

# FCC TEST REPORT FCC ID:2A4UH-STREAMXD2

Report Number	: ZKT-220328L1925-1
Date of Test	Feb. 24, 2022 to Mar. 29, 2022
Date of issue	: Mar. 30, 2022
Total number of pages	69
Test Result	: PASS
Testing Laboratory	: Shenzhen ZKT Technology Co., Ltd.
Address	1/F, No. 101, Building B, No. 6, Tangwei Community Industrial Avenue, Fuhai Street, Bao'an District, Shenzhen, China
Applicant's name	: Santos Electronics
Address	: 775 Columbia Street, Brea, CA92821, United States
Manufacturer's name	: Shanghai Liansheng Technology Development Co., Ltd.
Address	: #2131, Building 5, No.397 Jiaozhou Road Jingan District Shanghai
Test specification:	
Standard	FCC CFR Title 47 Part 15 Subpart C Section 15.247
Test procedure	: /
Non-standard test method	: N/A
Test Report Form No	: TRF-EL-111_V0
Test Report Form(s) Originator.	: ZKT Testing
Master TRF	: Dated: 2020-01-06
test (EUT) is in compliance with identified in the report.	been tested by ZKT, and the test results show that the equipment under the FCC requirements. And it is applicable only to the tested sample of except in full, without the written approval of ZKT, this document may
	onal only, and shall be noted in the revision of the document.
	: WIRELESS HI-FI DAC POWER AMPLIFIER
Trademark	
Model/Type reference	
Ratings	AC 110-120V/60HZ AC 220-240V/50Hz
63.63	

Shenzhen ZKT Technolgy Co., Ltd.

1/F, No. 101, Building B, No. 6, Tangwei Community Industrial Avenue, Fuhai Street, Bao'an District, Shenzhen, China



Testing procedure and testing location:		
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Testing Laboratory	Shenzhen ZKT Techr	nology Co., Ltd.
Address:	1/F, No. 101, Building B, No. 6, Tangwei Community Industrial Avenue, Fuhai Street, Bao'an District, Shenzhen, China	
Tested by (name + signature):	Alen He	Aren. Me
Reviewer (name + signature):	Joe Liu	Joe. Lin.
Approved (name + signature):	Lake Xie	The chnology City



# **Table of Contents**

1. VERSION         2. TEST SUMMARY         2.1 TEST FACILITY         2.2 MEASUREMENT UNCERTAINTY         3. GENERAL INFORMATION         3.1 GENERAL DESCRIPTION OF EUT         3.2 Test Setup Configuration         3.3 Support Equipment         3.4 Test Mode         3.5 EQUIPMENTS LIST FOR ALL TEST ITEMS         4.1 Conducted emissions         4.1.1 POWER LINE CONDUCTED EMISSION Limits	•••••
<ul> <li>2.1 TEST FACILITY</li> <li>2.2 MEASUREMENT UNCERTAINTY</li> <li>3. GENERAL INFORMATION</li> <li>3.1 GENERAL DESCRIPTION OF EUT</li> <li>3.2 Test Setup Configuration</li> <li>3.3 Support Equipment</li> <li>3.4 Test Mode</li> <li>3.5 EQUIPMENTS LIST FOR ALL TEST ITEMS</li> <li>4. EMC EMISSION TEST</li> <li>4.1 Conducted emissions</li> </ul>	· · · · · · · · · · · · · · · · · · ·
<ul> <li>2.2 MEASUREMENT UNCERTAINTY</li> <li>3. GENERAL INFORMATION</li> <li>3.1 GENERAL DESCRIPTION OF EUT</li> <li>3.2 Test Setup Configuration</li> <li>3.3 Support Equipment</li> <li>3.4 Test Mode</li> <li>3.5 EQUIPMENTS LIST FOR ALL TEST ITEMS</li> <li>4. EMC EMISSION TEST</li> <li>4.1 Conducted emissions</li> </ul>	· · · · · · · · · · · · · · · · · · ·
3. GENERAL INFORMATION         3.1 GENERAL DESCRIPTION OF EUT         3.2 Test Setup Configuration         3.3 Support Equipment         3.4 Test Mode         3.5 EQUIPMENTS LIST FOR ALL TEST ITEMS         4. EMC EMISSION TEST         4.1 Conducted emissions	· · · · · · · · · · · · · · · · · · ·
<ul> <li>3.1 GENERAL DESCRIPTION OF EUT</li> <li>3.2 Test Setup Configuration</li> <li>3.3 Support Equipment</li> <li>3.4 Test Mode</li> <li>3.5 EQUIPMENTS LIST FOR ALL TEST ITEMS</li> <li>4. EMC EMISSION TEST</li> <li>4.1 Conducted emissions</li> </ul>	
<ul> <li>3.2 Test Setup Configuration</li> <li>3.3 Support Equipment</li> <li>3.4 Test Mode</li> <li>3.5 EQUIPMENTS LIST FOR ALL TEST ITEMS</li> <li>4. EMC EMISSION TEST</li> <li>4.1 Conducted emissions</li> </ul>	
<ul> <li>3.3 Support Equipment</li> <li>3.4 Test Mode</li> <li>3.5 EQUIPMENTS LIST FOR ALL TEST ITEMS</li> <li>4. EMC EMISSION TEST</li> <li>4.1 Conducted emissions</li> </ul>	
3.4 Test Mode         3.5 EQUIPMENTS LIST FOR ALL TEST ITEMS         4. EMC EMISSION TEST         4.1 Conducted emissions	
3.5 EQUIPMENTS LIST FOR ALL TEST ITEMS         4. EMC EMISSION TEST         4.1 Conducted emissions	
<b>4. EMC EMISSION TEST</b> 4.1 Conducted emissions	
4.1 Conducted emissions	1
	1
	1
	1
4.1.2 TEST PROCEDURE	1
4.1.3 DEVIATION FROM TEST STANDARD	
4.1.4 TEST SETUP	1
4.1.5 EUT OPERATING CONDITIONS	
4.1.6 Test Result	
4.2 Radiated emissions	
4.2.1 Radiated Emission Limits	
4.2.2 TEST PROCEDURE	
4.2.3 DEVIATION FROM TEST STANDARD	
4.2.4 TEST SETUP	
4.2.5 EUT OPERATING CONDITIONS	
4.2.6 TEST RESULTS	
5. RADIATED BAND EMISSION MEASUREMENT	
5.1 Test Requirement:	
5.2 TEST PROCEDURE	
5.3 DEVIATION FROM TEST STANDARD	
5.4 TEST SETUP	
5.5 EUT OPERATING CONDITIONS	·····2
5.6 TEST RESULT	
6. CONDUCTED BAND EDGE AND SPURIOUS EMISSION	
6.1 Limit	
6.2 Test Setup	
6.3 Test procedure	
6.4 DEVIATION FROM STANDARD	
6.5 Test Result	
<b>7. 20DB BANDWIDTH</b>	
7.1 Test Setup	
7.2 Limit	
7.4 DEVIATION FROM STANDARD	4



7.5 Test Result	41
8. MAXIMUM PEAK OUTPUT POWER	46
8.1 Block Diagram Of Test Setup	
8.2 Limit	
8.3 Test procedure	
8.4 DEVIATION FROM STANDARD	
8.5 Test Result	
9. HOPPING CHANNEL SEPARATION	
9.1 Test Setup	
9.2 Test procedure	
9.3 DEVIATION FROM STANDARD	
9.4 Test Result	
10.NUMBER OF HOPPING FREQUENCY	
10.1 Test Setup	
10.2 Test procedure	
10.3 DEVIATION FROM STANDARD	
10.4 Test Result	
11. DWELL TIME	61
11.1 Test Setup	61
11.2 Test procedure	
11.3 DEVIATION FROM STANDARD	
11.4 Test Result	
12. ANTENNA REQUIREMENT	
13. TEST SETUP PHOTO	
14. EUT CONSTRUCTIONAL DETAILS	





Report No.	Version	Description	Approved
ZKT-220328L1925-1	Rev.01	Initial issue of report	Mar. 30, 2022





Test procedures according to the technical standards:

FCC Part15 (15.247), Subpart C						
Standard Section	Test Item	Result	Remark			
15.203/15.247 (c)	Antenna Requirement	PASS				
15.207	AC Power Line Conducted Emission	PASS				
15.247 (b)(1)	Conducted Peak Output Power	PASS				
15.247 (a)(1)	20dB Occupied Bandwidth	PASS				
15.247 (a)(1)	Carrier Frequencies Separation	PASS				
15.247 (a)(1)(iii)	Hopping Channel Number	PASS				
15.247 (a)(1)(iii)	Dwell Time	PASS				
15.205/15.209	Radiated Emission and Restricted Bands	PASS				
15.247(d)	Conducted Unwanted emissions and Bandedge	PASS				

## NOTE:

(1)" N/A" denotes test is not applicable in this Test Report







# 2.1 TEST FACILITY

Shenzhen ZKT Technology Co., Ltd. Add. : 1/F, No. 101, Building B, No. 6, Tangwei Community Industrial Avenue, Fuhai Street, Bao'an District, Shenzhen, China

FCC Test Firm Registration Number: 692225 Designation Number: CN1299 IC Registered No.: 27033 Test lab CAB identifier:CN0110

#### 2.2 MEASUREMENT UNCERTAINTY

The reported uncertainty of measurement y ± 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 %  $^{\circ}$ 

No.	Item	Uncertainty
1	Conducted Emission Test	±1.38dB
2	RF power conducted	±0.16dB
3	Spurious emissions conducted	±0.21dB
4	All emissions radiated(<1G)	±4.68dB
5	All emissions radiated(>1G)	±4.89dB
6	Temperature	±0.5°C
7	Humidity	±2%



# **3. GENERAL INFORMATION**

# 3.1 GENERAL DESCRIPTION OF EUT

Product Name:	WIRELESS HI-FI DAC POWER AMPLIFIER	
Model No.:	NERO STREAM XD2	
Sample ID:	ZKT220328L1925-1#	
Serial No.:	N/A	
Model Different .:	N/A	
Hardware Version:	V1.0	
Software Version:	V1.0	
Sample(s) Status:	Engineer sample	
Channel numbers:	79	
Channel separation:	2402MHz~2480MHz	
Modulation technology:	GFSK, π/4-DQPSK, 8-DPSK	
Antenna Type:	External Antenna	
Antenna gain:	3dBi	
Power supply:	AC 110-120V/60Hz	
	AC 220-240V/50Hz	

Operation	Frequency each	n of channel					
Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
1	2402MHz	21	2422MHz	41	2442MHz	61	2462MHz
2	2403MHz	22	2423MHz	42	2443MHz	62	2463MHz
3	2404MHz	23	2424MHz	43	2444MHz	63	2464MHz
4	2405MHz	24	2425MHz	44	2445MHz	64	2465MHz
5	2406MHz	25	2426MHz	45	2446MHz	65	2466MHz
6	2407MHz	26	2427MHz	46	2447MHz	66	2467MHz
7	2408MHz	27	2428MHz	47	2448MHz	67	2468MHz
8	2409MHz	28	2429MHz	48	2449MHz	68	2469MHz
9	2410MHz	29	2430MHz	49	2450MHz	69	2470MHz
10	2411MHz	30	2431MHz	50	2451MHz	70	2471MHz
11	2412MHz	31	2432MHz	51	2452MHz	71	2472MHz
12	2413MHz	32	2433MHz	52	2453MHz	72	2473MHz
13	2414MHz	33	2434MHz	53	2454MHz	73	2474MHz
14	2415MHz	34	2435MHz	54	2455MHz	74	2475MHz
15	2416MHz	35	2436MHz	55	2456MHz	75	2476MHz
16	2417MHz	36	2437MHz	56	2457MHz	76	2477MHz
17	2418MHz	37	2438MHz	57	2458MHz	77	2478MHz



18	2419MHz	38	2439MHz	58	2459MHz	78	2479MHz
19	2420MHz	39	2440MHz	59	2460MHz	79	2480MHz
20	2421MHz	40	2441MHz	60	2461MHz		

Note:

In section 15.31(m), regards to the operating frequency range over 10 MHz, the Lowest frequency, the middle frequency, and the highest frequency of channel were selected to perform the test, and the selected channel see below:

Test channel	Frequency
The lowest channel	2402MHz
The middle channel	2441MHz
The Highest channel	2480MHz

## 3.2 Test Setup Configuration

**Conducted Emission** 

AC Line	EUT

Radiated Emission

AC Line	EUT

Conducted Spurious

AC Line	EUT

3.3 Support Equipment

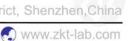
The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

Item	Equipment	Mfr/Brand	Model/Type No.	Series No.	Note
E-1	WIRELESS HI-FI DAC POWER AMPLIFIER	OSD AUDIO	NERO STREAM XD2	N/A	EUT
AE	Notebook	lenovo	B40-80	MP07F6JD	AE

Item	Shielded Type	Ferrite Core	Length	Note

Note:

- (1) The support equipment was authorized by Declaration of Confirmation.
- (2) For detachable type I/O cable should be specified the length in cm in  $\[\]$  Length  $\[\]$  column.





Transmitting mode	Keep the EUT in continuously transmitting mode.
•	, the test voltage was tuned from 85% to 115% of the nominal rated supply the worst case was under the nominal rated supply condition. So the report n's data.

Test Software	BlueTest3
Power level setup	<7dBm



# 3.5 EQUIPMENTS LIST FOR ALL TEST ITEMS

# Radiation & RF Conducted Test equipment

Item	Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until
1	Spectrum Analyzer (9kHz-26.5GHz)	KEYSIGHT	9020A	MY45109572	Sep. 21, 2021	Sep. 20, 2022
2	Spectrum Analyzer (1GHz-40GHz)	Agilent	E4446A	100363	Sep. 21, 2021	Sep. 20, 2022
3	Test Receiver (9kHz-7GHz)	R&S	ESCI7	101169	Sep. 21, 2021	Sep. 20, 2022
4	Bilog Antenna (30MHz-1400MHz)	Schwarzbeck	VULB9168	00877	Sep. 21, 2021	Sep. 20, 2022
5	Horn Antenna (1GHz-18GHz)	SCHWARZBEC K	BBHA9120D	1541	Sep. 21, 2021	Sep. 20, 2022
6	Horn Antenna (18GHz-40GHz)	A.H. System	SAS-574	588	Sep. 21, 2021	Sep. 20, 2022
7	Amplifier (30-1000MHz)	EM Electronics	EM330 Amplifier	N/A	Sep. 21, 2021	Sep. 20, 2022
8	Amplifier (1GHz-40GHz)	全聚达	DLE-161	097	Sep. 21, 2021	Sep. 20, 2022
9	Loop Antenna (9KHz-30MHz)	SCHWARZBEC K	FMZB1519B	014	Sep. 21, 2021	Sep. 20, 2022
10	RF cables1 (9kHz-30MHz)	N/A	9kHz-30MHz	N/A	Sep. 21, 2021	Sep. 20, 2022
11	RF cables2 (30MHz-1GHz)	N/A	30MHz-1GHz	N/A	Sep. 21, 2021	Sep. 20, 2022
12	RF cables3 (1GHz-40GHz)	N/A	1GHz-40GHz	N/A	Sep. 21, 2021	Sep. 20, 2022
13	CMW500 Test	R&S	CMW500	106504	Sep. 21, 2021	Sep. 20, 2022
14	ESG Signal Generator	Agilent	E4421B	GB40051203	Sep. 21, 2021	Sep. 20, 2022
15	Signal Generator	Agilent	N5182A	MY47420215	Sep. 21, 2021	Sep. 20, 2022
16	Power Meter	Anritsu	ML2495A	N/A	Sep. 21, 2021	Sep. 20, 2022
17	D.C. Power Supply	LongWei	TPR-6405D	١	١	١
18	Software	Audix	E3	6.101223a	١	١

# **Conduction Test equipment**

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until
1	LISN	R&S	ENV216	101471	Sep. 21, 2021	Sep. 20, 2022
2	LISN	CYBERTEK	EM5040A	E1850400149	Sep. 21, 2021	Sep. 20, 2022
3	Test Cable	N/A	C01	N/A	Sep. 21, 2021	Sep. 20, 2022
4	Test Cable	N/A	C02	N/A	Sep. 21, 2021	Sep. 20, 2022
5	EMI Test Receiver	R&S	ESRP3	101946	Sep. 21, 2021	Sep. 20, 2022
6	Absorbing Clamp	DZ	ZN23201	N/A	Sep. 21, 2021	Sep. 20, 2022
7	Software	Audix	E3	6.101223a	١	١











#### 4. EMC EMISSION TEST

#### 4.1 Conducted emissions

Test Requirement:	FCC Part15 C Section 15.207
Test Method:	ANSI C63.10:2013
Test Frequency Range:	150KHz to 30MHz
Receiver setup:	RBW=9KHz, VBW=30KHz, Sweep time=auto

## 4.1.1 POWER LINE CONDUCTED EMISSION Limits

FREQUENCY (MHz)	Limit (	dBuV)	Standard
	Quasi-peak	Average	Stanuaru
0.15 -0.5	66 - 56 *	56 - 46 *	FCC
0.50 -5.0	56.00	46.00	FCC
5.0 -30.0	60.00	50.00	FCC

Note:

(1) \*Decreases with the logarithm of the frequency.

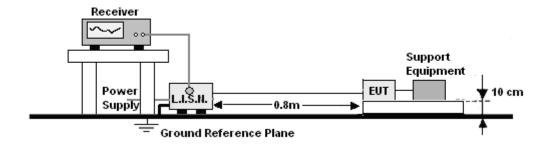
#### 4.1.2 TEST PROCEDURE

- a. The EUT was placed 0.1 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.
- b. 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.
- c. 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.
- d. LISN at least 80 cm from nearest part of EUT chassis.
- e. For the actual test configuration, please refer to the related Item -EUT Test Photos.

4.1.3 DEVIATION FROM TEST STANDARD No deviation







# 4.1.5 EUT OPERATING CONDITIONS

The EUT was configured for testing in a typical fashion (as a customer would normally use it). The EUT has been programmed to continuously transmit during test. This operating condition was tested and used to collect the included data.

We pretest AC 120V and AC 230V, the worst voltage was AC 120V and the data recording in the report.

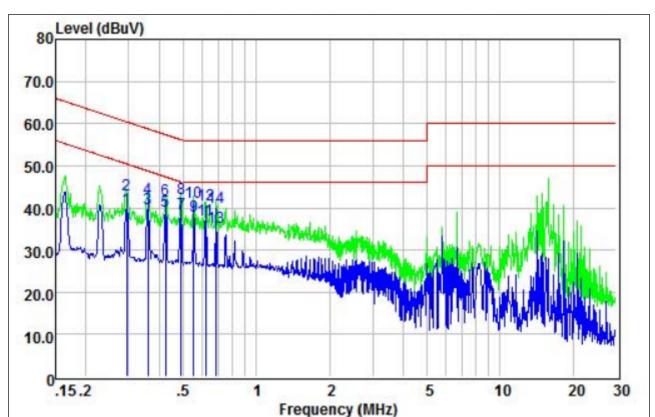






#### 4.1.6 Test Result

Temperature :	<b>26</b> ℃	Relative Humidity:	54%
Pressure :	101kPa	Phase :	L
Test Voltage :	AC 120V/60Hz		



		Read	LISN	Cable		Limit	Over	
	Freq	Level	Factor	Loss	Level	Line	Limit	Remark
_	MHz	dBuV	dB	dB	dBuV	dBuV	dB	-
1	0.29	30.31	9.62	0.05	39.98	50.41	-10.43	Average
2	0.29	33.49	9.62	0.05	43.16	60.41	-17.25	QP
3	0.36	30.02	9.65	0.05	39.72	48.74	-9.02	Average
4	0.36	32.41	9.65	0.05	42.11	58.74	-16.63	QP
5	0.42	29.53	9.68	0.05	39.26	47.37	-8.11	Average
6	0.42	32.23	9.68	0.05	41.96	57.37	-15.41	QP
7	0.49	28.90	9.69	0.05	38.64	46.14	-7.50	Average
8	0.49	32.62	9.69	0.05	42.36	56.14	-13.78	QP
9	0.56	28.47	9.67	0.05	38.19	46.00	-7.81	Average
10	0.56	31.56	9.67	0.05	41.28	56.00	-14.72	QP
11	0.62	27.41	9.66	0.05	37.12	46.00	-8.88	Average
12	0.62	31.07	9.66	0.05	40.78	56.00	-15.22	QP
13	0.69	25.58	9.64	0.05	35.27	46.00	-10.73	Average
14	0.69	30.42	9.64	0.05	40.11	56.00	-15.89	QP

# Notes:

1.An initial pre-scan was performed on the line and neutral lines with peak detector.

2.Quasi-Peak and Average measurement were performed at the frequencies with maximized peak emission.3.Mesurement Level = Reading level + Correct Factor

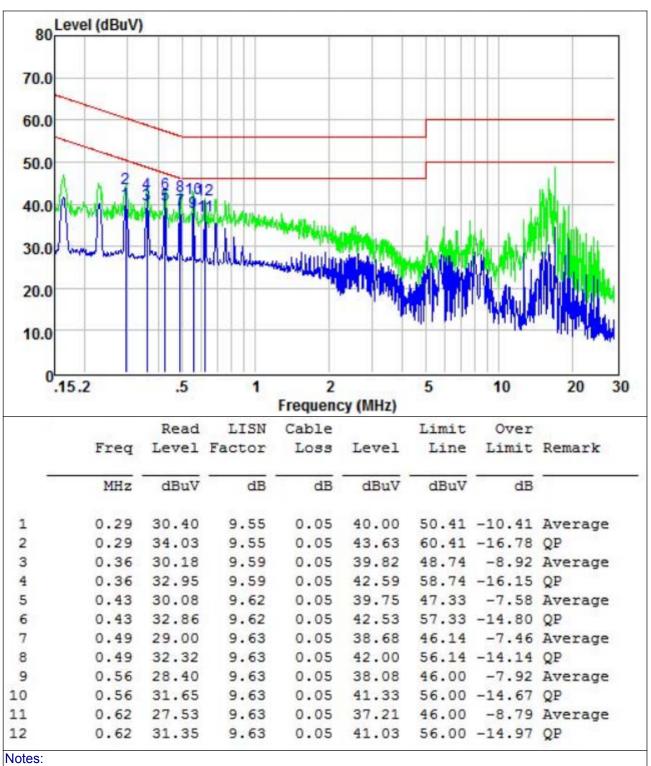
# Shenzhen ZKT Technolgy Co., Ltd.

1/F, No. 101, Building B, No. 6, Tangwei Community Industrial Avenue, Fuhai Street, Bao'an District, Shenzhen, China





Temperature :	<b>26</b> ℃	Relative Humidity:	54%
Pressure :	101kPa	Phase :	Ν
Test Voltage :	AC 120V/60Hz		



1.An initial pre-scan was performed on the line and neutral lines with peak detector.

2.Quasi-Peak and Average measurement were performed at the frequencies with maximized peak emission.3.Mesurement Level = Reading level + Correct Factor

Shenzhen ZKT Technolgy Co., Ltd.

1/F, No. 101, Building B, No. 6, Tangwei Community Industrial Avenue, Fuhai Street, Bao'an District, Shenzhen, China







# 4.2 Radiated emissions

Test Requirement:	FCC Part15 C Section 15.209					
Test Method:	ANSI C63.10:2013					
Test Frequency Range:	9kHz to 25GHz					
Test site:	Measurement Distance: 3m					
Receiver setup:	Frequency	Detector	RBW	VBW	Value	
	9KHz-150KHz	Quasi-peak	200Hz	600Hz	Quasi-peak	
	150KHz-30MHz	Quasi-peak	9KHz	30KHz	Quasi-peak	
	30MHz-1GHz	Quasi-peak	100KHz	300KHz	Quasi-peak	
	Above 1GHz	Peak	1MHz	3MHz	Peak	
		Peak	1MHz	1/T	Average	
	30MHz-1GHz Above 1GHz	Peak	1MHz	3MHz	Peak	

#### 4.2.1 Radiated Emission Limits

Frequencies (MHz)	Field Strength (micorvolts/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

## LIMITS OF RADIATED EMISSION MEASUREMENT

	Limit (dBuV/m) (at 3M)			
FREQUENCY (MHz)	PEAK	AVERAGE		
Above 1000	74	54		

Notes:

- (1) The limit for radiated test was performed according to FCC PART 15C.
- (2) The tighter limit applies at the band edges.
- (3) Emission level (dBuV/m)=20log Emission level (uV/m).

## 4.2.2 TEST PROCEDURE

Below 1GHz test procedure as below:

- a. The EUT was placed on the top of a rotating table 0.1 meters above the ground at a 3 meter semi-anechoic camber. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- c. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.





- d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters (for the test frequency of below 30MHz, the antenna was tuned to heights 1 meter) and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- e. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
- f. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.

Above 1GHz test procedure as below:

- g. Different between above is the test site, change from Semi- Anechoic Chamber to fully Anechoic Chamber and change form table 0.8 metre to 1.5 metre( Above 18GHz the distance is 1 meter and table is 1.5 metre).
- h. Test the EUT in the lowest channel ,the middle channel ,the Highest channel

Note:

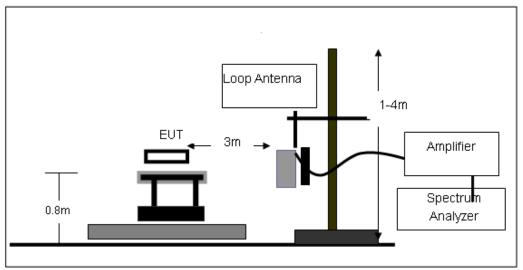
Both horizontal and vertical antenna polarities were tested and performed pretest to three orthogonal axis. The worst case emissions were reported

#### 4.2.3 DEVIATION FROM TEST STANDARD

#### No deviation

#### 4.2.4 TEST SETUP

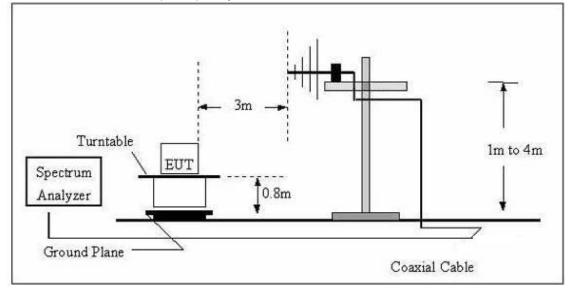
(A) Radiated Emission Test-Up Frequency Below 30MHz



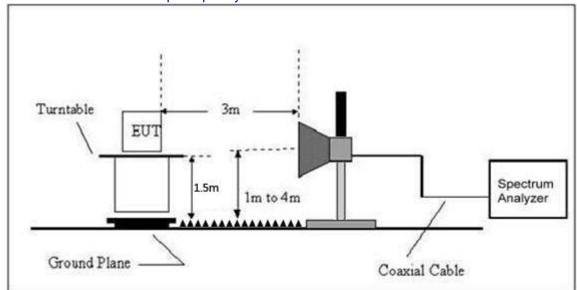




# (B) Radiated Emission Test-Up Frequency 30MHz~1GHz



# (C) Radiated Emission Test-Up Frequency Above 1GHz



# 4.2.5 EUT OPERATING CONDITIONS

The EUT tested system was configured as the statements of 2.4 Unless otherwise a special operating condition is specified in the follows during the testing.







# 4.2.6 TEST RESULTS

## Between 9KHz – 30MHz

The emission from 9 kHz to 30MHz was pre-tested and found the result was 20dB lower than the limit, and according to 15.31(o) & RSS-Gen 6.13, the test result no need to reported.

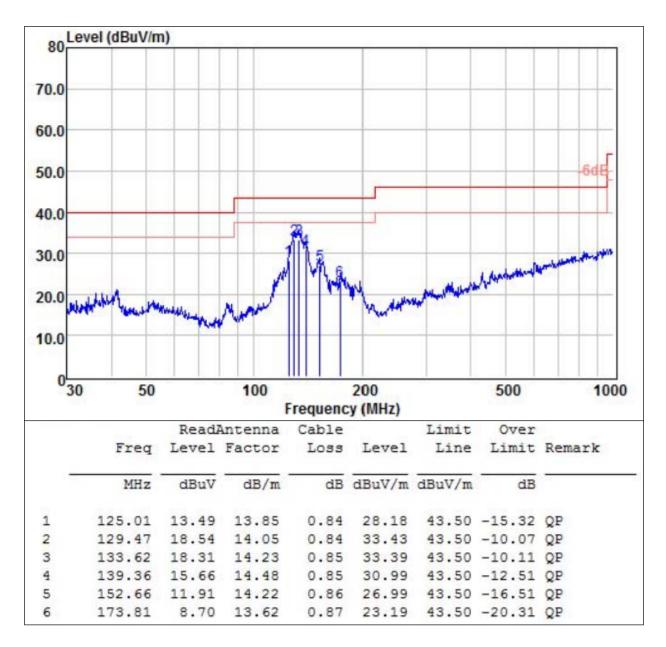






#### Between 30MHz - 1GHz

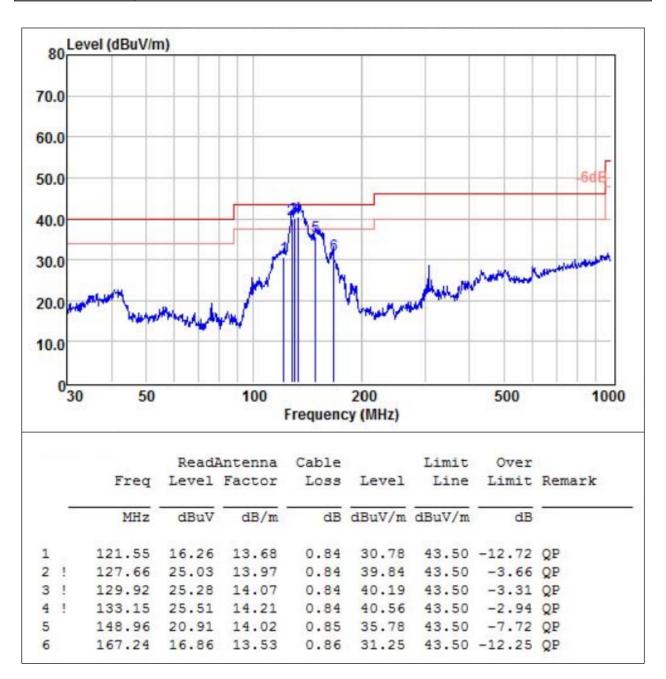
Temperature:	<b>26</b> ℃	Relative Humidity:	54%
Pressure:	101 kPa	Polarization:	Horizontal
Test Voltage:	AC 120V/60Hz		







Temperature:	<b>26</b> ℃	Relative Humidity:	54%
Pressure:	101kPa	Polarization:	Vertical
Test Voltage:	AC 120V/60Hz		



#### Remarks:

1. Final Level = Receiver Read level + Antenna Factor + Cable Loss

2. The emission levels of other frequencies are very lower than the limit and not show in test report.

3. The test data shows only the worst case GFSK mode









# Above 1 GHz Test Results (GFSK Worst Case): 1GHz~25GHz

				(	GFSK				
Polar	Frequency	Meter Reading	Pre-ampli fier	Cable Loss	Antenna Factor	Emission Level	Limits	Margin	Detector
(H/V)	(MHz)	(dBuV)	(dB)	(dB)	(dB)	(dBuV/m)	(dBuV/m)	(dB)	Туре
	•			Low Cha	nnel:2402M	Hz			
V	4804.00	59.14	30.55	5.77	24.66	59.02	74.00	-14.98	Pk
V	4804.00	47.63	30.55	5.77	24.66	47.51	54.00	-6.49	AV
V	7206.00	57.41	30.33	6.32	24.55	57.95	74.00	-16.05	Pk
V	7206.00	45.26	30.33	6.32	24.55	45.8	54.00	-8.2	AV
V	9608.00	55.26	30.85	7.45	24.69	56.55	74.00	-17.45	Pk
V	9608.00	44.17	30.85	7.45	24.69	45.46	54.00	-8.54	AV
V	12010.00	54.12	31.02	8.99	25.57	57.66	74.00	-16.34	Pk
V	12010.00	42.63	31.02	8.99	25.57	46.17	54.00	-7.83	AV
Н	4804.00	58.87	30.55	5.77	24.66	58.75	74.00	-15.25	Pk
Н	4804.00	47.56	30.55	5.77	24.66	47.44	54.00	-6.56	AV
Н	7206.00	57.41	30.33	6.32	24.55	57.95	74.00	-16.05	Pk
Н	7206.00	46.32	30.33	6.32	24.55	46.86	54.00	-7.14	AV
Н	9608.00	56.34	30.85	7.45	24.69	57.63	74.00	-16.37	Pk
Н	9608.00	43.16	30.85	7.45	24.69	44.45	54.00	-9.55	AV
Н	12010.00	54.86	31.02	8.99	25.57	58.4	74.00	-15.6	Pk
Н	12010.00	42.63	31.02	8.99	25.57	46.17	54.00	-7.83	AV

Polar	Frequency	Meter Reading	Pre-ampli fier	Cable Loss	Antenna Factor	Emission Level	Limits	Margin	Detector
(H/V)	(MHz)	(dBuV)	(dB)	(dB)	(dB)	(dBuV/m)	(dBuV/m)	(dB)	Туре
				Aiddle Ch	nannel:2441	MHz			
V	4882.00	58.47	30.55	5.77	24.66	58.35	74.00	-15.65	Pk
V	4882.00	46.35	30.55	5.77	24.66	46.23	54.00	-7.77	AV
V	7323.00	57.11	30.33	6.32	24.55	57.65	74.00	-16.35	Pk
V	7323.00	45.3	30.33	6.32	24.55	45.84	54.00	-8.16	AV
V	9764.00	55.19	30.85	7.45	24.69	56.48	74.00	-17.52	Pk
V	9764.00	43.62	30.85	7.45	24.69	44.91	54.00	-9.09	AV
V	12205.00	53.89	31.02	8.99	25.57	57.43	74.00	-16.57	Pk
V	12205.00	42.11	31.02	8.99	25.57	45.65	54.00	-8.35	AV
Н	4882.00	58.34	30.55	5.77	24.66	58.22	74.00	-15.78	Pk
Н	4882.00	46.31	30.55	5.77	24.66	46.19	54.00	-7.81	AV
Н	7323.00	57.33	30.33	6.32	24.55	57.87	74.00	-16.13	Pk
Н	7323.00	45.69	30.33	6.32	24.55	46.23	54.00	-7.77	AV
Н	9764.00	56.34	30.85	7.45	24.69	57.63	74.00	-16.37	Pk
Н	9764.00	43.12	30.85	7.45	24.69	44.41	54.00	-9.59	AV
Н	12205.00	54.18	31.02	8.99	25.57	57.72	74.00	-16.28	Pk
Н	12205.00	42.05	31.02	8.99	25.57	45.59	54.00	-8.41	AV



Polar	Frequency	Meter Reading	Pre-ampli fier	Cable Loss	Antenna Factor	Emission Level	Limits	Margin	Detector
(H/V)	(MHz)	(dBuV)	(dB)	(dB)	(dB)	(dBuV/m)	(dBuV/m)	(dB)	Туре
				High Cha	nnel:2480M	lHz			
V	4960.00	57.49	30.55	5.77	24.66	57.37	74.00	-16.63	Pk
V	4960.00	46.39	30.55	5.77	24.66	46.27	54.00	-7.73	AV
V	7440.00	55.43	30.33	6.32	24.55	55.97	74.00	-18.03	Pk
V	7440.00	44.57	30.33	6.32	24.55	45.11	54.00	-8.89	AV
V	9920.00	54.16	30.85	7.45	24.69	55.45	74.00	-18.55	Pk
V	9920.00	43.29	30.85	7.45	24.69	44.58	54.00	-9.42	AV
V	12400.00	53.76	31.02	8.99	25.57	57.3	74.00	-16.7	Pk
V	12400.00	42.11	31.02	8.99	25.57	45.65	54.00	-8.35	AV
Н	4960.00	58.29	30.55	5.77	24.66	58.17	74.00	-15.83	Pk
Н	4960.00	47.63	30.55	5.77	24.66	47.51	54.00	-6.49	AV
Н	7440.00	56.39	30.33	6.32	24.55	56.93	74.00	-17.07	Pk
Н	7440.00	46.71	30.33	6.32	24.55	47.25	54.00	-6.75	AV
Н	9920.00	55.49	30.85	7.45	24.69	56.78	74.00	-17.22	Pk
Н	9920.00	44.26	30.85	7.45	24.69	45.55	54.00	-8.45	AV
Н	12400.00	53.74	31.02	8.99	25.57	57.28	74.00	-16.72	Pk
Н	12400.00	41.69	31.02	8.99	25.57	45.23	54.00	-8.77	AV

# Remark:

1. Emission Level = Meter Reading + Antenna Factor + Cable Loss – Pre-amplifier, Margin= Emission Level - Limit

2. If peak below the average limit, the average emission was no test.

3. The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.





# 5. RADIATED BAND EMISSION MEASUREMENT

#### 5.1 Test Requirement:

Test Requirement:	FCC Part15 C Section 15.209 and 15.205				
Test Method:	ANSI C63.10: 2013				
Test Frequency Range:	All of the restrict bands were tested, only the worst band's (2310MHz to 2500MHz) data was showed.				
Test site:	Measurement Distance: 3m				
Receiver setup:	Frequency	Detector	RBW	VBW	Value
	Above	Peak	1MHz	3MHz	Peak
	1GHz	Average	1MHz	1/T	Average

# LIMITS OF RADIATED EMISSION MEASUREMENT (Above 1000MHz)

FREQUENCY (MHz)	Limit (dBuV/m) (at 3M)			
	PEAK	AVERAGE		
Above 1000	74	54		

Notes:

(1) The limit for radiated test was performed according to FCC PART 15C.

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

Spectrum Parameter	Setting
Attenuation	Auto
Start Frequency	2300MHz
Stop Frequency	2520
RB / VB (emission in restricted band)	1 MHz / 1 MHz for Peak, 1 MHz / 1/T for Average

## 5.2 TEST PROCEDURE

Above 1GHz test procedure as below:

- a. 1. The EUT was placed on the top of a rotating table 1.5 meters above the ground at a 3 meter camber. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- c. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rota table was turned from 0 degrees to 360 degrees to find the maximum reading.
- e. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
- f. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.
- g. Test the EUT in the lowest channel,the Highest channel Note:

Both horizontal and vertical antenna polarities were tested and performed pretest to three orthogonal axis. The worst case emissions were reported

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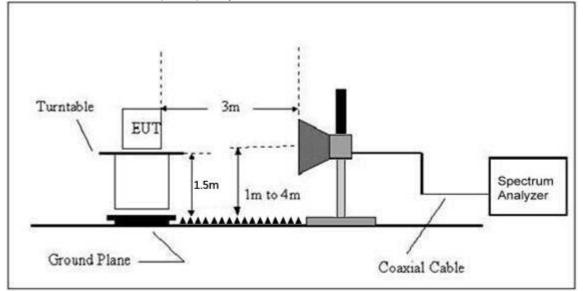




# 5.3 DEVIATION FROM TEST STANDARD No deviation

# 5.4 TEST SETUP

Radiated Emission Test-Up Frequency Above 1GHz



# 5.5 EUT OPERATING CONDITIONS

The EUT tested system was configured as the statements of 2.3 Unless otherwise a special operating condition is specified in the follows during the testing.







# 5.6 TEST RESULT

## PASS

Remark: All modes of GFSK,  $\pi/4$  DQPSK, 8DPSK were tested, only the worst result of GFSK was reported as below.

y (MHz) 2390.00 2390.00 2400.00 2390.00 2390.00 2390.00 2400.00 2400.00	Reading (dBuV) 57.49 48.22 56.37 47.11 55.83 46.29 54.27	amplifier (dB) 30.22 30.22 30.22 30.22 30.22 30.22 30.22 30.22	4.85 4.85 4.85 4.85 4.85 4.85	Factor (dB/m) I: 2402MHz 23.98 23.98 23.98 23.98 23.98 23.98 23.98	level (dBuV/m) 56.1 46.83 54.98 45.72 54.44 44.9	(dBuV /m) 74.00 54.00 74.00 54.00 74.00	tor Type PK AV PK AV PK	t PASS PASS PASS PASS		
2390.00 2400.00 2390.00 2390.00 2400.00	48.22 56.37 47.11 55.83 46.29 54.27	30.22 30.22 30.22 30.22 30.22 30.22 30.22	4.85 4.85 4.85 4.85 4.85 4.85	23.98 23.98 23.98 23.98 23.98 23.98	56.1 46.83 54.98 45.72 54.44	54.00 74.00 54.00	AV PK AV	PASS PASS PASS		
2390.00 2400.00 2390.00 2390.00 2400.00	48.22 56.37 47.11 55.83 46.29 54.27	30.22 30.22 30.22 30.22 30.22 30.22	4.85 4.85 4.85 4.85 4.85	23.98 23.98 23.98 23.98	46.83 54.98 45.72 54.44	54.00 74.00 54.00	AV PK AV	PASS PASS PASS		
2400.00 2400.00 2390.00 2390.00 2400.00	56.37 47.11 55.83 46.29 54.27	30.22 30.22 30.22 30.22	4.85 4.85 4.85 4.85	23.98 23.98 23.98	54.98 45.72 54.44	74.00 54.00	PK AV	PASS PASS		
2400.00 2390.00 2390.00 2400.00	47.11 55.83 46.29 54.27	30.22 30.22 30.22	4.85 4.85 4.85	23.98 23.98	45.72 54.44	54.00	AV	PASS		
2390.00 2390.00 2400.00	55.83 46.29 54.27	30.22 30.22	4.85 4.85	23.98	54.44					
2390.00 2400.00	46.29 54.27	30.22	4.85			74.00	PK			
2400.00	54.27			23.98	44.0			PASS		
		30.22			44.9	54.00	AV	PASS		
2400.00		00.22	4.85	23.98	52.88	74.00	PK	PASS		
	44.16	30.22	4.85	23.98	42.77	54.00	AV	PASS		
High Channel: 2480MHz           H         2483.50         58.63         30.22         4.85         23.98         57.24         74.00         PK         PASS										
2483.50	58.63	30.22	4.85	23.98	57.24	74.00	PK	PASS		
2483.50	48.63	30.22	4.85	23.98	47.24	54.00	AV	PASS		
2483.50	57.12	30.22	4.85	23.98	55.73	74.00	PK	PASS		
2483.50	47.59	30.22	4.85	23.98	46.2	54.00	AV	PASS		
2483.50	56.39	30.22	4.85	23.98	55	74.00	PK	PASS		
2483.50	47.12	30.22	4.85	23.98	45.73	54.00	AV	PASS		
2483.50	54.63	30.22	4.85	23.98	53.24	74.00	PK	PASS		
2483.50	44.96	30.22	4.85	23.98	43.57	54.00	AV	PASS		
	2483.502483.502483.502483.502483.502483.50	2483.5057.122483.5047.592483.5056.392483.5047.122483.5054.63	2483.5057.1230.222483.5047.5930.222483.5056.3930.222483.5047.1230.222483.5054.6330.22	2483.5057.1230.224.852483.5047.5930.224.852483.5056.3930.224.852483.5047.1230.224.852483.5054.6330.224.85	2483.5057.1230.224.8523.982483.5047.5930.224.8523.982483.5056.3930.224.8523.982483.5047.1230.224.8523.982483.5054.6330.224.8523.98	2483.5057.1230.224.8523.9855.732483.5047.5930.224.8523.9846.22483.5056.3930.224.8523.98552483.5047.1230.224.8523.9845.732483.5054.6330.224.8523.9853.24	2483.5057.1230.224.8523.9855.7374.002483.5047.5930.224.8523.9846.254.002483.5056.3930.224.8523.985574.002483.5047.1230.224.8523.9845.7354.002483.5054.6330.224.8523.9853.2474.00	2483.5057.1230.224.8523.9855.7374.00PK2483.5047.5930.224.8523.9846.254.00AV2483.5056.3930.224.8523.985574.00PK2483.5056.3930.224.8523.985574.00PK2483.5047.1230.224.8523.9845.7354.00AV2483.5054.6330.224.8523.9853.2474.00PK		





# 6. CONDUCTED BAND EDGE AND SPURIOUS EMISSION

Test Requirement:	FCC Part15 C Section 15.247 (d)
Test Method:	KDB558074 D0115.247 Meas Guidancev05r02

#### 6.1 Limit

Regulation 15.247 (d),In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).

#### 6.2 Test Setup



#### 6.3 Test procedure

Using the following spectrum analyzer setting:

- A) Set the RBW = 100KHz.
- B) Set the VBW = 300KHz.
- C) Sweep time = auto couple.
- D) Detector function = peak.
- E) Trace mode = max hold.
- F) Allow trace to fully stabilize.

## 6.4 DEVIATION FROM STANDARD

No deviation.



# 6.5 Test Result

Remark: Spurious Emission all modes of GFSK,  $\pi/4$  DQPSK, 8DPSK were tested, only the worst result of GFSK

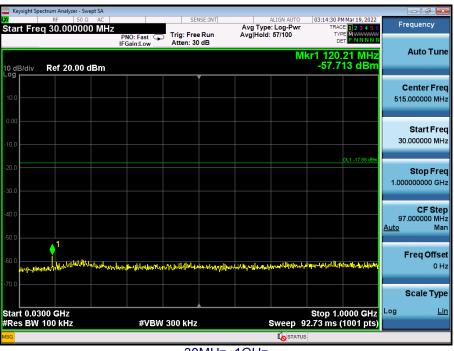
was i	reported	as	bel	low
GFSI	K mode:			

Test channel:





## CH:2402MHz



30MHz~1GHz









ш. К	eysight Sp	ectrum /	Analyzer - Sw	/ept SA									
<mark>⊯</mark> Sta	rt Fre	<sub>R</sub> ⊧ q 1.0		000 GH2					ALIGN AUTO /pe: Log-Pwr old:>100/100	TRA	M Mar 19, 2022 DE 1 2 3 4 5 6 PE M WWWW	F	requency
					PNO: Fast ( FGain:Low	Atten: 3		Avgine		₀ /kr1 2.4	64 GHz		Auto Tune
10 c Log	B/div	Re	f 20.00	dBm						-35.8	86 dBm		
10.0	·												Center Freq 0000000 GHz
-10.0	, <u> </u>										DL1 -17.98 dBm		
-20.0 -30.0		1											Start Freq
-30.0											James Car	1.00	0000000 GHz
-50.0		men	ng maham	Marthalani Mara	معداهر للادميدهم	marked and a second	Marahay and Anald T	e how and	and a second				Oton Eren
-60.0												25.00	Stop Freq 0000000 GHz
-70.0													
	rt 1.00 es BW				#VB	W 3.0 MHz			Sweep 6		5.00 GHz 1001 pts)	2.40 Auto	CF Step 0000000 GHz Man
	MODE T			Х		Y		INCTION   I	FUNCTION WIDTH	FUNCTI	ON VALUE	Auto	wan
1 2 3	N 1	1 f		2.4	64 GHz	-35.886 d	Bm						Freq Offset
4 5													0 Hz
67													
89													Scale Type
10 11											-	Log	<u>Lin</u>
•						m			-1		F		
MSG										6			

1MHz~25GHz



#### Middle channel





🔤 Keysight Spe	ectrum Analyzer - Swept SA						- 6 -
XI Start Fre	RF 50 Ω AC q 30.000000 MHz	PNO: Fast	SENSE:INT	Avg Type: Avg Hold:		03:15:52 PM Mar 19, 2 TRACE 1 2 3 4 TYPE MWW	Frequency
10 dB/div	Ref 20.00 dBm	IFGain:Low Atten:	30 dB		MI	оет <sup>р</sup> ммп kr1 120.21 M -58.141 dE	Auto Tune
10.0							Center Freq 515.000000 MHz
-10.0							Start Freq 30.000000 MHz
-20.0						DL1 -17.97	<b>Stop Freq</b> 1.000000000 GHz
-40.0							CF Step 97.000000 MHz <u>Auto</u> Man
	1 hahrdauthedantallithannadera	utranka sharibatan sakaki aharrada	MAMMAN	ultiperson and a start	"hyv-kofekterider.	aylaytrawybytywstree	Freq Offset 0 Hz
-70.0							Scale Type
Start 0.03 #Res BW		#VBW 300 kł	łz	s	weep 9	Stop 1.0000 G 2.73 ms (1001 p	HZ <sup>Log <u>Lin</u> ots)</sup>
MSG					<b>STATUS</b>		

# 30MHz~1GHz

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-



Keysight Spectrum Analyzer - Swept SA				
₩ RF 50 Ω AC Start Freg 1.000000000 GI	SENSE:I	ALIGN AUTO Avg Type: Log-Pwr	03:16:34 PM Mar 19, 2022 TRACE 1 2 3 4 5 6	Frequency
10 dB/div Ref 20.00 dBm	PNO: Fast Trig: Free Ru IFGain:Low Atten: 30 dB	n Avg Hold:>100/100	7YPE MARANAN DET P NNNNN Akr1 4.888 GHz -45.194 dBm	Auto Tune
10.0 .000 .10.0			DL1 -17.97 dBm	<b>Center Freq</b> 13.000000000 GHz
-20.0	مر میں میں اور میں میں اور میں	and the house of the net served		Start Freq 1.000000000 GHz
-50.0				<b>Stop Freq</b> 25.000000000 GHz
Start 1.00 GHz           #Res BW 1.0 MHz           MKR MODE TRC SCL         X           1         N         1         f	#VBW 3.0 MHz	Sweep 6	Stop 25.00 GHz 0.00 ms (1001 pts)	<b>CF Step</b> 2.40000000 GHz <u>Auto</u> Man
N 1 T 4	I.888 GHz -45.194 dBm		E	Freq Offset 0 Hz
7 8 9 9 10 11				<b>Scale Type</b> Log <u>Lin</u>
MSG	III	<b>I</b> o status	5	

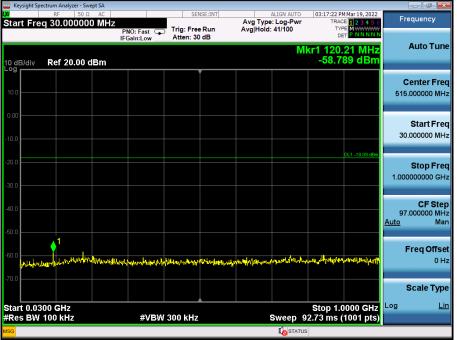
1GHz~25GHz



#### **Highest channel**



CH:2480MHz



#### 30MHz~1GHz





Keysight Spec	trum Analyzer - Swept SA						- 6 💌
Start Fred	RF 50 Ω AC 1.000000000 G	Hz	SENSE:	Avg T	ALIGN AUTO ype: Log-Pwr	03:17:37 PM Mar 19, 20 TRACE 1 2 3 4	5 6 Frequency
	-	PNO: Fast IFGain:Low	Trig: Free Ru Atten: 30 dB		6id: 2/100	TYPE WWW DET PNNN 1kr1 4.960 GH -53,846 dB	Auto Tune
10 dB/div 10.0 0.00	Ref 20.00 dBm					-55.840 UB	Center Freq 13.00000000 GHz
-20.0 -30.0 -40.0						DL1 -18.09 0	1.000000000 GHz
-50.0 -60.0	مى مى المراجع من	مينيني مريونيا ميريني ماليان ميريني مريونيا ميريني مريونيا ميريني	بلو <sub>ر م</sub> ورار مرور المرور مرور المرور مرور المرور مرور مرور مرور مرور مرور مرور مرور	Marthan Marthan	<sub>₩₩</sub> ₽₩₩₽₩₩₩₩₩₩₩₽₩₽₩₽	and the second second second	<b>Stop Freq</b> 25.000000000 GHz
Start 1.00 #Res BW 1	100 kHz	#VBW	300 kHz	` 	-	Stop 25.00 Gl 2.294 s (1001 p	
MKR MODE TRO 1 N 1 2 3 4 5 6		4.960 GHz	Ƴ -53.846 dBm	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE	Freq Offset 0 Hz
7 8 9 10 11							Scale Type
MSG			III		<b>K</b> STATUS	→ →	

1GHz~25GHz

#### Conducted band edge Test result Pass

Мо	dulation	Frequency Band	Delta Peak to band emission (dBc)	>Limit (dBc)	Result
	Nen honning	Left Band	56.13	20	Pass
OFOK	Non-hopping	Right Band	59.60	20	Pass
GFSK		Left Band	59.93	20	Pass
	hopping	Right Band	61.68	20	Pass
	Nen honning	Left Band	54.78	20	Pass
	Non-hopping	Right Band	55.91	20	Pass
π/4DQPSK	hanning	Left Band	55.74	20	Pass
	hopping	Right Band	57.35	20	Pass
	Nen henning	Left Band	50.85	20	Pass
	Non-hopping	Right Band	56.39	20	Pass
8DPSK	honoing	Left Band	53.93	20	Pass
	hopping	Right Band	58.54	20	Pass



# GFSK No-hopping Band edge-left side

Keysight Spectrum A							
RF	50 Ω AC 310000000 G		SENSE:IN		ALIGN AUTO Type: Log-Pwr	03:12:13 PM Mar 19, 2022 TRACE 1 2 3 4 5	
tart Freq 2.5	010000000	PNO: Fast C	Trig: Free Run		Hold:>100/100		₩.
		IFGain:Low _	Atten: 30 dB			001	Auto Tur
					Mk	r1 2.402 2 GHz	
0 dB/div Rei	20.00 dBm					2.067 dBm	
10.0						1	Center Fre
0.00						Y	2.36000000 GH
10.0							
20.0						DU1 -17.93 dBm	
30.0							Start Fre
							2.310000000 GI
40.0						<u>^</u> 2	
50.0						a day have	Stop Fre
60.0 <b></b>		en an	level (Carlor and a grad and a second at the	and the second	~~~	and the second	2.41000000 GI
70.0							
tart 2.31000	GH7					Stop 2.41000 GHz	CF Ste
Res BW 100		#VB	W 300 kHz			.600 ms (1001 pts)	
IKRI MODEI TRCI SCL	X		Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE	Auto Ma
1 N 1 f		102 2 GHz	2.067 dBm				
2 N 1 f	2.4	400 0 GHz	-54.059 dBm				Freq Offs
4 5						_	0 H
6							
7 8							Scale Typ
9							
10							Log <u>L</u>
			ш			•	
s <mark>G</mark>						3	

# GFSK Hopping Band edge-left side

Keysight Spectrum Analyzer - Swept SA						- 6 ×
XI         RF         50 Ω         AC           Ctrast         Energy         2.2400000000         C		SENSE:IN		ALIGN AUTO Type: Log-Pwr	03:13:17 PM Mar 19, 2022 TRACE 1 2 3 4 5 6	Frequency
Start Freq 2.310000000 G	PNO: Fast IFGain:Low	Trig: Free Run Atten: 30 dB		loid:>100/100	TYPE MWWWW DET P NNNN	Auto Tune
10 dB/div Ref 20.00 dBm		<b>T</b>			2.222 dBm	
10.0 0.00 -10.0						Center Freq 2.360000000 GHz
-20.0 -30.0 -40.0						<b>Start Freq</b> 2.310000000 GHz
-50.0 -60.0 -70.0	p	unu al munited along a	una parte a latera a late	ng fanglen a te sagerek	nu la	<b>Stop Freq</b> 2.410000000 GHz
Start 2.31000 GHz #Res BW 100 kHz	#VBW	300 kHz		Sweep 9	Stop 2.41000 GHz .600 ms (1001 pts)	CF Step 10.000000 MHz Auto Man
MKR MODE         TRC         SCL         X           1         N         1         f         2.2           2         N         1         f         2.4           3         -         -         -         -           5         -         -         -         -           6         -         -         -         -	405 2 GHz 400 0 GHz	Y 2.222 dBm -57.707 dBm	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE	Freq Offset 0 Hz
7 8 9 10						Scale Type
11 < [ MSG		m		<b>I</b> o status	• • • • • • • • • • • • • • • • • • •	



# GFSK No-hopping Band edge-right side

Keysight Spec	ctrum Analyzer -								
Start Fred		00000 GH		Trig: Free R	A	ALIGN AUTO vg Type: Log-Pwr vg Hold:>100/100	03:03:42 PM M TRACE	1ar 19, 2022 1 2 3 4 5 6 MWWWWW	Frequency
0 dB/div	Ref 20.0	0 dBm	PNO: Fast C IFGain:Low	Atten: 30 d			DET 2.480 02	PNNNNN	Auto Tur
- <b>og</b> 10.0 0.00 10.0									<b>Center Fre</b> 2.487500000 GF
20.0 30.0 40.0								1 -17.86 dBm	<b>Start Fre</b> 2.475000000 GH
50.0 60.0	manner	h	<sup>w</sup> 2	m-1/mbangenayari	Vanderson	and and the state	Jun mannigh	n Alam	<b>Stop Fre</b> 2.50000000 GF
tart 2.47	100 kHz	X	#VB	W 300 kHz	FUNCTION	Sweep 2	Stop 2.500 2.400 ms (10	001 pts)	<b>CF Ste</b> 2.500000 Mł <u>Auto</u> Mł
1 N 1 2 N 1 3 4 5 5			025 GHz 500 GHz	2.145 dBn -57.450 dBn				E	Freq Offs 0 F
7 8 9 10									Scale Typ
sg				m		<b>I</b> o statu	IS		

# GFSK Hopping Band edge-right side

Keysight Spectrum Analyzer - Swept SA				
₩ RF 50 Ω AC Start Freq 2.475000000 GHz	SENSE:INT	ALIGN AUTO Avg Type: Log-Pwr	03:05:12 PM Mar 19, 2022 TRACE 1 2 3 4 5 6	Frequency
PNO: Fas IFGain:Lo	t 🖵 Trig: Free Run w Atten: 30 dB	Avg Hold:>100/100	2.476 175 GHz 2.314 dBm	Auto Tune
				Center Fred 2.487500000 GH:
20 0			DL1 -17.69 dBm	Start Free 2.475000000 GH:
60.0	2 Marchannessen Marker and Marker Marker Marker Marker	alor manual shine	Moral Maral arounds	Stop Free 2.500000000 GH
	/BW 300 kHz	Sweep 2	Stop 2.50000 GHz 400 ms (1001 pts)	<b>CF Step</b> 2.500000 MH <u>Auto</u> Mar
MKR MODE TRC SCL X 1 N 1 f 2476 175 GHz 2 N 1 f 2483 500 GHz 3 2 3 4 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5		TION FUNCTION WIDTH	FUNCTION VALUE	Freq Offse 0 H:
7 8 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9				Scale Type
11	m	<b>I</b> STATUS		





# $\pi/4\text{-}DQPSK$ No-hopping Band edge-left side

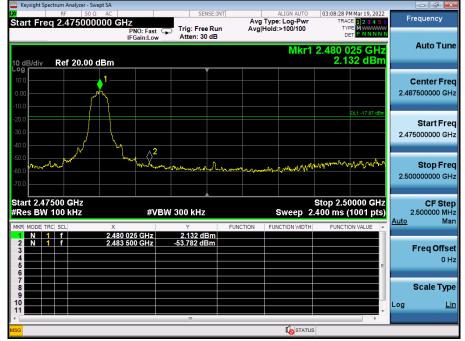
Keysight Spectrum Analyzer - Swept SA				- 7 💌
X RF 50 Ω AC Start Freq 2.310000000 G	Hz	ALIGN AUTO Avg Type: Log-Pwr	03:09:22 PM Mar 19, 2022 TRACE 1 2 3 4 5 6	Frequency
	PNO: Fast 🏹 Trig: Free Run IFGain:Low Atten: 30 dB	Avg Hold:>100/100	TYPE DET P NNNNN 1 2.402 0 GHz 2.168 dBm	Auto Tune
10 dB/div Ref 20.00 dBm				<b>Center Fre</b> 2.360000000 GH
-20.0			0(1 -17.83 dBm	<b>Start Fre</b> 2.310000000 GH
-50.0 -60.0	เราะหารไปการระบางไประหา ไก่ กองรำหรือประเทศ การเหตุไปการการเหตุไป	angler of the state of the stat	marken hannen	<b>Stop Fre</b> 2.410000000 GH
Start 2.31000 GHz #Res BW 100 kHz	#VBW 300 kHz	Sweep 9.	Stop 2.41000 GHz 600 ms (1001 pts)	CF Ste 10.000000 M⊢ <u>Auto</u> Ma
	402 0 GHz 2.168 dBm 400 0 GHz -52.616 dBm	ICTION FUNCTION WIDTH	FUNCTION VALUE	Freq Offse 0 H
7 8 9 10				Scale Typ
	m		4	

# $\pi/4\text{-}DQPSK$ Hopping Band edge-left side

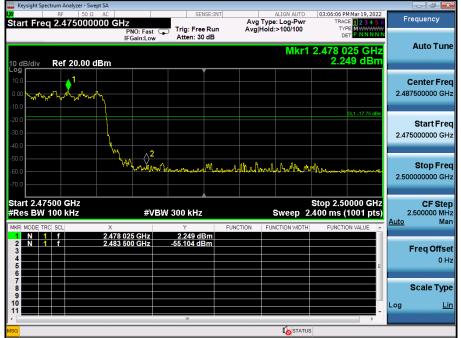
Keysight Spectrum Analyzer -	Swept SA					
Start Freq 2.3100		SENSE		ALIGN AUTO	03:10:12 PM Mar 19, 2022 TRACE 1 2 3 4 5 0	Frequency
	PNO: Fas IFGain:Lo		un Avg	Hold:>100/100		Auto Tune
10 dB/div Ref 20.0	0 dBm				<u>2.174 dBm</u>	Center Fre 2.360000000 GH
-10.0					Dc1 -17.83 dBm	<b>Start Fre</b> 2.310000000 GH
-40.0 -50.0 -60.0	analingfunctions of the state of the	ومروعية مالية ومروعية معامير ومروعية الم	n de filmente en	bywnasgael ogdel Alfang Alan Jamph	putrusundatila	<b>Stop Fre</b> 2.410000000 GH
Start 2.31000 GHz Res BW 100 kHz	#\ X	/BW 300 kHz	FUNCTION		Stop 2.41000 GHz .600 ms (1001 pts)	CF Ste 10.000000 M⊦ Auto Ma
1 N 1 f 2 N 1 f 3 4 5	2.408 8 GHz 2.400 0 GHz					Freq Offse 0 ⊦
6 7 8 9 10						Scale Typ
11 <		m				



#### π/4-DQPSK No-hopping Band edge-right side



#### $\pi$ /4-DQPSK Hopping Band edge-right side







#### 8-DQPSK No-hopping Band edge-left side

Keysight Spectrum Analyzer - Swept SA				- 7 💌
₩ RF 50 Ω AC Start Freq 2.310000000 G	H7	Avg Type: Log-Pwr	03:11:41 PM Mar 19, 2022 TRACE 1 2 3 4 5 6	Frequency
10 dB/div Ref 20.00 dBm	PNO: Fast Trig: Free Ru IFGain:Low Atten: 30 dB		r1 2.402 2 GHz 2.000 dBm	Auto Tune
			<b>1</b>	Center Free 2.360000000 GH:
-20.0			Dt1 17.00 dBm	Start Free 2.310000000 GH:
-50.0	Produce and an and the state of the strength and an and a strength and the	ىلىرىمە ئىلىلىغان مەرەلىرىكى تىرىمىلىغان مەرەلىرىكى تىرىمىلىغان تەرەپىلىغان تەرەپىلىغان تەرەپىلىغان تەرەپىلىغان مەرەپىلىغان تەرەپىلىغان تەرەپىلىغان تەرەپىلىغان تەرەپىلىغان تەرەپىلىغان تەرەپىلىغان تەرەپىلىغان تەرەپىلىغان تەر		<b>Stop Fre</b> 2.410000000 GH
Start 2.31000 GHz #Res BW 100 kHz	#VBW 300 kHz	Sweep 9	Stop 2.41000 GHz .600 ms (1001 pts)	CF Stej 10.000000 MH <u>Auto</u> Ma
1 N 1 f 2.4	402 2 GHz 2.000 dBm 400 0 GHz -48.853 dBm			Freq Offse 0 H
7 8 9 9 9 10 10 10 10 10 10 10 10 10 10 10 10 10				Scale Typ
	III			

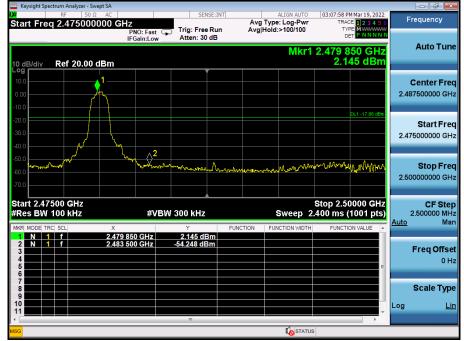
#### 8-DQPSK Hopping Band edge-left side

Keysight Spe	ectrum Analyzer - Swept							- 7
XI Start Fred	RF 50 Ω q 2.31000000		SENSE:		g Type: Log-Pwr	03:11:00 PM Mar TRACE		Frequency
		PNO: Fast IFGain:Low	Trig: Free Ro Atten: 30 dE	un Avg	g Hold:>100/100	TYPE M DET P	GHz	Auto Tun
10 dB/div Log 10.0 0.00	Ref 20.00 dE	3m				1.854		<b>Center Fre</b> 2.360000000 GH
-10.0 -20.0 -30.0 -40.0						D(1.1	8.15 dBm	<b>Start Fre</b> 2.310000000 GH
-50.0 -60.0		مري موجوع والمعاد المريح المعاد المريح ا	alj∩ปฏy^าร่องเกมรู∏ใกรเหตุ…เร	مىلىر بىرى بىرى بىرى بىرى بىرى بىرى بىرى	ามหลามกรุงไป โด <sub>ยอาก</sub> ารับรูเอ	entercontrativ		<b>Stop Fre</b> 2.410000000 GH
Start 2.31 #Res BW	100 kHz	#VI	300 kHz	FUNCTION	Sweep 9	Stop 2.41000 .600 ms (100	1 pts)	<b>CF Ste</b> 10.000000 MH <u>Auto</u> Ma
1 N 1 2 N 1 3 4 5	f	2.407 0 GHz 2.400 0 GHz	1.854 dBm -52.079 dBm					<b>Freq Offse</b> 0 H
6 7 8 9 10								Scale Typ ₋og Li
11			III		I STATUS	6	• •	

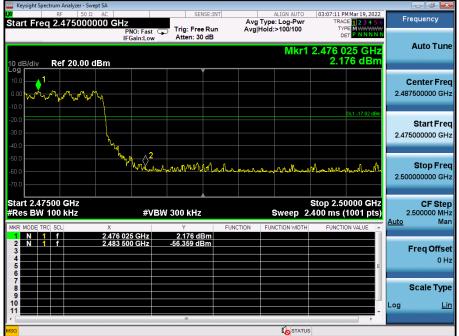




#### 8-DQPSK No-hopping Band edge-right side



#### 8-DQPSK Hopping Band edge-right side









#### 7. 20DB BANDWIDTH

Test Requirement:	FCC Part15 C Section 15.247 (a)(1)
Test Method:	ANSI C63.10:2013

# 7.1 Test Setup



#### 7.2 Limit

N/A

#### 7.3 Test procedure

- 1. Set RBW = 30 kHz.
- 2. Set the video bandwidth (VBW)  $\ge$  3 x RBW.
- 3. Detector = Peak.
- 4. Trace mode = max hold.
- 5. Sweep = auto couple.
- 6. Allow the trace to stabilize.

7. Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission.

7.4 DEVIATION FROM STANDARD

No deviation.







Mode	Test channel	20dB Emission Bandwidth (MHz)	Result
	Lowest	0.920	
GFSK	Middle	0.921	Pass
	Highest	0.884	
	Lowest	1.319	
π/4-DQPSK	Middle	1.318	Pass
	Highest	1.322	
	Lowest	1.265	
8-DPSK	Middle	1.266	Pass
	Highest	1.363	

# Test plots

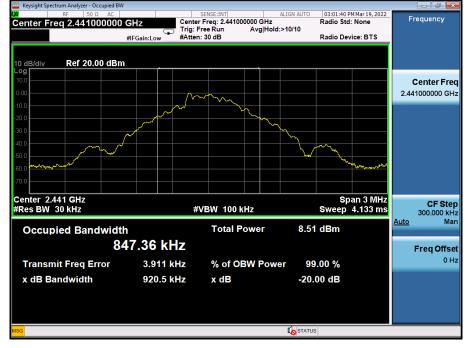


**GFSK Low Channel** 





#### **GFSK Middle Channel**



#### **GFSK High Channel**

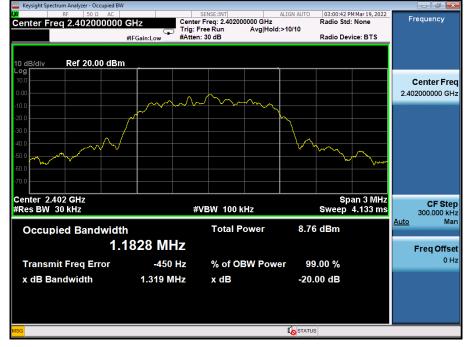








#### π/4-DQPSK Low Channel

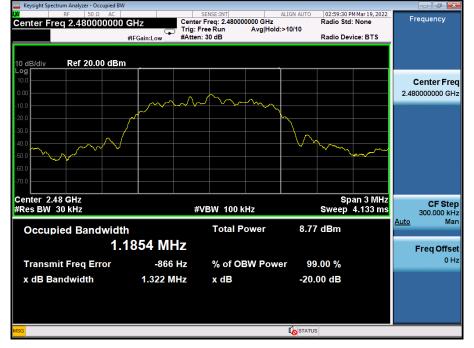


#### $\pi$ /4-DQPSK Middle Channel





#### π/4-DQPSK High Channel



# 8-DPSK Low Channel

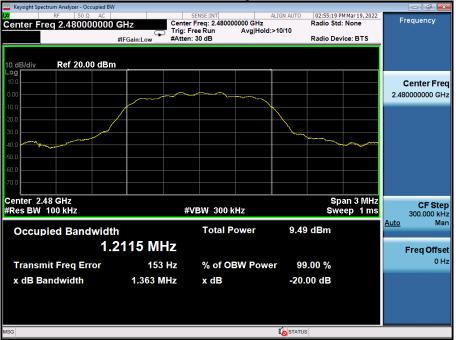




#### 8-DPSK Middle Channel



#### 8-DPSK High Channel







#### 8. Maximum Peak Output Power

Test Requirement:	FCC Part15 C Section 15.247 (b)(1)
Test Method:	ANSI C63.10:2013
Limit:	20.97dBm(for GFSK), 20.97dBm(for EDR)

# 8.1 Block Diagram Of Test Setup



#### 8.2 Limit

For frequency hopping systems operating in the 2400-2483.5 MHz band employing at least 75 non-overlapping hopping channels, and all frequency hopping systems in the 5725-5850 MHz band: 1 watt. For all other frequency hopping systems in the 2400-2483.5 MHz band: 0.125 watts.

#### 8.3 Test procedure

- 1. Remove the antenna from the EUT and then connect a low RF cable from the antenna port to the spectrum.
- 2. Set the spectrum analyzer: RBW = 2MHz. VBW = 2MHz. Sweep = auto; Detector Function = Peak.
- 3. Keep the EUT in transmitting at lowest, medium and highest channel individually. Record the max value.

#### 8.4 DEVIATION FROM STANDARD

No deviation.

8.5 Test Result

Mode	Test channel	Peak Output Power (dBm)	Limit (dBm)	Result	
	Lowest	2.959			
GFSK	Middle	2.929	20.97	Pass	
	Highest	2.961			
	Lowest	2.231			
π/4-DQPSK	Middle	2.887	20.97	Pass	
	Highest	2.849			
	Lowest	2.110			
8-DPSK	Middle	2.133	20.97	Pass	
	Highest	1.995			

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# Test plots

#### **GFSK Low Channel**

3				<b>K</b> STATUS	3	
	102000 GHz 2.0 MHz	#VBW 2	.0 MHz	Sweep 1	Span 5.000 MHz .000 ms (1001 pts)	Log <u>Lin</u>
						Scale Type
).0						Out to The
).0						0 H:
						Freq Offse
0.0						Auto Mar
).0						CF Step 500.000 kH
).0						2.404500000 GH.
1.0						Stop Free 2.404500000 GH
0.0						Start Fred 2.399500000 GHz
0.0			1			2.402000000 GHz
			Ĭ			Center Fred
dB/div	Ref 20.00 dBm			WIKT	2.402 155 GHZ 2.959 dBm	
		IFGain:Low	Atten: 30 dB		2.402 155 GHz	Auto Tun
enter Fi	req 2.402000000	GHz PNO: Fast	Trig: Free Run	Avg Type: Log-Pwr Avg Hold:>100/100	TRACE 1 2 3 4 5 6 TYPE MWWWWW DET P NNNN	Frequency
Reysigne ope	ctrum Analyzer - Swept SA RF 50 Ω AC		SENSE:INT	ALIGN AUTO	02:48:18 PM Mar 19, 2022	- 7 💌

#### **GFSK Middle Channel**



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#### **GFSK High Channel**



#### π/4-DQPSK Low Channel

Keysight Sp	ectrum Analyzer - Swept SA						- 7 🔀
<sup>ø</sup> Senter F	RF 50 Ω AC req 2.402000000		SENSE:INT	Avg Type: Lo	g-Pwr TRA	PM Mar 19, 2022 CE 1 2 3 4 5 6	Frequency
0 dB/div	Ref 20.00 dBm	PNO: Fast G	Trig: Free Run Atten: 30 dB	Avg Hold:>10	Mkr1 2.401	785 GHz 31 dBm	Auto Tune
og			1				<b>Center Fre</b> 2.402000000 GH
10.0							<b>Start Fre</b> 2.399500000 GH
20.0							<b>Stop Fre</b> 2.404500000 GH
10.0						A	CF Ste 500.000 kH uto Ma
i0.0							<b>Freq Offse</b> 0 H
70.0							Scale Type
	402000 GHz 2.0 MHz	#VBW	2.0 MHz	Sw	Span s eep 1.000 ms	5.000 MHz <sup>Lo</sup> (1001 pts)	og <u>Lii</u>
SG				Ĺ,	STATUS		





#### π/4-DQPSK Middle Channel



#### π/4-DQPSK High Channel



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# 8-DPSK Low Channel



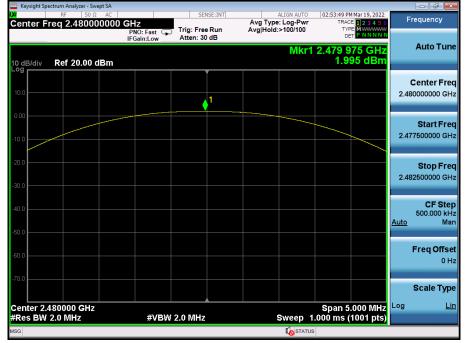
#### 8-DPSK Middle Channel

Keysight Sp	ectrum Analyzer - Swept SA								
× Center F	RF 50 Ω AC req 2.441000000	GHz	SENSE	Avg Type:	LIGN AUTO	TRAC	Mar 19, 2022	F	requency
		PNO: Fast IFGain:Low	Trig: Free R Atten: 30 dl	Avg Hold:>		TYF DE			Auto Tune
10 dB/div	Ref 20.00 dBm				MKr1	2.440 9	80 GHz 33 dBm		Auto Fun
			Ĭ						Center Fred
10.0			1					2.44	1000000 GH:
0.00									Start Free
10.0								2.43	8500000 GH
20.0									Stop Free 3500000 GH
30.0								2.44	13500000 GH
40.0									CF Stej 500.000 kH
50.0								<u>Auto</u>	Ma
60.0									Freq Offse
70.0									0 H
									Scale Type
Center 2.4 #Res BW	441000 GHz 2.0 MHz	#VBW	2.0 MHz	5	Sweep 1	Span 5 .000 ms (	.000 MHz 1001 pts)	Log	<u>Lir</u>
ISG					<b>I</b> STATUS				





# 8-DPSK High Channel









Test Requirement:	FCC Part15 C Section 15.247 (a)(1)
Test Method:	ANSI C63.10:2013
Receiver setup:	RBW=100KHz, VBW=300KHz, detector=Peak
Limit:	GFSK: 20dB bandwidth $\pi$ /4-DQPSK & 8DPSK: 0.025MHz or 2/3 of the 20dB bandwidth (whichever is greater)

#### 9.1 Test Setup

EUT	SPECTRUM
	ANALYZER

#### 9.2 Test procedure

1. Remove the antenna from the EUT and then connect a low RF cable from the antenna port

to the spectrum.

2. Set the spectrum analyzer: RBW = 100kHz. VBW = 300kHz , Span = 3.0MHz. Sweep = auto; Detector Function = Peak. Trace = Max hold.

3. Allow the trace to stabilize. Use the marker-delta function to determine the separation between the peaks of the adjacent channels. The limit is specified in one of the subparagraphs of this Section Submit this plot.

9.3 DEVIATION FROM STANDARD No deviation.







#### 9.4 Test Result

Modulation	Test Channel	Separation (MHz)	Limit(MHz)	Result
GFSK	Low	0.994	0.920	PASS
GFSK	Middle	1.000	0.921	PASS
GFSK	High	1.000	0.884	PASS
π/4-DQPSK	Low	0.998	0.879	PASS
π/4-DQPSK	Middle	1.002	0.878	PASS
π/4-DQPSK	High	1.004	0.881	PASS
8-DPSK	Low	1.002	0.843	PASS
8-DPSK	Middle	1.008	0.844	PASS
8-DPSK	High	1.000	0.909	PASS

#### Test plots GFSK Low Channel







# GFSK Middle Channel



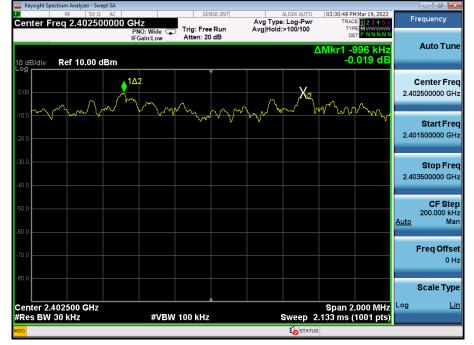
# **GFSK High Channel**







## π/4-DQPSK Low Channel



# π/4-DQPSK Middle Channel



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#### π/4-DQPSK High Channel



# 8-DPSK Low Channel



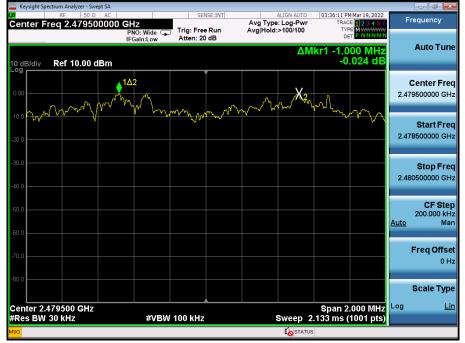








8-DPSK High Channel



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#### **10.NUMBER OF HOPPING FREQUENCY**

Test Requirement:	FCC Part15 C Section 15.247 (a)(1)(iii)
Test Method:	ANSI C63.10:2013
Receiver setup:	RBW=100kHz, VBW=300kHz, Frequency range=2400MHz-2483.5MHz, Detector=Peak
Limit:	15 channels

#### 10.1 Test Setup

EUT	SPECTRUM
	ANALYZER

#### 10.2 Test procedure

1. Remove the antenna from the EUT and then connect a low RF cable from the antenna port to the spectrum.

2. Set the spectrum analyzer: RBW = 100kHz. VBW = 300kHz. Sweep = auto; Detector Function = Peak. Trace = Max hold.

3. Allow the trace to stabilize. It may prove necessary to break the span up to sections. in order to clearly show all of the hopping frequencies. The limit is specified in one of the subparagraphs of this Section.

4. Set the spectrum analyzer: Start Frequency = 2.4GHz, Stop Frequency = 2.4835GHz. Sweep=auto;

10.3 DEVIATION FROM STANDARD No deviation.

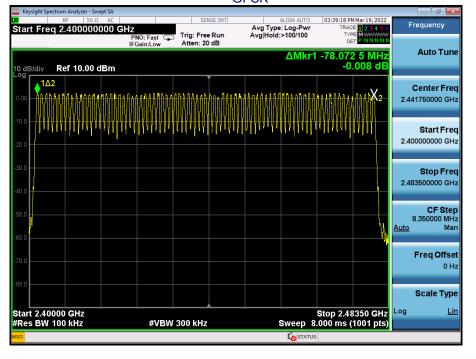




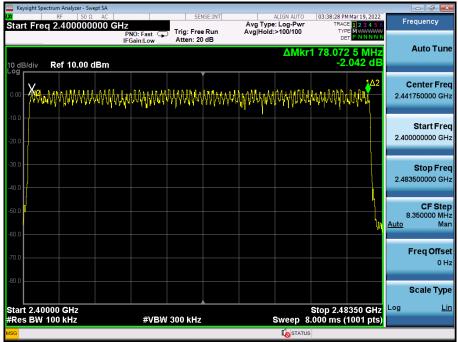


#### 10.4 Test Result

#### Test Plots: 79 Channels in total GFSK



## π/4-DQPSK



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					0-L	PSK					
	ectrum Analyzer - Sw									_	
<mark>(</mark> Start Ere	RF 50 Ω cq 2.400000			SEN	NSE:INT		LIGN AUTO		M Mar 19, 2022	F	requency
start me	sq 2.400000	Р	NO: Fast 🕞 Gain:Low	Trig: Free Atten: 20		Avg Hold:		TY			
10 dB/div	Ref 10.00 (	dBm					ΔMk	r1 78.40 -1	6 5 MHz .387 dB		Auto Tune
0.00	MMMMM	WWW	WWW	AMAMAA	MMM	WWW	patrickally	WWWW.			<b>Center Freq</b> 1750000 GHz
20.0										2.40	Start Freq 0000000 GHz
30.0 40.0										2.48	Stop Freq 3500000 GHz
50.0 <b></b>										<u>Auto</u>	<b>CF Step</b> 3.350000 MHz Man
70.0											Freq Offset 0 Hz
80.0											Scale Type
	0000 GHz 100 kHz		#VBW	300 kHz			Sweep	Stop 2.4 8.000 ms (	8350 GHz (1001 pts)	Log	<u>Lin</u>
ISG							<b>I</b> o STATU	IS			

8-DPSK



#### **11. DWELL TIME**

Test Requirement:	FCC Part15 C Section 15.247 (a)(1)(iii)
Test Method:	ANSI C63.10:2013
Receiver setup:	RBW=1MHz, VBW=3MHz, Span=0Hz, Detector=Peak
Limit:	0.4 Second

# 11.1 Test Setup

EUT	SPECTRUM
	ANALYZER

#### 11.2 Test procedure

1. Remove the antenna from the EUT and then connect a low RF cable from the antenna port to the spectrum.

2. Set spectrum analyzer span = 0Hz;

3. Set RBW = 1MHz and VBW = 3MHz.Sweep = as necessary to capture the entire dwell time per hopping channel. Set the EUT for DH5, DH3 and DH1 packet transmitting.

4. Use the marker-delta function to determine the dwell time. If this value varies with different modes of operation (e.g., data rate, modulation format, etc.), repeat this test for each variation. The limit is specified in one of the subparagraphs of this Section. Submit this plot(s).

11.3 DEVIATION FROM STANDARD No deviation.







# 11.4 Test Result

#### GFSK DH5 mode:

Frequency	Frequency Packet		Limit(ms)	Result
2402MHz	DH5	312.85	400	Pass
2441MHz	DH5	311.15	400	Pass
2480MHz	DH5	312.00	400	Pass

Remarks:

The test period: T= 0.4 Second/Channel x 79 Channel = 31.6 s

Test channel: as blow

CH:2402MHz time slot=2.933(ms)\*(1600/ (6\*79))\*31.6=312.85ms

CH:2441MHz time slot=2.917(ms)\*(1600/ (6\*79))\*31.6=311.15ms

CH:2480MHz time slot=2.925(ms)\*(1600/ (6\*79))\*31.6=312.00ms

 $\pi$ /4-DQPSK mode:

Frequency	Packet	Dwell time(ms)	Limit(ms)	Result
2402MHz	2DH5	312.85	400	Pass
2441MHz	2DH5	312.85	400	Pass
2480MHz	2DH5	313.81	400	Pass

Remarks:

The test period: T= 0.4 Second/Channel x 79 Channel = 31.6 s Test channel: as blow CH:2402MHz time slot=2.933(ms)\*(1600/ (6\*79))\*31.6=312.85ms CH:2441MHz time slot=2.933(ms)\*(1600/ (6\*79))\*31.6=312.85ms CH:2480MHz time slot=2.942(ms)\*(1600/ (6\*79))\*31.6=313.81ms

#### 8-DPSK mode:

Frequency	Packet	Dwell time(ms)	Limit(ms)	Result
2480MHz	3DH5	311.15	400	Pass
2480MHz	3DH5	313.81	400	Pass
2480MHz	3DH5	312.85	400	Pass

Remarks:

The test period: T= 0.4 Second/Channel x 79 Channel = 31.6 s Test channel: as blow CH:2402MHz time slot=2.917(ms)\*(1600/ (6\*79))\*31.6=311.15ms CH:2441MHz time slot=2.942(ms)\*(1600/ (6\*79))\*31.6=313.81ms CH:2480MHz time slot=2.933(ms)\*(1600/ (6\*79))\*31.6=312.85ms



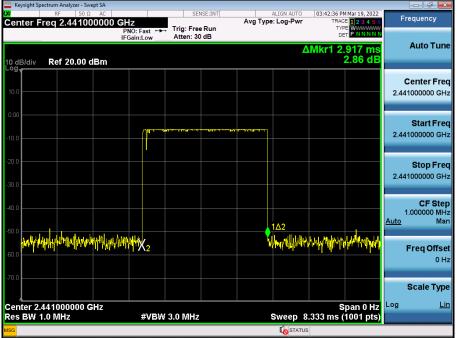




#### GFSK 2402MHz

Keysight Spectrum Analyzer - Swept SA					- 6 ×
RF 50 Ω AC Center Freq 2.40200000	0 GHz	SENSE:INT	ALIGN AUTO Avg Type: Log-Pwr	03:41:49 PM Mar 19, 2022 TRACE 1 2 3 4 5 6	Frequency
0 dB/div Ref 20.00 dBm	PNO: Fast ↔ IFGain:Low	Trig: Free Run Atten: 30 dB	Δ	Mkr1 2.933 ms 1.82 dB	Auto Tune
10.0					Center Fred 2.402000000 GH:
0.00					Start Fred 2.402000000 GHz
30.0					<b>Stop Fred</b> 2.402000000 GHz
40.0				162	<b>CF Stej</b> 1.000000 MH <u>Auto</u> Ma
	n'nddfolan yn dynhol yn y	him hall har		yhmynu	Freq Offse 0 H
center 2.402000000 GHz				opunvnz	Scale Type
tes BW 1.0 MHz	#VBW	3.0 MHz	Sweep 8	.333 ms (1001 pts)	

#### GFSK 2441MHz



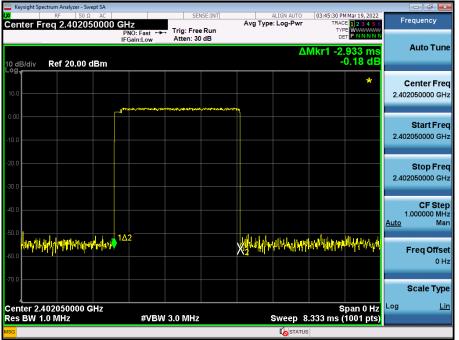




#### GFSK 2480MHz

🚾 Keysight Sp	ectrum Analyzer - Swept S	А									- 7
<u>KI</u>	RF 50 Ω A			SEI	ISE:INT	Aver Turn	ALIGN AUTO e: Log-Pwr		Mar 19, 2022	F	requency
Senter F	req 2.4800000	PNC	:Fast ↔ in:Low	Trig: Free Atten: 30		Avgiyp	e. Log-Pwi	TYP			
l0 dB/div _og <sub>w</sub>	Ref 20.00 dBr	n					Δ		925 ms 1.53 dB		Auto Tune
10.0											Center Free 0000000 GH
0.00		<u>, П., </u>	· · ·		4					2.48	Start Free
20.0										2.48	<b>Stop Fre</b> 0000000 GH
40.0										<u>Auto</u>	<b>CF Stej</b> 1.000000 MH Mai
50.0 60.0	ullyfliffiallitaninglyfrig	X <sub>2</sub>				1 <u>0</u> 2	hintidypu	ur hiyya a	hur yan yan ya		Freq Offse 0 H
70.0											Scale Typ
Center 2. Res BW	480000000 GHz 1.0 MHz		#VBW	3.0 MHz			Sweep 8	S .333 ms (	pan 0 Hz 1001 pts)	Log	Li
SG										_	

#### π/4-DQPSK 2402MHz







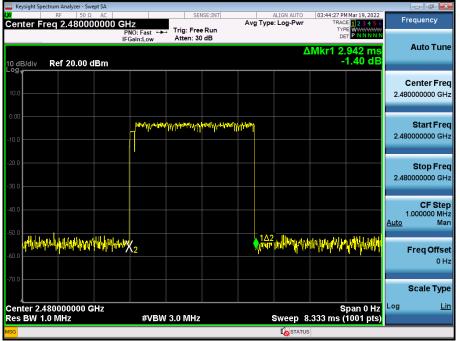




#### π/4-DQPSK 2441MHz

Keysight Spectrum Analyzer - Swept SA					
X/ RF 50 Ω AC		ISE:INT	ALIGN AUT		
Center Freq 2.441000000	PNO: Fast +++ Trig: Free	Run	Avg Type: Log-Pw	TYPE WAAAAAAAA	¥
	IFGain:Low Atten: 30			DET P NNNN	
				ΔMkr1 2.933 ms	Auto Tune
10 dB/div Ref 20.00 dBm				-1.45 dE	
Log					
					Center Fred
10.0					2.441000000 GHz
0.00					
<mark>MP<sup>4</sup>4/<sup>N</sup></mark>	rant-rangetarangetar	<sup>14</sup> 11			Start Freq
-10.0					2.441000000 GHz
-20.0					Stop Fred
					2.441000000 GHz
-30.0					2.441000000 0112
-40.0					CF Step
					1.000000 MHz Auto Mar
-50.0		140-			Auto
Man Manual Ya			An ALIA LAUANAM	ar walled from the first of the	
-60.0			es A of Actual of a	ale a conclusion della la della	Freq Offset
					0 Hz
-70.0					
					Scale Type
Center 2.441000000 GHz				Span 0 Hz	Log <u>Lin</u>
Res BW 1.0 MHz	#VBW 3.0 MHz		Sweep	8.333 ms (1001 pts	
ISG			I sta	TUS	

#### π/4-DQPSK 2480MHz



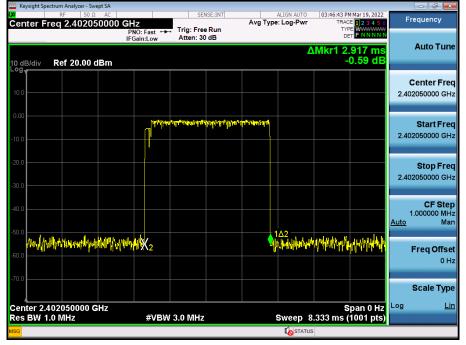
Shenzhen ZKT Technolgy Co., Ltd. 1/F, No. 101, Building B, No. 6, Tangwei Community Industrial Avenue, Fuhai Street, Bao'an District, Shenzhen, China

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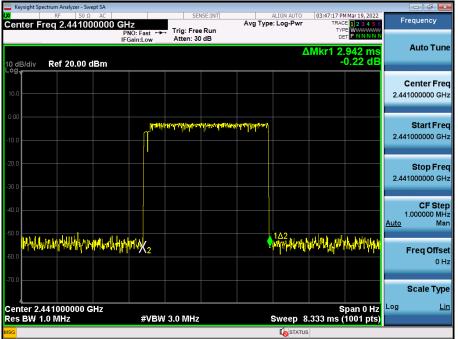




#### 8-DPSK 2402MHz



# 8-DPSK 2441MHz







# 8-DPSK 2480MHz

Keysight Spectrum Analyzer - Swept SA					- J ×
<b>X</b> RF 50 Ω AC		SENSE:INT	ALIGN AUTO Avg Type: Log-Pwr	03:47:55 PM Mar 19, 2022 TRACE 1 2 3 4 5 6	Frequency
Center Freq 2.480050000	PNO: Fast	. Trig: Free Run Atten: 30 dB	Avg Type. Log-Pwi		
10 dB/div Ref 20.00 dBm			L	∆Mkr1 2.933 ms -0.08 dB	Auto Tune
				*	Center Free
10.0		<sup>๛</sup> มีมาณาะสะปุญาณา <sub>ต</sub> องปุญาณได้	-144		2.480050000 GH
0.00					Start Fre
10.0					2.480050000 GH
20.0					Stop Fre
30.0					2.480050000 GH
40.0					CF Step 1.000000 MH
50.0					Auto Ma
May you and a manager and a second	K <sub>2</sub>			h h w h h h h h h h h h h h h h h h h h	FreqOffse
					0 H
70.0					Scale Typ
Center 2.480050000 GHz				Span 0 Hz	Log <u>Li</u>
Res BW 1.0 MHz	#VBW	3.0 MHz	Sweep 8	3.333 ms (1001 pts)	
G			Lo STATU	S	





# R

# 12. Antenna Requirement

Standard requirement: FCC Part15 C Section 15.203 /247(c)
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#### 15.203 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, 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.

#### 15.247(c) (1)(i) requirement:

(i) Systems operating in the 2400-2483.5 MHz band that is used exclusively for fixed. Point-to-point operations may employ transmitting antennas with directional gain greater than 6dBi provided the maximum conducted output power of the intentional radiator is reduced by 1 dB for every 3 dB that the directional gain of the antenna exceeds 6dBi.

#### EUT Antenna:

The antennas are External antenna, the best case gain of the antennas are 3dBi.









Reference to the **appendix I** for details.

# **14. EUT Constructional Details**

Reference to the appendix II for details.

\*\*\*\*\* END OF REPORT \*\*\*\*\*

