

MobileAccessVE AWS MIMO

Operational Description

Main Elements - The MobileAccessVE AWS MIMO solution is based on the following main elements:

- **VE Control Unit** (VCU) – Provides interface to up to 12 VAPs, and the central interface for managing the VE deployment. In Master/Slave mode, it can serve to expand the network coverage with additional VCUs serving as Slaves and a single control point at the Master. Slave mode is automatically detected when a Slave VCU detects that it is connected to the Master VCU.
 - **Master VE Control Unit** (Master VCU) – Installed in the main IDF/Telco closet, the Master VCU interfaces with the service provider's RF capacity sources and provides secure, central management to up to twelve VCUs and VAP devices in any combination. The Master and Slave VCUs are connected using *dedicated* CAT-6/7 cables.
 - **Slave VE Control Unit** (Slave VCU) – Installed in the IDF/Telco closet and used to expand coverage to additional floors. Each VCU interfaces the Master VCU and up to 12 VAPs and 12 Ethernet connections.

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) – VAPs 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 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: When the total number of VAPs in the deployment exceeds 72, consult with MobileAccess support.

The following figure shows the Multi-tier VE AWS MIMO solution architecture.

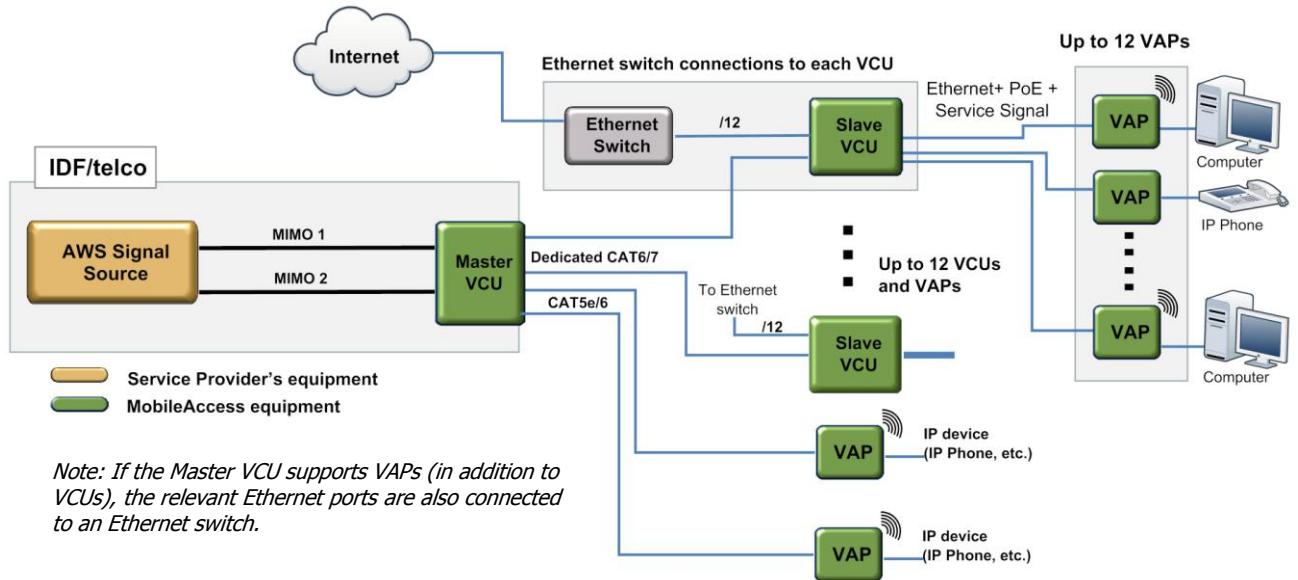


Figure **Error! No text of specified style in document.-1.** VE Multi-Tier Basic Architecture

The Master VCU distributes the wireless MIMO services from the service provider's equipment to the Slave VCUs. At the Slave VCUs, the wireless MIMO services are converged with Ethernet service and routed to the VAPs via the Ethernet LAN CAT-5e/6 cabling infrastructure.

The AWS VAPs are equipped (only) with external antennas, allowing support of dual MIMO arrays for any of the available mounting configurations and provide Ethernet/IP connectivity (and PoE pass-through) to the connected appliances such as WiFi APs and IP phones.

System Elements

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

VE Control Unit (VCU)

While operating as a Master VCU:

- Interfaces to RF source(s) and to VCUs/VAPs.
- Converges Wireless services and distribution to Slave VCUs.
- Slave VCUs and VAP management and control.
- Remote management of the entire deployment.

While operating as a Slave VCU:

- Interfaces to Master VCU.
- Converges Wireless services, Ethernet and PoE and interfaces to VAPs.
- Management and control of connected VAPs.

VCU Front Panel

The front panel supports the interfaces to the wireless AWS MIMO service (two channels – corresponding to the two supported TDD MIMO channels) and includes interfaces to VAPs or Slave VCUs depending on the configuration.

The following provides the front panel ports.

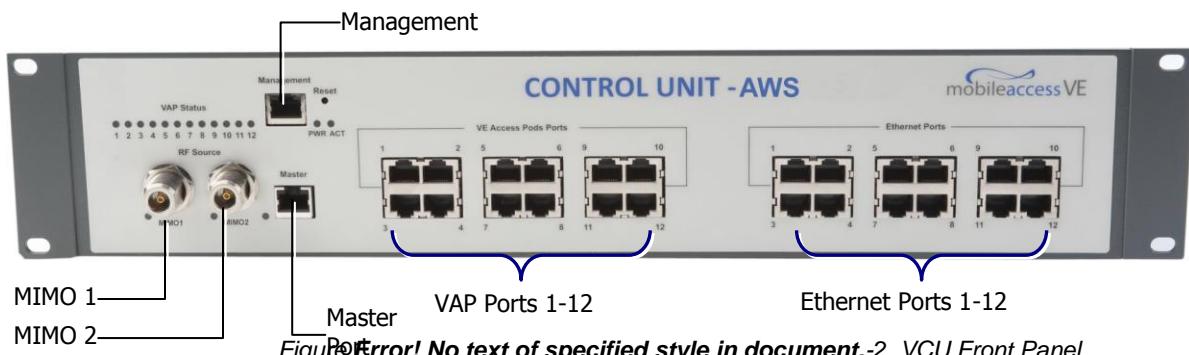


Figure 2. VCU Front Panel

Table 1: VCU Ports Description

Ports	Description
MIMO1	RF connections (two TDD MIMO channels) to the service provider AWSSignal Source equipment. N-Type female connectors. Coax cables. <i>Note: When supporting SISO service – only MIMO 1 connector is relevant.</i>
Management	RJ45 web management connection.
VE Access Pod Ports 1-12	VAP/VCU port connections. For Master VCU – Connections to Slave VCUs or VAPs. For Slave VCU – Connections to VAPs.
Ethernet Ports 1-12	Relevant only for Slave VCUs. Ethernet switch connections.
Master	Used for connecting a Slave VCU to the Master VCU in a multi-tier deployment (connects to one of the VAP ports of the Master VCU).
Reset	N/A in current version.

The following provides a description of the front panel LEDs.

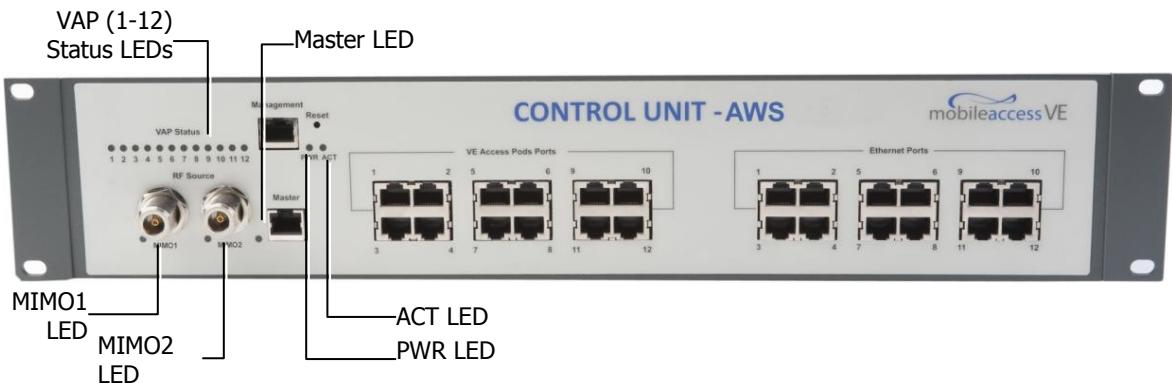


Table 2: VCU LEDs Description

LED	Description
PWR	Indicates whether the VCU receives power: Green - Power OK Disabled - No power received by VCU
ACT	VCU activity LED: Solid Green - During initialization Blinking Green - Normal system operation Fast Blinking Green - User activated <i>VCU Identify</i> on this VCU
VAP Status (One LED per Port)	Indicates the status of the <i>corresponding</i> 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 invoked "Identify" command on the unit Off - No VAP or VCU connected to this port.
MIMO (One LED per Channel)	Indicates the 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	Indicates the 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

1.1.1.1 VCU Rear Panel

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



Figure **Error! No text of specified style in document.**-3. VCU Rear Panel

Table 3: VCU Rear Panel Description

Connector	Description
Console	RS232 local connection for service personnel (D-Type 9)
Alarms	AUX alarms connections - see section Error! Reference source not found.. 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:

- Two interfaces for external antennas. By default, the VAP is set to transmit through the external antennas.

Note: Do not change the “External Antenna” option in VAP Config-Service RF tab of the VE Web GUI application (See section **Error! Reference source not found.**).

- An Ethernet port for physical Ethernet connection to devices such as a computer, IP phone or WiFi Access Point.
- Two LED status indicators

The VAP is provided with brackets for either hanging the device on the wall or placing it on a flat surface (such as a desk).

Note: Ceiling Mount Kits can be ordered separately for installing the VAP on the ceiling (P/N: AK-CEILING-MT-H (Horizontal mount) or AK-CEILING-MT-V (Vertical mount)).

VE Access Pod (VAP)

Each VAP provides the following functions:

- Antennas – distributes the wireless services signals. The antennas are internal, where external (optional) antennas can also be connected.
- Connection to Ethernet port – relevant when connected to jacks that provide an Ethernet connection to a user terminal.

The VAP can be mounted/hung on the wall or placed on a flat surface (such as a desk).

The following figure shows the desktop VAP.



Figure 4. VE Access Pod-Front

Table 4: 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.

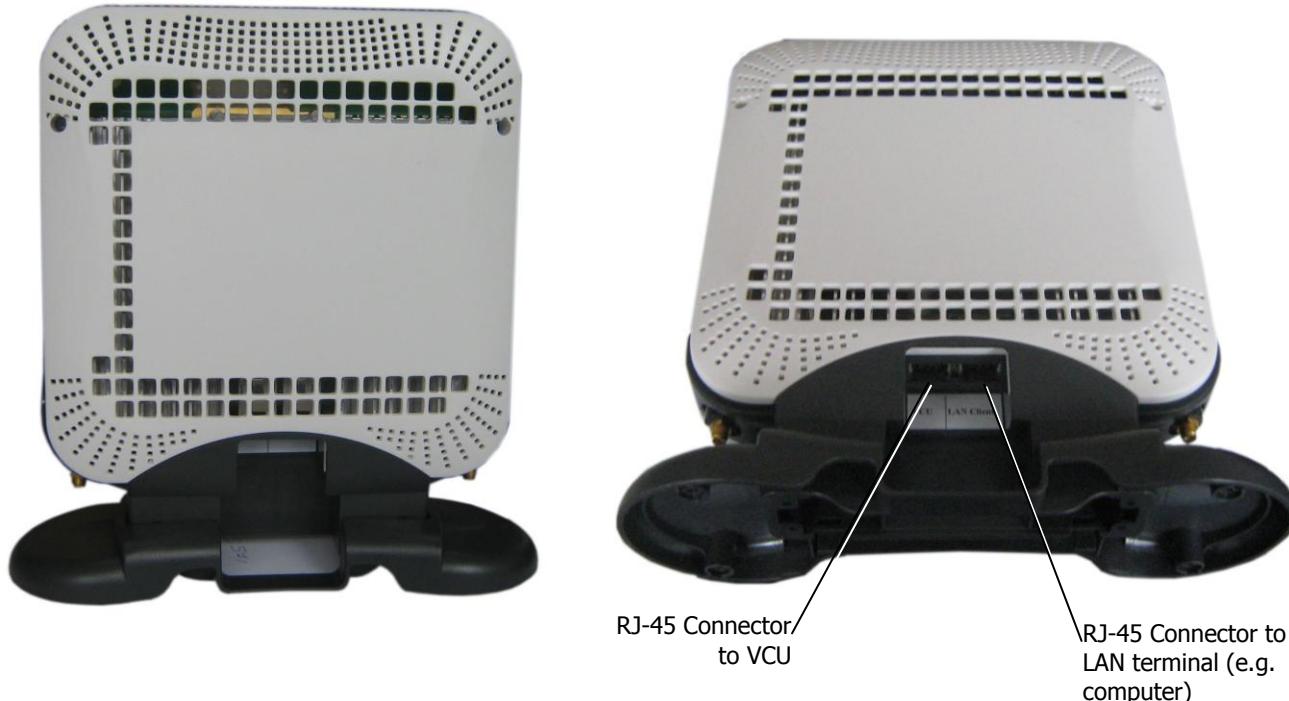


Figure -5. VE Access Pod-Rear

VAP Antenna Options

Two antenna options are available for VAPs:

- Integral internal antennas
- Connectors that interfaces to external antennas for special coverage requirements.

Note: 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-RF Parameters tab of the VE Web GUI application
