

MobileAccessVE LTE 700 MHz MIMO

Operational Description

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

- **VE Control Unit** (VCU) – The control Unit can serve as either a Master or a Slave and interfaces the other VCUs (in case of Master) or the VAPs (when serving as Slave). The Master or Slave mode is automatically detected according to the VCU's physical connection. If a connection to another VCU is detected, the VCU will automatically be identified as a Slave; otherwise it will assume the role of a Master.
- **Master VE Control Unit** (Master VCU) – installed in the main communication Telco closet, interfaces to the service provider's RF capacity sources, and provides secure, central management to up to twelve VCUs, as well as all connected VAPs. In cases where no Slave VCUs are required, VAPs can be connected directly to the Master VCU.
- **Slave VE Control Unit** (Slave VCU) – installed in the telco/IDF closet and used to expand coverage to additional floors. Each VCU interfaces the Master VCU and up to twelve **VE** Access Pods and twelve Ethernet connections.

The Slave 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 infrastructure.

The Slave VCUs are connected to the Master VCU using CAT-6 or 7 cables.

- **VE Access Pod (VAP)** – These are pluggable antennas distributed at strategic locations over one or more floors to provide maximum coverage. VAPs provide RF coverage via integrated, internal antennas. VAPs are also equipped with an interface for external antennas for special coverage requirements. VAPs are remotely powered from the VCU using Power over Ethernet (PoE), eliminating the need for local powering.

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** LTE 700 MHz MIMO solution architecture.

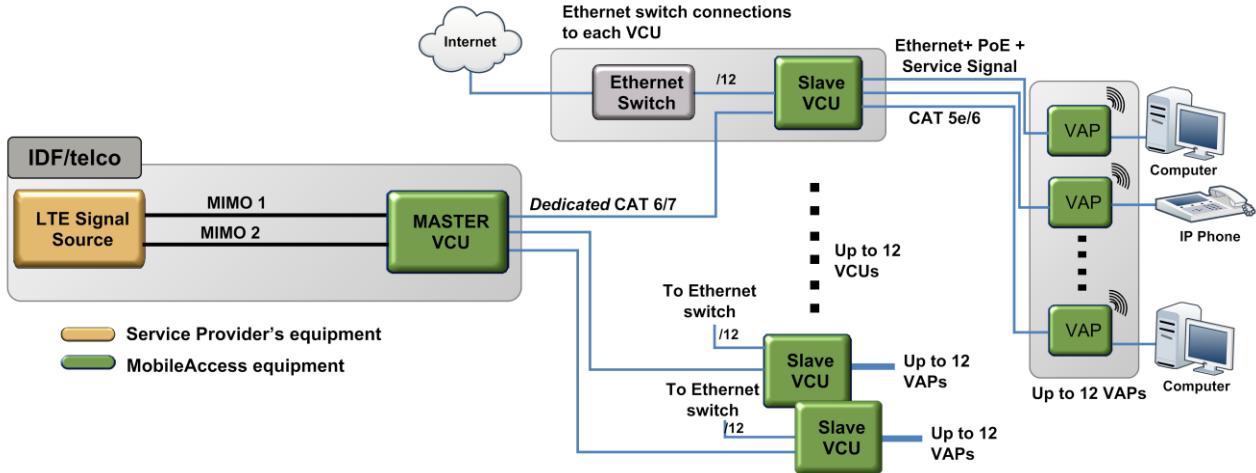


Figure **Error! No text of specified style in document.**-1. VE Multi-Tier Basic Architecture

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 VAPs distribute the wireless LTE MIMO service via integrated internal antennas or (optional) external antennas and provide Ethernet/IP connectivity (and PoE pass-through) to the connected appliances such as WiFi APs and IP Phones.

VCU Front Panel

The front panel supports the interfaces to the wireless LTE 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 front panel also interfaces to the Ethernet switch, includes a connector (Master) for receiving the wireless LTE MIMO services from the Master VCU (in Master/Slave configuration) and the management interface.

The following provides the front panel ports.

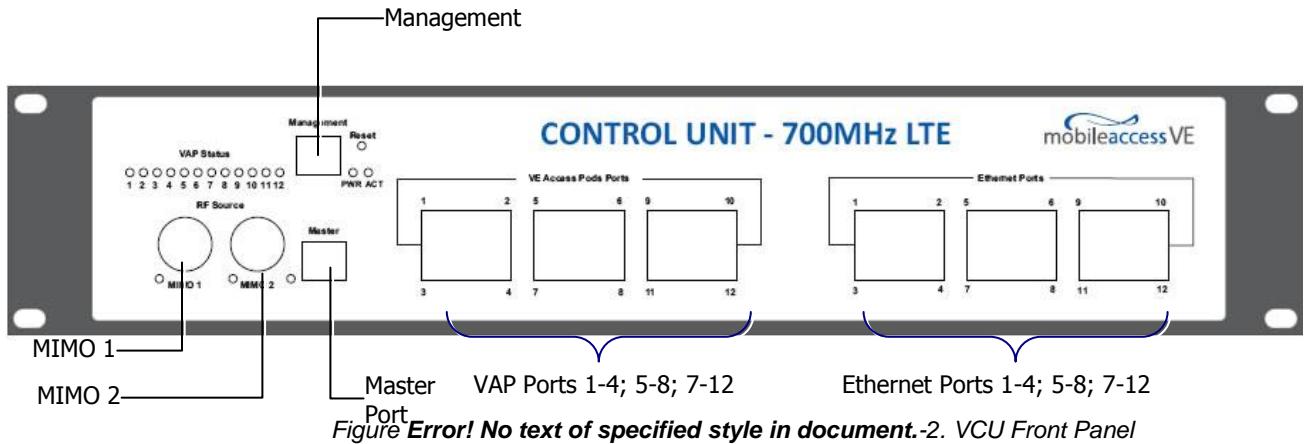


Figure **Error! No text of specified style in document.**-2. VCU Front Panel

Table 1: VCU Ports Description

Ports	Description
MIMO1 MIMO2	RF connections (two TDD MIMO channels) to the service provider LTE Signal 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 1-4; 5-8; 7-12	VAP/VCU port connections. RJ-45 connection to VAP/VCU through the LAN infrastructure. CAT-5e/6 cables. If VCU is connected as Master – these are connections to the Slave VCUs. If VCU is connected as Slave – these are connections to VAPs.
Ethernet Ports 1-4; 5-8; 7-12	Ethernet port connections to Ethernet Switch. Ethernet cables (used only in Slave VCUs).
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.

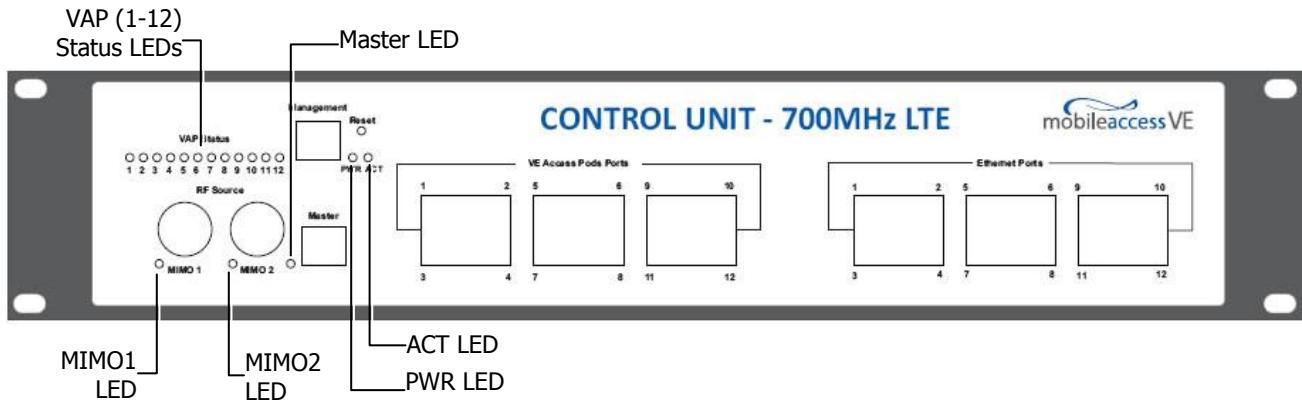


Table 2: VCU LEDs Description

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

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 connector

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.
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.

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 *Error! No text of specified style in document.*-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.

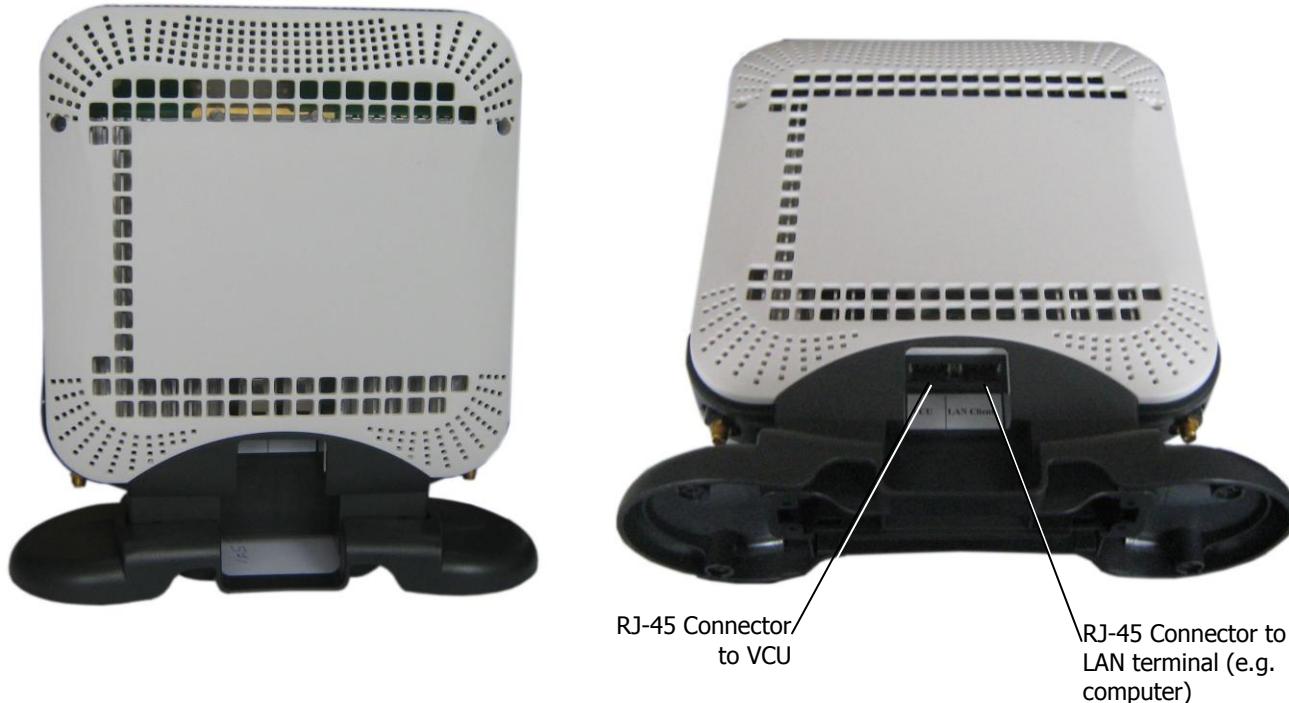


Figure *Error! No text of specified style in document.*-5. VE Access Pod-Rear

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 (see **Error! Reference source not found.**).

