



시험 성적서

TEST REPORT

페이지(page) : (1) / (총(Total) 25)

성적서 번호 Report No.		ICRT-TR-E222375-0A	
신청자 Client	기관명 Name	TAEHA MECHATRONICS Co., Ltd.	
	주 소 Address	421, Bakdal-ro, Manan-gu, Anyang-si, Gyeonggi-do, Republic of Korea	
시험대상품목 Sample description		Monitor	
모델명 Type designation		WL-STAGE VE Monitor	
정 격 Ratings		DC 24 V	
시험장소 Place of test		☒ 고정시험(Inside test) ☐ 현장시험(Field test) 주소지(Address): 112, Hwanggeum 3-ro 7beon-gil, Hagun-ri, Yangchon-eup, Gimpo-si, Gyeonggi-do, Korea	
시험기간 Date of test		14. Sep. 2022 ~ 16. Sep. 2022	
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	기술책임자 Technical Manager	
	성 명 Name	In-Jung, Kim (서명)	성 명 Name

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The above test report is certified that the above mentioned products have been tested for the sample.

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2022. 09. 20

주식회사 아이씨알 대표이사

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Revision History

Issued Report No.	Issued Date	Revisions	Effect Section
ICRT-TR-E222375-0A	2022.09.20	Initial Issue	All



1. Applicant & Manufacturer & Test Laboratory Information

1.1 Applicant information

Applicant	TAEHA MECHATRONICS Co., Ltd.
Address	421, Bakdal-ro, Manan-gu, Anyang-si, Gyeonggi-do, Republic of Korea
Contact Person	Byoungsun Lee
Telephone No.	+82-31-463-8075
Fax No.	+82-31-447-0529
E-mail	best-electronic@taeha.co.kr

1.2 Manufacturer Information

Manufacturer	TAEHA MECHATRONICS Co., Ltd.
Address	421, Bakdal-ro, Manan-gu, Anyang-si, Gyeonggi-do, 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	Monitor
Brand Name	-
Model Name	WL-STAGE VE Monitor
Additional Model Name	-
FCC ID	2AP7F-WLSTAGEVEMONI
Power Supply	DC 24 V

2.2 Additional Information

Equipment Class	DTS-Digital Transmission System	
Device Type	Stand-alone	
Operating Frequency	802.11n(HT20)	2 412 MHz ~ 2 462 MHz
RF Output Power	802.11n(HT20)	14.25 dBm
Number of Channel	802.11n(HT20)	11
Modulation Type	OFDM	
Antenna Type	SMD Antenna	
Antenna Gain	3.5 dBi	
Antenna Operating Mode	Single Antenna Equipment with only one antenna	
List of Each Oscillator or Crystal Frequency	24 MHz	

2.3 Mode of operation during the test

- The EUT is continuous transmission mode during the test with set at Low Channel, Middle Channel, and High Channel. To get a maximum radiated emission levels from the EUT, the EUT was moved throughout the XY, YZ, XZ planes.

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) (2)	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
§15.203	Antenna Requirement	☒	PASS

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 Test Methodology

Both conducted and radiated testing was performed according to the procedures in ANSI C63.10: 2013.

Radiated testing was performed at a distance of 3 m from EUT to the antenna.

3.4 Configuration of Test System

3.4.1 Radiated emission test

Preliminary radiated emissions test were conducted using the procedure in ANSI C63.10: 2013 to determine the worse operating conditions. Final radiated emission tests were conducted at 3 m Semi Anechoic Chamber.

The turntable was rotated through 360 degrees and the EUT was tested by positioned three orthogonal planes to obtain the highest reading on the field strength meter. Once maximum reading was determined, the search antenna was raised and lowered in both vertical and horizontal polarization.



3.5 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.

3.5.1 Result: Pass

The transmitter has a **SMD Antenna**. The directional gain of the antenna is **3.5 dBi**.

**4. Used equipment on test**

	Description	Model Name	Manufacturer	Serial Number	Next Cal. (cycle)
☒	Spectrum analyzer	FSV40-N	Rohde&Schwarz	101936	2023-06-15
☒	Signal Generator	SMB100A	R&S	180607	2023-03-03
☒	DC Power Supply	XDL 35-5P	Sorensen	J00385373	2023-03-03
☒	10 dB Attenuator	WA54-10-11	Weinschel	-	2023-03-07
☒	Loop Antenna	HFH2-Z2	Rohde & Schwarz	100506	2023-07-05
☒	TRILOG BROADBAND ANTENNA	VULB9162	SCHWARZBECK	143	2022-12-08
☒	RF Pre Amplifier	SCU08	Rohde & Schwarz	100747	2023-04-13
☒	EMI Test Receiver	ESR7	Rohde & Schwarz	102034	2023-04-13
☒	Horn Antenna	HF907	Rohde & Schwarz	102556	2024-08-22
☒	RF Pre Amplifier	SCU18	Rohde & Schwarz	102342	2023-04-13
☒	EMI Test Receiver	ESR26	Rohde & Schwarz	101462	2023-04-13
☒	Horn Antenna	LB-42-10-C-KF	AIBFO Inc.	J202024625	2023-03-10
☒	High Pass Filter	WT-A1698-HS	WT Microwave	WT171201-6-4	2023-03-03
☒	PreAmplifier	AMF-4F-18265-35-8P-1	MITEQ	771846	2023-03-07

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



5. 6 dB Bandwidth

5.1 Operating environment

Temperature : 23.6 °C

Relative humidity : 47.2 %

5.2 Measurement method

Standard : §15.247 (a) (2)

5.3 Test data

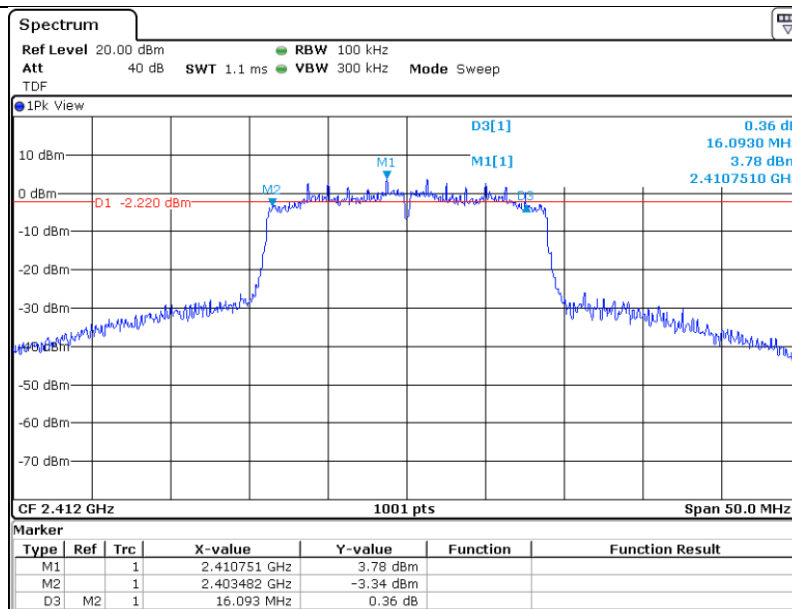
Operating mode : Transmit mode

Test Result : Pass

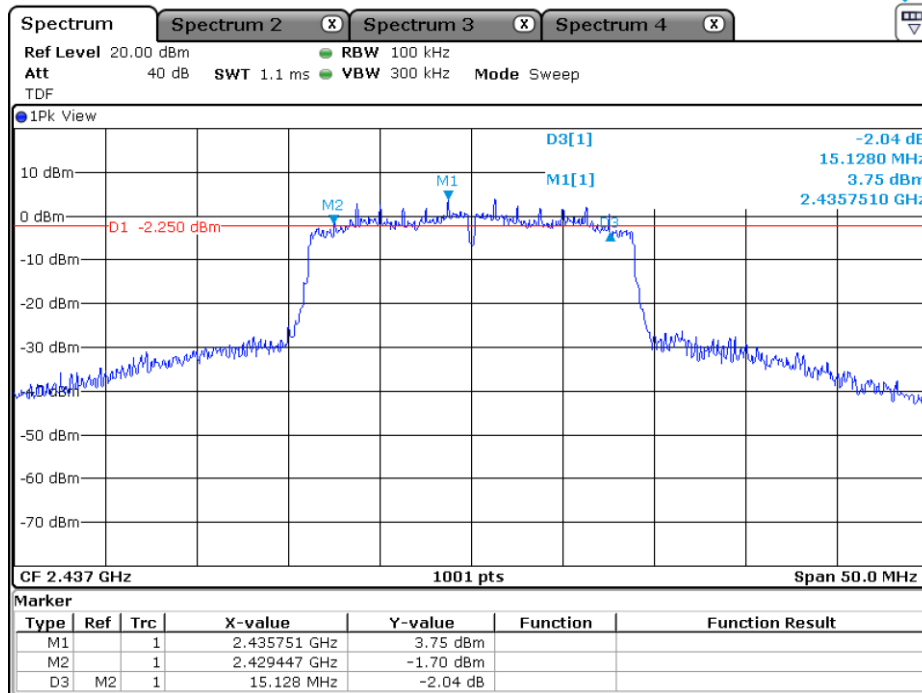
5.3.1 Measured Results

Modulation Type	Channel (Frequency)	Measured Value (kHz)	Limit (kHz)
802.11n(HT20)	0 (2 412 MHz)	16.093	at least 500
	6 (2 437 MHz)	15.128	
	11 (2 462 MHz)	15.086	

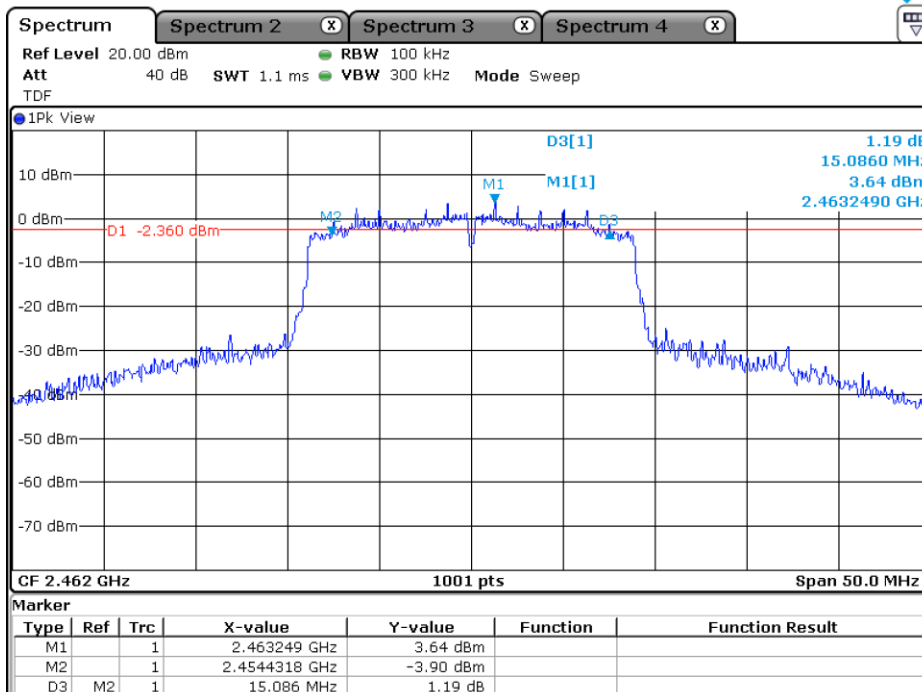
5.3.2 Measured Graph (6 dB Bandwidth)



Low CH



Mid CH



High CH



6. Maximum Conducted Output Power

6.1 Operating environment

Temperature : 23.6 °C

Relative humidity : 47.2 %

6.2 Measurement method

Standard : §15.247 (b) (3)

6.3 Test data

Operating mode : Transmit mode

Test Result : Pass

6.3.1 Measured Results

Modulation Type	Channel (Frequency)	Highest signal level (dBm)	Limit (dBm)
802.11n(HT20)	0 (2 412 MHz)	14.13	30 (1 Watt)
	6 (2 437 MHz)	14.09	
	11 (2 462 MHz)	14.25	



7. Power Spectral Density

7.1 Operating environment

Temperature : 23.6 °C

Relative humidity : 47.2 %

7.2 Measurement method

Standard : §15.247 (e)

7.3 Test data

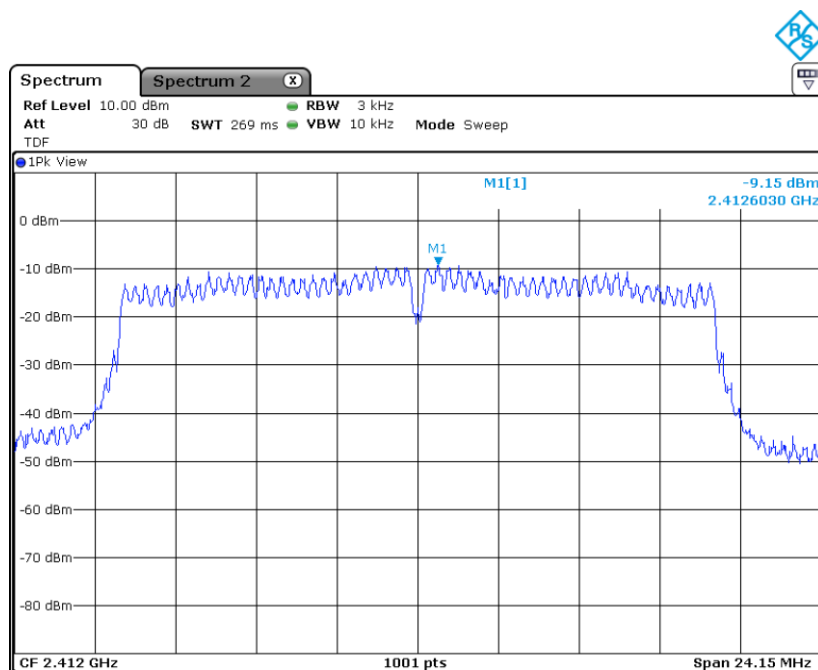
Operating mode : Transmit mode

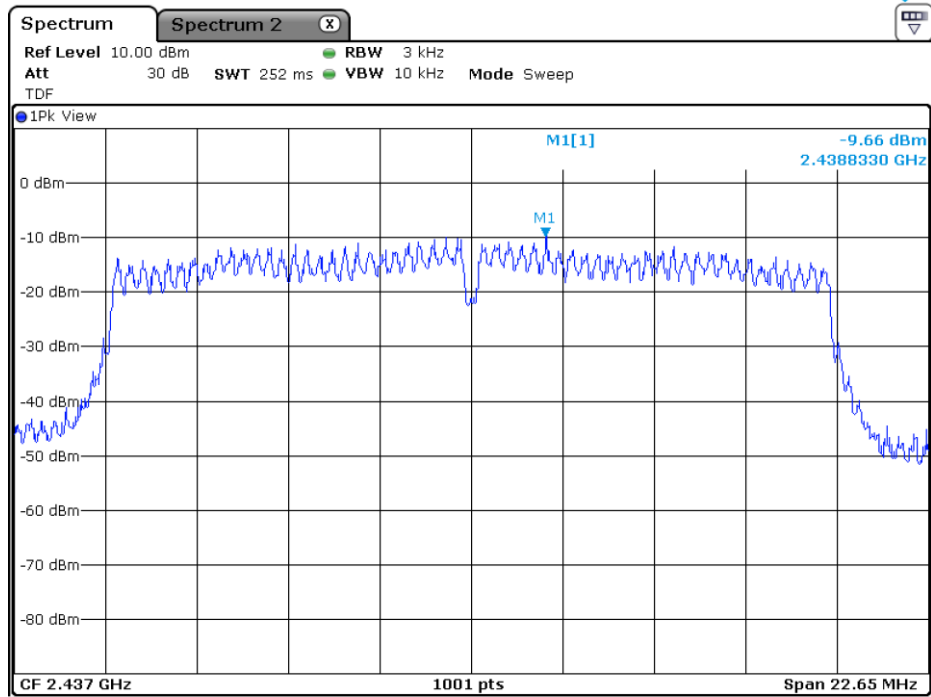
Test Result : Pass

7.3.1 Measured Results

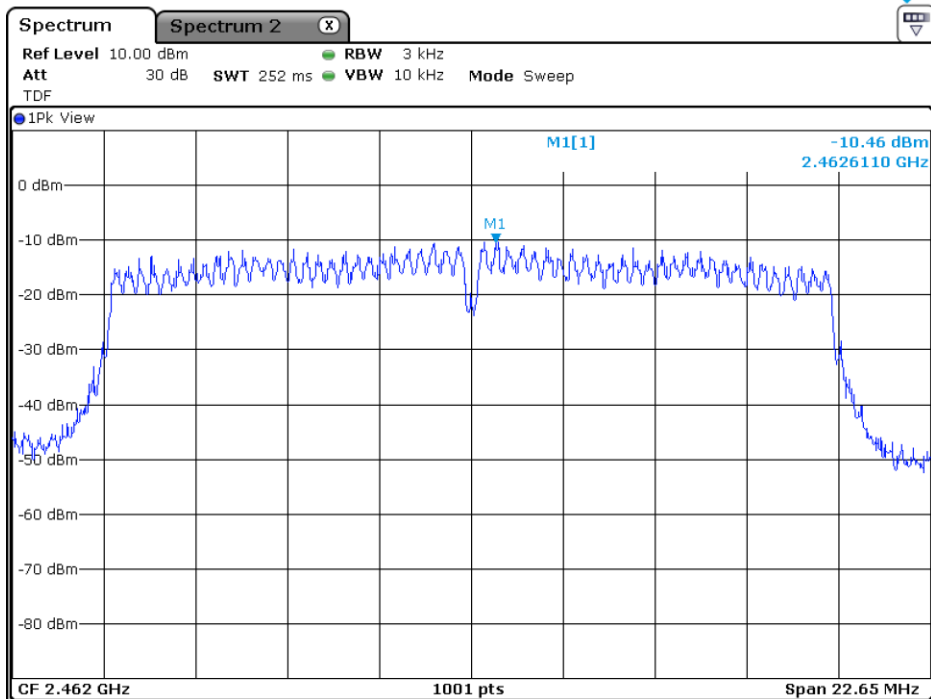
Modulation Type	Channel (Frequency)	Highest signal level (dBm)	Limit (dBm/3kHz)
802.11n(HT20)	0 (2 412 MHz)	-9.15	8
	6 (2 437 MHz)	-9.66	
	11 (2 462 MHz)	-10.46	

7.3.2 Measured Graph





Mid CH



High CH

8. Conducted Spurious Emission

8.1 Operating environment

Temperature : 23.6 °C
Relative humidity : 47.2 %

8.2 Measurement method

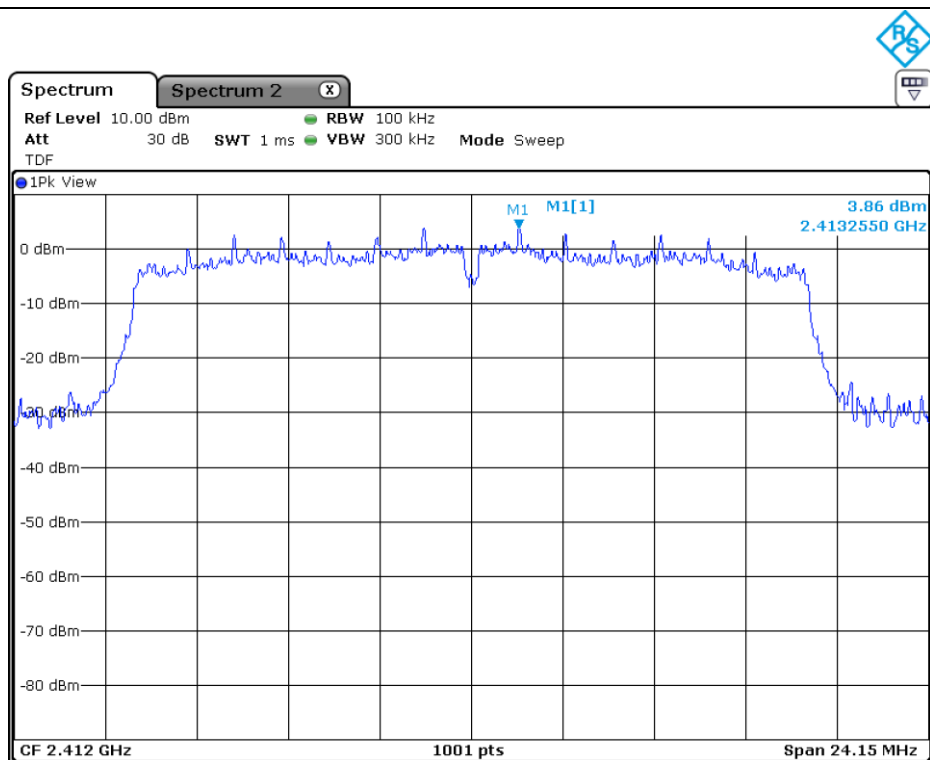
Standard : §15.247 (d)

8.3 Test data

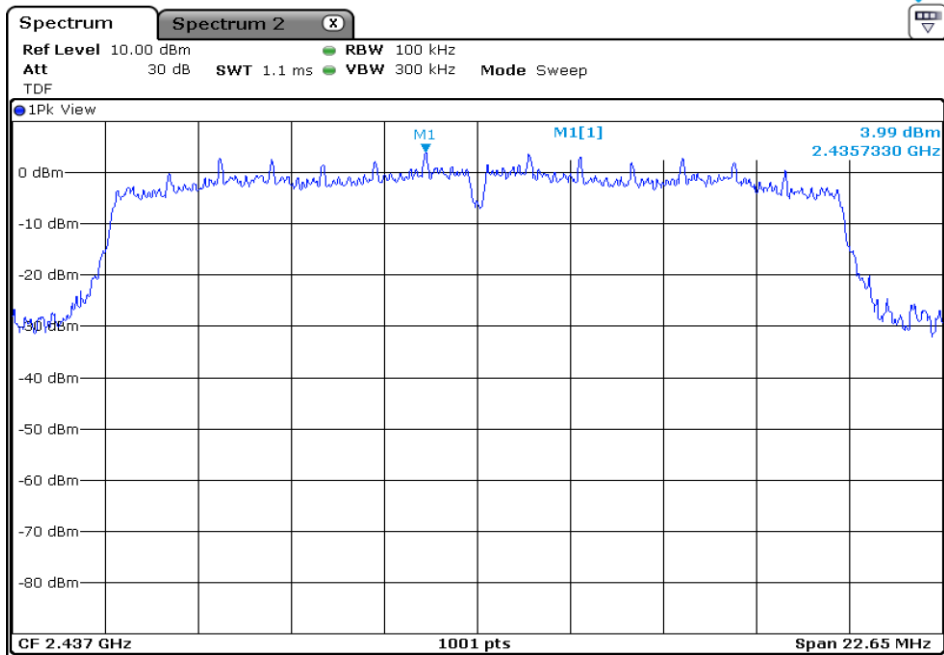
Operating mode : Transmit mode
Test Result : Pass

8.3.1 Measured Results

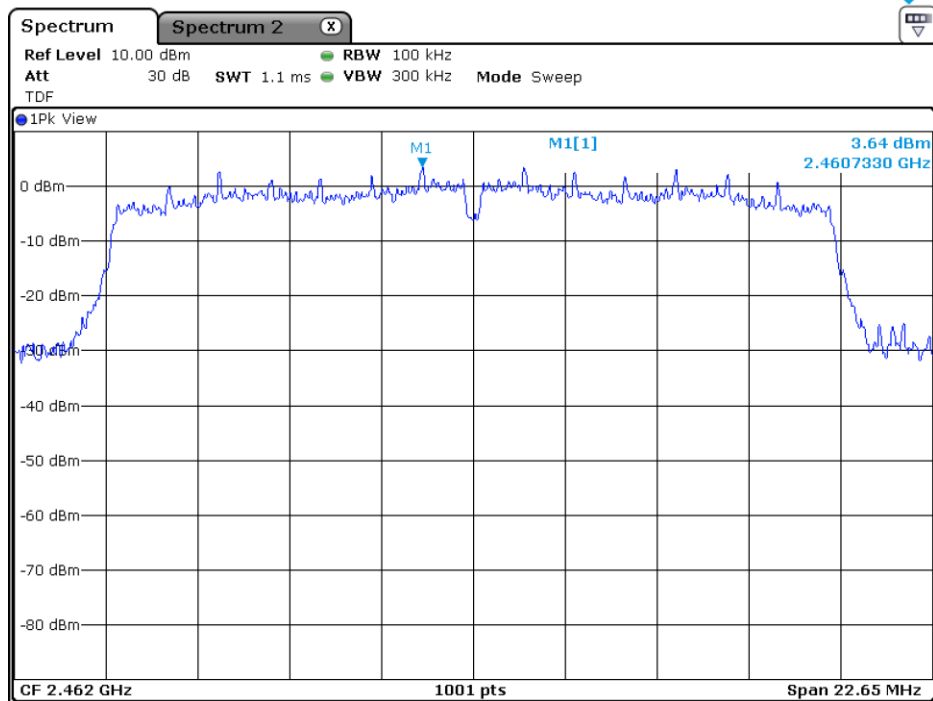
8.3.1.1 Signal level (dB m)



Low CH



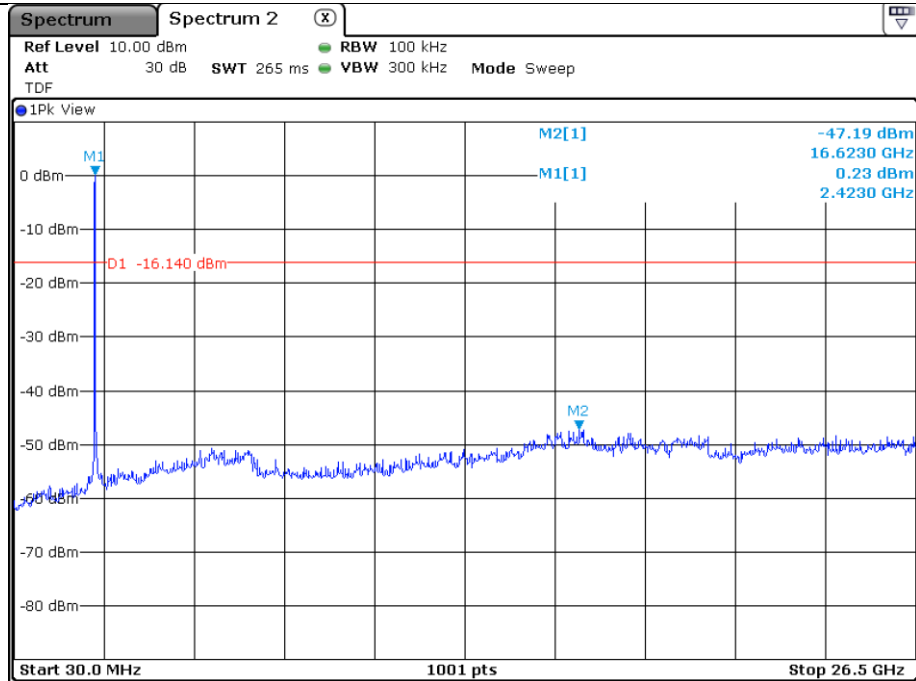
Mid CH



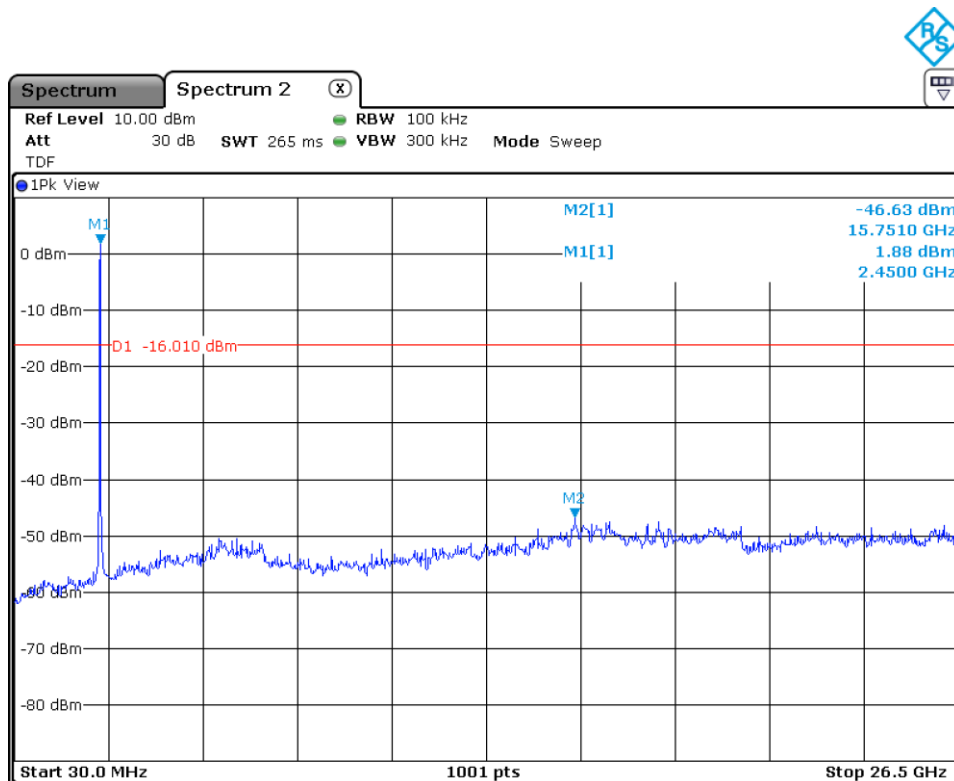
High CH



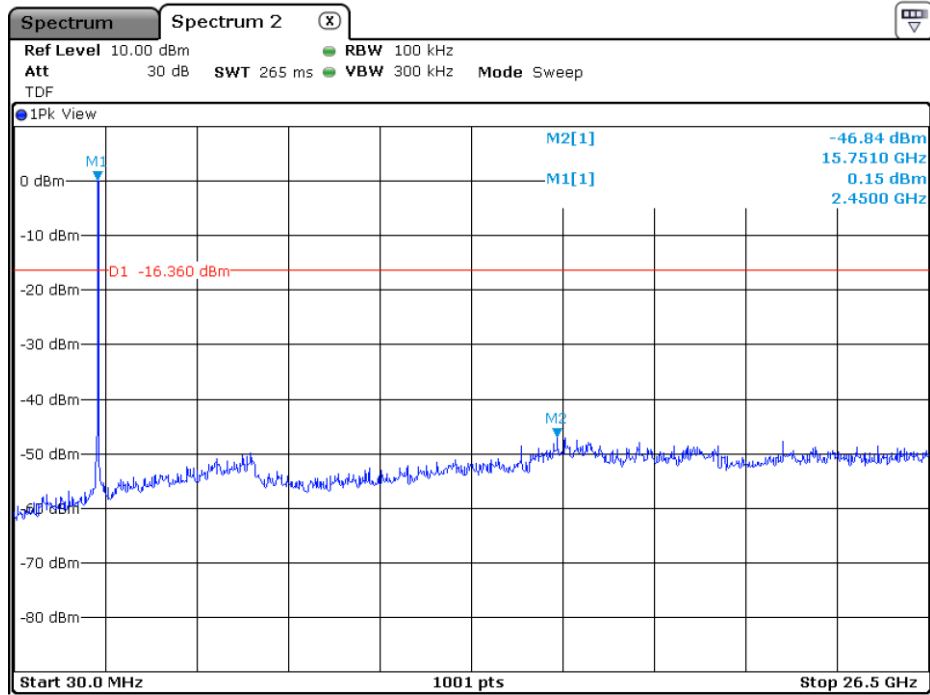
8.3.1.2 Unwanted Emissions In Non-Restricted Frequency Bands



Low CH



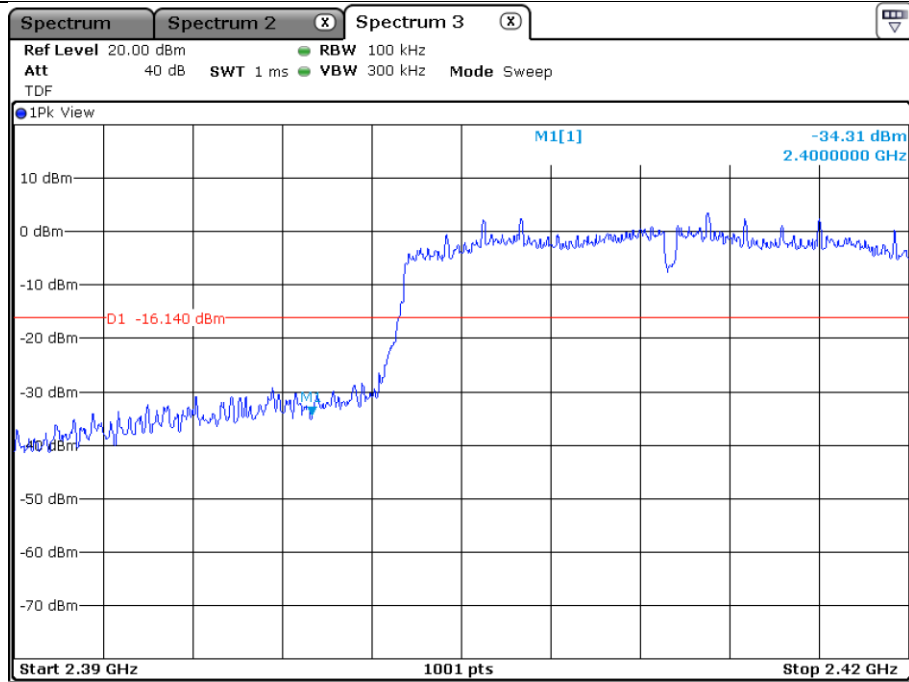
Mid CH



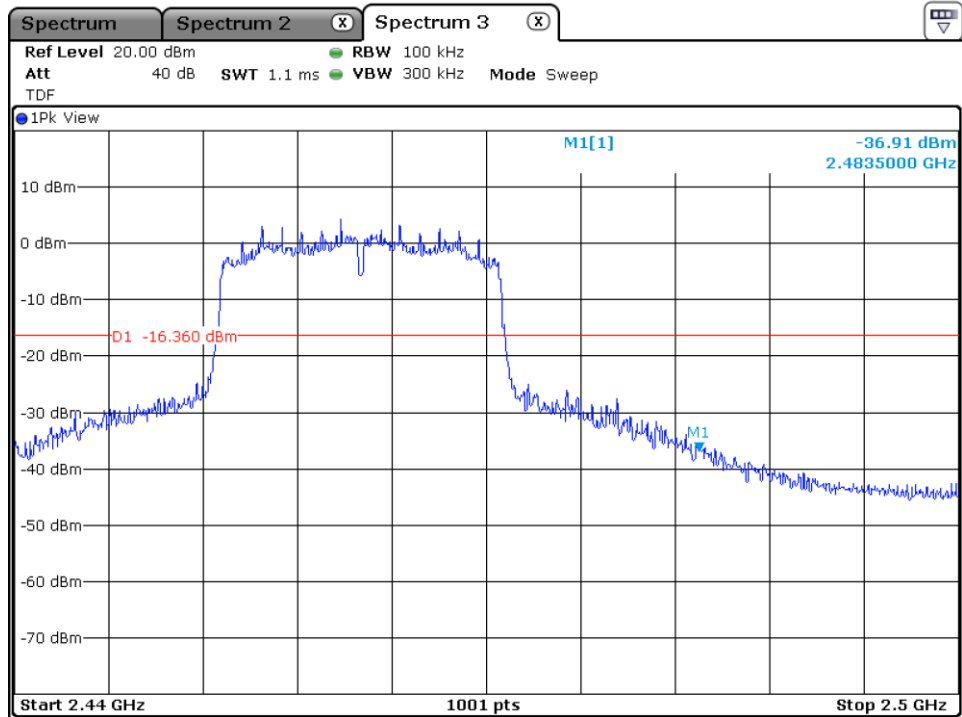
High CH



8.3.1.3 Band Edge



Low CH



High CH

9. Radiated Spurious Emission

9.1 Operating environment

Temperature : 24.3 °C
Relative humidity : 48.1 %

9.2 Measurement method

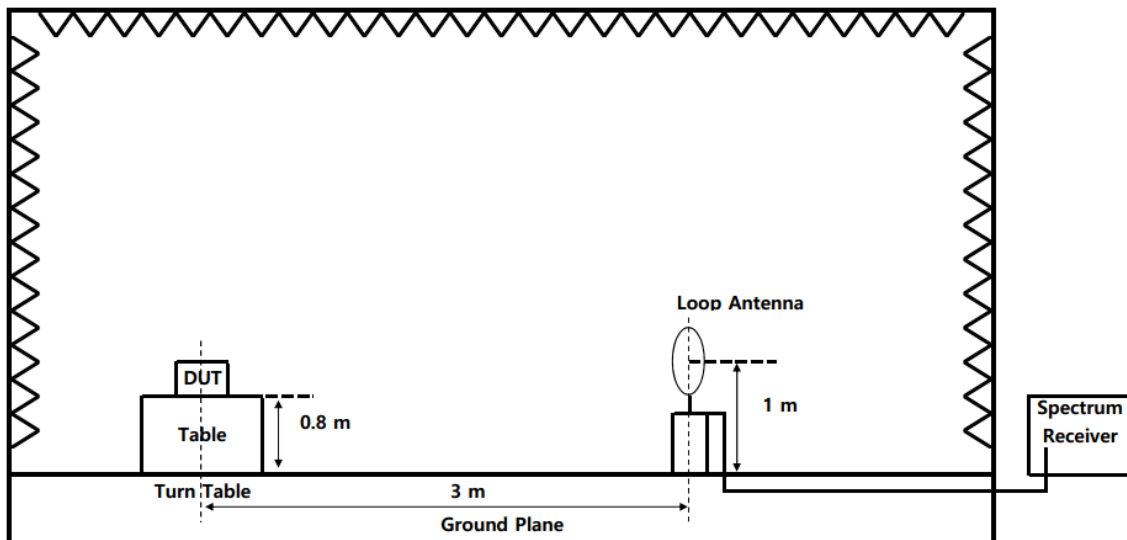
Standard : §15.247 (d), §15.209, §15.205

9.3 Test setup

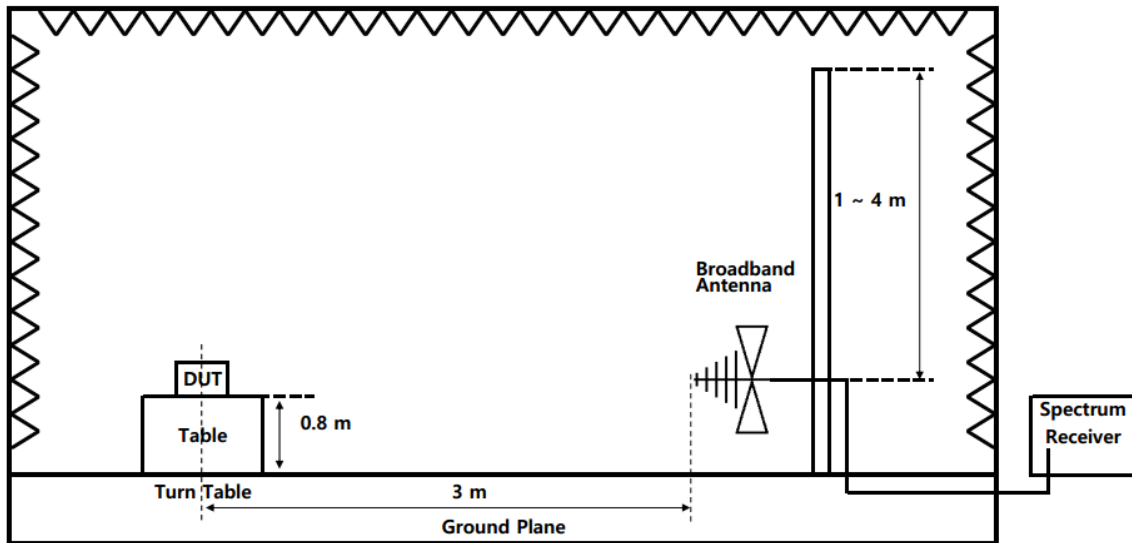
The radiated emissions measurements were performed on the 3 m, Semi-Anechoic Chamber. The EUT was placed on a non-conductive turntable above the ground plane.

The frequency spectrum from 9 kHz to 26.5 GHz 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.

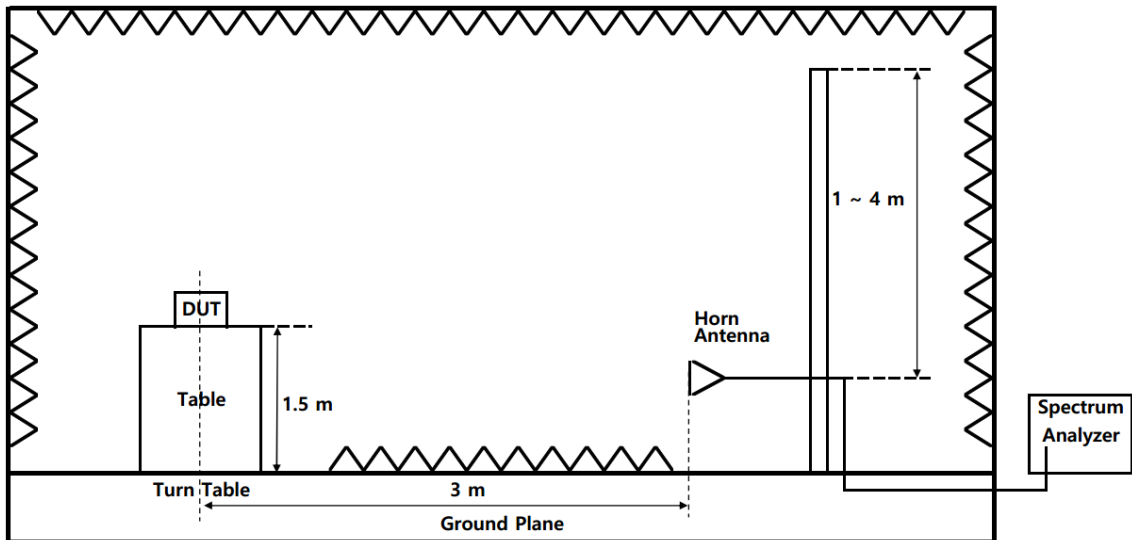
9.3.1 Below 30 MHz



9.3.2 30 MHz to 1 GHz



9.3.3 Above 1 GHz



**9.4 Test data**

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							
2 390.00	52.11	Peak	H	-14.50	66.61	74.00	7.39
	31.35	Average	H		45.85	54.00	8.15
High CH							
2 484.70	53.78	Peak	H	-14.10	67.88	74.00	6.12
	34.44	Average	H		48.54	54.00	5.46

※ Ant. Pol. : Antenna Polarization

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

※ Result = Reading + Corr. Factor

※ Margin = Limit - Result

9.4.2 Test data for Spurious & Harmonic**9.4.2.1 Measurement Results for below 30 MHz**

Frequency (MHz)	Reading (dB μ V)	Detector	Ant. Pol. (H/V)	Corr. Factor (dB)	Result (dB μ V/m)	Limit (dB μ V/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.							

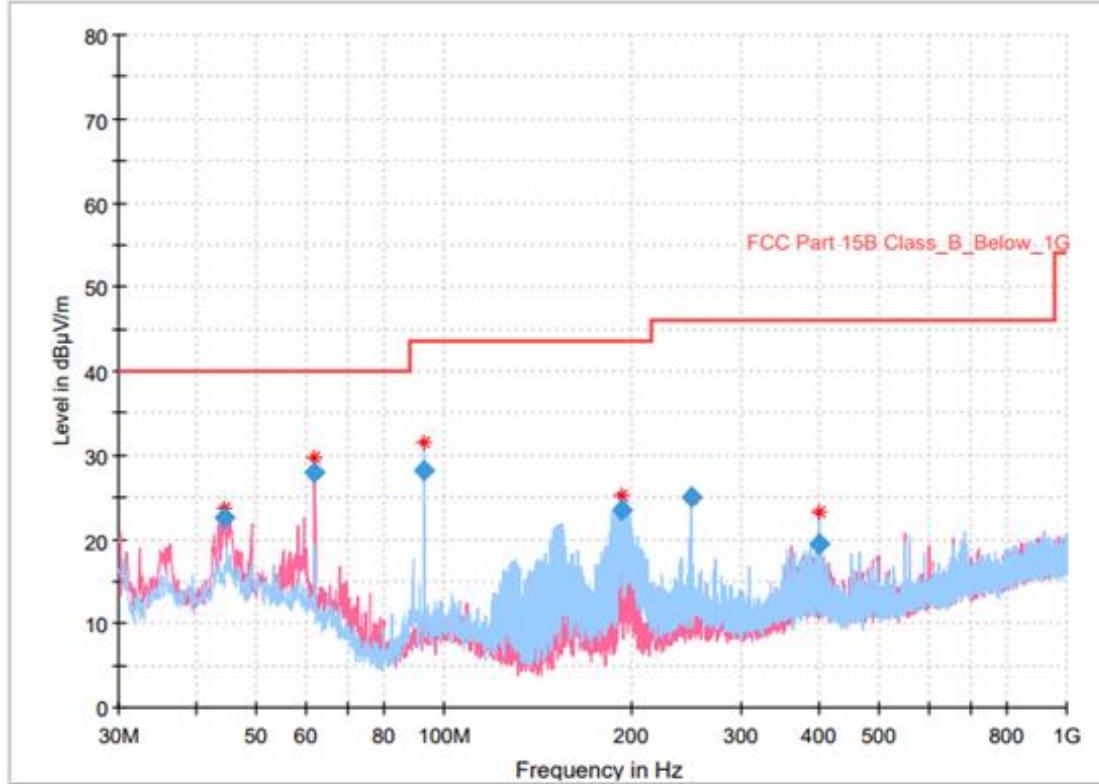
※ Ant. Pol. : Antenna Polarization

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

※ Result = Reading + Corr. Factor

※ Margin = Limit – Result

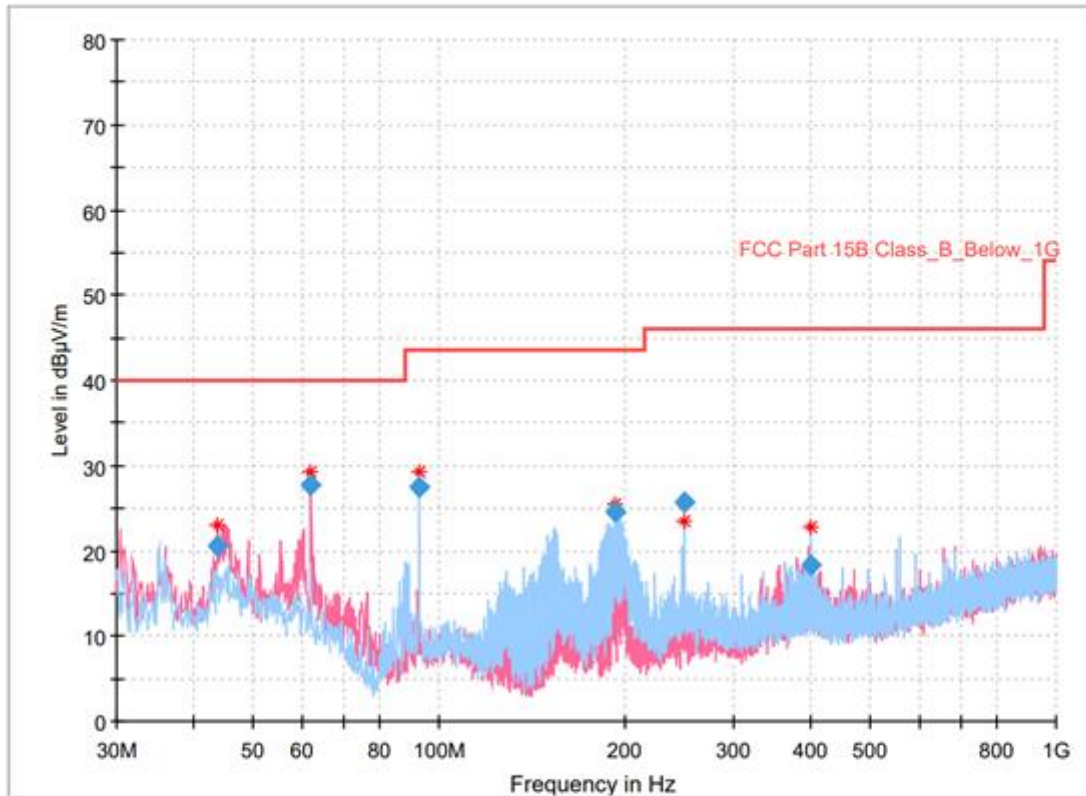
9.4.2.2 Measurement Results for below 1 GHz



Final Result

Frequency (MHz)	QuasiPeak (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
44.356000	22.50	40.00	17.50	1000.0	120.000	99.9	V	232.0	-20.8
62.010000	27.90	40.00	12.10	1000.0	120.000	99.9	V	0.0	-22.1
92.953000	28.15	43.50	15.35	1000.0	120.000	300.0	H	0.0	-23.9
192.087000	23.42	43.50	20.08	1000.0	120.000	200.0	H	232.0	-23.9
249.996000	25.04	46.00	20.96	1000.0	120.000	99.9	H	302.0	-21.7
399.958000	19.47	46.00	26.53	1000.0	120.000	99.9	V	30.0	-18.4

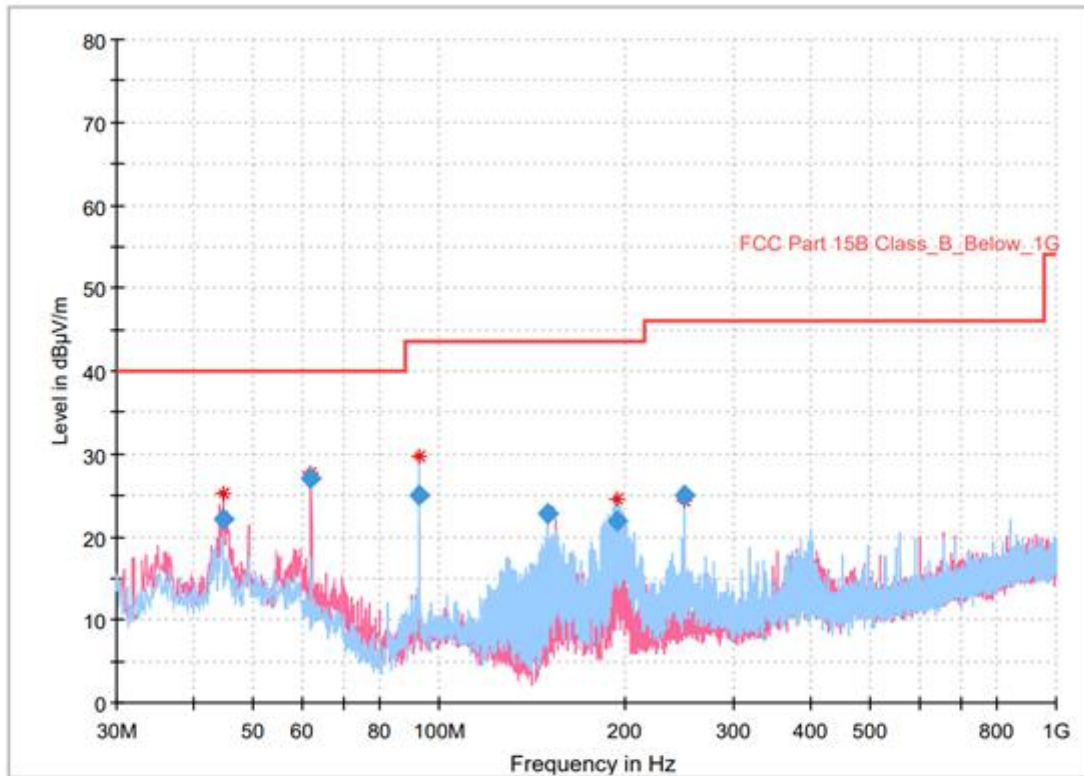
Low CH



Final Result

Frequency (MHz)	QuasiPeak (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
43.774000	20.67	40.00	19.33	1000.0	120.000	100.0	V	331.0	-21.0
62.010000	27.75	40.00	12.25	1000.0	120.000	100.0	V	30.0	-22.1
92.953000	27.44	43.50	16.06	1000.0	120.000	200.0	H	358.0	-23.9
193.154000	24.56	43.50	18.94	1000.0	120.000	200.0	H	231.0	-23.7
249.996000	25.74	46.00	20.26	1000.0	120.000	100.0	H	316.0	-21.7
400.055000	18.40	46.00	27.60	1000.0	120.000	100.0	H	198.0	-18.4

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)
44.744000	22.01	40.00	17.99	1000.0	120.000	100.0	V	167.0	-20.8
62.010000	27.07	40.00	12.93	1000.0	120.000	100.0	V	197.0	-22.1
92.953000	24.99	43.50	18.51	1000.0	120.000	200.0	H	50.0	-23.9
149.989000	22.70	43.50	20.80	1000.0	120.000	200.0	H	330.0	-26.5
194.027000	21.89	43.50	21.61	1000.0	120.000	100.0	H	0.0	-23.5
249.996000	25.13	46.00	20.87	1000.0	120.000	100.0	H	305.0	-21.7

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							
4 808.00	34.72	Peak	H	-3.90	38.62	74.00	35.38
	21.11	Average	H		25.01	54.00	28.99
7 205.00	42.90	Peak	H	0.70	42.20	74.00	31.80
	28.71	Average	H		28.01	54.00	25.99
Mid CH							
4 665.20	38.74	Peak	H	-4.80	43.54	74.00	30.46
	31.38	Average	H		36.18	54.00	17.82
7 320.60	42.07	Peak	H	0.70	41.37	74.00	32.63
	28.51	Average	H		27.81	54.00	26.19
High CH							
4 935.50	35.86	Peak	V	-3.20	39.06	74.00	34.94
	22.45	Average	V		25.65	54.00	28.35
7 327.40	42.15	Peak	V	0.70	41.45	74.00	32.55
	28.57	Average	V		27.87	54.00	26.13

※ Ant. Pol. : Antenna Polarization

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

※ Result = Reading + Corr. Factor

※ Margin = Limit – Result

- END -