Antenna Measurement System Information

Antenna Information

Manufacturer: Pegatron
Brand: Humane
Model: 13EP-5DQ1T01

Measurement OTA Chamber

- MVG SG 24-S 3D fully anechoic chamber, also known as Satimo chamber.

- The list of antenna engineers performed antenna passive measurement activities:
  - Gary2_Chang (gary2_chang@pegatroncorp.com)
  - William1_Lin (william1_lin@pegatroncorp.com)

Test Equipment

- Annual calibration by an ISO 17025 accredited laboratory is performed on all test equipment. The following test equipment is typically used:

Network Analyzer	ENA E5063A

The list of test equipment calibration information are as follows :

- MVG SG 24-S 3D fully anechoic antenna test chamber
- Agilent E5063A Network analyzer
- Agilent E5063A Network analyzer calibration date : 2023 / 04 / 19
- Agilent E5063A Network analyzer calibration name of personnel : Stan Lin

Test Software

- The test equipment operates under the control of commercial test software. For OTA chambers sold by MVG, WaveStudio 22.4 is used.

Test Method

- EIRP measurement is based on industry-standard method described in CTIA OTA Test Plan (current version 3.9.4). Peak gain (Horizontal and Vertical Polarization) is calculated by subtracting Conducted Power from the measured maximum EIRP. Testing is performed with Antenna integrated in the product Below is the measurement summary from the specification:

Figure 4-2 shows a typical real world configuration for measuring the path loss. In this case, a reference antenna with known gain is used in place of the theoretical isotropic source. The path loss may then be determined from the power into the reference antenna by adding the gain of the reference antenna. That is:

EQUATION 4.2

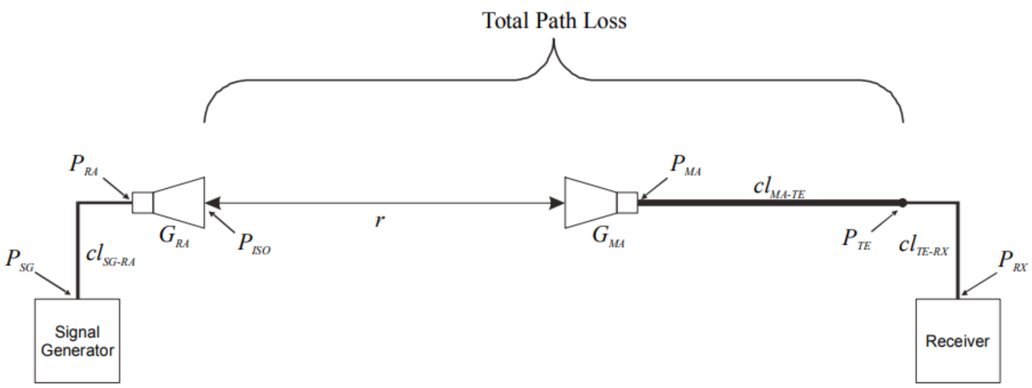
$$P_{ISO} = P_{RA} + G_{RA}$$

where P_{RA} is the power radiated by reference antenna, and G_{RA} is the gain of the reference antenna, so that:

EQUATION 4.3

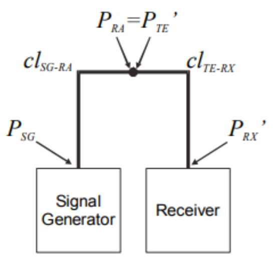
$$PL = P_{RA} + G_{RA} - P_{TE}$$

FIGURE 4-2 TYPICAL CONFIGURATION FOR MEASURING PATH LOSS



$$P_{RA} - P_{TE} = P_{RX}' - P_{RX}$$

FIGURE 4-3 CABLE REFERENCE CALIBRATION CONFIGURATION



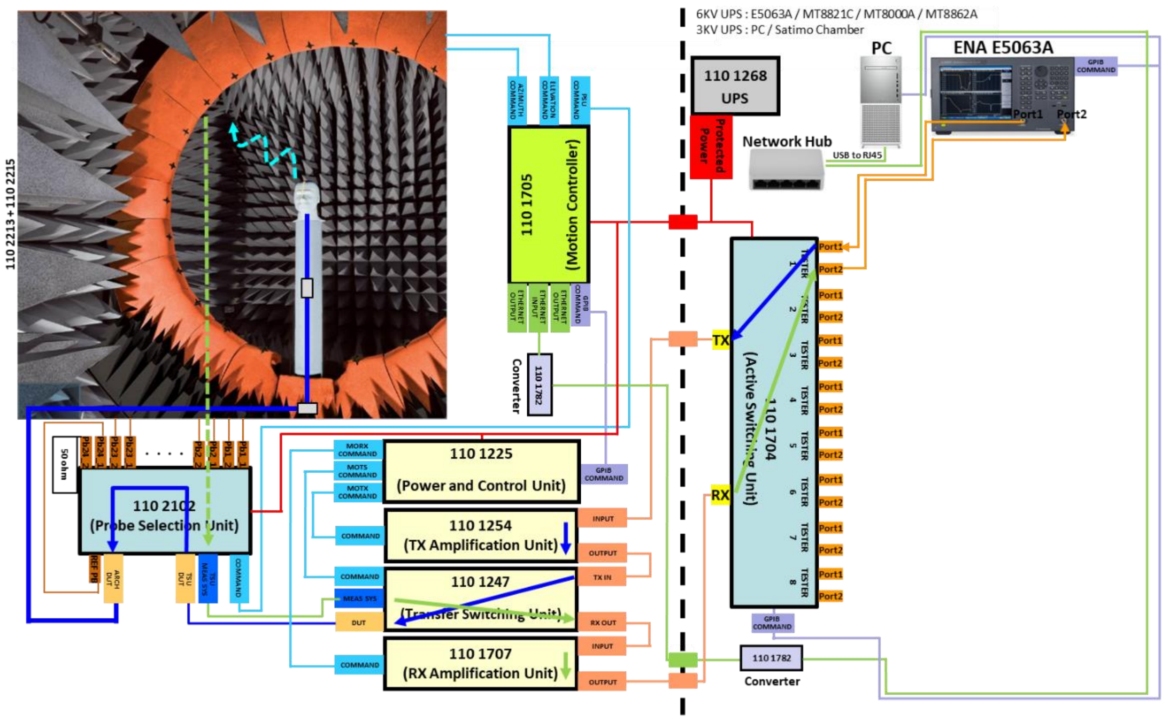
where P_{RX}' is the power measured at the receiver during the cable reference test, and P_{RX} is the power measured at the receiver during the range path loss measurement in Figure 4-2. Note that this formulation assumes that the effects of the reference antenna VSWR are accounted for in the gain of the reference antenna. For more information on this subject, refer to [1]. Thus, the path loss is then just given by:

EQUATION 4.5

$$PL = G_{RA} + P_{RX}' - P_{RX}$$

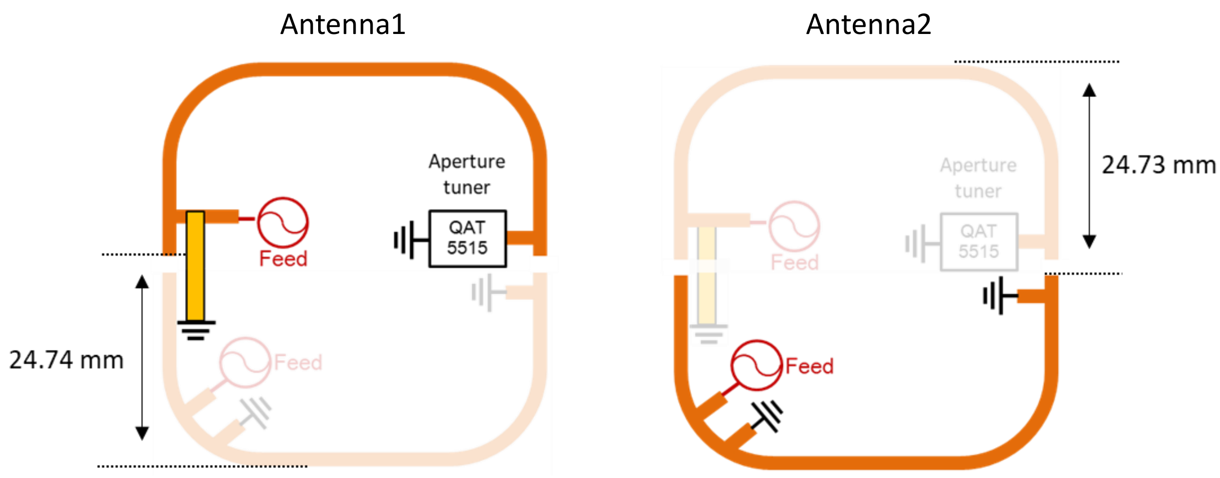
- ## Typical Setup for MVG SG 24-S

Satimo 3D Chamber Instrument Setup – E5063A Passive



Antenna Description

- Antenna Architecture



Description		
Antenna Type (Upper Antenna,Antenna 1)	PIFA Type	
Antenna Type (Lower Antenna,Antenna 2)	PIFA Type	
Peak Gain(Antenna 1) [V-pol / H-pol]	**V-Polarization** Band1=-8.01 dBi Band2=-8.52 dBi Band3=-11.6 dBi Band4=-11.85 dBi Band5=-9.37 dBi Band7=-3.76 dBi Band8=-9.14 dBi Band12=-13.1 dBi Band17=-13.1 dBi Band20=-9.37 dBi Band26=-8.52 dBi Band66=-11.6 dBi Band71=-13.87 dBi Band38=-3.47 dBi Band41=-3.47 dBi	**H-Polarization** Band1=-7.05 dBi Band2=-8.24 dBi Band3=-11.04 dBi Band4=-10.96 dBi Band5=-9.37 dBi Band7=-4.07 dBi Band8=-9.18 dBi Band12=-12.91 dBi Band17=-12.91 dBi Band20=-9.37 dBi Band26=-8.52 dBi Band66=-11.04 dBi Band71=-14.38 dBi Band38=-3.1 dBi Band41=-3.1 dBi

Peak Gain(Antenna 2) [V-pol / H-pol]	**V-Polarization** Wi-Fi 2.4GHz =-4.57 dBi Wi-Fi 5GHz: 5200MHz =-2.66 dBi 5500MHz =-5.37 dBi 5775MHz =-4.88 dBi	**H-Polarization** Wi-Fi 2.4GHz =-4.63 dBi Wi-Fi 5GHz 5200MHz =-3.58 dBi 5500MHz =-4.88 dBi 5775MHz =-4.48 dB
Cable Loss (Antenna 1)	without antenna cable	
Cable Loss (Antenna 2)	without antenna cable	
RF Connector	none	
Cable Diameter	none	

X Gary Chang

Gary Chang
Antenna Engineer