

FCC Radio Test Report FCC ID: 2AMIU-VISION650

Original Grant

Report No.	:	TB-FCC170050
Applicant	•	Shenzhen Benjun Technology Co., LTD
Equipment Under Test	E (EL	
EUT Name		WIRELESS HEADPHONES
Model No.	:	Vision 650
Series Model No.	11	Vision 680
Brand Name	1	
Receipt Date		2019-10-31
Test Date	:	2019-11-01 to 2019-11-29
Issue Date	1	2019-11-30
Standards	:	FCC Part 15: 2019, 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 : WAN SV : fry La.



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-FCC170050	Rev.01	Initial issue of report	2019-11-30
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1. General Information about EUT

1.1 Client Information

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Applicant		Shenzhen Benjun Technology Co., LTD	
Address	•	8-709 Runcheng garden xili town, Nanshan District, Shenzhen City, Guangdong province, China	
Manufacturer		Shenzhen Tianjiu electronics CO., LTD	
Address	:	3 Bldg. No. 21Makan Road, Xili town, Nanshan District, shenzhen city, Guangdong, province, China	

1.2 General Description of EUT (Equipment Under Test)

EUT Name	-	WIRELESS HEADPHONES		
Models No.	:	Vision 650, Vision 680		
Model Difference	:	All these models are in the same PCB, layout and electrical circuit, the only difference is horn and the honk.		
		Operation Frequency:	Bluetooth V4.0(BT): 2402~2480 MHz	
	5	Number of Channel:	Bluetooth: 79 Channels See Note 2	
Product		Max Peak Output Power:	Bluetooth: 1.227dBm(GFSK)	
Description		Antenna Gain:	1.5dBi Ceramic Antenna	
		Modulation Type:	GFSK:1.227dBm π /4-DQPSK:0.796dBm 8-DPSK: 1.188dBm	
Power Supply	-	DC Voltage Supply from USB Interface. DC Voltage supplied by Li-ion battery.		
Power Rating	:	USB Input:5V 0.15A DC 3.7V by 250mAh Li-ion battery		
Software Version	:	1.0		
Hardware Version		1.0		
Connecting I/O Port(S)	5	Please refer to the User's Manual		
Remark:	Z			

Note:

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



(2) Channel List:

Bluetooth Channel List					
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
00	2402	27	2429	54	2456
01	2403	28	2430	55	2457
02	2404	29	2431	56	2458
03	2405	30	2432	57	2459
04	2406	31	2433	58	2460
05	2407	32	2434	59	2461
06	2408	33	2435	60	2462
07	2409	34	2436	61	2463
08	2410	35	2437	62	2464
09	2411	36	2438	63	2465
10	2412	37	2439	64	2466
11	2413	38	2440	65	2467
12	2414	39	2441	66	2468
13	2415	40	2442	67	2469
14	2416	41	2443	68	2470
15	2417	42	2444	69	2471
16	2418	43	2445	70	2472
17	2419	44	2446	71	2473
18	2420	45	2447	72	2474
19	2421	46	2448	73	2475
20	2422	47	2449	74	2476
21	2423	48	2450	75	2477
22	2424	49	2451	76	2478
23	2425	50	2452	77	2479
24	2426	51	2453	78	2480
25	2427	52	2454		
26	2428	53	2455		

(3) The Antenna information about the equipment is provided by the applicant.

1.3 Block Diagram Showing the Configuration of System Tested

Charging + TX Mode

Adapter	

Cable 1



TX Mode



1.4 Description of Support Units

Cable Information				
Number	Shielded Type	Ferrite Core	Length	Note
Cable 1	Yes	NO	1.0M	Accessory

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 Power Supply + TX Mode Channel 00		
	For Radiated Test	
Final Test Mode	Description	
Mode 1	TX GFSK Mode Channel 00	
Mode 2	TX Mode(GFSK) Channel 00/39/78	
Mode 3	TX Mode(π /4-DQPSK) Channel 00/39/78	
Mode 4	TX Mode(8-DPSK) Channel 00/39/78	
Mode 5	Hopping Mode(GFSK)	
Mode 6	Hopping Mode(π /4-DQPSK)	
Mode 7 Hopping Mode(8-DPSK)		
Remark:	and a number of	

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 (1 Mbps)

TX Mode: π /4-DQPSK (2 Mbps)

TX Mode: 8-DPSK (3Mbps)

(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.

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	ang	MTK Engineer Mode.ex	e
Frequency	2402 MHz	2441MHz	2480 MHz
GFSK	DEF	DEF	DEF
π /4-DQPSK	DEF	DEF	DEF
8-DPSK	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	±3.42 dB ±3.42 dB	
Radiated Emission	Level Accuracy: 9kHz to 30 MHz	±4.60 dB	
Radiated Emission	Level Accuracy: 30MHz to 1000 MHz	±4.40 dB	
Radiated Emission	Level Accuracy: Above 1000MHz	±4.20 dB	



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.



2. Test Summary

FCC Part 15 Subpart C(15.247)/ RSS 247 Issue 2				
Standard Section		T (14	l	Demode
FCC	IC	- Test Item	Judgment	Remark
15.203	2	Antenna Requirement	PASS	N/A
15.207	RSS-GEN 7.2.2	Conducted Emission	PASS	N/A
15.205	RSS-Gen 7.2.3	Restricted Bands	PASS	N/A
15.247(a)(1)	RSS 247 5.1 (2)	Hopping Channel Separation	PASS	N/A
15.247(a)(1)	RSS 247 5.1 (4)	Dwell Time	PASS	N/A
15.247(b)(1)	RSS 247 5.4 (2)	Peak Output Power	PASS	N/A
15.247(b)(1)	RSS 247 5.1 (4)	Number of Hopping Frequency	PASS	N/A
15.247(d)	RSS 247 5.5	Band Edge	PASS	N/A
15.247(c)& 15.209	RSS 247 5.5	Radiated Spurious Emission	PASS	N/A
15.247(a)	RSS 247 5.1 (1)	99% Occupied Bandwidth & 20dB Bandwidth	PASS	99%OBW: GFSK: 860.46kHz π /4-DQPSK: 1155.0kHz 8-DPSK: 1154.2KHz

Note: N/A is an abbreviation for Not Applicable.

3. Test Software

Test Item	Test Software	Manufacturer	Version No.
Conducted Emission	EZ-EMC	EZ	CDI-03A2
Radiation Emission	EZ-EMC	EZ	FA-03A2RE

4. Test Equipment

Conducted Emission	Test				
Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Due Date
EMI Test Receiver	Rohde & Schwarz	ESCI	100321	Jul. 13, 2019	Jul. 12, 2020
RF Switching Unit	Compliance Direction Systems Inc	RSU-A4	34403	Jul. 13, 2019	Jul. 12, 2020
AMN	SCHWARZBECK	NNBL 8226-2	8226-2/164	Jul. 13, 2019	Jul. 12, 2020
LISN	Rohde & Schwarz	ENV216	101131	Jul. 13, 2019	Jul. 12, 2020
Radiation Emission 1	lest	-	-	-	-
Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Due Date
Spectrum Analyzer	Agilent	E4407B	MY45106456	Jul. 13, 2019	Jul. 12, 2020
EMI Test Receiver	Rohde & Schwarz	ESPI	100010/007	Jul. 13, 2019	Jul. 12, 2020
Spectrum Analyzer	Rohde & Schwarz	FSVR	1311.006K40-10 0945-DH	Feb. 10, 2019	Feb. 09, 2020
Bilog Antenna	ETS-LINDGREN	3142E	00117537	Jan. 27, 2019	Jan. 26, 2020
Bilog Antenna	ETS-LINDGREN	3142E	00117542	Jan. 27, 2019	Jan. 26, 2020
Horn Antenna	ETS-LINDGREN	3117	00143207	Mar.03, 2019	Mar. 02, 2020
Horn Antenna	ETS-LINDGREN	3117	00143209	Mar.03, 2019	Mar. 02, 2020
Horn Antenna	ETS-LINDGREN	BBHA 9170	BBHA9170582	Mar.03, 2019	Mar. 02, 2020
Loop Antenna	SCHWARZBECK	FMZB 1519 B	1519B-059	Jul. 13, 2019	Jul. 12, 2020
Pre-amplifier	Sonoma	310N	185903	Mar.04, 2019	Mar. 03, 2020
Pre-amplifier	HP	8449B	3008A00849	Mar.03, 2019	Mar. 02, 2020
Pre-amplifier	EMCI	EMC02325	980217	Mar.03, 2019	Mar. 02, 2020
Cable	HUBER+SUHNER	100	SUCOFLEX	Mar.03, 2019	Mar. 02, 2020
Positioning Controller	ETS-LINDGREN	2090	N/A	N/A	N/A
Antenna Conducted	Emission				
Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Due Date
Spectrum Analyzer	Agilent	E4407B	MY45106456	Jul. 13, 2019	Jul. 12, 2020
Spectrum Analyzer	Rohde & Schwarz	ESCI	100010/007	Jul. 13, 2019	Jul. 12, 2020
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
(III)	DARE!! Instruments	RadiPowerRPR3006W	17100015SNO26	Sep. 16, 2019	Sep. 15, 2020
RF Power Sensor	DARE!! Instruments	RadiPowerRPR3006W	17100015SNO29	Sep. 16, 2019	Sep. 15, 2020
IN I'OWEI SEIISOI	DARE!! Instruments	RadiPowerRPR3006W	17100015SNO31	Sep. 16, 2019	Sep. 15, 2020
	DARE!! Instruments	RadiPowerRPR3006W	17100015SNO33	Sep. 16, 2019	Sep. 15, 2020



5. Conducted Emission Test

- 5.1 Test Standard and Limit
 - 5.1.1Test Standard FCC Part 15.207
 - 5.1.2 Test Limit

Eroguanay	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	

Conducted Emission Test Limit

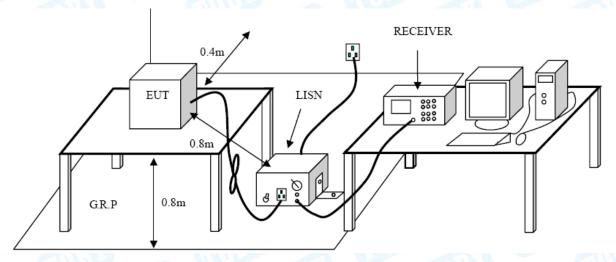
Notes:

(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



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 EUT Operating Mode

Please refer to the description of test mode.

5.5 Test Data

Please refer to the Attachment A.



6. Radiated Emission Test

- 6.1 Test Standard and Limit
 - 6.1.1 Test Standard
 - FCC Part 15.209
 - 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

Frequency	Distance of 3	8m (dBuV/m)
(MHz)	Peak	Average
bove 1000	74	54

Note:

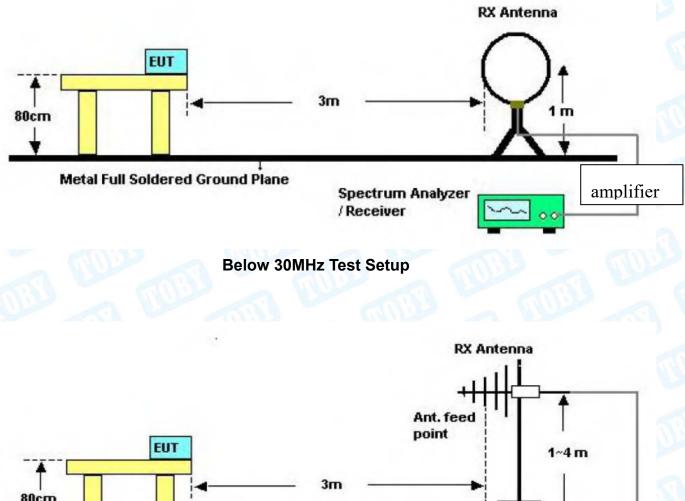
(1) The tighter limit applies at the band edges.

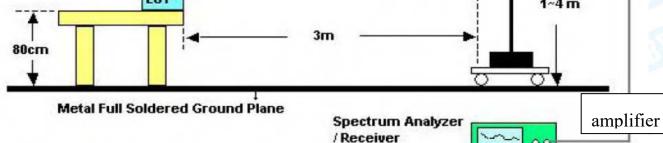
(2) Emission Level (dBuV/m)=20log Emission Level (uV/m)



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6.2 Test Setup

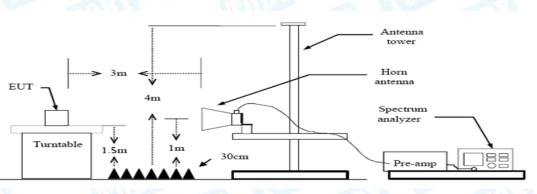




Below 1000MHz Test Setup

0.0





Above 1GHz Test Setup

6.3 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 Peak Detector for Average Values.
- (8) For the actual test configuration, please see the test setup photo.

6.4 EUT Operating Condition

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

6.5 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.

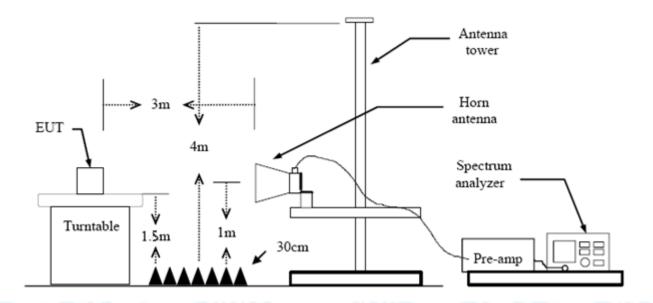


7. Restricted Bands Requirement

- 7.1 Test Standard and Limit
 - 7.1.1 Test Standard FCC Part 15.209 FCC Part 15.205
 - 7.1.2 Test Limit

Restricted Frequency	Distance of	3m (dBuV/m)
Band (MHz)	Peak	Average
2310 ~2390	74	54
2483.5 ~2500	74	54

7.2 Test Setup



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 EUT Operating Condition

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

7.5 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.

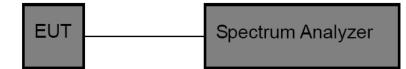


8. Number of Hopping Channel

- 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 EUT Operating Condition

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

8.5 Test Data

Please refer to the Attachment D.

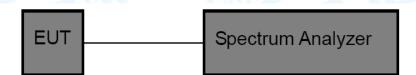


9. Average Time of Occupancy

- 9.1 Test Standard and Limit
 - 9.1.1 Test Standard
 - FCC Part 15.247 (a)(1)
 - 9.1.2 Test Limit

Section	Test Item	Limit
15.247(a)(1)	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=1MHz, VBW=1MHz.
- (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:

{Total of Dwell} = {Pulse Time} * (1600 / X) / {Number of Hopping Frequency} * {Period} {Period} = 0.4s * {Number of Hopping Frequency}

Note: X=2 or 4 or 6 (1DH1=2, 1DH3=4, 1DH5=6. 2DH1=2, 2DH3=4, 2DH5=6. 3DH1=2, 3DH3=4, 3DH5=6)

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.

9.5 Test Data

Please refer to the Attachment E.



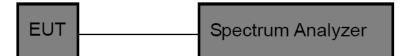
10. Channel Separation and Bandwidth Test

10.1 Test Standard and Limit

10.1.1 Test Standard FCC Part 15.247 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 EUT Operating Condition

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

10.5 Test Data

Please refer to the Attachment F.

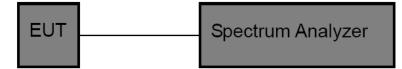


11. Peak Output Power Test

- 11.1 Test Standard and Limit
 - 11.1.1 Test Standard
 - FCC Part 15.247 (b) (1)
 - 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 \geq RBW for bandwidth more than 1MHz.

11.4 EUT Operating Condition

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

11.5 Test Data

Please refer to the Attachment G.



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 Antenna Connected Construction

The gains of the antenna used for transmitting is 1.5dBi, and the antenna connector is de-signed with permanent attachment and no consideration of replacement. Please see the EUT photo for details.

12.3 Result

The	e EUT antenna is a Ceramic Antenna. It complies with the standard requirement
	Antenna Type
	Permanent attached antenna
	Unique connector antenna
	Professional installation antenna

Attachment A-- Conducted Emission Test Data

Temperatu	ire: 24	₽°C		Relative H	lumidity	: 55%	6
est Volta	ge: A	C 120V/60 Hz	z	a v	0	689)	
ferminal:	Li	ne					-
est Mode	: M	ode 1	N C	and!	6	_	Ann
Remark:	O	nly worse cas	se is reported		1		
40 X M	m M	Murring the Marken Murring Marken	an in a natification from		https://www.com	QP: AVE	
10 0.150							
		Reading	(MHz)	5 Measure-			30.00
No. Mk.	Freq.	Reading		⁵ Measure- ment	Limit	Over	30.00
	Freq. MHz	Reading	Correct	Measure-	Limit dBuV	Over dB	30.00
		Reading Level dBuV	Correct Factor	Measure- ment	dBuV		
No. Mk.	MHz	Reading Level dBuV 29.54	Correct Factor dB	Measure- ment dBuV	dBuV 64.96	dB	Detector
No. Mk.	MHz 0.1700	Reading Level dBuV 29.54 14.66	Correct Factor dB 9.58	Measure- ment dBuV 39.12	dBuV 64.96 54.96	dB -25.84	Detector
No. Mk. 1 2	MHz 0.1700 0.1700	Reading Level dBuV 29.54 14.66 35.26	Correct Factor dB 9.58 9.58	Measure- ment dBuV 39.12 24.24	dBuV 64.96 54.96 57.33	dB -25.84 -30.72	Detector QP AVG QP
No. Mk. 1 2 3 *	MHz 0.1700 0.1700 0.4260	Reading Level dBuV 29.54 29.54 14.66 35.26 15.75	Correct Factor dB 9.58 9.58 9.60	Measure- ment dBuV 39.12 24.24 44.86	dBuV 64.96 54.96 57.33 47.33	dB -25.84 -30.72 -12.47	Detector QP AVG QP
No. Mk. 1 2 3 * 4	MHz 0.1700 0.1700 0.4260 0.4260	Reading Level dBuV 29.54 29.54 14.66 35.26 15.75 23.46	Correct Factor dB 9.58 9.58 9.60 9.60	Measure- ment dBuV 39.12 24.24 44.86 25.35	dBuV 64.96 54.96 57.33 47.33 56.00	dB -25.84 -30.72 -12.47 -21.98	Detector QP AVG QP AVG QP
No. Mk. 1 2 3 * 4 5	MHz 0.1700 0.1700 0.4260 0.4260 0.7300	Reading Level dBuV 29.54 29.54 14.66 35.26 15.75 23.46 14.99	Correct Factor dB 9.58 9.58 9.60 9.60 9.61	Measure- ment dBuV 39.12 24.24 44.86 25.35 33.07	dBuV 64.96 54.96 57.33 47.33 56.00 46.00	dB -25.84 -30.72 -12.47 -21.98 -22.93	Detector QP AVG QP AVG QP AVG
No. Mk. 1 2 3 * 4 5 6	MHz 0.1700 0.1700 0.4260 0.4260 0.7300 0.7300	Reading Level dBuV 29.54 29.54 14.66 35.26 15.75 23.46 14.99 24.00	Correct Factor dB 9.58 9.58 9.60 9.60 9.61 9.61	Measure- ment dBuV 39.12 24.24 44.86 25.35 33.07 24.60	dBuV 64.96 54.96 57.33 47.33 56.00 46.00 56.00	dB -25.84 -30.72 -12.47 -21.98 -22.93 -21.40	Detector QP AVG QP AVG QP AVG QP
No. Mk. 1 2 3 * 4 5 6 7	MHz 0.1700 0.1700 0.4260 0.4260 0.7300 0.7300 0.8500	Reading Level dBuV 29.54 29.54 14.66 35.26 15.75 23.46 23.46 14.99 24.00 13.93	Correct Factor dB 9.58 9.58 9.60 9.60 9.61 9.61 9.60	Measure- ment dBuV 39.12 24.24 44.86 25.35 33.07 24.60 33.60	dBuV 64.96 54.96 57.33 47.33 56.00 46.00 56.00 46.00	dB -25.84 -30.72 -12.47 -21.98 -22.93 -21.40 -22.40	Detector QP AVG QP AVG QP AVG QP AVG
No. Mk. 1 2 3 * 4 5 6 7 8	MHz 0.1700 0.1700 0.4260 0.4260 0.7300 0.7300 0.8500	Reading Level dBuV 29.54 29.54 14.66 35.26 15.75 23.46 23.46 14.99 24.00 13.93 17.55	Correct Factor dB 9.58 9.58 9.60 9.60 9.61 9.61 9.60 9.60 9.60	Measure- ment dBuV 39.12 24.24 44.86 25.35 33.07 24.60 33.60 23.53	dBuV 64.96 54.96 57.33 47.33 56.00 46.00 56.00 56.00	dB -25.84 -30.72 -12.47 -21.98 -22.93 -21.40 -22.40 -22.47	Detector QP AVG QP AVG QP AVG QP AVG QP
No. Mk. 1 2 3 * 4 5 6 7 8 9	MHz 0.1700 0.1700 0.4260 0.4260 0.7300 0.7300 0.8500 0.8500 1.5660	Reading Level dBuV 29.54 29.54 14.66 35.26 15.75 23.46 23.46 14.99 24.00 13.93 17.55 9.60	Correct Factor dB 9.58 9.58 9.60 9.60 9.61 9.60 9.60 9.60 9.61	Measure- ment dBuV 39.12 24.24 44.86 25.35 33.07 24.60 33.60 23.53 27.16	dBuV 64.96 54.96 57.33 47.33 56.00 46.00 56.00 46.00 46.00	dB -25.84 -30.72 -12.47 -21.98 -22.93 -21.40 -22.40 -22.47 -28.84	Detector QP AVG QP AVG



Temperati	ure:	24 ℃		Rela	tive Humidi	ty: 55%	6
Fest Volta	ge:	AC 120V/6	0 Hz		(CIIII)		alor
Terminal:	1	Neutral	The second			ARY.	
Test Mode	ə: I	Mode 1		NU OF		89	1300
Remark:	(Only worse	e case is repo	orted			MUL
90.0 dBuV				1	· · · · · ·	0.0	
						QP: AV	
X		<u>x</u>			+		
40 Mars	harden	1 Murianay	MAN A.			m	
	mint		Munice -	and the stand of the stand of the	the superstant between	whether "Manual	Murmun pe
		Υψι _{Μα} ν ·	" "Munow	man man			AV AV
10							
0.150		0.5		(Hz)	5		30.000
No. Mk.	Free	Read a. Lev	<u> </u>			t Over	
NO. MIN.	MHz	•		dBu			Detector
1	0.170					6 -30.24	QP
2	0.170						AVG
3 *	0.426					3 -15.98	QP
4	0.426	50 17.3	26 9.5	8 26.8	34 47.3	3 -20.49	
5	0.618	30 22.	75 9.5	9 32.3	34 56.0	0 -23.66	QP
6	0.618	30 16.	62 9.5	9 26.2	21 46.0	0 -19.79	AVG
7	0.834	0 24.	92 9.5	9 34.	51 56.0	0 -21.49	QP
8	0.834	0 16.	13 9.5	9 25.	72 46.0	0 -20.28	AVG
9	3.026	0 16.	58 9.6	7 26.2	25 56.0	0 -29.75	QP
10	3.026					0 -26.33	
11	13.510					0 -35.41	
	15.510	0 14.	10.0	24.	00.0	0 -55.41	Q/F

6.05

10.50

16.55

13.5100

12

AVG

50.00 -33.45



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

emperature:	25 ℃	Relative Humidity:	55%			
est Voltage:	AC 120V60HZ					
nt. Pol.	Horizontal	TUDE A	N.C.			
est Mode:	Mode 1 2402MHz					
emark:	Only worse case is reported	eported				
80.0 dBuV/m						
30 1 X 1 X 1 X 1 X X X X X X X X X X X X		4 5 4 X	C 3M Radiation Margin -6 dB			

No	. Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over	
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector
1		32.1795	35.10	-14.65	20.45	40.00	-19.55	QP
2		87.7248	35.97	-22.13	13.84	40.00	-26.16	QP
3		180.6488	43.63	-20.10	23.53	43.50	-19.97	QP
4		216.7828	44.99	-18.94	26.05	46.00	-19.95	QP
5		273.2341	44.34	-16.56	27.78	46.00	-18.22	QP
6	*	760.7036	37.16	-6.21	30.95	46.00	-15.05	QP

*:Maximum data x:Over limit !:over margin



emperature:	25 ℃		Relative Humidity	/: 55%
est Voltage:	AC 120\	V60HZ	Caller -	~ 640
nt. Pol.	Vertical	NUCL.		5819
est Mode:	Mode 1	2402MHz		
Remark:	Only wo	orse case is reporte	ed	- 6102
80.0 dBuV/m				
		and a start of the	4 5 X 5	15C 3M Radiation Margin -6 dB
-20 30.000 40	50 60 70	80 (MH	z) 300 400	500 600 700 1000.

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over	
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector
1		32.1795	39.44	-14.65	24.79	40.00	-15.21	QP
2		47.9940	39.56	-22.67	16.89	40.00	-23.11	QP
3		151.5972	41.59	-21.33	20.26	43.50	-23.24	QP
4		224.5193	43.14	-18.50	24.64	46.00	-21.36	QP
5		379.9141	36.25	-13.01	23.24	46.00	-22.76	QP
6	*	893.8567	34.68	-3.78	30.90	46.00	-15.10	QP

*:Maximum data x:Over limit !:over margin

Above 1GHz(Only worse case is reported)

Temperature:	25 ℃	Relative Humidity:	55%				
Test Voltage:	DC 3.7V	DC 3.7V					
Ant. Pol.	Horizontal						
Test Mode:	TX GFSK Mode 2402MHz	TX GFSK Mode 2402MHz					
Remark:	No report for the emission which more than 20 dB below the						
	prescribed limit.						

No.	Mk.	Freq.	Reading Level		Measure- ment	Limit	Over	
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector
1		4803.772	48.79	12.42	61.21	74.00	-12.79	peak
2	*	4804.714	33.50	12.43	45.93	54.00	-8.07	AVG

Emission Level= Read Level+ Correct Factor

Temperature:	25 ℃	Relative Humidity:	55%			
Test Voltage:	DC 3.7V					
Ant. Pol.	Vertical					
Test Mode:	TX GFSK Mode 2402MHz	TX GFSK Mode 2402MHz				
Remark:	No report for the emission	No report for the emission which more than 20 dB below the				
	prescribed limit.					

No	. Mk	. Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over	
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector
1		4804.072	47.58	12.42	60.00	74.00	-14.00	peak
2	*	4805.182	33.46	12.43	45.89	54.00	-8.11	AVG



Temperature:	25 ℃	Relative Humidity:	55%			
Test Voltage:	DC 3.7V	DC 3.7V				
Ant. Pol.	Horizontal	Horizontal				
Test Mode:	TX GFSK Mode 24	41MHz				
Remark:	No report for the emission which more than 20 dB below the prescribed limit.					

No	o. Mk	. Freq.	Reading Level		Measure- ment	Limit	Over	
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector
1		4882.864	47.83	12.90	60.73	74.00	-13.27	peak
2	*	4883.500	34.10	12.90	47.00	54.00	-7.00	AVG

Temperature:	25 ℃	Relative Humidity:	55%				
Test Voltage:	DC 3.7V		TORU -				
Ant. Pol.	Vertical						
Test Mode:	TX GFSK Mode 2441MHz						
Remark:	No report for the emission	No report for the emission which more than 20 dB below the					
	prescribed limit.		U.S. A				

No	. Mk	. Freq.	Reading Level		Measure- ment	Limit	Over	
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector
1		4881.970	48.15	12.90	61.05	74.00	-12.95	peak
2	*	4883.344	34.04	12.90	46.94	54.00	-7.06	AVG



Temperature:	25 ℃	Relative Humidity:	55%			
Test Voltage:	DC 3.7V					
Ant. Pol.	Horizontal	Horizontal				
Test Mode:	TX GFSK Mode 2480	TX GFSK Mode 2480MHz				
Remark:	No report for the emis	No report for the emission which more than 20 dB below the				
	prescribed limit.					

No	. Mk	. Freq.	Reading Level		Measure- ment	Limit	Over	
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector
1		4960.018	48.08	13.37	61.45	74.00	-12.55	peak
2	*	4961.500	33.82	13.39	47.21	54.00	-6.79	AVG

Temperature:	25 ℃	Relative Humidity:	55%			
Test Voltage:	DC 3.7V					
Ant. Pol.	Vertical					
Test Mode:	TX GFSK Mode 248	TX GFSK Mode 2480MHz				
Remark:	No report for the emission which more than 20 dB below the					
	prescribed limit.					

No	. Mk	. Freq.	Reading Level		Measure- ment	Limit	Over	
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector
1		4960.192	49.15	13.37	62.52	74.00	-11.48	peak
2	*	4960.870	33.80	13.38	47.18	54.00	-6.82	AVG



Temperature:	25 ℃	Relative Humidity:	55%				
Test Voltage:	DC 3.7V	6002					
Ant. Pol.	Horizontal	Horizontal					
Test Mode:	TX π /4-DQPSK Mode 24	TX π /4-DQPSK Mode 2402MHz					
Remark:	No report for the emissio prescribed limit.	n which more than 20 dB	below the				

No.	Mk.	Freq.	Reading Level		Measure- ment	Limit	Over	
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detec
1		4803.352	48.71	12.42	61.13	74.00	-12.87	pea
2	*	4805.344	33.49	12.43	45.92	54.00	-8.08	AV

Temperature:	25 ℃	Relative Humidity:	55%			
Test Voltage:	DC 3.7V					
Ant. Pol.	Vertical					
Test Mode:	TX π /4-DQPSK Mode 24	TX π /4-DQPSK Mode 2402MHz				
Remark:	No report for the emission which more than 20 dB below the					
	prescribed limit.					

N	o. Mk	. Freq.	Reading Level		Measure- ment	Limit	Over	
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector
1	*	4804.714	33.44	12.43	45.87	54.00	-8.13	AVG
2		4805.398	48.45	12.43	60.88	74.00	-13.12	peak



Temperature:	25 ℃	Relative Humidity:	55%			
Test Voltage:	DC 3.7V	1000				
Ant. Pol.	Horizontal	Horizontal				
Test Mode:	TX π /4-DQPSK Me	TX π /4-DQPSK Mode 2441MHz				
Remark:	No report for the e	No report for the emission which more than 20 dB below the				
	prescribed limit.					

No	. Mk	. Freq.	Reading Level		Measure- ment	Limit	Over	
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector
1		4882.648	48.51	12.90	61.41	74.00	-12.59	peak
2	*	4883.344	34.07	12.90	46.97	54.00	-7.03	AVG

Temperature:	25 ℃	Relative Humidity:	55%
Test Voltage:	DC 3.7V		
Ant. Pol.	Vertical	A RUUS	
Test Mode:	TX π /4-DQPSK M	ode 2441MHz	
Remark:	No report for the e	mission which more than 20 dB	below the
	prescribed limit.		

No	o. Mk	. Freq.	Reading Level		Measure- ment	Limit	Over	
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector
1		4881.142	48.80	12.90	61.70	74.00	-12.30	peak
2	*	4883.344	34.04	12.90	46.94	54.00	-7.06	AVG



Temperature:	25 ℃	Relative Humidity:	55%
Test Voltage:	DC 3.7V		
Ant. Pol.	Horizontal		33
Test Mode:	TX π /4-DQPSK Mod	e 2480MHz	
Remark:	No report for the emi	ssion which more than 20 dB b	elow the
	prescribed limit.		

No	. Mk	. Freq.	Reading Level		Measure- ment	Limit	Over	
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector
1		4959.478	48.15	13.37	61.52	74.00	-12.48	peak
2	*	4960.078	33.83	13.37	47.20	54.00	-6.80	AVG

Temperature:	25 ℃	Relative Humidity:	55%
Test Voltage:	DC 3.7V		
Ant. Pol.	Vertical		
Test Mode:	TX π /4-DQPSK Mode 2480M	IHz	E
Remark:	No report for the emission wh	ich more than 20 dB b	elow the
	prescribed limit.		

No	o. Mk	. Freq.	Reading Level		Measure- ment	Limit	Over	
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector
1	*	4959.604	33.81	13.37	47.18	54.00	-6.82	AVG
2		4960.306	48.11	13.37	61.48	74.00	-12.52	peak



Temperature:	25 ℃	Relative Humidity:	55%				
Test Voltage:	DC 3.7V						
Ant. Pol.	Horizontal	Horizontal					
Test Mode:	TX 8-DPSK Mode	2402MHz					
Remark:	No report for the e	No report for the emission which more than 20 dB below the					
	prescribed limit.						

Ν	lo.	Mk.	Freq.			Measure- ment	Limit	Over	
			MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector
1		*	4802.974	33.50	12.41	45.91	54.00	-8.09	AVG
2			4804.750	47.75	12.43	60.18	74.00	-13.82	peak

Relative Humidity:	55%				
	No.				
Hz					
No report for the emission which more than 20 dB below the prescribed limit.					

No	b. Mk	. Freq.	Reading Level		Measure- ment	Limit	Over	
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector
1		4802.656	47.43	12.41	59.84	74.00	-14.16	peak
2	*	4805.338	33.45	12.43	45.88	54.00	-8.12	AVG



Temperature:	25 ℃	Relative Humidity:	55%				
Test Voltage:	DC 3.7V						
Ant. Pol.	Horizontal	Horizontal					
Test Mode:	TX 8-DPSK Mode	2441MHz					
Remark:	No report for the e prescribed limit.	mission which more than 20 dB	below the				

No.	Mk.	Freq.			Measure- ment	Limit	Over	
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector
1		4881.376	48.71	12.90	61.61	74.00	-12.39	peak
2	*	4881.766	34.02	12.90	46.92	54.00	-7.08	AVG

Temperature:	25 ℃	Relative Humidity:	55%				
Test Voltage:	DC 3.7V		- ORD				
Ant. Pol.	Vertical						
Test Mode:	TX 8-DPSK Mode 2441MHz						
Remark:	No report for the emission which more than 20 dB below the						
	prescribed limit.		No a				

No	. Mk	. Freq.	Reading Level		Measure- ment	Limit	Over	
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector
1		4882.540	48.67	12.90	61.57	74.00	-12.43	peak
2	*	4883.500	34.02	12.90	46.92	54.00	-7.08	AVG



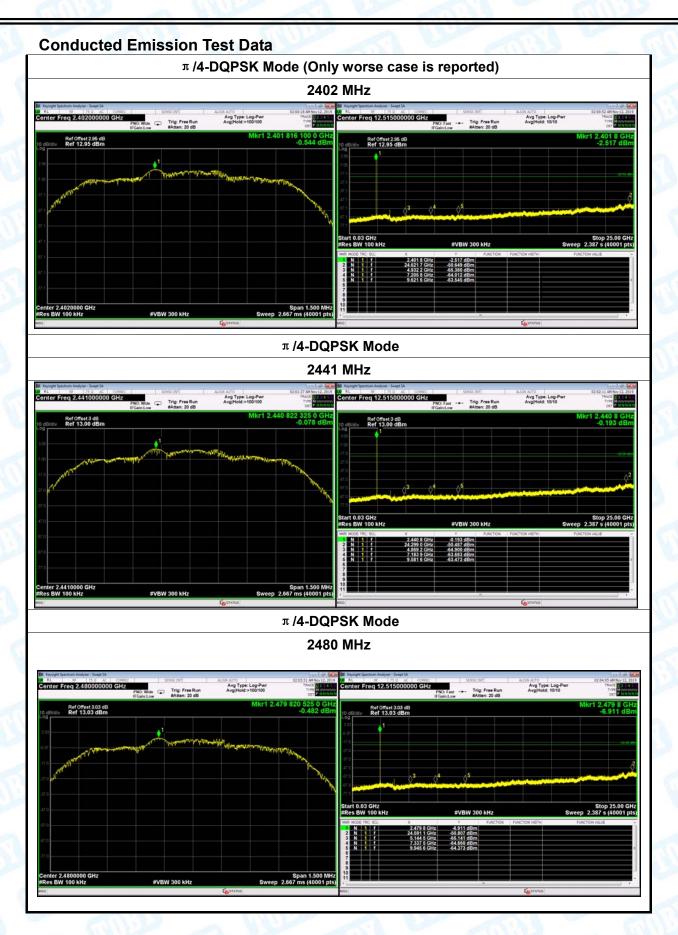
		Relative Humidity:	55%					
Test Voltage:	DC 3.7V	6000	A DIVE					
Ant. Pol.	Horizontal							
Test Mode:	TX 8-DPSK Mode 2480MHz							
	No report for the emission which more than 20 dB below the prescribed limit.							

1	No. Mk	. Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over	
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector
1	*	4960.390	33.79	13.38	47.17	54.00	-6.83	AVG
2		4960.606	48.41	13.38	61.79	74.00	-12.21	peak

Temperature:	25℃	Relative Humidity:	55%					
Test Voltage:	DC 3.7V							
Ant. Pol.	Vertical							
Test Mode:	TX 8-DPSK Mode 2480MHz							
Remark:	No report for the emission wh	No report for the emission which more than 20 dB below the						
	prescribed limit.							

N	lo. M	k. Freq.			Measure- ment	Limit	Over	
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector
1	*	4960.390	33.75	13.38	47.13	54.00	-6.87	AVG
2		4960.804	48.02	13.38	61.40	74.00	-12.60	peak





Attachment C-- Restricted Bands Requirement and Band

Edge Test Data

(1) Radiation Test

emp	perature:	25℃		Relative Humidity:	55%
est '	Voltage:	DC 3.7V	29	NUL A	
nt. I	Pol.	Horizontal		MUP -	2
est l	Mode:	TX GFSK Mo	de 2402MHz		Can D
ema	ark:	Only worse c	ase is reported	ALL A	
100.0	0 dBu∀/m		1		
					3 X
				(RF) FCC PA	RT 15C (PEAK)
					Å
				(RF) FCC P	ART 15C (AVG)
50				1 X 2	
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No.	Mk	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over	
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector
1		2390.000	42.81	1.51	44.32	74.00	-29.68	peak
2		2390.000	32.87	1.51	34.38	54.00	-19.62	AVG
3	Х	2402.000	87.13	1.56	88.69	Fundamental Frequency		peak
4	*	2402.000	69.95	1.56	71.51	Fundamental F	requency	AVG



əmp	perature:	25 ℃			Relati	ive Humidity:	55%		
est '	Voltage:	DC 3.7V	ANV.	5		NUL -			
nt.	Pol.	Vertical	1300	-05					
est	Mode:	TX GFSk	〈 Mode 2	2402MHz					
Rema	ark:	Only wor	se case	is reporte	d 🔨	199			
100.0	0 dBu∀/m								
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						(RF) FCC PART 15C (
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						(96) 600	PART 15¢ (AVG)		
50							ART TOU (AVG)		
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No.	Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over	
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector
1		2390.000	42.65	1.51	44.16	74.00	-29.84	peak
2		2390.200	32.76	1.51	34.27	54.00	-19.73	AVG
3	*	2402.000	68.35	1.56	69.91	Fundamental I	Frequency	AVG
4	Х	2402.400	81.89	1.56	83.45	Fundamental I	Frequency	peak



emperature:	25 ℃	Relative Humidi	ity: 55%
est Voltage:	DC 3.7V		
nt. Pol.	Horizontal		mil
est Mode:	TX GFSK Mode 2	480 MHz	
emark:	Only worse case i	is reported	
100.0 dBuV/m			
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2		(RF)) FCC PART 15C (PEAK)
Ň			
			F) FCC PART 15C (AVG)
50	3 X		FJ FCC PART TOC (AVG)
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No	. Mk	. Freq.	Reading Level	Correct Factor	Measure- ment	- Limit	Over	
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector
1	Х	2479.800	86.14	2.07	88.21	Fundamental Frequency		peak
2	*	2479.800	69.25	2.07	71.32	Fundamental I	Frequency	AVG
3		2483.500	47.74	2.10	49.84	74.00	-24.16	peak
4		2483.500	35.06	2.10	37.16	54.00	-16.84	AVG



emp	eratur	e:	25 ℃			R	elative Humi	idity:	55%
est \	Voltage):	DC 3.7\				and		~ GU
nt. F	Pol.		Vertical	NV		2		AN I	
est I	Mode:		TX GFS	K Mode	2480 MH	łz		NA BAR	-
ema	ark:		Only wo	rse case	is repor	ted	A CINT		Ann
100.0	dBuV/m								
-		1 X					(RI	F) FCC PART	15C (PEAK)
		Ž Ň							
		Α_					(RF) FCC PAF	RT 15C (AVG)
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0.0									

No	No. Mk. Freq.		Reading Level	Correct Factor	Measure ment	- Limit	Over	
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector
1	Х	2479.800	78.06	2.07	80.13	Fundamental Frequency		peak
2	*	2479.800	67.72	2.07	69.79	Fundamental F	requency	AVG
3		2483.500	43.96	2.10	46.06	74.00	-27.94	peak
4		2483.500	34.65	2.10	36.75	54.00	-17.25	AVG



_	GUL		
ſemį	perature:	25 ℃	Relative Humidity: 55%
ſest	Voltage:	DC 3.7V	
Ant.	Pol.	Horizontal	
ſest	Mode:	TX π /4-DQPSK Mode	2402MHz
Rem	ark:	Only worse case is rep	ported
100.0) dBu¥/m		
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			(RF) FCC PART 15C (PEAK)
			(BF) FCC PART 15C (AVG)
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			2 X
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23	310.000 2320.00	2330.00 2340.00 2350.00	2360.00 2370.00 2380.00 2390.00 2410.00 MI

No	. Mk	. Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over	
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector
1		2390.000	42.36	1.51	43.87	74.00	-30.13	peak
2		2390.000	32.87	1.51	34.38	54.00	-19.62	AVG
3	Х	2402.000	86.96	1.56	88.52	Fundamental Frequency		peak
4	*	2402.000	69.95	1.56	71.51	Fundamental Frequency		AVG



Temp	erature:	25 ℃		Relative Humidity:	55%			
est V	Voltage:	DC 3.7V	anis -	THUR -	~ ~			
Ant. F	Pol.	Vertical			122			
lest I	Mode:	TX π /4-D0	QPSK Mode 240	2MHz				
Rema	ark:	Only wors	e case is reporte	ported				
100.0	dBuV/m							
Γ								
					4 ×			
				(RF) FCC	PART 15C (PEAK)			
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No	. Mk	. Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over	
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector
1		2390.000	42.55	1.51	44.06	74.00	-29.94	peak
2		2390.200	32.76	1.51	34.27	54.00	-19.73	AVG
3	*	2402.000	67.35	1.56	68.91	Fundamental Frequency		AVG
4	Х	2402.400	81.61	1.56	83.17	Fundamental Frequency		peak



emr	perature:	:	25 ℃			Re	elative Hu	umidity:	55%	
est	Voltage:		DC 3.7V		0		(III)		AV	9
nt.	Pol.		Horizont	al	-	20		1122	32	
Test Mode: TX π /4-DQPSK Mode 2480MHz										
Remark: Only worse case is reported							2			
100.0	0 dBuV/m									
		1 X								
		2						(RF) FCC P#	ART 15C (PEAK)	
		Ň								_
		4_						(BELECC I	PART 15C (AVG)	
50	t	3 X							Ann rac (nrac)	
		4								
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0.0										

No.	Mk	. Freq.	Reading Level	Correct Factor	Measure ment	Limit	Over	
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector
1	Х	2479.800	84.72	2.07	86.79	Fundamental Frequency		peak
2	*	2479.800	69.25	2.07	71.32	Fundamental Frequency		AVG
3		2483.500	48.02	2.10	50.12	74.00	-23.88	peak
4		2483.500	35.78	2.10	37.88	54.00	-16.12	AVG



ſemį	perature:	25 ℃	Relative Humidity: 55%					
est	Voltage:	DC 3.7V						
Ant.	Pol.	Vertical	and a					
est	est Mode: TX π /4-DQPSK Mode 2480MHz							
Remark: Only worse case is reported								
100.0) dBuV/m							
	1 X							
	2		(RF) FCC PART 15C (PEAK)					
	Ň							
			(RF) FCC PART 15C (AVG)					
50	3 ×							
	/ ×_							
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No	. Mk	. Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over	
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector
1	Х	2479.800	77.65	2.07	79.72	Fundamenta	I Frequency	peak
2	*	2479.800	67.22	2.07	69.29	Fundamenta	I Frequency	AVG
3		2483.500	43.48	2.10	45.58	74.00	-28.42	peak
4		2483.500	36.15	2.10	38.25	54.00	-15.75	AVG



25 ℃	Relative Humidity:	55%
DC 3.7V	THUR A	
Horizontal		122
TX 8-DPSK Mode 2402	MHz	
Only worse case is repo	rted	
	(RF) FCC F	3 X PART 15C (PEAK)
		Å
	(RF) FCC	PART 15C (AVG)
	2	
	*	
	DC 3.7V Horizontal TX 8-DPSK Mode 2402I	DC 3.7V Horizontal TX 8-DPSK Mode 2402MHz Only worse case is reported (RF) FCC F (RF) FCC F

No	. Mk	. Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over	
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector
1		2390.000	43.11	1.51	44.62	74.00	-29.38	peak
2		2390.000	32.87	1.51	34.38	54.00	-19.62	AVG
3	Х	2402.000	86.13	1.56	87.69	Fundamental Frequency		peak
4	*	2402.000	69.95	1.56	71.51	Fundamental Frequency		AVG



emperature:	25 ℃	Relative Humidity:	55%
est Voltage:	DC 3.7V		
Ant. Pol.	Vertical		
est Mode:	TX 8-DPSK Mode 2402	MHz	100
Remark:	Only worse case is repo	orted	2 199
100.0 dBu∀/m			
			4 ×
		(RF) FCC P	ART 15C (PEAK)
			X
		(RF) FCC	PART 15¢ (AVG)
50		1 X	
		2	
0.0			

No	. Mk	. Freq.	Reading Level	Correct Factor	Measure ment	- Limit	Over	
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector
1		2390.000	42.25	1.51	43.76	74.00	-30.24	peak
2		2390.000	32.79	1.51	34.30	54.00	-19.70	AVG
3	*	2402.000	68.35	1.56	69.91	- Fundamental Frequency		AVG
4	Х	2402.400	80.75	1.56	82.31	- Fundamental Frequency		peak



Tem	peratur	e:	25 ℃			Relative H	umidity:	55%
Test	Voltage):	DC 3.7\		5	a and	250	
Ant.	Pol.		Horizon	al	-		115	2
Test	Mode:		TX 8-DF	SK Mode	2480MHz	- 51		(Inc.
Rem	nark:		Only wo	rse case is	s reported	alles	-	
100.0) dBuV/m							
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		×						
		2					(RF) FCC P/	ART 15C (PEAK)
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		\square					(BF) FCC I	PART 15C (AVG)
50		X						
		4						
		×						
0.0								

No	. Mk	. Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over	
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector
1	Х	2479.800	85.34	2.07	87.41	Fundamental	Frequency	peak
2	*	2479.800	69.25	2.07	71.32	Fundamental	Frequency	AVG
3		2483.500	47.52	2.10	49.62	74.00	-24.38	peak
4		2483.500	35.78	2.10	37.88	54.00	-16.12	AVG



ēm	perature:		25° ℃			Relat	tive Humi	dity:	55%	
est	Voltage:		DC 3.7V	(III)	3		AUT-			W
Ant.	Pol.		Vertical	100	-			100	132	-
est	Mode:		TX 8-DP	SK Mod	e 2480M	Hz	10	V	0	
Rem	ark:		Only wor	se case	is report	ed 📉	1100	1		
100.0	dBu¥/m									
	1 X							(RF) FCC F	ART 15C (PI	EAK)
	2 X									
	(\							(RF) FCC	PART 15C (/	AVG1
50		3								
		X 4								
		×								
0.0	69.000 2479.00		489.00 249	9.00 250	9.00 2519	.00 2529.	00 2539.00	2549.		2569.00 M

No.	Mk	. Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over	
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector
1	Х	2479.800	77.77	2.07	79.84	Fundamenta	I Frequency	peak
2	*	2479.800	67.72	2.07	69.79	Fundamenta	l Frequency	AVG
3		2483.500	44.07	2.10	46.17	74.00	-27.83	peak
4		2483.500	35.04	2.10	37.14	54.00	-16.86	AVG



(2) Conducted Test

Temperature:	25℃	Relative Humidity:	55%
Test Voltage:	DC 3.7V		
Test Mode:	TX GFSK Mode 2402MHz/24	80 MHz	180
Remark:	Only worse case is reported		muus
	Test Voltage: Test Mode:	Test Voltage:DC 3.7VTest Mode:TX GFSK Mode 2402MHz/24	Test Voltage:DC 3.7VTest Mode:TX GFSK Mode 2402MHz/2480 MHz

	RF	nalyzer - Swept SA 75 Ω AC	CORREC		SENSE:IN	π	A	IGN AUTO			01:28:0	📥 🗗 💽
enter F	req 2	.35600000		PNO: Fast G FGain:Low		: Free Run en: 30 dB			/pe: Log-P\ ld:>100/10		Т	TYPE MWWWW DET PNNNN
0 dB/div		Offset 2.95 dE 22.95 dBm								ľ	Vikr1 2.4 0	01 8 GHz .777 dBm
. og 13.0												
2.95												
7.05												1 j
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47.1											4 <u>3</u>	
57.1	مراميمهم	(Jacon Colored and a state of the second	nalynometicke.dyde	**************************************	and the state of the	- Jac Jon - California	un an	a da da calandar da fan fa	peoledisce)		ny fadan da kabilan da	
67.1												
	0000	BI I										.40600 GHz
										Sween	0 600 m	s (1001 pts)
				#VI	BW 300	J KHZ				oweep	9.000 III	s (1001 pts,
	TRC SCL	∢Hz		Y		FUNCTION		TION WIDTH			NCTION VALUE	s (1001 pts,
	100	<hz< b=""></hz<>	2.401 8 GHz	ү 0.77	7 dBm		I FUNC	TION WIDTH				s (1001 pts)
Res BW	I 100 I I RC SCL 1 f 1 f 1 f	≺Hz	2.401 8 GHz 2.400 0 GHz 2.390 0 GHz	¥ 0.77 -55.85 -56.98	7 dBm 2 dBm 0 dBm		I FUNC	TION WIDTH				
Res BW	I 100 I TRC SCL 1 f 1 f	≺Hz	2.401 8 GHz 2.400 0 GHz	¥ 0.77 -55.85 -56.98	7 dBm 2 dBm		I FUNC	TION WIDTH				
Res BW	I 100 I I RC SCL 1 f 1 f 1 f	≺Hz	2.401 8 GHz 2.400 0 GHz 2.390 0 GHz	¥ 0.77 -55.85 -56.98	7 dBm 2 dBm 0 dBm		I FUNC	TION WIDTH				
Res BW MKR MODE T 1 N 2 N 3 N 4 N 5 6 7 7 8	I 100 I I RC SCL 1 f 1 f 1 f	≺Hz	2.401 8 GHz 2.400 0 GHz 2.390 0 GHz	¥ 0.77 -55.85 -56.98	7 dBm 2 dBm 0 dBm		I FUNC	TION WIDTH				
Res BW IKR MODE T 1 N 2 3 N 4 4 N 5 6 7 8 9 9 10	I 100 I I RC SCL 1 f 1 f 1 f	≺Hz	2.401 8 GHz 2.400 0 GHz 2.390 0 GHz	¥ 0.77 -55.85 -56.98	7 dBm 2 dBm 0 dBm		I FUNC	TION WIDTH				
2 N 3 N 4 N 5 6 7 8	I 100 I I RC SCL 1 f 1 f 1 f	≺Hz	2.401 8 GHz 2.400 0 GHz 2.390 0 GHz	¥ 0.77 -55.85 -56.98	7 dBm 2 dBm 0 dBm		I FUNC	TION WIDTH				

Keysight Spe RL	ectrum Ar RF	nalyzer - Swept SA 75 Ω AC	CORREC	1	SENSE:INT		ALIGN AUTO		01-00-	🗖 🗗 🛃
		.52600000	00 GHz	PNO: Fast 🕞			Avg Ty	pe: Log-Pwr d:>100/100		TYPE MWWWW DET P N N N N
0 dB/div		Offset 3.03 dE 23.03 dBm								179 8 GH .738 dBn
13.0 3.03	1									
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7.0										
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67.0										
tart 2.47 Res BW				#VB	W 300 kH	z		Swee	Stop 2 p 9.600 m	.57600 GH s (1001 pts
KR MODE TR	RC SCL	;	× 2.479 8 GHz 2.483 5 GHz		dBm	NCTION	FUNCTION WIDTH	I	FUNCTION VALUE	
2 N 3 N 4 N 5	f f		2.485 5 GHz 2.500 0 GHz 2.485 7 GHz	-55.414	dBm					
6 1 1 1 1 1 1 1 1 1 1										
9 10 11										
G	_									



perature:	25 ℃		Relative Humidity:	55%
Voltage:	DC 3.7V		< d(nm)	
Mode:	GFSK Hopp	ing Mode		89
ark:	Only worse	case is reported		
Keysight Spectrum		CENCEINT		01:33:54 AM Nov 12, 2019
Center Freq	2.356000000 GHz	SENSE:INT PNO: Fast Trig: Free Rui Gain:Low Atten: 30 dB	Avg Type: Log-Pwr	01:33:54 AM Nov 12, 2019 TRACE 1 2 3 4 5 6 TYPE MWWWWW DET P N N N N N
Re	f Offset 2.95 dB	Gain:Low Atten: 30 dB	Mkr1	2.405 8 GHz 0.753 dBm
10 dB/div Re Log 13.0	ef 22.95 dBm			0.755 UBII
2.95				ARAN
-17.1				-19-27 tubu
-27.1				
-47.1 -57.1	enell-uselistelyetyetytelyeise, angereges, Mai	4	an etta an a gelefitetar en ten et da temper sont ten et da te	3 2 2
-67.1				
Start 2.30600 #Res BW 100		#VBW 300 kHz	Sweep 9.60	op 2.40600 GHz 00 ms (1001 pts)
MKR MODE TRC SCI 1 N 1 f 2 N 1 f	2.405 8 GHz 2.400 0 GHz	Y FUNCTIO 0.753 dBm -56.003 dBm	N FUNCTION WIDTH FUNCTION	VALUE
3 N 1 f 4 N 1 f 5	2.390 0 GHz 2.341 2 GHz	-56.977 dBm -54.251 dBm		E
6 7 8				
9				
11				
MSG	·		STATUS	, F
•	Analyzer - Swept SA		STATUS	
Keysight Spectrum	75 Ω AC CORREC 2.526000000 GHz	SENSE:INT	ALIGN AUTO Avg Type: Log-Pwr	01-E6-E4 AM Nov12, 2010
MSG MSG Keysight Spectrum KR RL RF Center Freq	F 75 Ω AC CORREC 2.526000000 GHz F IF		ALIGN AUTO Avg Type: Log-Pwr Avg Hold:>100/100	01:56:54 AM Nov 12, 2019 TRACE 1 2 3 4 5 6 TYPE DET P NNNNN 2.479 9 GHz
MSG Keysight Spectrum MR RL FR Center Freq 10 dB/div Re	E 75 Ω AC CORREC 2.526000000 GHz F	NO: Fast 🖵 Trig: Free Ru	ALIGN AUTO Avg Type: Log-Pwr Avg Hold:>100/100	01:56:54 AM Nov 12, 2019 TRACE 1 2 3 4 5 6 TYPE WWWWWW DET P N N N N N
Keysight Spectrum MG RL FF Center Freq 10 dB/div Re 13.0 3.03	F 75 Ω AC CORREC 2.526000000 GHz F IF	NO: Fast 🖵 Trig: Free Ru	ALIGN AUTO Avg Type: Log-Pwr Avg Hold:>100/100	01:56:54 AM Nov 12, 2019 TRACE 1 2 3 4 5 6 TYPE DET P NNNNN 2.479 9 GHz
MSG MSG MSG MSG MSG MSG MSG MSG	F 75 Ω AC CORREC 2.526000000 GHz F IF	NO: Fast 🖵 Trig: Free Ru	ALIGN AUTO Avg Type: Log-Pwr Avg Hold:>100/100	01:56:54 AM Nov 12, 2019 TRACE 1 2 3 4 5 6 TYPE DET P NNNNN 2.479 9 GHz
Keysight Spectrum MG RL FF Center Freq 10 dB/div Re 13.0 3.03	F 75 Ω AC CORREC 2.526000000 GHz F IF	NO: Fast 🖵 Trig: Free Ru	ALIGN AUTO Avg Type: Log-Pwr Avg Hold:>100/100	01:56:54 AM Nov 12, 2019 TRACE 1 2 3 4 5 6 TYPE DET P NNNNN 2.479 9 GHz
Image: Sector of the	E 75 9. AC CORREC 2.526000000 GHz f Offset 3.03 dB f 23.03 dBm	NO: Fast 🖵 Trig: Free Ru	ALIGN AUTO Avg Type: Log-Pwr Avg Hold:>100/100	01:56:54 AM Nov 12, 2019 TRACE 1 2 3 4 5 6 TYPE DET P NNNNN 2.479 9 GHz
Keysight Spectrum R RL RF Center Freq 10 dB/div Re 13.0 3.03 6.97 17.0 27.0 -37.0 -37.0	E 75 9. AC CORREC 2.526000000 GHz f Offset 3.03 dB f 23.03 dBm	NO: Fast 🖵 Trig: Free Ru	ALIGN AUTO Avg Type: Log-Pwr Avg Hold:>100/100	01:56:54 AM Nov 12, 2019 TRACE 1 2 3 4 5 6 TYPE DET P NNNNN 2.479 9 GHz
MSG MSG MSG MSG MSG MSG MSG MSG	E 75 9. AC CORFEC 2.526000000 GHz f Offset 3.03 dB f 23.03 dBm d 4 d d d d d d d d d d d d d d d d d d	NO: Fast 🖵 Trig: Free Ru	ALIGN AUTO Avg Type: Log-Pwr Avg Hold:>100/100 Mkr1	01:56:54 AM Nov 12, 2019 TRACE 1 2 3 4 5 6 TYPE DET P NNNNN 2.479 9 GHz
Keysight Spectrum RL RP Center Freq Re 10 dB/div Re 13 0 1 3.03 1 3.07 1 47.0 27.0 57.0 27.0 47.0 27.0 57.0 27.0 57.0 27.0 57.0 27.0 57.0 27.0 47.0 27.0 47.0 27.0 47.0 27.0 47.0 27.0 47.0 27.0 47.0 27.0 47.0 27.0 47.0 27.0 47.0 27.0 47.0 27.0 47.0 27.0 47.0 27.0 47.0 27.0 47.0 27.0 47.0 27.0 47.0 47.0 47.0 47.0 47.0 47.0 47.0 <th< td=""><td>E 75 9. AC CORREC 2.526000000 GHz F f Offset 3.03 dB f 23.03 dBm GHz KHz 2.479 9 GHz</td><td>PNO: Fast Frig: Free Ru Atten: 30 dB</td><td>ALIGN AUTO Avg Type: Log-Pwr AvgIHold:>100/100 Mkr1</td><td>015654 AM Nov12, 2019 TRACE 12 24 5 G TYPE P NYN NYN 2.479 9 GHz 0.352 dBm </td></th<>	E 75 9. AC CORREC 2.526000000 GHz F f Offset 3.03 dB f 23.03 dBm GHz KHz 2.479 9 GHz	PNO: Fast Frig: Free Ru Atten: 30 dB	ALIGN AUTO Avg Type: Log-Pwr AvgIHold:>100/100 Mkr1	015654 AM Nov12, 2019 TRACE 12 24 5 G TYPE P NYN NYN 2.479 9 GHz 0.352 dBm
Keysight Spectrum MSG Start 2.47600 #Res BW 100 MKR MODE TRC: SCI MSG MODE TRC: SCI M N M M M	E 75 9. AC CORREC 2.526000000 GHz F f Offset 3.03 dB f 23.03 dBm GHz kHz L X 2.479 9 GHz 2.483 5 GHz 2.500 0 GHz	PNO: Fast Gain:Low Trig: Free Ru Atten: 30 dB	ALIGN AUTO Avg Type: Log-Pwr AvgIHold:>100/100 Mkr1	015654 AM Nov12, 2019 TRACE 12 24 5 G TYPE P NYN NYN 2.479 9 GHz 0.352 dBm
Image: Content Freq Image: Content Fr	E 75 9. AC CORREC 2.526000000 GHz F f Offset 3.03 dB f 23.03 dBm GHz kHz L X 2.479 9 GHz 2.483 5 GHz 2.500 0 GHz	Trig: Free Ru Gaint.ow Trig: Free Ru Atten: 30 dB	ALIGN AUTO Avg Type: Log-Pwr AvgIHold:>100/100 Mkr1	015654 AM Nov12, 2019 TRACE 12 24 5 G TYPE P NYN NYN 2.479 9 GHz 0.352 dBm
Keysight Spectrum MSG MSG MSG MSG Center Freq 10 dB/div Re Signation 3 d3 -5 37 -17 0 -27 0 -37 0 -47.0 Start 2.47600 #Res BW 100 MKR MODE TRC SCI N 1 f 3 N 1 f 3 N 1 f 6 0	E 75 9. AC CORREC 2.526000000 GHz F f Offset 3.03 dB f 23.03 dBm GHz kHz L X 2.479 9 GHz 2.483 5 GHz 2.500 0 GHz	Trig: Free Ru Gaint.ow Trig: Free Ru Atten: 30 dB	ALIGN AUTO Avg Type: Log-Pwr AvgIHold:>100/100 Mkr1	015654 AM Nov12, 2019 TRACE 12 24 5 G TYPE P NYN NYN 2.479 9 GHz 0.352 dBm



perature:	25 ℃		Relative Hu	midity:	55%
Voltage:	DC 3.7V	201			
Mode:	TX π /4-DQP	SK Mode 2402	MHz/2480 MHz	2	219
ark:	Only worse of	ase is reported	d d	N.	
Keysight Spectrum A	75 Ω AC CORREC 2.356000000 GHz	SENSE:INT		wr	00:04 AM Nov 12, 2019 TRACE 2 3 4 5 6 TYPE MWWWW DET P N N N N N
Ref	Offset 2.95 dB 7 22.95 dB m	Gain:Low Atten: 30 dB			.401 8 GHz
10 dB/div Ref	22.95 dBm				
2.95					
-17.1					-20.28 dBm
-37.1					
-57.1	Epile and and a state of the second	น _เ ลาแหม่ม _ี มีของมากกระที่สุดของใหม่ไหม่ไปไปเป็นไปได้	on more portant ways and	annime marce a deur	muno h
Start 2.30600	GHz				2.40600 GHz
#Res BW 100	X	#VBW 300 kHz		Sweep 9.600 FUNCTION VAL	
1 N 1 f 2 N 1 f 3 N 1 f 4 N 1 f	2.401 8 GHz 2.400 0 GHz 2.390 0 GHz 2.369 5 GHz	-0.222 dBm -54.741 dBm -56.477 dBm -53.571 dBm			
4 N 1 1 5 6 7		-53.571 dBm			E
8 9 10					
11		m	STATUS		
			NO STATOS		
MSG					
Keysight Spectrum A	75 Ω AC CORREC 2.526000000 GHz	SENSE:INT	ALIGN AUTO	wr	03:18 AM Nov 12, 2019 TRACE 1 2 3 4 5 6
Keysight Spectrum A	75 Ω AC CORREC 2.526000000 GHz IFC	VO: Fast Atten: 30 dB	Avg Type: Log-P n Avg Hold:>100/10	wr 0	03:18 AM Nov 12, 2019 TRACE 1 2 3 4 5 6 TYPE MWWWW DET P N N N N N
Mi Keysight Spectrum A Wi RL PF Center Freq 2 Conter Freq 2 Ref 10 dB/div Ref	75 Ω AC CORREC 2.526000000 GHz	NO: Fast 😱 Trig: Free Ru	Avg Type: Log-P n Avg Hold:>100/10	wr 0 Mkr1 2	03:18 AM Nov 12, 2019 TRACE 1 2 3 4 5 6 TYPE MWWWWW
Keysight Spectrum 4	75 Ω AC CORREC 2.526000000 GHz Pr IFC Offset 3.03 dB	NO: Fast 😱 Trig: Free Ru	Avg Type: Log-P n Avg Hold:>100/10	wr 0 Mkr1 2	D3:18 AM Nov 12, 2019 TRACE 1 2 3 4 5 6 TYPE MWWWW DET P N N N N 2.479 8 GHz
Center Freq 2	75 Ω AC CORREC 2.526000000 GHz Pr IFC Offset 3.03 dB	NO: Fast 😱 Trig: Free Ru	Avg Type: Log-P n Avg Hold:>100/10	wr 0 Mkr1 2	D3:18 AM Nov 12, 2019 TRACE 1 2 3 4 5 6 TYPE MWWWW DET P N N N N 2.479 8 GHz
Keysight Spectrum A CM RL RF Center Freq 2 10 dB/div Ref 10 dB/div Ref 13.0 3.03 1	75 Ω AC CORREC 2.526000000 GHz Pr IFC Offset 3.03 dB	NO: Fast 😱 Trig: Free Ru	Avg Type: Log-P n Avg Hold:>100/10	wr 0 Mkr1 2	D3:18 AM Nov 12, 2019 TRACE 1 2 3 4 5 6 TYPE MWWWW DET P N N N N 2.479 8 GHz
Image: Secture Active Rep Center Freq 2 Ref 10 dB/div Ref 13 0 1 4:97 1 17 0 1 27 0 1	2.52600000 GHz P P P P COffset 3.03 dB 23.03 dBm	NO: Fast 😱 Trig: Free Ru	Avg Type: Log-P n Avg Hold:>100/10	wr 0 Mkr1 2	D3:18 AM Nov 12, 2019 TRACE 1 2 3 4 5 6 TYPE MWWWW DET P N N N N 2.479 8 GHz
Image: Secture Active	2.52600000 GHz PIFC Offset 3.03 dB 23.03 dBm	NO: Fast 😱 Trig: Free Ru	Avg Type: Log-P n Avg Hold:>100/10	Mkr1 2	33:19 AM Nov 12, 2019 TRACE 12 34 5 6 TYPE A WAYNAWA DET P NN N NN C.479 8 GHz -0.191 dBm -20 24 uBm
Keysight Spectrum / Center Freq 2 O dB/div Ref 10 dB/div Ref 13 0 1 3.03 1 5.97 1 47.0 47.0 <td>2.526000000 GHz PIFC Offset 3.03 dB 23.03 dBm 3.03 dBm 3.03 dBm 3.03 dBm 3.03 dBm 4.1 5.1 5.1 5.1 5.1 5.1 5.1 5.1 5.1 5.1 5</td> <td>NO: Fast 😱 Trig: Free Ru</td> <td>Avg Type: Log-P n Avg Hold:>100/10</td> <td>Wr Mkr1 2</td> <td>2:19 AM Nov12, 2:19 TRACE [] 2:3 4 5 6 TYPE H WWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWW</td>	2.526000000 GHz PIFC Offset 3.03 dB 23.03 dBm 3.03 dBm 3.03 dBm 3.03 dBm 3.03 dBm 4.1 5.1 5.1 5.1 5.1 5.1 5.1 5.1 5.1 5.1 5	NO: Fast 😱 Trig: Free Ru	Avg Type: Log-P n Avg Hold:>100/10	Wr Mkr1 2	2:19 AM Nov12, 2:19 TRACE [] 2:3 4 5 6 TYPE H WWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWW
Keysight Spectrum / Center Freq 2 Od B/div Ref 13.0 1 3.03 1 6.97 1 -17.0 4 -37.0 4 57.0 4 Start 2.47600 4 WRes MDW INO More MDW INO	2.526000000 GHz PIFC 2.526000000 GHz PIFC Offset 3.03 dB 2 23.03 dBm 3 23.03 dBm 4 23.03 dBm 4 2483 5 GHz 2.483 5 GHz	NO: Fast Jain:Low Trig: Free Ru Atten: 30 dB	Avg Type: Log-P n Avg Hold:>100/10	Wr Mkr1 2	2:19 AM Nov12, 2:19 TRACE [] 2:3 4 5 6 TYPE H WWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWW
Image: system in the	2.526000000 GHz PIFC Offset 3.03 dB 2.3.03 dBm 2.3.03 dBm Coffset 3.03 dB 2.3.03 dBm Coffset 3.03 dB 2.479 8 GHz 2.479 8 GHz 2.479 8 GHz 2.433 5 GHz 2.4500 0 GHz	NO: Fast Jain:Low Trig: Free Ru Atten: 30 dB	Avg Type: Log-P n Avg Hold:>100/10	Wr Mkr1 2	2:19 AM Nov12, 2:19 TRACE [] 2:3 4 5 6 TYPE H WWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWW
Keysight Spectrum / Center Freq / Center Freq / 13 0 1 3.03 1 6.97 1 7.0 47.0 57.0 5 Start 2.47600 #Res BW 100 MCR MODE TC ScL 1 1 f 3 1 f 3 1 f 3 1 f 3 1 f 3 1 f 3 1 f 3 1 f 3 1 f 3 1 f 4 1 f 6 6 6 7 2 1 1 8 3 6 6	2.526000000 GHz PIFC Offset 3.03 dB 2.3.03 dBm 2.3.03 dBm Coffset 3.03 dB 2.3.03 dBm Coffset 3.03 dB 2.479 8 GHz 2.479 8 GHz 2.479 8 GHz 2.433 5 GHz 2.4500 0 GHz	NO: Fast Sain:Low Trig: Free Ru Atten: 30 dB	Avg Type: Log-P n Avg Hold:>100/10	Wr Mkr1 2	2:19 AM Nov12, 2:19 TRACE [] 2:3 4 5 6 TYPE H WWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWW
Keysight Spectrum // Center Freq // Center Freq // 10 dB/div Ref 10 dB/div Ref 10 dB/div Ref 10 dB/div Ref 13 0 1 303 1 6.57 1 -77 0 2 -87 0 2 57 0 2 57 0 2 67 0 2 67 0 2 McR MODE TRC SCL 1 3 1 1 2 N 1 1 3 N 1 1 4 N 1 1 6 7 7 7	2.526000000 GHz PIFC Offset 3.03 dB 2.3.03 dBm 2.3.03 dBm Coffset 3.03 dB 2.3.03 dBm Coffset 3.03 dB 2.479 8 GHz 2.479 8 GHz 2.479 8 GHz 2.433 5 GHz 2.4500 0 GHz	NO: Fast Sain:Low Trig: Free Ru Atten: 30 dB	Avg Type: Log-P n Avg Hold:>100/10	Wr Mkr1 2	2:19 AM Nov12, 2:19 TRACE [] 2:3 4 5 6 TYPE II 2:3 4 5 6 AVENTION II 2:00 2:0 24 URm 2:0 2:0 21 URM 2:0 2:0 2:0 21 URM 2:0 2:0 2:0 21 URM 2:0 2:0 2:0 2:0 2:0 2:0 2:0 2:0 2:0 2:0



25 ℃	Relati	ve Humidity:	55%
DC 3.7V		1000	
π /4-DQPSK Hopp	oing Mode		219
Only worse case is	s reported	A 12	
75 Ω AC CORREC .356000000 GHz	Avg Trig: Free Run Avg	Type: Log-Pwr	D5:38 AM Nov 12, 2019 TRACE 2 3 4 5 6 TYPE MWWWWW
IFGain:Low	Atten: 30 dB		.405 0 GHz
22.95 dBm			-0.218 dBm
			AN,
			-20.20 dBm
4			2
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			2.40600 GHz
X Y	FUNCTION FUNCTION WIDT	-	
2.405 0 GHz -55.64 2.300 0 GHz -55.64 2.390 0 GHz -55.32 2.315 8 GHz -53.44	5 dBm		
			E
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nalizzar - Swant SA			
75 Ω AC CORREC	Trig: Free Run Avg +	02: Type: Log-Pwr told:>100/100	11:05 AM Nov 12, 2019
.526000000 GHz		1010:2100/100	TYPE MWWWWW
.526000000 GHz PNO: Fast IFGain:Low	Atten: 30 dB	Mkr1 2	TRACE 123456 TYPE MWWWW DET PNNNN
.526000000 GHz	Atten: 30 dB	Mkr1 2	
.526000000 GHz PNO: Fast IFGain:Low	Atten: 30 dB	Mkr1 2	.476 0 GHz
.526000000 GHz PNO: Fast IFGain:Low	Atten: 30 dB	Mkr1 2	.476 0 GHz
.526000000 GHz PN0: Fast IFGain:Low 23.03 dB 23.03 dBm	Atten: 30 dB	Mkr1 2	.476 0 GHz -0.505 dBm
.526000000 GHz PN0: Fast IFGain:Low 23.03 dB 23.03 dBm	Atten: 30 dB	Mkr1 2	.476 0 GHz -0.505 dBm
.526000000 GHz PN0: Fast IFGain:Low 23.03 dB 23.03 dBm		Mkr1 2	.476 0 GHz -0.505 dBm
.526000000 GHz PN0: Fast IFGain:Low Dffset 3.03 dB 23.03 dBm 4 3 4 3 6 4 3 6 1 5 1 1 5 1 1 5 5 5 5 5 5 5 5 5 5 5 5 5		Mkr1 2	.476 0 GHz -0.505 dBm -22 12 dbm
.526000000 GHz PN0: Fast IFGain:Low Dffset 3.03 dB 23.03 dBm 4 34 4 34 34 4 4 3 34 2476 0 GHz 4 5 6 5 6 5 7 1 1 1 1 1 1 1 1 1 1 1 1 1	Atten: 30 dB	Mkr1 2	.476 0 GHz -0.505 dBm
.526000000 GHz PNO: Fast IFGain:Low Dffset 3.03 dB 23.03 dBm 23.03 dBm 4 3 Hz 4 3 Hz 2.476 0 GHz 2.476 0 GHz -0.50 2.483 5 GHz -56.85 2.500 0 GHz -56.85	Atten: 30 dB	Mkr1 2	.476 0 GHz -0.505 dBm
.526000000 GHz PNO: Fast IFGain:Low Dffset 3.03 dB 23.03 dBm 23.03 dBm 4 3 Hz 4 3 Hz 2.476 0 GHz 2.476 0 GHz -0.50 2.483 5 GHz -56.85 2.500 0 GHz -56.85	Atten: 30 dB	Mkr1 2	.476 0 GHz -0.505 dBm
.526000000 GHz PNO: Fast IFGain:Low Dffset 3.03 dB 23.03 dBm 23.03 dBm 4 3 Hz 4 3 Hz 2.476 0 GHz 2.476 0 GHz -0.50 2.483 5 GHz -56.85 2.500 0 GHz -56.85	Atten: 30 dB	Mkr1 2	.476 0 GHz -0.505 dBm
	π /4-DQPSK Hopp Only worse case is Nature - Swept SA 25.9. AC CORREC 3356000000 GHZ PR0: Fast PR0: Fast Dffset 2.95 dB 22.95 dB AL AL	π /4-DQPSK Hopping Mode Only worse case is reported Autor area Autor area Store - Swept SA Store - Stor	π /4-DQPSK Hopping Mode Only worse case is reported Never SA 25.0 AC CORREC 3356000000 GHz PNO: Fast PNO: Fast PNO: Fast 1FGain:Low Trig: Free Run Avg1Type: Log-Pwr Avg1Hold:>100/100 Atten: 30 dB Offset2.95 dB 22.95 dBm Atten: 4 Auton Mutro Auton Mutro



perature:	25 ℃		Relative Humidity:	55%
Voltage:	DC 3.7V	RU -	< d m	
Mode:	TX 8-DPSK M	lode 2402MHz	/2480 MHz	23
ark:	Only worse ca	ase is reported		
	m Analyzer - Swept SA RF 75 Ω AC CORREC	SENSE:INT	ALIGN AUTO	02:14:31 AM Nov 12, 2019
	2.356000000 GHz	IO: Fast Trig: Free Rur iain:Low Atten: 30 dB	Avg Type: Log-Pwr	TRACE 1 2 3 4 5 6 TYPE MWWWW DET P NNNN
R	tef Offset 2.95 dB tef 22.95 dBm		Mkr1	2.401 8 GHz -0.094 dBm
10 dB/div R Log 13.0	er 22.95 dBm			
2.95				
-17.1				-20.18 dBm
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-47.1 -57.1		เสนะปลากคารในหมู่สาวระ	og han mer des states and a second and a second	
-67.1				
Start 2.3060 #Res BW 10	0 kHz	#VBW 300 kHz	Sweep 9.60	op 2.40600 GHz 00 ms (1001 pts)
MKR MODE TRC S 1 N 1 2 N 1	f 2.401 8 GHz f 2.400 0 GHz	Y FUNCTIO -0.094 dBm -52.924 dBm -56.152 dBm	N FUNCTION WIDTH FUNCTION	VALUE
3 N 1 4 N 1 5	f 2.390 0 GHz f 2.329 3 GHz	-56.152 dBm -54.211 dBm		E
6 7 8				
9 10 11				
·			I S STATUS	4
MSG			~	
💓 Keysight Spectrum				
Keysight Spectrum (X) RL RL RL	F 75 Ω AC CORREC 2.526000000 GHz PNC	SENSE:INT		2:17:42 AM Nov 12, 2019
Keysight Spectrum WRLR Center Freq Re	F 75 Ω AC CORREC 2.526000000 GHz PNC IFGa f Offset 3.03 dB		ALIGN AUTO 02 Avg Type: Log-Pwr Avg[Hold:>100/100	2:17:42 AM Nov 12, 2019 TRACE 1 2 3 4 5 6 TYPE MWWWW DET P N N N N N 2.479 8 GHz
Center Freq OdB/div Re Log	F 75 Ω AC CORREC 2.526000000 GHz PNC	: Fast 😱 Trig: Free Run	ALIGN AUTO 02 Avg Type: Log-Pwr Avg[Hold:>100/100	2:17:42 AM Nov 12, 2019 TRACE 1 2 3 4 5 6 TYPE MWWWW DET P N N N N
Center Freq	F 75 Ω AC CORREC 2.526000000 GHz PNC IFGa f Offset 3.03 dB	: Fast 😱 Trig: Free Run	ALIGN AUTO 02 Avg Type: Log-Pwr Avg[Hold:>100/100	2:17:42 AM Nov 12, 2019 TRACE 1 2 3 4 5 6 TYPE MWWWW DET P N N N N N 2.479 8 GHz
Center Freq	F 75 Ω AC CORREC 2.526000000 GHz PNC IFGa f Offset 3.03 dB	: Fast 😱 Trig: Free Run	ALIGN AUTO 02 Avg Type: Log-Pwr Avg[Hold:>100/100	2:17:42 AM Nov 12, 2019 TRACE 1 2 3 4 5 6 TYPE MWWWW DET P N N N N N 2.479 8 GHz
Center Freq	F 75 Ω AC CORREC 2.526000000 GHz PNC IFGa f Offset 3.03 dB	: Fast 😱 Trig: Free Run	ALIGN AUTO 02 Avg Type: Log-Pwr Avg[Hold:>100/100	21.742 AM NOV 12, 2010 TRACE 10: 3 4 5 5 TYPE MANNAN DET P NN NN NN 2.479 8 GHz -0.142 dBm
Center Freq	F 75 0 AC CORREC 2.526000000 GH2 PNC IFGa f Offset 3.03 dB f 23.03 dBm	: Fast 😱 Trig: Free Run	ALIGN AUTO 02 Avg Type: Log-Pwr Avg[Hold:>100/100	21.742 AM NOV 12, 2010 TRACE 10: 3 4 5 5 TYPE MANNAN DET P NN NN NN 2.479 8 GHz -0.142 dBm
Image: Keysight Spectrum XX RL RI Center Freq Re Re 10 dB/div Re 13.03 13.03 3.03	F 75 0 AC CORREC 2.526000000 GH2 PNC IFGa f Offset 3.03 dB f 23.03 dBm	: Fast 😱 Trig: Free Run	ALIGN AUTO 02 Avg Type: Log-Pwr Avg[Hold:>100/100	21.742 AM NOV 12, 2010 TRACE TYPE TYPE TYPE AMANNAN DET PNN NNN 2.479 8 GHz -0.142 dBm
Image: Reyalph Spectrum Center Freq 0 dB/div Re 10 dB/div Re 13 0 1 3 03 1 -6.97 -17.0 -37.0 -47.0 -57.0 -47.0	F 75 0 AC CORREC 2.526000000 GH2 PNC IFGa f Offset 3.03 dB f 23.03 dBm 2 2 4 3 6 GHz	: Fast 😱 Trig: Free Run	ALIGN AUTO 02 Avg Type: Log-Pwr Avg Hold:>100/100 Mkr1	21.742 AM NOV 12, 2010 TRACE TYPE TYPE TYPE AMANNAN DET PNN NNN 2.479 8 GHz -0.142 dBm
Keysight Spectrum Center Freq 0 dB/div Re 10 dB/div Re 13 0 1 3 09 1 6 97 1 -77 0 1 -57 0 1 Start 2.47600 7 #Res BW 100 100 MRR MODE TRC S 1 <th1< th=""> 1 <th1< th=""> <th1< th=""></th1<></th1<></th1<>	F 75 0 AC CORREC 2.526000000 GHZ PNC IFGa f Offset 3 03 dB f 23.03 dBm 2 4 4 3 6 Hz kHz 2.479 8 GHz	* Fast rin:Low Trig: Free Run Atten: 30 dB 4 4 4 4 4 4 4 4 4 4 4 4 4	ALIGN AUTO 02 Avg Type: Log-Pwr Avg Hold:>100/100 Mkr1	2:17-22 AN NOV 12: 2010 TRACE [] 3: 4 5 5 TYPE AN IN N DET P NN NN NN 2:479 8 GHz -0.142 dBm -0.142 dBm -0.142 dBm -0.142 dBm -0.142 dBm -0.142 dBm -0.142 dBm -0.142 dBm -0.142 dBm
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Image: Sector of the	F 75 0 AC CORREC 2.526000000 GHZ PNC IFGa f Offset 3 03 dB of 0ffset 3 03 dB 2 4 4 3 CHZ CHZ KHZ 2 2479 8 GHZ 2.479 8 GHZ 2.479 8 GHZ 2.433 5 GHZ 2.430 5 GHZ 2.430 5 GHZ 2.500 0 GHZ	Fast Trig: Free Run Atten: 30 dB Hatten: 30 dB #VBW 300 kHz #VBW 300 kHz FUNCTION -0.142 dBm -65.273 dBm	ALIGN AUTO 02 Avg Type: Log-Pwr Avg Hold:>100/100 Mkr1	2:17-22 AN NOV 12: 2010 TRACE [] 3: 4 5 5 TYPE AN IN N DET P NN NN NN 2:479 8 GHz -0.142 dBm -0.142 dBm -0.142 dBm -0.142 dBm -0.142 dBm -0.142 dBm -0.142 dBm -0.142 dBm -0.142 dBm
Image: Section with the section withe section withe section with the section withe section with the se	F 75 0 AC CORREC 2.526000000 GHZ PNC IFGa f Offset 3 03 dB of 0ffset 3 03 dB 2 4 4 3 CHZ CHZ KHZ 2 2479 8 GHZ 2.479 8 GHZ 2.479 8 GHZ 2.433 5 GHZ 2.430 5 GHZ 2.430 5 GHZ 2.500 0 GHZ	Fast Trig: Free Run Atten: 30 dB Hatten: 30 dB #VBW 300 kHz #VBW 300 kHz FUNCTION -0.142 dBm -65.273 dBm	ALIGN AUTO 02 Avg Type: Log-Pwr Avg Hold:>100/100 Mkr1	2:17-22 AN NOV 12: 2010 TRACE [] 3: 4 5 5 TYPE AN IN N DET P NN NN NN 2:479 8 GHz -0.142 dBm -0.142 dBm -0.142 dBm -0.142 dBm -0.142 dBm -0.142 dBm -0.142 dBm -0.142 dBm -0.142 dBm

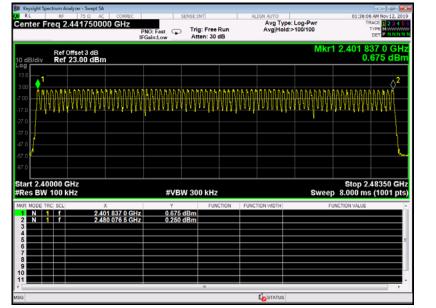


	25 ℃		Relative Humid	ty: 55%
Voltage:	DC 3.7V	201	Can S	
Mode:	8-DPSK Hop	ping Mode		AR S
ark:	Only worse o	ase is reported		
Keysight Spectrum				
Center Freq	2.356000000 GHz	NO: Fast Trig: Free Run Sain:Low Atten: 30 dB	ALIGN AUTO Avg Type: Log-Pwr Avg Hold:>100/100	02:19:59 AM Nov 12, 2019 TRACE 1 2 3 4 5 0 TYPE MWWWW DET P N N N N
Re	ef Offset 2.95 dB	Gain:Low Atten: 30 dB	Λ	lkr1 2.405 0 GHz -0.338 dBm
10 dB/div Re Log 13.0	ef 22.95 dBm			-0.338 dBm
2.95				
-17.1				-2 ^{1.33} dBm
-27.1				
-47.1 -57.1	- water and the state of the state	tra marger and the second second second second		3 2 2
-67.1				
Start 2.30600 #Res BW 100		#VBW 300 kHz	Sweep	Stop 2.40600 GHz 9.600 ms (1001 pts)
MKR MODE TRC SC 1 N 1 f 2 N 1 f	2.405 0 GHz	Y FUNCTION -0.338 dBm -56.410 dBm	FUNCTION WIDTH FU	ICTION VALUE
3 N 1 f 4 N 1 f	2.390 0 GHz 2.390 0 GHz 2.376 8 GHz	-56.415 dBm -54.121 dBm		
6 7 8				
9 10 11				
•		III		•
MSG				
	- Analyzer Count CA			
₩ Keysight Spectrum	n Analyzer - Swept SA RF 75 Ω AC CORREC 2.526000000 GHz	SENSE:INT	ALIGN AUTO Avg Type: Log-Pwr	02:22:55 AM Nov 12, 2019 TRACE 1 2 3 4 5 6
Keysight Spectrum IXI RL R Center Freq	RF 75 Ω AC CORREC 2.526000000 GHz PI IFC	NO: Fast Trig: Free Run Sain:Low Atten: 30 dB	ALIGN AUTO Avg Type: Log-Pwr Avg Hold:>100/100	02:22:55 AM Nov 12, 2019 TRACE 1 2 3 4 5 0 TYPE MWWWW DET PNNNN
Keysight Spectrum KK RL R Center Freq Re	RF 75 Ω AC CORREC 2.526000000 GHz PI	NO: Fast 🖵 Trig: Free Run	ALIGN AUTO Avg Type: Log-Pwr Avg Hold:>100/100	02:22:55 AM Nov 12, 2019
Keysight Spectrum WRL R Center Freq	RF 75 Ω AC CORREC PI 2.526000000 GHz PI FC	NO: Fast 🖵 Trig: Free Run	ALIGN AUTO Avg Type: Log-Pwr Avg Hold:>100/100	02:22:55 AM Nov 12, 2019 TRACE 1 2 3 4 5 6 TYPE MWWWWW DET P NNNN Ikr1 2.476 0 GHz
III Keysight Spectrum IXI RL R Center Freq 10 dB/div R Log 13.0	RF 75 Ω AC CORREC PI 2.526000000 GHz PI FC	NO: Fast 🖵 Trig: Free Run	ALIGN AUTO Avg Type: Log-Pwr Avg Hold:>100/100	02:22:55 AM Nov 12, 2019 TRACE 1 2 3 4 5 6 TYPE MWWWWW DET P NNNN Ikr1 2.476 0 GHz
Center Freq	RF 75 Ω AC CORREC PI 2.526000000 GHz PI FC	NO: Fast 🖵 Trig: Free Run	ALIGN AUTO Avg Type: Log-Pwr Avg Hold:>100/100	02:22:55 AM Nov 12, 2019 TRACE 1 2 3 4 5 6 TYPE MWWWWW DET P NNNN Ikr1 2.476 0 GHz
Image: Sector Reysight Spectrum Center Freq Reg 10 dB/div Reg 13.0 1 3.03 1 -6.97 14/4 -17.0 -4/4 -37.0 -4/4	F 75.0 AC CORFEC 2.526000000 GHz PI F0 ef Offset 3.03 dB ef 23.03 dBm	NO: Fast 🖵 Trig: Free Run	ALIGN AUTO Avg Type: Log-Pwr Avg Hold:>100/100	02:22:55 AM Nov 12, 2019 TRACE [2 3 4 5 4 TYPE MINIMUM DEF NNNNN 1kr1 2.476 0 GHz -0.555 dBm
Keysight Spectrum Center Freq 10 dB/div Re 13 0 1 3.03 1 -6.97 N/// -17.0 - -37.0 - -47.0 -	FE 75.0 AC CORREC 2.526000000 GHz P PI P ef Offset 3.03 dB P ef 23.03 dB P	NO: Fast 🖵 Trig: Free Run	ALIGN AUTO Avg Type: Log-Pwr Avg Hold:>100/100	02:22:55 AM Nov 12, 2019 TRACE [2 3 4 5 4 TYPE MINIMUM DEF NNNNN 1kr1 2.476 0 GHz -0.555 dBm
III Keysight Spectrum M RL R Center Freq R 10 dB/div R 10 aB/div R 13.0 1 a 3.03 1 a -17.0	PF 75.0 AC CORREC P 2.5250000000 GHz P <td>NO: Fast 🖵 Trig: Free Run</td> <td>ALIGN AUTO Avg Type: Log-Pwr Avg Hold:>100/100</td> <td>02:22:55 MN NOT 12, 2019 TRACE [] 2 3 4 5 TYPE MINIMUM DET MINIMUM 1kr1 2,476 0 GHz -0.555 dBm -22 26 dBm</td>	NO: Fast 🖵 Trig: Free Run	ALIGN AUTO Avg Type: Log-Pwr Avg Hold:>100/100	02:22:55 MN NOT 12, 2019 TRACE [] 2 3 4 5 TYPE MINIMUM DET MINIMUM 1kr1 2,476 0 GHz -0.555 dBm -22 26 dBm
Image: Sector Reysight Spectrum Center Freq Re 10 dB/div Re 13.0 1 3.03 1 -6.97 1 -17.0 - -37.0 - -47.0 - -57.0 - Start 2.47600 #Res BW 100	PF 75.0 AC CORPEC 2.526000000 GHz PF PF PF PF PF PF PF PF PF PF	NO: Fast Sain:Low Trig: Free Run Atten: 30 dB	ALIGN AUTO Avg Type: Log-Pwr Avg Hold:>100/100	02:22:55 AM Nov 12, 2019 TRACE [] 2.3 4.5 TOPE MINIMUM Ikr1 2.476 0 GHz -0.555 dBm -22.26 dBm -22.26 dBm Stop 2.57600 GHz 9.600 ms (1001 pts)
Image: Sector	PF 75.0 AC CORREC 2.526000000 GHz PI ef Offset 3.03 dB ef 23.03 dB ef 23.03 dB ef 2.3.03 dB ef 2.3.03 dB ef 2.3.03 dB of D GHz 0 0 2 2 43 2 2 476.0 2 2 476.0	NO: Fast Sain:Low Trig: Free Run Atten: 30 dB	ALIGN AUTO Avg Type: Log-Pwr Avg Hold:>100/100	02:22:55 AM Nov 12, 2019 TRACE [2 3 4 5 TRACE [2 3 4 5 TRACE [2 3 4 5 TRACE [2 3 4 5 M MMMMM DEF M MMMMM DEF M MMMMM 1kr1 2.476 0 GHz -0.555 dBm -22 20 dBm -22 20 dBm -22 20 dBm
Image: Sector RL PR Center Freq RL PR 10 dB/div RC RC 13.0 1 1 3.03 1 1 1 47.0 1 1 1 -37.0 -37.0 -37.0 -37.0 -47.0 -37.0 -37.0 -37.0 -47.0 -37.0 -37.0 -37.0 -47.0 -37.0 -37.0 -37.0 -47.0 -37.0 -37.0 -37.0 -47.0 -37.0 -37.0 -37.0 -47.0 -37.0 -37.0 -37.0 -47.0 -37.0 -37.0 -37.0 -47.0 -37.0 -37.0 -37.0 -47.0 -37.0 -37.0 -37.0 -47.0 -37.0 -37.0 -37.0 -47.0 -37.0 -37.0 -37.0 -47.0 -37.0 -37.0 -37.0 -47.0 -37.0	PF 75.0 AC CORREC 2.526000000 GHz PI ef Offset 3.03 dB ef 23.03 dB ef 23.03 dB ef 2.3.03 dB ef 2.3.03 dB ef 2.3.03 dB of D GHz 0 0 2 2 43 2 2 476.0 2 2 476.0	NO: Fast Sain:Low Trig: Free Run Atten: 30 dB	ALIGN AUTO Avg Type: Log-Pwr Avg Hold:>100/100	02:22:55 AM Nov 12, 2019 TRACE [] 2.3 4.5 TOPE MINIMUM Ikr1 2.476 0 GHz -0.555 dBm -22.26 dBm -22.26 dBm Stop 2.57600 GHz 9.600 ms (1001 pts)
Keysight Spectrum RL R Center Freq 0 dB/div 8 R 13.0 1 3.03 1 -6.97 1 -17.0 27.0 -37.0 -47.0 -47.0 -47.0 -8.77 -47.0 -8.77 -47.0 -8.77 -47.0 -8.77 -47.0 -8.77 -47.0 -8.77 -7.70 -7.70 -7.70 -7.70 -7.70 -7.70 -7.70 -7.70 -7.70 -7.70 -7.70 -7.70 -7.70 -7.70 -7.70 -7.70 -7.70 -7.70 -7.70 -7.70 -7.70 -7.70 -7.70 -7.70 -7.70 -7.70 -7.70 -7.70 -7.70 -7.70 -7.70 -7.7	PF 75.0 AC CORREC 2.526000000 GHz PI ef Offset 3.03 dB ef 23.03 dB ef 23.03 dB ef 2.3.03 dB ef 2.3.03 dB ef 2.3.03 dB of D GHz 0 0 2 2 43 2 2 476.0 2 2 476.0	NO: Fast Sain:Low Trig: Free Run Atten: 30 dB	ALIGN AUTO Avg Type: Log-Pwr Avg Hold:>100/100	02:22:55 AM Nov 12, 2019 TRACE [] 2.3 4.5 TOPE MINIMUM Ikr1 2.476 0 GHz -0.555 dBm -22.26 dBm -22.26 dBm Stop 2.57600 GHz 9.600 ms (1001 pts)
Image: Sector M RL R Center Freq 10 dB/div R 10 dB/div R 10 dB/div R 10 dB/div R 13.0 1 3 3.03 1 3 -17.0	PF 75.0 AC CORREC 2.526000000 GHz PI ef Offset 3.03 dB ef 23.03 dB ef 23.03 dB ef 2.3.03 dB ef 23.03 dB ef 23.03 dB g g g g g g g g g g g g g g g g g g g g g g g	NO: Fast Sain:Low Trig: Free Run Atten: 30 dB	ALIGN AUTO Avg Type: Log-Pwr Avg Hold:>100/100	02:22:55 AM Nov 12, 2019 TRACE [] 2.3 4.5 TOPE MINIMUM Ikr1 2.476 0 GHz -0.555 dBm -22.26 dBm -22.26 dBm Stop 2.57600 GHz 9.600 ms (1001 pts)

Attachment D-- Number of Hopping Channel Test Data

Temperature:	25°	0	Relative Humidity:	55%
Test Voltage:	DC	3.7V		39
Test Mode:	Нор	ping Mode	(igo)	
Frequency Ran	ge	Test Mode	Quantity of Hopping Channel	Limit
		GFSK	79	
2402MHz~2480MHz		π /4-DQPSK	79	>15
		8-DPSK	79	

GFSK Mode



π /4-DQPSK Mode

nter Freq 2.441750000 0	CORREC BHZ PNO: Fast IFGain:Low	SENSE:INT Trig: Fr Atten: 3	e Run	ALIGN AUTO Avg Type: Avg Hold:>		TR. T	AM Nov 12, 2019 ACE 2 3 4 5 6 YPE M DET PNNNN
Ref Offset 3 dB B/div Ref 23.00 dBm					Mkr1	2.402 00	04 0 GHz 636 dBm
1 MMMAAAMANAAA	hAllagaAllar	MANNA	www.	www.	mmm	NANANNA	2 ₩₩44
							Ļ
rt 2.40000 GHz es BW 100 kHz	;	#VBW 300 kH	łz		Sweep	Stop 2.4 8.000 ms	8350 GHz (1001 pts)
		Y F .636 dBm .715 dBm	UNCTION FUN	CTION WIDTH	FUI	ICTION VALUE	
							-



Center Freq 2.441750000 GHz	PNO: Fast Trig: Free Run IFGain:Low Atten: 30 dB	Avg Type: Log-Pwr Avg Hold:>100/100	TRACE 2 2 3 4 5 6 TYPE MWWWWW DET PNNNNN
Ref Offset 3 dB 10 dB/div Ref 23.00 dBm		MI	r1 2.402 087 5 GHz -0.641 dBm
130 300 400 400 400 400 400 400 4	<u>መረት የተሰራ የተሰራ የተሰራ የተሰራ የተሰራ የተሰራ የተሰራ የተሰራ</u>		Stop 2.48350 GHz
#Res BW 100 KHz	#VBW 300 KHz	FUNCTION WIDTH	ep 8.000 ms (1001 pts)
1 N 1 f 24020875 2 N 1 7 24800765 3 - - - 4 - - - 5 - - - 6 - - - 7 - - - 8 - - - 9 - - - 10 - - -	Hz -0.641 dBm		

Attachment E-- Average Time of Occupancy Test Data

Temper	ature:	25°	С	55%	MUL		
Test Vo	Itage:	DC	3.7V	233			
Test Mo	ode:	Hop	oping Mode (C		1		
Test	Chan	nel	Pulse	Total of Dwell	Period Time	Limit	Result
84.1.							
Mode	(MH:	z)	Time (ms)	(ms)	(s)	(ms)	Result
Mode 1DH1	(MH) 244	•	Time (ms) 0.371	(ms) 118.72	(s) 31.60	(ms) 400	PASS
	•	1	. ,				
1DH1	244	1 1	0.371	118.72	31.60	400	PASS

1DH1 Total of Dwell= Pulse Time*(1600/2)*31.6/79

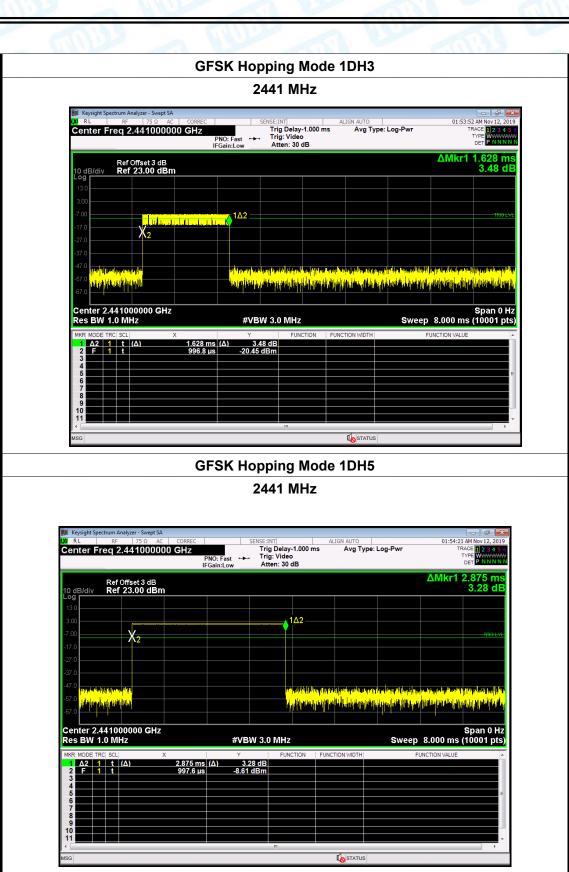
1DH3 Total of Dwell= Pulse Time*(1600/4)*31.6/79

1DH5 Total of Dwell= Pulse Time*(1600/6)*31.6/79

GFSK Hopping Mode 1DH1

RL RF 75 enter Freg 2.4410		SENSE:	g Delay-1.000 ms		e: Log-Pwr		AM Nov 12, 20
enter Freq 2.44 to		PNO: Fast ++ Tri	g: Video ten: 30 dB			1	
Ref Offset 3 0 dB/div Ref 23.00						ΔMkr1	371.4 µ 0.17 d
3.0							
.00							
.00				\rightarrow	1Δ2		TRIO L
7.0			<u>X2</u>				
7.0							
7.0							
7.0 I state and their contributes the set	ar Galal day a tanyi ng dag tanyi ng sala	a in the state of the	F PPN <mark>0</mark>		A ALCOLOGY DE LA LA	a dhahalan shadin	<mark>VA AN</mark> YON
7.0 7.0 <mark>AND AND AND AND AND AND AND AND AND AND </mark>					e a la line de la line A la line de		
7.0 7.0 7.0 7.0 enter 2.441000000 es BW 1.0 MHz	GHz	#VBW 3.0			Sweep	2.000 ms (Span 0 H (10001 pt
7.0 7.0 enter 2.441000000 es BW 1.0 MHz	X	Y	FUNCTION F			2.000 ms (Span 0 H (10001 pt
70 70 enter 2.441000000 es BW 1.0 MHz rr Mode Trci scl 4 A2 1 t (A) 2 F 1 t		Υ (Δ) 0.17 dB	FUNCTION F			2.000 ms (Span 0 H (10001 pi
7.0 2.0 2.0 2.0 2.0 2.0 2.1 2.44100000 2.5 2.44100000 2.5 2.44100000 3.5 2.44100000 3.5 3.441000 3.441000 3.441000 3.441000 3.4410000000 3.44100000000000000000000000000000000000	× 371.4 μs	Υ (Δ) 0.17 dB	FUNCTION F	UNCTION WIDTH		2.000 ms (Span 0 H (10001 pt
7 0 7 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	× 371.4 μs	Υ (Δ) 0.17 dB	FUNCTION F			2.000 ms (Span 0 H (10001 pi
70 70 90 90 90 90 90 90 90 90 90 90 90 90 90	× 371.4 μs	Υ (Δ) 0.17 dB	FUNCTION F			2.000 ms (Span 0 H
70 70 70 70 70 70 70 70 70 70	× 371.4 μs	Υ (Δ) 0.17 dB	FUNCTION F			2.000 ms (Span 0 H (10001 pt







100 March 100 Ma							
Temper	ature:	25°	С	55%	A COL		
Test Vo	ltage:	DC	3.7V		MOR		
Test Mo	ode:	Hop	oping Mode (183			
Test	Chan	nel	Pulse	Total of Dwell	Period Time	Limit	D
Mode	(MH	z)	Time (ms)	(ms)	(s)	(ms)	Result
Mode 2DH1	(MH) 244	•	Time (ms) 0.378	(ms) 120.96	(s) 31.60	(ms) 400	PASS
	•	<i>.</i> 1	,			. ,	
2DH1	244	1 1	0.378	120.96	31.60	400	PASS

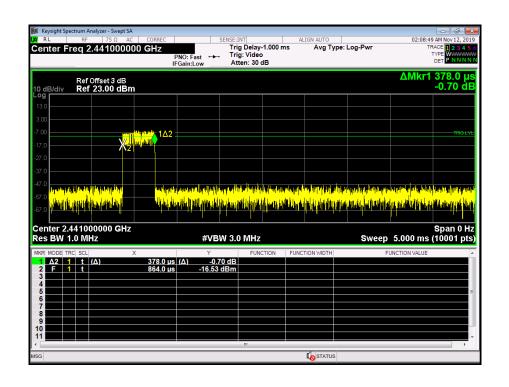
2DH1 Total of Dwell= Pulse Time*(1600/2)*31.6/79

2DH3 Total of Dwell= Pulse Time*(1600/4)*31.6/79

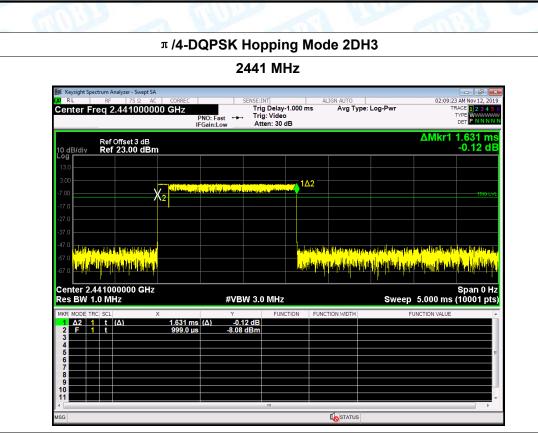
2DH5 Total of Dwell= Pulse Time*(1600/6)*31.6/79

π /4-DQPSK Hopping Mode 2DH1

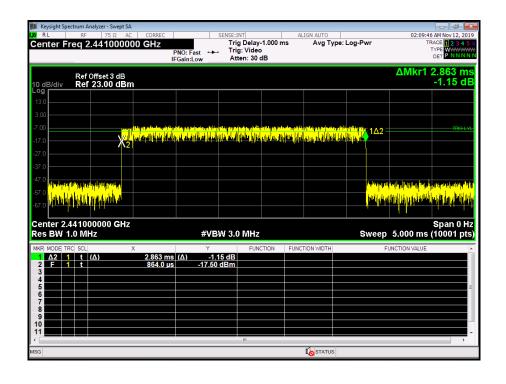








π /4-DQPSK Hopping Mode 2DH5





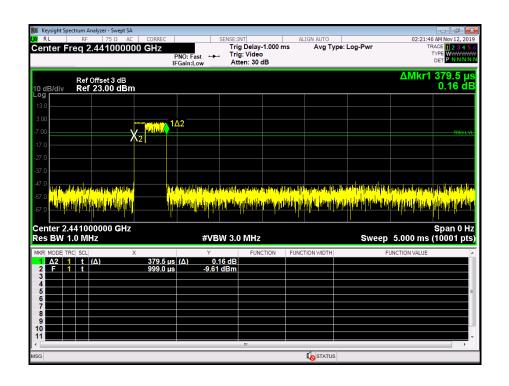
Temper	ature:	25°	С	55%	100		
Test Vo	Itage:	DC	3.7V		MAG		
Test Mo	de:	Ho	oping Mode (8	183			
Test	Chan	nel	Pulse	Total of Dwell	Period Time	Limit	Desult
Mode	(MH:	z)	Time (ms)	(ms)	(s)	(ms)	Result
Mode 3DH1	(MH) 244		Time (ms) 0.379	(ms) 121.28	(s) 31.60	(ms) 400	PASS
	•	<i>,</i> 1	,	. ,	. ,	. ,	
3DH1	244	, 1 1	0.379	121.28	31.60	400	PASS

1DH1 Total of Dwell= Pulse Time*(1600/2)*31.6/79

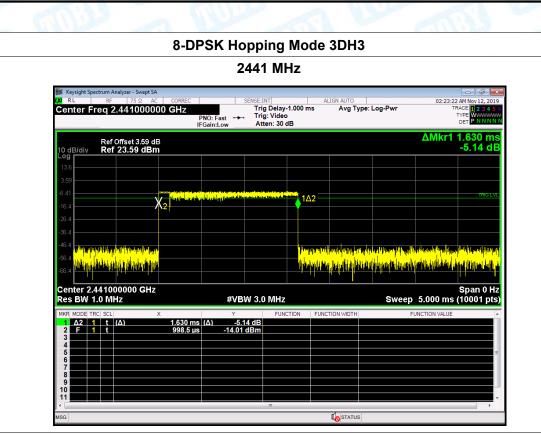
1DH3 Total of Dwell= Pulse Time*(1600/4)*31.6/79

1DH5 Total of Dwell= Pulse Time*(1600/6)*31.6/79

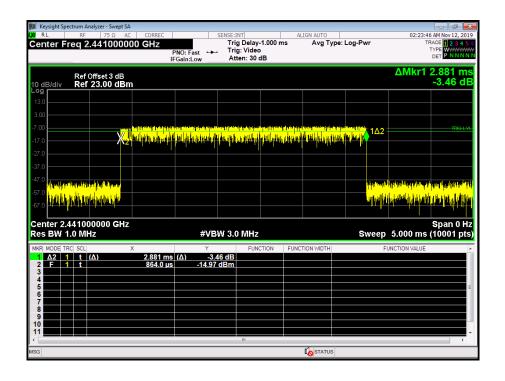
8-DPSK Hopping Mode 3DH1







8-DPSK Hopping Mode 3DH5

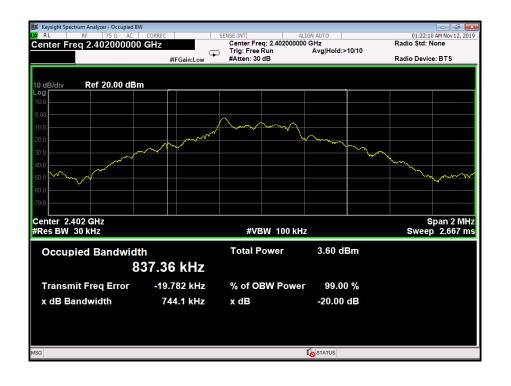


TOBY

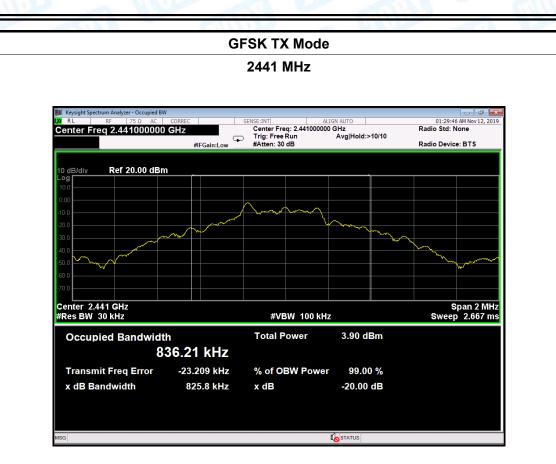
Attachment F-- Channel Separation and Bandwidth Test

Data

Temperature:	25°	C	Relative Humidity:	55%
Test Voltage:	DC	3.7V		Call Day
Test Mode:	ТΧ	Mode (GFSK)		
Channel frequer (MHz)	су	99% OBW (kHz)	20dB Bandwidth (kHz)	20dB Bandwidth *2/3 (kHz)
2402		837.36	744.1	
2441	2441 836.21		825.8	
2480		833.73	827.5	
		GFSK TX	Mode	







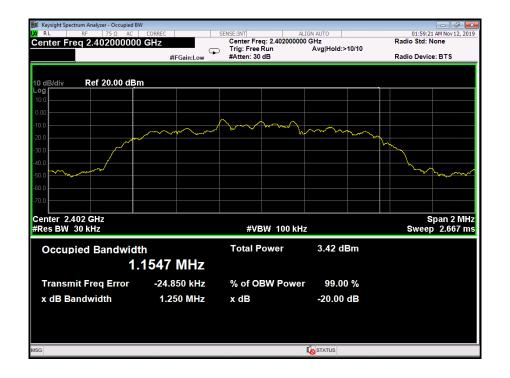
GFSK TX Mode

Keysight Spectrum Analyzer - Occupied BV R L RF 75 Ω AC	CORREC	SENSE:INT	ALIGN AUTO	01:31:37 AM Nov 12, 201
enter Freq 2.48000000		Center Freq: 2.4800000 Trig: Free Run	00 GHz Avg Hold:>10/10	Radio Std: None
	#IFGain:Low	#Atten: 10 dB		Radio Device: BTS
dB/div Ref 20.00 dBn	n			
og				
3.0				
i.0				
			+	
0.0				
00				
15				
enter 2.48 GHz Res BW 30 kHz		#VBW 100 kH	Hz	Span 2 MH: Sweep 2.667 m
Occupied Bandwidt	h	Total Power	3.22 dBm	
	33.73 kHz			
Transmit Freg Error	-23.629 kHz	% of OBW Powe	er 99.00 %	
	827.5 kHz	x dB	-20.00 dB	
x dB Bandwidth				
x dB Bandwidth				
x dB Bandwidth				
x dB Bandwidth			STATUS	

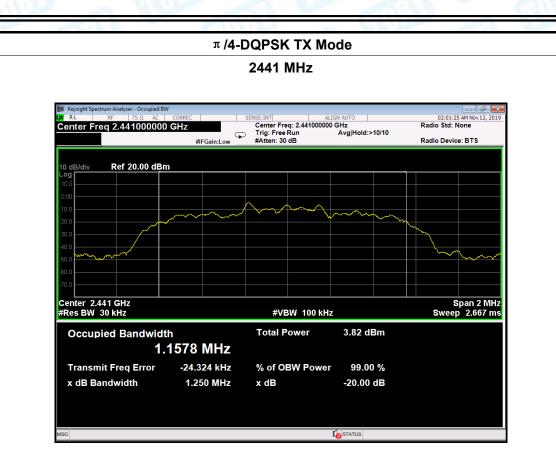


Temperature:	25°	C	Relative Humidity:	55%			
Test Voltage:	DC 3.7V						
Test Mode:	Iode: TX Mode (π /4-DQPSK)						
Channel frequei (MHz)	ncy	99% OBW (kHz)	20dB Bandwidth (kHz)	20dB Bandwidth *2/3 (kHz)			
2402		1154.7	1250	769.8			
2441	2441 1157.8		1250	771.8			
2480		1160.9	1252	773.9			

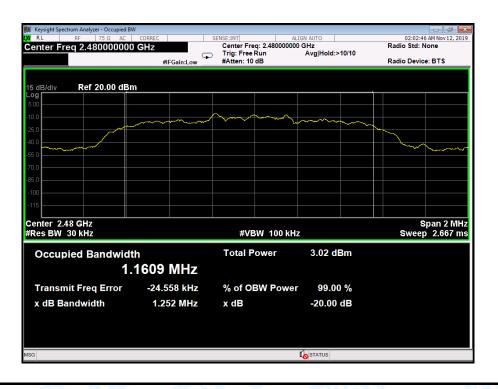
π /4-DQPSK TX Mode







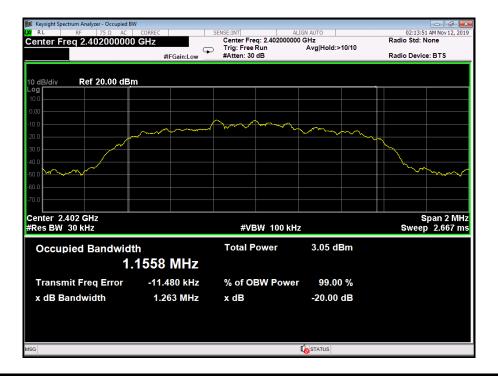
π /4-DQPSK TX Mode



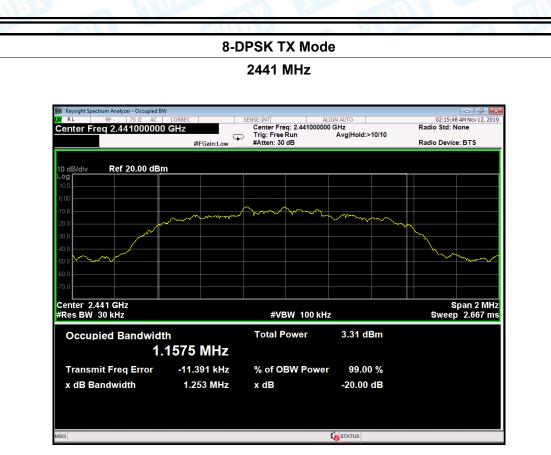


Temperature: 25°C		С	Relative Humidity:	55%	
Test Voltage:	Test Voltage: DC 3.7V			BI	
Test Mode:	TX	Mode (8-DPSK)		130	
Channel freque (MHz)	ncy	99% OBW (kHz)	20dB Bandwidth (kHz)	20dB Bandwidth *2/3 (kHz)	
2402		1155.8	1263	770.53	
2441	2441 1157.5		1253	771.66	
2480		1157.5	1262	771.66	
			Mada		

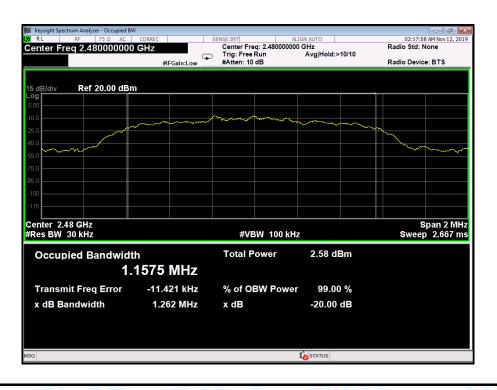
8-DPSK TX Mode







8-DPSK TX Mode



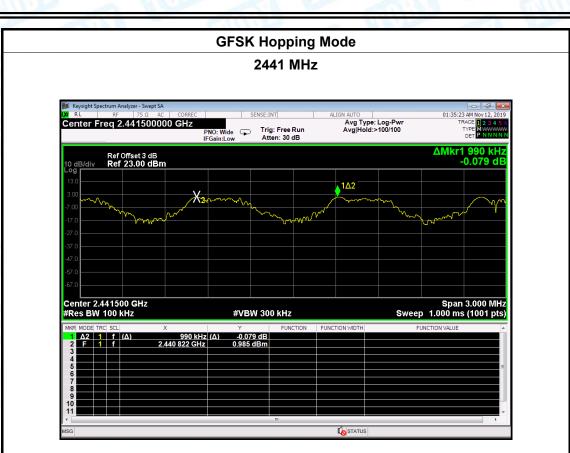


Temperature:	25 ℃		Relative Humidity:	55%			
Test Voltage:	DC 3.7V						
Test Mode:	Hopping I	Hopping Mode (GFSK)					
Channel frequ	uency	Separation Re	ad Value Se	paration Limit			
(MHz)		(kHz)		(kHz)			
2402		990		744.1			
2441		990		825.8			
2480		920	920				
			· · ·				

GFSK Hopping Mode







GFSK Hopping Mode 2480 MHz



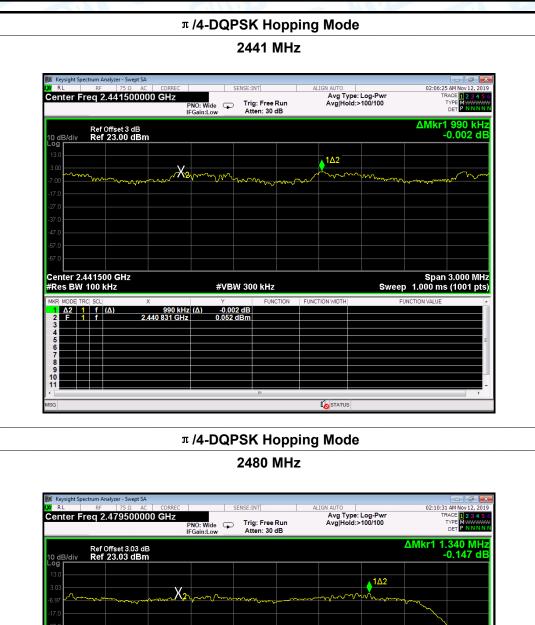


Temperature:	25 ℃		Relative Humidity:		55%
Test Voltage:	DC 3.7V				
Test Mode:	Hopping Mode (π /4-DQPSK)				
Channel frequ	uency	Separation Read Value		Separation Limit	
(MHz)		(kHz)			(kHz)
2402		870			769.8
2441		990			771.8
2480		1340			773.9

π /4-DQPSK Hopping Mode









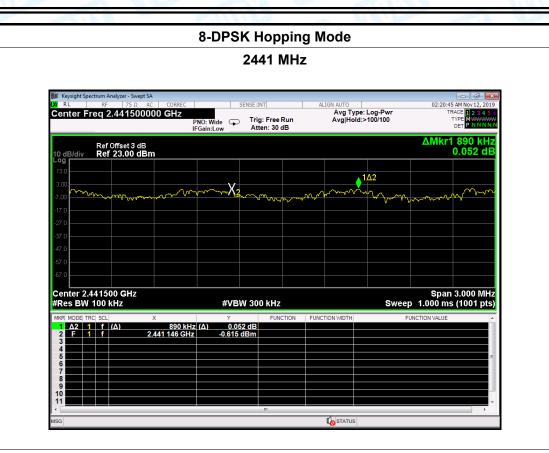


Temperature:	25 ℃		Relative Humidity	/: 55%	
Test Voltage:	DC 3.7V				
Test Mode:	Hopping Mode (8-DPSK)				
Channel frequency Separatio			ad Value S	paration Limit	
(MHz)		(kHz)		(kHz)	
2402		850		770.53	
2441		890		771.66	
2480		980		771.66	

8-DPSK Hopping Mode







8-DPSK Hopping Mode

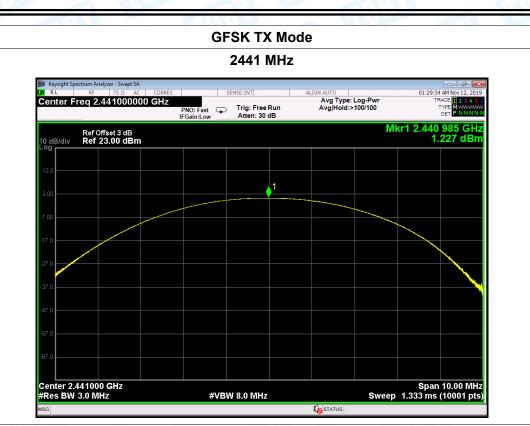


Attachment G-- Peak Output Power Test Data

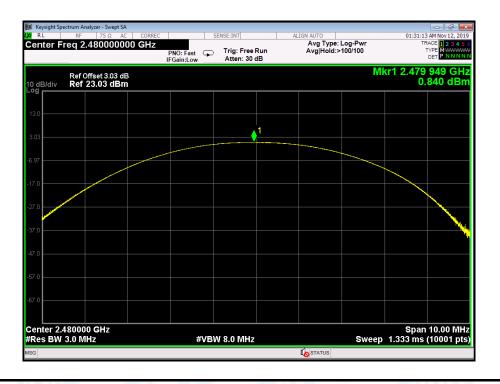
Temperature:	25 ℃		Relative Humidity:	55%
Test Voltage:	DC 3.7V		3	191
Test Mode:	TX Mode	(GFSK)		The second second
Channel frequen	cy (MHz)	Test Result	(dBm) L	.imit (dBm)
2402		1.011		
2441		1.227		30
2480		0.840		
		GFSK TX I	lode	





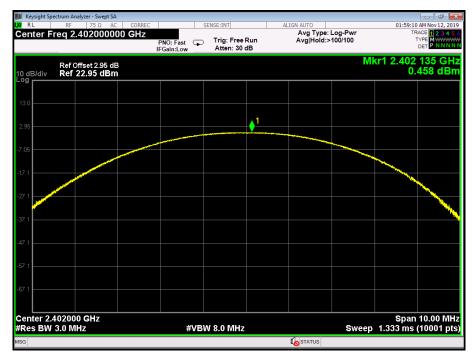


GFSK TX Mode

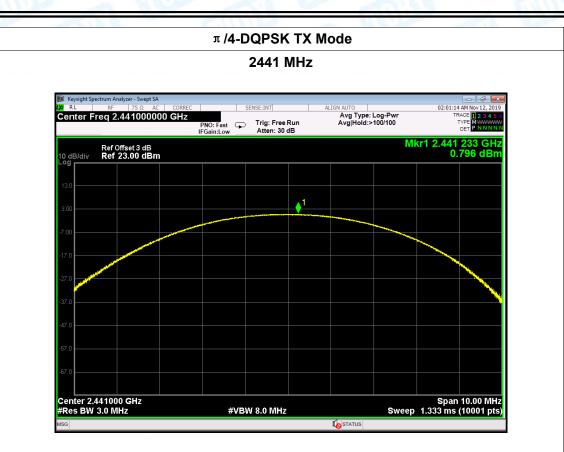




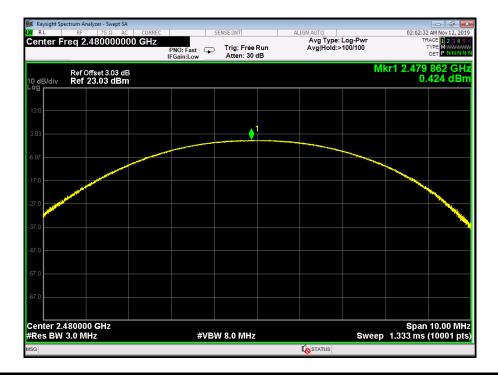
Temperature:	25 ℃	Relative Humidity:		55%
Test Voltage:	DC 3.7V			
Test Mode:	TX Mode (π/4-DQPSK)			
Channel frequen	cy (MHz)	Test Result	(dBm) L	imit (dBm)
2402		0.458		
2441		0.796		30
2480		0.424		
		π /4-DQPSK 1	X Mode	





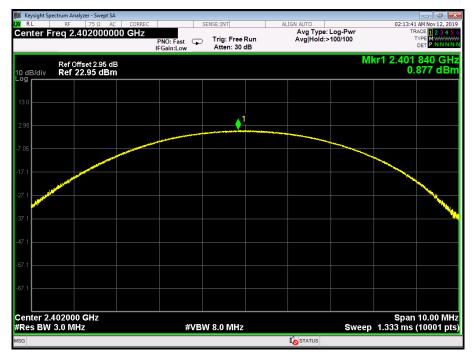


π /4-DQPSK TX Mode

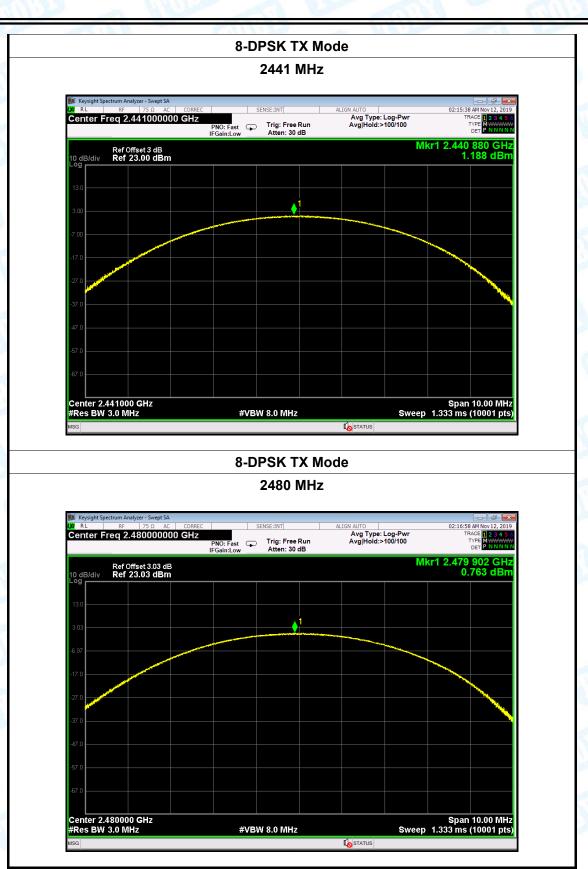




Temperature:	25 ℃	Relative Humidi		55%	
Test Voltage:	DC 3.7V		anis -		
Test Mode:	TX Mode (8-DPSK)				
Channel frequen	cy (MHz)	Test Result (d	IBm) Lin	nit (dBm)	
2402		0.877			
2441 2480		1.188		30	
		0.763			
8-DPSK TX Mode					







-----END OF REPORT-----