

TEST REPORT

Applicant: Zhejiang Bove Intelligent Technology Co., Ltd.
Address: Building 23, No. 36, Changsheng South Road,
Jiaxing, Zhejiang, China
Equipment Type: Ultrasonic Water Meter
Model Name: B39 VW-M
Brand Name: BOVE TECHNOLOGY
FCC ID: 2BCZQB39VWM
Test Standard: 47 CFR Part 15 Subpart C
(refer to section 3.1)
Sample Arrival Date: Jan. 26, 2026
Test Date: Feb. 10, 2026 - Mar. 07, 2026
Date of Issue: Mar. 26, 2026

ISSUED BY:

Shenzhen BALUN Technology Co., Ltd.

**Tested by:** Yang Wenxuan**Checked by:** Ye Hongji**Approved by:** Tolan Tu
(Testing Director)

Revision History

Version	Issue Date	Revisions
<u>Rev. 01</u>	<u>Mar. 17, 2026</u>	<u>Initial Issue</u>
<u>Rev. 02</u>	<u>Mar. 26, 2026</u>	<u>1. Corrected the 20 dB Bandwidth description in Section A.4.</u>
		<u>2. Corrected the restricted-band band-edge limit in Section A.9.</u>

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1 GENERAL INFORMATION

1.1 Test Laboratory

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

1.2 Test Location

Name	Shenzhen BALUN Technology Co., Ltd.
Location	☐ Block B, 1/F, Baisha Science and Technology Park, Shahe Xi Road, Nanshan District, Shenzhen, Guangdong Province, P. R. China
	☒ 1/F, Building B, Ganghongji High-tech Intelligent Industrial Park, No. 1008, Songbai Road, Yangguang Community, Xili Sub-district, Nanshan District, Shenzhen, Guangdong Province, P. R. China
	☐ Building 2, Intelligent Connected Vehicle Industrial Park, No. 55, Xiangshan Road, Luotian Community, Yanluo Sub-district, Bao'an District, Shenzhen, Guangdong Province, 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	Zhejiang Bove Intelligent Technology Co., Ltd.
Address	Building 23, No. 36, Changsheng South Road, Jiaxing, Zhejiang, China

2.2 Manufacturer Information

Manufacturer	Zhejiang Bove Intelligent Technology Co., Ltd.
Address	Building 23, No. 36, Changsheng South Road, Jiaxing, Zhejiang, China

2.3 General Description for Equipment under Test (EUT)

EUT Name	Ultrasonic Water Meter
Model Name Under Test	B39 VW-M
Series Model Name	N/A
Description of Model name differentiation	N/A
Hardware Version	V1.2
Software Version	V1.1.12
Dimensions (Approx.)	N/A
Weight (Approx.)	N/A

2.4 Technical Information

Network and Wireless connectivity	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 915.2 MHz - 927.8 MHz; The frequency block is 902 MHz - 928 MHz
Number of Channel	64
Tested Channel	1 (915.2 MHz), 32 (921.4 MHz), 64 (927.8 MHz)
Antenna Type	Omni Antenna
Antenna Gain	-3.37 dBi
Antenna System (MIMO Smart Antenna)	N/A

All channel was listed on the following table:

Channel Number	Frequency (MHz)	Channel Number	Frequency (MHz)	Channel Number	Frequency (MHz)
1	915.2	23	919.6	45	924.0
2	915.4	24	919.8	46	924.2
3	915.6	25	920.0	47	924.4
4	915.8	26	920.2	48	924.6
5	916.0	27	920.4	49	924.8
6	916.2	28	920.6	50	925.0
7	916.4	29	920.8	51	925.2
8	916.6	30	921.0	52	925.4
9	916.8	31	921.2	53	925.6
10	917.0	32	921.4	54	925.8
11	917.2	33	921.6	55	926.0
12	917.4	34	921.8	56	926.2
13	917.6	35	922.0	57	926.4
14	917.8	36	922.2	58	926.6
15	918.0	37	922.4	59	926.8
16	918.2	38	922.6	60	927.0
17	918.4	39	922.8	61	927.2
18	918.6	40	923.0	62	927.4
19	918.8	41	923.2	63	927.6
20	919.0	42	923.4	64	927.8
21	919.2	43	923.6	--	--
22	919.4	44	923.8	--	--

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 C63.10-2020	American National Standard for Procedures for Compliance Testing of 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 ^{Note1}
2	Number of Hopping Frequencies	15.247(a)	Frequency hopping system	Hopping Mode	ANNEX A.1	Pass
3	Peak Output Powe	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	N/A ^{Note2}
9	Radiated Spurious Emission	15.209 15.247(d)	Frequency hopping system	Low/Middle/High	ANNEX A.8	Pass
10	Band Edge(Restricted-band band-edge)	15.209 15.247(d)	Frequency hopping system	Low/High	ANNEX A.9	Pass

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

Note ²: The EUT only powered by battery, so the Conducted Emission test is not applicable.

4 GENERAL TEST CONFIGURATIONS

4.1 Test Environments

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

Relative Humidity	46% to 69%	
Atmospheric Pressure	100 kPa to 102 kPa	
Temperature	NT (Normal Temperature)	+20.2°C to +25.7°C
Working Voltage of the EUT	NV (Normal Voltage)	3.6 V

4.2 Test Equipment List

Description	Manufacturer	Model	Serial No.	Cal. Date	Cal. Due
Spectrum Analyzer	KEYSIGHT	N9020A	MY54420186	2025.05.21	2026.05.20
Power meter	R&S	NRP8S	101498	2025.07.07	2026.07.06
Test Antenna-Horn	A-INFO	LB-180400KF	J211060273	2024.06.15	2027.06.14
Test Antenna-Bi-Log	Schwarzbeck	VULB 9163	01414	2023.11.03	2026.11.02
Test Antenna-Horn	Schwarzbeck	BBHA 9120D	02459	2023.10.26	2026.10.25
Test Antenna-Loop	Schwarzbeck	FMZB 1513-60	00015	2024.05.07	2026.05.06
Anechoic Chamber	YIHENG	C8-966	107	2024.05.12	2027.05.11
EMI Receiver	Keysight	N9038A	MY55330121	2025.04.16	2026.04.15
Filtering unit	balun	SU319F	LW-SZ19D0001F01	N/A	N/A
Switching unit	BALUN	SU319	LW-SZ19D0001S01	N/A	N/A
EMI Receiver	keysight	N9038B	MY61380132	2025.04.01	2026.03.31
LISN	SCHWARZBECK MESS- ELEKTRONIK	NSLK8127	01009	2025.07.15	2026.07.14
Shielded Enclosure	YiHeng Electronic Co., Ltd	4.3m*2.9m*2.4m	235	2024.11.05	2027.11.04
EMI Receiver	ROHDE&SCHWARZ	ESRP	101036	2025.06.16	2026.06.15
Test Antenna-Loop	SCHWARZBECK	FMZB 1519	1519-037	2024.01.23	2027.01.22
Amplifier	COM-MV	ZT30-1000M	B2018054558	2025.11.26	2026.11.25
Anechoic Chamber	EMC Electronic Co., Ltd	20.10*11.60*7.35m	130	2024.07.13	2027.07.12

4.3 Test Software List

Description	Manufacturer	Software Version	Serial No.	Applicable test Setup
BL410R	BALUN	V2.1.1.488	N/A	The section 4.5.1
BL410E	BALUN	V22.930	N/A	The section 4.5.2&4.5.3&4.5.4&4.5.5

4.4 Measurement Uncertainty

The following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2.

This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of $k=2$.

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

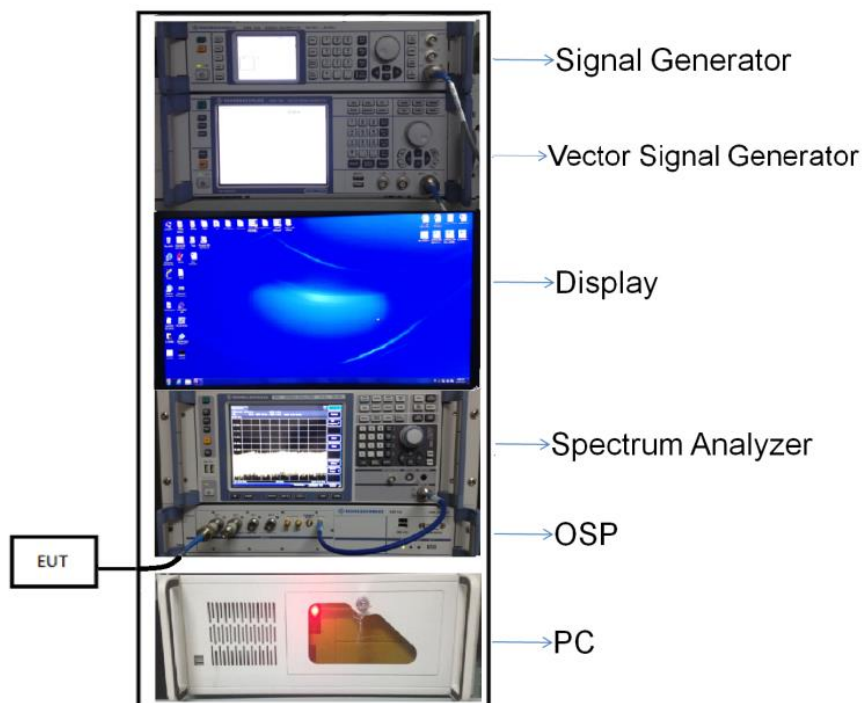
4.5 Description of Test Setup

4.5.1 For Antenna Port Test

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

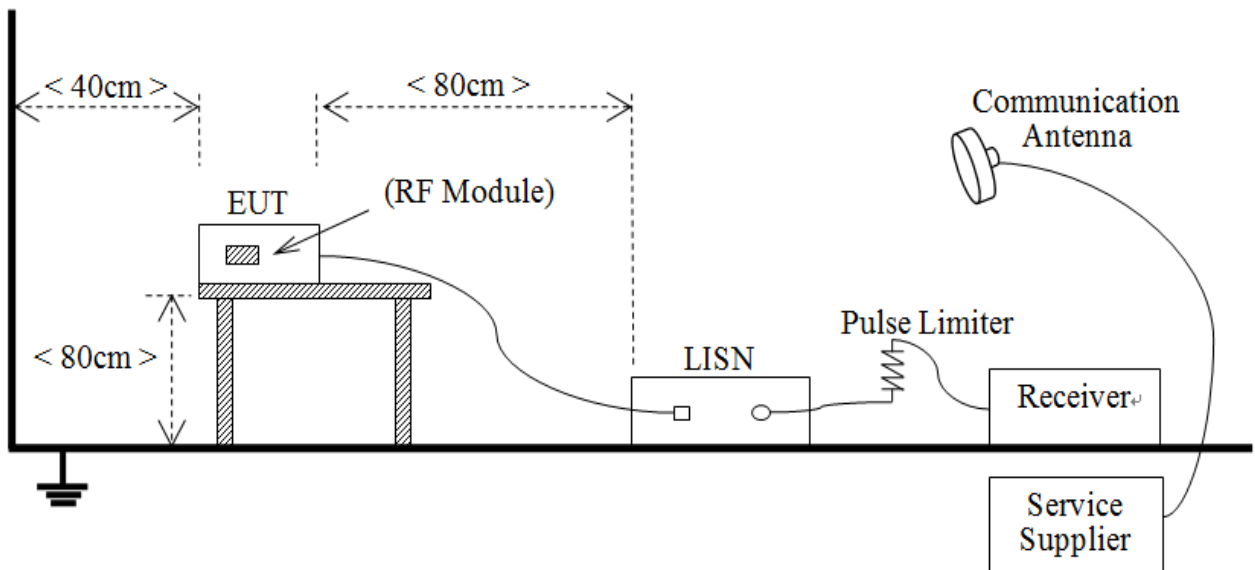
For example: the measurement value is 10 dBm and the cable 0.5dBm used, then the final result of EUT:

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



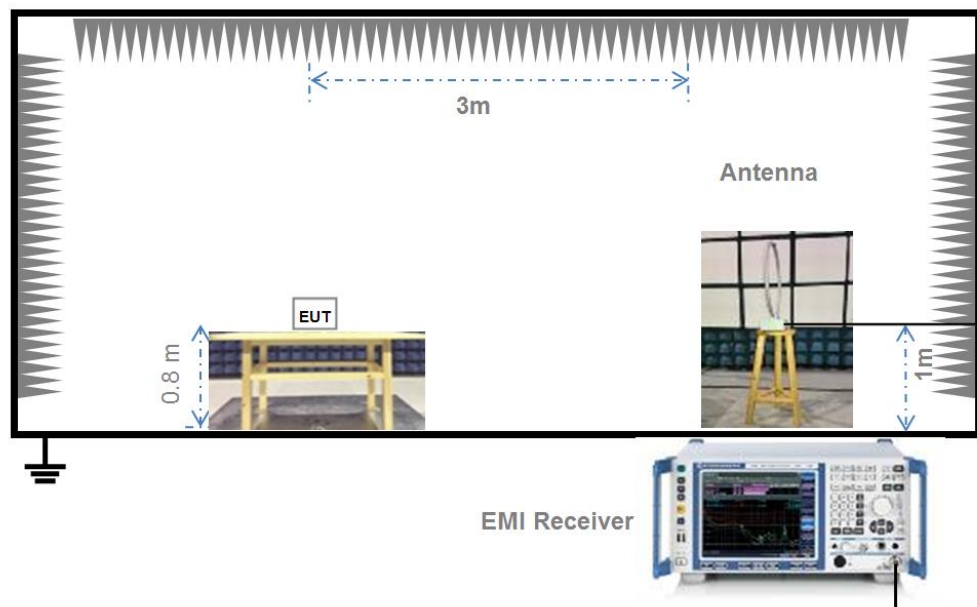
(Diagram 1)

4.5.2 For AC Power Supply Port Test



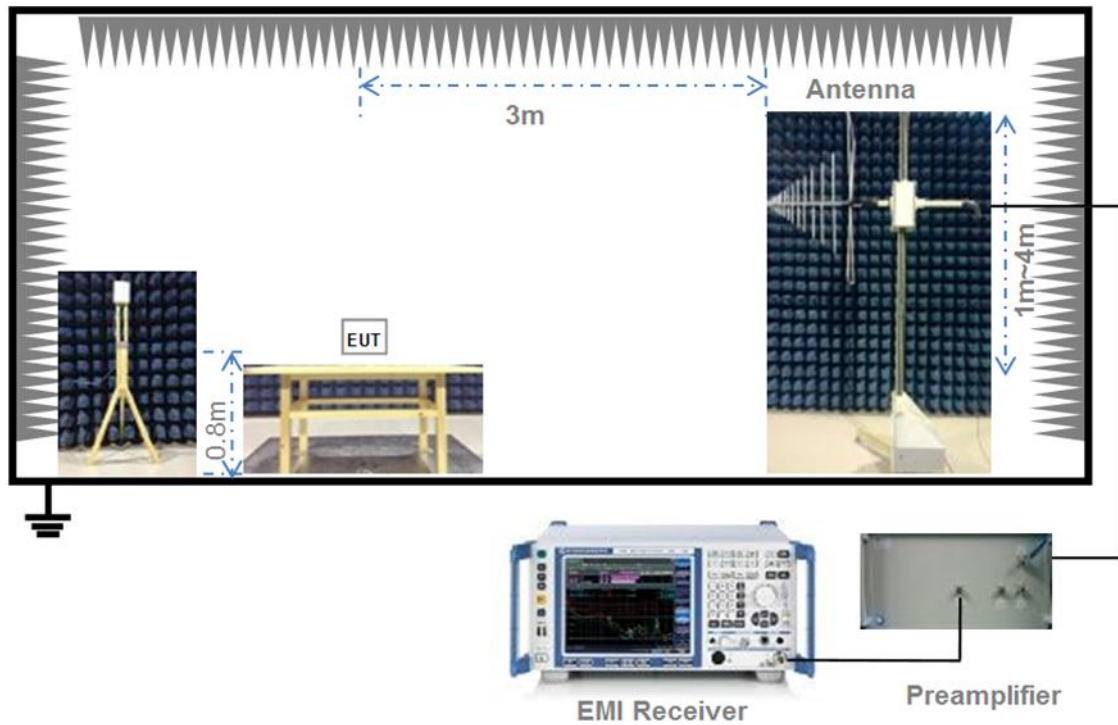
(Diagram 2)

4.5.3 For Radiated Test (Below 30 MHz)



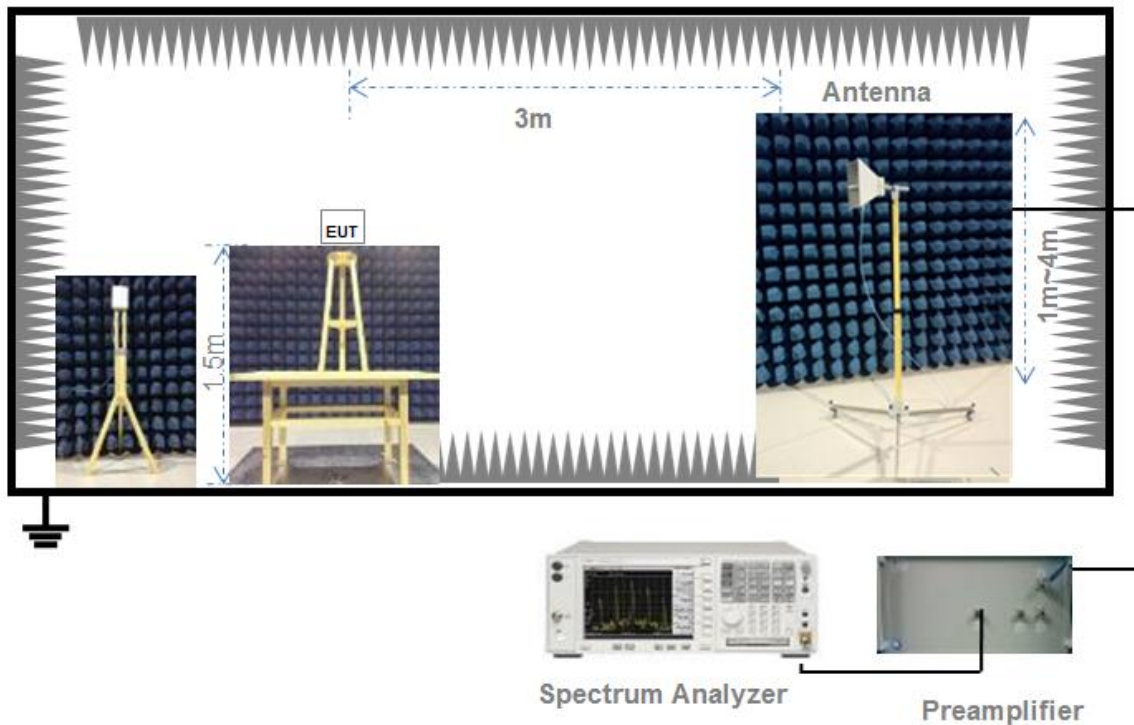
(Diagram 3)

4.5.4 For Radiated Test (30 MHz-1 GHz)



(Diagram 4)

4.5.5 For Radiated Test (Above 1 GHz)



(Diagram 5)

4.6 Measurement Results Explanation Example

4.6.1 For conducted test items:

The offset level is set in the spectrum analyzer to compensate the RF cable loss and attenuator between EUT conducted output port and spectrum analyzer. With the offset compensation, the spectrum analyzer reading level is exactly the EUT RF output level.

The spectrum analyzer offset is derived from RF cable loss and attenuator factor.

Offset = RF cable loss + attenuator factor.

5 TEST ITEMS

5.1 Antenna Requirements

5.1.1 Relevant Standards

FCC §15.203;

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

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

5.1.2 Antenna Anti-Replacement Construction

The Antenna Anti-Replacement as following method:

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

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

5.1.3 Antenna Gain

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

5.2 Number of Hopping Frequencies

5.2.1 Limit

FCC §15.247(a)

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

5.2.2 Test Setup

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

5.2.3 Test Procedure

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

Span = the frequency band of operation

RBW $\geq$ 1% of the span

VBW $\geq$ RBW

Sweep = auto

Detector function = peak

Trace = max hold

Allow the trace to stabilize

5.2.4 Test Result

Please refer to ANNEX A.1.

5.3 Peak Output Power

5.3.1 Test Limit

FCC § 15.247(b)

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

5.3.2 Test Setup

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

5.3.3 Test Procedure

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

Use the following spectrum analyzer settings:

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

RBW > the 20 dB bandwidth of the emission being measured

VBW ≥ RBW

Sweep = auto

Detector function = peak

Trace = max hold

Allow the trace to stabilize.

5.3.4 Test Result

Please refer to ANNEX A.2.

5.4 Occupied Bandwidth

5.4.1 Limit

FCC §15.247(a)

5.4.2 Test Setup

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

5.4.3 Test Procedure

Use the following spectrum analyzer settings:

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

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

VBW $\geq$ RBW

Sweep = auto

Detector function = peak

Trace = max hold

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

5.4.4 Test Result

Please refer to ANNEX A.3.

5.5 Carrier Frequency Separation

5.5.1 Limit

FCC §15.247(a)

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

5.5.2 Test Setup

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

5.5.3 Test Procedure

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

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

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

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

Sweep = auto

Detector function = peak

Trace = max hold

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

5.5.4 Test Result

Please refer to ANNEX A.4.

5.6 Time of Occupancy (Dwell time)

5.6.1 Limit

FCC §15.247(a)

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

5.6.2 Test Setup

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

5.6.3 Test Procedure

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

5.6.4 Test Result

Please refer to ANNEX A.5.

5.7 Conducted Spurious Emission & Authorized-band band-edge

5.7.1 Limit

FCC §15.247(d)

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

5.7.2 Test Setup

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

5.7.3 Test Procedure

Use the following spectrum analyzer settings:

Span = wide enough to capture the peak level of the in-band emission and all spurious emissions (e.g., harmonics) from the lowest frequency generated in the EUT up through the 10th harmonic. Typically, several plots are required to cover this entire span.

RBW = 100 kHz

VBW $\geq$ RBW

Sweep = auto

Detector function = peak

Trace = max hold

Allow the trace to stabilize

5.7.4 Test Result

Please refer to ANNEX A.6.

5.8 Conducted Emission

5.8.1 Limit

FCC §15.207

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

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

5.8.2 Test Setup

See section 4.5.2 for test setup description for the AC power supply port. The photo of test setup please refer to ANNEX B.

5.8.3 Test Procedure

The maximum conducted interference is searched using Peak (PK), if the emission levels more than the AV and QP limits, and that have narrow margins from the AV and QP limits will be re-measured with AV and QP detectors. Tests for both L phase and N phase lines of the power mains connected to the EUT are performed. Refer to recorded points and plots below.

Devices subject to Part 15 must be tested for all available U.S. voltages and frequencies (such as a nominal 120 VAC, 50/60 Hz and 240 VAC, 50/60 Hz) for which the device is capable of operation. A device rated for 50/60 Hz operation need not be tested at both frequencies provided the radiated and line conducted emissions are the same at both frequencies.

5.8.4 Test Result

Please refer to ANNEX A.7.

5.9 Radiated Spurious Emission

5.9.1 Limit

FCC §15.209&15.247(d)

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

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

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

Note:

1. Field Strength (dBμV/m) = $20 \times \log[\text{Field Strength } (\mu\text{V/m})]$.
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 4.5.3 to 4.5.5 for test setup description for the antenna port. The photo of test setup please refer to ANNEX B.

5.9.3 Test Procedure

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

The power of the EUT transmitting frequency should be ignored.

All Spurious Emission tests were performed in X, Y, Z axis direction. And only the worst axis test

condition was recorded in this test report.

Use the following spectrum analyzer settings:

Span = wide enough to fully capture the emission being measured

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

VBW $\geq$ RBW

Sweep = auto

Detector function = peak

Trace = max hold

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

5.9.4 Test Result

Please refer to ANNEX A.8.

5.10 Band Edge (Restricted-band band-edge)

5.10.1 Limit

FCC §15.209&15.247(d)

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

5.10.2 Test Setup

See section 4.5.3 to 4.5.5 for test setup description for the antenna port. The photo of test setup please refer to ANNEX B.

5.10.3 Test Procedure

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

The power of the EUT transmitting frequency should be ignored.

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

Use the following spectrum analyzer settings:

Span = wide enough to fully capture the emission being measured

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

VBW $\geq$ RBW

Sweep = auto

Detector function = peak

Trace = max hold

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

5.10.4 Test Result

Please refer to ANNEX A.9.

ANNEX A TEST RESULT

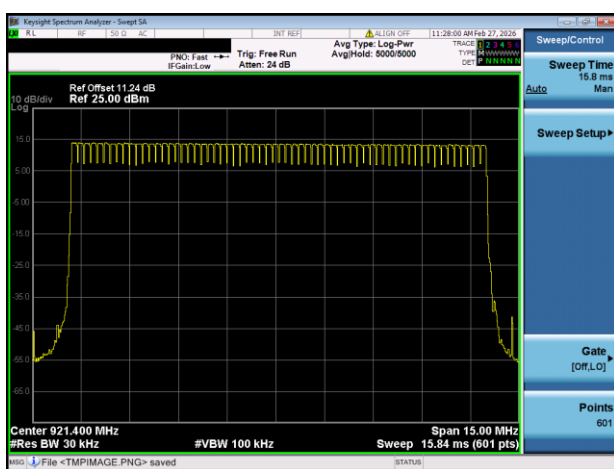
A.1 Number of Hopping Frequency

Test Data

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

Test Plot

LoRa



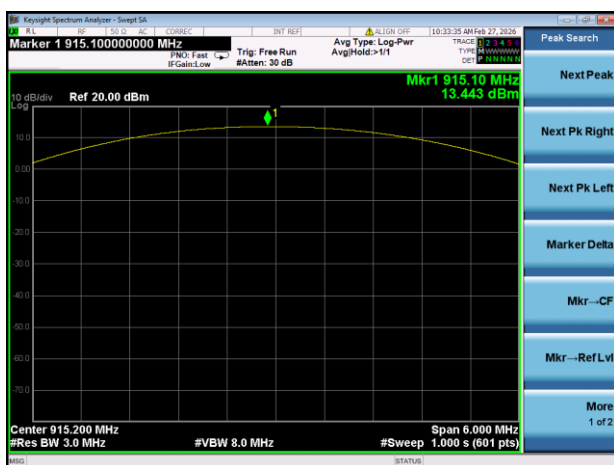
A.2 Peak Output Power

Peak Power Test Data

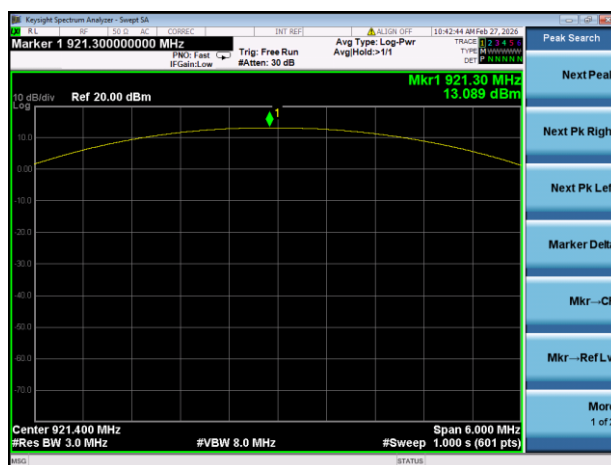
Channel	Measured Output Peak Power		Limit		Verdict
	LoRa		dBm	mW	
	dBm	mW			
Low	13.44	22.10	30	1000	Pass
Middle	13.09	20.37			Pass
High	12.79	19.01			Pass

Test Plots

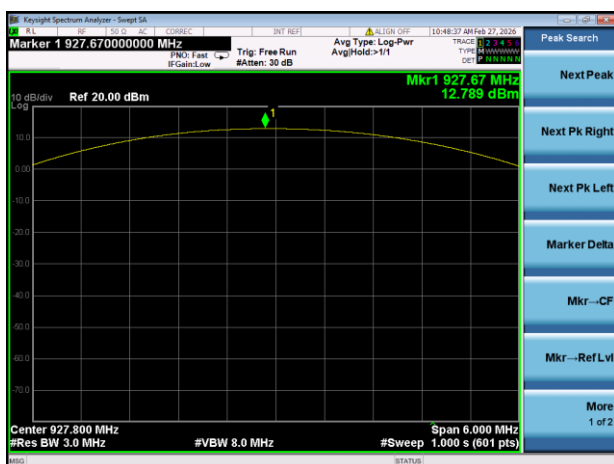
LOW CHANNEL



MIDDLE CHANNEL



HIGH CHANNEL



A.3 20 dB and 99% bandwidth

Test Data

LoRa		
Channel	20 dB Bandwidth (MHz)	99% Bandwidth (MHz)
Low	0.141000	0.126840
Middle	0.141000	0.126850
High	0.141000	0.126780

Test Plots

20 dB Bandwidth

LOW CHANNEL

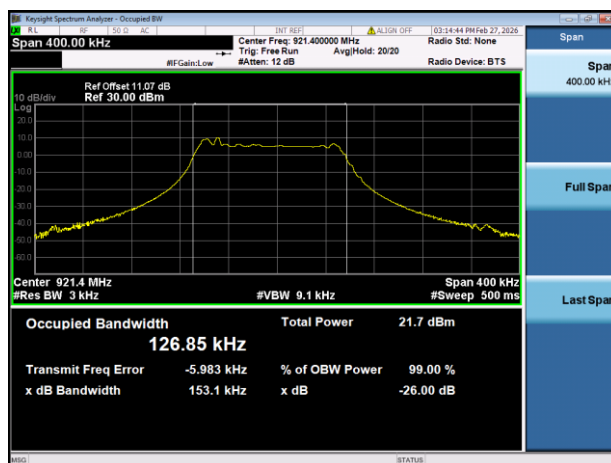
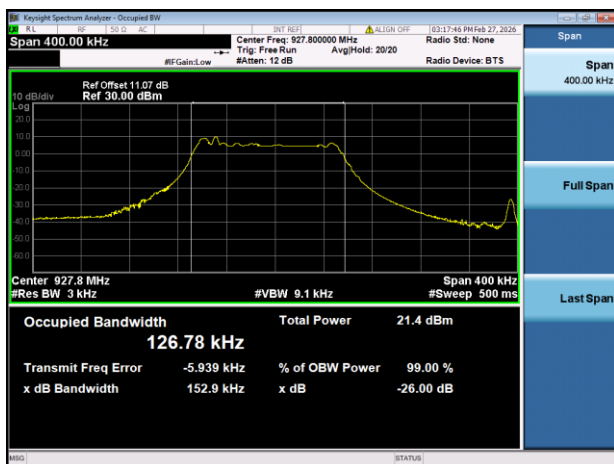


MIDDLE CHANNEL



HIGH CHANNEL



99% Bandwidth**LOW CHANNEL****MIDDLE CHANNEL****HIGH CHANNEL**

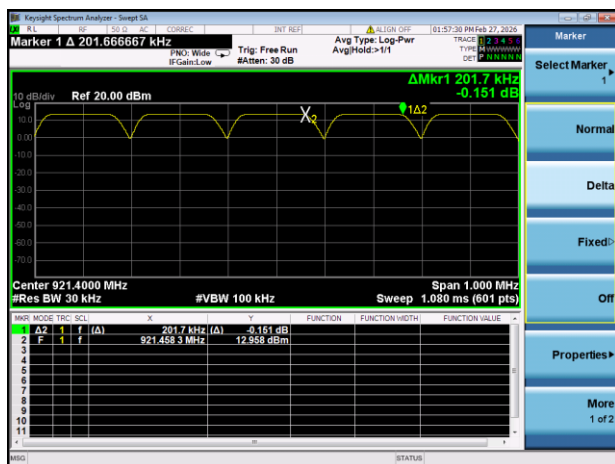
A.4 Hopping Frequency Separation

Test Data

Mode	Frequency separation (MHz)	20 dB Bandwidth (MHz)	Verdict
LoRa	0.2017	0.141000	Pass

Test Plot

LoRa



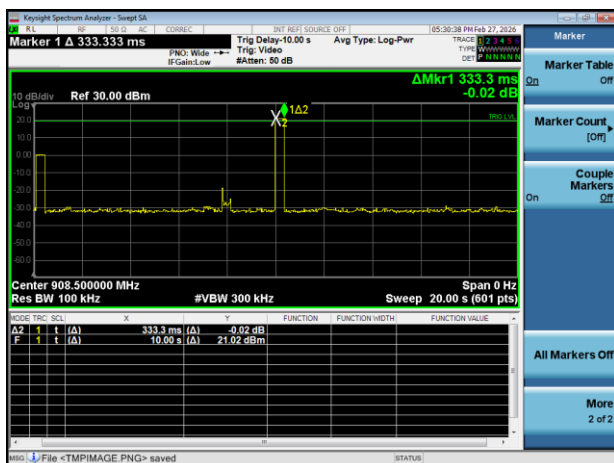
A.5 Average Time of Occupancy

Test Data

Total of Dwell (ms)	Limit (sec)	Verdict
333.30000	0.4	Pass

Test Plot

LoRa



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

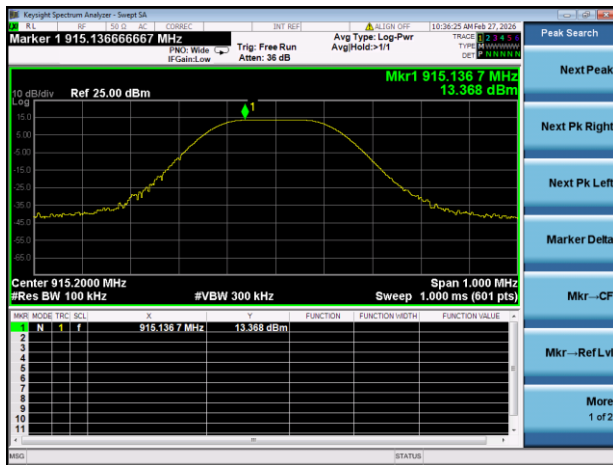
Test Data

LoRa				
Channel	Measured Max. Out of Band Emission (dBm)	Limit (dBm)		Verdict
		Carrier Level	Calculated 20 dBc Limit	
Low	-26.74	13.37	-6.632	Pass
Middle	-26.31	13.06	-6.936	Pass
High	-26.78	12.74	-7.264	Pass

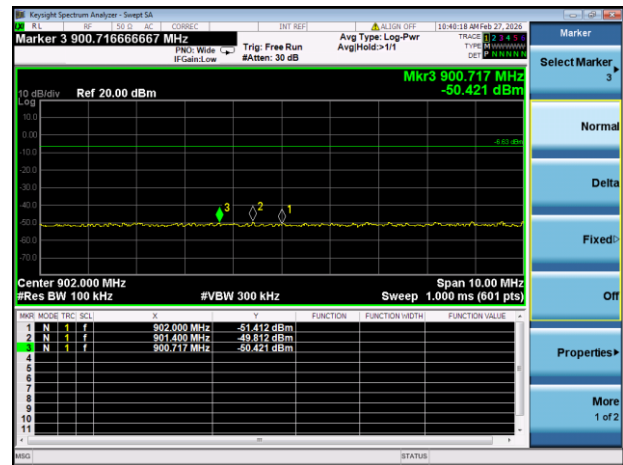
LoRa				
Mode	Measured Max. Out of Band Emission (dBm)	Limit (dBm)		Verdict
		Carrier Level	Calculated 20 dBc Limit	
Hopping	-33.54	13.69	-6.308	Pass

Test Plots

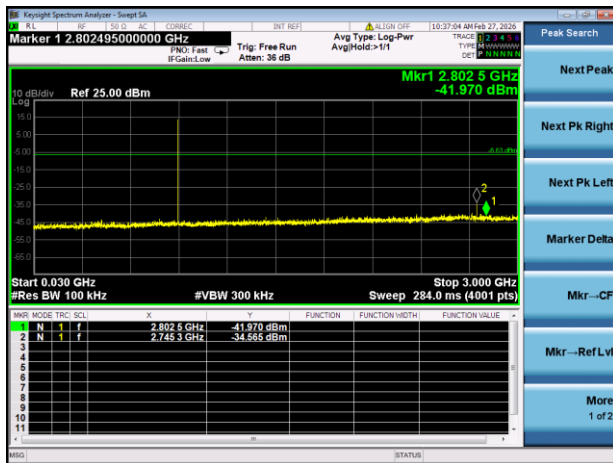
LOW CHANNEL, CARRIER LEVEL



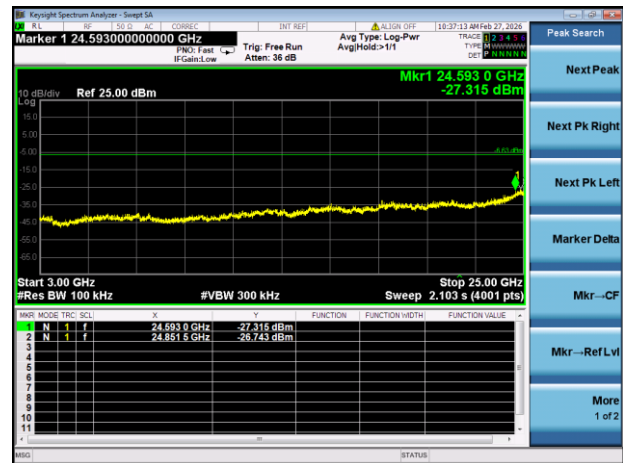
LOW CHANNEL, BAND EDGE



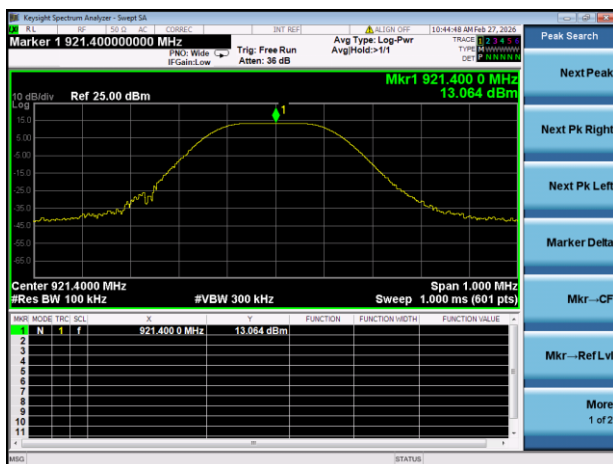
LOW CHANNEL, SPURIOUS 30 MHz ~ 3 GHz



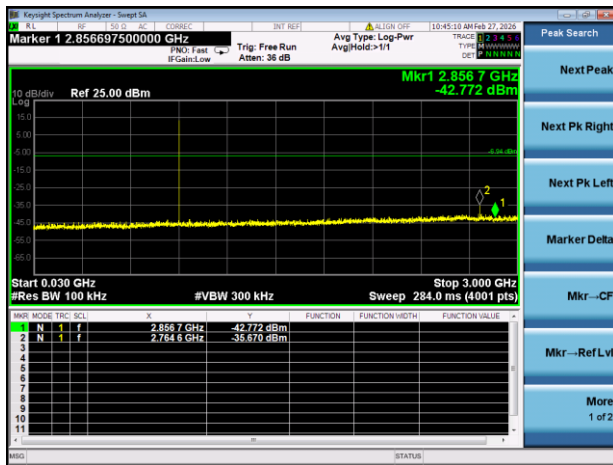
LOW CHANNEL, SPURIOUS 3 GHz ~ 25 GHz



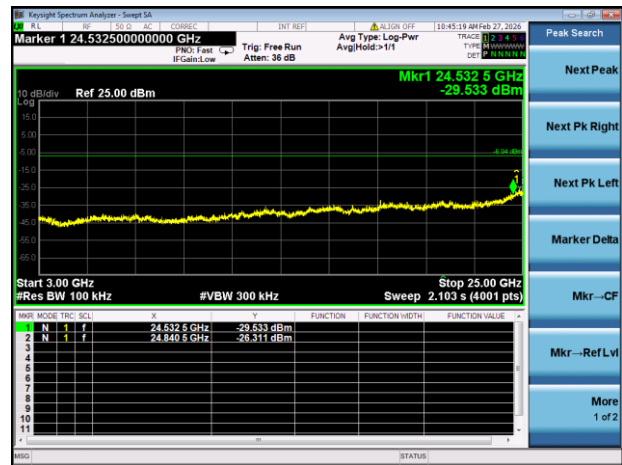
MIDDLE CHANNEL, CARRIER LEVEL



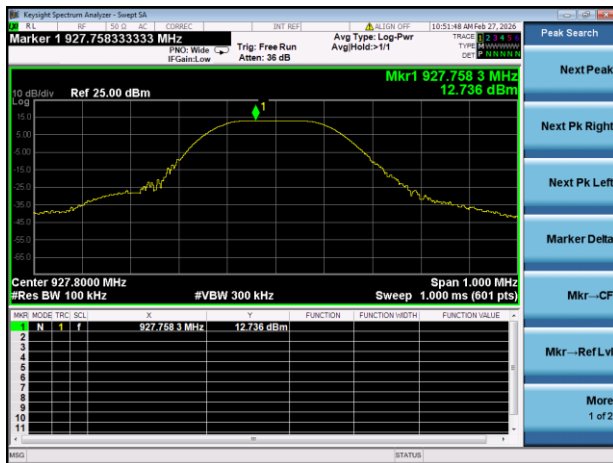
MIDDLE CHANNEL, SPURIOUS 30 MHz ~ 3 GHz



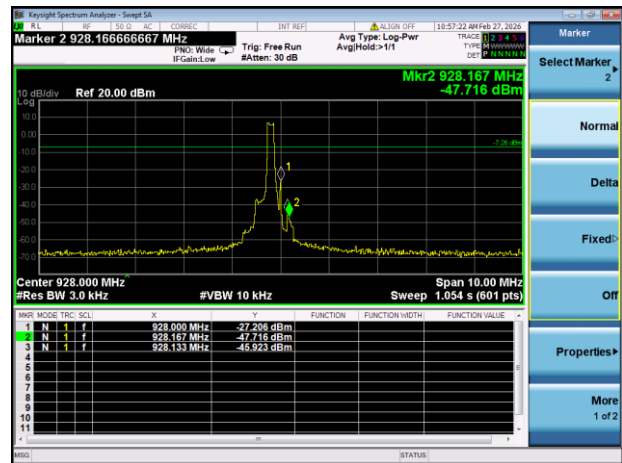
MIDDLE CHANNEL, SPURIOUS 3 GHz ~ 25 GHz



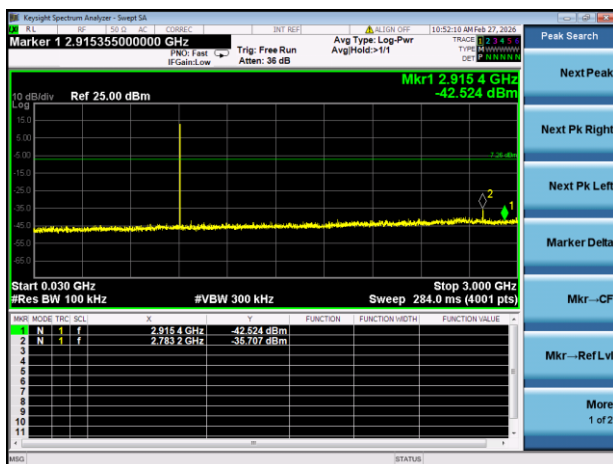
HIGH CHANNEL, CARRIER LEVEL



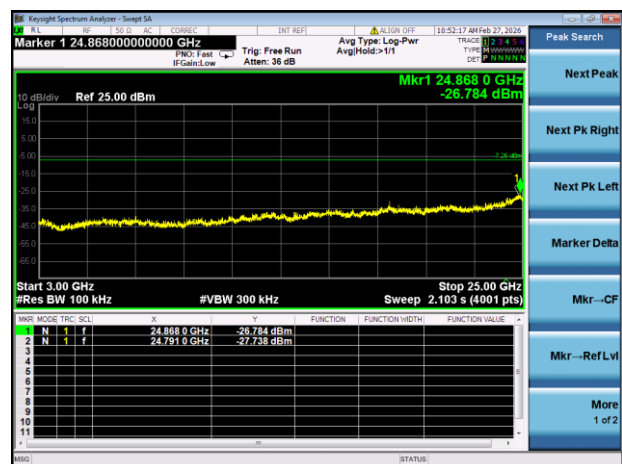
HIGH CHANNEL, BAND EDGE



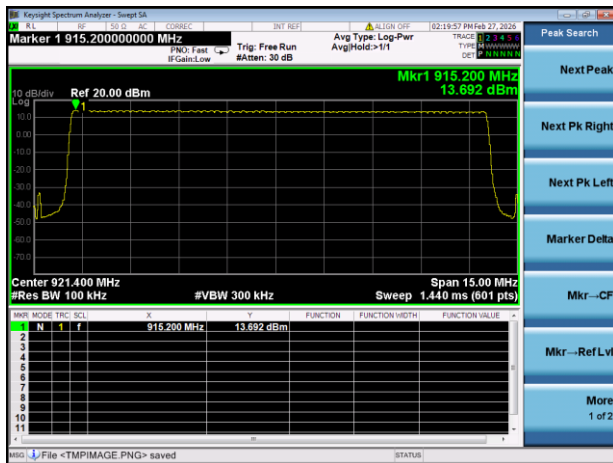
HIGH CHANNEL, SPURIOUS 30 MHz ~ 3 GHz



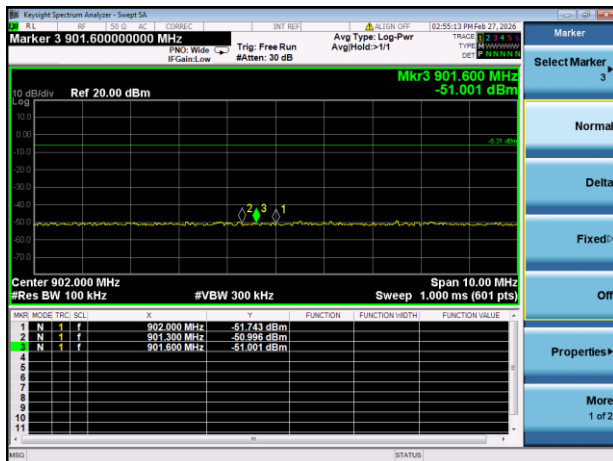
HIGH CHANNEL, SPURIOUS 3 GHz ~ 25 GHz



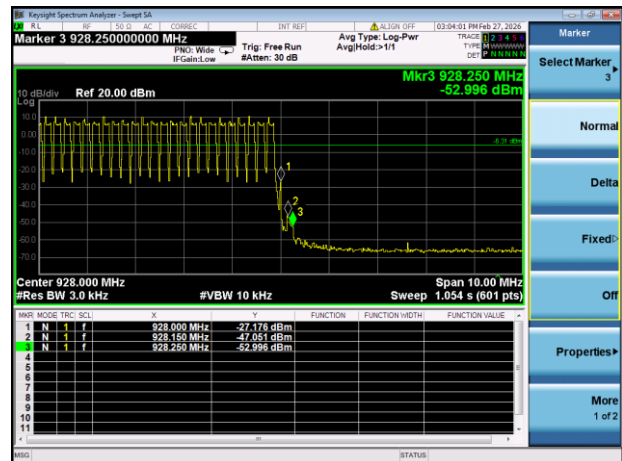
HOPPING, CARRIER LEVEL



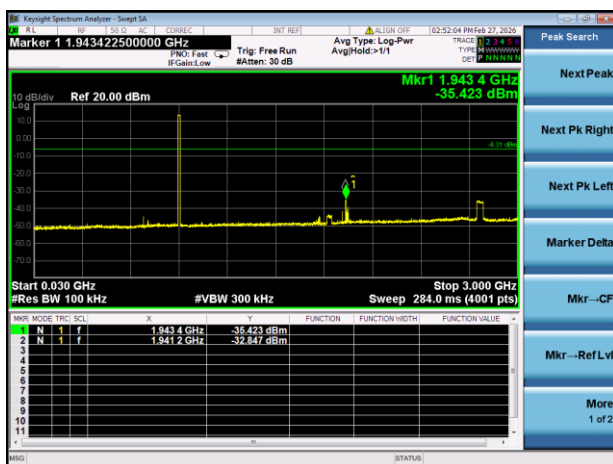
HOPPING BAND EDGE (LOW)



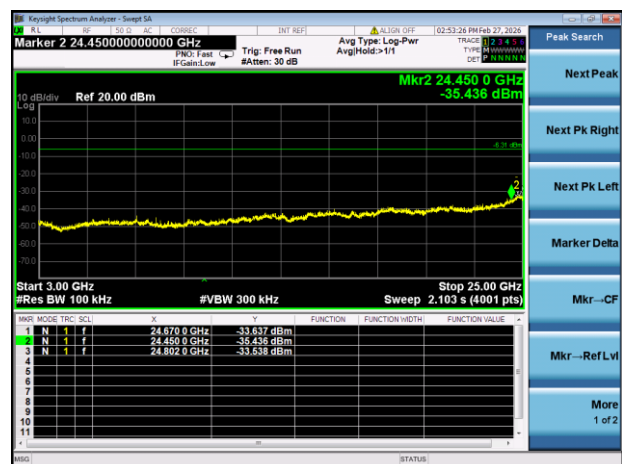
HOPPING BAND EDGE (HIGH)



Hopping Mode, SPURIOUS 30 MHz ~ 3 GHz



Hopping Mode, SPURIOUS 3GHz ~ 25 GHz



A.7 Conducted Emissions

Note: Not applicable.

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 C63.10-2020, 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.

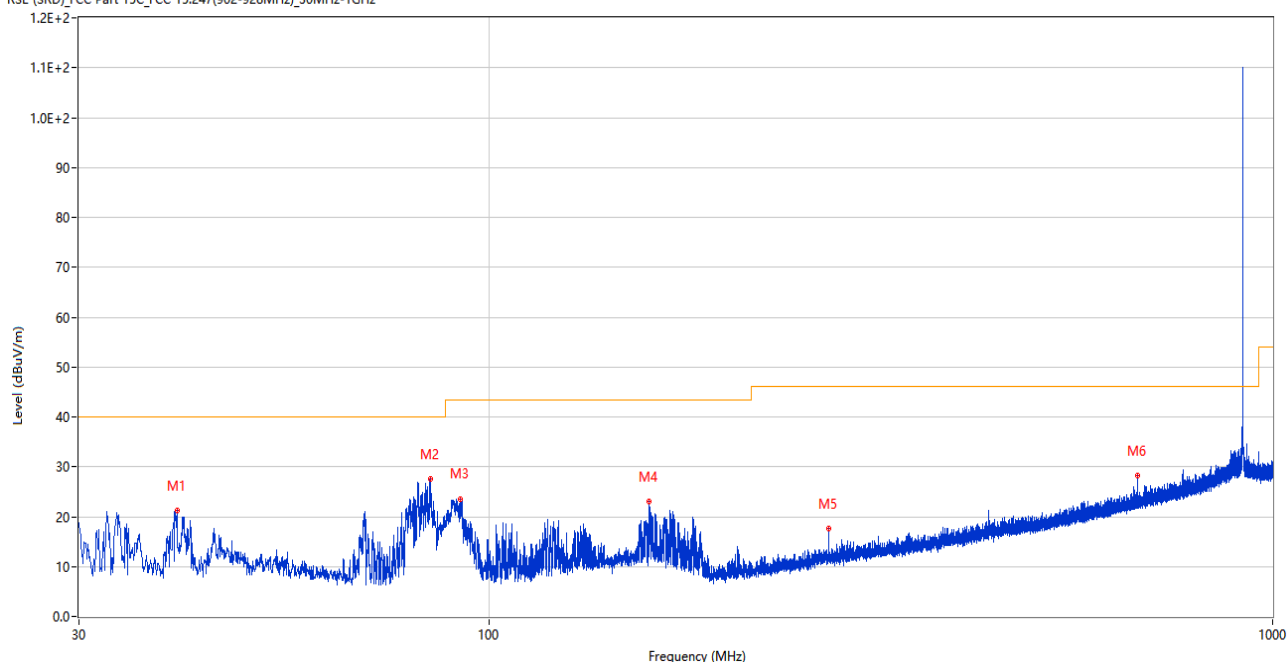
Note³: Results (dBuV/m) = Original reading level of Spectrum Analyzer (dBuV/m) + Factor (dB)

Note⁴: 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.

Test Data and Plots

LOW CHANNEL, 30 MHz to 1 GHz, ANT H

RSE (SRD)_FCC Part 15C_FCC 15.247(902-928MHz)_30MHz-1GHz



No.	Frequency (MHz)	Results (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	39.991	21.29	40.0	18.71	Peak	356.00	150	Horizontal	Pass
2	84.174	27.52	40.0	12.48	Peak	142.00	150	Horizontal	Pass
3	91.886	23.55	43.5	19.95	Peak	171.00	150	Horizontal	Pass
4	160.222	22.99	43.5	20.51	Peak	343.00	150	Horizontal	Pass
5	271.239	17.63	46.0	28.37	Peak	6.00	150	Horizontal	Pass
6	671.994	28.30	46.0	17.70	Peak	171.00	150	Horizontal	Pass

LOW CHANNEL, 30 MHz to 1 GHz, ANT V

No.	Frequency (MHz)	Results (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	42.054	21.20	40.0	18.81	Peak	65.00	200	Vertical	Pass
2	85.594	24.20	40.0	15.81	Peak	65.00	200	Vertical	Pass
3	172.081	21.41	43.5	22.09	Peak	325.00	400	Vertical	Pass
4	379.019	17.65	46.0	28.35	Peak	325.00	400	Vertical	Pass
5	661.336	25.52	46.0	20.48	Peak	318.00	200	Vertical	Pass
6	862.913	33.37	46.0	12.63	Peak	318.00	200	Vertical	Pass

MIDDLE CHANNEL, 30 MHz to 1 GHz, ANT H

No.	Frequency (MHz)	Results (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	37.342	21.69	40.0	18.31	Peak	31.00	100	Horizontal	Pass
2	82.995	25.28	40.0	14.72	Peak	31.00	400	Horizontal	Pass
3	95.873	20.69	43.5	22.81	Peak	327.00	200	Horizontal	Pass
4	159.689	25.19	43.5	18.31	Peak	327.00	200	Horizontal	Pass
5	269.926	20.02	46.0	25.98	Peak	247.00	300	Horizontal	Pass
6	675.278	27.26	46.0	18.74	Peak	247.00	300	Horizontal	Pass

MIDDLE CHANNEL, 30 MHz to 1 GHz, ANT V

No.	Frequency (MHz)	Results (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	41.900	23.73	40.0	16.27	Peak	182.00	400	Vertical	Pass
2	80.575	26.24	40.0	13.77	Peak	182.00	300	Vertical	Pass
3	175.373	22.64	43.5	20.86	Peak	278.00	300	Vertical	Pass
4	386.093	14.77	46.0	31.24	Peak	278.00	100	Vertical	Pass
5	659.963	26.17	46.0	19.84	Peak	27.00	400	Vertical	Pass
6	865.258	35.14	46.0	10.86	Peak	27.00	100	Vertical	Pass

HIGH CHANNEL, 30 MHz to 1 GHz, ANT H

No.	Frequency (MHz)	Results (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	37.698	19.28	40.0	20.72	Peak	302.00	300	Horizontal	Pass
2	83.422	26.96	40.0	13.04	Peak	302.00	100	Horizontal	Pass
3	95.076	20.78	43.5	22.72	Peak	263.00	200	Horizontal	Pass
4	157.665	25.84	43.5	17.66	Peak	263.00	400	Horizontal	Pass
5	268.676	15.46	46.0	30.54	Peak	49.00	100	Horizontal	Pass
6	674.313	29.54	46.0	16.46	Peak	49.00	200	Horizontal	Pass

HIGH CHANNEL, 30 MHz to 1 GHz, ANT V

No.	Frequency (MHz)	Results (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	51.241	20.98	40.0	19.03	Peak	156.00	200	Vertical	Pass
2	141.772	24.90	43.5	18.61	Peak	156.00	200	Vertical	Pass
3	154.861	18.68	43.5	24.82	Peak	80.00	200	Vertical	Pass
4	406.145	20.35	46.0	25.65	Peak	80.00	200	Vertical	Pass
5	639.595	24.23	46.0	21.77	Peak	297.00	200	Vertical	Pass
6	774.535	33.12	46.0	12.88	Peak	297.00	200	Vertical	Pass

LOW CHANNEL 1 GHz to 12.75 GHz, ANT H

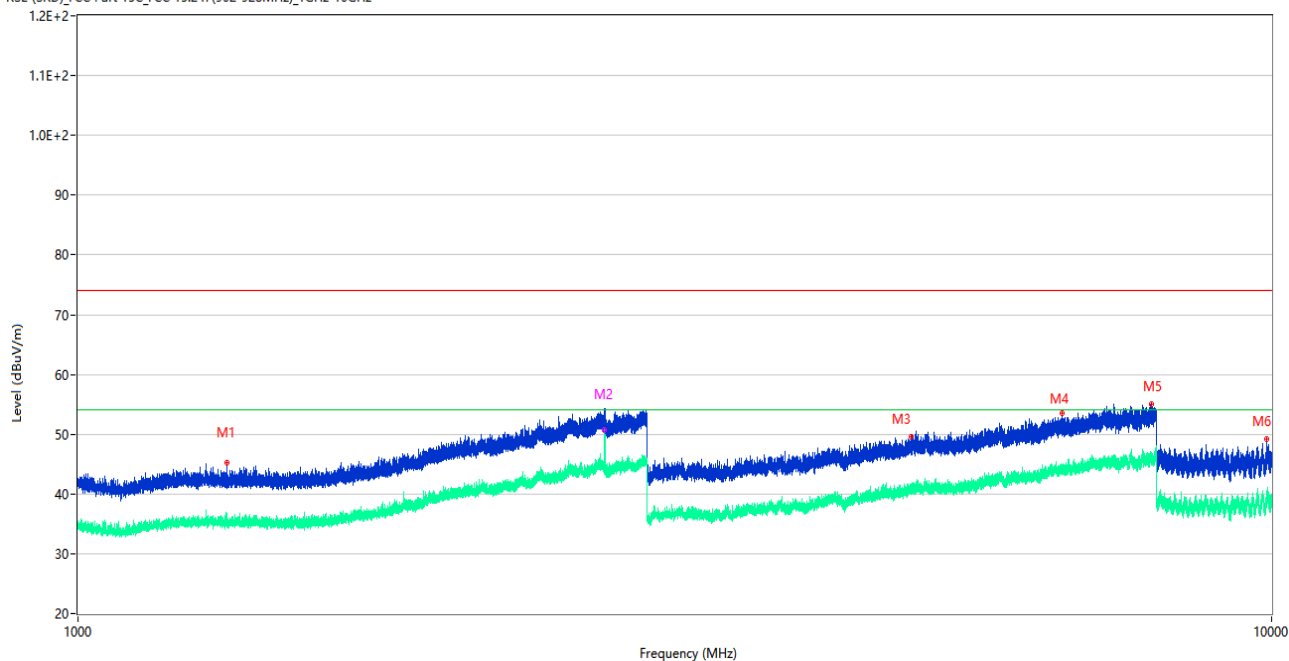
No.	Frequency (MHz)	Results (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	1366.795	45.20	74.0	28.80	Peak	252.00	100	Horizontal	Pass
1**	1366.795	35.56	54.0	18.44	AV	252.00	100	Horizontal	Pass
2	2748.203	54.90	74.0	19.10	Peak	36.00	200	Horizontal	Pass
2**	2748.203	47.96	54.0	6.04	AV	36.00	200	Horizontal	Pass
3	4958.509	50.21	74.0	23.79	Peak	350.00	200	Horizontal	Pass
3**	4958.509	41.23	54.0	12.77	AV	350.00	200	Horizontal	Pass
4	7063.014	55.07	74.0	18.93	Peak	213.00	100	Horizontal	Pass
4**	7063.014	46.37	54.0	7.63	AV	213.00	100	Horizontal	Pass
5	7988.432	54.98	74.0	19.02	Peak	163.00	300	Horizontal	Pass
5**	7988.432	46.65	54.0	7.35	AV	163.00	300	Horizontal	Pass
6	9907.320	48.95	74.0	25.05	Peak	144.00	100	Horizontal	Pass
6**	9907.320	38.41	54.0	15.59	AV	144.00	100	Horizontal	Pass

LOW CHANNEL 1 GHz to 12.75 GHz, ANT V

No.	Frequency (MHz)	Results (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	1332.448	49.05	74.0	24.95	Peak	115.00	200	Vertical	Pass
1**	1332.448	41.42	54.0	12.58	AV	115.00	200	Vertical	Pass
2	2663.796	56.04	74.0	17.96	Peak	286.00	100	Vertical	Pass
2**	2663.796	45.51	54.0	8.49	AV	286.00	100	Vertical	Pass
3	4905.121	50.21	74.0	23.79	Peak	236.00	200	Vertical	Pass
3**	4905.121	40.63	54.0	13.37	AV	236.00	200	Vertical	Pass
4	6652.911	53.84	74.0	20.16	Peak	12.00	400	Vertical	Pass
4**	6652.911	44.19	54.0	9.81	AV	12.00	400	Vertical	Pass
5	7924.689	55.87	74.0	18.13	Peak	312.00	400	Vertical	Pass
5**	7924.689	46.37	54.0	7.63	AV	312.00	400	Vertical	Pass
6	9826.790	49.49	74.0	24.51	Peak	166.00	100	Vertical	Pass
6**	9826.790	39.34	54.0	14.66	AV	166.00	100	Vertical	Pass

MIDDLE CHANNEL 1 GHz to 12.75 GHz, ANT H

RSE (SRD)_FCC Part 15C_FCC 15.247(902-928MHz)_1GHz-10GHz



No.	Frequency (MHz)	Results (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	1334.000	45.29	74.0	28.71	Peak	102.00	300	Horizontal	Pass
1**	1334.000	34.48	54.0	19.52	AV	102.00	300	Horizontal	Pass
2	2762.100	53.74	74.0	20.26	Peak	58.00	150	Horizontal	Pass
2**	2762.100	50.76	54.0	3.24	AV	58.00	150	Horizontal	Pass
3	4986.250	49.52	74.0	24.48	Peak	1.00	100	Horizontal	Pass
3**	4986.250	40.66	54.0	13.34	AV	1.00	100	Horizontal	Pass
4	6678.500	53.44	74.0	20.56	Peak	315.00	150	Horizontal	Pass
4**	6678.500	43.81	54.0	10.19	AV	315.00	150	Horizontal	Pass
5	7926.250	54.99	74.0	19.01	Peak	45.00	100	Horizontal	Pass
5**	7926.250	45.65	54.0	8.35	AV	45.00	100	Horizontal	Pass
6	9911.200	49.22	74.0	24.78	Peak	171.00	400	Horizontal	Pass
6**	9911.200	39.35	54.0	14.65	AV	171.00	400	Horizontal	Pass

MIDDLE CHANNEL 1 GHz to 12.75 GHz, ANT V

No.	Frequency (MHz)	Results (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	1329.448	48.98	74.0	25.02	Peak	326.00	400	Vertical	Pass
1**	1329.448	41.13	54.0	12.88	AV	326.00	400	Vertical	Pass
2	2661.023	55.99	74.0	18.01	Peak	348.00	100	Vertical	Pass
2**	2661.023	45.23	54.0	8.77	AV	348.00	100	Vertical	Pass
3	4908.009	50.16	74.0	23.84	Peak	13.00	200	Vertical	Pass
3**	4908.009	40.54	54.0	13.46	AV	13.00	200	Vertical	Pass
4	6654.517	53.57	74.0	20.43	Peak	27.00	100	Vertical	Pass
4**	6654.517	43.95	54.0	10.05	AV	27.00	100	Vertical	Pass
5	7923.797	55.59	74.0	18.41	Peak	273.00	400	Vertical	Pass
5**	7923.797	46.32	54.0	7.68	AV	273.00	400	Vertical	Pass
6	9826.125	49.29	74.0	24.71	Peak	267.00	200	Vertical	Pass
6**	9826.125	39.19	54.0	14.81	AV	267.00	200	Vertical	Pass

HIGH CHANNEL 1 GHz to 12.75 GHz, ANT H

No.	Frequency (MHz)	Results (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	1372.216	44.90	74.0	29.10	Peak	326.00	200	Horizontal	Pass
1**	1372.216	35.41	54.0	18.60	AV	326.00	200	Horizontal	Pass
2	2784.253	54.66	74.0	19.34	Peak	320.00	400	Horizontal	Pass
2**	2784.253	50.73	54.0	3.27	AV	320.00	400	Horizontal	Pass
3	4959.176	50.02	74.0	23.98	Peak	63.00	200	Horizontal	Pass
3**	4959.176	41.14	54.0	12.86	AV	63.00	200	Horizontal	Pass
4	7068.355	54.97	74.0	19.03	Peak	16.00	400	Horizontal	Pass
4**	7068.355	46.15	54.0	7.85	AV	16.00	400	Horizontal	Pass
5	7984.076	54.74	74.0	19.26	Peak	46.00	400	Horizontal	Pass
5**	7984.076	46.47	54.0	7.53	AV	46.00	400	Horizontal	Pass
6	9906.668	48.93	74.0	25.07	Peak	300.00	100	Horizontal	Pass
6**	9906.668	38.23	54.0	15.77	AV	300.00	100	Horizontal	Pass

HIGH CHANNEL 1 GHz to 12.75 GHz, ANT V

No.	Frequency (MHz)	Results (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	1326.820	48.90	74.0	25.10	Peak	343.00	400	Vertical	Pass
1**	1326.820	41.30	54.0	12.70	AV	343.00	400	Vertical	Pass
2	2657.431	55.90	74.0	18.10	Peak	159.00	300	Vertical	Pass
2**	2657.431	45.47	54.0	8.53	AV	159.00	300	Vertical	Pass
3	4911.813	49.99	74.0	24.01	Peak	223.00	200	Vertical	Pass
3**	4911.813	40.47	54.0	13.53	AV	223.00	200	Vertical	Pass
4	6655.483	53.69	74.0	20.31	Peak	270.00	200	Vertical	Pass
4**	6655.483	43.92	54.0	10.08	AV	270.00	200	Vertical	Pass
5	7924.549	55.82	74.0	18.18	Peak	128.00	400	Vertical	Pass
5**	7924.549	46.09	54.0	7.91	AV	128.00	400	Vertical	Pass
6	9828.655	49.40	74.0	24.60	Peak	143.00	400	Vertical	Pass
6**	9828.655	39.12	54.0	14.88	AV	143.00	400	Vertical	Pass

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

Note¹: The lowest and highest channels are tested to verify the band edge emissions. Please refer to the following the plots for emissions values.

Note²: 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.

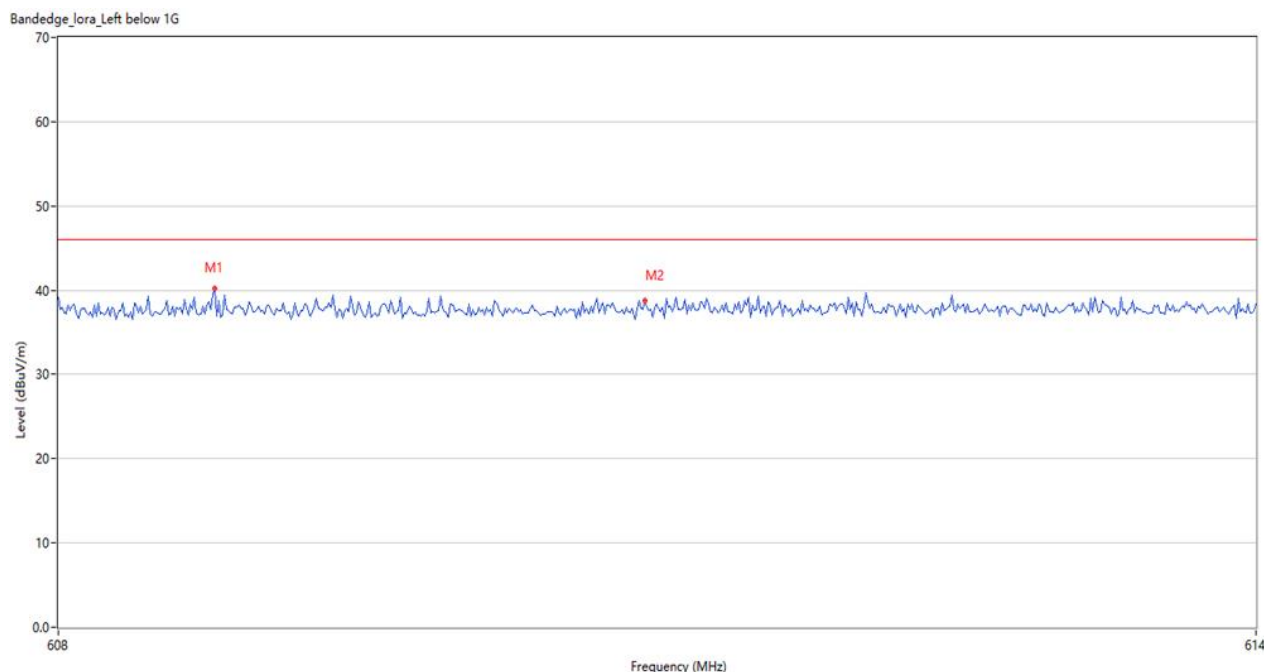
Note³: According the ANSI C63.10-2020, where limits are specified for both average and peak (or quasi-peak) detector functions, if the peak (or quasi-peak) measured value complies with the average limit, it is unnecessary to perform an average measurement.

Note⁴: The Level (dBuV/m) has been corrected by factor.

Note⁵: Both horizontal and vertical directions were pre tested, only the worst configuration has been reported in this report.

Test Data and Plots

608 MHz to 614 MHz



No.	Frequency (MHz)	Results (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	607.496	40.56	46.0	5.44	Peak	113.00	200	Horizontal	Pass
2	610.367	38.42	46.0	7.58	Peak	222.00	200	Horizontal	Pass

960 MHz to 1 GHz

No.	Frequency (MHz)	Results (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	960.599	40.79	54.0	13.21	Peak	247.00	200	Horizontal	Pass
2	963.720	42.24	54.0	11.76	Peak	356.00	200	Horizontal	Pass

1 GHz to 1.24 GHz

No.	Frequency (MHz)	Results (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	1034.400	42.78	54.0	11.22	Peak	52.00	150	Horizontal	Pass
2	1182.400	44.65	54.0	9.35	Peak	360.00	150	Horizontal	Pass

ANNEX B TEST SETUP PHOTOS

Please refer the document “Ti-EE26010537-AR.PDF”.

ANNEX C EUT EXTERNAL PHOTOS

Please refer the document “Ti-EE26010537-AW.PDF”.

ANNEX D EUT INTERNAL PHOTOS

Please refer the document “Ti-EE26010537-AI.PDF”.

Statement

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