시 험 성 적 서
TEST REPORT

성적서 번호 Report No.		ICRT-TR-E181662-0A
신청자 Client	기관명 Name	Sentech Korea Corp
	주 소 Address	21-6, Jimokro75-gil, Paju-Si, Gyeonggi-Do, 10880, Republic of Korea
시험대상품목 Sample description		Breathanalyzer
모델명 Type designation		AL8800BT
정 격 Ratings		DC 3 V
시험기간 Date of test		Nov. 26, 2018 ~ Nov. 28, 2018
시험방법/항목 Test Method/Item		FCC Part 15 Subpart C §15.247
시험결과 Test Results		Refer to 3. Test Summary
확 인 Affirmation	작성자 Tested by 성 명 Name Hong-Kyu, Lee (Signature)	기술책임자 Technical Manager 성 명 Name Jun-Hui, Lee (Signature)

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This is certified that the above mentioned products have been tested for the sample provided by customer and forbid the use except for original purpose.

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2018. 12. 12

주식회사 아이씨알 대표이사

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Revision History

Issued Report No.	Issued Date	Revisions	Effect Section
ICRT-TR-E181662-0A	12-Dec-2018	Initial Issue	All

1. Applicant & Manufacturer & Test Laboratory Information

1.1 Applicant information

Applicant	Sentech Korea Corp
Address	21-6, Jimokro75-gil, Paju-Si, Gyeonggi-Do, 10880, Republic of Korea
Contact Person	JunNo Lee
Telephone No.	+82-10-5028-0706
Fax No.	+82-31-8071-4411
E-mail	jnlee@sentechkorea.com

1.2 Manufacturer Information

Manufacturer	Sentech Korea Corp
Address	21-6, Jimokro75-gil, Paju-Si, Gyeonggi-Do, 10880, Republic of Korea

1.3 Test Laboratory Information

Conducted tests were performed at	
Laboratory	ICR Co., Ltd.
Address	112, Hwanggeum 3-ro 7beon-gil, Hagun-ri, Yangchon-eup, Gimpo-si, Gyeonggi-do, Korea
Telephone No.	+82-2-6351-9002
Fax No.	+82-2-6351-9007
RRA No.	KR0165
KOLAS No.	KT652

2. Equipment under Test(EUT) Information

2.1 General Information

Product Name	Breathanalyzer
Brand Name	-
Model Name	AL8800BT
Additional Model Name	Elite3-BT, ACE Pluto, Promiler AC-017, ISOBER10
Hardware Version	-
Software Version	-
Power Supply	DC 3 V

2.2 Additional Information

Equipment Class	DTS-Digital Transmission System
Device Type	Stand-alone
Operating Frequency	2 402 ㎒ ~ 2 480 ㎒
RF Output Power	-2.58 ㏈m
Number of Channel	40
Modulation Type	GFSK
Antenna Type	Integral Antenna (Chip Antenna)
Antenna Gain	0.5 ㏈i
Antenna Operating Mode	Single Antenna Equipment with only one antenna
List of Each Oscillator or Crystal Frequency	32 ㎒

2.3 Mode of operation during the test

- The EUT is continuous transmission mode during the test

2.4 Modifications of EUT

- None

3. Test Summary

3.1 Test standards and results

FCC Part 15 Subpart C			
Clause	Test items	Applied	Results
§15.247 (a) (1)	6 dB Bandwidth	☒	PASS
§15.247 (b) (3)	Maximum Conducted Output Power	☒	PASS
§15.247 (e)	Power Spectral Density	☒	PASS
§15.247 (d)	Conducted Spurious Emission	☒	PASS
§15.247 (d) & §15.209 & §15.205	Radiated Spurious Emission	☒	PASS
§15.207	Power Line Conducted Emission	☐	N/A (See Note)
§15.203	Antenna Requirement	☒	PASS

※ Note: This test is not performed because the EUT is operated by DC battery.

3.2 Purpose of the test

- To determine whether the equipment under test fulfills the requirements of the standards stated in FCC Part 15 Subpart C Section 15.247

3.3 Antenna requirement

According to §15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device.

The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this Section.

The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.

And according to §15.247(b)(4), the conducted output power limit specified in paragraph (b) of this section is based on the use of antennas with directional gains that do not exceed 6 dBi.

Except as shown in paragraph (c) of this section, if transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced below the stated values in paragraphs (b)(1), (b)(2), and (b)(3) of this section, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

3.3.1 Result: Pass

The transmitter has an ***integral Chip antenna.*** The directional gain of the antenna is ***0.5*** dBi.

4. Used equipment on test

	Description	Model Name	Serial Number	Manufacturer	Last Cal. (cycle)
☐	Spectrum Analyzer	FSW85	100864	Rohde & Schwarz	2018. 03. 22 (1Y)
☒	Spectrum Analyzer	FSV40	101455	Rohde & Schwarz	2018 .07. 10 (1Y)
☒	Signal Generator	SMB100A	180607	Rohde & Schwarz	2018. 03. 05 (1Y)
☐	Power Sensor	NRP-Z81	103673	Rohde & Schwarz	2018. 03. 05 (1Y)
☐	Open Switch and Control Platform	OSP150	101000	Rohde & Schwarz	2018. 03. 22 (1Y)
☐	Environmental Test Chamber	MHK-408NKDA	1060908	TERCHY	2018. 03. 14 (1Y)
☒	DC Power Supply	XDL 35-5P	J00385373	Sorensen	2018. 03. 05 (1Y)
☐	DC Power Supply	6603D	672483	Topward	2018. 03. 05 (1Y)
☒	Loop Antenna	HFH2-Z2	100506	Rohde & Schwarz	2017. 06. 19 (2Y)
☒	TRILOG BROADBAND ANTENNA	VULB9162	120	SCHWARZBECK	2018. 11. 23 (2Y)
☒	RF Pre Amplifier	SCU08	100747	Rohde & Schwarz	2018. 04. 17 (1Y)
☒	DOUBLE-RIDGE WAVEGUIDE HORN ANTENNA	HF907	102556	Rohde & Schwarz	2017. 07. 05 (2Y)
☒	RF Pre Amplifier	SCU18	102342	Rohde & Schwarz	2018. 04. 17 (1Y)
☒	Horn Antenna	LB-42-10-C-KF	J202024625	AINFO Inc.	2018. 04. 20 (2Y)
☒	RF Pre Amplifier	AMF-4F-18265-35-8P-1	771846	MITEQ	2018. 03. 06(1Y)
☐	Horn Antenna	LB-28-10-C-KF	J202024627	AINFO Inc.	2018. 04. 20 (2Y)
☐	RF Pre Amplifier	AMF-4D-260400-45-6P	779919	MITEQ	2018. 03. 22 (1Y)
☒	EMI Test Receiver	ESR26	101461	Rohde & Schwarz	2018. 04. 17 (1Y)
☐	EMI Test Receiver	ESR3	102119	Rohde & Schwarz	2018. 04. 17 (1Y)
☐	LISN	ENV216	102193	Rohde & Schwarz	2018. 04. 16 (1Y)

※ All test equipment used is calibration on a regular basis.

5. 6 dB Bandwidth

5.1 Operating environment

Temperature : 24 ℃

Relative humidity : 51 %

5.2 Measurement method

Standard : §15.247 (a) (2)

5.3 Test setup

The antenna output of the EUT was connected to the spectrum analyzer. The resolution bandwidth is set to 100 ㎑, and peak detection was used. The 6 dB bandwidth is defined as the total spectrum over which the power is higher than the peak power minus 6 dB.

Spectrum Analyzer	———	EUT

5.4 Test data

Test date : 26. Nov. 2018

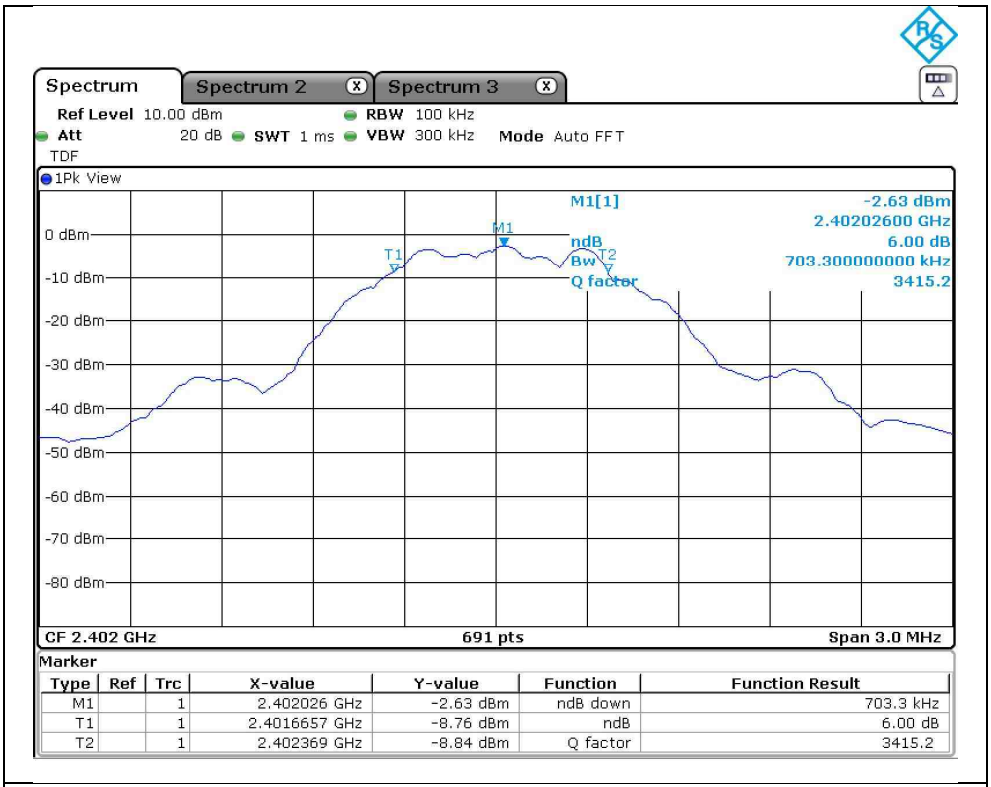
Operating mode : Transmit mode

Test Result : Pass

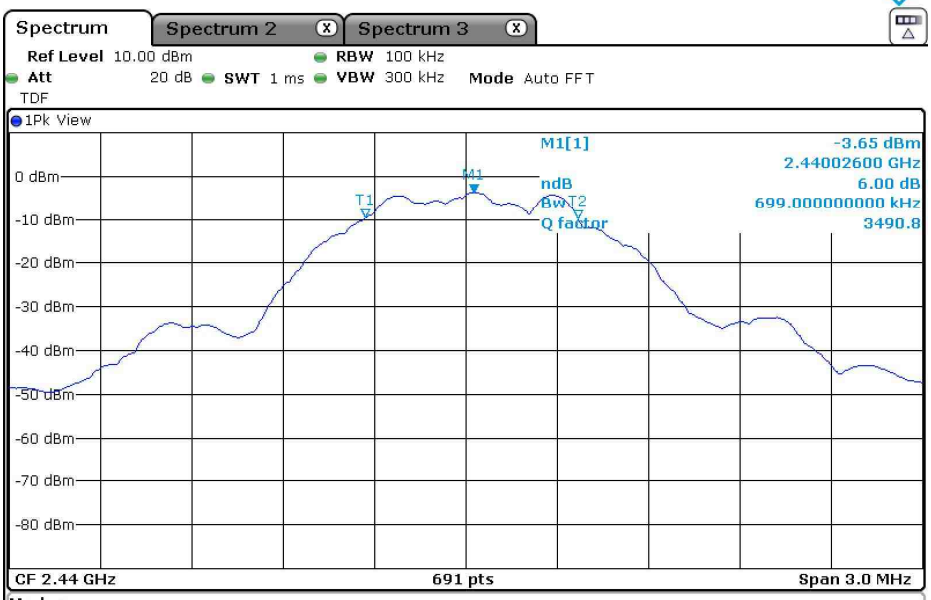
5.4.1 Measured Results

Modulation Type	Channel (Frequency)	Measured Value (㎑)	Limit (㎑)
Bluetooth LE	0 (2 402 ㎒)	703.3	at least 500
	19 (2 440 ㎒)	699.0	
	39 (2 480 ㎒)	694.6	

5.4.2 Measured Graph



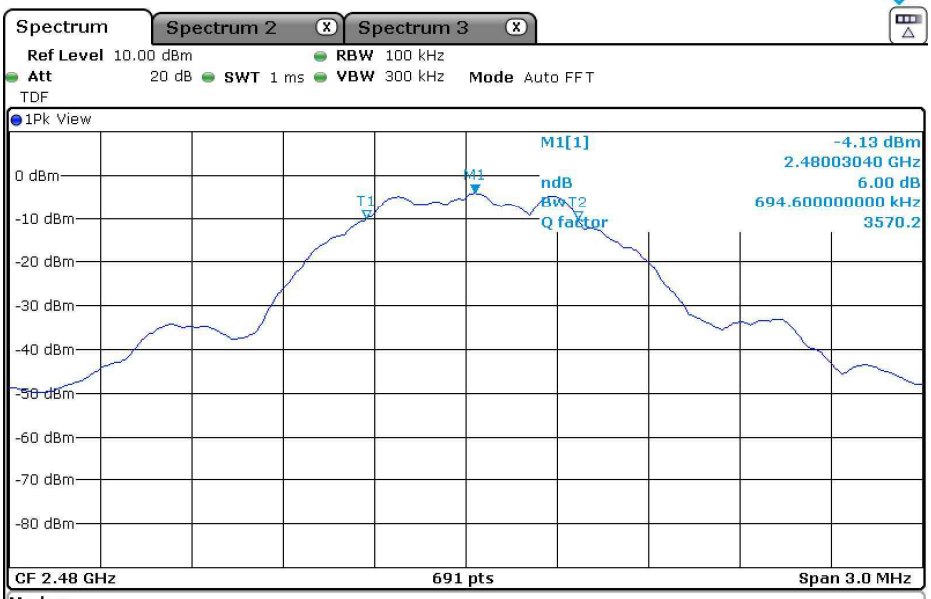
Low CH



Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	2.440026 GHz	-3.65 dBm	ndB down	699.0 kHz
T1		1	2.43967 GHz	-9.69 dBm	ndB	6.00 dB
T2		1	2.440369 GHz	-9.92 dBm	Q factor	3490.8

Mid CH



Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	2.4800304 GHz	-4.13 dBm	ndB down	694.6 kHz
T1		1	2.4796744 GHz	-10.02 dBm	ndB	6.00 dB
T2		1	2.480369 GHz	-10.37 dBm	Q factor	3570.2

High CH

6. Maximum Conducted Output Power

6.1 Operating environment

Temperature : 24 ℃

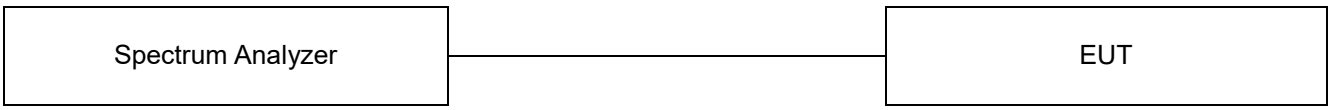
Relative humidity : 51 %

6.2 Measurement method

Standard : §15.247 (b) (3)

6.3 Test setup

The maximum peak output power was measured with the spectrum analyzer connected to the antenna output of the EUT. The spectrum analyzer's internal channel power integration function is used to integrate the power over a bandwidth greater than or equal to the 99 % bandwidth. The EUT was operating in transmit mode at the appropriate center frequency.



6.4 Test data

Test date : 26. Nov. 2018

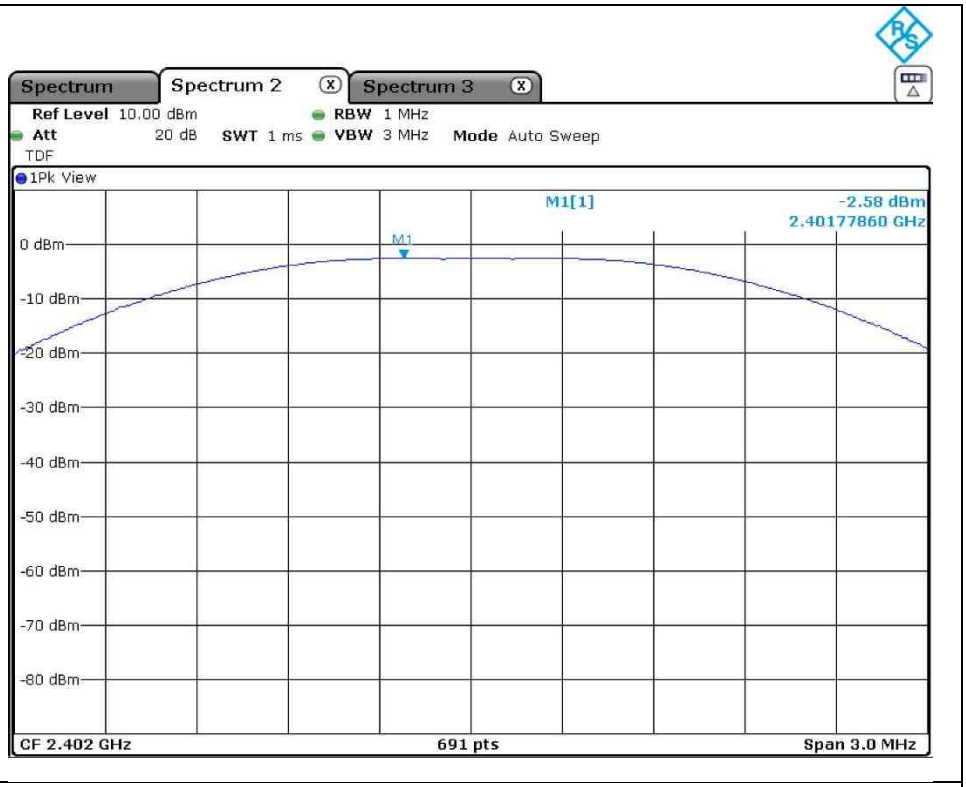
Operating mode : Transmit mode

Test Result : Pass

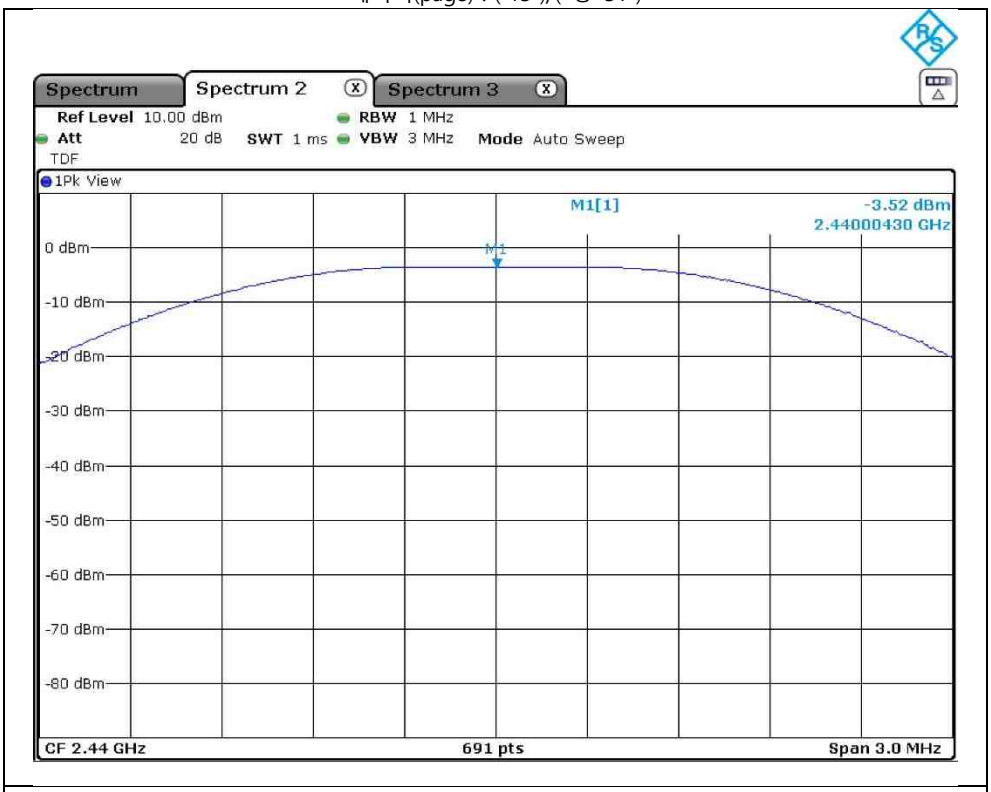
6.4.1 Measured Results

Modulation Type	Channel (Frequency)	Highest signal level (dBm)	Limit (dBm)
Bluetooth LE	0 (2 402 ㎒)	***-2.58***	30 (1 Watt)
	19 (2 440 ㎒)	-3.52	
	39 (2 480 ㎒)	-4.03	

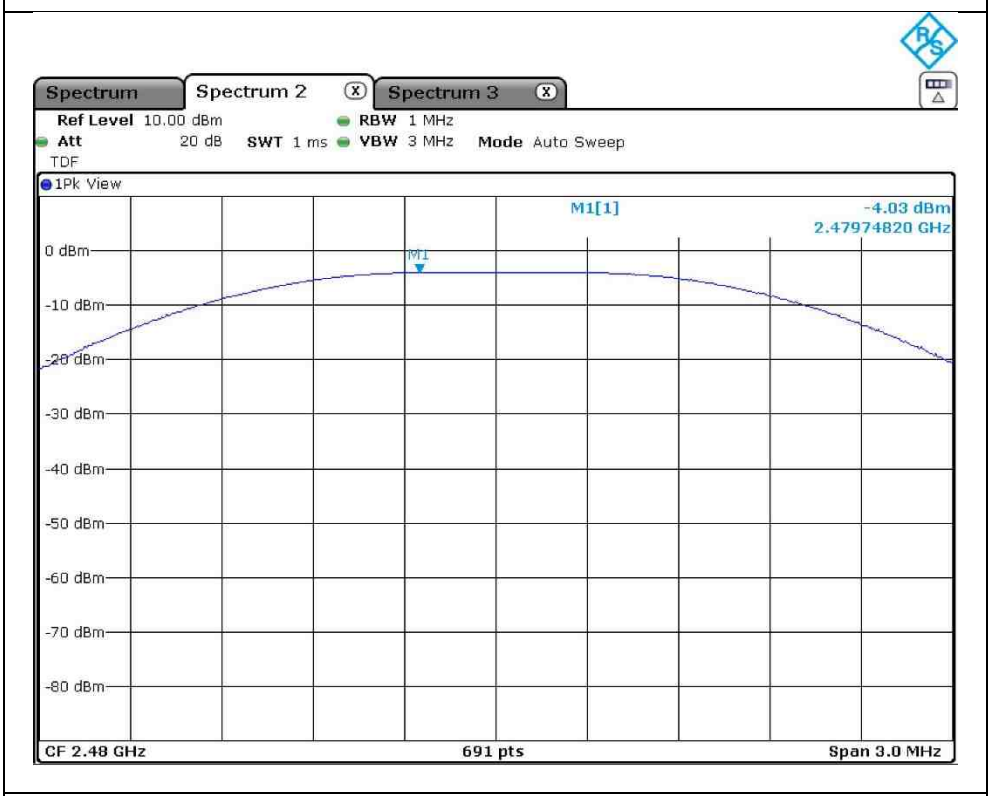
6.4.2 Measured Graph



Low CH



Mid CH



High CH

7. Power Spectral Density

7.1 Operating environment

Temperature : 24 ℃

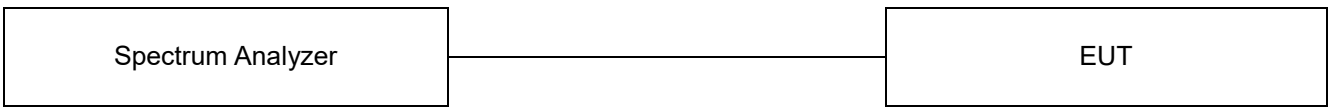
Relative humidity : 51 %

7.2 Measurement method

Standard : §15.247 (e)

7.3 Test setup

The antenna output of the EUT was connected to the spectrum analyzer. The resolution bandwidth is set to 3 ㎑, the video bandwidth is set to 3 times the resolution bandwidth.



7.4 Test data

Test date : 26. Nov. 2018

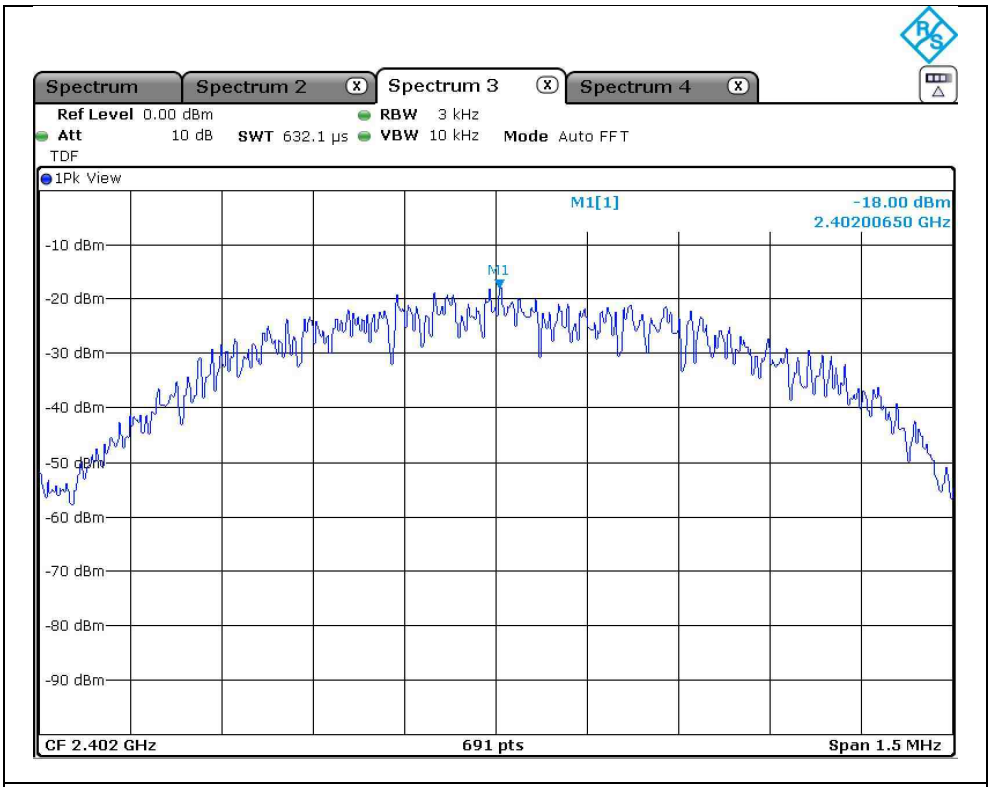
Operating mode : Transmit mode

Test Result : Pass

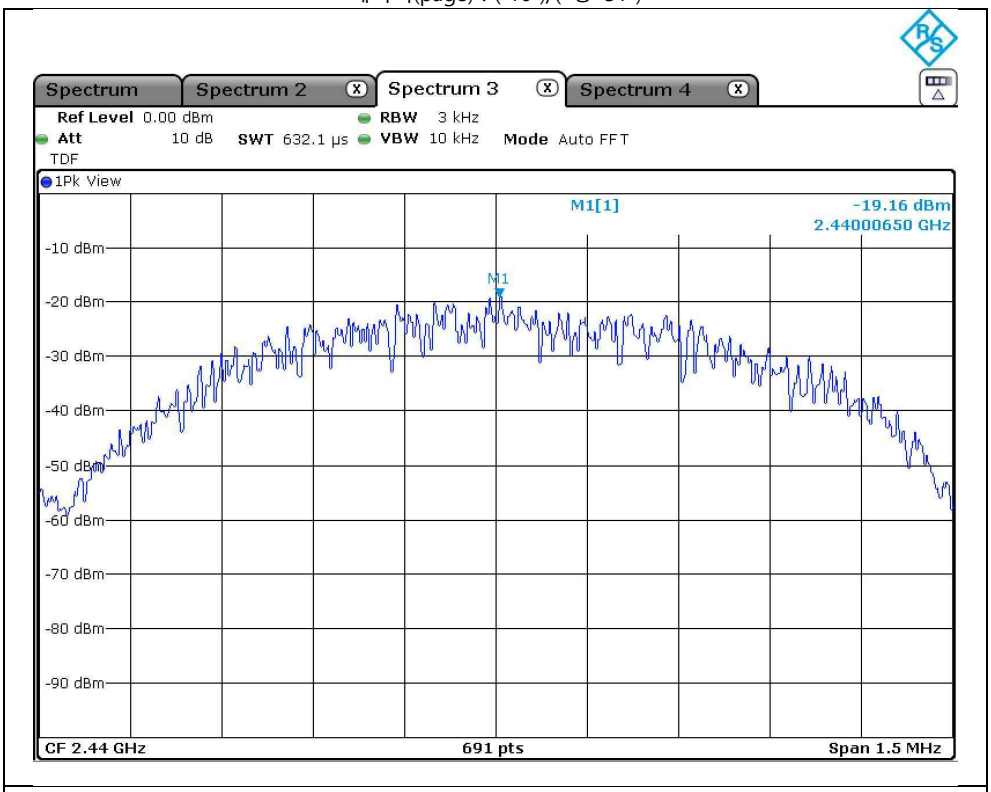
7.4.1 Measured Results

Modulation Type	Channel (Frequency)	Highest signal leve (dBm)	Limit (dBm/3 ㎑)
Bluetooth LE	0 (2 402 ㎒)	-18.00	8
	19 (2 440 ㎒)	-19.16	
	39 (2 480 ㎒)	-19.76	

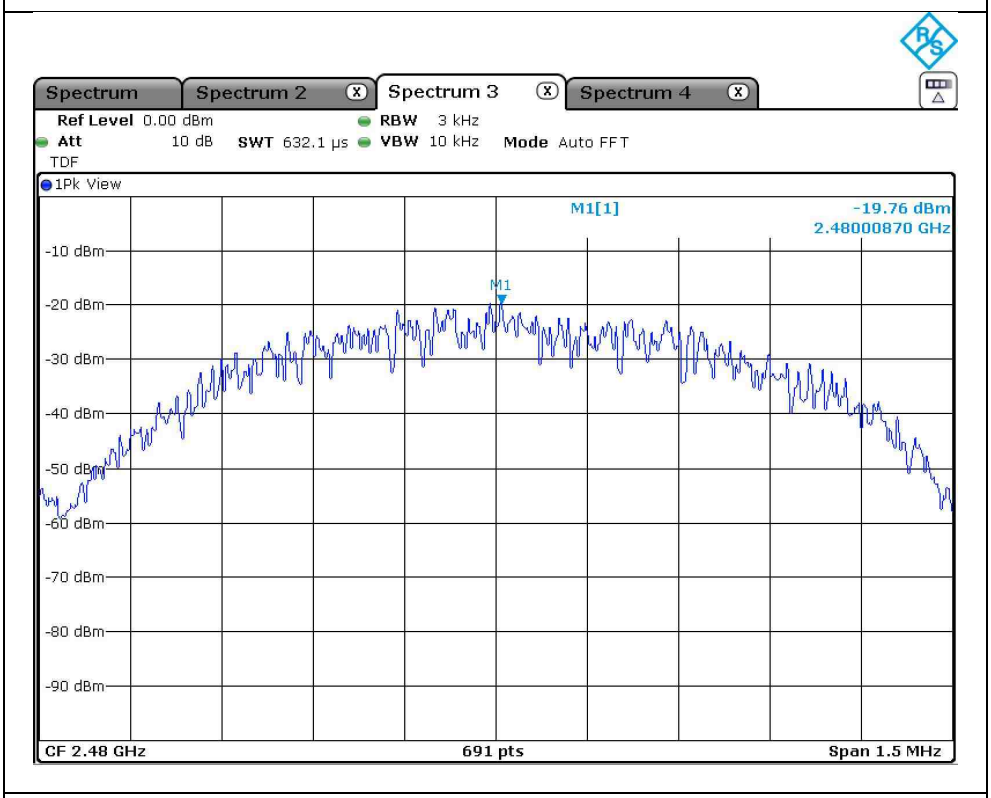
7.4.2 Measured Graph



Low CH



Mid CH



High CH

8. Conducted Spurious Emission

8.1 Operating environment

Temperature : 24 ℃

Relative humidity : 51 %

8.2 Measurement method

Standard : §15.247 (d)

8.3 Test setup

The antenna output of the EUT was connected to the spectrum analyzer. The resolution and video bandwidth is set to 100 ㎑, and peak detection was used.

Spectrum Analyzer	———	EUT

8.4 Test data

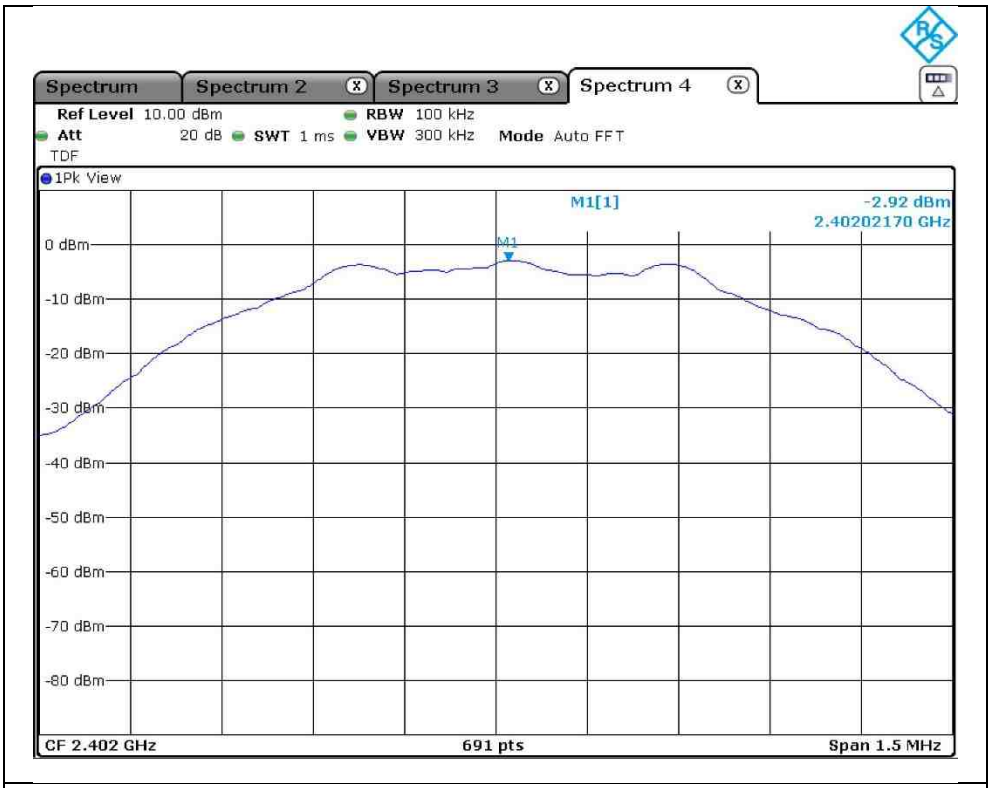
Test date : 26. Nov. 2018

Operating mode : Transmit mode

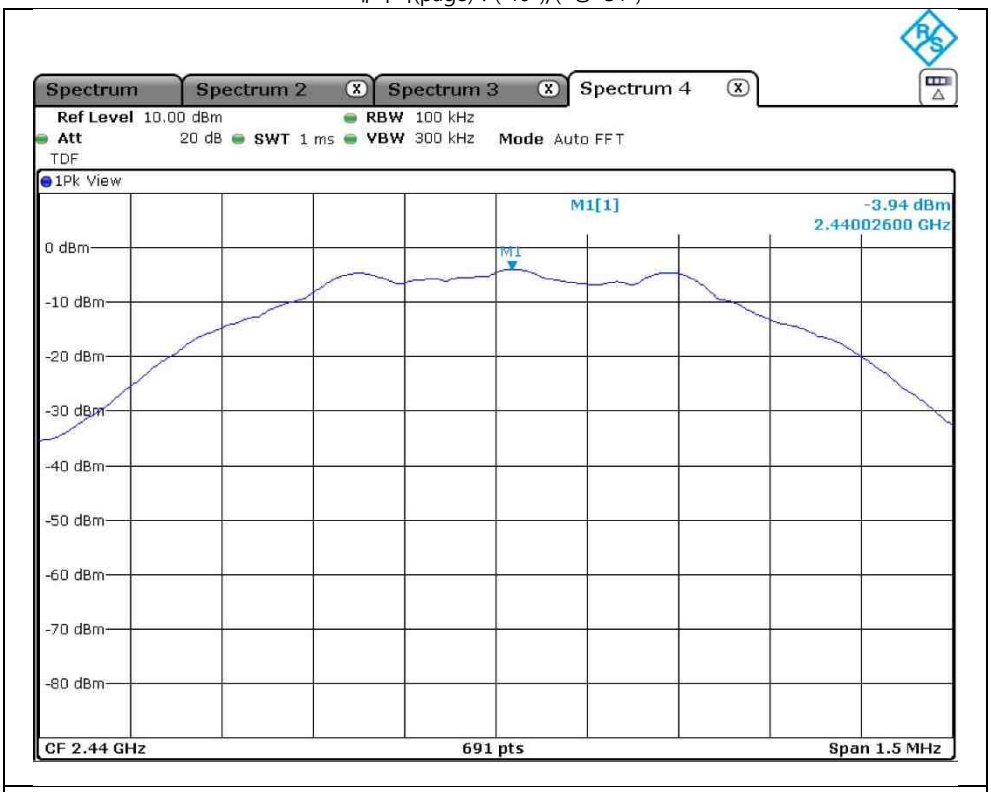
Test Result : Pass

8.4.1 Measured Results

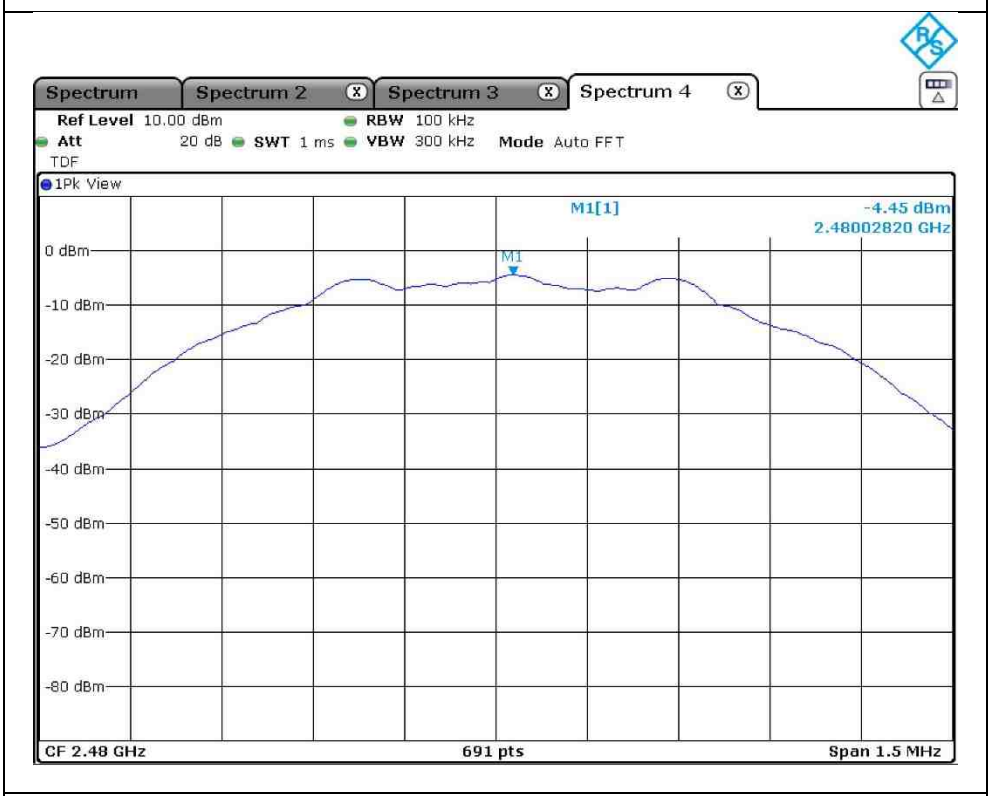
8.4.1.1 Signal level (dB m)



Low CH

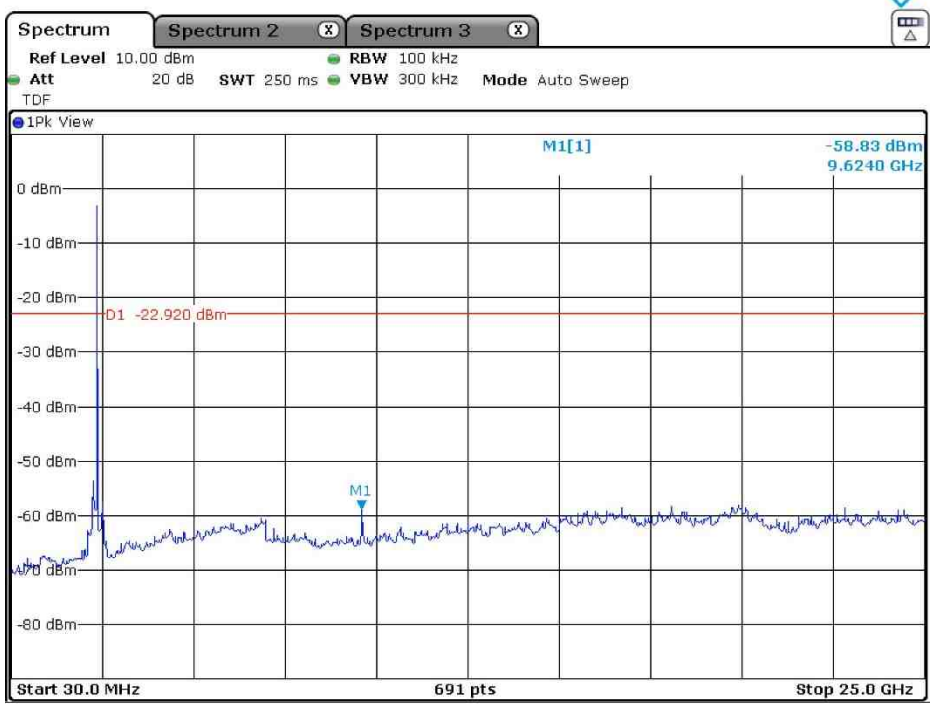


Mid CH

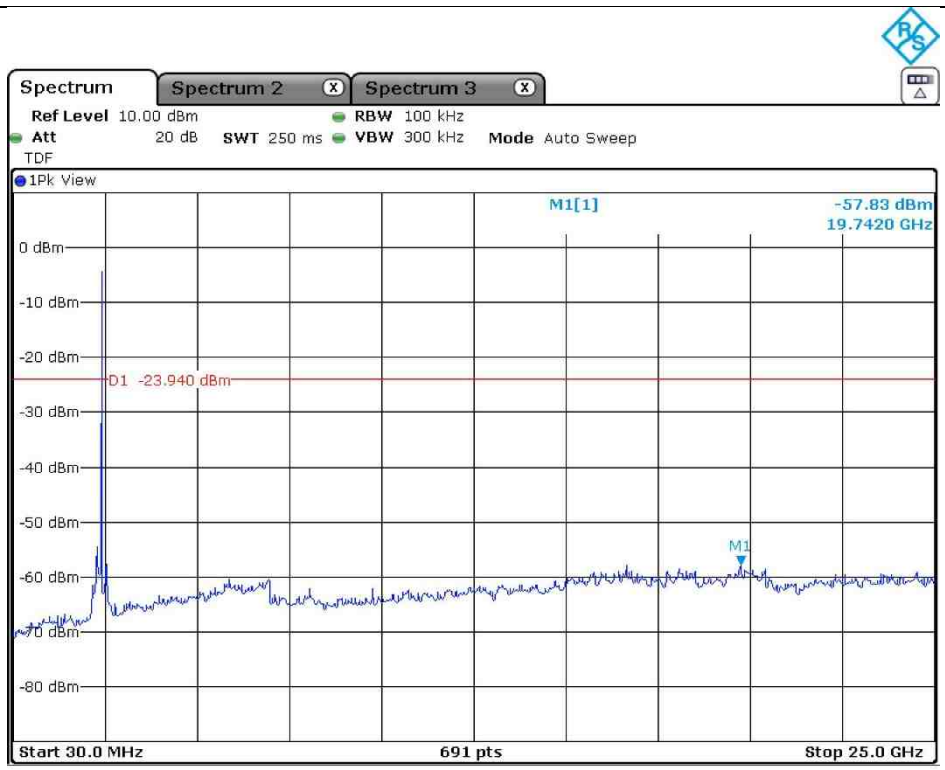


High CH

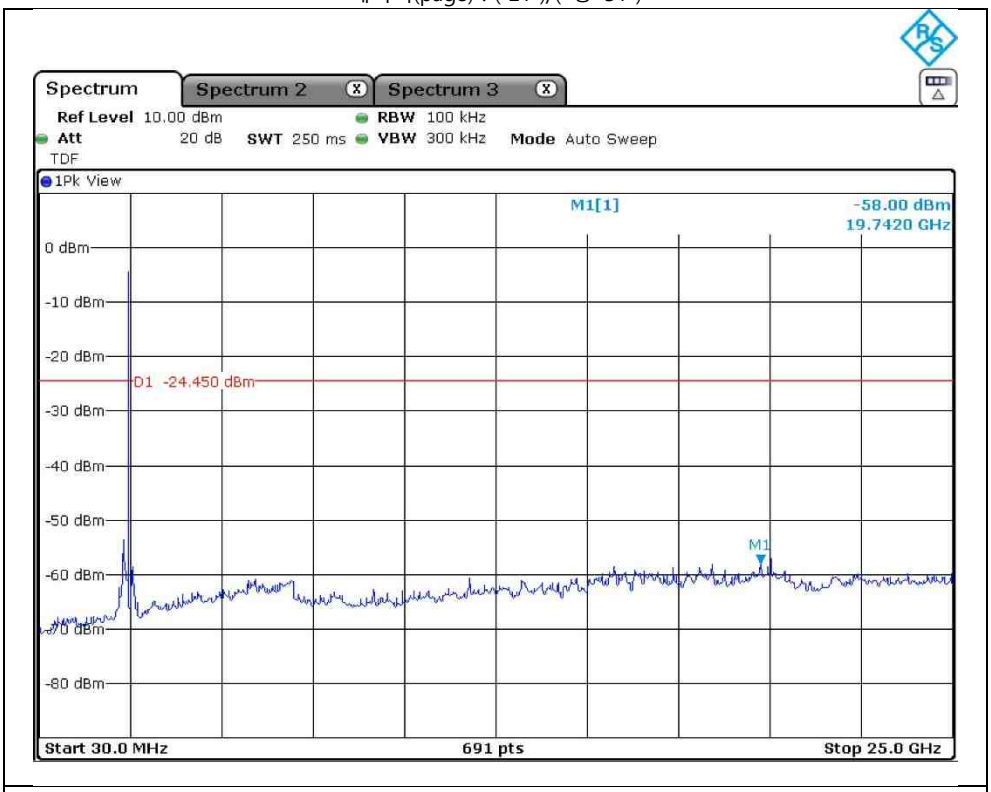
8.4.1.2 Unwanted Emissions In Non-Restricted Frequency Bands



Low CH

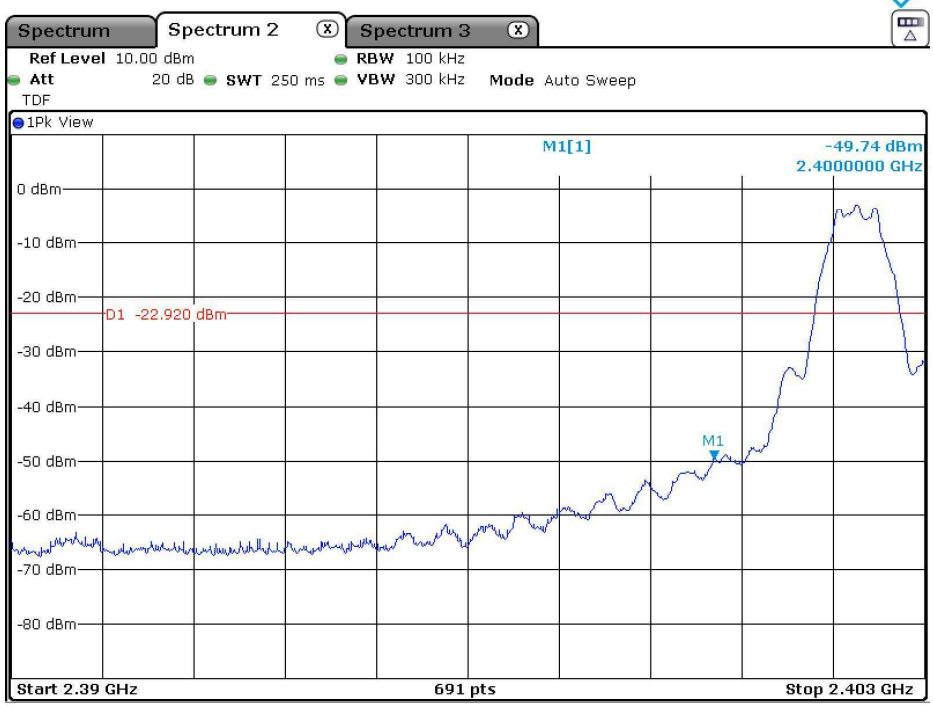


Mid CH

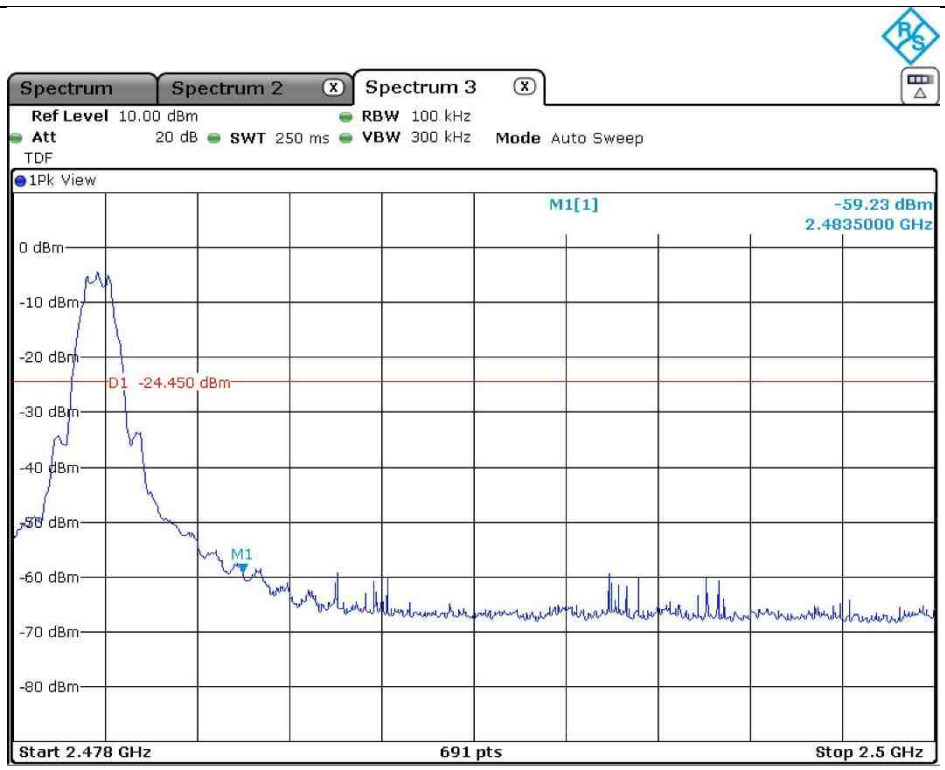

Spectrum
Spectrum 2
Spectrum 3
Ref Level 10.00 dBm
RBW 100 kHz
Att 20 dB
SWT 250 ms
VBW 300 kHz
Mode Auto Sweep
TDF
1Pk View
M1[1]
-58.00 dBm
19.7420 GHz
0 dBm
-10 dBm
-20 dBm
D1 -24.450 dBm
-30 dBm
-40 dBm
-50 dBm
-60 dBm
-70 dBm
-80 dBm
M1
Start 30.0 MHz
691 pts
Stop 25.0 GHz

High CH

8.4.1.3 Band Edge



Low CH



High CH

9. Radiated Spurious Emission

9.1 Operating environment

Temperature : 25 ℃

Relative humidity : 53 %

9.2 Measurement method

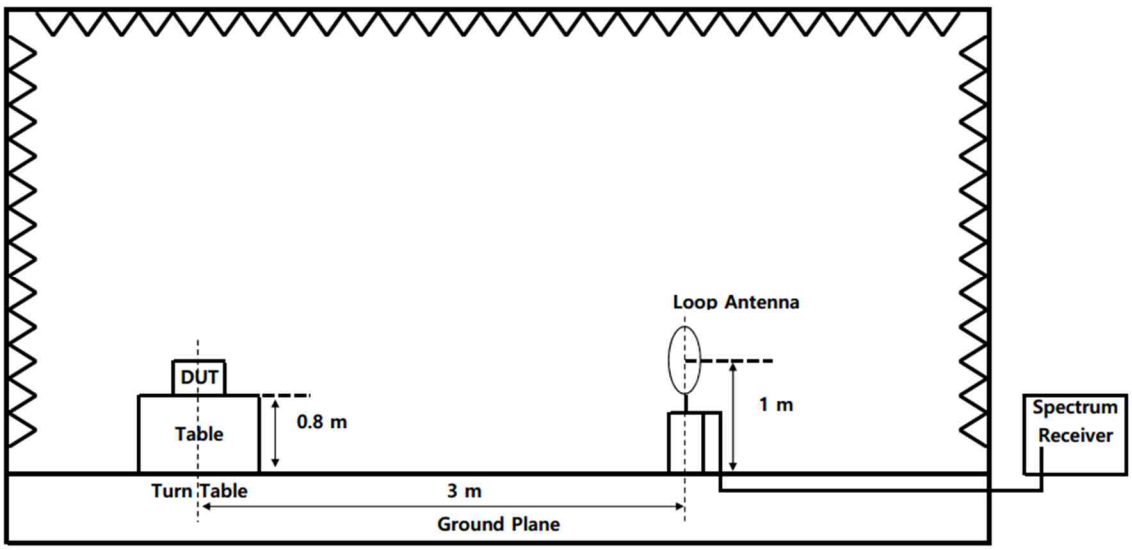
Standard : §15.247 (d), §15.209, §15.205

9.3 Test setup

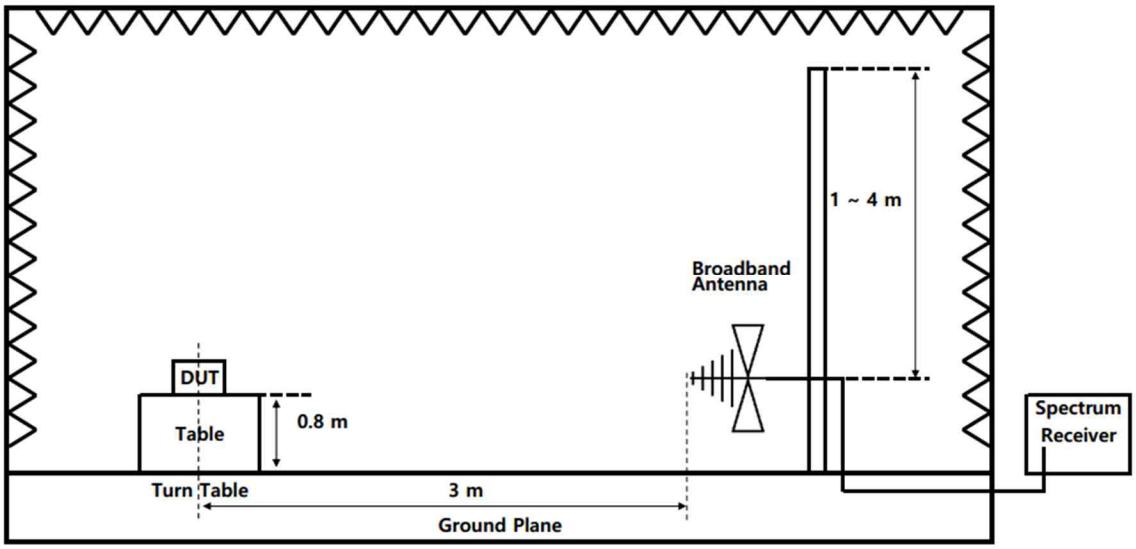
The radiated emissions measurements were performed on the 3 m, open-field test site. The EUT was placed on a non-conductive turntable above the ground plane.

The frequency spectrum from 9 ㎑ to 26.5 ㎓ was scanned and maximum emission levels at each frequency recorded. The system was rotated 360°, and the antenna was varied in the height between 1.0 m and 4.0 m in order to determine the maximum emission levels. This procedure was performed for horizontal and vertical polarization of the receiving antenna.

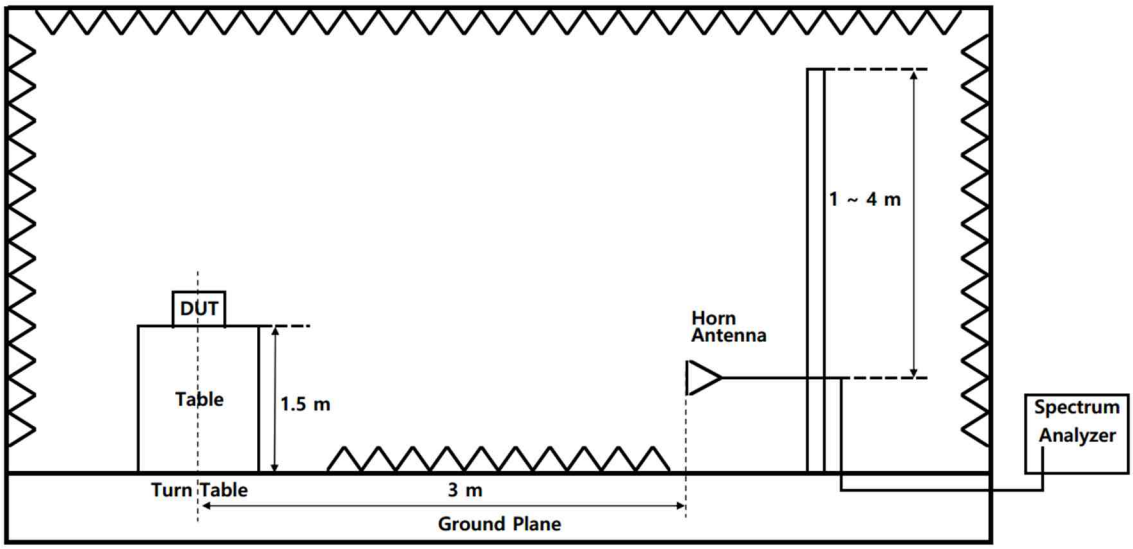
9.3.1 Below 30 ㎒



9.3.2 30 MHz to 1 GHz



9.3.3 Above 1 GHz



9.4 Test data

Test date : 28. Nov. 2018

Operating mode : Transmit mode

Test Result : Pass

9.4.1 Test data for Restricted band

Frequency (MHz)	Reading (dBμV)	Detector	Ant. Pol. (H/V)	Corr. Factor (dB)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)
Low CH							
2 369.90	53.87	Peak	V	-11.50	42.37	73.98	-31.61
	48.83	Average	V		37.33	53.98	-16.65
High CH							
2 483.52	66.71	Peak	V	-10.50	56.21	73.98	-17.77
	44.98	Average	V		34.48	53.98	-19.50

※ Ant. Pol. : Antenna Polarization

※ Corr. Factor. : Antenna Factor + Cable Loss - Amplifier Gain

※ Result = Reading + Corr. Factor

※ Margin = Result - Limit

9.4.2 Test data for Spurious & Harmonic

9.4.2.1 Measurement Results for below 30 MHz

Frequency (MHz)	Reading (dBμV)	Detector	Ant. Pol. (H/V)	Corr. Factor (dB)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)
Low CH							
It was not found any emissions peaks found from the EUT.							
Mid CH							
It was not found any emissions peaks found from the EUT.							
High CH							
It was not found any emissions peaks found from the EUT.							

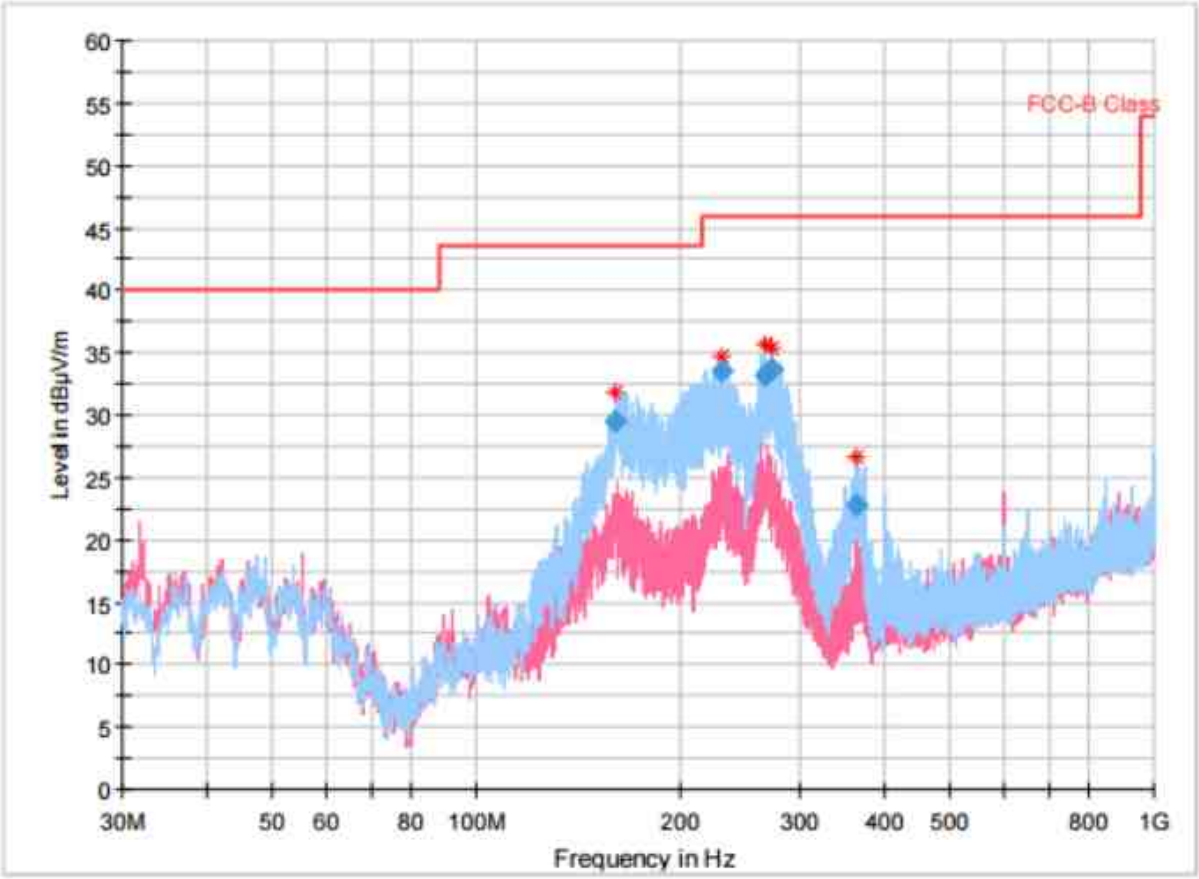
※ Ant. Pol. : Antenna Polarization

※ Corr. Factor. : Antenna Factor + Cable Loss - Amplifier Gain

※ Result = Reading + Corr. Factor

※ Margin = Result - Limit

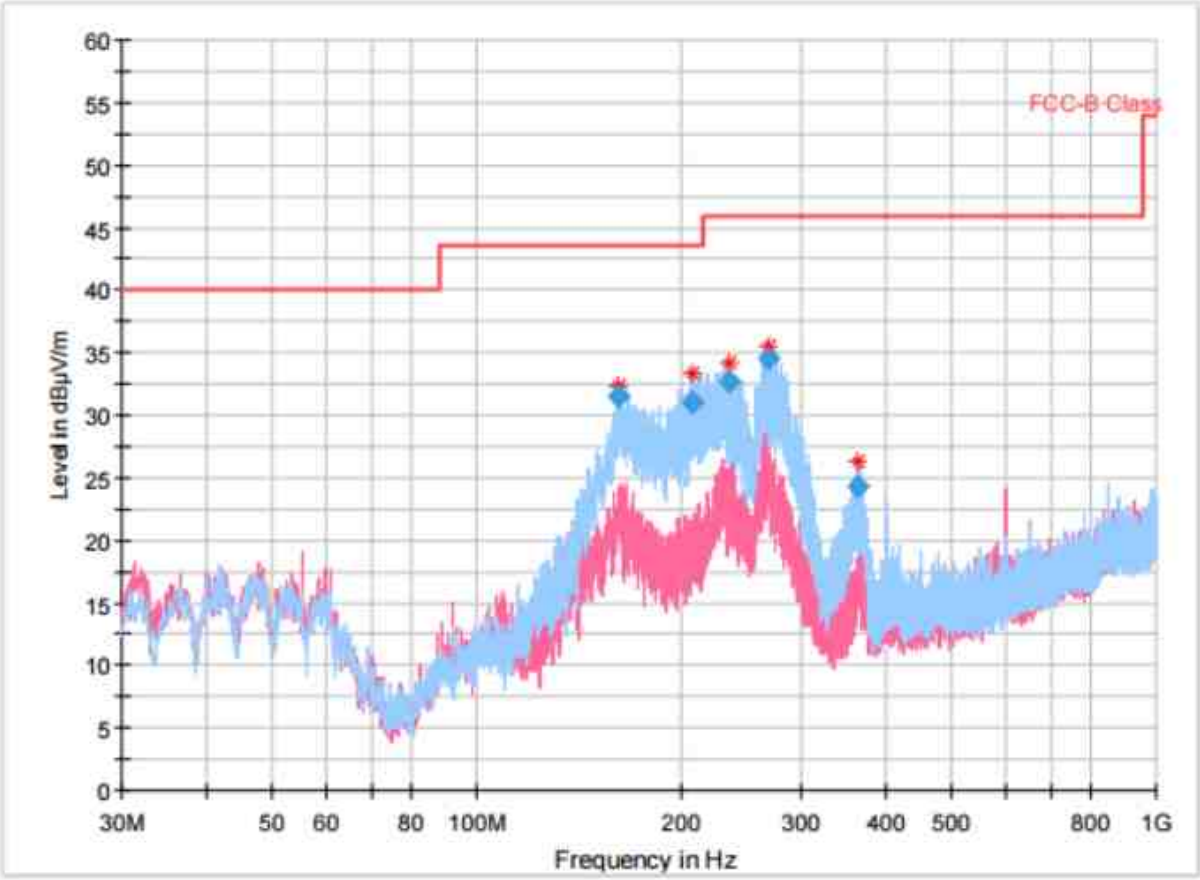
9.4.2.2 Measurement Results for below 1 GHz



Final_Result

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
159.919375	29.42	43.50	14.08	1000.0	120.000	150.2	H	285.0	-23.7
230.305000	33.50	46.00	12.50	1000.0	120.000	99.7	H	272.0	-20.5
266.498125	33.19	46.00	12.81	1000.0	120.000	99.7	H	265.0	-19.3
271.954375	33.73	46.00	12.27	1000.0	120.000	99.7	H	272.0	-19.2
364.104375	22.83	46.00	23.17	1000.0	120.000	99.7	H	55.0	-16.9

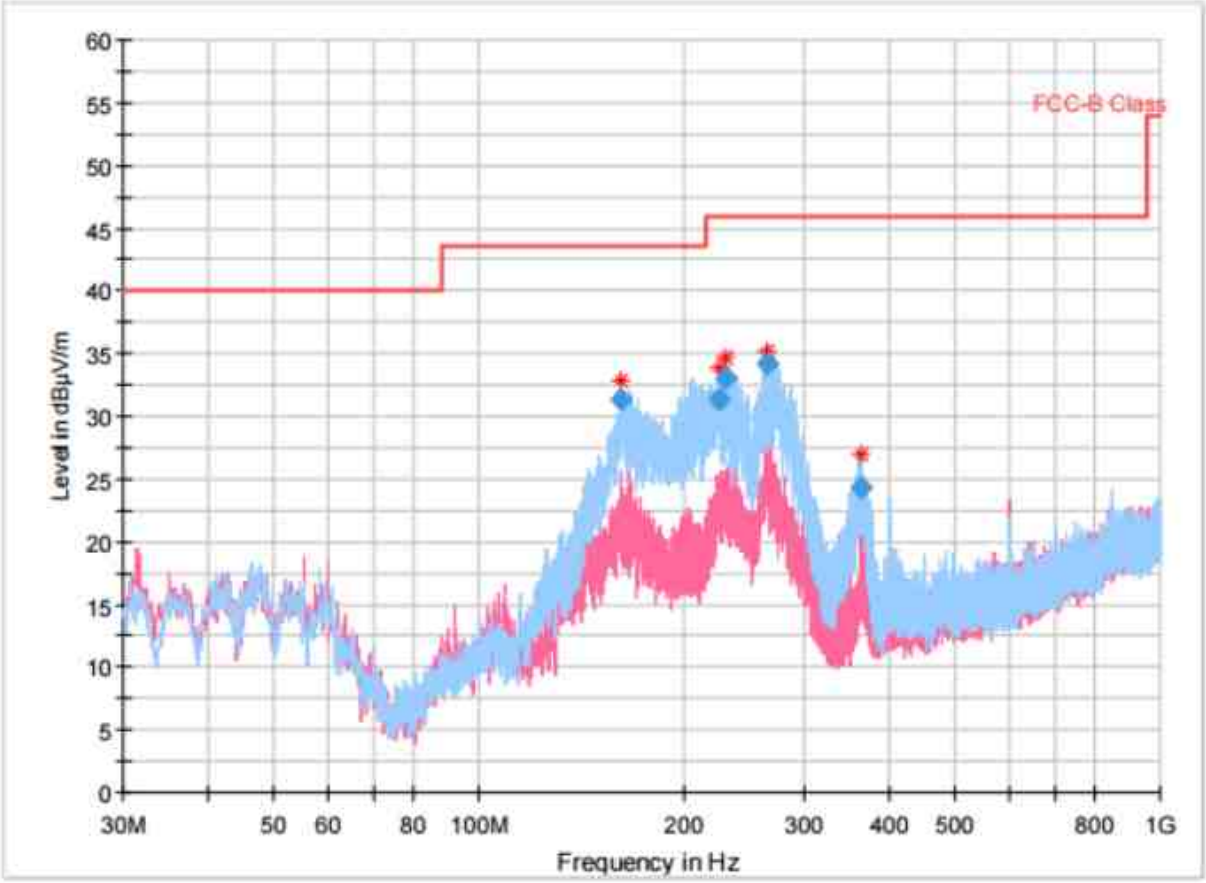
Low CH



Final_Result

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
161.374375	31.51	43.50	11.99	1000.0	120.000	150.2	H	268.0	-23.7
206.843125	31.08	43.50	12.42	1000.0	120.000	150.2	H	260.0	-21.6
235.640000	32.67	46.00	13.33	1000.0	120.000	99.7	H	262.0	-20.2
269.347500	34.52	46.00	11.48	1000.0	120.000	99.7	H	277.0	-19.3
363.134375	24.25	46.00	21.75	1000.0	120.000	99.7	H	88.0	-16.9

Mid CH



Final_Result

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
161.374375	31.38	43.50	12.12	1000.0	120.000	150.2	H	265.0	-23.7
225.273125	31.33	46.00	14.67	1000.0	120.000	99.8	H	280.0	-20.8
230.486875	32.97	46.00	13.03	1000.0	120.000	99.8	H	274.0	-20.5
265.528125	34.12	46.00	11.88	1000.0	120.000	99.8	H	280.0	-19.3
363.013125	24.34	46.00	21.66	1000.0	120.000	99.8	H	72.0	-16.9

High CH

9.4.2.3 Measurement Results for Above 1 GHz

Frequency (MHz)	Reading (dBμV)	Detector	Ant. Pol. (H/V)	Corr. Factor (dB)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)
Low CH							
1 595.00	59.82	Peak	H	-15.00	44.82	73.98	-29.16
	36.52	Average	H		21.52	53.98	-32.46
4 804.00	64.81	Peak	V	-2.70	62.11	73.98	-11.87
	50.49	Average	V		47.79	53.98	-6.19
7 206.00	65.35	Peak	V	1.20	66.55	73.98	-7.43
	48.56	Average	V		49.76	53.98	-4.22
Mid CH							
1 595.00	64.48	Peak	H	-15.00	49.48	73.98	-24.50
	35.90	Average	H		20.90	53.98	-33.08
4 880.00	62.32	Peak	V	-2.70	59.82	73.98	-14.16
	47.66	Average	V		45.16	53.98	-8.82
7 320.00	58.80	Peak	V	1.20	59.80	73.98	-14.18
	44.84	Average	V		45.84	53.98	-8.14
High CH							
1 595.00	65.61	Peak	H	-15.00	50.61	73.98	-23.37
	38.08	Average	H		23.08	53.98	-30.90
4 860.00	58.30	Peak	H	-2.40	55.90	73.98	-18.08
	50.11	Average	H		47.71	53.98	-6.27
7 440.00	53.67	Peak	V	1.50	55.17	73.98	-18.81
	39.41	Average	V		40.91	53.98	-13.07

※ Ant. Pol. : Antenna Polarization

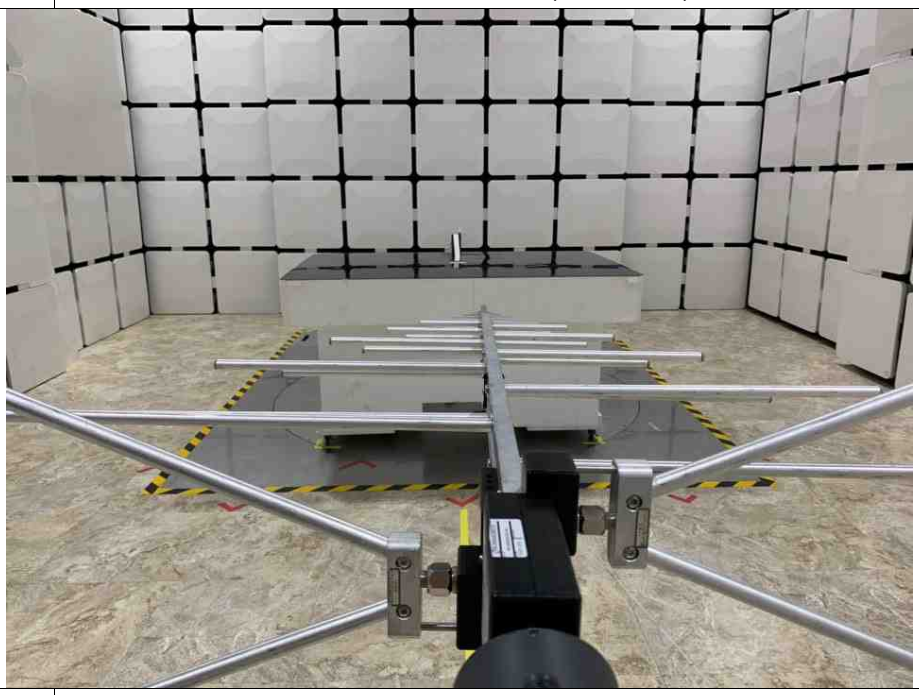
※ Corr. Factor. : Antenna Factor + Cable Loss - Amplifier Gain

※ Result = Reading + Corr. Factor

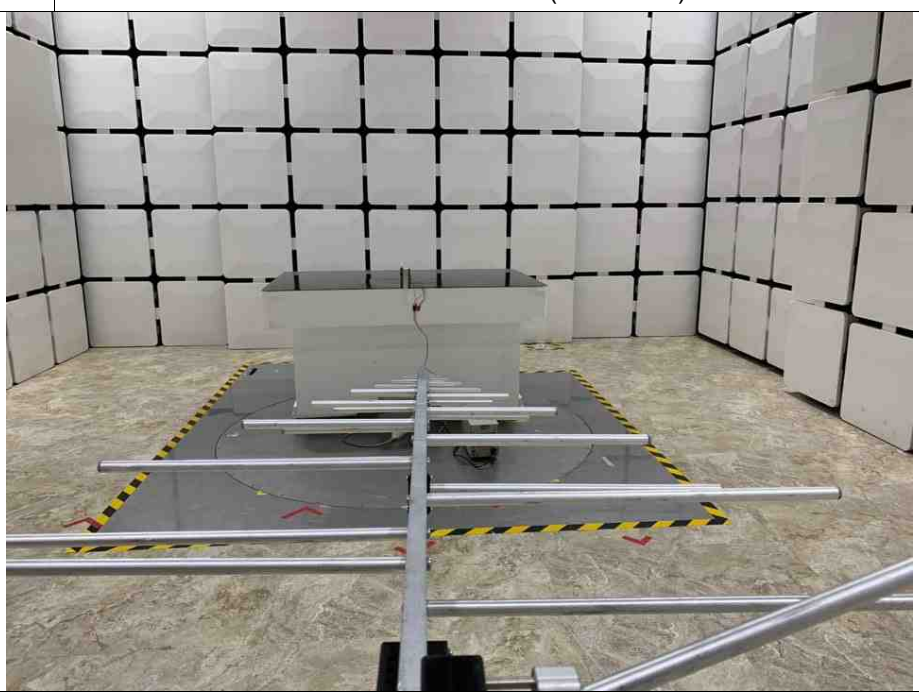
※ Margin = Result - Limit

10. Test Setup Photo

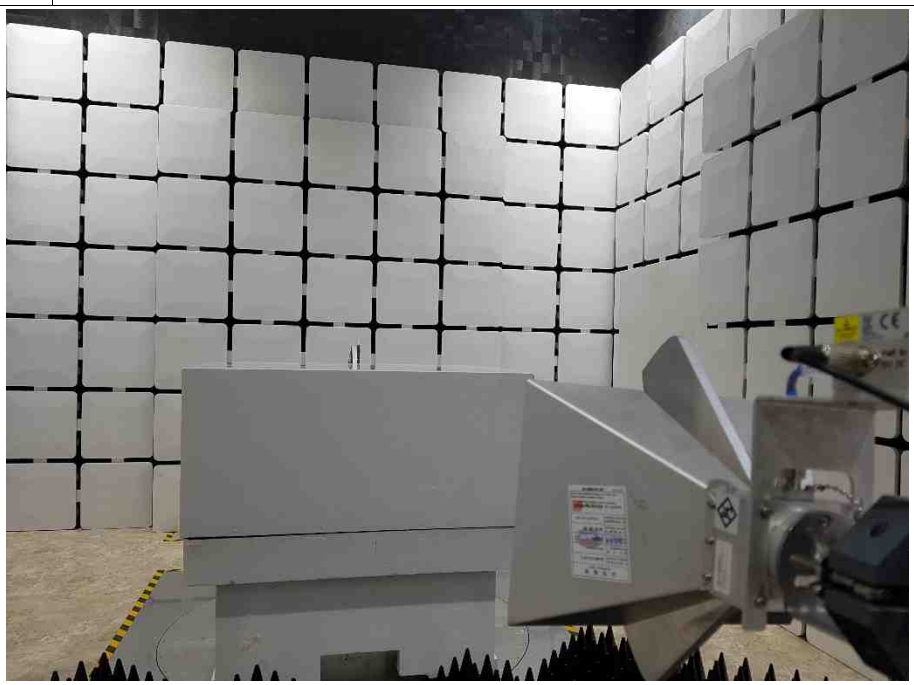
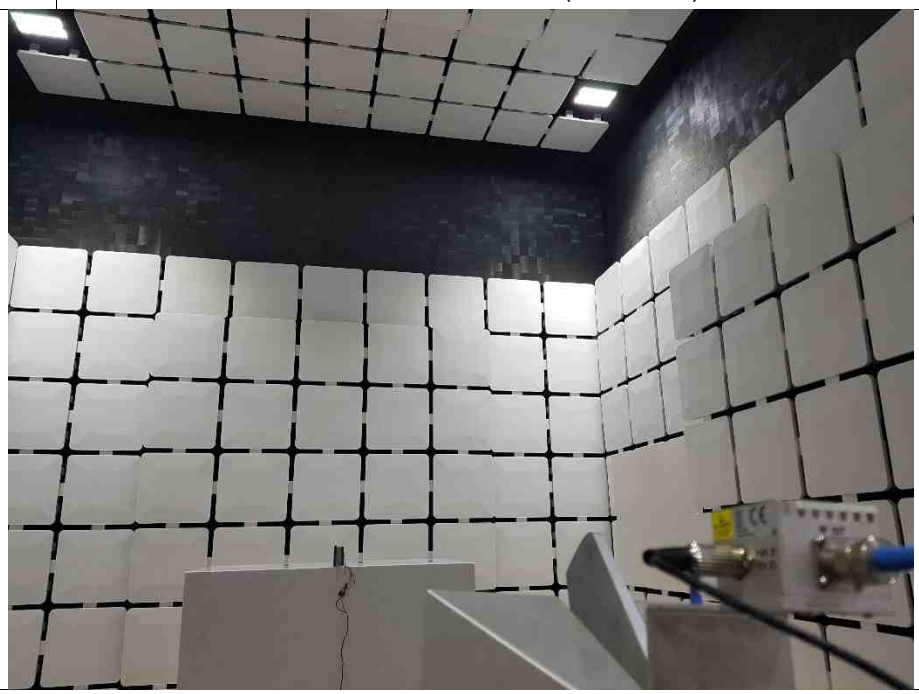
Test Setup	Radiated measurement for below 1 ㎓ (Front side)



Test Setup	Radiated measurement for below 1 ㎓ (Rear side)



Test Setup	Radiated measurement for Above 1 ㎓ (Front side)



Test Setup	Radiated measurement for Above 1 ㎓ (Rear side)