

TEST REPORT

Applicant: Convergence Systems Limited
Address: 11/F., Tower I, Tern Centre, 237 Queen's Road
Central, Hong Kong
Equipment Type: RFID Reader
Model Name: CS710S-2
Brand Name: CSL
FCC ID: UB4CS710S
ISED Number: 8073A-CS710SCA
Test Standard: 47 CFR Part 15 Subpart C
RSS-Gen Issue 5
RSS-247 Issue 2
(refer section 3.1)
Test Date: Jun. 01, 2022 - Jun. 07, 2022
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ISSUED BY:

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Revision History

Version	Issue Date	Revisions
<u>Rev. 01</u>	<u>Aug. 01, 2022</u>	<u>Initial Issue</u>

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1 GENERAL INFORMATION

1.1 Identification of the Testing Laboratory

Company Name	Shenzhen BALUN Technology Co., Ltd.
Address	Block B, 1/F, Baisha Science and Technology Park, Shahe West Road, Nanshan District, ShenZhen, GuangDong Province, China
Phone Number	+86 755 6685 0100

1.2 Identification of the Responsible Testing Location

Test Location	Shenzhen BALUN Technology Co., Ltd.
Address	Block B, 1/F, Baisha Science and Technology Park, Shahe West Road, Nanshan District, ShenZhen, GuangDong Province, China
Accreditation Certificate	The laboratory is a testing organization accredited by FCC as a accredited testing laboratory. The designation number is CN1196. The laboratory has been listed by Industry Canada to perform electromagnetic emission measurements. The recognition numbers of test site are 11524A.
Description	All measurement facilities used to collect the measurement data are located at Block B, 1/F, Baisha Science and Technology Park, Shahe West Road, Nanshan District, ShenZhen, GuangDong Province, China

2 PRODUCT INFORMATION

2.1 Applicant Information

Applicant	Convergence Systems Limited
Address	11/F., Tower I, Tern Centre, 237 Queen's Road Central, Hong Kong

2.2 Manufacturer Information

Manufacturer	Convergence Systems Limited
Address	11/F., Tower I, Tern Centre, 237 Queen's Road Central, Hong Kong

2.3 Factory Information

Factory	Seveco Global Limited
Address	No.2, Jianxiang Street, Hanxishui Village, Chashan Town, Dongguan City, Guangdong Province, P.R. China

2.4 General Description for Equipment under Test (EUT)

EUT Name	RFID Reader
Model Name Under Test	CS710S-2
Series Model Name	N/A
Description of Model name differentiation	N/A
Serial Number	KBAYYMPQQXXXXXXXX
Hardware Version	V1.1
Software Version	V0.0.105
Dimensions (Approx.)	N/A
Weight (Approx.)	N/A

2.5 Technical Information

Network and Wireless connectivity	Bluetooth BLE, RFID
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The requirement for the following technical information of the EUT was tested in this report:

Modulation Technology	Frequency hopping system
Modulation Type	RFID
Product Type	☐ Mobile ☒ Portable ☐ Fix Location
Frequency Range	The frequency block is 902MHz to 928MHz.
Number of channel	50
Tested Channel	1 (902.75 MHz), 26 (915.25 MHz), 50 (927.25 MHz)
Antenna Type	Patch Antenna
Antenna Gain	2.45 dBi (In test items related to antenna gain, the final results reflect this figure. This value is provided by the applicant.)
Antenna System(MIMO Smart Antenna)	N/A

All channel was listed on the following table:

Channel number	Freq. (MHz)	Channel number	Freq. (MHz)	Channel number	Freq. (MHz)	Channel number	Freq. (MHz)
1	902.75	14	909.25	27	915.75	40	922.25
2	903.25	15	909.75	28	916.25	41	922.75
3	903.75	16	910.25	29	916.75	42	923.25
4	904.25	17	910.75	30	917.25	43	923.75
5	904.75	18	911.25	31	917.75	44	924.25
6	905.25	19	911.75	32	918.25	45	924.75
7	905.75	20	912.25	33	918.75	46	925.25
8	906.25	21	912.75	34	919.25	47	925.75
9	906.75	22	913.25	35	919.75	48	926.25
10	907.25	23	913.75	36	920.25	49	926.75
11	907.75	24	914.25	37	920.75	50	927.25
12	908.25	25	914.75	38	921.25		
13	908.75	26	915.25	39	921.75		

2.6 Additional Instructions

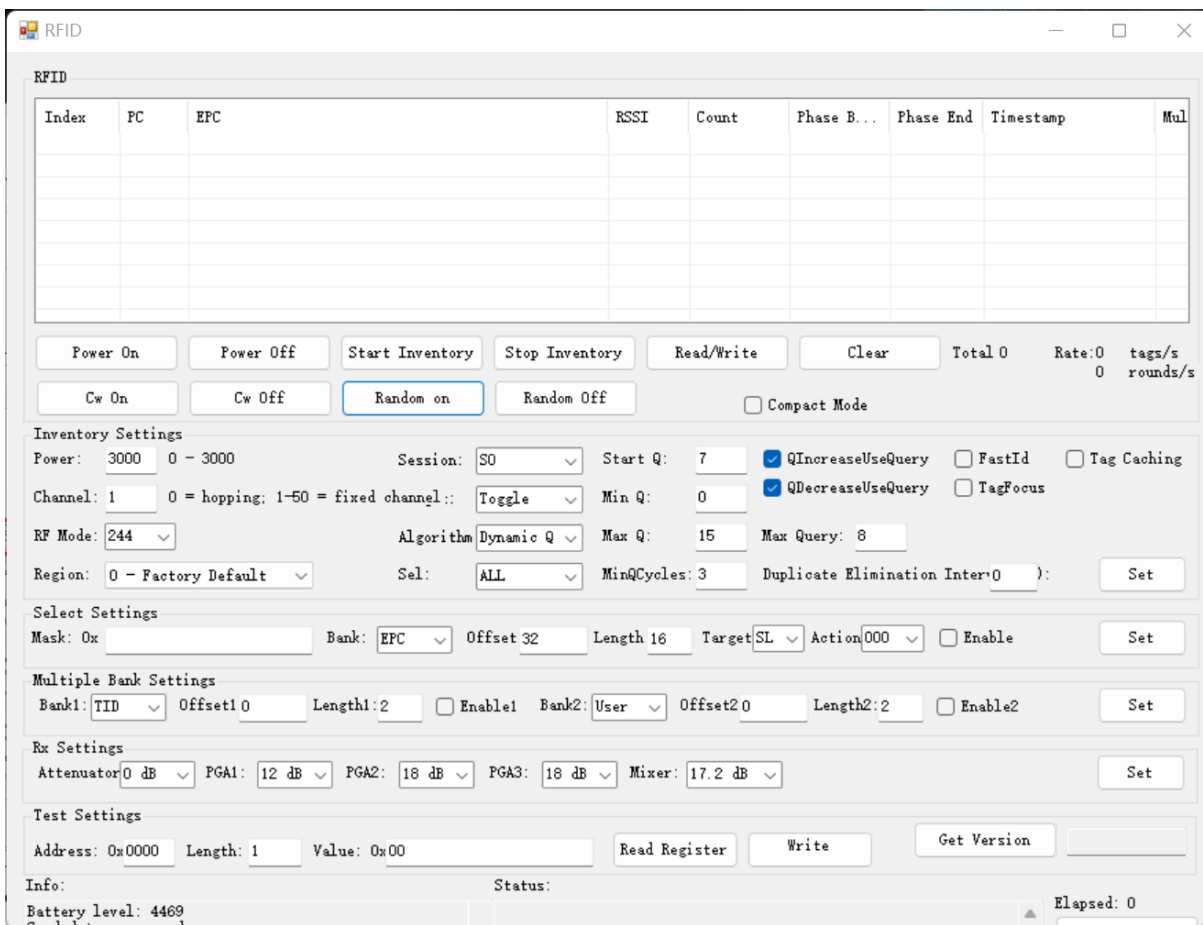
EUT Software Settings:

Mode	☒ Special software is used. The software provided by client to enable the EUT under transmission condition continuously at specific channel frequencies individually.
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During testing, Channel and Power Controlling Software provided by the customer was used to control the operating channel as well as the output power level. The RF output power selection is for the setting of RF output power expected by the customer and is going to be fixed on the firmware of the final end product.

Power level setup in software			
Test Software Version	CS710 Factory Test App		
Support Units (Software installation media)	Description	Manufacturer	Model
	Notebook	Lenovo	X220
Mode	Channel	Frequency (MHz)	Soft Set
RFID	CH1	902.75	TX LEVEL is built-in set parameters and cannot be changed and selected.
	CH26	915.25	
	CH50	927.25	

Run Software:



The screenshot shows the RFID software interface with the following sections:

- RFID Table:** A table with columns: Index, PC, EPC, RSSI, Count, Phase B..., Phase End, Timestamp, and Mul.
- Control Buttons:** Power On, Power Off, Start Inventory, Stop Inventory, Read/Write, Clear, Total 0, Rate: 0 tags/s, 0 rounds/s, Cw On, Cw Off, Random on, Random Off, and Compact Mode checkbox.
- Inventory Settings:**
 - Power: 3000 (0 - 3000)
 - Session: S0
 - Start Q: 7
 - QIncreaseUseQuery: ☒
 - FastId: ☐
 - Tag Caching: ☐
 - Channel: 1 (0 = hopping; 1-50 = fixed channel)
 - Toggle: ☐
 - Min Q: 0
 - QDecreaseUseQuery: ☒
 - TagFocus: ☐
 - RF Mode: 244
 - Algorithm: Dynamic Q
 - Max Q: 15
 - Max Query: 8
 - Region: 0 - Factory Default
 - Sel: ALL
 - MinQCycles: 3
 - Duplicate Elimination Inter: 0
 - Set button
- Select Settings:**
 - Mask: 0x
 - Bank: EPC
 - Offset: 32
 - Length: 16
 - Target: SL
 - Action: 000
 - Enable: ☐
 - Set button
- Multiple Bank Settings:**
 - Bank1: TID
 - Offset1: 0
 - Length1: 2
 - Enable1: ☐
 - Bank2: User
 - Offset2: 0
 - Length2: 2
 - Enable2: ☐
 - Set button
- Rx Settings:**
 - Attenuator: 0 dB
 - PGA1: 12 dB
 - PGA2: 18 dB
 - PGA3: 18 dB
 - Mixer: 17.2 dB
 - Set button
- Test Settings:**
 - Address: 0x0000
 - Length: 1
 - Value: 0x00
 - Read Register button
 - Write button
 - Get Version button
- Info:** Battery level: 4469
- Status:** Elapsed: 0

3 SUMMARY OF TEST RESULTS

3.1 Test Standards

No.	Identity	Document Title
1	47 CFR Part 15, Subpart C	Miscellaneous Wireless Communications Services
2	KDB Publication 558074 D01v05r02	GUIDANCE FOR COMPLIANCE MEASUREMENTS ON DIGITAL TRANSMISSION SYSTEM, FREQUENCY HOPPING SPREAD SPECTRUM SYSTEM, AND HYBRID SYSTEM DEVICES OPERATING UNDER SECTION 15.247 OF THE FCC RULES
3	RSS-Gen Issue 5	General Requirements for Compliance of Radio Apparatus
4	RSS-247 Issue 2	Digital Transmission Systems (DTSs), Frequency Hopping Systems(FHSs) and Licence-Exempt Local Area Network (LE-LAN) Devices
5	ANSI C63.10-2013	American National Standard for Testing Unlicensed Wireless Devices

3.2 Test Verdict

No.	Description	FCC Part No.	ISED Part No.	Modulation Technology	Channel	Test Result	Verdict
1	Antenna Requirement	15.203	RSS-247, 5.4 (d)	N/A	N/A	--	Pass ^{Note}
2	Number of Hopping Frequencies	15.247(a)	RSS-247, 5.1 (c)	Frequency hopping system	Hopping Mode	ANNEX A.1	Pass
3	Peak Output Power	15.247(b)	RSS-247, 5.4 (a)	Frequency hopping system	Low/Middle/High	ANNEX A.2	Pass
4	Occupied Bandwidth	15.247(a)	RSS-247, 5.1 (a)	Frequency hopping system	Low/Middle/High	ANNEX A.3	Pass
5	Carrier Frequency Separation	15.247(a)	RSS-247, 5.1 (b)	Frequency hopping system	Hopping Mode	ANNEX A.4	Pass
6	Time of Occupancy (Dwell time)	15.247(a)	RSS-247, 5.1 (c)	Frequency hopping system	Hopping Mode	ANNEX A.5	Pass
7	Conducted Spurious Emission & Authorized-band band-edge	15.247(d)	RSS-247, 5.5	Frequency hopping system	Low/Middle/High, Hopping Mode	ANNEX A.6	Pass
8	Conducted Emission	15.207	RSS-GEN, 8.8	Frequency hopping system	Low/Middle/High	ANNEX A.7	Pass
9	Radiated Spurious Emission	15.209 15.247(d)	RSS-247, 5.5	Frequency hopping system	Low/Middle/High	ANNEX A.8	Pass
10	Band Edge(Restricted-band band-edge)	15.209 15.247(d)	RSS-247, 5.5	Frequency hopping system	Low/Middle/High	ANNEX A.9	Pass
Note: Please refer to section 5.1							

4 GENERAL TEST CONFIGURATIONS

4.1 Test Environments

During the measurement, the normal environmental conditions were within the listed ranges:

Relative Humidity	47% to 66%	
Atmospheric Pressure	100 kPa to 102 kPa	
Temperature	NT (Normal Temperature)	+18.7°C to +25°C
Working Voltage of the EUT	NV (Normal Voltage)	3.7 V

4.2 Test Equipment List

Description	Manufacturer	Model	Serial No.	Cal. Date	Cal. Due
Spectrum Analyzer	KEYSIGHT	N9020A	MY50330200	2022.05.19	2023.05.18
Spectrum Analyzer	ROHDE&SCHWARZ	FSV-40	101544	2022.01.04	2023.01.03
Spectrum Analyzer	KEYSIGHT	N9020A	MY52510065	2021.09.08	2022.09.07
Test Antenna-Horn (1-18 GHz)	SCHWARZBECK	BBHA 9120D	01631	2022.02.03	2025.02.02
Test Antenna-Horn (18-40 GHz)	A-INFO	LB- 180400KF	J211060273	2021.07.02	2024.07.01
Anechoic Chamber	RAINFORD	9m*6m*6m	N/A	2021.09.04	2024.09.03
EMI Receiver	ROHDE&SCHWARZ	ESRP	101036	2021.10.10	2022.10.09
Test Antenna-Bi-Log (30 MHz-1 GHz)	SCHWARZBECK	VULB 9168	00883	2022.04.01	2025.03.31
Anechoic Chamber	EMC Electronic Co., Ltd	20.10*11.60 *7.35m	N/A	2021.08.15	2024.08.14
EMI Receiver	KEYSIGHT	N9010B	MY57110309	2021.10.10	2022.10.09
LISN	SCHWARZBECK	NSLK 8127	8127-687	2022.06.01	2023.05.31
Shielded Enclosure	YiHeng Electronic Co., Ltd	3.5m*3.1m* 2.8m	N/A	2022.02.19	2025.02.18

4.3 Test Software List

Description	Manufacturer	Software Version	Serial No.	Applicable test Setup
BL410R	BALUN	V2.1.1.488	N/A	The section 4.5.1
BL410E	BALUN	V19.8.28.435	N/A	The section 4.5.2&4.5.3&4.5.4&4.5.5

4.4 Measurement Uncertainty

The following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2.

This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

Parameters	Uncertainty
Occupied Channel Bandwidth	2.8%
RF output power, conducted	1.28 dB
Power Spectral Density, conducted	1.30 dB
Unwanted Emissions, conducted	1.84 dB
All emissions, radiated	5.36 dB
Temperature	0.82°C
Humidity	4.1%

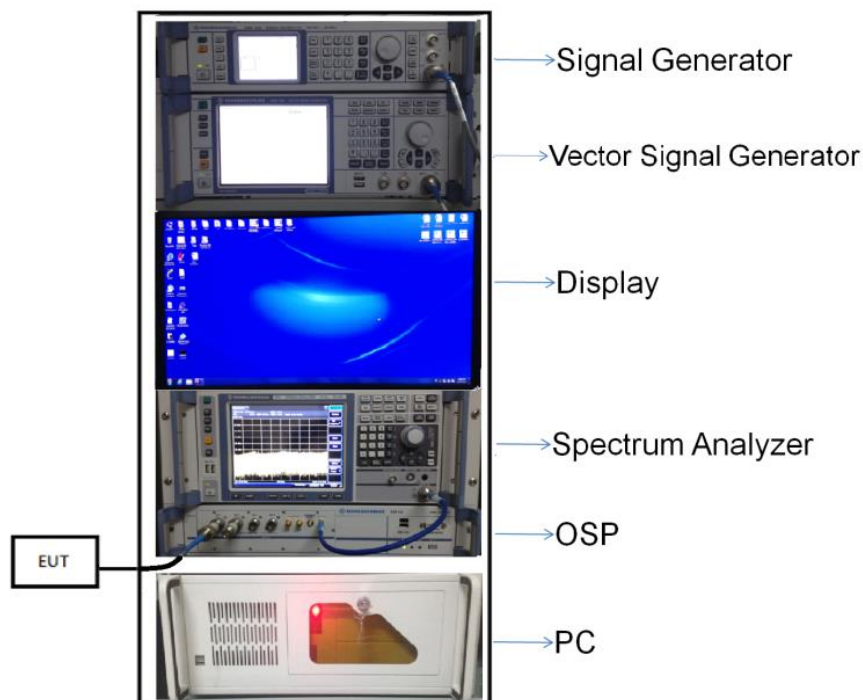
4.5 Description of Test Setup

4.5.1 For Antenna Port Test

Conducted value (dBm) = Measurement value (dBm) + cable loss (dB)

For example: the measurement value is 10 dBm and the cable 0.5dBm used, then the final result of EUT:

Conducted value (dBm) = 10 dBm + 0.5 dB = 10.5 dBm



(Diagram 1)

4.5.2 For AC Power Supply Port Test



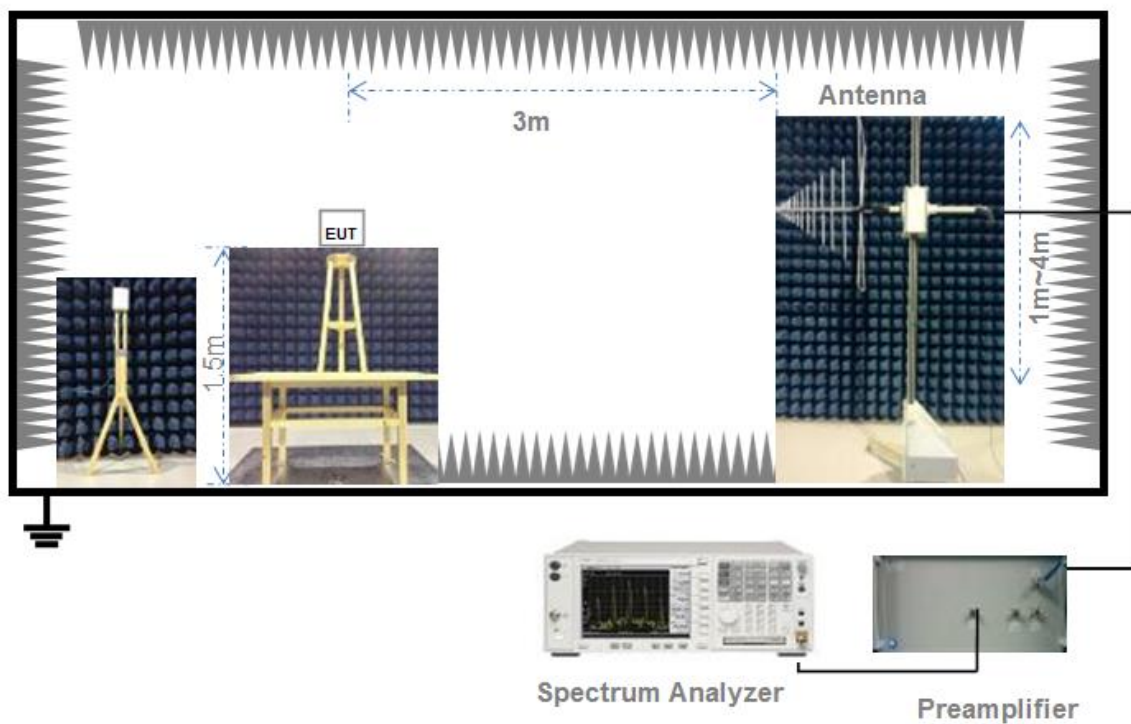
(Diagram 2)

4.5.3 For Radiated Test (Below 30 MHz)



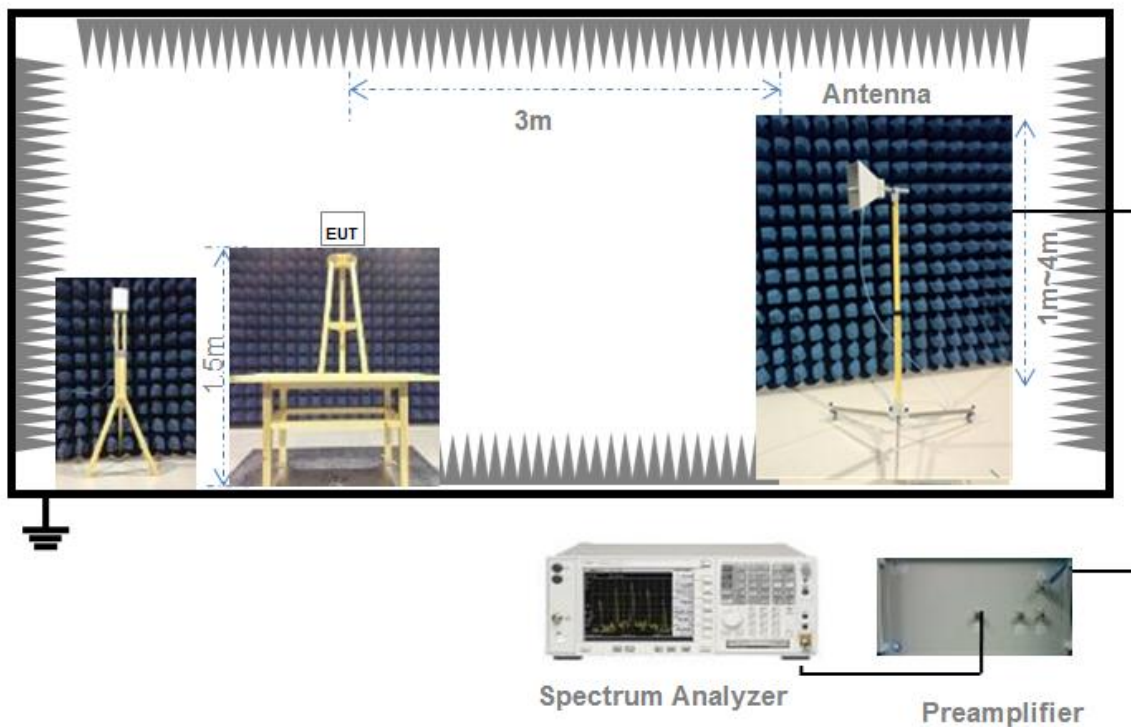
(Diagram 3)

4.5.4 For Radiated Test (30 MHz-1 GHz)



(Diagram 4)

4.5.5 For Radiated Test (Above 1 GHz)



(Diagram 5)

4.6 Measurement Results Explanation Example

4.6.1 For conducted test items:

The offset level is set in the spectrum analyzer to compensate the RF cable loss and attenuator between EUT conducted output port and spectrum analyzer. With the offset compensation, the spectrum analyzer reading level is exactly the EUT RF output level.

The spectrum analyzer offset is derived from RF cable loss and attenuator factor.

Offset = RF cable loss + attenuator factor.

5 TEST ITEMS

5.1 Antenna Requirements

5.1.1 Relevant Standards

FCC §15.203; RSS-247, 5.4 (d)

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. This requirement does not apply to carrier current devices or to devices operated under the provisions of § 15.211, § 15.213, § 15.217, § 15.219, or § 15.221. Further, this requirement does not apply to intentional radiators that must be professionally installed, such as perimeter protection systems and some field disturbance sensors, or to other intentional radiators which, in accordance with § 15.31(d), must be measured at the installation site. However, the installer shall be responsible for ensuring that the proper antenna is employed so that the limits in this part are not exceeded.

If directional gain of transmitting antennas is greater than 6 dBi, the power shall be reduced by the same level in dB comparing to gain minus 6 dBi. For the fixed point-to-point operation, the power shall be reduced by one dB for every 3 dB that the directional gain of the antenna exceeds 6 dBi. 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 FCC rule.

5.1.2 Antenna Anti-Replacement Construction

The Antenna Anti-Replacement as following method:

Protected Method	Description
The antenna is embedded in the product	The antenna is welded on the mainboard, can't be replaced by the consumer

Reference Documents	Item
Photo	Please refer to the EUT Photo documents.

5.1.3 Antenna Gain

The antenna peak gain of EUT is less than 6 dBi. Therefore, it is not necessary to reduce maximum peak output power limit.

5.2 Number of Hopping Frequencies

5.2.1 Limit

FCC §15.247(a); RSS-247, 5.1 (c)

For FHSs in the band 902-928 MHz: if the 20 dB bandwidth of the hopping channel is less than 250 kHz, the system shall use at least 50 hopping channels and the average time of occupancy on any channel shall not be greater than 0.4 seconds within a 20-second period. If the 20 dB bandwidth of the hopping channel is 250 kHz or greater, the system shall use at least 25 hopping channels and the average time of occupancy on any channel shall not be greater than 0.4 seconds within a 10-second period. The maximum 20 dB bandwidth of the hopping channel shall be 500 kHz.

5.2.2 Test Setup

See section 4.4.1 for test setup description for the antenna port. The photo of test setup please refer to ANNEX B.

5.2.3 Test Procedure

The EUT must have its hopping function enabled. Use the following spectrum analyzer settings:

Span = the frequency band of operation

RBW $\geq$ 1% of the span

VBW $\geq$ RBW

Sweep = auto

Detector function = peak

Trace = max hold

Allow the trace to stabilize

5.2.4 Test Result

Please refer to ANNEX A.1.

5.3 Peak Output Power and E.I.R.P

5.3.1 Test Limit

FCC § 15.247(b); RSS-247, 5.4 (a)

For frequency hopping systems operating in the 902-928 MHz band: 1 watt for systems employing at least 50 hopping channels; and, 0.25 watts for systems employing less than 50 hopping channels, but at least 25 hopping channels, as permitted under paragraph (a)(1)(i) of this section.

RSS-247, 5.4 (2)

For FHSs operating in the band 902-928 MHz, the maximum peak conducted output power shall not exceed 1.0 W and the e.i.r.p. shall not exceed 4 W if the hopset uses 75 or more hopping channels; the maximum peak conducted output power shall not exceed 0.125 W and the e.i.r.p. shall not exceed 0.5 W if the hopset uses less than 75 hopping channels (see Section 5.4(5) for exceptions).

5.3.2 Test Setup

See section 4.4.1 for test setup description for the antenna port. The photo of test setup please refer to ANNEX B.

5.3.3 Test Procedure

The Module operates at hopping-off test mode. The lowest, middle and highest channels are selected to perform testing to verify the conducted RF output peak power of the Module.

Use the following spectrum analyzer settings:

Span = approximately 5 times the 20 dB bandwidth, centered on a hopping channel

RBW > the 20 dB bandwidth of the emission being measured

VBW $\geq$ RBW

Sweep = auto

Detector function = peak

Trace = max hold

Allow the trace to stabilize.

5.3.4 Test Result

Please refer to ANNEX A.2.

5.4 Occupied Bandwidth

5.4.1 Limit

FCC §15.247(a); RSS-247, 5.1 (a)

5.4.2 Test Setup

See section 4.4.1 for test setup description for the antenna port. The photo of test setup please refer to ANNEX B.

5.4.3 Test Procedure

Use the following spectrum analyzer settings:

Span = approximately 2 to 3 times the 20 dB bandwidth, centered on a hopping channel

RBW = in the range of 1% to 5% of the OBW

VBW $\geq$ RBW

Sweep = auto

Detector function = peak

Trace = max hold

The EUT should be transmitting at its maximum data rate, Allow the trace to stabilize.

5.4.4 Test Result

Please refer to ANNEX A.3.

5.5 Carrier Frequency Separation

5.5.1 Limit

FCC §15.247(a); RSS-247, 5.1 (b)

Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater.

5.5.2 Test Setup

See section 4.4.1 for test setup description for the antenna port. The photo of test setup please refer to ANNEX B.

5.5.3 Test Procedure

The EUT must have its hopping function enabled. Use the following spectrum analyzer settings:

Span = wide enough to capture the peaks of two adjacent channels

Resolution (or IF) Bandwidth (RBW) $\geq 1\%$ of the span

Video (or Average) Bandwidth (VBW) $\geq$ RBW

Sweep = auto

Detector function = peak

Trace = max hold

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

5.5.4 Test Result

Please refer to ANNEX A.4.

5.6 Time of Occupancy (Dwell time)

5.6.1 Limit

FCC §15.247(a); RSS-247, 5.1 (c)

For frequency hopping systems operating in the 902-928 MHz band: if the 20 dB bandwidth of the hopping channel is less than 250 kHz, the system shall use at least 50 hopping frequencies and the average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 20 second period; if the 20 dB bandwidth of the hopping channel is 250 kHz or greater, the system shall use at least 25 hopping frequencies and the average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 10 second period.

5.6.2 Test Setup

See section 4.4.1 for test setup description for the antenna port. The photo of test setup please refer to ANNEX B.

5.6.3 Test Procedure

The lowest, middle and highest channels are selected to perform testing to record the dwell time of each occupation measured in this channel, which is called Pulse Time here.

5.6.4 Test Result

Please refer to ANNEX A.5

5.7 Conducted Spurious Emission & Authorized-band band-edge

5.7.1 Limit

FCC §15.247(d); RSS-247, 5.5

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement.

5.7.2 Test Setup

See section 4.4.1 for test setup description for the antenna port. The photo of test setup please refer to ANNEX B.

5.7.3 Test Procedure

Use the following spectrum analyzer settings:

Span = wide enough to capture the peak level of the in-band emission and all spurious emissions (e.g., harmonics) from the lowest frequency generated in the EUT up through the 10th harmonic. Typically, several plots are required to cover this entire span.

RBW = 100 kHz

VBW $\geq$ RBW

Sweep = auto

Detector function = peak

Trace = max hold

Allow the trace to stabilize

5.7.4 Test Result

Please refer to ANNEX A.6 and A.7

5.8 Conducted Emission

5.8.1 Limit

FCC §15.207; RSS-GEN, 8.8

For an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency within the band 150 kHz to 30 MHz shall not exceed the limits in the following table, as measured using a 50 μ H/50 Ω line impedance stabilization network (LISN).

Frequency range (MHz)	Conducted Limit (dB μ V)	
	Quai-peak	Average
0.15 - 0.50	66 to 56	56 to 46
0.50 - 5	56	46
0.50 - 30	60	50

5.8.2 Test Setup

See section 4.4.2 for test setup description for the AC power supply port. The photo of test setup please refer to ANNEX B.

5.8.3 Test Procedure

The maximum conducted interference is searched using Peak (PK), if the emission levels more than the AV and QP limits, and that have narrow margins from the AV and QP limits will be re-measured with AV and QP detectors. Tests for both L phase and N phase lines of the power mains connected to the EUT are performed. Refer to recorded points and plots below.

Devices subject to Part 15 must be tested for all available U.S. voltages and frequencies (such as a nominal 120 VAC, 50/60 Hz and 240 VAC, 50/60 Hz) for which the device is capable of operation. A device rated for 50/60 Hz operation need not be tested at both frequencies provided the radiated and line conducted emissions are the same at both frequencies.

5.8.4 Test Result

Please refer to ANNEX A.7.

5.9 Radiated Spurious Emission

5.9.1 Limit

FCC §15.209&15.247(d); RSS-247, 5.5

Radiated emission outside the frequency band attenuation below the general limits specified in FCC section 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in FCC section 15.205(a), must also comply with the radiated emission limits specified in FCC section 15.209(a).

According to FCC section 15.209 (a), except as provided elsewhere in this subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:

Frequency (MHz)	Field Strength (μV/m)	Measurement Distance (m)
0.009 - 0.490	902/F(kHz)	300
0.490 - 1.705	9020/F(kHz)	30
1.705 - 30.0	30	30
30 - 88	100	3
88 - 216	150	3
216 - 960	200	3
Above 960	500	3

Note:

1. Field Strength (dBμV/m) = 20*log[Field Strength (μV/m)].
2. In the emission tables above, the tighter limit applies at the band edges.
3. For Above 1000 MHz, the emission limit in this paragraph is based on measurement instrumentation employing an average detector, measurement using instrumentation with a peak detector function, corresponding to 20dB above the maximum permitted average limit.
4. For above 1000 MHz, limit field strength of harmonics: 54dBuV/m@3m (AV) and 74dBuV/m@3m (PK).

5.9.2 Test Setup

See section 4.4.3 to 4.4.5 for test setup description for the antenna port. The photo of test setup please refer to ANNEX B.

5.9.3 Test Procedure

The measurement frequency range is from 9 kHz to the 10th harmonic of the fundamental frequency. The Turn Table is actuated to turn from 0° to 360°, and both horizontal and vertical polarizations of the Test Antenna are used to find the maximum radiated power. Mid channels on all channel bandwidth verified. Only the worst RB size/offset presented.

The power of the EUT transmitting frequency should be ignored.

All Spurious Emission tests were performed in X, Y, Z axis direction. And only the worst axis test condition was recorded in this test report.

Use the following spectrum analyzer settings:

Span = wide enough to fully capture the emission being measured

RBW = 1 MHz for $f \geq 1$ GHz, 100 kHz for $f < 1$ GHz

VBW $\geq$ RBW

Sweep = auto

Detector function = peak

Trace = max hold

For measurement below 1GHz, If the emission level of the EUT measured by the peak detector is 3 dB lower than the applicable limit, the peak emission level will be reported, Otherwise, the emission measurement will be repeated using the quasi-peak detector and reported.

5.9.4 Test Result

Please refer to ANNEX A.8.

5.10 Band Edge (Restricted-band band-edge)

5.10.1 Limit

FCC §15.209&15.247(d); RSS-247, 5.5

Radiated emission outside the frequency band attenuation below the general limits specified in FCC section 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in FCC section 15.205(a), must also comply with the radiated emission limits specified in FCC section 15.209(a).

5.10.2 Test Setup

See section 4.4.3 to 4.4.5 for test setup description for the antenna port. The photo of test setup please refer to ANNEX B.

5.10.3 Test Procedure

The measurement frequency range is from 9 kHz to the 10th harmonic of the fundamental frequency. The Turn Table is actuated to turn from 0° to 360°, and both horizontal and vertical polarizations of the Test Antenna are used to find the maximum radiated power. Mid channels on all channel bandwidth verified. Only the worst RB size/offset presented.

The power of the EUT transmitting frequency should be ignored.

All Spurious Emission tests were performed in X, Y, Z axis direction. And only the worst axis test condition was recorded in this test report.

Use the following spectrum analyzer settings:

Span = wide enough to fully capture the emission being measured

RBW = 1 MHz for $f \geq 1$ GHz, 100 kHz for $f < 1$ GHz

VBW $\geq$ RBW

Sweep = auto

Detector function = peak

Trace = max hold

For measurement below 1GHz, If the emission level of the EUT measured by the peak detector is 3 dB lower than the applicable limit, the peak emission level will be reported, Otherwise, the emission measurement will be repeated using the quasi-peak detector and reported.

5.10.4 Test Result

Please refer to ANNEX A.9.

ANNEX A TEST RESULT

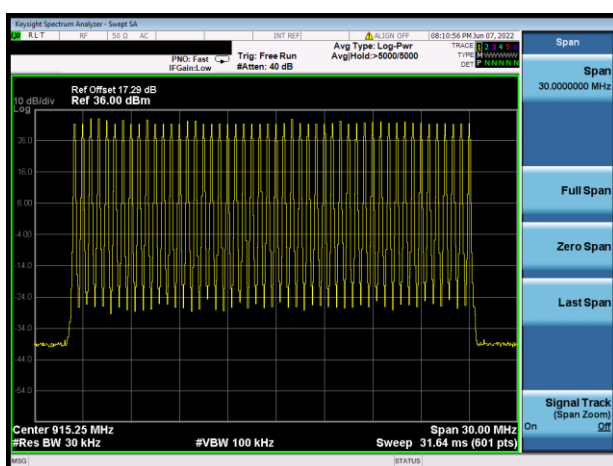
A.1 Number of Hopping Frequency

Test Data

Test Mode	Frequency Block (MHz)	Measured Channel Numbers	Min. Limit	Verdict
RFID	902-928	50	50	Pass

Test Plots

RFID



A.2 Peak Output Power

Test Data

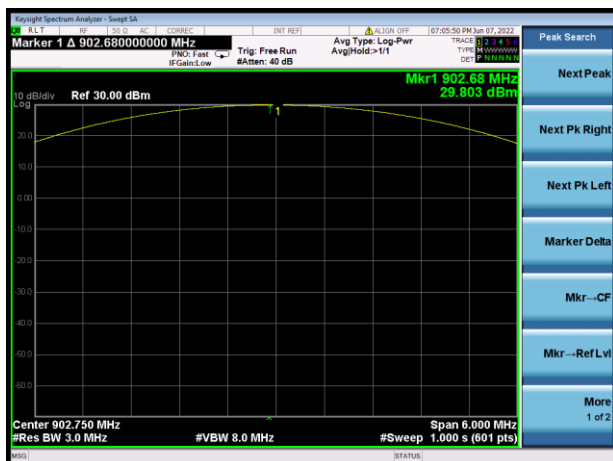
Channel	Measured Output Peak Power		Limit		Verdict
	RFID		dBm	mW	
	dBm	mW			
Low	29.80	955.65	30	1000	Pass
Middle	29.89	975.44			Pass
High	29.95	987.87			Pass

E.I.R.P Test Data (For ISSED)

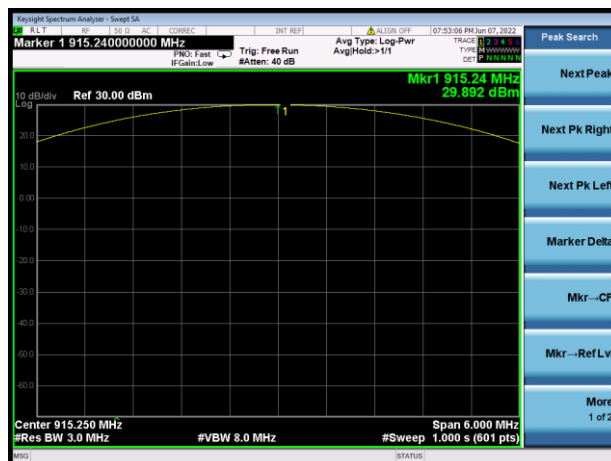
Channel	E.I.R.P		Limit		Verdict
	RFID		dBm	mW	
	dBm	mW			
Low	32.25	1679.96	36	4000	Pass
Middle	32.34	1714.75			Pass
High	32.40	1736.60			Pass

Test Plots

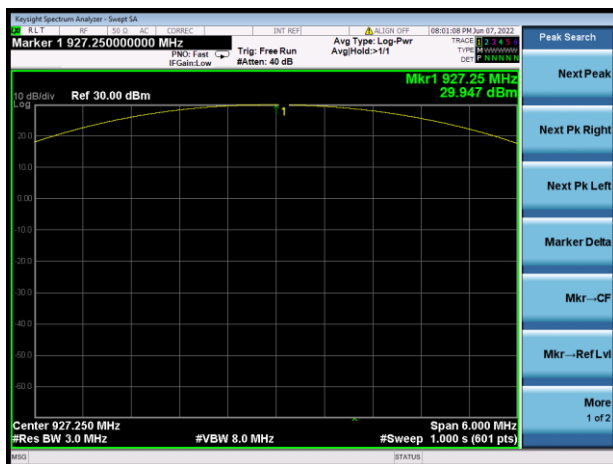
LOW CHANNEL



MIDDLE CHANNEL



HIGH CHANNEL



A.3 20 dB and 99% bandwidth

Test Data

RFID			
Channel	20 dB Bandwidth (MHz)	99% Bandwidth (MHz)	Verdict
Low	0.080000	0.073463	Pass
Middle	0.080000	0.073692	Pass
High	0.080000	0.074053	Pass

Test Plots

20 dB Bandwidth

LOW CHANNEL



MIDDLE CHANNEL



HIGH CHANNEL



99% Bandwidth

LOW CHANNEL



MIDDLE CHANNEL



HIGH CHANNEL



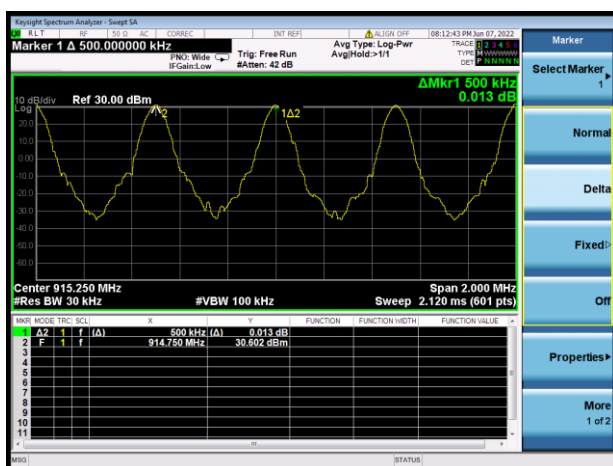
A.4 Hopping Frequency Separation

Test Data

Mode	Frequency separation (MHz)	Max 20 dB Bandwidth (MHz)	Verdict
RFID	0.500	0.080	Pass

Test Plots

RFID



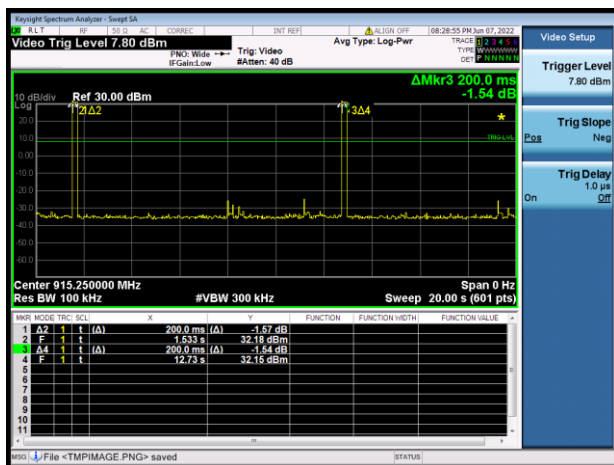
A.5 Average Time of Occupancy

Test Data

Total of Dwell (ms)	Limit (sec)	Verdict
400.0	0.4	Pass

Test Plots

RFID



A.6 Conducted Spurious Emissions & Authorized-band band-edge

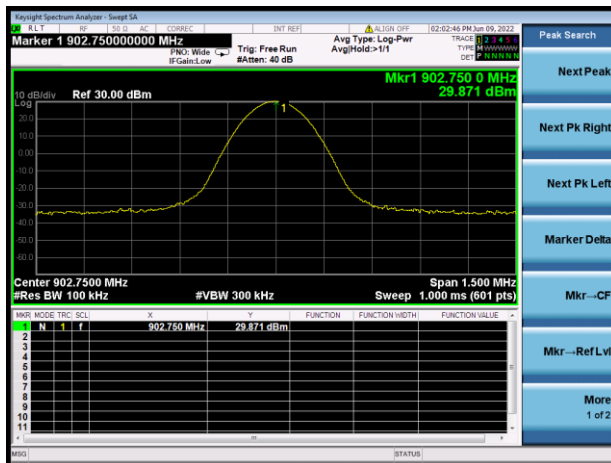
Test Data

RFID				
Channel	Measured Max. Out of Band Emission (dBm)	Limit (dBm)		Verdict
		Carrier Level	Calculated 20 dBc Limit	
Low	-17.37	29.87	9.87	Pass
Middle	-17.43	29.63	9.63	Pass
High	-18.16	29.68	9.68	Pass

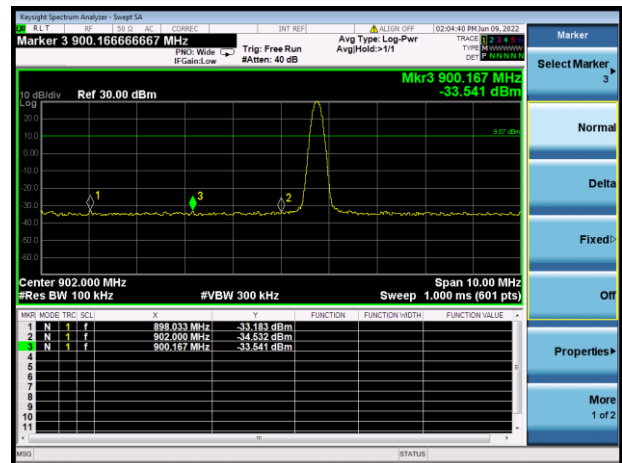
RFID				
Mode	Measured Max. Out of Band Emission (dBm)	Limit (dBm)		Verdict
		Carrier Level	Calculated 20 dBc Limit	
Hopping	-17.38	31.22	11.22	Pass

Test Plots

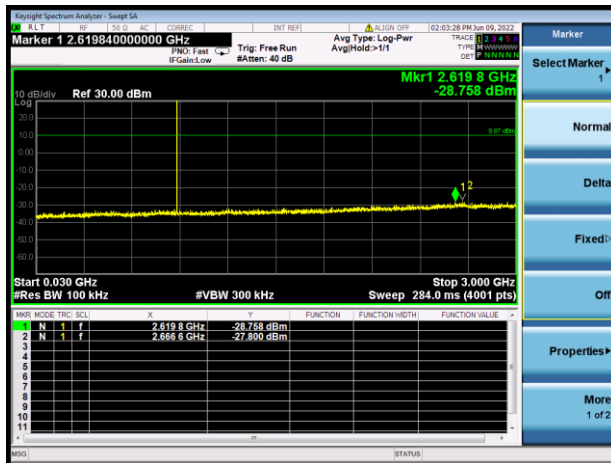
LOW CHANNEL, CARRIER LEVEL



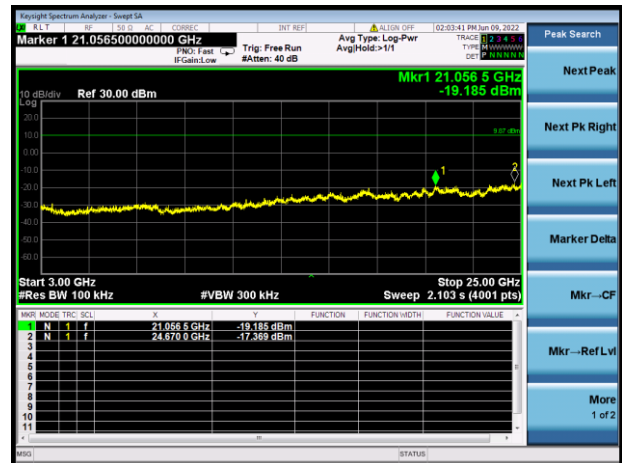
LOW CHANNEL, Band Edge



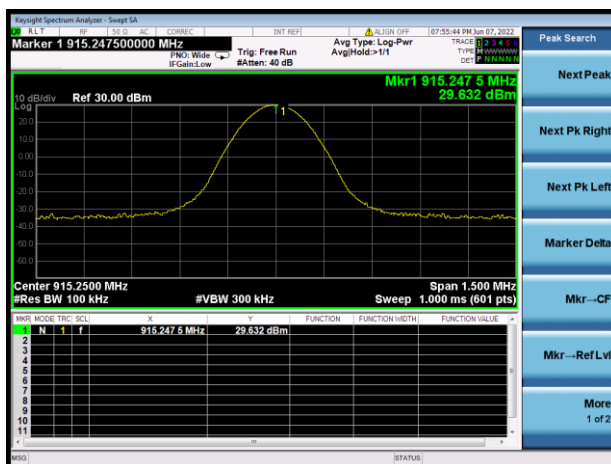
LOW CHANNEL, SPURIOUS 30 MHz ~ 3 GHz



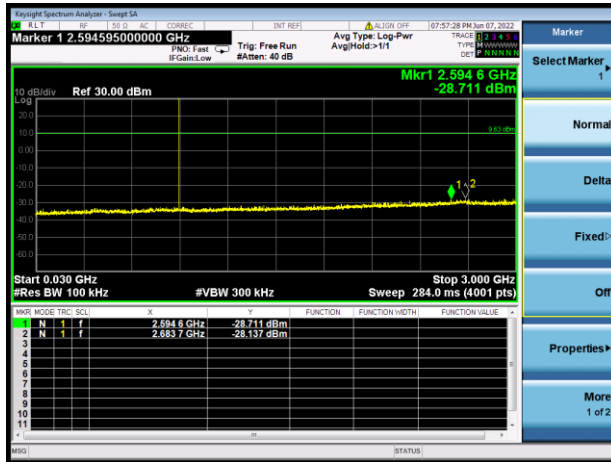
LOW CHANNEL, SPURIOUS 3 GHz ~ 25 GHz



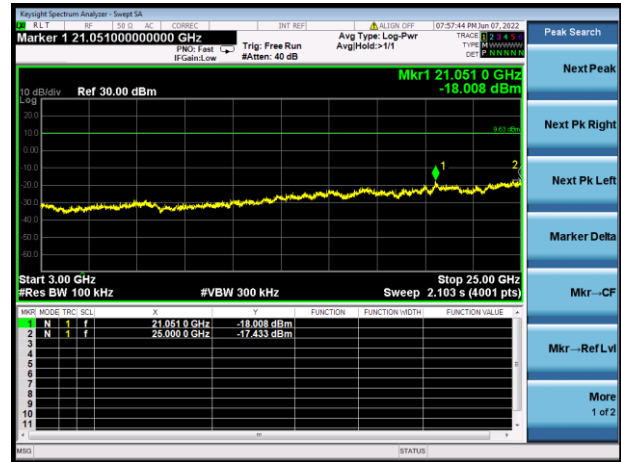
MIDDLE CHANNEL, CARRIER LEVEL



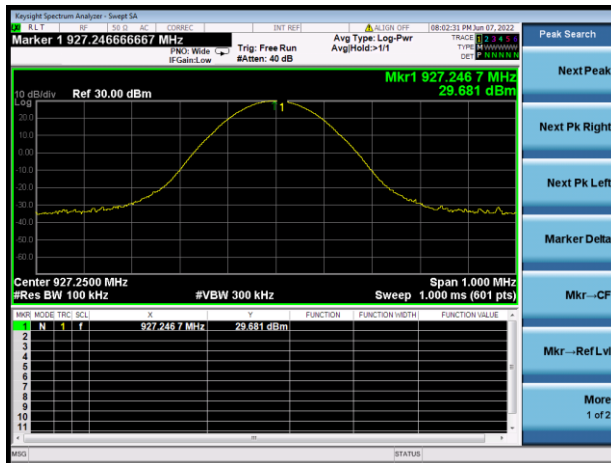
MIDDLE CHANNEL , SPURIOUS 30 MHz ~ 3 GHz



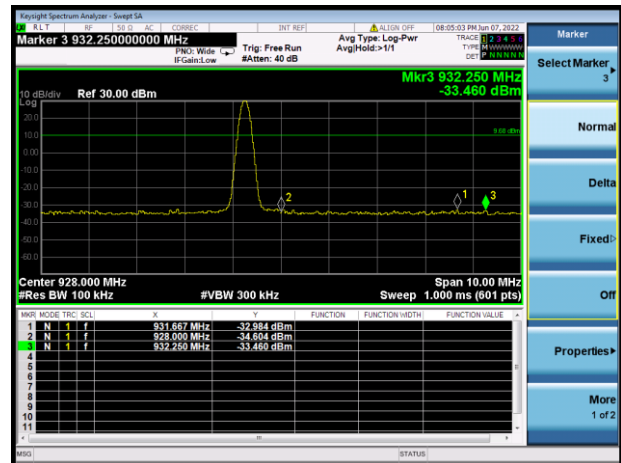
MIDDLE CHANNEL , SPURIOUS 3 GHz ~ 25 GHz



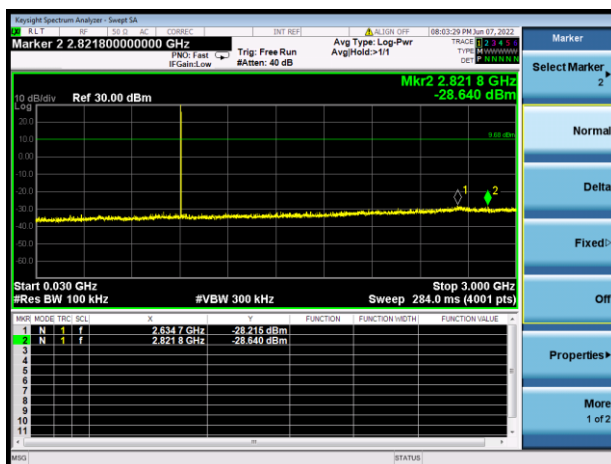
HIGH CHANNEL , CARRIER LEVEL



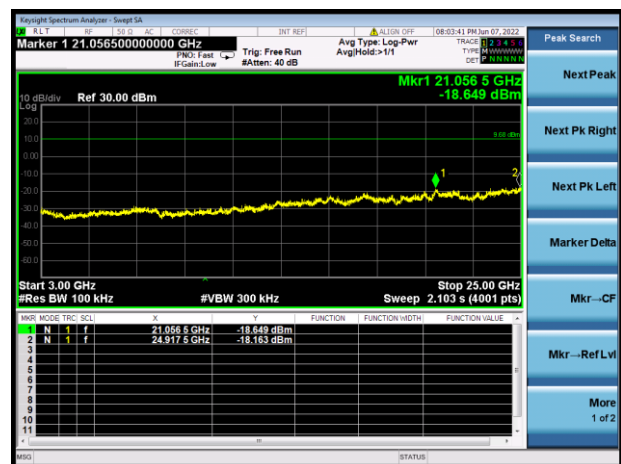
HIGH CHANNEL , BAND EDGE



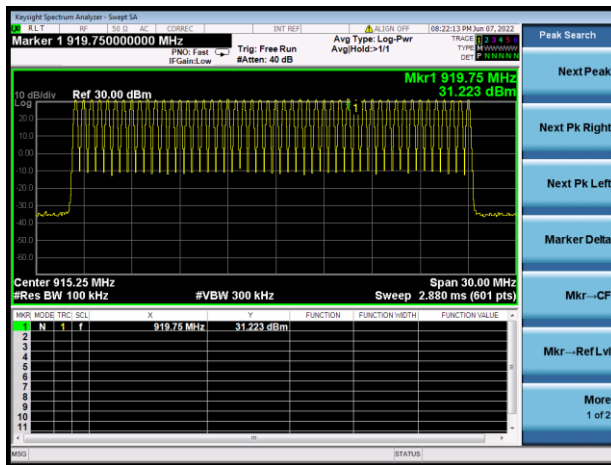
HIGH CHANNEL , SPURIOUS 30 MHz ~ 3 GHz



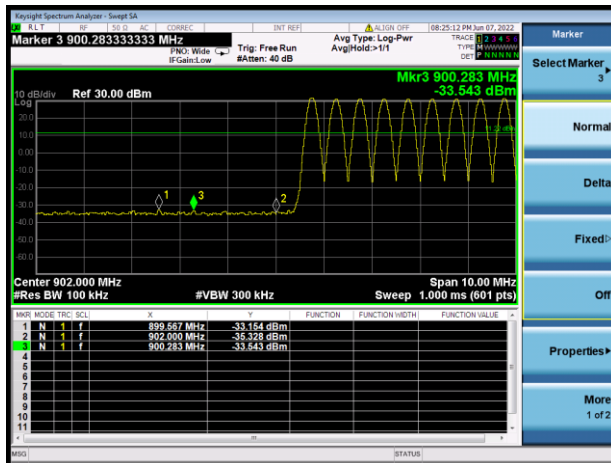
HIGH CHANNEL , SPURIOUS 3 GHz ~ 25 GHz



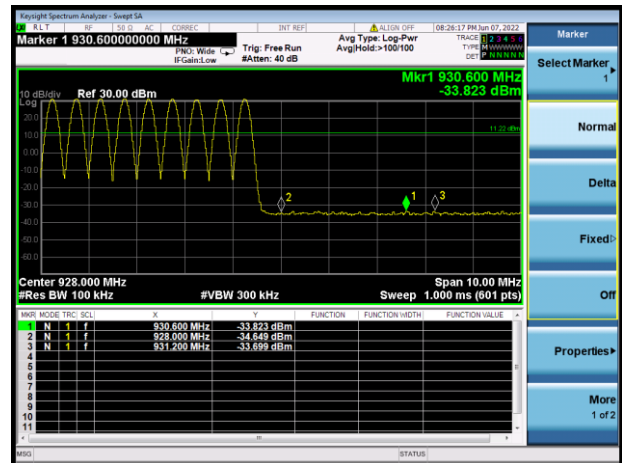
HOPPING, CARRIER LEVEL



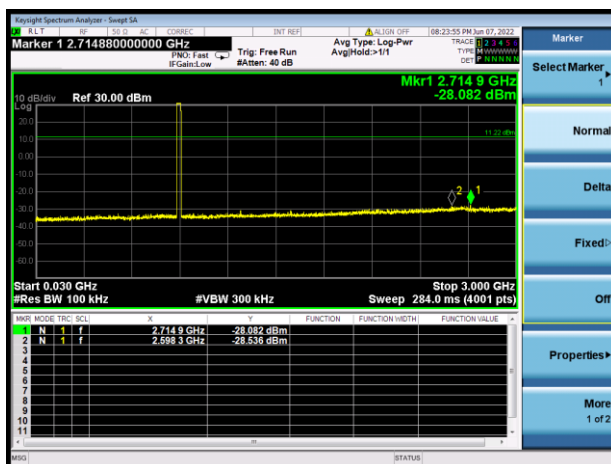
HOPPING BAND EDGE (LOW)



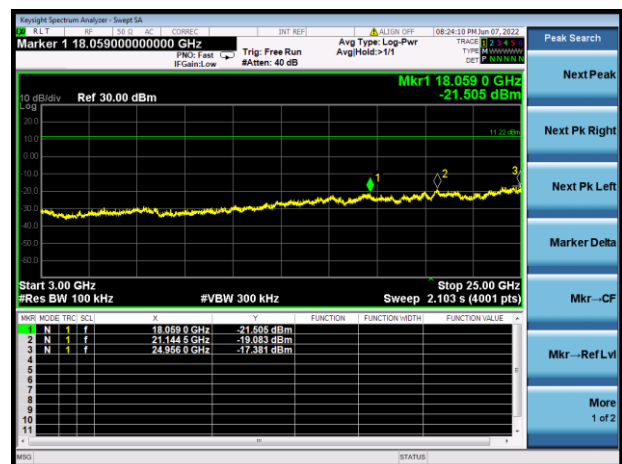
HOPPING BAND EDGE (HIGH)



HOPPING Mode, SPURIOUS 30 MHz ~ 3 GHz



Hopping Mode, SPURIOUS 3 GHz ~ 25 GHz



A.7 Conducted Emissions

Note ¹: The EUT is working in the Normal link mode. All modes have been tested and normal link mode is worst.

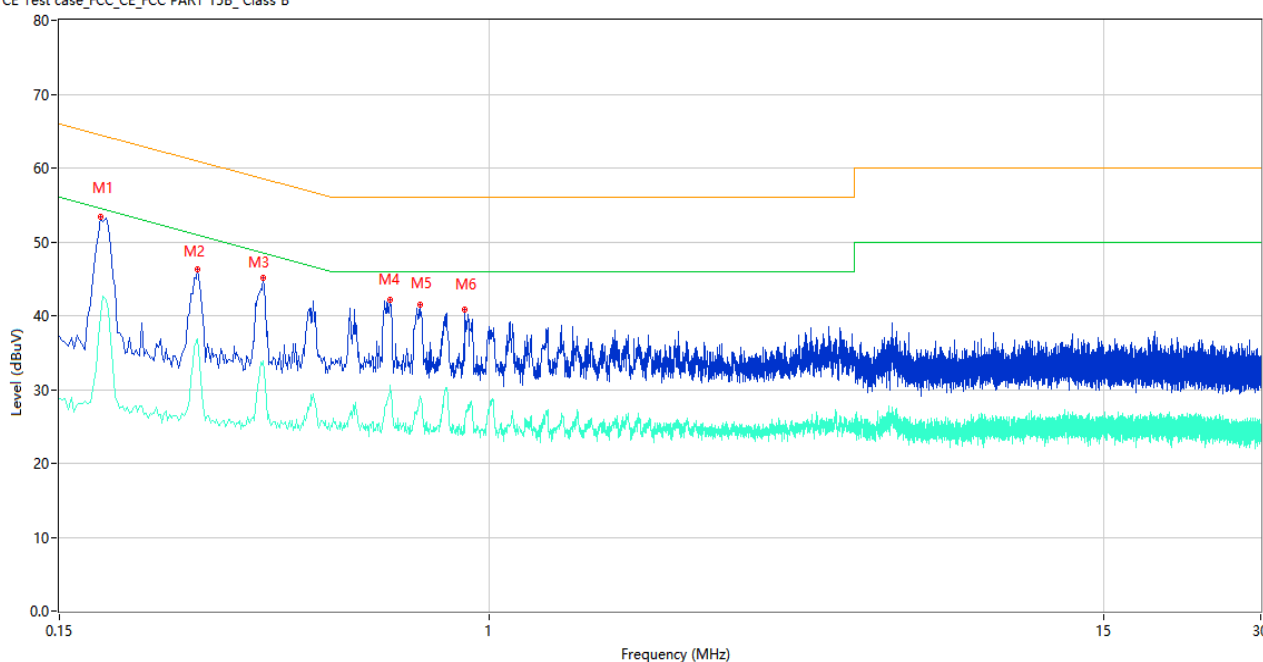
Note ²: Devices subject to Part 15 must be tested for all available U.S. voltages and frequencies (such as a nominal 120 VAC, 60 Hz and 240 VAC, 50 Hz) for which the device is capable of operation. So, The configuration 120 VAC, 60 Hz and 240 VAC, 50 Hz were tested respectively, but only the worst configuration (120 VAC, 60 Hz) shown here.

Note ³: Results (dBuV) = Original reading level of Spectrum Analyzer (dBuV) + Factor (dB)

Test Data and Plots

PHASE L

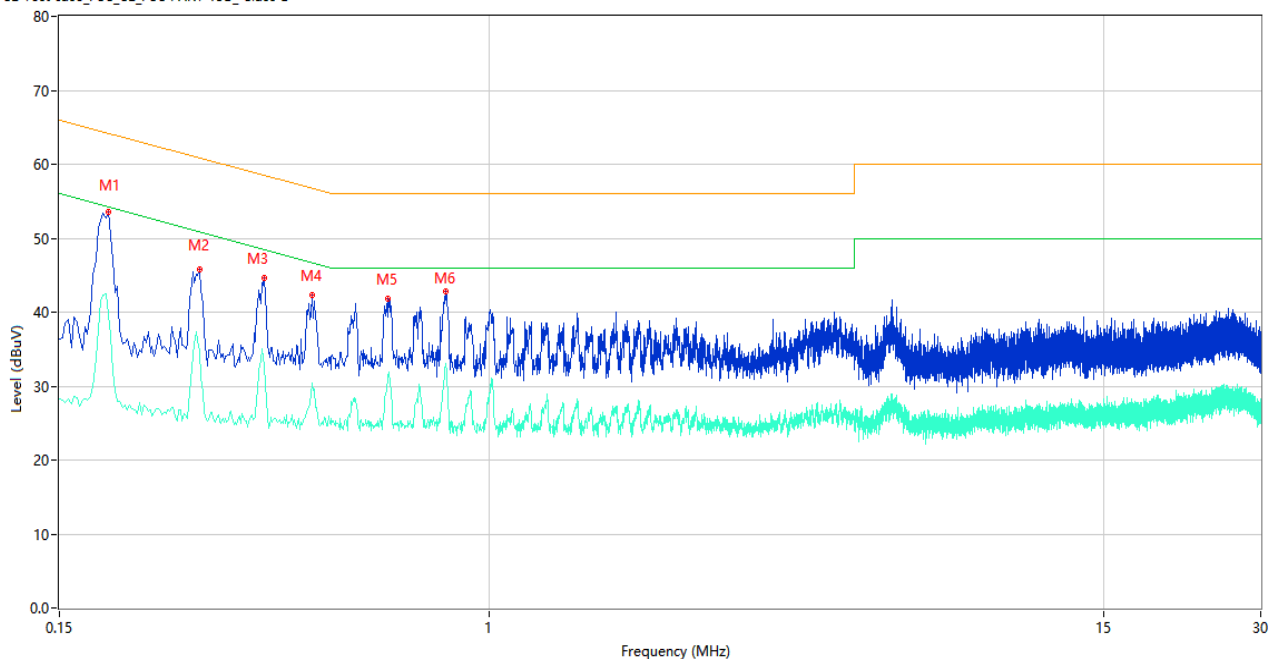
CE Test case_FCC_CE_FCC PART 15B_Class B



No.	Frequency (MHz)	Results (dBuV)	Factor (dB)	Limit (dBuV)	Over Limit (dB)	Detector	Line	Verdict
1	0.180	53.40	10.97	64.49	-11.09	Peak	L	Pass
1**	0.180	40.08	10.97	54.49	-14.41	AV	L	Pass
2	0.276	46.34	10.90	60.94	-14.60	Peak	L	Pass
2**	0.276	36.86	10.90	50.94	-14.08	AV	L	Pass
3	0.368	45.06	10.89	58.55	-13.49	Peak	L	Pass
3**	0.368	33.92	10.89	48.55	-14.63	AV	L	Pass
4	0.644	42.13	10.86	56.00	-13.87	Peak	L	Pass
4**	0.644	29.82	10.86	46.00	-16.18	AV	L	Pass
5	0.736	41.45	10.82	56.00	-14.55	Peak	L	Pass
5**	0.736	28.94	10.82	46.00	-17.06	AV	L	Pass
6	0.898	40.90	10.75	56.00	-15.10	Peak	L	Pass
6**	0.898	26.01	10.75	46.00	-19.99	AV	L	Pass

PHASE N

CE Test case_FCC_CE_FCC PART 15B_ Class B



No.	Frequency (MHz)	Results (dBuV)	Factor (dB)	Limit (dBuV)	Over Limit (dB)	Detector	Line	Verdict
1	0.186	53.57	10.97	64.21	-10.64	Peak	N	Pass
1**	0.186	39.71	10.97	54.21	-14.50	AV	N	Pass
2	0.278	45.72	10.90	60.88	-15.16	Peak	N	Pass
2**	0.278	34.90	10.90	50.88	-15.98	AV	N	Pass
3	0.370	44.55	10.89	58.50	-13.95	Peak	N	Pass
3**	0.370	32.75	10.89	48.50	-15.75	AV	N	Pass
4	0.458	42.26	10.91	56.73	-14.47	Peak	N	Pass
4**	0.458	30.35	10.91	46.73	-16.38	AV	N	Pass
5	0.638	41.89	10.86	56.00	-14.11	Peak	N	Pass
5**	0.638	30.72	10.86	46.00	-15.28	AV	N	Pass
6	0.826	42.82	10.78	56.00	-13.18	Peak	N	Pass
6**	0.826	32.88	10.78	46.00	-13.12	AV	N	Pass

A.8 Radiated Spurious Emission

Note ¹: The symbol of "--" in the table which means not application.

Note ²: For the test data above 1 GHz, according the ANSI C63.10-2013, where limits are specified for both average and peak (or quasi-peak) detector functions, if the peak (or quasi-peak) measured value complies with the average limit, it is unnecessary to perform an average measurement.

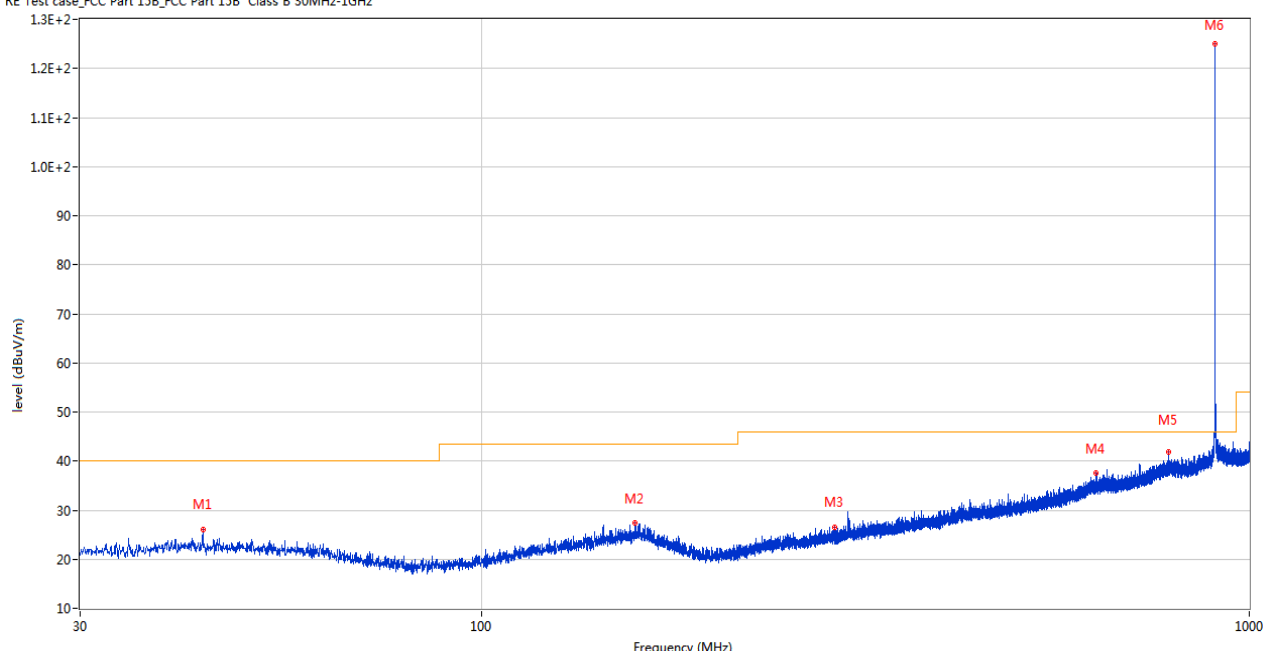
Note ³: The low frequency, which started from 9 kHz to 30 MHz, was pre-scanned and the result which was 20 dB lower than the limit line per 15.31(o) was not reported.

Note ⁴: The marked spikes near 900 MHz with circle should be ignored because they are Fundamental signal.

Test Data and Plots

LOW CHANNEL, 30 MHz to 1 GHz, ANT H

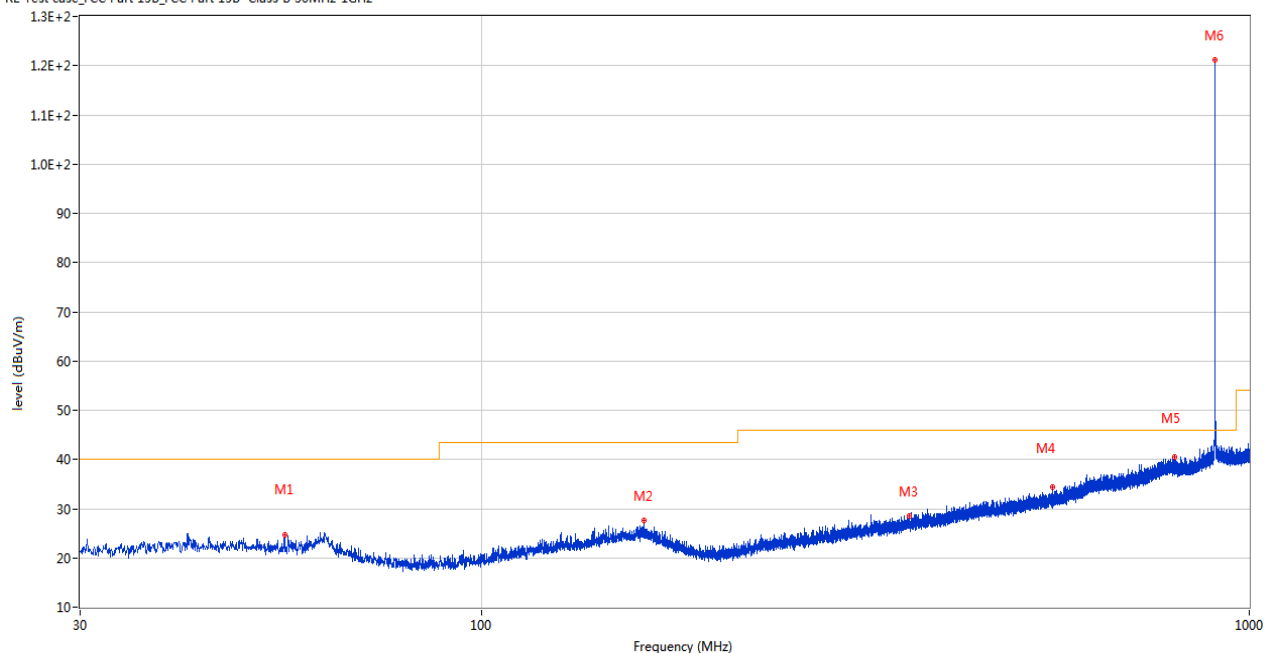
RE Test case_FCC Part 15B_FCC Part 15B Class B 30MHz-1GHz



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Over Limit (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	43.337	25.94	-13.98	40.0	-14.06	Peak	0.00	200	Horizontal	Pass
2	158.428	27.46	-12.18	43.5	-16.04	Peak	243.00	100	Horizontal	Pass
3	287.971	26.61	-12.33	46.0	-19.39	Peak	338.00	100	Horizontal	Pass
4	631.400	37.47	-1.51	46.0	-8.53	Peak	152.00	200	Horizontal	Pass
5	785.582	41.79	2.26	46.0	-4.21	Peak	360.00	100	Horizontal	Pass
6	902.758	124.95	4.26	46.0	78.95	Peak	192.00	200	Horizontal	N/A

LOW CHANNEL, 30 MHz to 1 GHz, ANT V

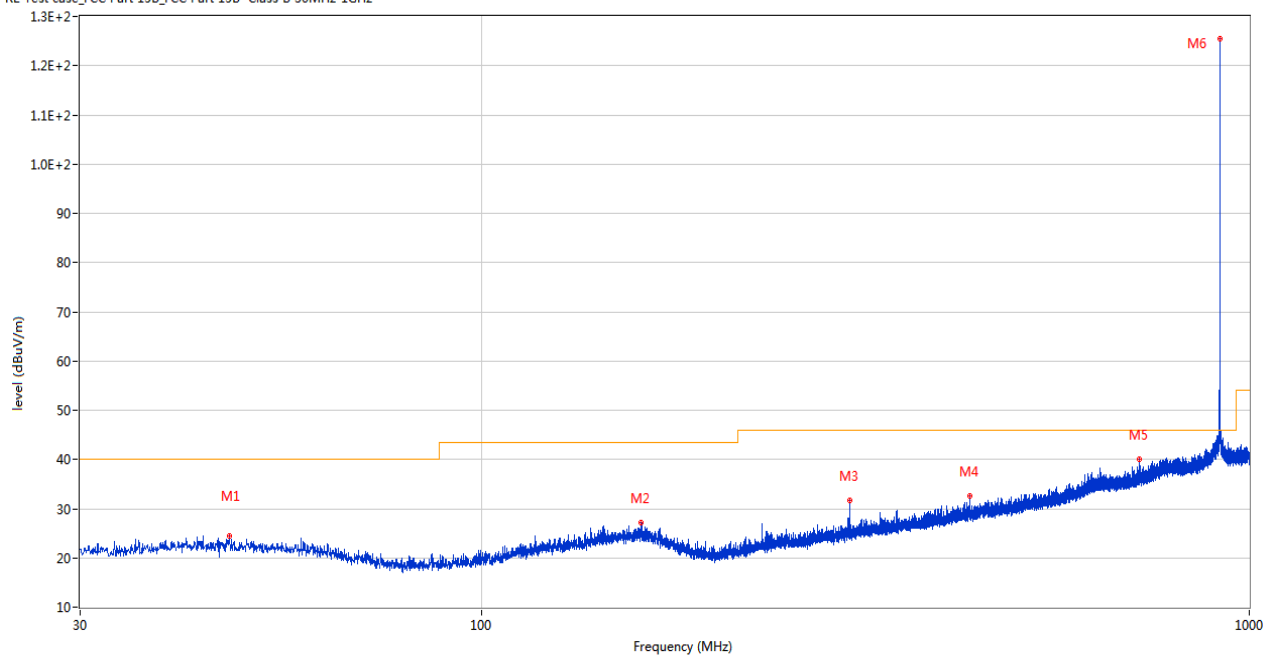
RE Test case_FCC Part 15B_FCC Part 15B Class B 30MHz-1GHz



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Over Limit (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	55.365	24.66	-14.41	40.0	-15.34	Peak	297.00	100	Vertical	Pass
2	162.939	27.62	-12.44	43.5	-15.88	Peak	0.00	200	Vertical	Pass
3	361.110	28.48	-10.14	46.0	-17.52	Peak	236.00	100	Vertical	Pass
4	554.576	34.50	-4.78	46.0	-11.50	Peak	311.00	100	Vertical	Pass
5	798.240	40.51	1.99	46.0	-5.49	Peak	326.00	100	Vertical	Pass
6	902.758	121.08	4.26	46.0	75.08	Peak	0.00	200	Vertical	N/A

MIDDLE CHANNEL, 30 MHz to 1 GHz, ANT H

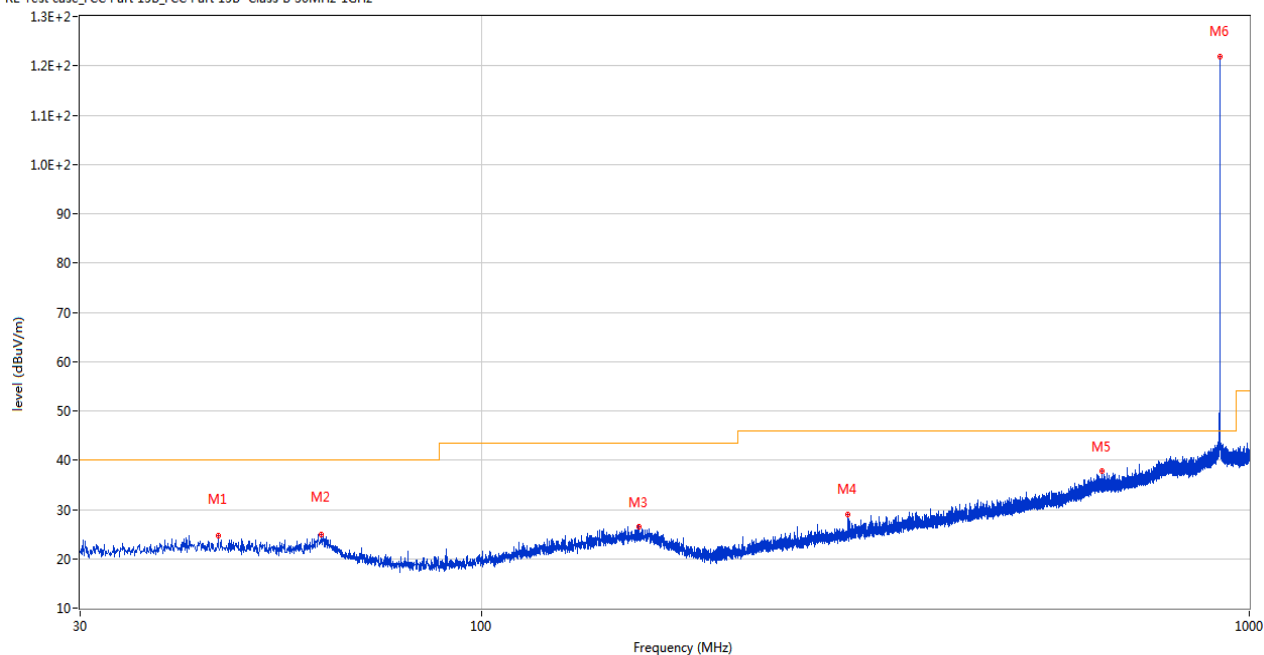
RE Test case_FCC Part 15B_FCC Part 15B Class B 30MHz-1GHz



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Over Limit (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	46.878	24.43	-14.04	40.0	-15.57	Peak	0.00	200	Horizontal	Pass
2	161.193	27.10	-12.30	43.5	-16.40	Peak	261.00	200	Horizontal	Pass
3	301.649	31.63	-11.80	46.0	-14.37	Peak	122.00	200	Horizontal	Pass
4	432.017	32.59	-7.99	46.0	-13.41	Peak	340.00	100	Horizontal	Pass
5	720.010	39.99	-0.33	46.0	-6.01	Peak	19.00	100	Horizontal	Pass
6	915.271	125.45	4.31	46.0	79.45	Peak	164.00	200	Horizontal	N/A

MIDDLE CHANNEL, 30 MHz to 1 GHz, ANT V

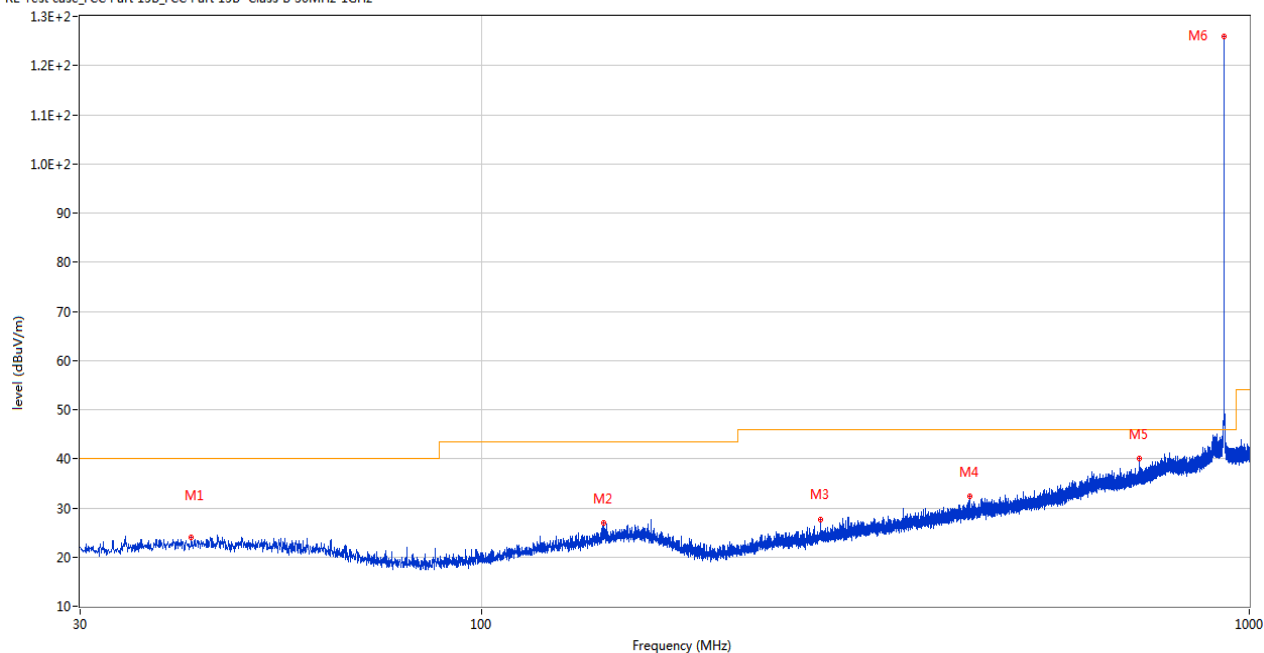
RE Test case_FCC Part 15B_FCC Part 15B Class B 30MHz-1GHz



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Over Limit (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	45.423	24.77	-14.08	40.0	-15.23	Peak	178.00	200	Vertical	Pass
2	61.816	24.89	-15.07	40.0	-15.11	Peak	282.00	200	Vertical	Pass
3	160.514	26.46	-12.22	43.5	-17.04	Peak	102.00	200	Vertical	Pass
4	300.290	29.07	-11.93	46.0	-16.93	Peak	212.00	100	Vertical	Pass
5	642.119	37.81	-1.38	46.0	-8.19	Peak	128.00	200	Vertical	Pass
6	915.271	121.76	4.31	46.0	75.76	Peak	185.00	200	Vertical	N/A

HIGH CHANNEL, 30 MHz to 1 GHz, ANT H

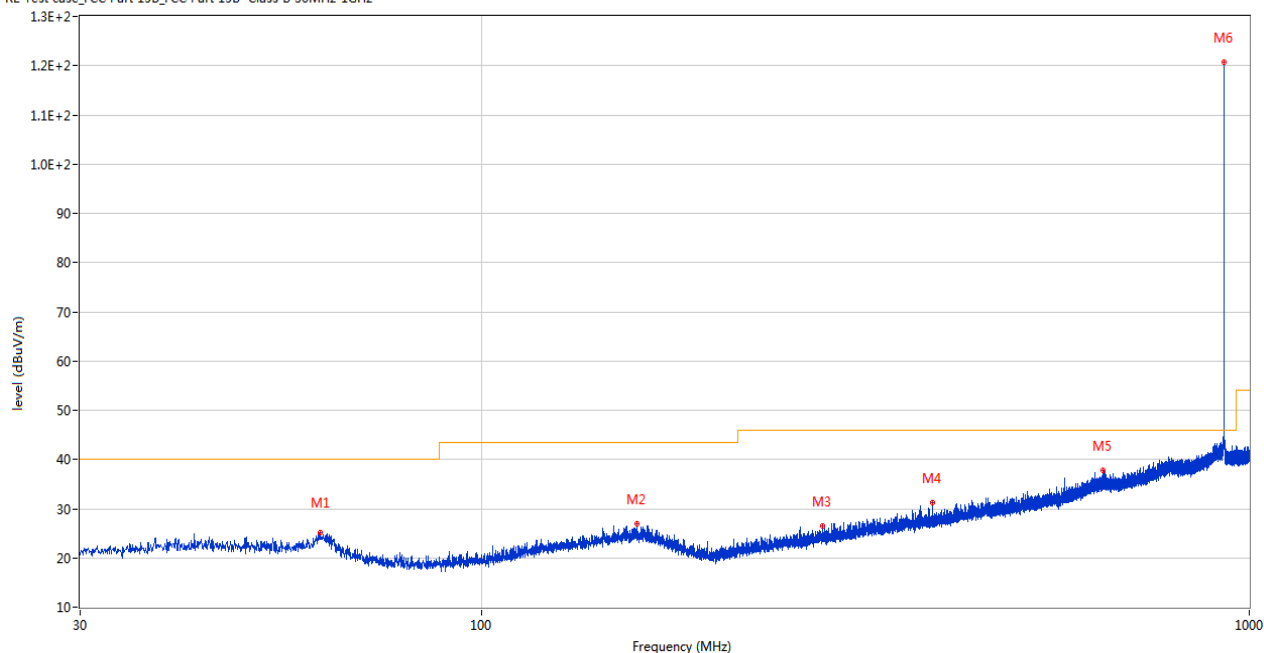
RE Test case_FCC Part 15B_FCC Part 15B Class B 30MHz-1GHz



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Over Limit (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	41.883	24.06	-13.88	40.0	-15.94	Peak	180.00	200	Horizontal	Pass
2	144.024	26.84	-12.63	43.5	-16.66	Peak	87.00	200	Horizontal	Pass
3	276.138	27.61	-12.52	46.0	-18.39	Peak	75.00	100	Horizontal	Pass
4	431.968	32.42	-8.00	46.0	-13.58	Peak	127.00	200	Horizontal	Pass
5	720.010	40.02	-0.33	46.0	-5.98	Peak	0.00	200	Horizontal	Pass
6	927.250	125.84	4.19	46.0	79.84	Peak	164.00	200	Horizontal	N/A

HIGH CHANNEL, 30 MHz to 1 GHz, ANT V

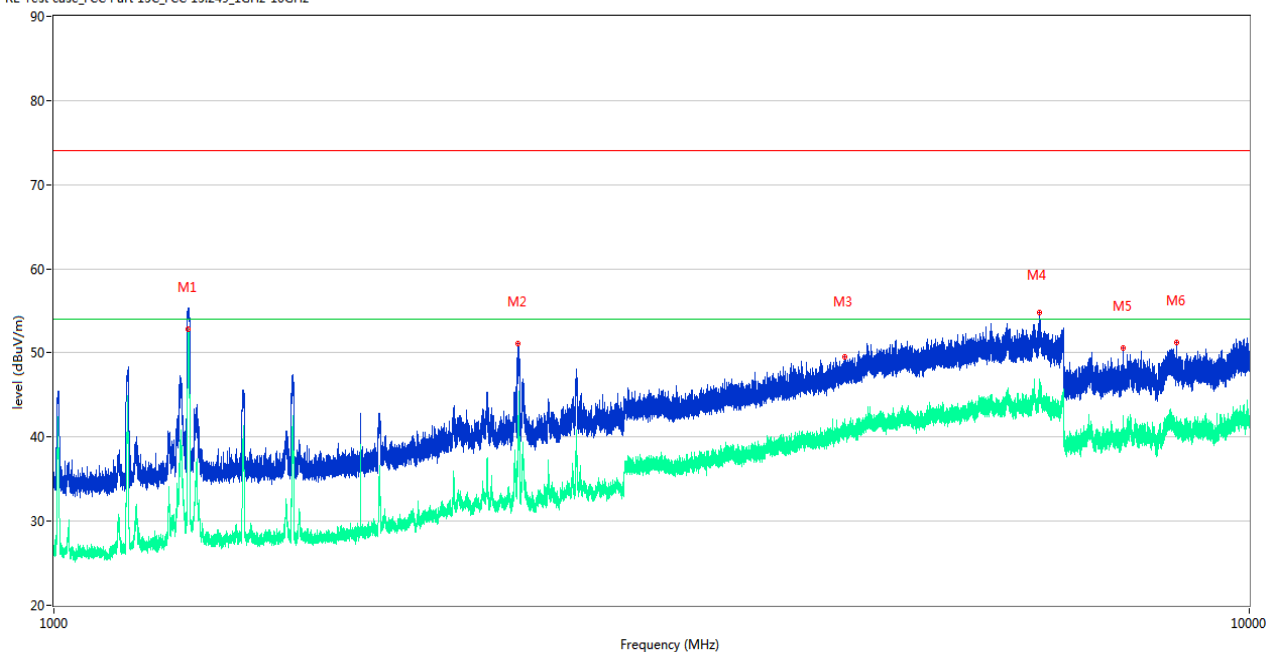
RE Test case_FCC Part 15B_FCC Part 15B Class B 30MHz-1GHz



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Over Limit (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	61.574	25.07	-15.02	40.0	-14.93	Peak	20.00	100	Vertical	Pass
2	159.204	27.00	-12.17	43.5	-16.50	Peak	193.00	200	Vertical	Pass
3	278.466	26.57	-12.49	46.0	-19.43	Peak	0.00	200	Vertical	Pass
4	386.863	31.26	-9.55	46.0	-14.74	Peak	140.00	100	Vertical	Pass
5	645.126	37.78	-1.48	46.0	-8.22	Peak	215.00	200	Vertical	Pass
6	927.250	120.71	4.19	46.0	74.71	Peak	181.00	200	Vertical	N/A

LOW CHANNEL 1 GHz to 10 GHz, ANT H

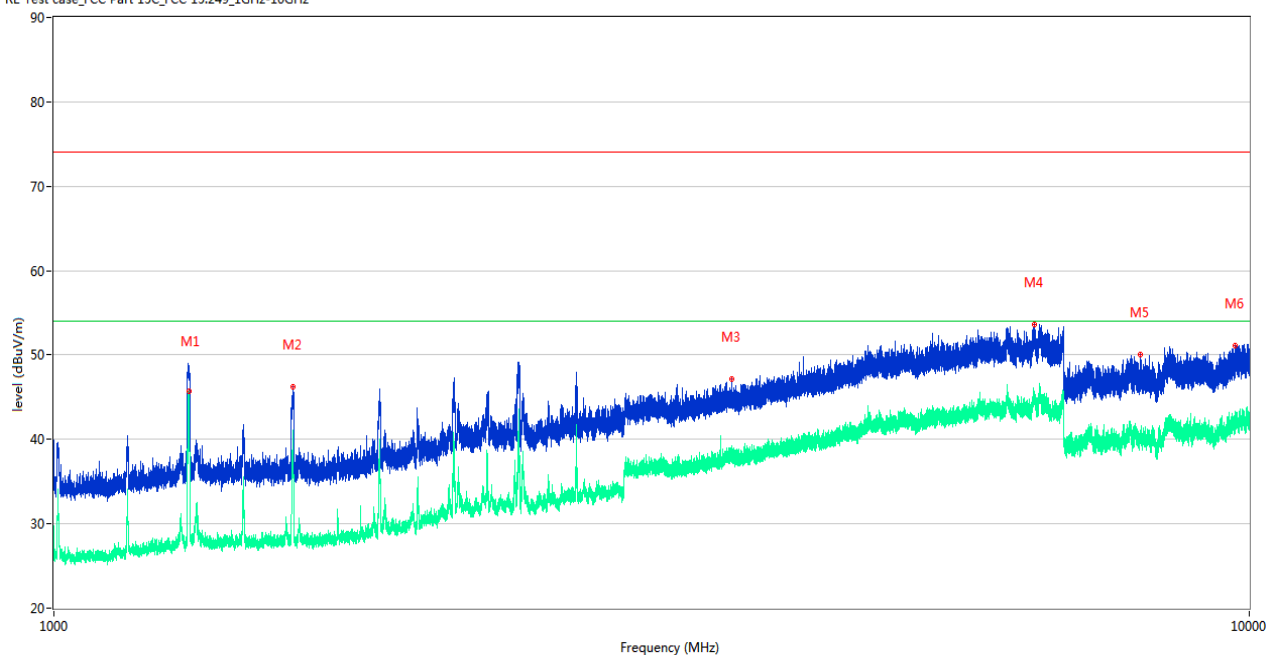
RE Test case_FCC Part 15C_FCC 15.249_1GHz-10GHz



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Over Limit (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	1295.900	55.38	-17.27	74.0	-18.62	Peak	231.00	150	Horizontal	Pass
1**	1295.900	52.77	-17.27	54.0	-1.23	AV	231.00	150	Horizontal	N/A
2	2444.900	51.13	-12.94	74.0	-22.87	Peak	284.00	150	Horizontal	Pass
2**	2444.900	38.99	-12.94	54.0	-15.01	AV	284.00	150	Horizontal	Pass
3	4586.800	49.53	-3.58	74.0	-24.47	Peak	90.00	150	Horizontal	Pass
3**	4586.800	40.19	-3.58	54.0	-13.81	AV	90.00	150	Horizontal	Pass
4	6680.000	54.76	-0.53	74.0	-19.24	Peak	314.00	150	Horizontal	Pass
4**	6680.000	45.43	-0.53	54.0	-8.57	AV	314.00	150	Horizontal	Pass
5	7845.700	50.56	-2.35	74.0	-23.44	Peak	349.00	150	Horizontal	Pass
5**	7845.700	40.23	-2.35	54.0	-13.77	AV	349.00	150	Horizontal	Pass
6	8702.050	51.21	-1.86	74.0	-22.79	Peak	273.00	150	Horizontal	Pass
6**	8702.050	40.35	-1.86	54.0	-13.65	AV	273.00	150	Horizontal	Pass

LOW CHANNEL 1 GHz to 10 GHz, ANT V

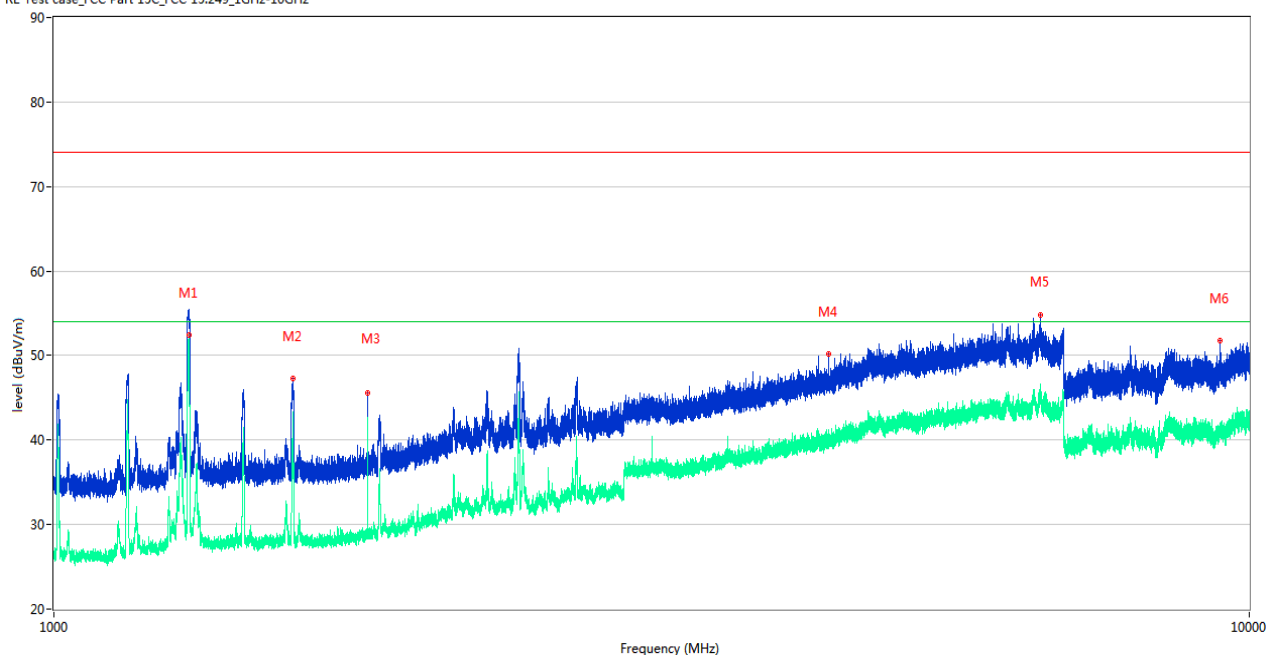
RE Test case_FCC Part 15C_FCC 15.249_1GHz-10GHz



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Over Limit (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	1296.200	48.69	-17.24	74.0	-25.31	Peak	69.00	150	Vertical	Pass
1**	1296.200	45.73	-17.24	54.0	-8.27	AV	69.00	150	Vertical	N/A
2	1584.200	46.17	-17.37	74.0	-27.83	Peak	255.00	150	Vertical	Pass
2**	1584.200	40.82	-17.37	54.0	-13.18	AV	255.00	150	Vertical	Pass
3	3688.600	47.18	-5.97	74.0	-26.82	Peak	125.00	150	Vertical	Pass
3**	3688.600	37.34	-5.97	54.0	-16.66	AV	125.00	150	Vertical	Pass
4	6613.000	53.60	0.19	74.0	-20.40	Peak	62.00	150	Vertical	Pass
4**	6613.000	45.01	0.19	54.0	-8.99	AV	62.00	150	Vertical	Pass
5	8112.250	50.05	-2.70	74.0	-23.95	Peak	0.00	150	Vertical	Pass
5**	8112.250	39.81	-2.70	54.0	-14.19	AV	0.00	150	Vertical	Pass
6	9737.800	51.08	-0.52	74.0	-22.92	Peak	28.00	150	Vertical	Pass
6**	9737.800	42.66	-0.52	54.0	-11.34	AV	28.00	150	Vertical	Pass

MIDDLE CHANNEL 1 GHz to 10 GHz, ANT H

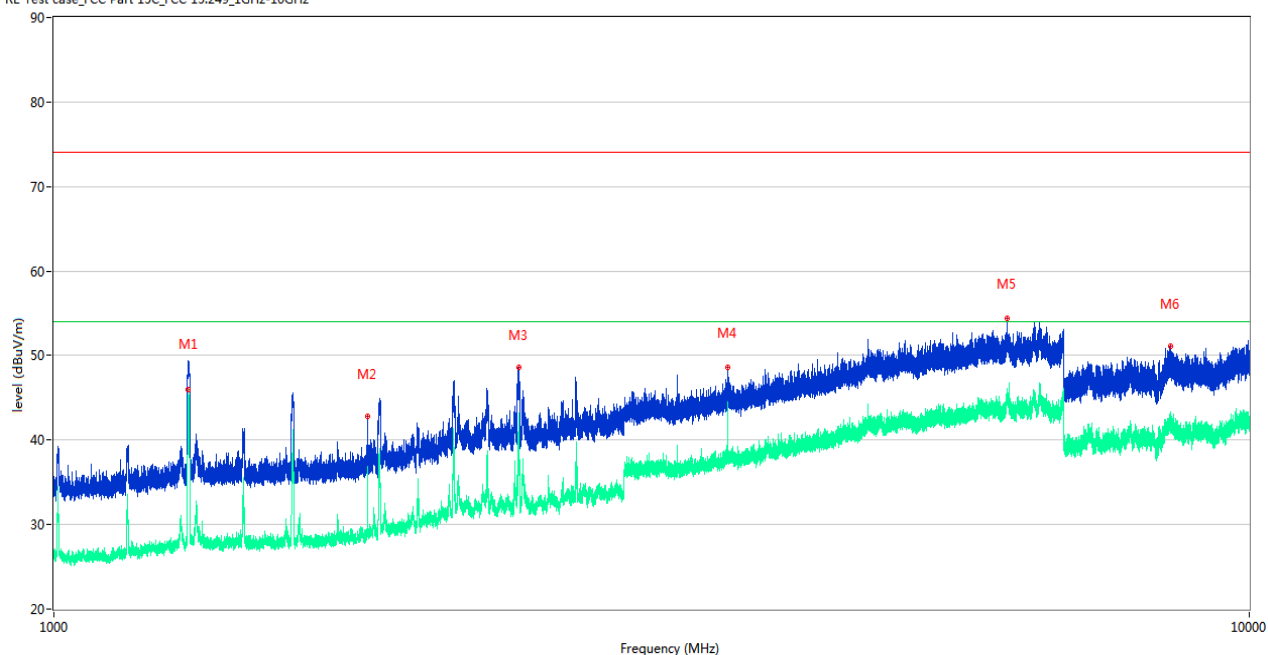
RE Test case_FCC Part 15C_FCC 15.249_1GHz-10GHz



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Over Limit (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	1296.300	55.42	-17.22	74.0	-18.58	Peak	234.00	150	Horizontal	Pass
1**	1296.300	52.37	-17.22	54.0	-1.63	AV	234.00	150	Horizontal	N/A
2	1583.800	47.28	-17.39	74.0	-26.72	Peak	75.00	150	Horizontal	Pass
2**	1583.800	42.00	-17.39	54.0	-12.00	AV	75.00	150	Horizontal	Pass
3	1830.400	45.59	-16.66	74.0	-28.41	Peak	200.00	150	Horizontal	Pass
3**	1830.400	42.12	-16.66	54.0	-11.88	AV	200.00	150	Horizontal	Pass
4	4448.200	50.13	-3.91	74.0	-23.87	Peak	257.00	150	Horizontal	Pass
4**	4448.200	39.58	-3.91	54.0	-14.42	AV	257.00	150	Horizontal	Pass
5	6686.800	54.82	-0.22	74.0	-19.18	Peak	310.00	150	Horizontal	Pass
5**	6686.800	45.44	-0.22	54.0	-8.56	AV	310.00	150	Horizontal	Pass
6	9454.000	51.75	-0.77	74.0	-22.25	Peak	318.00	150	Horizontal	Pass
6**	9454.000	41.36	-0.77	54.0	-12.64	AV	318.00	150	Horizontal	Pass

MIDDLE CHANNEL 1 GHz to 10 GHz, ANT V

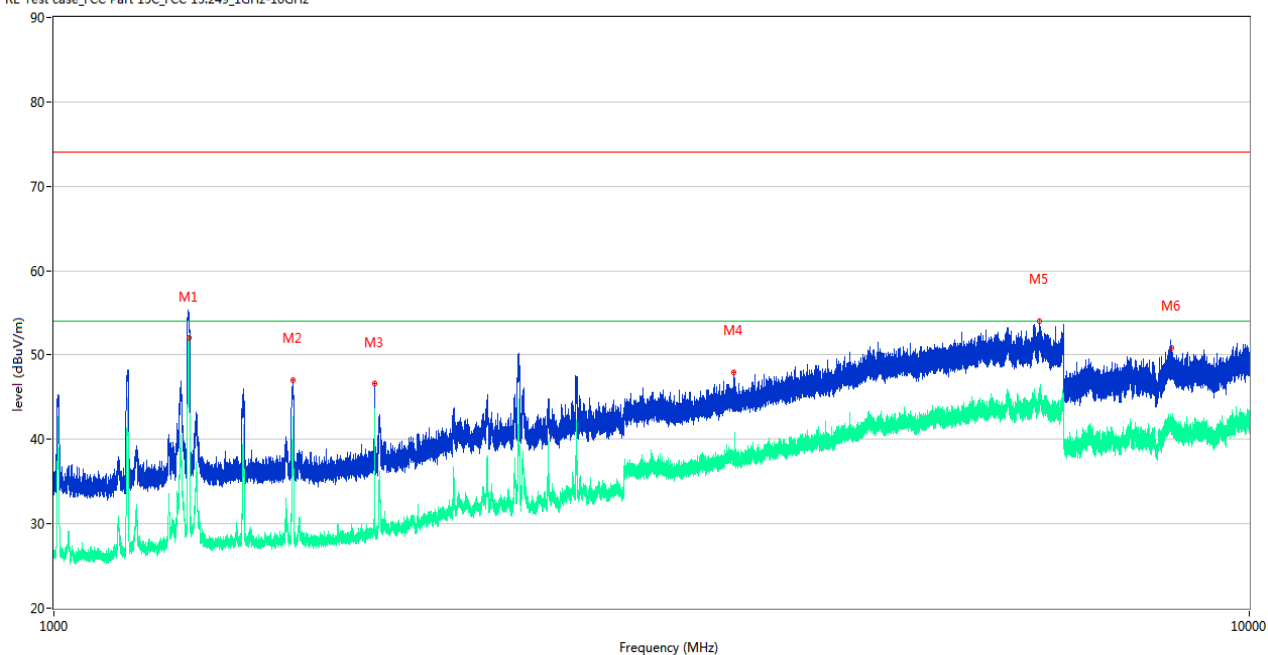
RE Test case_FCC Part 15C_FCC 15.249_1GHz-10GHz



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Over Limit (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	1296.000	48.73	-17.26	74.0	-25.27	Peak	83.00	150	Vertical	Pass
1**	1296.000	46.02	-17.26	54.0	-7.98	AV	83.00	150	Vertical	N/A
2	1830.500	42.74	-16.66	74.0	-31.26	Peak	184.00	150	Vertical	Pass
2**	1830.500	35.19	-16.66	54.0	-18.81	AV	184.00	150	Vertical	Pass
3	2447.700	48.61	-12.74	74.0	-25.39	Peak	284.00	150	Vertical	Pass
3**	2447.700	40.75	-12.74	54.0	-13.25	AV	284.00	150	Vertical	Pass
4	3661.200	48.58	-6.87	74.0	-25.42	Peak	354.00	150	Vertical	Pass
4**	3661.200	44.50	-6.87	54.0	-9.50	AV	354.00	150	Vertical	Pass
5	6272.800	54.35	-0.20	74.0	-19.65	Peak	215.00	150	Vertical	Pass
5**	6272.800	44.86	-0.20	54.0	-9.14	AV	215.00	150	Vertical	Pass
6	8599.750	51.15	-2.22	74.0	-22.85	Peak	118.00	150	Vertical	Pass
6**	8599.750	41.60	-2.22	54.0	-12.40	AV	118.00	150	Vertical	Pass

HIGH CHANNEL 1 GHz to 10 GHz, ANT H

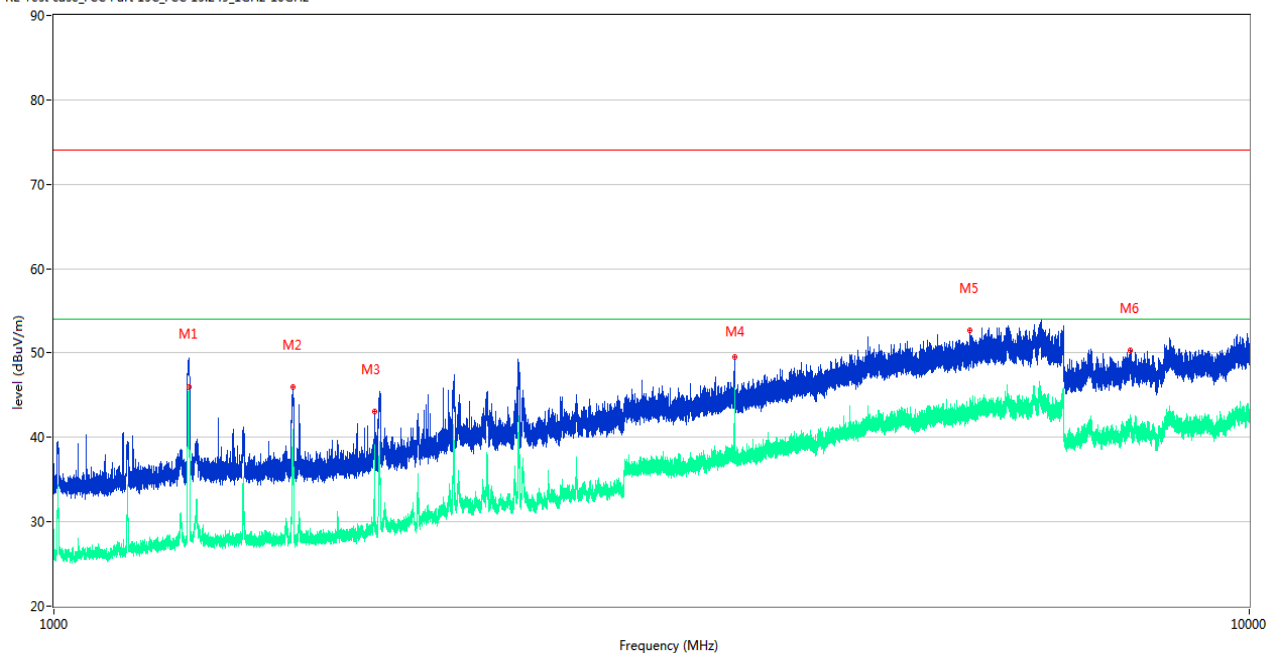
RE Test case_FCC Part 15C_FCC 15.249_1GHz-10GHz



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Over Limit (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	1296.300	54.78	-17.22	74.0	-19.22	Peak	240.00	150	Horizontal	Pass
1**	1296.300	52.04	-17.22	54.0	-1.96	AV	240.00	150	Horizontal	N/A
2	1584.300	47.08	-17.37	74.0	-26.92	Peak	94.00	150	Horizontal	Pass
2**	1584.300	42.35	-17.37	54.0	-11.65	AV	94.00	150	Horizontal	Pass
3	1854.600	46.69	-16.66	74.0	-27.31	Peak	188.00	150	Horizontal	Pass
3**	1854.600	43.59	-16.66	54.0	-10.41	AV	188.00	150	Horizontal	Pass
4	3705.400	47.96	-6.05	74.0	-26.04	Peak	163.00	150	Horizontal	Pass
4**	3705.400	37.83	-6.05	54.0	-16.17	AV	163.00	150	Horizontal	Pass
5	6674.800	53.98	-0.65	74.0	-20.02	Peak	277.00	150	Horizontal	Pass
5**	6674.800	44.97	-0.65	54.0	-9.03	AV	277.00	150	Horizontal	Pass
6	8610.700	50.84	-2.15	74.0	-23.16	Peak	12.00	150	Horizontal	Pass
6**	8610.700	41.46	-2.15	54.0	-12.54	AV	12.00	150	Horizontal	Pass

HIGH CHANNEL 1 GHz to 10 GHz, ANT V

RE Test case_FCC Part 15C_FCC 15.249_1GHz-10GHz



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Over Limit (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	1296.300	48.95	-17.22	74.0	-25.05	Peak	61.00	150	Vertical	Pass
1**	1296.300	45.96	-17.22	54.0	-8.04	AV	61.00	150	Vertical	N/A
2	1586.200	46.01	-17.35	74.0	-27.99	Peak	246.00	150	Vertical	Pass
2**	1586.200	35.81	-17.35	54.0	-18.19	AV	246.00	150	Vertical	Pass
3	1854.400	43.09	-16.63	74.0	-30.91	Peak	177.00	150	Vertical	Pass
3**	1854.400	38.50	-16.63	54.0	-15.50	AV	177.00	150	Vertical	Pass
4	3708.800	49.59	-6.19	74.0	-24.41	Peak	123.00	150	Vertical	Pass
4**	3708.800	44.23	-6.19	54.0	-9.77	AV	123.00	150	Vertical	Pass
5	5838.600	52.69	-1.87	74.0	-21.31	Peak	310.00	150	Vertical	Pass
5**	5838.600	42.70	-1.87	54.0	-11.30	AV	310.00	150	Vertical	Pass
6	7956.700	50.33	-2.34	74.0	-23.67	Peak	21.00	150	Vertical	Pass
6**	7956.700	41.80	-2.34	54.0	-12.20	AV	21.00	150	Vertical	Pass

A.9 Band Edge (Restricted-band band-edge)

Note ¹: The lowest and highest channels are tested to verify the band edge emissions. Please refer to the following the plots for emissions values.

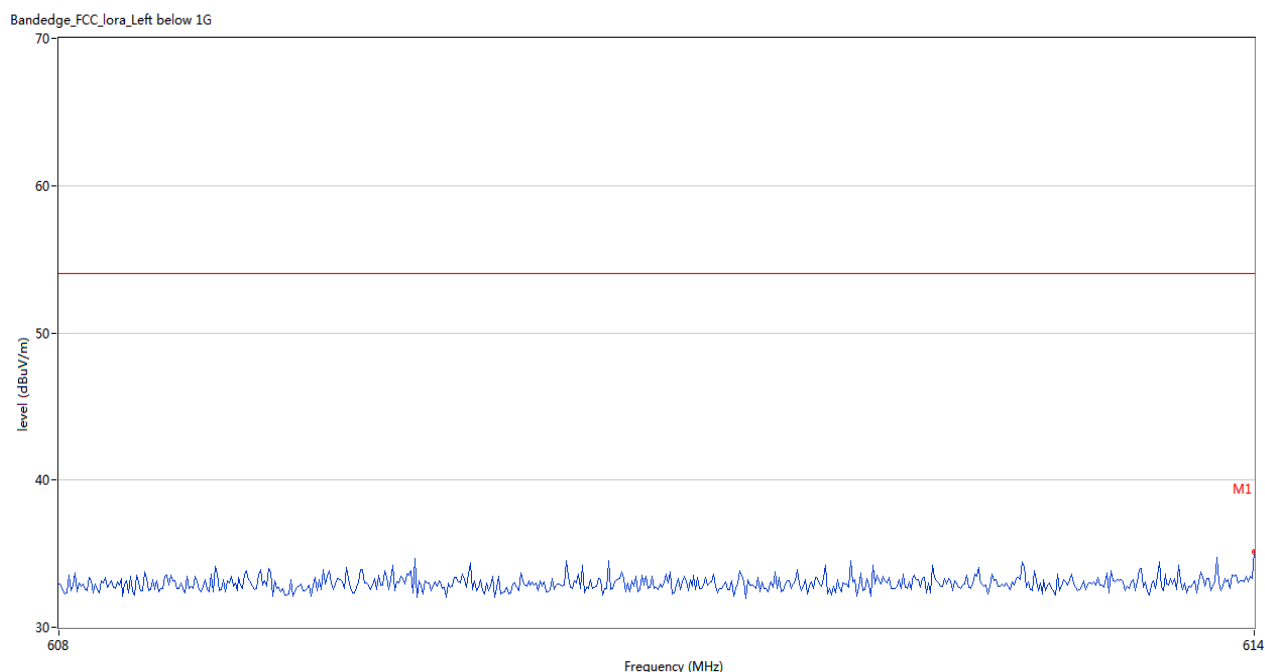
Note ²: The test data all are tested in the vertical and horizontal antenna which the trace is max hold. So these plots have shown the worst case.

Note ³: According the ANSI C63.10-2013, where limits are specified for both average and peak (or quasi-peak) detector functions, if the peak (or quasi-peak) measured value complies with the average limit, it is unnecessary to perform an average measurement.

Note ⁴: The Level (dBuV/m) has been corrected by factor.

Test Data and Plots

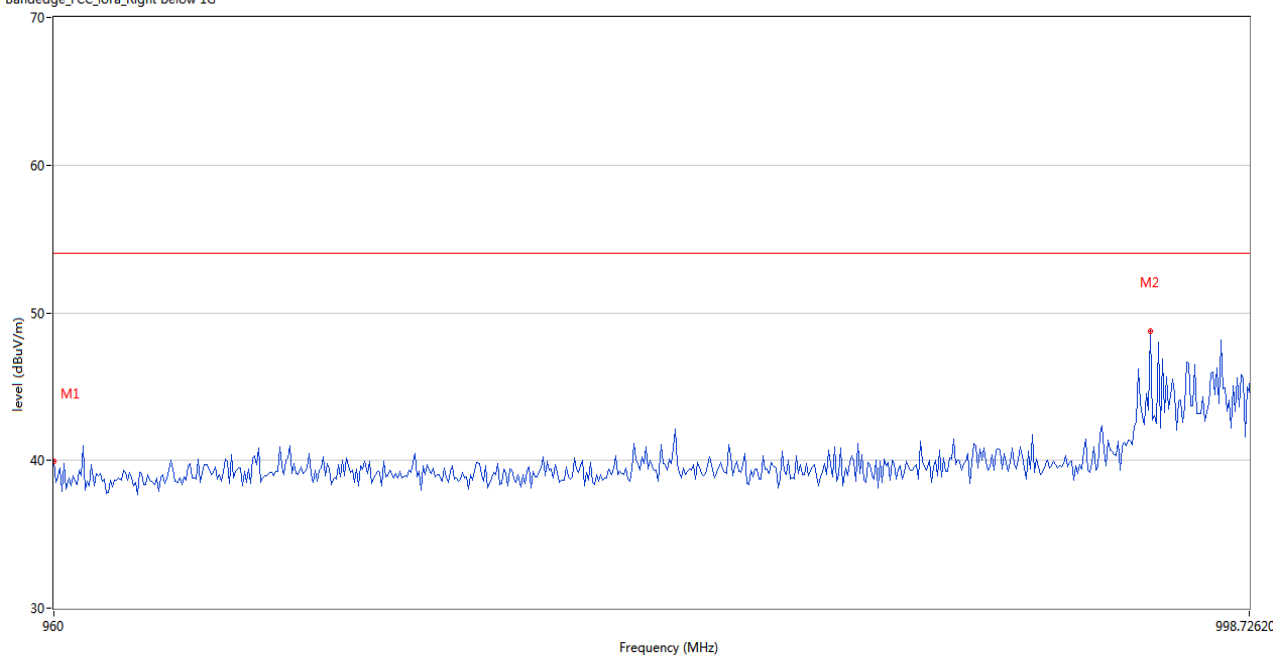
LOW CHANNEL



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Over Limit (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	614.000	35.15	-2.69	54.0	-18.85	Peak	145.00	150	Horizontal	Pass

HIGH CHANNEL

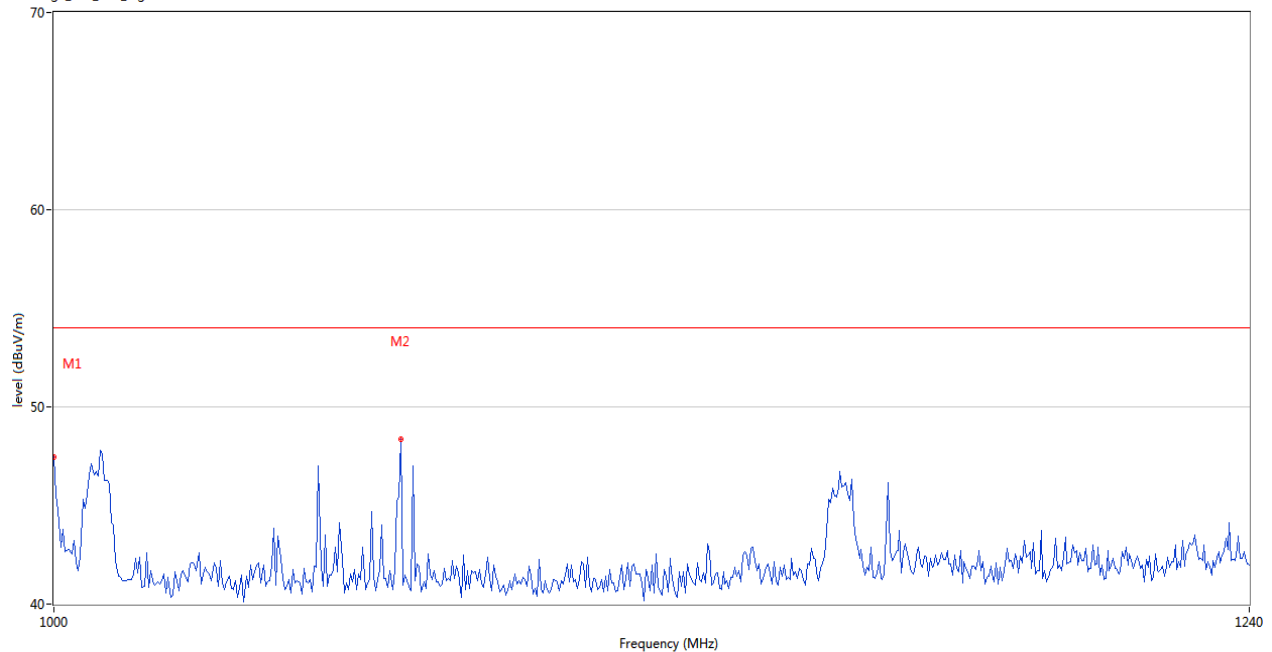
Bandedge_FCC_lora_Right below 1G



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Over Limit (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	960.000	38.81	-3.60	54.0	-15.19	Peak	30.00	150	Horizontal	Pass
2	995.467	48.75	-3.33	54.0	-5.25	Peak	53.00	150	Horizontal	Pass

HIGH CHANNEL

Bandedge_FCC_lora_Right above 1G



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Over Limit (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	1000.000	47.47	-12.22	54.0	-6.53	Peak	55.00	150	Horizontal	Pass
2	1064.400	48.34	-12.39	54.0	-5.66	Peak	292.00	150	Horizontal	Pass

ANNEX B TEST SETUP PHOTOS

Please refer the document “BL-SZ2250972-AR.PDF”.

ANNEX C EUT EXTERNAL PHOTOS

Please refer the document “BL-SZ2250972-AW.PDF”.

ANNEX D EUT INTERNAL PHOTOS

Please refer the document “BL-SZ2250972-AI.PDF”.

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--END OF REPORT--