Veea Edge Platform Manual

Contents

Contents 2

List of Figures 7

List of Tables 9

Preface 11

List of Abbreviations 12

1. About this Manual 14
   - 1.1. Overview 14
   - 1.2. Other Documentation 14
     - 1.2.1. Getting Started 14
     - 1.2.2. User Interfaces 15
     - 1.2.3. Partner Companies and Enterprise Users 15
     - 1.2.4. Developers for the Veea Edge Platform 15
     - 1.2.5. Other Information 15

2. Introduction to the Veea Edge Platform 15
   - 2.1. What is the Veea Edge Platform? 15
   - 2.2. Summary of Main Features 18
   - 2.3. Edge Management Interfaces 19
     - 2.3.1. Control Center (CC) 19
     - 2.3.2. Node Manager (NM) 19
     - 2.3.3. VeeaHub Manager (VHM) 19
   - 2.4. Connectivity 20
     - 2.4.1. Wi-Fi 20
     - 2.4.2. Ethernet 21
     - 2.4.3. LTE (4G Cellular) 21
     - 2.4.4. USB 21
     - 2.4.5. Bluetooth 22
     - 2.4.6. Zigbee 22
     - 2.4.7. LoRa 22
   - 2.5. Security 22
   - 2.6. Software Upgrades 23

3. Edge Management 23
   - 3.1. What is a Mesh? 23
   - 3.2. Procedure for Creating a Mesh 23
     - 3.2.1. Before You Start 23
     - 3.2.2. Activate the First VeeaHub 24
     - 3.2.3. Activate the other VeeaHubs 24
     - 3.2.4. Connect the VeeaHubs 24
     - 3.2.5. Configuring For Use 24
     - 3.2.6. Hub (Node) Configuration 25
     - 3.2.7. Mesh Configuration 26
     - 3.2.8. Mesh Wi-Fi Scan 27

4. LAN and WAN Interface Configuration 28
   - 4.1. Overview 28

4.2. LAN Configuration 28
4.2.1. Overview 28
4.2.2. LAN Configuration Process 29
4.2.3. Creating and Configuring the LAN 30
4.2.4. Limiting DHCP Ranges 31
4.2.5. DNS Nameservers 33
4.2.6. Reserved IP Addresses 33
4.2.7. LAN Static IP Address 33
4.3. WAN Interfaces 33
4.3.1. Overview 33
4.3.2. WAN Backhaul 34
4.3.3. WAN Interfaces 34
4.3.4. WAN Static IPs 34

5. Client Device Configuration 34
5.1. Overview 34
5.2. Access Control 35
5.3. Wireless Devices 35
5.3.1. Wi-Fi Radio 35
5.3.2. Wi-Fi Radio Scan 36
5.3.3. Wi-Fi Access Points (AP) 36
5.3.4. AP Security 37
5.3.5. Wi-Fi Security 37
5.4. LAN Ports 38
5.4.1. Port Configuration 38
5.4.2. Mesh Ports 39
5.4.3. VHC05 Ports 39
5.4.4. VHE09/VHE10 Ports 39
5.4.5. Example uses of Physical Ports Configuration 40

6. Logging and Analytics 40
6.1. Basic Features 40
6.2. Subscription Services 41

7. Firewall and Port Forwarding 41

8. Applications and Services for the Veea Edge Platform 42
8.1. Subscriptions 42
8.2. Developing Applications for the Veea Edge Platform 42

9. Backup and Recovery 43
9.1. Power and Recovery Options 43

10. User and Group Management 44
10.1. Users and Groups 44
10.2. Managing Your Own Account 44

11. Control Center - Managing and Monitoring Meshes and VeeaHubs 45
11.1. Logging In 45
11.2. Home Screen 46
11.2.1. Monitoring 48
11.2.2. Profile Link 49
11.2.3. Notifications 50

11.3. Managing VeeaHubs 51
11.3.1. VeeaHubs Detailed Information 52
11.3.2. Node Manager App 54
11.3.3. Unenroll a VeeaHub 54
11.3.4. Power Options 54
11.4. Managing Meshes 55
11.4.1. Mesh Detailed Information Page 56
11.4.2. Software Updates 60
11.4.3. Subscriptions 64
11.5. Managing Subscriptions 65
11.5.1. Active Subscriptions 65
11.5.2. Payment Methods 66
11.5.3. Software Updates 68
11.6. Managing Locations 71
11.6.1. Add a Location 72
11.6.2. Add a Mesh to a Location 76
11.6.3. Add a VeeaHub to a Location 77
11.6.4. Delete a Map Location 79
11.6.5. Remove a Mesh from a Location 79
11.6.6. Remove a VeeaHub from a Location 80
11.6.7. Edit a Map Name 80
11.6.8. Edit a Map Location 81
11.7. Managing Tasks 84
11.7.1. Active Tasks 84
11.7.2. Tasks History 86
11.8. vTPN 88
11.9. Settings Screen 88
11.9.1. Change Password 89
11.9.2. View Sessions 89
11.9.3. Received Invites Management 90
11.9.4. Group Management 90
11.9.5. Notifications Configuration Management 96
11.10. No VeeaHubs Registered 97
11.11. Help Center 97

12. VeeaHub Manager 98
12.1. Introduction 98
12.2. Please Note 98
12.3. Getting Started 99
12.3.1. Starting VeeaHub Manager 99
12.4. Manage Screen 102
12.5. Adding VeeaHubs to Your Account 104
12.5.1. Adding the First VeeaHub and Creating a Mesh 104
12.5.2. Adding More VeeaHubs 104
12.5.3. Wired Mesh 104
12.5.4. Adding a VeeaHub to an Account Over 4G Cellular Connection 105
12.6. Selecting a VeeaHub to Configure 105
12.7. Guides Screen 106
12.8. My Account Screen 107
12.8.1. Delete Account 108
12.9. Groups 109
12.10. Manage Groups Screen 109

12.11. Software Update Visibility 111
12.12. Dashboard – VeeaHub Settings 112
12.13. Icons and Links 113
12.14. Common Controls 115
12.15. Wi-Fi Access Point Configuration (2.4GHz and 5GHz) 116
12.15.1. Wi-Fi Tab (2.4GHz and 5GHz) 116
12.15.2. Radio Tab (2.4GHz, and 5GHz) 119
12.15.3. Wi-Fi Security (2.4GHz, and 5GHz) 122
12.16. LAN 126
12.16.1. Configuration 127
12.16.2. DHCP Settings 128
12.16.3. Reserved IP Addresses 130
12.17. WAN Gateway 133
12.17.1. WAN Configuration 133
12.17.2. WAN Interfaces 135
12.17.3. WAN Reserved IPs Tab 137
12.18. vMesh Configuration 138
12.18.1. vMesh Configuration Screen 138
12.18.2. vMesh Configuration: Scan 141
12.19. Physical Port Configuration 143
12.20. IP Address 148
12.21. Cellular Information 150
12.22. Data Usage 151
12.23. Router Access Mode and Control 152
12.24. Firewall Configuration 154
12.24.1. Creating a New Rule 155
12.24.2. Creating a New Accept/Drop Rule 155
12.24.3. Creating a New Firewall Forward Rule 156
12.24.4. Deleting a Firewall Rule 156
12.25. Subscriptions 157
12.26. Bluetooth Beacon Configuration 157
12.27. About VeeaHub 158
12.28. Shutdown, Restart or Recover 160
12.29. Removing a VeeaHub from your Account 162

13. Guide to Integrated Node Manager 163
13.1. Introduction 163
13.1.1. Opening Integrated Node Manager 163
13.2. Restricted Backhaul Mode 167
13.3. Other – About VeeaHub 167
13.4. Other - Beacon Configuration 168
13.5. Other - Cellular 168
13.6. Network Configuration 168
13.6.1. Networking – Local Area Network 168
13.6.2. IP Configuration 169
13.6.3. Wireless Configuration 169
13.6.4. Network Configuration: Scan 172
13.7. WAN Configuration 172
13.7.1. WAN Configuration Tab 172
13.7.2. WAN Interfaces Tab 173
13.7.3. WAN Static IP Tab 174
13.8. LAN Configuration 174

13.8.1. LAN Configuration 174
13.8.2. LAN DHCP Configuration 175
13.8.3. LAN Reserved IP 175
13.9. Wireless Access Point Configuration (2.4GHz and 5GHz) 176
13.9.1. Access Point Configuration (2.4GHz and 5GHz): SSIDs 176
13.9.2. Access Point Security Configuration (2.4GHz, and 5GHz) 177
13.9.3. Access Point Configuration (2.4GHz and 5GHz): Radio 179
13.9.4. Access Point Configuration (2.4 GHz and 5 GHz): Scan 180
13.10. Physical Port Configuration 181
13.11. Firewall Configuration 183
13.11.1. Adding an ACCEPT or DROP Rule 183
13.11.2. Adding a FORWARD Rule 183

14. LAN Configuration Use Cases 184
14.1. Overview 184
14.2. LAN Connections 184
14.3. LAN Configuration Option: NAT (Routed) to WAN 185
14.4. LAN Configuration Option: Bridged to WAN 186
14.5. Additional Services and VLANs 187
14.6. Guest Wi-Fi Access example 188
14.6.1. Overview 188
14.6.2. WAN Interface 188
14.6.3. LAN Configuration 188
14.6.4. DHCP Configuration 189
14.6.5. Static IP 189
14.6.6. Wireless Access Points 189
14.6.7. Physical Ports 189
14.7. Applying the Configuration 190
14.8. Finalizing and Testing a Configuration 190

15. Troubleshooting 190
15.1. Failed Adding the VeeaHub 190
15.2. Difficulty Connecting to Your VeeaHub Using VeeaHub Manager 191
15.3. DHCP Conflict 192
15.4. Configuration of VHE09 as MEN in Mixed 09/10 Configurations 192
15.4.1. NM Auto Channel Whitelist Configuration 193
15.4.2. VHM App Auto Channel Whitelist Configuration 194

16. Technical Support 196

Appendix A VeeaHub Technical Capabilities Overview 197

Appendix B Wi-Fi Capabilities of Different VeeaHub Models 198
B.1 VHC05 198
B.2 VHE09 198
B.3 VHE10/VHH10 199

Appendix C LAN Configuration 200
C.1 Default Configuration 200
C.2 IP Conflict Resolution 201

Appendix D Network Deployment Wi-Fi Management Connection Uncertainty After Power-up 202
D.1 Case A Scenario 202

List of Figures

Figure 1: The Veea Edge Platform 16
Figure 2: Veea Edge Connectivity 17
Figure 3: Veea Edge Application Integrations 18
Figure 4: VHC05 Connections 39
Figure 5: VHC09/10 Connections 40
Figure 6: Control Center – Login Dialog 46
Figure 7: Home Screen 47
Figure 8: VeeaHub and Mesh Monitoring 49
Figure 9: Profile Drop-down 50
Figure 10: Notifications 50
Figure 11: VeeaHubs Screen 51
Figure 12: VeeaHubs Details Page (Example) 52
Figure 13: Unenroll (4G Example Subscription) 54
Figure 14: VeeaHubs Page – Power Options 55
Figure 15: Meshes Screen 56
Figure 16: Meshes Details Page – Collapsed View 57
Figure 17: Meshes Details Page – Expanded View (Part A) 57
Figure 18: Meshes Details Page – Expanded View (Part B) 58
Figure 19: Software Updates (Example) 61
Figure 20: Scheduling Options - Apply Changes Immediately 61
Figure 21: Scheduling Options - Schedule Changes for a Later Time 61
Figure 22: Schedule a Date and Time 62
Figure 23: Software Update Started 62
Figure 24: Software Update is Scheduled 62
Figure 25: Update Thank You 63
Figure 26: Software Updates Progress 64
Figure 27: Select a Subscription (Example) 64
Figure 28: Subscription Removal (Example) 65
Figure 29: Unsubscribe from a Subscription (Example) 65
Figure 30: Subscriptions – Active Subscriptions 66
Figure 31: Subscriptions – Payment Methods 66
Figure 32: Subscriptions – Payment Card Details 67
Figure 33: Subscriptions – Software Updates 68
Figure 34: Locations Screen 72
Figure 35: New Location Screen 74
Figure 36: Location Record (Example) 74
Figure 37: Single Location Zoomed In – Red Dot Pinned Icon 75
Figure 38: Multiple Locations Zoomed Out - Group Icon 75
Figure 39: Locations Detail Add Nodes Button 77
Figure 40: Add Meshes Selection (Example) 77
Figure 41: Locations Details - Add Nodes Button 78
Figure 42: Add Nodes VeeaHub Selection (Example) 78
Figure 43: Delete Location Button 79

Figure 44: Delete Location Button 79
Figure 45: Edit Location Details 80
Figure 46: Edit Map Location Name 80
Figure 47: Edit Map Location (Manual Address Entry) 81
Figure 48: Edit Map Location (Set Pin Button) 82
Figure 49: Edit Map Location (Automatic Coordinate Entry) 82
Figure 50: Edit Map Location (Update Address Dialog) 83
Figure 51: Edit Map Location (Manual Coordinate Entry) 83
Figure 52: Active Tasks Screen 84
Figure 53: Active Tasks Details Screen 85
Figure 54: Active Tasks Schedule Calendar 86
Figure 55: Scheduled Task Cancelled Confirmation Dialog 86
Figure 56: Tasks History Screen 87
Figure 57: Completed Task Summary Details 87
Figure 58: Settings Screen 89
Figure 59: Settings Screen – Change Password 89
Figure 60: Settings Screen – View Sessions 90
Figure 61: Screen Settings – Invites 90
Figure 62: Settings Screen – Groups 91
Figure 63: Settings Screen – Group Info Page 92
Figure 64: Settings Screen – Group Users Page 95
Figure 65: Settings Screen - Notifications 97
Figure 66: Control Center Account – No Registered VeeaHubs 97
Figure 67: Help – Veea Support Center 98
Figure 68: VeeaHub Manager App Icon – With and Without Notifications 99
Figure 69: VeeaHub Manager License Screen 100
Figure 70: Selecting your Organization 100
Figure 71: Adding Organization 101
Figure 72: Login 101
Figure 73: Manage Button 102
Figure 74: Manage (Meshes) Screen 103
Figure 75: Selecting a VeeaHub 105
Figure 76: Connecting to VeeaHub 106
Figure 77: Guides Screen 106
Figure 78: My Account Screen 107
Figure 79: Delete Account Screen 108
Figure 80: Delete Account Confirmation Message 108
Figure 81: Manage Groups Screen (Example) 109
Figure 82: Selecting a Mesh (Example) 110
Figure 83: Connecting to VeeaHub 110
Figure 84: Connecting to VeeaHub 111
Figure 85: VHM VeeaHub Software Update Visibility 112
Figure 86: Dashboard (Example with 4G Backhaul) 113
Figure 87: Wi-Fi Configuration (Example) 117
Figure 88: Wi-Fi Access Point: Radio (2.4GHz and 5GHz) 120
Figure 89: PSK Configuration 123
Figure 90: Enterprise Security Configuration 125
Figure 91: LAN configuration 127

Figure 92 - DHCP Configuration 129
Figure 93: Reserved IP Addresses 130
Figure 94: Add New Reserved IP Address 131
Figure 95: Reserved IP Address Configured 132
Figure 96: WAN Configuration 134
Figure 97: WAN Interfaces 136
Figure 98: WAN Reserved IPs 137
Figure 99: vMesh Configuration 139
Figure 100: Network Configuration: Scan 142
Figure 101: Physical Ports Configuration 144
Figure 102: IP Address 149
Figure 103: Cellular Information 150
Figure 104: Data Usage (Example) 152
Figure 105: Router Configuration 153
Figure 106: Firewall Configuration 154
Figure 107: New Accept or Drop Rule 155
Figure 108: New Forward Rule 156
Figure 109: Subscriptions (Example) 157
Figure 110: Beacon Configuration 158
Figure 111: VeeaHub Configuration 159
Figure 112: Power / Reboot 160
Figure 113: Recovery and Reinstall 161
Figure 143: LAN 185
Figure 144: NAT (Routed) LAN 186
Figure 145: Bridged LAN 187
Figure 146: Example Error Screen 191
Figure 147: vMesh Screen (All Available Channels Whitelisted) 193
Figure 148: vMesh Screen (Channels 100 Plus Deselected from Whitelist) 194
Figure 149: vMesh Screen (Channels Below 100 Whitelisted) 194
Figure 150: vMesh Screen (Example) 195
Figure 151: vMesh Auto Channel Whitelist (Example Popup Box Screen) 196
Figure 152: Veea Network Deployment Case A Event Example 203

List of Tables

Table 1: VeeaHub Model Ethernet Ports 21
Table 2: Hub (Node) Configuration 25
Table 3: Mesh Configuration 26
Table 4: Mesh Wi-Fi Scan 28
Table 5: Wireless Device Configuration 35
Table 6: Logging and Analytics 40
Table 7: Power and Recovery Options 43
Table 8: Home Screen Features 47
Table 9: VeeaHub and Mesh Monitoring Color Code 49
Table 10: VeeaHubs Screen Details 51
Table 11: VeeaHubs Screen - Details 53
Table 12: Meshes Screen - Description 56
Table 13: Meshes Screen – Details 58

Table 14: Active Subscriptions – Details....66
Table 15: Payment Methods Description....67
Table 16: Add Card Details....67
Table 17: Subscriptions – Software Updates Details....68
Table 18: Locations Screen Description....72
Table 19: Tasks Details....84
Table 20: Tasks History Screen Details....87
Table 21: Completed Tasks Summary Detail Descriptions....88
Table 22: Groups Screen – Details....91
Table 23: Settings Screen – Group Info Page Details....92
Table 24: Group Users Page Details....95
Table 25: Icon Colors....113
Table 26: Dashboard Links....114
Table 27: Common Controls....115
Table 28: Wi-Fi Configuration (2.4GHz, and 5GHz)....117
Table 29: Access Point Status Information....118
Table 30: Wi-Fi Radio Configuration (2.4GHz, and 5GHz)....120
Table 31: PSK Configuration Options....124
Table 32: Enterprise Security Configuration Options....125
Table 33: LAN Configuration....127
Table 34: DHCP Configuration....129
Table 35: Reserved IPs Configuration....131
Table 36: WAN Configuration....134
Table 37: WAN Interfaces Configuration....136
Table 38: WAN Reserved IPs Configuration....138
Table 39: vMesh Configuration....140
Table 40: vMesh Configuration: Scan Tab....143
Table 41: Physical Ports Configuration (VHM)....145
Table 42: Port Status Messages (VHM)....147
Table 43: Port Reason Messages....148
Table 44: IP Configuration....149
Table 45: Cellular Information....151
Table 46: Router Configuration....153
Table 47: Accept and Drop Rules Configuration....155
Table 48: Forward Rules Configuration....156
Table 49: Beacon Configuration....158
Table 50: VeeaHub Configuration....159
Table 75: Example Case A Wi-Fi Mesh Optimization Settings....203

Preface

Information in this document is provided solely in connection with Veea Inc. and its affiliates (collectively "Veea") products. Veea reserves the right to make changes, corrections, modifications or improvements, to this document, and the products and services described herein at any time, without notice.

Use of Veea products and services is subject to the terms of use and/or separate agreements and warranties applicable to those products and services. Please visit www.veea.com/legal for these terms.

Evaluators are solely responsible for the choice, selection and use of the Veea products and services described herein, and Veea assumes no liability whatsoever relating to the choice, selection or use of the Veea products and services described herein.

Trademark Credits

Veea and all Veea-related trademarks are owned by Veea Inc.

All other trademarks and tradenames are the property of their respective owners.

Copyright Information and Restrictions

Document Feedback

Veea welcomes your suggestions for improving our documentation. If you have comments, send your feedback to: support@veeahub.com

Document History

Issue	Issue Date	Approved	Author	Description
1.0	31 March 2022		RJ	Revised edition.
DRAFT 1.1			RJ	Milestone 26 and 27 changes, Control Center, and VHM screens.
DRAFT 1.2	20 Oct 2022		RJ	Milestone 28 changes.

List of Abbreviations

The following abbreviations are used in this Manual and in Veea Edge Platform user interfaces.

Abbreviation	Meaning
802.11	IEEE 802.11 set of wireless LAN technical standards
ACS	Automatic Channel Selection
AP	Access Point (Wireless)
APN	Access Point Name
BLE	Bluetooth Low Energy
BSS	Basic Service Sets
BT	Bluetooth®
CC	Control Center
CIDR	Classless Inter-Domain Routing: format for IP address ranges
CSV	Comma Separated Variable
DFS	Dynamic Frequency Selection
DHCP	Dynamic Host Configuration Protocol
DNS	Domain Name System
EARFCN	E-UTRA Absolute Radio Frequency Channel Number
ICCID	Integrated Circuit Card ID
IMEI	International Mobile Equipment Identity
IoT	Internet of Things
IP	Internet Protocol
ISP	Internet Service Provider
LAN	Local Area Network
LoRa	Long Range: low-power wide-area network modulation technique
LTE	Long-Term Evolution, a telephone and mobile broadband standard
MCC	Mobile Country Code
MEN	Usually called the Gateway node, but in some user interface elements is MEN (Mesh Edge Node)
MN	A node in a VeeaHub network that is not the gateway (Mesh Node)
MNC	Mobile Network Code
NAT	Network Address Translation
NM	Node Manager
OSM	Open Street Maps
PLMN	Public Land Mobile Network
PoE	Power over Internet
PPPoE	Point-to-Point Protocol over Ethernet
PSK	Pre-Shared Key

Abbreviation	Meaning
RADIUS	Remote Authentication Dial-In User Service
RSRP	Reference Signal Received Power
RSRQ	Reference Signal Received Quality
RSSI	Received Signal Strength Indicator
SEN	Smart Edge Node, the device type that a VeeaHub represents
SINR	Signal to Interference Plus Noise Ratio
SOHO	Small Office/Home Office
SSD	Solid State Drive
SSH	Secure Socket Shell
SSID	Service Set Identifier
TCP	Transmission Control Protocol
UDP	User Datagram Protocol
URL	Uniform Resource Locator
USB	Universal Serial Bus
UUID	Universal Unique Identifier
VEP	Veea Edge Platform
VHM	VeeaHub Manager app
VLAN	Virtual LAN
vTPN	veea Trusted Private Network Security Service
WAN	Wide Area Network
WLAN	Wireless LAN
WPA	Wi-Fi Protected Access
WPA2, WPA3	Versions of Wi-Fi Protected Access (W-Fi security)

1. About this Manual

1.1. Overview

This document is designed for customers, administrators, and the developer community. It is a comprehensive manual to the Veea Edge Platform (**VEP**), based on the VeeaHub series of smart edge nodes and the Veea cloud.

Each topic is covered in the sections listed as follows:

- Introduction to the Veea Edge Platform - Refer to Section 2
- Setting up and managing your VeeaHub network - Refer to Section 3
- Configuring your VeeaHub network - Refer to Section 4
- Configuring devices connected to your VeeaHub network - Refer to Section 5
- Logging and analytics features on the Veea Edge Platform - Refer to Section 6
- Firewall and port forwarding on the VeeaHub network - Refer to Section 7
- Using applications and services on the Veea Edge Platform - Refer to Section 8
- Backup and recovery options for the VeeaHub network - Refer to Section 9
- Management of users and groups of VeeaHub networks - Refer to Section 10
- Cloud management and monitoring of VeeaHub meshes using Control Center (**CC**) - Refer to Section 11
- Using the VeeaHub Manager mobile app - Refer to Section 12
- Using Node Manager - Refer to Section 13
- How to configure your VeeaHub network for specific uses - Refer to Section 14
- Troubleshooting - Refer to Section 15
- How to get technical support - Refer to Section 16.

Reference information is shown in **Appendix A**, **Appendix B**, **Appendix C** and **Appendix D**.

We welcome feedback on the usefulness of this document. Please let us know of any suggestions or corrections through Veea Support Center.

1.2. Other Documentation

Other available documentation is listed here. Please refer to this section for links to each document.

1.2.1. Getting Started

If you have purchased a VeeaHub and are installing it, you should consult the Quick Start Guide for the specific model. These can be found in the Support Center in the Getting Started section:

- *https://go.veea.com/getstarted*

If you have purchased a package, such as vTPN Security Service, please consult the documentation that is provided as part of the contract for the package.

If you are using a VeeaHub mesh to control Internet of Things (**IoT**) devices, the Veea IoT Device Manager is described here for control of Bluetooth®, Zigbee, and LoRa devices:

- *https://go.veea.com/getstarted/iot*

1.2.2. User Interfaces

There is detailed documentation for the Veea Edge Platform user interfaces, used for control, monitor, and configuration of VeeaHub meshes:

- Control Center (refer to Section 2.3.1):
  - Control Center User Guide:
    - *https://go.veea.com/getstarted/cc*
- VeeaHub Manager (refer to Section 12)
- Node Manager (refer to Section 13).

1.2.3. Partner Companies and Enterprise Users

For an overview of the Veea Edge Platform architecture, see the System Overview document:

- *https://go.veea.com/getstarted/so*

1.2.4. Developers for the Veea Edge Platform

If you wish to develop applications for the platform, registration and detailed documentation are available at the Veea Developer Center:

- *https://developer.veea.com/*

1.2.5. Other Information

Other information including FAQs, troubleshooting information and application notes are available at the Veea Support Center:

- *https://go.veea.com/support*

You can raise support tickets through the Support Center.

2. Introduction to the Veea Edge Platform

2.1. What is the Veea Edge Platform?

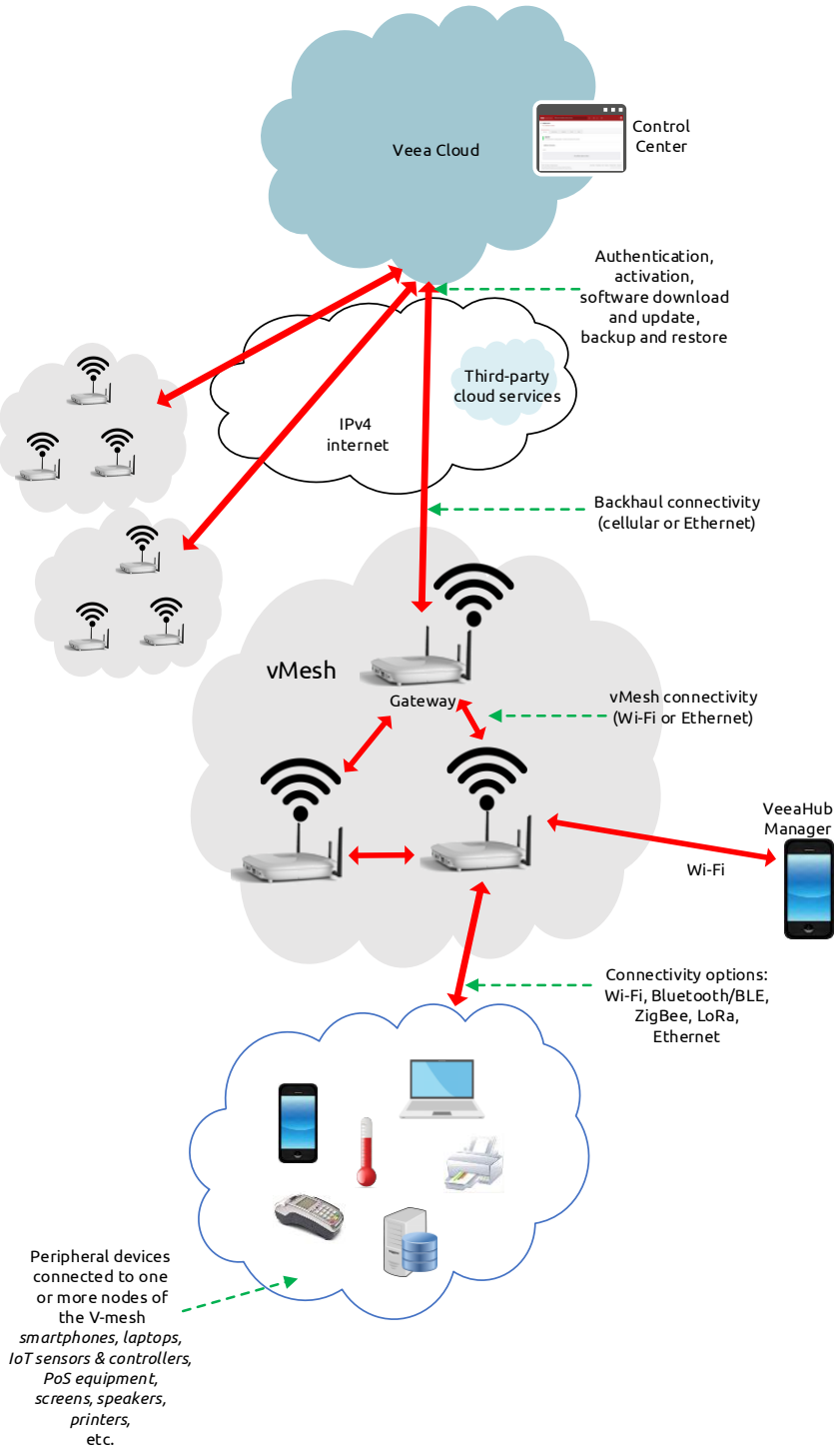
The Veea Edge Platform (**Figure 1**) combines hardware, software, and tools to enable you to build highly versatile, flexible, easily deployed and managed connectivity and computation capabilities at the edge of your network, where people and their devices connect. This edge computing approach:

- Provides faster application response
- Can reduce storage and bandwidth requirements
- Offers greater data security by localizing collected data
- Creates the opportunity for autonomous operations, supporting cloud-free and hybrid cloud/edge system architectures.

Unlike a variety of other edge computing system architectures that deploy micro-datacenters (a collection of rack-mounted servers in a cabinet), Veea has a highly scalable, easily deployed and scaled architecture for edge computing using wireless mesh technologies and a high level of integration.

A key element of this architecture is the VeeaHub Smart Edge Node (**SEN**). VeeaHubs combine quad-core compute resources, multiple wireless and wired connectivity options, and storage, all secured by a chain of trust that starts with the hardware and runs only signed software.

Figure 1: The Veea Edge Platform

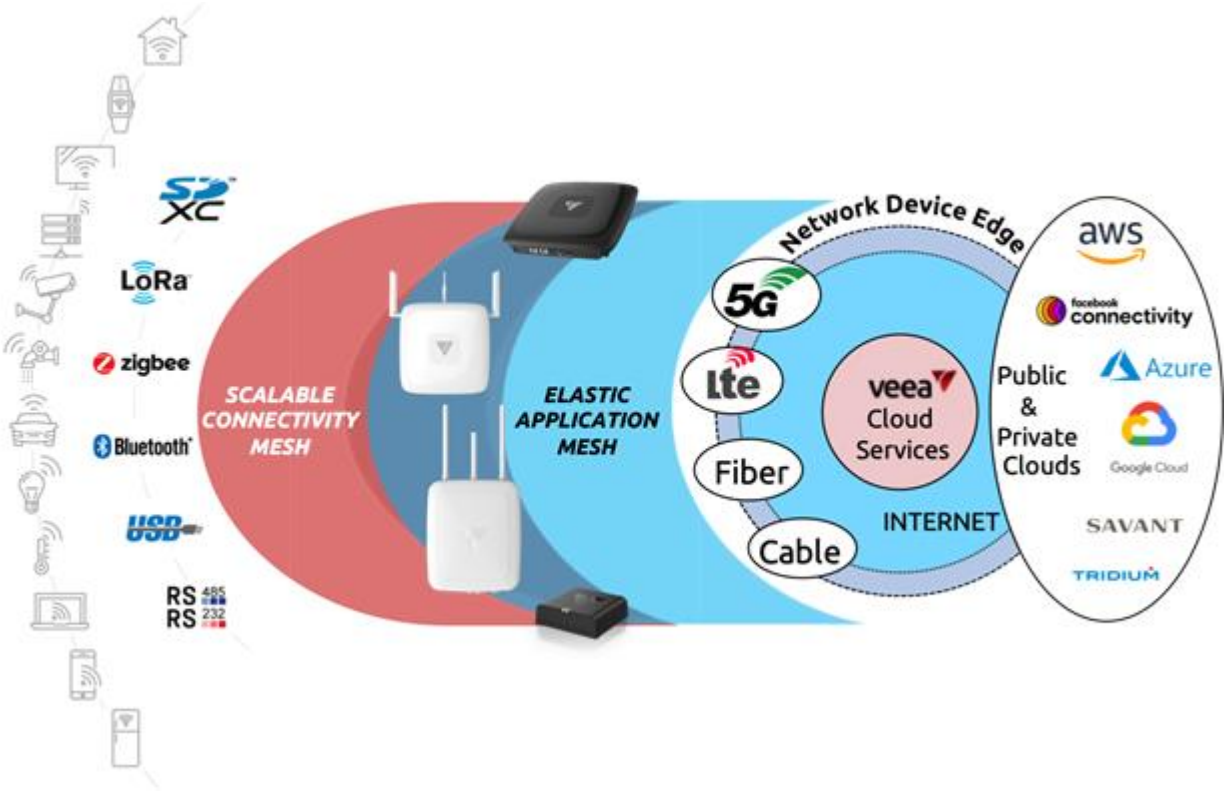


The platform software running on VeeaHubs is built on Linux. Multiple applications, both those supplied by Veea and those developed by others, can run simultaneously in Secure Docker containers designed to comply with the chain of trust.

VeeaHubs are deployed in locations where wireless routers and access points are typically located, as they have a small footprint, operate on commercial power, and do not require active cooling. Multiple VeeaHub types are available for indoor, outdoor, Small Office Home Office (**SOHO**) and Enterprise applications. An overview of the capabilities of the different models is provided in **Appendix A, Appendix B** and **Appendix C**.

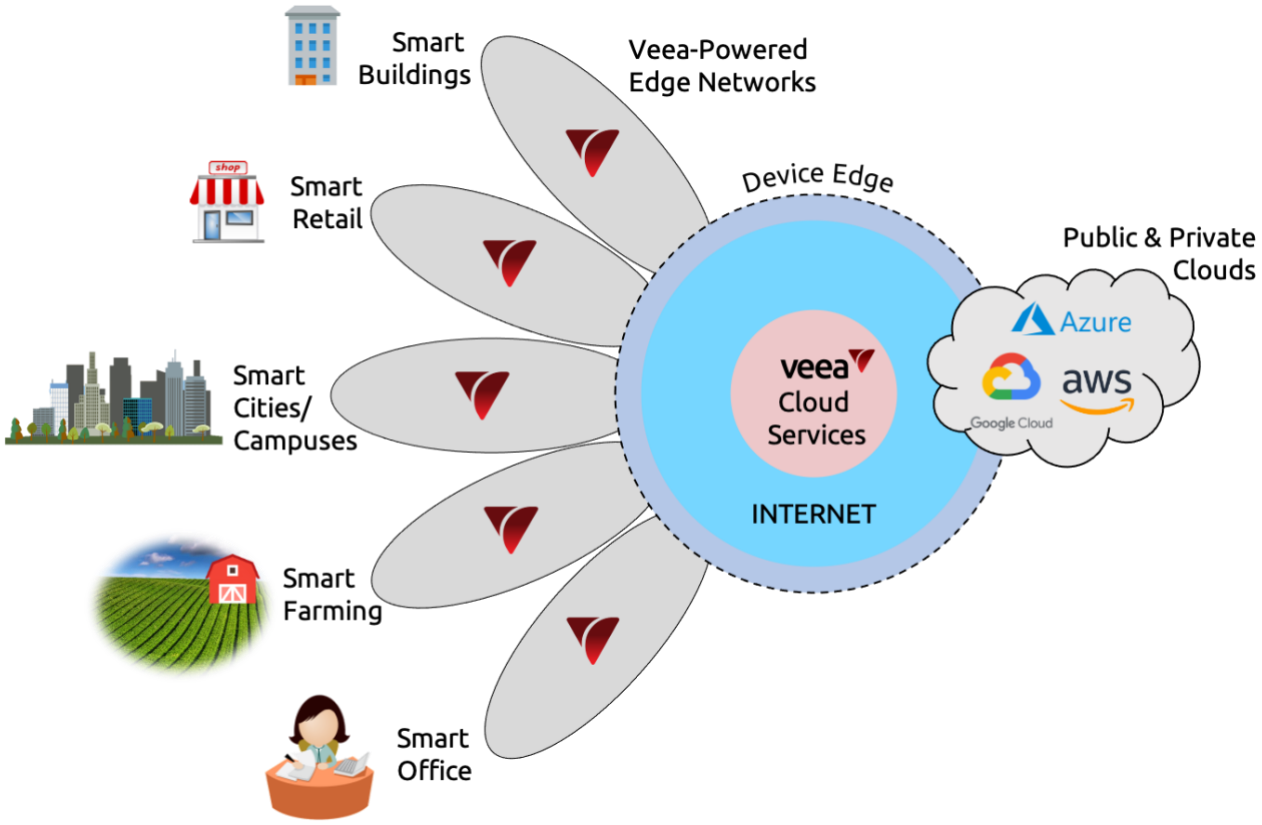
A single VeeaHub offers a great deal of capability and is a key building block of the Veea Edge Platform. Perhaps the greatest advantage of the Veea Edge Platform is the ability to connect many VeeaHubs together, using a combination of Wi-Fi and Ethernet, to form a local mesh running multiple Local Area Networks (**LANs**). Within this mesh, an application running on any VeeaHub has access and control of IoT devices connected to any other VeeaHub on the mesh, as can be seen in **Figure 2**.

Figure 2: Veea Edge Connectivity



Mesh-based edge networks can be used in a variety of vertical applications and can be used to build extensive system solutions that integrate cloud-based and edge-based elements, as shown in **Figure 3**.

Figure 3: Veea Edge Application Integrations



Veea's proprietary vMesh technology is used to create the self-organizing, resilient, route-optimized hybrid wired/wireless network over which data is communicated between individual VeeaHubs (the nodes of the network). Veea's vBus technology is the abstraction layer that allows applications running anywhere on the mesh to work with IoT devices and storage anywhere on the mesh.

Veea offers a variety of Edge Platform management tools, to simplify the task of configuring, deploying, managing, and maintaining Veea Edge Platform networks. Tools include:

- Veea Control Center, a cloud-based application which can be accessed through most internet browsers.
- VeeaHub Manager (**VHM**) app which can be downloaded to your Android or iOS mobile device. In normal use, it provides connection to your VeeaHubs and Meshes through the cloud but in the event of an internet failure, allows you to connect to your hubs by local Wi-Fi.
- For developers, the VeeaHub Tools (**VHT**) provides an environment for building a wide variety of applications that can leverage the power of the Veea Edge Platform.

2.2. Summary of Main Features

Some features vary between the models.

The VeeaHub offers most of the main features of a home or business router, including LAN subnet configuration, Network Address Translation (**NAT**), firewall, Dynamic Host Configuration Protocol (**DHCP**), reserved Internet Protocol (**IP**) addresses, wireless access points with WPA2 and WPA3, and Ethernet ports.

Wi-Fi, Ethernet, Bluetooth®, and Zigbee radio connectivity is standard. Co-existence arbitration exists between Wi-Fi, Bluetooth and Zigbee (not on VHC05).

Cellular 4G Wide Area Network (**WAN**) backhaul and LoRaWAN gateway are options.

VeeaHub networks automatically form a mesh using vMesh technology and automatically adapt when a VeeaHub is removed from the mesh. Large meshes can be created to cover large areas.

Veea offers a range of services, by free or paid subscription in the Control Center.

Applications can be easily developed by partner companies and offered for distribution through the Veea Control Center.

Configuration of the VeeaHubs and mesh can be carried out through the online Node Manager and the VeeaHub Manager app for Apple and Android mobile devices.

Backup, restore, and update of the VeeaHub software are carried out through the Veea Cloud.

Event logging and analytical metrics are available on Control Center (refer to Section 11 – Control Center – Managing and Monitoring Meshes). Analytical metrics leverage Grafana dashboard to provide graphical display of CPU and Wi-Fi data metrics.

2.3. Edge Management Interfaces

Veea's operational software is built for ease of configuration and use, and the complexities of configuring VeeaHubs in an edge mesh are handled through Veea's User Interface (**UI**)-based tools. A Command Line Interface (**CLI**) is not supported.

2.3.1. Control Center (CC)

With your enrollment account, Control Center provides portal access to the VeeaHubs and meshes that you have control over. It provides the ability to monitor meshes and devices, download paid or free application subscription packages, and monitor events.

A VeeaHub appears in Control Center once it has been added to the user's account. Node Manager, displayed in Control Center, offers node and mesh configuration options.

If the user has installed packages that have their own monitoring or configuration requirements, these appear in the Control Center interface.

Access to Control Center depends on the contract under which you are using the VeeaHub mesh, and you may be provided with a Control Center Uniform Resource Locator (**URL**) that is unique to your organization.

2.3.2. Node Manager (NM)

Node Manager (**NM**) is a tool in the Veea Cloud for monitoring and configuring VeeaHubs and meshes.

Node Manager can be opened from a link in Control Center. Refer to the Node Manager (Section 13) for details.

2.3.3. VeeaHub Manager (VHM)

VeeaHub Manager is a tool for monitoring and configuring VeeaHubs and meshes. It is available as an app from the Apple Store for iPhones and iPads, and from the Google Play Store for Android devices.

It is also used to add a new VeeaHub to the Veea Cloud and to the Veea user's account. If the user does not already have an account, a new one can be created at the time of activating the first VeeaHub on the Cloud. All users need to use VeeaHub Manager, and it also enables setting up of user-configurable options on a VeeaHub or its mesh at any time.

Refer to VeeaHub Manager (Section 12) for the functionality of VeeaHub Manager in detail.

Note.

The iOS app is designed for iPhones. It will run on iPad and on devices with M1 processors, but this is not fully supported.

2.4. Connectivity

This section summarizes the connectivity capabilities on the Veea Edge Platform. Not all VeeaHub models have all options or combinations of options.

The range of connectivity options makes the Veea Edge Platform an attractive and flexible platform for development of applications, especially in the field of IoT devices, and for business-related services delivered on-site.

2.4.1. Wi-Fi

The Wi-Fi radios on VeeaHubs are used for two purposes:

- To establish the wireless mesh between VeeaHubs in a network.
- To offer Access Points (**APs**) that enable wireless devices such as phones, laptops, and tablets to connect to the LAN on a VeeaHub network.

The different VeeaHub models have different Wi-Fi capabilities:

- **VHC05** has a 2.4GHz radio for APs and a 5GHz radio that is dedicated to the mesh. If the wireless mesh is disabled, this radio becomes available for 5GHz APs.
- **VHE09** and **VHH09** have a 2.4GHz radio for APs and a 5GHz radio that is time-sliced between mesh and AP use. This means that the Wi-Fi radio options must be the same as for the mesh.
- **VHE10** and **VHH10** have a 2.4GHz radio and two 5GHz radios, one for the mesh and one for APs. The two 5GHz radios have filters to operate in different 5GHz channels and avoid self-interference.

For more information, refer to **Appendix B**.

2.4.2. Ethernet

The different VeeaHub models have Ethernet connections as detailed in Table 1 below.

Table 1: VeeaHub Model Ethernet Ports

VeeaHub Model	Port Type	Speed	PoE Support?
VHE09 VHE10	Ethernet Port 1	1 Gbps	Yes
	Ethernet Port 2	5 Gbps	No
	USB 3.0 Port 1 (Ethernet Port 3 with suitable USB-Ethernet adaptor(i))	USB 3.0	
	USB 3.0 Port 2 (Ethernet Port 4 with suitable USB-Ethernet adaptor(i))	-	
	USB 3.0 Port 3 (USB Only)	-	
VHH09 VHH10	Ethernet Port 1	1 Gbps	Yes
	Ethernet Port 2	5 Gbps	No
VHC05	Ethernet Port 1	100 Mbps	No
	USB 2.0 Port 1 (Ethernet Port 2 with suitable USB-Ethernet adaptor(i))	-	
	USB 2.0 Port 1 (Ethernet Port 3 with suitable USB-Ethernet adaptor(i))	-	

Note.

(i)Veea has approved certain USB Ethernet adaptors that have been tested but cannot guarantee that other adaptors will be suitable. For the current list, see the FAQ section on the Veea Support Center (refer to Section 1.2 for the link).

VeeaHub meshes can consist of wireless vMesh links, cabled links, or a combination of the two.

2.4.3. LTE (4G Cellular)

Models that have a number with the suffix L come supplied with a Long-Term Evolution (**LTE**) module and SIM card. This can be used with Veea's cellular options under the name of Wireless WAN. This includes Internet access over cellular, veea Trusted Private Network (**vTPN**) Security Service, and failover to cellular when the wired Internet service fails (Wireless WAN Backup).

Different countries are supported by different modules. The correct VeeaHub type must be ordered.

Subscriptions to 4G services are available in Control Center.

2.4.4. USB

As well as additional Ethernet adapters as described above under Ethernet, USB storage devices including flash drives, SSDs, and low-power hard drives are supported.

USB can be used for upgrades and recovery in instances when a unit is without other connectivity, and for extracting diagnostic data. These operations are used under the instructions of Veea Support.

2.4.5. Bluetooth

Bluetooth® and Bluetooth LE applications can be developed with Veea's vBus IoT package and controlled using IoT Device Manager. All VeeaHub models have Bluetooth built in.

Documentation of IoT Device Manager can be found on the Veea Support Center (refer to Section 1.2 for the link).

2.4.6. Zigbee

Zigbee applications can be developed with Veea's vBus IoT package and controlled using IoT Manager. All VeeaHub models have Zigbee built in.

Documentation of IoT Device Manager can be found on the Veea Support Center (refer to Section 1.2 for the link).

2.4.7. LoRa

LoRaWAN is available as an option with the VHE09 and the VHH10. LoRa applications can be developed with Veea's vBus IoT package and controlled using IoT Manager. The VHE09 can be combined with the LTE option.

Documentation of IoT Device Manager can be found on the Veea Support Center (refer to Section 1.2 for the link).

2.5. Security

The Veea Edge Platform is designed with security as a priority for users, services, and applications. Application privileges are securely managed. All configuration is done through the user interfaces that have been provided (refer to Section 2.3).

Available applications and services that are not part of the base software must be downloaded from Control Center. Some may have a subscription charge. Applications that are developed by Veea partners must be created through the official Developer program and are then made available through the Control Center. Applications are developed using VeeaHub Toolkit and they run in separate containers sandboxed from each other and from the platform software.

Access to specific VeeaHub features is controlled by a system of licenses that ensure that the applications have access only to the features they need. Developers must sign developed applications using their certificates before the application can be accepted on to the Veea platform for distribution.

The security design of the VeeaHub incrementally defends against an attacker. If an attacker can compromise a VeeaHub, the goal is to limit the compromise only to that unit, not to the mesh.

To protect a VeeaHub against attack, the following procedures are implemented:

- **Hardware root of trust**: The bootloader is authenticated by a key programmed into the hardware fuses, so the unit will only run trusted bootloaders. The bootloader then checks the signature of the next part of the software, forming a chain of trust.
- **Authenticated system images**: The root file system is a signed image, so any attempt to tamper with it breaks the signature. The start-up software rejects any system that is not correctly signed.
- **Hardware key protection**: The device identity keys are protected by hardware, so they can only be used, not copied.
- **Hardware debug disabled**: Hardware debugging capabilities, such as JTAG, are disabled.

- **Logins**: All logins, even on the internal debug port, are disabled by default. Secure Socket Shell (**SSH**) logins can be added to (secure and isolated) third-party containers if required.
- **Firewall**: No unnecessary services are exposed to the network.

2.6. Software Upgrades

Software upgrades are offered from time to time for the platform software and applications. When an upgrade is available, it is displayed on the mesh Overview tab in Control Center. The user must accept the download for the installation to proceed.

3. Edge Management

3.1. What is a Mesh?

A mesh is a self-organizing network in which the data between individual VeeaHubs (nodes of the network) is automatically routed to take the optimal route between the nodes. Adding a new node is simple, as it automatically becomes part of the mesh, and there is no limit to the number of VeeaHubs you can add.

A mesh that has redundant paths between VeeaHubs has resilience and can reconfigure itself to handle the failure of a node where alternative paths through the remaining units in the mesh are possible. These paths can operate over wireless links, wired links, or a mixture of both. Veea's proprietary mesh technology is called vMesh.

The nodes in a mesh, by default, communicate via Wi-Fi radio on the 5GHz band, but they may also be connected by Ethernet cable. This enables a mesh to include nodes that are too far from other nodes in the mesh to communicate by radio. If desired, a mesh can be formed entirely over cabled links.

3.2. Procedure for Creating a Mesh

3.2.1. Before You Start

Plan your mesh before setting it up, especially if you have a number of VeeaHubs to be spatially located to give coverage across an area. Different purposes may be assigned to each VeeaHub in the mesh. After the mesh has been set up, you can configure nodes individually. For example, you can configure one VeeaHub in the mesh in a public area as a Guest Wi-Fi access point.

Note.

If you have different models of VeeaHubs in a single mesh, a VHC05 should not be the gateway hub.

For each model of VeeaHub that you intend to include in your mesh, read the appropriate Quick Start Guide, which you can find on the Veea Support Center.

If you have received your VeeaHub(s) as part of a package, such as vTPN Security Service, consult the documentation that was supplied with it.

3.2.2. Activate the First VeeaHub

When you create a new mesh, the first VeeaHub that you activate automatically becomes the gateway node (also called Mesh Edge Node, or MEN), which connects to your Internet service through the WAN, and manages the set-up of the rest of the network. The mesh is named at this step. You can accept the default name or specify a name of your choice.

Activation can be done either over an Ethernet connection to the WAN (Internet Service Provider (**ISP**) router or enterprise network with DHCP).

If the first VeeaHub is LTE-enabled, it can be activated over a cellular connection if it has been previously set up on Veea's systems.

To activate each VeeaHub, you must have the VeeaHub Manager app for Apple or Android mobile devices. You can download the app from the Apple Store or the Google Play Store. The VeeaHub Manager interface is described in Section 12.

To create a mesh, you need a Veea account, with a registered email address. If you do not have an account, you can create one as part of the activation process. You must also agree to the Veea terms and conditions.

Follow the instructions in VeeaHub Manager (refer to Section 12), and on the screen.

Note.

The VeeaHub default is set to use routers with DHCP. If you are using an ISP Point-to-Point Protocol over Ethernet (**PPPoE**) router without DHCP, change the **Access Mode** option from Dynamic to PPPoE on the Router Access Mode & Control screen.

3.2.3. Activate the other VeeaHubs

To join other VeeaHubs to the mesh, they can be activated in the same way as the gateway VeeaHub.

Another hub can be activated if it is in wireless range of another hub already operational on the mesh or connected to an Ethernet LAN port on another hub already operational on the mesh.

It is important to set the mesh name for each node the same as that you assigned when activating the gateway node, otherwise a new mesh will be formed.

3.2.4. Connect the VeeaHubs

As you add the VeeaHubs to the mesh, they are automatically connected by Wi-Fi, as long as they are within effective connection distance. They can also be connected by Ethernet cable, either over the whole mesh or selected links. The mesh automatically configures itself for the types of connections.

For further information about wired meshes, see the article '*Wired VeeaHub mesh: automatic configuration*' on the Veea Support Center at:

- *https://go.veea.com/getstarted*

3.2.5. Configuring For Use

Once the mesh has been established, you can manage it using VeeaHub Manager or Node Manager. You can also update the software and install services on the mesh from Control Center.

When the mesh is first created, it has the default configuration with one LAN and one WAN interface (refer to **Appendix C**). You can then configure it to your particular requirements. This may involve setting up multiple LANs and WAN interfaces, and additional wireless AP and Ethernet port configurations. Additional information can be found in the sections as follows:

- Information and configuration options for the VeeaHub – Refer to Section **3.2.6**
- Information and configuration options for the mesh – Refer to Section **3.2.7**
- Details of LAN and WAN configuration options – Refer to Section **4**
- Details of configuration options for connecting client devices – Refer to Section **5**
- Configurations for typical use cases – Refer to Section **14**.

3.2.6. Hub (Node) Configuration

You can view information about an individual VeeaHub in VeeaHub Manager or Node Manager and make certain changes there. Table 2 lists the items that you can view or configure, and where you can find the configuration option.

Table 2: Hub (Node) Configuration

Item	Description and Location
Node name	You can change the node name in VHM (About VeeaHub screen, Section **12.27**) or NM (Hub tab, Section Error! Reference source not found.).
Position	This is a free-text field that can be used to indicate where the unit is installed (for example, 'First floor' or 'Foyer') but can also provide other information, if required. Configure in VHM (About VeeaHub screen, Section **12.27**) or NM (Hub tab, Section Error! Reference source not found.).
Node Analytics	Switch node analytics on or off for this node. refer to Section **6**, **Logging and Analytics**. Configure on NM (Hub tab, Section Error! Reference source not found.).
Wi-Fi Analytics	Switch Wi-Fi analytics on or off for this node. refer to Section **6**, **Logging and Analytics**. Configure on NM (Hub tab, Section Error! Reference source not found.).
The items listed below give you information only about the selected VeeaHub.	
Node Type	MEN denotes the gateway VeeaHub, MN any other node. Displayed in VHM (About VeeaHub screen, Section **12.27**) or NM (Hub tab, Section Error! Reference source not found.).
Unit Serial number	Displayed in VHM (About VeeaHub screen, Section **12.27**) or NM (Hub tab, Section Error! Reference source not found.).
Software version	Displayed in VHM (About VeeaHub screen, Section **12.27**) or NM (Hub tab, Section Error! Reference source not found.).
Hardware version	Displayed in VHM (About VeeaHub screen, Section **12.27**) or NM (Hub tab, Section Error! Reference source not found.).
Hardware revision	Displayed in VHM (About VeeaHub screen, Section **12.27**) or NM (Hub tab, Section Error! Reference source not found.).
OS Version	Displayed in VHM (About VeeaHub screen, Section **12.27**) or NM (Hub tab, Section Error! Reference source not found.).
Restarted	Last time this VeeaHub was restarted. Displayed in VHM (About VeeaHub screen, Section **12.27**) or NM (Hub tab, Section Error! Reference source not found., and Time tab, Section Error! Reference source not found.).

Item	Description and Location
Restart reason	The reason why this VeeaHub was last restarted. Displayed in VHM (About VeeaHub screen, Section 12.27) or NM (Hub tab, Section Error! Reference source not found.).
Restart required	Displayed on VHM (About VeeaHub screen, Section 12.27). In NM, it is indicated by the icon on the Hub Configuration tab turning red. 
Hub Time	Displayed on VHM (About VeeaHub screen, Section 12.27) and in NM (Time tab, Section Error! Reference source not found.). Taken from NTP service.
Hub Location	Displayed on VHM (About VeeaHub screen, Section 12.27) and in NM (Time tab, Section Error! Reference source not found.). Taken from NTP service.

3.2.7. Mesh Configuration

vMesh is Veea's proprietary technology that enables the VeeaHubs in a network to work together. By default, the mesh is established over 5GHz Wi-Fi. It is possible to reconfigure VeeaHubs to connect over Ethernet. A VeeaHub mesh can consist of wireless links, wired links, or a combination.

The mesh name and default parameters are set up when the VeeaHub is added to the account. You can change the channel assignments and transmit power for improved operation in your particular circumstances (including location of units and usage of the mesh).

When Automatic Channel Selection (**ACS**) is on, the Wi-Fi channel used for the mesh is automatically chosen for you, based on various measurements of the quality of the signal. You can override this selection by choosing a single channel from those available, and you can also restrict the selection of channels that Auto Select uses.

Auto Select is not dynamic: once the channel has been selected, this applies until the VeeaHub is restarted, or a channel rescan is done. For more information about Auto Select and Dynamic Frequency Selection (**DFS**), see *Automatic Channel Selection and Dynamic Frequency Selection* article on the Veea Support Center at:

https://go.veea.com/support

Table 3 lists configuration options for the mesh, which are available through VeeaHub Manager (refer to Section 12) and Node Manager (refer to Section 13).

Table 3: Mesh Configuration

Item[(i)]	Description
Mesh Name	The name of the network is assigned when the first VeeaHub is added to the Veea account and used to create the mesh. The name can be changed on the gateway VeeaHub.
SSID	The SSID used for the network wireless mesh,1 to 32 characters.
Password	The password for the network WLAN. 8 to 63 characters (letters, digits or symbols).

Item[i]	Description
WLAN Enabled (Wired Hubs)	This option sets the VeeaHub to use Wi-Fi mesh and enabled by default. If you disable the wireless mesh, use Ethernet cable to wire the VeeaHub into the mesh using one of the Ethernet ports.
WLAN Operation (Local Hub)	Configures how the Veea hub connects to the Veea Wi-Fi network.
Channel	This enables selection of the Wi-Fi channel for the wireless mesh. The set of available channels is restricted, based on the configured VeeaHub location. By default, Auto Channel Selection is displayed. A number of criteria are used to choose the best channel at the time the mesh starts up, to minimize interference from other radio sources. If you prefer to override this because of local circumstances, choose the channel number from the list.
Channel in Use	The channel chosen by Auto Channel Selection, when selected. Information only.
Exclude DFS	This switch, when selected, prevents channels that are designated for Dynamic Frequency Selection being used for Auto Selection. If DFS channels are used, service interruption may happen if radar is detected, and the AP has to change to another channel. This interruption can be a minute long while the AP monitors the new channel if it is also a DFS channel. Therefore, use of DFS channels may not be suitable for all applications.
Auto Channel Whitelist	A dropdown that enables you to specify which channels will be used for Auto Channel Selection.
Wi-Fi Network Scan	When Auto Select is in operation, this displays the Scan screen.
Bandwidth	Select the bandwidth for the network LAN from a drop-down list. **Note**. 80MHz is not supported on the VHC05.
Bandwidth in Use	This shows the currently selected bandwidth. Information only.
Transmit Power (%)	Select the mesh transmit power (as a % of maximum). You may wish to reduce the power to avoid interference with other VeeaHub networks or other equipment in the vicinity.
Enable Beacon	Not available on a gateway node (MEN). This is used on a non-gateway node (MN) to create a new Wi-Fi mesh using the SSID above. This is OFF at all nodes.
Note. [i]All items in this table are on VHM (vMesh configuration screen, refer to Section 12.18) and NM (WLAN configuration tab under Network tab, refer to Section Error! Reference source not found.).	

3.2.8. Mesh Wi-Fi Scan

In both VeeaHub Manager and Node Manager, you can see a tab that shows the quality measurements for each channel on which the Auto Channel selection (refer to Section 3.2.7) is based. It also shows the date and time these measurements were made.

You can display these figures using the Wi-Fi Network Scan option on VHM (vMesh configuration screen, Section 12.18.1) or on the Scan tab under Network in NM (Section Error! Reference source not found.).

Note.

Although the scan is available on the VHC05 for the purpose of Auto Channel selection, the figures are not displayed on this model.

The measurements are listed in Table 4 below.

Table 4: Mesh Wi-Fi Scan

Item	Description
Channel	The channel number.
Rank	A number calculated from the measurements. The highest-ranking channel is auto selected.
#BSS	The number of Basic Service Sets (**BSS**) detected on this channel.
Minimum/Maximum RSSI for BSS	The minimum and maximum Received Signal Strength Indicator for the BSSs on this channel.
Noise Floor / dBm	The noise floor on this channel.
Load	A measure of the time the channel is occupied.

These measurements are combined to select a best channel for the Auto Channel selection. If a channel is ranked as 0, it is not considered suitable for auto selection. If all the channels show poor results, then move the VeeaHub to another position.

You can rescan the measurements by clicking '**Rescan**'. This may change the channel used.

4. LAN and WAN Interface Configuration

4.1. Overview

Once the mesh has been set up, it has the default LAN and WAN interface configuration (refer to Appendix C). It can be configured for specific purposes in two ways:

- By installing an available service from Control Center
- By manually configuring the settings that you need.

This section covers the options available for the LAN and WAN interfaces, and where you can find them in the user interfaces.

For use cases for LAN configuration, refer to Section 14.

4.2. LAN Configuration

4.2.1. Overview

The central step in putting your mesh to work, whether a single VeeaHub or a large network, is creating a Local Area Network (**LAN**) over the mesh. A VeeaHub mesh can carry up to four logical LANs, which are independent of each other although sharing the same wired or wireless connections between nodes.

When a mesh is created, a default LAN is created, with a default WAN interface and default wireless access point and Ethernet port settings. An additional LAN may be established by subscribing to a package application from Control Center, in which case all the configuration of this LAN is done for you. If you wish to configure your own LAN for your specific purpose, the following sections describe the configurations needed to do it. LAN configuration is explained in more detail for particular use cases in Section 14.

Default settings are listed in Appendix C.1. This appendix also includes information on how to avoid IP address conflicts with other ranges in use on the WAN.

A newly created LAN can be established in three possible configurations, routed, bridged and isolated. Those three are summarized below:

- Routed: In this configuration the IP addresses on the LAN are determined by the DHCP server built into the gateway VeeaHub. IP addresses on the LAN undergo Network Address Translation (NAT) to the WAN. The default DHCP settings can be overridden in the event of IP conflicts with the external network. Specific IP addresses can be reserved for devices connected to the network.
- Bridged: This means that the logical LAN takes its IP addresses from the DHCP server on the WAN, and the LAN is a part of the wider network defined on the WAN.
- Isolated: The LAN is not connected to the WAN network and no packet ingress or egress is permitted between the WAN and LAN.

The Veea approach is called Software Defined Networking, in which the LAN is defined as a logical overlay over the physical network. If your enterprise network uses a Virtual LAN (**VLAN**), a logical LAN can be mapped to a VLAN on the external network.

4.2.2. LAN Configuration Process

Before carrying out a configuration, determine the requirements for the LAN, and the interfaces required to meet the purposes. Configuration may involve modifying the default LAN, another LAN that has already been created, or a new LAN may be needed. The following sections start from creating a new LAN and then configuring it.

The configuration can be done using either VeeaHub Manager (refer to Section 12) or Node Manager (refer to Section 13).

A typical basic network will have one or two LANs configured. For example, the first LAN may provide business connectivity while the second LAN might be for guest Wi-Fi.

If your requirements include additional, separate LANs, you can configure up to a maximum of four LANs as described in this document. Include in your planning:

- The WAN sources that are required, physical Ethernet ports. A secondary cellular WAN, if available, can be used by all LANs with routed WAN mode.
- The network-wide (default) wireless access points. Determine whether every VeeaHub will have SSIDs enabled for every LAN or whether there will be SSID values local to specific hubs.
- The network-wide (default) physical ports required for connecting wired devices to particular VeeaHubs and LANs on the mesh.
- Any exceptions for specific hubs, for example to enable or disable a LAN in a particular location.

- Any non-bridged LANs that need to include IP address ranges and possibly static IP assignments.

Once you have made these decisions, assign settings in the following order.

On the gateway VeeaHub:

- WAN Interfaces (port/VLAN)
- Default wireless access points (2.4 GHz and 5GHz) for the network; add any local override on that gateway hub.
- Default physical port assignments for the network; add any local override on that gateway hub.
- LAN configurations
- Restricting DHCP ranges
- Non-default DNS nameservers
- Static IP assignment for an Isolated LAN

On other VeeaHubs in the mesh apply any required changes to the default setting to enable or disable the following at those hubs:

- Wireless access points (2.4 GHz and 5GHz)
- Physical ports.

4.2.3. Creating and Configuring the LAN

If creating a new LAN, use the first inactive entry in the VHM or NM LAN tab. Make this **Active** (or select **Use**). Give the LAN a name (for example, Guest Wi-Fi, CCTV).

Enter an **IPv4 subnet** in the Classless Inter-Domain Routing (**CIDR**) format that is different from the other subnets already set. It is important that this internal subnet does not clash with subnets configured on the external network.

To keep client devices on this LAN from seeing each other, select **Client Isolation**.

Select the **2.4GHz** and (where available) **5GHz** wireless access points (AP) for this LAN. Use AP numbers that have not already been selected for other use. Other configurations of these APs are done on the specific screens in VeeaHub Manager (refer to Section 12) or Node Manager (refer to Section 13).

Select any **Ethernet ports** to be interfaced with this LAN. Other configurations of these ports are done on the specific screens in VeeaHub Manager (refer to Section 12) or Node Manager (refer to Section 13).

Set the **WAN** to the number of the WAN interface you wish to use. Other configurations of these WAN interfaces are done on the specific screens in VeeaHub Manager (refer to Section 12) or Node Manager (refer to Section 13).

Select the **WAN** mode to Routed, Bridged or Isolated. The default is Routed.

LAN Configuration Option: NAT (Routed) to WAN

This option is the default on the first LAN that is set up when the mesh is created and automatically configured. It can be reconfigured as needed.

In this configuration, the internal IP subnet is isolated from the external WAN IP addressing with NAT. This LAN arrangement is required when Wireless WAN (4G) Failover is used, as the WAN IP can be re-assigned on failover, leaving the IP range on the LAN unchanged. The LAN IP addresses are assigned from the in-built DHCP

server on the gateway hub. They can be defined using the DHCP configuration options.

LAN Configuration Option: Bridged to WAN

In this configuration, the LAN is bridged to the configured WAN port of the gateway VeeaHub. The VeeaHub network shares an IP address range with the network beyond the gateway VeeaHub, taking IP addresses from an external DHCP server. This installation can be used to add VeeaHub edge computing to an existing network. This option requires manual configuration using VeeaHub Manager or Control Center.

Only one LAN can be bridged to the WAN; all other LANs must be routed.

LAN Configuration Option: Isolated from WAN

In this configuration, The LAN is not connected to the WAN network and no packet ingress or egress is permitted between the WAN and LAN.

When you turn on isolated mode, the IP mode is set to static so you are required to set the static IP in this mode.

The statically assigned IP address provides a point-of-presence on the LAN network and can be used as a gateway interface for applications running on the VeeaHub.

IP Mode

Depending on the choice of WAN mode, (routed, bridged or isolated) you will select an IP Mode. Here are the choices and what they mean:

- For **routed** WAN mode, the IP mode is set automatically to **server**. This means that the VeeaHub provides a DHCP server for the LAN, for which the **LAN DHCP** and **Reserved IP** settings are available.
- For **bridged** WAN mode, the IP mode is set automatically to **client**. This means that the VeeaHub expects the external WAN to provide a DHCP server and will configure internal DHCP clients if necessary to assign any IP addresses required on the LAN.
- For **isolated** WAN mode, the IP mode is set to **client** by default, for which the expectation is that the external LAN provides a DHCP server. The IP mode can also be set to **static** and in this case, the VeeaHub does not expect an external DHCP server and the IP address is configured manually using the **LAN Static IP** tab.

In future releases of the VeeaHub it will be possible to select more **IP** modes for the different **WAN** mode settings.

Note.

Applications installed to a mesh (for example, vTPN Security Service) may create additional LANs. These cannot be manually configured.

4.2.4. Limiting DHCP Ranges

This is only for a routed LAN and is configured on the gateway VeeaHub.

The LAN DHCP tab (NM) or the DHCP screen (VHM) can be used to restrict the range of IP addresses issued by the DHCP screen. You may wish to do this to limit the number of devices receiving an IP or to be able to assign static IPs outside the range.

You can set the **Start IP** and **End IP** of an enabled address range for each LAN that has been defined. The **Number of IP addresses** in the subnet and the **Subnet Mask** are automatically calculated and displayed.

4.2.5. DNS Nameservers

This is only for a routed LAN and is configured on the gateway VeeaHub. Normally this is not required, because the DNS information is provided to the VeeaHub in the DHCP lease from the WAN Ethernet or cellular network.

If necessary, you can override the default **DNS** nameservers on the LAN DHCP tab (NM) or the DHCP screen (VHM).

4.2.6. Reserved IP Addresses

This is only for a routed LAN and is configured on the gateway VeeaHub.

Individual devices on wireless APs or LAN ports can be assigned Reserved IP addresses. This can be done from LAN Reserved IP tab (NM) or the Reserved IP Addresses screen (VHM).

You can add up to 10 Reserved IP addresses on each LAN. This option is available only on the gateway VeeaHub. The setting is disabled if it is managed on the WAN, for example, if the LAN is bridged to the WAN, or if it is managed by an installed service such as vTPN.

You can reserve the **IP address** for the device using either the **Device name** (if known) or the **MAC address**. You can also enter a free text **Comment** for information.

4.2.7. LAN Static IP Address

The VeeaHub expects IP addresses to be statically configured on the LAN.
This IP mode is used for “isolated” WAN mode operation.

The statically assigned IP address provides a point-of-presence on the LAN network and can be used as a gateway interface for applications running on the VeeaHub.

4.3. WAN Interfaces

4.3.1. Overview

The gateway node (also called a MEN) is the VeeaHub in the mesh that connects to the external network. Typically, the link (the backhaul) is over an Ethernet cable, but it can alternatively be over a cellular network. A second connection can be used as a backup link in the case of failure of the primary connection. If the primary connection is a wired connection through an ISP’s router, the failover can be to the 4G cellular network. This is provided by Veea as a service that can be installed from Control Center.

There can be up to four WAN interfaces configured on a VeeaHub network. These can be used to separate different types of traffic between the mesh and the WAN. For example, the enterprise network may carry several virtual LANs (VLAN). VLANs are used to separate traffic on a single WAN (say, services for the business and for the customers). Each WAN interface on the Veea LAN can be connected to one VLAN, ensuring that this separation can be enforced within the VeeaHub network. One WAN interface may be associated with more than one logical LAN on the mesh.

WAN configuration can only be carried out on the gateway node.

refer to Section 1.2 for documentation links.

4.3.2. WAN Backhaul

In the event that more than one backhaul is installed, the order of priority can be changed in the WAN Configuration tab in either VHM or NM.

Each backhaul can be Enabled or disabled. It is also possible to apply Restricted data to the backhaul, which limits the control data being sent over this route. This is used to reduce data traffic over an expensive backhaul, such as cellular service.

Note.

The SIM currently supplied with cellular (LTE) enabled VeeaHubs can only be used with Veea's Wireless WAN 4G service, available by subscription.

4.3.3. WAN Interfaces

WAN interfaces are configured on the WAN Interfaces tab in either VHM or NM. This applies only to the gateway VeeaHub, which is the first VeeaHub created in the mesh by default when a new mesh is created.

A default WAN interface (number 1) is set up when the gateway VeeaHub is added to an account and activated. This WAN interface is attached to the port on which the VeeaHub finds a DHCP server, and this port becomes the WAN port for the mesh unless later reconfigured.

Each WAN interface has a number and must be set to **Active** (in VHM) or **Use** (in NM) to be used.

A **Name** can be given for easy reference.

The assigned **Port** can be changed.

If the WAN is an enterprise network using VLANs, a VLAN tag can be set on this interface to connect it to a given VLAN. A value of 0 means no VLAN tag.

4.3.4. WAN Static IPs

You can set a static IP address on the WAN for an active WAN interface. This can be configured on the WAN Static IP tab in NM or the WAN Reserved IPs tab in VHM. This is generally only necessary when the WAN has no DHCP server.

This is the IP address that the WAN interface will have on the WAN. For a WAN, you can set the static IP address on by setting **Active** (in VHM) or **Use** (in NM).

Choose an address by setting **CIDR,** and also set the **Gateway IP**. You must also assign the **DNS** nameservers.

5. Client Device Configuration

5.1. Overview

This section explains configurations for devices that are connected to the LANs on the mesh, such as phones, computers, printers, and Point of Sale devices.

Devices can be connected to a LAN either by the wireless access points (AP) on the LAN or by the Ethernet ports.

APs and LAN ports can be defined across the LAN, so that they are available on all the VeeaHubs on the mesh. These network settings are defined on the gateway node. This can be overridden by setting up different AP or port settings on individual VeeaHubs, for example to create a different SSID for a specific purpose or to turn an AP or port off altogether on that node.

By default, when the first LAN is created on activation of the VeeaHub, the default access point and the LAN ports are connected to that.

Wi-Fi configurations are made on separate tabs for the 2.4GHz and 5GHz ranges. The 5GHz tab appears only when that range is available for APs on the VeeaHub. The 5GHz range is also used for the wireless mesh. For more information about the Wi-Fi capabilities of individual VeeaHub models (for AP and mesh) see **Appendix B**.

refer to Section 1.2 for documentation links.

5.2. Access Control

Access for specific devices can be controlled by entering the MAC address of a device in the **Access Control** setting on the Router access mode & control screen in VHM. This can be set to Accept or Deny for each device.

5.3. Wireless Devices

5.3.1. Wi-Fi Radio

The Radio tab on the 2.4GHz and 5GHz screens (VHM) and the Radio tab on the 2.4GHz and 5GHz tabs (NM) offer general configuration settings for the built-in radios. The options available (Table 5) depend on the model of VeeaHub, whether it has wired or wireless connection to the mesh, and on the frequency range. Options that are not available are either not shown or are grayed out.

Note.

On the VHE09/10 models there is a single 5GHz radio that serves both the mesh and the APs, so many of the options here are configured on the vMesh screen (refer to Section 3.2.7).

Table 5: Wireless Device Configuration

Item	Description
Channel	This is used by all APs. By default, Auto Selection is displayed (when available). Wi-Fi uses a number of criteria to choose the best channel at the time the APs start up. If you prefer to override this and select one of the available channels, choose the channel number from the drop-down list. For further information on Automatic Channel Selection, see the article *Automatic Channel Selection and Dynamic Frequency Selection* on the Veea Support Center (refer to Section 1.2 for the link).
Channel in Use	Displays the auto selected channel number (information only).
Auto Channel Whitelist	This enables you to select the channels from which the auto selection occurs. Tap on the drop-down icon, select or deselect the channels as required, then tap OK.
Bandwidth	This sets the channel selection spread, which is dependent on the channel in use. Possible options include:

Item	Description
	• 20MHz • 20MHz/40MHz • 20MHz/40MHz/80MHz. If you are selecting this when ACS is active, ensure that the bonded channels are included in the Auto Channel Whitelist.
Bandwidth in Use	This displays the channel bandwidth in use (information only).
Mode	Selects the 802.11 standard to use (b/g/n/ac or n/ac).
Max stations	Specifies the maximum number of clients per AP.
Max inactivity (in seconds)	Specifies the maximum inactivity time after which the client is disconnected from the AP.
Transmit Power Scale (%)	Specifies the AP transmit power as a % of maximum.

5.3.2. Wi-Fi Radio Scan

Note.

Auto Channel Scan is available on the VHC05, but the metrics described here are not displayed.

Tapping on the **>** icon displays a page showing the measurements for each channel on which the Auto Selection is based. It also shows the date and time these measurements were made.

The measurements are:

- #BSS: the number of Basic Service Sets (**BSS**) detected on this channel
- The minimum and maximum Received Signal Strength Indicator for the BSSs on this channel
- The noise floor on this channel
- Load: A measure of the time the channel is occupied.

These measurements are combined to select a best channel for the auto select. If a channel is ranked as 0, it is not considered suitable for auto selection. If all the channels show poor results, then moving the VeeaHub to another position should be considered.

You can rescan the measurements by tapping **RESCAN**. This may change the channel used. Performing a scan and changing the mesh channel will disrupt network traffic over the Wi-Fi mesh until it has re-established. This can take around a minute.

5.3.3. Wi-Fi Access Points (AP)

The controls for the wireless APs can be found on the Wi-Fi tab for each radio in VHM, and on the SSIDs tab for each radio in NM.

Up to four APs can be defined in each of the 2.4 GHz and 5Gz frequency ranges. They can each be set **In Use** as required.

Note.

On a VHE09/10, the 5GHz AP is enabled by default. On a VHC05, the 5GHz AP can only be enabled if the wireless mesh used to connect peer VeeaHubs is first disabled.

Once an AP has been put into use, you can set to **Enabled** and the AP is then active with the settings that are configured here. If the Enabled switch is off, the AP is disabled on this VeeaHub, even if it is configured for the whole network.

The **Hub/Network** setting is used to determine whether an AP applies across the mesh or only on a single VeeaHub. On the gateway VeeaHub (MEN), set this to Network to apply the settings to this AP on all nodes across the VeeaHub network. On any VeeaHub, set this to apply the settings to the AP on this node alone. This overrides any mesh-wide settings for this AP.

To specify the SSID for the AP, enter the name in the SSID text box. You can make the SSID hidden by setting the **Hidden** control.

The **Status** of the AP is displayed for information, for example, Active, Not in use, Disabled, Incomplete, and Changes not applied.

5.3.4. AP Security

It is possible to set the type of security individually on each AP. This depends on the model. For details, refer to Section 2.5.

Security Type (not on VHC05)	This displays the type of security in effect on this AP. The default is Pre-Shared Key (**PSK**). Tap on **Configure** to make changes to this setting.
Password (VHC05 only)	Specify a password that the user must enter in order to connect to this AP. Leave blank if a password Is not required.

5.3.5. Wi-Fi Security

The Veea Edge Platform offers three security types:

- **Open**
- **Pre-Shared Key (PSK)**
- **Enterprise**.

The default is PSK. Different APs on one VeeaHub can be configured with different security types. These options are configured on the Wi-Fi Security tabs (2.4GHz and 5 GHz) in VHM, and from the **Security** option on the SSIDs tab (2.4GHz and 5 GHz) in NM.

Note.

The VHC05 model has only PSK, which can be configured with or without a passphrase.

Use **Open** if you do not require the user to enter a password in order to connect to an AP. There are no further configuration options.

PSK is the default and is used if you want the user to know a password in order to connect to the AP.

The options that must be set are:

- **Passphrase**

- **WPA Mode**: the AP can be configured to allow client devices to connect with WPA2 only, WPA3 only, or either encryption.
- **802.11r**: When set, this enables client devices to fast transition between network APs that are configured with the same SSID. This is currently available only on the 09/10 models. Enabling 80.11r may mean that some older devices cannot connect to this SSID.
- **802.11w**: This option is available only when the WAP2 Only option is selected. It enables compatible Wi-Fi devices to use Management Frame Protection (MFP) for additional security on the connection. This can be set to Disabled, Enabled, or Required. If Required, devices that cannot use MFP may not be able to connect to this SSID.

Enterprise security requires authentication on a separate server called a Remote Authentication Dial-In User Service (**RADIUS**) server. This option will typically be used if the VeeaHub is installed in a business network where this security type is used.

When using Enterprise mode, the passphrase or secret is not configured at the VeeaHub network, because all authentication is handled at the RADIUS server.

Before the options can be set for this security type, the details of the RADIUS server (**Address**, **Port Number**, and **Secret**) must be entered. This can be done from links on the Wi-Fi security tabs. Both RADIUS Authentication and RADIUS Accounting can be configured.

The options that must be set are:

- **WPA Mode:** the AP can be configured to allow client devices to connect with WPA2 only, WPA3 only, or either encryption.
- **802.11r**: When set, this enables client devices to fast transition between network APs that are configured with the same SSID. This is currently available only on the 09/10 models. Enabling 80.11r may mean that some older devices cannot connect to this SSID.
- **802.11w**: This option is available only when the WAP2 Only option is selected. It enables compatible Wi-Fi devices to use Management Frame Protection (MFP) for additional security on the connection. This can be set to Disabled, Enabled, or Required. If Required, devices that cannot use MFP may not be able to connect to this SSID.

5.4. LAN Ports

5.4.1. Port Configuration

A port can be configured as a WAN or LAN port:

- **WAN**: This port is used as the wired connection (backhaul) to the Internet. This is available on the gateway VeeaHub (MEN) only.
- **LAN**: This port is in use to connect a device to the VeeaHub network with an Ethernet cable. This can be applicable on any node in the network, where a port is available. Several devices can be connected to this port if you use a switch.

Ports are configured on the Physical Ports Configuration screen in VeeaHub Manager (refer to Section 12) or the Physical Ports Configuration tab in Node Manager (refer to Section 13).

As well as configuring for WAN or LAN use, you can configure the use for the whole **Network** (on the gateway VeeaHub) or override that use on an individual node (**Hub** setting). You can also edit the **Port Name**.

5.4.2. Mesh Ports

A port can also be used to create a wired connection to another VeeaHub and thus to the mesh network. This might be used, for example, to bridge the gap with a cable between two nodes where the distance is too great for effective Wi-Fi communication. A VeeaHub mesh can consist of any mixture of wired and wireless links. The mesh configures itself to provide full connectivity and redundancy. When a port is in use as a mesh port, this is displayed by the Mesh switch on this tab against that port.

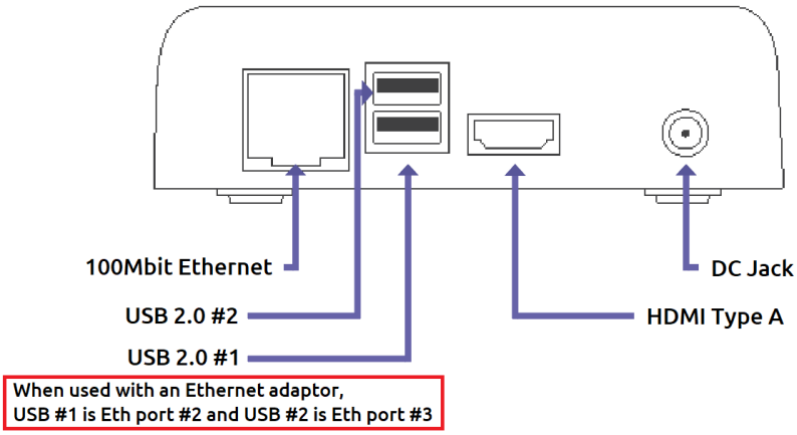
If all the VeeaHubs in the network are wired, the wireless mesh can be switched off, although that is not necessary.

There are certain cases in the current software version where some manual configuration may be needed. For more information about automatic configuration for wired mesh, please see the article *Wired VeeaHub mesh: automatic configuration* on the Veea Support Center (refer to Section 1.2 for the link).

5.4.3. VHC05 Ports

On the VHC05 (Figure 4), there is only one Ethernet port. In the typical case of Ethernet backhaul, the Ethernet port on the MEN is already dedicated to the WAN. You can use the USB ports as Ethernet ports with suitable adaptors. In these cases, Port 2 is the lower USB socket, and Port 3 is the upper USB socket.

Figure 4: VHC05 Connections

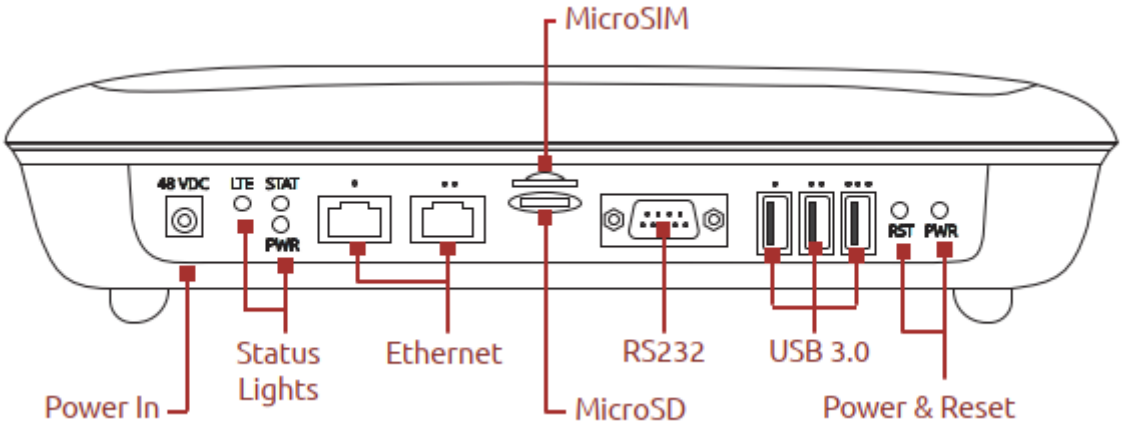


5.4.4. VHE09/VHE10 Ports

On the VHE09/10 (Figure 5), there are two Ethernet ports. They are marked on the casing with one dot for Port 1 and two dots for Port 2. Either port can be used as the WAN port, and the other can be configured as LAN. By default, Port 2 on the gateway VeeaHub is configured for WAN. If you change the cable to the other port, you must restart the VeeaHub. Port 1 can be used for Power over Ethernet, as an alternative to the regular power supply. On the gateway VeeaHub it is not possible to configure both Ethernet ports as LAN ports.

There are also two USB ports that can be used as Ethernet ports with adaptors. They are Port 3 (one dot) and Port 4 (two dots). The USB port with three dots cannot be used as a LAN port.

Figure 5: VHC09/10 Connections



5.4.5. Example uses of Physical Ports Configuration

An example of the use of the Port number and Enabled/Disabled controls is:

- On the gateway VeeaHub, select a Port number as follows:
  - Select **NETWORK**
  - Select **Enabled**
  - The configuration of that port (WAN, LAN, or Mesh) is then copied to all the nodes in the mesh.
- On another node:
  - Select the same Port Number and then set to **Disabled**. This turns off the function on that port on that VeeaHub. This might be used, for example, where you wish to disable the LAN port on a node in a public area so that it is not possible to plug in an unauthorized device.
- Alternatively, on the other node, you can select **HUB**, then configure the port for a specific use on that VeeaHub alone.

6. Logging and Analytics

This section summarizes the logging and analytics facilities of the Veea Edge Platform. For extended information, see the sources cited below.

Refer to Section 1.2 for documentation links.

6.1. Basic Features

Refer to Table 6 for a list of logging and analytics basic features.

Table 6: Logging and Analytics

Control	Where	Description
Node Analytics switch	Hub configuration tab in Node Manager	Enables collection of analytics for this node that can be accessed in a Grafana web page. See Node Manager Guide (Section 13).

Control	Where	Description
Wi-Fi Analytics switch	Hub configuration tab in Node Manager	Enables collection of Wi-Fi analytics for this node that can be accessed in a Grafana web page. See Node Manager Guide (Section 13).
Events	CC Mesh Events tab	Used to search events on the whole mesh, and to download logs. See the article *VeeaHub event logging in Control Center* on the Veea Support Center.
Events	CC VeeaHub Events tab	Used to search events on a single VeeaHub, and to download logs. See the article *VeeaHub event logging in Control Center* on the Veea Support Center.
Cellular Usage Analytics	VeeaHub Manager	Gives information on the quality of the cellular connection. See VeeaHub Manager Guide.
-	Cellular tab in Node Manager	Gives information on the quality of the cellular connection. See Node Manager Guide.
Cellular Usage	Control Center Mesh Overview tab in Control Center	Gives information on the usage of cellular connection. See the article on Control Center on the Veea Support Center.
Mesh scan	Scan tab under Network in Node Manager Scan option on vMesh screen in VeeaHub Manager	Shows some of the quality data used in Auto Channel on mesh (not available in VHC05). See Node Manager Guide (refer to Section 13) or VeeaHub Manager Guide (refer to Section 12).
Wi-Fi Analytics switch	Hub configuration tab in Node Manager	Enables information of Wi-Fi data for this node that can be accessed on the Wi-Fi stats screen. See Node Manager Guide (refer to Section 13).
Wi-Fi scan	Scan tab under the relevant Wi-Fi tab in Node Manager Scan option on the relevant Wi-Fi screen in VeeaHub Manager	Shows some of the quality data used in Auto Channel on Wi-Fi (not available in VHC05).

6.2. Subscription Services

The VeeaHub System Monitoring Tool is a free tool available by subscription in the Control Center. It monitors VeeaHub system characteristics in a mesh through a Grafana-based dashboard. It offers time-based system metrics and can be customized.

7. Firewall and Port Forwarding

The VeeaHub is provided with a firewall and port forwarding for network security. It is designed to prevent unauthorized access to or from devices or networks connected to the VeeaHub.

There are some rules that have been added to the firewall for the VeeaHub to connect to the Veea Control Center and VeeaHub Manager. Apart from that by default all ports are set to DROP, that is network connections are not permitted unless specifically

allowed. Port forwarding is also offered to enable applications to connect to the WAN or Internet.

Rules can be configured in the Firewall configuration options in VeeaHub Manager.

8. Applications and Services for the Veea Edge Platform

8.1. Subscriptions

Available applications and services (not part of the base software) must be, downloaded from Control Center. Veea or third-party providers may offer these applications available on free or paid subscription. Payments can be made online through Control Center and the software is then downloaded. Once installed, the service becomes immediately available.

8.2. Developing Applications for the Veea Edge Platform

Partner companies or independent developers wishing to create applications and services for VeeaHub meshes are welcome to register as developers with Veea. This gives the developer access to the relevant licenses and a powerful selection of tools for development, including VeeaHub Toolkit, a set of template applications for different services, vBus for control of devices on different communication protocols, and other components. Full documentation on creating apps for the Veea Edge Platform is available on:

- *https://developer.veea.com*

The current range of services available for a mesh can be seen on the Subscriptions tab in Control Center (refer to Section 11).

9. Backup and Recovery

9.1. Power and Recovery Options

Table 7 lists the restart and reset options on VeeaHubs.

Table 7: Power and Recovery Options

Type of reset	How and what	What unit will do after reset
Restart	Press and hold reset button for until the lights flash [1], or VeeaHub Manager and Node Manager Restart button.	Unit restarts with any new configurations applied
Local reinstall (Container reset)	Press and hold reset button for 5-9 seconds until flashing changes again [1], or From VeeaHub Manager Recover option, choose Reinstall Use this option if the unit is not connected to the Internet. The unit is restored using software and configuration stored on the unit. Most manual configuration is lost*. Subscriptions to services are not affected.	Unit restarts without some manual configurations
Recover (Network reinstall)	Press and hold reset button until flashing changes again [1], or Power off the unit, press the reset button, power on the reset button, wait for 10 seconds, release the reset button, or From VeeaHub Manager Recover option, choose Recover. The unit is restored using software and configuration from the cloud. Most manual configuration is lost [2]. Subscriptions to services are not affected. [3]	Unit restarts without some manual configurations
Full reset	Power off the unit, press the reset button, power on the unit, wait until both LEDs start flashing alternately (approximately 45 - 60 seconds after power has been applied), then release the reset button. Restore to factory settings with minimal software. All manual configuration is lost [2].	Unit restarts without any manual configurations
Notes. [1]. The flashing patterns of the different models can be found on the Veea Support Center (refer to Section 1.2 for the link) in the Troubleshooting section. Once an action has been accepted, the unit no longer responds until the requested action has completed. The operation is completed when the		

Type of reset	How and what	What unit will do after reset
	LEDs return to a steady state, which may take over 60 seconds. The LEDs may change state multiple times during the restart procedure. [2]. The VeeaHub stores some information persistently over a local and network reinstall. This information includes static IP for an Ethernet WAN interface and can also include cellular information if operating over 4G. In the Full Reset this persistent information is also cleared. Full reset can be used safely if the unit is connected to a regular Ethernet connection with dynamic IP assignment and internet access. [3]. In the event that the unit has failed and cannot be recovered by any of the above methods, it is possible to perform a network reinstall (recover) from power up. This requires Internet access (cabled, 4G or connection to a gateway VeeaHub). The procedure is: – Power down the VeeaHub – Press and hold the reset button while restoring power – Keep the button depressed for at least 10 seconds, or until the LED states stop changing, and then release. The VeeaHub now performs a network recover over the Internet.	

10. User and Group Management

10.1. Users and Groups

VeeaHubs are organized into meshes (networks) and meshes are organized into groups. Currently, there is one level of Groups defined, but in a future release of the Platform software there will be the possibility of organizing meshes into a hierarchy of Groups.

A user is associated with one or more Groups and can carry out actions on the meshes and VeeaHubs in the Group(s). Control Center is the online portal to the VeeaHubs and meshes belonging to Groups in scope for the User.

Users may have different levels of privilege, and the authorization process checks that the User role supports the action they wish to perform in the Group. A user may have different roles for different Groups.

A Group may also be associated with more than one User, and those Users may have the same or different roles in the Group.

Each Group has one special User, called the Group Contact, who takes responsibility for paying for usage of any device in the Group.

When you log into Control Center, you will see the VeeaHubs and Meshes to which you have been given access. For more information about Control Center, refer to Section 11.

10.2. Managing Your Own Account

You can change your password in Control Center by selecting the Profile option.

You can also change your registered payment method here (if you have one).

11. Control Center - Managing and Monitoring Meshes and VeeaHubs

Managing meshes and VeeaHubs and monitoring them to ensure that they are online and healthy is done from the Veea Control Center interface.

This section provides a description and user guide for Control Center.

You can reach Control Center at *https://controlcenter.veea.co/* from a computer or mobile phone.

If you have been given a different address for Control Center by your organization, use that address instead.

Control Center is a single interface where you can:

- Obtain information on your meshes and individual VeeaHubs
- Obtain status information and see warnings such as when a reboot is required
- Manage software updates
- Subscribe to or purchase paid services to run on a mesh.

Note.

To view changes of status in Control Center, you must refresh the page you are on.

Control Center also gives you access to other information and controls, including:

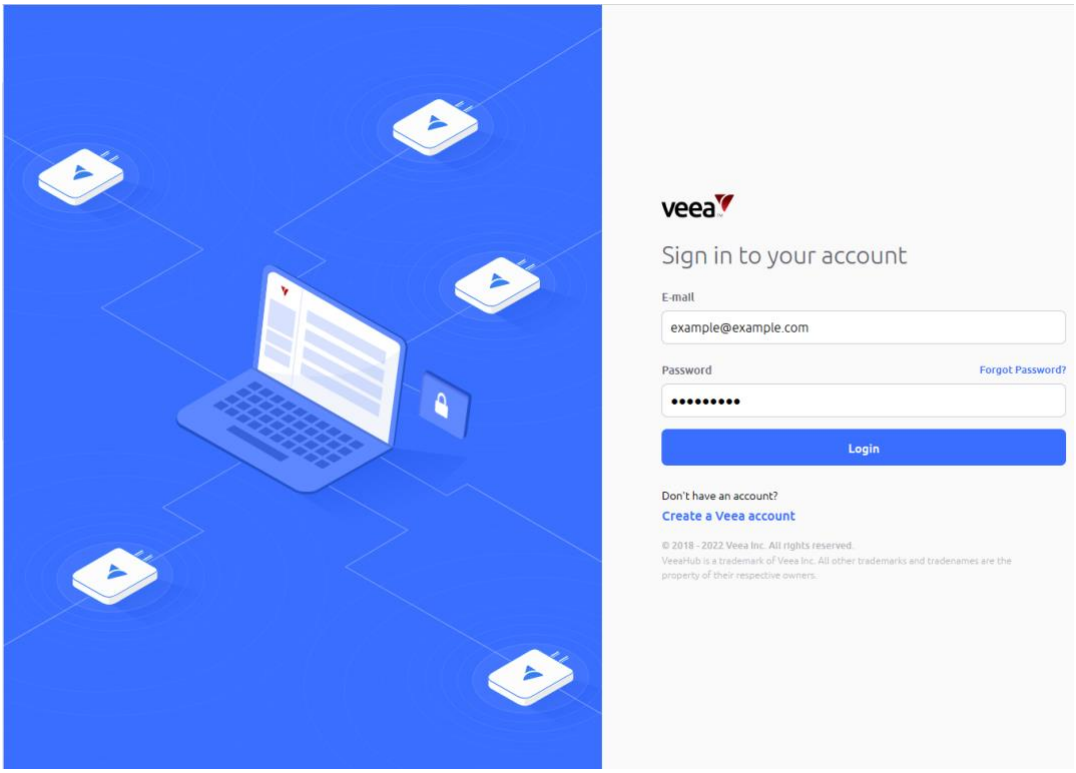
- Node Manager, where you can configure your meshes and VeeaHubs
- Logs of events on your VeeaHubs, for diagnosis and troubleshooting
- Statistics for cellular usage (if installed)
- Privafy Central (if you have vTPN installed).

Other features may be available if you subscribe to other services.

11.1. Logging In

Log in to Control Center (Figure 6). Your account details are the email and password you used to enroll your VeeaHub(s), unless you changed the details more recently.

Figure 6: Control Center – Login Dialog



Notes:

If you have VeeaHubs registered to your account, you are taken to the Home Screen.

If you do not appear to have VeeaHubs registered, the No VeeaHubs registered? message is displayed. This offers a number of options.

Control Center logs you out after a period of inactivity.

If you are a developer and already have a developer login, it is recommended that you enroll your VeeaHub with the same email address as your developer login. If you have a problem with login then contact Veea Technical Support at: *https://go.veea.com/support*

11.2. Home Screen

The home screen (Figure 7) forms the main dashboard for the Control Center and is the first page to appear when you login to your Control Center account. For description purposes, it can be divided into eight main areas as detailed in Table 8.

Figure 7: Home Screen

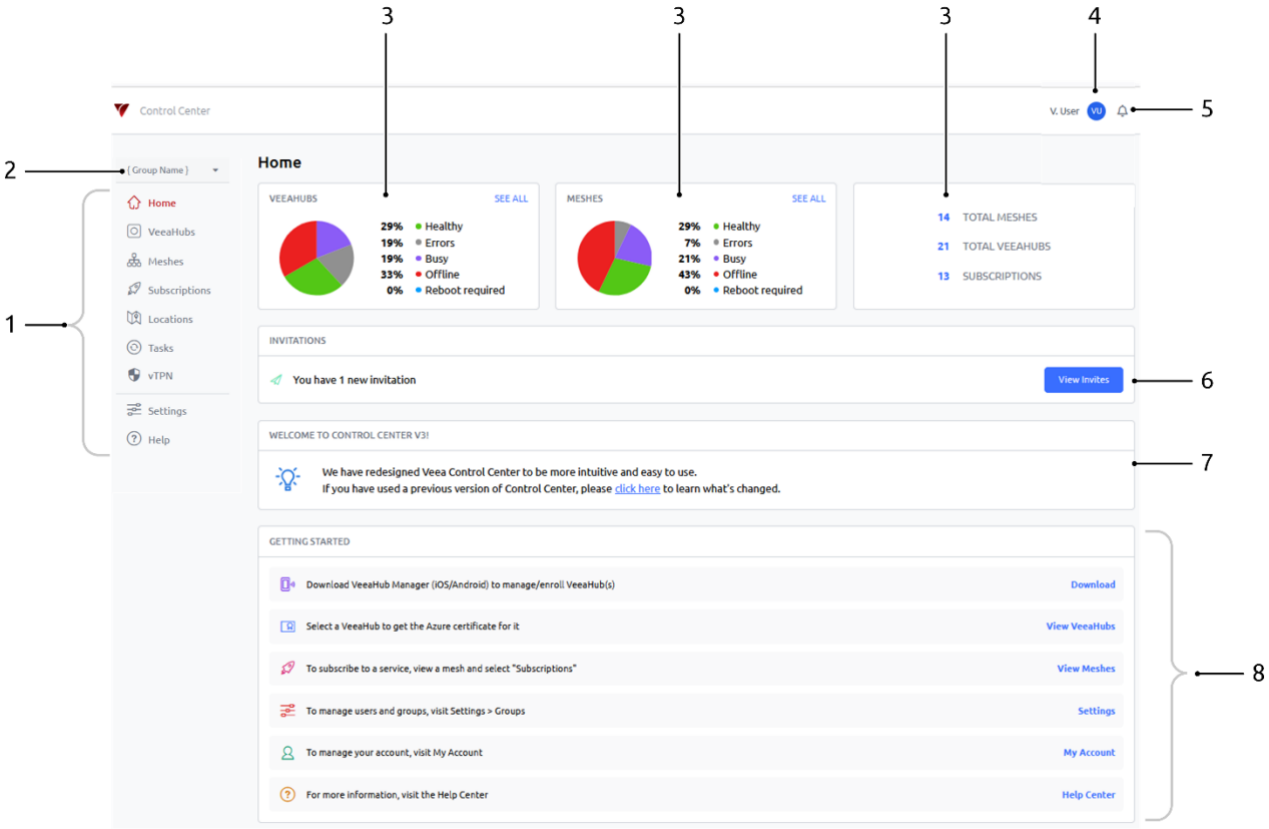


Table 8: Home Screen Features

Item #	Title	Description
1	Navigation Menu	Provides nine navigation buttons which enable you to switch between the primary Control Center screens. The navigation menu remains visible across many of the primary screens. Screens include: • **Home** | **VeeaHubs** | **Meshes** | **Subscriptions** | **Locations** | **Tasks** | **vTPN** | **Settings** | **Help**
2	Group Selection	Displays a list of groups that you are a member of and allows you to select the group that contains the collection of VeeaHubs and Meshes you would like to administer.
3	Monitoring	For the selected group, this provides charted and tabulated information about status and inventory quantities of both VeeaHubs and Meshes. Pie charts and percentage values display the collected data in a friendly format. Color is also used to highlight the different VeeaHub states (Table 9). Monitored categories include: • **Healthy** | **Errors** | **Busy** | **Offline** | **Reboot required** followed by the quantity of both Mesh and VeeaHub totals.
4	Profile Link	The account name and initials are displayed here. Click on the profile image to access functions to manage account credentials (My Account), Invitations, and logout from the Control Center.

Item #	Title	Description
5	Notifications	The bell icon provides access to the notifications message area. Notification messages inform users about events that that effect their VeeaHubs, for example, going offline or coming online. When a notification has been received, the icon changes to a red color and the number of unread messages is superimposed on the icon. The example image that follows shows four unread messages are present:  Click on the bell icon to review notification messages. The notifications bell appears on other navigation screens (refer to Section 11.2.3 for more information).
6	Invitations	When you have been invited to join another account's group, an **INVITATION** row appears on the home page. The '**View Invites**' button, provides a shortcut to INVITES management on the settings page.
7	Welcome to Control Center V3	This dialog provides a help link which takes users to a Control Center (V3) Change Overview article. The article provides users with a map of the main navigation changes between the new V3 and previous V2 Control Center software.
8	Getting Started	This area shows a list of useful resources and administration tasks together with links to their specific screen or location. Links include: • Download VeeaHub Manager (iOS/Android) to manage/enroll VeeaHub(s) – **Downloads** • Select a VeeaHub to get the Azure certificate for it – **View VeeaHubs** • To subscribe to a service, view a mesh and select "Subscriptions" – **View Meshes** • To manage users and groups, visit Settings > Groups – **Settings** • To manage your account, visit My Account – **My Account** • For more information, visit the Help Center – **Help Center**.
Notes. Next and Previous page buttons are active when the record table exceeds its maximum of ten rows. Selection of any column title changes the table sort order.		

11.2.1. Monitoring

11.2.1.1. VeeaHubs and Meshes

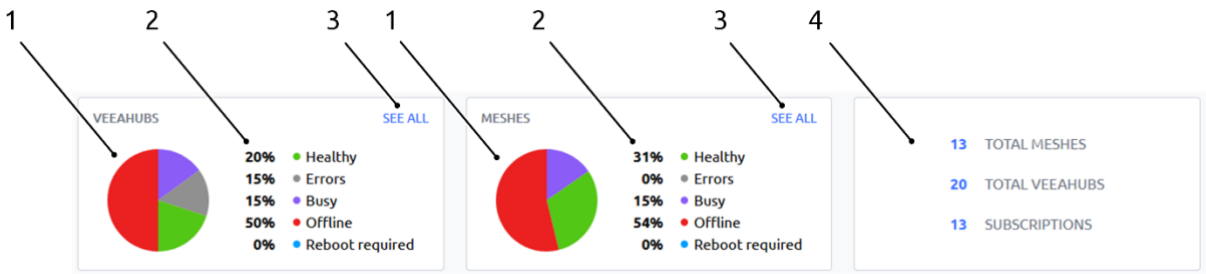
Monitored VeeaHub and Mesh data is displayed as shown in Figure 8 with color details shown in Table 9.

Pie charts (Item 1) display the percentage of VeeaHubs and Meshes attributed to each of their status conditions. The percentage value is also displayed (Item 2).

The two 'SEE ALL' buttons (Item 3) are shortcuts which take you to the related VeeaHubs or Meshes screens.

Inventory quantities are shown for Meshes, VeeaHubs, and Subscriptions (Item 4). Each value also forms a shortcut link to its related VeeaHubs, Meshes or Subscriptions screen.

Figure 8: VeeaHub and Mesh Monitoring



11.2.1.2. Monitor Color Code

Colors are also used to focus attention on VeeaHub and Mesh operational states. The colors are common throughout the Control Center and identified as shown in Table 9.

Table 9: VeeaHub and Mesh Monitoring Color Code

Status	Color	Example
Busy	Magenta	
Errors	Gray	
Healthy	Green	
Offline	Red	
Reboot Required	Blue	

11.2.2. Profile Link

11.2.2.1. My Account and Invites

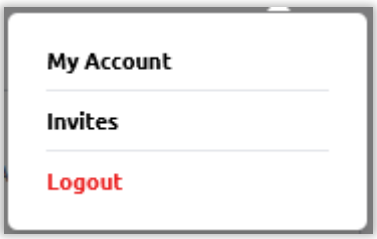
When you click on the profile link button, a list of options is displayed (Figure 9).

Both the '**My Account**' and '**Invites**' buttons provide shortcut links to their respective 'My Account' and 'Invites' tabs, both located on the settings screen.

11.2.2.2. Logout

Selection of the '**Logout**' button (Figure 9) will immediately log you out of your Control Center account.

Figure 9: Profile Drop-down



11.2.3. Notifications

To view notification messages, click on the bell icon located on the top tray (refer to Section 11.2). The last three messages are shown. Select the '**See more**' button to access the main message list which has a paged structure to allow you to view older messages (Figure 10). Messages tagged with a blue-colored information icon, indicate the message is unread.

A record of the elapsed time since the notification was triggered, is shown beneath each message.

Click on a message to tag it as read, or use the '**Mark all as read**' button to change all the messages on every page to read.

Click the '**Done**' button to close the message list.

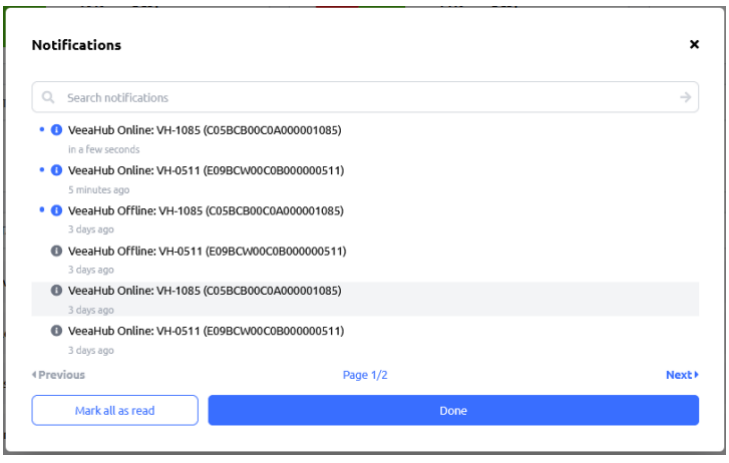
A 'search notifications' bar allows you to search for messages. It is an incremental search where you only need to enter a part of the required search string to find matches.

Notes.

Next and Previous page buttons are active when the record table exceeds its maximum length of six rows.

Messages only appear in the Control Center message tray when the 'PUSH' option is configured (refer to Section 11.9.5).

Figure 10: Notifications



11.3. Managing VeeaHubs

The VeeaHubs screen (Figure 11) provides the dashboard which enables you to select and manage all the VeeaHubs in your selected group. It shares some common navigation and profile features that are used across other screens. In addition, it provides a filtered tabulated record of VeeaHub data, together with a search facility. Here you can select a specific VeeaHub and carry out some VeeaHub management functions.

The VeeaHub screen is divided into four main areas and the details are shown in Table 10.

Figure 11: VeeaHubs Screen

Table 10: VeeaHubs Screen Details

Item #	Title	Description
1	Search Bar	The search bar allows you to search for VeeaHubs in your group account. It is an incremental search where you only need to enter a part of the required search string to find matches. The search bar allows you to enter text and search for a registered VeeaHub by name or serial number.
2	Filter by Status	This button provides status filter options for VeeaHubs listed in the VeeaHub record table (Item 4). Six filter categories are available which are: • **All Statuses** | **Error(s)** | **Healthy** | **Offline** | **Reboot Required** | **Installing**
3	Filter by Role	This button provides filter options for VeeaHubs listed in the VeeaHubs record table (Item 4). Three filter categories are available which include: • **All roles** | **Gateway VeeaHub** | **Mesh VeeaHub**
4	VeeaHub Tabulated Records Table and management	This section displays a record table of Gateway and non-gateway VeeaHubs used in the currently selected Mesh. Data is spread across five columns labelled: • **Name** | **Role** | **Mesh** | **Model** | **Status** Each VeeaHub name acts as a shortcut link which takes you to its associated VeeaHub details page. The details page is the management interface to the VeeaHub, and from here you can: • View VeeaHub information and health status • Locate the VeeaHub's associated Mesh and management page • Access the Node Manager app • Unenroll a VeeaHub from the Mesh • Restart a VeeaHub

Item #	Title	Description
		• Recover a VeeaHub • Shutdown a VeeaHub • View and download Azure certificate • View installed software versions • View event status.

Notes.

Next and Previous page buttons are active when the record table exceeds its maximum of ten rows.

Selection of any column title changes the table sort order.

11.3.1. VeeaHubs Detailed Information

When you click on any name in the VeeaHub record table, it opens the VeeaHub details page for the selected VeeaHub (Figure 12).

The content shown on this page automatically adjusts to accommodate information changes which are affected by VeeaHub model, backhaul option, and subscriptions.

The VeeaHubs details page is divided into a number of sections which are detailed and shown in Table 11.

Figure 12: VeeaHubs Details Page (Example)

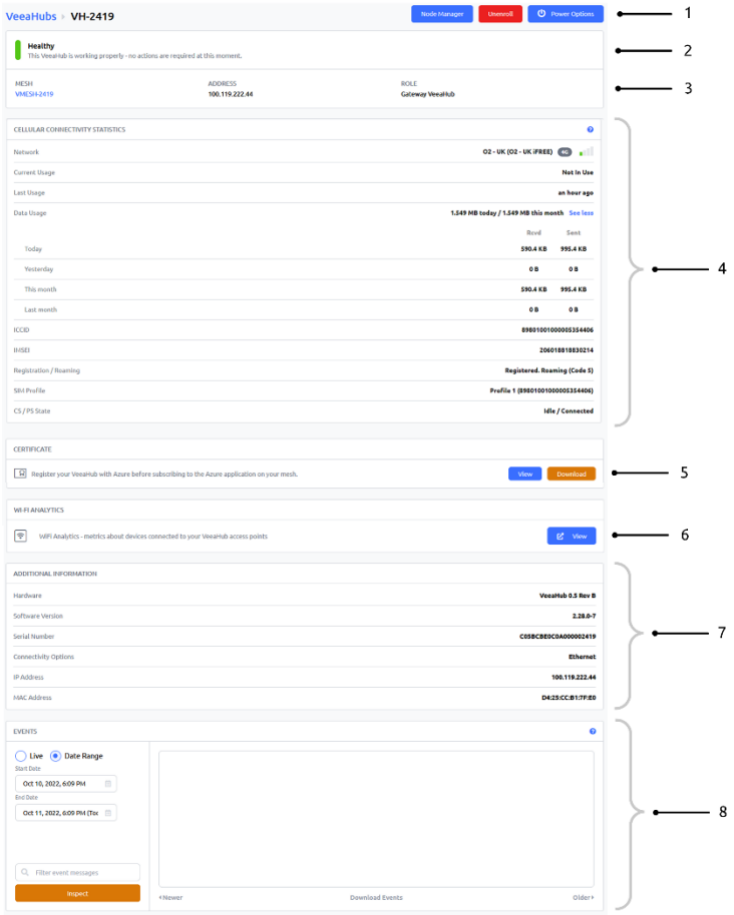


Table 11: VeeaHubs Screen - Details

Item #	Title	Description
1	VeeaHub name, Node Manager, Unenroll and Power options	On the far left is the selected VeeaHub name. On the right side are the three buttons for: • Node Manager app (refer to Section 13) • Unenroll • Power Options.
2	Health status	This row shows the current health of the VeeaHub.
3	Associated Mesh	This shows the Mesh which the VeeaHub is associated with. A Mesh record table displays three parameters: • **MESH | ADDRESS | ROLE**
4	CELLULAR CONNECTIVITY STATISTICS	This section content is only visible with a 4G backhaul subscription. It displays key parameters which are: • **Network** • **Current Usage** • **Last Usage** • **Data Usage** • **ICID*** • **IMSEI*** • **Registration / Roaming*** • **SIM Profile*** • **CS / PS State*.** The '**See more**' / '**See less**' button can be toggled to reveal or hide additional information. Additional information includes both received (Rcvd) and Sent data in bytes (or multiple units of bytes) for: • **Today** • **Yesterday** • **This month** • **Last month.**
5	CERTIFICATE	For the development community to integrate with Microsoft Azure, this section allows you to view and download the Veea generated Azure Public Key Infrastructure (PKI) public key. Select the '**View**' button to view or copy the text certificate, and the '**Download**' button to download the certificate Privacy Enhanced Mail (**PEM**) file.
6	WI-FI ANALYTICS	Use the '**View**' button to start the Grafana Wi-Fi analytics metrics chart viewer - Download the Veea Grafana Analytics Tool User Guide from Veea Support at: *https://veea.zendesk.com/hc/en-us/articles/4411621422995-Grafana-Analytics-Tool-User-Guide* **Note**. Wi-Fi Analytics is not available on VHC05 model VeeaHubs.
7	ADDITIONAL INFORMATION	This shows more information about software and various Identifiers. Used in conjunction with the '**Show more**' button, it can reveal: • Hardware • Software Version • Serial Number • Connectivity Options • IP Address • MAC Address.
8	EVENTS	VeeaHubs events are software messages to indicate that something has happened with your VeeaHub. For instance, when you restart your VeeaHub, you will see events from services being stopped, then started.

Item #	Title	Description
		The events section provides an area to view, filter and download logged data about your Meshes and VeeaHubs. You can select live or historic data respectively with the '**Live**' and the '**Date Range**' radio buttons. When the date range option is selected, use the Start Date and End Date pop up calendars to select the required date range to view. When event data is available, use the '**Filter event messages**' and '**Inspect**' button to refine your event view. Use the '**Newer**' and '**Older**' buttons to move back and forward in time across the displayed event data. Use the '**Download Events**' button to download event information to your computer or mobile device as a Comma Separated Variable (**CSV**) file.
***Note**. Property only available on VeeaHub C25 models.		

11.3.2. Node Manager App

The Veea Node Manager (**NM**) app is a browser-based application that allows VeeaHub account holders to manage their VeeaHubs and Meshes.

Refer to Section 13 for Node Manager operational and management information.

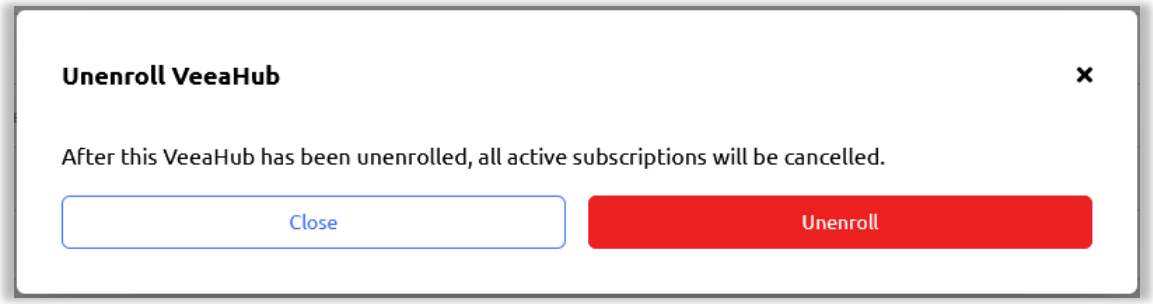
11.3.3. Unenroll a VeeaHub

Select the '**Unenroll**' button (Figure 12, Item 1), to unenroll your VeeaHub device from the Veea cloud server. When the unenroll button is selected, a confirmation button is presented (Figure 13). Select the '**Unenroll**' button to complete the unenroll process or '**Close**' to cancel the operation.

Note.

When a Mesh is formed from more than one VeeaHub, all non-gateway VeeaHubs must first be unenrolled before the Gateway VeeaHub can be unenrolled.

Figure 13: Unenroll (4G Example Subscription)

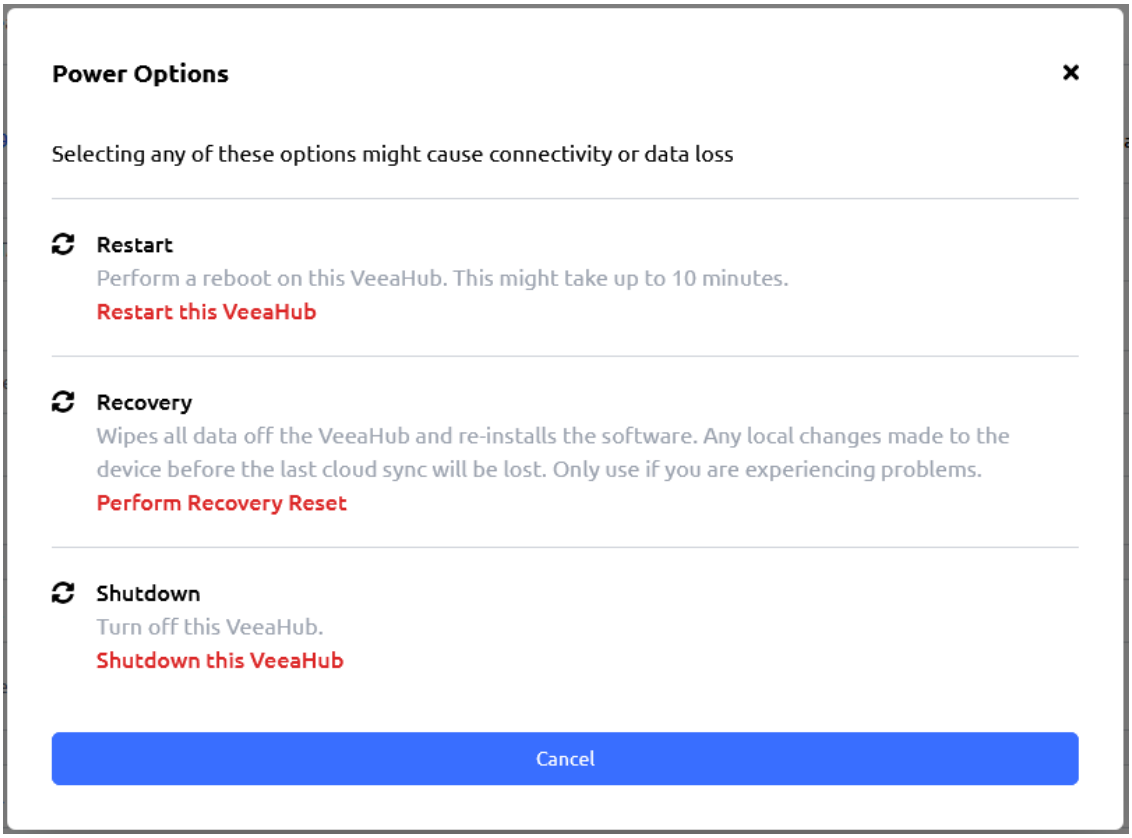


11.3.4. Power Options

The power options button reveals the three VeeaHub power management controls (Figure 14). These include:

- **Restart** - This performs a reboot on the VeeaHub (typically 10 minutes dependent on your internet speed).
- **Recovery** - This clears all data from the VeeaHub and re-installs the software from the cloud. Any local changes made to the device before the last cloud synchronization will be lost. This feature should be used with caution as it could impact the operation of the VeeaHub.
- **Shutdown** - This completes a controlled software shutdown and turns off the VeeaHub.

Figure 14: VeeaHubs Page – Power Options



11.4. Managing Meshes

The Meshes screen (Figure 15) provides the dashboard to select and manage all the Meshes in your selected group. It shares some common navigation and profile features that are used across other screens, and in addition provides a filtered record table of mesh data, together with a search facility. Here you can select a specific Mesh and carry out Mesh management functions.

The Meshes screen is divided into three main areas which are described in Table 12.

Figure 15: Meshes Screen

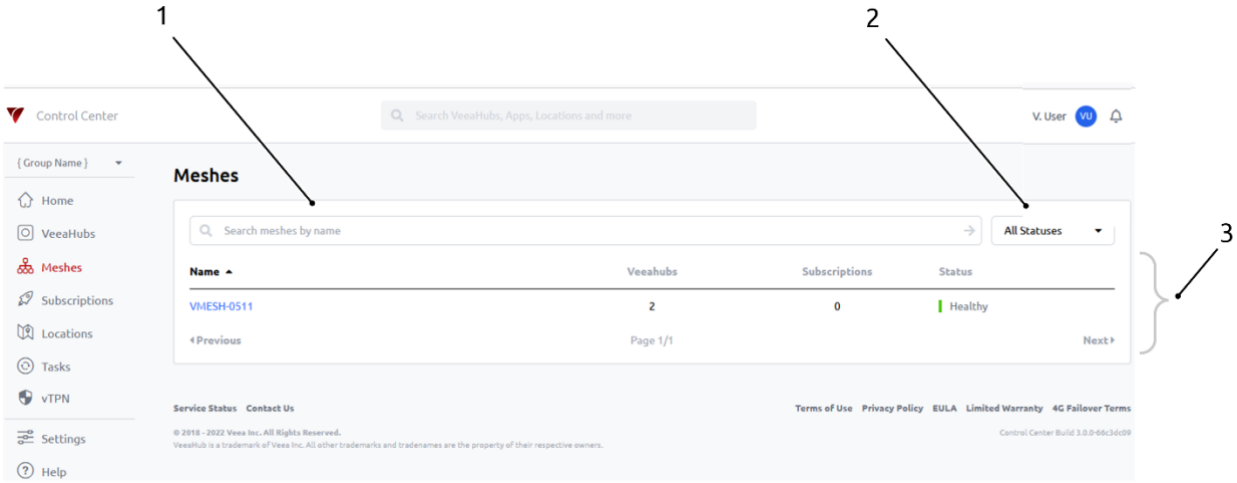


Table 12: Meshes Screen - Description

Item #	Title	Description
1	Search Bar	The search bar allows you to search for Meshes in your account groups. It is an incremental search where you only need to enter a part of the required search string to find matches.
2	Filter Options	This drop down button provides filter options for Meshes listed in the Meshes record table (Item 3). Six filter categories are available: • **All Statuses** | **Busy** | **Error(s)** | **Healthy** | **Offline** | **Reboot Required**
3	Mesh Tabulated Records Table and management	The table displays a record of inventory data and status for Meshes which reside in the currently selected group. Data is spread across four columns, labelled: • **Name** | **VeeaHubs** | **Subscriptions** | **Status** Each Mesh name acts as a shortcut link which takes you to its associated Mesh details page (Figure 16). The details page is the management interface to the Mesh, and from here you can: • View Mesh information and health status • Lookup and access VeeaHubs which form part of the Mesh • Add and remove subscription packages • Access the Node Manager app • View cellular statistics • View Access Point (**AP**) connected devices • View broadcast AP Secure Service Identifiers (**SSIDs**) • View Events • View installed software versions.
Notes. Next and Previous page buttons are active when the record table exceeds its maximum of ten rows. Selection of any column title changes the table sort order.		

11.4.1. Mesh Detailed Information Page

When you click on any Mesh name in the Mesh record table, it opens the Meshes detail page for the chosen Mesh (Figure 16, Figure 17 and Figure 18). The content shown on this page automatically adjusts to accommodate information changes affected by VeeaHub model, backhaul option and subscriptions.

The Meshes detailed page is divided into a number of sections and these are described in Table 13 below.

Figure 16: Meshes Details Page – Collapsed View

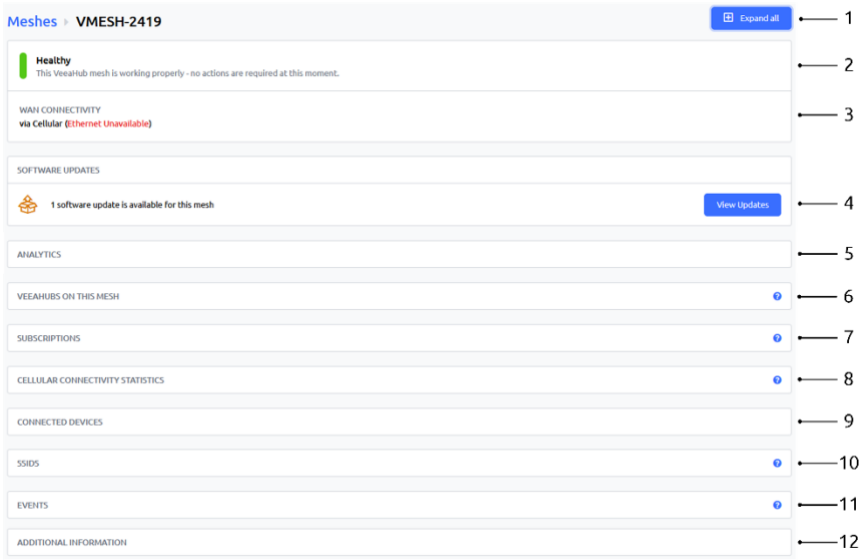


Figure 17: Meshes Details Page – Expanded View (Part A)

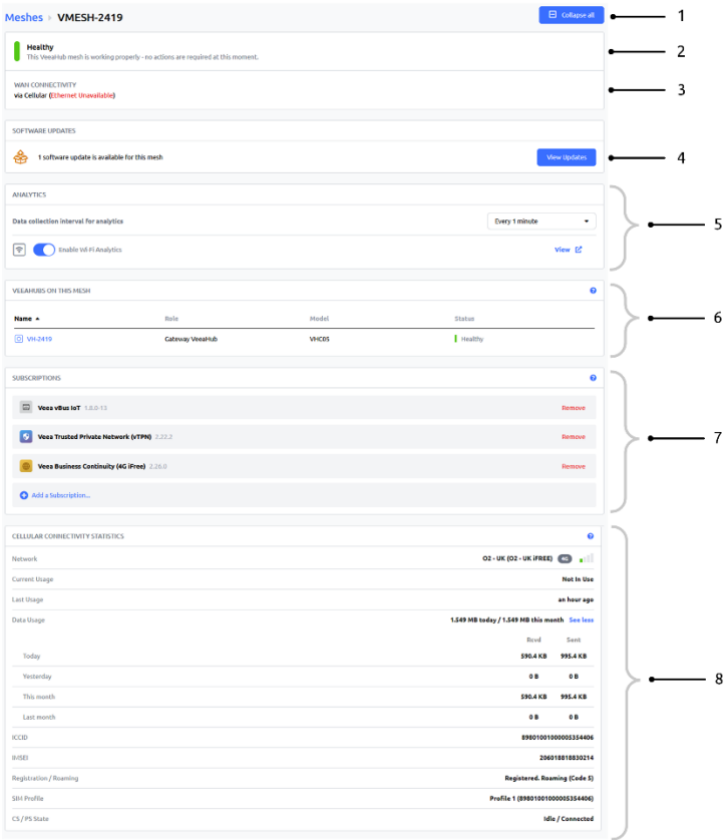


Figure 18: Meshes Details Page – Expanded View (Part B)

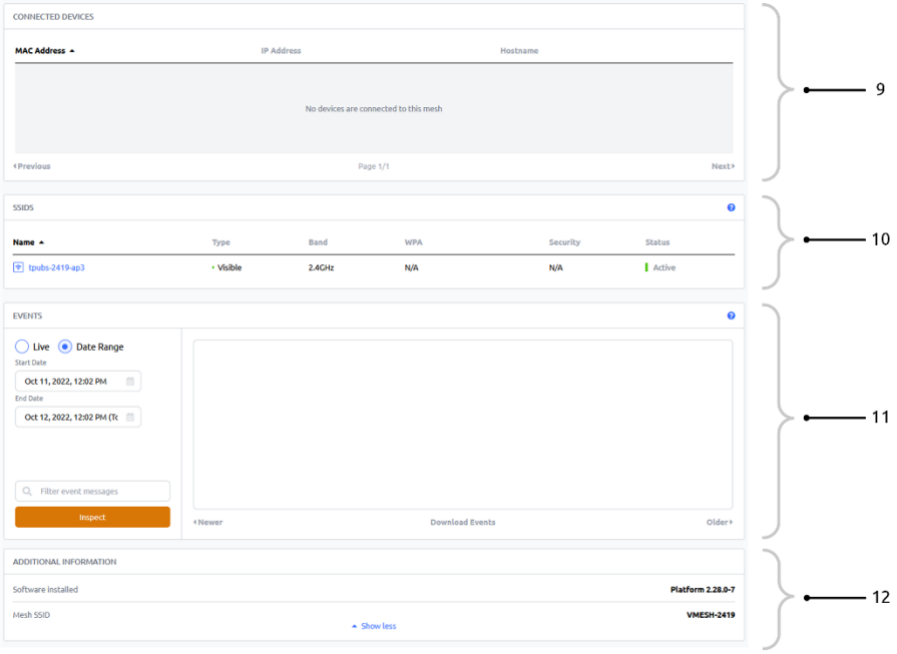
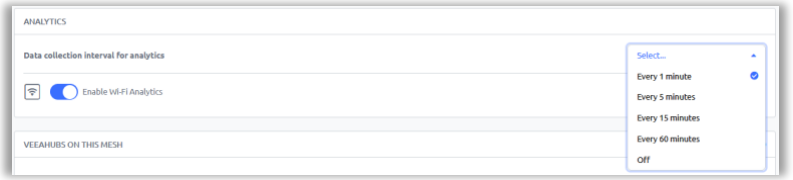


Table 13: Meshes Screen – Details

Item #	Title	Description
1	Meshes, Mesh name and Expand All	The '**Meshes**' button takes you back to the top level Meshes screen. The Mesh name is shown here adjacent to the Meshes button. The '**Expand All**' button toggles between '**Expand All**' and '**Collapse All**'. The button expands and collapses section row content contained on the page.
2	Mesh State	This row shows the current state of the Mesh. States include: • **Busy** | **Error(s)** | **Healthy** | **Offline** | **Reboot Required**
3	WAN CONNECTIVITY	Shows the current backhaul connection status and type.
4	SOFTWARE UPDATES and View Updates	The row is only visible when one or more software updates are available for the Mesh. The '**View Updates**' button allows you to see a summary of available updates and selectively choose which updates are applied. Software changes can occur as a result of: • Update of the packages installed • Software update • Cancellation of a paid subscription at the end of a billing period.
5	ANALYTICS	Grafana analytics is used to provide charted views of logged data metrics which includes Wi-Fi. Use the '**Enable Wi-Fi Analytics**' button to turn Grafana analytics on and off. A 'View' button is active when analytics is turned on. Select the button to open the Grafana dashboard and view the metrics. The data collection interval can be set from the drop-down list. The default time is every 1 minute:

Item #	Title	Description
		 You can also select view analytics from the VeeaHub screen (refer to Section 11.2.3). Download the Veea Grafana Analytics Tool User Guide from: *https://veea.zendesk.com/hc/en-us/articles/4411621422995-Grafana-Analytics-Tool-User-Guide* **Note**. Wi-Fi Analytics is not available on VHC05 model VeeaHubs.
6	VEEAHUBS ON THIS MESH	This section uses a record table to list Gateway and non-gateway VeeaHubs used in the selected Mesh. The table has four columns: • **Name** | **Role** | **Model** | **Status** The VeeaHub name forms an active shortcut link which opens the VeeaHubs screen.
7	SUBSCRIPTIONS	This section block shows the list of active subscriptions applied to the selected Mesh. A '**Remove**' button is used to remove a subscription from the Mesh. The '**Add a Subscription...**' button is used to add a subscription to the Mesh.
8	CELLULAR CONNECTIVITY STATISTICS	This section content is only visible with a 4G backhaul subscription. It displays key parameters which are: • **Network** • **Current Usage** • **Last Usage** • **Data Usage** • **ICID*** • **IMSEI*** • **Registration / Roaming*** • **SIM Profile*** • **CS / PS State***. The '**See more**' button reveals additional information that includes both Received (Rcvd) and Sent data in bytes for: • **Today** • **Yesterday** • **This month** • **Last month**.
9	CONNECTED DEVICES	This displays information about any Local Area Network (**LAN**) or Wi-Fi connected devices. Parameters include: • **MAC Address** | **IP Address** | **Hostname** **Note**. Information for connected devices comes from Dynamic Host Configuration Protocol (**DHCP**) leases that are provided by the Gateway VeeaHub (in routed mode). When a non gateway VeeaHub device is unenrolled from the Mesh, the connected devices information may continue to show the device present for up to 60 minutes.

Item #	Title	Description
10	SSIDS	Service Set Identifiers (**SSIDS**) are listed here. These are the broadcast Wi-Fi Access Points (**APs**). Parameters are: • **Name** | **Type** | **Band** | **WPA** | **Security** | **Status** **Note**. WPA => Wi-Fi Protected Access (**WPA**).
11	EVENTS	VeeaHubs events are software messages to indicate that something has happened with your VeeaHub. For instance, when you restart your VeeaHub, you will see events from services stopped, then started. The events section provides an area to view, filter and download logged data about your Meshes and VeeaHubs. You can select live or historic data respectively with the '**Live**' and the '**Date Range**' radio buttons. When the date range option is selected, use the Start Date and End Date pop up calendars to select the required date range to view. When event data is available, use the '**Filter event messages**' and '**Inspect**' button to refine your event view. Use the '**Newer**' and '**Older**' buttons to move back and forward in time across the displayed event data. Use the '**Download Events**' button to download event information to your computer or mobile device as a Common Separated Variable (**CSV**) file.
12	ADDITIONAL INFORMATION	This shows more information about software and various Identifiers. Used in conjunction with the 'Show more' button. It reveals: • **Software installed** • **Mesh SSID.**
Notes. To expand or collapse a single section row, click on the row. Repeated use causes the operation to toggle the expand and collapse function. **Next** and **Previous** page buttons are active when the record table exceeds its maximum length of ten rows. Selection of any column title changes the table sort order. ***Property only available on VeeaHub C25 models.		

11.4.2. Software Updates

When software updates are available, select the '**View Updates**' button from the SOFTWARE UPDATES section, which reveals update options. A dialog is presented (Figure 19) which enables you to update all available software for the selected mesh. By default you can select the '**Install selected software**' button to start the update process immediately. Alternatively the update can be delayed by selection of the '**Scheduling options**' button (Figure 20). Here you can select the '**Schedule changes for a later time**' radio button (Figure 21). Now click in the date box to invoke the pop-up calendar (Figure 22). Select the date and time then select the '**Install selected software**' button. The update begins on the date and time selected.

A confirmation message is presented after either a scheduled (Figure 23), or immediate (Figure 24) selection is made.

A new task is also created in the Active Tasks page (refer to Section 11.7) and the progress of the update can be tracked on the Mesh or Tasks page.

When updates are available for multiple Meshes, the '**Bulk update**' feature can be used to selectively choose which Meshes it will apply to (refer to Section 11.5.3).

Figure 19: Software Updates (Example)

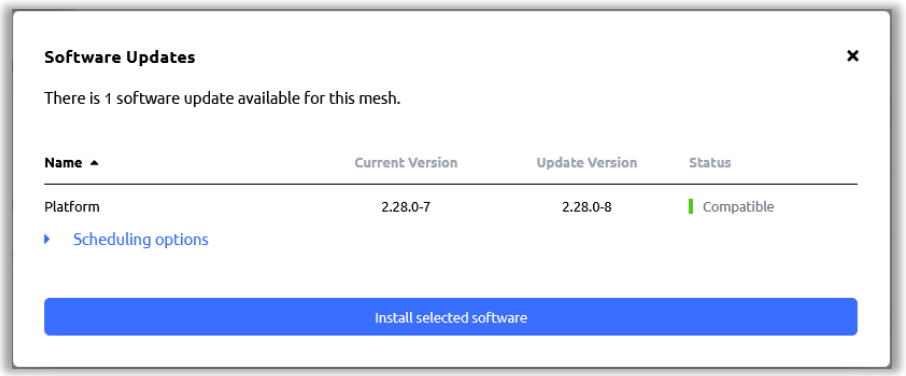


Figure 20: Scheduling Options - Apply Changes Immediately

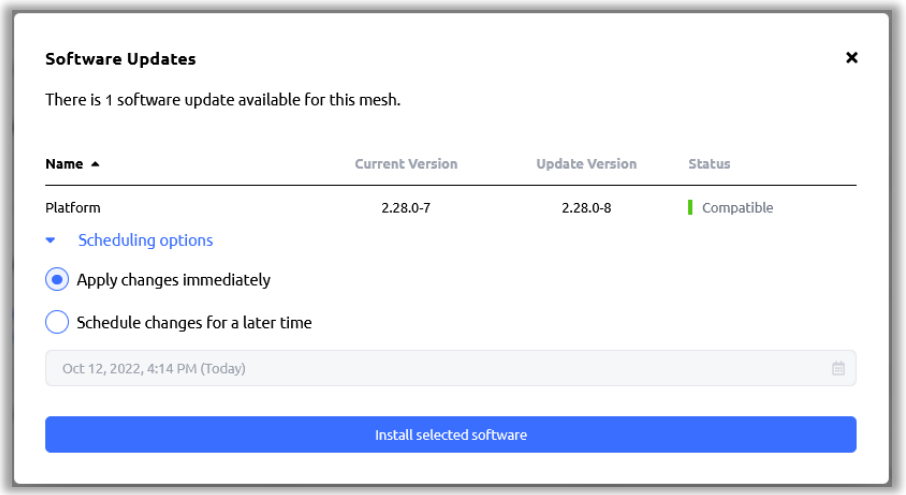


Figure 21: Scheduling Options - Schedule Changes for a Later Time

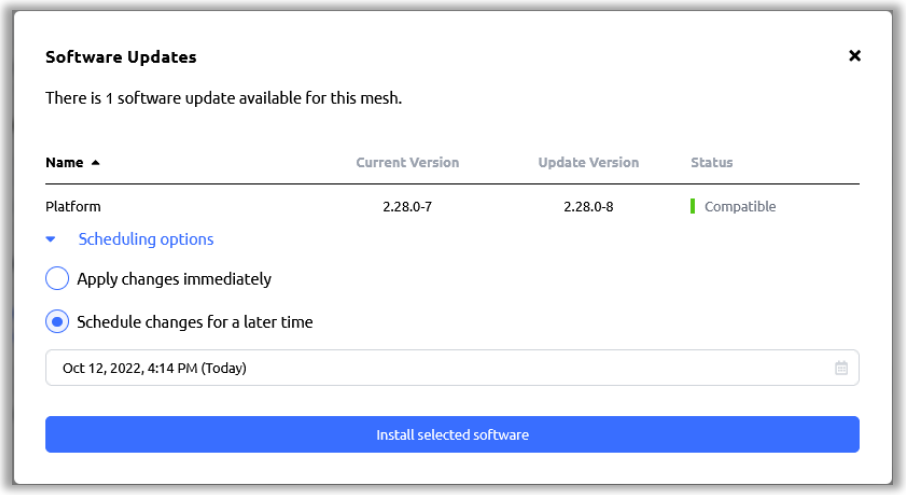


Figure 22: Schedule a Date and Time

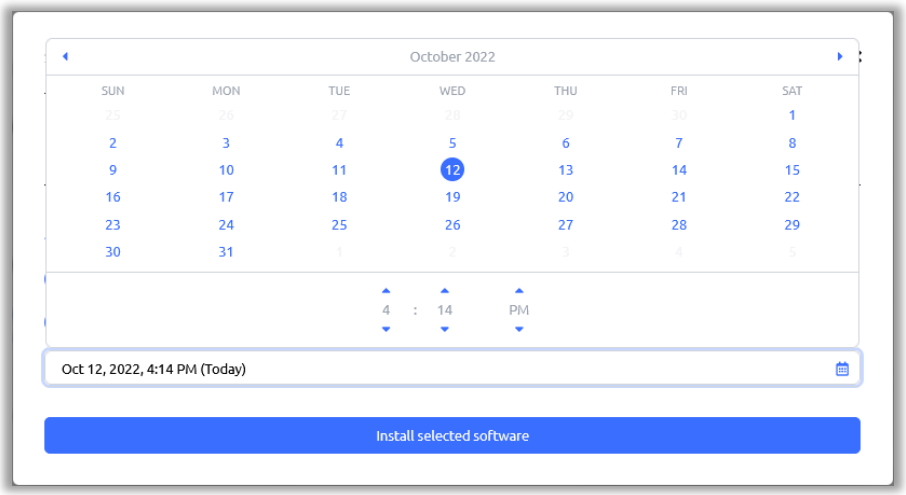


Figure 23: Software Update Started

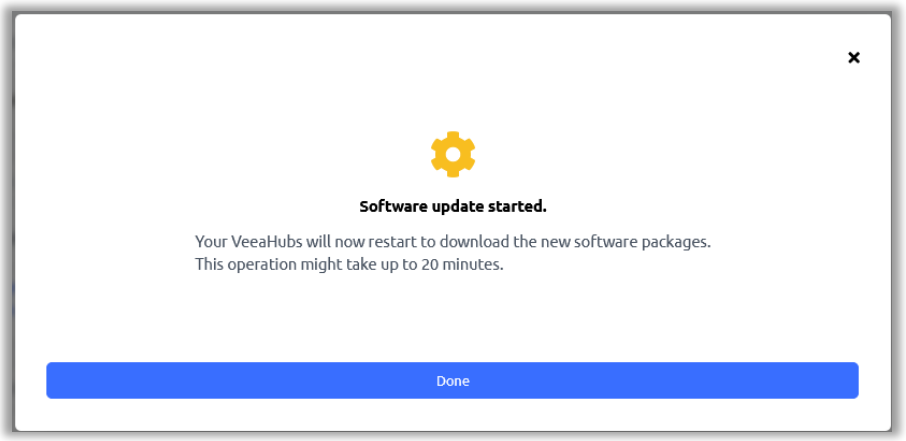


Figure 24: Software Update is Scheduled

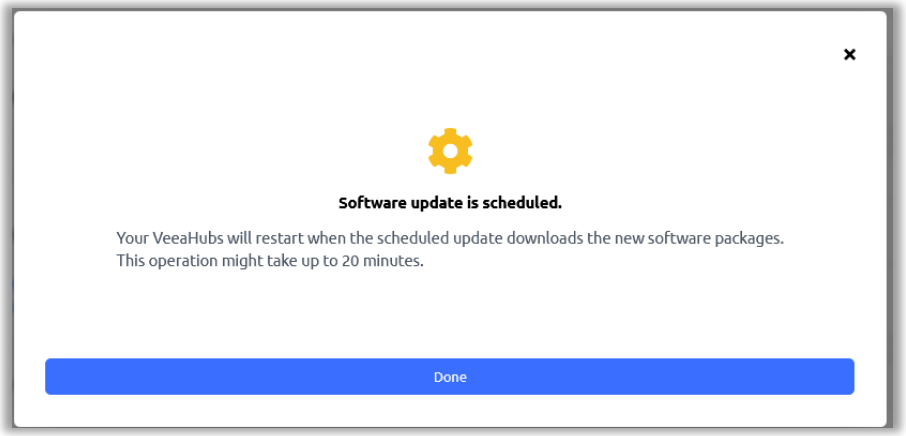
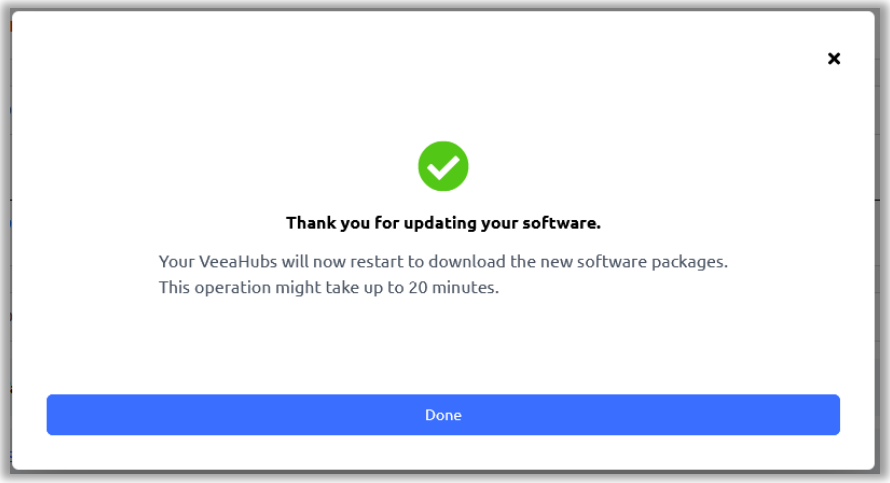


Figure 25: Update Thank You



11.4.2.1. Software Progress

Software updates are visually reported (Figure 26). When a software update is implemented, the progress is displayed graphically in the form of a horizontal bar with 16 milestone stages (circles) numbered one to sixteen. Each milestone circle has a radial line to show the progress of the current stage.

The 16 stages are:

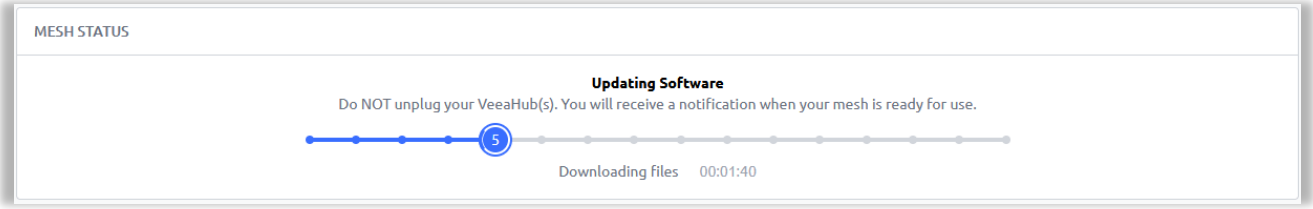
- Stage 1/16: Waiting for peers
- Stage 2/16: Checking peers
- Stage 3/16: Downloading configuration
- Stage 4/16: Inspecting configuration
- Stage 5/16: Downloading files
- Stage 6/16: Preparing platform for upgrade
- Stage 7/16: Programming bootloaders and recovery
- Stage 8/16: Programming system
- Stage 9/16: Preparing applications for upgrade
- Stage 10/16: Saving configuration
- Stage 11/16: Rebooting
- Stage 12/16: Rebooted
- Stage 13/16: Waiting for peers
- Stage 14/16: Checking peers
- Stage 15/16: Upgrading applications
- Stage 16/16: Completed.

The elapsed time is shown in sequence for each of the 16 milestones below the bar.

Note.

Do not unplug your VeeaHubs while a software update is in progress.

Figure 26: Software Updates Progress



When the software update has completed, a confirmation message confirms this on the Mesh screen status page.

Software update events are saved as a new record on the tasks history page.

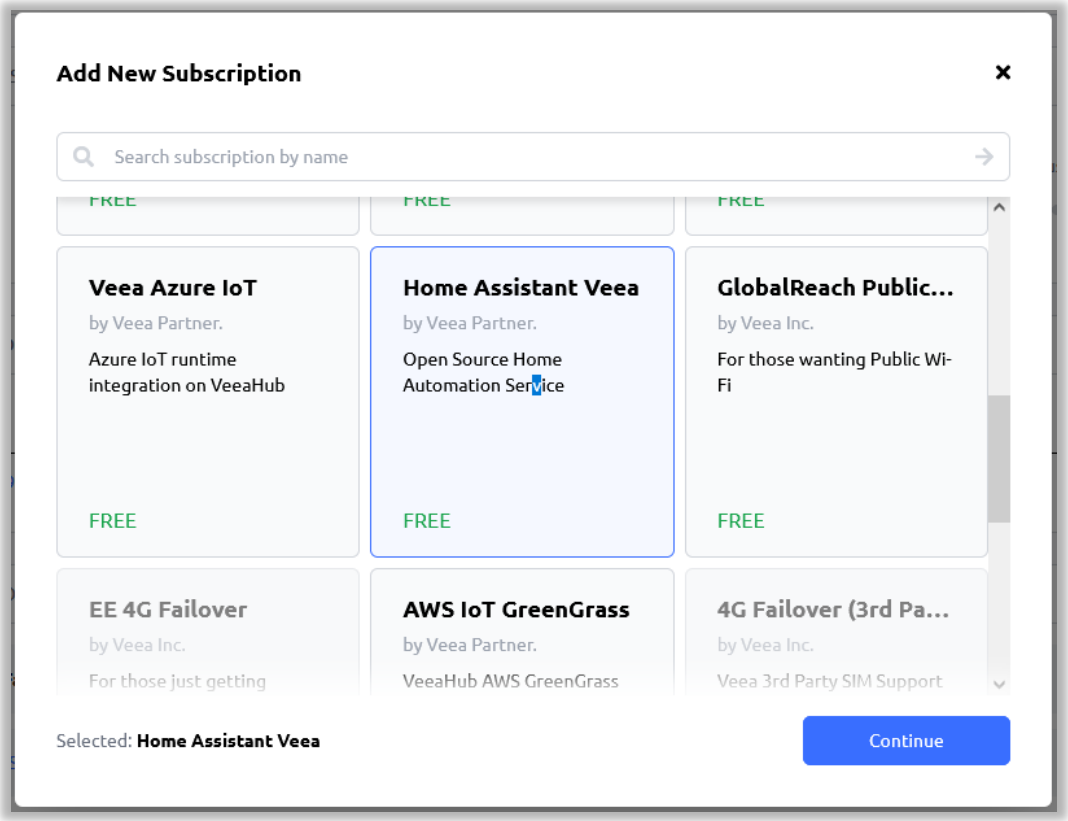
11.4.3. Subscriptions

11.4.3.1. Add a Subscription

From the SUBSCRIPTIONS section of the Meshes page, select the '**Add a Subscription...**' button, to choose and download the subscription software to your selected Mesh (Figure 27). Select the '**Continue**' button to start the subscription software download.

If you subscribe to a service, you are prompted to enter any necessary details and then taken to the payment page. These steps are specific to the particular service.

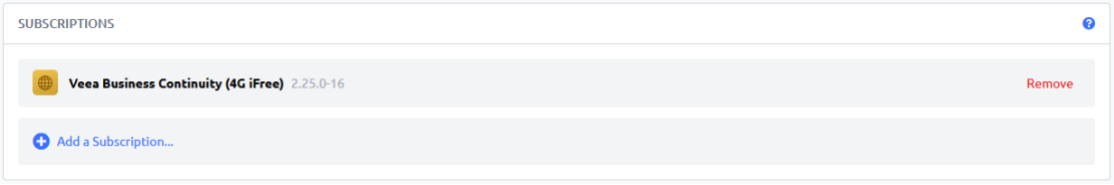
Figure 27: Select a Subscription (Example)



11.4.3.2. Remove a Subscription

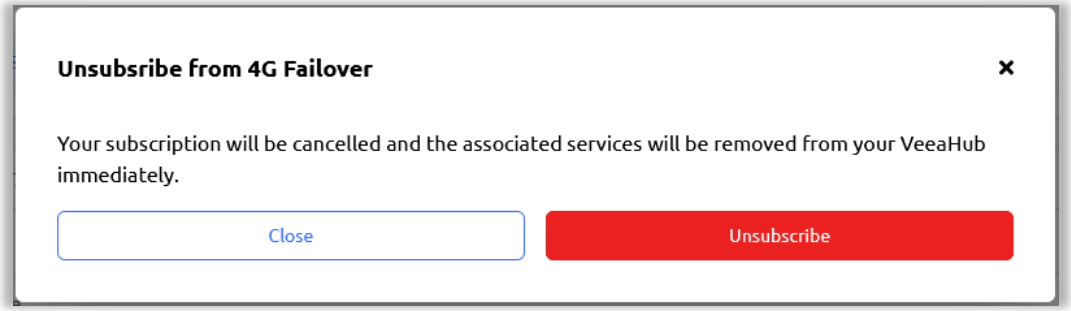
In the subscription section of the Meshes detail page, locate the required subscription to be removed. Select the '**Remove**' button located at the end of the row (refer to Figure 28).

Figure 28: Subscription Removal (Example)



Select the '**Unsubscribe**' button (Figure 29). The subscription is removed. This can take up to 30 min to complete.

Figure 29: Unsubscribe from a Subscription (Example)



11.5. Managing Subscriptions

In addition to common features shared across some other screens, the subscriptions screen provides management controls to search and view active subscriptions on a Mesh, filter Meshes by status and link to the Mesh subscriptions page where you can add and remove subscriptions.

The subscriptions screen is split into three parts:

- ACTIVE SUBSCRIPTIONS (default) – Refer to Section 11.5.1
- PAYMENT METHODS – Refer to Section 11.5.2
- SOFTWARE UPDATES – Refer to Section 11.5.3.

11.5.1. Active Subscriptions

The ACTIVE SUBSCRIPTIONS screen (Figure 30) is divided into two sections as described in Table 14.

Figure 30: Subscriptions – Active Subscriptions

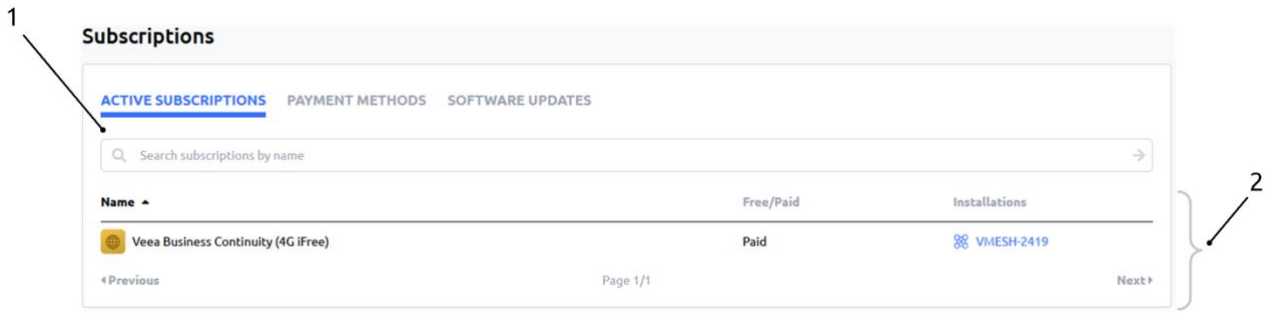


Table 14: Active Subscriptions – Details

Item #	Title	Description
1	Search	The search bar allows you to search for subscription packages subscribed to your Meshes. It is an incremental search where you only need to enter a part of the required search string to find matches.
2	Subscriptions record table	A record table shows a list of the current subscriptions that are active on the selected Mesh. The record table data includes three columns of data which are: • **Name** | **Free/Paid** | **Installations** Mesh names listed under the Installations column title form a shortcut link which takes you to the associated Meshes page where new subscriptions can be added, or active subscriptions removed (unsubscribed).
Notes. Next and Previous page buttons are active when the record table exceeds its maximum length of ten rows. Selection of any column title changes the table sort order.		

11.5.2. Payment Methods

The PAYMENT METHODS screen (Figure 31) is divided into two sections which are described in Table 15.

Figure 31: Subscriptions – Payment Methods

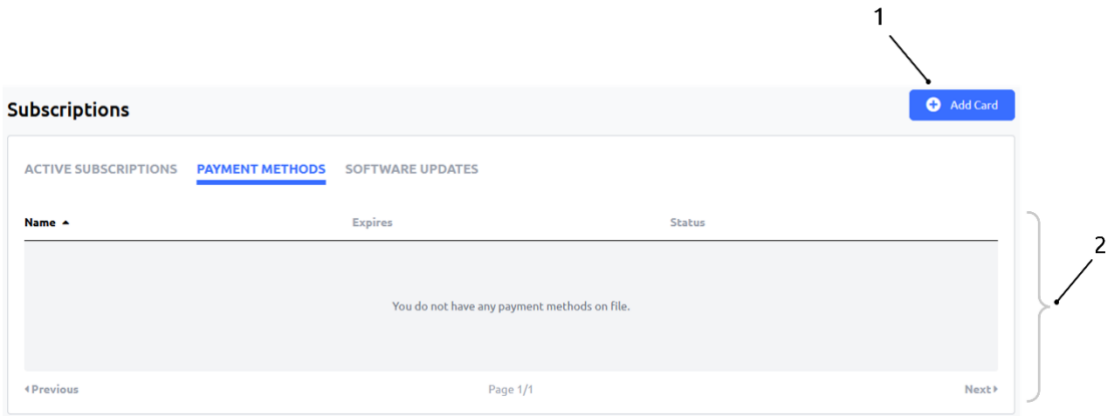


Table 15: Payment Methods Description

Item #	Title	Description
1	Add Card	This pops up a dialog screen which allows you to enter payment card type and details (Figure 32). These can be saved for future use.
2	Payment Card record table	A record table shows a list of the current payment cards attributed to your Veea Control Center account. Data columns include: • **Name** | **Expires** | **Status**
Notes. Next and Previous page buttons are active when the record table exceeds its maximum length of ten rows. Selection of any column title changes the table sort order.		

11.5.2.1. Add Card

When the '**Add Card**' button is selected (Figure 31, Item 1), the add card dialog form pops up (Figure 32). Enter the details as described in Table 16.

Figure 32: Subscriptions – Payment Card Details

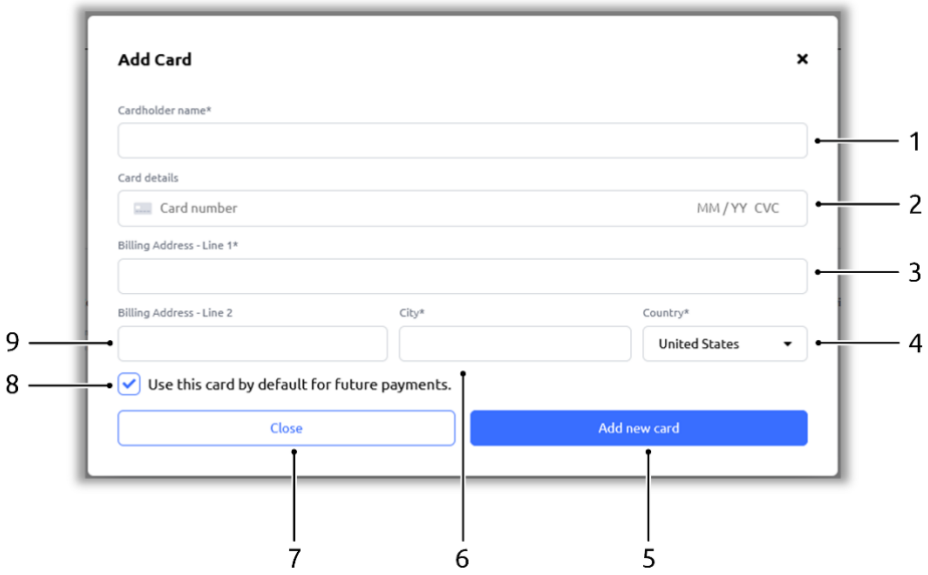


Table 16: Add Card Details

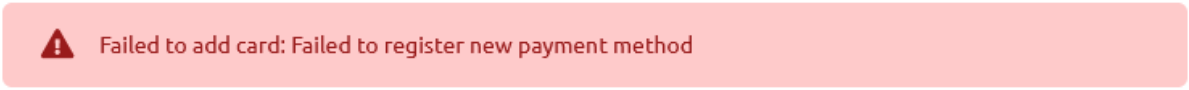
Item #	Title	Description
1	Cardholder name	Enter the name as shown on the front of the card holders card.
2	Card details	Enter the long number on the front of the card, followed by the card expiry date and the last three digits of the security code, which is found on the rear of the card.

Item #	Title	Description
3	Billing Address - Line 1	Enter the first part of the billing address.
4	Country	Select the country that the card was registered in. The button shows a drop-down list of countries to choose from.
5	Add new card	Select this button to enter new card details.
6	City	Enter the address city.
7	Close	Select to close the add card form.
8	Card default	The box is selected by default. Deselect the box if you do not want the card to be used for future payments.
9	Billing Address - Line 2	Enter the second part of the address.

Notes.

Parameters followed by an asterisk (*) indicate that the value is required.

If the card details are not valid, you are prompted with an error message as follows:



11.5.3. Software Updates

The SOFTWARE UPDATES screen (Figure 33) is divided into four sections which are described in Table 17.

Figure 33: Subscriptions – Software Updates

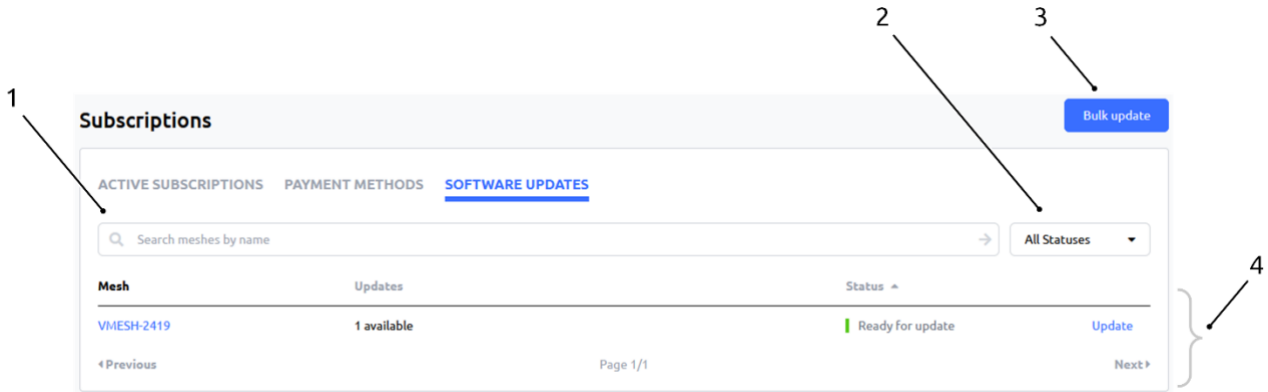
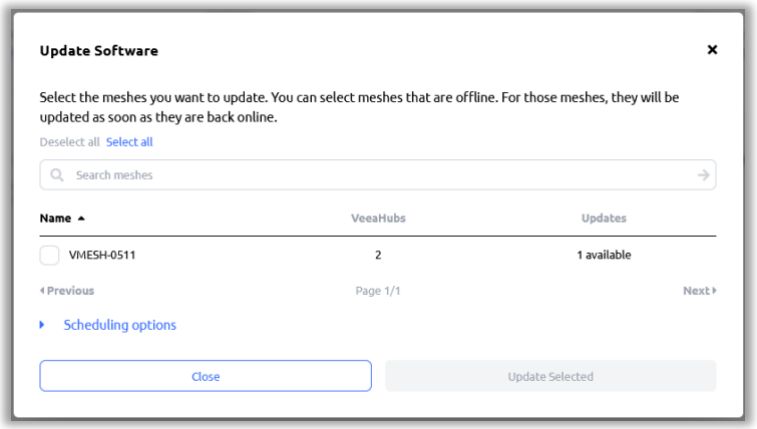
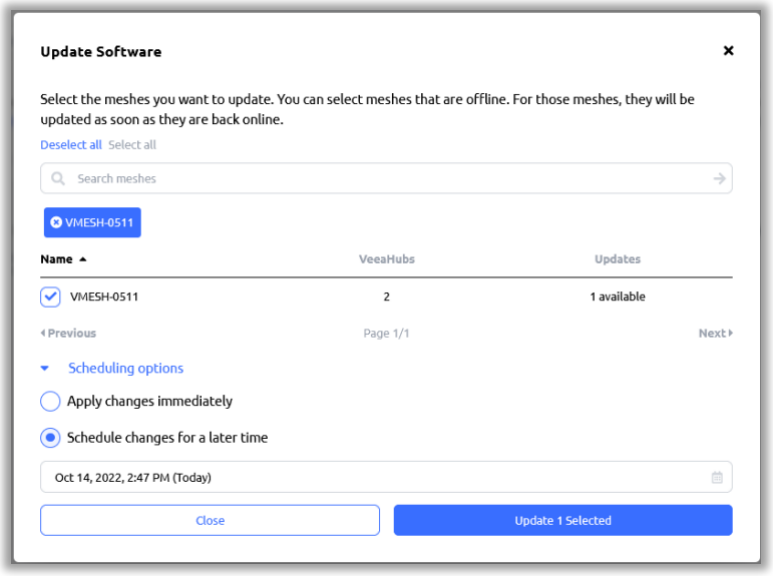
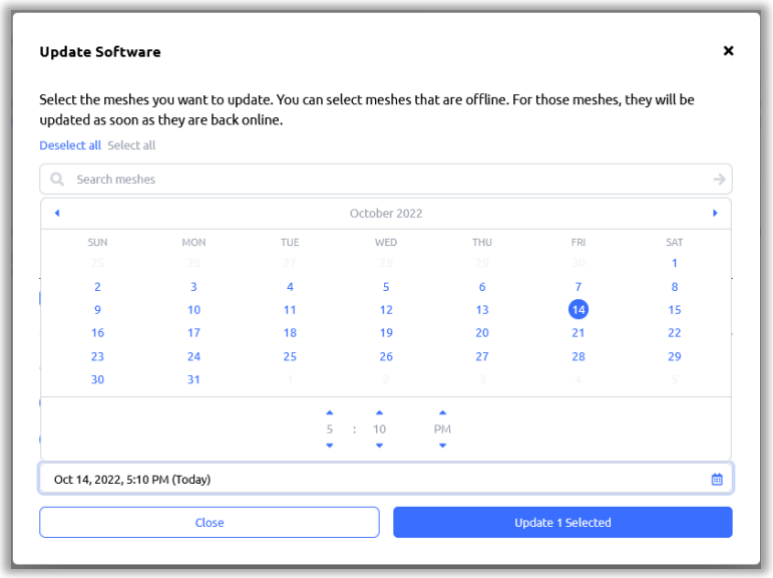
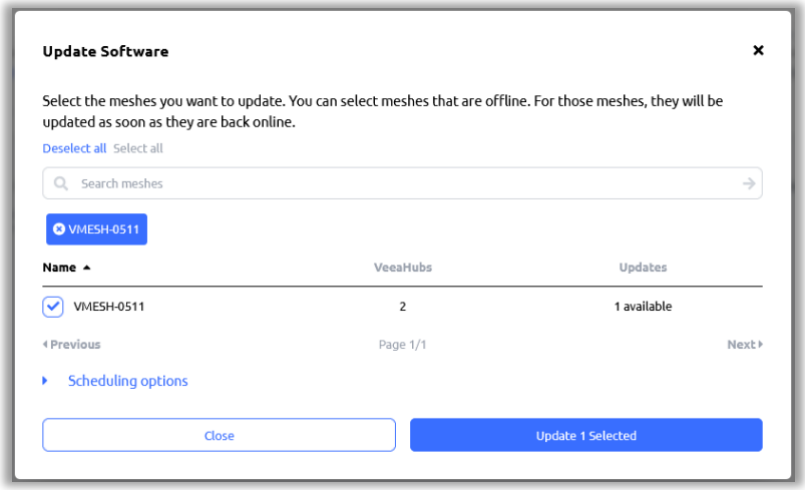
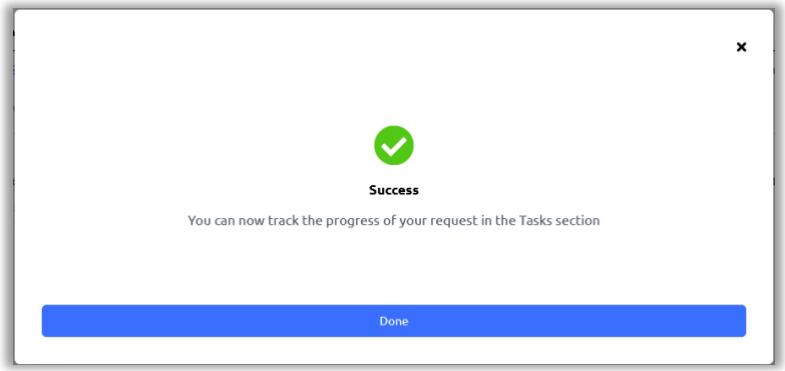


Table 17: Subscriptions – Software Updates Details

Item #	Title	Description
1	Search	The search bar allows you to search Meshes by name. It is an incremental search where you only need to enter a part of the required search string to find matches.

Item #	Title	Description
2	Filter by Status	This button provides status filter options for Mesh software updates listed in the subscription record table (Item 4). Six filter categories are available: • **All Statuses** | **Busy** | **Error(s)** | **Healthy** | **Offline** | **Reboot Required**
3	Bulk update	The '**Bulk update**' button allows you to select the Meshes you want to update. You can select Meshes offline and these will begin their software update when they are back online. When the bulk update button is selected, a dialog is presented with a Mesh search facility and record table which lists the Meshes in your group which have available software updates. Select (tick) the box against the Mesh names you would like to update. Deselect the box to remove it from selection. **Note**. Users cannot select meshes which have a '**Busy**' status at the moment of viewing the list.  When a Mesh is selected for update, the Update selected button is highlighted and indicates the quantity of selected Meshes that will be included. Select the '**Update # selected**' button (where # => the number of selected Meshes) to start the software update or '**Close**' button to cancel the operation. Individual Meshes can also be removed from the update by selection of the appropriate mesh 'X' icon which appears under the search bar:  Expand the **'Scheduling options**' menu to select and configure a preferred date and time to start the software update.

Item #	Title	Description
		 Click in the date/time box to invoke the pop up calendar and choose the required start date and time.  The '**Select all**' button allows you to select all the available Meshes to update and '**Deselect all**' to deselect all meshes from selection.

Item #	Title	Description
		 After the '**Update**' button is selected a success confirmation dialog is shown. You can track the software update progress from the tasks screen (Refer to Section 11.7.1). 
4	Mesh subscription software update record table	The record table displays a list of Meshes with available updates. Data is spread across three columns labelled: • **Mesh** | **Updates** | **Status** An '**Update**' button is available at the end of the row. This allows you to update a single Mesh.
Notes. Next and Previous page buttons are active when the record table exceeds its maximum of ten rows. Selection of any column title changes the table sort order.		

11.6. Managing Locations

The locations screen (Figure 34) leverages Open Street Maps (**OSM**) to provide a facility to allow you to accurately enter global locations for your VeeaHubs and display these on a detailed map (Figure 35).

In addition to some features shared across other screens, the LOCATIONS screen has three sections as described in Table 18.

Figure 34: Locations Screen

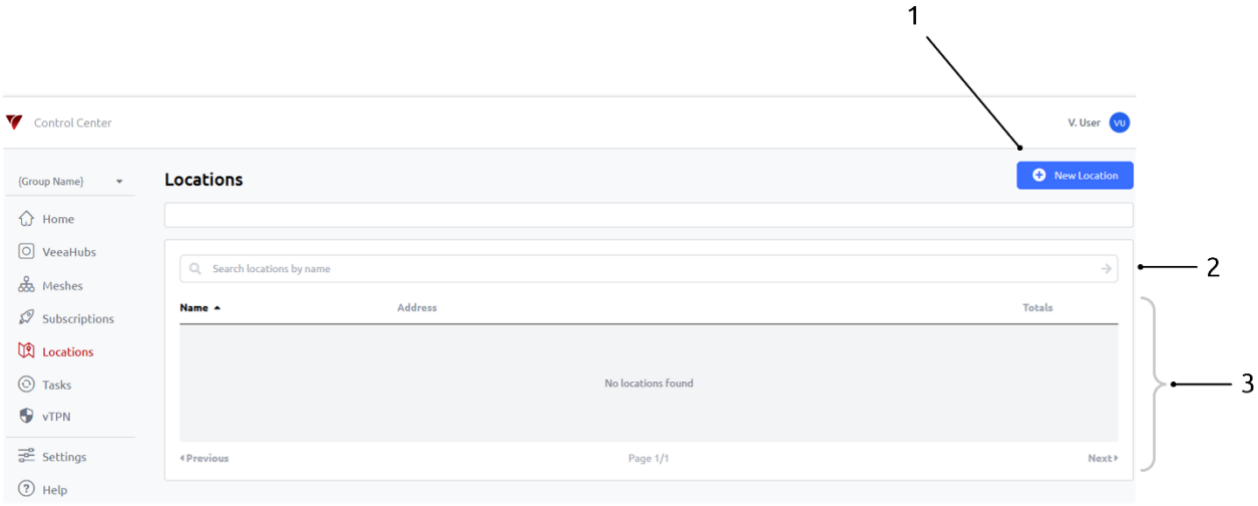


Table 18: Locations Screen Description

Item #	Title	Description
1	New Location	The new location button allows you to create a new OSM location.
2	Search Locations by Name	The search feature allows you to search the locations record table (Item 3) by name. This is the name that was assigned to the location when it was created. It is an incremental search where you only need to enter a part of the required search string to find matches.
3	Locations Record Table	A record table displays the list of assigned locations. Data is spread across three columns labelled: • **Name** | **Address** | **Totals**. The data titles are described as follows: • **Name** - This is the assigned name given to the location when it is created. • **Address** - This is the address provided by OSM and affiliated to the longitude and latitude coordinates provided, either from the map, or manually entered. • **Totals** - This is the quantity of VeeaHubs assigned to the listed location. The status is indicated as follows: – No VeeaHubs - Orange colored vertical bar – Assigned VeeaHubs - Green vertical bar. Selection of a name from the records table opens the locations detail page for the selected location. Here you can: • Add nodes • Delete a map location • Remove a VeeaHub assigned to a location • Edit the map location name • Edit the map location.
Notes. Next and Previous page buttons are active when the record table exceeds its maximum length of ten rows. Selection of any column title changes the table sort order Location names must be unique.		

11.6.1. Add a Location

Map locations can be added in three ways as follows:

- **Add a Location (Automatically from Map Coordinates)** - Refer to Section 11.6.1.1
- **Add a Location (from Longitude/Latitude Coordinates)** - Refer to Section 11.6.1.2
- **Add a Location (from Address)** - Refer to Section 11.6.1.3.

11.6.1.1. Add a Location (Automatically From Map Coordinates)

To add a new location automatically from map coordinates, select the **'New Location**' button (Figure 34, Item 1) which opens the new location screen (Figure 35):

1. Enter a unique location name in the '**Location Name**' text box (this can be any alpha-numeric string).
2. Click anywhere on the map, hold the left click and drag the map in any direction to move to the required location. Use the '**+/-**' buttons to zoom in and out of the map.
3. At the required map location insertion point, left click on the map and select the '**Set pin**' button. The longitude and latitude coordinates are automatically entered into the 'Address / Coordinates' field.
4. Select the '**Create**' button (**Note**. The 'Create' button will stay disabled until a valid map location has been found and the location name has been entered).
5. A message dialog is presented which confirms that the operation was a success. Select '**Done**' to close the message.
6. The locations screen is now displayed which shows the list of configured locations in the location record table (Figure 36) and a pinned icon at each location on the map (Item 1 and Item 2). Each pin icon also forms a link to the details page for the selected location.

Figure 35: New Location Screen

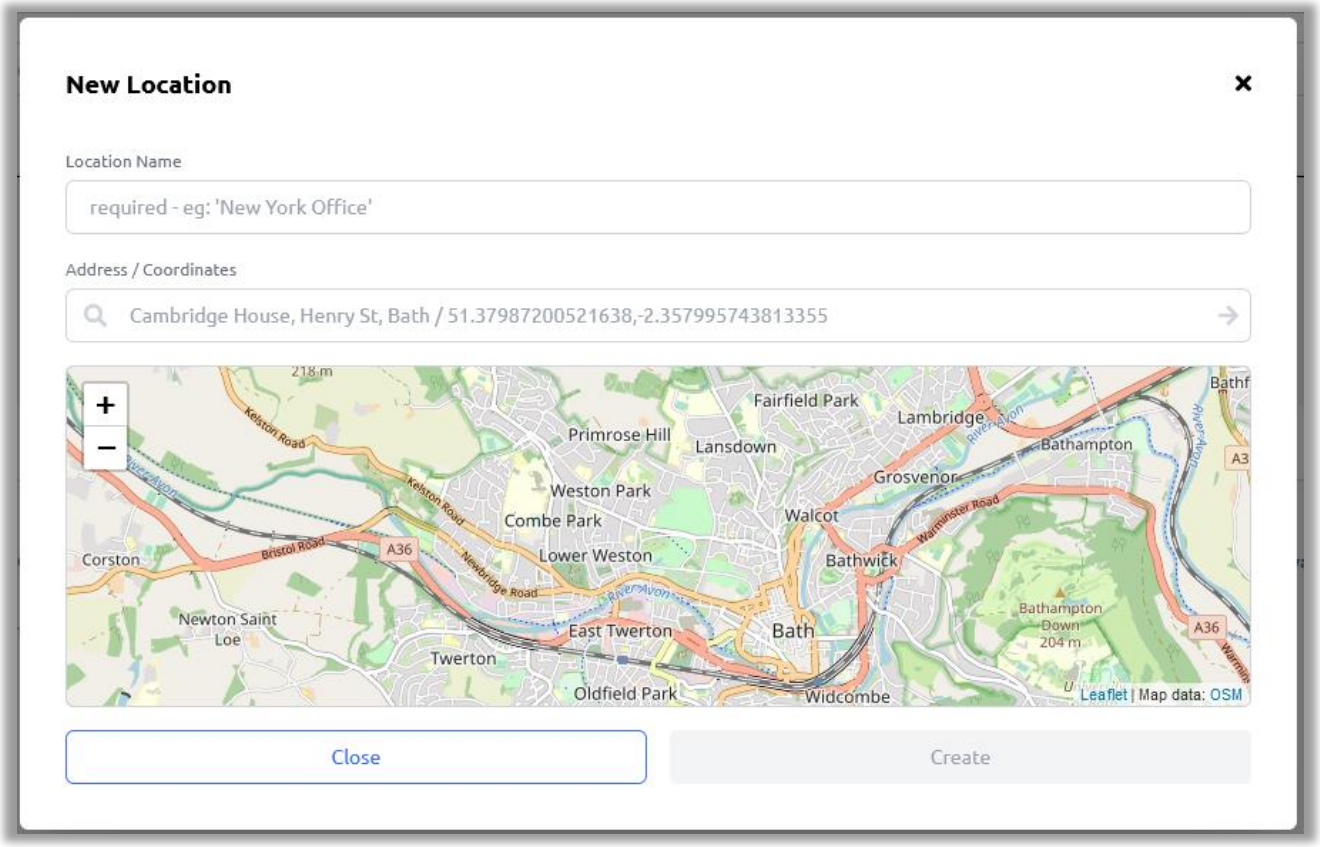
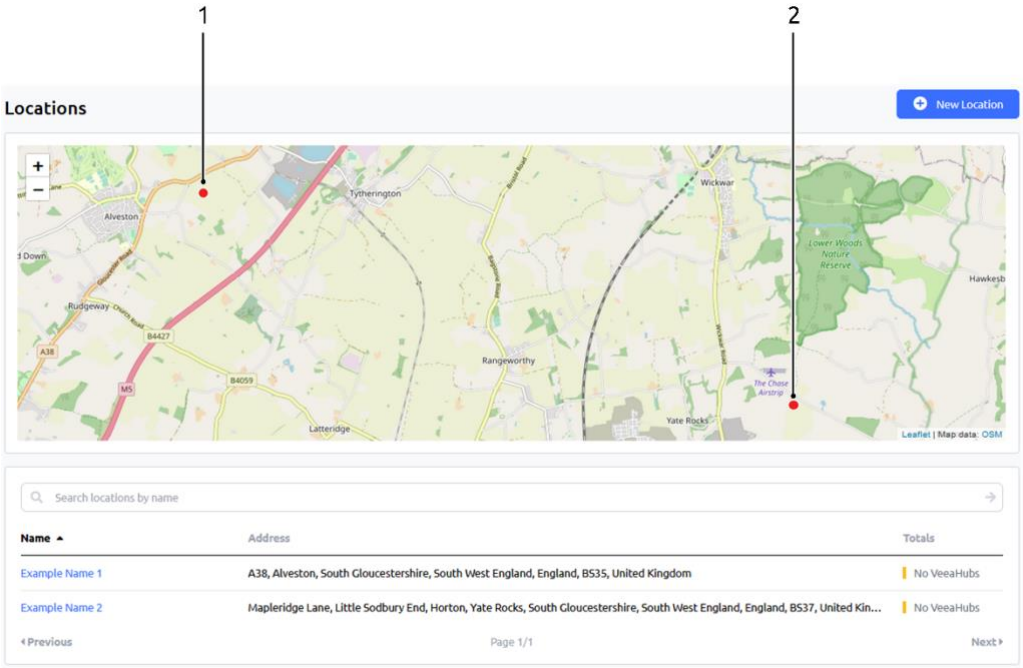


Figure 36: Location Record (Example)



Notes.

Dependent on the map zoom level, pinned locations display on the map in different ways. When you zoom into the map, individual locations are identified with a red-colored circle pinned icon (Figure 37). As you zoom out of the map, each location in an area will coalesce with adjacent locations and these then show as a set of green-colored shaded rings (Figure 38). The center of the circle indicates the quantity of sub locations within the selected area.

When you click on a pin location, it takes you to the locations detail page (Figure 41).

Figure 37: Single Location Zoomed In – Red Dot Pinned Icon

Figure 38: Multiple Locations Zoomed Out - Group Icon

11.6.1.2. Add a Location (From Longitude/Latitude Coordinates)

To create a new location from manually entered longitude and latitude coordinates, select the '**New Location**' button (Figure 34, Item 1) which opens the new location screen (Figure 35):

1. Enter a unique location name in the '**Location Name**' text box (this can be any alpha-numeric string).
2. Source the longitude and latitude coordinates for the required location (for example, from Google maps) and type or paste these (16-digit format comma delimited) into the '**Address / Coordinates**' entry box.
3. Select the arrow '→' button located to the left side of the 'Address / Coordinates' text line.
4. Select the '**Create**' button (**Note**. The 'Create' button will stay disabled until a valid map location has been found and the location name has been entered).
5. A message dialog is presented which confirms that the operation was a success. Select '**Done**' to close the message.
6. The locations screen is displayed which shows the list of configured locations in the location record table (Figure 36) and a pinned icon on the map at each location (Item 1 and Item 2).

11.6.1.3. Add a Location (From Address)

To add a new location from an address, select the '**New Location**' button (Figure 34) which opens the new location screen (Figure 35):

1. Enter a unique location name in the '**Location Name**' text box (this can be any alpha-numeric string).

2. Type in the required address with comma delimited properties into the '**Address / Coordinates**' entry box.
3. Select the arrow '→' button located to the left side of the 'Address / Coordinates' text line. A place marker is automatically created and placed at the required location on the map.
4. Select the '**Create**' button (**Note**. The 'Create' button will stay disabled until a valid map location has been found and the location name has been entered).
5. A message dialog is presented which confirms that the operation was a success. Select '**Done**' to close the message.
6. The locations screen is displayed which shows the list of configured locations in the location record table (Figure 36) and a pinned icon at each map location (Item 1 and Item 2).

11.6.2. Add a Mesh to a Location

To add a Mesh to a location, select the 'Locations' screen (Figure 34):

1. Select the location name from the record table of locations (Figure 36). This opens the location details screen (Figure 39). Select the '**Add Meshes**' button.
2. The Add Meshes selection dialog appears. Select (tick) the '**Action**' box for the required Mesh row (Figure 40). **Note**:
   - In the list of Meshes, users can have 10 meshes per page
   - Meshes can be sorted by name, status and action
   - Meshes with installing status during initial bootstrap to the user group will not be available in the list of meshes.
   - Meshes with all statuses are allowed to be assigned: healthy, offline, errors, reboots required and installing during recovery.
   - Users can add more than one mesh at a time.
3. Select the '**Add # Mesh(es)**' button (Figure 40). A message dialog is presented which confirms that the operation was a success. Select '**Done**' to close the message.
4. The associated Meshes are now assigned to the location and listed in the record table of VeeaHubs and Meshes at the defined location.

Notes.

A Mesh can only be added to one location.

The record table of VeeaHubs and Meshes can be selectively filtered with the 'VeeaHubs' and 'Meshes' buttons.

For each selected Mesh (action box ticked), a button is automatically added above the record table (Figure 40). Use the button as an alternative way to remove the Mesh from the list of selected Meshes.

Figure 39: Locations Detail Add Nodes Button

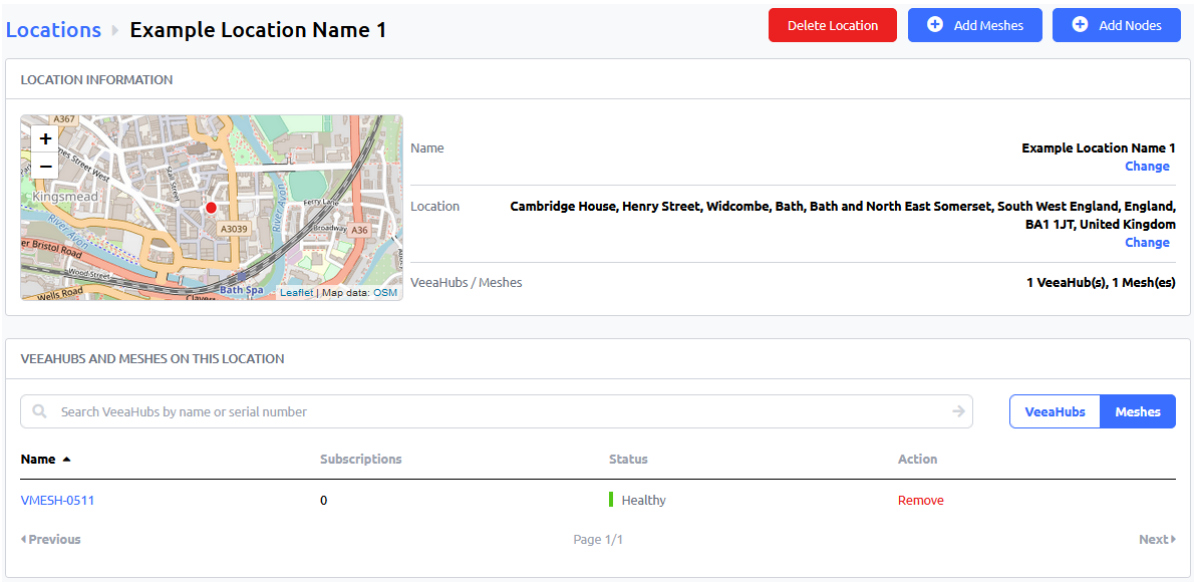
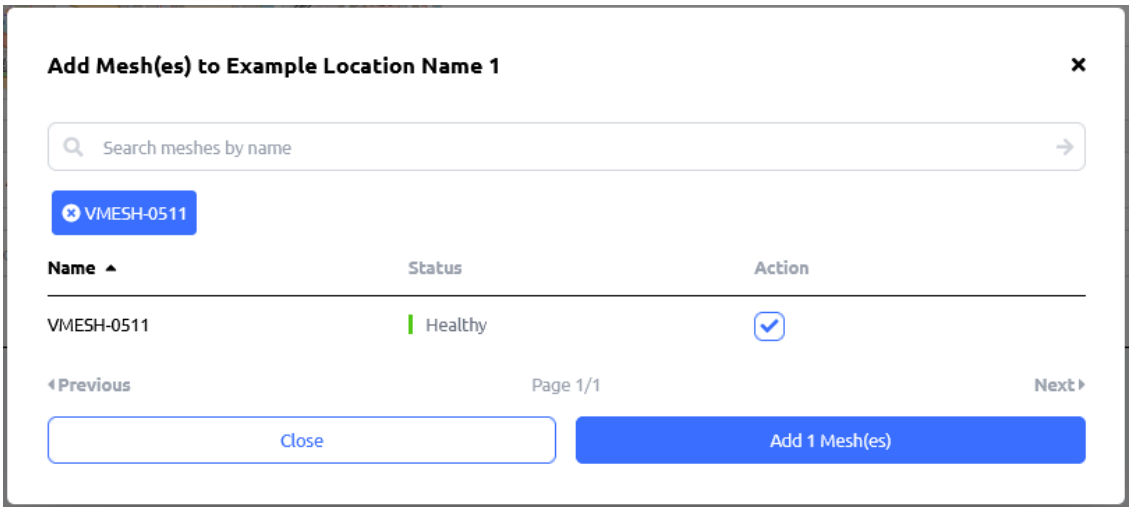


Figure 40: Add Meshes Selection (Example)



11.6.3. Add a VeeaHub to a Location

To add a VeeaHub node to a location, select the '**Locations**' screen (Figure 34):

1. Select the location name from the record table of locations. This opens the location details screen (Figure 41). Select the '**Add Nodes**' button.
2. The Add Node selection dialog appears. Select (tick) the '**Action**' box for the required VeeaHub row (Figure 42). **Note**:
   - In the list of VeeaHubs, users can have 10 nodes per page
   - Nodes can be sorted by name, role and status
   - VeeaHubs with installing status during initial bootstrap to the user group will not be available in the list of nodes.
   - VeeaHubs with all statuses are allowed to be assigned: healthy, offline, errors, reboots required, installing during recovery.
   - Users can add more than one node at a time.

3. Select the '**Add Nodes**' button (Figure 42). A message dialog is presented which confirms that the operation was a success. Select '**Done**' to close the message.
4. VeeaHubs are now assigned to their location and listed in the record table of VeeaHubs and Meshes at the defined location.

Notes.

A VeeaHub can only be added to one location.

The record table of VeeaHubs and Meshes can be selectively filtered with the '**VeeaHubs**' and '**Meshes**' buttons.

For each selected VeeaHub (action box ticked), a button is automatically added above the record table (Figure 40). Use the button as an alternative way to remove the VeeaHub from the list of selected VeeaHubs.

Figure 41: Locations Details - Add Nodes Button

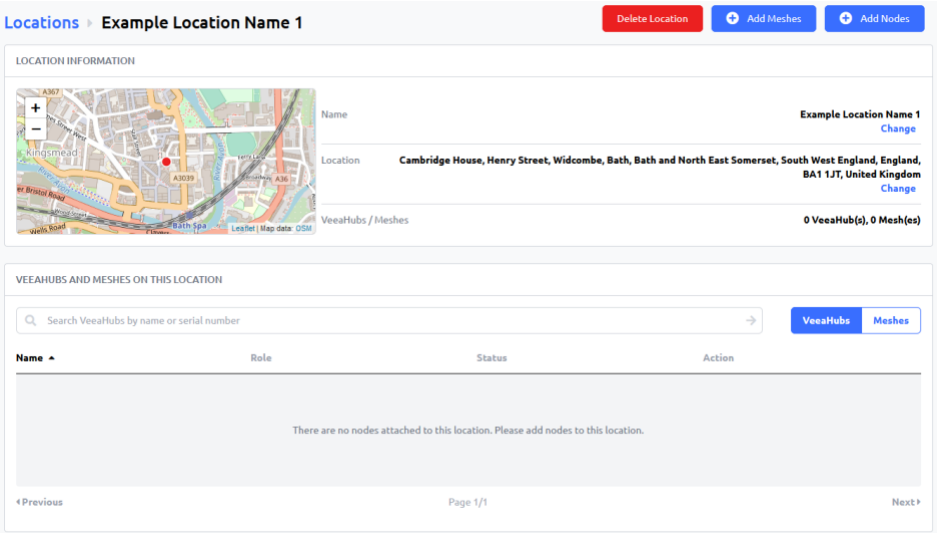
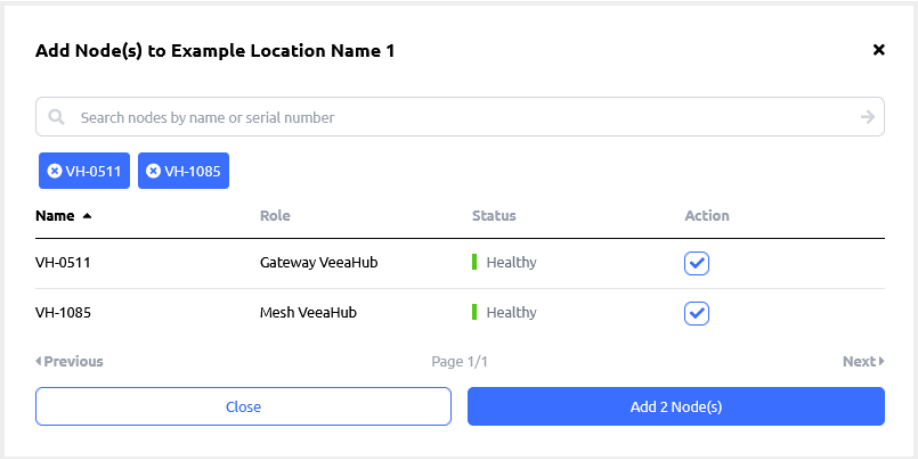


Figure 42: Add Nodes VeeaHub Selection (Example)



11.6.4. Delete a Map Location

To delete a map location, select the '**Locations**' screen (Figure 34):

1. Identify and select the required location name from the record table of locations.
2. Select the '**Delete Location**' button (Figure 43).
3. A Delete confirmation dialog is presented. Select the '**Delete**' button.
4. A message dialog is presented which confirms that the operation was a success. Select '**Done**' to close the message.
5. The screen reverts to the locations page.

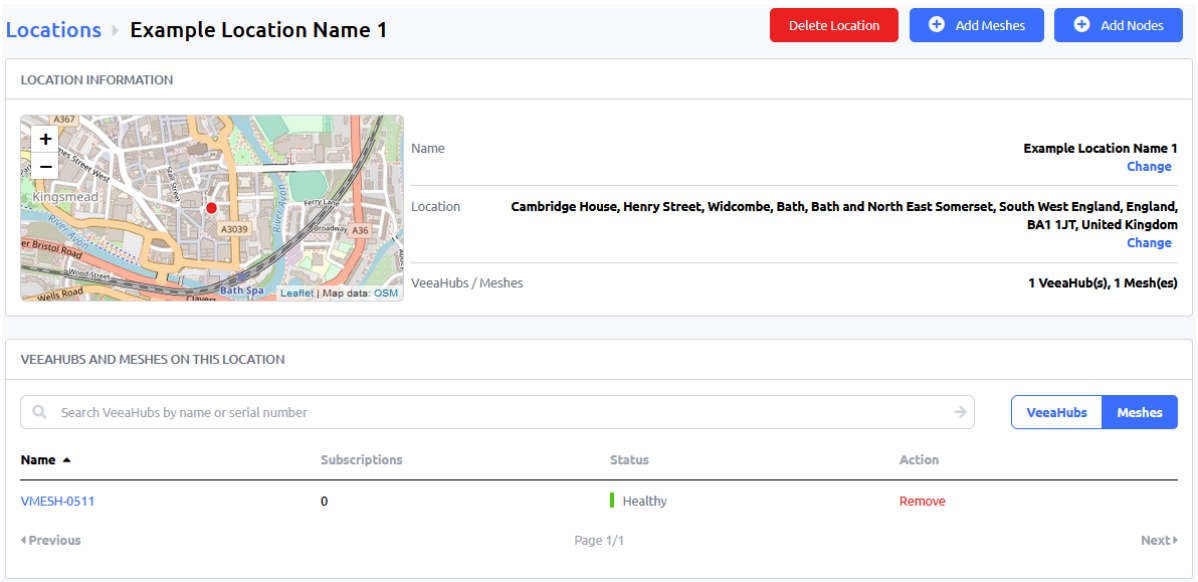
Figure 43: Delete Location Button

11.6.5. Remove a Mesh from a Location

To remove a Mesh from a location select the '**Locations**' screen (Figure 34):

1. From the record table of locations, identify and select the required location name which contains the Mesh to be removed.
2. In the record table of VeeaHubs and Meshes, identify and select the required Mesh to be removed. Use the '**Meshes**' filter button to view only meshes in the list. Under the 'Action' column, select the '**Remove**' button for the mesh which requires deletion (Figure 44).
3. A remove confirmation dialog is presented. Select the '**Remove**' button.
4. A message dialog is presented which confirms that the operation was a success. Select '**Done**' to close the message.
5. The screen reverts to the locations detail page.

Figure 44: Delete Location Button



11.6.6. Remove a VeeaHub from a Location

To remove a VeeaHub from a location select the '**Locations**' screen (Figure 34):

1. From the record table of locations, identify and select the required location name which contains the VeeaHub to be deleted.
2. In the record table of VeeaHubs, identify and select the required VeeaHub to be removed. Select the '**Remove**' button located under the 'Action' column (Figure 43).
3. A remove confirmation dialog is presented. Select the '**Remove**' button.
4. A message dialog is presented which confirms that the operation was a success. Select '**Done**' to close the message.
5. The screen reverts to the locations detail page.

11.6.7. Edit a Map Name

To edit a map location name, select the 'Locations' screen (Figure 34):

1. From the record table of locations, identify and select the required location to edit. The locations detail page is now displayed (Figure 45).
2. Select the name '**Change**' button (Item 1) which opens the rename dialog (Figure 46). Type the new name in the 'Location name' field followed by the 'Rename' button.
3. A message dialog is presented which confirms that the operation was a success. Select '**Done**' to close the message.
4. The screen reverts to the locations detail page and the location name is updated.

Figure 45: Edit Location Details

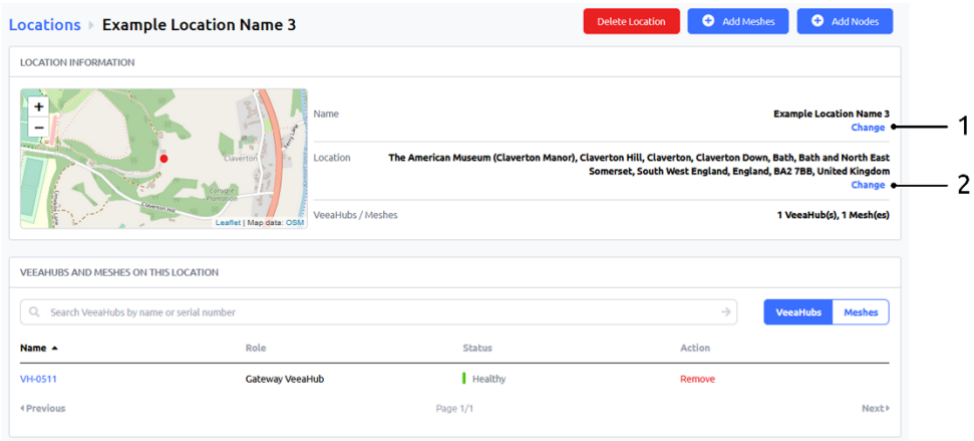


Figure 46: Edit Map Location Name

11.6.8. Edit a Map Location

Changes to the map location can be made in three ways:

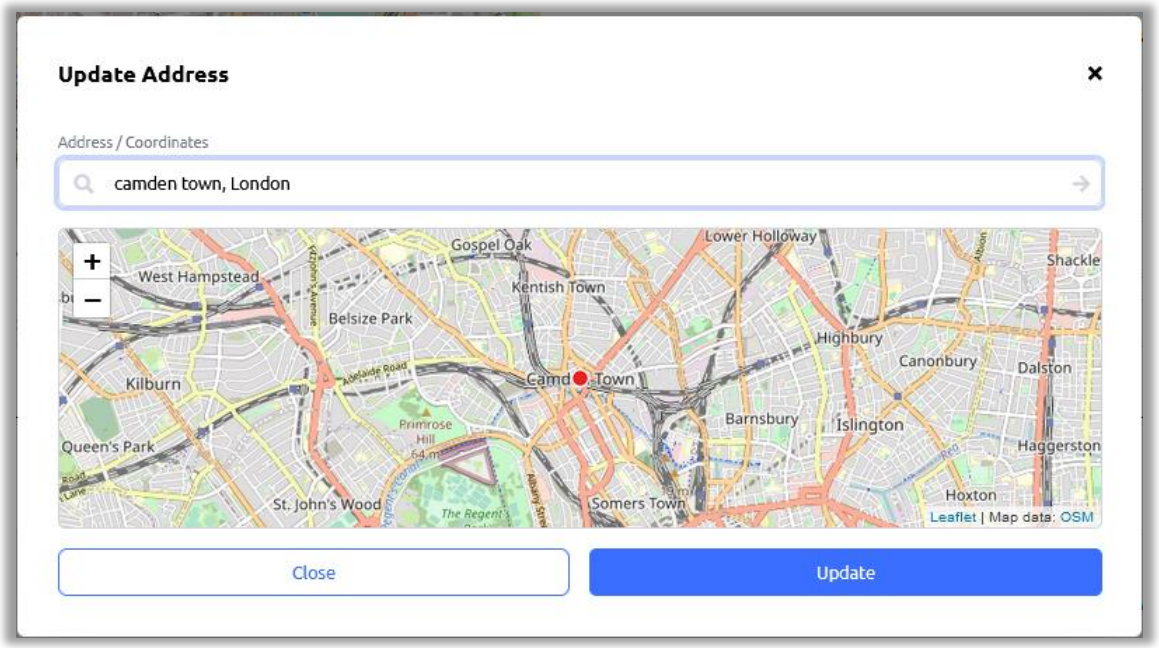
- **Edit a Map Location (By Address Change)** - Refer to Section 11.6.8.1
- **Edit a Map Location (Automatically from Map Coordinates)** - Refer to Section 11.6.8.2
- **Edit a Map Location (Manual Coordinate Entry)** - Refer to Section 11.6.8.3

11.6.8.1. Edit a Map Location (By Address Change)

Select the '**Locations**' screen (Figure 34):

1. From the locations record table, identify and select the required location to edit. The locations detail page is now displayed (Figure 45).
2. Select the map location '**Change**' button (Figure 45, Item 2) which opens the rename dialog (Figure 46). Enter the new address in the '**Address / Coordinates**' text field (Figure 47). The address is comma delimited.
3. Select the arrow '→' button located to the left side of the 'Address / Coordinates' text line.
4. Select the '**Update**' button. **Note**. The 'Update' button will stay disabled until a valid map location has been found.
5. A message dialog is presented which confirms that the operation was a success. Select '**Done**' to close the message.
6. The screen reverts to the locations detail page and the location is updated.

Figure 47: Edit Map Location (Manual Address Entry)



11.6.8.2. Edit a Map Location (Automatically From Map Coordinates)

Select the '**Locations**' screen (Figure 34):

1. From the record table of locations, identify and select the required location to edit. The locations detail page is now displayed (Figure 45).
2. Select the map location '**Change**' button (Figure 45, Item 2) which opens the update name dialog (Figure 47).

3. Click anywhere on the map, hold the left click and drag the map in any direction to move to the required location. Use the '+/-' buttons to zoom in and out of the map.
4. At the required map location insertion point, left click on the map and select the '**Set pin**' button (Figure 48).
5. The new longitude and latitude coordinates are automatically entered into the 'Address / Coordinates' field (Figure 49).
6. Select the '**Update**' button (Figure 49). **Note**. The 'Update' button will stay disabled until a valid map location has been found.
7. A message dialog is presented which confirms that the operation was a success. Select 'Done' to close the message.
8. The screen reverts to the locations detail page and the location is updated.

Figure 48: Edit Map Location (Set Pin Button)

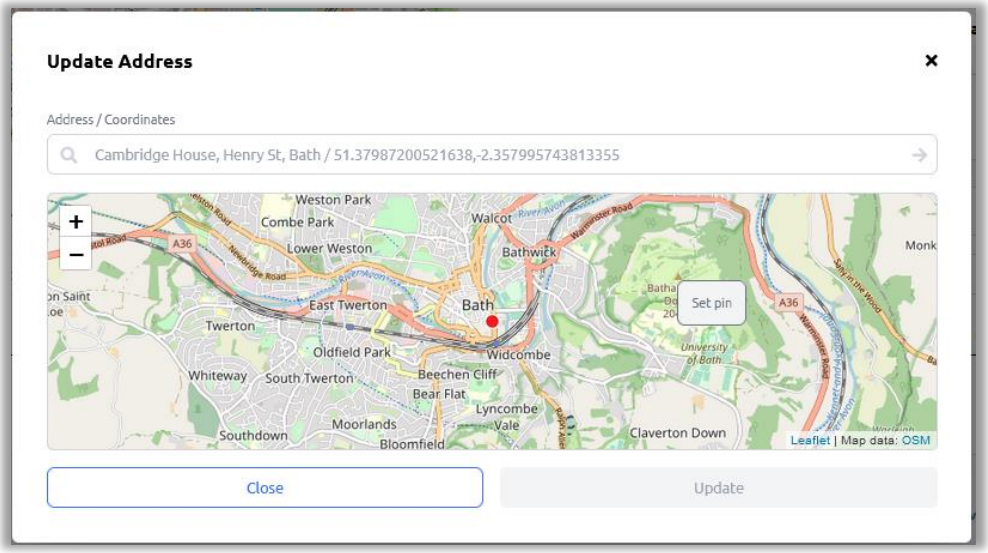
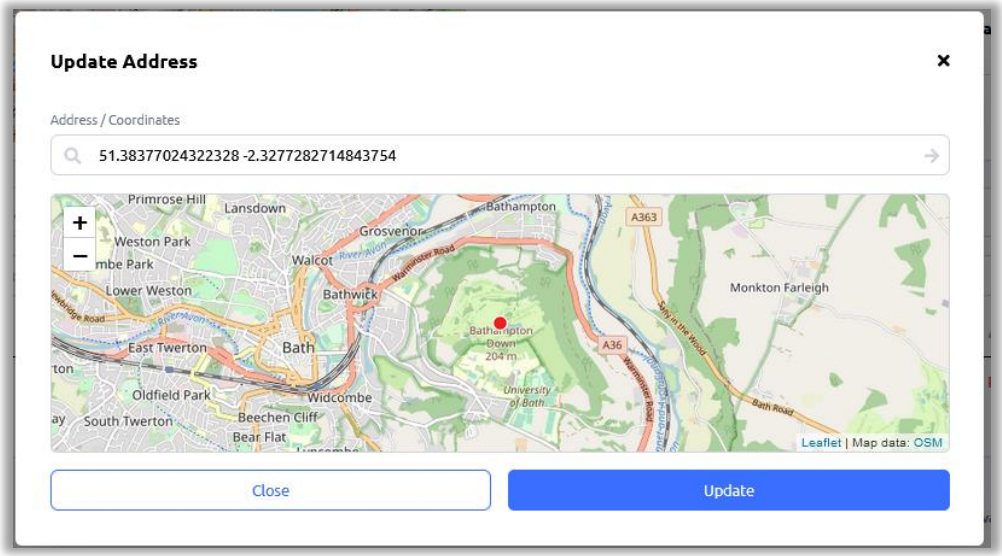


Figure 49: Edit Map Location (Automatic Coordinate Entry)



11.6.8.3. Edit a Map Location (Manual Coordinate Entry)

Select the 'Locations' screen (Figure 34):

1. From the record table of locations, identify and select the required location to edit. The locations detail page is now displayed (Figure 45).
2. Select the map location '**Change**' button (Figure 45, Item 2) which opens the 'Update Address' dialog (Figure 50).
3. Source the new longitude and latitude coordinates for the required location (for example, from Google maps) and type or paste these (16-digit format comma delimited) into the '**Address / Coordinates**' entry box (Figure 51).
4. Select the arrow '→' button located to the left side of the 'Address / Coordinates' text line.
5. Select the '**Update**' button. **Note**. The 'Update' button will stay disabled until a valid map location has been found.
6. A message dialog is presented which confirms that the operation was a success. Select '**Done**' to close the message.
7. The screen reverts to the locations detail page and the location is updated.

Figure 50: Edit Map Location (Update Address Dialog)

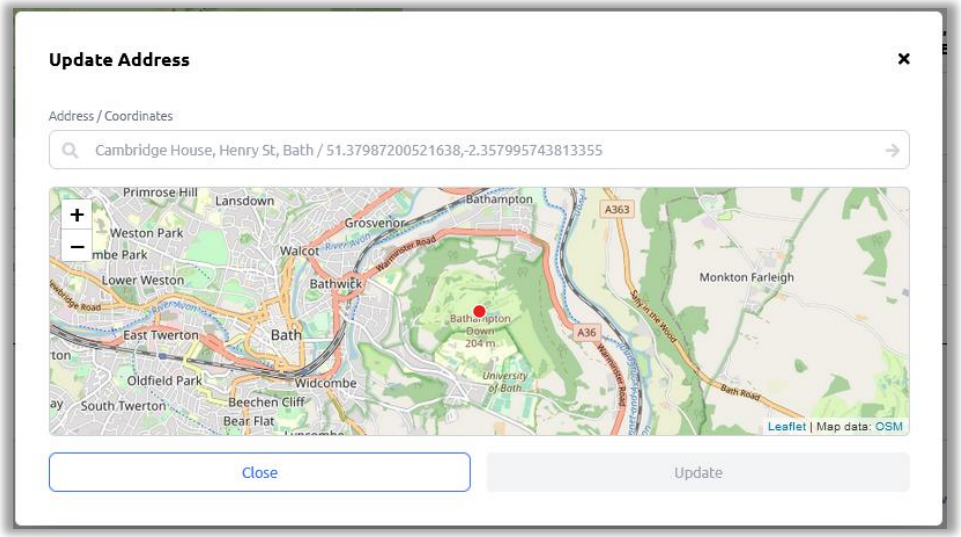
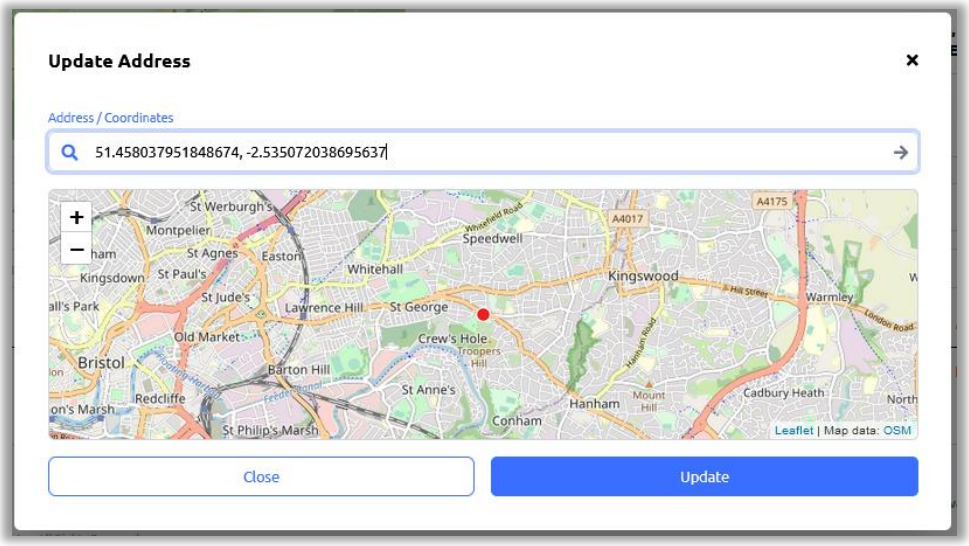


Figure 51: Edit Map Location (Manual Coordinate Entry)



11.7. Managing Tasks

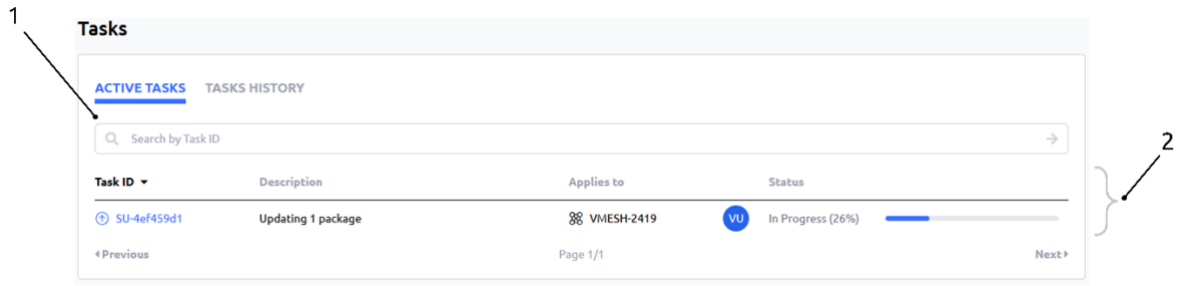
The tasks screen (Figure 52) provides information about current and completed software update tasks. Task types include:

- Update of the packages installed
- Software update
- Cancellation and rescheduling of pending software updates.

The tasks screen is split into two parts:

- ACTIVE TASKS screen (default) – Refer to Section 11.7.1.
- TASKS HISTORY screen – Refer to Section 11.7.2.

Figure 52: Active Tasks Screen



11.7.1. Active Tasks

In addition to common features shared across some other screens, the active tasks screen (Figure 52) has two features which are described in Table 19.

Table 19: Tasks Details

Item #	Title	Description
1	Search Bar	The search bar allows you to search by Task ID. It is an incremental search where you only need to enter a part of the required search string to find matches. When a task is created, it is automatically assigned a task ID.
2	Tasks Record Table	The table displays a list of tasks that apply to Meshes in the currently selected group. Task data is spread across four columns labelled: • **Task ID** | **Description** | **Applies to** | **Status** The status shows the completion state as a percentage value. The profile name of the account which triggered the update is prefixed to the status description. You can hover over this with the cursor to reveal the account email address. When you select a Task ID name from the record table, it opens the task summary details page (Figure 53).
Notes. Next and Previous page buttons are active when the record table exceeds its maximum of ten rows. Selection of any column title changes the table sort order.		

The active tasks summary details page (Figure 53) includes parameters for:

- Task Summary
- Initiated
- Started
- Status
- Changed Schedule Date.

Status is represented by a bar and the percentage completed value. When the update has finished the status shows a full-length bar and a 'completed successfully' message date and time.

On the 'Change Scheduled Date' row, click in the date box to invoke the popup calendar (Figure 54). Here users can alter the date and time of a planned software update.

Select the '**All affected Meshes**' button to show the list of Meshes that have a software update in progress.

A record table displays the list of Meshes which are currently in a software update cycle. Table data is spread across three columns labelled as:

- **Name | Task Details | Status**

Click on any Mesh name to link back to the Meshes screen.

Select the '**Start Now**' button to override a scheduled update and immediately commence the software update.

Select the '**Cancel Task**' button to cancel and clear the scheduled update. A cancellation confirmation dialog (Figure 55) is displayed to confirm the action has been successful.

Figure 53: Active Tasks Details Screen

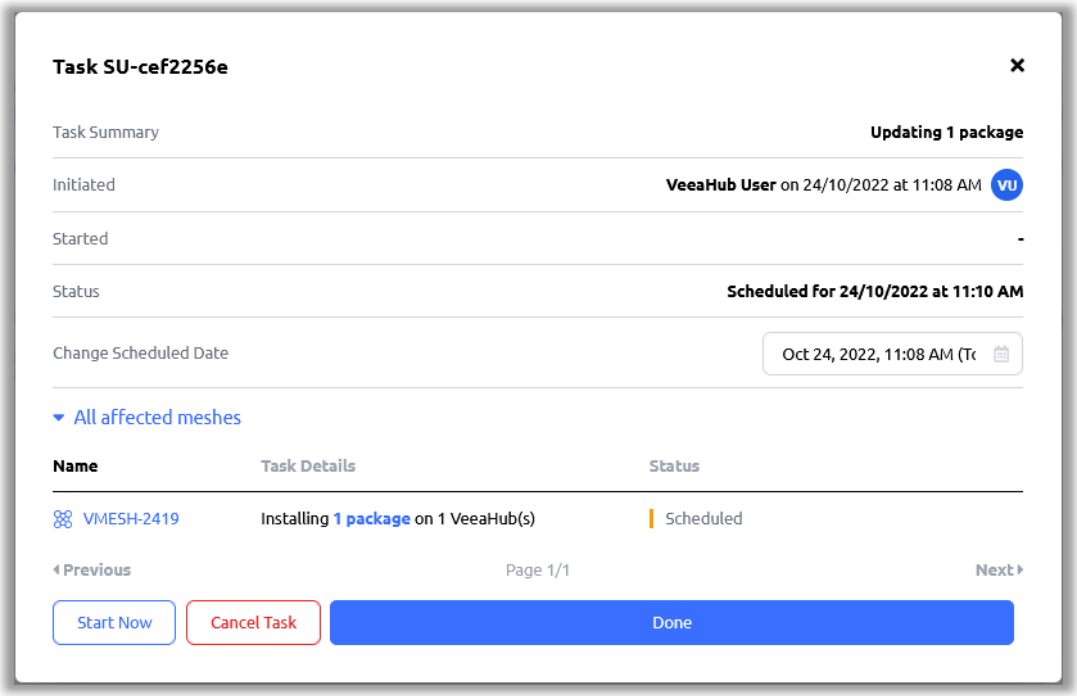


Figure 54: Active Tasks Schedule Calendar

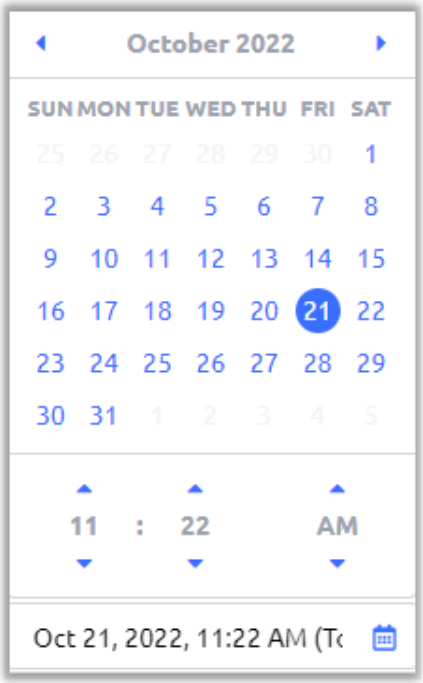
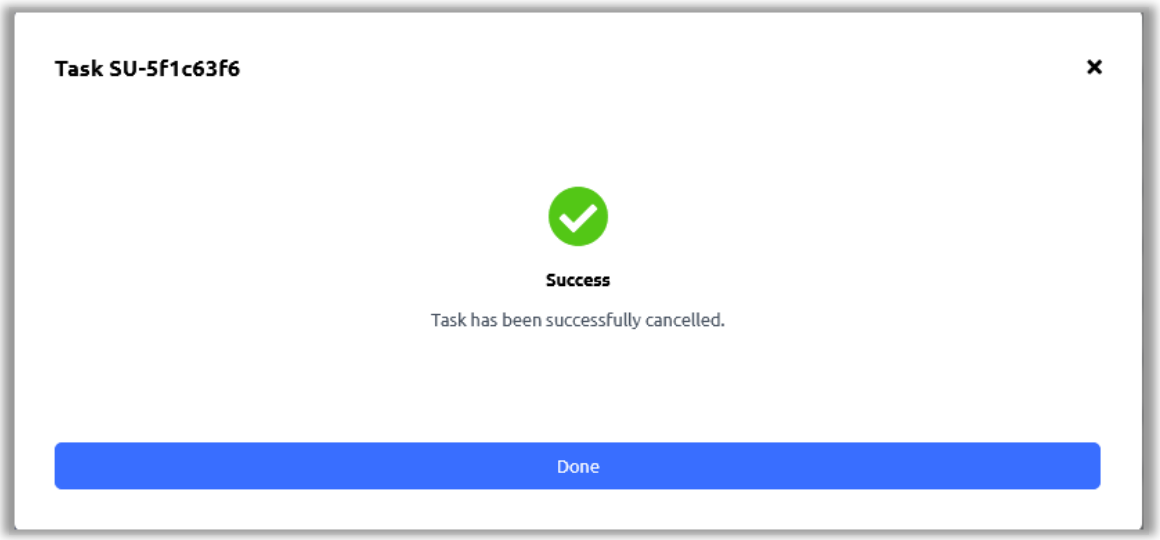


Figure 55: Scheduled Task Cancelled Confirmation Dialog



11.7.2. Tasks History

The tasks history screen (Figure 56) shares common features and contains a record table of historic tasks. Details are shown in Table 20.

Figure 56: Tasks History Screen

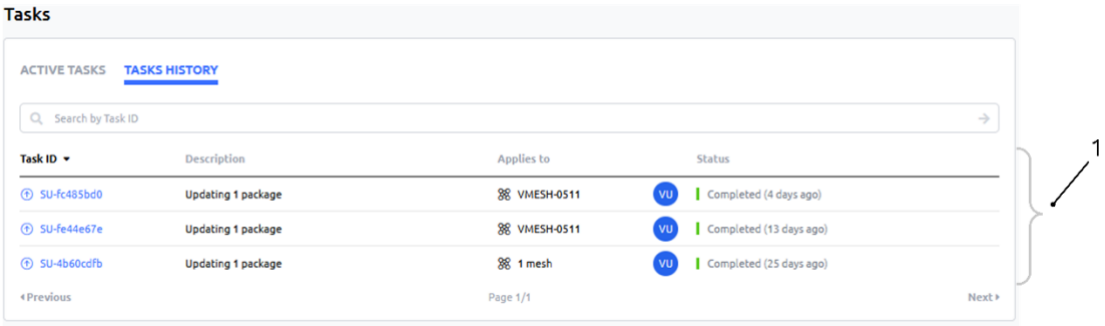


Table 20: Tasks History Screen Details

Item #	Title	Description
1	Tasks Record Table	The table displays a historic record of tasks applied to Meshes in the currently selected group. Data is spread across four columns labelled: • **Task ID** | **Description** | **Applies to** | **Status** The status column shows the elapsed period since the update took place. The profile name of the account which instigated the update is prefixed to the status description. When you select a Task ID from the record table, it opens the completed task summary details page (Figure 57). The properties are described in Table 21.
Notes. Next and Previous page buttons are active when the record table exceeds its maximum of ten rows. Selection of any column title changes the table sort order.		

Figure 57: Completed Task Summary Details

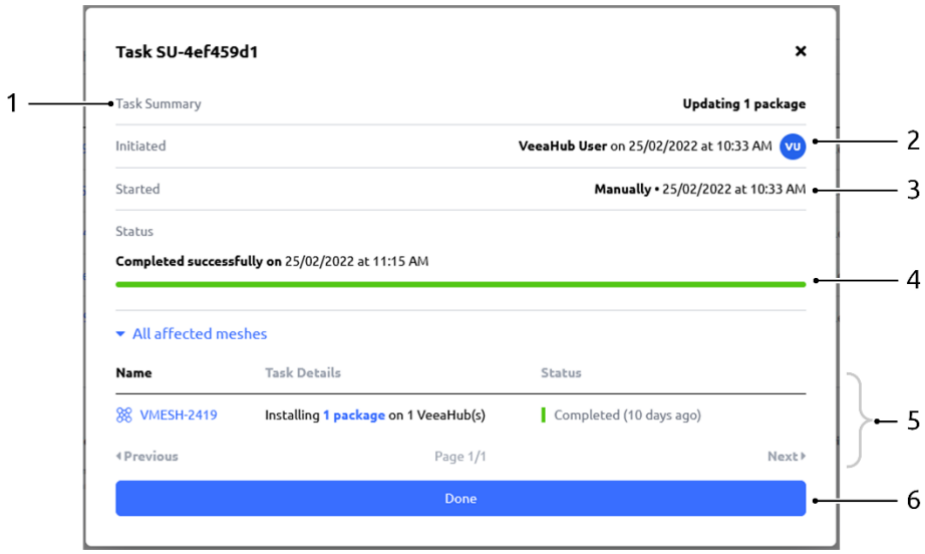


Table 21: Completed Tasks Summary Detail Descriptions

Item #	Title	Description
1	Task Summary	Update summary description.
2	Initiated	The account holder name, date and time the update was initiated.
3	Started	The start method, date and time.
4	Status	Status is represented by a bar and the percentage completed value. When the update has finished the status shows a full-length bar and a completed successfully message date and time.
5	Tasks Record Table	Select the '**All affected Meshes**' button to show the Meshes that are affected in the current group. The table displays a record of the completed task details. Data is spread across three columns labelled: • **Name** | **Task Details** | **Status** Click on any Mesh name in the list to link back to the Meshes screen.
6	Done Button	Select the '**Done**' button to close the dialog window.
Notes. Next and Previous page buttons are active when the record table exceeds its maximum of ten rows. Selection of any column title changes the table sort order.		

11.8. vTPN

This screen opens up an interface into the vTPN Control Center. This is available when you have Veea Trusted Private Network (vTPN) subscription installed on the selected mesh. For further information, consult the documentation supplied with vTPN.

11.9. Settings Screen

The settings screen (Figure 58) allows account holders to view and administer account profile credentials, accept or reject group invites, view and manage group membership.

It is divided into three screens labelled:

- **My Account** | **Invites** | **Groups** | **Notifications**

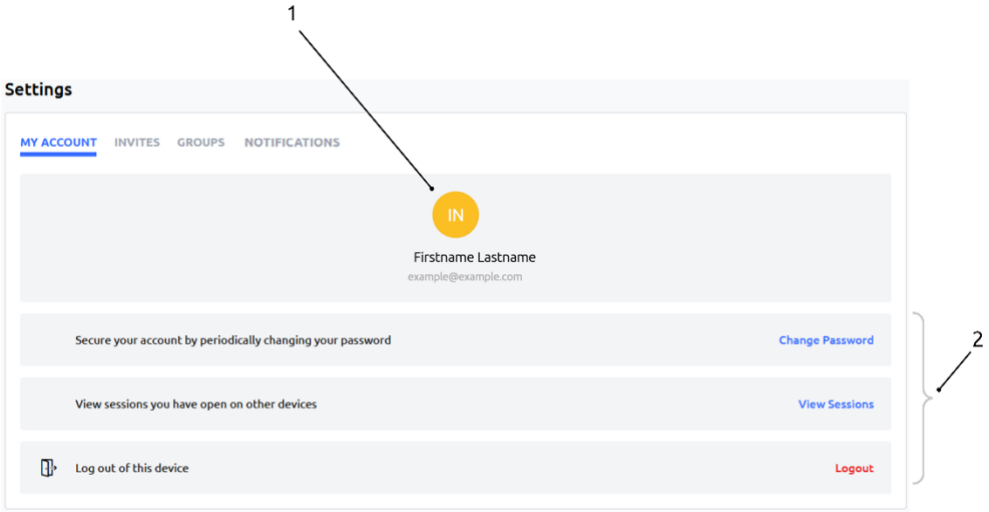
The account profile name (first and last) and email address are displayed at the top of the pane (Item 1).

The account password can be changed with the '**Change Password**' button (Item 2).

Session record data can be viewed with the '**View Sessions**' button (Item 2).

You can logout of Control Center account with the '**Logout**' button (Item 2).

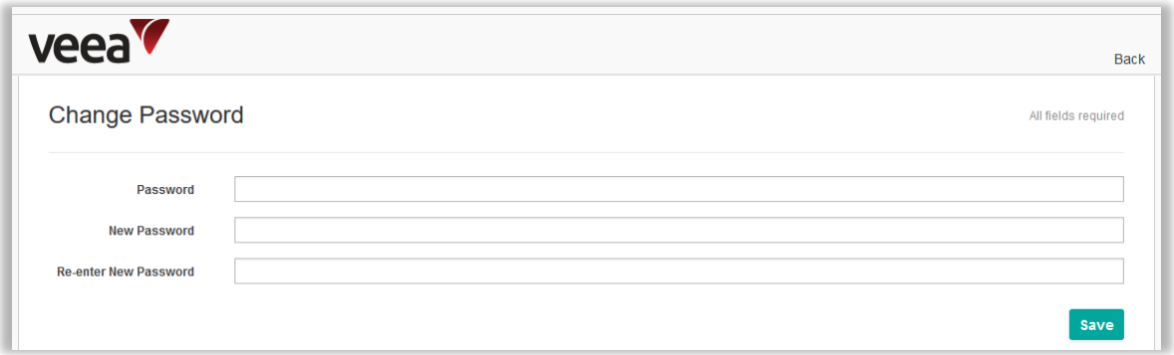
Figure 58: Settings Screen



11.9.1. Change Password

Select the '**Change Password**' button to bring up the change password dialog (Figure 59). Enter the three required information fields and select '**Save**' to finish.

Figure 59: Settings Screen – Change Password



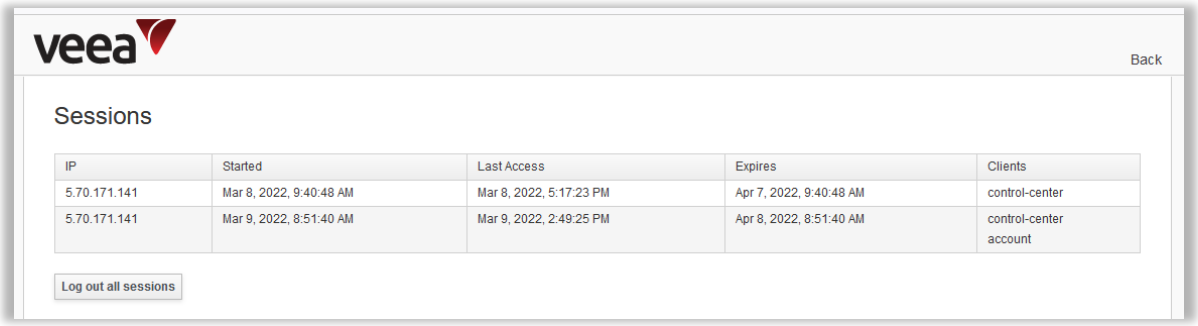
11.9.2. View Sessions

The '**View Sessions**' button presents a record table of your account Control Center login sessions (Figure 60). Data in the table includes:

- **IP | Started | Last Access | Expires | Clients**

Use the '**Log out all sessions**' button to exit the sessions dialog.

Figure 60: Settings Screen – View Sessions



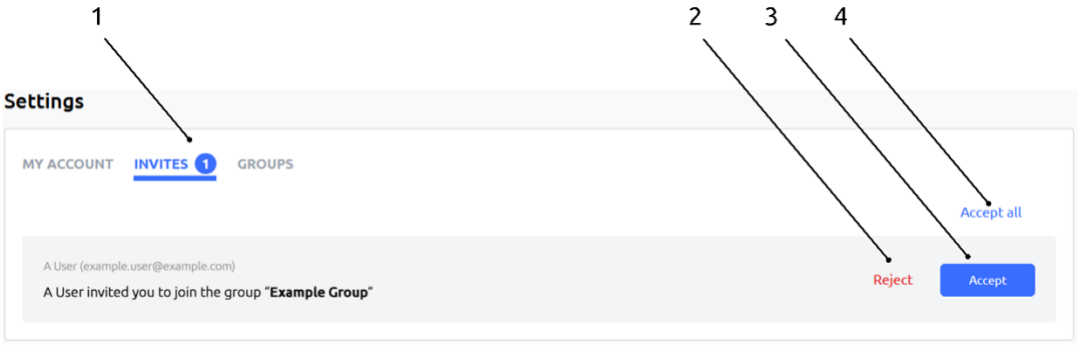
11.9.3. Received Invites Management

The Settings INVITES screen (Figure 61) is where received group invites are managed. The presence of received invites is indicated to the account holder by a blue circled number, suffixed to the INVITES title (Item 1). In this example, the account holder has one invite. The invite requestor email address and message text are located beneath the invite button.

Invites can be rejected or accepted respectively with the '**Reject**' (Item 2) and '**Accept**' (Item 3) buttons. An '**Accept all**' button (Item 4) is available for bulk acceptance.

When an invite is accepted, the invitee's group becomes a member of the requestor's group, and a record is added to the record list of members (Fig 28).

Figure 61: Screen Settings – Invites



11.9.4. Group Management

Group management is carried out from the Settings GROUPS tab (Figure 62), where you can search for a group name in the list of groups which you are a member. You also have the option to leave a selected group.

Changes to group selections (both Invites and Leave) impact data seen on the Home, Meshes, VeeaHubs, Subscriptions, Tasks, and vTPN screens. Group changes have no impact to data on Applications, Settings and Help pages.

The groups screen has three functions described in Table 22.

Figure 62: Settings Screen – Groups

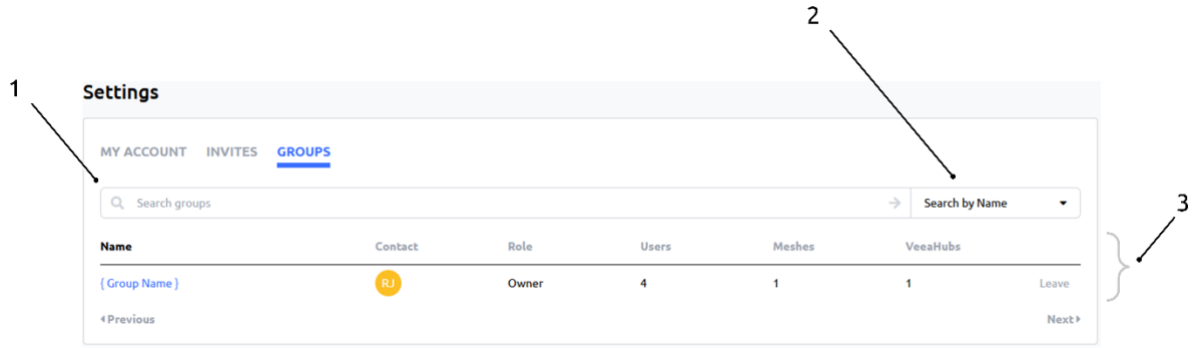


Table 22: Groups Screen – Details

Item #	Title	Description
1	Search Bar	The search bar allows you to enter a search string for group names dependent on the search type (Item 2). It is an incremental search where you only need to enter a part of the required search string to find matches.
2	Search Type	This button provides filter options for the string type used in the incremental search. This applies to the groups listed in the group record table (Item 3). Three filter categories are available and includes: **Search by Name | Search by Serial Number | Search by Contact Email**
3	Groups Record Table	The table displays a list of groups that are members of the currently selected group. Groups data spans six columns labelled: • **Name | Contact | Role | Users | Meshes | VeeaHubs** A '**Leave**' button is located at the end of each row which allows you to leave the affiliated group. Click on a group name to manage group invites to the selected group, view users in the selected group and change the group name (Figure 63).
Notes. Next and Previous page buttons are active when the record table exceeds its maximum of ten rows. Selection of any column title changes the table sort order.		

11.9.4.1. Send a Group Invite

The group info screen (Figure 63) provides functions to manage group invites. These include:

- Join a group
- Leave a group you are a member of
- Change the name of a group
- View the list of users in a selected group.

The groups info screen has eight controls which are described in Table 23.

Figure 63: Settings Screen – Group Info Page

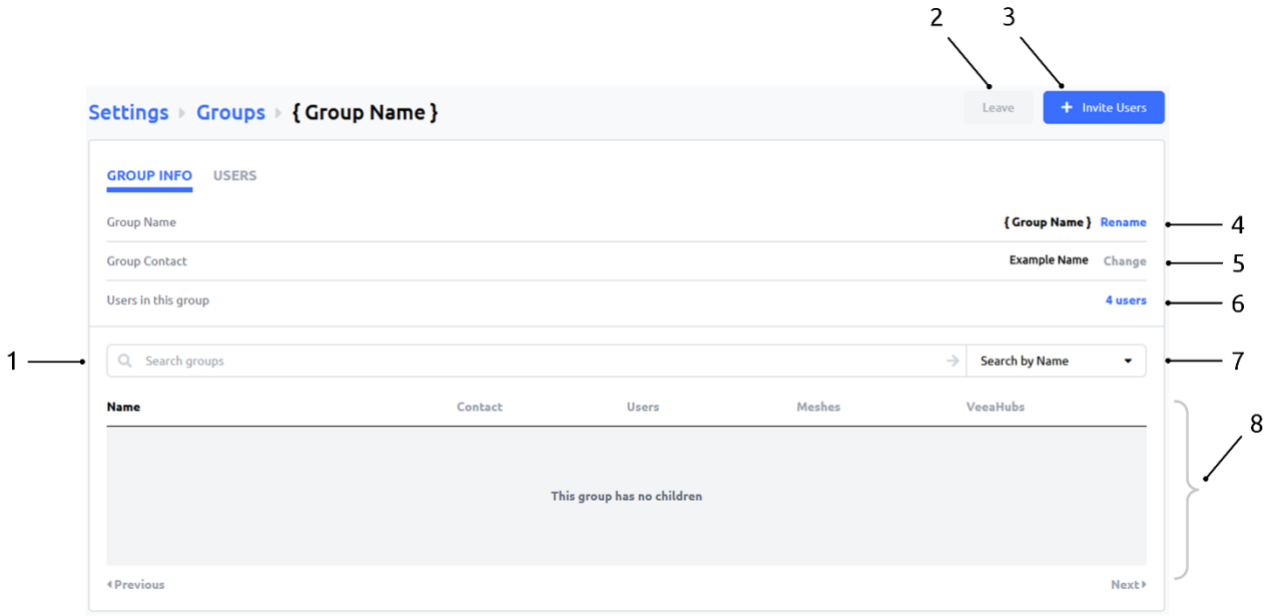
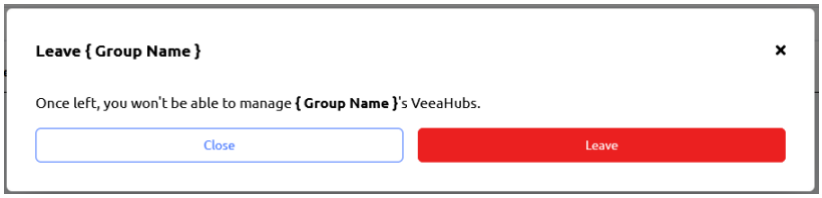
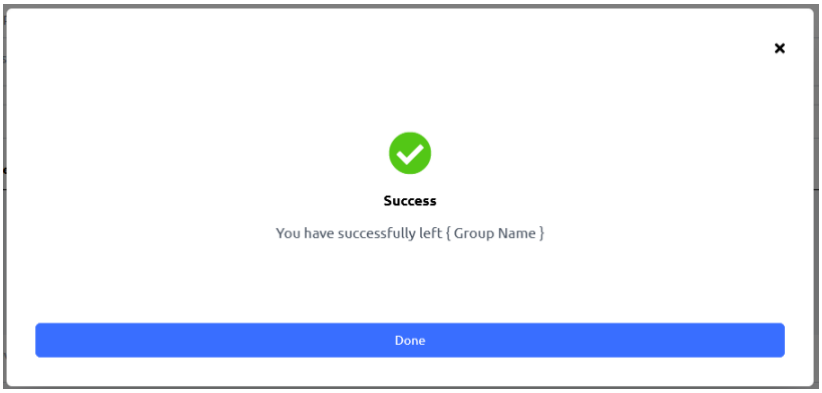
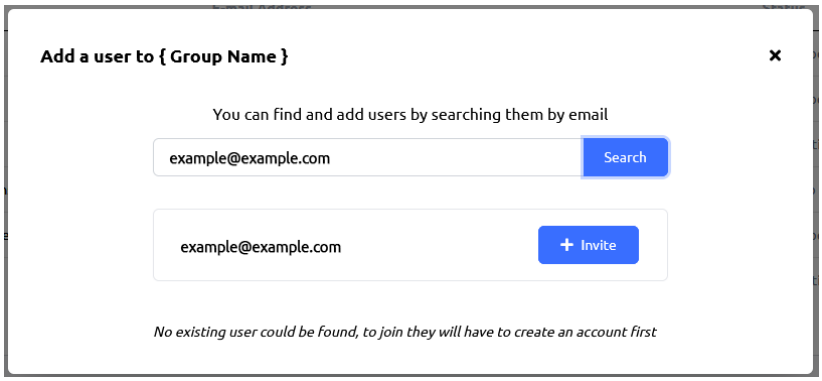
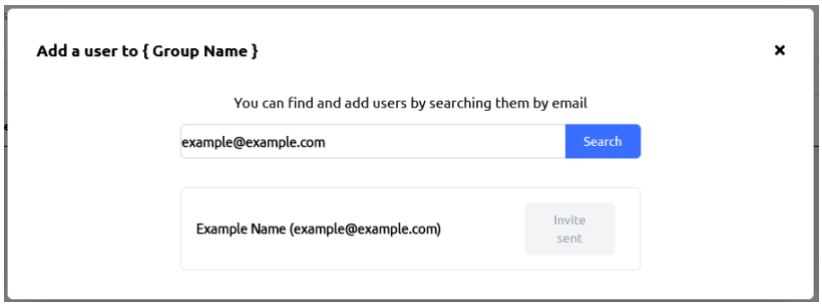
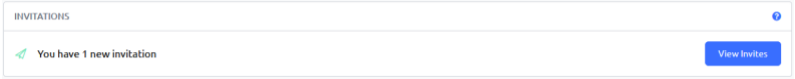


Table 23: Settings Screen – Group Info Page Details

Item #	Title	Description
1	Search Groups	The search bar allows you to search group names. It is an incremental search where you only need to enter a part of the required search string to find matches.
2	Leave button	Select the '**Leave**' button to relinquish membership of the affiliated group. A dialog is presented. Select the '**Leave**' button to leave the group or '**Close**' to cancel the operation:  A confirmation dialog is presented when the action has been completed: 

Item #	Title	Description
3	+ Invite Users Button	This button allows you to send invite requests to invitees to become a member of your group. When selected, it pops up an invite dialog where you can enter the invitees email address and send an invite:  Enter the email address of the invitee, followed by the search button. If the email is valid a second dialog will appear:  Select the '**+ Invite**' button to send the invite. The invite is sent:  An email is sent to the invitee's email address. The email is titled '**Veea Control Center - New Group Invitation**' and requests the invitee to log into their Control Center account where invite options can be managed from the settings invite page (refer to Section 11.9.3). An invite notification message also appears in the invitee's Control Center home page: 
4	Group Name / Rename	The group name can be changed. Select the '**Rename**' button which pops up the rename dialog:

Item #	Title	Description
		 Enter the new name followed by the '**Rename**' button. The name is now changed in all occurrences.
5	Group Contact	The contact name assigned to the group.
6	Number of Users	This is the number of users who are a member of the group in focus. The number is also a shortcut link to the groups users page (Figure 64).
7	Search Type	This button provides filter options for child groups that belong to the parent group in focus. These are listed in the child group info records table (Item 8). Three filter categories are available and include: • **Search by Name** | **Search by Serial Number** | **Search by Contact Email**
8	Child Group Record Table	The record table displays a list of subgroups. These are the children in the tree of group hierarchy, members of the currently selected parent group. Groups data spans six columns labelled: • **Name** | **Contact** | **Role** | **Users** | **Meshes** | **VeeaHubs** A '**Leave**' button is located at the end of each row which allows you to leave the group on the selected row. Click on a group name to manage group invites (Figure 63).
Notes. Next and Previous page buttons are active when the record table exceeds its maximum of ten rows. Selection of any column title changes the table sort order.		

11.9.4.2. Group Users Management and User Removal

The group users screen (Figure 64) provides functions to invite and remove users from a selected group. The group owner cannot be removed.

The groups users screen has five functions as described in Table 24 below.

Figure 64: Settings Screen – Group Users Page

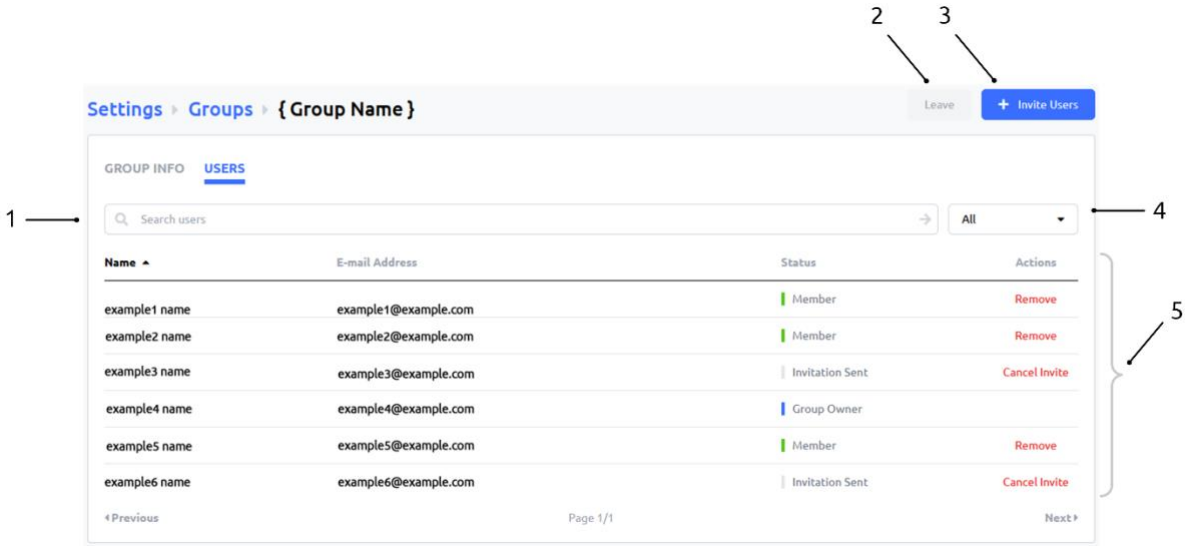
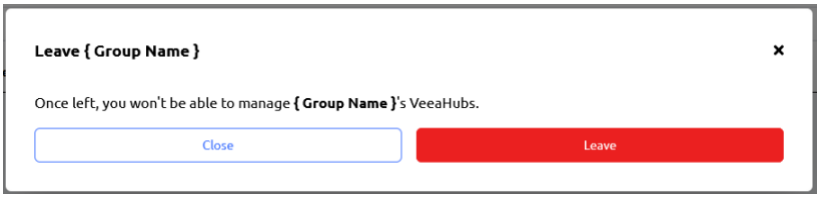
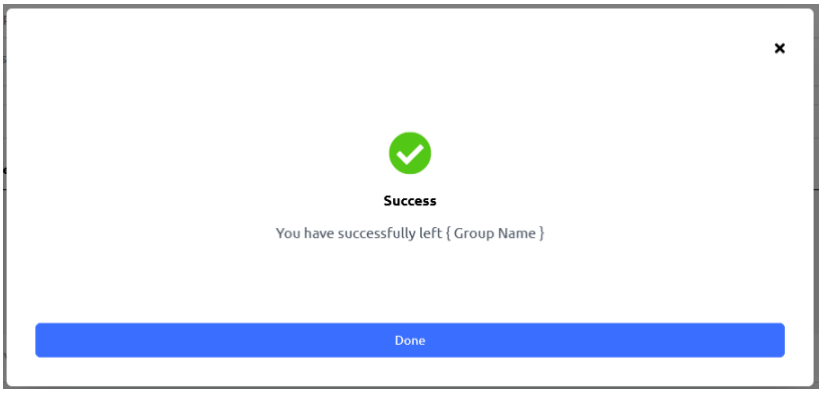


Table 24: Group Users Page Details

Item #	Title	Description
1	Search Users	The search bar allows you to search usernames. It is an incremental search where you only need to enter a part of the required search string to find matches.
2	Leave button	Select the '**Leave**' button to relinquish membership of the affiliated group. A dialog is presented. Select the '**Leave**' button to leave the group or '**Close**' to cancel the operation:  A success confirmation dialog is presented when the action has been completed: 
3	Invite Users button	This has the same function as described previously (refer to Section 11.9.3).
4	Filter options	This button provides filter options for the list of group users in the users record table (Item 5). Four filter categories are available and include:

Item #	Title	Description
		• **All** | **Members** | **Owner** | **Invitees**
5	Users Record Table	The table displays a list of users who are members of group owners. Data record columns listed here include: • **Name** | **Email Address** | **Status** | **Actions** The status column can include: • **Member** | **Invitation Sent** | **Group Owner** The actions column can include: • **Remove** | **Cancel Invite**
Notes. Next and Previous page buttons are active when the record table exceeds its maximum of ten rows. Selection of any column title changes the table sort order.		

11.9.5. Notifications Configuration Management

Notifications management enables users to choose how some VeeaHub events are communicated. Configuration is carried out from the Settings NOTIFICATIONS tab (Figure 65).

Options apply to Devices and Meshes (item 1), and Subscriptions (item 2).

Select (tick) the required check box which determines the notification type (item 3). Types include:

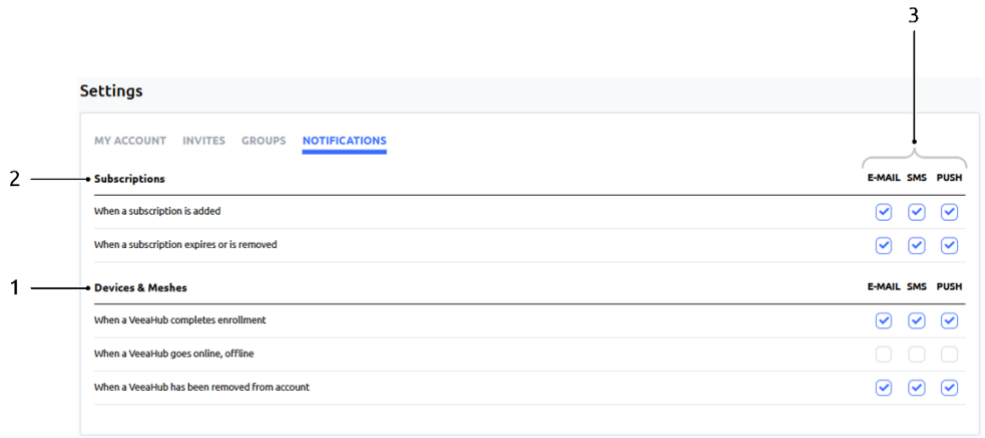
- **E-MAIL** - An email is sent to the email address of the group owner
- **SMS** - A text message is sent to the mobile phone number supplied when the enrollment account is created.
- **PUSH** - Messages are sent to the VHM app which is displayed in the mobile phone notifications tray, and Control Center notifications area (refer to Home Screen).

When a paid subscription, device, or mesh event occurs, a message is sent by the chosen channel to inform the user.

Types of Notifications Include:

1. When a VeeaHub goes offline/reports errors.
2. When a VeeaHub completes enrollment.
3. When a VeeaHub has been removed from an account.
4. When a subscription is added.
5. When a subscription expires or is removed.

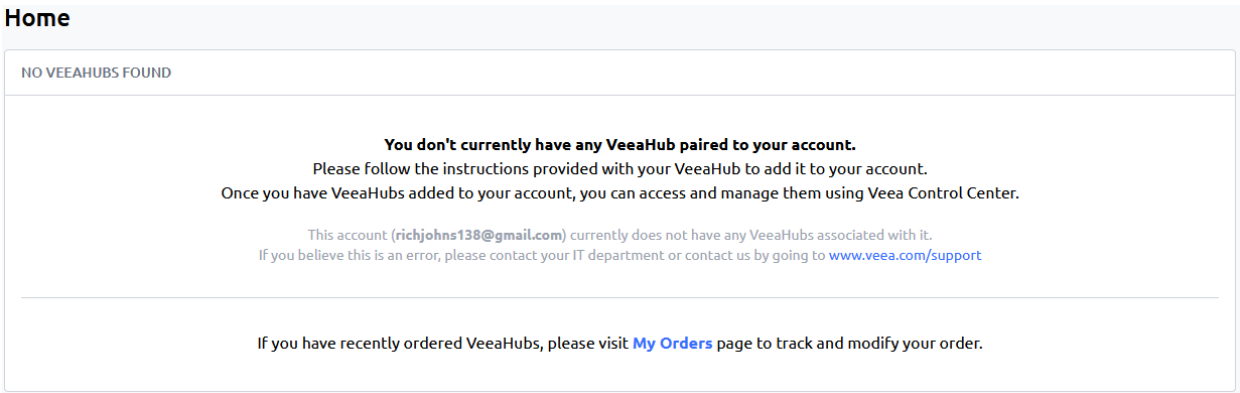
Figure 65: Settings Screen - Notifications



11.10. No VeeaHubs Registered

If you have no VeeaHubs registered to your account, a notification (Figure 66) is displayed on the home screen when you log in.

Figure 66: Control Center Account – No Registered VeeaHubs



11.11. Help Center

The '**Help**' button provides a link to resources on the Veea Support site (Figure 67).

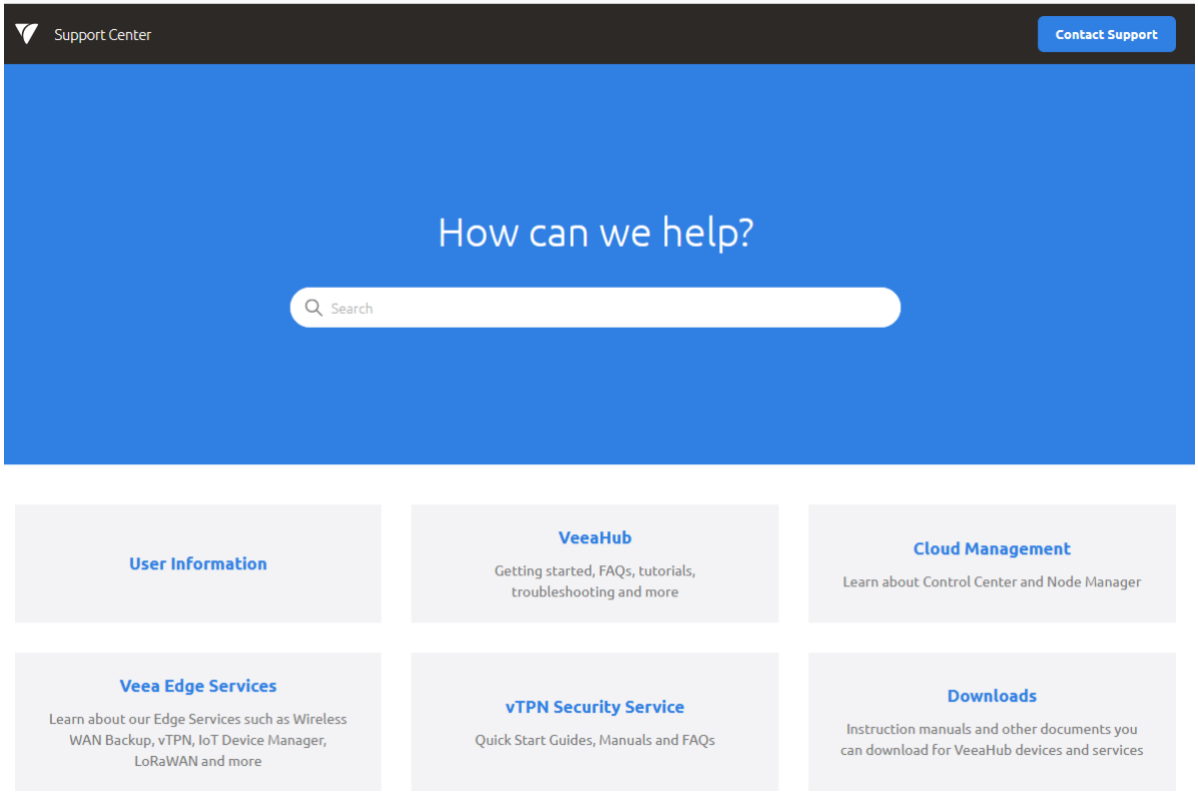
Information is categorized and structured under six titles as follows:

- User Information
- VeeaHub
- Cloud Management
- Veea Edge Services
- vTPN Security Service
- Downloads.

A text search bar is available to help you locate relevant articles.

The '**Contact Support**' button provides access to the support ticket process, handled by Veea's dedicated support team.

Figure 67: Help – Veea Support Center



12. VeeaHub Manager

12.1. Introduction

This section of the Veea Edge Platform Manual consists of a description and a screen-by-screen reference to the VeeaHub Manager application.

VeeaHub Manager is a configuration and diagnostic tool for the VeeaHub and networks of VeeaHubs. It is used to:

- Add new VeeaHubs to a network (refer to Section 12.5)
- Configure the VeeaHub network for specific purposes (refer to Section 12.11 onwards).

VeeaHub Manager is available as an app on both Apple and Android mobile devices. This guide covers both apps.

12.2. Please Note

This guide includes information and instructions for both Android and Apple devices. In general, the screens are very similar, and throughout this document the Android screens are used to illustrate what you can expect to see.

In a few cases there are differences in display or behavior in the two types of devices, and in these cases the differences will be highlighted:

Android	Highlight in yellow
Apple	Highlight in blue

The VeeaHub range comprises a number of models that are subject to continuing improvement. Not all information in this Guide is applicable to all models, and there are differences of functionality between models.

What you see on the screen may vary depending on:

- The version of VeeaHub Manager (Android or Apple)
- The model of VeeaHub, how it is configured for the network and what subscribed services it is running
- The type of your mobile device (phone or tablet) and its screen size
- The current release of the VeeaHub software
- The current release of the VeeaHub Manager app.

Screen images in this document can only be an approximate guide. In specific cases the layout may vary, and particular options may not be available.

Note.

If you have services installed on your mesh, such as vTPN, those may configure some of the options and they will not be configurable from VeeaHub Manager.

12.3. Getting Started

For a Quick Start Guide to your VeeaHub, and other information that is useful if you are new to VeeaHub, see veea.com/support.

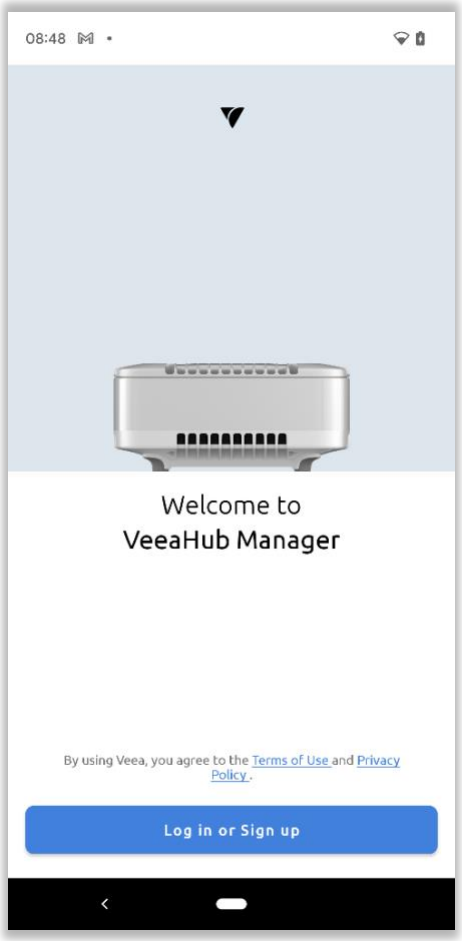
12.3.1. Starting VeeaHub Manager

To start VeeaHub Manager, tap the VeeaHub Manager app icon (**Figure 68**).

Figure 68: VeeaHub Manager App Icon – With and Without Notifications

When you first open the VeeaHub Manager app, the License screen (**Figure 69**) is displayed.

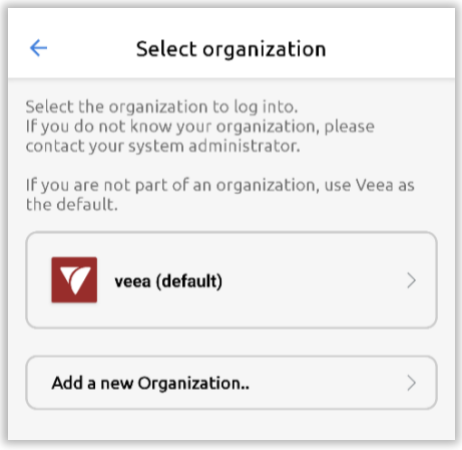
Figure 69: VeeaHub Manager License Screen



On passing this screen you accept the Veea Terms of Service and Privacy Policy. If you are not currently logged into your Veea account, you will be required to log in. If so, the next step is to choose the organization you belong to (**Figure 70**).

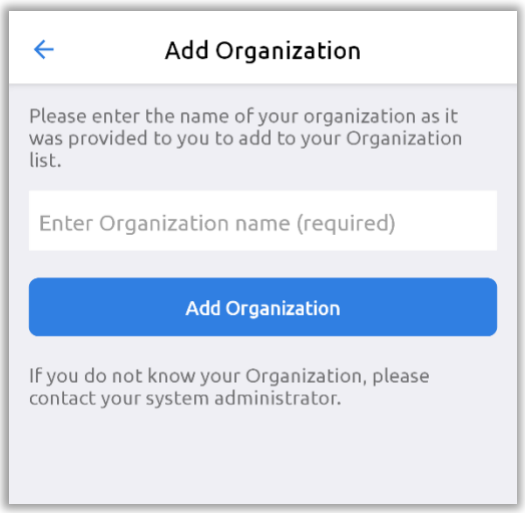
If you are using a VeeaHub in a business or other organization, you will be given the necessary information by your administrator, so select **Add a new Organization**. In other cases, choose the **Veea (default)** option.

Figure 70: Selecting your Organization



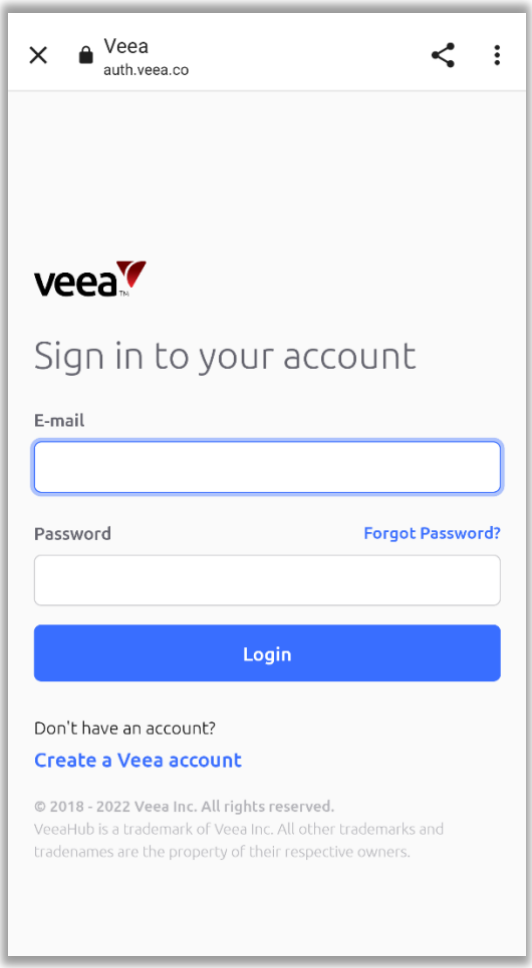
If you are in an organization and have been given a login, add the organization name in the screen in Figure 71.

Figure 71: Adding Organization



Log in as shown in Figure 72. If you do not have a Veea account, you can sign up for one at this point.

Figure 72: Login



If you have a new VeeaHub, you should add it to your account at this stage. Follow the instructions on screen.

When you add a VeeaHub, you can create a new mesh network, or you can add the unit to an existing mesh. A mesh is a self-organizing network of VeeaHubs.

Notes.

If you are setting up a network consisting of different models of VeeaHubs, the first VeeaHub in the network should be a VHE or VHH model.

If your gateway VeeaHub is a VHC05, the mesh must be built only with VHC05 VeeaHubs.

This step also adds the unit to Veea Control Center, where you can monitor your VeeaHubs and mesh networks.

After you have logged in and added the VeeaHub to your account, you are taken to the Manage screen (refer to Section 12.4), where you can add further VeeaHubs and access your meshes to monitor and configure them.

12.4. Manage Screen

The VeeaHub Manager app is used to configure VeeaHubs and VeeaHub networks to meet your specific requirements. For enrollment account holders who are a member of a single group with no other members, the process starts from the Manage (Meshes) screen (Figure 74). If you are part of a group with more than one member or multiple groups, then refer to Section 12.10.

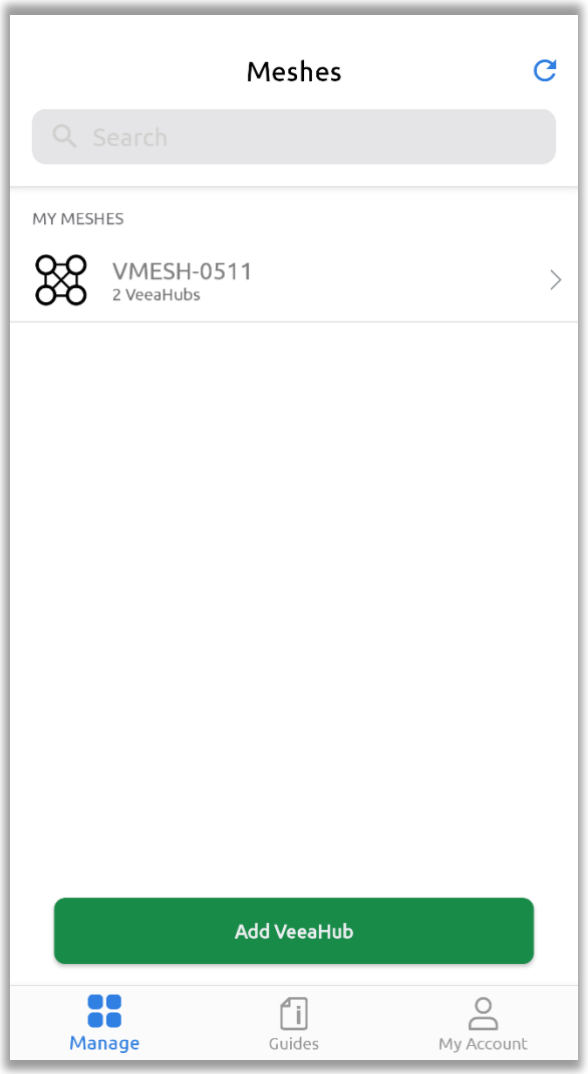
From this screen, you can:

- Add new VeeaHubs to a network (refer to Section 12.5)
- Configure the VeeaHub network options.

Log in to VeeaHub Manager and select the manage button (Figure 73) to view the Manage screen (Figure 74):

Figure 73: Manage Button

Figure 74: Manage (Meshes) Screen



12.5. Adding VeeaHubs to Your Account

Always read the Quick Start Guide for the VeeaHub you are activating. You can find it on Veea Support Center (refer to Section 1.2 for the link) under *Getting Started*. The Quick Start Guide gives you an overview of the features on your unit, how to mount it (if required) and other useful information.

When adding a VeeaHub, it must be connected to an Internet Service Provider's router or another network with Internet access and DHCP. Alternatively, if the VeeaHub is an LTE-enabled model (L suffix) and has been prepared by Veea, it can be activated over the cellular network.

12.5.1. Adding the First VeeaHub and Creating a Mesh

Creating a new mesh happens automatically when you activate the first VeeaHub in the mesh. Tap the '**Add VeeaHub**' button on the Manage screen (**Figure 74**). Follow the instructions on the screen, including scanning the QR code on the unit.

If you enter a name of a mesh that does not exist on your account, the VeeaHub will become the gateway node in a new mesh network. When asked for the mesh name, you can accept either the default name that is offered, or you can change it to something more informative for your network.

Once you have started the activation, the VeeaHub contacts the Veea Cloud and downloads and installs and runs its first software. This typically takes 20-40 minutes dependent on your internet connection. After this is done, the mesh is established, and the unit is ready for use. Using a Wi-Fi device such as a phone, you should be able to see the Mesh SSID and to see and connect to the default wireless AP. You can change the details for this AP in VeeaHub Manager (refer to Section 12.15.1).

12.5.2. Adding More VeeaHubs

12.5.2.1. Adding VeeaHubs to an Existing Mesh

To add additional VeeaHubs to an existing mesh, tap the '**Add VeeaHub**' button on the Manage screen (Figure 74). Follow the instructions on the screen, including scanning the QR code on the unit. When the 'Select Mesh' screen appears, choose the required vMesh from the available list.

12.5.2.2. Adding a VeeaHub as a New Mesh

To add a VeeaHub to form a new mesh, tap the '**Add VeeaHub**' button on the Manage screen (Figure 74). Follow the instructions on the screen, including scanning the QR code on the unit. When the 'Select Mesh' screen appears, select the '**+ Create a new mesh**' button. Accept the default mesh name or tap on the name to change it. Configure the Access Point (AP) Wi-Fi details or skip to complete later. Select Continue to complete the setup process.

12.5.3. Wired Mesh

VeeaHubs can be connected into a mesh using Ethernet cable as easily as they can be connected using the default wireless mesh. The wired mesh is automatically configured to provide full connectivity and redundancy. The mesh can include both wired and wireless connections between VeeaHubs, or it can be entirely wired or wireless. Once you have activated the hubs you can connect them together with cables as required and the mesh will do the necessary configuration. For more

information about different topologies, see Veea Support Center (refer to Section 1.2 for the link).

If the mesh is intended to be entirely wired, the wireless mesh can be turned off (refer to Section 12.18.1), but this is not essential.

12.5.4. Adding a VeeaHub to an Account Over 4G Cellular Connection

The VeeaHub can be bootstrapped over a cellular connection. This might be required, for example, where the hub is installed in a remote location, and is intended to use only 4G service as the WAN. To enable this, the unit must come preconfigured for 4G. Alternatively, you should contact Veea Support for configuration of the device using software on a USB memory stick or SD card.

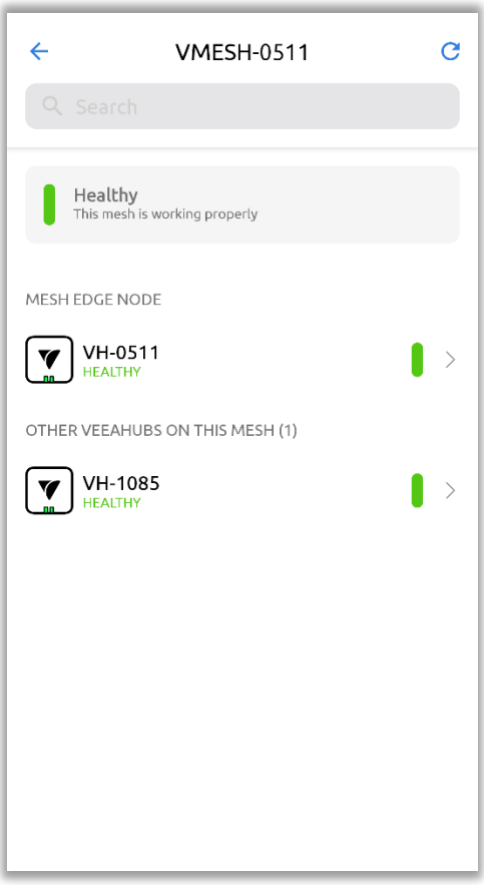
When configured, the VeeaHub holds a database of available Access Point Names (APNs), which are the data required to connect to a designated cellular network compatible with the VeeaHub service. If this is not possible because the database is not up to date, contact Veea Support.

12.6. Selecting a VeeaHub to Configure

Select the network from My Meshes on the Manage screen (Figure 74).

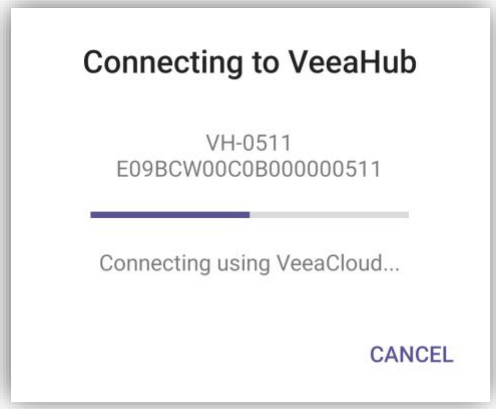
All the VeeaHubs in the network are listed on the next screen. (If you have a stand-alone VeeaHub, just the one is listed here.) Tap the VeeaHub you wish to monitor or configure (Figure 75).

Figure 75: Selecting a VeeaHub



Once you select the VeeaHub, VeeaHub Manager connects to it (Figure 76).

Figure 76: Connecting to VeeaHub

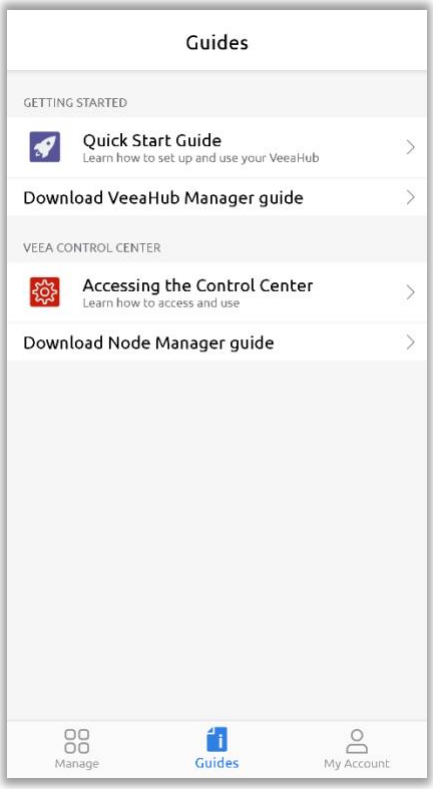


After the selected VeeaHub is connected, the Dashboard screen appears as in the example shown in Figure 86. For details of the functions accessible through the Dashboard, refer to Section 12.11.

12.7. Guides Screen

The Guides screen (Figure 77) links to information about your VeeaHub, VeeaHub Manager, and Control Center.

Figure 77: Guides Screen

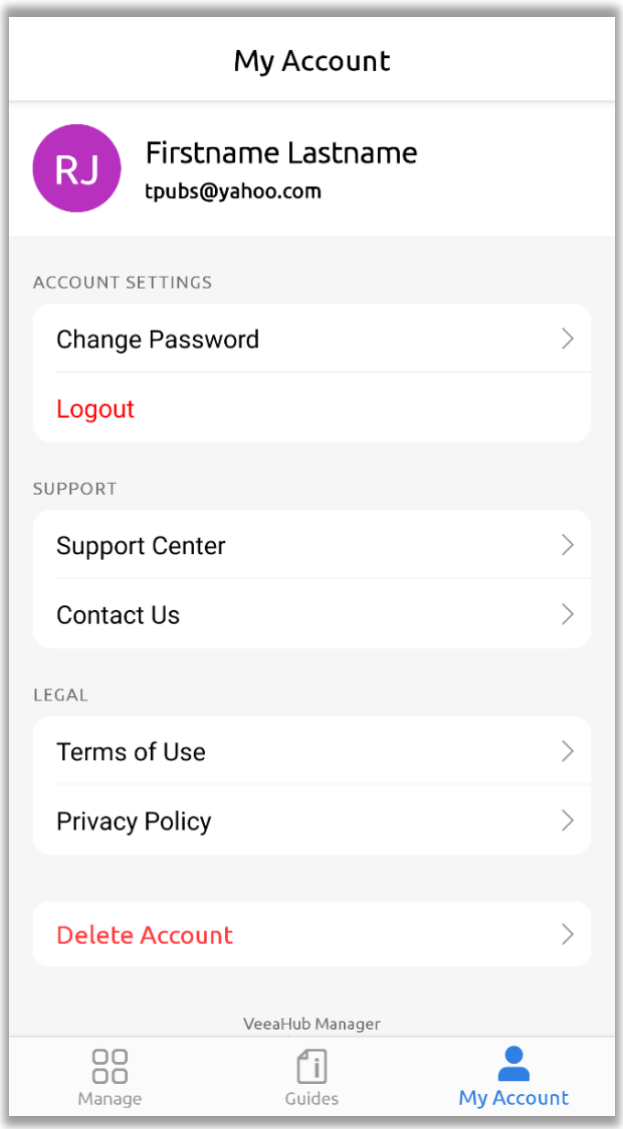


12.8. My Account Screen

This screen provides links to:

- **ACCOUNT SETTINGS**:
  - Change your account password: this changes access to Control Center as well as VeeaHub Manager
  - Log out of your account: you will no longer be able to access your VeeaHubs with this mobile device until you log in again.
- **SUPPORT**:
  - Access troubleshooting and other help information
  - Access a link to contact Support.
- **LEAGAL**:
  - Access the Terms if Use
  - Access the Privacy Policy.
- **Delete Account:**
  - Refer to Section 12.8.1.

Figure 78: My Account Screen



12.8.1. Delete Account

To delete a VeeaHub enrollment account, follow the procedure as follows:

1. Logon into the VHM app with the enrollment account credentials. This should be the account that is required to be deleted. Select the '**My Account**' screen (Figure 78).
2. Select the '**Delete Account**' button. The Delete Account screen is displayed (Figure 79).
3. Read the confirmation dialogue and when ready, select the '**Delete my account**' button. A confirmation message is displayed (Figure 80).
4. Select the '**DELETE ACCOUNT**' button to complete the process.

Figure 79: Delete Account Screen

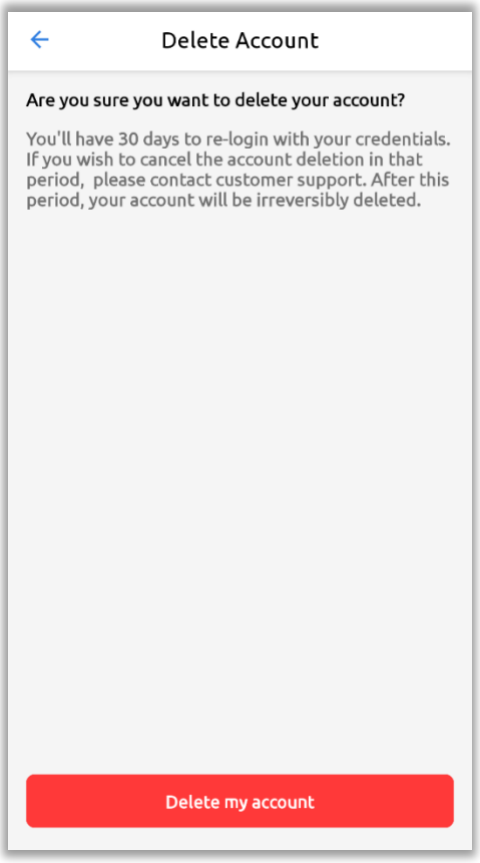
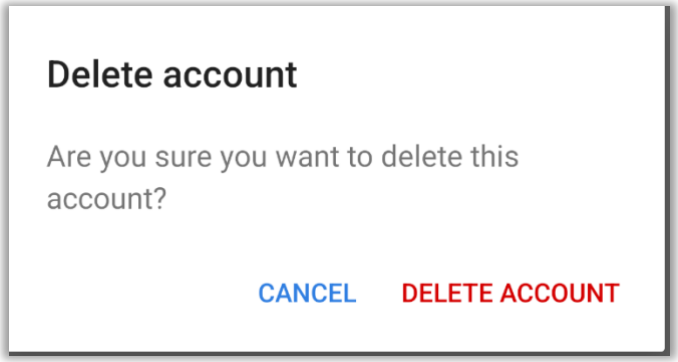


Figure 80: Delete Account Confirmation Message



12.9. Groups

Groups provide a centralized administrator feature for networks and VeeaHubs from Control Center dashboard. This allows enterprise, company, or individual administrators to have control over, and monitor account portfolio(s), from a single location.

Creation and management of groups is implemented from Control Center. Account holders are invited to join a group and must accept the invite before any group features become available in Control Center and VHM.

For more information on how to set up groups and invite users, refer to Section 11.

When your account has been successfully added to a group, the group then becomes visible on the VHM. In this case the screens and navigation to a VeeaHub or vMesh change slightly from those described previously in Section 12.4 and these changes are described as follows in Section 12.10.

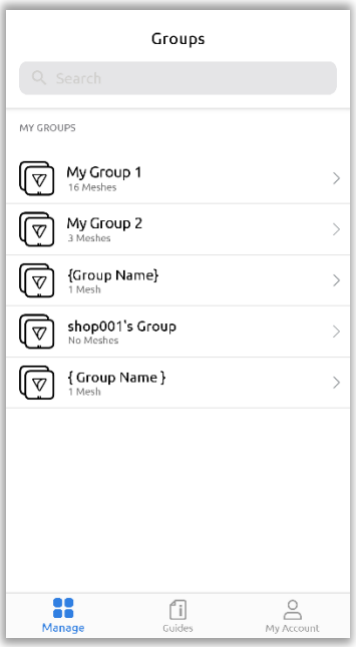
12.10. Manage Groups Screen

The procedure to login and manage VeeaHubs with accepted groups is described as follows:

1. Log in to VeeaHub Manager. Ensure you are on the Manage screen:

2. As shown in the next screen (Figure 81), all the groups you have been invited to (and accepted), are listed along with the number of networks in each group. Choose the required group name from the available groups.

Figure 81: Manage Groups Screen (Example)

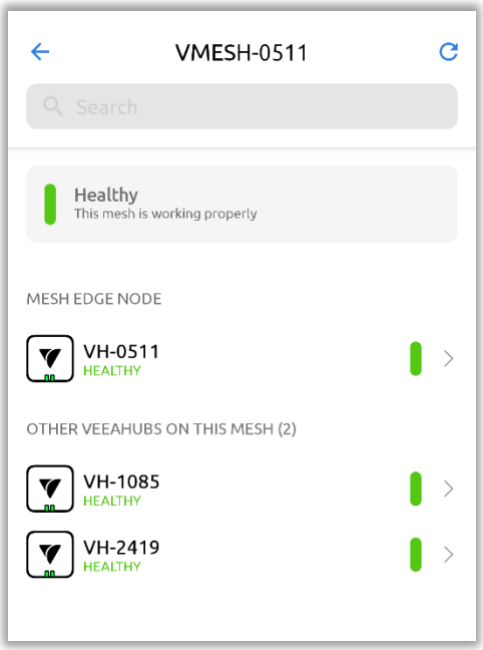


3. Select the network from the Groups screen. In this example the generic group name '**{Group Name}**' was selected (Figure 82).

Figure 82: Selecting a Mesh (Example)

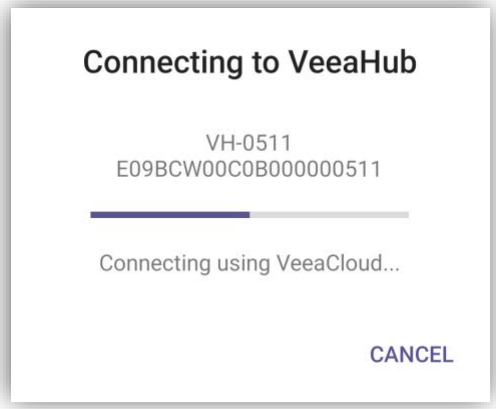
4. All the VeeaHubs in the network are listed on the next screen (if you have a stand-alone VeeaHub, just the one is listed here). Tap the VeeaHub you wish to monitor or configure (Figure 83).

Figure 83: Connecting to VeeaHub



After you select the VeeaHub, VeeaHub Manager connects to it (Figure 84).

Figure 84: Connecting to VeeaHub



After the selected VeeaHub is connected, the Dashboard screen appears as in the example shown in Figure 86. refer to Section 12.11, for details of the functions accessible through the Dashboard.

12.11. Software Update Visibility

When a VeeaHub software update has been activated from the Control Center (refer to Section 11.4.2), the progress status is also reflected on the VHM screen for the group and Mesh it applies to.

Two graphical horizontal blue lines are shown (Figure 85). The upper line shows the total progress with sixteen stages and the lower line shows the status of the current stage. The 16 stages are:

- Stage 1/16: Waiting for peers
- Stage 2/16: Checking peers
- Stage 3/16: Downloading configuration
- Stage 4/16: Inspecting configuration
- Stage 5/16: Downloading files
- Stage 6/16: Preparing platform for upgrade
- Stage 7/16: Programming bootloaders and recovery
- Stage 8/16: Programming system
- Stage 9/16: Preparing applications for upgrade
- Stage 10/16: Saving configuration
- Stage 11/16: Rebooting
- Stage 12/16: Rebooted
- Stage 13/16: Waiting for peers
- Stage 14/16: Checking peers
- Stage 15/16: Upgrading applications
- Stage 16/16: Completed.

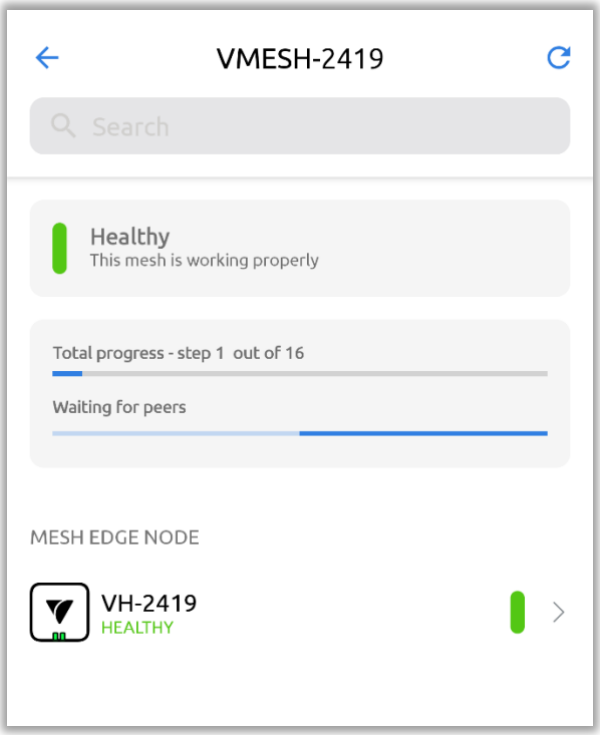
To view the software update status from the VHM, log into the VHM with your enrollment credentials and select the group and Mesh to view.

If the software update has commenced an indication will be shown on the VHM (Figure 85).

Note.

At stage 11/16 of a software update, the VeeaHub will reboot and go offline until the updated is completed.

Figure 85: VHM VeeaHub Software Update Visibility



12.12. Dashboard – VeeaHub Settings

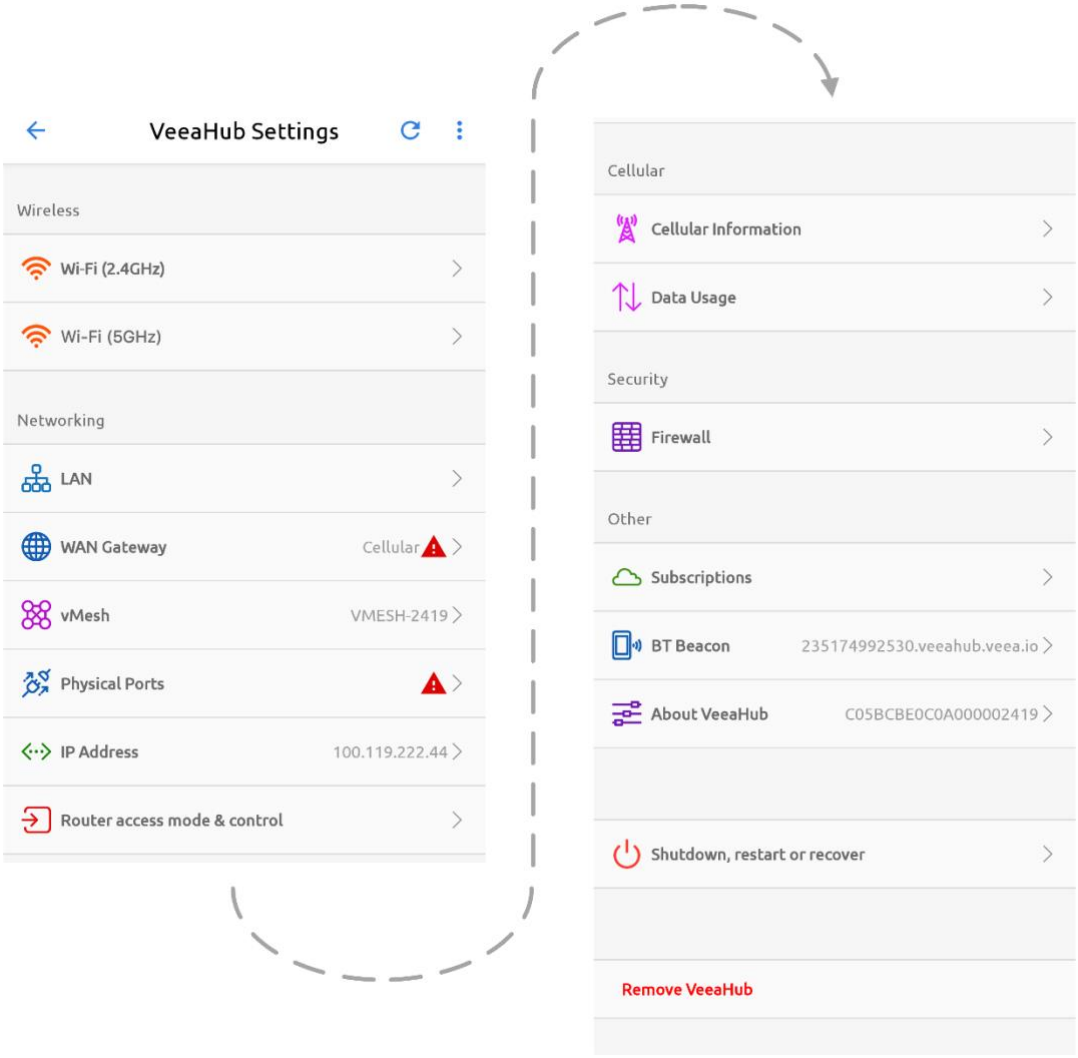
The VeeaHub Settings screen displays when you first connect to a VeeaHub and forms the Dashboard (VeeaHub Settings, **Figure 86**). It shows links to the other screens that you can use to configure the VeeaHub.

Note.

The options you see on the screen depend on the VeeaHub model and its current configuration.

Dashboard content can also show additional information and may also display warning symbols. refer to **Table 25** for a description of the color symbols used.

Figure 86: Dashboard (Example with 4G Backhaul)



Colored icons indicate the status as described in Table 25.

Table 25: Icon Colors

Icon Color	Description
Amber	The function is in an administrative state and functionality is currently disabled.
Red	The function is not operational.

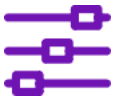
12.13. Icons and Links

Tap on a Dashboard line to view status information and to choose configuration options related to that function.

Refer to Figure 86 and Table 26 for a description of icon and link functions. Further details are available in the sections which follow.

Table 26: Dashboard Links

Icon	Description	Function
Wireless		
	Wi-Fi (2.4GHz)	Opens the Wi-Fi Access Point configuration screen for settings of the 2.4GHz virtual APs. Refer to Section 12.15
	Wi-Fi (5GHz)	Opens the Wi-Fi Access Point configuration screen for settings of the 5GHz virtual APs (where available). Refer to Section 12.15
Networking		
	LAN	Opens the LAN (Local Area Network) configuration screen (refer to Section 12.16)
	WAN Gateway Displays the current backhaul type	Opens the WAN (Wide Area Network) configuration screens for WAN interface and backhaul settings (refer to Section 12.17)
	vMesh Displays the mesh name	Opens the vMesh configuration screen for mesh settings (refer to Section 12.18)
	Physical Ports	Opens the Physical Ports configuration screen to configure the Ethernet ports (refer to Section 12.19)
	IP Address Displays the IP address	Opens the Internet Protocol (IP) address configuration screen (refer to Section 12.20)
	Router access mode & control	Opens the Router configuration screen (refer to Section 12.23)
Cellular		
	Cellular Information	Displays statistics for the cellular backhaul (refer to Section 12.21)
	Data Usage	Opens the Data Usage screen, to view data usage properties (refer to Section 12.22)
Security		
	Firewall	Opens the Firewall configuration screen, to create or amend Firewall rules (refer to Section 12.23)
Other		
	Subscriptions	View interfaces to view information about optional subscriptions that you have installed (refer to Section 12.25)
	Bluetooth Beacon Displays the Bluetooth subdomain	Opens the Beacon screen (refer to Section 12.26)

Icon	Description	Function
	About VeeaHub Displays VeeaHub serial number	Opens the About VeeaHub screen (refer to Section 12.27)
	Shutdown, Restart or Recover	Opens the Power Control screen, for shutdown, restart and system recovery options (refer to Section 12.28)
Remove VeeaHub	Remove a VeeaHub from your account	This command provides the capability to remove a VeeaHub from your Control Center account. Always unsubscribe any subscriptions before you implementation (refer to Section 12.29)

The three-dot icon at top right displays the full VeeaHub Manager version number, for reference purposes.

12.14. Common Controls

Some common controls, as seen in the following screens, and their actions are listed in Table 27.

Table 27: Common Controls

Android	Function
APPLY	Tap APPLY to close the screen – Cvhanges that you have made are applied. These changes are sent to the VeeaHub, which then performs the required configuration change.
Cancel	Tap Cancel to return to the previous screen - Changes are not applied.
 **Back**	Tap  to close the screen without applying changes. The VeeaHub Manager returns to the Dashboard screen.
DONE	Tap DONE to leave a screen that gives only information with no configuration options.
 **Refresh**	Tap this icon to refresh the current screen with updated information.

Apple	Function
APPLY	Tap Apply to close the screen – Changes that you have made are applied. These changes are sent to the VeeaHub, which then performs the required configuration change.

Apple	Function
Cancel	Tap Cancel to return to the previous screen - Changes are not applied.
Back	Tap Back to close the screen without making any changes.
Refresh	Tap this icon to refresh the current screen with updated information.

12.15. Wi-Fi Access Point Configuration (2.4GHz and 5GHz)

Tap the Wi-Fi 2.4GHz or Wi-Fi 5GHz option on the Dashboard to configure the wireless Access Points (**APs**). The Wi-Fi 5GHz option is not enabled on the VCH05 VeeaHub unless the wireless mesh is disabled (refer to Section 12.18).

Wi-Fi 2.4GHz is used for configuring channels in the 2.4GHz band and Wi-Fi 5GHz is for channels in the 5GHz band. The actual channels available for use depend on your location and national regulations.

The VeeaHub supports up to four virtual APs on each band (three on the VHC05). These APs are multiplexed on a single Wi-Fi device across a single Wi-Fi channel, which is configured for all of the four virtual APs.

The configuration is split into two tabs **Wi-Fi** (refer to Section 12.15.1) and **Radio** (refer to Section 12.15.2).

You may wish to hide one or more SSIDs so that they are not broadcast to Wi-Fi devices. In this case, users will need to know an SSID in order to connect to it.

12.15.1. Wi-Fi Tab (2.4GHz and 5GHz)

The Wi-Fi tab is shown in Figure 87 (gateway VeeaHub) with its associated parameters described in Table 28.

These settings allow configuration of Wi-Fi parameters. The tab for 2.4GHz is described here. The tab for 5GHz is similar.

Note.

The **Security Type** option does not appear on the VHC05 but is replaced by a simple **Password** option.

Figure 87: Wi-Fi Configuration (Example)

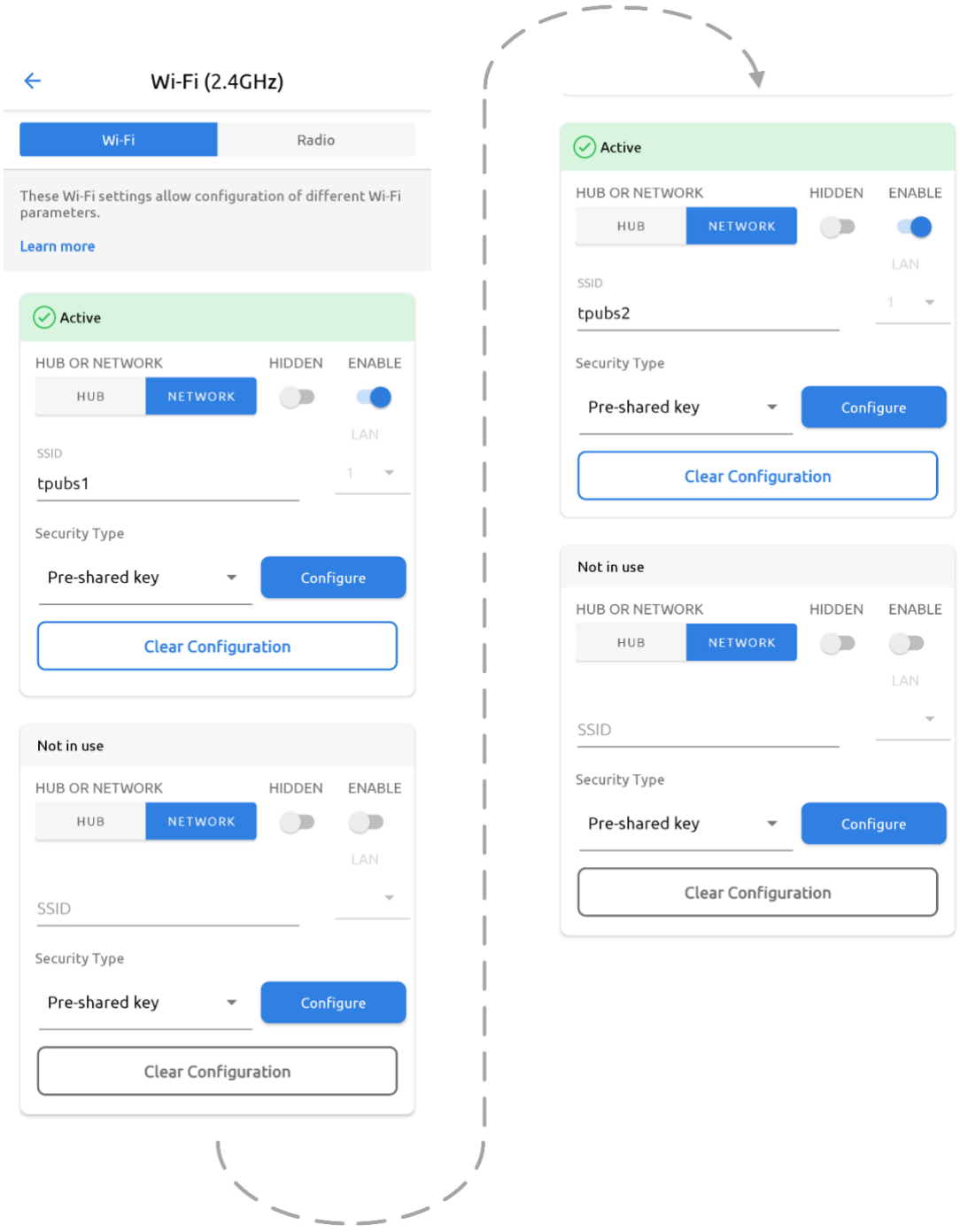


Table 28: Wi-Fi Configuration (2.4GHz, and 5GHz)

Name	Description
Status	At the right of the In Use option, the current status of this AP is displayed with a symbol, for example, Active, Not in use, Disabled, Incomplete, Changes not applied.
Hub/Network	On the gateway VeeaHub (MEN), set this to Network to apply the settings to this AP on all nodes across the VeeaHub network.

Name	Description
	On any VeeaHub, set this to Hub to apply the settings to the AP on this node alone. This overrides any mesh-wide settings for this AP.
Hidden	When set this hides the SSID from client devices.
Enabled	**Enabled switch on**: The AP has the settings that are configured on this screen. **Enabled switch off**: The AP is disabled on this VeeaHub, even if it is configured for the whole network (See hub or Network, below).
SSID	This is used to specify the SSID for the virtual AP.
Security Type (not on VHC05)	This displays the type of security in effect on this AP. The default is PSK. Tap on Configure in order to make changes to this setting. For details, refer to Section 12.15.3.
Password (VHC05 only)	Specify a password that the user must enter in order to connect to this AP. Leave blank if a password Is not required.
Clear Configuration	Clears the selected AP and SSID configuration.
Second, third and fourth virtual AP controls	Scroll down to see these. These are the network controls for the other virtual APs, which replicate the layout as shown above for the first virtual AP.

The icon and background color of an SSID entry gives information about the state of the AP as described in Table 29.

Table 29: Access Point Status Information

Icon	Color	Description
	Green	The AP is active and properly configured for this setting
	Blue	The AP is configured for the network (if Hub is selected) or configured for this VeeaHub (if Network is selected)
	Orange	The AP is disabled
	Red	The AP is non-operational
	Yellow	The configuration of this AP is incomplete
	No color	The AP is waiting for you to Apply a change in configuration
	No color	The AP is not in use

12.15.2. Radio Tab (2.4GHz, and 5GHz)

The Radio tabs for both 2.4GHz and 5GHz Wi-Fi are shown in **Figure 88** with their associated parameters described in **Table 30**.

Use the associated tab to set radio configuration options for 2.4GHz and 5GHz APs.

The available channels depend on the country where the VeeaHub has been registered, because local regulations vary. They also depend on the capabilities of the VeeaHub model, for example, the VHE10 has upper and lower 5GHz bands.

When Auto Selection is on, the AP channel is automatically chosen for you, based on various measurements of the quality of the signal. These measurements can be seen using the **Wi-Fi Network Scan** option. You can override this selection by choosing a single channel from those available, and you can also restrict the selection of channels that Auto Select uses.

Auto Select is not dynamic: once the channel has been selected, this applies until the VeeaHub is restarted, or until you choose another option.

Auto Select is not available in certain circumstances, for example, on the VHC09 the 5 GHz radio is shared by the APs and the wireless mesh, and the frequency channel is selected by the option on the Mesh screen (refer to Section **12.18**).

Note.

For VeeaHubs registered in the UK: UK regulations were changed in August 2017 to allow Wi-Fi usage on channels 144, 149, 153, 157, 161 and 165. Older mobile devices supplied in the UK may not be able to connect to those channels. If there are problems connecting to the VeeaHub network on the 5GHz band, we recommend excluding those channels from the Auto Channel whitelist.

Figure 88: Wi-Fi Access Point: Radio (2.4GHz and 5GHz)

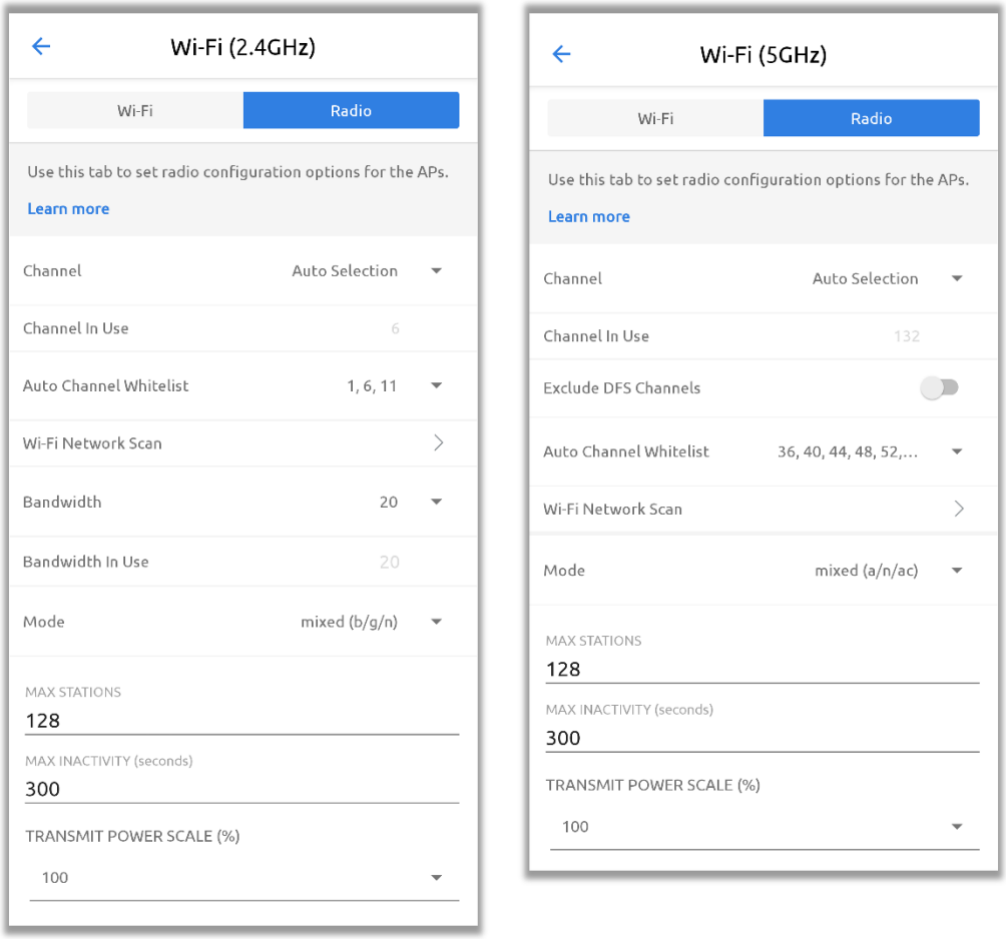
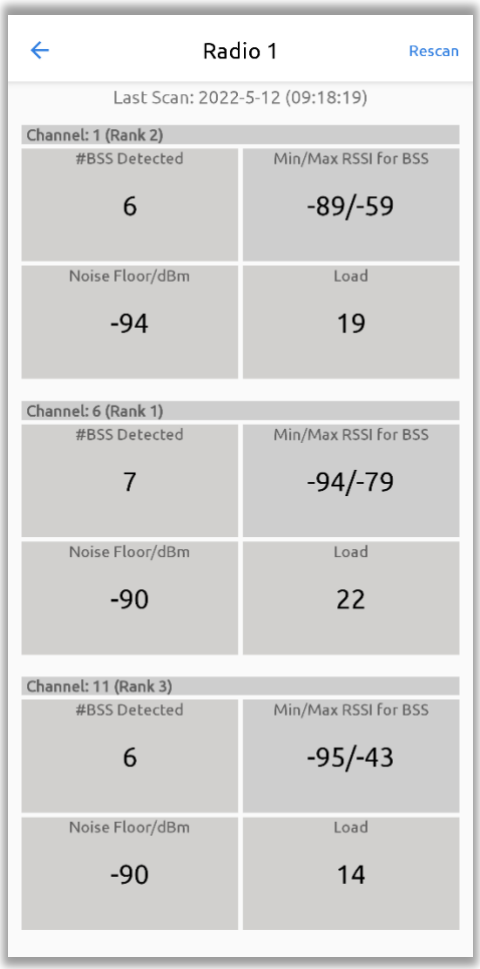


Table 30: Wi-Fi Radio Configuration (2.4GHz, and 5GHz)

For more information about Automatic Channel Selection (**ACS**) and Dynamic Frequency Selection (**DFS**), see the article *Automatic Channel Selection and Dynamic Frequency Selection* in Veea Support Center (link in Section 1.2).

Name	Description
Channel	This is used by all four APs. By default, Auto Selection is displayed (when available). Wi-Fi uses a number of criteria to choose the best channel at the time the APs start up. If you prefer to override this and select one of the available channels, choose the channel number from the drop-down list.
Channel in Use	Displays the auto selected channel number.
Auto Channel Whitelist	This enables you to select the channels from which the auto selection occurs. Tap on the drop-down icon, select or deselect the channels as required, then tap OK.

Name	Description
	Android 
	Apple 
Wi-Fi Network Scan	Auto Channel Scan is available on the VHC05, but these metrics are not displayed. Tapping on the > icon displays a page showing the measurements for each channel on which the auto selection is based. It also shows the date and time these measurements were made. A typical result is shown here.  The measurements are:

Name	Description
	• #BSS: the number of Basic Service Sets (**BSS**) detected on this channel • The minimum and maximum Received Signal Strength Indicator for the BSSs on this channel • The noise floor on this channel • Load: A measure of the time the channel is occupied These measurements are combined to select a best channel for the auto select. If a channel is ranked as 0, it is not considered suitable for auto selection. If all the channels show poor results, then moving the VeeaHub to another position should be considered. You can rescan the measurements by tapping RESCAN. This may change the channel used.
Bandwidth	This sets the channel selection spread, which is dependent on the channel in use. This is grayed out when the option is not available. Possible options include: • 20MHz • 20MHz/40MHz • 20MHz/40MHz/80MHz. If you are selecting this when ACS is active, ensure that the bonded channels are included in the Auto Channel Whitelist.
Bandwidth in Use	This displays the channel bandwidth in use.
Mode	Selects the 802.11 standard to use.
Max stations	Specifies the maximum number of clients per AP.
Max inactivity (in seconds)	Specifies the maximum inactivity time after which the client is disconnected from the AP.
Transmit Power Scale (%)	Specifies the AP transmit power.

12.15.3. Wi-Fi Security (2.4GHz, and 5GHz)

The VeeaHub offers three security types:

- **Open**
- **Pre-Shared Key (PSK)**
- **Enterprise**.

The default is PSK. Different APs on one VeeaHub can be configured with different security types.

Note.

This does not apply to the VHC05 model, which has only PSK, which can be configured with or without a password.

Use Open if you do not require the user to enter a password in order to connect to an AP. There are no further configuration options.

PSK is the default and is used if you want the user to know a password in order to connect to the AP.

Enterprise security requires authentication on a separate server called a Remote Authentication Dial-In User Service (**RADIUS**) server. This option will typically be

used if the VeeaHub is installed in a business network where this security type is used.

In the Wi-Fi tab (Figure 87), tap on the Security Type drop-down to select a different option.

The following subsections describe the different options.

Open security

No password is required for anyone to connect to an AP with Open security. There are no further options to set.

PSK security

A password must be set up on the VeeaHub. This password must be known by a user in order to connect their mobile device to this AP.

The PSK options are shown in **Figure 89** and **Table 31**.

Figure 89: PSK Configuration

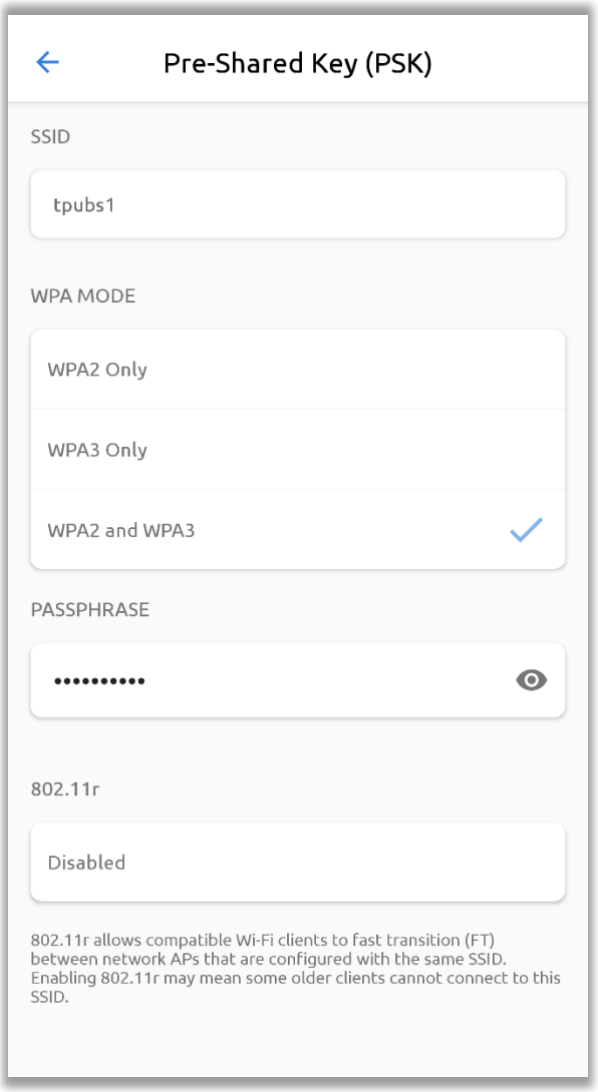


Table 31: PSK Configuration Options

Name	Description
SSID	Not editable in this screen, refer to Section 12.15.1.
WPA Mode	You can select to allow client devices to connect with WPA2 only, WPA3 only, or either.
Passphrase	Enter the required passphrase here, 8-63 characters.
802.11r	When set, this enables client devices to fast transition between network APs that are configured with the same SSID. This is currently available only on the 09/10 models. Enabling 802.11r may mean that some older devices without this capability cannot connect to this SSID.
802.11w	This option is available only when WPA2 Only is selected. The values are Enabled, Disabled or Required. This enhancement to security is set to Enabled by default: devices with or without 802.11w can connect. If set to Required, only devices that support 802.11w will be able to connect.

Enterprise Security

This option is for VeeaHubs in enterprise networks. Your system administrator will provide necessary information.

Authentication is performed by contacting a specialized server, called a RADIUS Authentication server. RADIUS may also be used to collect data on usage for billing purposes on an Accounting server. These servers must already be configured before this security option can be used.

RADIUS server details must be set up on the gateway VeeaHub (MEN) before a selection can be made on other nodes in the mesh.

The Enterprise security options are shown in Figure 90 and Table 32.

Figure 90: Enterprise Security Configuration

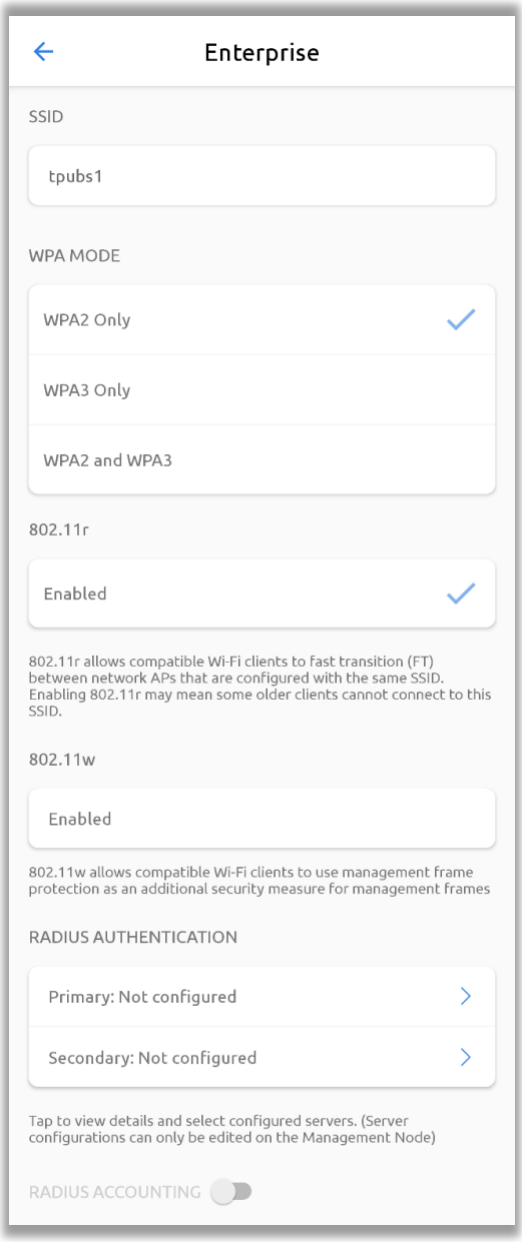
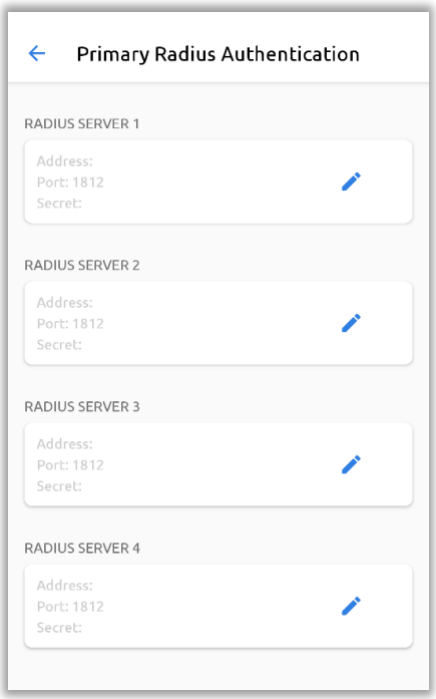
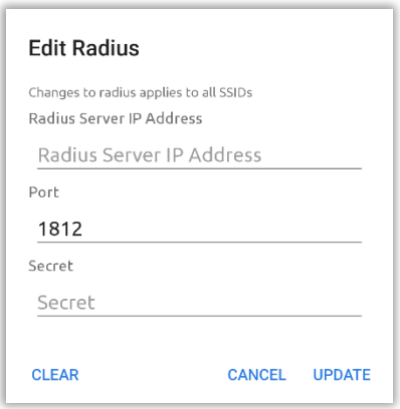


Table 32: Enterprise Security Configuration Options

Name	Description
SSID	Not editable in this screen, refer to Section 12.15.1.
WPA Mode	You can select to allow client devices to connect with WPA2 only, WPA3 only or either.
RADIUS Authentication	Tap the icon to edit the RADIUS server details. Primary and secondary servers can be configured. The secondary server is optional and acts as a backup if the primary server is unavailable.

Name	Description
	 For each server, click on the icon to enter the required details: the IP Address of the server, the port number (default 1812) and the secret for access to the server. The secret must be known by a user in order to connect their mobile device to this AP. 
RADIUS Accounting	Enable the switch if this option is required. The configuration is similar to RADIUS Authentication. The default port number for RADIUS accounting is 1813.

12.16. LAN

This screen is only configurable from the Gateway node (MEN).

There are three tabs to choose from and these are described in the sections which follow:

- Configuration – Refer to Section 12.16.1
- DHCP Settings – Refer to Section 12.16.2
- Reserved IP Addresses – Refer to Section 12.16.3.

12.16.1. Configuration

Tap the LAN option on the Dashboard to configure LANs on the VeeaHub network. The LAN screen (Configuration default) is shown in Figure 91 and its associated parameters are described in Table 33.

This screen is used to configure up to four LANs (VeeaHub model dependent) on the VeeaHub network. You should use this screen to link your AP settings (refer to Section 12.15) with your WAN settings (refer to Section 12.17).

Figure 91: LAN configuration

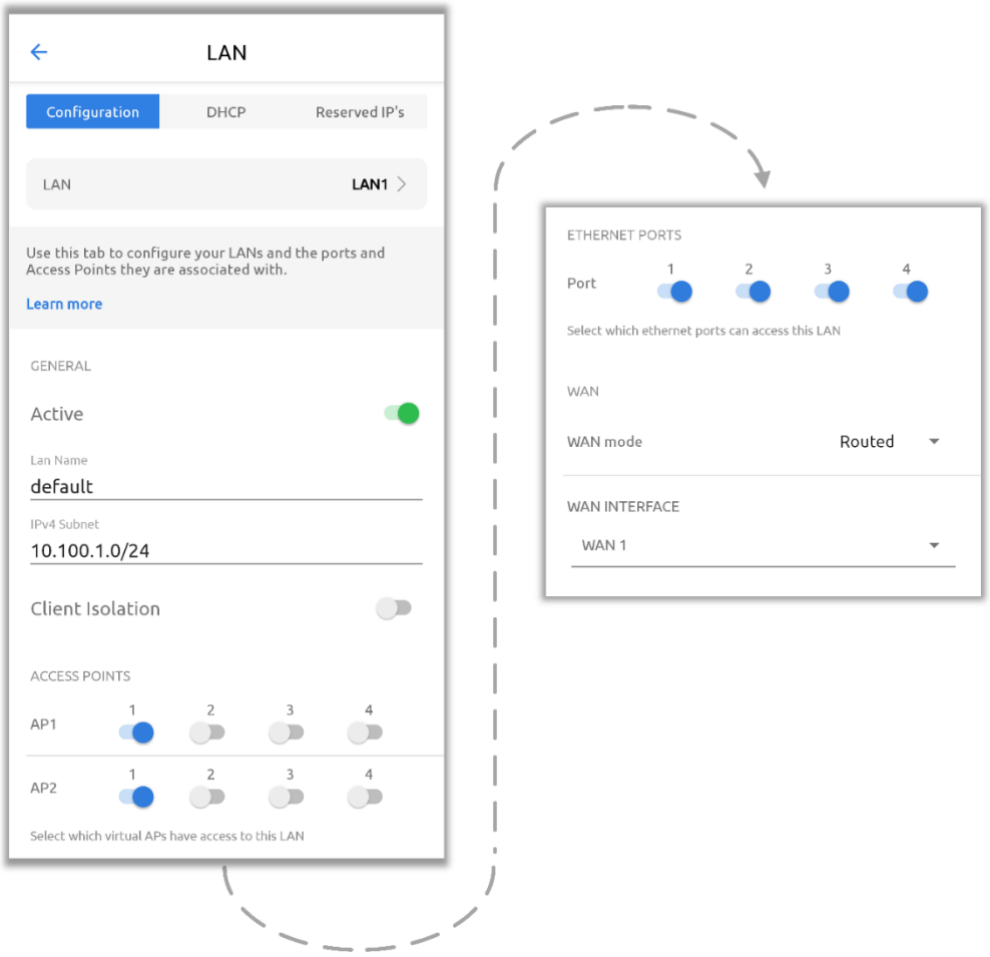


Table 33: LAN Configuration

Name	Description
LAN Tab	Used to select the LAN (1 to 4) to be configured.
GENERAL	
Active	Set this switch to ON to make the LAN active

Name	Description
LAN Name	Set the name of the LAN.
IPv4 Subnet	Specifies the allowable IP addresses assign to this LAN. For example, 10.1.0.0/24
Client Isolation	If this switch is set to ON, devices on this LAN cannot see each other.
ACCESS POINTS	
AP1: 2.4GHz	Each toggle button enables/disables routing of this Local Area Network (LAN) to the corresponding 2.4GHz virtual AP.
AP2: 5GHz	Each toggle button enables/disables routing of this Local Area Network (LAN) to the corresponding 5GHz virtual AP.
ETHERNET PORTS	
Port	Each toggle button enables/disables routing of this Local Area Network (LAN) to the corresponding Ethernet port.
WAN	
WAN mode	Select whether this LAN is routed or bridged to the WAN.
WAN INTERFACE	
WAN 1	This must be the number of the WAN interface in Figure 97 to which you are connecting this LAN.

12.16.2. DHCP Settings

Tap the DHCP option on the Dashboard to configure DHCP. This screen is shown in Figure 92 with its associated parameters described in Table 34. It is available only on the gateway node (MEN).

Use this screen to configure a DHCP server for each LAN that has been configured on the LAN configuration tab (refer to Section 12.16) where you have enabled DHCP. You can also configure DNS nameservers for each LAN here.

Figure 92 - DHCP Configuration

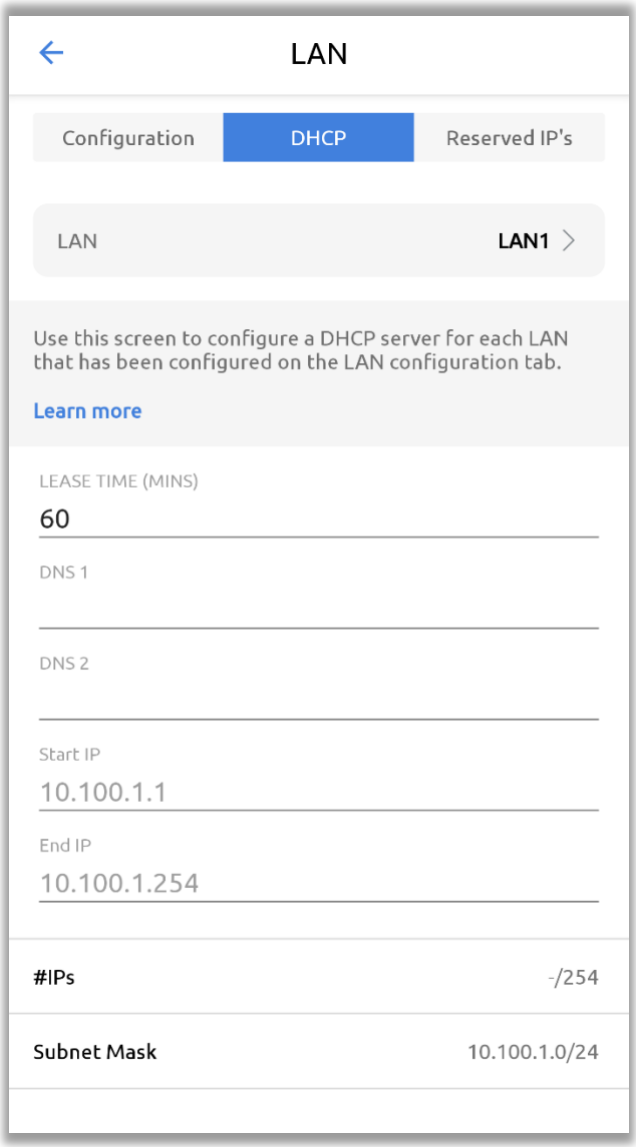


Table 34: DHCP Configuration

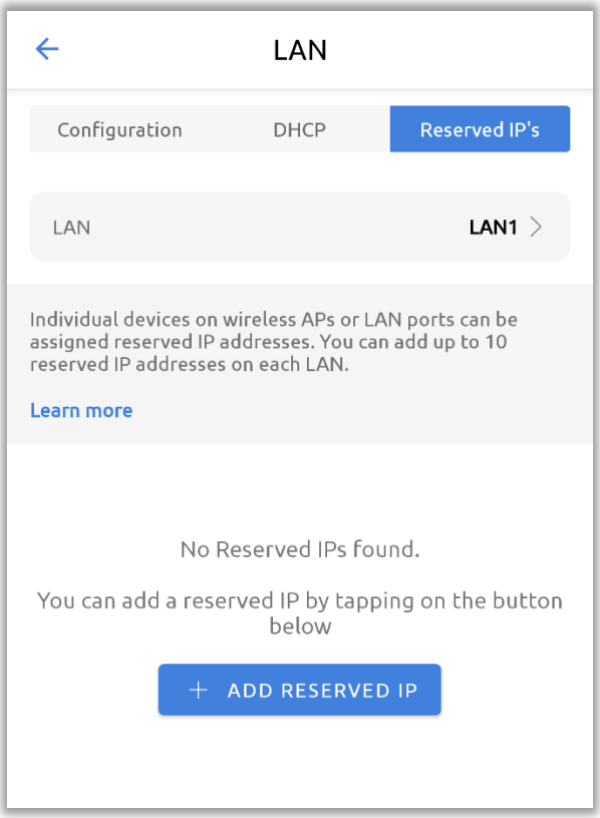
Name	Description
LAN	Used to select the LAN (1 to 4) to be configured with DHCP.
Lease Time	Set the Lease Time in minutes.
DNS 1	Set the primary nameserver, for example, 8.8.8.8 for Google.
DNS 2	Set the secondary nameserver, for example, 8.8.4.4 for Google.
Start IP	Set the start IP of the range for this LAN.
End IP	Set the end IP of the range for this LAN.
#IPs	The number of IPs in the defined range (calculated automatically from the preceding fields).
Subnet Mask	This is defined in Section 12.16.1. The settings in this screen must match this.

12.16.3. Reserved IP Addresses

Individual devices on wireless APs or LAN ports can be assigned reserved IP addresses (Figure 93). You can add up to 10 reserved IP addresses on each LAN. Tap the Reserved IPs option on the Dashboard to display the Reserved IP Addresses screen. If there are no reserved IPs currently configured, this screen is as shown in Figure 95.

This screen is available only on the gateway VeeaHub. The setting is disabled if it is managed on the WAN, for example, if the LAN is bridged to the WAN, or if it is managed by an installed service such as vTPN.

Figure 93: Reserved IP Addresses



To add a reserved IP, tap the **+ ADD RESERVED IP** button. The Add New Reserved IP dialog is displayed as shown in Figure 94 and its associated parameters are described in Table 35.

After you have entered the details, tap '**Add**' to add the reserved IP address.

Note.

When you have added one or more reserved IP addresses, you must restart the unit for the changes to take effect.

Figure 94: Add New Reserved IP Address

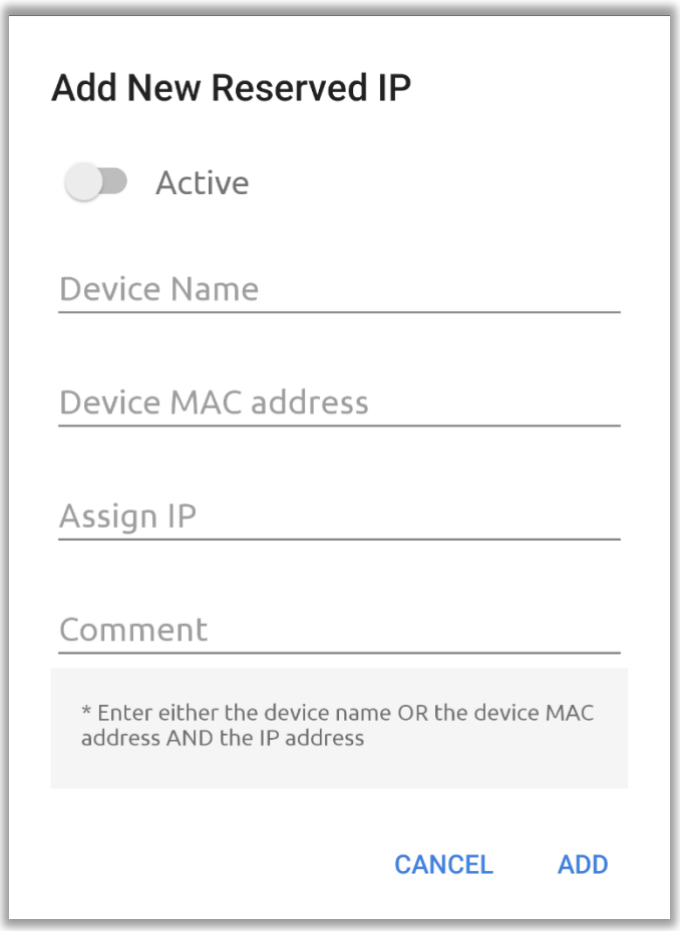
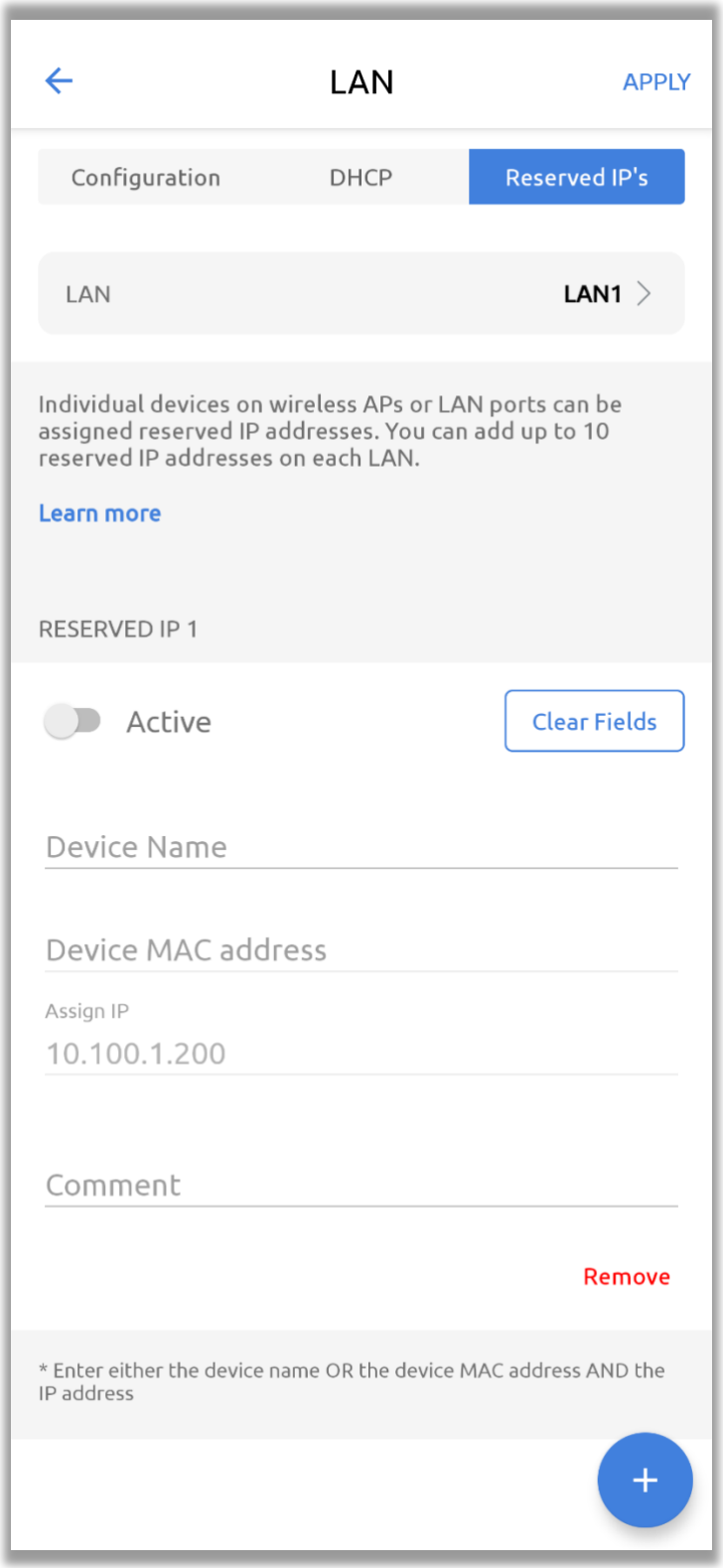


Table 35: Reserved IPs Configuration

Name	Description
Active	When switched on, the Reserved IP is in effect.
Device Name	Specify the name of the device you wish to assign the IP address to. This is an alternative to specifying the MAC address. How to find the device name depends on the type of the device.
Device MAC address	Specify the MAC address of the device you wish to assign the IP address to. This is an alternative to specifying the Device Name.
Assign IP	Enter the IP address to assign to this device on this LAN.
Comment	A free text field to record information about this reserved IP address.

Once you have one or more reserved IP addresses configured, the screen appears as in **Figure 95**.

Figure 95: Reserved IP Address Configured



To clear the details from a reserved IP address, tap **Clear Fields**.

To delete the reserved IP address, tap **Remove** and restart the unit to apply the changes.

12.17. WAN Gateway

Tap the WAN Configuration option on the Dashboard to open the WAN configuration screen shown in Figure 96. The details are in Table 36.

Backhaul is the service that connects the VeeaHub network to the WAN. Typically, this is an Ethernet (wired) connection or a wireless connection. A cellular connection may be used as a back-up if the main connection fails. Veea offers a 4G Failover service as a premium option.

A VeeaHub network connects to the backhaul through a single node, designated the MEN. By default, this is the first VeeaHub that was used to create the mesh.

12.17.1. WAN Configuration

This screen is applicable only to the gateway VeeaHub (MEN).

Any or all of the backhaul types can be enabled or disabled, if installed on the network. On the WAN configuration screen, you can place the available connections in order, so that if one connection fails, the VeeaHub will fail over to a different connection. The operational status of each backhaul type is shown.

Hold and drag the backhaul icons up/down to configure the preferred order. The backhaul type that appears at the top of the list will be preferred. If this should fail, the connection that is next in the list will be used for failover.

An option is also provided to limit the use of any backhaul for system management traffic. This is useful if the backhaul is a costly resource. For example, if you wish to reduce the cost of a cellular backhaul, enable the Restricted Backhaul setting shown in Figure 96. When this setting is enabled, the VeeaHub and other VeeaHub units in the same mesh communicate with the management and authentication server less frequently, typically once per-hour. This setting is for control traffic only and any application traffic is unaffected.

For the Wi-Fi backhaul, the SSID and passphrase can be entered on this screen. Check the instructions for your Wi-Fi service.

For the Cellular backhaul, the APN name, username and passphrase can be entered on this screen. Check the instructions for your cellular service.

Notes.

Failover is available only on a LAN configured as Routed (the default). Failover is not supported in Bridged mode (refer to Section 12.16).

When you make changes to the WAN configuration and interfaces, the VeeaHub Manager App may display messages warning you of potential cost implications of additional data traffic.

Figure 96: WAN Configuration

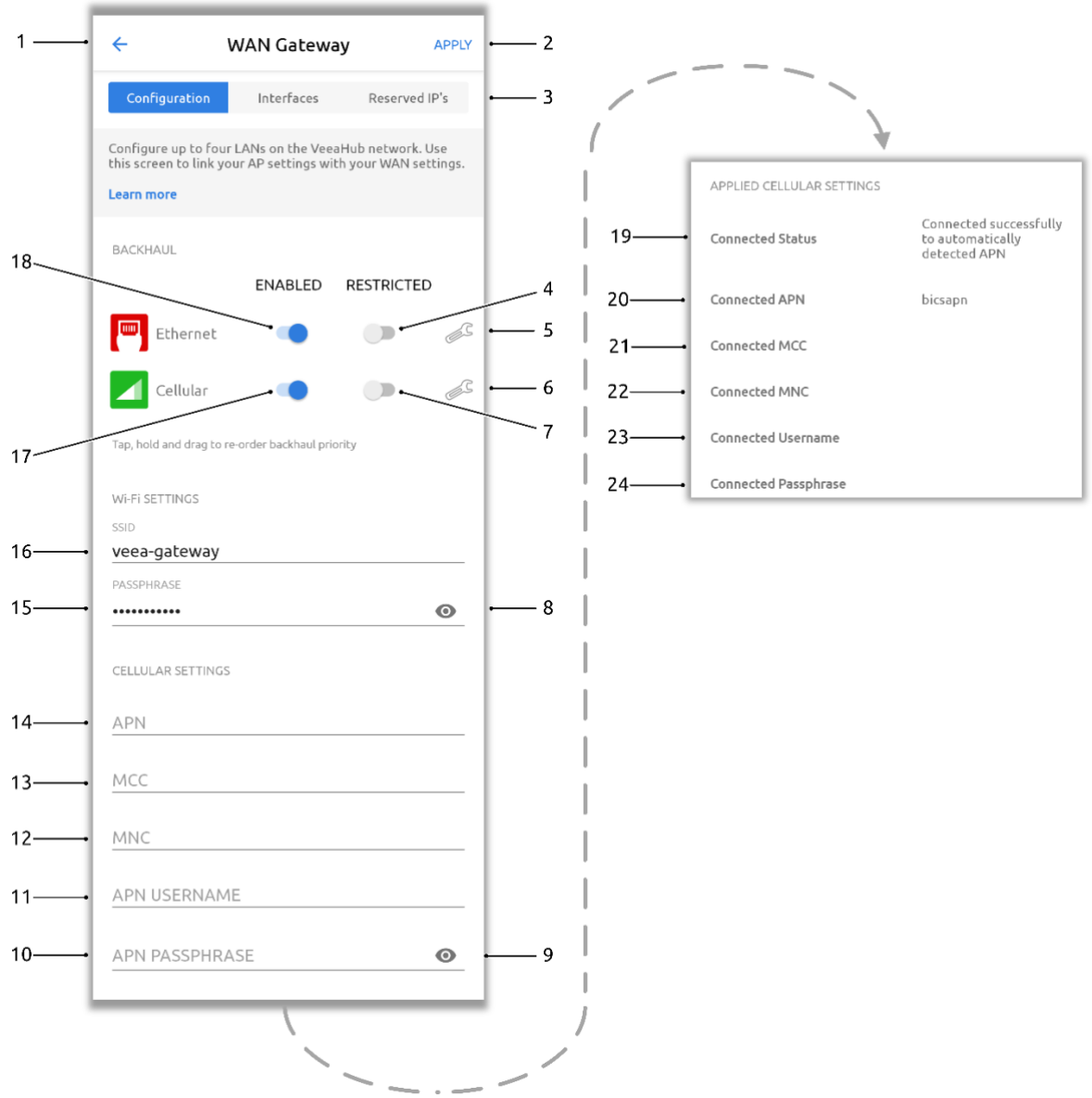


Table 36: WAN Configuration

Figure 96 Item	Name	Description
1	**Cancel Arrow**	Cancel and exit the page without changes.
2	**Apply**	Select the Apply button to apply changes (the button is only visible when changes are entered).
3	**Tabs**	Use these tabs to select the WAN configuration (refer to Section 12.17.1), interfaces (refer to Section 12.17.2) or reserved IP's (refer to Section 12.17.3) option.
4	**Restricted (Ethernet)**	Slide the switch to enable Ethernet backhaul data restriction. This reduces control traffic between the edge and cloud servers and so minimizes costs if your network

Figure 96 Item	Name	Description
		provider charges for data usage. It limits management and status reporting.
5	**Spanner**	-
6	**Spanner**	-
7	**Restricted (Cellular)**	Slide the switch to enable Cellular backhaul data restriction. This limits the amount of data that can be used when Cellular is selected for backhaul.
8	 **Eye icon**	Tap to reveal the Wi-Fi passphrase.
9	 **Eye icon**	Tap to reveal the cellular passphrase.
10	**APN Passphrase**	Enter the APN passphrase.
11	**APN Username**	Enter the Access Point Name (**APN**) username.
12	**MNC**	Enter the Mobile Network Code (**MNC**).
13	**MCC**	Enter the Mobile Country Code (**MCC**).
14	**APN**	Enter the APN.
15	**Passphrase**	Enter the Wi-Fi passphrase.
16	**SSID**	Enter the Wi-Fi SSID.
17	**Cellular Backhual**	Slide switch to enable Cellular backhual.
18	**Ethernet Backhual**	Slide switch to enable Ethernet backhual.
19	**Connected Status**	Displays the connected status.
20	**Connected APN**	Displays the connected APN.
21	**Connected MCC**	Displays the connected MCC.
22	**Connected MNC**	Displays the connected MNC.
23	**Connected Username**	Displays the connected Username.
24	**Connected Passphrase**	Displays the connected Passphrase.

12.17.2. WAN Interfaces

This screen appears only on the gateway node (MEN).

Tap the WAN Interfaces tab to open the WAN Interfaces screen, as shown in **Figure 97**. The details are in **Table 37**.

You should configure this screen to match the LAN settings (refer to Section **12.16**). If your VeeaHub network is connected to an enterprise network, the necessary settings, including vLAN tags where relevant, should be obtained from your enterprise WAN administrator.

Figure 97: WAN Interfaces

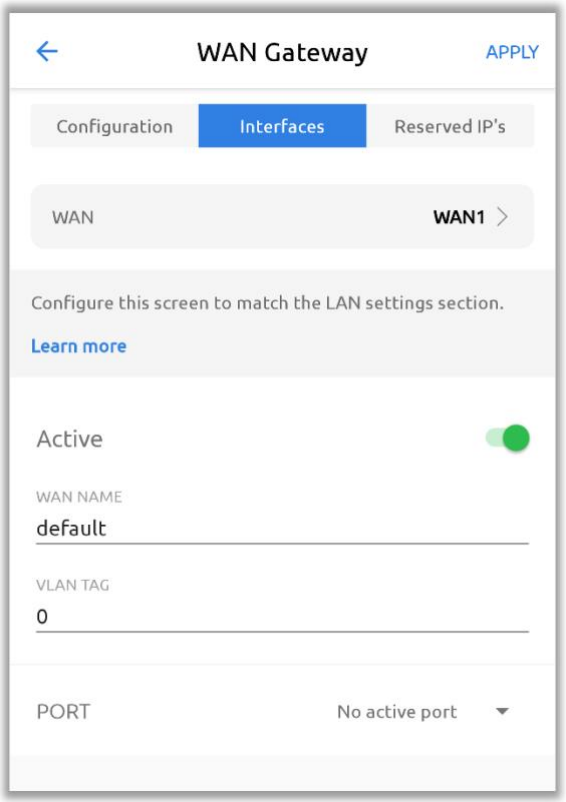


Table 37: WAN Interfaces Configuration

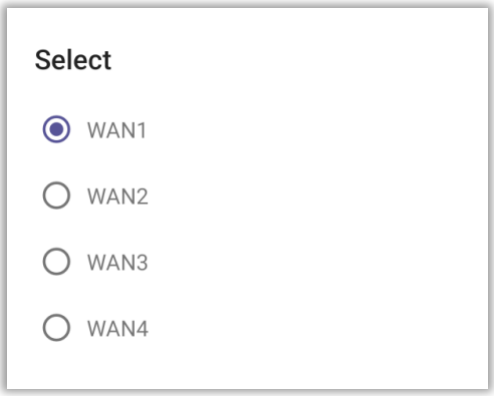
Figure 97 Item	Name	Description
1	**Cancel Arrow**	Select the arrow to exit the page without changes.
2	**Apply**	Select the Apply button to apply changes.
3	**Tabs**	Use these tabs to select the WAN interface or the WAN configuration option.
4	**WAN Selection**	Select the other WAN controls from a dropdown list: 
5	**Active**	Make the selected WAN active.
6	**WAN Name**	Enter a new name for the selected WAN interface.

Figure 97 Item	Name	Description
7	**VLAN Tag**	Set the VLAN tag for the WLAN interface traffic for the selected WAN. A value of 0 means no tag.
8	**Port**	Chose a Port to use for the selected WAN interface: 

12.17.3. WAN Reserved IPs Tab

This tab (Figure 98) is used to configure a reserved (fixed) IP address for the gateway VeeaHub on the WAN. This is usually necessary only when the WAN does not have a DHCP server.

The configuration options are listed in Table 38.

Figure 98: WAN Reserved IPs

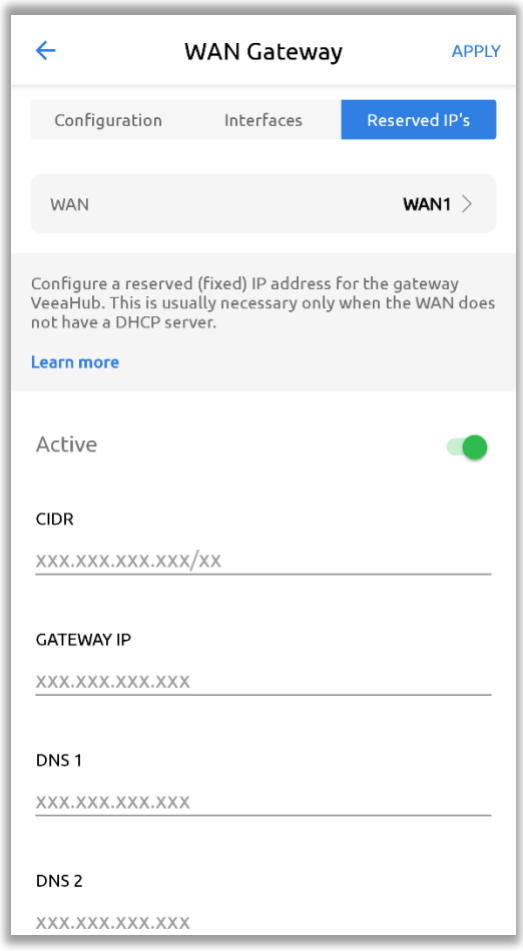
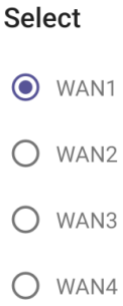


Table 38: WAN Reserved IPs Configuration

Name	Description
WAN	Select WAN which presents the WAN selection list. Choose and configure the WAN with the controls as shown below in this table. You can set reserved IP addresses for any of the WAN interfaces you have defined. 
CIDR	Set the reserved address and subnet mask in CIDR format (###.###.###.##/#)
GATEWAY IP	Set the Gateway IP address.
DNS 1, DNS 2	Assign DNS nameservers.

12.18. vMesh Configuration

12.18.1. vMesh Configuration Screen

Tap the vMesh configuration option on the Dashboard to open the vMesh Configuration screen shown in **Figure 99**. The details are in **Table 39**.

vMesh is Veea's proprietary technology that enables the VeeaHubs in a network to work together. For further information, see the VeeaHub Support Center. This and other mesh parameters can be configured on this screen.

By default, the mesh is established over 5GHz Wi-Fi. It is possible to reconfigure VeeaHubs to connect over Ethernet. A VeeaHub mesh can consist of wireless links, wired links or a mixture of the two.

The mesh name and default parameters are set up when the VeeaHub is added to the account. You may wish to change the channel assignments and transmit power for improved operation in your particular circumstances (including location of units and usage of the mesh).

When Auto Selection is on, the Wi-Fi channel used for the mesh is automatically chosen for you, based on various measurements of the quality of the signal. You can override this selection by choosing a single channel from those available, and you can also restrict the selection of channels that Auto Select uses.

Note.

Auto Selection is available only on the VHE09 and VHE10 models.

Auto Select is not dynamic: once the channel has been selected, this applies until the VeeaHub is restarted, or a channel rescan is done.

Figure 99: vMesh Configuration

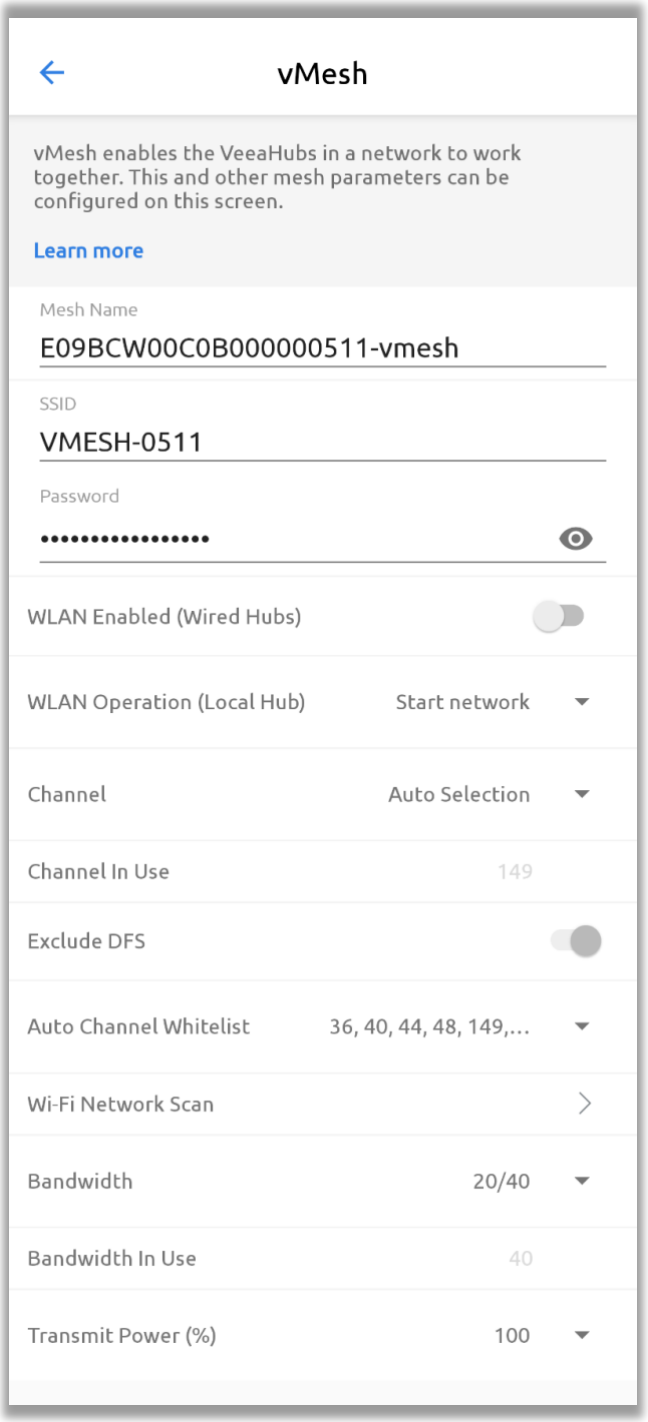
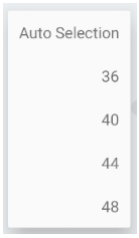


Table 39: vMesh Configuration

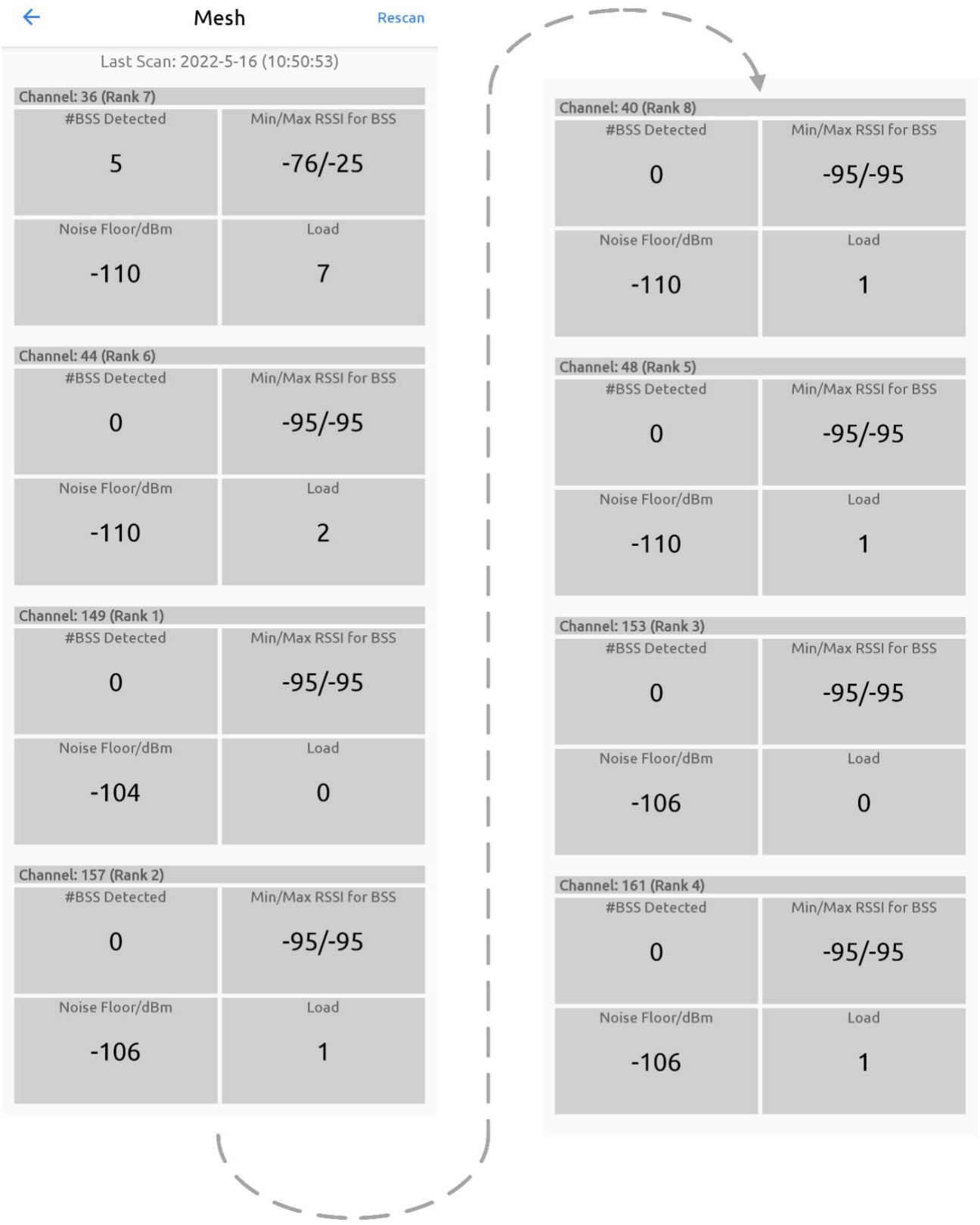
Name	Description
Mesh Name	The name of the network, usually assigned when the first VeeaHub is added to the Veea account and used to create the mesh. The name can be changed here.
SSID	The SSID used for the network WLAN. 1 to 32 characters.
Password	The password for the network WLAN. 8 to 63 characters (letters, digits or symbols).
Eye icon	Tap to reveal the password.
WLAN Enabled (Wired Hubs)[(i)]	**For a gateway VeeaHub (MEN)**: • In the on position, the wireless network operation is enabled for any connected wired hubs. This allows the network to extend wirelessly from these units. • In the off position, the wireless networking is disabled on any directly wired, remote hubs that have WLAN Operation set to '**Automatic**'. The network cannot be extended with wireless links from these units. **For a non-gateway VeeaHub (MN)**: • This is a read-only setting that is configured at the gateway hub. In the on position, the wireless network operation is enabled according to the 'WLAN Operation (Local Hub)' setting. This allows the network to extend wirelessly from these units. • In the off position, the wireless operation is disabled at this hub provided it has a direct wired link to the gateway hub and also that the 'WLAN Operation' setting is '**Automatic**'. Otherwise, the normal 'WLAN Operation' setting behavior applies.
WLAN Operation (Local Hub)[(i)]	**For a gateway VeeaHub (MEN)**: • With '**Start Network**' selected, the hub supports wireless networking and will start a network identified by the SSID setting. Other hubs can connect to this unit wirelessly using the SSID and matching PSK. • With '**Disabled**' selected, the wireless networking is disabled, and the network cannot be extended with wireless links from this hub. **For a non-gateway VeeaHub (MN)**: • With '**Disabled**' selected, the wireless networking is disabled, and the network cannot be extended with wireless links from this hub. • With '**Automatic**' selected, the behavior depends on whether this unit has a direct wired connection to the gateway hub, and also the setting of 'WLAN Enabled (Wired Hubs)'. If there is no direct wired connection then this unit joins an existing wireless network, similar to the 'Join Network' setting. If there is a direct wired connection and 'WLAN Enabled (Wired Hubs)' is off, then wireless networking is disabled on this unit, similar to the 'Disabled' setting. If there is a direct wired connection and 'WLAN Enabled (Wired Hubs)' is on, then the unit first attempts to join an existing network and, if this is unsuccessful, it starts a new wireless network. • With '**Join Network**' selected, the hub will join an existing wireless network identified by the SSID and provided the PSK matches. The hub must be in range of the existing wireless network. • With '**Start Network**' selected, the hub will start a wireless network using the SSID setting. Other wireless hubs can then connect to this. **Note**. If two hubs are in proximity and both start a network with the same SSID, then the networks are independent.
Channel	This enables selection of the Wi-Fi channel for the wireless mesh. The set of available channels is restricted, based on the configured VeeaHub location.

Name	Description
	By default, Auto Selection is displayed. A number of criteria are used to choose the best channel at the time the mesh starts up. If you prefer to override this and select one of the available channels, choose the channel number from the list. 
Channel in Use	The channel chosen by Auto Selection.
Exclude DFS	This switch, when selected, prevents channels that are designated for Dynamic Frequency Selection being used for Auto Selection.
Auto Channel Whitelist	This dropdown enables you to specify which channels will be used for Auto Channel selection.
Wi-Fi Network Scan	When Auto Select is in operation, this displays the Scan screen (refer to Section 12.18.2).
Bandwidth	Select the bandwidth for the network LAN. **Note**. 80MHz is not supported on the VHC05. 
Bandwidth in Use	This shows the currently selected bandwidth.
Enable Beacon	Not available on a gateway VeeaHub (MEN). This is used on a non-gateway VeeaHub (MN) to create a new Wi-Fi mesh using the SSID above. In normal use this should be OFF at all nodes.
Transmit Power (%)	Select the mesh transmit power (as a % of maximum).
Note. (i)These settings support deployment of a mixed wireless and wired network, for example adding a wireless extension to a wired network. The default settings cover most configurations when first deploying a network, and once deployed, the default settings can be updated to match the network topology more precisely. For more information and a case example, refer to Appendix D.	

12.18.2. vMesh Configuration: Scan

This tab (Figure 100), when it appears, shows the measurements for each channel on which the Auto Channel selection is based. It also shows the date and time these measurements were made. A typical result is shown here.

Figure 100: Network Configuration: Scan



The measurements are listed in **Table 40**.

Table 40: vMesh Configuration: Scan Tab

Name	Description
Channel	The channel number.
Rank	A number calculated from the measurements. The highest-ranking channel is auto selected.
#BSS	The number of Basic Service Sets (**BSS**) detected on this channel.
Minimum/Maximum RSSI for BSS	The minimum and maximum Received Signal Strength Indicator for the BSSs on this channel.
Noise Floor / dBm	The noise floor on this channel.
Load	A measure of the time the channel is occupied.

These measurements are combined to select a best channel for the Auto Channel selection. If a channel is ranked as 0, it is not considered suitable for auto selection. If all the channels show poor results, then moving the VeeaHub to another position should be considered.

You can rescan the measurements by clicking **Rescan**. This may change the channel used.

12.19. Physical Port Configuration

Tap the 'Learn more' button on the Dashboard to show more information about the Ethernet ports on the VeeaHub network. The screen is shown in Figure 101 and the details are described in Table 41, Table 42 and Table 43.

For detailed information about Ethernet ports on the VeeaHub, including example uses, refer to Section 5.4.

Figure 101: Physical Ports Configuration

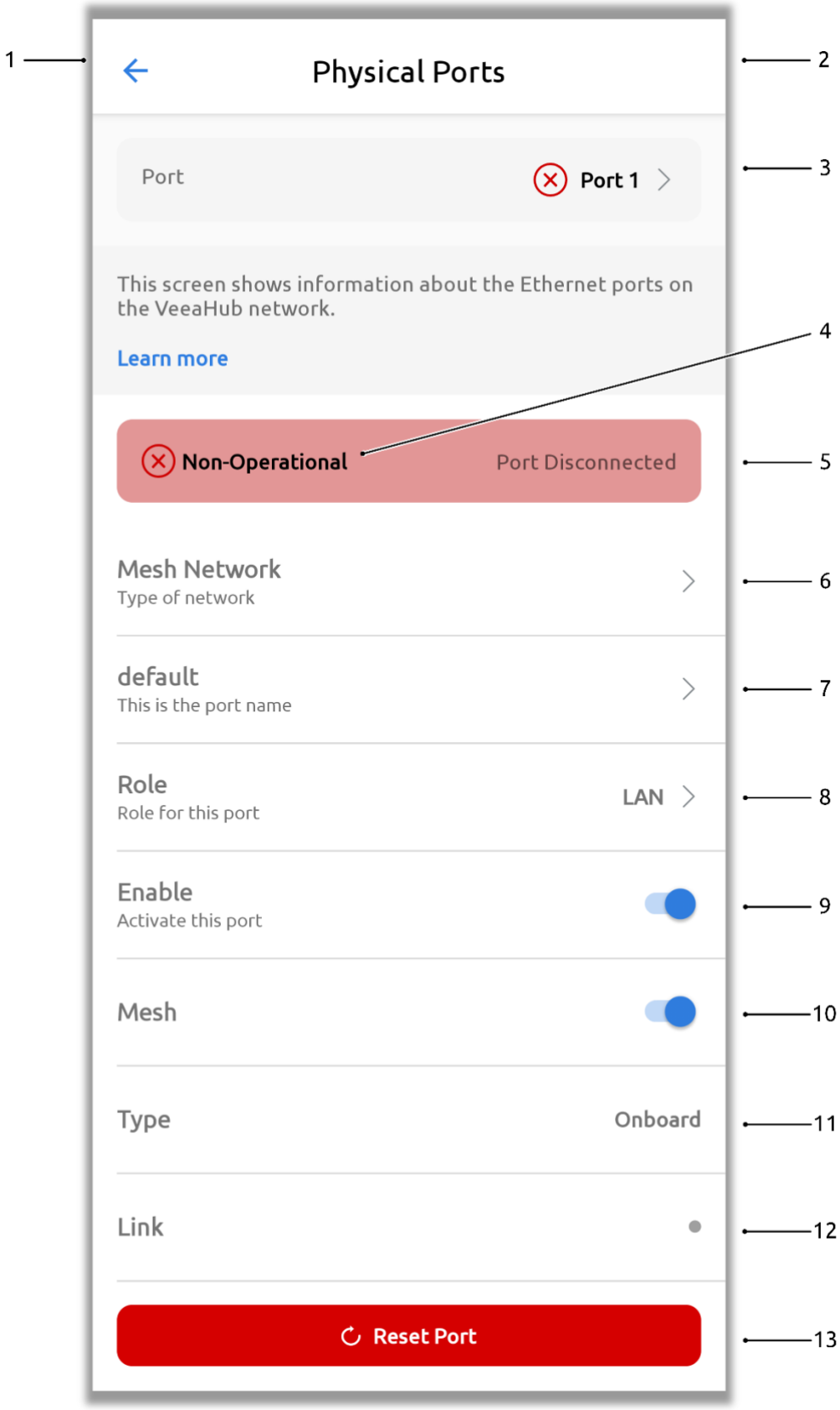


Table 41: Physical Ports Configuration (VHM)

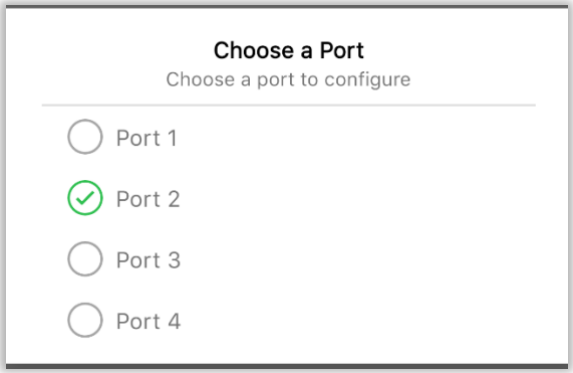
Figure 101 Item	Name	Description
1	**Cancel Arrow**	Select the arrow to exit the page without changes.
2	**APPLY**	Select the Apply button to apply changes (only visible when a change has been entered).
3	**Port 1**	Displays the current Port number with Port 1 set as the default. Select this to choose another port on this hub. The quantity of ports is dependent on the VeeaHub model type.  If the Enable switch (Item 9) is set on, the port has the settings that are configured here. If the Enable switch is off, the port is disabled on this VeeaHub, even if it is configured for the whole network (see '**Hub or Mesh Network**', Item 6).
4	**Status**	This indicates the operational status of the port. Status descriptions are listed in **Table 42**.
5	**Reason**	Reason messages are displayed here, refer to **Table 43** for details.
6	**Type of network. Hub Network or Mesh Network**	Select this to choose a Hub or Mesh Network.  If Mesh is selected, a wired mesh is formed with peer hubs on the same LAN network of a MEN or MN. They can also form a mesh on the WAN network with a routed or bridged MEN. You can disable a wired mesh if not required, for example, if only the MEN is connected to a WAN network, or a LAN port is on an isolated segment with no peer hubs connected.
7	**Default**	Enables you to change the name of this port. Enter the new name and tap OK.

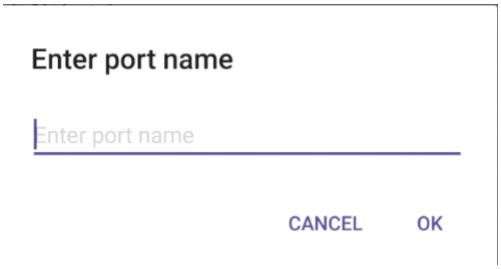
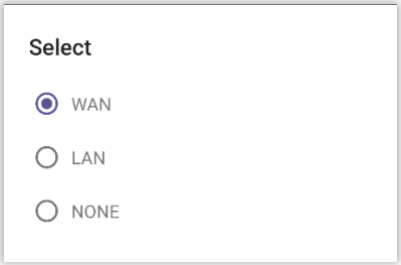
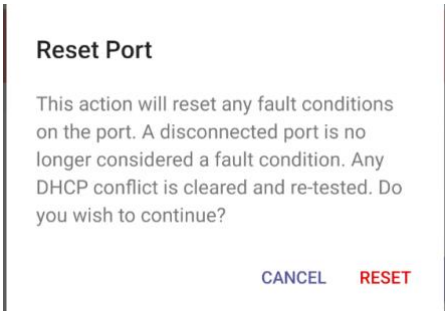
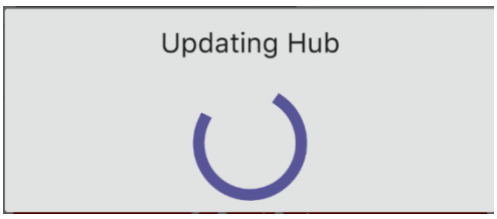
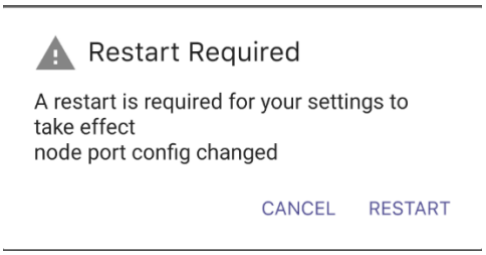
Figure 101 Item	Name	Description
		
8	**Role**	This selects this physical port for WAN or LAN use.  **WAN**: This can only be set on a gateway VeeaHub and indicates which port is used for 'backhaul' connectivity. The WAN settings are described in Section 12.17. There must be only one WAN port on a mesh. **LAN**: This specifies that the port is a LAN connection for other devices. **None**: Not used for WAN or LAN.
9	**Enable**	If HUB is selected, then the port is disabled on this node. If NET is selected, the port is disabled across the network, but may be overridden locally on a hub.
10	**Mesh**	If enabled, a wired mesh is formed with peer hubs on the same LAN segment. Hubs can form a peer mesh on the LAN network of an MEN or MN. They can also form a mesh on the WAN network with a routed or bridged MEN. You can disable a wired mesh if not required, for example, if only the MEN is connected to a WAN network, or a LAN port is on an isolated segment with no peer hubs connected.
11	**Type**	This legend shows whether the port is integrated within the unit, '**Onboard**', or is an external USB Ethernet device, '**USB/Eth**'.
12	**Link**	Indicates if the port is active, so cabled and connected to a networking or client device. **Green dot**: The port is active and connected to a peer networking or client device. **Grey dot**: The port is not active, either a cable is not inserted, or no link activity is detected with a peer.
13	**Reset Port**	Reset any fault conditions on the port. A disconnected port is no longer considered a fault condition. Any DHCP conflict is cleared and retested. The Port Reset button appears when the port cannot be automatically configured. Select the button to reset the port to its default setting and clear any fault. When selected, the 'Reset Port' dialog appears as follows:

Figure 101 Item	Name	Description
		 Select the RESET button to continue the port reset process. The 'Updating Hub' dialog is displayed as follows:  Once the local update has completed, a hub restart is required. Select the 'RESTART' button as shown in the screen that follows: 

Icons and colors

The icon and background color of a Port entry give information about the state of the Port. For full details, see the Status message displayed.

Table 42: Port Status Messages (VHM)

Icon	Color	Status Message/Description
	Grey	**Never Active** The port has never been connected and is not in use.
	Green	**Active** The Port is active and properly configured for this setting.

Icon	Color	Status Message/Description
	Orange	**Disabled** The port has been disabled.
	Red	**Non-Operational** The Port is non-operational, refer to reason for more information.
	Yellow	**Incomplete** The configuration of this Port is incomplete.
	Grey	**Changes not applied** Select the Apply button to apply changes.

Table 43: Port Reason Messages

Reason Message	Description
Port Not Connected	The port has never been connected or the port is disconnected.
Adapter not present	The device has never been present, or the device has been removed.
DHCP Conflict	DHCP conflict[1].
Port Down	Port is down[2].
Not Fitted	Not fitted[3].

Notes.

[1]If an Ethernet cable is connected to another network with a DHCP server and is plugged into a LAN port, this is an error situation. VHM will display the message 'DHCP conflict' (refer to Section 15.3).

[2]If an Ethernet port is In Use and Enabled but has no connected device, VHM will display the message 'Port Down'.

[3]If a USB port has been configured as a LAN port, but no Ethernet adaptor is present, the message 'Not Fitted' is displayed.

The error messages listed above are displayed if the error condition applies when you connect VHM to the VeeaHub, or if you tap APPLY while on the Physical Port screen.

12.20. IP Address

This screen is available only on a gateway VeeaHub (MEN). Tap the IP Configuration option on the Dashboard to open the IP Configuration screen as shown in Figure 102. Each parameter is described in Table 44.

The title section shows the IP address of the VeeaHub. If the VeeaHub is configured as a MEN, it also shows the backhaul type.

Figure 102: IP Address

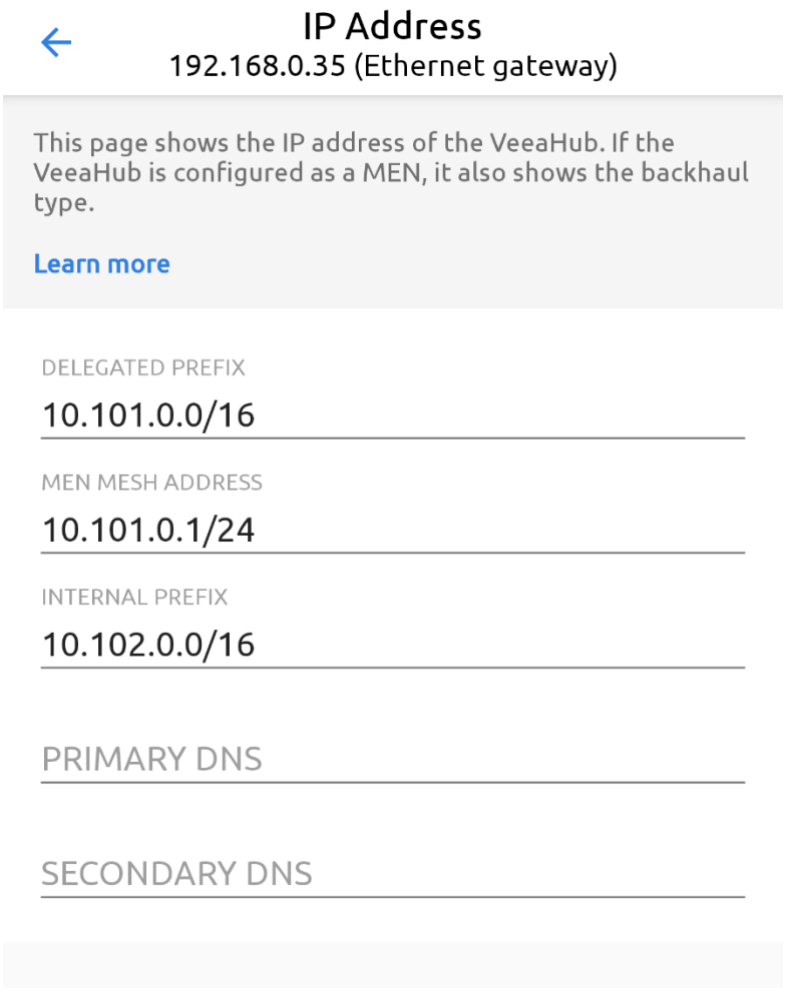


Table 44: IP Configuration

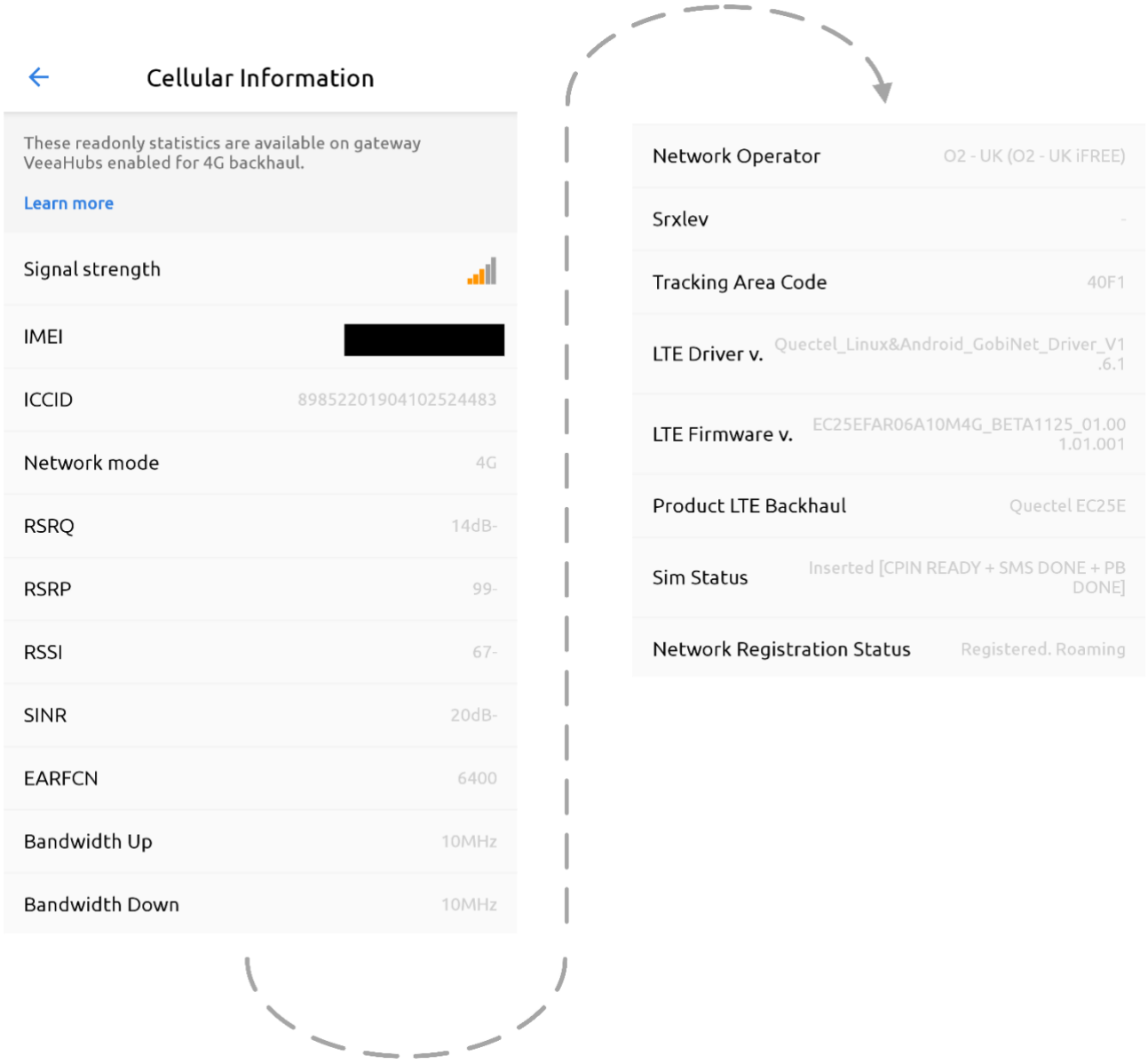
Name	Description
IP address	The external IP address of the VeeaHub, and the backhaul type.
Delegated prefix	Used to assign IP addresses to VeeaHub devices in the network. In the case of IPv4 operation this is a private IP prefix space. You should not need to change this value, unless the backhaul interface also has the same prefix. Changing this field will cause the MEN to reboot.
MEN mesh address	Defines the IP address of the MEN on the mesh. This should be within the delegated prefix address range. Changing this field will cause the MEN to reboot.
Internal prefix	Used to assign IP addresses to stations connected to the VeeaHub APs while the VeeaHub is not connected to a mesh.
Primary DNS server	The backhaul network interface DNS is propagated across the vMesh. If the backhaul network does not have DNS, this should be configured to point to an external DNS.
Secondary DNS server	The backhaul network interface DNS is propagated across the vMesh. If the backhaul network does not have DNS, this should be configured to point to an external DNS.

12.21. Cellular Information

Cellular information statistics are available on gateway VeeaHubs enabled for 4G backhaul (refer to Section 12.17).

Tap the Cellular Stats option on the Dashboard. Refer to Figure 103 and Table 45 for a description of the cellular stats screen.

Figure 103: Cellular Information



Tap the Cancel Arrow to return to the Dashboard.

Table 45: Cellular Information

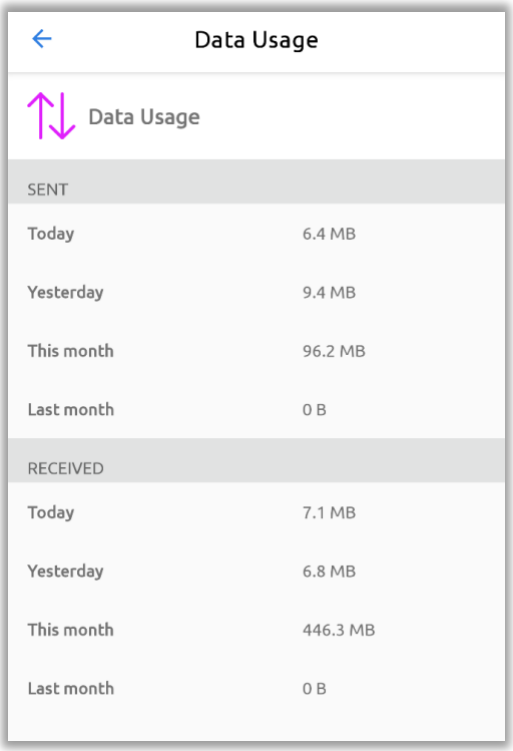
Name	Description
Signal Strength	Signal strength icon shows colored vertical bars to indicate signal strength.
IMEI	This is the International Mobile Equipment Identity (**IMEI**) number. It is formed from a digital code.
ICCID	This is the Integrated Circuit Card ID (**ICCID**). A unique number assigned to a SIM card used in the VeeaHub.
Network mode	This is the network mode which is automatically selected.
RSRQ	This is the Reference Signal Received Quality (**RSRQ**).
RSRP	This is the Reference Signal Received Power (**RSRP**).
RSSI	This is the Received Signal Strength Indicator (**RSSI**).
SINR	This is the Signal to Interference Plus Noise Ratio (**SINR**).
EARFCN	This is the E-UTRA Absolute Radio Frequency Channel Number (**EARFCN**).
Bandwidth Up	-
Bandwidth Down	-
Network Operator	-
Srxlev	-
Tracking Area Code	-
LTE Drive v.	-
LTE Firmware v.	-
Product LTE Backhaul	-
Sim Status	-
Network Registration Status	-

12.22. Data Usage

The data usage screen displays both sent and received data in units or multiple units of bytes. It is available from VeeaHubs which are enabled for 4G backhaul (refer to Section 12.17).

Tap the '**Data Usage**' option on the Dashboard (refer to Figure 86), which opens the data usage screen as shown in Figure 104.

Figure 104: Data Usage (Example)



12.23. Router Access Mode and Control

Tap the Router Access Mode and Control option on the Dashboard to show the Router configuration screen (Figure 105). The details are in Table 46. This screen is available only on the gateway VeeaHub.

This screen shows configurations relating to:

- Connecting to a router on the WAN
- Access control for devices on wireless Aps.

Figure 105: Router Configuration

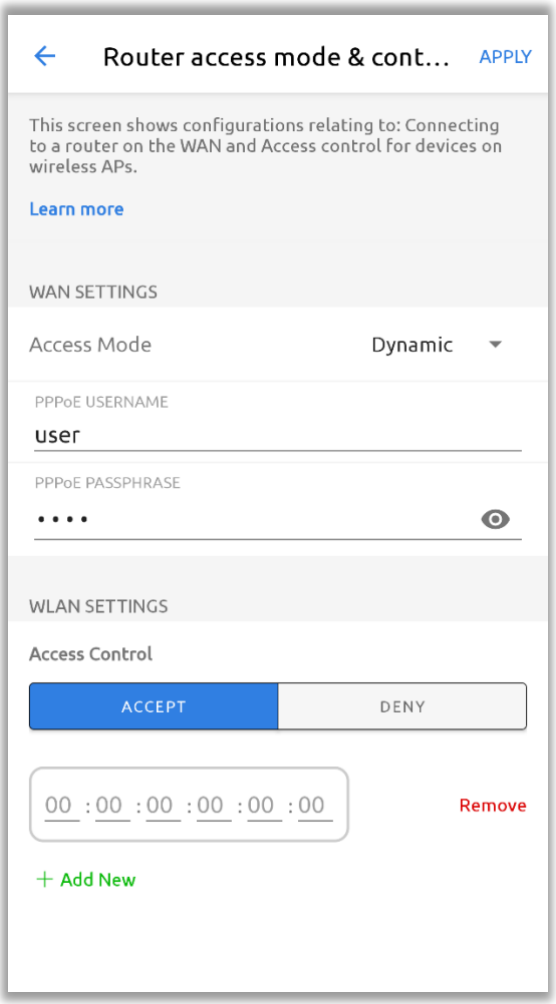
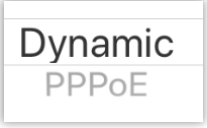


Table 46: Router Configuration

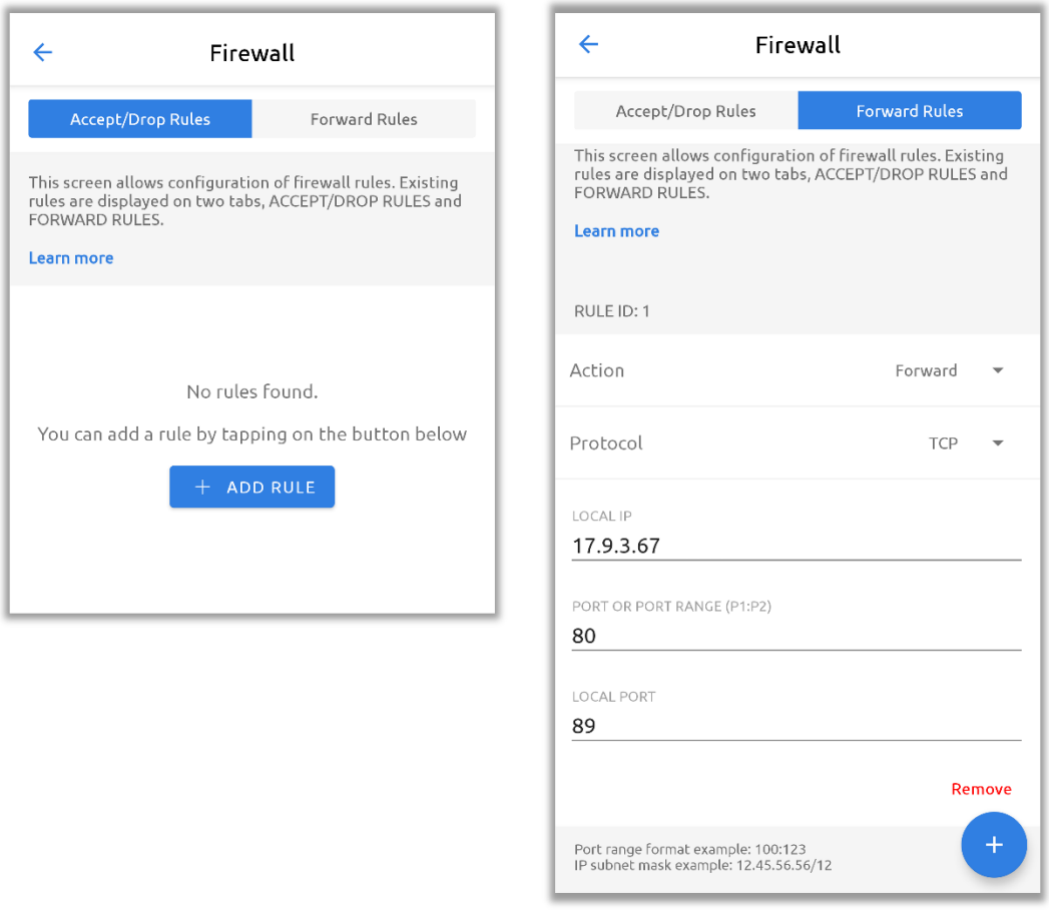
Name	Description
WAN SETTINGS	
Access Mode	Set from the menu. If the VeeaHub WAN port is connected to an external router, set this option to Dynamic (default). If the VeeaHub WAN port is connected to an external router configured for Point-to-Point Protocol over Ethernet (**PPPoE**), select the PPPoE option. 
PPPoE USERNAME	Set the username for PPPoE.
PPPoE PASSPHRASE	Set the passphrase for PPPoE.
Eye icon	Tap to reveal or hide the passphrase.
WLAN SETTINGS	

Name	Description
Access Control	Access Control provides options for acceptance (Accept) or denial (Deny) of access to the wireless APs for a device with a given MAC address. You can set up lists of allowed and denied devices. To add a new device to a list set the switch to Accept or Deny, then tap the Add New. Enter the required MAC address. **Note**. All MAC addresses are allowed by default.
Remove	Tap to delete the access control entry on that line.

12.24. Firewall Configuration

Tap the Firewall Configuration option on the Dashboard to configure Firewall rules. The screen (**Figure 106**) allows configuration of firewall rules. Any rules already configured are displayed on this screen on two tabs, ACCEPT/DROP RULES and FORWARD RULES.

Figure 106: Firewall Configuration



12.24.1. Creating a New Rule

To set up a new rule (Figure 106):

1. If no rules are displayed, tap the **+ ADD RULE** button, or if rules are already displayed, tap the plus icon to create a new rule.
2. Select the type of rule to create: **Accept**, **Drop** or **Forward**.
3. Select the protocol for the rule, Transmission Control Protocol (**TCP**) or User Datagram Protocol (**UDP**).
4. Enter the data specific for the rule.
5. Tap **Create**.

For specific details, refer to Section 12.24.2 for Accept and Drop rules, and refer to Section 12.24.3 for Forward rules.

For deleting rules, refer to Section 12.24.4.

12.24.2. Creating a New Accept/Drop Rule

Figure 107: New Accept or Drop Rule

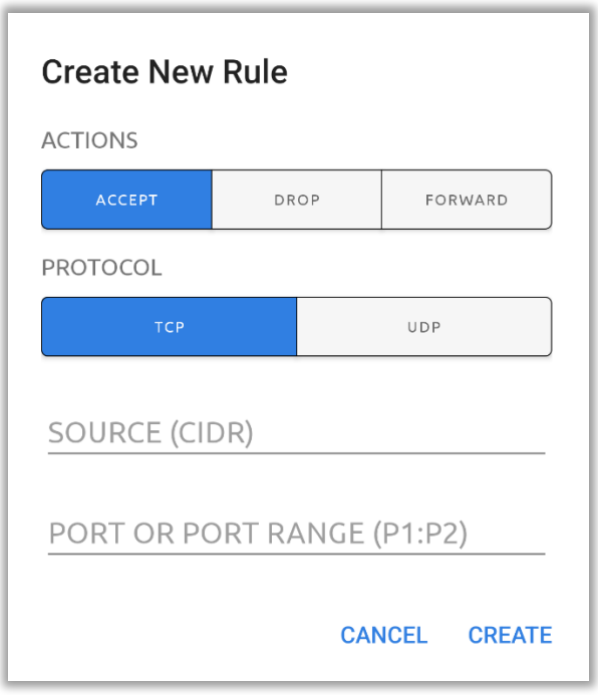


Table 47: Accept and Drop Rules Configuration

Name	Description
ACTIONS	Select ACCEPT, DROP or FORWARD.
PROTOCOL	Select TCP or UDP.
SOURCE (CIDR)	Enter the Classless Inter-Domain Routing (**CIDR**) IP address to be accepted or dropped.
PORT OR PORT RANGE (P1:P2)	Enter the Port or Port Range. A Port range is entered as *P1:P2*, where P1 is the first port number in the range and P2 is the last port number.

12.24.3. Creating a New Firewall Forward Rule

Figure 108: New Forward Rule

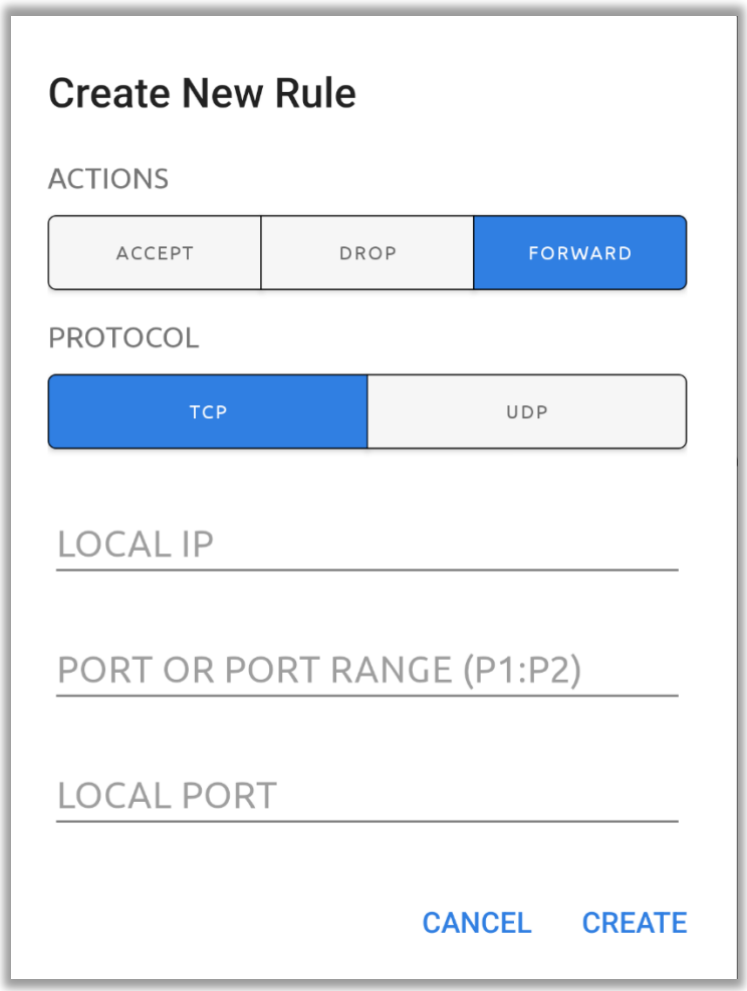


Table 48: Forward Rules Configuration

Name	Description
ACTIONS	Select Forward.
PROTOCOL	Select TCP or UDP.
PORT OR PORT RANGE (P1:P2)	Enter the Port or Port Range. A Port range is entered as *P1:P2*, where P1 is the first port number in the range and P2 is the last port number.
SOURCE IP ADDRESS	Enter the IP address to be forwarded.
LOCAL PORT	Enter the Local Port to be forwarded to.
CANCEL	Select CANCEL to return to the firewall screen. Changes are not saved.
CREATE	Enter the parameters above and select CREATE to complete the set up.

12.24.4. Deleting a Firewall Rule

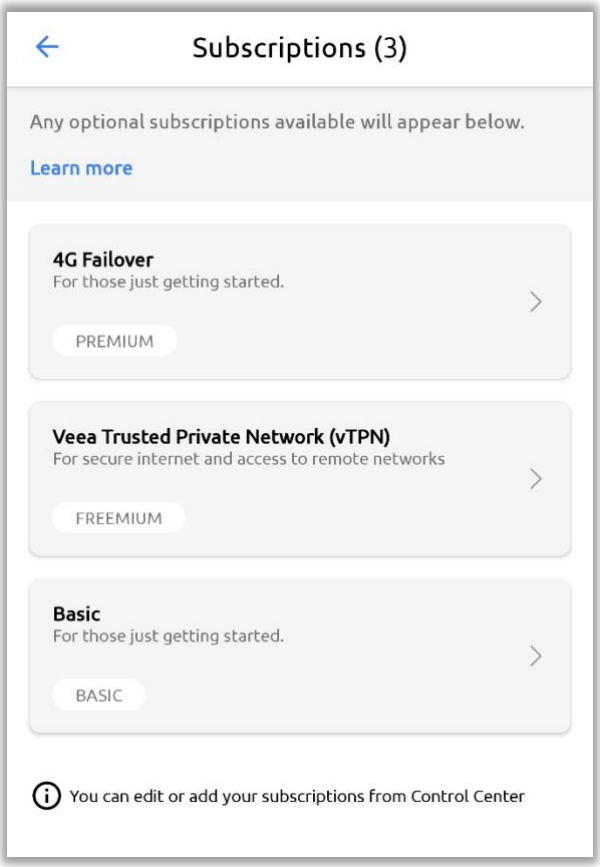
To delete a firewall rule, tap '**Remove**' against the rule.

12.25. Subscriptions

This option (Figure 109) opens a list of optional subscriptions that you have installed.

To view information and configuration options for one of these, tap on its name or icon in the list.

Figure 109: Subscriptions (Example)



12.26. Bluetooth Beacon Configuration

Tap the Beacon option on the Dashboard to open the Beacon Configuration screen shown in Figure 110. The details are in Table 49.

The Bluetooth beacon on a VeeaHub broadcasts an advertisement consisting of a sub-domain and Instance ID. These details are configured when the VeeaHub is added to your account. This screen is for information only.

Figure 110: Beacon Configuration

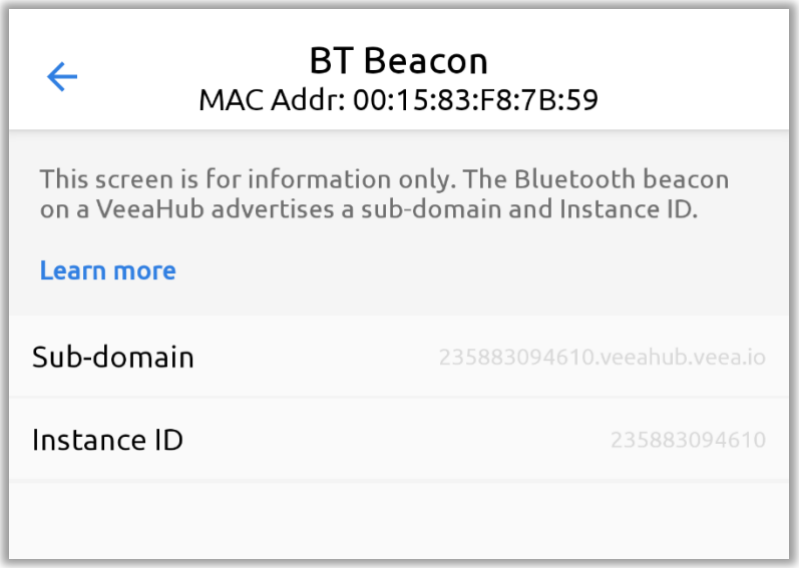
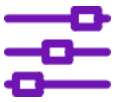


Table 49: Beacon Configuration

Name	Description
Back Arrow	Tap to return to the dashboard.
Screen title	Includes the MAC address.
Sub-domain	Sub-domain name.
Instance ID	The instance ID number.

12.27. About VeeaHub



Tap the About VeeaHub option on the Dashboard to open the About VeeaHub configuration screen shown in **Figure 111**. The details are in **Table 50**.

The first VeeaHub in a network has the status of Gateway node (also called MEN) and connects the mesh to the Internet. Further VeeaHubs are non-gateway nodes (also called MN).

The Node Name is set when the VeeaHub is added to your account. You can change it on this screen.

Position is an optional text field. You can use it for any descriptive purpose, for example, to show where the VeeaHub is located on your premises.

Figure 111: VeeaHub Configuration

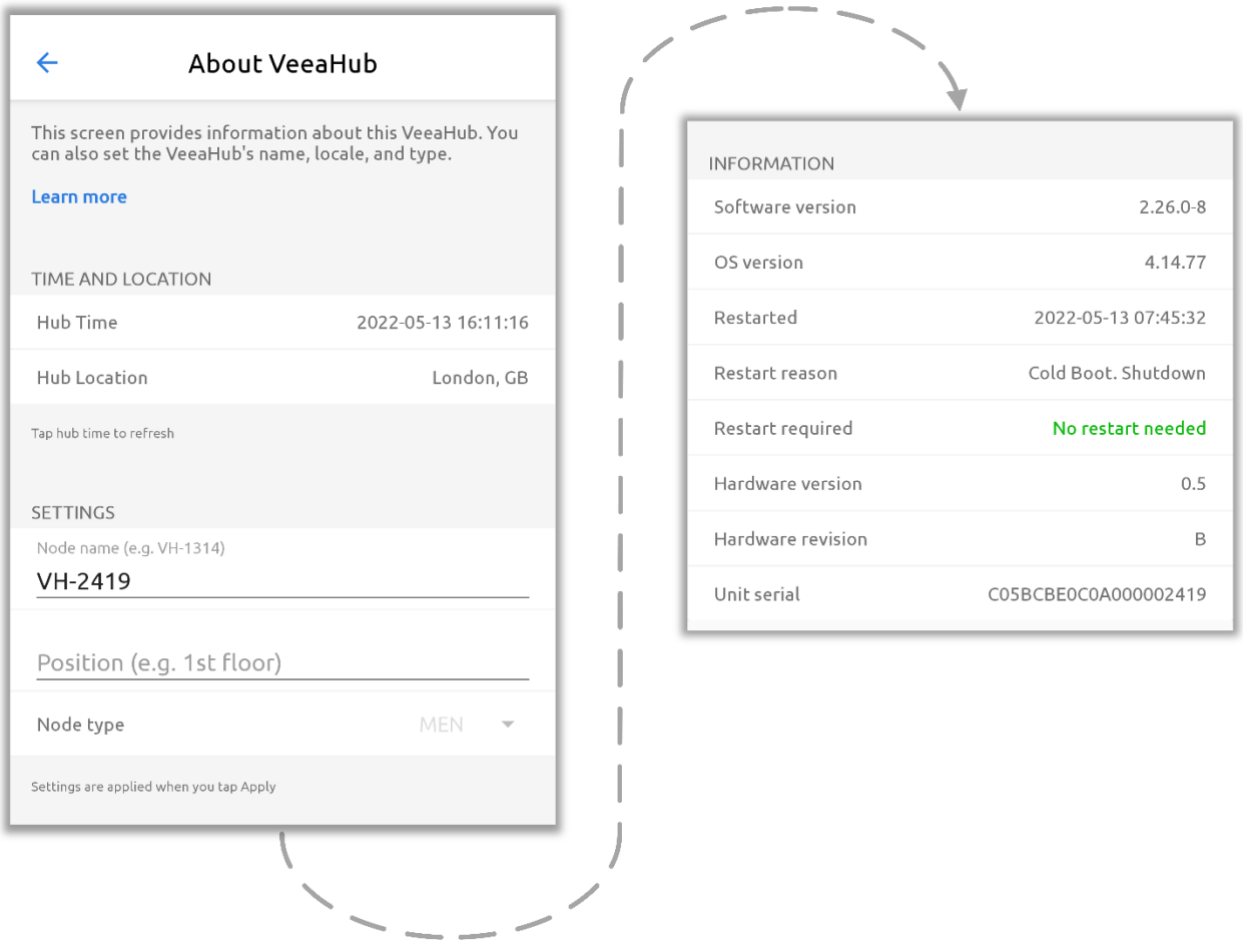


Table 50: VeeaHub Configuration

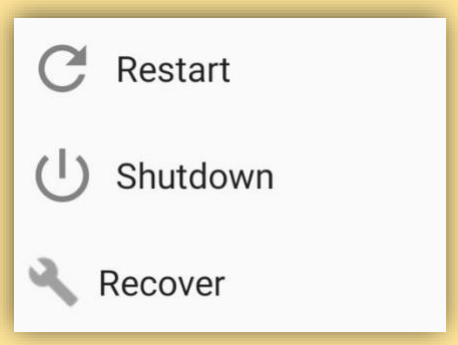
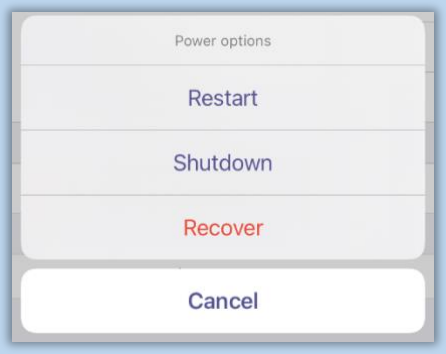
Name	Description
Screen name	The screen name also shows the node name and the serial number of the VeeaHub.
TIME AND LOCATION	
Hub Time	Tap this line to refresh the time display.
Hub Location	The city and country this VeeaHub is registered to.
SETTINGS	
Node Name	Tap on the row to customize the node name.
Position	This may be empty. The locale is free text that can be used to identify the VeeaHub, for example, by its location in a building.
Node type	MEN (Mesh Edge Node, gateway node) or MN (Mesh Node, network node). An MN connects to the wider internet via the MEN. A MEN acts as a gateway for the mesh and has a number of connection options to the wider internet, including cellular, Ethernet and Wi-Fi backhaul. For a MEN, these options are configured by tapping on the WAN option, Figure 86, detailed in Section 12.17. If the node type is changed, the node must be rebooted. The mesh SSID automatically reverts to the default and can be changed to enable the VeeaHub to join the intended network.

Name	Description
INFORMATION	
Software version	The version of the VeeaHub software.
OS version	Operating System (**OS**) version.
Restarted	The time the VeeaHub was last restarted.
Restart Reason	The reason why the VeeaHub was last restarted.
Restart Required	Whether the VeeaHub currently requires a restart.
Hardware version	The version of the VeeaHub hardware.
Hardware revision	The revision number of the hardware version.
Unit Serial	Serial number of this VeeaHub.

12.28. Shutdown, Restart or Recover

Tap the Shutdown, Restart or Recover option on the Dashboard. This opens the Power Controls dialog as shown in **Figure 112**.

Figure 112: Power / Reboot

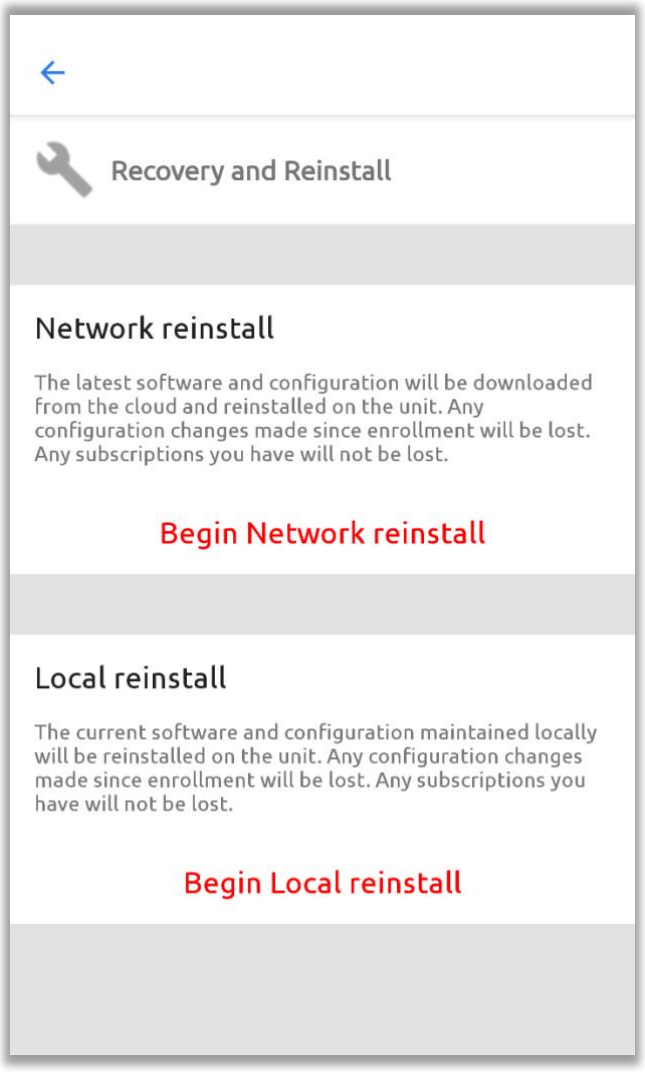
Android	 To cancel, tap on the screen outside the box.
Apple	 To cancel, tap on Cancel.

Available power control functions are:

- **Restart**:
  - Restart the VeeaHub.
- **Shutdown**:
  - Shut down the VeeaHub.
- **Recover**:
  - The VeeaHub will do a recovery or reinstall of the software (Figure 113). There are two recover options which are:
    - **Begin Network reinstall** – The latest software and configuration will be downloaded from the cloud and reinstalled on the unit. Any configuration changes made since enrollment will be lost. Any subscriptions you have will not be lost.
    - **Begin Local reinstall** – The current software and configuration maintained locally will be reinstalled on the unit. Any configuration changes made since enrollment will be lost. Any subscriptions you have will not be lost.

Tap '**Begin Network reinstall**' or '**Begin Local reinstall**' to initiate the required Recovery procedure. A confirmation prompt presents options to either 'CANCEL' or 'BEGIN' the chosen recovery sequence.

Figure 113: Recovery and Reinstall

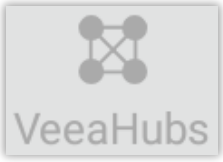


12.29. Removing a VeeaHub from your Account

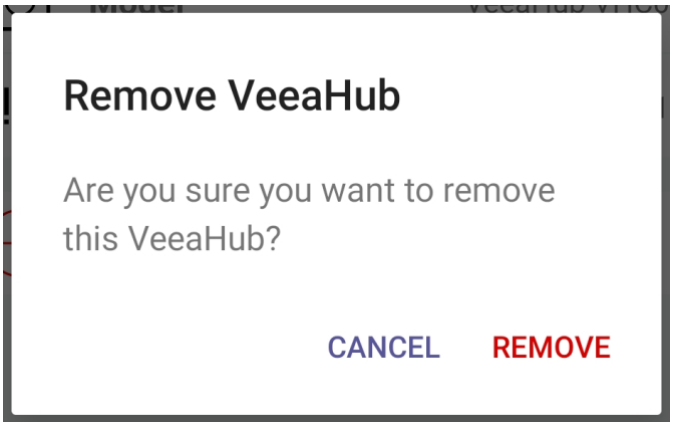
You can remove a VeeaHub from your account using VeeaHub Manager.

This enables the VeeaHub to be added under a different account or for its role to be changed from gateway node (MEN) to edge node (MN).

1. Log in to VeeaHub Manager.
2. Tap the VeeaHubs icon on the Home screen (**Figure 77**).



3. Select the network from My Meshes (**Figure 74**).
4. From the listed VeeaHubs, select the node you wish to remove (**Figure 75**).
5. On the Dashboard (**Figure 86**), tap '**Remove VeeaHub**'. You are prompted to confirm this:



Notes.

1. In order to remove a Gateway VeeaHub (MEN) from a mesh, you must remove any non-gateway VeeaHubs from the mesh (refer to Section **12.29**). You must also unsubscribe from any subscription packages that have been installed on the VeeaHub.

2. On a VHE09/10, the 5GHz AP is enabled by default. On a VHC05, the 5GHz AP can only be enabled if the wireless mesh used to connect peer VeeaHubs is first disabled.

3. Failover is available only on a LAN configured as Routed (the default). Failover is not supported in Bridged mode.

---

13. Guide to Integrated Node Manager

13.1. Introduction

NOTE: This section pertains to Integrated Node Manager, the NEW version of Node Manager. We will refer to the previous (legacy) version of Node Manger as NM. INM is generally available to all users of VeeaCloud Platform 3.6 and later. In some cases, you will have access to both versions, but the legacy NM will be phased out in a future release.

This section describes the use of Integrated Node Manager (INM) to manage and monitor VeeaHub networks. It includes details of the screens and the controls on them.
Integrated Node Manager is a cloud-based management tool for managing VeeaHub networks and individual VeeaHubs available through Control Center.
Integrated Node Manager (with some differences) provides most of the monitoring and configuration options that are also available in the VeeaHub Manager (**VHM**) application which is available to download on Apple and Android mobile devices.

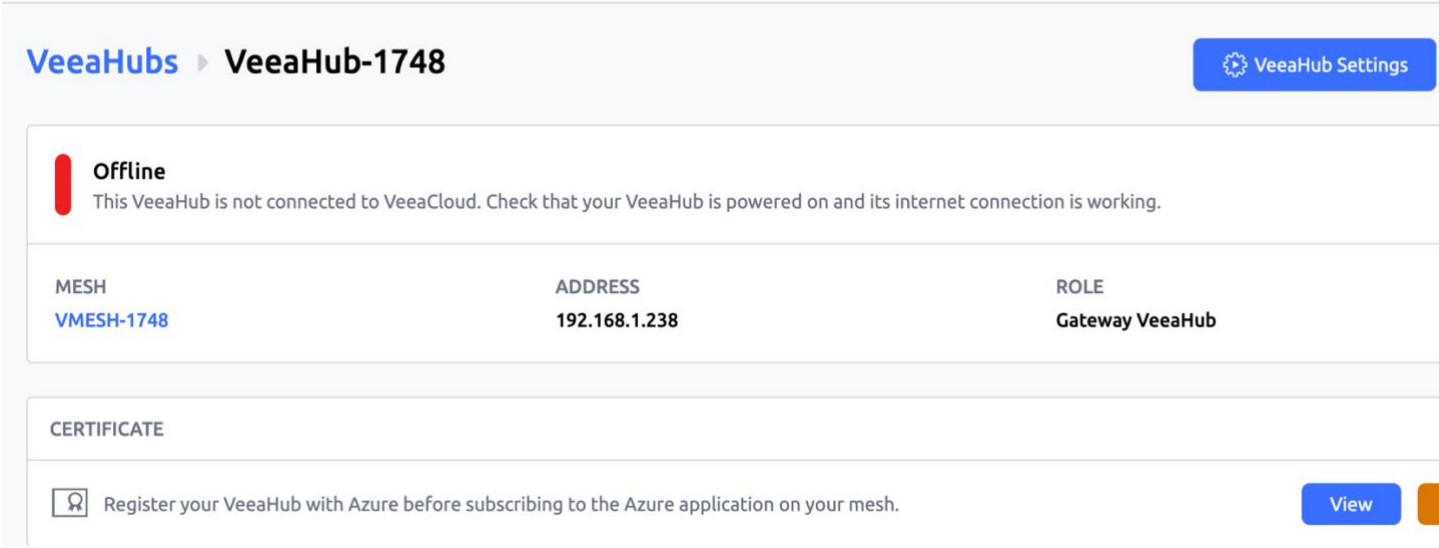
Note.
If you have services such as vTPN installed on your mesh, those may configure some of the options and they will not be configurable from Node Manager.

13.1.1. Opening Integrated Node Manager

Integrated Node Manager (I**NM**) is a set of controls for configuring a selected VeeaHub. On the gateway VeeaHub (MEN), this can also be used to apply settings to the whole network.
Integrated Node Manager is opened from Control Center (refer to Section 11.3.1).
In Control Center, select the VeeaHubs screen and choose the VeeaHub you would like to configure from the VeeaHub record table. Select the '**VeeaHub Settings'** button (Figure 114).

Note the legacy Node Manager may also be available under the Options Menu to allow customers to use the legacy Node Manager for a short time while transitioning to INM.

Figure 114: Opening Integrated Node Manager from Control Center



When the Hub Configuration opens, the first screen will show the INM configuration home page with WiFi settings for 2.4 Ghz. (Figure 115).

The INM menu will be shown on the right side in a vertical orientation. (Figure 116).

The INM Menu is grouped into several sections. Example Sections Include:

- **Other**:
  - Functions that apply only to individual VeeaHubs. This includes About this VeeaHub.
- **Wireless, Networking and Security**:
  - Functions that apply to a network of VeeaHubs or can either apply network-wide or to a single hub.

The available sections and the controls on them vary, depending on which VeeaHub model you are configuring and whether it is configured as the Gateway hub or a non-gateway hub in the network. The full set is

Figure 115: Integrated Node Manager Home Screen

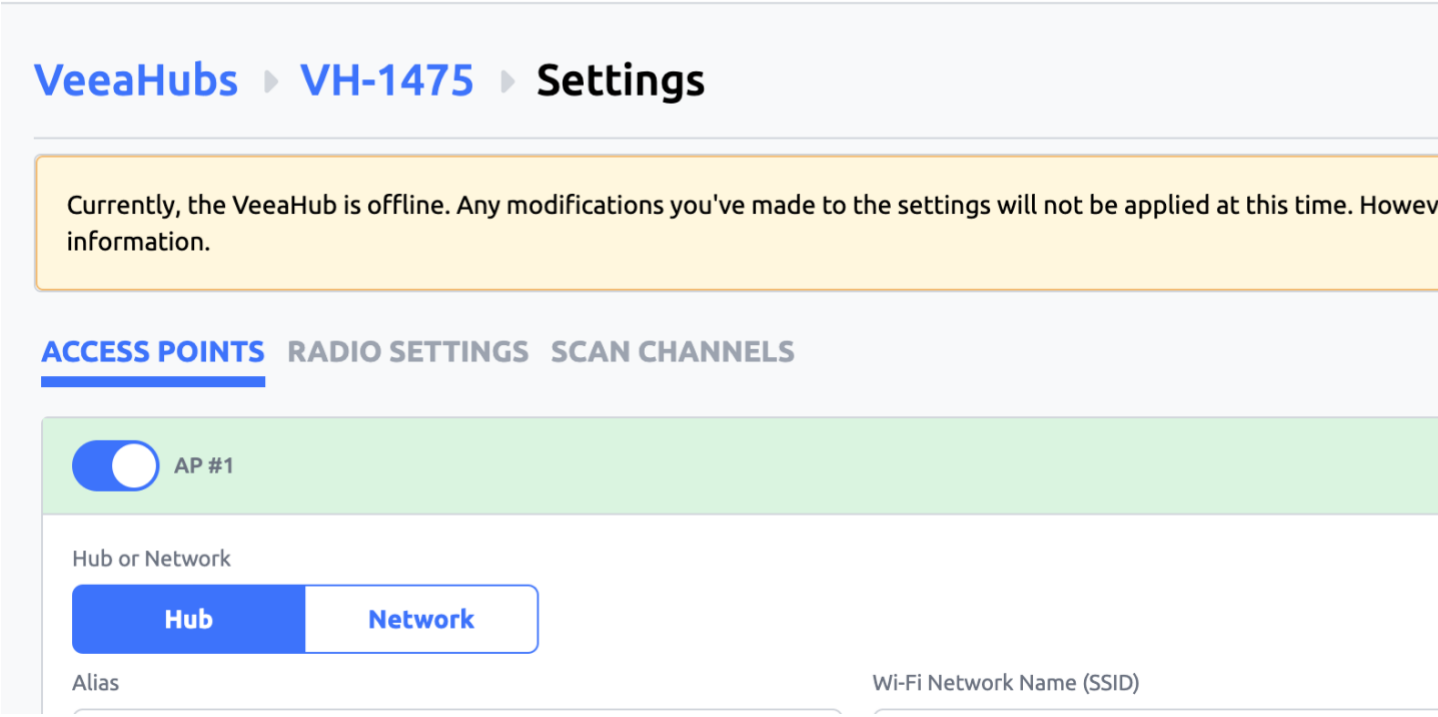
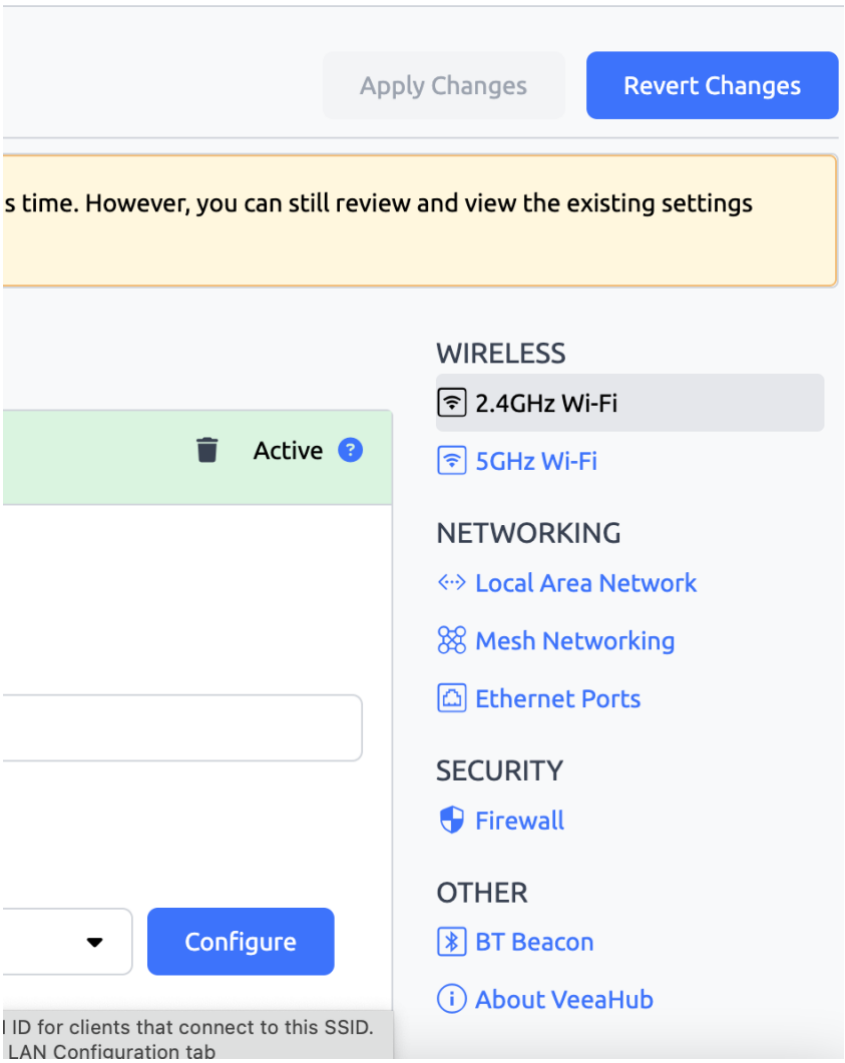


Figure 116: Integrated Node Manager Menu



13.2. Applying and Reverting Changes in INM

A new system has been developed to more intuitively allow you to track the changes you have made in the INM and apply or revert them. As you make changes inside various tabs and sections of INM, you will see a blue dot icon appear next to that section in the right side menu (Fig 116.). The blue dot means you made a change to a parameter within this working session. As you continue to edit parameters, you will see more blue dots appear. The changes have NOT been applied yet, they are only temporary changes. In order to apply the changes you must click the “Apply Changes” button at the top of the right side menu. After clicking Apply you will see a message confirming your selection, and the changes will be applied to the VeeaHub. Note in some cases a restart might be needed for the applied change to take effect.

If you want to revert the changes and go back to the state of the VeeaHub before you started editing, then click the “Revert Changes” button and all of the blue dots will be removed and you will be brought back to where you started this editing session. Note this does not reset the VeeaHub back to defaults, it just brings you back to the state of the VeeaHub before you started editing.

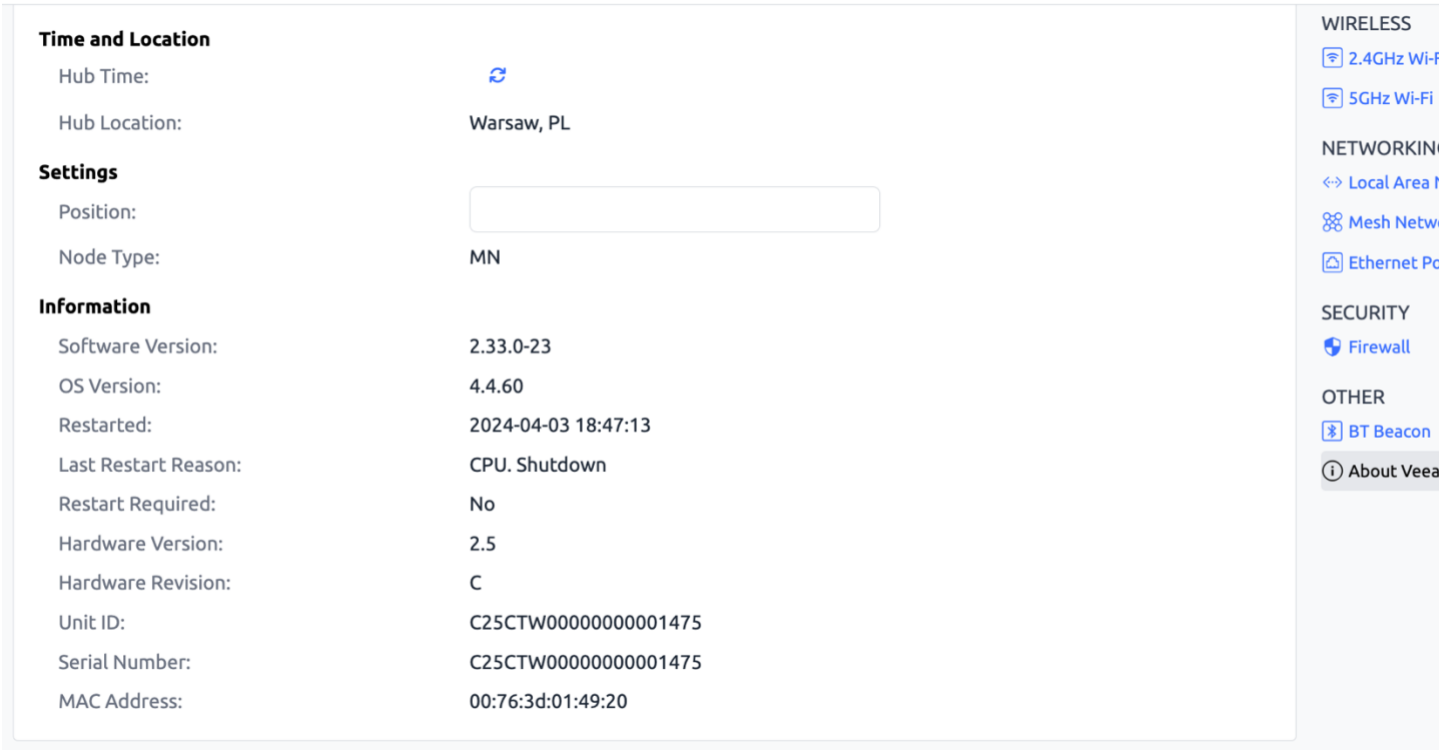
13.2. Restricted Backhaul Mode

The user may apply a restricted data policy on the Gateway node (MEN) to any or all supported backhaul interfaces (Ethernet, Wi-Fi or Cellular). When restricted backhaul is active, the MEN and Enterprise Center minimize the control data traffic on that interface. This is typically applied to a cellular backhaul to minimize the cellular data plan costs, but it may be applied to other backhaul types, for example, to the Ethernet backhaul if this traffic is subsequently routed through a cellular network.

13.3. Other – About VeeaHub

The information and configurations here apply only to the currently selected hub (Figure 118).

Figure 118: Other - About VeeaHub



The configurations here are shown in Table 51.

Table 51: Hub Configuration

Name	Description
Hub Time	The current time of the node
Hub Location	This field displays the location information, which is set during when the hub is added to the Veea account, and the software is installed. It cannot be changed. If you need to relocate the device to a different country, you must contact Veea Support to change it.
Position	Free Text to indicate the node position
Node Type	MEN or MN (for information only).
Software Version	Software version (for information only).
Restarted	Time of last restart

Last Restart Reason	Cause of the reboot (for information only).
Restart Required	Yes or No
Hardware Version	The Hardware version of the node (for information only)
Hardware Revision	The hardware version (for information only).
Unit ID	The node unit ID (for information only).
Serial Number	The node serial number (for information only).
MAC Address	The Node MAC Address (for information only).

13.4. Other - Beacon Configuration

A VeeaHub advertises its presence through a Bluetooth beacon that broadcasts an advertisement consisting of a sub-domain and Instance ID. A client app uses the sub-domain and instance ID values. This is configured when you first add the hub to the Veea account and is only for information. You can toggle enable or disable the Bluetooth Beacon here.

13.5. Other - Cellular

The Cellular tab (Figure 121) is available only on a Gateway VeeaHub (MEN). It displays information about the current Cellular connection.. These fields are read-only.
The information shown is listed in Table 52.

Figure 121: Other - Cellular

Table 52: Cellular Data

Name	Description
PLMN	The Public Land Mobile Network (**PLMN**) identifier of the cellular operator.
Cell ID	ID of the cell served by the base station.
Network Mode	Cellular network mode, 3G or 4G.
IMEI	International Mobile Equipment Identity number.
IMSI	International Mobile Subscriber Identity.
Connect Time	The length of time this connection has been made.

13.6. Network Configuration

13.6.1. Networking – Local Area Network

The information and configurations displayed in these tabs (Figure 124) apply to the network (mesh) to which the currently selected VeeaHub belongs. The first tab is described in Table 54.

Figure 124: Network Configuration Tab

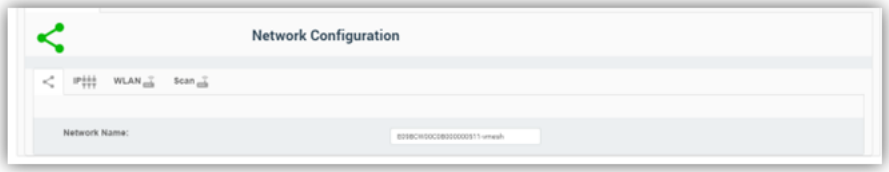


Table 54: Network Configuration First Tab

Name	Description
Network Name	The name of the network usually assigned when the first VeeaHub is added to the Veea account and used to create the mesh. The name can be changed here.

13.6.2. IP Configuration

The IP Configuration tab (Figure 125) is available only on a gateway VeeaHub (MEN). The details are listed in Table 55.

Figure 125: IP Tab

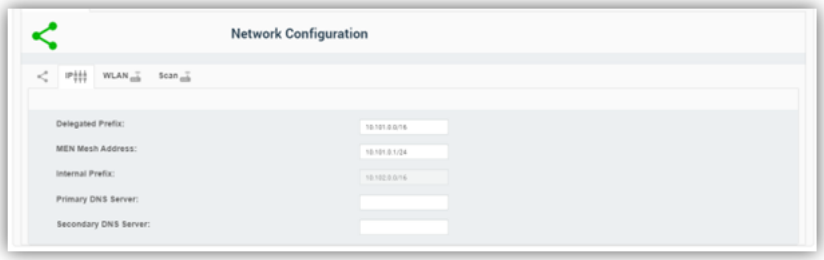


Table 55: IP Configuration

Name	Description
Delegated Prefix	Used to assign IP addresses to VeeaHub devices in the mesh. This is a private IP prefix space. You should not need to change this value, unless the backhaul interface also has the same prefix. Changing this field will cause the MEN to reboot.
MEN Mesh address	Defines the IP address of the MEN on the mesh. This should be within the delegated prefix address range. Changing this field will cause the MEN to reboot.
Internal Prefix	Used to assign IP addresses to stations connected to the VeeaHub APs while the node is not connected to a mesh.

13.6.3. Wireless Configuration

The configuration of the wireless LAN (mesh between VeeaHubs) is covered here. The tab is shown in Figure 126 and the configuration options are listed in Table 56.

vMesh is Veea's proprietary technology that enables the VeeaHubs in a network to work together. For further information, see the Veea Support Center.

By default, the mesh is established over 5GHz Wi-Fi. It is possible to reconfigure VeeaHubs to connect over Ethernet by disabling the WLAN Mesh, and a VeeaHub mesh can consist of wireless links, wired links or a mixture of the two.

The mesh name and default parameters are set up when the VeeaHub is added to the account. You may wish to change the channel assignments and transmit power for improved operation in your particular circumstances (including location of units and usage of the mesh).

When Auto Selection is on, the Wi-Fi channel used for the mesh is automatically chosen for you, based on various measurements of the quality of the signal. These measurements can be seen on the Scan tab, which is only displayed when WLAN is enabled. You can override this selection by choosing a single channel from those available, and you can also restrict the selection of channels that Auto Select uses.

Note.
Auto Selection is currently available only on the VHE09 and VHE10 models.
Auto Select is not dynamic: once the channel has been selected, this applies until the VeeaHub is restarted or a channel rescan is done.

Figure 126: WLAN Tab

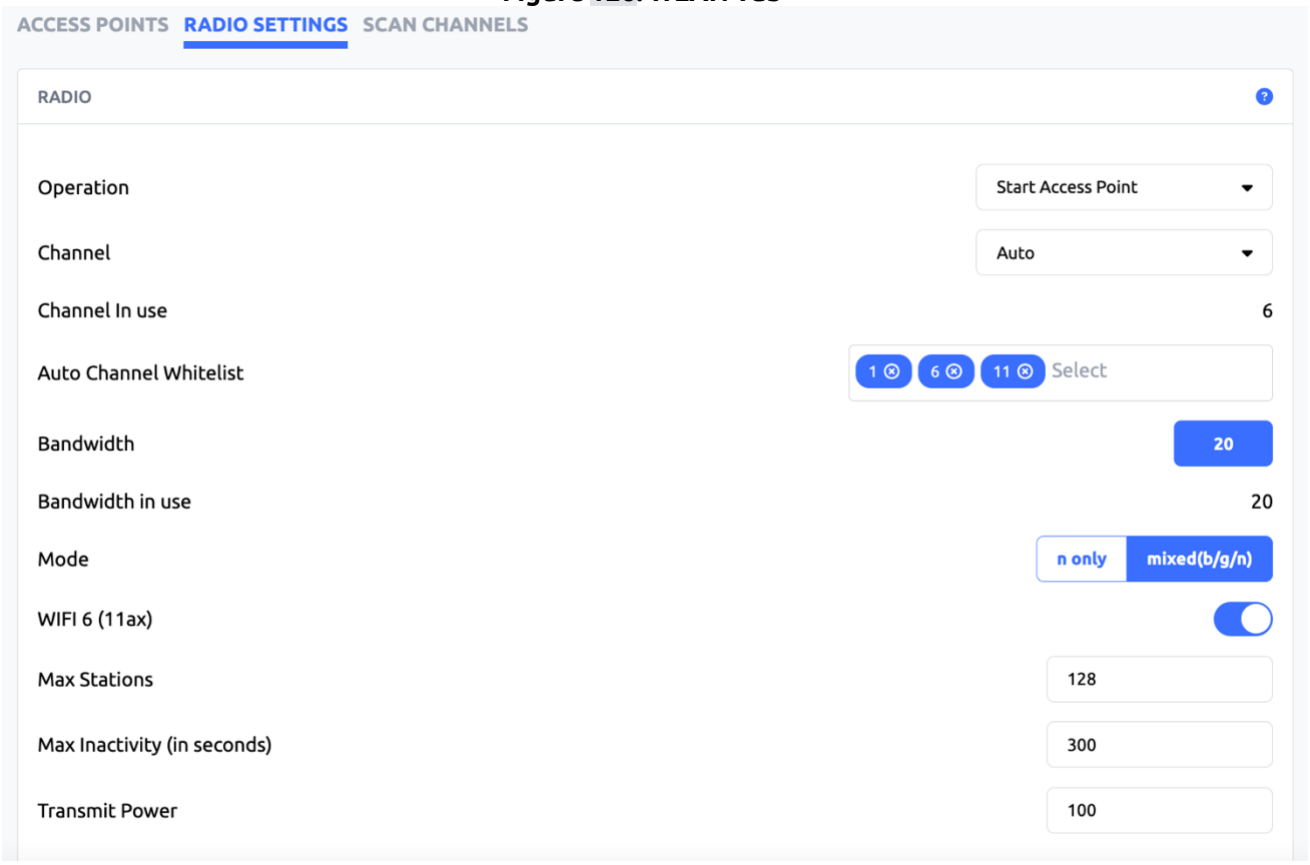
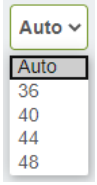
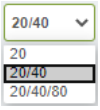


Table 56: Network Configuration

Name	Description
WLAN Enabled (Wired Hubs):(i)	**For a gateway VeeaHub (MEN)**: In the on position, the wireless network operation is enabled for any connected wired hubs. This allows the network to extend wirelessly from these units. In the off position, the wireless networking is disabled on any directly wired, remote hubs that have WLAN Operation set to '**Automatic**'. The network cannot be extended with wireless links from these units. **For a non-gateway VeeaHub (MN)**: This is a read-only setting that is configured at the gateway hub. In the on position, the wireless network operation is enabled according to the 'WLAN Operation (Local Hub)' setting. This allows the network to extend wirelessly from these units. In the off position, the wireless operation is disabled at this hub provided it has a direct wired link to the gateway hub and also that the 'WLAN Operation' setting is '**Automatic**'. Otherwise, the normal 'WLAN Operation' setting behavior applies.
WLAN Operation (Local Hub):(i)	**For a gateway VeeaHub (MEN)**: • With '**Start Network**' selected, the hub supports wireless networking and will start a network identified by the SSID setting. Other hubs can connect to this unit wirelessly using the SSID and matching PSK. • With '**Disabled**' selected, the wireless networking is disabled, and the network cannot be extended with wireless links from this hub.

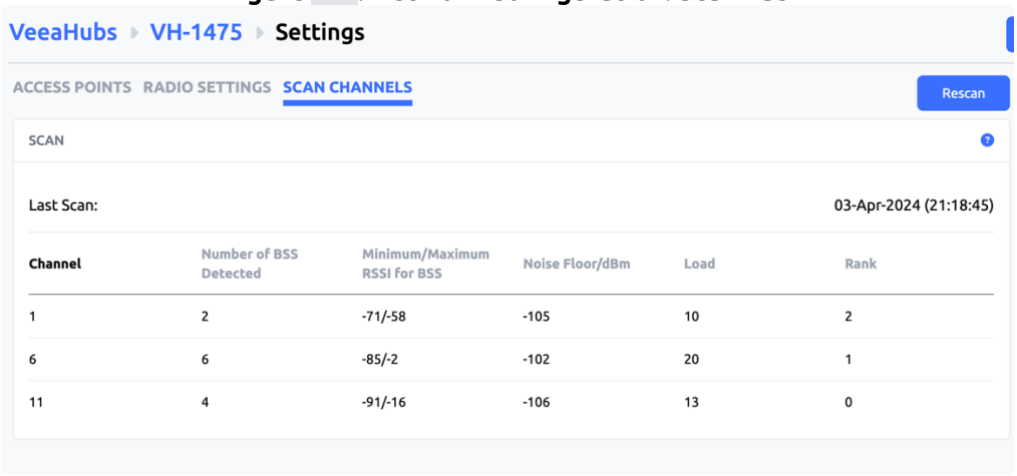
	For a non-gateway VeeaHub (MN): • With '**Disabled**' selected, the wireless networking is disabled, and the network cannot be extended with wireless links from this hub. • With '**Automatic**' selected, the behavior depends on whether this unit has a direct wired connection to the gateway hub, and the setting of 'WLAN Enabled (Wired Hubs)'. If there is no direct wired connection then this unit joins an existing wireless network, similar to the 'Join Network' setting. If there is a direct wired connection and 'WLAN Enabled (Wired Hubs)' is off, then wireless networking is disabled on this unit, similar to the 'Disabled' setting. If there is a direct wired connection and 'WLAN Enabled (Wired Hubs)' is on, then the unit first attempts to join an existing network and, if this is unsuccessful, it starts a new wireless network. • With '**Join Network**' selected, the hub will join an existing wireless network identified by the SSID and provided the PSK matches. The hub must be in range of the existing wireless network. • With **'Start Network**' selected, the hub will start a wireless network using the SSID setting. Other wireless hubs can then connect to this. **Note**. If two hubs are in proximity and both start a network with the same SSID, then the networks are independent.
Channel:	This dropdown enables selection of the Wi-Fi channel for the wireless mesh. The set of available channels is restricted, based on the configured VeeaHub location. By default, Auto Selection is displayed. A number of criteria are used to choose the best channel at the time the mesh starts up. If you prefer to override this and select one of the available channels, choose the channel number from the drop-down list. 
Channel in Use:	The channel chosen by Auto Selection.
Exclude DFS:	This switch, when selected, prevents channels that are designated for Dynamic Frequency Selection being used for Auto Selection.
Auto Channel Whitelist:	This dropdown enables you to specify which channels Auto Select can use.
SSID:	The SSID used for the network WLAN. 1 to 32 characters.
Password:	The password for the network WLAN. 8 to 63 characters (letters, digits or symbols). Tap the eye icon to reveal the password.
Bandwidth:	A dropdown to select the bandwidth for the network WLAN. 
Bandwidth in Use:	This shows the currently selected bandwidth.
Transmit Power (%):	Enter the transmission power for the mesh Wi-Fi, as a percentage of full power.
Network Air Time Fairness:	This option is available only on the VHE09 VeeaHub, where the mesh and the wireless access points share a single 5GHz radio. Use this switch to enable the Network Air Time percentage option.

Network Air Time Percentage:	This option changes the proportion of the time on the 5GHz radio used by the mesh. In certain circumstances, increasing this proportion may improve performance of the mesh. The default is 60%.
Note. These settings support deployment of a mixed wireless and wired network, for example adding a wireless extension to a wired network. The default settings cover most configurations when first deploying a network, and once deployed, the default settings can be updated to match the network topology more precisely. For more information refer to Appendix D.	

13.6.4. Network Configuration: Scan

This tab (Figure 100), when displayed, shows the measurements for each channel on which the Auto Channel selection is based. It also shows the date and time these measurements were made. An example result is shown here.

Figure 127: Network Configuration: Scan Tab



The measurements are listed in Table 40.

Table 57: Network Configuration: Scan Tab

Channel	The channel number.
#BSS	The number of Basic Service Sets (**BSS**) detected on this channel.
Minimum/Maximum RSSI for BSS	The minimum and maximum Received Signal Strength Indicator for the BSSs on this channel.
Noise Floor / dBm	The noise floor on this channel.
Load	A measure of the time the channel is occupied.
Rank	A number calculated from the measurements. The highest-ranking channel is auto selected.

These measurements are combined to select a best channel for the Auto Channel selection. If a channel is ranked as 0, it is not considered suitable for auto selection. If all the channels show poor results, then moving the VeeaHub to another position should be considered.
You can rescan the measurements by clicking '**Rescan**'. This may change the channel used.

13.7. WAN Configuration

The WAN tab is available only on a gateway VeeaHub. There are three subsidiary tabs: WAN Configuration (refer to Section 13.11.1), WAN Interfaces (refer to Section 13.11.2) and WAN Static IP (refer to Section 13.11.3).

13.7.1. WAN Configuration Tab

This tab is shown in Figure 128. It is used for configuring the connections of the VeeaHub network to the mesh.
Any or all of the backhaul types can be enabled or disabled, if installed on the network. On the WAN configuration screen, you can place the available connections in order, so that if one connection fails, the VeeaHub will fail over to a different connection. The operational status of each backhaul type is shown.
The Backhaul icons can be dragged up and down to change the order of priority. The top icon represents the primary backhaul, and failover occurs to the next one.
The configuration options here are listed in Table 58.

Figure 128: WAN Configuration Tab

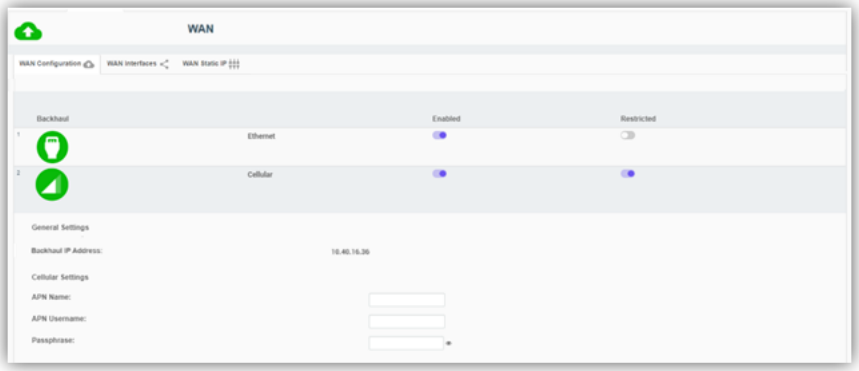


Table 58: WAN Configuration

Name	Description
Enabled	Enables the backhaul specified by the icon.
Restricted	Restricts data on this backhaul (refer to Section 13.3).
General Settings	
Backhaul IP Address	The external IP address on the gateway hub.
Cellular Settings	
APN Name	Enter the Access Point Name (**APN**) for the cellular connection.
APN Username	Enter the Access Point username.
Passphrase	Enter the Access Point passphrase (use the eye icon to reveal it).

13.7.2. WAN Interfaces Tab

This tab (Figure 129) enables configuration of up to four WAN interfaces for up to four separate LANs configured on the LAN tab. The configuration options here are listed in Table 59.
You should configure this screen to match the LAN settings (refer to Section 13.12.1). If your VeeaHub network is connected to an enterprise network, the necessary settings, including vLAN tags where relevant, should be obtained from your enterprise WAN administrator.

Figure 129: WAN Interfaces Tab

Table 59: WAN Interface Configuration

Name	Description
WAN ID	Number of the WAN to be configured
Use	Use this WAN interface on the network.
Name	Text to identify this WAN interface.
Port	Select the port on the gateway VeeaHub used for this WAN interface.
VLAN Tag	Specifies a VLAN tag to associate with this WAN interface, in connection with a VLAN on the WAN. A tag of 0 (zero) means no VLAN tag. Consult the administrator of your enterprise WAN if necessary.

13.7.3. WAN Static IP Tab

This tab (Figure 98)is used to configure a static IP address for the gateway VeeaHub on the WAN. This is usually necessary only when the WAN does not have a DHCP server.
The configuration options are listed in Table 60.

Figure 130: WAN Static IP Tab

Table 60: WAN Static IP Configuration

Name	Description
WAN ID	You can set static IP addresses for any of the WAN interfaces you have defined.
Use	Set this gateway VeeaHub as a static IP on the WAN.
Static IP	Set the static address and subnet mask in CIDR format (###.###.###.##/#).
Gateway	Set the Gateway IP address.
DNS 1, DNS 2	Assign DNS nameservers.

13.8. LAN Configuration

This tab, with three sub-tabs, is available only on the gateway VeeaHub.

13.8.1. LAN Configuration

These settings are used to configure up to four LANs on the VeeaHub mesh (Figure 131). You must associate these subnets with the WAN interfaces (refer to Section 13.11.2), the APs configured in Section 13.13 and the Ethernet ports (refer to Section 13.14). You should ensure that for each active AP (1-4) on the AP configuration tabs there is a corresponding check mark for that 2.4GHz or 5GHz AP on this tab.
The configuration options here are listed in Table 61.

Figure 131: LAN Configuration Tab

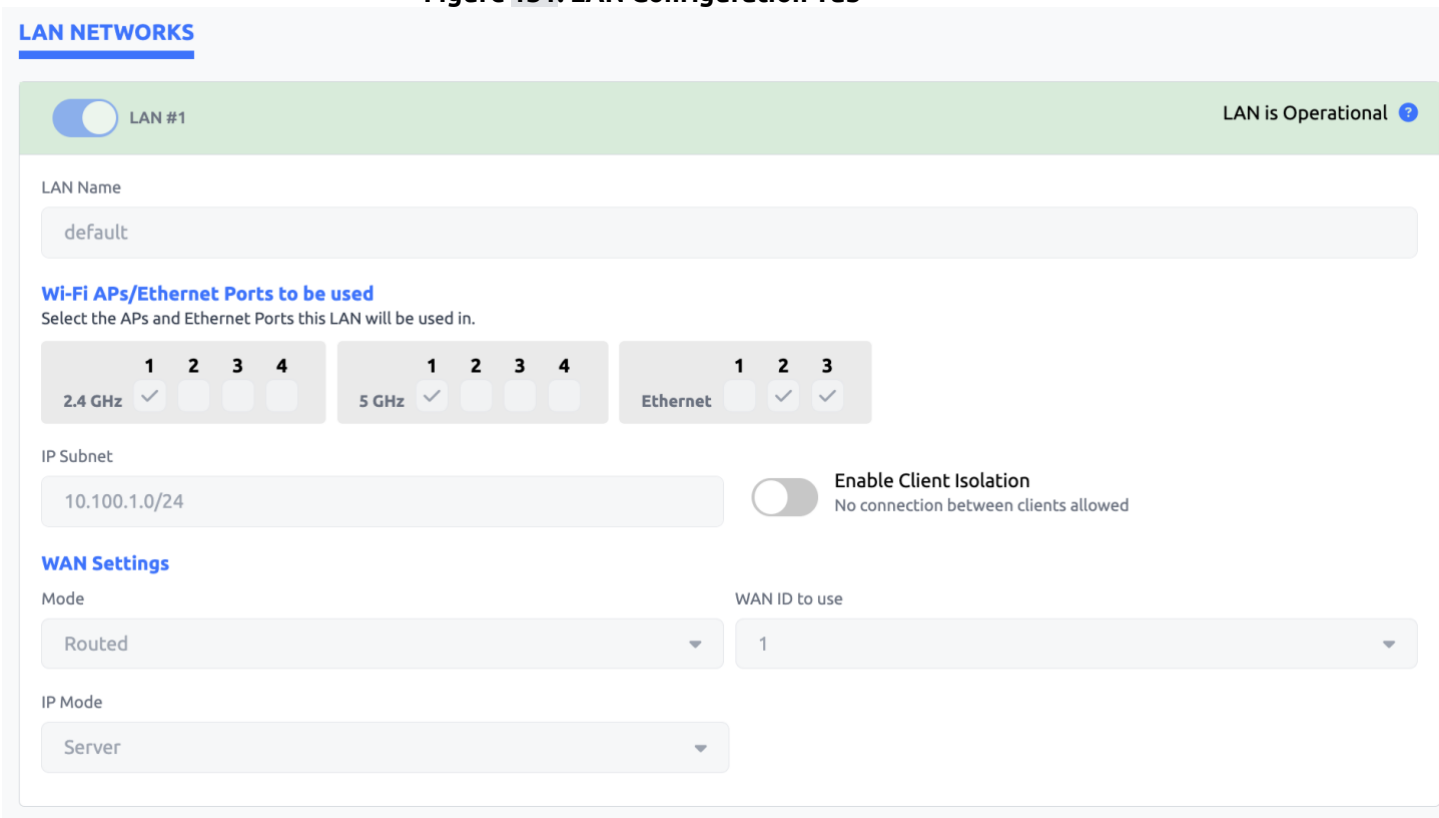


Table 61: LAN Configuration

Name	Description
1, 2, 3...	Number of the LAN to be configured. (ie LAN #1)
Toggle	Select this to use the LAN interface in this configuration.
LAN Name	Text to identify the LAN.
IP Subnet	Specify the allowable IP addresses for this subnet, using CIDR notation. For example, 192.168.100.0/24
Client Isolation	If this switch is set to ON, devices on this LAN cannot see each other.
Status	Status message shown in upper right (ie LAN is Operational)
2.4GHz APs 1-4	Connect the LAN to a 2.4 GHz virtual AP.
5GHz APs 1-4	Connect the LAN to a 5GHz virtual AP.
Ethernet Ports 1-3	Connect the LAN to one or more physical port.
WAN ID to use	Connect the LAN to a WAN interface. More than one LAN can be connected to a WAN.
IP Mode	Select the IP Mode(default Server)
WAN Mode	Specify whether this subnet is routed or bridged to the LAN.
Status	Status message.
Reason	Reason message.

On the VHC05, the 5GHz column will appear only if the wireless mesh is turned off and the 5GHz radio is available for AP use.

13.8.2. LAN DHCP Configuration

This tab (Figure 132) enables you to configure a DHCP server for each LAN (refer to Section 13.12.1) and also DNS servers. The configuration options are listed in Table 62.

Figure 132: DHCP Configuration Tab

Table 62: DHCP Configuration

Name	Description
LAN #	The number of the LAN for which the DHCP is being configured.
Lease Time	The Lease Time: in the range 60 to 260000 or empty.
DNS 1	The primary nameserver, for example, 8.8.8.8 for Google.
DNS 2	The secondary nameserver, for example, 8.8.4.4 for Google.
Start IP	The start IP of the range for this LAN. This is automatically set as the first available IP address in the subnet, but can be changed. Its value must be in the subnet and before or the same as the End IP. The first and last IP address in the subnet are not available because they are used as the network prefix and broadcast addresses respectively.
End IP	The end IP of the range for this LAN. This is automatically set as the last available IP address in the subnet, but can be changed. Its value must be in the subnet and after or the same as the Start IP. The first and last IP address in the subnet are not available because they are used as the network prefix and broadcast addresses respectively.
#IPs/#IPs in subnet	This calculates automatically the number of IP addresses in the start/end IP range compared with all available ones in the subnet.
Subnet Mask	Automatically populated using the subnet defined in Section 13.12.1.

13.8.3. LAN Reserved IP

Individual devices on wireless APs or LAN ports can be assigned Reserved IP addresses using the options here (Figure 133 and Table 63).
There is one tab for each of the LANs. By scrolling down, you can add up to 10 Reserved IP addresses on each LAN.

This option is available only on the gateway VeeaHub. The setting is disabled if it is managed on the WAN, for example, if the LAN is bridged to the WAN, or if it is managed by an installed service such as vTPN.
To add an IP definition, click **Add Reserved IP** on the relevant LAN tab. To remove an IP that has been configured, click **Remove** against it. You can reserve the IP address for the device using either the device name (if known) or the MAC address. You can also enter a free text comment for information.
When you make changes here, you need to restart the hub for the changes to take effect.

Figure 133: Reserved IP Configuration Tab

Table 63: Reserved IP Configuration

Name	Description
Enable	The reserved IP can be enabled or disabled on the selected LAN.
Comment	A text field to record information about this reserved IP.
Host MAC address	Specify the MAC address of the device you wish to assign the IP to. This is an alternative to specifying the Device Name.
Device Name	Specify the name of the device you wish to assign the IP address to. This is an alternative to specifying the MAC address. How to find the device name depends on the type of the device.
IP Address to Assign	Enter the IP address to assign to this device on this LAN.

13.9. Wireless Access Point Configuration (2.4GHz and 5GHz)

13.9.1. Access Point Configuration (2.4GHz and 5GHz): SSIDs

This tab (Figure 134) is used to configure the SSIDs for the virtual APs in the 2.4GHz or 5GHz band. The options are described in Table 64.

Figure 134: Access Points: SSIDs Configuration Tab

In order to use one of the APs, select Use and enter the chosen SSID. Also enter the password that the user must have in order to connect to this AP. If the SSID is marked as Hidden, the user will also need to know the SSID in order to connect the mobile device to it.

Table 64: AP SSIDs Configuration

Name	Description
Hub or Network	Select the configuration for this AP SSID either on the local VeeaHub (HUB) or on all nodes in the mesh network (NET). The network configuration can only be changed in the Gateway VeeaHub (MEN). The local hub configuration can be changed and tailored by any node in the mesh network. When the changes are applied, the position of the slider determines which configuration to use. **Note**. If you are changing network settings for an AP SSID at the MEN, but are using the HUB settings locally, then the slider must be moved back to the HUB position before the changes are applied.
AP number	The number of the AP being configured.
Name	The number of the AP being configured.
SSID	The broadcast name of the AP.
LAN	LAN ID for clients that connect to this SSID (refer to Section 13.12.1 - LAN Configuration)
Security	This drop-down, with the **Configure** button, is used to set security options on the wireless AP (refer to Section 13.13.1.1).

	Note. This option is not available on the VHC05.
Configure	See Security, above. Not available on the VHC05.
Hidden	Set whether the AP SSID is broadcast to nearby mobile devices.
Enabled	If Enabled is set, then the SSID configuration is acted on and Wi-Fi clients can connect. If Enabled is not set, then the configuration is not acted on and the SSID remains inactive. This can be useful if a network SSID is not required for a specific node. So, if the HUB configuration is selected, and Enabled is not set, then this has the effect of disabling the network wide SSID on a specific hub.
Status	Displays the current status of the AP.
Delete SSID Button	 This button removes the associated SSID.

Icons and Colors

The icon and background color of an SSID entry give information about the state of the AP. For further details, see the Status message displayed.

	**Green**	The AP is active and properly configured for this setting
	**Blue**	The AP is configured for the network (if Hub is selected) or configured for this VeeaHub (if Network is selected)
	**Orange**	The AP is disabled
	**Red**	The AP is non-operational
	**Yellow**	The configuration of this AP is incomplete
	**No color**	The AP is waiting for you to Apply a change in configuration

13.9.2. Access Point Security Configuration (2.4GHz, and 5GHz)

The **Security** option is used to change the security settings on an AP. When a VeeaHub is first added to a Veea account, one AP is initially created with PSK security by default and with the password assigned by the user.
These options are not available on the VHC05.
The options from the drop-down are shown in Table 65.

Table 65: Security Configuration (2.4GHz, and 5GHz)

Name	Description
Open	No password is required for anyone to connect to this AP. There are no further options.
PSK	A password must be set up on the VeeaHub. This password must be known by a user in order to connect their mobile device to this AP. The options are shown in Figure 135 and described in Table 66.
Enterprise	This option is for VeeaHubs in enterprise networks. Your administrator will provide necessary information for this option. See Figure 136 and Table 67. Authentication is performed by contacting a specialized server, called a RADIUS Authentication server. RADIUS may also be used to collect data on usage for billing purposes (Accounting server). RADIUS servers must be set up on the gateway VeeaHub (MEN) before a selection can be made on other nodes in the mesh.

Figure 135: PSK Security Configuration

Table 66: PSK Security Configuration

Name	Description
AP SSID	Not editable here, refer to Section 13.13.1.
AP Password	Enter the password here, 8-63 characters. Click and hold the eye icon to view.
WPA Mode	**WPA2 Only**, **WPA3 Only** or **WPA2 and WPA3**.
802.11r	When set, this enables client devices to fast transition between network APs that are configured with the same SSID. This is currently available only on the 09/10 models. Enabling 80.11r may mean that some older devices cannot connect to this SSID.
802.11w	This option is available only when **WPA2 Only** is selected. The values are **Enabled**, **Disabled** or **Required**. This enhancement to security is set to Enabled by default: devices with or without 802.11w can connect. If set to Required, only devices that support 802.11w will be able to connect.

Figure 136: Enterprise Security Configuration

Table 67: Enterprise Security Configuration

Name	Description
AP SSID	Not editable here, refer to Section 13.13.1.
WPA Mode	**WPA2 Only**, **WPA3 Only**, or **WPA2 and WPA3**.
802.11r	When set, this enables client devices to fast transition between network APs that are configured with the same SSID. This is currently available only on the 09/10 models. Enabling 80.11r may mean that some older devices cannot connect to this SSID.
802.11w	This option is available only when **WPA2 Only** is selected. The values are **Enabled**, **Disabled** or **Required**. This enhancement to security is set to Enabled by default: devices with or without 802.11w can connect. If set to Required, only devices that support 802.11w will be able to connect.
RADIUS Authentication Primary	Select the primary RADIUS Authentication server from the drop-down. If no servers have already been set up, click on the **Configure Servers** button (Figure 136 and Table 67).
RADIUS Authentication Secondary	Optional. Select from the drop-down if required. The secondary servers is optional and acts as a backup if the primary server is unavailable.
Configure Servers	Used to set up the servers from which you can select the primary and secondary servers.

RADIUS Accounting:	If required, enable this using the switch. A form for specifying the Accounting servers then appears. You can configure primary and (optional) secondary Accounting servers in the same way as the Authentication servers (Figure 136 and Table 67).

After clicking the **Configure Servers** button, you can define up to four RADIUS servers. This must be done on the gateway VeeaHub (MEN). See Figure 137 and Table 68.
After the server details have been entered, one can be selected as the primary server and one as the secondary from the drop-down list (Figure 136).
Once configured on the gateway server, the RADIUS servers can also be selected for SSIDs on the other nodes on the mesh.

Figure 137: RADIUS Authentication and Accounting Configuration

Table 68: RADIUS Configuration

IP Address	Enter the IP address of the RADIUS server (Authentication or Accounting).
Port	Enter the Port number for the RADIUS service. By default, this is 1812 for the Authentication server and 1813 for the Accounting server.
Secret	Enter the secret (passphrase) for the server (this is set at the server). Click on the eye icon to make the secret visible. The secret must be known by a user in order to connect their mobile device to this AP.
	Click to delete the entry.

13.9.3. Access Point Configuration (2.4GHz and 5GHz): Radio

There are corresponding tabs for the 2.4GHz and 5GHz bands (Figure 138). The controls are similar on the two tabs. The VHC05 model does not have the 5 GHz tab unless the wireless mesh WLAN has been disabled (refer to Section 13.10). The configuration options on these tabs are listed in Table 69.
Use this tab to set radio configuration options for the APs.
The available channels depend on the country where the VeeaHub has been registered, because local regulations vary.
When Auto Selection is on, the AP channel is automatically chosen for you, based on various measurements of the quality of the signal. These measurements can be seen using the **Wi-Fi Network Scan** option. You can override this selection by choosing a single channel from those available, and you can also restrict the selection of channels that Auto Select uses.
Auto Select is not dynamic: once the channel has been selected, this applies until the VeeaHub is restarted or until you choose a different channel.
Auto Select is not available in certain circumstances, for example, on the VHC09 the 5 GHz radio is shared by the APs and the wireless mesh, and the frequency channel is selected by the option on the Network tab (refer to Section 13.10).

Figure 138: Access Points: Radio Configuration Tab

Table 69: AP Radio Configuration

For more information about Automatic Channel Selection (**ACS**) and Dynamic Frequency Selection (**DFS**), see the article '*Automatic Channel Selection and Dynamic Frequency Selection*' in Veea Support Center (link in Section 1.2).

Name	Description
Channel	This is used by all four APs. By default, Auto Selection is displayed. Wi-Fi uses a number of criteria to choose the best channel at the time the APs start up. If you prefer to override this and select one of the available channels, choose the channel number from the drop-down list.

Channel in Use	Displays the actual channel in use, whether auto selected or selected manually.
Auto Channel Whitelist	This enables you to select the channels from which the auto selection occurs. Hold down the Ctrl key and select the channels you want Auto Channel Select from. Or hold down the shift key and select a range of channels from the list.
Bandwidth	This sets the channel selection spread. Dropdown menu options include: • 20MHz • 20MHz/40MHz • 20MHz/40MHz/80MHz. If you are selecting this when ACS is active, ensure that the bonded channels are included in the Auto Channel Whitelist.
Bandwidth in Use	This displays the channel bandwidth currently in effect.
Mode	Specify the 802.11 standards allowed for mobile devices to connect.
Max Stations	The maximum number of stations (such as mobile devices) that can connect to the AP (up to 225).
Max Inactivity (in seconds)	The time out before a station is disconnected for inactivity (30 to 600).
Transmit Power	Set the transmission power on the APs (0 to 100).

Certain options are not shown if the APs and the mesh share the same radio, as is the case for the 5GHz band on VHE09. These are:

- Channel
- Channel in Use
- Auto Channel Whitelist
- Bandwidth
- Bandwidth in Use
- Transmit Power.

An On/Off slider control '**Access Band Lower**' is shown for the VHE10 only. This sets the AP channel to be in the lower range of the 5GHz band.

Note.

For VeeaHubs registered in the UK: UK regulations were changed in August 2017 to allow Wi-Fi usage on channels 144, 149, 153, 157, 161 and 165. Older mobile devices supplied in the UK may not be able to connect to those channels. If there are problems connecting to the VeeaHub network on the 5GHz band, we recommend excluding those channels from the Auto Channel Whitelist.

13.9.4. Access Point Configuration (2.4 GHz and 5 GHz): Scan

This tab (Figure 139), when it appears, shows the measurements for each channel on which the Auto Channel selection is based. It also shows the date and time these measurements were made. A typical result is shown here.
Auto Channel Scan is available on the VHC05, but these metrics are not displayed.

Figure 139: Access Points: Scan Tab

The measurements are listed in Table 70

Table 70: Access Points: Scan Tab

Name	Description
Channel	The channel number.
#BSS	The number of Basic Service Sets (**BSS**) detected on this channel.
Minimum/Maximum RSSI for BSS	The minimum and maximum Received Signal Strength Indicator for the BSSs on this channel.
Noise Floor / dBm	The noise floor on this channel.
Load	A measure of the time the channel is occupied.

Rank	A number calculated from the measurements. The highest ranking channel is auto selected.

These measurements are combined to select a best channel for the Auto Channel selection. If a channel is ranked as 0, it is not considered suitable for auto selection. If all the channels show poor results, then moving the VeeaHub to another position should be considered.
You can rescan the measurements by clicking **RESCAN**. This may change the channel used.

13.10. Physical Port Configuration

Configurations of Ethernet ports (LAN ports) are made on this tab, shown in Figure 140. The configuration options are listed in Table 71.
For detailed information about the Ethernet ports on the VeeaHub, refer to Section 5.4.

Note.
The three-port arrangement shown in Figure 140 only applies to the VHC05. Other VeeaHub models may have a four-port arrangement, but the layout of the individual controls remains the same.

Figure 140: Physical Port Configuration Tab (VHC05 Example)

Table 71: Physical Ports Configuration (NM)

Name	Description
Port	Select this to use this node on this hub. If the Enable switch is set on, the port has the settings that are configured here. If the Enable switch is off, the port is disabled on this VeeaHub, even if it is configured for the whole network (See '**Hub or Network**' below).
Name	Give a custom name to this port for reference only.
LAN	If the port role is LAN, the port is configured for the corresponding entry in the LAN configuration tab. The port association with the LAN is managed in the LAN configuration tab (refer to Section).
Hub or Network	Select the configuration for this Port either on the local VeeaHub (HUB) or on all nodes in the mesh network (NET). The network configuration can only be changed on the MEN. The local hub configuration can be changed and tailored by any node in the mesh network. When the changes are applied, the position of the slider determines which configuration to use. **Note**. If you are changing network settings for a port at the MEN, but are using the HUB settings locally, then the changes must be made to the network settings and then the slider, moved back to the HUB position before the changes are applied.
Role	This selects this physical port for WAN or LAN use. **WAN**: This can only be set on a gateway VeeaHub and indicates which port is used for 'backhaul' connectivity. The WAN settings are described in Section 13.11. There must be only one WAN port on a mesh. **LAN**: This specifies that the port is a LAN connection for other devices. **Blank**: Not used for WAN or LAN.
Mesh	If enabled, a wired mesh is formed with peer hubs on the same LAN network of an MEN or MN. They can also form a mesh on the WAN network with a routed or bridged MEN. You can disable a wired mesh if not required, for example, if only the MEN is connected to a WAN network, or a LAN port is on an isolated segment with no peer hubs connected.
Enabled	Enables an override of the default usage of this port.

	If **HUB** is selected, then the port is disabled on this node. If **NETWORK** is selected, the port is disabled across the network, but may be overridden locally on a hub.
Type	This shows whether the port is integrated within the unit, '**Onboard**', or is an external USB Ethernet device, '**USB/Eth**'.
Link	Indicates if the port is active, so cabled and connected to a networking or client device. **Green dot**: The port is active and connected to a peer networking or client device. **Grey dot**: The port is not active, either a cable is not inserted, or no link activity is detected with a peer.
Status	The status of the active port configuration is reported here, refer to Table 72 for details.
Reason	Reason messages are displayed here, refer to Table 73 for details.
Reset	Reset any fault conditions on the port. A disconnected port is no longer considered a fault condition. Any DHCP conflict is cleared and retested.

Icons and Colors

The icon and background color of an SSID entry give information about the state of the AP. For further details, see the Status message displayed.

Table 72: Port Status Messages (NM)

Icon	Color	Status Message/Description
	Grey	**Never Active** The port has never been connected and is not in use.
	Green	**Active** The Port is active and properly configured for this setting.
	Orange	**Disabled** The port has been disabled.
	Red	**Non-Operational** The Port is non-operational, refer to reason for more information.
	Yellow	**Incomplete** The configuration of this Port is incomplete.
	Grey	**Changes not applied** Select the Apply button to apply changes.

Table 73: Port Reason Messages (NM)

Reason Message	Description
Port Not Connected	The port has never been connected or the port is disconnected.
Adapter not present	The device has never been present, or the device has been removed.
DHCP Conflict	DHCP conflict[1].
Port Down	Port is down[2].
Not Fitted	Not fitted[3].

Notes.

[1]If an Ethernet cable is connected to another network with a DHCP server and is plugged into a LAN port, this is an error situation. VHM will display the message 'DHCP conflict' (refer to Section 15.3).

[2]If an Ethernet port is In Use and Enabled but has no connected device, VHM will display the message 'Port Down'.

[3]If a USB port has been configured as a LAN port, but no Ethernet adaptor is present, the message 'Not Fitted' is displayed.

The error messages listed above are displayed if the error condition applies when you connect VHM to the VeeaHub, or if you tap APPLY while on the Physical Port screen.

13.11. Firewall Configuration

This tab enables you to configure firewall rules on a VeeaHub. The Input Firewall Rules tab enables you to configure ACCEPT and DROP rules. For FORWARD rules, use the Forward Firewall Rules tab.
You do not need to configure these settings if your system is protected by a firewall between the mesh and the Internet. You may, however, need to make changes for specific applications.
The Forward Firewall Rules subsidiary tab is available only on a gateway VeeaHub.

13.11.1. Adding an ACCEPT or DROP Rule

Figure 141: Input Firewall Rules Tab

1. On the Input Firewall Rules tab (Figure 141), click **Add New Rule**.
2. From the Action drop-down menu, select **Accept** or **Drop**, as required.
3. From the Protocol drop-down menu, select the packets you wish to filter:
   a. Transmission Control Protocol (**TCP**) or User Datagram Protocol (**UDP**).
4. Enter the Source IP address you wish to accept or drop packets from. This can be either a single dotted IP address or a subnet address specified in CIDR notation, for example, 192.168.1.0/16. This field must be present.
5. Enter the port or range of TCP/UDP ports you wish to accept or drop packets from. The lower and upper range values are separated by a colon (**:**) character. This field is required if the selected protocol requires a port to be defined.
6. Click **Apply** to complete the setup process and save the new rule.

To modify a rule, change the data as necessary and click **Apply**.
To delete a rule already entered, click Remove against the rule.
To change the order in which the rules are applied, click and drag a line up or down. The rules are applied in ascending order.

13.11.2. Adding a FORWARD Rule

Figure 142: Forward Firewall Rules Tab

1. On the Forward Firewall Rules tab (Figure 142), click **Add New Rule**.
   a. Firewall rules setup options are listed in Table 74.
2. From the Protocol drop-down menu, select the packets you wish to forward:
   a. Transmission Control Protocol (**TCP**), or User Datagram Protocol (**UDP**).
3. Enter a single TCP/UDP port number or a range of port numbers where the lower and upper range values are separated by a colon (**:**) character. This field is required if the selected protocol requires a port to be defined.
4. Enter the Local IP address to forward traffic to, in single dotted IP address notation.
5. Enter the Local Port number to which traffic is forwarded. This must be given unless the Port or Port Range specifies a range of TCP/UDP ports, in which case the port range will also be applied for the local ports to which traffic is forwarded.
6. Click **Apply** to complete the setup process and save the new rule.

To modify a rule, change the data as necessary and click **Apply**.
To delete a rule already entered, click **Remove** against the rule.
To change the order in which the rules are applied, click and drag a line up or down. The rules are applied in ascending order.

Table 74: Firewall Rules Setup Options

Action	Protocol	Source IP	Port or Range	Local IP	Local Port
Accept	TCP	Enter source IP address to ACCEPT.	Enter port or port range to ACCEPT.	Not used.	Not used.
	UDP	Enter source IP address to ACCEPT.	Enter port or port range to ACCEPT.	Not used.	Not used.
Drop	TCP	Enter source IP address to DROP.	Enter port or port range to DROP.	Not used.	Not used.
	UDP	Enter source IP address to DROP.	Enter port or port range to DROP.	Not used.	Not used.
Forward	TCP	Not used.	Enter port or port range to FORWARD.	Enter IP address to Forward to.	Enter port to Forward to.
	UDP	Not used.	Enter port or port range to FORWARD.	Enter IP address to Forward to.	Enter port to Forward to.

14. LAN Configuration Use Cases

14.1. Overview

VeeaHub edge-computing devices can be quickly and easily configured into networks of collaborating hubs through the use of Veea's mesh technology, vMesh. This process is designed to be simple and straightforward.

The configuration options are described in Section 4. Advanced users may have a requirement for greater control over the LAN configuration, for example, when integrating VeeaHub networks into existing business systems or developing new applications for the VeeaHub. This section is intended to provide information about important use cases and how to configure the network for them.

The VeeaHub network has two basic configurations, which you can adapt for the intended use. In the default configuration, labelled as 'Routed' in VeeaHub Manager and Node Manager, the gateway VeeaHub performs Network Address Translation (**NAT**) on traffic between the VeeaHub LAN and the outside network, so that IP addresses on the VeeaHub network are private to that network.

Alternatively, the VeeaHub LAN can be configured in 'Bridged' mode to the WAN. In this case, the VeeaHub mesh and its configured LANs are part of the wider network and take IP addresses from that network.

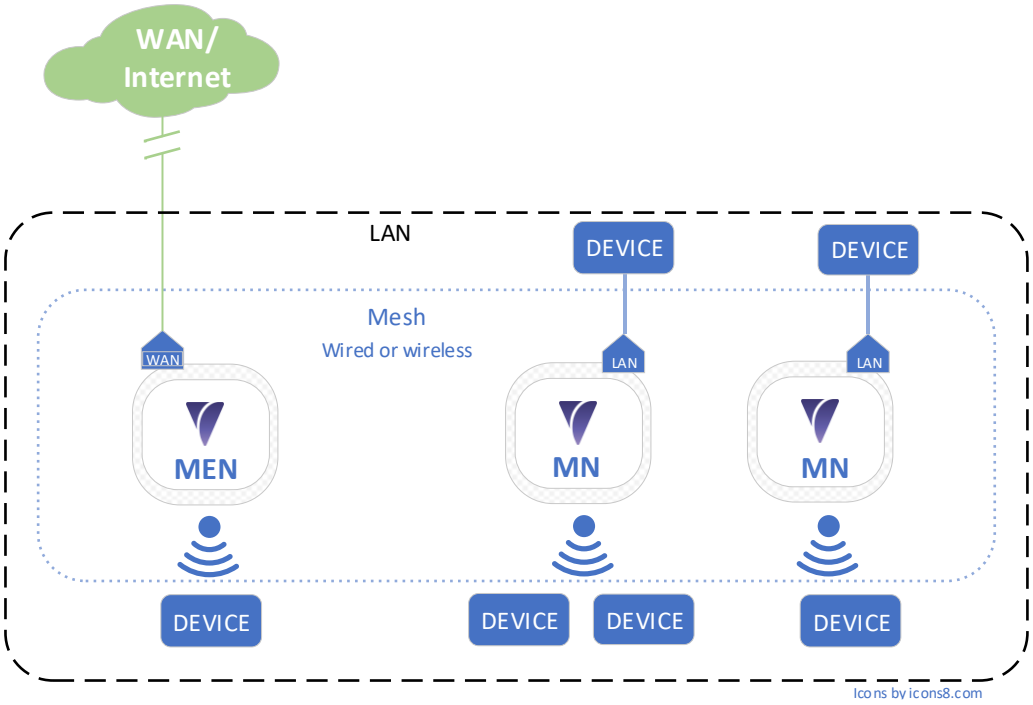
14.2. LAN Connections

There can be up to four LAN subnets (distinct IP address ranges) on a single VeeaHub network. A LAN subnet behaves like a separate LAN on the overall network. A LAN can be created in one of two configurations, routed (with NAT to the WAN) or bridged to the WAN, as described above. When a VeeaHub network is first set up, it comprises a single LAN in the NAT configuration.

A complete LAN definition consists of three parts (Figure 114):

1. A port connecting to the WAN outside the LAN.
2. Wireless access point (AP) connections and/or Ethernet port connections to devices that use services on the LAN.
3. A network configuration that joins the above options together as a LAN.

Figure 114: LAN



14.3. LAN Configuration Option: NAT (Routed) to WAN

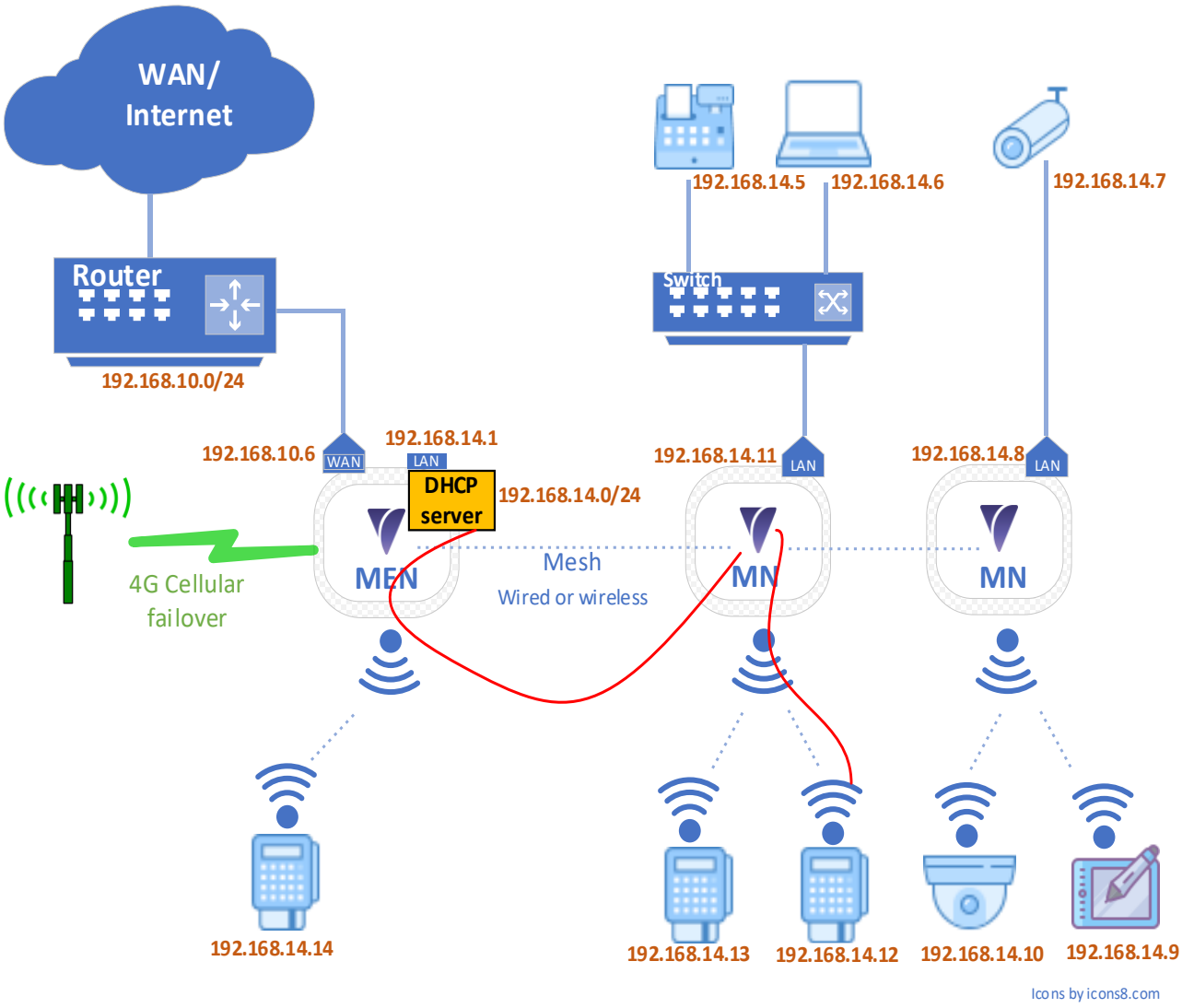
The Routed option is the default on the first LAN that is set up when the mesh is created and automatically configured. It can be reconfigured as needed.

In this configuration (Figure 115), the internal IP subnet is isolated from the external WAN IP addressing with NAT. This is the only LAN arrangement that will work with 4G Failover, as the WAN IP can be re-assigned on failover, leaving the IP range on the LAN unchanged.

The LAN IP addresses are assigned from the in-built DHCP server on the gateway hub. They can be defined using the DHCP configuration options in VeeaHub Manager or Node Manager (This enables the LAN to be configured as one to four LANs with defined address ranges, and individual connected devices can be given static addresses if required).

An example of this configuration is shown in the following diagram.

Figure 115: NAT (Routed) LAN

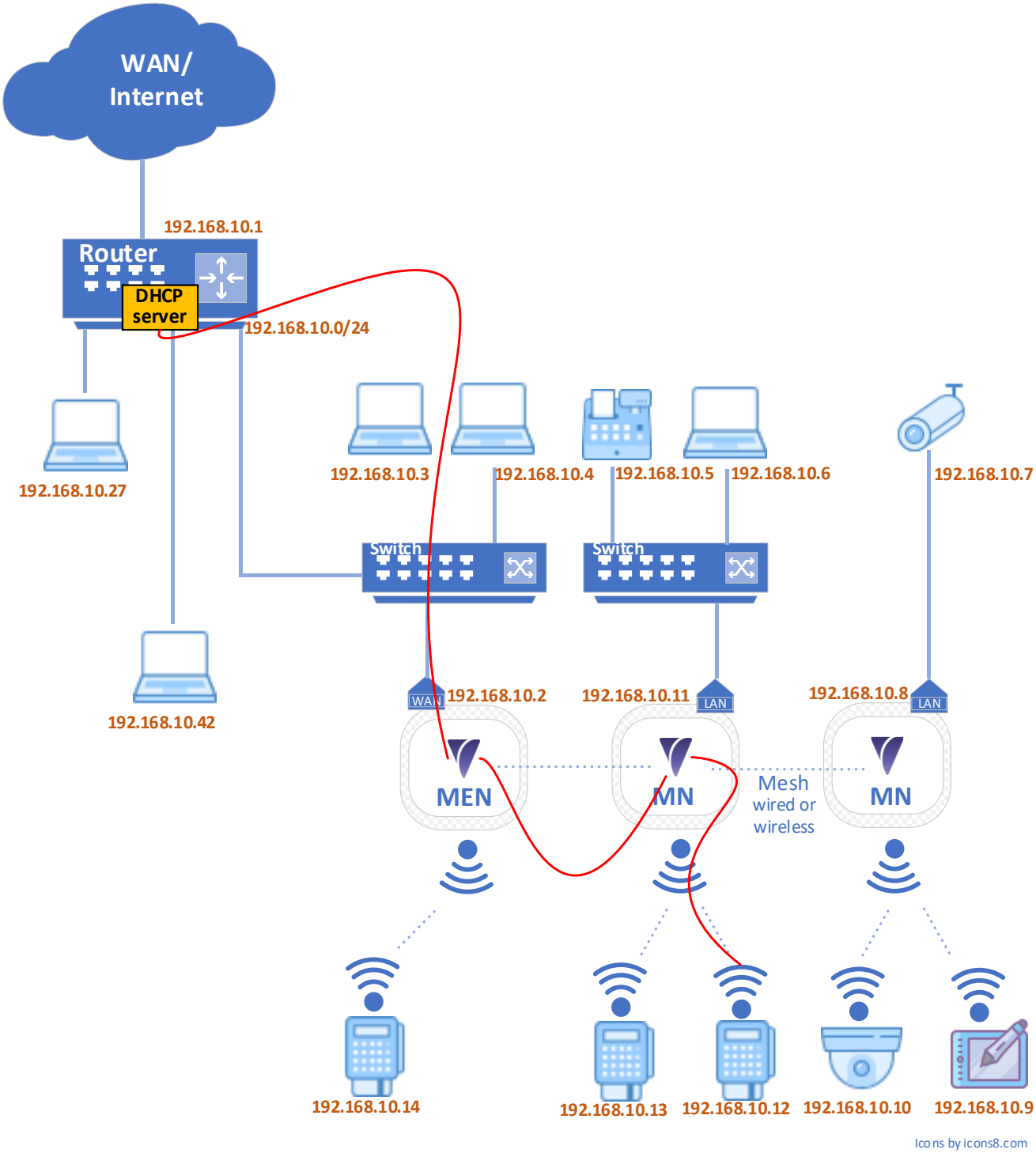


14.4. LAN Configuration Option: Bridged to WAN

In this configuration, the LAN is bridged to the configured WAN port of the gateway VeeaHub. The VeeaHub network shares an IP address range with the network beyond the gateway VeeaHub, taking IP addresses from an external DHCP server (Figure 116). This installation can be used to add VeeaHub edge computing to an existing network.

This option is not configured during enrollment and therefore requires manual configuration using VeeaHub Manager or Node Manager.

Figure 116: Bridged LAN



14.5. Additional Services and VLANs

Customers can develop their own applications (containers) for services they require, or simply bridge or route separate LANs for different traffic purposes. These will be trunked across the network of VeeaHubs and on to the WAN connections as needed.

VLAN tags can be applied to specified WAN interfaces in order meet enterprise requirements. VLANs are used to separate different types of traffic, defined by the network administrator, using the same physical network. The differently tagged data can be routed to and from different external networks. A VeeaHub network can currently have up to four VLANs defined, on one or more LANs. Each VLAN can be assigned to one LAN.

14.6. Guest Wi-Fi Access example

14.6.1. Overview

This section describes how you can set up guest Wi-Fi access on your VeeaHub, using your Internet service.

Setting up a separate guest access enables you to provide your visitors with Internet service while, for privacy and security reasons, preventing them from accessing the rest of your network and the devices connected to it. Users of the guest access log in to a different SSID and with a different password from your main, private, Internet service.

The service is provided by setting up a second LAN on the VeeaHub network. You can add further additional access accounts, up to a maximum of three, not counting the main service.

These instructions use Control Center Node Manager to show example configurations. You can also configure the service using the corresponding settings in VeeaHub Manager.

14.6.2. WAN Interface

The WAN Interface tab configures the interface to your Internet service provider or other WAN, such as your business network. You can configure up to three additional (guest or other) services on this WAN interface.

Wired WAN connection can be made on any Ethernet port, but if an Ethernet USB adaptor is used, either of the USB ports 1 and 2 can be a wired WAN connection on either model of hub.

If your VeeaHub network is connected to an enterprise network, it may be enterprise policy to separate the enterprise Wi-Fi access from the guest or other additional services. In this case, you must connect each Wi-Fi input to a different WAN interface. This input can be either a new Ethernet input or an input on an existing connection with a VLAN tag. You should get this information from your enterprise system administrator. Give the interfaces meaningful names.

If you are on the 4G failover service, the guest Wi-Fi will fail over with the main service, provided that it is connected to WAN #1. If it is connected to another WAN interface, this will not happen.

14.6.3. LAN Configuration

To create the new LAN, select **Use** against the first LAN entry that is not currently in use. Give the LAN an informative name (for example, Guest).

Enter an IPv4 subnet in CIDR format that is different from the main subnet, in this example, 192.168.50.0/24 is chosen. It is important that this internal subnet does not clash with subnets configured on the external network.

Set the DHCP toggle to ON.

Select the 2.4 GHz and (where available) 5 GHz wireless Access Points (**AP**) for this LAN. These should be AP numbers that have not already been selected for other use.

Set the WAN # to the number of the WAN interface you selected for the guest access (See WAN Interface, above).

14.6.4. DHCP Configuration

Against the number of the LAN you are creating, specify the DNS nameservers you wish to use. The example shows the Google public DNS.

You can specify the range of IP addresses you wish to use from the subnet you defined for the LAN, which is shown at the end of the line. You can set an address range in CIDR format between x.x.x.2 and x.x.x.254. If you leave these blank, the entire range x.x.x.2 to x.x.x.254 is available.

14.6.5. Static IP

For a guest network, where different people connect with different and unknown devices, this may not be useful. However, if needed you can assign static IPs to any known device on the LAN, by specifying its MAC address. Select the appropriate LAN by its number on the tab.

14.6.6. Wireless Access Points

Having set up the configuration of the LAN, you can assign the wireless APs. If you have a network of VeeaHubs, you can choose to make an AP available across the whole network (using the Network tab), or on only one VeeaHub (using the Hub tab), for example, if it is the hub in the area that the guests visit.

Alternatively, you may wish to make the AP available across most of the network but switch it off for one or more hubs.

2.4GHz and 5GHz APs can be configured, depending on the model of the VeeaHub. The 2.4GHz screen is shown above, but the 5GHz options are configured similarly.

Set the AP to In Use and give it an SSID that the users will be able to find in the Wi-Fi selection list of their mobile device (phone, tablet, etc.).

If users must enter a password to get access, then enter it here. A password must be at least 8 characters; if this field is left blank then no password is needed.

For simplicity, give the corresponding 2.4 GHz and 5 GHz APs the same SSID and password, so that users can connect to whichever is best for them.

14.6.7. Physical Ports

Ensure that the correct WAN port is configured on the network tab. This should be consistent with the Port number assigned to the WAN on the WAN Interface tab (above).

You can set other available ports as LAN ports, either on the whole network or for each individual hub. If a LAN port number is set on the Guest Wi-Fi row in the LAN Configuration tab (above), a wired device on that port will receive Internet service on the guest network with the specified password and an IP address in the set range.

When a Network setting applies to a port, it is highlighted in green, and the corresponding entry on the Node tab is red. If the Node entry is active, that is shown in green, and the corresponding Network entry is red.

14.7. Applying the Configuration

Before applying the configuration that you have just set up, you should consider whether you need to apply any Firewall settings to your network on account of its use by visitors (refer to Section 7).

After you have applied all the configurations, restart the VeeaHubs, restarting the gateway VeeaHub (MEN) last. The gateway hub should always be restarted last, whether you have made local settings on the other hubs or not.

14.8. Finalizing and Testing a Configuration

When you have made changes to configurations in your network, restarts may be required depending on the changes made. These are indicated in Control Center, VeeaHub Manager or Node Manager as relevant.

Test that the configuration is correct by connecting a device to the network (or to the VeeaHub, for an AP defined only on a node) using the SSID and password. Check that the IP address assigned to your device is in the correct subnet.

Check that it is possible to access the Internet with the connected device.

15. Troubleshooting

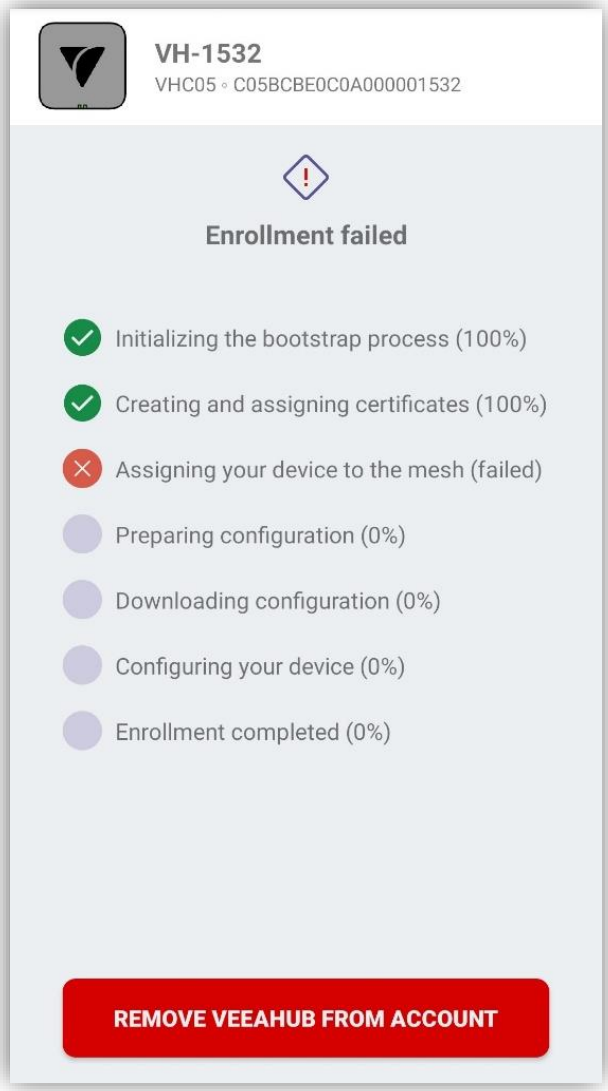
For troubleshooting information, see the Veea Support Center (refer to Section 1.2 for link).

There are comprehensive descriptions of the flashing patterns of the status lights on the different models, which are useful in identifying the activity of the VeeaHub and any error states.

15.1. Failed Adding the VeeaHub

If the process fails while you are adding the VeeaHub to your account (refer to Section 12.5), an error message appears showing the stage at which the failure occurred (Figure 117).

Figure 117: Example Error Screen



Click on the '**Remove VeeaHub from Account**' button to start the process again.

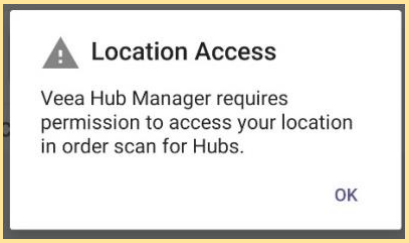
15.2. Difficulty Connecting to Your VeeaHub Using VeeaHub Manager

If you are having problems connecting to your VeeaHub, here are some possible solutions.

Make sure that you are close enough to the VeeaHub

If VHM does not connect, this may be caused by wireless interference. Try moving your mobile device closer to the VeeaHub. If this happens repeatedly, the next time you have a connection set the 2.4GHz channel to another value that may be less prone to interference (refer to Section 12.15.2).

Make sure that your Location setting is enabled

	On first login, or if the permission is lost, VeeaHub Manager will display a warning message that you must acknowledge by tapping OK.  The operating system will prompt you for your permission.

Make sure that you do not have a Virtual Private Network (VPN) running on your mobile device

A VPN makes it impossible for the device to connect to the VeeaHub.

Go back to the My Meshes screen before trying again.

15.3. DHCP Conflict

If the message 'DHCP conflict' is displayed on the Physical Ports configuration screen against an Ethernet port configured as LAN, this means that another DHCP server has been detected on the LAN. This is an error situation.

First, you must resolve the error by removing the DHCP server. This may require intervention by the network administration. Or if the cable has been connected incorrectly, reconnect it in correct configuration.

To subsequently clear the error status, disable and re-enable the port, or remove the cable from the port and reconnect it.

15.4. Configuration of VHE09 as MEN in Mixed 09/10 Configurations

When a VHE09 gateway VeeaHub (MEN) is wirelessly meshed with a VHE10 non-gateway VeeaHub (MN), this can impact the VHE10 (MN) ability to connect wirelessly to the VHE09 (MEN).

This happens when the VHE09 (MEN) 5GHz channel selection is set to automatic. In this case, the 5GHz channel is determined automatically by the VeeaHub software. Regulated 5GHz channel allocations vary from country to country. Some configurations of VHE09 units, for example, the US, have an extended channel capability with both low and high band channels available, whereas the VHE10 units, default to low band channels for wireless meshing. If the automatic channel selection on the VHE09 (MEN) selects a channel above 100, the VHE10 (MN) unit will not see the channel when it scans and cannot connect.

Solution:

Use either the Control Center Network Manager software or the VHM app to configure the 'Auto Channel Whitelist' control. Both methods are described respectively in Section 15.4.1 and Section 15.4.2.

15.4.1. NM Auto Channel Whitelist Configuration

Restrict the VHE09 (MEN) high band channels available for use by the automatic channel selection. This is implemented by use of the 'Auto Channel Whitelist' control as follows:

1. Login to the Control Center account and go to the Node Manager (**NM**) for the VHE09 (MEN) unit in focus.
2. In the NM select tabs **Network** > **Network** > **WLAN** to access the network Configuration WLAN screen (refer to Figure 118):
   - Locate the 'Auto Channel Whitelist' and on each channel 100 and above, select '**Ctrl**' + '**Left Click**' to deselect it (refer to Figure 119). This function toggles the selection and deselection of a channel. Deselected channels have a white background and selected channels have a blue background color (refer to Figure 120).
   - Select **Apply** to save the setting
   - Confirm the configuration change has resolved the connection issue
3. Procedure completed.

Figure 118: vMesh Screen (All Available Channels Whitelisted)

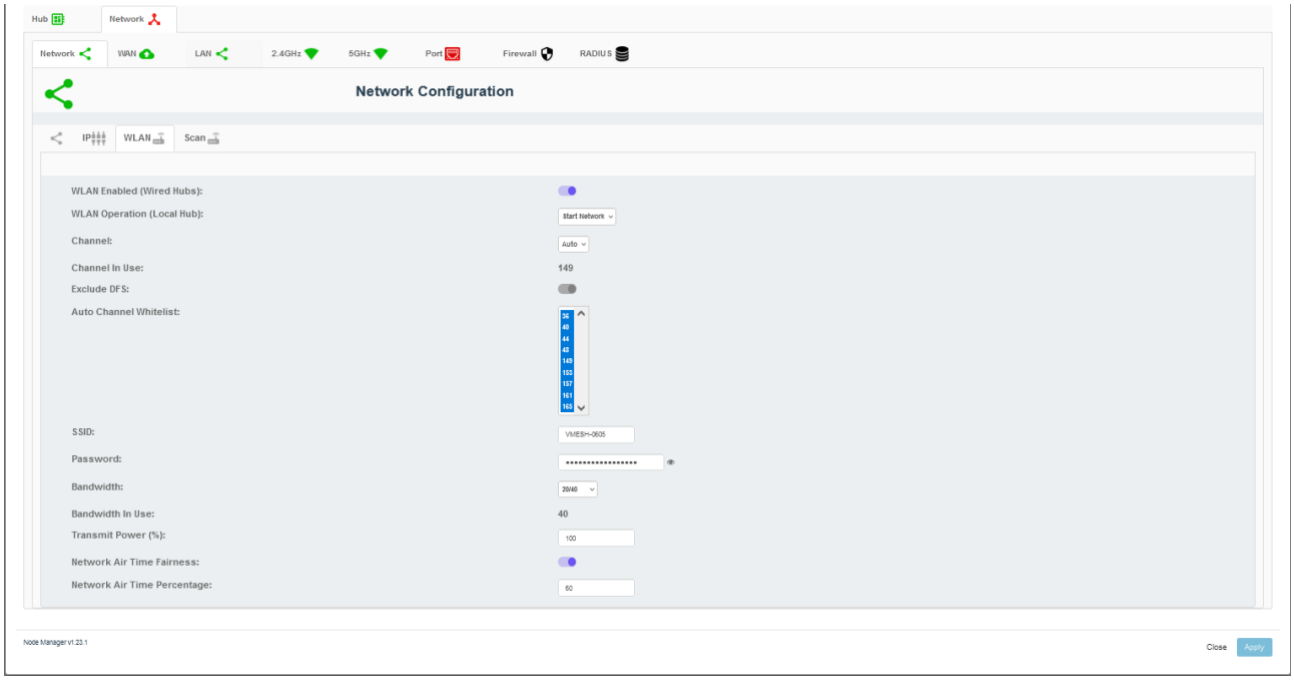


Figure 119: vMesh Screen (Channels 100 Plus Deselected from Whitelist)

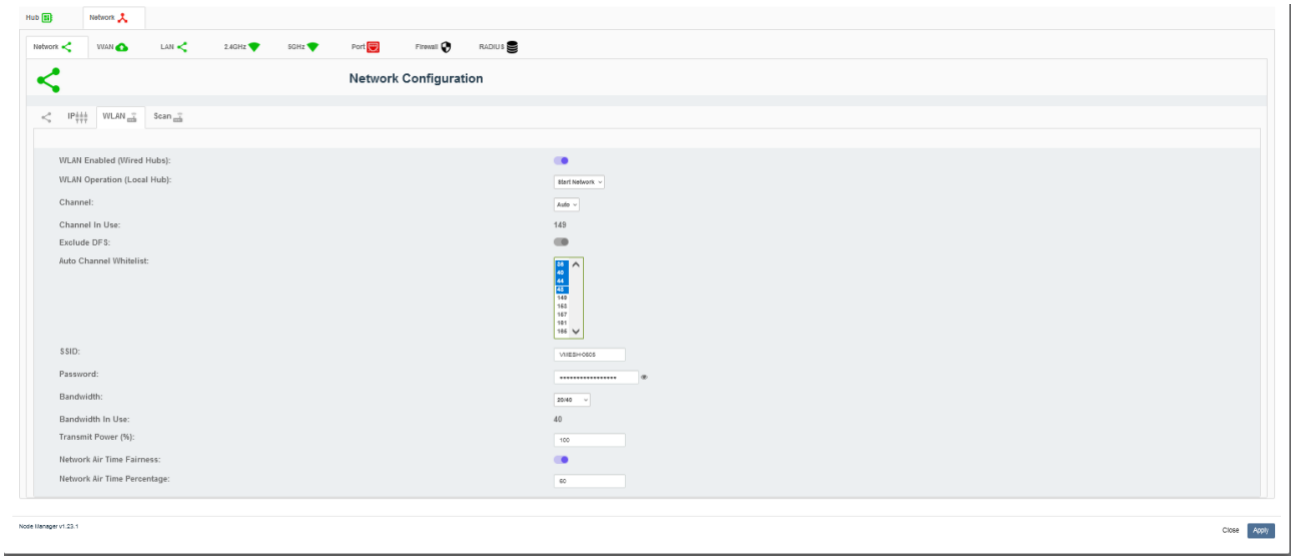
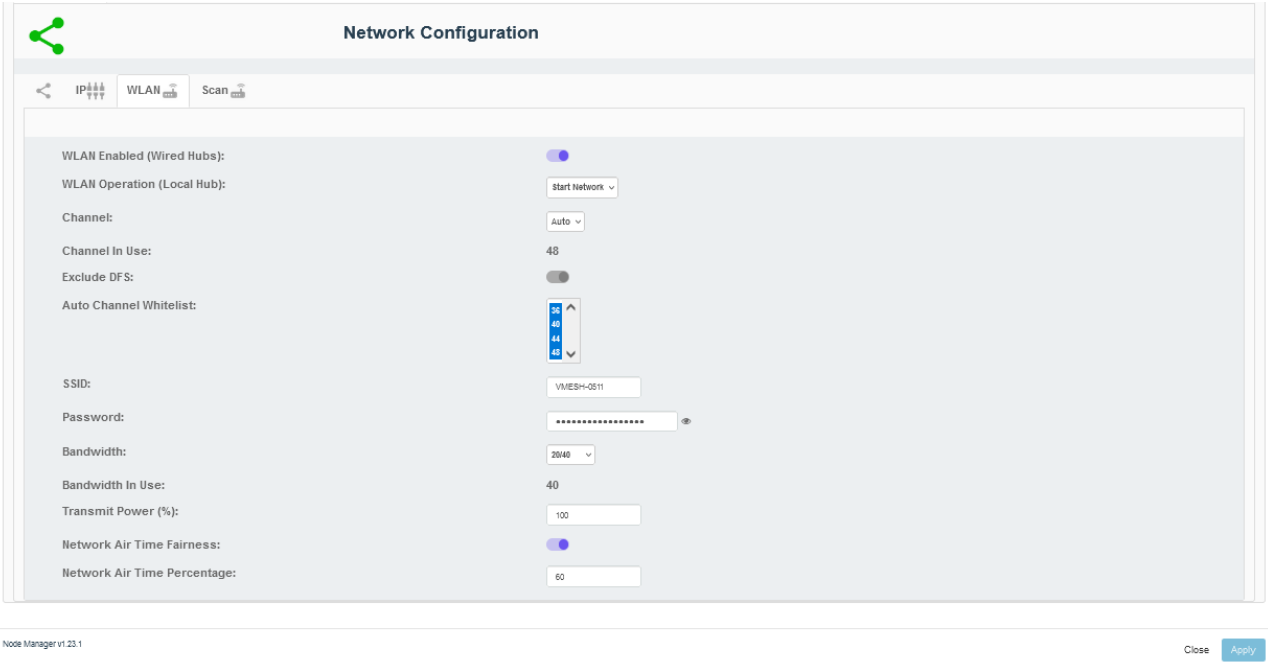


Figure 120: vMesh Screen (Channels Below 100 Whitelisted)



15.4.2. VHM App Auto Channel Whitelist Configuration

Restrict the VHE09 (MEN) high band channels, available for use by the automatic channel selection. This is implemented by use of the 'Auto Channel Whitelist' control as follows:

1. Login to the VeeaHub Manager account which contains the VHE09 (MEN) unit in focus.
2. Navigate to the VHE09 (MEN) vMesh configuration screen (Figure 121):
   - From the VHM, Select the required mesh
   - Select the required VeeaHub (MEN)
   - Tap the vMesh icon
   - Select the Auto Channel Whitelist (a popup box of channels will appear) as shown in Figure 122.
   - For each channel 100 and above, Deselect/Untick each one

– Select OK to save the setting
– Confirm the configuration change has resolved the connection issue

3. Procedure completed.

Figure 121: vMesh Screen (Example)

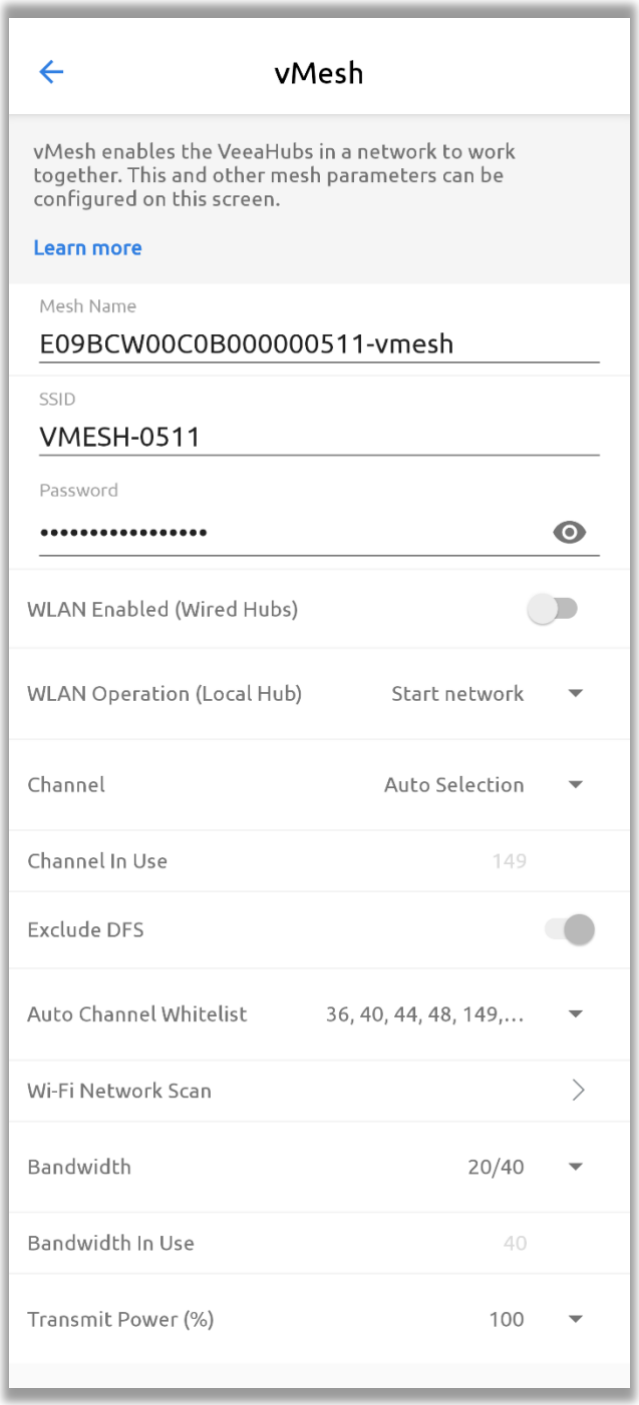
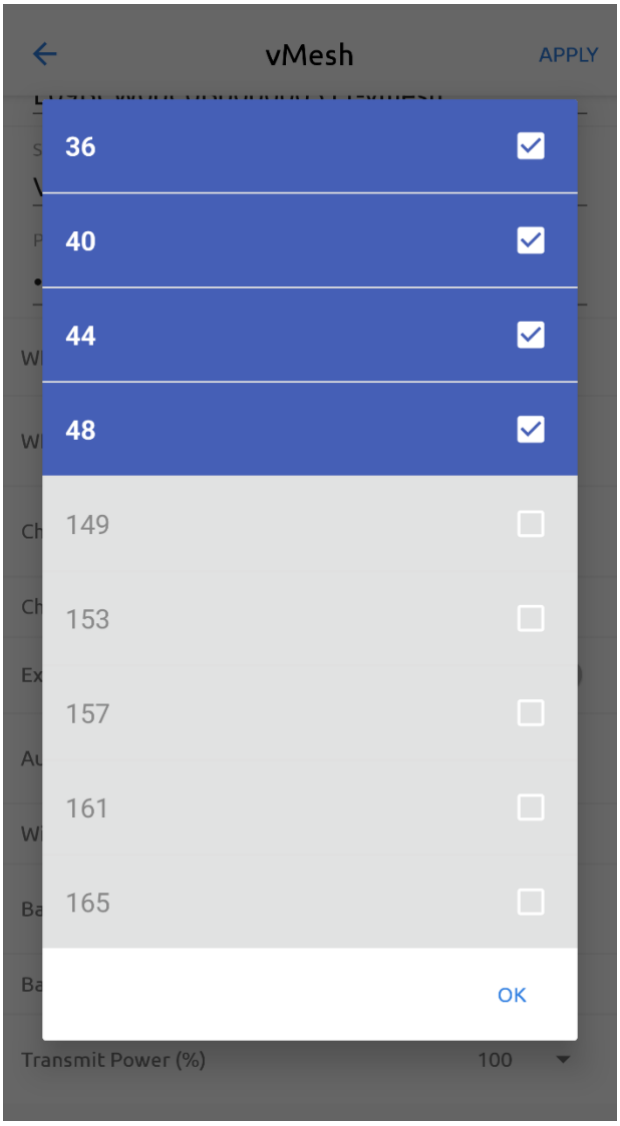


Figure 122: vMesh Auto Channel Whitelist (Example Popup Box Screen)



16. Technical Support

Before contacting Technical Support, please consult the documentation, tutorials, and community topics available on the Support Center at *www.veea.com/support/*. Please sign up, if you don't already have an account, and sign in.

For unresolved queries, click on the Submit a request link.

Please complete the form with a detailed subject, and as much information as possible in the description field. Please include any relevant information such as Veea hardware serial numbers, logs, and screenshots.

An email will automatically be sent to your email address to confirm the request has been received.

Appendix A VeeaHub Technical Capabilities Overview

Model	VHC05	VHE09	VHE10	VHH10
Environment	Indoor	Indoor	Indoor	Outdoor
Processor	64-bit Quad Core @1.2GHz	64-bit Quad Core @1.5GHz	64-bit Quad Core @1.5GHz	64-bit Quad Core @1.5GHz
Memory	1 GB	2 GB	4 GB	4 GB
Storage	32 GB	32 GB	32 GB	32 GB
Simultaneous Dual-band	Yes	Yes	Yes	Yes
2.4 GHz Radio rate	300 Mbps	300 Mbps	300 Mbps	300 Mbps
2.4 GHz MIMO	2 x 2	2 x 2	2 x 2	2 x 2
5 GHz Radio rate	867 Mbps	867 Mbps	1733 Mbps	1733 Mbps
5 GHz MIMO	2 x 2	4 x 4	4 x 4	4 x 4
PoE Mode	-	802.3bt Compliant	802.3bt Compliant	802.3bt Compliant
Bluetooth	4.1 +EDR, BLE	4.2 & 5.0	4.2 & 5.0	4.2 & 5.0
802.15.4	Zigbee & Z-Wave (USA Only)	Zigbee & Thread / 6LoWPAN	Zigbee & Thread / 6LoWPAN	Zigbee & Thread / 6LoWPAN
Cellular	LTE/WCDMA 1x2 (Optional)	LTE/WCDMA 1x2 (Optional)	LTE/WCDMA 1x2 (Optional)	LTE/WCDMA 1x2 (Optional)
GNSS	-	Yes (With Cellular Option)	Yes (With Cellular Option)	Yes (With Cellular Option)
LoRa Gateway	-	Yes (Optional)	-	Yes (Optional)
Ethernet	1 x 10/100 Base-T	1 x 10/100/1000 Base-T 1 x 10/100/1000/2.5G/5G Base-T	1 x 10/100/1000 Base-T 1 x 10/100/1000/2.5G/5G Base-T	1 x 10/100/1000 Base-T 1 x 10/100/1000/2.5G/5G Base-T
USB	2 x USB 2.0	3 x OTG / USB 3.0	3 x OTG / USB 3.0	-
Serial	-	1 x RS232/422/485	1 x RS232/422/485	1 x RS232/422/485
SD card	-	SDXC Max 2TB	SDXC Max 2TB	-
Power	5V @3.5A PoE n/a	48V @1.5A PoE 802.3bt Compliant (on Port 1) (60W)	48V @1.5A PoE 802.3bt Compliant (on Port 1) (60W)	48V @1.5A PoE 802.3bt Compliant (on Port 1) (60W)
Mounting	-	VESA mounting plate supplied	VESA mounting plate supplied	Wall or pole mount (ordered separately)

Appendix B Wi-Fi Capabilities of Different VeeaHub Models

This appendix describes the Wi-Fi capabilities of the different VeeaHub models.

Wi-Fi is used for two general purposes in a VeeaHub network.

It is used for creating the mesh linking the VeeaHubs, the technology that underlies the efficiency and resilience of the network.

It is used for connecting end devices (mobile phones and tablets) to the network, providing access to services on the internal network, as well as the Internet.

User devices on the VeeaHub network make the Wi-Fi connection by connecting to wireless Access Points (**APs**) on the network. APs are identified to the user by SSIDs, the names that appear in the list of available networks on the mobile device. On a VeeaHub, each radio in the unit can provide up to three or four SSIDs for use, depending on the model. Also depending on the model and its configuration, a radio can share the operation of the mesh and the APs.

It is possible to create APs across the whole VeeaHub network, or individual APs on single VeeaHubs within the mesh.

The VeeaHub uses Wi-Fi channels on the 2.4GHz and 5GHz ranges. Regulations concerning the use of these channels vary in each country, so when the VeeaHub is first registered and activated on Veea's systems, the available channels are set according to the location.

APs are usually configured across the whole network, but it is also possible to set up or disable APs on individual VeeaHubs, for example, to enable or disable specific services in certain areas. SSIDs may be configured as broadcast, so that they appear on the list of available networks, or as hidden, so that the user needs to know the SSID in order to connect to it manually.

Wi-Fi can be configured on the relevant screens in VeeaHub Manager and tabs in Node Manager. For models that have capabilities for APs in both 2.4GHz and 5GHz bands, there are two screens/tabs. For the cases where only 2.4GHz is available, only that option is shown.

B.1 VHC05

The VHC05 model contains two Wi-Fi radios, one operating in the 2.4GHz range and one in the 5GHz range. By default, the 5GHz card is dedicated to the mesh and the 2.4GHz card can be used to provide up to three APs. Within the options available, the channel can be selected in the 2.4GHz range for best performance in the operating conditions. All 2.4GHz APs share this channel.

If wireless mesh is switched off, a 5GHz radio option is automatically displayed in VeeaHub Manager and Node Manager, and three additional APs can now be configured for user purposes, sharing the same 5GHz channel.

VHC05	2.4GHz	5GHz	Mesh
Default, AP in 2.4GHz	2.4GHz	None	5GHz
Wireless mesh off, APs at 2.4GHz and 5GHz	2.4GHz	5GHz lower or upper (no DFS)	No wireless mesh

B.2 VHE09

The VHE09 model, like the VHC05, has two Wi-Fi radios at 2.4GHz and 5GHz. Each radio offers four APs (SSIDs) at its frequency. The 5GHz Wi-Fi radio provides both mesh connectivity and AP functionality. This enables both 2.4GHz and 5GHz networks

to be provided for enterprise Wi-Fi and other purposes while wireless mesh is also in use. The mesh and the 5GHz APs share one radio and are always on the same channel, so once the mesh channel has been chosen the corresponding APs share that channel and cannot be changed. The radio settings in this case are set on the vMesh tab.

VHE09	2.4GHz	5GHz	Mesh[i]
Default, Wireless mesh time multiplexed with AP2 in 5GHz band	2.4GHz	Same as mesh	5GHz upper or lower (no DFS)
Wireless mesh off	2.4GHz	5GHz lower or upper (incl. DFS)[ii]	No wireless mesh

Notes.

[i]A 2.4GHz mesh is not currently supported on this model.

[ii]Mesh is not currently supported on DFS channels.

B.3 VHE10/VHH10

The VHE10 and VHH10 models have three radios. The 5GHz APs and the 5GHz mesh function are provided by different radios, offering an improvement in performance over the VHE09 where APs and mesh share the same radio.

Filtering is provided on the 5GHz Wi-Fi cards to reduce interference, with one Wi-Fi radio covering the lower range of 5GHz channels and the other radio covering the upper 5GHz channels. By default, the mesh channel can be chosen from the lower part of the 5GHz range and the AP from the upper part. However, this configuration can be reversed if local spectrum regulations allow mesh operations on the upper part of the 5GHz frequency band.

The following table summarizes the possibilities for Wi-Fi channels on the VHE10/VHH10 models.

VHE10/VHH10	2.4GHz AP	5GHz AP	5GHz Mesh[i]
Default, wireless mesh in lower 5GHz band	2.4GHz	5GHz upper (incl. DFS)[ii]	5GHz lower (no DFS)
Wireless mesh off	2.4GHz	5GHz lower or upper (incl. DFS)(ii)	No wireless mesh

Notes:

[i]2.4GHz mesh is not currently supported on these models.

[ii]Mesh is not currently supported on DFS channels.

Note.

For further information about ACS and DFS, see the article '*Automatic Channel Selection and Dynamic Frequency Selection*' on the Veea Support Center (refer to Section 1.2 for link).

Appendix C LAN Configuration

C.1 Default Configuration

When a VeeaHub is activated as the first unit in the network, it automatically becomes the gateway VeeaHub, which also has management functions on the network. The LAN is established with the defaults in the table below, using the gateway option above. These settings can be changed using the relevant screens in VeeaHub Manager or Node Manager.

LAN Attribute	Notes
WAN Interface	The WAN interface used for the LAN is the interface that is connected to the Internet when the VeeaHub is first activated.
Mode	Routed (NAT)
Internal DHCP	Enabled
IPv4 Primary DNS	8.8.8.8
IPv4 Secondary DNS	8.8.4.4
Wi-Fi Access Points	First Wi-Fi entry for 2.4GHz and 5GHz. See below.
Ethernet Ports	All ports (other than the Gateway WAN interface) are configured as LAN by default, on the single subnet.
DNS Lease Time (minutes)	60
Default LAN	10.100.1.0/24
Guest Wi-Fi	10.100.2.0/24
Public Wi-Fi	10.100.5.0/24
LAN 3	10.100.3.0/24 - optional reserved
LAN 4	10.100.4.0/24 - optional reserved
Layer 3 Mesh (internal use)	10.101.0.0/16
Layer 3 Local (internal use)	10.102.0.0/16 (mesh internal prefix)
Docker	172.17.0.0/24
	172.18.0.0/24
LoRaWAN	169.254.0.0/16
Privafy	
<future>	

The port used for WAN connection is configured on power up. The physical connection can be changed, then the hub can be restarted.

The default for the first Wi-Fi entry is an SSID that matches the mesh name chosen when the first VeeaHub on the network is activated. For example, if the mesh name given during its creation is ‘MyNetwork’, the first user SSID is also ‘MyNetwork’. The mesh name can be changed in the vMesh Configuration screen of VeeaHub Manager, or the network name in Control Center Node manager.

This SSID is configured across the VeeaHub network, so any other VeeaHubs in the same network also have a Wi-Fi access point with a ‘MyNetwork’ SSID, for both the 2.4GHz radio and 5GHz radio.

C.2 IP Conflict Resolution

The VeeaHub platform uses specific IP ranges for internal purposes. These default LAN and guest Wi-Fi ranges can be manually configured, if required for specific purposes.

In the event that the gateway hub detects a conflict with the IP addresses on the WAN it can switch automatically to the alternate IP ranges listed below.

Subnet	Alias	Principal	Alternate
Default LAN	shared:trusted	10.100.1.0/24	172.20.1.0/24
Guest Wi-Fi	shared:guest	10.100.2.0/24	172.20.2.0/24
Layer 3 Mesh	-	10.101.0.0/16	172.21.0.0/16
Layer 3 Local	-	10.102.0.0/16	172.22.0.0/16

A LAN is switched to its alternate subnet if a WAN interface for the LAN is in conflict, and the subnet has been automatically assigned.

If the subnet has been manually assigned, and a WAN interface is in conflict, the LAN is marked as non-operational. If a LAN is non-operational, this is reported in Node Manager and in VeeaHub Manager.

Appendix D Network Deployment Wi-Fi Management Connection Uncertainty After Power-up

This appendix describes some possible operational events that can occur which result in the loss of some or all of your Veea network management LAN. It provides a description of the case scenario and reference to how the situation can be avoided.

D.1 Case A Scenario

In this example (refer to Figure 123), VeeaHubs (Items **A to D**) are shown connected together to form a physical network structure which has been deployed across several floors of a premises.

Network management on each floor is configured as wireless but wired between floors. This forms a complete integrated network structure.

Note.

In this example it was not possible to gain reliable Wi-Fi connection between floors. Various factors can prohibit the use of Wi-Fi connections between floors (for example, Wi-Fi maximum range, building construction and material types).

Except for the inter-floor LAN connected VeeaHubs (Items **A1, B3, C3** and **D3**), all other non-gateway VeeaHubs are configured to use a wireless management connection.

The gateway VeeaHub (Item **A1**) is also connected to the WAN and Internet cloud.

Reconnection Event:

It is possible that after a VeeaHub restart (forced or otherwise), a situation could occur as follows:

- A VeeaHub on a floor may not find a wireless connection to its previous management LAN.

To reduce the risk of this event, it is important to enable the VeeaHub, to help it make the right choice for management network reconnection.

This is implemented through optimized configuration of control features described previously (For the VeeaHub Manager, refer to Section **12.18** and the Node Manager, refer to Error! Reference source not found.).

Table 51 shows the configuration used to help resolve mesh Wi-Fi reconnection issues in example Case A.

Figure 123: Veea Network Deployment Case A Event Example

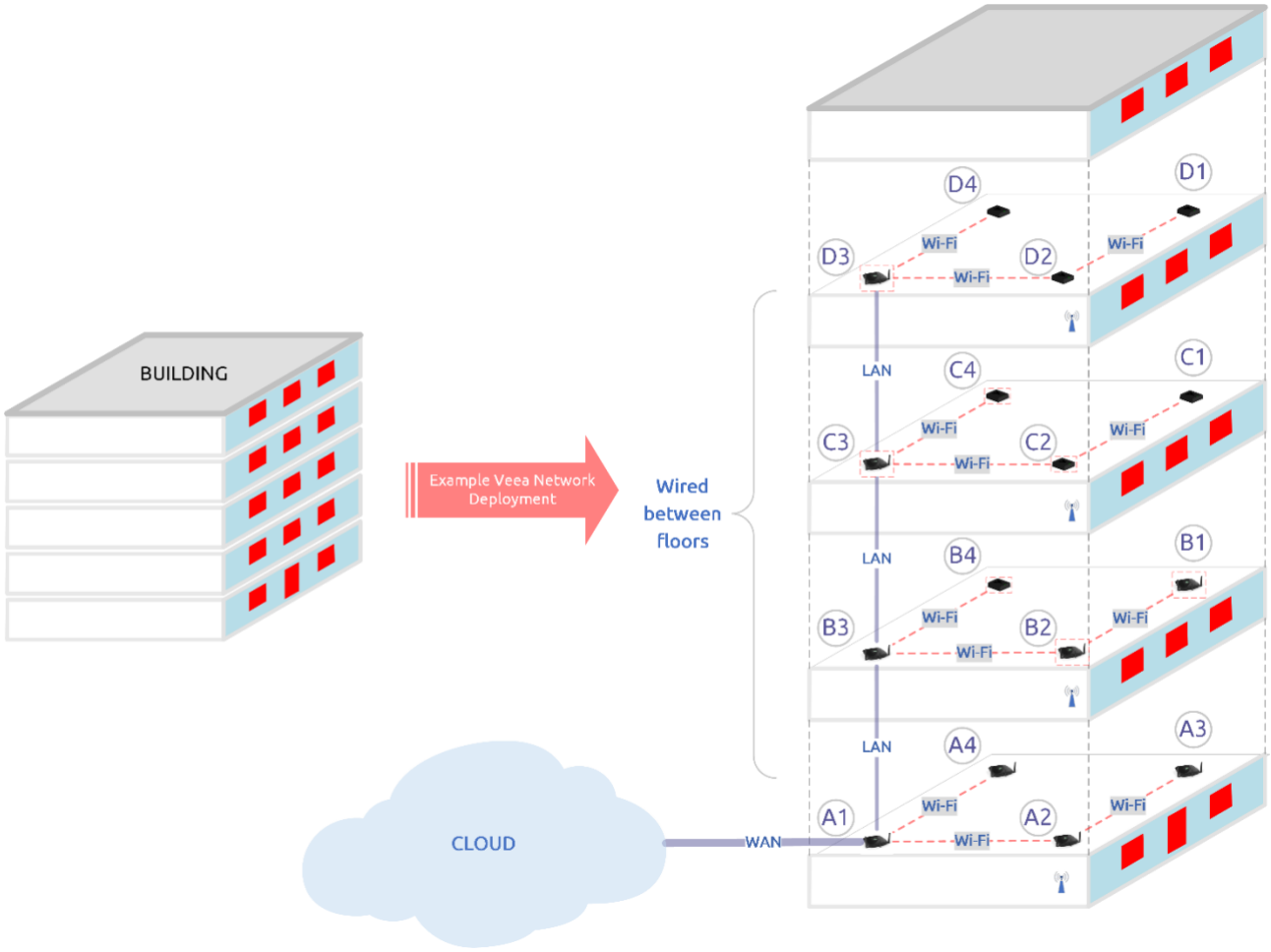


Table 51: Example Case A Wi-Fi Mesh Optimization Settings

VeeaHub (A, B, C, D)	VeeaHub Use	WLAN Enabled (Wired Hubs) Setting	WLAN Operation (Local Hub) Setting
A1	Gateway	Enabled	Start Network
A2, A3, A4	Non-gateway	Enabled	Join Network
B3, C3, D3	Non-gateway	Enabled	Start Network
C1, C2, C4, D1, D2, D4	Non-gateway	Enabled	Join Network