FCC PART 15 SUBPART C TEST REPORT

FCC PART 15.247

Report Reference No.....	**BSL24070901P02-R01**
FCC ID.....	**2AYJK-BLITZ2**
Compiled by (position+printed name+signature)..	Engineer/ Cindy Zheng
Supervised by (position+printed name+signature)..	Manager/Haley Wen
Approved by (position+printed name+signature)..	RF Manager/ Vivian Jiang
Date of issue	July 23, 2024

Testing Laboratory Name	**BSL Testing Co., Ltd.**
Address	1/F, Building B, Xinshidai GR Park,Shiyan Street, Bao'an District, Shenzhen,Guangdong, 518052, People's Republic of China

Applicant's name	**Shenzhen Warsong Technology Co., Ltd.**
Address	Room 1401, Building 4, Chongwen Garden, No. 1 Tangling Road, Fuguang Community, Taoyuan Street, Nanshan District, Shenzhen, China

Test specification	
Standard	**FCC Part 15.247** **KDB558074** **C63.10**

Equipment description.....	**Wireless Game Controller**
Trade Mark	BIGBIG WON
Manufacturer	ShenZhen MYGT Co., Ltd
Model/Type reference	BLITZ 2
Listed Models	BLITZ 2 PRO
Modulation	GFSK, QPSK, 8PSK
Frequency	From 2402MHz to 2480MHz
Ratings	DC 3.7V from battery or DC 5.0V from USB Port
Result	**PASS**

TEST REPORT

Equipment under Test	:	**Wireless Game Controller**
Model /Type	:	BLITZ 2
Listed Models	:	BLITZ 2 PRO
Model Declaration	:	All the models are electrical identical including the same software parameter and hardware design, same mechanical structure and design, the only difference is the model named different.
Applicant	:	**Shenzhen Warsong Technology Co., Ltd.**
Address	:	Room 1401, Building 4, Chongwen Garden, No. 1 Tangling Road, Fuguang Community, Taoyuan Street, Nanshan District, Shenzhen, China
Manufacturer	:	**ShenZhen MYGT Co., Ltd**
Address	:	Building 3, Tongfuyu Industrial Zone, Shajing Street Office, Bao'an District, Shenzhen

Test Result:	**PASS**

The test report merely corresponds to the test sample.
It is not permitted to copy extracts of these test result without the written permission of the test laboratory.

Contents

1 TEST STANDARDS

The tests were performed according to following standards:

FCC Rules Part 15.247: Frequency Hopping, Direct Spread Spectrum and Hybrid Systems that are in operation within the bands of 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz.
ANSI C63.10-2013: American National Standard for Testing Unlicensed Wireless Devices
KDB558074 D01 V05r02: Guidance for Performing Compliance Measurements on Digital Transmission Systems (DTS) Operating Under §15.247

2 SUMMARY

2.1 General Remarks

Date of receipt of test sample	:	July 2, 2024
Testing commenced on	:	July 23, 2024
Testing concluded on	:	July 23, 2024

2.2 Product Description

Product Description:	Wireless Game Controller
Model/Type reference:	BLITZ 2
Power supply:	DC 3.7V From Battery and DC 5V From external circuit
Adapter information (Auxiliary test supplied by testing Lab）	Model: EP-TA20CBC Input: AC 100-240V 50/60Hz Output: DC 5V 2A Firmware Version: EPTA5.14.2 Manufacture: Huizhou Dongyang Yienbi Electronics Co., Ltd
Testing sample ID：	BSL24070901P02-R01-1# (Engineer sample), BSL24070901P02-R01-2# (Normal sample)
SLE	
Supported type:	SLE
Modulation:	GFSK, QPSK, 8PSK
Operation frequency:	GFSK:2402MHz to 2480MHz, QPSK:2404MHz to 2478MHz, 8PSK:2405MHz to 2477MHz
Channel separation:	GFSK:1MHz , QPSK:2MHz , 8PSK:4MHz
Channel number:	GFSK:79 , QPSK:37 , 8PSK:18
Antenna type:	Chip Antenna
Antenna gain:	1.8 dBi

2.3 Equipment Under Test

Power supply system utilised

Power supply voltage	:	○	230V / 50 Hz	○	120V / 60Hz
		○	12 V DC	○	24 V DC
		●	Other (specified in blank below)		

DC 3.7V From Battery and DC 5V From external circuit

2.4 Short description of the Equipment under Test (EUT)

This is a Wireless Game Controller.
For more details, refer to the user's manual of the EUT.

2.5 EUT operation mode

The Applicant provides communication tools software(Engineer mode) to control the EUT for staying in continuous transmitting (Duty Cycle more than 98%) and receiving mode for testing .

SLE(GFSK)

Test Channel	EUT Channel	Test Frequency (MHz)
Lowest	CH00	2402
Middle	CH39	2441
Highest	CH78	2480

SLE(QPSK)

Test Channel	EUT Channel	Test Frequency (MHz)
Lowest	CH02	2404
Middle	CH40	2442
Highest	CH76	2478

SLE(8PSK)

Test Channel	EUT Channel	Test Frequency (MHz)
Lowest	CH03	2405
Middle	CH39	2441
Highest	CH75	2477

Operation Frequency：

79 channels are provided to SLE(GFSK)

Channel	Frequency (MHz
00	2402
01	2403
……	……
39	2441
……	…
……	……
77	2479
78	2480

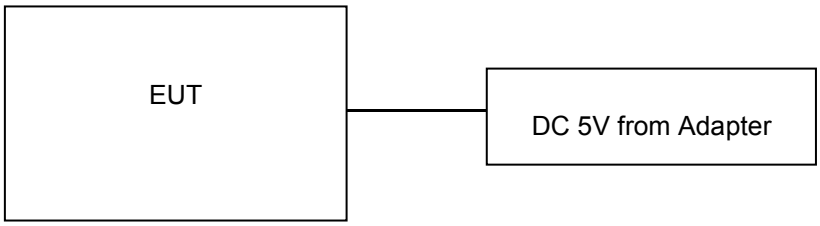
37 channels are provided to SLE(QPSK)

Channel	Frequency (MHz
02	2404
04	2406
……	……
40	2442
……	…
……	……
74	2476
76	2478

18 channels are provided to SLE(8PSK)

Channel	Frequency (MHz
03	2405
07	2409
……	……
39	2441
……	…
……	……
71	2473
75	2477

2.6 Block Diagram of Test Setup



2.7 Related Submittal(s) / Grant (s)

This submittal(s) (test report) is intended for the device filing to comply with Section 15.247 of the FCC Part 15, Subpart C Rules.

2.8 Modifications

No modifications were implemented to meet testing criteria.

3 TEST ENVIRONMENT

3.1 Address of the test laboratory

BSL Testing Co., Ltd.
1/F, Building B, Xinshidai GR Park,Shiyan Street, Bao'an District, Shenzhen,Guangdong, 518052, People's Republic of China

3.2 Test Facility

FCC-Registration No.: 562200 Designation Number: CN1338
BSL Testing Co.,Ltd. has been listed on the US Federal Communications Commission list of test facilities recognized to perform electromagnetic emissions measurements.

Industry Canada Registration Number. Is: 11093A CAB identifier: CN0019
The Laboratory has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing.

A2LA-Lab Cert. No.: 4707.01
BSL Testing Co.,Ltd. has been listed by American Association for Laboratory Accreditation to perform electromagnetic emission measurement.

The 3m-Semi anechoic test site fulfils CISPR 16-1-4 according to ANSI C63.10 and CISPR 16-1-4:2010.

3.3 Environmental conditions

During the measurement the environmental conditions were within the listed ranges:
Radiated Emission:

Temperature:	23 ° C
Humidity:	44 %
Atmospheric pressure:	950-1050mbar

AC Main Conducted testing：

Temperature:	24 ° C
Humidity:	47 %
Atmospheric pressure:	950-1050mbar

Conducted testing：

Temperature:	24 ° C
Humidity:	46 %
Atmospheric pressure:	950-1050mbar

3.4 Summary of measurement results

Test Specification clause	Test case	Test Mode	Test Channel	Recorded In Report		Test result
§15.247(e)	Power spectral density	GFSK QPSK 8PSK	☒ Lowest ☒ Middle ☒ Highest	GFSK QPSK 8PSK	☒ Lowest ☒ Middle ☒ Highest	complies
§15.247(a)(2)	Spectrum bandwidth – 6 dB bandwidth	GFSK QPSK 8PSK	☒ Lowest ☒ Middle ☒ Highest	GFSK QPSK 8PSK	☒ Lowest ☒ Middle ☒ Highest	complies
§15.247(b)(3)	Maximum output Peak power	GFSK QPSK 8PSK	☒ Lowest ☒ Middle ☒ Highest	GFSK QPSK 8PSK	☒ Lowest ☒ Middle ☒ Highest	complies
§15.247(d)	Band edge compliance conducted	GFSK QPSK 8PSK	☒ Lowest ☒ Highest	GFSK QPSK 8PSK	☒ Lowest ☒ Highest	complies
§15.205	Band edge compliance radiated	GFSK QPSK 8PSK	☒ Lowest ☒ Highest	GFSK QPSK 8PSK	☒ Lowest ☒ Highest	complies
§15.247(d)	TX spurious emissions conducted	GFSK QPSK 8PSK	☒ Lowest ☒ Middle ☒ Highest	GFSK QPSK 8PSK	☒ Lowest ☒ Middle ☒ Highest	complies
§15.247(d)	TX spurious emissions radiated	GFSK QPSK 8PSK	☒ Lowest ☒ Middle ☒ Highest	GFSK QPSK 8PSK	☒ Lowest ☒ Middle ☒ Highest	complies
§15.209(a)	TX spurious Emissions radiated Below 1GHz	GFSK QPSK 8PSK	-/-	GFSK QPSK 8PSK	-/-	complies
§15.107(a) §15.207	Conducted Emissions < 30 MHz	GFSK QPSK 8PSK	-/-	GFSK QPSK 8PSK	-/-	complies

Remark:
1. The measurement uncertainty is not included in the test result.
2. We tested all test mode and recorded worst case in report

3.5 Statement of the measurement uncertainty

The data and results referenced in this document are true and accurate. The reader is cautioned that there may be errors within the calibration limits of the equipment and facilities. The measurement uncertainty was calculated for all measurements listed in this test report acc. to TR-100028-01" Electromagnetic compatibility and Radio spectrum Matters (ERM);Uncertainties in the measurement of mobile radio equipment characteristics; Part 1" and TR-100028-02 "Electromagnetic compatibility and Radio spectrum Matters (ERM);Uncertainties in the measurement of mobile radio equipment characteristics; Part 2 " and is documented in the BSL Testing Co., Ltd.quality system acc. to DIN EN ISO/IEC 17025. Furthermore, component and process variability of devices similar to that tested may result in additional deviation. The manufacturer has the sole responsibility of continued compliance of the device.

Hereafter the best measurement capability for BSL Testing Co., Ltd.:

Test	Range	Measurement Uncertainty	Notes
Radiated Emission	9KHz~30MHz	3.82 dB	(1)
Radiated Emission	30~1000MHz	4.06 dB	(1)
Radiated Emission	1~18GHz	5.14 dB	(1)
Radiated Emission	18-40GHz	5.38 dB	(1)
Conducted Disturbance	0.15~30MHz	2.14 dB	(1)
Transmitter power conducted	1~40GHz	0.57 dB	(1)
Conducted spurious emission	1~40GHz	1.60 dB	(1)
OBW	1~40GHz	25 Hz	(1)
PSD	1~40GHz	0.01 dBm/3KHz	(1)

(1) This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

3.6 Equipments Used during the Test

Conducted Emission					
Test Equipment	**Manufacturer**	**Model**	**Serial No.**	**Date of Cal.**	**Due Date**
Shielding Room	ZhongYu Electron	7.3(L)x3.1(W)x2.9(H)	BSL252	2023-10-28	2024-10-27
EMI Test Receiver	R&S	ESCI 7	BSL552	2023-10-28	2024-10-27
Coaxial Switch	ANRITSU CORP	MP59B	BSL225	2023-10-28	2024-10-27
ENV216 2-L-V-NETZNACHB.DE	ROHDE&SCHWARZ	ENV216	BSL226	2023-10-28	2024-10-27
Coaxial Cable	BSL	N/A	BSL227	N/A	N/A
EMI Test Software	AUDIX	E3	N/A	N/A	N/A
Thermo meter	KTJ	TA328	BSL233	2023-10-28	2024-10-27
Absorbing clamp	Elektronik-Feinmechanik	MDS21	BSL229	2023-10-28	2024-10-27
LISN	R&S	ENV216	308	2023-10-28	2024-10-27
LISN	R&S	ENV216	314	2023-10-28	2024-10-27

Radiation Test equipment					
Test Equipment	**Manufacturer**	**Model**	**Serial No.**	**Date of Cal.**	**Due Date**
3m Semi- Anechoic Chamber	ZhongYu Electron	9.2(L)*6.2(W)* 6.4(H)	BSL250	2023-10-28	2024-10-27
Control Room	ZhongYu Electron	6.2(L)*2.5(W)* 2.4(H)	BSL251	N/A	N/A
EMI Test Receiver	Rohde & Schwarz	ESU26	BSL203	2023-10-28	2024-10-27
BiConiLog Antenna	SCHWARZBECK MESS-ELEKTRONIK	VULB9163	BSL214	2023-10-28	2024-10-27
Double -ridged waveguide horn	SCHWARZBECK MESS-ELEKTRONIK	BBHA 9120 D	BSL208	2023-10-28	2024-10-27
Horn Antenna	ETS-LINDGREN	3160	BSL217	2023-10-28	2024-10-27
EMI Test Software	AUDIX	E3	N/A	N/A	N/A
Coaxial Cable	BSL	N/A	BSL213	2023-10-28	2024-10-27
Coaxial Cable	BSL	N/A	BSL211	2023-10-28	2024-10-27
Coaxial cable	BSL	N/A	BSL210	2023-10-28	2024-10-27
Coaxial Cable	BSL	N/A	BSL212	2023-10-28	2024-10-27
Amplifier(100kHz-3GHz)	HP	8347A	BSL204	2023-10-28	2024-10-27
Amplifier(2GHz-20GHz)	HP	84722A	BSL206	2023-10-28	2024-10-27
Amplifier (18-26GHz)	Rohde & Schwarz	AFS33-18002 650-30-8P-44	BSL218	2023-10-28	2024-10-27
Band filter	Amindeon	82346	BSL219	2023-10-28	2024-10-27
Power Meter	Anritsu	ML2495A	BSL540	2023-10-28	2024-10-27
Power Sensor	Anritsu	MA2411B	BSL541	2023-10-28	2024-10-27
Wideband Radio Communication Tester	Rohde & Schwarz	CMW500	BSL575	2023-10-28	2024-10-27
Splitter	Agilent	11636B	BSL237	2023-10-28	2024-10-27
Loop Antenna	ZHINAN	ZN30900A	BSL534	2023-10-28	2024-10-27

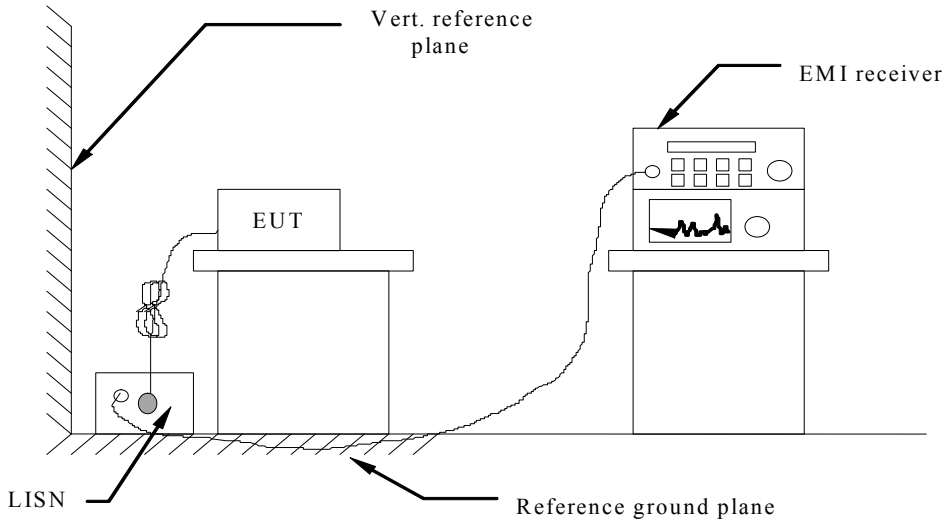
Breitband hornantenne	SCHWARZBECK	BBHA 9170	BSL579	2023-10-28	2024-10-27
Amplifier	TDK	PA-02-02	BSL574	2023-10-28	2024-10-27
Amplifier	TDK	PA-02-03	BSL576	2023-10-28	2024-10-27
PSA Series Spectrum Analyzer	Rohde & Schwarz	FSP	BSL578	2023-10-28	2024-10-27
Antenna tower	SKET	BK-4AT	BSL589	2023-10-28	2024-10-27

RF Conducted Test:					
Test Equipment	**Manufacturer**	**Model**	**Serial No.**	**Date of Cal.**	**Due Date**
MXA Signal Analyzer	Agilent	N9020A	BSL566	2023-10-28	2024-10-27
EMI Test Receiver	R&S	ESCI 7	BSL552	2023-10-28	2024-10-27
Spectrum Analyzer	Agilent	E4440A	BSL533	2023-10-28	2024-10-27
MXG vector Signal Generator	Agilent	N5182A	BSL567	2023-10-28	2024-10-27
ESG Analog Signal Generator	Agilent	E4428C	BSL568	2023-10-28	2024-10-27
USB RF Power Sensor	DARE	RPR3006W	BSL569	2023-10-28	2024-10-27
RF Switch Box	Shongyi	RFSW3003328	BSL571	2023-10-28	2024-10-27
Programmable Constant Temp & Humi Test Chamber	WEWON	WHTH-150L-40-880	BSL572	2023-10-28	2024-10-27

4 TEST CONDITIONS AND RESULTS

4.1 AC Power Conducted Emission

TEST CONFIGURATION



TEST PROCEDURE

1 The equipment was set up as per the test configuration to simulate typical actual usage per the user's manual. The EUT is a tabletop system, a wooden table with a height of 0.8 meters is used and is placed on the ground plane as per ANSI C63.10-2013.
2 Support equipment, if needed, was placed as per ANSI C63.10-2013
3 All I/O cables were positioned to simulate typical actual usage as per ANSI C63.10-2013
4 The EUT received power from adapter, the adapter received AC120V/60Hz and AC 240V/60Hz power through a Line Impedance Stabilization Network (LISN) which supplied power source and was grounded to the ground plane.
5 All support equipments received AC power from a second LISN, if any.
6 The EUT test program was started. Emissions were measured on each current carrying line of the EUT using a spectrum Analyzer / Receiver connected to the LISN powering the EUT.The LISN has two monitoring points: Line 1 (Hot Side) and Line 2 (Neutral Side). Two scans were taken: one with Line 1 connected to Analyzer / Receiver and Line 2 connected to a 50 ohm load; the second scan had Line 1 connected to a 50 ohm load and Line 2 connected to the Analyzer / Receiver.
7 Analyzer / Receiver scanned from 150 KHz to 30MHz for emissions in each of the test modes.
8 During the above scans, the emissions were maximized by cable manipulation.

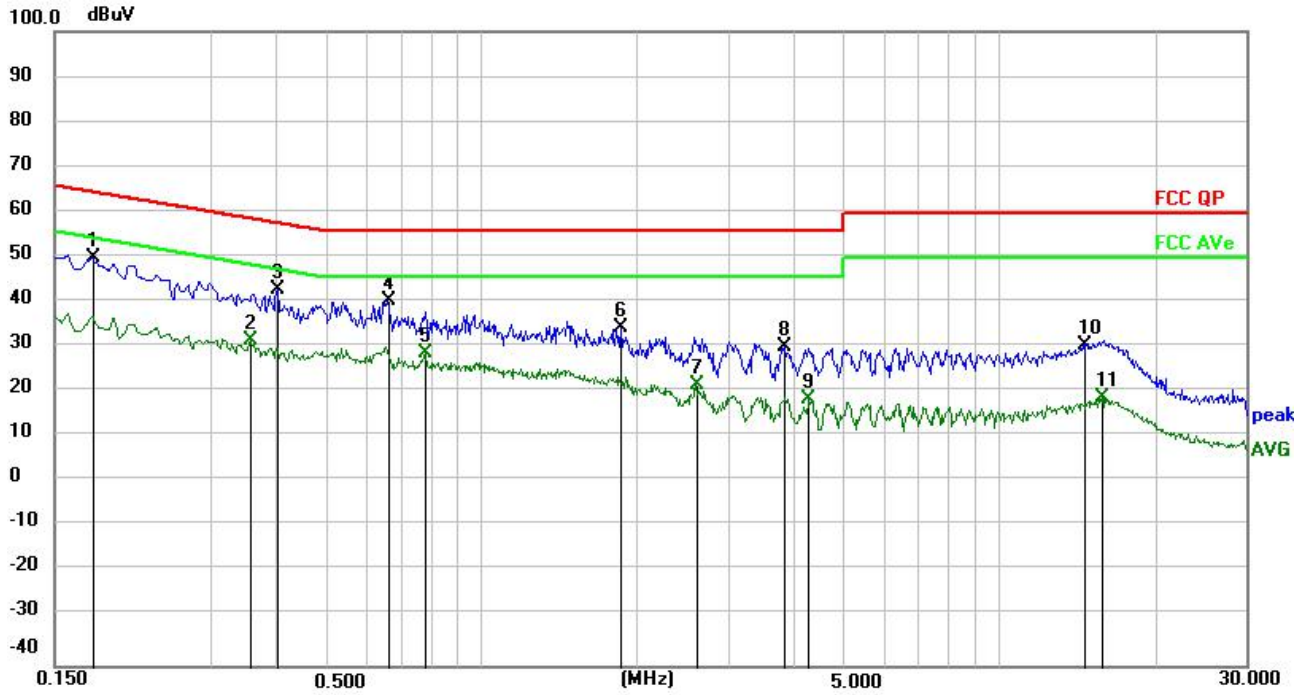
AC Power Conducted Emission Limit

For intentional device, according to § 15.207(a) AC Power Conducted Emission Limits is as following：

Frequency range (MHz)	Limit (dBuV)	
	Quasi-peak	Average
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50
* Decreases with the logarithm of the frequency.		

TEST RESULTS

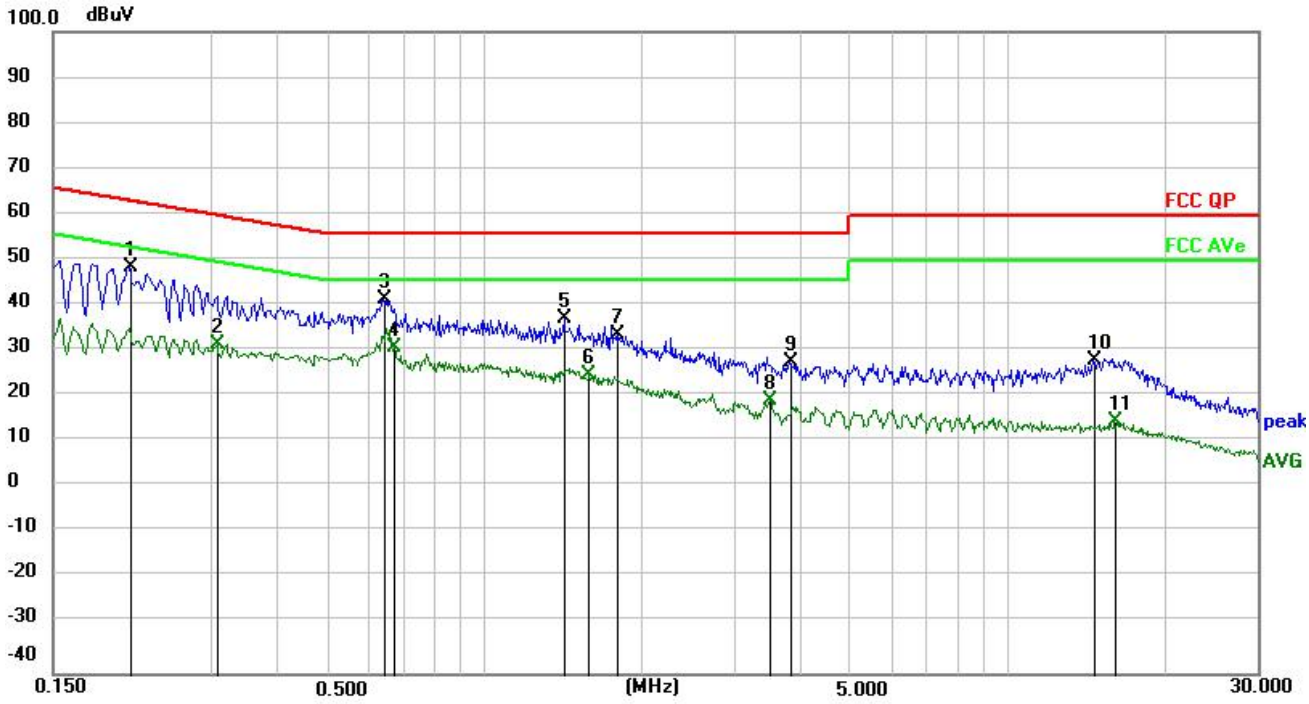
Power supply:	DC 5V from Adapter AC 120V/60Hz	Polarization	L



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	P/F
1 *	0.1770	33.40	16.73	50.13	64.63	-14.50	peak	P
2	0.3570	15.33	16.70	32.03	48.80	-16.77	AVG	P
3	0.4020	26.31	16.70	43.01	57.81	-14.80	peak	P
4	0.6585	24.00	16.66	40.66	56.00	-15.34	peak	P
5	0.7799	12.58	16.65	29.23	46.00	-16.77	AVG	P
6	1.8600	18.21	16.51	34.72	56.00	-21.28	peak	P
7	2.5980	5.57	16.40	21.97	46.00	-24.03	AVG	P
8	3.8445	14.23	16.25	30.48	56.00	-25.52	peak	P
9	4.3125	2.70	16.19	18.89	46.00	-27.11	AVG	P
10	14.5230	12.41	18.47	30.88	60.00	-29.12	peak	P
11	15.8055	0.49	18.84	19.33	50.00	-30.67	AVG	P

Note:1).Level (dBμV)= Reading (dBμV)+ Factor (dB)
2). Factor (dB)=insertion loss of LISN (dB) + Cable loss (dB)
3). Margin(dB) = Limit (dBμV) - Level (dBμV)

Power supply:	DC 5V from Adapter AC 120V/60Hz	Polarization	N



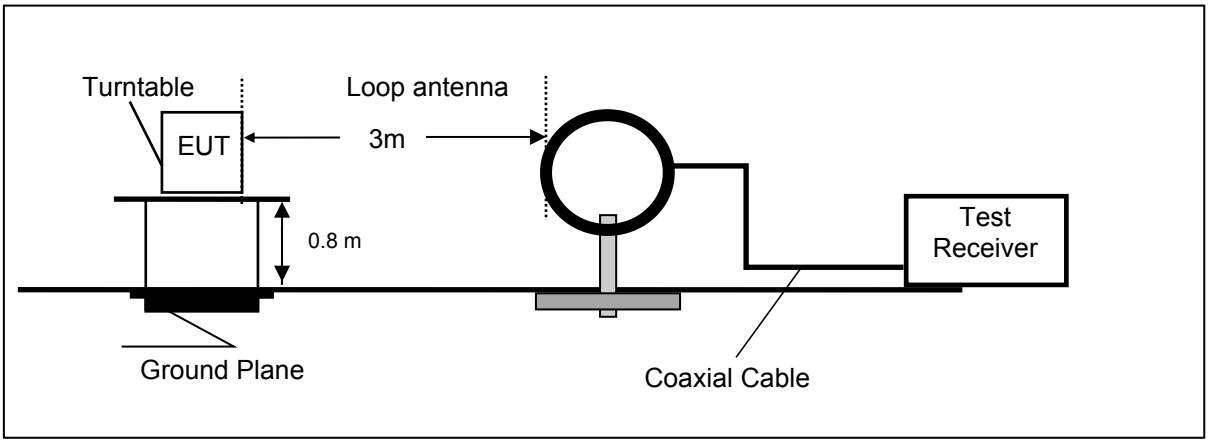
No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	P/F
1	0.2085	31.35	17.53	48.88	63.26	-14.38	peak	P
2	0.3075	14.40	17.52	31.92	50.04	-18.12	AVG	P
3 *	0.6405	24.26	17.51	41.77	56.00	-14.23	peak	P
4	0.6720	13.64	17.51	31.15	46.00	-14.85	AVG	P
5	1.4190	20.03	17.49	37.52	56.00	-18.48	peak	P
6	1.5900	7.83	17.49	25.32	46.00	-20.68	AVG	P
7	1.8060	16.64	17.48	34.12	56.00	-21.88	peak	P
8	3.5205	2.14	17.43	19.57	46.00	-26.43	AVG	P
9	3.8265	10.53	17.42	27.95	56.00	-28.05	peak	P
10	14.5230	9.76	18.83	28.59	60.00	-31.41	peak	P
11	15.9765	-4.00	19.04	15.04	50.00	-34.96	AVG	P

Note:1).Level (dBμV)= Reading (dBμV)+ Factor (dB)
2). Factor (dB)=insertion loss of LISN (dB) + Cable loss (dB)
3). Margin(dB) = Limit (dBμV) - Level (dBμV)

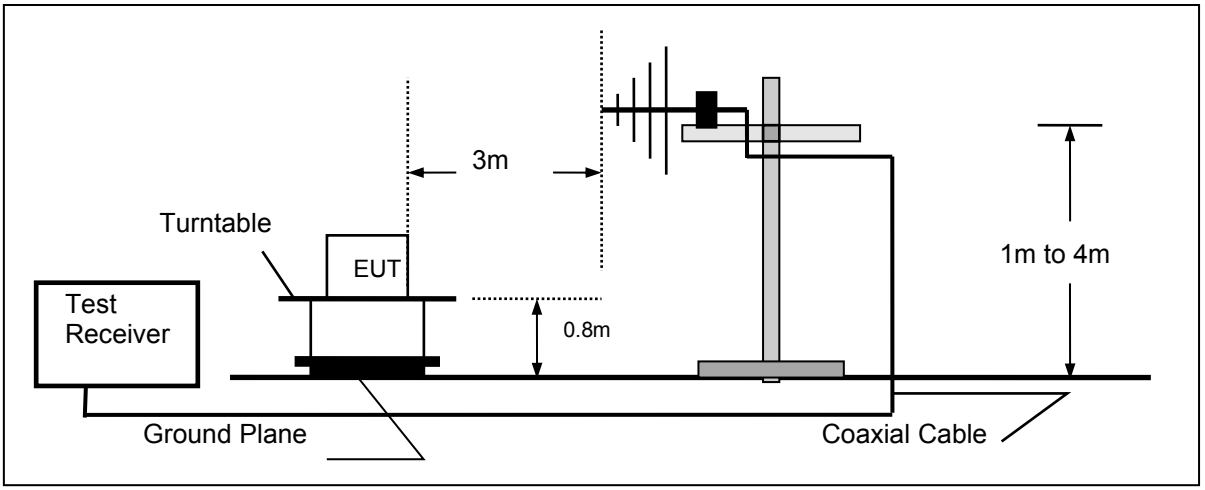
4.2 Radiated Emissions and Band Edge

TEST CONFIGURATION

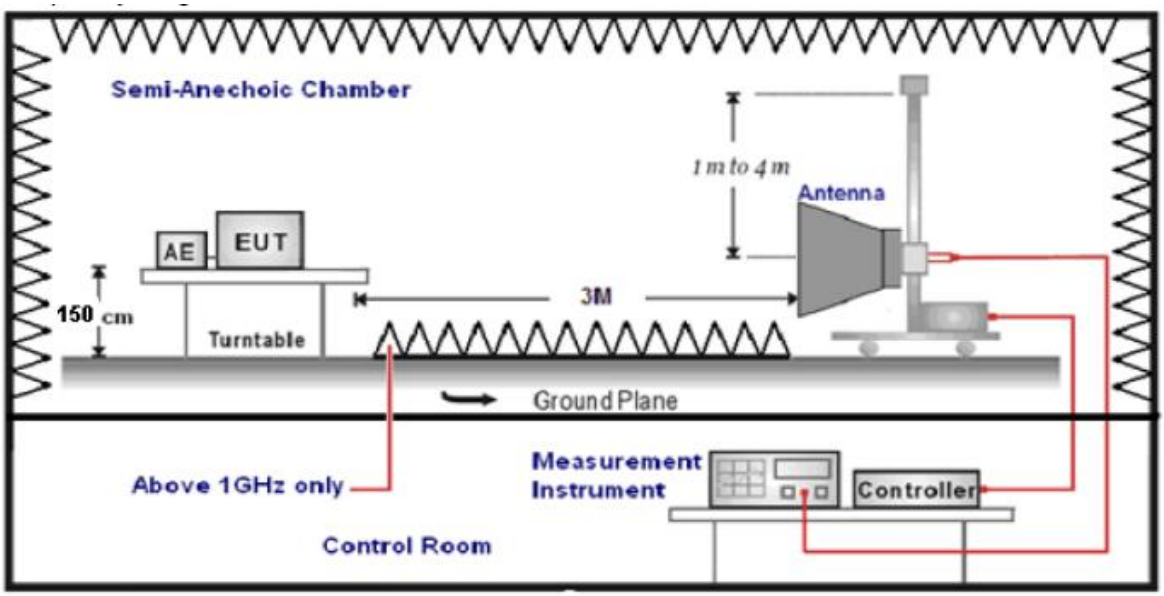
Frequency range 9 KHz – 30MHz



Frequency range 30MHz – 1000MHz



Frequency range above 1GHz-25GHz



TEST PROCEDURE

1. The EUT was placed on a turn table which is 0.8m above ground plane when testing frequency range 9 KHz –1GHz;the EUT was placed on a turn table which is 1.5m above ground plane when testing frequency range 1GHz – 25GHz.
2. Maximum procedure was performed by raising the receiving antenna from 1m to 4m and rotating the turn table from 0℃ to 360℃ to acquire the highest emissions from EUT.
3. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
4. Repeat above procedures until all frequency measurements have been completed.
5. The EUT minimum operation frequency was 32.768KHz and maximum operation frequency was 2480MHz.so radiated emission test frequency band from 9KHz to 25GHz.
6. The distance between test antenna and EUT as following table states:

Test Frequency range	Test Antenna Type	Test Distance
9KHz-30MHz	Active Loop Antenna	3
30MHz-1GHz	Ultra-Broadband Antenna	3
1GHz-18GHz	Double Ridged Horn Antenna	3
18GHz-25GHz	Horn Anternna	1

7. Setting test receiver/spectrum as following table states:

Test Frequency range	Test Receiver/Spectrum Setting	Detector
9KHz-150KHz	RBW=200Hz/VBW=3KHz,Sweep time=Auto	QP
150KHz-30MHz	RBW=9KHz/VBW=100KHz,Sweep time=Auto	QP
30MHz-1GHz	RBW=120KHz/VBW=1000KHz,Sweep time=Auto	QP
1GHz-40GHz	Peak Value: RBW=1MHz/VBW=3MHz, Sweep time=Auto Average Value: RBW=1MHz/VBW=10Hz, Sweep time=Auto	Peak

Field Strength Calculation

The field strength is calculated by adding the Antenna Factor and Cable Factor and subtracting the Amplifier Gain and Duty Cycle Correction Factor(if any) from the measured reading. The basic equation with a sample calculation is as follows:

FS = RA + AF + CL - AG

Where FS = Field Strength	CL = Cable Attenuation Factor (Cable Loss)
RA = Reading Amplitude	AG = Amplifier Gain
AF = Antenna Factor	

Transd=AF +CL-AG

RADIATION LIMIT

For intentional device, according to § 15.209(a), the general requirement of field strength of radiated emission from intentional radiators at a distance of 3 meters shall not exceed the following table. According to § 15.247(d), in any 100kHz bandwidth outside the frequency band in which the EUT is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20dB below that in the100kHz bandwidth within the band that contains the highest level of desired power.

The pre-test have done for the EUT in three axes and found the worst emission at position shown in test setup photos.

Frequency (MHz)	Distance (Meters)	Radiated (dBμV/m)	Radiated (μV/m)
0.009-0.49	3	20log(2400/F(KHz))+40log(300/3)	2400/F(KHz)
0.49-1.705	3	20log(24000/F(KHz))+ 40log(30/3)	24000/F(KHz)
1.705-30	3	20log(30)+ 40log(30/3)	30
30-88	3	40.0	100
88-216	3	43.5	150
216-960	3	46.0	200
Above 960	3	54.0	500

TEST RESULTS

Remark:
1. This test was performed with EUT in X, Y, Z position and the worse case was found when EUT in X position.
2. We measured Radiated Emission at GFSK, QPSK and 8PSK mode from 9 KHz to 25GHz and recorded worst case at GFSK mode.
3. 3.For below 1GHz testing recorded worst at GFSK middle channel.
4. Radiated emission test from 9 KHz to 10th harmonic of fundamental was verified, and no emission found except system noise floor in 9 KHz to 30MHz and not recorded in this report.

For 30MHz-1GHz

Horizontal

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg.)	P/F
1	44.2752	30.75	-16.49	14.26	40.00	-25.74	peak	100	360	P
2	72.3376	31.86	-19.12	12.74	40.00	-27.26	peak	100	360	P
3 *	125.8864	45.85	-17.49	28.36	43.50	-15.14	peak	100	360	P
4	135.9822	44.62	-16.94	27.68	43.50	-15.82	peak	100	360	P
5	215.2678	35.37	-19.33	16.04	43.50	-27.46	peak	100	360	P
6	413.2706	41.02	-12.71	28.31	46.00	-17.69	peak	100	360	P

Note:1).Level (dBμV/m)= Reading (dBμV)+ Factor (dB/m)

2). Factor(dB/m)=Antenna Factor (dB/m) + Cable loss (dB) - Pre Amplifier gain (dB)

3). Margin(dB) = Limit (dBμV/m) - Level (dBμV/m)

Vertical

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg.)	P/F
1 *	44.1202	44.58	-16.48	28.10	40.00	-11.90	peak	100	0	P
2	81.7833	45.13	-20.65	24.48	40.00	-15.52	peak	100	0	P
3	92.7871	51.27	-20.43	30.84	43.50	-12.66	peak	100	0	P
4	124.1330	49.20	-17.62	31.58	43.50	-11.92	peak	100	0	P
5	147.4036	47.70	-16.15	31.55	43.50	-11.95	peak	100	0	P
6	346.8092	28.13	-14.41	13.72	46.00	-32.28	peak	100	0	P

Note:1).Level (dBμV/m)= Reading (dBμV)+ Factor (dB/m)

2). Factor(dB/m)=Antenna Factor (dB/m) + Cable loss (dB) - Pre Amplifier gain (dB)

3). Margin(dB) = Limit (dBμV/m) - Level (dBμV/m)

For 1GHz to 25GHz

Note: GFSK, QPSK and 8PSK all have been tested, only worse case GFSK is reported.

GFSK (above 1GHz)

Frequency(MHz):			2402		Polarity:		HORIZONTAL		
Frequency (MHz)	Emission Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier (dB)	Correction Factor (dB/m)
4804.00	56.09	PK	74	17.91	60.45	32.40	5.11	41.87	-4.36
4804.00	46.28	AV	54	7.72	50.64	32.40	5.11	41.87	-4.36
7206.00	54.58	PK	74	19.42	55.21	36.58	6.43	43.64	-0.63
7206.00	44.63	AV	54	9.37	45.26	36.58	6.43	43.64	-0.63

Frequency(MHz):			2402		Polarity:		VERTICAL		
Frequency (MHz)	Emission Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier (dB)	Correction Factor (dB/m)
4804.00	56.08	PK	74	17.92	60.44	32.40	5.11	41.87	-4.36
4804.00	46.13	AV	54	7.87	50.49	32.40	5.11	41.87	-4.36
7206.00	54.60	PK	74	19.40	55.23	36.58	6.43	43.64	-0.63
7206.00	44.62	AV	54	9.38	45.25	36.58	6.43	43.64	-0.63

Frequency(MHz):			2441		Polarity:		HORIZONTAL		
Frequency (MHz)	Emission Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier (dB)	Correction Factor (dB/m)
4882.00	56.40	PK	74	17.60	60.35	32.56	5.34	41.85	-3.95
4882.00	46.29	AV	54	7.71	50.24	32.56	5.34	41.85	-3.95
7323.00	55.09	PK	74	18.91	55.45	36.54	6.81	43.71	-0.36
7323.00	44.89	AV	54	9.11	45.25	36.54	6.81	43.71	-0.36

Frequency(MHz):			2441		Polarity:		VERTICAL		
Frequency (MHz)	Emission Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier (dB)	Correction Factor (dB/m)
4882.00	56.43	PK	74	17.57	60.38	32.56	5.34	41.85	-3.95
4882.00	46.53	AV	54	7.47	50.48	32.56	5.34	41.85	-3.95
7323.00	55.09	PK	74	18.91	55.45	36.54	6.81	43.71	-0.36
7323.00	45.38	AV	54	8.62	45.74	36.54	6.81	43.71	-0.36

Frequency(MHz):			2480		Polarity:		HORIZONTAL		
Frequency (MHz)	Emission Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier (dB)	Correction Factor (dB/m)
4960.00	57.39	PK	74	16.61	60.85	32.73	5.64	41.83	-3.46
4960.00	47.03	AV	54	6.97	50.49	32.73	5.64	41.83	-3.46
7440.00	55.79	PK	74	18.21	55.85	36.50	7.23	43.79	-0.06
7440.00	45.50	PK	54	8.50	45.56	36.50	7.23	43.79	-0.06

Frequency(MHz):			2480		Polarity:		VERTICAL		
Frequency (MHz)	Emission Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier (dB)	Correction Factor (dB/m)
4960.00	57.09	PK	74	16.91	60.55	32.73	5.64	41.83	-3.46
4960.00	47.17	AV	54	6.83	50.63	32.73	5.64	41.83	-3.46
7440.00	55.39	PK	74	18.61	55.45	36.50	7.23	43.79	-0.06
7440.00	45.52	PK	54	8.48	45.58	36.50	7.23	43.79	-0.06

REMARKS:
1. Emission level (dBuV/m) =Raw Value (dBuV)+Correction Factor (dB/m)
2. Correction Factor (dB/m) = Antenna Factor (dB/m)+Cable Factor (dB)- Pre-amplifier
3. Margin value = Limit value- Emission level.
4. -- Mean the PK detector measured value is below average limit.
5. The other emission levels were very low against the limit.

Results of Band Edges Test (Radiated)

Note: GFSK, QPSK and 8PSK all have been tested, only worse case GFSK is reported.

GFSK

Test Frequency(MHz):			**Lowest channel**		**Polarity:**		**HORIZONTAL**		
Frequency (MHz)	Emission Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier (dB)	Correction Factor (dB/m)
2310.00	50.14	PK	74	23.86	60.56	27.42	4.31	42.15	-10.42
2310.00	40.12	AV	54	13.88	50.54	27.42	4.31	42.15	-10.42
2390.00	48.36	PK	74	25.64	58.65	27.55	4.35	42.19	-10.29
2390.00	37.96	AV	54	16.04	48.25	27.55	4.35	42.19	-10.29
2400.00	45.46	PK	74	28.54	55.65	27.70	4.39	42.28	-10.19
2400.00	35.16	AV	54	18.84	45.35	27.70	4.39	42.28	-10.19

Test Frequency(MHz):			**Lowest channel**		**Polarity:**		**VERTICAL**		
Frequency (MHz)	Emission Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier (dB)	Correction Factor (dB/m)
2310.00	47.51	PK	74	26.49	57.93	27.42	4.31	42.15	-10.42
2310.00	37.36	AV	54	16.64	47.78	27.42	4.31	42.15	-10.42
2390.00	45.34	PK	74	28.66	55.63	27.55	4.35	42.19	-10.29
2390.00	34.96	AV	54	19.04	45.25	27.55	4.35	42.19	-10.29
2400.00	42.15	PK	74	31.85	52.34	27.70	4.39	42.28	-10.19
2400.00	32.10	AV	54	21.90	42.29	27.70	4.39	42.28	-10.19

Test Frequency(MHz):			**Highest channel**		**Polarity:**		**HORIZONTAL**		
Frequency (MHz)	Emission Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier (dB)	Correction Factor (dB/m)
2483.50	45.02	PK	74	28.98	55.65	27.55	4.38	42.56	-10.63
2483.50	34.79	AV	54	19.21	45.42	27.55	4.38	42.56	-10.63
2500.00	42.73	PK	74	31.27	53.46	27.69	4.46	42.88	-10.73
2500.00	32.39	AV	54	21.61	43.12	27.69	4.46	42.88	-10.73

Test Frequency(MHz):			**Highest channel**		**Polarity:**		**VERTICAL**		
Frequency (MHz)	Emission Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier (dB)	Correction Factor (dB/m)
2483.50	42.93	PK	74	31.07	53.56	27.55	4.38	42.56	-10.63
2483.50	33.22	AV	54	20.78	43.85	27.55	4.38	42.56	-10.63
2500.00	40.51	PK	74	33.49	51.24	27.69	4.46	42.88	-10.73
2500.00	30.52	AV	54	23.48	41.25	27.69	4.46	42.88	-10.73

REMARKS:
1. Emission level (dBuV/m) =Raw Value (dBuV)+Correction Factor (dB/m)
2. Correction Factor (dB/m) = Antenna Factor (dB/m)+Cable Factor (dB)- Pre-amplifier
3. Margin value = Limit value- Emission level.
4. -- Mean the PK detector measured value is below average limit.
5. The other emission levels were very low against the limit.

4.3 Maximum Peak Output Power

Limit

The Maximum Peak Output Power Measurement is 30dBm.

Test Procedure

Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the power sensor.

Test Configuration

Test Results

Type	Channel	Output power (dBm)	Limit (dBm)	Result
GFSK	00	-2.131	30.00	Pass
	39	-1.273		
	78	-1.239		
QPSK	02	-3.797	30.00	Pass
	40	-2.968		
	76	-2.909		
8PSK	03	-4.607	30.00	Pass
	39	-3.569		
	73	-3.472		

Note: 1.The test results including the cable lose.

4.4 Power Spectral Density

Limit

For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

Test Procedure

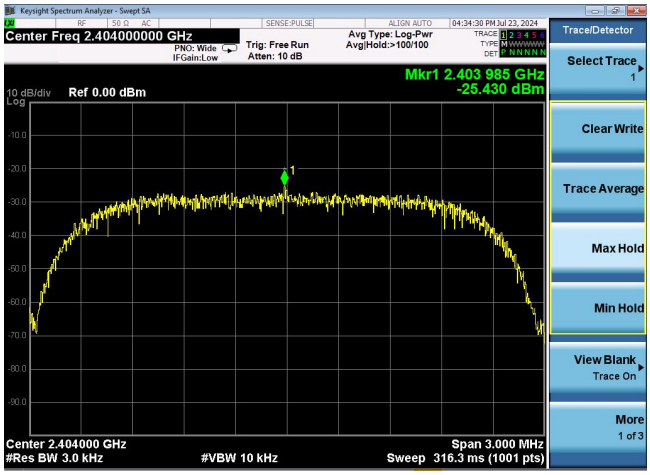
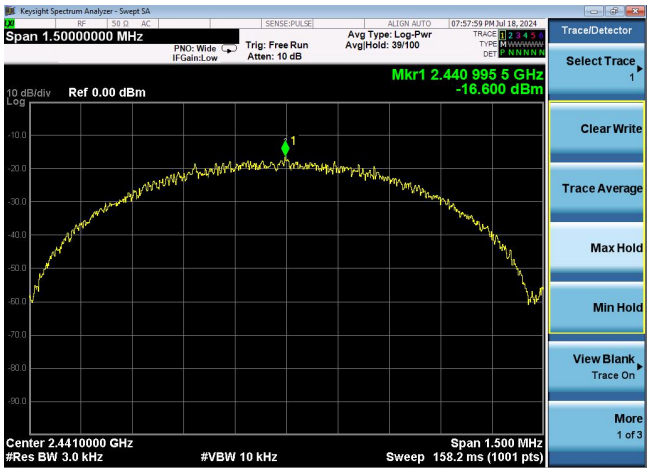
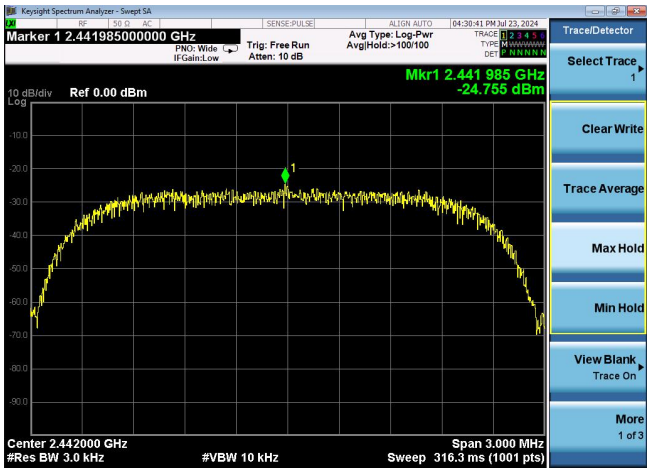
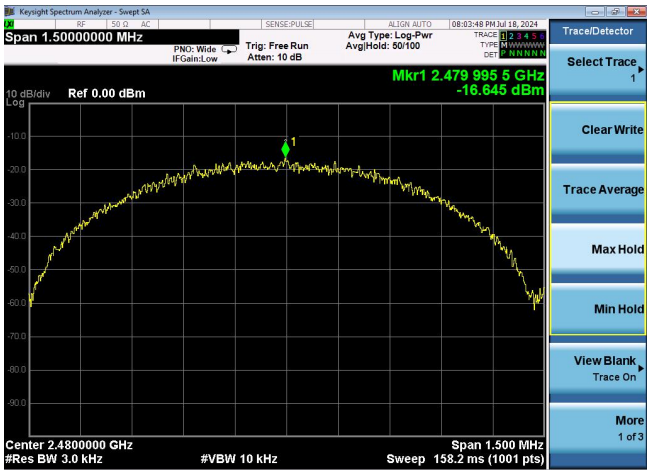
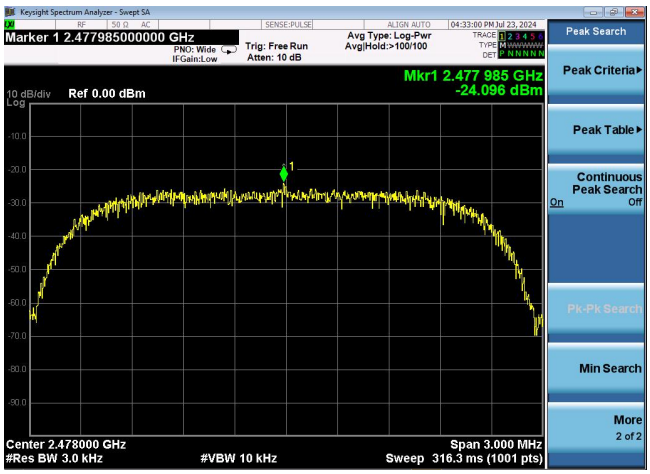
1. Use this procedure when the maximum peak conducted output power in the fundamental emission is used to demonstrate compliance.
2. Set the RBW ≥ 3 kHz.
3. Set the VBW ≥ 3× RBW.
4. Set the span to 1.5 times the DTS channel bandwidth.
5. Detector = peak.
6. Sweep time = auto couple.
7. Trace mode = max hold.
8. Allow trace to fully stabilize.
9. Use the peak marker function to determine the maximum power level.
10. If measured value exceeds limit, reduce RBW (no less than 3 kHz) and repeat.
11. The resulting peak PSD level must be 8dBm.

Test Configuration

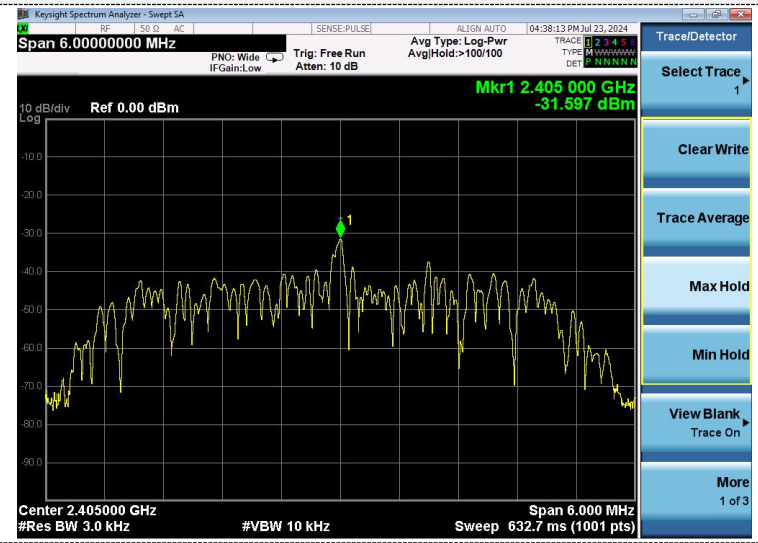
Test Results

Type	Channel	Power Spectral Density (dBm/3KHz)	Limit (dBm/3KHz)	Result
GFSK	00	-17.808	8.00	Pass
	39	-16.600		
	78	-16.645		
QPSK	02	-25.430		
	40	-24.755		
	76	-24.096		
8PSK	03	-31.597		
	39	-31.198		
	75	-30.355		

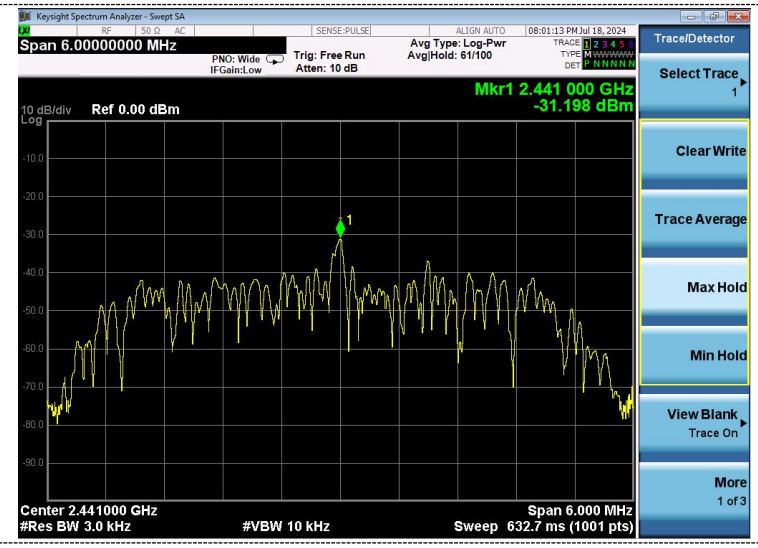
Test plot as follows:

GFSK	QPSK
	
CH00	CH02
	
CH39	CH40
	
CH78	CH76

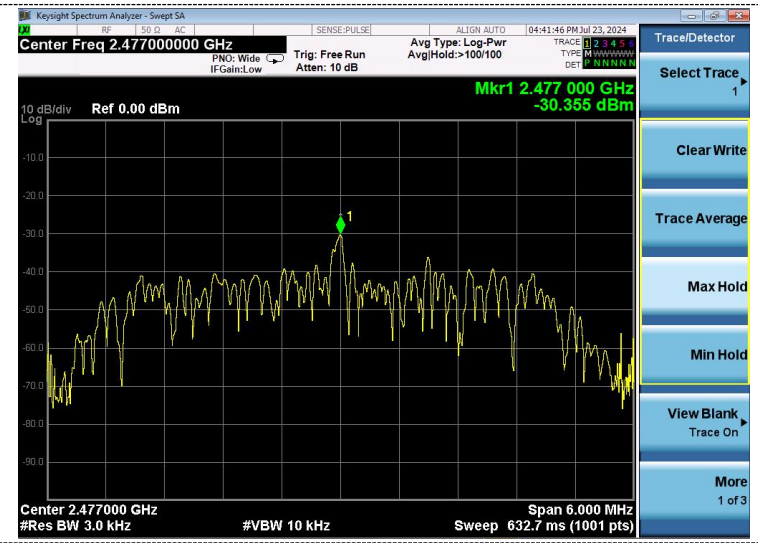
8PSK



CH03



CH39



CH75

4.5 6dB Bandwidth

Limit

For digital modulation systems, the minimum 6 dB bandwidth shall be at least 500 kHz

Test Procedure

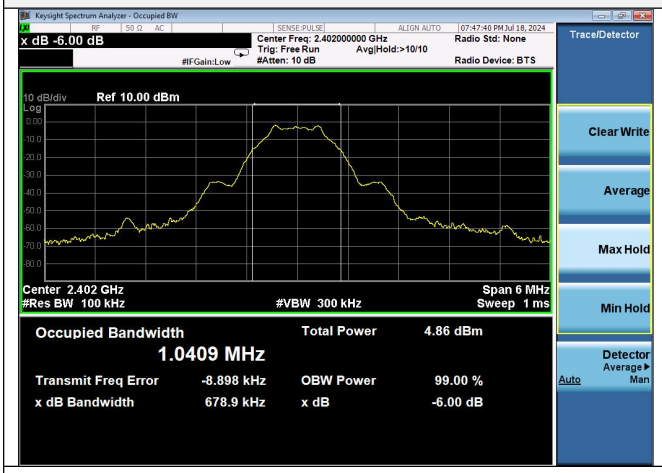
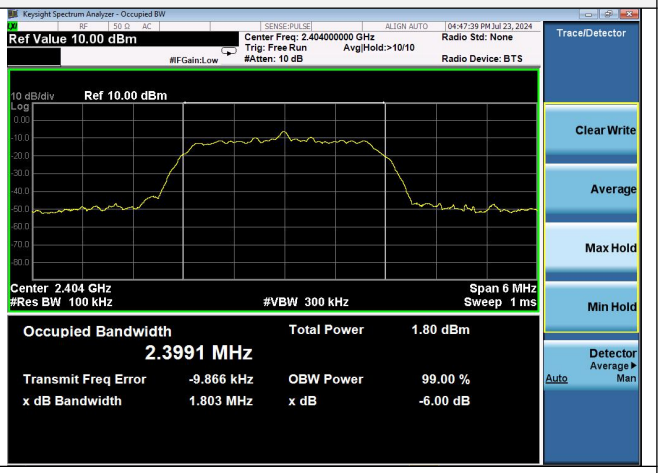
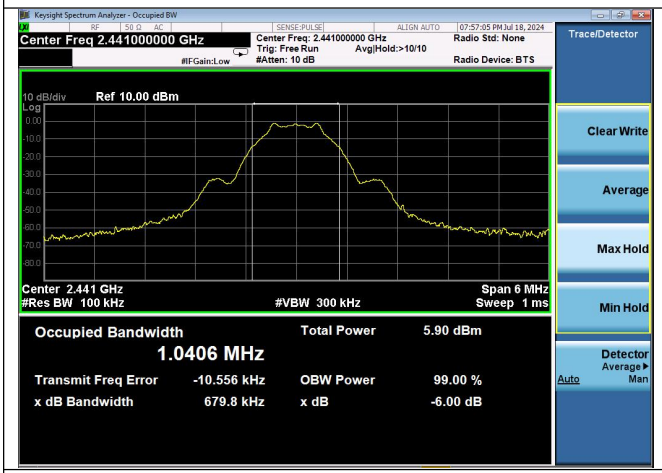
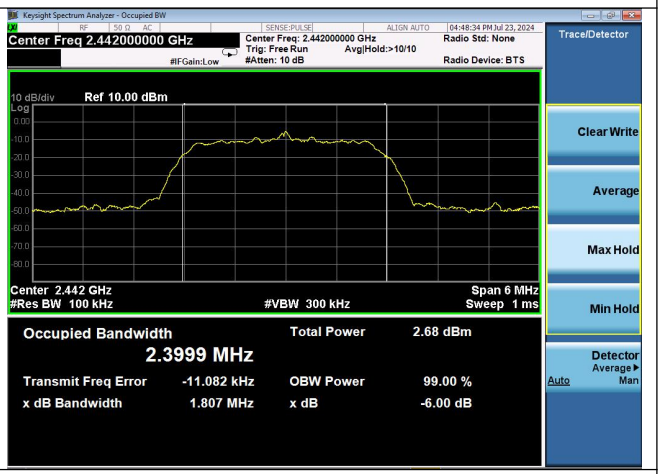
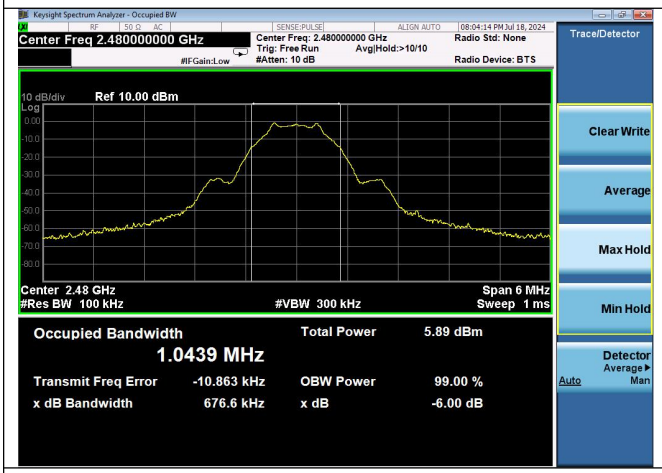
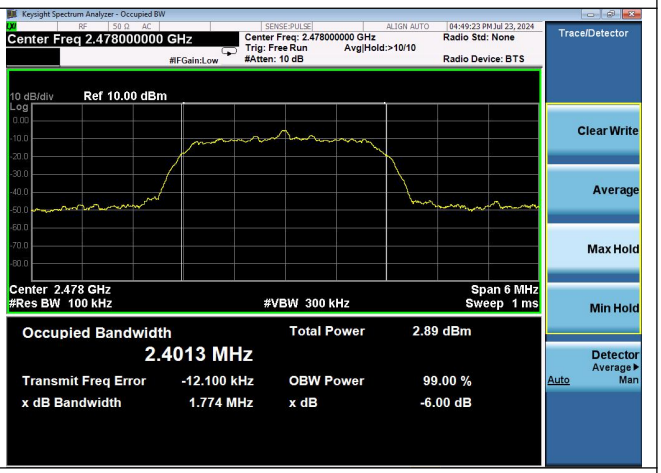
The transmitter output was connected to the spectrum analyzer through an attenuator. The bandwidth of the fundamental frequency was measured by spectrum analyzer with 100 KHz RBW and 300 KHz VBW. The 6dB bandwidth is defined as the total spectrum the power of which is higher than peak power minus 6dB.

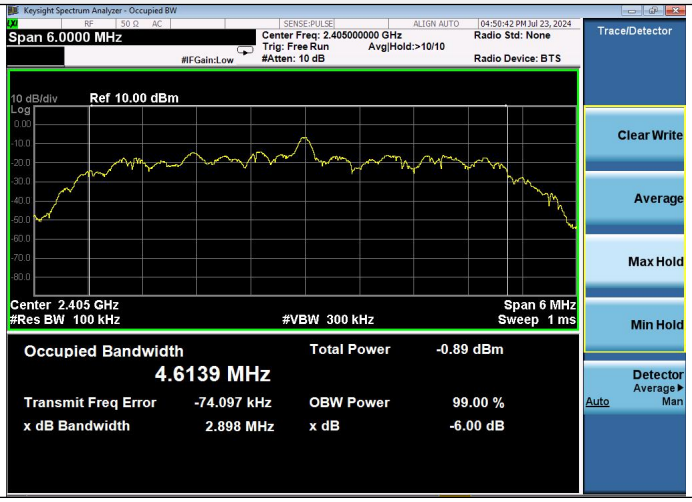
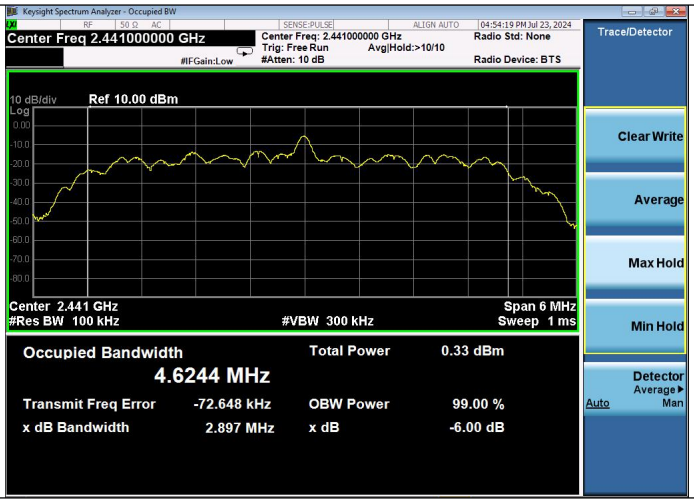
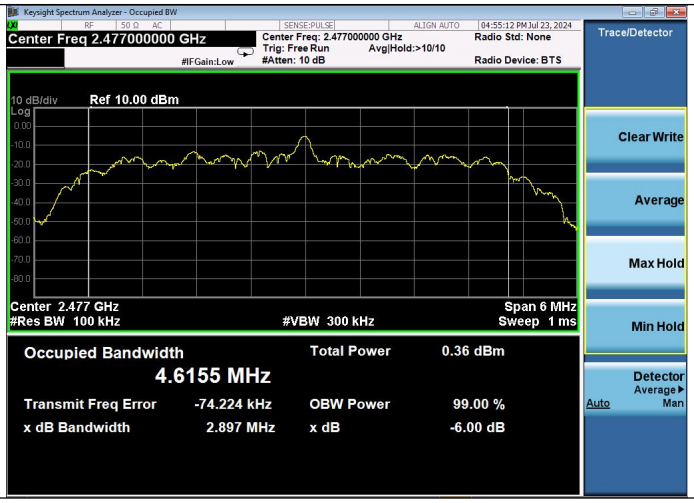
Test Configuration

Test Results

Modulation	Channel	6dB bandwidth (MHz)	**Limit (KHz)**	Result
GFSK	00	0.679	≥500	Pass
	39	0.680		
	78	0.677		
QPSK	02	1.803		
	40	1.807		
	76	1.774		
8PSK	03	2.898		
	39	2.897		
	75	2.897		

Test plot as follows:

GFSK Modulation	QPSK Modulation
	
CH00	CH02
	
CH39	CH40
	
CH78	CH76

8PSK Modulation

CH03

CH39

CH75

4.6 Out-of-band Emissions

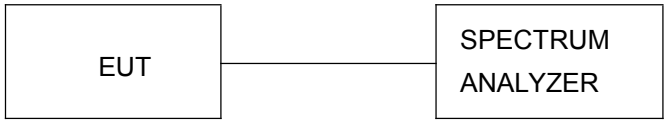
Limit

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 con-ducted or a radiated measurement, pro-vided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter com-plies 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.

Test Procedure

Connect the transmitter output to spectrum analyzer using a low loss RF cable, and set the spectrum analyzer to RBW=100 kHz, VBW= 300 kHz, peak detector , and max hold. Measurements utilizing these setting are made of the in-band reference level, bandedge and out-of-band emissions.

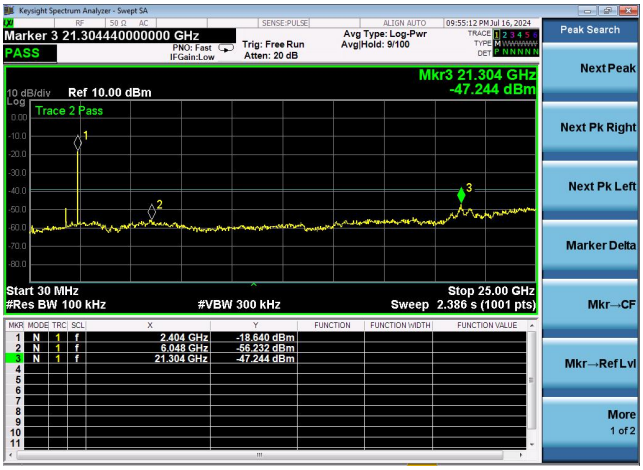
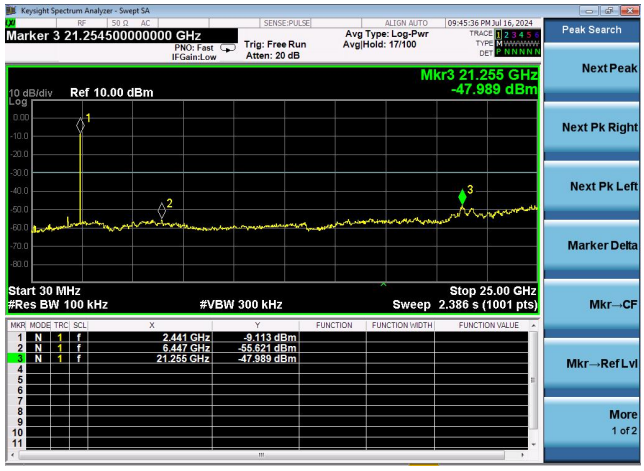
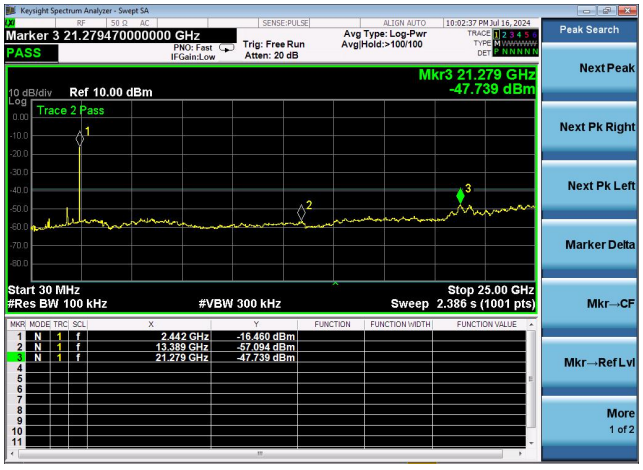
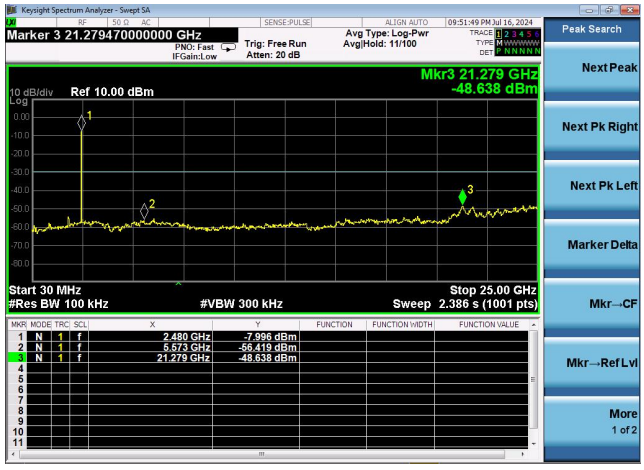
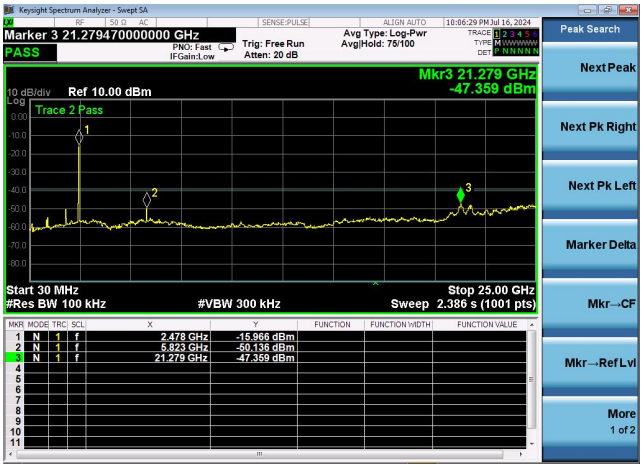
Test Configuration



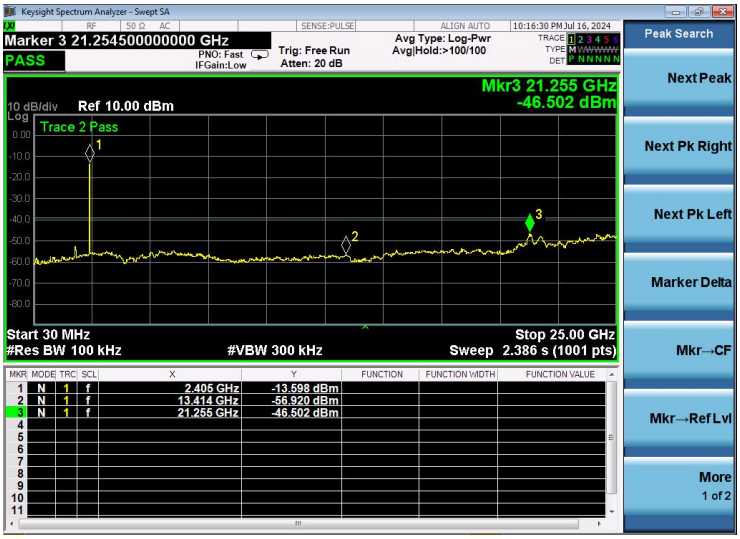
Test Results

Remark: The measurement frequency range is from 30MHz to the 10th harmonic of the fundamental frequency. The lowest, middle and highest channels are tested to verify the spurious emissions and bandage measurement data.
We measured all conditions (GFSK, QPSK, 8PSK) and recorded worst case at GFSK.

Test plot as follows:

GFSK(CH00)	QPSK (CH02)
	
GFSK(CH39)	**QPSK (CH40)**
	
GFSK(CH78)	**QPSK (CH76)**
	

8PSK(CH03)



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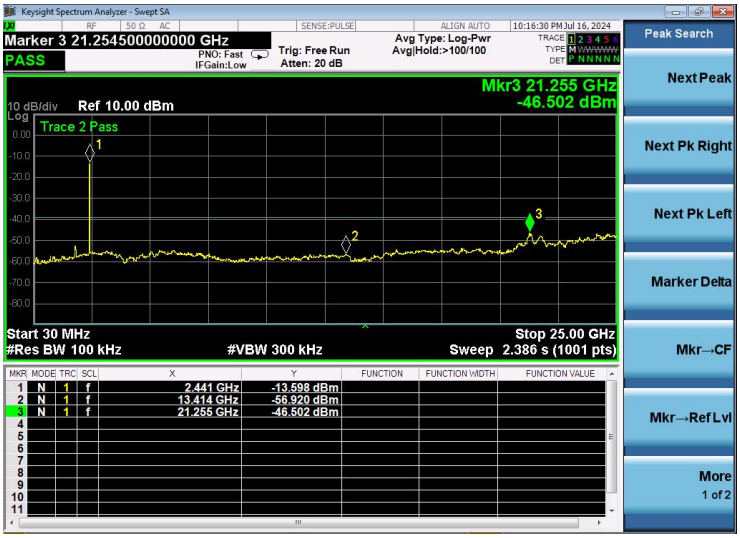
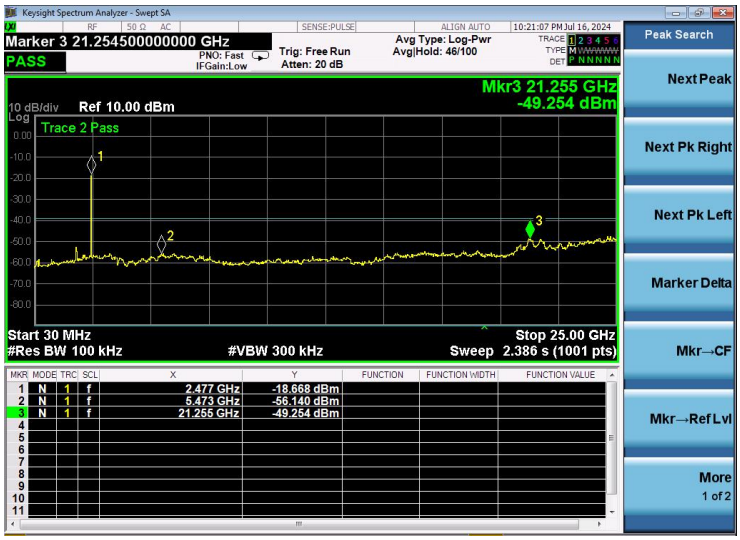
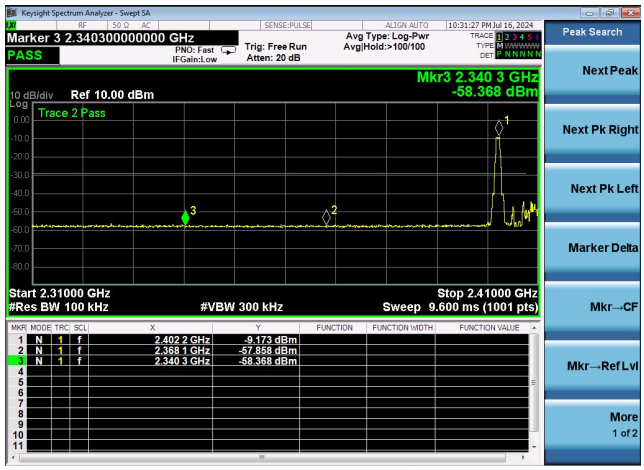


8PSK(CH75)

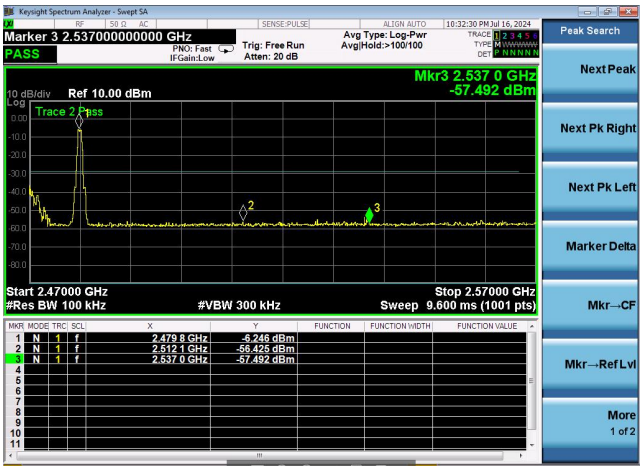


Band-edge Measurements for RF Conducted Emissions:

GFSK

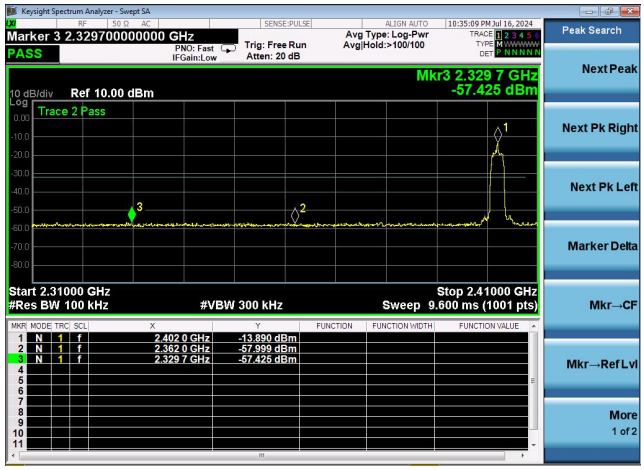


Left Bandedge

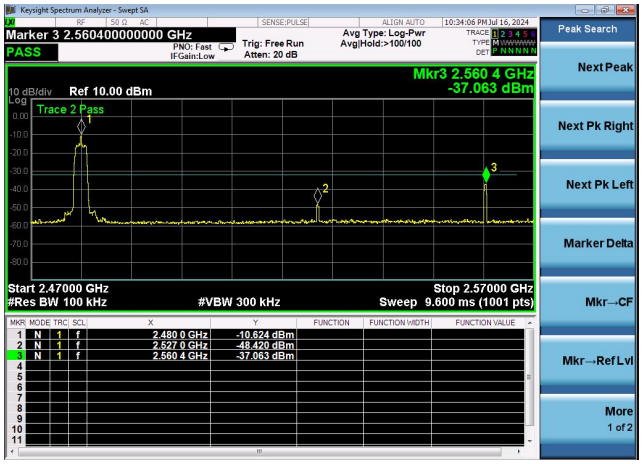


Right Bandedge

QPSK

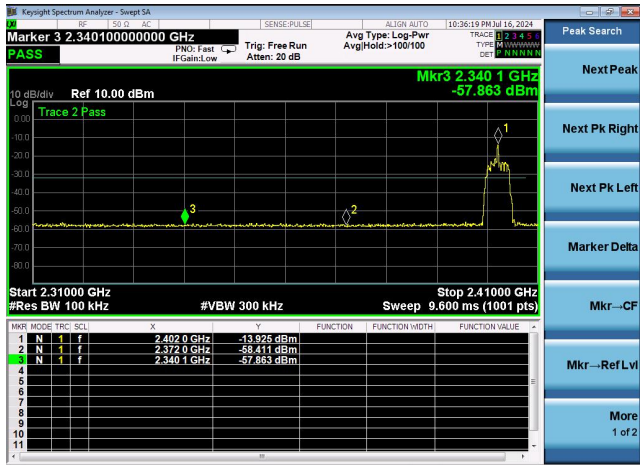


Left Bandedge

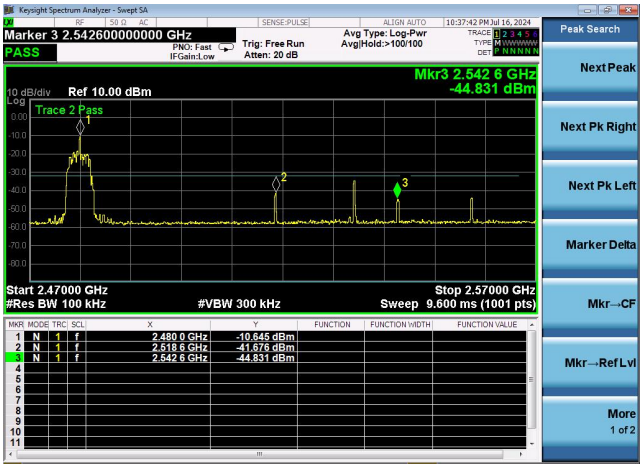


Right Bandedge

8PSK



Left Bandedge



Right Bandedge

4.7 Antenna Requirement

Standard Applicable

For intentional device, according to FCC 47 CFR Section 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. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator, the manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited

FCC CFR Title 47 Part 15 Subpart C Section 15.247(c) (1) (I):

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

Antenna Connected Construction

The maximum gain of antenna was 1.8 dBi.

Remark:The antenna gain is provided by the customer , if the data provided by the customer is not accurate, BSL Testing Co., Ltd. does not assume any responsibility.

5 Test Setup Photos of the EUT

Reference to the appendix I for details.

6 Photos of the EUT

Reference to the appendix II for details.

********** End of Report **********