

RF

TEST REPORT

ISSUED BY
Shenzhen BALUN Technology Co., Ltd.



FOR
IoT gateway based on LoRaWAN

ISSUED TO
Ruixing Hengfang Network (Shenzhen) Co., Ltd

Room 201, building 6 Software Park(Phase 1), Keji Mid 3rd Road,
NanShan District, Shenzhen 518057 China



Tested by:
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Date:
Jul. 15, 2021

Approved by:
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(Technical Director)

Date:
Jul. 15, 2021

Report No.: BL-SZ2160621-606

EUT Name: IoT gateway based on LoRaWAN

Model Name: RHF2S308

Brand Name: RisingHF

Test Standard: 47 CFR Part 15 Subpart C

FCC ID: 2AJUZ-RHF2S308

Test Conclusion: Pass

Test Date: Jun. 24, 2021 ~ Jul. 14, 2021

Date of Issue: Jul. 15, 2021

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Revision History

Version	Issue Date	Revisions Content
<u>Rev. 01</u>	<u>Jul. 15, 2021</u>	<u>Initial Issue</u>

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1 ADMINISTRATIVE DATA (GENERAL INFORMATION)

1.1 Identification of the Testing Laboratory

Company Name	Shenzhen BALUN Technology Co., Ltd.
Address	Block B, 1st FL, Baisha Science and Technology Park, Shahe Xi Road, Nanshan District, Shenzhen, Guangdong Province, P. R. China
Phone Number	+86 755 6685 0100
Fax Number	+86 755 6182 4271

1.2 Identification of the Responsible Testing Location

Test Location	Shenzhen BALUN Technology Co., Ltd.
Address	Block B, 1st FL, Baisha Science and Technology Park, Shahe Xi Road, 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.
Description	All measurement facilities used to collect the measurement data are located at Block B, FL 1, Baisha Science and Technology Park, Shahe Xi Road, Nanshan District, Shenzhen, Guangdong Province, P. R. China 518055

1.3 Laboratory Condition

Ambient Temperature	20°C to 25°C
Ambient Relative Humidity	45% to 55%
Ambient Pressure	100 kPa to 102 kPa

1.4 Announce

- (1) The test report reference to the report template version v2.2.
- (2) The test report is invalid if not marked with the signatures of the persons responsible for preparing and approving the test report.
- (3) The test report is invalid if there is any evidence and/or falsification.
- (4) The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein.
- (5) This document may not be altered or revised in any way unless done so by BALUN and all revisions are duly noted in the revisions section.
- (6) Content of the test report, in part or in full, cannot be used for publicity and/or promotional purposes without prior written approval from the laboratory.
- (7) The laboratory is only responsible for the data released by the laboratory, except for the part provided by the applicant.

2 PRODUCT INFORMATION

2.1 Applicant Information

Applicant	Ruixing Hengfang Network (Shenzhen) Co., Ltd
Address	Room 201, building 6 Software Park(Phase 1), Keji Mid 3rd Road, NanShan District, Shenzhen 518057 China

2.2 Manufacturer Information

Manufacturer	Ruixing Hengfang Network (Shenzhen) Co., Ltd
Address	Room 201, building 6 Software Park(Phase 1), Keji Mid 3rd Road, NanShan District, Shenzhen 518057 China

2.3 Factory Information

Factory	N/A
Address	N/A

2.4 General Description for Equipment under Test (EUT)

EUT Name	IoT gateway based on LoRaWAN
Model Name Under Test	RHF2S308
Series Model Name	N/A
Description of Model name differentiation	N/A
Serial Number	N/A
Hardware Version	RHF2S308V1.1
Software Version	1.0.1
Dimensions (Approx.)	N/A
Weight (Approx.)	N/A

2.5 Technical Information

Network and Wireless connectivity	Bluetooth (BR+EDR+BLE) WIFI 802.11b, 802.11g, 802.11n GPS, LoRa
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The requirement for the following technical information of the EUT was tested in this report:

Modulation Technology	Frequency hopping system
Modulation Type	LoRa
Product Type	☐ Mobile ☐ Portable ☒ Fix Location
Frequency Range	The frequency range used is 902 MHz to 928 MHz.
Number of channel	64
Tested Channel	1 (902.3 MHz), 33 (908.7 MHz), 64 (914.9 MHz)
Antenna Type	Dipole Antenna
Antenna Gain	2.0 dBi (In test items related to antenna gain, the final results reflect this figure. This value is provided by the applicant.)
Antenna System(MIMO Smart Antenna)	N/A

All channel was listed on the following table:

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

2.6 Additional Instructions

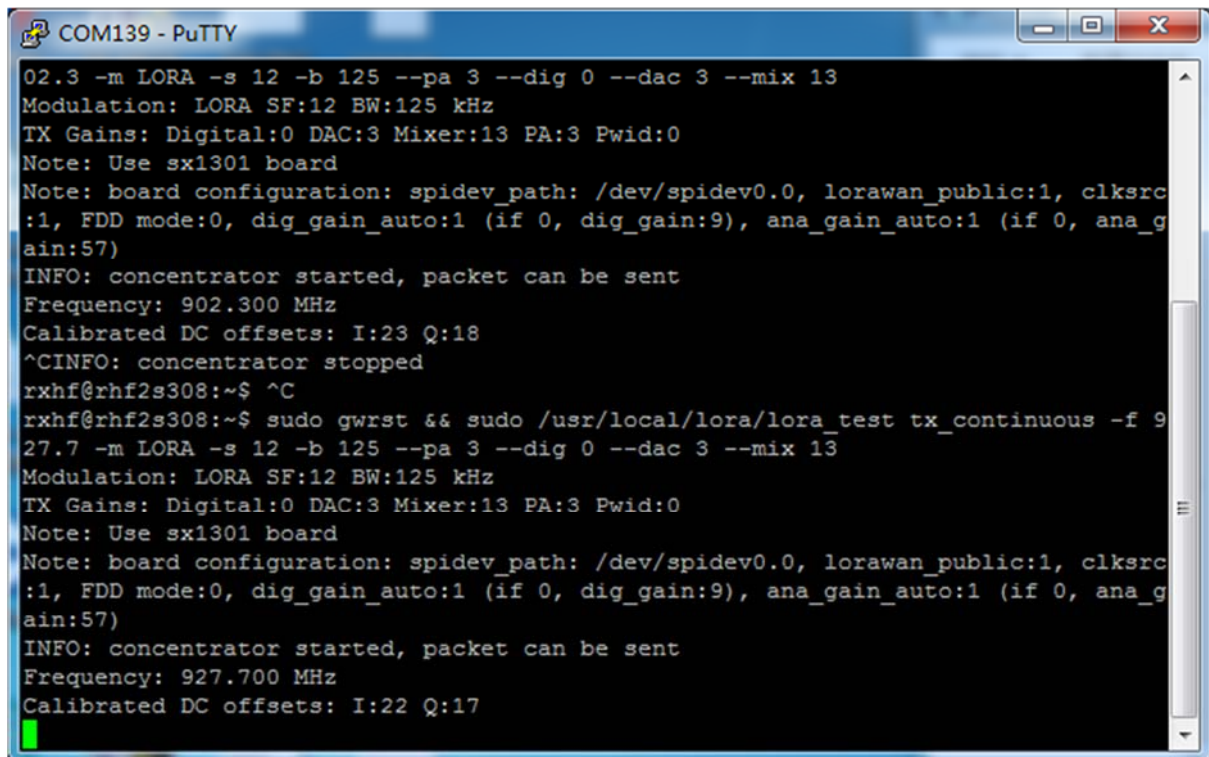
EUT Software Settings:

Mode	☒ Special software is used. The software provided by client to enable the EUT under transmission condition continuously at specific channel frequencies individually.
------	--

During testing, Channel and Power Controlling Software provided by the customer was used to control the operating channel as well as the output power level. The RF output power selection is for the setting of RF output power expected by the customer and is going to be fixed on the firmware of the final end product.

Power level setup in software			
Test Software Version	PuTTY		
Support Units (Software installation media)	Description	Manufacturer	Model
	Notebook	Lenovo	X220
Mode	Channel (MHz)	Pa	Mix
LoRa	902.3	3	13
	908.7		
	914.9		

Run Software



```

COM139 - PuTTY
02.3 -m LORA -s 12 -b 125 --pa 3 --dig 0 --dac 3 --mix 13
Modulation: LORA SF:12 BW:125 kHz
TX Gains: Digital:0 DAC:3 Mixer:13 PA:3 Pwid:0
Note: Use sx1301 board
Note: board configuration: spidev_path: /dev/spidev0.0, lorawan_public:1, clksrc:1, FDD mode:0, dig_gain_auto:1 (if 0, dig_gain:9), ana_gain_auto:1 (if 0, ana_gain:57)
INFO: concentrator started, packet can be sent
Frequency: 902.300 MHz
Calibrated DC offsets: I:23 Q:18
^CINFO: concentrator stopped
rxhf@rhf2s308:~$ ^C
rxhf@rhf2s308:~$ sudo gwrst && sudo /usr/local/lora/lora_test tx_continuous -f 927.7 -m LORA -s 12 -b 125 --pa 3 --dig 0 --dac 3 --mix 13
Modulation: LORA SF:12 BW:125 kHz
TX Gains: Digital:0 DAC:3 Mixer:13 PA:3 Pwid:0
Note: Use sx1301 board
Note: board configuration: spidev_path: /dev/spidev0.0, lorawan_public:1, clksrc:1, FDD mode:0, dig_gain_auto:1 (if 0, dig_gain:9), ana_gain_auto:1 (if 0, ana_gain:57)
INFO: concentrator started, packet can be sent
Frequency: 927.700 MHz
Calibrated DC offsets: I:22 Q:17

```


3 SUMMARY OF TEST RESULTS

3.1 Test Standards

No.	Identity	Document Title
1	47 CFR Part 15, Subpart C	Miscellaneous Wireless Communications Services
2	ANSI C63.10-2013	American National Standard for Testing Unlicensed Wireless Devices
3	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

3.2 Verdict

No.	Description	FCC Part No.	Modulation Technology	Channel	Test Result	Verdict
1	Antenna Requirement	15.203	N/A	N/A	--	Pass ^{Note1}
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 1: Please refer to section 5.1

4 GENERAL TEST CONFIGURATIONS

4.1 Test Environments

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

Relative Humidity	45% to 55%	
Atmospheric Pressure	100 kPa to 102 kPa	
Temperature	NT (Normal Temperature)	+22°C to +25°C
Working Voltage of the EUT	NV (Normal Voltage)	18 V

4.2 Test Equipment List

Description	Manufacturer	Model	Serial No.	Cal. Date	Cal. Due
Spectrum Analyzer	ROHDE&SCHWARZ	FSV-40	101544	2021.04.01	2022.03.31
Bluetooth Signaling Unit	ROHDE&SCHWARZ	CMW500	142028	2021.06.01	2022.05.31
EMI Receiver	KEYSIGHT	N9038A	MY53220118	2021.06.01	2022.05.31
EMI Receiver	ROHDE&SCHWARZ	ESRP	101036	2021.06.01	2022.05.31
LISN	SCHWARZBECK	NSLK 8127	8127-687	2021.06.01	2022.05.31
Test Antenna-Loop(9 kHz-30 MHz)	SCHWARZBECK	FMZB 1519	1519-037	2019.10.29	2021.10.28
Test Antenna-Bi-Log(30 MHz-3 GHz)	SCHWARZBECK	VULB 9163	9163-624	2019.07.02	2022.07.01
Test Antenna-Horn(1-18 GHz)	SCHWARZBECK	BBHA 9120D	9120D-1917	2019.07.02	2022.07.01
Test Antenna-Horn (18-40 GHz)	A-INFO	LB-180400KF	J211060273	2021.01.05	2023.01.04
Anechoic Chamber	RAINFORD	9m*6m*6m	N/A	2017.02.21	2022.02.20
Anechoic Chamber	EMC Electronic Co., Ltd	20.10*11.60*7.35m	N/A	2018.08.08	2021.08.07
Shielded Enclosure	ChangNing	CN-130701	130703	--	--

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.

Measurement	Value
Occupied Channel Bandwidth	±4%
RF output power, conducted	±1.21 dB
Power Spectral Density, conducted	±1.25 dB
Unwanted Emissions, conducted	±1.26 dB
All emissions, radiated	±3.86 dB
Temperature	±1°C
Humidity	±4%

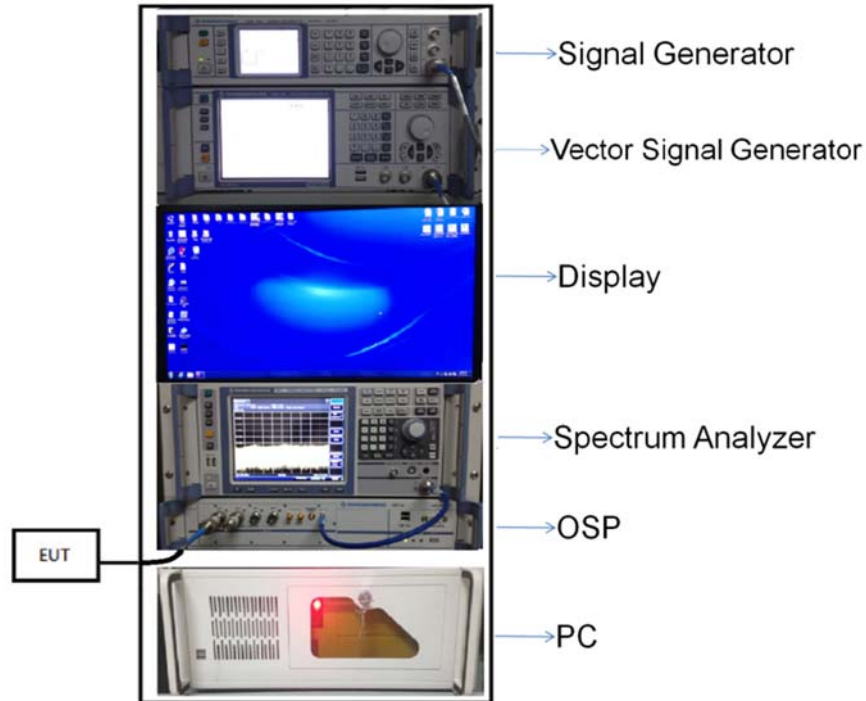
4.4 Description of Test Setup

4.4.1 For Antenna Port Test

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

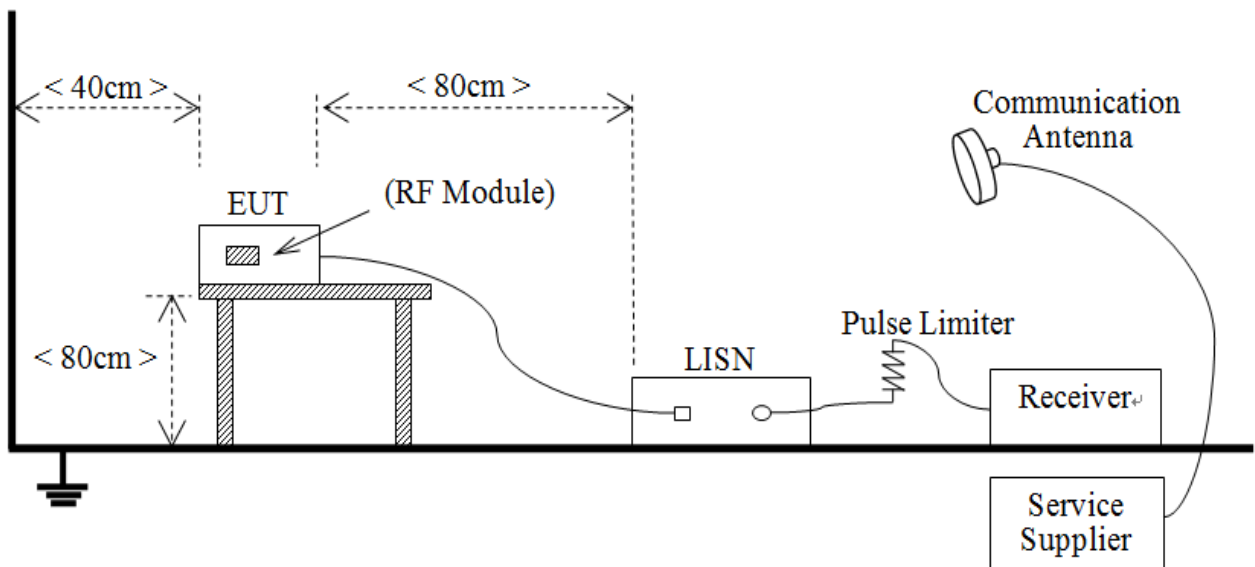
For example: the measurement value is 10 dBm and the cable 0.5dBm used, then the final result of EUT:

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



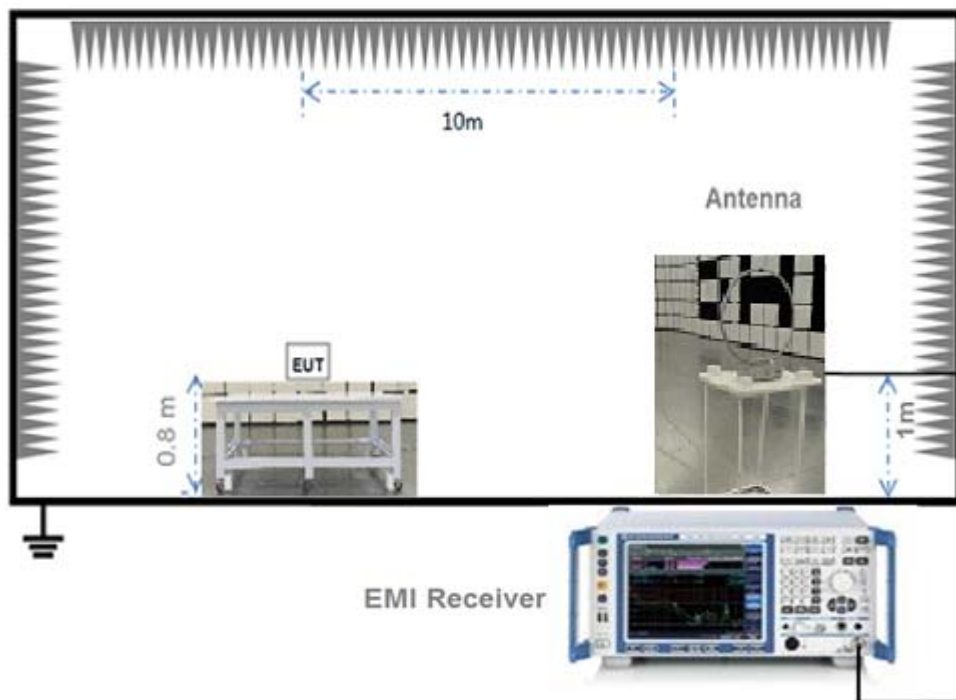
(Diagram 1)

4.4.2 For AC Power Supply Port Test



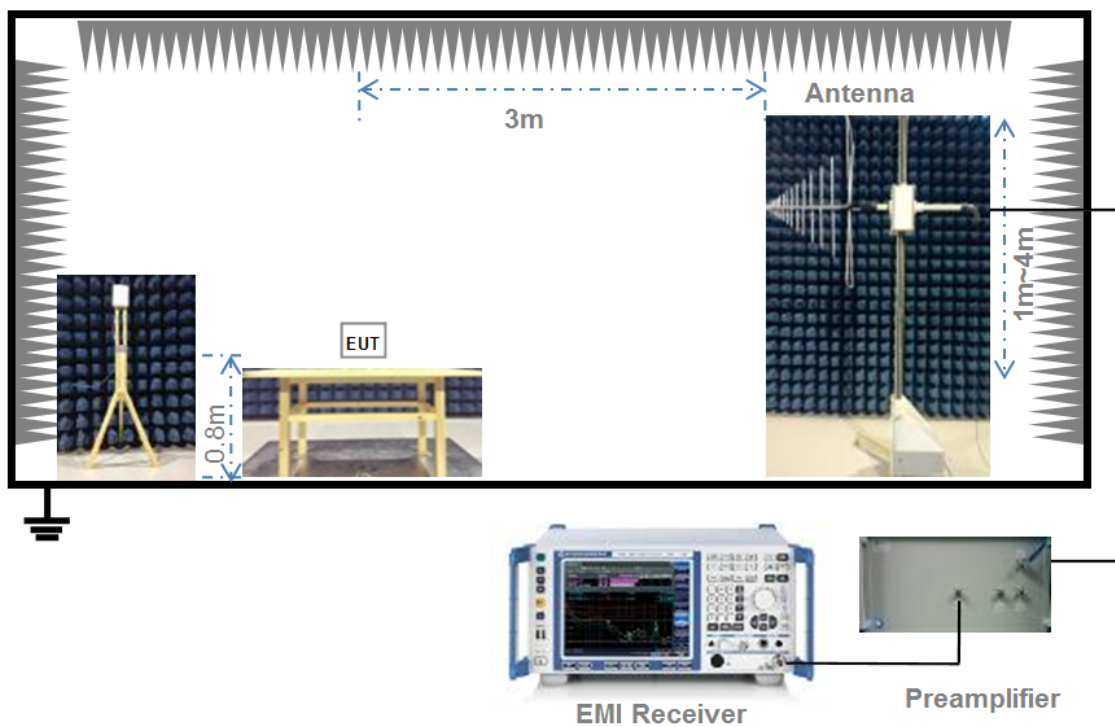
(Diagram 2)

4.4.3 For Radiated Test (Below 30 MHz)



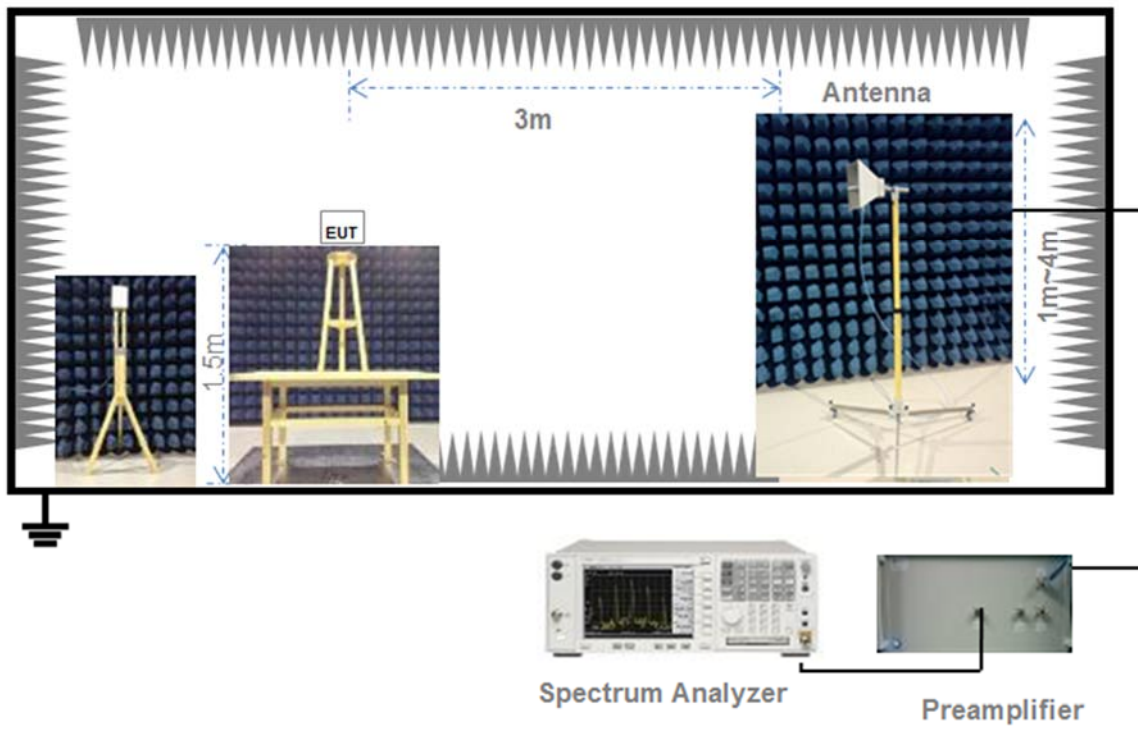
(Diagram 3)

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 & 15.247(b)

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

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

5.1.2 Antenna Anti-Replacement Construction

The Antenna Anti-Replacement as following method:

Protected Method	Description
The antenna is embedded in the product	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) (1) (i)

For frequency hopping systems operating in the 902-928 MHz band: the system shall use at least 50 hopping frequencies.

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.

5.2.2 Test Procedure

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

Span = the frequency band of operation

RBW $\geq$ 1% of the span

VBW $\geq$ RBW

Sweep = auto

Detector function = peak

Trace = max hold

Allow the trace to stabilize

5.2.3 Test Result

Please refer to ANNEX A.1.

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

5.3.1 Test Limit

FCC § 15.247(b)(1)

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 $\geq$ RBW

Sweep = auto

Detector function = peak

Trace = max hold

Allow the trace to stabilize.

5.3.4 Test Result

Please refer to ANNEX A.2.

5.4 Occupied Bandwidth

5.4.1 Limit

FCC §15.247(a)(1)(i)

5.4.2 Test Setup

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

5.4.3 Test Procedure

Use the following spectrum analyzer settings:

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

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

VBW $\geq$ RBW

Sweep = auto

Detector function = peak

Trace = max hold

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

5.4.4 Test Result

Please refer to ANNEX A.3.

5.5 Carrier Frequency Separation

5.5.1 Limit

FCC §15.247(a)(1)

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

5.5.2 Test Setup

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

5.5.3 Test Procedure

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

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

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

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

Sweep = auto

Detector function = peak

Trace = max hold

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

5.5.4 Test Result

Please refer to ANNEX A.4.

5.6 Time of Occupancy (Dwell time)

5.6.1 Limit

FCC §15.247(a)(1)(i)

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 $\geq$ RBW

Sweep = auto

Detector function = peak

Trace = max hold

Allow the trace to stabilize

5.7.4 Test Result

Please refer to ANNEX A.6.

5.8 Conducted Emission

5.8.1 Limit

FCC §15.207

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

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

5.8.2 Test Setup

See section 4.4.2 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) = $20 \cdot \log[\text{Field Strength } (\mu\text{V/m})]$.
2. In the emission tables above, the tighter limit applies at the band edges.
3. For Above 1000 MHz, the emission limit in this paragraph is based on measurement instrumentation employing an average detector, measurement using instrumentation with a peak detector function, corresponding to 20dB above the maximum permitted average limit.
4. For above 1000 MHz, limit field strength of harmonics: 54dBuV/m@3m (AV) and 74dBuV/m@3m (PK).

5.9.2 Test Setup

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

5.9.3 Test Procedure

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

The power of the EUT transmitting frequency should be ignored.

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

Use the following spectrum analyzer settings:

Span = wide enough to fully capture the emission being measured

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

VBW $\geq$ RBW

Sweep = auto

Detector function = peak

Trace = max hold

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

5.9.4 Test Result

Please refer to ANNEX A.8.

5.10 Band Edge (Restricted-band band-edge)

5.10.1 Limit

FCC §15.209&15.247(d)

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

5.10.2 Test Setup

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

5.10.3 Test Procedure

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

The power of the EUT transmitting frequency should be ignored.

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

Use the following spectrum analyzer settings:

Span = wide enough to fully capture the emission being measured

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

VBW $\geq$ RBW

Sweep = auto

Detector function = peak

Trace = max hold

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

5.10.4 Test Result

Please refer to ANNEX A.9.

ANNEX A TEST RESULT

A.1 Number of Hopping Frequency

Test Data

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

Test plots

LoRa



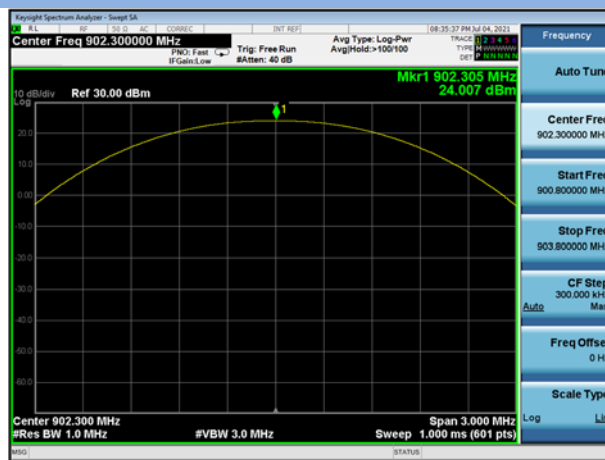
A.2 Peak Output Power

Peak Power Test Data

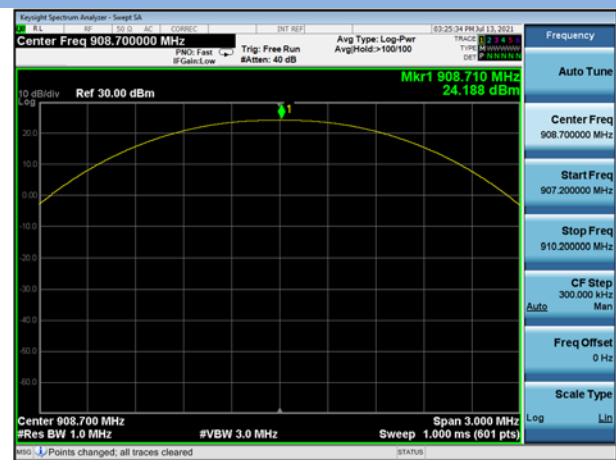
Channel	Measured Output Peak Power		Limit		Verdict
	LoRa		dBm	mW	
	dBm	mW			
Low	24.01	251.59	30	1000	Pass
Middle	24.19	262.30			Pass
High	23.73	236.21			Pass

Test plots

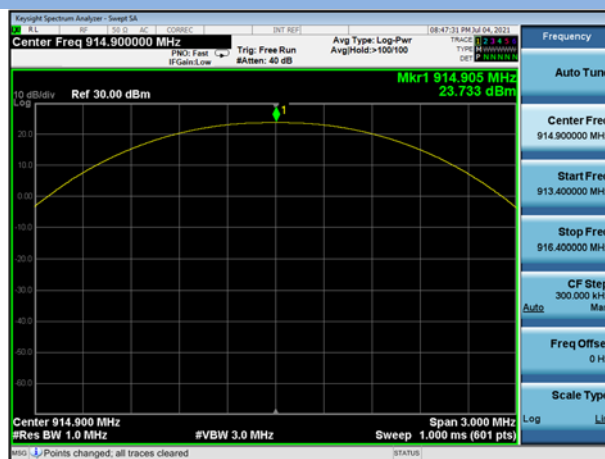
LOW CHANNEL



MIDDLE CHANNEL



HIGH CHANNEL



A.3 20 dB and 99% bandwidth

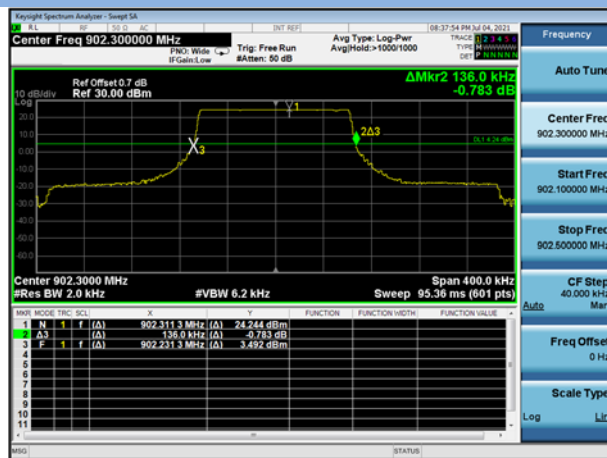
Test Data

LoRa			
Channel	20 dB Bandwidth (MHz)	99% Bandwidth (MHz)	Verdict
Low	0.136000	0.125810	Pass
Middle	0.136000	0.125860	Pass
High	0.135300	0.125880	Pass

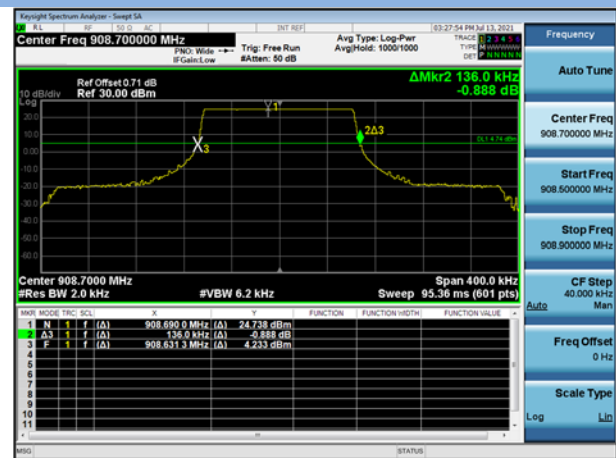
Test plots

20 dB Bandwidth

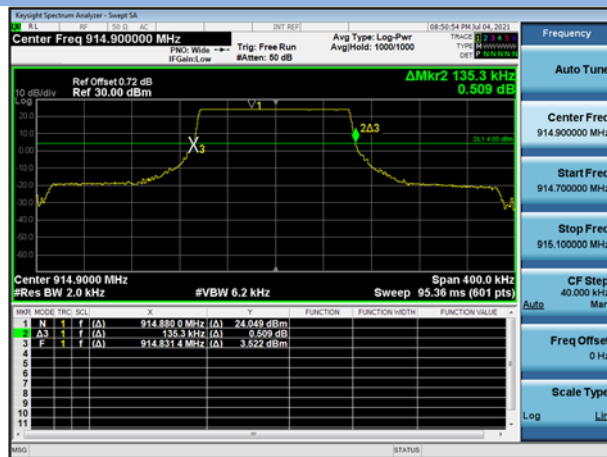
LOW CHANNEL



MIDDLE CHANNEL

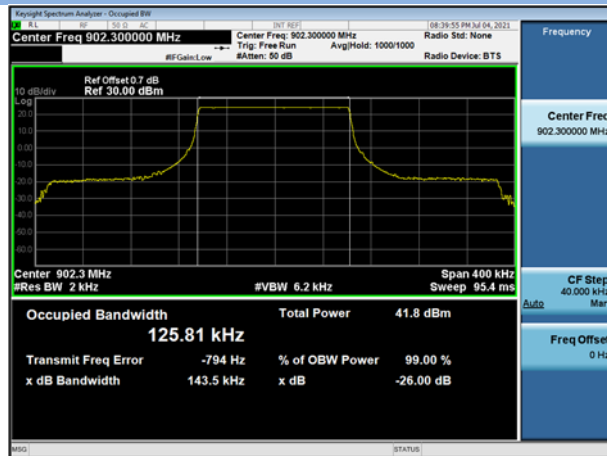


HIGH CHANNEL



99% Bandwidth

LOW CHANNEL



MIDDLE CHANNEL



HIGH CHANNEL



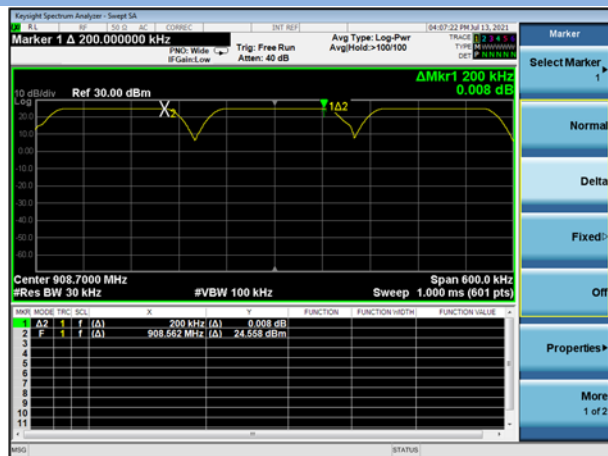
A.4 Hopping Frequency Separation

Test Data

Mode	Frequency separation (MHz)	Max 20 dB Bandwidth (MHz)	Verdict
LoRa	0.2	0.136000	Pass

Test Plots

LoRa

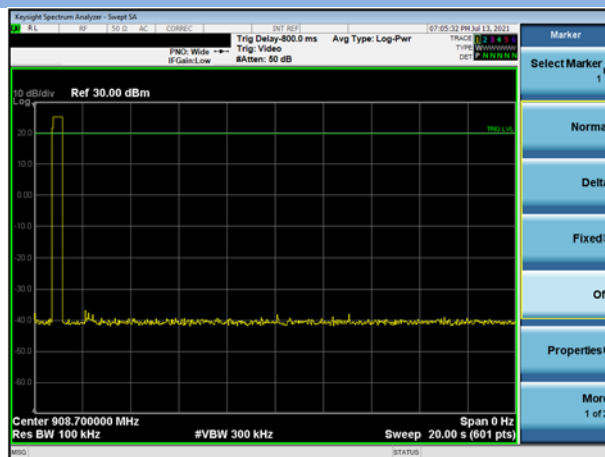
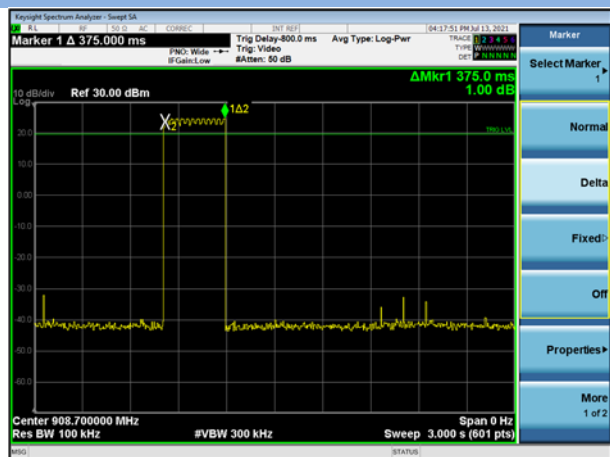


A.5 Average Time of Occupancy

Test Data

Mode	Total of Dwell (ms)	Limit (ms)	Verdict
LoRa	375.0	400	Pass

LoRa



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

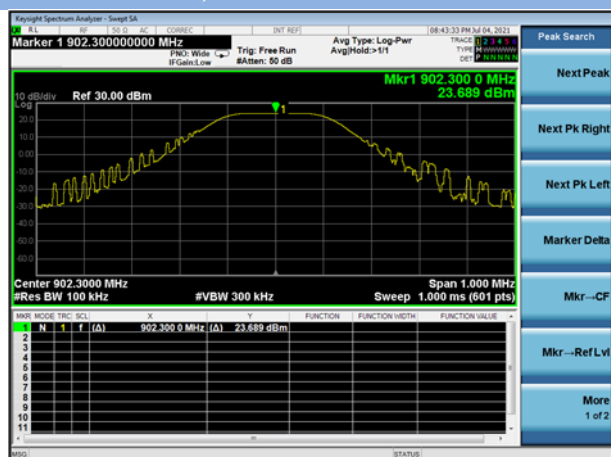
Test Data

LoRa				
Channel	Measured Max. Out of Band Emission (dBm)	Limit (dBm)		Verdict
		Carrier Level	Calculated 20 dBc Limit	
Low	-15.646	23.689	3.689	Pass
Middle	-33.264	24.195	4.195	Pass
High	-22.723	23.536	3.536	Pass

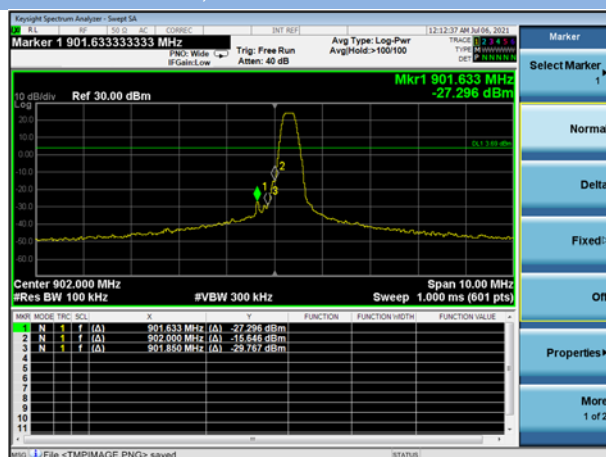
LoRa				
Mode	Measured Max. Out of Band Emission (dBm)	Limit (dBm)		Verdict
		Carrier Level	Calculated 20 dBc Limit	
Hopping	-23.832	24.763	4.763	Pass

Test Plots

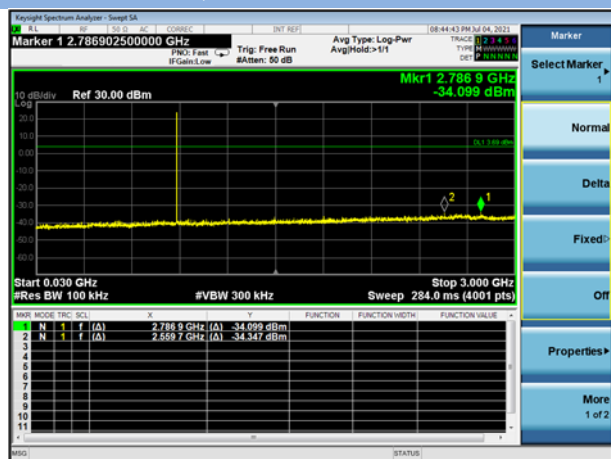
LOW CHANNEL, CARRIER LEVEL



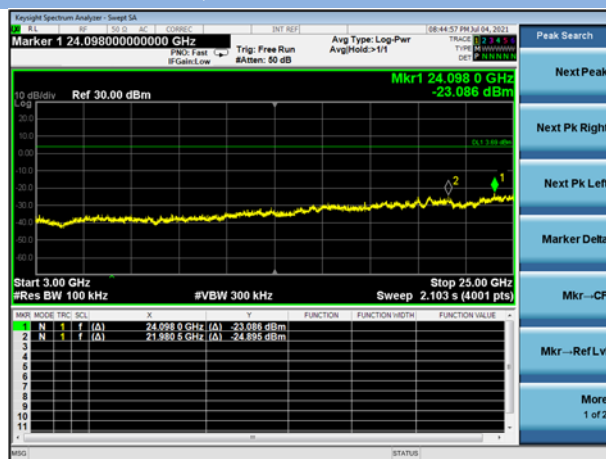
LOW CHANNEL, BAND EDGE



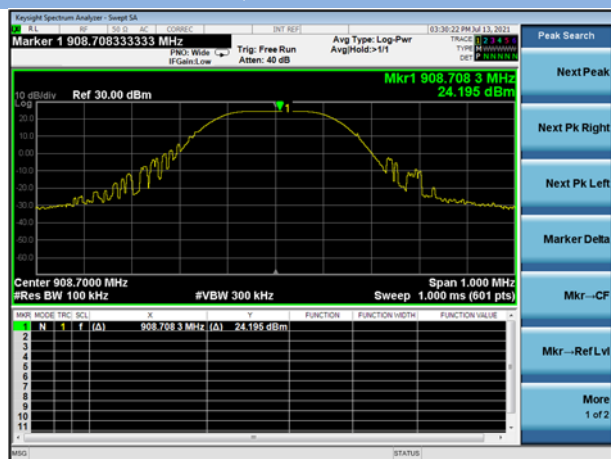
LOW CHANNEL, SPURIOUS 30 MHz ~ 3 GHz



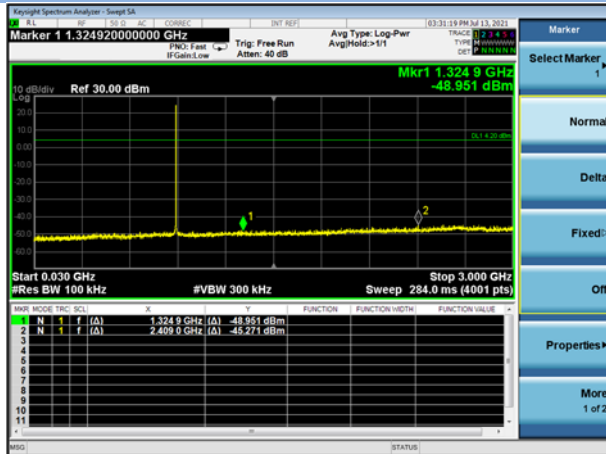
LOW CHANNEL, SPURIOUS 3 GHz ~ 25 GHz



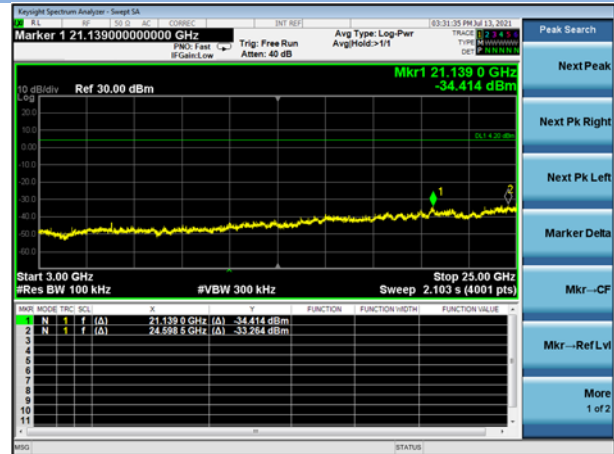
MIDDLE CHANNEL, CARRIER LEVEL



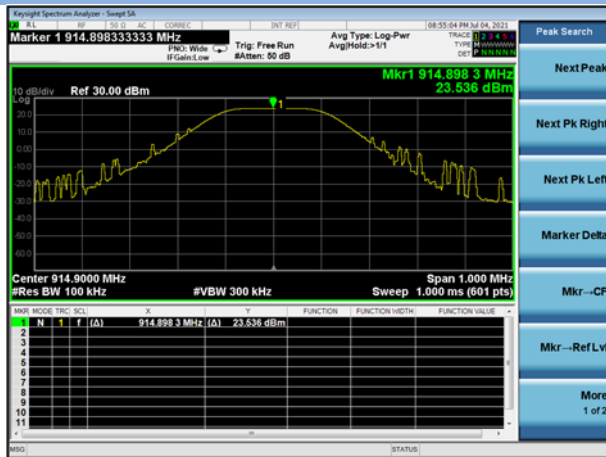
MIDDLE CHANNEL, SPURIOUS 30 MHz ~ 3 GHz



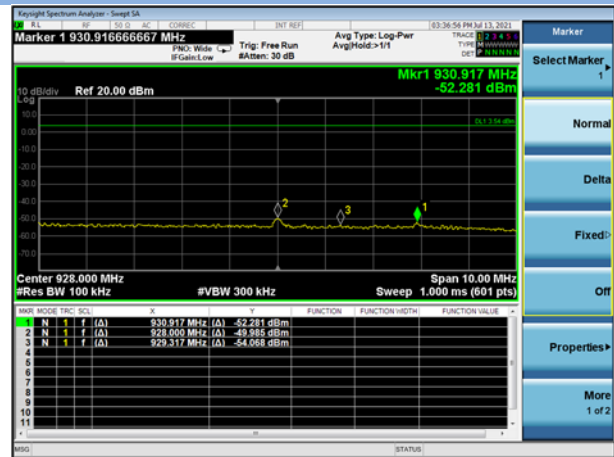
MIDDLE CHANNEL, SPURIOUS 3 GHz ~ 25 GHz



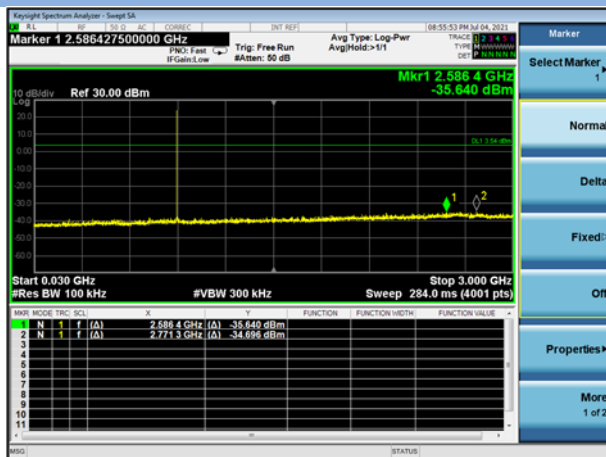
HIGH CHANNEL, CARRIER LEVEL



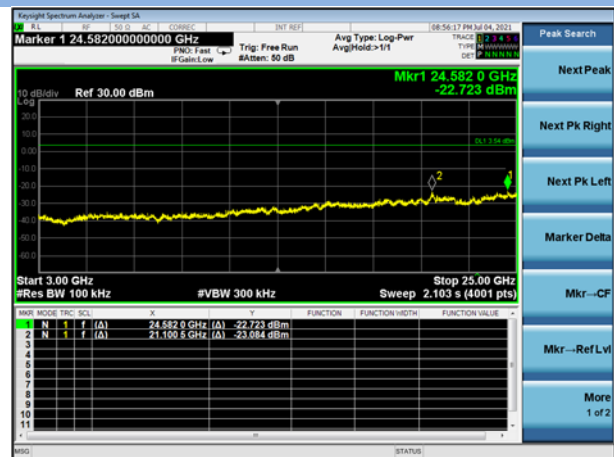
HIGH CHANNEL, BAND EDGE



HIGH CHANNEL, SPURIOUS 30 MHz ~ 3 GHz



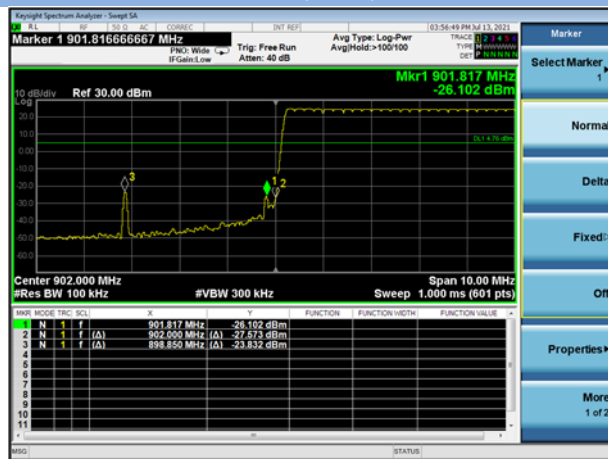
HIGH CHANNEL, SPURIOUS 3 GHz ~ 25 GHz



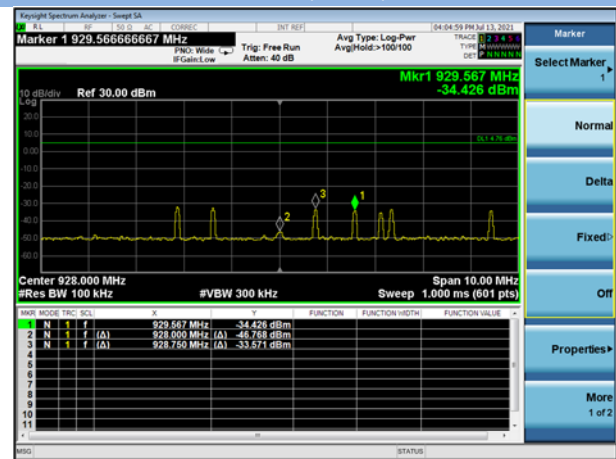
HOPPING, CARRIER LEVEL



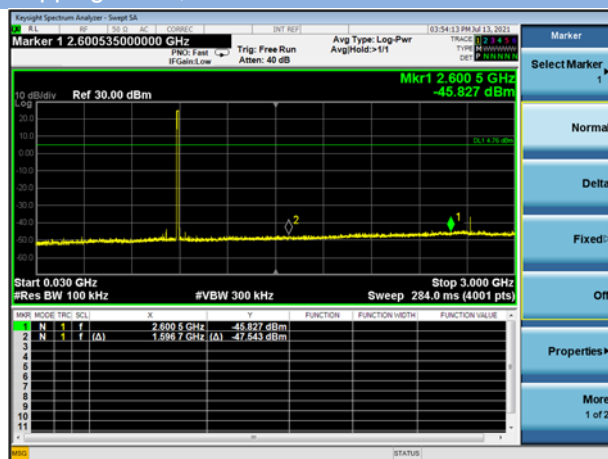
HOPPING BAND EDGE (LOW)



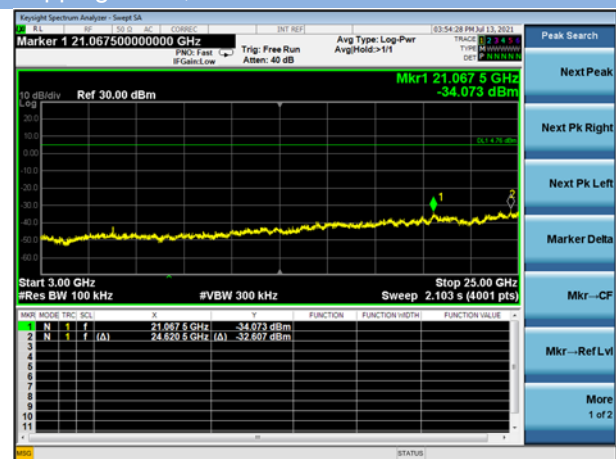
HOPPING BAND EDGE (HIGH)



Hopping Mode, SPURIOUS 30 MHz ~ 3 GHz



Hopping Mode, SPURIOUS 30 3GHz ~ 25 GHz



A.7 Conducted Emissions

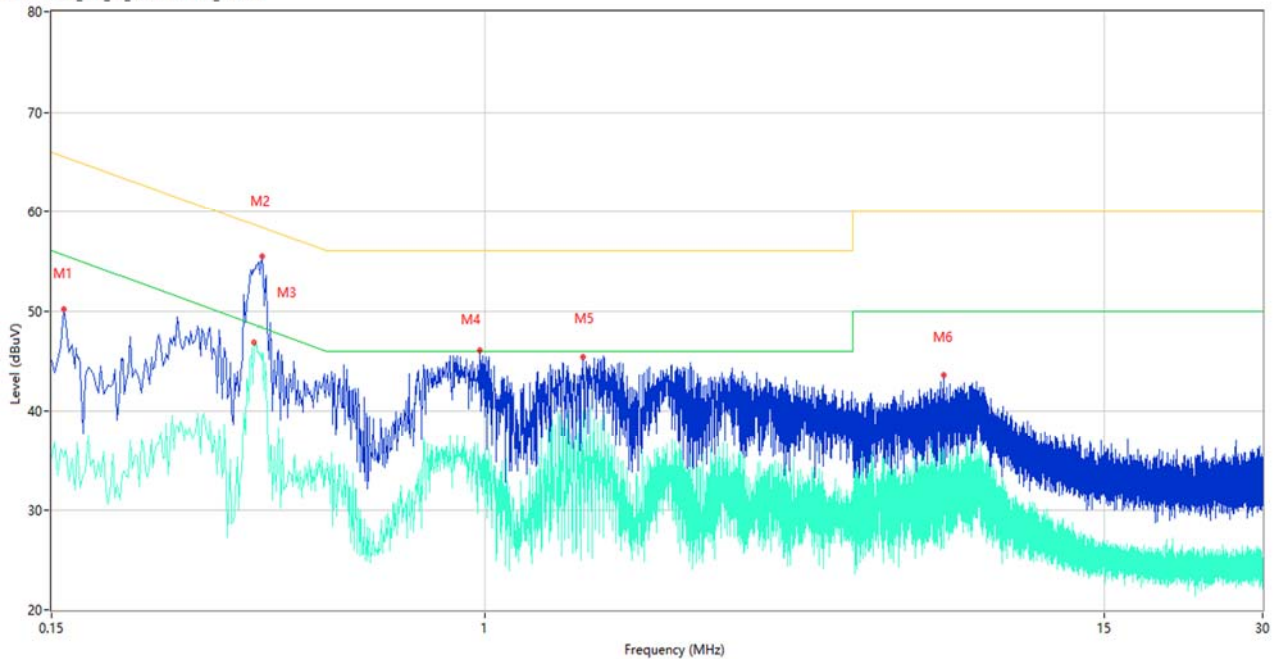
Note 1: The EUT is working in the Normal link mode. All modes have been tested and normal link mode is worst.

Note 2: Results (dBuV) = Original reading level of Spectrum Analyzer (dBuV) + Factor (dB)

Test Data and Plots

PHASE L

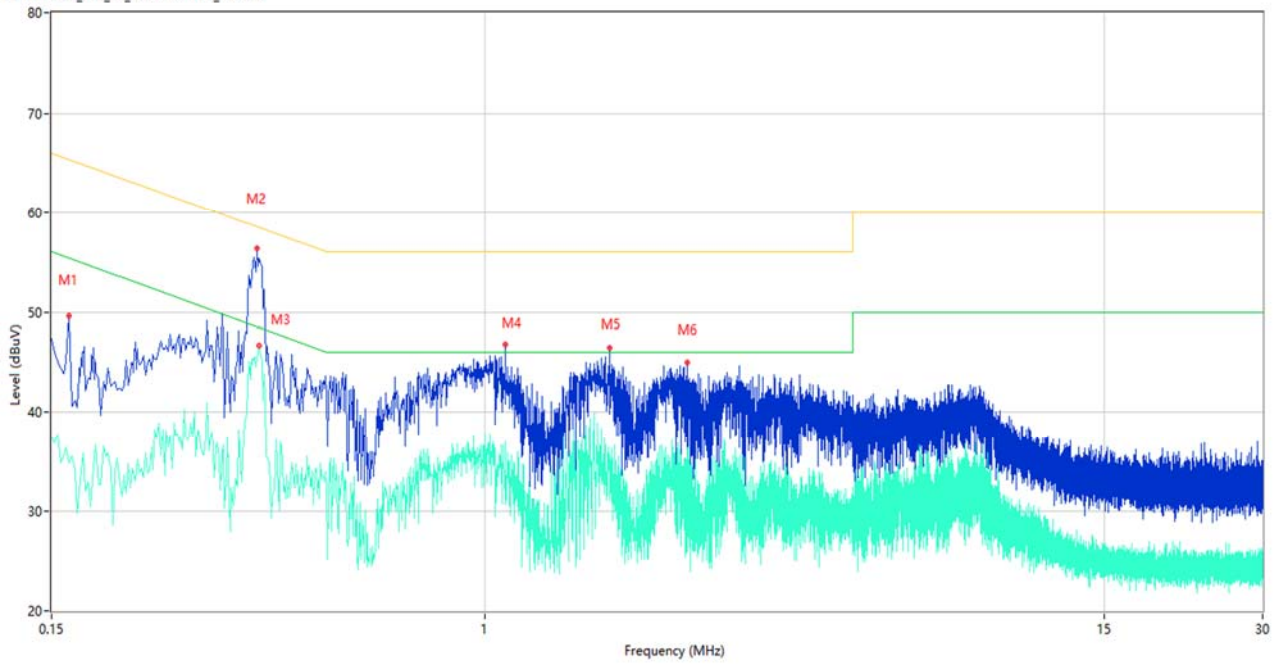
CE Test case_FCC_CE_FCC PART 15B_Class B



No.	Frequency (MHz)	Results (dBuV)	Factor (dB)	Limit (dBuV)	Over Limit (dB)	Detector	Line	Verdict
1	0.158	50.21	10.40	65.57	-15.36	Peak	L	Pass
1**	0.158	35.21	10.40	55.57	-20.36	AV	L	Pass
2	0.376	55.50	10.30	58.37	-2.87	Peak	L	N/A
2	0.376	53.22	10.30	58.37	-5.15	QP	L	Pass
2**	0.376	45.31	10.30	48.37	-3.06	AV	L	Pass
3	0.364	54.93	10.30	58.64	-3.71	Peak	L	Pass
3**	0.364	46.86	10.30	48.64	-1.78	AV	L	Pass
4	0.976	46.05	10.23	56.00	-9.95	Peak	L	Pass
4**	0.976	35.09	10.23	46.00	-10.91	AV	L	Pass
5	1.532	45.43	10.24	56.00	-10.57	Peak	L	Pass
5**	1.532	39.96	10.24	46.00	-6.04	AV	L	Pass
6	7.422	43.62	10.34	60.00	-16.38	Peak	L	Pass
6**	7.422	33.61	10.34	50.00	-16.39	AV	L	Pass

PHASE N

CE Test case_FCC_CE_FCC PART 15B_Class B



V	Frequency (MHz)	Results (dBuV)	Factor (dB)	Limit (dBuV)	Over Limit (dB)	Detector	Line	Verdict
1	0.162	49.65	10.40	65.36	-15.71	Peak	N	Pass
1**	0.162	34.85	10.40	55.36	-20.51	AV	N	Pass
2	0.368	56.43	10.30	58.55	-2.12	Peak	N	N/A
2*	0.368	54.45	10.30	58.55	-4.10	QP	N	Pass
2**	0.368	45.45	10.30	48.55	-3.10	AV	N	Pass
3	0.372	55.36	10.30	58.46	-3.10	Peak	N	Pass
3**	0.372	46.71	10.30	48.46	-1.75	AV	N	Pass
4	1.092	46.80	10.23	56.00	-9.20	Peak	N	Pass
4**	1.092	36.95	10.23	46.00	-9.05	AV	N	Pass
5	1.720	46.42	10.27	56.00	-9.58	Peak	N	Pass
5**	1.720	35.55	10.27	46.00	-10.45	AV	N	Pass
6	2.418	44.98	10.26	56.00	-11.02	Peak	N	Pass
6**	2.418	36.22	10.26	46.00	-9.78	AV	N	Pass

A.8 Radiated Spurious Emission

Note¹: The symbol of “--” in the table which means not application.

Note²: 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.

Note³: 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.

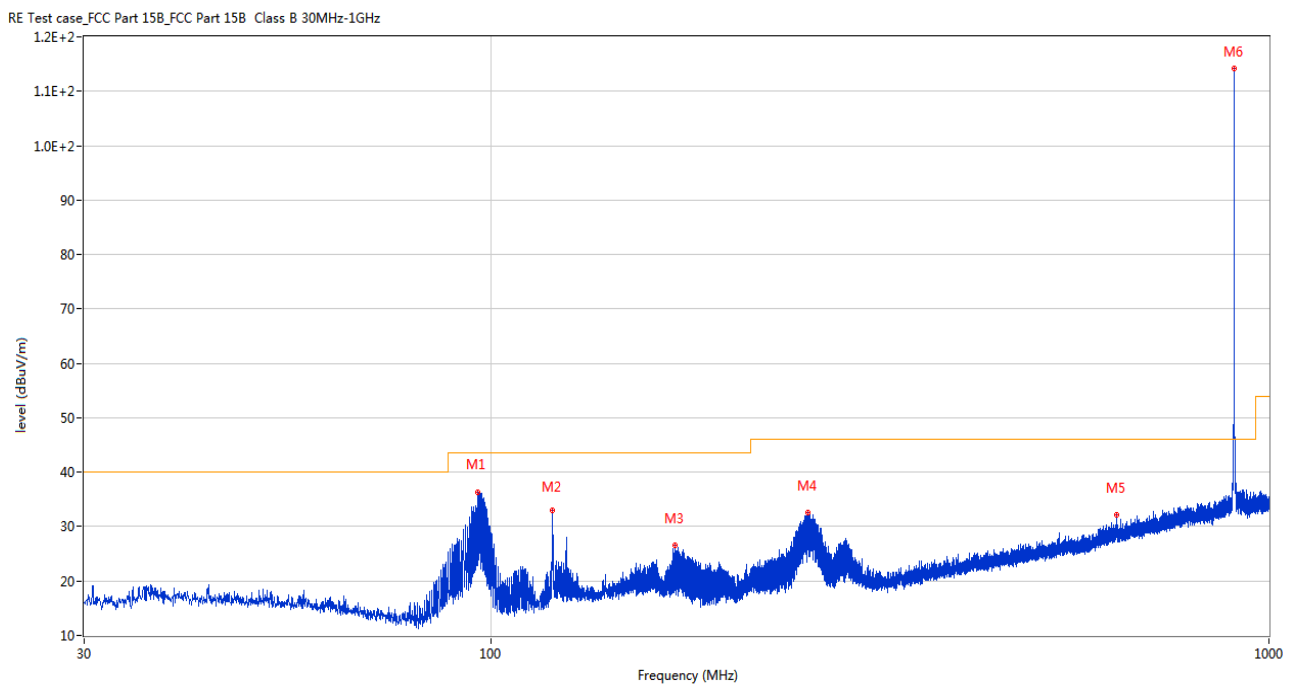
Note⁴: The marked spikes near 900 MHz with circle should be ignored because they are Fundamental signal.

Note⁵: The EUT is working in the Normal link mode below 1 GHz. All modes have been tested low channel mode is the worst.

Note⁶: Results (dBuV/m) = Original reading level of Spectrum Analyzer (dBuV/m) + Factor (dB)

Test Data and Plots

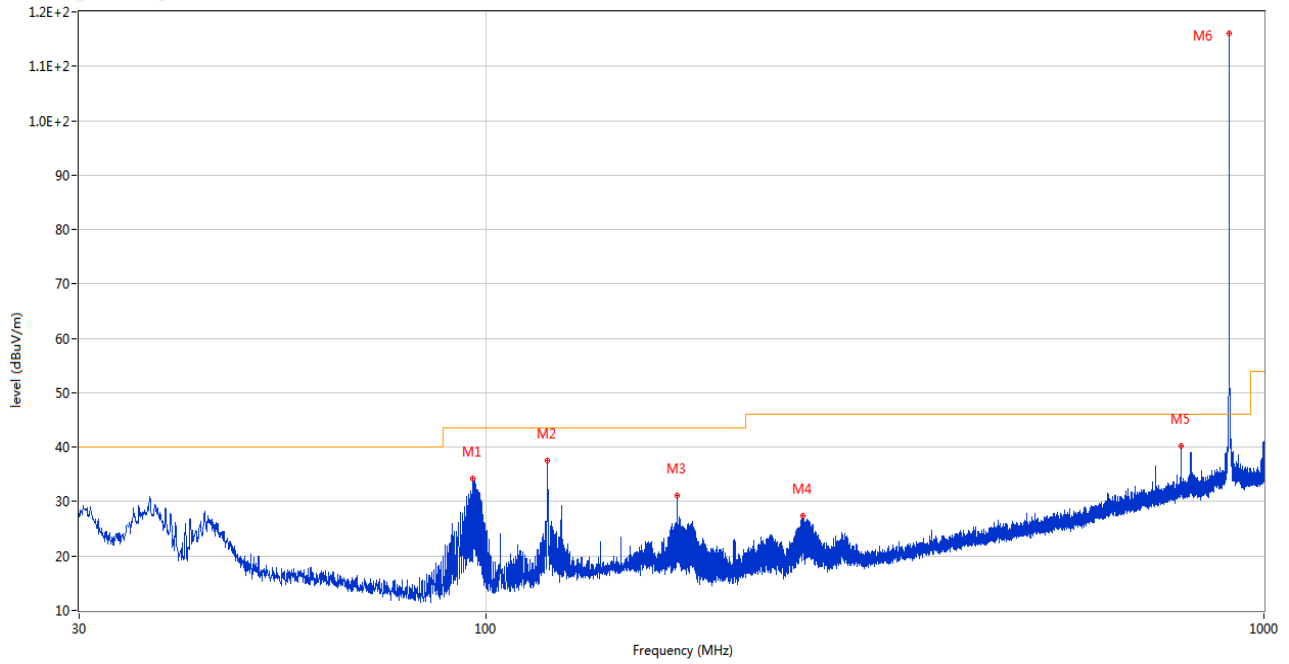
LOW CHANNEL 30 MHz to 1 GHz, ANT H



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Over Limit (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	96.299	36.37	-29.51	43.5	-7.13	Peak	186.00	200	Horizontal	Pass
2	119.967	33.00	-27.16	43.5	-10.50	Peak	360.00	200	Horizontal	Pass
3	172.590	26.66	-26.23	43.5	-16.84	Peak	208.00	200	Horizontal	Pass
4	255.476	32.67	-25.58	46.0	-13.33	Peak	155.00	100	Horizontal	Pass
5	636.881	32.11	-15.19	46.0	-13.89	Peak	125.00	100	Horizontal	Pass
6	902.273	114.10	-11.38	46.0	68.10	Peak	125.00	100	Horizontal	N/A

LOW CHANNEL 30 MHz to 1 GHz, ANT V

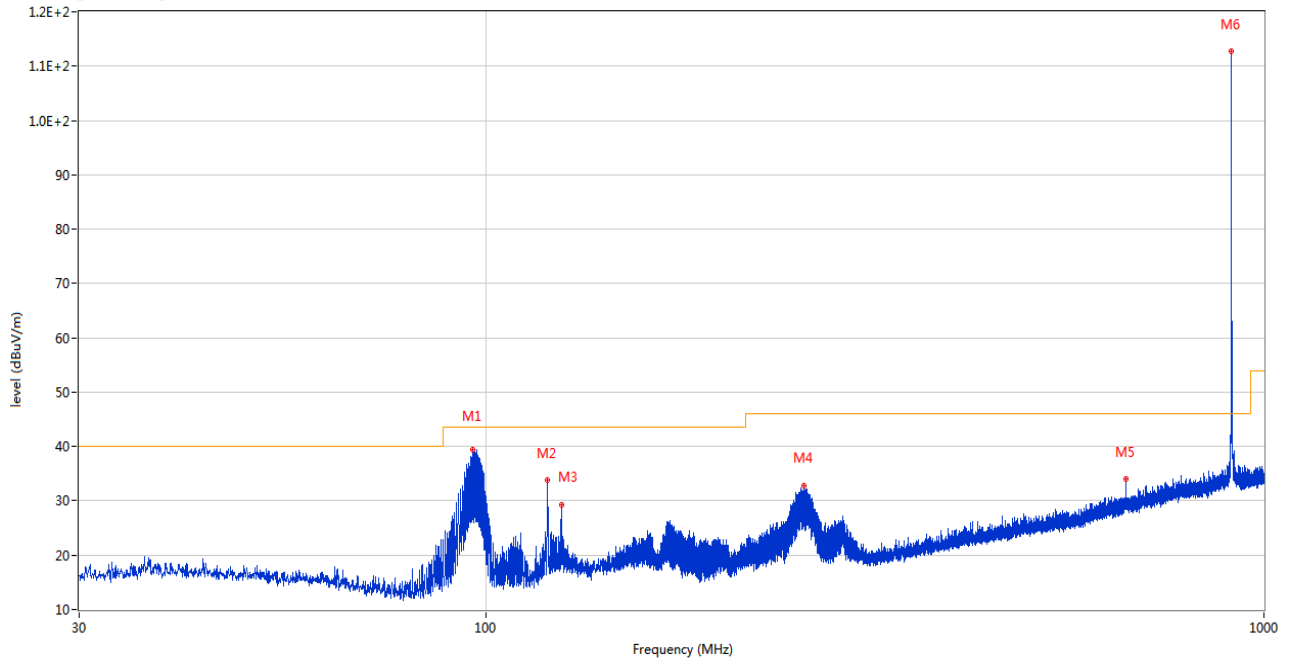
RE Test case_FCC Part 15B_FCC Part 15B Class B 30MHz-1GHz



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Over Limit (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	96.299	34.24	-29.51	43.5	-9.26	Peak	304.00	100	Vertical	Pass
2	120.016	37.55	-27.16	43.5	-5.95	Peak	297.00	100	Vertical	Pass
3	176.276	31.19	-26.49	43.5	-12.31	Peak	361.00	200	Vertical	Pass
4	255.380	27.44	-25.56	46.0	-18.56	Peak	331.00	100	Vertical	Pass
5	782.284	40.28	-12.78	46.0	-5.72	Peak	264.00	100	Vertical	Pass
6	902.224	115.99	-11.38	46.0	69.99	Peak	194.00	200	Vertical	N/A

MIDDLE CHANNEL 30 MHz to 1 GHz, ANT H

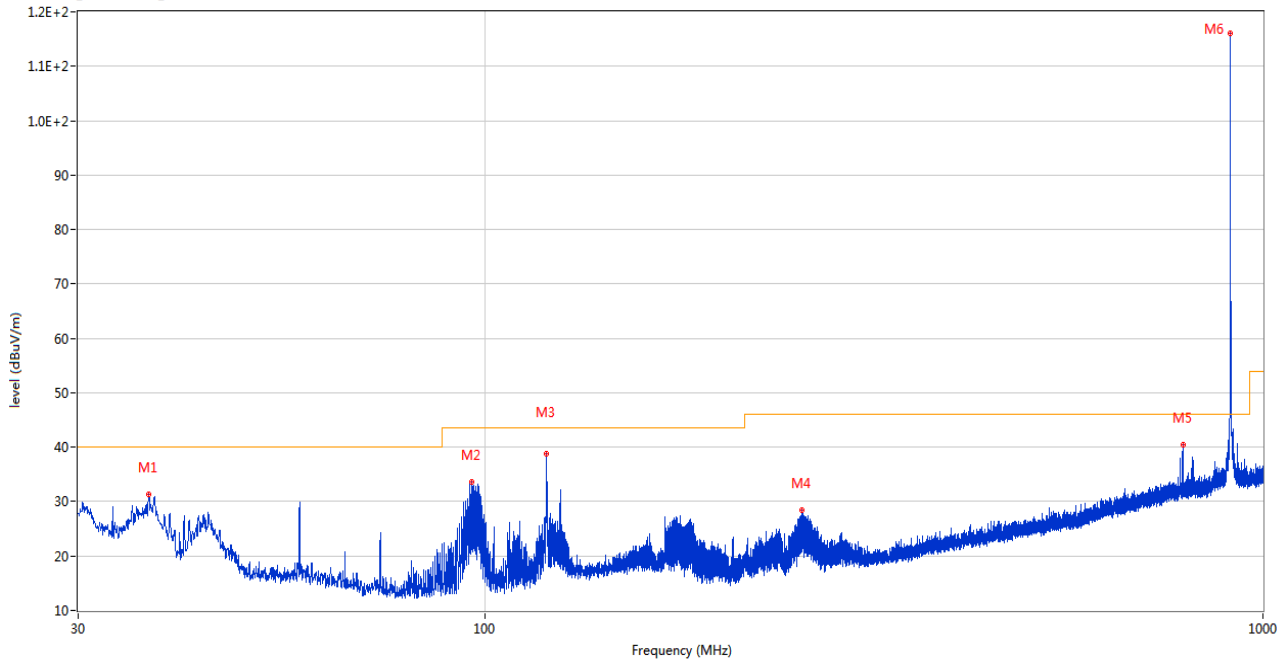
RE Test case_FCC Part 15B_FCC Part 15B Class B 30MHz-1GHz



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Over Limit (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	96.299	39.49	-29.51	43.5	-4.01	Peak	193.00	200	Horizontal	Pass
2	120.016	33.90	-27.16	43.5	-9.60	Peak	361.00	200	Horizontal	Pass
3	125.011	29.25	-27.13	43.5	-14.25	Peak	185.00	200	Horizontal	Pass
4	255.962	32.89	-25.70	46.0	-13.11	Peak	142.00	100	Horizontal	Pass
5	665.010	34.08	-14.90	46.0	-11.92	Peak	-1.00	200	Horizontal	Pass
6	908.723	112.71	-11.23	46.0	66.71	Peak	106.00	200	Horizontal	N/A

MIDDLE CHANNEL 30 MHz to 1 GHz, ANT V

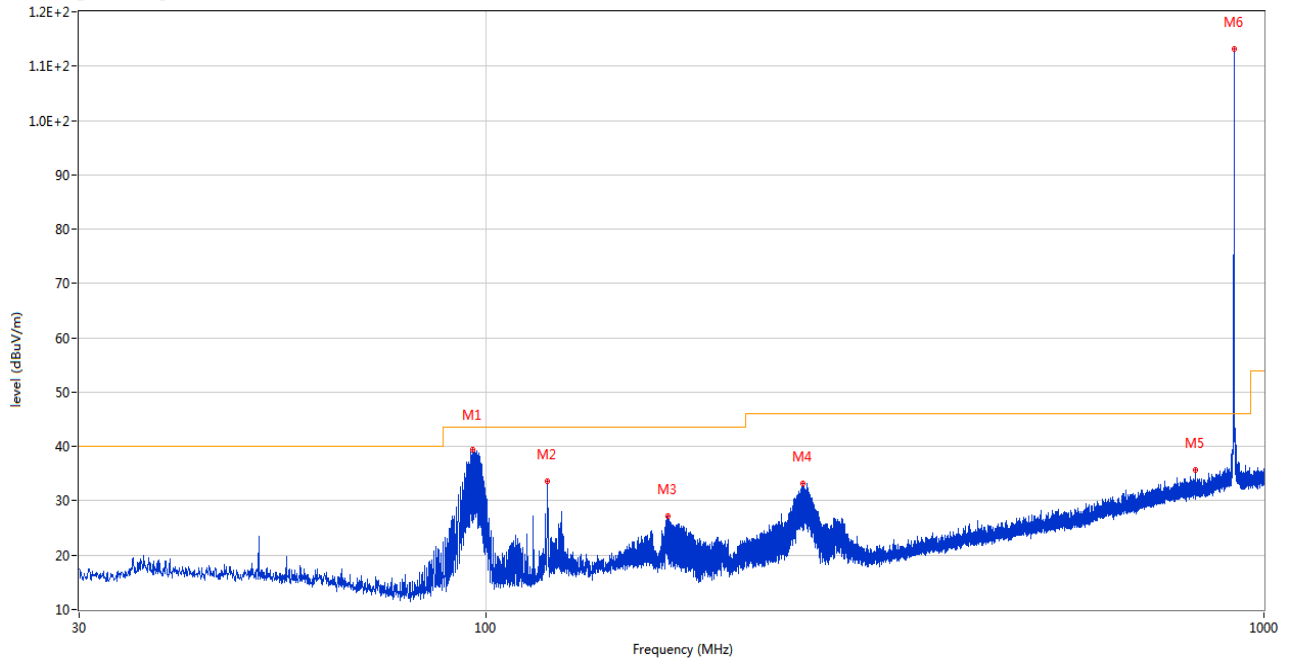
RE Test case_FCC Part 15B_FCC Part 15B Class B 30MHz-1GHz



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Over Limit (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	36.984	31.24	-26.48	40.0	-8.76	Peak	-1.00	200	Vertical	Pass
2	96.299	33.67	-29.51	43.5	-9.83	Peak	304.00	100	Vertical	Pass
3	119.967	38.71	-27.16	43.5	-4.79	Peak	250.00	100	Vertical	Pass
4	255.331	28.44	-25.55	46.0	-17.56	Peak	14.00	100	Vertical	Pass
5	788.686	40.47	-12.88	46.0	-5.53	Peak	283.00	100	Vertical	Pass
6	908.626	116.04	-11.26	46.0	70.04	Peak	195.00	200	Vertical	N/A

HIGH CHANNEL 30 MHz to 1 GHz, ANT H

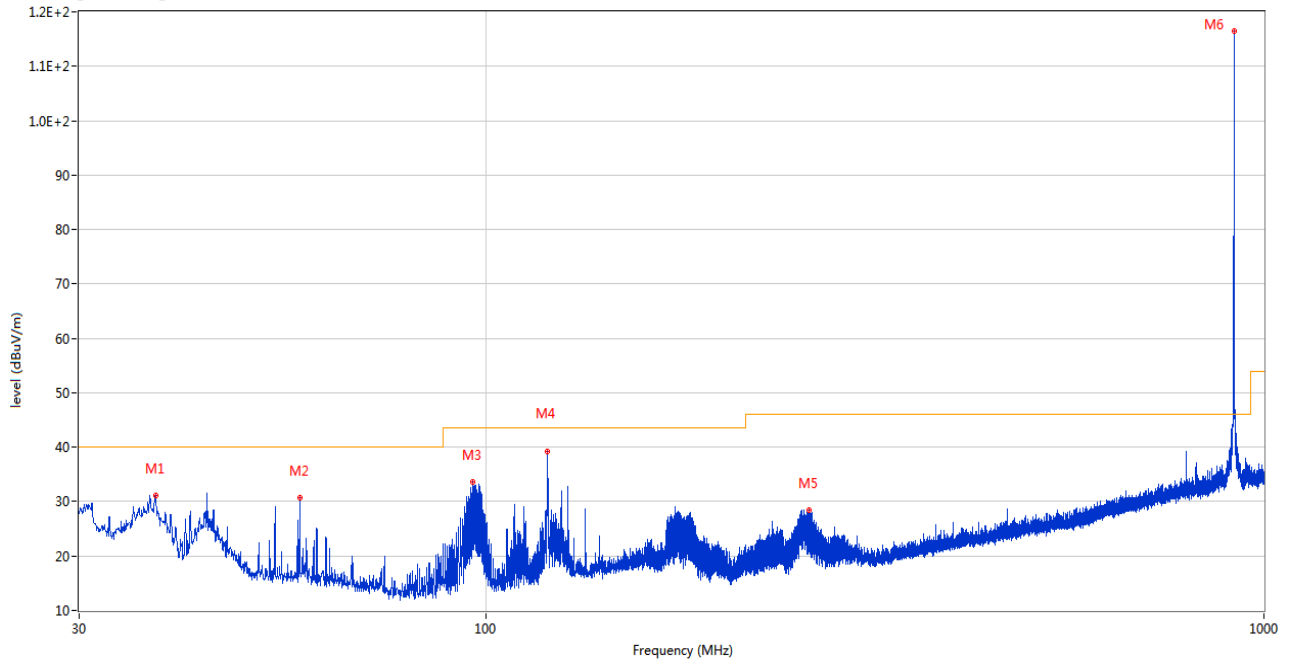
RE Test case_FCC Part 15B_FCC Part 15B Class B 30MHz-1GHz



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Over Limit (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	96.299	39.38	-29.51	43.5	-4.12	Peak	185.00	200	Horizontal	Pass
2	120.016	33.59	-27.16	43.5	-9.91	Peak	347.00	200	Horizontal	Pass
3	171.329	27.11	-25.93	43.5	-16.39	Peak	223.00	100	Horizontal	Pass
4	255.428	33.22	-25.57	46.0	-12.78	Peak	143.00	100	Horizontal	Pass
5	815.506	35.70	-12.62	46.0	-10.30	Peak	0.00	200	Horizontal	Pass
6	914.882	113.22	-10.77	46.0	67.22	Peak	98.00	200	Horizontal	N/A

HIGH CHANNEL 30 MHz to 1 GHz, ANT V

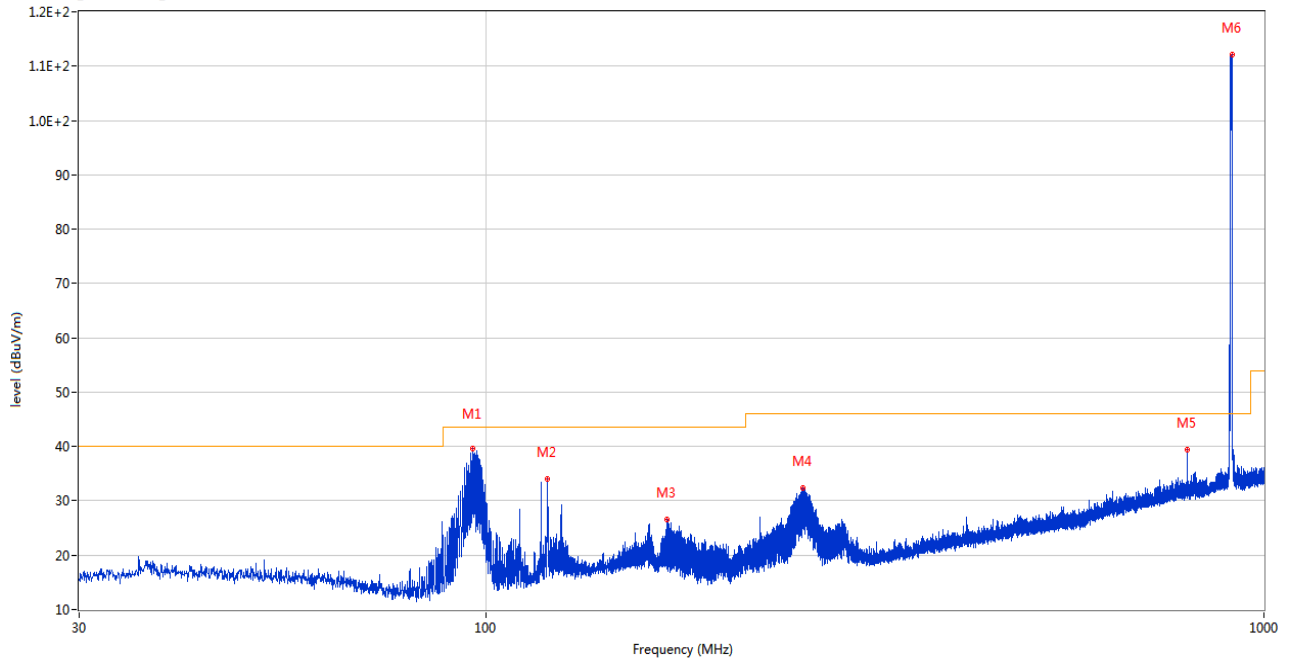
RE Test case_FCC Part 15B_FCC Part 15B Class B 30MHz-1GHz



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Over Limit (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	37.614	31.22	-26.43	40.0	-8.78	Peak	-1.00	100	Vertical	Pass
2	57.645	30.66	-27.01	40.0	-9.34	Peak	323.00	100	Vertical	Pass
3	96.299	33.63	-29.51	43.5	-9.87	Peak	276.00	100	Vertical	Pass
4	120.016	39.11	-27.16	43.5	-4.39	Peak	260.00	100	Vertical	Pass
5	260.084	28.36	-25.75	46.0	-17.64	Peak	125.00	100	Vertical	Pass
6	914.834	116.42	-10.78	46.0	70.42	Peak	203.00	200	Vertical	N/A

Hopping Mode 30 MHz to 1 GHz, ANT H

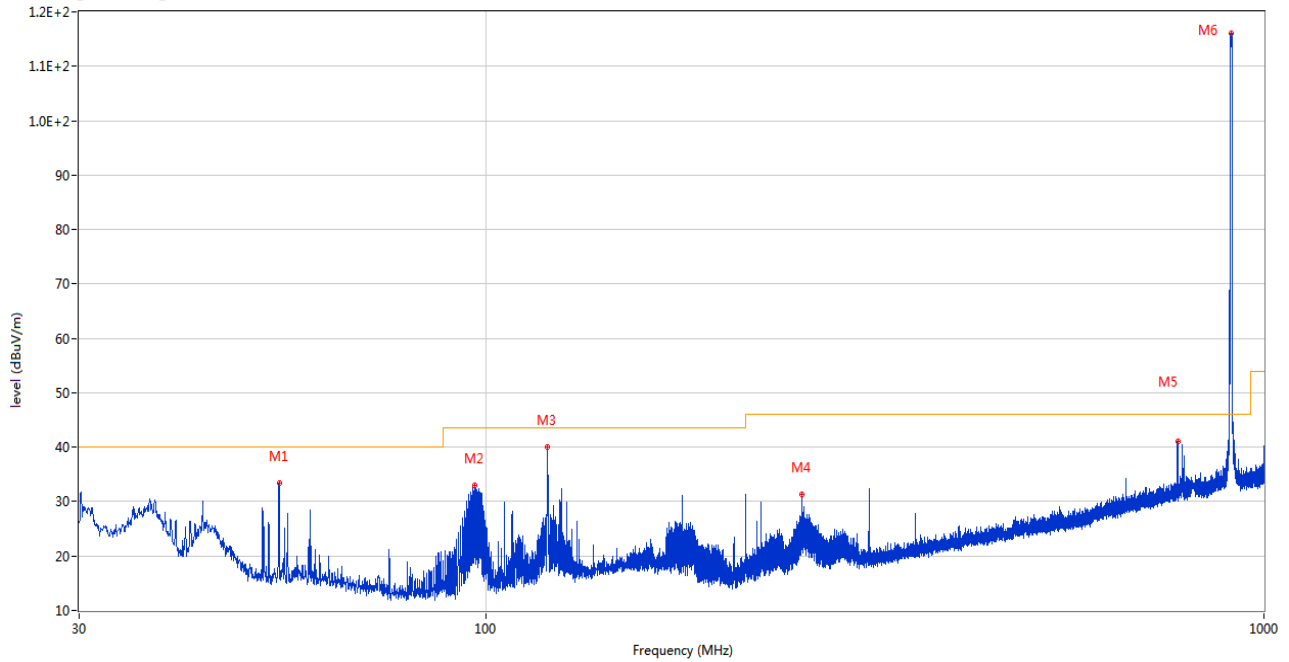
RE Test case_FCC Part 15B_FCC Part 15B Class B 30MHz-1GHz



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Over Limit (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	96.251	39.67	-29.51	43.5	-3.83	Peak	163.00	200	Horizontal	Pass
2	120.016	33.31	-27.16	43.5	-10.19	Peak	3.00	200	Horizontal	Pass
3	170.747	26.60	-25.77	43.5	-16.90	Peak	202.00	200	Horizontal	Pass
4	255.331	32.31	-25.55	46.0	-13.69	Peak	155.00	100	Horizontal	Pass
5	796.348	39.37	-12.89	46.0	-6.63	Peak	91.00	200	Horizontal	Pass
6	909.111	112.13	-11.12	46.0	66.13	Peak	202.00	200	Horizontal	N/A

Hopping Mode 30 MHz to 1 GHz, ANT V

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



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Over Limit (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	54.202	33.36	-27.11	40.0	-6.64	Peak	208.00	200	Vertical	Pass
2	96.833	33.01	-29.49	43.5	-10.49	Peak	90.00	100	Vertical	Pass
3	120.016	40.08	-27.16	43.5	-3.42	Peak	273.00	100	Vertical	Pass
4	255.040	31.31	-25.57	46.0	-14.69	Peak	126.00	200	Vertical	Pass
5	774.426	41.13	-13.02	46.0	-4.87	Peak	208.00	200	Vertical	Pass
6	908.626	116.00	-11.26	46.0	70.00	Peak	165.00	200	Vertical	N/A

Note 1: The spurious from 10GHz-25GHz is noise only, do not show on the report.

LOW CHANNEL 1 GHz to 10 GHz, ANT H

No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Over Limit (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	1463.200	48.98	-13.90	74.0	-25.02	Peak	147.00	150	Horizontal	Pass
1**	1463.200	46.99	-13.90	54.0	-7.01	AV	147.00	150	Horizontal	Pass
2	1816.500	47.66	-8.73	74.0	-26.34	Peak	64.00	150	Horizontal	Pass
2**	1816.500	38.36	-8.73	54.0	-15.64	AV	64.00	150	Horizontal	Pass
3	2706.700	50.06	-7.56	74.0	-23.94	Peak	221.00	150	Horizontal	Pass
3**	2706.700	44.02	-7.56	54.0	-9.98	AV	221.00	150	Horizontal	Pass
4	4511.400	49.95	-4.13	74.0	-24.05	Peak	27.00	150	Horizontal	Pass
4**	4511.400	42.53	-4.13	54.0	-11.47	AV	27.00	150	Horizontal	Pass
5	6282.600	53.65	-0.23	74.0	-20.35	Peak	27.00	150	Horizontal	Pass
5**	6282.600	43.79	-0.23	54.0	-10.21	AV	27.00	150	Horizontal	Pass
6	9412.000	51.21	-0.78	74.0	-22.79	Peak	52.00	150	Horizontal	Pass
6**	9412.000	40.42	-0.78	54.0	-13.58	AV	52.00	150	Horizontal	Pass

LOW CHANNEL 1 GHz to 10 GHz, ANT V

No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Over Limit (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	1463.200	48.15	-13.90	74.0	-25.85	Peak	360.00	150	Vertical	Pass
1**	1463.200	45.32	-13.90	54.0	-8.68	AV	360.00	150	Vertical	Pass
2	1777.000	48.65	-8.22	74.0	-25.35	Peak	90.00	150	Vertical	Pass
2**	1777.000	39.57	-8.22	54.0	-14.43	AV	90.00	150	Vertical	Pass
3	2706.900	49.44	-7.54	74.0	-24.56	Peak	300.00	150	Vertical	Pass
3**	2706.900	44.42	-7.54	54.0	-9.58	AV	300.00	150	Vertical	Pass
4	4506.400	49.10	-4.23	74.0	-24.90	Peak	293.00	150	Vertical	Pass
4**	4506.400	39.76	-4.23	54.0	-14.24	AV	293.00	150	Vertical	Pass
5	6292.400	52.73	-0.43	74.0	-21.27	Peak	62.00	150	Vertical	Pass
5**	6292.400	43.79	-0.43	54.0	-10.21	AV	62.00	150	Vertical	Pass
6	9592.450	51.27	-0.03	74.0	-22.73	Peak	176.00	150	Vertical	Pass
6**	9592.450	40.86	-0.03	54.0	-13.14	AV	176.00	150	Vertical	Pass

MIDDLE CHANNEL 1 GHz to 10 GHz, ANT H

No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Over Limit (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	1462.700	43.80	-13.88	74.0	-30.20	Peak	68.00	150	Horizontal	Pass
1**	1462.700	37.36	-13.88	54.0	-16.64	AV	68.00	150	Horizontal	Pass
2	1728.800	49.26	-11.78	74.0	-24.74	Peak	309.00	150	Horizontal	Pass
2**	1728.800	45.32	-11.78	54.0	-8.68	AV	309.00	150	Horizontal	Pass
3	2527.400	50.34	-8.56	74.0	-23.66	Peak	58.00	150	Horizontal	Pass
3**	2527.400	44.40	-8.56	54.0	-9.60	AV	58.00	150	Horizontal	Pass
4	4543.600	50.21	-4.20	74.0	-23.79	Peak	316.00	150	Horizontal	Pass
4**	4543.600	45.15	-4.20	54.0	-8.85	AV	316.00	150	Horizontal	Pass
5	6360.800	53.97	-2.09	74.0	-20.03	Peak	119.00	150	Horizontal	Pass
5**	6360.800	48.12	-2.09	54.0	-5.88	AV	119.00	150	Horizontal	Pass
6	8897.950	51.32	-0.94	74.0	-22.68	Peak	0.00	150	Horizontal	Pass
6**	8897.950	42.36	-0.94	54.0	-11.64	AV	0.00	150	Horizontal	Pass

MIDDLE CHANNEL 1 GHz to 10 GHz, ANT V

No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Over Limit (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	1463.100	44.02	-13.90	74.0	-29.98	Peak	360.00	150	Vertical	Pass
1**	1463.100	38.50	-13.90	54.0	-15.50	AV	360.00	150	Vertical	Pass
2	1729.000	48.35	-11.76	74.0	-25.65	Peak	360.00	150	Vertical	Pass
2**	1729.000	44.95	-11.76	54.0	-9.05	AV	360.00	150	Vertical	Pass
3	2527.200	50.18	-8.56	74.0	-23.82	Peak	346.00	150	Vertical	Pass
3**	2527.200	45.84	-8.56	54.0	-8.16	AV	346.00	150	Vertical	Pass
4	3059.200	45.92	-7.75	74.0	-28.08	Peak	311.00	150	Vertical	Pass
4**	3059.200	41.14	-7.75	54.0	-12.86	AV	311.00	150	Vertical	Pass
5	6299.200	53.49	-0.91	74.0	-20.51	Peak	285.00	150	Vertical	Pass
5**	6299.200	44.16	-0.91	54.0	-9.84	AV	285.00	150	Vertical	Pass
6	8890.000	51.27	-0.93	74.0	-22.73	Peak	0.00	150	Vertical	Pass
6**	8890.000	42.06	-0.93	54.0	-11.94	AV	0.00	150	Vertical	Pass

HIGH CHANNEL 1 GHz to 10 GHz, ANT H

No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Over Limit (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	1462.900	48.94	-13.89	74.0	-25.06	Peak	131.00	150	Horizontal	Pass
1**	1462.900	46.52	-13.89	54.0	-7.48	AV	131.00	150	Horizontal	Pass
2	1780.800	47.83	-7.71	74.0	-26.17	Peak	340.00	150	Horizontal	Pass
2**	1780.800	38.95	-7.71	54.0	-15.05	AV	340.00	150	Horizontal	Pass
3	2717.000	48.77	-7.24	74.0	-25.23	Peak	289.00	150	Horizontal	Pass
3**	2717.000	38.93	-7.24	54.0	-15.07	AV	289.00	150	Horizontal	Pass
4	4574.400	49.61	-3.89	74.0	-24.39	Peak	59.00	150	Horizontal	Pass
4**	4574.400	41.77	-3.89	54.0	-12.23	AV	59.00	150	Horizontal	Pass
5	6264.600	52.86	-0.77	74.0	-21.14	Peak	312.00	150	Horizontal	Pass
5**	6264.600	43.58	-0.77	54.0	-10.42	AV	312.00	150	Horizontal	Pass
6	9538.450	50.93	-0.40	74.0	-23.07	Peak	187.00	150	Horizontal	Pass
6**	9538.450	41.03	-0.40	54.0	-12.97	AV	187.00	150	Horizontal	Pass

HIGH CHANNEL 1 GHz to 10 GHz, ANT V

No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Over Limit (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	1463.000	48.39	-13.89	74.0	-25.61	Peak	359.00	150	Vertical	Pass
1**	1463.000	45.55	-13.89	54.0	-8.45	AV	359.00	150	Vertical	Pass
2	1789.300	47.95	-8.08	74.0	-26.05	Peak	210.00	150	Vertical	Pass
2**	1789.300	39.20	-8.08	54.0	-14.80	AV	210.00	150	Vertical	Pass
3	3076.400	46.03	-8.35	74.0	-27.97	Peak	-1.00	150	Vertical	Pass
3**	3076.400	35.62	-8.35	54.0	-18.38	AV	-1.00	150	Vertical	Pass
4	5206.400	52.23	-2.41	74.0	-21.77	Peak	79.00	150	Vertical	Pass
4**	5206.400	41.59	-2.41	54.0	-12.41	AV	79.00	150	Vertical	Pass
5	6691.400	53.20	-0.30	74.0	-20.80	Peak	324.00	150	Vertical	Pass
5**	6691.400	44.47	-0.30	54.0	-9.53	AV	324.00	150	Vertical	Pass
6	9121.599	50.27	-1.35	74.0	-23.73	Peak	226.00	150	Vertical	Pass
6**	9121.599	40.51	-1.35	54.0	-13.49	AV	226.00	150	Vertical	Pass

Hopping Mode 1 GHz to 10 GHz, ANT H

No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Over Limit (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	1463.000	49.82	-13.89	74.0	-24.18	Peak	133.00	150	Horizontal	Pass
1**	1463.000	48.02	-13.89	54.0	-5.98	AV	133.00	150	Horizontal	Pass
2	1780.700	47.34	-7.72	74.0	-26.66	Peak	214.00	150	Horizontal	Pass
2**	1780.700	39.22	-7.72	54.0	-14.78	AV	214.00	150	Horizontal	Pass
3	2716.800	48.99	-7.26	74.0	-25.01	Peak	198.00	150	Horizontal	Pass
3**	2716.800	39.13	-7.26	54.0	-14.87	AV	198.00	150	Horizontal	Pass
4	3612.000	46.31	-7.07	74.0	-27.69	Peak	363.00	150	Horizontal	Pass
4**	3612.000	36.71	-7.07	54.0	-17.29	AV	363.00	150	Horizontal	Pass
5	4551.200	49.59	-3.89	74.0	-24.41	Peak	0.00	150	Horizontal	Pass
5**	4551.200	43.89	-3.89	54.0	-10.11	AV	0.00	150	Horizontal	Pass
6	9623.950	51.02	0.04	74.0	-22.98	Peak	253.00	150	Horizontal	Pass
6**	9623.950	41.39	0.04	54.0	-12.61	AV	253.00	150	Horizontal	Pass

Hopping Mode 1 GHz to 10 GHz, ANT V

No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Over Limit (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	1463.200	49.33	-13.90	74.0	-24.67	Peak	360.00	150	Vertical	Pass
1**	1463.200	46.65	-13.90	54.0	-7.35	AV	360.00	150	Vertical	Pass
2	1777.200	47.71	-8.19	74.0	-26.29	Peak	78.00	150	Vertical	Pass
2**	1777.200	38.44	-8.19	54.0	-15.56	AV	78.00	150	Vertical	Pass
3	2792.900	48.81	-6.67	74.0	-25.19	Peak	5.00	150	Vertical	Pass
3**	2792.900	41.54	-6.67	54.0	-12.46	AV	5.00	150	Vertical	Pass
4	3058.800	46.31	-7.73	74.0	-27.69	Peak	185.00	150	Vertical	Pass
4**	3058.800	37.92	-7.73	54.0	-16.08	AV	185.00	150	Vertical	Pass
5	6281.400	53.58	-0.23	74.0	-20.42	Peak	360.00	150	Vertical	Pass
5**	6281.400	44.65	-0.23	54.0	-9.35	AV	360.00	150	Vertical	Pass
6	9466.150	51.16	-0.67	74.0	-22.84	Peak	269.00	150	Vertical	Pass
6**	9466.150	41.99	-0.67	54.0	-12.01	AV	269.00	150	Vertical	Pass

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

Pass

Note: The adjacent to the restricted frequency band (608-614MHz and 960-1240MHz) is far away the fundamental, it is noise only. Please refer to Section A.8 for test data.

ANNEX B TEST SETUP PHOTOS

Please refer the document "BL-SZ2160621-AR.PDF".

ANNEX C EUT EXTERNAL PHOTOS

Please refer the document "BL-SZ2160621-AW.PDF".

ANNEX D EUT INTERNAL PHOTOS

Please refer the document "BL-SZ2160621-AI.PDF".

--END OF REPORT--