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Radio Test Report FCC ID: OIE55955TR

Original Grant

Report No. : TB-FCC175133

Applicant : LB Technology Co., Ltd.

Equipment Under Test (EUT)

EUT Name : Baby Monitor

Model No. : LB55955T

Series Model No. : JLB55955ST,LB55955(CE)T,LB55955S(CE)T

Brand Name : LBTECH

Sample ID : TBBJ-20200730-12-01#

Receipt Date : 2020-08-20

Test Date : 2020-08-20 to 2020-09-09

Issue Date : 2020-09-09

Standards : FCC Part 15, Subpart C 15.247

Test Method : ANSI C63.10: 2013

Conclusions : PASS

In the configuration tested, the EUT complied with the standards specified above,

The EUT technically complies with the FCC requirements

Test/Witness Engineer

Engineer Supervisor

Engineer Manager

Jack Dengy

Jack Dengy

VAN SU

Ray Lai

This report details the results of the testing carried out on one sample. The results contained in this test report do not relate to other samples of the same product. The manufacturer should ensure that all products in series production are in conformity with the product sample detailed in the report.



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Revision History

Report No.	Version	Description	Issued Date
TB-FCC175133	Rev.01	Initial issue of report	2020-09-09
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miss miles	640		4 min
3 WWW	1003		



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1. General Information about EUT

1.1 Client Information

Applicant : LB Technology Co., Ltd.		LB Technology Co., Ltd.
Address No. 5 of Xiaoyang Rd, First Industrial Park, Tanzhou Town, Zhongshar City, Guangdong Province, China		No. 5 of Xiaoyang Rd, First Industrial Park, Tanzhou Town, Zhongshan City,Guangdong Province, China
Manufacturer : LB Technology Co., Ltd.		LB Technology Co., Ltd.
Address : No. 5 of Xiaoyang Rd, First Industrial Park, Tan. City,Guangdong Province, China		No. 5 of Xiaoyang Rd, First Industrial Park, Tanzhou Town, Zhongshan City, Guangdong Province, China

1.2 General Description of EUT (Equipment Under Test)

EUT Name	÷	Baby Monitor	Baby Monitor		
Models No.	9	LB55955T,JLB55955ST,LB55955(CE)T,LB55955S(CE)T			
Model Difference	:	All these models are the same PCB, layout and electrical circuit, The difference is the Brand Name.			
Sample ID	:	TBBJ-20200730-12-01#			
		Operation Frequency:	2406MHz~2475MHz		
	1	Number of Channel:	24 Channels See Note 2		
Product Description	ė	Max Peak Output Power:	13.054dBm		
Decempation		Antenna Gain:	3dBi FPC Antenna		
		Modulation Type:	GFSK (4Mbps)		
Power Supply		DC Voltage Supply from AC/DC Adapter			
Power Rating	:	Adapter (Model:ZD5C0501 Input: AC 100-240V~50/60 Output: DC 5.0V,1000mA			
Software Version	:	V1.0			
Hardware Version	:	LB55953_BU_V03			
Remark		The adapter and antenna gain provided by the applicant, the verified for the RF conduction test provided by TOBY test lab.			

Note:

(1) For a more detailed features description, please refer to the manufacturer's specifications or the User's Manual.



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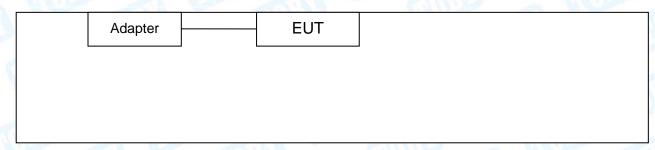
(2) Channel List:

Channel List						
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)	
00	2406	15	2451	CHILL		
01	2409	16	2454		ω_{MR}	
02	2412	17	2457			
03	2415	18	2460	WILL DE		
04	2418	19	2463	6.30		
05	2421	20	2466			
06	2424	21	2469			
07	2427	22	2472	No.	511	
08	2430	23	2475	_ Q/1	120	
09	2433		630	100 C		
10	2436		THE STATE OF THE S	The same of		
11	2439	100			3 7	
12	2442	1				
13	2445				UKO	
14	2448	NU				

Note: Test frequencies are lowest channel: 2406MHz, middle channel: 2442MHz and highest channel: 2475MHz.

- (3) The Antenna information about the equipment is provided by the applicant.
- 1.3 Block Diagram Showing the Configuration of System Tested

Adapter & TX Mode





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1.4 Description of Support Units

The EUT has been tested as an independent unit.

1.5 Description of Test Mode

To investigate the maximum EMI emission characteristics generates from EUT, the test system was pre-scanning tested base on the consideration of following EUT operation mode or test configuration mode which possible have effect on EMI emission level. Each of these EUT operation mode(s) or test configuration mode(s) mentioned follow was evaluated respectively.

For Conducted Test						
Final Test Mode	Description					
Mode 1	Adapter+ TX Mode					

For Radiated Test					
Final Test Mode	Description	-			
Mode 1	TX GFSK Mode	B			
Mode 2	TX Mode(GFSK) Channel 00/12/23				

Note:

(1) For all test, we have verified the construction and function in typical operation. And all the test modes were carried out with the EUT in transmitting operation in maximum power with all kinds of data rate. We have pretested all the test modes above.

According to ANSI C63.10 standards, the measurements are performed at the highest, middle, lowest available channels, and the worst case data rate as follows:

TX Mode: GFSK (4Mbps)

(2) The EUT is considered a portable unit; it was pre-tested on the positioned of each 3 axis, X-plane, Y-plane and Z-plane. The worst case was found positioned on X-plane as the normal use. Therefore only the test data of this X-plane was used for radiated emission measurement test.



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1.6 Description of Test Software Setting

During testing channel power controlling software provided by the customer was used to control the operating channel as well as the output power level. The RF output power selection is for the setting of RF output power expected by the customer and is going to be fixed on the firmware of the final end product power parameters of Bluetooth mode.

Test Software Version	Adjust and control the corresponding transmission frequency through the EUT entity key.				
Frequency	2406 MHz	2442 MHz	2475 MHz		
GFSK	DEF	DEF	DEF		

1.7 Measurement Uncertainty

The reported uncertainty of measurement $y \pm U$, where expended uncertainty U is based on a standard uncertainty multiplied by a coverage factor of k=2, providing a level of confidence of approximately 95 %.

Test Item	Parameters	Expanded Uncertainty (U _{Lab})
Conducted Emission	Level Accuracy: 9kHz~150kHz 150kHz to 30MHz	±3.60 dB ±3.10 dB
Radiated Emission	Level Accuracy: 9kHz to 30 MHz	±4.60 dB
Radiated Emission	Level Accuracy: 30MHz to 1000 MHz	±4.20 dB
Radiated Emission	Level Accuracy: Above 1000MHz	±4.20 dB



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1.8 Test Facility

The testing report were performed by the Shenzhen Toby Technology Co., Ltd., in their facilities located at 1A/F., Bldg.6, Yusheng Industrial Zone, The National Road No.107 Xixiang Section 467, Xixiang, Bao'an, Shenzhen, Guangdong, China. At the time of testing, the following bodies accredited the Laboratory:

CNAS (L5813)

The Laboratory has been accredited by CNAS to ISO/IEC 17025: 2005 General Requirements for the Competence of Testing and Calibration Laboratories for the competence in the field of testing. And the Registration No.: CNAS L5813.

A2LA Certificate No.: 4750.01

The laboratory has been accredited by American Association for Laboratory Accreditation(A2LA) to ISO/IEC 17025: 2005 General Requirements for the Competence of Testing and Calibration Laboratories for the technical competence in the field of Electrical Testing. And the A2LA Certificate No.: 4750.01. FCC Accredited Test Site Number: 854351.

IC Registration No.: (11950A-1)

The Laboratory has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing. The site registration: Site# 11950A-1.



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2. Test Summary

FCC Part 15 Subpart C(15.247)/ RSS 247 Issue 2					
Standard S	Standard Section				
FCC	IC	Test Item	Test Sample(s)	Judgment	Remark
15.203	4077	Antenna Requirement	TBBJ-20200730-12-01#	PASS	N/A
15.207	RSS-GEN 8.8	Conducted Emission	TBBJ-20200730-12-01#	PASS	N/A
15.205	RSS-Gen 8.10	Restricted Bands	TBBJ-20200730-12-01#	PASS	N/A
15.247(a)(1)	RSS 247 5.1 (b)	Hopping Channel Separation	TBBJ-20200730-12-01#	PASS	N/A
15.247(a)(1)	RSS 247 5.1 (d)	Dwell Time	TBBJ-20200730-12-01#	PASS	N/A
15.247(b)(1)	RSS 247 5.4 (b)	Peak Output Power	TBBJ-20200730-12-01#	PASS	N/A
15.247(b)(1)	RSS 247 5.1 (d)	Number of Hopping Frequency	TBBJ-20200730-12-01#	PASS	N/A
15.247(d)	RSS 247 5.5	Band Edge	TBBJ-20200730-12-01#	PASS	N/A
15.247(c)& 15.209	RSS 247 5.5 &RSS-GEN 8.9	Radiated Spurious Emission	TBBJ-20200730-12-01#	PASS	N/A
15.247(a)	RSS 247 5.1 (a)	99% Occupied Bandwidth & 20dB Bandwidth	TBBJ-20200730-12-01#	PASS	N/A

3. Test Software

Test Item	Test Software	Manufacturer	Version No.
Conducted Emission	EZ-EMC	EZ	CDI-03A2
Radiation Emission	EZ-EMC	EZ	FA-03A2RE
RF Conducted Measurement	MTS-8310	MWRFtest	V2.0.0.0



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4. Test Equipment

DARE!! Instruments

DARE!! Instruments

DARE!! Instruments

RF Power Sensor

Conducted Emission	on Test				
Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Due Date
EMI Test Receiver	Rohde & Schwarz	ESCI	100321	Jul. 12, 2020	Jul. 11, 2021
RF Switching Unit	Compliance Direction Systems Inc	RSU-A4	34403	Jul. 12, 2020	Jul. 11, 2021
AMN	SCHWARZBECK	NNBL 8226-2	8226-2/164	Jul. 12, 2020	Jul. 11, 2021
LISN	Rohde & Schwarz	ENV216	101131	Jul. 12, 2020	Jul. 11, 2021
Radiation Emission	Test				
Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Due Date
Spectrum Analyzer	Agilent	E4407B	MY45106456	Jul. 12, 2020	Jul. 11, 2021
EMI Test Receiver	Rohde & Schwarz	ESPI	100010/007	Jul. 12, 2020	Jul. 11, 2021
Spectrum Analyzer	Rohde & Schwarz	FSV40-N	102197	Jul. 06, 2020	Jul. 05, 2021
Bilog Antenna	ETS-LINDGREN	3142E	00117537	Mar.01, 2020	Feb. 28, 2021
Horn Antenna	ETS-LINDGREN	3117	00143209	Mar.01, 2020	Feb. 28, 2021
Horn Antenna	ETS-LINDGREN	BBHA 9170	BBHA9170582	Aug.07, 2020	Aug. 06, 2021
Loop Antenna	SCHWARZBECK	FMZB 1519 B	1519B-059	Jul. 07, 2020	Jul. 06, 2021
Pre-amplifier	Sonoma	310N	185903	Mar.01, 2020	Feb. 28, 2021
Pre-amplifier	HP	8449B	3008A00849	Mar.01, 2020	Feb. 28, 2021
Pre-amplifier	SKET	LNPA_1840G-50	SK201904032	Jul. 27, 2020	Jul. 26, 2021
Cable	HUBER+SUHNER	100	SUCOFLEX	Mar. 07, 2020	Mar. 06, 2021
Positioning Controller	ETS-LINDGREN	2090	N/A	N/A	N/A
Antenna Cond	ucted Emissio	า			
Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Due Date
Spectrum Analyzer	Agilent	E4407B	MY45106456	Jul. 12, 2020	Jul. 11, 2021
Spectrum Analyzer	Rohde & Schwarz	ESCI	100010/007	Jul. 12, 2020	Jul. 11, 2021
MXA Signal Analyzer	Agilent	N9020A	MY49100060	Sep. 16, 2019	Sep. 15, 2020
Vector Signal Generator	Agilent	N5182A	MY50141294	Sep. 16, 2019	Sep. 15, 2020
Analog Signal Generator	Agilent	N5181A	MY50141953	Sep. 16, 2019	Sep. 15, 2020
	DARE!! Instruments	RadiPowerRPR3006W	17I00015SNO26	Sep. 16, 2019	Sep. 15, 2020

RadiPowerRPR3006W

RadiPowerRPR3006W

RadiPowerRPR3006W

Sep. 15, 2020

Sep. 15, 2020

Sep. 15, 2020

Sep. 16, 2019

Sep. 16, 2019

Sep. 16, 2019

17I00015SNO29

17I00015SNO31

17I00015SNO33



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5. Conducted Emission Test

5.1 Test Standard and Limit

5.1.1Test Standard FCC Part 15.207/RSS-GEN 8.8

5.1.2 Test Limit

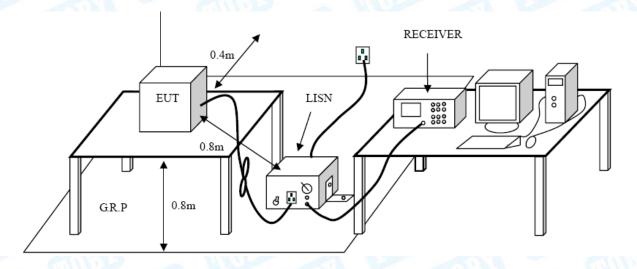
Conducted Emission Test Limit

Eroguenov	Maximum RF Line Voltage (dBμV)			
Frequency	Quasi-peak Level	Average Level		
150kHz~500kHz	66 ~ 56 *	56 ~ 46 *		
500kHz~5MHz	56	46		
5MHz~30MHz	60	50		

Notes:

- (1) *Decreasing linearly with logarithm of the frequency.
- (2) The lower limit shall apply at the transition frequencies.
- (3) The limit decrease in line with the logarithm of the frequency in the range of 0.15 to 0.50MHz.

5.2 Test Setup





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5.3 Test Procedure

The EUT was placed 0.8 meters from the horizontal ground plane with EUT being connected to the power mains through a line impedance stabilization network (LISN). All other support equipments powered from additional LISN(s). The LISN provide 50 Ohm/50uH of coupling impedance for the measuring instrument.

Interconnecting cables that hang closer than 40 cm to the ground plane shall be folded back and forth in the center forming a bundle 30 to 40 cm long.

I/O cables that are not connected to a peripheral shall be bundled in the center. The end of the cable may be terminated, if required, using the correct terminating impedance. The overall length shall not exceed 1 m.

LISN at least 80 cm from nearest part of EUT chassis

The bandwidth of EMI test receiver is set at 9kHz, and the test frequency band is from 0.15MHz to 30MHz.

5.4 Deviation From Test Standard

No deviation

5.5 EUT Operating Mode

Please refer to the description of test mode.

5.6 Test Data

Please refer to the Attachment A.



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6. Radiated Emission Test

6.1 Test Standard and Limit

6.1.1 Test Standard FCC Part 15.209/RSS-GEN 8.9

6.1.2 Test Limit

Radiated Emission Limit (9 kHz~1000MHz)

Frequency (MHz	Field Strength (microvolt/meter)	Measurement Distance (meters)
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

Radiated Emission Limit (Above 1000MHz)

Frequency	Distance Meters(at 3m)		
(MHz)	Peak	Average	
Above 1000	74	54	

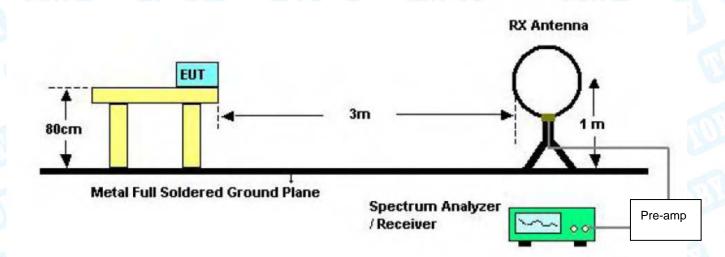
Note:

- (1) The tighter limit applies at the band edges.
- (2) Emission Level (dBuV/m)=20log Emission Level (uV/m)

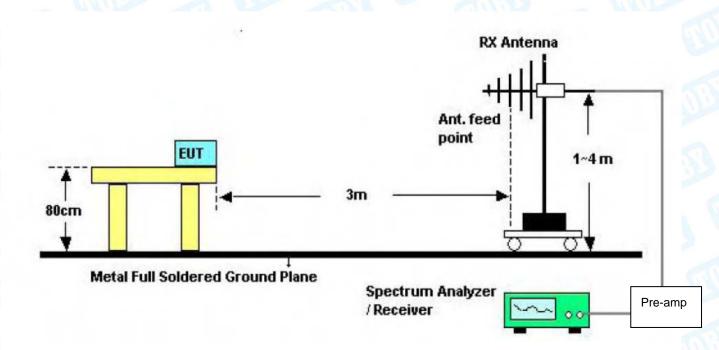


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6.2 Test Setup



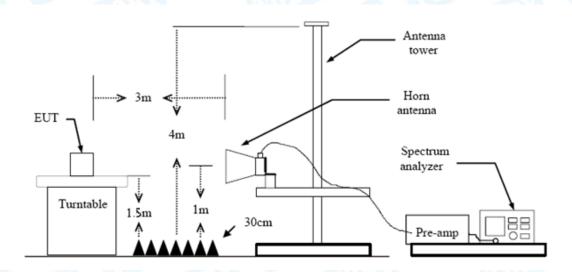
Below 30MHz Test Setup



Below 1000MHz Test Setup



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Above 1GHz Test Setup

6.3 Test Procedure

- (1) Measurements at frequency above 1GHz. The EUT was placed on a rotating 1.5m high above the ground. RF absorbers covered the ground plane with a minimum area of 3.0m by 3.0m between the EUT and measurement receiver antenna. The RF absorber shall not exceed 30cm in high above the conducting floor. The table was rotated 360 degrees to determine the position of the highest radiation.
- (2) Measurements at frequency Below 1GHz. The EUT was placed on a rotating 0.8m high above the ground. RF absorbers covered the ground plane with a minimum area of 3.0m by 3.0m between the EUT and measurement receiver antenna. The RF absorber shall not exceed 30cm in high above the conducting floor. The table was rotated 360 degrees to determine the position of the highest radiation.
- (3) The Test antenna shall vary between 1m and 4m, Both Horizontal and Vertical antenna are set to make measurement.
- (4) The initial step in collecting conducted emission data is a spectrum analyzer peak detector mode pre-scanning the measurement frequency range. Significant peaks are then marked and then Quasi Peak detector mode re-measured.
- (5) If the Peak Mode measured value compliance with and lower than Quasi Peak Mode Limit Bellow 1 GHz, the EUT shall be deemed to meet QP Limits and then no additional QP Mode measurement performed. But the Peak Value and average value both need to comply with applicable limit above 1 GHz.
- (6) Testing frequency range below 1GHz the measuring instrument use VBW=120 kHz with Quasi-peak detection.
- (7) Testing frequency range above 1GHz the measuring instrument use RBW=1 MHz and VBW=3 MHz with Peak Detector for Peak Values, and use RBW=1 MHz and VBW=10 Hz with Peak Detector for Average Values.
- (8) For the actual test configuration, please see the test setup photo.



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6.4 Deviation From Test Standard

No deviation

6.5 EUT Operating Condition

The Equipment Under Test was set to Continual Transmitting in maximum power.

6.6 Test Data

Remark: During testing above 1GHz the measuring instrument use RBW=1 MHz and VBW=3 MHz with Peak Detector for Peak Values, and use RBW=1 MHz and VBW=10 Hz with Peak Detector for Average Values.

Please refer to the Attachment B.



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7. Restricted Bands and Band-edge test

7.1 Test Standard and Limit

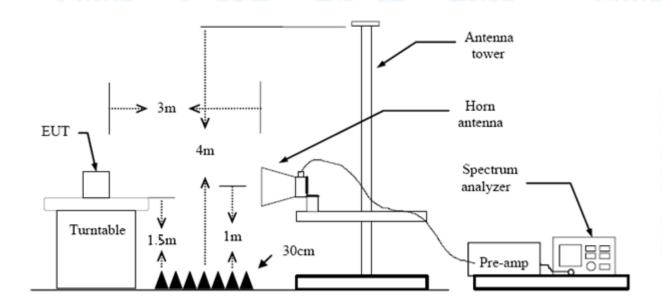
7.1.1 Test Standard FCC Part 15.209&15.205 RSS-GEN 8.9&8.10

7.1.2 Test Limit

Distance Meters(at 3m)			
Peak	Average		
74	54		
74	54		
	Peak 74		

Note: All restriction bands have been tested, only the worst case is reported.

7.2 Test Setup





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7.3 Test Procedure

(1) The measuring distance of 3m shall be used for measurements at frequency up to 1GHz and above 1 GHz. The EUT was placed on a rotating 0.8m high above ground, the table was rotated 360 degrees to determine the position of the highest radiation.

- (2) Measurements at frequency above 1GHz. The EUT was placed on a rotating 1.5m high above the ground. RF absorbers covered the ground plane with a minimum area of 3.0m by 3.0m between the EUT and measurement receiver antenna. The RF absorber shall not exceed 30cm in high above the conducting floor. The table was rotated 360 degrees to determine the position of the highest radiation.
- (3) The Test antenna shall vary between 1m and 4m, Both Horizontal and Vertical antenna are set to make measurement.
- (4) The initial step in collecting conducted emission data is a spectrum analyzer peak detector mode pre-scanning the measurement frequency range. Significant peaks are then marked and then Quasi Peak detector mode re-measured.
- (5) If the Peak Mode measured value compliance with and lower than Quasi Peak Mode Limit Bellow 1 GHz, the EUT shall be deemed to meet QP Limits and then no additional QP Mode measurement performed. But the Peak Value and average value both need to comply with applicable limit above 1 GHz.
- (6) Testing frequency range below 1GHz the measuring instrument use VBW=120 kHz with Quasi-peak detection.
- (7) Testing frequency range above 1GHz the measuring instrument use RBW=1 MHz and VBW=3 MHz with Peak Detector for Peak Values, and use RBW=1 MHz and VBW=10 Hz with AVG Detector for Average Values.
- (8) For the actual test configuration, please see the test setup photo.

7.4 Deviation From Test Standard

No deviation

7.5 EUT Operating Condition

The Equipment Under Test was set to Continual Transmitting in maximum power.

7.6 Test Data

Remark: During testing above 1GHz the measuring instrument use RBW=1 MHz and VBW=3 MHz with Peak Detector for Peak Values, and use RBW=1 MHz and VBW=10 Hz with Peak Detector for Average Values.

All restriction bands have been tested, only the worst case is reported.

Please refer to the Attachment C.



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8. Number of Hopping Channel

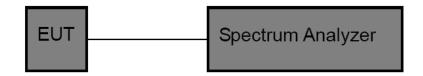
8.1 Test Standard and Limit

8.1.1 Test Standard FCC Part 15.247 (a)(1)

8.1.2 Test Limit

Section	Test Item	Limit
15.247	Number of Hopping Channel	>15

8.2 Test Setup



8.3 Test Procedure

- (1) The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram above.
- (2) Spectrum Setting: RBW=100 KHz, VBW=100 KHz, Sweep time= Auto.

8.4 Deviation From Test Standard

No deviation

8.5 EUT Operating Condition

The EUT was set to the Hopping Mode by the Customer.

8.6 Test Data

Please refer to the Attachment D.



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9. Average Time of Occupancy

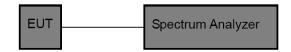
9.1 Test Standard and Limit

9.1.1 Test Standard FCC Part 15.247 (a)(1) / RSS 247 5.1(d)

9.1.2 Test Limit

Test Item	Limit
Average Time of Occupancy	0.4 sec

9.2 Test Setup



9.3 Test Procedure

- (1) The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram above.
- (2) Spectrum Setting: RBW=100KHz, VBW=300KHz.
- (3) Use video trigger with the trigger level set to enable triggering only on full pulses.
- (4) Sweep Time is more than once pulse time.
- (5) Set the center frequency on any frequency would be measure and set the frequency span to zero.
- (6) Measure the maximum time duration of one single pulse.
- (7) Set the EUT for packet transmitting.
- (8) Measure the maximum time duration of one single pulse.

9.4 EUT Operating Condition

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

The Dwell Time = Burst Width * Total Hops. The detailed calculations are showed as follows:

The duration for dwell time calculation: 0.4 [s] * hopping number = 0.4 [s] * 20 [ch] = 8.0 [s*ch];

The burst width, which is directly measured, refers to the duration on one channel hop.

The maximum number of hopping channels in 8.0s = 3*(8.0/0.24) = 100

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.

The EUT was set to the Hopping Mode by the Customer.

9.4 Deviation From Test Standard

No deviation

9.5 Test Data

Please refer to the Attachment E.



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10. Channel Separation and Bandwidth Test

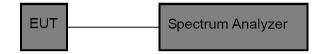
10.1 Test Standard and Limit

10.1.1 Test Standard FCC Part 15.247/RSS 247 5.1(b)

10.1.2 Test Limit

Test Item	Limit	Frequency Range(MHz)
Bandwidth	<=1 MHz (20dB bandwidth)	2400~2483.5
Channel Separation	>25KHz or >two-thirds of the 20 dB bandwidth Which is greater	2400~2483.5

10.2 Test Setup



10.3 Test Procedure

- (1) The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram above.
- (2) Spectrum Setting:

Channel Separation: RBW=100 kHz, VBW=100 kHz.

Bandwidth: RBW=30 kHz, VBW=100 kHz.

- (3) The bandwidth is measured at an amplitude level reduced 20dB from the reference level. The reference level is the level of the highest amplitude signal observed from the transmitter at the fundamental frequency. Once the reference level is established, the equipment is conditioned with typical modulating signal to produce the worst –case (i.e the widest) bandwidth.
- (4) Measure the channel separation the spectrum analyzer was set to Resolution Bandwidth:30 kHz, and Video Bandwidth:100 kHz. Sweep Time set auto.

10.4 Deviation From Test Standard

No deviation

10.5 EUT Operating Condition

The EUT was set to the Hopping Mode for Channel Separation Test and continuously transmitting for the Bandwidth Test.

10.6 Test Data

Please refer to the Attachment F.



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11. Peak Output Power Test

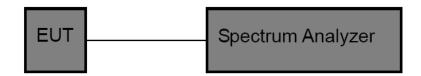
11.1 Test Standard and Limit

11.1.1 Test Standard FCC Part 15.247 (b) (1)/RSS 247 5.4(b)

11.1.2 Test Limit

Test Item	Limit	Frequency Range(MHz)
Peak Output Power	Hopping Channels>75 Power<1W(30dBm) Other <125 mW(21dBm)	2400~2483.5

11.2 Test Setup



11.3 Test Procedure

- (1) The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram above.
- (2) Spectrum Setting:

Peak Detector: RBW=1 MHz, VBW=3 MHz for bandwidth less than 1MHz. RBW=3 MHz, VBW=3 MHz for bandwidth more than 1MHz.

11.4 Deviation From Test Standard

No deviation

11.5 EUT Operating Condition

The EUT was set to continuously transmitting in the max power during the test.

11.6 Test Data

Please refer to the Attachment G.



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12. Antenna Requirement

12.1 Standard Requirement

12.1.1 Standard FCC Part 15.203

12.1.2 Requirement

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.

12.2 Deviation From Test Standard

No deviation

12.3 Antenna Connected Construction

The gains of the antenna used for transmitting is 3dBi, and the antenna connector is de-signed with permanent attachment and no consideration of replacement. Please see the EUT photo for details.

12.4 Result

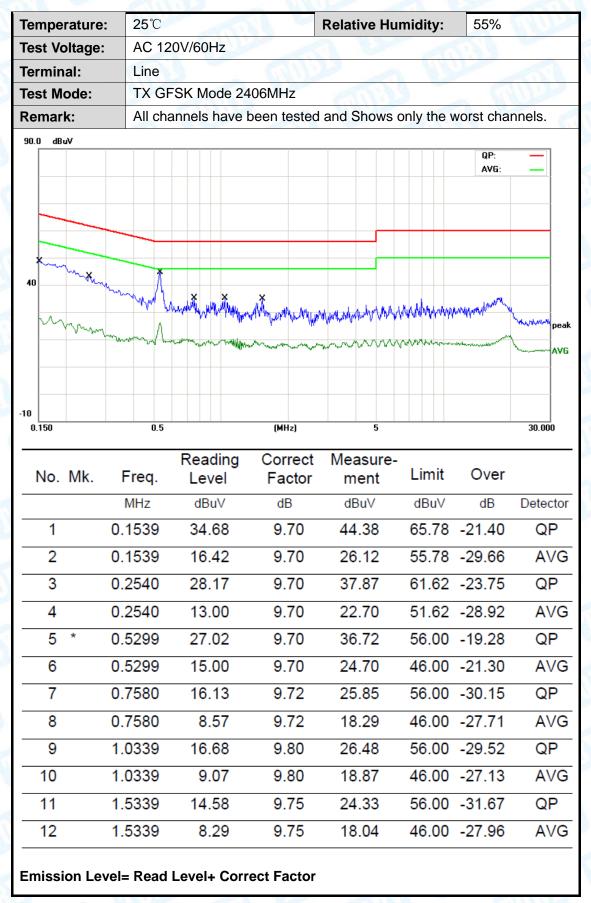
The EUT antenna is a FPC Antenna. It complies with the standard requirement.

	Antenna Type
	⊠Permanent attached antenna
61000	Unique connector antenna
1000	Professional installation antenna



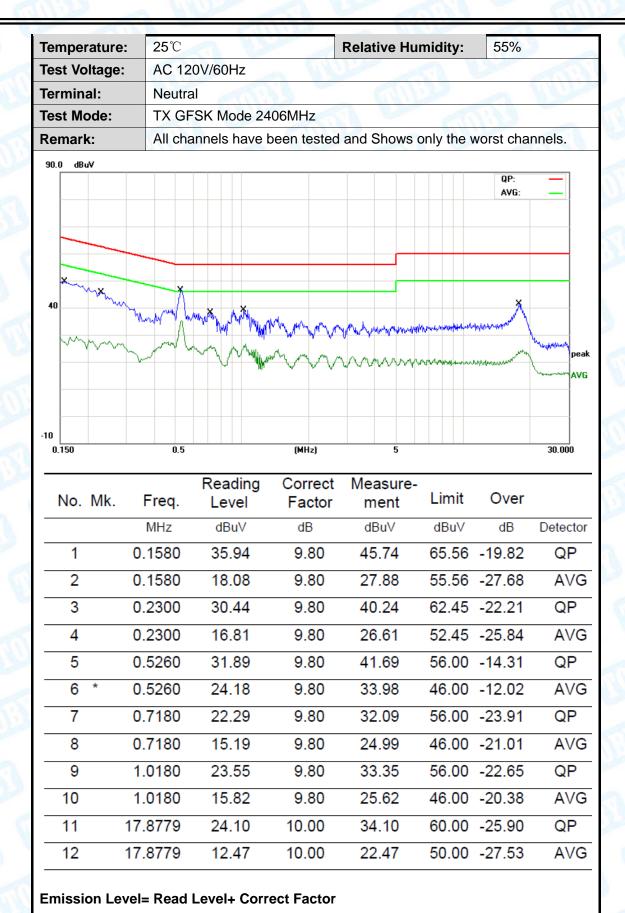


Attachment A-- Conducted Emission Test Data





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Attachment B-- Radiated Emission Test Data

9KHz~30MHz

From 9KHz to 30MHz: Conclusion: PASS

Note: The amplitude of spurious emissions which are attenuated by more than 20dB

below the permissible value has no need to be reported.

30MHz~1GHz

Temperature:	25℃	Time.	Relative H	umidity:	55%	A 1
Test Voltage:	AC 120V/60Hz	MILL		C. Sec.		13
Ant. Pol.	Horizontal		MID	-	HALL	
Test Mode:	TX GFSK Mode 2	2406MHz	6	MIND.		12/
Remark:	Only worse case	is reported			TO THE	1
80.0 dBuV/m						
30			2 **		3M Radiation Margin - 6	5
30.000 40 50 No. Mk. Fro	Reading eq. Level	(MHz) Correct Factor	Measure- ment	400 500 Limit	600 700 Over	1000.000
MI		dB/m	dBuV/m	dBuV/m	dB	Detecto
1 192.4	1186 47.90	-19.83	28.07	43.50	-15.43	QP
2 218.3		-18.95	30.02	46.00	-15.98	QP
3 282.9		-16.60	35.06	46.00	-10.94	QP
4 385.2		-12.98	31.00	46.00	-15.00	QP
5 578.6		-8.57	35.85	46.00	-10.15	QP
6 * 815.9		-5.73	36.28	46.00	-9.72	QP
	Over limit !:over margin	ect Factor				



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emperature:	25℃			Relative H	umaity:	55%	
est Voltage:	AC 120	OV/60Hz	il -	(Din)		- N	MAG
nt. Pol.	Vertica					199	
est Mode:	TX GF	SK Mode 24	106MHz		Mile		(17)
emark:	Only w	orse case is	reported	CITE !		· GA	117
0.0 dBuV/m							
					(RF)FCC 15C	3M Radiation Margin -6 d	* H
1 2		3	4	_		6	
30		M	M. I	5 Mv ₁ /	_hmmh	Marshran	hyt wh
		W \ .	May Mrwyll	1 V WML	MANAMAN		
	W - W	" "WMM	, ,	4			
0							
30.000 40 50	60 70	80	(MHz)	300	400 500	600 700	1000.000
30.000 40 50	60 70		(MHz) Correct	Measure-	400 500	600 700	1000.00
	60 70 Freq.	Reading Level			400 500 Limit	600 700 Over	1000.00
No. Mk.		Reading	Correct	Measure-			
No. Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over	Detect
No. Mk. i	Freq.	Reading Level	Correct Factor	Measure- ment	Limit dBuV/m	Over dB	Detecto
No. Mk. 1 1 37 2 * 43	Freq. MHz .2855	Reading Level dBuV 51.07	Correct Factor dB/m -17.74	Measure- ment dBuV/m	Limit dBuV/m 40.00	Over dB -6.67	Detecti QP QP
No. Mk. 1 1 37 2 * 43 3 90	Freq. MHz .2855 .5057	Reading Level dBuV 51.07 54.29 52.07	Correct Factor dB/m -17.74 -20.70 -21.87	Measure- ment dBuV/m 33.33 33.59 30.20	Limit dBuV/m 40.00 40.00 43.50	Over dB -6.67 -6.41 -13.30	Detect QP QP
No. Mk. 1 1 37 2 * 43 3 90 4 148	Freq. MHz .2855 .5057 .8554	Reading Level dBuV 51.07 54.29 52.07 53.02	Correct Factor dB/m -17.74 -20.70 -21.87 -21.51	Measure- ment dBuV/m 33.33 33.59 30.20 31.51	Limit dBuV/m 40.00 40.00 43.50 43.50	Over dB -6.67 -6.41 -13.30 -11.99	Detect QP QP QP
No. Mk. 1 1 37 2 * 43 3 90 4 148 5 222	Freq. MHz .2855 .5057 .8554 8.4410 2.9502	Reading Level dBuV 51.07 54.29 52.07 53.02 46.51	Correct Factor dB/m -17.74 -20.70 -21.87 -21.51 -18.70	Measure- ment dBuV/m 33.33 33.59 30.20 31.51 27.81	Limit dBuV/m 40.00 40.00 43.50 43.50 46.00	Over dB -6.67 -6.41 -13.30 -11.99 -18.19	Detector QP QP QP QP
No. Mk. 1 1 37 2 * 43 3 90 4 148 5 222	Freq. MHz .2855 .5057 .8554	Reading Level dBuV 51.07 54.29 52.07 53.02	Correct Factor dB/m -17.74 -20.70 -21.87 -21.51	Measure- ment dBuV/m 33.33 33.59 30.20 31.51	Limit dBuV/m 40.00 40.00 43.50 43.50	Over dB -6.67 -6.41 -13.30 -11.99	Detector QP QP QP QP
No. Mk. 1 1 37 2 * 43 3 90 4 148 5 222 6 558	Freq. MHz .2855 .5057 .8554 8.4410 2.9502	Reading Level dBuV 51.07 54.29 52.07 53.02 46.51	Correct Factor dB/m -17.74 -20.70 -21.87 -21.51 -18.70	Measure- ment dBuV/m 33.33 33.59 30.20 31.51 27.81	Limit dBuV/m 40.00 40.00 43.50 43.50 46.00	Over dB -6.67 -6.41 -13.30 -11.99 -18.19	Detector QP QP QP QP



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Above 1GHz (Only worse case is reported)

Tempe	eratu	re:	25 ℃		2 BA	Relative H	lumidity:	55%	TO STATE OF
Test V	oltag	e:	AC 1	20V/60Hz	118	TITTO	1329	- 1	HILL
Ant. Pol. Hori				contal				100	
Test M	lode:		TX G	FSK Mode 2	2406MHz		I Am		
Remar	rk:			eport for the cribed limit.	emission w	hich more th	an 10 dB b	elow the	المعتدل
No.	. Mk	. Fre	eq.	Reading Level	Correct Factor	Measure- ment	Limit	Over	
		MH	Ηz	dBu∨	dB/m	dBuV/m	dBuV/m	dB	Detector
1		4811.	526	49.10	13.07	62.17	74.00	-11.83	peak
2	*	4811.	922	33.34	13.07	46.41	54.00	-7.59	AVG
Emiss	ion L	.evel=	Read	Level+ Cori	ect Factor	•			

empe	eratur	e:	25 ℃		1 // 7	Relative Hum	nidity:	55%	
est V	oltage	e:	AC 1	20V/60Hz)	WALL TO		a V	
nt. P	ol.		Vertic	cal			(TIES)		_
est N	lode:		TX G	FSK Mode 2	2406MHz		1	A	111
Rema	rk:			eport for the cribed limit.	emission v	which more tha	an 10 dB l	pelow the	OT I
No	. Mk.	Fr	eq.	Reading Level	Correct Factor	Measure- ment	Limit	Over	
		MI	Hz	dBu∨	dB/m	dBuV/m	dBuV/m	dB	Detector
_	*	4811	.766	34.76	13.07	47.83	54.00	-6.17	AVG
1			.952	47.88	13.07	60.95	74.00	-13.05	peak



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Гетр	eratur	e:	25℃		- G1	Relative Hun	nidity:	55%			
Test V	oltag	e:	AC 1	20V/60Hz		1111	330	- N	الله الماله		
Ant. Pol. Horizontal						W D	-6	63.0			
Test Mode: TX G				TX GFSK Mode 2442MHz							
Rema	rk:			eport for the cribed limit.	emission v	which more that	an 10 dB	below the	المعتقل		
No	. Mk.	Fre	eq.	Reading Level	Correct Factor	Measure- ment	Limit	Over			
		MH	Ηz	dBu∨	dB/m	dBuV/m	dBuV/m	dB	Detector		
1		4883.	.736	48.32	13.59	61.91	74.00	-12.09	peak		
			234	33.75	13.61	47.36	54.00	-6.64	AVG		

Tempe	eratu	re:	25 ℃			Relative H	lumidity:	55%	
Test V	oltag	e:	AC 1	20V/60Hz	9	WALLE		a 1	
Ant. Pol. Vertic				cal			(AII)	100	_
Test Mode: TX (TX	SFSK Mode 2	2442MHz		Contract of the second	40	11.0
Rema	rk:			eport for the cribed limit.	emission w	hich more tha	an 10 dB b	elow the	M
No.	Mk.	Fre	eq.	Reading Level	Correct Factor	Measure- ment	Limit	Over	
		MH	łz	dBu∨	dB/m	dBuV/m	dBuV/m	dB	Detector
		4882.	656	33.66	13.59	47.25	54.00	-6.75	AVG
1	*	1002							



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Temperatu	re: 25°	C		Relative H	lumidity:	55%			
Test Voltag	ge: AC	AC 120V/60Hz							
Ant. Pol.	Ho	izontal		VI VE		19.10			
Test Mode: TX GFSK Mode 2475MHz							660		
Remark:		report for the scribed limit.	emission w	hich more tha	an 10 dB b	elow the	صعنال		
No. Mk	. Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over			
	MHz	dBu∀	dB/m	dBuV/m	dBuV/m	dB	Detector		
1	4948.758	47.91	14.08	61.99	74.00	-12.01	peak		
	4949.610	33.51	14.08	47.59	54.00	-6.41	AVG		

Temperature	: 25℃			Relative Hu	midity:	55%			
Test Voltage:	AC 1	20V/60Hz	9	WALL OF		a W			
Ant. Pol.	Verti	cal			Tim				
Test Mode:	TX C	TX GFSK Mode 2475MHz							
Remark:		eport for the cribed limit.	emission w	hich more tha	an 10 dB l	pelow the	m		
No. Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over			
	MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector		
1 * 1	949.604	33.57	14.08	47.65	54.00	-6.35	AVG		
1 * 4									



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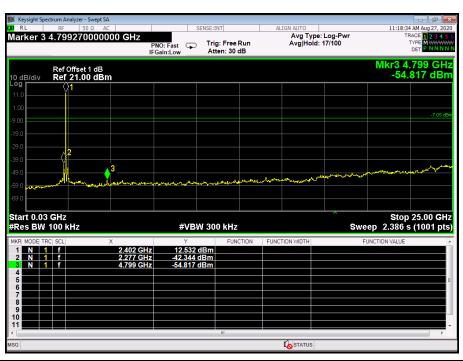
Conducted Emission Test Data

Temperature:	25 °C	Relative Humidity:	55%					
Test Voltage: AC 120V/60Hz								
Test Mode:	TX GFSK Mode	V C	133					
Remark:	Remark: This report only shall the worst case mode.							

2406 MHz

0.03GHz-26.5GHz





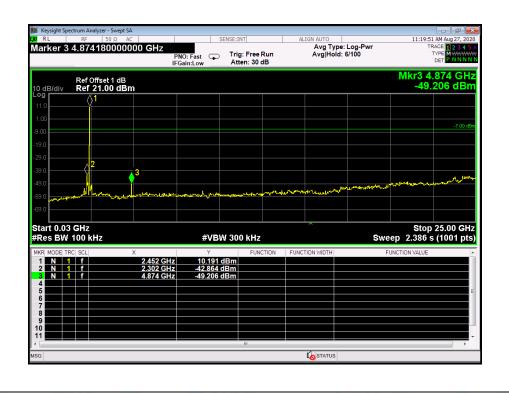


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2442 MHz

0.03GHz-26.5GHz





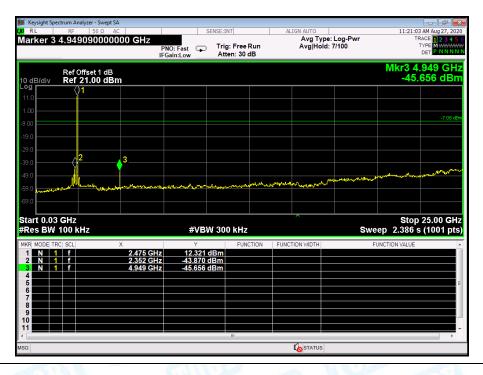


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0.03GHz-26.5GHz





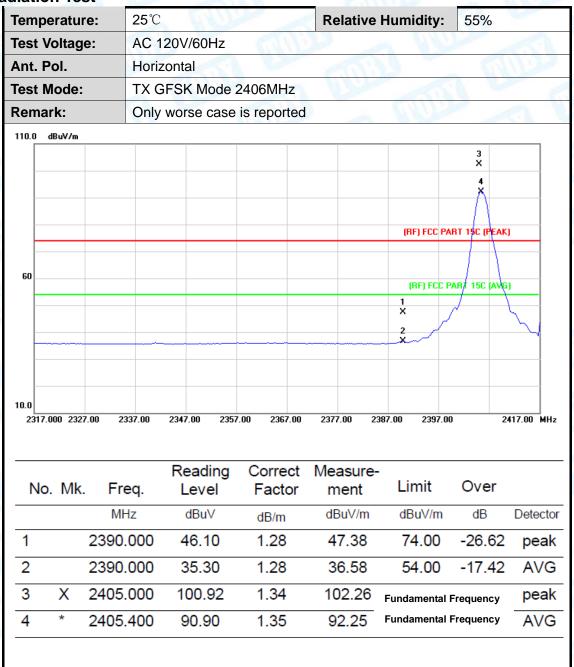




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Attachment C-- Restricted Bands Requirement Test Data

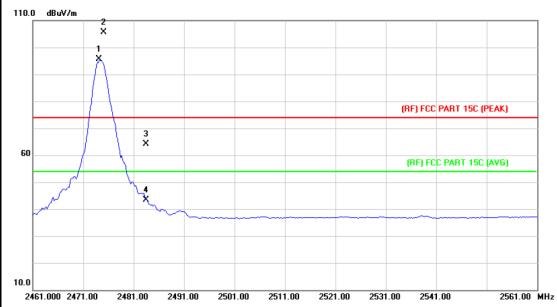
(1) Radiation Test





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Temperature:	25℃	Relative Humidity:	55%
Test Voltage:	AC 120V/60Hz	WILLIAM STATE	(1) (B)
Ant. Pol.	Vertical	nn i	
Test Mode:	TX GFSK Mode 2406MHz		
Remark:	Only worse case is reported	CHILL STORY	A Aller



-	No.	Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over	
			MHz	dBu∀	dB/m	dBuV/m	dBuV/m	dB	Detector
1		*	2474.200	93.71	1.81	95.52	Fundamental I	Frequency	AVG
2		X	2475.000	103.70	1.82	105.52	Fundamental I	Frequency	peak
3			2483.500	62.31	1.88	64.19	74.00	-9.81	peak
4			2483.500	41.62	1.88	43.50	54.00	-10.50	AVG

Emission Level= Read Level+ Correct Factor



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Temperature:	25℃	Relative Humidity:	55%					
Test Voltage:	AC 120V/60Hz	AC 120V/60Hz						
Ant. Pol.	Horizontal							
Test Mode:	TX GFSK Mode 2475 MHz							
Remark:	Only worse case is reported							

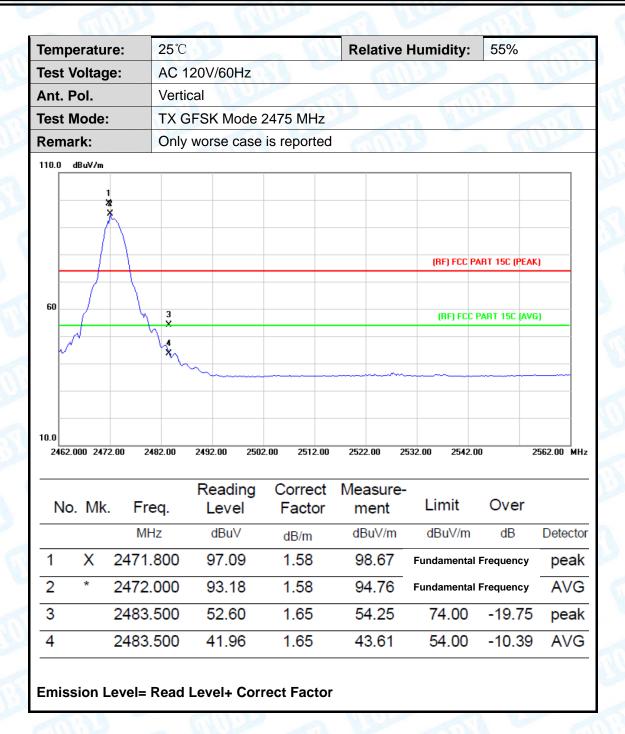


No	. Mk	. Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over	
		MHz	dBu∨	dB/m	dBuV/m	dBuV/m	dB	Detector
1	*	2474.200	95.41	1.81	97.22	Fundamental	Frequency	AVG
2	X	2474.800	105.51	1.82	107.33	Fundamental Frequency		peak
3		2483.500	67.22	1.88	69.10	74.00	-4.90	peak
4		2483.500	44.56	1.88	46.44	54.00	-7.56	AVG

Emission Level= Read Level+ Correct Factor

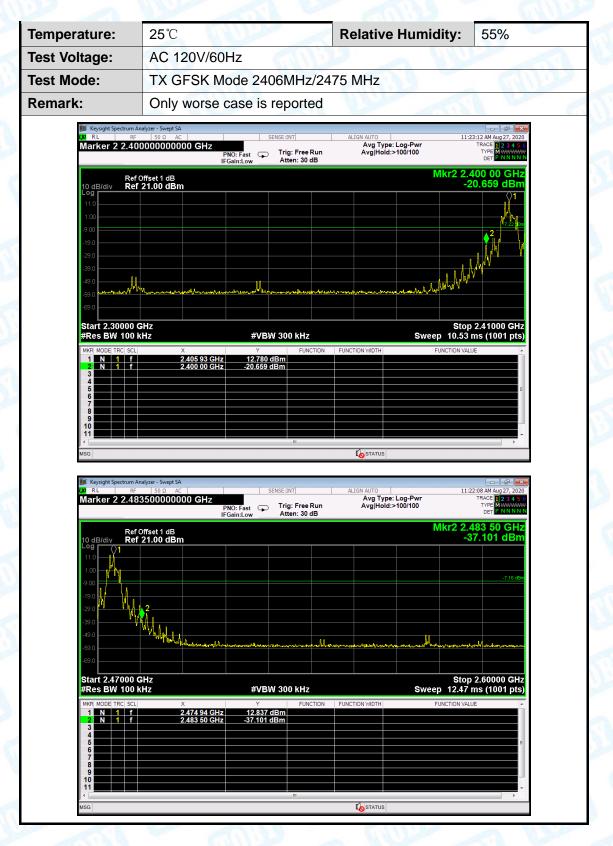


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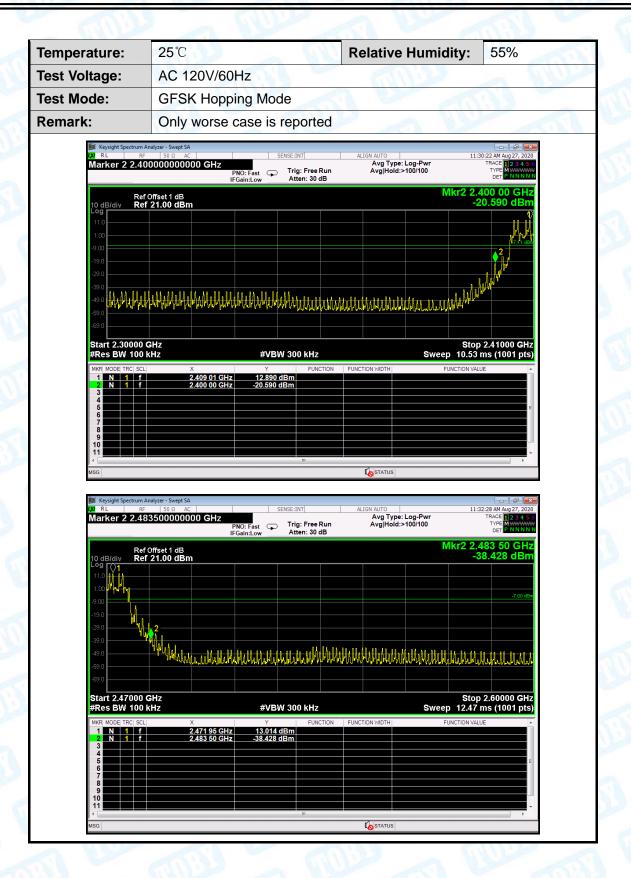




(2) Conducted Band Edge Test







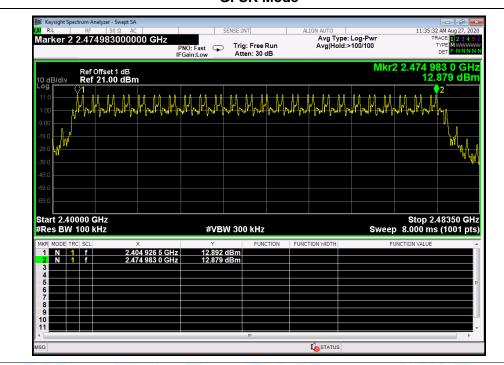




Attachment D-- Number of Hopping Channel Test Data

Temperature:	25℃	The same	Relative Humidity:	55%		
Test Voltage:	AC 1	20V/60Hz		333		
Test Mode:	Hopp	Hopping Mode				
Frequency Range		Test Mode	Quantity of Hopping Channel	Limit		
2406MHz~2475MHz		GFSK	24	>15		
		1	SECV Mada			

GFSK Mode







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Attachment E-- Average Time of Occupancy Test Data

Temperature:		25°	°C Relative Humidity:				Million
Test Vo	Itage:	AC	120V/60Hz	The same of the sa	1 Charles	1000	
Test Mo	de:	Hop	oping Mode (G	SFSK)		War.	
Remark	Κ:	The	number of to	tal hopping freq	uencies up to 24.		The same
Test Chann Mode (MHz		nel	Reading	Total hops	Test Result	Limit	Result
		z)	Time (ms)	Total Hops	(ms)	(ms)	Nesuit
GESK	240	6	1 0000	55	99 484	400	PASS

The Dwell Time = Burst Width * Total Hops. The detailed calculations are showed as follows:

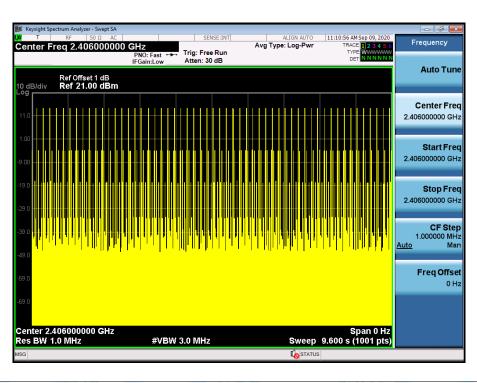
The duration for dwell time calculation: 0.4 [s] * hopping number = 0.4 [s] * 24 [ch] =9.60[s*ch];

The burst width, which is directly measured, refers to the duration on one channel hop.

The maximum number of hopping channels in 9.6s is 55.

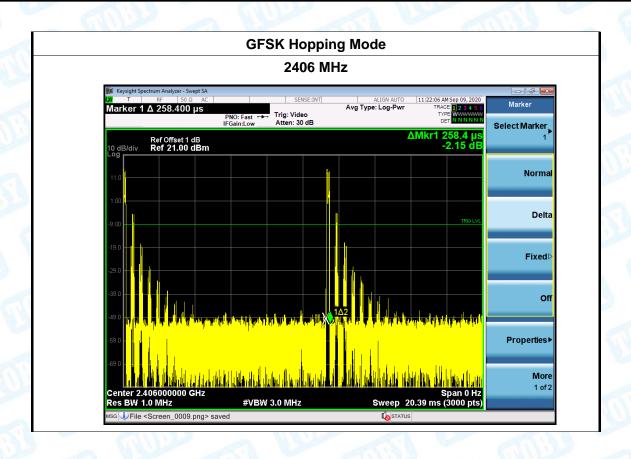
Reading Time=0.2584ms*7=1.8088ms

GFSK Hopping Mode





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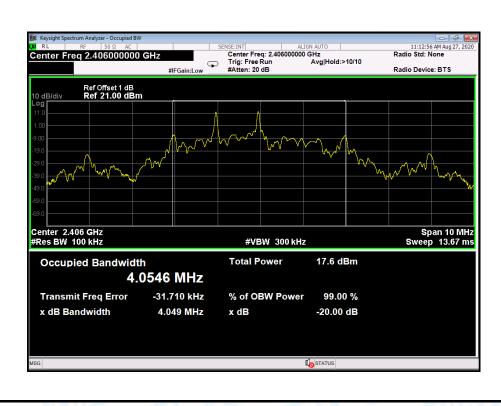
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Attachment F-- Channel Separation and Bandwidth Test Data

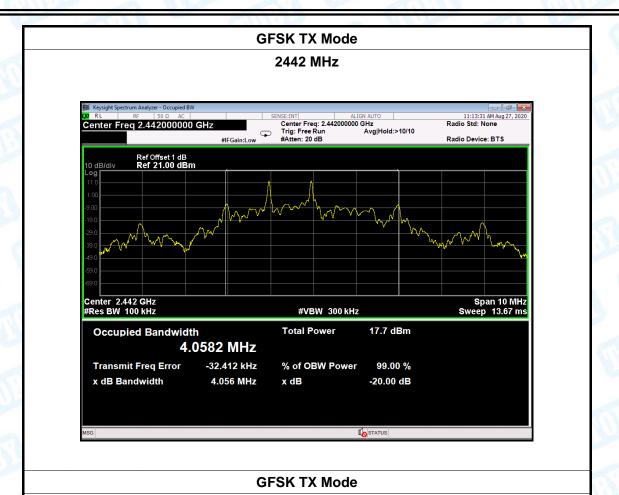
Bandwidth Test Data:

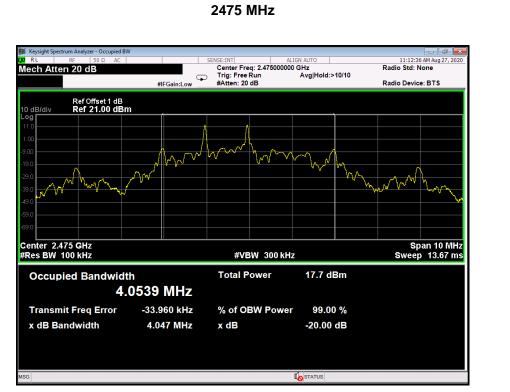
Temperature:	25°	C	Relative Humidity:	55%
Test Voltage:	AC	120V/60Hz	MAN	
Test Mode:	TX	Mode (GFSK)		
Channel frequency (MHz)		99% OBW (kHz)	20dB Bandwidth (kHz)	20dB Bandwidth *2/3 (kHz)
2406		4054.6	4049	2699
2442		4058.2	4056	2704
2475		4053.9	4047	2698

GFSK TX Mode











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Channel Separation Test data:

Temperature:	25℃		Relative Humidity:		55%			
Test Voltage:	AC 120V/	AC 120V/60Hz						
Test Mode:	Hopping I	Hopping Mode (GFSK)						
Remark:	We test a	We test all channel and worse case recorded in the report.						
Channel frequ	uency	Separation Read Value		Separation Limit				
(MHz)		(kHz)			(kHz)			
2406		3000.0)	2699 2704				
2442		3010.0)					
2475		3000.0			2698			
GFSK Hopping Mode								





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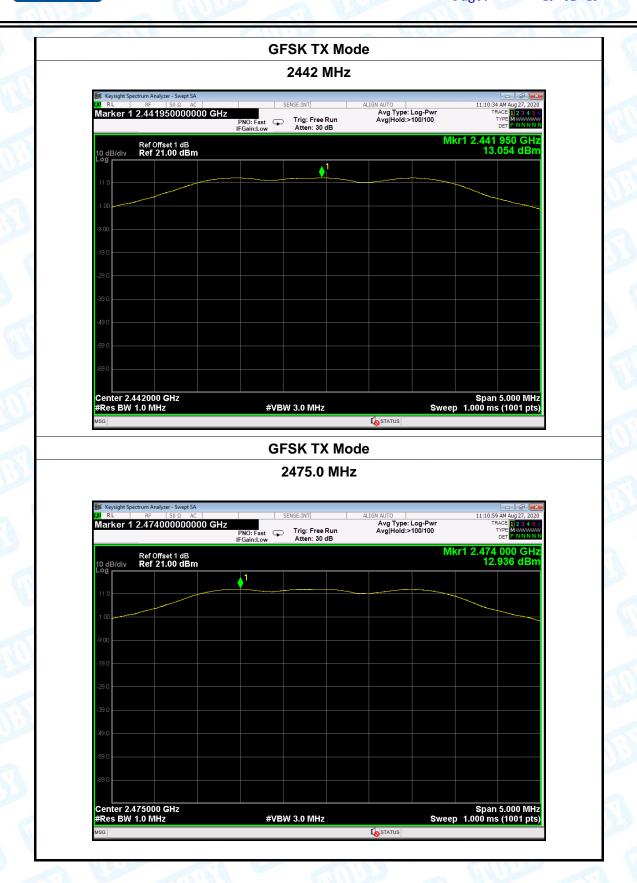
Attachment G-- Peak Output Power Test Data

Temperature:	25 ℃		Relative Humidity:	55%	
Test Voltage:	AC 120V/	60Hz			
Test Mode:	TX Mode	(GFSK)			
Channel frequen	cy (MHz)	Test Result (dBm)		Limit (dBm)	
2406	2406				
2442		13.054		21	
2475		12.936			
		GECK TY I	Modo.		

GFSK TX Mode







----END OF REPORT----