FCC 47 CFR PART 15 SUBPART C
ANSI C63.10: 2013

TEST REPORT

For

Cherry Wireless Mouse

Model: JF-85

Data Applies To: N/A

Brand: CHERRY

Test Report Number:
T190524N01-RP1-1

Issued to

CHERRY GmbH
Cherrystraße, 91275 Auerbach, Deutschland/Germany

Issued by

Compliance Certification Services Inc.
Tainan Lab.
No.8,Jiucengling, Xinhua Dist., Tainan City 712, Taiwan (R.O.C.)
TEL: 886-6-580-2201
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Issued Date: June 13, 2019

REVISION HISTORY

Rev.	Issue Date	Revisions	Effect Page	Revised By
00	June 13, 2019	Initial Issue	ALL	Gina Lin

TABLE OF CONTENTS

1. TEST REPORT CERTIFICATION

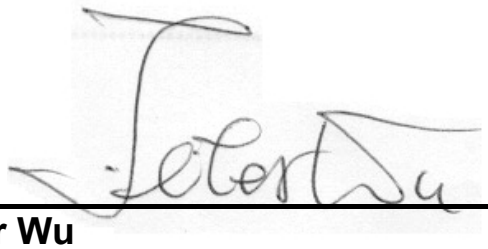
Applicant	:	**CHERRY GmbH** Cherrystraße, 91275 Auerbach, Deutschland/Germany
Manufacturer	:	**Jing Mold Electronic Tech. (Shen Zhen) Co., Ltd.** Xin Qiao 3rd Industrial Estate, Sha Jing, Bao An, Shenzhen, Guangdong, P.R. China
Equipment Under Test	:	Cherry Wireless Mouse
Model Number	:	JF-85
Data Applies To	:	N/A
Brand Name	:	CHERRY
Date of Test	:	June 06, 2019 ~ June 06, 2019

APPLICABLE STANDARD	
STANDARD	**TEST RESULT**
FCC 47 CFR Part 15 Subpart C ANSI C63.10: 2013	No non-compliance noted

Statements of Conformity
Determining compliance shall be based on the results of the compliance measurement, not taking into account measurement instrumentation uncertainty.

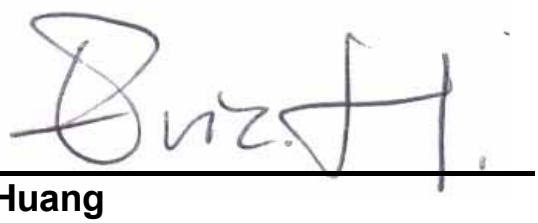
FCC Standard Section	Report Section	Test Item	Result
15.247(a)	8.1	6dB BANDWIDTH	Pass
15.247(b)	8.2	MAXIMUM PEAK OUTPUT POWER	Pass
-	8.3	DUTY CYCLE	-
15.247(e)	8.4	POWER SPECTRAL DENSITY	Pass
15.247(d)	8.5	CONDUCTED SPURIOUS EMISSION	Pass
15.205(a)	8.6	RADIATED EMISSIONS	Pass
15.207(a)	8.7	POWERLINE CONDUCTED EMISSIONS	Pass

Approved by:



Jeter Wu
Assistant Manager

Reviewed by:



Eric Huang
Section Manager

2. EUT DESCRIPTION

2.1 DESCRIPTION OF EUT & POWER

Product Name	Cherry Wireless Mouse
Model Number	JF-85
Data Applies To	N/A
Brand Name	CHERRY
Received Date	May 24, 2019
Reported Date	June 13, 2019
Operating Frequency Range	2402MHz~2480MHz
Transmit Power	-5.72dBm (0.26786mW)
Average Power	-6.33dBm (0.2327mW)
Channel Spacing	2 MHz
Channel Number	40 Channels
Transmit Data Rate	2 Mbps
Type of Modulation	GFSK
Frequency Selection	By software / firmware
Antenna Type	Type: Printed Antenna Model: N/A Manufacturer: N/A Gain: 3.2 dBi
RF Module Model	MAB43S
Power Source	DC 3.7V (Powered from battery)
Temperature Range	0°C ~ +40°C
Firmware Version	MA38MS-4_AES_V1.12_53D6
Software Version	N/A
Hardware Version	V02

REMARK: 1. The sample selected for test was engineering sample that approximated to production product and was provided by manufacturer.
2. This submittal(s) (test report) is intended for FCC ID: **GDDJF-85** filing to comply with Section 15.207, 15.209 and 15.247 of the FCC Part 15, Subpart C Rules.
3. For more details, please refer to the user manual.

3. DESCRIPTION OF TEST MODES

The EUT is a Cherry Wireless Mouse.

The antenna peak gain 3.2 dBi (highest gain) were chosen for full testing.

GFSK mode

The EUT had been tested under operating condition.

There are three channels have been tested as following:

Channel	Frequency (MHz)
Low	2402
Middle	2442
High	2480

GFSK mode: 2Mbps long data rates (worst case) were chosen for full testing.

4. TEST METHODOLOGY

The tests documented in this report were performed in accordance with ANSI C63.10 and FCC CFR 47 15.207, 15.209 and 15.247 and KDB 558074.

5. FACILITIES AND ACCREDITATIONS

5.1 FACILITIES

All measurement facilities used to collect the measurement data are located at

No.8,Jiucengling, Xinhua Dist., Tainan City 712, Taiwan (R.O.C.)

The sites are constructed in conformance with the requirements of ANSI C63.7:1992, ANSI C63.10: 2013 and CISPR Publication 22.

5.2 EQUIPMENT

Radiated emissions are measured with one or more of the following types of linearly polarized antennas: tuned dipole, biconical, log periodic, bi-log, and/or ridged waveguide, horn. Spectrum analyzers with preselectors and quasi-peak detectors are used to perform radiated measurements.

Conducted emissions are measured with Line Impedance Stabilization Networks and EMI Test Receivers.

Calibrated wideband preamplifiers, coaxial cables, and coaxial attenuators are also used for making measurements.

All receiving equipment conforms to CISPR Publication 16-1, “Radio Interference Measuring Apparatus and Measurement Methods.”

5.3 LABORATORY ACCREDITATIONS LISTINGS

The test facilities used to perform radiated and conducted emissions tests are accredited by Taiwan Accreditation Foundation for the specific scope of accreditation under Lab Code: 1109 to perform Electromagnetic Interference tests according to FCC PART 15 AND CISPR 22 requirements. No part of this report may be used to claim or imply product endorsement by TAF or any agency of the Government. In addition, the test facilities are listed with Federal Communications Commission (registration no: TW-1109 and 455173).

5.4 TABLE OF ACCREDITATIONS AND LISTINGS

Our laboratories are accredited and approved by the following accreditation body according to ISO/IEC 17025.

Taiwan	TAF

The measuring facility of laboratories has been authorized or registered by the following approval agencies.

Canada	Industry Canada
Germany	TUV NORD
Taiwan	BSMI
USA	FCC
Japan	VCCI

Copies of granted accreditation certificates are available for downloading from our web site, http://www.ccsrf.com

6. CALIBRATION AND UNCERTAINTY

6.1 MEASURING INSTRUMENT CALIBRATION

The measuring equipment utilized to perform the tests documented in this report has been calibrated in accordance with the manufacturer's recommendations, and is traceable to recognized national standards.

6.2 MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the apparatus:

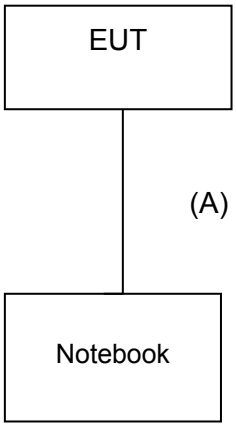
Parameter	Uncertainty
Radiated Emission, 30 to 200 MHz Test Site : CB966	±3.1dB
Radiated Emission, 200 to 1000 MHz Test Site : CB966	±2.7dB
Radiated Emission, 1 to 6 GHz	±2.7dB
Radiated Emission, 6 to 18 GHz	±2.7dB
Radiated Emission, 18 to 26.5 GHz	±2.7dB
Radiated Emission, 26 to 40 GHz	±3.7dB
Power Line Conducted Emission	±2.0dB

This measurement uncertainty is confidence of approximately 95%, k=2

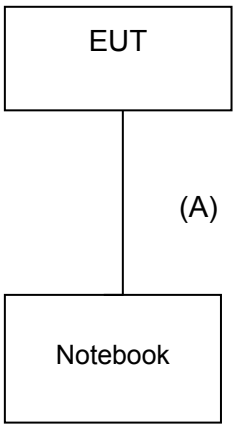
7. SETUP OF EQUIPMENT UNDER TEST

7.1 SETUP CONFIGURATION OF EUT

【RF】



【EMC】



7.2 SUPPORT EQUIPMENT

RF test

No.	Product	Manufacturer	Model No.	Certify No.	Signal cable
1	Notebook	Acer	AS 3830TG	DOC	Power cable, unshd, 1.6m

No.	Signal cable description	
A	USB	Shielded, 1.5m, 1pcs.

EMC test

No.	Product	Manufacturer	Model No.	Certify No.	Signal cable
1	Notebook	TOSHIBA	PORTEGE R30-A	DOC	Power cable, unshd, 1.8m

No.	Signal cable description	
A	USB	Shielded, 0.5m, 1pcs.

REMARK:

1. All the above equipment/cables were placed in worse case positions to maximize emission signals during emission test.
2. Grounding was established in accordance with the manufacturer's requirements and conditions for the intended use.
3. shd. = shielded; unshd. = unshielded

7.3 EUT OPERATING CONDITION

RF Setup

(1).To press" **Middle + Right**" button then switch on to RF position, release it after about 1 second and enter the EMI mode.
(2).Into the Scan Mode in range 2402~2480MHz (40ch)transmission frequency.
a. In Scan Mode press " **Middle**" button into2402MHz, Single-channel frequency hopping, frequency hopping time is 500ms to transmit 8ms data
(3). Click "**Right**" button into Modulation frequency 2402MHz (±500K), continuous emission.
(4). Click "**Right**" button into Modulation frequency 2440MHz (±500K), continuous emission.
(5). Click "**Right**" button into Modulation frequency 2480MHz (±500K), continuous emission.
a. In Modulation mode, sliding wheel can adjust frequency 2402MHz~2480MHz (±500K).
b. In Modulation mode, click middle button to cycle 2402MHz±500K, 2440MHz±500K, 2480MHz±500K three frequency.
(6). Click "**Right**" button into Modulation frequency 2402MHz (±500K), continuous receive.
(7) Click "**Right**" button into Modulation frequency 2440MHz (±500K), continuous receive.
(8). Click "**Right**" button into Modulation frequency 2480MHz (±500K), continuous receive.
(9). Click "**Right**" button into Non-Modulation frequency 2402MHz (±500K), continuous emission.
(10).Click "**Right**" button into Non-Modulation frequency 2440MHz (±500K), continuous emission.
(11).Click "**Right**" button into Non-Modulation frequency 2480MHz (±500K), continuous emission.
(12). Click "**Right**" button into Non-Modulation frequency 2402MHz (±500K), continuous receive.
(13). Click "**Right**" button into Non-Modulation frequency 2440MHz (±500K), continuous receive.
(14). Click "**Right**" button into Non-Modulation frequency 2480MHz (±500K), continuous receive.
(15). Click "**Right**" button into Non-Modulation frequency 2402MHz, continuous emission.
(16). Click "**Right**" button into Non-Modulation frequency 2440MHz, continuous emission.
(17). Click "**Right**" button into Non-Modulation frequency 2480MHz, continuous emission.
(18). Click "**Right**" button into Non-Modulation frequency 2402MHz, continuous receive.
(19). Click "**Right**" button into Non-Modulation frequency 2440MHz, continuous receive.
(20). Click "**Right**" button into Non-Modulation frequency 2480MHz, continuous receive.
(21). Click "**Right**" button resume to Scan Mode. Click "**Left**" button into normal Mode.

8. APPLICABLE LIMITS AND TEST RESULTS

8.1 6dB BANDWIDTH

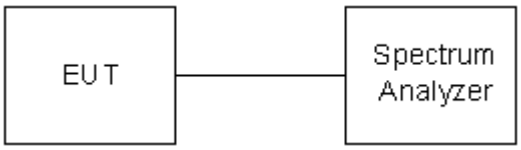
LIMIT

§ 15.247(a) For direct sequence systems, the minimum 6dB bandwidth shall be at least 500kHz

TEST EQUIPMENTS

Name of Equipment	Manufacturer	Model	Serial Number	Calibration Date	Calibration Due
EXA Spectrum Analyzer	KEYSIGHT	N9010A	MY54430216	07/05/2018	07/04/2019
SMA Cable + 10dB Attenuator	CCS	SMA + 10dB Att	O6	01/25/2019	01/24/2020

TEST SETUP



TEST PROCEDURE

a) Set RBW = 100 kHz.
b) Set the video bandwidth (VBW) ≥ 3 RBW.
c) Detector = Peak.
d) Trace mode = max hold.
e) Sweep = auto couple.
f) Allow the trace to stabilize.
g) Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission.

TEST RESULTS

No non-compliance noted.

Model Name	JF-85	Test By	Ted Huang
Temp & Humidity	25.8°C, 67%	Test Date	2019/06/06

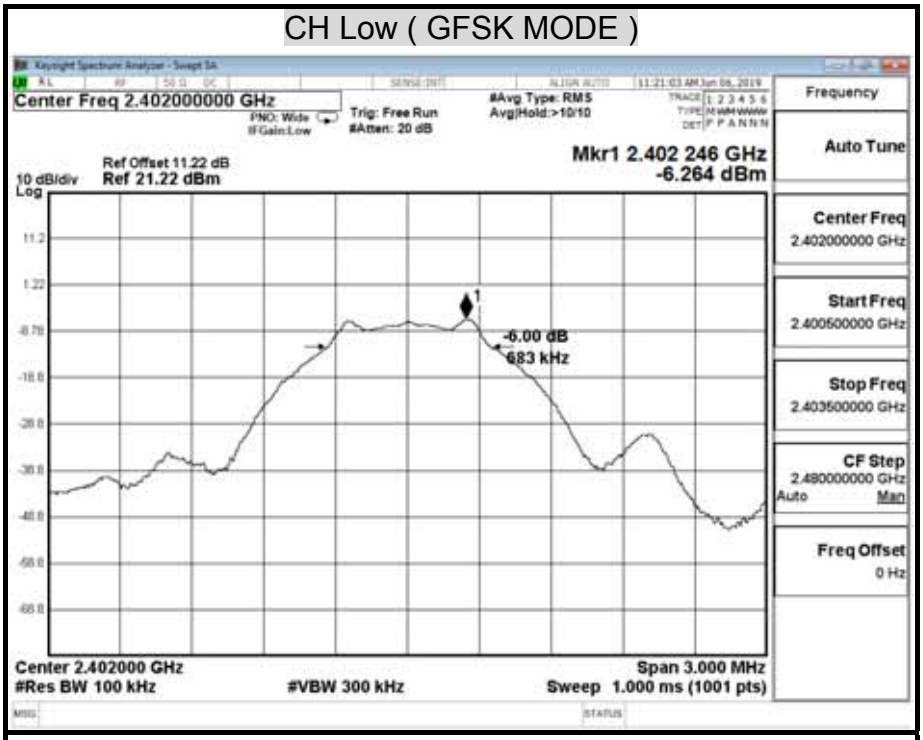
GFSK mode

Channel	Channel Frequency (MHz)	6dB Bandwidth (kHz)	Minimum Limit (kHz)	Pass/Fail
Low	2402	683	500	PASS
Middle	2440	680	500	PASS
High	2480	691	500	PASS

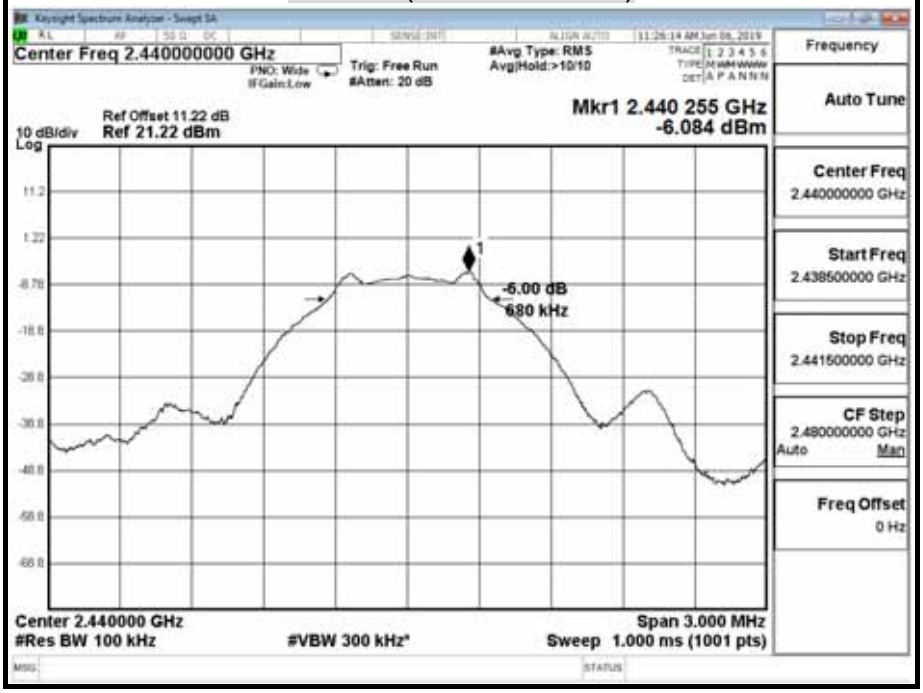
NOTE : 1. At finial test to get the worst-case emission at1Mbps long.
2. The cable assembly insertion loss of 11.1dB (including 10 dB pad and 1.1 dB cable) was entered as an offset in the spectrum analyzer to allow for direct reading of power.

6dB BANDWIDTH (GFSK MODE)

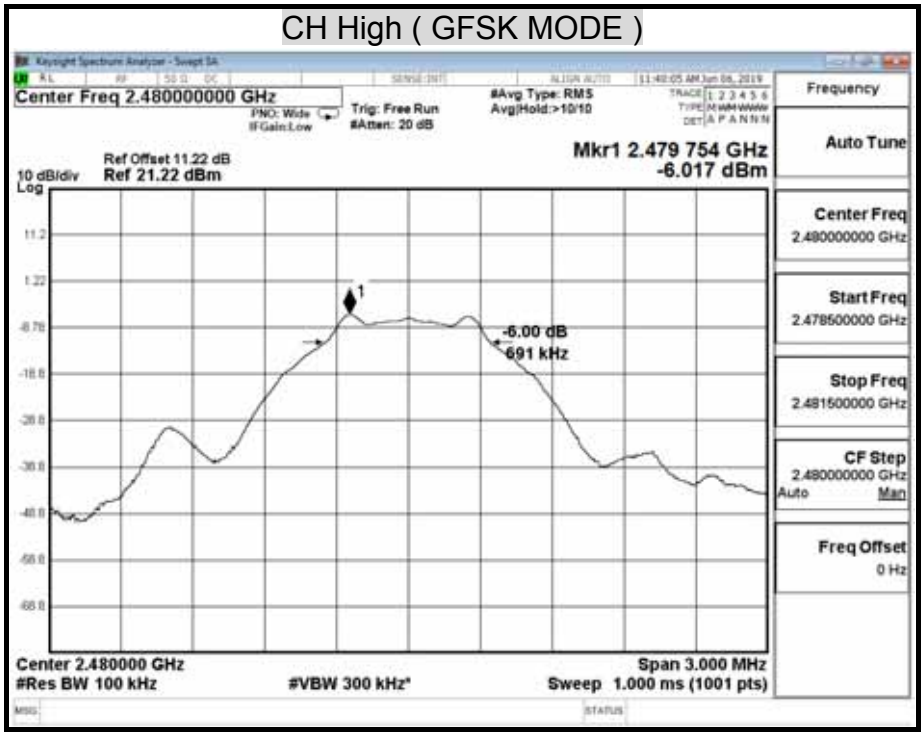
CH Low (GFSK MODE)



CH Mid (GFSK MODE)



CH High (GFSK MODE)



8.2 MAXIMUM PEAK OUTPUT POWER

LIMIT

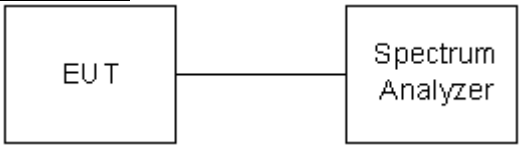
§ 15.247(b) The maximum peak output power of the intentional radiator shall not exceed the following :
§ 15.247(b) (3) For systems using digital modulation in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz bands : 1 watt.
§ 15.247(b) (4) Except as shown in paragraphs (c) of this section , if transmitting antennas of directional gain greater than 6 dBi are used the peak output power from the intentional radiator shall be reduced below the stated values in paragraphs (b)(1) or (b)(2), and (b)(3) of this section , as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

Name of Equipment	Manufacturer	Model	Serial Number	Calibration Date	Calibration Due
EXA Spectrum Analyzer	KEYSIGHT	N9010A	MY54430216	07/05/2018	07/04/2019
SMA Cable + 10dB Attenuator	CCS	SMA + 10dB Att	O6	01/25/2019	01/24/2020

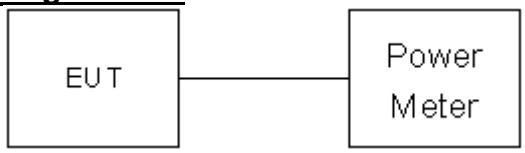
Remark: *Each piece of equipment is scheduled for calibration once a year.*

TEST SETUP

For Peak Power



For Average Power



TEST PROCEDURE

The tests were performed in accordance with KDB 558074 9.1.1

9.1.1 Measurement Procedure PK2:

a) Set the RBW ≥ DTS bandwidth.
b) Set VBW ≥ 3 RBW.
c) Set span ≥ 3 x RBW
d) Sweep time = auto couple.
e) Detector = peak.
f) Trace mode = max hold.
g) Allow trace to fully stabilize.
h) Use peak marker function to determine the peak amplitude level.

Average Power

Connect the EUT to power meter, set the center frequency of the power meter to the channel center frequency.

TEST RESULTS

No non-compliance noted.

Model Name	JF-85	Test By	Ted Huang
Temp & Humidity	25.8°C, 67%	Test Date	2019/06/06

GFSK mode

Channel	Channel Frequency (MHz)	Peak Power (dBm)	Peak Power Limit (dBm)	Pass / Fail
Low	2402	-6.13	30.00	PASS
Middle	2442	-5.90	30.00	PASS
High	2480	-5.72	30.00	PASS

NOTE : 1. At finial test to get the worst-case emission at 1Mbps long.
2. The cable assembly insertion loss of 11.1dB (including 10 dB pad and 1.1 dB cable) was entered as an offset in the power meter to allow for direct reading of power.

Average Power Data

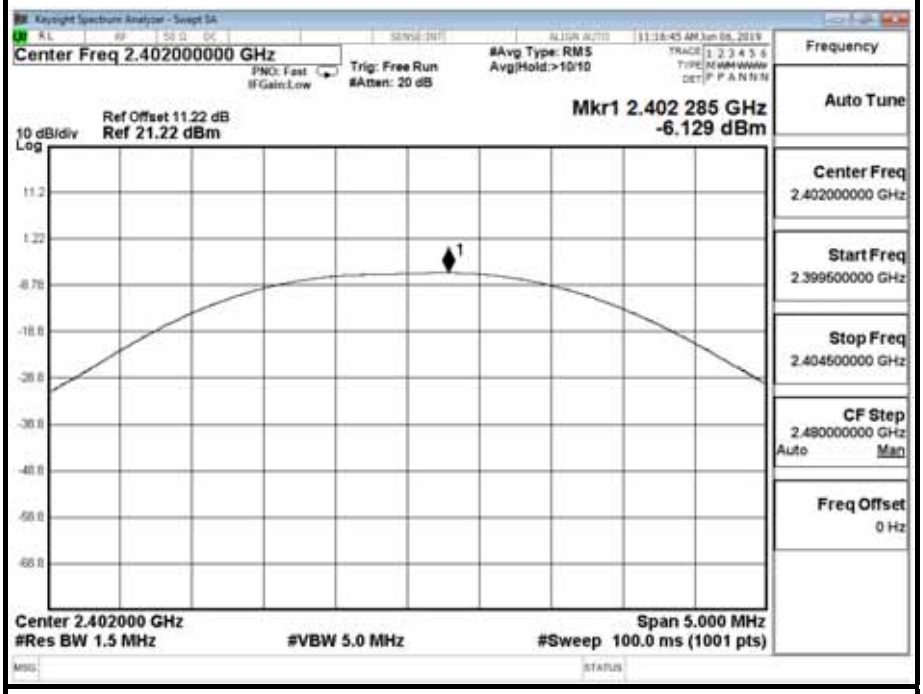
Model Name	JF-85	Test By	Ted Huang
Temp & Humidity	25.8°C, 67%	Test Date	2019/06/06

GFSK mode

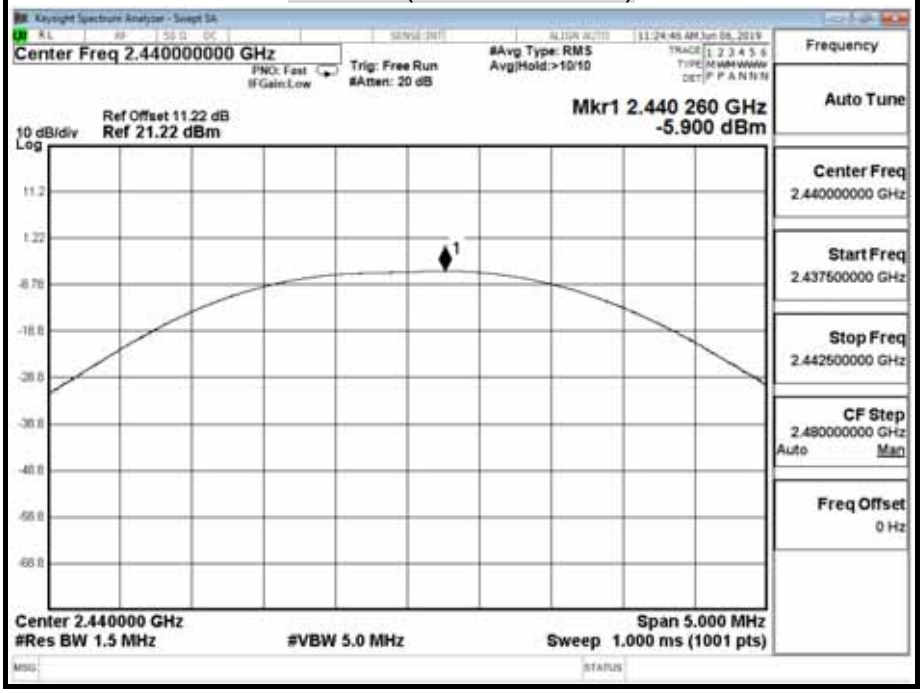
Channel	Channel Frequency (MHz)	Average Power (dBm)
Low	2402	-6.55
Middle	2442	-6.45
High	2480	-6.33

MAXIMUM PEAK OUTPUT POWER (GFSK MODE)

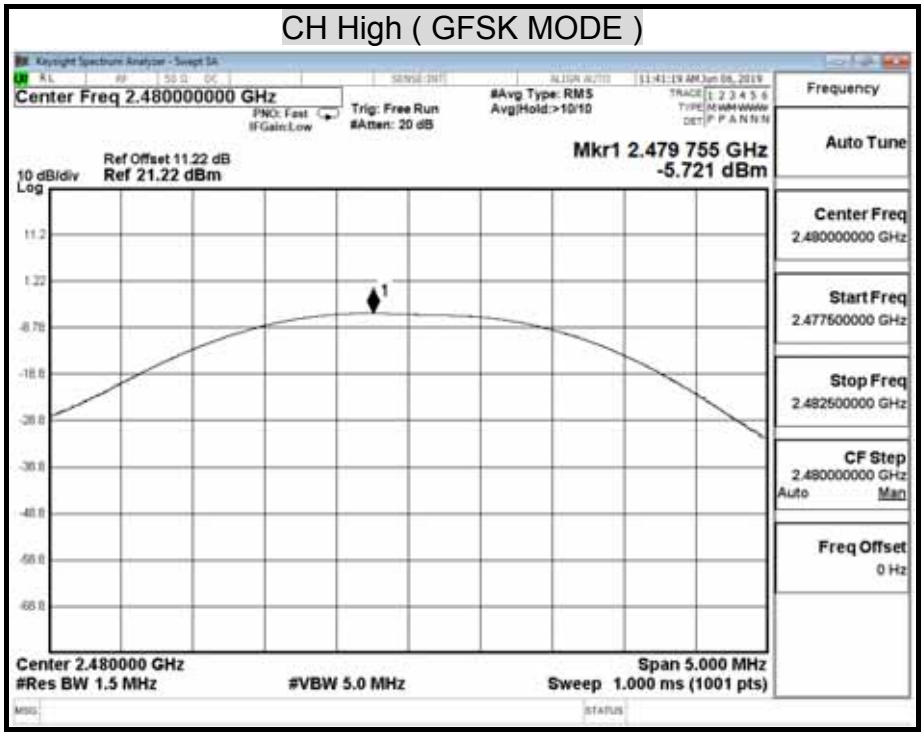
CH Low (GFSK MODE)



CH Mid (GFSK MODE)



CH High (GFSK MODE)



8.3 DUTY CYCLE

LIMIT

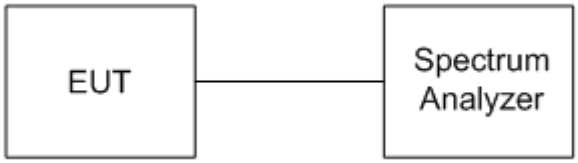
Nil (No dedicated limit specified in the Rules)

TEST EQUIPMENT

Name of Equipment	Manufacturer	Model	Serial Number	Calibration Date	Calibration Due
EXA Spectrum Analyzer	KEYSIGHT	N9010A	MY54430216	07/05/2018	07/04/2019
SMA Cable + 10dB Attenuator	CCS	SMA + 10dB Att	O6	01/25/2019	01/24/2020

Remark: *Each piece of equipment is scheduled for calibration once a year.*

TEST SETUP



TEST PROCEDURE

1. Place the EUT on the table and set it in transmitting mode.
2. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.
3. The zero-span mode on a spectrum analyzer or EMI receiver if the response time and spacing between bins on the sweep are sufficient to permit accurate measurements of the on and off times of the transmitted signal. Set the center frequency of the instrument to the center frequency of the transmission. Set RBW ≥ OBW if possible; otherwise, set RBW to the largest available value. Set VBW ≥ RBW. Set detector = peak or average. The zero-span measurement method shall not be used unless both RBW and VBW are > 50/T and the number of sweep points across duration T exceeds 100. (For example, if VBW and/or RBW are limited to 3 MHz, then the zero-span method of measuring duty cycle shall not be used if T ≤ 16.7 microseconds.)

TEST RESULTS

No non-compliance noted.

Model Name	JF-85	Test By	Ted Huang
Temp & Humidity	25.8°C, 67%	Test Date	2019/06/06

TEST DATA

	us	Times	Ton	Total Ton time(ms)
Ton1	100000.000	1	100000	
Ton2		0	0	
Ton3			0	100
Tp				100

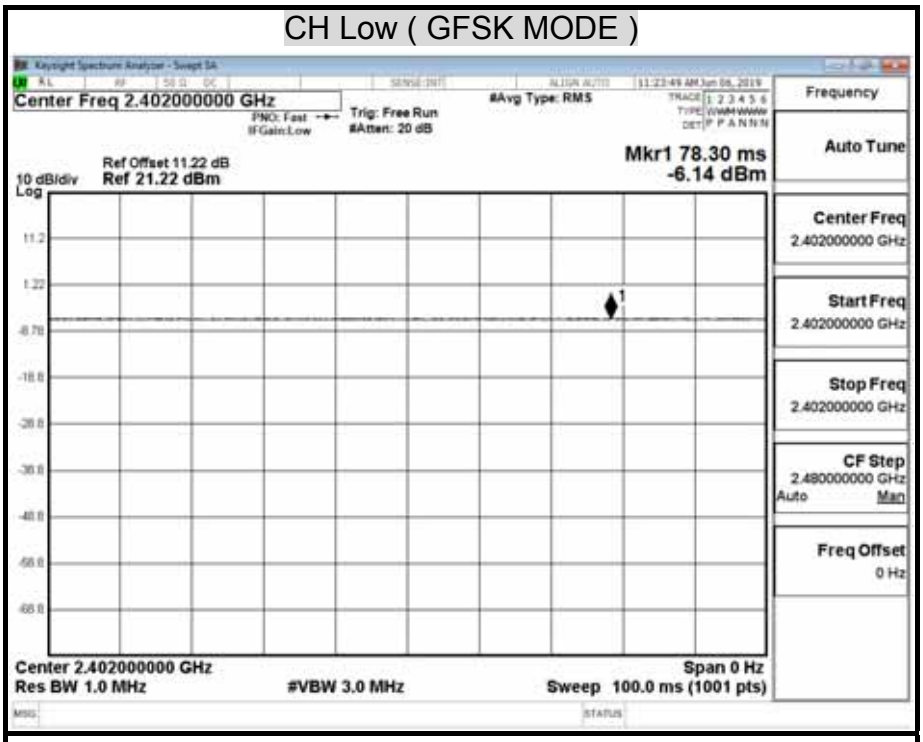
Ton	100
Tp(Ton+Toff)	100
Duty Cycle	1
Duty Factor	0

100 %

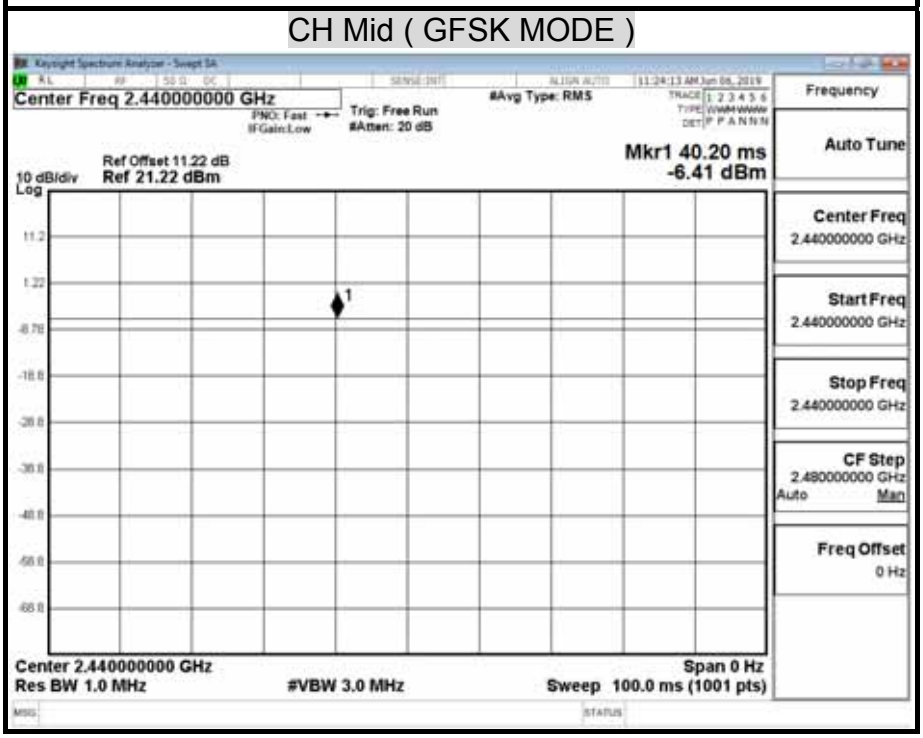
TEST PLOT

Duty Cycle

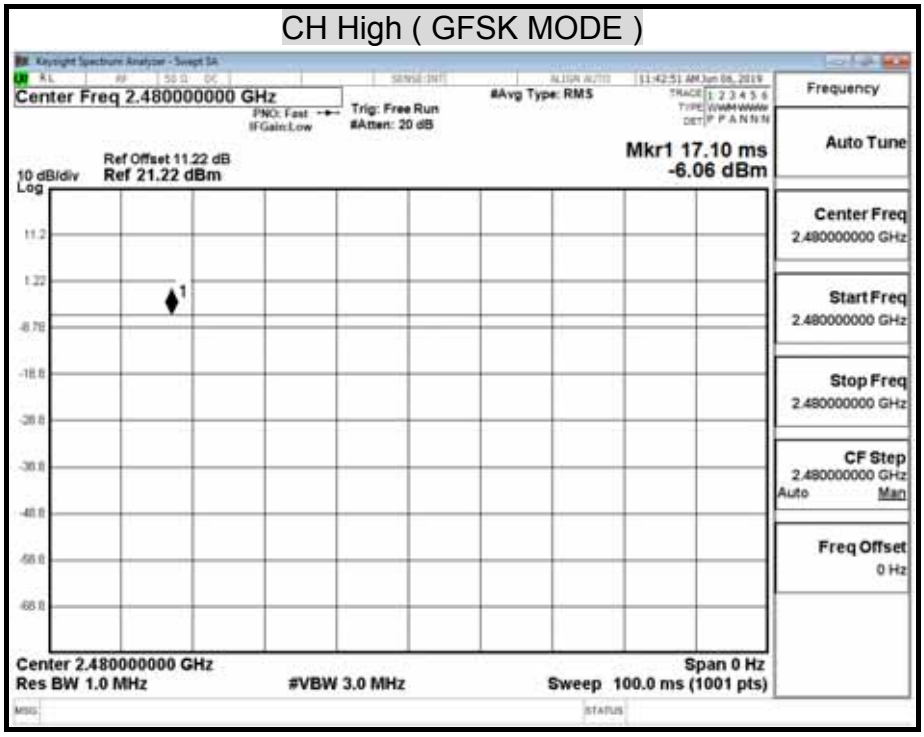
CH Low (GFSK MODE)



CH Mid (GFSK MODE)



CH High (GFSK MODE)



8.4 POWER SPECTRAL DENSITY

LIMIT

§ 15.247(e) For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

Name of Equipment	Manufacturer	Model	Serial Number	Calibration Date	Calibration Due
EXA Spectrum Analyzer	KEYSIGHT	N9010A	MY54430216	07/05/2018	07/04/2019
SMA Cable + 10dB Attenuator	CCS	SMA + 10dB Att	O6	01/25/2019	01/24/2020

Remark: *Each piece of equipment is scheduled for calibration once a year.*

TEST SETUP

TEST PROCEDURE

The tests were performed in accordance with 558074 D01 DTS Meas Guidance v03r03.
10.2 Method PKPSD (peak PSD):

1. Set analyzer center frequency to DTS channel center frequency.
2. Set the span to 1.5 times the DTS bandwidth.
3. Set the RBW to: 3 kHz ≤ RBW ≤ 100 kHz.
4. Set the VBW ≥ 3 RBW.
5. Detector = peak.
6. Sweep time = auto couple.
7. Trace mode = max hold.
8. Allow trace to fully stabilize.
9. Use the peak marker function to determine the maximum amplitude level within the RBW.
10. If measured value exceeds limit, reduce RBW (no less than 3 kHz) and repeat.

TEST RESULTS

No non-compliance noted.

Model Name	JF-85	Test By	Ted Huang
Temp & Humidity	25.8℃, 67%	Test Date	2019/06/06

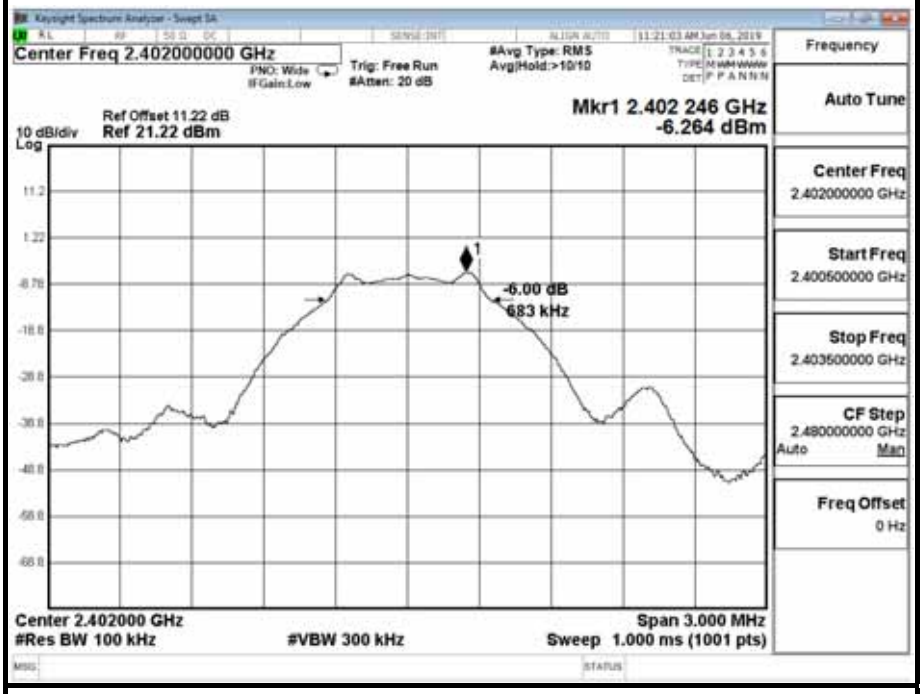
GFSK mode

Channel	Frequency (MHz)	PPSD/100kHz (dBm)	PPSD/3kHz (dBm)	Limit (dBm)	Margin (dB)	Result
Low	2402	-6.26	-21.49	8.00	-29.49	PASS
Middle	2442	-6.08	-21.31	8.00	-29.31	PASS
High	2480	-6.02	-21.25	8.00	-29.25	PASS

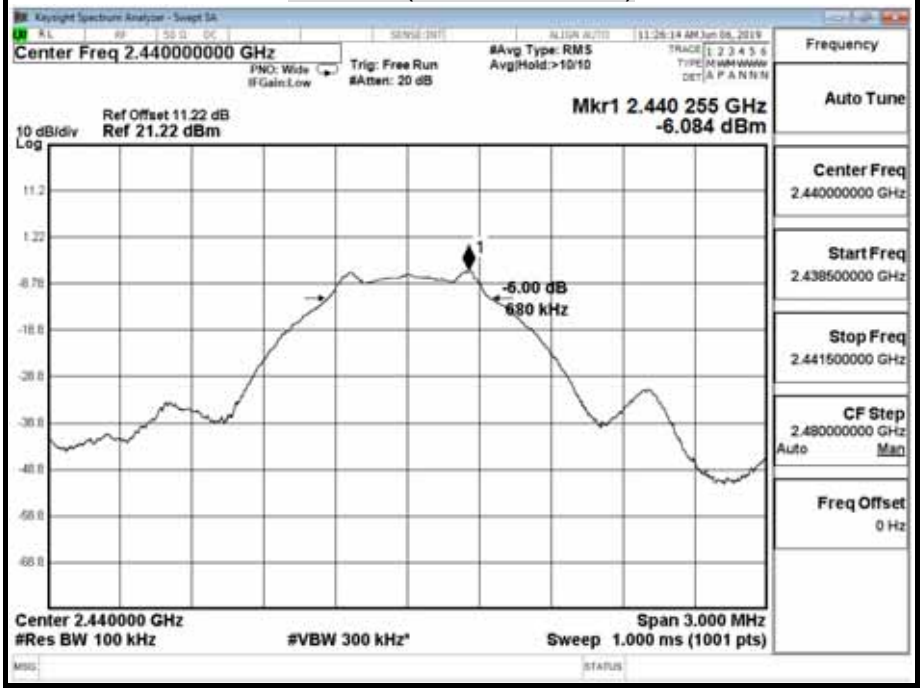
NOTE : 1. At finial test to get the worst-case emission at 1Mbps long.
2. The cable assembly insertion loss of 11.1dB (including 10 dB pad and 1.1 dB cable) was Entered as an offset in the spectrum analyzer to allow for direct reading of power.

POWER SPECTRAL DENSITY (GFSK MODE)

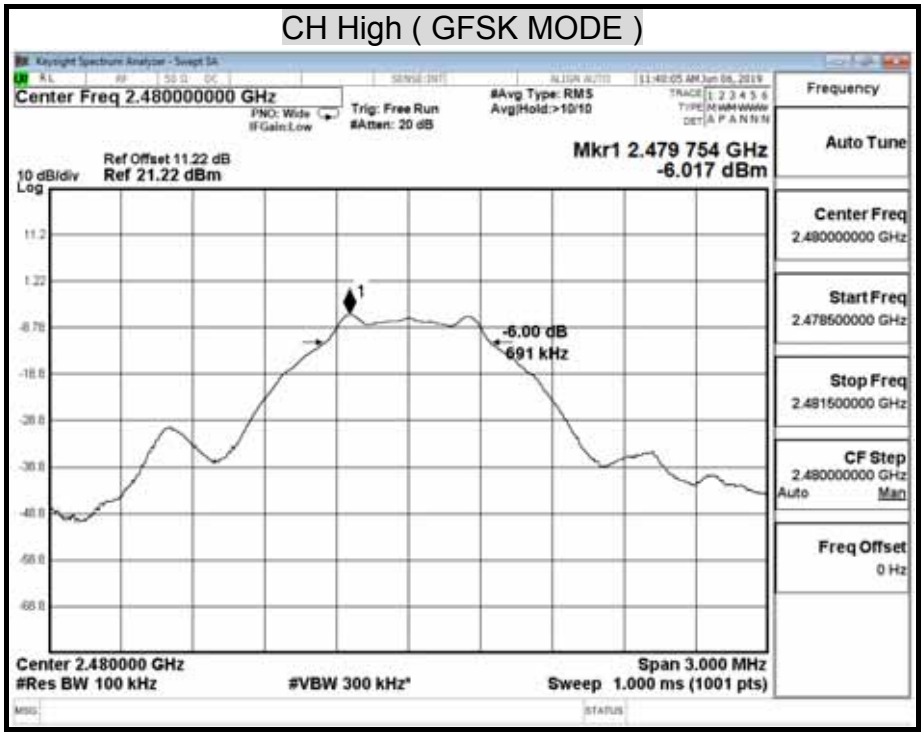
CH Low (GFSK MODE)



CH Mid (GFSK MODE)



CH High (GFSK MODE)



8.6 CONDUCTED SPURIOUS EMISSION

LIMITS

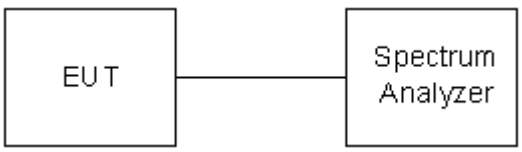
§ 15.247(d) In any 100 kHz bandwidth outside the frequency band in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the and that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement. Attenuation below the general limits specified in § 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in § 15.205(a), must also comply with the radiated emission limits specified in § 15.209(a) (see § 15.205(c)).

TEST EQUIPMENT

Name of Equipment	Manufacturer	Model	Serial Number	Calibration Date	Calibration Due
EXA Spectrum Analyzer	KEYSIGHT	N9010A	MY54430216	07/05/2018	07/04/2019
SMA Cable + 10dB Attenuator	CCS	SMA + 10dB Att	O6	01/25/2019	01/24/2020

Remark: *Each piece of equipment is scheduled for calibration once a year.*

TEST SETUP



TEST PROCEDURE

The transmitter output is connected to a spectrum analyzer. The resolution bandwidth is set to 1 MHz. The video bandwidth is set to 1 MHz.

The spectrum from 30 MHz to 26 GHz is investigated with the transmitter set to the lowest, middle, and highest channels in the 2.4 GHz band.

TEST RESULTS

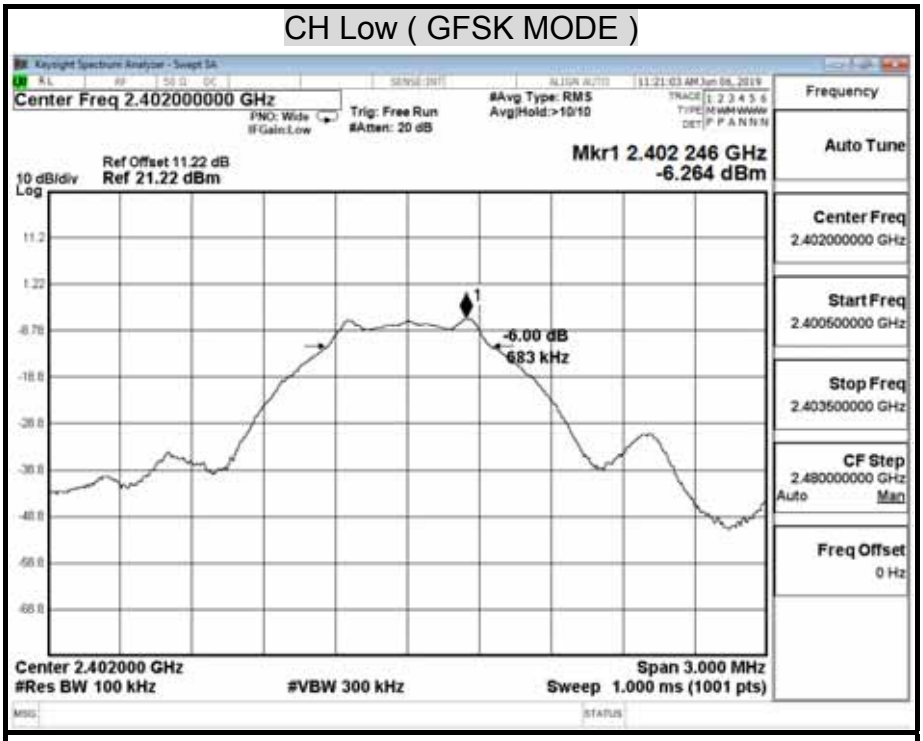
No non-compliance noted.

TEST DATA

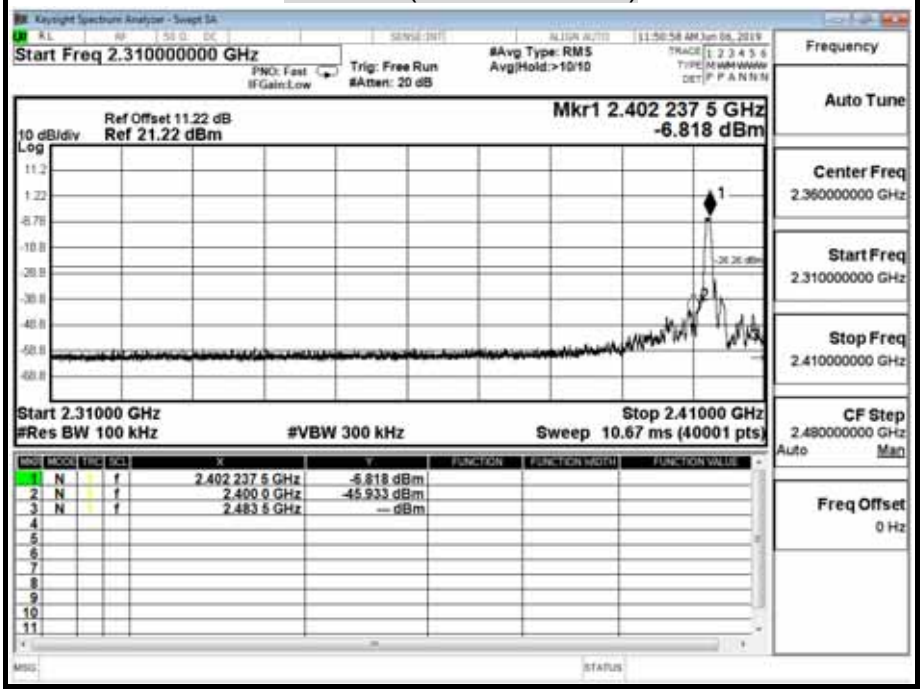
Model Name	JF-85	Test By	Ted Huang
Temp & Humidity	25.8°C, 67%	Test Date	2019/06/06

OUT-OF-BAND SPURIOUS EMISSIONS-CONDUCTED MEASUREMENT

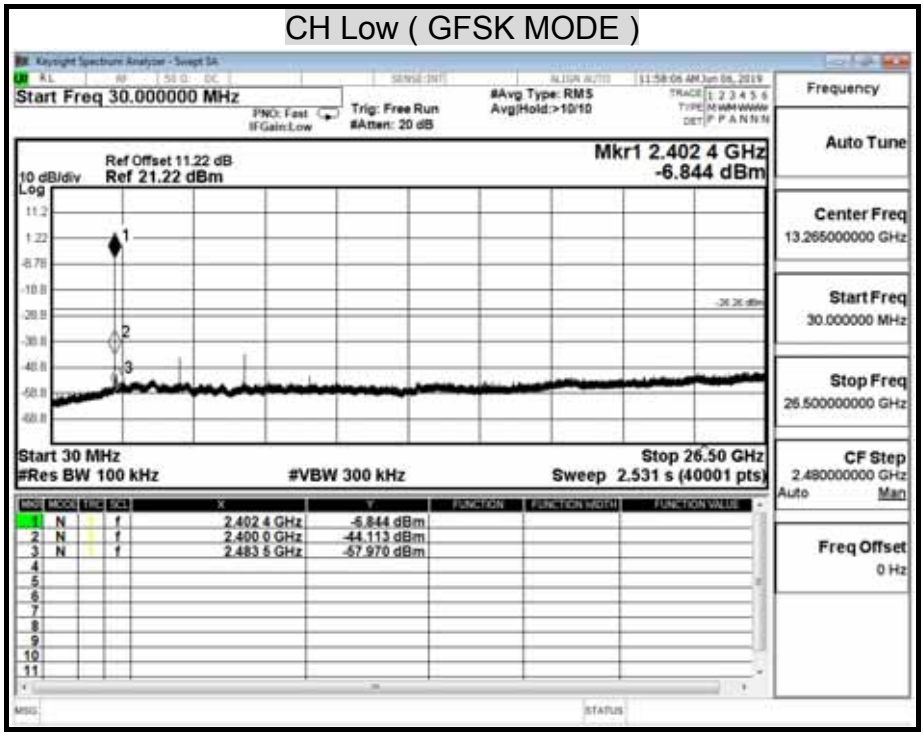
CH Low (GFSK MODE)



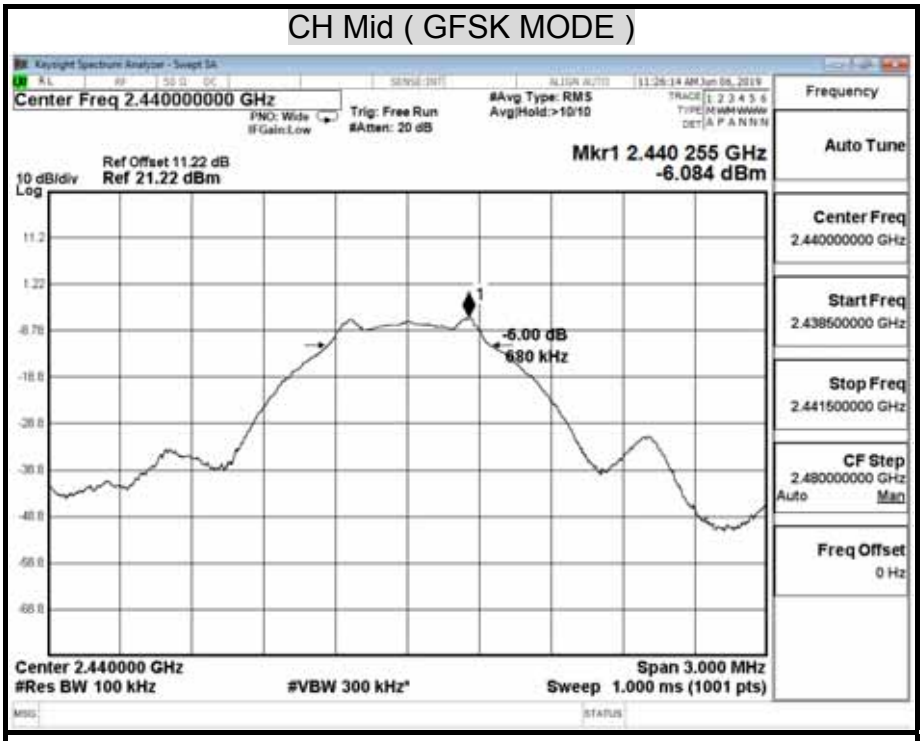
CH Low (GFSK MODE)



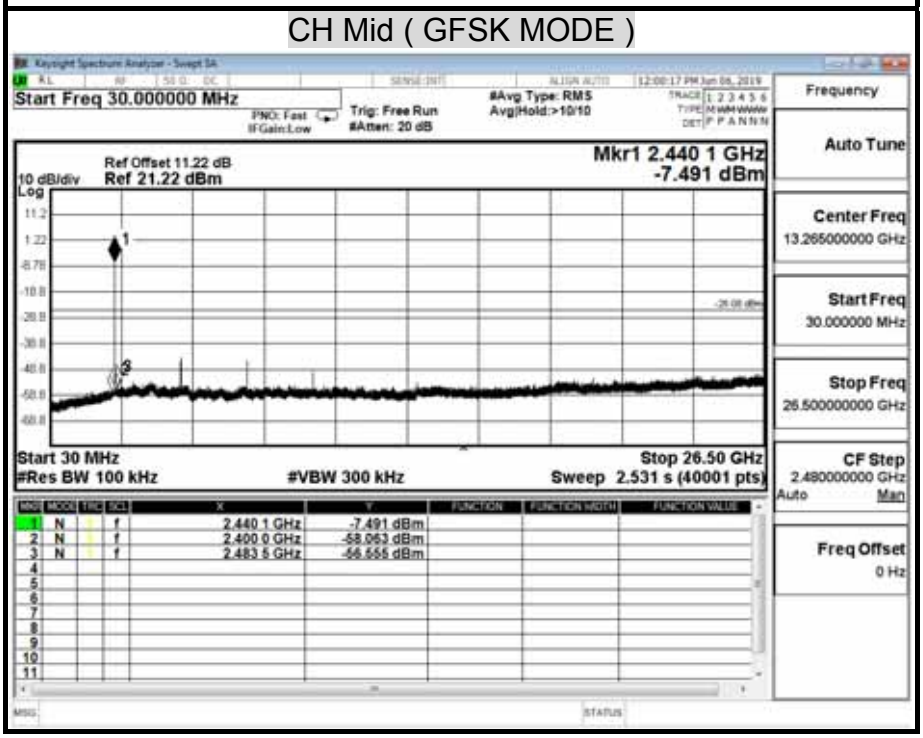
CH Low (GFSK MODE)



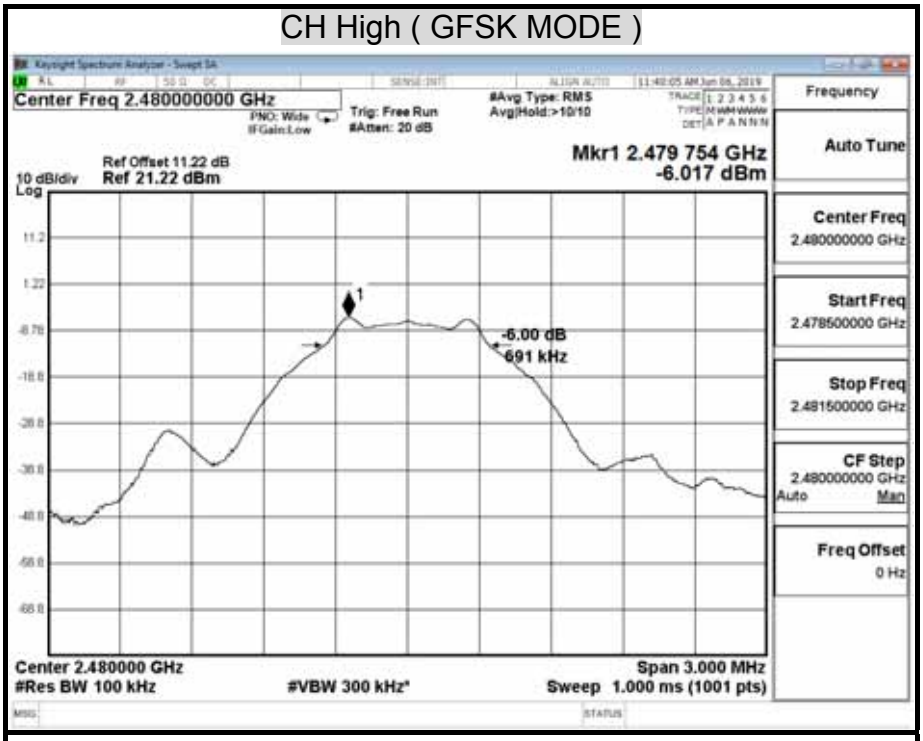
CH Mid (GFSK MODE)



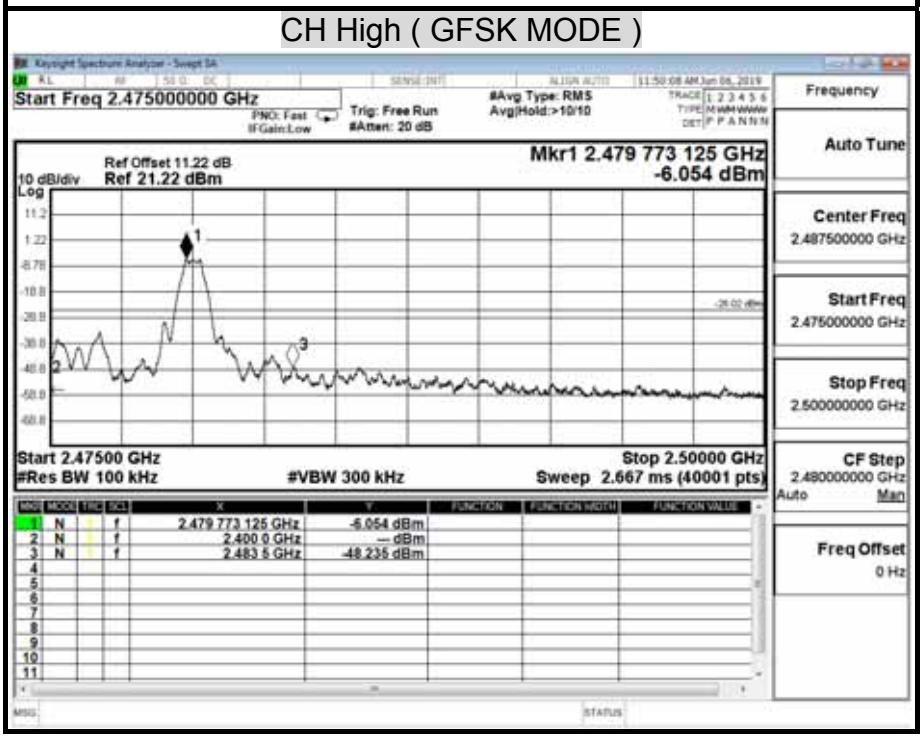
CH Mid (GFSK MODE)



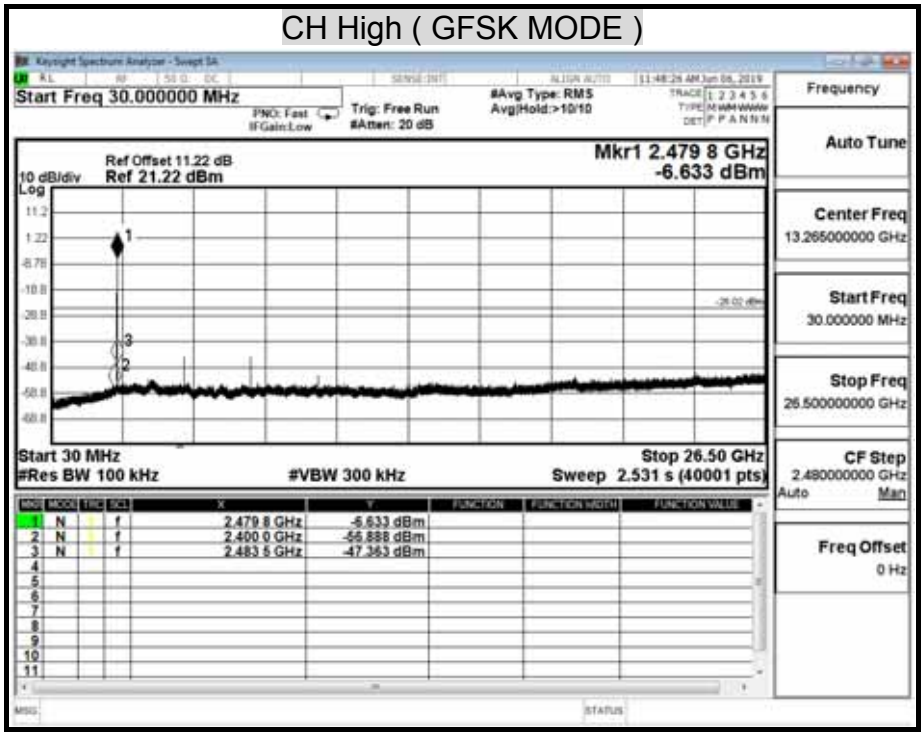
CH High (GFSK MODE)



CH High (GFSK MODE)



CH High (GFSK MODE)



8.7 RADIATED EMISSIONS

8.7.1 TRANSMITTER RADIATED SUPURIOUS EMSSIONS

LIMITS

§ 15.205 (a) Except as shown in paragraph (d) of this section, only spurious emissions are permitted in any of the frequency bands listed below:

MHz	MHz	MHz	GHz
0.090 - 0.110	16.42 - 16.423	399.9 - 410	4.5 - 5.15
[1]0.495 - 0.505	16.69475 - 16.69525	608 - 614	5.35 - 5.46
2.1735 - 2.1905	16.80425 - 16.80475	960 - 1240	7.25 - 7.75
4.125 - 4.128	25.5 - 25.67	1300 - 1427	8.025 - 8.5
4.17725 - 4.17775	37.5 - 38.25	1435 - 1626.5	9.0 - 9.2
4.20725 - 4.20775	73 - 74.6	1645.5 - 1646.5	9.3 - 9.5
6.215 - 6.218	74.8 - 75.2	1660 -1710	10.6 -12.7
6.26775 - 6.26825	108 -121.94	1718.8 - 1722.2	13.25 -13.4
6.31175 - 6.31225	123 - 138	2200 - 2300	14.47 – 14.5
8.291 - 8.294	149.9 - 150.05	2310 - 2390	15.35 -16.2
8.362 - 8.366	156.52475 - 156.52525	2483.5 - 2500	17.7 - 21.4
8.37625 - 8.38675	156.7 - 156.9	2655 - 2900	22.01 - 23.12
8.41425 - 8.41475	162.0125 - 167.17	3260 - 3267	23.6 - 24.0
12.29 - 12.293	167.72 - 173.2	3332 - 3339	31.2 - 31.8
12.51975 - 12.52025	240 - 285	3345.8 - 3338	36.43 - 36.5
12.57675 - 12.57725	322 -335.4	3600 - 4400	([2])
13.36 - 13.41			

[1] Until February 1, 1999, this restricted band shall be 0.490-0.510 MHz.

[2] Above 38.6

§ 15.205 (b) Except as provided in paragraphs (d) and (e), the field strength of emissions appearing within these frequency bands shall not exceed the limits shown is Section 15.209. At frequencies equal to or less than 1000 MHz, compliance with the limits in Section 15.209 shall be demonstrated using measurement instrumentation employing a CISPR quasi-peak detector. Above 1000 MHz, compliance with the emission limits in Section 15.209 shall be demonstrated based on the average value of the measured emissions. The provisions in Section 15.35 apply to these measurements.

§ 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 (microvolts/meter)	Measurement Distance (meters)
30 - 88	100 **	3
88 - 216	150 **	3
216 - 960	200 **	3
Above 960	500	3

** Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this Section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz, However, operation within these frequency bands is permitted under other sections of this Part, e-g, Sections 15.231 and 15.241.

§ 15.209 (b) In the emission table above, the tighter limit applies at the band edges.

TEST EQUIPMENTS

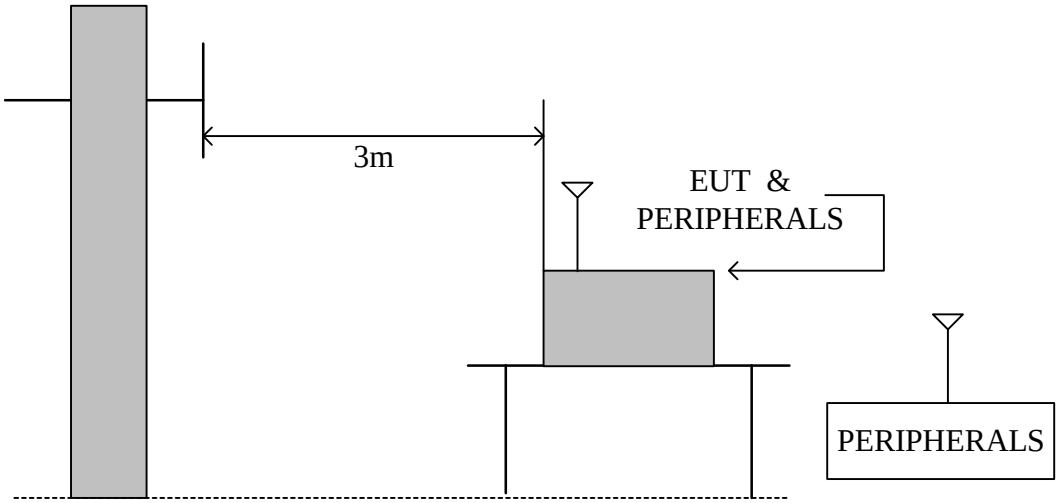
The following test equipments are utilized in making the measurements contained in this report.

Chamber Room #966					
Name of Equipment	**Manufacturer**	**Model**	**Serial Number**	**Calibration Date**	**Calibration Due**
Active Loop Antenna	ETS-LINDREN	6502	8905-2356	07/20/2017	07/19/2019
Amplifier	HP	8447F	2443A01671	01/25/2019	01/24/2020
Bi-Log Antenna	Sunol	JB1	A070506-2	02/09/2019	02/08/2020
Cable	Rosnol+Suhner	SUCOFLEX 104PEA	SN25737 /4PEA	01/27/2019	01/26/2020
Double Ridged Guide Horn Antenna	ETS-LINDGREN	3116	00078900	03/29/2019	03/28/2021
EMI Test Receiver	R&S	ESCI	100960	11/07/2018	11/06/2019
EXA Spectrum Analyzer	KEYSIGHT	N9010A	MY54430216	07/05/2018	07/04/2019
Horn Antenna	Com-Power	AH-118	071032	04/30/2019	04/29/2020
Pre-Amplifier	EMCI	EMC012645	980098	01/25/2019	01/24/2020
Pre-Amplifier	MITEQ	AMF-6F-260400-40-8P	985646	06/21/2018	06/20/2019
Hi-Pass Filter	MICRO-TRONICS	BRM50702-01	018	N.C.R	N.C.R
Software	Excel(ccs-o6-2019 v1.2)				

Remark: *1. Each piece of equipment is scheduled for calibration once a year.*

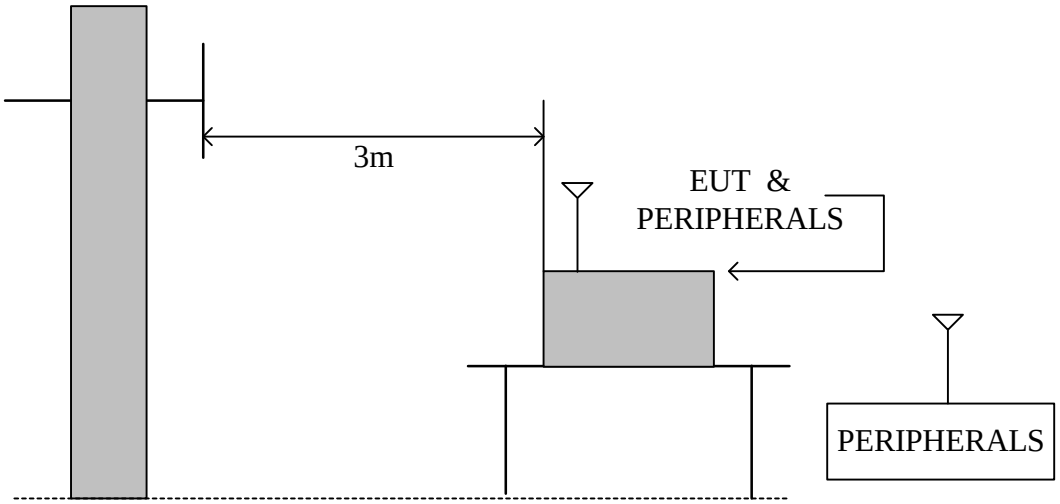
TEST SETUP

The diagram below shows the test setup that is utilized to make the measurements for emission from 30 to 1GHz.



Antenna Elevation Variable

The diagram below shows the test setup that is utilized to make the measurements for emission above 1GHz.



Antenna Elevation Variable

TEST PROCEDURE

a. The EUT was placed on the top of a rotating table 0.8/1.5 meters above the ground at a 10 meter open area test site. The table was rotated 360 degrees to determine the position of the highest radiation.

b. White measuring the radiated emission below 1GHz, the EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower. White measuring the radiated emission above 1GHz, the EUT was set 3 meters away from the interference-receiving antenna

c. The antenna is a broadband antenna, and its height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarization of the antenna are set to make the measurement.

d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the table was turned from 0 degrees to 360 degrees to find the maximum reading.

e. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

f. If the emission level of the EUT in peak mode was 10 dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10 dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.

g. The tests were performed in accordance with 558074 D01 DTS Meas Guidance v03r03.

NOTE：

1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120 KHz for Peak detection (PK) and Quasi-peak detection (QP) at frequency below 1GHz.

2. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 1 MHz for Peak detection and frequency above 1GHz.

3. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 10 Hz for Average detection (AV) at frequency above 1GHz.

4. No emission is found between lowest internal used/generated frequency to 30MHz (9kHz~30MHz)

TEST RESULTS

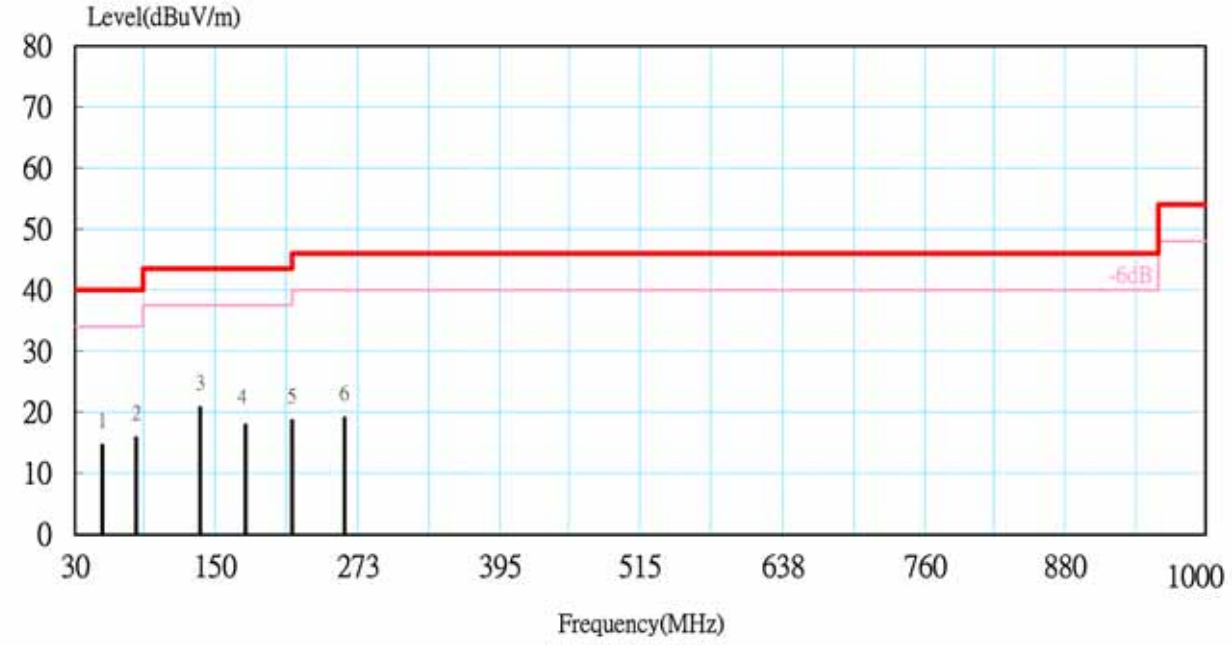
No non-compliance noted.

8.7.2 WORST-CASE RADIATED EMISSION BELOW 1 GHz

Product Name	Cherry Wireless Mouse	Test Date	2019/06/06
Model	JF-85	Test By	Ted Huang
Test Mode	TX	TEMP& Humidity	26.5℃/58%

Horizontal

(The chart below shows the highest readings taken from the final data.)



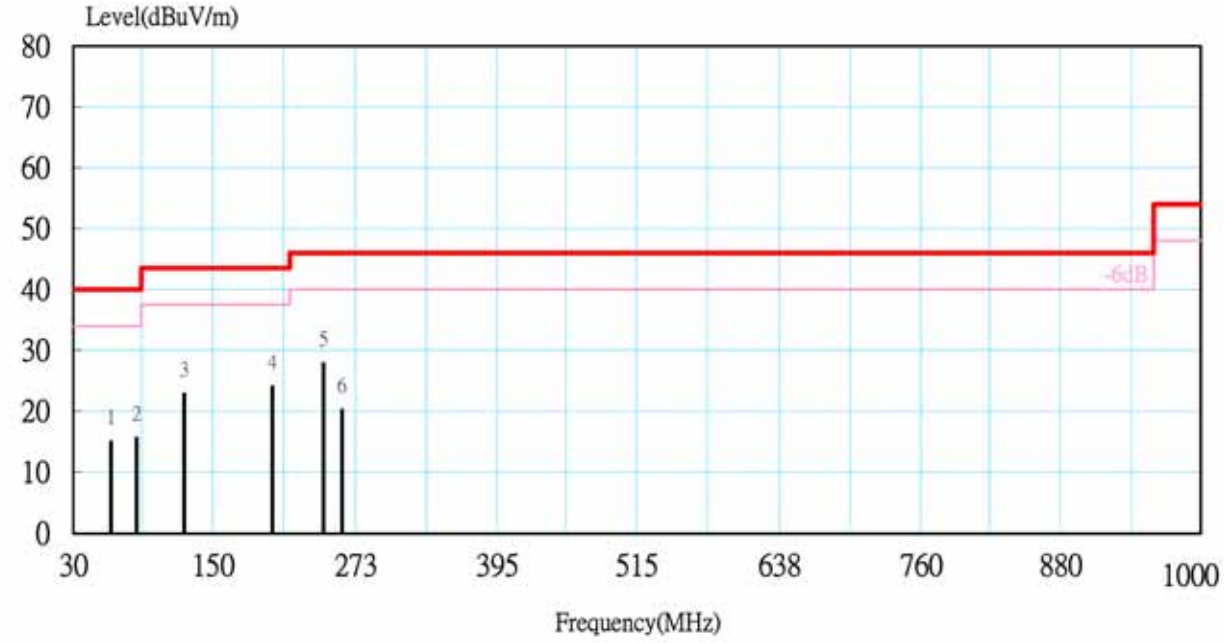
No.	Freq-Uency (MHz)	Meter Reading at 3 m Level (dBµV)	Antenna Factor (dB/m)	Cable Loss (dB)	Emission at 3 m Level (dBµV/m)	Limits (dBµV/m)	Margin (dB)	Detector Mode PK/QP
1	53.28	5.23	8.37	0.96	14.56	40.00	**-25.44**	QP
2	82.26	6.48	8.09	1.21	15.78	40.00	**-24.22**	QP
3	137.67	5.24	13.81	1.68	20.73	43.50	**-22.77**	QP
4	176.47	4.22	11.68	1.99	17.89	43.50	**-25.61**	QP
5	216.24	3.24	13.04	2.35	18.63	46.00	**-27.37**	QP
6	261.67	3.48	12.85	2.72	19.05	46.00	**-26.95**	QP

Note: 1. QP= Quasi-peak Reading.
2. The other emission levels were very low against the limit

Product Name	Cherry Wireless Mouse	Test Date	2019/06/06
Model	JF-85	Test By	Ted Huang
Test Mode	TX	TEMP& Humidity	26.5℃/58%

Vertical

(The chart below shows the highest readings taken from the final data.)



No.	Freq-Uency (MHz)	Meter Reading at 3 m Level (dBµV)	Antenna Factor (dB/m)	Cable Loss (dB)	Emission at 3 m Level (dBµV/m)	Limits (dBµV/m)	Margin (dB)	Detector Mode PK/QP
1	62.14	5.84	8.07	1.05	14.96	40.00	**-25.04**	QP
2	84.28	6.38	7.99	1.23	15.60	40.00	**-24.40**	QP
3	125.06	6.85	14.40	1.60	22.85	43.50	**-20.65**	QP
4	201.72	8.55	13.27	2.23	24.06	43.50	**-19.44**	QP
5	245.36	12.68	12.57	2.58	27.84	46.00	**-18.16**	QP
6	261.56	4.66	12.85	2.71	20.22	46.00	**-25.78**	QP

Note: 1. QP= Quasi-peak Reading.
2. The other emission levels were very low against the limit

8.7.3 TRANSMITTER RADIATED EMISSION ABOVE 1 GHz

Product Name	Cherry Wireless Mouse	Test Date	2019/06/06
Model	JF-85	Test By	Ted Huang
Test Mode	GFSK TX (CH Low)	TEMP& Humidity	25.8°C, 67%

Horizontal

	TX / GFSK mode / CH Low				Measurement Distance at 3m				Horizontal polarity	
	Freq.	Reading	AF	Cable Loss	Pre-amp	Filter	Level	Limit	Margin	Mark
	(MHz)	(dBμV)	(dB/m)	(dB)	(dB)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	(P/Q/A)
*	1534.76	60.68	26.77	2.35	45.00	0.50	45.29	74.00	-28.71	P
*	1534.76	48.72	26.77	2.35	45.00	0.50	33.33	54.00	-20.67	A
*	4804.33	60.50	32.91	4.37	44.32	0.22	53.69	74.00	-20.31	P
*	4804.33	54.51	32.91	4.37	44.32	0.22	47.70	54.00	-6.30	A

Product Name	Cherry Wireless Mouse	Test Date	2019/06/06
Model	JF-85	Test By	Ted Huang
Test Mode	GFSK TX (CH Low)	TEMP& Humidity	25.8°C, 67%

Vertical

	TX / GFSK mode / CH Low				Measurement Distance at 3m				Vertical polarity	
	Freq.	Reading	AF	Cable Loss	Pre-amp	Filter	Level	Limit	Margin	Mark
	(MHz)	(dBμV)	(dB/m)	(dB)	(dB)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	(P/Q/A)
*	1535.32	57.48	26.78	2.35	45.00	0.50	42.10	74.00	-31.90	P
*	1535.32	46.78	26.78	2.35	45.00	0.50	31.40	54.00	-22.60	A
*	4806.05	59.83	32.92	4.38	44.32	0.22	53.03	74.00	-20.97	P
*	4806.05	55.47	32.92	4.38	44.32	0.22	48.67	54.00	-5.33	A

REMARK:
1. AF: Antenna Factor, Cable: Cable Loss, Pre-Amp: Preamplifier gain, Filter: 2.4GHz~2.5GHz Filter Insertion Loss
2. Spectrum analyzer setting P(Peak): RBW=1MHz, VBW=1MHz, A(Average): RBW=1MHz, VBW=10Hz
3. The result basic equation calculation is as follow:
   Level = Reading + AF + Cable – Preamp + Filter – Dist, Margin = Level-Limit
4. The other emission level only under 20dB could be excluded from being reporting.
5. The test limit distance is 3M limit.
6. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.

Product Name	Cherry Wireless Mouse	Test Date	2019/06/06
Model	JF-85	Test By	Ted Huang
Test Mode	GFSK TX (CH Middle)	TEMP& Humidity	27.4℃,52%

Horizontal

	TX / GFSK mode / CH Mid				Measurement Distance at 3m				Horizontal polarity	
	Freq.	Reading	AF	Cable Loss	Pre-amp	Filter	Level	Limit	Margin	Mark
	(MHz)	(dBμV)	(dB/m)	(dB)	(dB)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	(P/Q/A)
*	1534.62	60.17	26.77	2.34	45.00	0.50	44.78	74.00	-29.22	P
*	1534.62	48.44	26.77	2.34	45.00	0.50	33.05	54.00	-20.95	A
*	4880.33	60.04	33.14	4.42	44.34	0.23	53.49	74.00	-20.51	P
*	4880.33	54.17	33.14	4.42	44.34	0.23	47.61	54.00	-6.39	A

Product Name	Cherry Wireless Mouse	Test Date	2019/06/06
Model	JF-85	Test By	Ted Huang
Test Mode	GFSK TX (CH Middle)	TEMP& Humidity	27.4℃,52%

Vertical

	TX / GFSK mode / CH Mid				Measurement Distance at 3m				Vertical polarity	
	Freq.	Reading	AF	Cable Loss	Pre-amp	Filter	Level	Limit	Margin	Mark
	(MHz)	(dBμV)	(dB/m)	(dB)	(dB)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	(P/Q/A)
*	1535.24	57.38	26.77	2.35	45.00	0.50	42.00	74.00	-32.00	P
*	1535.24	46.66	26.77	2.35	45.00	0.50	31.28	54.00	-22.72	A
*	4880.48	61.65	33.14	4.42	44.34	0.23	55.10	74.00	-18.90	P
*	4880.48	56.16	33.14	4.42	44.34	0.23	49.61	54.00	-4.39	A

REMARK:

1. AF: Antenna Factor, Cable: Cable Loss, Pre-Amp: Preamplifier gain, Filter: 2.4GHz~2.5GHz Filter Insertion Loss
2. Spectrum analyzer setting P(Peak): RBW=1MHz, VBW=1MHz, A(Average): RBW=1MHz, VBW=10Hz
3. The result basic equation calculation is as follow:
   Level = Reading + AF + Cable – Preamp + Filter – Dist, Margin = Level-Limit
4. The other emission level only under 20dB could be excluded from being reporting.
5. The test limit distance is 3M limit.
6. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.

Product Name	Cherry Wireless Mouse	Test Date	2019/06/06
Model	JF-85	Test By	Ted Huang
Test Mode	GFSK TX (CH High)	TEMP& Humidity	27.4℃,52%

Horizontal

	TX / GFSK mode / CH High				Measurement Distance at 3m				Horizontal polarity	
	Freq.	Reading	AF	Cable Loss	Pre-amp	Filter	Level	Limit	Margin	Mark
	(MHz)	(dBμV)	(dB/m)	(dB)	(dB)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	(P/Q/A)
*	1534.76	60.42	26.77	2.35	45.00	0.50	45.03	74.00	-28.97	P
*	1534.76	48.68	26.77	2.35	45.00	0.50	33.29	54.00	-20.71	A
*	4959.69	60.32	33.38	4.46	44.36	0.24	54.04	74.00	-19.96	P
*	4959.69	53.62	33.38	4.46	44.36	0.24	47.33	54.00	-6.67	A

Product Name	Cherry Wireless Mouse	Test Date	2019/06/06
Model	JF-85	Test By	Ted Huang
Test Mode	GFSK TX (CH High)	TEMP& Humidity	27.4℃,52%

Vertical

	TX / GFSK mode / CH High				Measurement Distance at 3m				Vertical polarity	
	Freq.	Reading	AF	Cable Loss	Pre-amp	Filter	Level	Limit	Margin	Mark
	(MHz)	(dBμV)	(dB/m)	(dB)	(dB)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	(P/Q/A)
*	1535.15	57.46	26.77	2.35	45.00	0.50	42.08	74.00	-31.92	P
*	1535.15	46.78	26.77	2.35	45.00	0.50	31.40	54.00	-22.60	A
*	4959.81	61.11	33.38	4.46	44.36	0.24	54.82	74.00	-19.18	P
*	4959.81	55.11	33.38	4.46	44.36	0.24	48.82	54.00	-5.18	A

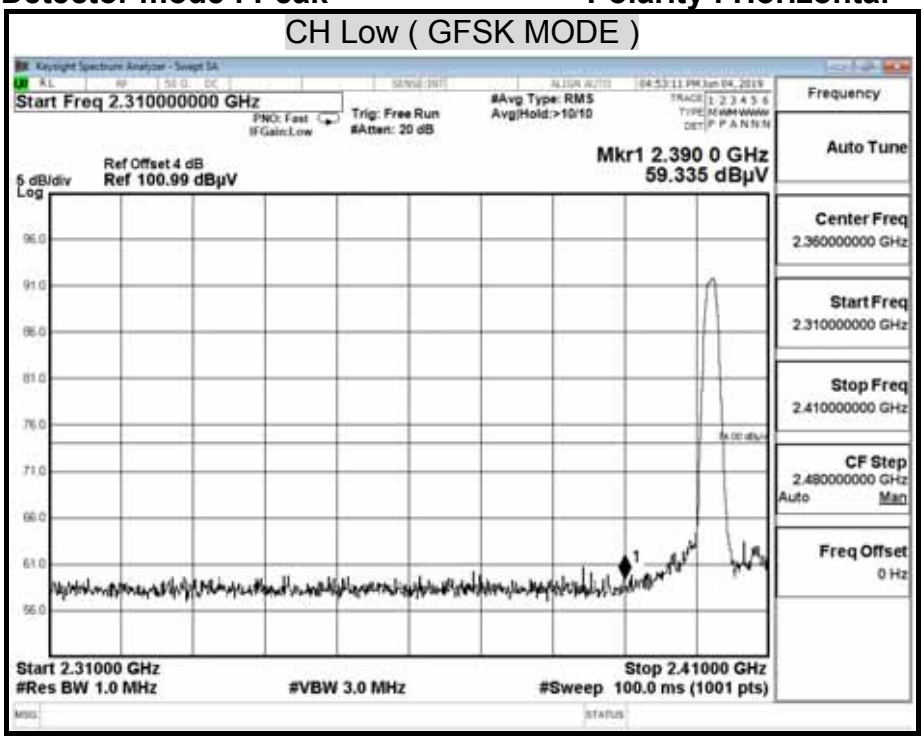
REMARK:

1. AF: Antenna Factor, Cable: Cable Loss, Pre-Amp: Preamplifier gain, Filter: 2.4GHz~2.5GHz Filter Insertion Loss
2. Spectrum analyzer setting P(Peak): RBW=1MHz, VBW=1MHz, A(Average): RBW=1MHz, VBW=10Hz
3. The result basic equation calculation is as follow:
   Level = Reading + AF + Cable – Preamp + Filter – Dist, Margin = Level-Limit
4. The other emission level only under 20dB could be excluded from being reporting.
5. The test limit distance is 3M limit.
6. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.

8.7.4 RESTRICTED BAND EDGES

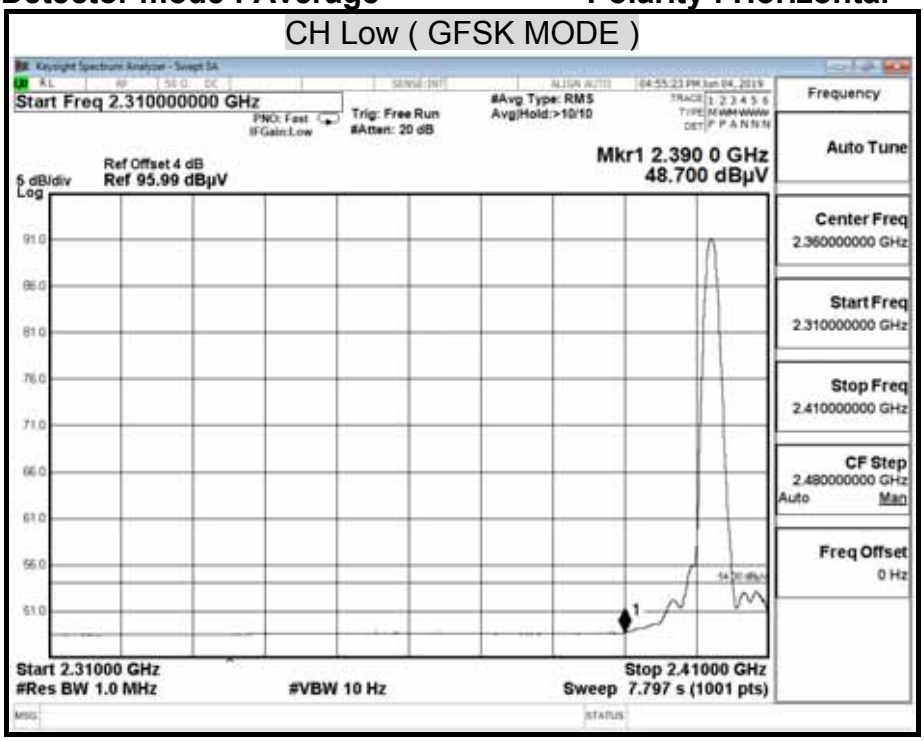
Detector mode : Peak **Polarity : Horizontal**

CH Low (GFSK MODE)



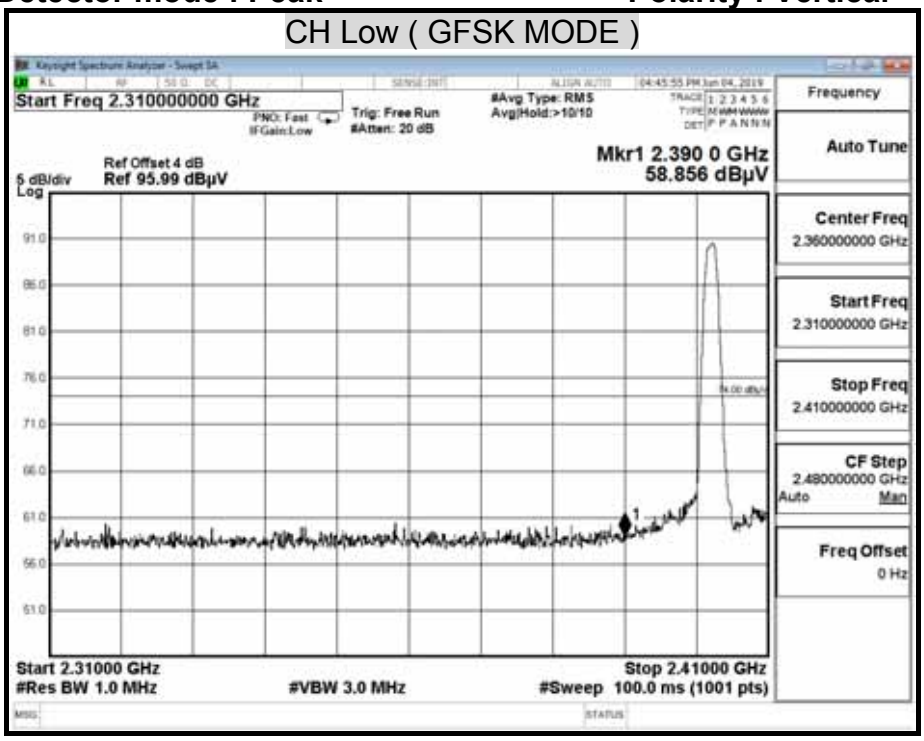
Detector mode : Average **Polarity : Horizontal**

CH Low (GFSK MODE)



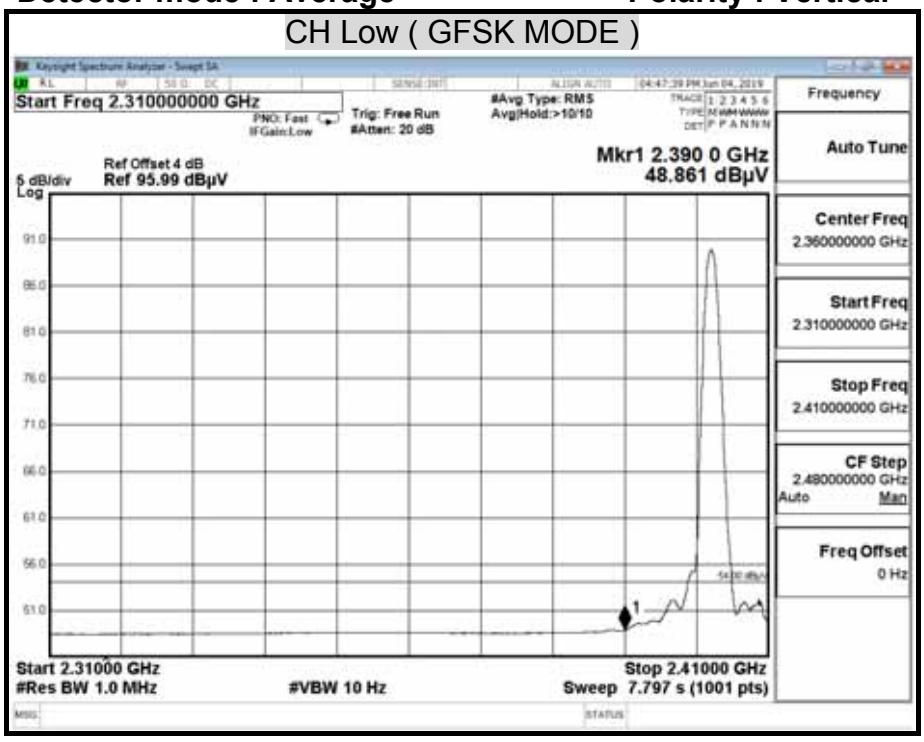
Detector mode : Peak **Polarity : Vertical**

CH Low (GFSK MODE)



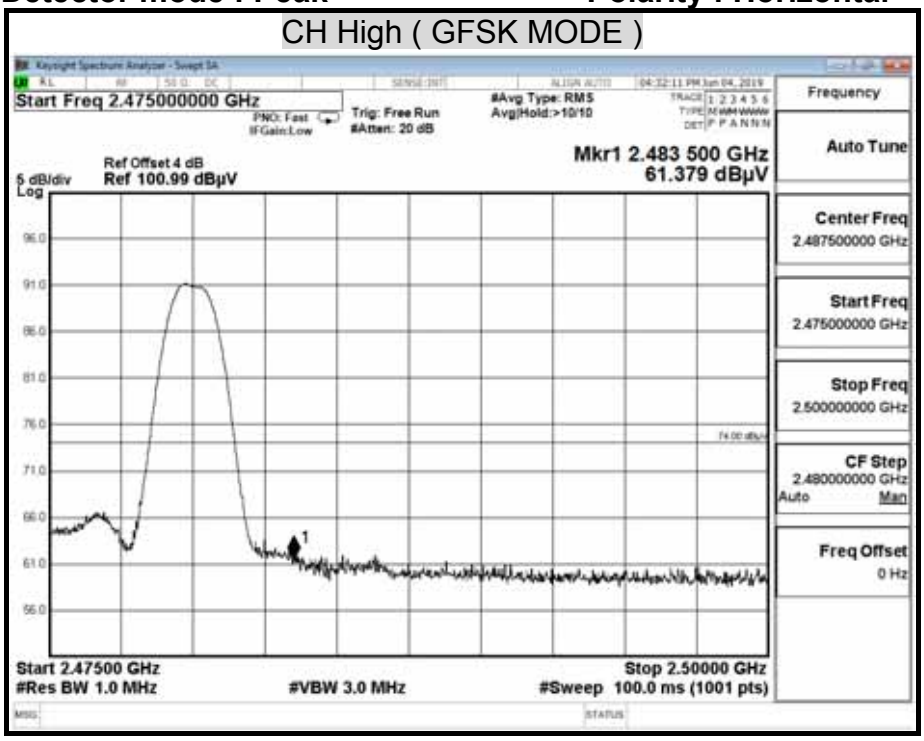
Detector mode : Average **Polarity : Vertical**

CH Low (GFSK MODE)



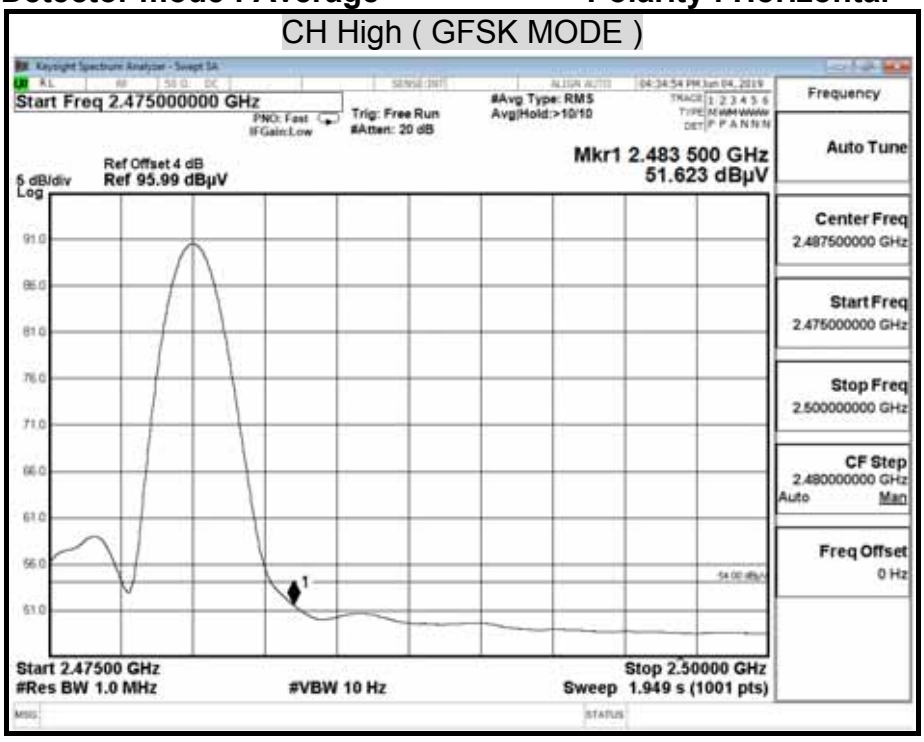
Detector mode : Peak **Polarity : Horizontal**

CH High (GFSK MODE)



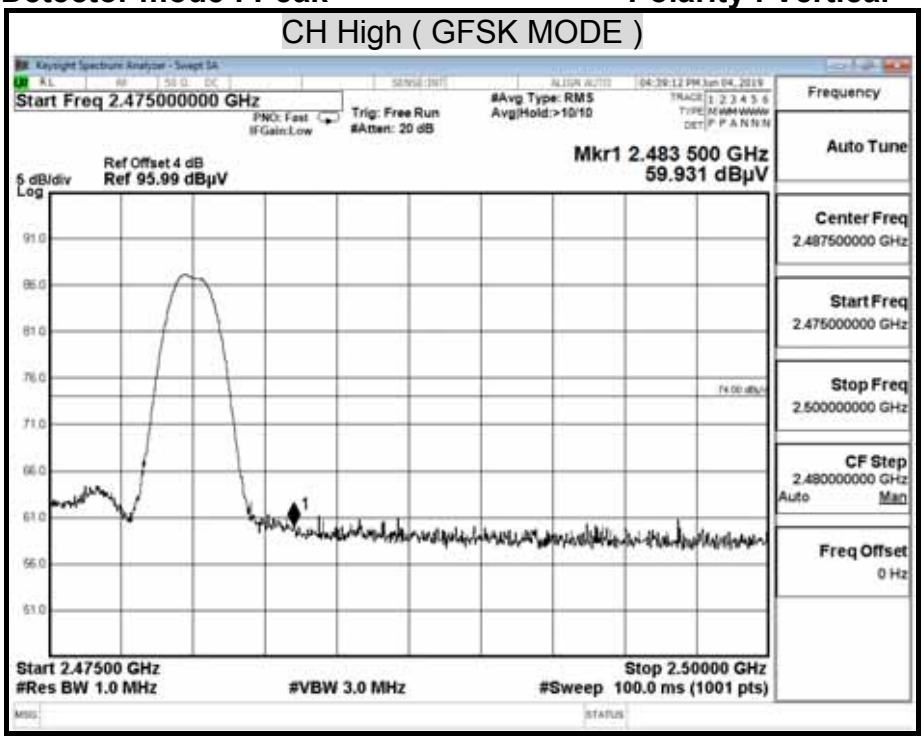
Detector mode : Average **Polarity : Horizontal**

CH High (GFSK MODE)



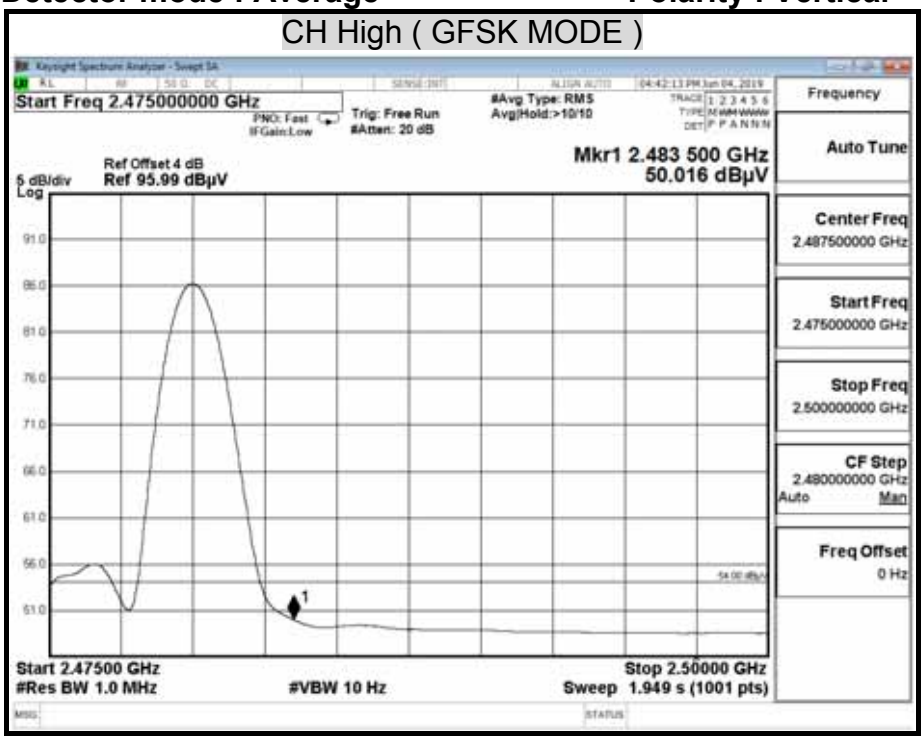
Detector mode : Peak **Polarity : Vertical**

CH High (GFSK MODE)



Detector mode : Average **Polarity : Vertical**

CH High (GFSK MODE)



8.8 POWERLINE CONDUCTED EMISSIONS

LIMITS

§ 15.207 (a) Except as shown in paragraph (b) and (c) this section, 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 or frequencies within the band 150 kHz to 30 MHz shall not exceed the limits in the following table, as measured using a 50 μH/50 ohms line impedance stabilization network (LISN). Compliance with the provisions of this paragraph shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminal.

The lower limit applies at the boundary between the frequency ranges.

Frequency of Emission (MHz)	Conducted limit (dBμv)	
	Quasi-peak	Average
0.15 - 0.5	66 to 56	56 to 46
0.5 - 5	56	46
5 - 30	60	50

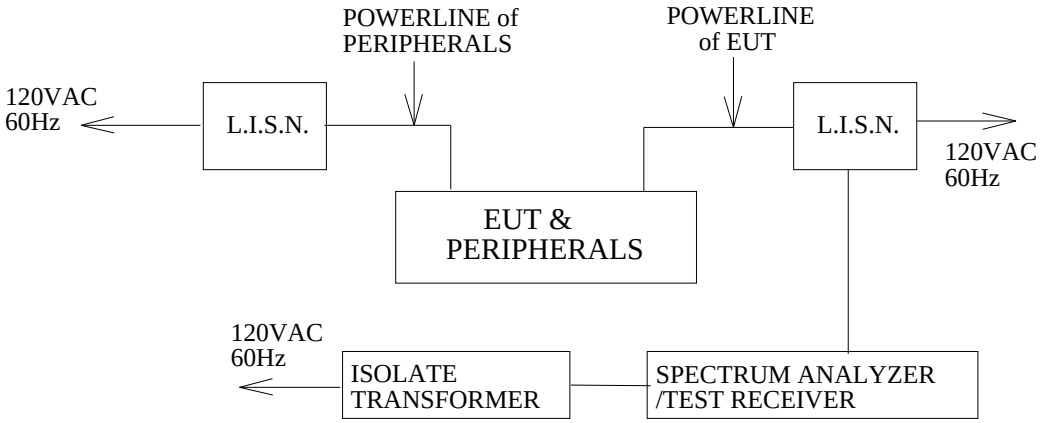
TEST EQUIPMENTS

The following test equipments are used during the conducted power line tests：

Conducted Emission room #1					
Name of Equipment	**Manufacturer**	**Model**	**Serial Number**	**Calibration Date**	**Calibration Due**
BNC Coaxial Cable	CCS	BNC50	11	02/25/2019	02/24/2020
EMI Test Receiver	R&S	ESCS 30	100348	02/19/2019	02/18/2020
LISN	SCHWARZBECK	NNLK8130	8130124	01/02/2019	01/01/2020
LISN	FCC	FCC-LISN-50-32-2	08009	05/24/2019	05/23/2020
Pulse Limiter	R&S	ESH3-Z2	100116	02/25/2019	02/24/2020
Test S/W	e3(6.101222)				

Remark: *Each piece of equipment is scheduled for calibration once a year.*

TEST SETUP



TEST PROCEDURE

The EUT is placed on a non-conducting table 40 cm from the vertical ground plane and 80cm above the horizontal ground plane. The EUT IS CONFIGURED IN ACCORDANCE WITH ANSI C63.10.

The resolution bandwidth is set to 9 kHz for both quasi-peak detection and average detection measurements.

Line conducted data is recorded for both NEUTRAL and LINE.

TEST RESULTS

※ This EUT is not connected to AC Source directly. Not applicable for this test.

9. ANTENNA REQUIREMENT

9.1 STANDARD APPLICABLE

For intentional device, according to FCC 47 CFR Section 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device.

And according to FCC 47 CFR Section 15.247 (b), if transmitting antennas of directional gain greater than 6dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi.

9.2 ANTENNA CONNECTED CONSTRUCTION

Type: Printed Antenna
Model: N/A
Manufacturer: N/A
Gain: 3.2 dBi

===End of Test Report===