

# OVERVIEW OF CMT'S OVER-THE-AIR (OTA) ANTENNA TEST SYSTEM FOR 5G AND MMWAVE FREQUENCIES

*Patrick Li, Applications Engineering Team Lead*

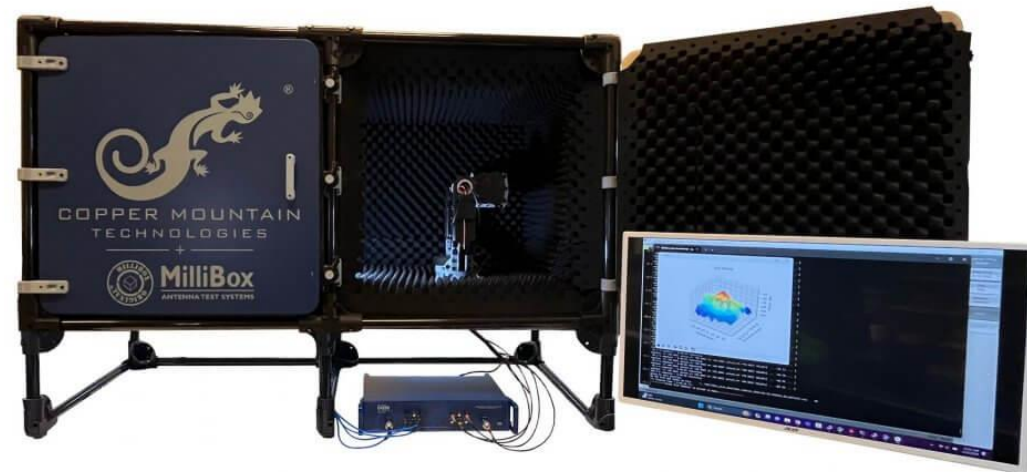


COPPER MOUNTAIN  
TECHNOLOGIES

# WHAT IS THE OTA ANTENNA TEST SYSTEM?

Antenna far field measurement solution for 18GHz to 220GHz

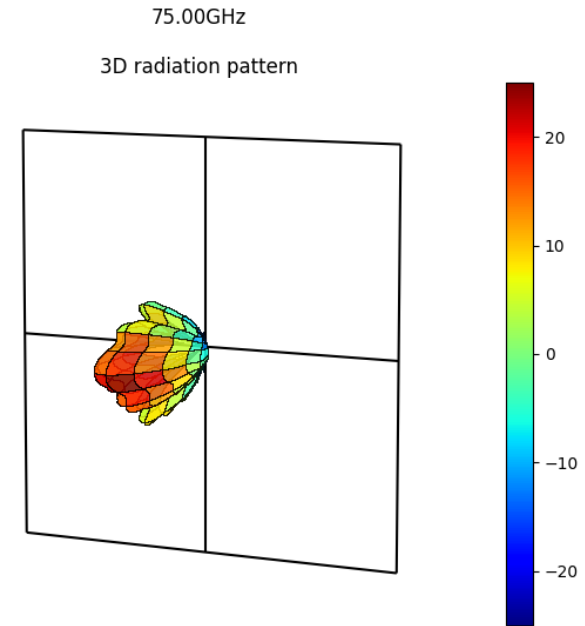
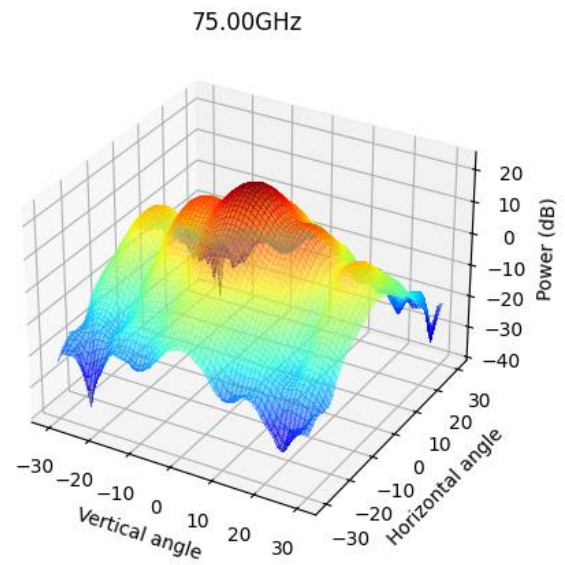
- The chamber is made of plywood panels and an absorber with a PVC frame. Portable and modular, can be deconstructed and reconstructed easily
- A gimbal to rotate the Antenna Under Test
- A post to mount receiving antenna
- Instrument bay under the chamber
- Open-source software in Python and saves measurement data into csv files
- A 9GHz VNA and a set of extenders



# LIVE DEMONSTRATION



# MEASUREMENT PLOTS



# CALIBRATION

1. Easy but does not measure gain - Response Thru calibration with the receiving antenna and the Antenna Under Test mounted
2. Hard but measures gain - Response Thru calibration by calibrating the two extenders before mounting them inside the chamber, putting the calibration plane at the port of the extenders. Gain can be calculated if the receiving antenna's response is known, or the receiving antenna and the DUT antenna are the same
3. Easy and measures gain - Calibrate with a Standard Gain Horn antenna



# WHAT SYSTEMS DOES CMT OFFER?

- 5G OTA Antenna Test System (OTA-XS-54) - 18 to 54GHz

System includes a 9GHz C4209 VNA, a set of FET1854 extenders, and a GIM04-230 gimbal  
3' height, 2' depth, 4', 6' or 8' width. Inside cavity: 16" x 16"

- mmWave OTA Antenna Test System (OTA-XH-XX) – 50 to 220GHz

System includes a 9GHz C4209 VNA, a set of WR15, 12, 10, 8, 6 or 5 extenders made by our partner Eravant, and a GIM04-330E gimbal

3'8" height, 2'9" depth, 5'3", 7'11" or 10'5" width. Inside cavity: 22" x 22"

Why two sizes for the chamber?

The bigger chambers are needed for physically bigger DUTs, for example, radar testing.

Bigger chambers are also needed to accommodate for the extenders.



# MAIN SPECS

## OTA-XS-54

- 18 to 54 GHz
- 50db absorber 18 to 330GHz
- Maximum far field distance:  
OTA-2S-54 (2 cubes) = 72 cm  
OTA-3S-54 (3 cubes) = 133 cm  
OTA-4S-54 (4 cubes) = 193 cm
- Maximum DUT weight: 1 lb
- Maximum DUT width: 7.9"
- Maximum DUT depth: 4.3"
- Gimbal movement resolution: 0.1 degrees
- Gimbal movement range: -180 to +180 degrees

## OTA-XH-XX

- 50 to 220 GHz
- 50db absorber 18 to 330GHz
- Maximum far field distance:  
OTA-2H-XX (2 cubes) = 80 cm  
OTA-3H-XX (3 cubes) = 158 cm  
OTA-4H-XX (4 cubes) = 235 cm
- Maximum DUT weight: 2 lbs
- Maximum DUT width: 11"
- Maximum DUT depth: 1.8", potentially 3"
- Gimbal movement resolution: 0.1 degrees
- Gimbal movement range: -180 to +180 degrees

# HOW TO CHOOSE A SYSTEM

Far field distance

Physical size and weight of antenna

Frequency range

Build your OTA system:

<https://coppermountaintech.com/build-your-ota-system/>



# QUESTIONS?

For additional questions, please reach out to:  
[support@coppermountaintech.com](mailto:support@coppermountaintech.com)

