Test Report
IC: 31085-XGP
FCC ID: 2BCEK-XGP

Applicant:	SHENZHEN XIAOGANGPAO COMMUNICATION EQUIPMENT CO., LTD.
Address:	ROOM 110, BOZHI CENTER,CHENTIAN SI ROAD,XIXIANG STREET, BAOAN DISTRICT, SHENZHEN
Manufacturer:	SHENZHEN XIAOGANGPAO COMMUNICATION EQUIPMENT CO., LTD.
Address:	ROOM 110, BOZHI CENTER,CHENTIAN SI ROAD,XIXIANG STREET, BAOAN DISTRICT, SHENZHEN
EUT:	Motorcycle Helmet Bluetooth Headset
Trade Mark:	N/A
Model Number:	XGP
Date of Receipt:	Jul. 23, 2023
Test Date:	Jul. 23, 2023 - Aug. 03, 2023
Date of Report:	Aug. 03, 2023
Prepared By:	BTF Testing Lab (Shenzhen) Co., Ltd.
Address:	F101, 201 and 301, Building 1, Block 2, Tantou Industrial Park, Tantou Community, Songgang Street, Bao'an District, Shenzhen, China
Applicable Standards:	RSS-210 Issue 10, Amendment 1, April 2020 RSS-Gen Issue 5, Amendment 2, February, 2021 FCC PART 15 C 15.249 ANSI C63.10:2013
Test Result:	Pass
Report Number:	BTF230718R01401

Prepared (Test Engineer):	Elma.yang
Approved (Manager):	Ryan.CJ

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 BTF Testing Lab (Shenzhen) Co., Ltd.

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1. SUMMARY OF TEST RESULTS

Test procedures according to the technical standards:

RSS-210 Issue 10, Amendment 1, April 2020 RSS-Gen Issue 5, Amendment 2, February, 2021 FCC Part15 (15.249) , Subpart C			
Standard Section	Test Item	Judgment	Remark
RSS-Gen Section 8.8 FCC Part15.207	Conducted Emission	PASS	
RSS-210 RSS-Gen Section 8.9 FCC Part15.205(a), FCC Part15.209(a) FCC Part15.249(a), FCC Part15.249(c)	Fundamental &Radiated Spurious Emission Measurement	PASS	
RSS-210 Section B.10 FCC Part15.249(d)	Band Edge Emission	PASS	
RSS-210 RSS-Gen Section 6.7 FCC Part15.215(c)	20dB&99% Bandwidth	PASS	
RSS-Gen Section 6.8 FCC Part15.203	Antenna Requirement	PASS	

NOTE:

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

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FCC Test Firm Registration Number: 518915
Designation Number: CN1330
IC Registered No.: 27844
CAB ID.: CN0135

1.1 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(<30MHz)	±3.54dB
5	All emissions,radiated(<1G)	±3.65dB
6	All emissions,radiated(>1G)	±4.89dB
7	Occupied bandwidth	±1.28MHz
8	PSD	±0.69dB
9	Temperature	±0.5°C
10	Humidity	±2%

2. GENERAL INFORMATION

2.1 GENERAL DESCRIPTION OF EUT

Product Name:	Motorcycle Helmet Bluetooth Headset
Trademark	N/A
Model No.:	XGP
Model Difference	N/A
Serial Number:	001
Sample Number:	001
Operation Frequency:	2402~2480MHz
Channel numbers:	79 Channels
Channel separation:	1M
Modulation technology:	GFSK, PI/4 DQPSK, 8DPSK
Antenna Type:	Internal Antenna
Antenna gain:	-0.42dBi
Power supply:	DC 5V from charger DC 3.7V from battery
Adapter:	Model: C006-050100-AVV1 Input: AC 100-240V 50/60Hz 0.2A Output: DC 5V 1A
software version	1.0

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.

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3.

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

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,PI/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,PI/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.

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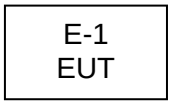
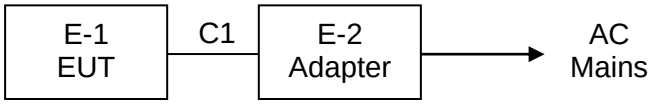
2.3 BLOCK DIGRAM SHOWING THE CONFIGURATION OF SYSTEM TESTED

Radiated Spurious Emission Test



Conducted 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	bluetooth microphone	XGP	001	EUT
E-2	Adapter	C006-050100-AVV1	202303001	Manufacturer:Xiaomi Provide by test cilent.

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: Bluetest 3		
Frequency	2402 MHz	2441 MHz	2480 MHz
Power Setting of Softwave	0	0	0

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2.6 EQUIPMENTS LIST FOR ALL TEST ITEMS

Conducted Method Test						
Description	Manufacturer	Model	Serial No.	Cal. Date	Cal. Due	Use
MXA Signal Analyzer	KEYSIGHT	N9020A	MY50410020	2022.11.24	2023.11.23	☒
WIDEBAND RADIO COMMNUNICATION TESTER	Rohde & Schwarz	CMW500	161997	2022.11.24	2023.11.23	☒
ESG VECTOR SIGNAL GENERATOR	Agilent	E4438C	MY45094854	2022.11.24	2023.11.23	☒
MXG Vector Signal Generator	Agilent	N5182A	MY46240163	2022.11.24	2023.11.23	☒
Adjustable Direct Current Regulated Power Supply	Dongguan Tongmen Electronic Technology Co., LTD	etm-6050c	20211026123	2022.11.25	2023.11.24	☒
Programmable constant temperature and humidity box	ZZCKONG	ZZ-K02A	20210928007	2022.11.24	2023.11.23	☒

Radiated Method Test						
Description	Manufacturer	Model	Serial No.	Cal. Date	Cal. Due	Use
SIGNAL ANALYZER	ROHDE&SCHWARZ	FSQ40	100010	2022.11.24	2023.11.23	☒
EMI TEST RECEIVER	ROHDE&SCHWARZ	ESCI7	101032	2022.11.24	2023.11.23	☒
Log periodic antenna	SCHWARZBECK	VULB 9168	01328	2021.11.28	2023.11.27	☒
Horn Antenna	SCHWARZBECK	BBHA9170	01157	2021.11.28	2023.11.27	☒
POSITIONAL CONTROLLER	SKET	PCI-GPIB	/	/	/	☒
RE Cable	REBES Talent	UF2-NMNM-10m	21101570	2022.11.24	2023.11.23	☒
RE Cable	REBES Talent	UF2-NMNM-2.5m	21101573	2022.11.24	2023.11.23	☒
RE Cable	REBES Talent	UF2-NMNM-1m	21101576	2022.11.24	2023.11.23	☒
Coaxial cable Multiflex 141	Schwarzbeck	N/SMA 0.5m	517386	2023.3.24	2024.3.23	☒
RE Cable	Talent Microwave	A40-2.92M2.92 M-14M	22080539	2022.11.24	2023.11.23	☒

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RE Cable	Talent Microwave	A81-SMAMNM-14M	22080538	2022.11.24	2023.11.23	☒
Preamplifier	SCHWARZBECK	BBV9744	00246	2022.11.24	2023.11.23	☒
Horn Antenna	Schwarzbeck	BBHA9120D	2597	2022.5.22	2024.5.21	☒
Broadband Preamplilifier	Schwarzbeck	BBV9718D	00008	2023.3.24	2024.3.23	☒

Conducted disturbance Test						
Description	Manufacturer	Model	Serial No.	Cal. Date	Cal. Due	Use
EMI Receiver	ROHDE&SCHWARZ	ESCI3	101422	2022.11.24	2023.11.23	☒
V-LISN	SCHWARZBECK	NSLK 8127	01073	2022.11.24	2023.11.23	☒
LISN	AFJ	LS16/110VAC	16010020076	2022.11.24	2023.11.23	☒
Coaxial Switcher	SCHWARZBECK	CX210	CX210	2022.11.24	2023.11.23	☒
Pulse Limiter	SCHWARZBECK	VTSD 9561-F	00953	2022.11.24	2023.11.23	☒
EZ_EMC	Frad	EMC-CON 3A1.1+	/	/	/	☒

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3. EMC EMISSION TEST

3.1 CONDUCTED EMISSION MEASUREMENT

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

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

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

3.1.2 TEST PROCEDURE

a. The EUT was placed 0.8 meters from the horizontal ground plane with EUT being connected to the power mains through a line impedance stabilization network (LISN). All other support equipments powered from additional LISN(s). The LISN provide 50 Ohm/ 50uH of coupling impedance for the measuring instrument.

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.

3.1.3 DEVIATION FROM TEST STANDARD

No deviation

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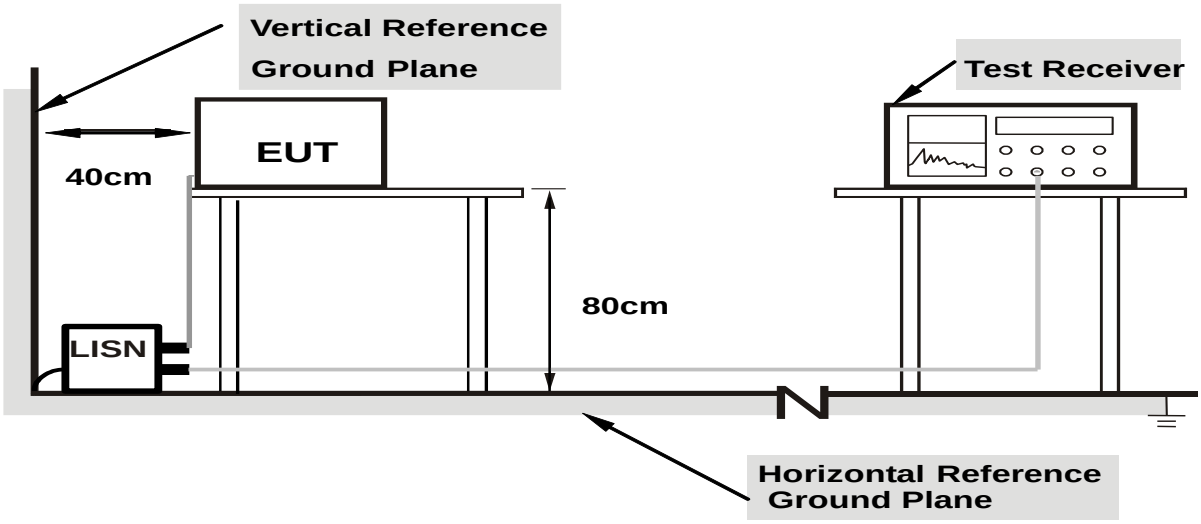
3.1.4 TEST SETUP



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

3.1.5 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.

3.1.6 TEST RESULTS

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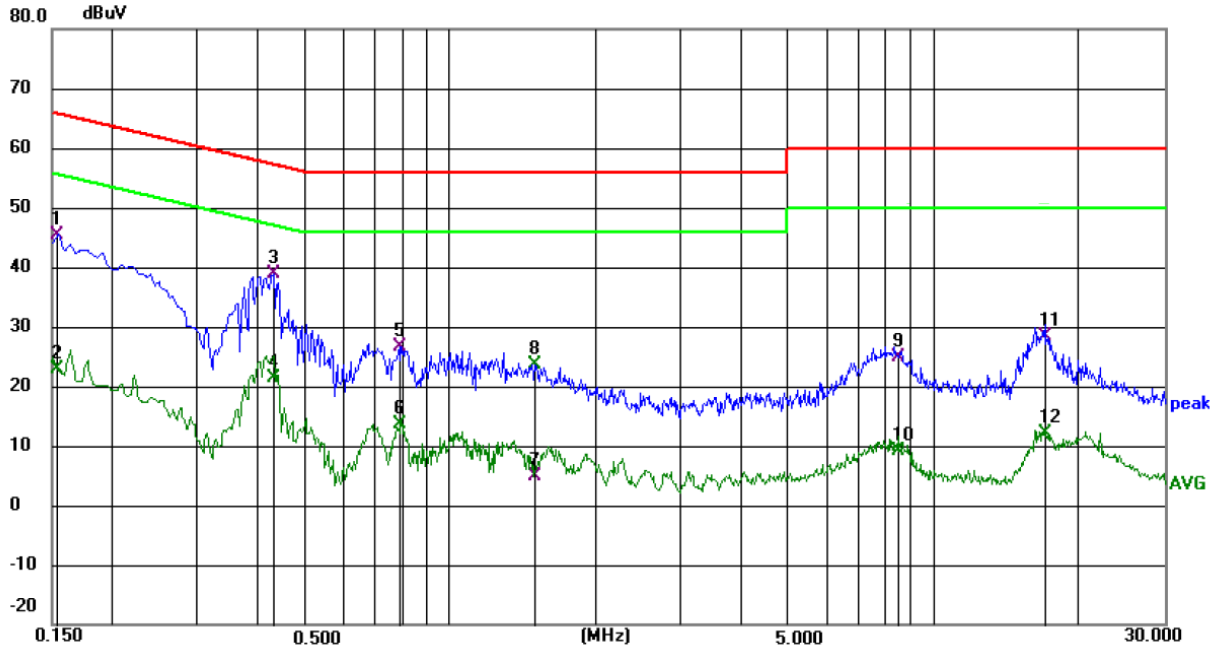
Temperature:	25 ℃	Relative Humidity:	54%
Pressure:	1010hPa	Phase :	L
Test Voltage :	AC 120V/60Hz	Test Mode:	Mode 4



Remark:

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

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	P/F	Remark
1	0.154000	34.98	10.42	45.40	65.78	-20.38	QP	P	
2	0.154000	12.41	10.42	22.83	55.78	-32.95	AVG	P	
3 *	0.429000	29.62	9.15	38.77	57.27	-18.50	QP	P	
4	0.429000	12.31	9.15	21.46	47.27	-25.81	AVG	P	
5	0.789000	17.17	9.35	26.52	56.00	-29.48	QP	P	
6	0.789000	4.30	9.35	13.65	46.00	-32.35	AVG	P	
7	1.500000	-4.63	9.57	4.94	56.00	-51.06	QP	P	
8	1.500000	14.13	9.57	23.70	46.00	-22.30	AVG	P	
9	8.461400	14.97	9.81	24.78	60.00	-35.22	QP	P	
10	8.461400	-0.70	9.81	9.11	50.00	-40.89	AVG	P	
11	17.034000	18.07	10.24	28.31	60.00	-31.69	QP	P	
12	17.034000	1.88	10.24	12.12	50.00	-37.88	AVG	P	

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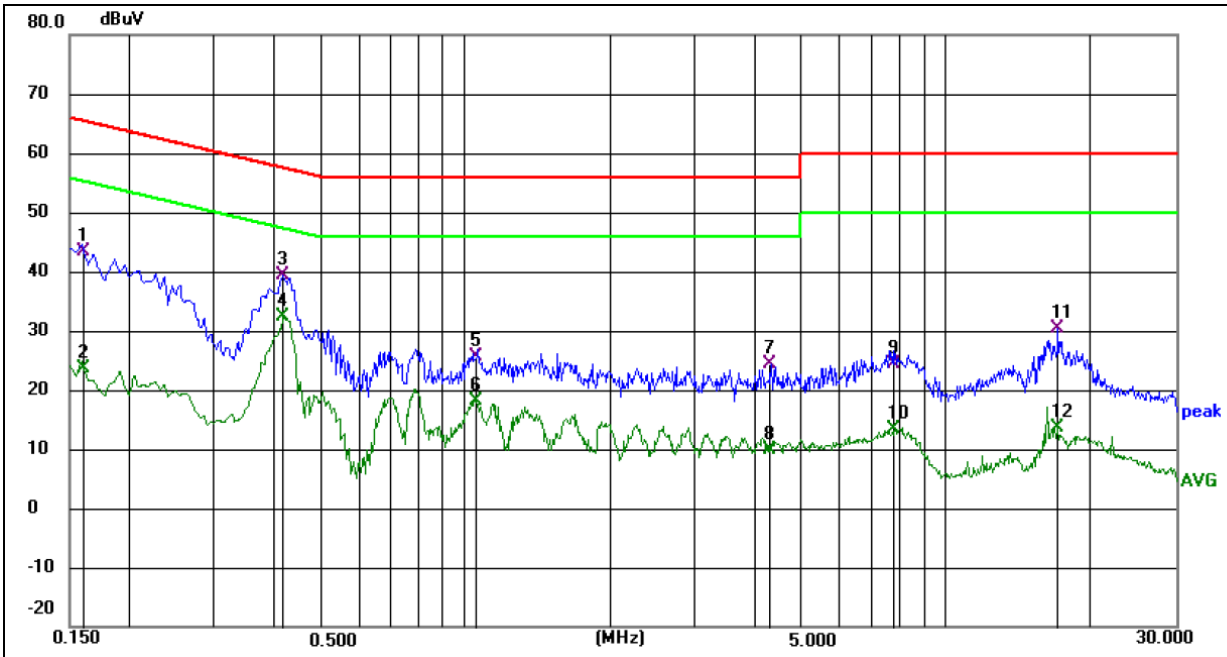
Temperature:	25 ℃	Relative Humidity:	54%
Pressure:	1010hPa	Phase :	N
Test Voltage :	AC 120V/60Hz	Test Mode:	Mode 4



Remark:

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

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	P/F	Remark
1	0.160600	33.34	10.03	43.37	65.43	-22.06	QP	P	
2	0.160600	13.57	10.03	23.60	55.43	-31.83	AVG	P	
3	0.415500	30.12	9.26	39.38	57.54	-18.16	QP	P	
4 *	0.415500	23.13	9.26	32.39	47.54	-15.15	AVG	P	
5	1.050000	16.25	9.43	25.68	56.00	-30.32	QP	P	
6	1.050000	8.63	9.43	18.06	46.00	-27.94	AVG	P	
7	4.308000	14.59	9.80	24.39	56.00	-31.61	QP	P	
8	4.308000	0.11	9.80	9.91	46.00	-36.09	AVG	P	
9	7.800000	14.47	9.92	24.39	60.00	-35.61	QP	P	
10	7.800000	3.56	9.92	13.48	50.00	-36.52	AVG	P	
11	17.029500	20.15	10.34	30.49	60.00	-29.51	QP	P	
12	17.029500	3.19	10.34	13.53	50.00	-36.47	AVG	P	

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3.2 RADIATED EMISSION MEASUREMENT

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

In case the emission fall within the restricted band specified on FCC PART 15.209, RSS-210, then the RSS-210 limit in the table below has to be followed.

Frequency (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

The field strength of emissions from intentional radiators operated within these frequency bands shall comply with the following:

Fundamental Frequency	Field Strength of Fundamental (millivolts/meter)	Field Strength of Harmonics (microvolts/meter)
902 - 928 MHz	50	500
2400 - 2483.5 MHz	50	500
5725 - 5875 MHz	50	500
24.0 - 24.25 GHz	250	2500

LIMITS OF RADIATED EMISSION MEASUREMENT (Above 1000MHz)

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

Notes:

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

(2) Emission level (dBuV/m)=20log Emission level (uV/m).

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	10Hz	Average

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3.2.2 TEST PROCEDURE

Below 1GHz test procedure as below:

a. The EUT was placed on the top of a rotating table 0.8 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. The EUT was placed on the top of a rotating table 1.5 meters above the ground at a 3 meter semi-anechoic camber. (Above 18GHz the distance is 3 meter and table is 1.5 metre).

h. Test the EUT in the lowest channel ,the middle channel ,the Highest channel

Note:

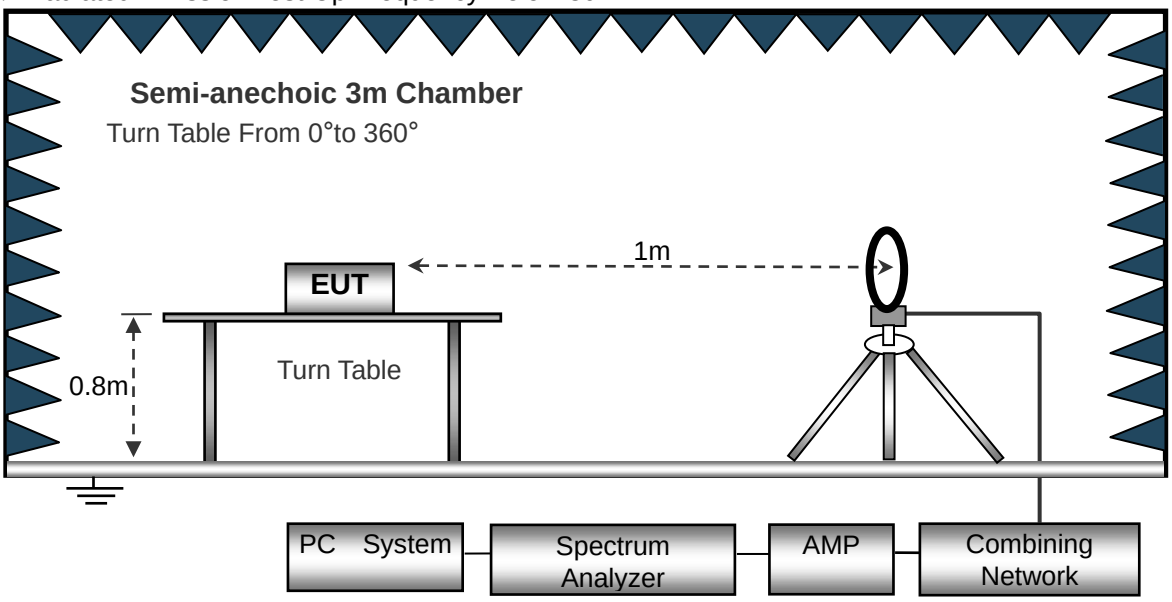
Both horizontal and vertical antenna polarities were tested
and performed pretest to three orthogonal axis. The worst case emissions were reported

3.2.3 DEVIATION FROM TEST STANDARD

No deviation

3.2.4 TEST SETUP

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



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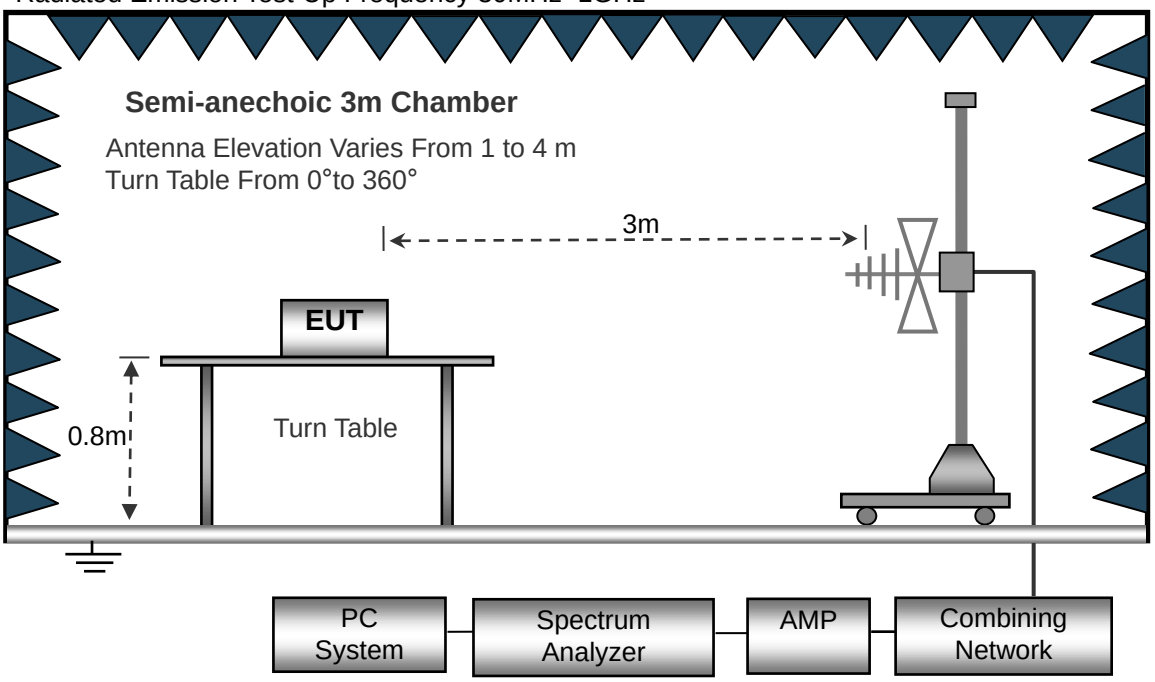
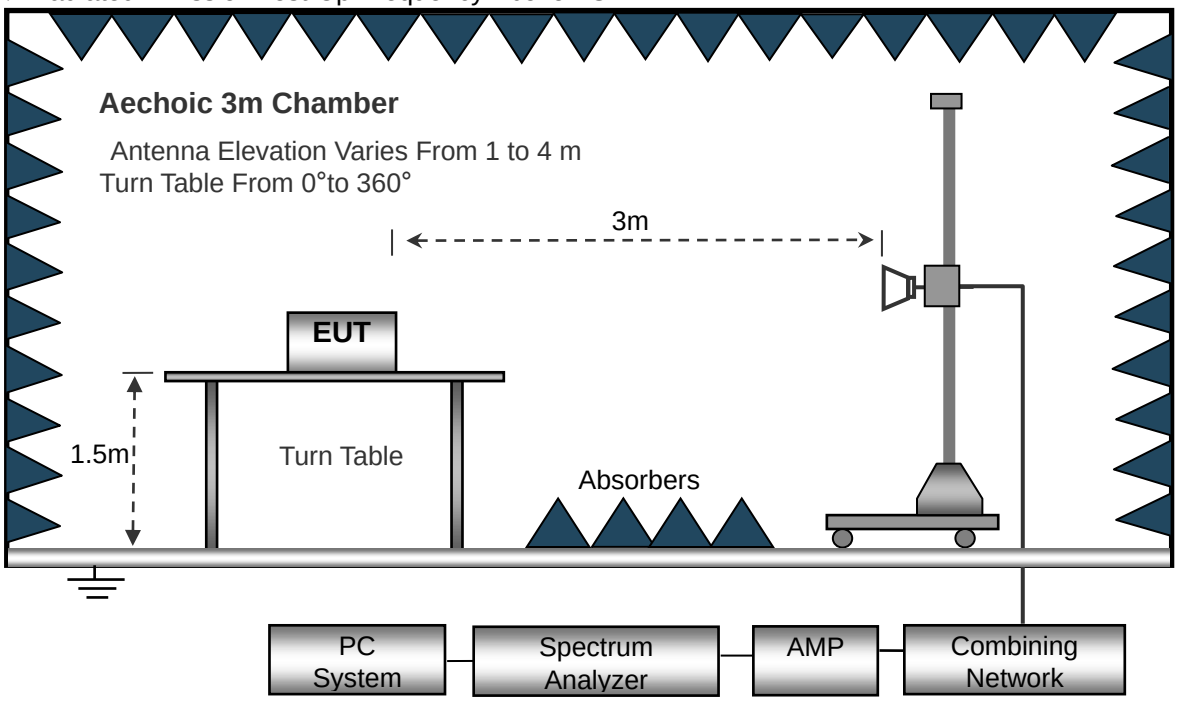
（B）Radiated Emission Test-Up Frequency 30MHz~1GHz



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



3.2.5 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.

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3.2.6 TEST RESULTS (BETWEEN 9KHZ – 30 MHZ)

Temperature:	20℃	Relative Humidtity:	48%
Pressure:	1010 hPa	Test Voltage :	AC 120V/60Hz
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.

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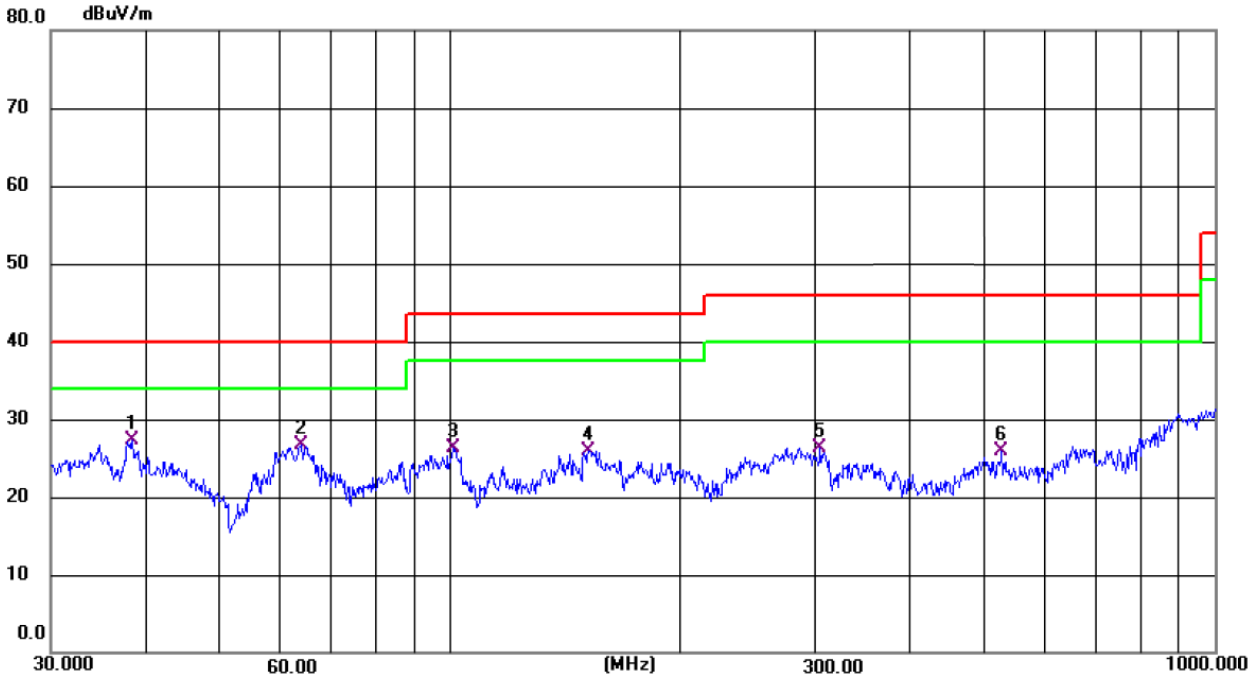
3.2.7 TEST RESULTS (BETWEEN 30MHZ – 1GHZ)

Temperature:	26℃	Relative Humidity:	54%
Pressure:	1010 hPa	Polarization :	Horizontal
Test Voltage :	AC 120V/60Hz		
Test Mode :	Mode 4		



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin	
		MHz	dBuV	dB	dBuV/m	dB/m	dB	Detector
1	*	38.3462	40.21	-12.96	27.25	40.00	-12.75	QP
2		63.7588	39.86	-13.12	26.74	40.00	-13.26	QP
3		100.9338	41.60	-15.31	26.29	43.50	-17.21	QP
4		151.5971	42.37	-16.39	25.98	43.50	-17.52	QP
5		304.6099	35.94	-9.54	26.40	46.00	-19.60	QP
6		526.3967	31.38	-5.54	25.84	46.00	-20.16	QP

Remark:
Correct Factor = Cable loss + Antenna factor – Preamplifier;
Level = Reading Level + Correct Factor; Margin = Level - Limit;

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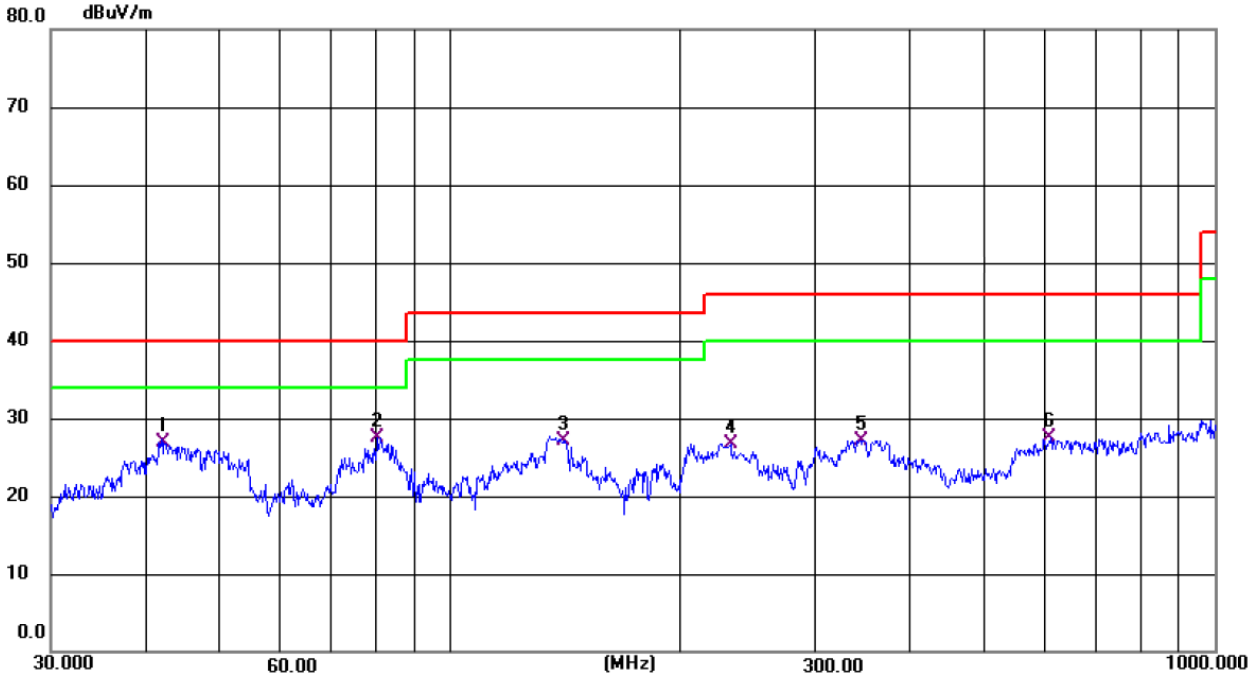
Temperature:	26℃	Relative Humidity:	54%
Pressure:	1010 hPa	Polarization :	Vertical
Test Voltage :	AC 120V/60Hz		
Test Mode :	Mode 4		



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin	
		MHz	dBuV	dB	dBuV/m	dB/m	dB	Detector
1		42.1540	38.92	-11.98	26.94	40.00	-13.06	QP
2	*	80.3617	43.79	-16.36	27.43	40.00	-12.57	QP
3		141.3296	43.31	-16.14	27.17	43.50	-16.33	QP
4		232.5318	39.09	-12.30	26.79	46.00	-19.21	QP
5		344.3854	37.24	-10.08	27.16	46.00	-18.84	QP
6		609.9215	33.05	-5.51	27.54	46.00	-18.46	QP

Remark:
Correct Factor = Cable loss + Antenna factor – Preamplifier;
Level = Reading Level + Correct Factor; Margin = Level - Limit;

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3.2.8 TEST RESULTS (1GHZ~25GHZ)

GFSK

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	2402.00	112.92	52.16	2.78	27.41	90.95	114	-23.05	PK
V	2402.00	103.19	52.16	2.78	27.41	81.22	94	-12.78	AV
V	4804.00	77.67	51.74	3.08	31.25	60.26	74	-13.74	PK
V	4804.00	60.44	51.74	3.08	31.25	43.03	54	-10.97	AV
V	16129.00	54.16	51.56	7.36	41.57	51.53	74	-22.47	PK
H	2402.00	112.66	52.16	2.78	27.41	90.69	114	-23.31	PK
H	2402.00	105.16	52.16	2.78	27.41	83.19	94	-10.81	AV
H	4804.00	76.49	51.74	3.08	31.25	59.08	74	-14.92	PK
H	4804.00	59.35	51.74	3.08	31.25	41.94	54	-12.06	AV
H	16129.00	55.07	51.56	7.36	41.57	52.44	74	-21.56	PK
operation frequency:2441									
V	2441.00	112.42	52.11	2.82	27.47	90.60	114	-23.40	PK
V	2441.00	105.32	52.11	2.82	27.47	83.50	94	-10.50	AV
V	4882.00	77.03	51.77	3.03	31.34	59.63	74	-14.37	PK
V	4882.00	60.02	51.77	3.03	31.34	42.62	54	-11.38	AV
V	16129.00	54.14	51.56	7.36	41.57	51.51	74	-22.49	PK
H	2441.00	112.16	52.11	2.82	27.47	90.34	114	-23.66	PK
H	2441.00	104.46	52.11	2.82	27.47	82.64	94	-11.36	AV
H	4882.00	76.00	51.77	3.03	31.34	58.60	74	-15.40	PK
H	4882.00	59.43	51.77	3.03	31.34	42.03	54	-11.97	AV
H	16129.00	55.37	51.56	7.36	41.57	52.74	74	-21.26	PK
operation frequency:2480									
V	2480.00	113.15	52.23	2.86	27.44	91.22	114	-22.78	PK
V	2480.00	105.97	52.23	2.86	27.44	84.04	94	-9.96	AV
V	4960.00	78.10	51.69	3.05	31.39	60.85	74	-13.15	PK
V	4960.00	60.85	51.69	3.05	31.39	43.60	54	-10.40	AV
V	16129.00	54.04	51.56	7.36	41.57	51.41	74	-22.59	PK
H	2480.00	112.91	52.23	2.86	27.44	90.98	114	-23.02	PK
H	2480.00	105.47	52.23	2.86	27.44	83.54	94	-10.46	AV
H	4960.00	77.23	51.69	3.05	31.39	59.98	74	-14.02	PK
H	4960.00	59.12	51.69	3.05	31.39	41.87	54	-12.13	AV
H	16129.00	54.27	51.56	7.36	41.57	51.64	74	-22.36	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.

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PI/4 DQPSK

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	2402.00	113.05	52.16	2.78	27.41	91.08	114	-22.92	PK
V	2402.00	103.22	52.16	2.78	27.41	81.25	94	-12.75	AV
V	4804.00	77.31	51.74	3.08	31.25	59.90	74	-14.10	PK
V	4804.00	61.15	51.74	3.08	31.25	43.74	54	-10.26	AV
V	16129.00	54.46	51.56	7.36	41.57	51.83	74	-22.17	PK
H	2402.00	113.16	52.16	2.78	27.41	91.19	114	-22.81	PK
H	2402.00	105.96	52.16	2.78	27.41	83.99	94	-10.01	AV
H	4804.00	79.31	51.74	3.08	31.25	61.90	74	-12.10	PK
H	4804.00	53.54	51.74	3.08	31.25	36.13	54	-17.87	AV
H	16129.00	54.46	51.56	7.36	41.57	51.83	74	-22.17	PK
operation frequency:2441									
V	2441.00	112.47	52.11	2.82	27.47	90.65	114	-23.35	PK
V	2441.00	105.32	52.11	2.82	27.47	83.50	94	-10.50	AV
V	4882.00	77.52	51.77	3.03	31.34	60.12	74	-13.88	PK
V	4882.00	61.63	51.77	3.03	31.34	44.23	54	-9.77	AV
V	16129.00	55.52	51.56	7.36	41.57	52.89	74	-21.11	PK
H	2441.00	112.44	52.11	2.82	27.47	90.62	114	-23.38	PK
H	2441.00	105.37	52.11	2.82	27.47	83.55	94	-10.45	AV
H	4882.00	76.34	51.77	3.03	31.34	58.94	74	-15.06	PK
H	4882.00	60.13	51.77	3.03	31.34	42.73	54	-11.27	AV
H	16129.00	55.22	51.56	7.36	41.57	52.59	74	-21.41	PK
operation frequency:2480									
V	2480.00	113.24	52.23	2.86	27.44	91.31	114	-22.69	PK
V	2480.00	105.68	52.23	2.86	27.44	83.75	94	-10.25	AV
V	4960.00	77.71	51.69	3.05	31.39	60.46	74	-13.54	PK
V	4960.00	60.15	51.69	3.05	31.39	42.90	54	-11.10	AV
V	16129.00	54.74	51.56	7.36	41.57	52.11	74	-21.89	PK
H	2480.00	112.92	52.23	2.86	27.44	90.99	114	-23.01	PK
H	2480.00	104.32	52.23	2.86	27.44	82.39	94	-11.61	AV
H	4960.00	76.72	51.69	3.05	31.39	59.47	74	-14.53	PK
H	4960.00	59.37	51.69	3.05	31.39	42.12	54	-11.88	AV
H	16129.00	55.52	51.56	7.36	41.57	52.89	74	-21.11	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.

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8DPSK

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	2402.00	112.63	52.16	2.78	27.41	90.66	114	-23.34	PK
V	2402.00	104.96	52.16	2.78	27.41	82.99	94	-11.01	AV
V	4804.00	76.52	51.74	3.08	31.25	59.11	74	-14.89	PK
V	4804.00	59.47	51.74	3.08	31.25	42.06	54	-11.94	AV
V	16129.00	55.13	51.56	7.36	41.57	52.50	74	-21.50	PK
H	2402.00	112.45	52.16	2.78	27.41	90.48	114	-23.52	PK
H	2402.00	105.58	52.16	2.78	27.41	83.61	94	-10.39	AV
H	4804.00	75.97	51.74	3.08	31.25	58.56	74	-15.44	PK
H	4804.00	60.46	51.74	3.08	31.25	43.05	54	-10.95	AV
H	16129.00	54.16	51.56	7.36	41.57	51.53	74	-22.47	PK
operation frequency:2441									
V	2441.00	112.63	52.11	2.82	27.47	90.81	114	-23.19	PK
V	2441.00	104.33	52.11	2.82	27.47	82.51	94	-11.49	AV
V	4882.00	76.03	51.77	3.03	31.34	58.63	74	-15.37	PK
V	4882.00	62.23	51.77	3.03	31.34	44.83	54	-9.17	AV
V	16129.00	54.06	51.56	7.36	41.57	51.43	74	-22.57	PK
H	2441.00	112.34	52.11	2.82	27.47	90.52	114	-23.48	PK
H	2441.00	103.17	52.11	2.82	27.47	81.35	94	-12.65	AV
H	4882.00	75.72	51.77	3.03	31.34	58.32	74	-15.68	PK
H	4882.00	61.52	51.77	3.03	31.34	44.12	54	-9.88	AV
H	16129.00	54.51	51.56	7.36	41.57	51.88	74	-22.12	PK
operation frequency:2480									
V	2480.00	112.62	52.23	2.86	27.44	90.69	114	-23.31	PK
V	2480.00	103.49	52.23	2.86	27.44	81.56	94	-12.44	AV
V	4960.00	77.70	51.69	3.05	31.39	60.45	74	-13.55	PK
V	4960.00	59.14	51.69	3.05	31.39	41.89	54	-12.11	AV
V	16129.00	55.07	51.56	7.36	41.57	52.44	74	-21.56	PK
H	2480.00	112.53	52.23	2.86	27.44	90.60	114	-23.40	PK
H	2480.00	103.07	52.23	2.86	27.44	81.14	94	-12.86	AV
H	4960.00	77.54	51.69	3.05	31.39	60.29	74	-13.71	PK
H	4960.00	61.01	51.69	3.05	31.39	43.76	54	-10.24	AV
H	16129.00	54.27	51.56	7.36	41.57	51.64	74	-22.36	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.

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3.3 RADIATED BAND EMISSION MEASUREMENT

3.3.1 TEST REQUIREMENT:

RSS-210 Issue 10, April 2020
FCC PART 15.249(d)

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 0.8 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

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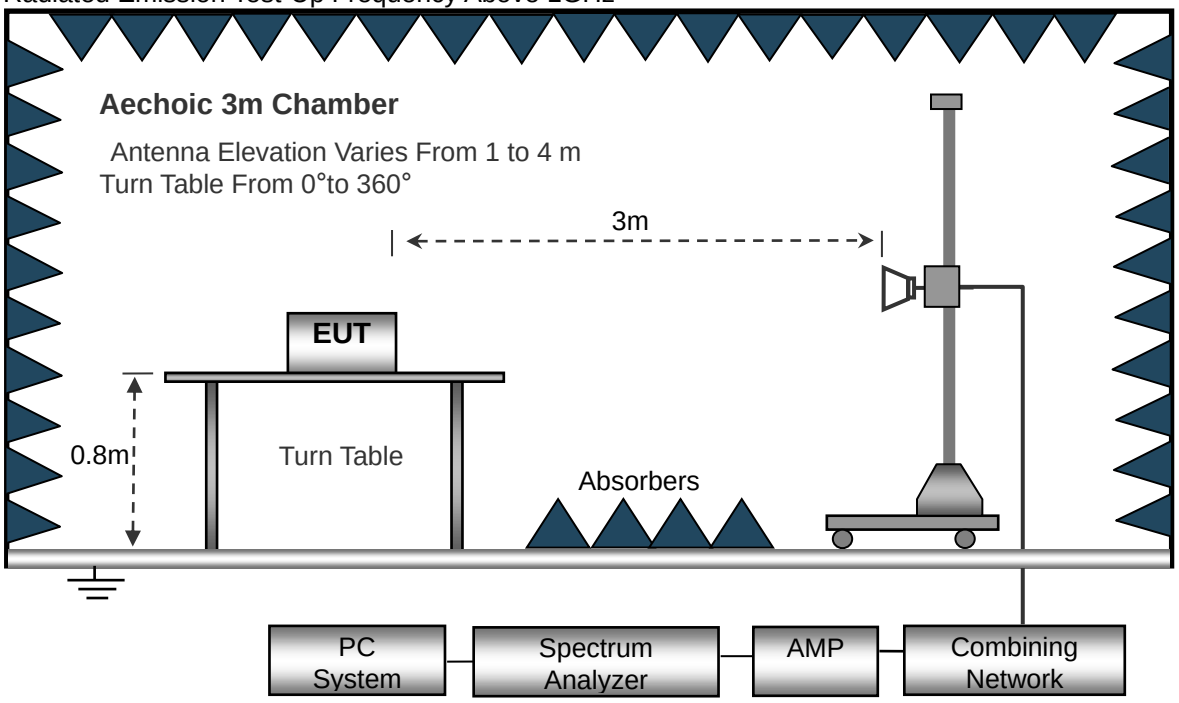
3.3.4 TEST SETUP

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.

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3.3.6 TEST RESULT

GFSK

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	76.13	52.12	2.73	27.38	54.12	74	-19.88	PK
V	2390.00	65.22	52.12	2.73	27.38	43.21	54	-10.79	AV
V	2400.00	76.01	52.16	2.78	27.41	54.04	74	-19.96	PK
V	2400.00	64.05	52.16	2.78	27.41	42.08	54	-11.92	AV
H	2390.00	76.29	52.12	2.73	27.38	54.28	74	-19.72	PK
H	2390.00	64.99	52.12	2.73	27.38	42.98	54	-11.02	AV
H	2400.00	76.14	52.16	2.78	27.41	54.17	74	-19.83	PK
H	2400.00	65.33	52.16	2.78	27.41	43.36	54	-10.64	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	76.49	52.23	2.86	27.44	54.56	74	-19.44	PK
V	2483.50	65.12	52.23	2.86	27.44	43.19	54	-10.81	AV
V	2500.00	76.01	52.26	2.88	27.49	54.12	74	-19.88	PK
V	2500.00	64.26	52.26	2.88	27.49	42.37	54	-11.63	AV
H	2483.50	76.60	52.23	2.86	27.44	54.67	74	-19.33	PK
H	2483.50	65.34	52.23	2.86	27.44	43.41	54	-10.59	AV
H	2500.00	76.13	52.26	2.88	27.49	54.24	74	-19.76	PK
H	2500.00	65.71	52.26	2.88	27.49	43.82	54	-10.18	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.

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PI/4 DQPSK

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	76.19	52.12	2.73	27.38	54.18	74	-19.82	PK
V	2390.00	65.14	52.12	2.73	27.38	43.13	54	-10.87	AV
V	2400.00	76.43	52.16	2.78	27.41	54.46	74	-19.54	PK
V	2400.00	64.03	52.16	2.78	27.41	42.06	54	-11.94	AV
H	2390.00	76.30	52.12	2.73	27.38	54.29	74	-19.71	PK
H	2390.00	65.04	52.12	2.73	27.38	43.03	54	-10.97	AV
H	2400.00	76.53	52.16	2.78	27.41	54.56	74	-19.44	PK
H	2400.00	65.33	52.16	2.78	27.41	43.36	54	-10.64	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	76.69	52.23	2.86	27.44	54.76	74	-19.24	PK
V	2483.50	65.23	52.23	2.86	27.44	43.30	54	-10.70	AV
V	2500.00	76.01	52.26	2.88	27.49	54.12	74	-19.88	PK
V	2500.00	65.05	52.26	2.88	27.49	43.16	54	-10.84	AV
H	2483.50	76.07	52.23	2.86	27.44	54.14	74	-19.86	PK
H	2483.50	65.26	52.23	2.86	27.44	43.33	54	-10.67	AV
H	2500.00	76.62	52.26	2.88	27.49	54.73	74	-19.27	PK
H	2500.00	65.42	52.26	2.88	27.49	43.53	54	-10.47	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.

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8DPSK

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	76.01	52.12	2.73	27.38	54.00	74	-20.00	PK
V	2390.00	65.36	52.12	2.73	27.38	43.35	54	-10.65	AV
V	2400.00	77.72	52.16	2.78	27.41	55.75	74	-18.25	PK
V	2400.00	65.55	52.16	2.78	27.41	43.58	54	-10.42	AV
H	2390.00	77.40	52.12	2.73	27.38	55.39	74	-18.61	PK
H	2390.00	65.14	52.12	2.73	27.38	43.13	54	-10.87	AV
H	2400.00	76.26	52.16	2.78	27.41	54.29	74	-19.71	PK
H	2400.00	65.54	52.16	2.78	27.41	43.57	54	-10.43	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	77.60	52.23	2.86	27.44	55.67	74	-18.33	PK
V	2483.50	65.41	52.23	2.86	27.44	43.48	54	-10.52	AV
V	2500.00	76.34	52.26	2.88	27.49	54.45	74	-19.55	PK
V	2500.00	65.12	52.26	2.88	27.49	43.23	54	-10.77	AV
H	2483.50	77.42	52.23	2.86	27.44	55.49	74	-18.51	PK
H	2483.50	65.13	52.23	2.86	27.44	43.20	54	-10.80	AV
H	2500.00	76.18	52.26	2.88	27.49	54.29	74	-19.71	PK
H	2500.00	66.34	52.26	2.88	27.49	44.45	54	-9.55	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.

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4. BANDWIDTH TEST

4.1 APPLIED PROCEDURES / LIMIT

Section	Test Item
RSS-210, RSS-Gen FCC PART15.215(c)	Bandwidth

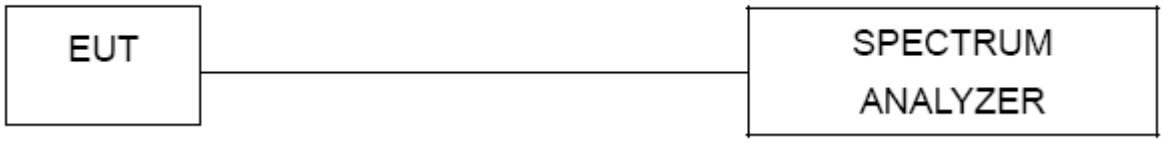
4.1.1 TEST PROCEDURE

1. Set RBW = 30 kHz.
2. Set the video bandwidth (VBW) ≥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 20 dB relative to the maximum level measured in the fundamental emission.

4.1.2 DEVIATION FROM STANDARD

No deviation.

4.1.3 TEST SETUP



4.1.4 EUT OPERATION 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.

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4.1.5 TEST RESULTS

	Frequency (MHz)	20dB Bandwidth (MHz)	99% Bandwidth (MHz)	Result
GFSK	2402	0.943	0.866	Pass
	2441	0.953	0.856	Pass
	2480	0.938	0.858	Pass
PI/4 DQPSK	2402	1.271	1.181	Pass
	2441	1.275	1.177	Pass
	2480	1.275	1.188	Pass
8DPSK	2402	1.293	1.179	Pass
	2441	1.298	1.198	Pass
	2480	1.299	1.201	Pass

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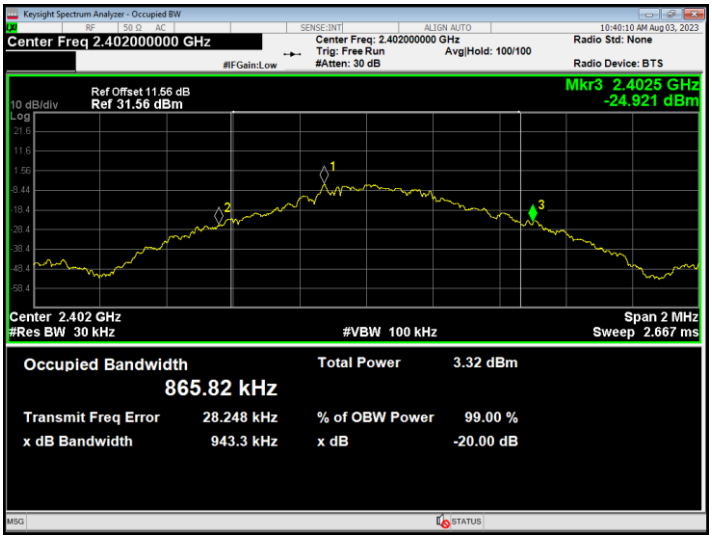
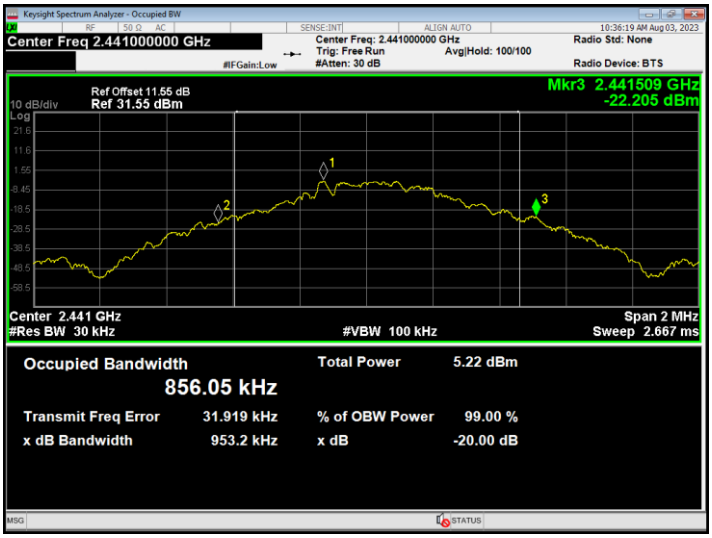
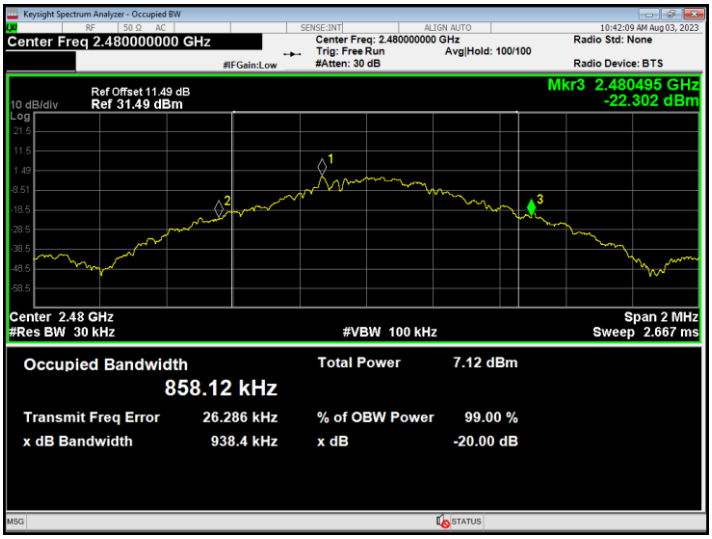
GFSK 2402MHz Ant1



GFSK 2441MHz Ant1



GFSK 2480MHz Ant1



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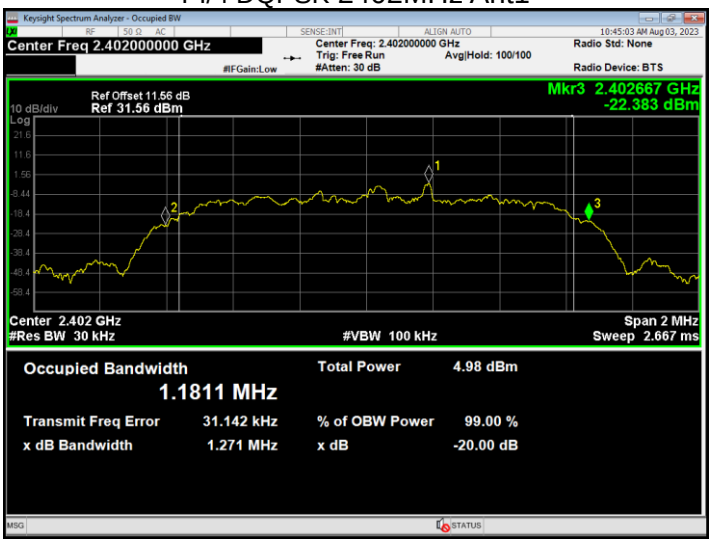
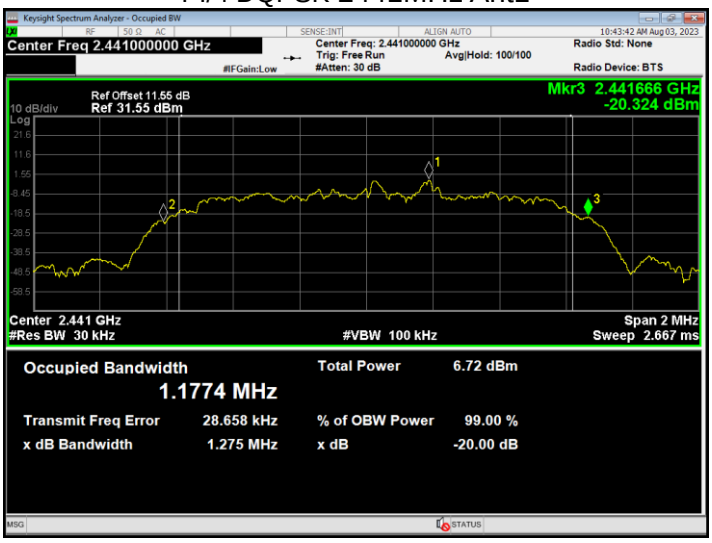
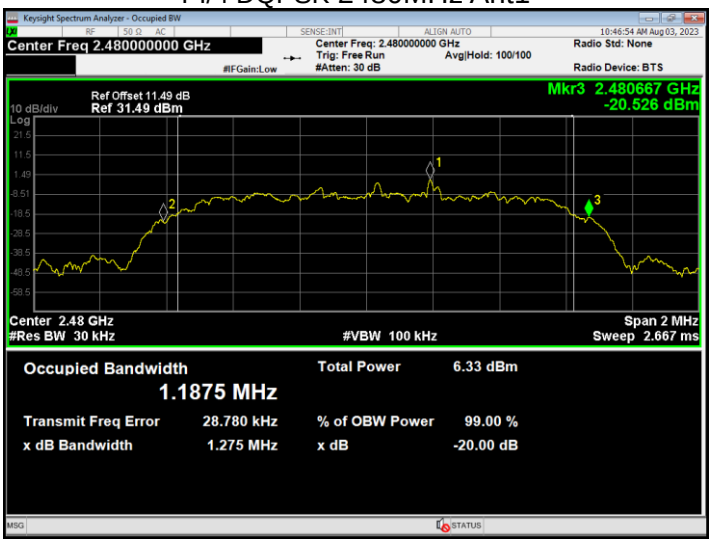
PI/4 DQPSK 2402MHz Ant1



PI/4 DQPSK 2441MHz Ant1



PI/4 DQPSK 2480MHz Ant1



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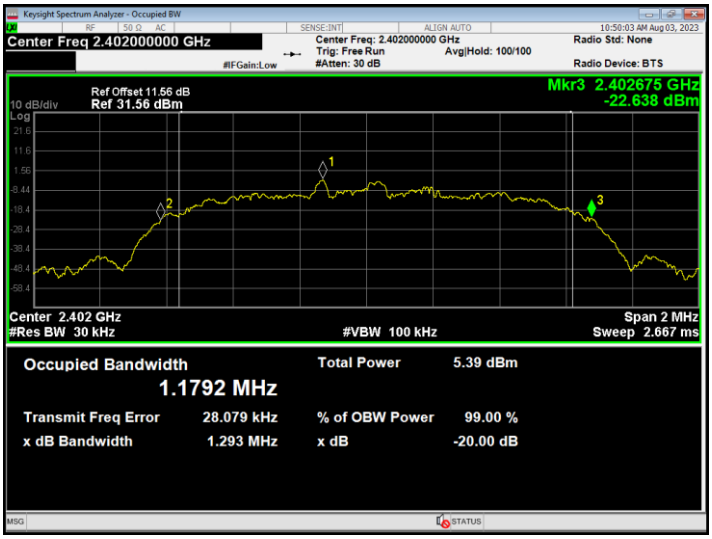
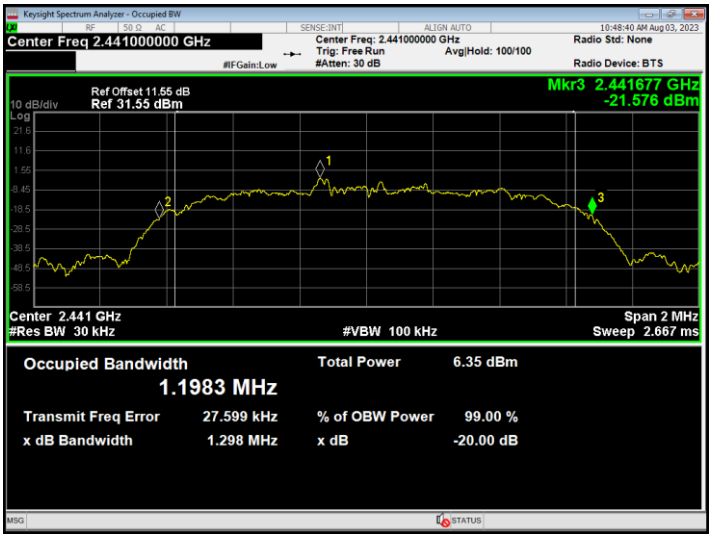
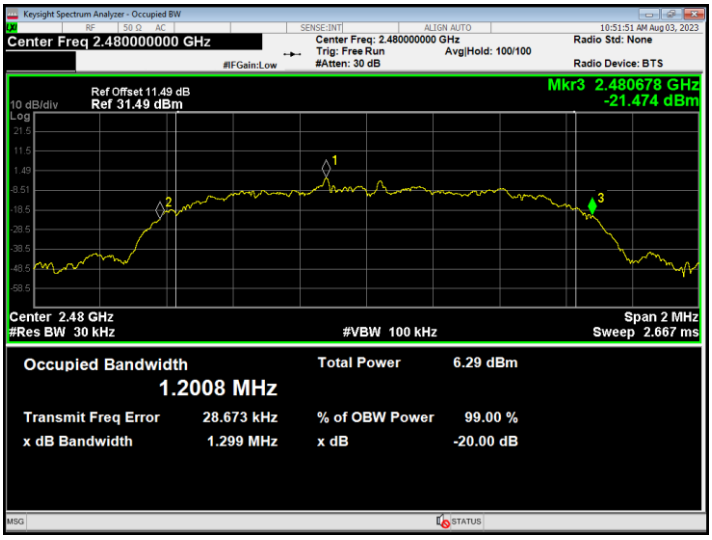
8DPSK 2402MHz Ant1



8DPSK 2441MHz Ant1



8DPSK 2480MHz Ant1



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5. ANTENNA REQUIREMENT

5.1 STANDARD REQUIREMENT

RSS-Gen requirement: The applicant for equipment certification shall provide a list of all antenna types that may be used with the transmitter, where applicable (i.e. for transmitters with detachable antenna), indicating the maximum permissible antenna gain (in dBi) and the required impedance for each antenna. The test report shall demonstrate the compliance of the transmitter with the limit for maximum equivalent isotropically radiated power (e.i.r.p.) specified in the applicable RSS, when the transmitter is equipped with any antenna type, selected from this list.

15.203 requirement: For intentional device, according to 15.203: 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.

5.2 EUT ANTENNA

The EUT antenna is internal antenna. It comply with the standard requirement.

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6. TEST SETUP PHOTO
Please see setup photo file.

7. EUT PHOTO

The other photo please see external photo and internal photo.

※※※※※ END OF REPORT ※※※※※

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