TEST REPORT

Product Name:	WIFI MODULE
FCC ID:	2BGY7-HZ
Trademark:	N/A
Model Number:	HZ-LY22UV1.0
Prepared For:	Huizhou Huizhi Technology Co., Ltd
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Manufacturer:	Huizhou Huizhi Technology Co., Ltd
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Sample Received Date:	May. 07, 2024
Sample tested Date:	May. 07, 2024 to Jun. 05, 2024
Issue Date:	Jun. 05, 2024
Report No.:	CTB240522006RFX
Test Standards	FCC CFR Title 47 Part 15 Subpart C Section 15.247 ANSI C63.10:2013
Test Results	PASS
Remark:	This is Bluetooth radio test report.

Compiled by:	Reviewed by:	Approved by:
Zhou Kui	Arron Liu	Bin Mei / Director

Note: If there is any objection to the inspection results in this report, please submit a written report to the company within 15 days from the date of receiving the report. The test report is effective only with both signature and specialized stamp. This result(s) shown in this report refer only to the sample(s) tested. Without written approval of Shenzhen CTB Testing Technology Co., Ltd. this report can't be reproduced except in full. The tested sample(s) and the sample information are provided by the client. "*" indicates the testing items were fulfilled by subcontracted lab. "#" indicates the items are not in CNAS accreditation scope.

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(Note: N/A means not applicable)

1. VERSION

Report No.	Issue Date	Description	Approved
CTB240522006RFX	Jun. 05, 2024	Original	Valid

2. TEST SUMMARY

The Product has been tested according to the following specifications:

Test Item	Test Requirement	Test method	Result
AC Power Line Conducted Emission	47 CFR Part 15 Subpart C Section 15.207	ANSI C63.10-2013	PASS
Radiated Spurious emissions	47 CFR Part 15 Subpart C Section 15.205/15.209	ANSI C63.10-2013	PASS
Band edge and RF Conducted Spurious Emissions	47 CFR Part 15 Subpart C Section 15.247(d)/15.205(a)	ANSI C63.10-2013	PASS
Conducted Peak Output Power	47 CFR Part 15 Subpart C Section 15.247 (b)(1)	ANSI C63.10-2013	PASS
20dB Occupied Bandwidth	47 CFR Part 15 Subpart C Section 15.247 (a)(1)	ANSI C63.10-2013	PASS
Carrier Frequencies Separation	47 CFR Part 15 Subpart C Section 15.247 (a)(1)	ANSI C63.10-2013	PASS
Hopping Channel Number	47 CFR Part 15 Subpart C Section 15.247 (b)	ANSI C63.10-2013	PASS
Dwell Time	47 CFR Part 15 Subpart C Section 15.247 (a)(1)	ANSI C63.10-2013	PASS
Pseudorandom Frequency Hopping Sequence	47 CFR Part 15 Subpart C Section 15.247(a)&TCB Exclusion List (7 July 2002)	ANSI C63.10-2013	PASS
Antenna Requirement	47 CFR Part 15 Subpart C Section 15.203/15.247 (b)	/	PASS
RF Exposure Evaluation	47 CFR Part 15 Subpart C Section 15.247 (i)/1.1310/2.1093	KDB447498D01v06	PASS

Remark:
Test according to ANSI C63.10-2013.

3. MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the Product as specified in CISPR 16-4-2. This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

Item	Uncertainty
Occupancy bandwidth	54.3kHz
Conducted output power Above 1G	0.9dB
Conducted output power below 1G	0.9dB
Power Spectral Density , Conduction	0.9dB
Conduction spurious emissions	2.0dB
Out of band emission	2.0dB
3m camber Radiated spurious emission(9KHz-30MHz)	4.8dB
3m camber Radiated spurious emission(30MHz-1GHz)	4.6dB
3m chamber Radiated spurious emission(1GHz-18GHz)	5.1dB
3m chamber Radiated spurious emission(18GHz-40GHz)	3.4dB
humidity uncertainty	5.5%
Temperature uncertainty	0.63℃
frequency	1×10-7
Conducted Emission (150KHz-30MHz)	3.2 dB
Radiated Emission(30MHz ~ 1000MHz)	4.8 dB
Radiated Emission(1GHz ~6GHz)	4.9 dB

4. PRODUCT INFORMATION AND TEST SETUP

4.1 Product Information

Model(s):	HZ-LY22UV1.0
Model Description:	N/A
Bluetooth Version:	Bluetooth 5.0
Hardware Version:	V1.0
Software Version:	V1.0
Operation Frequency:	Bluetooth: 2402-2480MHz
Max. RF output power:	Bluetooth: 10.809dBm
Type of Modulation:	Bluetooth: GFSK, π/4 DQPSK, 8DPSK
Antenna installation:	Bluetooth: Built-in antenna
Antenna Gain:	Bluetooth: 1.86dBi
Ratings:	DC 5V by notebook

4.2 Test Setup Configuration

See test photographs attached in EUT TEST SETUP PHOTOGRAPHS for the actual connections between Product and support equipment.

4.3 Support Equipment

Item	Equipment	Mfr/Brand	Model/Type No.	Series No.	Note
1.	Laptop	DELL	Vostro 5490	N/A	N/A

Notes:

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.

4.4 Channel List

CH	Frequency (MHz)	CH	Frequency (MHz)	CH	Frequency (MHz)	CH	Frequency (MHz)
0	2402	1	2403	2	2404	3	2405
4	2406	5	2407	6	2408	7	2409
8	2410	9	2411	10	2412	11	2413
12	2414	13	2415	14	2416	15	2417
16	2418	17	2419	18	2420	19	2421
20	2422	21	2423	22	2424	23	2425
24	2426	25	2427	26	2428	27	2429
28	2430	29	2431	30	2432	31	2433
32	2434	33	2435	34	2436	35	2437
36	2438	37	2439	38	2440	39	2441
40	2442	41	2443	42	2444	43	2445
44	2446	45	2447	46	2448	47	2449
48	2450	49	2451	50	2452	51	2453
52	2454	53	2455	54	2456	55	2457
56	2458	57	2459	58	2460	59	2461
60	2462	61	2463	62	2464	63	2465
64	2466	65	2467	66	2468	67	2469
68	2470	69	2471	70	2472	71	2473
72	2474	73	2475	74	2476	75	2477
76	2478	77	2479	78	2480	79	/

4.5 Test Mode

All test mode(s) and condition(s) mentioned were considered and evaluated respectively by performing full tests, the worst data were recorded and reported.

Test mode	Low channel	Middle channel	High channel
Transmitting (GFSK, π/4 DQPSK, 8DPSK)	2402MHz	2441MHz	2480MHz
Receiving (GFSK, π/4 DQPSK, 8DPSK)	2402MHz	2441MHz	2480MHz

4.6 Test Environment

Humidity(%):	54
Atmospheric Pressure(kPa):	101
Normal Voltage(DC):	5V
Normal Temperature(℃)	23
Low Temperature(℃)	0
High Temperature(℃)	40

5. TEST FACILITY AND TEST INSTRUMENT USED

5.1 Test Facility

All measurement facilities used to collect the measurement data are located at 1&2F., Building A, No. 26, Xinhe Road, Xinqiao, Xinqiao Street, Bao'an District, Shenzhen, Guangdong, China. The site and apparatus are constructed in conformance with the requirements of ANSI C63.4 and CISPR 16-1-1 other equivalent standards.

5.2 Test Instrument Used

No.	Equipment	Manufacturer	Type No.	Serial No.	Firmware Version	Calibrated until
1	Spectrum Analyzer	Agilent	N9020A	MY52090073	A.14.16	2024.07.05
2	Power Sensor	Agilent	U2021XA	MY56120032	/	2024.07.05
3	Power Sensor	Agilent	U2021XA	MY56120034	/	2024.07.05
4	Communication test set	R&S	CMW500	108058	V3.5.80	2024.07.05
5	Spectrum Analyzer	KEYSIGHT	N9020A	MY51289897	A.14.16	2024.07.05
6	Signal Generator	Agilent	N5181A	MY50140365	A.01.60	2024.07.05
7	Vector signal generator	Agilent	N5182A	MY47420195	A.01.87	2024.07.05
8	Communication test set	Agilent	E5515C	MY50102567	B.19.07 （E1962B ）	2024.07.06
9	2.4 GHz Filter	Shenxiang	MSF2400-2483.5MS-1154	20181015001	/	2024.07.05
10	5 GHz Filter	Shenxiang	MSF5150-5850MS-1155	20181015001	/	2024.07.06
11	Filter	Xingbo	XBLBQ-DZA120	190821-1-1	/	2024.07.06
12	BT&WI-FI Automatic test software	Micowave	MTS8000	Ver. 2.0.0.0	/	/
13	Rohde & Schwarz SFU Broadcast Test System	R&S	SFU	101017	/	2024.10.30
14	Temperature humidity chamber	Hongjing	TH-80CH	DG-15174	/	2024.07.05
15	234G Automatic test software	Micowave	MTS8200	Ver. 2.0.0.0	/	/
16	966 chamber	C.R.T.	966	/	/	2024.08.11
17	Receiver	R&S	ESPI	100362	RF_ATTEN_7 （104489/003）	2024.07.05
18	Amplifier	HP	8447E	2945A02747	/	2024.07.05
19	Amplifier	Agilent	8449B	3008A01838	/	2024.07.05
20	TRILOG Broadband Antenna	Schwarzbeck	VULB 9168	00869	/	2024.07.08

21	Double Ridged Broadband Horn Antenna	Schwarzbeck	BBHA9120D	01911	/	2024.07.08
22	EMI test software	Fala	EZ-EMC	FA-03A2 RE	/	/
23	Loop Antenna	Schwarzbeck	FMZB 1519B	1519B-224	/	2024.07.08
24	loop antenna	ZHINAN	ZN30900A	GTS534	/	/
25	40G Horn antenna	A/H/System	SAS-574	588	/	2024.10.30
26	Amplifier	AEROFLEX	Aeroflex	097	/	2024.07.05

Continuous disturbance

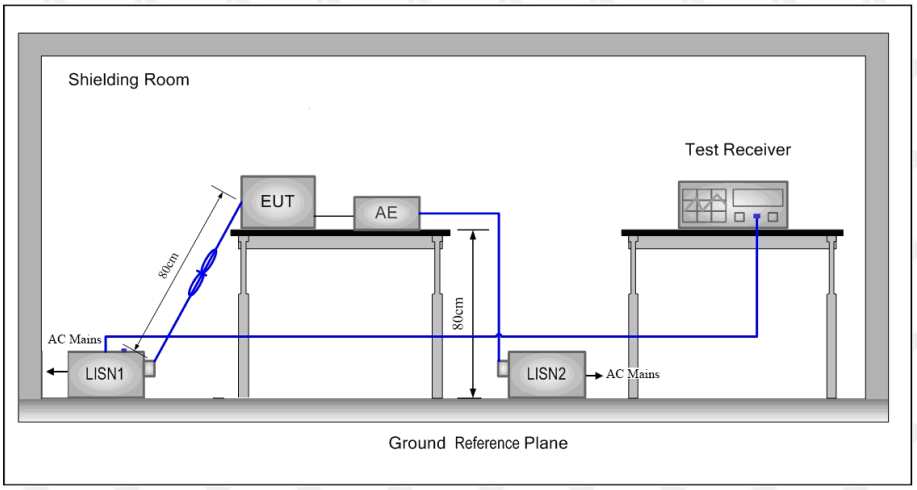
No.	Equipment	Manufacturer	Model No.	Serial No.	Firmware Version	Calibrated until
1	LISN	ROHDE&SCHWARZ	ESH3-Z5	100318	/	2024.07.05
2	Pulse limiter	ROHDE&SCHWARZ	ESH3Z2	357881052	/	2024.07.05
3	EMI TEST RECEIVER	ROHDE&SCHWARZ	ESCI	100428/003	V4.42.SP3	2024.07.05
4	Coaxial cable	ZDECL	Z302S-NJ-SM AJ-12M	18091905	/	2024.07.05
5	ISN	Schwarzbeck	NTFM8158	183	/	2024.07.05
6	Communication test set	Agilent	E5515C	MY50102567	B.19.07 （E1962B ）	2024.07.05
7	Communication test set	R&S	CMW500	108058	V3.5.80	2024.07.05
8	EZ-EMC	Frad	EMC-con3A1.1	/	/	/

Radiated emission

No.	Equipment	Manufacturer	Model No.	Serial No.	Firmware Version	Calibrated until
1	Double Ridged Broadband Horn Antenna	Schwarzbeck	BBHA 9120 D	01911	/	2024.07.08
2	TRILOG Broadband Antenna	Schwarzbeck	VULB 9168	00869	/	2024.07.08
3	Amplifier	Agilent	8449B	3008A01838	/	2024.07.05
4	Amplifier	HP	8447E	2945A02747	/	2024.07.05
5	EMI TEST RECEIVER	ROHDE&SCHWARZ	ESCI	100428/003	V4.42.SP3	2024.07.05
6	Coaxial cable	ETS	RFC-SNS-100-NMS-80 NI	/	/	2024.07.05
7	Coaxial cable	ETS	RFC-SNS-100-NMS-20 NI	/	/	2024.07.05
8	Coaxial cable	ETS	RFC-SNS-100-SMS-20 NI	/	/	2024.07.05
9	Coaxial cable	ETS	RFC-NNS-100-NMS-300 NI	/	/	2024.07.05
10	Communication test set	Agilent	E5515C	MY50102567	B.19.07 （E1962B）	2024.07.05
11	Communication test set	R&S	CMW500	108058	V3.5.80	2024.07.05
12	EZ-EMC	Frad	EMC-con3A1.1	/	/	/

6. AC POWER LINE CONDUCTED EMISSION

6.1 Block Diagram Of Test Setup



6.2 Limit

Table 4 – AC power-line conducted emissions limits

Frequency (MHz)	Conducted limit (dBµV)	
	Quasi-peak	Average
0.15 - 0.5	66 to 56[Note 1]	56 to 46[Note 1]
0.5 – 5	56	46
5 – 30	60	50

Note 1: The level decreases linearly with the logarithm of the frequency.

* Decreasing linearly with the logarithm of the frequency

6.3 Test procedure

1) The mains terminal disturbance voltage test was conducted in a shielded room.

2) The EUT was connected to AC power source through a LISN 1 (Line Impedance Stabilization Network) which provides a 50Ω/50µH + 5Ω linear impedance. The power cables of all other units of the EUT were connected to a second LISN 2, which was bonded to the ground reference plane in the same way as the LISN 1 for the unit being measured. A multiple socket outlet strip was used to connect multiple power cables to a single LISN provided the rating of the LISN was not exceeded.

3) The tabletop EUT was placed upon a non-metallic table 0.8m above the ground reference plane. And for floor-standing arrangement, the EUT was placed on the horizontal ground reference plane,

4) The test was performed with a vertical ground reference plane. The rear of the EUT shall be 0,4 m from the vertical ground reference plane. The vertical ground reference plane was bonded to the horizontal ground reference plane. The LISN 1 was placed 0.8 m from the boundary of the unit under test and bonded to a ground reference plane for LISNs mounted on top of the ground reference plane.

This distance was between the closest points of the LISN 1 and the EUT. All other units of the EUT and associated equipment was at least 0.8 m from the LISN 2.

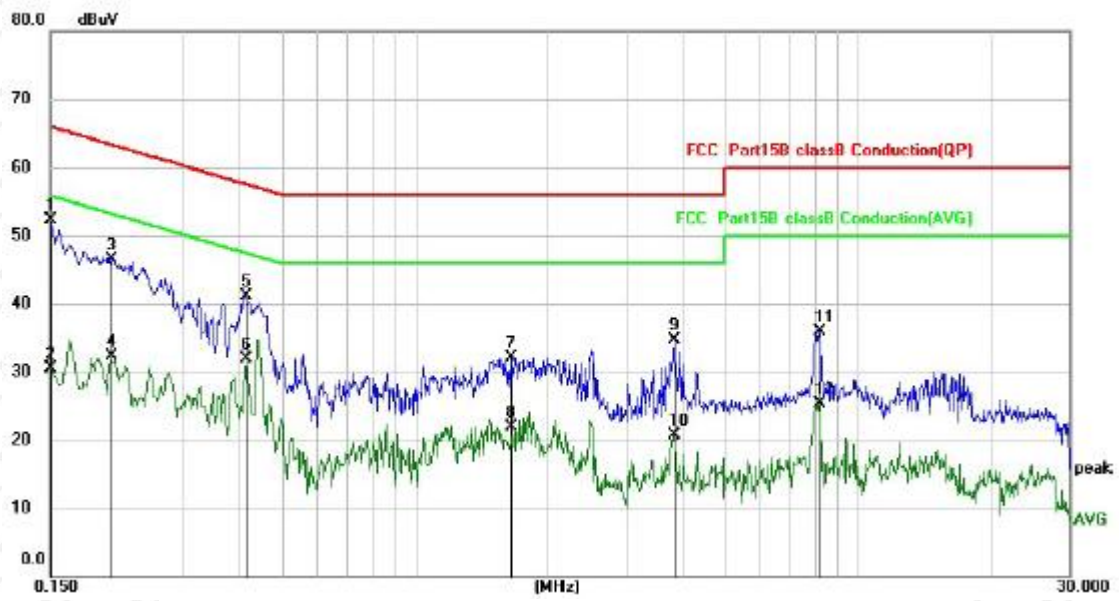
5) In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.10:2013 on conducted measurement**.**

6) All modes were tested at AC 120V and 240V, only the worst result of AC 120V 60Hz was reported.

7) If a EUT received DC power from the USB Port of Notebook PC, the PC's adapter received AC120V/60Hz power through a Line Impedance Stabilization Network (LISN) which supplied power source and was grounded to the ground plane.

6.4 Test Result

L: Worst case-GFSK(low channel)

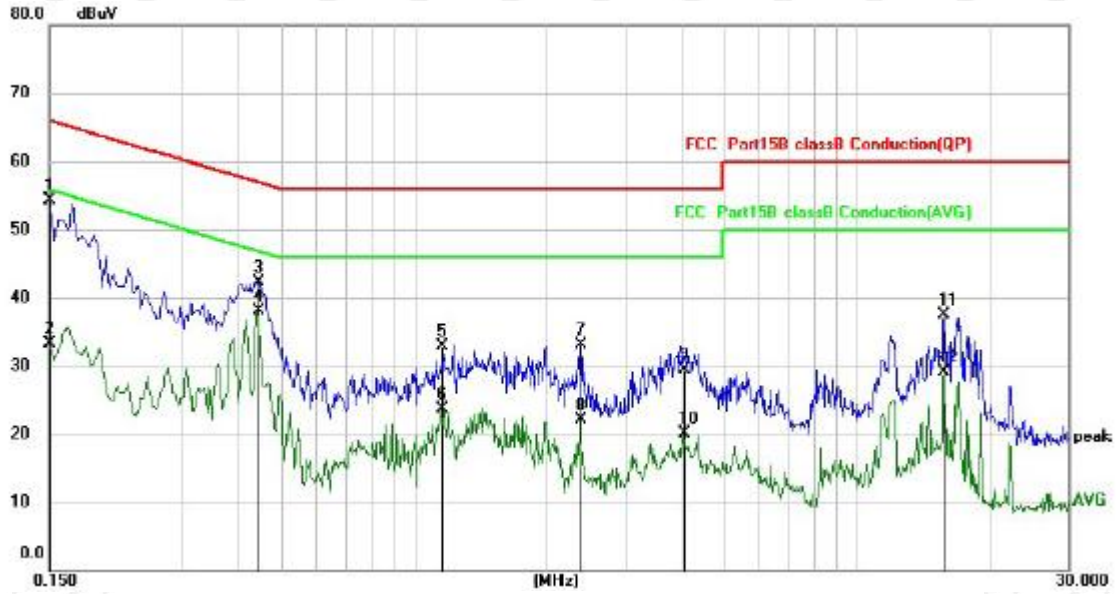


No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector
1	*	0.1500	42.40	9.95	52.35	66.00	-13.65	QP
2		0.1500	20.65	9.95	30.60	56.00	-25.40	AVG
3		0.2071	36.58	9.95	46.53	63.32	-16.79	QP
4		0.2071	22.26	9.95	32.21	53.32	-21.11	AVG
5		0.4139	31.03	9.98	41.01	57.57	-16.56	QP
6		0.4139	21.89	9.98	31.87	47.57	-15.70	AVG
7		1.6500	22.07	10.06	32.13	56.00	-23.87	QP
8		1.6500	11.81	10.06	21.87	46.00	-24.13	AVG
9		3.8580	24.37	10.27	34.64	56.00	-21.36	QP
10		3.8580	10.46	10.27	20.73	46.00	-25.27	AVG
11		8.1500	25.45	10.54	35.99	60.00	-24.01	QP
12		8.1500	14.85	10.54	25.39	50.00	-24.61	AVG

Remark:

Factor = Cable loss + LISN factor, Margin = Measurement – Limit

N: Worst case-GFSK(low channel)



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector
1		0.1500	44.28	9.95	54.23	66.00	-11.77	QP
2		0.1500	23.43	9.95	33.38	56.00	-22.62	AVG
3		0.4460	32.30	9.98	42.28	56.95	-14.67	QP
4	*	0.4460	28.17	9.98	38.15	46.95	-8.80	AVG
5		1.1579	22.98	10.02	33.00	56.00	-23.00	QP
6		1.1579	13.70	10.02	23.72	46.00	-22.28	AVG
7		2.3740	22.89	10.13	33.02	56.00	-22.98	QP
8		2.3740	12.00	10.13	22.13	46.00	-23.87	AVG
9		4.0700	19.19	10.29	29.48	56.00	-26.52	QP
10		4.0700	9.72	10.29	20.01	46.00	-25.99	AVG
11		15.7179	26.73	10.74	37.47	60.00	-22.53	QP
12		15.7179	18.31	10.74	29.05	50.00	-20.95	AVG

Remark:

Factor = Cable loss + LISN factor, Margin = Measurement – Limit

7. RADIATED SPURIOUS EMISSION

7.1 Block Diagram Of Test Setup

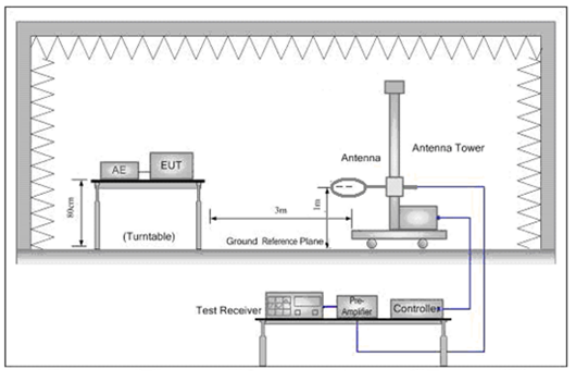


Figure 1. Below 30MHz

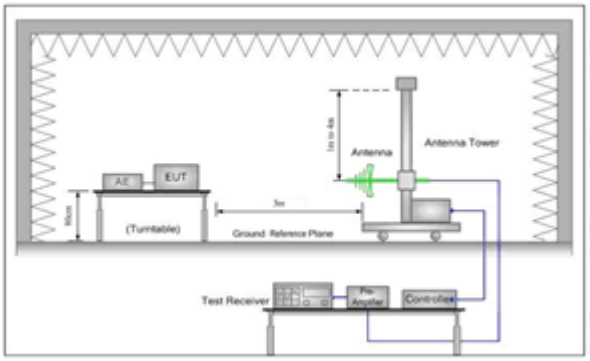


Figure 2. 30MHz to 1GHz

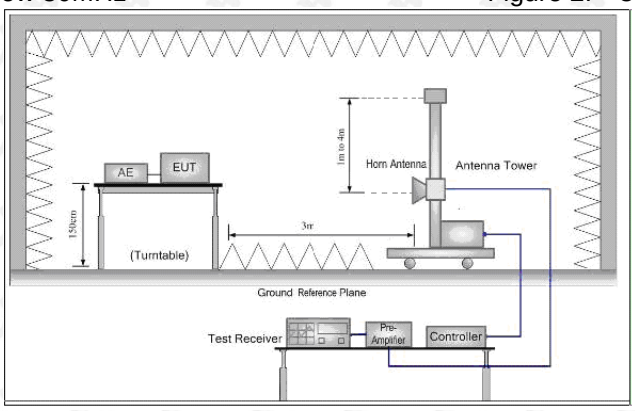


Figure 3. Above 1GHz

7.2 Limit

Spurious Emissions:

Frequency	Field strength (microvolt/meter)	Limit (dBμV/m)	Remark	Measurement distance (m)
0.009MHz-0.490MHz	2400/F(kHz)	-	-	300
0.490MHz-1.705MHz	24000/F(kHz)	-	-	30
1.705MHz-30MHz	30	-	-	30
30MHz-88MHz	100	40.0	Quasi-peak	3
88MHz-216MHz	150	43.5	Quasi-peak	3
216MHz-960MHz	200	46.0	Quasi-peak	3
960MHz-1GHz	500	54.0	Quasi-peak	3
Above 1GHz	500	54.0	Average	3

Note: 15.35(b), Unless otherwise specified, the limit on peak radio frequency emissions is 20dB above the maximum permitted average emission limit applicable to the equipment under test. This peak limit applies to the total peak emission level radiated by the device.

7.3 Test procedure

Below 1GHz test procedure as below:

a.The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter semi-anechoic camber. The table was rotated 360 degrees to determine the position of the highest radiation.

b.The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.

c.The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.

d.For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters (for the test frequency of below 30MHz, the antenna was tuned to heights 1 meter) and the rota table table was turned from 0 degrees to 360 degrees to find the maximum reading.

e.The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

f.If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.

Above 1GHz test procedure as below:

g.Different between above is the test site, change from Semi- Anechoic Chamber to fully Anechoic Chamber and change form table 0.8 meter to 1.5 meter(Above 18GHz the distance is 1 meter and table is 1.5 meter).

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

i.Repeat above procedures until all frequencies measured was complete.

j. Full battery is usedduring test

Receiver set:

Frequency	Detector	RBW	VBW	Remark
0.009MHz-0.090MHz	Peak	10kHz	30KHz	Peak
0.009MHz-0.090MHz	Average	10kHz	30KHz	Average
0.090MHz-0.110MHz	Quasi-peak	10kHz	30KHz	Quasi-peak
0.110MHz-0.490MHz	Peak	10kHz	30KHz	Peak
0.110MHz-0.490MHz	Average	10kHz	30KHz	Average
0.490MHz -30MHz	Quasi-peak	10kHz	30kHz	Quasi-peak
30MHz-1GHz	Quasi-peak	120 kHz	300KHz	Quasi-peak
Above 1GHz	Peak	1MHz	3MHz	Peak
	Peak	1MHz	10Hz	Average

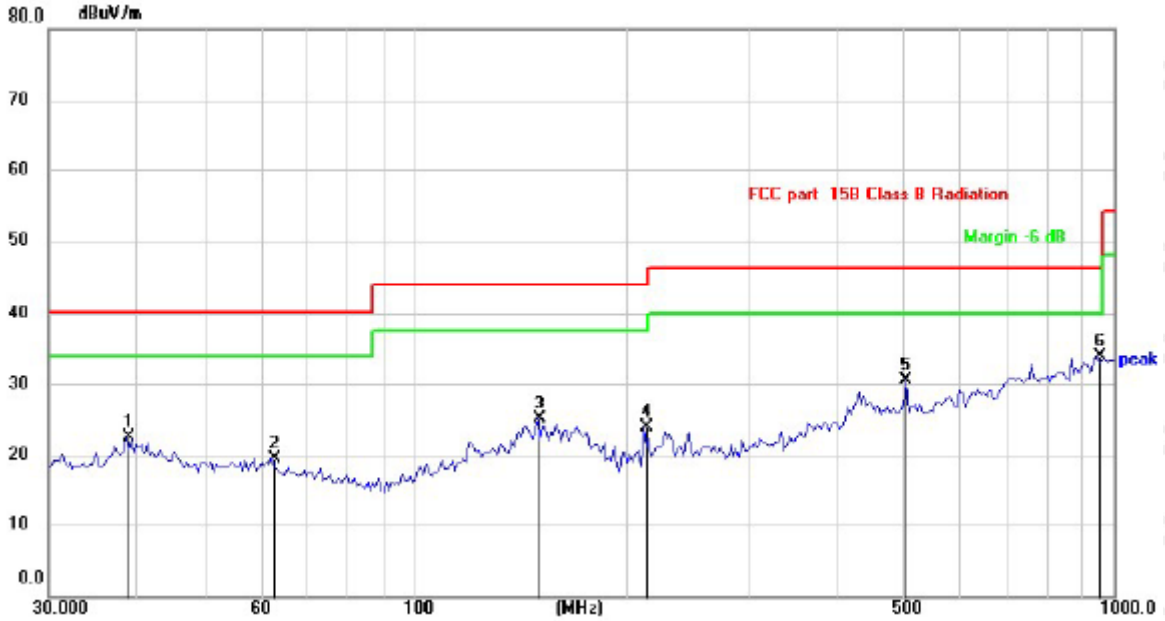
7.4 Test Result

Below 1GHz Test Results:
Antenna polarity: H
Worst case-GFSK(low channel)

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dB	dBuV/m	dB/m	dB	Detector
1		39.7146	26.19	-4.85	21.34	40.00	-18.66	QP
2		62.1039	25.78	-7.01	18.77	40.00	-21.23	QP
3		150.5378	28.28	-3.19	25.09	43.50	-18.41	QP
4		259.2338	38.38	-6.50	31.88	46.00	-14.12	QP
5		427.2695	32.07	-1.55	30.52	46.00	-15.48	QP
6	*	869.1302	28.15	6.73	34.88	46.00	-11.12	QP

Remark: Factor = Cable lose + Antenna factor - Pre-amplifier; Margin = Measurement– Limit

Antenna polarity: V
Worst case-GFSK(low channel)

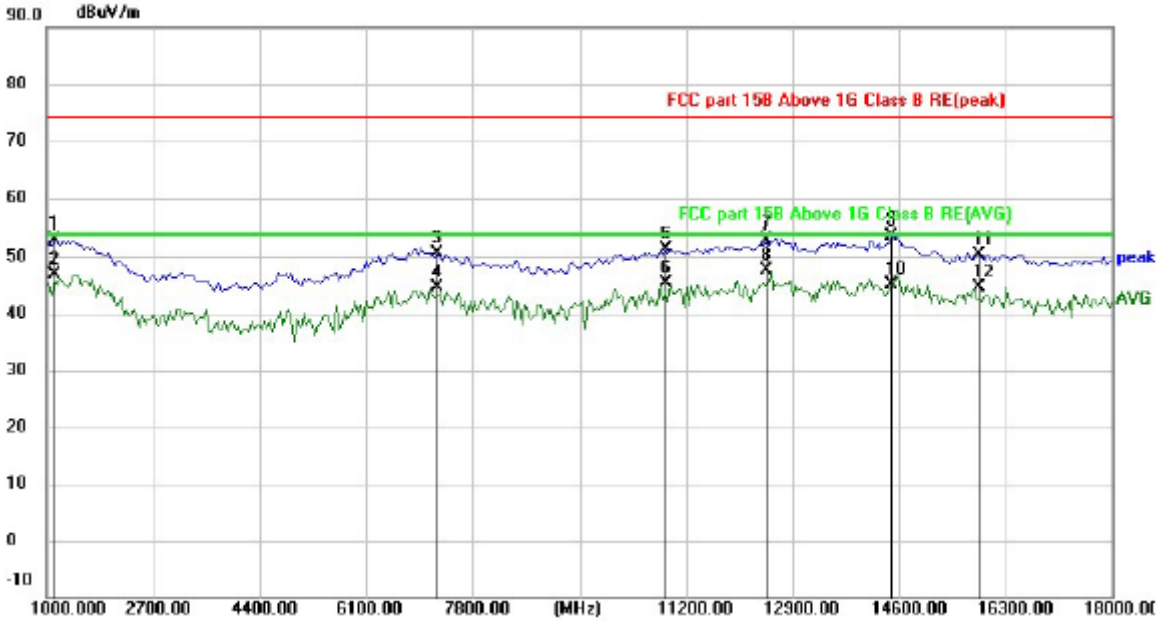


No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dB	dBuV/m	dB/m	dB	Detector
1		38.6839	27.62	-5.12	22.50	40.00	-17.50	QP
2		62.6507	26.60	-7.08	19.52	40.00	-20.48	QP
3		150.5378	28.33	-3.19	25.14	43.50	-18.36	QP
4		211.8977	31.21	-7.33	23.88	43.50	-19.62	QP
5		504.7062	30.31	0.16	30.47	46.00	-15.53	QP
6	*	948.7610	26.60	7.36	33.96	46.00	-12.04	QP

Remark: Factor = Cable lose + Antenna factor - Pre-amplifier; Margin = Measurement– Limit

Above 1 GHz Test Results:

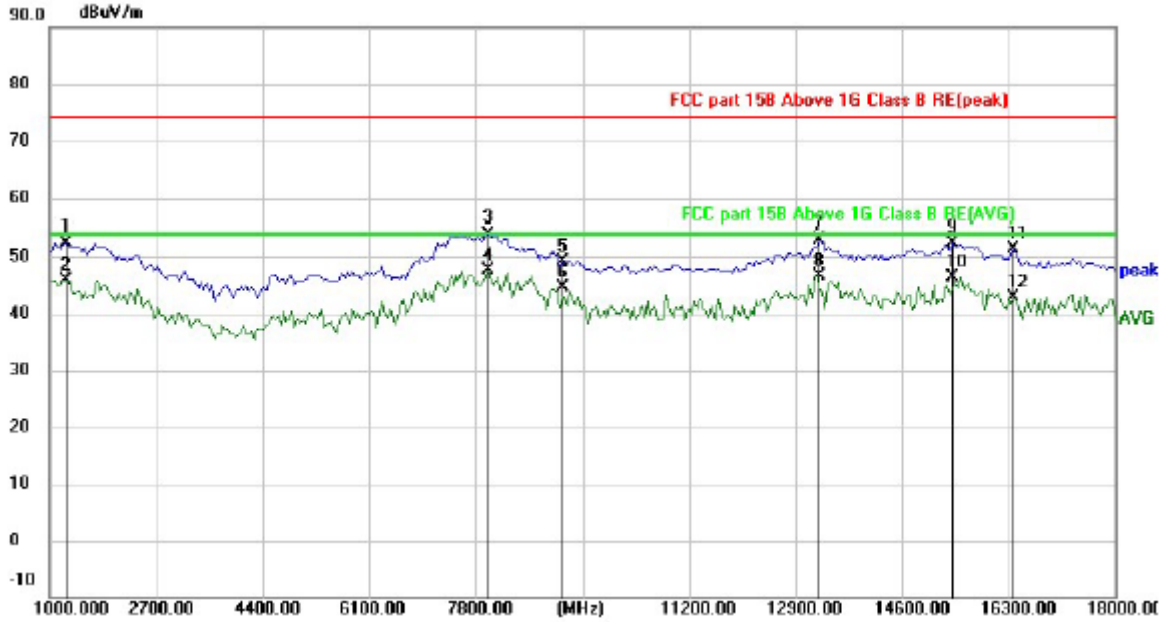
CH Low (2402MHz)
Horizontal:



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dB	dBuV/m	dB/m	dB	Detector
1		1127.500	48.98	3.97	52.95	74.00	-21.05	peak
2		1127.500	42.90	3.97	46.87	54.00	-7.13	AVG
3		7247.500	37.98	12.65	50.63	74.00	-23.37	peak
4		7247.500	31.94	12.65	44.59	54.00	-9.41	AVG
5		10860.00	34.69	16.73	51.42	74.00	-22.58	peak
6		10860.00	28.75	16.73	45.48	54.00	-8.52	AVG
7		12475.00	34.34	18.61	52.95	74.00	-21.05	peak
8	*	12475.00	28.96	18.61	47.57	54.00	-6.43	AVG
9		14472.50	31.69	22.01	53.70	74.00	-20.30	peak
10		14472.50	23.23	22.01	45.24	54.00	-8.76	AVG
11		15875.00	28.29	22.07	50.36	74.00	-23.64	peak
12		15875.00	22.56	22.07	44.63	54.00	-9.37	AVG

Remark: Factor = Cable lose + Antenna factor - Pre-amplifier; Margin = Measurement – Limit

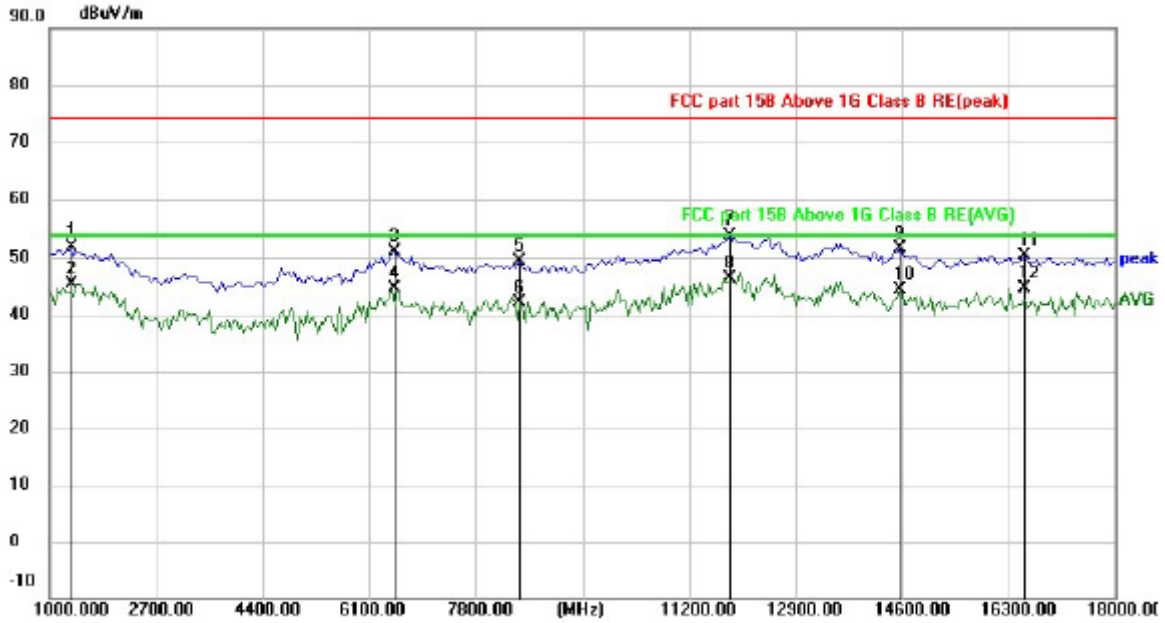
Vertical:



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dB	dBuV/m	dB/m	dB	Detector
1		1255.000	48.50	3.83	52.33	74.00	-21.67	peak
2		1255.000	42.12	3.83	45.95	54.00	-8.05	AVG
3		8012.500	40.09	13.67	53.76	74.00	-20.24	peak
4	*	8012.500	34.08	13.67	47.75	54.00	-6.25	AVG
5		9160.000	32.67	16.54	49.21	74.00	-24.79	peak
6		9160.000	28.20	16.54	44.74	54.00	-9.26	AVG
7		13282.50	33.26	19.59	52.85	74.00	-21.15	peak
8		13282.50	26.93	19.59	46.52	54.00	-7.48	AVG
9		15407.50	29.62	22.67	52.29	74.00	-21.71	peak
10		15407.50	23.65	22.67	46.32	54.00	-7.68	AVG
11		16385.00	28.63	22.67	51.30	74.00	-22.70	peak
12		16385.00	20.33	22.67	43.00	54.00	-11.00	AVG

Remark: Factor = Cable lose + Antenna factor - Pre-amplifier; Margin = Measurement – Limit

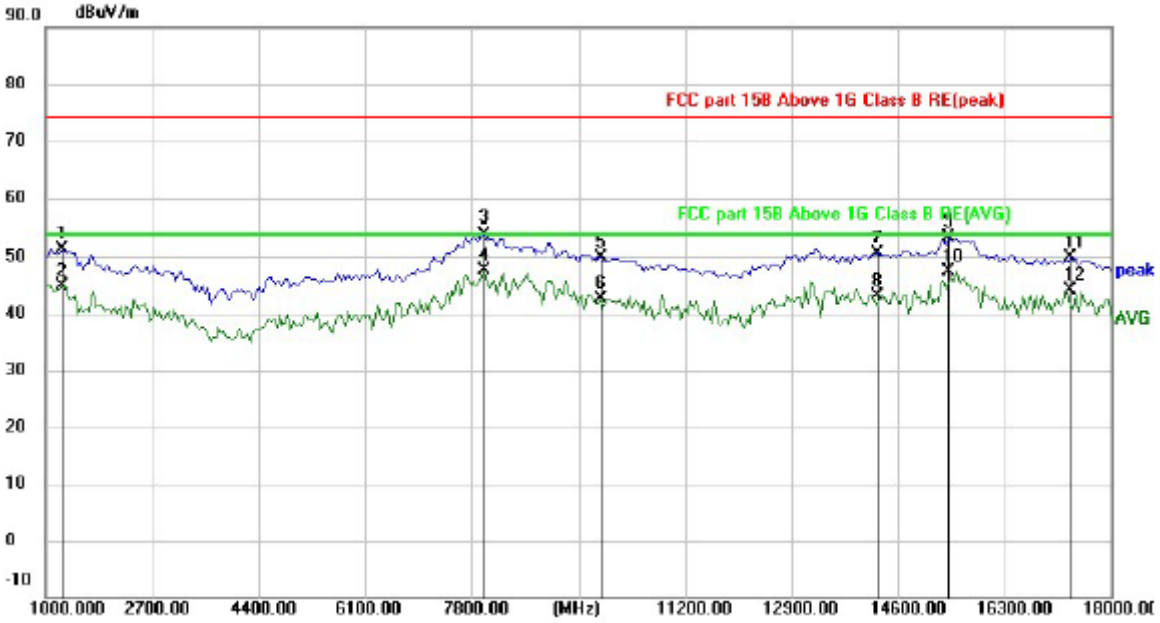
CH Middle (2441MHz)
Horizontal:



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dB	dBuV/m	dB/m	dB	Detector
1		1340.000	48.11	3.73	51.84	74.00	-22.16	peak
2		1340.000	41.64	3.73	45.37	54.00	-8.63	AVG
3		6525.000	39.75	11.27	51.02	74.00	-22.98	peak
4		6525.000	33.46	11.27	44.73	54.00	-9.27	AVG
5		8522.500	35.40	13.93	49.33	74.00	-24.67	peak
6		8522.500	28.26	13.93	42.19	54.00	-11.81	AVG
7		11837.50	36.21	17.70	53.91	74.00	-20.09	peak
8	*	11837.50	28.69	17.70	46.39	54.00	-7.61	AVG
9		14557.50	29.48	22.17	51.65	74.00	-22.35	peak
10		14557.50	22.33	22.17	44.50	54.00	-9.50	AVG
11		16555.00	27.47	22.88	50.35	74.00	-23.65	peak
12		16555.00	21.75	22.88	44.63	54.00	-9.37	AVG

Remark: Factor = Cable lose + Antenna factor - Pre-amplifier; Margin = Measurement – Limit

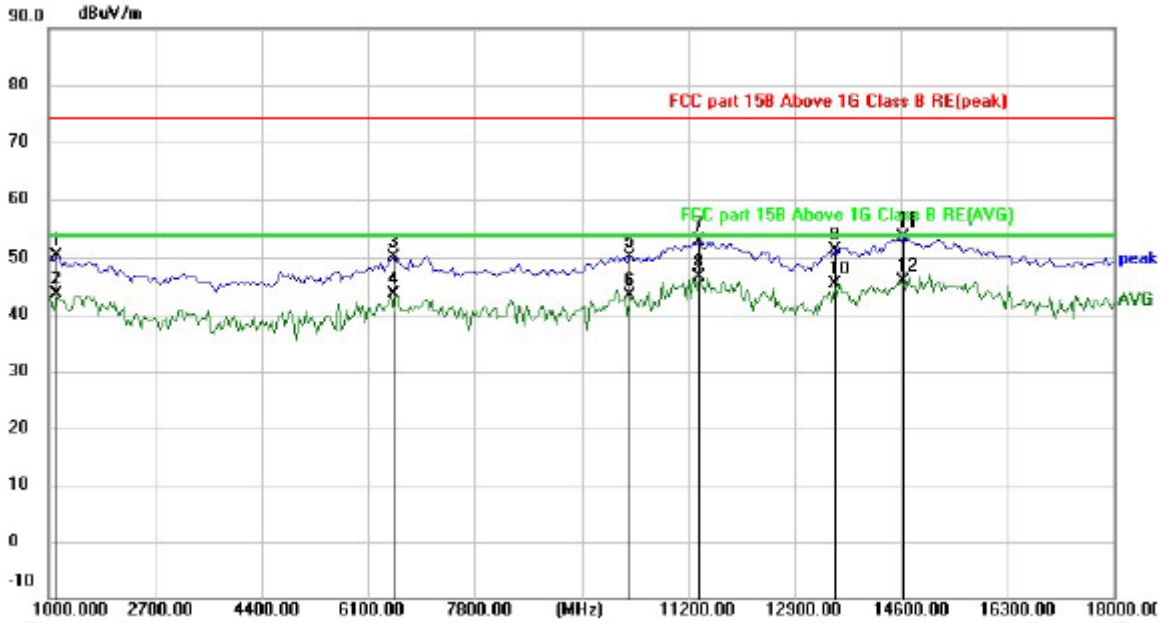
Vertical:



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dB	dBuV/m	dB/m	dB	Detector
1		1255.000	47.50	3.83	51.33	74.00	-22.67	peak
2		1255.000	41.12	3.83	44.95	54.00	-9.05	AVG
3		8012.500	40.09	13.67	53.76	74.00	-20.24	peak
4	*	8012.500	34.08	13.67	47.75	54.00	-6.25	AVG
5		9840.000	32.59	17.36	49.95	74.00	-24.05	peak
6		9840.000	25.22	17.36	42.58	54.00	-11.42	AVG
7		14260.00	29.06	21.69	50.75	74.00	-23.25	peak
8		14260.00	21.41	21.69	43.10	54.00	-10.90	AVG
9		15407.50	30.62	22.67	53.29	74.00	-20.71	peak
10		15407.50	24.65	22.67	47.32	54.00	-6.68	AVG
11		17362.50	24.75	25.11	49.86	74.00	-24.14	peak
12		17362.50	18.97	25.11	44.08	54.00	-9.92	AVG

Remark: Factor = Cable lose + Antenna factor - Pre-amplifier; Margin = Measurement – Limit

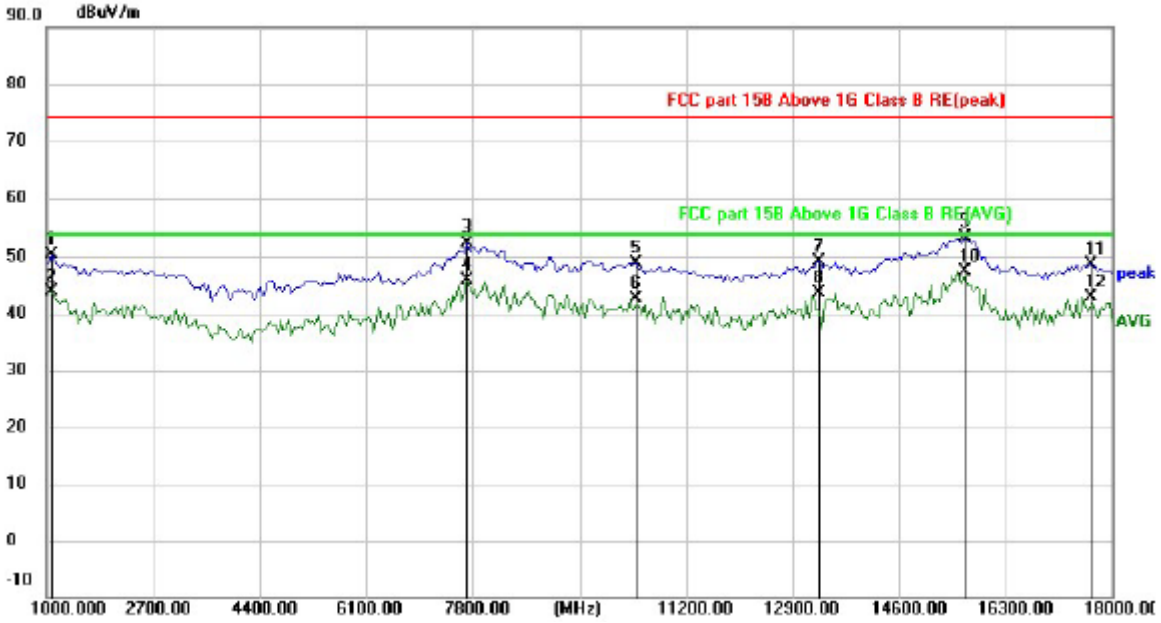
CH High (2480MHz)
Horizontal:



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dB	dBuV/m	dB/m	dB	Detector
1		1127.500	46.48	3.97	50.45	74.00	-23.55	peak
2		1127.500	39.70	3.97	43.67	54.00	-10.33	AVG
3		6525.000	38.75	11.27	50.02	74.00	-23.98	peak
4		6525.000	32.46	11.27	43.73	54.00	-10.27	AVG
5		10265.00	33.50	16.61	50.11	74.00	-23.89	peak
6		10265.00	26.77	16.61	43.38	54.00	-10.62	AVG
7		11370.00	35.56	17.34	52.90	74.00	-21.10	peak
8	*	11370.00	29.30	17.34	46.64	54.00	-7.36	AVG
9		13537.50	30.93	20.45	51.38	74.00	-22.62	peak
10		13537.50	24.86	20.45	45.31	54.00	-8.69	AVG
11		14642.50	31.30	22.36	53.66	74.00	-20.34	peak
12		14642.50	23.64	22.36	46.00	54.00	-8.00	AVG

Remark: Factor = Cable lose + Antenna factor - Pre-amplifier; Margin = Measurement – Limit

Vertical:

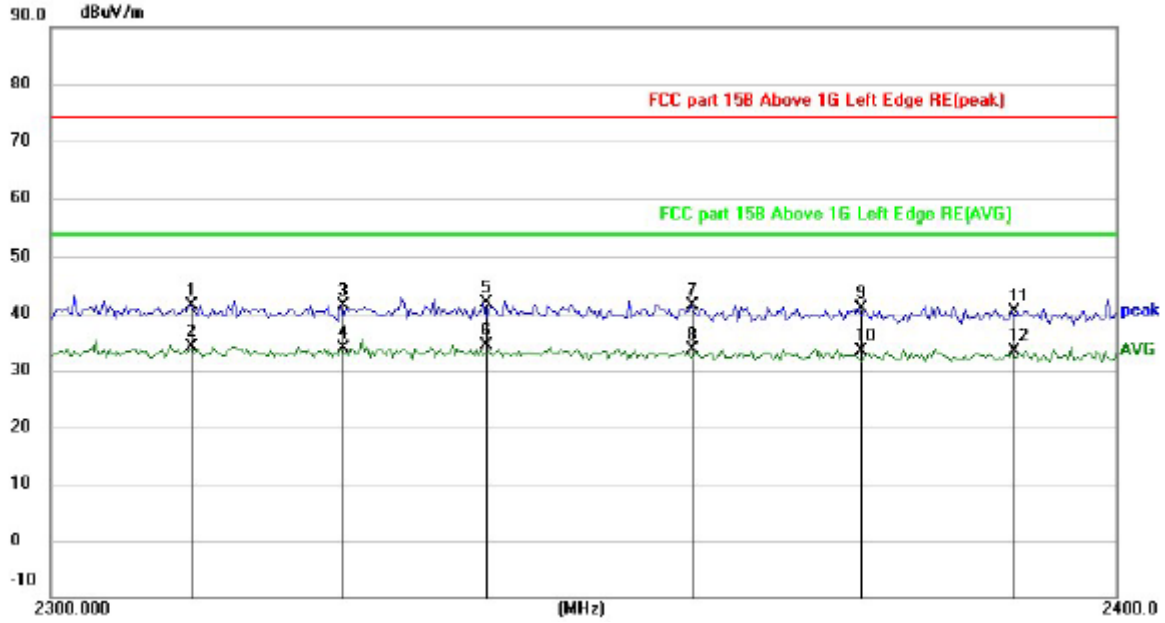


No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dB	dBuV/m	dB/m	dB	Detector
1		1085.000	46.25	4.03	50.28	74.00	-23.72	peak
2		1085.000	39.77	4.03	43.80	54.00	-10.20	AVG
3		7715.000	38.99	13.44	52.43	74.00	-21.57	peak
4		7715.000	32.40	13.44	45.84	54.00	-8.16	AVG
5		10392.50	32.46	16.31	48.77	74.00	-25.23	peak
6		10392.50	26.24	16.31	42.55	54.00	-11.45	AVG
7		13325.00	29.36	19.74	49.10	74.00	-24.90	peak
8		13325.00	23.98	19.74	43.72	54.00	-10.28	AVG
9		15662.50	30.99	22.35	53.34	74.00	-20.66	peak
10	*	15662.50	24.97	22.35	47.32	54.00	-6.68	AVG
11		17660.00	22.45	26.29	48.74	74.00	-25.26	peak
12		17660.00	16.55	26.29	42.84	54.00	-11.16	AVG

Remark: Factor = Cable lose + Antenna factor - Pre-amplifier; Margin = Measurement – Limit

Restricted bands around fundamental frequency (Radiated)

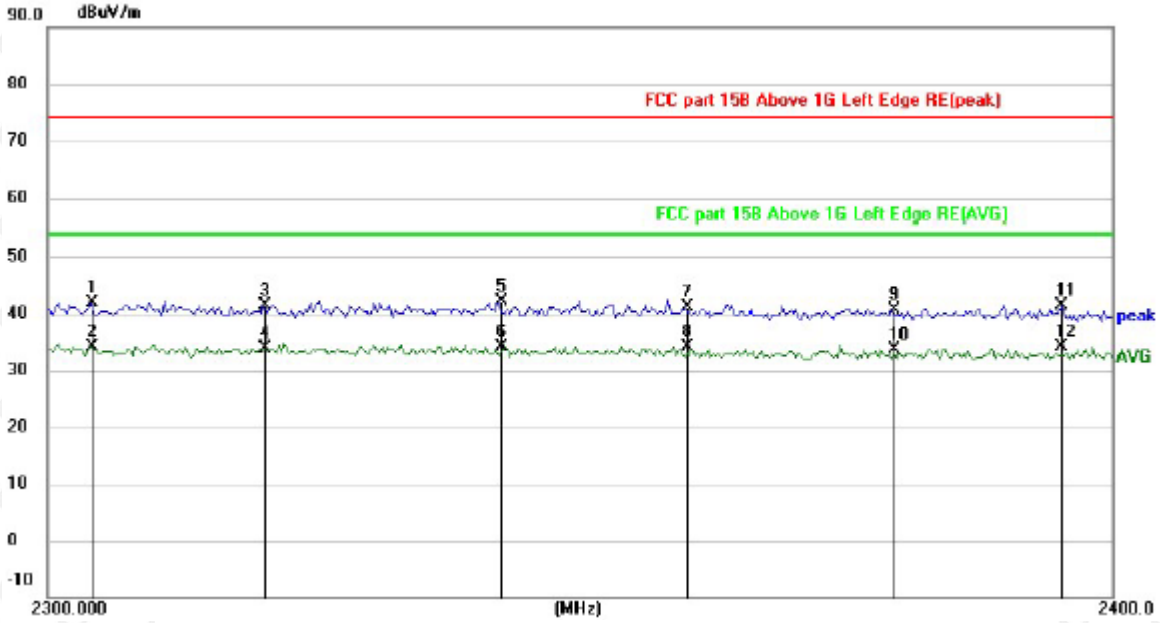
hopping
Operation Mode: TX CH Low (2402MHz)
Horizontal (Worst case-GFSK)



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dB	dBuV/m	dB/m	dB	Detector
1		2312.761	40.23	1.22	41.45	74.00	-32.55	peak
2		2312.761	32.93	1.22	34.15	54.00	-19.85	AVG
3		2326.830	40.34	1.14	41.48	74.00	-32.52	peak
4		2326.830	32.68	1.14	33.82	54.00	-20.18	AVG
5		2340.237	40.77	1.07	41.84	74.00	-32.16	peak
6	*	2340.237	33.22	1.07	34.29	54.00	-19.71	AVG
7		2359.489	40.48	0.97	41.45	74.00	-32.55	peak
8		2359.489	32.72	0.97	33.69	54.00	-20.31	AVG
9		2375.358	40.11	0.89	41.00	74.00	-33.00	peak
10		2375.358	32.39	0.89	33.28	54.00	-20.72	AVG
11		2390.062	39.57	0.81	40.38	74.00	-33.62	peak
12		2390.062	32.57	0.81	33.38	54.00	-20.62	AVG

Remark: Factor = Cable lose + Antenna factor - Pre-amplifier; Margin = Measurement – Limit

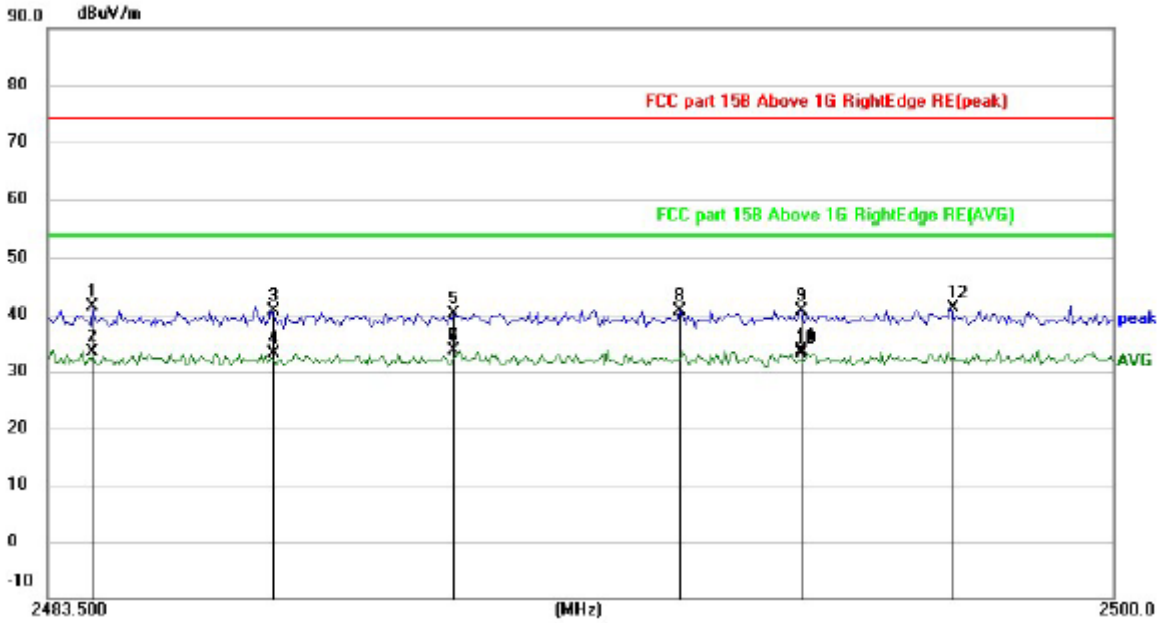
Vertical:



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dB	dBuV/m	dB/m	dB	Detector
1		2303.919	40.63	1.27	41.90	74.00	-32.10	peak
2		2303.919	32.90	1.27	34.17	54.00	-19.83	AVG
3		2319.908	40.11	1.18	41.29	74.00	-32.71	peak
4		2319.908	32.81	1.18	33.99	54.00	-20.01	AVG
5		2341.981	40.98	1.06	42.04	74.00	-31.96	peak
6		2341.981	33.07	1.06	34.13	54.00	-19.87	AVG
7		2359.238	40.25	0.97	41.22	74.00	-32.78	peak
8		2359.238	33.16	0.97	34.13	54.00	-19.87	AVG
9		2378.899	39.69	0.87	40.56	74.00	-33.44	peak
10		2378.899	32.85	0.87	33.72	54.00	-20.28	AVG
11		2395.153	40.50	0.78	41.28	74.00	-32.72	peak
12	*	2395.153	33.41	0.78	34.19	54.00	-19.81	AVG

Remark: Factor = Cable lose + Antenna factor - Pre-amplifier; Margin = Measurement – Limit

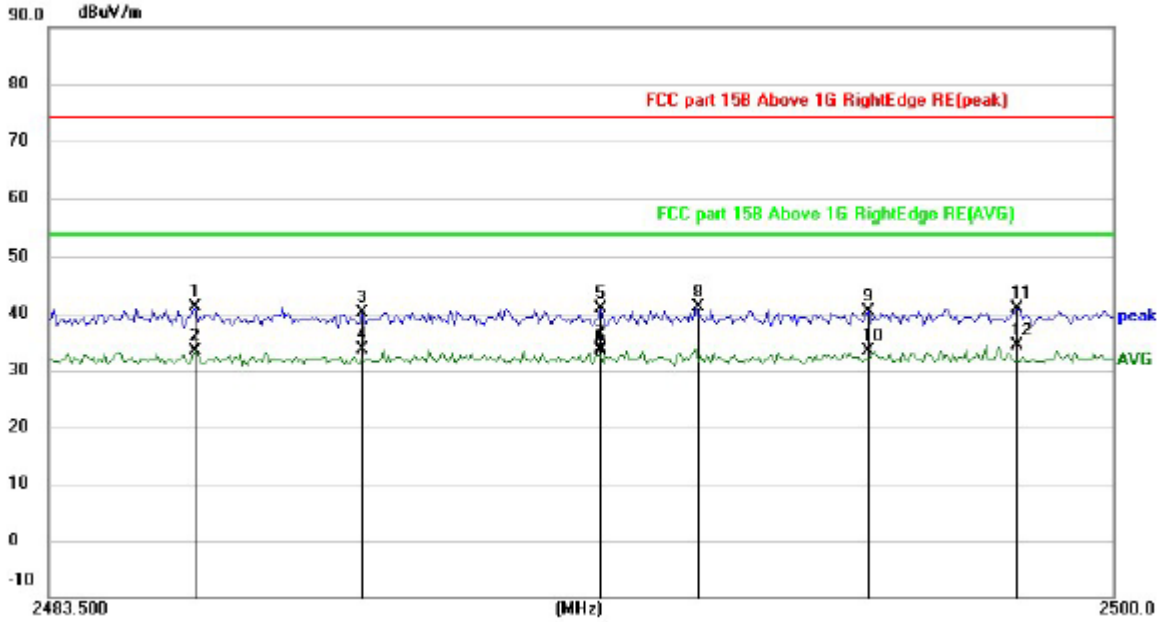
Operation Mode: TX CH High (2480MHz)
Horizontal (Worst case-GFSK)



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dB	dBuV/m	dB/m	dB	Detector
1		2484.199	41.06	0.31	41.37	74.00	-32.63	peak
2		2484.199	33.17	0.31	33.48	54.00	-20.52	AVG
3		2486.956	40.27	0.30	40.57	74.00	-33.43	peak
4		2486.956	32.94	0.30	33.24	54.00	-20.76	AVG
5		2489.798	39.88	0.28	40.16	74.00	-33.84	peak
6	*	2489.798	33.42	0.28	33.70	54.00	-20.30	AVG
7		2489.798	33.37	0.28	33.65	54.00	-20.35	AVG
8		2493.263	40.42	0.27	40.69	74.00	-33.31	peak
9		2495.162	40.26	0.26	40.52	74.00	-33.48	peak
10		2495.162	32.80	0.26	33.06	54.00	-20.94	AVG
11		2495.162	33.43	0.26	33.69	54.00	-20.31	AVG
12		2497.477	40.81	0.24	41.05	74.00	-32.95	peak

Remark: Factor = Cable lose + Antenna factor - Pre-amplifier; Margin = Measurement – Limit

Vertical:

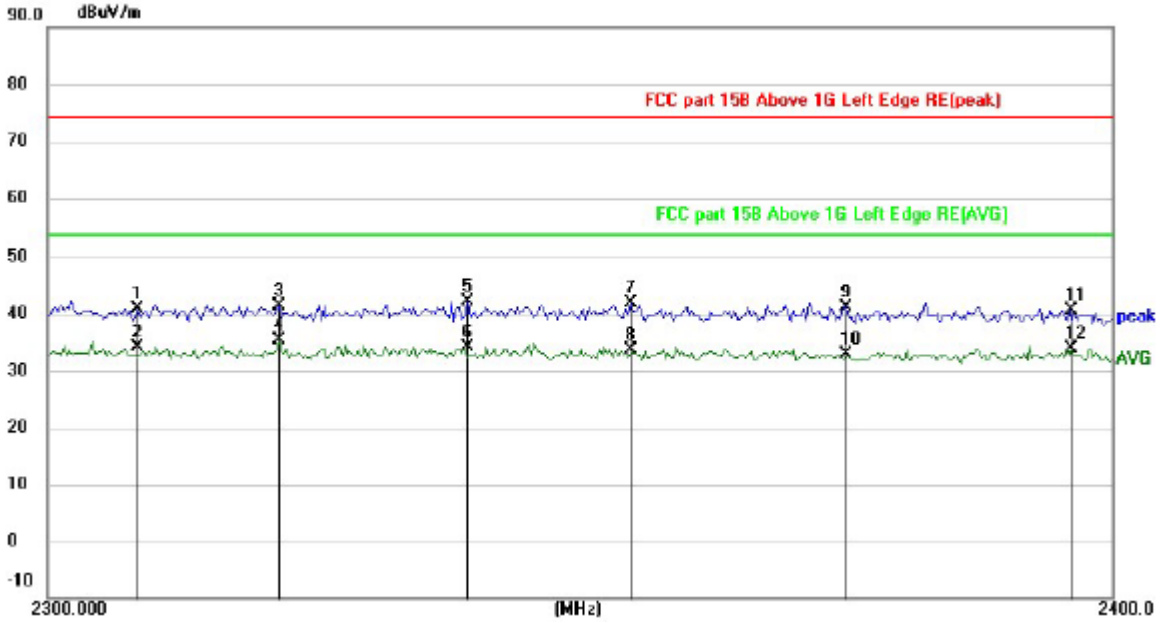


No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dB	dBuV/m	dB/m	dB	Detector
1		2485.762	40.81	0.31	41.12	74.00	-32.88	peak
2		2485.762	33.03	0.31	33.34	54.00	-20.66	AVG
3		2488.356	39.80	0.29	40.09	74.00	-33.91	peak
4		2488.356	33.39	0.29	33.68	54.00	-20.32	AVG
5		2492.025	40.61	0.27	40.88	74.00	-33.12	peak
6		2492.025	33.04	0.27	33.31	54.00	-20.69	AVG
7		2492.025	33.66	0.27	33.93	54.00	-20.07	AVG
8		2493.511	40.86	0.26	41.12	74.00	-32.88	peak
9		2496.195	40.09	0.25	40.34	74.00	-33.66	peak
10		2496.195	33.14	0.25	33.39	54.00	-20.61	AVG
11		2498.510	40.56	0.24	40.80	74.00	-33.20	peak
12	*	2498.510	34.21	0.24	34.45	54.00	-19.55	AVG

Remark: Factor = Cable lose + Antenna factor - Pre-amplifier; Margin = Measurement – Limit

NO hopping

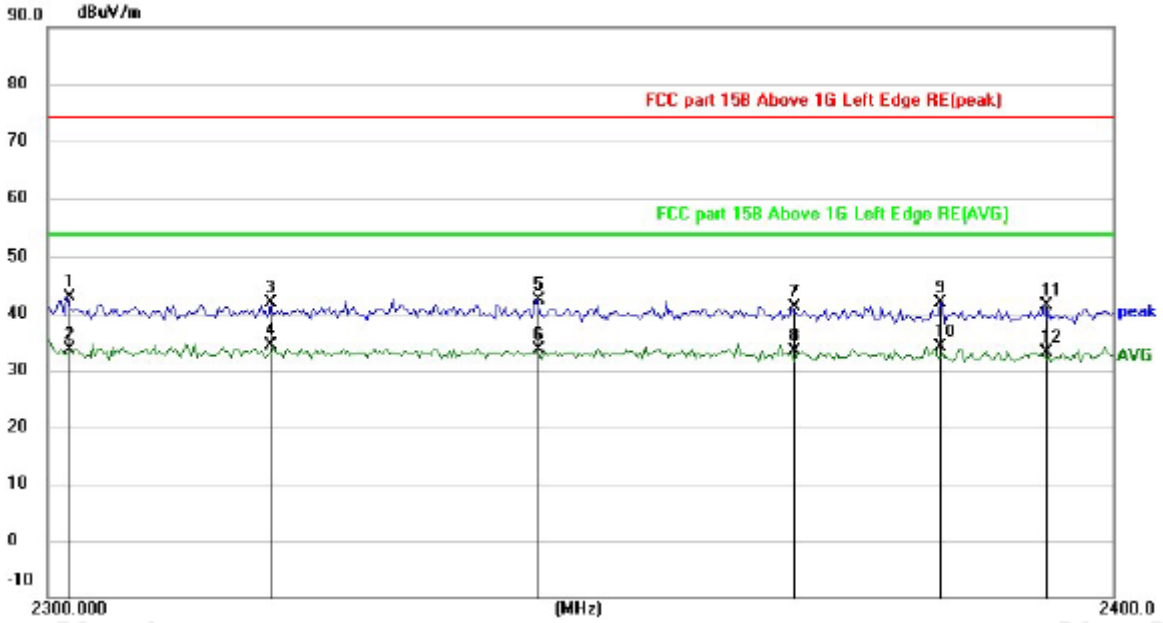
Operation Mode: TX CH Low (2402MHz)
Horizontal (Worst case-GFSK)



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dB	dBuV/m	dB/m	dB	Detector
1		2308.335	39.74	1.24	40.98	74.00	-33.02	peak
2		2308.335	32.93	1.24	34.17	54.00	-19.83	AVG
3		2321.389	40.10	1.17	41.27	74.00	-32.73	peak
4	*	2321.389	34.33	1.17	35.50	54.00	-18.50	AVG
5		2338.992	41.05	1.08	42.13	74.00	-31.87	peak
6		2338.992	33.00	1.08	34.08	54.00	-19.92	AVG
7		2354.222	40.92	1.00	41.92	74.00	-32.08	peak
8		2354.222	32.61	1.00	33.61	54.00	-20.39	AVG
9		2374.599	40.36	0.89	41.25	74.00	-32.75	peak
10		2374.599	32.06	0.89	32.95	54.00	-21.05	AVG
11		2395.918	39.84	0.78	40.62	74.00	-33.38	peak
12		2395.918	33.18	0.78	33.96	54.00	-20.04	AVG

Remark: Factor = Cable lose + Antenna factor - Pre-amplifier; Margin = Measurement – Limit

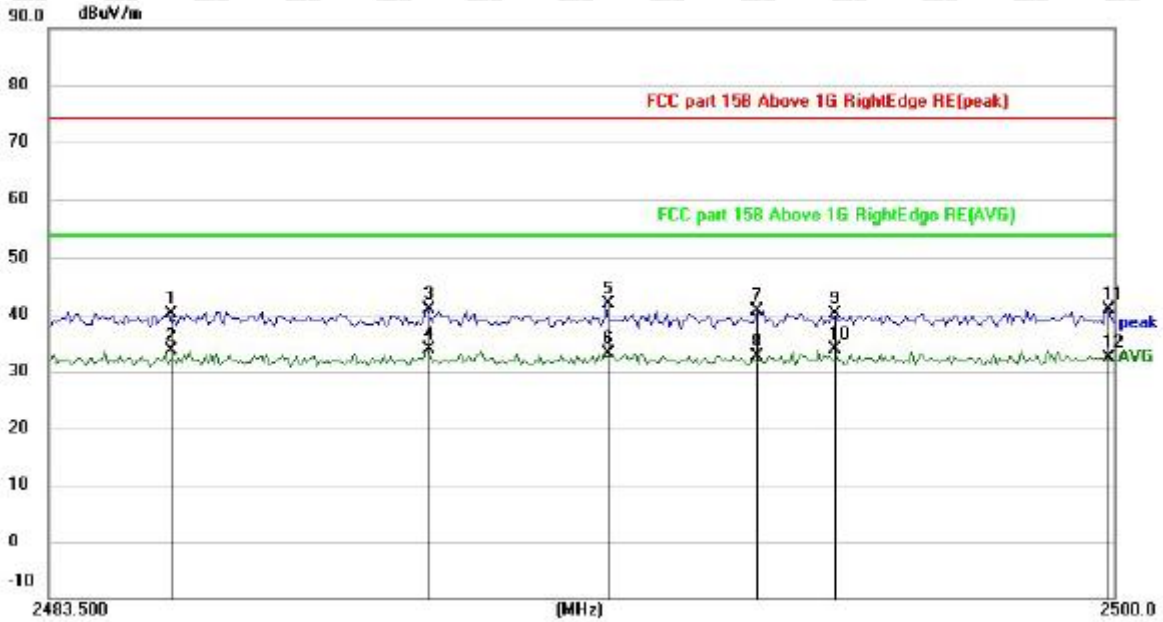
Vertical:



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dB	dBuV/m	dB/m	dB	Detector
1		2301.714	41.69	1.28	42.97	74.00	-31.03	peak
2		2301.714	32.23	1.28	33.51	54.00	-20.49	AVG
3		2320.648	40.60	1.18	41.78	74.00	-32.22	peak
4	*	2320.648	33.09	1.18	34.27	54.00	-19.73	AVG
5		2345.472	41.23	1.05	42.28	74.00	-31.72	peak
6		2345.472	32.64	1.05	33.69	54.00	-20.31	AVG
7		2369.300	40.30	0.92	41.22	74.00	-32.78	peak
8		2369.300	32.50	0.92	33.42	54.00	-20.58	AVG
9		2383.459	41.10	0.85	41.95	74.00	-32.05	peak
10		2383.459	33.38	0.85	34.23	54.00	-19.77	AVG
11		2393.370	40.68	0.79	41.47	74.00	-32.53	peak
12		2393.370	32.38	0.79	33.17	54.00	-20.83	AVG

Remark: Factor = Cable lose + Antenna factor - Pre-amplifier; Margin = Measurement – Limit

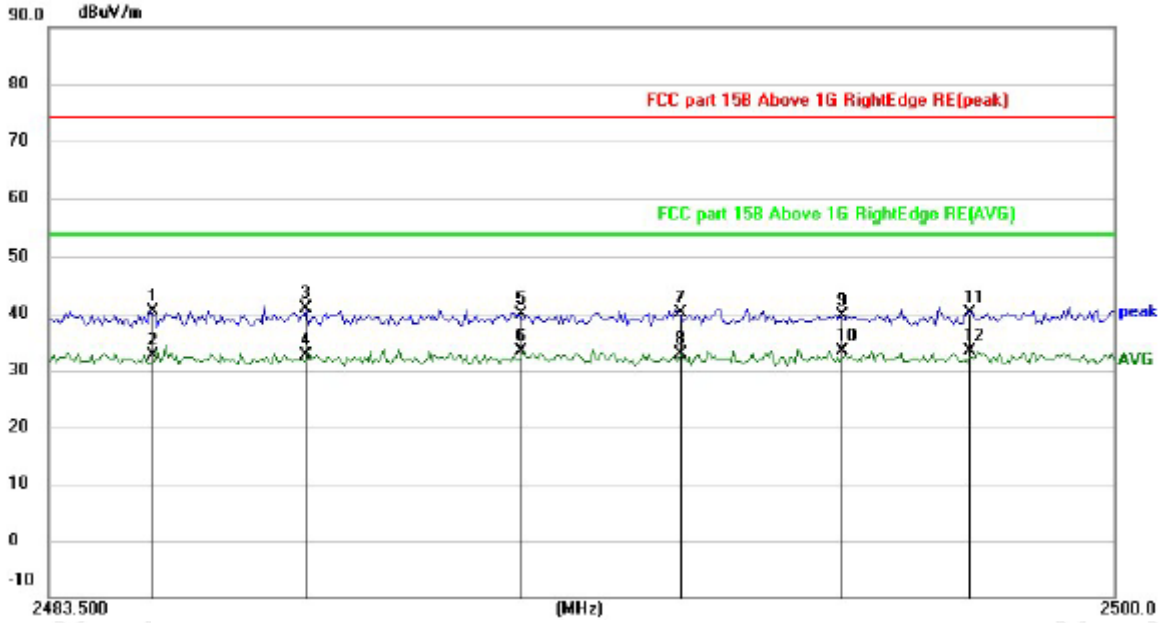
Operation Mode: TX CH High (2480MHz)
Horizontal (Worst case-GFSK)



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dB	dBuV/m	dB/m	dB	Detector
1		2485.351	39.90	0.31	40.21	74.00	-33.79	peak
2		2485.351	33.22	0.31	33.53	54.00	-20.47	AVG
3		2489.345	40.71	0.29	41.00	74.00	-33.00	peak
4	*	2489.345	33.54	0.29	33.83	54.00	-20.17	AVG
5		2492.108	41.72	0.27	41.99	74.00	-32.01	peak
6		2492.108	32.88	0.27	33.15	54.00	-20.85	AVG
7		2494.460	40.33	0.26	40.59	74.00	-33.41	peak
8		2494.460	32.26	0.26	32.52	54.00	-21.48	AVG
9		2495.617	39.87	0.25	40.12	74.00	-33.88	peak
10		2495.617	33.54	0.25	33.79	54.00	-20.21	AVG
11		2499.876	40.63	0.23	40.86	74.00	-33.14	peak
12		2499.876	32.19	0.23	32.42	54.00	-21.58	AVG

Remark: Factor = Cable lose + Antenna factor - Pre-amplifier; Margin = Measurement – Limit

Vertical:

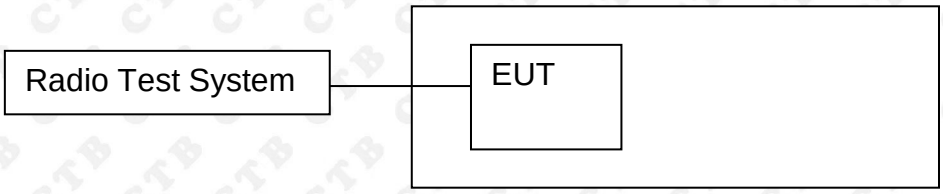


No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dB	dBuV/m	dB/m	dB	Detector
1		2485.063	40.16	0.31	40.47	74.00	-33.53	peak
2		2485.063	32.31	0.31	32.62	54.00	-21.38	AVG
3		2487.491	40.55	0.30	40.85	74.00	-33.15	peak
4		2487.491	32.36	0.30	32.66	54.00	-21.34	AVG
5		2490.788	39.48	0.28	39.76	74.00	-34.24	peak
6	*	2490.788	33.20	0.28	33.48	54.00	-20.52	AVG
7		2493.222	39.94	0.27	40.21	74.00	-33.79	peak
8		2493.222	32.49	0.27	32.76	54.00	-21.24	AVG
9		2495.741	39.48	0.25	39.73	74.00	-34.27	peak
10		2495.741	33.11	0.25	33.36	54.00	-20.64	AVG
11		2497.725	39.98	0.24	40.22	74.00	-33.78	peak
12		2497.725	33.16	0.24	33.40	54.00	-20.60	AVG

Remark: Factor = Cable lose + Antenna factor - Pre-amplifier; Margin = Measurement – Limit

8. BAND EDGE AND RF COUNDUCTED SPURIOUS EMISSIONS

8.1 Block Diagram Of Test Setup



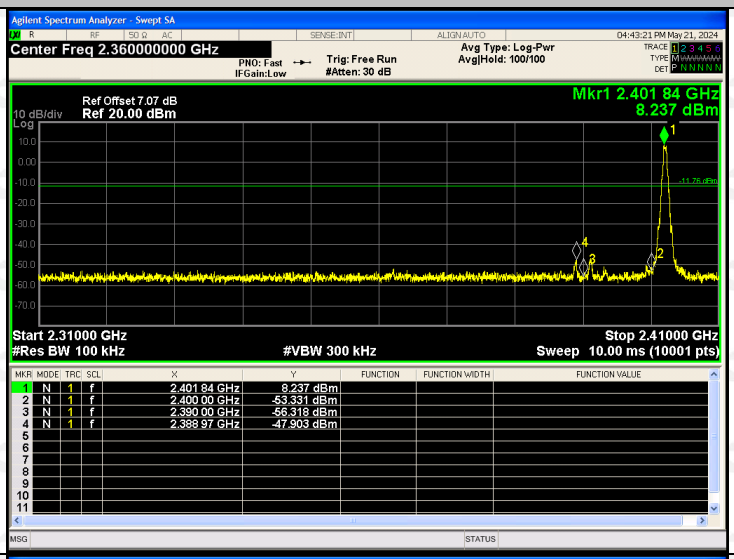
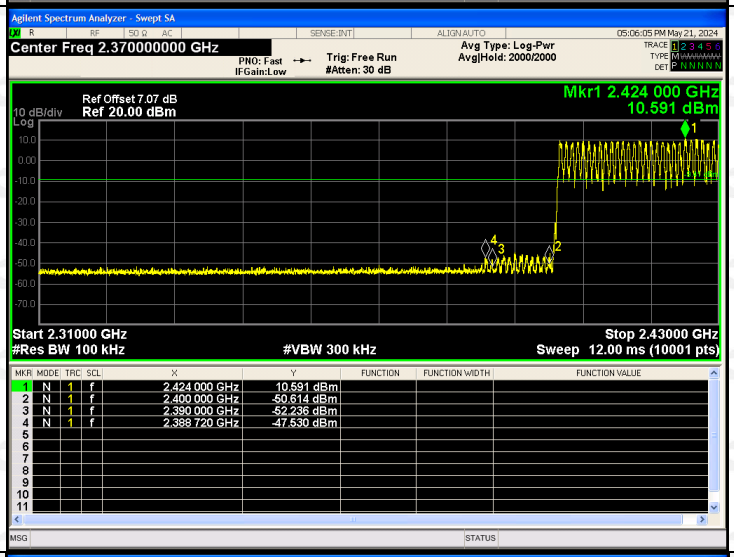
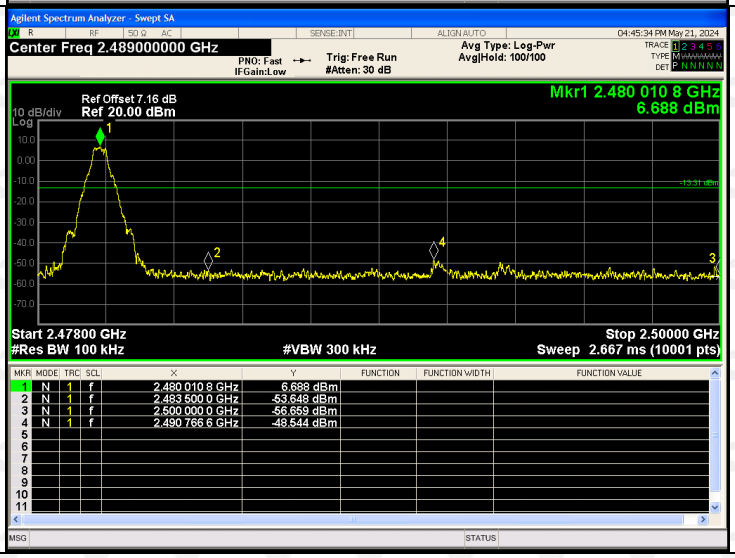
8.2 Limit

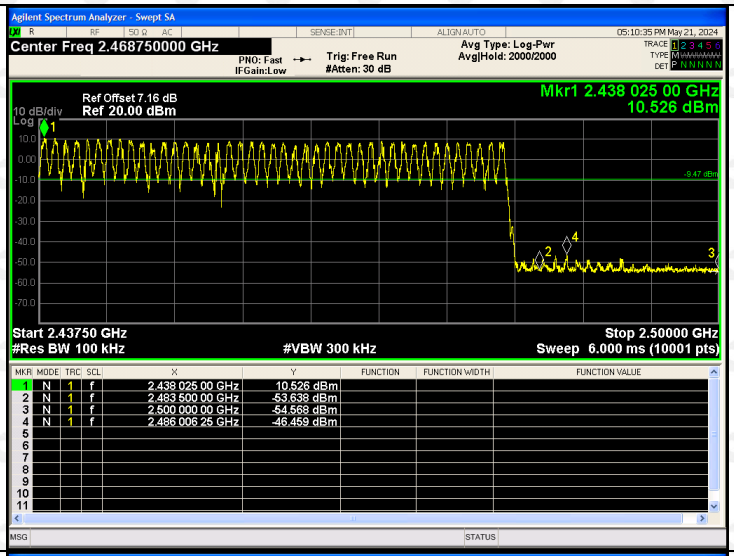
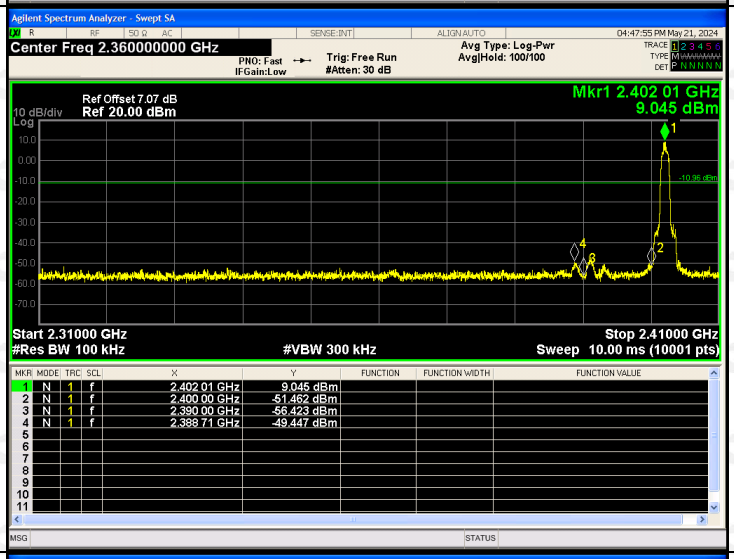
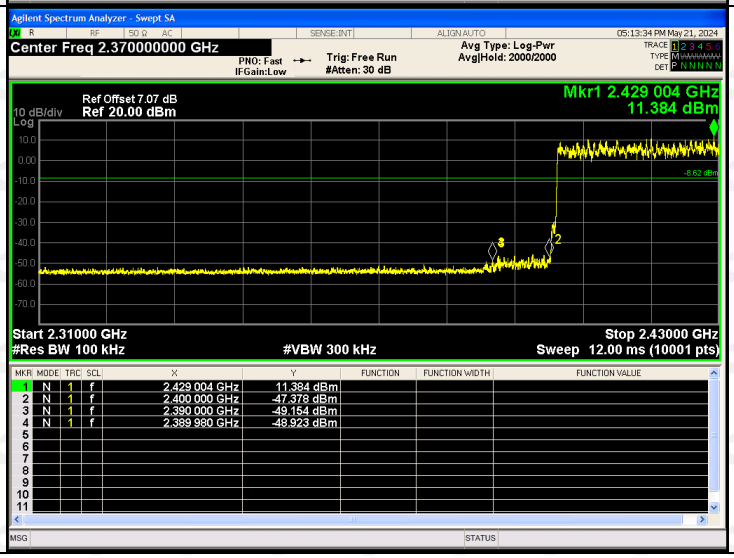
In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies 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. 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) (see §15.205(c)).

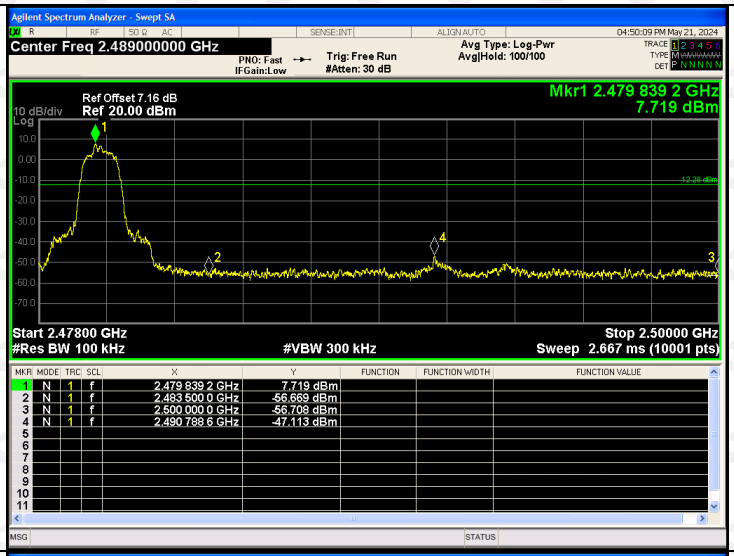
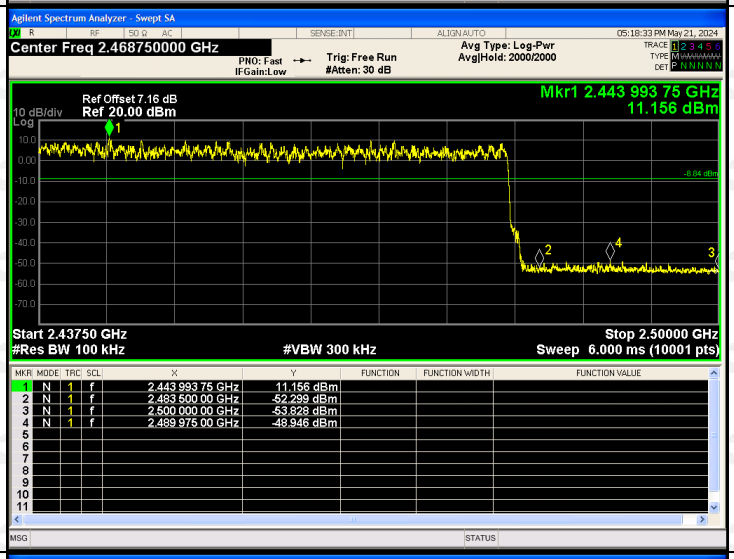
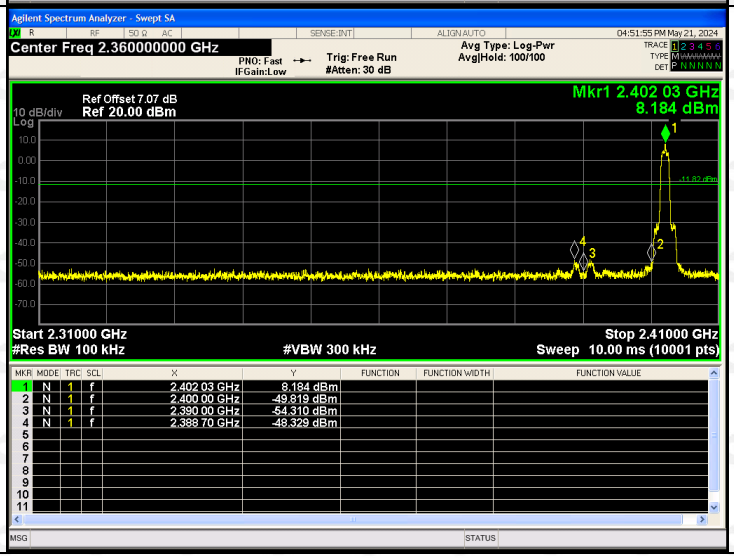
8.3 Test procedure

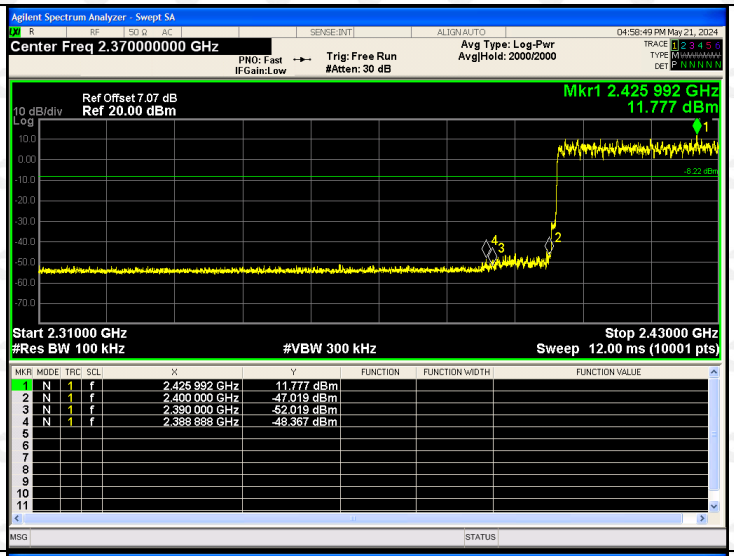
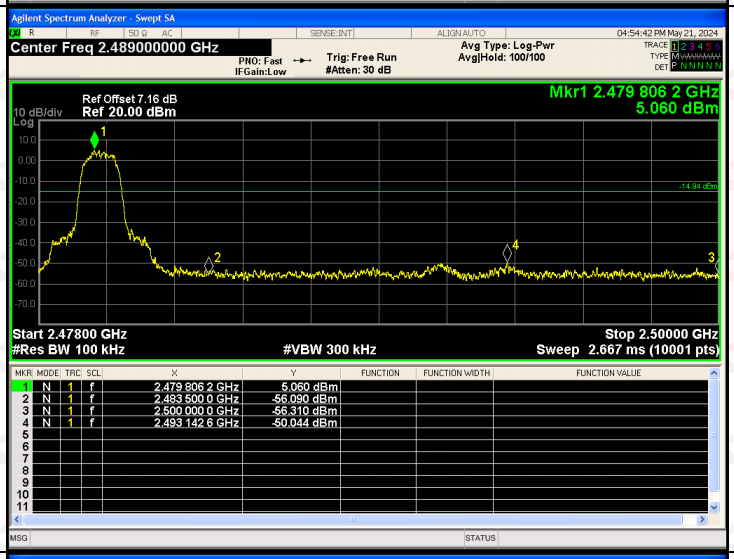
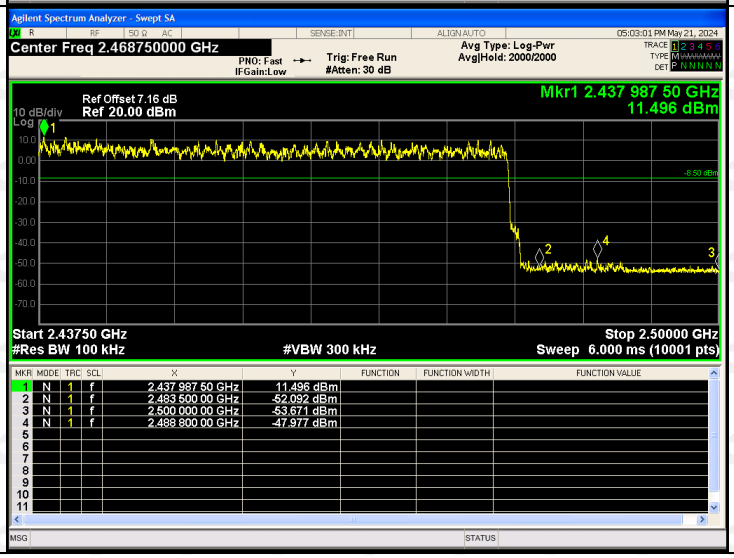
1. Remove the antenna from the EUT and then connect a low RF cable from the antenna port to the spectrum;
2. Set the spectrum analyzer:
Blow 30MHz:
RBW = 100kHz, VBW = 300kHz, Sweep = auto
Detector function = peak, Trace = max hold
Above 30MHz:
RBW = 100KHz, VBW = 300KHz, Sweep = auto
Detector function = peak, Trace = max hold

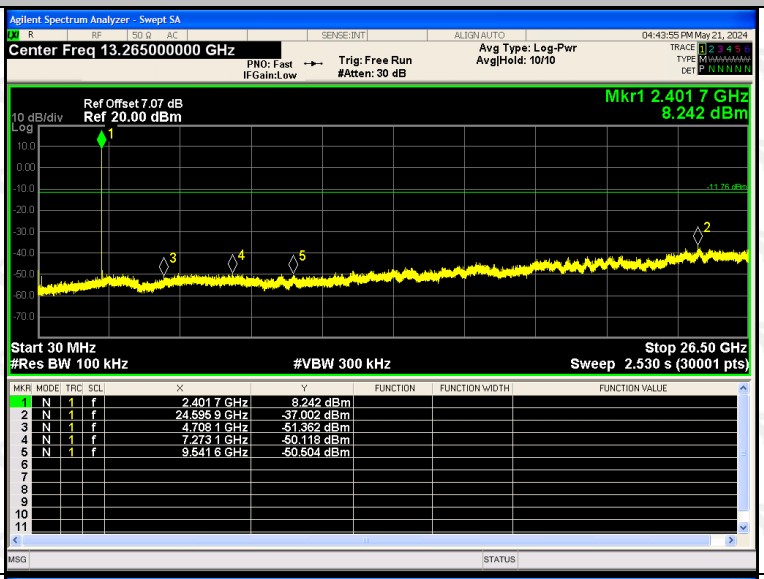
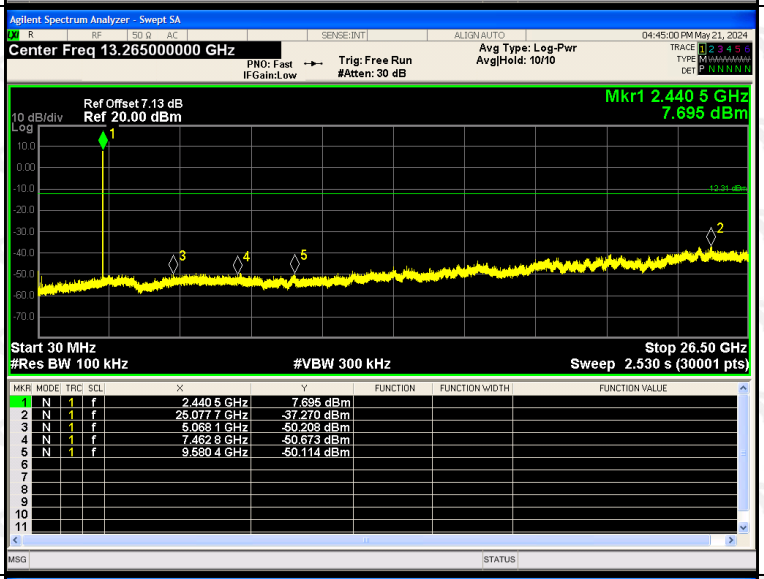
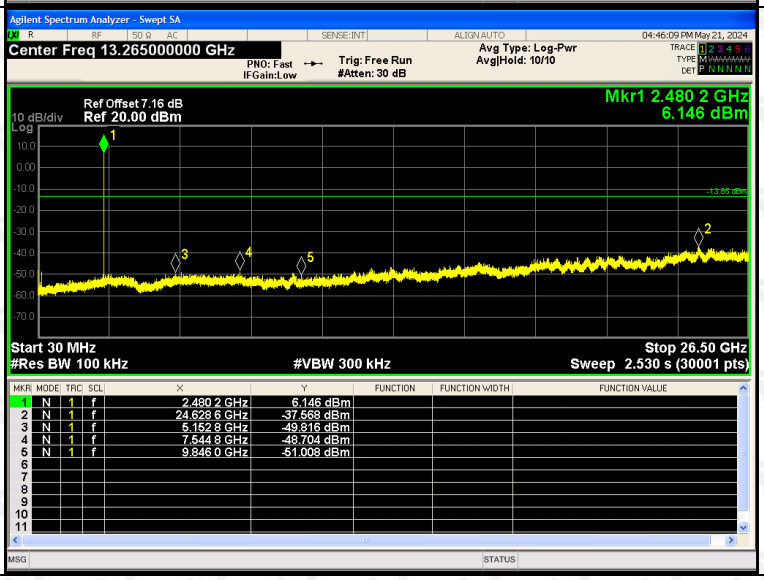
8.4 Test Result

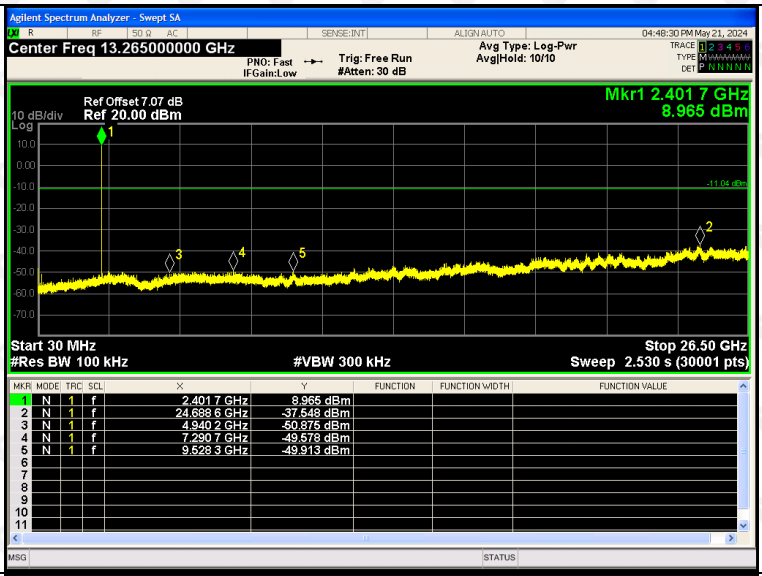
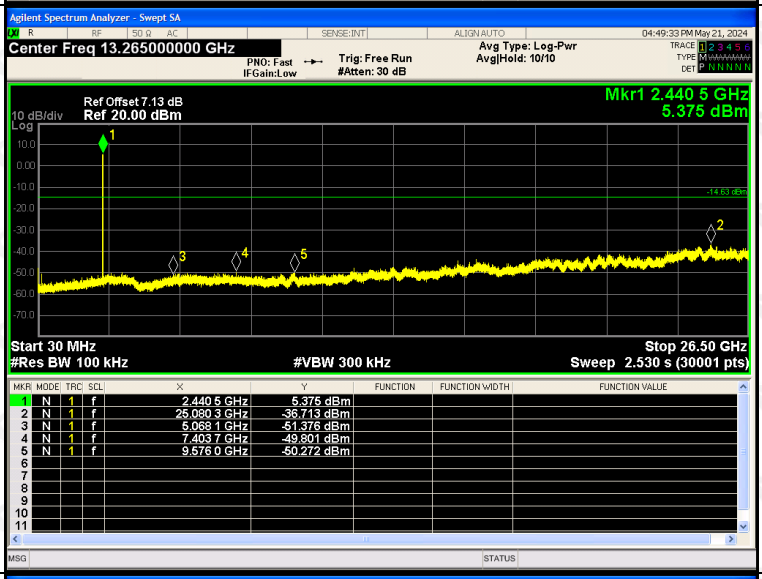
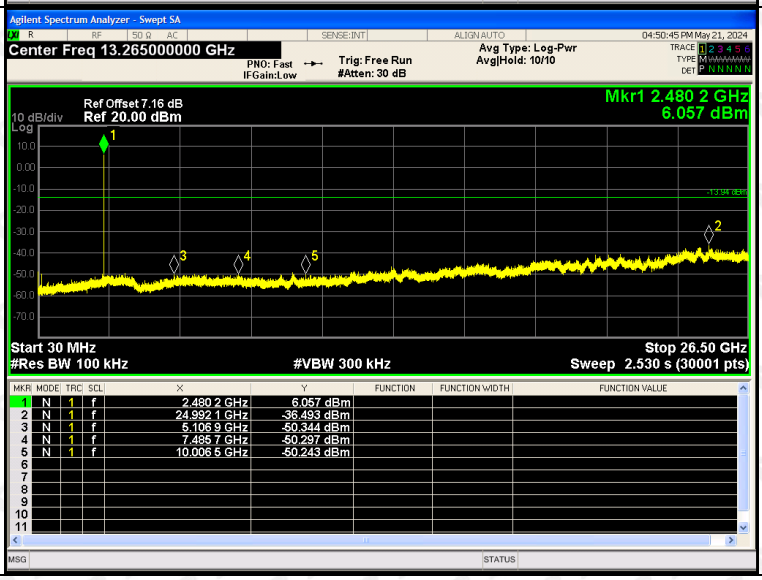
BAND EDGE Graphs	
GFSK/LCH/ No Hop	
GFSK/LCH/ Hop	
GFSK/HCH/ No Hop	

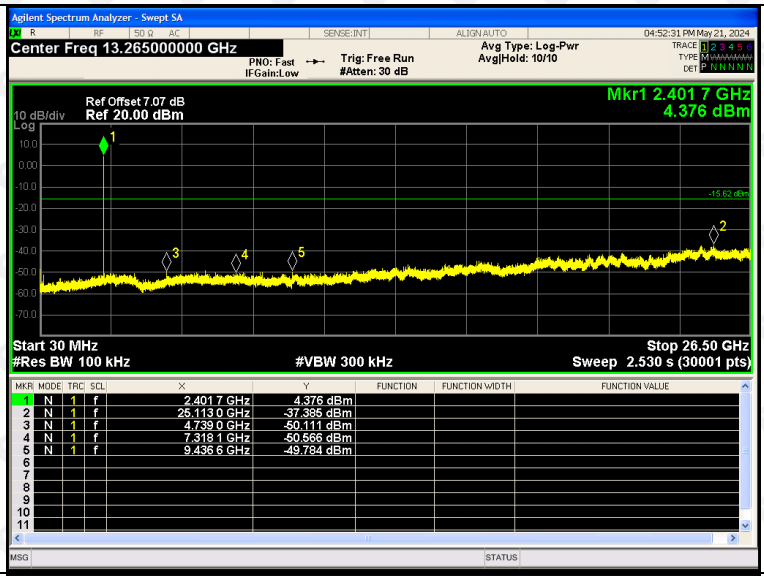
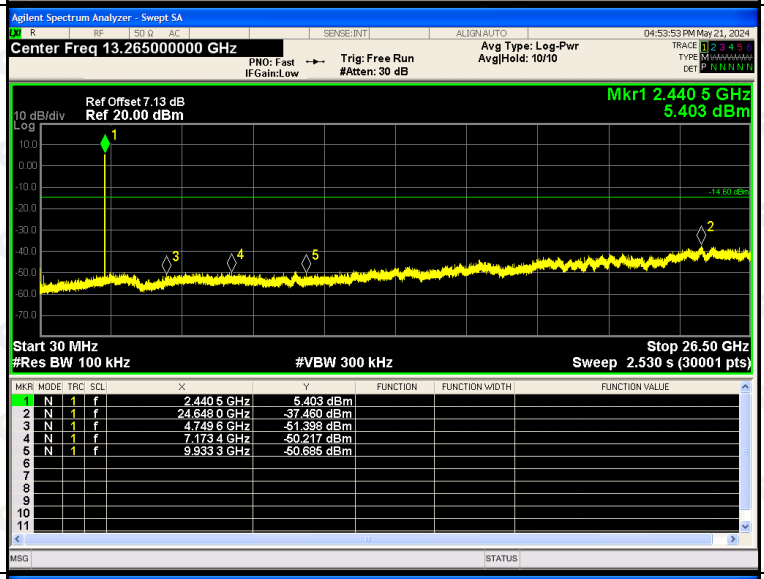
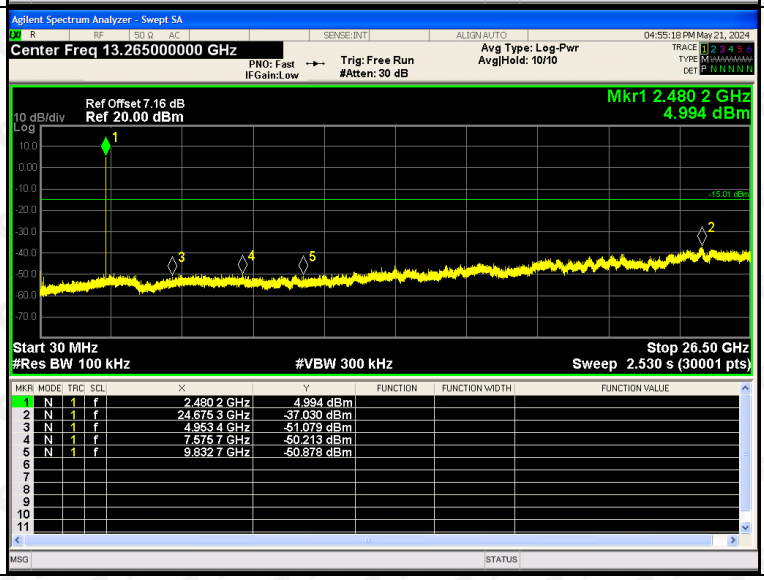
GFSK/HCH/ Hop			
π/4DQPSK/LCH/ No Hop			
π/4DQPSK/LCH/ Hop			

π/4DQPSK/HCH/ No Hop			
π/4DQPSK/HCH/ Hop			
8DPSK/LCH/No Hop			

8DPSK /LCH/Hop			
8DPSK /HCH/No Hop			
8DPSK /HCH/Hop			

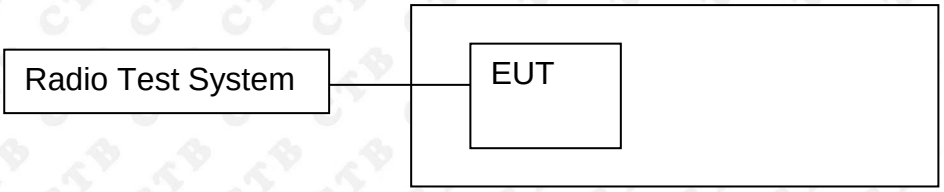
RF Conducted Spurious Emissions Graphs			
GFSK/LCH			
GFSK/MCH			
GFSK/HCH			

π/4DQPSK /LCH		
π/4DQPSK/MCH		
π/4DQPSK/HCH		

8DPSK /LCH		
8DPSK /MCH		
8DPSK /HCH		

9. COUDUCTED PEAK OUTPUT POWER

9.1 Block Diagram Of Test Setup



9.2 Limit

For frequency hopping systems operating in the 2400-2483.5 MHz band employing at least 75 non-overlapping hopping channels, and all frequency hopping systems in the 5725-5850 MHz band: 1 watt. For all other frequency hopping systems in the 2400-2483.5 MHz band: 0.125 watts.

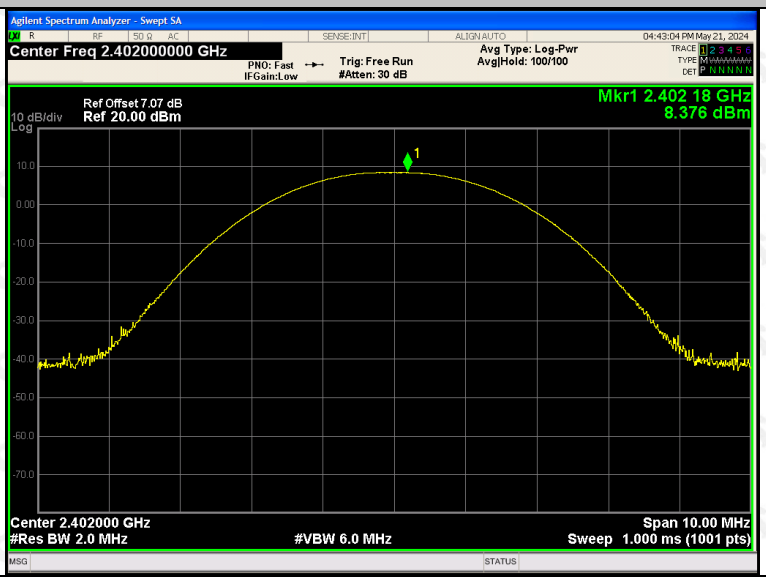
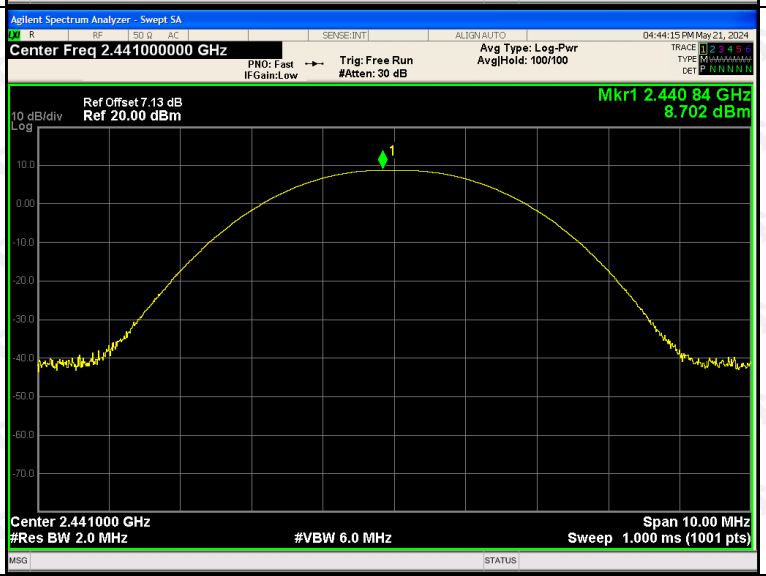
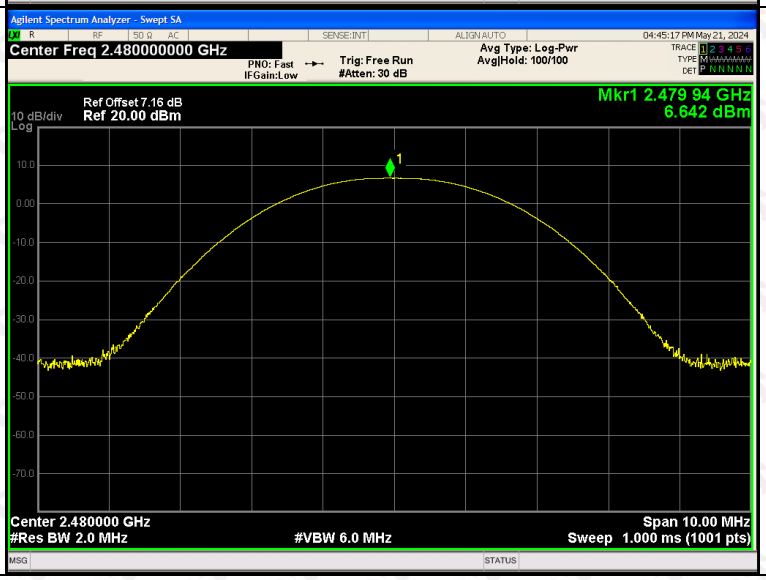
9.3 Test procedure

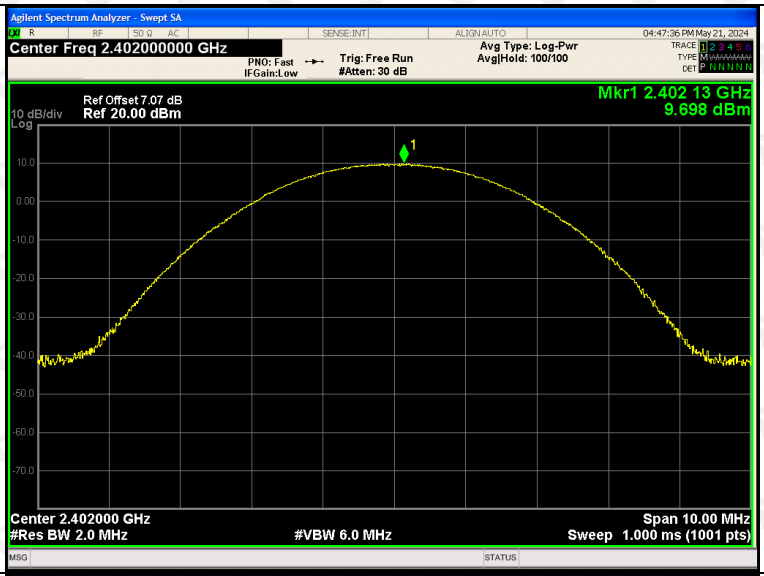
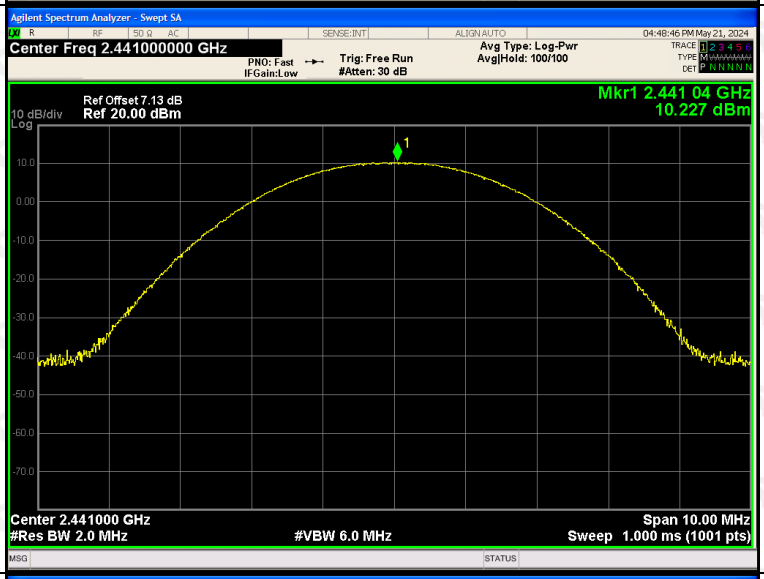
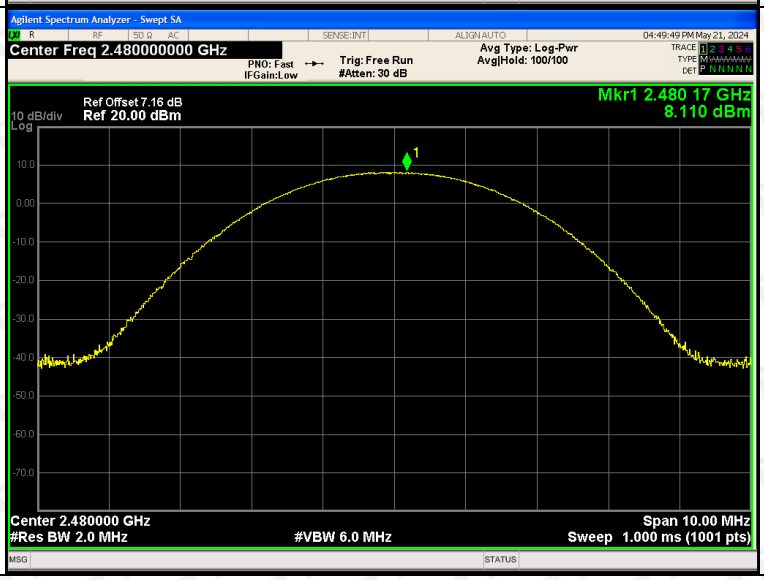
1. Remove the antenna from the EUT and then connect a low RF cable from the antenna port to the spectrum.
2. Set the spectrum analyzer: RBW = 2MHz. VBW = 6MHz. Sweep = auto; Detector Function = Peak.
3. Keep the EUT in transmitting at lowest, middle and highest channel individually. Record the max value.

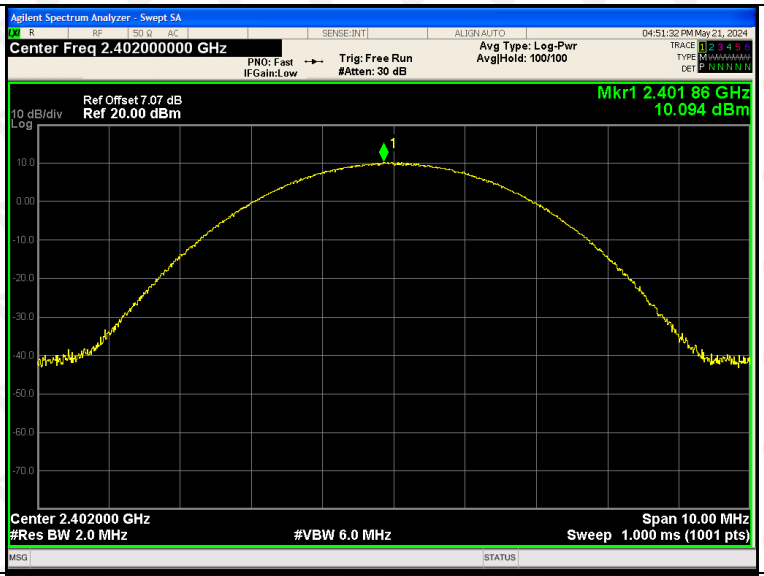
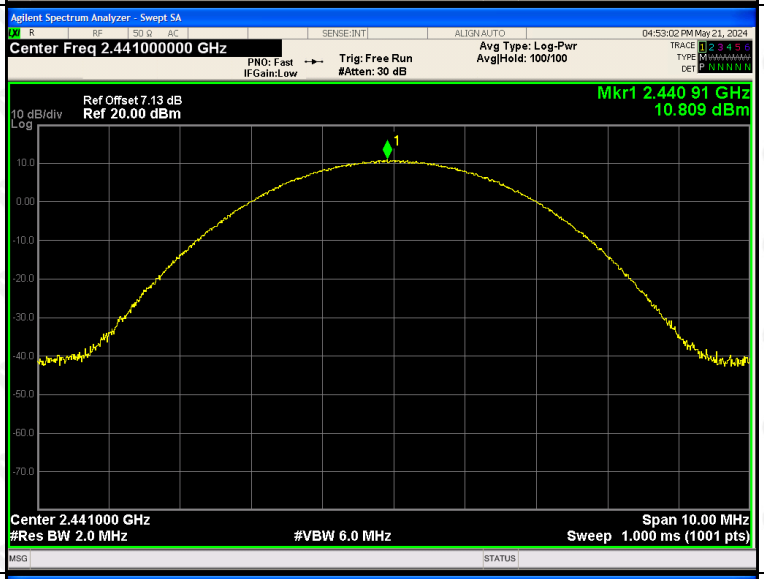
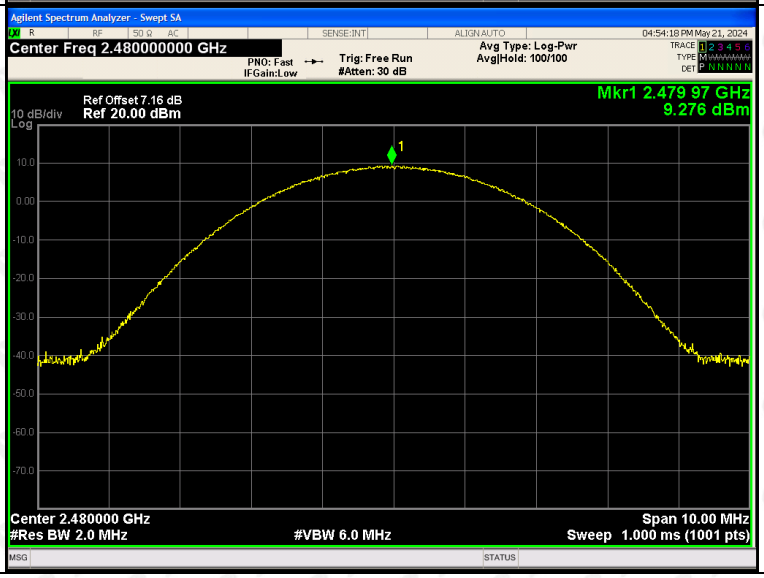
9.4 Test Result

Mode	Channel.	Maximum Peak Output Power [dBm]	Limit [dBm]	Verdict
EDR mode (GFSK)	LCH	8.376	20.97	PASS
	MCH	8.702	20.97	PASS
	HCH	6.642	20.97	PASS
EDR mode (π/4DQPSK)	LCH	9.698	20.97	PASS
	MCH	10.227	20.97	PASS
	HCH	8.110	20.97	PASS
EDR mode (8DPSK)	LCH	10.094	20.97	PASS
	MCH	10.809	20.97	PASS
	HCH	9.276	20.97	PASS

Test Graph:

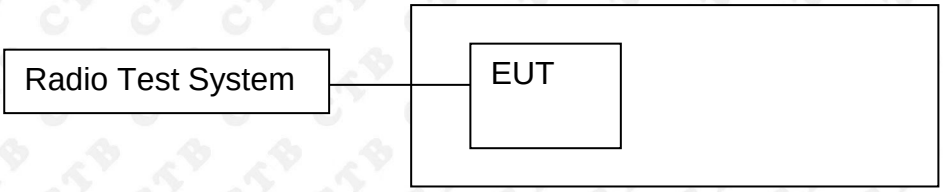
Graphs		
GFSK/LCH		
GFSK/MCH		
GFSK/HCH		

π/4DQPSK/LCH		
π/4DQPSK/MCH		
π/4DQPSK/HCH		

8DPSK/LCH			
8DPSK /MCH			
8DPSK /HCH			

10. 20DB OCCUPIED BANDWIDTH

10.1 Block Diagram Of Test Setup



10.2 Limit

Alternatively, frequency hopping systems operating in the 2400-2483.5MHz band may have hopping channel carrier frequencies that are separated by 25kHz or two-thirds of the 20dB bandwidth of the hopping channel, whichever is greater, provided the systems operate with an output power no greater than 125mw.

10.3 Test procedure

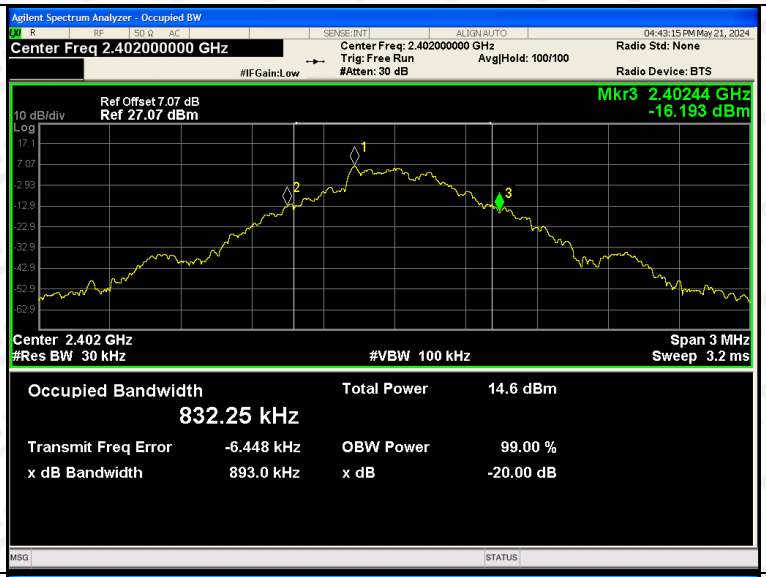
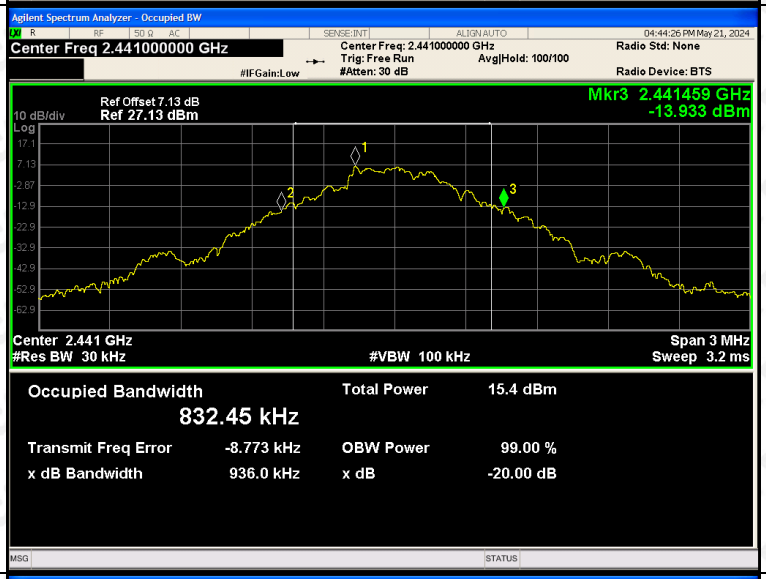
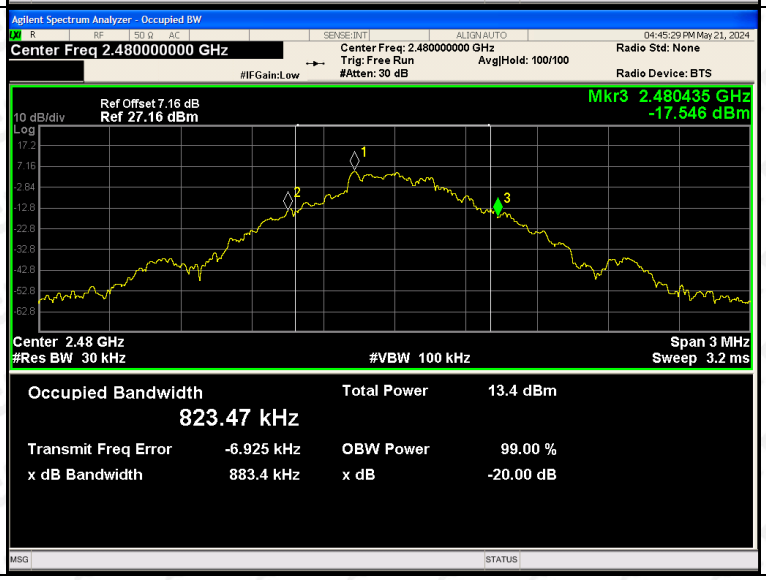
1. Rem1. Set RBW = 30 kHz.
2. Set the video bandwidth (VBW) ≥ 3 x RBW.
3. Detector = Peak.
4. Trace mode = max hold.
5. Sweep = auto couple.
6. Allow the trace to stabilize.
7. Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission.

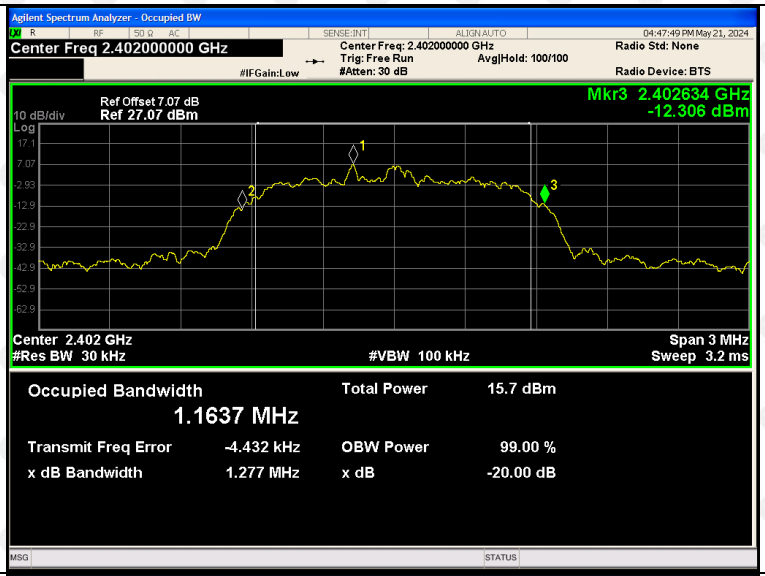
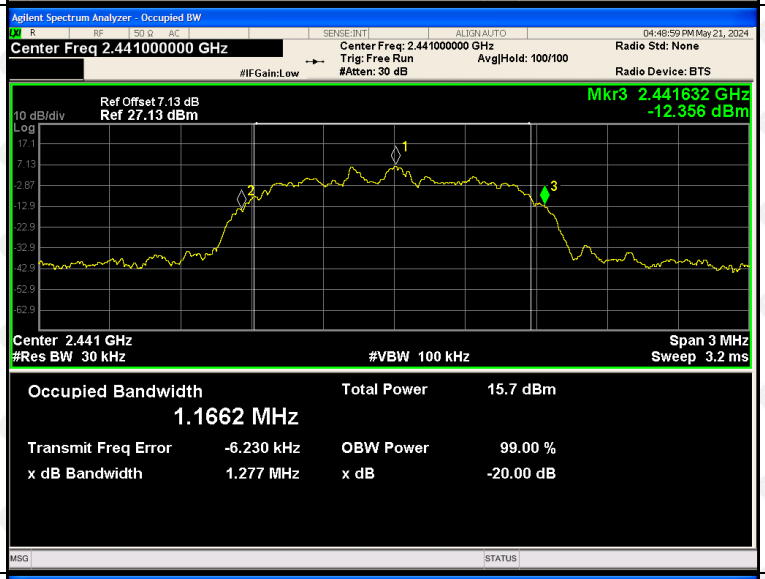
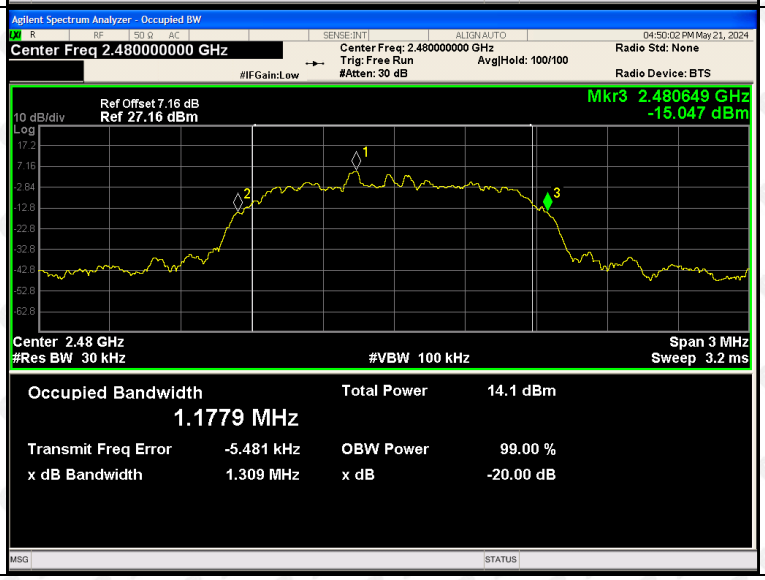
10.4 Test Result

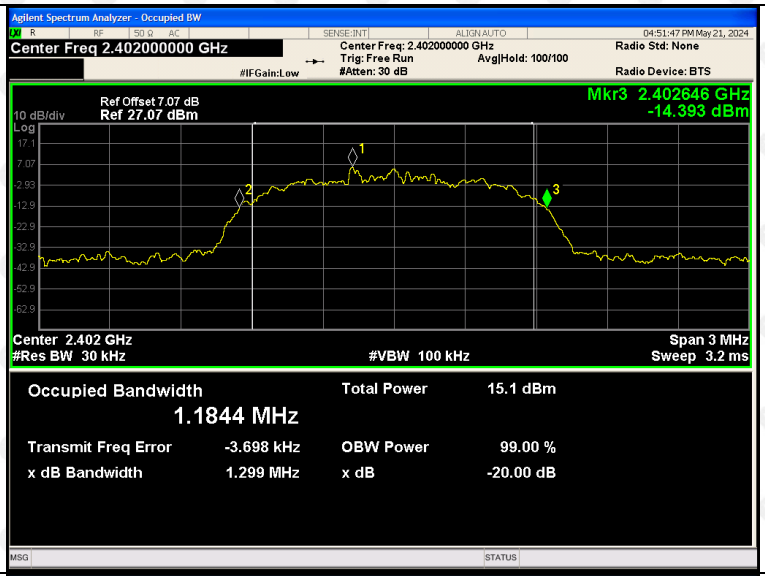
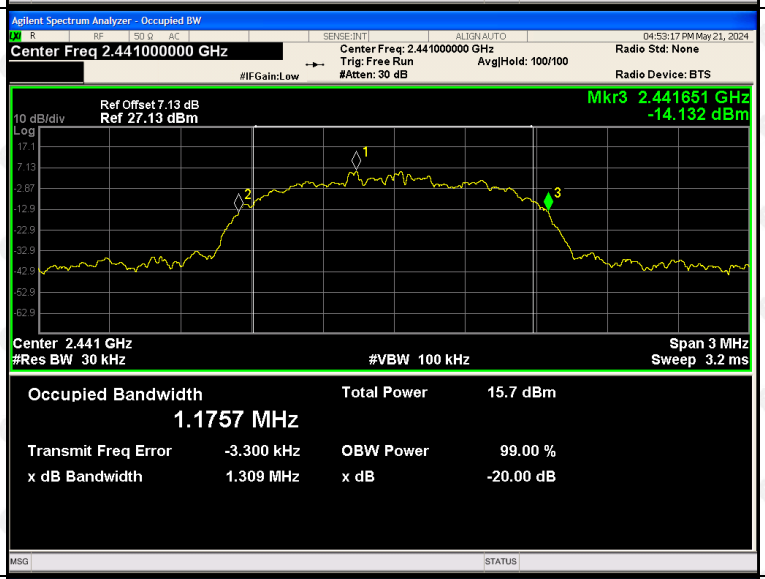
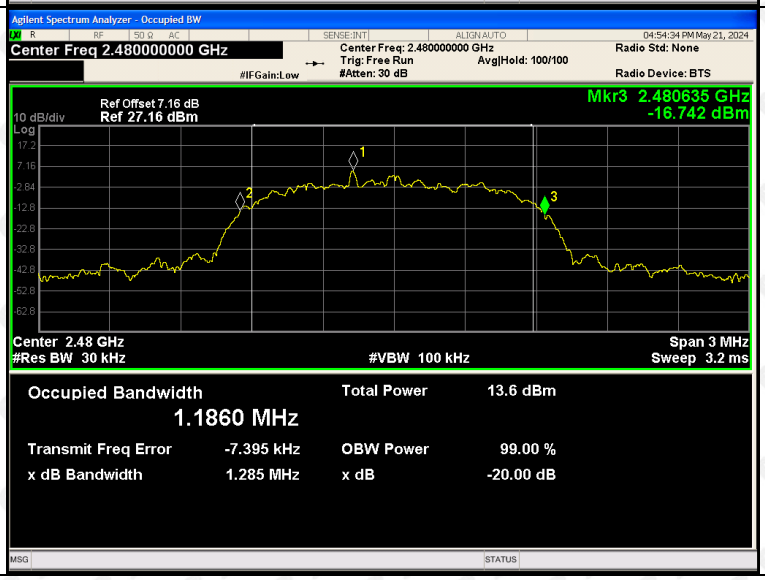
Test Mode	Frequency	20dB Bandwidth (MHz)	Result
GFSK	Low channel	0.893	**PASS**
	Mid channel	0.936	**PASS**
	High channel	0.883	**PASS**
π/4DQPSK	Low channel	1.277	**PASS**
	Mid channel	1.277	**PASS**
	High channel	1.309	**PASS**
8DPSK	Low channel	1.299	**PASS**
	Mid channel	1.309	**PASS**
	High channel	1.285	**PASS**

Note: All modes of operation were Pre-scan and the worst-case emissions are reported.

Test Graph:

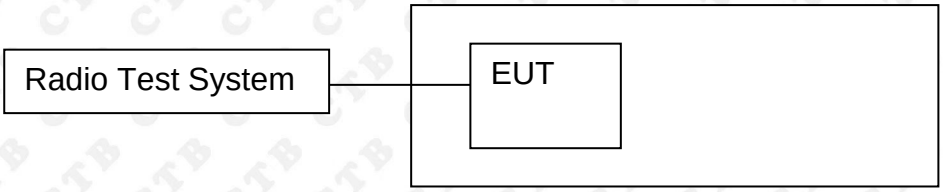
GFSK Low channel		
GFSK Mid channel		
GFSK High channel		

π/4-DQPSK Low channel			
π/4-DQPSK Mid channel			
π/4-DQPSK High channel			

8DPSK Low channel		
8DPSK Mid channel		
8DPSK High channel		

11. CARRIERFREQUENCIES SEPARATION

11.1 Block Diagram Of Test Setup



11.2 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 0.125W.

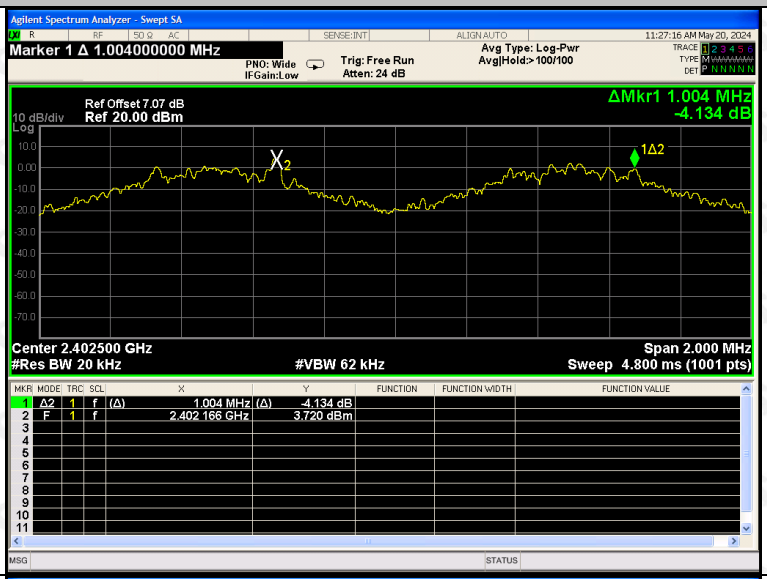
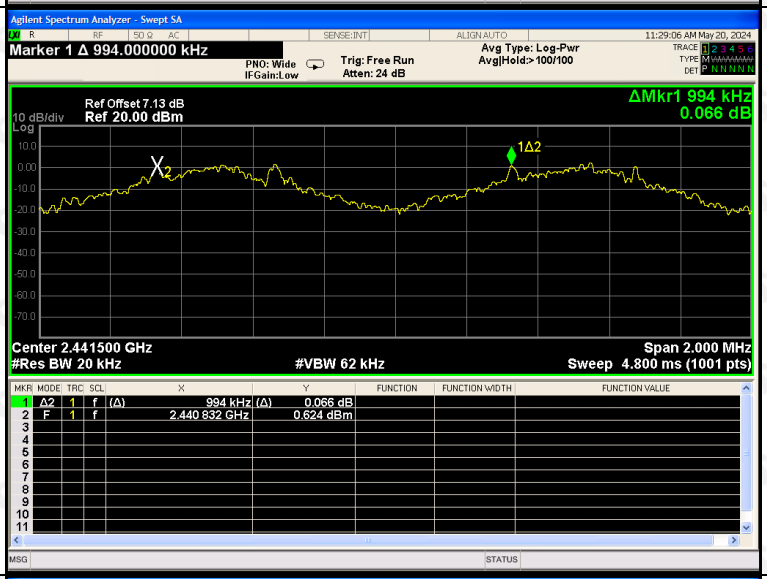
11.3 Test procedure

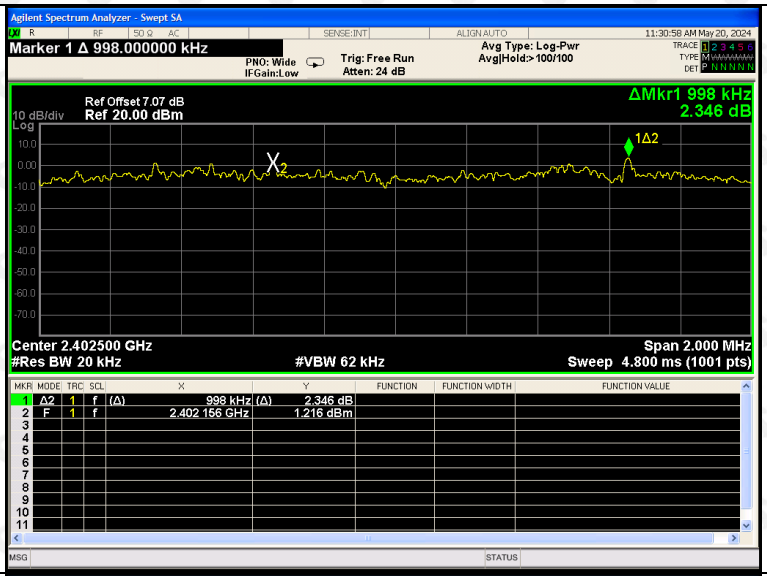
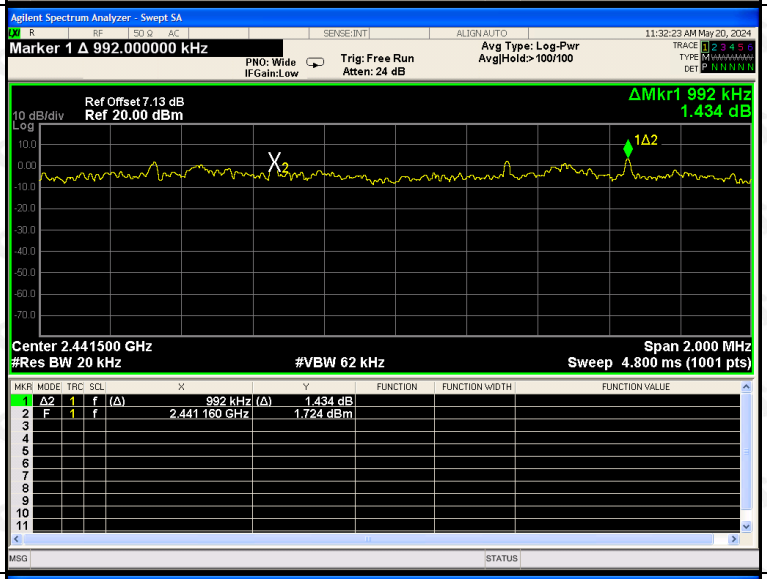
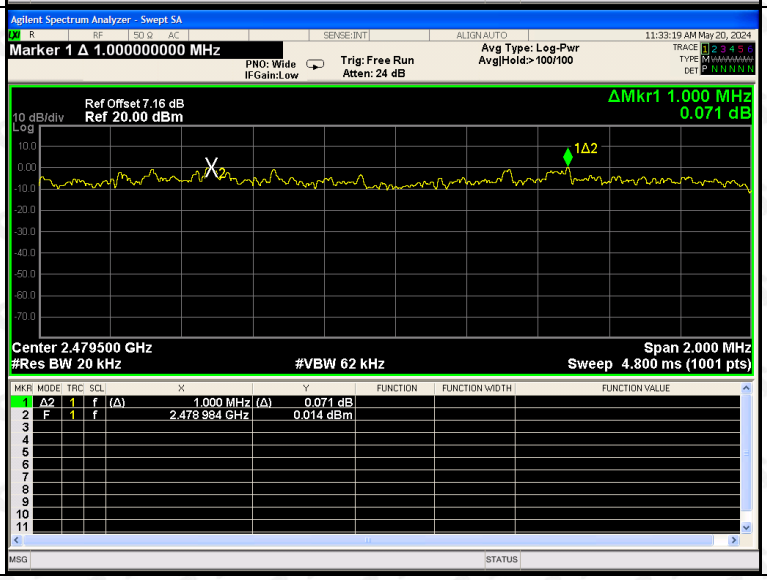
1. Remove the antenna from the EUT and then connect a low RF cable from the antenna port to the spectrum.
2. Set the spectrum analyzer: RBW = 100kHz. VBW = 300kHz , Span = 2MHz. Sweep = auto; Detector Function = Peak. Trace = Max hold.
3. Allow the trace to stabilize. Use the marker-delta function to determine the separation between the peaks of the adjacent channels. The limit is specified in one of the subparagraphs of this Section Submit this plot.

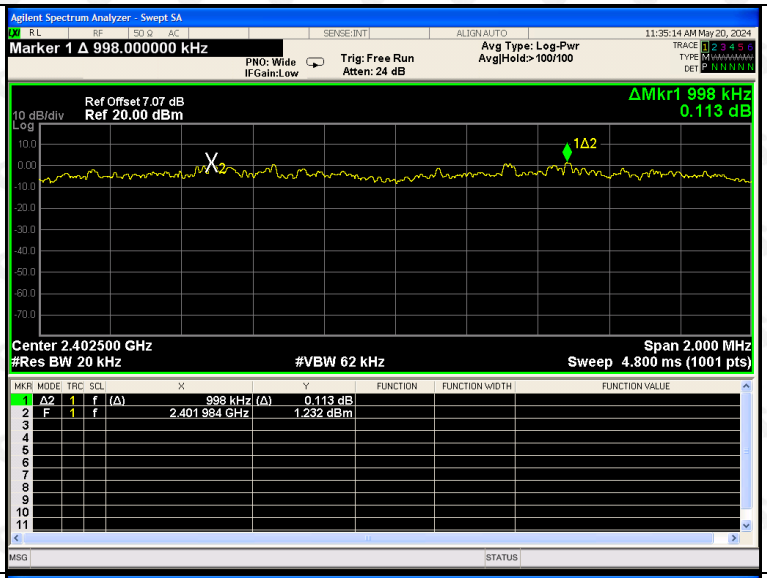
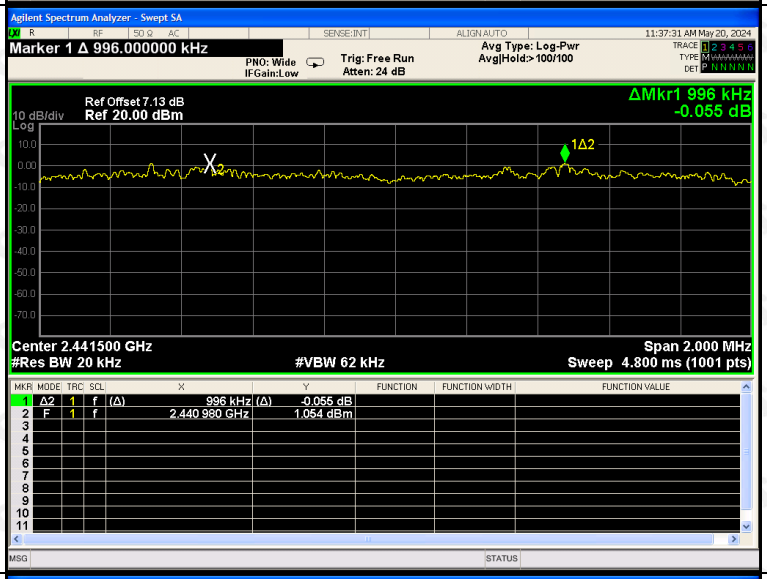
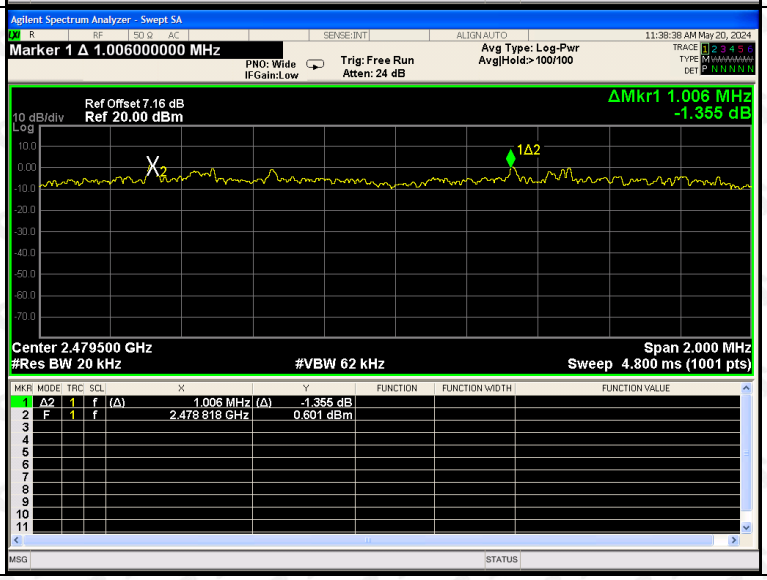
11.4 Test Result

Mode	Channel.	Carrier Frequency Separation [MHz]	Limit(2/3 of the 20dB bandwidth MHz)	Verdict
GFSK	LCH	1.004	0.595	PASS
GFSK	MCH	0.994	0.624	PASS
GFSK	HCH	0.998	0.589	PASS
π/4DQPSK	LCH	0.998	0.851	PASS
π/4DQPSK	MCH	0.992	0.851	PASS
π/4DQPSK	HCH	1.000	0.873	PASS
8DPSK	LCH	0.998	0.866	PASS
8DPSK	MCH	0.996	0.873	PASS
8DPSK	HCH	1.006	0.857	PASS

Test Graph

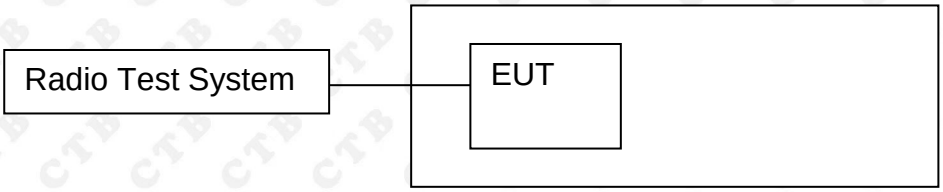
Graphs	
GFSK/LCH	
GFSK/MCH	
GFSK/HCH	

π/4DQPSK/LCH	
π/4DQPSK/MCH	
π/4DQPSK/HCH	

8DPSK/LCH	
8DPSK /MCH	
8DPSK /HCH	

12. HOPPING CHANNEL NUMBER

12.1 Block Diagram Of Test Setup



12.2 Limit

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

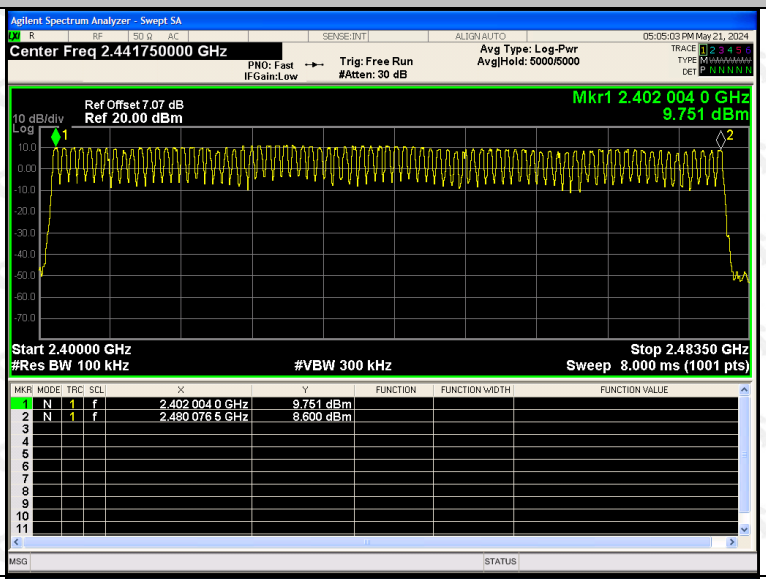
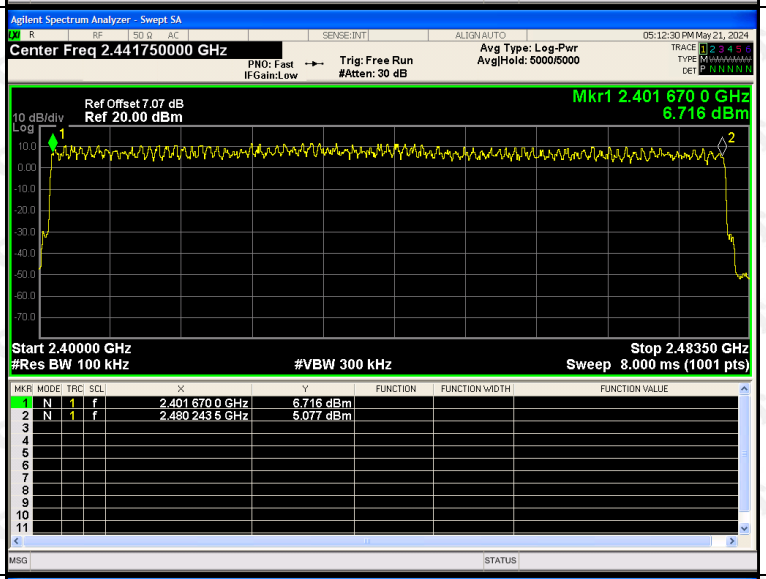
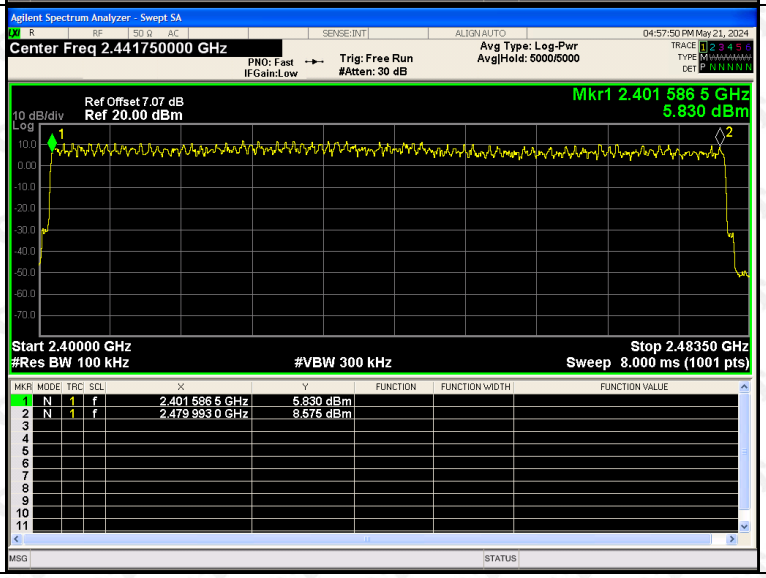
12.3 Test procedure

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 = 100kHz. VBW = 300kHz. Sweep = auto; Detector Function = Peak. Trace = Max hold.
3. Allow the trace to stabilize. It may prove necessary to break the span up to sections. in order to clearly show all of the hopping frequencies. The limit is specified in one of the subparagraphs of this Section.
4. Set the spectrum analyzer: Start Frequency = 2.4GHz, Stop Frequency = 2.4835GHz. Sweep=auto;

12.4 Test Result

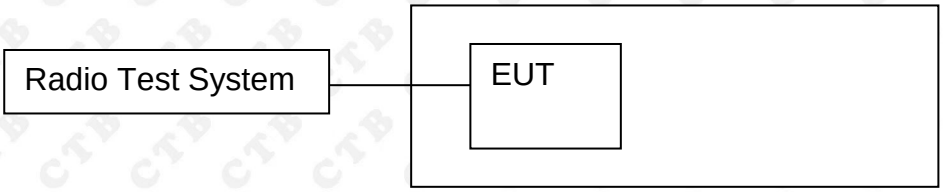
Mode	Channel.	Number of Hopping Channel	Limit	Verdict
GFSK	Hop	79	⩾15	PASS
π/4DQPSK	Hop	79	⩾15	PASS
8DPSK	Hop	79	⩾15	PASS

Test Graph

Graphs		
GFSK/Hop		
π/4DQPSK/Hop		
8DPSK/Hop		

13. DWELL TIME

13.1 Block Diagram Of Test Setup



13.2 Limit

Frequency hopping systems in the 2400-2483.5 MHz band shall use at least 15 channels. 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. Frequency hopping systems may avoid or suppress transmissions on a particular hopping frequency provided that a minimum of 15 channels are used.

13.3 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 spectrum analyzer span = 0. Centred on a hopping channel;
3. Set RBW = 1MHz and VBW = 3MHz.Sweep = as necessary to capture the entire dwell time per hopping channel. Set the EUT for DH5, DH3 and DH1 packet transmitting.
4. Use the marker-delta function to determine the dwell time. If this value varies with different modes of operation (e.g.. data rate. modulation format. etc.). repeat this test for each variation. The limit is specified in one of the subparagraphs of this Section. Submit this plot(s).

13.4 Test Result

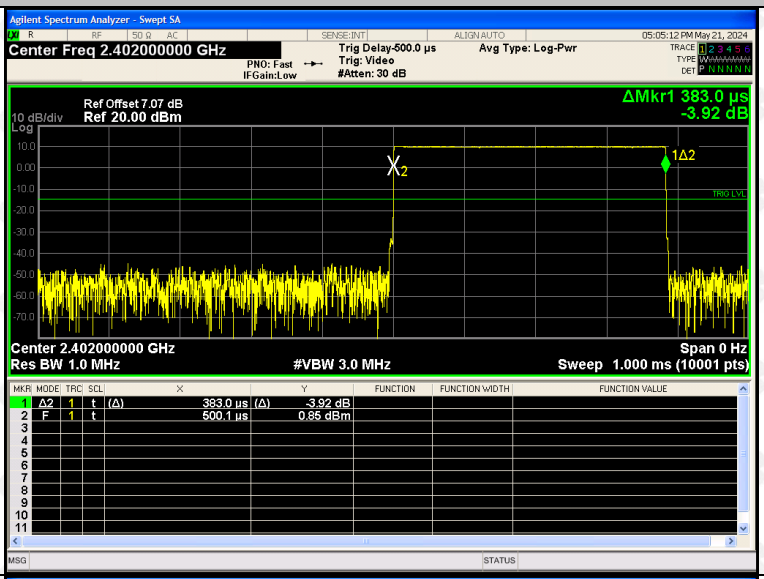
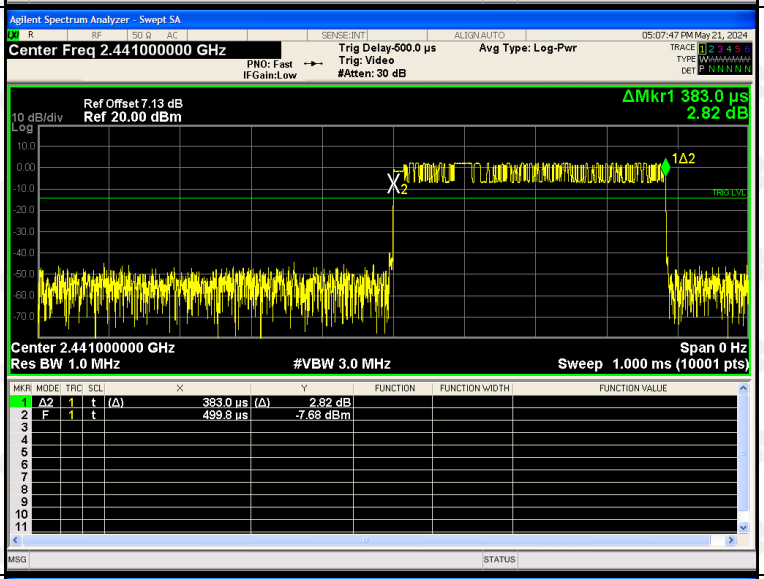
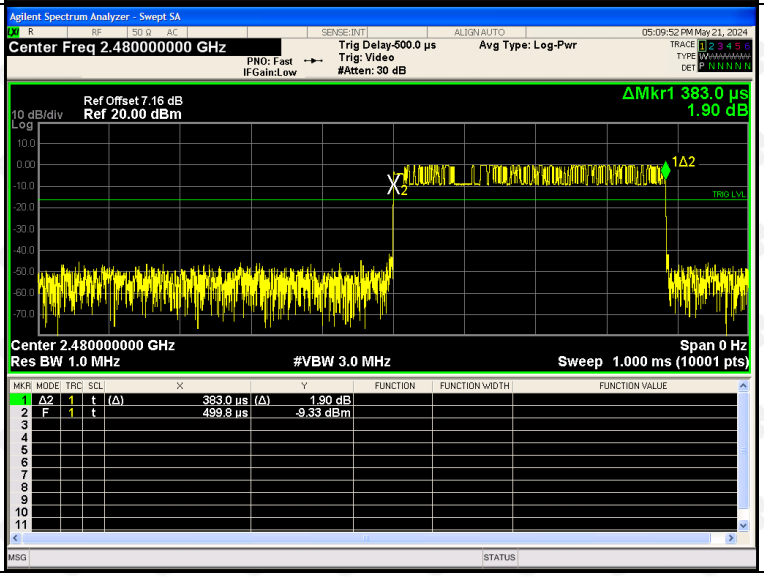
Worst case-GFSK:

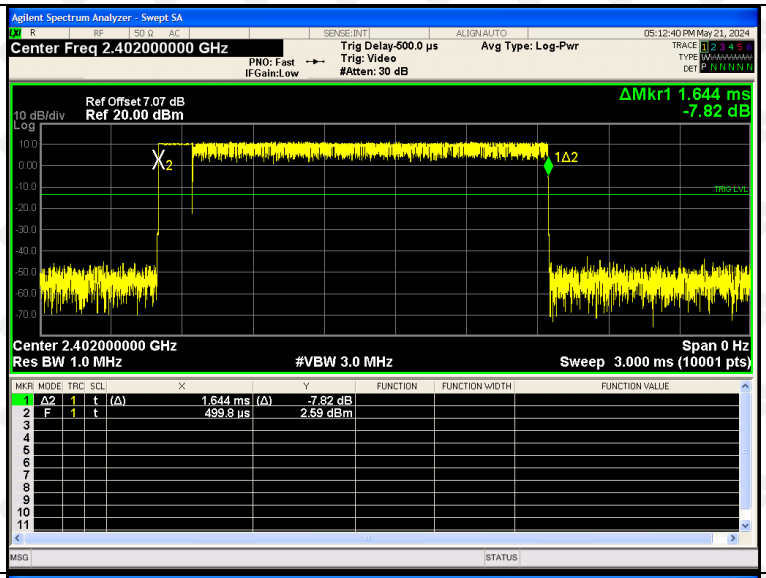
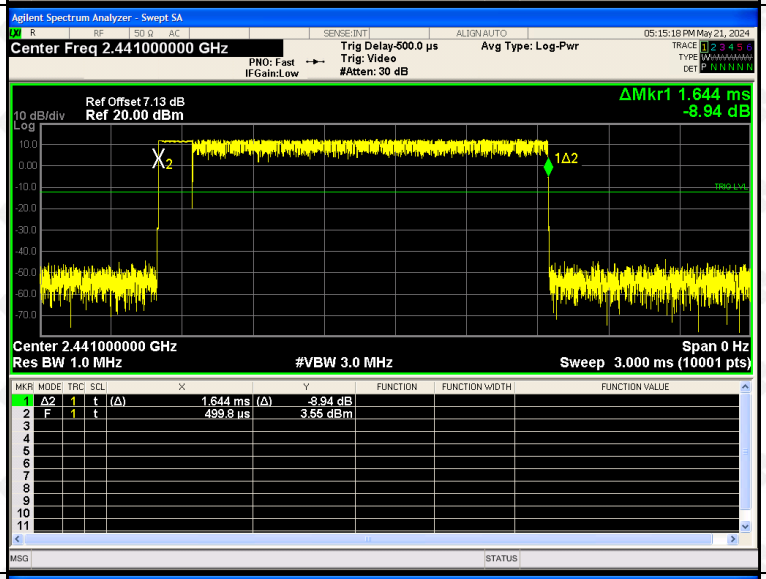
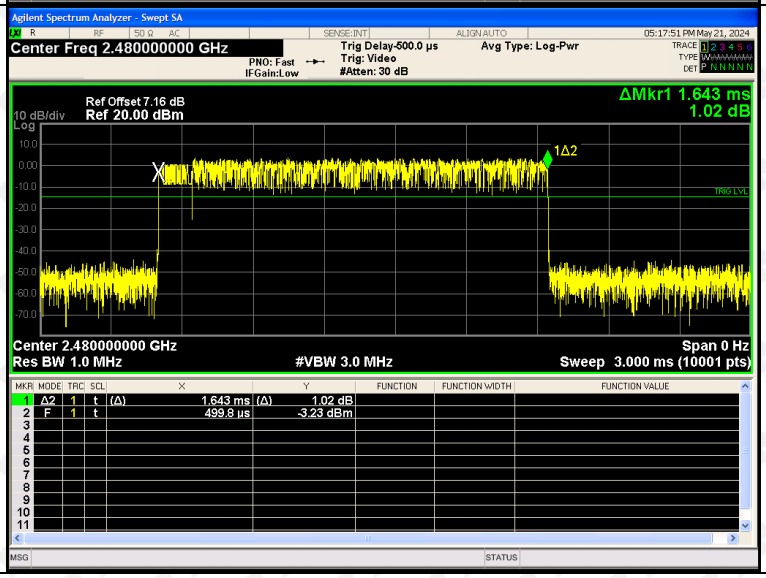
Mode	Packet	Channel	Pulse Time (ms)	Total Dwell Time (ms)	Limit (ms)	Verdict
GFSK	DH1	LCH	0.383	122.56	400	PASS
	DH1	MCH	0.383	122.56	400	PASS
	DH1	HCH	0.383	122.56	400	PASS
	DH3	LCH	1.644	263.04	400	PASS
	DH3	MCH	1.644	263.04	400	PASS
	DH3	HCH	1.643	262.88	400	PASS
	DH5	LCH	2.894	308.693	400	PASS
	DH5	MCH	2.894	308.693	400	PASS
	DH5	HCH	2.894	308.693	400	PASS

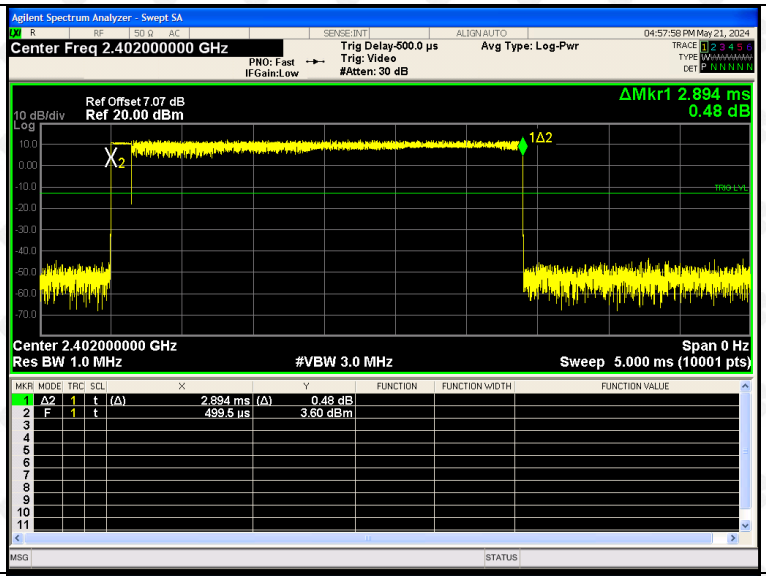
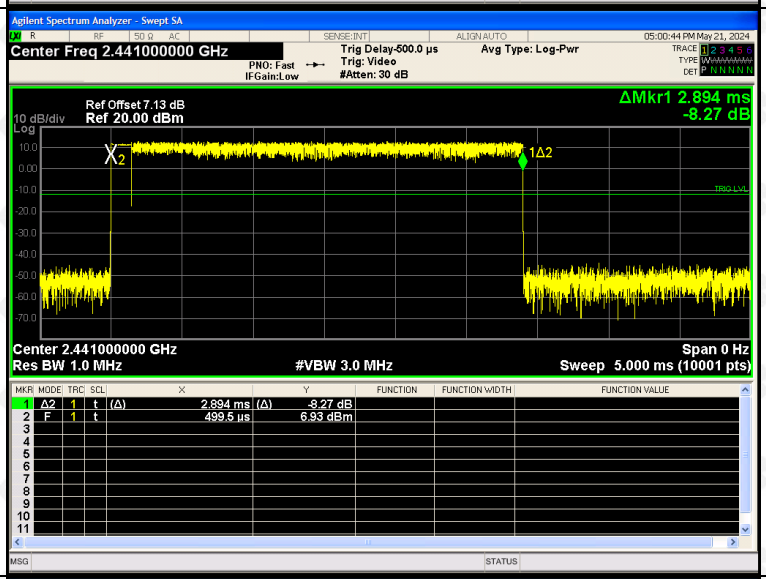
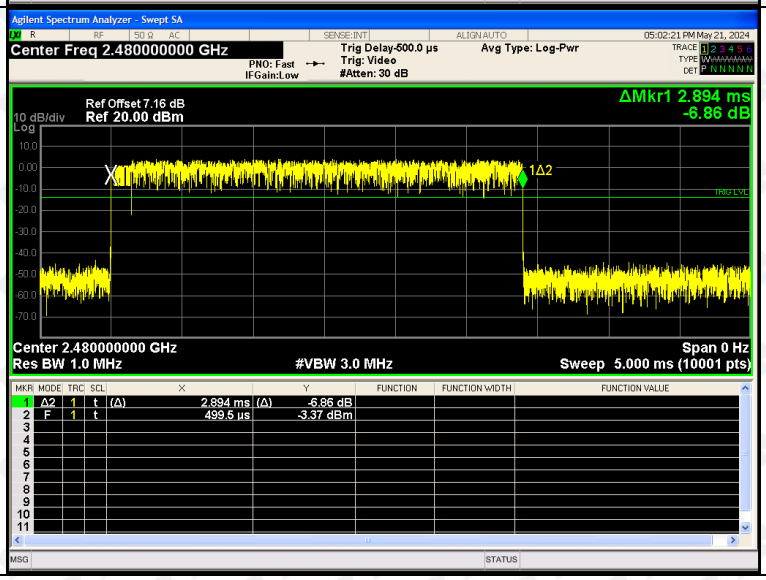
Remark: DH5 Packet permit maximum 1600 / 79 / 6 hops per second in each channel
(5 time slots RX, 1 time slot TX).
DH3 Packet permit maximum 1600 / 79 / 4 hops per second in each channel
(3 time slots RX, 1 time slot TX).
DH1 Packet permit maximum 1600 / 79 /2 hops per second in each channel
(1 time slot RX, 1 time slot TX). So, the Dwell Time can be calculated as follows:

DH5:1600/79/6*0.4*79*(MkrDelta)/1000
DH3:1600/79/4*0.4*79*(MkrDelta)/1000
DH1:1600/79/2*0.4*79*(MkrDelta)/1000
Remark: Mkr Delta is once pulse time.

Test Graph

Graphs		
GFSK_DH1/LCH		
GFSK_DH1/MCH		
GFSK_DH1/HCH		

GFSK_DH3/LCH		
GFSK_DH3/MCH		
GFSK_DH3/HCH		

GFSK_DH5/LCH		
GFSK_DH5/MCH		
GFSK_DH5/HCH		

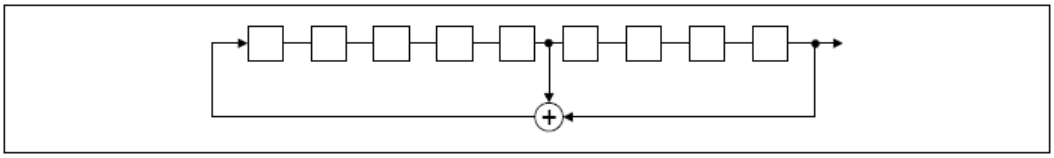
14. PSEUDORANDOM FREQUENCY

14.1 Limit

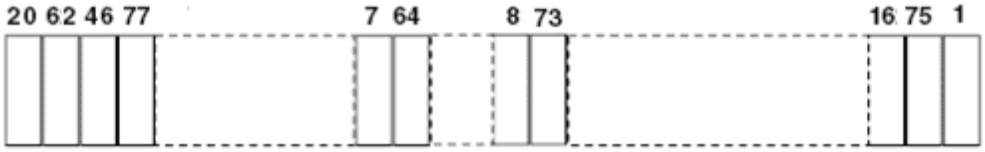
Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater.
Alternatively. Frequency hopping systems operating in the 2400-2483.5 MHz band may have hopping channel carrier frequencies that 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 125 mW. The system shall hop to channel frequencies that are selected at the system hopping rate from a Pseudorandom 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.

14.2 Test procedure

The pseudorandom sequence may be generated in a nine-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; i.e. 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)



An example of Pseudorandom Frequency Hopping Sequence as follow:



Each frequency used equally on the average by each transmitter.
The system receivers have input bandwidths that match the hopping channel bandwidths of their Corresponding transmitters and shift frequencies in synchronization with the transmitted signals.

14.3 Test Result

The device does not have the ability to be coordinated with other FHSS systems in an effort to avoid the simultaneous occupancy of individual hopping frequencies by multiple transmitters.

15. ANTENNA REQUIREMENT

15.203 requirement:
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.
15.247(b) (4) requirement:
The conducted output power limit specified in paragraph (b) of this section is based on the use of antennas with directional gains that do not exceed 6 dBi. Except as shown in paragraph (c) of this section, if transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced below the stated values in paragraphs (b)(1), (b)(2), and (b)(3) of this section, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

EUT Antenna:

The antenna is Built-in antenna. The best case gain of the antenna is 1.86dBi.

16. EUT TEST SETUP PHOTOGRAPHS

Radiated Emission

Below 1G

Above 1G

Conducted emissions

※※※※※ **END OF REPORT** ※※※※※