FCC PART 15 SUBPART C TEST REPORT

FCC PART 15.247

Report Reference No..... :	**MAX26090090P01-R01**
FCC ID..... :	**2A6EDAL-N10**
Compiled by (position+printed name+signature).. :	Engineer/ Cindy Zheng Cindy zheng
Supervised by (position+printed name+signature).. :	Manager/Haley Wen Haley wen
Approved by (position+printed name+signature).. :	RF Manager/ Vivian Jiang Vivian Jiang
Date of issue.....:	September 30, 2026
Testing Laboratory Name.....:	**MAXLAB 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 Jindinglong Technology Co., Ltd.**
Address..... :	4th Floor, Building 1, Sanwei Chaxi Industrial Zone, Sanwei Community, Hangcheng Street, Baoan District, Shenzhen, China
Test specification..... :	
Standard.....:	**FCC Part 15.247** **ANSI C63.10-2020 + Cor. 1-2023+C63.10a-2024 + Errata to C63.10a-2024** **KDB558074 D01 V05r02: April 2, 2019**

MAXLAB Testing Co.,Ltd. All rights reserved.
This publication may be reproduced in whole or in part for non-commercial purposes as long as the MAXLAB Testing Co.,Ltd. is acknowledged as copyright owner and source of the material. MAXLAB Testing Co.,Ltd. takes no responsibility for and will not assume liability for damages resulting from the reader's interpretation of the reproduced material due to its placement and context.

Test item description.....:	Game Controller
Trade Mark.....:	N/A
Manufacturer.....:	Shenzhen Jindinglong Technology Co., Ltd.
Model/Type reference..... :	AL-N10
Listed Models ..... :	AL-N20, AL-N30, AL-N35, AL-K30, AL-NS2318, SW2
Modulation ..... :	GFSK, π/4DQPSK, 8-DPSK
Frequency.....	From 2402MHz to 2480MHz
Ratings.....:	DC 3.7V From Battery or DC 5V by USB port
Result.....:	**PASS**

TEST REPORT

Equipment under Test	:	**Game Controller**
Model /Type	:	AL-N10
Listed Models	:	AL-N20, AL-N30, AL-N35, AL-K30, AL-NS2318, SW2
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 and appearance color different.
Applicant	:	**Shenzhen Jindinglong Technology Co., Ltd.**
Address	:	4th Floor, Building 1, Sanwei Chaxi Industrial Zone, Sanwei Community, Hangcheng Street, Baoan District, Shenzhen, China
Manufacturer	:	**Shenzhen Jindinglong Technology Co., Ltd.**
Address	:	4th Floor, Building 1, Sanwei Chaxi Industrial Zone, Sanwei Community, Hangcheng Street, Baoan District, Shenzhen, China

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 4

2 SUMMARY 5

2.1 General Remarks 5
2.2 Product Description 5
2.3 Equipment Under Test 5
2.4 Short description of the Equipment under Test (EUT) 5
2.5 EUT operation mode 5
2.6 Block Diagram of Test Setup 6
2.7 Related Submittal(s) / Grant (s) 6
2.8 Modifications 6

3 TEST ENVIRONMENT 7

3.1 Address of the test laboratory 7
3.2 Test Facility 7
3.3 Environmental conditions 7
3.4 Summary of measurement results 8
3.5 Statement of the measurement uncertainty 8
3.6 Equipments Used during the Test 9

4 TEST CONDITIONS AND RESULTS 11

4.1 AC Power Conducted Emission 11
4.2 Radiated Emission 14
4.3 Maximum Peak Output Power 20
4.4 20dB Bandwidth 23
4.5 Frequency Separation 26
4.6 Number of hopping frequency 28
4.7 Time of Occupancy (Dwell Time) 30
4.8 Out-of-band Emissions 31
4.9 Pseudorandom Frequency Hopping Sequence 40
4.10 Antenna Requirement 41

5 TEST SETUP PHOTOS OF THE EUT 42

6 PHOTOS OF THE EUT 43

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 C63.10-2020 + Cor. 1-2023+C63.10a-2024 + Errata to C63.10a-2024: 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	:	September 17, 2026
Testing commenced on	:	September 17, 2026
Testing concluded on	:	September 30, 2026

2.2 Product Description

Product Name:	Game Controller
Model/Type reference:	AL-N10
Power supply:	DC 3.7V From Battery
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
Hardware version:	V1.0
Software version:	/
Testing sample ID：	MAX26090090P01-R01-1# (Engineer sample) MAX26090090P01-R01-2# (Normal sample)
Bluetooth :	
Supported Type:	Bluetooth BR/EDR
Modulation:	GFSK, π/4DQPSK, 8-DPSK
Operation frequency:	2402MHz~2480MHz
Channel number:	79
Channel separation:	1MHz
Antenna type:	PCB antenna
Antenna gain:	-2.30dBi

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 or DC 5V by USB port

2.4 Short description of the Equipment under Test (EUT)

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

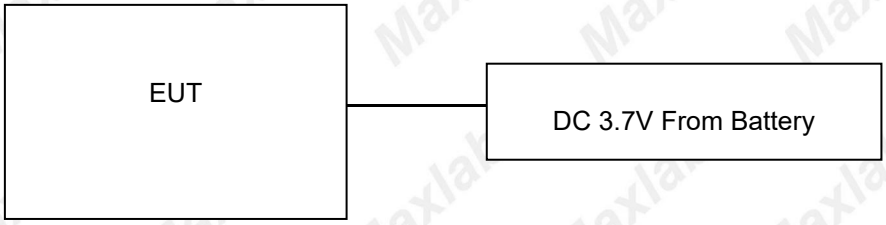
2.5 EUT operation mode

The Applicant provides communication tools software(bt_tool_v1.1.0) to control the EUT for staying in continuous transmitting (Duty Cycle more than 98%) and receiving mode for testing .There are 79 channels provided to the EUT and Channel 00/39/78 were selected to test.

Operation Frequency:

Channel	Frequency (MHz)
00	2402
01	2403
⋮	⋮
38	2440
39	2441
40	2442
⋮	⋮
77	2479
78	2480

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

MAXLAB 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
MAX 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
MAX 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:	24 ° C
Humidity:	45 %
Atmospheric pressure:	950-1050mbar

AC Power Conducted Emission:

Temperature:	25 ° C
Humidity:	46 %
Atmospheric pressure:	950-1050mbar

Conducted testing:

Temperature:	25 ° C
Humidity:	44 %
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(a)(1)	Carrier Frequency separation	GFSK Π/4DQPSK 8DPSK	☒ Lowest ☒ Middle ☒ Highest	GFSK Π/4DQPSK 8DPSK	☒ Middle	Compliant
§15.247(a)(1)	Number of Hopping channels	GFSK Π/4DQPSK 8DPSK	☒ Full	GFSK	☒ Full	Compliant
§15.247(a)(1)	Time of Occupancy (dwell time)	GFSK Π/4DQPSK 8DPSK	☒ Lowest ☒ Middle ☒ Highest	GFSK Π/4DQPSK 8DPSK	☒ Middle	Compliant
§15.247(a)(1)	Spectrumbandwidth of aFHSS system20dB bandwidth	GFSK Π/4DQPSK 8DPSK	☒ Lowest ☒ Middle ☒ Highest	GFSK Π/4DQPSK 8DPSK	☒ Lowest ☒ Middle ☒ Highest	Compliant
§15.247(b)(1)	Maximum output peak power	GFSK Π/4DQPSK 8DPSK	☒ Lowest ☒ Middle ☒ Highest	GFSK Π/4DQPSK 8DPSK	☒ Lowest ☒ Middle ☒ Highest	Compliant
§15.247(d)	Band edgecompliance conducted	GFSK Π/4DQPSK 8DPSK	☒ Lowest ☒ Highest	GFSK Π/4DQPSK 8DPSK	☒ Lowest ☒ Highest	Compliant
§15.205	Band edgecompliance radiated	GFSK Π/4DQPSK 8DPSK	☒ Lowest ☒ Highest	GFSK Π/4DQPSK 8DPSK	☒ Lowest ☒ Highest	Compliant
§15.247(d)	TX spuriousemissions conducted	GFSK Π/4DQPSK 8DPSK	☒ Lowest ☒ Middle ☒ Highest	GFSK Π/4DQPSK 8DPSK	☒ Lowest ☒ Middle ☒ Highest	Compliant
§15.247(d)	TX spuriousemissions radiated	GFSK Π/4DQPSK 8DPSK	☒ Lowest ☒ Middle ☒ Highest	GFSK	☒ Lowest ☒ Middle ☒ Highest	Compliant
§15.209(a)	TX spurious Emissions radiated Below 1GHz	GFSK Π/4DQPSK 8DPSK	☒ Lowest ☒ Middle ☒ Highest	GFSK	☒ Middle	Compliant
§15.107(a) §15.207	Conducted Emissions 9KHz-30 MHz	Charging	/	Charging	/	Compliant

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 MAXLAB 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 MAXLAB 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)

(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)	MAX252	2025-10-27	2026-10-26
EMI Test Receiver	R&S	ESCI 7	MAX552	2025-10-27	2026-10-26
Coaxial Switch	ANRITSU CORP	MP59B	MAX225	2025-10-27	2026-10-26
ENV216 2-L-V-NETZNACHB.DE	ROHDE&SCHWARZ	ENV216	MAX226	2025-10-27	2026-10-26
Coaxial Cable	MAX	N/A	MAX227	N/A	N/A
EMI Test Software	AUDIX	E3	N/A	N/A	N/A
Thermo meter	KTJ	TA328	MAX233	2025-10-27	2026-10-26
Absorbing clamp	Elektronik-Feinmechanik	MDS21	MAX229	2025-10-27	2026-10-26
LISN	R&S	ENV216	308	2025-10-27	2026-10-26
LISN	R&S	ENV216	314	2025-10-27	2026-10-26

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)	MAX250	2025-10-27	2026-10-26
Control Room	ZhongYu Electron	6.2(L)*2.5(W)* 2.4(H)	MAX251	N/A	N/A
EMI Test Receiver	Rohde & Schwarz	ESU26	MAX203	2025-10-27	2026-10-26
BiConiLog Antenna	SCHWARZBECK MESS-ELEKTRONIK	VULB9163	MAX214	2025-10-27	2026-10-26
Double -ridged waveguide horn	SCHWARZBECK MESS-ELEKTRONIK	BBHA 9120 D	MAX208	2025-10-27	2026-10-26
Horn Antenna	ETS-LINDGREN	3160	MAX217	2025-10-27	2026-10-26
EMI Test Software	AUDIX	E3	N/A	N/A	N/A
Coaxial Cable	MAX	N/A	MAX213	2025-10-27	2026-10-26
Coaxial Cable	MAX	N/A	MAX211	2025-10-27	2026-10-26
Coaxial cable	MAX	N/A	MAX210	2025-10-27	2026-10-26
Coaxial Cable	MAX	N/A	MAX212	2025-10-27	2026-10-26
Amplifier(100kHz-3GHz)	HP	8347A	MAX204	2025-10-27	2026-10-26
Amplifier(2GHz-20GHz)	HP	84722A	MAX206	2025-10-27	2026-10-26
Amplifier (18-26GHz)	Rohde & Schwarz	AFS33-18002 650-30-8P-44	MAX218	2025-10-27	2026-10-26
Band filter	Amindeon	82346	MAX219	2025-10-27	2026-10-26
Power Meter	Anritsu	ML2495A	MAX540	2025-10-27	2026-10-26
Power Sensor	Anritsu	MA2411B	MAX541	2025-10-27	2026-10-26

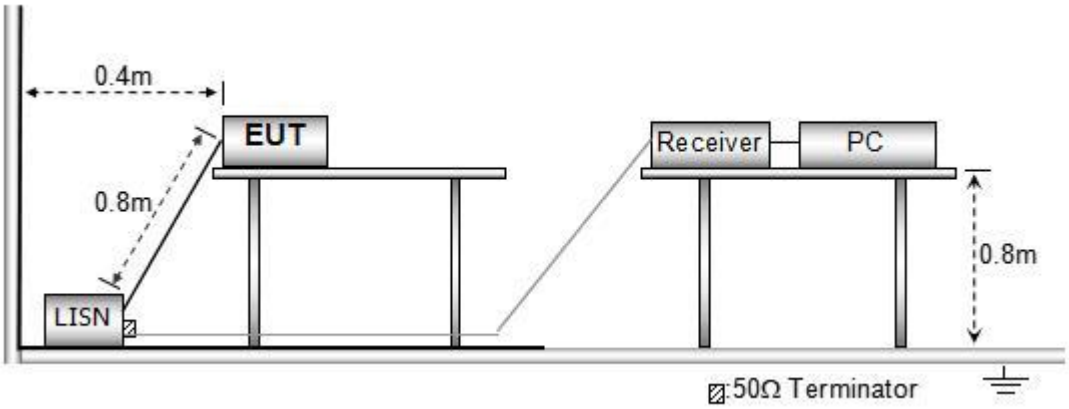
Wideband Radio Communication Tester	Rohde & Schwarz	CMW500	MAX575	2025-10-27	2026-10-26
Splitter	Agilent	11636B	MAX237	2025-10-27	2026-10-26
Loop Antenna	ZHINAN	ZN30900A	MAX534	2025-10-27	2026-10-26
Breitband hornantenne	SCHWARZBECK	BBHA 9170	MAX579	2025-10-27	2026-10-26
Amplifier	TDK	PA-02-02	MAX574	2025-10-27	2026-10-26
Amplifier	TDK	PA-02-03	MAX576	2025-10-27	2026-10-26
PSA Series Spectrum Analyzer	Rohde & Schwarz	FSP	MAX578	2025-10-27	2026-10-26

RF Conducted Test:					
Test Equipment	**Manufacturer**	**Model**	**Serial No.**	**Date of Cal.**	**Due Date**
MXA Signal Analyzer	Agilent	N9020A	MAX566	2025-10-27	2026-10-26
EMI Test Receiver	R&S	ESCI 7	MAX552	2025-10-27	2026-10-26
Spectrum Analyzer	Agilent	E4440A	MAX533	2025-10-27	2026-10-26
MXG vector Signal Generator	Agilent	N5182A	MAX567	2025-10-27	2026-10-26
ESG Analog Signal Generator	Agilent	E4428C	MAX568	2025-10-27	2026-10-26
USB RF Power Sensor	DARE	RPR3006W	MAX569	2025-10-27	2026-10-26
RF Switch Box	Shongyi	RFSW3003328	MAX571	2025-10-27	2026-10-26
Programmable Constant Temp & Humi Test Chamber	WEWON	WHTH-150L-40-880	MAX572	2025-10-27	2026-10-26

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 C63.10-2020 + Cor. 1-2023+C63.10a-2024 + Errata to C63.10a-2024
2 Support equipment, if needed, was placed as per ANSI C63.10-2020 + Cor. 1-2023+C63.10a-2024 + Errata to C63.10a-2024 All I/O cables were positioned to simulate typical actual usage as per ANSI C63.10-2020 + Cor. 1-2023+C63.10a-2024 + Errata to C63.10a-2024 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.

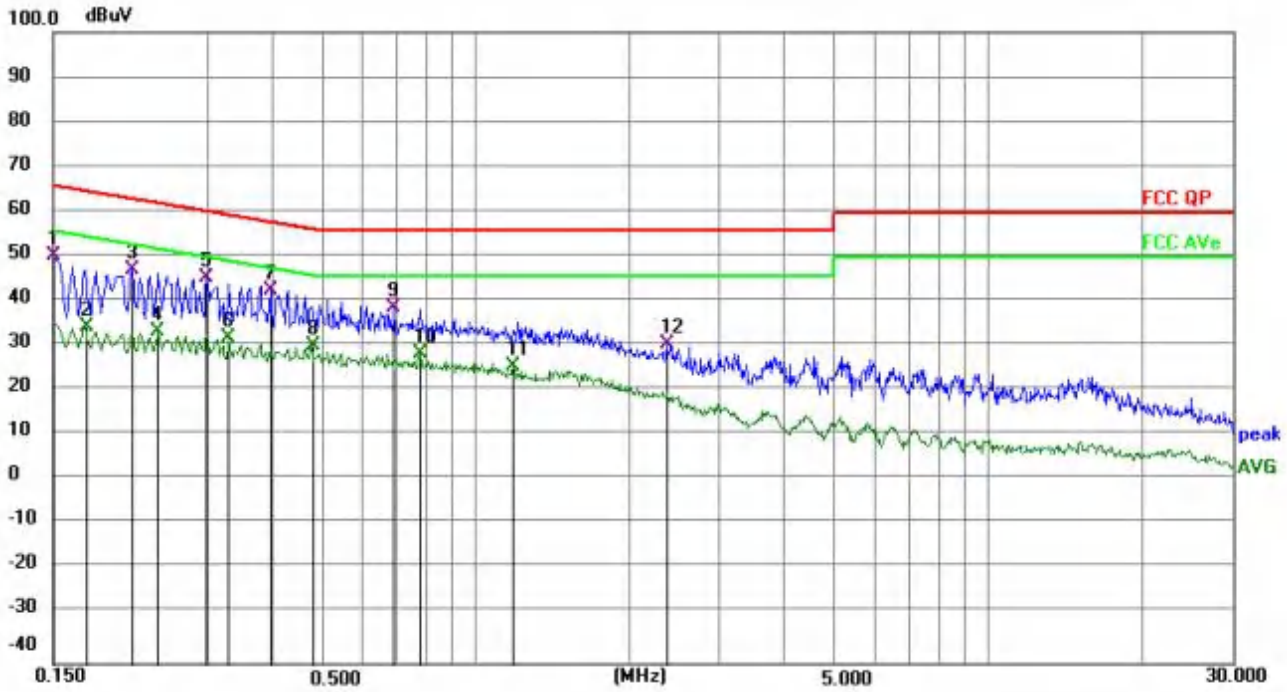
AC Power Conducted Emission Limit

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

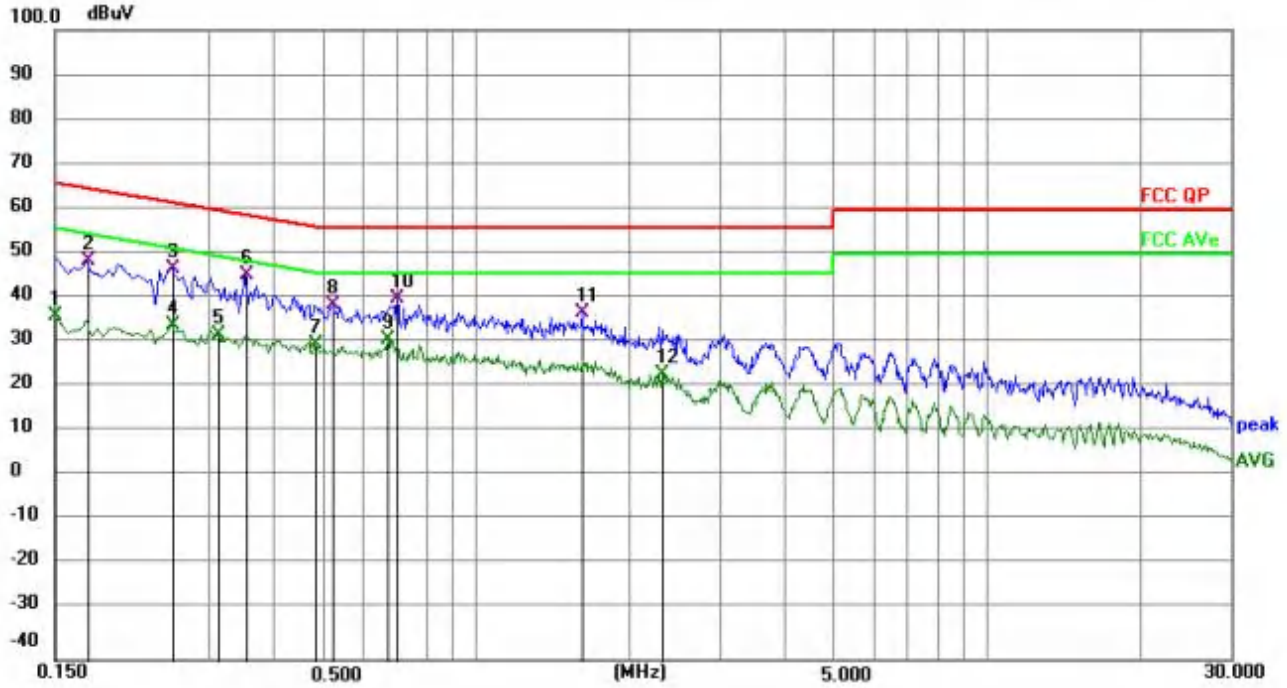
Power supply:	DC 5V from Adapter AC 120V/60Hz	Polarization	L



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	P/F	Remark
1	0.1500	33.82	16.58	50.40	66.00	-15.60	QP	P	
2	0.1724	18.13	16.73	34.86	54.84	-19.98	AVG	P	
3	0.2129	30.48	16.72	47.20	63.09	-15.89	QP	P	
4	0.2400	16.81	16.72	33.53	52.10	-18.57	AVG	P	
5 *	0.2983	28.85	16.71	45.56	60.29	-14.73	QP	P	
6	0.3300	15.47	16.71	32.18	49.45	-17.27	AVG	P	
7	0.3975	26.22	16.70	42.92	57.91	-14.99	QP	P	
8	0.4784	13.71	16.69	30.40	46.37	-15.97	AVG	P	
9	0.6945	22.41	16.65	39.06	56.00	-16.94	QP	P	
10	0.7799	12.13	16.65	28.78	46.00	-17.22	AVG	P	
11	1.1849	9.22	16.59	25.81	46.00	-20.19	AVG	P	
12	2.3685	14.54	16.43	30.97	56.00	-25.03	QP	P	

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

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



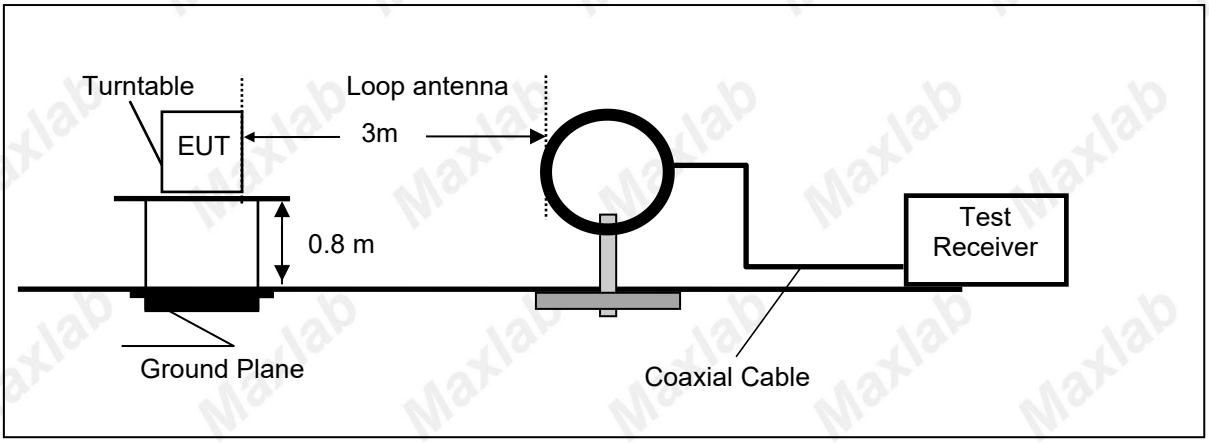
No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	P/F	Remark
1	0.1500	19.00	17.53	36.53	56.00	-19.47	AVG	P	
2	0.1724	31.12	17.53	48.65	64.84	-16.19	QP	P	
3	0.2535	29.58	17.53	47.11	61.64	-14.53	QP	P	
4	0.2535	16.71	17.53	34.24	51.64	-17.40	AVG	P	
5	0.3119	14.59	17.52	32.11	49.92	-17.81	AVG	P	
6 *	0.3524	27.94	17.52	45.46	58.91	-13.45	QP	P	
7	0.4829	12.71	17.52	30.23	46.29	-16.06	AVG	P	
8	0.5234	21.47	17.51	38.98	56.00	-17.02	QP	P	
9	0.6720	13.57	17.51	31.08	46.00	-14.92	AVG	P	
10	0.7035	22.94	17.51	40.45	56.00	-15.55	QP	P	
11	1.6169	19.68	17.49	37.17	56.00	-18.83	QP	P	
12	2.3189	6.21	17.46	23.67	46.00	-22.33	AVG	P	

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

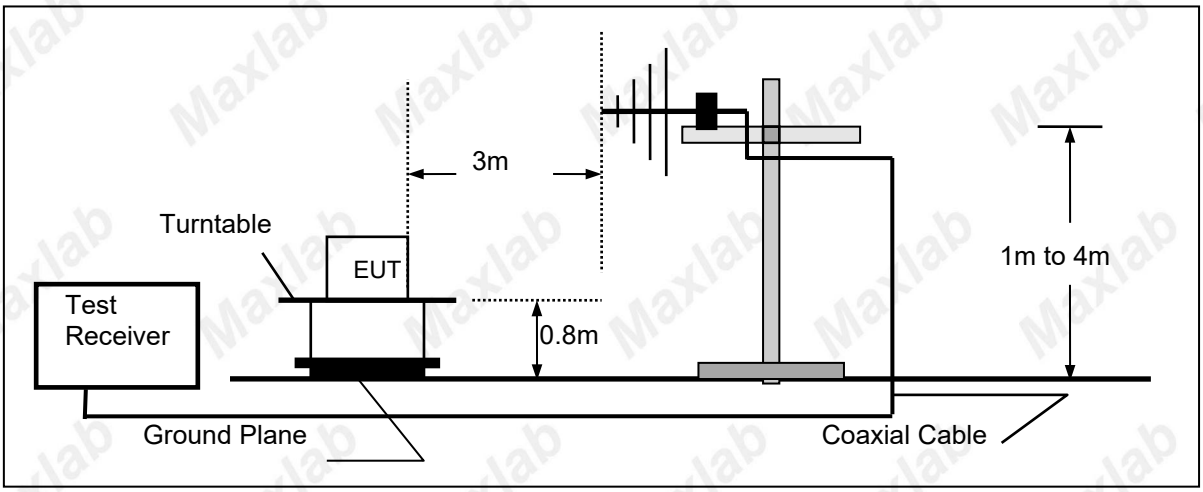
4.2 Radiated Emission

TEST CONFIGURATION

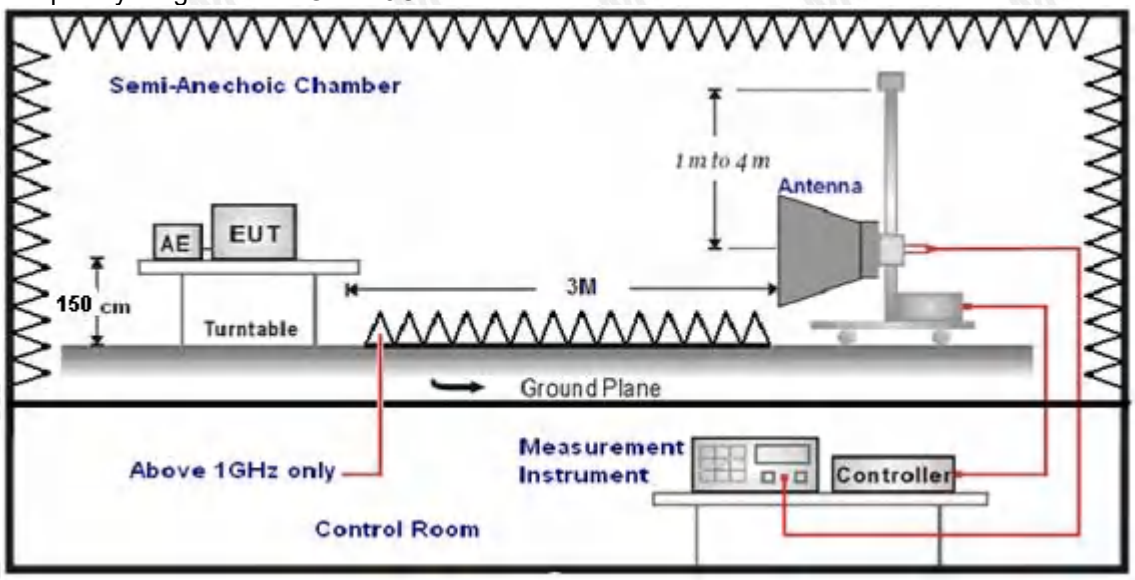
Frequency range 9KHz – 30MHz



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. 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.

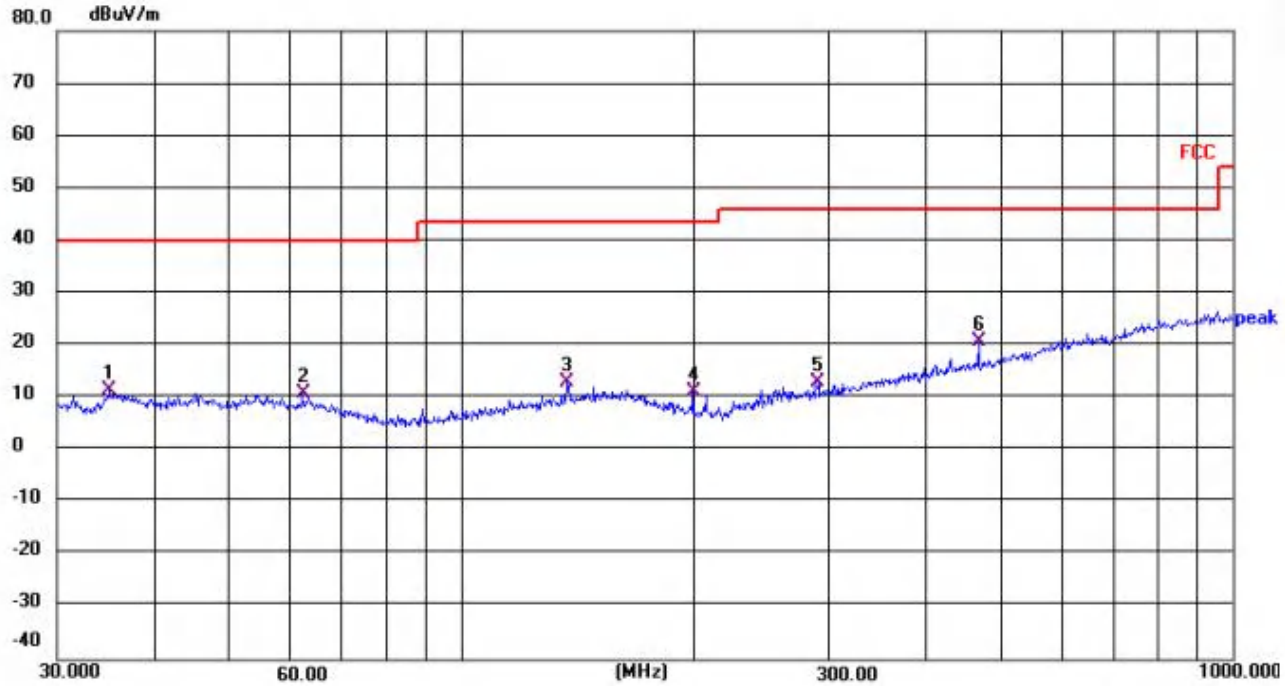
Frequency (MHz)	Distance (Meters)	Radiated (dBμV/m)	Radiated (μV/m)
0.009-0.49	3	20log(2400/F(KHz))+40log(300/3)	2400/F(KHz)
0.49-1.705	3	20log(24000/F(KHz))+ 40log(30/3)	24000/F(KHz)
1.705-30	3	20log(30)+ 40log(30/3)	30
30-88	3	40.0	100
88-216	3	43.5	150
216-960	3	46.0	200
Above 960	3	54.0	500

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, π*/4 DQPSK and 8-DPSK* mode from 9 KHz to 25GHz and recorded worst case at GFSK DH5 mode.
3. For below 1GHz testing recorded worst at GFSK DH5 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

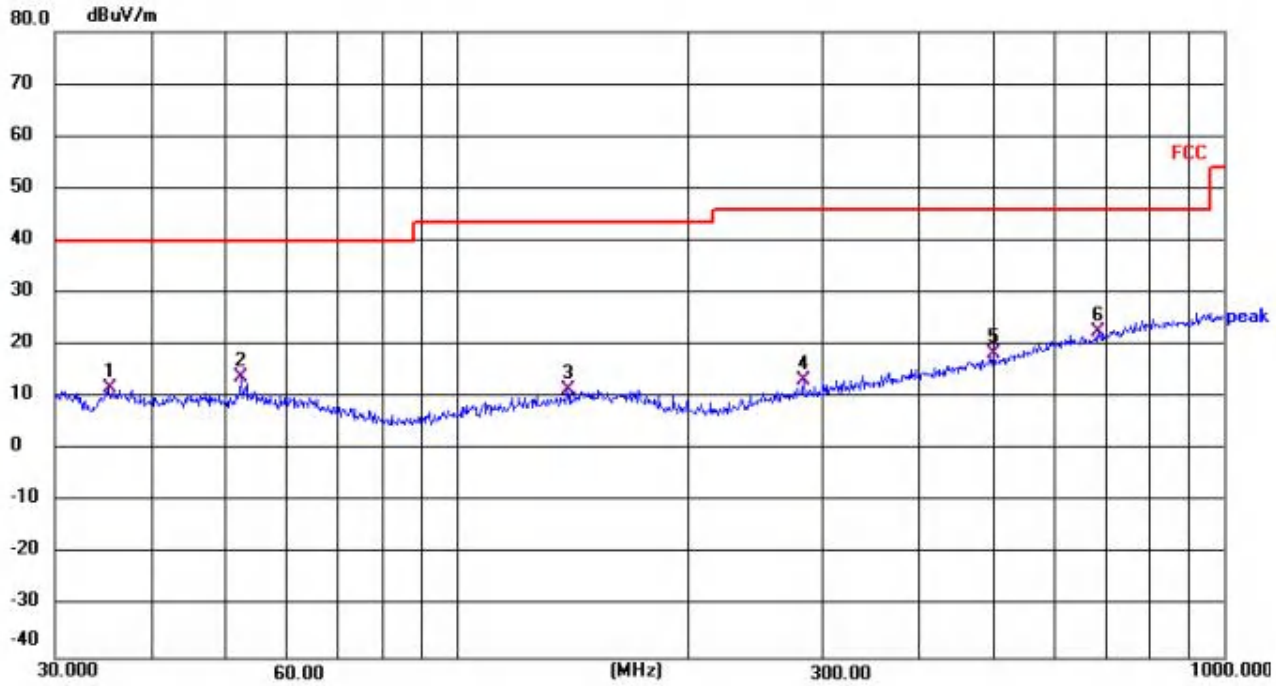
Horizontal



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg.)	P/F	Remark
1	35.0048	28.60	-17.08	11.52	40.00	-28.48	QP	100	360	P	
2	62.4314	28.37	-17.43	10.94	40.00	-29.06	QP	100	360	P	
3	137.4202	29.86	-16.88	12.98	43.50	-30.52	QP	100	360	P	
4	199.9856	30.52	-19.32	11.20	43.50	-32.30	QP	100	360	P	
5	289.0021	28.98	-15.91	13.07	46.00	-32.93	QP	100	360	P	
6 *	468.8762	31.99	-11.29	20.70	46.00	-25.30	QP	100	360	P	

Note:1).Level (dBμV/m)= Reading (dBμV/m)+ Factor (dB/m)
2). Factor(dB/m)=Antenna Factor (dB/m) + Cable loss (dB) - Pre Amplifier gain (dB)
3). Margin(dB) = Level (dBμV/m) - Limit(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	Remark
1	35.2512	28.86	-17.03	11.83	40.00	-28.17	QP	100	0	P	
2	52.3912	30.36	-16.60	13.76	40.00	-26.24	QP	100	0	P	
3	139.3613	28.24	-16.80	11.44	43.50	-32.06	QP	100	0	P	
4	282.9852	29.49	-16.10	13.39	46.00	-32.61	QP	100	0	P	
5	501.1790	28.87	-10.66	18.21	46.00	-27.79	QP	100	0	P	
6 *	684.7454	29.23	-6.67	22.56	46.00	-23.44	QP	100	0	P	

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

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

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

For 1GHz to 25GHz

Note: GFSK, π/4 DQPSK and 8-DPSK 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	56.49	PK	74	17.51	60.85	32.40	5.11	41.87	-4.36
4804.00	46.09	AV	54	7.91	50.45	32.40	5.11	41.87	-4.36
7206.00	55.11	PK	74	18.89	55.74	36.58	6.43	43.64	-0.63
7206.00	45.05	AV	54	8.95	45.68	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	56.49	PK	74	17.51	60.85	32.40	5.11	41.87	-4.36
4804.00	45.98	AV	54	8.02	50.34	32.40	5.11	41.87	-4.36
7206.00	54.86	PK	74	19.14	55.49	36.58	6.43	43.64	-0.63
7206.00	44.60	AV	54	9.40	45.23	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	56.90	PK	74	17.10	60.85	32.56	5.34	41.85	-3.95
4882.00	46.39	AV	54	7.61	50.34	32.56	5.34	41.85	-3.95
7323.00	55.13	PK	74	18.87	55.49	36.54	6.81	43.71	-0.36
7323.00	45.00	AV	54	9.00	45.36	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	56.57	PK	74	17.43	60.52	32.56	5.34	41.85	-3.95
4882.00	46.46	AV	54	7.54	50.41	32.56	5.34	41.85	-3.95
7323.00	54.90	PK	74	19.10	55.26	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	56.73	PK	74	17.27	60.19	32.73	5.64	41.83	-3.46
4960.00	46.82	AV	54	7.18	50.28	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	45.31	AV	54	8.69	45.37	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	57.12	PK	74	16.88	60.58	32.73	5.64	41.83	-3.46
4960.00	47.19	AV	54	6.81	50.65	32.73	5.64	41.83	-3.46
7440.00	55.29	PK	74	18.71	55.35	36.50	7.23	43.79	-0.06
7440.00	45.23	AV	54	8.77	45.29	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, Pi/4 DQPSK and 8-DPSK all have been tested, only worse case GFSK is reported.

GFSK

Test 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)
2310.00	50.32	PK	74	23.68	60.74	27.42	4.31	42.15	-10.42
2310.00	40.23	AV	54	13.77	50.65	27.42	4.31	42.15	-10.42
2390.00	48.05	PK	74	25.95	58.34	27.55	4.35	42.19	-10.29
2390.00	38.46	AV	54	15.54	48.75	27.55	4.35	42.19	-10.29
2400.00	45.45	PK	74	28.55	55.64	27.70	4.39	42.28	-10.19
2400.00	35.13	AV	54	18.87	45.32	27.70	4.39	42.28	-10.19

Test 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)
2310.00	48.00	PK	74	26.00	58.42	27.42	4.31	42.15	-10.42
2310.00	37.92	AV	54	16.08	48.34	27.42	4.31	42.15	-10.42
2390.00	45.12	PK	74	28.88	55.41	27.55	4.35	42.19	-10.29
2390.00	35.36	AV	54	18.64	45.65	27.55	4.35	42.19	-10.29
2400.00	43.05	PK	74	30.95	53.24	27.70	4.39	42.28	-10.19
2400.00	33.66	AV	54	20.34	43.85	27.70	4.39	42.28	-10.19

Test 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)
2483.50	44.99	PK	74	29.01	55.62	27.55	4.38	42.56	-10.63
2483.50	34.62	AV	54	19.38	45.25	27.55	4.38	42.56	-10.63
2500.00	41.61	PK	74	32.39	52.34	27.69	4.46	42.88	-10.73
2500.00	31.89	AV	54	22.11	42.62	27.69	4.46	42.88	-10.73

Test 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)
2483.50	42.78	PK	74	31.22	53.41	27.55	4.38	42.56	-10.63
2483.50	31.99	AV	54	22.01	42.62	27.55	4.38	42.56	-10.63
2500.00	40.32	PK	74	33.68	51.05	27.69	4.46	42.88	-10.73
2500.00	30.13	AV	54	23.87	40.86	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 20.97dBm(for EDR)

Test Procedure

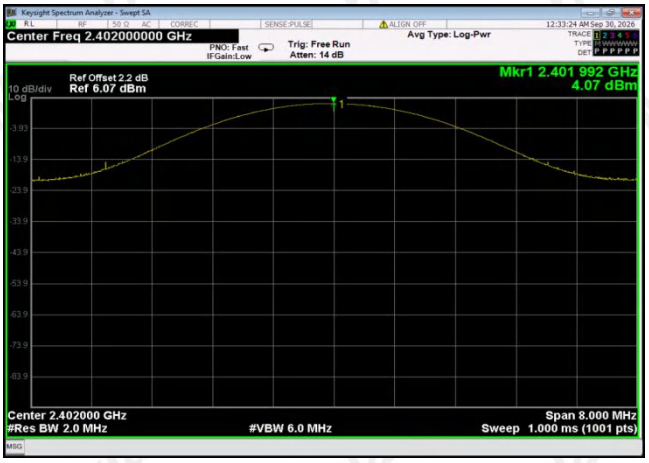
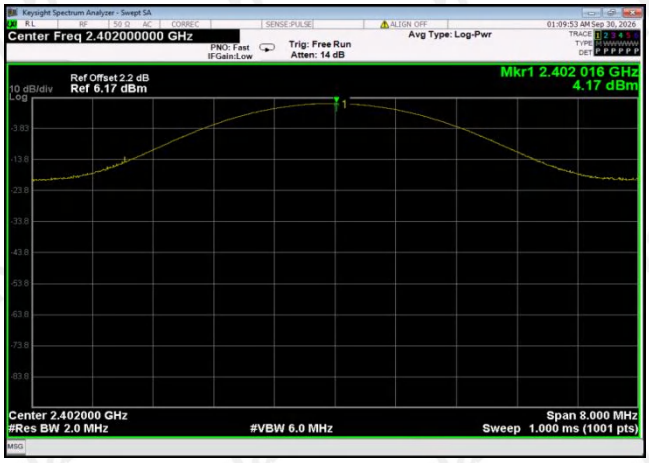
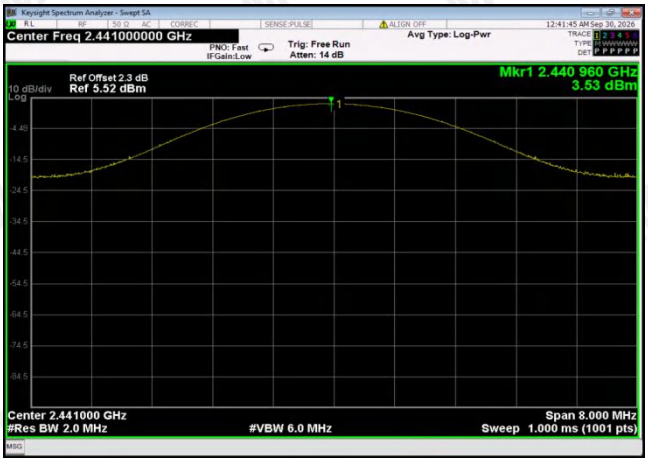
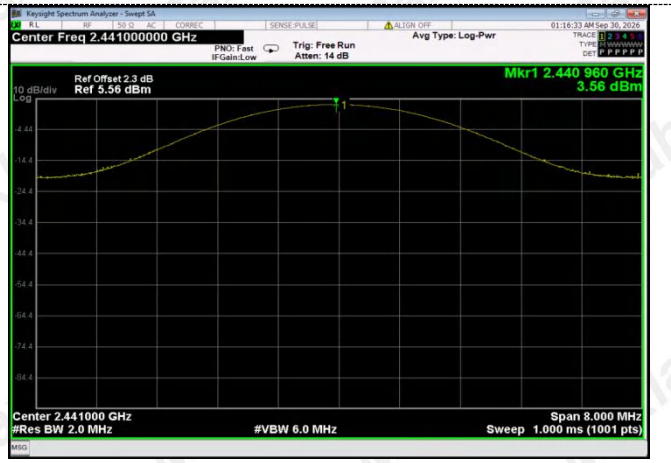
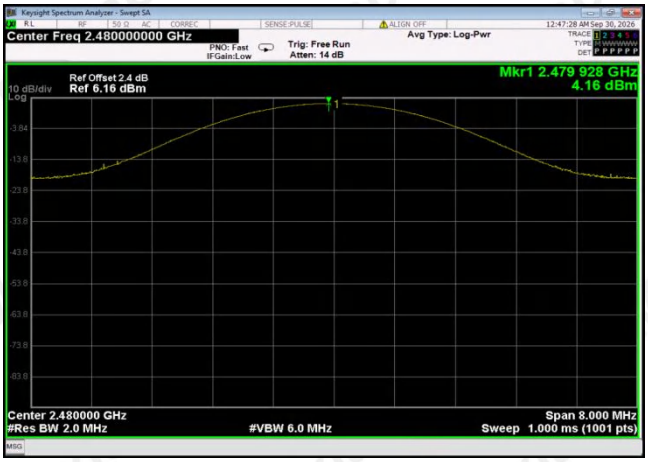
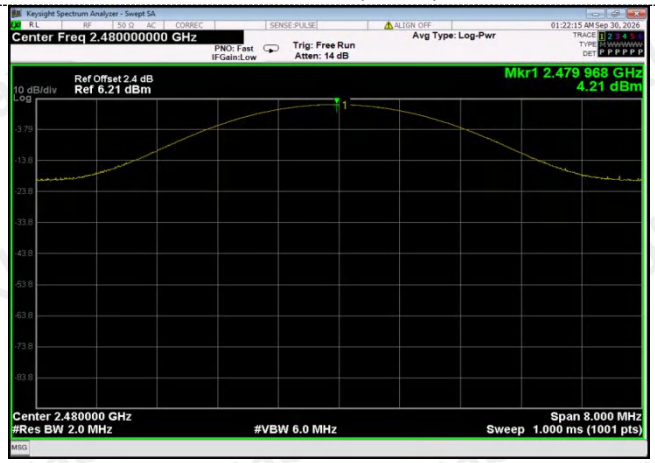
1. Remove the antenna from the EUT and then connect a low RF cable from the antenna port to the spectrum.
2. Set the spectrum analyzer: RBW = 3MHz. VBW = 8MHz. Sweep = auto; Detector Function = Peak.
3. Keep the EUT in transmitting at lowest, medium and highest channel individually. Record the max value.

Test Configuration

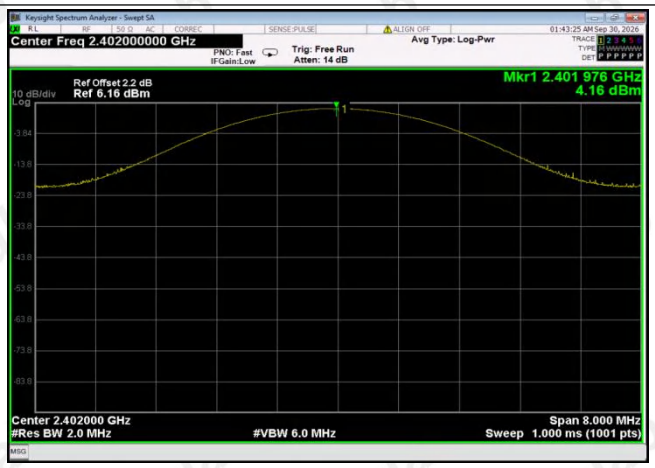
Test Results

Type	Channel	Output power (dBm)	Limit (dBm)	Result
GFSK	00	4.07	20.97	Pass
	39	3.53		
	78	4.16		
π/4DQPSK	00	4.17	20.97	Pass
	39	3.56		
	78	4.21		
8-DPSK	00	4.16	20.97	Pass
	39	3.56		
	78	4.20		

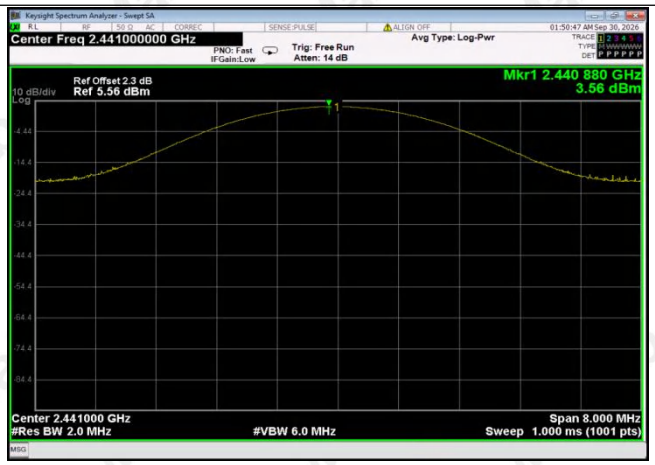
Note: 1.The test results including the cable lose.

GFSK(CH00)	π/4DQPSK (CH00)
	
GFSK(CH39)	π/4DQPSK (CH39)
	
GFSK(CH78)	π/4DQPSK (CH78)
	

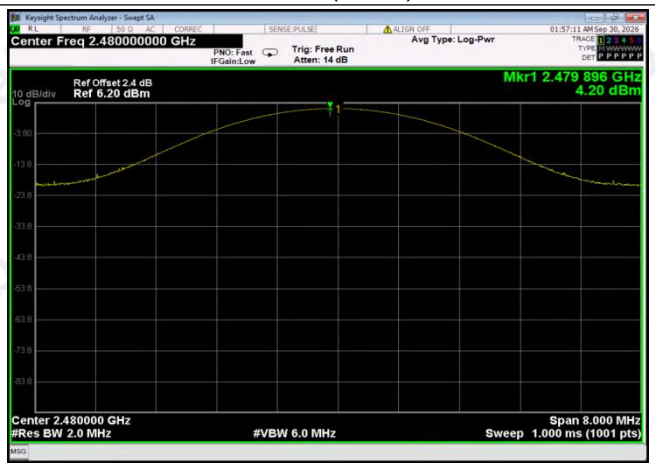
8-DPSK(CH00)



8-DPSK(CH39)



8-DPSK(CH78)



4.4 20dB Bandwidth

Limit

For frequency hopping systems operating in the 2400MHz-2483.5MHz no limit for 20dB bandwidth.

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 30 KHz RBW and 100 KHz VBW.

The 20dB bandwidth is defined as the total spectrum the power of which is higher than peak power minus 20dB.

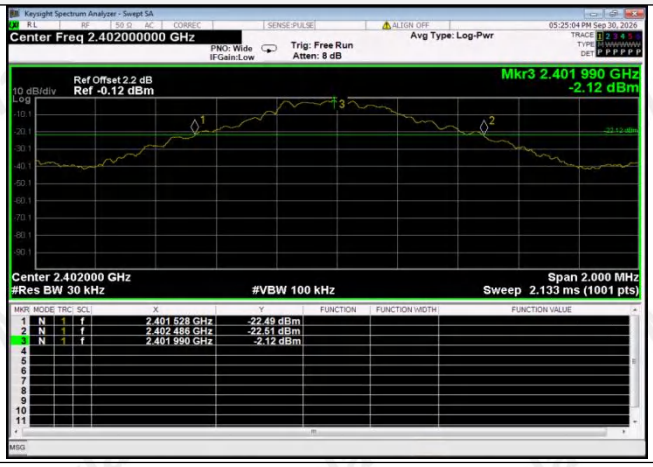
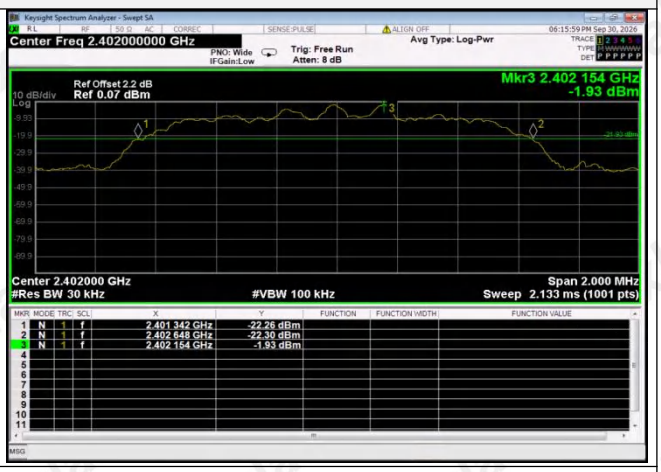
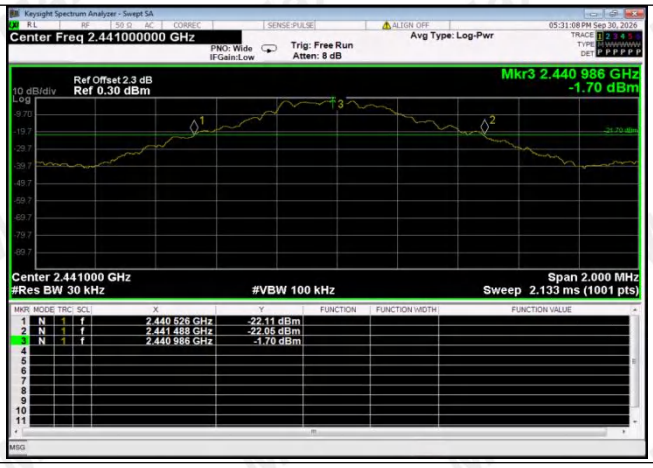
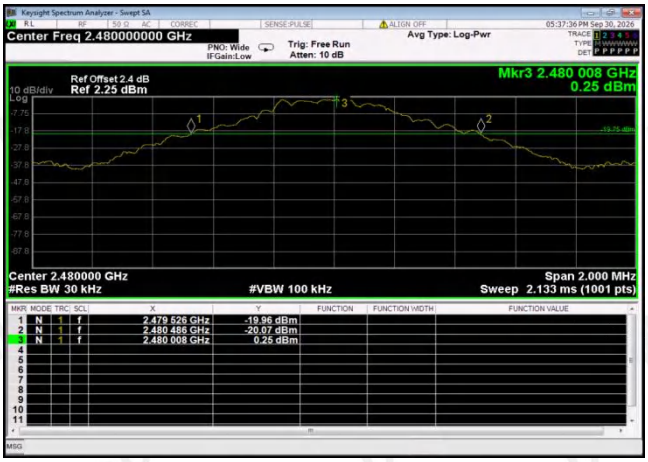
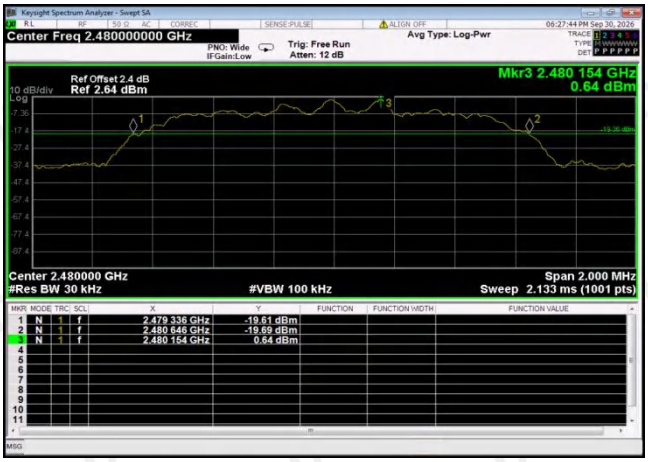
The 20dB bandwidth is defined as the total spectrum the power of which is higher than peak power minus 20dB.

Test Configuration

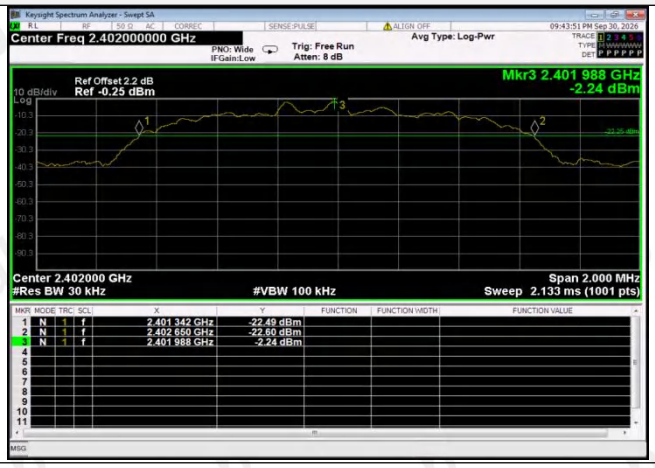
Test Results

Modulation	Channel	20dB bandwidth (MHz)	Result
GFSK	CH00	0.958	Pass
	CH39	0.962	
	CH78	0.960	
π/4DQPSK	CH00	1.306	
	CH39	1.312	
	CH78	1.310	
8-DPSK	CH00	1.308	
	CH39	1.306	
	CH78	1.310	

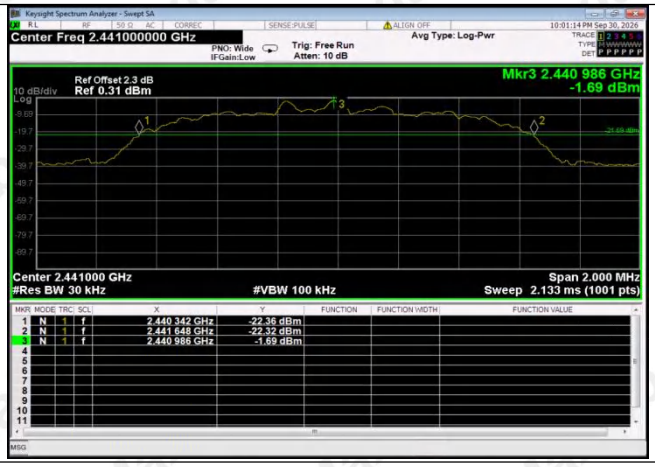
Test plot as follows:

GFSK Modulation	*π/4DQPSK Modulation*
	
CH00	*CH00*
	
CH39	*CH39*
	
CH78	*CH78*

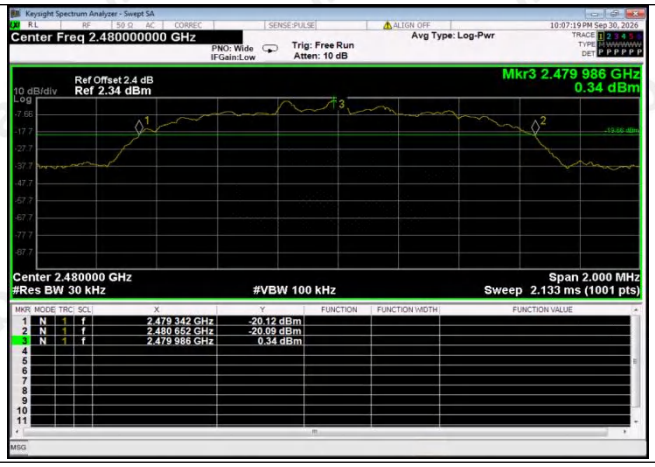
8-DPSK Modulation



CH00



CH39



CH78

4.5 Frequency Separation

LIMIT

According to 15.247(a)(1),frequency hopping systems shall have hopping channel carrier frequencies separated by minimum of 25KHz or the 2/3*20dB bandwidth of the hopping channel, whichever is greater.

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 300 KHz RBW and 1 MHz VBW.

TEST CONFIGURATION

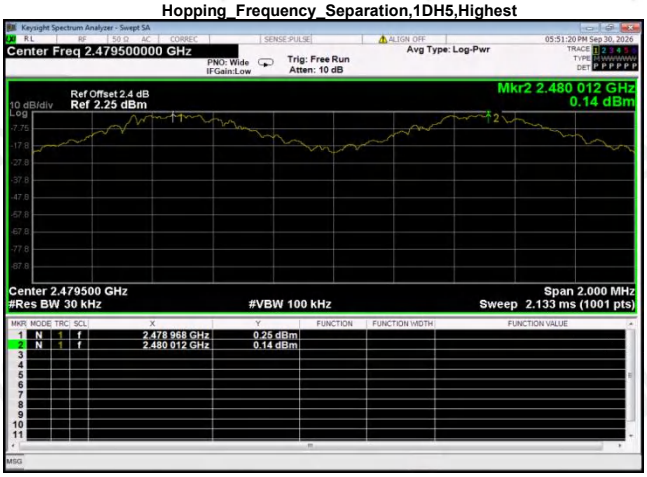
TEST RESULTS

Modulation	Channel	Channel Separation (MHz)	Limit (MHz)	Result
GFSK	CH78	1.044	0.64	Pass
π/4DQPSK	CH78	1.016	0.88	Pass
8-DPSK	CH78	0.992	0.87	Pass

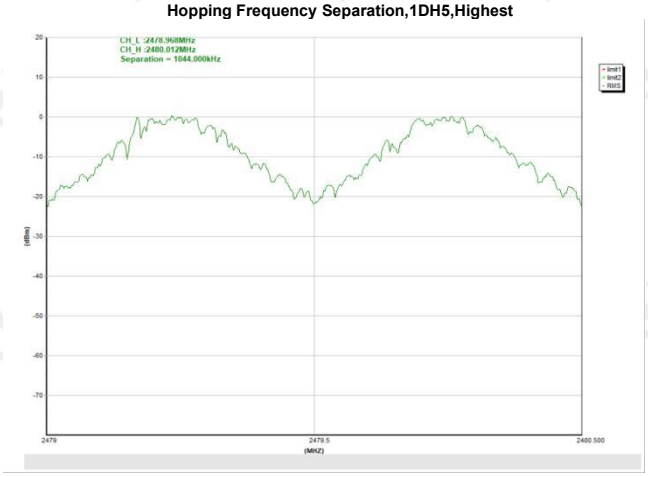
Note:
We have tested all mode at high, middle and low channel, and recorded worst case at high.

Test plot as follows:

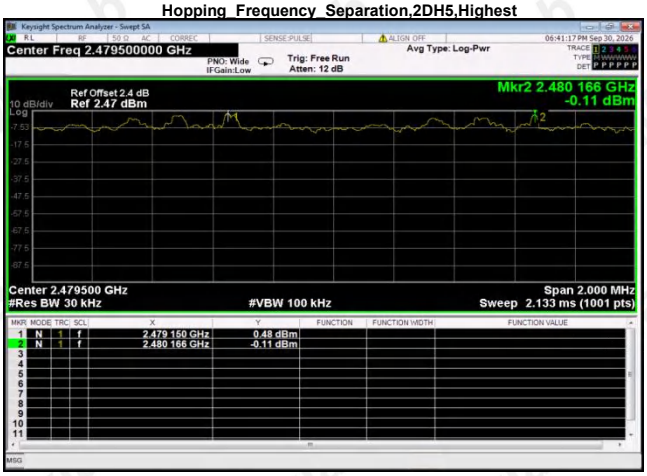
Hopping_Frequency_Separation,1DH5,Highest



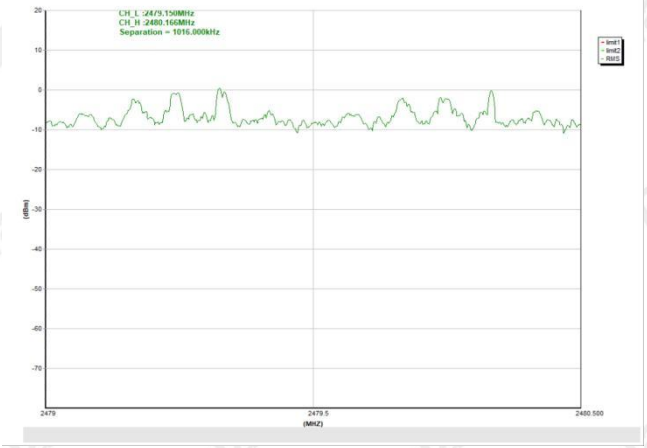
Hopping Frequency Separation,1DH5,Highest



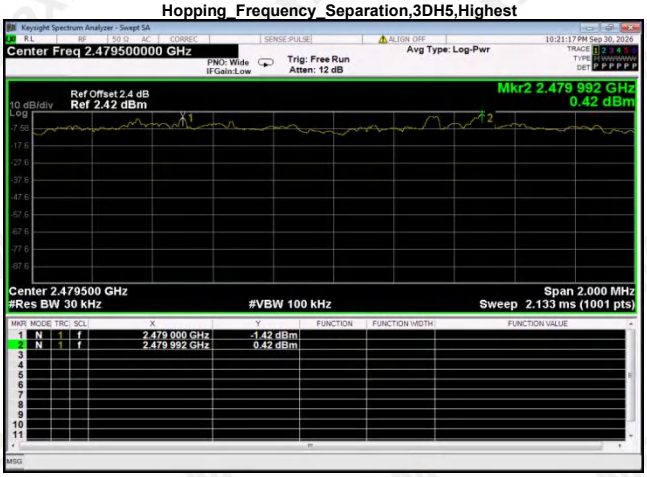
Hopping_Frequency_Separation,2DH5,Highest



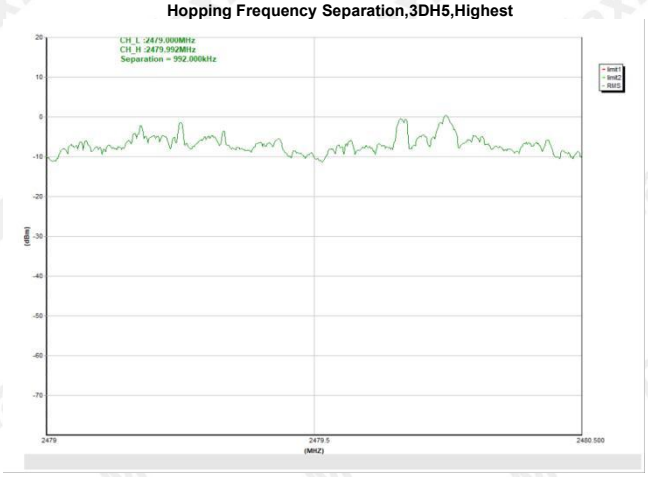
Hopping Frequency Separation,2DH5,Highest



Hopping_Frequency_Separation,3DH5,Highest



Hopping Frequency Separation,3DH5,Highest



4.6 Number of hopping frequency

Limit

Frequency hopping systems in the 2400–2483.5 MHz band shall use at least 15 channels.

Test Procedure

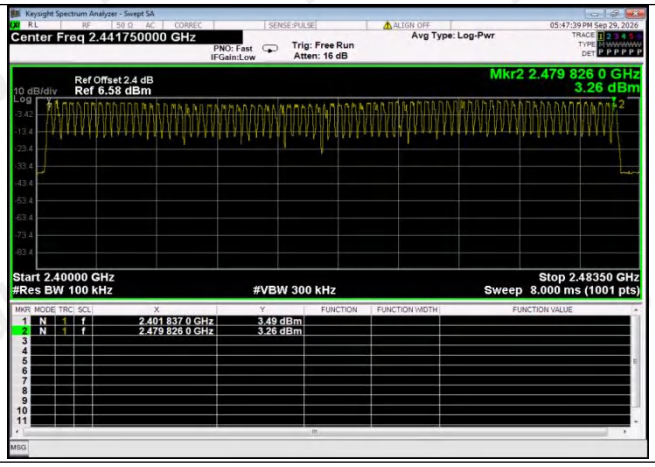
The transmitter output was connected to the spectrum analyzer through an attenuator. Set spectrum analyzer start 2400MHz to 2483.5MHz with 100 KHz RBW and 300 KHz VBW.

Test Configuration

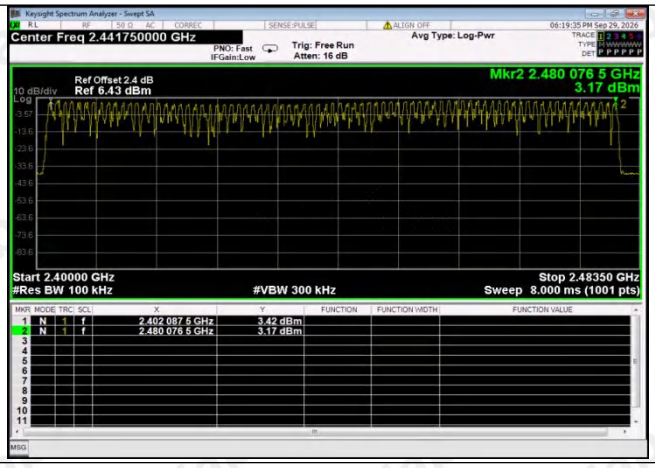
Test Results

Modulation	Number of Hopping Channel	Limit	Result
GFSK	79	≥15	Pass
π/4DQPSK	79		
8-DPSK	79		

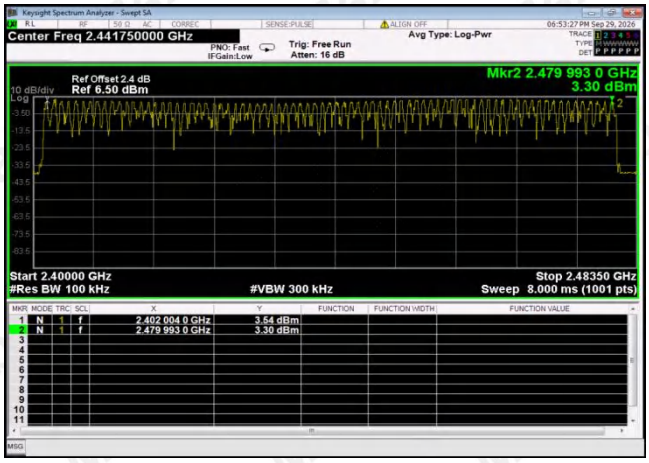
Test plot as follows:



GFSK Modulation



π/4DQPSK Modulation



8-DPSK Modulation

4.7 Time of Occupancy (Dwell Time)

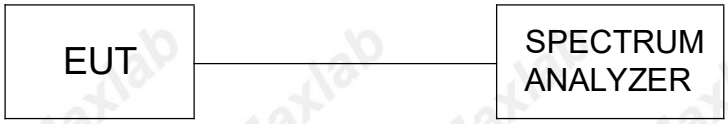
Limit

The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed.

Test Procedure

The transmitter output was connected to the spectrum analyzer through an attenuator. Set center frequency of spectrum analyzer=operating frequency with 1MHz RBW and 1MHz VBW, Span 0Hz.

Test Configuration

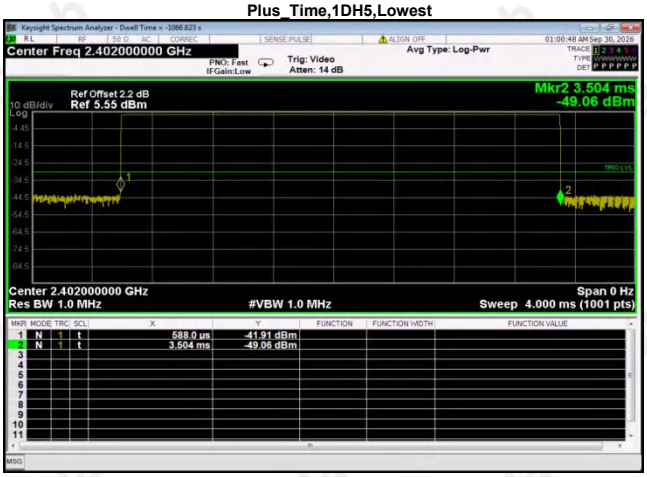


Test Results

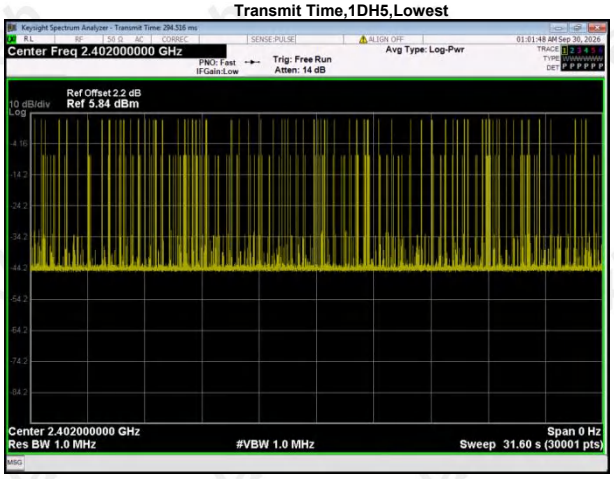
Condition	Mode	Frequency(MHz)	Pulse Time(ms)	Average Time of Occupancy(ms)	Limit(ms)	Burst Number	Results
NVNT	1DH5	2402	2.916	294.516	400	101	Pass
NVNT	1DH5	2441	2.916	309.096	400	106	Pass
NVNT	1DH5	2480	2.916	312.012	400	107	Pass
NVNT	2DH5	2402	2.920	321.200	400	110	Pass
NVNT	2DH5	2441	2.924	321.640	400	110	Pass
NVNT	2DH5	2480	2.920	321.200	400	110	Pass
NVNT	3DH5	2402	2.924	292.400	400	100	Pass
NVNT	3DH5	2441	2.924	295.324	400	101	Pass
NVNT	3DH5	2480	2.928	292.800	400	100	Pass

Test plot as follows:

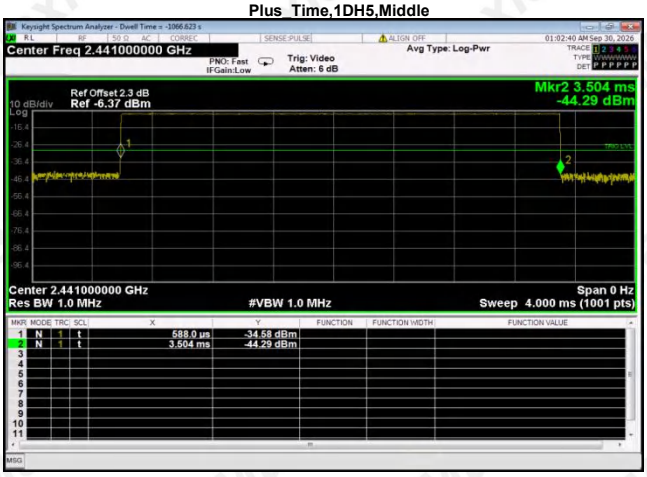
Plus_Time,1DH5,Lowest



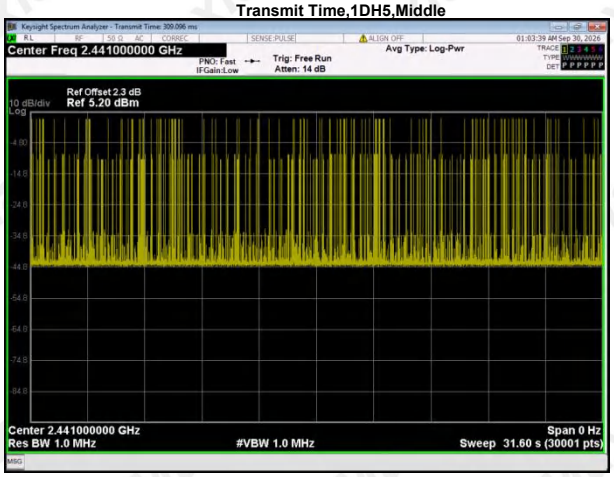
Transmit Time,1DH5,Lowest



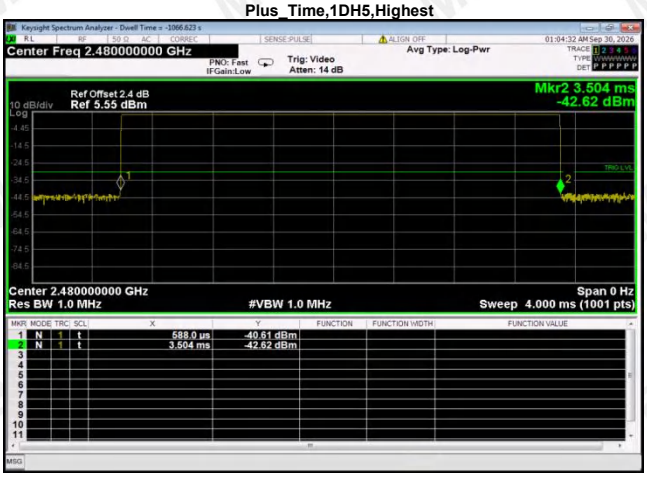
Plus_Time,1DH5,Middle



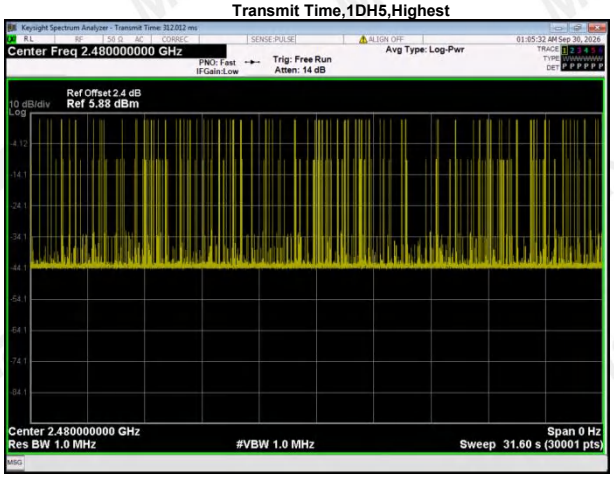
Transmit Time,1DH5,Middle



Plus_Time,1DH5,Highest

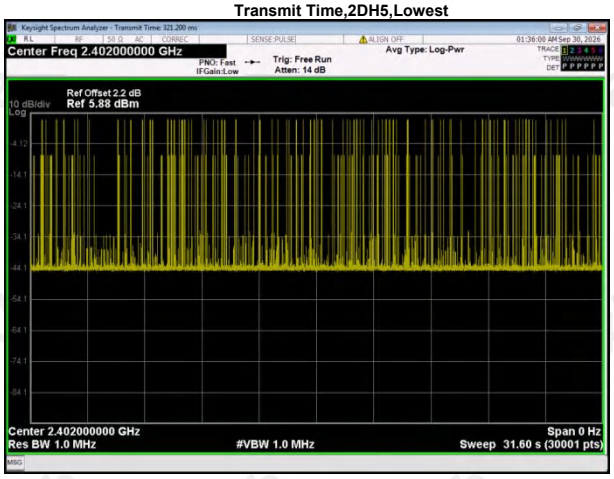


Transmit Time,1DH5,Highest

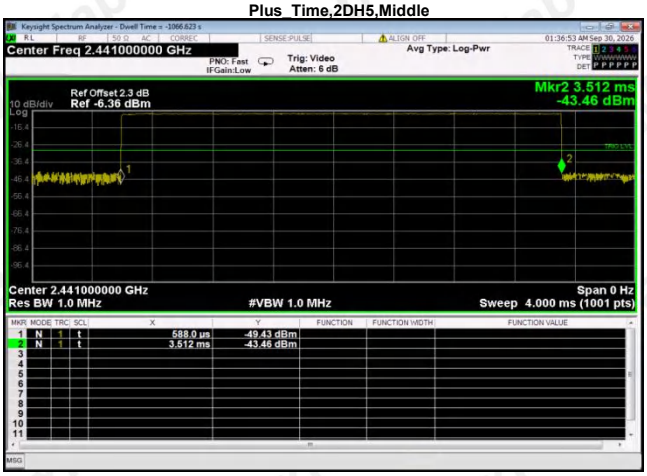


Plus_Time,2DH5,Lowest

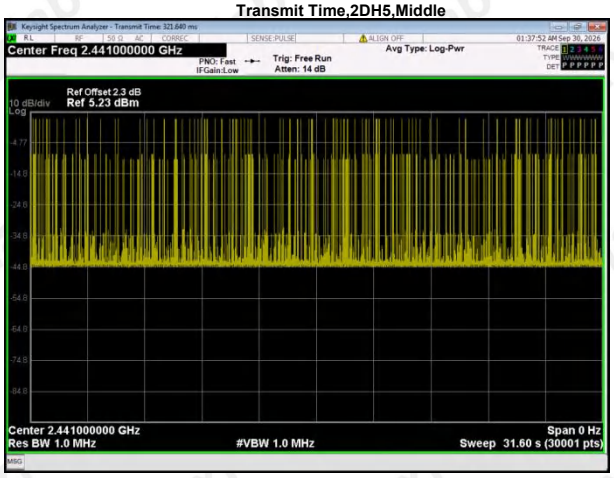
Transmit Time,2DH5,Lowest



Plus_Time,2DH5,Middle

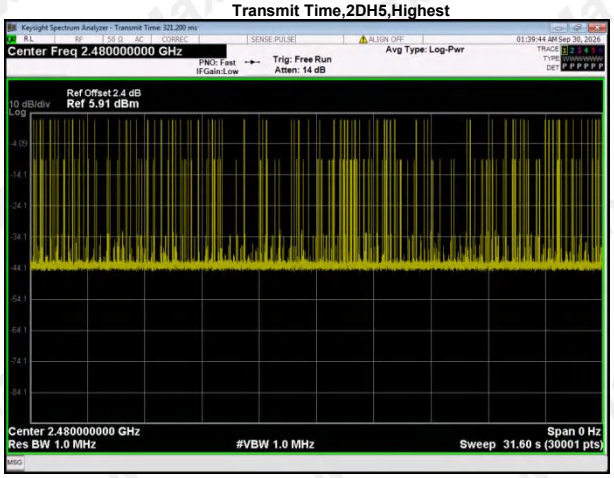


Transmit Time,2DH5,Middle



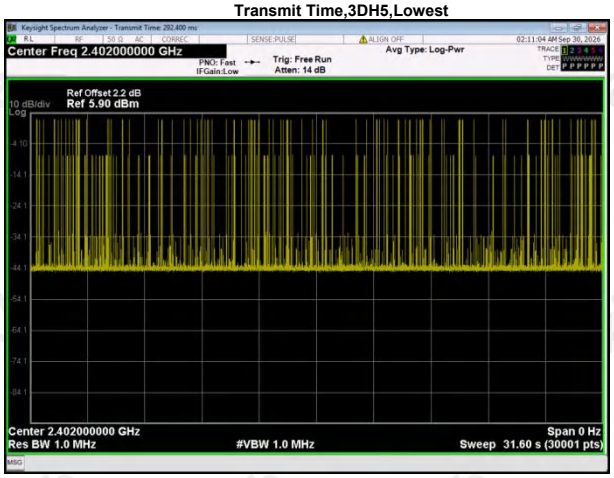
Plus_Time,2DH5,Highest

Transmit Time,2DH5,Highest

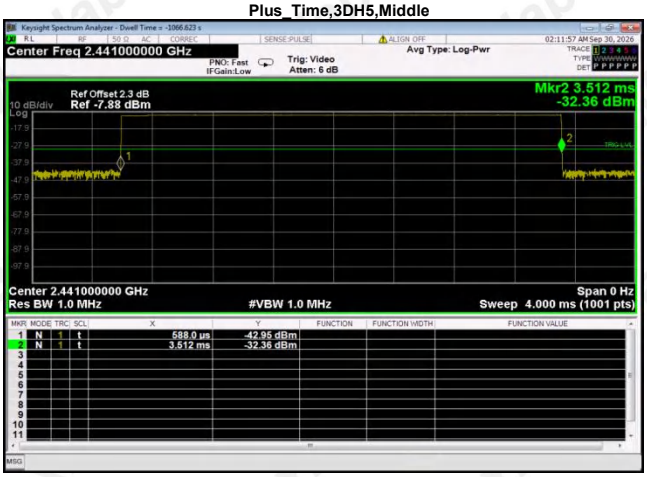


Plus_Time,3DH5,Lowest

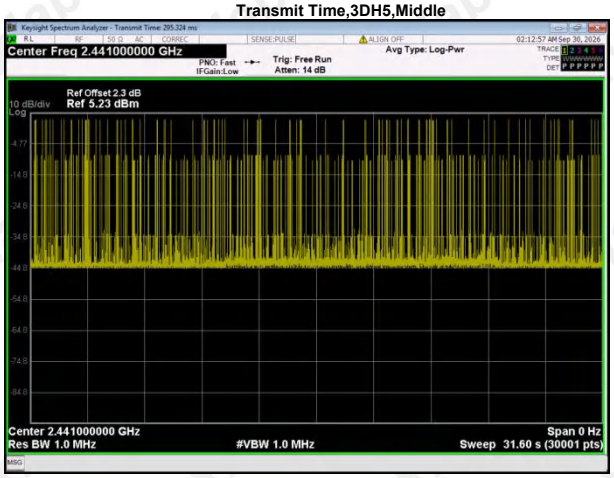
Transmit Time,3DH5,Lowest



Plus_Time,3DH5,Middle

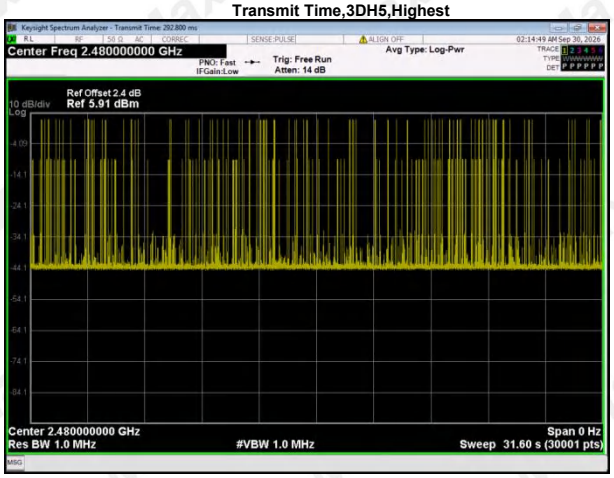


Transmit Time,3DH5,Middle



Plus_Time,3DH5,Highest

Transmit Time,3DH5,Highest



4.8 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

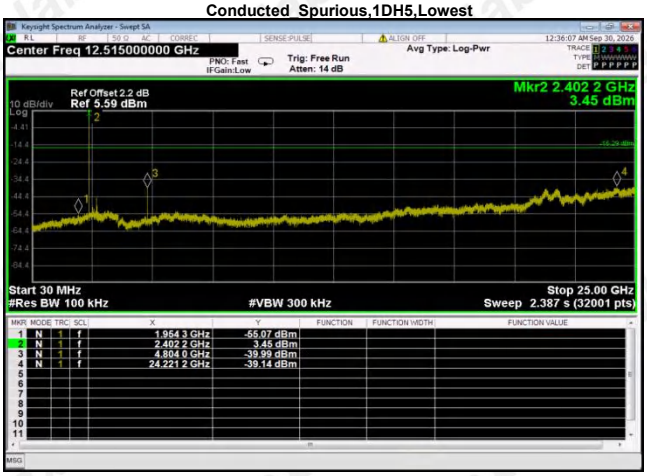
Test Results

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 (DH1, DH3, DH5) and recorded worst case at DH5

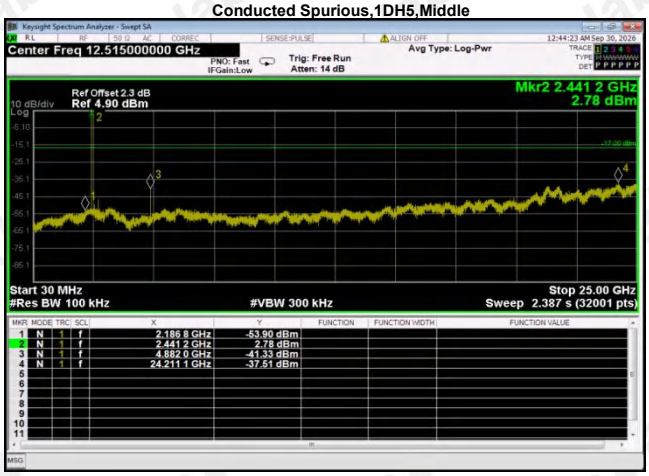
Test plot as follows:

Conducted_Spurious

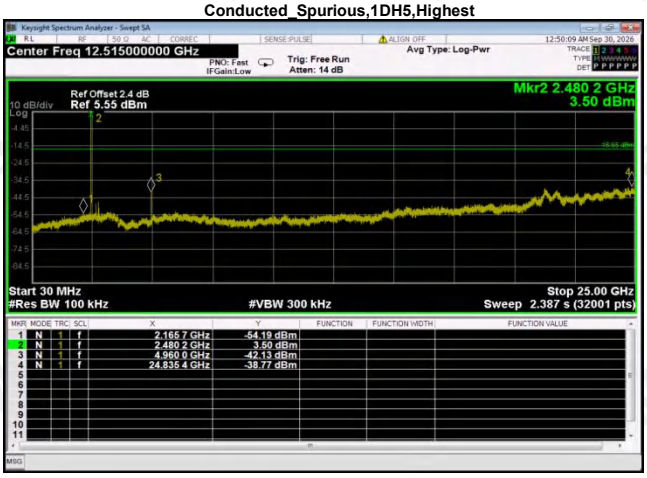
Conducted_Spurious,1DH5,Lowest



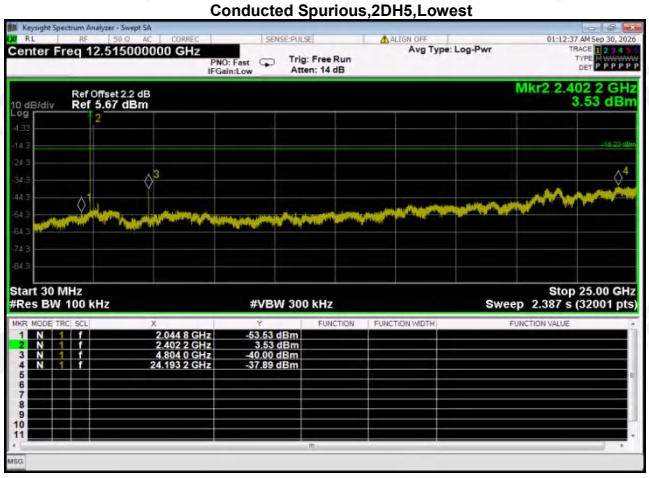
Conducted Spurious,1DH5,Middle



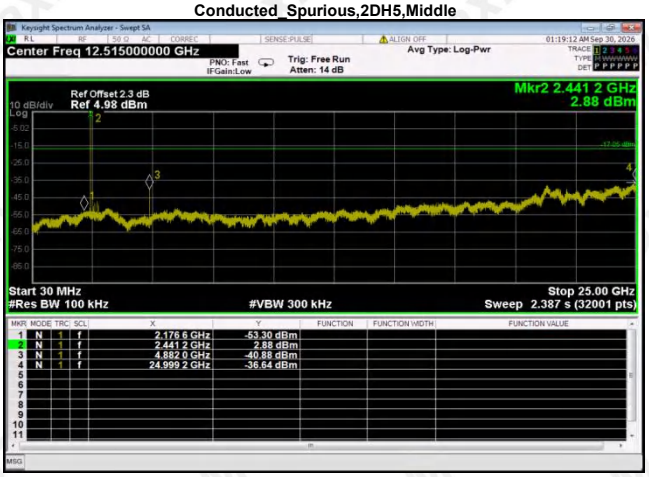
Conducted_Spurious,1DH5,Highest



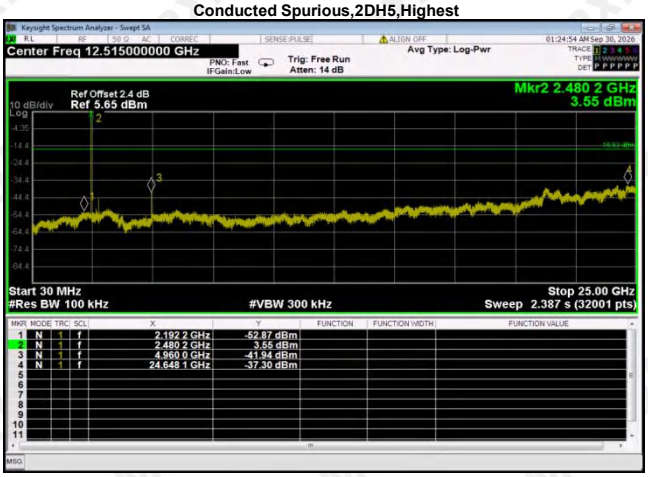
Conducted Spurious,2DH5,Lowest



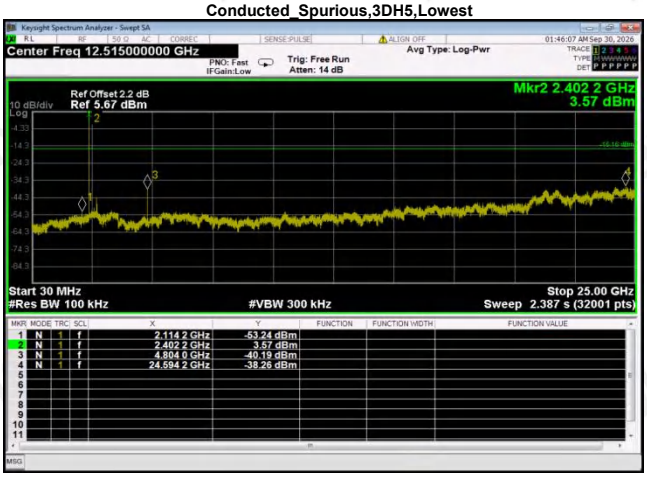
Conducted_Spurious,2DH5,Middle



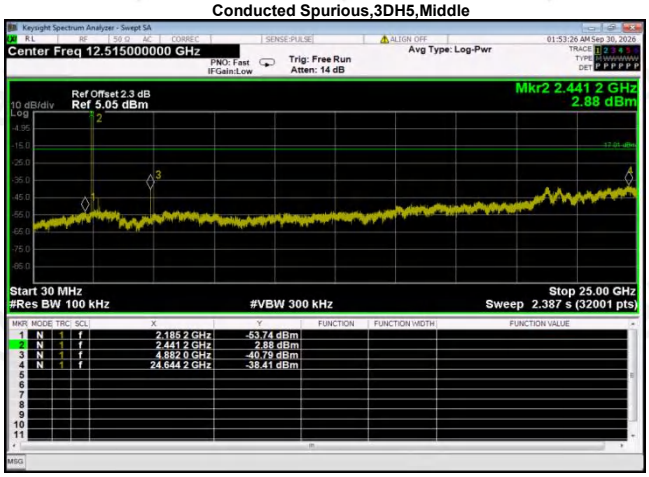
Conducted Spurious,2DH5,Highest



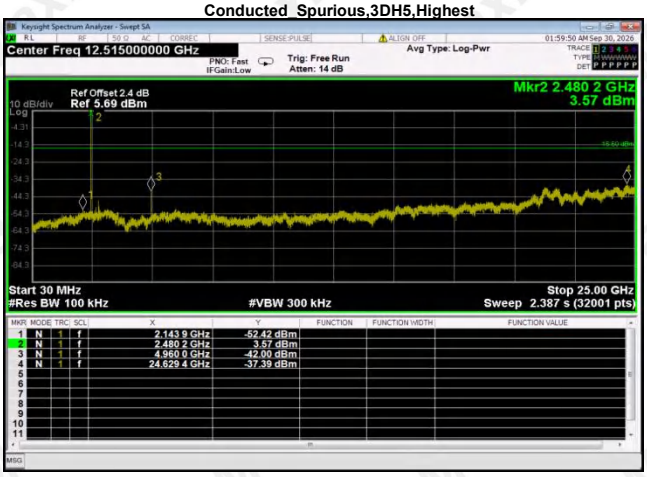
Conducted_Spurious,3DH5,Lowest



Conducted Spurious,3DH5,Middle

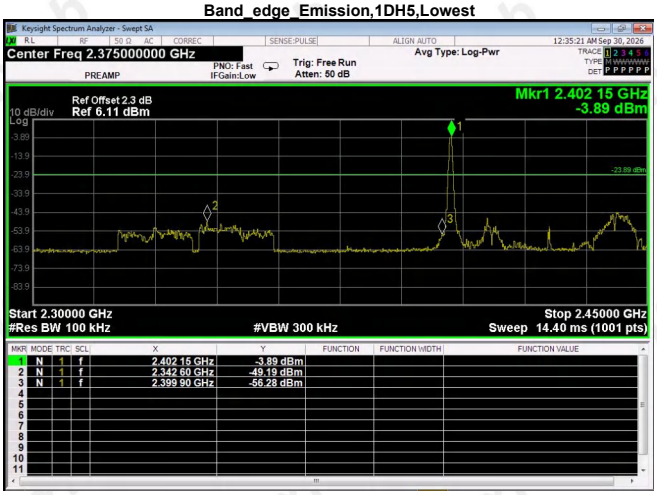


Conducted_Spurious,3DH5,Highest

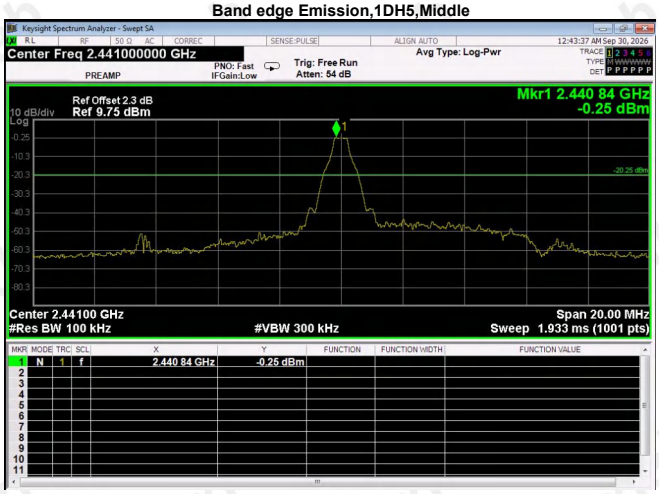


Band_edge_Emission

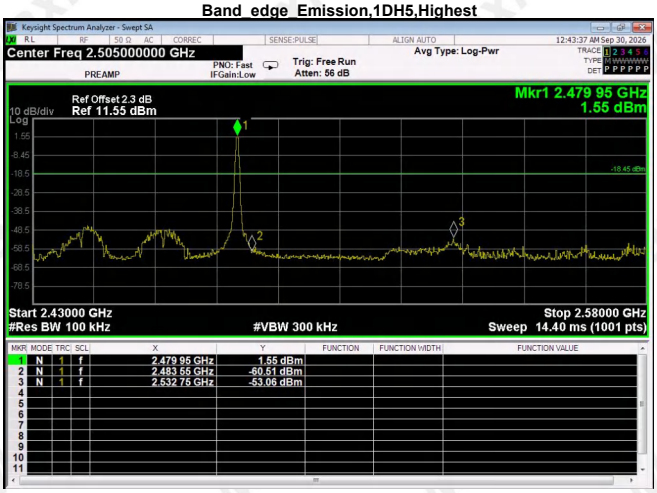
Band_edge_Emission,1DH5,Lowest



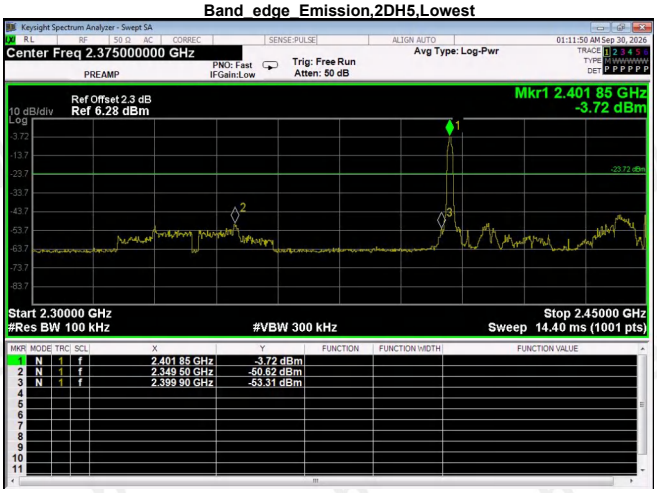
Band edge Emission,1DH5,Middle



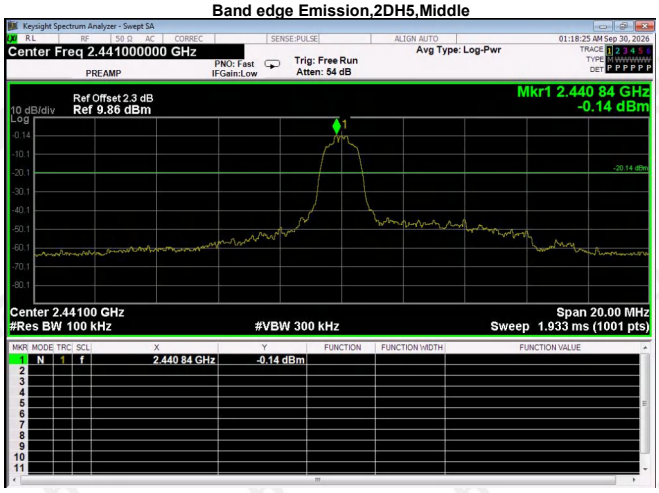
Band_edge_Emission,1DH5,Highest



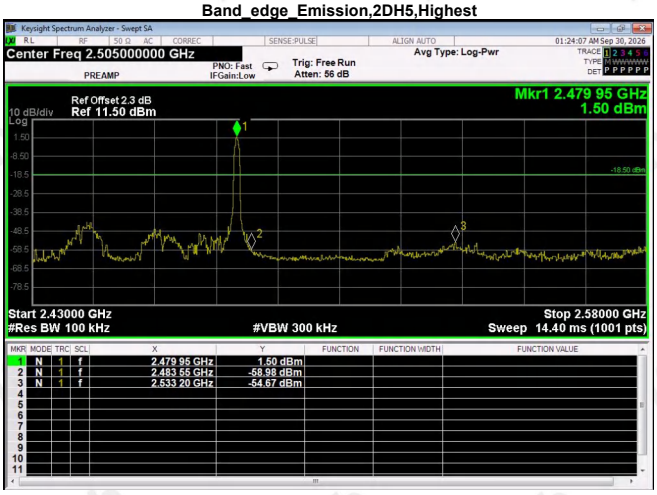
Band_edge_Emission,2DH5,Lowest



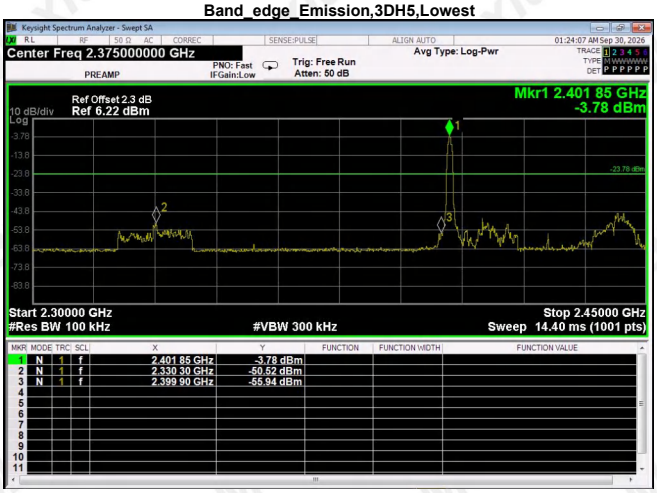
Band edge Emission,2DH5,Middle



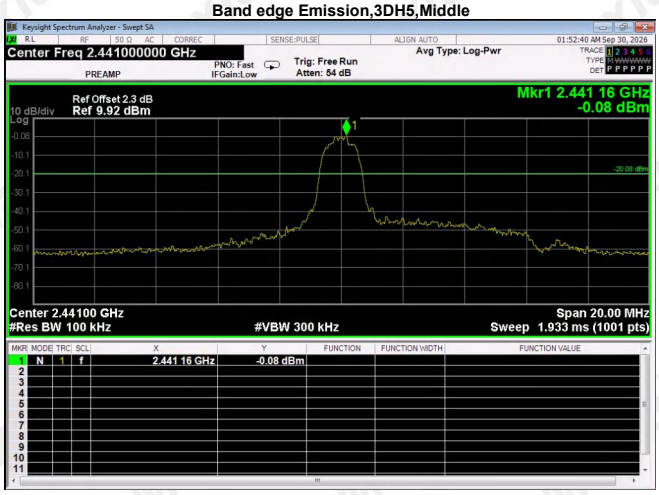
Band_edge_Emission,2DH5,Highest



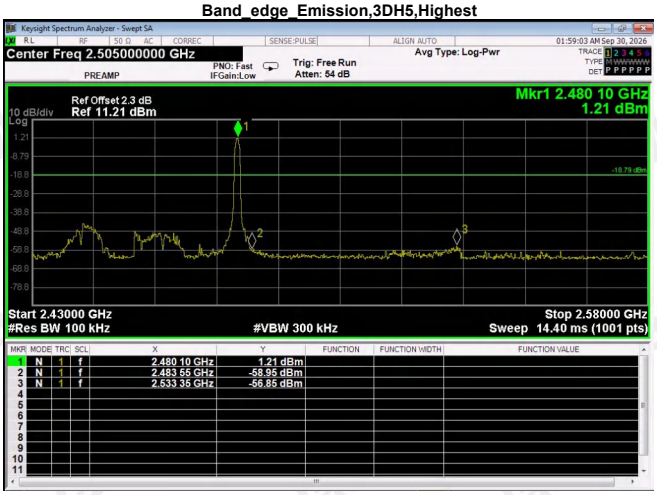
Band_edge_Emission,3DH5,Lowest

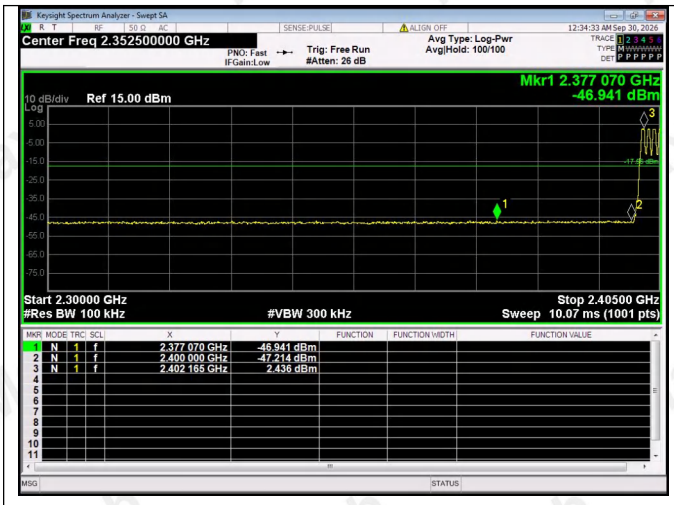


Band edge Emission,3DH5,Middle

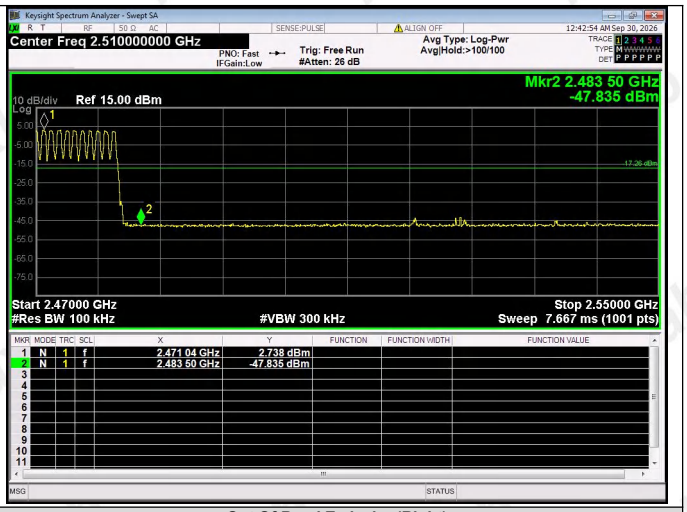


Band_edge_Emission,3DH5,Highest

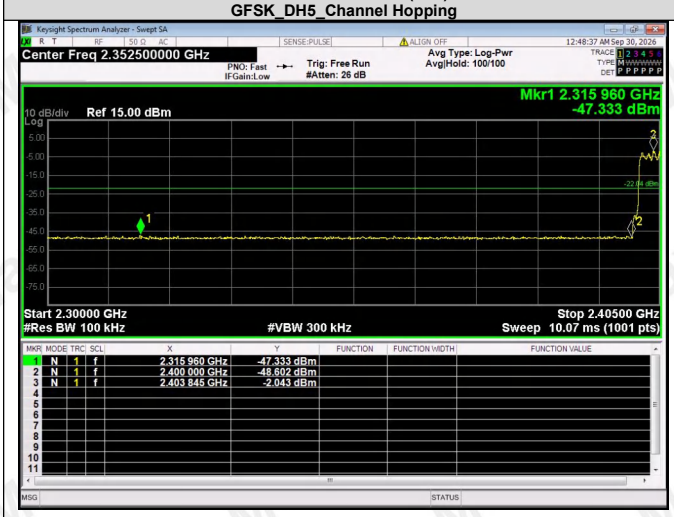




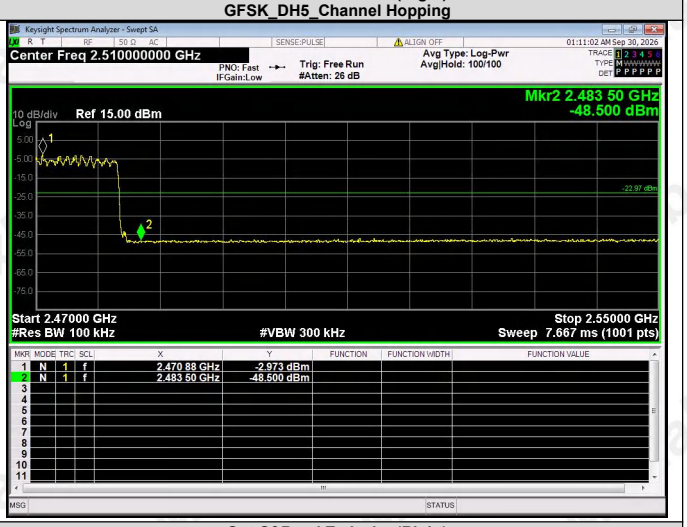
Out Of Band Emission(Left)
GFSK_DH5_Channel Hopping



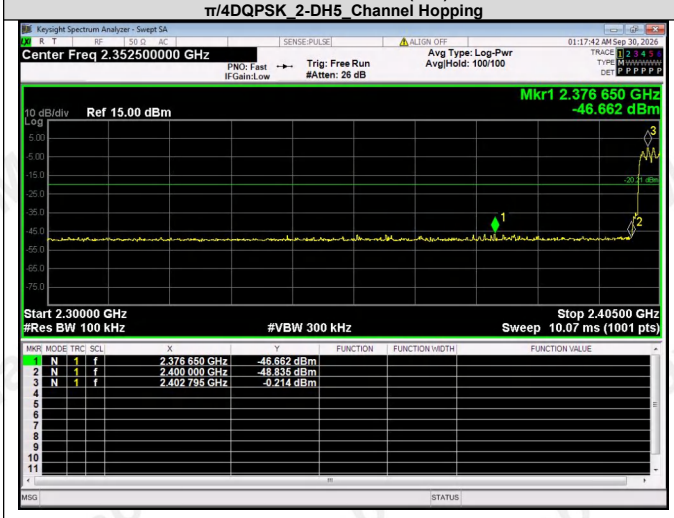
Out Of Band Emission(Right)
GFSK_DH5_Channel Hopping



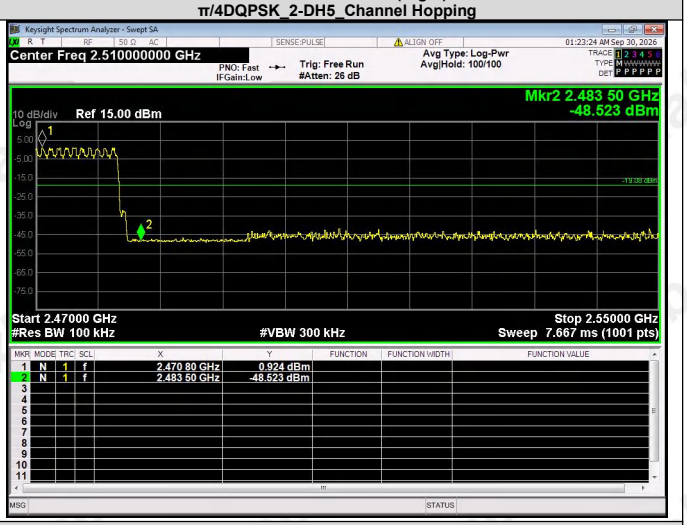
Out Of Band Emission(Left)
π/4DQPSK_2-DH5_Channel Hopping



Out Of Band Emission(Right)
π/4DQPSK_2-DH5_Channel Hopping



Out Of Band Emission(Left)
8DPSK_3-DH5_Channel Hopping



Out Of Band Emission(Right)
8DPSK_3-DH5_Channel Hopping

4.9 Pseudorandom Frequency Hopping Sequence

TEST APPLICABLE

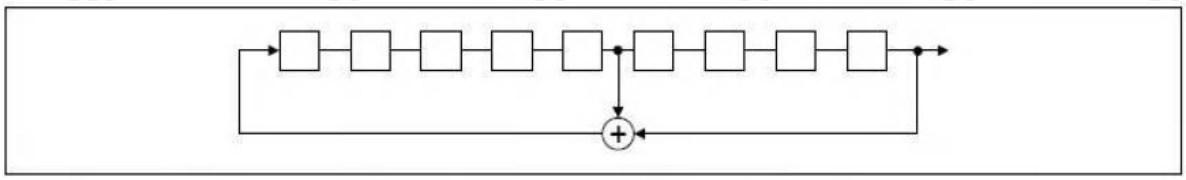
For 47 CFR Part 15C section 15.247 (a) (1) requirement:

Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hop-ping channel, whichever is greater. Alternatively, frequency hopping systems operating in the 2400–2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater, provided the systems operate with an output power no greater than 125 mW. The system shall hop to channel frequencies that are selected at the system hopping rate from a pseudo randomly ordered list of hopping frequencies. Each frequency must be used equally on the average by each transmitter. The system receivers shall have input bandwidths that match the hop-ping channel bandwidths of their corresponding transmitters and shall shift frequencies in synchronization with the transmitted signals.

EUT Pseudorandom Frequency Hopping Sequence Requirement

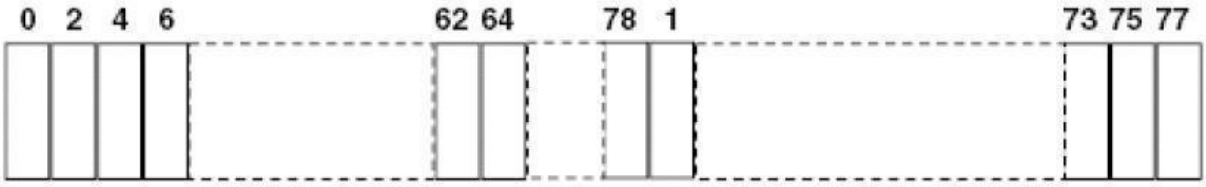
The pseudorandom frequency hopping sequence may be generated in a nice-stage shift register whose 5th and 9th stage outputs are added in a modulo-two addition stage. And the result is fed back to the input of the first stage. The sequence begins with the first one of 9 consecutive ones, for example: the shift register is initialized with nine ones.

- Number of shift register stages:9
- Length of pseudo-random sequence:29-1=511 bits
- Longest sequence of zeros:8(non-inverted signal)



Linear Feedback Shift Register for Generation of the PRBS sequence

An example of pseudorandom frequency hopping sequence as follows:



Each frequency used equally one the average by each transmitter.

The system receiver have input bandwidths that match the hopping channel bandwidths of their corresponding transmitter and shift frequencies in synchronization with the transmitted signals.

4.10 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. And according to FCC 47 CFR Section 15.247 (c), if transmitting antennas of directional gain greater than 6dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi.

Refer to statement below for compliance

The manufacturer may design the unit so that the user can replace a broken antenna, but the use of a standard antenna jack or electrical connector is prohibited. Further, this requirement does not apply to intentional radiators that must be professionally installed.

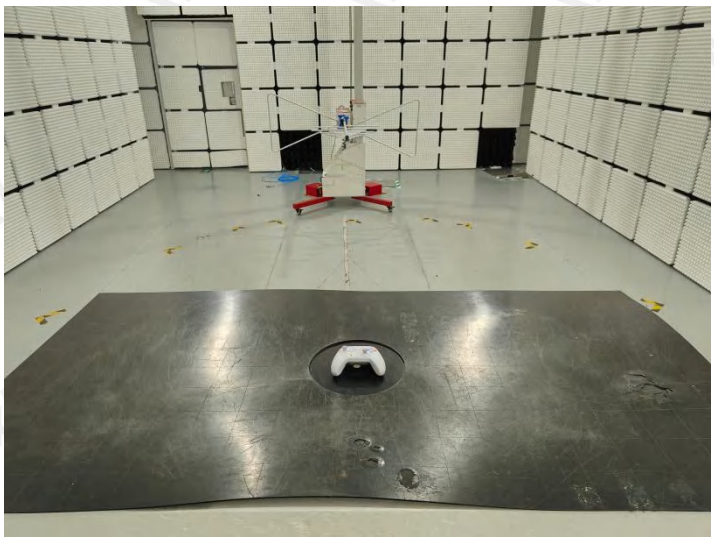
Antenna Connected Construction

The maximum gain of antenna was -2.30dBi.

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

5 Test Setup Photos of the EUT

Right wireless gaming controllers



Photos of the EUT

Reference to the report ANNEX A of external photos and ANNEX B of internal photos.

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