TEST REPORT

Applicant:	HASHDOG PTE. LTD.
Address:	152 BEACH ROAD #11-05, GATEWAY EAST, 189721 SINGAPORE
Equipment Type:	Mini OBD2 Dongle
Model Name:	Macaron
Brand Name:	HashDog
FCC ID:	2BBAK-MACARON
ISED Number:	30639-MACARON
Test Standard:	47 CFR Part 15 Subpart C RSS-Gen Issue 5 RSS-247 Issue 2 (refer to section 3.1)
Sample Arrival Date:	May 29, 2023
Test Date:	Jun. 02, 2023 - Jun. 06, 2023
Date of Issue:	Jul. 20, 2023

ISSUED BY:

Shenzhen BALUN Technology Co., Ltd.

Tested by: Julie Zhu **Checked by:** Ye Hongji **Approved by:** Liao Jianming (Technical Director)

Revision History

Version	Issue Date	Revisions
Rev. 01	Jul. 13, 2023	Initial Issue
Rev. 02	Jul. 20, 2023	Corrected the Product Type in Section 2.5.

TABLE OF CONTENTS

1 GENERAL INFORMATION 4

1.1 Test Laboratory 4

1.2 Test Location 4

2 PRODUCT INFORMATION 5

2.1 Applicant Information 5

2.2 Manufacturer Information 5

2.3 Factory Information 5

2.4 General Description for Equipment under Test (EUT) 5

2.5 Technical Information 6

3 SUMMARY OF TEST RESULTS 7

3.1 Test Standards 7

3.2 Test Verdict 7

4 GENERAL TEST CONFIGURATIONS 8

4.1 Test Environments 8

4.2 Test Equipment List 8

4.3 Measurement Uncertainty 9

4.4 Description of Test Setup 9

4.5 Measurement Results Explanation Example 12

5 TEST ITEMS 13

5.1 Antenna Requirements 13

5.2 Output Power 14

5.3 Occupied Bandwidth 16

5.4 Conducted Spurious Emission 17

5.5 Band Edge (Authorized-band band-edge) 19
5.6 Conducted Emission 21
5.7 Radiated Spurious Emission 22
5.8 Band Edge (Restricted-band band-edge) 24
5.9 Power Spectral density (PSD) 25
ANNEX A TEST RESULT 26
A.1 Output Power 26
A.2 Occupied Bandwidth 28
A.3 Conducted Spurious Emissions 30
A.4 Band Edge (Authorized-band band-edge) 33
A.5 Conducted Emissions 34
A.6 Radiated Spurious Emission 35
A.7 Band Edge (Restricted-band band-edge) 47
A.8 Power Spectral Density (PSD) 50
ANNEX B TEST SETUP PHOTOS 51
ANNEX C EUT EXTERNAL PHOTOS 51
ANNEX D EUT INTERNAL PHOTOS 51

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. The laboratory has been listed by Industry Canada to perform electromagnetic emission measurements. The recognition numbers of test site are 11524A.

2 PRODUCT INFORMATION

2.1 Applicant Information

Applicant	HASHDOG PTE. LTD.
Address	152 BEACH ROAD #11-05, GATEWAY EAST, 189721 SINGAPORE

2.2 Manufacturer Information

Manufacturer	HASHDOG PTE. LTD.
Address	152 BEACH ROAD #11-05, GATEWAY EAST, 189721 SINGAPORE

2.3 Factory Information

Factory	N/A
Address	N/A

2.4 General Description for Equipment under Test (EUT)

EUT Name	Mini OBD2 Dongle
Model Name Under Test	Macaron
Series Model Name	N/A
Description of Model name differentiation	N/A
Serial Number	Macaron230621HZ0001
Hardware Version	1.2
Software Version	1.1.0
Dimensions (Approx.)	N/A
Weight (Approx.)	N/A

2.5 Technical Information

Network and Wireless connectivity	LoRa, Bluetooth (BLE) GPS, GLONASS, BDS, Galileo

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.
Number of Channel	8
Tested Channel	65 (903 MHz), 68 (907.8 MHz), 72 (914.2 MHz)
Antenna Type	PIFA Antenna
Antenna Gain	-0.51 dBi
Antenna System (MIMO Smart Antenna)	N/A

All channel was listed on the following table:

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

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	RSS-Gen Issue 5	General Requirements for Compliance of Radio Apparatus
4	RSS-247 Issue 2	Digital Transmission Systems (DTSs), Frequency Hopping Systems(FHSs) and Licence-Exempt Local Area Network (LE-LAN) Devices
5	ANSI C63.10-2013	American National Standard for Testing Unlicensed Wireless Devices

3.2 Test Verdict

No.	Description	FCC Part No.	ISED Part No.	Channel	Verdict
1	Antenna Requirement	15.203	RSS-247, 5.4 (6)	--	Pass[Note1]
2	Output Power	15.247(b)	RSS-247, 5.4 (4)	ANNEX A.1	Pass
3	Occupied Bandwidth	15.247(a)	RSS-GEN, 6.6; RSS-247, 5.2 (1)	ANNEX A.2	Pass
4	Conducted Spurious Emission	15.247(d)	RSS-247, 5.5	ANNEX A.3	Pass
5	Band Edge(Authorized-band band-edge)	15.247(d)	RSS-GEN, 8.9; RSS-247, 5.5	ANNEX A.4	Pass
6	Conducted Emission	15.207	RSS-GEN, 8.8	ANNEX A.5	N/A[Note2]
7	Radiated Spurious Emission	15.209 15.247(d)	RSS-247, 5.5	ANNEX A.6	Pass
8	Band Edge(Restricted-band band-edge)	15.209 15.247(d)	RSS-247, 5.5	ANNEX A.7	Pass
9	Power spectral density (PSD)	15.247(e)	RSS-247, 5.2 (2)	ANNEX A.8	Pass

Note [1]: The EUT has a permanently and irreplaceable attached antenna, which complies with the requirement FCC 15.203.

Note [2]: The EUT only powered by DC Source, so the Conducted Emission test is not applicable.

4 GENERAL TEST CONFIGURATIONS

4.1 Test Environments

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

Relative Humidity	48% to 57%	
Atmospheric Pressure	100 kPa to 102 kPa	
Temperature	NT (Normal Temperature)	+22.7℃ to +24.5℃
Working Voltage of the EUT	NV (Normal Voltage)	12 V

4.2 Test Equipment List

Description	Manufacturer	Model	Serial No.	Cal. Date	Cal. Due
Spectrum Analyzer	KEYSIGHT	N9020A	MY50330200	2023.05.16	2024.05.15
Spectrum Analyzer	ROHDE&SCHWARZ	FSV-40	101544	2022.12.28	2023.12.27
Spectrum Analyzer	KEYSIGHT	N9020A	MY52510065	2022.09.06	2023.09.05
Signaling Unit	ROHDE&SCHWARZ	CMW500	171150	2022.06.29	2023.06.28
Test Antenna-Bi-Log	SCHWARZBECK	VULB 9163	00884	2021.03.08	2024.03.07
Test Antenna-Horn	SCHWARZBECK	BBHA 9120D	01631	2022.02.03	2025.02.02
Test Antenna-Horn	A-INFO	LB-180400KF	J211060273	2021.07.02	2024.07.01
Anechoic Chamber	RAINFORD	9m*6m*6m	144	2022.02.19	2024.09.03
EMI Receiver	ROHDE&SCHWARZ	ESRP	101036	2022.09.09	2023.09.08
Test Antenna-Loop	SCHWARZBECK	FMZB 1519	1519-037	2021.04.16	2024.04.15
Anechoic Chamber	EMC Electronic Co., Ltd	20.10*11.60 *7.35m	130	2021.08.15	2024.08.14
Amplifier	COM-MV	LSCX_LNA 1-12G-01	180602	2020.09.08	2023.09.07
Amplifier	COM-MV	XKu_LNA7-18G-01	180601	2020.09.08	2023.09.07
Amplifier	COM-MV	KA_LNA18-40G-01	18050001	2020.09.08	2023.09.07
Amplifier	COM-MV	ZT30-1000M	B2017119082	2022.12.07	2023.12.06

4.3 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.

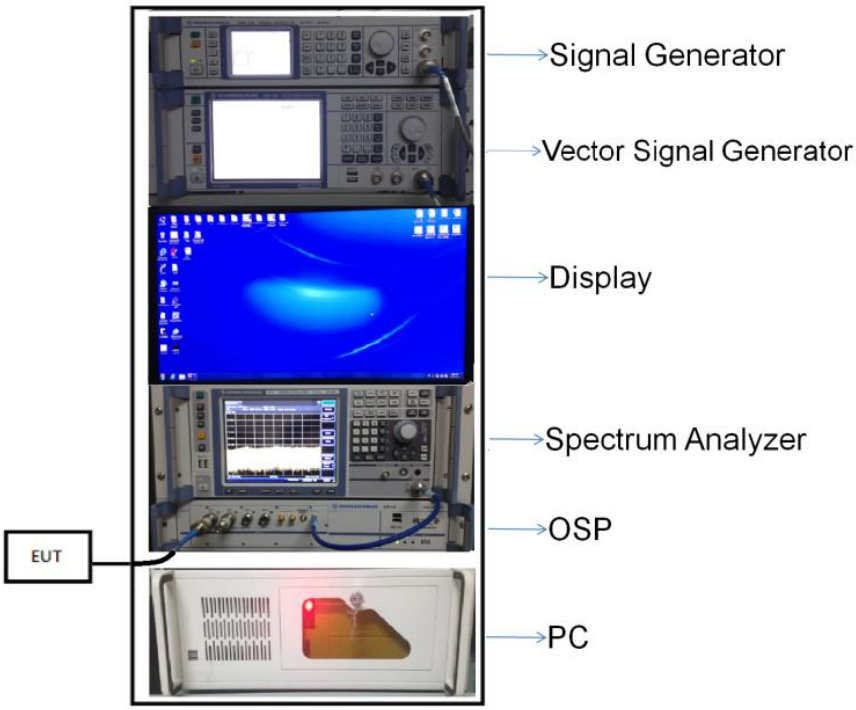
Parameters	Uncertainty
Occupied Channel Bandwidth	2.8%
RF output power, conducted	1.28 dB
Power Spectral Density, conducted	1.30 dB
Unwanted Emissions, conducted	1.84 dB
All emissions, radiated	5.36 dB
Temperature	0.8 °C
Humidity	4 %

4.4 Description of Test Setup

4.4.1 For Antenna Port Test

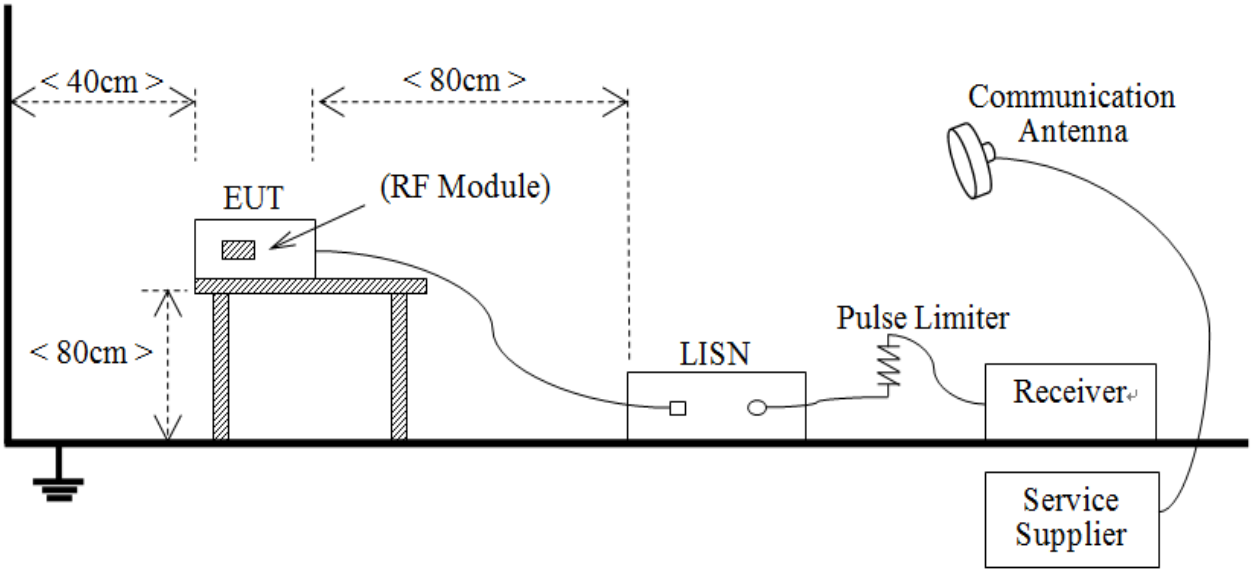
Conducted value (dBm) = Measurement value (dBm) + cable loss (dB)

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



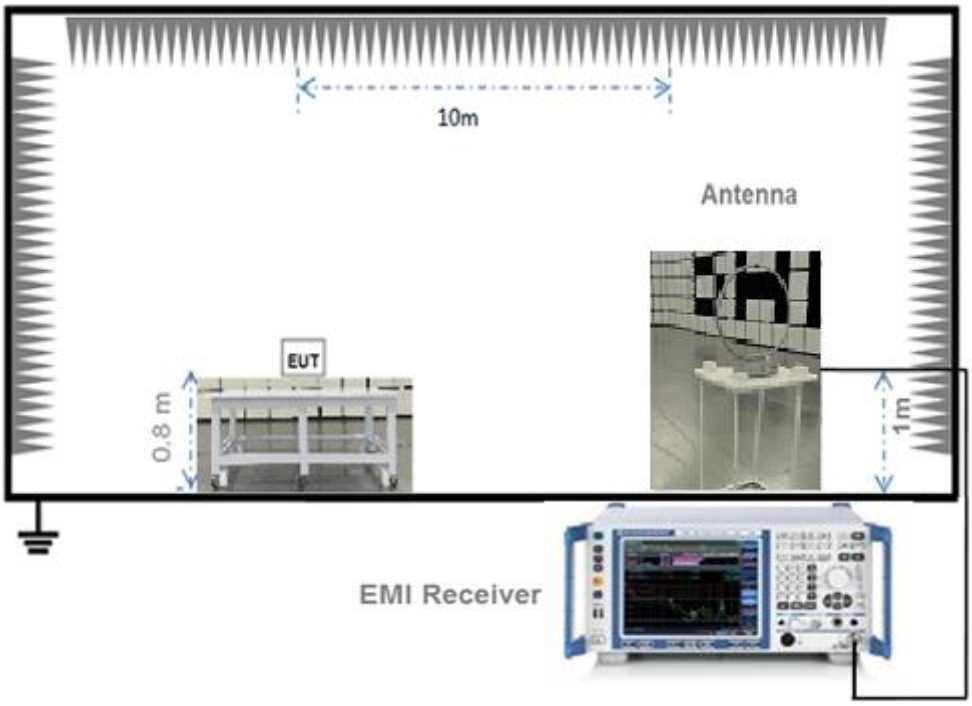
(Diagram 1)

4.4.2 For AC Power Supply Port Test



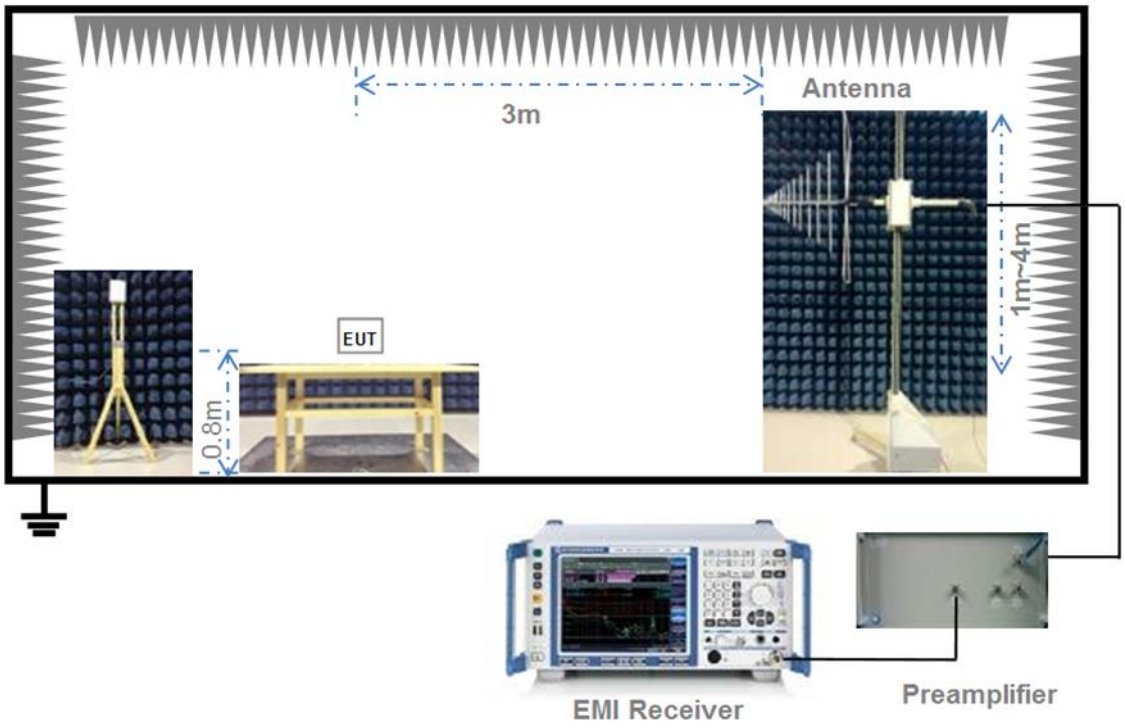
(Diagram 2)

4.4.3 For Radiated Test (Below 30 MHz)



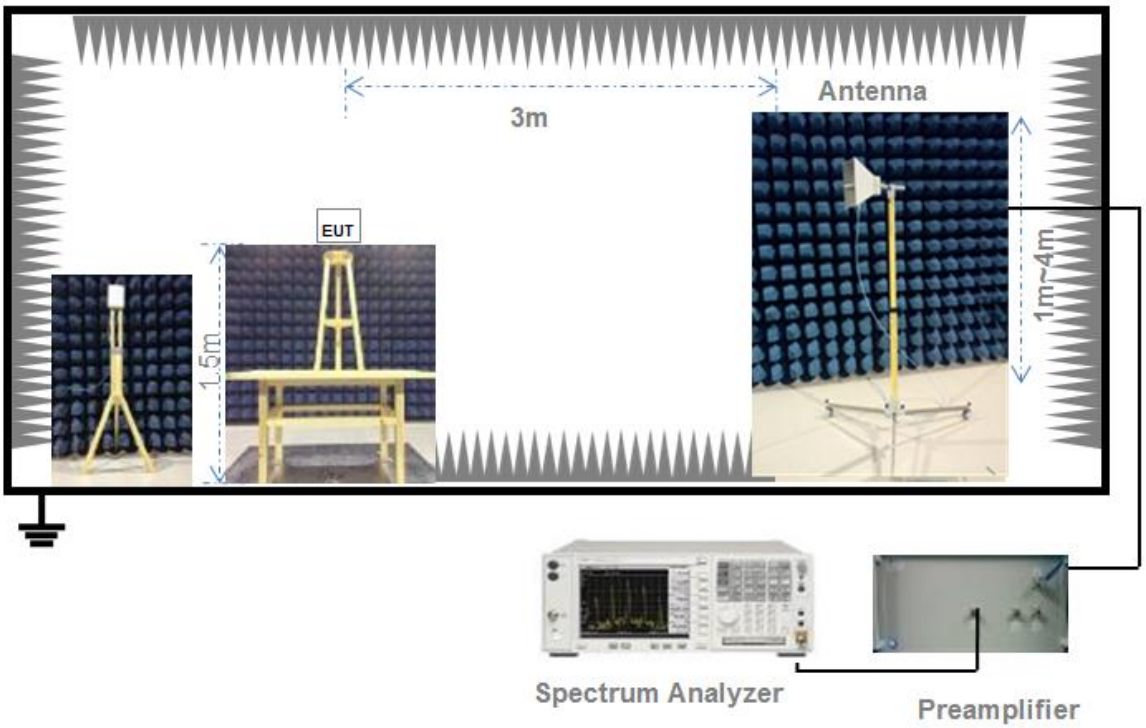
(Diagram 3)

4.4.4 For Radiated Test (30 MHz-1 GHz)



(Diagram 4)

4.4.5 For Radiated Test (Above 1 GHz)



(Diagram 5)

4.5 Measurement Results Explanation Example

4.5.1 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.

4.5.2 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.

EIRP= Measure Conducted output power Value (dBm) + Maximum transmit antenna gain (dBi) + the appropriate maximum ground reflection factor (dB)

5 TEST ITEMS

5.1 Antenna Requirements

5.1.1 Relevant Standards

FCC §15.203 & 15.247(b); RSS-247, 5.4 (6)

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.

RSS-247, 5.4 (4)

For DTSs employing digital modulation techniques operating in the bands 902-928 MHz and 2400-2483.5 MHz, the maximum peak conducted output power shall not exceed 1W. Except as provided in Section 5.4(5), the e.i.r.p. shall not exceed 4 W.

5.2.2 Test Setup

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

5.2.3 Test Procedure

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); RSS-247, 5.1 (1); RSS-GEN, 6.6

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

5.3.3 Test Procedure

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); RSS-247, 5.5

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

5.4.2 Test Setup

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

5.4.3 Test Procedure

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); RSS-247, 5.5

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

5.5.2 Test Setup

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

5.5.3 Test Procedure

The 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; RSS-GEN, 8.8

For an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency within the band 150 kHz to 30 MHz shall not exceed the limits in the following table, as measured using a 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 4.4.2 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); RSS-GEN, 8.9; RSS-247, 5.5

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

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

Frequency (MHz)	Field Strength (μV/m)	Measurement Distance (m)
0.009 - 0.490	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 4.4.3 to 4.4.5 for test setup description for the antenna port. The photo of test setup please refer to ANNEX B.

5.7.3 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.

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); RSS-GEN, 8.9; RSS-247, 5.5

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

5.8.2 Test Setup

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

5.8.3 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); RSS-247, 5.2 (2)

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 4.4.1 (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

Peak Power Test Data

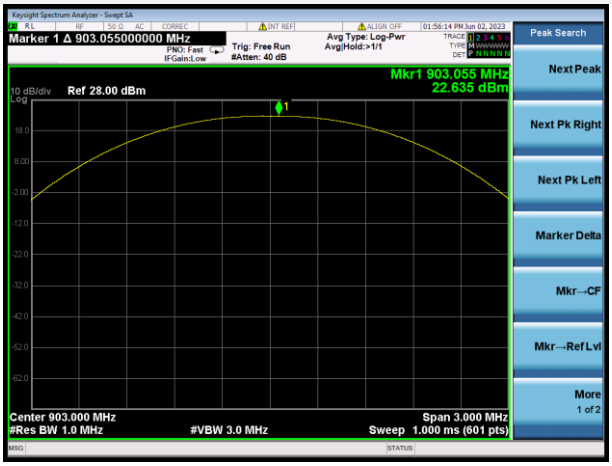
Channel	Measured Output Peak Power		Limit		Verdict
	LoRa		dBm	mW	
	dBm	mW			
Low	22.64	183.44	30	1000	Pass
Middle	22.72	187.24			Pass
High	22.69	185.82			Pass

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

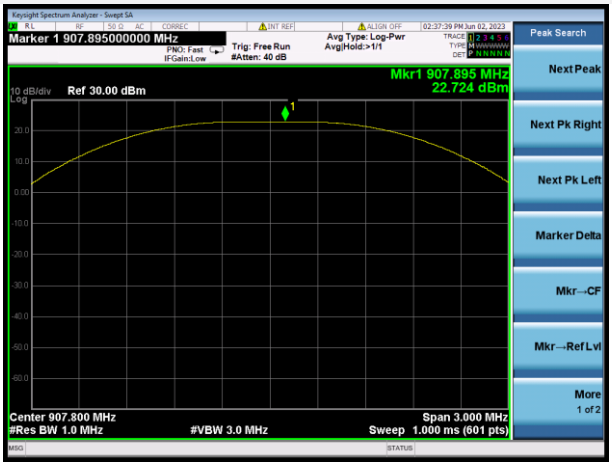
Channel	E.I.R.P		Limit		Verdict
	LoRa		dBm	mW	
	dBm	mW			
Low Channel	22.13	163.12	36	4000	Pass
Middle Channel	22.21	166.49			Pass
High Channel	22.18	165.23			Pass

Test Plots

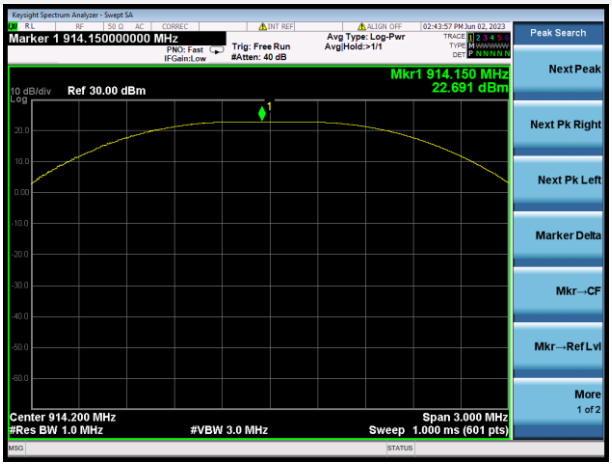
LOW CHANNEL



MIDDLE CHANNEL



HIGH CHANNEL



A.2 Occupied Bandwidth

Test Data

Test Mode	LoRa		
Channel	6 dB Bandwidth (MHz)	99% Bandwidth (MHz)	6 dB Bandwidth Limits (MHz)
Low Channel	0.650000	0.520160	≥0.5
Middle Channel	0.655000	0.534630	≥0.5
High Channel	0.650000	0.522310	≥0.5

Test Plots

6 dB Bandwidth

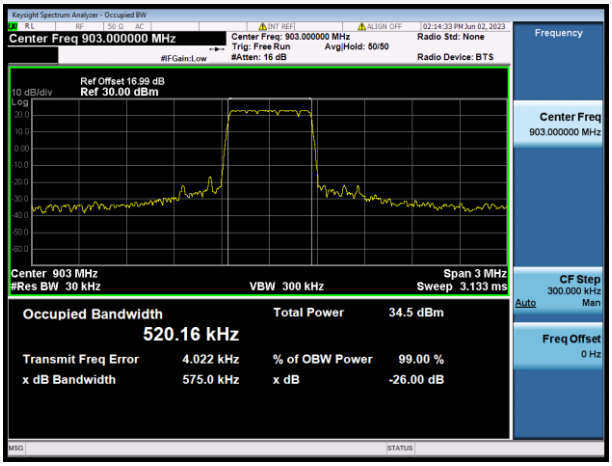
LOW CHANNEL

MIDDLE CHANNEL

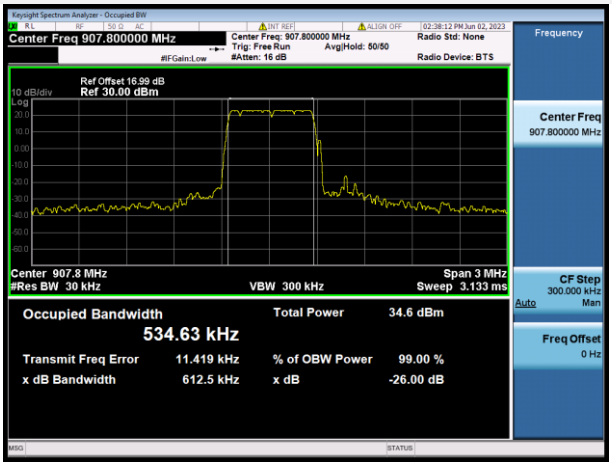
HIGH CHANNEL

99% Bandwidth

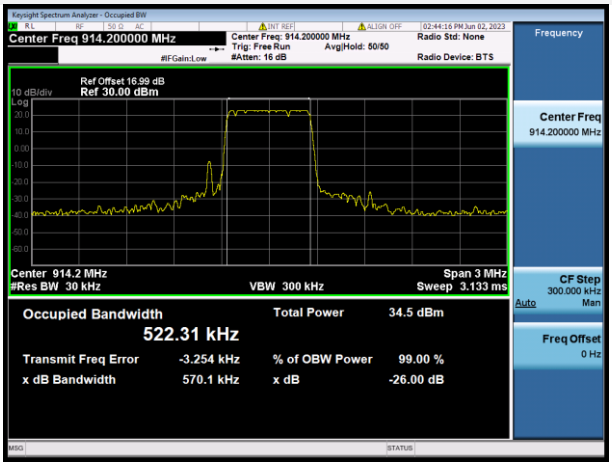
LOW CHANNEL



MIDDLE CHANNEL



HIGH CHANNEL



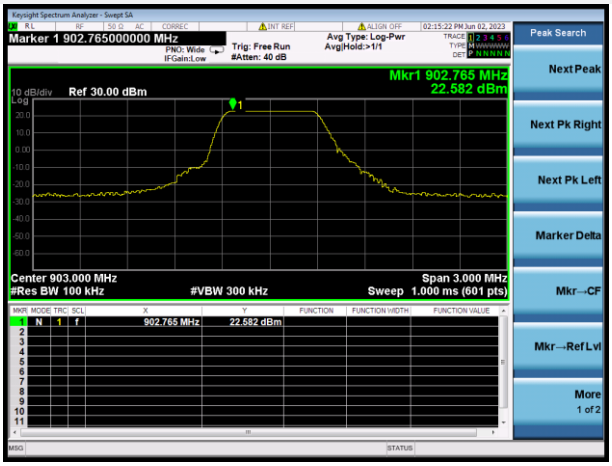
A.3 Conducted Spurious Emissions

Test Data

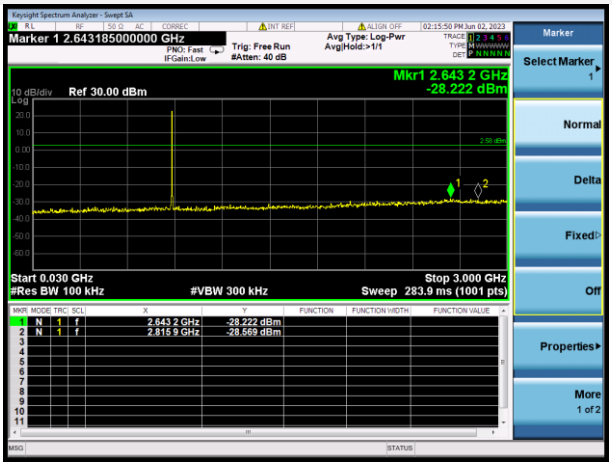
LoRa				
Channel	Measured Max. Out of Band Emission (dBm)	Limit (dBm)		Verdict
		Carrier Level	Calculated 20 dBc Limit	
Low	-14.58	22.58	2.58	Pass
Middle	-14.62	22.70	2.70	Pass
High	-14.30	22.67	2.67	Pass

Test Plots

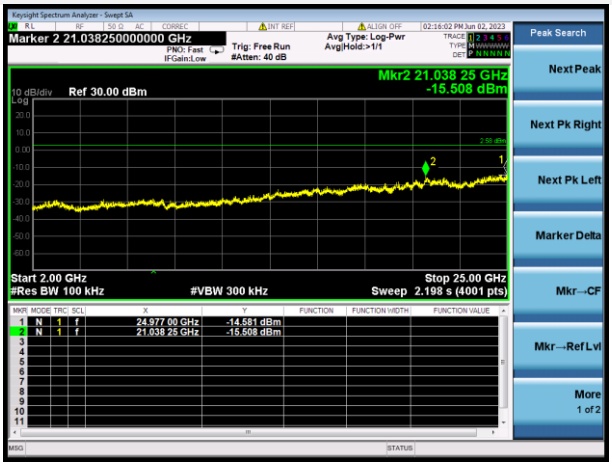
LOW CHANNEL, CARRIER LEVEL



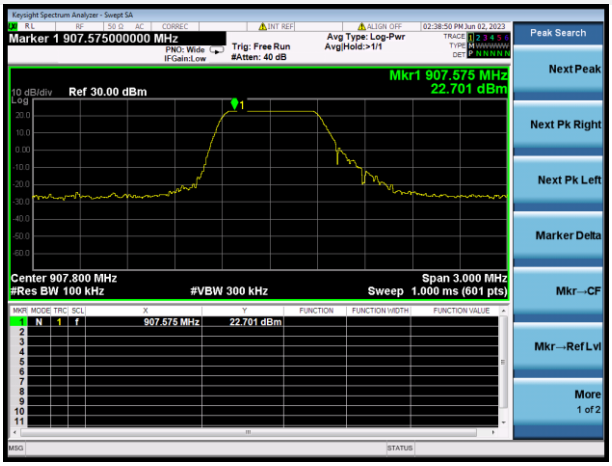
LOW CHANNEL, SPURIOUS 30 MHz ~ 3 GHz



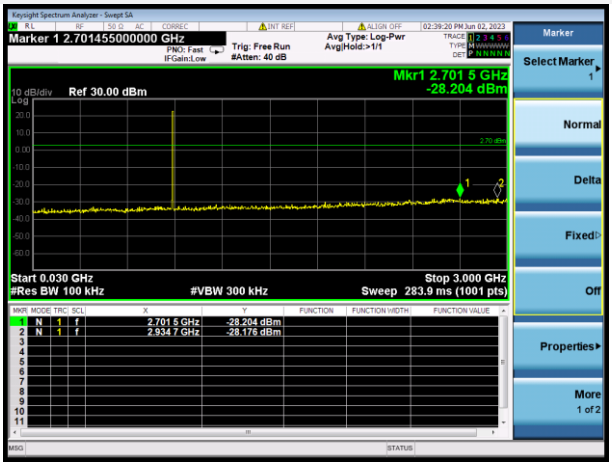
LOW CHANNEL, SPURIOUS 2 GHz ~ 25 GHz



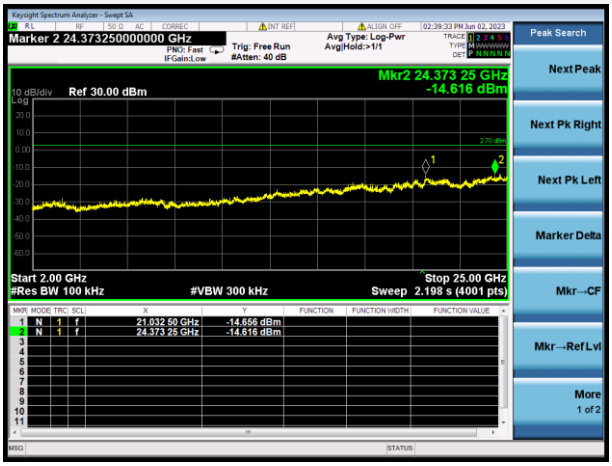
MIDDLE CHANNEL, CARRIER LEVEL



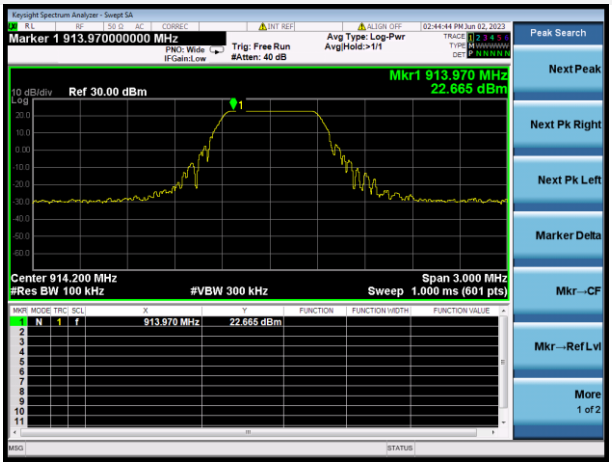
MIDDLE CHANNEL, SPURIOUS 30 MHz ~ 3 GHz



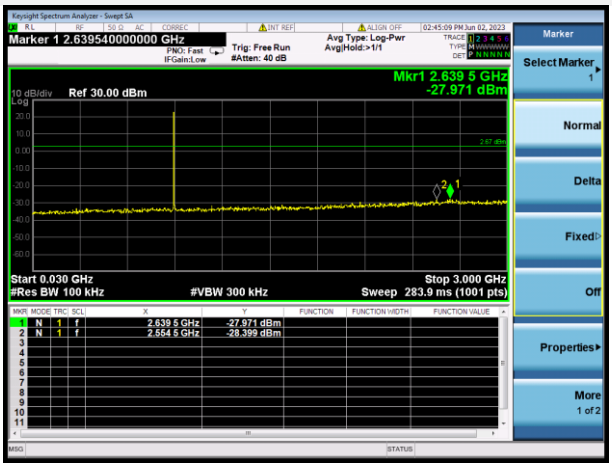
MIDDLE CHANNEL, SPURIOUS 2 GHz ~ 25 GHz



HIGH CHANNEL, CARRIER LEVEL



HIGH CHANNEL, SPURIOUS 30 MHz ~ 3 GHz



HIGH CHANNEL, SPURIOUS 2 GHz ~ 25 GHz

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

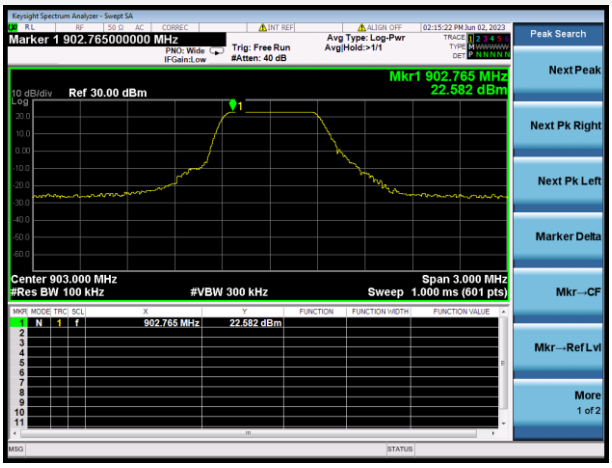
Note: The lowest and highest channels are tested to verify the band edge emissions. Please refer to the following the plots for emissions values.

Test Data

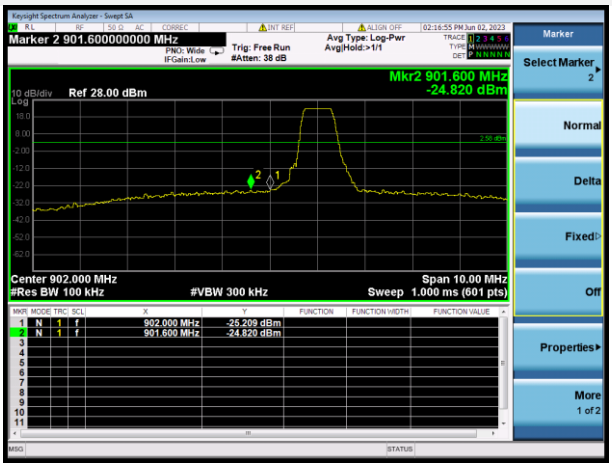
LoRa				
Channel	Measured Max. Band Edge Emission (dBm)	Limit (dBm)		Verdict
		Carrier Level	Calculated 20 dBc Limit	
Low Channel	-24.82	22.58	2.58	Pass
High Channel	-47.70	22.67	2.67	Pass

Test Plots

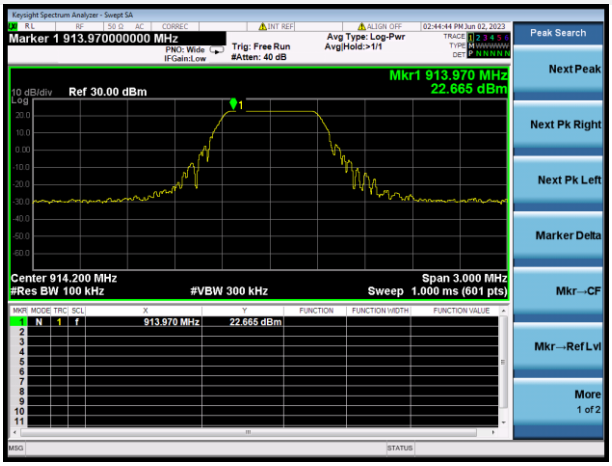
LOW CHANNEL, CARRIER LEVEL



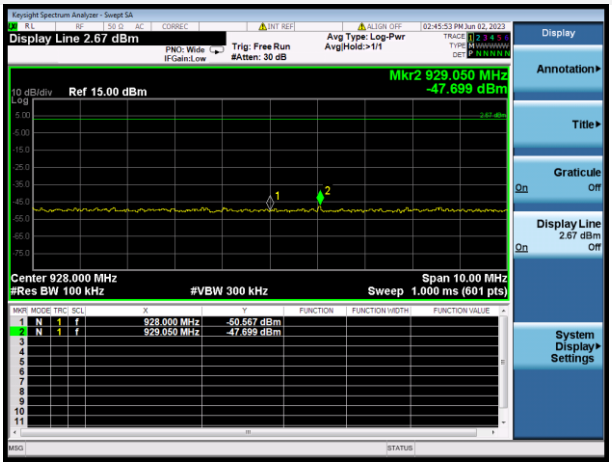
LOW CHANNEL, BAND EDGE



HIGH CHANNEL, CARRIER LEVEL



HIGH CHANNEL, BAND EDGE



A.5 Conducted Emissions

Note: Not applicable.

A.6 Radiated Spurious Emission

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

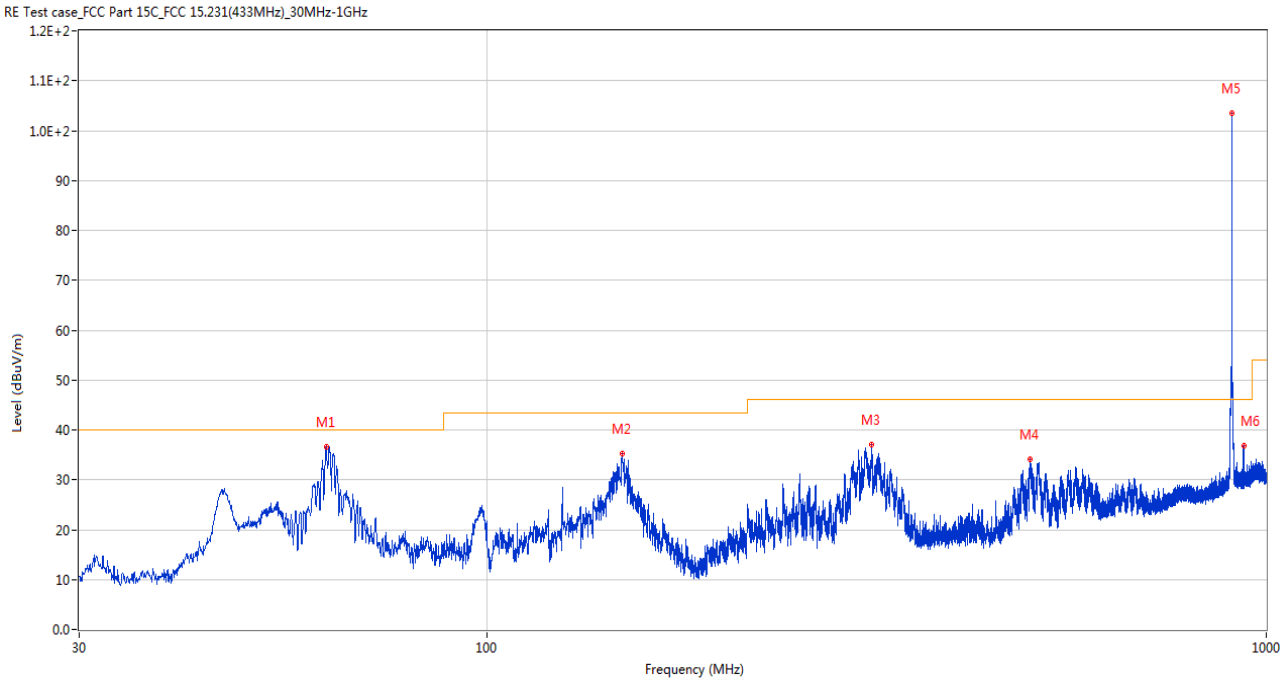
Note [2]: For the test data above 1 GHz, according the ANSI C63.4-2014, where limits are specified for both average and peak (or quasi-peak) detector functions, if the peak (or quasi-peak) measured value complies with the average limit, it is unnecessary to perform an average measurement.

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.

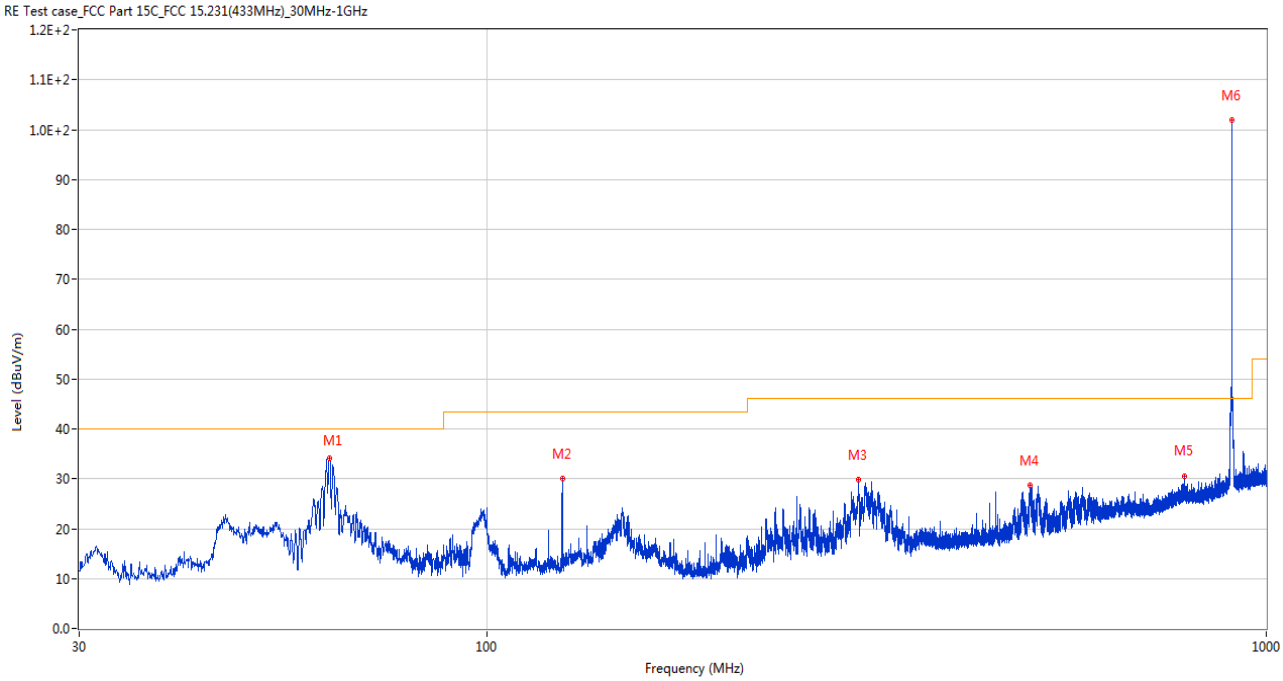
Test Data and Plots

LOW CHANNEL, 30 MHz to 1 GHz, ANT H



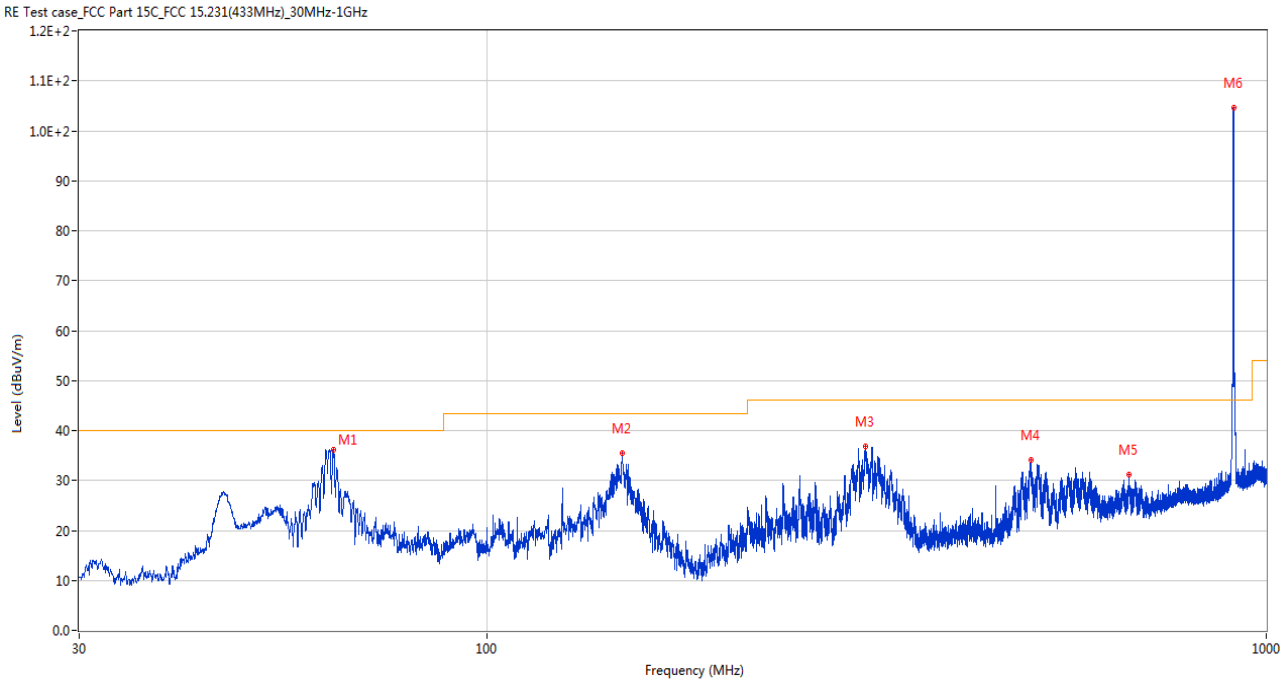
No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	62.204	36.54	-27.31	40.0	3.46	Peak	153.00	300	Horizontal	Pass
2	149.213	35.22	-24.35	43.5	8.28	Peak	278.00	150	Horizontal	Pass
3	311.834	37.02	-23.41	46.0	8.98	Peak	243.00	150	Horizontal	Pass
4	497.685	34.05	-18.37	46.0	11.95	Peak	108.00	150	Horizontal	Pass
5	903.242	103.57	-7.44	46.0	-57.57	Peak	256.00	150	Horizontal	N/A
6	935.204	36.81	-7.76	46.0	9.19	Peak	74.00	150	Horizontal	Pass

LOW CHANNEL, 30 MHz to 1 GHz, ANT V



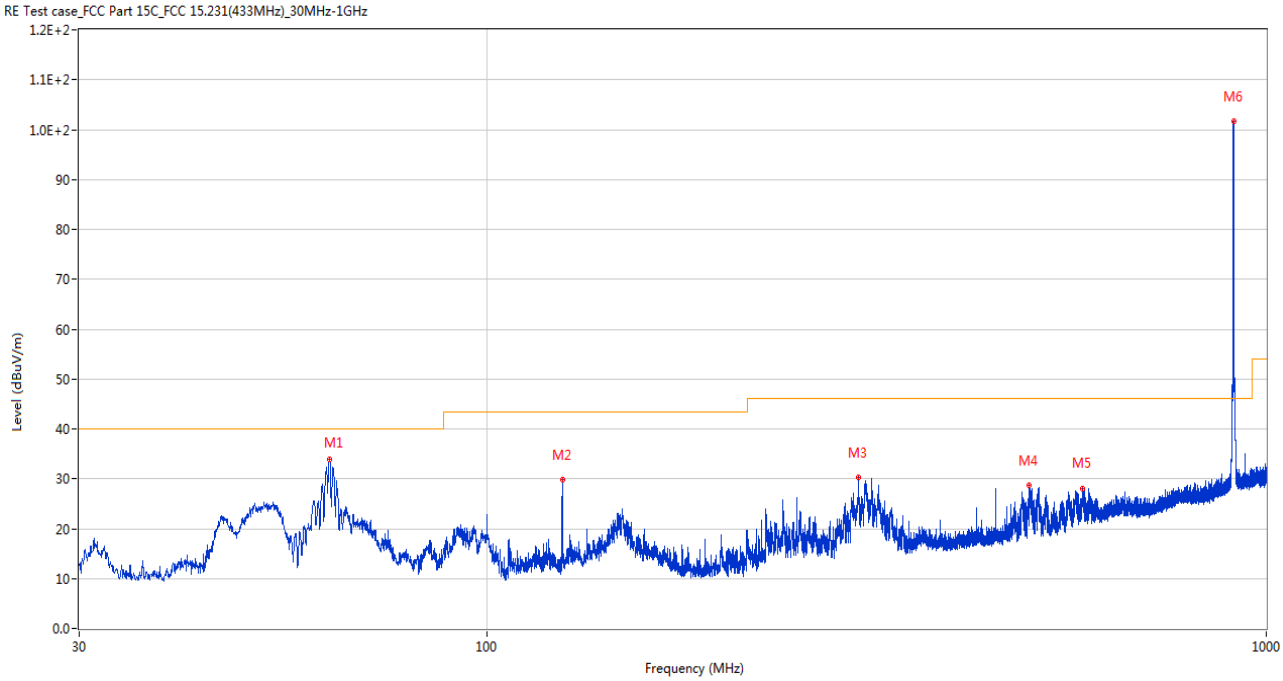
No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	62.931	34.07	-27.45	40.0	5.93	Peak	49.00	300	Vertical	Pass
2	125.011	30.05	-26.17	43.5	13.45	Peak	359.00	300	Vertical	Pass
3	300.048	29.86	-24.07	46.0	16.14	Peak	10.00	150	Vertical	Pass
4	497.685	28.66	-18.37	46.0	17.34	Peak	135.00	300	Vertical	Pass
5	785.388	30.61	-9.78	46.0	15.39	Peak	14.00	200	Vertical	Pass
6	902.951	101.91	-7.49	46.0	-55.91	Peak	105.00	300	Vertical	N/A

MIDDLE CHANNEL, 30 MHz to 1 GHz, ANT H



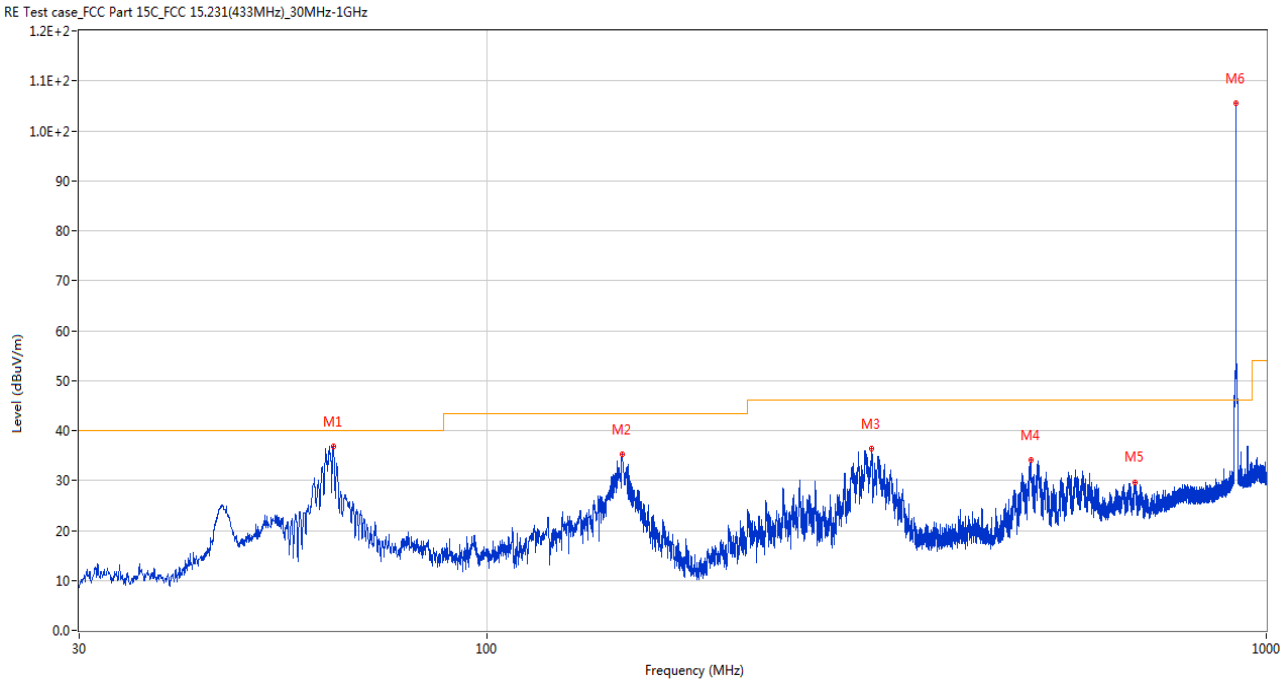
No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	63.562	36.44	-27.58	40.0	3.56	Peak	147.00	300	Horizontal	Pass
2	149.262	35.54	-24.35	43.5	7.96	Peak	290.00	150	Horizontal	Pass
3	306.305	36.80	-23.63	46.0	9.20	Peak	242.00	200	Horizontal	Pass
4	499.480	34.06	-18.35	46.0	11.94	Peak	107.00	200	Horizontal	Pass
5	666.902	31.23	-13.46	46.0	14.77	Peak	17.00	200	Horizontal	Pass
6	907.898	104.56	-7.60	46.0	-58.56	Peak	253.00	150	Horizontal	N/A

MIDDLE CHANNEL, 30 MHz to 1 GHz, ANT V



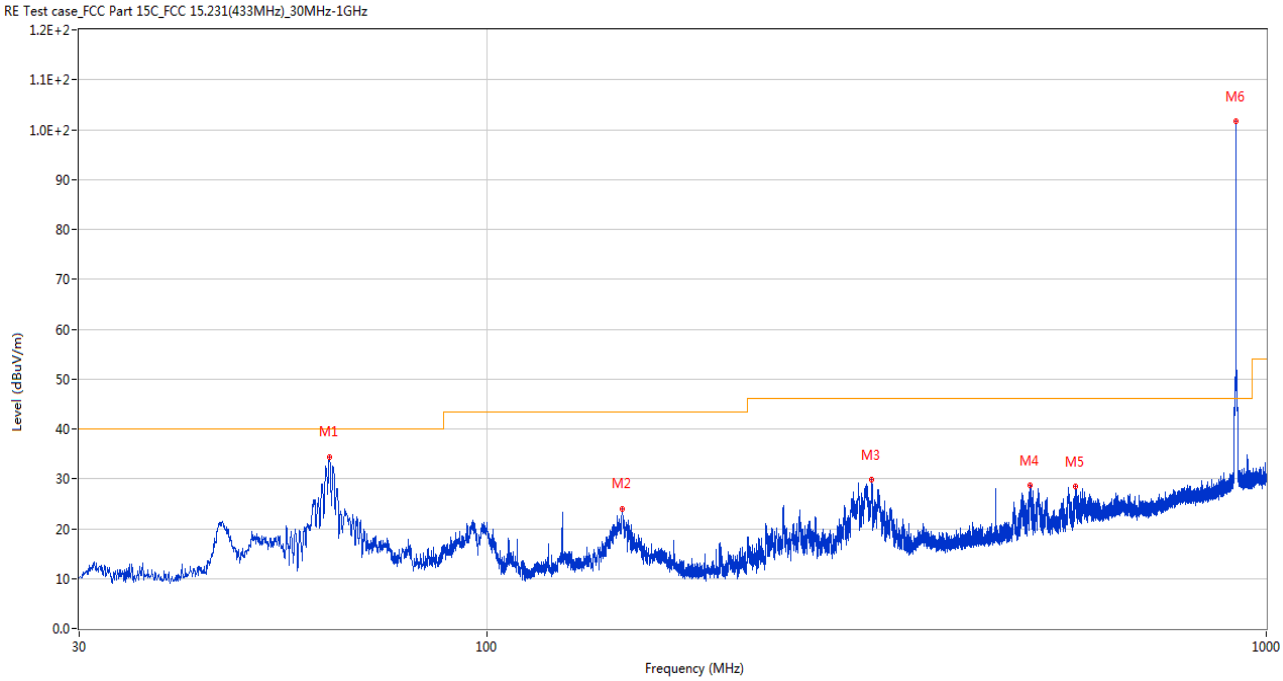
No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	62.786	33.22	-27.42	40.0	6.78	Peak	61.00	200	Vertical	Pass
2	125.011	29.88	-26.17	43.5	13.62	Peak	222.00	300	Vertical	Pass
3	300.048	30.24	-24.07	46.0	15.76	Peak	281.00	200	Vertical	Pass
4	496.861	28.67	-18.45	46.0	17.33	Peak	144.00	300	Vertical	Pass
5	580.524	28.11	-16.02	46.0	17.89	Peak	167.00	200	Vertical	Pass
6	907.995	101.60	-7.60	46.0	-55.60	Peak	109.00	300	Vertical	N/A

HIGH CHANNEL, 30 MHz to 1 GHz, ANT H



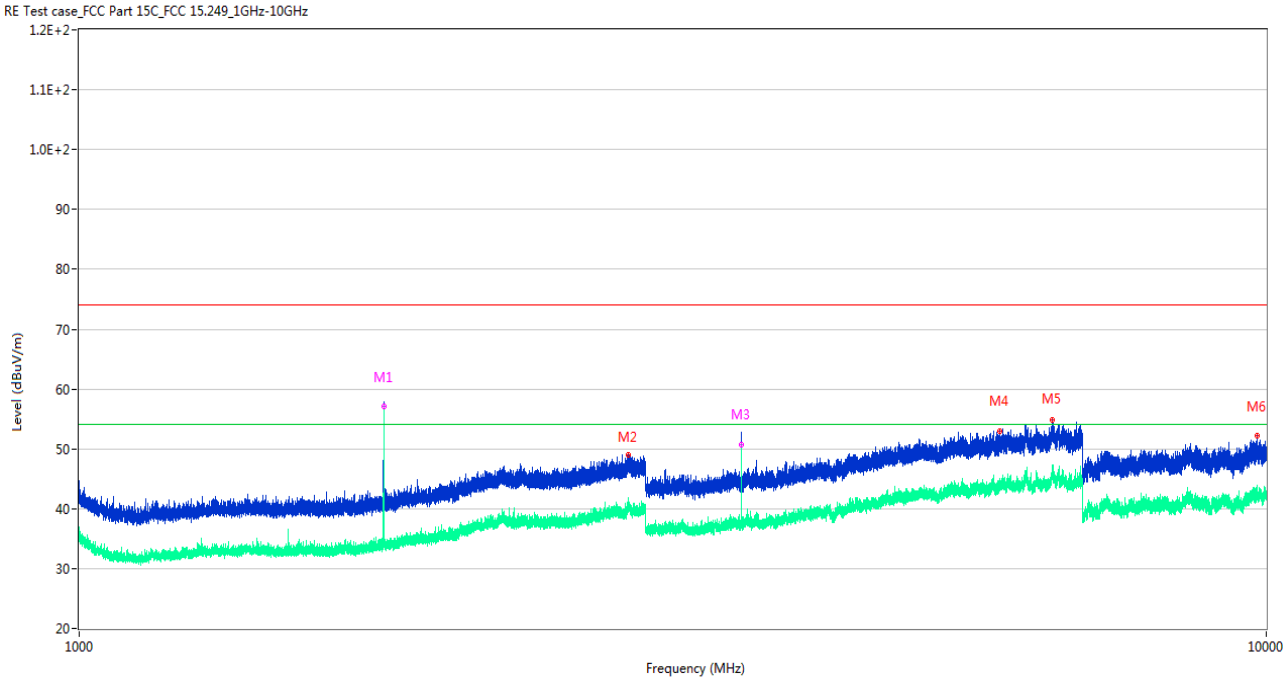
No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	63.514	36.74	-27.57	40.0	3.26	Peak	118.00	300	Horizontal	Pass
2	149.213	35.20	-24.35	43.5	8.30	Peak	281.00	150	Horizontal	Pass
3	312.027	36.36	-23.40	46.0	9.64	Peak	254.00	150	Horizontal	Pass
4	499.141	34.17	-18.35	46.0	11.83	Peak	110.00	150	Horizontal	Pass
5	679.367	29.71	-13.46	46.0	16.29	Peak	43.00	200	Horizontal	Pass
6	914.155	105.52	-7.81	46.0	-59.52	Peak	254.00	150	Horizontal	N/A

HIGH CHANNEL, 30 MHz to 1 GHz, ANT V



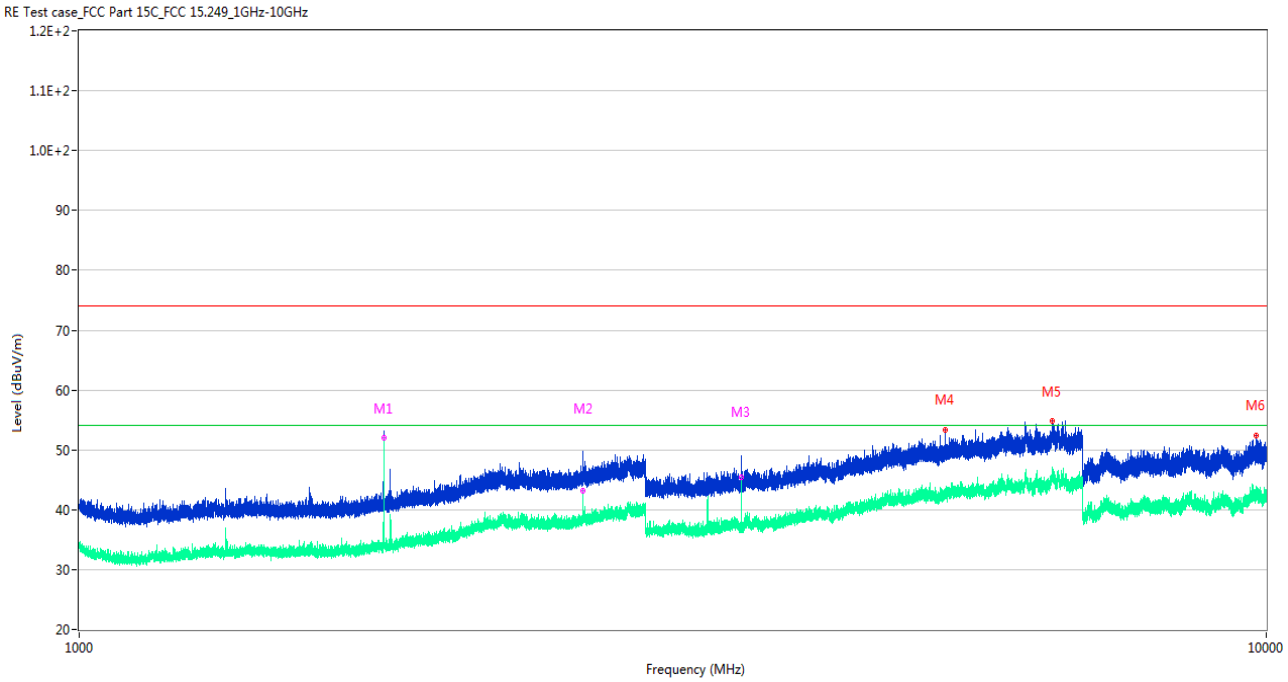
No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	62.883	34.45	-27.44	40.0	5.55	Peak	51.00	300	Vertical	Pass
2	149.359	24.07	-24.34	43.5	19.43	Peak	352.00	300	Vertical	Pass
3	311.979	29.77	-23.40	46.0	16.23	Peak	297.00	200	Vertical	Pass
4	497.831	28.69	-18.37	46.0	17.31	Peak	152.00	300	Vertical	Pass
5	569.999	28.54	-16.43	46.0	17.46	Peak	156.00	300	Vertical	Pass
6	914.252	101.69	-7.81	46.0	-55.69	Peak	319.00	150	Vertical	N/A

LOW CHANNEL, 1 GHz to 10 GHz, ANT H



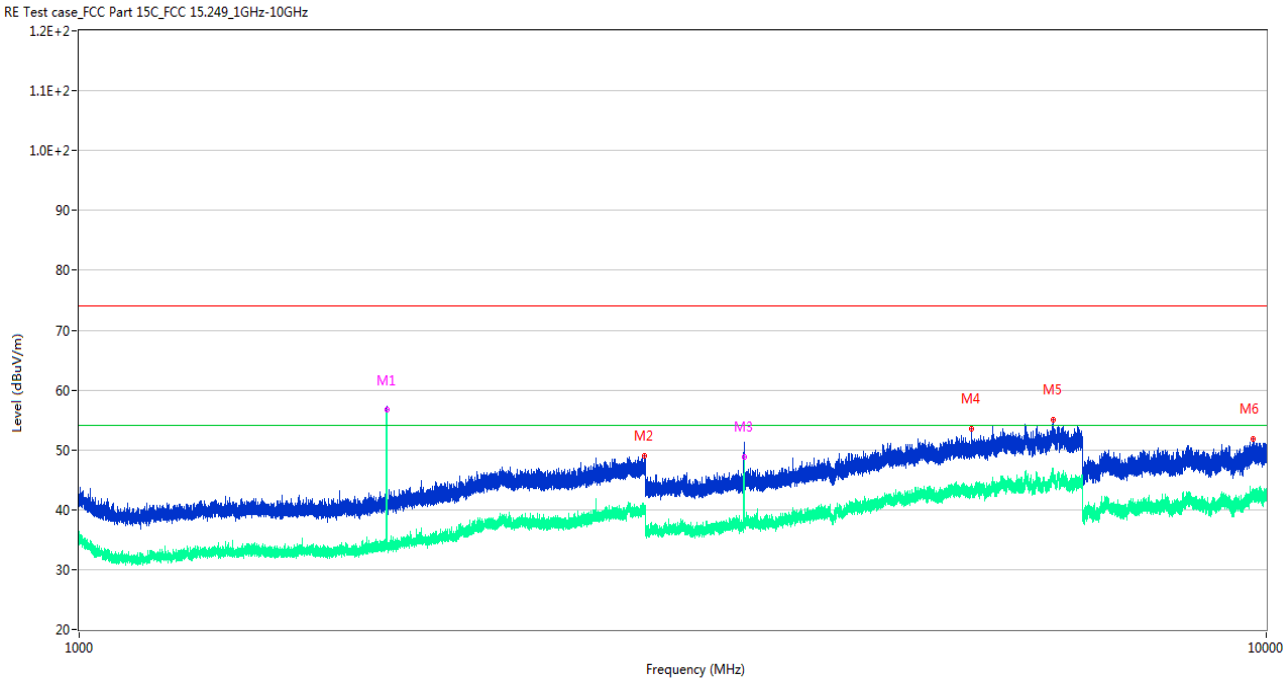
No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	1805.800	57.70	-13.06	74.0	16.30	Peak	358.00	100	Horizontal	Pass
1**	1805.800	57.01	-13.06	54.0	-3.01	AV	358.00	100	Horizontal	N/A
2	2903.600	48.97	-3.44	74.0	25.03	Peak	113.00	100	Horizontal	Pass
2**	2903.600	40.07	-3.44	54.0	13.93	AV	113.00	100	Horizontal	Pass
3	3612.400	51.91	-7.11	74.0	22.09	Peak	84.00	100	Horizontal	Pass
3**	3612.400	50.70	-7.11	54.0	3.30	AV	84.00	100	Horizontal	Pass
4	5964.800	53.05	-1.32	74.0	20.95	Peak	189.00	200	Horizontal	Pass
4**	5964.800	43.80	-1.32	54.0	10.20	AV	189.00	200	Horizontal	Pass
5	6602.800	54.87	0.81	74.0	19.13	Peak	318.00	400	Horizontal	Pass
5**	6602.800	46.12	0.81	54.0	7.88	AV	318.00	400	Horizontal	Pass
6	9823.750	52.14	-0.10	74.0	21.86	Peak	269.00	400	Horizontal	Pass
6**	9823.750	43.95	-0.10	54.0	10.05	AV	269.00	400	Horizontal	Pass

LOW CHANNEL, 1 GHz to 10 GHz, ANT V



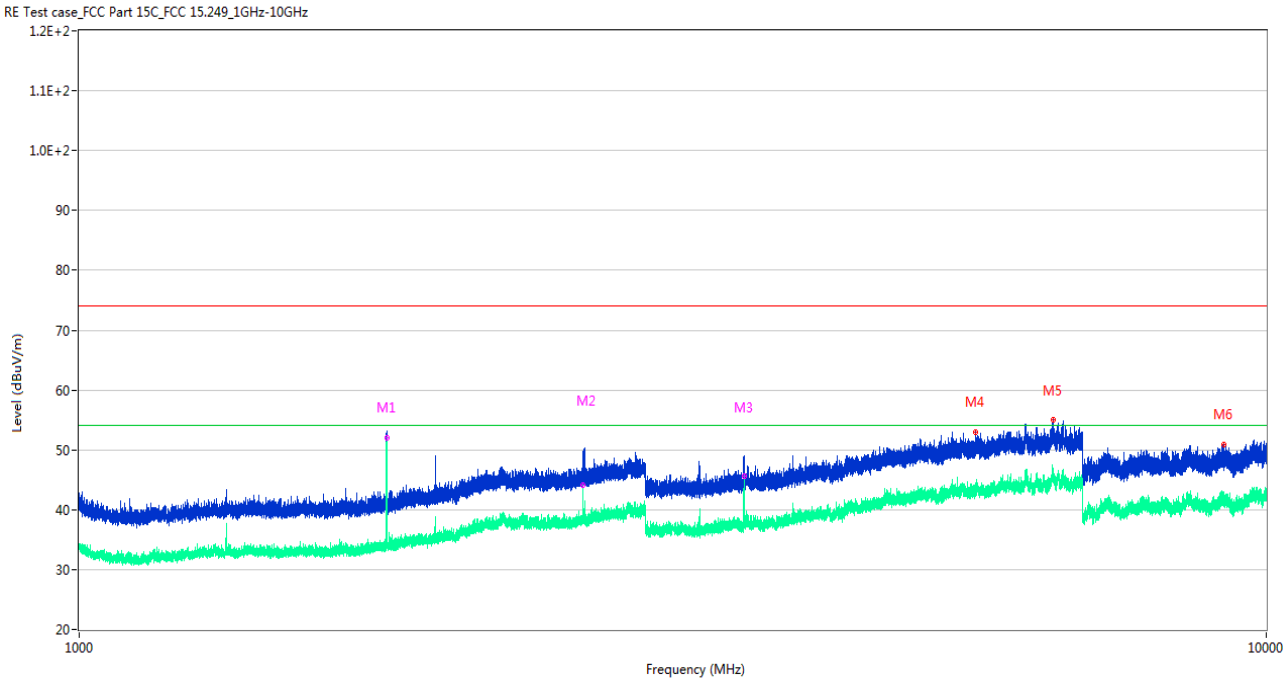
No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	1806.000	52.60	-13.09	74.0	21.40	Peak	73.00	200	Vertical	Pass
1**	1806.000	51.94	-13.09	54.0	2.06	AV	73.00	200	Vertical	N/A
2	2655.400	44.62	-7.02	74.0	29.38	Peak	169.00	200	Vertical	Pass
2**	2655.400	43.13	-7.02	54.0	10.87	AV	169.00	200	Vertical	Pass
3	3611.400	48.43	-7.19	74.0	25.57	Peak	40.00	150	Vertical	Pass
3**	3611.400	45.38	-7.19	54.0	8.62	AV	40.00	150	Vertical	Pass
4	5368.400	53.36	-2.22	74.0	20.64	Peak	9.00	400	Vertical	Pass
4**	5368.400	42.23	-2.22	54.0	11.77	AV	9.00	400	Vertical	Pass
5	6608.800	54.76	1.60	74.0	19.24	Peak	354.00	200	Vertical	Pass
5**	6608.800	46.99	1.60	54.0	7.01	AV	354.00	200	Vertical	Pass
6	9811.151	52.39	-0.02	74.0	21.61	Peak	233.00	200	Vertical	Pass
6**	9811.151	42.27	-0.02	54.0	11.73	AV	233.00	200	Vertical	Pass

MIDDLE CHANNEL, 1 GHz to 10 GHz, ANT H



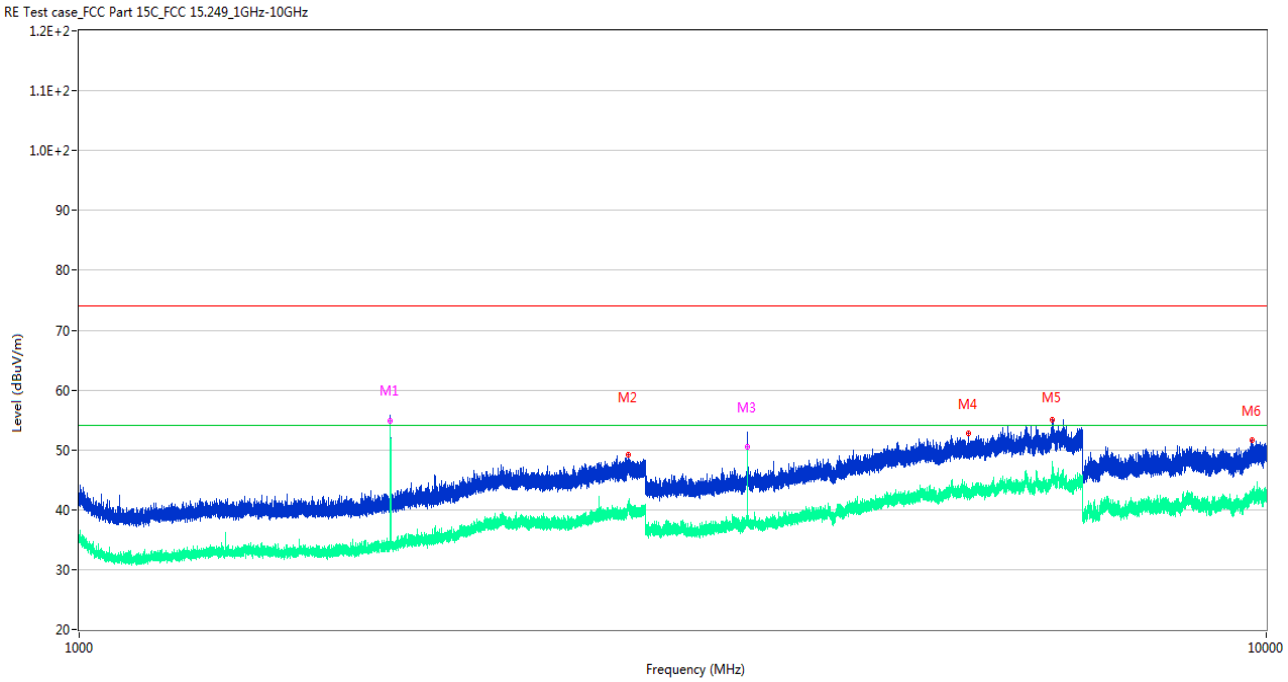
No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	1815.500	57.22	-13.09	74.0	16.78	Peak	0.00	100	Horizontal	Pass
1**	1815.500	56.65	-13.09	54.0	-2.65	AV	0.00	100	Horizontal	N/A
2	2993.000	48.99	-4.82	74.0	25.01	Peak	178.00	150	Horizontal	Pass
2**	2993.000	40.07	-4.82	54.0	13.93	AV	178.00	150	Horizontal	Pass
3	3632.000	50.65	-6.99	74.0	23.35	Peak	69.00	100	Horizontal	Pass
3**	3632.000	48.81	-6.99	54.0	5.19	AV	69.00	100	Horizontal	Pass
4	5641.800	53.57	-2.08	74.0	20.43	Peak	318.00	200	Horizontal	Pass
4**	5641.800	42.98	-2.08	54.0	11.02	AV	318.00	200	Horizontal	Pass
5	6609.400	55.08	1.57	74.0	18.92	Peak	140.00	100	Horizontal	Pass
5**	6609.400	46.86	1.57	54.0	7.14	AV	140.00	100	Horizontal	Pass
6	9746.500	51.79	-0.50	74.0	22.21	Peak	167.00	300	Horizontal	Pass
6**	9746.500	42.36	-0.50	54.0	11.64	AV	167.00	300	Horizontal	Pass

MIDDLE CHANNEL, 1 GHz to 10 GHz, ANT V



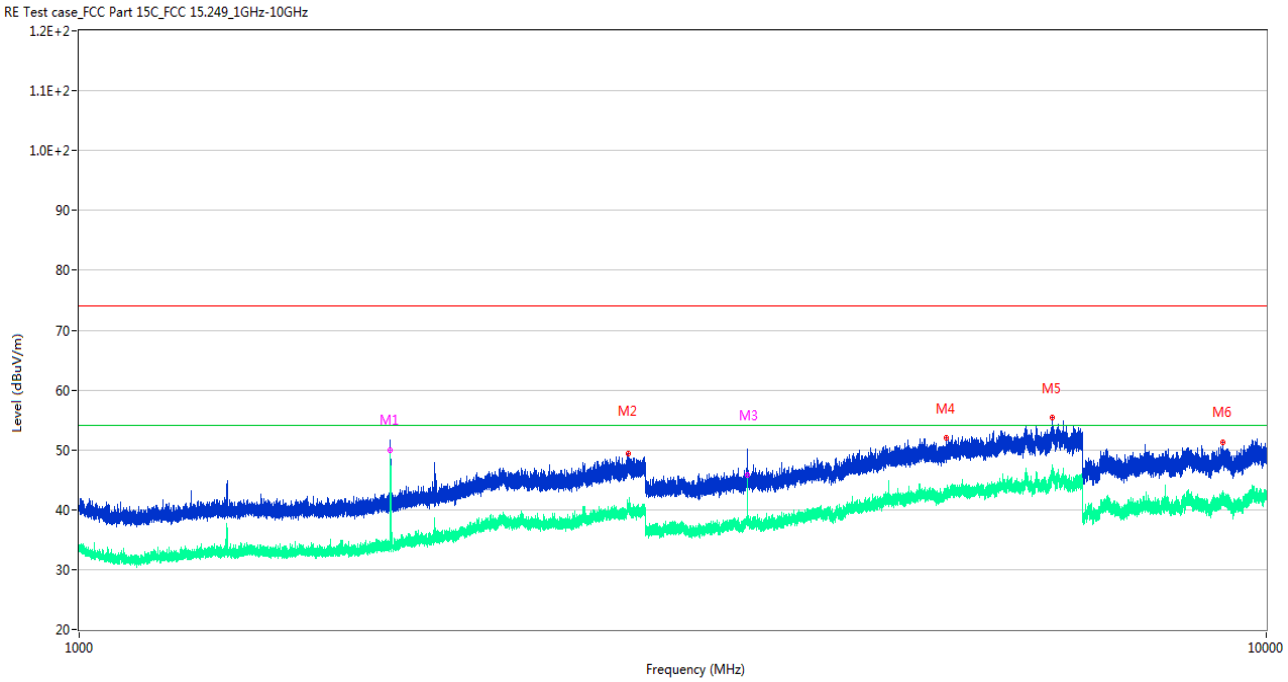
No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	1815.600	52.64	-13.08	74.0	21.36	Peak	74.00	100	Vertical	Pass
1**	1815.600	52.03	-13.08	54.0	1.97	AV	74.00	100	Vertical	N/A
2	2656.700	49.29	-7.06	74.0	24.71	Peak	148.00	100	Vertical	Pass
2**	2656.700	44.13	-7.06	54.0	9.87	AV	148.00	100	Vertical	Pass
3	3631.600	48.38	-7.00	74.0	25.62	Peak	211.00	100	Vertical	Pass
3**	3631.600	45.57	-7.00	54.0	8.43	AV	211.00	100	Vertical	Pass
4	5687.000	53.05	-1.72	74.0	20.95	Peak	41.00	200	Vertical	Pass
4**	5687.000	43.19	-1.72	54.0	10.81	AV	41.00	200	Vertical	Pass
5	6611.000	54.97	1.47	74.0	19.03	Peak	307.00	400	Vertical	Pass
5**	6611.000	46.06	1.47	54.0	7.94	AV	307.00	400	Vertical	Pass
6	9213.700	50.96	-1.36	74.0	23.04	Peak	57.00	400	Vertical	Pass
6**	9213.700	41.10	-1.36	54.0	12.90	AV	57.00	400	Vertical	Pass

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	1828.600	55.38	-12.64	74.0	18.62	Peak	61.00	200	Horizontal	Pass
1**	1828.600	54.90	-12.64	54.0	-0.90	AV	61.00	200	Horizontal	N/A
2	2899.400	49.10	-3.86	74.0	24.90	Peak	317.00	200	Horizontal	Pass
2**	2899.400	40.96	-3.86	54.0	13.04	AV	317.00	200	Horizontal	Pass
3	3656.600	52.38	-6.64	74.0	21.62	Peak	89.00	150	Horizontal	Pass
3**	3656.600	50.55	-6.64	54.0	3.45	AV	89.00	150	Horizontal	Pass
4	5617.800	52.74	-2.49	74.0	21.26	Peak	182.00	400	Horizontal	Pass
4**	5617.800	42.63	-2.49	54.0	11.37	AV	182.00	400	Horizontal	Pass
5	6605.200	55.05	1.22	74.0	18.95	Peak	28.00	200	Horizontal	Pass
5**	6605.200	48.08	1.22	54.0	5.92	AV	28.00	200	Horizontal	Pass
6	9733.450	51.58	-0.49	74.0	22.42	Peak	303.00	200	Horizontal	Pass
6**	9733.450	41.89	-0.49	54.0	12.11	AV	303.00	200	Horizontal	Pass

HIGH CHANNEL, 1 GHz to 10 GHz, ANT V



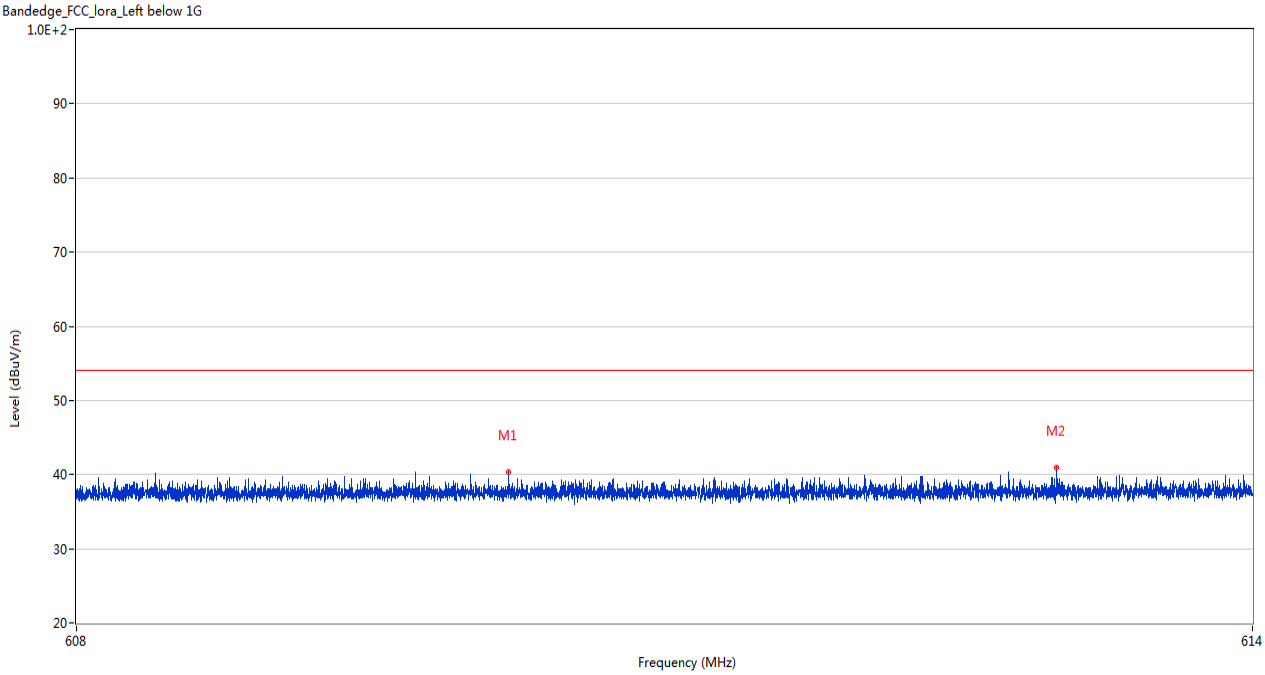
No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	1828.100	51.20	-12.67	74.0	22.80	Peak	352.00	100	Vertical	Pass
1**	1828.100	50.01	-12.67	54.0	3.99	AV	352.00	100	Vertical	N/A
2	2903.400	49.34	-3.44	74.0	24.66	Peak	70.00	150	Vertical	Pass
2**	2903.400	40.15	-3.44	54.0	13.85	AV	70.00	150	Vertical	Pass
3	3657.200	48.23	-6.59	74.0	25.77	Peak	204.00	100	Vertical	Pass
3**	3657.200	45.77	-6.59	54.0	8.23	AV	204.00	100	Vertical	Pass
4	5380.600	51.95	-2.39	74.0	22.05	Peak	34.00	200	Vertical	Pass
4**	5380.600	42.70	-2.39	54.0	11.30	AV	34.00	200	Vertical	Pass
5	6609.200	55.32	1.58	74.0	18.68	Peak	0.00	100	Vertical	Pass
5**	6609.200	46.39	1.58	54.0	7.61	AV	0.00	100	Vertical	Pass
6	9198.099	51.17	-1.18	74.0	22.83	Peak	197.00	300	Vertical	Pass
6**	9198.099	41.52	-1.18	54.0	12.48	AV	197.00	300	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.

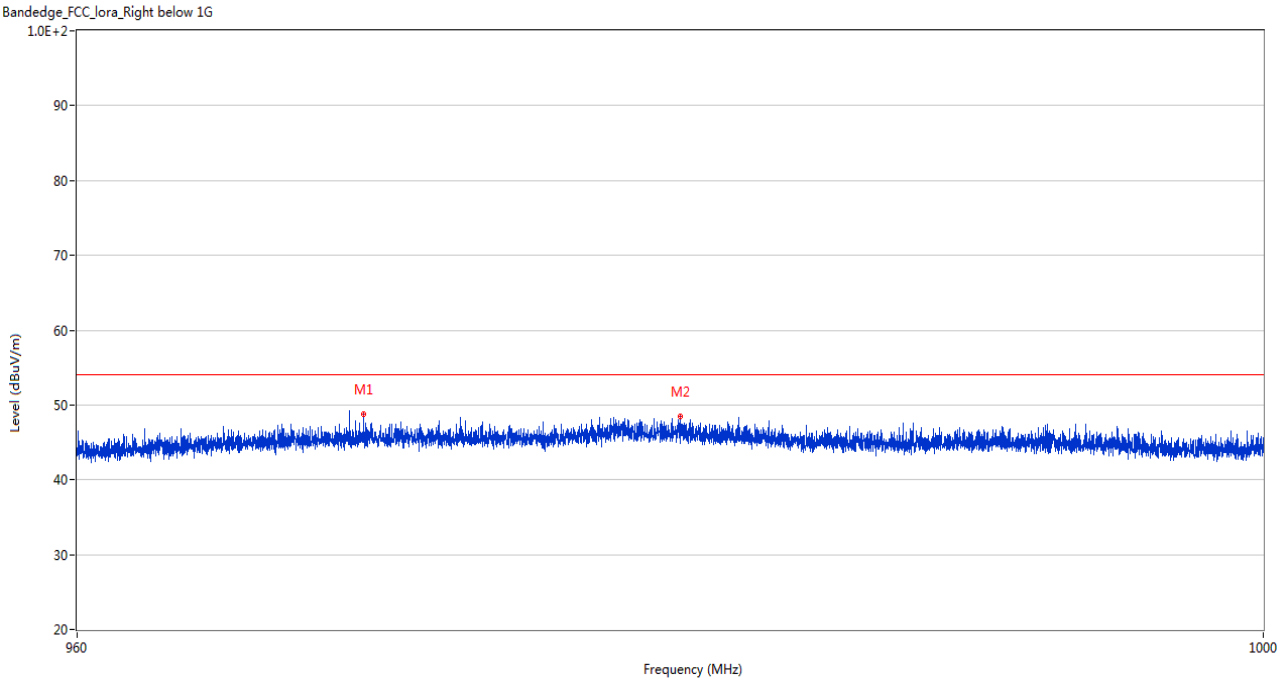
Test Data and Plots

LOW CHANNEL



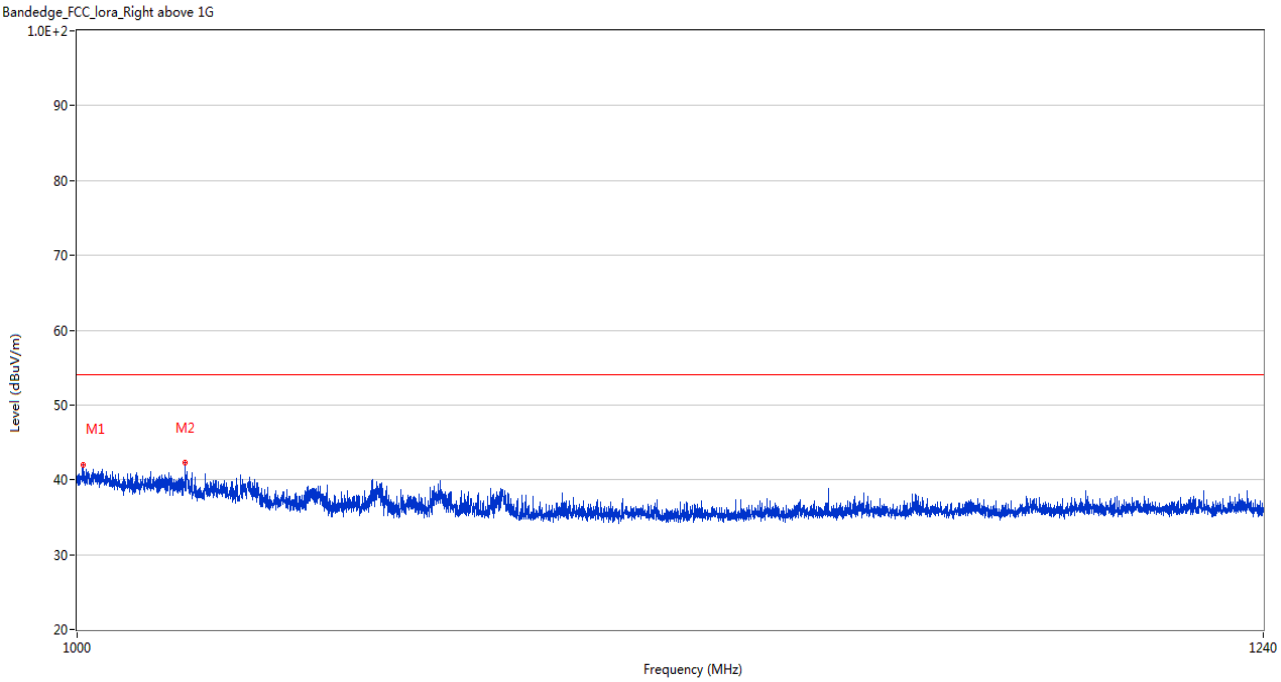
No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	610.197	40.27	3.09	54.0	13.73	Peak	271.00	150	Horizontal	Pass
2	612.998	40.91	3.16	54.0	13.09	Peak	247.00	150	Horizontal	Pass

HIGH CHANNEL



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	969.507	48.72	-3.36	54.0	5.28	Peak	60.00	200	Horizontal	Pass
2	980.120	48.52	-3.46	54.0	5.48	Peak	236.00	200	Horizontal	Pass

HIGH CHANNEL



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	1001.160	41.97	-18.18	54.0	12.03	Peak	15.00	100	Horizontal	Pass
2	1019.720	42.25	-18.15	54.0	11.75	Peak	360.00	100	Horizontal	Pass

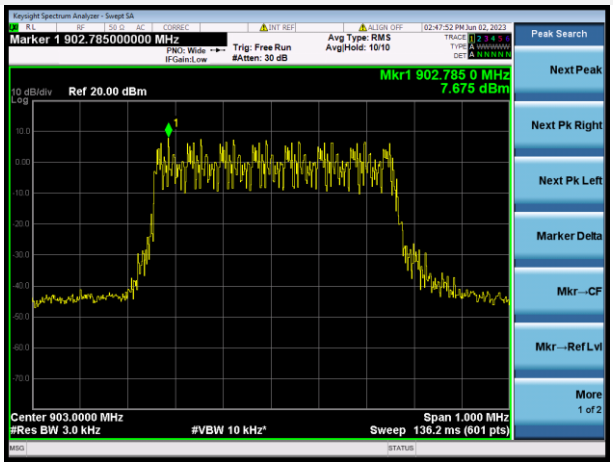
A.8 Power Spectral Density (PSD)

Test Data

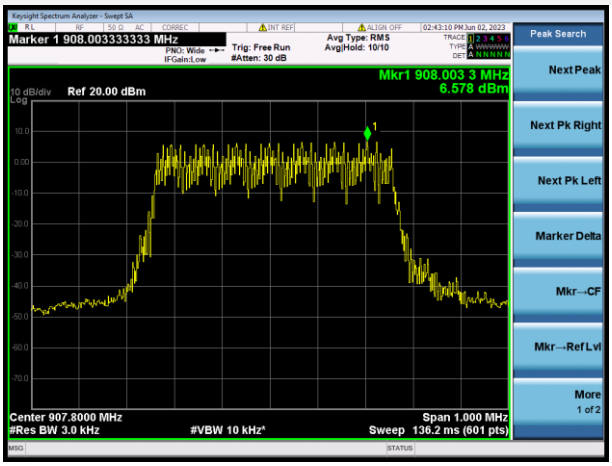
LoRa			
Channel	Spectral power density (dBm/3kHz)	Limit (dBm/3kHz)	Verdict
Low Channel	7.68	8	Pass
Middle Channel	6.58	8	Pass
High Channel	7.19	8	Pass

Test Plots

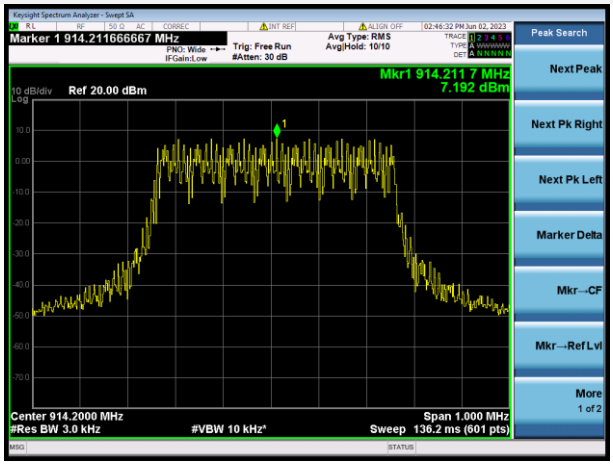
LOW CHANNEL



MIDDLE CHANNEL



HIGH CHANNEL



ANNEX B TEST SETUP PHOTOS

Please refer the document “BL-SZ2351022-AR.PDF”.

ANNEX C EUT EXTERNAL PHOTOS

Please refer the document “BL-SZ2351022-AW.PDF”.

ANNEX D EUT INTERNAL PHOTOS

Please refer the document “BL-SZ2351022-AI.PDF”.

Statement

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

--END OF REPORT--