



TEST REPORT

Applicant: Zhongshan Polono Electronic Technology Co., Ltd.
Address: No.132, Tanlong North Road, Tanzhou Town,
Zhongshan City, 4th and 5th floors, Building 2, 4th
and 5th floors, Building 3, Zhongshan, China
Equipment Type: Thermal Label Printer
Model Name: LP610BT
Brand Name: N/A
FCC ID: 2BQIW-LP610BT
ISED Number: 30531-LP610BT
Test Standard: 47 CFR Part 15 Subpart C
RSS-Gen Issue 5
RSS-247 Issue 4
(refer to section 3.1)
Sample Arrival Date: Aug. 06, 2026
Test Date: Aug. 13, 2026 - Sep. 08, 2026
Date of Issue: Sep. 17, 2026

ISSUED BY:

Shenzhen BALUN Technology Co., Ltd.



Tested by: Yang Wenxuan **Checked by:** Li Ganming **Approved by:** Tolan Tu
(Testing Director)

Revision History

Version	Issue Date	Revisions
<u>Rev. 01</u>	<u>Sep. 11, 2026</u>	<u>Initial Issue</u>
<u>Rev. 02</u>	<u>Sep. 17, 2026</u>	<u>Updated Antenna Type to PCB Antenna</u>

TABLE OF CONTENTS

1	GENERAL INFORMATION.....	4
1.1	Test Laboratory	4
1.2	Test Location	4
2	PRODUCT INFORMATION	5
2.1	Applicant Information	5
2.2	Manufacturer Information.....	5
2.3	General Description for Equipment under Test (EUT).....	5
2.4	Technical Information	6
2.5	Additional Instructions.....	8
3	SUMMARY OF TEST RESULTS	9
3.1	Test Standards	9
3.2	Test Verdict	10
4	GENERAL TEST CONFIGURATIONS	11
4.1	Test Environments.....	11
4.2	Test Equipment List.....	11
4.3	Test Software List.....	11
4.4	Measurement Uncertainty.....	12
4.5	Description of Test Setup	12
4.6	Measurement Results Explanation Example.....	15
5	TEST ITEMS	16
5.1	Antenna Requirements.....	16
5.2	Frequency Hopping Systems.....	17
5.3	Number of Hopping Frequencies	19

5.4	Peak Output Power and E.I.R.P	20
5.5	Occupied Bandwidth.....	21
5.6	Carrier Frequency Separation.....	22
5.7	Time of Occupancy (Dwell time)	23
5.8	Conducted Spurious Emission & Authorized-band band-edge.....	25
5.9	Conducted Emission.....	26
5.10	Radiated Spurious Emission.....	27
5.11	Band Edge (Restricted-band band-edge).....	32
ANNEX A	TEST RESULT	35
A.1	Number of Hopping Frequency	35
A.2	Peak Output Power and E.I.R.P	36
A.3	20 dB and 99% bandwidth	38
A.4	Hopping Frequency Separation	40
A.5	Average Time of Occupancy.....	41
A.6	Conducted Spurious Emissions & Authorized-band band-edge	44
A.7	Conducted Emissions	48
A.8	Radiated Spurious Emission.....	51
A.9	Band Edge (Restricted-band band-edge).....	58
ANNEX B	TEST SETUP PHOTOS	60
ANNEX C	EUT EXTERNAL PHOTOS.....	60
ANNEX D	EUT INTERNAL PHOTOS.....	60

1 GENERAL INFORMATION

1.1 Test Laboratory

Name	Shenzhen BALUN Technology Co., Ltd.
Address	601, Building 2, Intelligent Connected Vehicle Industrial Park, No.55, Xiangshan Road, Luotian Community, Yanluo Sub-district, Bao'an District, Shenzhen
Phone Number	+86 755 6685 0100

1.2 Test Location

Name	Shenzhen BALUN Technology Co., Ltd.
Location	☒ Building 2, Intelligent Connected Vehicle Industrial Park, No.55, Xiangshan Road, Luotian Community, Yanluo Sub-district, Bao'an District, Shenzhen, Guangdong
	☐ 1/F., Building B, Ganghongji High-Tech Intelligent Industrial Park, No.1008, Songbai Road, Yangguang Community, Xili Subdistrict, Nanshan District, Shenzhen, Guangdong
Accreditation Certificate	The laboratory is a testing organization accredited by FCC as a accredited testing laboratory. The designation number is CN1196. The laboratory has been listed by Industry Canada to perform electromagnetic emission measurements. The CAB identifier number is CN0030.

2 PRODUCT INFORMATION

2.1 Applicant Information

Applicant	Zhongshan Polono Electronic Technology Co., Ltd.
Address	No.132, Tanlong North Road, Tanzhou Town, Zhongshan City, 4th and 5th floors, Building 2, 4th and 5th floors, Building 3, Zhongshan, China

2.2 Manufacturer Information

Manufacturer	Zhongshan Polono Electronic Technology Co., Ltd.
Address	No.132, Tanlong North Road, Tanzhou Town, Zhongshan City, 4th and 5th floors, Building 2, 4th and 5th floors, Building 3, Zhongshan, China

2.3 General Description for Equipment under Test (EUT)

EUT Name	Thermal Label Printer
Model Name Under Test	LP610BT
Series Model Name	N/A
Description of Model name differentiation	N/A
Serial Number	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	Bluetooth (BR+BLE)
-----------------------------------	--------------------

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

Modulation Technology	FHSS
Modulation Type	GFSK
Product Type	☒ Mobile ☐ Portable ☐ Fix Location
Transfer Rate	DH5: 1 Mbps
Frequency Range	The frequency range used is 2400 MHz to 2483.5 MHz.
Number of Channel	79 (at intervals of 1 MHz)
Tested Channel	0 (2402 MHz), 39 (2441 MHz), 78 (2480 MHz)
Antenna Type	PCB Antenna
Antenna Gain	1.66 dBi
Antenna Impedance	50 Ω
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)
0	2402	21	2423	42	2444	63	2465
1	2403	22	2424	43	2445	64	2466
2	2404	23	2425	44	2446	65	2467
3	2405	24	2426	45	2447	66	2468
4	2406	25	2427	46	2448	67	2469
5	2407	26	2428	47	2449	68	2470
6	2408	27	2429	48	2450	69	2471
7	2409	28	2430	49	2451	70	2472
8	2410	29	2431	50	2452	71	2473
9	2411	30	2432	51	2453	72	2474
10	2412	31	2433	52	2454	73	2475
11	2413	32	2434	53	2455	74	2476
12	2414	33	2435	54	2456	75	2477
13	2415	34	2436	55	2457	76	2478
14	2416	35	2437	56	2458	77	2479
15	2417	36	2438	57	2459	78	2480
16	2418	37	2439	58	2460	-	-
17	2419	38	2440	59	2461	-	-
18	2420	39	2441	60	2462	-	-
19	2421	40	2442	61	2463	-	-
20	2422	41	2443	62	2464	-	-

2.5 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	FCC Test Tool V2.4.3		
Mode	Channel	Frequency (MHz)	Soft Set
GFSK (DH5)	0	2402	N/A
	39	2441	
	78	2480	

Run Software:



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	RSS-Gen Issue 5	General Requirements for Compliance of Radio Apparatus
3	RSS-247 Issue 4	Digital Transmission Systems, Frequency Hopping Systems and Licence Exempt Local Area Network Devices in 902-928 MHz, 2400-2483.5 MHz, 5150-5350 MHz, and 5470-5895 MHz bands
4	ANSI C63.10-2020 + Cor. 1-2023 + C63.10a-2024 + Errata to C63.10a-2024	American National Standard for Procedures for Compliance Testing of Unlicensed Wireless Devices
5	KDB 558074 D01 15.247 Meas Guidance v05r02 ☆	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 Test Verdict

No.	Description	FCC Part No.	ISED Part No.	Channel	Test Result	Verdict	Remark
1	Antenna Requirement	15.203	RSS-Gen, 6.8	N/A	--	Pass	Note ¹
2	Number of Hopping Frequencies	15.247(a)	RSS-247, 6.2.3.1 (b)	Hopping Mode	ANNEX A.1	Pass	--
3	Peak Output Power and E.I.R.P	15.247(b)	RSS-247, 6.2.3.2	Low	ANNEX A.2	Pass	--
4	Occupied Bandwidth	15.247(a)	RSS-247, 6.2.1 (a)	Low	ANNEX A.3	Pass	--
5	Carrier Frequency Separation	15.247(a)	RSS-247, 6.2.3.1 (a)	Hopping Mode	ANNEX A.4	Pass	--
6	Time of Occupancy (Dwell time)	15.247(a)	RSS-247, 6.2.3.1 (b)	Hopping Mode	ANNEX A.5	Pass	--
7	Conducted Spurious Emission & Authorized-band band-edge	15.247(d)	RSS-247, 6.6	Hopping Mode; Low	ANNEX A.6	Pass	--
8	Conducted Emission	15.207	RSS-GEN, 8.8	Low	ANNEX A.7	Pass	--
9	Radiated Spurious Emission	15.209 15.247(d)	RSS-247, 6.6	Low	ANNEX A.8	Pass	--
10	Band Edge(Restricted-band band-edge)	15.209 15.247(d)	RSS-247, 6.6	Low	ANNEX A.9	Pass	--
11	Receiver Spurious Emissions	--	RSS-Gen, 7.3	--	--	N/A	Note ²

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

Note ²: Only radio communication receivers operating in stand-alone mode within the band 30-960 MHz, as well as scanner receivers, are subject to Industry Canada requirements, so this 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)	+20.1℃ to +25.4℃
Working Voltage of the EUT	NV (Normal Voltage)	110V

4.2 Test Equipment List

Description	Manufacturer	Model	Serial No.	Cal. Date	Cal. Due
Spectrum Analyzer	KEYSIGHT	N9020A	MY46471071	2026.06.01	2027.05.31
Power Sensor	KEYSIGHT	U2063XA	MY58000247	2026.06.01	2027.05.31
Spectrum Analyzer	KEYSIGHT	N9020A	MY52510065	2026.06.01	2027.05.31
Signaling Unit	ROHDE&SCHWARZ	CMW500	171150	2026.03.24	2027.03.23
Test Antenna-Horn	SCHWARZBECK	BBHA 9120D	01631	2025.02.22	2028.02.21
Test Antenna-Horn	A-INFO	LB-180400KF	J211060273	2024.06.15	2027.06.14
Anechoic Chamber	RAINFORD	9m*6m*6m	144	2025.01.04	2028.01.03
Amplifier	COM-MV	LSCX_LNA1-12G-01	180602	2026.05.20	2027.05.19
Amplifier	COM-MV	XKu_LNA7-18G-01	180601	2026.05.20	2027.05.19
Amplifier	COM-MV	KA LNA18 40G-01	10248150	2025.12.04	2026.12.03
EMI Receiver	KEYSIGHT	N9038A	MY53220118	2025.09.25	2026.09.24
Test Antenna-Bi-Log	SCHWARZBECK	VULB 9163	9163-624	2024.07.06	2027.07.05
Test Antenna-Loop	SCHWARZBECK	FMZB 1519	1519-037	2024.01.23	2027.01.22
Amplifier	COM-MV	ZT30-1000M	B2017119082	2025.11.25	2026.11.24
Anechoic Chamber	RAINFORD	9m*6m*6m	101	2025.10.12	2028.10.11
EMI Receiver	KEYSIGHT	N9010B	MY57110309	2025.09.25	2026.09.24
LISN	SCHWARZBECK	NSLK 8127	8127-687	2026.03.25	2027.03.24
Shielded Enclosure	YiHeng Electronic Co., Ltd	3.5m*3.1m*2.8 m	112	2025.02.14	2028.02.13

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%

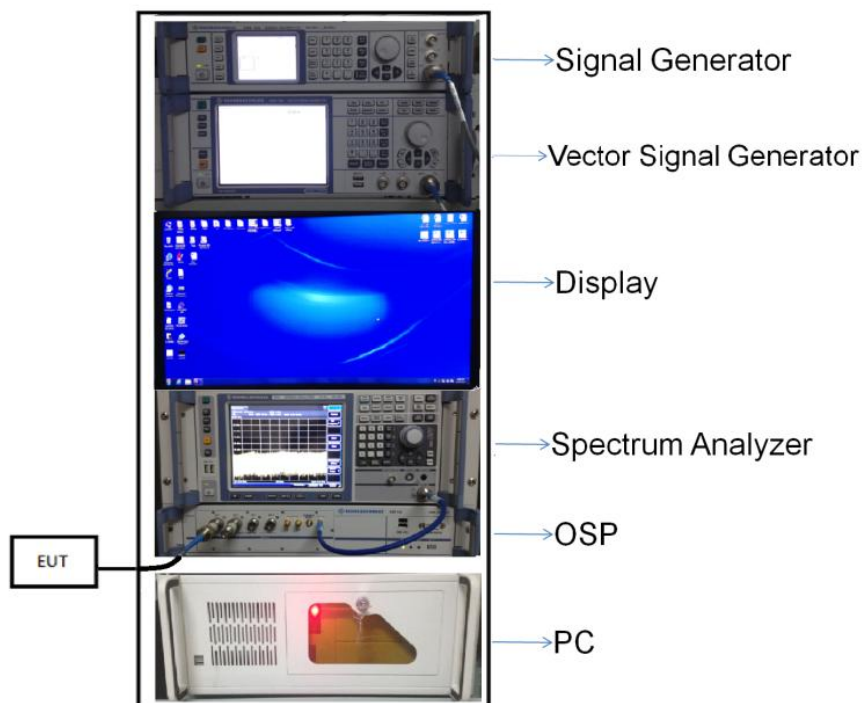
4.5 Description of Test Setup

4.5.1 For Antenna Port Test

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

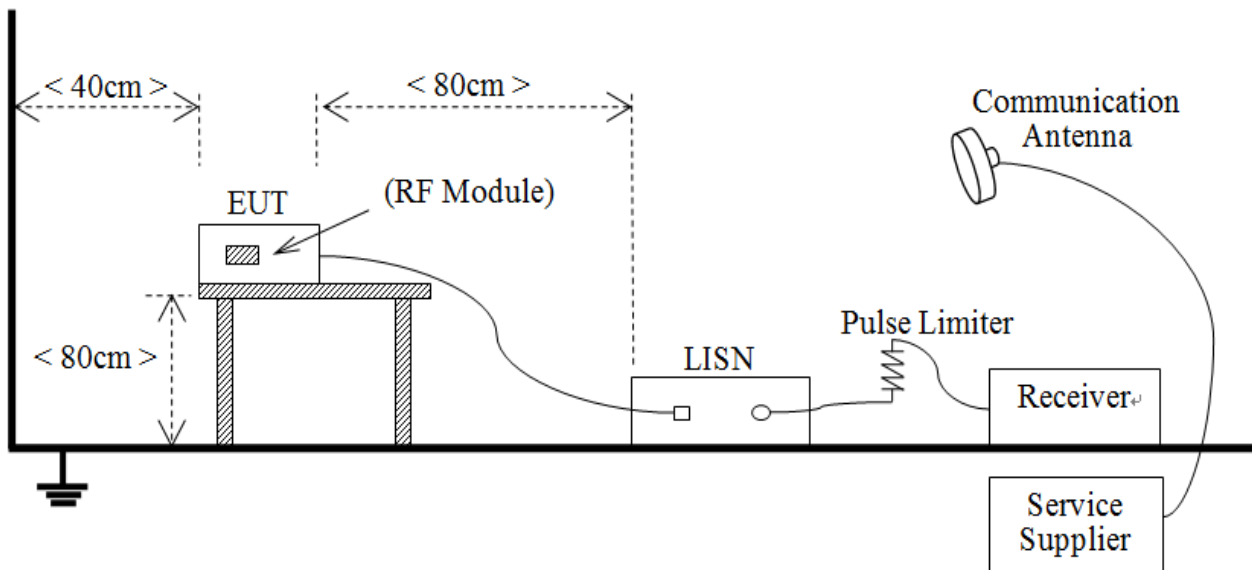
For example: the measurement value is 10 dBm and the cable 0.5dBm used, then the final result of EUT:

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



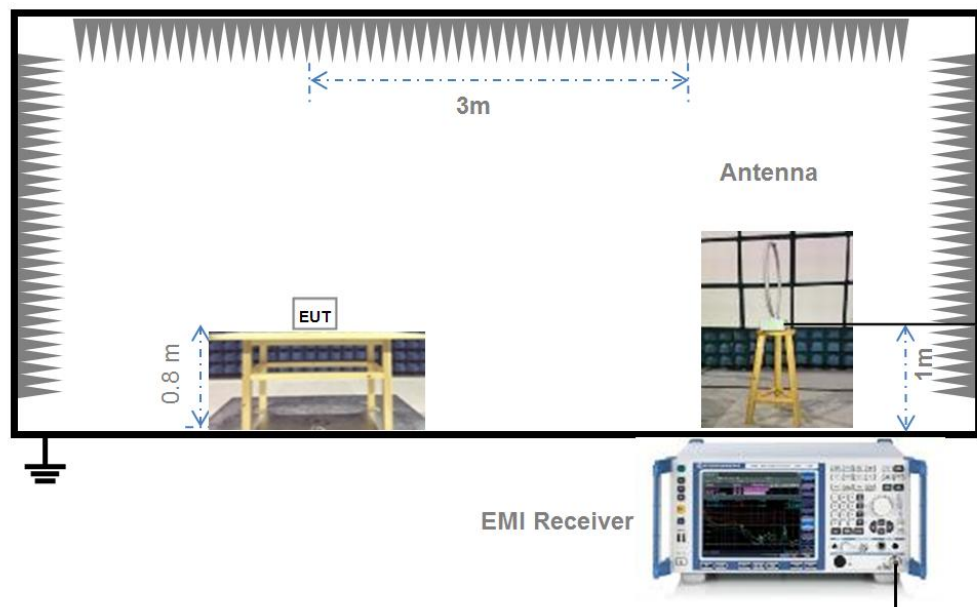
(Diagram 1)

4.5.2 For AC Power Supply Port Test



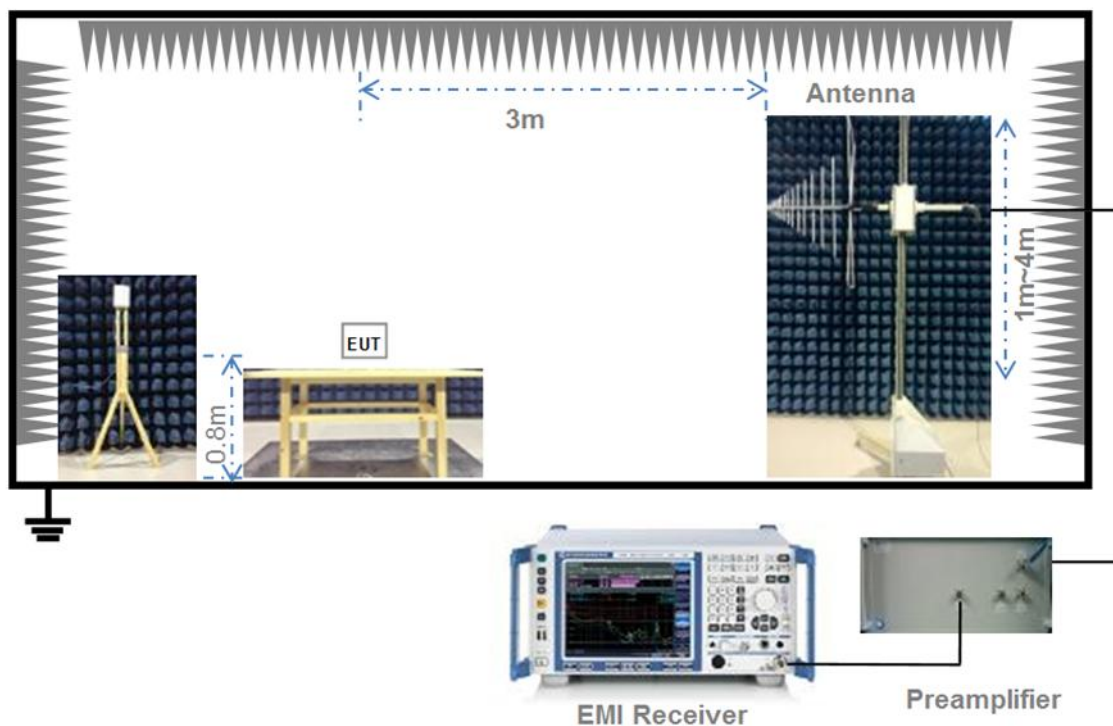
(Diagram 2)

4.5.3 For Radiated Test (Below 30 MHz)



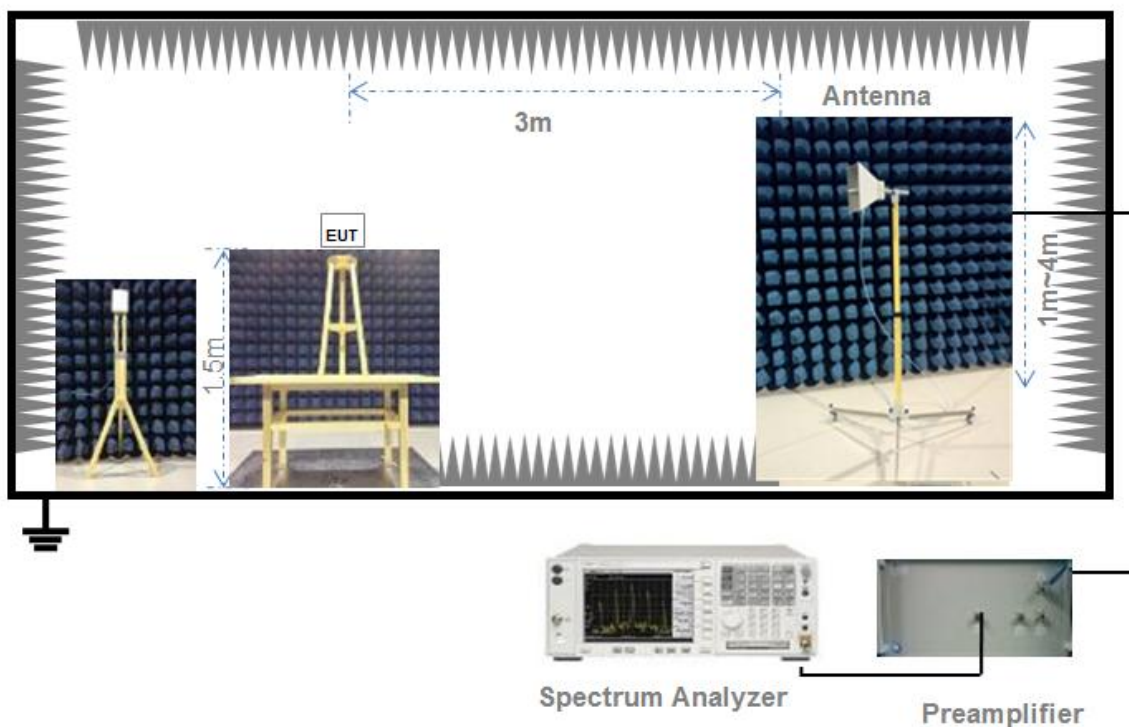
(Diagram 3)

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 & 15.247(b); RSS-Gen, 6.8

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

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

5.1.2 Antenna Anti-Replacement Construction

The Antenna Anti-Replacement as following method:

Protected Method	Description
The antenna is embedded in the product.	An embedded-in antenna design is used.

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

5.1.3 Antenna Gain

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

5.2 Frequency Hopping Systems

5.2.1 Relevant Standards

FCC §15.247(a) (1) (i) (ii) (iii) (iv); FCC §15.247(g); FCC §15.247(h);

Describe how the hopping sequence is generated. Provide an example of the hopping sequence channels, to demonstrate that the sequence meets the requirement specified in the definition of an FHSS system. Per the definition in Section 2.1(c), the hop set shall appear as random in the near term, shall appear as evenly distributed in the long term, and sequential hops shall be randomly distributed in both direction and magnitude of change.

Describe how each individual EUT meets the requirement that each of its hopping channels is used equally on average (e.g., that each new transmission event begins on the next channel in the hopping sequence after the final channel used in the previous transmission event).

Describe how the associated receiver(s) complies with the requirement that the input bandwidth (either RF or IF) matches the bandwidth of the transmitted signal.

Describe how the associated receiver(s) has the ability to shift frequencies in synchronization with the transmitted signals.

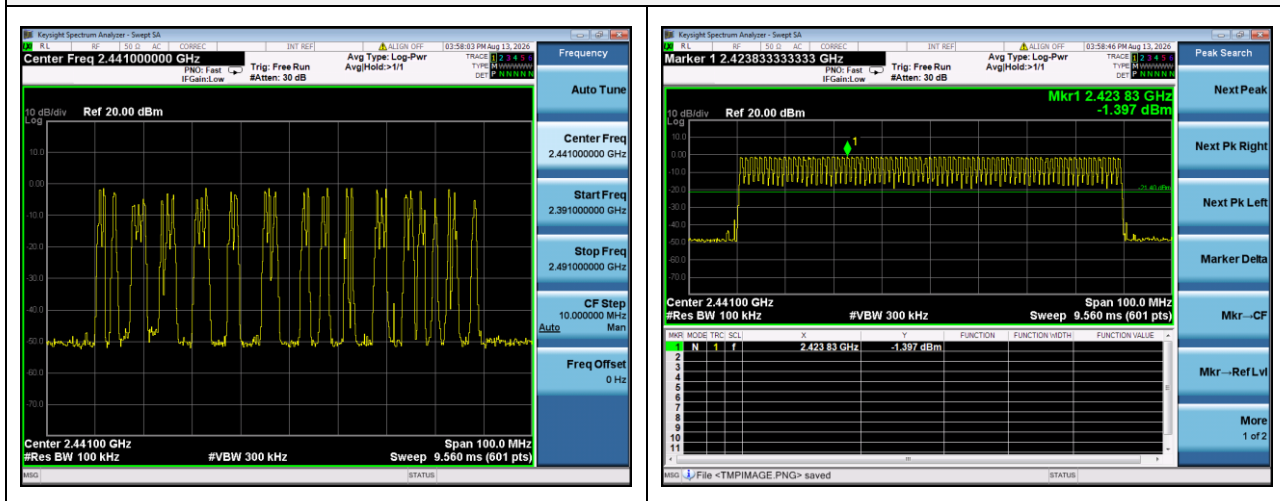
For short burst systems, describe how the EUT complies with the requirement that it be designed to be capable of operating as a true frequency hopping system. Specifically, the device shall comply with the equal frequency use and pseudorandom hopping sequence requirement when transmitting in short bursts, and shall be designed to comply when presented with continuous data (or information) stream.

Describe how the EUT complies with the requirement that it not have the ability to be coordinated with other FHSS systems in an effort to avoid the simultaneous occupancy of individual hopping frequencies by multiple transmitters.

5.2.2 Description of the systems

1. According to the preset procedure of the whole network, all the stations in the automatic control network synchronously change the frequency multiple times within one second, and temporarily stay on each frequency hopping channel. Periodic synchronization signaling is sent from the primary station, instructing all slaves to simultaneously change the operating frequency, then the hopping sequence is generated.
2. The hop set shall appear as random in the near term, shall appear as evenly distributed in the long term, and sequential hops shall be randomly distributed in both direction and magnitude of change.

Reference Documents



3. Channels are classified into two categories, used and unused, where used channels are part of the hopping sequence and unused channels are replaced in the hopping sequence by used channels in a pseudo-random way. Make each individual EUT meets the requirement that each of its hopping channels is used equally on average.
4. The input bandwidth and transmitted bandwidth are both 1MHz, the associated receiver(s) complies with the requirement that the input bandwidth matches the bandwidth of the transmitted signal.
5. Connected devices communicate on the same physical channel by synchronizing with a common clock and hopping sequence.
6. EUT isn't short burst systems.
7. EUT can't have the ability to be coordinated with other FHSS systems in an effort.

5.3 Number of Hopping Frequencies

5.3.1 Limit

FCC §15.247(a) (1) (iii); RSS-247, 6.2.3.1(b)

Frequency hopping systems operating in the 2400 MHz to 2483.5 MHz bands shall use at least 15 hopping frequencies.

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

Span = The frequency band of operation

RBW = To identify clearly the individual channels, set the RBW to less than 30% of the channel spacing or the 20 dB bandwidth, whichever is smaller.

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.1.

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

5.4.1 Test Limit

FCC § 15.247(b)

For frequency hopping systems operating in the 2400-2483.5 MHz band employing at least 75 non-overlapping hopping channels band: 1 watt. For all other frequency hopping systems in the 2400-2483.5 MHz band: 0.125 watts.

RSS-247, 6.2.3.2

The following transmitter output power and e.i.r.p. requirements shall apply:

- a. if the hopset uses 75 or more hopping channels, the maximum peak conducted output power shall not exceed 1.0 W.
- b. if the hopset uses less than 75 hopping channels the maximum peak conducted output power shall not exceed 0.125 W.
- c. the e.i.r.p. shall not exceed 4 W, except as provided in sections 6.5 a) and b).

5.4.2 Test Setup

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

5.4.3 Test Procedure

The 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.

5.4.4 Test Result

Please refer to ANNEX A.2.

5.5 Occupied Bandwidth

5.5.1 Limit

FCC §15.247(a); RSS-247, 6.2.1 (a)

Measurement of the 20dB bandwidth of the modulated signal.

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

20dB bandwidth

use the following spectrum analyzer settings:

Span = approximately 2 to 5 times the 20 dB bandwidth, centered on a hopping channel

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

VBW $\geq 3 \times$ RBW

Sweep = auto

Detector function = peak

Trace = max hold

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

99% bandwidth

use the following spectrum analyzer settings:

Span = approximately 1.5 to 5 times the 99% bandwidth, centered on a hopping channel

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

VBW $\geq 3 \times$ RBW

Sweep = auto

Detector function = peak

Trace = max hold

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

Use the 99% power bandwidth function of the instrument and report the measured bandwidth.

5.5.4 Test Result

Please refer to ANNEX A.3.

5.6 Carrier Frequency Separation

5.6.1 Limit

FCC §15.247(a); RSS-247, 6.2.3.1(a)

Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 2/3 of the 20 dB bandwidth of the hopping channel, whichever is greater.

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 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.

5.6.4 Test Result

Please refer to ANNEX A.4.

5.7 Time of Occupancy (Dwell time)

5.7.1 Limit

FCC §15.247(a); RSS-247, 6.2.3.1(b)

Frequency hopping systems in the 2400 MHz - 2483.5 MHz band shall use at least 15 non-overlapping channels. The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed. Frequency hopping systems may avoid or suppress transmissions on a particular hopping frequency provided that a minimum of 15 channels are used.

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

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

Span: Zero span, centered on a hopping channel

RBW shall be $\leq$ channel spacing and where possible RBW should be set $\gg 1/T$, where T is the expected dwell time per channel

Sweep: Set so that the start of the first transmission and end of the last transmission for the hop are clearly captured. Setting the sweep time to be slightly longer than the hopping period per channel (hopping period = $1/\text{hopping rate}$) should achieve this.

Detector function: Peak

Trace: Max hold

Use the marker-delta function to determine the transmit time per hop. If this value varies with different modes of operation (data rate, modulation format, number of hopping channels, etc.), then repeat this test for each variation in transmit time.

The average time of occupancy on any channel within the Period can be calculated with formulas:

For GFSK and 8DPSK:

For DH1 package type

$$\{\text{Total of Dwell}\} = \{\text{Pulse Time}\} * (1600 / 2) / \{\text{Number of Hopping Frequency}\} * \{\text{Period}\}$$

$$\{\text{Period}\} = 0.4 \text{ s} * \{\text{Number of Hopping Frequency}\}$$

For DH3 package type

$$\{\text{Total of Dwell}\} = \{\text{Pulse Time}\} * (1600 / 4) / \{\text{Number of Hopping Frequency}\} * \{\text{Period}\}$$

$$\{\text{Period}\} = 0.4 \text{ s} * \{\text{Number of Hopping Frequency}\}$$

For DH5 package type

$$\{\text{Total of Dwell}\} = \{\text{Pulse Time}\} * (1600 / 6) / \{\text{Number of Hopping Frequency}\} * \{\text{Period}\}$$

$$\{\text{Period}\} = 0.4 \text{ s} * \{\text{Number of Hopping Frequency}\}$$

For AFH Mode:

For DH1 package type

$$\{\text{Total of Dwell}\} = \{\text{Pulse Time}\} * (800 / 2) / \{\text{Number of Hopping Frequency}\} * \{\text{Period}\}$$

$$\{\text{Period}\} = 0.4 \text{ s} * \{\text{Number of Hopping Frequency}\}$$

For DH3 package type

$$\{\text{Total of Dwell}\} = \{\text{Pulse Time}\} * (800 / 4) / \{\text{Number of Hopping Frequency}\} * \{\text{Period}\}$$

$$\{\text{Period}\} = 0.4 \text{ s} * \{\text{Number of Hopping Frequency}\}$$

For DH5 package type

$$\{\text{Total of Dwell}\} = \{\text{Pulse Time}\} * (800 / 6) / \{\text{Number of Hopping Frequency}\} * \{\text{Period}\}$$

$$\{\text{Period}\} = 0.4 \text{ s} * \{\text{Number of Hopping Frequency}\}$$

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.

5.7.4 Test Result

Please refer to ANNEX A.5.

5.8 Conducted Spurious Emission & Authorized-band band-edge

5.8.1 Limit

FCC §15.247(d); RSS-247, 6.6

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.

5.8.2 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.

5.8.3 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 = 300 kHz

Sweep = auto

Detector function = peak

Trace = max hold

Allow the trace to stabilize

5.8.4 Test Result

Please refer to ANNEX A.6.

5.9 Conducted Emission

5.9.1 Limit

FCC §15.207; RSS-GEN, 8.8

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

5.9.2 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.

5.9.3 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.

5.9.4 Test Result

Please refer to ANNEX A.7.

5.10 Radiated Spurious Emission

5.10.1 Limit

FCC §15.209&15.247(d); RSS-247, 6.6

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 ($\mu\text{V/m}$)	Measurement Distance (m)
0.009 - 0.490	$2400/F(\text{kHz})$	300
0.490 - 1.705	$24000/F(\text{kHz})$	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 ($\text{dB}\mu\text{V/m}$) = $20 \times \log[\text{Field Strength } (\mu\text{V/m})]$.
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: $54\text{dB}\mu\text{V/m}@3\text{m}$ (AV) and $74\text{dB}\mu\text{V/m}@3\text{m}$ (PK).

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

Since the emission limits are specified in terms of radiated field strength levels, measurements performed to demonstrate compliance have traditionally relied on a radiated test configuration. Radiated measurements remain the principal method for demonstrating compliance to the specified limits; however antenna-port conducted measurements are also now acceptable to demonstrate compliance (see below for details). When radiated measurements are utilized, test site requirements and procedures for maximizing and measuring radiated emissions that are described in ANSI C63.10-2020 + Cor. 1-2023 + C63.10a-2024 + Errata to C63.10a-2024 shall be followed.

Antenna-port conducted measurements may also be used as an alternative to radiated measurements for demonstrating compliance in the restricted frequency bands. If conducted measurements are performed, then proper impedance matching must be ensured and an additional radiated test for cabinet/case spurious emissions is required.

General Procedure for conducted measurements in restricted bands

- a) Measure the conducted output power (in dBm) using the detector specified (see guidance regarding measurement procedures for determining quasi-peak, peak, and average conducted output power, respectively).
- b) Add the maximum transmit antenna gain (in dBi) to the measured output power level to determine the EIRP level (see guidance on determining the applicable antenna gain)
- c) Add the appropriate maximum ground reflection factor to the EIRP level (6 dB for frequencies ≤ 30 MHz, 4.7 dB for frequencies between 30 MHz and 1000 MHz, inclusive and 0 dB for frequencies > 1000 MHz).
- d) For devices with multiple antenna-ports, measure the power of each individual chain and sum the EIRP of all chains in linear terms (e.g., Watts, mW).
- e) Convert the resultant EIRP level to an equivalent electric field strength using the following relationship:

$$E = \text{EIRP} - 20\log D + 104.8$$

where:

E = electric field strength in dB μ V/m,

EIRP = equivalent isotropic radiated power in dBm

D = specified measurement distance in meters.

- f) Compare the resultant electric field strength level to the applicable limit.
- g) Perform radiated spurious emission test.

Quasi-Peak measurement procedure

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

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

Peak power measurement procedure

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

- a) RBW = as specified in Table 1.
- b) VBW $\geq 3 \times$ RBW.
- c) Detector = Peak.

- d) Sweep time = auto.
- e) Trace mode = max hold.
- f) Allow sweeps to continue until the trace stabilizes. (Note that the required measurement time may be longer for low duty cycle applications).

Table 1—RBW as a function of frequency

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

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

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

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

- a) The EUT shall be configured to operate at the maximum achievable duty cycle.
- b) Measure the duty cycle, x , of the transmitter output signal as described in section 6.0.
- c) RBW = 1 MHz (unless otherwise specified).
- d) VBW $\geq 3 \times$ RBW.
- e) Detector = RMS, if $\text{span}/(\# \text{ of points in sweep}) \leq (\text{RBW}/2)$. Satisfying this condition may require increasing the number of points in the sweep or reducing the span. If this condition cannot be satisfied, then the detector mode shall be set to peak.
- f) Averaging type = power (i.e., RMS).
 - 1) As an alternative, the detector and averaging type may be set for linear voltage averaging.
 - 2) Some instruments require linear display mode in order to use linear voltage averaging. Log or dB averaging shall not be used.
- g) Sweep time = auto.
- h) Perform a trace average of at least 100 traces.
- i) A correction factor shall be added to the measurement results prior to comparing to the emission limit in order to compute the emission level that would have been measured had the test been performed at 100 percent duty cycle. The correction factor is computed as follows:
 - 1) If power averaging (RMS) mode was used in step f), then the applicable correction factor is $10 \log(1/x)$, where x is the duty cycle.

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

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

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

Determining the applicable transmit antenna gain

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

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

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

Radiated spurious emission test

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

For these cabinet radiated spurious emission measurements the EUT transmit antenna may be replaced with a termination matching the nominal impedance of the antenna. Procedures for performing radiated measurements are specified in ANSI C63.10-2020 + Cor. 1-2023 + C63.10a-2024 + Errata to C63.10a-2024. All detected emissions shall comply with the applicable limits.

The measurement frequency range is from 30 MHz 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

5.10.4 Test Result

Please refer to ANNEX A.8.

5.11 Band Edge (Restricted-band band-edge)

5.11.1 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).

5.11.2 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.

5.11.3 Test Procedure

The following procedures may be used to determine the average field strength or power of an unwanted emission that is within 2 MHz of the authorized band-edge. Use the procedure described in 11.12.3.2.2 when using an average detector and the EUT can be configured to transmit continuously (i.e., $D \geq 98\%$). Use the procedure described in 11.12.3.2.3 when using an average detector and the EUT cannot be configured to transmit continuously but the duty cycle is constant (i.e., duty cycle variations are less than $\pm 2\%$). Use the procedure described in 11.12.3.2.4 when using an average detector for those cases where the EUT cannot be configured to transmit continuously and the duty cycle is not constant (duty cycle variations equal or exceed 2%).

If the EUT can be configured or modified to transmit continuously ($D \geq 98\%$), measured using the following method (with EUT transmitting continuously):

Use the following spectrum analyzer settings:

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

RBW = 100 kHz.

VBW $\geq [3 \times \text{RBW}]$.

Detector = Power averaging (rms), if $[\text{span} / (\# \text{ of points in sweep})] \leq (\text{RBW} / 2)$.

Averaging type = power (i.e., rms):

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

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

Sweep time = auto.

Perform a trace average of at least 100 traces.

Compute the power by integrating the spectrum over 1 MHz using the analyzer's band-power

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

If continuous transmission of the EUT ($D \geq 98\%$) cannot be achieved and the duty cycle is constant (duty cycle variations are less $\pm 2\%$), then the following procedure may be used to measure the average power of unwanted emissions within 2 MHz of the authorized band-edge:

RBW = 100 kHz.

VBW $\geq [3 \times \text{RBW}]$.

Detector = Power averaging (rms), if $[\text{span} / (\# \text{ of points in sweep})] \leq (\text{RBW} / 2)$.

Averaging type = power (i.e., rms):

Detector = Power averaging (rms), if $[\text{span} / (\# \text{ of points in sweep})] \leq (\text{RBW} / 2)$. Satisfying this condition might require increasing the number of points in the sweep or reducing the span. If this condition cannot be satisfied, then the detector mode shall be set to peak.

Averaging type = power (i.e., rms):

- 1) As an alternative, the detector and averaging type may be set for linear voltage averaging
- 2) Some instruments require linear display mode to use linear voltage averaging. Log or dB averaging shall not be used.

Sweep time = auto.

Perform a trace average of at least 100 traces.

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

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

- 1) If power averaging (rms) mode was used in step f), then the applicable correction factor is

$[10 \log (1 / D)]$, where D is the duty cycle.

- 2) If linear voltage averaging mode was used in step f), then the applicable correction factor is

$[20 \log (1 / D)]$, where D is the duty cycle.

- 3) If a specific emission is demonstrated to be continuous ($D \geq 98\%$) rather than turning ON and

OFF with the transmit cycle, then no duty cycle correction is required for that emission.

Reduction of the measured emission amplitude levels to account for operational duty cycle is not permitted. Determining compliance is based on emission levels occurring during transmission—it is not based on an average across ON and OFF times of the transmitter.

5.11.4 Test Result

Please refer to ANNEX A.9.

ANNEX A TEST RESULT

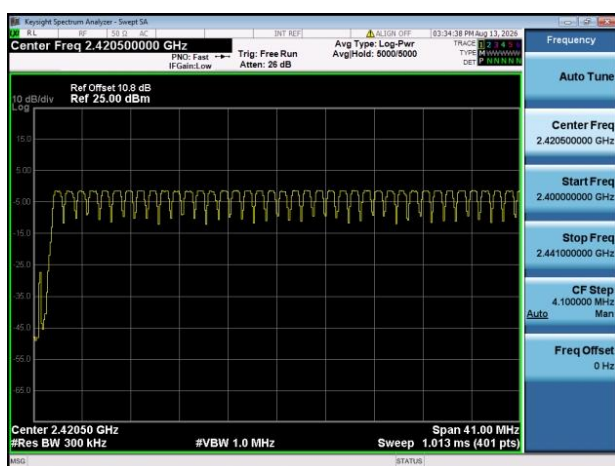
A.1 Number of Hopping Frequency

Test Data

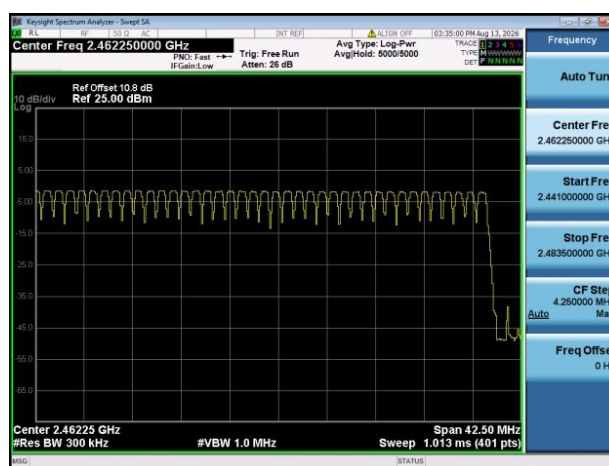
Test Mode	Frequency Block (MHz)	Measured Channel Numbers	Min. Limit	Verdict
GFSK	2400 - 2483.5	79	15	Pass

Test Plots

GFSK 2.4 GHz ~ 2.4415 GHz



GFSK 2.4415 GHz ~ 2.4835 GHz



A.2 Peak Output Power and E.I.R.P

Duty Cycle

Test Mode	On Time (ms)	On+Off Time (ms)	Duty Cycle	Duty Factor
GFSK	2.809	2.99	93.95%	0.27

Peak Power Test Data

Channel	Measured Output Peak Power		Limit		Verdict
	GFSK		dBm	mW	
	dBm	mW			
Low	-1.16	0.77	21	125	Pass
Middle	-0.90	0.81			Pass
High	-1.38	0.73			Pass

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

Channel	E.I.R.P		Limit		Verdict
	GFSK		dBm	mW	
	dBm	mW			
Low	0.50	1.12	36	4000	Pass
Middle	0.76	1.19			Pass
High	0.28	1.07			Pass

Test Plots

GFSK LOW CHANNEL



GFSK MIDDLE CHANNEL



GFSK HIGH CHANNEL



A.3 20 dB and 99% bandwidth

Test Data

GFSK		
Channel	20 dB Bandwidth (MHz)	99% Bandwidth (MHz)
Low	0.869900	0.857880
Middle	0.869900	0.864210
High	0.869900	0.863160

Test Plots

20 dB Bandwidth

GFSK LOW CHANNEL



GFSK MIDDLE CHANNEL



GFSK HIGH CHANNEL



99% Bandwidth

GFSK LOW CHANNEL



GFSK MIDDLE CHANNEL



GFSK HIGH CHANNEL



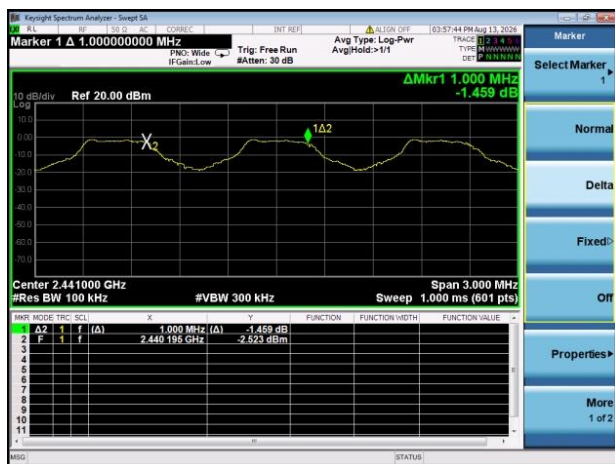
A.4 Hopping Frequency Separation

Test Data

Mode	Frequency separation (MHz)	2/3 of the 20 dB Bandwidth (MHz)	Verdict
GFSK	1.000	0.580	Pass

Test Plots

GFSK



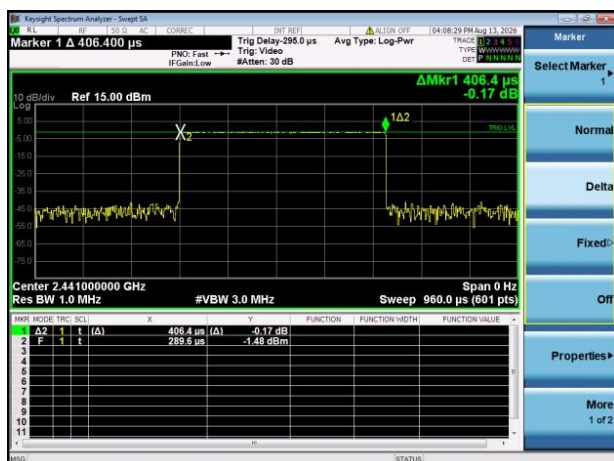
A.5 Average Time of Occupancy

Test Data

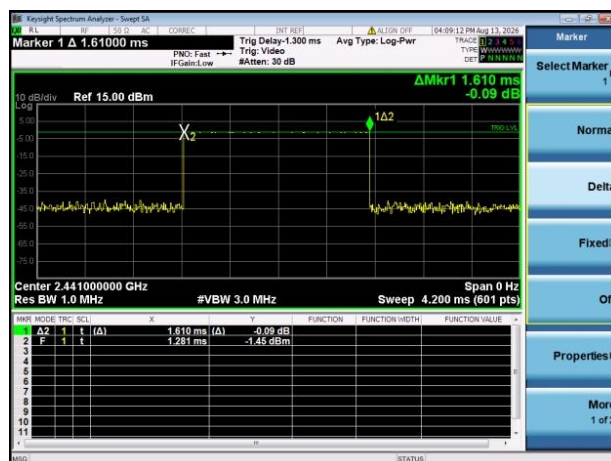
GFSK				
DH Packet	Pulse Width (ms)	Total of Dwell (ms)	Limit (sec)	Verdict
DH 1	0.40640	130.048	0.4	Pass
DH 3	1.61000	257.600	0.4	Pass
DH 5	2.80800	299.520	0.4	Pass
AFH Mode				
DH Packet	Pulse Width (ms)	Total of Dwell (ms)	Limit (sec)	Verdict
DH 1	0.40800	65.280	0.4	Pass
DH 3	1.61000	128.800	0.4	Pass
DH 5	2.80800	149.760	0.4	Pass

Test Plots

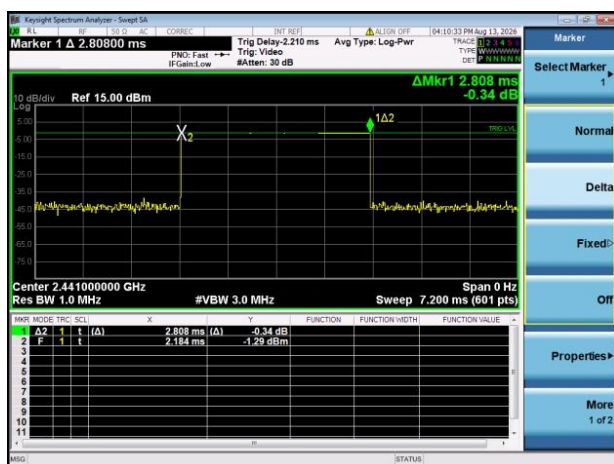
GFSK DH1



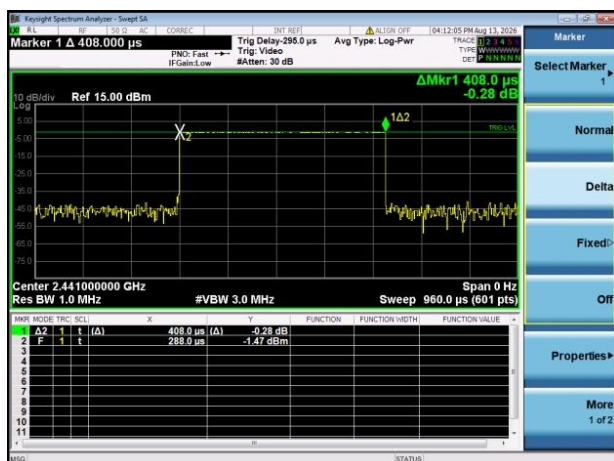
GFSK DH3



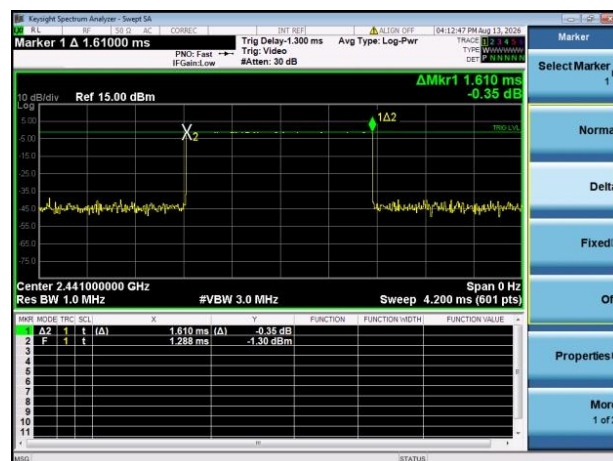
GFSK DH5



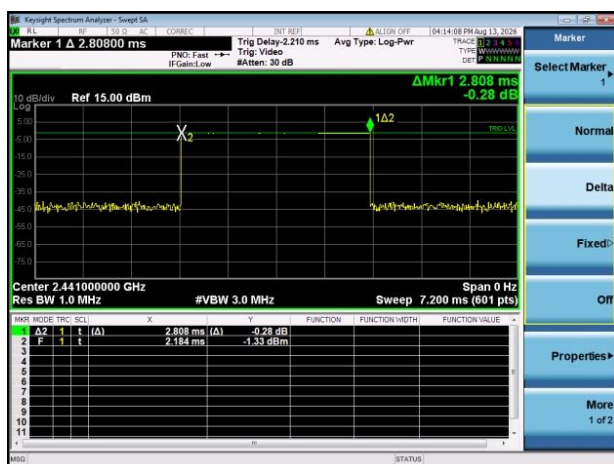
AFH Mode DH1



AFH Mode DH3



AFH Mode DH5



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

Test Data

GFSK				
Channel	Measured Max. Out of Band Emission (dBm)	Limit (dBm)		Verdict
		Carrier Level	Calculated 20 dBc Limit	
Low	-33.80	-1.67	-21.67	Pass
Middle	-34.69	-1.55	-21.55	Pass
High	-34.39	-2.05	-22.05	Pass

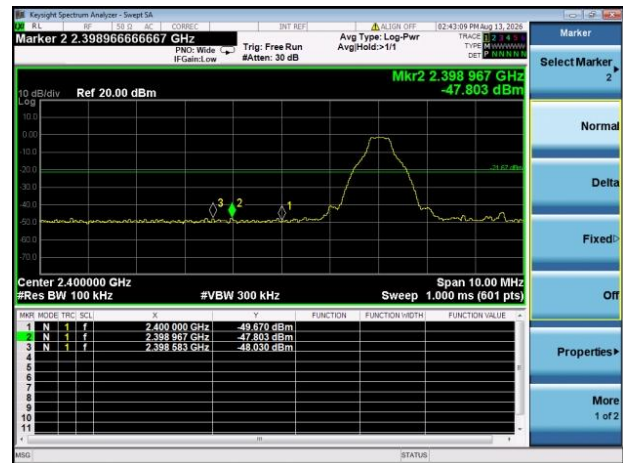
Hopping Mode				
Mode	Measured Max. Out of Band Emission (dBm)	Limit (dBm)		Verdict
		Carrier Level	Calculated 20 dBc Limit	
GFSK	-34.65	-1.40	-21.40	Pass

Test Plots

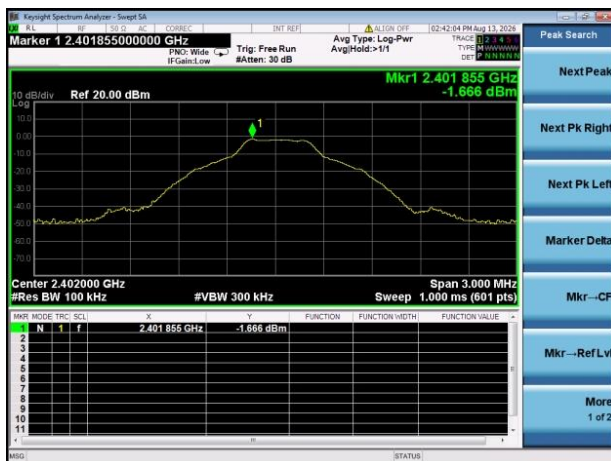
GFSK LOW CHANNEL, CARRIER LEVEL



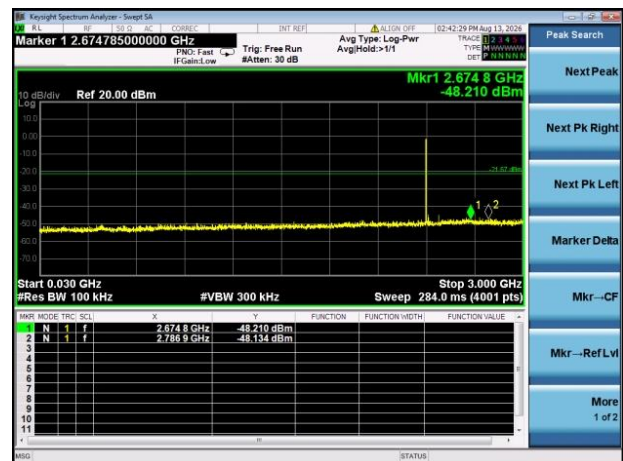
GFSK LOW CHANNEL, BAND EDGE



GFSK LOW CHANNEL, SPURIOUS 30 MHz ~ 3 GHz



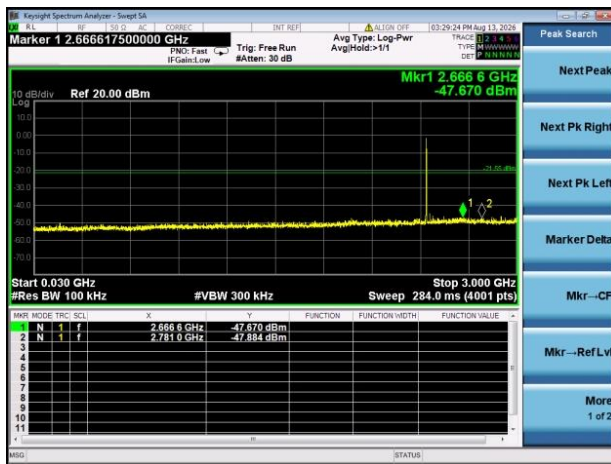
GFSK LOW CHANNEL, SPURIOUS 3 GHz ~ 25 GHz



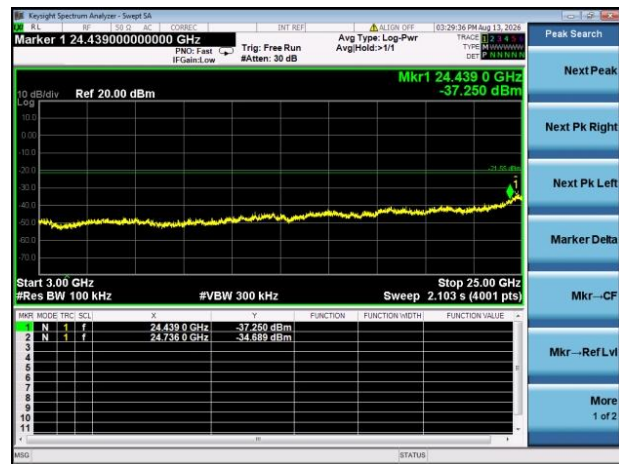
GFSK MIDDLE CHANNEL, CARRIER LEVEL



GFSK MIDDLE CHANNEL, SPURIOUS 30 MHz ~ 3 GHz



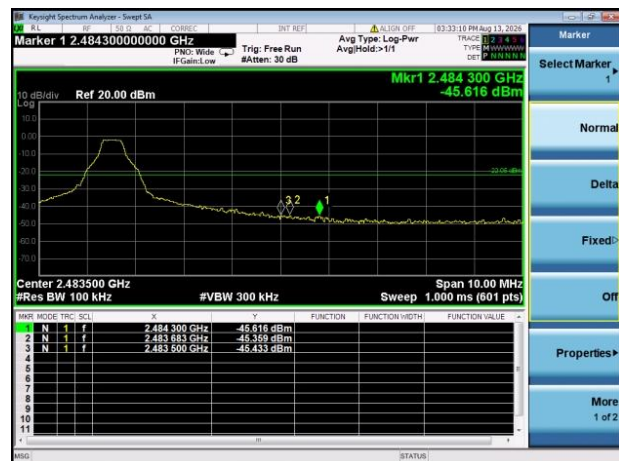
GFSK MIDDLE CHANNEL, SPURIOUS 3 GHz ~ 25 GHz



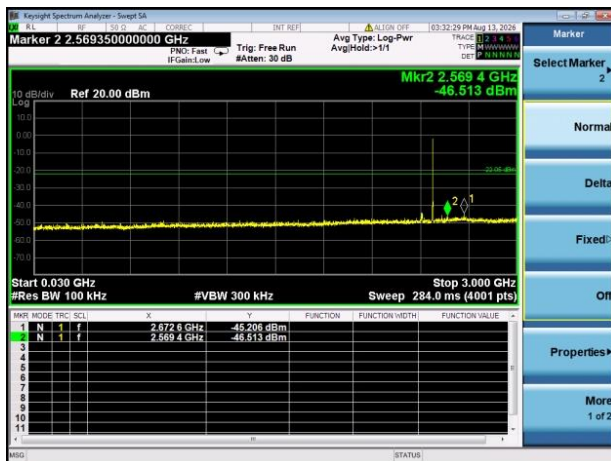
GFSK HIGH CHANNEL, CARRIER LEVEL



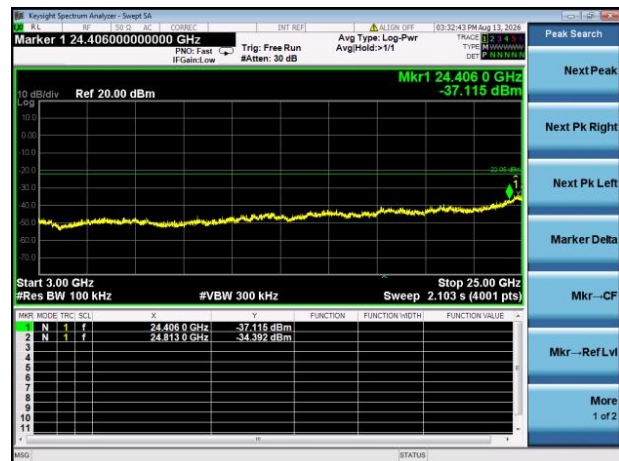
GFSK HIGH CHANNEL, BAND EDGE



GFSK HIGH CHANNEL, SPURIOUS 30 MHz ~ 3 GHz



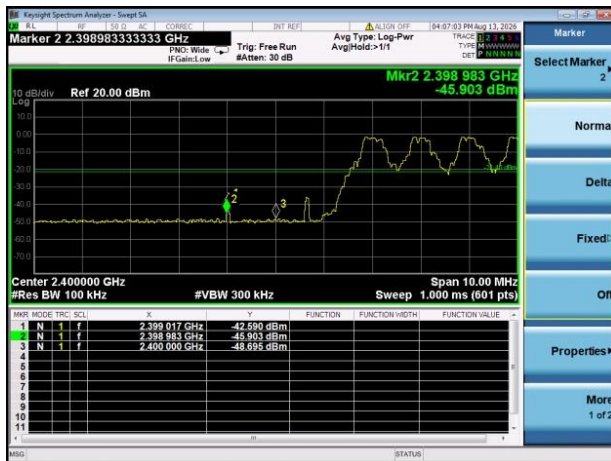
GFSK HIGH CHANNEL, SPURIOUS 3 GHz ~ 25 GHz



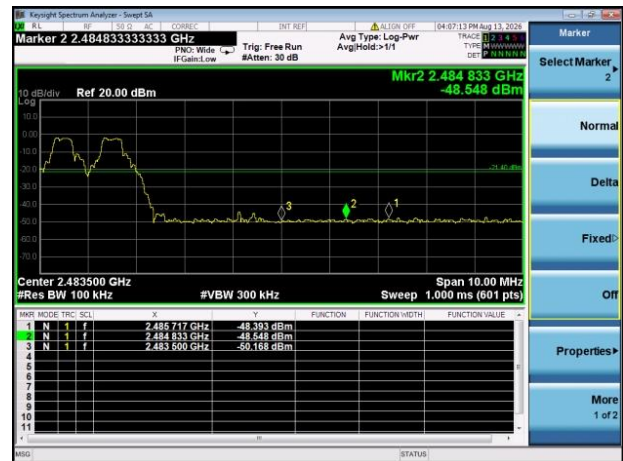
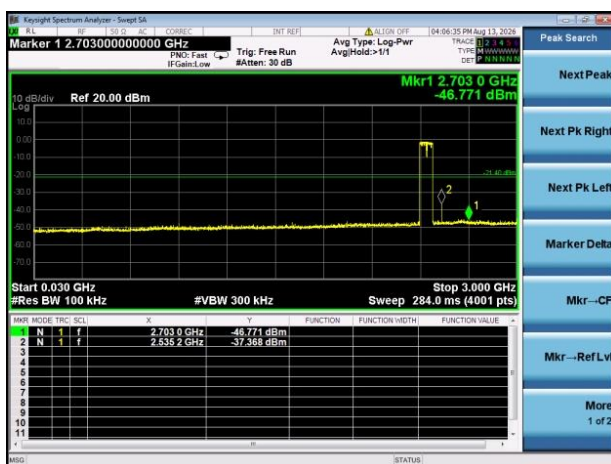
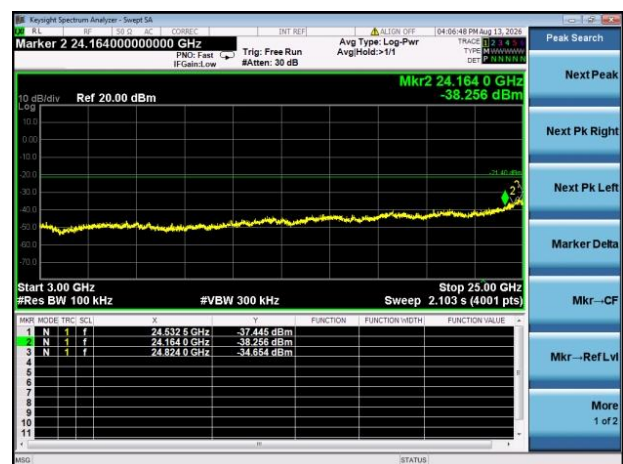
GFSK HOPPING, CARRIER LEVEL



GFSK HOPPING BAND EDGE (LOW)



GFSK HOPPING BAND EDGE (HIGH)

GFSK Hopping Mode, SPURIOUS
30 MHz ~ 3 GHzGFSK Hopping Mode, SPURIOUS
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.

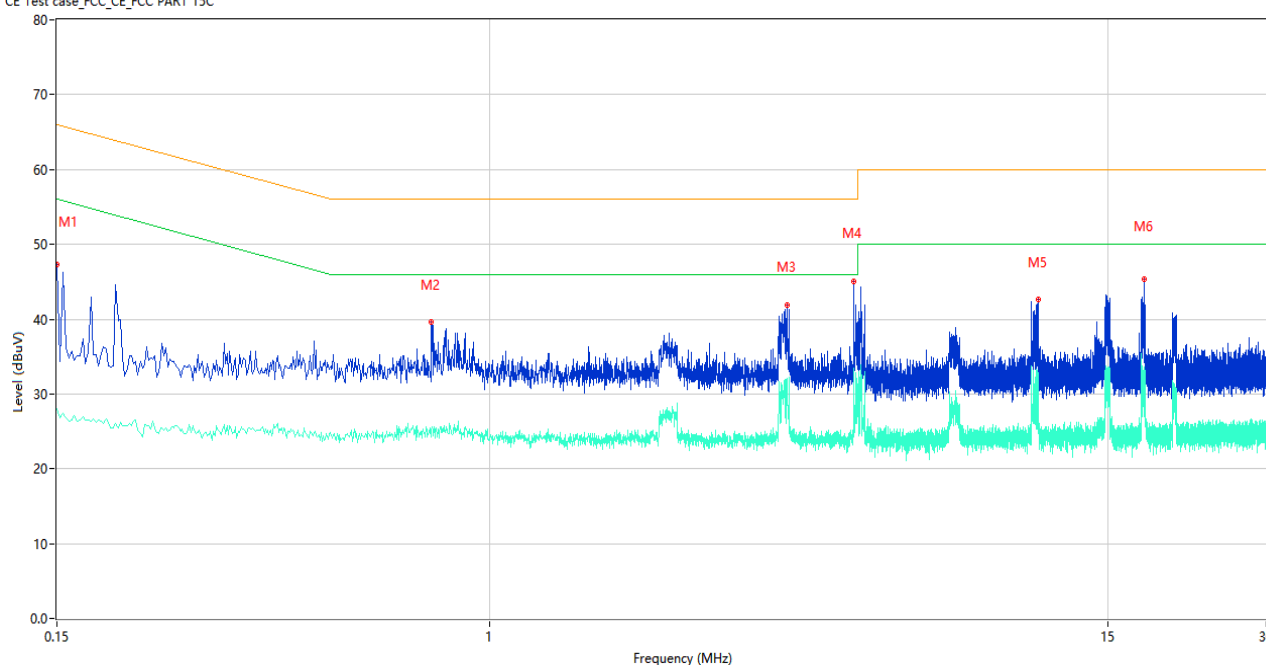
Note ²: Devices subject to Part 15 must be tested for all available U.S. voltages and frequencies (such as a nominal 120 VAC, 60 Hz and 240 VAC, 50 Hz) for which the device is capable of operation. So, The configuration 120 VAC, 60 Hz and 240 VAC, 50 Hz were tested respectively, but only the worst configuration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

CE Test case_FCC_CE_FCC PART 15C

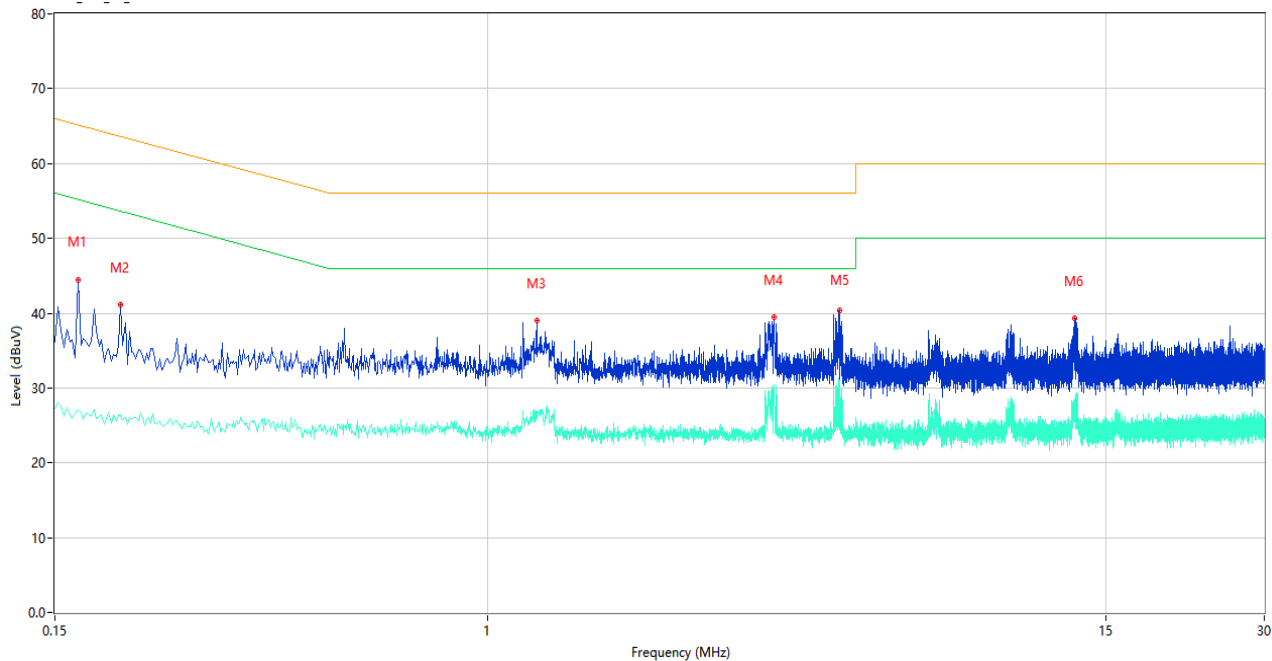


No.	Frequency (MHz)	Results (dBuV)	Factor (dB)	Limit (dBuV)	Over Limit (dB)	Detector	Line	Verdict
1	0.150	47.30	9.74	66.00	18.70	Peak	L	Pass
1**	0.150	27.97	9.74	56.00	28.03	AV	L	Pass
2	0.774	39.62	10.33	56.00	16.38	Peak	L	Pass
2**	0.774	25.03	10.33	46.00	20.97	AV	L	Pass
3	3.676	41.95	10.28	56.00	14.05	Peak	L	Pass
3**	3.676	31.23	10.28	46.00	14.77	AV	L	Pass
4	4.924	45.08	10.18	56.00	10.92	Peak	L	Pass
4**	4.924	33.49	10.18	46.00	12.51	AV	L	Pass
5	11.068	42.64	10.52	60.00	17.36	Peak	L	Pass
5**	11.068	32.71	10.52	50.00	17.29	AV	L	Pass
6	17.550	45.42	10.52	60.00	14.58	Peak	L	Pass

6**	17.550	29.45	10.52	50.00	20.55	AV	L	Pass
-----	--------	-------	-------	-------	-------	----	---	------

PHASE N

CE Test case_FCC_CE_FCC PART 15C



No.	Frequency (MHz)	Results (dBuV)	Factor (dB)	Limit (dBuV)	Over Limit (dB)	Detector	Line	Verdict
1	0.166	44.49	9.74	65.16	20.67	Peak	N	Pass
1**	0.166	27.19	9.74	55.16	27.97	AV	N	Pass
2	0.200	41.10	9.74	63.61	22.51	Peak	N	Pass
2**	0.200	26.32	9.74	53.61	27.29	AV	N	Pass
3	1.238	38.99	10.30	56.00	17.01	Peak	N	Pass
3**	1.238	25.91	10.30	46.00	20.09	AV	N	Pass
4	3.498	39.49	10.05	56.00	16.51	Peak	N	Pass
4**	3.498	29.07	10.05	46.00	16.93	AV	N	Pass
5	4.674	40.40	10.13	56.00	15.60	Peak	N	Pass
5**	4.674	31.05	10.13	46.00	14.95	AV	N	Pass
6	13.078	39.34	10.29	60.00	20.66	Peak	N	Pass
6**	13.078	28.52	10.29	50.00	21.48	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 C63.10-2020 + Cor. 1-2023 + C63.10a-2024 + Errata to C63.10a-2024, 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 EUT is working in the Normal link mode below 1 GHz. All modes have been tested and DH5-Hopping mode is the worst.

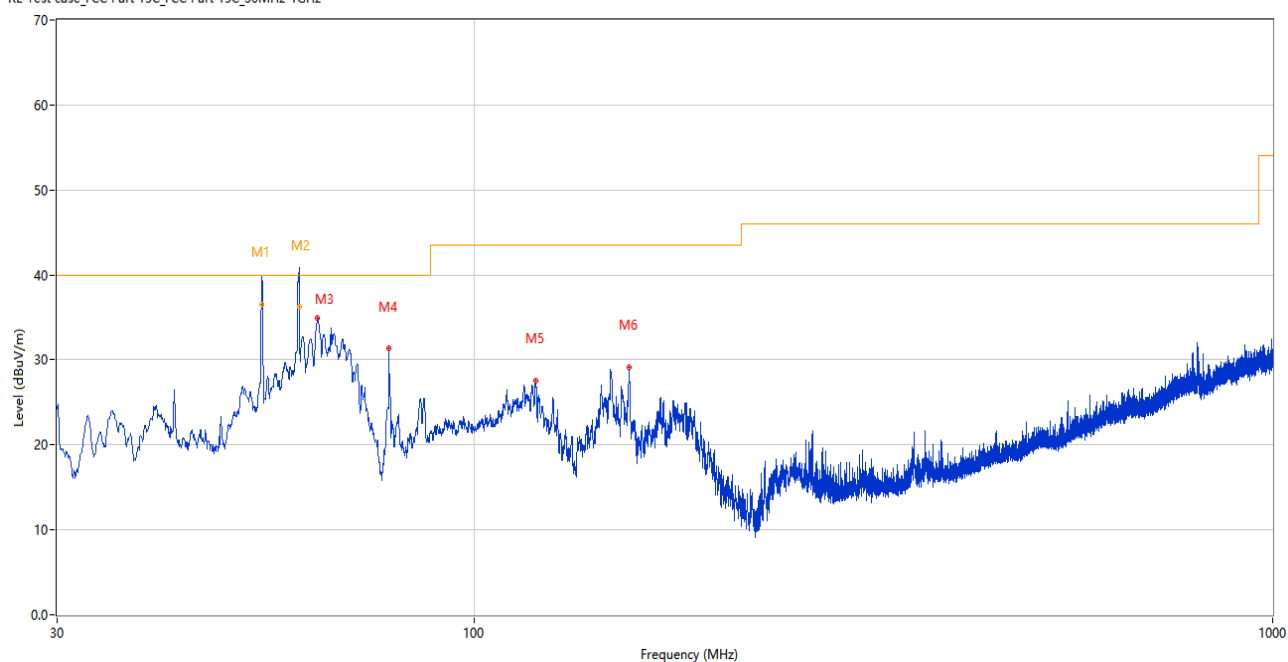
Note ⁴: Results (dBuV/m) = Original reading level of Spectrum Analyzer (dBuV/m) + Factor (dB)

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

30 MHz to 1 GHz, ANT H

RE Test case_FCC Part 15C_FCC Part 15C_30MHz-1GHz

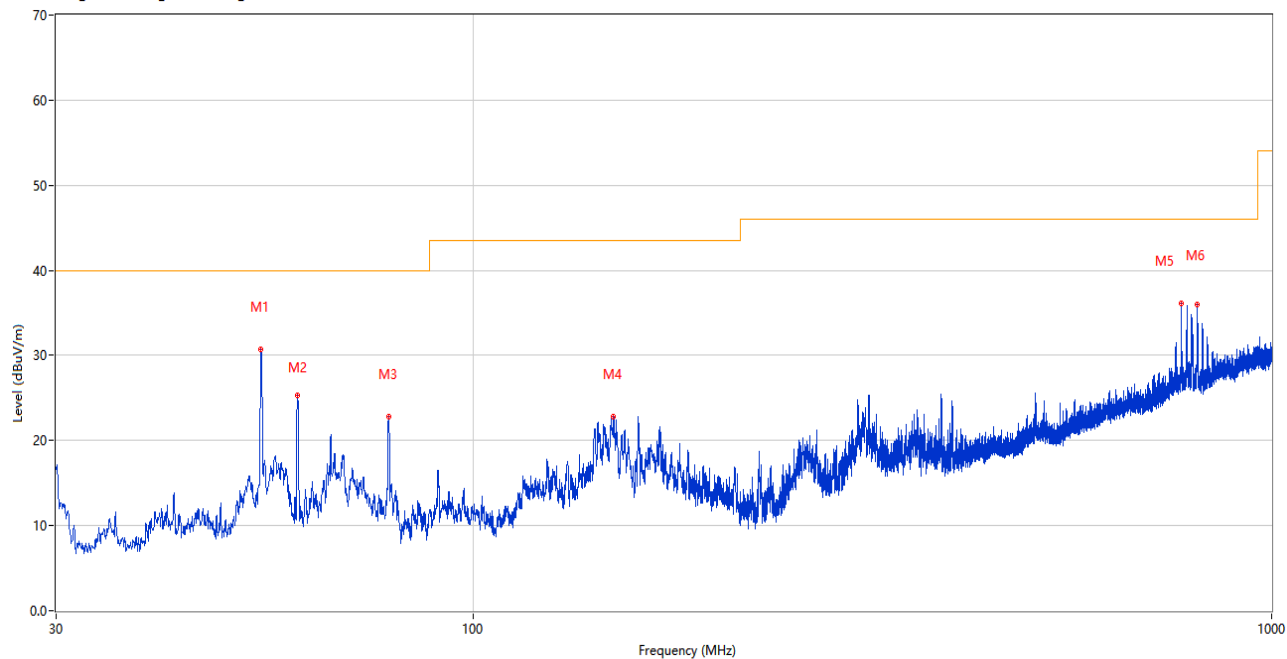


No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Over Limit (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	54.202	38.77	-29.64	40.0	1.23	Peak	244.00	100	Vertical	N/A
1*	54.202	36.57	-29.64	40.0	3.43	QP	244.00	100	Vertical	Pass
2	60.267	40.86	-29.14	40.0	-0.86	Peak	64.10	100	Vertical	N/A
2*	60.267	36.20	-29.14	40.0	3.80	QP	64.10	100	Vertical	Pass
3	63.611	34.87	-29.53	40.0	5.13	Peak	57.10	100	Vertical	Pass
4	78.160	31.32	-32.43	40.0	8.68	Peak	156.50	100	Vertical	Pass
5	119.288	27.54	-30.28	43.5	15.96	Peak	271.90	100	Vertical	Pass

6	156.342	29.15	-27.25	43.5	14.35	Peak	55.40	100	Vertical	Pass
---	---------	-------	--------	------	-------	------	-------	-----	----------	------

30 MHz to 1 GHz, ANT V

RE Test case_FCC Part 15C_FCC Part 15C_30MHz-1GHz



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Over Limit (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	54.153	30.68	-29.65	40.0	9.32	Peak	299.00	100	Horizontal	Pass
2	60.167	25.28	-29.13	40.0	14.72	Peak	295.70	200	Horizontal	Pass
3	78.306	22.78	-32.47	40.0	17.22	Peak	0.10	200	Horizontal	Pass
4	149.844	22.84	-27.44	43.5	20.66	Peak	88.20	200	Horizontal	Pass
5	771.031	36.07	-12.04	46.0	9.93	Peak	200.10	100	Horizontal	Pass
6	805.951	36.04	-11.65	46.0	9.96	Peak	201.80	100	Horizontal	Pass

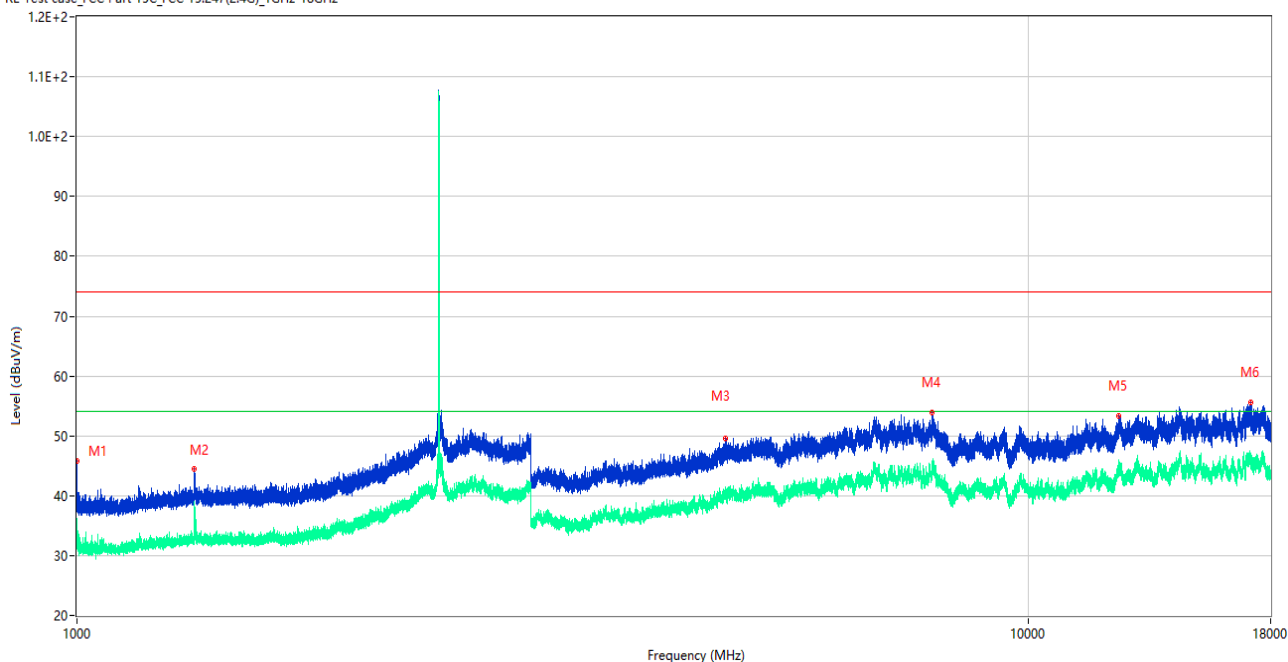
Note¹: The marked spikes near 2400 MHz with circle should be ignored because they are Fundamental signal.

Note²: The spurious from 18GHz-25GHz is noise only, do not show on the report.

Note³: The RSE Plot only shows the worst-case scenario, while all other data are presented in tabular form.

FSK LOW CHANNEL 1 GHz to 18 GHz, ANT H

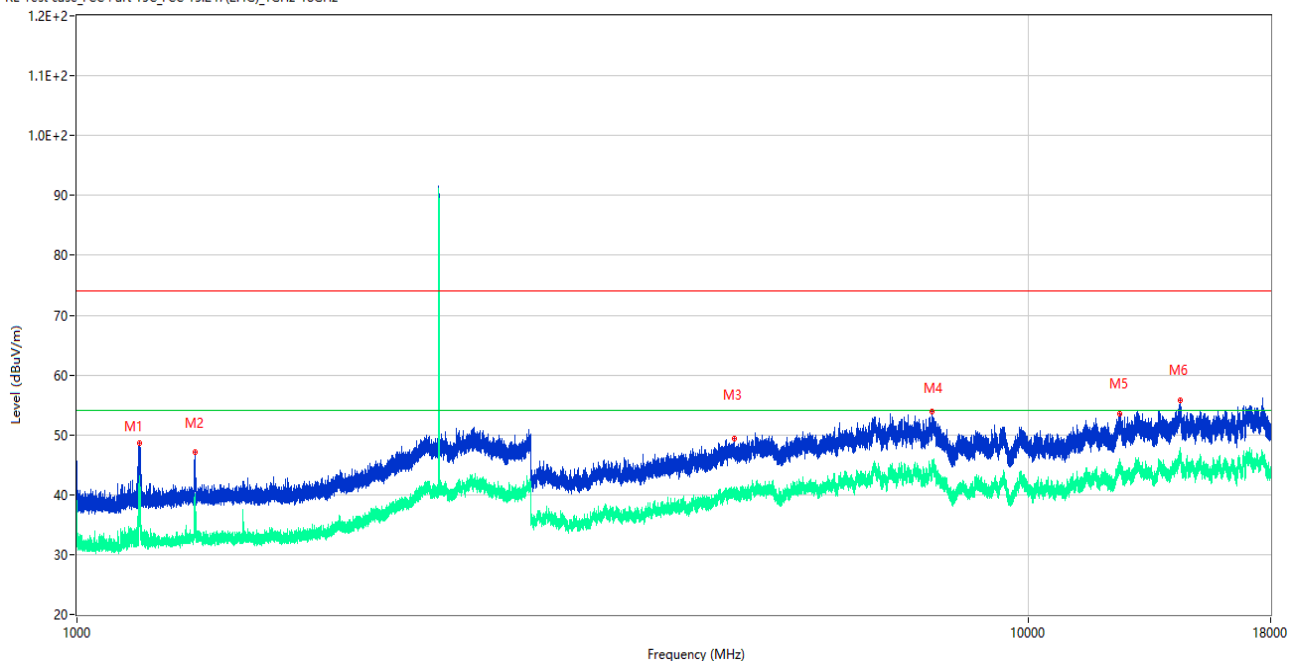
RE Test case_FCC Part 15C_FCC 15.247(2.4G)_1GHz-18GHz



No.	Frequency (MHz)	Results (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	998.242	45.91	74.0	28.09	Peak	263.00	100	Horizontal	Pass
1**	998.242	32.24	54.0	21.76	AV	263.00	100	Horizontal	Pass
2	1327.420	44.66	74.0	29.34	Peak	157.00	100	Horizontal	Pass
2**	1327.420	34.70	54.0	19.31	AV	157.00	100	Horizontal	Pass
3	4800.887	49.65	74.0	24.35	Peak	117.00	200	Horizontal	Pass
3**	4800.887	40.72	54.0	13.28	AV	117.00	200	Horizontal	Pass
4	7937.397	53.94	74.0	20.07	Peak	176.00	400	Horizontal	Pass
4**	7937.397	45.58	54.0	8.42	AV	176.00	400	Horizontal	Pass
5	12448.195	53.62	74.0	20.38	Peak	36.00	100	Horizontal	Pass
5**	12448.195	44.65	54.0	9.35	AV	36.00	100	Horizontal	Pass
6	17145.416	55.68	74.0	18.32	Peak	221.00	300	Horizontal	Pass
6**	17145.416	45.77	54.0	8.23	AV	221.00	300	Horizontal	Pass

GFSK LOW CHANNEL 1 GHz to 18 GHz, ANT V

RE Test case_FCC Part 15C_FCC 15.247(2.4G)_1GHz-18GHz



No.	Frequency (MHz)	Results (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	1164.525	48.87	74.0	25.13	Peak	141.00	200	Vertical	Pass
1**	1164.525	35.12	54.0	18.88	AV	141.00	200	Vertical	Pass
2	1330.601	47.94	74.0	26.06	Peak	157.00	400	Vertical	Pass
2**	1330.601	38.46	54.0	15.54	AV	157.00	400	Vertical	Pass
3	4916.341	50.41	74.0	23.59	Peak	0.00	200	Vertical	Pass
3**	4916.341	41.68	54.0	12.32	AV	0.00	200	Vertical	Pass
4	7935.139	52.82	74.0	21.18	Peak	89.00	100	Vertical	Pass
4**	7935.139	44.14	54.0	9.86	AV	89.00	100	Vertical	Pass
5	12501.257	52.39	74.0	21.61	Peak	10.00	100	Vertical	Pass
5**	12501.257	45.84	54.0	8.16	AV	10.00	100	Vertical	Pass
6	14441.495	58.22	74.0	15.78	Peak	263.00	400	Vertical	Pass
6**	14441.495	45.18	54.0	8.82	AV	263.00	400	Vertical	Pass

GFSK MIDDLE CHANNEL 1 GHz to 18 GHz, ANT H

No.	Frequency (MHz)	Results (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	997.972	45.30	74.0	28.70	Peak	182.00	200	Horizontal	Pass
1**	997.972	31.68	54.0	22.32	AV	182.00	200	Horizontal	Pass
2	1325.195	44.42	74.0	29.58	Peak	360.00	200	Horizontal	Pass
2**	1325.195	34.42	54.0	19.59	AV	360.00	200	Horizontal	Pass
3	4804.727	48.65	74.0	25.35	Peak	67.00	200	Horizontal	Pass
3**	4804.727	40.47	54.0	13.53	AV	67.00	200	Horizontal	Pass
4	7938.210	53.23	74.0	20.78	Peak	264.00	200	Horizontal	Pass
4**	7938.210	44.66	54.0	9.34	AV	264.00	200	Horizontal	Pass
5	12448.073	52.97	74.0	21.03	Peak	21.00	300	Horizontal	Pass
5**	12448.073	44.37	54.0	9.63	AV	21.00	300	Horizontal	Pass
6	17143.540	55.38	74.0	18.62	Peak	199.00	200	Horizontal	Pass
6**	17143.540	45.51	54.0	8.49	AV	199.00	200	Horizontal	Pass

GFSK MIDDLE CHANNEL 1 GHz to 18 GHz, ANT V

No.	Frequency (MHz)	Results (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	1161.903	48.47	74.0	25.53	Peak	295.00	200	Vertical	Pass
1**	1161.903	34.78	54.0	19.22	AV	295.00	200	Vertical	Pass
2	1332.051	47.60	74.0	26.40	Peak	106.00	100	Vertical	Pass
2**	1332.051	37.78	54.0	16.22	AV	106.00	100	Vertical	Pass
3	4914.298	50.31	74.0	23.69	Peak	129.00	200	Vertical	Pass
3**	4914.298	41.57	54.0	12.43	AV	129.00	200	Vertical	Pass
4	7933.691	52.66	74.0	21.34	Peak	110.00	400	Vertical	Pass
4**	7933.691	43.40	54.0	10.60	AV	110.00	400	Vertical	Pass
5	12500.639	52.28	74.0	21.72	Peak	67.00	300	Vertical	Pass
5**	12500.639	44.84	54.0	9.16	AV	67.00	300	Vertical	Pass
6	14444.682	57.44	74.0	16.56	Peak	236.00	200	Vertical	Pass
6**	14444.682	44.32	54.0	9.68	AV	236.00	200	Vertical	Pass

GFSK HIGH CHANNEL 1 GHz to 18 GHz, ANT H

No.	Frequency (MHz)	Results (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	1001.453	45.06	74.0	28.94	Peak	330.00	400	Horizontal	Pass
1**	1001.453	31.50	54.0	22.50	AV	330.00	400	Horizontal	Pass
2	1328.655	44.10	74.0	29.90	Peak	61.00	100	Horizontal	Pass
2**	1328.655	34.30	54.0	19.71	AV	61.00	100	Horizontal	Pass
3	4800.147	48.73	74.0	25.27	Peak	214.00	200	Horizontal	Pass
3**	4800.147	39.85	54.0	14.15	AV	214.00	200	Horizontal	Pass
4	7938.955	53.34	74.0	20.67	Peak	258.00	200	Horizontal	Pass
4**	7938.955	45.22	54.0	8.78	AV	258.00	200	Horizontal	Pass
5	12448.655	52.64	74.0	21.36	Peak	136.00	300	Horizontal	Pass
5**	12448.655	44.10	54.0	9.90	AV	136.00	300	Horizontal	Pass
6	17145.814	55.40	74.0	18.60	Peak	55.00	400	Horizontal	Pass
6**	17145.814	45.19	54.0	8.81	AV	55.00	400	Horizontal	Pass

GFSK HIGH CHANNEL 1 GHz to 18 GHz, ANT V

No.	Frequency (MHz)	Results (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	1160.481	48.17	74.0	25.83	Peak	297.00	300	Vertical	Pass
1**	1160.481	34.47	54.0	19.53	AV	297.00	300	Vertical	Pass
2	1329.640	47.85	74.0	26.15	Peak	27.00	300	Vertical	Pass
2**	1329.640	38.30	54.0	15.70	AV	27.00	300	Vertical	Pass
3	4910.913	49.72	74.0	24.28	Peak	304.00	200	Vertical	Pass
3**	4910.913	41.20	54.0	12.80	AV	304.00	200	Vertical	Pass
4	7931.530	52.61	74.0	21.39	Peak	274.00	400	Vertical	Pass
4**	7931.530	43.36	54.0	10.64	AV	274.00	400	Vertical	Pass
5	12506.643	51.52	74.0	22.48	Peak	134.00	200	Vertical	Pass
5**	12506.643	45.70	54.0	8.30	AV	134.00	200	Vertical	Pass
6	14443.210	58.16	74.0	15.84	Peak	152.00	300	Vertical	Pass
6**	14443.210	44.49	54.0	9.51	AV	152.00	300	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 C63.10-2020 + Cor. 1-2023 + C63.10a-2024 + Errata to C63.10a-2024, 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.

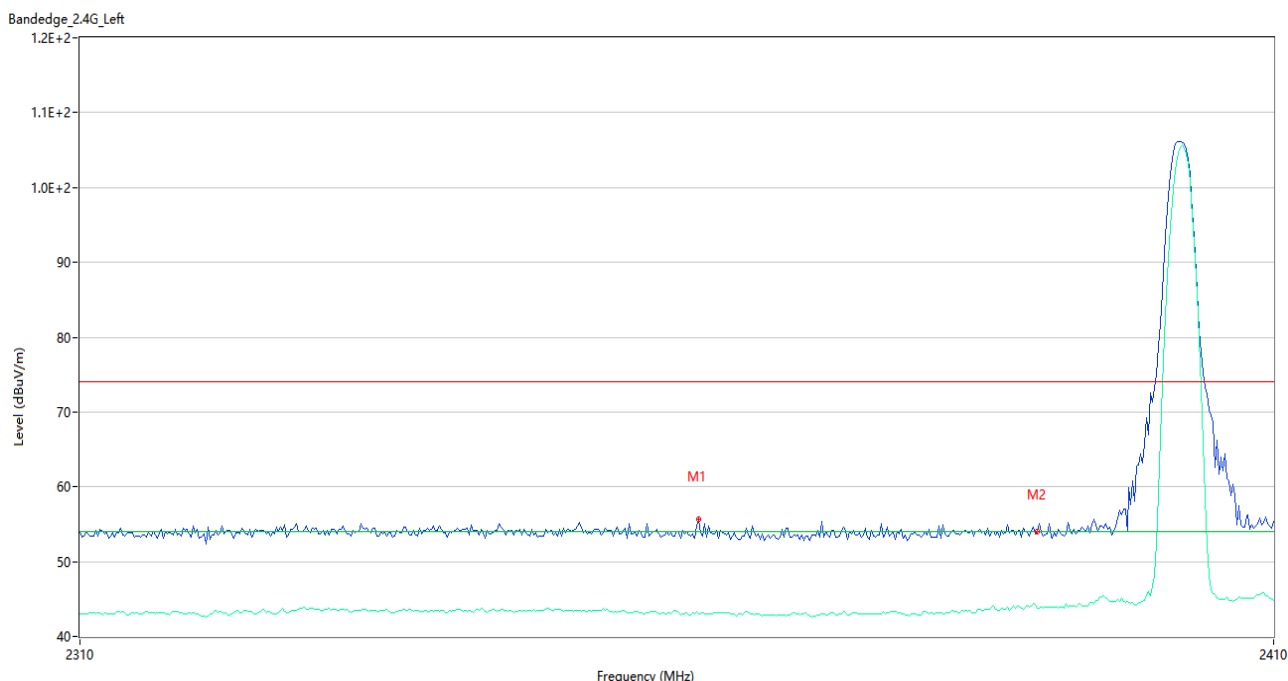
Note ⁴: The Level (dBuV/m) has been corrected by factor.

Note ⁵: Both horizontal and vertical directions were pre tested, only the worst configuration has been reported in this report.

Note ⁶: The RSE Plot only shows the worst-case scenario, while all other data are presented in tabular form.

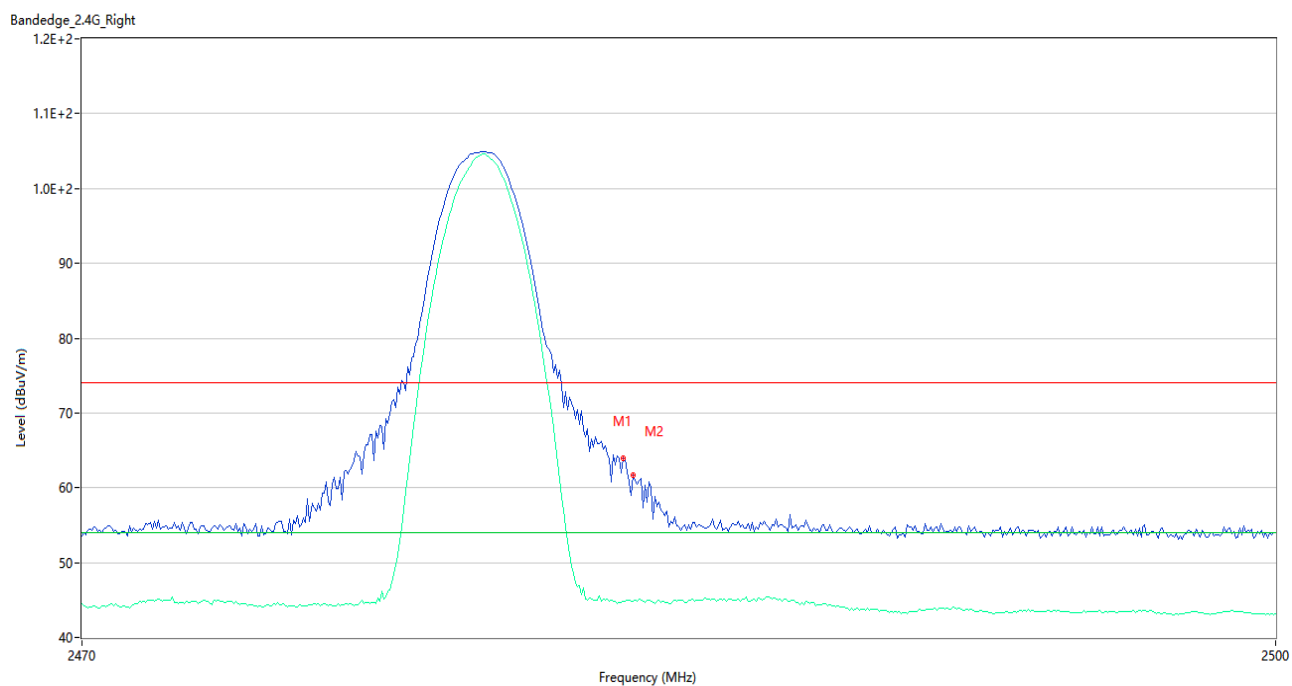
Test Data and Plots

GFSK LOW CHANNEL



No.	Frequency (MHz)	Results (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	2358.613	55.89	74.0	18.11	Peak	86.00	300	Horizontal	Pass
1**	2358.613	43.26	54.0	10.74	AV	86.00	300	Horizontal	Pass
2	2390.000	54.23	74.0	19.77	Peak	148.00	200	Horizontal	Pass
2**	2390.000	43.82	54.0	10.18	AV	148.00	200	Horizontal	Pass

GFSK HIGH CHANNEL



No.	Frequency (MHz)	Results (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	2483.500	64.13	74.0	9.87	Peak	107.00	100	Horizontal	Pass
1**	2483.500	45.11	54.0	8.89	AV	107.00	100	Horizontal	Pass
2	2485.416	61.82	74.0	12.18	Peak	340.00	300	Horizontal	Pass
2**	2485.416	44.91	54.0	9.10	AV	340.00	300	Horizontal	Pass

ANNEX B TEST SETUP PHOTOS

Please refer the document “Ti-EE26080323-AR.PDF”.

ANNEX C EUT EXTERNAL PHOTOS

Please refer the document “Ti-EE26080323-AW.PDF”.

ANNEX D EUT INTERNAL PHOTOS

Please refer the document “Ti-EE26080323-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--