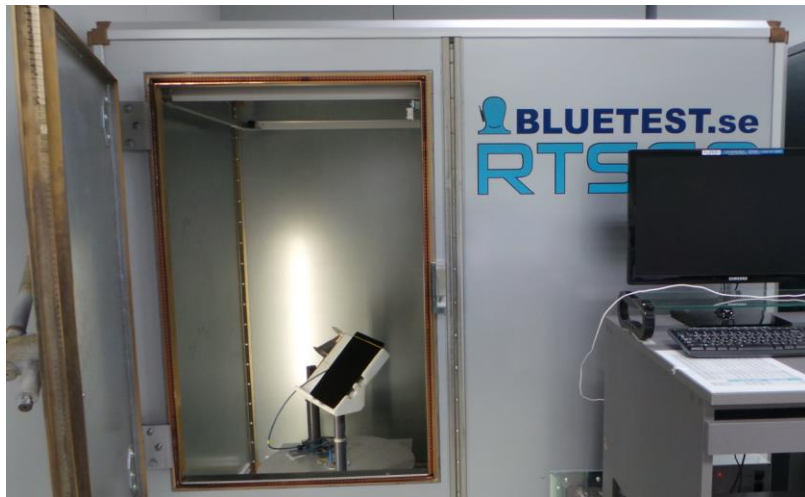


## 1. Measurement information

- Measurement : Samsung Electronics
- Equipment : RTS60 Chamber, ZNB 8 Network Analyzer

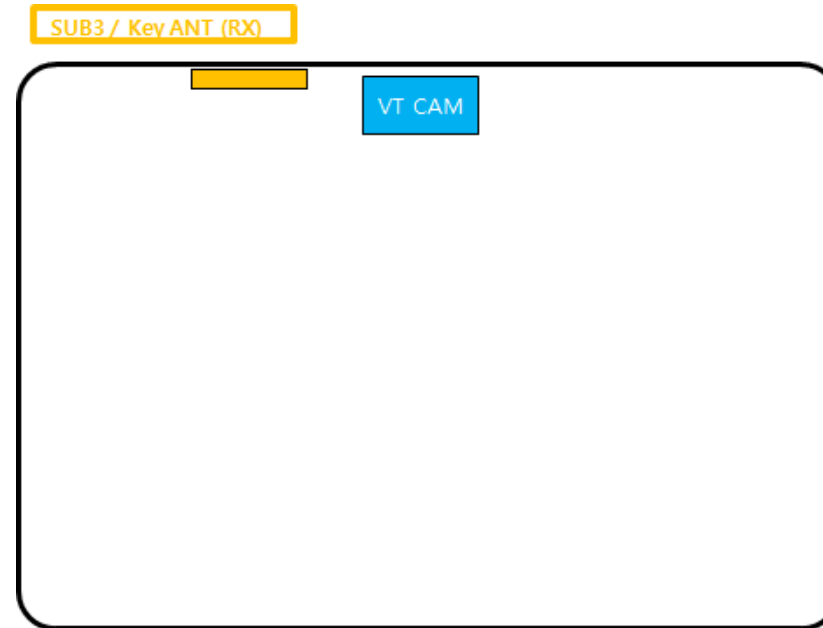
### 2.1. Return Loss & VSWR Test

The VSWR measurement of antennas assembled into a fully operating SM-T638U 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.



## 2.2. Return Loss & VSWR Test

Samsung Antenna Lab has a system that can measure VSWR using RTS60 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-T638U is assembled in the same state as the user environment.

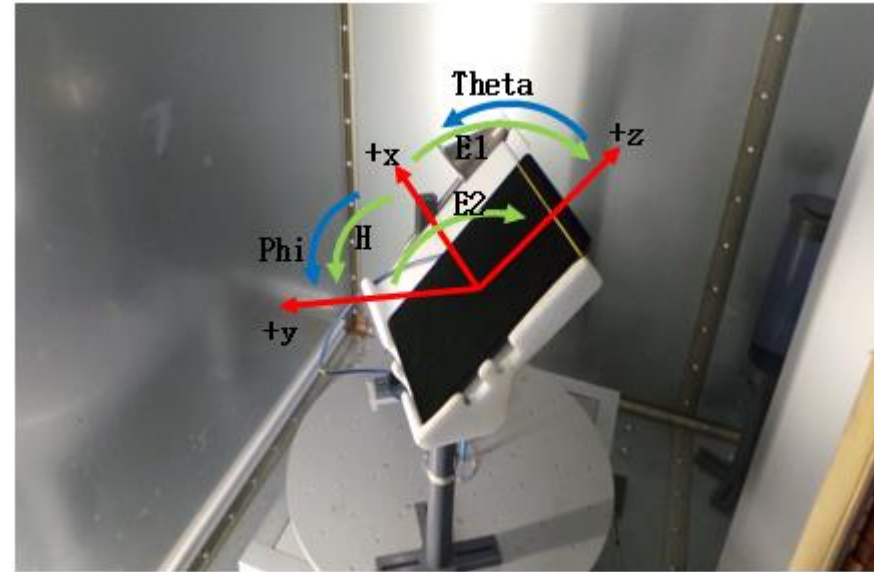


※ Coaxial cables are connected to each antenna.

※ 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-T638U. 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.



### 4. Test Method (Manufacturing)

All measurements are done with SM-T638U fully assembled. Measure in consideration of the customer's usage environment. Use a fully shielded chamber environment to prevent any noise-induced errors. Typically, the electrical properties of the antenna are measured using a jig that can hold the set.

## 4. Antenna Gain

### 4.1. SM-T638U Sub3 Antenna

- Antenna Manufacturer: HOSIDEN
- Antenna Type: Key Antenna

Frequency(Mhz)	Efficiency(%)	Max Gain(dBi)
3300 ~ 4200	5.36	-10.3