1. Measurement information

- Measurement : Samsung Electronics Ant Lab.
- Equipment : RTS60 Chamber, ZNB 8 Network Analyzer.
- Equipment Cal Date : Jun.27.2022
- Test Date : Mar.16.2023
- Tester : Jeong-Wan Park

2.1. Return Loss & VSWR Test

The VSWR measurement of antennas assembled into a fully operating SM-X616B, SM-X610 device 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.

Photo #1

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-X616B, SM-X610 is assembled in the same state as the user environment.

Photo #2

3. Radiation Pattern Test

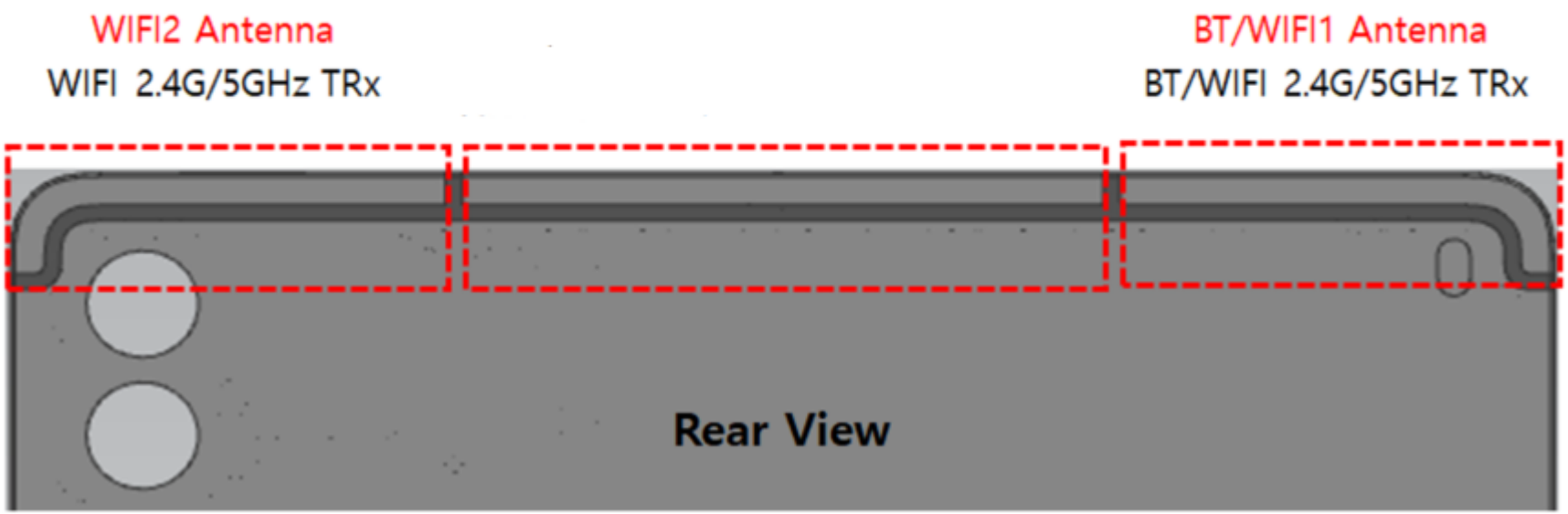
Antennas tested for Gain and Efficiency must be assembled into the enclosure and tested in the fully assembled and operating SM-X616B, SM-X610 device. The antenna is tested in free space in the anechoic chamber in the H, E1 and, E2 planes. The radiation patterns are measured at the center of transmit and receive bands.

Photo #3

4. Test Method (Manufacturing)

All measurements are done with SM-X616B, SM-X610 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.

5. Antenna location



6. Radiation Patterns

Ant	Band	Fre 악 (MHz)	EFF	AVG	Peak
BT/WiFi 1	BT/Wif i	2400	29.51	-530	-3.50
		2451	30.90	-5.1 ○	-3.53
		2473	30.90	-5.10	-2.84
		2480	33.11	-480	-3.23
		5150	21.88	-6.60	-4.80
		5350	1820	-7.40	-5.78
		5500	14.13	-850	-6.25
		5700	1479	-8.30	-6.38
		5795	18.20	-7.40	-5.56
		5815	15.49	-8.10	-6.34
		5825	1862	-7.30	-5.00

Ant	Band	Freq. (MHz)	EFF	AVG	Peak
Wif i2	Wifi	2400	33.02	-470	-3.21
		2451	36.10	-4.40	-2.78
		2473	35.40	-450	-2.92
		2480	30.81	-501	-3.33
		515 ○	38.90	-4.10	-2.17
		5350	38.02	-420	-2.58
		55∞	3802	-420	-2.38
		5700	31.62	-5.00	-2.99
		5795	35.48	-450	-2.52
		5815	30.90	-5.10	-3.51
		5825	30.90	-5 10	-2.71