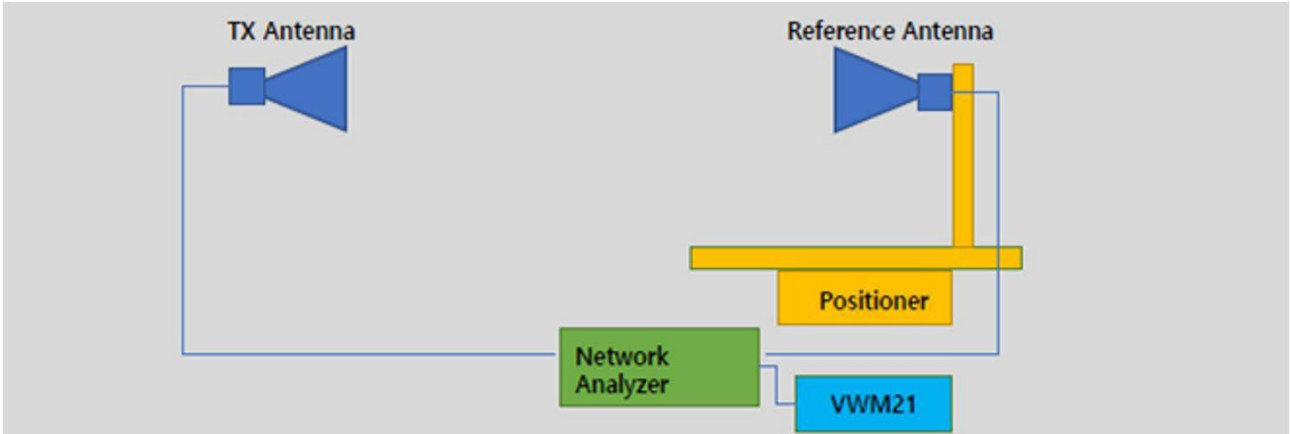


- FCC ID: A3LSMX516B
- Model: SM-X516B

1. Table of calibrated equipment



| Part                 | Model Name    | Specification     |                                                                                           |
|----------------------|---------------|-------------------|-------------------------------------------------------------------------------------------|
| Tx Antenna           | QRH-006M-006G | 600MHz to 6GHz    | Calibrated date :2022.8.8 / Cal. Due : 2023.12.28                                         |
|                      | QRH-002G-018G | 2GHz to 18GHz     | Calibrated date :2022.8.8 / Cal. Due : 2023.12.28                                         |
| Reference Antenna    | BBHA9120LFA   | 680MHz to 6500MHz | Calibration Frequency(680MHzto 6GHz)<br>Calibrated date:2022.8.8 / Cal. Due : 2023.12.28  |
|                      | BBHA9120C     | 2GHz to 18GHz     | Calibration Frequency(2GHz to 8.5GHz)<br>Calibrated date:2022.8.8 / Cal. Due : 2023.12.28 |
| Network Analyzer     | Agilent 5071B | 300KHz to 8.5GHz  | Calibrated date :2022.8.8 / Cal. Due : 2023.12.28                                         |
| Measurement Software | VWM21         |                   | MTG Visual Wave-Mobile(Ver.2.1)                                                           |

Test dates

2023.06.20

Names of test personnel

JIYEON YUN

Names of commercial test software being used

MTG Visual Wave-Mobile (Ver.2.1)

## SM-X516B Antenna specification Test setup photo

### 2.1. Return Loss & VSWR Test

The VSWR measurement of antennas assembled into a fully operating SM-X516B handset is measured on the Network Analyzer. The handset is set up with a 50 Ohm coaxial cable connected to the 50 Ohm point. Calibration is done at the end of the 50 Ohm coaxial cable connection. The other end of the 50 Ohm coaxial cable is connected to a network analyzer. The handset is positioned on a non-conductive table for free space measurements.

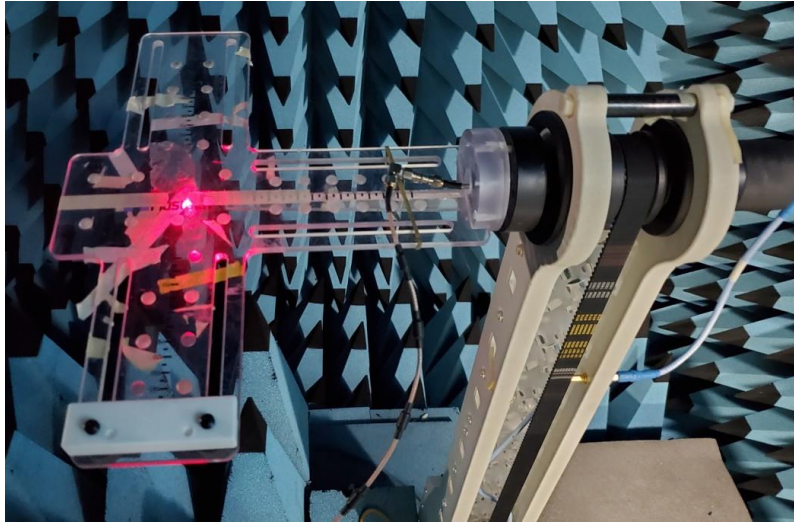


Figure 2: Geometry of Anechoic Chamber for Radiation patterns.

- ✓ 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

## 2.2. Return Loss & VSWR Test

Samsung Antenna Lab has a system that can measure VSWR using Anechoic Chamber and ZNB8 network analyzer. In order to measure the VSWR of each antenna, the antenna lab connects the coaxial cable to the point in contact with the antenna on the main board. The VSWR is measured through the coaxial cable connected in the set. At this time, the SM-X516B is assembled in the same state as the user environment.



*Confidential*

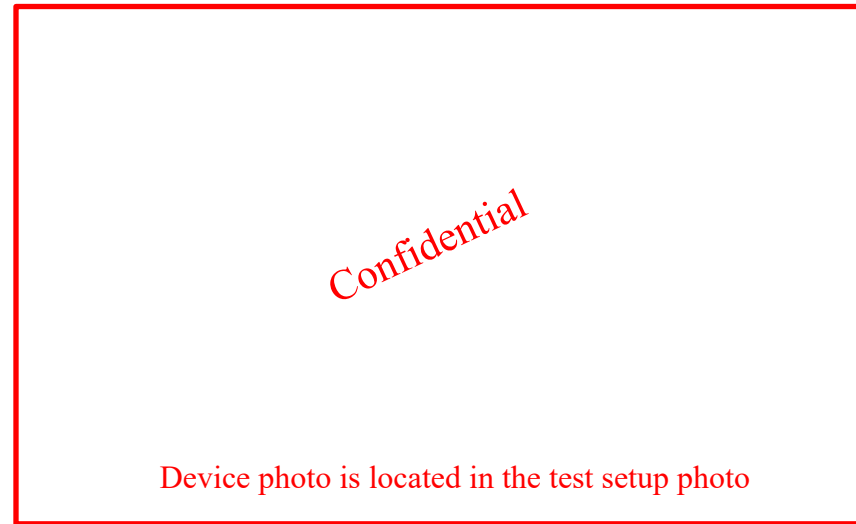
Device photo is located in the test setup photo

※ Coaxial cables are connected to each antenna.

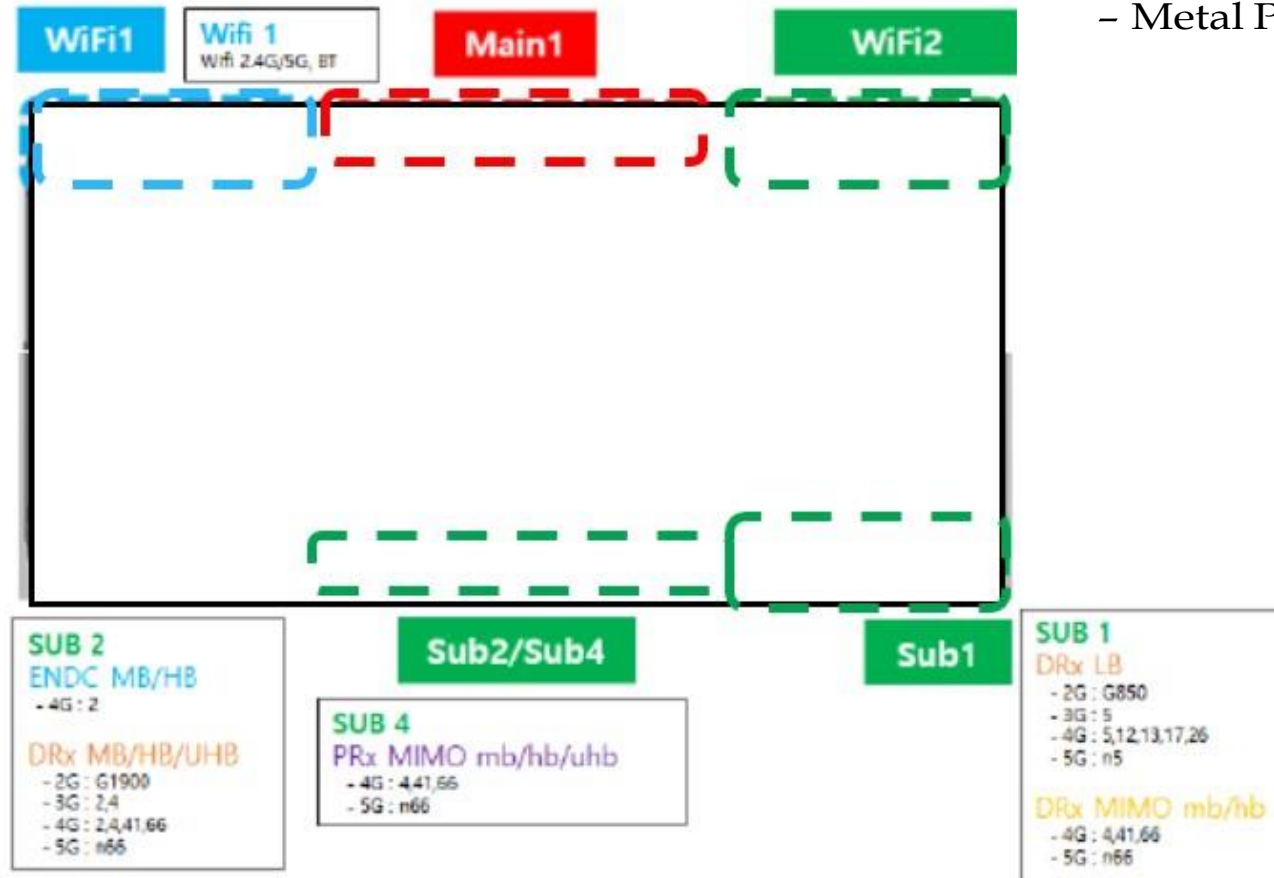
※ The coaxial cable is connected to the RTS60 chamber to measure the VSWR.

### 3. Radiation Pattern Test

Antennas tested for Gain and Efficiency must be assembled into the enclosure and tested in the fully assembled and operating SM-X516B 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.



## 5. Antenna location

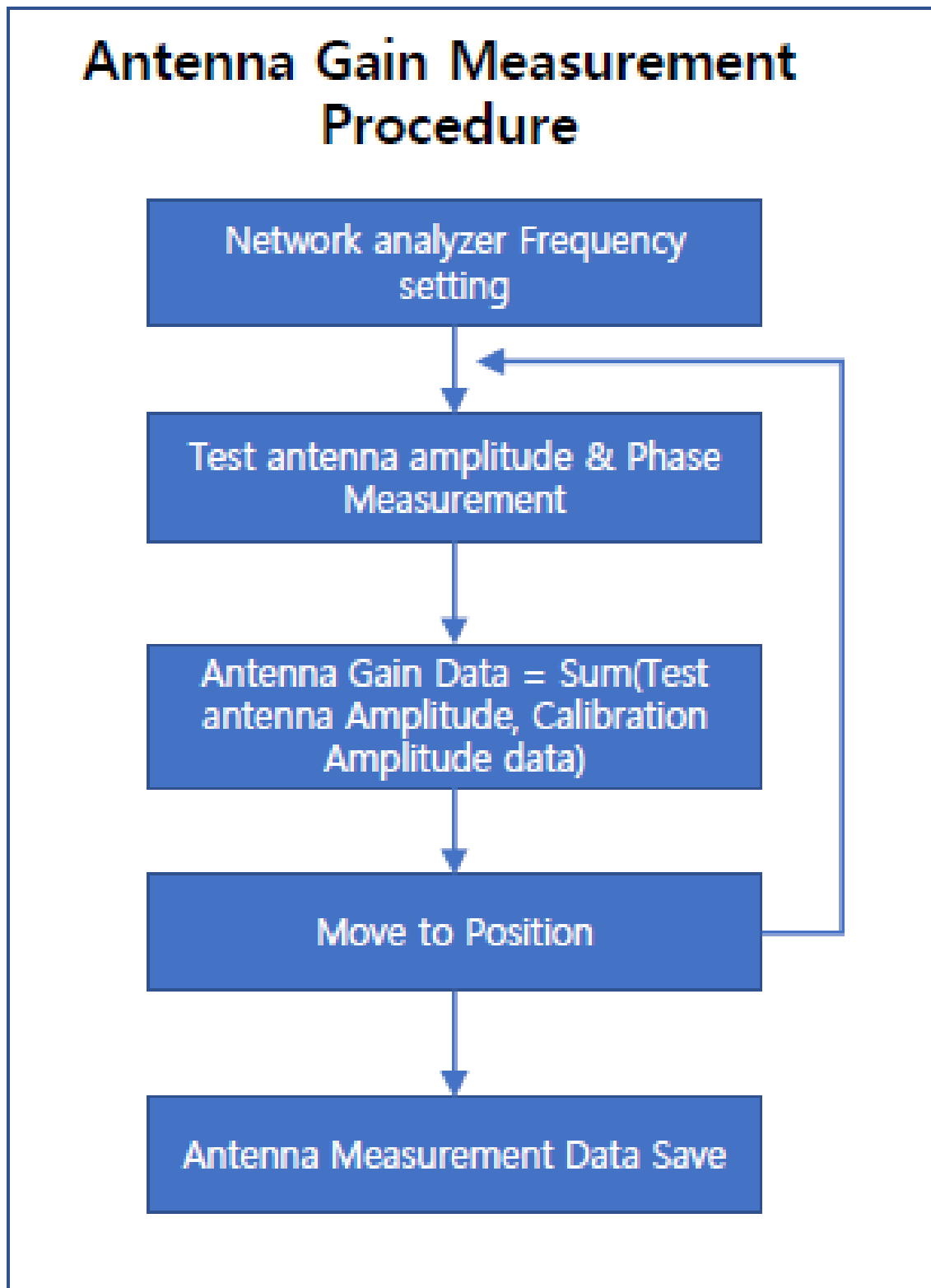


- Antenna Manufacture
  - Main1 Ant : SAMSUNG
  - Metal PIFA

- WIFI1(BT/WIFI) Antenna: SAMSUNG
  - Metal PIFA

- WIFI2(WIFI/GPS) Antenna: SAMSUNG
  - Metal PIFA

## 6. Antenna Gain Measurement Procedure



# 7.Radiation Patterns

| Ant | Band                             | Freq. | EFF  | AVG  | Peak |
|-----|----------------------------------|-------|------|------|------|
|     |                                  | (MHz) |      |      |      |
| M1  | LTE B12, B17                     | 699   | 24.0 | -6.2 | -4.6 |
|     |                                  | 707   | 23.4 | -6.3 | -4.7 |
|     |                                  | 716   | 28.8 | -5.4 | -3.2 |
|     |                                  | 729   | 27.5 | -5.6 | -3.1 |
|     |                                  | 737   | 26.3 | -5.8 | -3.4 |
|     |                                  | 746   | 25.7 | -5.9 | -4.0 |
|     | LTE B13                          | 746   | 33.1 | -4.8 | -2.8 |
|     |                                  | 751   | 34.7 | -4.6 | -2.9 |
|     |                                  | 756   | 35.5 | -4.5 | -2.7 |
|     |                                  | 777   | 37.2 | -4.3 | -2.4 |
|     |                                  | 782   | 38.9 | -4.1 | -2.1 |
|     |                                  | 787   | 38.0 | -4.2 | -2.0 |
|     | G850<br>WB5<br>LTE B5, B26<br>N5 | 814   | 39.8 | -4.0 | -2.2 |
|     |                                  | 831   | 37.2 | -4.3 | -1.8 |
|     |                                  | 849   | 37.2 | -4.3 | -2.2 |
|     |                                  | 859   | 39.8 | -4.0 | -1.9 |
|     |                                  | 876   | 35.5 | -4.5 | -2.7 |
|     |                                  | 894   | 31.6 | -5.0 | -3.5 |
|     | WB4<br>LTE B4, B66<br>N66        | 1710  | 46.8 | -3.3 | -1.7 |
|     |                                  | 1745  | 46.8 | -3.3 | -1.5 |
|     |                                  | 1780  | 46.8 | -3.3 | -1.4 |
|     |                                  | 2110  | 30.2 | -5.2 | -3.2 |
|     |                                  | 2155  | 24.5 | -6.1 | -4.6 |
|     |                                  | 2200  | 20.9 | -6.8 | -4.6 |
|     | G1900<br>WB2<br>LTE B2           | 1850  | 47.9 | -3.2 | -1.5 |
|     |                                  | 1880  | 44.7 | -3.5 | -1.1 |
|     |                                  | 1915  | 44.7 | -3.5 | -1.1 |
|     |                                  | 1930  | 43.7 | -3.6 | -1.8 |
|     |                                  | 1960  | 41.7 | -3.8 | -1.4 |
|     | LTE B41                          | 1995  | 39.8 | -4.0 | -1.5 |
|     |                                  | 2500  | 30.9 | -5.1 | -3.1 |
|     |                                  | 2540  | 27.5 | -5.6 | -4.0 |
|     |                                  | 2580  | 30.2 | -5.2 | -3.1 |
|     |                                  | 2620  | 28.2 | -5.5 | -3.6 |
|     |                                  | 2660  | 28.8 | -5.4 | -3.7 |
|     |                                  | 2700  | 30.2 | -5.2 | -2.9 |

| Ant  | Band   | Freq. | EFF  | AVG  | Peak |
|------|--------|-------|------|------|------|
|      |        | (MHz) |      |      |      |
| Sub2 | LTE B2 | 1852  | 20.9 | -6.8 | -5.2 |
|      |        | 1880  | 21.9 | -6.6 | -4.2 |
|      |        | 1907  | 22.4 | -6.5 | -4.2 |
|      |        |       |      |      |      |

| Ant   | Band | Freq. | AVG  | Peak |
|-------|------|-------|------|------|
|       |      | (MHz) |      |      |
| Wifi1 | 2.4G | 2400  | -6.3 | -5.2 |
|       |      | 2451  | -6.4 | -4.9 |
|       |      | 2473  | -6.6 | -4.8 |
|       |      | 2480  | -6.5 | -5.0 |
|       |      |       |      |      |
|       | 5G   | 5150  | -6.8 | -5.5 |
|       |      | 5350  | -7.8 | -6.0 |
|       |      | 5500  | -8.8 | -5.9 |
|       |      | 5700  | -8.2 | -6.0 |
|       |      | 5795  | -8.7 | -6.3 |
|       |      | 5815  | -7.9 | -6.6 |
|       |      | 5825  | -7.9 | -6.2 |
|       |      | 5850  | -6.9 | -6.4 |
|       |      | 5885  | -7.3 | -6.5 |
|       |      |       |      |      |
| Wifi2 | 2.4G | 2400  | -6.5 | -5.2 |
|       |      | 2451  | -6.3 | -5.5 |
|       |      | 2473  | -6.6 | -5.2 |
|       |      | 2480  | -6.6 | -5.2 |
|       | 5G   | 5150  | -8.1 | -6.5 |
|       |      | 5350  | -8.7 | -6.1 |
|       |      | 5500  | -8.9 | -6.4 |
|       |      | 5700  | -8.8 | -6.2 |
|       |      | 5795  | -8.9 | -6.3 |
|       |      | 5815  | -8.5 | -6.0 |
|       |      | 5825  | -8.7 | -6.1 |
|       |      | 5850  | -8.8 | -6.2 |
|       |      | 5885  | -8.5 | -6.7 |
|       |      |       |      |      |

# 8. Contact person

■ Name: Dongsuk Lee

■ Signature: 이동석