



FCC Part 15C Test Report

FCC ID: 2BOMF-S619

Applicant: Dongguan Runwei Electronics Co., Ltd

Address: No. 401, 4th Floor, Comprehensive Building, No.1 Senhu 2nd Road, Bihu Industrial Zone, Wulian Village, Fenggang Town, Dongguan, China

Manufacturer: Dongguan Runwei Electronics Co., Ltd

Address: No. 401, 4th Floor, Comprehensive Building, No.1 Senhu 2nd Road, Bihu Industrial Zone, Wulian Village, Fenggang Town, Dongguan, China

EUT: Wireless Speaker

Trade Mark: N/A

Model Number: S619

Date of Receipt: Mar. 17, 2025

Test Date: Mar. 17, 2025 - Mar. 29, 2025

Date of Report: Mar. 29, 2025

Prepared By: Shenzhen DL Testing Technology Co., Ltd.

Address: 101-201, Comprehensive Building, Tongzhou Electronics Longgang Factory Area, No.1 Baolong Fifth Road, Baolong Community, Baolong Street, Longgang District, Shenzhen, China

Applicable Standards: FCC PART 15 C 15.249
ANSI C63.10:2013

Test Result: Pass

Report Number: DLE-250326005R

Prepared by(Engineer): Ken Tan

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.

**Table of Contents****Page**

1 . SUMMARY OF TEST RESULTS	4
1.1 MEASUREMENT UNCERTAINTY	4
2 . GENERAL INFORMATION	5
2.1 GENERAL DESCRIPTION OF EUT	5
2.2 DESCRIPTION OF TEST MODES	6
2.3 BLOCK DIGRAM SHOWING THE CONFIGURATION OF SYSTEM TESTED	6
2.4 DESCRIPTION OF SUPPORT UNITS(CONDUCTED MODE)	6
2.5 EQUIPMENTS LIST FOR ALL TEST ITEMS	7
3 . EMC EMISSION TEST	8
3.1 CONDUCTED EMISSION MEASUREMENT	8
3.1.1 POWER LINE CONDUCTED EMISSION LIMITS	8
3.1.2 TEST PROCEDURE	8
3.1.3 DEVIATION FROM TEST STANDARD	8
3.1.4 TEST SETUP	9
3.1.5 EUT OPERATING CONDITIONS	9
3.1.6 TEST RESULTS	9
3.2 RADIATED EMISSION MEASUREMENT	12
3.2.1 RADIATED EMISSION LIMITS	12
3.2.2 TEST PROCEDURE	13
3.2.3 DEVIATION FROM TEST STANDARD	13
3.2.4 TEST SETUP	13
3.2.5 EUT OPERATING CONDITIONS	14
3.2.6 TEST RESULTS (BETWEEN 9KHZ – 30 MHZ)	15
3.2.7 TEST RESULTS (BETWEEN 30MHZ – 1GHZ)	16
3.2.8 TEST RESULTS (1GHZ~25GHZ)	18
3.3 RADIATED BAND EMISSION MEASUREMENT	19
3.3.1 TEST REQUIREMENT:	19
3.3.2 TEST PROCEDURE	19
3.3.3 DEVIATION FROM TEST STANDARD	19
3.3.4 TEST SETUP	20
3.3.5 EUT OPERATING CONDITIONS	20
4. BANDWIDTH TEST	22
4.1 APPLIED PROCEDURES / LIMIT	22
4.1.1 TEST PROCEDURE	22
4.1.2 DEVIATION FROM STANDARD	22
4.1.3 TEST SETUP	22
4.1.4 EUT OPERATION CONDITIONS	22
4.1.5 TEST RESULTS	23



	Page
Table of Contents	
5.1 STANDARD REQUIREMENT	28
5.2 EUT ANTENNA	28
6TEST SEUUP PHOTO	28
7EUT PHOTO	28



1. SUMMARY OF TEST RESULTS

Test procedures according to the technical standards:

FCC Part15 (15.249) , Subpart C			
Standard Section	Test Item	Judgment	Remark
15.207	Conducted Emission	PASS	
15.205(a), 15.209(a) 15.249(a), 15.249(c)	Fundamental & Radiated Spurious Emission Measurement	PASS	
15.249(d)	Band Edge Emission	PASS	
15.215(c)	20dB Bandwidth	PASS	
15.203	Antenna Requirement	PASS	

NOTE:

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

Test lab: Shenzhen DL Testing Technology Co., Ltd.

101-201, Comprehensive Building, Tongzhou Electronics Longgang Factory Area, No.1

Address: Baolong Fifth Road, Baolong Community, Baolong Street, Longgang District, Shenzhen, China

FCC Test Firm Registration Number: 854456

Designation Number: CN1307

IC Registered No.: 27485

CAB ID.: CN0118

1.1 MEASUREMENT UNCERTAINTY

The reported uncertainty of measurement $y \pm U$, where expanded 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	$\pm 2.56\text{dB}$
2	RF power, conducted	$\pm 0.42\text{dB}$
3	Spurious emissions, conducted	$\pm 2.76\text{dB}$
4	All emissions, radiated (<1G)	$\pm 3.65\text{dB}$
5	All emissions, radiated (>1G)	$\pm 4.89\text{dB}$
6	Temperature	$\pm 0.5^\circ\text{C}$
7	Humidity	$\pm 2\%$
8	20dB Bandwidth	$\pm 0.2\text{MHz}$



2. GENERAL INFORMATION

2.1 GENERAL DESCRIPTION OF EUT

Product Name:	Wireless Speaker
Trademark	N/A
Model No.:	S619
Model Difference	N/A
Sample No.:	DLE-250326005-001#
Operation Frequency:	2402-2480MHz
Channel numbers:	79 Channels
Modulation technology:	GFSK, $\pi/4$ DQPSK, 8DPSK
Antenna Type:	PCB Antenna
Antenna gain:	1.7 dBi
Power supply:	DC 5V/1000mA DC 3.7V/1800mA

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.

Channels List							
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
0	2402	1	2403	2	2404	3	2405
4	2406	5	2407	6	2408	7	2409
8	2410	9	2411	10	2412	11	2413
12	2414	13	2415	14	2416	15	2417
16	2418	17	2419	18	2420	19	2421
20	2422	21	2423	22	2424	23	2425
24	2426	25	2427	26	2428	27	2429
28	2430	29	2431	30	2432	31	2433
32	2434	33	2435	34	2436	35	2437
36	2438	37	2439	38	2440	39	2441
40	2442	41	2443	42	2444	43	2445
44	2446	45	2447	46	2448	47	2449
48	2450	49	2451	50	2452	51	2453
52	2454	53	2455	54	2456	55	2457
56	2458	57	2459	58	2460	59	2461
60	2462	61	2463	62	2464	63	2465
64	2466	65	2467	66	2468	67	2469
68	2470	69	2471	70	2472	71	2473
72	2474	73	2475	74	2476	75	2477
76	2478	77	2479	78	2480	-	-



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.

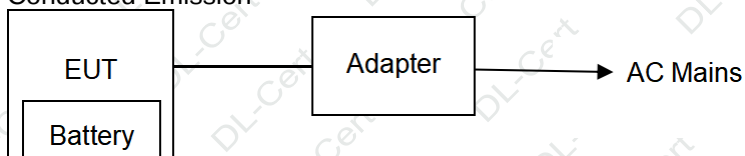
Pretest Mode	Description	
Mode 1	CH00	GFSK, $\pi/4$ DQPSK,8DPSK
Mode 2	CH39	
Mode 3	CH78	
For Conducted & Radiated Emission		
Final Test Mode	Description	
Mode 1	CH00	GFSK, $\pi/4$ DQPSK,8DPSK
Mode 2	CH39	
Mode 3	CH78	

Note:

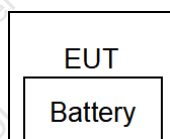
- (1) The measurements are performed at the highest, middle, lowest available channels.
- (2) A new fully charged battery was used for testing during the test.

2.3 BLOCK DIGRAM SHOWING THE CONFIGURATION OF SYSTEM TESTED

Conducted Emission



Radiated 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
1	Wireless Speaker	S619	N/A	EUT
2	Adapter	HW-0502000E	N/A	AE

Note:

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



2.5 EQUIPMENTS LIST FOR ALL TEST ITEMS

Radiation test, Band-edge test and 20db bandwidth test equipment

Item	Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until
1	Spectrum Analyzer (9kHz-26.5GHz)	Agilent	E4408B	MY50140780	Nov. 01, 2024	Oct. 31, 2025
2	Test Receiver (9kHz-7GHz)	R&S	ESRP7	101393	Nov. 01, 2024	Oct. 31, 2025
3	Bilog Antenna (30MHz-1GHz)	R&S	VULB9162	00306	Nov. 01, 2024	Oct. 31, 2025
4	Horn Antenna (1GHz-18GHz)	Schwarzbeck	BBHA9120D	02139	Nov. 01, 2024	Oct. 31, 2025
5	Horn Antenna (18GHz-40GHz)	A.H. Systems	SAS-574	588	Nov. 01, 2024	Oct. 31, 2025
6	Amplifier (9KHz-6GHz)	Schwarzbeck	BBV9743B	00153	Nov. 01, 2024	Oct. 31, 2025
7	Amplifier (1GHz-18GHz)	EMEC	EM01G8GA	00270	Nov. 01, 2024	Oct. 31, 2025
8	Amplifier (18GHz-40GHz)	Quanjuda	DLE-161	97	Nov. 01, 2024	Oct. 31, 2025
9	Loop Antenna (9KHz-30MHz)	Schwarzbeck	FMZB1519B	00014	Nov. 01, 2024	Oct. 31, 2025
10	RF cables1 (9kHz-1GHz)	ChengYu	966	004	Nov. 01, 2024	Oct. 31, 2025
11	RF cables2 (1GHz-40GHz)	ChengYu	966	003	Nov. 01, 2024	Oct. 31, 2025
12	Antenna connector	Florida RF Labs	N/A	RF 01#	Nov. 01, 2024	Oct. 31, 2025
13	Power probe	KEYSIGHT	U2021XA	MY55210018	Nov. 01, 2024	Oct. 31, 2025
14	Signal Analyzer 9kHz-26.5GHz	Agilent	N9020A	MY55370280	Nov. 01, 2024	Oct. 31, 2025
15	Test Receiver 20kHz-40GHz	R&S	ESU 40	100376	Nov. 01, 2024	Oct. 31, 2025
16	D.C. Power Supply	LongWei	PS-305D	010964729	Nov. 01, 2024	Oct. 31, 2025

Conduction Test equipment

Item	Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until
1	843 Shielded Room	YIHENG	843 Room	843	Nov. 05, 2023	Nov. 04, 2026
2	EMI Receiver	R&S	ESR	101421	Nov. 01, 2024	Oct. 31, 2025
3	LISN	R&S	ENV216	102417	Nov. 01, 2024	Oct. 31, 2025
4	843 Cable 1#	ChengYu	CE Cable	001	Nov. 01, 2024	Oct. 31, 2025

Other

Item	Name	Manufacturer	Model	Software version
1	EMC Conduction Test System	FALA	EZ_EMCC	EMC-CON 3A1.1
2	EMC radiation test system	FALA	EZ_EMCC	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

3.1.1 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

3.1.2 TEST PROCEDURE

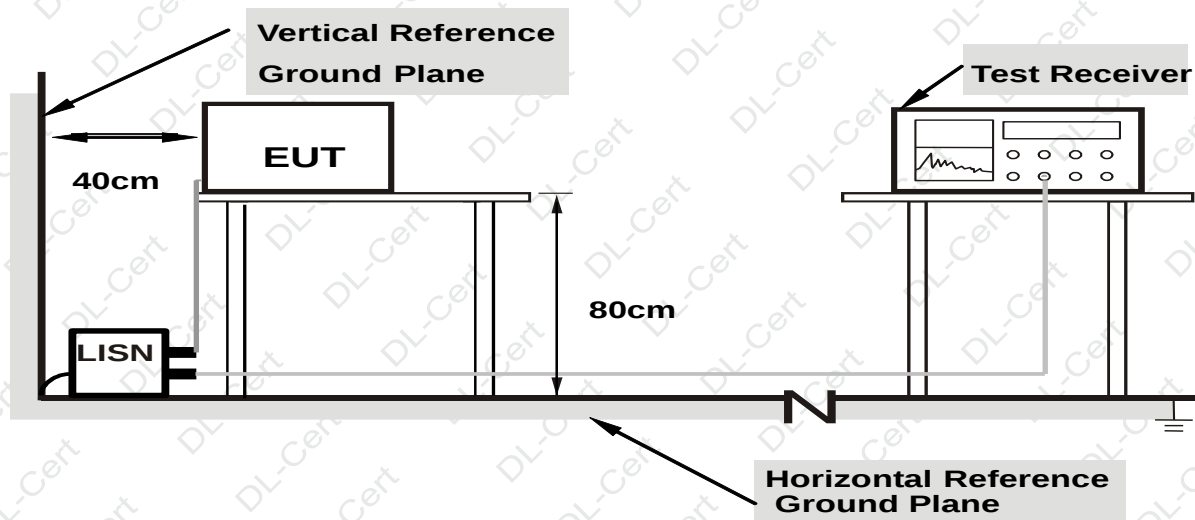
- The EUT was placed 0.8 meters from the horizontal ground plane with EUT being connected to the power mains through a line impedance stabilization network (LISN). All other support equipments powered from additional LISN(s). The LISN provide 50 Ohm/ 50uH of coupling impedance for the measuring instrument.
- Interconnecting cables that hang closer than 40 cm to the ground plane shall be folded back and forth in the center forming a bundle 30 to 40 cm long.
- I/O cables that are not connected to a peripheral shall be bundled in the center. The end of the cable may be terminated, if required, using the correct terminating impedance. The overall length shall not exceed 1 m.
- LISN at least 80 cm from nearest part of EUT chassis.
- For the actual test configuration, please refer to the related Item –EUT Test Photos.

3.1.3 DEVIATION FROM TEST STANDARD

No deviation



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.

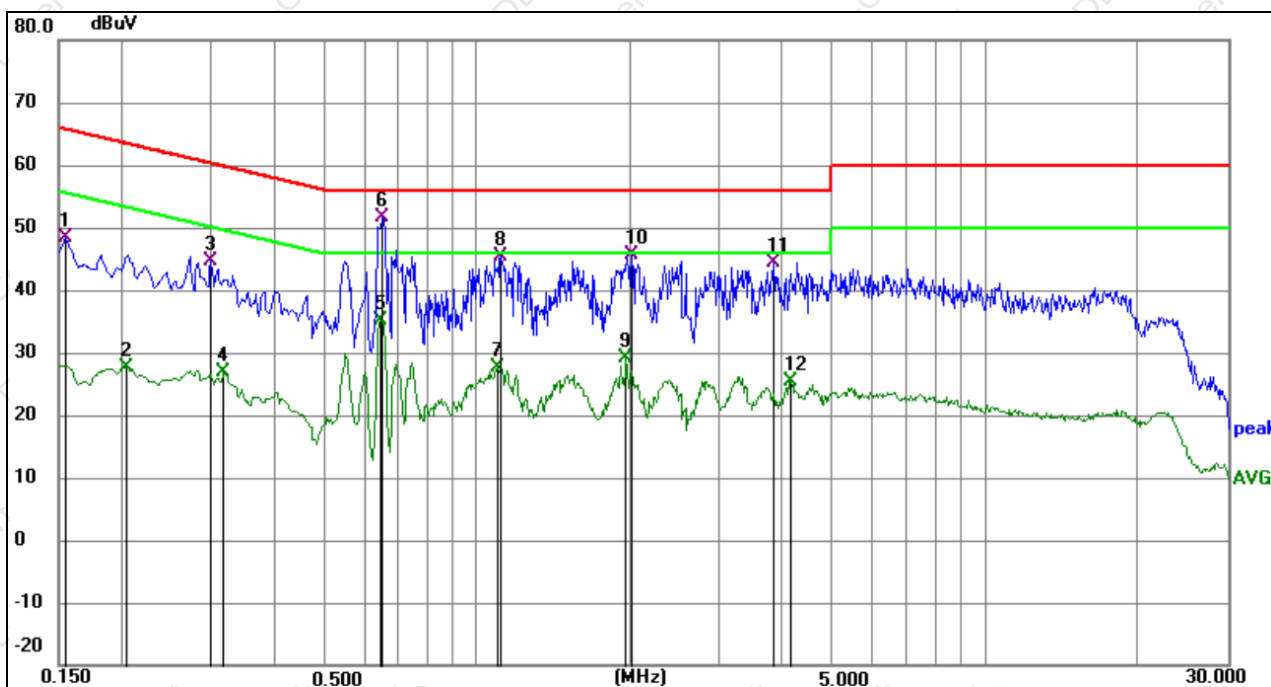
All the test modes completed for test. Only the worst result that is Low channel mode was reported as below.

3.1.6 TEST RESULTS

All the modulation modes were tested the data of the worst mode (AC 120V/60Hz, GFSK TX 2402MHz) are recorded in the following pages and the others modulation methods do not exceed the limits.



Temperature:	25 °C	Relative Humidity:	54%
Pressure:	1010hPa	Phase :	L
Test Voltage :	AC 120V/60Hz	Test Mode:	Mode 1



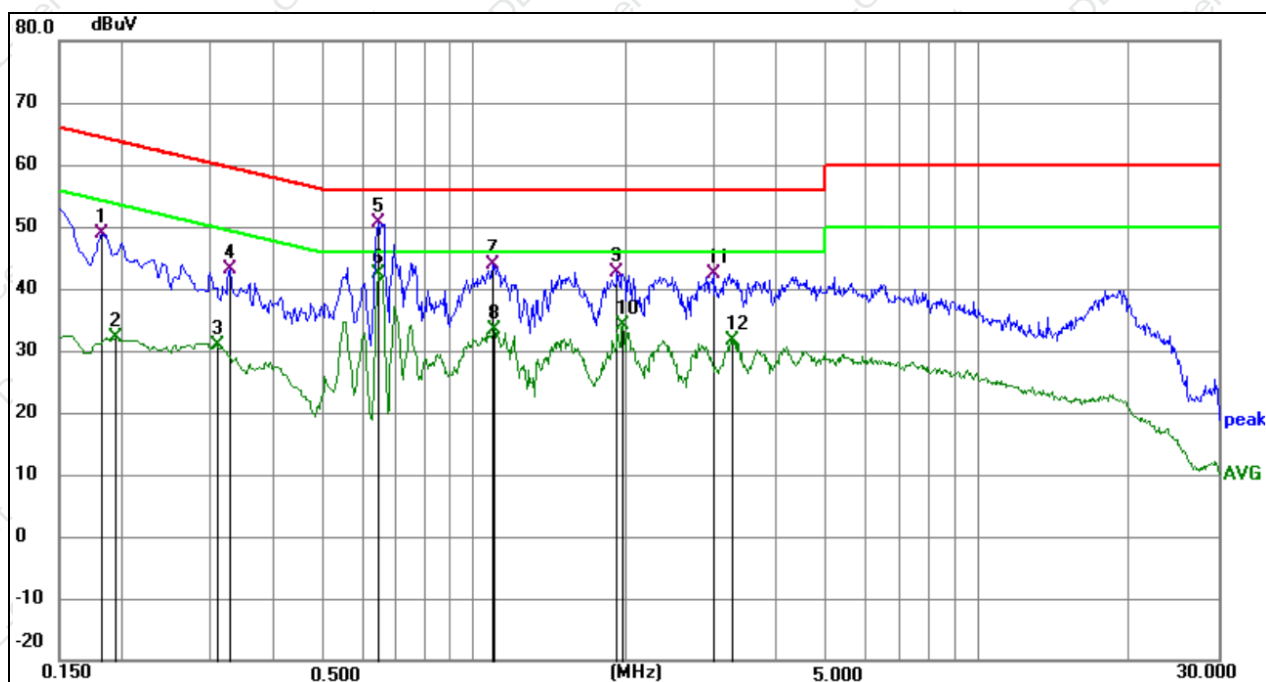
Remark:

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
1	0.1544	37.84	10.46	48.30	65.76	-17.46	QP
2	0.2040	17.11	10.56	27.67	53.45	-25.78	AVG
3	0.2983	34.17	10.56	44.73	60.29	-15.56	QP
4	0.3165	16.29	10.57	26.86	49.80	-22.94	AVG
5	0.6450	24.44	10.65	35.09	46.00	-10.91	AVG
6 *	0.6493	41.08	10.65	51.73	56.00	-4.27	QP
7	1.0994	17.08	10.66	27.74	46.00	-18.26	AVG
8	1.1130	34.72	10.66	45.38	56.00	-10.62	QP
9	1.9635	18.51	10.68	29.19	46.00	-16.81	AVG
10	2.0175	34.90	10.68	45.58	56.00	-10.42	QP
11	3.8310	33.76	10.66	44.42	56.00	-11.58	QP
12	4.1460	14.68	10.69	25.37	46.00	-20.63	AVG



Temperature:	25 °C	Relative Humidity:	54%
Pressure:	1010hPa	Phase :	N
Test Voltage :	AC 120V/60Hz	Test Mode:	Mode 1



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
1	0.1814	38.39	10.52	48.91	64.42	-15.51	QP
2	0.1949	21.64	10.55	32.19	53.83	-21.64	AVG
3	0.3074	20.31	10.57	30.88	50.04	-19.16	AVG
4	0.3255	32.45	10.57	43.02	59.57	-16.55	QP
5	0.6450	39.93	10.65	50.58	56.00	-5.42	QP
6 *	0.6450	31.79	10.65	42.44	46.00	-3.56	AVG
7	1.0905	33.32	10.66	43.98	56.00	-12.02	QP
8	1.0950	22.78	10.66	33.44	46.00	-12.56	AVG
9	1.9230	31.83	10.68	42.51	56.00	-13.49	QP
10	1.9724	23.51	10.68	34.19	46.00	-11.81	AVG
11	2.9805	31.64	10.68	42.32	56.00	-13.68	QP
12	3.2595	21.06	10.65	31.71	46.00	-14.29	AVG



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 15.205(a), then the 15.209(a) limit in the table below has to be followed.

Frequency (MHz)	Field Strength (micromvolts/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 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).

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



3.2.2 TEST PROCEDURE

Below 1GHz test procedure as below:

- The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
- The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- 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.
- 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.
- The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
- 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:

- The EUT was placed on the top of a rotating table 1.5 meters above the ground at a 3 meter semi-anechoic chamber. (Above 18GHz the distance is 3 meter and table is 1.5 metre).
- Test the EUT in the lowest channel ,the middle channel ,the Highest channel

Note:

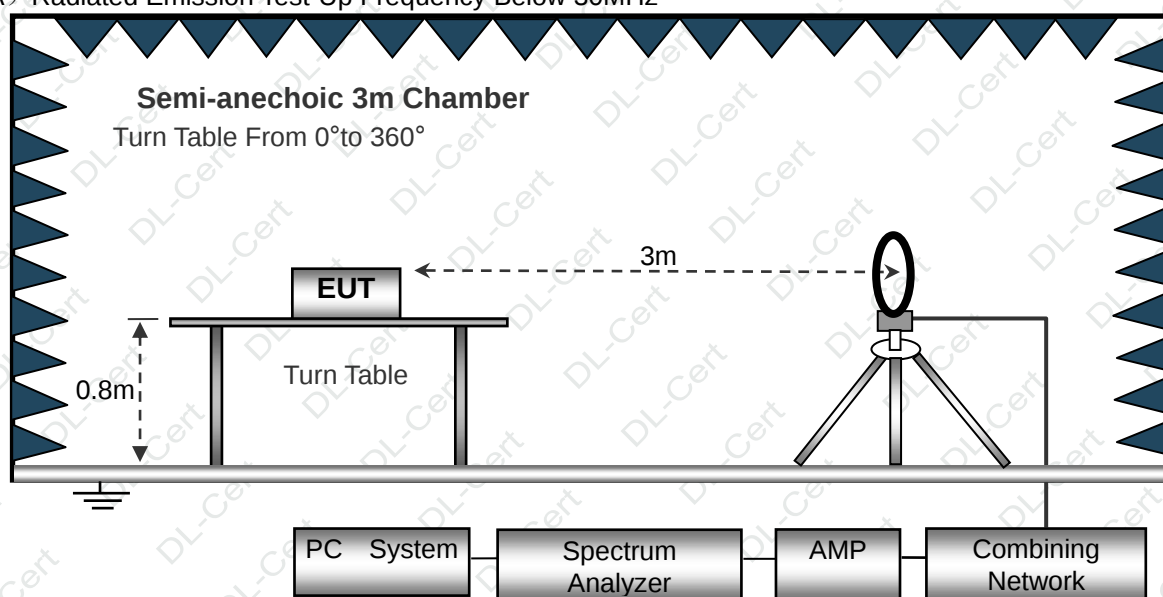
Both horizontal and vertical antenna polarities were tested and performed pretest to three orthogonal axis. The worst case emissions were reported

3.2.3 DEVIATION FROM TEST STANDARD

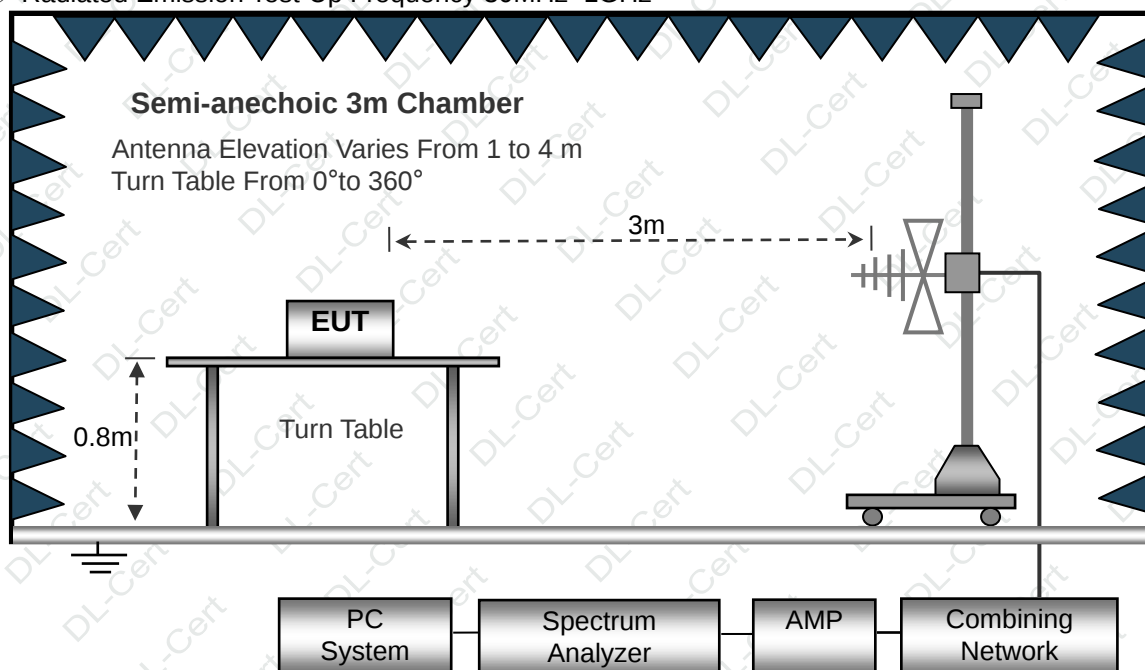
No deviation

3.2.4 TEST SETUP

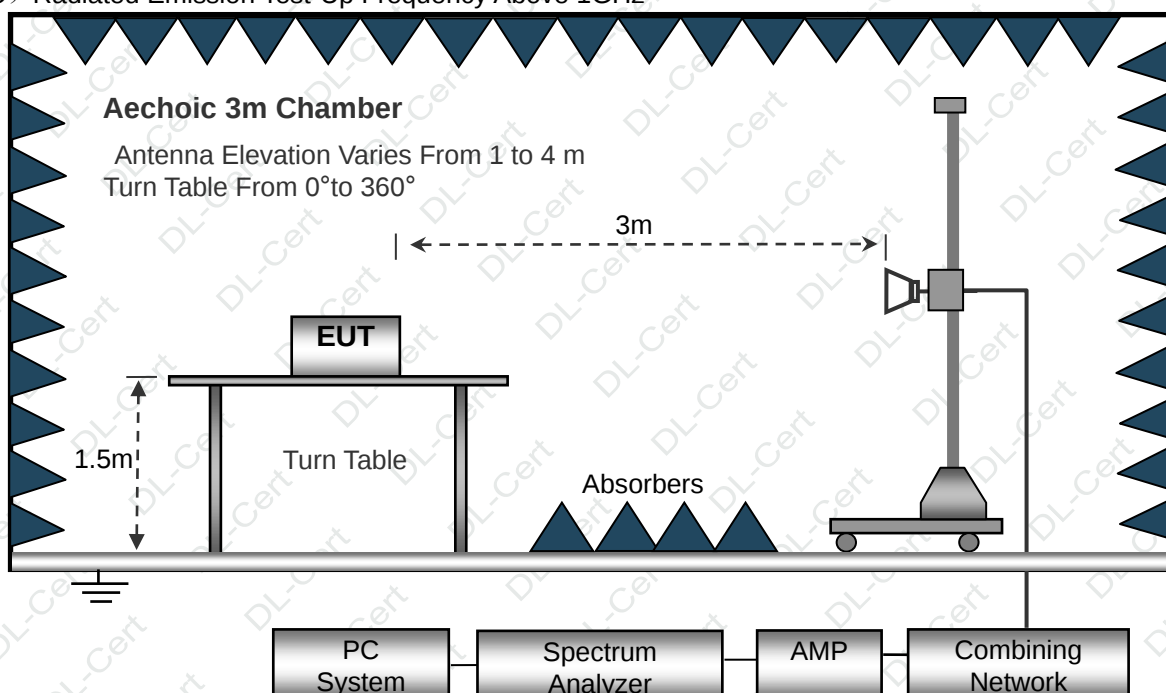
(A) Radiated Emission Test-Up Frequency Below 30MHz



(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.

**3.2.6 TEST RESULTS (BETWEEN 9KHZ – 30 MHZ)**

Temperature:	20°C	Relative Humidity:	48%
Pressure:	1010 hPa	Test Voltage :	DC 3.7V
Test Mode :	Mode 1	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 = $40 \log (\text{specific distance/test distance})$ (dB);

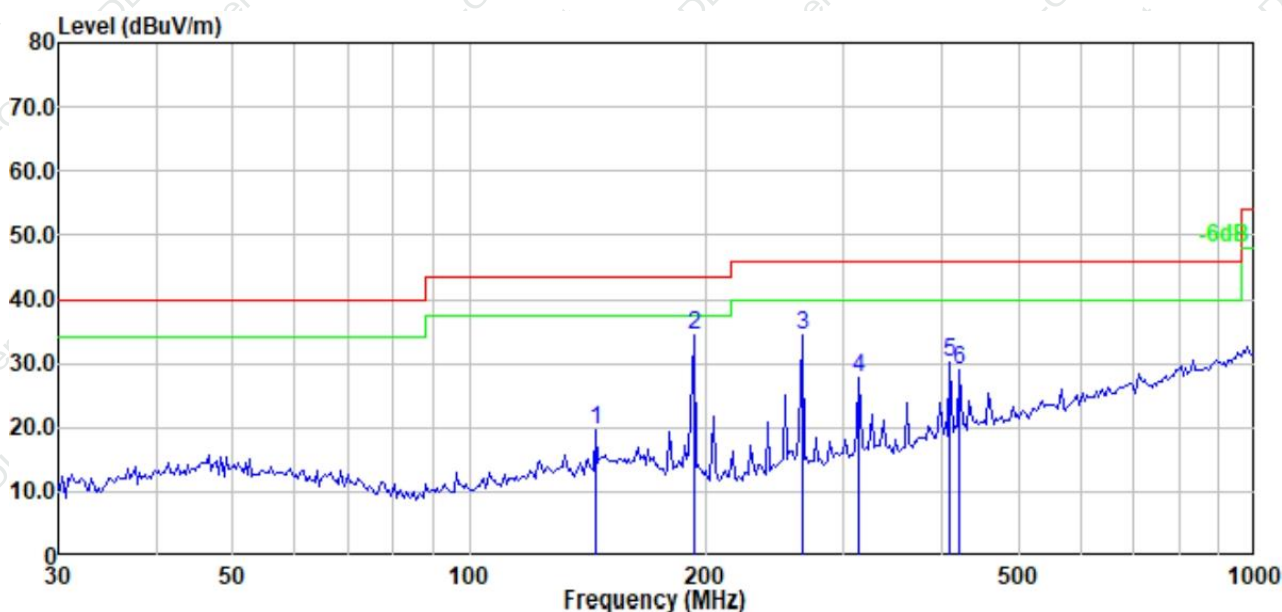
Limit line = specific limits(dBuv) + distance extrapolation factor.



3.2.7 TEST RESULTS (BETWEEN 30MHZ – 1GHZ)

All the modulation modes were tested the data of the worst mode (GFSK TX 2402MHz) are recorded in the following pages and the others modulation methods do not exceed the limits.

Temperature:	26°C	Relative Humidity:	54%
Pressure:	1010 hPa	Polarization :	Horizontal
Test Voltage :	DC 3.7V		
Test Mode :	Mode 1		



	Read				Limit	Over		
	Freq	Level	Level	Factor	Line	Limit	Pol/Phase	Remark
	MHz	dBuV	dBuV/m	dB/m	dBuV/m	dB		
1	144.790	31.63	19.69	-11.94	43.50	-23.81	Horizontal	QP
2	193.137	48.21	34.36	-13.85	43.50	-9.14	Horizontal	QP
3	264.971	46.42	34.52	-11.90	46.00	-11.48	Horizontal	QP
4	313.648	37.50	27.65	-9.85	46.00	-18.35	Horizontal	QP
5	409.651	37.61	30.10	-7.51	46.00	-15.90	Horizontal	QP
6	421.329	35.90	28.84	-7.06	46.00	-17.16	Horizontal	QP

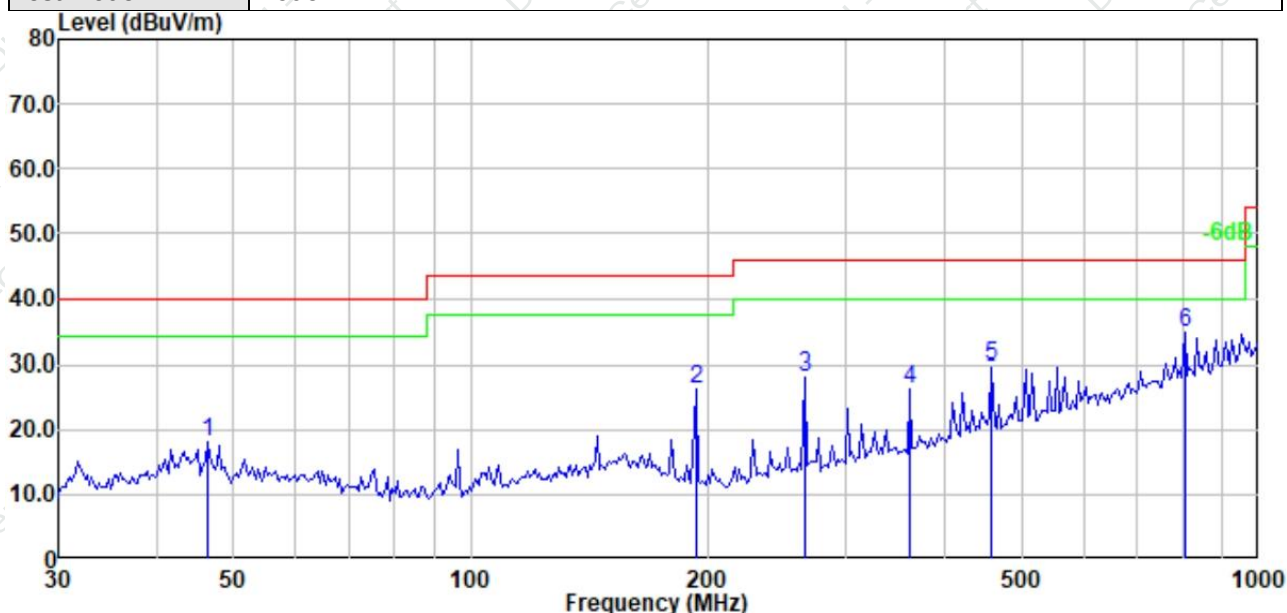
Remark:

Correct Factor = Cable loss + Antenna factor – Preamplifier;

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



Temperature:	26°C	Relative Humidity:	54%
Pressure:	1010 hPa	Polarization :	Vertical
Test Voltage :	DC 3.7V		
Test Mode :	Mode 1		



	Read				Limit	Over		
	Freq	Level	Level	Factor	Line	Limit	Pol/Phase	Remark
	MHz	dBuV	dBuV/m	dB/m	dBuV/m	dB		
1	46.381	30.62	18.20	-12.42	40.00	-21.80	Vertical	QP
2	193.137	40.11	26.26	-13.85	43.50	-17.24	Vertical	QP
3	264.971	40.08	28.18	-11.90	46.00	-17.82	Vertical	QP
4	360.978	35.49	26.15	-9.34	46.00	-19.85	Vertical	QP
5	458.399	35.81	29.53	-6.28	46.00	-16.47	Vertical	QP
6	804.252	33.69	34.66	0.97	46.00	-11.34	Vertical	QP

Remark:

Correct Factor = Cable loss + Antenna factor – Preamplifier;

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



3.2.8 TEST RESULTS (1GHZ~25GHZ)

All the modulation modes were tested the data of the worst mode (GFSK) was recorded in the following pages and the others modulation methods do not exceed the limits.

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	114.91	52.16	2.78	27.41	92.94	114.00	-21.06	PK
V	2402.00	106.88	52.16	2.78	27.41	84.91	94.00	-9.09	AV
V	4804.00	77.80	51.74	3.08	31.25	60.39	74.00	-13.61	PK
V	4804.00	61.12	51.74	3.08	31.25	43.71	54.00	-10.29	AV
V	16132.00	54.70	51.56	7.36	41.57	52.07	74.00	-21.93	PK
H	2402.00	113.47	52.16	2.78	27.41	91.50	114.00	-22.50	PK
H	2402.00	104.90	52.16	2.78	27.41	82.93	94.00	-11.07	AV
H	4804.00	76.70	51.74	3.08	31.25	59.29	74.00	-14.71	PK
H	4804.00	59.42	51.74	3.08	31.25	42.01	54.00	-11.99	AV
H	16132.00	56.01	51.56	7.36	41.57	53.38	74.00	-20.62	PK
operation frequency:2441									
V	2441.00	114.12	52.11	2.82	27.47	92.30	114.00	-21.70	PK
V	2441.00	105.91	52.11	2.82	27.47	84.09	94.00	-9.91	AV
V	4882.00	77.58	51.77	3.03	31.34	60.18	74.00	-13.82	PK
V	4882.00	60.95	51.77	3.03	31.34	43.55	54.00	-10.45	AV
V	16132.00	54.80	51.56	7.36	41.57	52.17	74.00	-21.83	PK
H	2441.00	112.61	52.11	2.82	27.47	90.79	114.00	-23.21	PK
H	2441.00	104.76	52.11	2.82	27.47	82.94	94.00	-11.06	AV
H	4882.00	76.60	51.77	3.03	31.34	59.20	74.00	-14.80	PK
H	4882.00	59.96	51.77	3.03	31.34	42.56	54.00	-11.44	AV
H	16132.00	55.91	51.56	7.36	41.57	53.28	74.00	-20.72	PK
operation frequency:2480									
V	2480.00	114.11	52.23	2.86	27.44	92.18	114.00	-21.82	PK
V	2480.00	107.07	52.23	2.86	27.44	85.14	94.00	-8.86	AV
V	4960.00	78.41	51.69	3.05	31.39	61.16	74.00	-12.84	PK
V	4960.00	60.41	51.69	3.05	31.39	43.16	54.00	-10.84	AV
V	16132.00	54.76	51.56	7.36	41.57	52.13	74.00	-21.87	PK
H	2480.00	113.84	52.23	2.86	27.44	91.91	114.00	-22.09	PK
H	2480.00	105.97	52.23	2.86	27.44	84.04	94.00	-9.96	AV
H	4960.00	77.70	51.69	3.05	31.39	60.45	74.00	-13.55	PK
H	4960.00	59.86	51.69	3.05	31.39	42.61	54.00	-11.39	AV
H	16132.00	54.95	51.56	7.36	41.57	52.32	74.00	-21.68	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	2520MHz
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 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

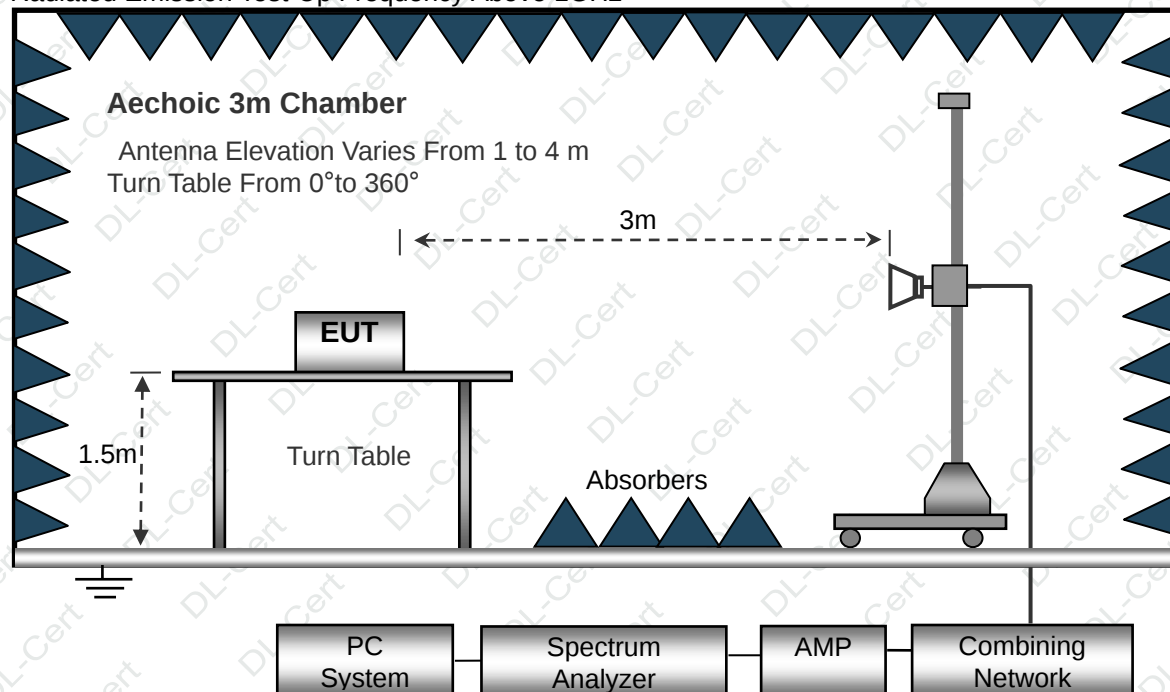
3.3.3 DEVIATION FROM TEST STANDARD

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

All the modulation modes were tested the data of the worst mode (GFSK) was recorded in the following pages and the others modulation methods do not exceed the limits.

Polar (H/V)	Frequency (MHz)	Meter Reading (dBuV)	Pre-amplifier (dB)	Cable Loss (dB)	Antenna Factor (dB/m)	Emission level (dBuV/m)	Limit (dBuV/m)	Margin (dBuV/m)	Detect or Type	Result
Low Channel: 2402MHz										
H	2390.00	76.48	52.12	2.73	27.38	54.47	74.00	-19.53	PK	PASS
H	2390.00	65.98	52.12	2.73	27.38	43.97	54.00	-10.03	AV	PASS
H	2400.00	77.76	52.16	2.78	27.41	55.79	74.00	-18.21	PK	PASS
H	2400.00	65.41	52.16	2.78	27.41	43.44	54.00	-10.56	AV	PASS
V	2390.00	77.27	52.12	2.73	27.38	55.26	74.00	-18.74	PK	PASS
V	2390.00	65.39	52.12	2.73	27.38	43.38	54.00	-10.62	AV	PASS
V	2400.00	76.98	52.16	2.78	27.41	55.01	74.00	-18.99	PK	PASS
V	2400.00	66.06	52.16	2.78	27.41	44.09	54.00	-9.91	AV	PASS
High Channel: 2480MHz										
H	2483.50	75.98	52.23	2.86	27.44	54.05	74.00	-19.95	PK	PASS
H	2483.50	66.47	52.23	2.86	27.44	44.54	54.00	-9.46	AV	PASS
H	2500.00	75.76	52.26	2.88	27.49	53.87	74.00	-20.13	PK	PASS
H	2500.00	65.34	52.26	2.88	27.49	43.45	54.00	-10.55	AV	PASS
V	2483.50	75.96	52.23	2.86	27.44	54.03	74.00	-19.97	PK	PASS
V	2483.50	64.98	52.23	2.86	27.44	43.05	54.00	-10.95	AV	PASS
V	2500.00	75.78	52.26	2.88	27.49	53.89	74.00	-20.11	PK	PASS
V	2500.00	66.76	52.26	2.88	27.49	44.87	54.00	-9.13	AV	PASS
Remark: 1. Emission Level = Meter Reading + Antenna Factor + Cable Loss – Pre-amplifier, Margin= Emission Level - Limit										



4. BANDWIDTH TEST

4.1 APPLIED PROCEDURES / LIMIT

FCC Part15 (15.215) , Subpart C	
Section	Test Item
15.215	Bandwidth

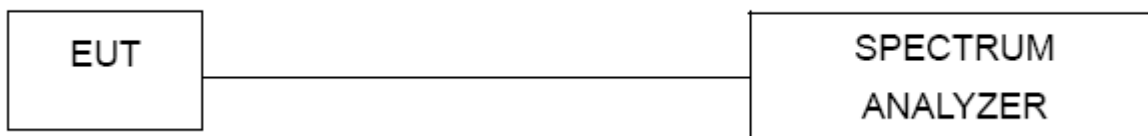
4.1.1 TEST PROCEDURE

1. Set RBW = 1 kHz.
2. Set the video bandwidth (VBW) $\geq$ 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



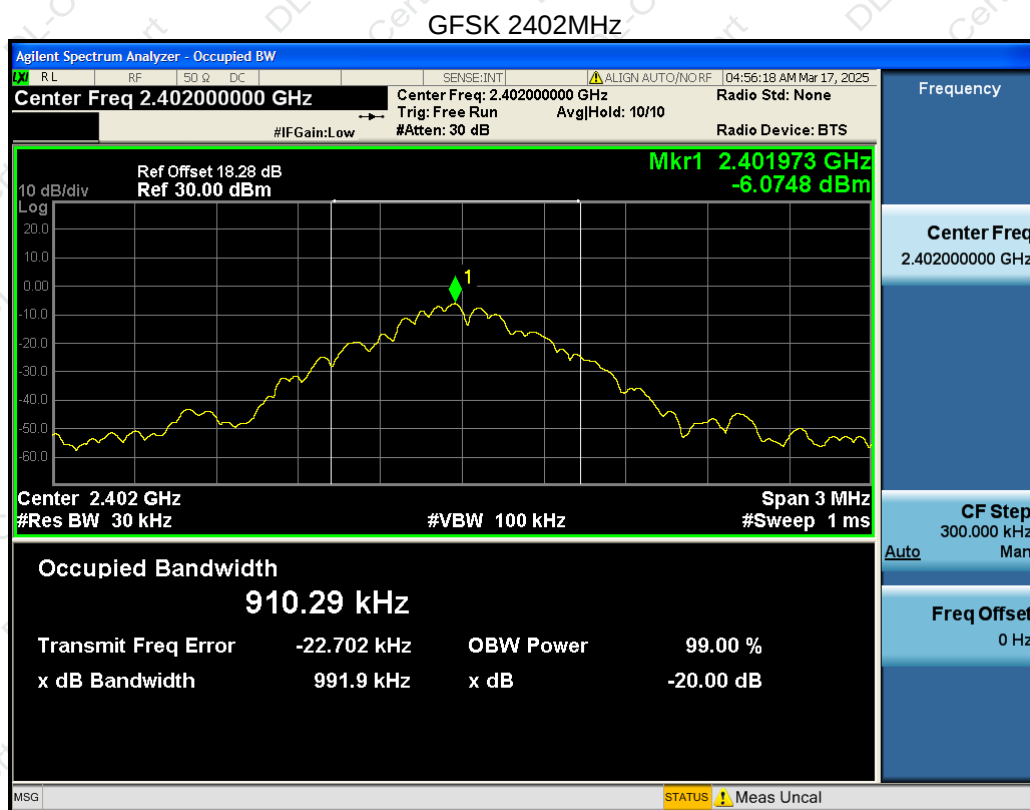
4.1.4 EUT OPERATION CONDITIONS

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.



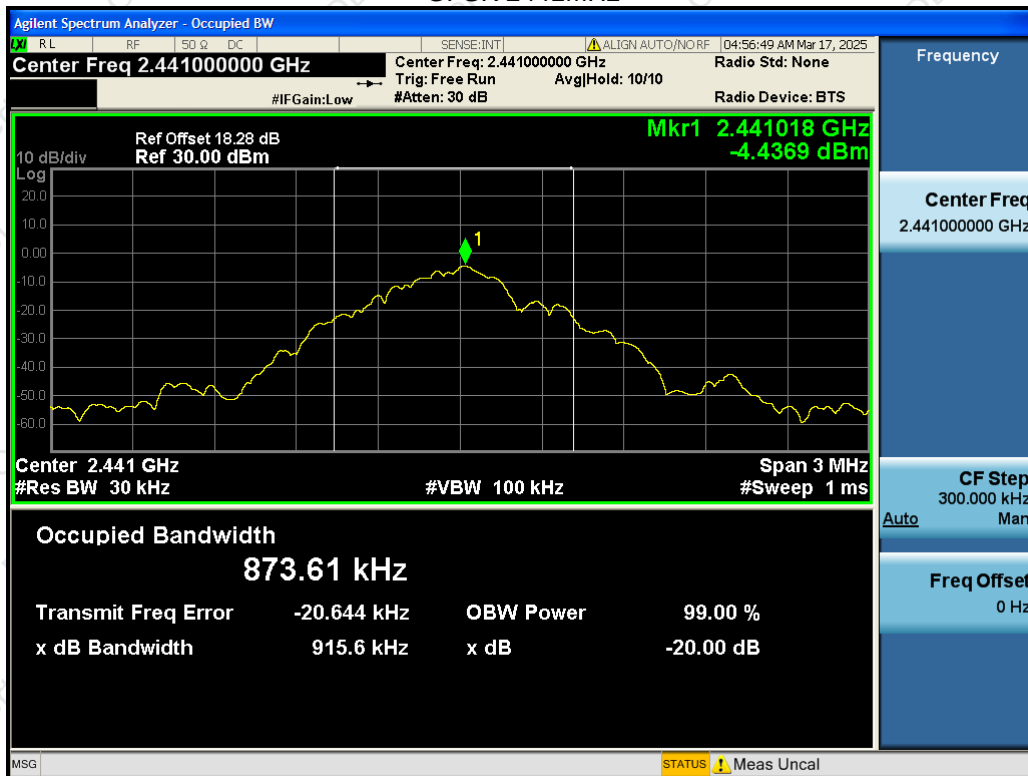
4.1.5 TEST RESULTS

Modulation	Frequency (MHz)	20dB Bandwidth (MHz)	Result
GFSK	2402	0.992	Pass
	2441	0.917	Pass
	2480	0.869	Pass
$\pi/4$ DQPSK	2402	1.374	Pass
	2441	1.317	Pass
	2480	1.285	Pass
8DPSK	2402	1.292	Pass
	2441	1.328	Pass
	2480	1.355	Pass

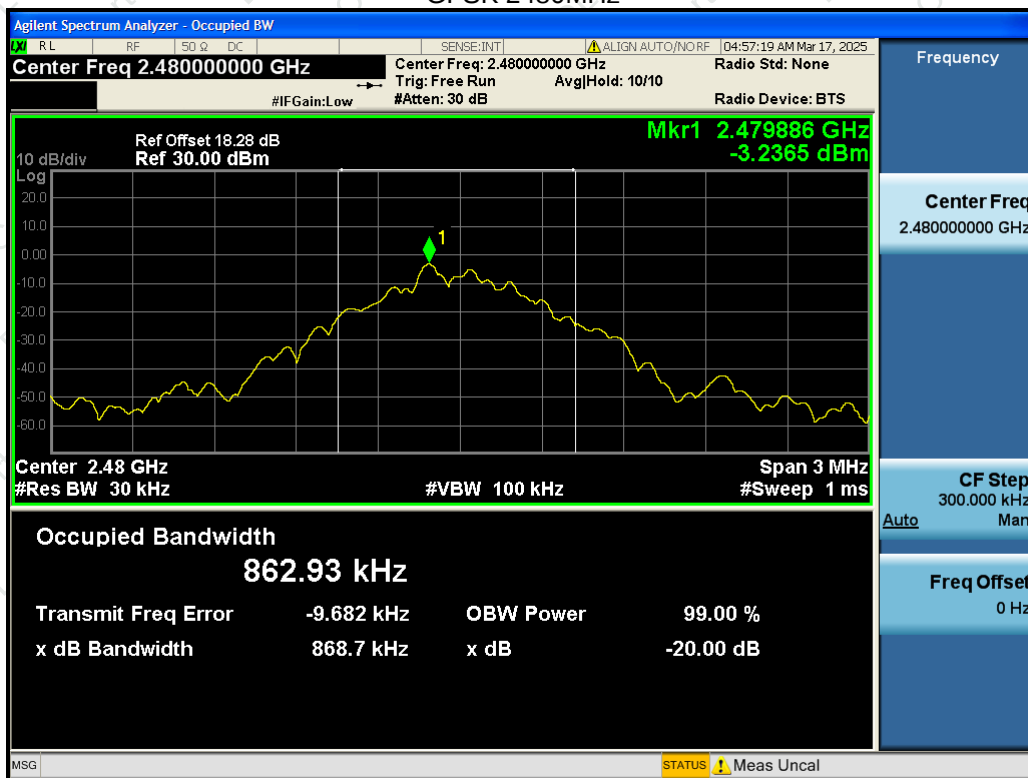


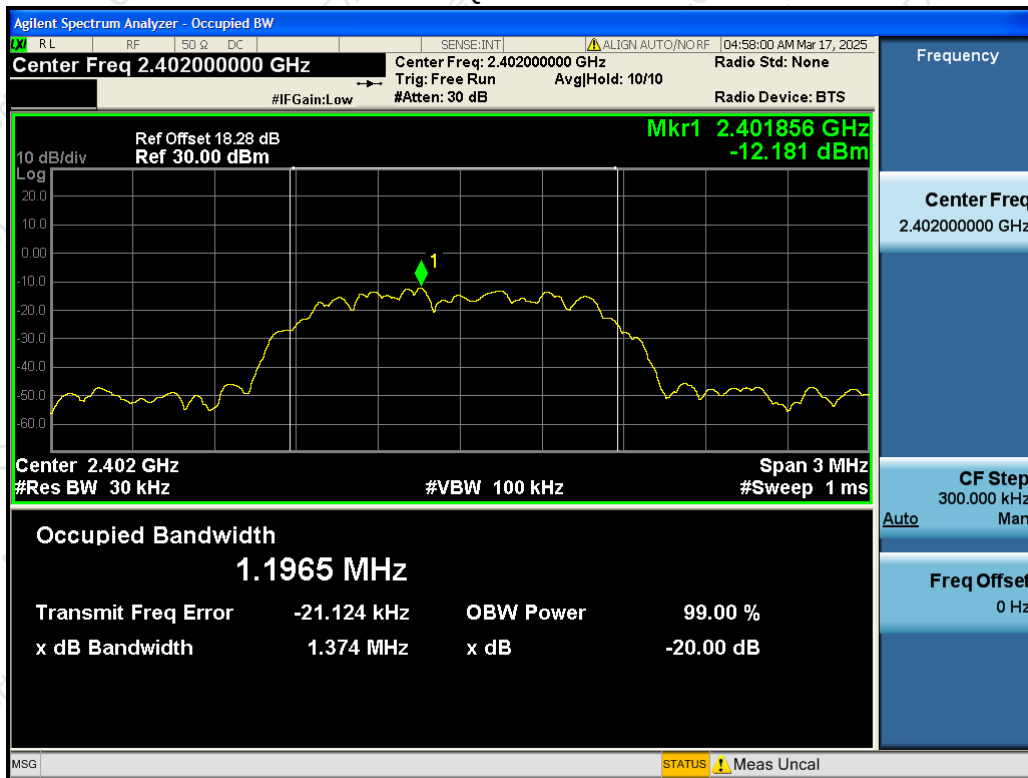
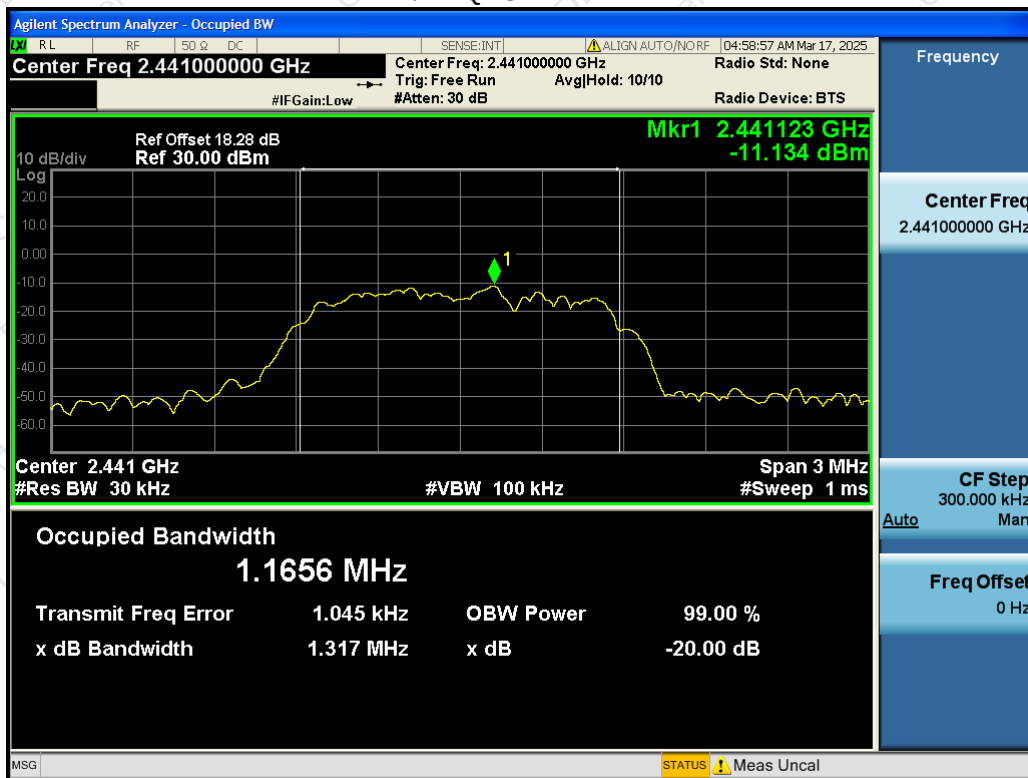


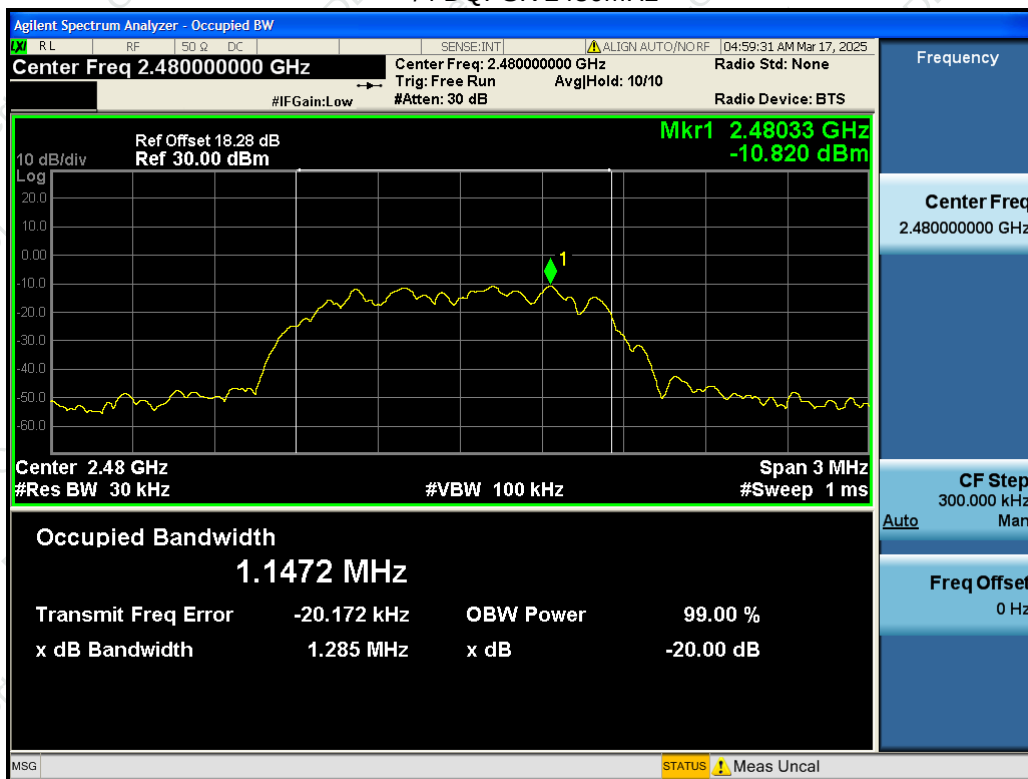
GFSK 2441MHz



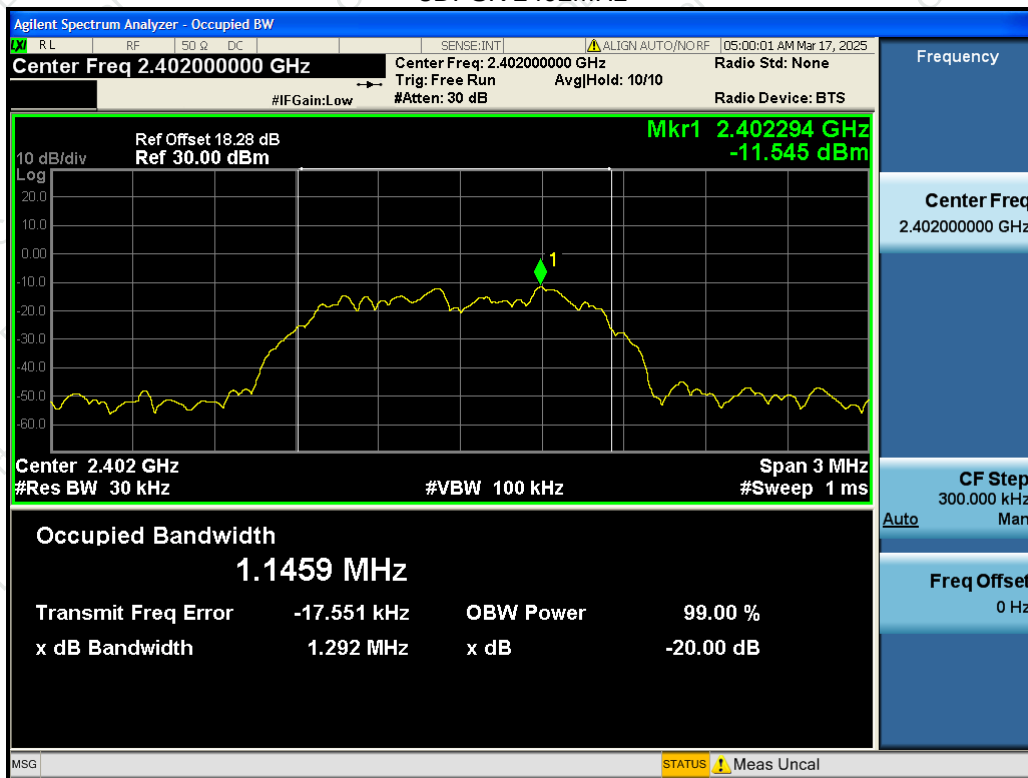
GFSK 2480MHz



 $\pi/4$ DQPSK 2402MHz $\pi/4$ DQPSK 2441MHz

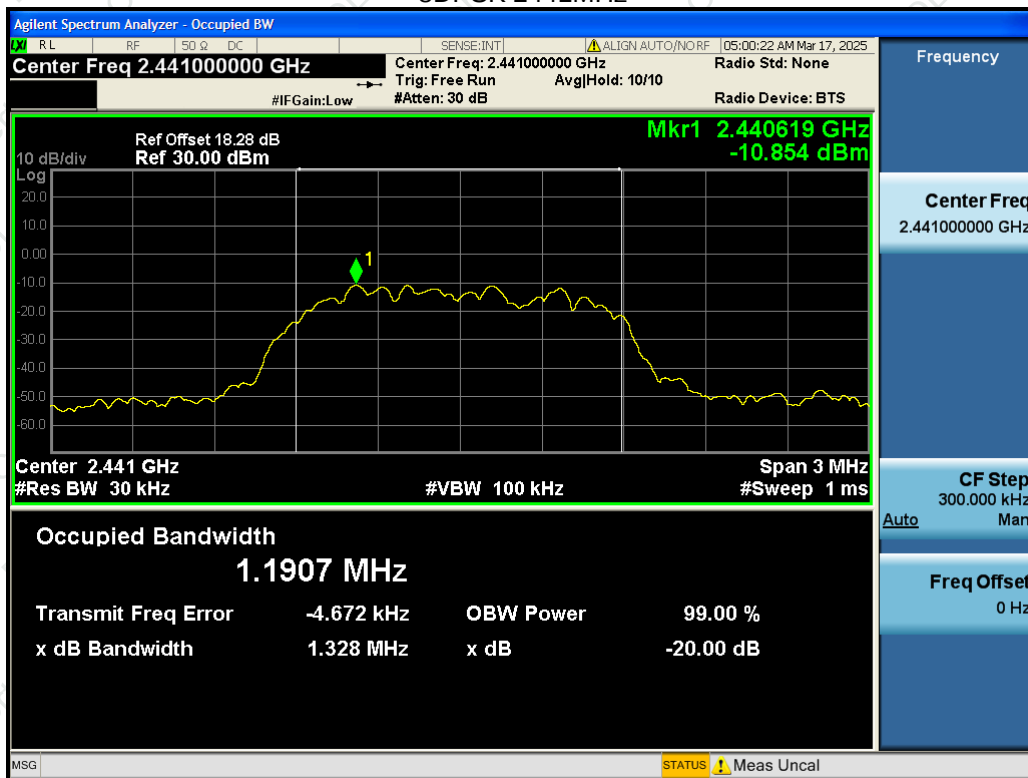
 $\pi/4$ DQPSK 2480MHz

8DPSK 2402MHz

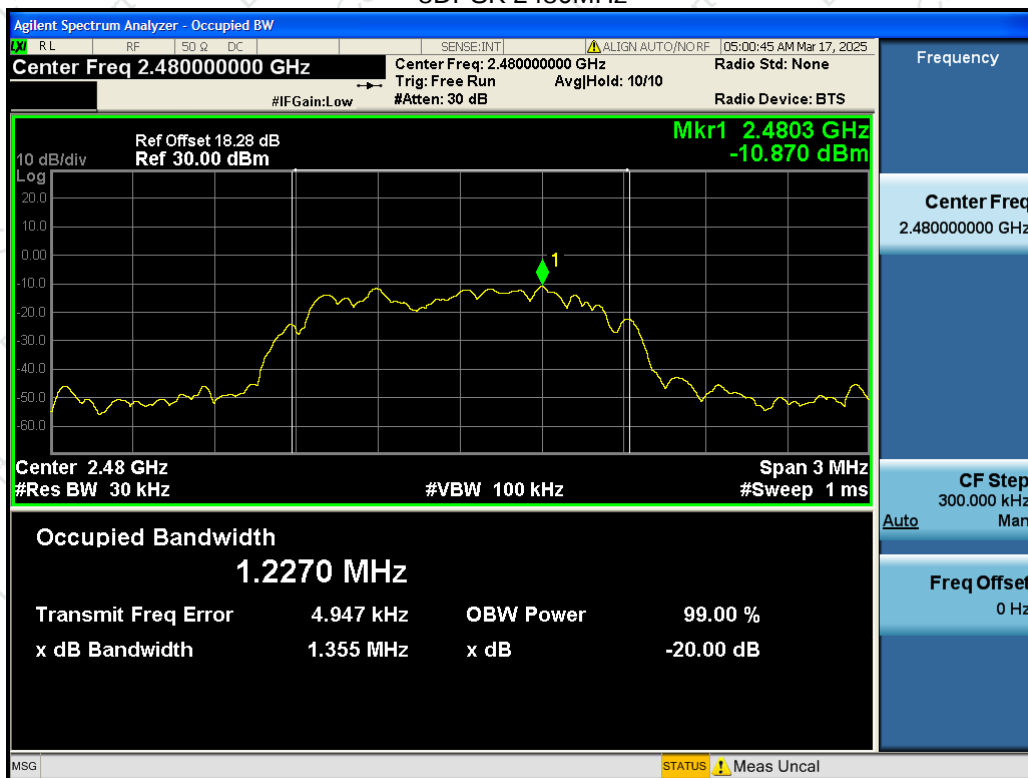




8DPSK 2441MHz



8DPSK 2480MHz





5. ANTENNA REQUIREMENT

5.1 STANDARD REQUIREMENT

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 PCB Antenna, It comply with the standard requirement.

6TEST SEUUP PHOTO

Reference to the appendix I for details.

7EUT PHOTO

Reference to the appendix II for details.

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