

Shenzhen Toby Technology Co., Ltd.

Report No.: TB-FCC180316 Page: 1 of 75

# **FCC Radio Test Report** FCC ID: 2AZ2P-X5M

## **Original Grant**

Report No.		TB-FCC180316
Applicant		Shenzhen Zijing Optoelectronics Technology Co., Ltd.
Equipment Under Test	E (EL	лт)
EUT Name	:	Projector
Model No.	-	X5M
Series Model No.		X5A, X5P, X2A, X2M, X2P, X3A, X3M, X3P
Brand Name	~	Aisy.od, waygoal
Sample ID	10	20210510-22-01#& 20210510-22-04#
Receipt Date	÷	2021-05-10
Test Date		2021-05-11 to 2021-05-24
Issue Date	:	2021-05-25
Standards	:	FCC Part 15, Subpart C 15.247
Test Method	:	ANSI C63.10: 2013 KDB 558074 D01 15.247 Meas Guidance v05r02
Conclusions	2	PASS

In the configuration tested, the EUT complied with the standards specified above, The EUT technically complies with the FCC requirements

AC

**Test/Witness Engineer** 

**Engineer Supervisor** 

**Engineer Manager** 

: Rebeea : WAN SV : Ray Lai. Ray Lai

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

TB-RF-074-1.0



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# **Revision History**

Report No.	Version	Description	Issued Date
TB-FCC180316	Rev.01	Initial issue of report	2021-05-25
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# 1. General Information about EUT

# **1.1 Client Information**

Applicant		Shenzhen Zijing Optoelectronics Technology Co., Ltd.		
Address	:	F, No.66, Baotian Industrial Park, Xixiang Street, Baoan District, henzhen City, China		
Manufacturer		Shenzhen Zijing Optoelectronics Technology Co., Ltd.		
Address	:	4 / F, No.66, Baotian Industrial Park, Xixiang Street, Baoan District, Shenzhen City, China		

# 1.2 General Description of EUT (Equipment Under Test)

EUT Name		Projector			
Models No.		X5M, X5A, X5P, X2A, X2M, X2P, X3A, X3M, X3P			
Model Difference	:	All these models are identical in the same PCB, layout and electrical circuit, The only difference is model name.			
on B		Operation Frequency:	Bluetooth V5.0(BT): 2402~2480 MHz		
Product	5	Number of Channel:	Bluetooth: 79 Channels See Note 2		
Description		Antenna Gain:	-0.58dBi PCB Antenna		
R Dub		Modulation Type:	GFSK π /4-DQPSK		
Power Rating		Input: 100-240V~, 50/60H Output: DC 19.0V 3.42A 6 Adapter 2#(CW1903420)	Input: 100-240V~, 50/60Hz,1.2A MAX		
Software Version		N/A	N/A		
Hardware Version		N/A			
Remark		The antenna gain and adapter provided by the applicant, the verified for the RF conduction test provided by TOBY test lab.			

#### Note:

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



# (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

EUT

# **1.4 Description of Support Units**

	Equipment Information						
Name	Model	FCC ID/VOC	Manufacturer	Used "√"			
	Cable Information						
Number	Shielded Type	Ferrite Core	Length	Note			
			a china				

## 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.

F	For Conducted Test
Final Test Mode	Description
Mode 1	Charging+TX Mode with Adapter 1#
Mode 2	Charging+TX Mode with Adapter 2#
	For Radiated Test
Final Test Mode	Description
Mode 3	Charging+TX Mode with Adapter 1#
Mode 4	Charging+TX Mode with Adapter 2#
Mode 5	TX Mode(GFSK) Channel 00/39/78
Mode 6	TX Mode(π /4-DQPSK) Channel 00/39/78
Mode 7	Hopping Mode(GFSK)
Mode 8	Hopping Mode(π /4-DQPSK)



#### 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)

(2) The EUT is considered a Mobile 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	FCC_assist.exe			
Frequency	2402 MHz	2441MHz	2480 MHz	
GFSK	DEF	DEF	DEF	
π /4-DQPSK	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 <sub>Lab</sub> )
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

#### 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: 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.

Designation Number: CN1223.

#### 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. CAB identifier: CN0056



# 2. Test Summary

FCC Part 15 Subpart C(15.247)					
Test Item	Test Sample(s)	Judgment	Remark		
Antenna Requirement	20210510-22-01#	PASS	N/A		
Conducted Emission	20210510-22-04#	PASS	N/A		
Restricted Bands	20210510-22-01#	PASS	N/A		
Hopping Channel Separation	20210510-22-01#	PASS	N/A		
Dwell Time	20210510-22-01#	PASS	N/A		
Peak Output Power	20210510-22-01#	PASS	N/A		
Number of Hopping Frequency	20210510-22-01#	PASS	N/A		
Band Edge	20210510-22-01#	PASS	N/A		
Radiated Spurious Emission	20210510-22-01# 20210510-22-04#	PASS	N/A		
99% Occupied Bandwidth & 20dB Bandwidth	20210510-22-01#	PASS	N/A		
	Test ItemAntenna RequirementConducted EmissionRestricted BandsHopping Channel SeparationDwell TimePeak Output PowerNumber of Hopping FrequencyBand EdgeRadiated Spurious Emission99% Occupied Bandwidth	Test ItemTest Sample(s)Antenna Requirement20210510-22-01#Conducted Emission20210510-22-04#Restricted Bands20210510-22-01#Hopping Channel Separation20210510-22-01#Dwell Time20210510-22-01#Peak Output Power20210510-22-01#Number of Hopping Frequency20210510-22-01#Band Edge20210510-22-01#Radiated Spurious Emission20210510-22-01#99% Occupied Bandwidth20210510-22-01#	Test ItemTest Sample(s)JudgmentAntenna Requirement20210510-22-01#PASSConducted Emission20210510-22-04#PASSRestricted Bands20210510-22-01#PASSHopping Channel Separation20210510-22-01#PASSDwell Time20210510-22-01#PASSPeak Output Power20210510-22-01#PASSNumber of Hopping Frequency20210510-22-01#PASSBand Edge20210510-22-01#PASSRadiated Spurious Emission20210510-22-01#PASS99% Occupied Bandwidth20210510-22-01#PASS		

# 3. Test Software

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

# 4. Test Equipment

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Due Date
EMI Test Receiver	Rohde & Schwarz	ESCI	100321	Jul. 06, 2020	Jul. 05, 2021
	Compliance		100021		0011 00, 2021
RF Switching Unit	Direction Systems	RSU-A4	34403	Jul. 06, 2020	Jul. 05, 2021
	Inc	anBU		2	N.U.
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
adiation Emission T	est				
Equipment	Manufacturer	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
	Ļ	Antenna Conducted E	mission		
Equipment	Manufacturer	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
/ector Signal Generator	Agilent	N5182A	MY50141294	Sep. 11, 2020	Sep. 10, 2021
Analog Signal Generator	Agilent	N5181A	MY50141953	Sep. 11, 2020	Sep. 10, 2021
2 100	DARE!! Instruments	RadiPowerRPR3006W	17100015SNO26	Sep. 11, 2020	Sep. 10, 2021
	DARE!! Instruments	RadiPowerRPR3006W	17100015SNO29	Sep. 11, 2020	Sep. 10, 2021
RF Power Sensor	DARE!! Instruments	RadiPowerRPR3006W	17100015SNO31	Sep. 11, 2020	Sep. 10, 2021
	DARE!! Instruments	RadiPowerRPR3006W	17100015SNO33	Sep. 11, 2020	Sep. 10, 2021



# 5. Conducted Emission Test

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

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

#### **Conducted Emission Test Limit**

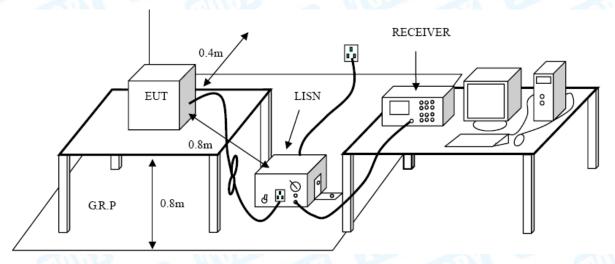
Notes:

(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 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.



# 6. Radiated and Conducted Unwanted Emissions

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

#### Radiated Emission Limits (9kHz~1000MHz)

Frequency (MHz	Field Strength (microvolt/meter)	Measurement Distance (meters)
0.009~0.490	2400/F(KHz)	300
0.490~1.705	24000/F(KHz)	30
1.705~30.0	30	30
30~88	100	3
88~216	150	3
216~960	200	3
Above 960	500	3

#### Radiated Emission Limit (Above 1000MHz)

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

#### Note:

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

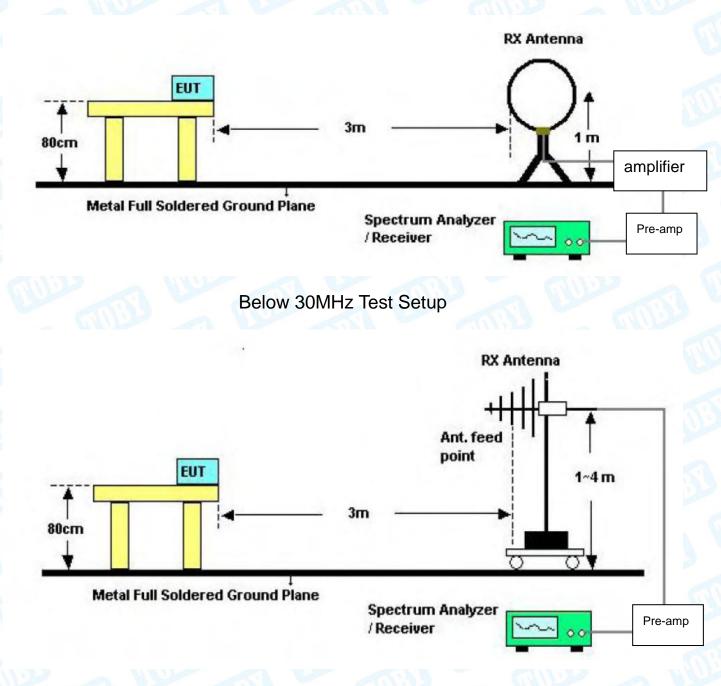
(2) Emission Level (dBuV/m)=20log Emission Level (uV/m)

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated device is operating, the RF power that is produced 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, provided that the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of root-mean-square averaging over a time interval, as permitted under section 5.4(d), the attenuation required shall be 30 dB instead of 20 dB.



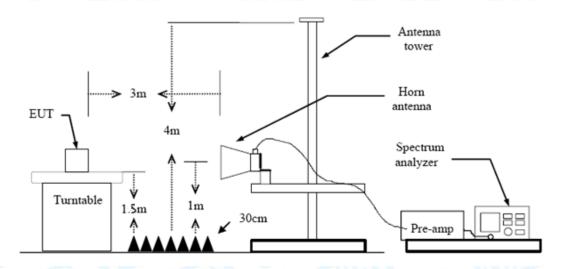
6.2 Test Setup

**Radiated measurement** 



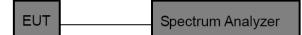
Below 1000MHz Test Setup





Above 1GHz Test Setup

## **Conducted measurement**



### 6.3 Test Procedure

## **Radiated measurement**

- (1) Measurements at frequency above 1GHz. The EUT was placed on a rotating 1.5m high above the ground. RF absorbers covered the ground plane with a minimum area of 3.0m by 3.0m between the EUT and measurement receiver antenna. The RF absorber shall not exceed 30cm in high above the conducting floor. The table was rotated 360 degrees to determine the position of the highest radiation.
- (2) Measurements at frequency Below 1GHz. The EUT was placed on a rotating 0.8m high above the ground. RF absorbers covered the ground plane with a minimum area of 3.0m by 3.0m between the EUT and measurement receiver antenna. The RF absorber shall not exceed 30cm in high above the conducting floor. The table was rotated 360 degrees to determine the position of the highest radiation.
- (3) The Test antenna shall vary between 1m and 4m, Both Horizontal and Vertical antenna are set to make measurement.
- (4) The initial step in collecting conducted emission data is a spectrum analyzer peak detector mode pre-scanning the measurement frequency range. Significant peaks are then marked and then Quasi Peak detector mode re-measured.
- (5) If the Peak Mode measured value compliance with and lower than Quasi Peak Mode



Limit Bellow 1 GHz, the EUT shall be deemed to meet QP Limits and then no additional QP Mode measurement performed. But the Peak Value and average value both need to comply with applicable limit above 1 GHz.

- (6) Testing frequency range below 1GHz the measuring instrument use VBW=120 kHz with Quasi-peak detection.
- (7) Testing frequency range above 1GHz the measuring instrument use RBW=1 MHz and VBW=3 MHz with Peak Detector for Peak Values, and use RBW=1 MHz and VBW=10 Hz with Peak Detector for Average Values.
- (8) For the actual test configuration, please see the test setup photo.

## **Conducted measurement**

Testing shall be done on a laboratory bench in a shielded room or in another suitable location. The active antenna port of the unlicensed wireless device shall be connected to the spectrum analyzer after applying appropriate precautions to protect the instrumentation. If a second antenna port is available, then it shall be tested at one operating frequency, with other port(s) appropriately terminated, to verify it has similar output characteristics as the fully tested port. (See also 7.8.8, 11.12.2, and 12.1.2.)

For the actual test configuration, please see the test setup photo.

### 6.4 Deviation From Test Standard

No deviation

### 6.5 EUT Operating Condition

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

#### 6.6 Test Data

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

Please refer to the Attachment B.

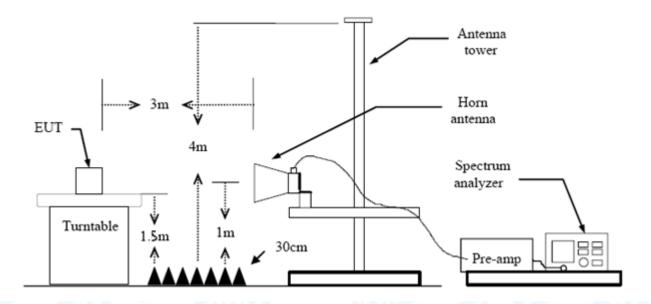


# 7. Restricted Bands Requirement

- 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 Band (MHz)	Distance of 3m (dBuV/m)		
	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 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.

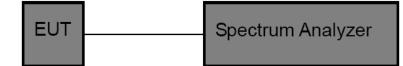


# 8. Number of Hopping Channel

- 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	B

### 8.2 Test Setup



### 8.3 Test Procedure

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

No deviation

8.5 EUT Operating Condition

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

### 8.6 Test Data

Please refer to the Attachment D.



# 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 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} {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.



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 E.



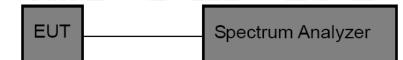
# 10. Channel Separation and Bandwidth Test

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 Deviation From Test Standard

No deviation

10.5 EUT Operating Condition

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

### 10.6 Test Data

Please refer to the Attachment F.

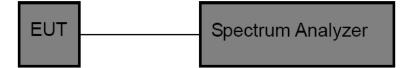


# 11. Peak Output Power Test

- 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)	2400~2483.5
The second	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  $\geq$  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 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 Deviation From Test Standard

No deviation

#### 12.3 Antenna Connected Construction

The gains of the antenna used for transmitting is -0.58dBi, 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 PCB Antenna. It complies with the standard requirement.

	Antenna Type				
	Permanent attached antenna				
00	Unique connector antenna				
	Professional installation antenna				

# **Attachment A-- Conducted Emission Test Data**

minent A Conducted Emission Test Data							
Tem	perature:	<b>23.5℃</b>		Relative	Humidity:	48%	MU2
Tes	t Voltage:	AC 120V/60	Hz		A		
Terr	Terminal: Line					130	
	t Mode:	Mode 1			39		NUC
Remark:		Only worse c	ase is reported	b	101		6
30		ny M W Walthouse	C X X AMMANAMANA AMANA AMMANAMANA AMANA AMANA AMMANAMANA AMANA AMANA AMMANAMANA AMANA AMANA AMANA AMANA AMA			QP: AVG:	peak AVG
-20 0.*	150	0.5	(MHz)	5			30.000
No.	. Mk. Fre	Readir eq. Level	•		e- Limit	Over	
	MH	Hz dBuV	dB	dBuV	dBuV	dB	Detector
1	0.31	00 35.05	9.70	44.75	59.97	-15.22	QP
2	0.31	00 34.32	9.70	44.02	49.97	-5.95	AVG
3	0.93	380 37.29	9.78	47.07	56.00	-8.93	QP
4	* 0.93	380 35.18	9.78	44.96	46.00	-1.04	AVG
5	1.55	580 38.87	9.74	48.61	56.00	-7.39	QP
6	1.55	580 34.89	9.74	44.63	46.00	-1.37	AVG
7	2.18	320 39.47	9.74	49.21	56.00	-6.79	QP
8	2.18	320 34.63	9.74	44.37	46.00	-1.63	AVG
9	2.80	060 37.83	9.86	47.69	56.00	-8.31	QP
10	2.80	060 34.40	9.86	44.26	46.00	-1.74	AVG
11	3.43			45.36	56.00		QP
12				43.18	46.00		AVG
Rem							

emark:

Corr. = Antenna Factor (dB/m) + Cable Loss (dB)
 QuasiPeak (dBμV/m)= Corr. (dB/m)+ Read Level (dBμV)



Temperature:	<b>23.5℃</b>	Relative Humidity:	48%
Test Voltage:	AC 120V/60 Hz	CODD -	00
Terminal:	Neutral		
Test Mode:	Mode 1		
Remark:	Only worse case is report	ed	THUR .
80.0 dBu¥			QP: —
			AVG: —
Mark	× ×	X X	
" ym	month mar and a stratility of more	Marine Marine	Hulus .
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	aM. W.		an a
M A M A	·/ 4		Peter State
			A
-20			

1 2 3 4		MHz 0.3100	dBu∨ 35.13	dB	dBuV	10.14		
2		0.3100	25 12		abu v	dBuV	dB	Detector
3			30.13	9.70	44.83	59.97	-15.14	QP
		0.3100	34.42	9.70	44.12	49.97	-5.85	AVG
1		0.9380	37.34	9.78	47.12	56.00	-8.88	QP
4		0.9380	34.08	9.78	43.86	46.00	-2.14	AVG
5		1.5580	38.79	9.74	48.53	56.00	-7.47	QP
6	*	1.5580	34.58	9.74	44.32	46.00	-1.68	AVG
7		2.1820	39.49	9.74	49.23	56.00	-6.77	QP
8		2.1820	34.13	9.74	43.87	46.00	-2.13	AVG
9		2.8060	37.56	9.86	47.42	56.00	-8.58	QP
10		2.8060	34.37	9.86	44.23	46.00	-1.77	AVG
11		3.4300	35.10	9.90	45.00	56.00	-11.00	QP
12		3.4300	33.10	9.90	43.00	46.00	-3.00	AVG

Remark: 1. Corr. = Antenna Factor (dB/m) + Cable Loss (dB) 2. QuasiPeak (dBµV/m)= Corr. (dB/m)+ Read Level (dBµV)



Temperature:	<b>23.5℃</b>	Relative Humidity:	48%
Test Voltage:	AC 120V/60 Hz		NY S
Terminal:	Line		
Test Mode:	Mode 2		- AUD
Remark:	Only worse case is reported	t de la companya de	
80.0 dBuV			
			QP: AVG:
aug aug			
W WYMM A	* * *		
M M M			
30	Mun I I I		
W L MA	The many many part of the second of the seco	Tak Mananan Manananya Pa	peak
	What is a state of the second	JAP <sup>eren</sup> Jaar I. Kanalahanana	AVG
	a. A 18 M. WYANA Annakalawana	, ACARDA ARABATICA AND	
-20 0.150	0.5 (MHz)	5	30.000

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over	
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector
1		0.9380	32.85	9.78	42.63	56.00	-13.37	QP
2		0.9380	33.03	9.78	42.81	46.00	-3.19	AVG
3		1.5580	34.22	9.74	43.96	56.00	-12.04	QP
4	*	1.5580	34.40	9.74	44.14	46.00	-1.86	AVG
5		2.1860	31.18	9.74	40.92	56.00	-15.08	QP
6		2.1860	31.06	9.74	40.80	46.00	-5.20	AVG
7		2.8100	30.81	9.86	40.67	56.00	-15.33	QP
8		2.8100	29.99	9.86	39.85	46.00	-6.15	AVG
9		3.4340	27.17	9.90	37.07	56.00	-18.93	QP
10		3.4340	26.06	9.90	35.96	46.00	-10.04	AVG
11		4.0540	30.91	9.90	40.81	56.00	-15.19	QP
12		4.0540	30.55	9.90	40.45	46.00	-5.55	AVG

Remark:

Corr. = Antenna Factor (dB/m) + Cable Loss (dB)
 QuasiPeak (dBμV/m)= Corr. (dB/m)+ Read Level (dBμV)



		11		
Temperature:	<b>23.5℃</b>	Rela	ative Humidity:	48%
Test Voltage:	AC 120V/60 Hz		6000	~ ~~~
Terminal:	Neutral	1		
Test Mode:	Mode 2	aus		
Remark:	Only worse case is	s reported	11:32	TUP-
80.0 dBuV	Mummun winder			QP:
-20				

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over	
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector
1		0.9340	34.03	9.80	43.83	56.00	-12.17	QP
2		0.9340	34.21	9.80	44.01	46.00	-1.99	AVG
3		1.5580	34.13	9.80	43.93	56.00	-12.07	QP
4	*	1.5580	34.28	9.80	44.08	46.00	-1.92	AVG
5		2.1820	34.00	9.80	43.80	56.00	-12.20	QP
6		2.1820	34.03	9.80	43.83	46.00	-2.17	AVG
7		2.8060	34.19	9.80	43.99	56.00	-12.01	QP
8		2.8060	33.62	9.80	43.42	46.00	-2.58	AVG
9		3.4300	31.84	9.80	41.64	56.00	-14.36	QP
10		3.4300	30.75	9.80	40.55	46.00	-5.45	AVG
11		4.0540	30.96	9.80	40.76	56.00	-15.24	QP
12		4.0540	30.61	9.80	40.41	46.00	-5.59	AVG

Remark: 1. Corr. = Antenna Factor (dB/m) + Cable Loss (dB) 2. QuasiPeak (dBµV/m)= Corr. (dB/m)+ Read Level (dBµV)



# **Attachment B--Unwanted Emissions Data**

#### ---Radiated Unwanted Emissions

### 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

12~10112			
Temperature:	<b>23.6</b> ℃	<b>Relative Humidity:</b>	45%
Fest Voltage:	AC 120V60Hz	MILLON A	NUU -
Ant. Pol.	Horizontal		
Fest Mode:	Mode 3	1	100
Remark:	Only worse case is reported		NU SA
30 dBuV/m			Radiation Margin -6 dB
-20			

No	. Mk	. Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over	
		MHz	dBu∨	dB/m	dBuV/m	dBuV/m	dB	Detector
1		62.6507	56.77	-24.00	32.77	40.00	-7.23	peak
2		127.2176	51.80	-22.28	29.52	43.50	-13.98	peak
3	İ	161.4740	59.52	-20.76	38.76	43.50	-4.74	peak
4		197.8926	57.08	-19.92	37.16	43.50	-6.34	peak
5		249.4250	54.43	-17.25	37.18	46.00	-8.82	peak
6	*	499.4246	52.33	-10.48	41.85	46.00	-4.15	peak

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

#### Remark:

1. Corr. = Antenna Factor (dB/m) + Cable Loss (dB)

2. QuasiPeak (dB $\mu$ V/m)= Corr. (dB/m)+ Read Level (dB $\mu$ V)



Temperature:	<b>23.6</b> ℃			Relative H	lumidity:	45%	
Test Voltage:	AC 120	0V60Hz			50	-	ALUS .
Ant. Pol.	Vertica					R L	
Test Mode:	Mode 3	3	all	2			1200
Remark:	Only w	orse case is	s reported	CIND			1 Proventie
80.0 dBu¥/m							
30	1 		2			5C 3M Radiatio Margin - ( 5 X	6 dB
	hours	mar hu			19 k		
-20	- Worked	man marken	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~				
-20		80	(MHz)	300	400 50	0 600 700	1000.00
30.000 40 50	0 60 70		(MHz) Correct Factor	300 Measure- ment	400 50	00 600 700 Over	1000.00
30.000 40 50 No. Mk. F	0 60 70	80 Reading	Correct	Measure-			
30.000 40 50 No. Mk. F	0 60 70 Freq.	80 Reading Level	Correct Factor	Measure- ment	Limit	Over	Detector
30.000 40 50 No. Mk. F 1 55.	0 60 70 Freq. MHz	80 Reading Level dBuV	Correct Factor dB/m	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector
30.000 40 50 No. Mk. F 1 55. 2 167	<sup>0</sup> 60 70 Freq. MHz .6094	80 Reading Level dBu∨ 55.90	Correct Factor dB/m -23.70	Measure- ment dBuV/m 32.20	Limit dBuV/m 40.00	Over dB -7.80	Detector peak peak peak
30.000         40         50           No.         Mk.         F           1         55.           2         167           3         *         249	<sup>0</sup> 60 70 Freq. MHz 6094 7.2366	80 Reading Level dBu∨ 55.90 54.85	Correct Factor dB/m -23.70 -20.56	Measure- ment dBuV/m 32.20 34.29	Limit dBuV/m 40.00 43.50	Over dB -7.80 -9.21	Detector peak peak peak
30.000         40         50           No.         Mk.         F           1         55.           2         167           3         *         249           4         374	<sup>0</sup> 60 70 Freq. MHz 6094 7.2366 0.4250	80 Reading Level dBu∨ 55.90 54.85 57.95	Correct Factor dB/m -23.70 -20.56 -17.25	Measure- ment dBuV/m 32.20 34.29 40.70	Limit dBuV/m 40.00 43.50 46.00	Over dB -7.80 -9.21 -5.30	Detector peak peak

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

#### Remark:

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



Temperature:	<b>23.6</b> °C	ALL A	Relative Hu	umidity:	45%			
Test Voltage:	AC 120V60Hz		an'			NUY		
Ant. Pol.	Horizontal	Horizontal						
Test Mode:	Mode 4	GIL		NU				
Remark:	Only worse case	e is reported	603		GH	1000		
80.0 dBu∀/m								
			2	(RF)FCC 15C	3M Radiation Margin -6	1B		
30	Munu man Man	1 May		× +	5 X	J-J		
		1 ////////////////////////////////////	300		5 X	1000.000		
-20 30.000 40 5		(MHz)	, Marine and Andrews	A M	5 X	1000.00		
-20 30.000 40 5 No. Mk.	0 60 70 80 Reading	(MHz) Correct	300 Measure-	400 500	5 × ×	1000.000		
-20 30.000 40 5 No. Mk.	0 60 70 80 Reading Freq. Level	(۲۲۲۲) Correct Factor	300 Measure- ment	400 500 Limit	5 × *	Detecto		
-20 30.000 40 5 No. Mk. 1 160	0 60 70 80 Reading Freq. Level MHz dBuV	(MHz) Correct Factor dB/m	300 Measure- ment dBuV/m	400 500 Limit	5 X M M M 600 700 Over dB			

4 462.3455 43.37 -11.57 31.80 46.00 -14.20 5 42.31 33.94 595.1329 -8.37 46.00 -12.06 750.1083 37.13 46.00 -8.87 6 43.73 -6.60

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

Remark:

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

peak

peak

peak



emperature:	<b>23.6℃</b>			Relative Humidity:	45%
est Voltage:	AC 12	0V60Hz		A COM	
nt. Pol.	Vertica	al			
est Mode:	Mode	4	au		
emark:	Only w	vorse case is	reported	anis -	CHUL-
80.0 dBu∀/m					
				(BE)ECC 15	iC 3M Radiation
					Margin -6 dB
			2 3		<u> </u>
	1		<u> </u>		
30 mm	. A	$\Box \wedge$		Long the former	my Marker
	Mer wh	when we	V~	WWW	·~~·
20					
30.000 40	50 60 70	) 80	(MHz)	300 400 50	0 600 700 1000.00
		Deedline	O a mar at	N 4	
No. Mk.	Freq.	Reading Level	Correct Factor	Measure- ment Limit	Over

No	o. Mk	. Freq.	Level	Factor	ment	Limit	Over	
		MHz	dBu∨	dB/m	dBuV/m	dBuV/m	dB	Detector
1		62.6507	57.27	-24.00	33.27	40.00	-6.73	peak
2	İ	161.4742	60.02	-20.76	39.26	43.50	-4.24	peak
3	İ	197.8928	58.08	-19.92	38.16	43.50	-5.34	peak
4		249.4250	55.43	-17.25	38.18	46.00	-7.82	peak
5		396.2415	49.25	-12.48	36.77	46.00	-9.23	peak
6	*	499.4247	52.33	-10.48	41.85	46.00	-4.15	peak

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

#### Remark:

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

#### Above 1GHz(Only worse case is reported)

Temperature:	<b>23.6℃</b>	<b>Relative Humidity:</b>	46%
Test Voltage:	AC 120V60Hz	6000	2 1000
Ant. Pol.	Horizontal		
Test Mode:	TX GFSK Mode 2402MHz		

Nc	. Mk	. Freq.			Measure- ment	Limit	Over	
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector
1	*	4804.016	37.30	13.01	50.31	54.00	-3.69	AVG
2		4804.742	49.73	13.03	62.76	74.00	-11.24	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 (dBµV/m)-Limit PK/AVG(dBµV/m)

4. The tests evaluated1-26.5GHz,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:	<b>23.6℃</b>	Relative Humidity:	46%
Test Voltage:	AC 120V60Hz	TUUS A	
Ant. Pol.	Vertical	anus -	
Test Mode:	TX GFSK Mode 2402MHz		AR I

No	o. Mk	. Freq.	•		Measure- ment	Limit	Over	
		MHz	dBu∨	dB/m	dBuV/m	dBuV/m	dB	Detector
1	*	4804.036	37.33	13.01	50.34	54.00	-3.66	AVG
2		4804.050	48.38	13.01	61.39	74.00	-12.61	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 (dBµV/m)-Limit PK/AVG(dBµV/m)

4. The tests evaluated1-26.5GHz,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:	<b>23.6</b> ℃	Relative Humidity:	46%			
Test Voltage:	AC 120V60Hz					
Ant. Pol.	Horizontal		ABL -			
Test Mode:	TX GFSK Mode 24	41MHz				

No	. Mk	. Freq.	Reading Level		Measure- ment	Limit	Over	
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector
1	*	4882.030	36.50	13.59	50.09	54.00	-3.91	AVG
2		4882.114	49.80	13.59	63.39	74.00	-10.61	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 (dBµV/m)-Limit PK/AVG(dBµV/m)

4. The tests evaluated1-26.5GHz,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:	<b>23.6℃</b>	Relative Humidity:	46%
Test Voltage:	AC 120V60Hz		
Ant. Pol.	Vertical	6135	
Test Mode:	TX GFSK Mode 2441MHz	201	C.L.

No.	Mk.	Freq.	Reading Level		Measure- ment	Limit	Over	
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector
1		4882.074	49.48	13.59	63.07	74.00	-10.93	peak
2	*	4882.122	36.19	13.59	49.78	54.00	-4.22	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 (dBµV/m)-Limit PK/AVG(dBµV/m)

4. The tests evaluated1-26.5GHz,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:	<b>23.6℃</b>	46%					
Test Voltage:	AC 120V60Hz	AC 120V60Hz					
Ant. Pol.	Horizontal						
Test Mode:	TX GFSK Mode 2480MHz		i an				

No	Mk.	Freq.	Reading Level		Measure- ment	Limit	Over	
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector
1		4960.010	50.11	13.01	63.12	74.00	-10.88	peak
2	*	4960.468	34.22	13.03	47.25	54.00	-6.75	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 $\mu$ V/m)-Limit PK/AVG(dB $\mu$ V/m)

4. The tests evaluated1-26.5GHz,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:	<b>23.6</b> ℃	Relative Humidity:	46%
Test Voltage:	AC 120V60Hz	ULL A	
Ant. Pol.	Vertical	COLON I	
Test Mode:	TX GFSK Mode 2480MHz		ARK I

No.	Mk.	Freq.	• •	Correct Factor	Measure- ment	Limit	Over	
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector
1		4959.546	49.55	14.15	63.70	74.00	-10.30	peak
2	*	4959.884	35.17	14.15	49.32	54.00	-4.68	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 (dBµV/m)-Limit PK/AVG(dBµV/m)

4. The tests evaluated1-26.5GHz,The testing has been conformed to the 10th harmonic of the highest fundamental frequency.



Temperature:	<b>23.6</b> °C	46%					
Test Voltage:	AC 120V60Hz	AC 120V60Hz					
Ant. Pol.	Horizontal		R				
Test Mode:	TXπ /4-DQPSK Mode 2402	MHz					

No	. Mk.	Freq.	-	Correct Factor	Measure- ment	Limit	Over	
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector
1		4803.946	49.08	13.01	62.09	74.00	-11.91	peak
2	*	4804.110	36.35	13.02	49.37	54.00	-4.63	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)

4. The tests evaluated1-26.5GHz,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:	<b>23.6</b> ℃	46%					
Test Voltage:	AC 120V60Hz	AC 120V60Hz					
Ant. Pol.	Vertical	6000					
Test Mode:	TXπ /4-DQPSK Mode 2402MHz						

N	o. Mk	. Freq.	Reading Level		Measure- ment	Limit	Over	
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector
1	*	4803.914	35.18	13.01	48.19	54.00	-5.81	AVG
2		4804.376	48.88	13.02	61.90	74.00	-12.10	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 (dBµV/m)-Limit PK/AVG(dBµV/m)

4. The tests evaluated1-26.5GHz,The testing has been conformed to the 10th harmonic of the highest fundamental frequency.



Temperature:	<b>23.6℃</b>	Relative Humidity:	46%				
Test Voltage:	AC 120V60Hz	AC 120V60Hz					
Ant. Pol.	Horizontal		13.				
Test Mode:	TXπ /4-DQPSK Mode 244	11MHz	i and				

N	o. I	Иk.	Freq.	-	Correct Factor	Measure- ment	Limit	Over	
			MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector
1	*		4881.930	35.59	13.59	49.18	54.00	-4.82	AVG
2			4881.978	45.66	13.59	59.25	74.00	-14.75	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 $\mu$ V/m)-Limit PK/AVG(dB $\mu$ V/m)

4. The tests evaluated1-26.5GHz,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:	<b>23.6</b> ℃	46%					
Test Voltage:	AC 120V60Hz	AC 120V60Hz					
Ant. Pol.	Vertical	COLON I					
Test Mode:	TXπ /4-DQPSK Mode 2441MHz						

Ν	No. N	Иk.	Freq.	Reading Level		Measure- ment	Limit	Over	
			MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector
1	*		4881.838	35.44	13.59	49.03	54.00	-4.97	AVG
2			4882.198	48.95	13.59	62.54	74.00	-11.46	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 (dBµV/m)-Limit PK/AVG(dBµV/m)

4. The tests evaluated1-26.5GHz,The testing has been conformed to the 10th harmonic of the highest fundamental frequency.



Temperature:	<b>23.6</b> ℃	46%				
Test Voltage:	AC 120V60Hz					
Ant. Pol.	Horizontal					
Test Mode:	TXπ /4-DQPSK Mode 2480M	Hz	1.0			

No	. Mk	. Freq.	Reading Level		Measure- ment	Limit	Over	
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector
1	*	4960.112	35.16	14.15	49.31	54.00	-4.69	AVG
2		4960.500	48.32	14.16	62.48	74.00	-11.52	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 (dBµV/m)-Limit PK/AVG(dBµV/m)

4. The tests evaluated1-26.5GHz,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:	<b>23.6℃</b>	Relative Humidity:	46%
Test Voltage:	AC 120V60Hz		
Ant. Pol.	Vertical	6185	
Test Mode:	TXπ /4-DQPSK Mode 2480M	Hz	R

N	lo.	Mk.	Freq.	Reading Level		Measure- ment	Limit	Over	
			MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector
1	,	*	4959.740	34.93	14.15	49.08	54.00	-4.92	AVG
2			4960.298	48.62	14.15	62.77	74.00	-11.23	peak

### Remark:

1. Corr. = Antenna Factor (dB/m) + Cable Loss (dB)

2. Peak/AVG (dBµV/m)= Corr. (dB/m)+ Read Level (dBµV)

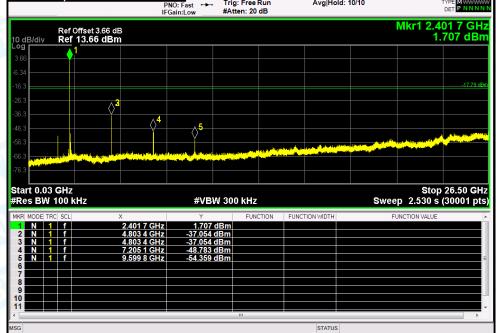
3. Margin (dB) = Peak/AVG (dBµV/m)-Limit PK/AVG(dBµV/m)

4. The tests evaluated1-26.5GHz,The testing has been conformed to the 10th harmonic of the highest fundamental frequency.



## ---Conducted Unwanted Emissions



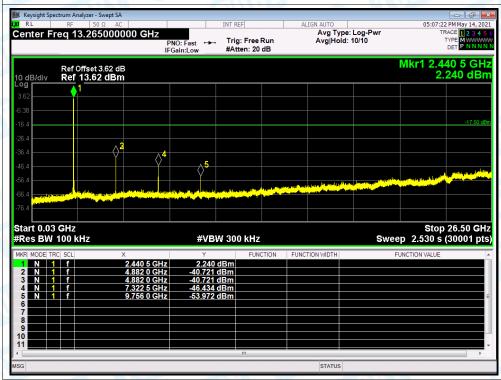






Tx. Spurious NVNT 1-DH1 2441MHz Ant1 Ref

Tx. Spurious NVNT 1-DH1 2441MHz Ant1 Emission

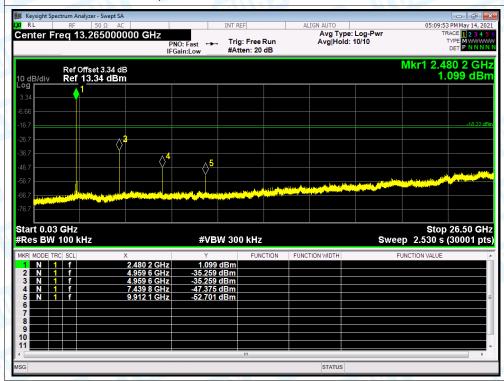






Tx. Spurious NVNT 1-DH1 2480MHz Ant1 Ref

Tx. Spurious NVNT 1-DH1 2480MHz Ant1 Emission

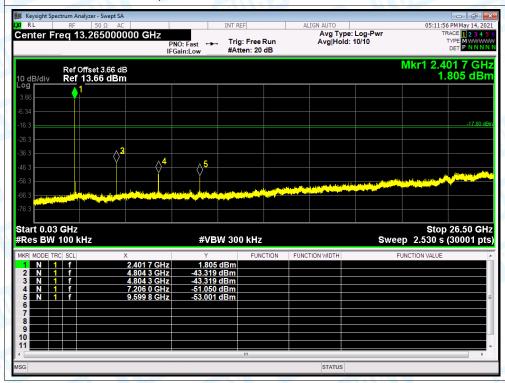






Tx. Spurious NVNT 2-DH1 2402MHz Ant1 Ref

Tx. Spurious NVNT 2-DH1 2402MHz Ant1 Emission

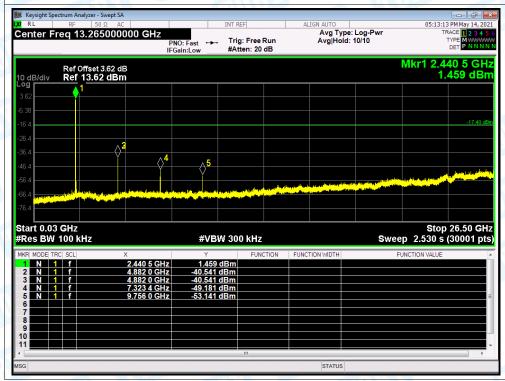




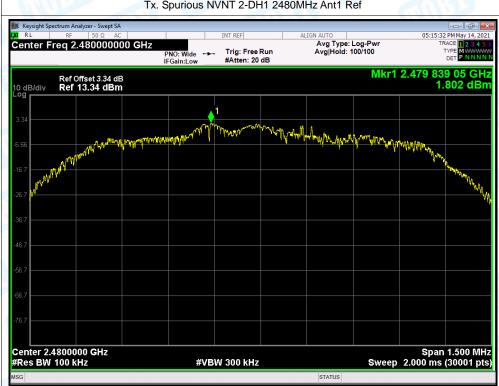


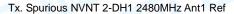
Tx. Spurious NVNT 2-DH1 2441MHz Ant1 Ref

Tx. Spurious NVNT 2-DH1 2441MHz Ant1 Emission

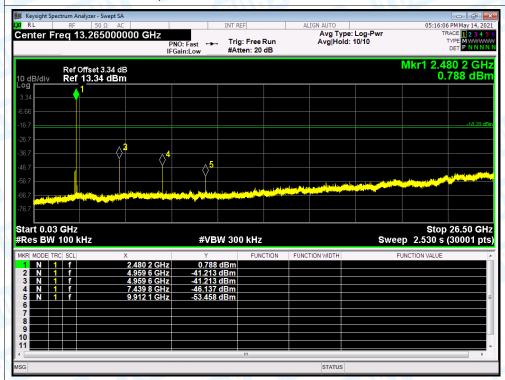








Tx. Spurious NVNT 2-DH1 2480MHz Ant1 Emission



# Attachment C-- Restricted Bands Requirement and Band

# **Edge Test Data**

# (1) Radiation Test

Temperature:	<b>23.6</b> ℃	Relative Humidity:	46%		
Test Voltage:	AC 120V60Hz				
Ant. Pol.	Horizontal		1		
Test Mode: TX GFSK Mode 2402MHz					
Remark:	No.				
110.0 dBuV/m					
			3		
			¥		
		(RF) FCC F	ART 15C (PEAK)		
60			PART 15C (AVG)		
			X N		
			2 X		
10.0					

No.	Mk	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over	
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector
1		2390.000	42.96	1.28	44.24	74.00	-29.76	peak
2		2390.000	31.48	1.28	32.76	54.00	-21.24	AVG
3	Х	2402.000	88.04	1.33	89.37	Fundamental	Frequency	peak
4	*	2402.000	82.99	1.33	84.32	Fundamental	Frequency	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 $\mu$ V/m)-Limit PK/AVG(dB $\mu$ V/m)



emperature:	<b>23.6℃</b>	Relative Humidity:	46%
est Voltage:	AC 120V60Hz	TUP-	a V
nt. Pol.	Vertical	17.0	UD -
est Mode:	TX GFSK Mode 2402MHz		
emark:	Only worse case is reported	ed	3 194
100.0 dBuV/m			
			3
		(BE) ECC P.	ART 15C (PEAK)
		(RF) FCC	PART 15C (AV6)
50			1 ×
			2 / L
0.0			

No	o. Mk	. Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over	
		MHz	dBu∨	dB/m	dBuV/m	dBuV/m	dB	Detector
1		2390.000	43.27	1.28	44.55	74.00	-29.45	peak
2		2390.000	31.53	1.28	32.81	54.00	-21.19	AVG
3	Х	2402.200	84.92	1.33	86.25	Fundamental	Frequency	peak
4	*	2402.200	79.67	1.33	81.00	Fundamental	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 (dBµV/m)-Limit PK/AVG(dBµV/m)



Femperature:	<b>23.6℃</b>	<b>Relative Humidity:</b>	46%		
Fest Voltage:	AC 120V60Hz	THUP -	a V		
Ant. Pol. Horizontal					
Test Mode:	TX GFSK Mode 2480 MHz				
Remark:	Only worse case is reported	1000			
110.0 dBuV/m					
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ř X					
		(RF) FCC PAR	T 15C (PEAK)		
60		(BE) FCC PA	RT 15C (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	*	2479.800	83.17	1.85	85.02	Fundamental	Frequency	AVG
2	Х	2480.000	88.30	1.85	90.15	Fundamenta	I Frequency	peak
3		2483.500	49.74	1.88	51.62	74.00	-22.38	peak
4		2483.500	42.27	1.88	44.15	54.00	-9.85	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)



emperature:	<b>23.6</b> ℃	Relative	Humidity: 46%			
est Voltage:	AC 120V60Hz		L'EL	140		
nt. Pol.	Vertical					
est Mode:	TX GFSK Mode 2480 MHz					
emark:	Only worse case	is reported		NP		
10.0 dBu¥/m						
1						
*						
			(RF) FCC PART 15C (PE	EAK)		
60			(RF) FCC PART 15C (/	WGI		
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0.0						

No	b. Mł	k. Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over	
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector
1	Х	2479.800	88.46	1.85	90.31	Fundamental	Frequency	peak
2	*	2480.200	84.64	1.85	86.49	Fundamental	Frequency	AVG
3		2483.500	49.57	1.88	51.45	74.00	-22.55	peak
4		2483.500	43.83	1.88	45.71	54.00	-8.29	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 (dBµV/m)-Limit PK/AVG(dBµV/m)



emperatu	re:	<b>23.6℃</b>	2		Relative	e Humidity:	46%	
est Voltag	e:	AC 12	0V60Hz	82		UP		199
nt. Pol.		Horizo	ontal		22	(n)		-
est Mode:		ΤΧπ /	4-DQPSK	Mode 240	2MHz	1 V		
Remark:		Only v	vorse cas	e is reporte	ed 🔨	00	2 3	100
10.0 dBuV/m								
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						(RF) FCC	PART 15C (PEAK	$\wedge$
60						(RF) FC	C PART 15C (AVG	++
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0.0								
2307.000 231	7.00	2327.00	2337.00 23	347.00 2357.	0 2367.00	2377.00 2387	200 2	407.00 M

No.	Mk.	. Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over	
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector
1		2390.000	42.79	1.28	44.07	74.00	-29.93	peak
2		2390.000	31.41	1.28	32.69	54.00	-21.31	AVG
3	Х	2402.000	88.62	1.33	89.95	Fundamenta	al Frequency	peak
4	*	2402.200	80.93	1.33	82.26	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)



Temperature:	<b>23.6</b> ℃		Re	elative Humidity:	46%
Fest Voltage:	AC 120	/60Hz		GUL!	AV
Ant. Pol.	Vertical			11.0	20
Fest Mode:	TXπ /4-	DQPSK Mode	2402MHz	A V	-03
Remark:	Only wo	rse case is re	ported	NUC	2 190
100.0 dBuV/m					
					3
					3 X 4
				(RF) FCC P	ART 15C (PEAK)
				(RF) FCC	PART 15C (AV6)
50					1
					× × ×
					2 X
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	42.29	1.28	43.57	74.00	-30.43	peak
2		2390.000	31.97	1.28	33.25	54.00	-20.75	AVG
3	Х	2402.200	85.15	1.33	86.48	Fundamenta	I Frequency	peak
4	*	2402.200	78.92	1.33	80.25	Fundamenta	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)



Temperature:	<b>23.6</b> ℃	Relative Humidity:	46%
Test Voltage:	AC 120V60Hz	THUR -	0
Ant. Pol.	Horizontal		
Test Mode:	TXπ /4-DQPSK Mode 2480M	ЛНz	-03
Remark:	Only worse case is reported	MUDD	
110.0 dBuV/m			
2			
ř X			
		(RF) FCC PA	RT 15C (PEAK)
60		(RF) FCC P	ART 15C (AVG)
3			
/* *			
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10.0			
10.0 2474.000 2484.00	2494.00 2504.00 2514.00 2524.00	2534.00 2544.00 2554.00	) 2574.00

No.	Mk	. Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over	
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector
1	*	2479.800	83.04	1.85	84.89	Fundamental	Frequency	AVG
2	Х	2480.000	87.77	1.85	89.62	Fundamental	Frequency	peak
3		2483.500	50.02	1.88	51.90	74.00	-22.10	peak
4		2483.500	43.33	1.88	45.21	54.00	-8.79	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 (dBµV/m)-Limit PK/AVG(dBµV/m)



Tem	perature:	<b>23.6</b> ℃		Relative Humidity:	46%					
Tes	t Voltage:	AC 120V60Hz		A COULS						
Ant	. Pol.	Vertical	-02							
Tes	t Mode:	TXπ /4-DQPSk	K Mode 2480M	IHz						
Ren	nark:	Only worse cas	Only worse case is reported							
110.0	) dBuV/m									
60					C PART 15C (PEAK)					
					kurnek					
10.0										

Readii req. Leve	•		Limit	Over	
MHz dBu∨	dB/m	dBuV/m	dBuV/m	dB	Detector
9.600 87.93	3 1.85	89.78	Fundamenta	I Frequency	peak
9.800 81.49	9 1.85	83.34	Fundamenta	I Frequency	AVG
3.500 48.8	1 1.88	50.69	74.00	-23.31	peak
3.500 43.92	2 1.88	45.80	54.00	-8.20	AVG
	Freq.         Leve           MHz         dBuV           9.600         87.93           9.800         81.49           3.500         48.87	Freq.         Level         Facto           MHz         dBu∨         dB/m           '9.600         87.93         1.85           '9.800         81.49         1.85           '3.500         48.81         1.88	Freq.LevelFactormentMHzdBuVdB/mdBuV/m'9.60087.931.8589.78'9.80081.491.8583.34:3.50048.811.8850.69	Freq.         Level         Factor         ment         Limit           MHz         dBuV         dB/m         dBuV/m         dBuV/m           9.600         87.93         1.85         89.78         Fundamenta           9.800         81.49         1.85         83.34         Fundamenta           3.500         48.81         1.88         50.69         74.00	Freq.         Level         Factor         ment         Limit         Over           MHz         dBuV         dB/m         dBuV/m         dBuV/m         dB           9.600         87.93         1.85         89.78         Fundamental Frequency           9.800         81.49         1.85         83.34         Fundamental Frequency           3.500         48.81         1.88         50.69         74.00         -23.31

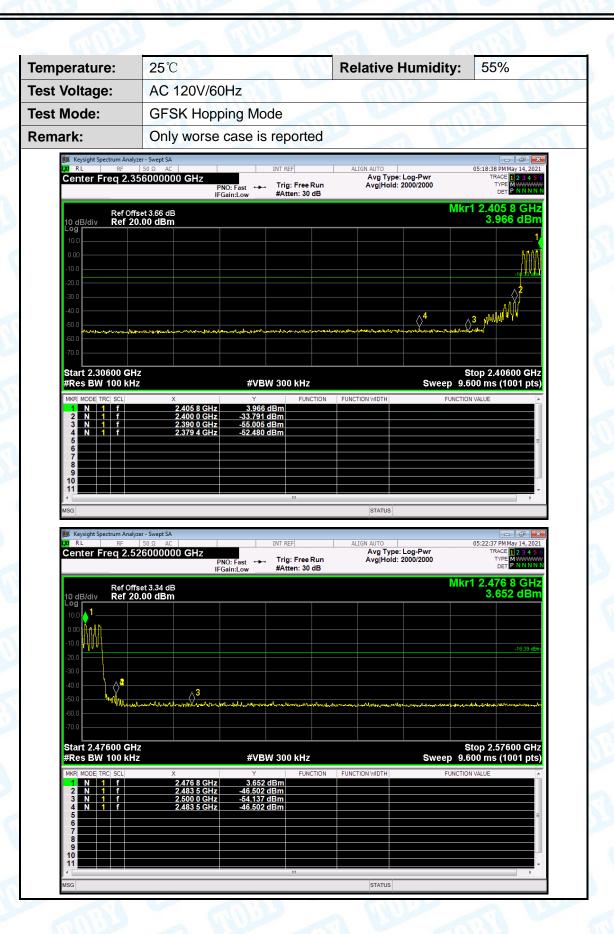
- 1. Corr. = Antenna Factor (dB/m) + Cable Loss (dB) 2. Peak/AVG (dBμV/m)= Corr. (dB/m)+ Read Level (dBμV)
- 3. Margin (dB) = Peak/AVG (dBµV/m)-Limit PK/AVG(dBµV/m)



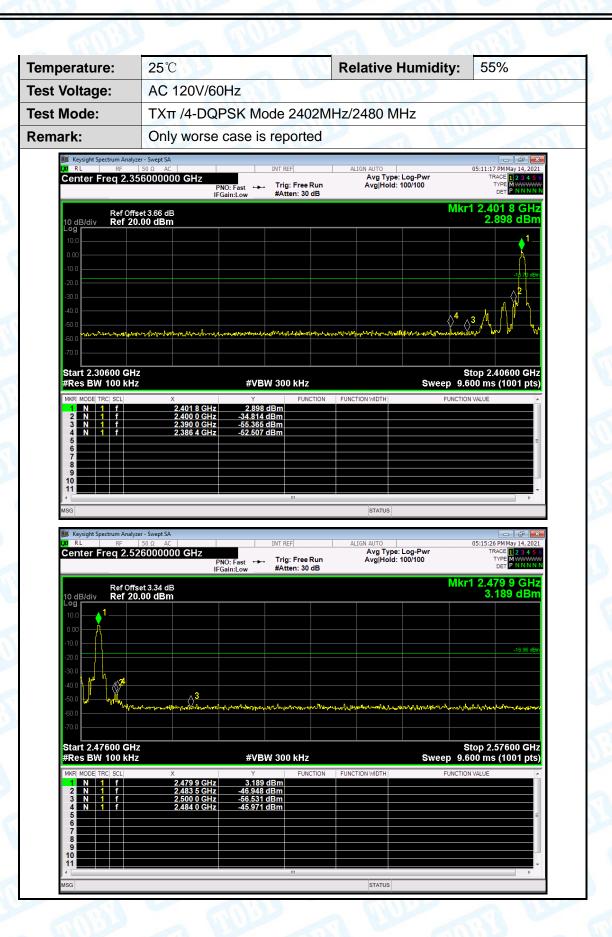
# (2) Conducted Test

perature:	<b>25</b> ℃		<b>Relative Humidity:</b>	55%
Voltage:	AC 120V/60Hz			01
Mode:	TX GFSK Mode	2402MHz/2	480 MHz	
nark:	Only worse case	is reported		CHIL
Keysight Spectrum Analyze	r - Swept SA			05:05:26 DMMay 14, 2021
Center Freq 2.35		INT REF	ALIGN AUTO Avg Type: Log-Pwr Avg Hold: 100/100	05:05:26 PM May 14, 2021 TRACE 1 2 3 4 5 6 TYPE MWWWW DET P N N N N N
	IFGain:Low	#Atten: 30 dB	MI	(r1 2.402 2 GHz
	et 3.66 dB 00 dBm			3.862 dBm
0.00				<b>1</b>
-10.0				-16.15 dBm
-20.0				
-40.0				.3 M
-50.0 -60.0	ประเทศ ( ) แล้ว ( ) แล้ว ( ) แล้ว ( ) แล้ว ( ) แล้ว ( ) แล้ว ( ) แล้ว ( ) แล้ว ( ) แล้ว ( ) แล้ว ( ) แล้ว ( ) แ	urman grant water	rank and value and and the	and and we fill
-70.0				
Start 2.30600 GHz #Res BW 100 kHz		VBW 300 kHz	Sweep 9	Stop 2.40600 GHz 0.600 ms (1001 pts)
MKR MODE TRC SCL	Х	Y FUNCTION 862 dBm		TION VALUE
2 N 1 f 3 N 1 f	<u>2.400 0 GHz</u> -35. 2.390 0 GHz -55.	334 dBm 876 dBm		
4 N 1 f 5	2.353 9 GHz -53.	365 dBm		E
6 7 8				
9				
10				
11		m	STATUS	
11 MSG	- 5	m	STATUS	•
11       MSG       Keysight Spectrum Analyze       XX     RL	50 Ω AC	III	ALIGN AUTO	05:09:13 PM May 14, 2021
11       MSG       Image: Sectrum Analyze	50 Ω AC	INT REF		05:09:13 PMMay 14, 2021 TRACE 12, 24, 56 TYPE M DET P.NNNNN
11         MSG         Image: Sector Market Sector Market Sector Market Sector Market Sector Market Sector Market Sector Market Sector Market Sector Market Sector Market Sector Market Sector Market Sector Market Sector Market Sector Market Sector Market Sector Market Sector Market Sector Market Sector Market Sector Market Sector Market Sector Market Sector Market Sector Market Sector Market Sector Market Sector Market Sector Market Sector Market Sector Market Sector Market Sector Market Sector Market Sector Market Sector Market Sector Market Sector Market Sector Market Sector Market Sector Market Sector Market Sector Market Sector Market Sector Market Sector Market Sector Market Sector Market Sector Market Sector Market Sector Market Sector Market Sector Market Sector Market Sector Market Sector Market Sector Market Sector Market Sector Market Sector Market Sector Market Sector Market Sector Market Sector Market Sector Market Sector Market Sector Market Sector Market Sector Market Sector Market Sector Market Sector Market Sector Market Sector Market Sector Market Sector Market Sector Market Sector Market Sector Market Sector Market Sector Market Sector Market Sector Market Sector Market Sector Market Sector Market Sector Market Sector Market Sector Market Sector Market Sector Market Sector Market Sector Market Sector Market Sector Market Sector Market Sector Market Sector Market Sector Market Sector Market Sector Market Sector Market Sector Market Sector Market Sector Market Sector Market Sector Market Sector Market Sector Market Sector Market Sector Market Sector Market Sector Market Sector Market Sector Market Sector Market Sector Market Sector Market Sector Market Sector Market Sector Market Sector Market Sector Market Sector Market Sector Market Sector Market Sector Market Sector Market Sector Market Sector Market Sector Market Sector Market Sector Market Sector Market Sector Market Sector Market Sector Market Sector Market S	50 Ω AC 6000000 GHz PNO: Fast IFGain:Low	INT REF	ALIGN AUTO Avg Type: Log-Pwr Avg Hold: 100/100	05:09:13 PM May 14, 2021 TRACE 1 2 3 4 5 6
11         MSG         Image: Sector Market Sector Market Sector Market Sector Market Sector Market Sector Market Sector Market Sector Market Sector Market Sector Market Sector Market Sector Market Sector Market Sector Market Sector Market Sector Market Sector Market Sector Market Sector Market Sector Market Sector Market Sector Market Sector Market Sector Market Sector Market Sector Market Sector Market Sector Market Sector Market Sector Market Sector Market Sector Market Sector Market Sector Market Sector Market Sector Market Sector Market Sector Market Sector Market Sector Market Sector Market Sector Market Sector Market Sector Market Sector Market Sector Market Sector Market Sector Market Sector Market Sector Market Sector Market Sector Market Sector Market Sector Market Sector Market Sector Market Sector Market Sector Market Sector Market Sector Market Sector Market Sector Market Sector Market Sector Market Sector Market Sector Market Sector Market Sector Market Sector Market Sector Market Sector Market Sector Market Sector Market Sector Market Sector Market Sector Market Sector Market Sector Market Sector Market Sector Market Sector Market Sector Market Sector Market Sector Market Sector Market Sector Market Sector Market Sector Market Sector Market Sector Market Sector Market Sector Market Sector Market Sector Market Sector Market Sector Market Sector Market Sector Market Sector Market Sector Market Sector Market Sector Market Sector Market Sector Market Sector Market Sector Market Sector Market Sector Market Sector Market Sector Market Sector Market Sector Market Sector Market Sector Market Sector Market Sector Market Sector Market Sector Market Sector Market Sector Market Sector Market Sector Market Sector Market Sector Market Sector Market Sector Market Sector Market Sector Market Sector Market Sector Market Sector Market Sector Market Sector Market Sector Market Sector Market Sector Market Sector Market Sector Market S	50 Ω AC 6000000 GHz PNO: Fast IFGain:Low	INT REF	ALIGN AUTO Avg Type: Log-Pwr Avg Hold: 100/100	05:09:13 PMMay 14, 2021 TRACE 1 2 3 4 5 6 TYPE MWWWWW DET PNNNNN
11 MSG MSG Center Freq 2.52 Center Freq 2.52 Center Freq 2.52 10 dB/div Ref 20. 10 0 10	50 Ω AC 6000000 GHz PNO: Fast IFGain:Low	INT REF	ALIGN AUTO Avg Type: Log-Pwr Avg Hold: 100/100	05:09:13 PMMay 14, 2021 TRACE 1 2 3 4 5 6 TYPE MWWWWW DET PNNNNN
11 MSG M RL RF Center Freq 2.52 Center Freq 2.52 10 dB/div Ref 20. 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0	50 Ω AC 6000000 GHz PNO: Fast IFGain:Low	INT REF	ALIGN AUTO Avg Type: Log-Pwr Avg Hold: 100/100	05:09:13 PMMay 14, 2021 TRACE 1 2 3 4 5 6 TYPE MWWWWW DET PNNNNN
11       MSG       Image: Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second	50 Ω AC 6000000 GHz PNO: Fast IFGain:Low	INT REF	ALIGN AUTO Avg Type: Log-Pwr Avg Hold: 100/100	05:09:13 PMAy 14, 2021 TRACE 12 34 3 6 TYPE MANNIN DET P. NANN N Kr1 2.480 2 GHz 3.450 dBm
11           MSG           Image: Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Secon	50 Ω AC 6000000 GHz PNO: Fast IFGain:Low et 3.34 dB 00 dBm	INT REF → Trig: Free Run #Atten: 30 dB	ALIGN AUTO Avg Type: Log-Pwr Avg Hold: 100/100	05:09:13 PMAy 14, 2021 TRPE M 45:00 TRPE M 4
11           MSG           Image: Second Control of Second Control of Second Control of Second Control of Second Control of Second Control of Second Control of Second Control of Second Control of Second Control of Second Control of Second Control of Second Control of Second Control of Second Control of Second Control of Second Control of Second Control of Second Control of Second Control of Second Control of Second Control of Second Control of Second Control of Second Control of Second Control of Second Control of Second Control of Second Control of Second Control of Second Control of Second Control of Second Control of Second Control of Second Control of Second Control of Second Control of Second Control of Second Control of Second Control of Second Control of Second Control of Second Control of Second Control of Second Control of Second Control of Second Control of Second Control of Second Control of Second Control of Second Control of Second Control of Second Control of Second Control of Second Control of Second Control of Second Control of Second Control of Second Control of Second Control of Second Control of Second Control of Second Control of Second Control of Second Control of Second Control of Second Control of Second Control of Second Control of Second Control of Second Control of Second Control of Second Control of Second Control of Second Control of Second Control of Second Control of Second Control of Second Control of Second Control of Second Control of Second Control of Second Control of Second Control of Second Control of Second Control of Second Control of Second Control of Second Control of Second Control of Second Control of Second Control of Second Control of Second Control of Second Control of Second Control of Second Control of Second Control of Second Control of Second Control of Second Control of Second Control of Second Control of Second Control of Second Control of Second Control of Second Control of Second Cont	50 Ω AC 6000000 GHz PNO: Fast IFGain:Low	INT REF → Trig: Free Run #Atten: 30 dB	ALIGN AUTO Avg Type: Log-Pwr Avg Hold: 100/100	05:09:13 PMAy 14, 2021 TRPE M 45:00 TRPE M 4
11           MSG           Image: Sector of Sector of Sector of Sector of Sector of Sector of Sector of Sector of Sector of Sector of Sector of Sector of Sector of Sector of Sector of Sector of Sector of Sector of Sector of Sector of Sector of Sector of Sector of Sector of Sector of Sector of Sector of Sector of Sector of Sector of Sector of Sector of Sector of Sector of Sector of Sector of Sector of Sector of Sector of Sector of Sector of Sector of Sector of Sector of Sector of Sector of Sector of Sector of Sector of Sector of Sector of Sector of Sector of Sector of Sector of Sector of Sector of Sector of Sector of Sector of Sector of Sector of Sector of Sector of Sector of Sector of Sector of Sector of Sector of Sector of Sector of Sector of Sector of Sector of Sector of Sector of Sector of Sector of Sector of Sector of Sector of Sector of Sector of Sector of Sector of Sector of Sector of Sector of Sector of Sector of Sector of Sector of Sector of Sector of Sector of Sector of Sector of Sector of Sector of Sector of Sector of Sector of Sector of Sector of Sector of Sector of Sector of Sector of Sector of Sector of Sector of Sector of Sector of Sector of Sector of Sector of Sector of Sector of Sector of Sector of Sector of Sector of Sector of Sector of Sector of Sector of Sector of Sector of Sector of Sector of Sector of Sector of Sector of Sector of Sector of Sector of Sector of Sector of Sector of Sector of Sector of Sector of Sector of Sector of Sector of Sector of Sector of Sector of Sector of Sector of Sector of Sector of Sector of Sector of Sector of Sector of Sector of Sector of Sector of Sector of Sector of Sector of Sector of Sector of Sector of Sector of Sector of Sector of Sector of Sector of Sector of Sector of Sector of Sector of Sector of Sector of Sector of Sector of Sector of Sector of Sector of Sector of Sector of Sector of Sector of Sector of Sector of Sector of Sector of Sector of Sector of Sector of Sector of Sector	50 9 AC 6000000 GHz PNO: Fast IFGain:Low et 3.34 dB 00 dBm	INT REF → Trig: Free Run #Atten: 30 dB	ALIGN AUTO Avg Type: Log-Pwr Avg Hold: 100/100	05:09:13 PM Ay 14, 2021 TROPE 1 2 3 4 5 6 TROPE M MANAGEMENT DET P MANNAN Kr1 2.480 2 GHz 3.450 dBm 16.81 dBm
11           MSG           Image: Second Control of Second Control of Second Control of Second Control of Second Control of Second Control of Second Control of Second Control of Second Control of Second Control of Second Control of Second Control of Second Control of Second Control of Second Control of Second Control of Second Control of Second Control of Second Control of Second Control of Second Control of Second Control of Second Control of Second Control of Second Control of Second Control of Second Control of Second Control of Second Control of Second Control of Second Control of Second Control of Second Control of Second Control of Second Control of Second Control of Second Control of Second Control of Second Control of Second Control of Second Control of Second Control of Second Control of Second Control of Second Control of Second Control of Second Control of Second Control of Second Control of Second Control of Second Control of Second Control of Second Control of Second Control of Second Control of Second Control of Second Control of Second Control of Second Control of Second Control of Second Control of Second Control of Second Control of Second Control of Second Control of Second Control of Second Control of Second Control of Second Control of Second Control of Second Control of Second Control of Second Control of Second Control of Second Control of Second Control of Second Control of Second Control of Second Control of Second Control of Second Control of Second Control of Second Control of Second Control of Second Control of Second Control of Second Control of Second Control of Second Control of Second Control of Second Control of Second Control of Second Control of Second Control of Second Control of Second Control of Second Control of Second Control of Second Control of Second Control of Second Control of Second Control of Second Control of Second Control of Second Control of Second Control of Second Control of Second Cont	50 g AC 6000000 GHz PNO: Fast IFGain:Low et 3.34 dB 00 dBm 334 dB 00 dBm	INT REF → Trig: Free Run #Atten: 30 dB	ALIGN AUTO Avg Type: Log-Pwr Avg Hold: 100/100	05:09:13 PMAy 14, 2021 TRPE M 45:00 TRPE M 4
11           MsG           MsG           Center Freq 2.52           Center Freq 2.52           10           20           10           20           10           20           10           20           10           20           20           30.0           40.0           50.0           50.0           50.0           50.0           50.0           50.0           50.0           50.0           50.0           50.0           50.0           50.0           50.0           50.0           50.0           50.0           50.0           50.0           50.0           50.0           50.0           50.0           50.0           50.0           50.0           50.0           50.0           50.0           50.0           50.0           50.0           50.0 </td <td>50 9 AC 6000000 GHz PNO: Fast IFGain:Low et 3.34 dB 00 dBm ,</td> <td>Trig: Free Run #Atten: 30 dB</td> <td>ALIGN AUTO Avg Type: Log-Pwr Avg Hold: 100/100</td> <td>05:09:13PMAy14,2021 TRYEE 12 34 5 6 TYPE 12 34 5 6 TYPE 12 34 5 6 TYPE 12 34 5 6 TYPE 12 34 5 6 TYPE 12 34 5 6 TYPE 12 34 5 6 TYPE 12 34 5 6 TYPE 12 34 5 6 TYPE 12 34 5 6 TYPE 12 34 5 6 TYPE 12 34 5 6 TYPE 12 34 5 6 TYPE 12 34 5 6 TYPE 12 34 5 6 TYPE 12 34 5 6 TYPE 12 34 5 6 TYPE 12 34 5 6 TYPE 12 34 5 6 TYPE 12 34 5 6 TYPE 12 34 5 6 TYPE 12 34 5 6 TYPE 12 34 5 6 TYPE 12 34 5 6 TYPE 12 34 5 6 TYPE 12 34 5 6 TYPE 12 34 5 6 TYPE 12 34 5 6 TYPE 12 34 5 6 TYPE 12 34 5 6 TYPE 12 34 5 6 TYPE 12 34 5 6 TYPE 12 34 5 6 TYPE 12 34 5 6 TYPE 12 34 5 6 TYPE 12 34 5 6 TYPE 12 34 5 6 TYPE 12 34 5 6 TYPE 12 34 5 6 TYPE 12 34 5 6 TYPE 12 34 5 6 TYPE 12 34 5 6 TYPE 12 34 5 6 TYPE 12 34 5 6 TYPE 12 34 5 6 TYPE 12 34 5 6 TYPE 12 34 5 6 TYPE 12 34 5 6 TYPE 12 34 5 6 TYPE 12 34 5 6 TYPE 12 34 5 6 TYPE 12 34 5 6 TYPE 12 34 5 6 TYPE 12 34 5 6 TYPE 12 34 5 6 TYPE 12 34 5 6 TYPE 12 34 5 6 TYPE 12 34 5 6 TYPE 12 34 5 6 TYPE 12 34 5 6 TYPE 12 34 5 6 TYPE 12 34 5 6 TYPE 12 34 5 6 TYPE 12 34 5 6 TYPE 12 34 5 6 TYPE 12 34 5 6 TYPE 12 34 5 6 TYPE 12 34 5 6 TYPE 12 34 5 6 TYPE 12 34 5 6 TYPE 12 34 5 6 TYPE 12 34 5 6 TYPE 12 34 5 6 TYPE 12 34 5 6 TYPE 12 34 5 6 TYPE 12 34 5 6 TYPE 12 34 5 6 TYPE 12 34 5 6 TYPE 12 34 5 6 TYPE 12 34 5 6 TYPE 12 34 5 6 TYPE 12 34 5 6 TYPE 12 34 5 6 TYPE 12 34 5 6 TYPE 12 34 5 6 TYPE 12 34 5 6 TYPE 12 34 5 6 TYPE 12 34 5 6 TYPE 12 34 5 6 TYPE 12 34 5 6 TYPE 12 34 5 6 TYPE 12 34 5 6 TYPE 12 34 5 6 TYPE 12 34 5 6 TYPE 12 34 5 6 TYPE 12 34 5 6 TYPE 12 34 5 6 TYPE 12 34 5 6 TYPE 12 34 5 6 TYPE 12 34 5 6 TYPE 12 34 5 6 TYPE 12 34 5 6 TYPE 12 34 5 6 TYPE 12 34 5 6 TYPE 12 34 5 6 TYPE 12 34 5 6 TYPE 12 34 5 6 TYPE 12 34 5 6 TYPE 12 34 5 6 TYPE 12 34 5 6 TYPE 12 34 5 6 TYPE 12 34 5 6 TYPE 12 34 5 6 TYPE 12 34 5 6 TYPE 12 34 5 6 TYPE 12 34 5 6 TYPE 12 34 5 6 TYPE 12 34 5 6 TYPE 12 34 5 6 TYPE 12 34 5 6 TYPE 12 34 5 6 TYPE 12 34 5 6 TYPE 12 34 5 6 TYPE 12 34 5 6 TYPE 12 34 5 6 TYPE 12 34 5 6 TYPE 12</td>	50 9 AC 6000000 GHz PNO: Fast IFGain:Low et 3.34 dB 00 dBm ,	Trig: Free Run #Atten: 30 dB	ALIGN AUTO Avg Type: Log-Pwr Avg Hold: 100/100	05:09:13PMAy14,2021 TRYEE 12 34 5 6 TYPE 12 34 5 6 TYPE 12 34 5 6 TYPE 12 34 5 6 TYPE 12 34 5 6 TYPE 12 34 5 6 TYPE 12 34 5 6 TYPE 12 34 5 6 TYPE 12 34 5 6 TYPE 12 34 5 6 TYPE 12 34 5 6 TYPE 12 34 5 6 TYPE 12 34 5 6 TYPE 12 34 5 6 TYPE 12 34 5 6 TYPE 12 34 5 6 TYPE 12 34 5 6 TYPE 12 34 5 6 TYPE 12 34 5 6 TYPE 12 34 5 6 TYPE 12 34 5 6 TYPE 12 34 5 6 TYPE 12 34 5 6 TYPE 12 34 5 6 TYPE 12 34 5 6 TYPE 12 34 5 6 TYPE 12 34 5 6 TYPE 12 34 5 6 TYPE 12 34 5 6 TYPE 12 34 5 6 TYPE 12 34 5 6 TYPE 12 34 5 6 TYPE 12 34 5 6 TYPE 12 34 5 6 TYPE 12 34 5 6 TYPE 12 34 5 6 TYPE 12 34 5 6 TYPE 12 34 5 6 TYPE 12 34 5 6 TYPE 12 34 5 6 TYPE 12 34 5 6 TYPE 12 34 5 6 TYPE 12 34 5 6 TYPE 12 34 5 6 TYPE 12 34 5 6 TYPE 12 34 5 6 TYPE 12 34 5 6 TYPE 12 34 5 6 TYPE 12 34 5 6 TYPE 12 34 5 6 TYPE 12 34 5 6 TYPE 12 34 5 6 TYPE 12 34 5 6 TYPE 12 34 5 6 TYPE 12 34 5 6 TYPE 12 34 5 6 TYPE 12 34 5 6 TYPE 12 34 5 6 TYPE 12 34 5 6 TYPE 12 34 5 6 TYPE 12 34 5 6 TYPE 12 34 5 6 TYPE 12 34 5 6 TYPE 12 34 5 6 TYPE 12 34 5 6 TYPE 12 34 5 6 TYPE 12 34 5 6 TYPE 12 34 5 6 TYPE 12 34 5 6 TYPE 12 34 5 6 TYPE 12 34 5 6 TYPE 12 34 5 6 TYPE 12 34 5 6 TYPE 12 34 5 6 TYPE 12 34 5 6 TYPE 12 34 5 6 TYPE 12 34 5 6 TYPE 12 34 5 6 TYPE 12 34 5 6 TYPE 12 34 5 6 TYPE 12 34 5 6 TYPE 12 34 5 6 TYPE 12 34 5 6 TYPE 12 34 5 6 TYPE 12 34 5 6 TYPE 12 34 5 6 TYPE 12 34 5 6 TYPE 12 34 5 6 TYPE 12 34 5 6 TYPE 12 34 5 6 TYPE 12 34 5 6 TYPE 12 34 5 6 TYPE 12 34 5 6 TYPE 12 34 5 6 TYPE 12 34 5 6 TYPE 12 34 5 6 TYPE 12 34 5 6 TYPE 12 34 5 6 TYPE 12 34 5 6 TYPE 12 34 5 6 TYPE 12 34 5 6 TYPE 12 34 5 6 TYPE 12 34 5 6 TYPE 12 34 5 6 TYPE 12 34 5 6 TYPE 12 34 5 6 TYPE 12 34 5 6 TYPE 12 34 5 6 TYPE 12 34 5 6 TYPE 12 34 5 6 TYPE 12 34 5 6 TYPE 12 34 5 6 TYPE 12 34 5 6 TYPE 12 34 5 6 TYPE 12 34 5 6 TYPE 12 34 5 6 TYPE 12 34 5 6 TYPE 12 34 5 6 TYPE 12 34 5 6 TYPE 12 34 5 6 TYPE 12 34 5 6 TYPE 12 34 5 6 TYPE 12 34 5 6 TYPE 12 34 5 6 TYPE 12 34 5 6 TYPE 12 34 5 6 TYPE 12
Image: Constraint Spectrum Analyze           MsG           MsG           Center Freq 2.52           Ref Offso           Conter Freq 2.52           Ref Offso           O dB/div         Ref 20.           Conter Freq 2.52           Ref Offso           O 00         1           O 00         1           O 00         1           Start 2.47600 GHz           KR MORE TRC SCL         1           MkR MORE TRC SCL         1           M 1         1	50 9 AC 6000000 GHz PNO: Fast IFGain:Low et 3.34 dB 00 dBm 3 3 4 4 2.480 2 GHz 2.483 5 GHz 4 3 2.483 5 GHz 4 4 3 3 4 4 4 5 5 5 5 5 5 5 5 5 5 5 5 5	INT REF            Trig: Free Run #Atten: 30 dB            #Atten: 30 dB	ALIGN AUTO Avg Type: Log-Pwr Avg Hold: 100/100	05:09:13PMAy14,2021 TRACE    2 3 4 5 0 TYPE    2
11         MSG           MSG         Ref offset           Center Freq 2.52         Ref offset           0 dB/div         Ref 20.           10 dB/div         Ref 20.           0 00         1           0.00         1           0.00         2           0.00         2           0.00         2           0.00         2           0.00         2           0.00         2           10.00         2           20.00         2           10.00         2           10.00         2           10.00         2           10.00         2           10.00         2           10.00         2           10.00         2           10.00         2           10.00         2           10.00         1           10.00         1           10.00         1           10.00         1	50 9 AC 6000000 GHz PNO: Fast IFGain:Low et 3.34 dB 00 dBm 3 3 4 4 2.480 2 GHz 2.483 5 GHz 4 3 2.483 5 GHz 4 4 3 3 4 4 4 5 5 5 5 5 5 5 5 5 5 5 5 5	INT REF     Trig: Free Run     #Atten: 30 dB     Int REF     Int Ref     Int R	ALIGN AUTO Avg Type: Log-Pwr Avg Hold: 100/100	05:09:13PMAy14,2021 TRACE    2 3 4 5 0 TYPE    2
Image: Sector of the sector of the sector of the sector of the sector of the sector of the sector of the sector of the sector of the sector of the sector of the sector of the sector of the sector of the sector of the sector of the sector of the sector of the sector of the sector of the sector of the sector of the sector of the sector of the sector of the sector of the sector of the sector of the sector of the sector of the sector of the sector of the sector of the sector of the sector of the sector of the sector of the sector of the sector of the sector of the sector of the sector of the sector of the sector of the sector of the sector of the sector of the sector of the sector of the sector of the sector of the sector of the sector of the sector of the sector of the sector of the sector of the sector of the sector of the sector of the sector of the sector of the sector of the sector of the sector of the sector of the sector of the sector of the sector of the sector of the sector of the sector of the sector of the sector of the sector of the sector of the sector of the sector of the sector of the sector of the sector of the sector of the sector of the sector of the sector of the sector of the sector of the sector of the sector of the sector of the sector of the sector of the sector of the sector of the sector of the sector of the sector of the sector of the sector of the sector of the sector of the sector of the sector of the sector of the sector of the sector of the sector of the sector of the sector of the sector of the sector of the sector of the sector of the sector of the sector of the sector of the sector of the sector of the sector of the sector of the sector of the sector of the sector of the sector of the sector of the sector of the sector of the sector of the sector of the sector of the sector of the sector of the sector of the sector of the sector of the sector of the sector of the sector of the sector of the sector of the sector of the sector of the sector of the sector of the	50 9 AC 6000000 GHz PNO: Fast IFGain:Low et 3.34 dB 00 dBm 3 3 4 4 2.480 2 GHz 2.483 5 GHz 4 3 2.483 5 GHz 4 4 3 3 4 4 4 5 5 5 5 5 5 5 5 5 5 5 5 5	INT REF            Trig: Free Run #Atten: 30 dB            #Atten: 30 dB	ALIGN AUTO Avg Type: Log-Pwr Avg Hold: 100/100	05:09:13PMAy14,2021 TRACE    2 3 4 5 0 TYPE    2

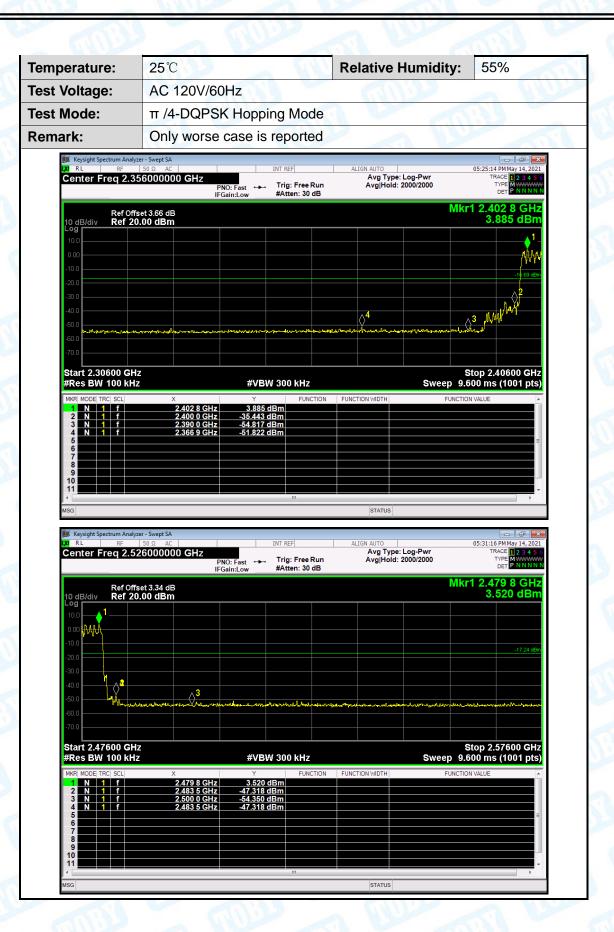








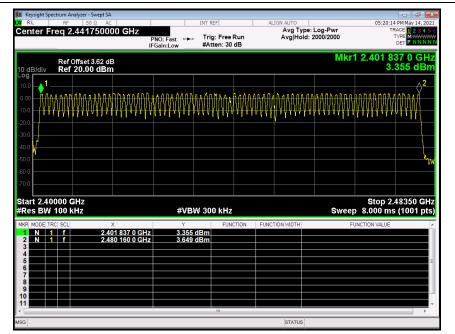




# **Attachment D-- Number of Hopping Channel Test Data**

Temperature:	25°			Relative Humi	dity:	55%	
Test Voltage:	AC	120V/60Hz	-		600		
Test Mode:	Нор	pping Mode	OH CE		V	(ETC)	
Frequency Rang	ge	Test Mode	Qu	antity of Hoppir	ng	Limit	
		0501/		Channel			
2402MHz~2480M	IHz	GFSK		79		>15	
		π /4-DQPSK		79			

## **GFSK Mode**



## $\pi$ /4-DQPSK Mode

and an I	RF	50 Ω AC				INT REF		ALIC	5N AUTO			6 PM May 14, 20
inter i	req 2	.4417500		PNO: Fast IFGain:Low	•••	Trig: Free #Atten: 30			Avg Type: Avg Hold:	Log-Pwr 2000/2000		TYPE MWWW DET PNNN
dB/div		Offset 3.62 di <b>20.00 dBn</b>								Mkr	1 2.401 5 -2.	86 5 GH 330 dBi
	ሌሌጭ	ւսերելեր	hymredige	www	አላላሌ	MWWA	A.MA	Muhy	www	J. w. J. W. W. W. W. W. W. W. W. W. W. W. W. W.	und thank	www.
).0 ).0												
						/ 300 kHz				Swee	Stop 2.	48350 GH (1001 pt
les BW	100	Hz		#				SUN OTI				
les BW	100	(Hz	X 04 596 5 CH		Y	FUN	CTION	FUNCTI	DN WIDTH		UNCTION VALUE	
art 2.4 Res BW	100	(Hz 2.4	01 586 5 GH	z -2	ү . <b>330 d</b>	FUN		FUNCTI	DN WIDTH			
R MODE 1	100	(Hz 2.4		z -2	Y	FUN		FUNCTI	DN WIDTH			
R MODE T	100	(Hz 2.4	01 586 5 GH	z -2	ү . <b>330 d</b>	FUN		FUNCTION	DN WIDTH			
R MODE 1 N N	100	(Hz 2.4	01 586 5 GH	z -2	ү . <b>330 d</b>	FUN		FUNCTION	DN WIDTH			
	100	(Hz 2.4	01 586 5 GH	z -2	ү . <b>330 d</b>	FUN		FUNCTION	DN WIDTH			
R MODE 1	100	(Hz 2.4	01 586 5 GH	z -2	ү . <b>330 d</b>	FUN		FUNCTION	HTDW ND			
R MODE 1	100	(Hz 2.4	01 586 5 GH	z -2	ү . <b>330 d</b>	FUN		FUNCTI	DN WIDTH			
R MODE 1 N N N N N N N N N N N N N N N N N N N	100	(Hz 2.4	01 586 5 GH	z -2	ү . <b>330 d</b>	FUN		FUNCTI	M WIDTH			

# Attachment E-- Average Time of Occupancy Test Data

Temper	ature:	25°	С	R	elative Humidity:	55%	MU2	
Test Vo	ltage:	AC	120V/60Hz			1 Car		
Test Mo	de:	le: Hopping Mode (GFSK)						
Test	Chan	nel Pulse Total of Dwell I		Period Time	Limit	Result		
Mode	(MH	z)	Time (ms)	(ms)	(s)	(ms)	Result	
1DH1	244	1	0.377	120.64	31.60	400	PASS	
1DH3	244	1	1.633	261.28	31.60	400	PASS	
1DH5	244	1	2.88	307.2	31.60	400	PASS	

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

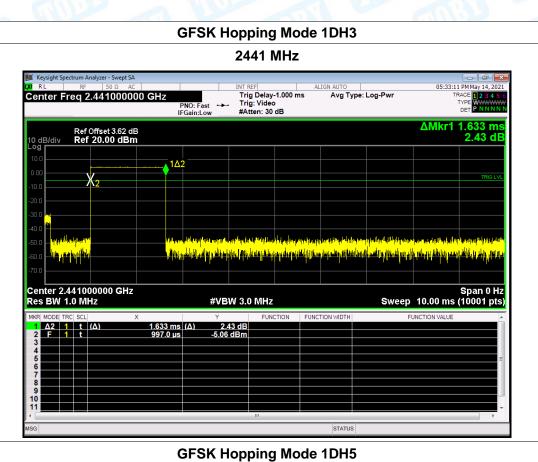
1DH3 Total of Dwell= Pulse Time\*(1600/4)\*31.6/79

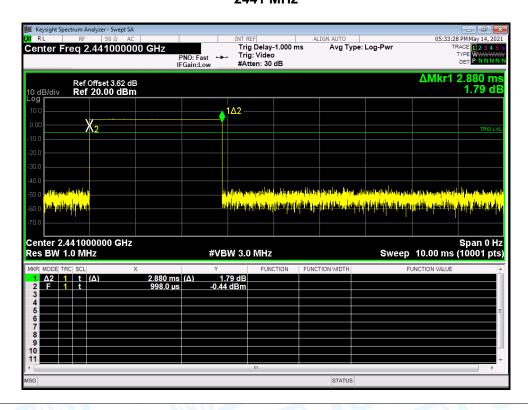
1DH5 Total of Dwell= Pulse Time\*(1600/6)\*31.6/79

### GFSK Hopping Mode 1DH1

# Keysight Spectrum Analyzer - Swept SA Trig Delay-1.000 ms Trig: Video #Atten: 30 dB Avg Type: Log-Pwr Center Freq 2.441000000 GHz PNO: Fast IFGain:Low ΔMkr1 377.0 μs 0.16 dB Ref Offset 3.62 dB Ref 20.00 dBm 10 dB Log **r** 1<u>Δ</u>2 ومروا غلال ومردع العرار فالمعالية والغرب المتعاولة المتعادل وتعارفهم المرواني ومعارك المعالية فالمعار المعلم والمالي n, an da baan maani matala dahar maadar jalla ku il kadaa jarah baan. Center 2.441000000 GHz Res BW 1.0 MHz Span 0 Hz Sweep 10.00 ms (10001 pts) #VBW 3.0 MHz 0.16 dB -3.84 dBm <u>377.0 μs</u> 997.0 μs









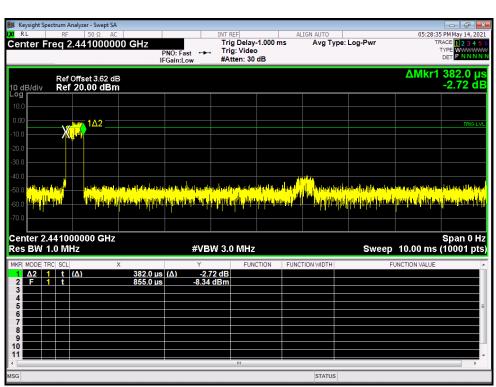
Temperature: 25°		25°	С	Re	lative Humidity:	55%	
Test Voltage: AC 120V/60Hz					60000		110-2
Test Mo	Test Mode:         Hopping Mode (π /4-DQPSK)					A.	
Test	Chan	nel	Pulse	Total of Dwell	Period Time	Limit	Decult
Mode	(MH:	_\	<b>T</b> <sup>1</sup> ( ) ( )	<i>(</i> )			Result
		Z)	Time (ms)	(ms)	(s)	(ms)	
2DH1	244	-	0.382	(ms) 122.24	(s) 31.60	(ms) 400	PASS
		1					PASS PASS
2DH1	244	1 1	0.382	122.24	31.60	400	

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

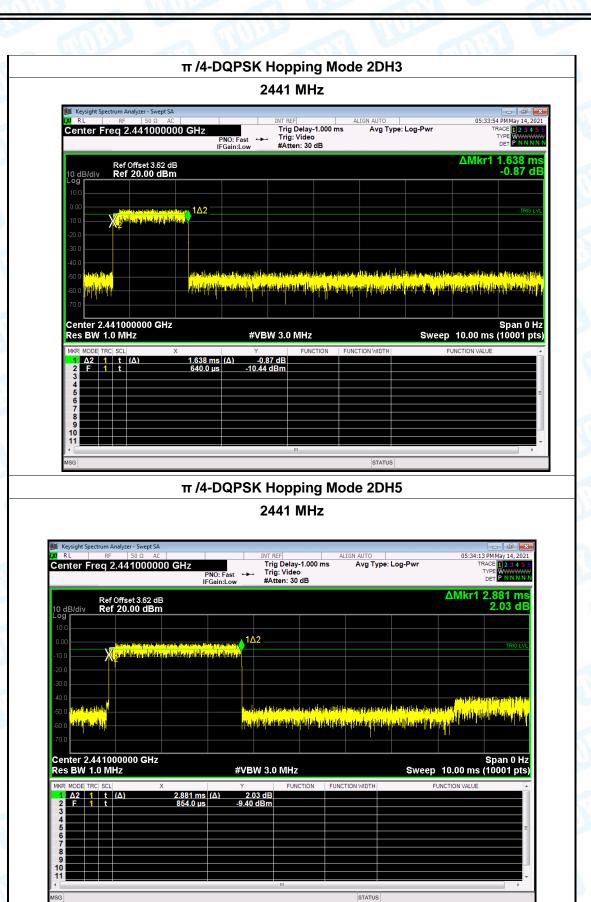
2DH3 Total of Dwell= Pulse Time\*(1600/4)\*31.6/79

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

## $\pi$ /4-DQPSK Hopping Mode 2DH1









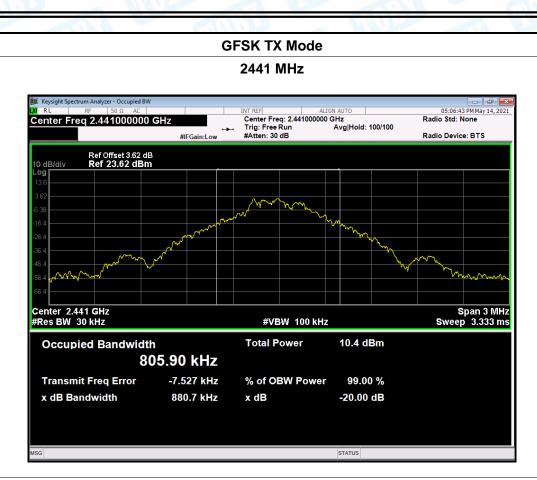
# **Attachment F-- Channel Separation and Bandwidth Test**

# Data

Temperature:   25°C			Relative Humidity:	55%	
Test Voltage:	AC	120V/60Hz		3 0	
Test Mode: TX		Mode (GFSK)			
Channel frequency (MHz)		99% OBW (kHz)	20dB Bandwidth (kHz)	20dB Bandwidth *2/3 (kHz)	
2402		817.87	878.3		
2441		805.90	880.7		
2480			070.4		
2480		842.01	878.4		







## **GFSK TX Mode**



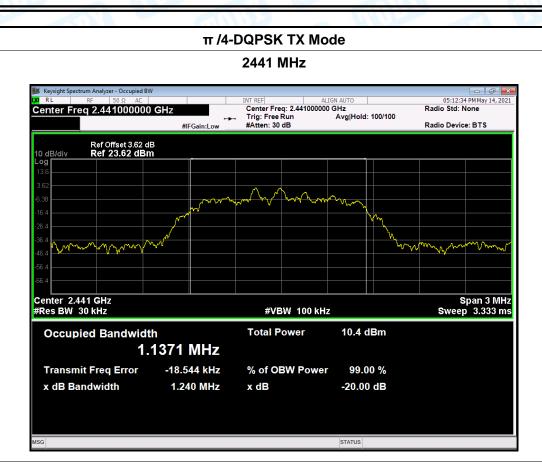


Temperature: 25°		C	Relative Humidity:	55%	
Test Voltage:	AC	120V/60Hz			
Test Mode: TX		Mode (π /4-DQPSK)			
Channel frequency (MHz)		99% OBW (kHz)	20dB Bandwidth (kHz)	20dB Bandwidth *2/3 (kHz)	
2402		1162.9	1275	850.00	
2441		2441 1137.1		826.67	
2480		1168.6	1274	849.33	

## $\pi$ /4-DQPSK TX Mode







### $\pi$ /4-DQPSK TX Mode





Temperature:	<b>25</b> ℃	Relative Humidity:		t <b>y:</b> 55%	
Test Voltage:	AC 120V/60Hz				
Test Mode:	Hopping Mode (GFSK)				
Channel frequency		Separation Re	ad Value	Separation Limit	
(MHz)		(KHz)		(kHz)	
2402		999		878.3	
2441		1002		880.7	
2480		1002		878.4	

# **GFSK Hopping Mode**







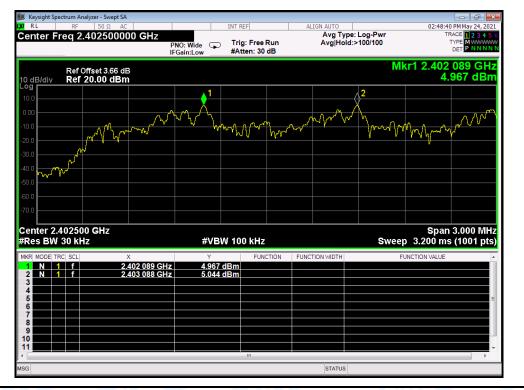
# GFSK Hopping Mode 2480 MHz





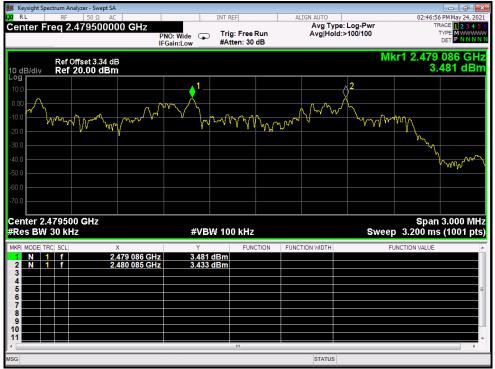
Temperature:	<b>25</b> ℃	Relative Humidity:		55%		
Test Voltage:	AC 120V/	AC 120V/60Hz				
Test Mode:	Hopping Mode (π /4-DQPSK)					
Channel frequency		Separation Re	ad Value Se	Separation Limit		
(MHz)		(KHz)		(kHz)		
2402		999		850.00		
2441		1002		826.67		
2480		999		849.33		

# $\pi$ /4-DQPSK Hopping Mode





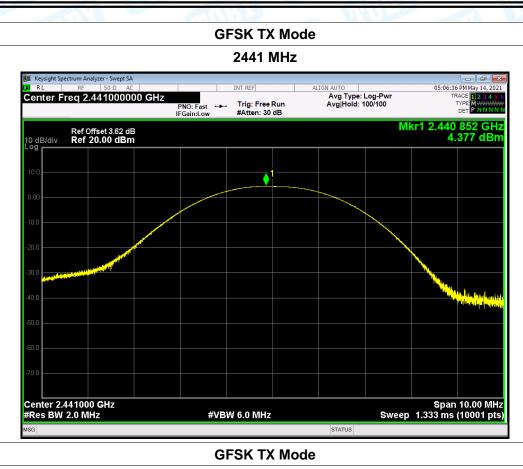


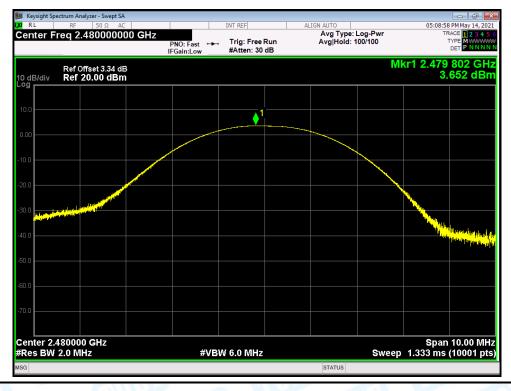


# Attachment G-- Peak Output Power Test Data

nperature:	<b>25</b> ℃		Relative H	umidity:	55%
st Voltage:	AC 120V/	60Hz	AV	-	nu -
st Mode:	TX Mode	(GFSK)	200		
annel freque	ncy (MHz)	Test Resu	ılt (dBm)	L	imit (dBm)
2402		3.9	63		
2441		4.377		21	
2480		3.6	52	-	
		GFSK T	X Mode	1	
		2402	MHz		
Keysight Spectrum Analy	zer - Swept SA 50 Ω AC	INT REF	ALIGN AUTO		05:05:11 PM May 14, 2021
Center Freq 2.4		PNO: Fast + Trig: Free IFGain:Low #Atten: 3	Avg Type Run Avg Hold	e: Log-Pwr : 100/100	TRACE 1 2 3 4 5 6 TYPE MWWWW DET PNNNNN
	set 3.66 dB 0.00 dBm			Mkr1	2.401 835 GHz 3.963 dBm
10.0					
0.00					
-10.0					
-20.0	- Starter and a starter and a starter and a starter and a starter and a starter and a starter and a starter and				
-30.0					
-40.0					
-50.0					
-60.0					
-70.0					
Center 2.402000	GHz				Span 10.00 MHz
#Res BW 2.0 MH		#VBW 6.0 MH;	7	Sween 1	333 ms (10001 pts)



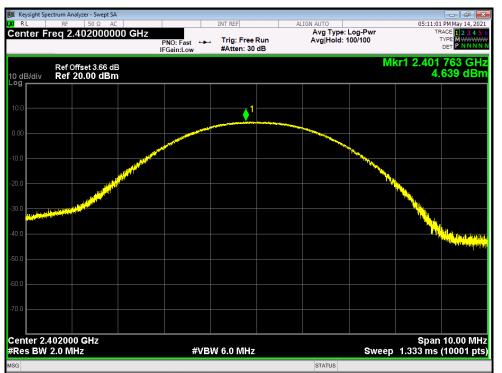






Temperature:25°C		Relative Humidity:		55%	
Test Voltage:	AC 120V	/60Hz	4000	2 102	
Test Mode:	TX Mode	(π /4-DQPSK)		RE	
Channel frequency (MHz)		Test Result (dBm)		Limit (dBm)	
2402		4.639			
2441		5.050		21	
2480		4.295			

## $\pi$ /4-DQPSK TX Mode



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



