



## **Unlicensed Band Antenna Gain**

**Model: SM-F956B, SM-F956B/DS**

**FCC ID: A3LSMF956B**

**BT/WIFI 1\_2.4/5/6GHz (SUB4)**

| <b>Freq. [Hz]</b> | <b>Peak. [dBi]</b> |
|-------------------|--------------------|
| 2,400,000,000 Hz  | -4.48 dBi          |
| 2,412,000,000 Hz  | -3.2 dBi           |
| 2,437,000,000 Hz  | -3.56 dBi          |
| 2,442,000,000 Hz  | -3.53 dBi          |
| 2,450,000,000 Hz  | -2.42 dBi          |
| 2,462,000,000 Hz  | -2.52 dBi          |
| 2,472,000,000 Hz  | -2.22 dBi          |
| 2,484,000,000 Hz  | -2.56 dBi          |
| 2,500,000,000 Hz  | -2.93 dBi          |
| 5,150,000,000 Hz  | -6.3 dBi           |
| 5,200,000,000 Hz  | -6.22 dBi          |
| 5,220,000,000 Hz  | -5.11 dBi          |
| 5,250,000,000 Hz  | -4.21 dBi          |
| 5,280,000,000 Hz  | -4.97 dBi          |
| 5,300,000,000 Hz  | -3.21 dBi          |
| 5,350,000,000 Hz  | -4.62 dBi          |
| 5,400,000,000 Hz  | -3.41 dBi          |
| 5,500,000,000 Hz  | -3.78 dBi          |
| 5,600,000,000 Hz  | -2.84 dBi          |
| 5,700,000,000 Hz  | -2.64 dBi          |
| 5,785,000,000 Hz  | -2.41 dBi          |
| 5,800,000,000 Hz  | -2.9 dBi           |
| 5,805,000,000 Hz  | -2.58 dBi          |
| 5,850,000,000 Hz  | -2.65 dBi          |
| 5,885,000,000 Hz  | -2.33 dBi          |
| 5,895,000,000 Hz  | -2.56 dBi          |
| 5,925,000,000 Hz  | -5.85 dBi          |
| 6,025,000,000 Hz  | -5.92 dBi          |
| 6,125,000,000 Hz  | -5.26 dBi          |
| 6,225,000,000 Hz  | -6.74 dBi          |
| 6,325,000,000 Hz  | -7.12 dBi          |
| 6,425,000,000 Hz  | -6.54 dBi          |
| 6,525,000,000 Hz  | -7.21 dBi          |
| 6,625,000,000 Hz  | -7.17 dBi          |
| 6,725,000,000 Hz  | -6.48 dBi          |
| 6,825,000,000 Hz  | -6.39 dBi          |
| 6,925,000,000 Hz  | -5.77 dBi          |
| 7,025,000,000 Hz  | -6.03 dBi          |
| 7,125,000,000 Hz  | -6.12 dBi          |

WIFI 2 #1\_2.4GHz (SUB3), WIFI2 #2\_5/6GHz (SUB1)

| Freq. [Hz]       | Peak. [dBi] |
|------------------|-------------|
| 2,400,000,000 Hz | -6.89 dBi   |
| 2,412,000,000 Hz | -4.14 dBi   |
| 2,437,000,000 Hz | -2.73 dBi   |
| 2,442,000,000 Hz | -2.6 dBi    |
| 2,450,000,000 Hz | -1.93 dBi   |
| 2,462,000,000 Hz | -2.31 dBi   |
| 2,472,000,000 Hz | -2.12 dBi   |
| 2,484,000,000 Hz | -1.78 dBi   |
| 2,500,000,000 Hz | -2.29 dBi   |
| 5,150,000,000 Hz | -2.68 dBi   |
| 5,200,000,000 Hz | -2.68 dBi   |
| 5,220,000,000 Hz | -2.4 dBi    |
| 5,250,000,000 Hz | -2.45 dBi   |
| 5,280,000,000 Hz | -2.39 dBi   |
| 5,300,000,000 Hz | -2.21 dBi   |
| 5,350,000,000 Hz | -2.59 dBi   |
| 5,400,000,000 Hz | -2.38 dBi   |
| 5,500,000,000 Hz | -2.41 dBi   |
| 5,600,000,000 Hz | -2.59 dBi   |
| 5,700,000,000 Hz | -2.5 dBi    |
| 5,785,000,000 Hz | -3.26 dBi   |
| 5,800,000,000 Hz | -3.23 dBi   |
| 5,805,000,000 Hz | -3.16 dBi   |
| 5,850,000,000 Hz | -3.64 dBi   |
| 5,885,000,000 Hz | -2.95 dBi   |
| 5,895,000,000 Hz | -3.02 dBi   |
| 5,925,000,000 Hz | -7.53 dBi   |
| 6,025,000,000 Hz | -8.19 dBi   |
| 6,125,000,000 Hz | -8.89 dBi   |
| 6,225,000,000 Hz | -8.7 dBi    |
| 6,325,000,000 Hz | -9.29 dBi   |
| 6,425,000,000 Hz | -8.07 dBi   |
| 6,525,000,000 Hz | -8.52 dBi   |
| 6,625,000,000 Hz | -9.69 dBi   |
| 6,725,000,000 Hz | -9.73 dBi   |
| 6,825,000,000 Hz | -9.66 dBi   |
| 6,925,000,000 Hz | -8.26 dBi   |
| 7,025,000,000 Hz | -8.73 dBi   |
| 7,125,000,000 Hz | -8.77 dBi   |

## Radiation Pattern Test

Antennas tested for Gain and Efficiency must be assembled into the enclosure and tested in the fully assembled and operating **SM-F956B** handset. The antenna is tested in free space in the anechoic chamber in the H, E1 and, E2 planes. The radiation patterns are measured at the center of transmit and receive bands.

A picture showing the geometry for this device is included in the test setup photos.

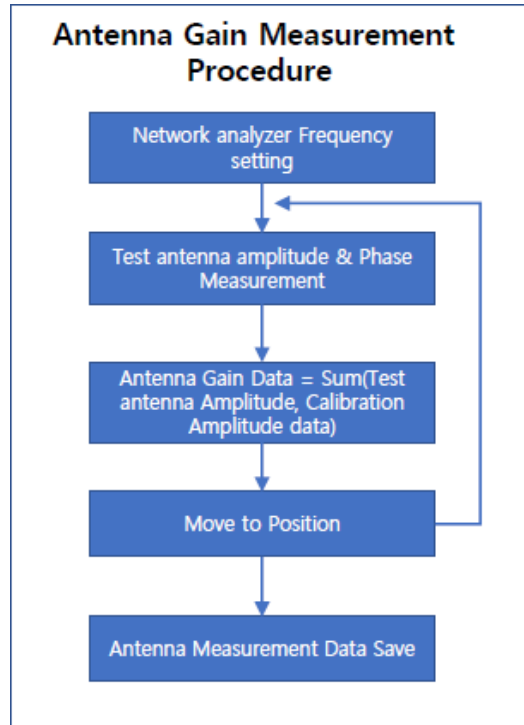
## Chamber Information



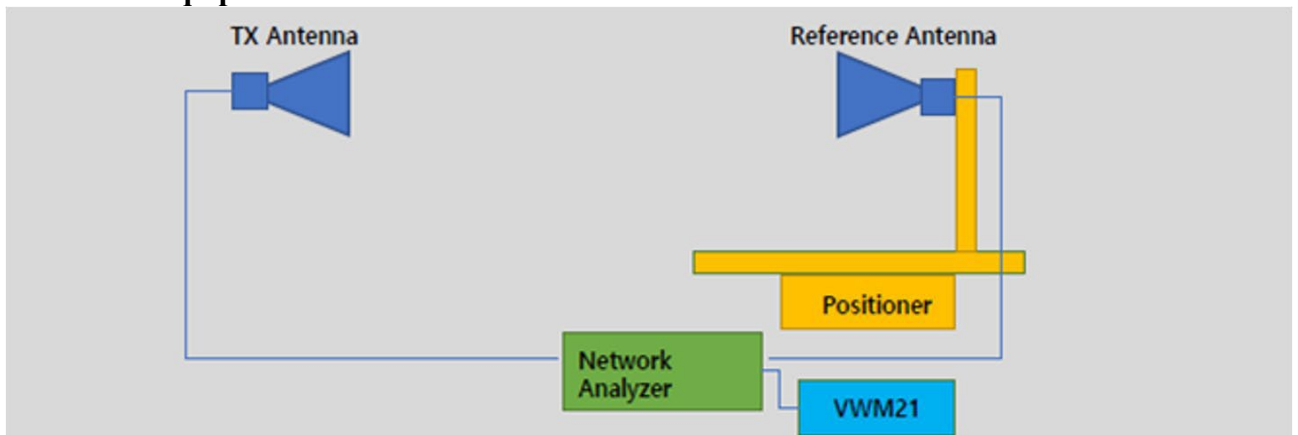
Figure 2: Geometry of Anechoic Chamber for Radiation patterns.

- ✓ Location : Samsung R&D Center R5 bld.
- ✓ Size : 4m x 2.5 x 2.5m (L x W x H)
- ✓ Frequency : 600 MHz -18GHz
- ✓ TX Antenna : 2GHz –18GHz Dual Polarization
- ✓ Quiet zone : 22cm @ 6GHz (Far-Field Length 2m)
- ✓ 2-axis DUT positioner -360°continuous rotation

## Antenna Gain Measurement Procedure



## Table of calibrated equipment



| Part                 | Model Name    | Specification     | Cal date  | Serial number |
|----------------------|---------------|-------------------|---|---------------|
| Tx Antenna           | QRH-006M-006G | 600MHz to 6GHz    | Calibrated date :2023.8.8 / Cal. Due : 2024.12.28   | -             |
|                      | QRH-002G-018G | 2GHz to 18GHz     | Calibrated date :2023.8.8 / Cal. Due : 2024.12.28   | -             |
| Reference Antenna    | BBHA9120LFA   | 680MHz to 6500MHz | Calibration Frequency(680MHzto 6GHz)<br>Calibrated date:2023.8.8 / Cal. Due : 2024.12.28  | 9120LF-365    |
|                      | BBHA9120C     | 2GHz to 18GHz     | Calibration Frequency(2GHz to 8.5GHz)<br>Calibrated date:2023.8.8 / Cal. Due : 2024.12.28 | BBHA9120C#714 |
| Network Analyzer     | Agilent 5071B | 300KHz to 8.5GHz  | Calibrated date :2023.8.8 / Cal. Due : 2024.12.28   | C000026236    |
| Measurement Software | VWM21         |                   | MTG Visual Wave-Mobile(Ver.2.1)   | -             |

**Test dates**

**2024.02.16**

**Test Lab**

**SAMSUNG R&D Center**

**SAMSUNG ELECTRONICS CO., LTD. 129 SAMSUNG-RO, YEONGTONG-GU, SUWON-SI,  
GYEONGGI-DO, 16677, KOREA**

**Names of test personnel**

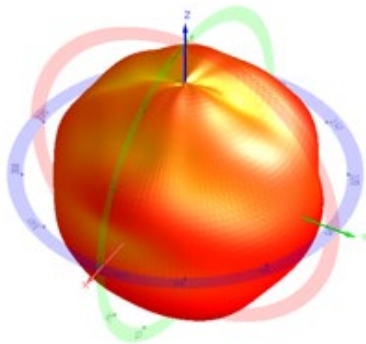
**Jeonghoon Kim**

**Names of commercial test software being used**

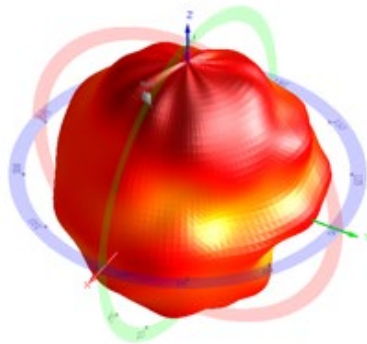
**MTG Visual Wave-Mobile (Ver.2.1)**

**Radiation plots for max gain plane (3D)**

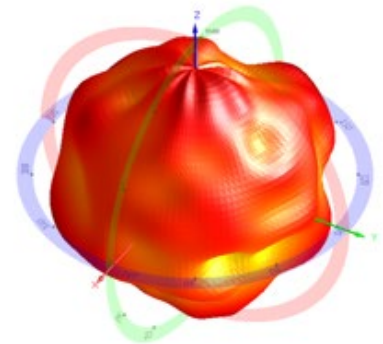
**WiFi 1**



**2.4G**

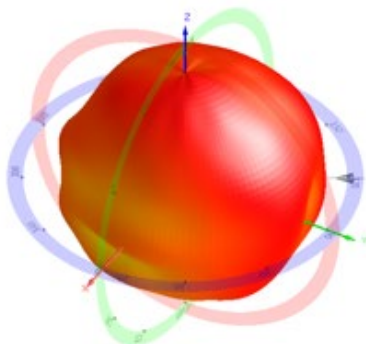


**5G**

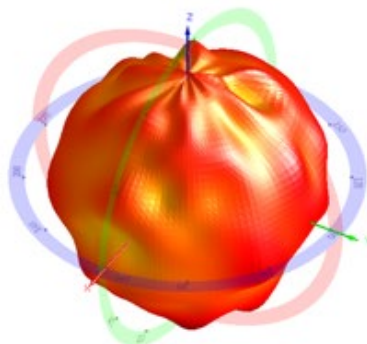


**6G**

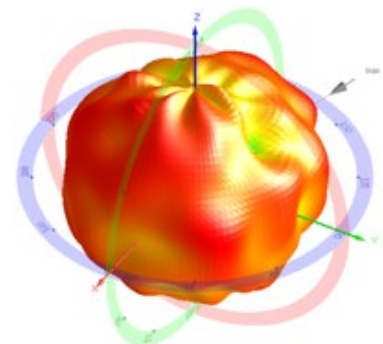
**WiFi 2**



**2.4G**



**5G**



**6G**