

Shenzhen Toby Technology Co., Ltd.

Report No.: TB-FCC179891

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FCC Radio Test Report FCC ID: 2AXWO-M200

Original Grant

Report No. : TB-FCC179891

Applicant : Doors Korea Co., Ltd

Equipment Under Test (EUT)

EUT Name: Miracle, m M200 Wireless portable karaoke speaker

Model No. : M200

Series Model No. : M220, M230

Brand Name : Miracle,m

Sample ID : TBBJ-20210409-31-1#&TBBJ-20210409-31-2#

Receipt Date : 2021-04-19

Test Date : 2021-04-19 to 2021-05-31

Issue Date : 2021-06-02

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 : Countle 4

Engineer Supervisor : WWW SV

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.

TB-RF-074-1.0

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ATTACHMENT F AVERAGE TIME OF OCCUPANCY TEST DATA72			



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ATTACHMENT G CHANNEL SEPARATION AND BANDWIDTH TEST DATA	78
ATTACHMENT H PEAK OUTPUT POWER TEST DATA	8



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Revision History

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TB-FCC179891	Rev.01	Initial issue of report	2021-06-02
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1. General Information about EUT

1.1 Client Information

Applicant	:(Doors Korea Co., Ltd
Address	\ :	1F, 27, Mangu-ro 81-gil, Jungnang-gu, Seoul,South Korea
Manufacturer		TIAN JIN PACHEM ELCTRONICS CO.,LTD
Address	1	Dagang Development Area, Binhai New Area, Tianjin, China 300270

1.2 General Description of EUT (Equipment Under Test)

EUT Name	· Constitution	Miracle, m M200 Wireless portable karaoke speaker				
Model(s)	1	M200, M220, M230				
Model Difference		All PCB boards and circuit diagrams are the same, the only different that different customers have different names.				
		Operation Frequency:	Bluetooth V5.0(BT): 2402~2480 MHz			
		Number of Channel:	Bluetooth: 79 Channels see Note 2			
Product		Max Peak Output Power: Bluetooth: 5.477dBm (8DPSK)				
Description		Antenna Gain:	0.5dBi PCB Antenna			
	N	Modulation Type:	GFSK π/4-DQPSK 8DPSK			
Power Supply		DC 7.4V by 2500mAh Li-ic	on battery			
Software Version	:	: VE31 : V3.2				
Hardware Version	:					
Connecting I/O Port(S)	3:	Please refer to the User's Manual				

Note:

(1) This Test Report is FCC Part 15.247 for Bluetooth, the test procedure follows the FCC KDB 558074 D01 DTS Means Guidance v05.



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

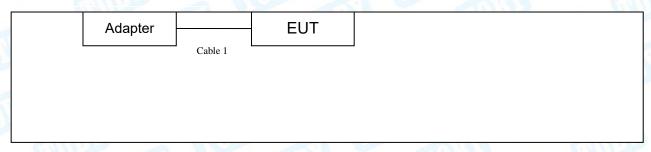
⁽³⁾ The Antenna information about the equipment is provided by the applicant.



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1.3 Block Diagram Showing the Configuration of System Tested

Charging + TX Mode



TX Mode

	8.1111.20				
			_		
		EUT			

1.4 Description of Support Units

	Equipment Information									
Name	Model	FCC ID/VOC	Manufacturer	Used "√"						
ADAPTER	-		HUAWEI	√						
	Cable Information									
Number	Shielded Type	Ferrite Core	Length	Note						
			Q							



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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	Charging + 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 (8DPSK) Channel 00/39/78	
Mode 5	Hopping Mode (GFSK)	
Mode 6	Hopping Mode (π/4-DQPSK)	
Mode 7	Hopping Mode (8DPSK)	

Note: (1) The adapter and antenna gain provided by the applicant, the verified for the RF conduction test provided by TOBY test lab.

(2) All test with left and right earphone, and only show the worst case(left earphone)

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: 8DPSK (3 Mbps)

(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	THE PARTY OF THE P	FCC_assist	
Frequency	2402 MHz	2441MHz	2480 MHz
GFSK	DEF	DEF	DEF
π /4-DQPSK	DEF	DEF	DEF
8DPSK	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	±3.50 dB ±3.10 dB
Radiated Emission	Level Accuracy: 9kHz to 30 MHz	±4.60 dB
Radiated Emission	Level Accuracy: 30MHz to 1000 MHz	±4.50 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 1/F.,Building 6, Rundongsheng Industrial Zone, Longzhu, 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: 2017 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: 2017 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)

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



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2. Test Summary

	F	FCC Part 15 Subpart C(1	5.247)/ RSS 247 Issue 2		
Standard Se	ction	T			
FCC	IC	Test Item	Test Sample(s)	Judgment	Remark
15.203	RSS-GEN 6.8	Antenna Requirement	TBBJ-20210409-31-1#	PASS	N/A
15.207	RSS-GEN 8.8	Conducted Emission	TBBJ-20210409-31-2#	PASS	N/A
15.205	RSS-Gen 8.10	Restricted Bands	TBBJ-20210409-31-1#	PASS	N/A
15.247(a)(1)	RSS 247 5.1 (b)	Hopping Channel Separation	TBBJ-20210409-31-1#	PASS	N/A
15.247(a)(1)	RSS 247 5.1 (d)	Dwell Time	TBBJ-20210409-31-1#	PASS	N/A
15.247(b)(1)	RSS 247 5.4 (b)	Peak Output Power	TBBJ-20210409-31-1#	PASS	N/A
15.247(a)(1)	RSS 247 5.1 (d)	Number of Hopping Frequency	TBBJ-20210409-31-1#	PASS	N/A
15.247(d)	RSS 247 5.5	Conducted Spurious Emissions&Band edge	TBBJ-20210409-31-1#	PASS	N/A
15.247(c)& 15.209	RSS 247 5.5	Radiated Spurious Emission	TBBJ-20210409-31-1# TBBJ-20210409-31-2#	PASS	N/A
15.247(a)	RSS 247 5.1 (a)	99% Occupied Bandwidth & 20dB Bandwidth	TBBJ-20210409-31-1#	PASS	N/A

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

Conducted Emi	ssion Test				
Equipment	Manufact urer	Model No.	Serial No.	Last Cal.	Cal. Due Date
EMI Test Receiver	Rohde & Schwarz	ESCI	100321	Jul. 06, 2020	Jul. 05, 2021
RF Switching Unit	Compliance Direction Systems Inc	RSU-A4	34403	Jul. 06, 2020	Jul. 05, 2021
AMN	SCHWARZBECK	NNBL 8226-2	8226-2/164	Jul. 06, 2020	Jul. 05, 2021
LISN	Rohde & Schwarz	ENV216	101131	Jul. 06, 2020	Jul. 05, 2021
Radiation Emis	sion Test		<u>'</u>		
Equipment	Manufact urer	Model No.	Serial No.	Last Cal.	Cal. Due Date
Spectrum Analyzer	Agilent	E4407B	MY45106456	Jul. 06, 2020	Jul. 05, 2021
EMI Test Receiver	Rohde & Schwarz	ESPI	100010/007	Jul. 06, 2020	Jul. 05, 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, 2022
Horn Antenna	ETS-LINDGREN	3117	00143207	Mar.01, 2020	Feb. 28, 2022
Horn Antenna	ETS-LINDGREN	BBHA 9170	BBHA9170582	Mar.01, 2020	Feb. 28, 2022
Loop Antenna	SCHWARZBECK	FMZB 1519 B	1519B-059	Jul. 07, 2020	Jul. 06, 2021
Pre-amplifier	Sonoma	310N	185903	Feb.25, 2021	Feb. 24, 2022
Pre-amplifier	HP	8449B	3008A00849	Feb.25, 2021	Feb. 24, 2022
Pre-amplifier	SKET	LNPA_1840G-50	SK201904032	Feb.25, 2021	Feb. 24, 2022
Cable	HUBER+SUHNER	100	SUCOFLEX	Feb.25, 2021	Feb. 24, 2022
Positioning Controller	ETS-LINDGREN	2090	N/A	N/A	N/A
Antenna Conducted I	Emission				
Equipment	Manufact urer	Model No.	Serial No.	Last Cal.	Cal. Due Date
Spectrum Analyzer	Agilent	E4407B	MY45106456	Jul. 06, 2020	Jul. 05, 2021
Spectrum Analyzer	Rohde & Schwarz	ESPI	100010/007	Jul. 06, 2020	Jul. 05, 2021
MXA Signal Analyzer	Agilent	N9020A	MY49100060	Sep. 11, 2020	Sep. 10, 2021
Vector Signal Generator	Agilent	N5182A	MY50141294	Sep. 11, 2020	Sep. 10, 2021
Analog Signal Generator	Agilent	N5181A	MY50141953	Sep. 11, 2020	Sep. 10, 2021
	DARE!! Instruments	RadiPowerRPR3006W	17I00015SNO26	Sep. 11, 2020	Sep. 10, 2021
RF Power Sensor	DARE!! Instruments	RadiPowerRPR3006W	17I00015SNO29	Sep. 11, 2020	Sep. 10, 2021
IVI LOME! SELISUI	DARE!! Instruments	RadiPowerRPR3006W	17I00015SNO31	Sep. 11, 2020	Sep. 10, 2021
	DARE!! Instruments	RadiPowerRPR3006W	17I00015SNO33	Sep. 11, 2020	Sep. 10, 2021



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5. Conducted Emission Test

5.1 Test Standard and Limit

5.1.1Test Standard FCC Part 15.207

5.1.2 Test Limit

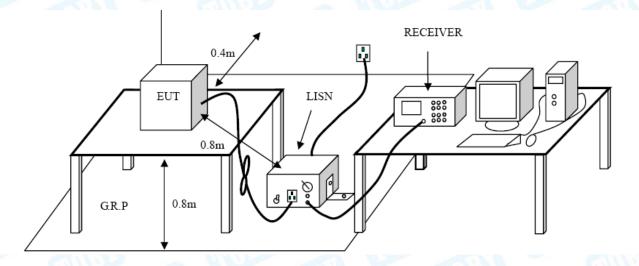
Conducted Emission Test Limit

Eroguanav	Maximum RF Lin	e 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

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 of 3m	(dBuV/m)
(MHz)	Peak	Average
Above 1000	74	54

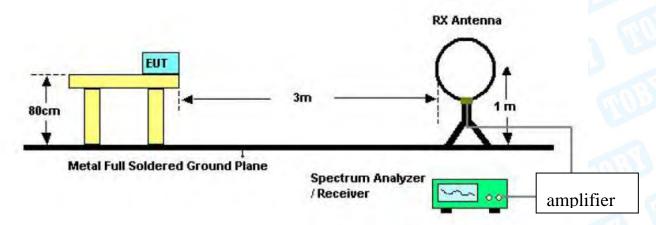
Note:

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

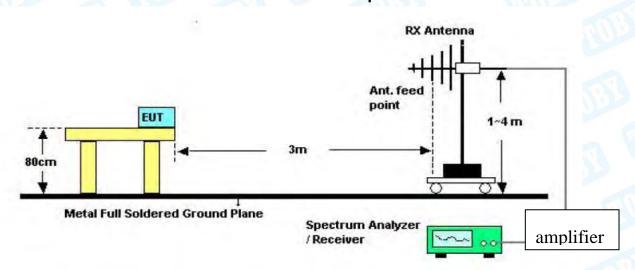


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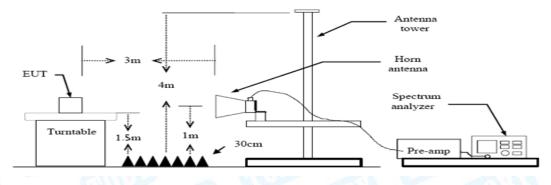
6.2 Test Setup



Below 30MHz Test Setup



Below 1000MHz Test Setup



Above 1GHz Test Setup



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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 Deviation From Test Standard

No deviation

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.



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7. Restricted Bands Requirement

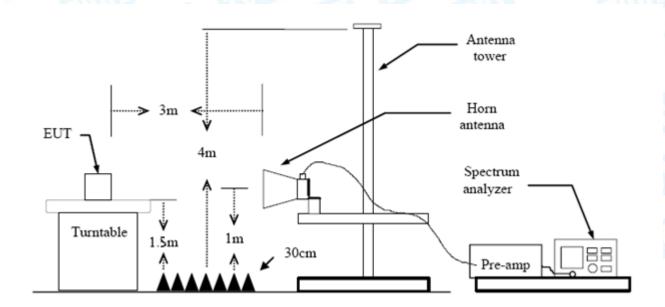
7.1 Test Standard and Limit

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





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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. Conducted Spurious Emissions and Band Edges Test

8.1.1 Test Standard

According to RSS 247§ 5.5: In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement. Attenuation below the general limits specified in Section 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a) (see Section 15.205(c)).

8.1.2 Test Limit

Please refer to equipment list in this report. The following table is the setting of the spectrum analyzer.

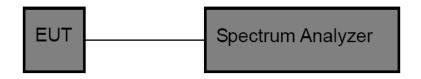
Spectrum Parameter	Setting
Detector	Peak
Attenuation	Auto
RB / VB (Emission in restricted band)	100KHz/300KHz
RB / VB (Emission in non-restricted band)	100KHz/300KHz

8.7.3. Test Procedures

The transmitter output is connected to a spectrum analyzer. The resolution bandwidth is set to 100 kHz. The video bandwidth is set to 300 kHz

The spectrum from 9 kHz to 26.5GHz is investigated with the transmitter set to the lowest, middle, and highest channels.

8.7.4. Test Setup Layout





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8.7.5. EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

8.7.6. Test Data

Please refer to the Attachment D.

- 1). Test results including cable loss;
- 2). "---"means that the fundamental frequency not for 15.209 limits requirement.
- 3). Not recorded emission from 9 KHz to 30 MHz as emission level at least 20dBc lower than emission limit.



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9. Number of Hopping Channel

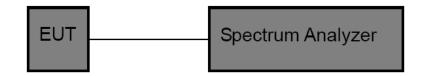
8.1 Test Standard and Limit

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 E.

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10. Average Time of Occupancy

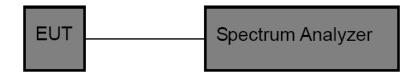
9.1 Test Standard and Limit

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 centre 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:

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

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.



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9.4 Deviation From Test Standard

No deviation

9.5 EUT Operating Condition

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

9.6 Test Data

Please refer to the Attachment F.



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11. Channel Separation and Bandwidth Test

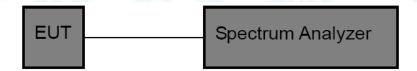
10.1 Test Standard and Limit

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.



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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 G.



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12. Peak Output Power Test

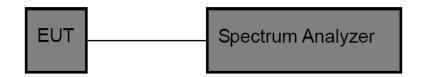
11.1 Test Standard and Limit

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)	2400~2483.5
	Other <125 mW(21dBm)	

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 ≥ RBW 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 H.



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13. 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 0.5 dBi, 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

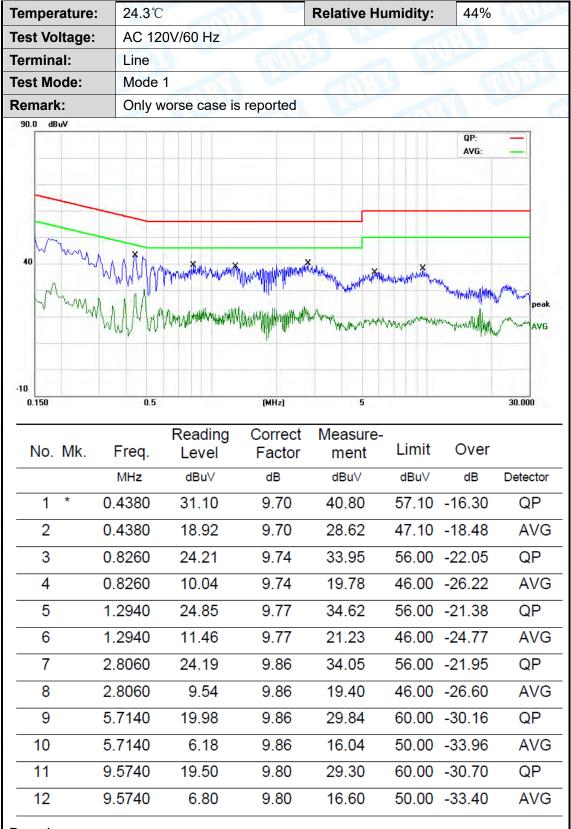
The EUT antenna is a Ceramic Antenna. It complies with the standard requirement.

Antenna Type					
⊠Permanent attached antenna					
☐Unique connector antenna					
☐Professional installation antenna	9				

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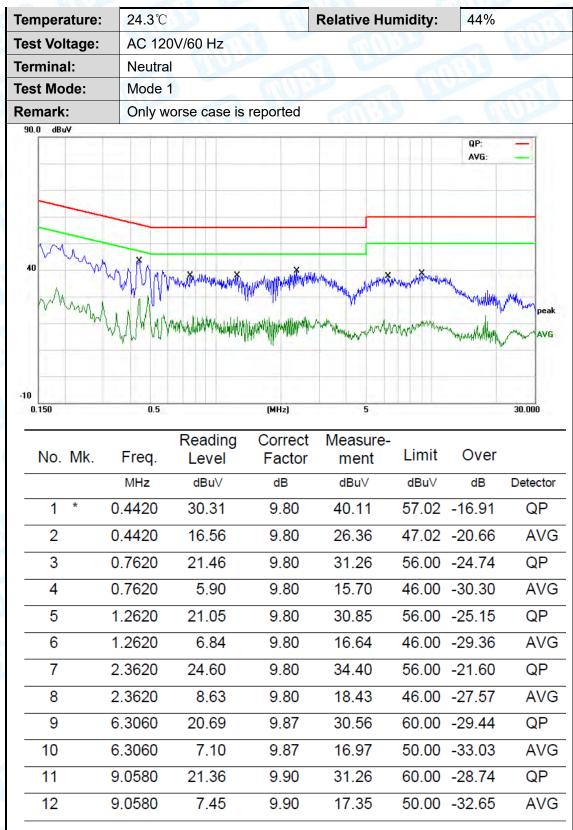


TOBY

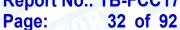
- 1. Corr. Factor (dB) = LISN Factor (dB) + Cable Loss (dB)
- 2. Margin (dB) =QuasiPeak/Average (dBuV)-Limit (dBuV)



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- 1. Corr. Factor (dB) = LISN Factor (dB) + Cable Loss (dB)
- 2. Margin (dB) =QuasiPeak/Average (dBuV)-Limit (dBuV)





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

Temperatur	e: 23.4°	C		Relative H	umidity:	43%	
est Voltage	e: DC 7	'.4V	AL LO		1		77
Ant. Pol.	Horiz	ontal		THINE		MAG	
Test Mode:	Mode	e 1 2402MHz	Z	6	M'AS		21
Remark:	Only	worse case	is reported			A COL	1 6
80.0 dBuV/m		1.7.7					
					(RF)FCC 15C 3	M Radiation	
				×			
			4				
30		3 X	M Mm	WWW ALL A BUT	. III *	mapunahan	wa
X	2	-(.)	W W	" W WYNY W	PHIN MINTON PLANS		
W.	LIŽ	Jev L	Ų,	7			
" Minn	wanner 1 Park	many many	ν.				-
Many	May May May Mark	was from the of	v'				
2 Norm	Many	man ham hand	,				
-20	Martin Marian	and harden	y				
a warm	50 60 70	80	(MHz)	300	400 500	S00 700 1	1000.000
-20 30.000 40		Reading	Correct	300 Measure-	700		000.000
-20					400 500 Limit	600 700 1 Over	1000.000
-20 30.000 40		Reading	Correct	Measure-	700		Detecto
-20 30.000 40	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over	
-20 30.000 40 No. Mk.	Freq.	Reading Level	Correct Factor	Measure- ment dBuV/m	Limit dBuV/m	Over	Detecto
-20 30.000 40 No. Mk.	Freq. MHz 31.0706	Reading Level dBuV 36.65	Correct Factor dB/m -13.74	Measure- ment dBuV/m 22.91	Limit dBuV/m 40.00	Over dB -17.09	Detecto peak peak
No. Mk.	Freq. MHz 31.0706 47.9940	Reading Level dBuV 36.65 40.47	Correct Factor dB/m -13.74 -22.40	Measure- ment dBuV/m 22.91 18.07	Limit dBuV/m 40.00 40.00	Over dB -17.09 -21.93	Detecto peak peak peak
No. Mk.	Freq. MHz 31.0706 47.9940 84.1100	Reading Level dBuV 36.65 40.47 48.18	Correct Factor dB/m -13.74 -22.40 -22.21	Measure- ment dBuV/m 22.91 18.07 25.97	Limit dBuV/m 40.00 40.00 40.00	Over dB -17.09 -21.93 -14.03	Detecto peak peak peak
No. Mk.	Freq. MHz 31.0706 47.9940 84.1100 159.2251	Reading Level dBuV 36.65 40.47 48.18 50.73	Correct Factor dB/m -13.74 -22.40 -22.21 -20.85	Measure- ment dBuV/m 22.91 18.07 25.97 29.88	Limit dBuV/m 40.00 40.00 40.00 43.50	Over dB -17.09 -21.93 -14.03 -13.62	Detecto peak peak peak

^{*:}Maximum data x:Over limit !:over margin

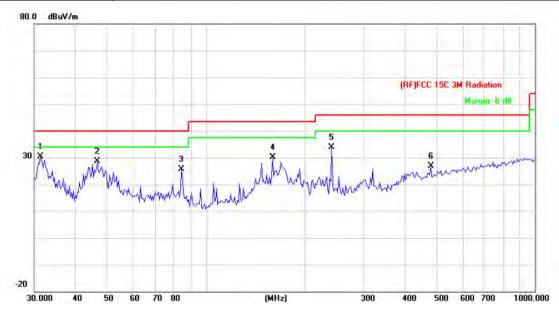
- 1. Corr. = Antenna Factor (dB/m) + Cable Loss (dB)
- 2. QuasiPeak (dB μ V/m)= Corr. (dB/m)+ Read Level (dB μ V)
- 3. Margin (dB) = QuasiPeak (dB μ V/m)-Limit QPK(dB μ V/m)





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1	Temperature:	23.4 °C	Relative Humidity:	43%
1	Test Voltage:	DC 7.4V	A AMOUNT	
	Ant. Pol.	Vertical		
	Test Mode:	Mode 1 2402MHz		
	Remark:	Only worse case is reported		UMIL STATE



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over	
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector
1	*	31.2893	44.34	-13.91	30.43	40.00	-9.57	peak
2		46.6664	50.57	-21.96	28.61	40.00	-11.39	peak
3		84.1100	47.78	-22.21	25.57	40.00	-14.43	peak
4		159.2251	50.90	-20.85	30.05	43.50	-13.45	peak
5		240.8304	51.72	-17.72	34.00	46.00	-12.00	peak
6		482.2156	37.75	-10.99	26.76	46.00	-19.24	peak

^{*:}Maximum data x:Over limit !:over margin

- 1. Corr. = Antenna Factor (dB/m) + Cable Loss (dB)
- 2. QuasiPeak (dBμV/m)= Corr. (dB/m)+ Read Level (dBμV)
- 3. Margin (dB) = QuasiPeak (dB μ V/m)-Limit QPK(dB μ V/m)



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Above 1GHz(Only worse case is reported)

	Temperature:	23.6℃	Relative Humidity:	45%
1	Test Voltage:	DC 7.4V	WW COUNTY	A LIVE
	Ant. Pol.	Horizontal		
	Test Mode:	TX GFSK Mode 2402MHz		

N	lo. Mk	. Freq.			Measure- ment	Limit	Over	
		MHz	dBu∀	dB/m	dBu√/m	dBu∀/m	dB	Detector
1	*	4803.728	34.80	13.01	47.81	54.00	-6.19	AVG
2		4803.992	48.19	13.01	61.20	74.00	-12.80	peak

- 1. Corr. = Antenna Factor (dB/m) + Cable Loss (dB)
- 2. Peak/AVG (dBμV/m)= Corr. (dB/m)+ Read Level (dBμV)
- 3. Margin (dB) = Peak/AVG (dB μ V/m)-Limit PK/AVG(dB μ V/m)
- 4. The tests evaluated 1-26.5GHz, The testing has been conformed to the 10th harmonic of the highest fundamental frequency.
- 5. No report for the emission which more than 20dB below the prescribed limit.

Temperature:	23.6℃	Relative Humidity:	45%
Test Voltage:	DC 7.4V		A STATE OF THE STA
Ant. Pol.	Vertical		THE STATE OF THE S
Test Mode:	TX GFSK Mode 2402MHz		

No	. Mk.	Freq.	Reading Level		Measure- ment	Limit	Over	
		MHz	dBu∨	dB/m	dBuV/m	dBu∀/m	dB	Detector
1		4803.640	47.75	13.01	60.76	74.00	-13.24	peak
2	*	4803.640	34.53	13.01	47.54	54.00	-6.46	AVG

- 1. Corr. = Antenna Factor (dB/m) + Cable Loss (dB)
- 2. Peak/AVG (dBμV/m)= Corr. (dB/m)+ Read Level (dBμV)
- 3. Margin (dB) = Peak/AVG (dB μ V/m)-Limit PK/AVG(dB μ V/m)
- 4. The tests evaluated 1-26.5GHz, The testing has been conformed to the 10th harmonic of the highest fundamental frequency.
- 5. No report for the emission which more than 20dB below the prescribed limit.





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Ŕ	Temperature:	23.6℃	Relative Humidity:	45%				
Ì	Test Voltage:	DC 7.4V						
	Ant. Pol.	Horizontal						
	Test Mode:	TX GFSK Mode 2441MHz	The same of the					

N	o. Mk	. Freq.	Reading Level		Measure- ment	Limit	Over	
		MHz	dBu∀	dB/m	dBu√/m	dBu∀/m	dB	Detector
1		4882.378	48.32	13.59	61.91	74.00	-12.09	peak
2	*	4882.378	34.77	13.59	48.36	54.00	-5.64	AVG

- 1. Corr. = Antenna Factor (dB/m) + Cable Loss (dB)
- 2. Peak/AVG (dBμV/m)= Corr. (dB/m)+ Read Level (dBμV)
- 3. Margin (dB) = Peak/AVG (dB μ V/m)-Limit PK/AVG(dB μ V/m)
- 4. The tests evaluated 1-26.5GHz, The testing has been conformed to the 10th harmonic of the highest fundamental frequency.
- 5. No report for the emission which more than 20dB below the prescribed limit.

Temperature:	23.6℃	Relative Humidity:	45%
Test Voltage:	DC 7.4V		CH.
Ant. Pol.	Vertical		
Test Mode:	TX GFSK Mode 2441MHz	000	

No. Mk.		k. Freq.			Measure- ment	Limit	Over	
		MHz	dBu∀	dB/m	dBu√/m	dBuV/m	dB	Detector
1	*	4882.222	35.01	13.59	48.60	54.00	-5.40	AVG
2		4882.654	48.12	13.59	61.71	74.00	-12.29	peak

- 1. Corr. = Antenna Factor (dB/m) + Cable Loss (dB) 2. Peak/AVG (dB μ V/m)= Corr. (dB/m)+ Read Level (dB μ V)
- 3. Margin (dB) = Peak/AVG (dB μ V/m)-Limit PK/AVG(dB μ V/m)
- 4. The tests evaluated 1-26.5GHz, The testing has been conformed to the 10th harmonic of the highest fundamental frequency.
- 5. No report for the emission which more than 20dB below the prescribed limit.



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Temperature:	23.6℃	Relative Humidity:	45%
Test Voltage:	DC 7.4V		A A A A
Ant. Pol.	Horizontal		
Test Mode:	TX GFSK Mode 2480MHz		

N	o. Mk.	. Freq.	Reading Level		Measure- ment	Limit	Over	
		MHz	dBu∨	dB/m	dBuV/m	dBu∀/m	dB	Detector
1		4959.572	48.18	14.15	62.33	74.00	-11.67	peak
2	*	4959.914	34.84	14.15	48.99	54.00	-5.01	AVG

- 1. Corr. = Antenna Factor (dB/m) + Cable Loss (dB) 2. Peak/AVG (dB μ V/m)= Corr. (dB/m)+ Read Level (dB μ V)
- 3. Margin (dB) = Peak/AVG (dB μ V/m)-Limit PK/AVG(dB μ V/m)
- 4. The tests evaluated 1-26.5GHz, The testing has been conformed to the 10th harmonic of the highest fundamental frequency.
- 5. No report for the emission which more than 20dB below the prescribed limit.

Temperature:	23.6℃	Relative Humidity:	45%
Test Voltage:	DC 7.4V		
Ant. Pol.	Vertical		
Test Mode:	TX GFSK Mode 2480MHz	THE CHIEF	

No	. Mk	. Freq.	Reading Level		Measure- ment	Limit	Over	
		MHz	dBu∨	dB/m	dBu∀/m	dBu∀/m	dB	Detector
1		4960.114	48.06	14.15	62.21	74.00	-11.79	peak
2	*	4960.114	34.51	14.15	48.66	54.00	-5.34	AVG

- 1. Corr. = Antenna Factor (dB/m) + Cable Loss (dB)
- 2. Peak/AVG (dBμV/m)= Corr. (dB/m)+ Read Level (dBμV)
- 3. Margin (dB) = Peak/AVG (dB μ V/m)-Limit PK/AVG(dB μ V/m)
- 4. The tests evaluated 1-26.5GHz, The testing has been conformed to the 10th harmonic of the highest fundamental frequency.
- 5. No report for the emission which more than 20dB below the prescribed limit.





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Temperature:	23.6℃	Relative Humidity:	45%					
Test Voltage:	DC 7.4V	anno s	A A A A A A A A A A A A A A A A A A A					
Ant. Pol.	Horizontal	Horizontal						
Test Mode:	TX π /4-DQPSK Mode 2402MHz							
	•							

-	No. Mk	. Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over	
		MHz	dBu∨	dB/m	dBuV/m	dBu∀/m	dB	Detector
1		4803.980	47.84	13.01	60.85	74.00	-13.15	peak
2	*	4803.980	34.32	13.01	47.33	54.00	-6.67	AVG

Remark:

- 1. Corr. = Antenna Factor (dB/m) + Cable Loss (dB)
- 2. Peak/AVG (dBμV/m)= Corr. (dB/m)+ Read Level (dBμV)
- 3. Margin (dB) = Peak/AVG (dB μ V/m)-Limit PK/AVG(dB μ V/m)
- 4. The tests evaluated 1-26.5GHz, The testing has been conformed to the 10th harmonic of the highest fundamental frequency.
- 5. No report for the emission which more than 20dB below the prescribed limit.

Temperature:	23.6℃		Relative Hu	midity:	45%
Test Voltage:	DC 7.4V		Fr.		
Ant. Pol.	Vertical			MA	
Test Mode:	TX π /4-DQPSK I	Mode 2402I	MHz		WINDS.
	Reading	Correct	Measure-		_

No	. Mk.	Freq.	Reading Level		Measure- ment	Limit	Over	
		MHz	dBu∨	dB/m	dBu√/m	dBu√/m	dB	Detector
1		4803.668	47.95	13.01	60.96	74.00	-13.04	peak
2	*	4804.210	34.95	13.02	47.97	54.00	-6.03	AVG

- 1. Corr. = Antenna Factor (dB/m) + Cable Loss (dB)
- 2. Peak/AVG (dBμV/m)= Corr. (dB/m)+ Read Level (dBμV)
- 3. Margin (dB) = Peak/AVG (dB μ V/m)-Limit PK/AVG(dB μ V/m)
- 4. The tests evaluated 1-26.5GHz, The testing has been conformed to the 10th harmonic of the highest fundamental frequency.
- 5. No report for the emission which more than 20dB below the prescribed limit.





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Temperature:	23.6℃	Relative Humidity:	45%					
Test Voltage:	DC 7.4V	DC 7.4V						
Ant. Pol.	Horizontal	Horizontal						
Test Mode:	TX π /4-DQPSK Mode 2441	MHz						

	No.	Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over	
			MHz	dBu∨	dB/m	dBu√/m	dBu∀/m	dB	Detector
1		*	4881.620	35.13	13.59	48.72	54.00	-5.28	AVG
2			4881.782	48.18	13.59	61.77	74.00	-12.23	peak

Remark:

- 1. Corr. = Antenna Factor (dB/m) + Cable Loss (dB)
- 2. Peak/AVG (dBμV/m)= Corr. (dB/m)+ Read Level (dBμV)
- 3. Margin (dB) = Peak/AVG (dB μ V/m)-Limit PK/AVG(dB μ V/m)
- 4. The tests evaluated 1-26.5GHz, The testing has been conformed to the 10th harmonic of the highest fundamental frequency.
- 5. No report for the emission which more than 20dB below the prescribed limit.

Temperature:	23.6℃	Relative Humidity:	45%				
Test Voltage:	DC 7.4V	DC 7.4V					
Ant. Pol.	Vertical	Vertical					
Test Mode:	TX π /4-DQPSK Mode 2441	MHz	00				

No.	Mk	. Freq.			Measure- ment	Limit	Over	-
		MHz	dBu∨	dB/m	dBu√/m	dBu∀/m	dB	Detector
1		4882.742	48.21	13.59	61.80	74.00	-12.20	peak
2	*	4882.742	34.36	13.59	47.95	54.00	-6.05	AVG

- 1. Corr. = Antenna Factor (dB/m) + Cable Loss (dB)
- 2. Peak/AVG (dB μ V/m)= Corr. (dB/m)+ Read Level (dB μ V)
- 3. Margin (dB) = Peak/AVG (dB μ V/m)-Limit PK/AVG(dB μ V/m)
- 4. The tests evaluated 1-26.5GHz, The testing has been conformed to the 10th harmonic of the highest fundamental frequency.
- 5. No report for the emission which more than 20dB below the prescribed limit.





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Temperature:	23.6℃	Relative Humidity:	45%					
Test Voltage:	OC 7.4V							
Ant. Pol.	Horizontal	lorizontal englishment of the second of the						
Test Mode:	TX π /4-DQPSK Mode 2480M	Hz						

No	o. Mk.	Freq.			Measure- ment	Limit	Over	
		MHz	dBu∨	dB/m	dBu√/m	dBu∀/m	dB	Detector
1		4960.140	47.85	14.15	62.00	74.00	-12.00	peak
2	*	4960.140	34.38	14.15	48.53	54.00	-5.47	AVG

Remark:

- 1. Corr. = Antenna Factor (dB/m) + Cable Loss (dB)
- 2. Peak/AVG (dBμV/m)= Corr. (dB/m)+ Read Level (dBμV)
- 3. Margin (dB) = Peak/AVG (dB μ V/m)-Limit PK/AVG(dB μ V/m)
- 4. The tests evaluated 1-26.5GHz, The testing has been conformed to the 10th harmonic of the highest fundamental frequency.
- 5. No report for the emission which more than 20dB below the prescribed limit.

Temperature:	23.6℃	Relative Humidity:	45%
Test Voltage:	DC 7.4V		
Ant. Pol.	Vertical		
Test Mode:	TX π /4-DQPSK Mode 2480M	Hz	THU.

No. Mk.		Лk.	Freq.	Reading Level		Measure- ment	Limit	Over	
			MHz	dBu∀	dB/m	dBu∀/m	dBu∀/m	dB	Detector
1	*	,	4959.822	34.85	14.15	49.00	54.00	-5.00	AVG
2			4960.220	48.63	14.15	62.78	74.00	-11.22	peak

- 1. Corr. = Antenna Factor (dB/m) + Cable Loss (dB)
- 2. Peak/AVG (dBμV/m)= Corr. (dB/m)+ Read Level (dBμV)
- 3. Margin (dB) = Peak/AVG (dB μ V/m)-Limit PK/AVG(dB μ V/m)
- 4. The tests evaluated 1-26.5GHz, The testing has been conformed to the 10th harmonic of the highest fundamental frequency.
- 5. No report for the emission which more than 20dB below the prescribed limit.





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Temperature:	23.6℃	Relative Humidity:	45%
Test Voltage:	DC 7.4V		
Ant. Pol.	Horizontal		
Test Mode:	TX 8DPSK Mode 2402MHz		MILLER

No. Mk.		Freq.	_	Correct Factor	Measure- ment	Limit	Over		
			MHz	dBu∀	dB/m	dBuV/m	dBu√/m	dB	Detector
1	*	4	4804.046	34.93	13.01	47.94	54.00	-6.06	AVG
2		4	4804.372	48.63	13.02	61.65	74.00	-12.35	peak

Remark:

- 1. Corr. = Antenna Factor (dB/m) + Cable Loss (dB)
- 2. Peak/AVG (dB μ V/m)= Corr. (dB/m)+ Read Level (dB μ V)
- 3. Margin (dB) = Peak/AVG (dB μ V/m)-Limit PK/AVG(dB μ V/m)
- 4. The tests evaluated 1-26.5GHz, The testing has been conformed to the 10th harmonic of the highest fundamental frequency.
- 5. No report for the emission which more than 20dB below the prescribed limit.

Temperature:	23.6℃	Relative Humidity:	45%
Test Voltage:	DC 7.4V		
Ant. Pol.	Vertical		WUD
Test Mode:	TX 8DPSK Mode 2402MHz		WILL STATE

No	. Mk.	Freq.		Correct Factor	Measure- ment	Limit	Over	
		MHz	dBu∨	dB/m	dBu∀/m	dBu∀/m	dB	Detector
1		4804.098	47.99	13.02	61.01	74.00	-12.99	peak
2	*	4804.098	34.63	13.02	47.65	54.00	-6.35	AVG

- 1. Corr. = Antenna Factor (dB/m) + Cable Loss (dB)
- 2. Peak/AVG (dBμV/m)= Corr. (dB/m)+ Read Level (dBμV)
- 3. Margin (dB) = Peak/AVG (dB μ V/m)-Limit PK/AVG(dB μ V/m)
- 4. The tests evaluated 1-26.5GHz, The testing has been conformed to the 10th harmonic of the highest fundamental frequency.
- 5. No report for the emission which more than 20dB below the prescribed limit.





 Temperature:
 23.6 ℃
 Relative Humidity:
 45%

 Test Voltage:
 DC 7.4V

 Ant. Pol.
 Horizontal

 Test Mode:
 TX 8DPSK Mode 2441MHz

No	o. Mk	c. Freq.		Correct Factor	Measure- ment	Limit	Over	
		MHz	dBu∀	dB/m	dBu∀/m	dBu∀/m	dB	Detector
1		4881.634	48.15	13.59	61.74	74.00	-12.26	peak
2	*	4881.634	34.63	13.59	48.22	54.00	-5.78	AVG

Remark:

- 1. Corr. = Antenna Factor (dB/m) + Cable Loss (dB)
- 2. Peak/AVG (dBμV/m)= Corr. (dB/m)+ Read Level (dBμV)
- 3. Margin (dB) = Peak/AVG (dB μ V/m)-Limit PK/AVG(dB μ V/m)
- 4. The tests evaluated 1-26.5GHz, The testing has been conformed to the 10th harmonic of the highest fundamental frequency.
- 5. No report for the emission which more than 20dB below the prescribed limit.

Temperature:	23.6℃	Relative Humidity:	45%
Test Voltage:	DC 7.4V		130
Ant. Pol.	Vertical		DH.
Test Mode:	TX 8DPSK Mode 2441MHz		

No.	. Mk	. Freq.	Reading Level		Measure- ment	Limit	Over	
		MHz	dBu∨	dB/m	dBu∀/m	dBu∀/m	dB	Detector
1		4882.214	48.29	13.59	61.88	74.00	-12.12	peak
2	*	4882.314	35.05	13.59	48.64	54.00	-5.36	AVG

- 1. Corr. = Antenna Factor (dB/m) + Cable Loss (dB)
- 2. Peak/AVG (dBμV/m)= Corr. (dB/m)+ Read Level (dBμV)
- 3. Margin (dB) = Peak/AVG (dB μ V/m)-Limit PK/AVG(dB μ V/m)
- 4. The tests evaluated 1-26.5GHz, The testing has been conformed to the 10th harmonic of the highest fundamental frequency.
- 5. No report for the emission which more than 20dB below the prescribed limit.



TOBY

 Temperature:
 23.6 °C
 Relative Humidity:
 45%

 Test Voltage:
 DC 7.4V

 Ant. Pol.
 Horizontal

 Test Mode:
 TX 8DPSK Mode 2480MHz

1	No.	Mk.	Freq.	Reading Level		Measure- ment	Limit	Over	,
			MHz	dBu∨	dB/m	dBu∀/m	dBu∀/m	dB	Detector
1		*	4959.816	34.84	14.15	48.99	54.00	-5.01	AVG
2			4960.356	48.01	14.16	62.17	74.00	-11.83	peak

Remark:

- 1. Corr. = Antenna Factor (dB/m) + Cable Loss (dB)
- 2. Peak/AVG (dBμV/m)= Corr. (dB/m)+ Read Level (dBμV)
- 3. Margin (dB) = Peak/AVG (dB μ V/m)-Limit PK/AVG(dB μ V/m)
- 4. The tests evaluated 1-26.5GHz, The testing has been conformed to the 10th harmonic of the highest fundamental frequency.
- 5. No report for the emission which more than 20dB below the prescribed limit.

Temperature:	23.6℃	Relative Humidity:	45%
Test Voltage:	DC 7.4V		130
Ant. Pol.	Vertical		C.H.
Test Mode:	TX 8DPSK Mode 2480MHz		

No. Mk.		c. Freq.	Reading Level		Measure- ment	Limit	Over	
		MHz	dBu∀	dB/m	dBu∀/m	dBu∀/m	dB	Detector
1	*	4960.274	34.75	14.15		54.00	-5.10	AVG
2		4960.492	48.43	14.16	62.59	74.00	-11.41	peak

- 1. Corr. = Antenna Factor (dB/m) + Cable Loss (dB)
- 2. Peak/AVG (dBμV/m)= Corr. (dB/m)+ Read Level (dBμV)
- 3. Margin (dB) = Peak/AVG (dB μ V/m)-Limit PK/AVG(dB μ V/m)
- 4. The tests evaluated 1-26.5GHz, The testing has been conformed to the 10th harmonic of the highest fundamental frequency.
- 5. No report for the emission which more than 20dB below the prescribed limit.

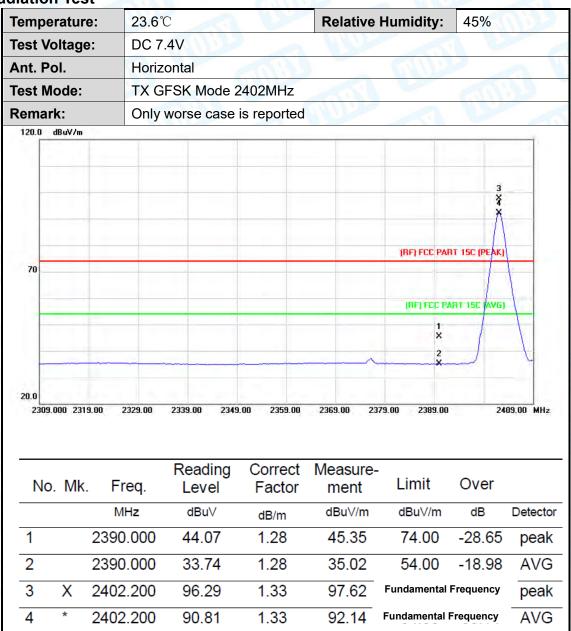
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(1) Radiation Test

TOBY

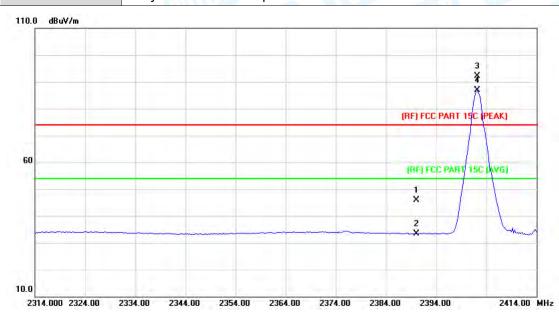


- 1. Corr. = Antenna Factor (dB/m) + Cable Loss (dB)
- 2. Peak/AVG (dBμV/m)= Corr. (dB/m)+ Read Level (dBμV)
- 3. Margin (dB) = Peak/AVG (dB μ V/m)-Limit PK/AVG(dB μ V/m)





Temperature: 23.6℃ **Relative Humidity:** 45% DC 7.4V Test Voltage: Vertical Ant. Pol. **Test Mode:** TX GFSK Mode 2402MHz Remark: Only worse case is reported



No	. Mk	. Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over	
		MHz	dBu∀	dB/m	dBu∀/m	dBuV/m	dB	Detector
1		2390.000	44.48	1.28	45.76	74.00	-28.24	peak
2		2390.000	32.15	1.28	33.43	54.00	-20.57	AVG
3	Χ	2402.200	90.68	1.33	92.01	Fundamenta	al Frequency	peak
4	*	2402.200	85.44	1.33	86.77	Fundamenta	l Frequency	AVG

- 1. Corr. = Antenna Factor (dB/m) + Cable Loss (dB) 2. Peak/AVG (dB μ V/m)= Corr. (dB/m)+ Read Level (dB μ V)
- 3. Margin (dB) = Peak/AVG (dB μ V/m)-Limit PK/AVG(dB μ V/m)





Temperature: 23.6℃ **Relative Humidity:** 45% DC 7.4V Test Voltage: Horizontal Ant. Pol. **Test Mode:** TX GFSK Mode 2480 MHz Remark: Only worse case is reported



No	. Mk	. Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over	
		MHz	dBu∨	dB/m	dBuV/m	dBu∀/m	dB	Detector
1	X	2480.000	92.45	1.85	94.30	Fundament	al Frequency	peak
2	*	2480.000	87.41	1.85	89.26	Fundamenta	l Frequency	AVG
3		2483.500	53.20	1.88	55.08	74.00	-18.92	peak
4		2483.500	47.43	1.88	49.31	54.00	-4.69	AVG

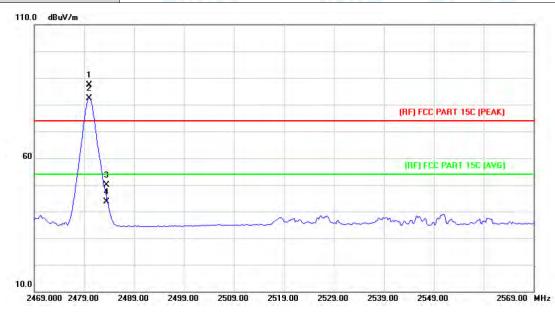
- 1. Corr. = Antenna Factor (dB/m) + Cable Loss (dB)
 2. Peak/AVG (dBμV/m)= Corr. (dB/m)+ Read Level (dBμV)
- 3. Margin (dB) = Peak/AVG (dB μ V/m)-Limit PK/AVG(dB μ V/m)





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3	Temperature:	23.6℃	Relative Humidity:	45%
	Test Voltage:	DC 7.4V	WW Pro	
	Ant. Pol.	Vertical		
	Test Mode:	TX GFSK Mode 2480 MHz		
	Remark:	Only worse case is reported	WILLIAM TO	THU .



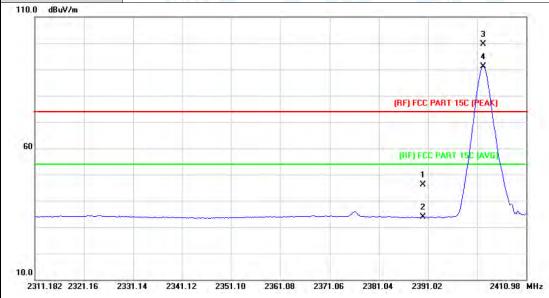
•	No.	Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over	
			MHz	dBu∨	dB/m	dBuV/m	dBuV/m	dB	Detector
-	1	Χ	2480.000	85.43	1.85	87.28	Fundamenta	I Frequency	peak
	2	*	2480.000	80.59	1.85	82.44	Fundamenta	l Frequency	AVG
	3		2483.500	48.07	1.88	49.95	74.00	-24.05	peak
	4		2483.500	41.71	1.88	43.59	54.00	-10.41	AVG

- 1. Corr. = Antenna Factor (dB/m) + Cable Loss (dB)
 2. Peak/AVG (dBμV/m)= Corr. (dB/m)+ Read Level (dBμV)
- 3. Margin (dB) = Peak/AVG (dBµV/m)-Limit PK/AVG(dBµV/m)





Temperature:	23.6℃	Relative Humidity:	45%					
Test Voltage:	DC 7.4V							
Ant. Pol.	Horizontal							
Test Mode:	TX π /4-DQPSK Mode 2402	MHz	CEMP					
Remark:	Only worse case is reported	MADE	J. H.					
VINCE THE								



No.	Mk.	. Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over	
		MHz	dBu∨	dB/m	dBuV/m	dBu∀/m	dB	Detector
1		2390.000	44.80	1.28	46.08	74.00	-27.92	peak
2		2390.000	32.51	1.28	33.79	54.00	-20.21	AVG
3	Χ	2402.200	98.26	1.33	99.59	Fundamenta	al Frequency	peak
4	*	2402.200	89.90	1.33	91.23	Fundamenta	ıl Frequency	AVG

- Remark:
 1. Corr. = Antenna Factor (dB/m) + Cable Loss (dB)
 2. Peak/AVG (dBμV/m)= Corr. (dB/m)+ Read Level (dBμV)
- 3. Margin (dB) = Peak/AVG (dB μ V/m)-Limit PK/AVG(dB μ V/m)





Test Mode:

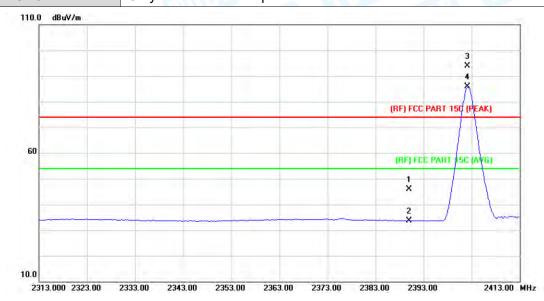
Temperature: 23.6℃ Relative Humidity: 45%

Test Voltage: DC 7.4V

Ant. Pol. Vertical

TX π /4-DQPSK Mode 2402MHz

Remark: Only worse case is reported



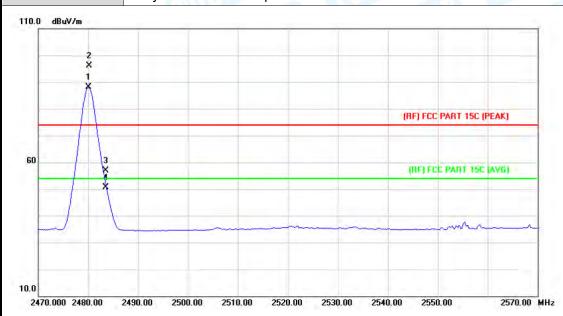
No	. Mk	. Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over	
		MHz	dBu∨	dB/m	dBu∀/m	dBuV/m	dB	Detector
1		2390.000	44.51	1.28	45.79	74.00	-28.21	peak
2		2390.000	32.41	1.28	33.69	54.00	-20.31	AVG
3	Χ	2402.200	92.50	1.33	93.83	Fundamental	Frequency	peak
4	*	2402.200	84.48	1.33	85.81	Fundamental	Frequency	AVG

- 1. Corr. = Antenna Factor (dB/m) + Cable Loss (dB)
- 2. Peak/AVG (dBµV/m)= Corr. (dB/m)+ Read Level (dBµV)
- 3. Margin (dB) = Peak/AVG (dB μ V/m)-Limit PK/AVG(dB μ V/m)





Temperature: 23.6℃ **Relative Humidity:** 45% DC 7.4V Test Voltage: Ant. Pol. Horizontal **Test Mode:** TX π /4-DQPSK Mode 2480MHz Remark: Only worse case is reported



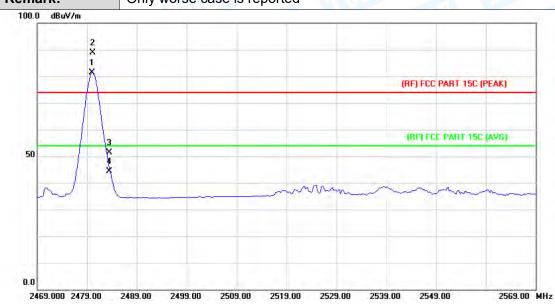
No	. Mk	. Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over	
		MHz	dBu∨	dB/m	dBuV/m	dBu∀/m	dB	Detector
1	*	2480.000	86.38	1.85	88.23	Fundamenta	l Frequency	AVG
2	Χ	2480.200	94.24	1.85	96.09	Fundamenta	l Frequency	peak
3		2483.500	54.97	1.88	56.85	74.00	-17.15	peak
4		2483.500	48.69	1.88	50.57	54.00	-3.43	AVG

- 1. Corr. = Antenna Factor (dB/m) + Cable Loss (dB)
 2. Peak/AVG (dBμV/m)= Corr. (dB/m)+ Read Level (dBμV)
- 3. Margin (dB) = Peak/AVG (dB μ V/m)-Limit PK/AVG(dB μ V/m)





Temperature: 23.6℃ **Relative Humidity:** 45% DC 7.4V Test Voltage: Vertical Ant. Pol. **Test Mode:** TX π /4-DQPSK Mode 2480MHz Remark: Only worse case is reported



No	. Mk	. Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over	
		MHz	dBu∀	dB/m	dBu∀/m	dBu√/m	dB	Detector
1	*	2480.000	79.63	1.85	81.48	Fundamental	Frequency	AVG
2	X	2480.200	87.12	1.85	88.97	Fundamental	Frequency	peak
3		2483.500	49.54	1.88	51.42	74.00	-22.58	peak
4		2483.500	42.41	1.88	44.29	54.00	-9.71	AVG

- 1. Corr. = Antenna Factor (dB/m) + Cable Loss (dB) 2. Peak/AVG (dB μ V/m)= Corr. (dB/m)+ Read Level (dB μ V)
- 3. Margin (dB) = Peak/AVG (dB μ V/m)-Limit PK/AVG(dB μ V/m)





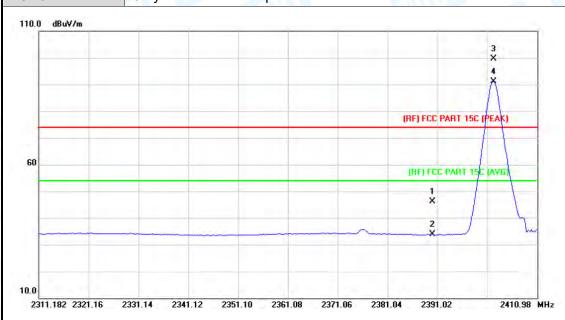
Temperature: 23.6 °C Relative Humidity: 45%

Test Voltage: DC 7.4V

Ant. Pol. Horizontal

Test Mode: TX 8DPSK Mode 2402MHz

Remark: Only worse case is reported



No.	Mk	. Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over	
		MHz	dBu∨	dB/m	dBuV/m	dBu∀/m	dB	Detector
1		2390.000	44.95	1.28	46.23	74.00	-27.77	peak
2		2390.000	32.48	1.28	33.76	54.00	-20.24	AVG
3	Χ	2402.200	98.38	1.33	99.71	Fundamental	∠5./ i	peak
4	*	2402.200	89.87	1.33	91.20	Fundamental	Frequency	AVG

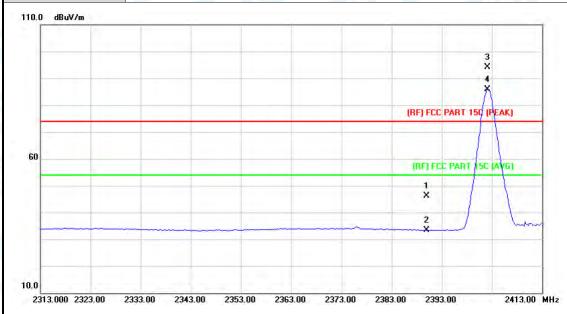
- 1. Corr. = Antenna Factor (dB/m) + Cable Loss (dB)
- 2. Peak/AVG (dBμV/m)= Corr. (dB/m)+ Read Level (dBμV)
- 3. Margin (dB) = Peak/AVG (dB μ V/m)-Limit PK/AVG(dB μ V/m)



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Temperature:	23.6℃	Relative Humidity:	45%					
Test Voltage:	DC 7.4V	OC 7.4V						
Ant. Pol.	Vertical	COUNTY OF	disco					
Test Mode:	TX 8DPSK Mode 2402MHz							
Remark:	Only worse case is reported							



No.	. Mk	. Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over	
		MHz	dBu∨	dB/m	dBu∀/m	dBuV/m	dB	Detector
1		2390.000	44.86	1.28	46.14	74.00	-27.86	peak
2		2390.000	32.08	1.28	33.36	54.00	-20.64	AVG
3	Χ	2402.200	92.71	1.33	94.04	Fundamental	Frequency	peak
4	*	2402.200	84.62	1.33	85.95	Fundamental Frequency		AVG

- 1. Corr. = Antenna Factor (dB/m) + Cable Loss (dB)
 2. Peak/AVG (dBμV/m)= Corr. (dB/m)+ Read Level (dBμV)
- 3. Margin (dB) = Peak/AVG (dBµV/m)-Limit PK/AVG(dBµV/m)



TOBY

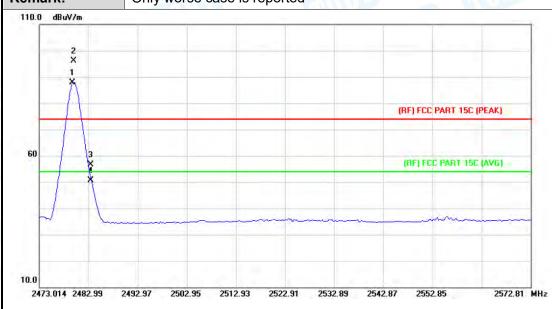
Temperature: 23.6℃ Relative Humidity: 45%

Test Voltage: DC 7.4V

Ant. Pol. Horizontal

Test Mode: TX 8DPSK Mode 2480MHz

Remark: Only worse case is reported



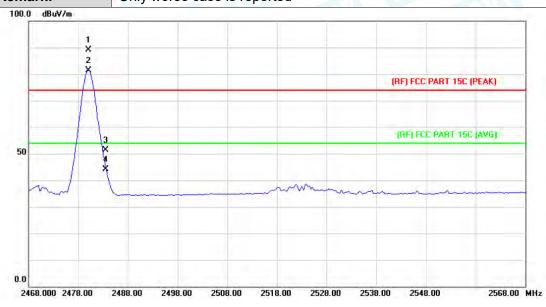
No	. Mk	. Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over	
		MHz	dBu∀	dB/m	dBuV/m	dBuV/m	dB	Detector
1	*	2479.800	86.15	1.85	88.00	Fundamenta	I Frequency	AVG
2	Χ	2480.000	94.36	1.85	96.21	Fundamenta	I Frequency	peak
3		2483.500	54.79	1.88	56.67	74.00	-17.33	peak
4		2483.500	48.83	1.88	50.71	54.00	-3.29	AVG

- 1. Corr. = Antenna Factor (dB/m) + Cable Loss (dB)
- 2. Peak/AVG (dB μ V/m)= Corr. (dB/m)+ Read Level (dB μ V)
- 3. Margin (dB) = Peak/AVG (dB μ V/m)-Limit PK/AVG(dB μ V/m)



TOBY Page:

23.6℃ 45% Temperature: **Relative Humidity: Test Voltage:** DC 7.4V Ant. Pol. Vertical **Test Mode:** TX 8DPSK Mode 2480MHz Remark: Only worse case is reported



No.	. Mk	. Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over	
		MHz	dBu∨	dB/m	dBu√/m	dBu√/m	dB	Detector
1	Χ	2480.000	87.40	1.85	89.25	74.00	15.25	peak
2	*	2480.000	79.57	1.85	81.42	Fundamental	1141	AVG
3		2483.500	49.62	1.88	51.50	Fundamental /4.UU	-22.5U	peak
4		2483.500	42.17	1.88	44.05	54.00	-9.95	AVG

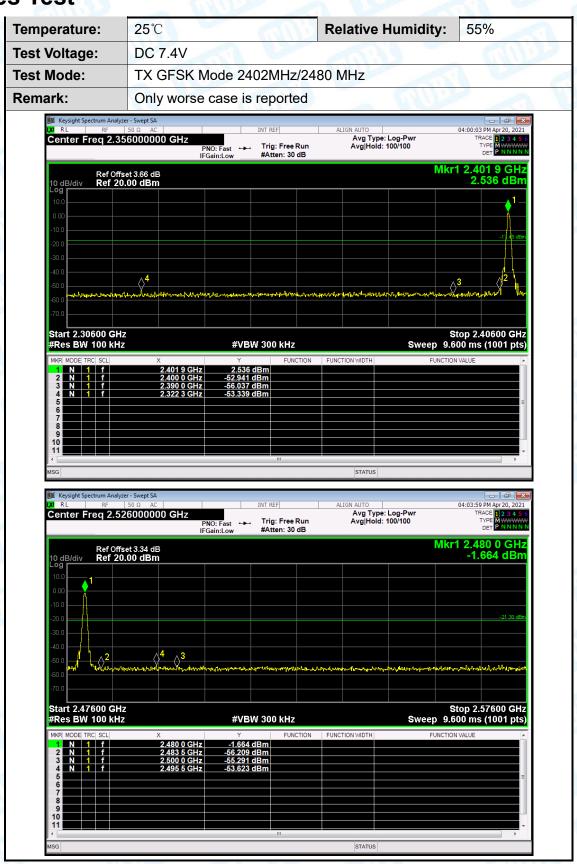
- Corr. = Antenna Factor (dB/m) + Cable Loss (dB)
 Peak/AVG (dBμV/m)= Corr. (dB/m)+ Read Level (dBμV)
- 3. Margin (dB) = Peak/AVG (dB μ V/m)-Limit PK/AVG(dB μ V/m)



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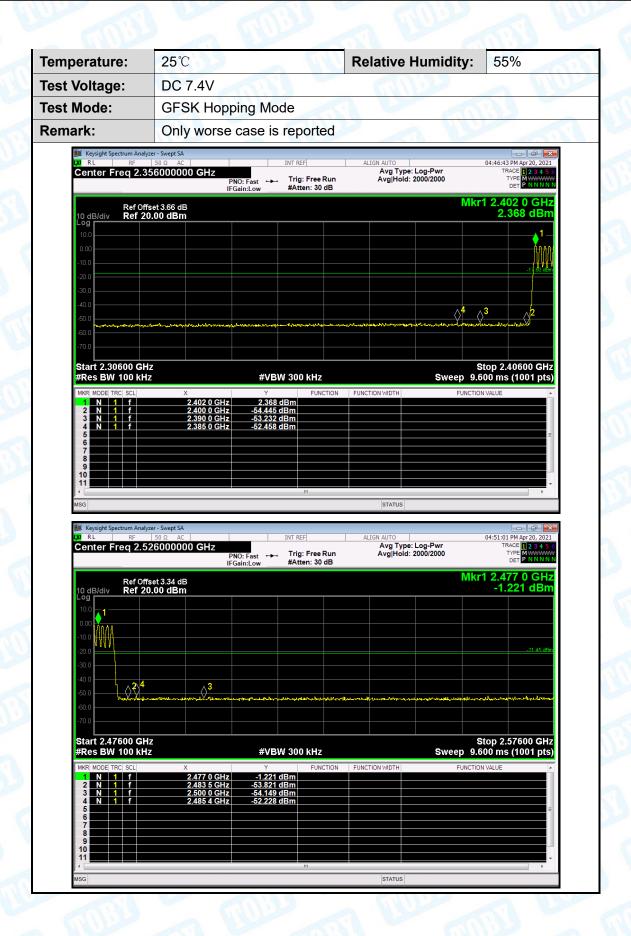
Attachment D-- Conducted Spurious Emissions and Band Edges Test



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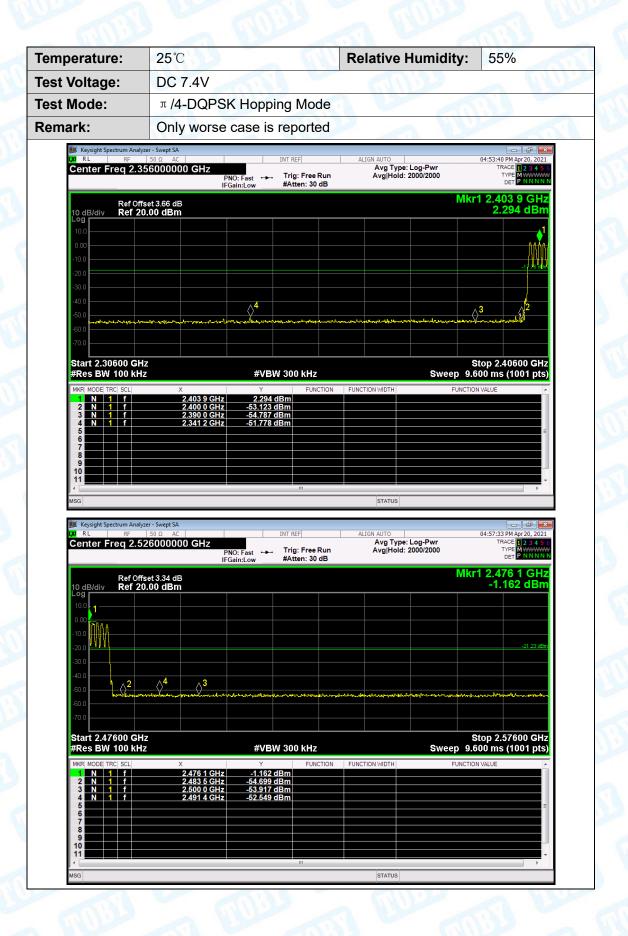


Temperature: 25℃ **Relative Humidity:** 55% DC 7.4V **Test Voltage: Test Mode:** TX 11/4-DQPSK Mode 2402MHz/2480 MHz Remark: Only worse case is reported Avg Type: Log-Pwi Avg|Hold: 100/100 Center Freq 2.356000000 GHz PNO: Fast Trig: Free Run Mkr1 2.401 9 GHz 2.528 dBm Ref Offset 3.66 dB Ref 20.00 dBm Start 2.30600 GHz #Res BW 100 kHz Stop 2.40600 GHz Sweep 9.600 ms (1001 pts) #VBW 300 kHz STATUS Avg Type: Log-Pwr Avg|Hold: 100/100 Center Freq 2.526000000 GHz Trig: Free Run #Atten: 30 dB PNO: Fast IFGain:Low Mkr1 2.479 9 GHz -1.481 dBm Ref Offset 3.34 dB Ref 20.00 dBm Start 2.47600 GHz #Res BW 100 kHz Stop 2.57600 GHz Sweep 9.600 ms (1001 pts) **#VBW** 300 kHz

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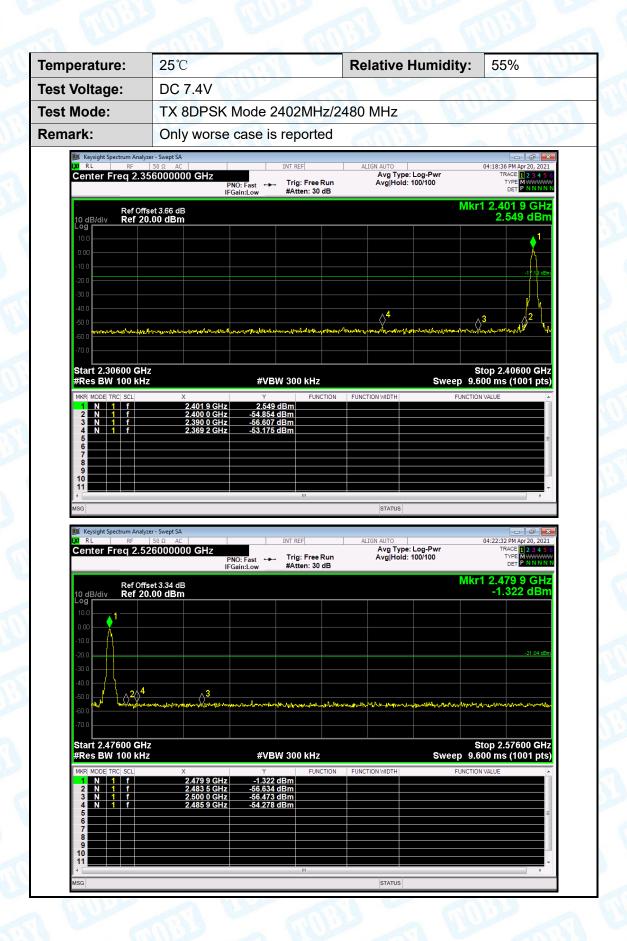
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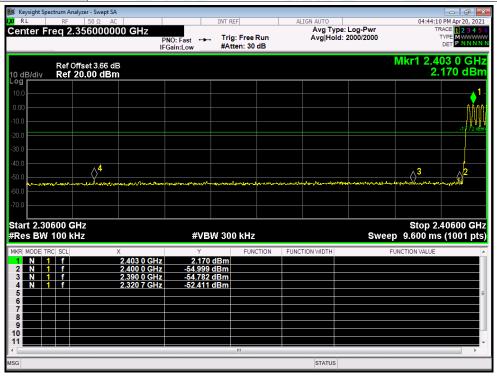


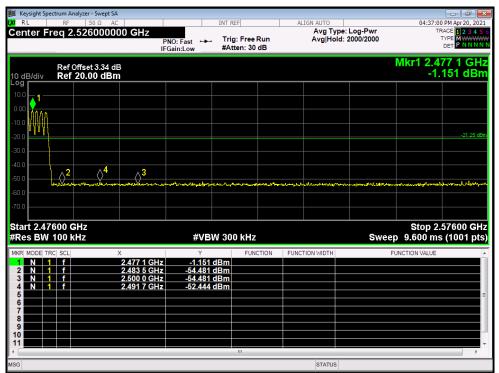
 Temperature:
 25 °C
 Relative Humidity:
 55%

 Test Voltage:
 DC 7.4V

 Test Mode:
 8DPSK Hopping Mode

 Remark:
 Only worse case is reported







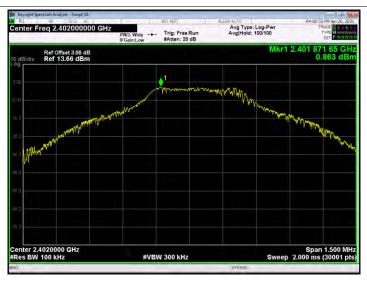
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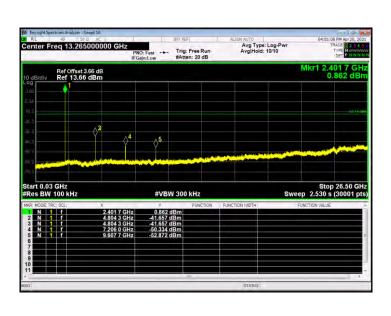
RF Conducted Spurious Emissions

Temperature:	25℃		Relative Humic	Relative Humidity:					
Test Voltage:	DC 7.4V	MIN	THU:						
Mode	Frequency	Antenna	Max Value (dBc)	Limit	t (dBc)	Verdict			
	(MHz)								
GFSK	2402	Ant1	-42.51		-20	Pass			
GFSK	2442	Ant1	-41.76		-20	Pass			
GFSK	2480	Ant1	-45.63		-20	Pass			
Remark:	The EUT is programmed in continuously transmitting mode								
	OFON Mode								

GFSK Mode

2402 MHz





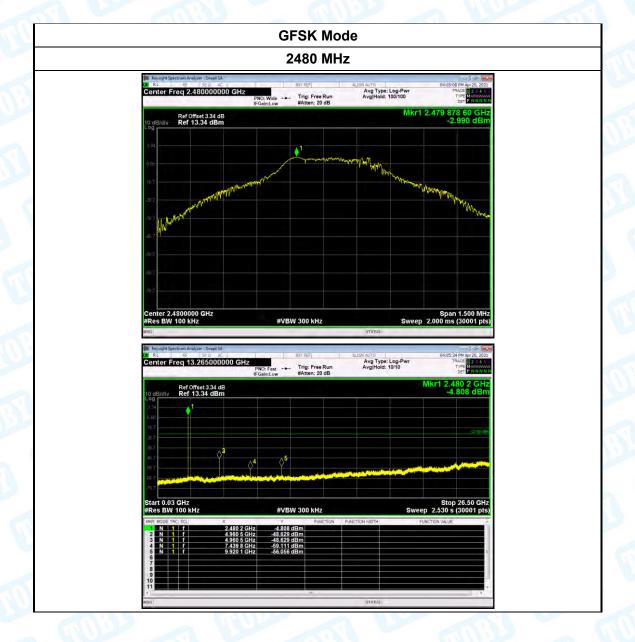
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GFSK Mode 2441 MHz Avg Type: Log-Pwr Avg|Hold: 100/100 Trig: Free Run #Atten: 20 dB Ref Offset 3.62 dB Avg Type: Log-Pwr Avg|Hold: 10/10 PNO: Fast --- Trig: Free Run FGain:Low #Atten: 20 dB Ref Offset 3.62 dB Ref 13.62 dBm

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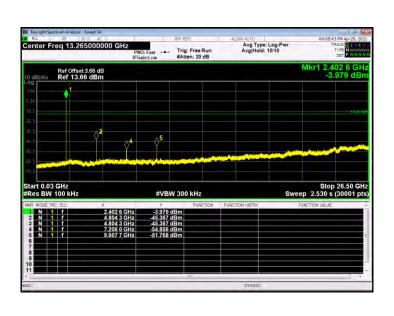
Page:

			And the same of th				
Temperature:	25℃		Relative Humic	55%			
Test Voltage:	DC 7.4V						
Mode	Frequency (MHz)	Antenna	Max Value (dBc)	Limit (dBc)		Verdict	
π /4-DQPSK	2402	Ant1	-46.08		-20	Pass	
π /4-DQPSK	2442	Ant1	-45.26	M	-20	Pass	
π /4-DQPSK	2480	Ant1	-46.24		-20	Pass	
Remark:	The EUT is programmed in continuously transmitting mode						

π /4-DQPSK Mode

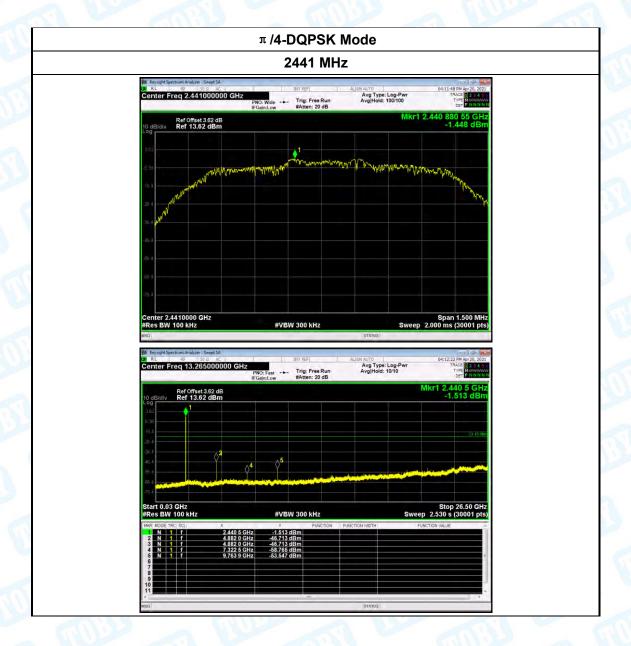
2402 MHz





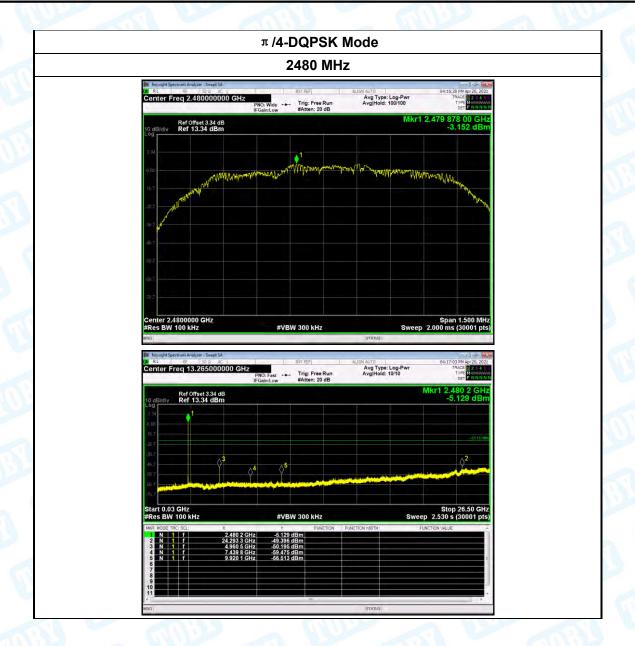






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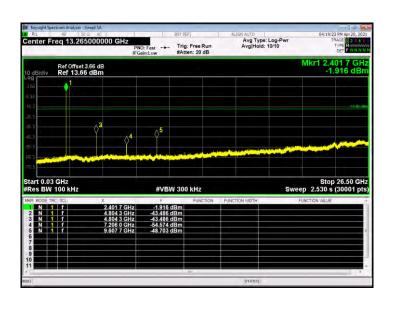


Temperature: 25℃ **Relative Humidity:** 55% DC 7.4V **Test Voltage:** Antenna Max Value (dBc) Limit (dBc) Verdict Mode **Frequency** (MHz) 8DPSK 2402 -44.63 -20 Ant1 **Pass** 8DPSK 2442 Ant1 -42.31-20 **Pass** 8DPSK 2480 Ant1 -43.03 -20 **Pass** Remark: The EUT is programmed in continuously transmitting mode

8DPSK Mode

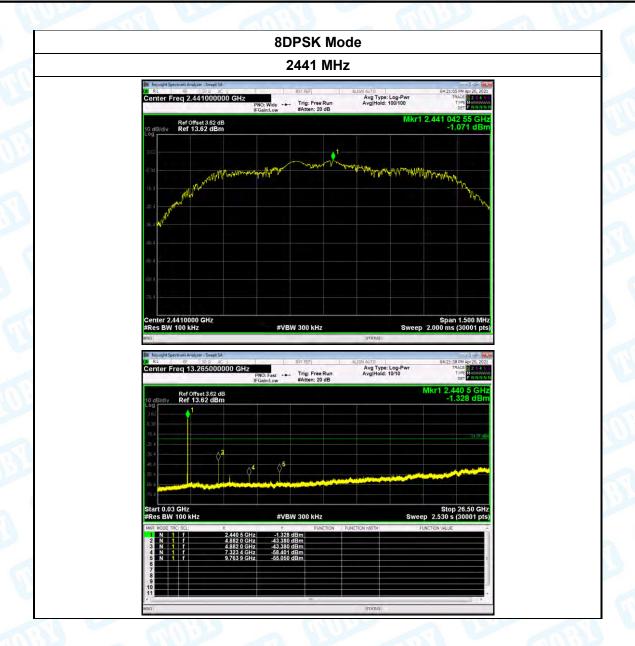
2402 MHz





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8DPSK Mode 2480 MHz Avg Type: Log-Pwr Avg[Hold: 100/100 Trig: Free Run #Atten: 20 dB Ref Offset 3.34 dB Ref 13.34 dBm Center 2.4800000 GHz #Res BW 100 kHz In Report Spectrum Analysis Sweet has Street Land Report Specific Report Avg Type: Log-Pwr Avg|Hold: 10/10 Ref Offset 3,34 dB Ref 13,34 dBm Stop 26.50 GHz Sweep 2.530 s (30001 pts) #VBW 300 kHz

Page:

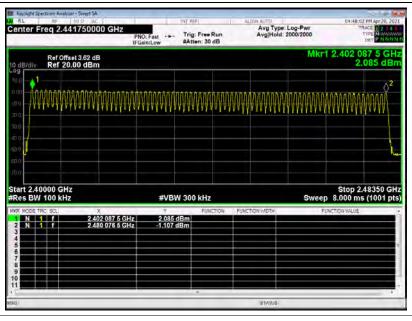
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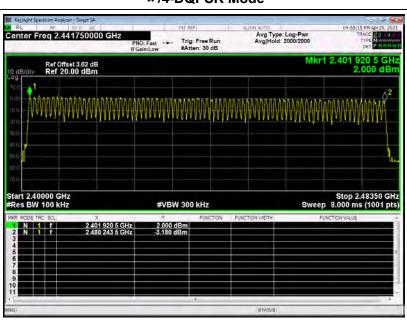
Attachment E-- Number of Hopping Channel Test Data

V B	Temperature:	25°		3	Relative Humidity:	55%	
	Test Voltage:	DC	7.4V			1333	
	Test Mode:	Hop	pping Mode	CHIE			
	Frequency Rang	ne.	Test Mode	Qu	antity of Hopping	Limit	
	Troquency run;	,•	root mode		Channel	2	
	Troquency run,		GFSK		Channel 79		
	2402MHz~2480M					>15	
			GFSK		79		

GFSK Mode



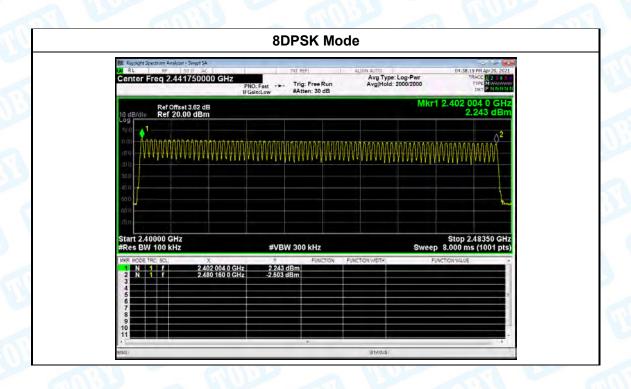
π/4-DQPSK Mode





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Attachment F-- Average Time of Occupancy Test Data

Temper	rature: 25℃ Relative Humidit				lative Humidity:	55%	MAIN	
Test Vo	Test Voltage: DC 7.4V							
Test Mode: Hopping Mode (GFSK)						U.		
Test	Channel		Pulse	Total of Dw	ell	Period Time	Limit	Result
Mode	(MHz)		Time (ms)	(ms)		(s)	(ms)	Result
1DH1	2441		0.389	124.48		31.60	400	PASS
1DH3	H3 2441		1.644	263.04		31.60	400	PASS
1DH5	2441		2.893	308.587		31.60	400	PASS

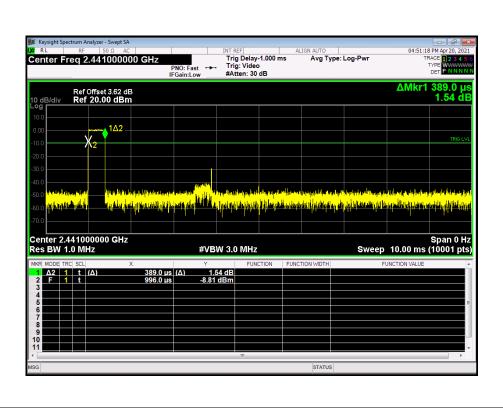
1DH1 Total of Dwell= Pulse Time*(1600/2)*31.6/79

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

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

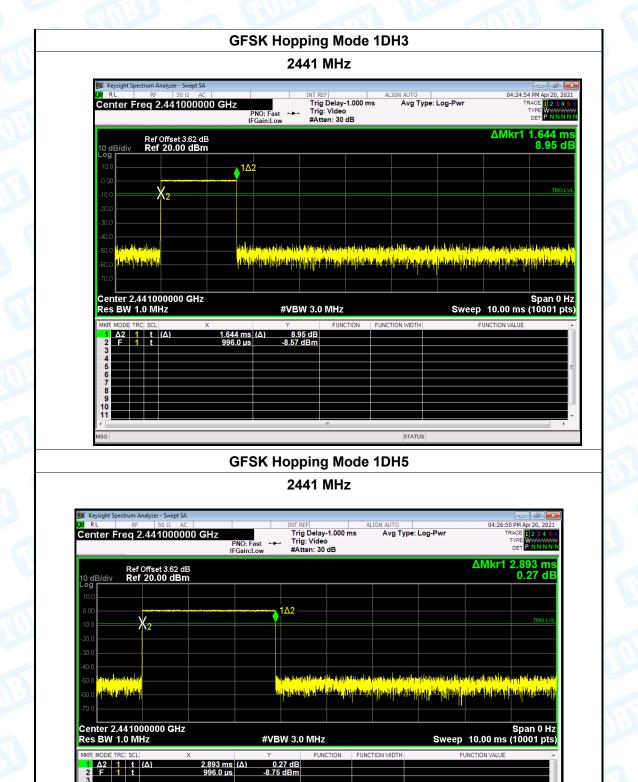
GFSK Hopping Mode 1DH1

2441 MHz



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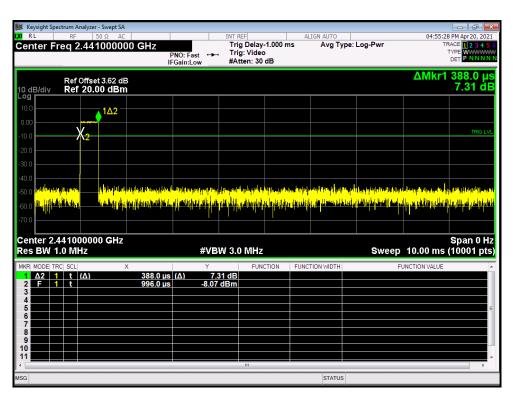
Temperature:		25°	C	R	elative Humidity:	55%	
Test Voltage:		DC	7.4V	13/1	CONTRACTOR OF THE PARTY OF THE		AHD
Test Mo	de:	Hoj	oping Mode (π/4-DQPSK)			
Test	Channel		Pulse	Total of Dwell	Period Time	Limit	Result
Mode	(MH	z)	Time (ms)	(ms)	(s)	(ms)	Resuit
2DH1	244	1	0.388	124.16	31.60	400	PASS
2DH3	2441		1.649	263.84	31.60	400	PASS
2DH5	2DH5 2441		2.894	308.693	31.60	400	PASS

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

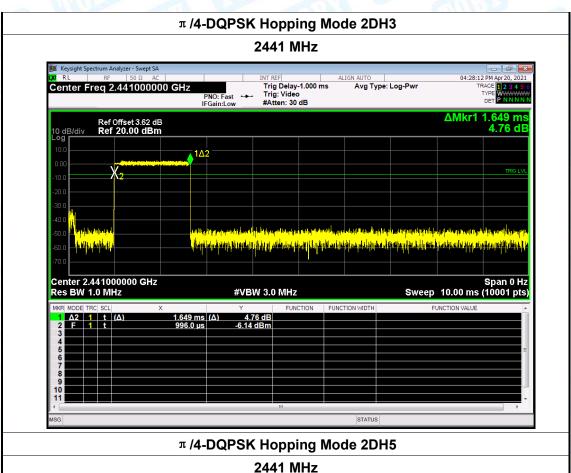
2DH3 Total of Dwell= Pulse Time*(1600/4)*31.6/79

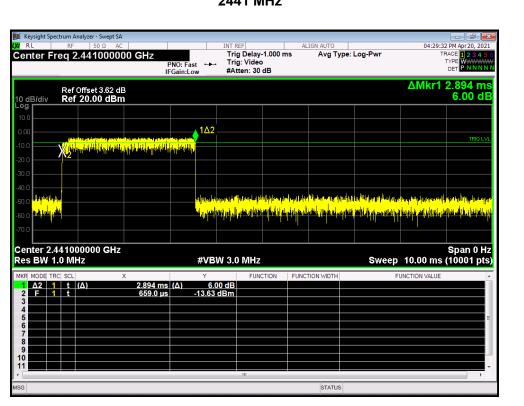
2DH5 Total of Dwell= Pulse Time*(1600/6)*31.6/79

π /4-DQPSK Hopping Mode 2DH1



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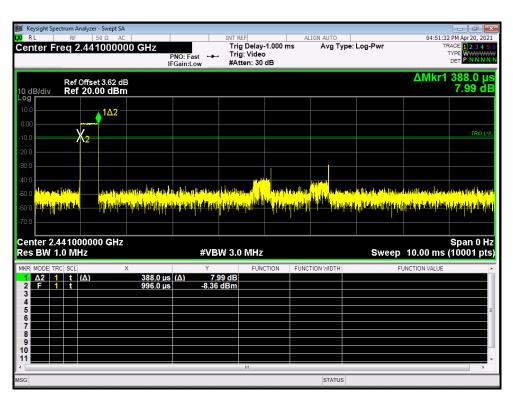
Temperature:		25°	C		Relative Humidity:	55%	DAM
Test Voltage:		DC 7.4V					
Test Mo	de:	Hop	oping Mode (8	DPSK)		U	
Test	Channel		Pulse	Total of Dwel	Period Time	Limit	Result
Mode	(MHz)		Time (ms)	(ms)	(s)	(ms)	Result
3DH1	244	1	0.388	124.16	31.60	400	PASS
3DH3	244	1	1.649	263.84	31.60	400	PASS
3DH5	244	1	2.9	309.333	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

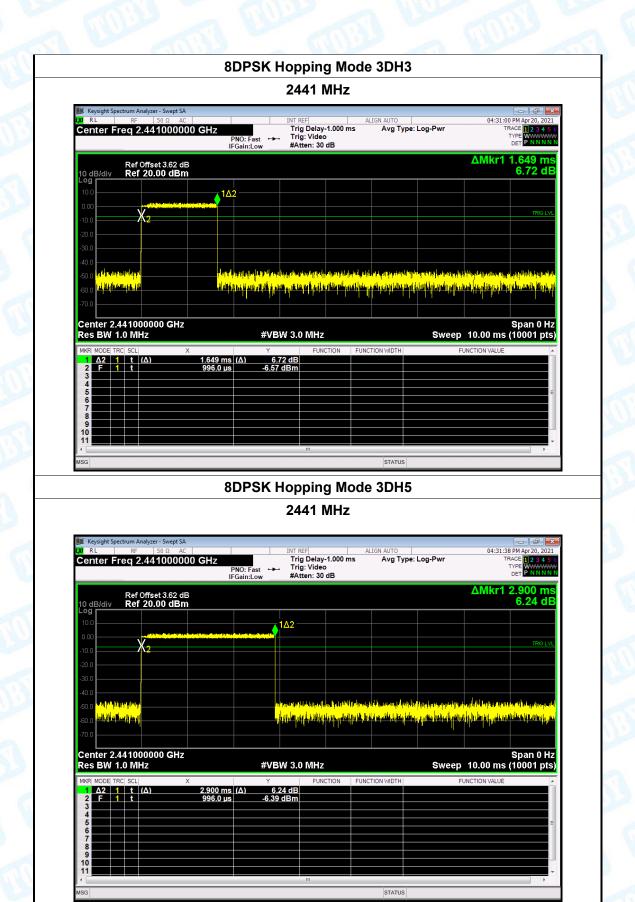
8DPSK Hopping Mode 3DH1



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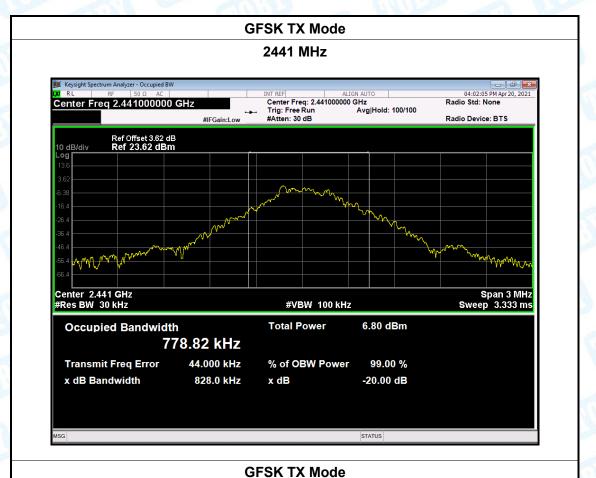
Attachment G-- Channel Separation and Bandwidth Test Data

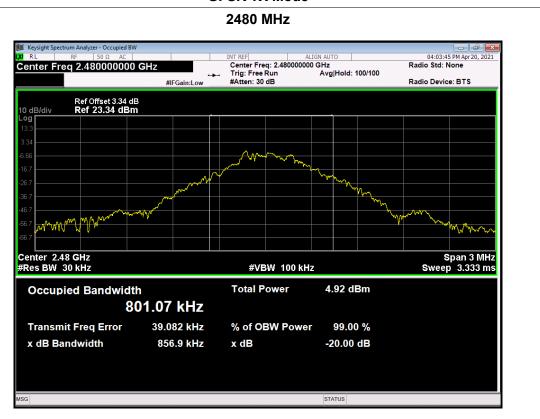
emperature:	25℃		R	elative Humidity:	55%
est Voltage:	DC 7.4V		6.3		
est Mode:	TX Mode	e (GFSK)		MAG	
hannel frequer (MHz)	псу	99% OBV (kHz)	v :	20dB Bandwidth (kHz)	20dB Bandwidth *2/3 (kHz)
2402		807.27		865.7	577.13
2441		778.82		828.0	552
2480		801.07		856.9	571.27
		GI	FSK TX Mod	de	•
			2402 MHz		
10 dB/div Ref Log 13.7	Offset 3.66 dB f 23.66 dBm	#IFGain:Low	Trig: Free Run #Atten: 30 dB	Avg Hold: 100/100	Radio Device: BTS
13.7	Offset 3.66 dB f 23.66 dBm	#FGain:Low		Avg Hold: 100/100	Radio Device: BTS
Log 13.7 3.86 6.34 -16.3 -26.3 -36.3 -46.3 -66.3	hun wh	#FGain:Low			
13.7 3.66 -6.34 -16.3 -26.3 -36.3 -46.3	//w//	#FGain:Low		Mary Mary Mary Mary Mary Mary Mary Mary	
Log 13.7 3.66 -6.34 -16.3 -26.3 -36.3 -46.3 -66.3	Hz z Sandwidth	#FGain:Low	#Atten: 30 dB	Mary Mary Mary Mary Mary Mary Mary Mary	Span 3 MHz
Log 13.7 3.66 6.34 -16.3 -26.3 -36.3 -46.3 -66.3 Center 2.402 GH#Res BW 30 kHz Occupied E	Hz z Bandwidth 807	7.27 kHz 36.887 kHz	#VBW 100 Total Power % of OBW Po	kHz 8.59 dBm	Span 3 MHz
Log 13.7 3.86 6.34 -16.3 -26.3 -36.3 -46.3 -66.3 Center 2.402 GF #Res BW 30 kHz	Hz z Bandwidth 807	7.27 kHz	#VBW 100	kHz 8.59 dBm	Span 3 MHz

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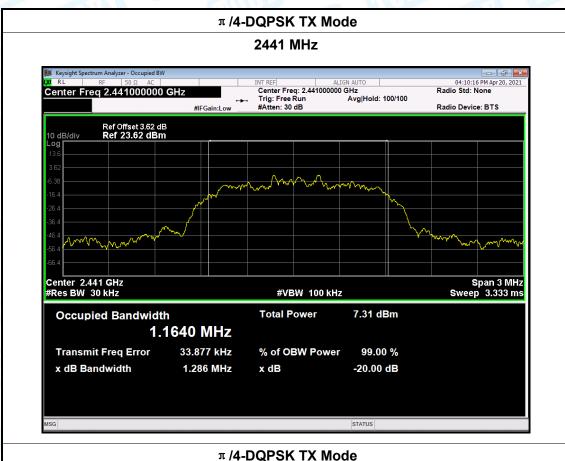
Temperature: 2			Relative Humidity:	55%
Test Voltage:	DC	7.4V		AMIL A
Test Mode: TX		Mode (π /4-DQPSK)		
Channel frequency (MHz)		99% OBW (kHz)	20dB Bandwidth (kHz)	20dB Bandwidth *2/3 (kHz)
2402		1158.0	1264.0	842.67
2441		1164.0	1286.0	857.33
2480		1157.7	1244.0	829.33
		π /4-DOPSK 1	TY Mode	

π /4-DQPSK TX Mode

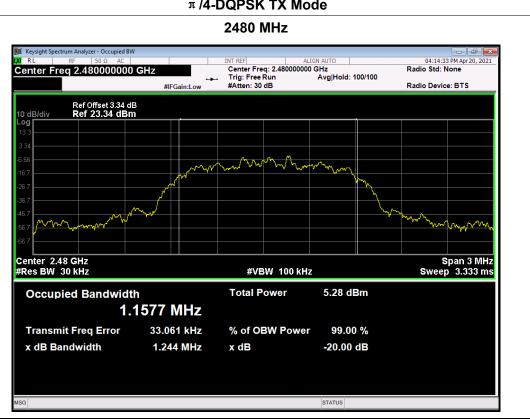


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Temperature:	25°		Relative Humidity:	55%
			Relative Hamilarty.	3370
Test Voltage:	DC	7.4V		1/12
Test Mode:		Mode (8DPSK)		
Observation and		000/ ODW	OO dD D and dedd	20dB
Channel frequency (MHz)		99% OBW	20dB Bandwidth	Bandwidth *2/3
		(kHz)	(kHz)	(kHz)
2402		1160.8	1213.0	808.67
2441		1154.6	1206.0	804
2480		1157.2	1215.0	810

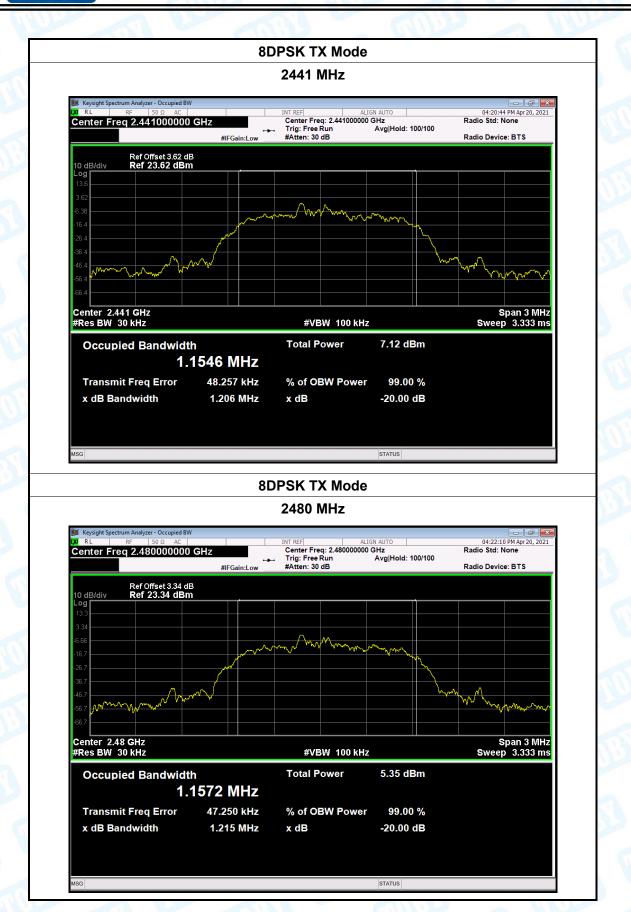
8DPSK TX Mode



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25℃ Temperature: **Relative Humidity:** 55% DC 7.4V **Test Voltage:** Test Mode: Hopping Mode (GFSK) **Separation Read Value Separation Limit Channel frequency** (MHz) (kHz) (kHz) 2441 981.0 552

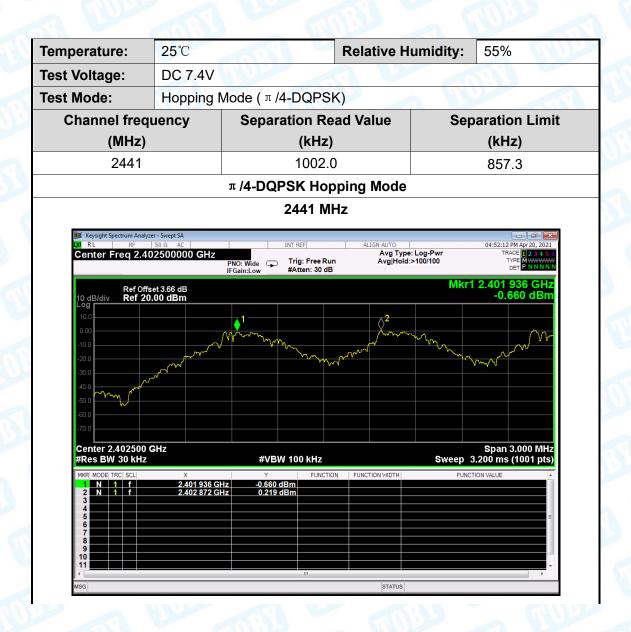
GFSK Hopping Mode







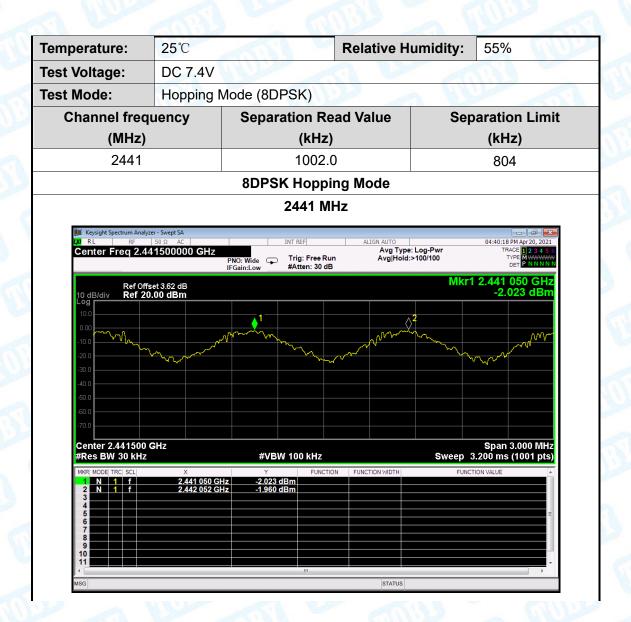
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Attachment H-- Peak Output Power Test Data

Temperature:	25℃		Relative	Humidity:	55%		
Test Voltage:	DC 7.4V	THU					
Test Mode:	TX Mode	(GFSK)	1100				
Channel frequer	ncy (MHz)	Test Res	sult (dBm)	L	imit (dBm)		
2402		2.9	931				
2441		0.	763		21		
2480		-0.	919				
		GFSK 1	TX Mode				
		2402	2 MHz				
Keysight Spectrum Analyz							
Center Freq 2.4	50 Ω AC 02000000 GHz	PNO: Fast Trig: Fr	ALIGN AUTO Avg ree Run Avg	O Type: Log-Pwr Hold: 100/100	03:58:54 PM Apr 20, 2021 TRACE 1 2 3 4 5 6 TYPE MWWWWW		
		IFGain:Low #Atten:	30 dB	Mkr'	DET P NNNNN 1 2.402 033 GHz		
10 dB/div Ref 20	et 3.66 dB .00 dBm				2.931 dBm		
10.0							
10.0			1				
0.00			1				
	معمل		1				
0.00			1				
-10.0			•1				
-10.0			♦ ¹				
-10.0			1				

#VBW 6.0 MHz

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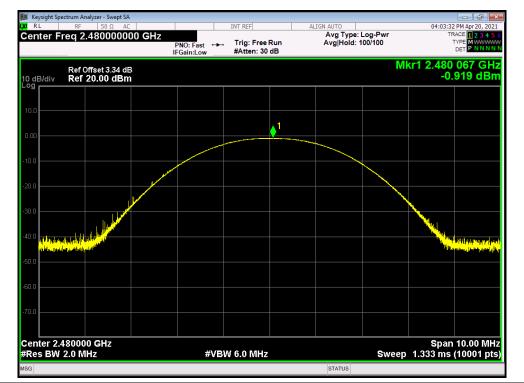


GFSK TX Mode

2441 MHz



GFSK TX Mode



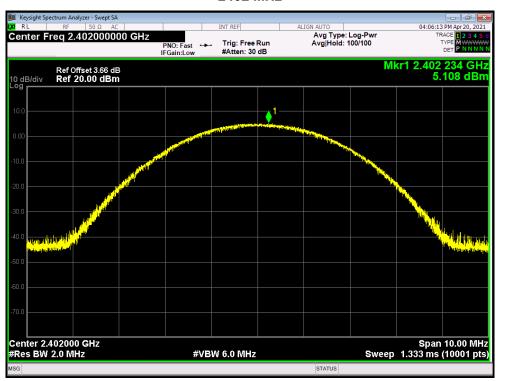




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Temperature:	25 ℃		Relative Humidity:	55%
Test Voltage:	DC 7.4V			A WILLIAM
Test Mode:	TX Mode	(π /4-DQPSK)		
Channel frequen	cy (MHz)	Test Result	(dBm) L	imit (dBm)
2402		5.108		
2441		2.958		21
2480		1.172		
		# /4 DODGK T	V Mada	

π /4-DQPSK TX Mode



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Center 2.480000 GHz #Res BW 2.0 MHz

π /4-DQPSK TX Mode 2441 MHz Keysight Spectrum Analyzer - Swept SA Avg Type: Log-Pwr Avg|Hold: 100/100 Center Freq 2.441000000 GHz Trig: Free Run #Atten: 30 dB Mkr1 2.441 134 GHz 2.958 dBm Ref Offset 3.62 dB Ref 20.00 dBm Center 2.441000 GHz #Res BW 2.0 MHz Span 10.00 MHz Sweep 1.333 ms (10001 pts) **#VBW** 6.0 MHz π /4-DQPSK TX Mode 2480 MHz Center Freq 2.480000000 GHz Avg Type: Log-Pwr Avg|Hold: 100/100 PNO: Fast --- Trig: Free Run IFGain:Low #Atten: 30 dB Mkr1 2.479 931 GHz 1.172 dBm Ref Offset 3.34 dB Ref 20.00 dBm

#VBW 6.0 MHz

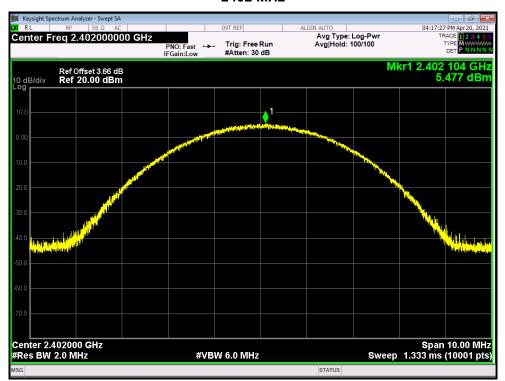
Span 10.00 MHz Sweep 1.333 ms (10001 pts)

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25℃ Temperature: **Relative Humidity:** 55% **Test Voltage:** DC 7.4V **Test Mode:** TX Mode (8DPSK) **Channel frequency (MHz)** Test Result (dBm) Limit (dBm) 5.477 2402 3.294 2441 21 2480 1.547

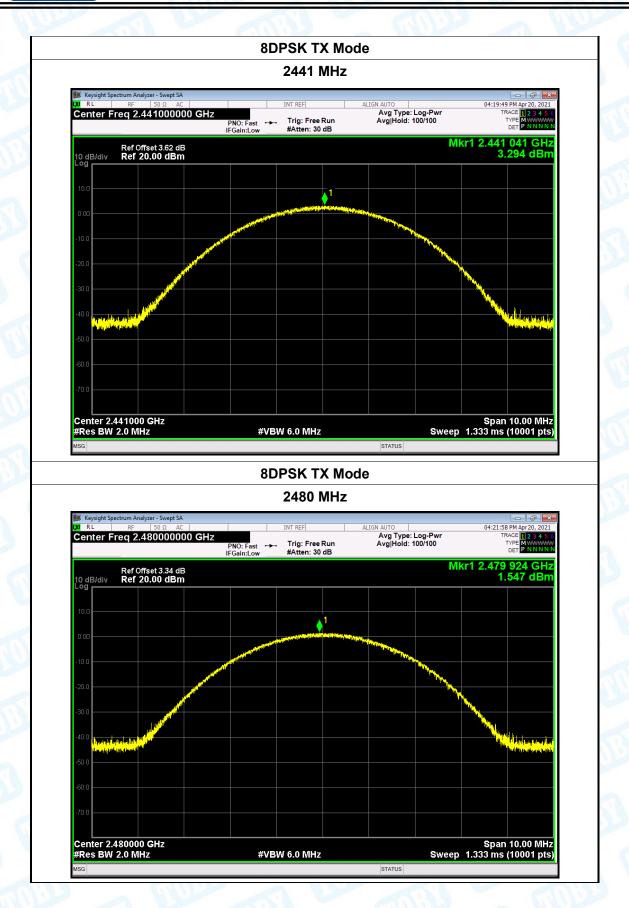
8DPSK TX Mode



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