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:	Wio-SX1262 Wireless Module
Model Name:	Wio-SX1262
Brand Name:	Seeed Studio
FCC ID:	Z4T-WIO-SX1262
Test Standard:	47 CFR Part 15 Subpart C (refer to section 3.1)
Sample Arrival Date:	Aug. 13, 2024
Test Date:	Aug. 22, 2024 - Sep. 26, 2024
Date of Issue:	Oct. 12, 2024

ISSUED BY:

Shenzhen BALUN Technology Co., Ltd.

Tested by: Li Ganming	**Checked by:** Ye Hongji	**Approved by:** Sunny Zou (Technical Director)
Li Ganming	Ye Hongji	Sunny Zou

Revision History

Version	Issue Date	Revisions
Rev. 01	Oct. 12, 2024	Initial Issue

TABLE OF CONTENTS

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	Wio-SX1262 Wireless Module
Model Name Under Test	Wio-SX1262
Series Model Name	N/A
Description of Model name differentiation	N/A
Hardware Version	v1.0
Software Version	v1.0
Dimensions (Approx.)	N/A
Weight (Approx.)	N/A

2.4 Technical Information

Network and Wireless connectivity	LoRa

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

Modulation Technology		Frequency hopping system
Modulation Type		LoRa
Product Type		☒ Mobile ☐ Portable ☐ Fix Location
Frequency Range		The frequency range used is 902.3 MHz – 914.9 MHz; The frequency block is 902 MHz to 928 MHz.
Frequency Bandwidth		125 kHz
Number of channel		64
Tested Channel		0 (902.3 MHz), 31 (908.5 MHz), 63 (914.9 MHz)
Antenna Type	Antenna 1	FPC Antenna
	Antenna 2	Dipole Antenna
	Antenna 3	Spring Antenna
Antenna Gain	Antenna 1	2.36 dBi
	Antenna 2	5.85 dBi
	Antenna 3	3.11 dBi
About the Product		The EUT is supply the DTS, Frequency hopping system, only the frequency hopping system and were tested in this report.

All channel was listed on the following table:

Channel Number	Frequency (MHz)	Channel Number	Frequency (MHz)	Channel Number	Frequency (MHz)	Channel Number	Frequency (MHz)
0	**902.3**	16	905.5	32	908.7	48	911.9
1	902.5	17	905.7	33	908.9	49	912.1
2	902.7	18	905.9	34	909.1	50	912.3
3	902.9	19	906.1	35	909.3	51	912.5
4	903.1	20	906.3	36	909.5	52	912.7
5	903.3	21	906.5	37	909.7	53	912.9
6	903.5	22	906.7	38	909.9	54	913.1
7	903.7	23	906.9	39	910.1	55	913.3
8	903.9	24	907.1	40	910.3	56	913.5
9	904.1	25	907.3	41	910.5	57	913.7
10	904.3	26	907.5	42	910.7	58	913.9
11	904.5	27	907.7	43	910.9	59	914.1
12	904.7	28	907.9	44	911.1	60	914.3
13	904.9	29	908.1	45	911.3	61	914.5
14	905.1	30	908.3	46	911.5	62	914.7
15	905.3	**31**	**908.5**	47	911.7	**63**	**914.9**

3 SUMMARY OF TEST RESULTS

3.1 Test Standards

No.	Identity	Document Title
1	47 CFR Part 15, Subpart C	Intentional radiators of radio frequency equipment
2	KDB Publication 558074 D01v05r02	GUIDANCE FOR COMPLIANCE MEASUREMENTS ON DIGITAL TRANSMISSION SYSTEM, FREQUENCY HOPPING SPREAD SPECTRUM SYSTEM, AND HYBRID SYSTEM DEVICES OPERATING UNDER SECTION 15.247 OF THE FCC RULES
3	ANSI C63.10-2013	American National Standard for Testing Unlicensed Wireless Devices

3.2 Test Verdict

No.	Description	FCC Part No.	Modulation Technology	Channel	Test Result	Verdict
1	Antenna Requirement	15.203	N/A	N/A	--	Pass[Note]
2	Number of Hopping Frequencies	15.247(a)	Frequency hopping system	Hopping Mode	ANNEX A.1	Pass
3	Peak Output Power	15.247(b)	Frequency hopping system	Low/Middle/High	ANNEX A.2	Pass
4	Occupied Bandwidth	15.247(a)	Frequency hopping system	Low/Middle/High	ANNEX A.3	Pass
5	Carrier Frequency Separation	15.247(a)	Frequency hopping system	Hopping Mode	ANNEX A.4	Pass
6	Time of Occupancy (Dwell time)	15.247(a)	Frequency hopping system	Hopping Mode	ANNEX A.5	Pass
7	Conducted Spurious Emission & Authorized-band band-edge	15.247(d)	Frequency hopping system	Low/Middle/High, Hopping Mode	ANNEX A.6	Pass
8	Conducted Emission	15.207	Frequency hopping system	Low/Middle/High	ANNEX A.7	Pass
9	Radiated Spurious Emission	15.209 15.247(d)	Frequency hopping system	Low/Middle/High, Hopping Mode	ANNEX A.8	Pass
10	Band Edge(Restricted-band band-edge)	15.209 15.247(d)	Frequency hopping system	Low/Middle/High, Hopping Mode	ANNEX A.9	Pass
Note: The EUT has a permanently and irreplaceable attached antenna, which complies with the requirement FCC 15.203						

4 GENERAL TEST CONFIGURATIONS

4.1 Test Environments

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

Relative Humidity	42% to 65%	
Atmospheric Pressure	100 kPa to 102 kPa	
Temperature	NT (Normal Temperature)	+20.1℃ to +25.9℃
Working Voltage of the EUT	NV (Normal Voltage)	3.3V

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
Power Sensor	KEYSIGHT	U2063XA	MY58000247	2024.07.04	2025.07.03
Spectrum Analyzer	KEYSIGHT	N9020A	MY52510065	2024.08.01	2025.07.31
Signaling Unit	ROHDE&SCHWARZ	CMW500	171150	2024.05.22	2025.05.21
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	2024.08.01	2025.07.31
Amplifier	COM-MV	LSCX_LNA1-12G-01	180602	2024.08.01	2025.07.31
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-Bi-Log	SCHWARZBECK	VULB 9168	9168-01162	2023.08.04	2026.08.03
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	N9038A	MY53220118	2024.08.01	2025.07.31
Test Antenna-Bi-Log	SCHWARZBECK	VULB 9163	9163-624	2024.07.06	2027.07.05
Amplifier	COM-MV	ZT30-1000M	B2017119082	2023.12.05	2024.12.04
Anechoic Chamber	RAINFORD	9m*6m*6m	101	2023.03.04	2026.03.03
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 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.

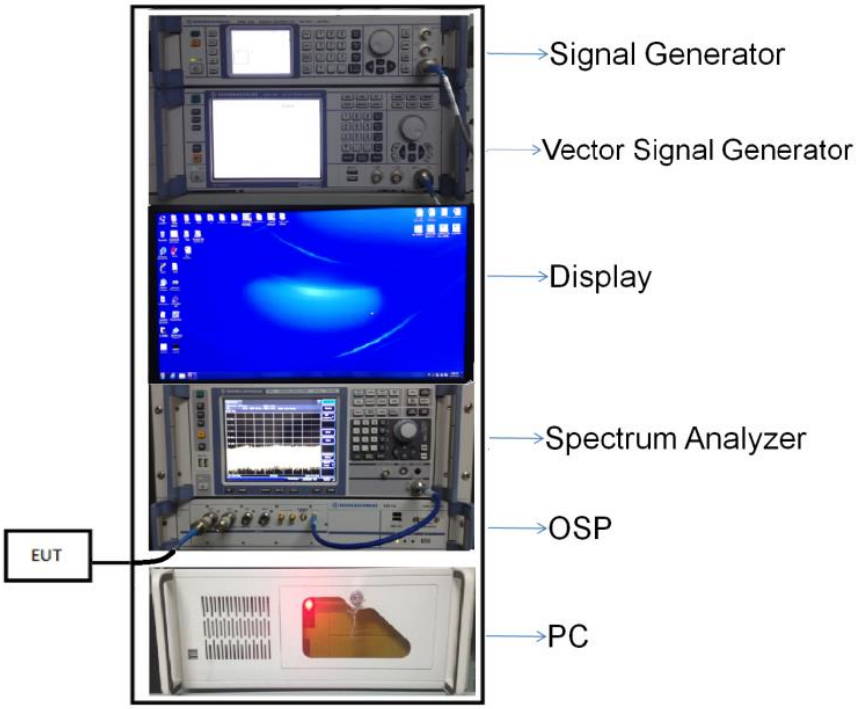
Parameters	Uncertainty
Occupied Channel Bandwidth	2.8%
RF output power, conducted	1.28 dB
Power Spectral Density, conducted	1.30 dB
Unwanted Emissions, conducted	1.84 dB
All emissions, radiated	5.36 dB
Temperature	0.8°C
Humidity	4%

4.4 Description of Test Setup

4.4.1 For Antenna Port Test

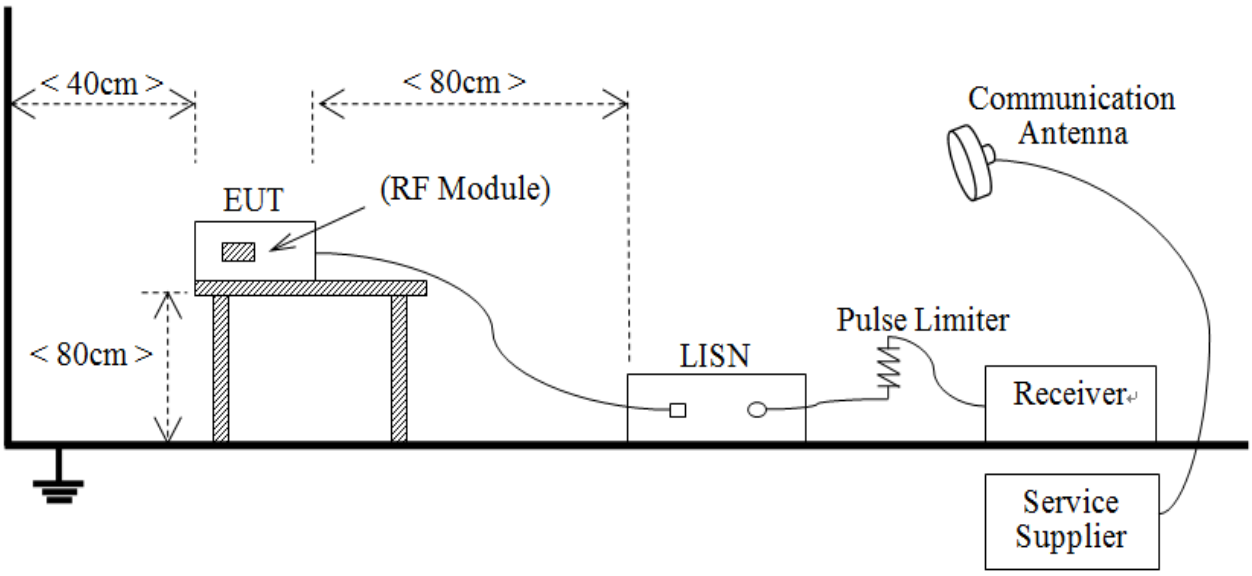
Conducted value (dBm) = Measurement value (dBm) + cable loss (dB)

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



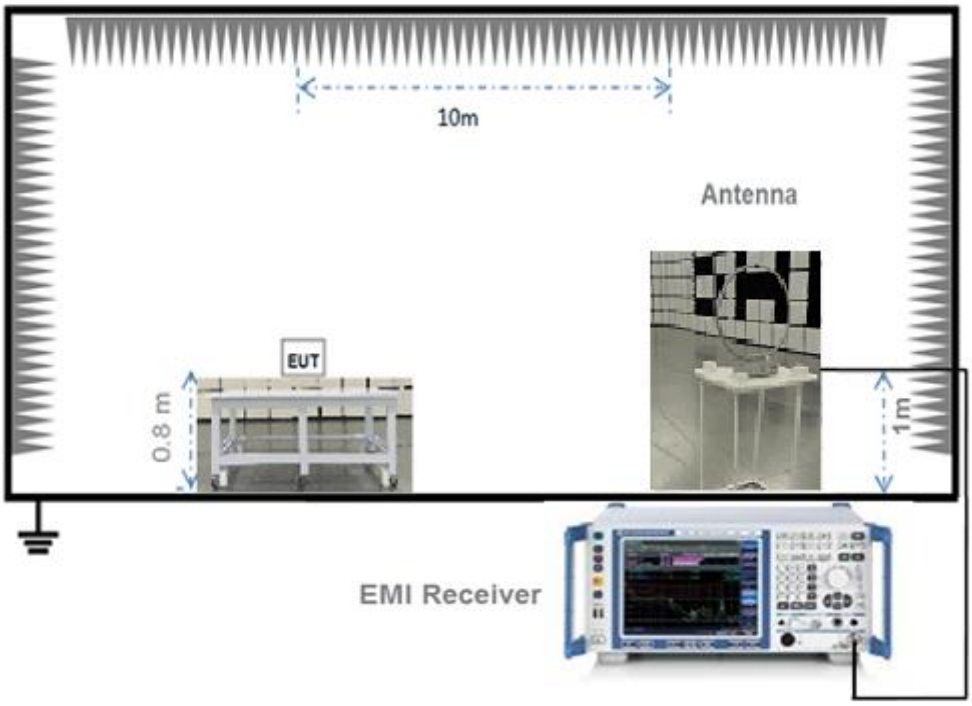
(Diagram 1)

4.4.2 For AC Power Supply Port Test



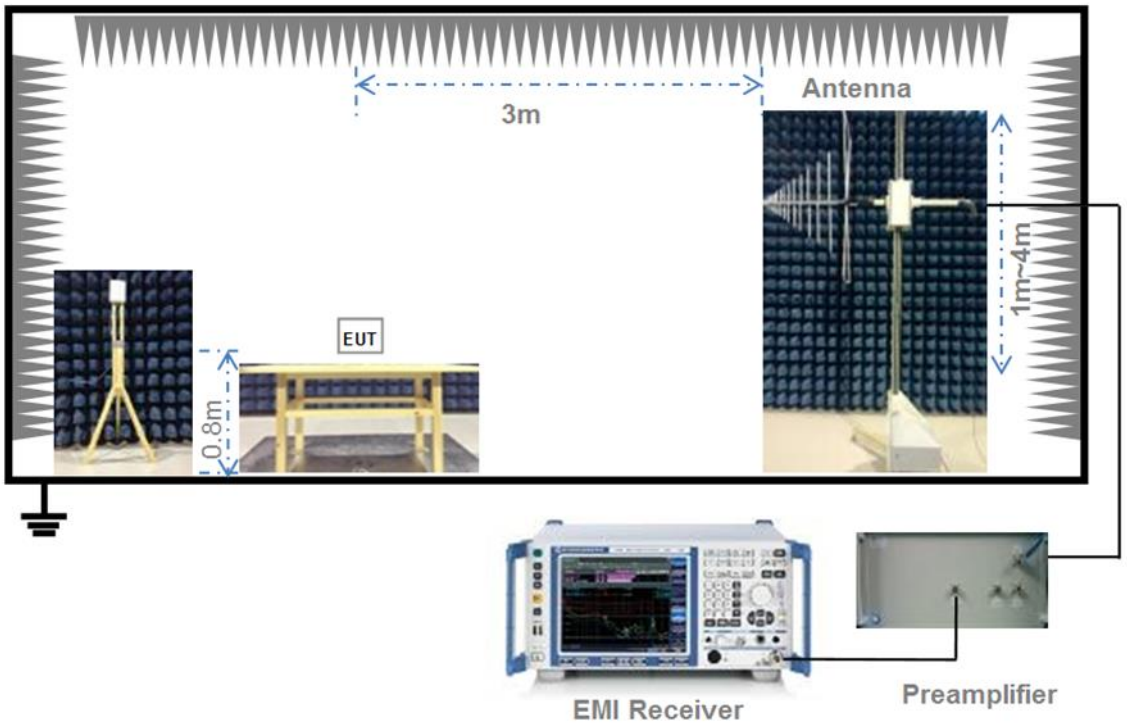
(Diagram 2)

4.4.3 For Radiated Test (Below 30 MHz)



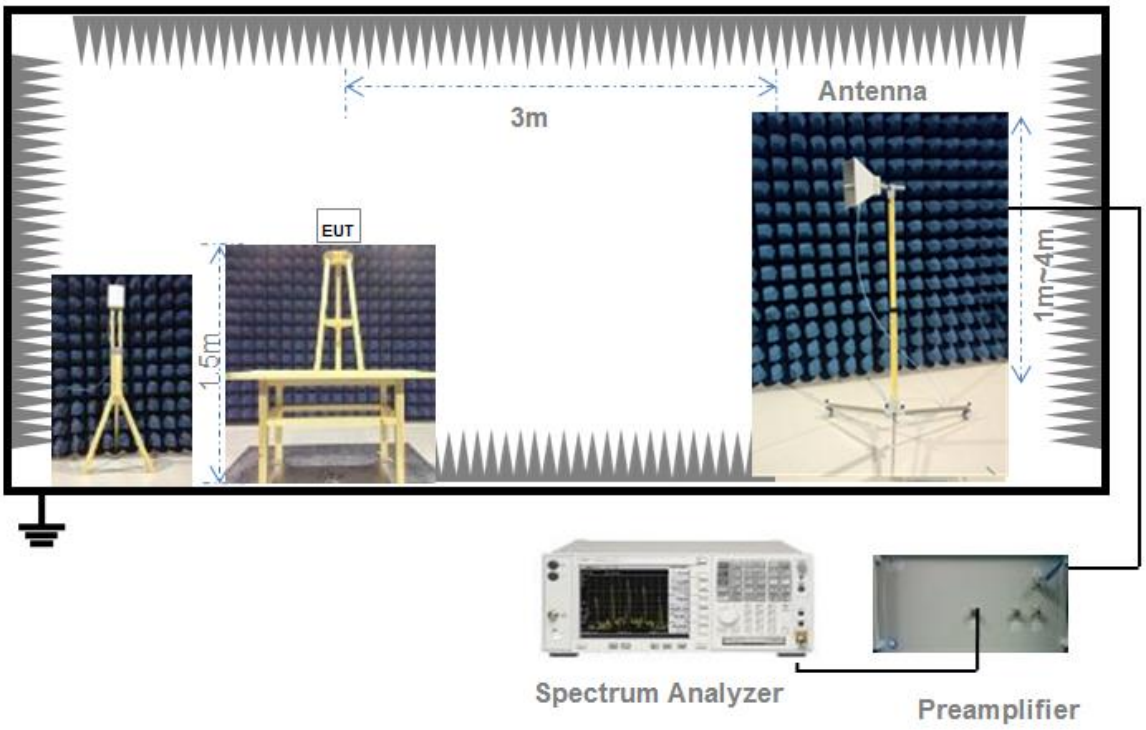
(Diagram 3)

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.

5 TEST ITEMS

5.1 Antenna Requirements

5.1.1 Relevant Standards

FCC §15.203

An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited. This requirement does not apply to carrier current devices or to devices operated under the provisions of § 15.211, § 15.213, § 15.217, § 15.219, or § 15.221. Further, this requirement does not apply to intentional radiators that must be professionally installed, such as perimeter protection systems and some field disturbance sensors, or to other intentional radiators which, in accordance with § 15.31(d), must be measured at the installation site. However, the installer shall be responsible for ensuring that the proper antenna is employed so that the limits in this part are not exceeded.

If directional gain of transmitting antennas is greater than 6 dBi, the power shall be reduced by the same level in dB comparing to gain minus 6 dBi. For the fixed point-to-point operation, the power shall be reduced by one dB for every 3 dB that the directional gain of the antenna exceeds 6 dBi. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the FCC rule.

5.1.2 Antenna Anti-Replacement Construction

The Antenna Anti-Replacement as following method:

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

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

5.1.3 Antenna Gain

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

5.2 Number of Hopping Frequencies

5.2.1 Limit

FCC §15.247(a)

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

5.2.2 Test Setup

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

5.2.3 Test Procedure

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

Span = the frequency band of operation

RBW ≥ 1% of the span

VBW ≥ RBW

Sweep = auto

Detector function = peak

Trace = max hold

Allow the trace to stabilize

5.2.4 Test Result

Please refer to ANNEX A.1.

5.3 Peak Output Power

5.3.1 Test Limit

FCC § 15.247(b)

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

5.3.2 Test Setup

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

5.3.3 Test Procedure

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

Use the following spectrum analyzer settings:

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

RBW > the 20 dB bandwidth of the emission being measured

VBW ≥ RBW

Sweep = auto

Detector function = peak

Trace = max hold

Allow the trace to stabilize.

5.3.4 Test Result

Please refer to ANNEX A.2.

5.4 Occupied Bandwidth

5.4.1 Limit

FCC §15.247(a)

5.4.2 Test Setup

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

5.4.3 Test Procedure

Use the following spectrum analyzer settings:

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

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

VBW ≥ RBW

Sweep = auto

Detector function = peak

Trace = max hold

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

5.4.4 Test Result

Please refer to ANNEX A.3.

5.5 Carrier Frequency Separation

5.5.1 Limit

FCC §15.247(a)

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

5.5.2 Test Setup

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

5.5.3 Test Procedure

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

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

Resolution (or IF) Bandwidth (RBW) ≥ 1% of the span

Video (or Average) Bandwidth (VBW) ≥ RBW

Sweep = auto

Detector function = peak

Trace = max hold

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

5.5.4 Test Result

Please refer to ANNEX A.4.

5.6 Time of Occupancy (Dwell time)

5.6.1 Limit

FCC §15.247(a)

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

5.6.2 Test Setup

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

5.6.3 Test Procedure

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

5.6.4 Test Result

Please refer to ANNEX A.5.

5.7 Conducted Spurious Emission & Authorized-band band-edge

5.7.1 Limit

FCC §15.247(d)

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

5.7.2 Test Setup

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

5.7.3 Test Procedure

Use the following spectrum analyzer settings:

Span = wide enough to capture the peak level of the in-band emission and all spurious emissions (e.g., harmonics) from the lowest frequency generated in the EUT up through the 10th harmonic. Typically, several plots are required to cover this entire span.
RBW = 100 kHz
VBW ≥ RBW
Sweep = auto
Detector function = peak
Trace = max hold
Allow the trace to stabilize

5.7.4 Test Result

Please refer to ANNEX A.6.

5.8 Conducted Emission

5.8.1 Limit

FCC §15.207

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

5.8.2 Test Setup

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

5.8.3 Test Procedure

The maximum conducted interference is searched using Peak (PK), if the emission levels more than the AV and QP limits, and that have narrow margins from the AV and QP limits will be re-measured with AV and QP detectors. Tests for both L phase and N phase lines of the power mains connected to the EUT are performed. Refer to recorded points and plots below.
Devices subject to Part 15 must be tested for all available U.S. voltages and frequencies (such as a nominal 120 VAC, 50/60 Hz and 240 VAC, 50/60 Hz) for which the device is capable of operation. A device rated for 50/60 Hz operation need not be tested at both frequencies provided the radiated and line conducted emissions are the same at both frequencies.

5.8.4 Test Result

Please refer to ANNEX A.7.

5.9 Radiated Spurious Emission

5.9.1 Limit

FCC §15.209&15.247(d)

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

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

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

Note:

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

5.9.2 Test Setup

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

5.9.3 Test Procedure

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

The power of the EUT transmitting frequency should be ignored.

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

Use the following spectrum analyzer settings:

Span = wide enough to fully capture the emission being measured
RBW = 1 MHz for f ≥ 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.

5.9.4 Test Result

Please refer to ANNEX A.8.

5.10 Band Edge (Restricted-band band-edge)

5.10.1 Limit

FCC §15.209&15.247(d)

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

5.10.2 Test Setup

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

5.10.3 Test Procedure

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

The power of the EUT transmitting frequency should be ignored.

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

Use the following spectrum analyzer settings:

Span = wide enough to fully capture the emission being measured
RBW = 1 MHz for f ≥ 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.

5.10.4 Test Result

Please refer to ANNEX A.9.

ANNEX A TEST RESULT

A.1 Number of Hopping Frequency

Test Data

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

Test Plots

LoRa

A.2 Peak Output Power

Test Data

Channel	Measured Output Peak Power		Limit		Verdict
	LoRa		dBm	mW	
	dBm	mW			
Low	19.48	88.72	30	1000	Pass
Middle	19.62	91.62			Pass
High	16.65	46.24			Pass

A.3 20 dB and 99% bandwidth

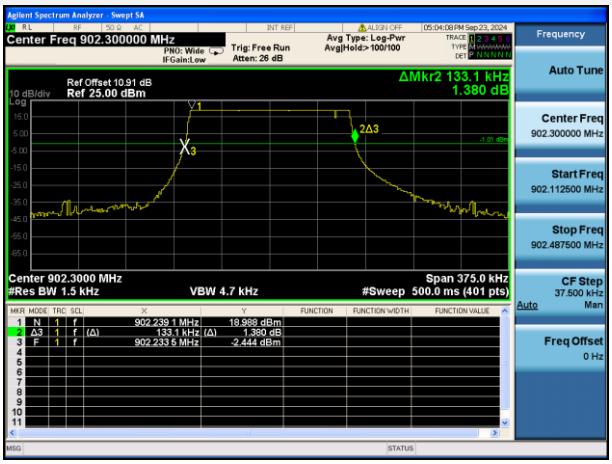
Test Data

LoRa			
Channel	20 dB Bandwidth (MHz)	99% Bandwidth (MHz)	Verdict
Low	0.133100	0.124490	Pass
Middle	0.134100	0.124460	Pass
High	0.133100	0.124340	Pass

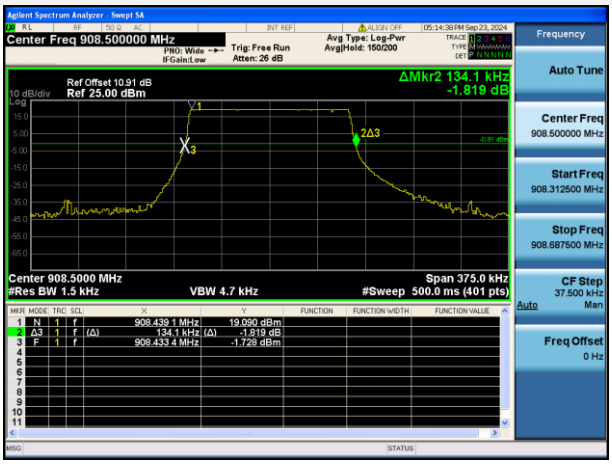
Test Plots

20 dB Bandwidth

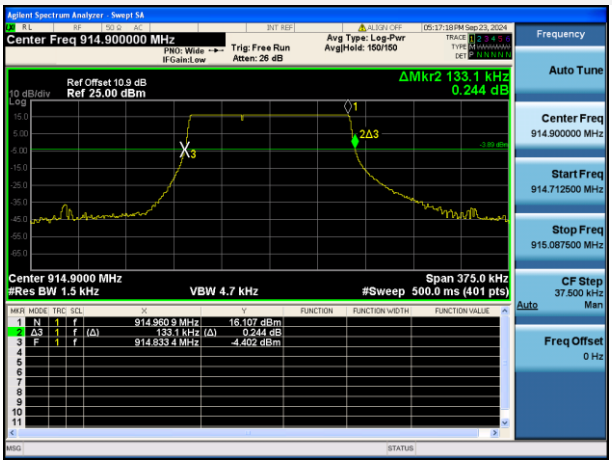
LOW CHANNEL



MIDDLE CHANNEL

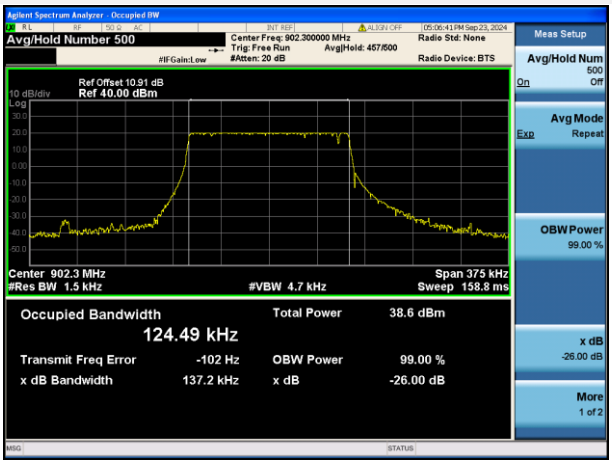


HIGH CHANNEL

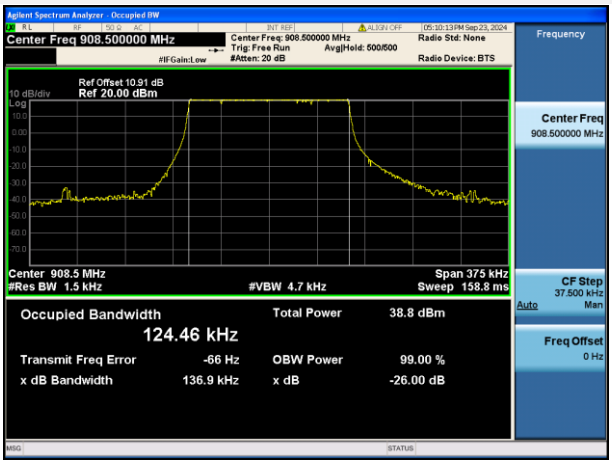


99% Bandwidth

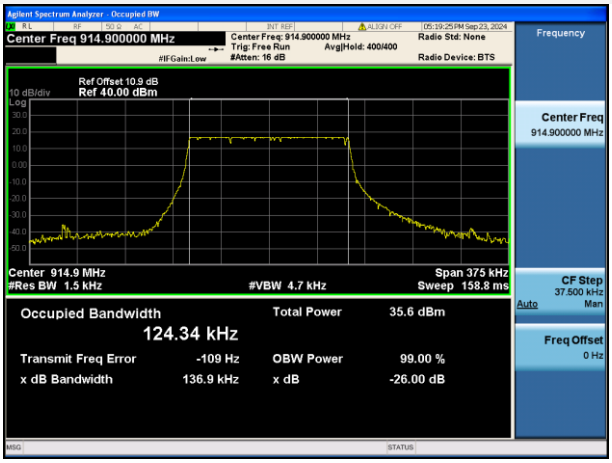
LOW CHANNEL



MIDDLE CHANNEL



HIGH CHANNEL



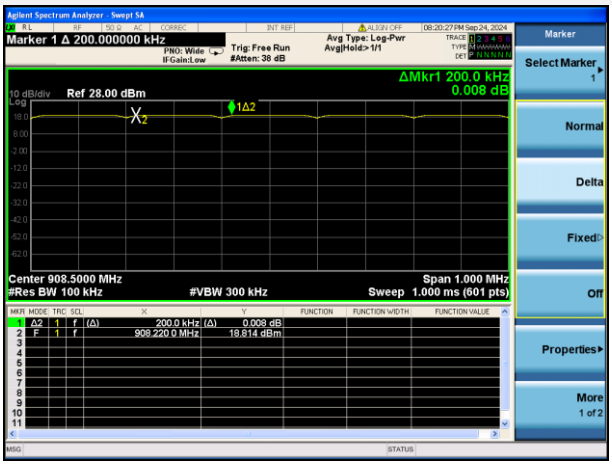
A.4 Hopping Frequency Separation

Test Data

Mode	Frequency separation (MHz)	Max 20 dB Bandwidth (MHz)	Verdict
LoRa	0.200	0.134	Pass

Test Plots

LoRa



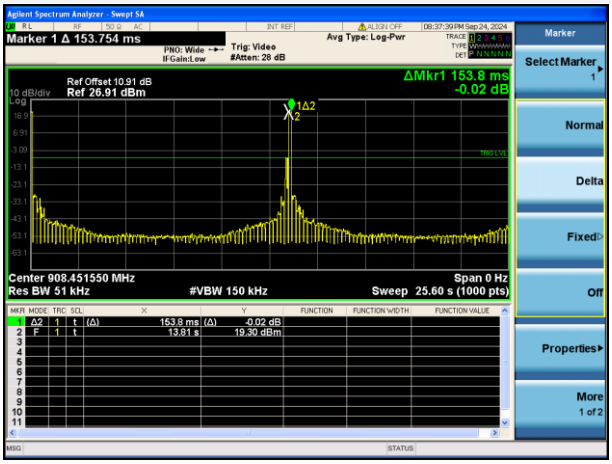
A.5 Average Time of Occupancy

Test Data

Total of Dwell (ms)	Limit (sec)	Verdict
307.600	0.4	Pass

Test Plots

LoRa



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

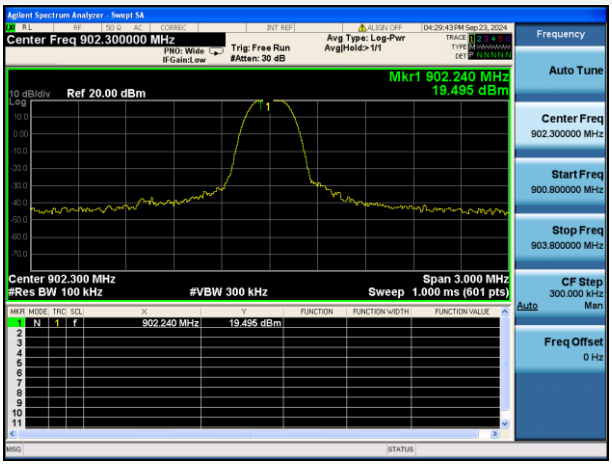
Test Data

LoRa				
Channel	Measured Max. Out of Band Emission (dBm)	Limit (dBm)		Verdict
		Carrier Level	Calculated 20 dBc Limit	
Low	-26.10	19.50	-0.50	Pass
Middle	-13.32	19.11	-0.89	Pass
High	-36.19	16.66	-3.34	Pass

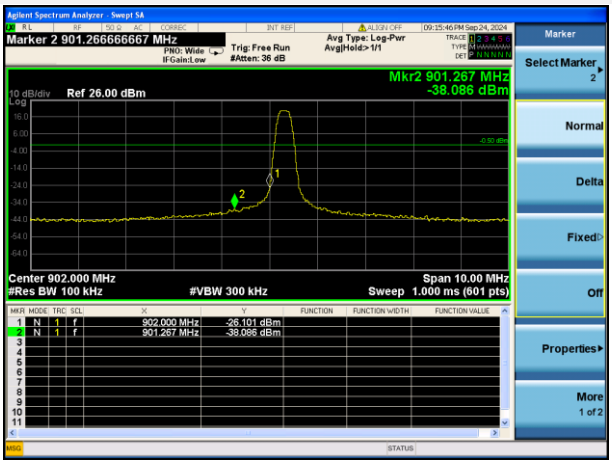
LoRa				
Mode	Measured Max. Out of Band Emission (dBm)	Limit (dBm)		Verdict
		Carrier Level	Calculated 20 dBc Limit	
Hopping	-26.53	19.28	-0.72	Pass

Test Plots

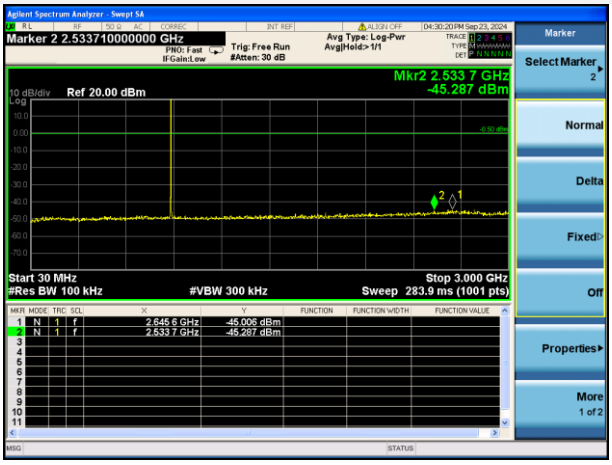
LOW CHANNEL, CARRIER LEVEL



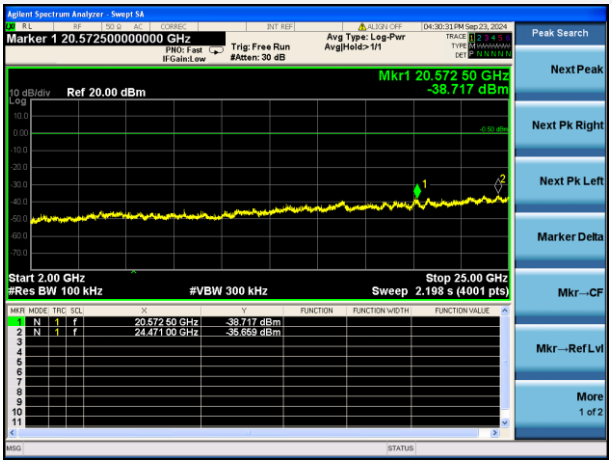
LOW CHANNEL, Band Edge



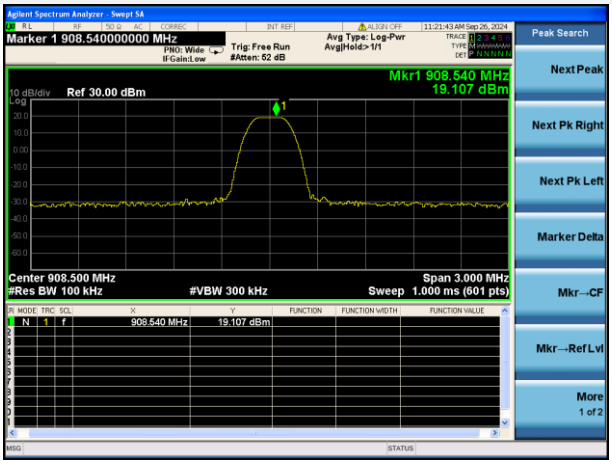
LOW CHANNEL, SPURIOUS 30 MHz ~ 3 GHz



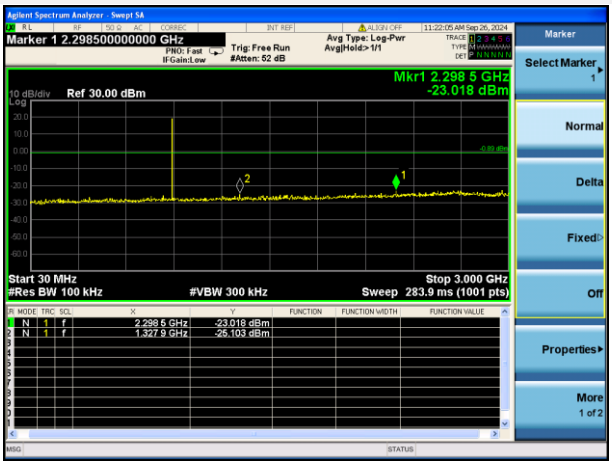
LOW CHANNEL, SPURIOUS 3 GHz ~ 25 GHz



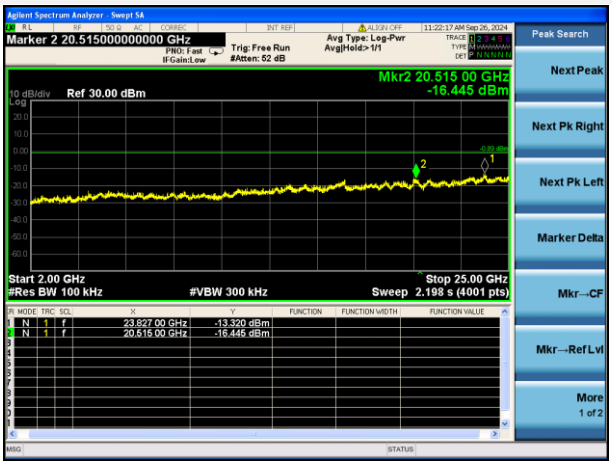
MIDDLE CHANNEL, CARRIER LEVEL



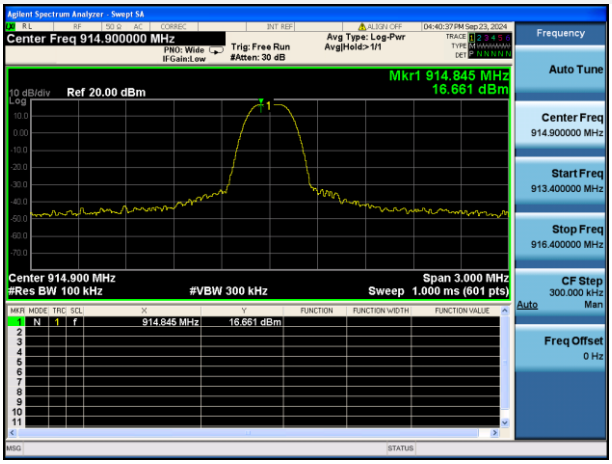
MIDDLE CHANNEL , SPURIOUS 30 MHz ~ 3 GHz



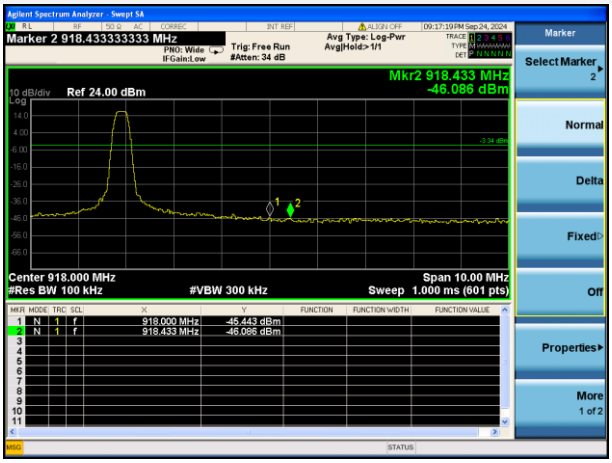
MIDDLE CHANNEL , SPURIOUS 3 GHz ~ 25 GHz



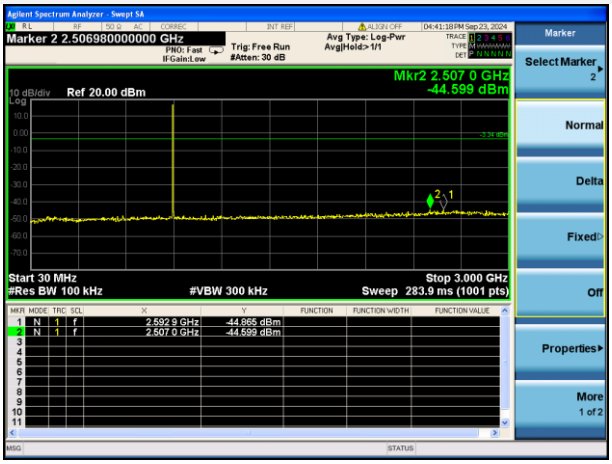
HIGH CHANNEL, CARRIER LEVEL



HIGH CHANNEL , BAND EDGE

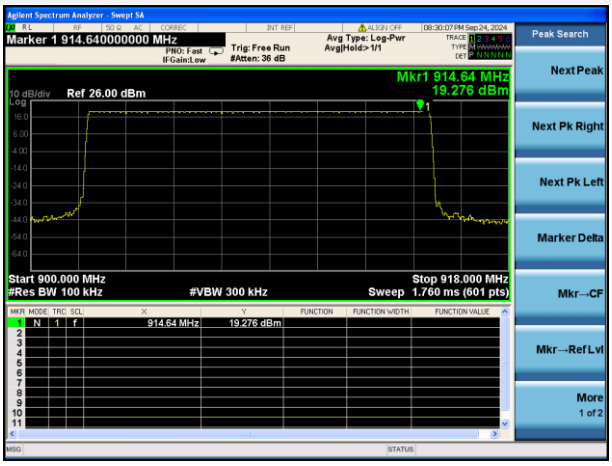


HIGH CHANNEL , SPURIOUS 30 MHz ~ 3 GHz



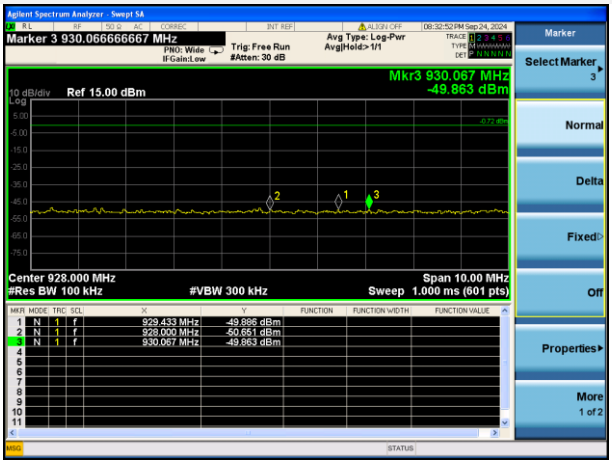
HIGH CHANNEL , SPURIOUS 3 GHz ~ 25 GHz

HOPPING, CARRIER LEVEL

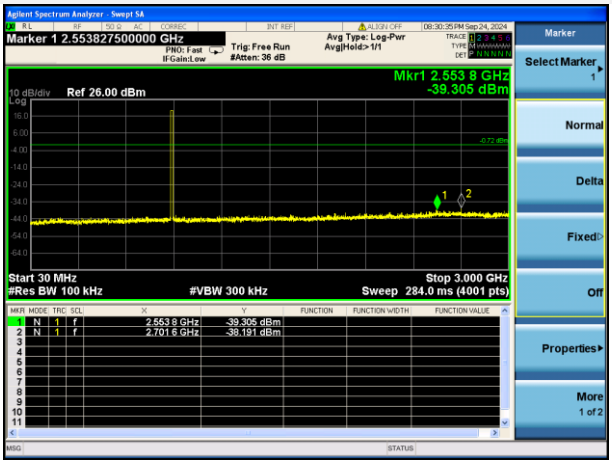


HOPPING BAND EDGE (LOW)

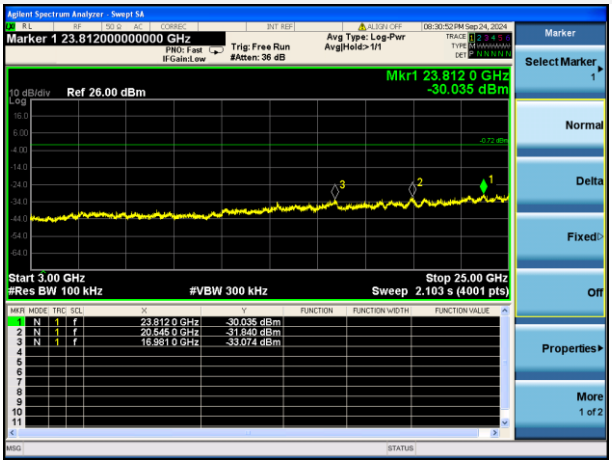
HOPPING BAND EDGE (HIGH)



HOPPING Mode, SPURIOUS 30 MHz ~ 3 GHz



Hopping Mode, SPURIOUS 3 GHz ~ 25 GHz



A.7 Conducted Emissions

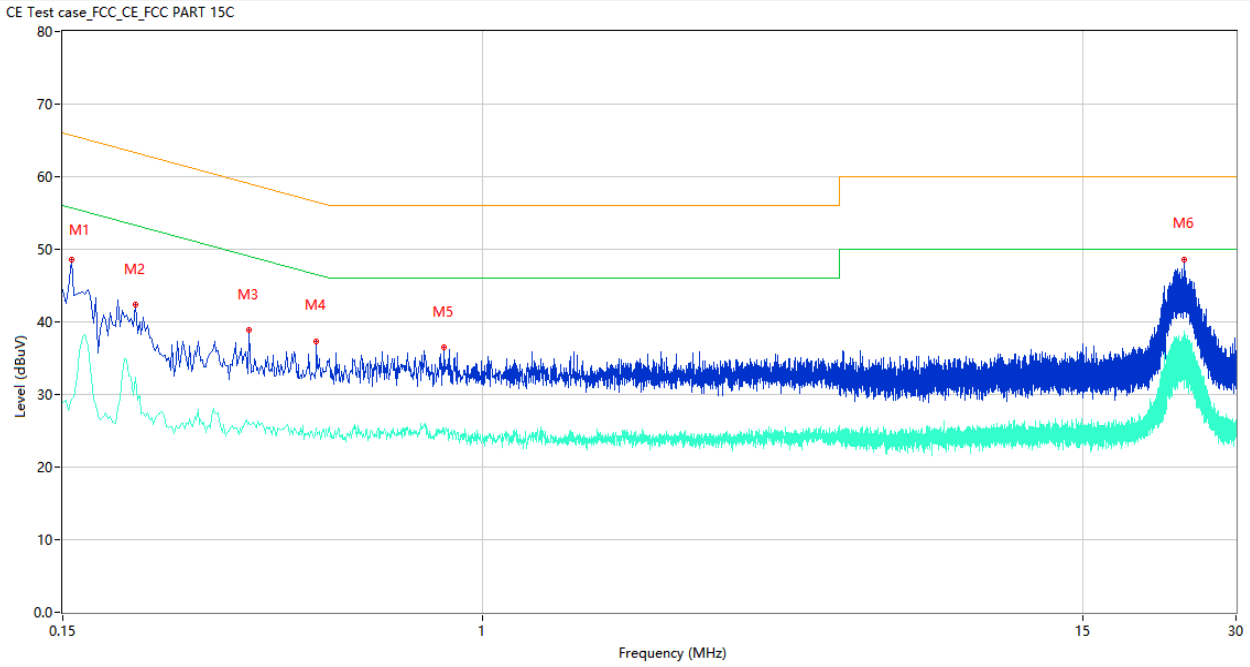
Note [1]: The EUT is working in the Normal link mode. All modes have been tested and normal link mode is worst.

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

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

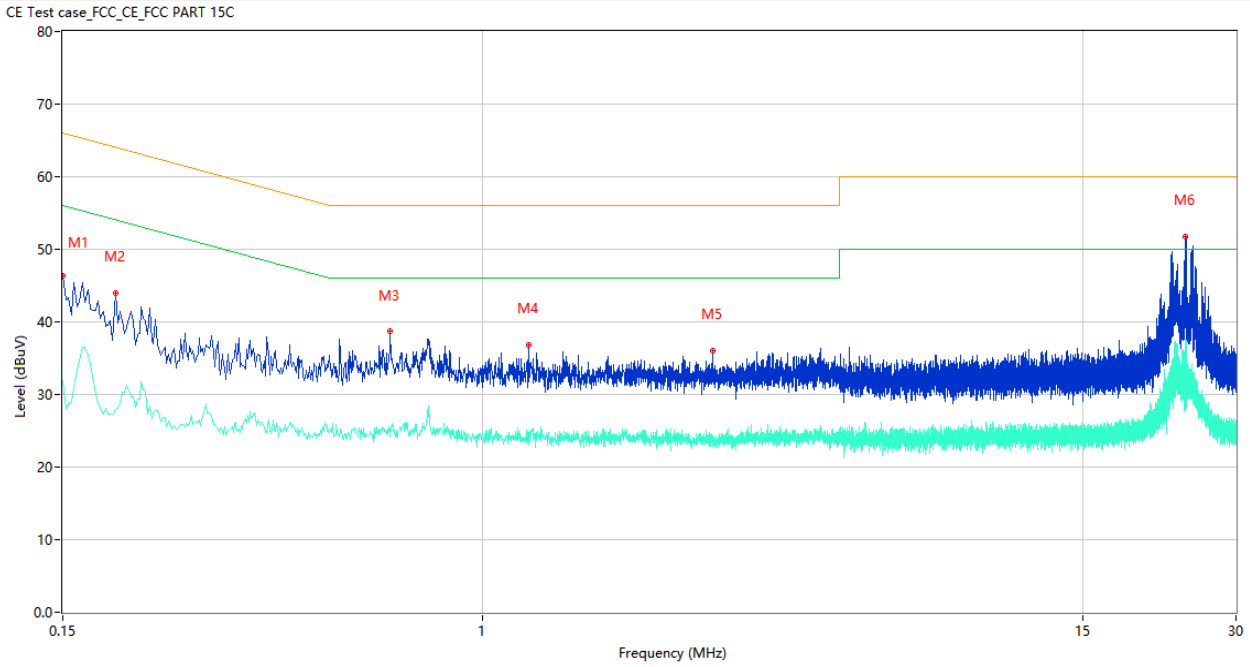
Test Data and Plots

PHASE L



No.	Frequency (MHz)	Results (dBuV)	Factor (dB)	Limit (dBuV)	Margin (dB)	Detector	Line	Verdict
1	0.156	48.51	9.78	65.67	17.16	Peak	L	Pass
1**	0.156	29.29	9.78	55.67	26.38	AV	L	Pass
2	0.208	42.32	9.77	63.28	20.96	Peak	L	Pass
2**	0.208	32.43	9.77	53.28	20.85	AV	L	Pass
3	0.348	38.87	10.72	59.01	20.14	Peak	L	Pass
3**	0.348	26.11	10.72	49.01	22.90	AV	L	Pass
4	0.472	37.34	10.01	56.48	19.14	Peak	L	Pass
4**	0.472	25.38	10.01	46.48	21.10	AV	L	Pass
5	0.840	36.46	10.60	56.00	19.54	Peak	L	Pass
5**	0.840	25.38	10.60	46.00	20.62	AV	L	Pass
6	23.748	48.59	10.73	60.00	11.41	Peak	L	Pass
6**	23.748	37.56	10.73	50.00	12.44	AV	L	Pass

PHASE N



No.	Frequency (MHz)	Results (dBuV)	Factor (dB)	Limit (dBuV)	Margin (dB)	Detector	Line	Verdict
1	0.150	46.35	9.78	66.00	19.65	Peak	N	Pass
1**	0.150	31.94	9.78	56.00	24.06	AV	N	Pass
2	0.190	43.98	9.78	64.04	20.06	Peak	N	Pass
2**	0.190	27.94	9.78	54.04	26.10	AV	N	Pass
3	0.658	38.66	10.28	56.00	17.34	Peak	N	Pass
3**	0.658	25.30	10.28	46.00	20.70	AV	N	Pass
4	1.230	36.85	10.24	56.00	19.15	Peak	N	Pass
4**	1.230	24.79	10.24	46.00	21.21	AV	N	Pass
5	2.822	36.11	10.06	56.00	19.89	Peak	N	Pass
5**	2.822	23.81	10.06	46.00	22.19	AV	N	Pass
6	23.870	51.76	10.98	60.00	8.24	Peak	N	Pass
6**	23.870	33.76	10.98	50.00	16.24	AV	N	Pass

A.8 Radiated Spurious Emission

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

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

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

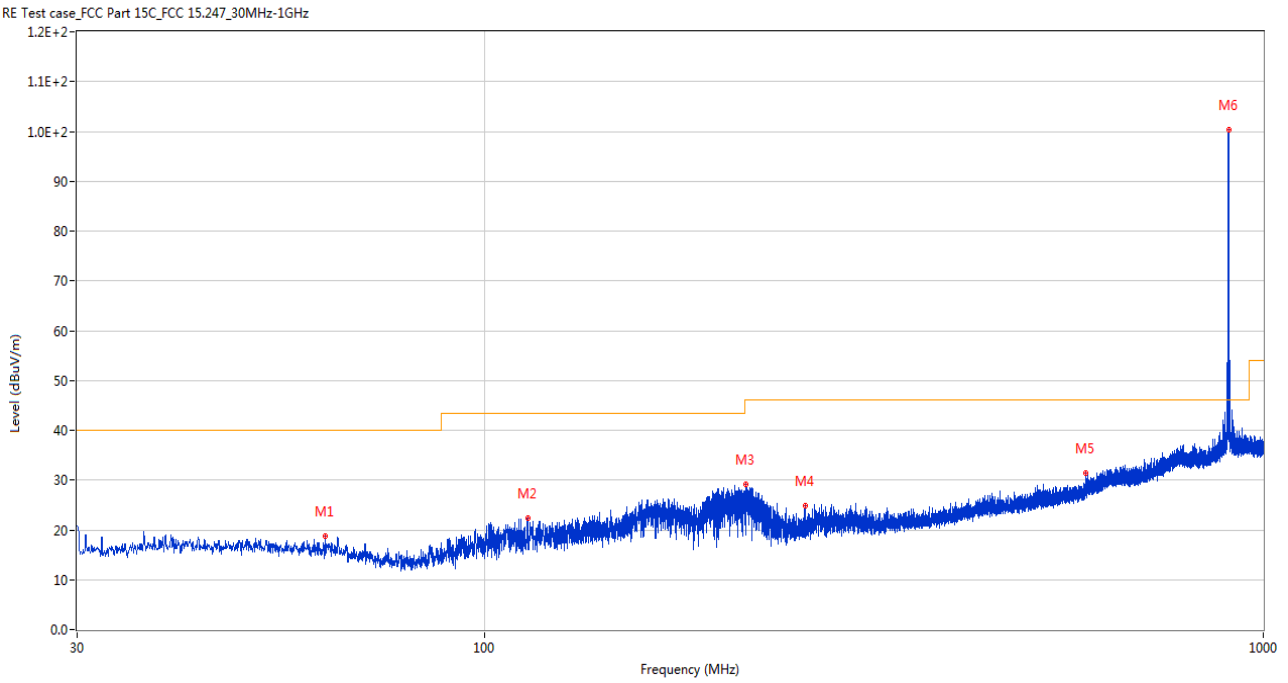
Note [4]: The marked spikes near 900 MHz with circle should be ignored because they are Fundamental signal.

Note [5]: All antenna were pre tested, but only the worst case has been reported in this report.

Test Data and Plots

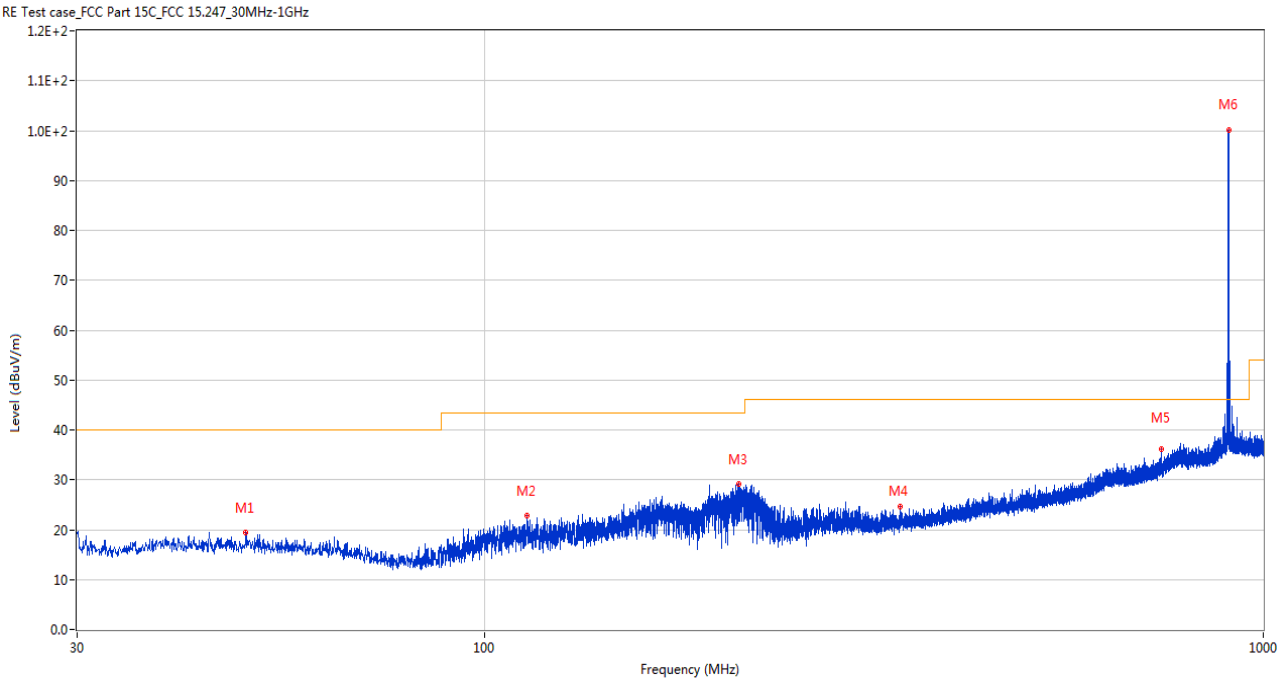
Dipole Antenna

LOW CHANNEL 30 MHz to 1 GHz, ANT H



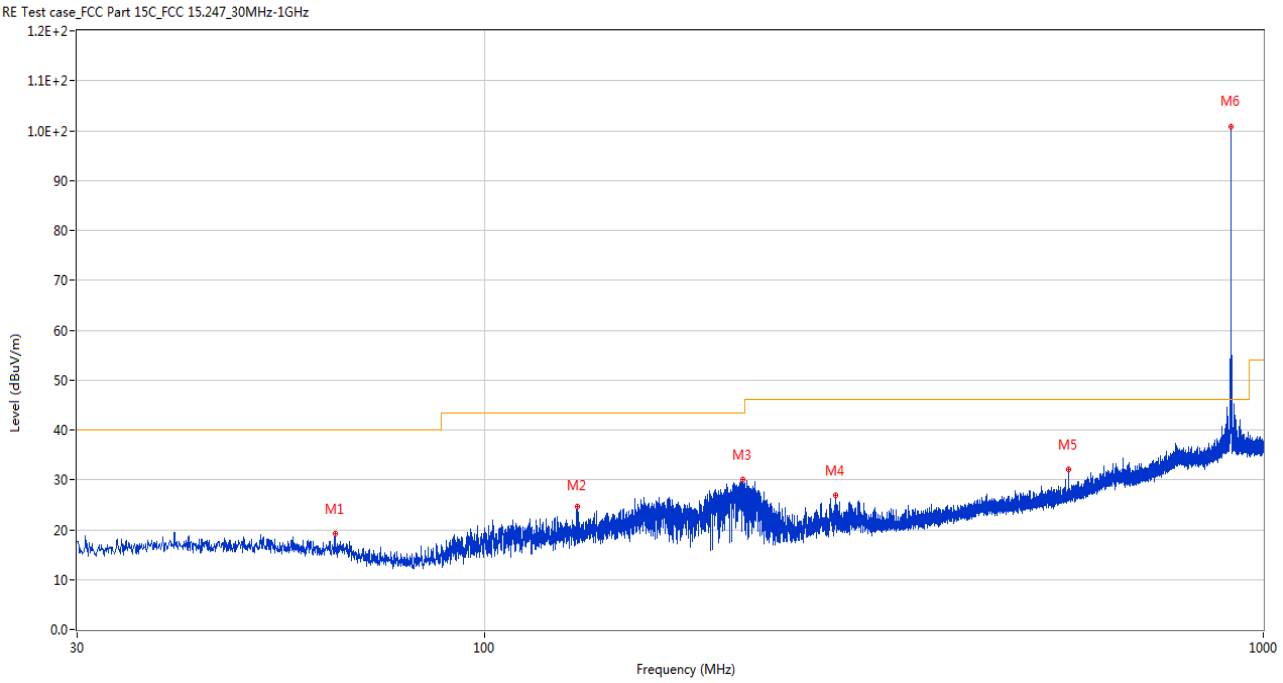
No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	62.544	18.79	-27.12	40.0	21.21	Peak	8.00	150	Horizontal	Pass
2	113.614	22.38	-27.02	43.5	21.12	Peak	104.00	400	Horizontal	Pass
3	216.580	29.04	-26.85	46.0	16.96	Peak	248.00	100	Horizontal	Pass
4	257.901	24.88	-25.30	46.0	21.12	Peak	104.00	150	Horizontal	Pass
5	592.503	31.52	-14.98	46.0	14.48	Peak	350.00	150	Horizontal	Pass
6	902.370	100.23	-7.24	46.0	-54.23	Peak	184.00	150	Horizontal	N/A

LOW CHANNEL 30 MHz to 1 GHz, ANT V



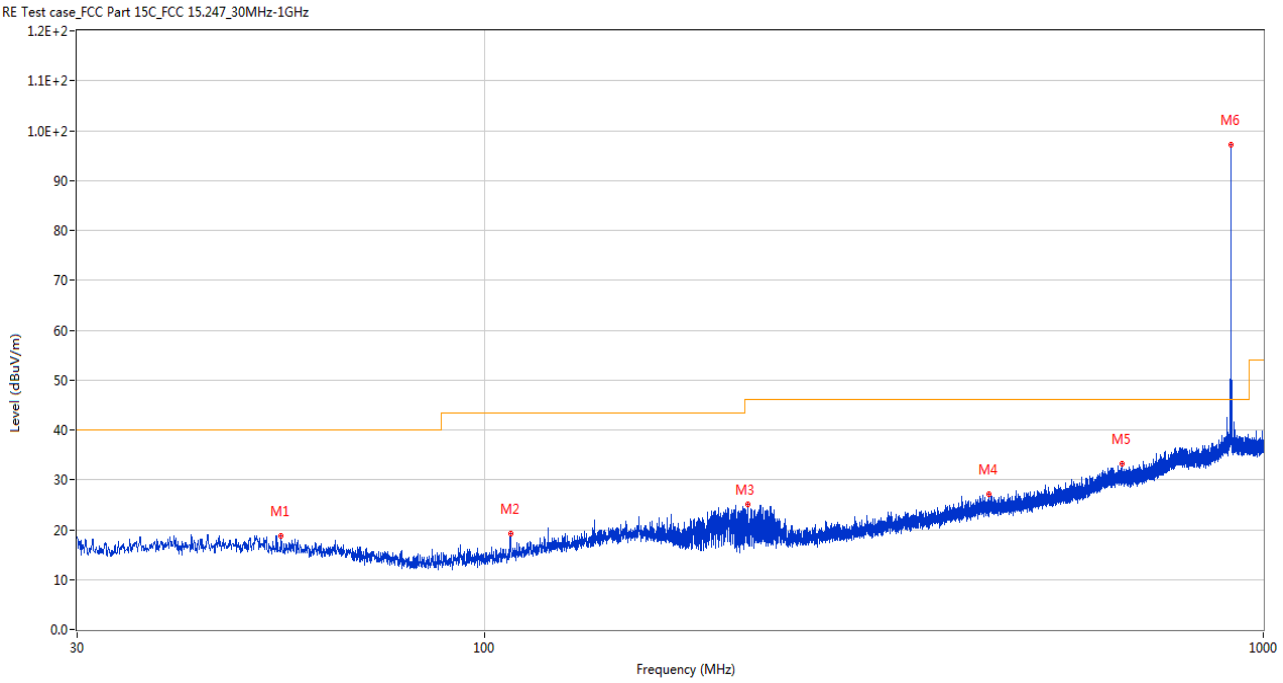
No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	49.400	19.45	-26.02	40.0	20.55	Peak	164.00	400	Vertical	Pass
2	113.565	22.85	-27.02	43.5	20.65	Peak	239.00	400	Vertical	Pass
3	212.408	29.22	-27.22	43.5	14.28	Peak	105.00	200	Vertical	Pass
4	342.146	24.70	-22.17	46.0	21.30	Peak	220.00	200	Vertical	Pass
5	739.894	36.24	-11.18	46.0	9.76	Peak	213.00	150	Vertical	Pass
6	902.273	100.21	-7.26	46.0	-54.21	Peak	181.00	150	Vertical	N/A

MIDDLE CHANNEL 30 MHz to 1 GHz, ANT H



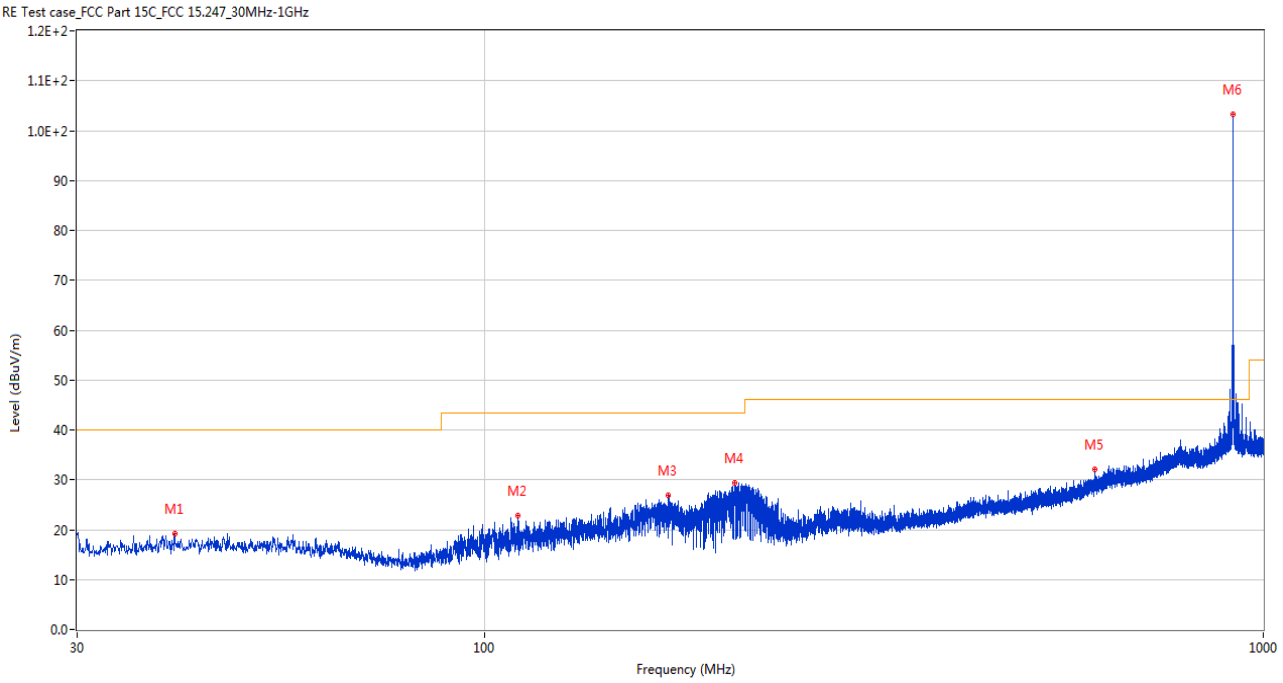
No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	64.289	19.10	-27.21	40.0	20.90	Peak	49.00	150	Horizontal	Pass
2	131.462	24.59	-25.58	43.5	18.91	Peak	112.00	200	Horizontal	Pass
3	214.930	30.04	-27.13	43.5	13.46	Peak	257.00	150	Horizontal	Pass
4	282.637	26.81	-24.23	46.0	19.19	Peak	122.00	100	Horizontal	Pass
5	561.899	31.99	-16.22	46.0	14.01	Peak	0.00	150	Horizontal	Pass
6	908.529	100.90	-7.02	46.0	-54.90	Peak	187.00	150	Horizontal	N/A

MIDDLE CHANNEL 30 MHz to 1 GHz, ANT V



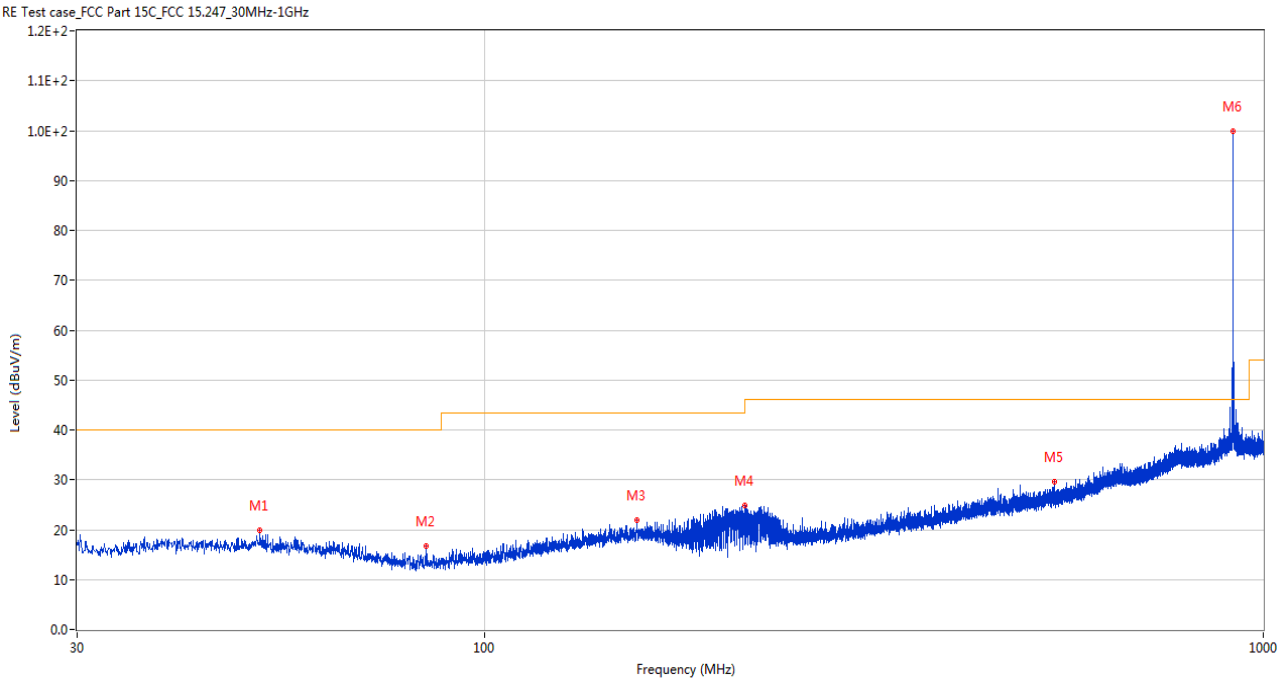
No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	54.783	18.82	-26.33	40.0	21.18	Peak	337.00	150	Vertical	Pass
2	108.036	19.19	-27.71	43.5	24.31	Peak	199.00	150	Vertical	Pass
3	217.744	25.00	-26.80	46.0	21.00	Peak	160.00	200	Vertical	Pass
4	444.238	27.20	-19.09	46.0	18.80	Peak	90.00	150	Vertical	Pass
5	657.881	33.11	-13.03	46.0	12.89	Peak	243.00	100	Vertical	Pass
6	908.529	97.18	-7.02	46.0	-51.18	Peak	186.00	300	Vertical	N/A

HIGH CHANNEL 30 MHz to 1 GHz, ANT H



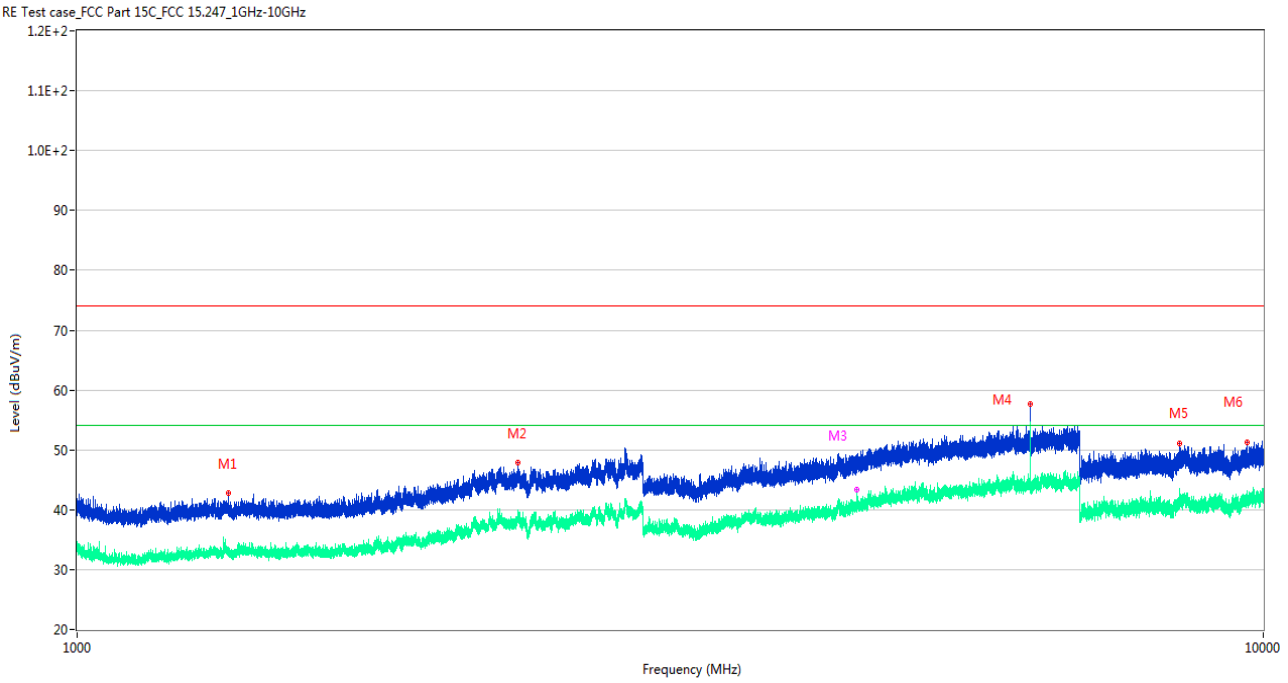
No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	40.039	19.12	-25.94	40.0	20.88	Peak	360.00	150	Horizontal	Pass
2	110.316	22.76	-27.57	43.5	20.74	Peak	253.00	200	Horizontal	Pass
3	172.396	26.94	-25.27	43.5	16.56	Peak	267.00	150	Horizontal	Pass
4	209.644	29.46	-27.42	43.5	14.04	Peak	262.00	100	Horizontal	Pass
5	608.314	32.20	-14.15	46.0	13.80	Peak	269.00	300	Horizontal	Pass
6	914.882	103.25	-7.43	46.0	-57.25	Peak	187.00	150	Horizontal	N/A

HIGH CHANNEL 30 MHz to 1 GHz, ANT V



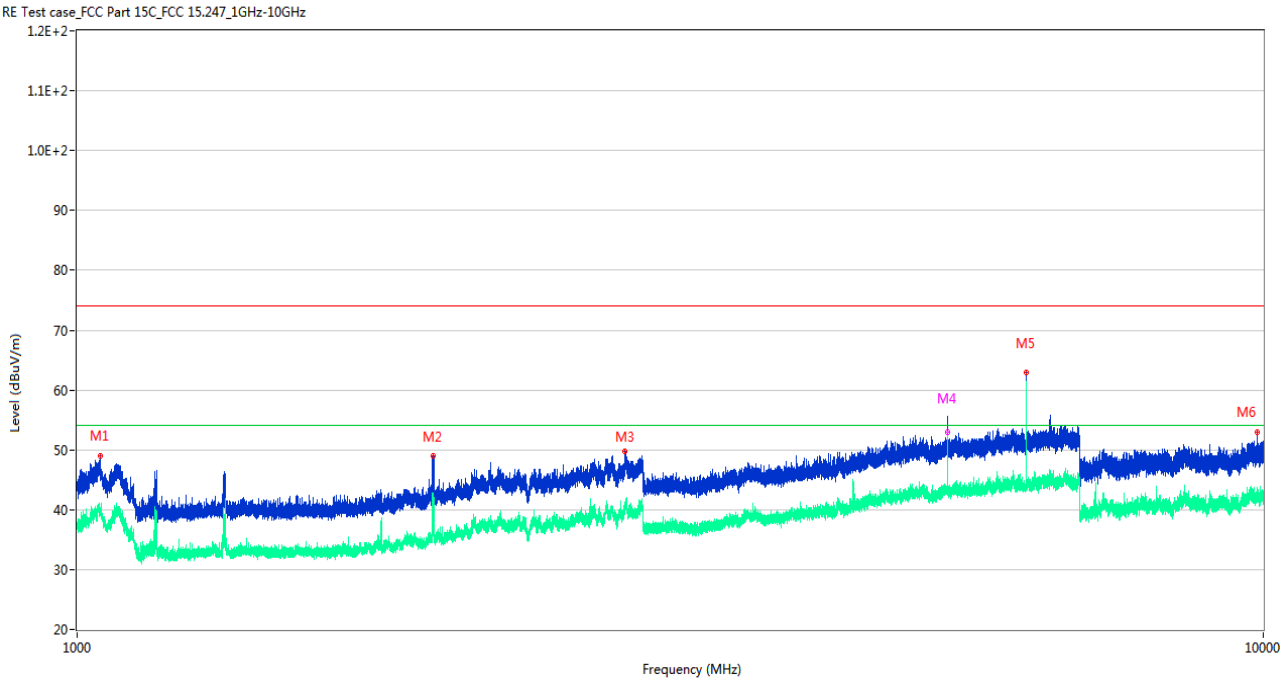
No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	51.486	19.78	-26.28	40.0	20.22	Peak	294.00	200	Vertical	Pass
2	84.271	16.66	-29.63	40.0	23.34	Peak	95.00	150	Vertical	Pass
3	157.022	21.86	-24.01	43.5	21.64	Peak	155.00	100	Vertical	Pass
4	216.143	24.80	-26.93	46.0	21.20	Peak	150.00	200	Vertical	Pass
5	539.832	29.54	-16.99	46.0	16.46	Peak	117.00	150	Vertical	Pass
6	914.834	99.82	-7.43	46.0	-53.82	Peak	186.00	100	Vertical	N/A

LOW CHANNEL 1 GHz to 10 GHz, ANT H



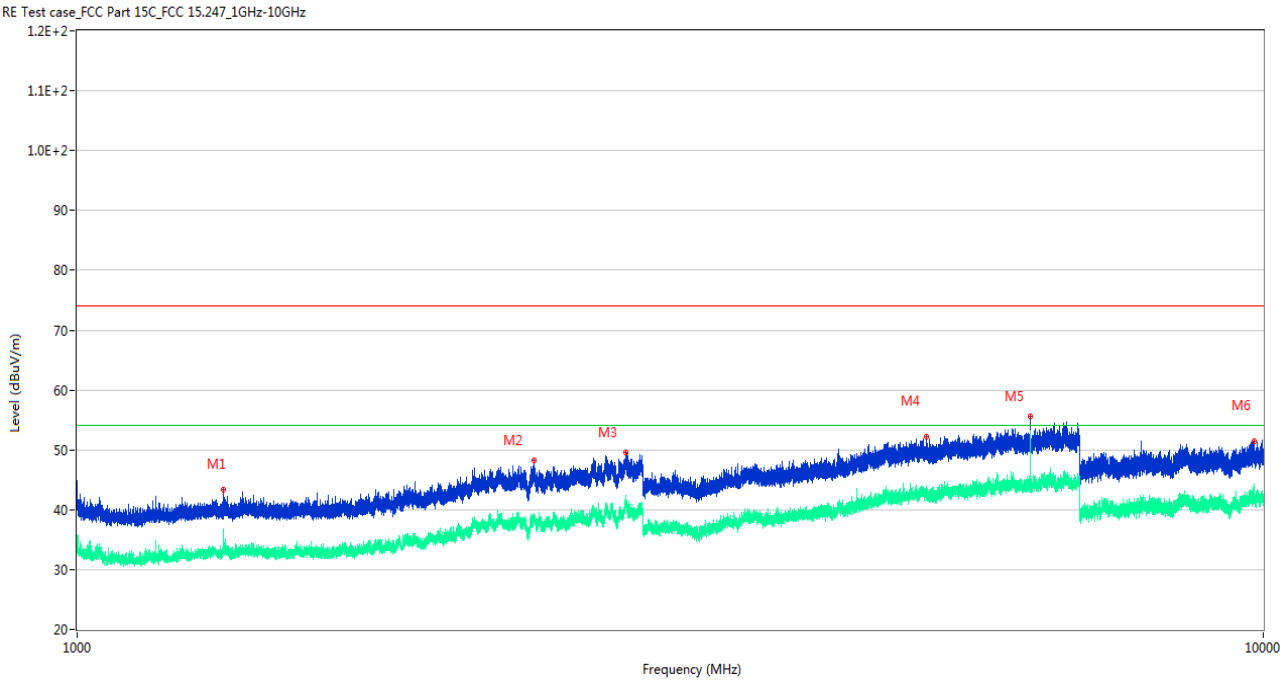
No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	1342.400	42.77	-13.57	74.0	31.23	Peak	233.00	100	Horizontal	Pass
1**	1342.400	33.68	-13.57	54.0	20.32	AV	233.00	100	Horizontal	Pass
2	2353.200	47.85	-7.60	74.0	26.15	Peak	215.00	100	Horizontal	Pass
2**	2353.200	38.56	-7.60	54.0	15.44	AV	215.00	100	Horizontal	Pass
3	4543.200	48.47	-3.52	74.0	25.53	Peak	50.00	150	Horizontal	Pass
3**	4543.200	43.36	-3.52	54.0	10.64	AV	50.00	150	Horizontal	Pass
4	6359.400	57.66	-1.18	74.0	16.34	Peak	50.00	100	Horizontal	Pass
4**	6359.400	54.33	-1.18	--	--	AV	50.00	100	Horizontal	N/A
5	8507.800	51.16	-1.42	74.0	22.84	Peak	223.00	150	Horizontal	Pass
5**	8507.800	41.81	-1.42	54.0	12.19	AV	223.00	150	Horizontal	Pass
6	9699.550	51.21	0.01	74.0	22.79	Peak	191.00	150	Horizontal	Pass
6**	9699.550	41.47	0.01	54.0	12.53	AV	191.00	150	Horizontal	Pass

LOW CHANNEL 1 GHz to 10 GHz, ANT V



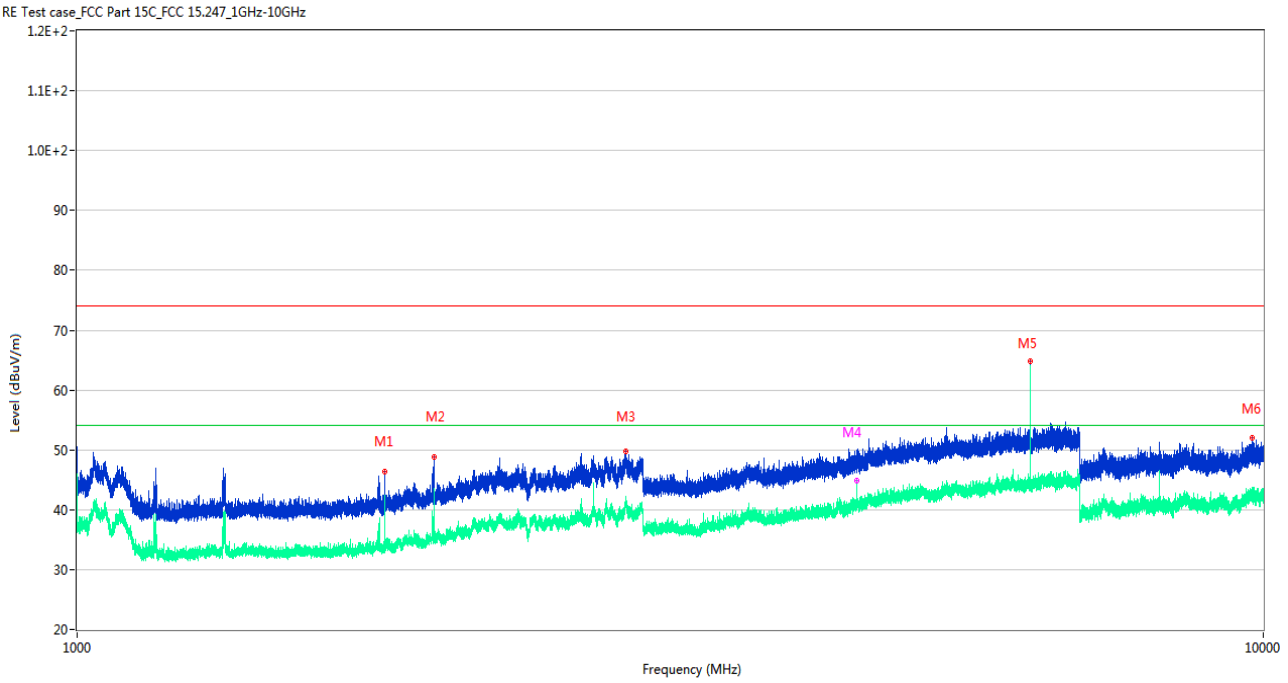
No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	1045.800	49.09	-13.53	74.0	24.91	Peak	351.00	300	Vertical	Pass
1**	1045.800	39.88	-13.53	54.0	14.12	AV	351.00	300	Vertical	Pass
2	1997.700	48.92	-11.87	74.0	25.08	Peak	55.00	200	Vertical	Pass
2**	1997.700	38.78	-11.87	54.0	15.22	AV	55.00	200	Vertical	Pass
3	2898.200	49.73	-4.09	74.0	24.27	Peak	141.00	150	Vertical	Pass
3**	2898.200	40.95	-4.09	54.0	13.05	AV	141.00	150	Vertical	Pass
4	5414.400	54.37	-1.72	74.0	19.63	Peak	349.00	150	Vertical	Pass
4**	5414.400	52.95	-1.72	54.0	1.05	AV	349.00	150	Vertical	Pass
5	6316.600	62.91	-1.46	74.0	11.09	Peak	338.00	100	Vertical	Pass
5**	6316.600	61.23	-1.46	--	--	AV	338.00	100	Vertical	N/A
6	9875.951	53.01	-0.86	74.0	20.99	Peak	147.00	400	Vertical	Pass
6**	9875.951	42.43	-0.86	54.0	11.57	AV	147.00	400	Vertical	Pass

MIDDLE CHANNEL 1 GHz to 10 GHz, ANT H



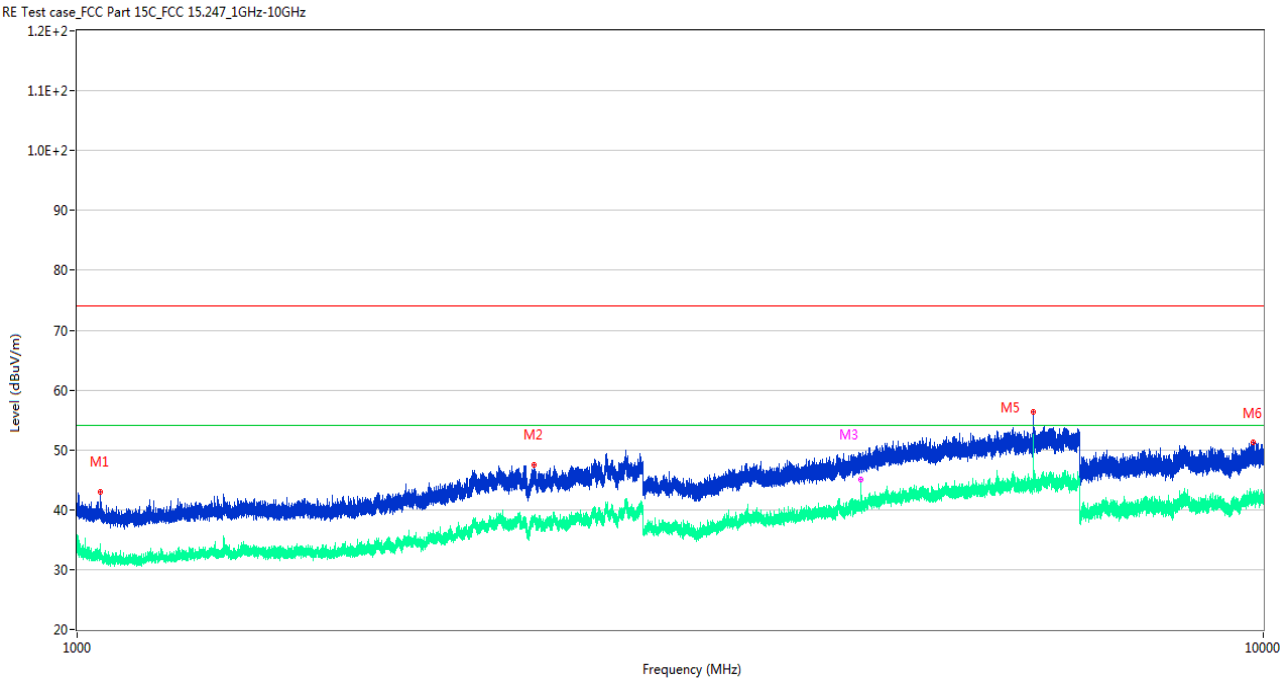
No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	1329.300	43.31	-13.42	74.0	30.69	Peak	173.00	150	Horizontal	Pass
1**	1329.300	33.40	-13.42	54.0	20.60	AV	173.00	150	Horizontal	Pass
2	2425.400	48.23	-7.96	74.0	25.77	Peak	86.00	300	Horizontal	Pass
2**	2425.400	38.12	-7.96	54.0	15.88	AV	86.00	300	Horizontal	Pass
3	2900.400	49.53	-3.71	74.0	24.47	Peak	192.00	200	Horizontal	Pass
3**	2900.400	40.60	-3.71	54.0	13.40	AV	192.00	200	Horizontal	Pass
4	5203.000	52.29	-2.18	74.0	21.71	Peak	6.00	150	Horizontal	Pass
4**	5203.000	43.87	-2.18	54.0	10.13	AV	6.00	150	Horizontal	Pass
5	6359.600	55.66	-1.23	74.0	18.34	Peak	37.00	150	Horizontal	Pass
5**	6359.600	52.66	-1.23	54.0	1.34	AV	37.00	150	Horizontal	Pass
6	9816.700	51.51	-0.01	74.0	22.49	Peak	122.00	300	Horizontal	Pass
6**	9816.700	42.12	-0.01	54.0	11.88	AV	122.00	300	Horizontal	Pass

MIDDLE CHANNEL 1 GHz to 10 GHz, ANT V



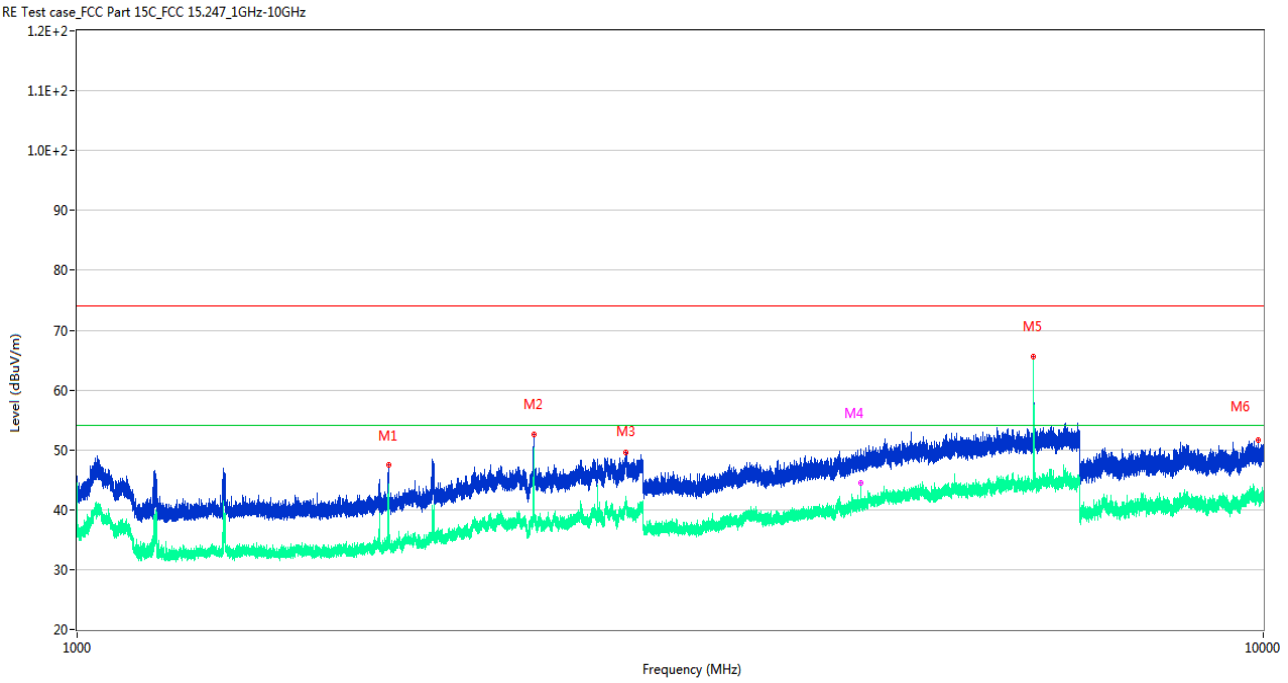
No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	1817.100	46.31	-13.04	74.0	27.69	Peak	323.00	150	Vertical	Pass
1**	1817.100	42.36	-13.04	54.0	11.64	AV	323.00	150	Vertical	Pass
2	1999.000	48.90	-11.78	74.0	25.10	Peak	61.00	100	Vertical	Pass
2**	1999.000	34.89	-11.78	54.0	19.11	AV	61.00	100	Vertical	Pass
3	2904.000	49.73	-3.44	74.0	24.27	Peak	358.00	150	Vertical	Pass
3**	2904.000	40.52	-3.44	54.0	13.48	AV	358.00	150	Vertical	Pass
4	4542.600	49.88	-3.56	74.0	24.12	Peak	48.00	150	Vertical	Pass
4**	4542.600	44.82	-3.56	54.0	9.18	AV	48.00	150	Vertical	Pass
5	6359.400	64.84	-1.18	74.0	9.16	Peak	227.00	100	Vertical	Pass
5**	6359.400	63.89	-1.18	--	--	AV	227.00	100	Vertical	N/A
6	9782.651	51.98	-0.44	74.0	22.02	Peak	257.00	300	Vertical	Pass
6**	9782.651	42.18	-0.44	54.0	11.82	AV	257.00	300	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	1045.400	42.99	-13.49	74.0	31.01	Peak	152.00	100	Horizontal	Pass
1**	1045.400	31.60	-13.49	54.0	22.40	AV	152.00	100	Horizontal	Pass
2	2429.100	47.52	-8.09	74.0	26.48	Peak	231.00	300	Horizontal	Pass
2**	2429.100	38.38	-8.09	54.0	15.62	AV	231.00	300	Horizontal	Pass
3	4574.600	48.45	-3.66	74.0	25.55	Peak	82.00	150	Horizontal	Pass
3**	4574.600	45.13	-3.66	54.0	8.87	AV	82.00	150	Horizontal	Pass
4	5489.800	52.10	-1.91	74.0	21.90	Peak	27.00	150	Horizontal	Pass
4**	5489.800	49.93	-1.91	54.0	4.07	AV	27.00	150	Horizontal	Pass
5	6404.000	56.31	-0.71	74.0	17.69	Peak	38.00	100	Horizontal	Pass
5**	6404.000	51.21	-0.71	54.0	2.79	AV	38.00	100	Horizontal	Pass
6	9813.850	51.20	-0.03	74.0	22.80	Peak	0.00	400	Horizontal	Pass
6**	9813.850	42.49	-0.03	54.0	11.51	AV	0.00	400	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	1829.800	47.56	-12.56	74.0	26.44	Peak	358.00	150	Vertical	Pass
1**	1829.800	44.35	-12.56	54.0	9.65	AV	358.00	150	Vertical	Pass
2	2426.000	52.66	-8.01	74.0	21.34	Peak	209.00	100	Vertical	Pass
2**	2426.000	49.96	-8.01	54.0	4.04	AV	209.00	100	Vertical	Pass
3	2903.900	49.60	-3.44	74.0	24.40	Peak	22.00	150	Vertical	Pass
3**	2903.900	41.10	-3.44	54.0	12.90	AV	22.00	150	Vertical	Pass
4	4574.600	49.95	-3.66	74.0	24.05	Peak	50.00	150	Vertical	Pass
4**	4574.600	44.53	-3.66	54.0	9.47	AV	50.00	150	Vertical	Pass
5	6404.200	65.67	-0.70	74.0	8.33	Peak	231.00	100	Vertical	Pass
5**	6404.200	64.92	-0.70	--	--	AV	231.00	100	Vertical	N/A
6	9902.650	51.55	-0.87	74.0	22.45	Peak	285.00	200	Vertical	Pass
6**	9902.650	42.95	-0.87	54.0	11.05	AV	285.00	200	Vertical	Pass

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

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

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

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

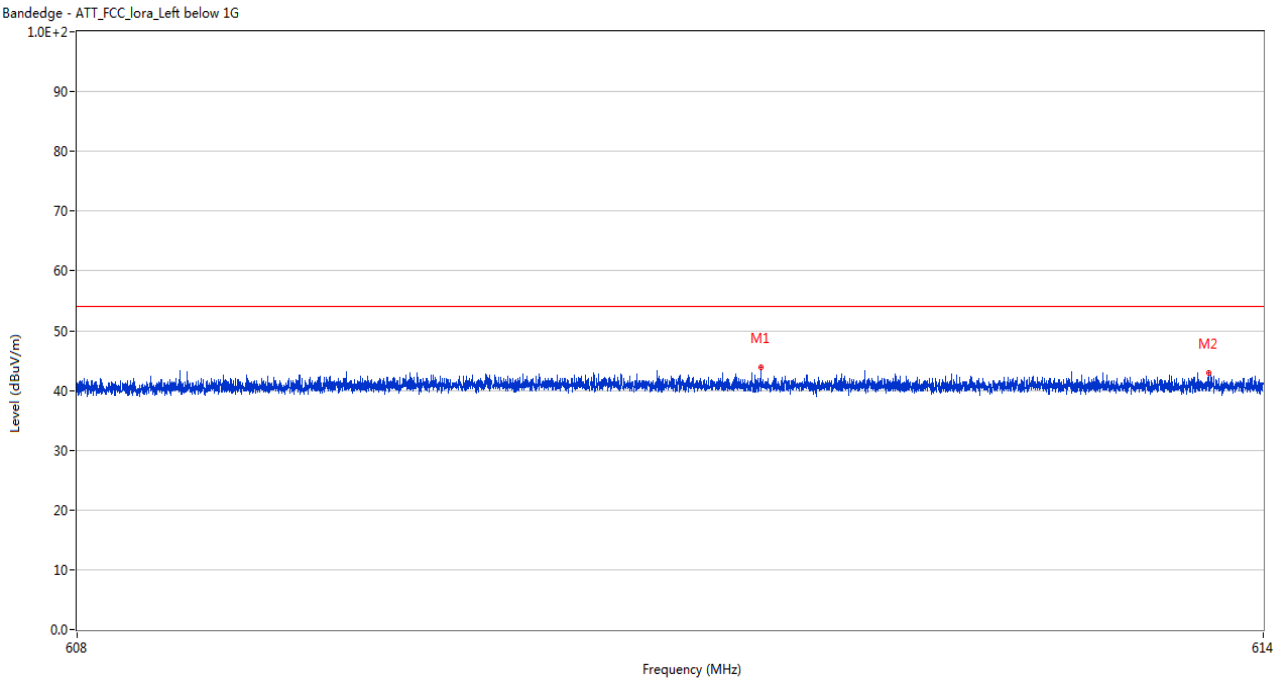
Note [4]: The Level (dBuV/m) has been corrected by factor.

Note [5]: All antenna were pre tested, but only the worst case has been reported in this report.

Test Data and Plots

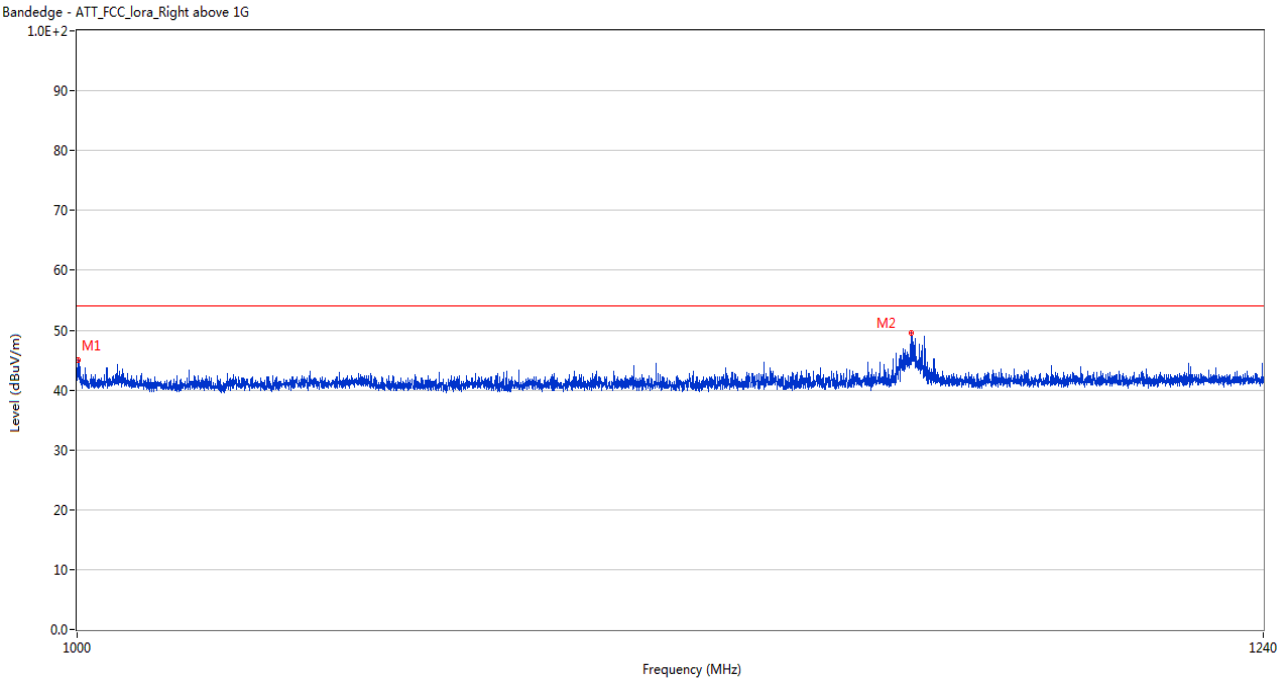
Dipole Antenna

LOW CHANNEL



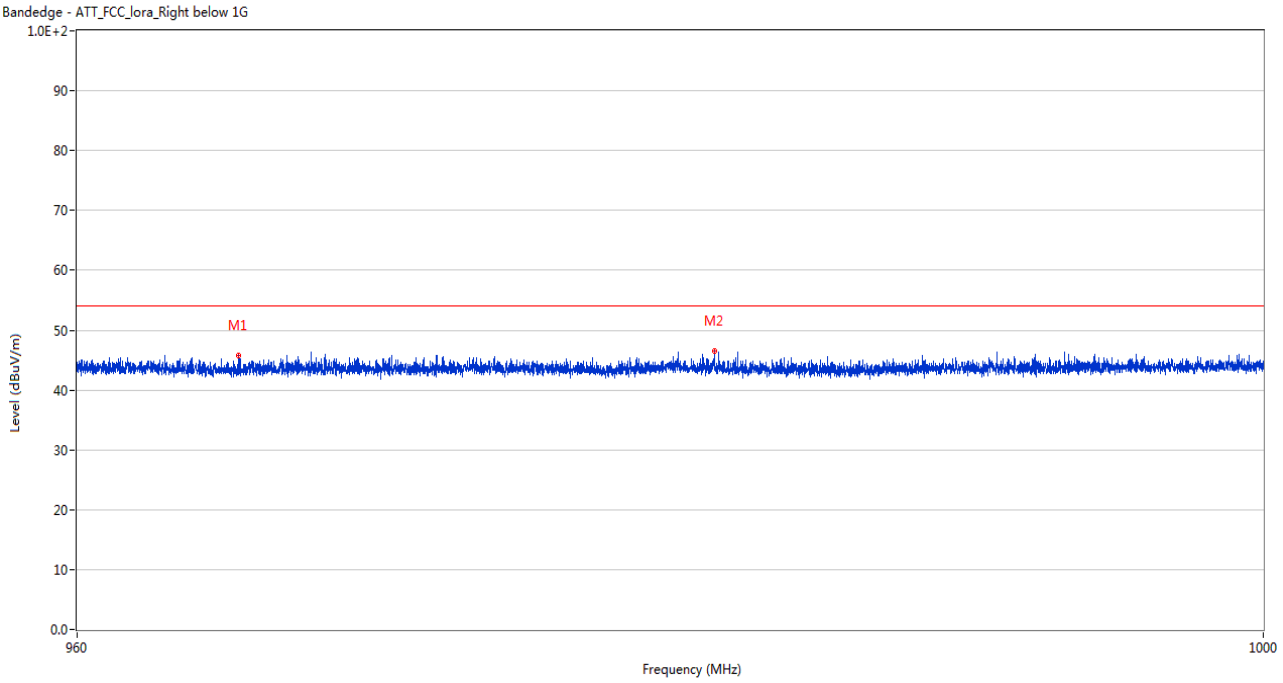
No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	611.451	43.82	6.33	54.0	10.18	Peak	175.00	150	Vertical	Pass
2	613.721	42.99	6.26	54.0	11.01	Peak	244.00	150	Vertical	Pass

HIGH CHANNEL



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	1000.120	45.09	-12.65	54.0	8.91	Peak	129.00	150	Vertical	Pass
2	1163.400	49.62	-12.43	54.0	4.38	Peak	81.00	150	Vertical	Pass

HIGH CHANNEL



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	965.333	45.79	9.33	54.0	8.21	Peak	28.00	150	Vertical	Pass
2	981.280	46.58	9.64	54.0	7.42	Peak	82.00	150	Vertical	Pass

ANNEX B TEST SETUP PHOTOS

Please refer the document “BL-SZ2480665-AR.PDF”.

ANNEX C EUT EXTERNAL PHOTOS

Please refer the document “BL-SZ2480665-AW.PDF”.

ANNEX D EUT INTERNAL PHOTOS

Please refer the document “BL-SZ2480665-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--