MobileAccessVE CELL-PCS Full Band

Operational Description

System Architecture

Main Elements - The MobileAccess**VE** solution is based on the following main elements:

- **VE Control Unit** (VCU) – installed in the communication room or shaft. Converges the Ethernet and RF signals and provides secure, central management to up to 12 VAPs or (Slave) VCUs in any combination. The same unit model can be configured either as Master or Slave depending on the installation topology:

  - **Master VE Control Unit** (Master VCU) – Installed in the main communication IDF/Telco closet, interfaces to the service provider's RF equipment, and provides secure, central management to up to twelve VCUs and VAP devices in any combination.

  - **Slave VE Control Unit** (Slave VCU) – Used to expand coverage to additional floors. Installed in the IDF/Telco closet of the relevant floor. Each Slave VCU interfaces the Master VCU and up to twelve VAPs and twelve Ethernet connections.

  The Master and Slave VCUs are connected using *dedicated* CAT-6/7 cables. VCUs distribute wireless service signals to each VAP along with PoE and where relevant Ethernet signals from the Ethernet switch, throughout the *existing* CAT-5e/6 infrastructure.

- **VE Access Pod (VAP)** – These are pluggable antennas distributed at strategic locations on the floor to provide Ethernet connection to an IP device and wireless coverage of the service via integrated internal (or external) antennas. Power to VAPs is provided via PoE from the VCU.

  Up to twelve VAPs can be connected to a single VCU using LAN cables (CAT-5e or higher).

Note: If the total number of VAPs in the deployment exceeds 72, consult with MobileAccess support.

The following figure shows the Multi-tier Dual-Band VE solution architecture.
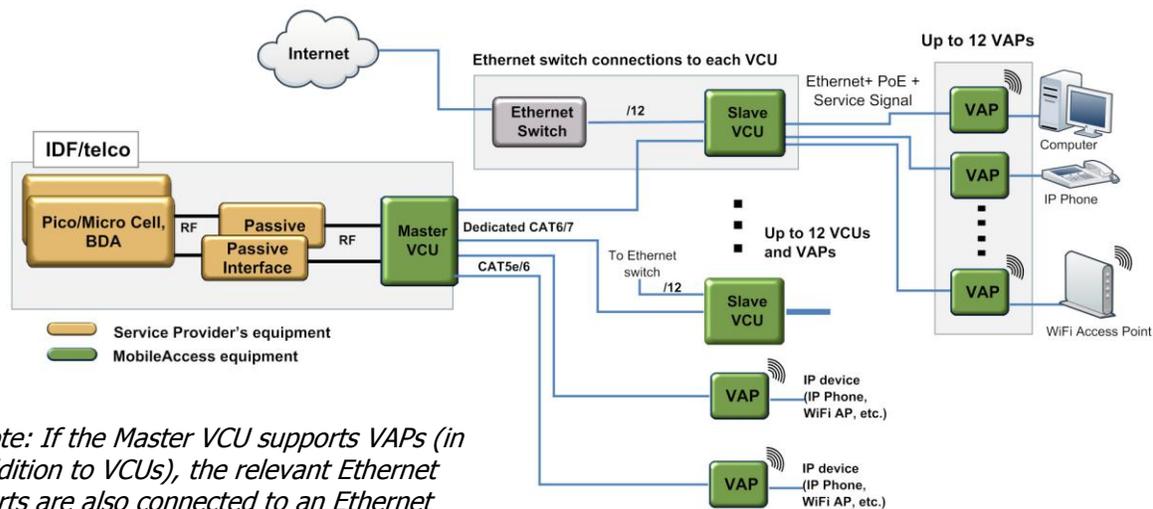

Note: If the Master VCU supports VAPs (in addition to VCUs), the relevant Ethernet ports are also connected to an Ethernet switch.

Figure 1. VE Multi-Tier Basic Architecture

Note: Connecting both VAPs and slave VCUs to the master VCU simultaneously is supported only with VE network elements running SW version 2.6 and above

1.1 System Elements

This section describes the interfaces of the VE Control Units and Access Pods.

1.1.1 VE Control Unit (VCU)

The VCU can operate as either Master/Standalone or Slave. The front panel supports all the RF, control and optic interfaces, while the rear panel contains the power and alarms interfaces.

1.1.1.1 VCU Front Panel

The VCU front panel provides interfaces to RF, management VAP, and VCU interfaces. The type of RF interfaces may vary depending on the VCU model. Below are two models: the top model supports only Duplex N-type interface, while the bottom model supports both Simplex and Duplex QMA connections.

Figure 2: Example of VCU with both Simplex and Duplex RF Connectors

Interfaces	Description
RF Source	RF connections to the RF source: simplex or duplex, N-type or QMA depending on the model.
Management	Relevant only for Master or Standalone VCU. RJ45 WEB management connection to Master or Standalone VCU.
VE Access Pod Ports 1-12	VAP and or VCU connections (in any combination): Master VCU – Connections to Slave VCUs or VAPs. Slave VCU – Connections to VAPs.
Ethernet Ports 1-12	Ethernet switch connections. Relevant for VCUs with connected VAPs. Connect according to corresponding VAP connections.
Master	Relevant for Slave VCUs. Connection towards Master VCU VE Access Pod Ports.
Reset	N/A in current version.

Interfaces	Description

PWR and ACT LEDs	PWR - VCU power source:
	  Green - Power OK
	  Disabled - No power received by VCU
	ACT VCU activity LED:
	  Solid Green – During initialization
	  Blinking Green – Normal operation
	  Fast Blinking Green – User activated *VCU Identify* on this VCU

VAP Status (One LED per Port)	Status of the *corresponding* unit (VAP or VCU)
	  Blinking Green – Unit is initializing
	  Solid Green – Normal operation of unit
	  Solid Orange – Unit is faulty, or unmanaged. This can be due to mismatch type, VoIP phone, etc.
	  Fast Blinking Green – User selected "Identify" command on the unit
	  Off – No VAP or VCU connected to this port.

RF (One LED per Service)	Status of connected RF capacity source:
	  Green – Master VCU only. Normal RF level
	  Orange – Master VCU only. RF level is either too low, too high, or service has been turned off by the user.
	  Off – VCU is Slave.

Master	Status of the connection to the Master VCU:
	  Off – Master mode (not connected to VCU)
	  Blinking Green – During attachment process with Master VCU
	  Solid green – Slave (IF-IF) mode and connected to Master

Table 1: VCU Ports Description

1.1.1.2 VCU Rear Panel

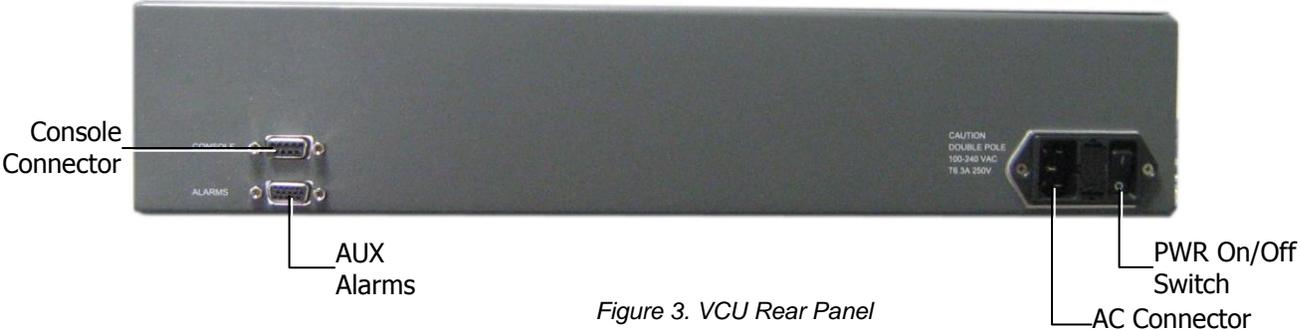The rear panel includes the following: power switch, AC input, AUX alarms, and service personnel connections.

Figure 3. VCU Rear Panel

Table 2 VCU Rear Panel Description

Connector	Description
Console	RS232 local connection for service personnel (D-Type 9)
Alarms	AUX Alarms Connections *In Master/Slave configuration - relevant only for Master VCU.*
Power Input	Standard 3-pins AC power connector equipped with an ON/OFF switch. 90-264V AC, 47-63 Hz AC; 350W power consumption maximum.

1.1.2 VE Access Pod (VAP)

Each VAP supports:

- Internal antennas and two interfaces for external antennas. By default, the VAP is set to transmit through the integrated internal antennas. To use the external antennas connectors, select the "External Antenna" option in VAP Config-Service RF tab of the VE Web GUI application

- An Ethernet port for physical Ethernet connection to devices such as a computer, IP phone or Wi-Fi Access Point.

- Two LED status indictors.

The VAP can be mounted on the wall or placed on a flat surface. Brackets are provided for each type of installation.

The following figure shows the desktop VAP.

Front View

External Antenna Connectors

Blue LED (Activity and Identify)

Green LED (Power)

Figure 4. VE Access Pod-Front

Table 2: VAP LEDs

LED	Description	
Power	Solid Green	- Power supplied to VAP
	Off	- No power supplied to VAP
Activity	Off	- No power supplied to VAP or Overall Status of VAP is faulty
	Blinking Blue	- Power on, VAP is initializing (connecting to VCU)
	Solid Blue	- Power on, unit operating normally
	Fast Blinking Blue	- User invoked "Identify" command on corresponding VAP

The following figure shows the desktop VAP rear side and the underside view with the CAT-5e/6 patch-cord cable.

Rear View

RJ-45 Connector to

RJ-45 Connector to LAN Terminal
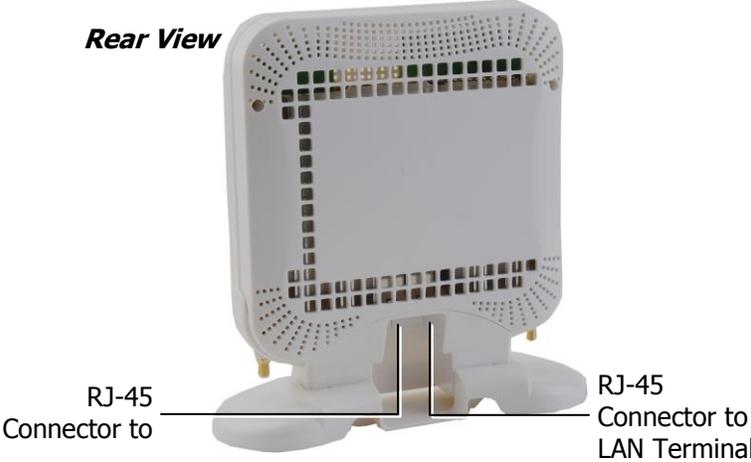
1.2   System Monitoring and Management

The MobileAccess**VE** system (Master VCU, Slave VCUs, and VAPs) is centrally managed via a single Web connection to the Master VCU. The basic screen in the GUI is the **Config** tab, which enables the user to view the system topology and setup parameters, control units, and all Access Pods connected to the control units.

Note: When locally connecting to a specific Slave VCU, only the VAPs connected to this VCU can be monitored. When connected to the Master, the entire deployment can be monitored.

The following figure shows the Master VCU with a single Slave VCU and its nine VAPs. The session is opened by a connection to the Master VCU.

1.2.1   Integration with an External Fault Management System

The MobileAccess**VE** system can be seamlessly integrated into any existing Fault Management (FM) system that supports SNMP events. The Master VCU generates a SNMP event for each relevant system alarm and forwards this trap to the pre-configured IP address of the external Fault Management system.