



TEST REPORT

Applicant: Ugreen Group Limited
Address: URGEEN Building, Longcheng Industrial Park,
Longguanxi Road, Longhua, ShenZhen, China
Equipment Type: Portable Wireless Mouse
Model Name: UGREEN Air 3
Brand Name: **UGREEN**
FCC ID: 2AQI5-M520
Test Standard: 47 CFR Part 15 Subpart C
(refer to section 3.1)
Sample Arrival Date: Jul. 02, 2026
Test Date: Jul. 06, 2026 - Jul. 27, 2026
Date of Issue: Sep. 03, 2026

ISSUED BY:

Shenzhen BALUN Technology Co., Ltd.

**Tested by:** Julie Zhu**Checked by:** Li Ganming**Approved by:** Tolan Tu

(Testing Director)

Revision History

Version	Issue Date	Revisions
<u>Rev. 01</u>	<u>Sep. 03, 2026</u>	<u>Initial Issue</u>

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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.

2 PRODUCT INFORMATION

2.1 Applicant Information

Applicant	Ugreen Group Limited
Address	URGEEN Building, Longcheng Industrial Park, Longguanxi Road, Longhua, ShenZhen, China

2.2 Manufacturer Information

Manufacturer	Ugreen Group Limited
Address	URGEEN Building, Longcheng Industrial Park, Longguanxi Road, Longhua, ShenZhen, China

2.3 General Description for Equipment under Test (EUT)

EUT Name	Portable Wireless Mouse
Model Name Under Test	UGREEN Air 3
Series Model Name	N/A
Description of Model name differentiation	N/A
Hardware Version	V1.3
Software Version	V19
Dimensions (Approx.)	N/A
Weight (Approx.)	N/A

Remark:

- Product Number (P/N) code in the below table, for marketing purpose, will be marked on the marking plate.

95225	95225C	95225P	95225X	95225A	95225B	95225U	95225US
95225EU	95225JP	95225CN	95225KC	95225SG	KC-95225	95225AU	95225UK
26008	26008C	26008P	26008X	26008A	26008B	26008U	26008US
26008EU	26008JP	26008CN	26008KC	26008SG	KC-26008	26008AU	26008UK

2.4 Technical Information

Network and Wireless connectivity	Bluetooth (BLE) 2.4G ISM Band
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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	1 Mbps
Frequency Range	The frequency range used is 2402 MHz – 2480 MHz; The frequency block is 2400 MHz to 2483.5 MHz.
Number of Channel	40
Tested Channel	Low (2402 MHz), Middle (2440 MHz), High (2480 MHz)
Antenna Type	PCB Antenna
Antenna Gain	0.68 dBi
Adaptive or Non-Adaptive	Non-Adaptive
The Max RF Output power	1.57 dBm

Channel List

Channel number	Freq. (MHz)	Channel number	Freq. (MHz)	Channel number	Freq. (MHz)	Channel number	Freq. (MHz)
1	2402	11	2422	21	2442	31	2462
2	2404	12	2424	22	2444	32	2464
3	2406	13	2426	23	2446	33	2466
4	2408	14	2428	24	2448	34	2468
5	2410	15	2430	25	2450	35	2470
6	2412	16	2432	26	2452	36	2472
7	2414	17	2434	27	2454	37	2474
8	2416	18	2436	28	2456	38	2476
9	2418	19	2438	29	2458	39	2478
10	2420	20	2440	30	2460	40	2480

Note: The modulation is GFSK with FHSS, there are total 40 channels (frequency range is 2402-2480MHz, channel step is 2MHz, totally 40 channels), when this part works, it will choose 40 channels, each channel band width is 1MHz, if one channel is chosen, adjacent two channels cannot be chosen to make sure step of working channels is more than 1MHz. In this report, the equipment select the lowest, middle and highest channel from 40 channels, Which are 2402 MHz, 2440 MHz and 2480 MHz. The more information please refer to the manufacturer's instructions.

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.
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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	662x_FCC_Rev1.9		
Support Units (Software installation media)	Description	Manufacturer	Model
	Computer	DELL	25H2
Mode	Channel	Frequency (MHz)	Soft Set
GFSK	1	2402	2.00
	20	2440	
	40	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	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
3	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 Verdict

No.	Description	FCC Part No.	Test Result	Verdict
1	Antenna Requirement	15.203	--	Pass ^{Note}
2	Number of Hopping Frequency	15.247(a)	5.2.4	Pass
3	Peak Output Power	15.247(b)	5.3.4	Pass
4	Occupied Bandwidth	15.247(a)	5.4.4	Pass
5	Hopping Frequency Separation	15.247(a)	5.5.4	Pass
6	Time of Occupancy (Dwell time)	15.247(a)	5.6.4	Pass
7	Conducted Spurious Emission& Authorized-band band-edge	15.247(d)	5.7.4	Pass
8	Conducted Emission	15.207	5.8.4	Pass
9	Radiated Spurious Emission	15.209 15.247(d)	5.9.4	Pass
10	Band Edge (Restricted-band band-edge)	15.209 15.247(d)	5.10.4	Pass

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

4 GENERAL TEST CONFIGURATIONS

4.1 Test Environments

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

Relative Humidity	47% to 68%	
Atmospheric Pressure	100 kPa to 102 kPa	
Temperature	NT (Normal Temperature)	+20.8℃ to +26.3℃
Working Voltage of the EUT	NV (Normal Voltage)	3.7 V

4.2 Test Equipment List

Description	Manufacturer	Model	Serial No.	Cal. Date	Cal. Due
Spectrum Analyzer	KEYSIGHT	N9020A	MY54420186	2026.05.11	2027.05.10
Power meter	R&S	NRP8S	101498	2026.06.23	2027.06.22
Spectrum Analyzer	KEYSIGHT	N9020A	MY56060127	2025.12.25	2026.12.24
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	2026.05.12	2028.05.11
Anechoic Chamber	YIHENG	C8-966	107	2024.05.12	2027.05.11
EMI Receiver	Keysight	N9038A	MY55330121	2025.12.26	2026.12.25
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	2025.12.26	2026.12.25
LISN	SCHWARZBECK MESS- ELEKTRONIK	NSLK8127	01009	2026.06.22	2027.06.21
Shielded Enclosure	YiHeng Electronic Co., Ltd	4.3m*2.9m*2.4 m	235	2024.11.05	2027.11.04

Description	Manufacturer	Model	Parameter
Power Adapter	JIN XIN YU POWER (SHENGZHEN) SUPPLY CO., LTD	XVE073-4200150	100-240V/AC 50/60Hz 1.5A MAX

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	V19.8.28.435	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

4.4.1 For Antenna Port Test

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

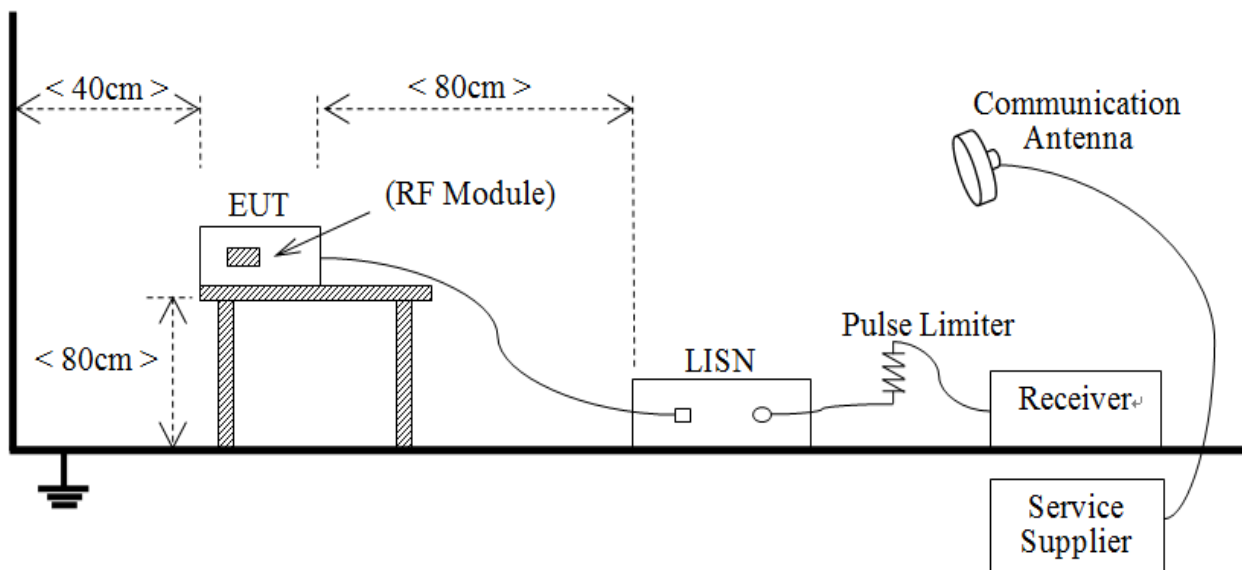
For example: the measurement value is 10 dBm and the cable 0.5dBm used, then the final result of EUT:

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



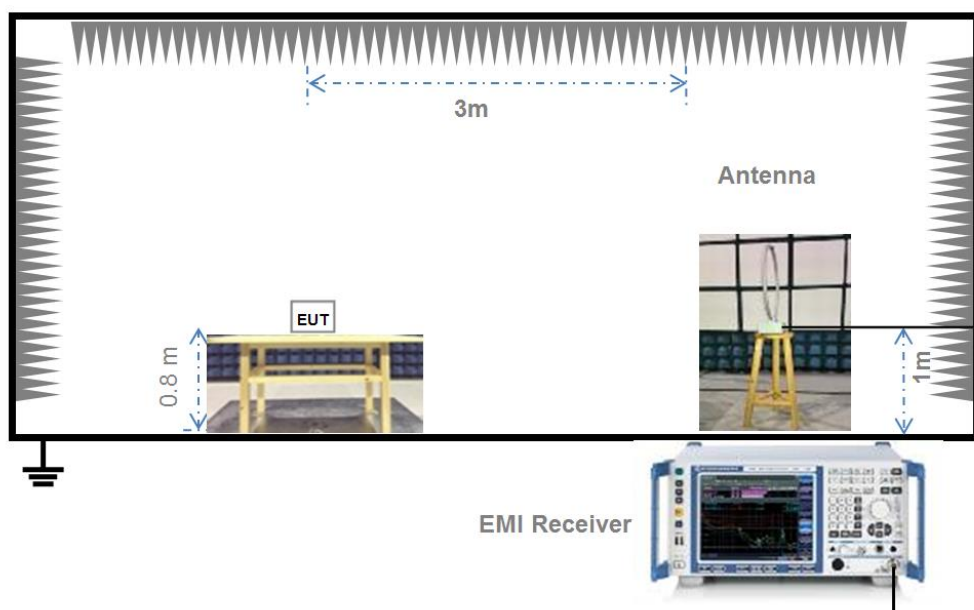
(Diagram 1)

4.4.2 For AC Power Supply Port Test



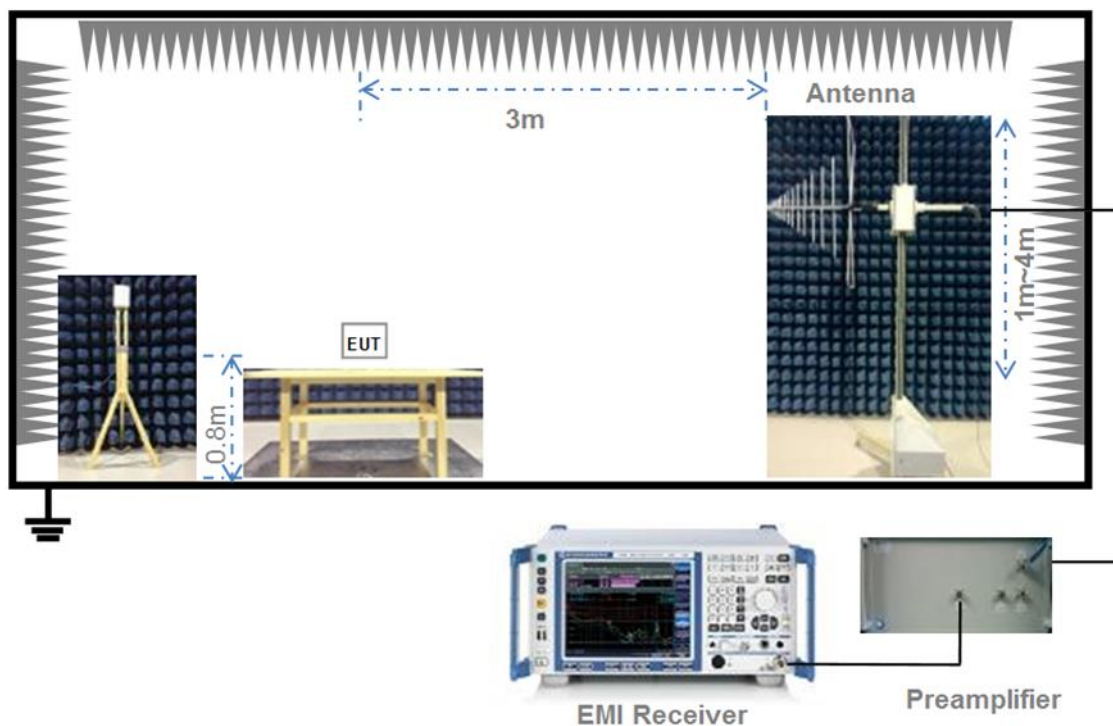
(Diagram 2)

4.4.3 For Radiated Test (Below 30 MHz)



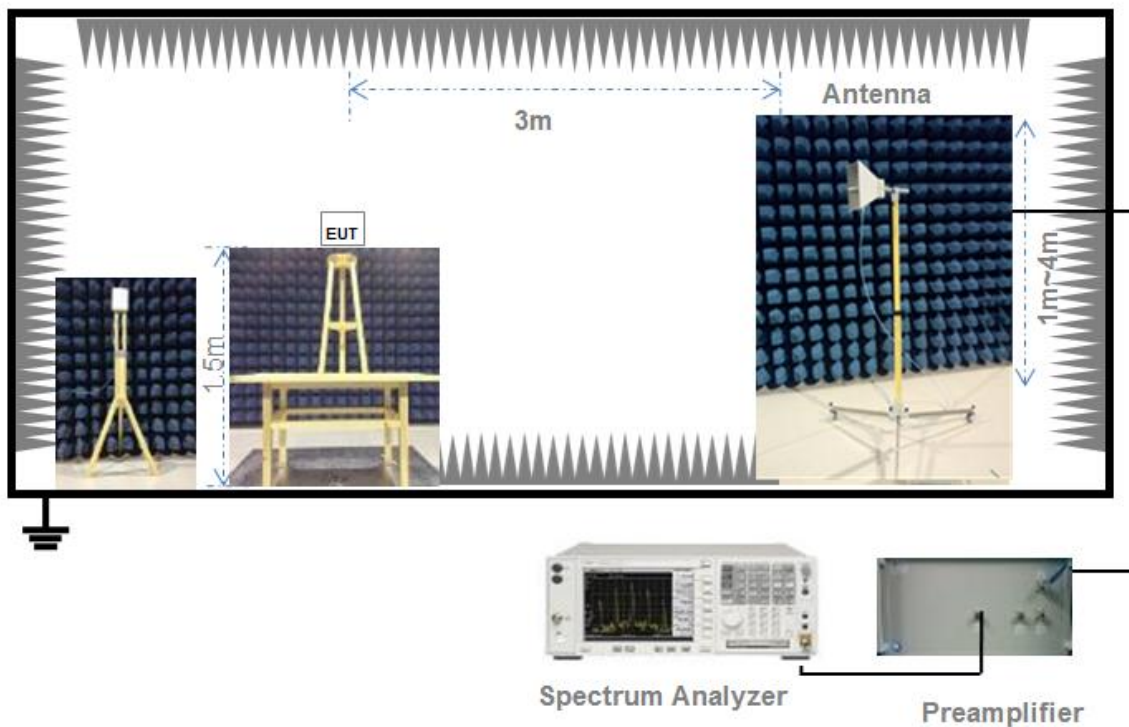
(Diagram 3)

4.4.4 For Radiated Test (30 MHz-1 GHz)



(Diagram 4)

4.4.5 For Radiated Test (Above 1 GHz)



(Diagram 5)

4.6 Measurement Results Explanation Example

4.5.1 For conducted test items:

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

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

Offset = RF cable loss + attenuator factor.

4.5.2 For radiated band edges and spurious emission test:

Per part 15.35(c), the EUT Bluetooth average emission level could be determined by the peak emission level applying duty cycle correction factor, to represent averaging over the whole pulse train.

The average level is derived from the peak level corrected with "Duty cycle correction factor".

Average Emission Level (dBuV/m) = Peak Emission Level (dBuV/m) + Duty cycle correction factor (dB)

Duty cycle correction factor (dB) = $20 * \log (\text{Duty cycle})$.

Duty cycle = on time / 100 milliseconds

On time = dwell time * hopping number in 100 ms

For example: bluetooth with dwell time 2.9 ms and 3 hops in 100 ms, then

Duty cycle correction factor (dB) = $20 * \log ((2.9 * 3) / 100) = -21.21 \text{ dB}$

Following shows an average computation example with duty cycle correction factor = -21.21 dB, and the peak emission level is 45.61 dBuV/m.

Example:

Average Emission Level (dBuV/m) = Peak Emission Level (dBuV/m) + duty cycle correction factor (dB)
= $45.61 + (-21.21) = 24.4 \text{ (dBuV/m)}$

5 TEST ITEMS

5.1 Antenna Requirements

5.1.1 Relevant Standards

FCC §15.203 & 15.247(b)

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

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

5.1.2 Antenna Anti-Replacement Construction

The Antenna Anti-Replacement as following method:

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

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

5.1.3 Antenna Gain

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

5.2 Number of Hopping Frequency

5.2.1 Limit

FCC §15.247(a) (1) (iii)

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

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 A.

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

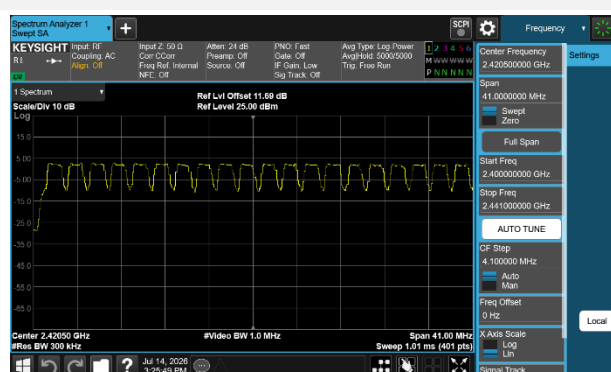
5.2.4 Test Result

Test Data

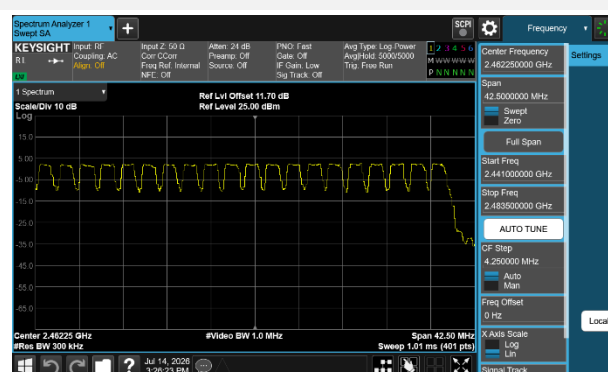
Test Mode	Frequency Block (MHz)	Measured Channel Numbers	Min. Limit	Verdict
GFSK	2400 - 2483.5	40	15	Pass

Test Plots

GFSK 2.4 GHz ~ 2.4835 GHz



GFSK 2.4 GHz ~ 2.4835 GHz



5.3 Peak Output Power

5.3.1 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. For all other frequency hopping systems in the 2400-2483.5 MHz band: 0.125 watts.

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 A.

5.3.3 Test Procedure

The Bluetooth 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

Peak Power Test Data

Channel	Measured Output Peak Power		Limit		Verdict
	GFSK		dBm	mW	
	dBm	mW			
Low	1.50	1.41	21	125	Pass
Middle	1.12	1.29			Pass
High	1.57	1.44			Pass

Test Plots

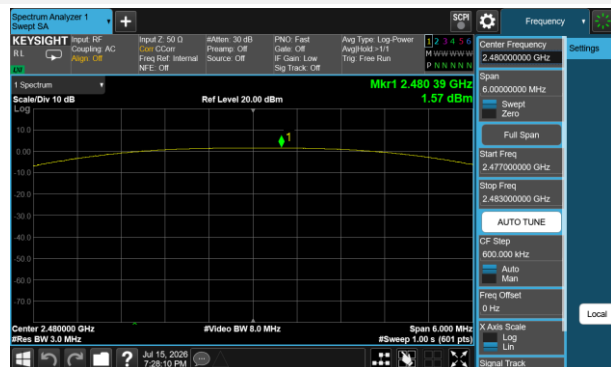
GFSK LOW CHANNEL



GFSK MIDDLE CHANNEL



GFSK HIGH CHANNEL

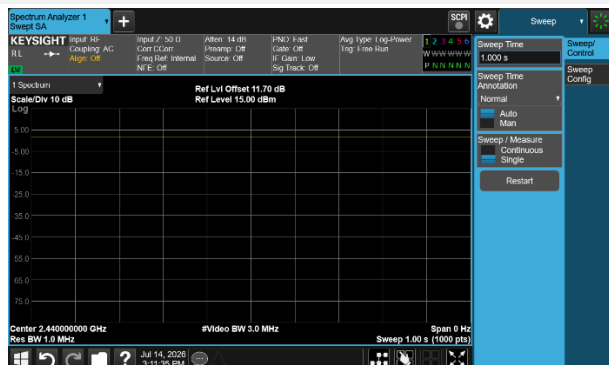


Duty Cycle Test Data

Test Mode	On Time (ms)	On+Off Time (ms)	Duty Cycle	Duty Factor
GFSK	1000	1000	100.00%	0.00

Test Plots

GFSK



5.4 Occupied Bandwidth

5.4.1 Limit

FCC §15.247(a)

Measurement of the 20dB bandwidth of the modulated signal.

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 A.

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 $\geq$ 1% of the 20 dB bandwidth

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

Test Data

GFSK		
Channel	20 dB Bandwidth (MHz)	99% Bandwidth (MHz)
Low	2.250000	2.057700
Middle	2.235100	2.046000
High	2.242700	2.047300

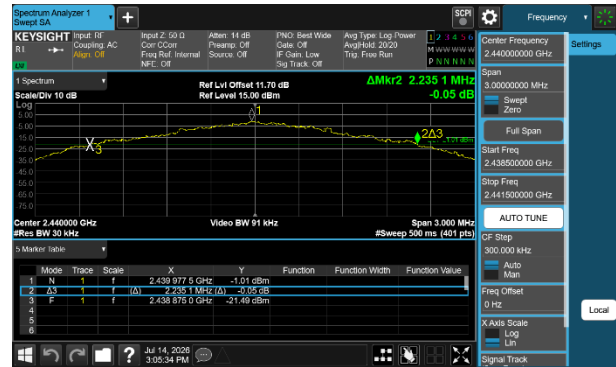
Test Plots

20 dB Bandwidth

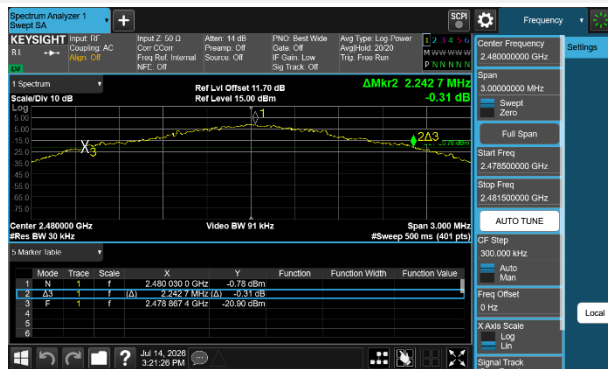
GFSK LOW CHANNEL



GFSK MIDDLE CHANNEL

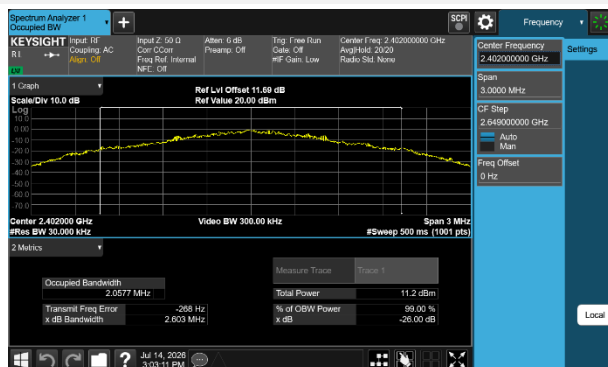


GFSK HIGH CHANNEL

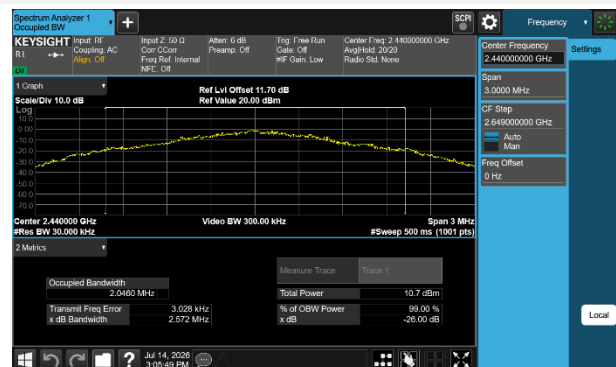


99% Bandwidth

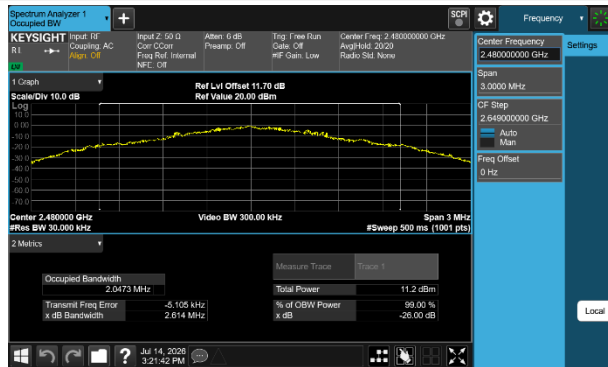
GFSK LOW CHANNEL



GFSK MIDDLE CHANNEL



GFSK HIGH CHANNEL



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. Alternatively, Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater, provided the systems operate with an output power no greater than 125 mW.

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 A.

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.

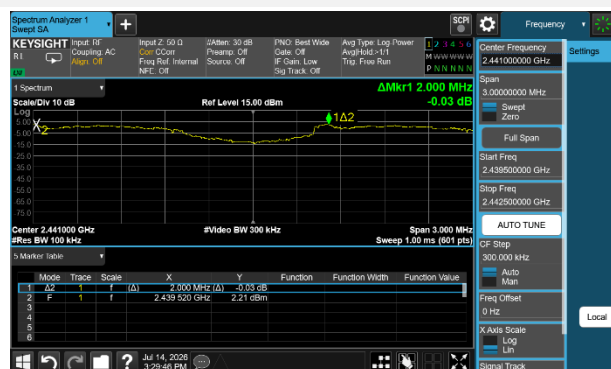
5.5.4 Test Result

Test Data

Mode	Frequency separation (MHz)	2/3 of the 20 dB Bandwidth (MHz)	Verdict
GFSK	2.000	1.500	Pass

Test Plots

GFSK



5.6 Time of Occupancy (Dwell time)

5.6.1 Limit

FCC §15.247(a)

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.

5.6.2 Test Setup

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

5.6.3 Test Procedure

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

$$\{\text{Total of Dwell}\} = \{\text{Pulse Time}\} * \{\text{Number of Hopping Frequency in Period}\}$$

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

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

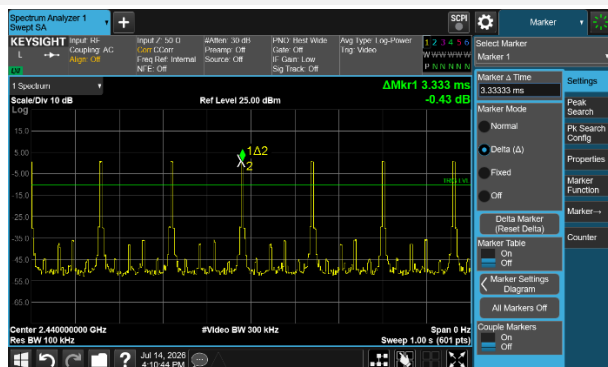
5.6.4 Test Result

Test Data

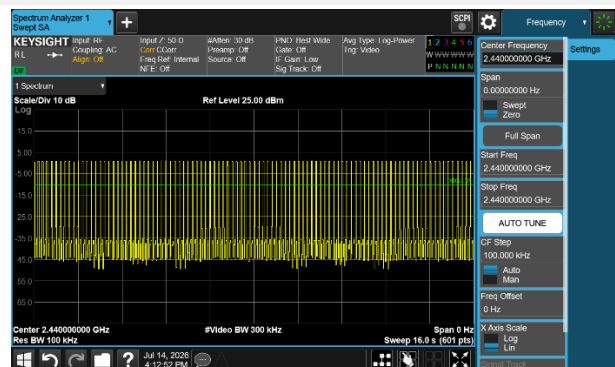
GFSK				
Test Mode	Pulse Width (ms)	Total of Dwell (ms)	Limit (sec)	Verdict
Hopping	3.33300	373.296	0.4	Pass

Test Plots

GFSK Pulse Width



GFSK Total of Dwell



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 A.

5.7.3 Test Procedure

Use the following spectrum analyzer settings:

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

RBW = 100 kHz

VBW ≥ RBW

Sweep = auto

Detector function = peak

Trace = max hold

Allow the trace to stabilize

5.7.4 Test Result

Test Data

GFSK				
Channel	Measured Max. Out of Band Emission (dBm)	Limit (dBm)		Verdict
		Carrier Level	Calculated 20 dBc Limit	
Low	-33.98	0.49	-19.51	Pass
Middle	-33.45	0.34	-19.66	Pass
High	-34.34	0.46	-19.54	Pass

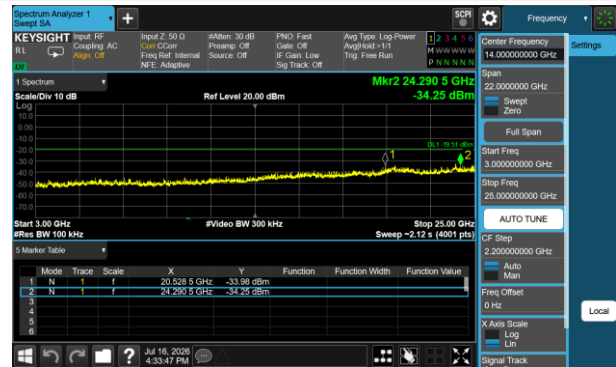
Hopping Mode				
Mode	Measured Max. Out of Band Emission (dBm)	Limit (dBm)		Verdict
		Carrier Level	Calculated 20 dBc Limit	
GFSK	-34.36	1.50	-18.50	Pass

Test Plots

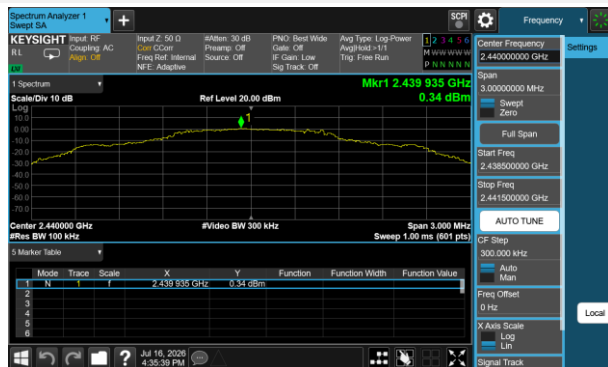
GFSK LOW CHANNEL, CARRIER LEVEL



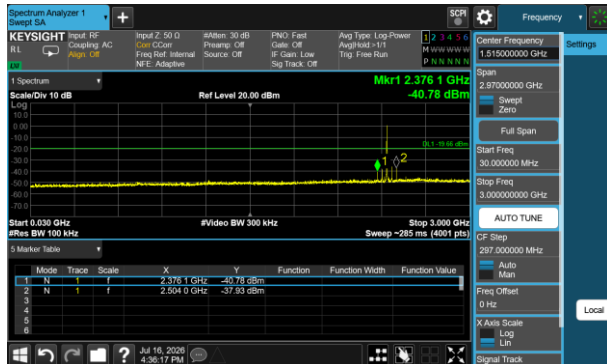
GFSK LOW CHANNEL, BAND EDGE

GFSK LOW CHANNEL, SPURIOUS
30 MHz ~ 3 GHzGFSK LOW CHANNEL, SPURIOUS
3 GHz ~ 25 GHz

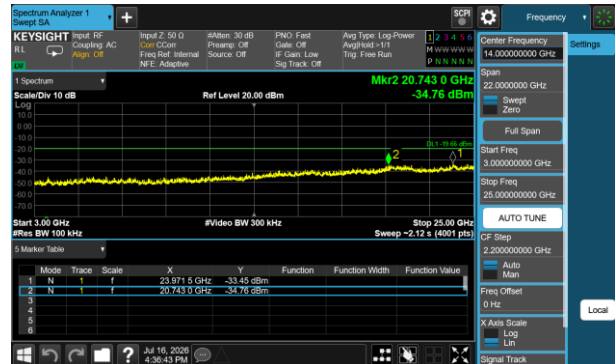
GFSK MIDDLE CHANNEL, CARRIER LEVEL



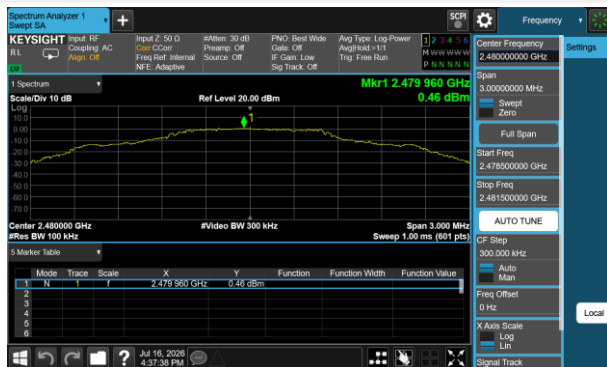
GFSK MIDDLE CHANNEL, SPURIOUS 30 MHz ~ 3 GHz



GFSK MIDDLE CHANNEL, SPURIOUS 3 GHz ~ 25 GHz



GFSK HIGH CHANNEL, CARRIER LEVEL



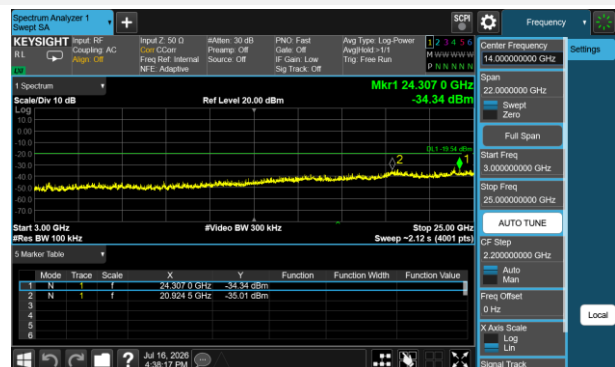
GFSK HIGH CHANNEL, BAND EDGE



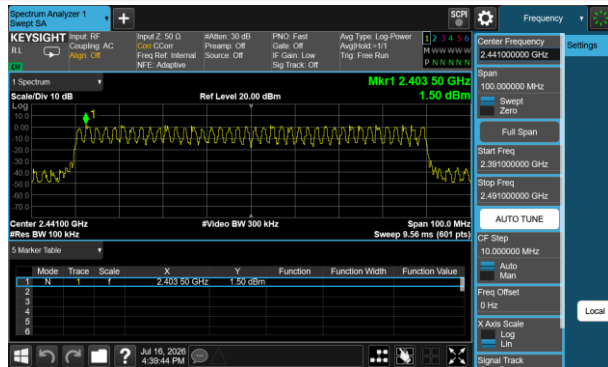
GFSK HIGH CHANNEL, SPURIOUS 30 MHz ~ 3 GHz



GFSK HIGH CHANNEL, SPURIOUS 3 GHz ~ 25 GHz



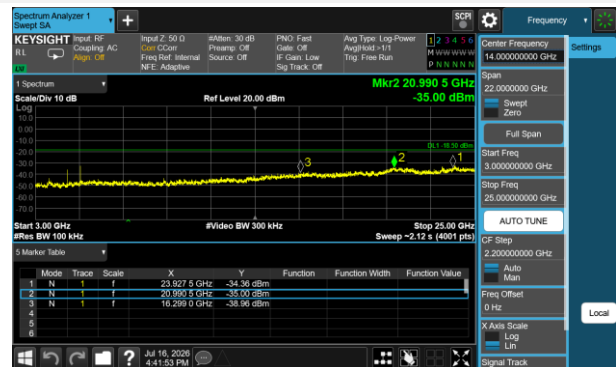
GFSK HOPPING, CARRIER LEVEL



GFSK HOPPING BAND EDGE (LOW)



GFSK HOPPING BAND EDGE (HIGH)

GFSK Hopping Mode, SPURIOUS
30 MHz ~ 3 GHzGFSK Hopping Mode, SPURIOUS
3GHz ~ 25 GHz

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 A.

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.

5.8.4 Test Result

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

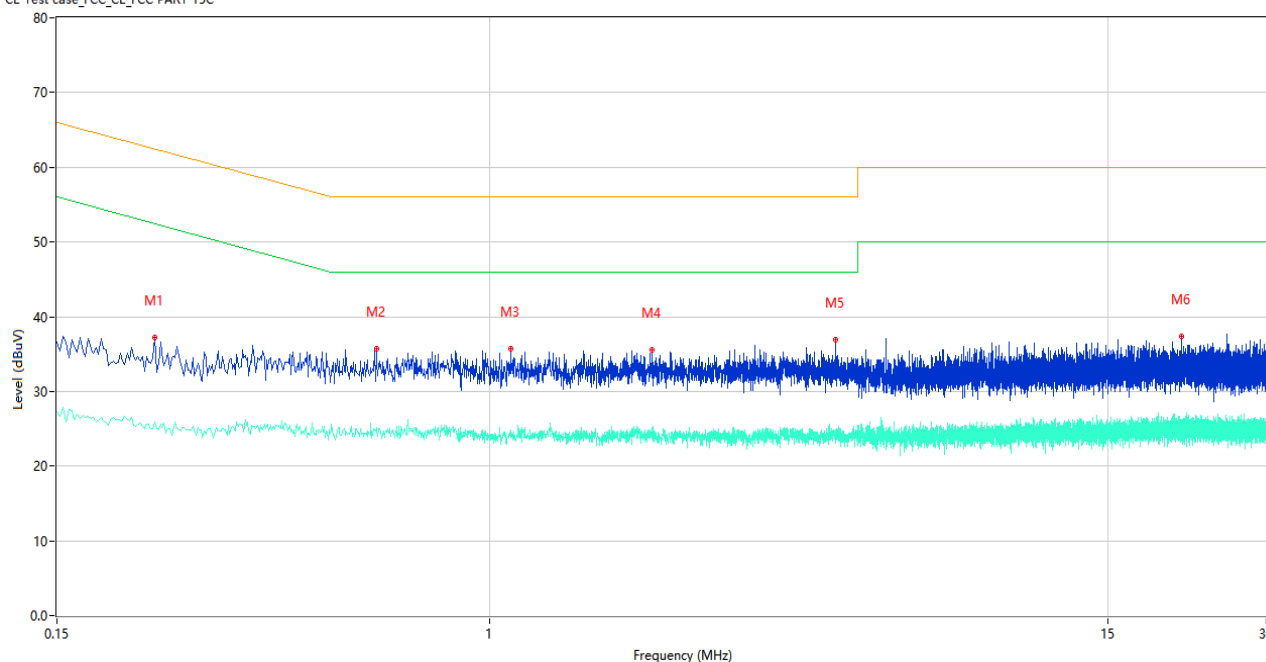
Note ²: Devices subject to Part 15 must be tested for all available U.S. voltages and frequencies (such as a nominal 120 VAC, 60 Hz and 240 VAC, 50 Hz) for which the device is capable of operation. So, The configuration 120 VAC, 60 Hz and 240 VAC, 50 Hz were tested respectively, but only the worst configuration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

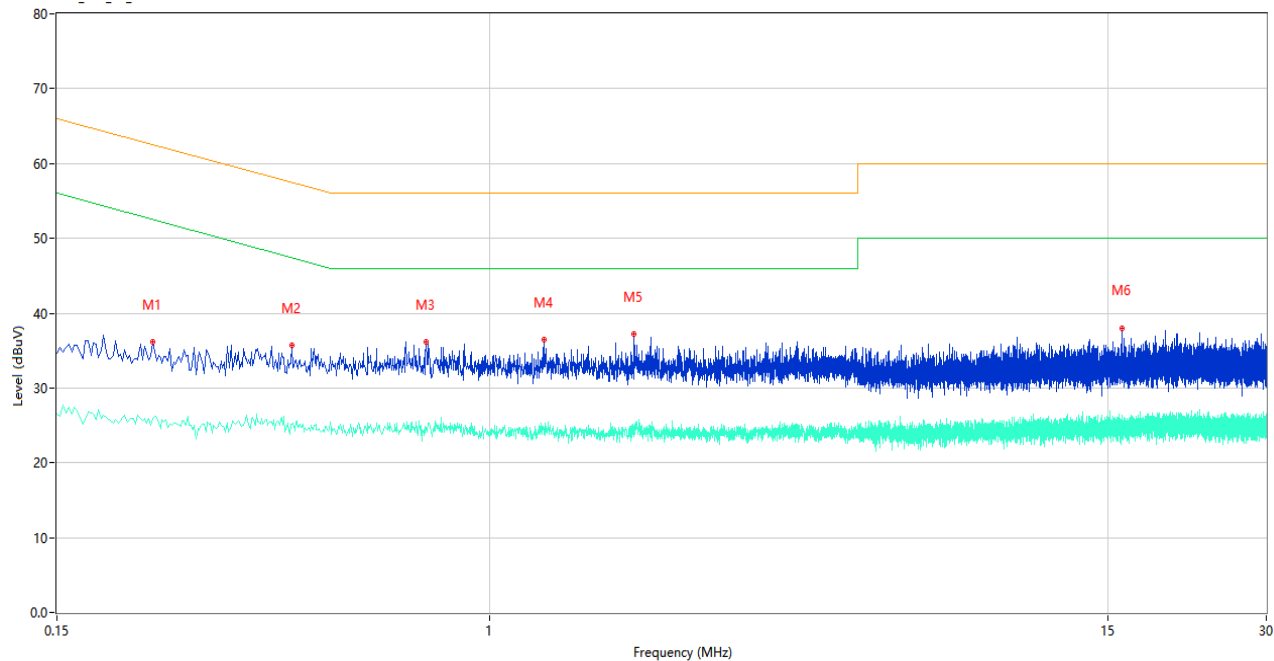
CE Test case_FCC_CE_FCC PART 15C



No.	Frequency (MHz)	Results (dBuV)	Factor (dB)	Limit (dBuV)	Margin (dB)	Detector	Line	Verdict
1	0.230	37.23	9.75	62.45	25.22	Peak	L	Pass
1**	0.230	25.97	9.75	52.45	26.48	AV	L	Pass
2	0.608	35.67	10.15	56.00	20.33	Peak	L	Pass
2**	0.608	25.13	10.15	46.00	20.87	AV	L	Pass
3	1.096	35.73	9.98	56.00	20.27	Peak	L	Pass
3**	1.096	24.15	9.98	46.00	21.85	AV	L	Pass
4	2.036	35.50	10.41	56.00	20.50	Peak	L	Pass
4**	2.036	25.11	10.41	46.00	20.89	AV	L	Pass
5	4.546	36.96	10.36	56.00	19.04	Peak	L	Pass
5**	4.546	24.10	10.36	46.00	21.90	AV	L	Pass
6	20.718	37.31	10.95	60.00	22.69	Peak	L	Pass
6**	20.718	25.60	10.95	50.00	24.40	AV	L	Pass

PHASE N

CE Test case_FCC_CE_FCC PART 15C



No.	Frequency (MHz)	Results (dBuV)	Factor (dB)	Limit (dBuV)	Margin (dB)	Detector	Line	Verdict
1	0.228	36.13	9.75	62.52	26.39	Peak	N	Pass
1**	0.228	25.95	9.75	52.52	26.57	AV	N	Pass
2	0.420	35.64	10.32	57.45	21.81	Peak	N	Pass
2**	0.420	25.12	10.32	47.45	22.33	AV	N	Pass
3	0.756	36.10	10.20	56.00	19.90	Peak	N	Pass
3**	0.756	24.65	10.20	46.00	21.35	AV	N	Pass
4	1.268	36.42	10.45	56.00	19.58	Peak	N	Pass
4**	1.268	24.37	10.45	46.00	21.63	AV	N	Pass
5	1.882	37.16	10.52	56.00	18.84	Peak	N	Pass
5**	1.882	24.41	10.52	46.00	21.59	AV	N	Pass
6	15.958	38.03	10.52	60.00	21.97	Peak	N	Pass
6**	15.958	26.39	10.52	50.00	23.61	AV	N	Pass

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	2400/F(kHz)	300
0.490 - 1.705	24000/F(kHz)	30
1.705 - 30.0	30	30
30 - 88	100	3
88 - 216	150	3
216 - 960	200	3
Above 960	500	3

Note:

1. Field Strength (dBμV/m) = $20 \times \log[\text{Field Strength } (\mu\text{V/m})]$.
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 A.

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

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.

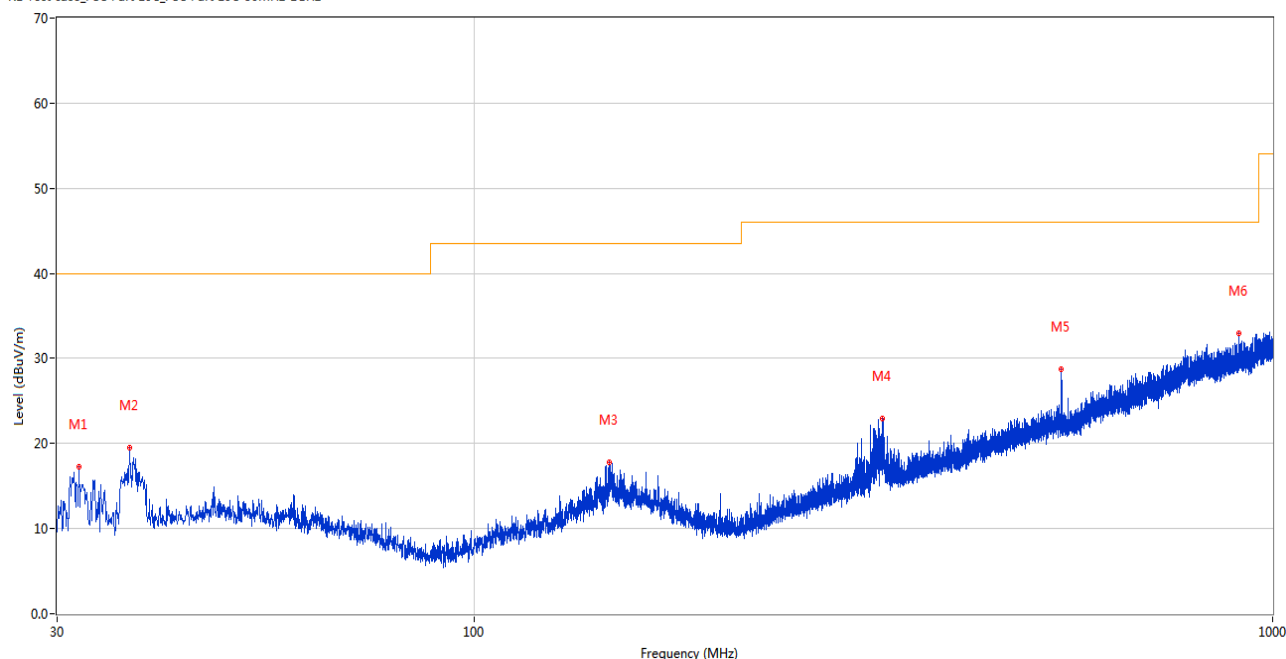
Note ⁴: Results (dBuV/m) = Original reading level of Spectrum Analyzer (dBuV/m) + Factor (dB)

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

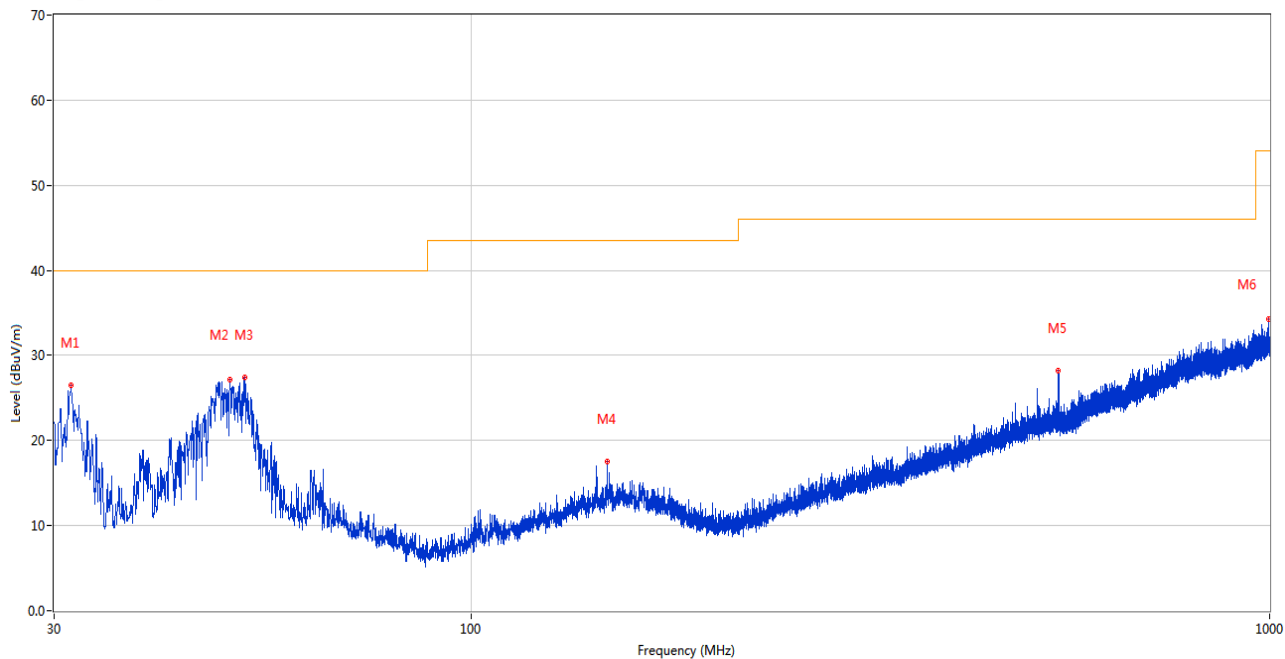
RE Test case_FCC Part 15C_FCC Part 15C-30MHz-1GHz



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	31.940	17.28	-26.76	40.0	22.72	Peak	360.00	100	Horizontal	Pass
2	36.984	19.46	-25.99	40.0	20.54	Peak	38.00	100	Horizontal	Pass
3	147.564	17.76	-23.77	43.5	25.74	Peak	175.00	200	Horizontal	Pass
4	324.832	22.88	-21.25	46.0	23.12	Peak	299.00	100	Horizontal	Pass
5	544.003	28.77	-14.92	46.0	17.23	Peak	63.00	200	Horizontal	Pass
6	906.395	32.91	-7.97	46.0	13.09	Peak	72.00	200	Horizontal	Pass

30 MHz to 1 GHz, ANT V

RE Test case_FCC Part 15C_FCC Part 15C-30MHz-1GHz



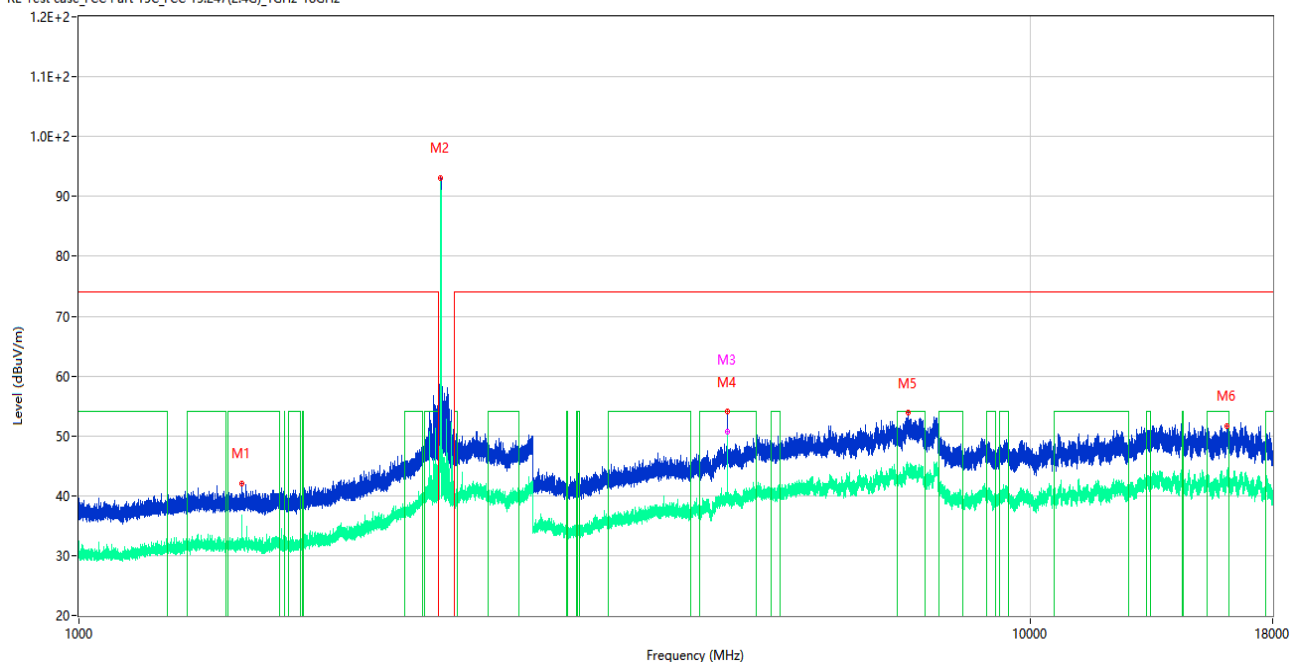
No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	31.503	26.52	-26.79	40.0	13.48	Peak	89.00	100	Vertical	Pass
2	49.837	27.21	-24.80	40.0	12.79	Peak	196.00	100	Vertical	Pass
3	51.971	27.42	-24.86	40.0	12.58	Peak	18.00	100	Vertical	Pass
4	147.855	17.50	-23.74	43.5	26.00	Peak	0.00	100	Vertical	Pass
5	544.003	28.26	-14.92	46.0	17.74	Peak	81.00	100	Vertical	Pass
6	997.381	34.28	-6.56	54.0	19.72	Peak	268.00	100	Vertical	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.

GFSK LOW CHANNEL 1 GHz to 18 GHz, ANT H

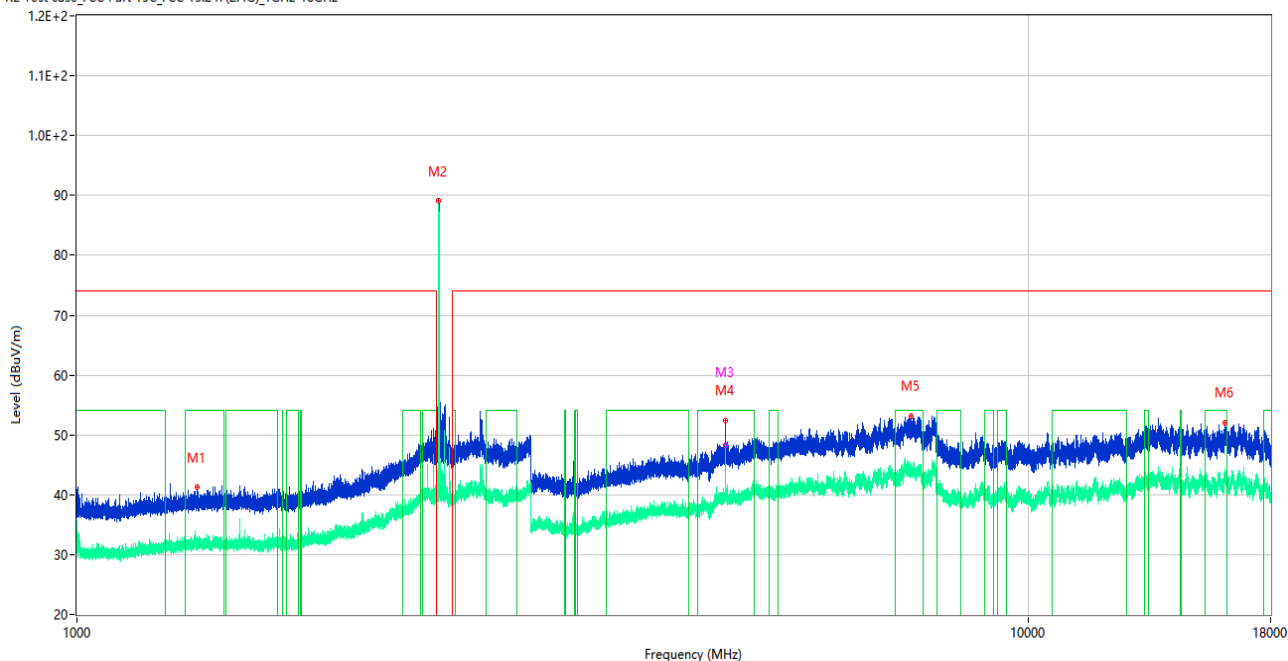
RE Test case_FCC Part 15C_FCC 15.247(2.4G)_1GHz-18GHz



No.	Frequency (MHz)	Results (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	1483.800	42.05	74.0	31.95	Peak	123.00	100	Horizontal	Pass
1**	1483.800	35.42	54.0	18.58	AV	123.00	100	Horizontal	Pass
2	2402.300	93.16	--	--	Peak	139.00	100	Horizontal	N/A
2**	2402.300	92.10	--	--	AV	139.00	100	Horizontal	N/A
3	4803.500	53.77	74.0	20.23	Peak	45.00	100	Horizontal	Pass
3**	4803.500	50.70	54.0	3.30	AV	45.00	100	Horizontal	Pass
4	4804.500	54.07	74.0	19.93	Peak	45.00	100	Horizontal	Pass
4**	4804.500	50.29	54.0	3.71	AV	45.00	100	Horizontal	Pass
5	7442.250	53.86	74.0	20.14	Peak	285.00	400	Horizontal	Pass
5**	7442.250	44.23	54.0	9.77	AV	285.00	400	Horizontal	Pass
6	16110.525	51.71	74.0	22.29	Peak	145.00	200	Horizontal	Pass
6**	16110.525	42.32	54.0	11.68	AV	145.00	200	Horizontal	Pass

GFSK LOW CHANNEL 1 GHz to 18 GHz, ANT V

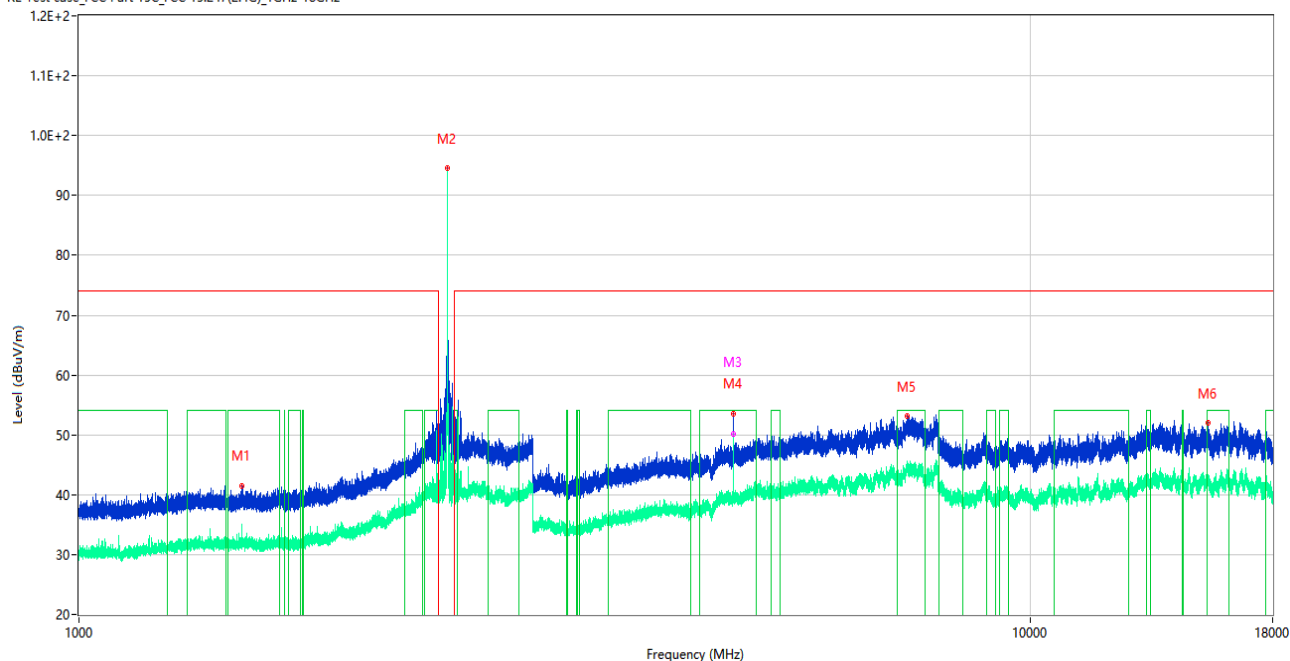
RE Test case_FCC Part 15C_FCC 15.247(2.4G)_1GHz-18GHz



No.	Frequency (MHz)	Results (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	1337.800	41.24	74.0	32.76	Peak	190.00	100	Vertical	Pass
1**	1337.800	31.07	54.0	22.93	AV	190.00	100	Vertical	Pass
2	2401.800	89.04	--	--	Peak	251.00	150	Vertical	N/A
2**	2401.800	88.28	--	--	AV	251.00	150	Vertical	N/A
3	4804.250	51.19	74.0	22.81	Peak	159.00	100	Vertical	Pass
3**	4804.250	48.17	54.0	5.83	AV	159.00	100	Vertical	Pass
4	4804.750	52.40	74.0	21.60	Peak	302.00	200	Vertical	Pass
4**	4804.750	47.47	54.0	6.53	AV	302.00	200	Vertical	Pass
5	7537.250	53.17	74.0	20.83	Peak	360.00	300	Vertical	Pass
5**	7537.250	43.67	54.0	10.33	AV	360.00	300	Vertical	Pass
6	16095.825	52.05	74.0	21.95	Peak	118.00	100	Vertical	Pass
6**	16095.825	42.55	54.0	11.45	AV	118.00	100	Vertical	Pass

GFSK MIDDLE CHANNEL 1 GHz to 18 GHz, ANT H

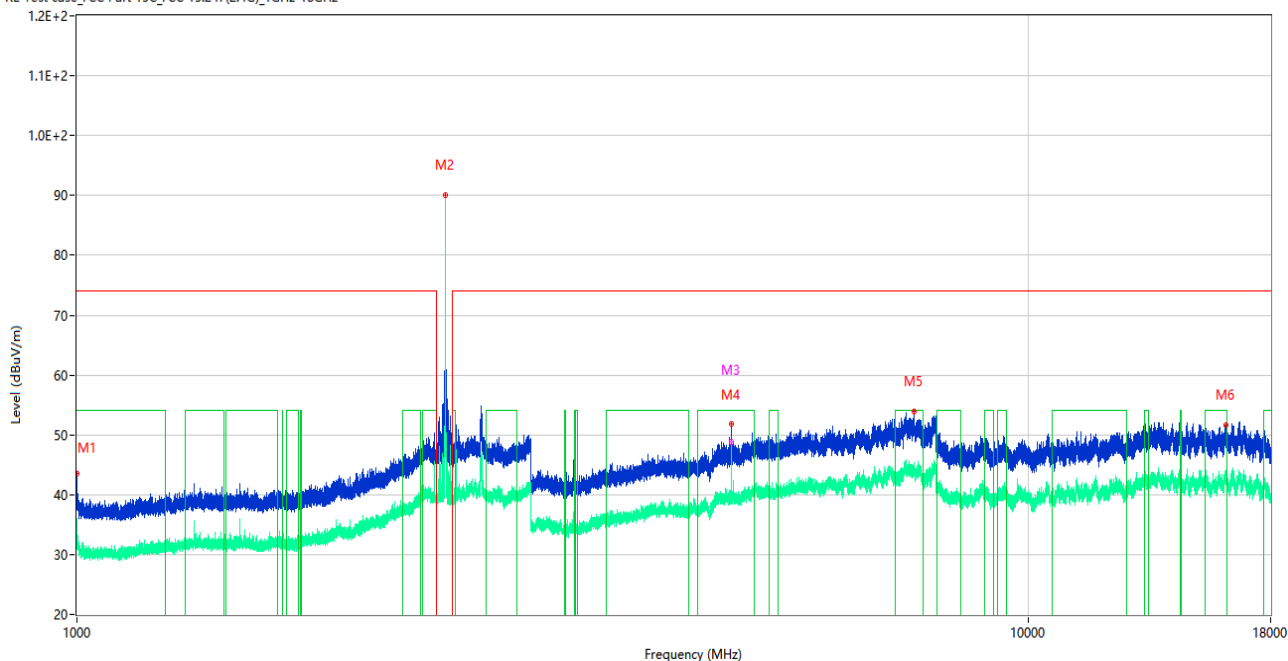
RE Test case_FCC Part 15C_FCC 15.247(2.4G)_1GHz-18GHz



No.	Frequency (MHz)	Results (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	1483.100	41.52	74.0	32.48	Peak	294.00	200	Horizontal	Pass
1**	1483.100	33.35	54.0	20.65	AV	294.00	200	Horizontal	Pass
2	2440.300	94.51	--	--	Peak	331.00	150	Horizontal	N/A
2**	2440.300	93.32	--	--	AV	331.00	150	Horizontal	N/A
3	4879.750	53.06	74.0	20.94	Peak	46.00	100	Horizontal	Pass
3**	4879.750	50.15	54.0	3.85	AV	46.00	100	Horizontal	Pass
4	4880.500	53.55	74.0	20.45	Peak	46.00	100	Horizontal	Pass
4**	4880.500	47.54	54.0	6.46	AV	46.00	100	Horizontal	Pass
5	7425.750	53.07	74.0	20.93	Peak	77.00	200	Horizontal	Pass
5**	7425.750	44.23	54.0	9.77	AV	77.00	200	Horizontal	Pass
6	15386.025	51.92	74.0	22.08	Peak	118.00	400	Horizontal	Pass
6**	15386.025	42.20	54.0	11.80	AV	118.00	400	Horizontal	Pass

GFSK MIDDLE CHANNEL 1 GHz to 18 GHz, ANT V

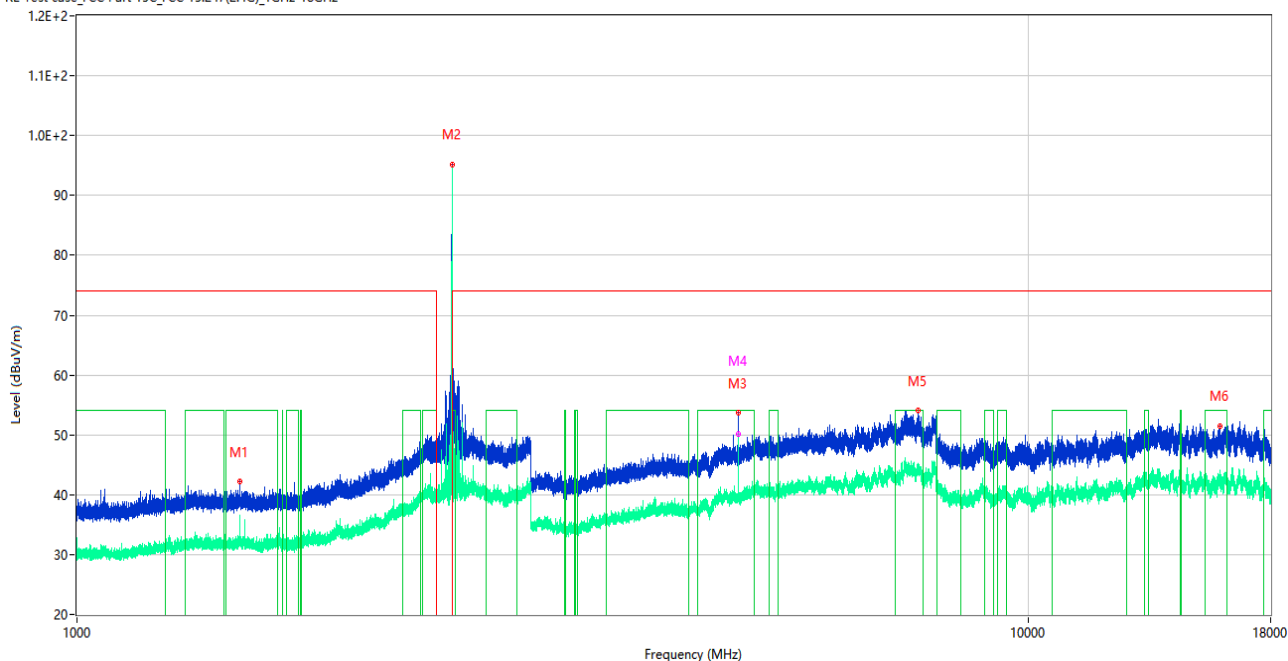
RE Test case_FCC Part 15C_FCC 15.247(2.4G)_1GHz-18GHz



No.	Frequency (MHz)	Results (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	1000.200	43.60	74.0	30.40	Peak	110.00	400	Vertical	Pass
1**	1000.200	32.98	54.0	21.02	AV	110.00	400	Vertical	Pass
2	2440.400	90.14	--	--	Peak	261.00	150	Vertical	N/A
2**	2440.400	89.73	--	--	AV	261.00	150	Vertical	N/A
3	4880.000	50.73	74.0	23.27	Peak	108.00	100	Vertical	Pass
3**	4880.000	48.83	54.0	5.17	AV	108.00	100	Vertical	Pass
4	4880.750	51.77	74.0	22.23	Peak	41.00	100	Vertical	Pass
4**	4880.750	45.75	54.0	8.25	AV	41.00	100	Vertical	Pass
5	7590.000	53.95	74.0	20.05	Peak	234.00	200	Vertical	Pass
5**	7590.000	44.78	54.0	9.22	AV	234.00	200	Vertical	Pass
6	16134.938	51.67	74.0	22.33	Peak	242.00	300	Vertical	Pass
6**	16134.938	42.85	54.0	11.15	AV	242.00	300	Vertical	Pass

GFSK HIGH CHANNEL 1 GHz to 18 GHz, ANT H

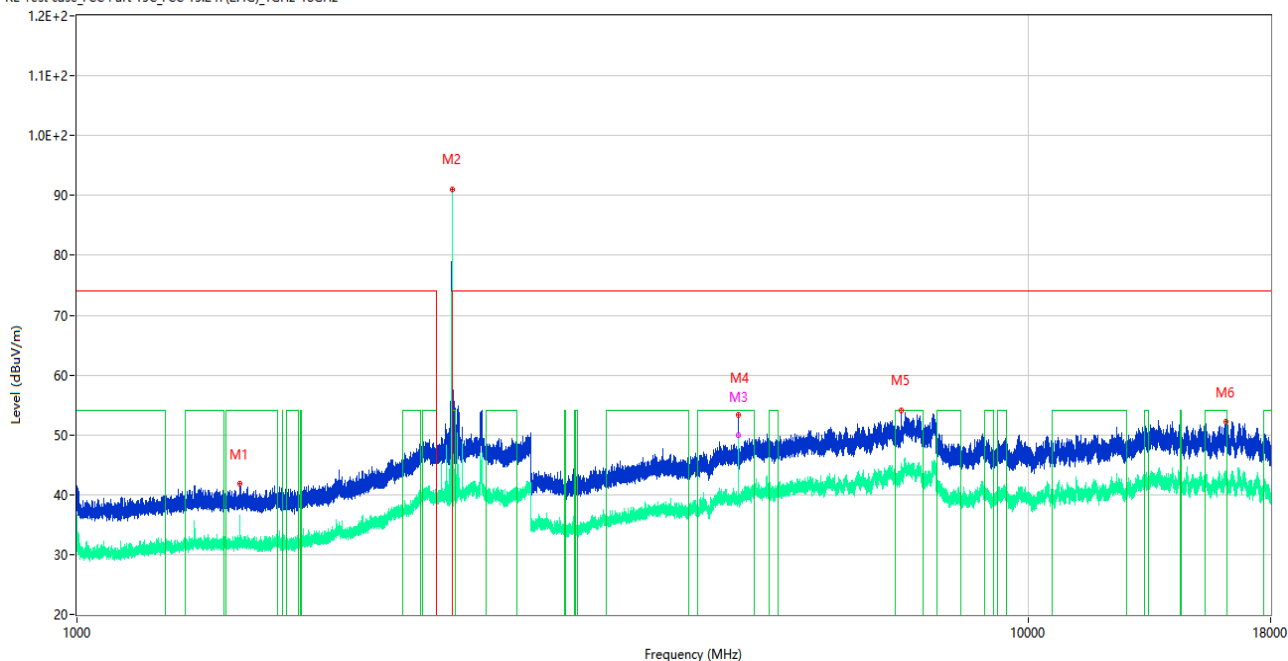
RE Test case_FCC Part 15C_FCC 15.247(2.4G)_1GHz-18GHz



No.	Frequency (MHz)	Results (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	1483.400	42.21	74.0	31.79	Peak	170.00	200	Horizontal	Pass
1**	1483.400	36.62	54.0	17.38	AV	170.00	200	Horizontal	Pass
2	2479.800	95.19	--	--	Peak	350.00	100	Horizontal	N/A
2**	2479.800	95.00	--	--	AV	350.00	100	Horizontal	N/A
3	4960.000	53.63	74.0	20.37	Peak	47.00	200	Horizontal	Pass
3**	4960.000	49.31	54.0	4.69	AV	47.00	200	Horizontal	Pass
4	4960.500	52.79	74.0	21.21	Peak	360.00	100	Horizontal	Pass
4**	4960.500	50.07	54.0	3.93	AV	360.00	100	Horizontal	Pass
5	7657.250	54.00	74.0	20.00	Peak	360.00	200	Horizontal	Pass
5**	7657.250	44.78	54.0	9.22	AV	360.00	200	Horizontal	Pass
6	15905.776	51.53	74.0	22.47	Peak	303.00	100	Horizontal	Pass
6**	15905.776	42.74	54.0	11.26	AV	303.00	100	Horizontal	Pass

GFSK HIGH 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	1483.200	41.80	74.0	32.20	Peak	129.00	400	Vertical	Pass
1**	1483.200	34.65	54.0	19.35	AV	129.00	400	Vertical	Pass
2	2479.800	91.03	--	--	Peak	249.00	100	Vertical	N/A
2**	2479.800	89.84	--	--	AV	249.00	100	Vertical	N/A
3	4960.250	52.87	74.0	21.13	Peak	106.00	100	Vertical	Pass
3**	4960.250	49.94	54.0	4.06	AV	106.00	100	Vertical	Pass
4	4960.750	53.27	74.0	20.73	Peak	106.00	100	Vertical	Pass
4**	4960.750	48.45	54.0	5.55	AV	106.00	100	Vertical	Pass
5	7363.250	54.13	74.0	19.87	Peak	0.00	200	Vertical	Pass
5**	7363.250	43.79	54.0	10.21	AV	0.00	200	Vertical	Pass
6	16160.663	52.17	74.0	21.83	Peak	230.00	200	Vertical	Pass
6**	16160.663	43.16	54.0	10.84	AV	230.00	200	Vertical	Pass