



시험 성적서 TEST REPORT

페이지(page) : (1) / (총(Total) 23)

성적서 번호 Report No.		ICRT-TR-E230669-0A	
신청자 Client	기관명 Name	AISOLUTION CO., LTD	
	주소 Address	28-4, Samyang-ro 29gil, Gangbuk-gu, Seoul, 01194, Republic of Korea	
시험대상품목 Sample description		KOAMTAC SLED UHF 1.0W RFID READER	
모델명 Type designation		KSLED-UHF1.0W	
정격 Ratings		DC 3.7 V	
시험장소 Place of test		<input checked="" type="checkbox"/> 고정시험(Inside test) <input type="checkbox"/> 현장시험(Field test) 주소지(Address): 112, Hwanggeum 3-ro 7beon-gil, Hagun-ri, Yangchon-eup, Gimpo-si, Gyeonggi-do, Korea	
시험기간 Date of test		24. Mar. 2023 ~ 28. Mar. 2023	
시험방법/항목 Test Method/Item		FCC Part 15 Subpart C §15.247	
시험결과 Test Results		Refer to 3. Test Summary	
확인 Affirmation	작성자 Tested by	기술책임자 Technical Manager	
	성명 Name	Eun-Hye, Gwak (Signature)	Yae-Yang, Yoon (Signature)
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Revision History

Issued Report No.	Issued Date	Revisions	Effect Section
ICRT-TR-E230669-0A	28-Mar-2023	Initial Issue	All



1. Applicant & Manufacturer & Test Laboratory Information

1.1 Applicant information

Applicant	AISOLUTION CO., LTD
Address	28-4, Samyang-ro 29gil, Gangbuk-gu, Seoul, 01194, Republic of Korea
Contact Person	Seoneyong Kim
Telephone No.	82-01-9876-3482
Fax No.	82-07-8260-3731
E-mail	seonyeong.kim@koamtac.com

1.2 Manufacturer Information

Manufacturer	AISOLUTION CO., LTD
Address	28-4, Samyang-ro 29gil, Gangbuk-gu, Seoul, 01194, 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
Test Firm Registration Number	490614



2. Equipment under Test(EUT) Information

2.1 General Information

Product Name	KOAMTAC SLED UHF 1.0W RFID READER
Brand Name	-
Model Name	KSLED-UHF1.0W
Additional Model Name	KDCSLED-UHF1.0W, SKXSLED-UHF1.0W, SKESLED-UHF1.0W, KNSLED-UHF1.0W
FCC ID	VH9-KSLEDUHF10
Hardware Version	1.0
Software Version	1.0
Power Supply	DC 3.7 V

2.2 Additional Information

Equipment Class	DSS - Frequency Hopping Spread Spectrum system
Device Type	Stand-alone
Operating Frequency	902.75 MHz ~ 927.25 MHz
RF Output Power	29.610 dBm
Number of Channel	50
Modulation Type	ASK
Antenna Type	pcb Antenna
Antenna Gain	3.72 dBi
Antenna Operating Mode	Single Antenna Equipment with only one antenna

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



2.5 Reason of Additional Model Name

- Same electrical specifications, structure and circuit as the basic model but
- KDCSLED-UHF1.0W : Products combined with KDC480, KDC485
- SKXSLED-UHF1.0W : Products combined with SKX Sled (SKXPro, SKX5, SKX6Pro) Apply additional injections for finishing according to product shape.
- SKESLED-UHF1.0W : Products combined with SKE50 Sled Apply additional injections for finishing according to product shape.
- KNSLED-UHF1.0W : Products combined with KOAMTAC Next Generation Sled Apply additional injections for finishing according to product shape.



3. Test Summary

3.1 Test standards and results

FCC Part 15 Subpart C			
Clause	Test items	Applied	Results
§15.247 (a) (1)	20 dB bandwidth	<input checked="" type="checkbox"/>	N/A(Note 1)
§15.247 (b) (2)	Maximum Peak Conducted Output Power	<input checked="" type="checkbox"/>	N/A(Note 1)
§15.247 (a) (1)	Carrier Frequency Separation	<input checked="" type="checkbox"/>	N/A(Note 1)
§15.247 (a) (1) (i)	Number of Hopping Frequencies	<input checked="" type="checkbox"/>	N/A(Note 1)
§15.247 (a) (1) (i)	Average Time of Occupancy (Dwell Time)	<input checked="" type="checkbox"/>	N/A(Note 1)
§15.247 (d)	Conducted Spurious Emission	<input checked="" type="checkbox"/>	N/A(Note 1)
§15.247 (d) & §15.209 & §15.205	Radiated Spurious Emission	<input checked="" type="checkbox"/>	PASS
§15.203	Antenna Requirement	<input checked="" type="checkbox"/>	PASS

Note 1 : Not applicable because it is a certified module

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 **Pcb Antenna**. The directional gain of the antenna is **3.72 dBi**.



4. Used equipment on test

	Description	Model Name	Manufacturer	Serial Number	Next Cal. (cycle)
<input checked="" type="checkbox"/>	SIGNAL GENERATOR	SMB100A	R&S	180607	2024-03-02
<input checked="" type="checkbox"/>	SPECTRUM ANALYZER	FSV40-N	R&S	101303	2024-03-03
<input checked="" type="checkbox"/>	BAND REJECTION FILTER	CTF-912M-S1	RF ONE ELECTRONICS	BRF1805C001	2024.03.02
<input checked="" type="checkbox"/>	DC POWER SUPPLY	XDL 35-5P	Sorensen	J00385373	2024-03-03
<input checked="" type="checkbox"/>	ATTENUATOR	PFA40K2-10	PSATEK	-	2024-03-07
<input checked="" type="checkbox"/>	LOOP ANTENNA	HFH2-Z2	Rohde & Schwarz	100271	2025-03-08
<input checked="" type="checkbox"/>	BI-Log ANTENNA	VULB9162	SCHWARZBECK	120	2024-12-26
<input checked="" type="checkbox"/>	SIGNAL CONDITIONING UNIT	SCU08	Rohde & Schwarz	100746	2023-04-13
<input checked="" type="checkbox"/>	EMI TEST RECEIVER	ESR26	Rohde & Schwarz	101461	2023-05-18
<input checked="" type="checkbox"/>	DOUBLE RIDGED HORN ANTENNA	HF907	Rohde & Schwarz	102556	2023-08-22
<input checked="" type="checkbox"/>	SIGNAL CONDITIONING UNIT	SCU18	Rohde & Schwarz	102342	2023-04-13
<input checked="" type="checkbox"/>	EMI TEST RECEIVER	ESR26	Rohde & Schwarz	101462	2023-04-13
<input checked="" type="checkbox"/>	HORN ANTENNA	LB-42-10-C-KF	A-INFOMW	J202024625	2024-03-07
<input checked="" type="checkbox"/>	PREAMPLIFIER	AMF-4F-18265-35-8P-1	MITEQ	771846	2024-03-07

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



5. 20 dB Bandwidth

5.1 Operating environment

Temperature : -

Relative humidity : -

5.2 Measurement method

Standard : §15.247 (a) (1) (i)

5.3 Test setup

The EUT should be transmitting at its maximum data rate. Allow the trace to stabilize. Use the marker-to-peak function to set the marker to the peak of the emission. Use the marker-delta function to measure 20 dB down one side of the emission.

Reset the marker- delta function, and move the marker to the other side of the emission, until it is (as close as possible to) even with the reference marker level. The marker-delta reading at this point is the 20 dB bandwidth of the emission. If this value varies with different modes of operation (e.g., data rate, modulation format, etc.), repeat this test for each variation.

The limit is specified in one of the subparagraphs of this Section.



5.4 Test data

Operating mode : Transmit mode

Test Result : Report No : DRTFCC1510-0211



6. Maximum Peak Conducted Output Power

6.1 Operating environment

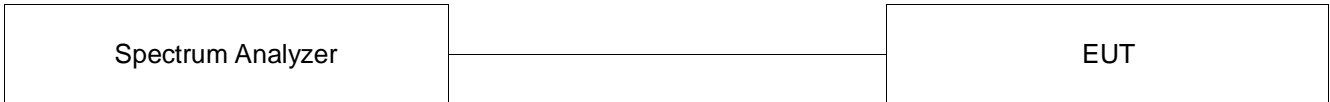
Temperature : -
Relative humidity : -

6.2 Measurement method

Standard : §15.247 (b) (2)

6.3 Test setup

Allow the trace to stabilize. Use the marker-to-peak function to set the marker to the peak of the emission. The indicated level is the peak output power



6.4 Test data

Operating mode : Transmit mode
Test Result : Report No : DRTFCC1510-0211



7. Carrier Frequency Separation

7.1 Operating environment

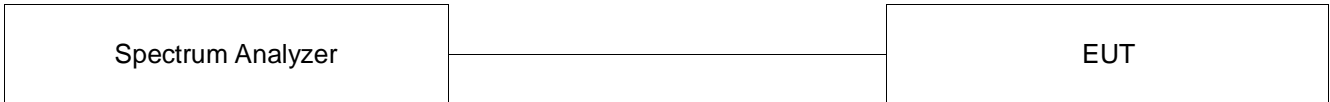
Temperature : -
Relative humidity : -

7.2 Measurement method

Standard : §15.247 (a) (1)

7.3 Test setup

Allow the trace to stabilize. Use the marker-delta function to determine the separation between the peaks of the adjacent channels



7.4 Test data

Operating mode : Transmit mode
Test Result : Report No : DRTFCC1510-0211



8. Number of Hopping Frequency

8.1 Operating environment

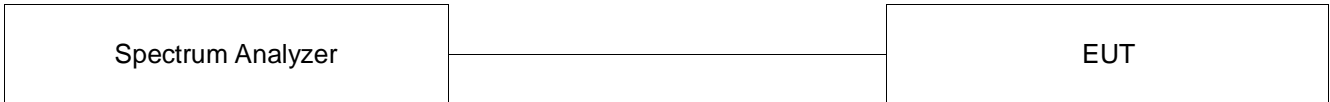
Temperature : -
Relative humidity : -

8.2 Measurement method

Standard : §15.247 (a) (1) (i)

8.3 Test setup

Allow the trace to stabilize. It may prove necessary to break the span up to sections, in order to clearly show all of the hopping frequencies.



8.4 Test data

Operating mode : Transmit mode
Test Result : Report No : DRTFCC1510-0211



9. Time of Occupancy (Dwell Time)

9.1 Operating environment

Temperature : -

Relative humidity : -

9.2 Measurement method

Standard : §15.247 (a) (1) (i)

9.3 Test setup

If possible, use the marker-delta function to determine the dwell time. If this value varies with different modes of operation (e.g., data rate, modulation format, etc.), repeat this test for each variation.



9.4 Test data

Operating mode : Transmit mode

Test Result : Report No : DRTFCC1510-0211



10. Conducted Spurious Emission

10.1 Operating environment

Temperature : -

Relative humidity : -

10.2 Measurement method

Standard : §15.247 (d)

10.3 Test setup

Allow the trace to stabilize. Set the marker on the peak of any spurious emission recorded.



10.4 Test data

Operating mode : Transmit mode

Test Result : Report No : DRTFCC1510-0211

11. Radiated Spurious Emission

11.1 Operating environment

Temperature : 24.1 °C
Relative humidity : 47.6 %

11.2 Measurement method

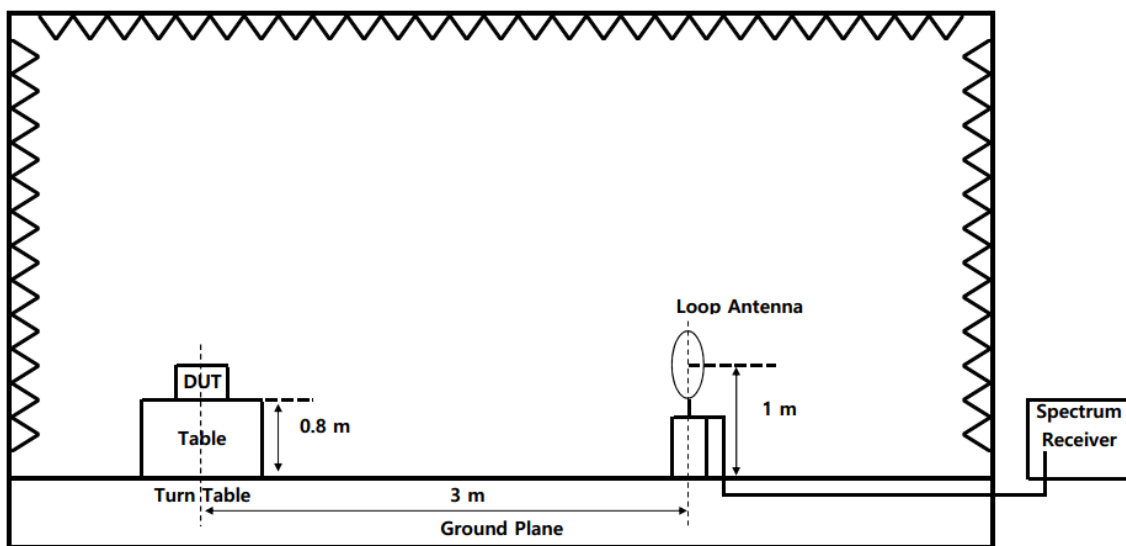
Standard : §15.247 (d), §15.209, §15.205

11.3 Test setup

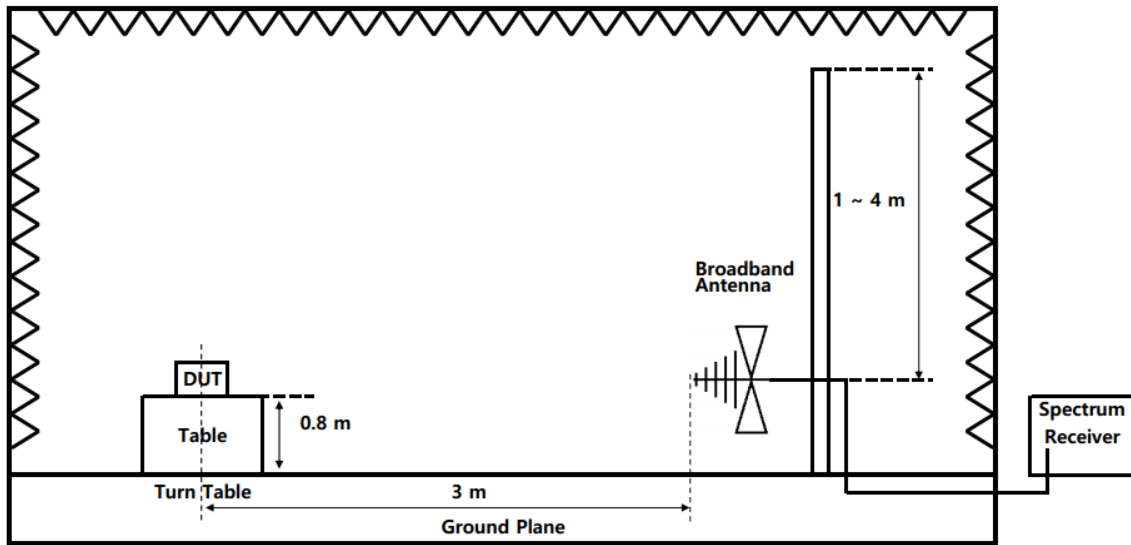
The radiated emissions measurements were performed on the 3 m, Semi-Anechoic Chamber. The EUT was placed on a non-conductive turntable above the ground plane.

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.

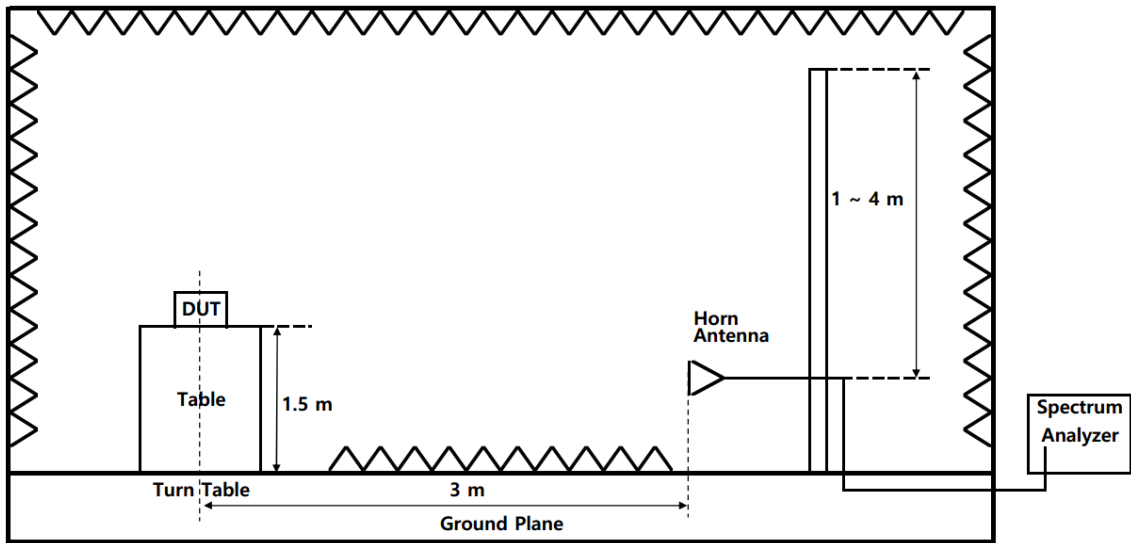
11.3.1 Below 30 MHz



11.3.2 30 MHz to 1 GHz



11.3.3 Above 1 GHz





11.4 Test data

Operating mode : Transmit mode

Test Result : Pass

11.4.1 Test data for Spurious & Harmonic

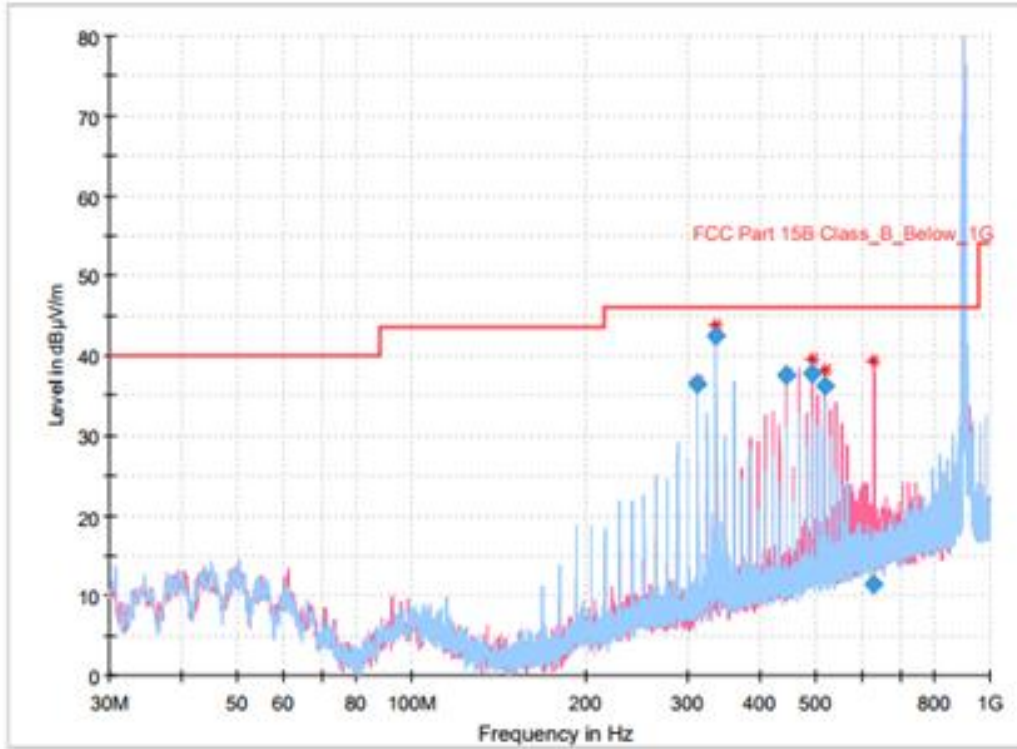
11.4.1.1 Measurement Results for below 30 MHz

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 = Limit – Result



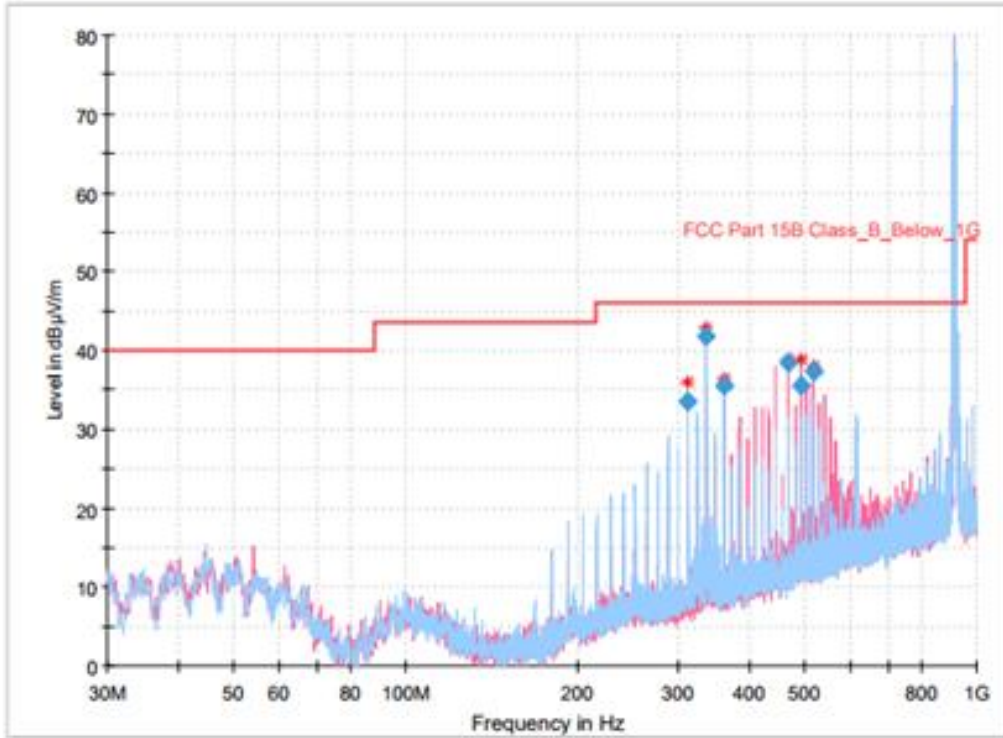
11.4.1.2 Measurement Results for below 1 GHz



Final Result

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
312.367000	36.51	46.00	9.49	1000.0	120.000	100.1	H	103.0	-20.6
336.423000	42.57	46.00	3.43	1000.0	120.000	100.1	H	300.0	-19.4
444.481000	37.49	46.00	8.51	1000.0	120.000	100.1	V	354.0	-17.0
492.593000	37.74	46.00	8.26	1000.0	120.000	100.1	V	23.0	-15.7
516.649000	36.18	46.00	9.82	1000.0	120.000	100.1	V	354.0	-15.4
630.333000	11.33	46.00	34.67	1000.0	120.000	200.0	V	334.0	-13.3

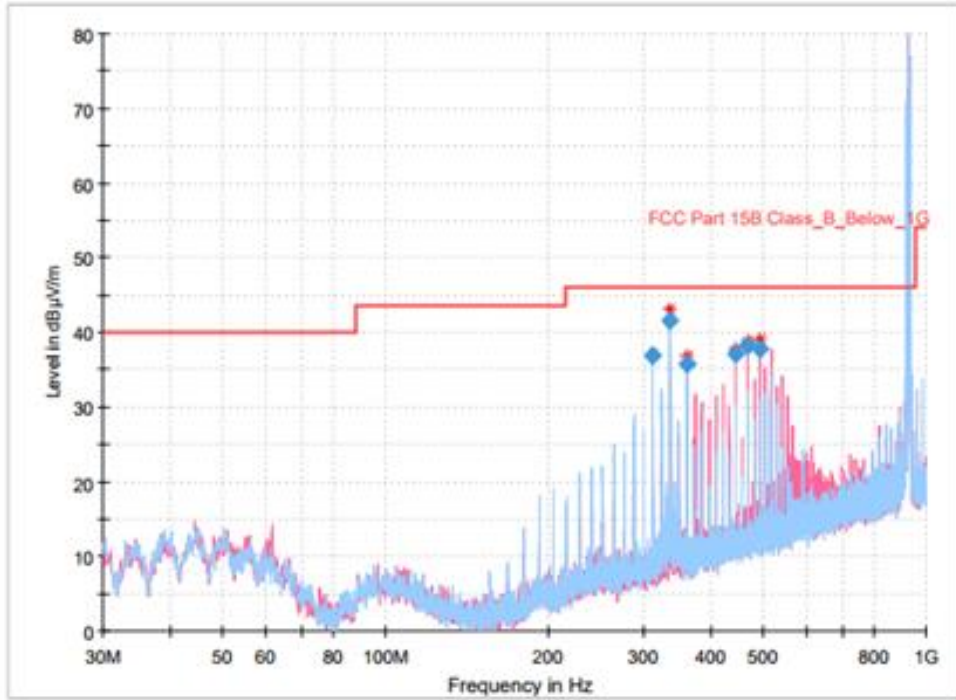
Low CH



Final Result

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
312.270000	33.45	46.00	12.55	1000.0	120.000	100.1	H	265.0	-20.6
336.326000	41.84	46.00	4.16	1000.0	120.000	100.1	H	265.0	-19.4
360.382000	35.59	46.00	10.41	1000.0	120.000	100.1	H	69.0	-19.3
468.634000	38.54	46.00	7.46	1000.0	120.000	100.1	V	8.0	-16.5
492.496000	35.57	46.00	10.43	1000.0	120.000	100.1	V	0.0	-15.7
516.552000	37.27	46.00	8.73	1000.0	120.000	100.1	V	18.0	-15.4

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)
312.367000	36.83	46.00	9.17	1000.0	120.000	100.1	H	87.0	-20.6
336.326000	41.61	46.00	4.39	1000.0	120.000	100.1	H	87.0	-19.4
360.382000	35.69	46.00	10.31	1000.0	120.000	100.1	H	283.0	-19.3
444.578000	37.09	46.00	8.91	1000.0	120.000	100.1	V	335.0	-17.0
468.537000	38.26	46.00	7.74	1000.0	120.000	100.1	V	0.0	-16.5
492.593000	37.79	46.00	8.21	1000.0	120.000	100.1	V	359.0	-15.7

High CH



11.4.1.3 Measurement Results for Above 1 GHz

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							
1 804.10	57.11	Peak	V	-15.70	41.41	73.98	32.57
	39.05	Average	V		23.35	53.98	30.63
2 708.50	52.06	Peak	V	-13.60	38.46	73.98	35.52
	35.75	Average	V		22.15	53.98	31.83
4 513.90	42.02	Peak	H	-5.20	36.82	73.98	37.16
	27.52	Average	H		22.32	53.98	31.66
Mid CH							
1 829.60	59.54	Peak	V	-15.80	43.74	73.98	30.24
	36.14	Average	V		20.34	53.98	33.64
2 745.90	48.72	Peak	V	-13.60	35.12	73.98	38.86
	32.80	Average	V		19.20	53.98	34.78
High CH							
1 853.40	58.25	Peak	V	-15.70	42.55	73.98	31.43
	38.57	Average	V		22.87	53.98	31.11
2 781.60	54.14	Peak	V	-13.40	40.74	73.98	33.24
	36.92	Average	V		23.52	53.98	30.46

- ※ Ant. Pol. : Antenna Polarization
- ※ Corr. Factor. : Antenna Factor + Cable Loss - Amplifier Gain
- ※ Result = Reading + Corr. Factor
- ※ Margin = Limit – Result

- END -