FCC Part 15C Test Report
FCC ID: 2A5QJXDSDGRYPHON

Applicant:	Abbingdon Global Limited
Address:	79 SCARISBRICK NEW ROAD SOUTHPORT ENGLAND United Kingdom
Manufacturer:	Abbingdon Global Limited
Address:	79 SCARISBRICK NEW ROAD SOUTHPORT ENGLAND United Kingdom
EUT:	USB/Bluetooth decoder
Trade Mark:	ifi
Model Number:	xDSD Gryphon
Date of Receipt:	Mar. 14, 2022
Test Date:	Mar. 14 - 25, 2022
Date of Report:	Mar. 25, 2022
Prepared By:	Shenzhen DL Testing Technology Co., Ltd.
Address:	101-201, Building C, Shuanghuan, No.8, Baoqing Road, Baolong Industrial Zone, Baolong Street, Longgang District, Shenzhen, Guangdong, China
Applicable Standards:	FCC PART 15 C 15.247 ANSI C63.10:2013
Test Result:	Pass
Report Number:	DL-20220324009E

Prepared (Test Engineer):	Pxing Huang
Reviewer (Supervisor):	Jack Bu
Approved (Manager):	Jade Yang

This test report is based on a single evaluation of one sample of above mentioned products. It is not permitted to be duplicated in extracts without written approval of Shenzhen DL Testing Technology Co., Ltd.

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1. SUMMARY OF TEST RESULTS

Test procedures according to the technical standards:

FCC Part15 (15.247) , Subpart C			
Standard Section	Test Item	Judgment	Remark
15.207	Conducted Emission	PASS	
15.209(a)	Radiated Spurious Emission	PASS	
15.205	Restricted Band Edge	PASS	
15.247(b)(1)	Peak Output Power	PASS	
15.247(a)(1)(iii)	Number of Hopping Frequency	PASS	
15.247(a)(1)(iii)	Dwell Time	PASS	
15.247(a)(1)	Bandwidth	PASS	
15.247(a)(1)	Hopping Channel Separation	PASS	
15.247 (d)	Conducted Unwanted Emissions and Bandedge	PASS	
15.203	Antenna Requirement	PASS	

NOTE:

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

TEST FACILITY

Shenzhen DL Testing Technology Co., Ltd.
Add. : 101-201, Building C, Shuanghuan, No.8, Baoqing Road, Baolong Industrial Zone, Baolong Street, Longgang District, Shenzhen, Guangdong, China

FCC Test Firm Registration Number: 854456
Designation Number: CN1307
IC Registered No.:CN0118

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** %。

No.	Item	Uncertainty
1	Conducted Emission Test	±2.56dB
2	RF power,conducted	±0.42dB
3	Spurious emissions,conducted	±2.76dB
4	All emissions,radiated(<1G)	±3.65dB
5	All emissions,radiated(>1G)	±4.89dB
6	Temperature	±0.5°C
7	Humidity	±2%

2. GENERAL INFORMATION

2.1. GENERAL DESCRIPTION OF EUT

Product Name:	USB/Bluetooth decoder
Model No.:	xDSD Gryphon
Sample ID:	DL-20220324009E-1#
Serial No.:	N/A
Model Difference	N/A
Operation Frequency:	2402~2480MHz
Channel numbers:	79 Channels
Channel separation:	1/2/3M
Modulation technology:	GFSK, π/4-DQPSK, 8DPSK
Antenna Type:	Internal Antenna
Antenna gain:	0dBi
Power supply:	DC 3.8V by battery ; Charging input: DC 5V
Charging Battery Information:	Model: 756288 Nominal Voltage: 3.8V Nominal Capacity: 3600mAh

Note:

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

2.The EUT's all information provided by client.

2.

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
~	~	~	~	~	~
08	2410	35	2437	62	2464
09	2411	36	2438	63	2465
10	2412	37	2439	64	2466
11	2413	38	2441	65	2467
12	2414	39	2441	66	2468
13	2415	40	2442	67	2469
~	~	~	~	~	~
14	2416	41	2443	68	2470
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		

2.2. DESCRIPTION OF TEST MODES

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 above was evaluated respectively.

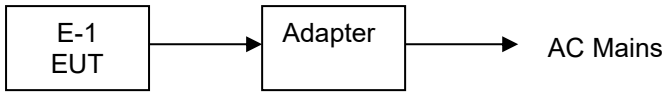
Pretest Mode	Description	
Mode 1	CH00	GFSK, π /4 DQPSK, 8DPSK
Mode 2	CH39	
Mode 3	CH78	
Mode 4	Link Mode	
For Conducted & Radiated Emission		
Final Test Mode	Description	
Mode 1	CH00	GFSK, π /4 DQPSK, 8DPSK
Mode 2	CH39	
Mode 3	CH78	
Mode 4	Link Mode	

Note:

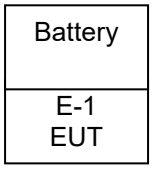
(1) The measurements are performed at the highest, middle, lowest available channels.

2.3. BLOCK DIGRAM SHOWING THE CONFIGURATION OF SYSTEM TESTED

Radiated Spurious Emission Test



Conducted Spurious Emission Test



2.4. DESCRIPTION OF SUPPORT UNITS(CONDUCTED MODE)

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	Model/Type No.	Series No.	Note
E-1	USB/Bluetooth decoder	xDSD Gryphon	N/A	EUT
AE	Notebook	B40-80	MP07F6JD	AE

Item	Shielded Type	Ferrite Core	Length	Note

Note:

(1) For detachable type I/O cable should be specified the length in cm in 『Length』 column.

2.5. TABLE OF PARAMETERS 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 end product.

Test software Version	Test program: AB456X		
Frequency	2402 MHz	2441 MHz	2480 MHz
Power Setting of Softwave	61	61	61

2.6. EQUIPMENTS LIST FOR ALL TEST ITEMS

Radiation test, Band-edge test and 6db bandwidth test equipment

Item	Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until
1	Spectrum Analyzer (9kHz-26.5GHz)	Agilent	E4408B	MY50140780	Dec. 07, 2021	Dec. 06, 2022
2	Test Receiver (9kHz-7GHz)	R&S	ESRP7	101393	Dec. 07, 2021	Dec. 06, 2022
3	Bilog Antenna (30MHz-1GHz)	R&S	VULB9162	00306	Dec. 07, 2021	Dec. 06, 2022
4	Horn Antenna (1GHz-18GHz)	Schwarzbeck	BBHA9120D	02139	Dec. 07, 2021	Dec. 06, 2022
5	Horn Antenna (18GHz-40GHz)	A.H. Systems	SAS-574	588	Dec. 07, 2021	Dec. 06, 2022
6	Amplifier (9KHz-6GHz)	Schwarzbeck	BBV9743B	00153	Dec. 07, 2021	Dec. 06, 2022
7	Amplifier (1GHz-18GHz)	EMEC	EM01G8GA	00270	Dec. 07, 2021	Dec. 06, 2022
8	Amplifier (18GHz-40GHz)	Quanjuda	DLE-161	97	Dec. 07, 2021	Dec. 06, 2022
9	Loop Antenna (9KHz-30MHz)	Schwarzbeck	FMZB1519B	00014	Dec. 07, 2021	Dec. 06, 2022
10	RF cables1 (9kHz-1GHz)	ChengYu	966	004	Dec. 07, 2021	Dec. 06, 2022
11	RF cables2 (1GHz-40GHz)	ChengYu	966	003	Dec. 07, 2021	Dec. 06, 2022
12	Antenna connector	Florida RF Labs	N/A	RF 01#	Dec. 07, 2021	Dec. 06, 2022
13	Power probe	KEYSIGHT	U2021XA	MY55210018	Dec. 07, 2021	Dec. 06, 2022
14	Signal Analyzer 9kHz-26.5GHz	Agilent	N9020A	MY55370280	Dec. 07, 2021	Dec. 06, 2022
15	Test Receiver 20kHz-40GHz	R&S	ESU 40	100376	Dec. 07, 2021	Dec. 06, 2022
16	D.C. Power Supply	LongWei	PS-305D	010964729	Dec. 07, 2021	Dec. 06, 2022

Conduction Test equipment

Item	Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until
1	843 Shielded Room	ChengYu	843 Room	843	Dec. 07, 2021	Dec. 06, 2022
2	EMI Receiver	R&S	ESR	101421	Dec. 07, 2021	Dec. 06, 2022
3	LISN	R&S	ENV216	102417	Dec. 07, 2021	Dec. 06, 2022
4	843 Cable 1#	ChengYu	CE Cable	001	Dec. 07, 2021	Dec. 06, 2022

Other

Item	Name	Manufacturer	Model	Software version
1	EMC Conduction Test System	FALA	EZ_EMC	EMC-CON 3A1.1
2	EMC radiation test system	FALA	EZ_EMC	FA-03A2
3	RF test system	MAIWEI	MTS8310	2.0.0.0
4	RF communication test system	MAIWEI	MTS8200	2.0.0.0

3. EMC EMISSION TEST

3.1. CONDUCTED EMISSION MEASUREMENT

POWER LINE CONDUCTED EMISSION Limits (Frequency Range 150KHz-30MHz)

FREQUENCY (MHz)	Limit (dBuV)		Standard
	Quasi-peak	Average	
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) The tighter limit applies at the band edges.

(2) The limit of " * " marked band means the limitation decreases linearly with the logarithm of the frequency in the range.

The following table is the setting of the receiver

Receiver Parameters	Setting
Attenuation	10 dB
Start Frequency	0.15 MHz
Stop Frequency	30 MHz
IF Bandwidth	9 kHz

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.

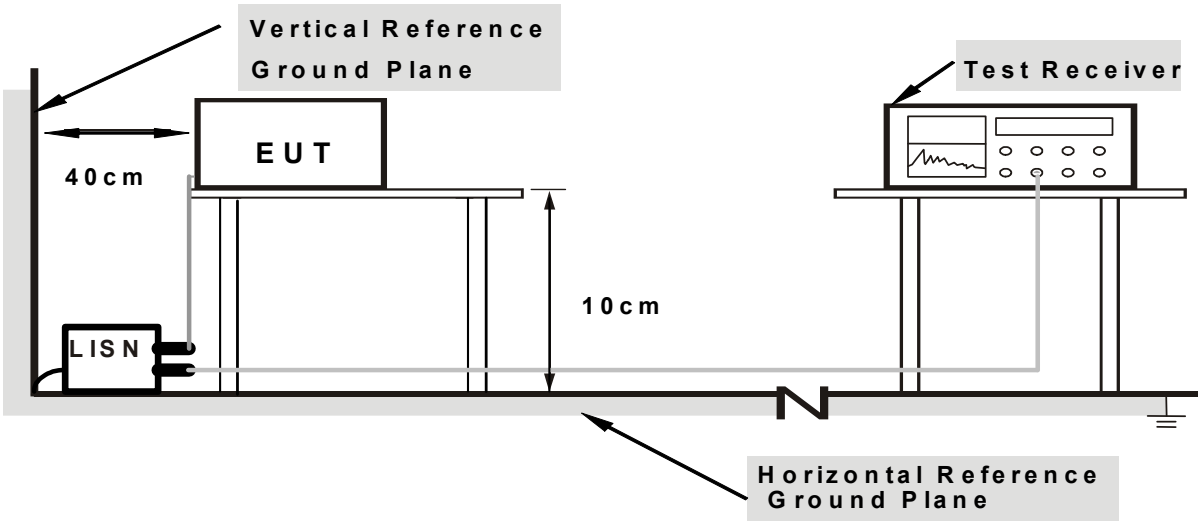
d. LISN at least 80 cm from nearest part of EUT chassis.

e. For the actual test configuration, please refer to the related Item –EUT Test Photos.

DEVIATION FROM TEST STANDARD

No deviation

TEST SETUP



Note: 1.Support units were connected to second LISN.
2.Both of LISNs (AMN) are 80 cm from EUT and at least 80 from other units and other metal planes

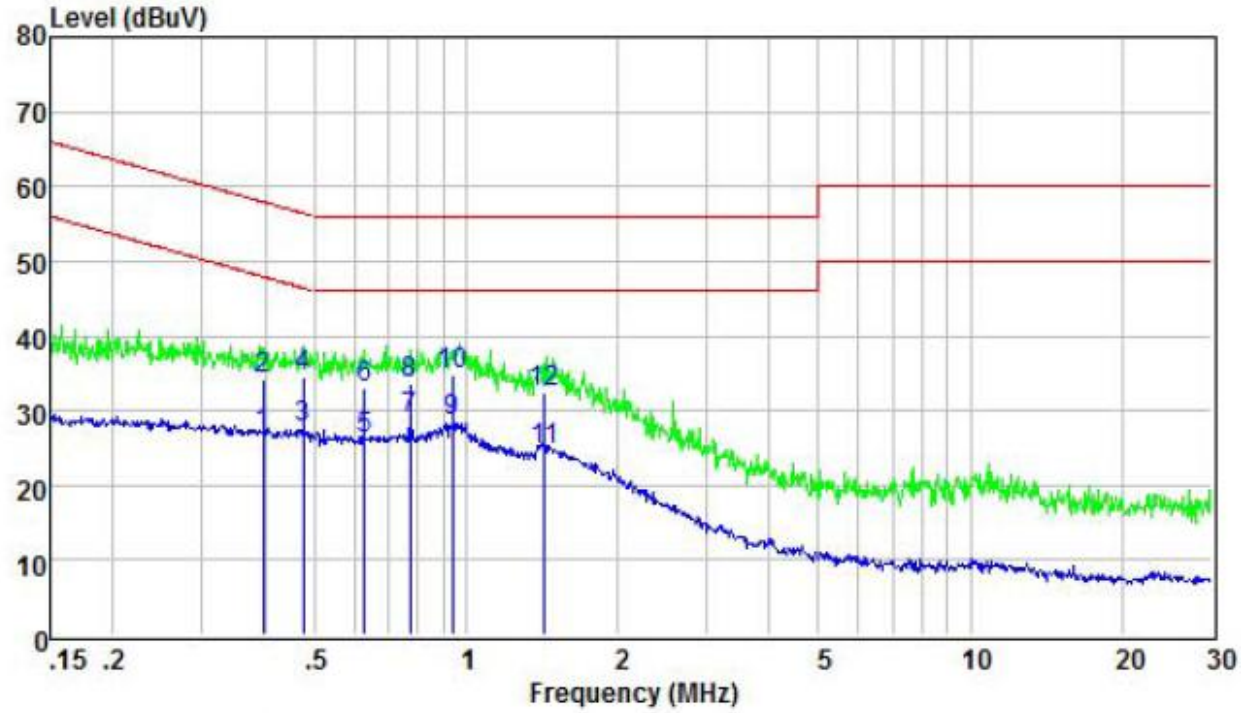
EUT OPERATING CONDITIONS

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.

TEST RESULTS

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

Temperature:	25 ℃	Relative Humidity:	54%
Pressure:	1010hPa	Phase :	L
Test Voltage :	AC 120V/60Hz	Test Mode:	Mode 4

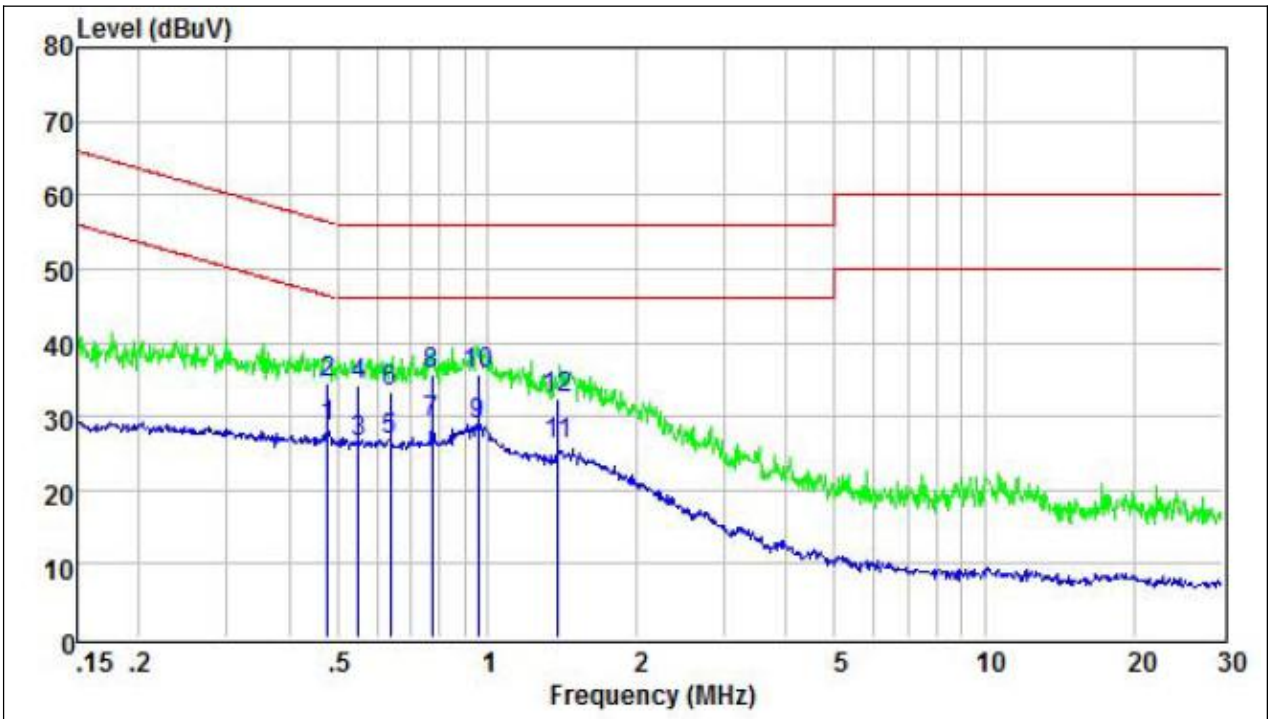


Remark:

Margin = Limit – Level, Correct Factor = Cable lose + LISN insertion loss, Level= Reading + Correct factor

	Freq	Read Level	LISN Factor	Cable Loss	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dB	dBuV	dB	
1	0.40	17.41	9.48	0.01	47.95	-21.05	Average
2	0.40	24.69	9.48	0.01	57.95	-23.77	QP
3	0.48	18.20	9.49	0.01	46.41	-18.71	Average
4	0.48	25.02	9.49	0.01	56.41	-21.89	QP
5	0.63	16.71	9.50	0.01	46.00	-19.78	Average
6	0.63	23.55	9.50	0.01	56.00	-22.94	QP
7	0.78	19.19	9.50	0.01	46.00	-17.30	Average
8	0.78	24.01	9.50	0.01	56.00	-22.48	QP
9	0.94	18.91	9.51	0.01	46.00	-17.57	Average
10	0.94	25.24	9.51	0.01	56.00	-21.24	QP
11	1.43	15.11	9.52	0.01	46.00	-21.36	Average
12	1.43	22.99	9.52	0.01	56.00	-23.48	QP

Temperature:	25 ℃	Relative Humidity:	54%
Pressure:	1010hPa	Phase :	N
Test Voltage :	AC 120V/60Hz	Test Mode:	Mode 4



Remark:

Margin = Limit – Level, Correct Factor = Cable lose + LISN insertion loss, Level= Reading + Correct factor

	Freq	Read Level	LISN Factor	Cable Loss	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dB	dBuV	dB	
1	0.48	19.18	9.41	0.01	46.36	-17.76	Average
2	0.48	25.04	9.41	0.01	56.36	-21.90	QP
3	0.55	16.94	9.42	0.01	46.00	-19.63	Average
4	0.55	24.85	9.42	0.01	56.00	-21.72	QP
5	0.64	17.38	9.42	0.01	46.00	-19.19	Average
6	0.64	24.00	9.42	0.01	56.00	-22.57	QP
7	0.78	19.61	9.43	0.01	46.00	-16.95	Average
8	0.78	26.36	9.43	0.01	56.00	-20.20	QP
9	0.96	19.54	9.43	0.01	46.00	-17.02	Average
10	0.96	26.26	9.43	0.01	56.00	-20.30	QP
11	1.39	16.61	9.44	0.01	46.00	-19.94	Average
12	1.39	22.99	9.44	0.01	56.00	-23.56	QP

3.2. RADIATED EMISSION MEASUREMENT

RADIATED EMISSION LIMITS (Frequency Range 9kHz-1000MHz)

In case the emission fall within the restricted band specified on 15.205(a), then the 15.209(a) limit in the table below has to be followed.

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 (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	1000 MHz
Stop Frequency	25GHz
RB / VB (emission in restricted band)	1 MHz / 1 MHz for Peak, 1 MHz / 10Hz for Average

Receiver Parameter	Setting
Attenuation	Auto
Start ~ Stop Frequency	9kHz~150kHz / RB 200Hz for QP
Start ~ Stop Frequency	150kHz~30MHz / RB 9kHz for QP
Start ~ Stop Frequency	30MHz~1000MHz / RB 120kHz for QP

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 0.1 metre to 0.1 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:

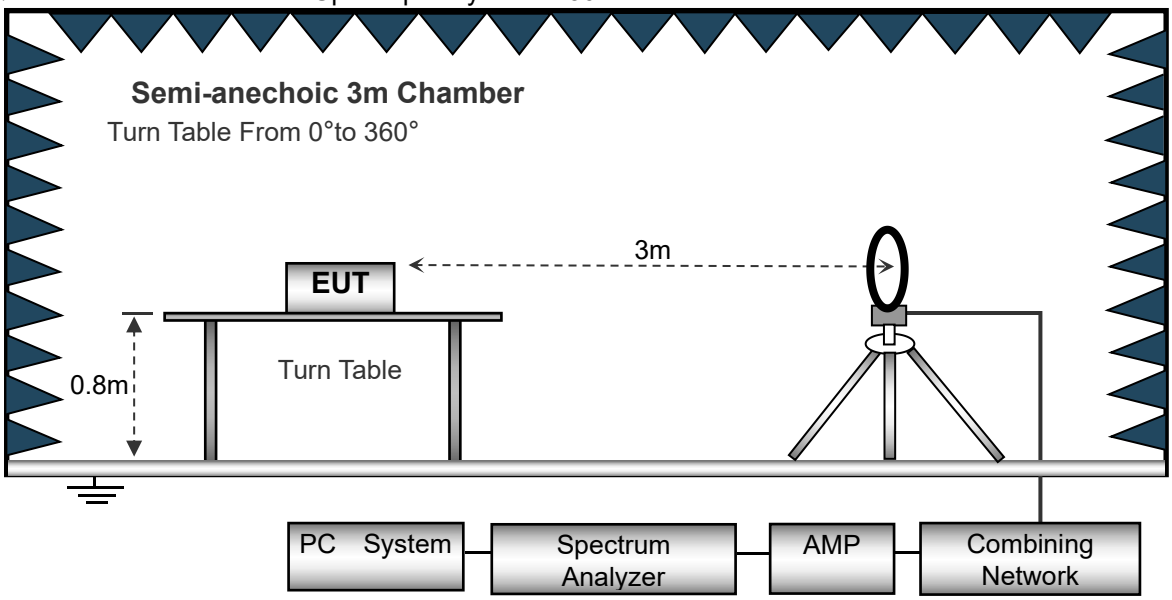
Both horizontal and vertical antenna polarities were tested
and performed pretest to three orthogonal axis. The worst case emissions were reported

DEVIATION FROM TEST STANDARD

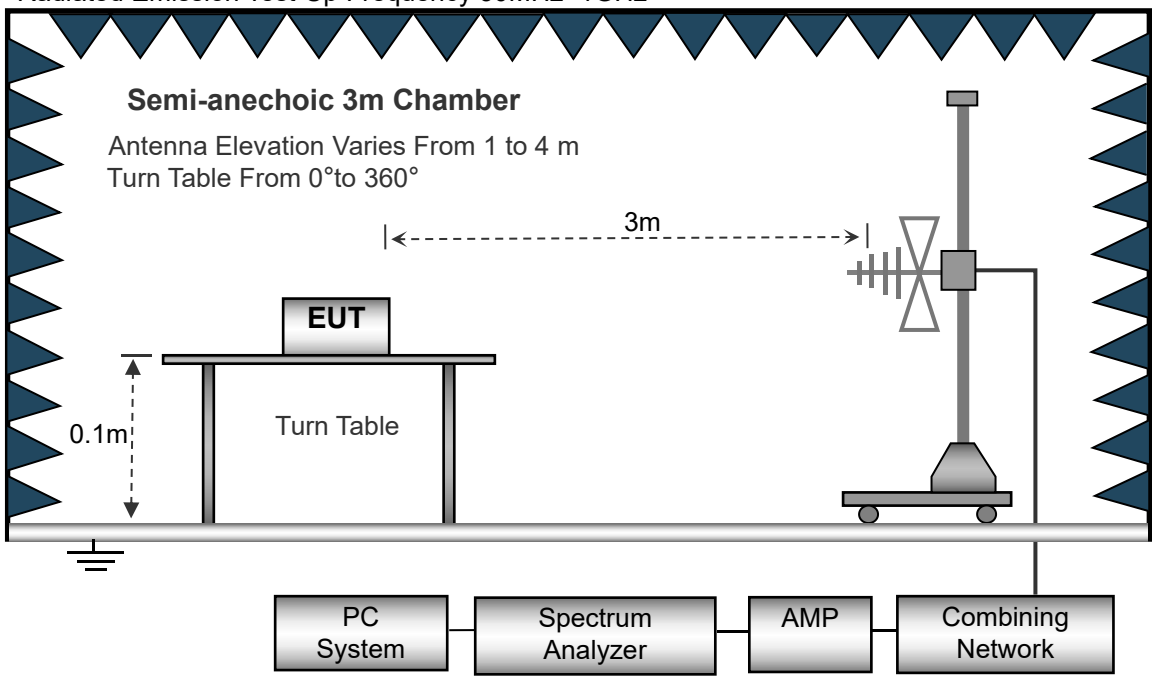
No deviation

TEST SETUP

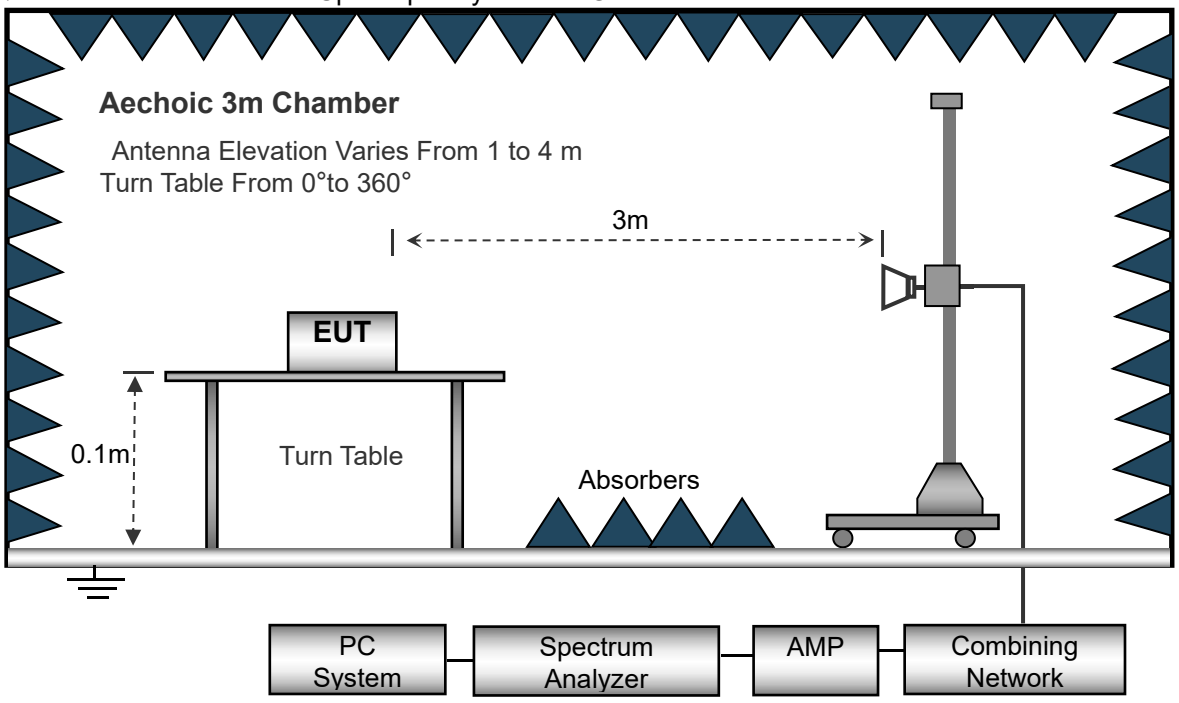
（A）Radiated Emission Test-Up Frequency Below 30MHz



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



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



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.

TEST RESULTS (BETWEEN 9KHZ – 30 MHZ)

Temperature:	20℃	Relative Humidtity:	48%
Pressure:	1010 hPa	Test Voltage :	DC 3.8V
Test Mode :	Mode 4	Polarization :	--

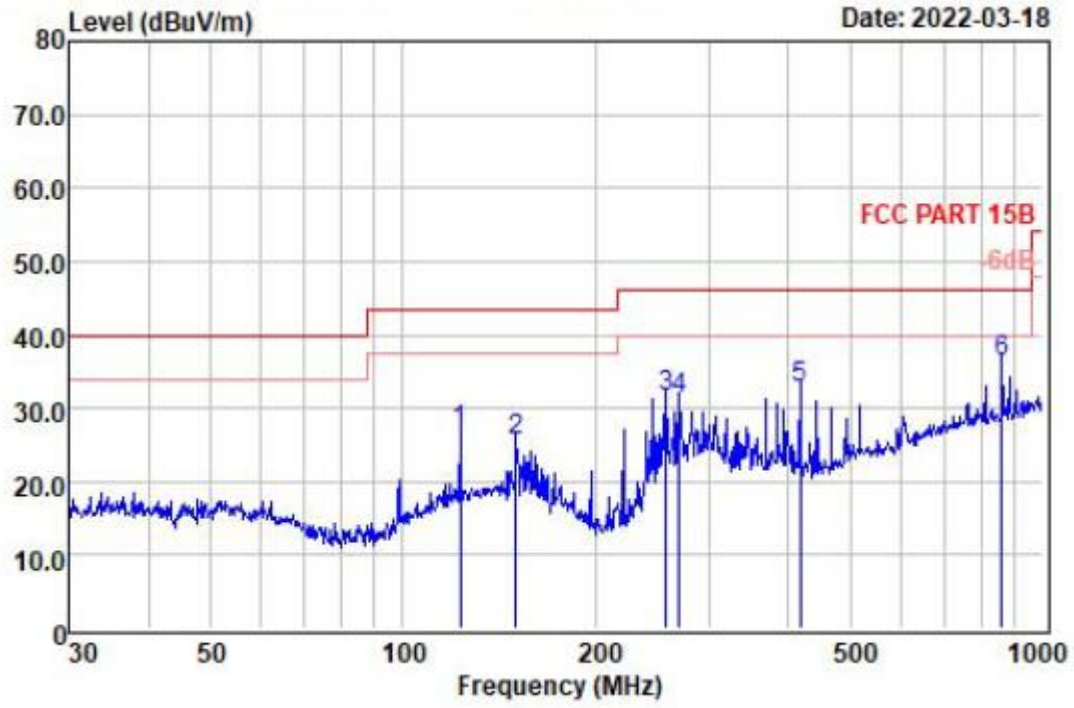
Freq.	Reading	Limit	Margin	State
(MHz)	(dBuV/m)	(dBuV/m)	(dB)	P/F
--	--	--	--	PASS
--	--	--	--	PASS

NOTE:

The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.
Distance extrapolation factor =40 log (specific distance/test distance)(dB);
Limit line = specific limits(dBuv) + distance extrapolation factor.

TEST RESULTS (BETWEEN 30MHZ – 1GHZ)

Temperature:	26℃	Relative Humidity:	54%
Pressure:	1010 hPa	Polarization :	Horizontal
Test Voltage :	DC 3.8V		
Test Mode :	Mode 4		



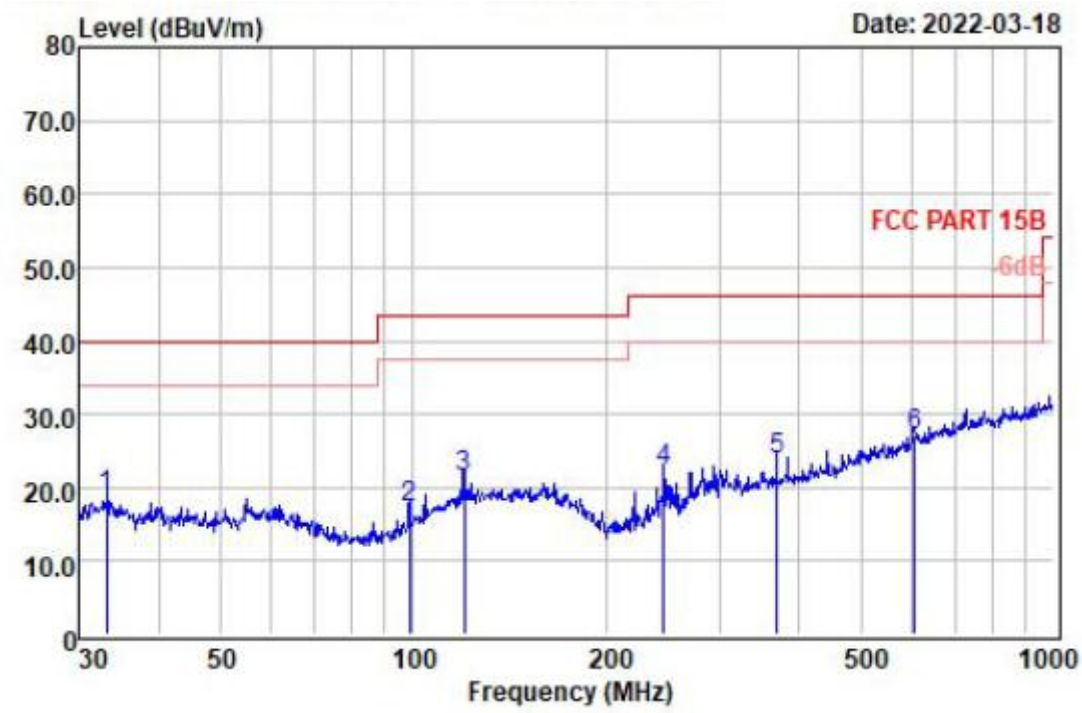
	Freq	Read Level	Antenna Factor	Cable Loss	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dBuV/m	dBuV/m	dB	
1	122.83	12.06	13.74	0.84	26.64	43.50	-16.86	QP
2	150.01	10.65	14.08	0.86	25.59	43.50	-17.91	QP
3	257.42	18.68	11.98	0.86	31.52	46.00	-14.48	QP
4	270.37	17.48	12.81	0.86	31.15	46.00	-14.85	QP
5	417.64	15.49	15.92	1.37	32.78	46.00	-13.22	QP
6	863.06	11.83	22.35	2.15	36.33	46.00	-9.67	QP

Remark:

Correct Factor = Cable loss + Antenna factor – Preamplifier;

Level = Reading Level + Correct Factor; Margin = Limit – Level;

Temperature:	26℃	Relative Humidity:	54%
Pressure:	1010 hPa	Polarization :	Vertical
Test Voltage :	DC 3.8V		
Test Mode :	Mode 4		



	Freq	Read Level	Antenna Factor	Cable Loss	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dBuV/m	dBuV/m	dB	
1	33.21	5.72	12.52	0.47	18.71	40.00	-21.29	QP
2	98.49	5.82	10.71	0.82	17.35	43.50	-26.15	QP
3	119.86	6.98	13.60	0.84	21.42	43.50	-22.08	QP
4	245.95	10.18	11.21	0.86	22.25	46.00	-23.75	QP
5	369.40	7.32	15.16	1.18	23.66	46.00	-22.34	QP
6	605.66	6.16	19.42	1.51	27.09	46.00	-18.91	QP

Remark:

Correct Factor = Cable loss + Antenna factor – Preamplifier;

Level = Reading Level + Correct Factor; Margin = Limit – Level;

TEST RESULTS (1GHZ~25GHZ)

GFSK Worst Case

Polar (H/V)	Frequency (MHz)	Meter Reading (dBuV)	Pre-amplifier (dB)	Cable Loss (dB)	Antenna Factor (dB/m)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Detector Type
operation frequency:2402									
V	4804.00	54.36	30.55	5.77	24.66	54.24	74.00	-19.76	PK
V	4804.00	44.36	30.55	5.77	24.66	44.24	54.00	-9.76	AV
V	7206.00	53.39	30.33	6.32	24.55	53.93	74.00	-20.07	PK
V	7206.00	44.12	30.33	6.32	24.55	44.66	54.00	-9.34	AV
V	16132.00	48.97	51.56	11.36	41.57	50.34	74.00	-23.66	PK
H	4804.00	54.36	30.55	5.77	24.66	54.24	74.00	-19.76	PK
H	4804.00	44.59	30.55	5.77	24.66	44.47	54.00	-9.53	AV
H	7206.00	52.36	30.33	6.32	24.55	52.9	74.00	-21.1	PK
H	7206.00	42.35	30.33	6.32	24.55	42.89	54.00	-11.11	AV
H	16132.00	48.93	51.56	11.36	41.57	50.30	74.00	-23.70	PK
operation frequency:2441									
V	4882.00	53.61	30.55	5.77	24.66	53.49	74.00	-20.51	PK
V	4882.00	41.28	30.55	5.77	24.66	41.16	54.00	-12.84	AV
V	7323.00	52.36	30.33	6.32	24.55	52.9	74.00	-21.1	PK
V	7323.00	43.16	30.33	6.32	24.55	43.7	54.00	-10.3	AV
V	16132.00	48.80	51.56	11.36	41.57	50.17	74.00	-23.83	PK
H	4882.00	51.43	30.55	5.77	24.66	51.31	74.00	-22.69	PK
H	4882.00	41.27	30.55	5.77	24.66	41.15	54.00	-12.85	AV
H	7323.00	52.89	30.33	6.32	24.55	53.43	74.00	-20.57	PK
H	7323.00	41.36	30.33	6.32	24.55	41.9	54.00	-12.1	AV
H	16132.00	48.76	51.56	11.36	41.57	50.13	74.00	-23.87	PK
operation frequency:2480									
V	4960.00	52.36	30.55	5.77	24.66	52.24	74.00	-21.76	PK
V	4960.00	42.16	30.55	5.77	24.66	42.04	54.00	-11.96	AV
V	7440.00	52.61	30.33	6.32	24.55	53.15	74.00	-20.85	PK
V	7440.00	42.36	30.33	6.32	24.55	42.9	54.00	-11.1	AV
V	16132.00	49.16	51.56	11.36	41.57	50.53	74.00	-23.47	PK
H	4960.00	52.89	30.55	5.77	24.66	52.77	74.00	-21.23	PK
H	4960.00	43.61	30.55	5.77	24.66	43.49	54.00	-10.51	AV
H	7440.00	54.27	30.33	6.32	24.55	54.81	74.00	-19.19	PK
H	7440.00	43.62	30.33	6.32	24.55	44.16	54.00	-9.84	AV
H	16132.00	49.12	51.56	11.36	41.57	50.49	74.00	-23.51	PK

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.

3.3 RADIATED BAND EMISSION MEASUREMENT

3.3.1 TEST REQUIREMENT:

FCC Part15 C Section 15.209 and 15.205

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 / 10Hz for Average

3.3.2 TEST PROCEDURE

Above 1GHz test procedure as below:

a. 1. The EUT was placed on the top of a rotating table 0.1 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:

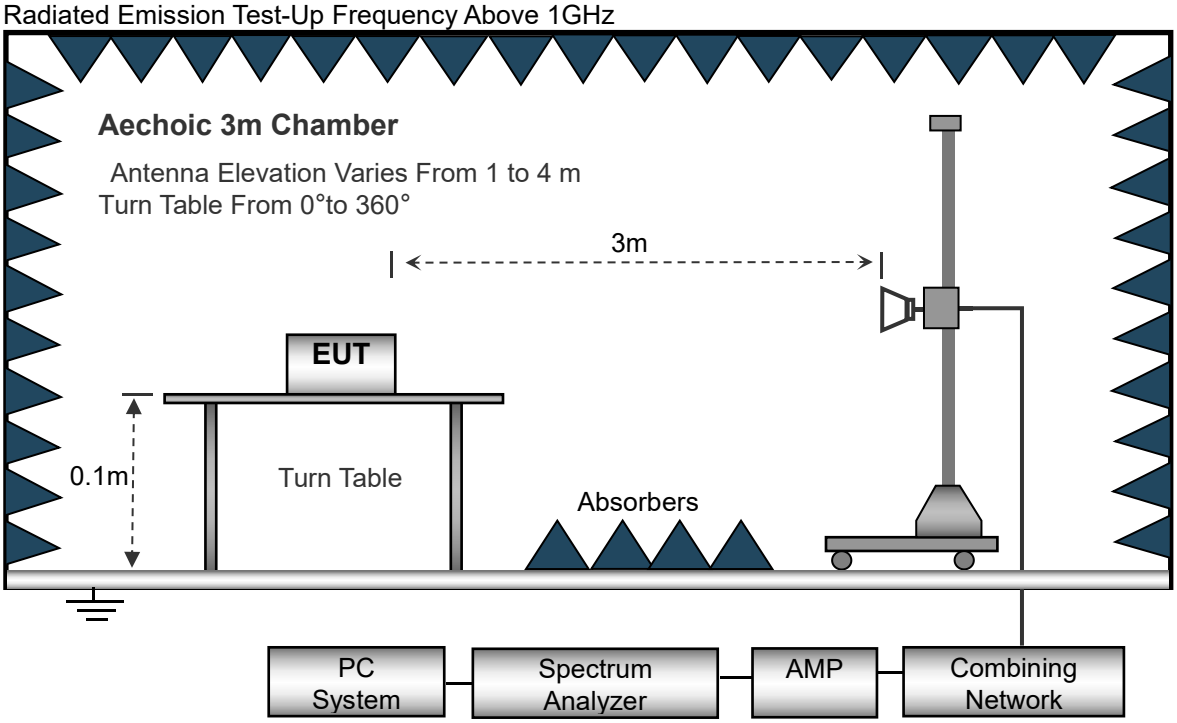
Both horizontal and vertical antenna polarities were tested
and performed pretest to three orthogonal axis. The worst case emissions were reported

3.3.3 DEVIATION FROM TEST STANDARD

No deviation

3.3.4 TEST SETUP

Radiated Emission Test-Up Frequency Above 1GHz



3.3.5 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.

3.3.6 TEST RESULT

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

Polar (H/V)	Frequency (MHz)	Meter Reading (dBuV)	Pre-amplifier (dB)	Cable Loss (dB)	Antenna Factor (dB/m)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Detector Type
operation frequency:2402									
V	2390.00	76.44	52.12	2.73	27.38	54.43	74.00	-19.57	PK
V	2390.00	65.19	52.12	2.73	27.38	43.18	54.00	-10.82	AV
V	2400.00	76.65	52.16	2.78	27.41	54.68	74.00	-19.32	PK
V	2400.00	64.78	52.16	2.78	27.41	42.81	54.00	-11.19	AV
H	2390.00	76.73	52.12	2.73	27.38	54.72	74.00	-19.28	PK
H	2390.00	65.22	52.12	2.73	27.38	43.21	54.00	-10.79	AV
H	2400.00	76.60	52.16	2.78	27.41	54.63	74.00	-19.37	PK
H	2400.00	65.16	52.16	2.78	27.41	43.19	54.00	-10.81	AV

Polar (H/V)	Frequency (MHz)	Meter Reading (dBuV)	Pre-amplifier (dB)	Cable Loss (dB)	Antenna Factor (dB/m)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Detector Type
operation frequency:2480									
V	2483.50	76.65	52.23	2.86	27.44	54.72	74.00	-19.28	PK
V	2483.50	65.43	52.23	2.86	27.44	43.50	54.00	-10.50	AV
V	2500.00	76.59	52.26	2.88	27.49	54.70	74.00	-19.30	PK
V	2500.00	64.89	52.26	2.88	27.49	43.00	54.00	-11.00	AV
H	2483.50	76.77	52.23	2.86	27.44	54.84	74.00	-19.16	PK
H	2483.50	65.47	52.23	2.86	27.44	43.54	54.00	-10.46	AV
H	2500.00	76.39	52.26	2.88	27.49	54.50	74.00	-19.50	PK
H	2500.00	65.73	52.26	2.88	27.49	43.84	54.00	-10.16	AV

Remark:

1. Emission Level = Meter Reading + Factor, 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.

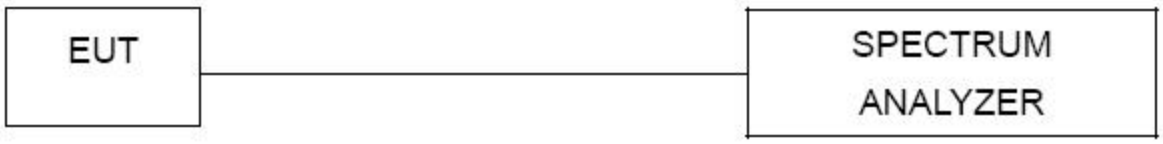
4. CONDUCTED BAND EDGE AND SPURIOUS EMISSION

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

4.1 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)).

4.1.1 TEST SETUP



4.1.2 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.

4.1.3 DEVIATION FROM STANDARD

No deviation.

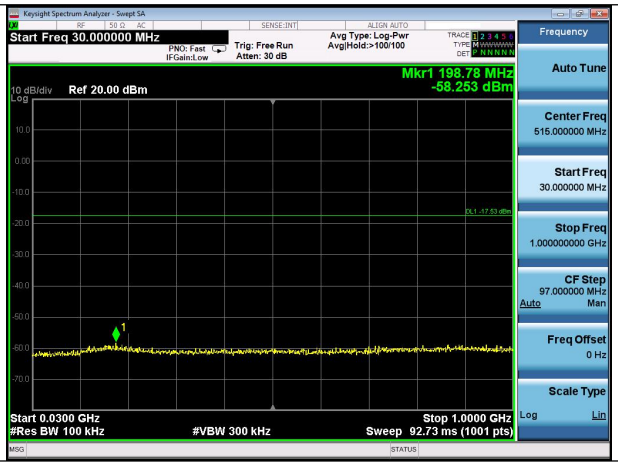
4.1.4 TEST RESULT

Remark: Spurious Emission all modes of GFSK, π/4 DQPSK, 8DPSK were tested, only the worst result of GFSK was reported as below:

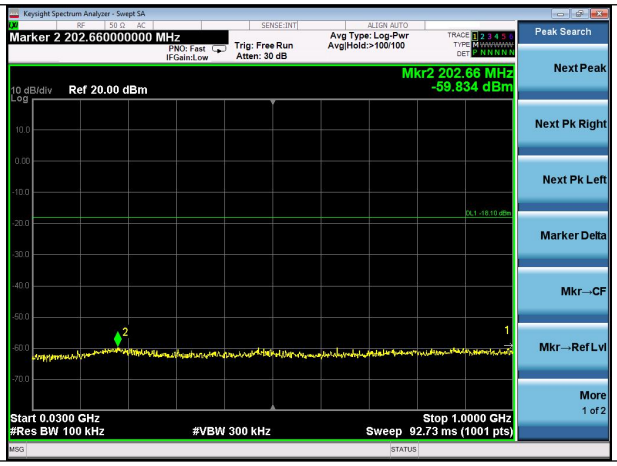
GFSK mode:

2402MHz

2441MHz



30MHz-1GHz

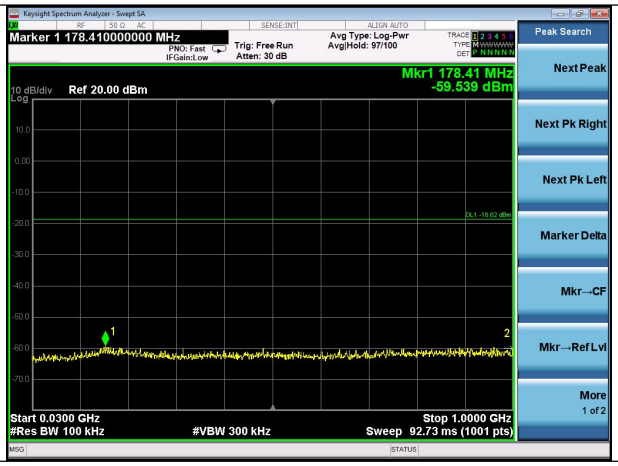


30MHz-1GHz

1GHz-25GHz

1GHz-25GHz

2480MHz



30MHz-1GHz

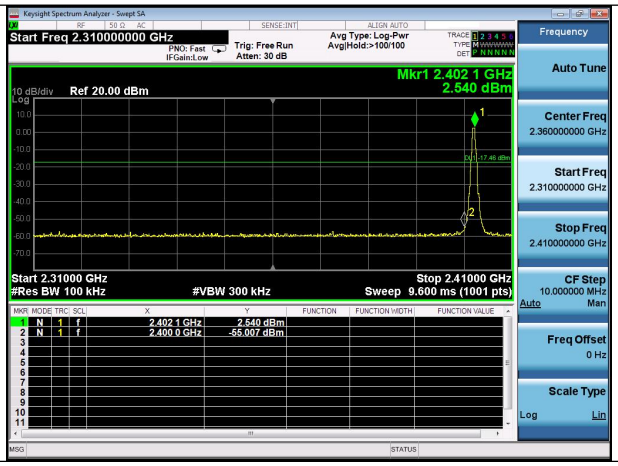
1GHz-25GHz

Conducted band edge

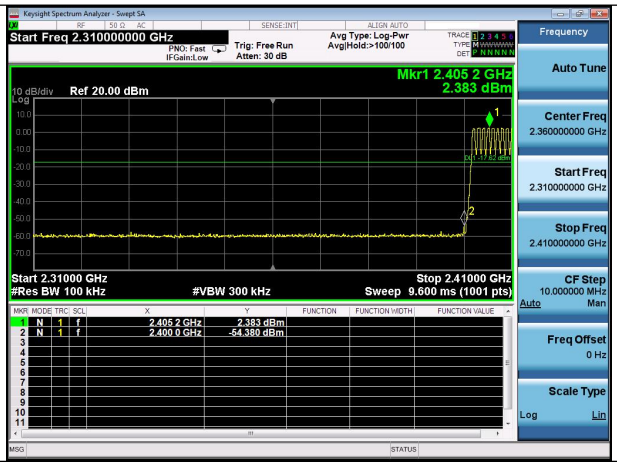
Test result

Pass

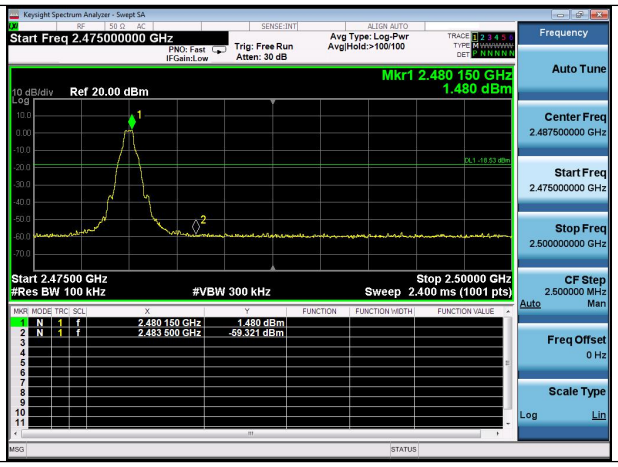
Modulation		Frequency Band	Delta Peak to band emission (dBc)	＞Limit (dBc)	Result
GFSK	Non-hopping	Left Band	57.547	20	Pass
		Right Band	60.801	20	Pass
	hopping	Left Band	56.763	20	Pass
		Right Band	60.815	20	Pass
π/4DQPSK	Non-hopping	Left Band	57.374	20	Pass
		Right Band	59.646	20	Pass
	hopping	Left Band	57.636	20	Pass
		Right Band	59.946	20	Pass
8DPSK	Non-hopping	Left Band	58.300	20	Pass
		Right Band	60.311	20	Pass
	hopping	Left Band	57.816	20	Pass
		Right Band	60.361	20	Pass



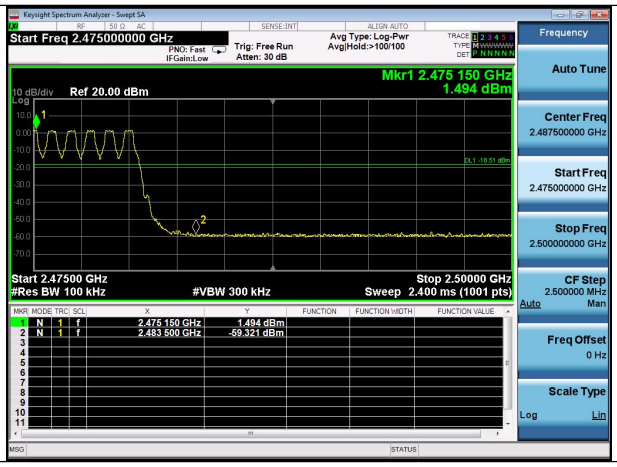
GFSK No-Hopping Band edge-left side



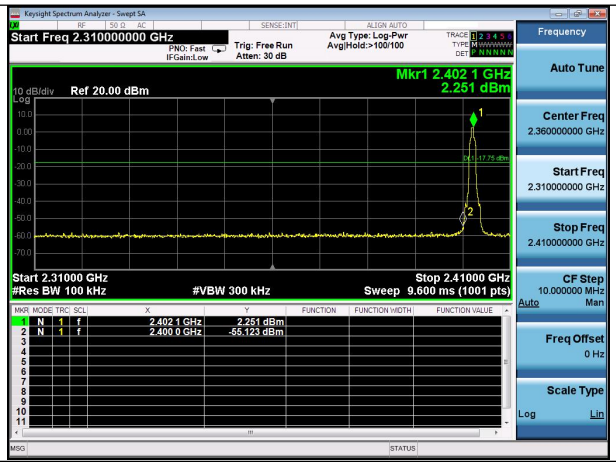
GFSK Hopping Band edge-left side



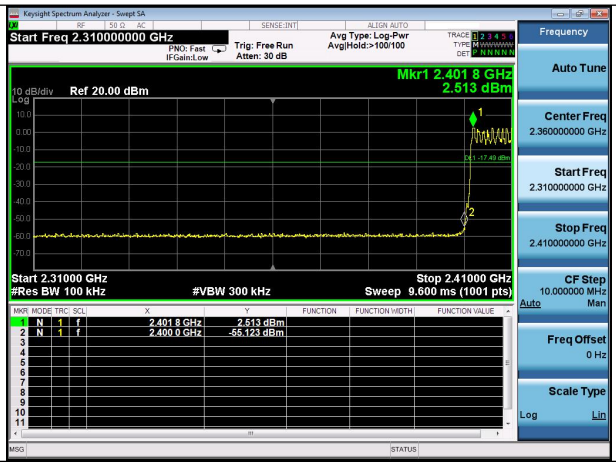
GFSK No-Hopping Band edge-Right side



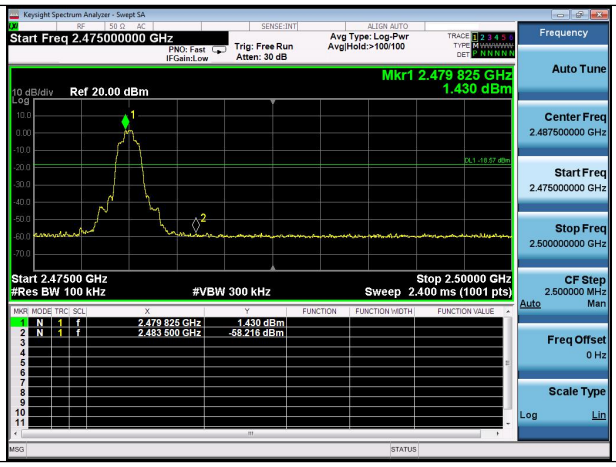
GFSK Hopping Band edge-Right side



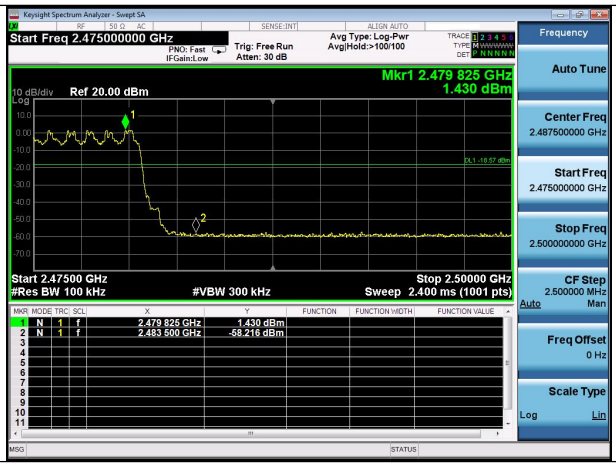
π/4DQPSK No-Hopping Band edge-Left side



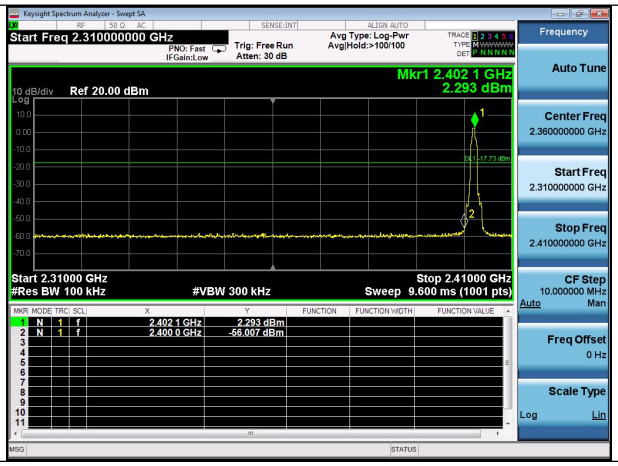
π/4DQPSK Hopping Band edge-Left side



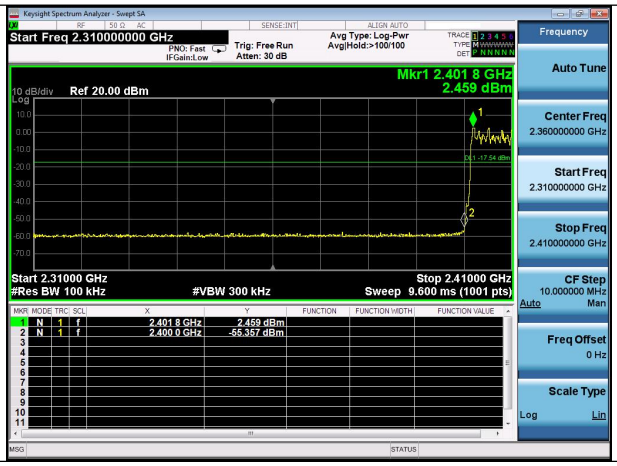
π/4DQPSK No-Hopping Band edge-Right side



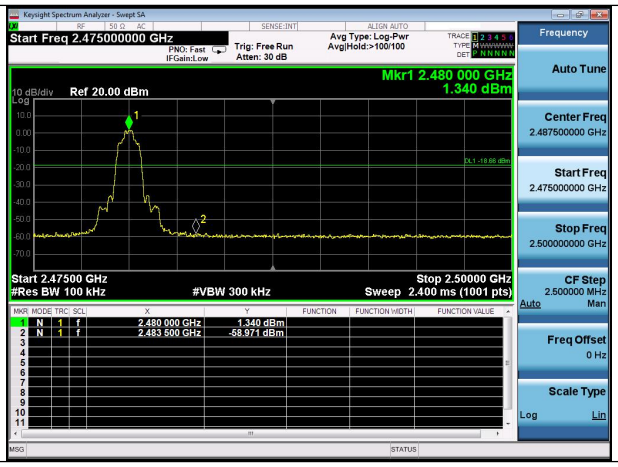
π/4DQPSK Hopping Band edge-Right side



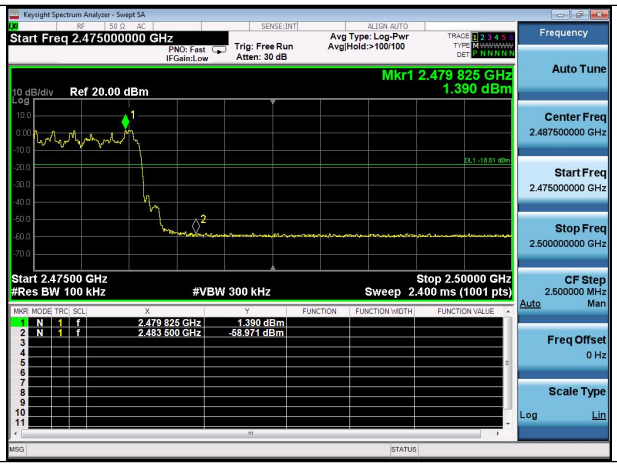
8DPSK No-Hopping Band edge-Left side



8DPSK Hopping Band edge-Left side



8DPSK No-Hopping Band edge-Right side



8DPSK Hopping Band edge-Right side

5. PEAK OUTPUT POWER

5.1 APPLIED PROCEDURES / LIMIT

FCC Part15 (15.247) , Subpart C				
Section	Test Item	Limit	Frequency Range (MHz)	Result
15.247 (b)(i)	Peak Output Power	30Bm or 20.96dBm	2400-2483.5	PASS

5.1.1 TEST PROCEDURE

a. The EUT was directly connected to the power meter and antenna output port as show in the block diagram below,

b. Spectrum Setting : RBW > the 20 dB bandwidth of the emission being measured

Span = approximately 5 times the 20 dB bandwidth, centered on a hopping channel

VBW ≥ RBW

Sweep = auto

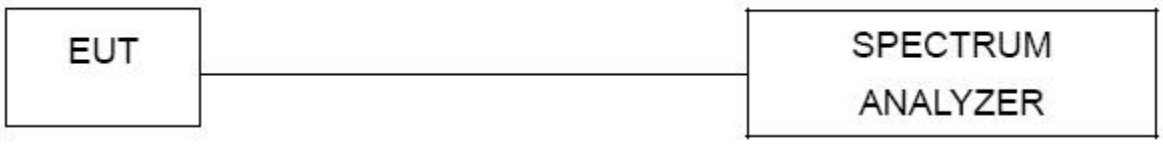
Detector function = peak

Trace = max hold

5.1.2 DEVIATION FROM STANDARD

No deviation.

5.1.3 TEST SETUP



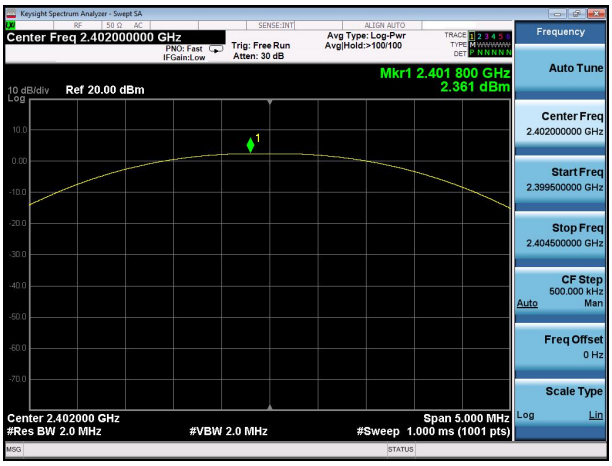
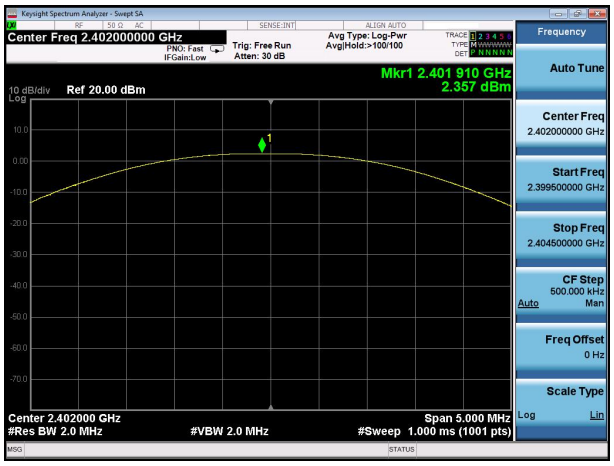
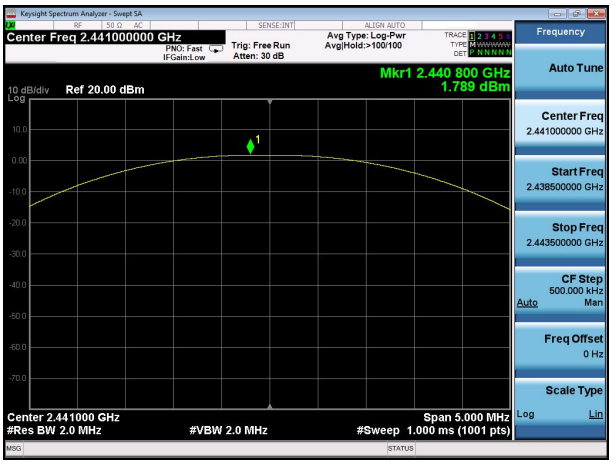
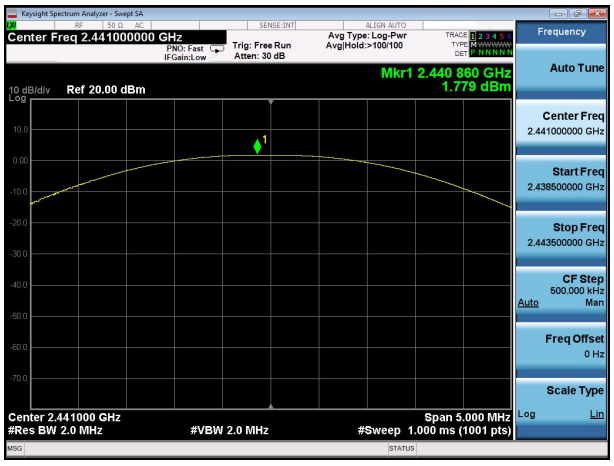
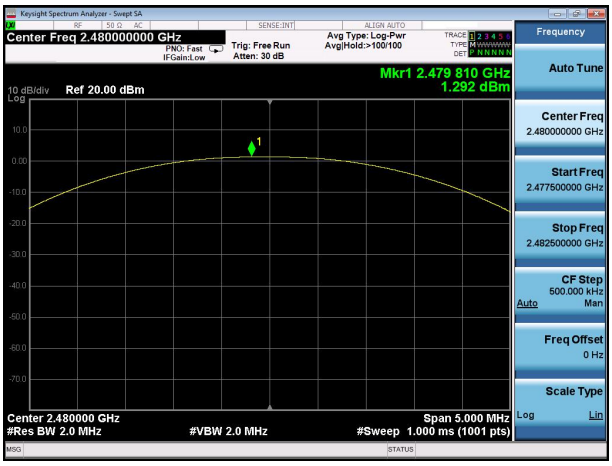
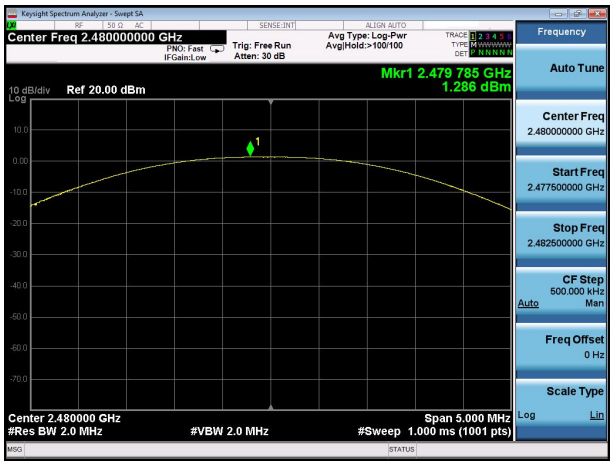
5.1.4 EUT OPERATION CONDITIONS

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.

5.1.5 TEST RESULTS

Temperature:	25 ℃	Relative Humidity:	60%
Pressure:	1012 hPa	Test Voltage :	DC 3.8V
Test Mode :	CH00/ CH39 /CH78 (1M/2M/3Mbps Mode)		

Mode	Test Channel	Peak Output Power (dBm)	LIMIT (dBm)
GFSK	CH00	2.361	20.96
	CH39	1.789	20.96
	CH78	1.292	20.96
π/4 DQPSK	CH00	2.357	20.96
	CH39	1.779	20.96
	CH78	1.286	20.96
8DPSK	CH00	2.427	20.96
	CH39	1.843	20.96
	CH78	1.361	20.96

GFSK	π /4 DQPSK
	
2402MHz	2402MHz
	
2441MHz	2441MHz
	
2480MHz	2480MHz