



FCC Part 15C Test Report

FCC ID: 2A6FX-PT888BTWM

Applicant: Sound Around INC.

Address: 1600, 63rd Street, 1st Floor, Brooklyn, NY, New York, 11219, United States

Manufacturer: Guangzhou Huaqi Electronics Co., Ltd

Address: 101, No. 1, wenshengzhuang Xindong Road, Dongping village, Yongping street, Baiyun District, Guangzhou, Guangdong, China

Product Name: Amplifier

Trade Mark: PYLE

Model Number: PT888BTWM, PT888BTWM.5, PT696BT, PT696BT.5, PT696BT.7, PT796BT, PT796BT.5, PT796BT.7

Date of Receipt: Feb. 02, 2025

Test Date: Feb. 02, 2025 ~ Mar. 13, 2026

Date of Report: Mar. 13, 2026

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

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

Applicable Standards: 47 CFR FCC Part 15 Subpart C 15.247

Test Result: Pass

Report Number: DLE-260313032R

Prepared by(Engineer): Ken Tan

Reviewer(Supervisor): Jack Bu

Approved(Manager): Jade Yang



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



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**** Issued History ****

Revision	Description	Issued Date	Remark
Revision 1.0	Initial Test Report Release	Mar. 13, 2026	



1. Summary

1.1 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: American National Standard for Testing Unlicensed Wireless Devices

1.2 Test Description

FCC PART 15.247		
FCC Part 15.207	AC Power Conducted Emission	PASS
FCC Part 15.215	20dB Bandwidth& 99% Bandwidth	PASS
FCC Part 15.247(d)	Spurious RF Conducted Emission	PASS
FCC Part 15.247(b)	Maximum Peak Output Power	PASS
FCC Part 15.247 (a) (1)	Pseudorandom Frequency Hopping Sequence	PASS
FCC Part 15.247(a)(1)(iii)	Number of Hopping Frequency& Time of Occupancy	PASS
FCC Part 15.247(a)(1)	Frequency Separation	PASS
FCC Part 15.205/15.209	Radiated Emissions	PASS
FCC Part 15.247(d)	Band Edge Compliance of RF Emission	PASS

Note:

1. PASS: Test item meets the requirement.
2. Fail: Test item does not meet the requirement.
3. N/A: Test case does not apply to the test object.
4. The test result judgment is decided by the limit of test standard.



1.3 Information of the Test Laboratory

Shenzhen DL Testing Technology Co., Ltd.

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

1.4 Statement of the Measurement Uncertainty

The reported uncertainty of measurement $y \pm U$, where expanded uncertainty U is based on a standard uncertainty multiplied by a coverage factor of $k=2$, providing a level of confidence of approximately **95 %**.

No.	Item	Uncertainty
1	Conducted Emission Test	$\pm 2.56\text{dB}$
2	RF power, conducted	$\pm 0.42\text{dB}$
3	Spurious emissions, conducted	$\pm 2.76\text{dB}$
4	All emissions, radiated(<1G)	$\pm 3.65\text{dB}$
5	All emissions, radiated(>1G)	$\pm 4.89\text{dB}$
6	Temperature	$\pm 0.5^\circ\text{C}$
7	Humidity	$\pm 2\%$
8	6dB Bandwidth	$\pm 0.2\text{MHz}$
9	Power Spectral Density	$\pm 0.3\text{dBm}$



2. General Information

2.1 Environmental Conditions

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

Normal Temperature:	25°C
Relative Humidity:	55 %
Air Pressure:	101 kPa

2.2 General Description of EUT

Product Name:	Amplifier
Mode No.	PT888BTWM
Series Model(s):	PT888BTWM.5, PT696BT, PT696BT.5, PT696BT.7, PT796BT, PT796BT.5, PT796BT.7
Model Difference:	All model's the function, software and electric circuit are the same, only with product model named different. Test sample model: PT888BTWM.
Power Supply:	AC115V-230V, 50/60Hz
Version:	Supported EDR
Modulation:	GFSK, $\pi/4$ DQPSK, 8DPSK
Operation Frequency:	2402MHz~2480MHz
Channel Number:	79
Channel Separation:	1MHz
Antenna Type:	External Antenna
Antenna Gain:	2dBi
Hardware Version:	V1.0
Software Version:	V1.0

Note:

1. For a more detailed features description, please refer to the manufacturer's specifications or the User's Manual.
2. Antenna gain Refer to the antenna specifications.
3. The cable loss data is obtained from the supplier.
4. The test results in the report only apply to the tested sample.



2.3 Description of Test Modes and Test Frequency

The Applicant provides communication tools software to control the EUT for staying in continuous transmitting and receiving mode for testing.

There are 79 channels provided to the EUT and Channel 00/39/78 was selected for testing.

Operation Frequency:

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

Note: The line display in grey were the channel selected for testing

Preliminary tests were performed in each mode and packet length of BT, and found worst case as below, finally test were conducted at those mode and recorded in this report.

Test Items	Worst case
Conducted Emissions	Charging mode
Radiated Emissions and Band Edge	DH5 Low channel
Maximum Conducted Output Power	DH5/2DH5/3DH5
20dB Bandwidth&99% Bandwidth	DH5/2DH5/3DH5
Frequency Separation	DH5/2DH5/3DH5 Middle channel
Number of hopping frequency	DH5/2DH5/3DH5
Time of Occupancy (Dwell Time)	DH1/DH3/DH5 Middle channel 2DH1/2DH3/2DH5 Middle channel 3DH1/3DH3/3DH5 Middle channel
Out-of-band Emissions	DH5/2DH5/3DH5



2.4 Equipments Used during the Test

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

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

Conduction Test equipment

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

Other

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



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

Item	Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until
1	Spectrum Analyzer (9kHz-26.5GHz)	Agilent	E4408B	MY50140780	Oct. 25, 2025	Oct. 24, 2026
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15	Test Receiver 20kHz-40GHz	R&S	ESU 40	100376	Oct. 25, 2025	Oct. 24, 2026
16	D.C. Power Supply	LongWei	PS-305D	010964729	Oct. 25, 2025	Oct. 24, 2026

Conduction Test equipment

Item	Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until
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2	EMI Receiver	R&S	ESR	101421	Oct. 25, 2025	Oct. 24, 2026
3	LISN	R&S	ENV216	102417	Oct. 25, 2025	Oct. 24, 2026
4	843 Cable 1#	ChengYu	CE Cable	001	Oct. 25, 2025	Oct. 24, 2026

Other

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



2.5 Related Submittal(s) / Grant (s)

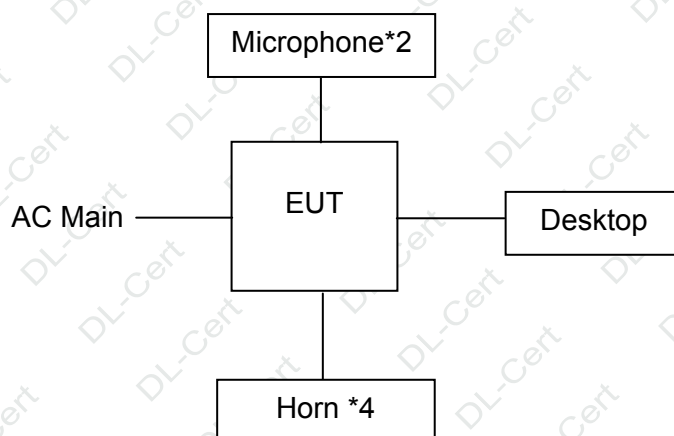
This submittal(s) (test report) is intended to comply with Section 15.247 of the FCC Part 15, Subpart C Rules.

2.6 Modifications

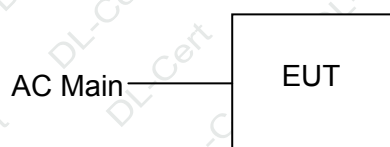
No modifications were implemented to meet testing criteria.

2.7 Description of Test Setup

Operation of EUT during AC Conducted and Radiation below 1GHz testing:



Operation of EUT during Radiation Above 1GHz testing:



Operation of EUT during RF Conducted testing:



The sample was placed (0.8m below 1GHz, 1.5m above 1GHz) above the ground plane of 3m chamber. Measurements in both horizontal and vertical polarities were performed. During the test, each emission was maximized by: having the EUT continuously working, investigated all operating modes, rotated about all 3 axis (X, Y & Z) and considered typical configuration to obtain worst position, manipulating interconnecting cables, rotating the turntable, varying antenna height from 1m to 4m in both horizontal and vertical polarizations. The report only reflects the worst emission test results. The worst case is X position.



2.8 Description of Support Units

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

Item	Equipment	Trade Mark	Model/Type No.	Specification	Note
1	Amplifier	PYLE	PT888BTWM	N/A	EUT
2	AC Cable	N/A	N/A	Length: 1.5m	
3	Desktop	Lenovo	ThinkPad E14 Gen 5	DC20V, 3.25A	
4	Microphone	N/A	N/A	N/A	
5	Horn	N/A	N/A	N/A	

Note:

1. All the equipment/cables were placed in the worst-case configuration to maximize the emission during the test.
2. Grounding was established in accordance with the manufacturer's requirements and conditions for the intended use.
3. For conducted measurements (Output Power, 6dB Emission Bandwidth, Power Spectral Density, Spurious Emissions), the antenna of EUT is connected to the test equipment via temporary antenna connector, the antenna connector is soldered on the antenna port of EUT, and the temporary antenna connector is listed in the Test Instruments.



3. Test Conditions and Results

3.1 AC Conducted Emissions Test

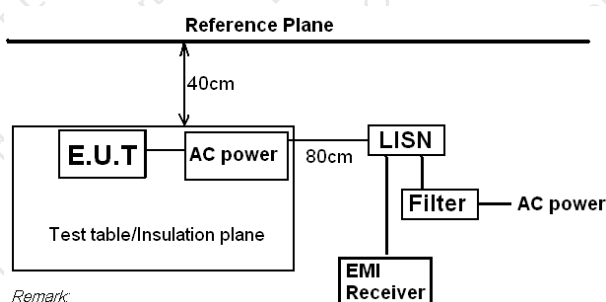
Limit

According to FCC CFR Title 47 Part 15 Subpart C Section 15.207 and RSS Gen 8.8, AC Power Line Conducted Emissions Limits for License-Exempt Radio Apparatus as below:

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 Configuration



Remark

E.U.T: Equipment Under Test

LISN: Line Impedance Stabilization Network

Test table height=0.8m

Test Procedure

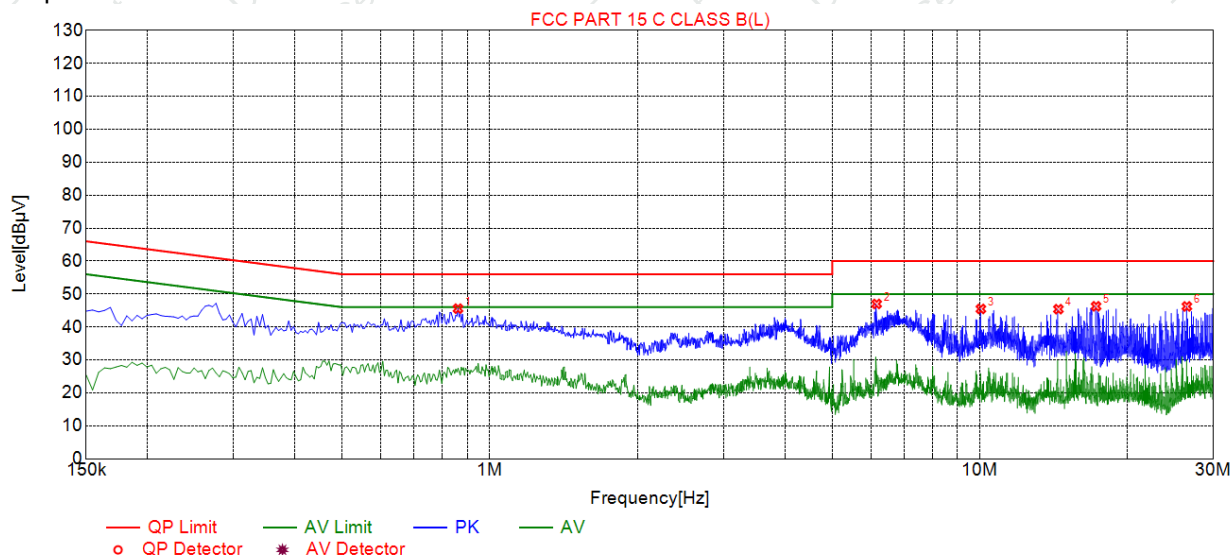
1. The equipment was set up as per the test configuration to simulate typical actual usage per the user's manual. The EUT is a tabletop system; a wooden table with a height of 0.8 meters is used and is placed on the ground plane as per ANSI C63.10.
2. Support equipment, if needed, was placed as per ANSI C63.10.
3. All I/O cables were positioned to simulate typical actual usage as per ANSI C63.10.
4. The adapter received AC120V/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.



Test Results

All the test modes completed for test. Only the worst result was reported as below:

Test Specification: Line



Suspected List

NO.	Freq. [MHz]	Level [dBμV]	Factor [dB]	Limit [dBμV]	Margin [dB]	Reading [dBμV]	Detector	Type
1	0.8610	45.56	19.71	56.00	10.44	27.85	PK	L
2	6.1620	47.00	20.40	60.00	13.00	28.60	PK	L
3	10.0590	45.48	21.17	60.00	14.52	26.31	PK	L
4	14.4780	45.41	21.77	60.00	14.59	25.64	PK	L
5	17.2815	46.28	22.36	60.00	13.72	25.92	PK	L
6	26.4840	46.24	24.72	60.00	13.76	23.52	PK	L

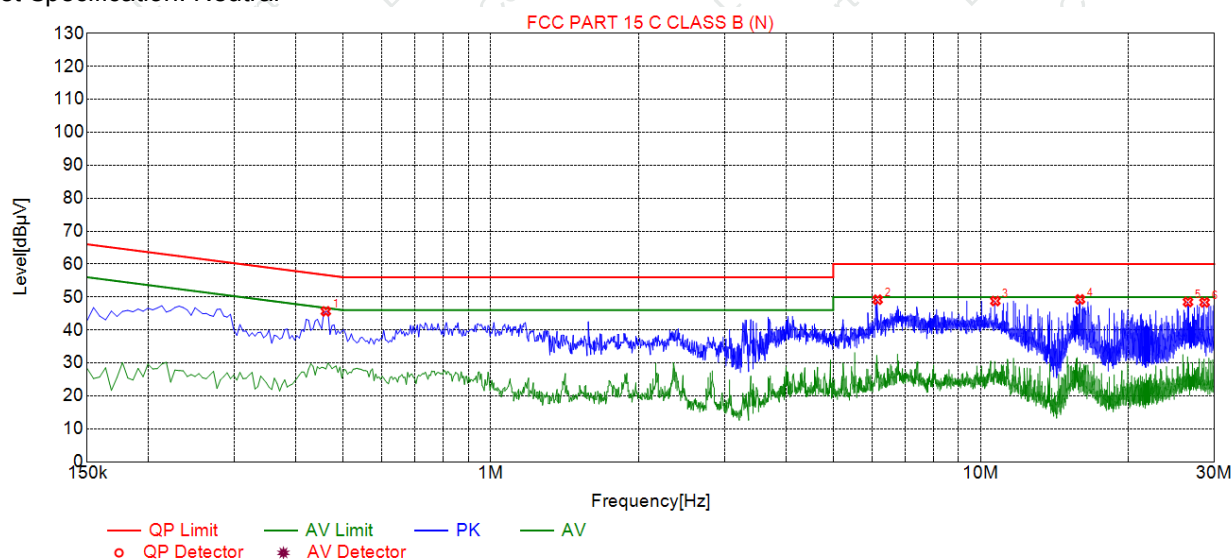
Remark: Margin = Limit – Level

Correction factor = Cable lose + LISN insertion loss

Level=Test receiver reading + correction factor



Test Specification: Neutral



Suspected List

NO.	Freq. [MHz]	Level [dBμV]	Factor [dB]	Limit [dBμV]	Margin [dB]	Reading [dBμV]	Detector	Type
1	0.4605	45.65	19.73	56.68	11.03	25.92	PK	N
2	6.1620	49.18	20.41	60.00	10.82	28.77	PK	N
3	10.7160	48.78	21.05	60.00	11.22	27.73	PK	N
4	15.9495	49.27	22.01	60.00	10.73	27.26	PK	N
5	26.4975	48.49	24.69	60.00	11.51	23.80	PK	N
6	28.6440	48.37	25.16	60.00	11.63	23.21	PK	N

Remark: Margin = Limit – Level

Correction factor = Cable lose + LISN insertion loss

Level=Test receiver reading + correction factor



3.2 Radiated Emissions

Limit

For intentional device, according to § 15.209(a), the general requirement of field strength of radiated emission out of authorized band shall not exceed the following table at a 3 meters measurement distance.

In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a)

Except when the requirements applicable to a given device state otherwise, emissions from licence-exempt transmitters shall comply with the field strength limits shown in table below.

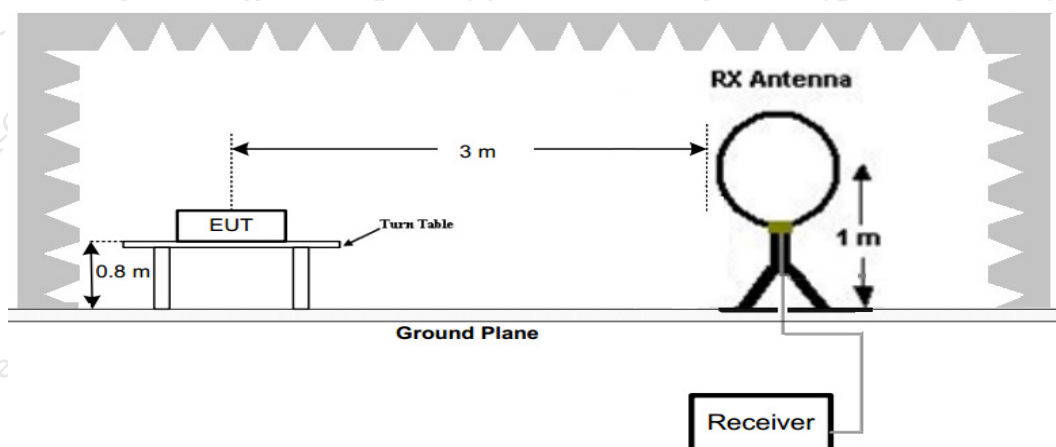
Additionally, the level of any transmitter emission shall not exceed the level of the transmitter's fundamental emission

Radiated Emission Limits

Frequency (MHz)	Distance (Meters)	Radiated (dBμV/m)	Radiated (μV/m)
0.009-0.49	3	$20\log(2400/F(\text{KHz}))+40\log(300/3)$	$2400/F(\text{KHz})$
0.49-1.705	3	$20\log(24000/F(\text{KHz}))+40\log(30/3)$	$24000/F(\text{KHz})$
1.705-30	3	$20\log(30)+40\log(30/3)$	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

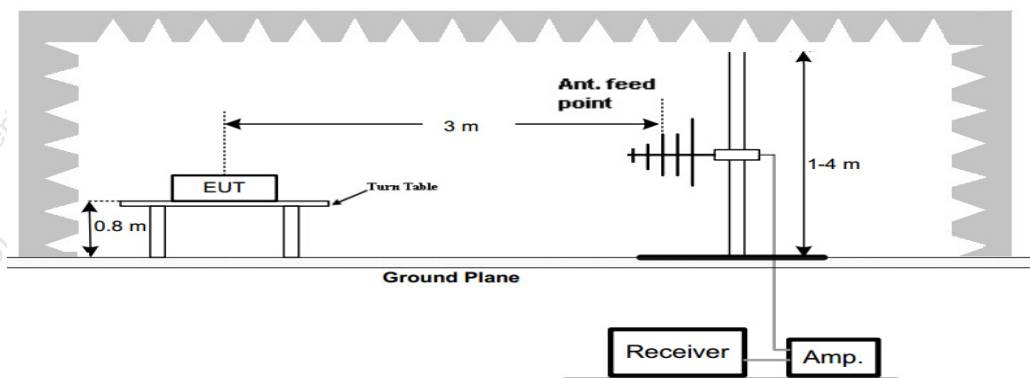
Test Configuration

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

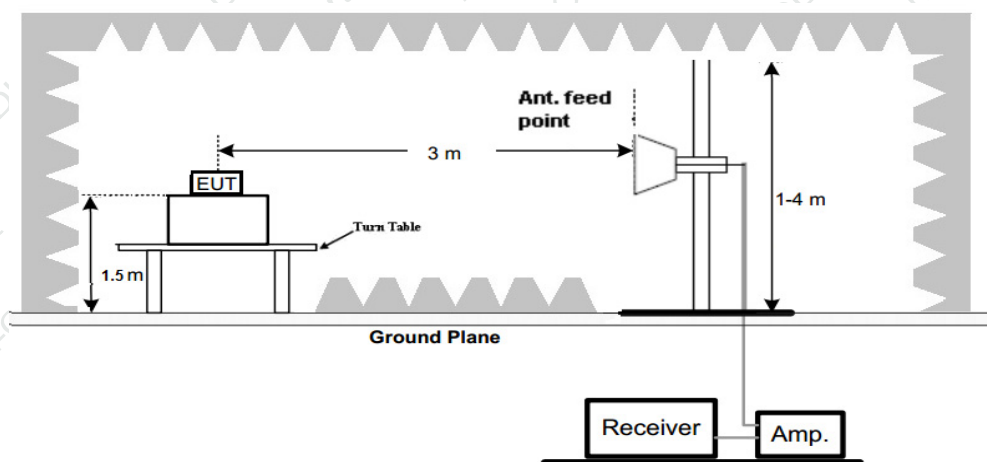




(B) Radiated Emission Test Set-Up, Frequency below 1000MHz



(C) Radiated Emission Test Set-Up, Frequency above 1000MHz

**Test Procedure**

1. The EUT was placed on turn table which is 0.8m above ground plane for below 1GHz test, and on a low permittivity and low loss tangent turn table which is 1.5m above ground plane for above 1GHz test.
2. Maximum procedure was performed by raising the receiving antenna from 1m to 4m and rotating the turn table from 0 degrees to 360 degrees 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.



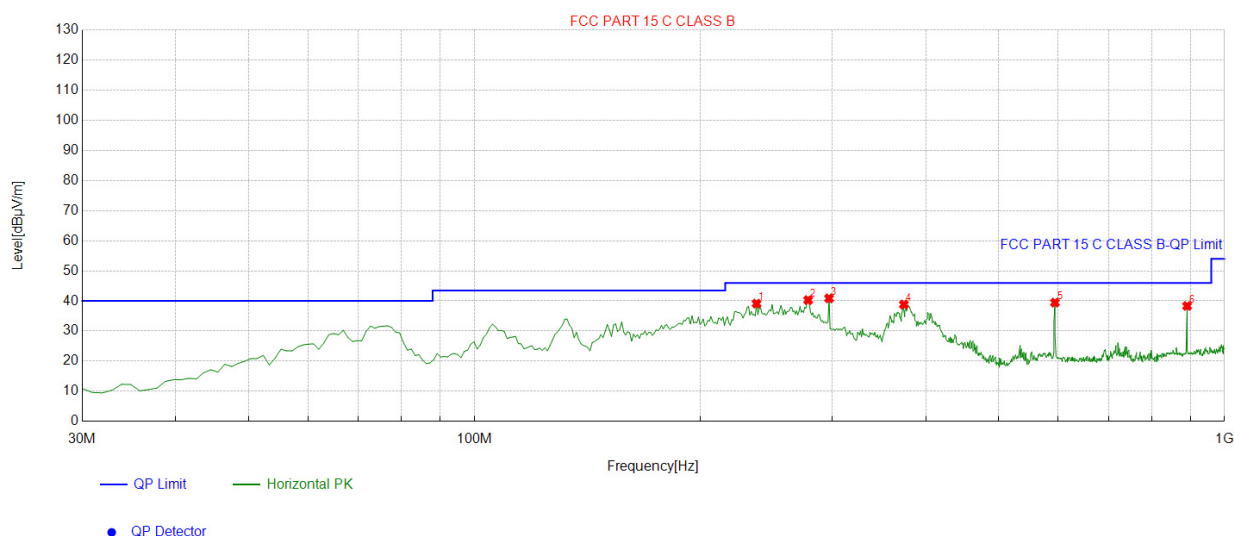
Test Results

Remark:

1. Radiated Emission measured at GFSK, $\pi/4$ DQPSK and 8DPSK mode from 9 KHz to 10th harmonic of fundamental and recorded worst case at GFSK DH5 mode.
2. There is no emission found except system noise floor in 9 KHz to 30MHz and not recorded in this report.
3. For below 1GHz testing recorded worst at GFSK DH5 low channel.

Below 1GHz Test Results

Antenna polarity: Horizontal

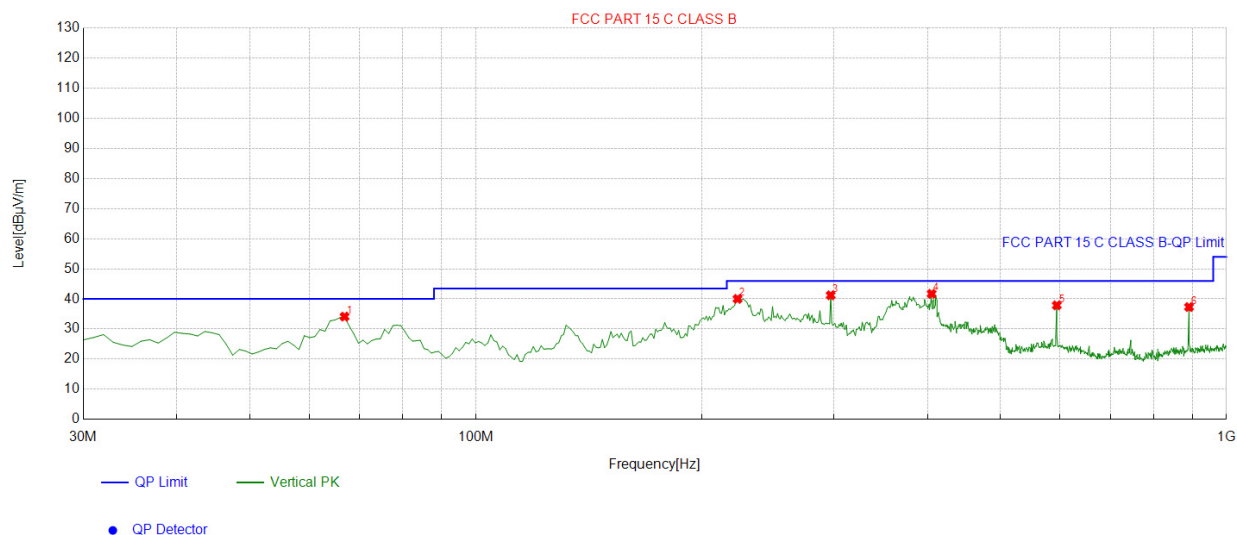


Suspected List									
NO.	Freq. [MHz]	Factor [dB]	Reading [dBμV/m]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	237.7878	-13.77	52.89	39.12	46.00	6.88	100	331	Horizontal
2	278.5686	-12.65	52.93	40.28	46.00	5.72	100	130	Horizontal
3	297.0170	-11.84	52.70	40.86	46.00	5.14	100	121	Horizontal
4	373.7237	-9.89	48.71	38.82	46.00	7.18	100	124	Horizontal
5	594.1341	-5.06	44.51	39.45	46.00	6.55	100	222	Horizontal
6	891.2513	-1.49	39.83	38.34	46.00	7.66	100	326	Horizontal

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



Antenna polarity: Vertical



Suspected List

NO.	Freq. [MHz]	Factor [dB]	Reading [dBμV/m]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	66.8969	-16.17	50.31	34.14	40.00	5.86	100	99	Vertical
2	223.2232	-14.15	54.18	40.03	46.00	5.97	100	131	Vertical
3	297.0170	-11.84	53.06	41.22	46.00	4.78	100	96	Vertical
4	404.7948	-9.83	51.54	41.71	46.00	4.29	100	322	Vertical
5	594.1341	-5.06	42.95	37.89	46.00	8.11	100	25	Vertical
6	891.2513	-1.49	38.81	37.32	46.00	8.68	100	193	Vertical

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

Harmonics and Spurious Emissions

Frequency Range (9kHz-30MHz)

Frequency (MHz)	Level@3m (dBμV/m)	Limit@3m (dBμV/m)
--	--	--
--	--	--
--	--	--
--	--	--

Note: 1. Emission Level=Reading+ Cable loss+ Antenna factor-Amp factor.

2. The emission levels are 20 dB below the limit value, which are not reported. It is deemed to comply with the requirement.

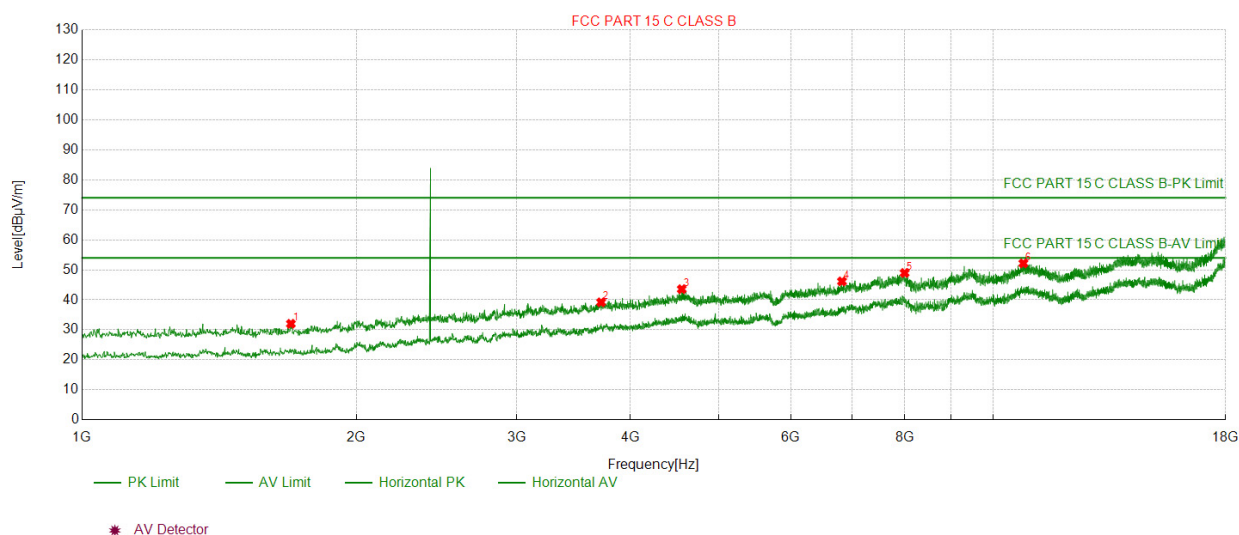


Above 1GHz Test Results

All the test modes completed for test. Only the worst result was reported as below:

For 1GHz to 18GHz

Antenna polarity: Horizontal

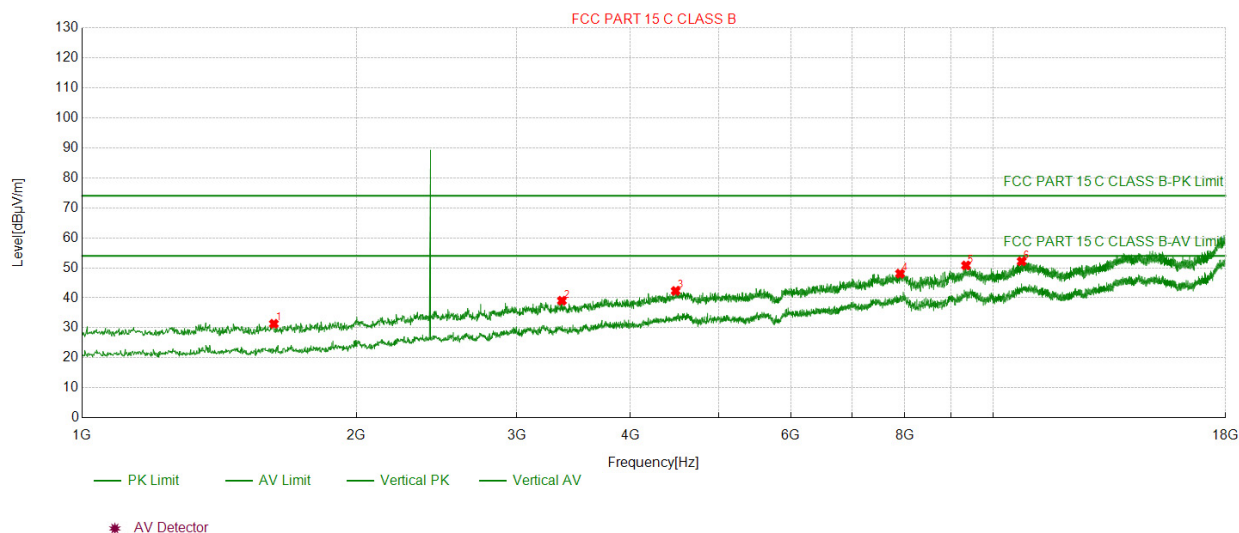


Suspected Data List									
NO.	Freq. [MHz]	Reading [dBμV/m]	PK Level [dBμV/m]	Factor [dB]	PK Limit [dBμV/m]	PK Margin [dB]	Height [cm]	Angle [°]	Polarity
1	1695.369	52.06	32.04	-20.02	74.00	41.96	150	90	Horizontal
2	3713.471	51.64	39.20	-12.44	74.00	34.80	150	300	Horizontal
3	4553.355	53.12	43.57	-9.55	74.00	30.43	150	170	Horizontal
4	6826.482	51.26	46.15	-5.11	74.00	27.85	150	50	Horizontal
5	7997.899	51.06	48.96	-2.10	74.00	25.04	150	210	Horizontal
6	10796.37	51.02	52.16	1.14	74.00	21.84	150	310	Horizontal

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



Antenna polarity: Vertical



Suspected Data List

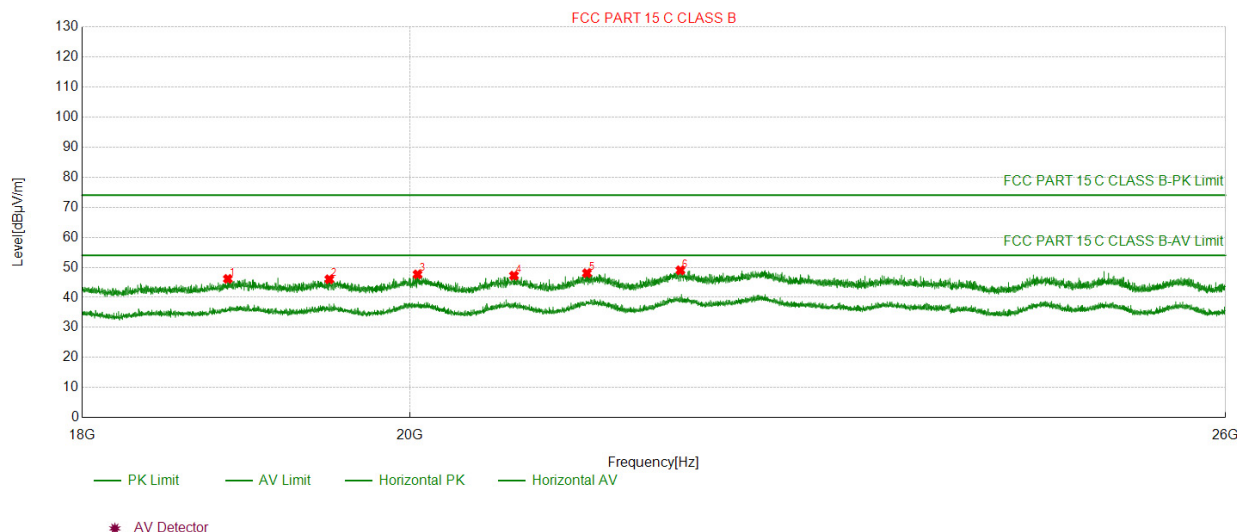
NO.	Freq. [MHz]	Reading [dBμV/m]	PK Level [dBμV/m]	Factor [dB]	PK Limit [dBμV/m]	PK Margin [dB]	Height [cm]	Angle [°]	Polarity
1	1623.962	51.53	31.36	-20.17	74.00	42.64	150	310	Vertical
2	3363.236	53.39	39.05	-14.34	74.00	34.95	150	340	Vertical
3	4483.648	52.30	42.32	-9.98	74.00	31.68	150	120	Vertical
4	7906.090	51.18	48.08	-3.10	74.00	25.92	150	330	Vertical
5	9339.333	52.07	50.79	-1.28	74.00	23.21	150	280	Vertical
6	10750.47	51.18	52.17	0.99	74.00	21.83	150	150	Vertical

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



For 18GHz to 26GHz

Antenna polarity: Horizontal

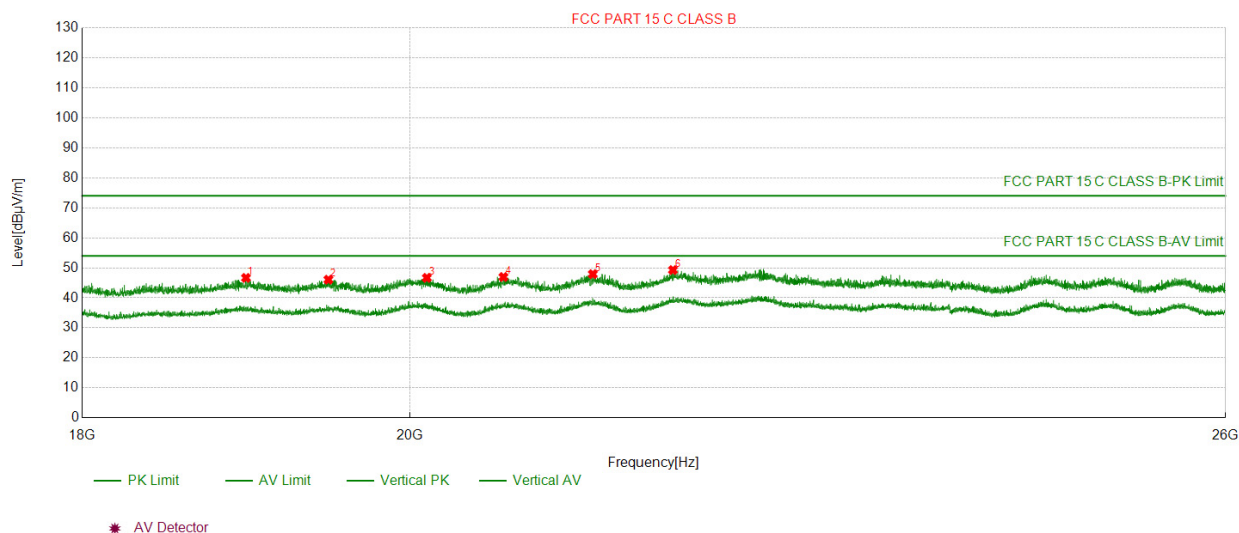


Suspected Data List									
NO.	Freq. [MHz]	Reading [dBμV/m]	PK Level [dBμV/m]	Factor [dB]	PK Limit [dBμV/m]	PK Margin [dB]	Height [cm]	Angle [°]	Polarity
1	18864.08	40.57	46.16	5.59	74.00	27.84	150	250	Horizontal
2	19489.74	39.95	46.04	6.09	74.00	27.96	150	310	Horizontal
3	20050.60	41.48	47.66	6.18	74.00	26.34	150	60	Horizontal
4	20681.86	41.46	47.25	5.79	74.00	26.75	150	330	Horizontal
5	21173.11	42.76	48.06	5.30	74.00	25.94	150	130	Horizontal
6	21818.78	43.43	49.01	5.58	74.00	24.99	150	220	Horizontal

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



Antenna polarity: Vertical



Suspected Data List									
NO.	Freq. [MHz]	Reading [dBμV/m]	PK Level [dBμV/m]	Factor [dB]	PK Limit [dBμV/m]	PK Margin [dB]	Height [cm]	Angle [°]	Polarity
1	18974.49	41.00	46.66	5.66	74.00	27.34	150	10	Vertical
2	19484.14	39.98	46.07	6.09	74.00	27.93	150	120	Vertical
3	20110.61	40.53	46.67	6.14	74.00	27.33	150	260	Vertical
4	20612.26	41.09	46.96	5.87	74.00	27.04	150	40	Vertical
5	21213.12	42.64	47.92	5.28	74.00	26.08	150	300	Vertical
6	21766.77	43.75	49.28	5.53	74.00	24.72	150	110	Vertical

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



3.3 Maximum Peak Conducted Output Power

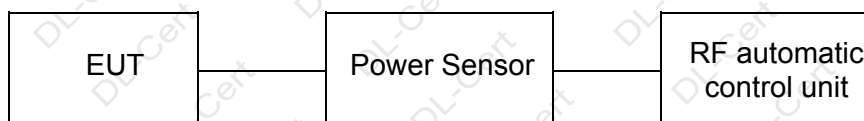
Limit

Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping 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 125mW. 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 hopping channel bandwidths of their corresponding transmitters and shall shift frequencies in synchronization with the transmitted signals.

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	Maximum Peak Conducted Output Power (dBm)	Limit (dBm)	Result
GFSK	00	2.08	21.00	Pass
	39	2.09		
	78	1.48		
$\pi/4$ DQPSK	00	2.52	21.00	Pass
	39	2.45		
	78	1.88		
8DPSK	00	3.10	21.00	Pass
	39	2.95		
	78	2.43		

Note: The test results including the cable loss.



3.4 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 occupied bandwidth is the frequency bandwidth such that, below its lower and above its upper frequency limits, the mean powers are each equal to 0.5% of the total mean power of the given emission. The following procedure shall be used for measuring 99% power bandwidth:

RBW=1% to 5% of the OBW

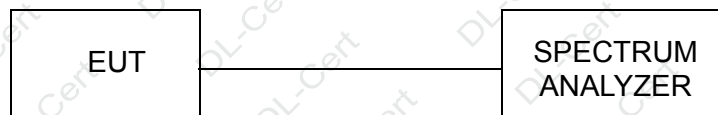
VBW=approximately 3 X RBW

Detector=Peak

Trace Mode: Max Hold

Use the 99% power bandwidth function of the instrument to measure the Occupied Bandwidth and recorded.

Test Configuration



Test Results

Modulation	Channel	20dB bandwidth (MHz)	Result
GFSK	CH00	0.948	Pass
	CH39	0.957	
	CH78	0.948	
π/4DQPSK	CH00	1.335	
	CH39	1.323	
	CH78	1.323	
8DPSK	CH00	1.323	
	CH39	1.332	
	CH78	1.302	

Test plot as follows:



20dB Bandwidth

GFSK Modulation



CH00



CH39



CH78

 $\pi/4$ DQPSK Modulation

CH00



CH39



CH78



8DPSK Modulation



CH00



CH39



CH78



3.5 Frequency Separation

Limit

Frequency hopping systems shall have hopping channel carrier frequencies separated by minimum of 25 KHz or the $2/3 \times 20\text{dB}$ 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 1000 KHz VBW.

Test Configuration



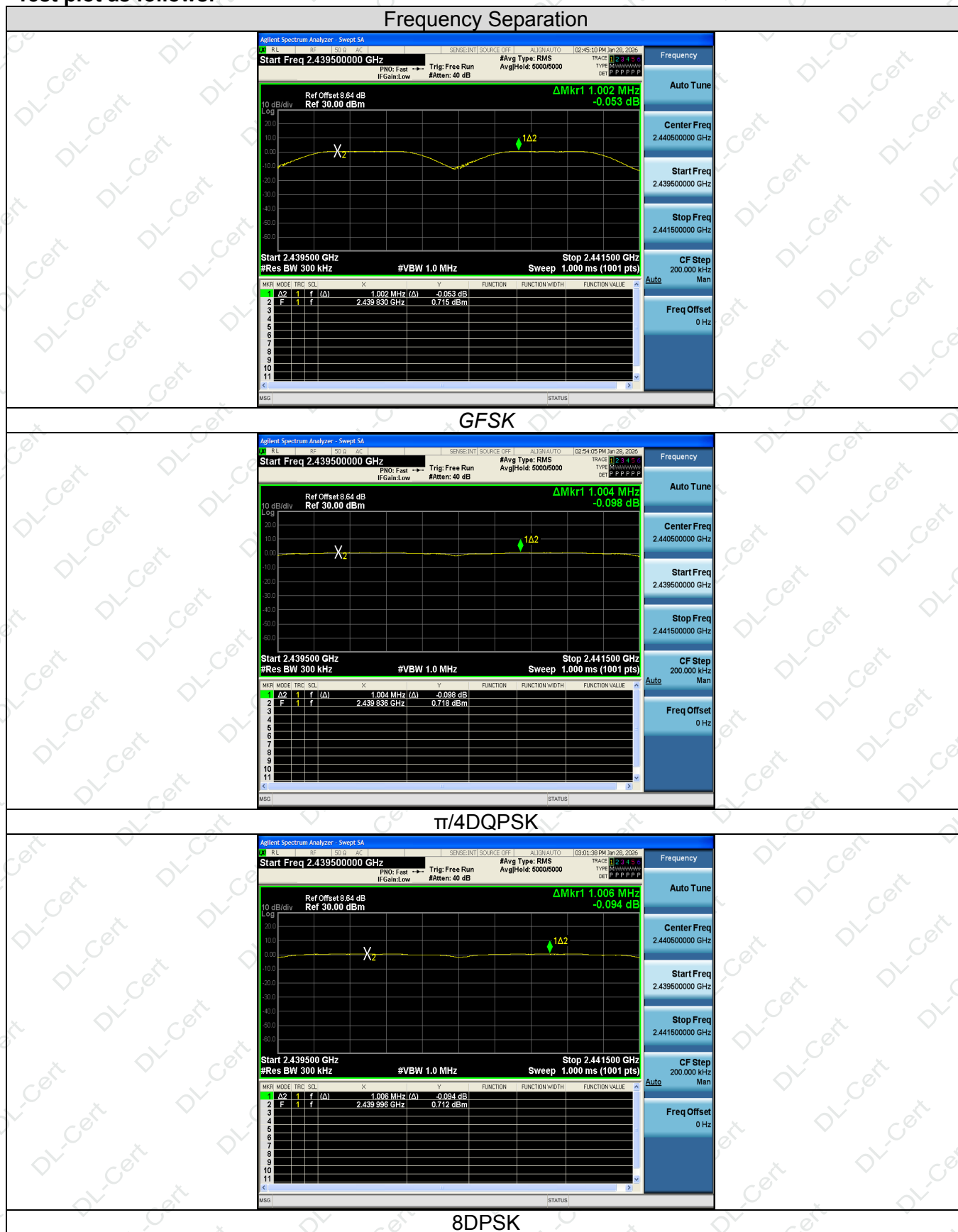
Test Results

Modulation	Channel	Channel Separation (MHz)	Limit(MHz)	Result
GFSK	CH39	1.002	0.638	Pass
	CH40			
$\pi/4$ DQPSK	CH39	1.004	0.890	Pass
	CH40			
8DPSK	CH39	1.006	0.888	Pass
	CH40			

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



Test plot as follows:





3.6 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.

Test Configuration



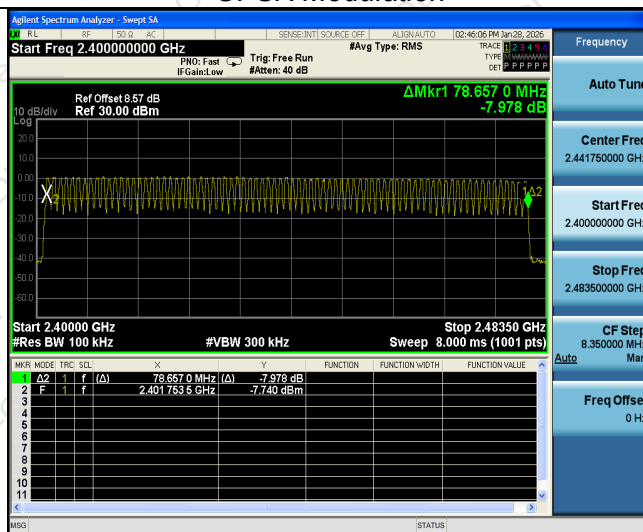
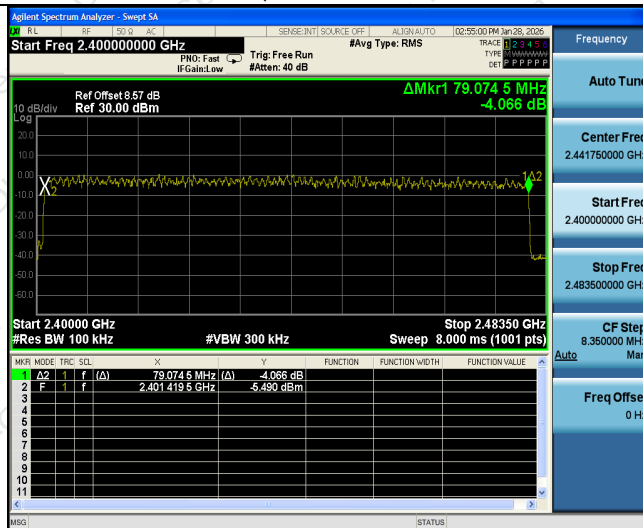
Test Results

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

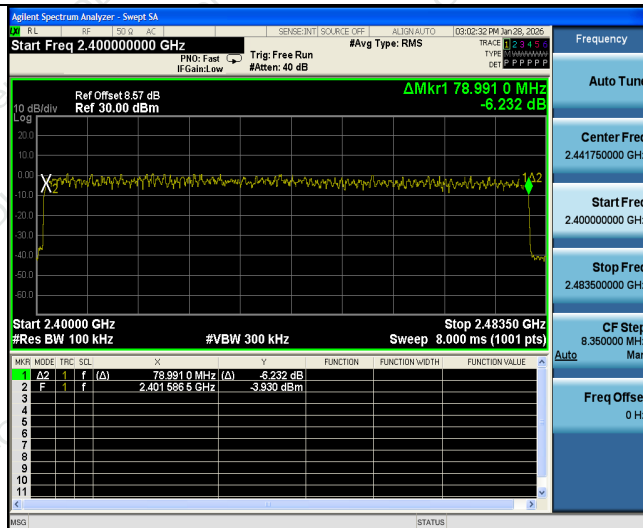
Test plot as follows:



GFSK Modulation

 $\pi/4$ DQPSK Modulation

8DPSK Modulation





3.7 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 3MHz VBW, Span 0Hz.

Test Configuration



Test Results

Modulation	Packet	Pulse time (ms)	Number of transmission in 31.6s (79 Hopping*0.4) = Burst Count	Dwell time (second)	Limit (second)	Result
GFSK	DH1	0.395	31 (pulses) * 10 = 310	0.122	0.40	Pass
	DH3	1.652	16 (pulses) * 10 = 160	0.264		
	DH5	2.899	11 (pulses) * 10 = 110	0.319		
$\pi/4$ DQPSK	2-DH1	0.405	32 (pulses) * 10 = 320	0.130	0.40	Pass
	2-DH3	1.658	16 (pulses) * 10 = 160	0.265		
	2-DH5	2.906	11 (pulses) * 10 = 110	0.320		
8DPSK	3-DH1	0.407	31 (pulses) * 10 = 310	0.126	0.40	Pass
	3-DH3	1.657	17 (pulses) * 10 = 170	0.282		
	3-DH5	2.908	11 (pulses) * 10 = 110	0.320		

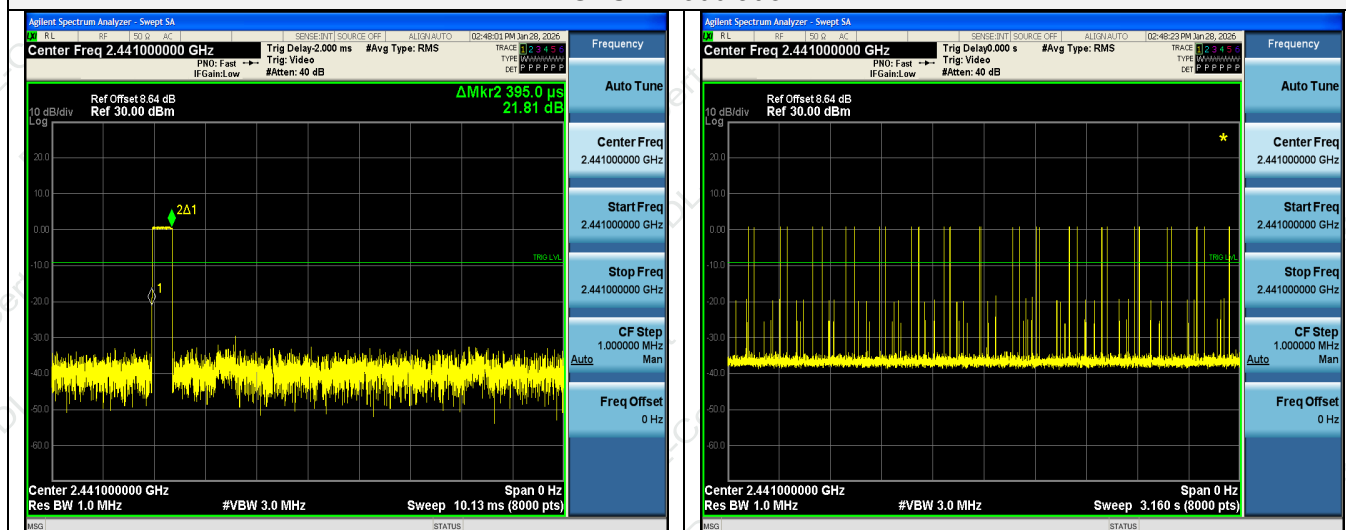
Note:

1. We have tested all mode at high, middle and low channel, and recorded worst case at middle channel.
2. Dwell time = [Pulse time (ms) / 1000] × Burst Count

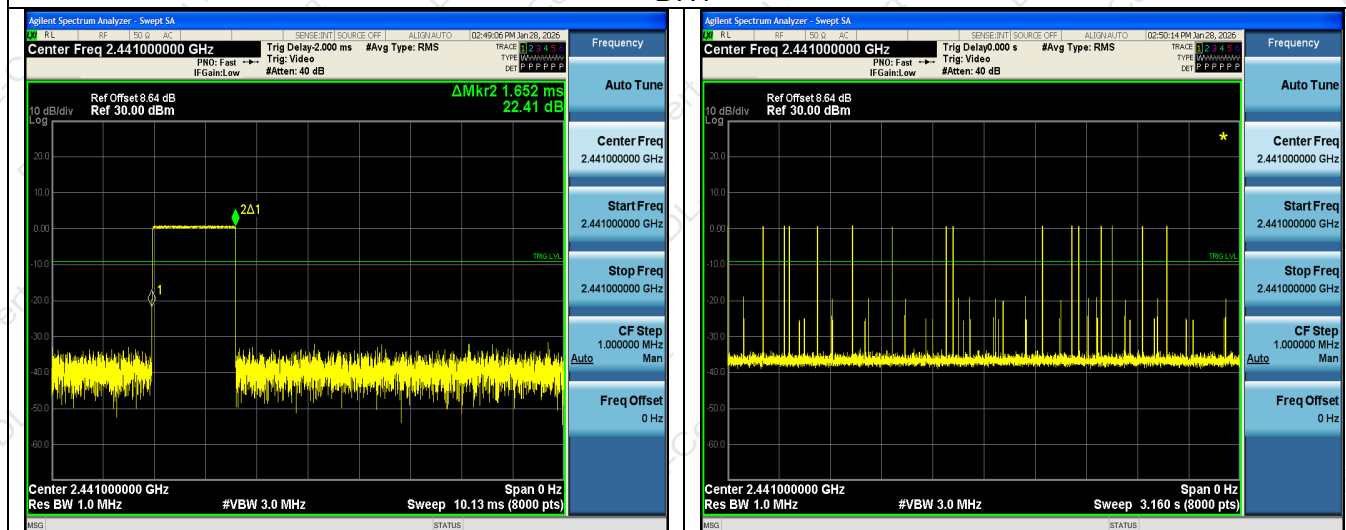
Test plot as follows:



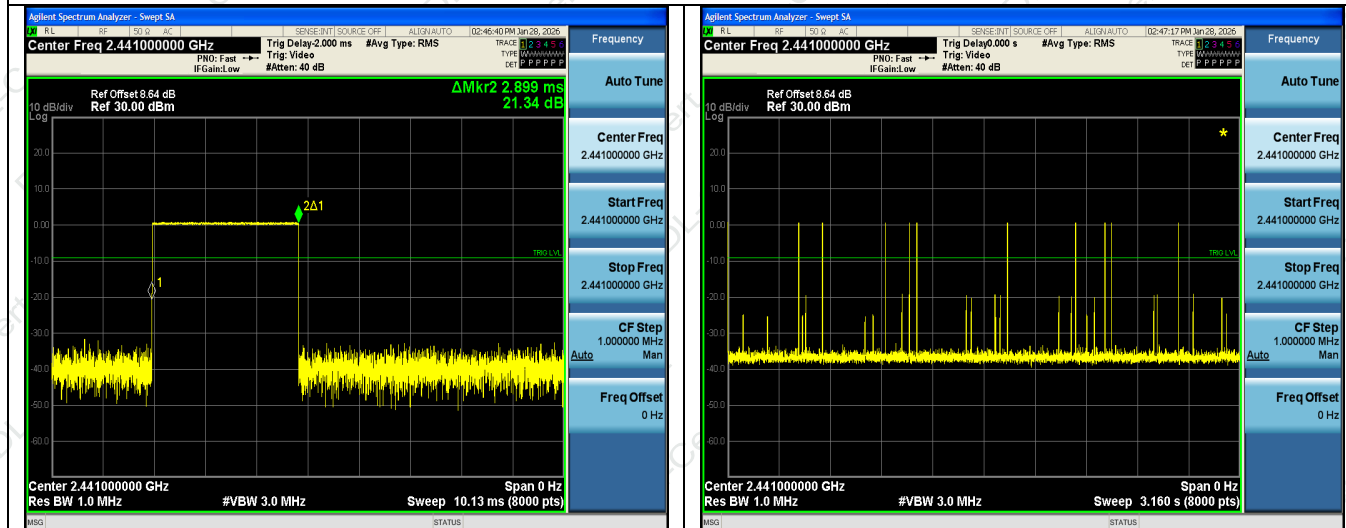
GFSK Modulation



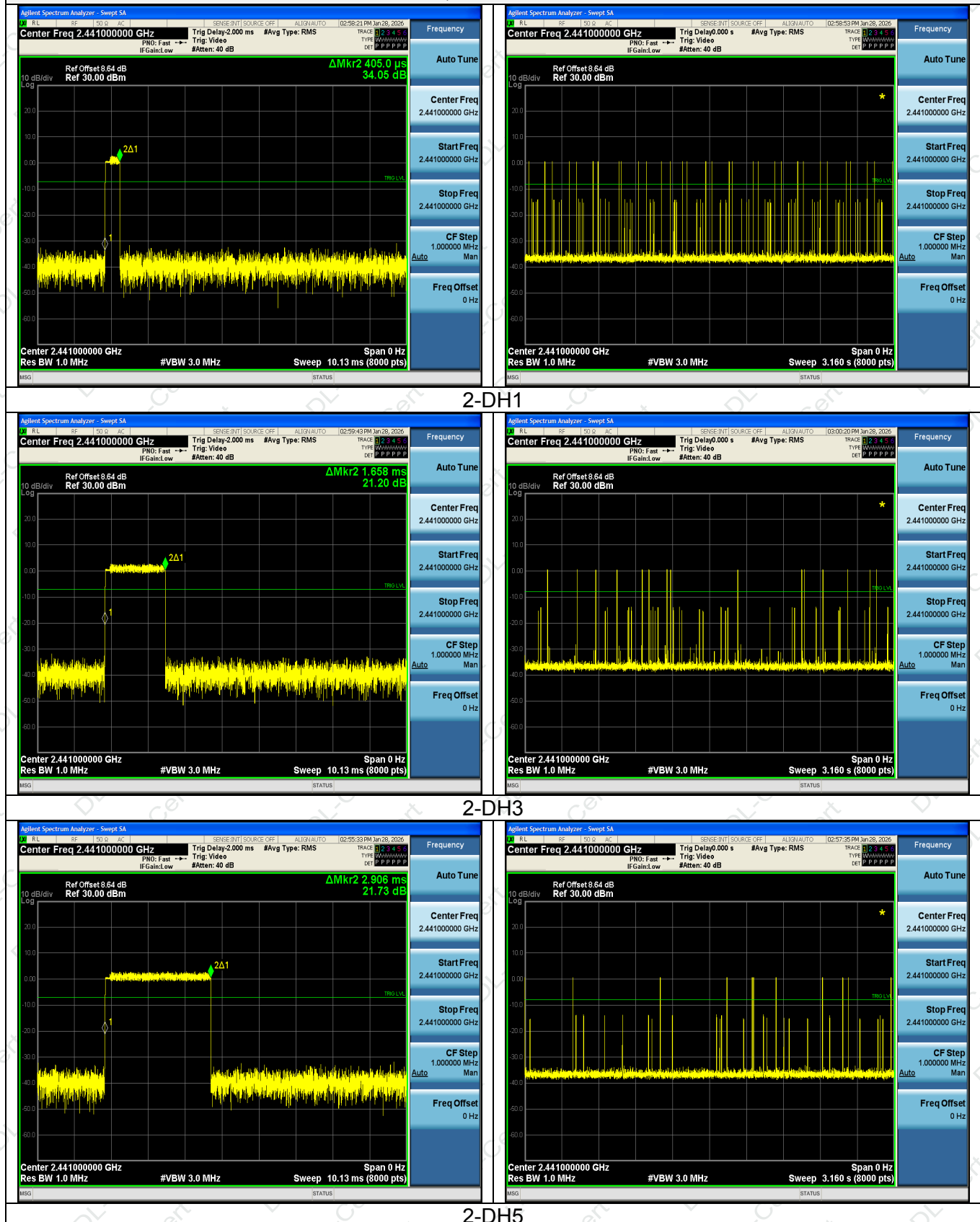
DH1



DH3

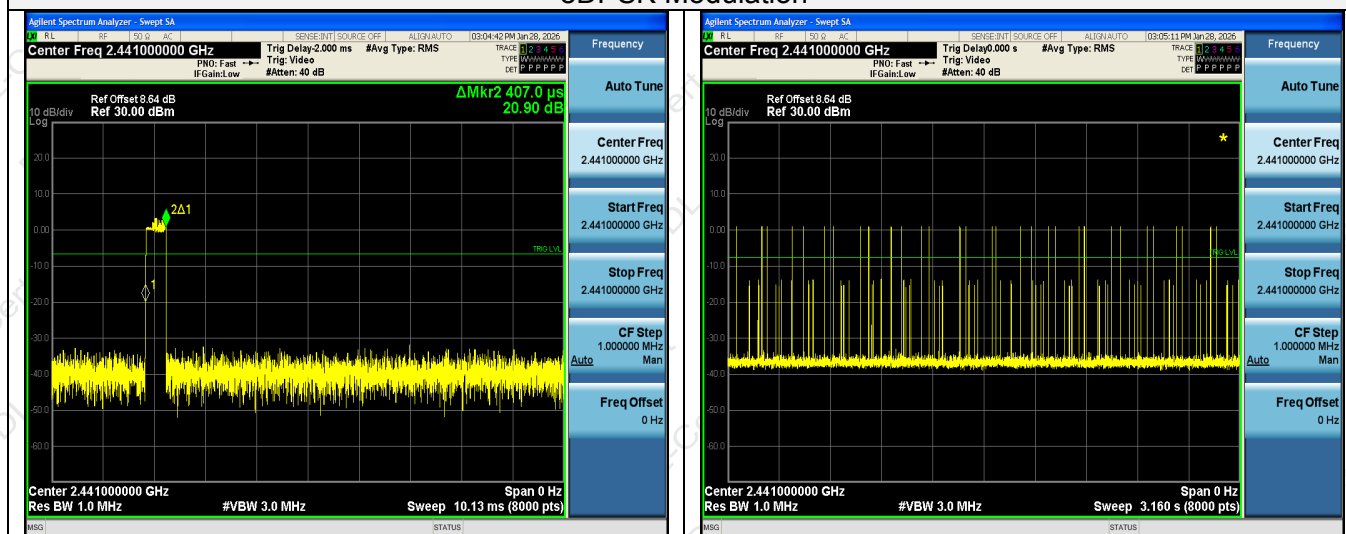


DH5

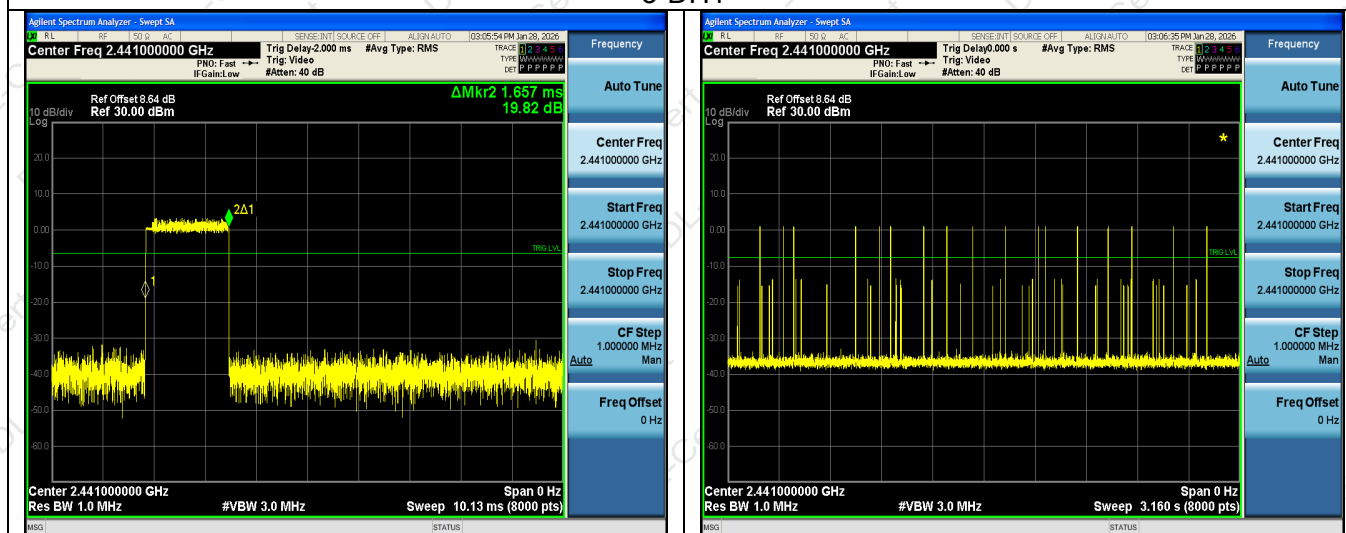
 $\pi/4$ DQPSK Modulation



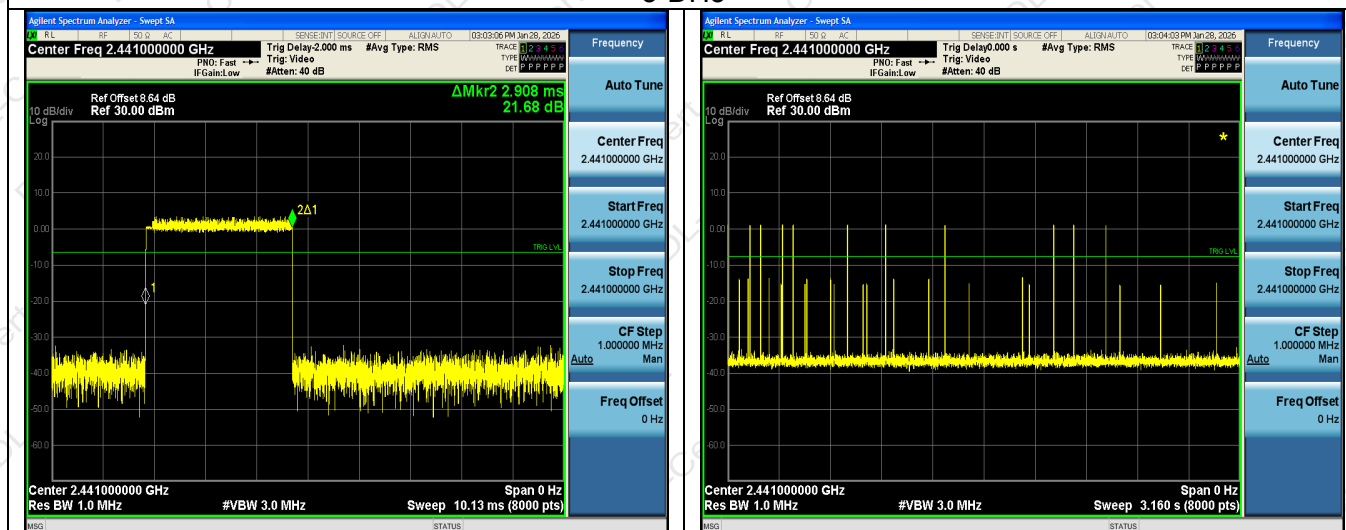
8DPSK Modulation



3-DH1



3-DH3



3-DH5