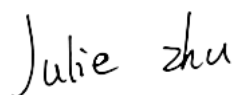
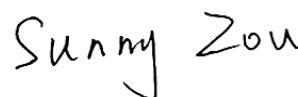


TEST REPORT

Applicant: Seeed Technology Co., Ltd.
Address: 9F, G3 Building, TCL International E City,
Zhongshanyuan Road, Nanshan District, Shenzhen,
Guangdong Province, P.R.C
Equipment Type: SenseCAP Card Tracker T1000-E for Meshtastic
Model Name: T1000-E
Brand Name: Seeed Studio
FCC ID: Z4T-T1000-E
Test Standard: 47 CFR Part 15 Subpart C
(refer to section 3.1)
Sample Arrival Date: Jul. 23, 2024
Test Date: Aug. 14, 2024 - Sep. 05, 2024
Date of Issue: Sep. 13, 2024

ISSUED BY:

Shenzhen BALUN Technology Co., Ltd.

Tested by: Julie Zhu**Checked by:** Ye Hongji**Approved by:** Sunny Zou
(Technical Director)

Revision History

Version	Issue Date	Revisions
<u>Rev. 01</u>	<u>Sep. 13, 2024</u>	<u>Initial Issue</u>

TABLE OF CONTENTS

1	GENERAL INFORMATION	4
1.1	Test Laboratory	4
1.2	Test Location	4
2	PRODUCT INFORMATION	5
2.1	Applicant Information	5
2.2	Manufacturer Information	5
2.3	General Description for Equipment under Test (EUT)	5
2.4	Technical Information	6
3	SUMMARY OF TEST RESULTS	9
3.1	Test Standards	9
3.2	Test Verdict	9
4	GENERAL TEST CONFIGURATIONS	10
4.1	Test Environments	10
4.2	Test Equipment List	10
4.3	Test Software List	10
4.4	Measurement Uncertainty	11
4.5	Description of Test Setup	11
4.6	Measurement Results Explanation Example	14
5	TEST ITEMS	15
5.1	Antenna Requirements	15
5.2	Number of Hopping Frequencies	16
5.3	Peak Output Power	17
5.4	Occupied Bandwidth	18
5.5	Carrier Frequency Separation	19

5.6	Time of Occupancy (Dwell time)	20
5.7	Conducted Spurious Emission & Authorized-band band-edge.....	21
5.8	Conducted Emission.....	22
5.9	Radiated Spurious Emission	23
5.10	Band Edge (Restricted-band band-edge).....	25
ANNEX A	TEST RESULT	26
A.1	Number of Hopping Frequency.....	26
A.2	Peak Output Power	27
A.3	20 dB and 99% bandwidth	30
A.4	Hopping Frequency Separation	35
A.5	Average Time of Occupancy.....	36
A.6	Conducted Spurious Emissions & Authorized-band band-edge	37
A.7	Conducted Emissions	44
A.8	Radiated Spurious Emission.....	46
A.9	Band Edge (Restricted-band band-edge).....	70
ANNEX B	TEST SETUP PHOTOS	76
ANNEX C	EUT EXTERNAL PHOTOS.....	76
ANNEX D	EUT INTERNAL PHOTOS.....	76

1 GENERAL INFORMATION

1.1 Test Laboratory

Name	Shenzhen BALUN Technology Co., Ltd.
Address	Block B, 1/F, Baisha Science and Technology Park, Shahe Xi Road, Nanshan District, Shenzhen, Guangdong Province, P. R. China
Phone Number	+86 755 6685 0100

1.2 Test Location

Name	Shenzhen BALUN Technology Co., Ltd.
Location	☒ Block B, 1/F, Baisha Science and Technology Park, Shahe Xi Road, Nanshan District, Shenzhen, Guangdong Province, P. R. China
	☐ 1/F, Building B, Ganghongji High-tech Intelligent Industrial Park, No. 1008, Songbai Road, Yangguang Community, Xili Sub-district, Nanshan District, Shenzhen, Guangdong Province, P. R. China
Accreditation Certificate	The laboratory is a testing organization accredited by FCC as a accredited testing laboratory. The designation number is CN1196.

2 PRODUCT INFORMATION

2.1 Applicant Information

Applicant	Seeed Technology Co., Ltd.
Address	9F, G3 Building, TCL International E City, Zhongshanyuan Road, Nanshan District, Shenzhen, Guangdong Province, P.R.C

2.2 Manufacturer Information

Manufacturer	Seeed Technology Co., Ltd.
Address	9F, G3 Building, TCL International E City, Zhongshanyuan Road, Nanshan District, Shenzhen, Guangdong Province, P.R.C

2.3 General Description for Equipment under Test (EUT)

EUT Name	SenseCAP Card Tracker T1000-E for Meshtastic
Model Name Under Test	T1000-E
Series Model Name	N/A
Description of Model name differentiation	N/A
Hardware Version	v2.2
Software Version	v1.0
Dimensions (Approx.)	N/A
Weight (Approx.)	N/A

2.4 Technical Information

Network and Wireless connectivity	Bluetooth (BLE), LoRa WIFI 802.11b, 802.11g and 802.11n(HT20/40) (Only RX) GPS, Galileo, GLONASS, BDS
-----------------------------------	---

The requirement for the following technical information of the EUT was tested in this report:

Modulation Technology	Frequency hopping system
Modulation Type	100kHz: FSK 125kHz: LoRa
Product Type	☐ Mobile ☒ Portable ☐ Fix Location
Frequency Range	The frequency range used is 902 MHz to 928 MHz.
Frequency Bandwidth	100kHz, 125 kHz
Number of channel	100kHz: 129 125kHz: 64
Tested Channel	100kHz: 1 (902.2 MHz), 64 (914.8 MHz), 129 (927.8 MHz) 125kHz: 1 (902.3 MHz), 32 (908.5 MHz), 64 (914.9 MHz)
Antenna Type	PCB Antenna
Antenna Gain	0.39 dBi
Antenna System(MIMO Smart Antenna)	N/A

All channel was listed on the following table:

100kHz:

Channel number	Freq. (MHz)	Channel number	Freq. (MHz)	Channel number	Freq. (MHz)	Channel number	Freq. (MHz)
1	902.2	34	908.8	67	915.4	100	922.0
2	902.4	35	909.0	68	915.6	101	922.2
3	902.6	36	909.2	69	915.8	102	922.4
4	902.8	37	909.4	70	916.0	103	922.6
5	903.0	38	909.6	71	916.2	104	922.8
6	903.2	39	909.8	72	916.4	105	923.0
7	903.4	40	910.0	73	916.6	106	923.2
8	903.6	41	910.2	74	916.8	107	923.4
9	903.8	42	910.4	75	917.0	108	923.6
10	904.0	43	910.6	76	917.2	109	923.8
11	904.2	44	910.8	77	917.4	110	924.0
12	904.4	45	911.0	78	917.6	111	924.2
13	904.6	46	911.2	79	917.8	112	924.4
14	904.8	47	911.4	80	918.0	113	924.6
15	905.0	48	911.6	81	918.2	114	924.8
16	905.2	49	911.8	82	918.4	115	925.0
17	905.4	50	912.0	83	918.6	116	925.2
18	905.6	51	912.2	84	918.8	117	925.4
19	905.8	52	912.4	85	919.0	118	925.6
20	906.0	53	912.6	86	919.2	119	925.8
21	906.2	54	912.8	87	919.4	120	926.0
22	906.4	55	913.0	88	919.6	121	926.2
23	906.6	56	913.2	89	919.8	122	926.4
24	906.8	57	913.4	90	920.0	123	926.6
25	907.0	58	913.6	91	920.2	124	926.8
26	907.2	59	913.8	92	920.4	125	927.0
27	907.4	60	914.0	93	920.6	126	927.2
28	907.6	61	914.2	94	920.8	127	927.4
29	907.8	62	914.4	95	921.0	128	927.6
30	908.0	63	914.6	96	921.2	129	927.8
31	908.2	64	914.8	97	921.4	--	--
32	908.4	65	915.0	98	921.6	--	--
33	908.6	66	915.2	99	921.8	--	--

125kHz:

Channel number	Freq. (MHz)	Channel number	Freq. (MHz)	Channel number	Freq. (MHz)	Channel number	Freq. (MHz)
1	902.3	17	905.5	33	908.7	49	911.9
2	902.5	18	905.7	34	908.9	50	912.1
3	902.7	19	905.9	35	909.1	51	912.3
4	902.9	20	906.1	36	909.3	52	912.5
5	903.1	21	906.3	37	909.5	53	912.7
6	903.3	22	906.5	38	909.7	54	912.9
7	903.5	23	906.7	39	909.9	55	913.1
8	903.7	24	906.9	40	910.1	56	913.3
9	903.9	25	907.1	41	910.3	57	913.5
10	904.1	26	907.3	42	910.5	58	913.7
11	904.3	27	907.5	43	910.7	59	913.9
12	904.5	28	907.7	44	910.9	60	914.1
13	904.7	29	907.9	45	911.1	61	914.3
14	904.9	30	908.1	46	911.3	62	914.5
15	905.1	31	908.3	47	911.5	63	914.7
16	905.3	32	908.5	48	911.7	64	914.9

3 SUMMARY OF TEST RESULTS

3.1 Test Standards

No.	Identity	Document Title
1	47 CFR Part 15, Subpart C	Intentional radiators of radio frequency equipment
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	ANSI C63.10-2013	American National Standard for Testing Unlicensed Wireless Devices

3.2 Test Verdict

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

Note: The EUT has a permanently and irreplaceable attached antenna, which complies with the requirement FCC 15.203

4 GENERAL TEST CONFIGURATIONS

4.1 Test Environments

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

Relative Humidity	49% to 68%	
Atmospheric Pressure	100 kPa to 102 kPa	
Temperature	NT (Normal Temperature)	+21.8°C to +25.1°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	2024.05.08	2025.05.07
Spectrum Analyzer	KEYSIGHT	N9020A	MY52510065	2024.08.01	2025.07.31
Test Antenna-Horn	SCHWARZBECK	BBHA 9120D	01631	2022.02.23	2025.02.22
Test Antenna-Horn	A-INFO	LB-180400KF	J211060273	2024.06.15	2027.06.14
Anechoic Chamber	RAINFORD	9m*6m*6m	144	2022.02.19	2025.09.03
Amplifier	COM-MV	LSCX_LNA1-12G-01	180602	2024.08.01	2025.07.31
Test Antenna-Bi-Log	SCHWARZBECK	VULB 9163	00884	2022.02.20	2025.02.19
Amplifier	COM-MV	XKu_LNA7-18G-01	180601	2024.08.01	2025.07.31
EMI Receiver	ROHDE&SCHWARZ	ESRP	101036	2024.08.01	2025.07.31
Test Antenna-Loop	SCHWARZBECK	FMZB 1519	1519-037	2024.01.23	2025.01.22
Amplifier	COM-MV	ZT30-1000M	B2018054558	2023.12.05	2024.12.04
Anechoic Chamber	EMC Electronic Co., Ltd	20.10*11.60*7.35m	130	2024.07.13	2027.07.12
EMI Receiver	KEYSIGHT	N9010B	MY57110309	2024.08.01	2025.07.31
LISN	SCHWARZBECK	NSLK 8127	8127-687	2024.05.09	2025.05.08
Shielded Enclosure	YiHeng Electronic Co., Ltd	3.5m*3.1m*2.8m	112	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	V22.930	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	0.8 ℃
Humidity	4 %

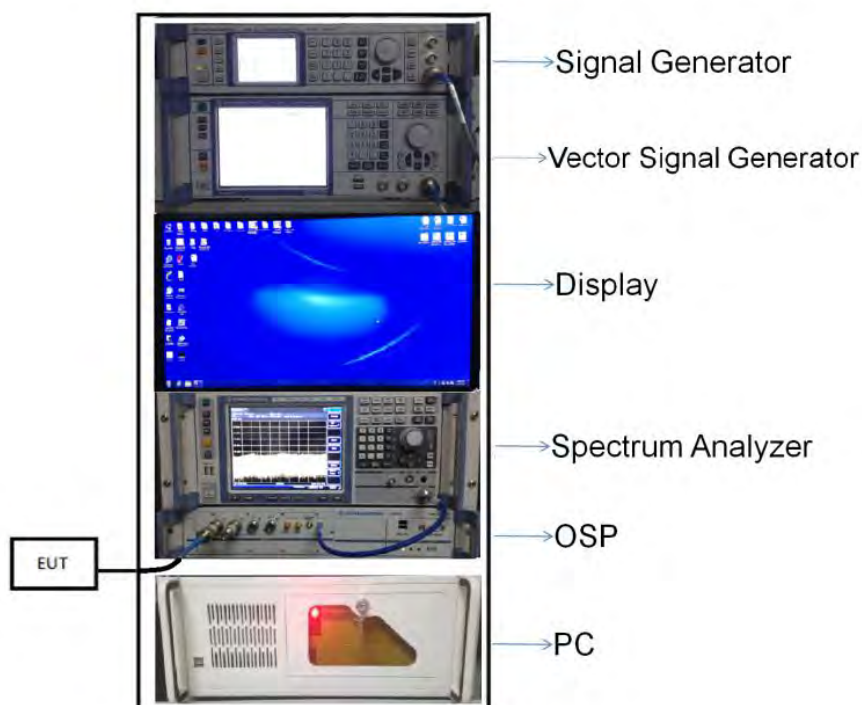
4.5 Description of Test Setup

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



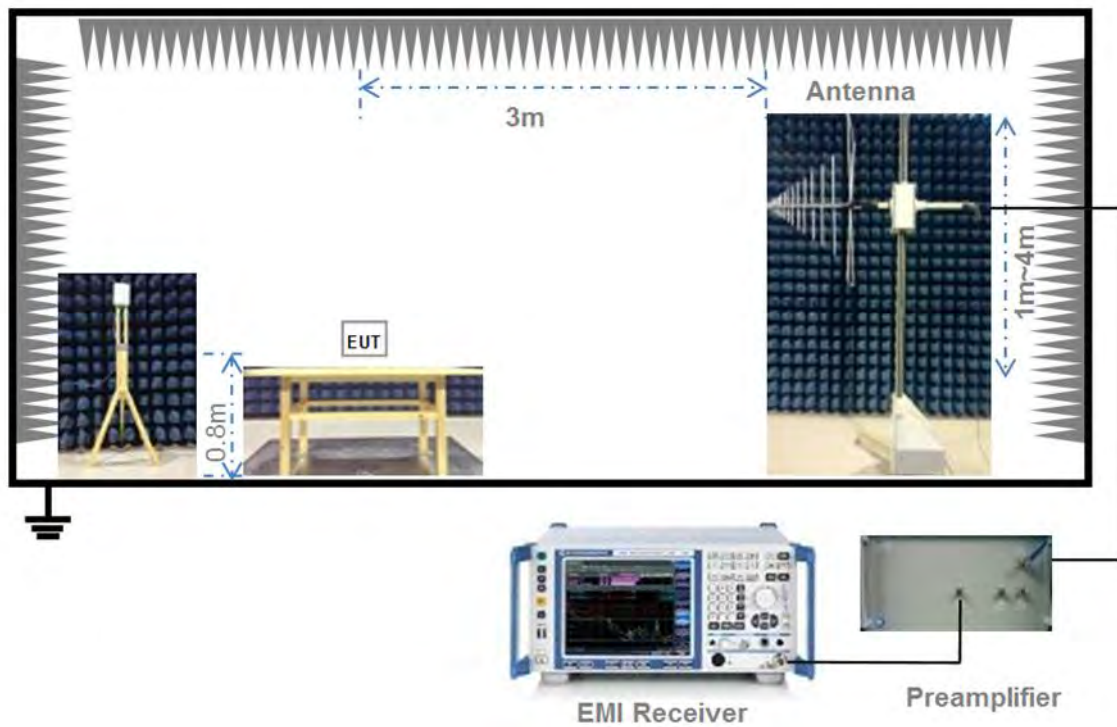
(Diagram 2)

4.5.3 For Radiated Test (Below 30 MHz)



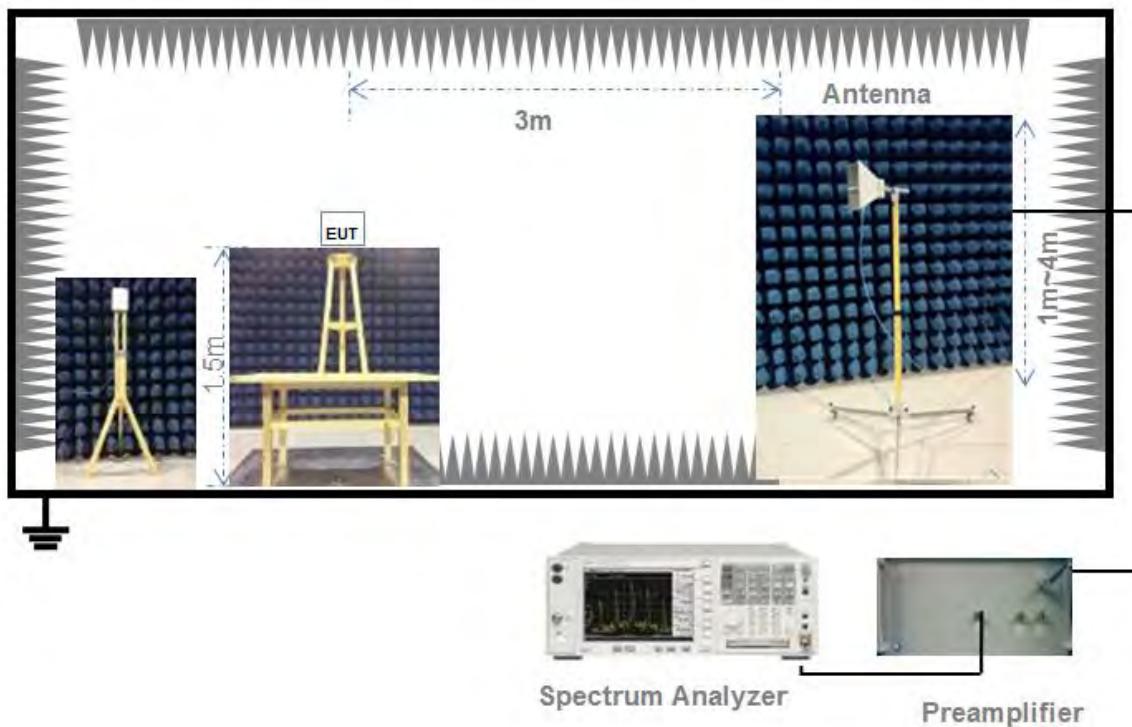
(Diagram 3)

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

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)

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 4.5.1 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

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.

5.3.2 Test Setup

See section 4.5.1 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)

5.4.2 Test Setup

See section 4.5.1 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)

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 4.5.1 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)

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 4.5.1 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)

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 4.5.1 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

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 4.5.2 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)

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 4.5.3 to 4.5.5 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)

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 4.5.3 to 4.5.5 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
LoRa (100kHz)	902-928	129	50	Pass

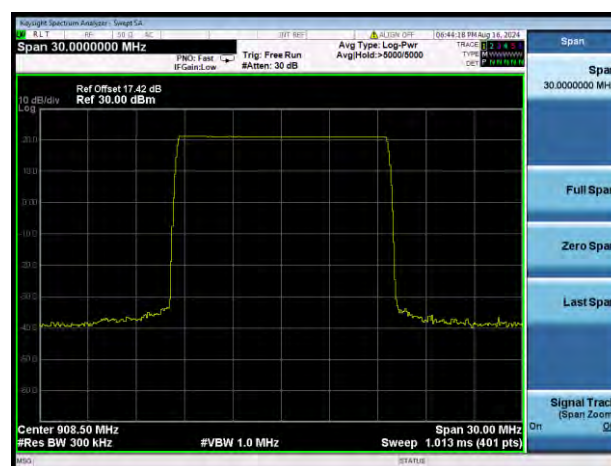
Test Mode	Frequency Block (MHz)	Measured Channel Numbers	Min. Limit	Verdict
LoRa (125kHz)	902-928	64	50	Pass

Test Plots

LoRa (100kHz)



LoRa (125kHz)



A.2 Peak Output Power

Test Data

Channel	Measured Output Peak Power		Limit		Verdict
	LoRa (100kHz)		dBm	mW	
	dBm	mW			
Low	20.32	107.57	30	1000	Pass
Middle	20.09	102.09			Pass
High	20.17	103.99			Pass

Channel	Measured Output Peak Power		Limit		Verdict
	LoRa (125kHz)		dBm	mW	
	dBm	mW			
Low	20.30	107.05	30	1000	Pass
Middle	20.21	104.93			Pass
High	20.11	102.57			Pass

Test Plots

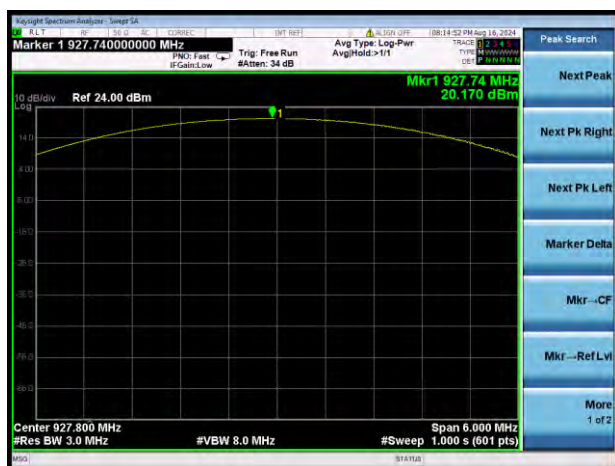
LoRa (100kHz) LOW CHANNEL



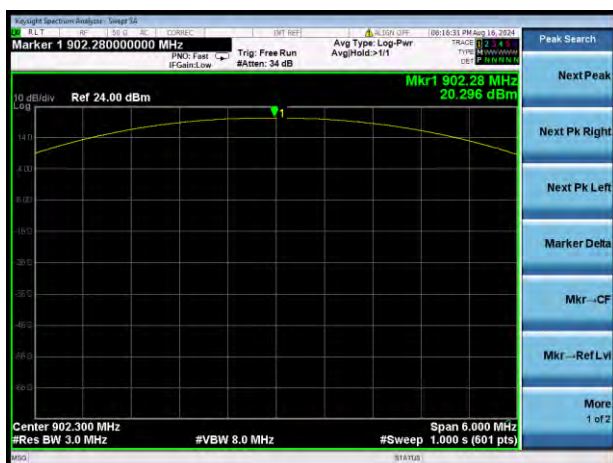
LoRa (100kHz) MIDDLE CHANNEL



LoRa (100kHz) HIGH CHANNEL



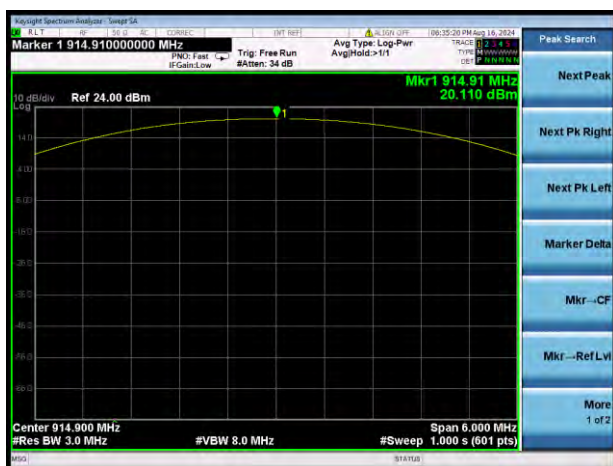
LoRa (125kHz) LOW CHANNEL



LoRa (125kHz) MIDDLE CHANNEL



LoRa (125kHz) HIGH CHANNEL



A.3 20 dB and 99% bandwidth

Test Data

LoRa (100kHz)				
Channel	20 dB Bandwidth (MHz)	99% Bandwidth (MHz)	Limit (MHz)	Verdict
Low	0.147200	0.105110	0.25	Pass
Middle	0.149100	0.105330	0.25	Pass
High	0.148100	0.104550	0.25	Pass

LoRa (125kHz)				
Channel	20 dB Bandwidth (MHz)	99% Bandwidth (MHz)	Limit (MHz)	Verdict
Low	0.224100	0.125550	0.25	Pass
Middle	0.226000	0.125760	0.25	Pass
High	0.226000	0.125840	0.25	Pass

Test Plots

20 dB Bandwidth

LoRa (100kHz) LOW CHANNEL



LoRa (100kHz) MIDDLE CHANNEL



LoRa (100kHz) HIGH CHANNEL



LoRa (125kHz) LOW CHANNEL



LoRa (125kHz) MIDDLE CHANNEL



LoRa (125kHz) HIGH CHANNEL



99% Bandwidth

LoRa (100kHz) LOW CHANNEL



LoRa (100kHz) MIDDLE CHANNEL



LoRa (100kHz) HIGH CHANNEL



LoRa (125kHz) LOW CHANNEL



LoRa (125kHz) MIDDLE CHANNEL



LoRa (125kHz) HIGH CHANNEL



A.4 Hopping Frequency Separation

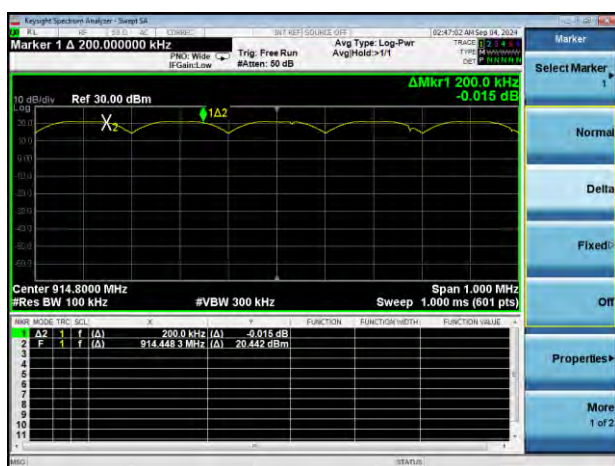
Test Data

Mode	Frequency separation (MHz)	Max 20 dB Bandwidth (MHz)	Verdict
LoRa (100kHz)	0.200	0.099	Pass

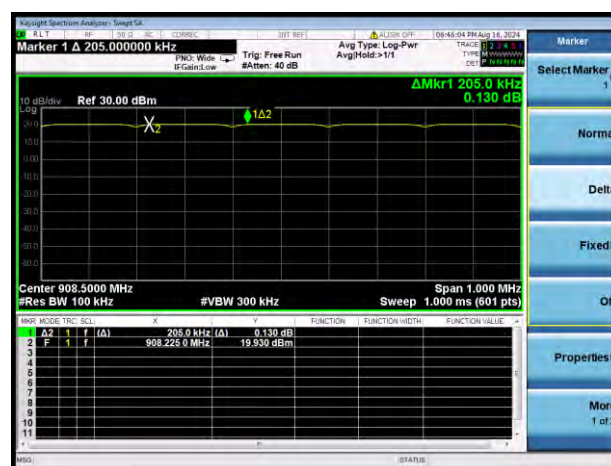
Mode	Frequency separation (MHz)	Max 20 dB Bandwidth (MHz)	Verdict
LoRa (125kHz)	0.205	0.151	Pass

Test Plots

LoRa (100kHz)



LoRa (125kHz)



A.5 Average Time of Occupancy

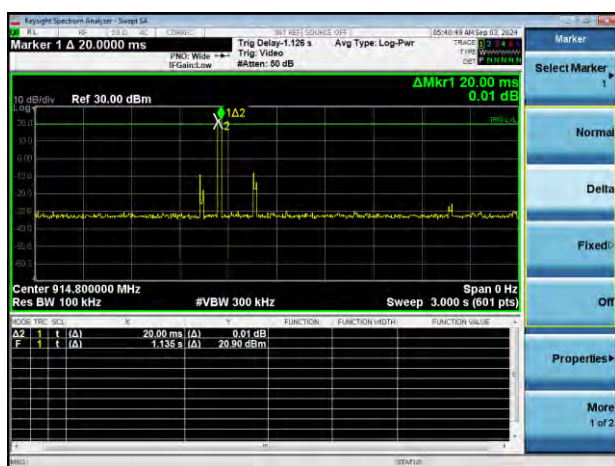
Test Data

LoRa (100kHz)			
Pulse Width (ms)	Total of Dwell (ms)	Limit (sec)	Verdict
20.00000	100.000	0.4	Pass

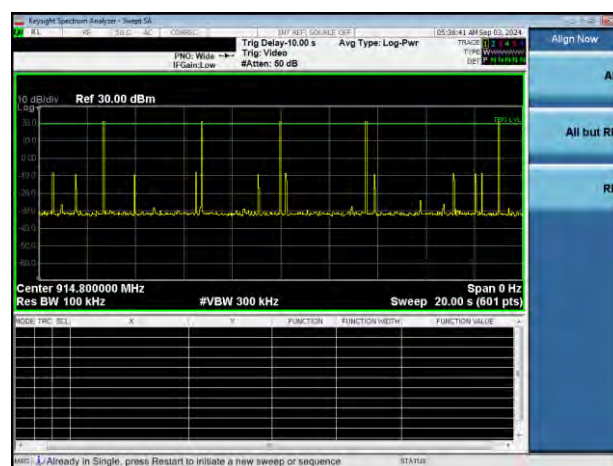
LoRa (125kHz)			
Pulse Width (ms)	Total of Dwell (ms)	Limit (sec)	Verdict
333.300	333.300	0.4	Pass

Test Plots

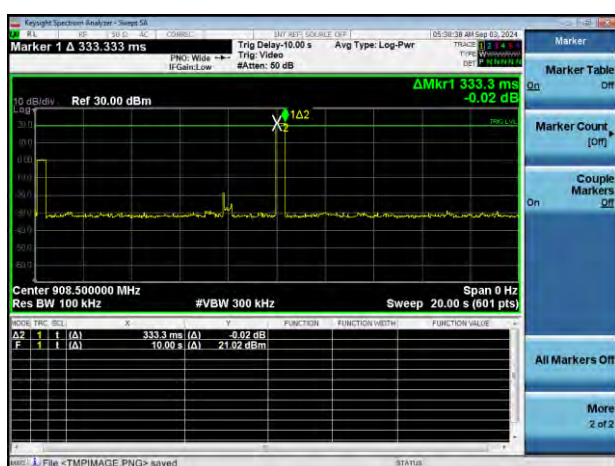
LoRa (100kHz) Pulse Width



LoRa (100kHz) Total of Dwell



LoRa (125kHz)



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

Test Data

LoRa (100kHz)				
Channel	Measured Max. Out of Band Emission (dBm)	Limit (dBm)		Verdict
		Carrier Level	Calculated 20 dBc Limit	
Low	-15.56	20.19	0.19	Pass
Middle	-16.23	19.94	-0.06	Pass
High	-16.69	19.62	-0.38	Pass

LoRa (100kHz)				
Mode	Measured Max. Out of Band Emission (dBm)	Limit (dBm)		Verdict
		Carrier Level	Calculated 20 dBc Limit	
Hopping	-15.00	21.30	1.30	Pass

LoRa (125kHz)				
Channel	Measured Max. Out of Band Emission (dBm)	Limit (dBm)		Verdict
		Carrier Level	Calculated 20 dBc Limit	
Low	-15.57	20.19	0.19	Pass
Middle	-15.32	19.29	-0.71	Pass
High	-16.75	19.18	-0.82	Pass

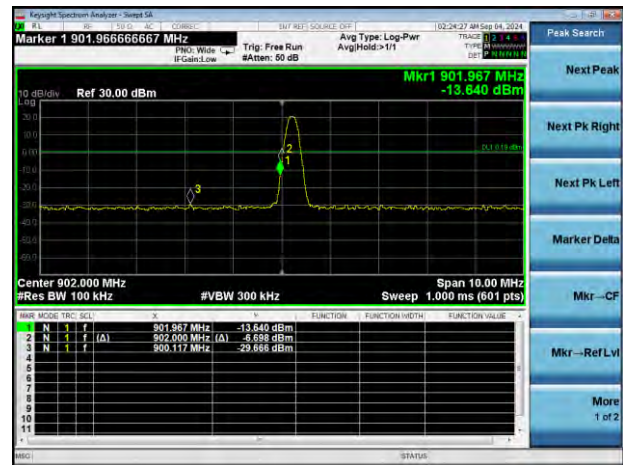
LoRa (125kHz)				
Mode	Measured Max. Out of Band Emission (dBm)	Limit (dBm)		Verdict
		Carrier Level	Calculated 20 dBc Limit	
Hopping	-16.37	19.23	-0.77	Pass

Test Plots

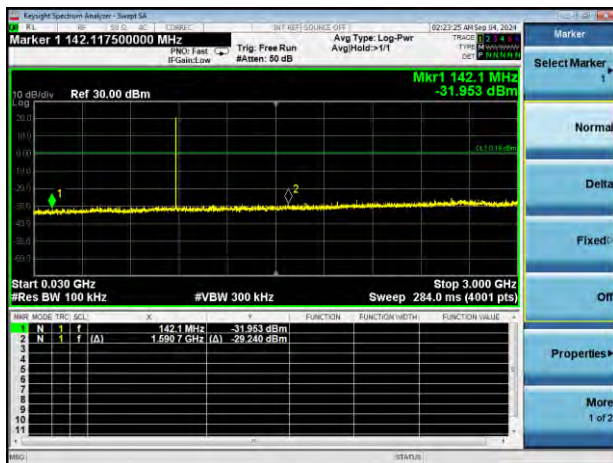
LoRa (100kHz) LOW CHANNEL, CARRIER LEVEL



LoRa (100kHz) LOW CHANNEL, Band Edge



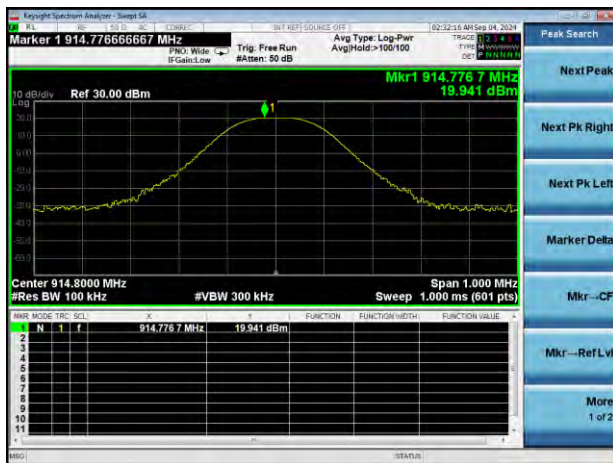
LoRa (100kHz) LOW CHANNEL, SPURIOUS 30 MHz ~ 3 GHz



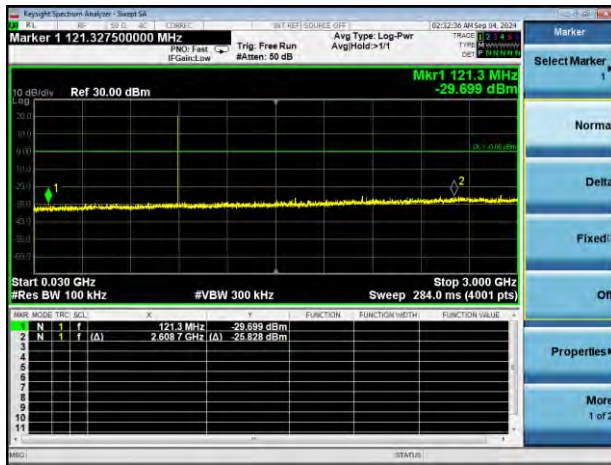
LoRa (100kHz) LOW CHANNEL, SPURIOUS 3 GHz ~ 25 GHz



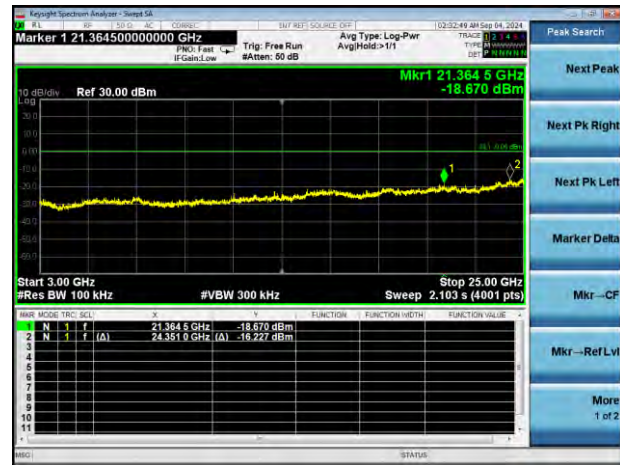
LoRa (100kHz) MIDDLE CHANNEL, CARRIER LEVEL



LoRa (100kHz) MIDDLE CHANNEL, SPURIOUS 30 MHz ~ 3 GHz



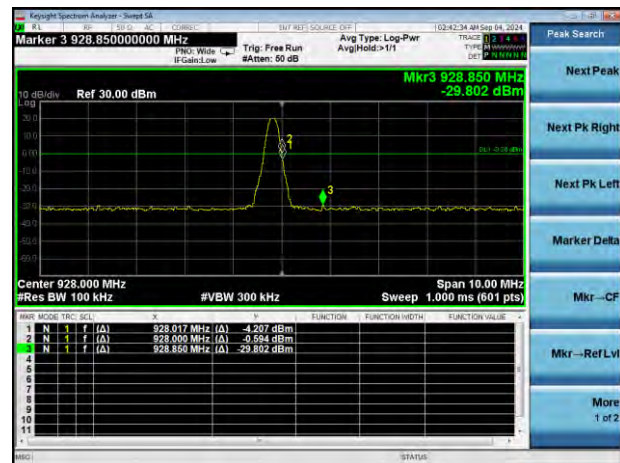
LoRa (100kHz) MIDDLE CHANNEL, SPURIOUS 3 GHz ~ 25 GHz



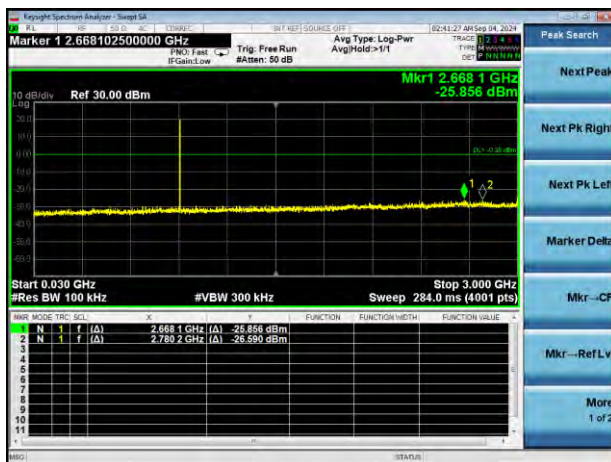
LoRa (100kHz) HIGH CHANNEL, CARRIER LEVEL



LoRa (100kHz) HIGH CHANNEL, BAND EDGE



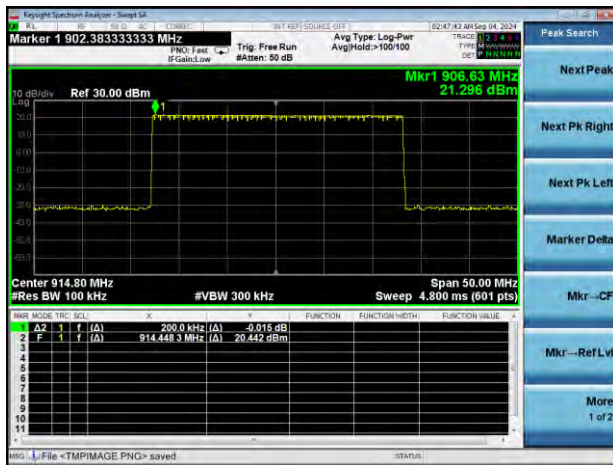
LoRa (100kHz) HIGH CHANNEL, SPURIOUS 30 MHz ~ 3 GHz



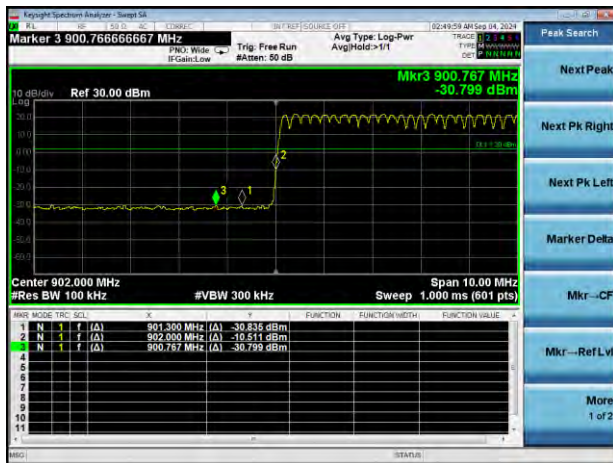
LoRa (100kHz) HIGH CHANNEL, SPURIOUS 3 GHz ~ 25 GHz



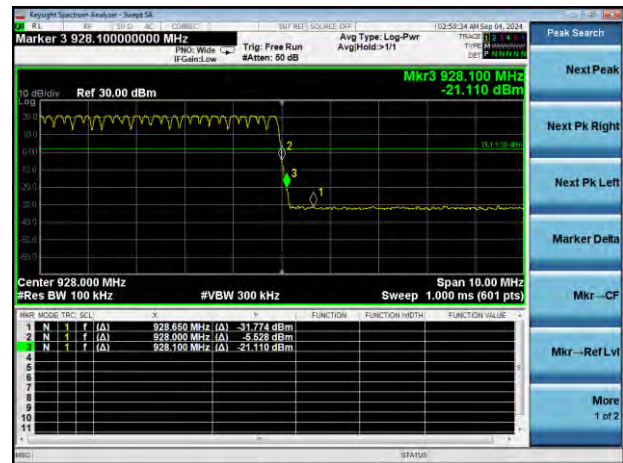
LoRa (100kHz) HOPPING, CARRIER LEVEL



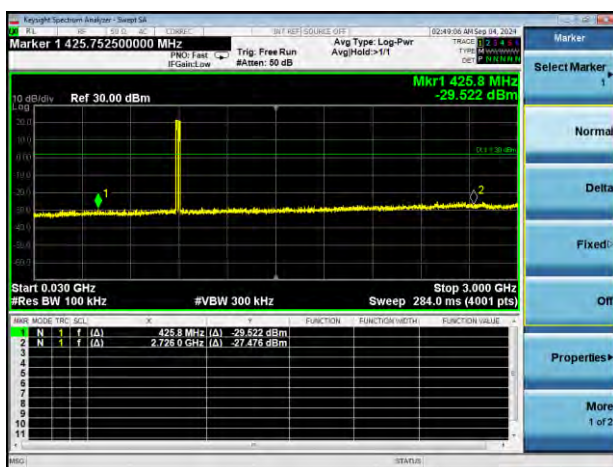
LoRa (100kHz) HOPPING BAND EDGE (LOW)



LoRa (100kHz) HOPPING BAND EDGE (HIGH)



LoRa (100kHz) HOPPING Mode, SPURIOUS 30 MHz ~ 3 GHz



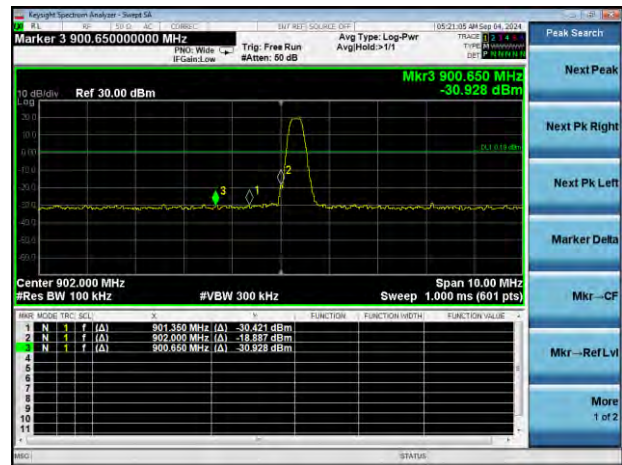
LoRa (100kHz) Hopping Mode, SPURIOUS 3 GHz ~ 25 GHz



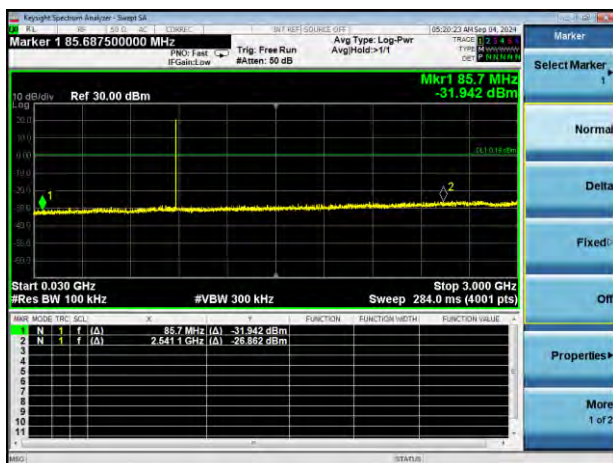
LoRa (125kHz) LOW CHANNEL, CARRIER LEVEL



LoRa (125kHz) LOW CHANNEL, Band Edge



LoRa (125kHz) LOW CHANNEL, SPURIOUS 30 MHz ~ 3 GHz



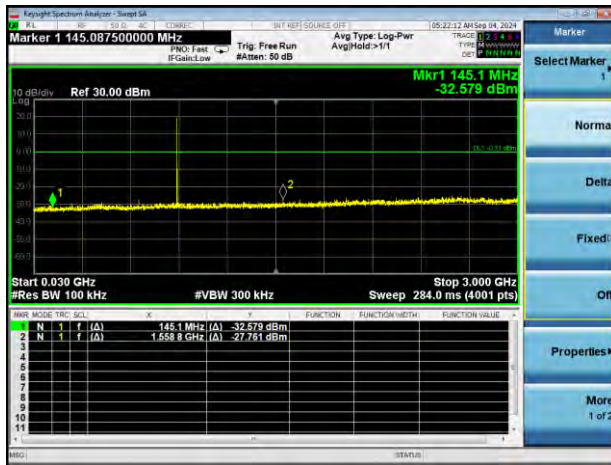
LoRa (125kHz) LOW CHANNEL, SPURIOUS 3 GHz ~ 25 GHz



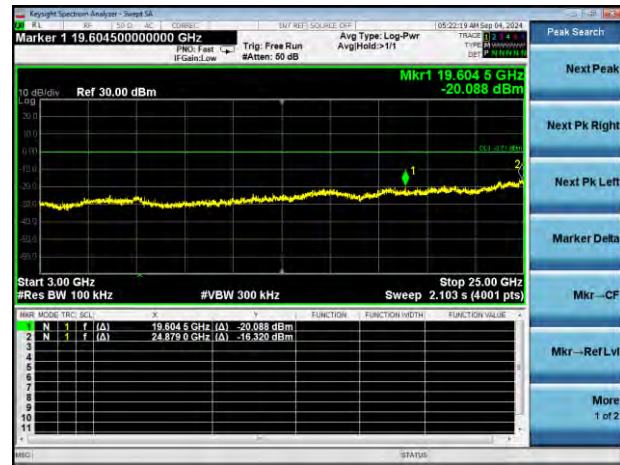
LoRa (125kHz) MIDDLE CHANNEL, CARRIER LEVEL



LoRa (125kHz) MIDDLE CHANNEL, SPURIOUS 30 MHz ~ 3 GHz



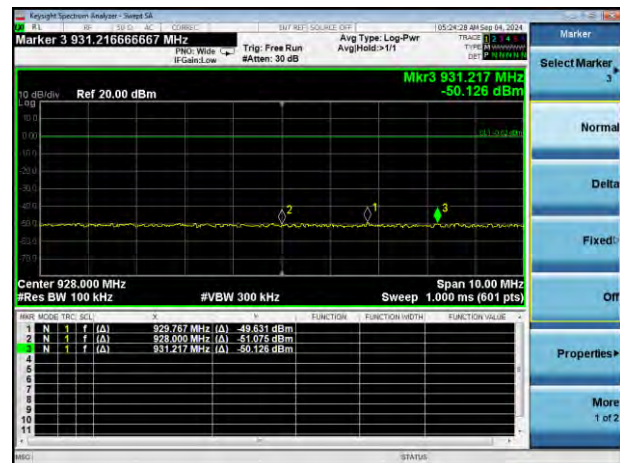
LoRa (125kHz) MIDDLE CHANNEL, SPURIOUS 3 GHz ~ 25 GHz



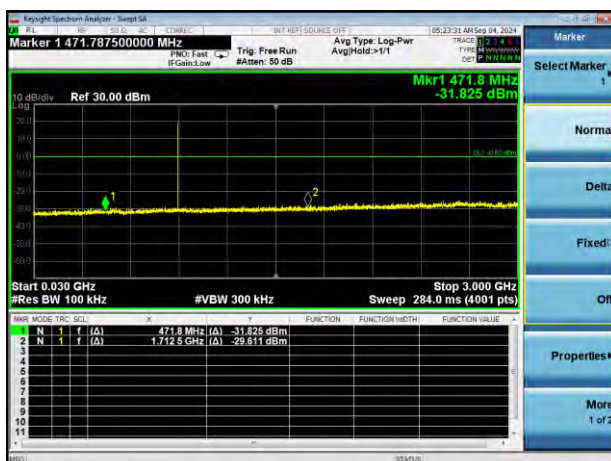
LoRa (125kHz) HIGH CHANNEL, CARRIER LEVEL



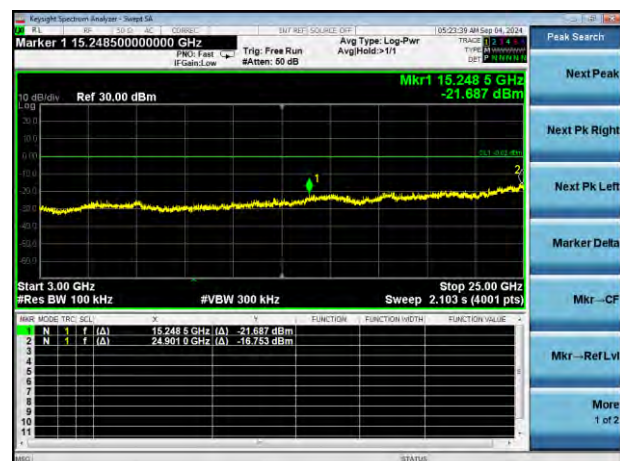
LoRa (125kHz) HIGH CHANNEL, BAND EDGE



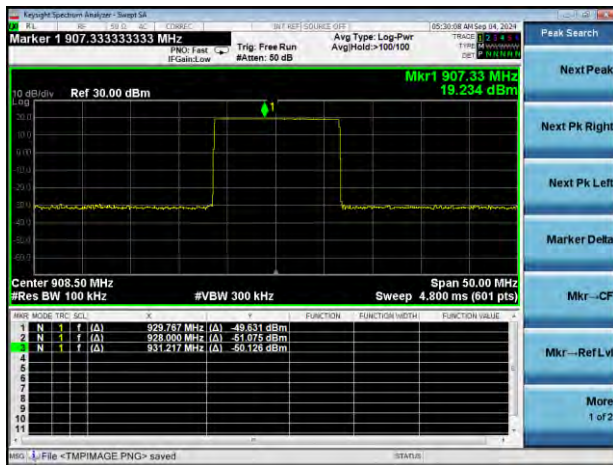
LoRa (125kHz) HIGH CHANNEL, SPURIOUS 30 MHz ~ 3 GHz



LoRa (125kHz) HIGH CHANNEL, SPURIOUS 3 GHz ~ 25 GHz



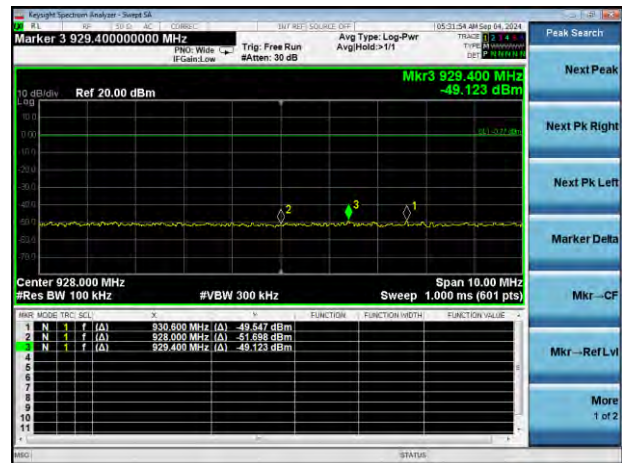
LoRa (125kHz) HOPPING, CARRIER LEVEL



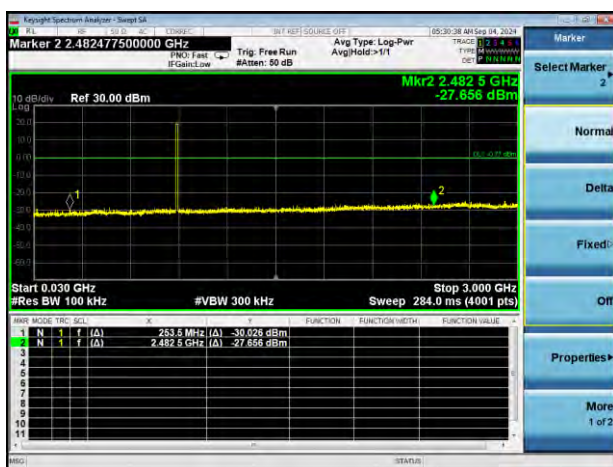
LoRa (125kHz) HOPPING BAND EDGE (LOW)



LoRa (125kHz) HOPPING BAND EDGE (HIGH)



LoRa (125kHz) HOPPING Mode, SPURIOUS 30 MHz ~ 3 GHz



LoRa (125kHz) Hopping Mode, SPURIOUS 3 GHz ~ 25 GHz



A.7 Conducted Emissions

Note ¹: The EUT is working in the Normal link mode.

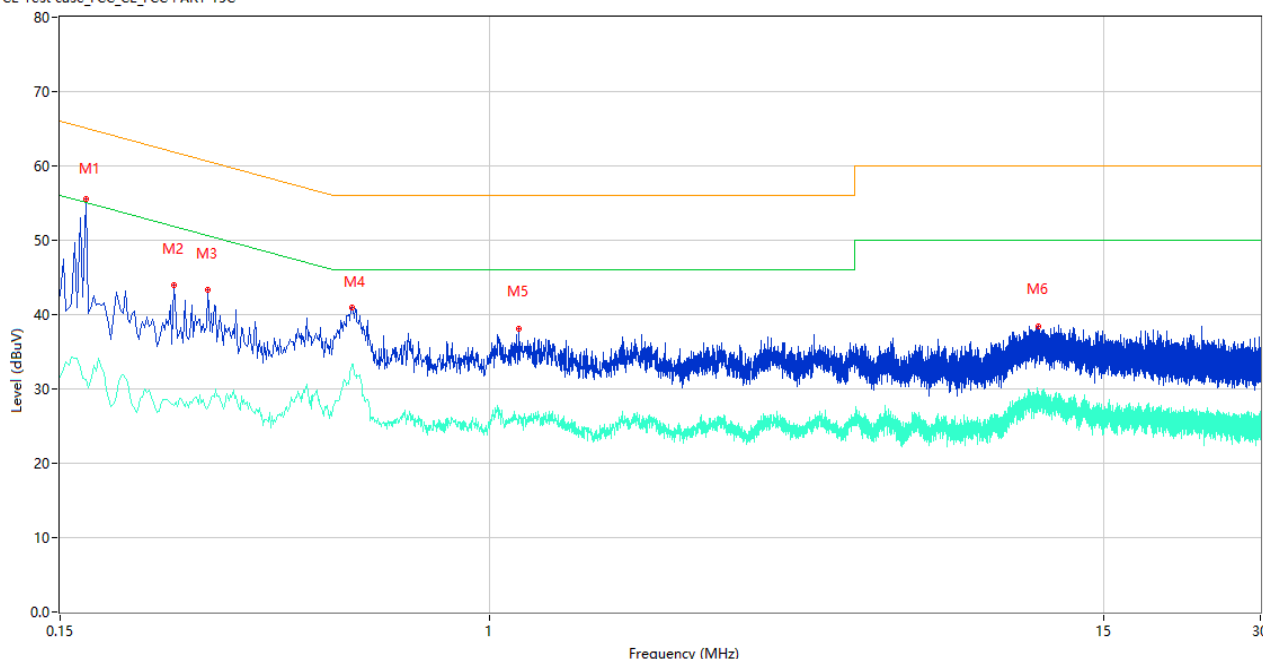
Note ²: Devices subject to Part 15 must be tested for all available U.S. voltages and frequencies (such as a nominal 120 VAC, 60 Hz and 240 VAC, 50 Hz) for which the device is capable of operation. So, The configuration 120 VAC, 60 Hz and 240 VAC, 50 Hz were tested respectively, but only the worst configuration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

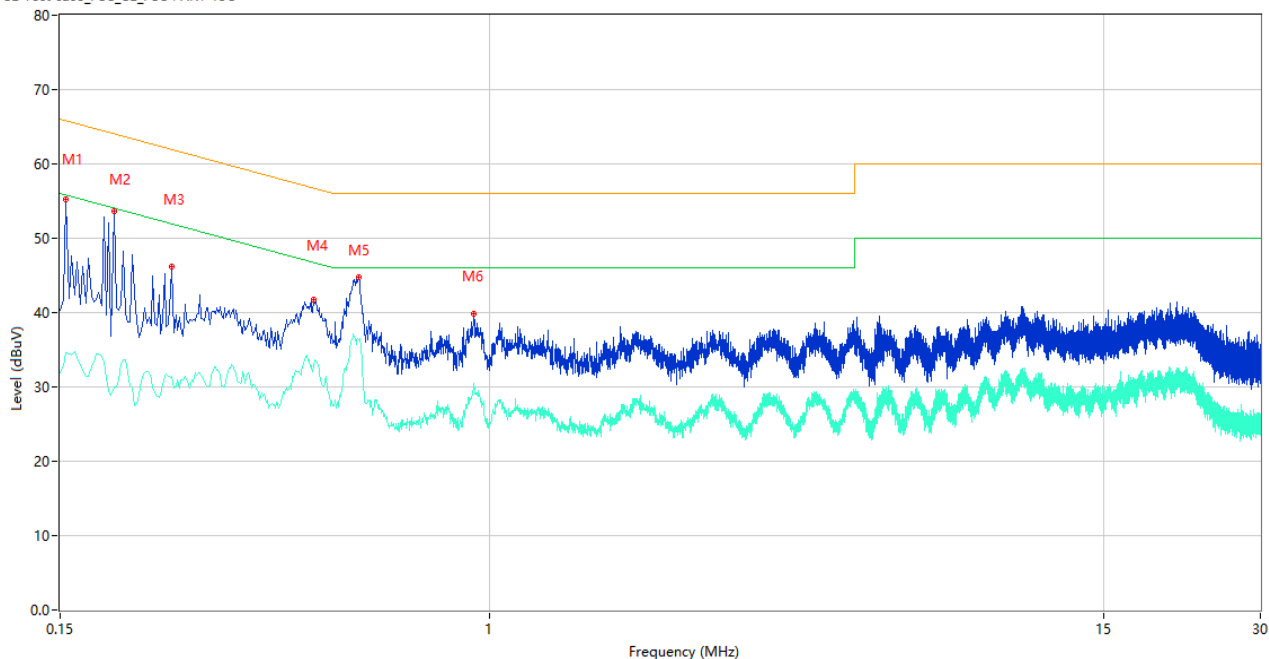
CE Test case_FCC_CE_FCC PART 15C



No.	Frequency (MHz)	Results (dBuV)	Factor (dB)	Limit (dBuV)	Margin (dB)	Detector	Line	Verdict
1	0.168	55.53	9.78	65.06	9.53	Peak	L	Pass
1**	0.168	31.22	9.78	55.06	23.84	AV	L	Pass
2	0.248	43.93	9.77	61.82	17.89	Peak	L	Pass
2**	0.248	27.71	9.77	51.82	24.11	AV	L	Pass
3	0.288	43.27	9.76	60.58	17.31	Peak	L	Pass
3**	0.288	27.39	9.76	50.58	23.19	AV	L	Pass
4	0.544	40.95	10.02	56.00	15.05	Peak	L	Pass
4**	0.544	33.31	10.02	46.00	12.69	AV	L	Pass
5	1.134	38.16	10.28	56.00	17.84	Peak	L	Pass
5**	1.134	26.51	10.28	46.00	19.49	AV	L	Pass
6	11.270	38.46	10.54	60.00	21.54	Peak	L	Pass
6**	11.270	28.44	10.54	50.00	21.56	AV	L	Pass

PHASE N

CE Test case_FCC_CE_FCC PART 15C



No.	Frequency (MHz)	Results (dBuV)	Factor (dB)	Limit (dBuV)	Margin (dB)	Detector	Line	Verdict
1	0.154	55.31	9.78	65.78	10.47	Peak	N	Pass
1**	0.154	34.63	9.78	55.78	21.15	AV	N	Pass
2	0.190	53.72	9.78	64.04	10.32	Peak	N	Pass
2**	0.190	30.07	9.78	54.04	23.97	AV	N	Pass
3	0.246	46.25	9.77	61.89	15.64	Peak	N	Pass
3**	0.246	31.50	9.77	51.89	20.39	AV	N	Pass
4	0.460	41.75	10.02	56.69	14.94	Peak	N	Pass
4**	0.460	32.64	10.02	46.69	14.05	AV	N	Pass
5	0.560	44.79	10.06	56.00	11.21	Peak	N	Pass
5**	0.560	36.38	10.06	46.00	9.62	AV	N	Pass
6	0.932	39.82	10.10	56.00	16.18	Peak	N	Pass
6**	0.932	30.40	10.10	46.00	15.60	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.

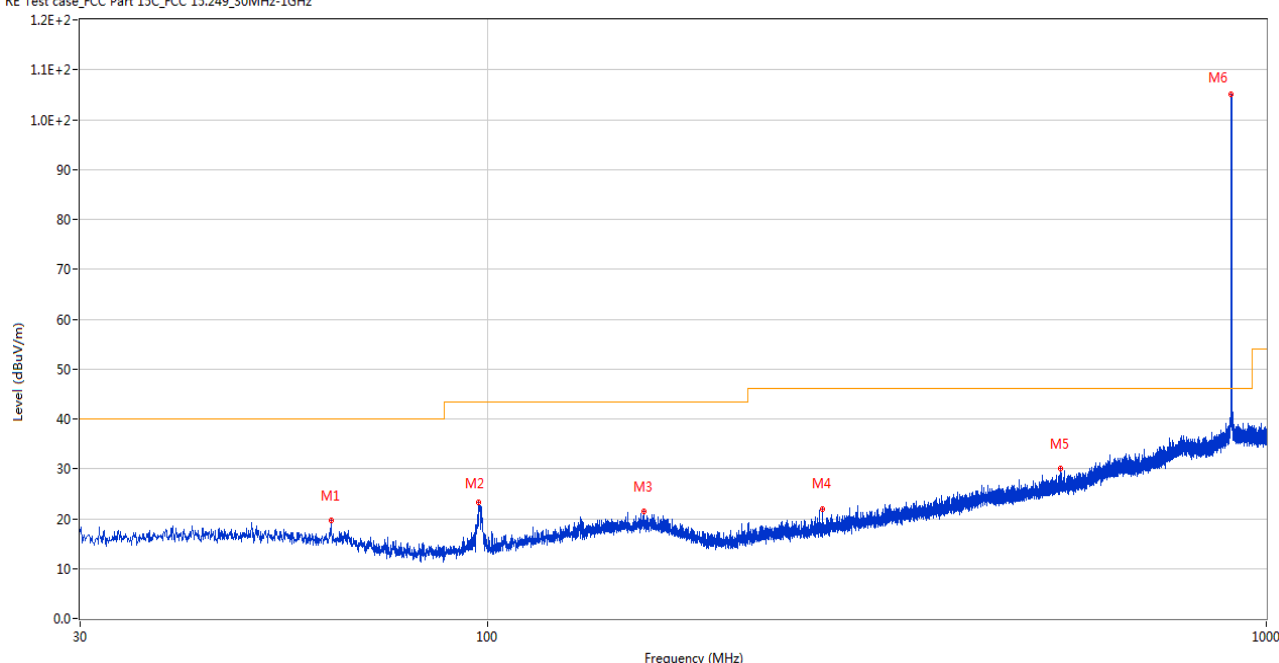
Note ³: The low frequency, which started from 9 kHz to 30 MHz, was pre-scanned and the result which was 20 dB lower than the limit line per 15.31(o) was not reported.

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

Test Data and Plots

LoRa (100kHz) LOW CHANNEL, 30 MHz to 1 GHz, ANT H

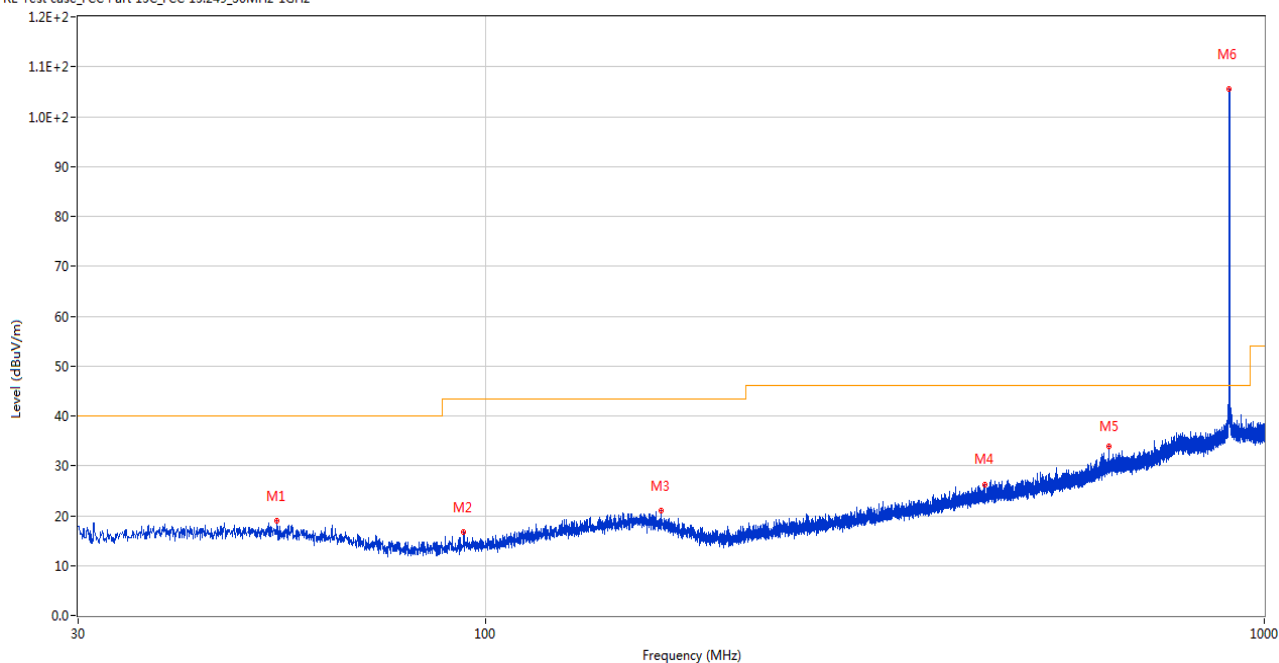
RE Test case_FCC Part 15C_FCC 15.249_30MHz-1GHz



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	62.980	19.70	-27.13	40.0	20.30	Peak	89.00	100	Horizontal	Pass
2	97.464	23.22	-28.91	43.5	20.28	Peak	304.00	100	Horizontal	Pass
3	158.670	21.50	-23.99	43.5	22.00	Peak	230.00	150	Horizontal	Pass
4	269.250	22.01	-24.81	46.0	23.99	Peak	30.00	150	Horizontal	Pass
5	544.682	29.99	-16.80	46.0	16.01	Peak	348.00	100	Horizontal	Pass
6	902.175	105.15	-7.27	46.0	-59.15	Peak	356.00	100	Horizontal	N/A

LoRa (100kHz) LOW CHANNEL, 30 MHz to 1 GHz, ANT V

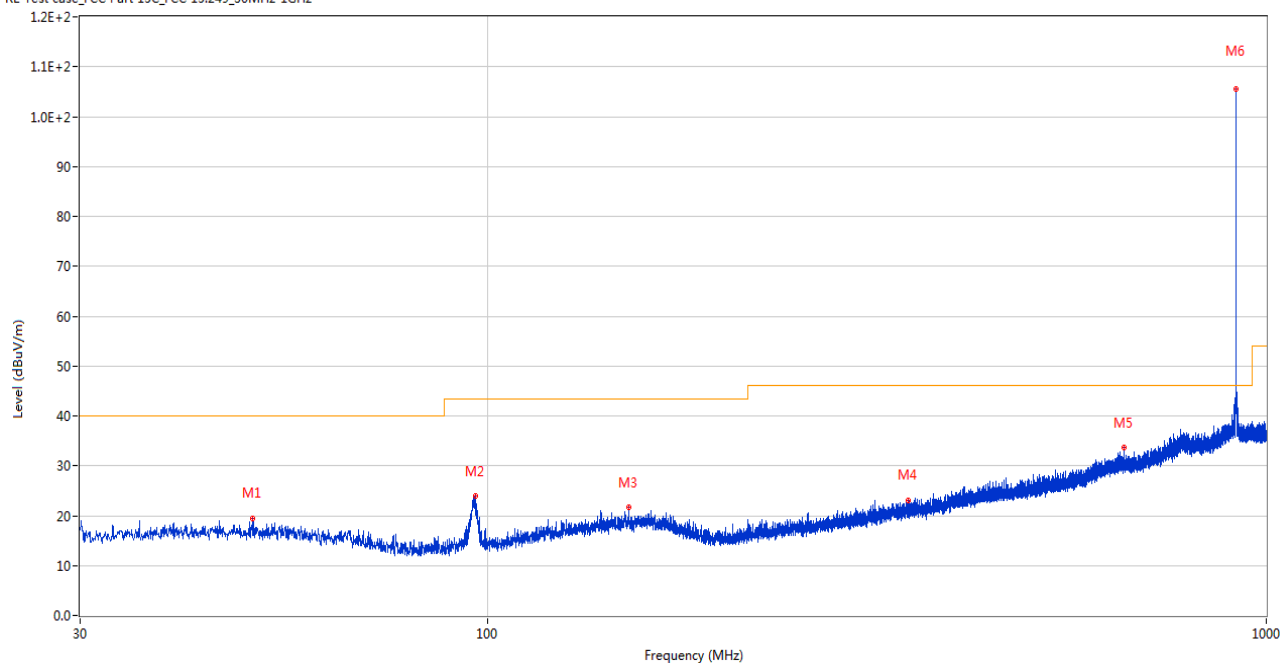
RE Test case_FCC Part 15C_FCC 15.249_30MHz-1GHz



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	54.008	19.03	-26.29	40.0	20.97	Peak	46.00	100	Vertical	Pass
2	93.826	16.75	-29.02	43.5	26.75	Peak	310.00	100	Vertical	Pass
3	168.031	21.02	-24.71	43.5	22.48	Peak	360.00	200	Vertical	Pass
4	437.351	26.30	-19.44	46.0	19.70	Peak	190.00	200	Vertical	Pass
5	632.127	34.00	-13.25	46.0	12.00	Peak	90.00	200	Vertical	Pass
6	902.224	105.43	-7.26	46.0	-59.43	Peak	328.00	200	Vertical	N/A

LoRa (100kHz) MIDDLE CHANNEL, 30 MHz to 1 GHz, ANT H

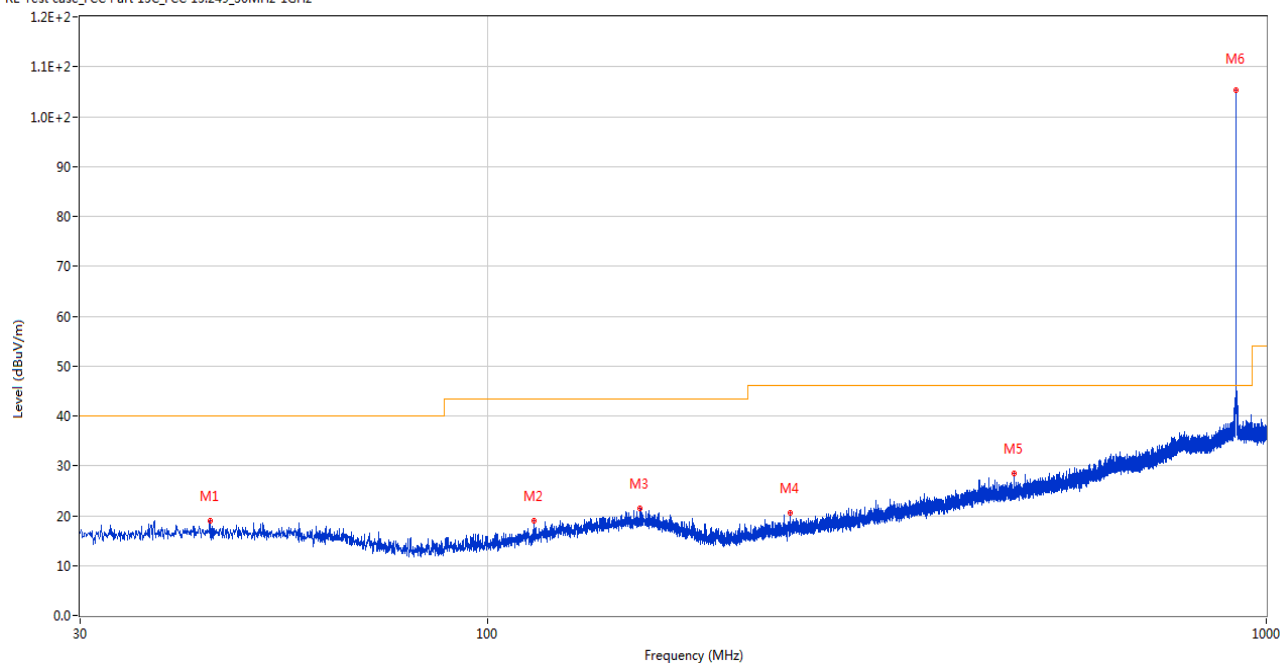
RE Test case_FCC Part 15C_FCC 15.249_30MHz-1GHz



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	49.982	19.53	-26.08	40.0	20.47	Peak	165.00	200	Horizontal	Pass
2	96.590	24.03	-28.89	43.5	19.47	Peak	133.00	200	Horizontal	Pass
3	151.929	21.59	-24.18	43.5	21.91	Peak	272.00	300	Horizontal	Pass
4	346.608	23.14	-22.11	46.0	22.86	Peak	158.00	300	Horizontal	Pass
5	656.426	33.62	-13.01	46.0	12.38	Peak	227.00	200	Horizontal	Pass
6	914.737	105.59	-7.43	46.0	-59.59	Peak	350.00	200	Horizontal	N/A

LoRa (100kHz) MIDDLE CHANNEL, 30 MHz to 1 GHz, ANT V

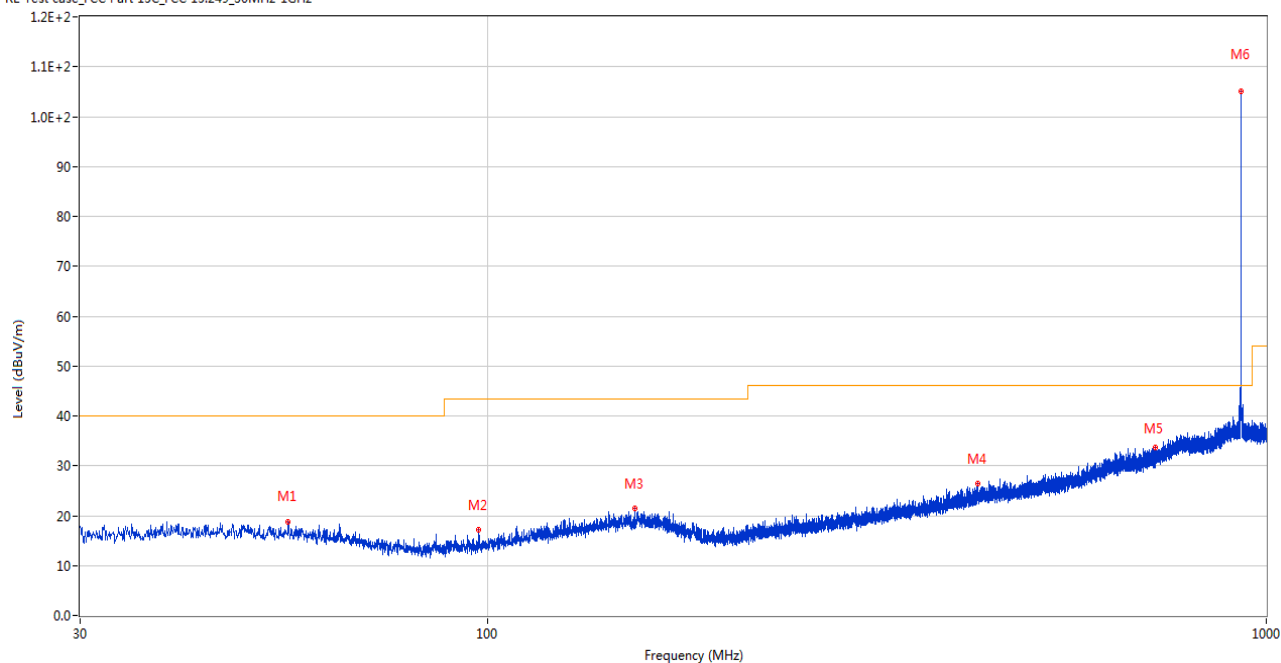
RE Test case_FCC Part 15C_FCC 15.249_30MHz-1GHz



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	44.017	19.01	-26.02	40.0	20.99	Peak	23.00	150	Vertical	Pass
2	114.681	19.06	-26.98	43.5	24.44	Peak	360.00	150	Vertical	Pass
3	156.973	21.42	-24.02	43.5	22.08	Peak	0.00	300	Vertical	Pass
4	244.952	20.48	-25.70	46.0	25.52	Peak	324.00	300	Vertical	Pass
5	474.745	28.39	-18.71	46.0	17.61	Peak	23.00	100	Vertical	Pass
6	914.834	105.32	-7.43	46.0	-59.32	Peak	326.00	100	Vertical	N/A

LoRa (100kHz) HIGH CHANNEL, 30 MHz to 1 GHz, ANT H

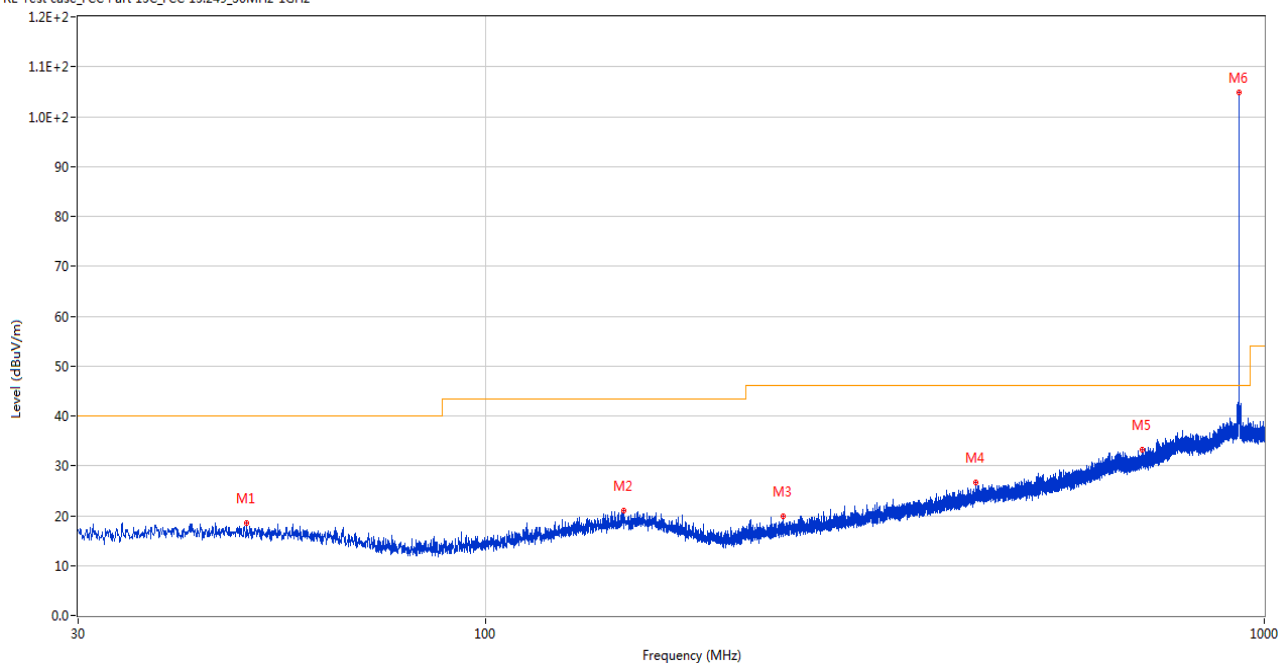
RE Test case_FCC Part 15C_FCC 15.249_30MHz-1GHz



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	55.511	18.86	-26.36	40.0	21.14	Peak	156.00	100	Horizontal	Pass
2	97.561	17.26	-28.91	43.5	26.24	Peak	347.00	100	Horizontal	Pass
3	154.742	21.45	-24.30	43.5	22.05	Peak	40.00	200	Horizontal	Pass
4	426.487	26.34	-19.79	46.0	19.66	Peak	360.00	200	Horizontal	Pass
5	719.815	33.77	-12.11	46.0	12.23	Peak	57.00	100	Horizontal	Pass
6	927.829	105.13	-7.61	46.0	-59.13	Peak	329.00	100	Horizontal	N/A

LoRa (100kHz) HIGH CHANNEL, 30 MHz to 1 GHz, ANT V

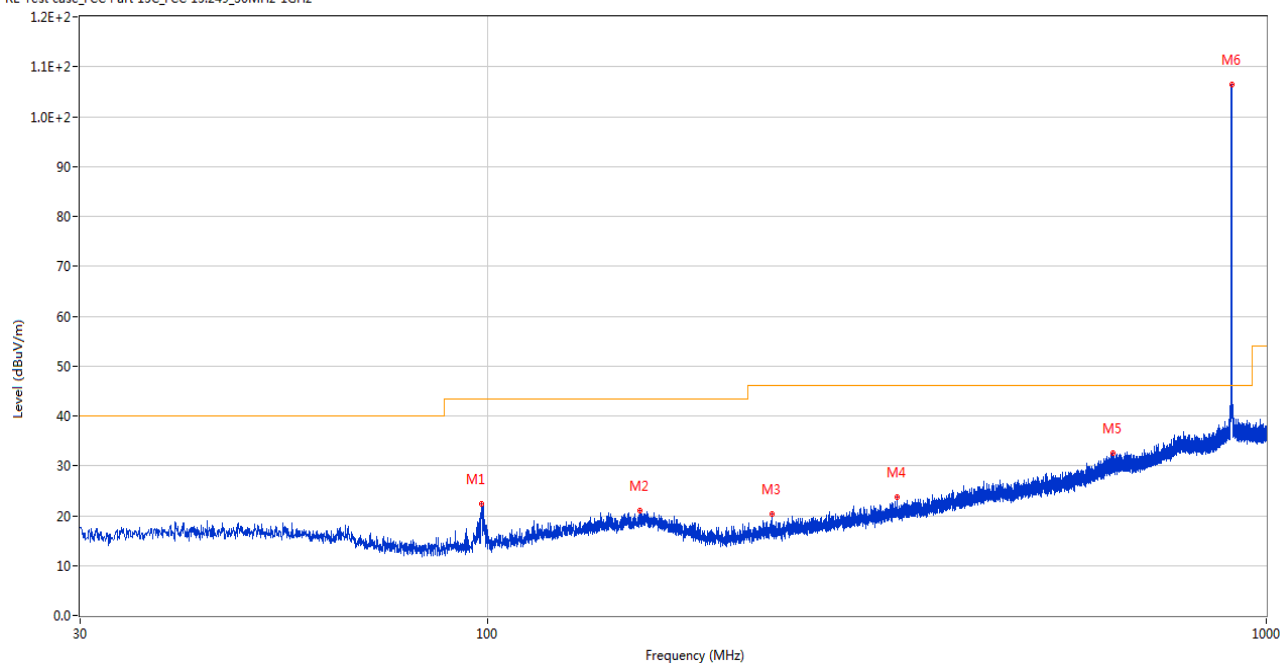
RE Test case_FCC Part 15C_FCC 15.249_30MHz-1GHz



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	49.352	18.49	-26.01	40.0	21.51	Peak	197.00	400	Vertical	Pass
2	150.377	21.03	-24.09	43.5	22.47	Peak	286.00	400	Vertical	Pass
3	240.926	19.87	-25.74	46.0	26.13	Peak	19.00	150	Vertical	Pass
4	425.809	26.66	-19.84	46.0	19.34	Peak	315.00	150	Vertical	Pass
5	697.409	33.13	-12.41	46.0	12.87	Peak	239.00	200	Vertical	Pass
6	927.835	104.96	-7.59	46.0	-58.96	Peak	324.00	200	Vertical	N/A

LoRa (125kHz) LOW CHANNEL, 30 MHz to 1 GHz, ANT H

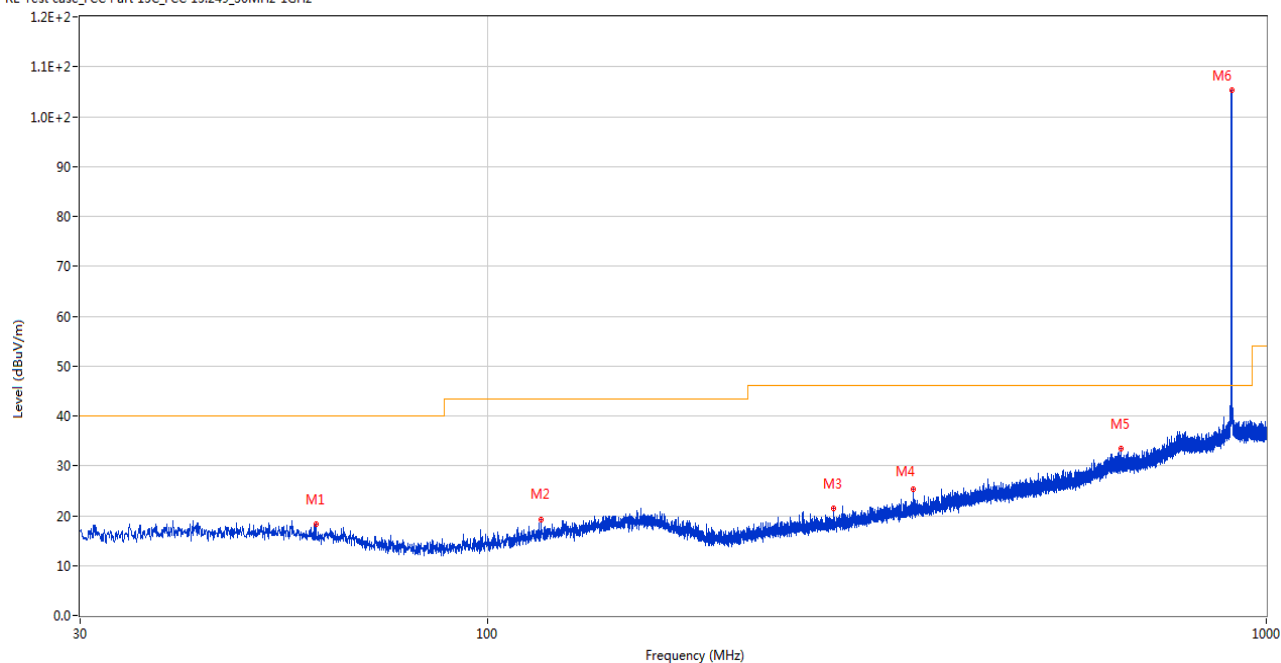
RE Test case_FCC Part 15C_FCC 15.249_30MHz-1GHz



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	98.337	22.32	-28.90	43.5	21.18	Peak	48.00	300	Horizontal	Pass
2	156.876	20.91	-24.03	43.5	22.59	Peak	0.00	200	Horizontal	Pass
3	231.857	20.38	-26.11	46.0	25.62	Peak	0.00	150	Horizontal	Pass
4	335.938	23.81	-22.41	46.0	22.19	Peak	267.00	100	Horizontal	Pass
5	635.571	32.56	-13.13	46.0	13.44	Peak	212.00	200	Horizontal	Pass
6	902.370	106.39	-7.24	46.0	-60.39	Peak	348.00	200	Horizontal	N/A

LoRa (125kHz) LOW CHANNEL, 30 MHz to 1 GHz, ANT V

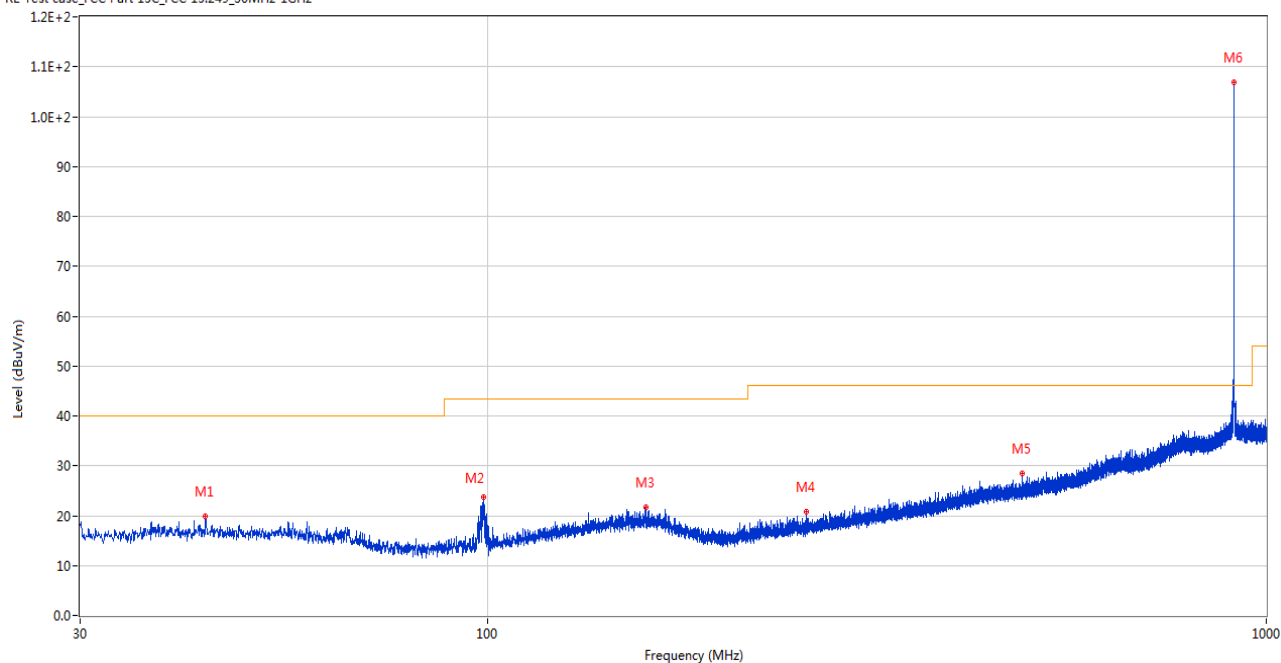
RE Test case_FCC Part 15C_FCC 15.249_30MHz-1GHz



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	60.312	18.32	-26.86	40.0	21.68	Peak	360.00	100	Vertical	Pass
2	117.155	19.31	-26.61	43.5	24.19	Peak	360.00	100	Vertical	Pass
3	278.126	21.54	-24.48	46.0	24.46	Peak	40.00	150	Vertical	Pass
4	351.846	25.41	-22.02	46.0	20.59	Peak	46.00	150	Vertical	Pass
5	651.091	33.35	-12.92	46.0	12.65	Peak	187.00	100	Vertical	Pass
6	902.321	105.34	-7.25	46.0	-59.34	Peak	325.00	100	Vertical	N/A

LoRa (125kHz) MIDDLE CHANNEL, 30 MHz to 1 GHz, ANT H

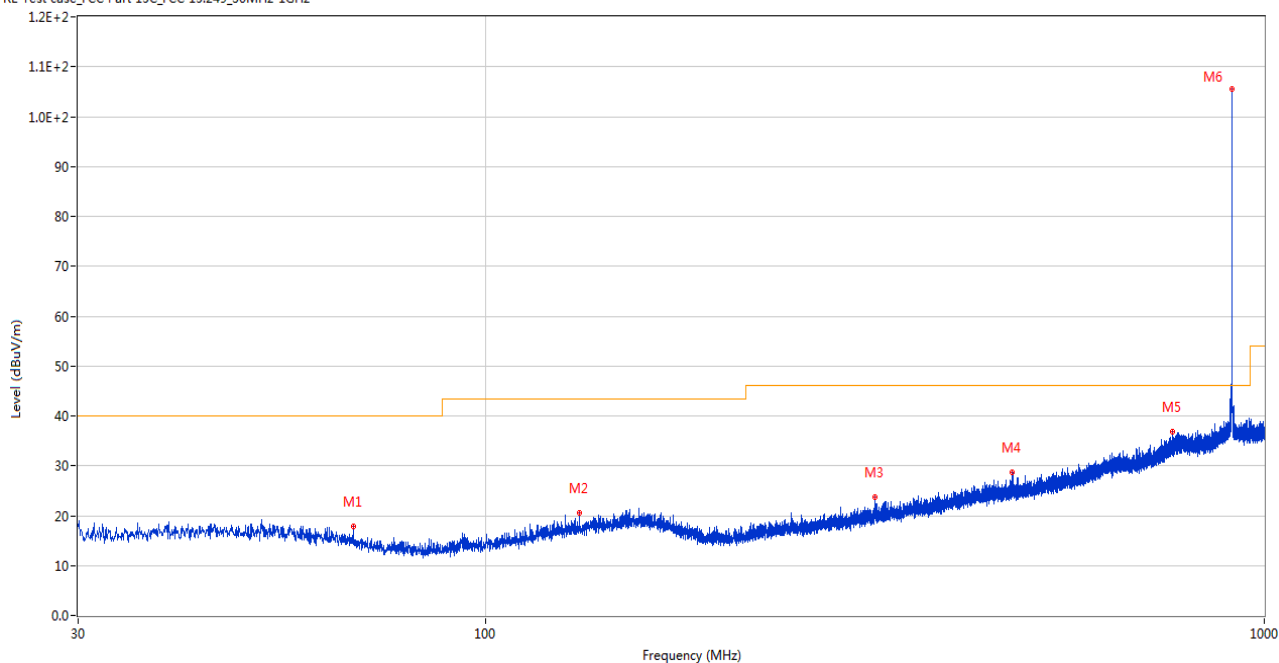
RE Test case_FCC Part 15C_FCC 15.249_30MHz-1GHz



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	43.483	19.86	-26.03	40.0	20.14	Peak	201.00	200	Horizontal	Pass
2	98.822	23.73	-28.88	43.5	19.77	Peak	265.00	200	Horizontal	Pass
3	159.592	21.68	-24.01	43.5	21.82	Peak	254.00	400	Horizontal	Pass
4	256.495	20.78	-25.43	46.0	25.22	Peak	326.00	400	Horizontal	Pass
5	486.579	28.44	-18.41	46.0	17.56	Peak	0.00	100	Horizontal	Pass
6	908.578	106.88	-7.03	46.0	-60.88	Peak	347.00	100	Horizontal	N/A

LoRa (125kHz) MIDDLE CHANNEL, 30 MHz to 1 GHz, ANT V

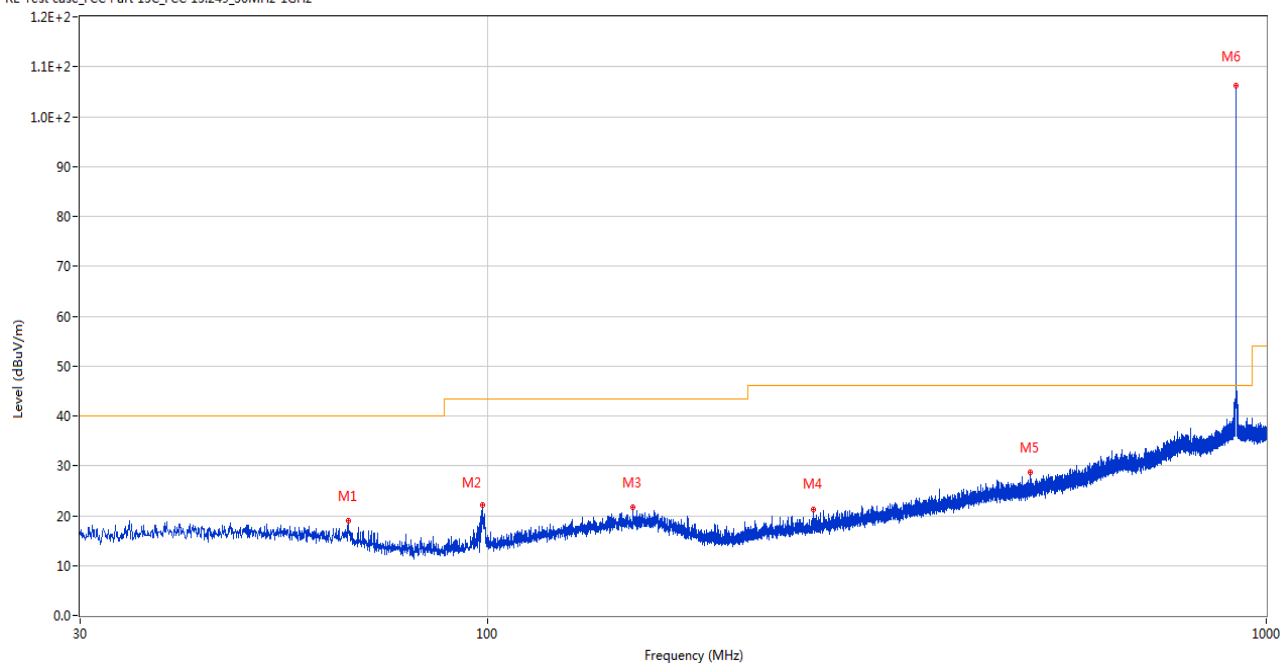
RE Test case_FCC Part 15C_FCC 15.249_30MHz-1GHz



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	67.733	17.81	-27.92	40.0	22.19	Peak	46.00	100	Vertical	Pass
2	131.995	20.63	-25.51	43.5	22.87	Peak	123.00	100	Vertical	Pass
3	316.538	23.81	-23.07	46.0	22.19	Peak	326.00	200	Vertical	Pass
4	475.230	28.71	-18.64	46.0	17.29	Peak	309.00	200	Vertical	Pass
5	763.320	36.74	-10.07	46.0	9.26	Peak	119.00	200	Vertical	Pass
6	908.529	105.61	-7.02	46.0	-59.61	Peak	322.00	200	Vertical	N/A

LoRa (125kHz) HIGH CHANNEL, 30 MHz to 1 GHz, ANT H

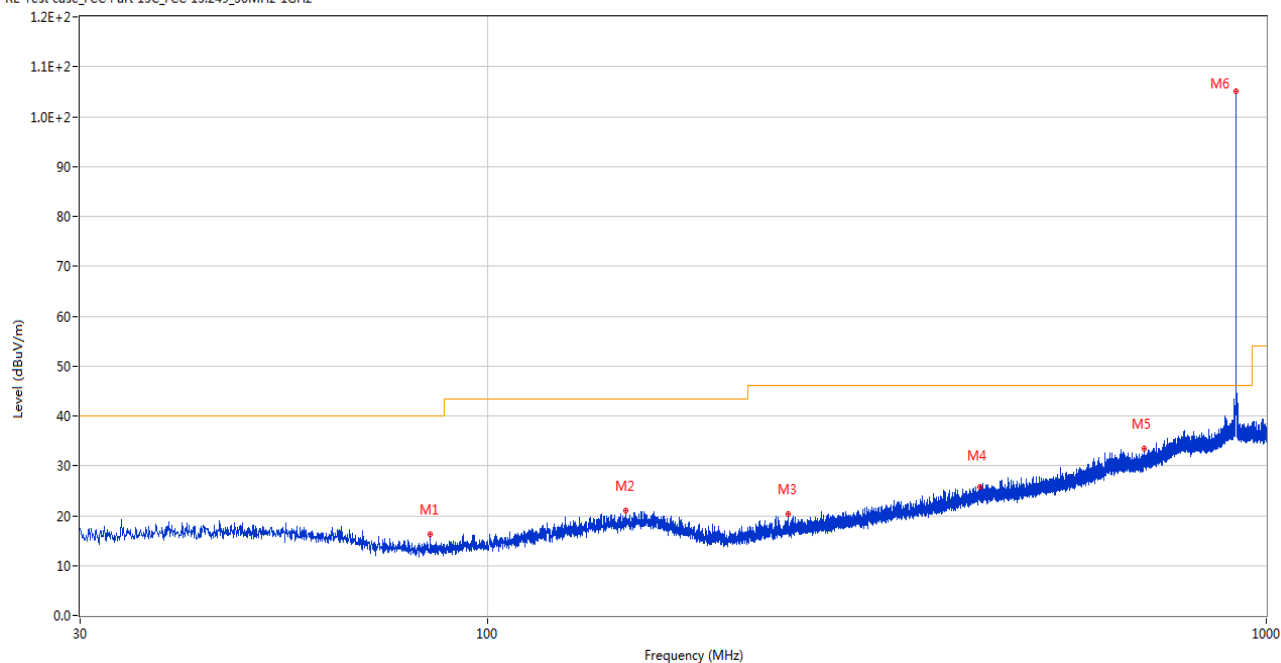
RE Test case_FCC Part 15C_FCC 15.249_30MHz-1GHz



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	66.278	18.99	-27.51	40.0	21.01	Peak	307.00	300	Horizontal	Pass
2	98.676	22.07	-28.88	43.5	21.43	Peak	83.00	300	Horizontal	Pass
3	153.626	21.67	-24.51	43.5	21.83	Peak	347.00	200	Horizontal	Pass
4	261.781	21.14	-25.21	46.0	24.86	Peak	242.00	200	Horizontal	Pass
5	497.734	28.63	-18.08	46.0	17.37	Peak	106.00	400	Horizontal	Pass
6	914.931	106.25	-7.42	46.0	-60.25	Peak	342.00	400	Horizontal	N/A

LoRa (125kHz) HIGH CHANNEL, 30 MHz to 1 GHz, ANT V

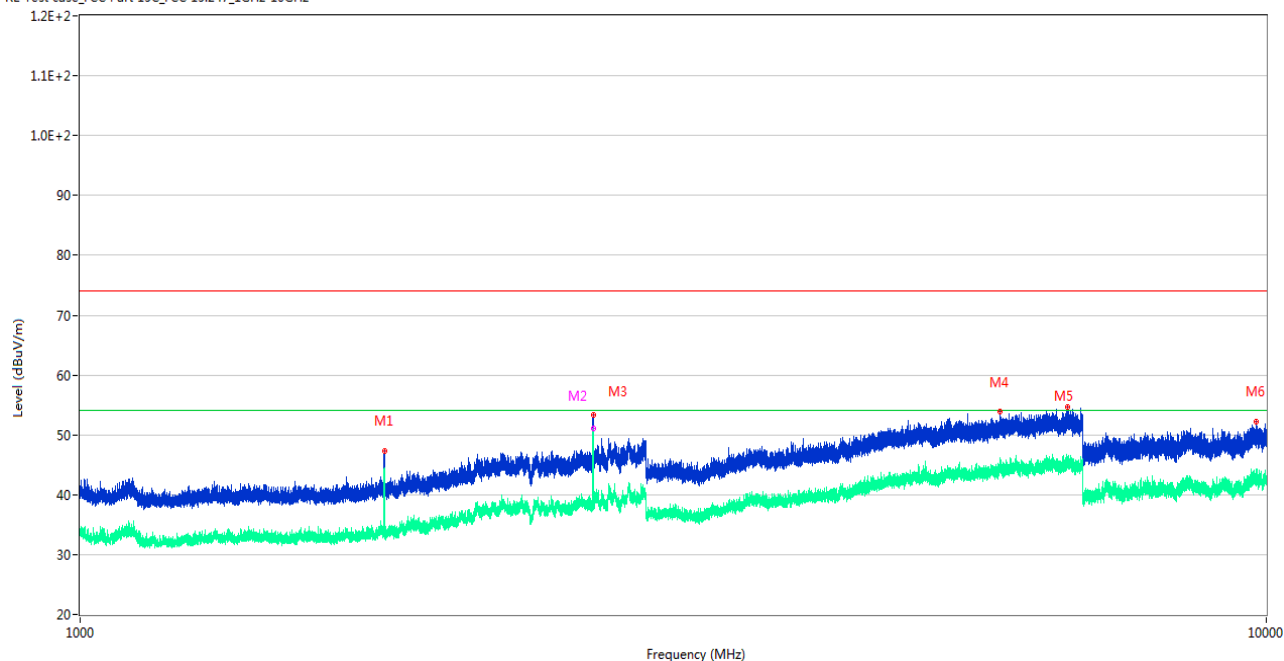
RE Test case_FCC Part 15C_FCC 15.249_30MHz-1GHz



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	84.417	16.28	-29.61	40.0	23.72	Peak	308.00	300	Vertical	Pass
2	150.426	20.92	-24.08	43.5	22.58	Peak	11.00	300	Vertical	Pass
3	243.158	20.31	-25.60	46.0	25.69	Peak	266.00	300	Vertical	Pass
4	428.864	25.84	-19.48	46.0	20.16	Peak	307.00	300	Vertical	Pass
5	698.088	33.38	-12.54	46.0	12.62	Peak	42.00	200	Vertical	Pass
6	914.931	105.13	-7.42	46.0	-59.13	Peak	324.00	200	Vertical	N/A

LoRa (100kHz) LOW CHANNEL 1 GHz to 10 GHz, ANT H

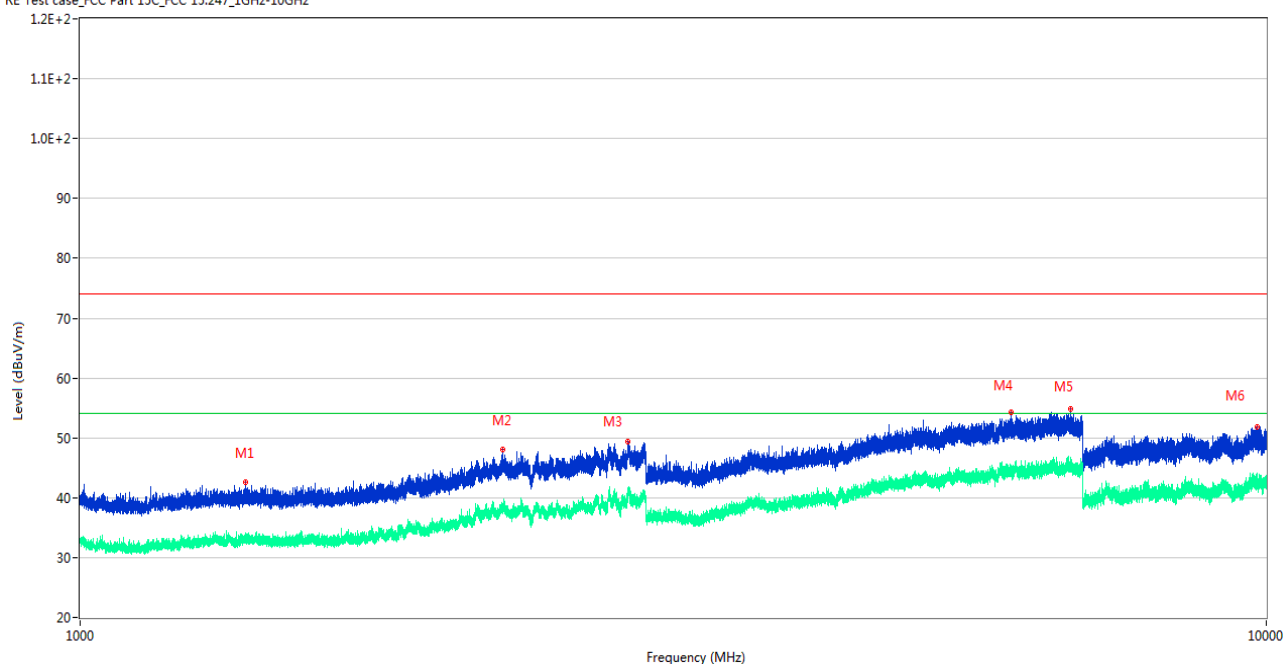
RE Test case_FCC Part 15C_FCC 15.247_1GHz-10GHz



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	1804.700	47.31	-12.90	74.0	26.69	Peak	75.00	100	Horizontal	Pass
1**	1804.700	44.33	-12.90	54.0	9.67	AV	75.00	100	Horizontal	Pass
2	2706.500	52.96	-7.26	74.0	21.04	Peak	99.00	200	Horizontal	Pass
2**	2706.500	51.00	-7.26	54.0	3.00	AV	99.00	200	Horizontal	Pass
3	2706.800	53.30	-7.23	74.0	20.70	Peak	99.00	200	Horizontal	Pass
3**	2706.800	50.96	-7.23	54.0	3.04	AV	99.00	200	Horizontal	Pass
4	5968.000	53.84	0.13	74.0	20.16	Peak	19.00	400	Horizontal	Pass
4**	5968.000	45.50	0.13	54.0	8.50	AV	19.00	400	Horizontal	Pass
5	6804.400	54.66	1.68	74.0	19.34	Peak	306.00	100	Horizontal	Pass
5**	6804.400	46.32	1.68	54.0	7.68	AV	306.00	100	Horizontal	Pass
6	9811.750	52.11	-0.02	74.0	21.89	Peak	104.00	300	Horizontal	Pass
6**	9811.750	43.05	-0.02	54.0	10.95	AV	104.00	300	Horizontal	Pass

LoRa (100kHz) LOW CHANNEL 1 GHz to 10 GHz, ANT V

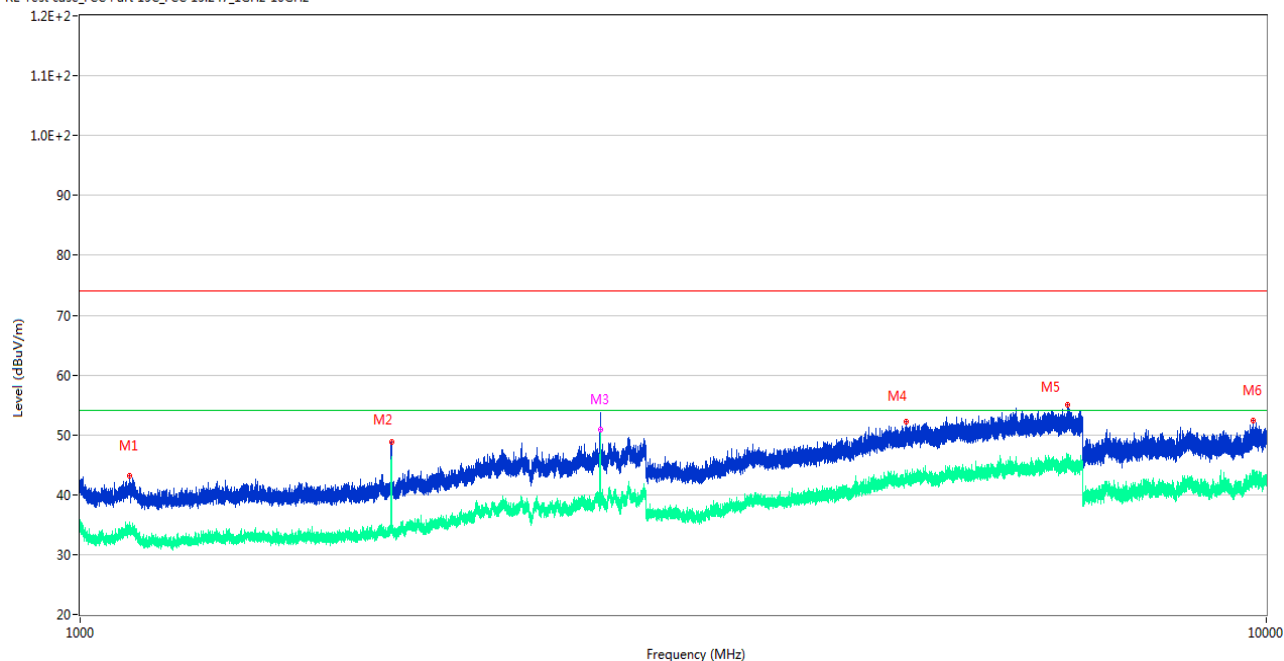
RE Test case_FCC Part 15C_FCC 15.247_1GHz-10GHz



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	1379.100	42.53	-13.22	74.0	31.47	Peak	179.00	400	Vertical	Pass
1**	1379.100	33.11	-13.22	54.0	20.89	AV	179.00	400	Vertical	Pass
2	2273.500	48.05	-7.36	74.0	25.95	Peak	110.00	100	Vertical	Pass
2**	2273.500	38.41	-7.36	54.0	15.59	AV	110.00	100	Vertical	Pass
3	2897.900	49.46	-4.16	74.0	24.54	Peak	191.00	150	Vertical	Pass
3**	2897.900	41.05	-4.16	54.0	12.95	AV	191.00	150	Vertical	Pass
4	6097.800	54.37	-1.46	74.0	19.63	Peak	360.00	100	Vertical	Pass
4**	6097.800	43.57	-1.46	54.0	10.43	AV	360.00	100	Vertical	Pass
5	6839.800	54.92	0.79	74.0	19.08	Peak	360.00	300	Vertical	Pass
5**	6839.800	45.49	0.79	54.0	8.51	AV	360.00	300	Vertical	Pass
6	9821.950	51.89	-0.03	74.0	22.11	Peak	61.00	100	Vertical	Pass
6**	9821.950	43.20	-0.03	54.0	10.80	AV	61.00	100	Vertical	Pass

LoRa (100kHz) MIDDLE CHANNEL 1 GHz to 10 GHz, ANT H

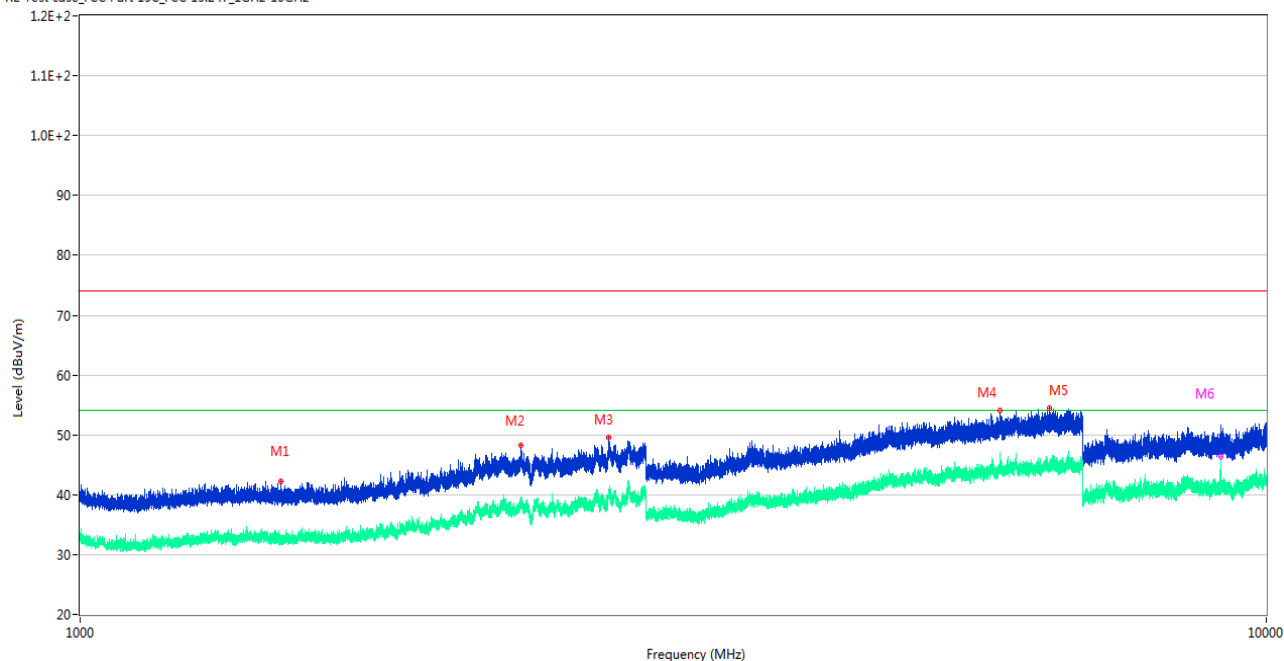
RE Test case_FCC Part 15C_FCC 15.247_1GHz-10GHz



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	1101.400	43.23	-14.54	74.0	30.77	Peak	356.00	100	Horizontal	Pass
1**	1101.400	33.61	-14.54	54.0	20.39	AV	356.00	100	Horizontal	Pass
2	1829.900	48.87	-12.56	74.0	25.13	Peak	94.00	100	Horizontal	Pass
2**	1829.900	45.58	-12.56	54.0	8.42	AV	94.00	100	Horizontal	Pass
3	2744.300	53.63	-6.93	74.0	20.37	Peak	167.00	100	Horizontal	Pass
3**	2744.300	50.90	-6.93	54.0	3.10	AV	167.00	100	Horizontal	Pass
4	4967.800	52.11	-1.94	74.0	21.89	Peak	56.00	100	Horizontal	Pass
4**	4967.800	42.06	-1.94	54.0	11.94	AV	56.00	100	Horizontal	Pass
5	6805.200	55.12	1.94	74.0	18.88	Peak	360.00	400	Horizontal	Pass
5**	6805.200	46.05	1.94	54.0	7.95	AV	360.00	400	Horizontal	Pass
6	9740.049	52.46	-0.55	74.0	21.54	Peak	75.00	200	Horizontal	Pass
6**	9740.049	42.31	-0.55	54.0	11.69	AV	75.00	200	Horizontal	Pass

LoRa (100kHz) MIDDLE CHANNEL 1 GHz to 10 GHz, ANT V

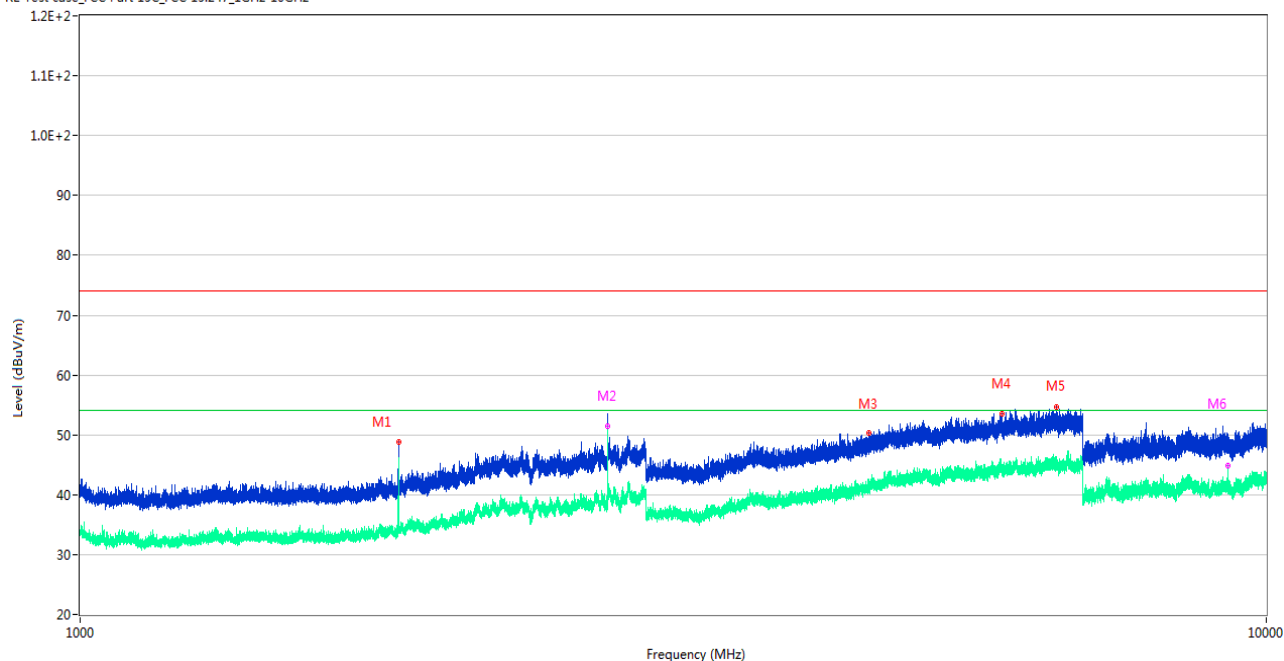
RE Test case_FCC Part 15C_FCC 15.247_1GHz-10GHz



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	1477.300	42.30	-13.90	74.0	31.70	Peak	282.00	400	Vertical	Pass
1**	1477.300	32.68	-13.90	54.0	21.32	AV	282.00	400	Vertical	Pass
2	2354.200	48.20	-7.56	74.0	25.80	Peak	81.00	100	Vertical	Pass
2**	2354.200	38.50	-7.56	54.0	15.50	AV	81.00	100	Vertical	Pass
3	2790.400	49.50	-5.33	74.0	24.50	Peak	76.00	200	Vertical	Pass
3**	2790.400	40.03	-5.33	54.0	13.97	AV	76.00	200	Vertical	Pass
4	5967.800	54.16	0.14	74.0	19.84	Peak	280.00	400	Vertical	Pass
4**	5967.800	45.56	0.14	54.0	8.44	AV	280.00	400	Vertical	Pass
5	6563.000	54.54	-0.99	74.0	19.46	Peak	187.00	300	Vertical	Pass
5**	6563.000	44.92	-0.99	54.0	9.08	AV	187.00	300	Vertical	Pass
6	9147.850	50.44	-1.50	74.0	23.56	Peak	166.00	400	Vertical	Pass
6**	9147.850	46.29	-1.50	54.0	7.71	AV	166.00	400	Vertical	Pass

LoRa (100kHz) HIGH CHANNEL 1 GHz to 10 GHz, ANT H

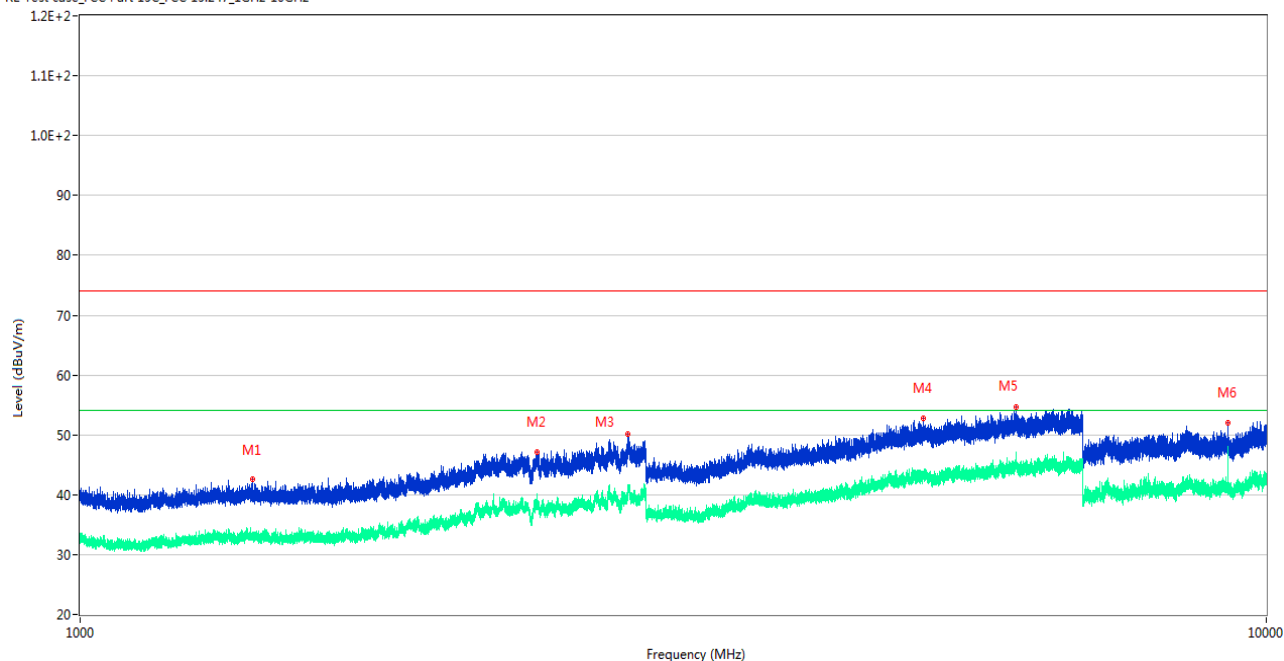
RE Test case_FCC Part 15C_FCC 15.247_1GHz-10GHz



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	1855.800	48.81	-12.80	74.0	25.19	Peak	256.00	200	Horizontal	Pass
1**	1855.800	46.06	-12.80	54.0	7.94	AV	256.00	200	Horizontal	Pass
2	2783.800	53.59	-6.03	74.0	20.41	Peak	139.00	150	Horizontal	Pass
2**	2783.800	51.53	-6.03	54.0	2.47	AV	139.00	150	Horizontal	Pass
3	4627.600	50.28	-3.57	74.0	23.72	Peak	329.00	150	Horizontal	Pass
3**	4627.600	41.42	-3.57	54.0	12.58	AV	329.00	150	Horizontal	Pass
4	5984.000	53.55	-0.88	74.0	20.45	Peak	88.00	300	Horizontal	Pass
4**	5984.000	44.22	-0.88	54.0	9.78	AV	88.00	300	Horizontal	Pass
5	6655.000	54.67	-0.22	74.0	19.33	Peak	295.00	150	Horizontal	Pass
5**	6655.000	45.51	-0.22	54.0	8.49	AV	295.00	150	Horizontal	Pass
6	9278.200	49.11	-1.51	74.0	24.89	Peak	171.00	150	Horizontal	Pass
6**	9278.200	44.84	-1.51	54.0	9.16	AV	171.00	150	Horizontal	Pass

LoRa (100kHz) HIGH CHANNEL 1 GHz to 10 GHz, ANT V

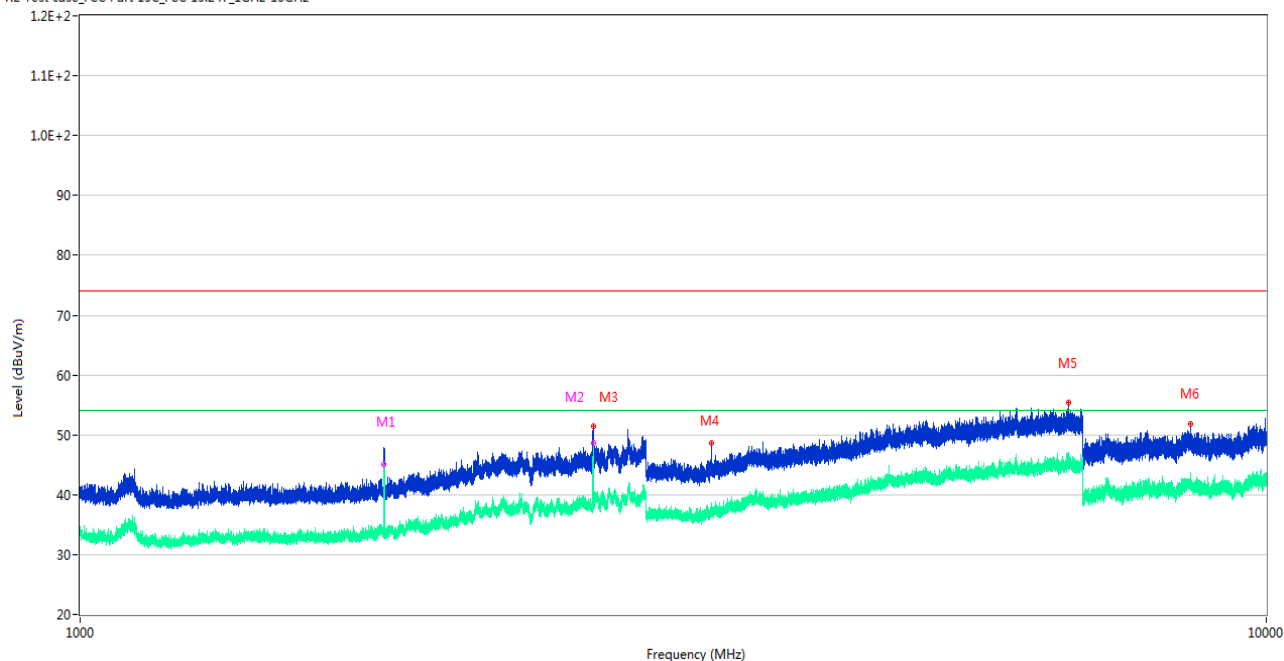
RE Test case_FCC Part 15C_FCC 15.247_1GHz-10GHz



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	1396.900	42.52	-13.47	74.0	31.48	Peak	341.00	300	Vertical	Pass
1**	1396.900	32.79	-13.47	54.0	21.21	AV	341.00	300	Vertical	Pass
2	2429.900	47.19	-8.16	74.0	26.81	Peak	292.00	200	Vertical	Pass
2**	2429.900	38.27	-8.16	54.0	15.73	AV	292.00	200	Vertical	Pass
3	2897.600	50.11	-4.23	74.0	23.89	Peak	234.00	200	Vertical	Pass
3**	2897.600	40.05	-4.23	54.0	13.95	AV	234.00	200	Vertical	Pass
4	5143.200	52.70	-1.38	74.0	21.30	Peak	61.00	150	Vertical	Pass
4**	5143.200	43.31	-1.38	54.0	10.69	AV	61.00	150	Vertical	Pass
5	6151.800	54.58	0.23	74.0	19.42	Peak	331.00	150	Vertical	Pass
5**	6151.800	46.07	0.23	54.0	7.93	AV	331.00	150	Vertical	Pass
6	9277.600	51.97	-1.50	74.0	22.03	Peak	174.00	150	Vertical	Pass
6**	9277.600	47.83	-1.50	54.0	6.17	AV	174.00	150	Vertical	Pass

LoRa (125kHz) LOW CHANNEL 1 GHz to 10 GHz, ANT H

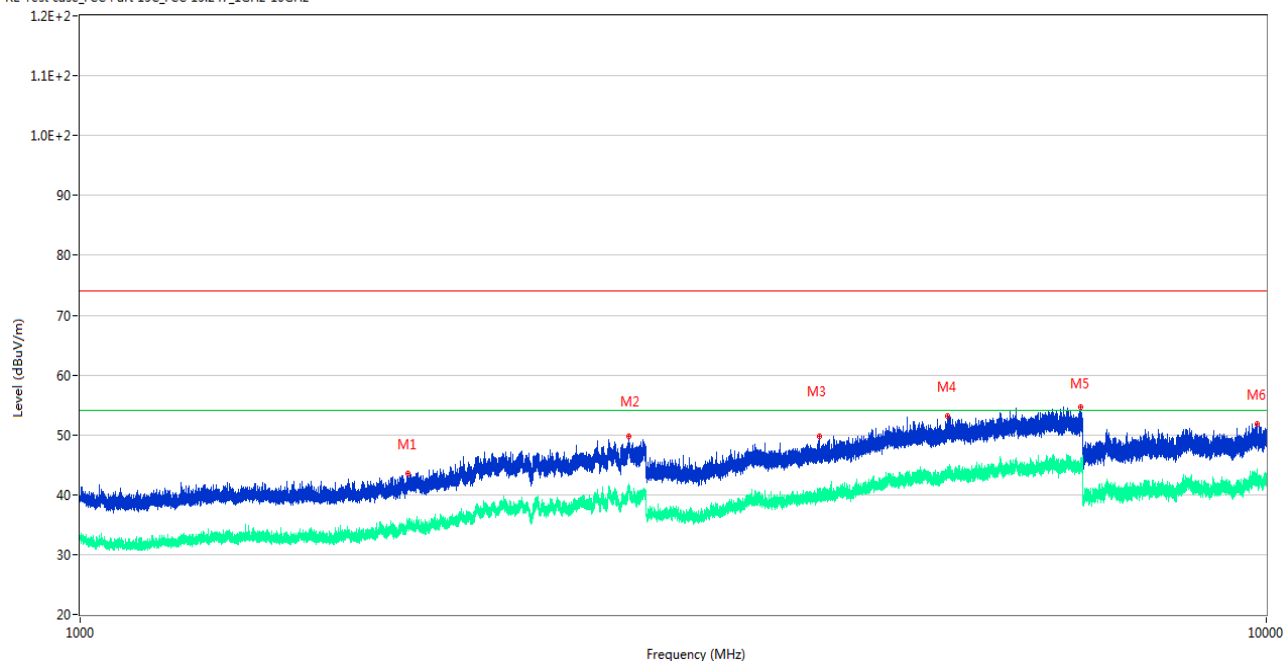
RE Test case_FCC Part 15C_FCC 15.247_1GHz-10GHz



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	1804.500	47.80	-12.87	74.0	26.20	Peak	261.00	100	Horizontal	Pass
1**	1804.500	45.05	-12.87	54.0	8.95	AV	261.00	100	Horizontal	Pass
2	2706.900	50.80	-7.22	74.0	23.20	Peak	290.00	150	Horizontal	Pass
2**	2706.900	48.59	-7.22	54.0	5.41	AV	290.00	150	Horizontal	Pass
3	2707.300	51.42	-7.18	74.0	22.58	Peak	82.00	200	Horizontal	Pass
3**	2707.300	47.45	-7.18	54.0	6.55	AV	82.00	200	Horizontal	Pass
4	3406.800	48.71	-6.31	74.0	25.29	Peak	22.00	150	Horizontal	Pass
4**	3406.800	37.08	-6.31	54.0	16.92	AV	22.00	150	Horizontal	Pass
5	6807.400	55.41	2.02	74.0	18.59	Peak	125.00	100	Horizontal	Pass
5**	6807.400	45.52	2.02	54.0	8.48	AV	125.00	100	Horizontal	Pass
6	8637.400	51.85	-1.84	74.0	22.15	Peak	27.00	400	Horizontal	Pass
6**	8637.400	42.04	-1.84	54.0	11.96	AV	27.00	400	Horizontal	Pass

LoRa (125kHz) LOW CHANNEL 1 GHz to 10 GHz, ANT V

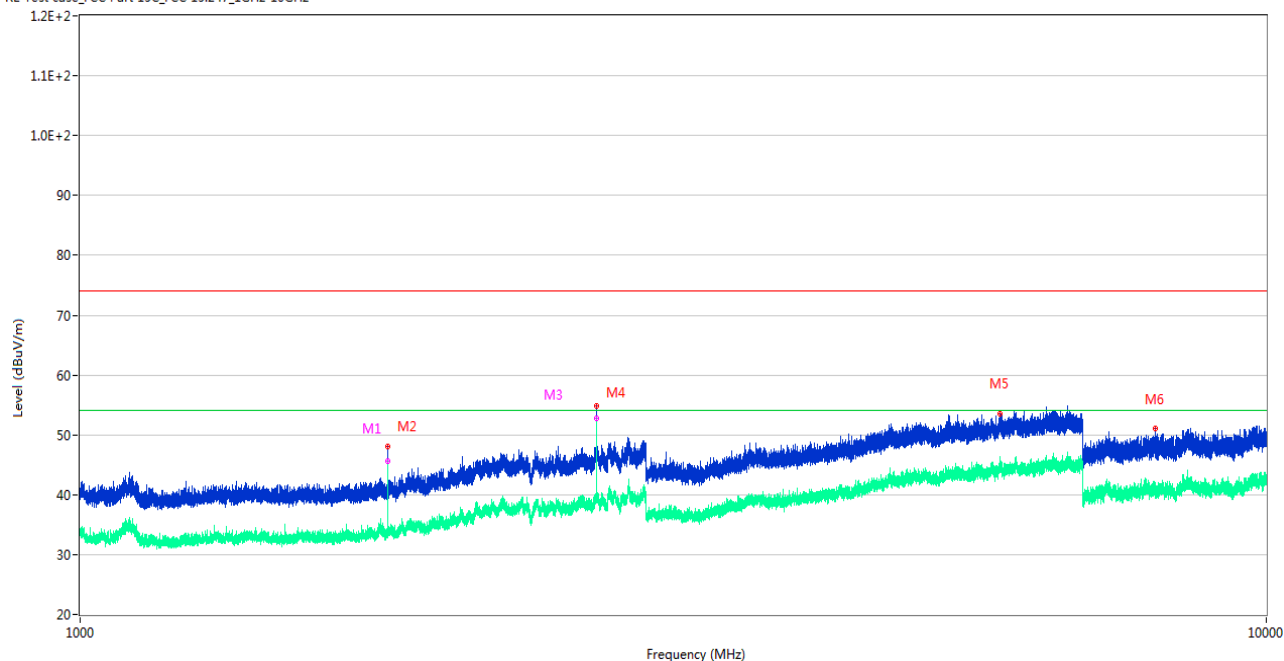
RE Test case_FCC Part 15C_FCC 15.247_1GHz-10GHz



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	1891.100	43.50	-12.05	74.0	30.50	Peak	360.00	100	Vertical	Pass
1**	1891.100	35.37	-12.05	54.0	18.63	AV	360.00	100	Vertical	Pass
2	2900.500	49.74	-3.69	74.0	24.26	Peak	360.00	100	Vertical	Pass
2**	2900.500	40.54	-3.69	54.0	13.46	AV	360.00	100	Vertical	Pass
3	4201.800	49.83	-4.44	74.0	24.17	Peak	110.00	200	Vertical	Pass
3**	4201.800	40.30	-4.44	54.0	13.70	AV	110.00	200	Vertical	Pass
4	5384.600	53.09	-2.19	74.0	20.91	Peak	47.00	300	Vertical	Pass
4**	5384.600	43.97	-2.19	54.0	10.03	AV	47.00	300	Vertical	Pass
5	6978.800	54.68	1.83	74.0	19.32	Peak	276.00	300	Vertical	Pass
5**	6978.800	45.52	1.83	54.0	8.48	AV	276.00	300	Vertical	Pass
6	9820.450	51.77	0.02	74.0	22.23	Peak	0.00	100	Vertical	Pass
6**	9820.450	42.95	0.02	54.0	11.05	AV	0.00	100	Vertical	Pass

LoRa (125kHz) MIDDLE CHANNEL 1 GHz to 10 GHz, ANT H

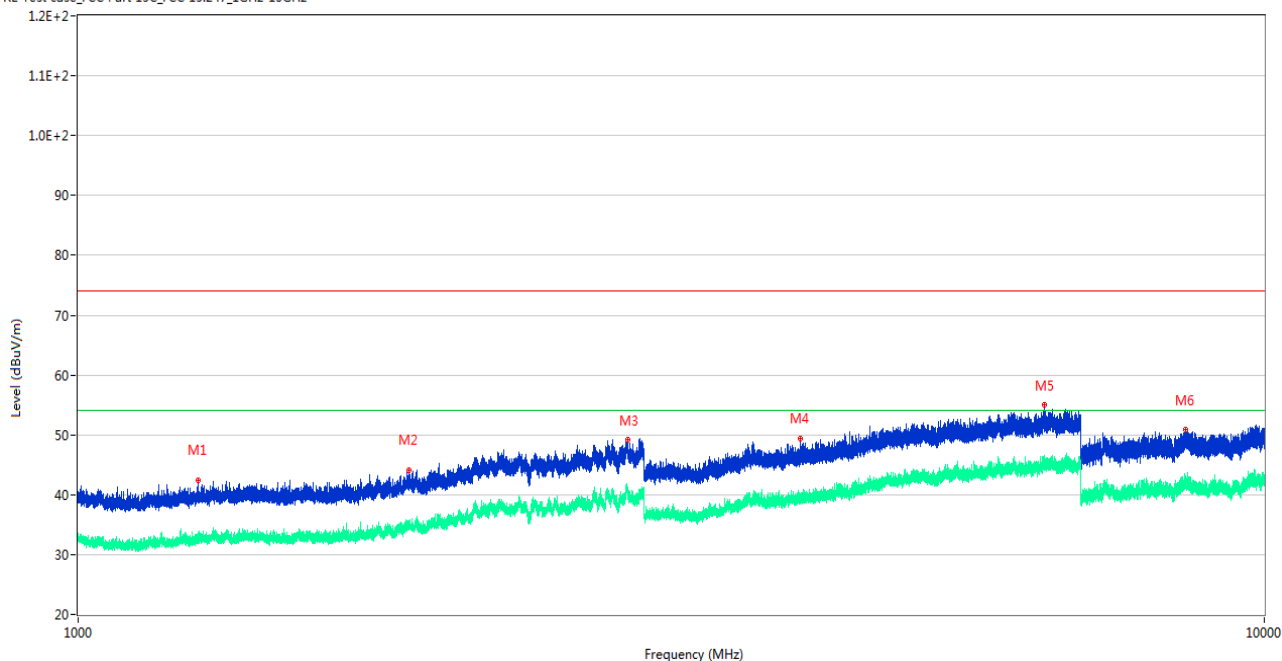
RE Test case_FCC Part 15C_FCC 15.247_1GHz-10GHz



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	1817.300	47.13	-13.02	74.0	26.87	Peak	262.00	200	Horizontal	Pass
1**	1817.300	45.62	-13.02	54.0	8.38	AV	262.00	200	Horizontal	Pass
2	1817.200	48.04	-13.03	74.0	25.96	Peak	112.00	100	Horizontal	Pass
2**	1817.200	45.27	-13.03	54.0	8.73	AV	112.00	100	Horizontal	Pass
3	2725.600	54.93	-6.70	74.0	19.07	Peak	291.00	100	Horizontal	Pass
3**	2725.600	52.76	-6.70	54.0	1.24	AV	291.00	100	Horizontal	Pass
4	2725.600	54.93	-6.70	74.0	19.07	Peak	291.00	300	Horizontal	Pass
4**	2725.600	52.76	-6.70	54.0	1.24	AV	291.00	300	Horizontal	Pass
5	5964.800	53.56	-0.17	74.0	20.44	Peak	1.00	100	Horizontal	Pass
5**	5964.800	44.21	-0.17	54.0	9.79	AV	1.00	100	Horizontal	Pass
6	8065.600	51.13	-2.58	74.0	22.87	Peak	12.00	200	Horizontal	Pass
6**	8065.600	42.04	-2.58	54.0	11.96	AV	12.00	200	Horizontal	Pass

LoRa (125kHz) MIDDLE CHANNEL 1 GHz to 10 GHz, ANT V

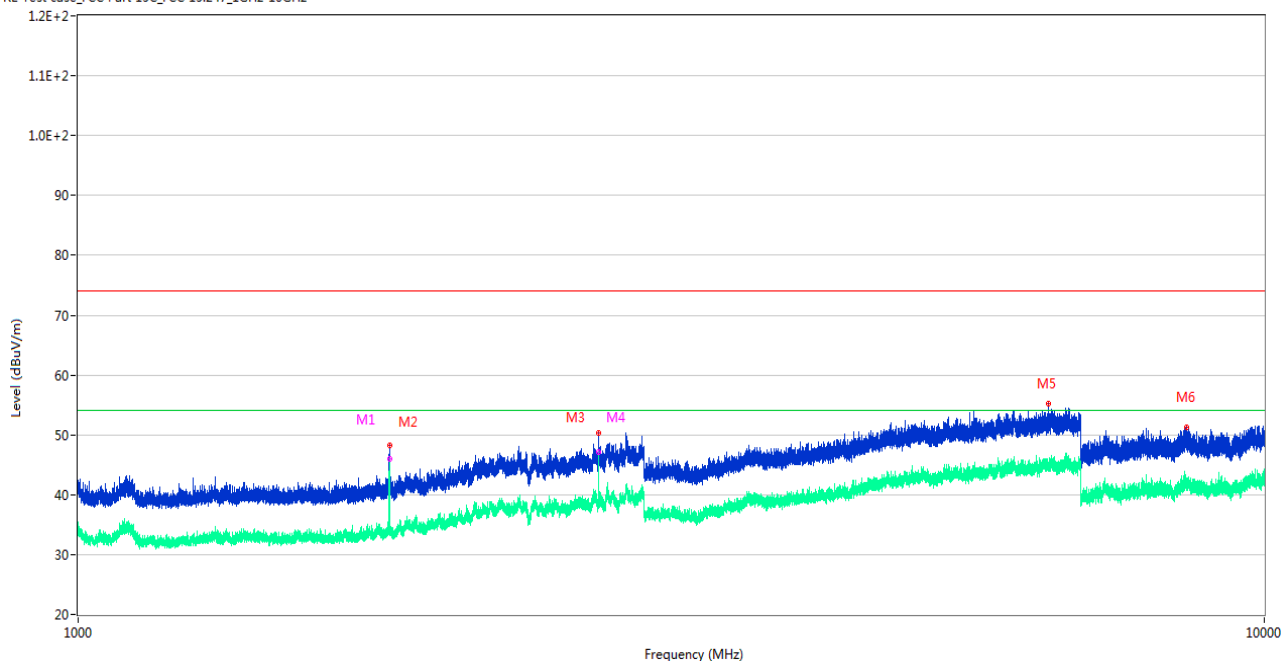
RE Test case_FCC Part 15C_FCC 15.247_1GHz-10GHz



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	1263.400	42.48	-13.74	74.0	31.52	Peak	360.00	100	Vertical	Pass
1**	1263.400	32.99	-13.74	54.0	21.01	AV	360.00	100	Vertical	Pass
2	1900.700	44.18	-11.77	74.0	29.82	Peak	214.00	100	Vertical	Pass
2**	1900.700	35.32	-11.77	54.0	18.68	AV	214.00	100	Vertical	Pass
3	2904.700	49.23	-3.44	74.0	24.77	Peak	53.00	200	Vertical	Pass
3**	2904.700	40.74	-3.44	54.0	13.26	AV	53.00	200	Vertical	Pass
4	4064.000	49.30	-4.79	74.0	24.70	Peak	129.00	400	Vertical	Pass
4**	4064.000	38.74	-4.79	54.0	15.26	AV	129.00	400	Vertical	Pass
5	6524.200	54.94	-0.08	74.0	19.06	Peak	254.00	400	Vertical	Pass
5**	6524.200	44.75	-0.08	54.0	9.25	AV	254.00	400	Vertical	Pass
6	8585.950	50.87	-2.09	74.0	23.13	Peak	270.00	200	Vertical	Pass
6**	8585.950	42.04	-2.09	54.0	11.96	AV	270.00	200	Vertical	Pass

LoRa (125kHz) HIGH CHANNEL 1 GHz to 10 GHz, ANT H

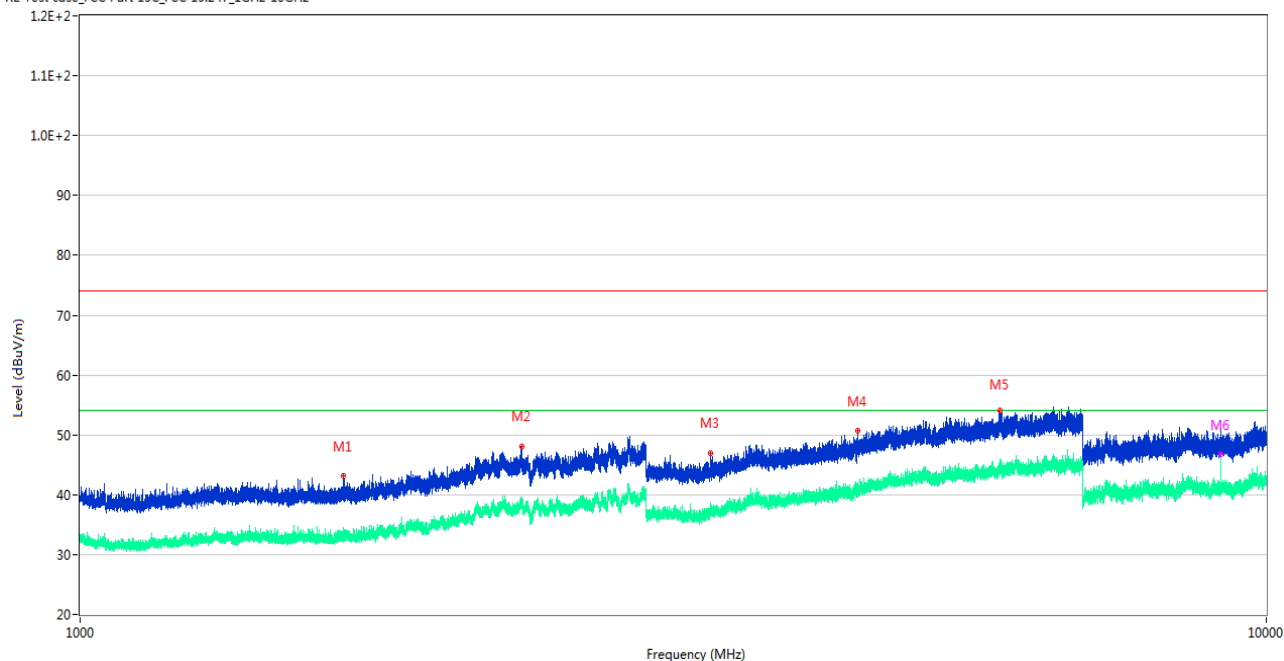
RE Test case_FCC Part 15C_FCC 15.247_1GHz-10GHz



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	1830.000	47.80	-12.56	74.0	26.20	Peak	95.00	400	Horizontal	Pass
1**	1830.000	46.04	-12.56	54.0	7.96	AV	95.00	400	Horizontal	Pass
2	1830.100	48.32	-12.55	74.0	25.68	Peak	270.00	150	Horizontal	Pass
2**	1830.100	45.36	-12.55	54.0	8.64	AV	270.00	150	Horizontal	Pass
3	2744.500	50.39	-6.91	74.0	23.61	Peak	287.00	150	Horizontal	Pass
3**	2744.500	46.61	-6.91	54.0	7.39	AV	287.00	150	Horizontal	Pass
4	2744.600	49.50	-6.90	74.0	24.50	Peak	282.00	400	Horizontal	Pass
4**	2744.600	47.03	-6.90	54.0	6.97	AV	282.00	400	Horizontal	Pass
5	6575.400	55.12	-1.42	74.0	18.88	Peak	53.00	100	Horizontal	Pass
5**	6575.400	45.29	-1.42	54.0	8.71	AV	53.00	100	Horizontal	Pass
6	8602.900	51.32	-2.19	74.0	22.68	Peak	12.00	100	Horizontal	Pass
6**	8602.900	42.39	-2.19	54.0	11.61	AV	12.00	100	Horizontal	Pass

LoRa (125kHz) HIGH CHANNEL 1 GHz to 10 GHz, ANT V

RE Test case_FCC Part 15C_FCC 15.247_1GHz-10GHz



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	1666.900	43.10	-13.63	74.0	30.90	Peak	277.00	400	Vertical	Pass
1**	1666.900	32.22	-13.63	54.0	21.78	AV	277.00	400	Vertical	Pass
2	2355.400	48.13	-7.58	74.0	25.87	Peak	294.00	100	Vertical	Pass
2**	2355.400	38.50	-7.58	54.0	15.50	AV	294.00	100	Vertical	Pass
3	3399.200	46.96	-6.64	74.0	27.04	Peak	234.00	150	Vertical	Pass
3**	3399.200	37.12	-6.64	54.0	16.88	AV	234.00	150	Vertical	Pass
4	4523.600	50.64	-3.27	74.0	23.36	Peak	348.00	100	Vertical	Pass
4**	4523.600	41.01	-3.27	54.0	12.99	AV	348.00	100	Vertical	Pass
5	5964.200	54.07	-0.42	74.0	19.93	Peak	305.00	300	Vertical	Pass
5**	5964.200	45.00	-0.42	54.0	9.00	AV	305.00	300	Vertical	Pass
6	9148.599	49.90	-1.51	74.0	24.10	Peak	360.00	300	Vertical	Pass
6**	9148.599	46.66	-1.51	54.0	7.34	AV	360.00	300	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.

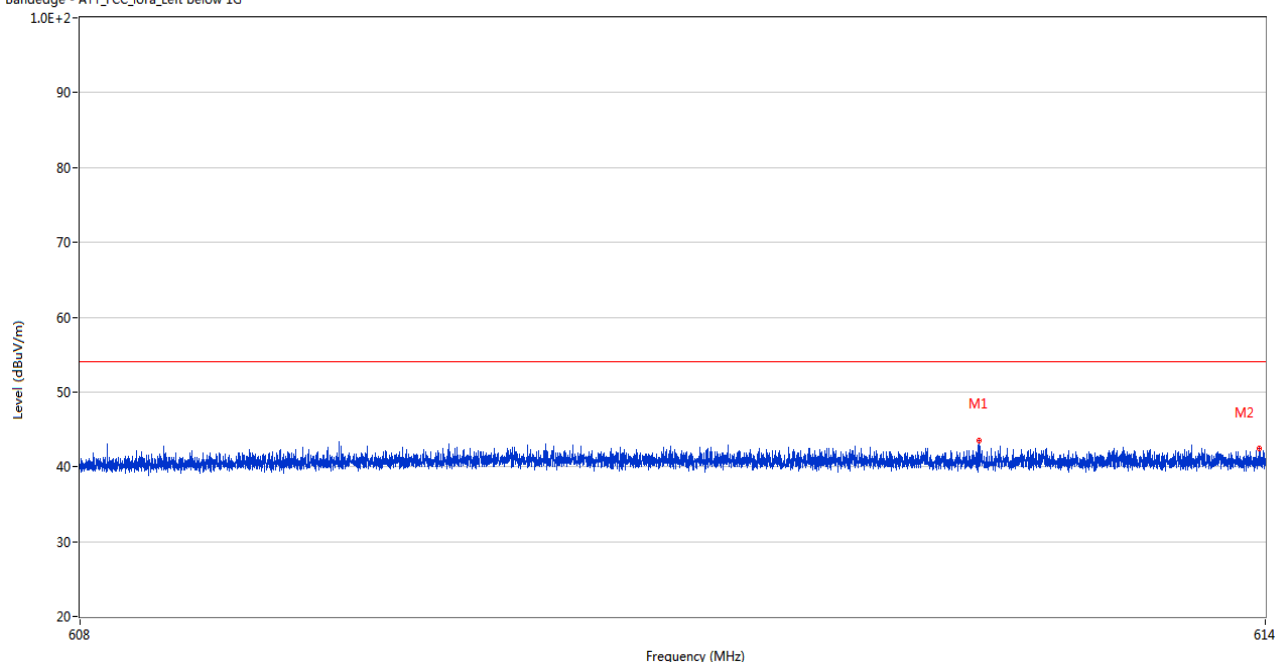
Note ³: According the ANSI C63.10-2013, where limits are specified for both average and peak (or quasi-peak) detector functions, if the peak (or quasi-peak) measured value complies with the average limit, it is unnecessary to perform an average measurement.

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

Test Data and Plots

LoRa (100kHz) LOW CHANNEL

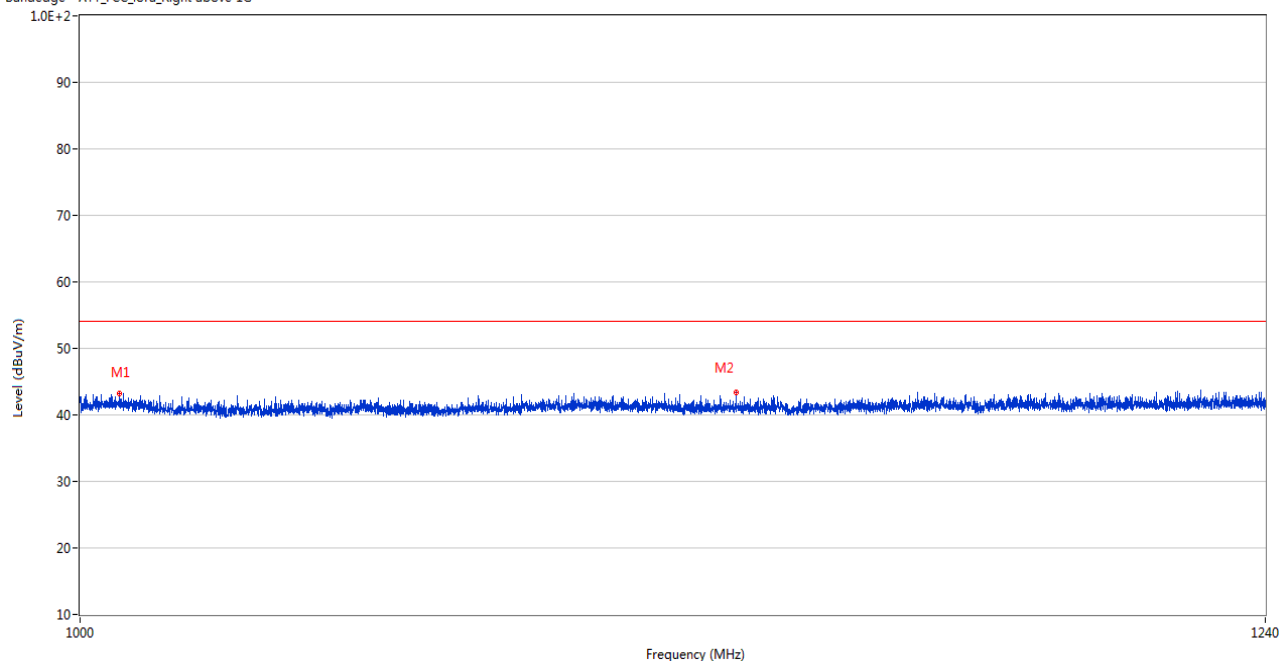
Bandedge - ATT_FCC_Lora_Left below 1G



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	612.548	43.49	6.23	54.0	10.51	Peak	41.00	200	Horizontal	Pass
2	613.969	42.49	6.27	54.0	11.51	Peak	20.00	150	Horizontal	Pass

LoRa (100kHz) HIGH CHANNEL

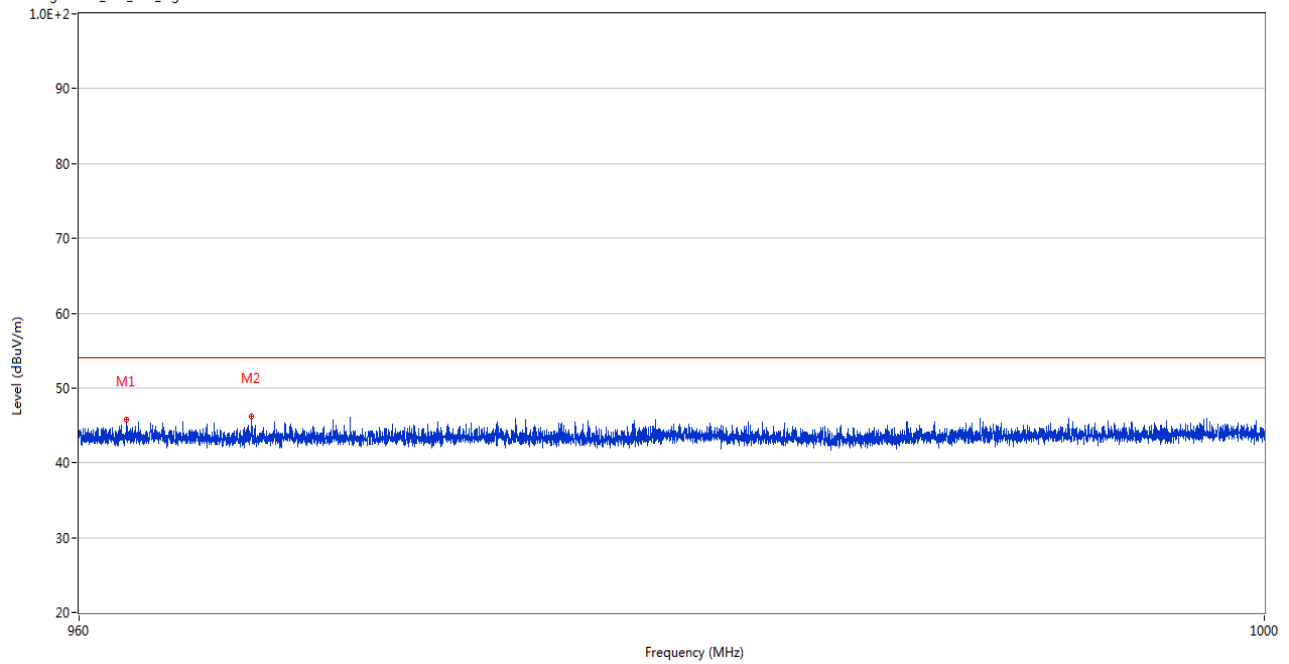
Bandedge - ATT_FCC_Lora_Right above 1G



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	1007.160	43.28	-12.17	54.0	10.72	Peak	107.00	150	Horizontal	Pass
2	1126.440	43.39	-12.71	54.0	10.61	Peak	202.00	300	Horizontal	Pass

LoRa (100kHz) HIGH CHANNEL

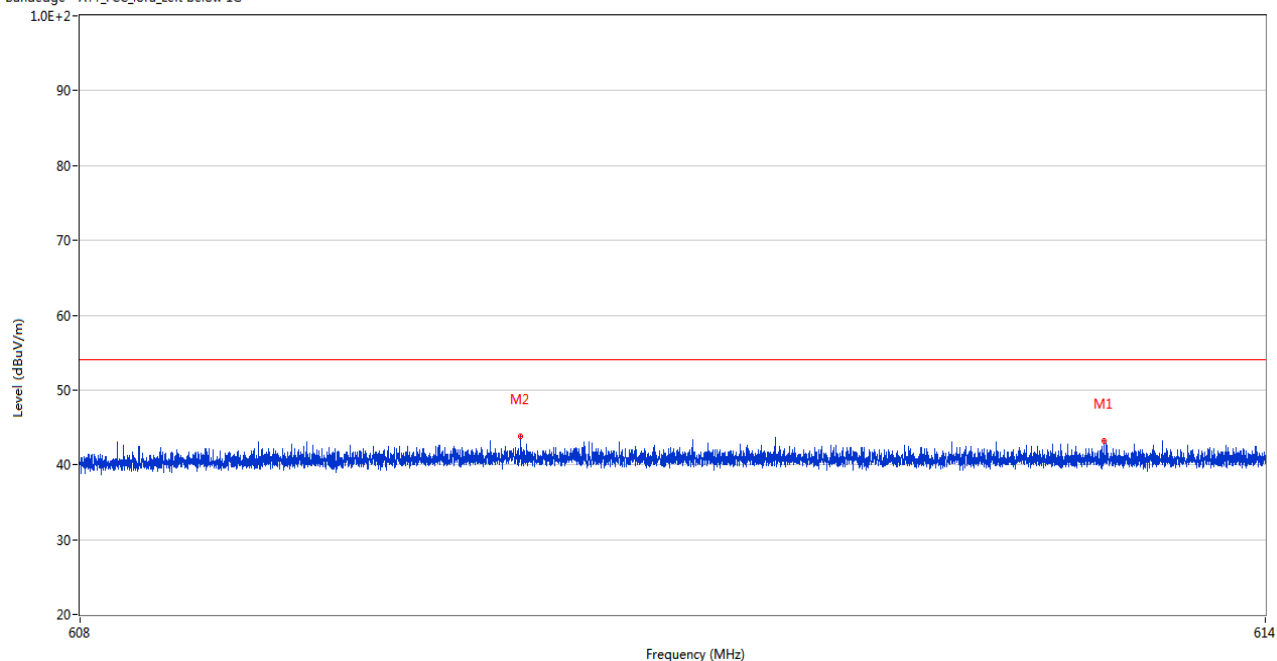
Bandedge - ATT_FCC_Lora_Right below 1G



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	961.580	45.73	9.57	54.0	8.27	Peak	291.00	150	Horizontal	Pass
2	965.727	46.27	9.37	54.0	7.73	Peak	76.00	200	Horizontal	Pass

LoRa (125kHz) LOW CHANNEL

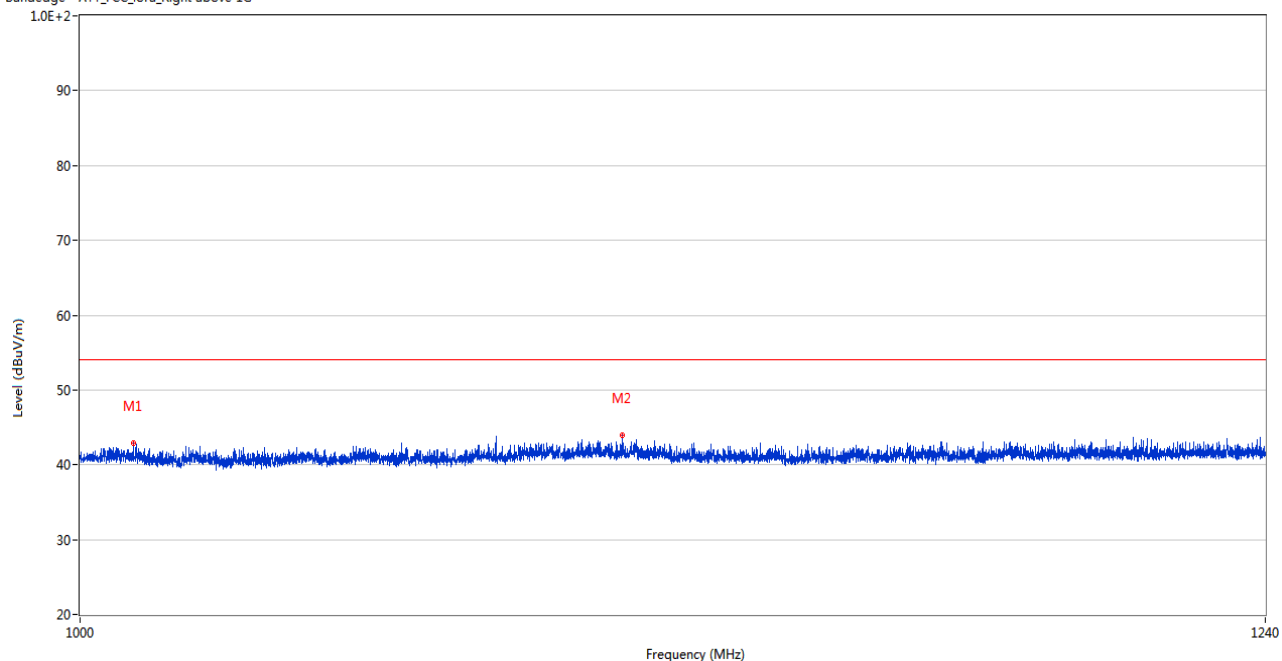
Bandedge - ATT_FCC_Lora_Left below 1G



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	613.178	43.18	6.25	54.0	10.82	Peak	294.00	200	Horizontal	Pass
2	610.225	43.76	6.48	54.0	10.24	Peak	12.00	100	Horizontal	Pass

LoRa (125kHz) HIGH CHANNEL

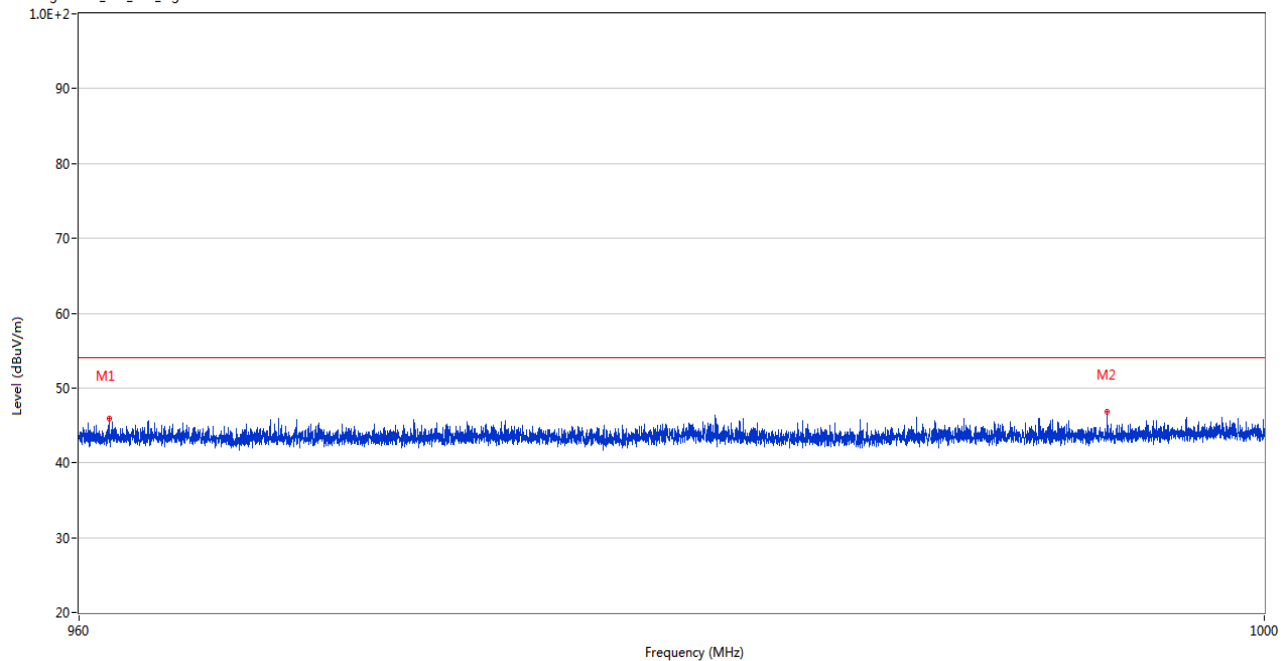
Bandedge - ATT_FCC_Lora_Right above 1G



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	1009.680	42.87	-12.29	54.0	11.13	Peak	271.00	200	Horizontal	Pass
2	1103.360	43.88	-13.00	54.0	10.12	Peak	263.00	150	Horizontal	Pass

LoRa (125kHz) HIGH CHANNEL

Bandedge - ATT_FCC_Lora_Right below 1G



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	960.993	45.85	9.55	54.0	8.15	Peak	229.00	150	Horizontal	Pass
2	994.593	46.83	9.78	54.0	7.17	Peak	152.00	300	Horizontal	Pass

ANNEX B TEST SETUP PHOTOS

Please refer the document “BL-SZ2471156-AR.PDF”.

ANNEX C EUT EXTERNAL PHOTOS

Please refer the document “BL-SZ2471156-AW.PDF”.

ANNEX D EUT INTERNAL PHOTOS

Please refer the document “BL-SZ2471156-AI.PDF”.

Statement

1. The laboratory guarantees the scientificity, accuracy and impartiality of the test, and is responsible for all the information in the report, except the information provided by the customer. The customer is responsible for the impact of the information provided on the validity of the results.
2. The report without China inspection body and laboratory Mandatory Approval (CMA) mark has no effect of proving to the society.
3. For the report with CNAS mark or A2LA mark, the items marked with "☆" are not within the accredited scope.
4. This report is invalid if it is altered, without the signature of the testing and approval personnel, or without the "inspection and testing dedicated stamp" or test report stamp.
5. The test data and results are only valid for the tested samples provided by the customer.
6. This report shall not be partially reproduced without the written permission of the laboratory.
7. Any objection shall be raised to the laboratory within 30 days after receiving the report.

--END OF REPORT--