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
Rev. 01	Sep. 13, 2024	Initial Issue

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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	DTS
Modulation Type	LoRa
Product Type	☐ Mobile ☒ Portable ☐ Fix Location
Frequency Range	The frequency range used is 902 MHz to 928 MHz.
Frequency Bandwidth	500 kHz, 1523 kHz
Number of Channel	500 kHz&1523 kHz: 8 500 kHz-US915_2: 31
Tested Channel	500 kHz&1523 kHz: 65 (903 MHz), 68 (907.8 MHz), 72 (914.2 MHz) 500 kHz-US915_2: 1 (902.5 MHz), 16 (914.5 MHz), 31 (926.5 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:

500 kHz&1523 kHz:

Channel number	Freq. (MHz)	Channel number	Freq. (MHz)	Channel number	Freq. (MHz)	Channel number	Freq. (MHz)
65	**903.0**	67	906.2	69	909.4	71	912.6
66	904.6	**68**	**907.8**	70	911.0	**72**	**914.2**

500 kHz-US915_2:

Channel number	Freq. (MHz)	Channel number	Freq. (MHz)	Channel number	Freq. (MHz)	Channel number	Freq. (MHz)
1	**902.5**	9	908.9	17	915.3	25	921.7
2	903.3	10	909.7	18	916.1	26	922.5
3	904.1	11	910.5	19	916.9	27	923.3
4	904.9	12	911.3	20	917.7	28	924.1
5	905.7	13	912.1	21	918.5	29	924.9
6	906.5	14	912.9	22	919.3	30	925.7
7	907.3	15	913.7	23	920.1	**31**	**926.5**
8	908.1	**16**	**914.5**	24	920.9	**--**	**--**

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.	Channel	Verdict
1	Antenna Requirement	15.203	--	Pass[Note]
2	Output Power	15.247(b)	ANNEX A.1	Pass
3	Occupied Bandwidth	15.247(a)	ANNEX A.2	Pass
4	Conducted Spurious Emission	15.247(d)	ANNEX A.3	Pass
5	Band Edge(Authorized-band band-edge)	15.247(d)	ANNEX A.4	Pass
6	Conducted Emission	15.207	ANNEX A.5	Pass
7	Radiated Spurious Emission	15.209 15.247(d)	ANNEX A.6	Pass
8	Band Edge(Restricted-band band-edge)	15.209 15.247(d)	ANNEX A.7	Pass
9	Power spectral density (PSD)	15.247(e)	ANNEX A.8	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℃ to +25.1℃
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.

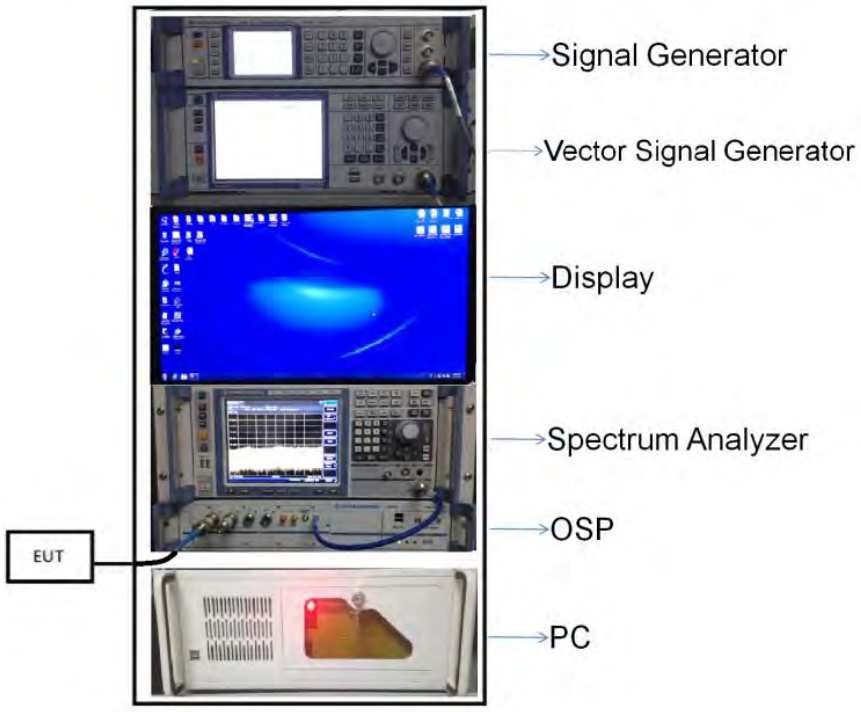
Parameters	Uncertainty
Occupied Channel Bandwidth	2.8%
RF output power, conducted	1.28 dB
Power Spectral Density, conducted	1.30 dB
Unwanted Emissions, conducted	1.84 dB
All emissions, radiated	5.36 dB
Temperature	0.8 ℃
Humidity	4 %

4.5 Description of Test Setup

4.5.1 For Antenna Port Test

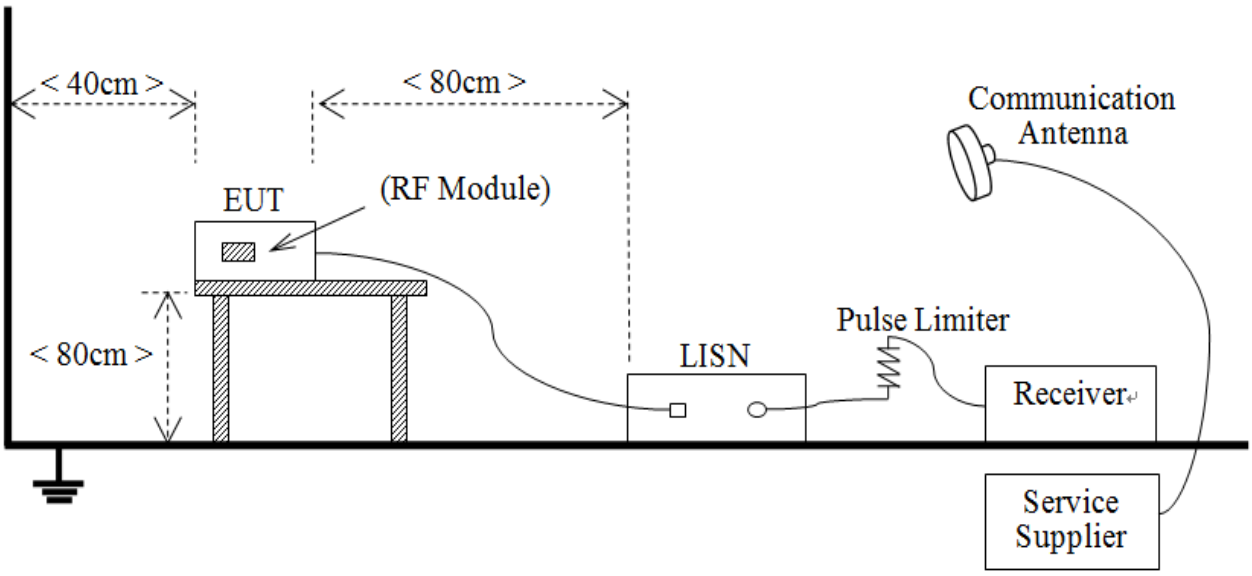
Conducted value (dBm) = Measurement value (dBm) + cable loss (dB)

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



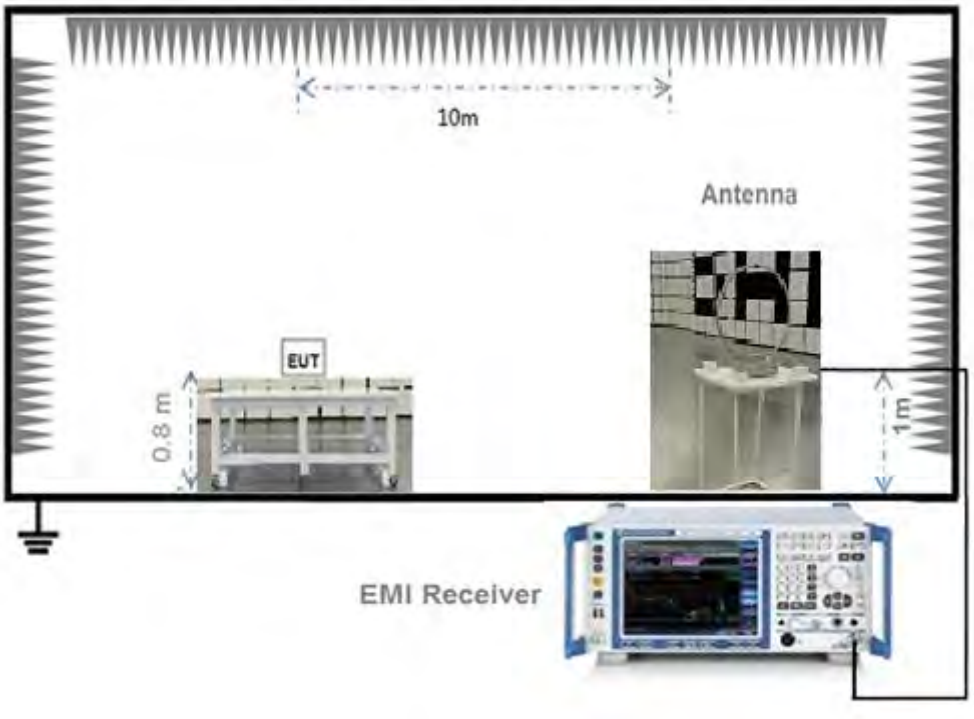
(Diagram 1)

4.5.2 For AC Power Supply Port Test



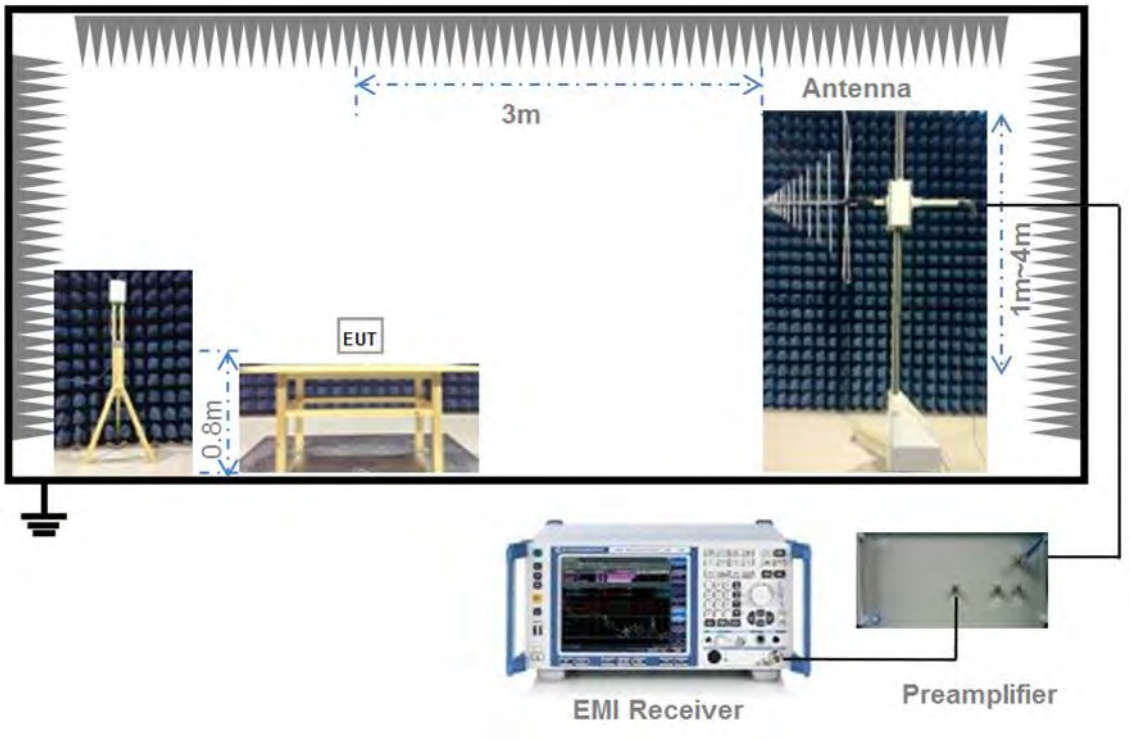
(Diagram 2)

4.5.3 For Radiated Test (Below 30 MHz)



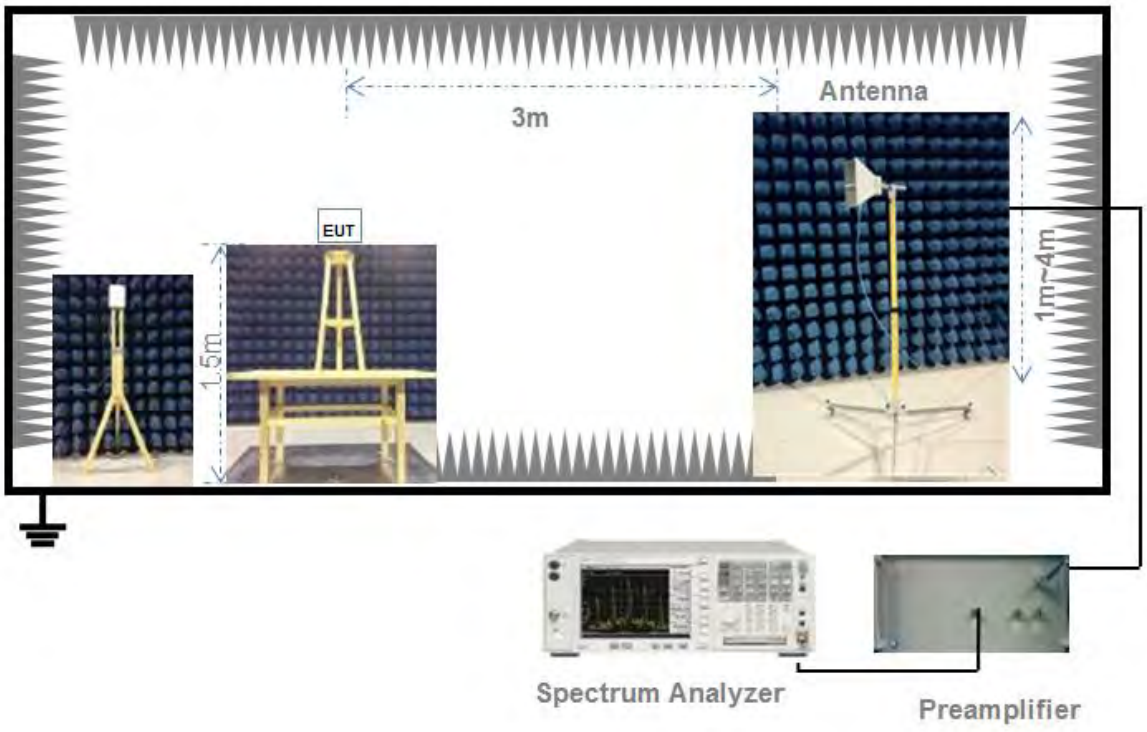
(Diagram 3)

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.

4.6.2 For radiated band edges and spurious emission test:

E = EIRP – 20log D + 104.8

where:

E = electric field strength in dBμV/m,

EIRP = equivalent isotropic radiated power in dBm

D = specified measurement distance in meters.

5 TEST ITEMS

5.1 Antenna Requirements

5.1.1 Relevant Standards

FCC §15.203 & 15.247(b)

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.	An embedded-in antenna design is used.

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 Output Power

5.2.1 Test Limit

FCC § 15.247(b)

For systems using digital modulation in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz bands: 1 Watt. As an alternative to a peak power measurement, compliance with the one Watt limit can be based on a measurement of the maximum conducted output power. Maximum Conducted Output Power is defined as the total transmit power delivered to all antennas and antenna elements averaged across all symbols in the signaling alphabet when the transmitter is operating at its maximum power control level. Power must be summed across all antennas and antenna elements.

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

a) Maximum peak conducted output power

This procedure shall be used when the measurement instrument has available a resolution bandwidth that is greater than the DTS bandwidth.

Set the RBW ≥ DTS bandwidth.

Set VBW ≥ 3 x RBW.

Set span ≥ 3 x RBW

Sweep time = auto couple.

Detector = peak.

Trace mode = max hold.

Allow trace to fully stabilize.

Use peak marker function to determine the peak amplitude level.

b) Measurements of duty cycle

The zero-span mode on a spectrum analyzer or EMI receiver if the response time and spacing between bins on the sweep are sufficient to permit accurate measurements of the on and off times of the transmitted signal.

Set the center frequency of the instrument to the center frequency of the transmission.

Set RBW ≥ OBW if possible; otherwise, set RBW to the largest available value.

Set VBW ≥ RBW. Set detector = peak or average.

The zero-span measurement method shall not be used unless both RBW and VBW are > 50/T and the number of sweep points across duration T exceeds 100. (For example, if VBW and/or RBW are limited to 3 MHz, then the zero-span method of measuring duty cycle shall not be used if T ≤ 16.7 microseconds.)

5.2.4 Test Result

Please refer to ANNEX A.1.

5.3 Occupied Bandwidth

5.3.1 Limit

FCC §15.247(a)

Make the measurement with the spectrum analyzer's resolution bandwidth (RBW) = 100 kHz. In order to make an accurate measurement, set the span greater than RBW. The 6 dB bandwidth must be greater than 500 kHz.

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

Use the following spectrum analyzer settings:

Set RBW = 100 kHz.

Set the video bandwidth (VBW) ≥ 3 RBW.

Detector = Peak.

Trace mode = max hold.

Sweep = auto couple.

Allow the trace to stabilize.

Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission.

5.3.4 Test Result

Please refer to ANNEX A.2.

5.4 Conducted Spurious Emission

5.4.1 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.

5.4.2 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

The DTS rules specify that in any 100 kHz bandwidth outside of the authorized frequency band, the power shall be attenuated according to the following conditions:

a) If the maximum peak conducted output power procedure was used to demonstrate compliance as described in 9.1, then the peak output power measured in any 100 kHz bandwidth outside of the authorized frequency band shall be attenuated by at least 20 dB relative to the maximum in-band peak PSD level in 100 kHz (i.e., 20 dBc).

b) If maximum conducted (average) output power was used to demonstrate compliance as described in 9.2, then the peak power in any 100 kHz bandwidth outside of the authorized frequency band shall be attenuated by at least 30 dB relative to the maximum in-band peak PSD level in 100 kHz (i.e., 30 dBc).

c) In either case, attenuation to levels below the 15.209 general radiated emissions limits is not required.

The following procedures shall be used to demonstrate compliance to these limits. Note that these procedures can be used in either an antenna-port conducted or radiated test set-up. Radiated tests must conform to the test site requirements and utilize maximization procedures defined herein.

Reference level measurement:

Establish a reference level by using the following procedure:

Set instrument center frequency to DTS channel center frequency.

Set the span to ≥ 1.5 times the DTS bandwidth.

Set the RBW = 100 kHz.

Set the VBW ≥ 3 x RBW.

Detector = peak.

Sweep time = auto couple.

Trace mode = max hold.

Allow trace to fully stabilize.

Use the peak marker function to determine the maximum PSD level.

Emission level measurement:

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.

Set the RBW = 100 kHz.

Set the VBW ≥ 3 x RBW.

Detector = peak.

Sweep time = auto couple.

Trace mode = max hold.

Allow trace to fully stabilize.

Use the peak marker function to determine the maximum amplitude level.

Ensure that the amplitude of all unwanted emissions outside of the authorized frequency band (excluding restricted frequency bands) are attenuated by at least the minimum requirements specified in 11.1 a) or 11.1 b). Report the three highest emissions relative to the limit.

5.4.4 Test Result

Please refer to ANNEX A.3.

5.5 Band Edge (Authorized-band band-edge)

5.5.1 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.

5.5.2 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 following procedures may be used to determine the peak or average field strength or power of an unwanted emission that is within 2 MHz of the authorized band edge. If a peak detector is utilized, use the procedure described in 13.2.1. Use the procedure described in 13.2.2 when using an average detector and the EUT can be configured to transmit continuously (i.e., duty cycle ≥ 98%). Use the procedure described in 13.2.3 when using an average detector and the EUT cannot be configured to transmit continuously but the duty cycle is constant (i.e., duty cycle variations are less than ± 2 percent). Use the procedure described in 13.2.4 when using an average detector for those cases where the EUT cannot be configured to transmit continuously and the duty cycle is not constant (duty cycle variations equal or exceed 2 percent).

When using a peak detector to measure unwanted emissions at or near the band edge (within 2 MHz of the authorized band), the following integration procedure can be used.

Set instrument center frequency to the frequency of the emission to be measured (must be within 2 MHz of the authorized band edge).

Set span to 2 MHz

RBW = 100 kHz.

VBW ≥ 3 x RBW.

Detector = peak.

Sweep time = auto.

Trace mode = max hold.

Allow sweep to continue until the trace stabilizes (required measurement time may increase for low duty cycle applications)

Compute the power by integrating the spectrum over 1 MHz using the analyzer's band power measurement function with band limits set equal to the emission frequency (femission) ± 0.5 MHz. If the instrument does not have a band power function, then sum the amplitude levels (in power units) at 100 kHz intervals extending across the 1 MHz spectrum defined by femission ± 0.5 MHz.

5.5.4 Test Result

Please refer to ANNEX A.4.

5.6 Conducted Emission

5.6.1 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 50μH/50Ω line impedance stabilization network (LISN).

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

5.6.2 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.

5.6.3 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.

5.6.4 Test Result

Please refer to ANNEX A.5.

5.7 Radiated Spurious Emission

5.7.1 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	2400/F(kHz)	300
0.490 - 1.705	24000/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).

5.7.2 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.

5.7.3 Test Procedure

Since the emission limits are specified in terms of radiated field strength levels, measurements performed to demonstrate compliance have traditionally relied on a radiated test configuration. Radiated measurements remain the principal method for demonstrating compliance to the specified limits; however antenna-port conducted measurements are also now acceptable to demonstrate compliance (see below for details). When radiated measurements are utilized, test site requirements and procedures for maximizing and measuring radiated emissions that are described in ANSI C63.10 shall be followed.

Antenna-port conducted measurements may also be used as an alternative to radiated measurements

for demonstrating compliance in the restricted frequency bands. If conducted measurements are performed, then proper impedance matching must be ensured and an additional radiated test for cabinet/case spurious emissions is required.

General Procedure for conducted measurements in restricted bands:

a) Measure the conducted output power (in dBm) using the detector specified (see guidance regarding measurement procedures for determining quasi-peak, peak, and average conducted output power, respectively).

b) Add the maximum transmit antenna gain (in dBi) to the measured output power level to determine the EIRP level (see guidance on determining the applicable antenna gain)

c) Add the appropriate maximum ground reflection factor to the EIRP level (6 dB for frequencies ≤ 30 MHz, 4.7 dB for frequencies between 30 MHz and 1000 MHz, inclusive and 0 dB for frequencies > 1000 MHz).

d) For devices with multiple antenna-ports, measure the power of each individual chain and sum the EIRP of all chains in linear terms (e.g., Watts, mW).

e) Convert the resultant EIRP level to an equivalent electric field strength using the following relationship:

$E = EIRP - 20\log D + 104.8$

where:

E = electric field strength in dBμV/m,

EIRP = equivalent isotropic radiated power in dBm

D = specified measurement distance in meters.

f) Compare the resultant electric field strength level to the applicable limit.

g) Perform radiated spurious emission test.

Quasi-Peak measurement procedure

The specifications for measurements using the CISPR quasi-peak detector can be found in Publication 16 of the International Special Committee on Radio Frequency Interference (CISPR) of the International Electrotechnical Commission.

As an alternative to CISPR quasi-peak measurement, compliance can be demonstrated to the applicable emission limits using a peak detector.

Peak power measurement procedure:

Peak emission levels are measured by setting the instrument as follows:

a) RBW = as specified in Table 1.

b) VBW ≥ 3 x RBW.

c) Detector = Peak.

d) Sweep time = auto.

e) Trace mode = max hold.

f) Allow sweeps to continue until the trace stabilizes. (Note that the required measurement time may be longer for low duty cycle applications).

Table 1—RBW as a function of frequency

Frequency	RBW
9-150 kHz	200-300 Hz
0.15-30 MHz	9-10 kHz
30-1000 MHz	100-120 kHz
> 1000 MHz	1 MHz

If the peak-detected amplitude can be shown to comply with the average limit, then it is not necessary to perform a separate average measurement.

Trace averaging across on and off times of the EUT transmissions followed by duty cycle correction:

If continuous transmission of the EUT (i.e., duty cycle ≥ 98 percent) cannot be achieved and the duty cycle is constant (i.e., duty cycle variations are less than ± 2 percent), then the following procedure shall be used:

a) The EUT shall be configured to operate at the maximum achievable duty cycle.

b) Measure the duty cycle, x, of the transmitter output signal as described in section 6.0.

c) RBW = 1 MHz (unless otherwise specified).

d) VBW ≥ 3 x RBW.

e) Detector = RMS, if span/(# of points in sweep) ≤ (RBW/2). Satisfying this condition may require increasing the number of points in the sweep or reducing the span. If this condition cannot be satisfied, then the detector mode shall be set to peak.

f) Averaging type = power (i.e., RMS).

1) As an alternative, the detector and averaging type may be set for linear voltage averaging.

2) Some instruments require linear display mode in order to use linear voltage averaging. Log or dB averaging shall not be used.

g) Sweep time = auto.

h) Perform a trace average of at least 100 traces.

i) A correction factor shall be added to the measurement results prior to comparing to the emission limit in order to compute the emission level that would have been measured had the test been performed at 100 percent duty cycle. The correction factor is computed as follows:

1) If power averaging (RMS) mode was used in step f), then the applicable correction factor is 10 log(1/x), where x is the duty cycle.

2) If linear voltage averaging mode was used in step f), then the applicable correction factor is 20 log(1/x), where x is the duty cycle.

3) If a specific emission is demonstrated to be continuous (≥ 98 percent duty cycle) rather than turning on and off with the transmit cycle, then no duty cycle correction is required for that emission.

NOTE: Reduction of the measured emission amplitude levels to account for operational duty factor is not permitted. Compliance is based on emission levels occurring during transmission - not on an average across on and off times of the transmitter.

Determining the applicable transmit antenna gain:

A conducted power measurement will determine the maximum output power associated with a restricted band emission; however, in order to determine the associated EIRP level, the gain of the transmitting antenna (in dBi) must be added to the measured output power (in dBm).

Since the out-of-band characteristics of the EUT transmit antenna will often be unknown, the use of a conservative antenna gain value is necessary. Thus, when determining the EIRP based on the measured conducted power, the upper bound on antenna gain for a device with a single RF output shall be selected as the maximum in-band gain of the antenna across all operating bands, or 2 dBi, whichever is greater. However, for devices that operate in multiple frequency bands while using the same transmit antenna, the highest gain of the antenna within the operating band nearest in frequency to the restricted band emission being measured may be used in lieu of the overall highest gain when the emission is at a frequency that is within 20 percent of the nearest band edge frequency, but in no case shall a value less than 2 dBi be used.

See KDB 662911 for guidance on calculating the additional array gain term when determining the effective antenna gain for a EUT with multiple outputs occupying the same or overlapping frequency ranges in the same band.

Radiated spurious emission test:

An additional consideration when performing conducted measurements of restricted band emissions is that unwanted emissions radiating from the EUT cabinet, control circuits, power leads, or intermediate circuit elements will likely go undetected in a conducted measurement configuration. To address this concern, a radiated test shall be performed to ensure that emissions emanating from the EUT cabinet (rather than the antenna port) also comply with the applicable limits.

For these cabinet radiated spurious emission measurements the EUT transmit antenna may be replaced with a termination matching the nominal impedance of the antenna. Procedures for performing radiated measurements are specified in ANSI C63.10. All detected emissions shall comply with the applicable limits.

The measurement frequency range is from 30MHz 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 ≥ 1 GHz, 100 kHz for f < 1 GHz
VBW ≥ RBW
Sweep = auto
Detector function = peak
Trace = max hold

5.7.4 Test Result

Please refer to ANNEX A.6.

5.8 Band Edge (Restricted-band band-edge)

5.8.1 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).

5.8.2 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.

5.8.3 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 ≥ 1 GHz, 100 kHz for f < 1 GHz
VBW ≥ 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.

For transmitters operating above 1 GHz repeat the measurement with an average detector.

5.8.4 Test Result

Please refer to ANNEX A.7.

5.9 Power Spectral density (PSD)

5.9.1 Limit

FCC §15.247(e)

The same method of determining the conducted output power shall be used to determine the power spectral density. If a peak output power is measured, then a peak power spectral density measurement is required. If an average output power is measured, then an average power spectral density measurement should be used.

The transmitter power spectral density conducted from the transmitter to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission. This power spectral density shall be determined in accordance with the provisions of Section 5.4(4), (i.e. the power spectral density shall be determined using the same method as is used to determine the conducted output power).

5.9.2 Test Setup

See section 4.5.1 (Diagram 1) for test setup description for the antenna port. The photo of test setup please refer to ANNEX B.

5.9.3 Test Procedure

Set analyzer center frequency to DTS channel center frequency.

Set the span to 1.5 times the DTS bandwidth.

Set the RBW to: 3 kHz ≤ RBW ≤ 100 kHz.

Set the VBW ≥ 3 RBW.

Detector = peak.

Sweep time = auto couple.

Trace mode = max hold.

Allow trace to fully stabilize.

Use the peak marker function to determine the maximum amplitude level within the RBW.

If measured value exceeds limit, reduce RBW (no less than 3 kHz) and repeat.

5.9.4 Test Result

Please refer to ANNEX A.8.

ANNEX A TEST RESULT

A.1 Output Power, Duty Cycle

Peak Power Test Data

Channel	Measured Output Peak Power		Limit		Verdict
	LoRa (500kHz)		dBm	mW	
	dBm	mW			
Low	20.22	105.20	30	1000	Pass
Middle	20.15	103.51			Pass
High	20.09	102.09			Pass

Channel	Measured Output Peak Power		Limit		Verdict
	LoRa (500kHz-US915_2)		dBm	mW	
	dBm	mW			
Low	20.25	105.93	30	1000	Pass
Middle	20.15	103.51			Pass
High	20.01	100.23			Pass

Channel	Measured Output Peak Power		Limit		Verdict
	LoRa (1523kHz)		dBm	mW	
	dBm	mW			
Low	20.95	124.45	30	1000	Pass
Middle	20.93	123.88			Pass
High	20.76	119.12			Pass

Average Power Test Data

Channel	Measured Output Average Power		Limit		Verdict
	LoRa (500kHz)		dBm	mW	
	dBm	mW			
Low	20.18	104.23	30	1000	Pass
Middle	20.11	102.57			Pass
High	20.06	101.39			Pass

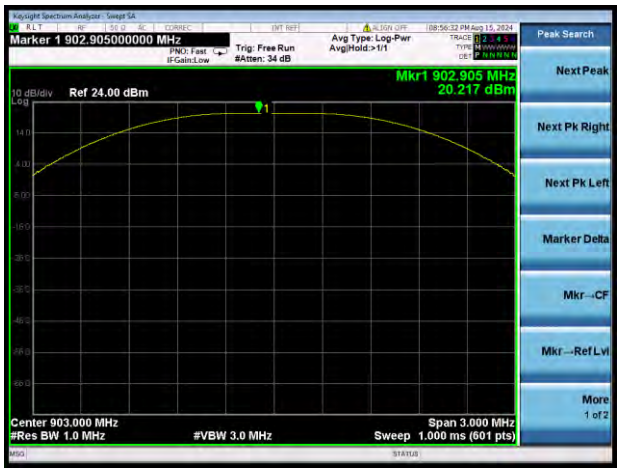
Channel	Measured Output Average Power		Limit		Verdict
	LoRa (500kHz-US915_2)		dBm	mW	
	dBm	mW			
Low	20.19	104.47	30	1000	Pass
Middle	20.11	102.57			Pass
High	19.99	99.68			Pass

Channel	Measured Output Average Power		Limit		Verdict
	LoRa (1523kHz)		dBm	mW	
	dBm	mW			
Low	20.94	124.22	30	1000	Pass
Middle	20.92	123.59			Pass
High	20.75	118.85			Pass

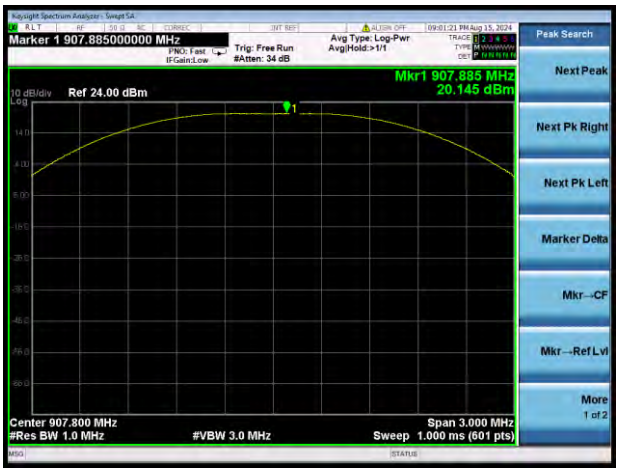
Test Plots

Peak Power

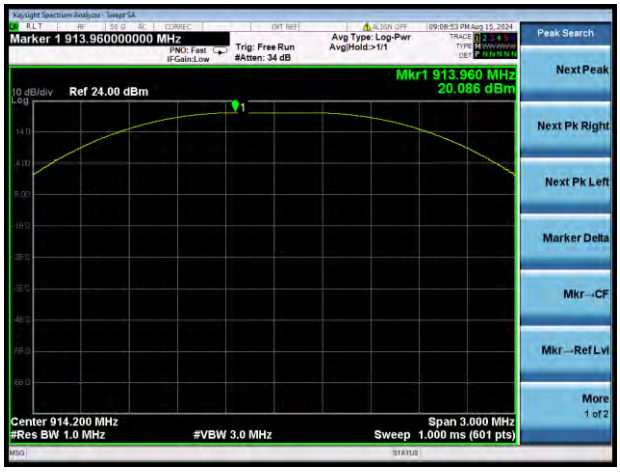
LoRa (500kHz) LOW CHANNEL



LoRa (500kHz) MIDDLE CHANNEL



LoRa (500kHz) HIGH CHANNEL



LoRa (500kHz-US915_2) LOW CHANNEL

LoRa (500kHz-US915_2) MIDDLE CHANNEL

LoRa (500kHz-US915_2) HIGH CHANNEL

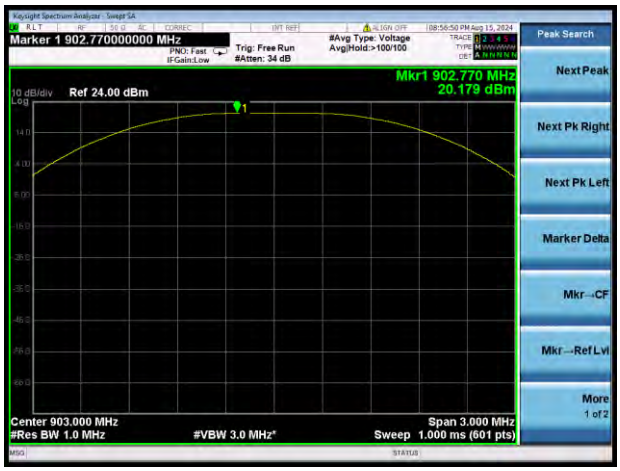
LoRa (1523kHz) LOW CHANNEL

LoRa (1523kHz) MIDDLE CHANNEL

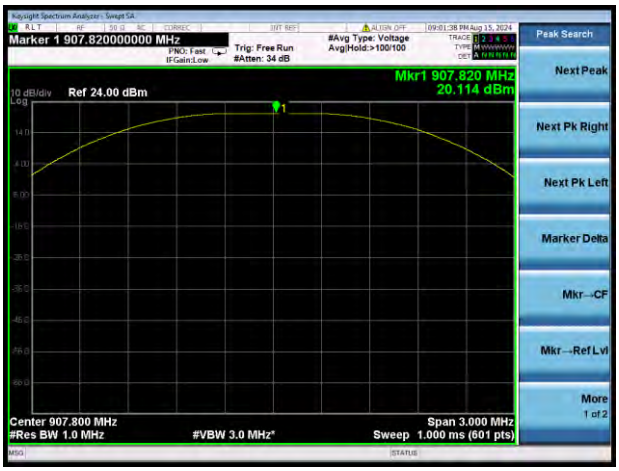
LoRa (1523kHz) HIGH CHANNEL

Average Power

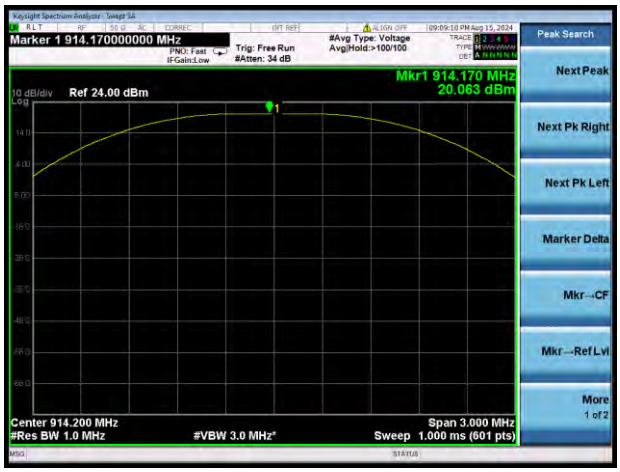
LoRa (500kHz) LOW CHANNEL



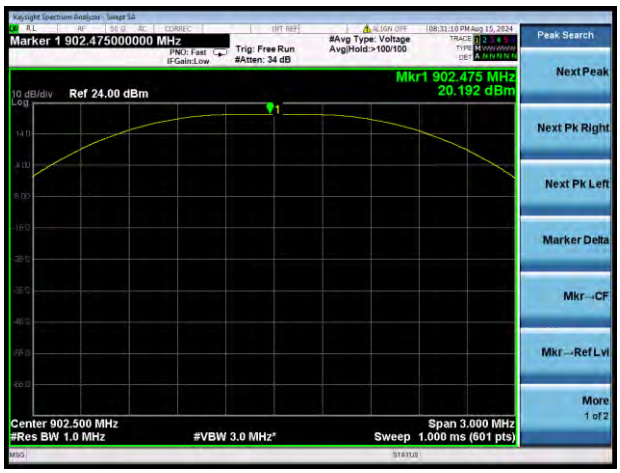
LoRa (500kHz) MIDDLE CHANNEL



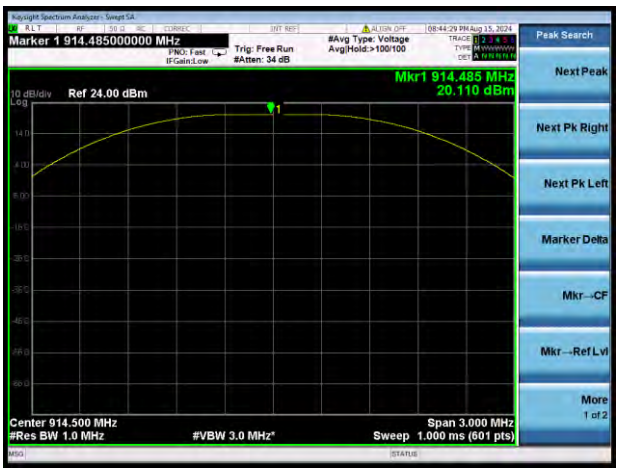
LoRa (500kHz) HIGH CHANNEL



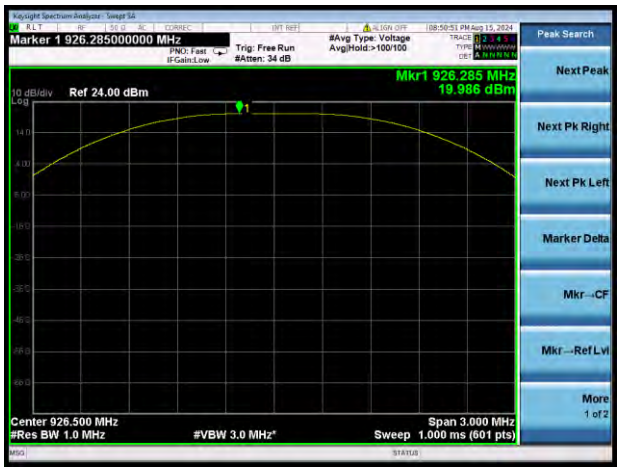
LoRa (500kHz-US915_2) LOW CHANNEL



LoRa (500kHz-US915_2) MIDDLE CHANNEL



LoRa (500kHz-US915_2) HIGH CHANNEL



LoRa (1523kHz) LOW CHANNEL

LoRa (1523kHz) MIDDLE CHANNEL

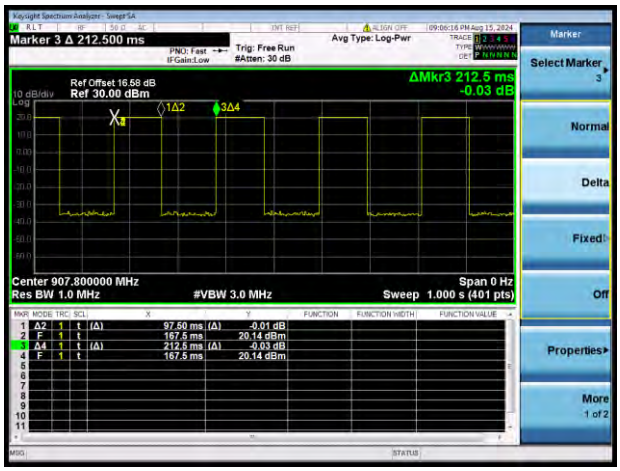
LoRa (1523kHz) HIGH CHANNEL

Duty Cycle Test Data

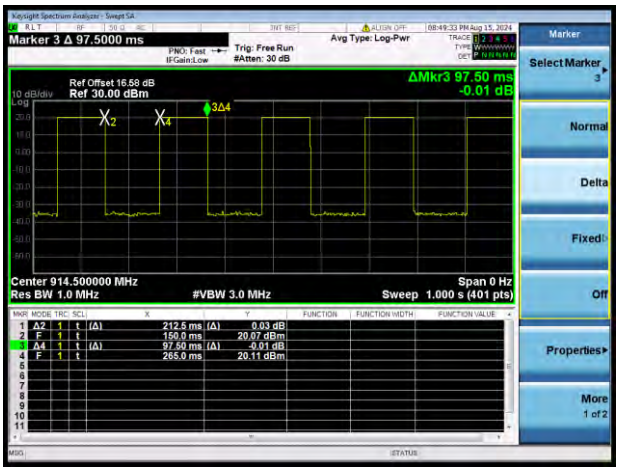
Band	On Time (ms)	On+Off Time (ms)	Duty Cycle (%)	Duty Factor (10 log (1/x))
LoRa (500kHz)	97.5	212.5	45.88	3.38
LoRa (500 kHz-US915_2)	97.5	212.5	45.88	3.38
LoRa (1523kHz)	600.0	1625.0	36.92	4.33

Test Plots

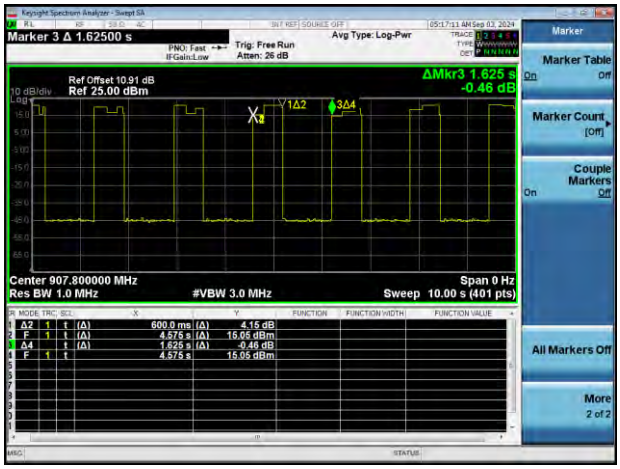
LoRa (500kHz)



LoRa (500kHz-US915_2)



LoRa (1523kHz)



A.2 Occupied Bandwidth

Test Data

Test Mode	LoRa (500kHz)		
Channel	6 dB Bandwidth (MHz)	99% Bandwidth (MHz)	6 dB Bandwidth Limits (MHz)
Low Channel	0.641240	0.521950	≥0.50
Middle Channel	0.645020	0.517550	≥0.50
High Channel	0.645020	0.520130	≥0.50

Test Mode	LoRa (500kHz-US915_2)		
Channel	6 dB Bandwidth (MHz)	99% Bandwidth (MHz)	6 dB Bandwidth Limits (MHz)
Low Channel	0.645020	0.518640	≥0.50
Middle Channel	0.645020	0.519330	≥0.50
High Channel	0.641240	0.519110	≥0.50

Test Mode	LoRa (1523kHz)		
Channel	6 dB Bandwidth (MHz)	99% Bandwidth (MHz)	6 dB Bandwidth Limits (MHz)
Low Channel	1.633000	1.526800	≥0.50
Middle Channel	1.611000	1.526900	≥0.50
High Channel	1.633000	1.527000	≥0.50

Test Plots

6 dB Bandwidth

LoRa (500kHz) LOW CHANNEL

LoRa (500kHz) MIDDLE CHANNEL

LoRa (500kHz) HIGH CHANNEL

LoRa (500kHz-US915_2) LOW CHANNEL

LoRa (500kHz-US915_2) MIDDLE CHANNEL

LoRa (500kHz-US915_2) HIGH CHANNEL

LoRa (1523kHz) LOW CHANNEL

LoRa (1523kHz) MIDDLE CHANNEL

LoRa (1523kHz) HIGH CHANNEL

99% Bandwidth

LoRa (500kHz) LOW CHANNEL

LoRa (500kHz) MIDDLE CHANNEL

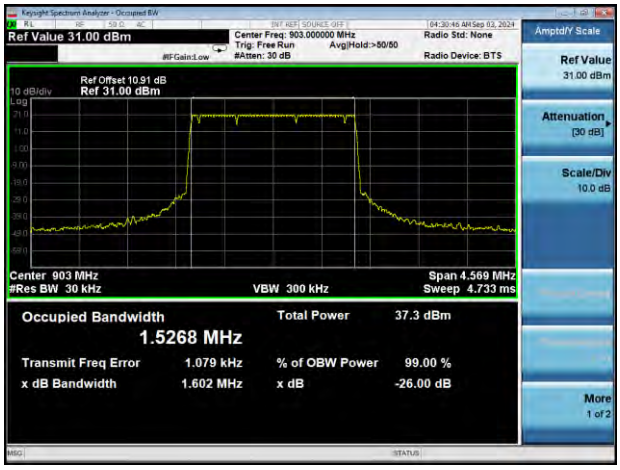
LoRa (500kHz) HIGH CHANNEL

LoRa (500kHz-US915_2) LOW CHANNEL

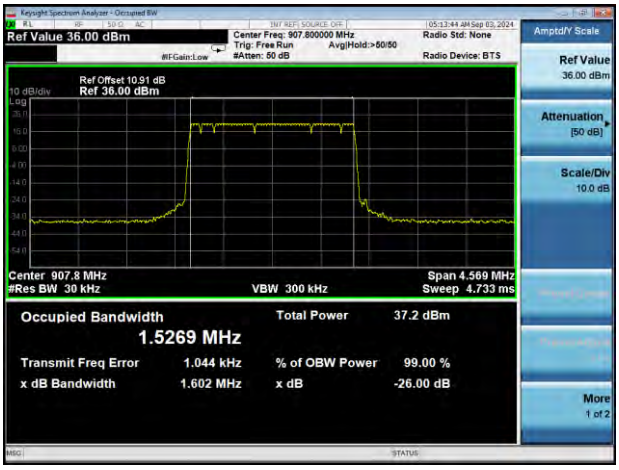
LoRa (500kHz-US915_2) MIDDLE CHANNEL

LoRa (500kHz-US915_2) HIGH CHANNEL

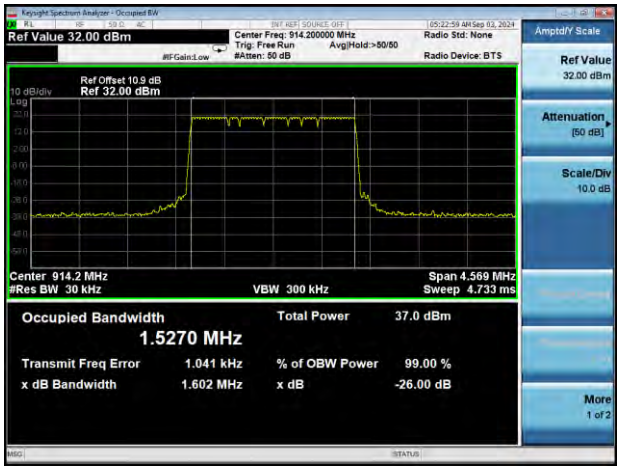
LoRa (1523kHz) LOW CHANNEL



LoRa (1523kHz) MIDDLE CHANNEL



LoRa (1523kHz) HIGH CHANNEL



A.3 Conducted Spurious Emissions

Test Data

LoRa (500kHz)				
Channel	Measured Max. Out of Band Emission (dBm)	Limit (dBm)		Verdict
		Carrier Level	Calculated 20 dBc Limit	
Low	-14.07	20.27	0.27	Pass
Middle	-13.84	20.20	0.20	Pass
High	-14.11	20.15	0.15	Pass

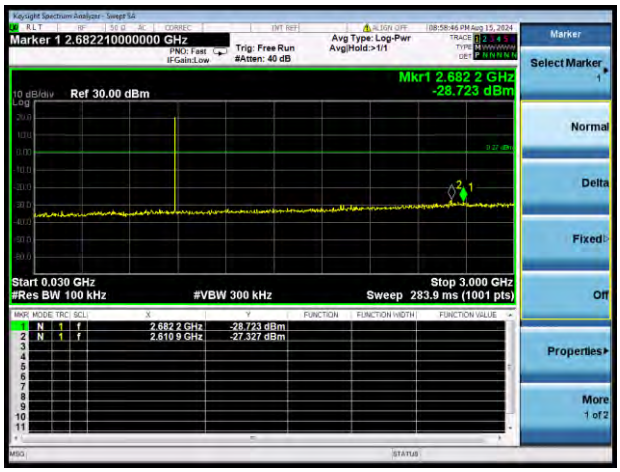
LoRa (500kHz-US915_2)				
Channel	Measured Max. Out of Band Emission (dBm)	Limit (dBm)		Verdict
		Carrier Level	Calculated 20 dBc Limit	
Low	-14.46	20.29	0.29	Pass
Middle	-13.93	20.19	0.19	Pass
High	-13.82	20.08	0.08	Pass

LoRa (1523kHz)				
Channel	Measured Max. Out of Band Emission (dBm)	Limit (dBm)		Verdict
		Carrier Level	Calculated 20 dBc Limit	
Low	-16.07	20.92	0.92	Pass
Middle	-14.20	20.84	0.84	Pass
High	-15.17	20.70	0.70	Pass

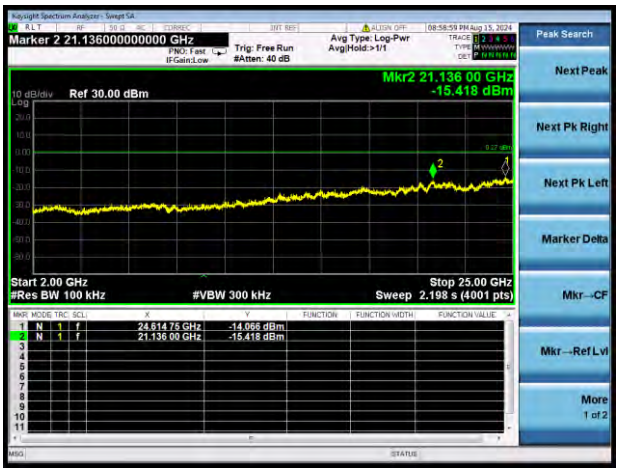
Test Plots

LoRa (500kHz) LOW CHANNEL, CARRIER LEVEL

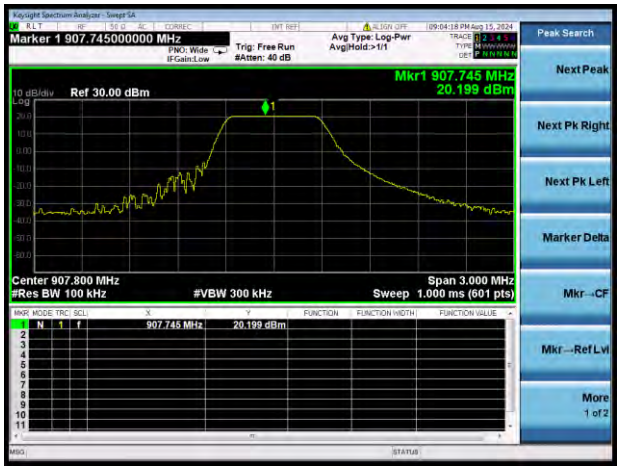
LoRa (500kHz) LOW CHANNEL, SPURIOUS 30 MHz ~ 3 GHz



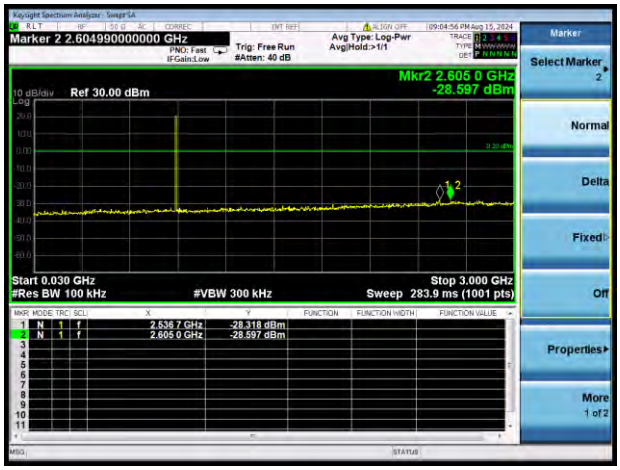
LoRa (500kHz) LOW CHANNEL, SPURIOUS 2 GHz ~ 25 GHz



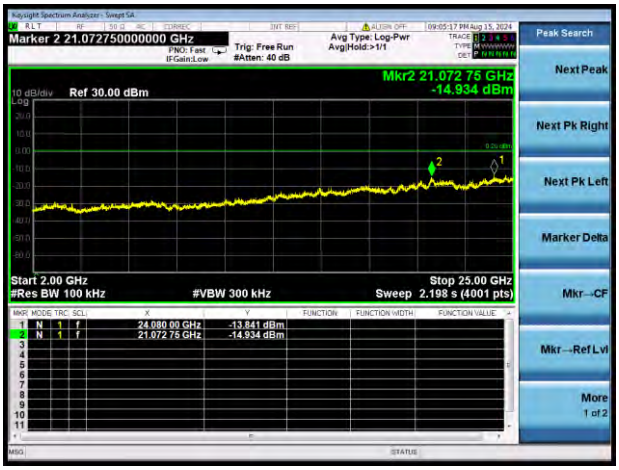
LoRa (500kHz) MIDDLE CHANNEL, CARRIER LEVEL



LoRa (500kHz) MIDDLE CHANNEL, SPURIOUS 30 MHz ~ 3 GHz

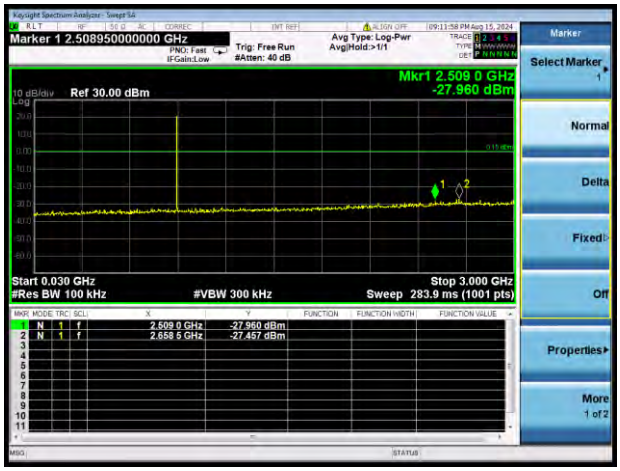


LoRa (500kHz) MIDDLE CHANNEL, SPURIOUS 2 GHz ~ 25 GHz

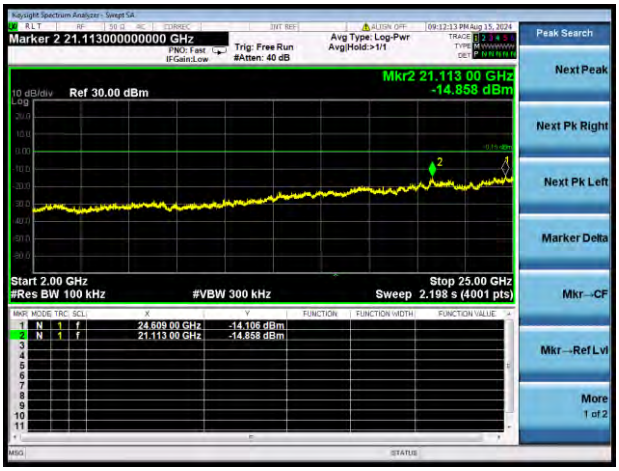


LoRa (500kHz) HIGH CHANNEL, CARRIER LEVEL

LoRa (500kHz) HIGH CHANNEL, SPURIOUS 30 MHz ~ 3 GHz

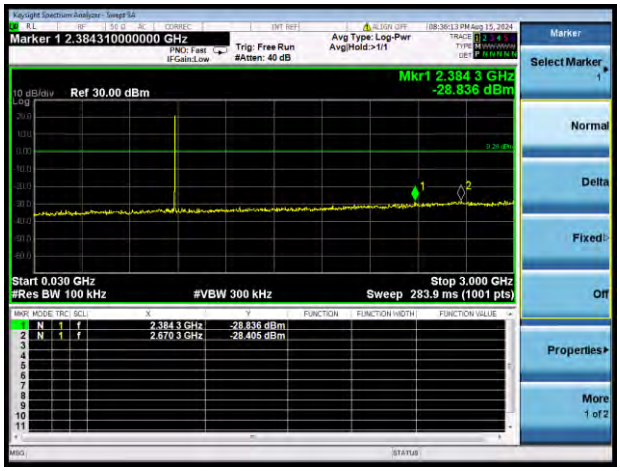


LoRa (500kHz) HIGH CHANNEL, SPURIOUS 2 GHz ~ 25 GHz

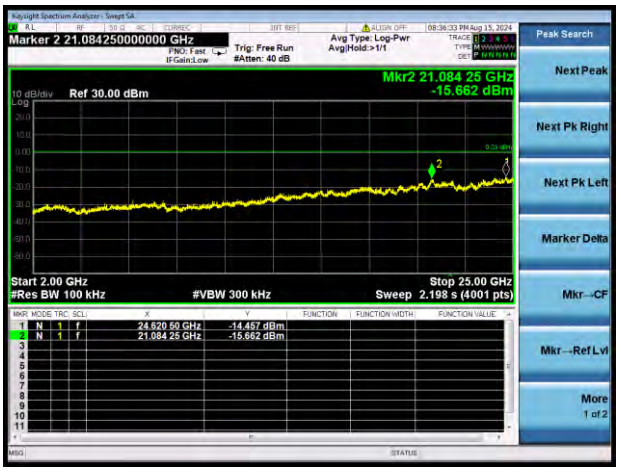


LoRa (500kHz-US915_2) LOW CHANNEL, CARRIER LEVEL

LoRa (500kHz-US915_2) LOW CHANNEL, SPURIOUS 30 MHz ~ 3 GHz

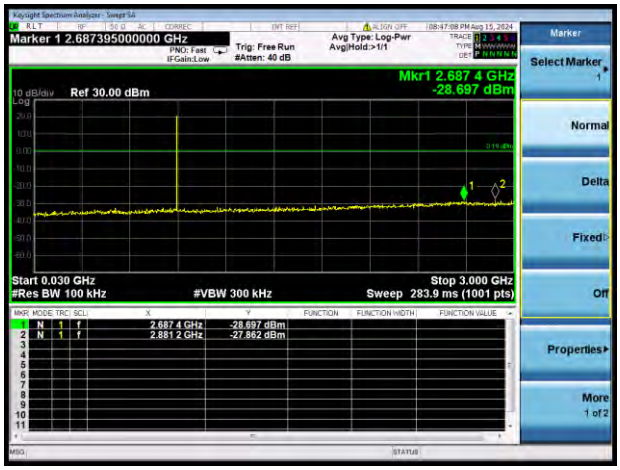


LoRa (500kHz-US915_2) LOW CHANNEL, SPURIOUS 2 GHz ~ 25 GHz



LoRa (500kHz-US915_2) MIDDLE CHANNEL, CARRIER LEVEL

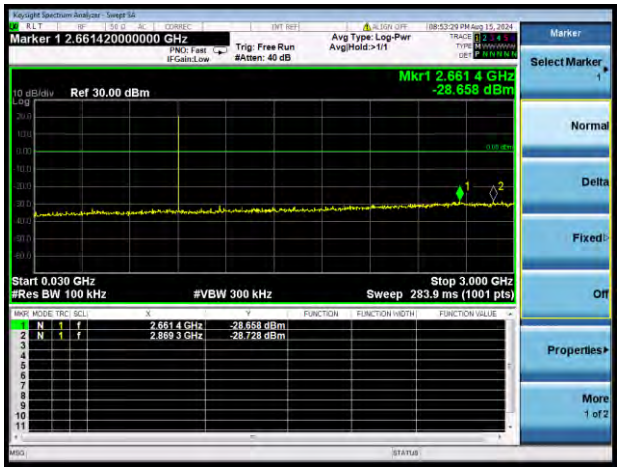
LoRa (500kHz-US915_2) MIDDLE CHANNEL, SPURIOUS 30 MHz ~ 3 GHz



LoRa (500kHz-US915_2) MIDDLE CHANNEL, SPURIOUS 2 GHz ~ 25 GHz

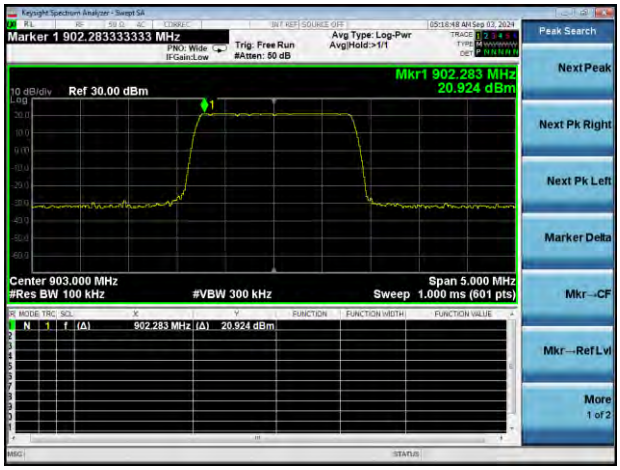
LoRa (500kHz-US915_2) HIGH CHANNEL, CARRIER LEVEL

LoRa (500kHz-US915_2) HIGH CHANNEL, SPURIOUS 30 MHz ~ 3 GHz

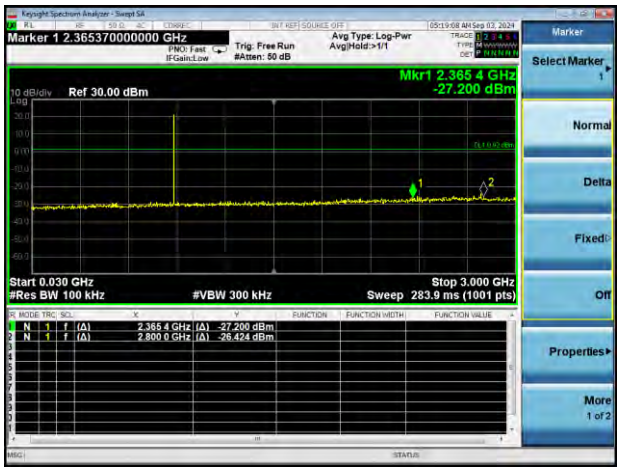


LoRa (500kHz-US915_2) HIGH CHANNEL, SPURIOUS 2 GHz ~ 25 GHz

LoRa (1523kHz) LOW CHANNEL, CARRIER LEVEL

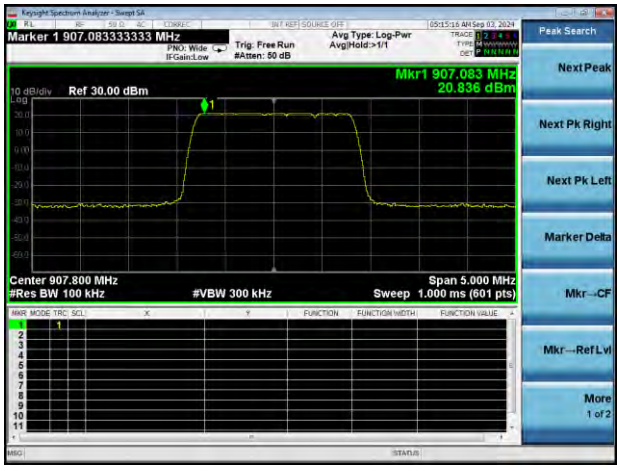


LoRa (1523kHz) LOW CHANNEL, SPURIOUS 30 MHz ~ 3 GHz

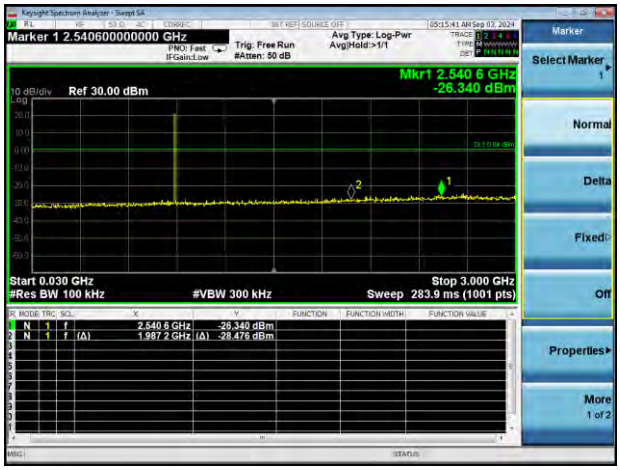


LoRa (1523kHz) LOW CHANNEL, SPURIOUS 2 GHz ~ 25 GHz

LoRa (1523kHz) MIDDLE CHANNEL, CARRIER LEVEL

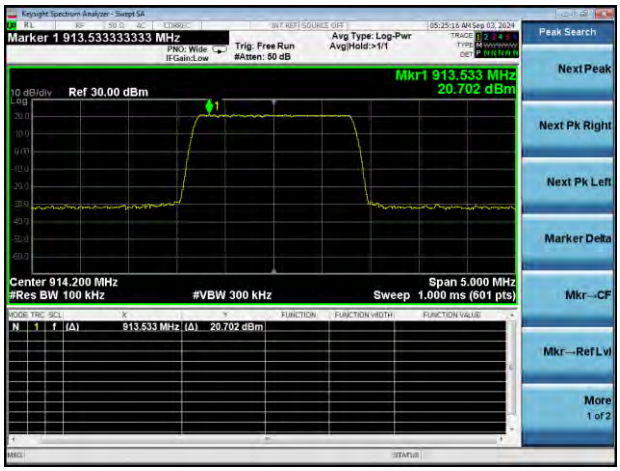


LoRa (1523kHz) MIDDLE CHANNEL, SPURIOUS 30 MHz ~ 3 GHz

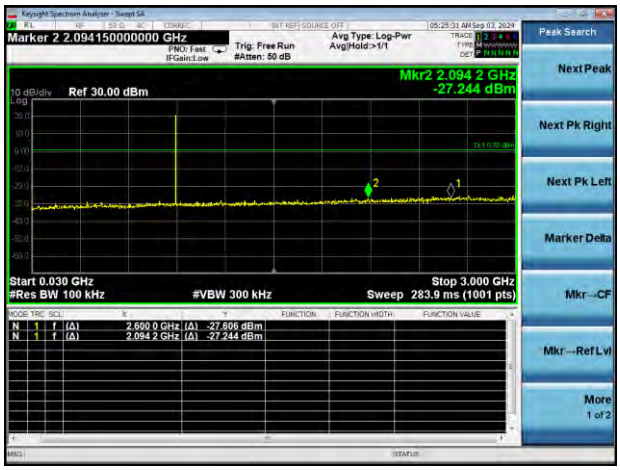


LoRa (1523kHz) MIDDLE CHANNEL, SPURIOUS 2 GHz ~ 25 GHz

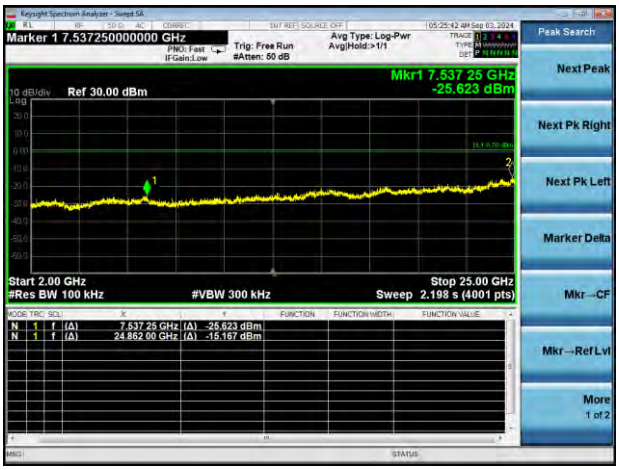
LoRa (1523kHz) HIGH CHANNEL, CARRIER LEVEL



LoRa (1523kHz) HIGH CHANNEL, SPURIOUS 30 MHz ~ 3 GHz



LoRa (1523kHz) HIGH CHANNEL, SPURIOUS 2 GHz ~ 25 GHz



A.4 Band Edge (Authorized-band band-edge)

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

Test Data

LoRa (500kHz)				
Channel	Measured Max. Band Edge Emission (dBm)	Limit (dBm)		Verdict
		Carrier Level	Calculated 20 dBc Limit	
Low Channel	-28.98	20.27	0.27	Pass
High Channel	-49.16	20.15	0.15	Pass

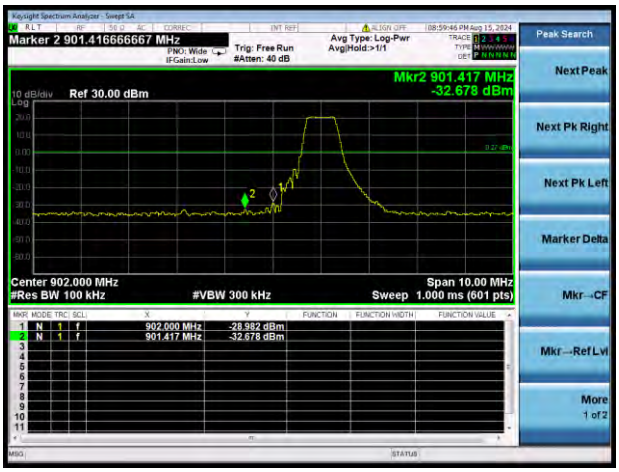
LoRa (500kHz-US915_2)				
Channel	Measured Max. Band Edge Emission (dBm)	Limit (dBm)		Verdict
		Carrier Level	Calculated 20 dBc Limit	
Low Channel	-5.36	20.29	0.29	Pass
High Channel	-42.93	20.08	0.08	Pass

LoRa (1523kHz)				
Channel	Measured Max. Band Edge Emission (dBm)	Limit (dBm)		Verdict
		Carrier Level	Calculated 20 dBc Limit	
Low Channel	-28.84	20.92	0.92	Pass
High Channel	-42.52	20.70	0.70	Pass

Test Plots

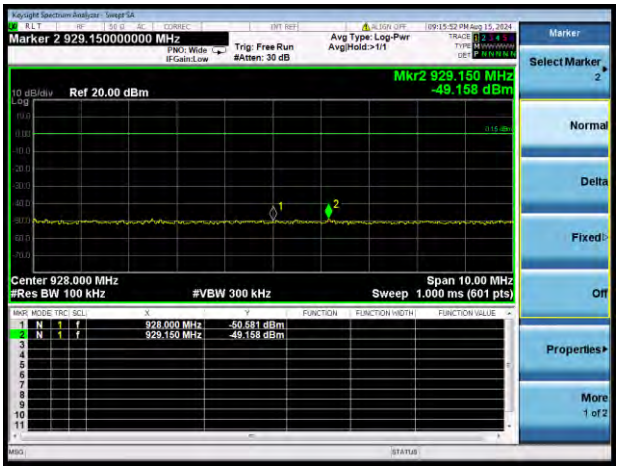
LoRa (500kHz) LOW CHANNEL, CARRIER LEVEL

LoRa (500kHz) LOW CHANNEL, BAND EDGE



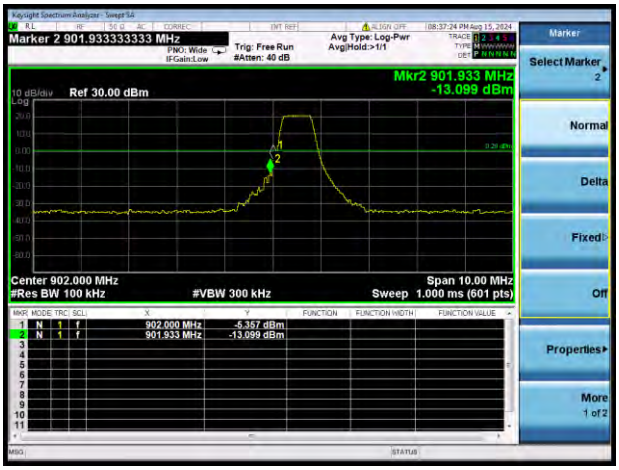
LoRa (500kHz) HIGH CHANNEL, CARRIER LEVEL

LoRa (500kHz) HIGH CHANNEL, BAND EDGE



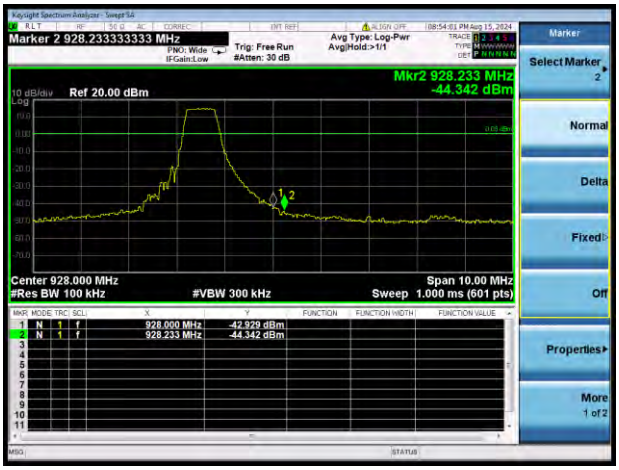
LoRa (500kHz-US915_2) LOW CHANNEL, CARRIER LEVEL

LoRa (500kHz-US915_2) LOW CHANNEL, BAND EDGE

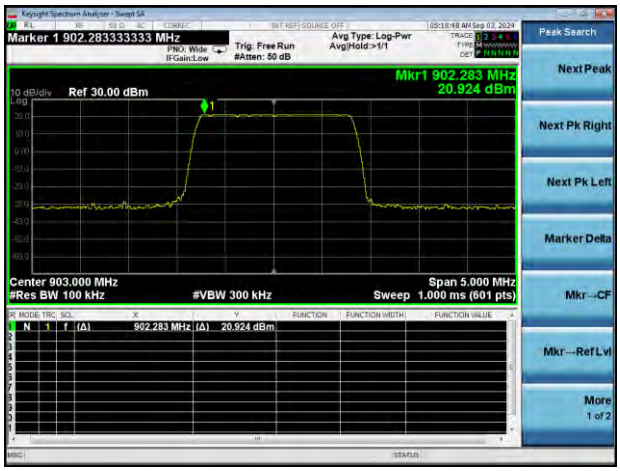


LoRa (500kHz-US915_2) HIGH CHANNEL, CARRIER LEVEL

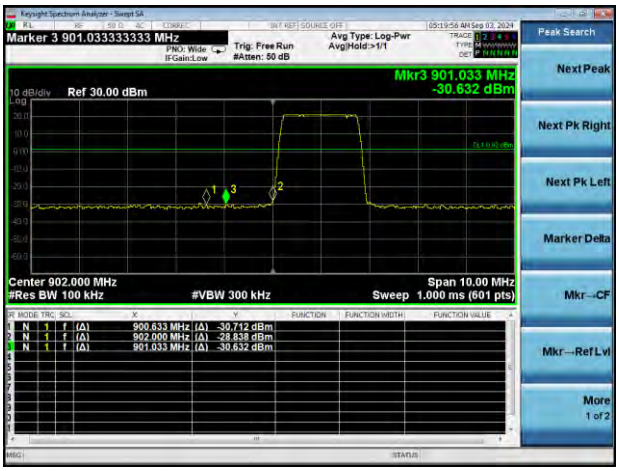
LoRa (500kHz-US915_2) HIGH CHANNEL, BAND EDGE



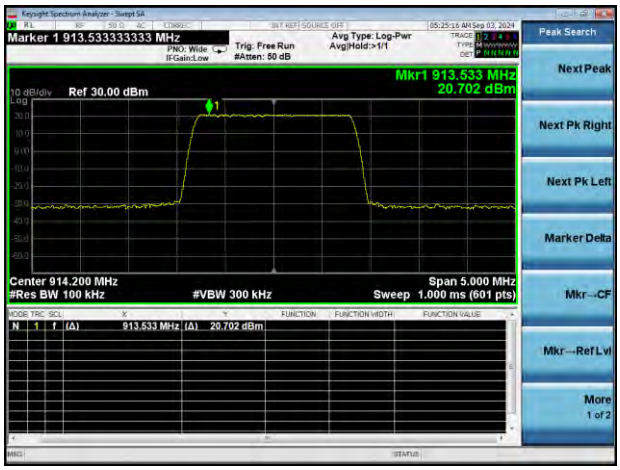
LoRa (1523kHz) LOW CHANNEL, CARRIER LEVEL



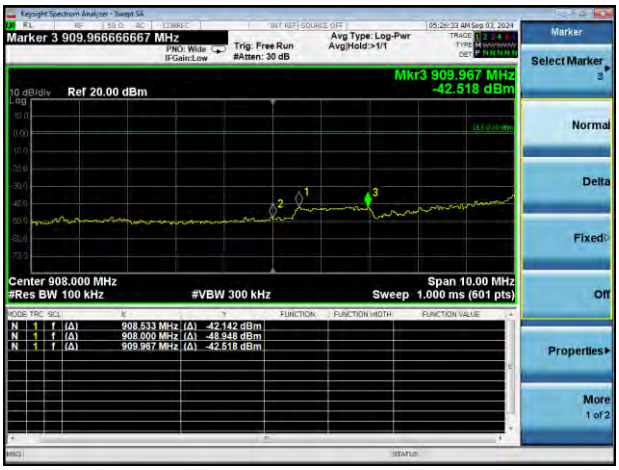
LoRa (1523kHz) LOW CHANNEL, BAND EDGE



LoRa (1523kHz) HIGH CHANNEL, CARRIER LEVEL



LoRa (1523kHz) HIGH CHANNEL, BAND EDGE



A.5 Conducted Emissions

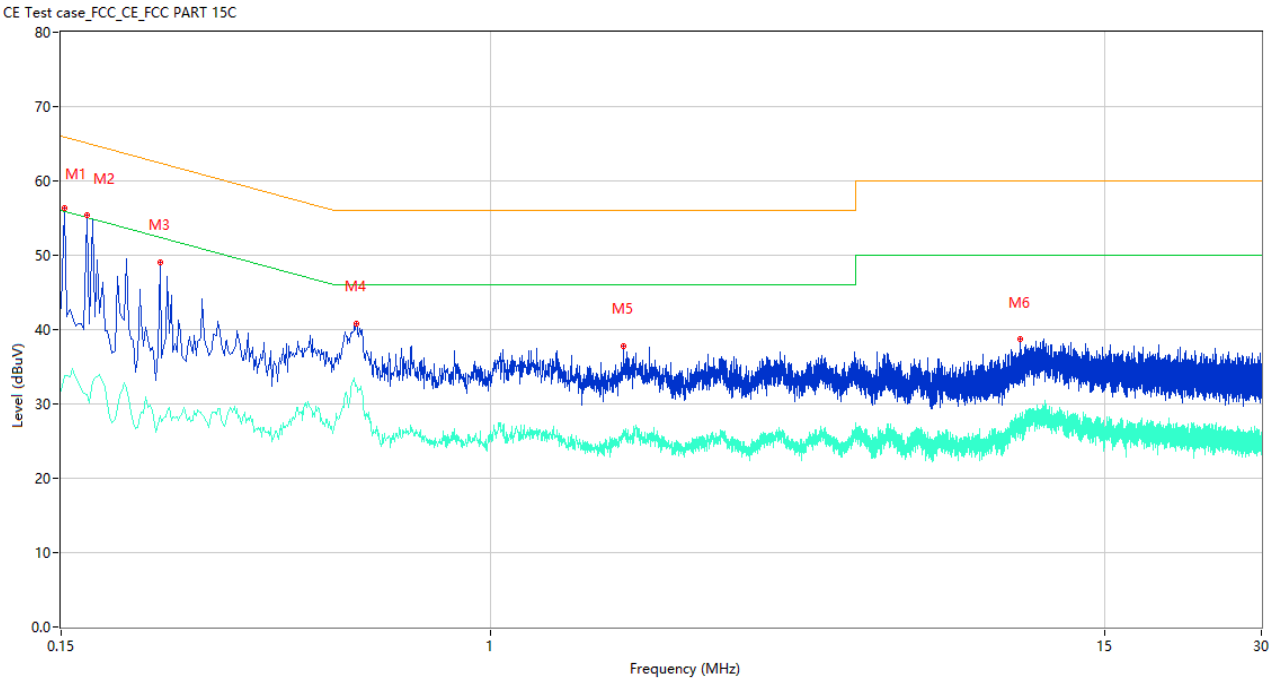
Note [1]: The EUT is working in the Normal link mode.

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).

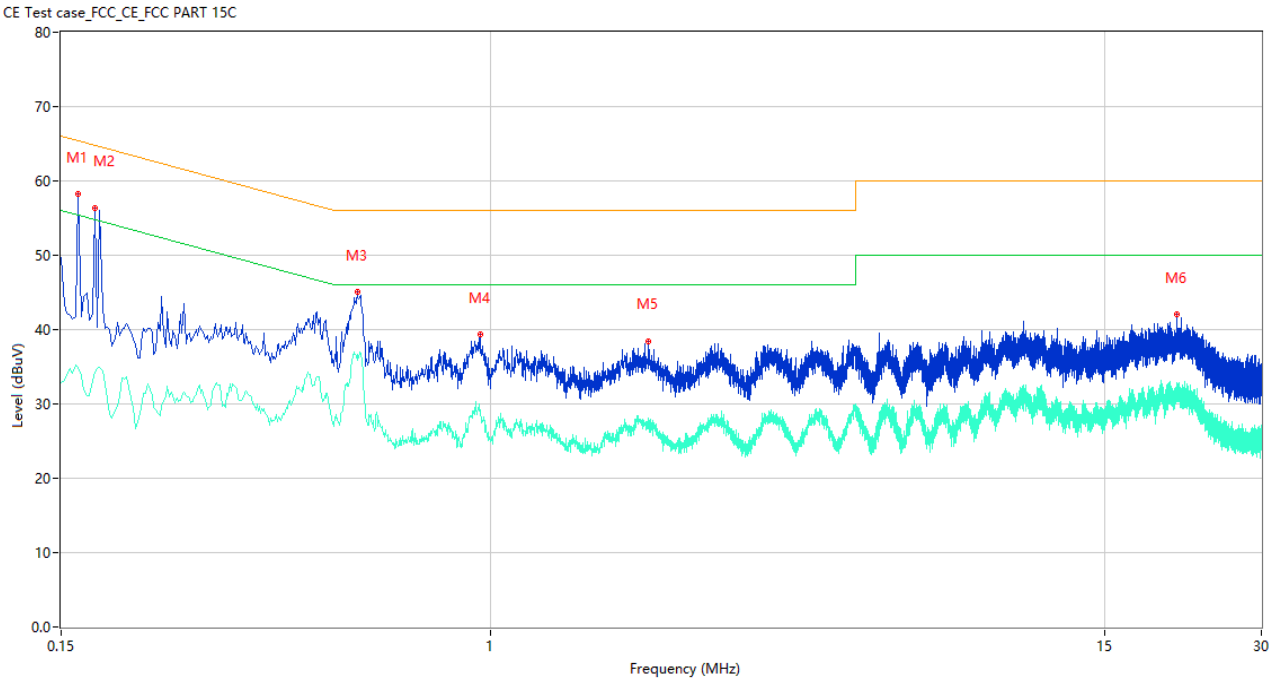
Test Data and Plots

PHASE L



No.	Frequency (MHz)	Results (dBuV)	Factor (dB)	Limit (dBuV)	Margin (dB)	Detector	Line	Verdict
1	0.152	56.39	9.78	65.89	9.50	Peak	L	Pass
1**	0.152	33.86	9.78	55.89	22.03	AV	L	Pass
2	0.168	55.33	9.78	65.06	9.73	Peak	L	Pass
2**	0.168	31.20	9.78	55.06	23.86	AV	L	Pass
3	0.232	49.11	9.77	62.38	13.27	Peak	L	Pass
3**	0.232	28.47	9.77	52.38	23.91	AV	L	Pass
4	0.552	40.83	10.03	56.00	15.17	Peak	L	Pass
4**	0.552	32.47	10.03	46.00	13.53	AV	L	Pass
5	1.796	37.84	10.19	56.00	18.16	Peak	L	Pass
5**	1.796	26.53	10.19	46.00	19.47	AV	L	Pass
6	10.326	38.78	10.51	60.00	21.22	Peak	L	Pass
6**	10.326	28.30	10.51	50.00	21.70	AV	L	Pass

PHASE N



No.	Frequency (MHz)	Results (dBuV)	Factor (dB)	Limit (dBuV)	Margin (dB)	Detector	Line	Verdict
1	0.162	58.18	9.78	65.36	7.18	Peak	N	Pass
1**	0.162	34.89	9.78	55.36	20.47	AV	N	Pass
2	0.174	56.34	9.78	64.77	8.43	Peak	N	Pass
2**	0.174	34.31	9.78	54.77	20.46	AV	N	Pass
3	0.554	45.00	10.04	56.00	11.00	Peak	N	Pass
3**	0.554	35.91	10.04	46.00	10.09	AV	N	Pass
4	0.954	39.30	10.05	56.00	16.70	Peak	N	Pass
4**	0.954	29.22	10.05	46.00	16.78	AV	N	Pass
5	2.008	38.49	10.27	56.00	17.51	Peak	N	Pass
5**	2.008	28.14	10.27	46.00	17.86	AV	N	Pass
6	20.706	42.06	10.88	60.00	17.94	Peak	N	Pass
6**	20.706	32.28	10.88	50.00	17.72	AV	N	Pass

A.6 Radiated Spurious Emission

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

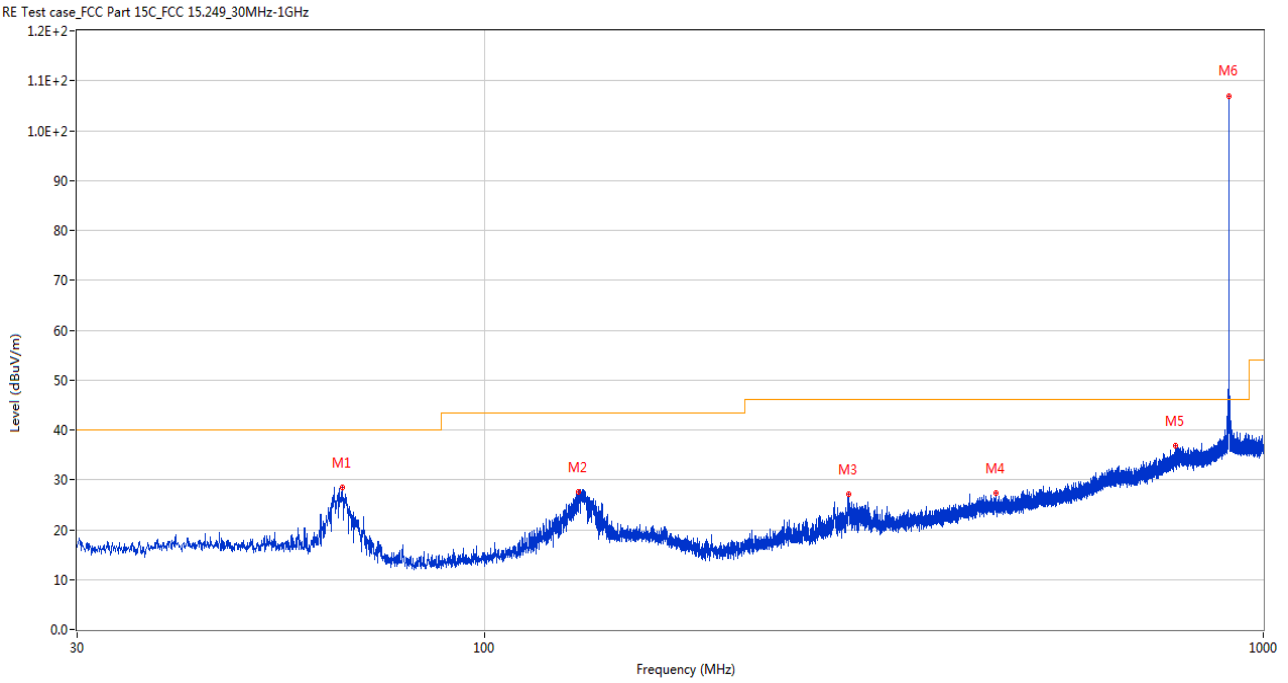
Note [2]: For the test data above 1 GHz, according the ANSI C63.4-2014, where limits are specified for both average and peak (or quasi-peak) detector functions, if the peak (or quasi-peak) measured value complies with the average limit, it is unnecessary to perform an average measurement.

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.

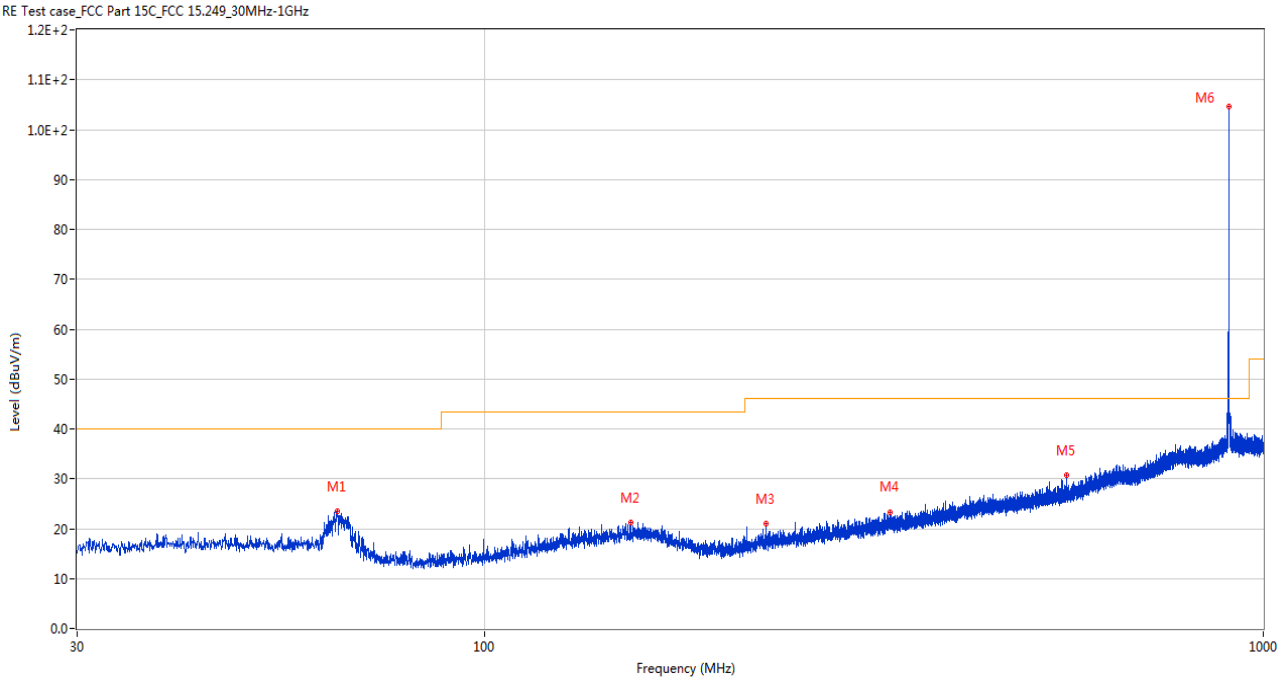
Test Data and Plots

LoRa (500kHz) LOW CHANNEL, 30 MHz to 1 GHz, ANT H



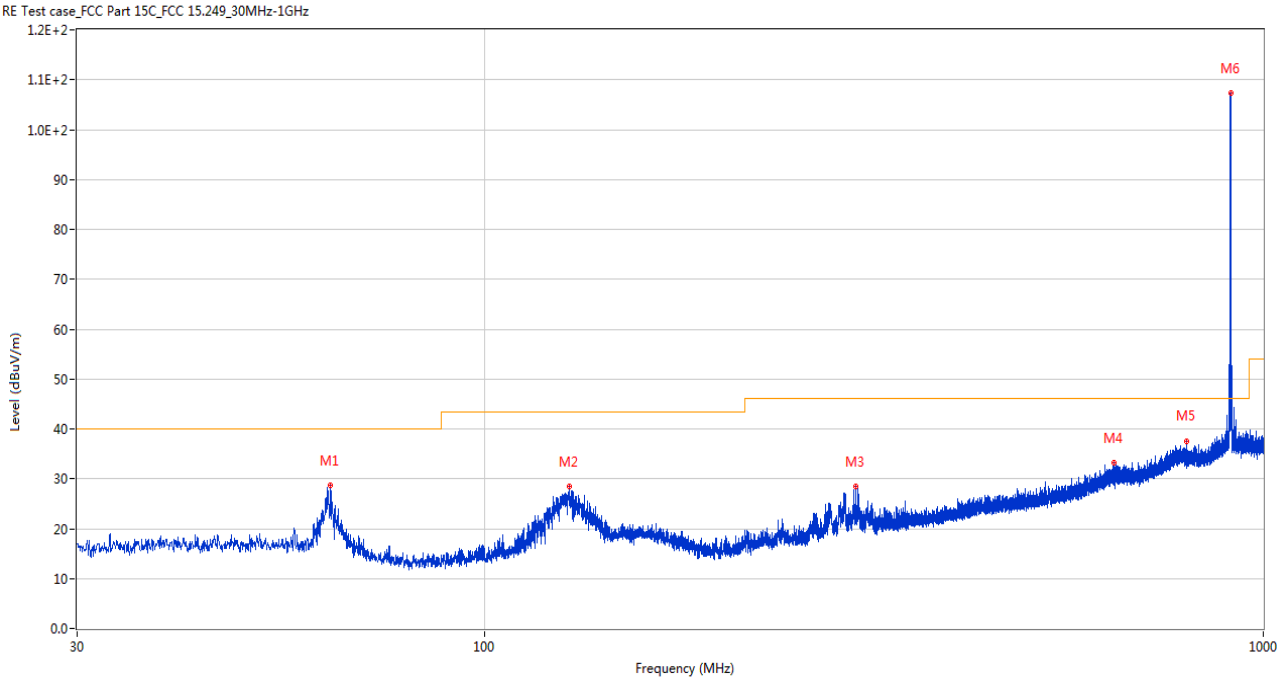
No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	65.647	28.46	-27.40	40.0	11.54	Peak	241.00	150	Horizontal	Pass
2	132.189	27.53	-25.49	43.5	15.97	Peak	43.00	200	Horizontal	Pass
3	293.937	27.12	-23.87	46.0	18.88	Peak	230.00	150	Horizontal	Pass
4	453.308	27.42	-18.94	46.0	18.58	Peak	360.00	100	Horizontal	Pass
5	771.274	36.88	-9.85	46.0	9.12	Peak	20.00	150	Horizontal	Pass
6	903.242	106.98	-7.10	46.0	-60.98	Peak	276.00	150	Horizontal	N/A

LoRa (500kHz) LOW CHANNEL, 30 MHz to 1 GHz, ANT V



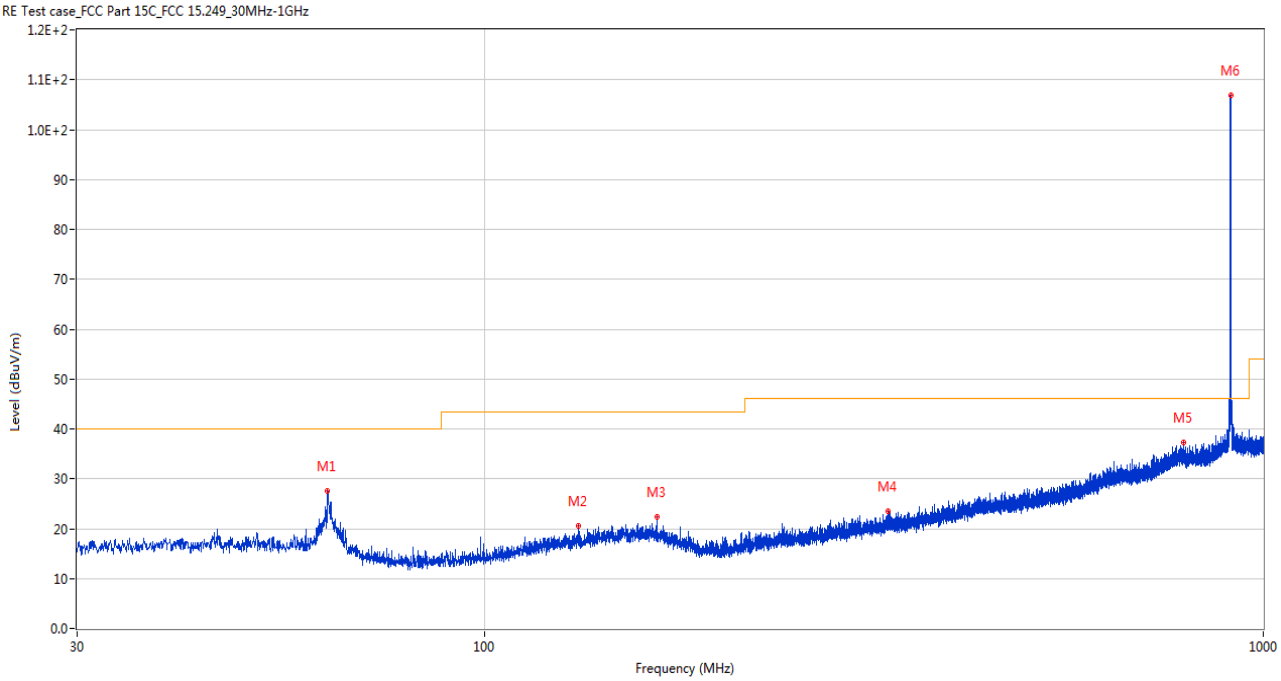
No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	64.823	23.49	-27.28	40.0	16.51	Peak	323.00	150	Vertical	Pass
2	154.111	21.19	-24.42	43.5	22.31	Peak	314.00	100	Vertical	Pass
3	229.723	21.00	-26.13	46.0	25.00	Peak	94.00	150	Vertical	Pass
4	331.913	23.39	-22.32	46.0	22.61	Peak	22.00	100	Vertical	Pass
5	558.698	30.77	-16.35	46.0	15.23	Peak	187.00	150	Vertical	Pass
6	903.000	104.56	-7.14	46.0	-58.56	Peak	62.00	150	Vertical	N/A

LoRa (500kHz) MIDDLE CHANNEL, 30 MHz to 1 GHz, ANT H



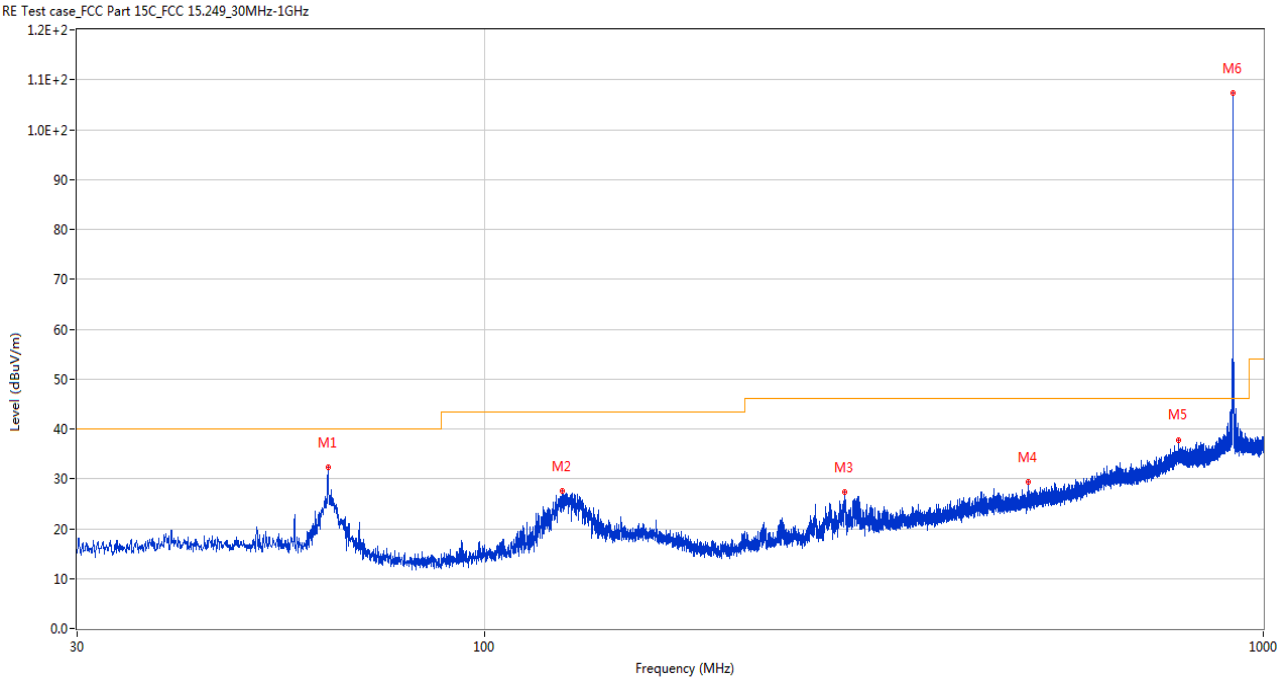
No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	63.465	28.70	-27.15	40.0	11.30	Peak	237.00	150	Horizontal	Pass
2	128.552	28.38	-25.77	43.5	15.12	Peak	223.00	150	Horizontal	Pass
3	299.466	28.38	-23.52	46.0	17.62	Peak	260.00	100	Horizontal	Pass
4	642.749	33.16	-13.12	46.0	12.84	Peak	177.00	150	Horizontal	Pass
5	797.270	37.63	-10.10	46.0	8.37	Peak	181.00	200	Horizontal	Pass
6	907.898	107.28	-6.99	46.0	-61.28	Peak	278.00	150	Horizontal	N/A

LoRa (500kHz) MIDDLE CHANNEL, 30 MHz to 1 GHz, ANT V



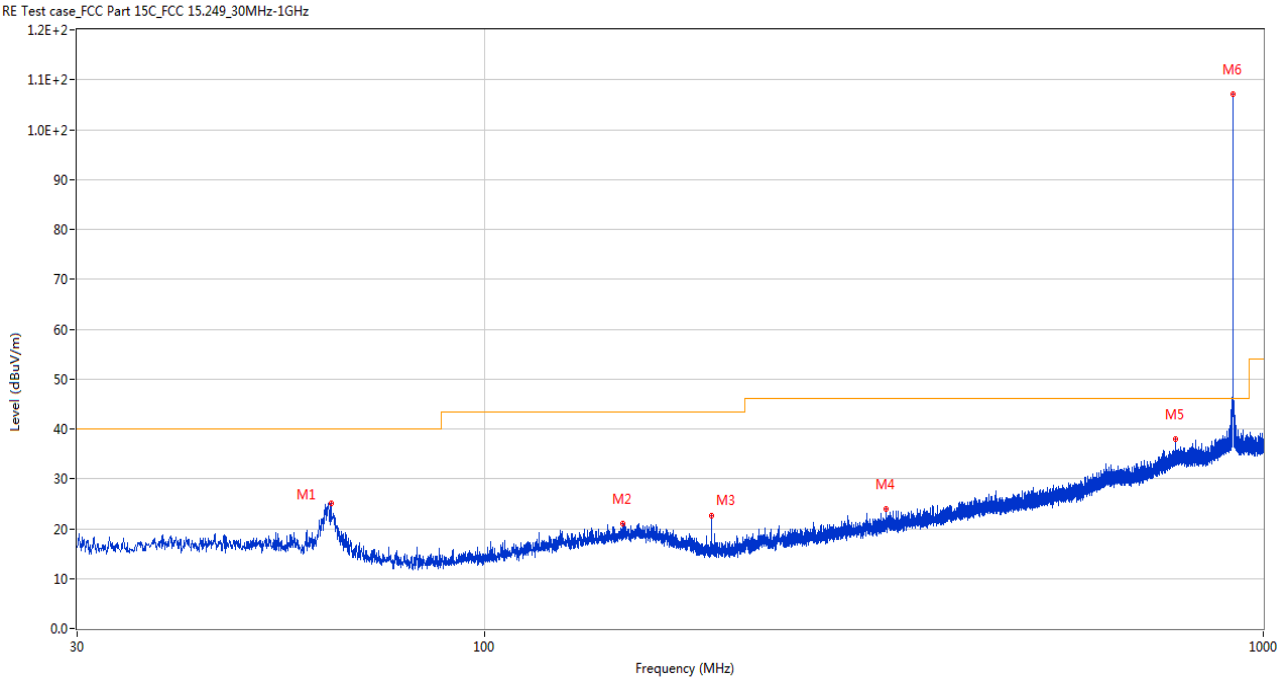
No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	62.931	27.50	-27.13	40.0	12.50	Peak	132.00	150	Vertical	Pass
2	132.141	20.52	-25.50	43.5	22.98	Peak	114.00	200	Vertical	Pass
3	166.576	22.28	-24.56	43.5	21.22	Peak	82.00	150	Vertical	Pass
4	330.263	23.45	-22.32	46.0	22.55	Peak	94.00	200	Vertical	Pass
5	789.122	37.28	-9.57	46.0	8.72	Peak	75.00	150	Vertical	Pass
6	907.656	106.94	-6.98	46.0	-60.94	Peak	128.00	150	Vertical	N/A

LoRa (500kHz) HIGH CHANNEL, 30 MHz to 1 GHz, ANT H



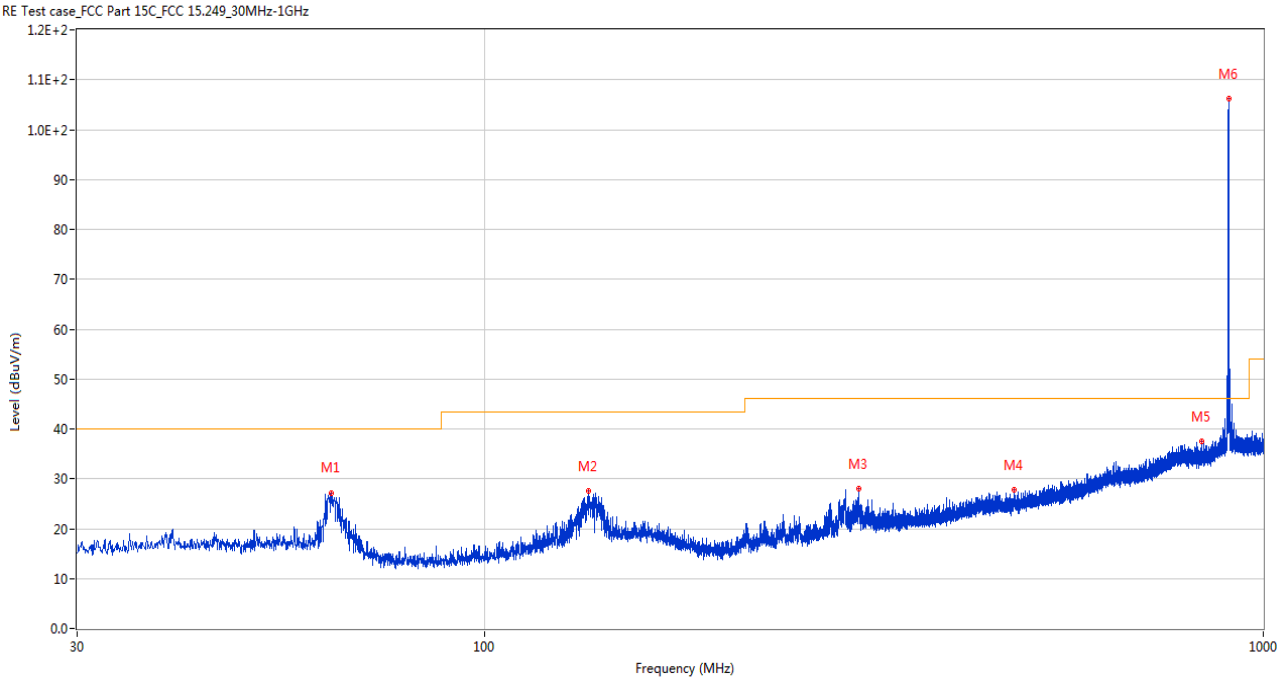
No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	63.029	32.27	-27.13	40.0	7.73	Peak	76.00	150	Horizontal	Pass
2	125.739	27.56	-25.85	43.5	15.94	Peak	27.00	100	Horizontal	Pass
3	290.203	27.32	-24.09	46.0	18.68	Peak	128.00	150	Horizontal	Pass
4	498.849	29.44	-18.02	46.0	16.56	Peak	4.00	150	Horizontal	Pass
5	777.773	37.83	-9.54	46.0	8.17	Peak	52.00	200	Horizontal	Pass
6	914.252	107.26	-7.44	46.0	-61.26	Peak	274.00	150	Horizontal	N/A

LoRa (500kHz) HIGH CHANNEL, 30 MHz to 1 GHz, ANT V



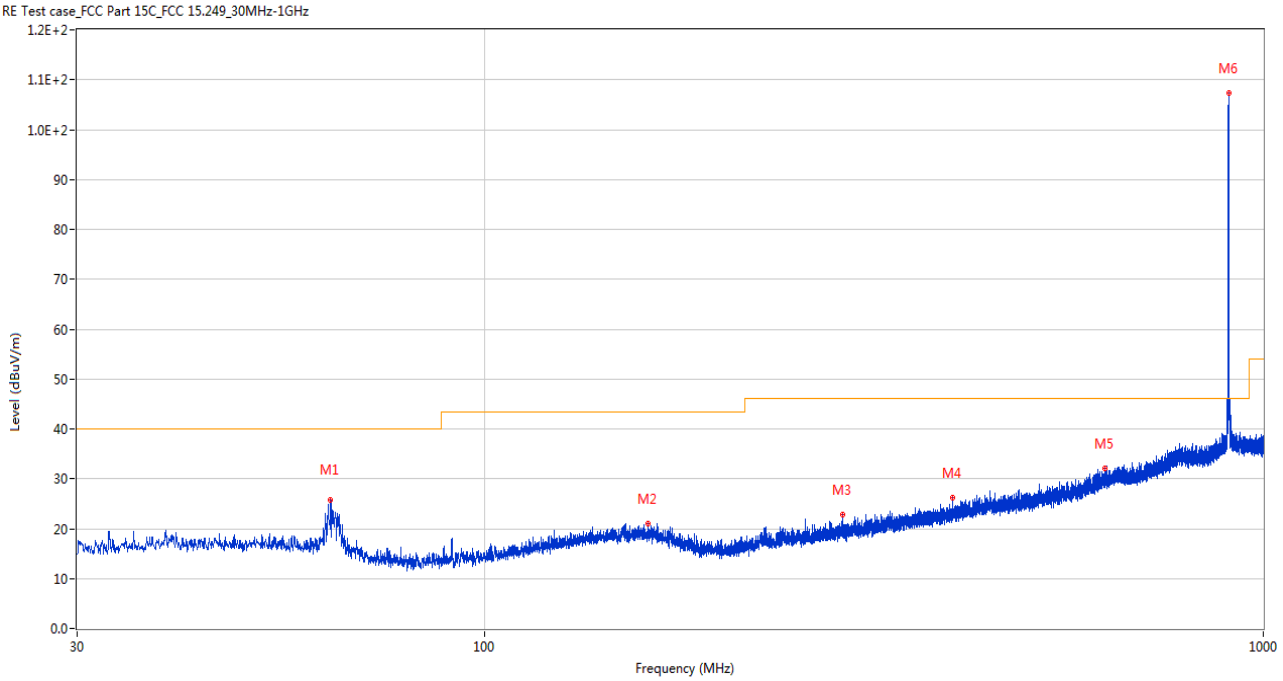
No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	63.514	25.04	-27.15	40.0	14.96	Peak	347.00	150	Vertical	Pass
2	150.765	21.09	-24.02	43.5	22.41	Peak	77.00	150	Vertical	Pass
3	195.628	22.49	-27.46	43.5	21.01	Peak	163.00	200	Vertical	Pass
4	328.033	24.03	-22.52	46.0	21.97	Peak	63.00	150	Vertical	Pass
5	771.953	38.00	-9.86	46.0	8.00	Peak	22.00	150	Vertical	Pass
6	914.349	107.07	-7.44	46.0	-61.07	Peak	128.00	150	Vertical	N/A

LoRa (500kHz-US915_2) LOW CHANNEL, 30 MHz to 1 GHz, ANT H



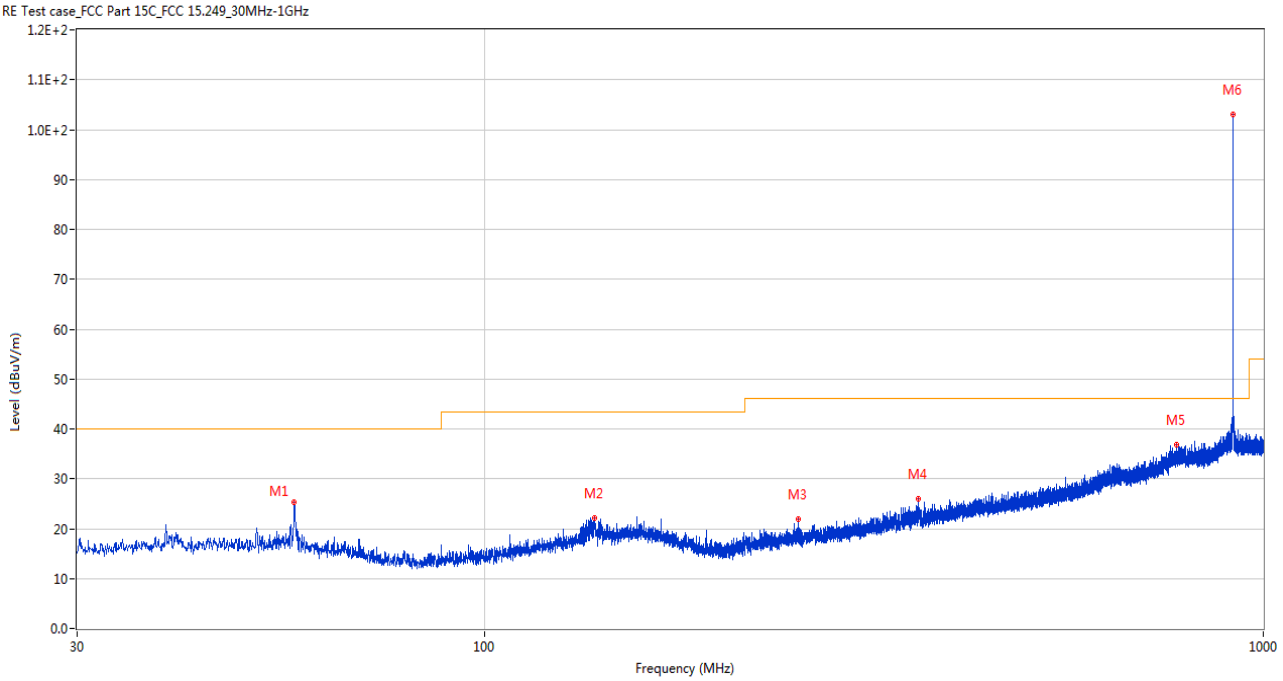
No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	63.514	27.23	-27.15	40.0	12.77	Peak	110.00	150	Horizontal	Pass
2	135.972	27.49	-25.07	43.5	16.01	Peak	63.00	100	Horizontal	Pass
3	302.328	28.02	-23.63	46.0	17.98	Peak	84.00	150	Horizontal	Pass
4	478.528	27.79	-18.75	46.0	18.21	Peak	187.00	200	Horizontal	Pass
5	833.257	37.49	-9.57	46.0	8.51	Peak	251.00	150	Horizontal	Pass
6	902.758	106.22	-7.18	46.0	-60.22	Peak	281.00	150	Horizontal	N/A

LoRa (500kHz-US915_2) LOW CHANNEL, 30 MHz to 1 GHz, ANT V



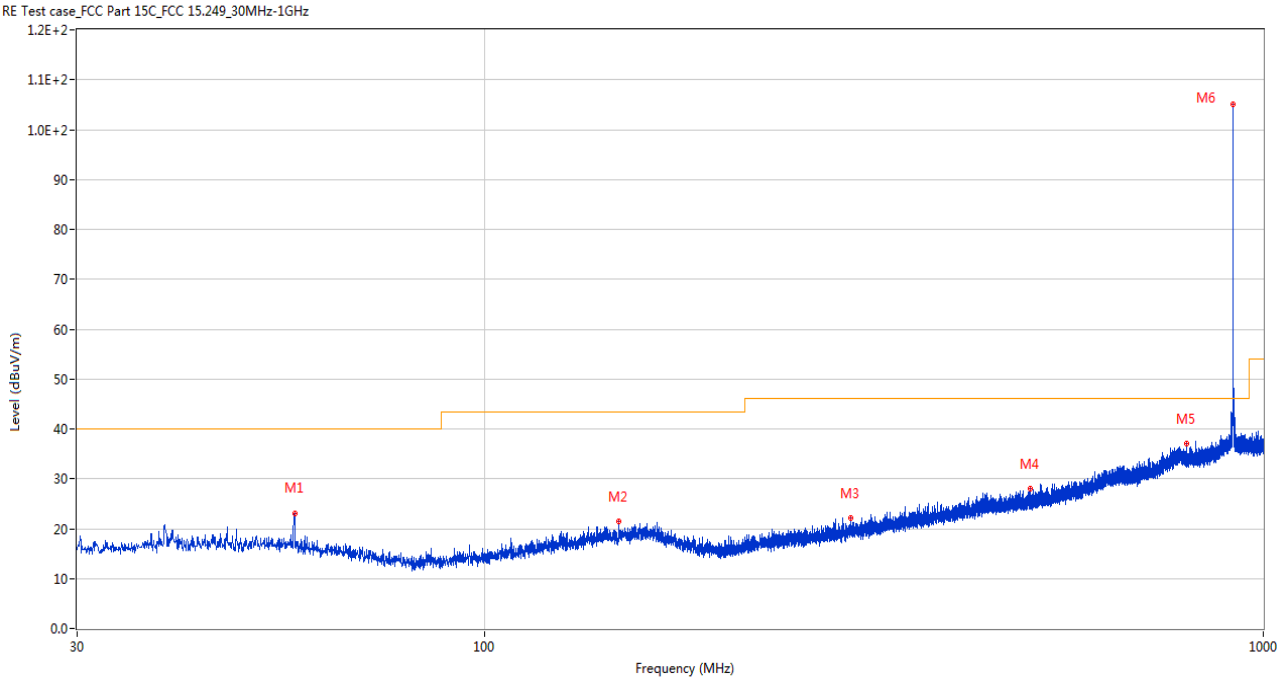
No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	63.465	25.65	-27.15	40.0	14.35	Peak	185.00	100	Vertical	Pass
2	162.211	21.07	-24.25	43.5	22.43	Peak	141.00	150	Vertical	Pass
3	288.457	22.73	-24.07	46.0	23.27	Peak	77.00	150	Vertical	Pass
4	399.134	26.11	-20.78	46.0	19.89	Peak	113.00	200	Vertical	Pass
5	625.919	32.01	-13.39	46.0	13.99	Peak	105.00	150	Vertical	Pass
6	902.515	107.25	-7.22	46.0	-61.25	Peak	126.00	150	Vertical	N/A

LoRa (500kHz-US915_2) MIDDLE CHANNEL, 30 MHz to 1 GHz, ANT H



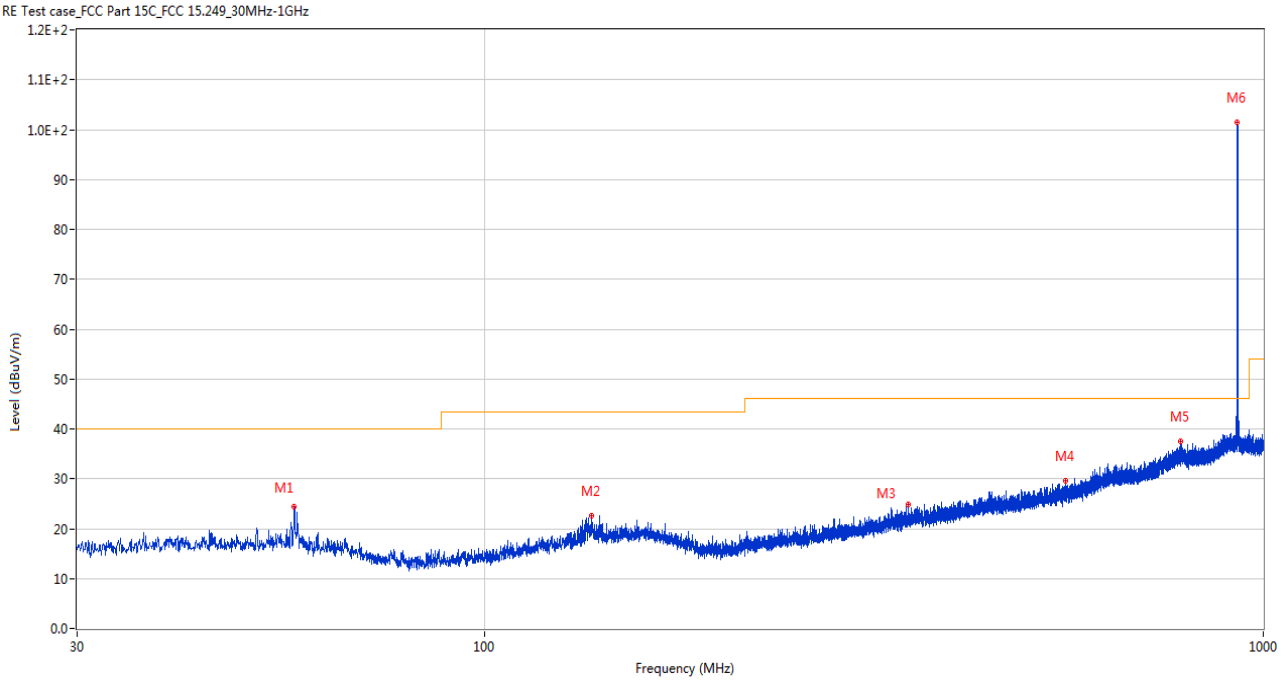
No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	56.966	25.32	-26.48	40.0	14.68	Peak	262.00	100	Horizontal	Pass
2	138.689	22.10	-24.94	43.5	21.40	Peak	83.00	150	Horizontal	Pass
3	253.003	21.91	-25.40	46.0	24.09	Peak	224.00	200	Horizontal	Pass
4	361.061	26.07	-21.87	46.0	19.93	Peak	215.00	150	Horizontal	Pass
5	774.087	36.92	-9.78	46.0	9.08	Peak	162.00	200	Horizontal	Pass
6	914.737	103.04	-7.43	46.0	-57.04	Peak	275.00	150	Horizontal	N/A

LoRa (500kHz-US915_2) MIDDLE CHANNEL, 30 MHz to 1 GHz, ANT V



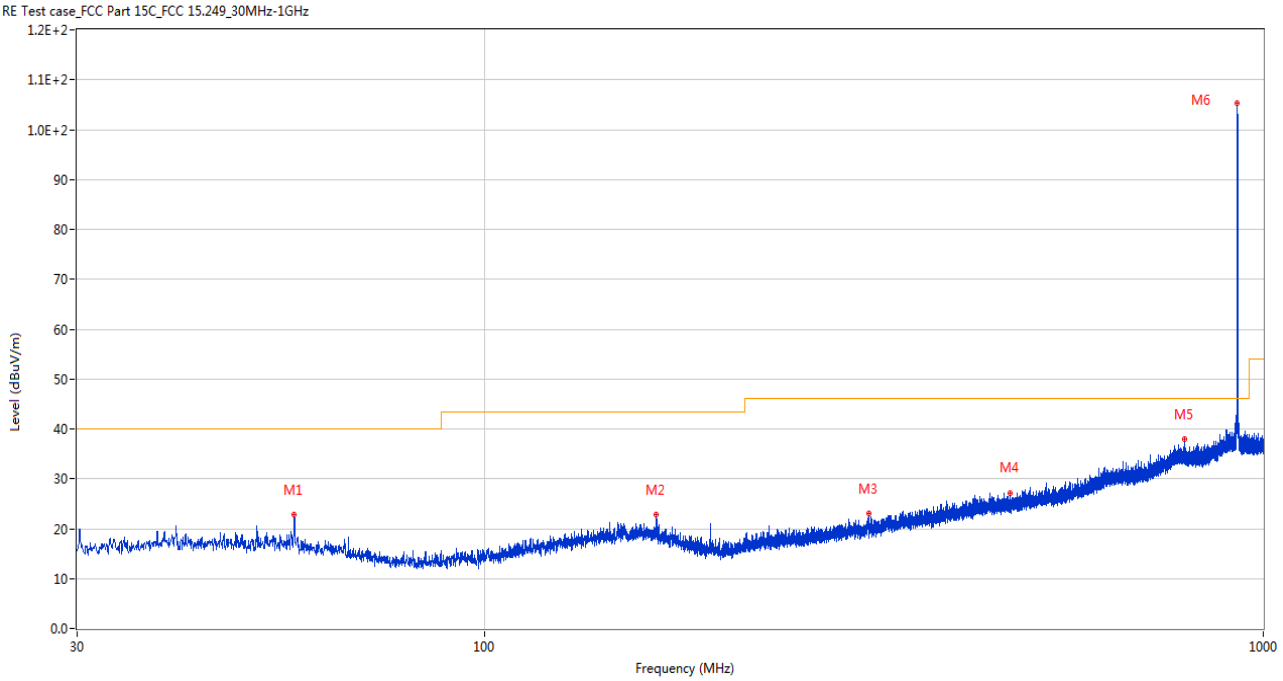
No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	57.063	23.14	-26.48	40.0	16.86	Peak	143.00	100	Vertical	Pass
2	148.728	21.53	-24.43	43.5	21.97	Peak	118.00	150	Vertical	Pass
3	295.004	22.16	-23.76	46.0	23.84	Peak	201.00	100	Vertical	Pass
4	501.711	27.97	-18.16	46.0	18.03	Peak	269.00	150	Vertical	Pass
5	798.046	37.01	-10.13	46.0	8.99	Peak	301.00	200	Vertical	Pass
6	914.446	105.19	-7.44	46.0	-59.19	Peak	329.00	150	Vertical	N/A

LoRa (500kHz-US915_2) HIGH CHANNEL, 30 MHz to 1 GHz, ANT H



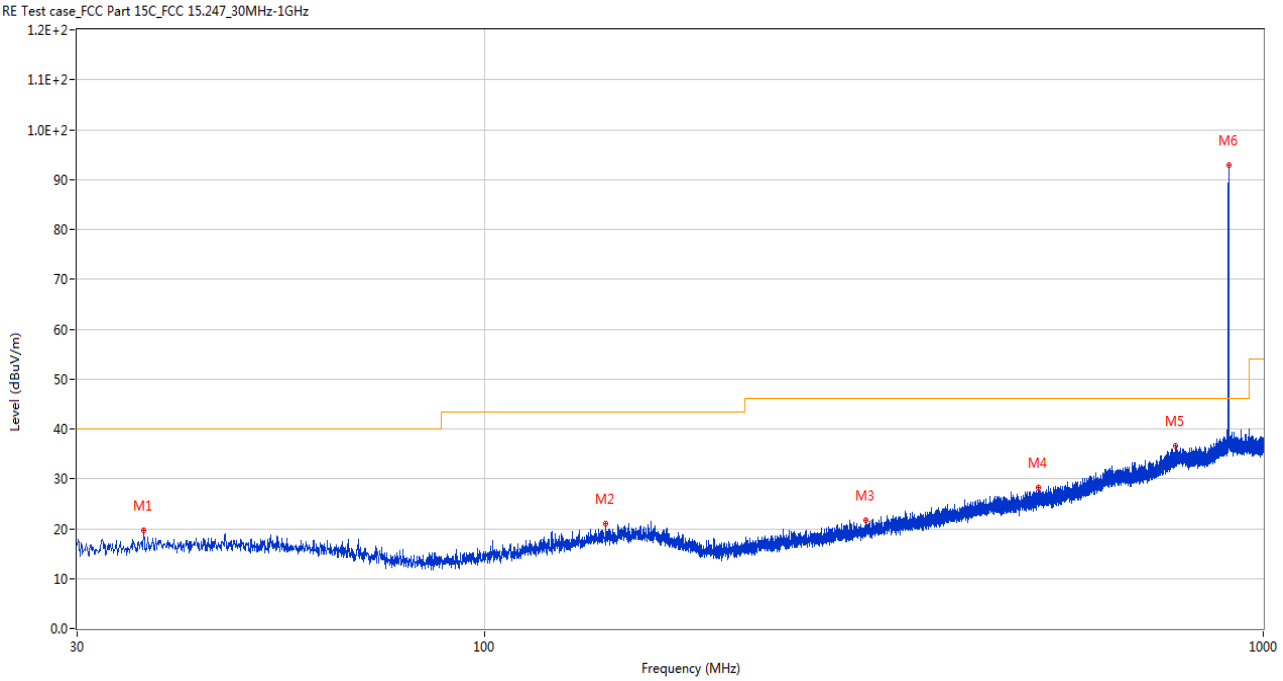
No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	57.014	24.31	-26.48	40.0	15.69	Peak	272.00	200	Horizontal	Pass
2	137.234	22.66	-25.00	43.5	20.84	Peak	270.00	150	Horizontal	Pass
3	350.537	24.91	-22.03	46.0	21.09	Peak	208.00	100	Horizontal	Pass
4	558.117	29.55	-16.38	46.0	16.45	Peak	15.00	150	Horizontal	Pass
5	783.545	37.44	-9.35	46.0	8.56	Peak	29.00	100	Horizontal	Pass
6	926.329	101.54	-7.53	46.0	-55.54	Peak	272.00	150	Horizontal	N/A

LoRa (500kHz-US915_2) HIGH CHANNEL, 30 MHz to 1 GHz, ANT V



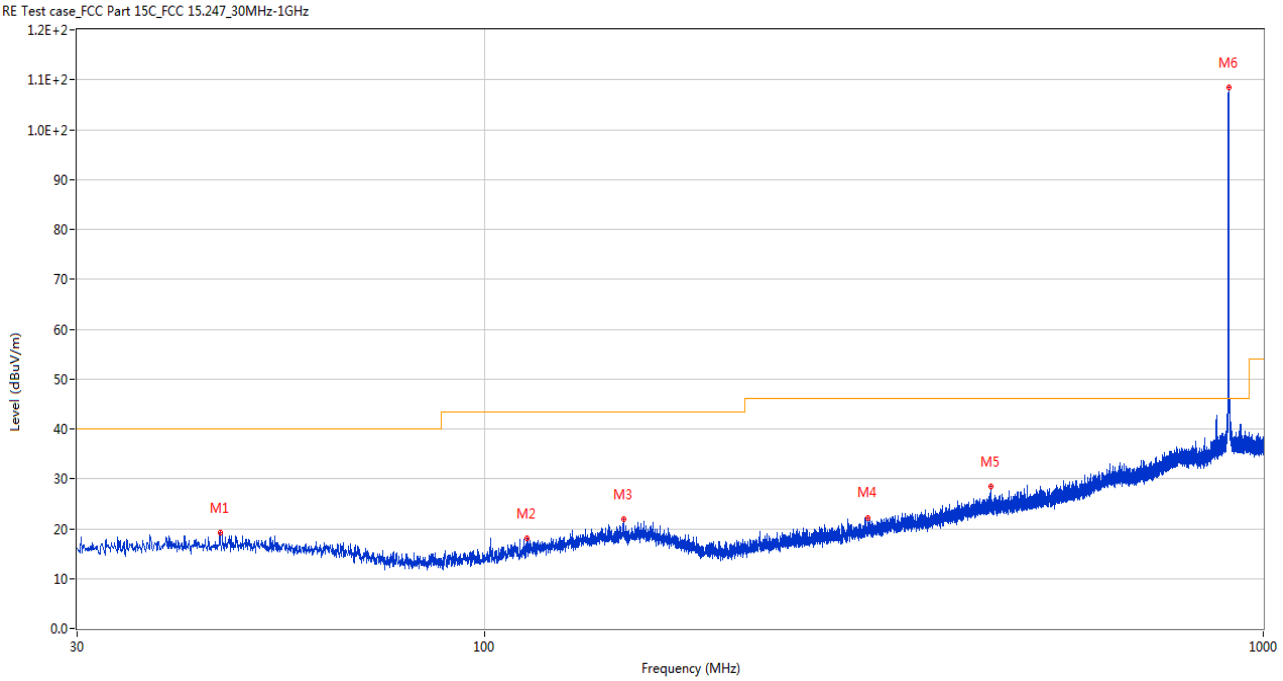
No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	57.014	22.74	-26.48	40.0	17.26	Peak	170.00	100	Vertical	Pass
2	166.188	22.82	-24.52	43.5	20.68	Peak	232.00	150	Vertical	Pass
3	311.397	23.08	-22.98	46.0	22.92	Peak	100.00	100	Vertical	Pass
4	472.950	27.21	-18.80	46.0	18.79	Peak	131.00	150	Vertical	Pass
5	792.566	37.94	-9.70	46.0	8.06	Peak	176.00	200	Vertical	Pass
6	926.668	105.42	-7.50	46.0	-59.42	Peak	116.00	150	Vertical	N/A

LoRa (1532kHz) LOW CHANNEL, 30 MHz to 1 GHz, ANT H



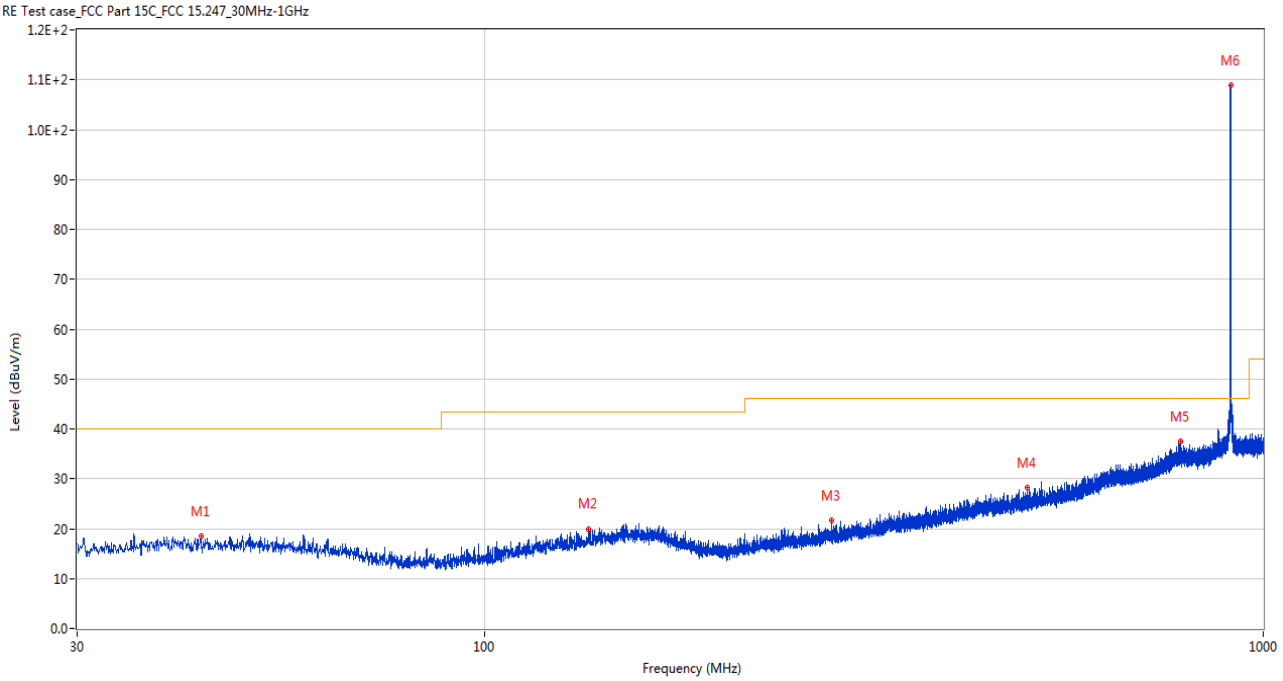
No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	36.547	19.59	-26.33	40.0	20.41	Peak	1.00	150	Horizontal	Pass
2	143.199	20.95	-24.64	43.5	22.55	Peak	258.00	150	Horizontal	Pass
3	309.214	21.74	-23.09	46.0	24.26	Peak	129.00	150	Horizontal	Pass
4	513.885	28.16	-17.83	46.0	17.84	Peak	157.00	150	Horizontal	Pass
5	771.953	36.53	-9.86	46.0	9.47	Peak	61.00	150	Horizontal	Pass
6	903.146	92.86	-7.11	46.0	-46.86	Peak	218.00	150	Horizontal	N/A

LoRa (1532kHz) LOW CHANNEL, 30 MHz to 1 GHz, ANT V



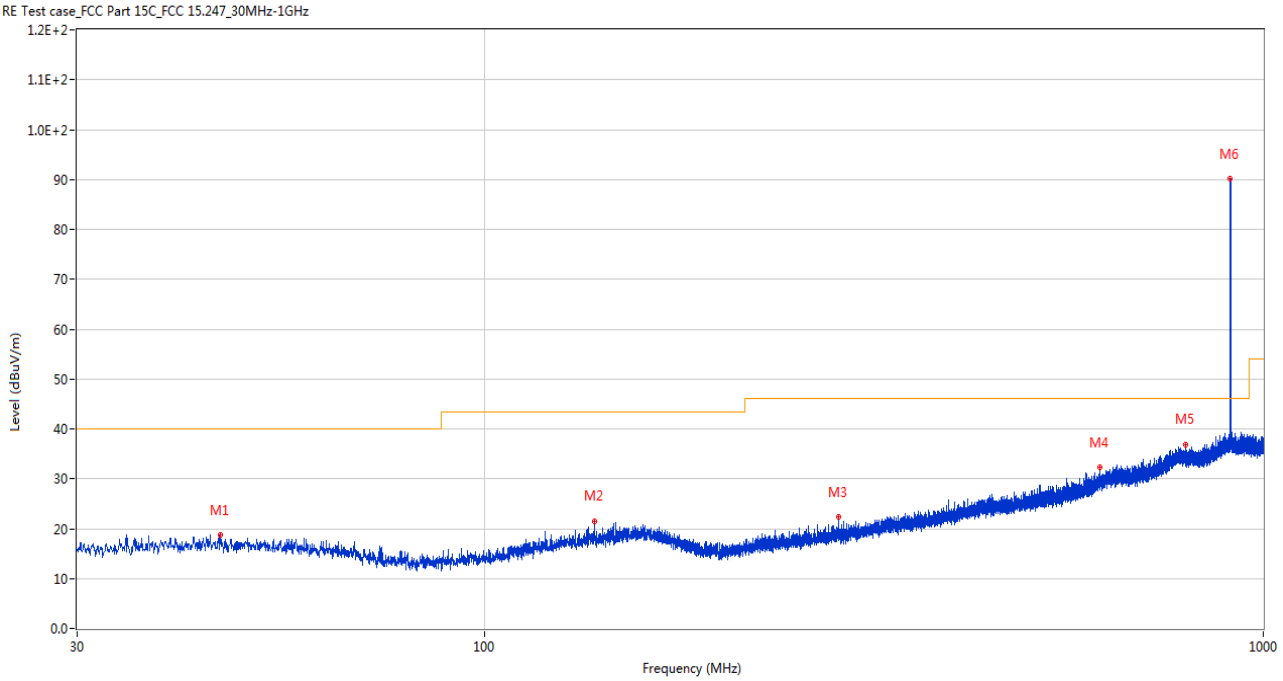
No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	45.763	19.27	-26.00	40.0	20.73	Peak	169.00	150	Vertical	Pass
2	113.274	18.07	-27.03	43.5	25.43	Peak	277.00	150	Vertical	Pass
3	150.959	21.96	-23.99	43.5	21.54	Peak	166.00	150	Vertical	Pass
4	310.475	22.25	-22.94	46.0	23.75	Peak	244.00	150	Vertical	Pass
5	446.954	28.45	-19.04	46.0	17.55	Peak	82.00	150	Vertical	Pass
6	903.485	108.54	-7.09	46.0	-62.54	Peak	0.00	150	Vertical	N/A

LoRa (1532kHz) MIDDLE CHANNEL, 30 MHz to 1 GHz, ANT H



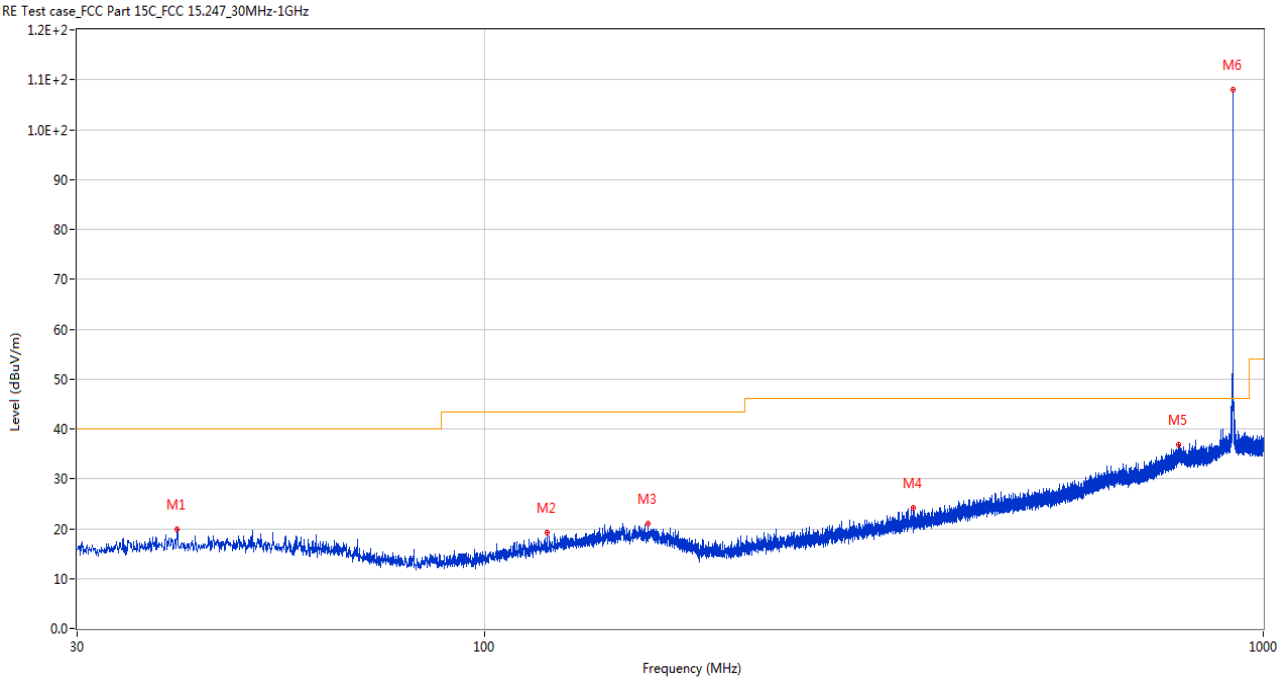
No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	43.240	18.56	-26.04	40.0	21.44	Peak	192.00	150	Horizontal	Pass
2	136.118	20.00	-25.06	43.5	23.50	Peak	345.00	150	Horizontal	Pass
3	279.435	21.73	-24.42	46.0	24.27	Peak	17.00	150	Horizontal	Pass
4	497.394	28.18	-18.10	46.0	17.82	Peak	249.00	150	Horizontal	Pass
5	783.981	37.40	-9.30	46.0	8.60	Peak	216.00	150	Horizontal	Pass
6	907.656	108.97	-6.98	46.0	-62.97	Peak	9.00	150	Horizontal	N/A

LoRa (1532kHz) MIDDLE CHANNEL, 30 MHz to 1 GHz, ANT V



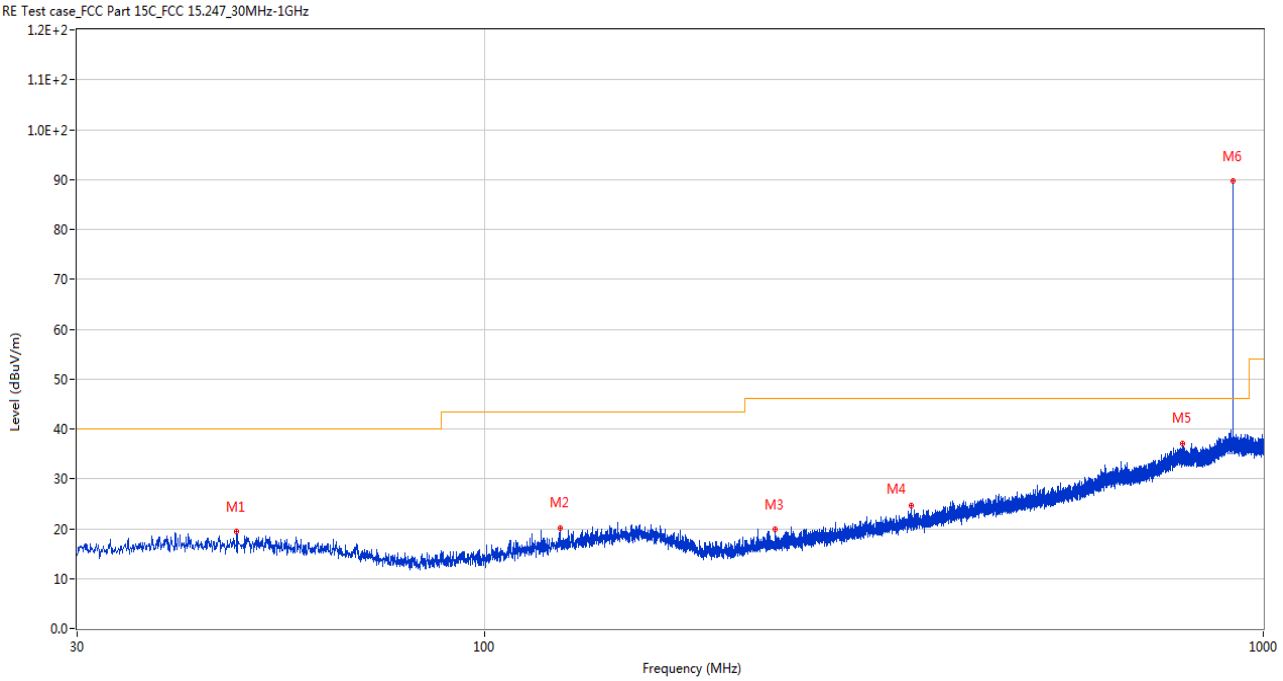
No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	45.763	18.68	-26.00	40.0	21.32	Peak	286.00	150	Vertical	Pass
2	138.446	21.58	-24.96	43.5	21.92	Peak	268.00	150	Vertical	Pass
3	285.255	22.39	-24.19	46.0	23.61	Peak	211.00	150	Vertical	Pass
4	616.511	32.22	-13.92	46.0	13.78	Peak	360.00	150	Vertical	Pass
5	795.572	36.93	-9.85	46.0	9.07	Peak	222.00	150	Vertical	Pass
6	907.511	90.09	-7.01	46.0	-44.09	Peak	197.00	150	Vertical	N/A

LoRa (1532kHz) HIGH CHANNEL, 30 MHz to 1 GHz, ANT H



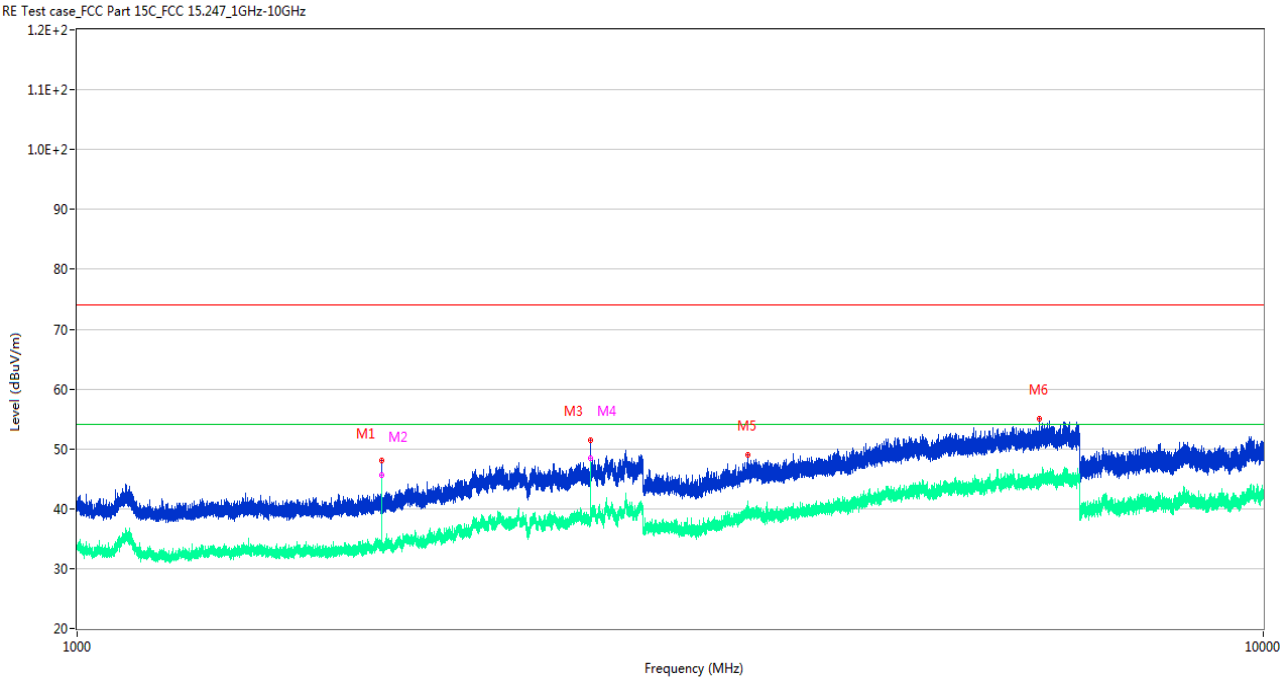
No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	40.331	19.95	-26.00	40.0	20.05	Peak	336.00	150	Horizontal	Pass
2	120.258	19.16	-26.44	43.5	24.34	Peak	314.00	150	Horizontal	Pass
3	162.357	21.01	-24.24	43.5	22.49	Peak	53.00	150	Horizontal	Pass
4	354.950	24.20	-21.91	46.0	21.80	Peak	274.00	150	Horizontal	Pass
5	778.695	36.74	-9.55	46.0	9.26	Peak	226.00	150	Horizontal	Pass
6	914.688	107.99	-7.43	46.0	-61.99	Peak	10.00	150	Horizontal	N/A

LoRa (1532kHz) HIGH CHANNEL, 30 MHz to 1 GHz, ANT V



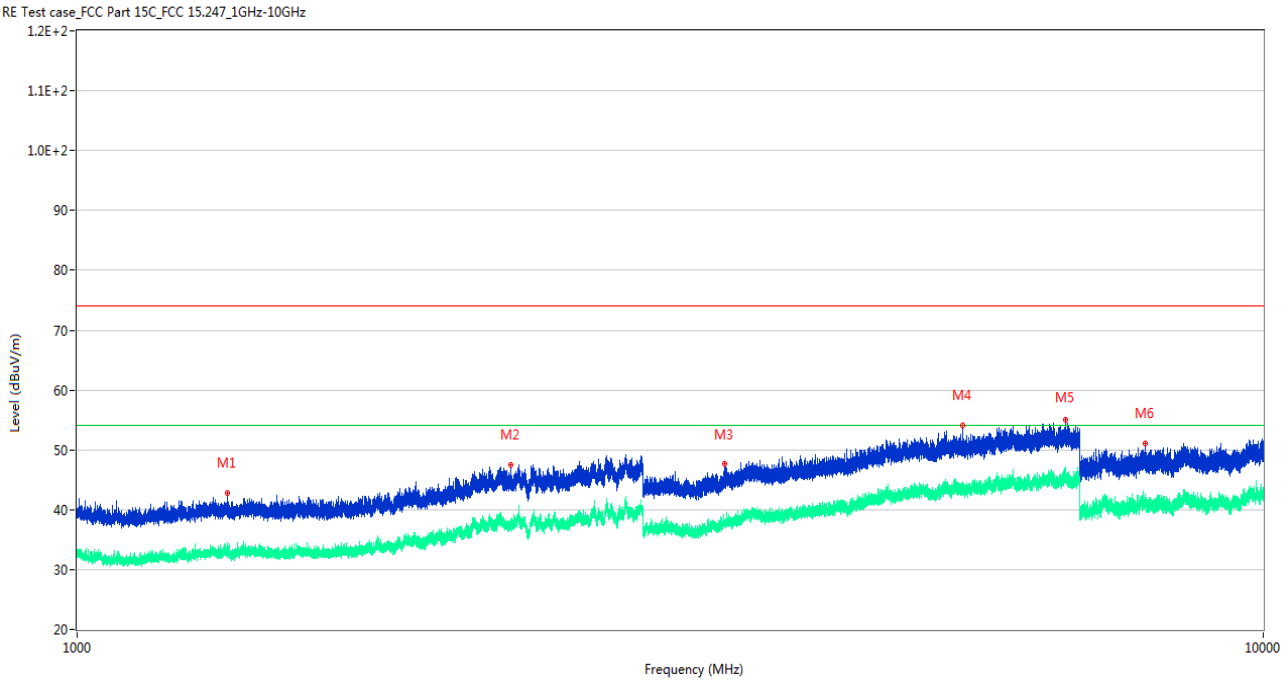
No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	48.090	19.47	-26.01	40.0	20.53	Peak	232.00	150	Vertical	Pass
2	124.963	20.22	-25.94	43.5	23.28	Peak	115.00	150	Vertical	Pass
3	236.077	19.84	-25.88	46.0	26.16	Peak	318.00	150	Vertical	Pass
4	353.689	24.69	-22.01	46.0	21.31	Peak	175.00	150	Vertical	Pass
5	788.492	37.17	-9.57	46.0	8.83	Peak	331.00	150	Vertical	Pass
6	914.688	89.67	-7.43	46.0	-43.67	Peak	45.00	150	Vertical	N/A

LoRa (500kHz) LOW CHANNEL 1 GHz to 10 GHz, ANT H



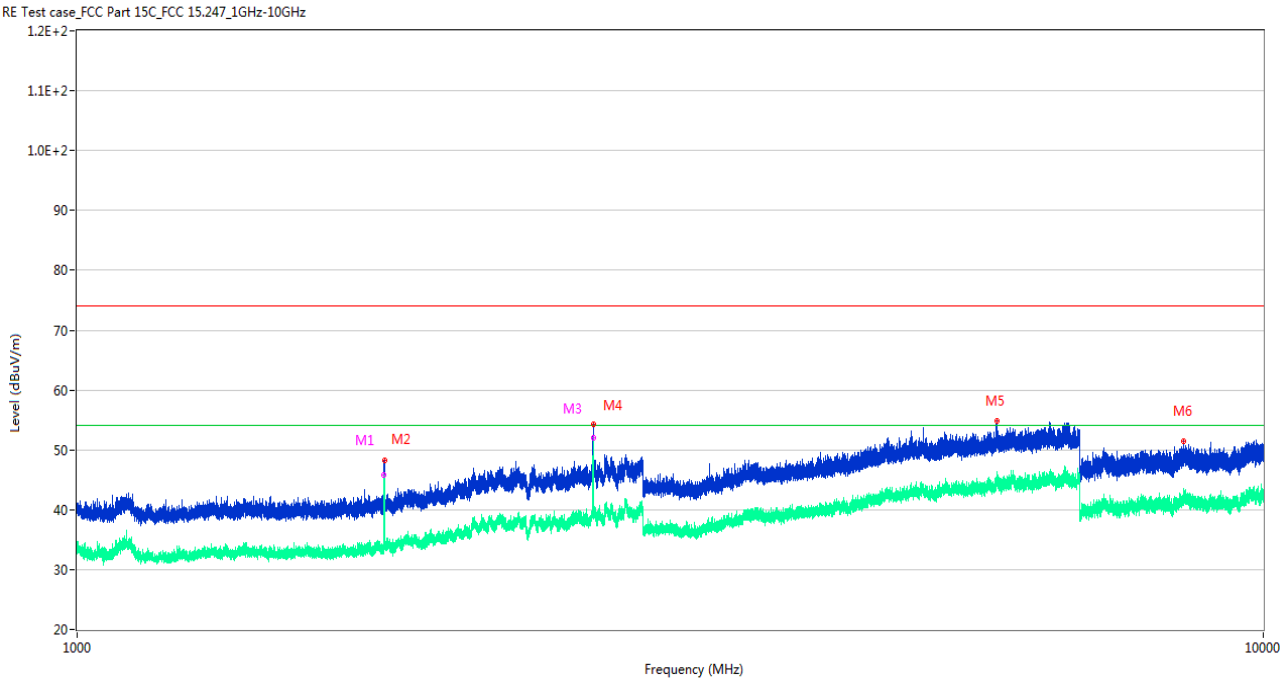
No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	1805.800	47.99	-13.06	74.0	26.01	Peak	45.00	400	Horizontal	Pass
1**	1805.800	45.41	-13.06	54.0	8.59	AV	45.00	400	Horizontal	Pass
2	1805.900	47.41	-13.07	74.0	26.59	Peak	57.00	300	Horizontal	Pass
2**	1805.900	45.55	-13.07	54.0	8.45	AV	57.00	300	Horizontal	Pass
3	2708.800	51.42	-7.06	74.0	22.58	Peak	360.00	100	Horizontal	Pass
3**	2708.800	47.97	-7.06	54.0	6.03	AV	360.00	100	Horizontal	Pass
4	2709.400	50.52	-7.01	74.0	23.48	Peak	360.00	100	Horizontal	Pass
4**	2709.400	48.45	-7.01	54.0	5.55	AV	360.00	100	Horizontal	Pass
5	3680.000	48.96	-5.04	74.0	25.04	Peak	342.00	150	Horizontal	Pass
5**	3680.000	39.61	-5.04	54.0	14.39	AV	342.00	150	Horizontal	Pass
6	6475.600	55.00	-0.89	74.0	19.00	Peak	332.00	200	Horizontal	Pass
6**	6475.600	44.42	-0.89	54.0	9.58	AV	332.00	200	Horizontal	Pass

LoRa (500kHz) LOW CHANNEL 1 GHz to 10 GHz, ANT V



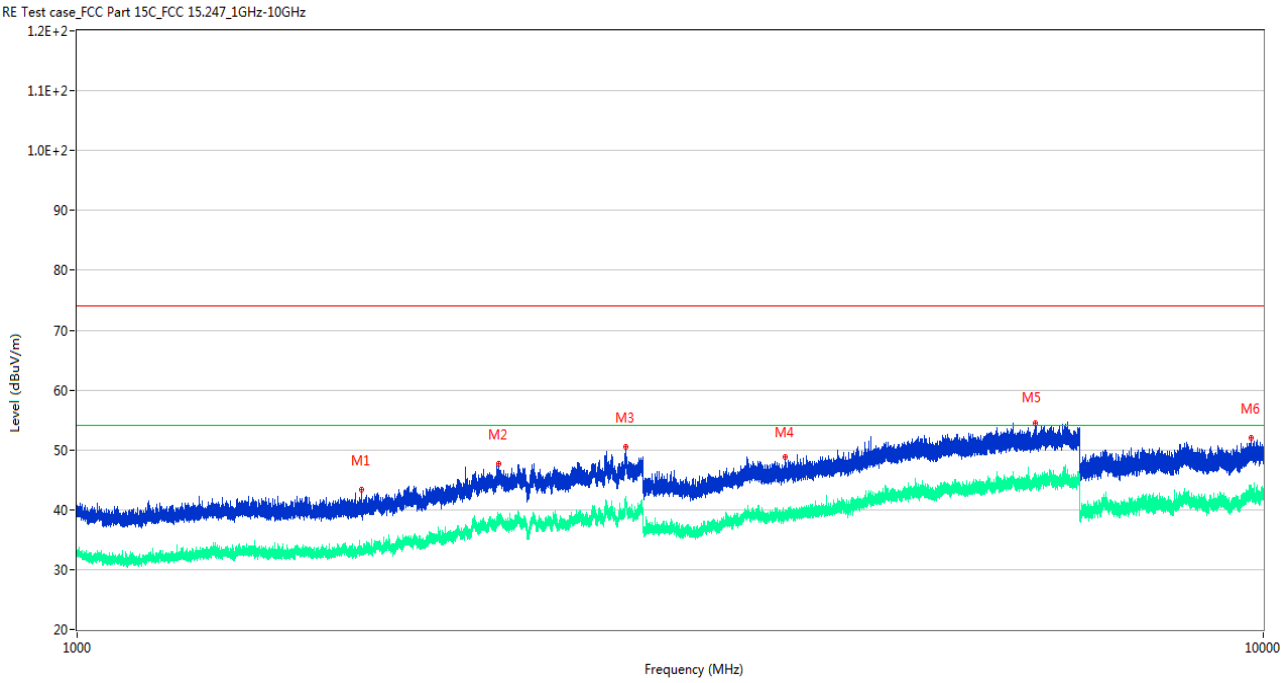
No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	1337.800	42.84	-13.41	74.0	31.16	Peak	188.00	400	Vertical	Pass
1**	1337.800	33.39	-13.41	54.0	20.61	AV	188.00	400	Vertical	Pass
2	2320.300	47.57	-8.64	74.0	26.43	Peak	335.00	300	Vertical	Pass
2**	2320.300	38.01	-8.64	54.0	15.99	AV	335.00	300	Vertical	Pass
3	3517.400	47.61	-6.50	74.0	26.39	Peak	37.00	150	Vertical	Pass
3**	3517.400	37.36	-6.50	54.0	16.64	AV	37.00	150	Vertical	Pass
4	5580.800	54.14	-1.69	74.0	19.86	Peak	131.00	200	Vertical	Pass
4**	5580.800	44.66	-1.69	54.0	9.34	AV	131.00	200	Vertical	Pass
5	6806.800	55.11	2.22	74.0	18.89	Peak	28.00	150	Vertical	Pass
5**	6806.800	45.84	2.22	54.0	8.16	AV	28.00	150	Vertical	Pass
6	7959.250	51.13	-2.52	74.0	22.87	Peak	89.00	300	Vertical	Pass
6**	7959.250	40.60	-2.52	54.0	13.40	AV	89.00	300	Vertical	Pass

LoRa (500kHz) MIDDLE CHANNEL 1 GHz to 10 GHz, ANT H



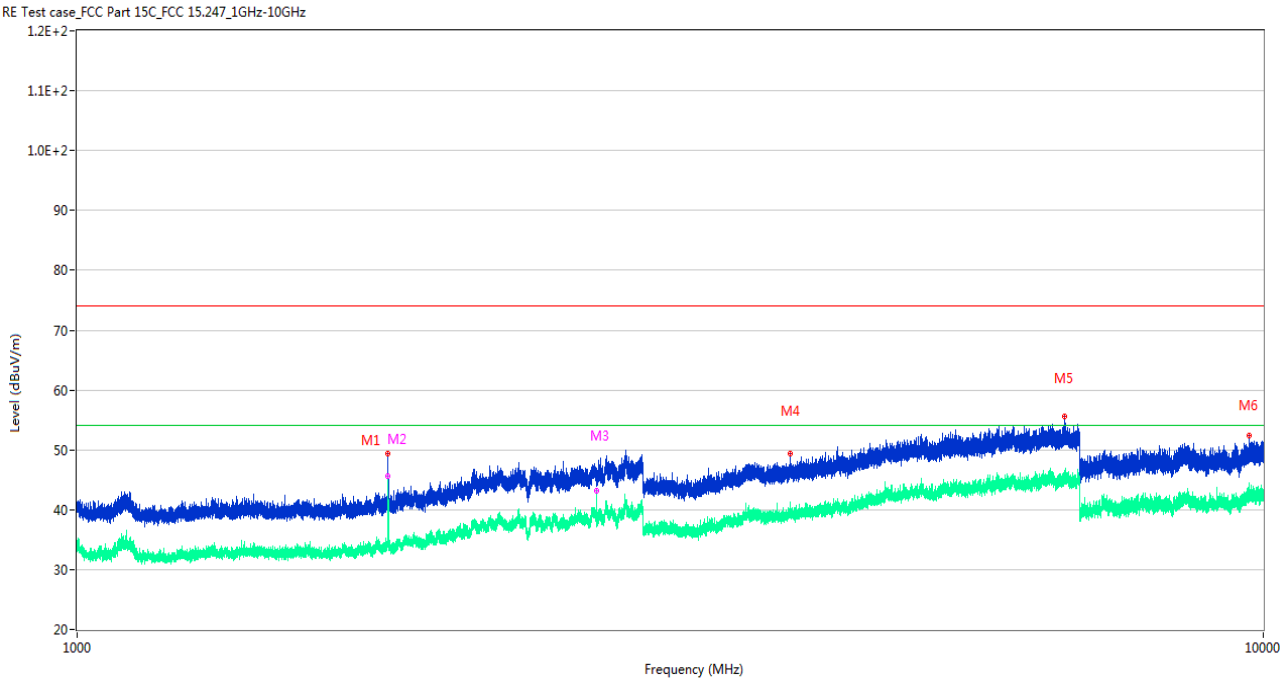
No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	1815.200	47.50	-13.10	74.0	26.50	Peak	49.00	400	Horizontal	Pass
1**	1815.200	45.89	-13.10	54.0	8.11	AV	49.00	400	Horizontal	Pass
2	1816.000	48.26	-13.07	74.0	25.74	Peak	54.00	100	Horizontal	Pass
2**	1816.000	44.93	-13.07	54.0	9.07	AV	54.00	100	Horizontal	Pass
3	2723.000	53.71	-6.48	74.0	20.29	Peak	210.00	200	Horizontal	Pass
3**	2723.000	51.95	-6.48	54.0	2.05	AV	210.00	200	Horizontal	Pass
4	2723.300	54.36	-6.50	74.0	19.64	Peak	240.00	400	Horizontal	Pass
4**	2723.300	51.72	-6.50	54.0	2.28	AV	240.00	400	Horizontal	Pass
5	5966.600	54.85	0.10	74.0	19.15	Peak	283.00	200	Horizontal	Pass
5**	5966.600	45.08	0.10	54.0	8.92	AV	283.00	200	Horizontal	Pass
6	8570.800	51.48	-2.06	74.0	22.52	Peak	336.00	100	Horizontal	Pass
6**	8570.800	41.28	-2.06	54.0	12.72	AV	336.00	100	Horizontal	Pass

LoRa (500kHz) MIDDLE CHANNEL 1 GHz to 10 GHz, ANT V



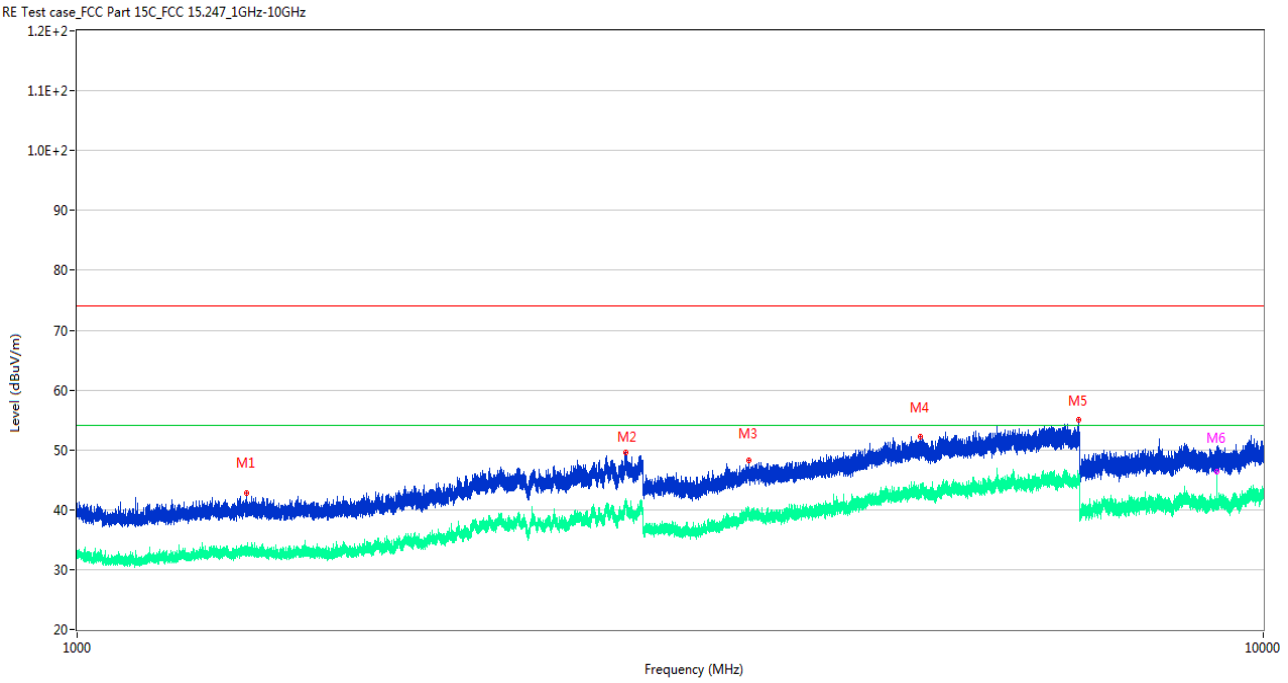
No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	1738.200	43.27	-13.55	74.0	30.73	Peak	295.00	400	Vertical	Pass
1**	1738.200	32.67	-13.55	54.0	21.33	AV	295.00	400	Vertical	Pass
2	2266.400	47.64	-7.75	74.0	26.36	Peak	266.00	200	Vertical	Pass
2**	2266.400	38.01	-7.75	54.0	15.99	AV	266.00	200	Vertical	Pass
3	2900.100	50.43	-3.75	74.0	23.57	Peak	277.00	150	Vertical	Pass
3**	2900.100	40.74	-3.75	54.0	13.26	AV	277.00	150	Vertical	Pass
4	3956.800	48.90	-4.48	74.0	25.10	Peak	131.00	100	Vertical	Pass
4**	3956.800	39.47	-4.48	54.0	14.53	AV	131.00	100	Vertical	Pass
5	6426.000	54.52	-0.67	74.0	19.48	Peak	173.00	100	Vertical	Pass
5**	6426.000	45.98	-0.67	54.0	8.02	AV	173.00	100	Vertical	Pass
6	9761.350	51.94	-0.39	74.0	22.06	Peak	302.00	400	Vertical	Pass
6**	9761.350	41.81	-0.39	54.0	12.19	AV	302.00	400	Vertical	Pass

LoRa (500kHz) HIGH CHANNEL 1 GHz to 10 GHz, ANT H



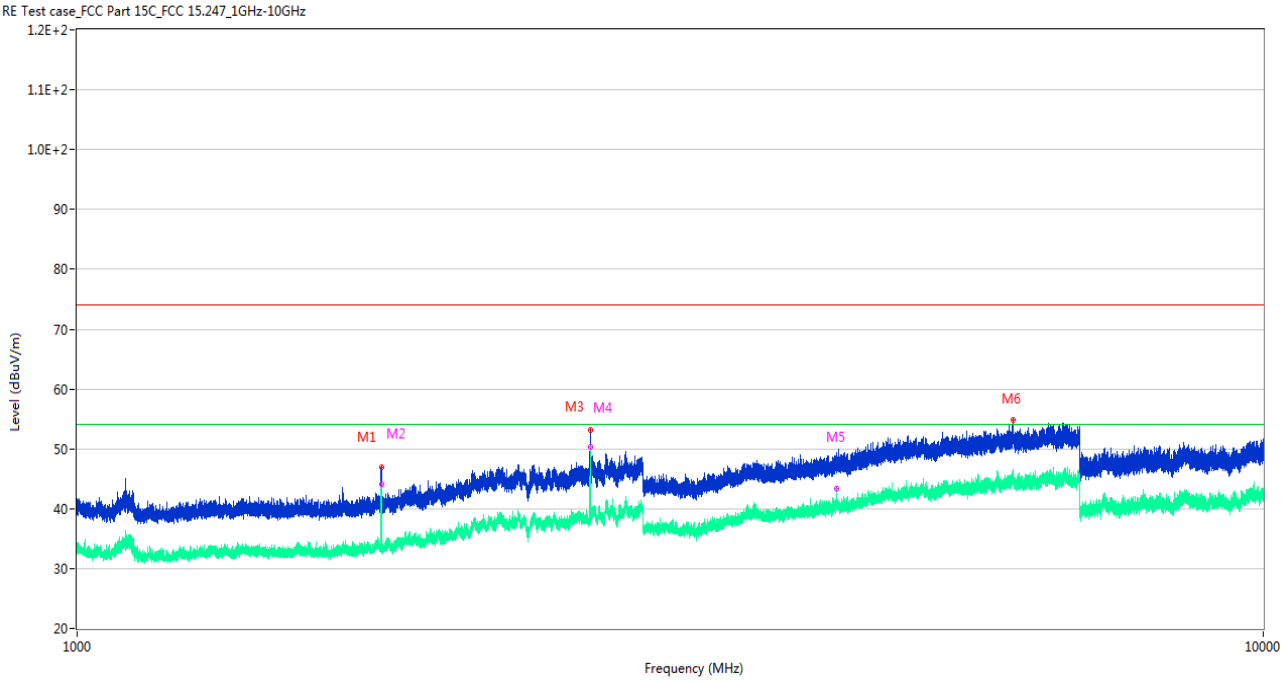
No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	1827.800	49.45	-12.68	74.0	24.55	Peak	260.00	100	Horizontal	Pass
1**	1827.800	44.23	-12.68	54.0	9.77	AV	260.00	100	Horizontal	Pass
2	1828.200	46.99	-12.66	74.0	27.01	Peak	249.00	100	Horizontal	Pass
2**	1828.200	45.67	-12.66	54.0	8.33	AV	249.00	100	Horizontal	Pass
3	2742.000	46.05	-7.05	74.0	27.95	Peak	288.00	150	Horizontal	Pass
3**	2742.000	43.17	-7.05	54.0	10.83	AV	288.00	150	Horizontal	Pass
4	3989.000	49.47	-4.73	74.0	24.53	Peak	0.00	300	Horizontal	Pass
4**	3989.000	39.05	-4.73	54.0	14.95	AV	0.00	300	Horizontal	Pass
5	6796.000	55.51	0.87	74.0	18.49	Peak	240.00	100	Horizontal	Pass
5**	6796.000	45.83	0.87	54.0	8.17	AV	240.00	100	Horizontal	Pass
6	9735.400	52.47	-0.49	74.0	21.53	Peak	194.00	200	Horizontal	Pass
6**	9735.400	42.62	-0.49	54.0	11.38	AV	194.00	200	Horizontal	Pass

LoRa (500kHz) HIGH CHANNEL 1 GHz to 10 GHz, ANT V



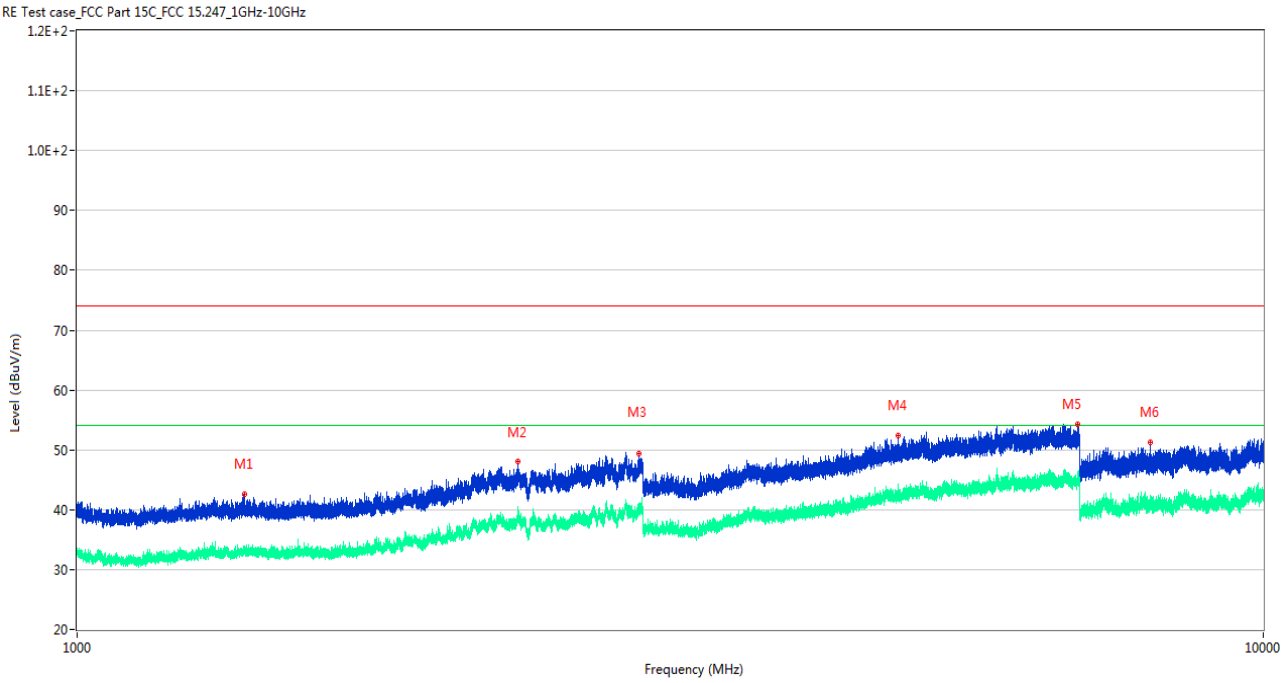
No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	1389.000	42.87	-13.48	74.0	31.13	Peak	71.00	100	Vertical	Pass
1**	1389.000	33.82	-13.48	54.0	20.18	AV	71.00	100	Vertical	Pass
2	2899.100	49.66	-3.91	74.0	24.34	Peak	110.00	300	Vertical	Pass
2**	2899.100	40.29	-3.91	54.0	13.71	AV	110.00	300	Vertical	Pass
3	3683.200	48.33	-5.12	74.0	25.67	Peak	89.00	150	Vertical	Pass
3**	3683.200	39.14	-5.12	54.0	14.86	AV	89.00	150	Vertical	Pass
4	5141.200	52.16	-1.43	74.0	21.84	Peak	130.00	100	Vertical	Pass
4**	5141.200	43.57	-1.43	54.0	10.43	AV	130.00	100	Vertical	Pass
5	6990.400	55.07	1.81	74.0	18.93	Peak	46.00	200	Vertical	Pass
5**	6990.400	45.44	1.81	54.0	8.56	AV	46.00	200	Vertical	Pass
6	9143.950	50.11	-1.45	74.0	23.89	Peak	349.00	300	Vertical	Pass
6**	9143.950	46.32	-1.45	54.0	7.68	AV	349.00	300	Vertical	Pass

LoRa (500kHz-US915_2) LOW CHANNEL 1 GHz to 10 GHz, ANT H



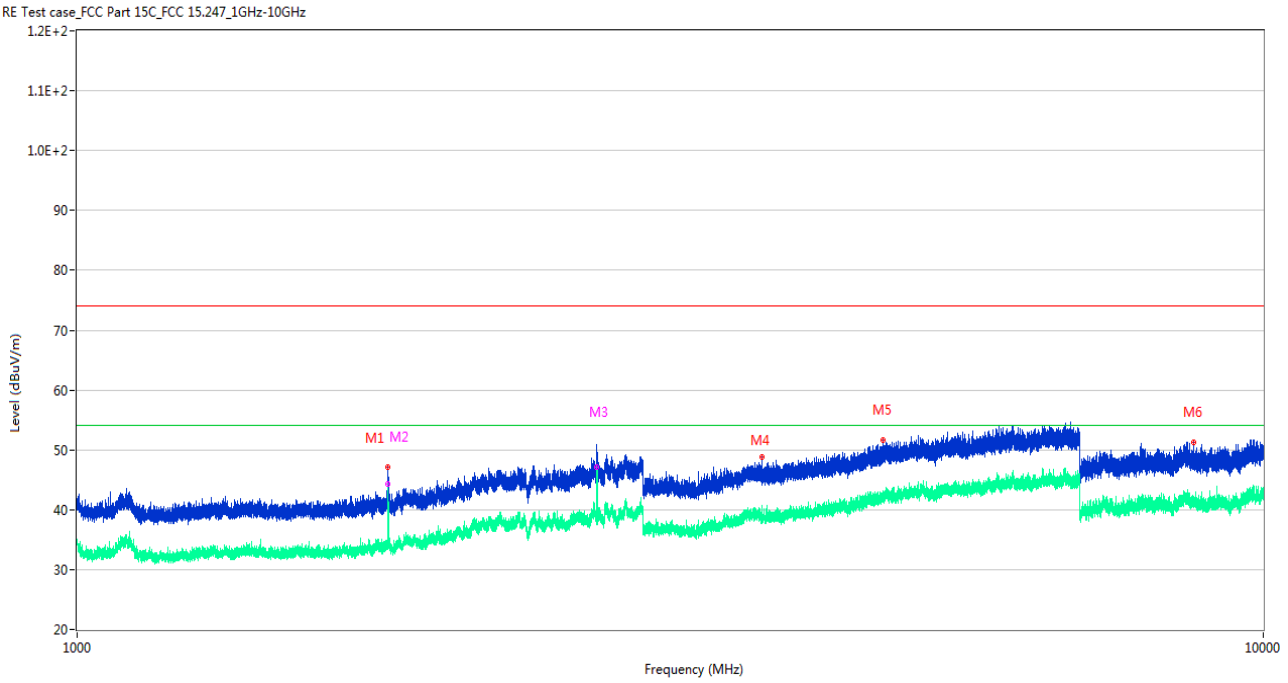
No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	1804.600	46.95	-12.88	74.0	27.05	Peak	305.00	100	Horizontal	Pass
1**	1804.600	43.73	-12.88	54.0	10.27	AV	305.00	100	Horizontal	Pass
2	1805.300	46.18	-12.99	74.0	27.82	Peak	300.00	400	Horizontal	Pass
2**	1805.300	44.18	-12.99	54.0	9.82	AV	300.00	400	Horizontal	Pass
3	2707.400	53.06	-7.17	74.0	20.94	Peak	281.00	100	Horizontal	Pass
3**	2707.400	49.64	-7.17	54.0	4.36	AV	281.00	100	Horizontal	Pass
4	2708.100	52.93	-7.12	74.0	21.07	Peak	287.00	100	Horizontal	Pass
4**	2708.100	50.30	-7.12	54.0	3.70	AV	287.00	100	Horizontal	Pass
5	4368.000	47.30	-3.85	74.0	26.70	Peak	24.00	200	Horizontal	Pass
5**	4368.000	43.30	-3.85	54.0	10.70	AV	24.00	200	Horizontal	Pass
6	6155.800	54.76	-0.13	74.0	19.24	Peak	210.00	300	Horizontal	Pass
6**	6155.800	45.21	-0.13	54.0	8.79	AV	210.00	300	Horizontal	Pass

LoRa (500kHz-US915_2) LOW CHANNEL 1 GHz to 10 GHz, ANT V



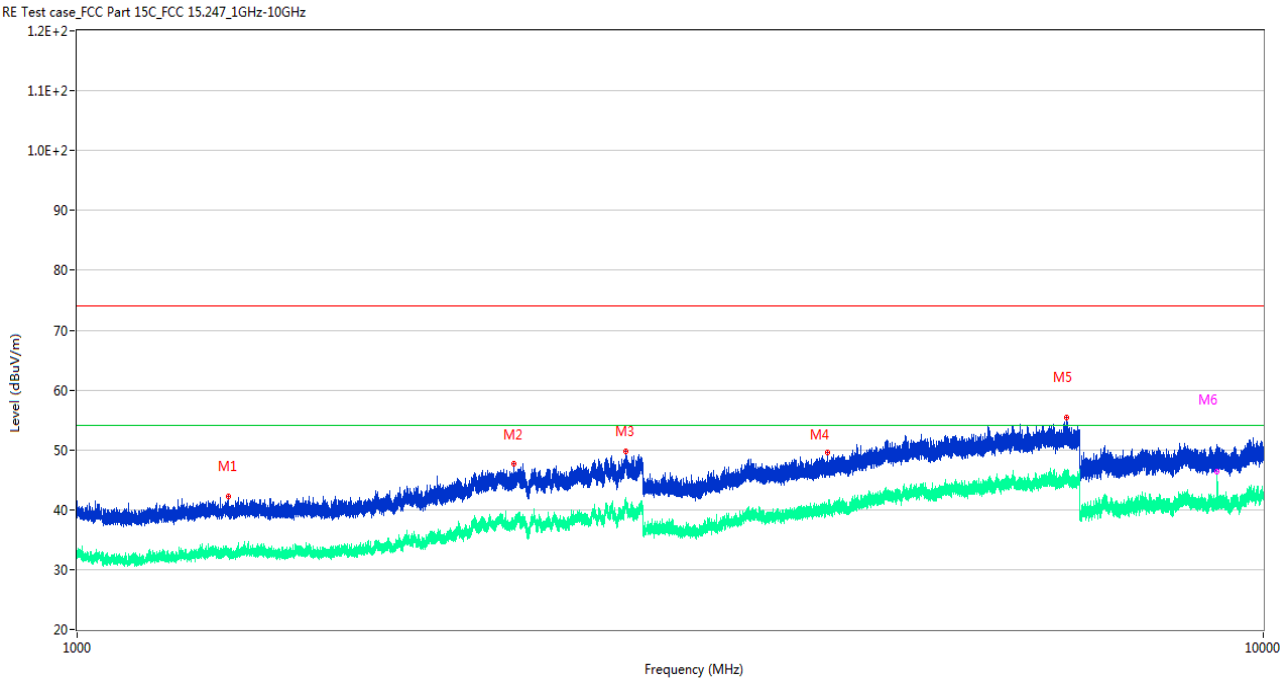
No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	1383.000	42.62	-13.35	74.0	31.38	Peak	224.00	200	Vertical	Pass
1**	1383.000	33.27	-13.35	54.0	20.73	AV	224.00	200	Vertical	Pass
2	2354.700	48.05	-7.54	74.0	25.95	Peak	224.00	400	Vertical	Pass
2**	2354.700	38.68	-7.54	54.0	15.32	AV	224.00	400	Vertical	Pass
3	2976.200	49.36	-4.99	74.0	24.64	Peak	212.00	100	Vertical	Pass
3**	2976.200	39.55	-4.99	54.0	14.45	AV	212.00	100	Vertical	Pass
4	4919.800	52.43	-2.59	74.0	21.57	Peak	246.00	200	Vertical	Pass
4**	4919.800	42.32	-2.59	54.0	11.68	AV	246.00	200	Vertical	Pass
5	6978.600	54.35	1.84	74.0	19.65	Peak	173.00	150	Vertical	Pass
5**	6978.600	45.51	1.84	54.0	8.49	AV	173.00	150	Vertical	Pass
6	8031.400	51.29	-2.47	74.0	22.71	Peak	162.00	200	Vertical	Pass
6**	8031.400	41.82	-2.47	54.0	12.18	AV	162.00	200	Vertical	Pass

LoRa (500kHz-US915_2) MIDDLE CHANNEL 1 GHz to 10 GHz, ANT H



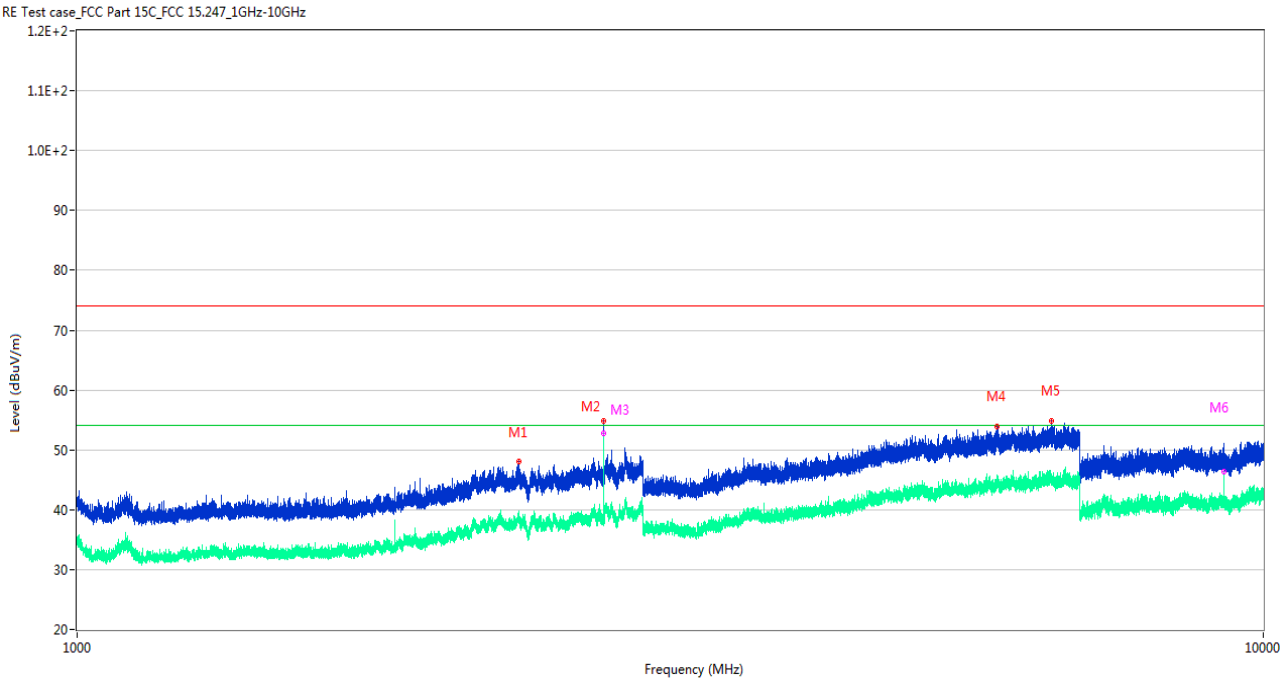
No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	1828.600	47.05	-12.64	74.0	26.95	Peak	118.00	100	Horizontal	Pass
1**	1828.600	43.31	-12.64	54.0	10.69	AV	118.00	100	Horizontal	Pass
2	1828.700	45.36	-12.63	74.0	28.64	Peak	118.00	300	Horizontal	Pass
2**	1828.700	44.36	-12.63	54.0	9.64	AV	118.00	300	Horizontal	Pass
3	2743.500	50.87	-7.03	74.0	23.13	Peak	266.00	150	Horizontal	Pass
3**	2743.500	47.09	-7.03	54.0	6.91	AV	266.00	150	Horizontal	Pass
4	3780.200	48.86	-5.32	74.0	25.14	Peak	123.00	100	Horizontal	Pass
4**	3780.200	38.93	-5.32	54.0	15.07	AV	123.00	100	Horizontal	Pass
5	4778.000	51.65	-2.53	74.0	22.35	Peak	360.00	150	Horizontal	Pass
5**	4778.000	42.16	-2.53	54.0	11.84	AV	360.00	150	Horizontal	Pass
6	8736.850	51.35	-1.88	74.0	22.65	Peak	182.00	200	Horizontal	Pass
6**	8736.850	40.96	-1.88	54.0	13.04	AV	182.00	200	Horizontal	Pass

LoRa (500kHz-US915_2) MIDDLE CHANNEL 1 GHz to 10 GHz, ANT V



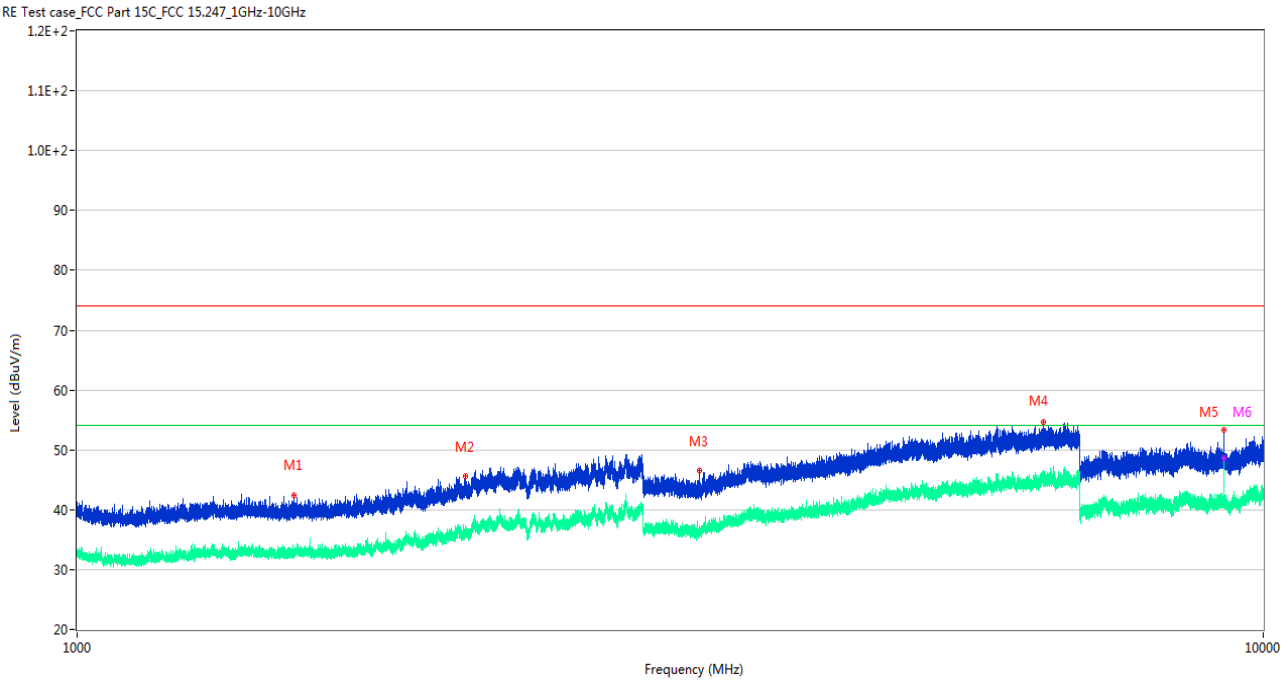
No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	1340.800	42.28	-13.49	74.0	31.72	Peak	260.00	300	Vertical	Pass
1**	1340.800	32.99	-13.49	54.0	21.01	AV	260.00	300	Vertical	Pass
2	2334.700	47.70	-8.72	74.0	26.30	Peak	222.00	400	Vertical	Pass
2**	2334.700	38.19	-8.72	54.0	15.81	AV	222.00	400	Vertical	Pass
3	2903.900	49.70	-3.44	74.0	24.30	Peak	358.00	100	Vertical	Pass
3**	2903.900	41.08	-3.44	54.0	12.92	AV	358.00	100	Vertical	Pass
4	4294.400	49.48	-4.64	74.0	24.52	Peak	89.00	200	Vertical	Pass
4**	4294.400	39.24	-4.64	54.0	14.76	AV	89.00	200	Vertical	Pass
5	6824.600	55.47	0.18	74.0	18.53	Peak	317.00	150	Vertical	Pass
5**	6824.600	44.81	0.18	54.0	9.19	AV	317.00	150	Vertical	Pass
6	9147.400	48.41	-1.49	74.0	25.59	Peak	349.00	200	Vertical	Pass
6**	9147.400	46.27	-1.49	54.0	7.73	AV	349.00	200	Vertical	Pass

LoRa (500kHz-US915_2) HIGH CHANNEL 1 GHz to 10 GHz, ANT H



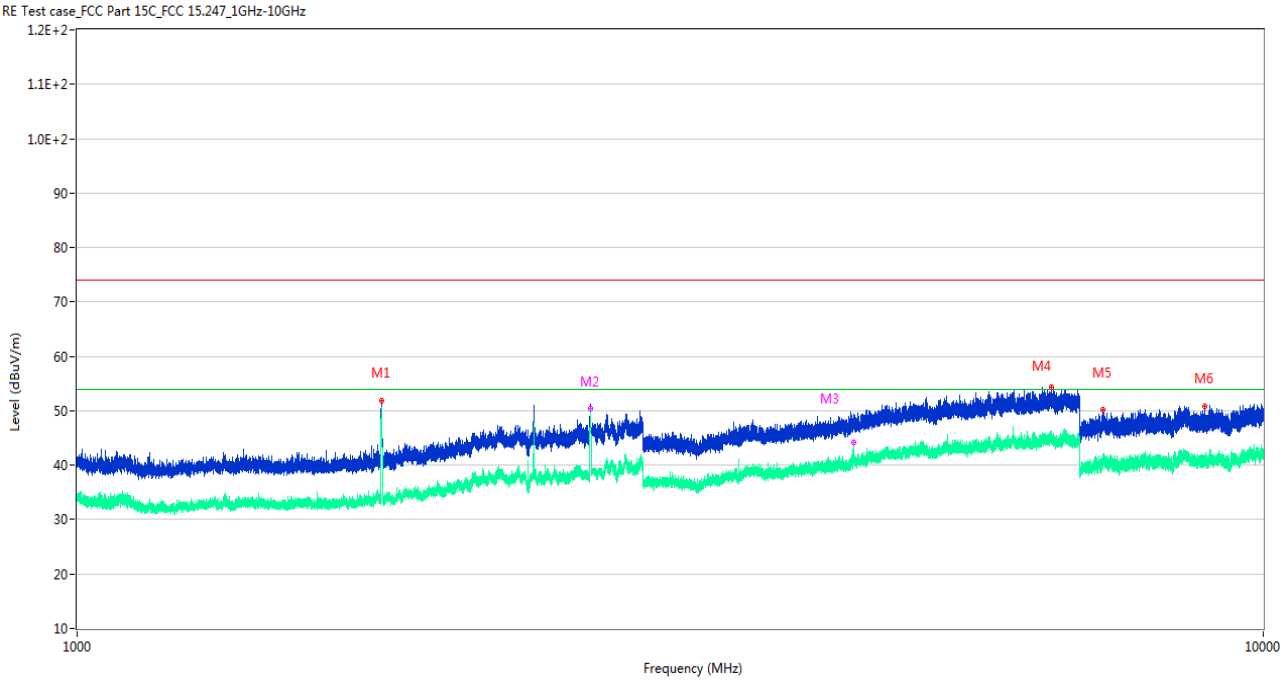
No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	2355.700	47.98	-7.60	74.0	26.02	Peak	90.00	300	Horizontal	Pass
1**	2355.700	39.10	-7.60	54.0	14.90	AV	90.00	300	Horizontal	Pass
2	2778.700	55.26	-6.31	74.0	18.74	Peak	74.00	100	Horizontal	Pass
2**	2778.700	51.73	-6.31	54.0	2.27	AV	74.00	100	Horizontal	Pass
3	2778.900	54.32	-6.30	74.0	19.68	Peak	79.00	150	Horizontal	Pass
3**	2778.900	52.71	-6.30	54.0	1.29	AV	79.00	150	Horizontal	Pass
4	5969.400	53.96	0.09	74.0	20.04	Peak	113.00	300	Horizontal	Pass
4**	5969.400	45.59	0.09	54.0	8.41	AV	113.00	300	Horizontal	Pass
5	6624.600	54.83	0.23	74.0	19.17	Peak	270.00	200	Horizontal	Pass
5**	6624.600	45.70	0.23	54.0	8.30	AV	270.00	200	Horizontal	Pass
6	9262.750	49.94	-1.36	74.0	24.06	Peak	12.00	150	Horizontal	Pass
6**	9262.750	46.44	-1.36	54.0	7.56	AV	12.00	150	Horizontal	Pass

LoRa (500kHz-US915_2) HIGH CHANNEL 1 GHz to 10 GHz, ANT V



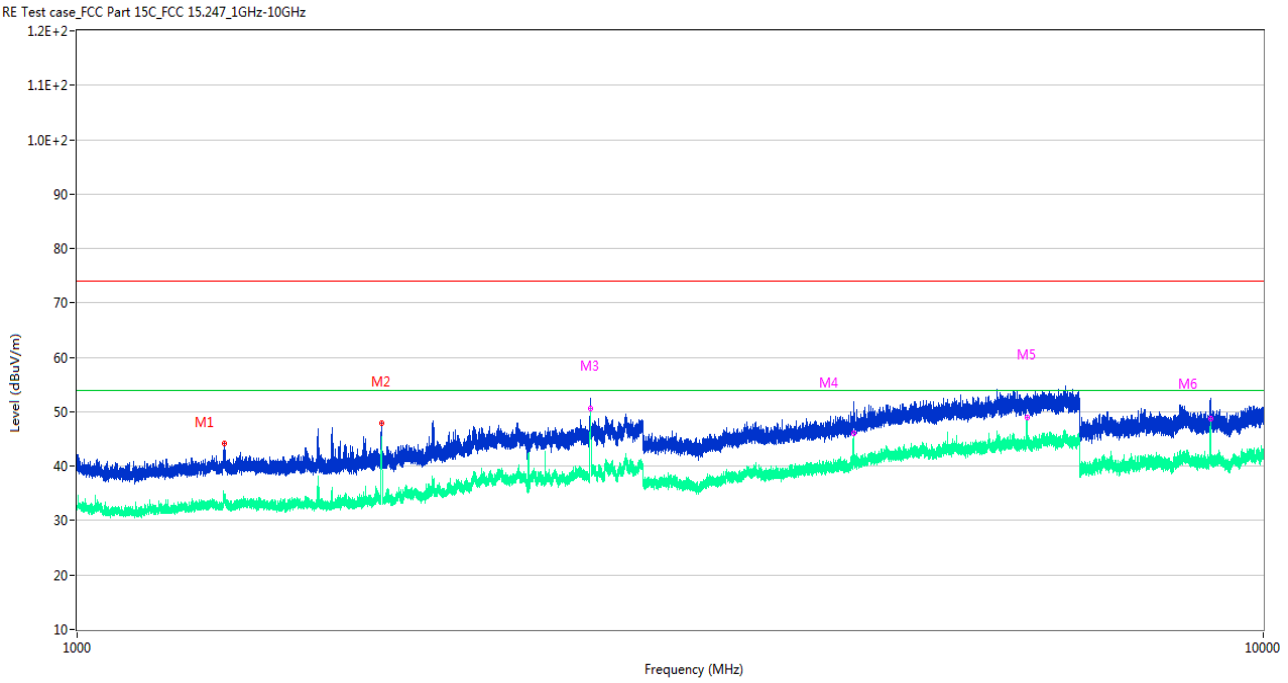
No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	1523.600	42.38	-13.97	74.0	31.62	Peak	44.00	300	Vertical	Pass
1**	1523.600	32.70	-13.97	54.0	21.30	AV	44.00	300	Vertical	Pass
2	2125.600	45.56	-10.25	74.0	28.44	Peak	126.00	400	Vertical	Pass
2**	2125.600	36.29	-10.25	54.0	17.71	AV	126.00	400	Vertical	Pass
3	3348.400	46.47	-7.43	74.0	27.53	Peak	68.00	100	Vertical	Pass
3**	3348.400	36.84	-7.43	54.0	17.16	AV	68.00	100	Vertical	Pass
4	6521.600	54.65	0.21	74.0	19.35	Peak	327.00	200	Vertical	Pass
4**	6521.600	44.78	0.21	54.0	9.22	AV	327.00	200	Vertical	Pass
5	9265.000	53.34	-1.39	74.0	20.66	Peak	0.00	150	Vertical	Pass
5**	9265.000	48.05	-1.39	54.0	5.95	AV	0.00	150	Vertical	Pass
6	9265.299	50.56	-1.39	74.0	23.44	Peak	349.00	200	Vertical	Pass
6**	9265.299	48.61	-1.39	54.0	5.39	AV	349.00	200	Vertical	Pass

LoRa (1523kHz) LOW CHANNEL 1 GHz to 10 GHz, ANT H



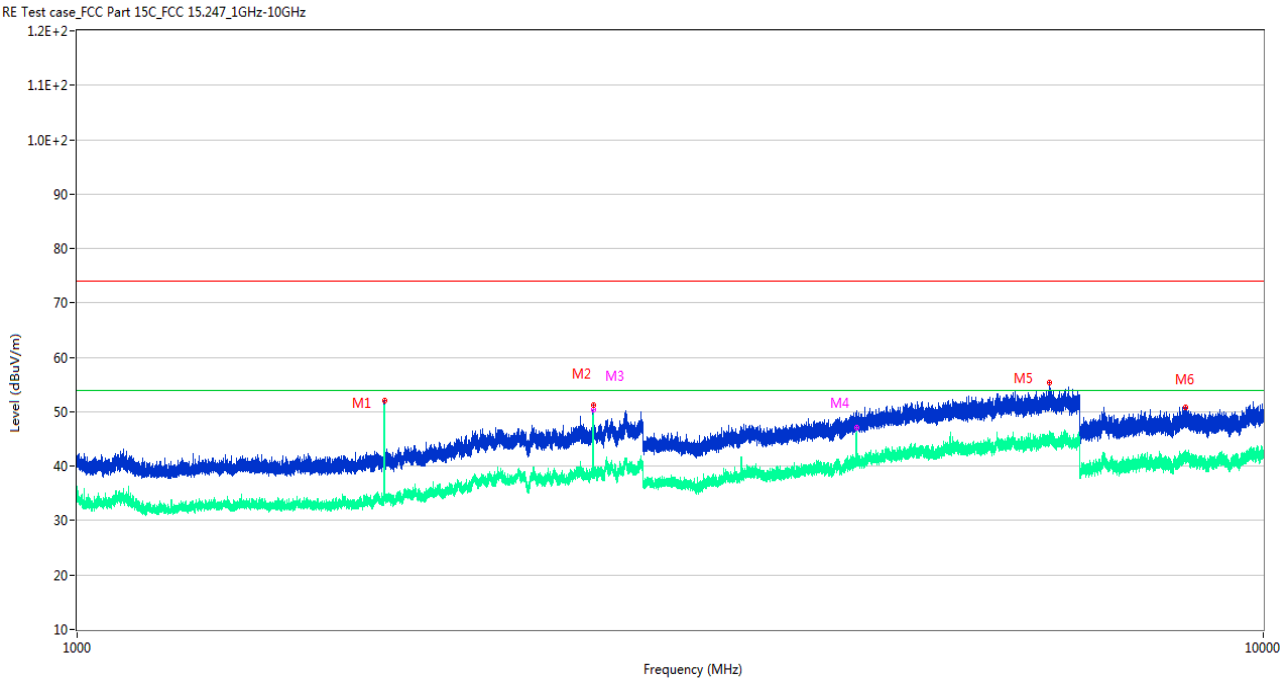
No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	1807.100	51.94	-13.16	74.0	22.06	Peak	270.00	200	Horizontal	Pass
1**	1807.100	50.56	-13.16	54.0	3.44	AV	270.00	200	Horizontal	Pass
2	2710.200	58.50	-6.94	74.0	15.50	Peak	109.00	150	Horizontal	Pass
2**	2710.200	50.31	-6.94	54.0	3.69	AV	109.00	150	Horizontal	Pass
3	4513.600	47.29	-2.91	74.0	26.71	Peak	17.00	100	Horizontal	Pass
3**	4513.600	44.22	-2.91	54.0	9.78	AV	17.00	100	Horizontal	Pass
4	6626.600	54.27	0.24	74.0	19.73	Peak	112.00	150	Horizontal	Pass
4**	6626.600	45.44	0.24	54.0	8.56	AV	112.00	150	Horizontal	Pass
5	7320.100	50.19	-3.06	74.0	23.81	Peak	185.00	400	Horizontal	Pass
5**	7320.100	41.24	-3.06	54.0	12.76	AV	185.00	400	Horizontal	Pass
6	8932.901	50.89	-0.40	74.0	23.11	Peak	153.00	150	Horizontal	Pass
6**	8932.901	40.53	-0.40	54.0	13.47	AV	153.00	150	Horizontal	Pass

LoRa (1523kHz) LOW CHANNEL 1 GHz to 10 GHz, ANT V



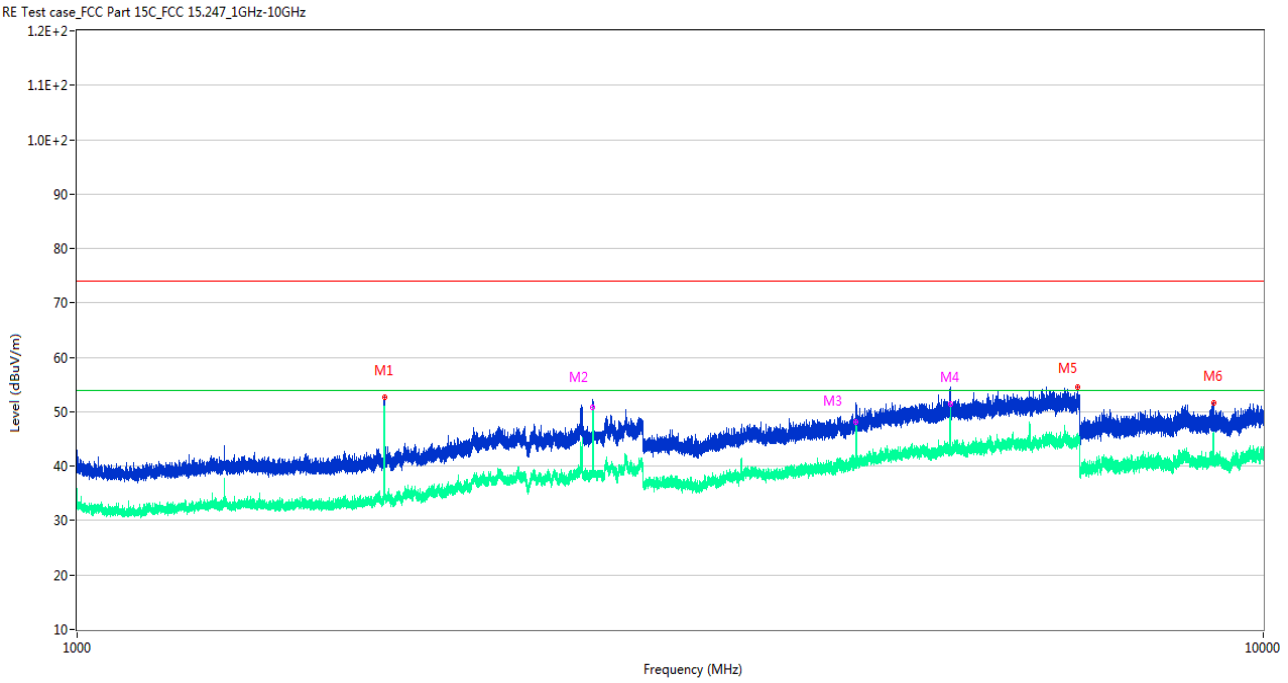
No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	1331.900	44.10	-13.39	74.0	29.90	Peak	217.00	150	Vertical	Pass
1**	1331.900	33.55	-13.39	54.0	20.45	AV	217.00	150	Vertical	Pass
2	1806.600	47.87	-13.16	74.0	26.13	Peak	151.00	150	Vertical	Pass
2**	1806.600	44.41	-13.16	54.0	9.59	AV	151.00	150	Vertical	Pass
3	2708.400	54.87	-7.09	74.0	19.13	Peak	77.00	400	Vertical	Pass
3**	2708.400	50.61	-7.09	54.0	3.39	AV	77.00	400	Vertical	Pass
4	4515.200	51.88	-3.28	74.0	22.12	Peak	183.00	200	Vertical	Pass
4**	4515.200	46.12	-3.28	54.0	7.88	AV	183.00	200	Vertical	Pass
5	6323.400	52.03	-1.29	74.0	21.97	Peak	360.00	200	Vertical	Pass
5**	6323.400	48.94	-1.29	54.0	5.06	AV	360.00	200	Vertical	Pass
6	9028.450	51.49	-0.74	74.0	22.51	Peak	276.00	150	Vertical	Pass
6**	9028.450	48.69	-0.74	54.0	5.31	AV	276.00	150	Vertical	Pass

LoRa (1523kHz) MIDDLE CHANNEL 1 GHz to 10 GHz, ANT H



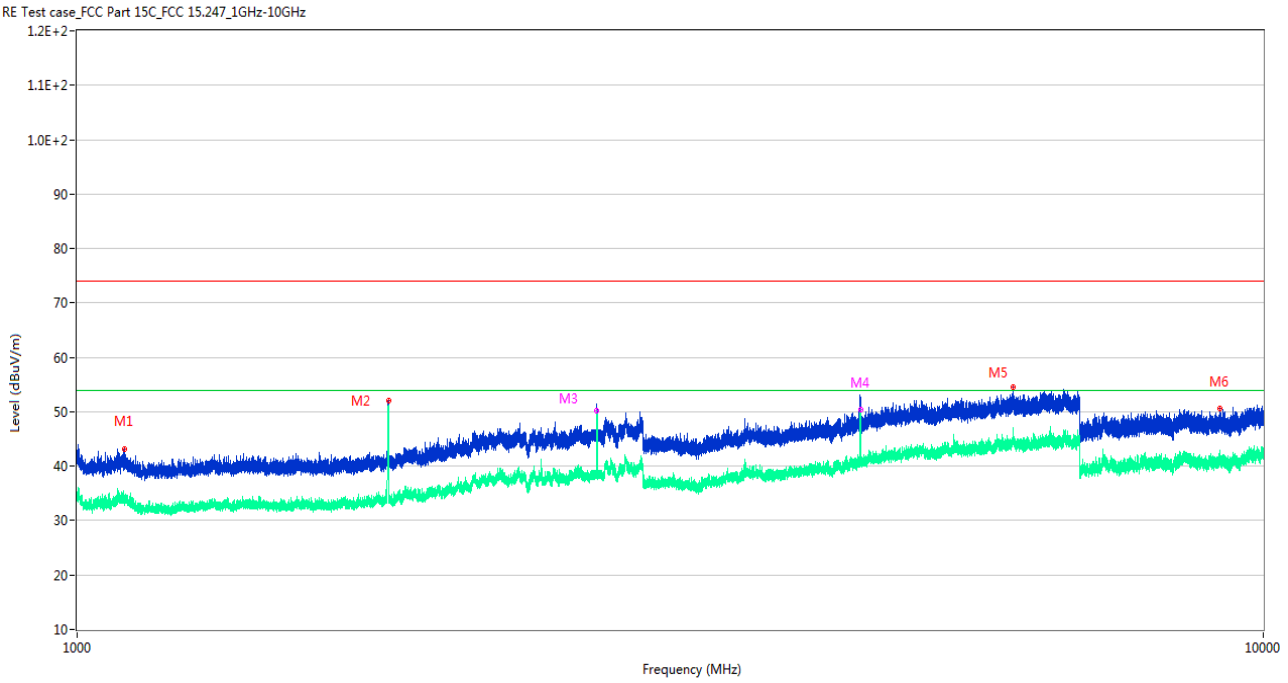
No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	1815.600	55.56	-13.08	74.0	18.44	Peak	328.00	400	Horizontal	Pass
1**	1815.600	51.80	-13.08	54.0	2.20	AV	328.00	400	Horizontal	N/A
2	2724.700	64.13	-6.60	74.0	9.87	Peak	108.00	200	Horizontal	Pass
2**	2724.700	50.31	-6.60	54.0	3.69	AV	108.00	200	Horizontal	Pass
3	2724.800	50.52	-6.61	74.0	10.48	Peak	108.00	150	Horizontal	Pass
3**	2724.800	63.36	-6.61	54.0	3.64	AV	108.00	150	Horizontal	Pass
4	4539.000	49.27	-3.71	74.0	24.73	Peak	155.00	150	Horizontal	Pass
4**	4539.000	46.99	-3.71	54.0	7.01	AV	155.00	150	Horizontal	Pass
5	6609.200	55.37	0.39	74.0	18.63	Peak	245.00	400	Horizontal	Pass
5**	6609.200	45.38	0.39	54.0	8.62	AV	245.00	400	Horizontal	Pass
6	8599.599	50.89	-2.22	74.0	23.11	Peak	218.00	200	Horizontal	Pass
6**	8599.599	42.31	-2.22	54.0	11.69	AV	218.00	200	Horizontal	Pass

LoRa (1523kHz) MIDDLE CHANNEL 1 GHz to 10 GHz, ANT V



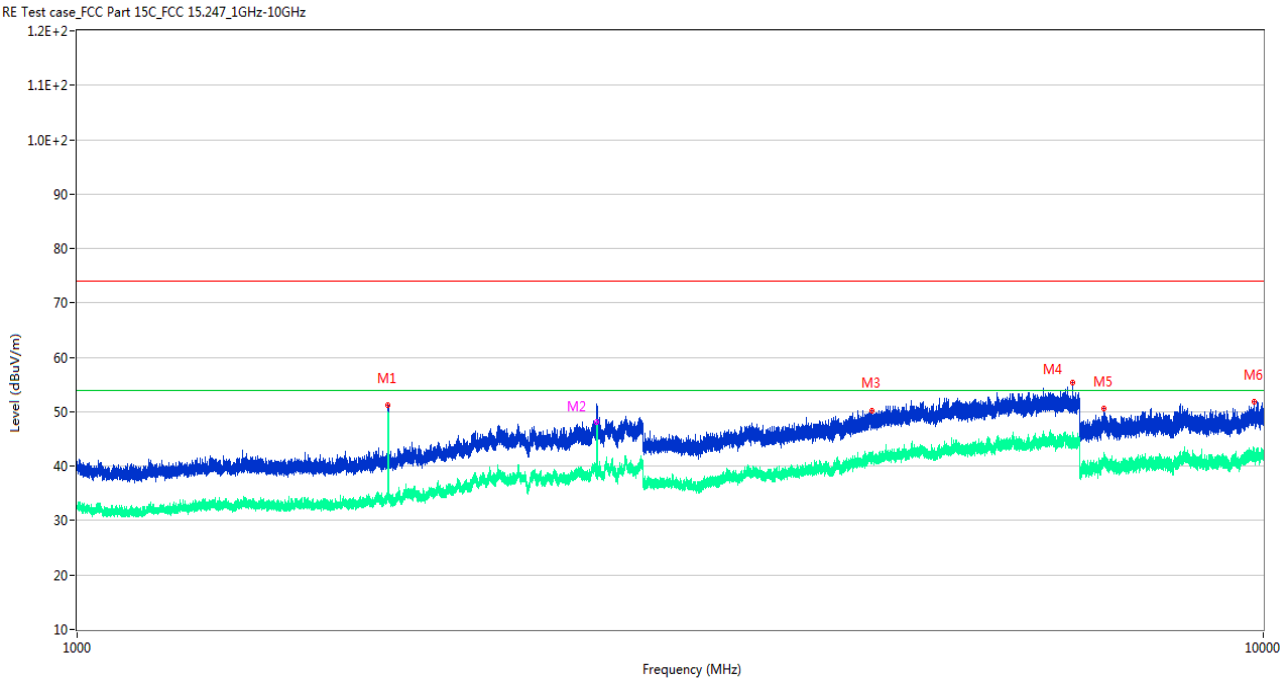
No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	1816.400	52.71	-13.06	74.0	21.29	Peak	0.00	400	Vertical	Pass
1**	1816.400	50.71	-13.06	54.0	3.29	AV	0.00	400	Vertical	Pass
2	2721.400	57.68	-6.43	74.0	16.32	Peak	71.00	200	Vertical	Pass
2**	2721.400	50.89	-6.43	54.0	3.11	AV	71.00	200	Vertical	Pass
3	4537.800	50.32	-3.51	74.0	23.68	Peak	130.00	150	Vertical	Pass
3**	4537.800	48.05	-3.51	54.0	5.95	AV	130.00	150	Vertical	Pass
4	5451.200	52.74	-2.33	74.0	21.26	Peak	142.00	150	Vertical	Pass
4**	5451.200	50.95	-2.33	54.0	3.05	AV	142.00	150	Vertical	Pass
5	6973.200	54.47	1.11	74.0	19.53	Peak	118.00	400	Vertical	Pass
5**	6973.200	45.16	1.11	54.0	8.84	AV	118.00	400	Vertical	Pass
6	9076.300	51.57	-1.42	74.0	22.43	Peak	0.00	200	Vertical	Pass
6**	9076.300	45.14	-1.42	54.0	8.86	AV	0.00	200	Vertical	Pass

LoRa (1523kHz) HIGH CHANNEL 1 GHz to 10 GHz, ANT H



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	1097.200	43.23	-14.49	74.0	30.77	Peak	360.00	400	Horizontal	Pass
1**	1097.200	33.48	-14.49	54.0	20.52	AV	360.00	400	Horizontal	Pass
2	1829.500	55.59	-12.58	74.0	18.41	Peak	271.00	200	Horizontal	Pass
2**	1829.500	52.05	-12.58	54.0	1.95	AV	271.00	200	Horizontal	N/A
3	2743.700	57.51	-7.01	74.0	16.49	Peak	131.00	150	Horizontal	Pass
3**	2743.700	50.14	-7.01	54.0	3.86	AV	131.00	150	Horizontal	N/A
4	4574.800	51.70	-3.62	74.0	22.30	Peak	350.00	150	Horizontal	Pass
4**	4574.800	50.36	-3.62	54.0	3.64	AV	350.00	150	Horizontal	Pass
5	6154.400	54.51	0.33	74.0	19.49	Peak	265.00	400	Horizontal	Pass
5**	6154.400	44.99	0.33	54.0	9.01	AV	265.00	400	Horizontal	Pass
6	9196.599	50.56	-1.19	74.0	23.44	Peak	275.00	200	Horizontal	Pass
6**	9196.599	41.83	-1.19	54.0	12.17	AV	275.00	200	Horizontal	Pass

LoRa (1523kHz) HIGH CHANNEL 1 GHz to 10 GHz, ANT V



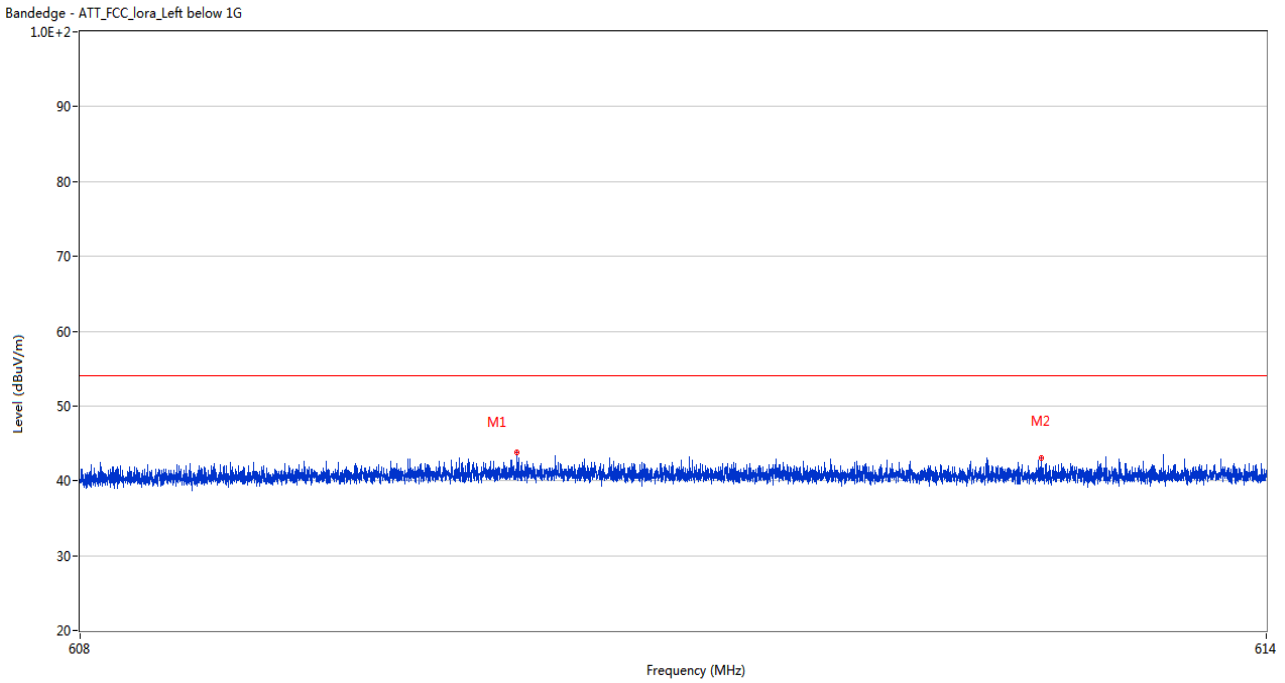
No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	1828.500	51.26	-12.64	74.0	22.74	Peak	360.00	400	Vertical	Pass
1**	1828.500	49.57	-12.64	54.0	4.43	AV	360.00	400	Vertical	Pass
2	2742.900	50.61	-7.04	74.0	23.39	Peak	360.00	200	Vertical	Pass
2**	2742.900	48.06	-7.04	54.0	5.94	AV	360.00	200	Vertical	Pass
3	4678.800	50.27	-2.65	74.0	23.73	Peak	125.00	400	Vertical	Pass
3**	4678.800	42.50	-2.65	54.0	11.50	AV	125.00	400	Vertical	Pass
4	6908.600	55.29	0.30	74.0	18.71	Peak	48.00	200	Vertical	Pass
4**	6908.600	44.19	0.30	54.0	9.81	AV	48.00	200	Vertical	Pass
5	7339.000	50.62	-2.92	74.0	23.38	Peak	105.00	150	Vertical	Pass
5**	7339.000	41.73	-2.92	54.0	12.27	AV	105.00	150	Vertical	Pass
6	9826.150	51.84	-0.19	74.0	22.16	Peak	218.00	150	Vertical	Pass
6**	9826.150	42.43	-0.19	54.0	11.57	AV	218.00	150	Vertical	Pass

A.7 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.

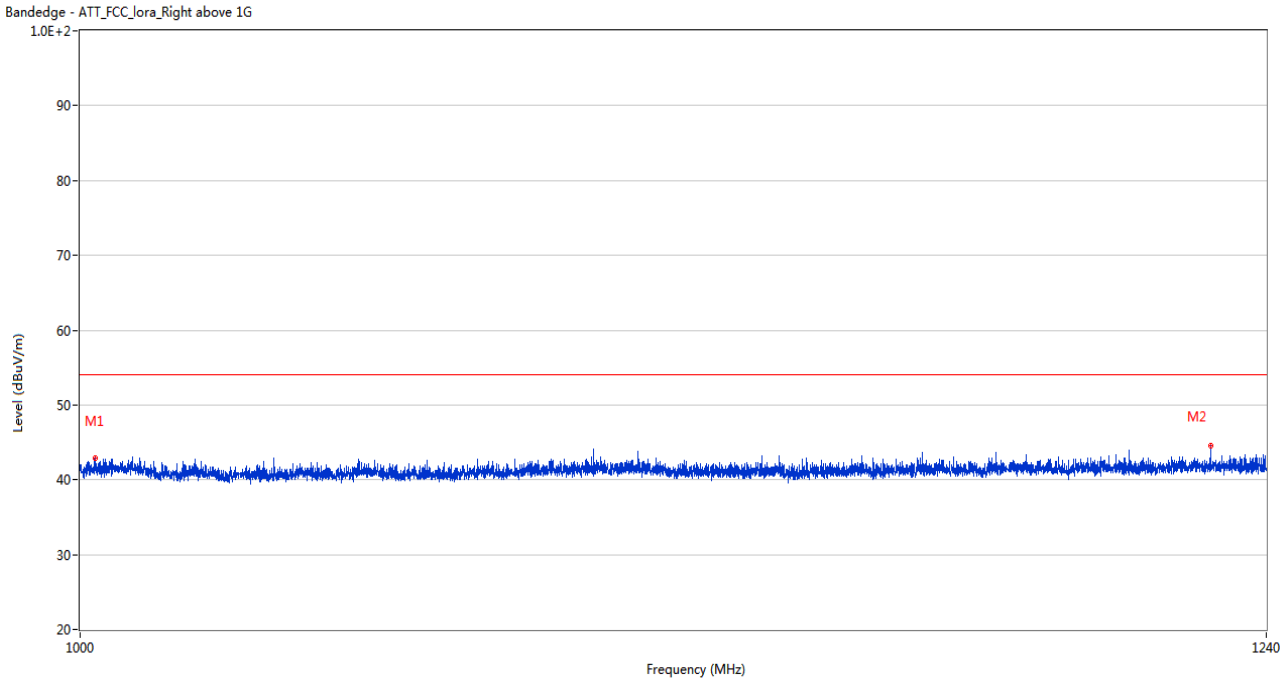
Test Data and Plots

LoRa (500kHz) LOW CHANNEL



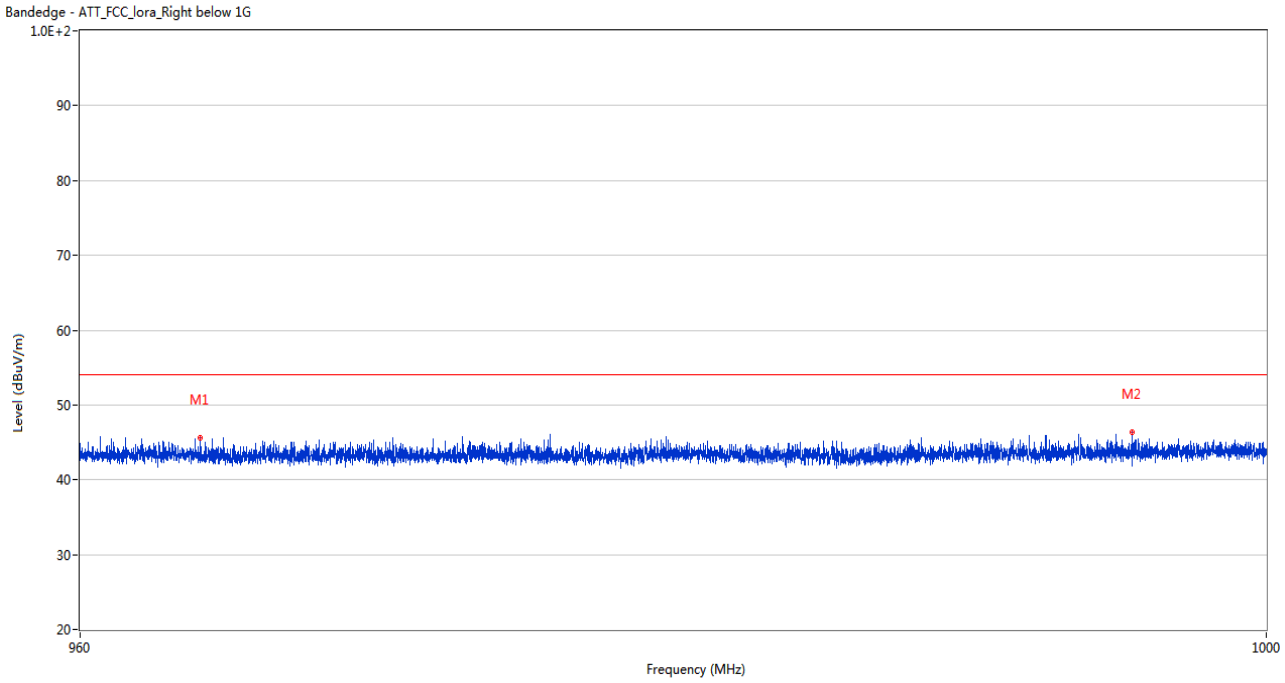
No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	610.203	43.85	6.48	54.0	10.15	Peak	82.00	150	Horizontal	Pass
2	612.857	43.09	6.24	54.0	10.91	Peak	216.00	150	Horizontal	Pass

LoRa (500kHz) HIGH CHANNEL



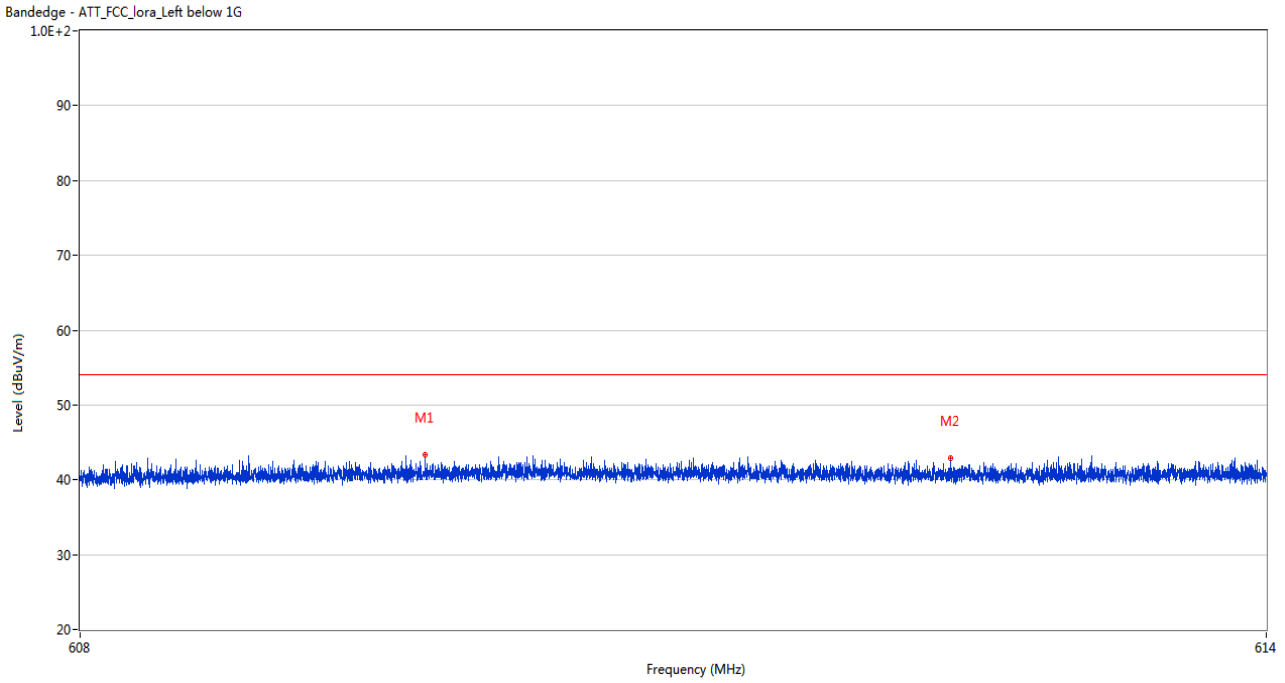
No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	1002.720	42.85	-12.43	54.0	11.15	Peak	300.00	200	Horizontal	Pass
2	1227.480	44.49	-12.21	54.0	9.51	Peak	75.00	150	Horizontal	Pass

LoRa (500kHz) HIGH CHANNEL



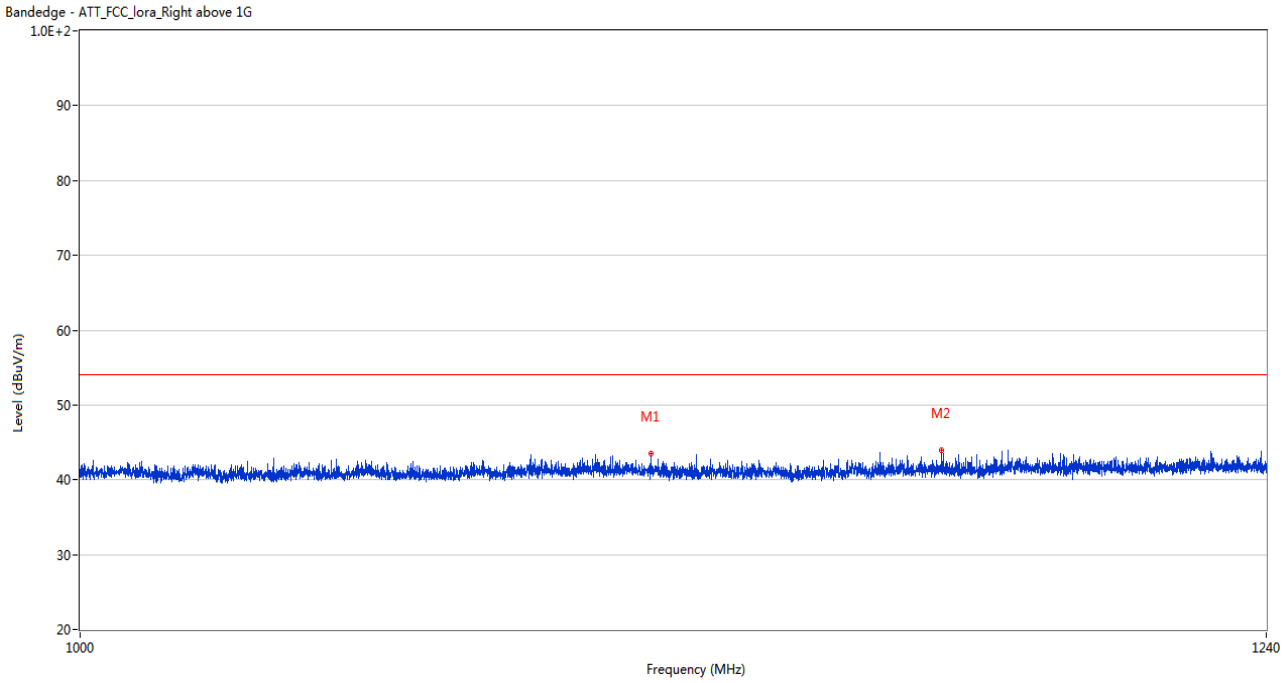
No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	963.987	45.61	9.45	54.0	8.39	Peak	176.00	150	Horizontal	Pass
2	995.393	46.42	9.82	54.0	7.58	Peak	113.00	100	Horizontal	Pass

LoRa (500kHz-US915_2) LOW CHANNEL



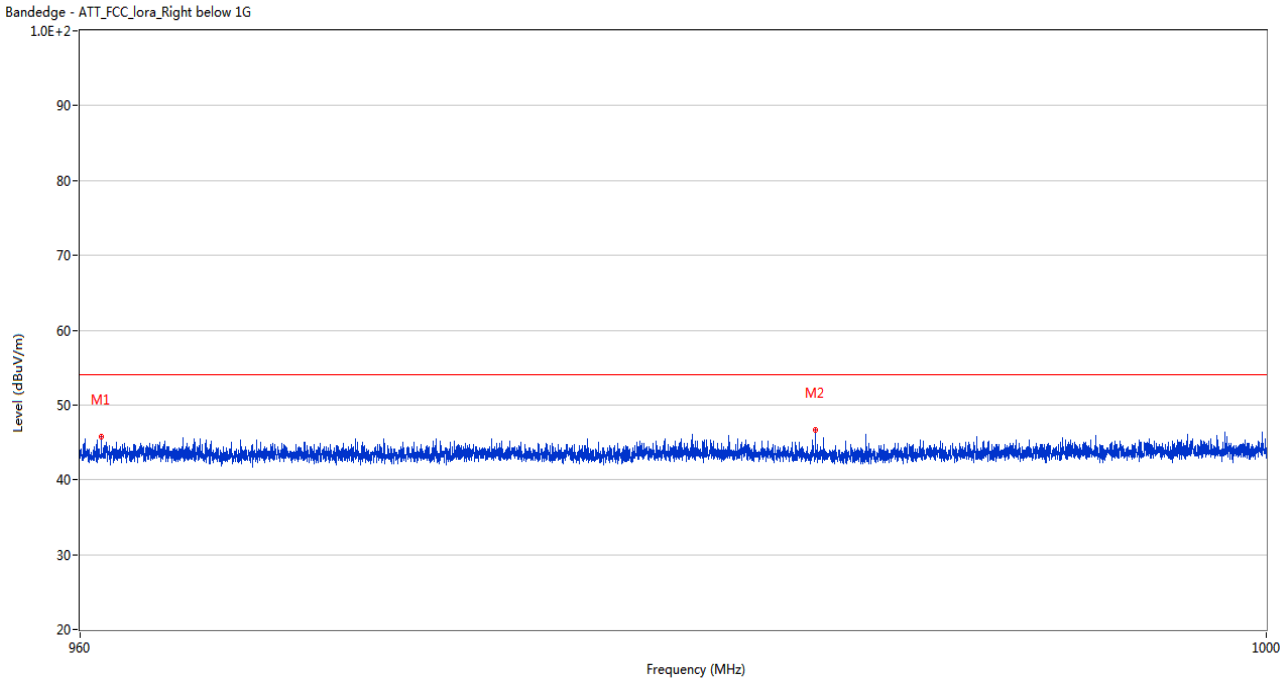
No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	609.738	43.29	6.34	54.0	10.71	Peak	44.00	150	Horizontal	Pass
2	612.397	42.86	6.23	54.0	11.14	Peak	337.00	150	Horizontal	Pass

LoRa (500kHz-US915_2) HIGH CHANNEL



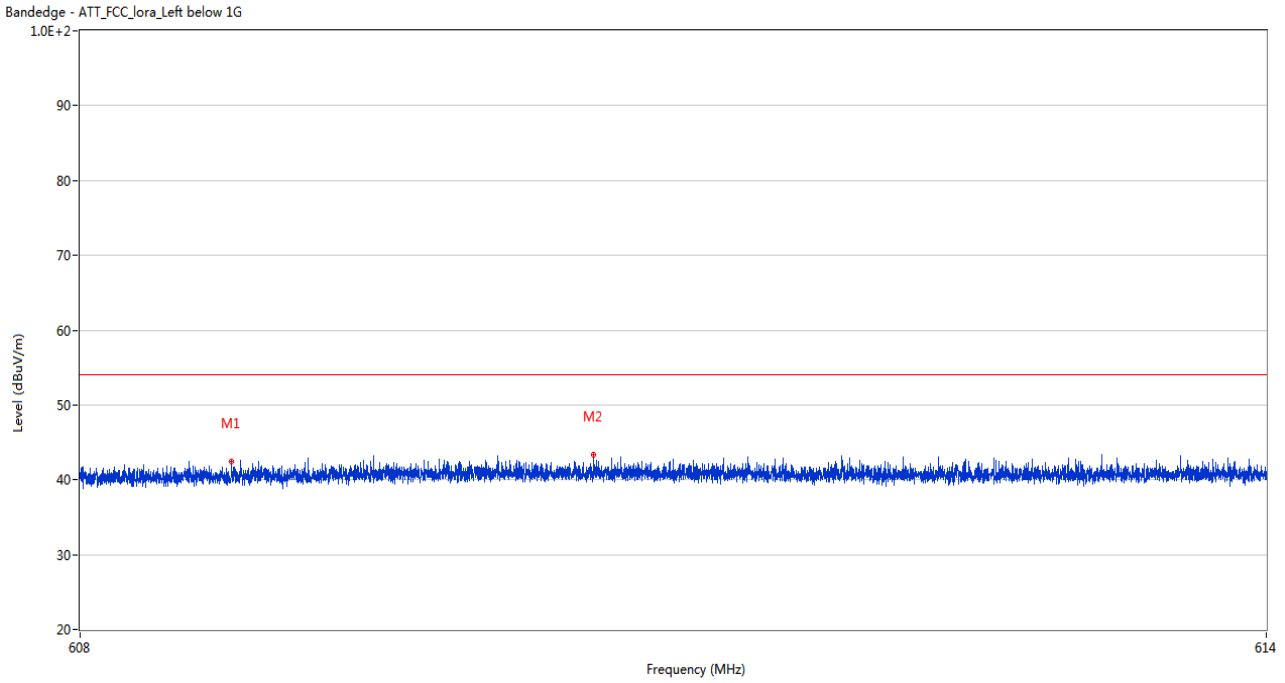
No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	1109.000	43.52	-13.06	54.0	10.48	Peak	53.00	150	Horizontal	Pass
2	1169.160	43.96	-12.12	54.0	10.04	Peak	61.00	150	Horizontal	Pass

LoRa (500kHz-US915_2) HIGH CHANNEL



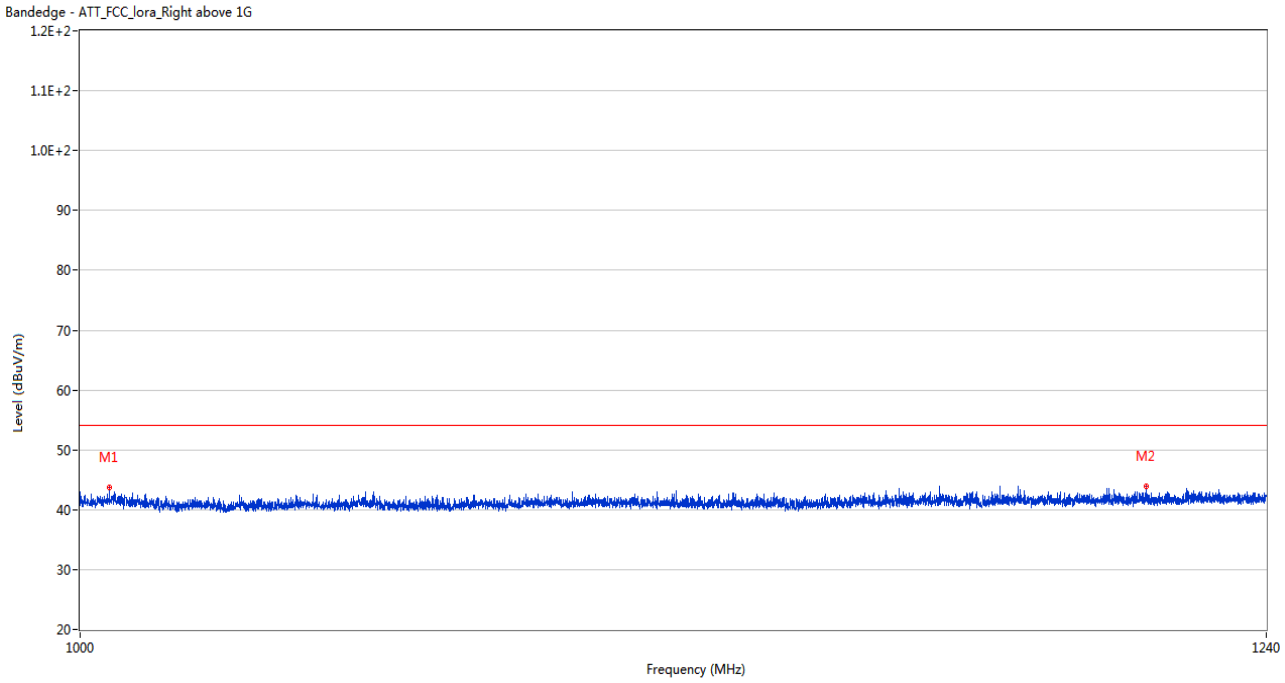
No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	960.693	45.74	9.55	54.0	8.26	Peak	76.00	150	Horizontal	Pass
2	984.607	46.69	9.36	54.0	7.31	Peak	105.00	150	Horizontal	Pass

LoRa (1523kHz) LOW CHANNEL



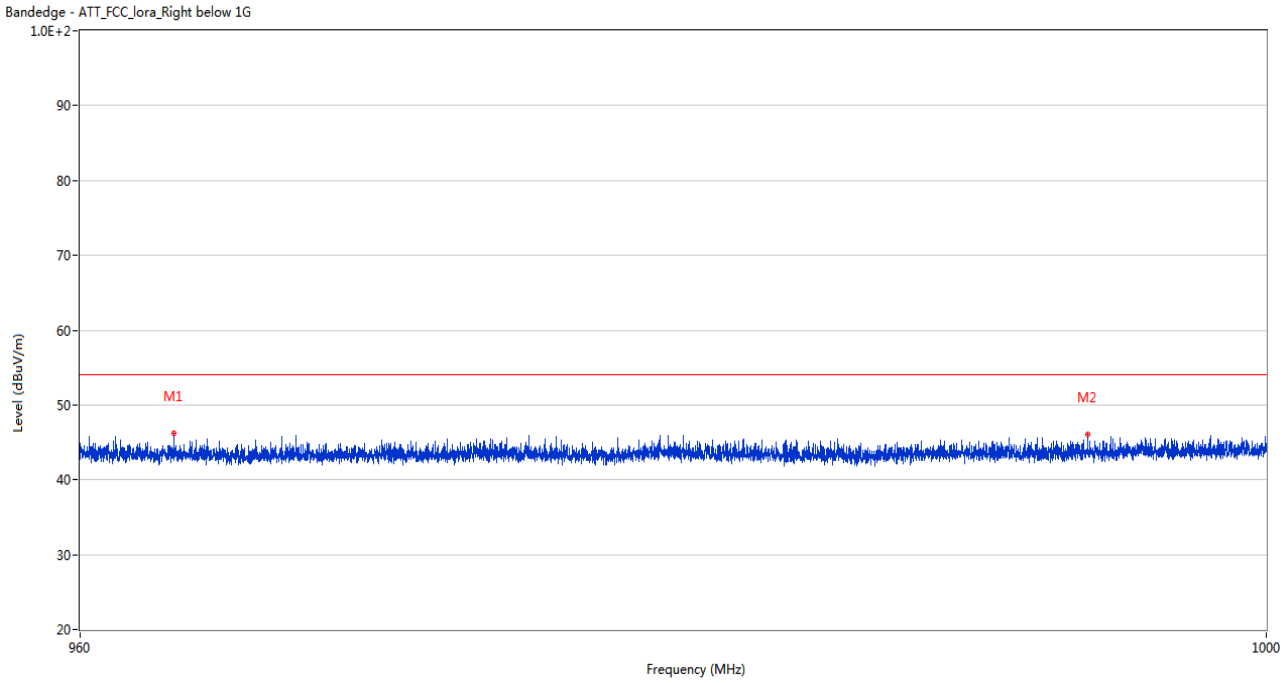
No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	608.763	42.48	5.99	54.0	11.52	Peak	8.00	150	Horizontal	Pass
2	610.589	43.41	6.44	54.0	10.59	Peak	202.00	100	Horizontal	Pass

LoRa (1523kHz) HIGH CHANNEL



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	1005.360	43.72	-12.20	54.0	10.28	Peak	357.00	150	Horizontal	Pass
2	1213.200	43.94	-12.39	54.0	10.06	Peak	235.00	300	Horizontal	Pass

LoRa (1523kHz) HIGH CHANNEL



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	963.107	46.15	9.57	54.0	7.85	Peak	202.00	150	Horizontal	Pass
2	993.873	46.04	9.73	54.0	7.96	Peak	0.00	100	Horizontal	Pass

A.8 Power Spectral Density (PSD)

Duty Cycle Test Data

Band	On Time (ms)	On+Off Time (ms)	Duty Cycle (%)	Duty Factor (10 log (1/x))
LoRa (500kHz)	97.5	212.5	45.88	3.38
LoRa (500 kHz-US915_2)	97.5	212.5	45.88	3.38
LoRa (1523kHz)	600.0	1625.0	36.92	4.33

Note: Spectral power density = Measured Spectral power density + Duty Factor.

Power Spectral Density Test Data

LoRa (500kHz)				
Channel	Measured Spectral power density (dBm/3kHz)	Spectral power density (dBm/3kHz)	Limit (dBm/3kHz)	Verdict
Low	-1.45	1.93	8	Pass
Middle	-1.27	2.12	8	Pass
High	-1.63	1.76	8	Pass

LoRa (500kHz-US915_2)				
Channel	Measured Spectral power density (dBm/3kHz)	Spectral power density (dBm/3kHz)	Limit (dBm/3kHz)	Verdict
Low	-1.83	1.56	8	Pass
Middle	-1.49	1.89	8	Pass
High	-2.27	1.12	8	Pass

LoRa (1523kHz)				
Channel	Measured Spectral power density (dBm/3kHz)	Spectral power density (dBm/3kHz)	Limit (dBm/3kHz)	Verdict
Low	3.18	7.51	8	Pass
Middle	1.94	6.27	8	Pass
High	0.80	5.13	8	Pass

Test Plots

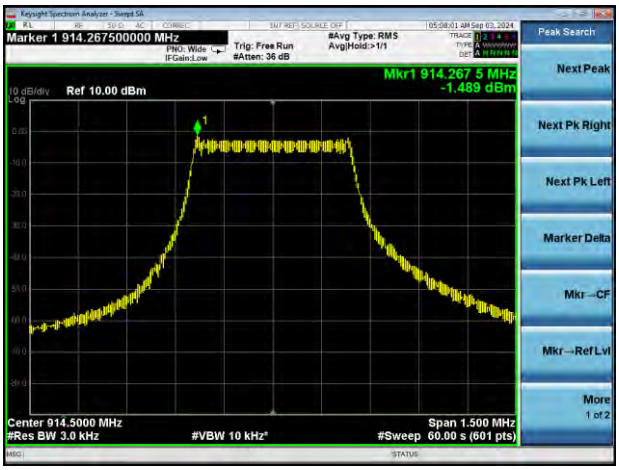
LoRa (500kHz) LOW CHANNEL

LoRa (500kHz) MIDDLE CHANNEL

LoRa (500kHz) HIGH CHANNEL

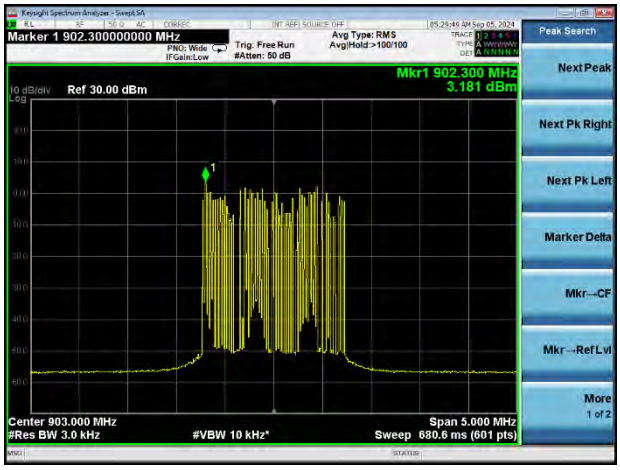
LoRa (500kHz-US915_2) LOW CHANNEL

LoRa (500kHz-US915_2) MIDDLE CHANNEL

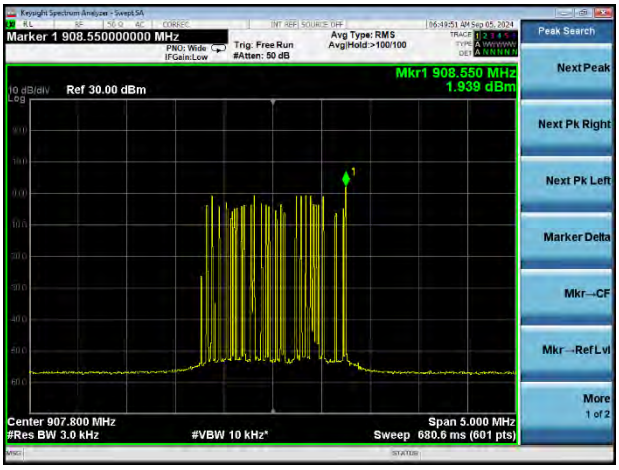


LoRa (500kHz-US915_2) HIGH CHANNEL

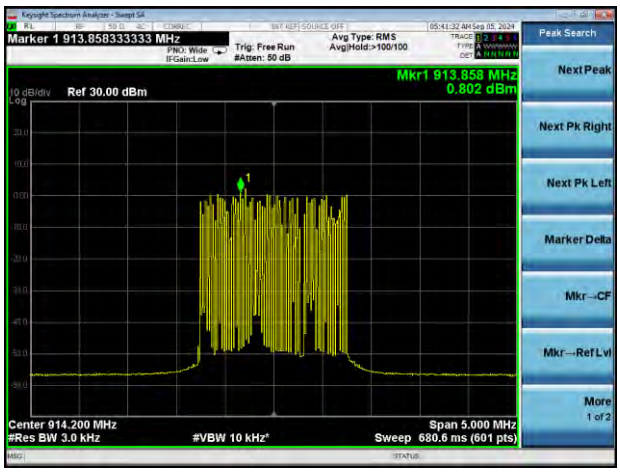
LoRa (1523kHz) LOW CHANNEL



LoRa (1523kHz) MIDDLE CHANNEL



LoRa (1523kHz) HIGH CHANNEL



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”.

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