FCC RF TEST REPORT

ISSUED BY
Shenzhen BALUN Technology Co., Ltd.

FOR

8BitDo Arcade Stick

ISSUED TO
SHENZHEN 8BITDO TECH CO., LTD.

Room 210, Building 1, Nanhai Ecool, No.6 Xinghua Road, Shekou, Nanshan District, Shenzhen

Tested by: Ye Hongji
Date: Sep. 22

Approved by: Wei Yanquan (Chief Engineer)
Date: Sep. 22

Report No.:	BL-SZ2080669-602
EUT Name:	8BitDo Arcade Stick
Model Name:	80FE (refer section2.4)
Brand Name:	8BITDO
Test Standard:	47 CFR Part 15 Subpart C
FCC ID:	2AOWF-ARCADE
Test Conclusion:	Pass
Test Date:	Aug. 25, 2020 ~ Sep. 17, 2020
Date of Issue:	Sep. 22, 2020

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Revision History

Version	Issue Date	Revisions Content
Rev. 01	Sep. 22, 2020	Initial Issue

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1 ADMINISTRATIVE DATA (GENERAL INFORMATION)

1.1 Identification of the Testing Laboratory

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

1.2 Identification of the Responsible Testing Location

Test Location	Shenzhen BALUN Technology Co., Ltd.
Address	Block B, 1st FL, Baisha Science and Technology Park, Shahe Xi Road, Nanshan District, Shenzhen, Guangdong Province, P. R. China
Accreditation Certificate	The laboratory has been listed by Industry Canada to perform electromagnetic emission measurements. The recognition numbers of test site are 11524A-1. The laboratory is a testing organization accredited by FCC as a accredited testing laboratory. The designation number is CN1196. The laboratory is a testing organization accredited by American Association for Laboratory Accreditation(A2LA) according to ISO/IEC 17025.The accreditation certificate is 4344.01. The laboratory is a testing organization accredited by China National Accreditation Service for Conformity Assessment (CNAS) according to ISO/IEC 17025. The accreditation certificate number is L6791.
Description	All measurement facilities used to collect the measurement data are located at Block B, FL 1, Baisha Science and Technology Park, Shahe Xi Road, Nanshan District, Shenzhen, Guangdong Province, P. R. China 518055

1.3 Laboratory Condition

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

1.4 Announce

(1) The test report reference to the report template version v2.2.

(2) The test report is invalid if not marked with the signatures of the persons responsible for preparing and approving the test report.

(3) The test report is invalid if there is any evidence and/or falsification.

(4) The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein.

(5) This document may not be altered or revised in any way unless done so by BALUN and all revisions are duly noted in the revisions section.

(6) Content of the test report, in part or in full, cannot be used for publicity and/or promotional purposes without prior written approval from the laboratory.

(7) The laboratory is only responsible for the data released by the laboratory, except for the part provided by the applicant.

2 PRODUCT INFORMATION

2.1 Applicant Information

Applicant	SHENZHEN 8BITDO TECH CO., LTD.
Address	Room 210, Building 1, Nanhai Ecool, No.6 Xinghua Road, Shekou, Nanshan District, Shenzhen

2.2 Manufacturer Information

Manufacturer	Shenzhen Zhongxingda Electronic Co., Ltd.
Address	3-4/F, Bldg 10, Tongfuyu Industrial Zone, Lezhujiao Village, Xixiang, Baoan District, Shenzhen

2.3 Factory Information

Factory	N/A
Address	N/A

2.4 General Description for Equipment under Test (EUT)

EUT Name	8BitDo Arcade Stick
Model Name Under Test	80FE
Series Model Name	80F
Description of Model name differentiation	All models are same with electrical parameters and internal circuit structure, but only differ in appearance color.
Serial Number	N/A
Hardware Version	1.0
Software Version	1.0
Dimensions (Approx.)	N/A

2.5 Technical Information

Network and Wireless connectivity	Bluetooth 2.1 (BR+EDR) 2.4G ISM Band (GFSK modulation)

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	2 Mbps
Frequency Range	The frequency range used is 2400 MHz to 2483.5 MHz.
Number of Channel	15 (at intervals of 3 MHz)
Tested Channel	Low (2402 MHz), Middle (2441 MHz), High (2480 MHz)
Antenna Type	PCB Antenna
Antenna Gain	0.84 dBi (In test items related to antenna gain, the final results reflect this figure. This value is provided by the applicant.)
Adaptive or non-adaptive	non-adaptive
The Max RF Output power	-5.92 dBm

Channel List

Channel	Frequency	Channel	Frequency
1 (Low)	2402	9	2448
2	2412	10	2453
3	2419	11	2463
4	2422	12	2469
5	2426	13	2472
6	2430	14	2477
7	2433	15 (High)	2480
8 (Middle)	2441		

Test Case	Test Conditions			
	Modulation Technology	Modulation Type	Date rate	Channel
Number of Hopping Frequency	FHSS	GFSK	2 Mbps	Hopping
Peak Output Power	FHSS	GFSK	2 Mbps	Low/Middle/High
Occupied Bandwidth	FHSS	GFSK	2 Mbps	Low/Middle/High
Carrier Frequency Separation	FHSS	GFSK	2 Mbps	Hopping
Time of Occupancy (Dwell time)	FHSS	GFSK	2 Mbps	Hopping
Conducted Spurious Emission	FHSS	GFSK	2 Mbps	Low/Middle/High
Conducted Emission	FHSS	GFSK	2 Mbps	Low/Middle/High
Radiated Emission	FHSS	GFSK	2 Mbps	Low/Middle/High
Band Edge	FHSS	GFSK	2 Mbps	Low/High

2.6 Additional Instructions

EUT Software Settings:

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

Power level setup in software			
Test Software Version	N/A		
Support Units (Software installation media)	Description	Manufacturer	Model
	Notebook	Lenovo	X220
Mode	Channel		Soft Set
GFSK	CH1	2402	TX LEVEL is built-in set parameters and cannot be changed and selected.
	CH8	2441	
	CH15	2480	

3 SUMMARY OF TEST RESULTS

3.1 Test Standards

No.	Identity	Document Title
1	47 CFR Part 15, Subpart C	Miscellaneous Wireless Communications Services
2	KDB Publication 558074 D01v05r02	Guidance for compliance measurements on digital transmission system, frequency hopping spread spectrum system, and hybrid system devices operating under section 15.247 of the FCC rules
3	ANSI C63.10-2013	American National Standard for Testing Unlicensed Wireless Devices

3.2 Verdict

No.	Description	FCC Part No.	Test Result	Verdict
1	Antenna Requirement	15.203	--	Pass Note 1
2	Number of Hopping Frequency	15.247(a)	ANNEX A.1	Pass
3	Peak Output Power	15.247(b)	ANNEX A.2	Pass
4	Occupied Bandwidth	15.247(a)	ANNEX A.3	Pass
5	Carrier Frequency Separation	15.247(a)	ANNEX A.4	Pass
6	Time of Occupancy (Dwell time)	15.247(a)	ANNEX A.5	Pass
7	Conducted Spurious Emission& Authorized-band band-edge	15.247(d)	ANNEX A.6	Pass
8	Conducted Emission	15.207	ANNEX A.7	Pass
9	Radiated Spurious Emission	15.209 15.247(d)	ANNEX A.8	Pass
10	Band Edge (Restricted-band band-edge)	15.209 15.247(d)	ANNEX A.9	Pass
11	Receiver Spurious Emissions	--	--	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	45% to 55%	
Atmospheric Pressure	100 kPa to 102 kPa	
Temperature	NT (Normal Temperature)	20℃ to +25℃
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	ROHDE&SCHWARZ	FSV-30	103118	2020.06.08	2021.06.07
Switch Unit with OSP-B157	ROHDE&SCHWARZ	OSP120	101270	2020.06.08	2021.06.07
EMI Receiver	KEYSIGHT	N9038A	MY53220118	2020.06.09	2021.06.08
EMI Receiver	ROHDE&SCHWARZ	ESRP	101036	2020.06.09	2021.06.08
LISN	SCHWARZBECK	NSLK 8127	8127-687	2020.06.09	2021.06.08
Bluetooth Tester	ROHDE&SCHWARZ	CBT	101005	2020.06.08	2021.06.07
DC Power Supply	ROHDE&SCHWARZ	HMP2020	018141664	2020.06.08	2021.06.07
Power Splitter	KMW	DCPD-LDC	1305003215	--	--
Power Sensor	ROHDE&SCHWARZ	NRP-Z21	103971	2020.06.08	2021.06.07
Attenuator (20 dB)	KMW	ZA-S1-201	110617091	--	--
Attenuator (6 dB)	KMW	ZA-S1-61	1305003189	--	--
Temperature Chamber	AHK	SP20	1412	2020.06.10	2021.06.09
Test Antenna-Loop(9 kHz-30 MHz)	SCHWARZBECK	FMZB 1519	1519-037	2019.10.29	2021.10.28
Test Antenna-Bi-Log(30 MHz-3 GHz)	SCHWARZBECK	VULB 9163	9163-624	2019.07.02	2021.07.01
Test Antenna-Horn(1-18 GHz)	SCHWARZBECK	BBHA 9120D	9120D-1917	2019.07.02	2021.07.01
Test Antenna-Horn (18-40 GHz)	A-INFO	LB-180400KF	J211060273	2019.01.06	2021.01.05
Anechoic Chamber	RAINFORD	9m*6m*6m	N/A	2017.02.21	2022.02.20
Anechoic Chamber	EMC Electronic Co., Ltd	20.10*11.60 *7.35m	N/A	2018.08.08	2021.08.07
Shielded Enclosure	ChangNing	CN-130701	130703	--	--
Signal Generator	ROHDE&SCHWARZ	SMB100A	177746	2020.06.08	2021.06.07
Power Amplifier	OPHIR RF	5225F	1037	2020.02.19	2021.02.18
Power Amplifier	OPHIR RF	5273F	1016	2020.02.19	2021.02.18
Directional Coupler	Werlantone	C5982-10	109275	N/A	N/A
Directional Coupler	Werlantone	CHP-273E	S00801z-01	N/A	N/A
Sound Level Meter	B&K	NL-20	00844023	2019.11.12	2020.11.11
Ear Simulator	B&K	4185	2409449	2019.11.12	2020.11.11

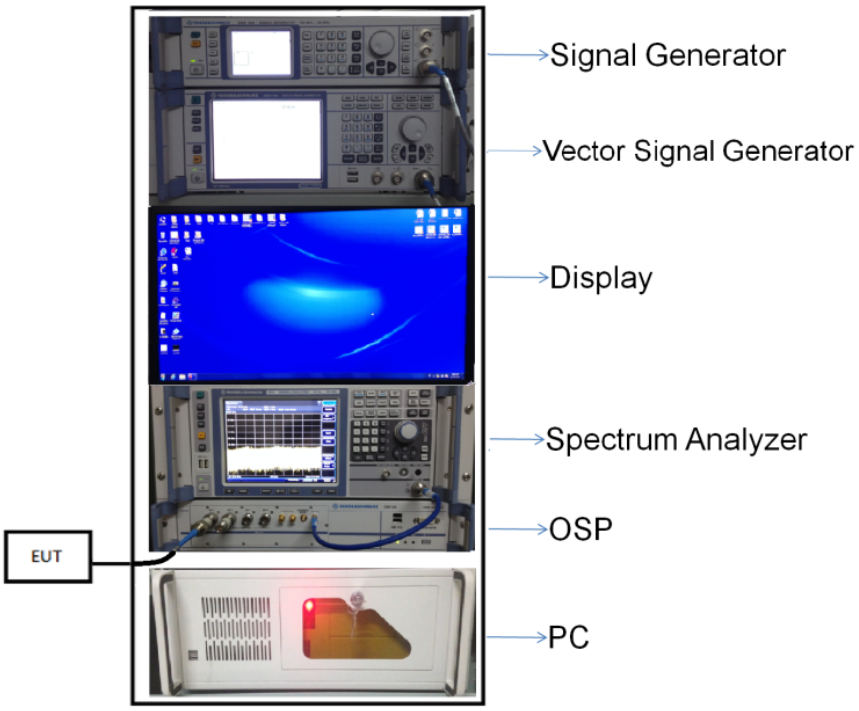
Description	Manufacturer	Model	Serial No.	Cal. Date	Cal. Due
Ear Simulator	B&K	4195	2418189	2019.11.12	2020.11.11
Audio analyzer	B&K	UPL 16	100129	2019.11.12	2020.11.11

4.3 Description of Test Setup

4.3.1 For Antenna Port Test

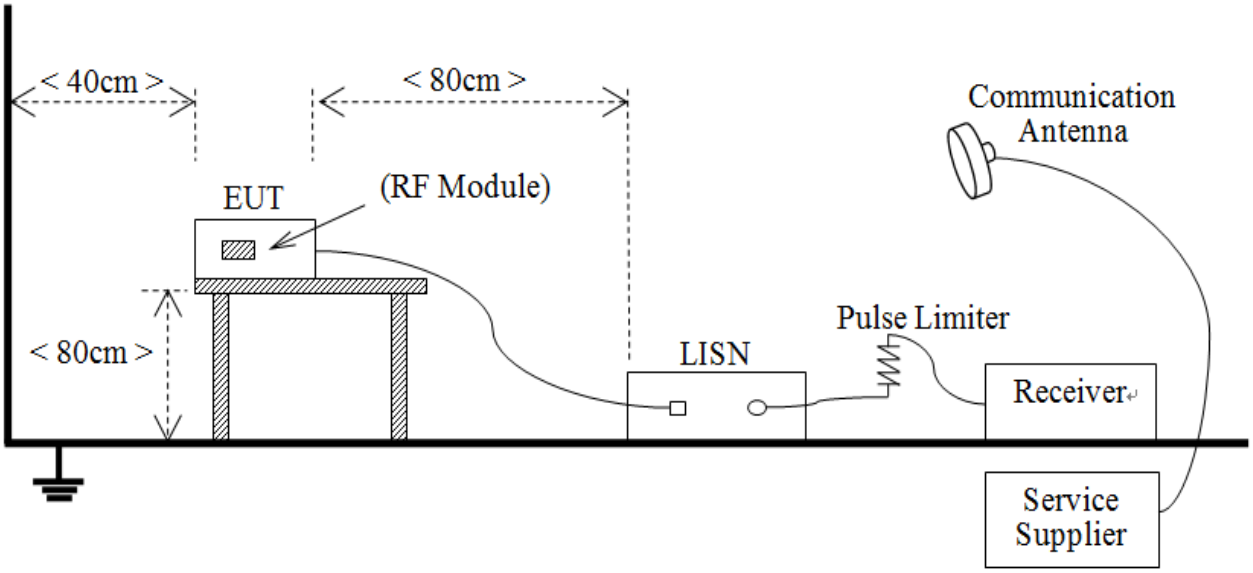
Conducted value (dBm) = Measurement value (dBm) + cable loss (dB)

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



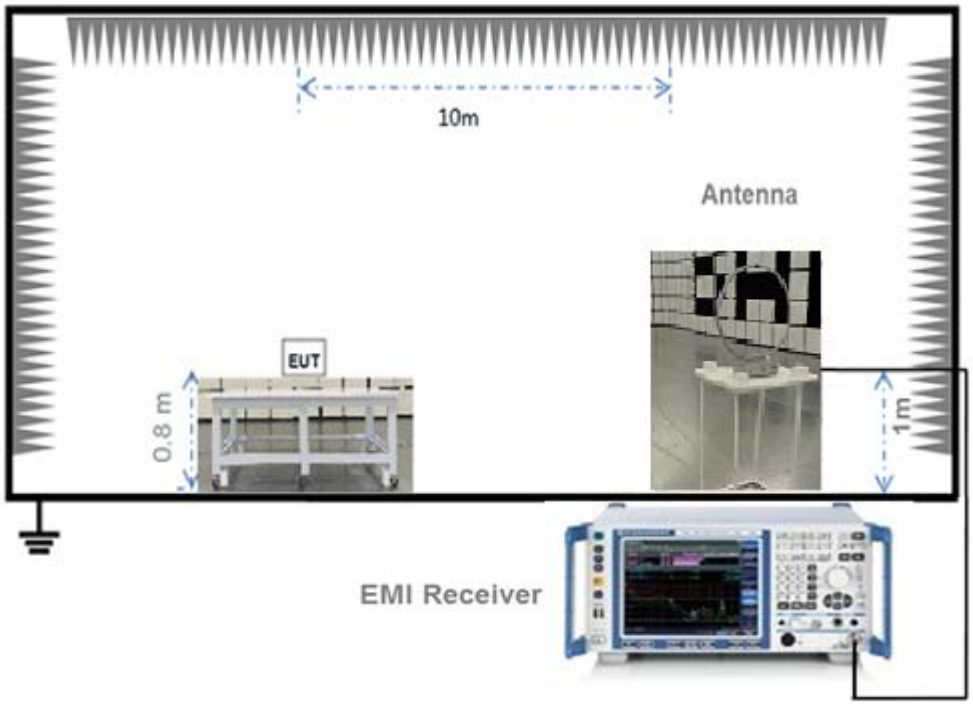
(Diagram 1)

4.3.2 For AC Power Supply Port Test



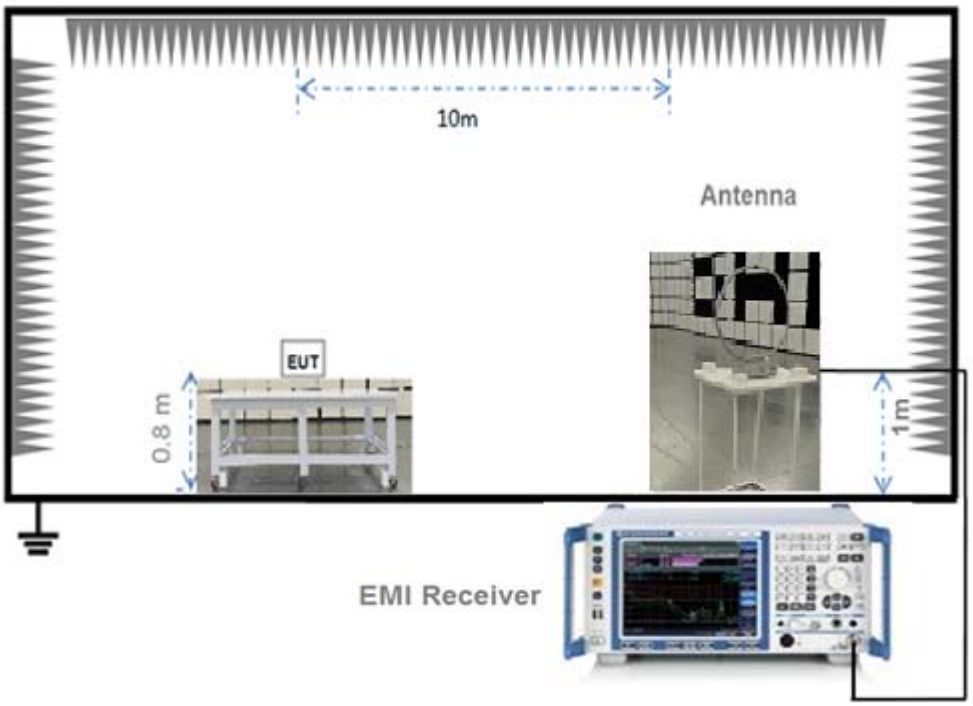
(Diagram 2)

4.3.3 For Radiated Test (Below 30 MHz)



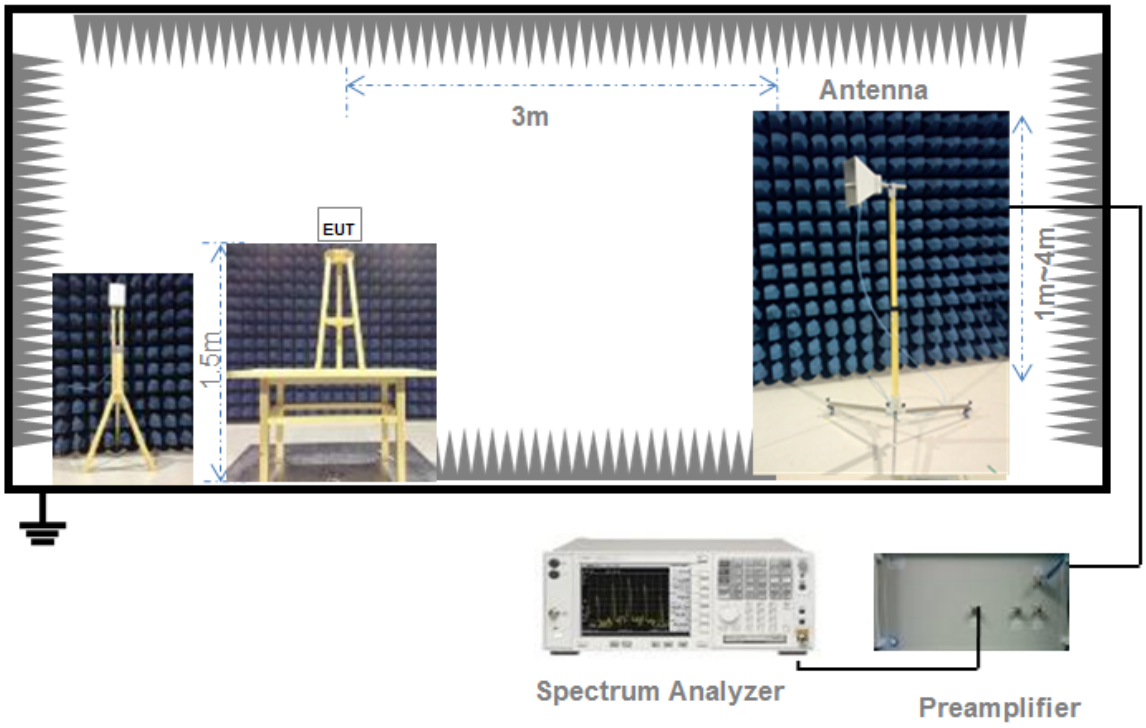
(Diagram 3)

4.3.4 For Radiated Test (30 MHz-1 GHz)



(Diagram 4)

4.3.5 For Radiated Test (Above 1 GHz)



(Diagram 5)

4.4 Measurement Results Explanation Example

4.4.1 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.

4.4.2 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 (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 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 (dBuV/m)

5 TEST ITEMS

5.1 Antenna Requirements

5.1.1 Relevant Standards

FCC §15.203 & 15.247(b); RSS-247, 5.4 (6)

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); RSS-247, 5.1 (4)

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

5.2.3 Test Procedure

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

Span = the frequency band of operation

RBW ≥ 1% of the span

VBW ≥ RBW

Sweep = auto

Detector function = peak

Trace = max hold

Allow the trace to stabilize

5.2.4 Test Result

Please refer to ANNEX A.1.

5.3 Peak Output Power

5.3.1 Test Limit

FCC § 15.247(b)

For frequency hopping systems operating in the 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.

RSS-247, 5.4 (2)

For FHSS operating in the band 2400-2483.5 MHz, the maximum peak conducted output power shall not exceed 1.0 W and the e.i.r.p. shall not exceed 4 W if the hopset uses 75 or more hopping channels; the maximum peak conducted output power shall not exceed 0.125 W and the e.i.r.p. shall not exceed 0.5 W if the hopset uses less than 75 hopping channels (see Section 5.4(5) for exceptions).

5.3.2 Test Setup

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

5.3.3 Test Procedure

The 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

Please refer to ANNEX A.2.

5.4 Occupied Bandwidth

5.4.1 Limit

FCC §15.247(a); RSS-247, 5.1 (1)

Measurement of the 20dB bandwidth of the modulated signal.

5.4.2 Test Setup

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

5.4.3 Test Procedure

Use the following spectrum analyzer settings:

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

RBW ≥ 1% of the 20 dB bandwidth

VBW ≥ RBW

Sweep = auto

Detector function = peak

Trace = max hold

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

5.4.4 Test Result

Please refer to ANNEX A.3.

5.5 Carrier Frequency Separation

5.5.1 Limit

FCC §15.247(a); RSS-247, 5.1 (2)

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

5.5.3 Test Procedure

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

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

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

Video (or Average) Bandwidth (VBW) ≥ RBW

Sweep = auto

Detector function = peak

Trace = max hold

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

5.5.4 Test Result

Please refer to ANNEX A.4.

5.6 Time of Occupancy (Dwell time)

5.6.1 Limit

FCC §15.247(a); RSS-247, 5.1 (4)

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

5.6.3 Test Procedure

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

5.6.4 Test Result

Please refer to ANNEX A.5

5.7 Conducted Spurious Emission & Authorized-band band-edge

5.7.1 Limit

FCC §15.247(d); RSS-247, 5.5

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

5.7.2 Test Setup

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

5.7.3 Test Procedure

Use the following spectrum analyzer settings:

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

5.7.4 Test Result

Please refer to ANNEX A.6.

5.8 Conducted Emission

5.8.1 Limit

FCC §15.207; 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 50μH/50Ω line impedance stabilization network (LISN).

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

5.8.2 Test Setup

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

5.8.3 Test Procedure

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

5.8.4 Test Result

Please refer to ANNEX A.7.

5.9 Radiated Spurious Emission

5.9.1 Limit

FCC §15.209&15.247(d); RSS-247, 5.5

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

5.9.2 Test Setup

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

5.9.3 Test Procedure

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

The power of the EUT transmitting frequency should be ignored.

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

Use the following spectrum analyzer settings:

Span = wide enough to fully capture the emission being measured
RBW = 1 MHz for f ≥ 1 GHz, 100 kHz for f < 1 GHz
VBW ≥ RBW

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

5.9.4 Test Result

Please refer to ANNEX A.8.

5.10 Band Edge (Restricted-band band-edge)

5.10.1 Limit

FCC §15.209&15.247(d); RSS-247, 5.5

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

5.10.2 Test Setup

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

5.10.3 Test Procedure

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

The power of the EUT transmitting frequency should be ignored.

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

Use the following spectrum analyzer settings:

Span = wide enough to fully capture the emission being measured
RBW = 1 MHz for f ≥ 1 GHz, 100 kHz for f < 1 GHz
VBW ≥ RBW
Sweep = auto
Detector function = peak
Trace = max hold

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

5.10.4 Test Result

Please refer to ANNEX A.9.

ANNEX A TEST RESULT

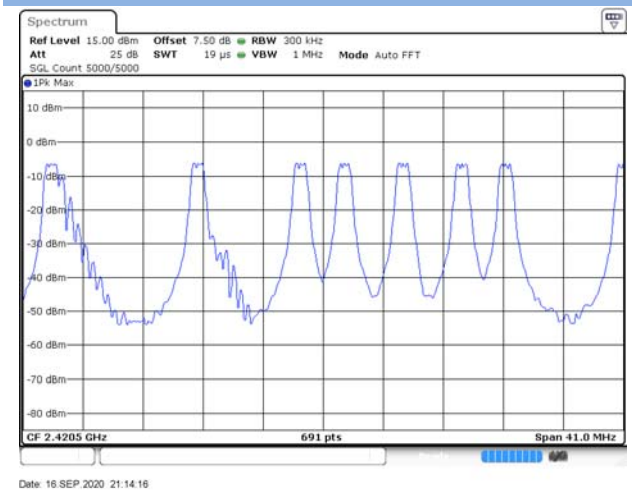
A.1 Number of Hopping Frequency

Test Data

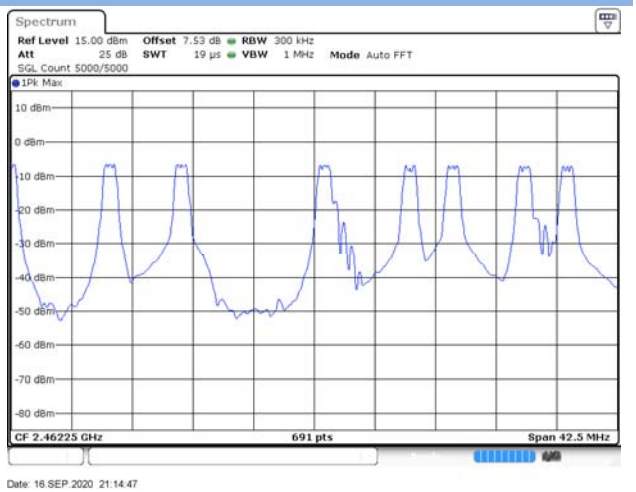
Test Mode	Frequency Block (MHz)	Measured Channel Numbers	Min. Limit	Verdict
GFSK	2400 - 2483.5	15	15	Pass

Test plots

GFSK 2.4 GHz ~ 2.4415 GHz



GFSK 2.4415 GHz ~ 2.4835 GHz



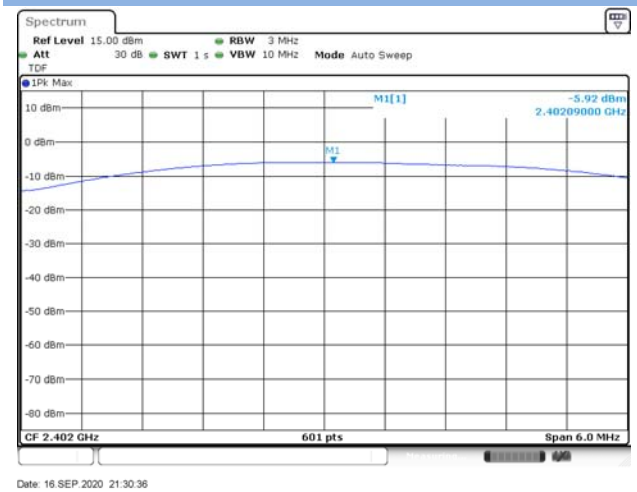
A.2 Peak Output Power

Peak Power Test Data

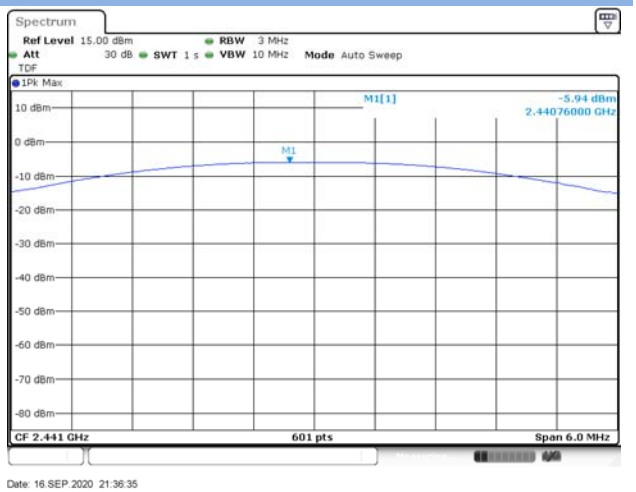
Channel	Measured Output Peak Power		Limit		Verdict
	GFSK		dBm	mW	
	dBm	mW			
Low	-5.92	0.26	21	125	Pass
Middle	-5.94	0.25			Pass
High	-6.64	0.22			Pass

Test plots

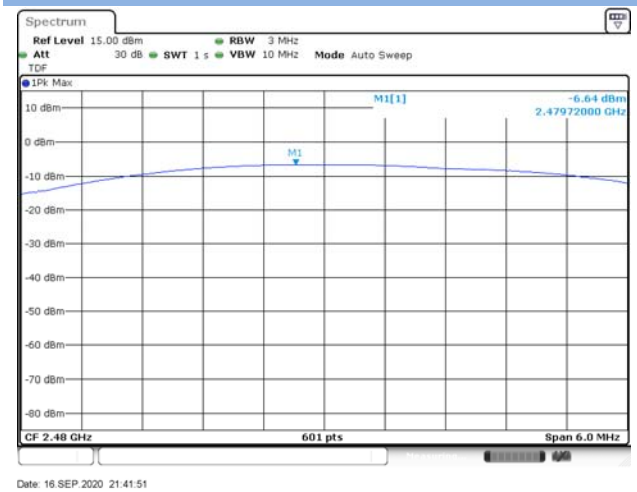
GFSK LOW CHANNEL



GFSK MIDDLE CHANNEL



GFSK HIGH CHANNEL



A.3 20 dB and 99% bandwidth

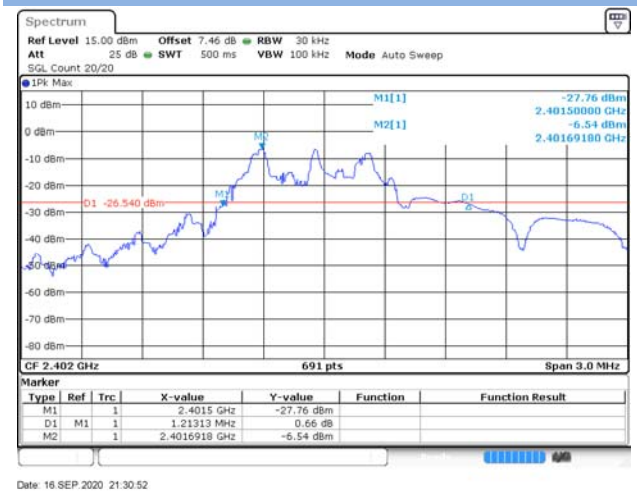
Test Data

GFSK		
Channel	20 dB Bandwidth (MHz)	99% Bandwidth (MHz)
Low	1.213135	1.354559
Middle	0.882568	0.989870
High	1.113037	1.341534

Test plots

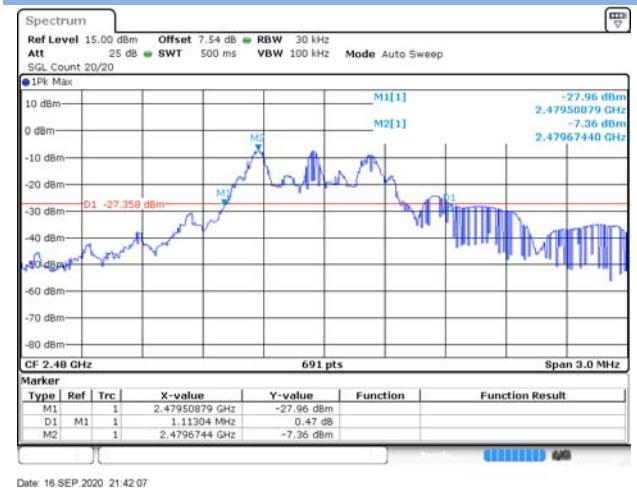
20 dB Bandwidth

GFSK LOW CHANNEL



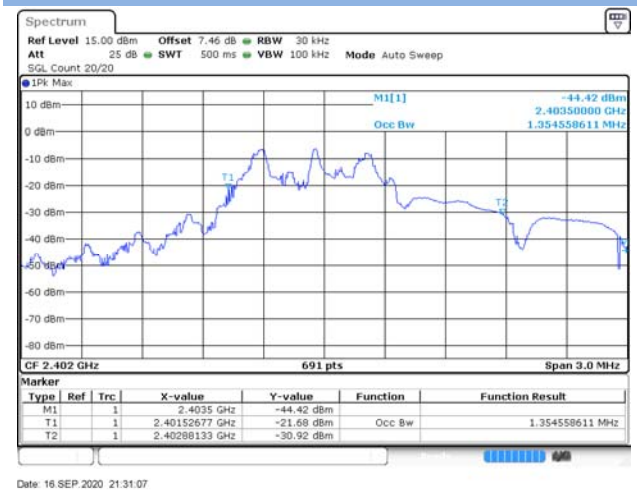
GFSK MIDDLE CHANNEL

GFSK HIGH CHANNEL

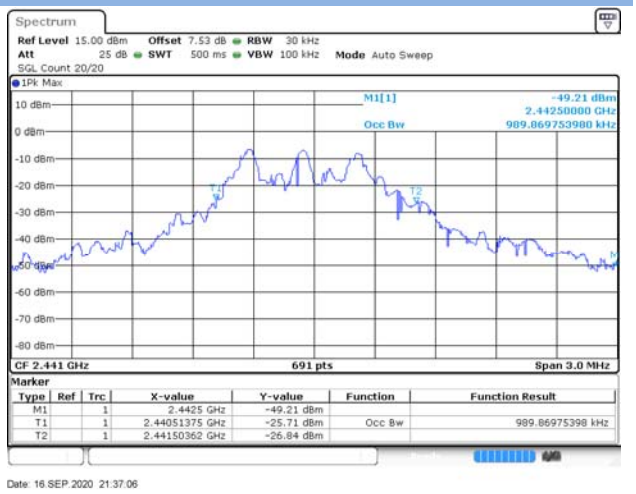


99% Bandwidth

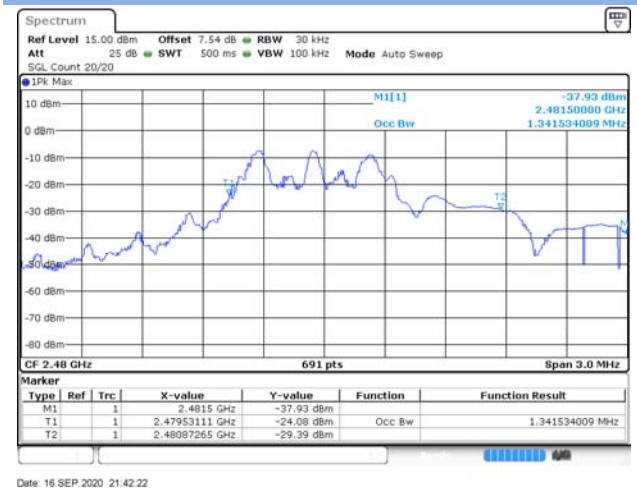
GFSK LOW CHANNEL



GFSK MIDDLE CHANNEL



GFSK HIGH CHANNEL



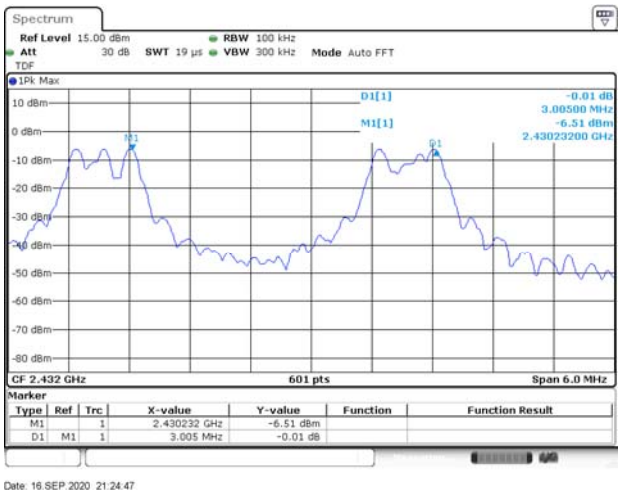
A.4 Hopping Frequency Separation

Test Data

Mode	Frequency separation (MHz)	Max 2/3 of the 20 dB Bandwidth (MHz)	Verdict
GFSK	3.005	0.808757	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
DH1	1.70340	66.433	0.4	Pass

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

Test Data

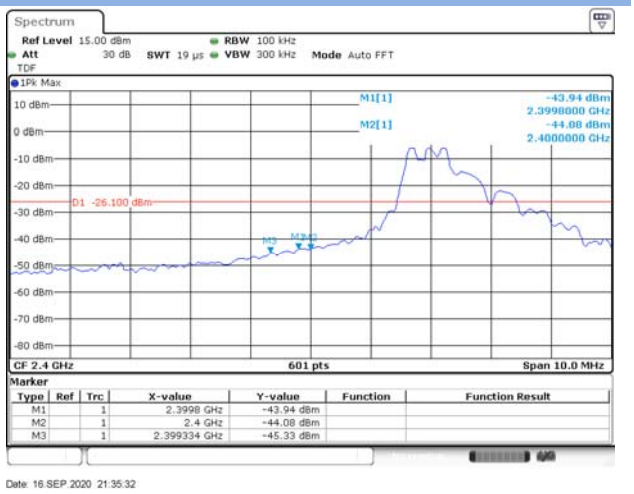
GFSK				
Channel	Measured Max. Out of Band Emission (dBm)	Limit (dBm)		Verdict
		Carrier Level	Calculated 20 dBc Limit	
Low	-36.37	-6.10	-26.10	Pass
Middle	-37.35	-6.15	-26.15	Pass
High	-37.06	-6.89	-26.89	Pass

Hopping Mode				
Mode	Measured Max. Out of Band Emission (dBm)	Limit (dBm)		Verdict
		Carrier Level	Calculated 20 dBc Limit	
GFSK	-36.59	-6.92	-26.92	Pass

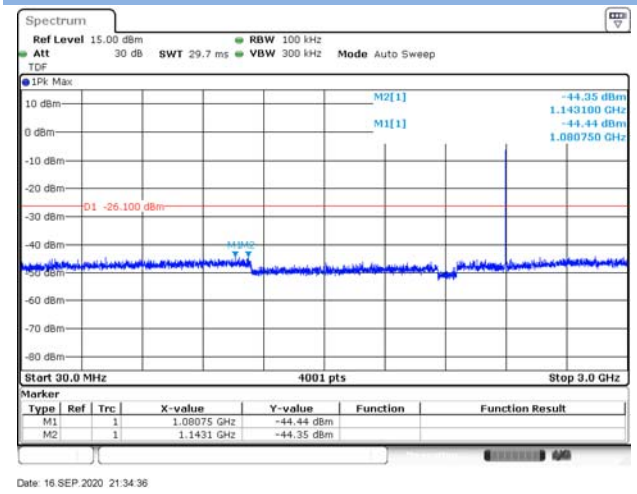
Test Plots

GFSK LOW CHANNEL, CARRIER LEVEL

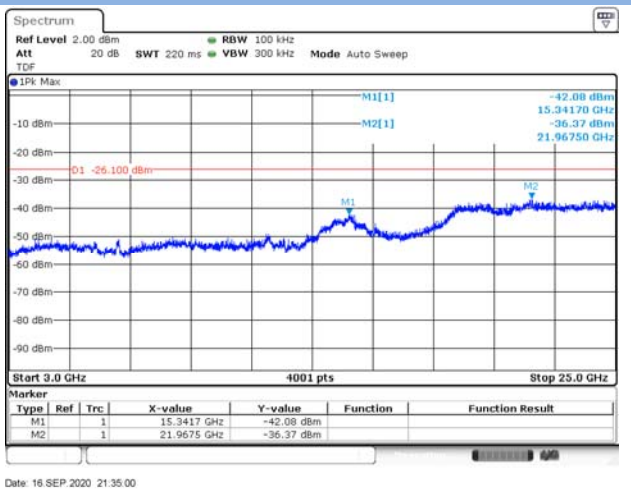
GFSK LOW CHANNEL, BAND EDGE



GFSK LOW CHANNEL, SPURIOUS 30 MHz ~ 3 GHz

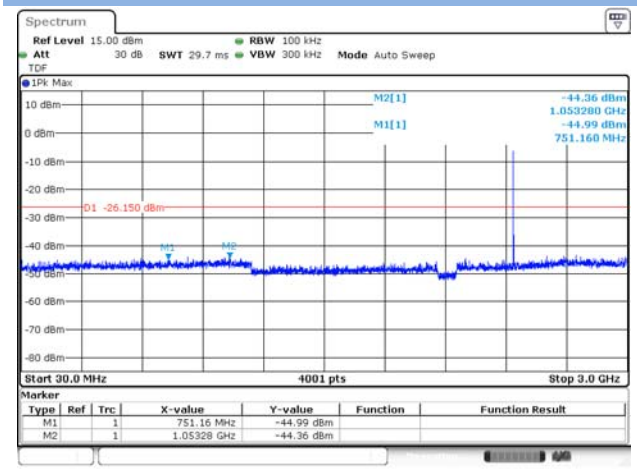


GFSK LOW CHANNEL, SPURIOUS 3 GHz ~ 25 GHz



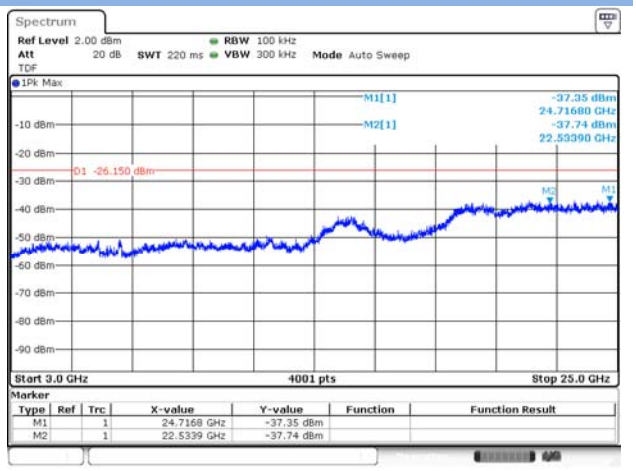
GFSK MIDDLE CHANNEL, CARRIER LEVEL

GFSK MIDDLE CHANNEL, SPURIOUS 30 MHz ~ 3 GHz



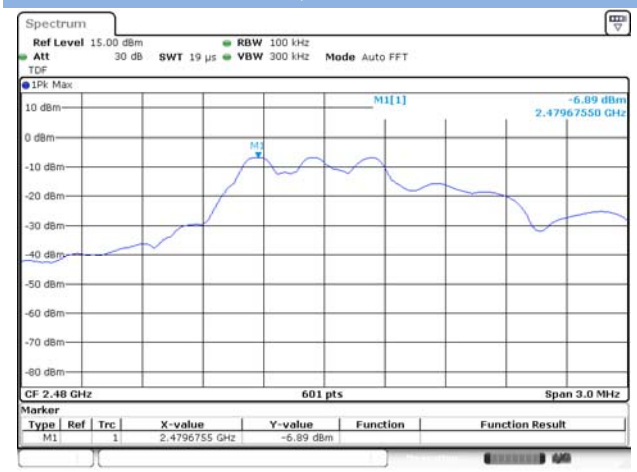
Date: 16.SEP.2020 21:37:45

GFSK MIDDLE CHANNEL, SPURIOUS 3 GHz ~ 25 GHz



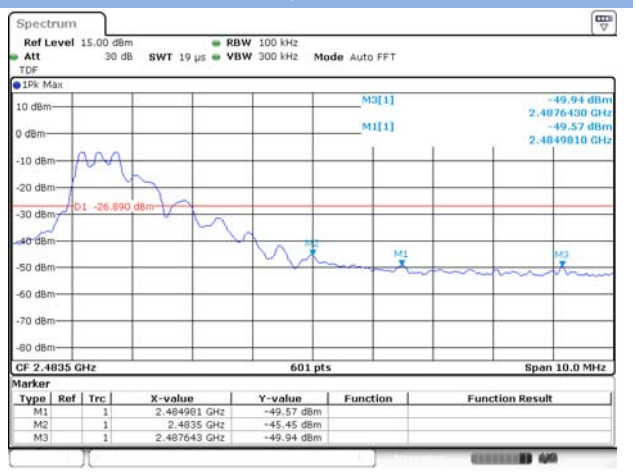
Date: 16.SEP.2020 21:38:02

GFSK HIGH CHANNEL, CARRIER LEVEL



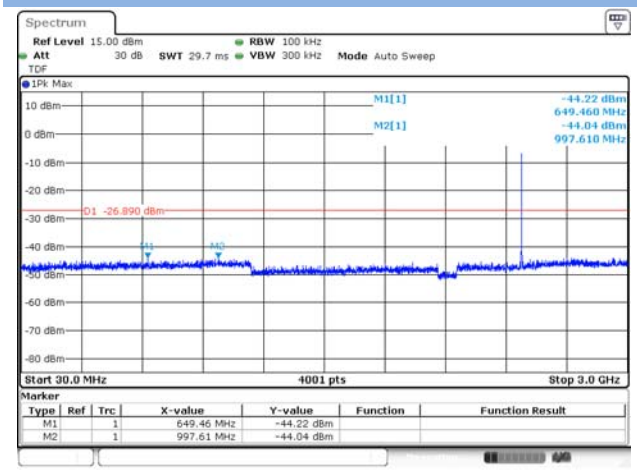
Date: 16.SEP.2020 21:42:36

GFSK HIGH CHANNEL, BAND EDGE



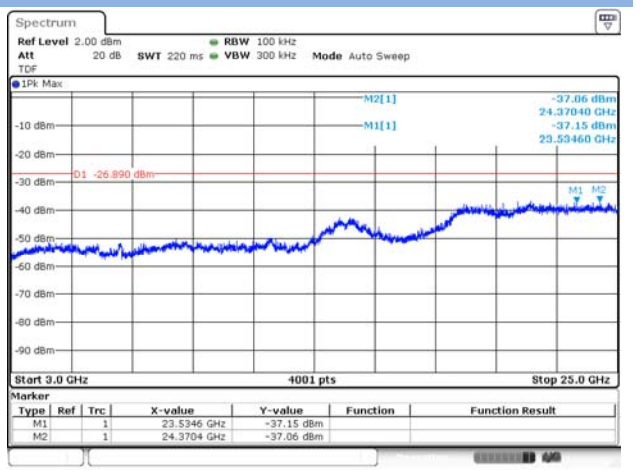
Date: 16.SEP.2020 21:43:55

GFSK HIGH CHANNEL, SPURIOUS 30 MHz ~ 3 GHz



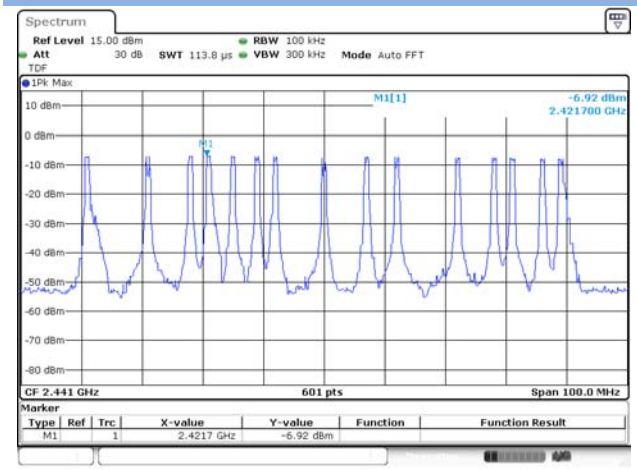
Date: 16.SEP.2020 21:43:05

GFSK HIGH CHANNEL, SPURIOUS 3 GHz ~ 25 GHz



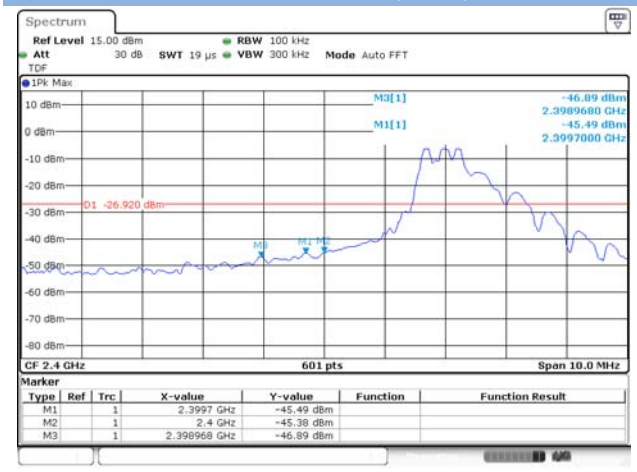
Date: 16.SEP.2020 21:43:24

GFSK HOPPING, CARRIER LEVEL



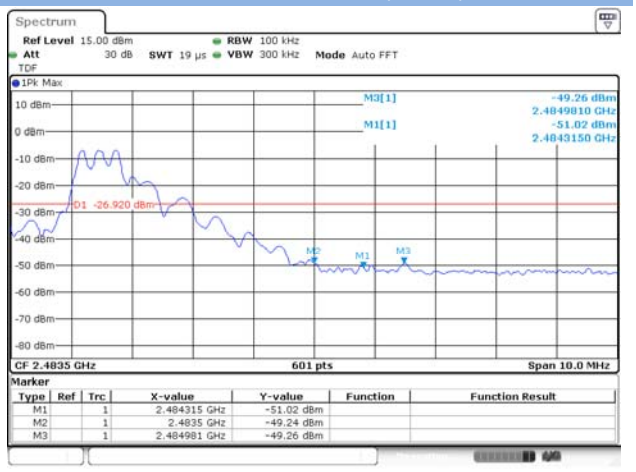
Date: 16.SEP.2020 21:04:12

GFSK HOPPING BAND EDGE (LOW)



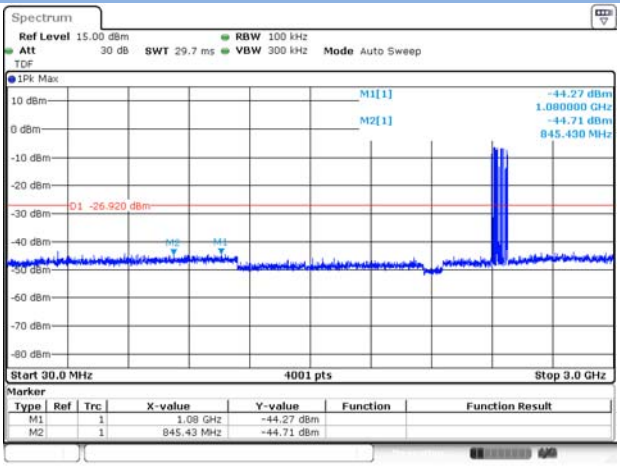
Date: 16.SEP.2020 21:13:07

GFSK HOPPING BAND EDGE (HIGH)



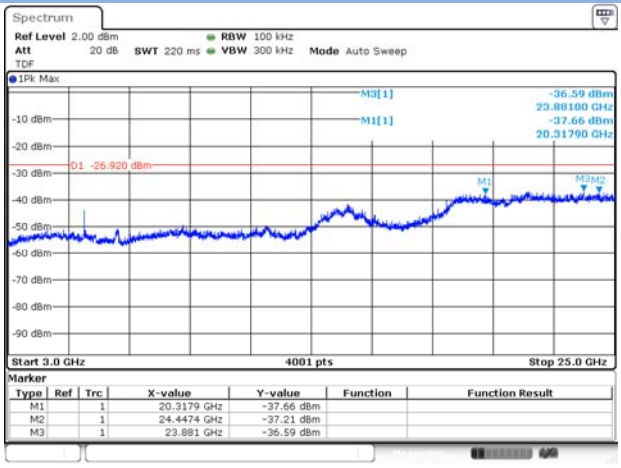
Date: 16.SEP.2020 21:13:34

GFSK Hopping Mode, SPURIOUS 30 MHz ~ 3 GHz



Date: 16.SEP.2020 21:11:54

GFSK Hopping Mode, SPURIOUS 30 3GHz ~ 25 GHz



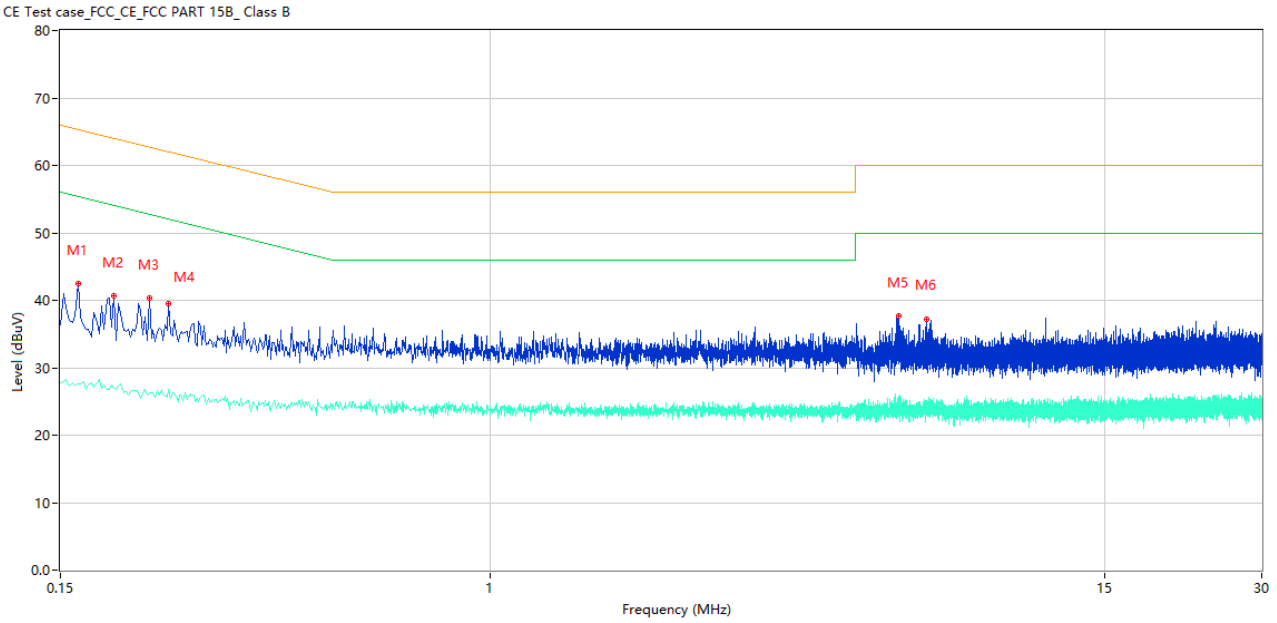
Date: 16.SEP.2020 21:12:22

A.7 Conducted Emissions

Note [1]: The EUT is working in the Normal link mode. All modes have been tested and normal link mode is worst.
Note [2]: Devices subject to Part 15 must be tested for all available U.S. voltages and frequencies (such as a nominal 120 VAC, 60 Hz and 240 VAC, 50 Hz) for which the device is capable of operation. So, The configuration 120 VAC, 60 Hz and 240 VAC, 50 Hz were tested respectively, but only the worst configuration (120 VAC, 60 Hz) shown here.
Note [3]: Results (dBuV) = Original reading level of Spectrum Analyzer (dBuV) + Factor (dB)

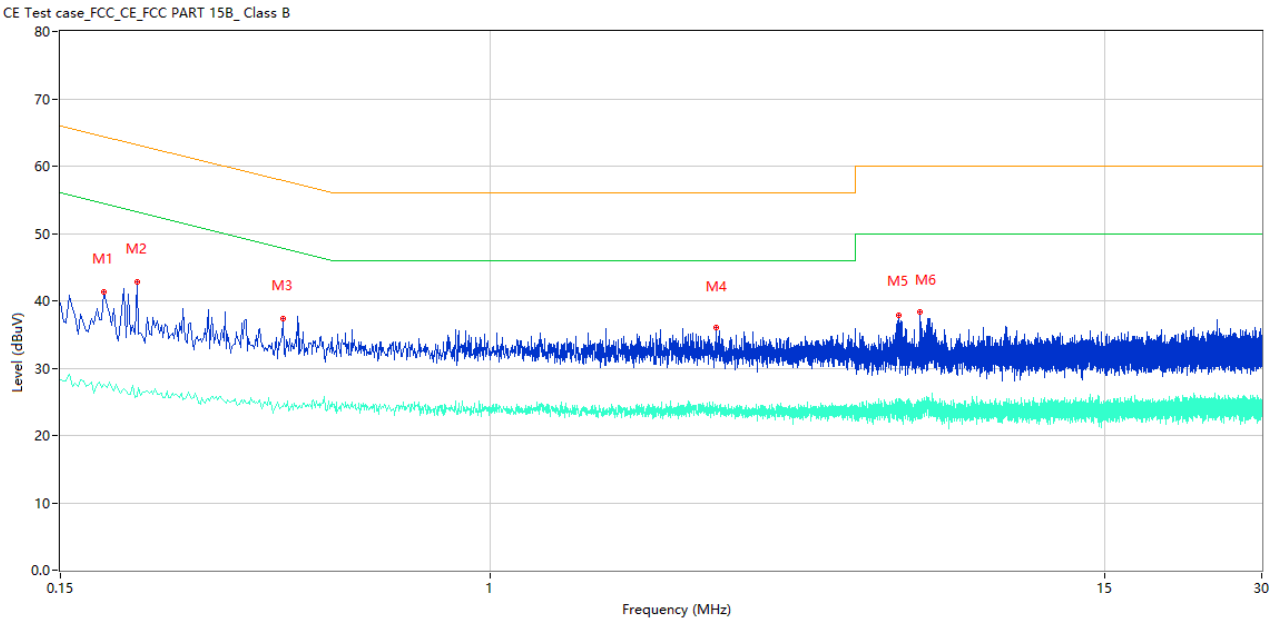
Test Data and Plots

PHASE L



No.	Frequency (MHz)	Results (dBuV)	Factor (dB)	Limit (dBuV)	Over Limit (dB)	Detector	Line	Verdict
1	0.162	42.47	10.40	65.36	-22.89	Peak	L	Pass
1**	0.162	27.64	10.40	55.36	-27.72	AV	L	Pass
2	0.190	40.62	10.38	64.04	-23.42	Peak	L	Pass
2**	0.190	26.88	10.38	54.04	-27.16	AV	L	Pass
3	0.222	40.25	10.37	62.74	-22.49	Peak	L	Pass
3**	0.222	26.31	10.37	52.74	-26.43	AV	L	Pass
4	0.242	39.51	10.34	62.03	-22.52	Peak	L	Pass
4**	0.242	26.74	10.34	52.03	-25.29	AV	L	Pass
5	6.056	37.66	10.32	60.00	-22.34	Peak	L	Pass
5**	6.056	24.16	10.32	50.00	-25.84	AV	L	Pass
6	6.826	37.25	10.34	60.00	-22.75	Peak	L	Pass
6**	6.826	25.16	10.34	50.00	-24.84	AV	L	Pass

PHASE N



No.	Frequency (MHz)	Results (dBuV)	Factor (dB)	Limit (dBuV)	Over Limit (dB)	Detector	Line	Verdict
1	0.182	41.30	10.39	64.39	-23.09	Peak	N	Pass
1**	0.182	27.60	10.39	54.39	-26.79	AV	N	Pass
2	0.210	42.82	10.38	63.21	-20.39	Peak	N	Pass
2**	0.210	25.80	10.38	53.21	-27.41	AV	N	Pass
3	0.400	37.28	10.31	57.85	-20.57	Peak	N	Pass
3**	0.400	24.36	10.31	47.85	-23.49	AV	N	Pass
4	2.702	36.08	10.28	56.00	-19.92	Peak	N	Pass
4**	2.702	23.46	10.28	46.00	-22.54	AV	N	Pass
5	6.042	37.93	10.33	60.00	-22.07	Peak	N	Pass
5**	6.042	23.73	10.33	50.00	-26.27	AV	N	Pass
6	6.636	38.30	10.33	60.00	-21.70	Peak	N	Pass
6**	6.636	24.99	10.33	50.00	-25.01	AV	N	Pass

A.8 Radiated Emission

Test Data and Plots

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

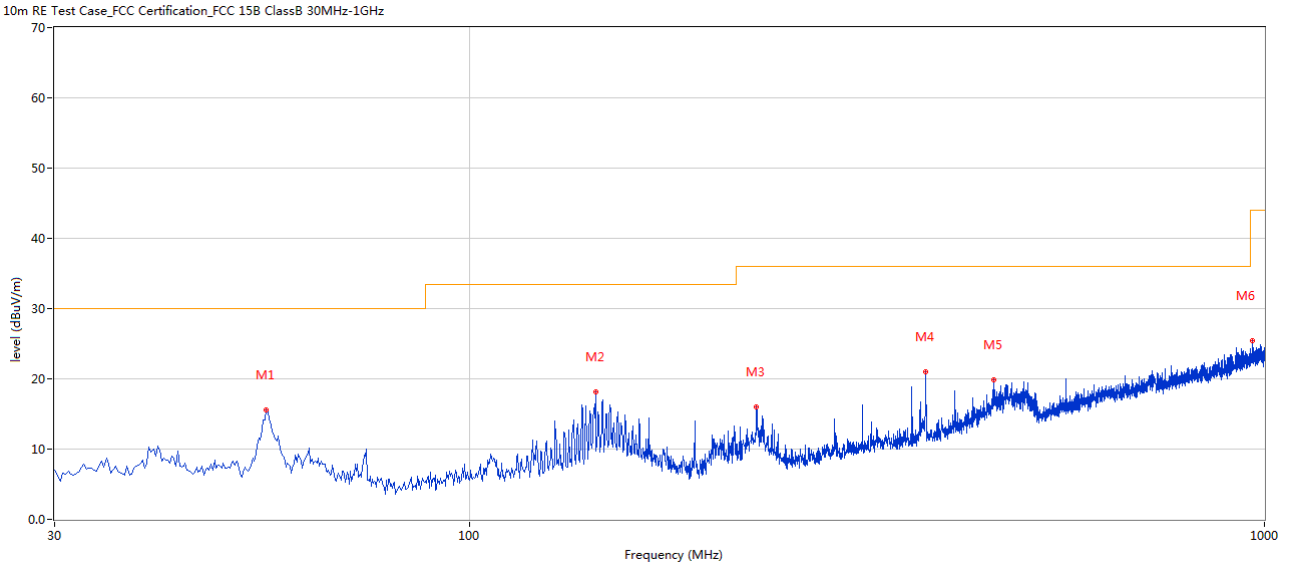
Note [2]: For the test data above 1 GHz, according the ANSI C63.10-2013, where limits are specified for both average and peak (or quasi-peak) detector functions, if the peak (or quasi-peak) measured value complies with the average limit, it is unnecessary to perform an average measurement.

Note [3]: The 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)

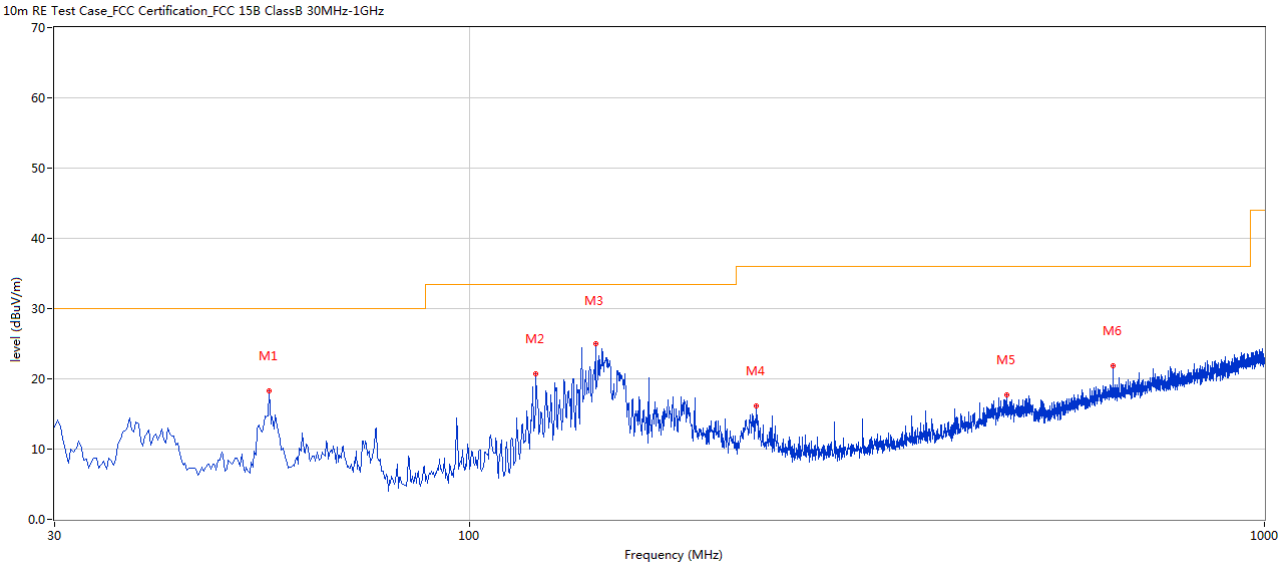
The low frequency, which started from 9 kHz to 30 MHz, was pre-scanned and the result which was 20 dB lower than the limit line per 15.31(o) was not reported.

30 MHz to 1 GHz, ANT H



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Over Limit (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	55.456	15.58	-27.45	30.0	-14.42	Peak	28.00	100	Horizontal	Pass
2	143.947	18.14	-26.15	33.5	-15.36	Peak	130.00	200	Horizontal	Pass
3	229.528	15.96	-27.94	36.0	-20.04	Peak	70.00	200	Horizontal	Pass
4	374.991	20.93	-23.84	36.0	-15.07	Peak	125.00	200	Horizontal	Pass
5	455.966	19.92	-21.36	36.0	-16.08	Peak	140.00	200	Horizontal	Pass
6	966.543	25.41	-11.47	44.0	-18.59	Peak	154.00	100	Horizontal	Pass

30 MHz to 1 GHz, ANT V



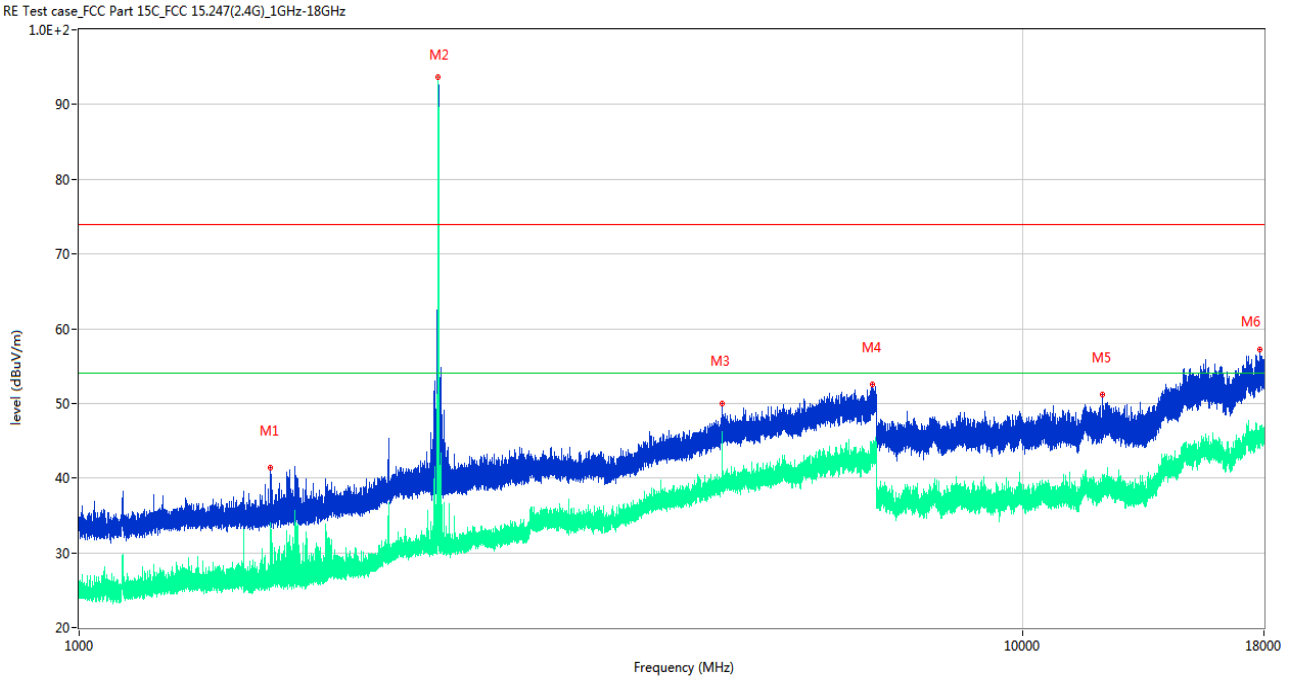
No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Over Limit (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	55.941	18.26	-27.51	30.0	-11.74	Peak	184.00	100	Vertical	Pass
2	121.157	20.66	-27.87	33.5	-12.84	Peak	68.00	100	Vertical	Pass
3	143.947	25.06	-26.15	33.5	-8.44	Peak	0.00	200	Vertical	Pass
4	229.528	16.21	-27.94	36.0	-19.79	Peak	120.00	200	Vertical	Pass
5	473.422	17.75	-21.28	36.0	-18.25	Peak	359.00	100	Vertical	Pass
6	644.584	21.80	-16.93	36.0	-14.20	Peak	171.00	200	Vertical	Pass

Test Data and Plots (1 GHz ~ 10th Harmonic)

Note 1: The marked spikes near 2400 MHz with circle should be ignored because they are Fundamental signal.

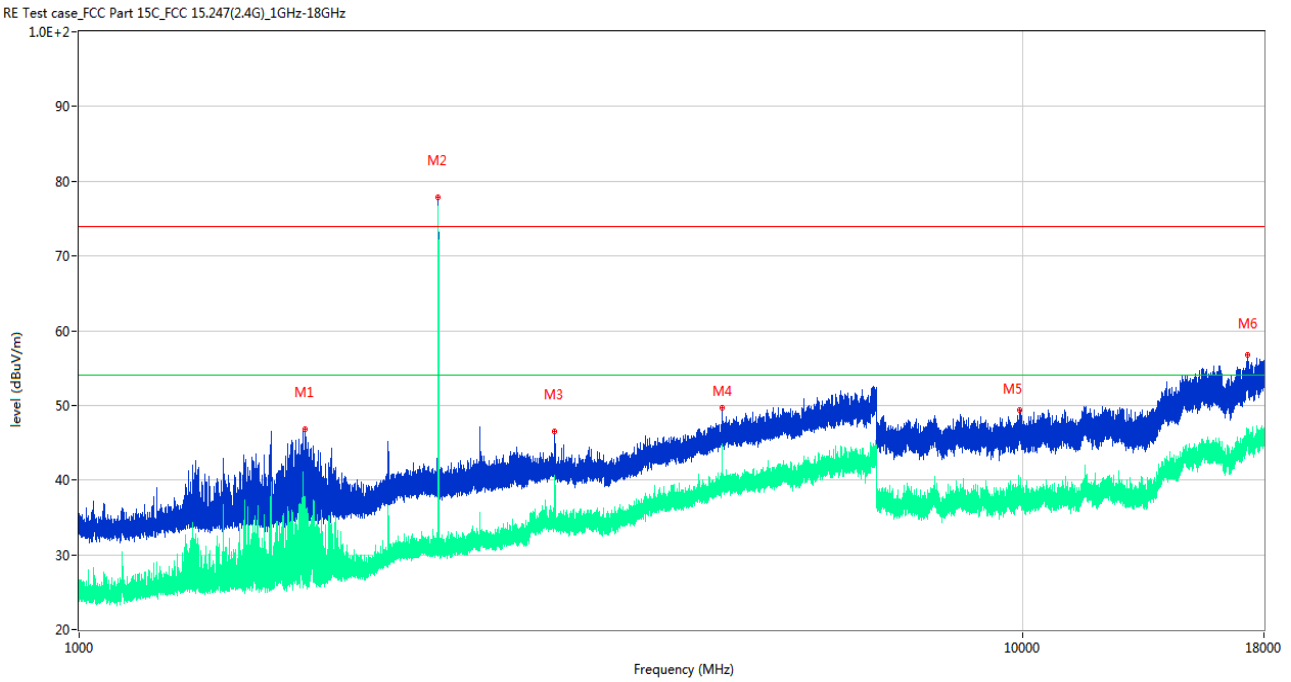
Note 2: The spurious from 18GHz-25GHz is noise only, do not show on the report.

GFSK LOW CHANNEL 1 GHz to 18 GHz, ANT H



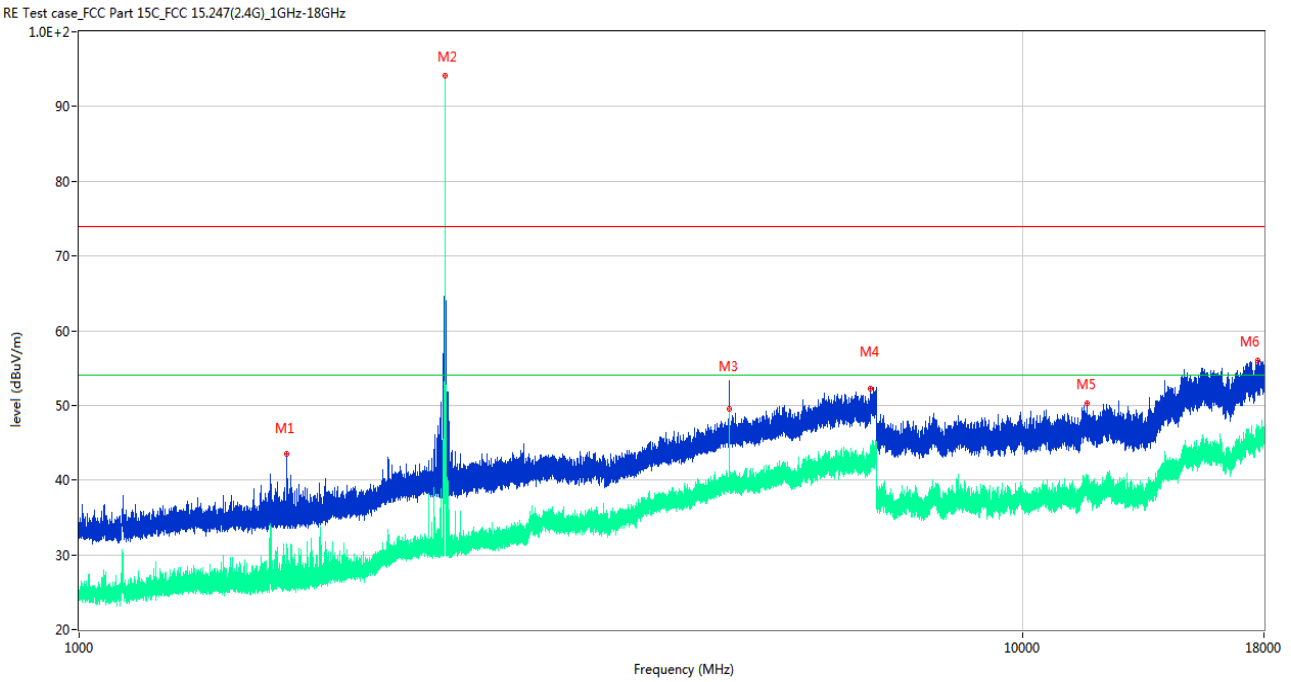
No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Over Limit (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	1595.500	41.32	-15.27	74.0	-32.68	Peak	325.00	150	Horizontal	Pass
1**	1595.500	32.02	-15.27	54.0	-21.98	AV	325.00	150	Horizontal	Pass
2	2401.800	93.64	-10.61	74.0	19.64	Peak	85.00	150	Horizontal	N/A
2**	2401.800	93.68	-10.61	54.0	39.68	AV	85.00	150	Horizontal	N/A
3	4803.200	50.04	-1.24	74.0	-23.96	Peak	57.00	150	Horizontal	Pass
3**	4803.200	44.80	-1.24	54.0	-9.20	AV	57.00	150	Horizontal	Pass
4	6921.600	52.50	4.46	74.0	-21.50	Peak	143.00	150	Horizontal	Pass
4**	6921.600	42.79	4.46	54.0	-11.21	AV	143.00	150	Horizontal	Pass
5	12141.650	51.20	19.86	74.0	-22.80	Peak	111.00	150	Horizontal	Pass
5**	12141.650	38.20	19.86	54.0	-15.80	AV	111.00	150	Horizontal	Pass
6	17812.574	57.16	23.89	74.0	-16.84	Peak	33.00	150	Horizontal	Pass
6**	17812.574	44.34	23.89	54.0	-9.66	AV	33.00	150	Horizontal	Pass

GFSK LOW CHANNEL 1 GHz to 18 GHz, ANT V



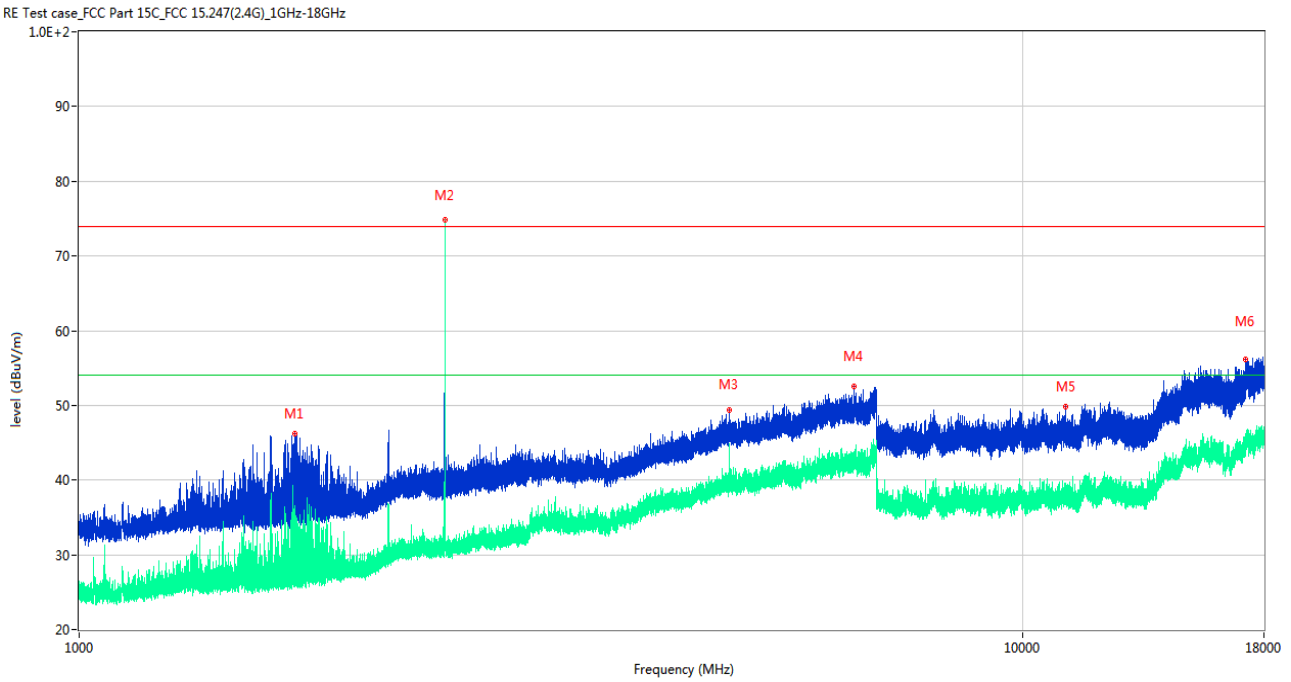
No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Over Limit (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	1735.100	46.83	-14.98	74.0	-27.17	Peak	268.00	150	Vertical	Pass
1**	1735.100	26.80	-14.98	54.0	-27.20	AV	268.00	150	Vertical	Pass
2	2401.700	77.88	-10.62	74.0	3.88	Peak	142.00	150	Vertical	N/A
2**	2401.700	76.57	-10.62	54.0	22.57	AV	142.00	150	Vertical	N/A
3	3186.400	46.51	-6.40	74.0	-27.49	Peak	285.00	150	Vertical	Pass
3**	3186.400	35.20	-6.40	54.0	-18.80	AV	285.00	150	Vertical	Pass
4	4803.600	49.62	-1.22	74.0	-24.38	Peak	321.00	150	Vertical	Pass
4**	4803.600	44.32	-1.22	54.0	-9.68	AV	321.00	150	Vertical	Pass
5	9927.612	49.33	17.80	74.0	-24.67	Peak	306.00	150	Vertical	Pass
5**	9927.612	38.66	17.80	54.0	-15.34	AV	306.00	150	Vertical	Pass
6	17279.699	56.76	24.49	74.0	-17.24	Peak	175.00	150	Vertical	Pass
6**	17279.699	46.05	24.49	54.0	-7.95	AV	175.00	150	Vertical	Pass

GFSK MIDDLE CHANNEL 1 GHz to 18 GHz, ANT H



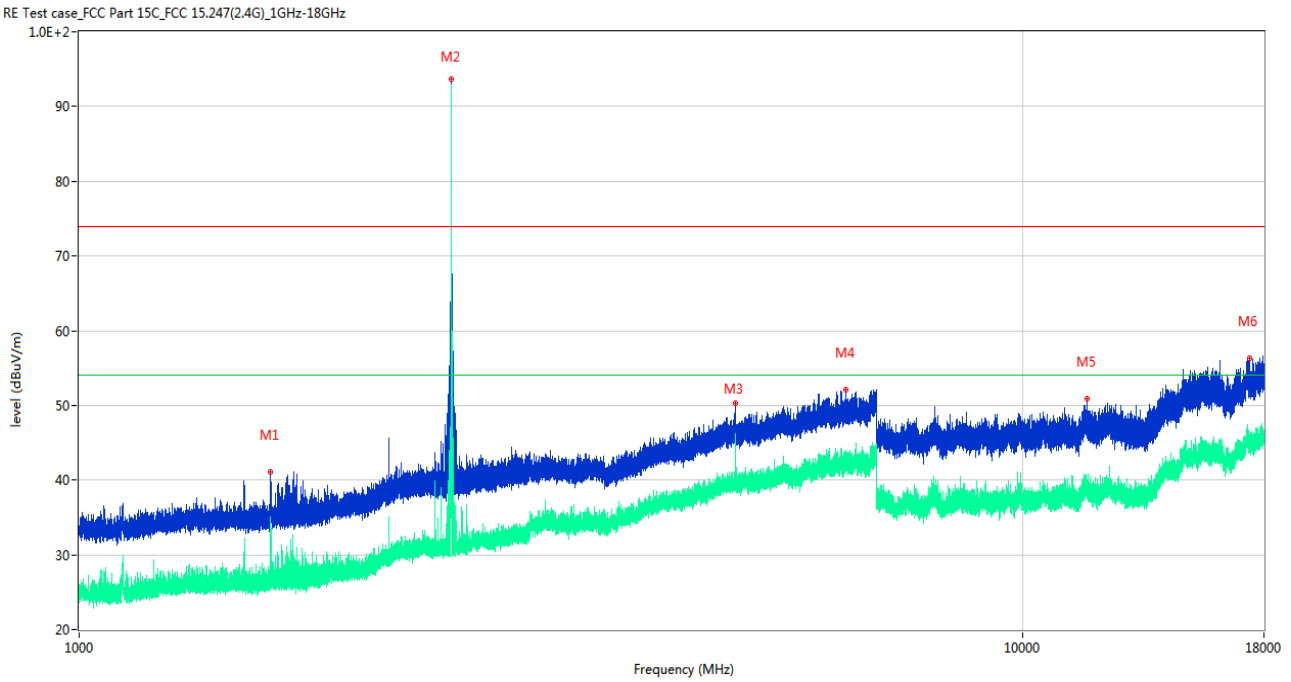
No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Over Limit (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	1660.100	43.45	-15.31	74.0	-30.55	Peak	300.00	150	Horizontal	Pass
1**	1660.100	31.38	-15.31	54.0	-22.62	AV	300.00	150	Horizontal	Pass
2	2440.600	94.43	-10.40	74.0	20.43	Peak	64.00	150	Horizontal	N/A
2**	2440.600	93.54	-10.40	54.0	39.54	AV	64.00	150	Horizontal	N/A
3	4881.400	53.33	-1.19	74.0	-20.67	Peak	146.00	150	Horizontal	Pass
3**	4881.400	49.49	-1.19	54.0	-4.51	AV	146.00	150	Horizontal	Pass
4	6897.200	52.30	4.51	74.0	-21.70	Peak	319.00	150	Horizontal	Pass
4**	6897.200	42.37	4.51	54.0	-11.63	AV	319.00	150	Horizontal	Pass
5	11689.125	50.31	19.96	74.0	-23.69	Peak	312.00	150	Horizontal	Pass
5**	11689.125	38.99	19.96	54.0	-15.01	AV	312.00	150	Horizontal	Pass
6	17733.825	56.02	24.01	74.0	-17.98	Peak	192.00	150	Horizontal	Pass
6**	17733.825	45.18	24.01	54.0	-8.82	AV	192.00	150	Horizontal	Pass

GFSK MIDDLE CHANNEL 1 GHz to 18 GHz, ANT V



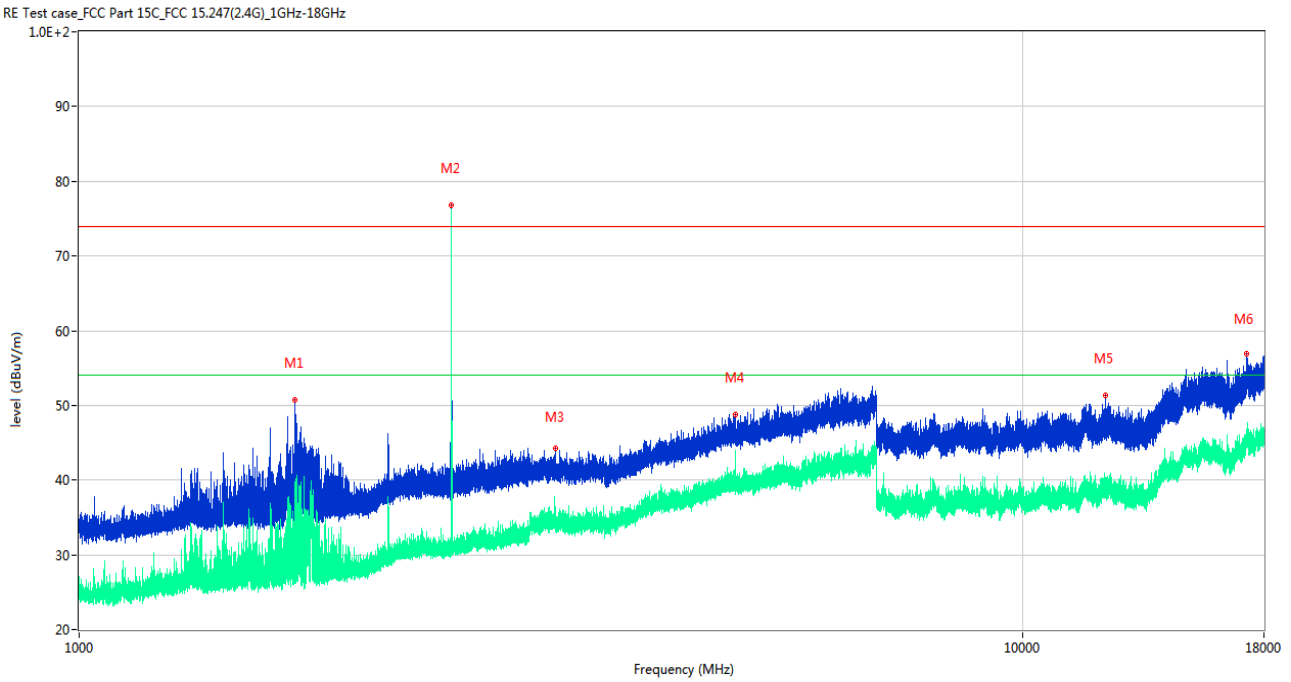
No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Over Limit (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	1694.100	46.21	-15.21	74.0	-27.79	Peak	268.00	150	Vertical	Pass
1**	1694.100	25.82	-15.21	54.0	-28.18	AV	268.00	150	Vertical	Pass
2	2441.200	75.20	-10.43	74.0	1.20	Peak	344.00	150	Vertical	N/A
2**	2441.200	73.33	-10.43	54.0	19.33	AV	344.00	150	Vertical	N/A
3	4881.200	49.42	-1.19	74.0	-24.58	Peak	331.00	150	Vertical	Pass
3**	4881.200	41.30	-1.19	54.0	-12.70	AV	331.00	150	Vertical	Pass
4	6620.400	52.58	3.67	74.0	-21.42	Peak	102.00	150	Vertical	Pass
4**	6620.400	42.68	3.67	54.0	-11.32	AV	102.00	150	Vertical	Pass
5	11103.487	49.87	18.90	74.0	-24.13	Peak	248.00	150	Vertical	Pass
5**	11103.487	36.95	18.90	54.0	-17.05	AV	248.00	150	Vertical	Pass
6	17216.438	56.21	23.92	74.0	-17.79	Peak	355.00	150	Vertical	Pass
6**	17216.438	44.59	23.92	54.0	-9.41	AV	355.00	150	Vertical	Pass

GFSK HIGH CHANNEL 1 GHz to 18 GHz, ANT H



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Over Limit (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	1593.100	41.13	-15.28	74.0	-32.87	Peak	149.00	150	Horizontal	Pass
1**	1593.100	28.51	-15.28	54.0	-25.49	AV	149.00	150	Horizontal	Pass
2	2479.600	93.61	-10.28	74.0	19.61	Peak	67.00	150	Horizontal	N/A
2**	2479.600	91.79	-10.28	54.0	37.79	AV	67.00	150	Horizontal	N/A
3	4960.800	50.29	-1.65	74.0	-23.71	Peak	149.00	150	Horizontal	Pass
3**	4960.800	44.21	-1.65	54.0	-9.79	AV	149.00	150	Horizontal	Pass
4	6492.000	52.09	2.78	74.0	-21.91	Peak	236.00	150	Horizontal	Pass
4**	6492.000	43.14	2.78	54.0	-10.86	AV	236.00	150	Horizontal	Pass
5	11681.075	50.85	20.05	74.0	-23.15	Peak	143.00	150	Horizontal	Pass
5**	11681.075	38.44	20.05	54.0	-15.56	AV	143.00	150	Horizontal	Pass
6	17384.438	56.25	23.71	74.0	-17.75	Peak	197.00	150	Horizontal	Pass
6**	17384.438	45.05	23.71	54.0	-8.95	AV	197.00	150	Horizontal	Pass

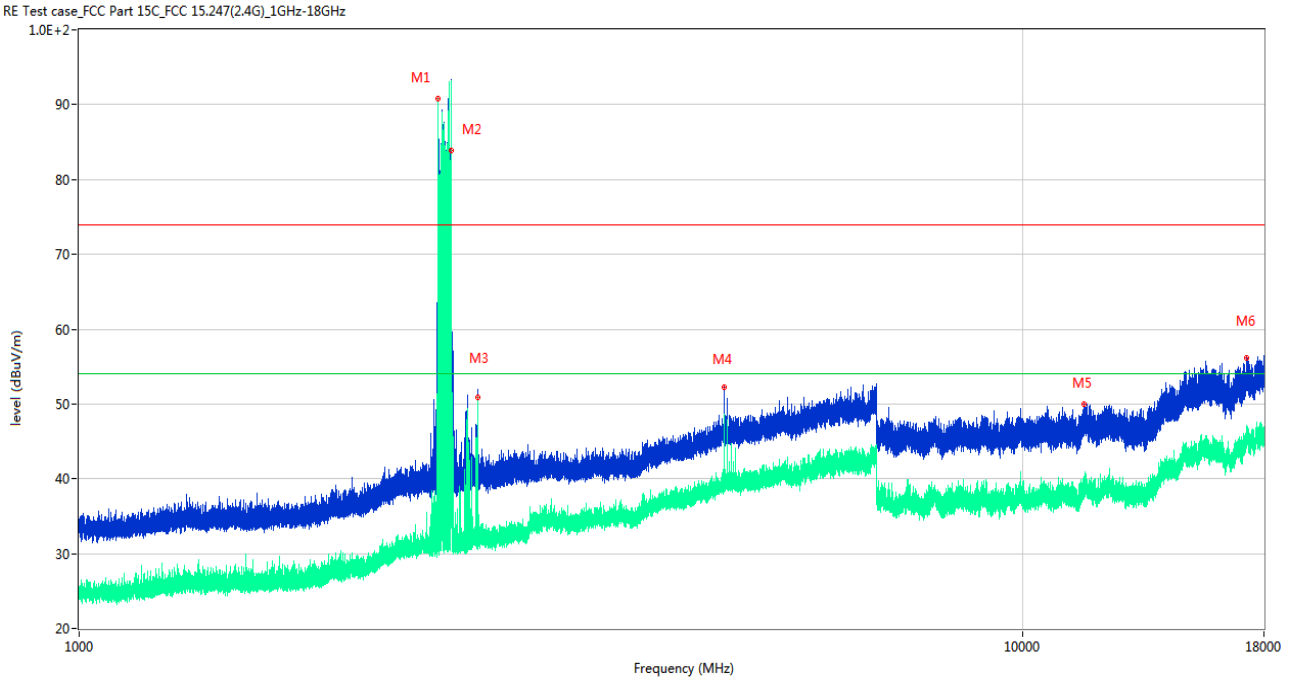
GFSK HIGH CHANNEL 1 GHz to 18 GHz, ANT V



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Over Limit (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	1693.800	50.71	-15.20	74.0	-23.29	Peak	271.00	150	Vertical	Pass
1**	1693.800	32.46	-15.20	54.0	-21.54	AV	271.00	150	Vertical	Pass
2	2479.700	76.74	-10.27	74.0	2.74	Peak	4.00	150	Vertical	N/A
2**	2479.700	75.54	-10.27	54.0	21.54	AV	4.00	150	Vertical	N/A
3	3198.800	44.32	-6.65	74.0	-29.68	Peak	336.00	150	Vertical	Pass
3**	3198.800	33.63	-6.65	54.0	-20.37	AV	336.00	150	Vertical	Pass
4	4960.600	48.70	-1.68	74.0	-25.30	Peak	336.00	150	Vertical	Pass
4**	4960.600	44.01	-1.68	54.0	-9.99	AV	336.00	150	Vertical	Pass
5	12216.401	51.28	20.45	74.0	-22.72	Peak	291.00	150	Vertical	Pass
5**	12216.401	39.16	20.45	54.0	-14.84	AV	291.00	150	Vertical	Pass
6	17270.776	56.92	24.38	74.0	-17.08	Peak	248.00	150	Vertical	Pass
6**	17270.776	44.96	24.38	54.0	-9.04	AV	248.00	150	Vertical	Pass

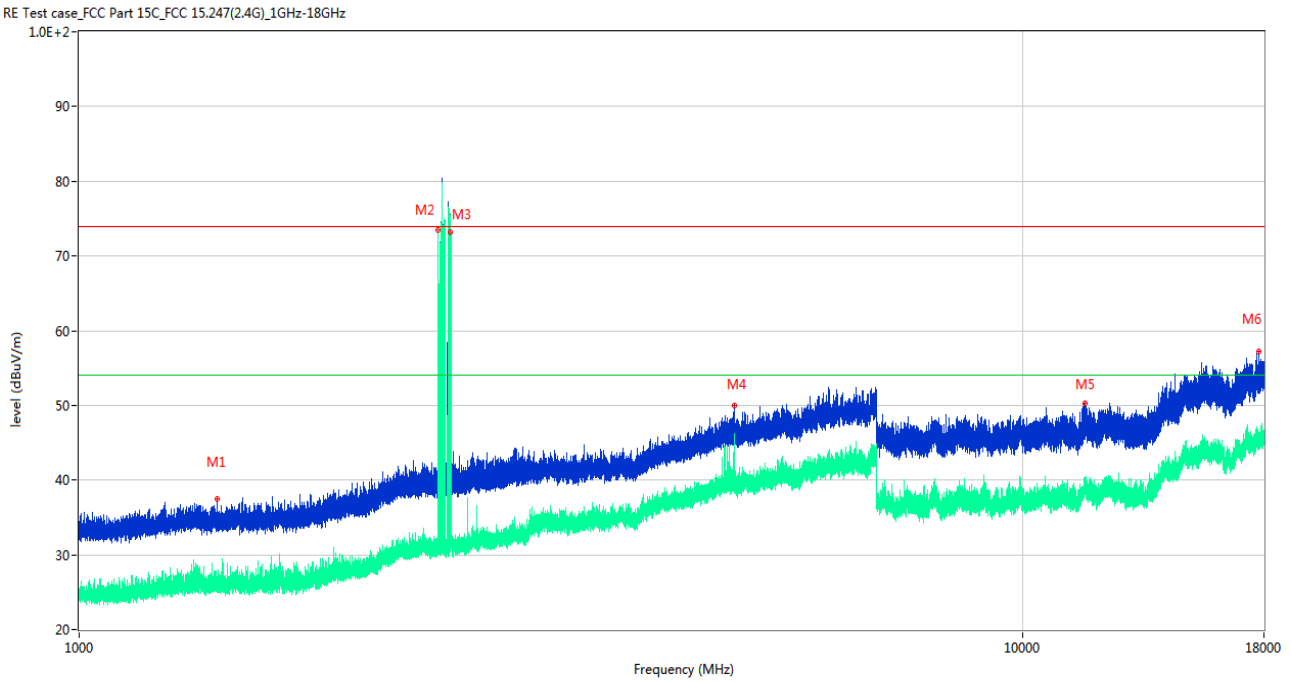
Hopping Mode:

GFSK MODE 1 GHz to 18 GHz, ANT H



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Over Limit (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	2402.200	90.93	-10.56	74.0	16.93	Peak	116.00	150	Horizontal	N/A
1**	2402.200	86.08	-10.56	54.0	32.08	AV	116.00	150	Horizontal	N/A
2	2479.700	84.07	-10.27	74.0	10.07	Peak	31.00	150	Horizontal	N/A
2**	2479.700	82.02	-10.27	54.0	28.02	AV	31.00	150	Horizontal	N/A
3	2644.300	51.49	-9.73	74.0	-22.51	Peak	94.00	150	Horizontal	Pass
3**	2644.300	50.89	-9.73	54.0	-3.11	AV	94.00	150	Horizontal	Pass
4	4823.400	52.29	-1.47	74.0	-21.71	Peak	122.00	150	Horizontal	Pass
4**	4823.400	46.33	-1.47	54.0	-7.67	AV	122.00	150	Horizontal	Pass
5	11612.075	49.98	20.20	74.0	-24.02	Peak	56.00	150	Horizontal	Pass
5**	11612.075	39.81	20.20	54.0	-14.19	AV	56.00	150	Horizontal	Pass
6	17251.875	56.11	24.21	74.0	-17.89	Peak	60.00	150	Horizontal	Pass
6**	17251.875	45.50	24.21	54.0	-8.50	AV	60.00	150	Horizontal	Pass

GFSK MODE 1 GHz to 18 GHz, ANT V



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Over Limit (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	1399.300	37.53	-14.91	74.0	-36.47	Peak	290.00	150	Vertical	Pass
1**	1399.300	26.83	-14.91	54.0	-27.17	AV	290.00	150	Vertical	Pass
2	2401.700	73.68	-10.62	74.0	-0.32	Peak	11.00	150	Vertical	N/A
2**	2401.700	73.43	-10.62	54.0	19.43	AV	11.00	150	Vertical	N/A
3	2477.200	73.19	-10.48	74.0	-0.81	Peak	71.00	150	Vertical	N/A
3**	2477.200	72.71	-10.48	54.0	18.71	AV	71.00	150	Vertical	N/A
4	4944.800	49.93	-1.65	74.0	-24.07	Peak	15.00	150	Vertical	Pass
4**	4944.800	43.12	-1.65	54.0	-10.88	AV	15.00	150	Vertical	Pass
5	11629.038	50.24	20.29	74.0	-23.76	Peak	344.00	150	Vertical	Pass
5**	11629.038	39.25	20.29	54.0	-14.75	AV	344.00	150	Vertical	Pass
6	17762.437	57.15	23.77	74.0	-16.85	Peak	351.00	150	Vertical	Pass
6**	17762.437	45.52	23.77	54.0	-8.48	AV	351.00	150	Vertical	Pass

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

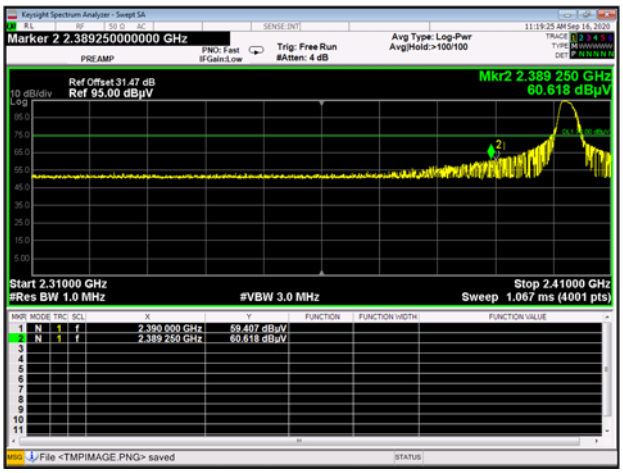
Note [1]: The lowest and highest channels are tested to verify the band edge emissions. Please refer to the following the plots for emissions values.
Note [2]: The test data all are tested in the vertical and horizontal antenna which the trace is max hold. So these plots have shown the worst case.
Note [3]: According the ANSI C63.10-2013, where limits are specified for both average and peak (or quasi-peak) detector functions, if the peak (or quasi-peak) measured value complies with the average limit, it is unnecessary to perform an average measurement.
Note [4]: The Level (dBuV/m) has been corrected by factor.

Test Data

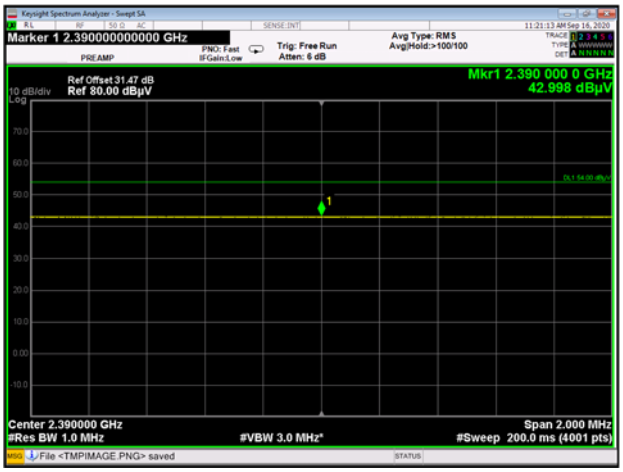
Test Mode	Test Channel	Frequency (MHz)	Level (dBuV/m)	Factor (dB)	Limit Line (dBuV/m)	Margin (dB)	Remark	Verdict
GFSK	Low	2390.00	60.618	31.47	74	13.382	PEAK	Pass
		2390.00	43.001	31.47	54	10.999	AVERAGE	Pass
GFSK	HIGH	2483.50	69.989	31.40	74	4.011	PEAK	Pass
		2483.50	43.830	31.40	54	10.170	AVERAGE	Pass
GFSK(Hopping)	Low	2390.00	59.663	31.47	74	14.337	PEAK	Pass
		2390.00	42.851	31.47	54	11.149	AVERAGE	Pass
GFSK(Hopping)	HIGH	2483.50	69.857	31.40	74	4.143	PEAK	Pass
		2483.50	43.014	31.40	54	10.986	AVERAGE	Pass

Test Plots

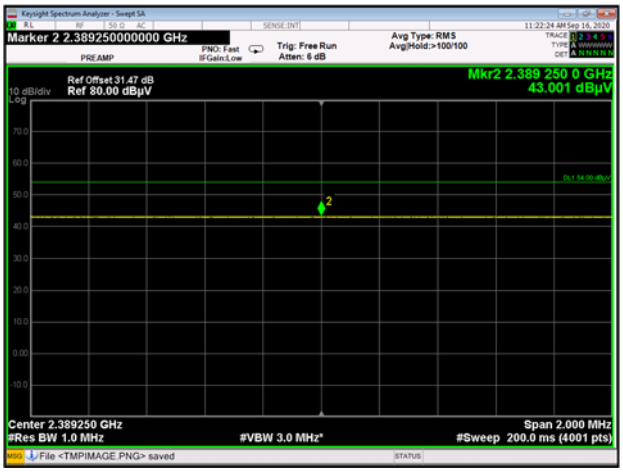
GFSK LOW CHANNEL, PEAK



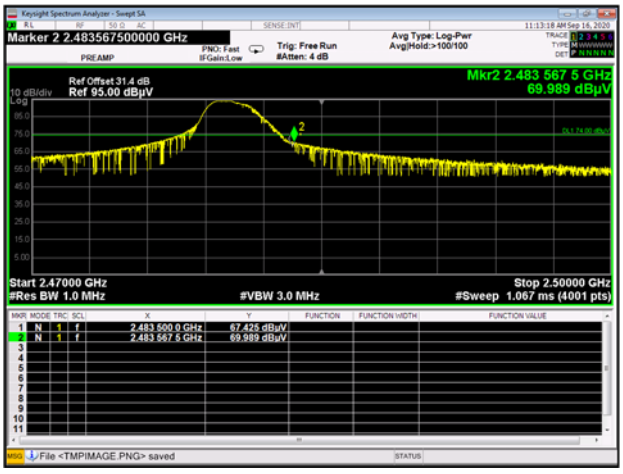
GFSK LOW CHANNEL, AV



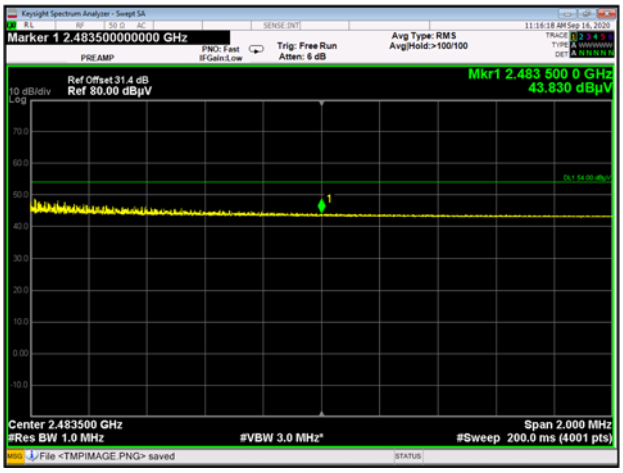
GFSK LOW CHANNEL, AV



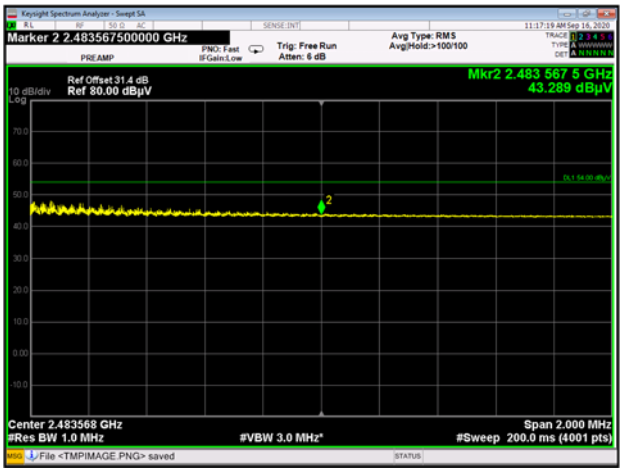
GFSK HIGH CHANNEL, PEAK



GFSK HIGH CHANNEL, AV

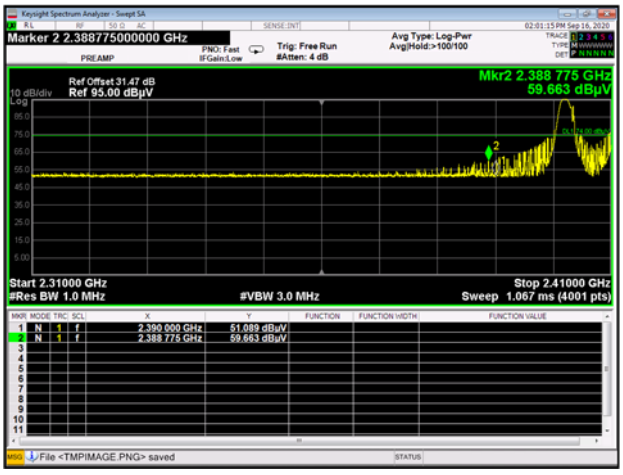


GFSK HIGH CHANNEL, AV

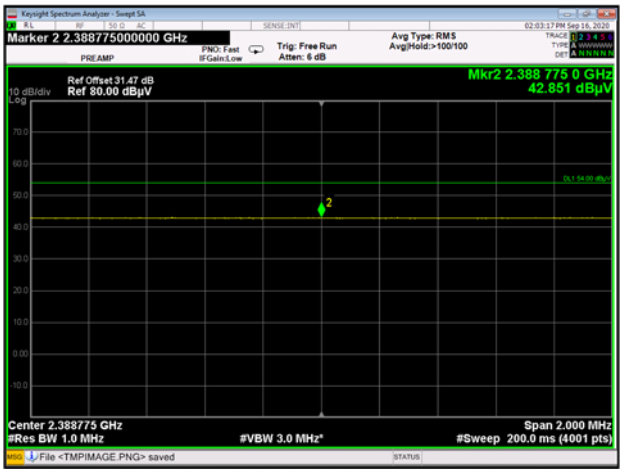


Hopping Mode:

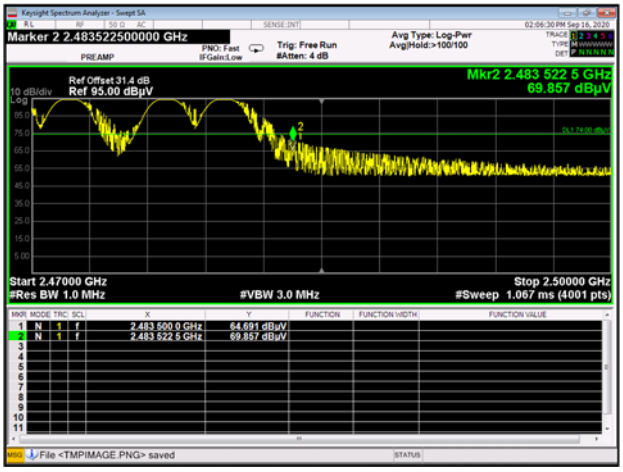
GFSK LOW FREQUENCY BAND, PEAK



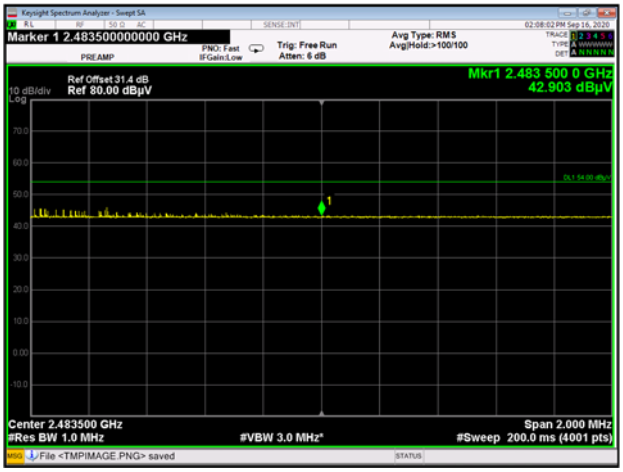
GFSK LOW FREQUENCY BAND, AV



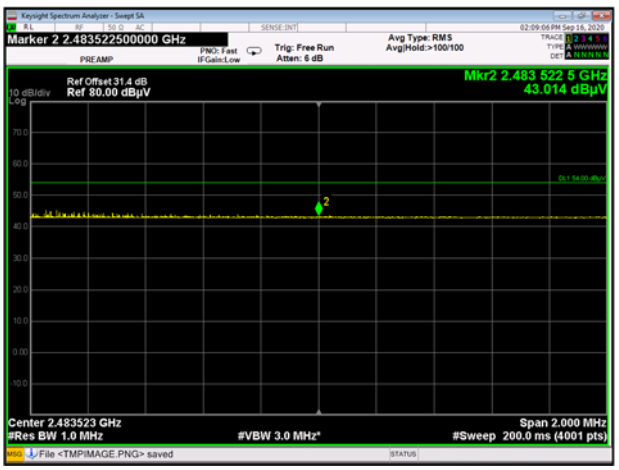
GFSK HIGH FREQUENCY BAND, PEAK



GFSK HIGH FREQUENCY BAND, AV



GFSK HIGH FREQUENCY BAND, PEAK



ANNEX B TEST SETUP PHOTOS

Please refer the document “BL-SZ2080669-AR.PDF”.

ANNEX C EUT EXTERNAL PHOTOS

Please refer the document “BL-SZ2080669-AW.PDF”.

ANNEX D EUT INTERNAL PHOTOS

Please refer the document “BL-SZ2080669-AI.PDF”.

--END OF REPORT--