



FCC PART 15 SUBPART C FCC PART 15.247 TEST REPORT

FCC ID:2BVOF-HY11050

Report No: CTSL2620330272E

Product Name: Bluetooth audio

Main Test Model: HY11050-402701

Series Models: HY11050-402226B, HY10018-402313 (All models share same electric circuits except model name.)

Applicant: SHENZHEN HAO YUN TECHNOLOGY CO.,LTD

EXECUTIVE SUMMARY

A sample of this product was tested and found to be in compliance with
FCC PART 15C, FCC PART 15 SUBPART C (15.247).

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CTSL Testing (Dongguan) Co., Ltd.

Main company address: Building 1, Houjie Road, Houjie Town, Guangdong Province
Dongguan City, China

Test Report**FCC ID:2BVOF-HY11050**

Applicant Name	SHENZHEN HAO YUN TECHNOLOGY CO.,LTD				
Applicant Address	2F, Bldg B, Zhongguanda Science&Technology Park, Tangxiawei, Gongming, Guangming New Dist, Shenzhen, GuangDong, China				
Manufacturer Name	SHENZHEN HAO YUN TECHNOLOGY CO.,LTD				
Manufacturer Address	2F, Bldg B, Zhongguanda Science&Technology Park, Tangxiawei, Gongming, Guangming New Dist, Shenzhen, GuangDong, China				
Trade Mark	/				
Product name	Bluetooth audio				
Main Test Model	HY11050-402701				
Series Models	HY11050-402226B, HY10018-402313 (All models share same electric circuits except model name.)				
Standard	FCC Part 15 Subpart C (15.247) ANSI C63.10:2020 FCC KDB 558074 D01 15.247 Meas Guidance v05r02				
Test Location	ISO/IEC 17025 by ILAC-MRA is A2LA 7556.01 CTSL Testing (Dongguan) Co., Ltd. Room 112, Building 1, No. 15, Jiaoyuansongshan Hetian Village, Houjie Town Dongguan City, Guangdong, People's Republic of China				
Receipt Date	2026.03.31	Test period	2026.04.01-2026.04.13	Issue Date	2026.04.15
Conclusion	The equipment under test was found to be compliance with the requirements of the standards applied.				
Performs Testing:	Ethan Zhao	(Special seal)			
Test Report Reviewer:	Steve Qin				
Test Report Authorizer:	Alan Li				

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1.GENERAL INFORMATION

1.1.General Description of EUT (Equipment Under Test)

Product Information	
Product Name	: Bluetooth audio
Main Test Model	: HY11050-402701
Series Models	: HY11050-402226B, HY10018-402313 (All models share same electric circuits except model name.)
Power supply	: Input: DC 12V Operating Power: 5W.
Battery	: /
Software Version	: Version:0.0.6
Hardware Version	: HY11050 Version:0.0.6
Equipment Under Test	
Testing sample ID	: CTSL2620330272-S1 (Engineer sample) CTSL2620330272-S2 (Normal sample)
Test supplied	: ☐ supplied by the manufacturer ☒ supplied by the lab
Adapter information (Auxiliary test supplied by test Lab)	: AC 100-240V, 50/60Hz Output: DC 12V, 1A
Wireless Specification	
Supported Type	: Bluetooth V5.0 (BR/EDR)
Modulation Type	: BT BDR(1Mbps): GFSK BT EDR(2Mbps): $\pi/4$ -DQPSK BT EDR(3Mbps): 8-DPSK
Operation frequency	: 2402MHz-2480MHz
Number of channels	: 79
Channel separation	: 1MHz
Max Output Power (PEAK)	: 5.50dBm (5.0 $\pm$ 1.0)dBm
Antenna Gain& type	: Refer to Section 1.2 of the report.
Sample Type	: Prototype production
Type of Device	: ☒ Portable Device; ☐ Mobile Device; ☐ Modular Device

Note 1: For a more detailed features description, please refer to the manufacturer's specifications or the user's manual.

Note 2: The Manufacturer states that the product may be used in end products such as smart mirrors, bedside tables, and sofas.

1.2. Antenna Information

Ant No.	Brand	Model Name	Antenna Type	Connector	Gain (dBi)
1	2400 ~ 2500MHz	Antenna module on the system board	PCB Antenna	N/A	1.7
Note: 1. The antenna gain is declared by the customer and the laboratory is not responsible for the accuracy of the antenna gain. 2. The test results of this report only apply to the sample as received.					

1.3. Information of RF Cable

Cable Loss(dB)	Provided by
1.0	SHENZHEN HAO YUN TECHNOLOGY CO.,LTD
Note: 1. The customer declared the loss value of the RF Cable. and the test results of this report only apply to the sample as received. 2. The laboratory is not responsible for the accuracy of the cable loss.	

2.SUMMARY OF TEST

2.1.Test 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
FCC KDB 558074 D01 15.247 Meas Guidance v05r02

2.2.Summary of test result

No.	Description of Test Item	FCC Standard Section	Results
1	Maximum Peak Output Power	§15.247(a)(1)	PASS
2	20dB Bandwidth	§15.247(a)(1)	PASS
3	Carrier Frequency Separation	§15.247(a)(1)	PASS
4	Number Of Hopping Channels	§15.247(a)(1)(iii)	PASS
5	Time of Occupancy (Time of Occupancy (Dwell Time))	§15.247(a)(1)(iii)	PASS
6	Conducted Band Edge	§15.247(d)	PASS
7	Conducted Spurious Emissions	§15.247(d)	PASS
8	Radiated Spurious Emissions and Band Edge	§15.205 §15.209(a) §15.247(d)	PASS
9	AC Power Line Conducted Emissions	§15.107(a) §15.207	PASS
10	Antenna Requirement	§15.203	PASS

Note: "N/A" denotes test is not applicable in this test report.

2.3. Test Facilities

EMC Lab :

A2LA Certificate Number: 7556.01;
CTSL Testing (Dongguan) Co., Ltd. has been listed by American Association for Laboratory Accreditation to perform electromagnetic emission measurement.
The 3m-Semi anechoic test site fulfils CISPR 16-1-4 according to ANSI C63.10 and CISPR 16-1-4:2010.

FCC Designation Number: CN1425;
Test Firm Registration Number: 750639;
CTSL Testing (Dongguan) Co., Ltd. has been listed on the US Federal Communications Commission list of test facilities recognized to perform electromagnetic emissions measurements.

Industry Canada Registration Number. Is: 34801;
CAB identifier: CN0192;
CTSL Testing (Dongguan) Co., Ltd. The Laboratory has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing.

Name of Firm : CTSL Testing (Dongguan) Co., Ltd.

EMC test location/satellite location:
Room 112, Building 1, No. 15, Jiaoyuansongshan Hetian Village, Houjie Town Dongguan City, Guangdong, People's Republic of China City, Guangdong, China

2.4. Measurement uncertainty

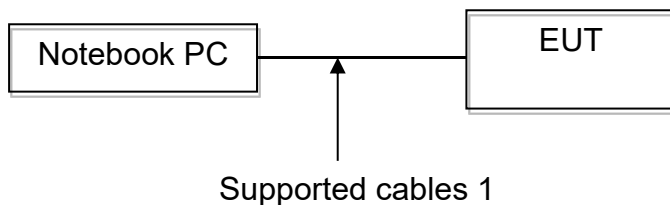
Test Item	Uncertainty
Uncertainty for Conduction emission test	$\pm 3.48\text{dB}$
Uncertainty for spurious emissions test (Below 30MHz)	$\pm 1.62\text{ dB}$
Uncertainty for spurious emissions test (30MHz-1GHz)	$\pm 4.60\text{ dB(Polarize: H)}$
	$\pm 4.68\text{ dB(Polarize: V)}$
Uncertainty for spurious emissions test (1GHz to 25GHz)	$\pm 4.96\text{dB}$
Uncertainty for radio frequency	7×10^{-8}
Uncertainty for conducted RF Power	1.08dB
Uncertainty for Power density test	0.26dB

Note: This uncertainty represents an expanded uncertainty expressed at approximately The 95% confidence level using a coverage factor of $k=2$.

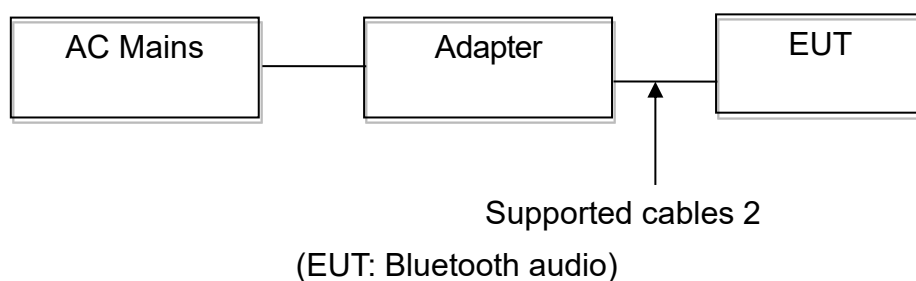
2.5. Block Diagram

For radiated emissions test: EUT was placed on a turn table, which is 0.8 (or 1.5) meter high above ground. EUT was beset into Bluetooth test mode by software before test.

Connect EUT Antenna Terminal, Radiated Spurious Emissions& Band Edge Test



AC Power Line Conducted Emissions& Radiated Emission Test (30-1000MHz):



2.6. Assistant equipment used for test

Item	Equipment	Brand	Model Name/Type No.	FCC ID	Series No.
1	Notebook PC	-	Inspiron 14R-5421 (Manufacturer: Dell)	-	25TZHW1
2	AC ADAPTER (supplied by the Lab.)	-	20120M-120300C	-	TW4A100057

Supported cables				
Item	Shielded Type	Ferrite Core	Length	Note
1	NO	NO	0.5m	USB Extension Cable (supplied by the Lab.)
/	/	/	/	/

2.7. Test mode

Combining all the rates, modulations, and packet types, the Pre-scans had been carried out. The worst-case test mode was selected for the final test as listed below.

Test Item	Modulation Type	Operating Mode	Packet Type	Test Channel
Maximum Peak Output Power	GFSK; $\pi/4$ -DQPSK; 8-DPSK;	Non-Hopping	DH5; 2-DH5; 3-DH5	Low/Middle/High
20dB Bandwidth	GFSK; $\pi/4$ -DQPSK; 8-DPSK;	Non-Hopping	DH5; 2-DH5; 3-DH5	Low/Middle/High
Carrier Frequency Separation	GFSK; $\pi/4$ -DQPSK; 8-DPSK;	Hopping On	DH5; 2-DH5; 3-DH5	CH 38/CH 39
Number Of Hopping Channel	GFSK; $\pi/4$ -DQPSK; 8-DPSK;	Hopping On	DH5; 2-DH5; 3-DH5	All Channel Hopping
Time of Occupancy (Dwell Time)	GFSK; $\pi/4$ -DQPSK; 8-DPSK;	Hopping On	DH1/DH3/ DH5	Middle (All Channel Hopping)
Conducted Band Edge	GFSK; $\pi/4$ -DQPSK; 8-DPSK;	Non-Hopping & Hopping On	DH5; 2-DH5; 3-DH5	Low / High & All Channel Hopping
Conducted Spurious Emissions	GFSK; $\pi/4$ -DQPSK; 8-DPSK;	Non-Hopping	DH5; 2-DH5; 3-DH5	Low/Middle/High
Radiated Spurious Emissions (Below 1GHz)	GFSK; $\pi/4$ -DQPSK; 8-DPSK;	Non-Hopping	DH5; 2-DH5; 3-DH5	Low/Middle/High
Radiated Spurious Emissions (Above 1GHz)	GFSK; $\pi/4$ -DQPSK; 8-DPSK;	Non-Hopping	DH5; 2-DH5; 3-DH5	Low/Middle/High
Radiated Band Edge	GFSK; $\pi/4$ -DQPSK; 8-DPSK;	Non-Hopping	DH5; 2-DH5; 3-DH5	Low/High
AC Power Line Conducted Emissions	GFSK	Non-Hopping	DH5	Low/Middle/High

Note: In radiated measurement, the EUT had been pre-scan on the positioned of each 3 axis (X, Y, Z), the worst case was found when positioned on **X-plane**.

2.8.Channel List

Channel No.	Frequency (MHz)	Channel No.	Frequency (MHz)	Channel No.	Frequency (MHz)	Channel No.	Frequency (MHz)
00	2402	01	2403	02	2404	03	2405
04	2406	05	2407	06	2408	07	2409
08	2410	09	2411	10	2412	11	2413
12	2414	13	2415	14	2416	15	2417
16	2418	17	2419	18	2420	19	2421
20	2422	21	2423	22	2424	23	2425
24	2426	25	2427	26	2428	27	2429
28	2430	29	2431	30	2432	31	2433
32	2434	33	2435	34	2436	35	2437
36	2438	37	2439	38	2440	39	2441
40	2442	41	2443	42	2444	43	2445
44	2446	45	2447	46	2448	47	2449
48	2450	49	2451	50	2452	51	2453
52	2454	53	2455	54	2456	55	2457
56	2458	57	2459	58	2460	59	2461
60	2462	61	2463	62	2464	63	2465
64	2466	65	2467	66	2468	67	2469
68	2470	69	2471	70	2472	71	2473
72	2474	73	2475	74	2476	75	2477
76	2478	77	2479	78	2480	-	-

2.9.Power Setting of Test Software

Software Name	bt_tool_v1.1.4		
Frequency (MHz)	2402	2441	2480
GFSK(1Mbps) Setting	5	5	5
$\pi/4$ -DQPSK (2Mbps) Setting	5	5	5
8-DPSK(3Mbps) Setting	5	5	5

Note: This information is provided by the applicant.

2.10. Test Equipment

For Conducted Emission Test						
Equipment	Manufacturer	Model No.	Serial No.	Calibration Body	Last Cal.	Next Cal.
EMI Test Receiver	Rohde & Schwarz	ESCI 3	AT005	GUANGZHOU NEM	May 16,25	May 15,26
LISN	Rohde & Schwarz	ENV216	AT006	LISAI	July 31,25	July 30,26
Pulse Limiter	Rohde & Schwarz	ESH3-Z2	AT007	CCIC (Shenzhen)	July 10,25	July 09,26
CE Cable	Times Microwave	LMR195UF-N MNM-1.50M	AT041	GUANGZHOU NEM	May 16,25	May 15,26
Test Software	FARAD	EZ-EMC Ver.3A1.1+	N/A	N/A	N/A	N/A

For Radiated Emission Test (9kHz-30MHz)						
Equipment	Manufacturer	Model No.	Serial No.	Calibration Body	Last Cal.	Next Cal.
EMI Test Receiver	Rohde & Schwarz	ESCI 7	AT001	Ti Group	July 31,24	July 30,26
Active Loop Antenna	ZHINAN	ZN30900C	AT063	LISAI	Aug 03,24	Aug 02,26
Test Software	FARAD	EZ-EMC Ver.3A1.1+	N/A	N/A	N/A	N/A
9kHz-30MHz Cable	Times Microwave	LMR195UF-N MNM-9M	AT045	GUANGZHOU NEM	May 16,25	May 15,26

For Radiated Emissions Test (30MHz-1000MHz)						
Equipment	Manufacturer	Model No.	Serial No.	Calibration Body	Last Cal.	Next Cal.
EMI Test Receiver	Rohde & Schwarz	ESCI 7	AT001	Ti Group	Jun 12,25	Jun 11,26
Trilog-Broadband Antenna	SCHWARZBECK	VULB 9168	AT002	LISAI	Aug 03,24	Aug 02,26
Test Software	FARAD	EZ-EMC Ver.3A1.1+	N/A	N/A	N/A	N/A
30-1000MHz Cable	Times Microwave Systems	LMR195UF-N MRNMR-3.00M+ LMR400UF-N MNM-3.00M+ LMR400UF-N MNM-3.00M	AT042+AT043+AT044	GUANGZHOU NEM	May 16,25	May 15,26

For Radiated Emission Test (Above 1000MHz)						
Equipment	Manufacturer	Model No.	Serial No.	Calibration Body	Last Cal.	Next Cal.
Horn Antenna 1-18G	SCHWARZBECK	BBHA 9120 D	AT003	Shenzhen Academy of Metrology & Quality Inspection	Sep 23,24	Sep 22,26
Horn Antenna 18-40GHz	XIBAO	XB-WDB18-40K	AT064	LISAI	Feb 25,25	Feb 24,27
Broadband Preamplifier	SCHWARZBECK	BBV 9718 D	AT004	CCIC (Shenzhen)	July 10,25	July 9,26
Low Noise Amplifier	MWRFTest	DLA8-18-40G-2078	AT065	GUANGZHOU NEM	July 10,25	July 9,26
Spectrum Analyzer 40G	Keysight	N9020B	AT066	GUANGZHOU NEM	May 13,25	May 12,26
Spectrum Analyzer 26.5G	Keysight	N9020A	AT050	GUANGZHOU NEM	Jun 12,25	Jun 11,26
Radio switching unit	TiGroup	SU319	AT055	N/A	N/A	N/A
Filtering unit	TiGroup	SU319F	AT056	N/A	N/A	N/A
Test Software	BL	BL410-E V25.5 en	N/A	N/A	N/A	N/A
Above 1GHz Cable	Times Microwave Systems	SFT205-NMN M-7.0M+ SFT205-NMN M-2.0M	AT057+ AT058	GUANGZHOU NEM	July 09,25	July 08,26

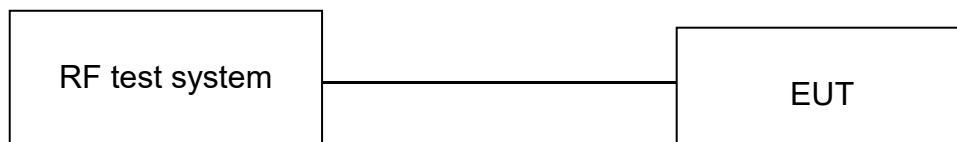
For Connect EUT Antenna Terminal Test (RF Test system)						
Equipment	Manufacturer	Model No.	Serial No.	Calibration Body	Last Cal.	Next Cal.
Spectrum analyzer	Keysight	N9020A	AT050	GUANGZHOU NEM	Jun 12,25	Jun 11,26
Analog signal source	Keysight	N5173B	AT051	GUANGZHOU NEM	Jun 12,25	Jun 11,26
WIDEBAND RADIO COMMUNICATION TESTER	Rohde&Schwarz	CMW500	AT052	GUANGZHOU NEM	Jun 12,25	Jun 11,26
Power probe unit	Ti Group	SU319P	AT053	GUANGZHOU NEM	Jun 12,25	Jun 11,26
Switch unit	Ti Group	SU319S	AT054	N/A	N/A	N/A
Test Software	BL	BL410R 3.5.2.621	N/A	N/A	N/A	N/A

3. MAXIMUM PEAK OUTPUT POWER

3.1. 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.

3.2. Test Setup



3.3. Spectrum Analyzer Setting

Spectrum Parameters	Setting
RBW	3MHz
VBW	8MHz
Span	6MHz
Sweep Time	Auto
Detector	Peak
Trace Mode	Max Hold

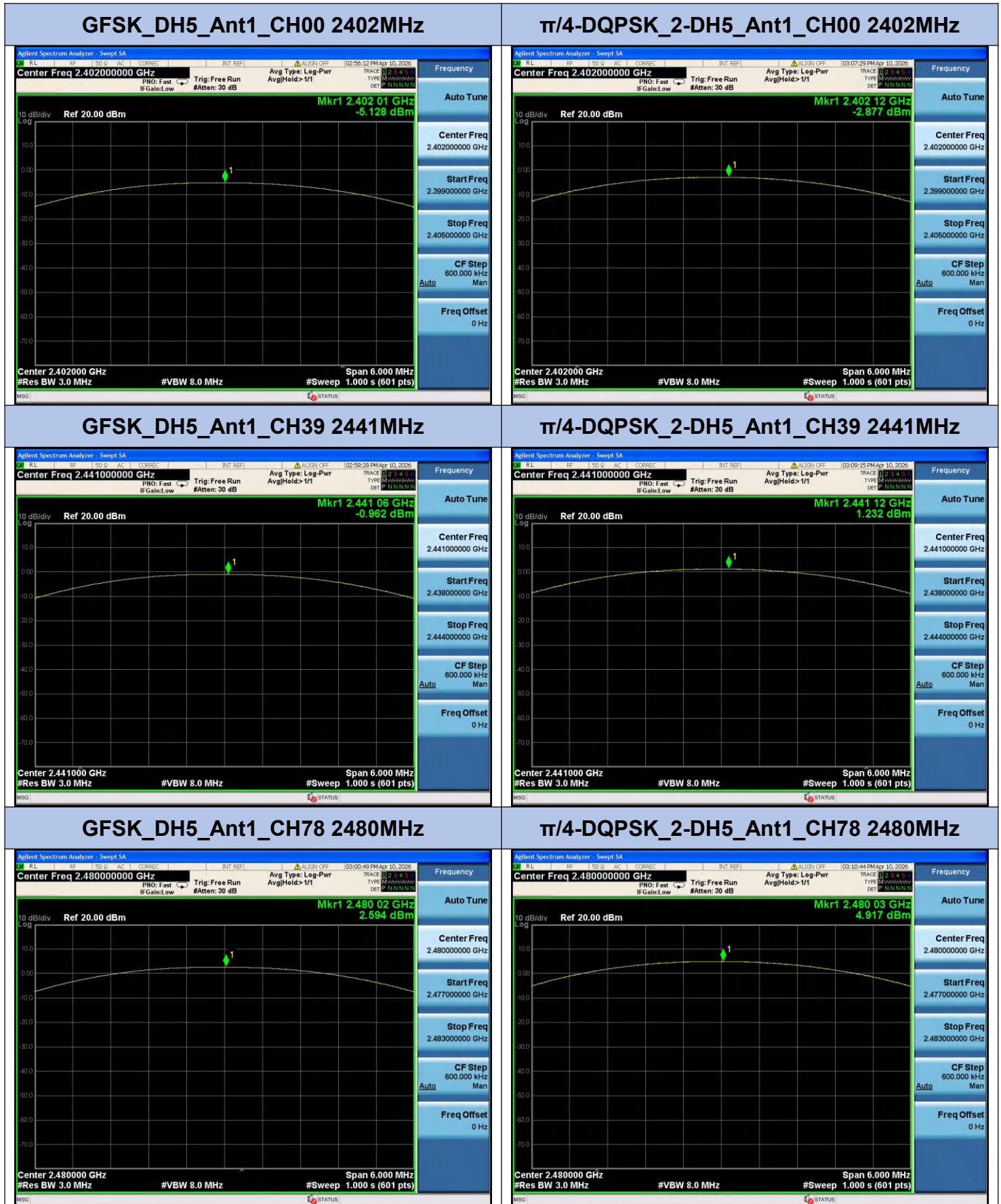
3.4. Test Procedure

- Connect EUT antenna terminal to the spectrum analyzer with RF cable.
- Spectrum analyzer setting parameters in accordance with section 3.3.
- Set the EUT transmit continuously with maximum output power over fixed single hopping channel.
- Allow trace to stabilize, use the marker-to-peak function to set the marker to the peak of the emission.
- Repeat above procedures until all channels and test modes were measured.
- Record the results in the test report.

3.5. Test Result

Test Mode	Antenna	Channel & Frequency	Conducted Peak Power	Conducted Limit	Result
		MHz	dBm	dBm	
GFSK DH5 (Non-Hopping)	Ant1	CH00 2402	-5.13	≤20.97	PASS
		CH39 2441	-0.96	≤20.97	PASS
		CH78 2480	2.59	≤20.97	PASS
π/4-DQPSK 2-DH5 (Non-Hopping)	Ant1	CH00 2402	-2.88	≤20.97	PASS
		CH39 2441	1.23	≤20.97	PASS
		CH78 2480	4.92	≤20.97	PASS
8-DPSK 3-DH5 (Non-Hopping)	Ant1	CH00 2402	-2.29	≤20.97	PASS
		CH39 2441	1.82	≤20.97	PASS
		CH78 2480	5.50	≤20.97	PASS

3.6.Original Test Record



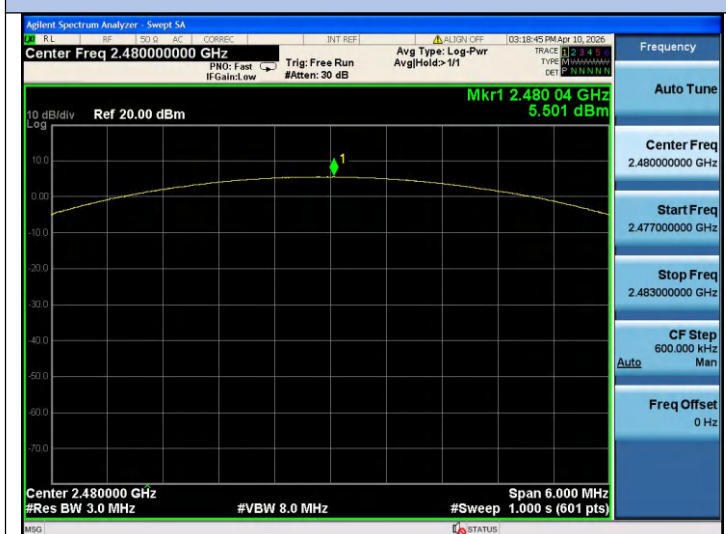
8-DPSK_3-DH5_Ant1_CH00 2402MHz



8-DPSK_3-DH5_Ant1_CH39 2441MHz



8-DPSK_3-DH5_Ant1_CH78 2480MHz



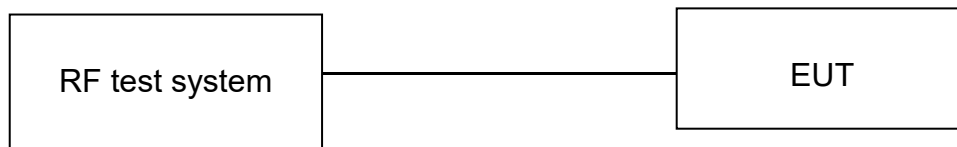
4. 20DB BANDWIDTH

4.1.Limit

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

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

4.2.Test Setup



4.3.Spectrum Analyzer Setting

Spectrum Parameters	Setting
RBW	30KHz
VBW	100KHz
Span	3MHz
Sweep Time	Auto
Detector	Peak
Trace Mode	Max Hold

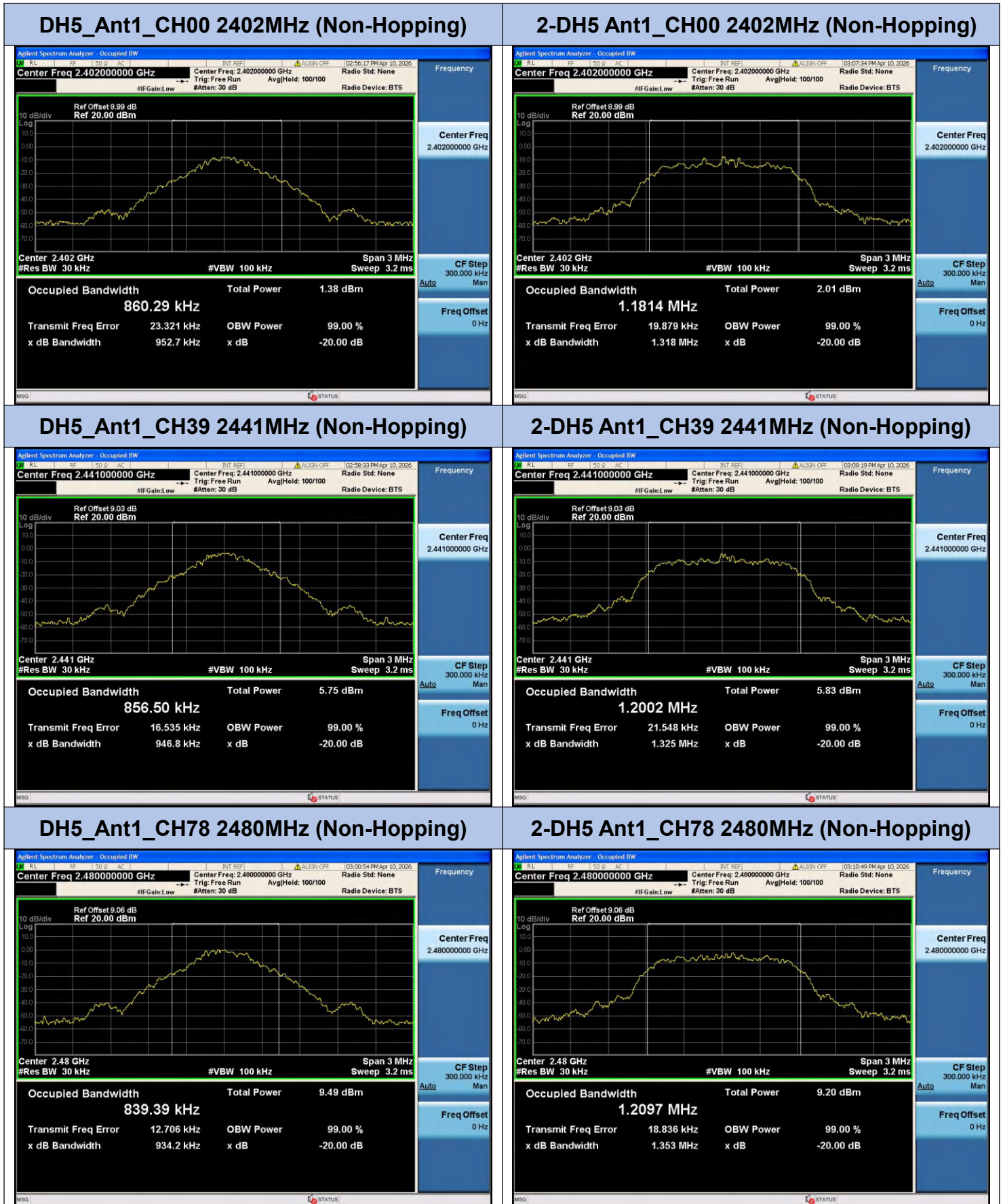
4.4.Test Procedure

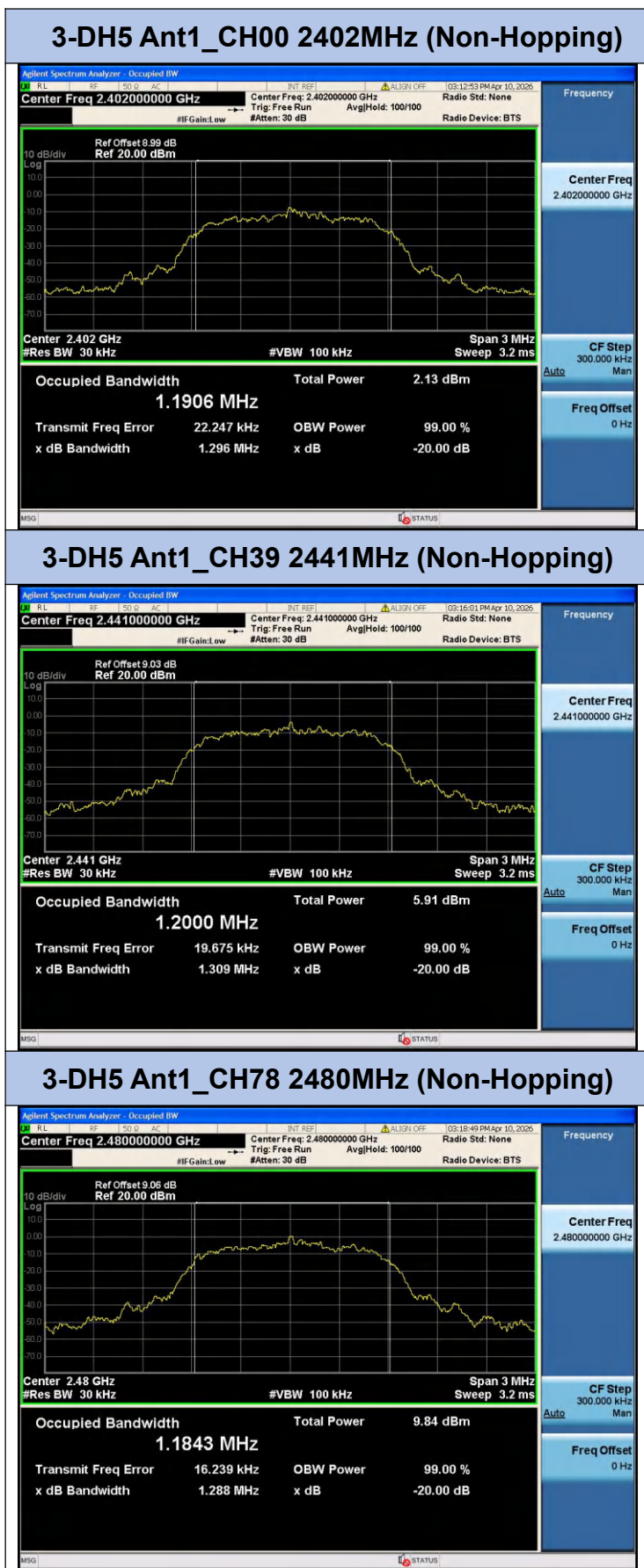
- Connect EUT antenna terminal to the spectrum analyzer with RF cable.
- Spectrum analyzer setting parameters in accordance with section 4.3.
- Set the EUT transmit continuously with maximum output power over fixed single hopping channel.
- Allow trace to stabilize, use the ndB down function to measure 20dB Bandwidth.
- Repeat above procedures until all channels and test modes were measured.
- Record the results in the test report.

4.5. Test Result

Test Mode	Antenna	Channel& Frequency	20dB Bandwidth	Result
		MHz	MHz	
GFSK DH5 (Non-Hopping)	Ant1	CH00 2402	0.953	PASS
		CH39 2441	0.947	PASS
		CH78 2480	0.934	PASS
$\pi/4$ -DQPSK 2-DH5 (Non-Hopping)	Ant1	CH00 2402	1.318	PASS
		CH39 2441	1.325	PASS
		CH78 2480	1.353	PASS
8-DPSK 3-DH5 (Non-Hopping)	Ant1	CH00 2402	1.296	PASS
		CH39 2441	1.309	PASS
		CH78 2480	1.288	PASS

4.6.Original Test Record



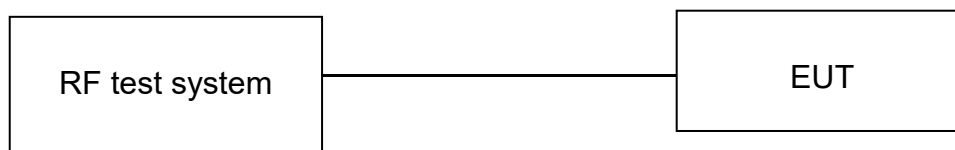


5. CARRIER FREQUENCY SEPARATION

5.1. 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.

5.2. Test Setup



5.3. Spectrum Analyzer Setting

Spectrum Parameters	Setting
RBW	30KHz
VBW	100KHz
Span	3MHz
Sweep Time	Auto
Detector	Peak
Trace Mode	Max Hold

5.4. Test Procedure

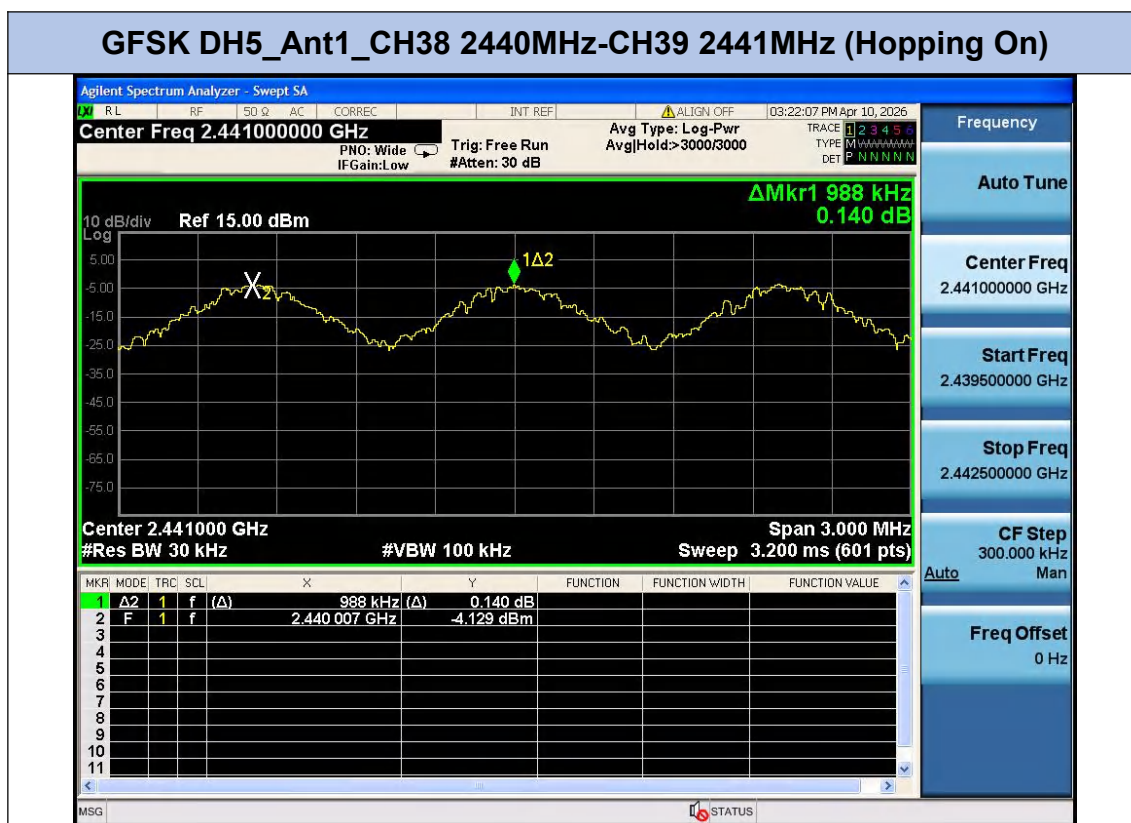
- Connect EUT antenna terminal to the spectrum analyzer with RF cable.
- Spectrum analyzer setting parameters in accordance with section 5.3.
- Set the EUT transmit continuously with maximum output power in all channel hopping mode.
- Allow trace to stabilize, use the marker-delta function to measure channel separation between two adjacent channels.
- Repeat above procedures until all channels and test modes were measured.
- Record the results in the test report.

5.5. Test Result

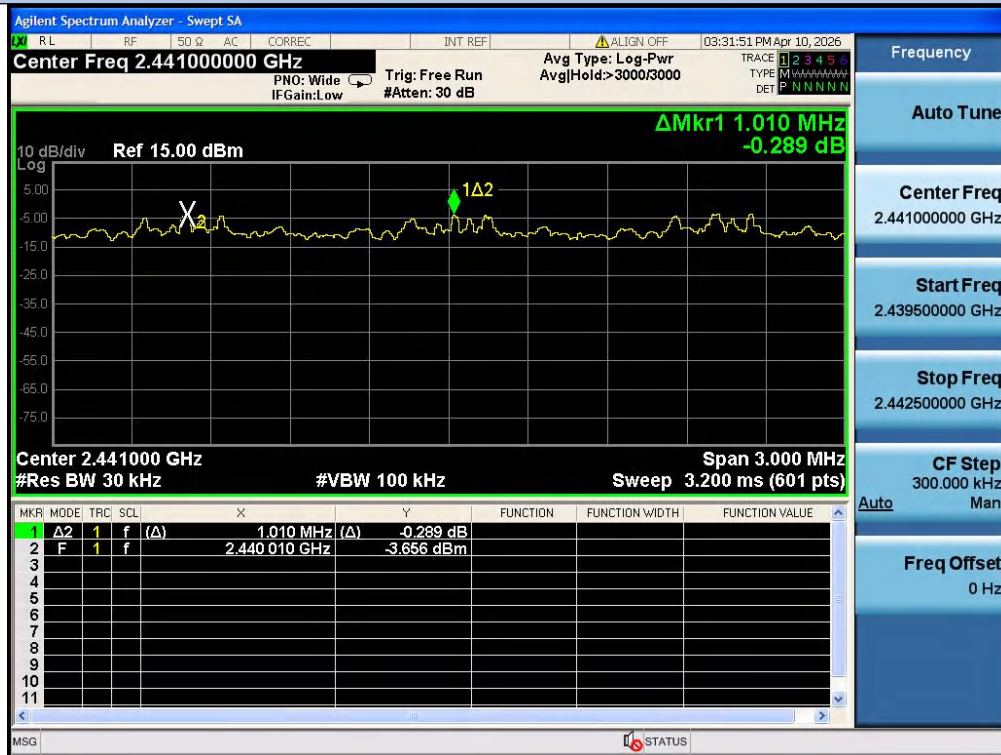
Test Mode	Antenna	Channel	Frequency	Channel Separation	Limit	Result
			MHz	MHz	MHz	
GFSK DH5 (Hopping On)	Ant1	CH38	2440	0.988	>0.635*	PASS
		CH39	2441			
$\pi/4$ -DQPSK 2-DH5 (Hopping On)	Ant1	CH38	2440	1.010	>0.902*	PASS
		CH39	2441			
8-DPSK 3-DH5 (Hopping On)	Ant1	CH38	2440	1.005	>0.873*	PASS
		CH39	2441			

Note *: Limit from Section 4 20DB BANDWIDTH 2/3 (> 2/3 of the 20dB Bandwidth or 25[kHz] (whichever is greater))

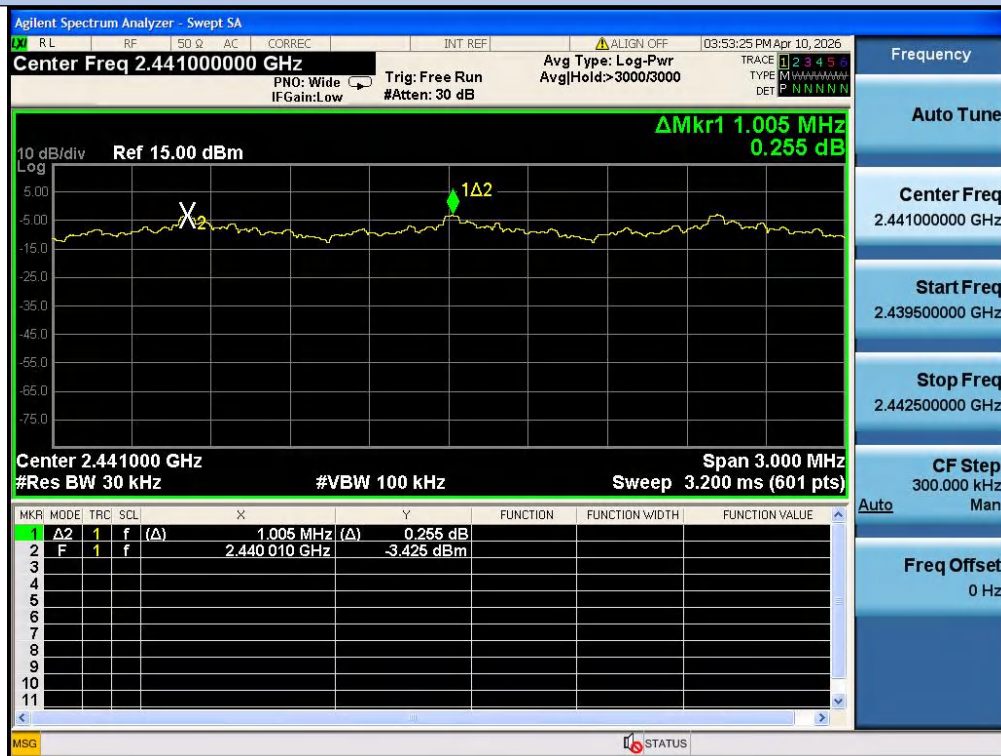
5.6. Original Test Record



$\pi/4$ -DQPSK 2-DH5_Ant1_CH38 2440MHz-CH39 2441MHz (Hopping On)



8-DPSK 3-DH5_Ant1_CH38 2440MHz-CH39 2441MHz (Hopping On)

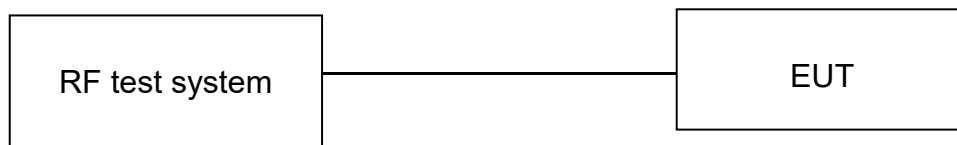


6.NUMBER OF HOPPING CHANNEL

6.1.Limit

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

6.2.Test Setup



6.3.Spectrum Analyzer Setting

Spectrum Parameters	Setting	
RBW	300KHz	
VBW	300KHz	
Start frequency	2400MHz	2441MH
Stop frequency	2441MHz	2483.5MHz
Sweep Time	Auto	
Detector	Peak	
Trace Mode	Max Hold	

6.4.Test Procedure

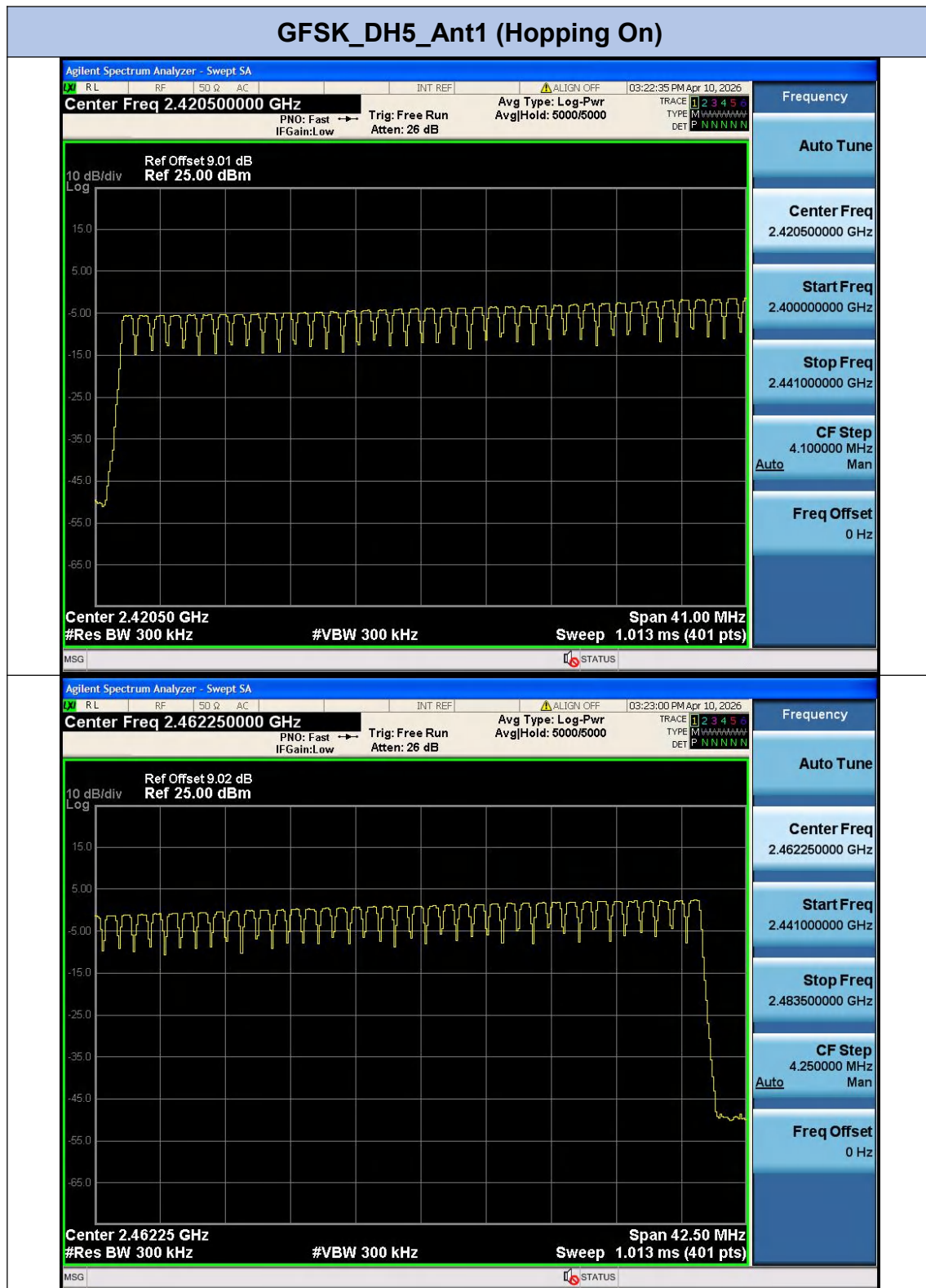
- Connect EUT antenna terminal to the spectrum analyzer with RF cable.
- Spectrum analyzer setting parameters in accordance with section 6.3.
- Set the EUT transmit continuously with maximum output power in all channel hopping mode.
- Allow trace to stabilize, use the marker-peak function to mark the first and last frequency hopping channel.
- Repeat above procedures until all test modes were measured.
- Record the results in the test report.

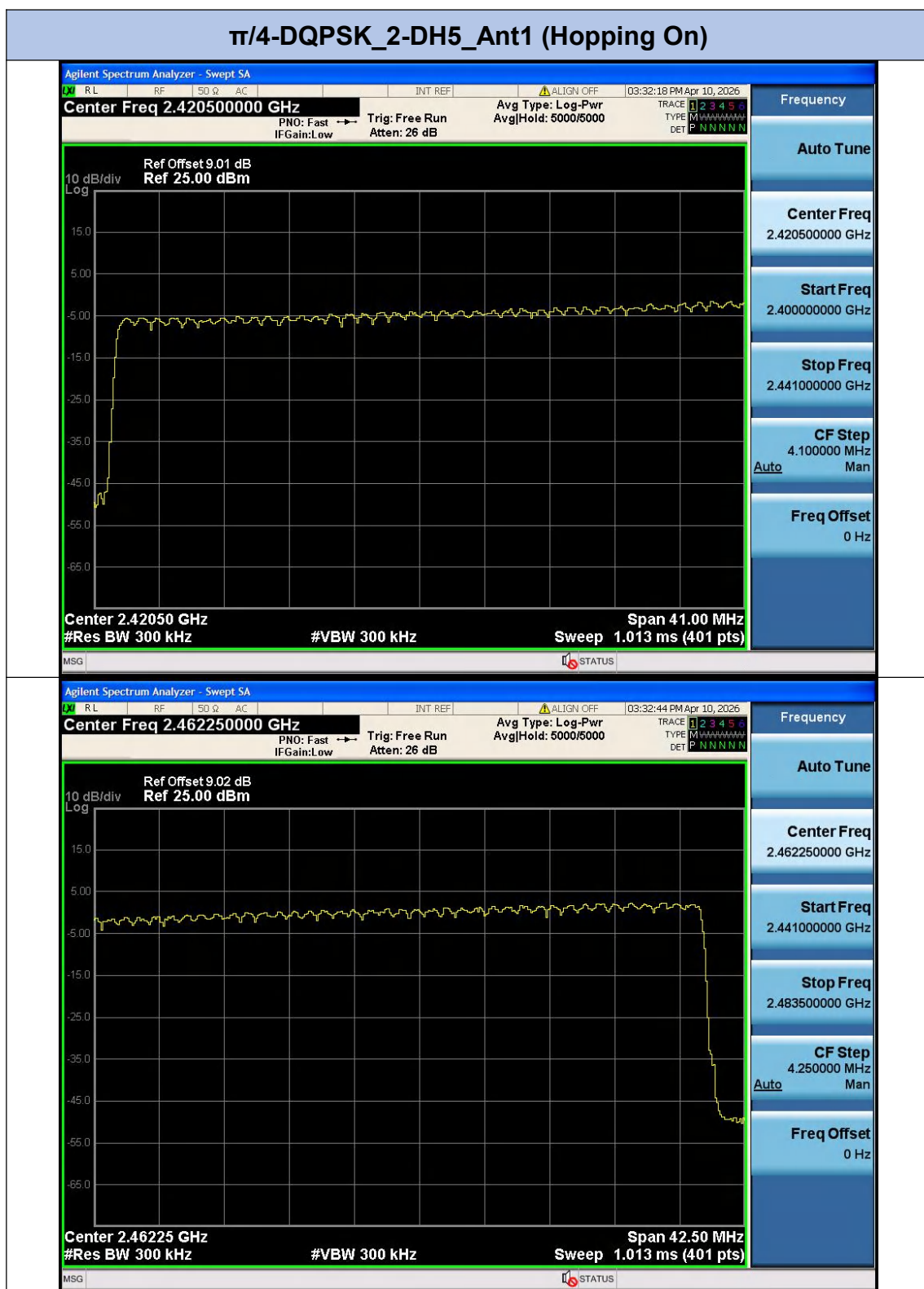
6.5. Test Result

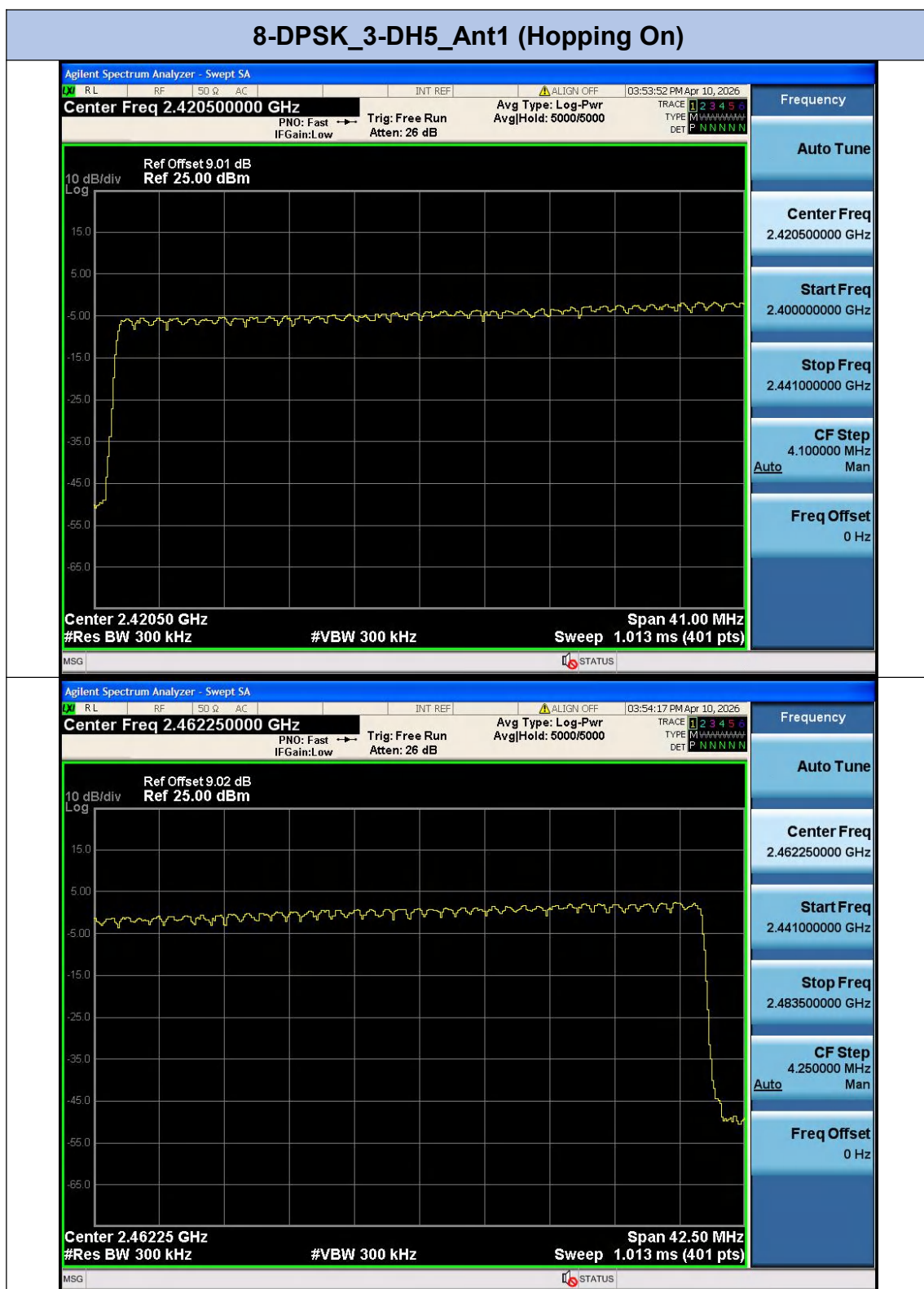
Test Mode	Antenna	Number of Hopping Channel	Limit	Result
GFSK DH5 (Hopping On)	Ant1	79	>15	PASS
$\pi/4$ -DQPSK 2-DH5 (Hopping On)	Ant1	79		PASS
8-DPSK 3-DH5 (Hopping On)	Ant1	79		PASS



6.6.Original Test Record





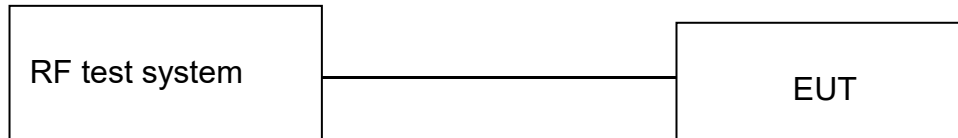


7.TIME OF OCCUPANCY (DWELL TIME)

7.1.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.

7.2.Test Setup



7.3.Spectrum Analyzer Setting

Spectrum Parameters	Setting
RBW	1MHz
VBW	3MHz
Span	Zero
Detector	Peak
Sweep Time	0.96ms(DH1)/4.2ms(DH3)/7.2ms(DH5)
Sweep Mode	Single Sweep

7.4.Test Procedure

- Connect EUT antenna terminal to the spectrum analyzer with RF cable.
- Spectrum analyzer setting parameters in accordance with section 7.3.
- Set the EUT transmit continuously with maximum output power in all channel hopping mode.
- Allow trace to stabilize, use the marker-delta function to measure single pulse duration.
- Repeat above procedures until all test modes were measured.
- Record the results in the test report.

7.5. Test Result

Test Mode	Packet	Channel& Frequency	Burst time	Dwell time	Limit	Result
		MHz	ms	s	s	
GFSK (Hopping On)	DH1	CH39 2441	0.398	0.1274	0.4	PASS
	DH3		1.652	0.2643		
	DH5		2.904	0.3098		
π/4-DQPSK (Hopping On)	2-DH1	CH39 2441	0.410	0.1312	0.4	PASS
	2-DH3		1.659	0.2654		
	2-DH5		2.904	0.3098		
8-DPSK (Hopping On)	3-DH1	CH39 2441	0.411	0.1315	0.4	PASS
	3-DH3		1.666	0.2666		
	3-DH5		2.904	0.3098		

Note:

Dwell time=Pulse time (ms) × (1600 ÷ 2 ÷ 79) ×31.6 Second for DH1, 2-DH1, 3-DH1

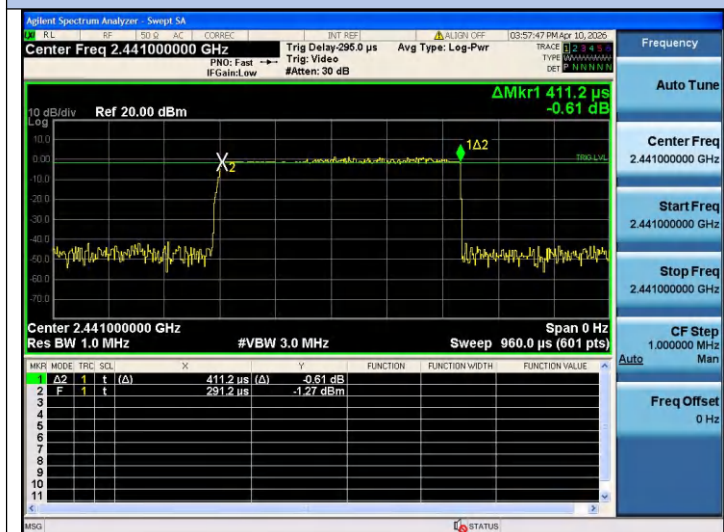
Dwell time=Pulse time (ms) × (1600 ÷ 4 ÷ 79) ×31.6 Second for DH3, 2-DH3, 3-DH2

Dwell time=Pulse time (ms) × (1600 ÷ 6 ÷ 79) ×31.6 Second for DH5, 2-DH5, 3-DH3

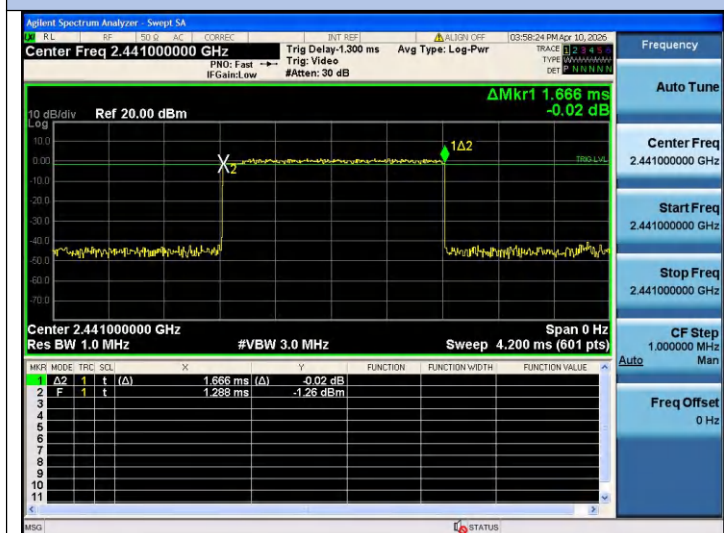
7.6.Original Test Record



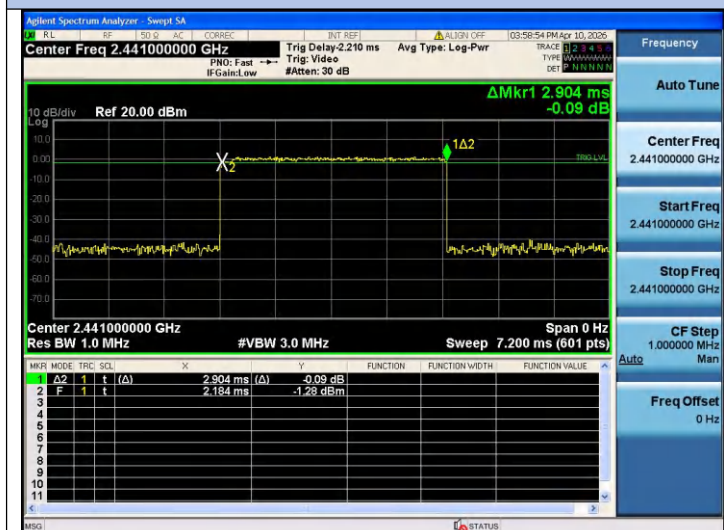
8-DPSK_3-DH1 (Hopping On)



8-DPSK_3-DH3 (Hopping On)



8-DPSK_3-DH5 (Hopping On)

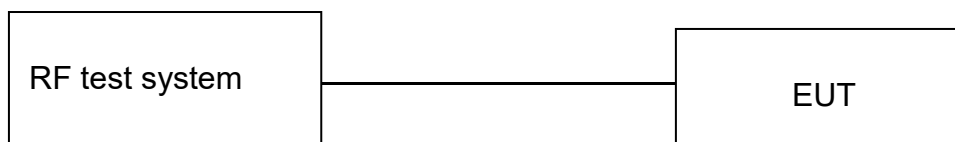


8.CONDUCTED BAND EDGE

8.1.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)).

8.2.Test Setup



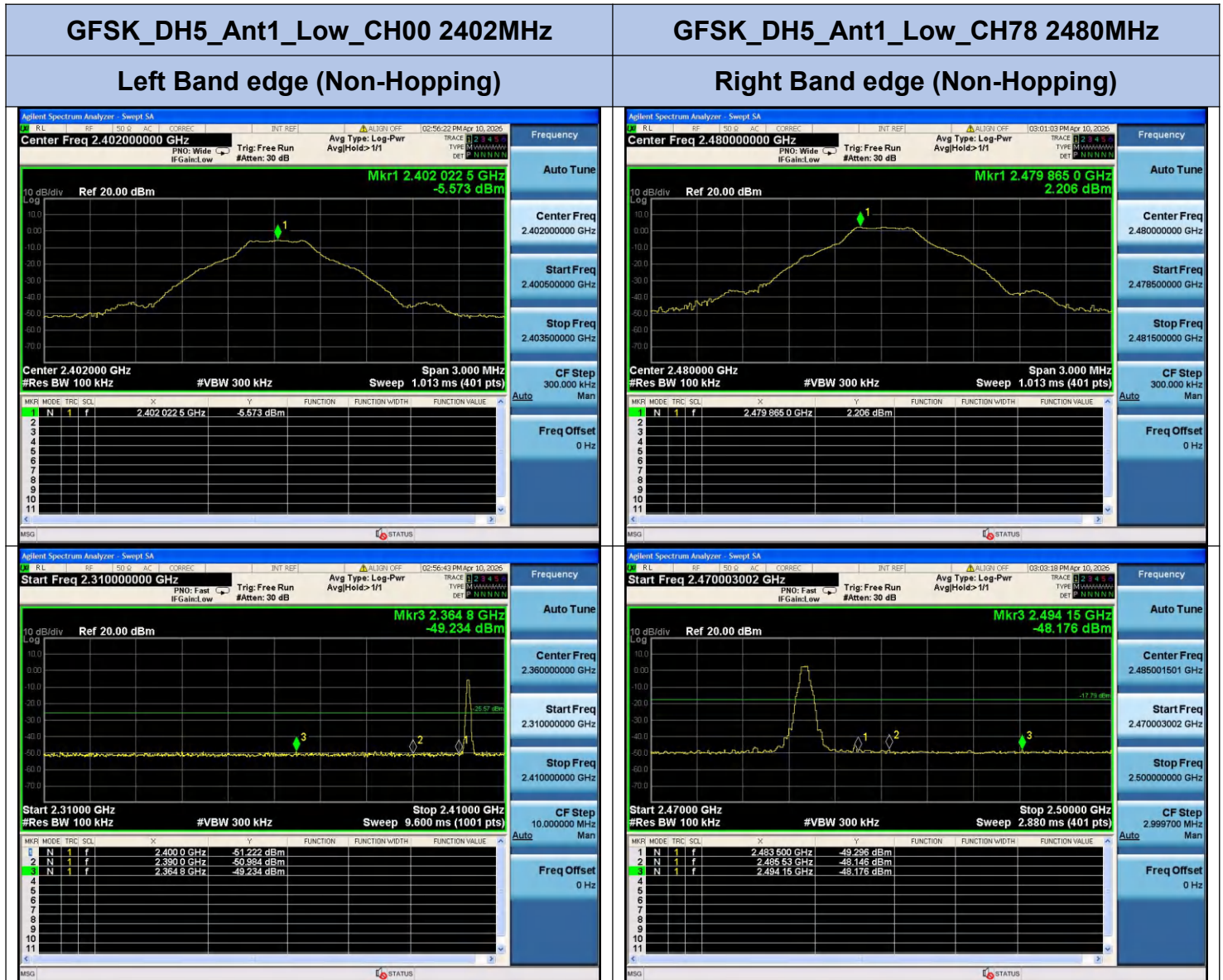
8.3.Spectrum Analyzer Setting

Spectrum Parameters	Setting
RBW	100KHz
VBW	300KHz
Span	3MHz (Reference Level) 100MHz (Left Band edge) 30MHz (Right Band edge)
Sweep Time	Auto
Detector	Peak
Trace Mode	Max Hold

8.4.Test Procedure

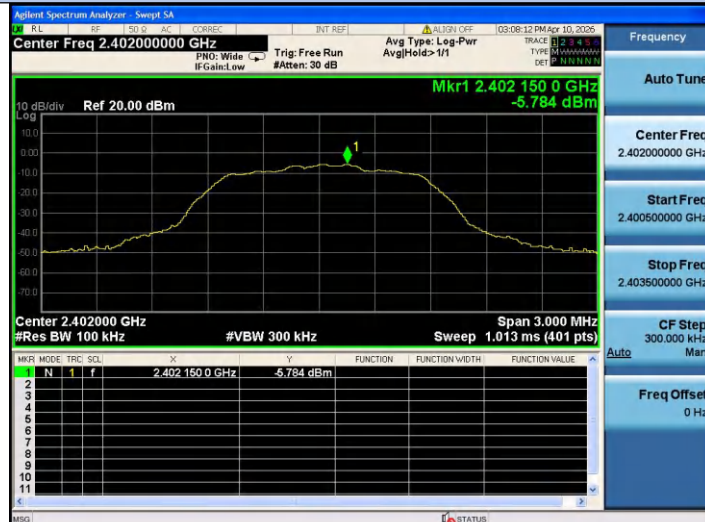
- Connect EUT antenna terminal to the spectrum analyzer with RF cable.
- Spectrum analyzer setting parameters in accordance with section 8.3.
- Set the EUT transmit continuously with maximum output power over fixed single hopping channel.
- Allow trace to stabilize, use the marker function to mark the highest emission level outside the authorized band.
- Repeat above procedures until all channels and test modes were measured(including frequency hopping off and frequency hopping on).
- Record the results in the test report.

8.5. Test Result



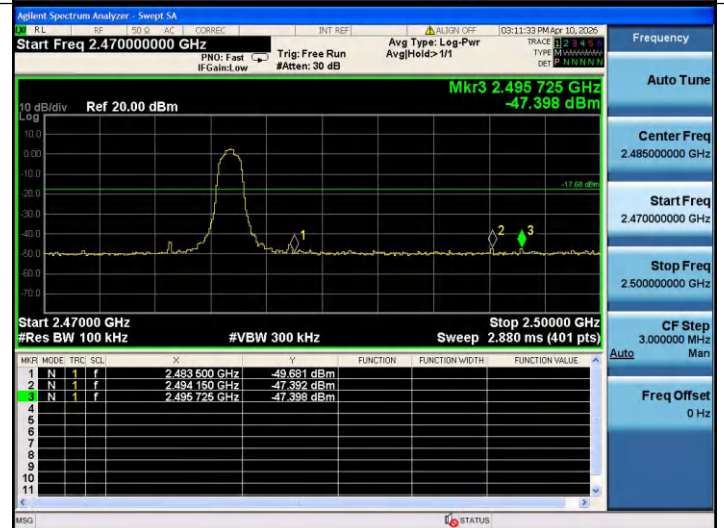
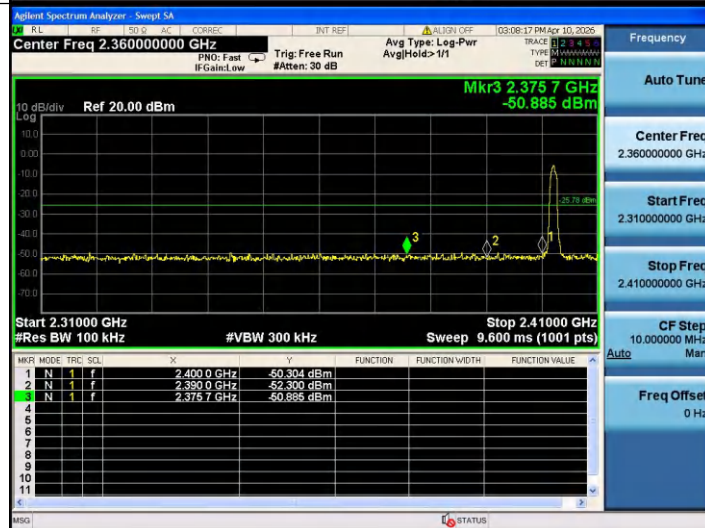
$\pi/4$ -DQPSK_2-DH5_Ant1_Low_CH00 2402MHz

Left Band edge (Non-Hopping)



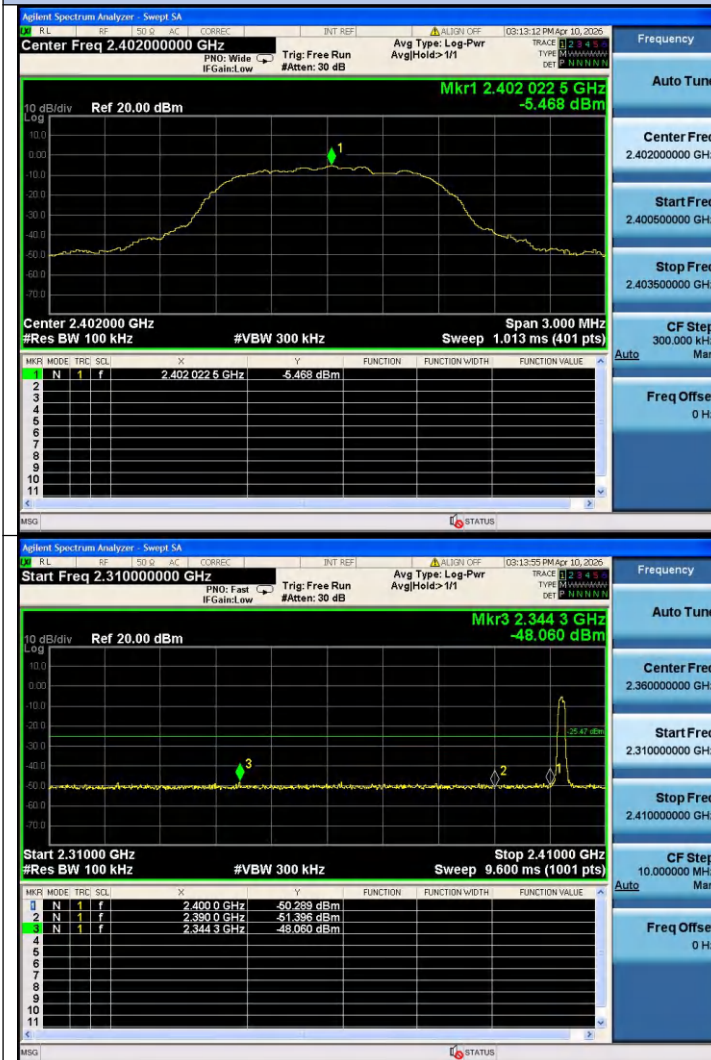
$\pi/4$ -DQPSK_2-DH5_Ant1_Low_CH78 2480MHz

Right Band edge (Non-Hopping)



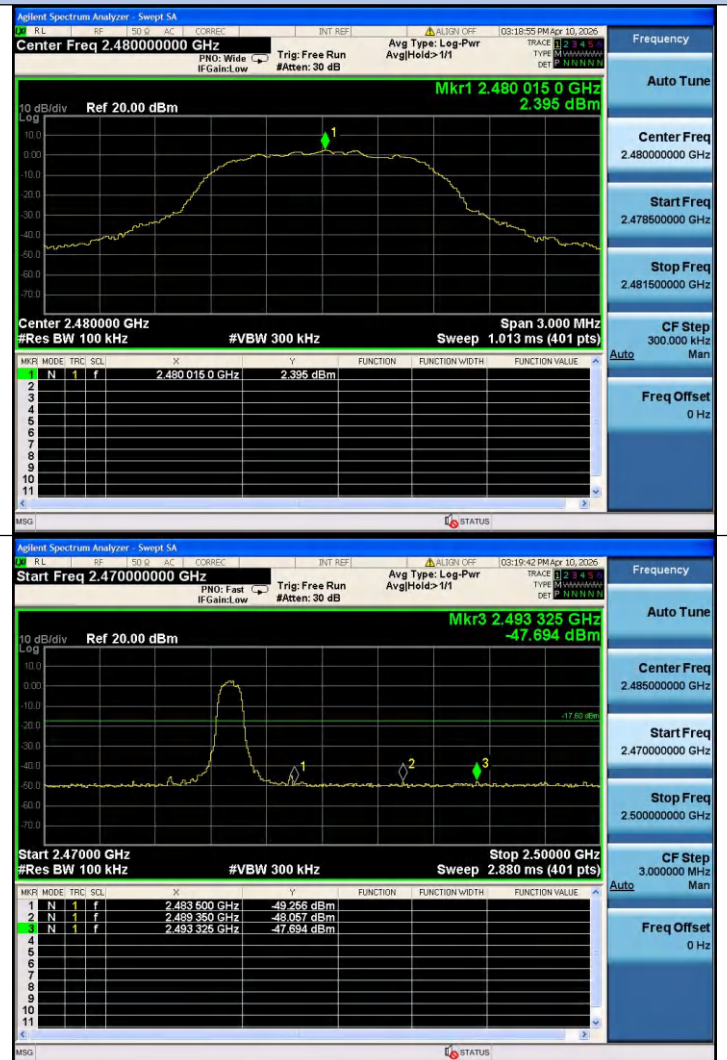
8-DPSK_3-DH5_Ant1_Low_CH00 2402MHz

Left Band edge (Non-Hopping)



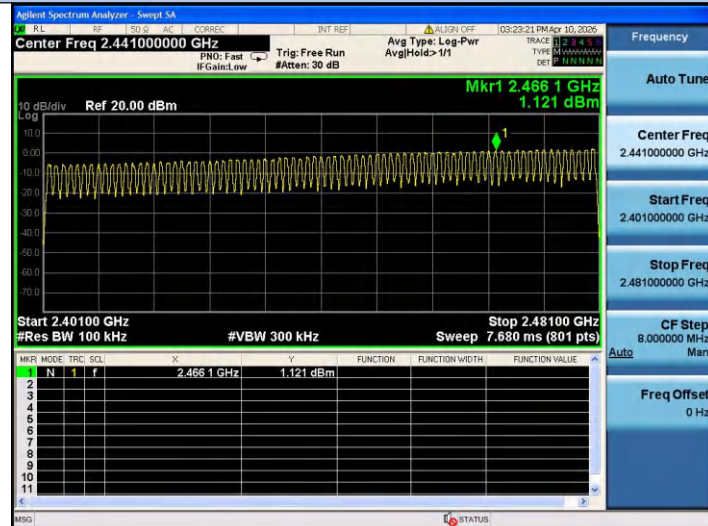
8-DPSK_3-DH5_Ant1_Low_CH78 2480MHz

Right Band edge (Non-Hopping)



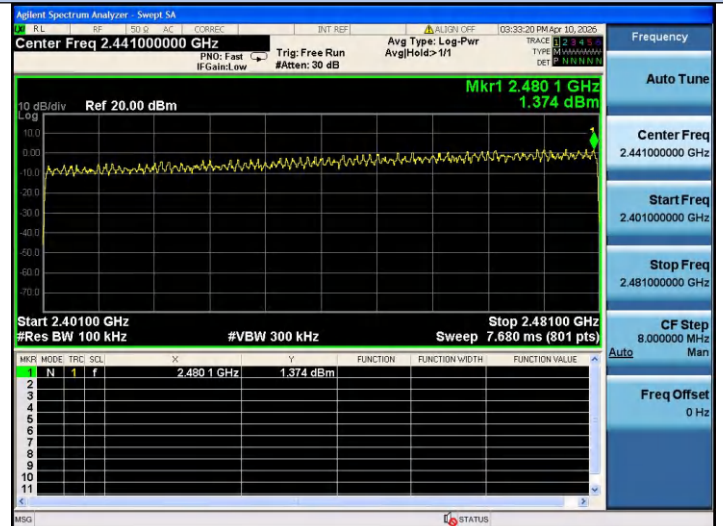
GFSK_DH5_Ant1

Reference_ (Hopping On)

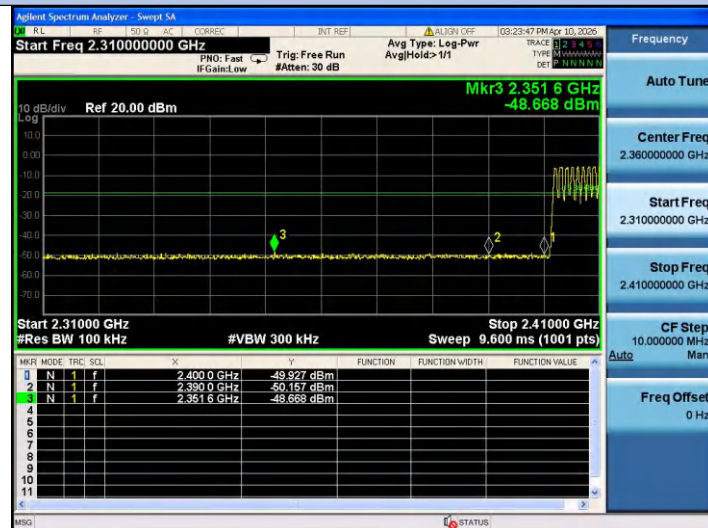


$\pi/4$ -DQPSK_2-DH5_Ant1

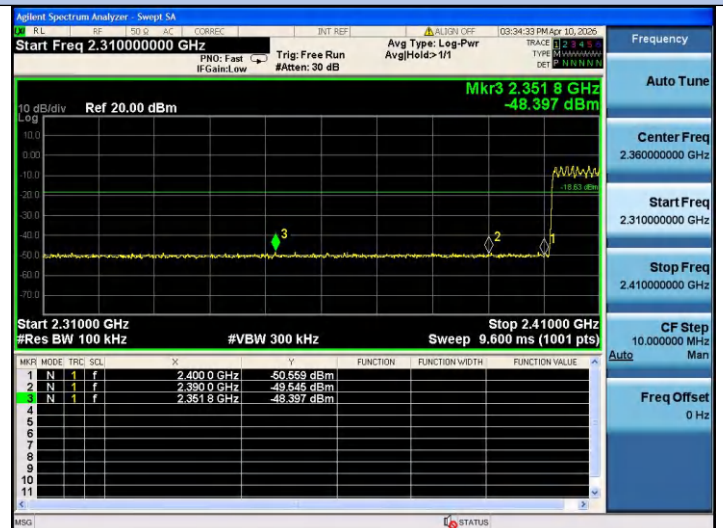
Reference_ (Hopping On)



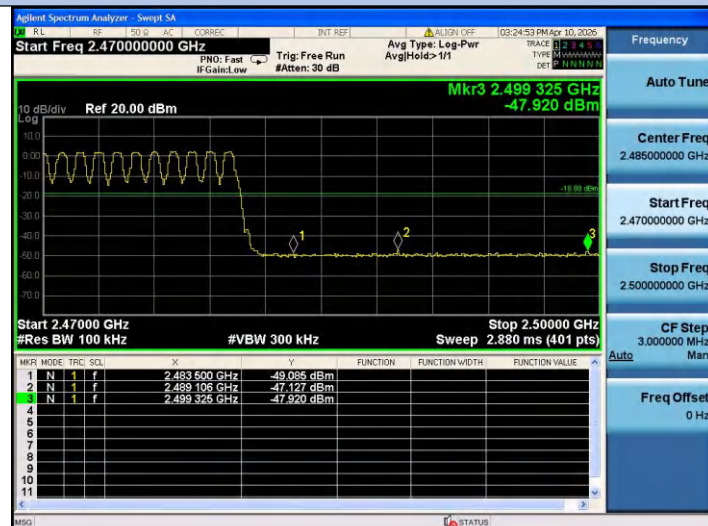
Left Band edge (Hopping On)



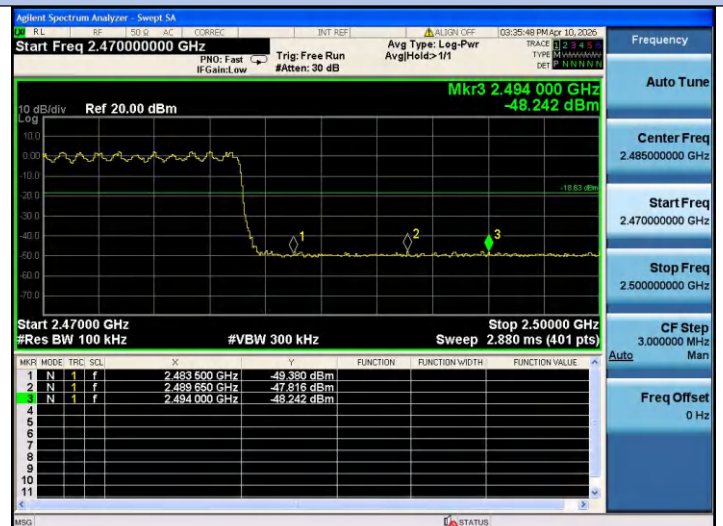
Left Band edge (Hopping On)



Right Band edge (Hopping On)

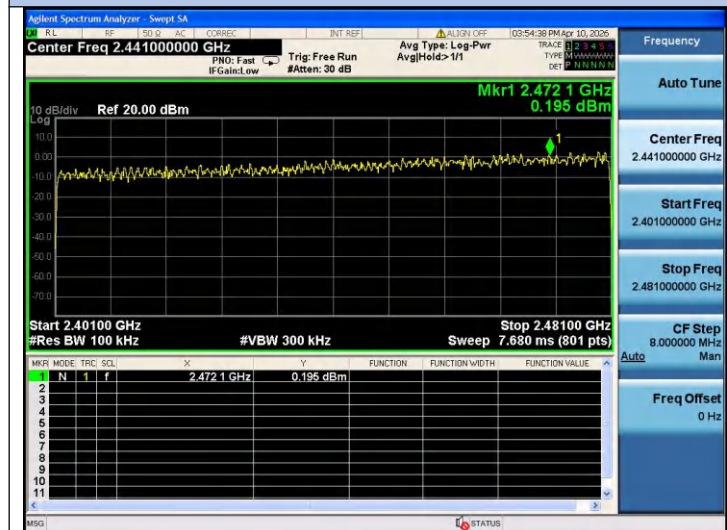


Right Band edge (Hopping On)

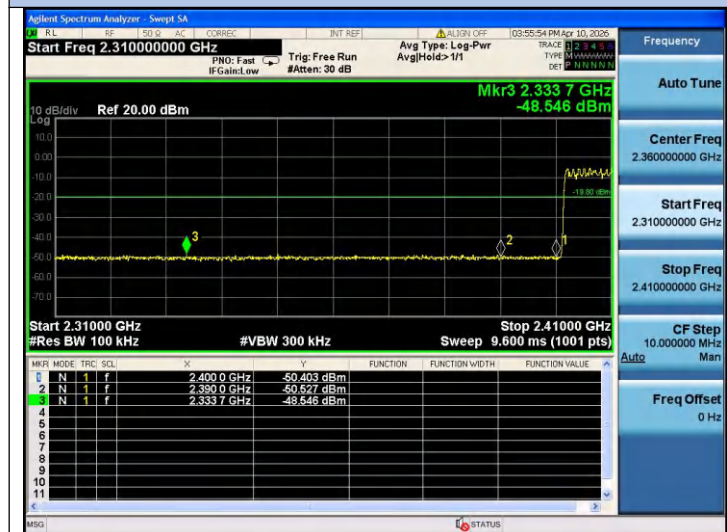


8-DPSK_3-DH5_Ant1

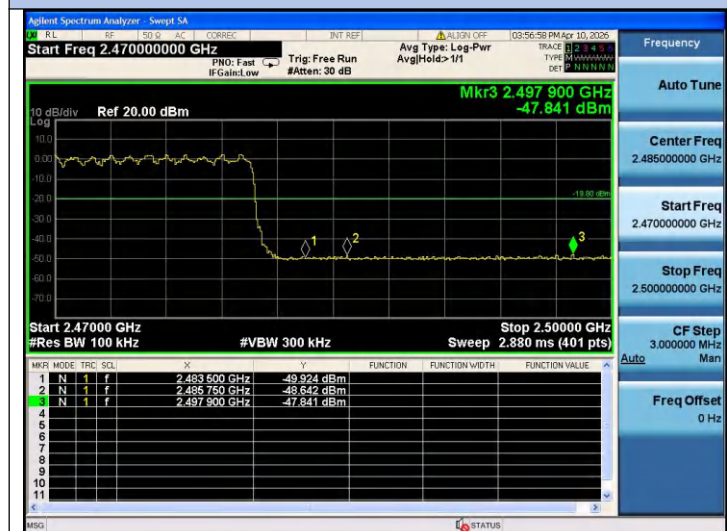
Reference_ (Hopping On)



Left Band edge (Hopping On)



Right Band edge (Hopping On)

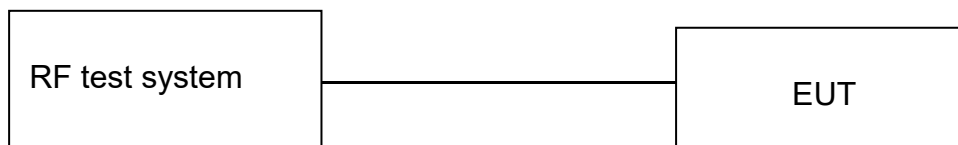


9.CONDUCTED SPURIOUS EMISSIONS

9.1.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)).

9.2.Test Setup



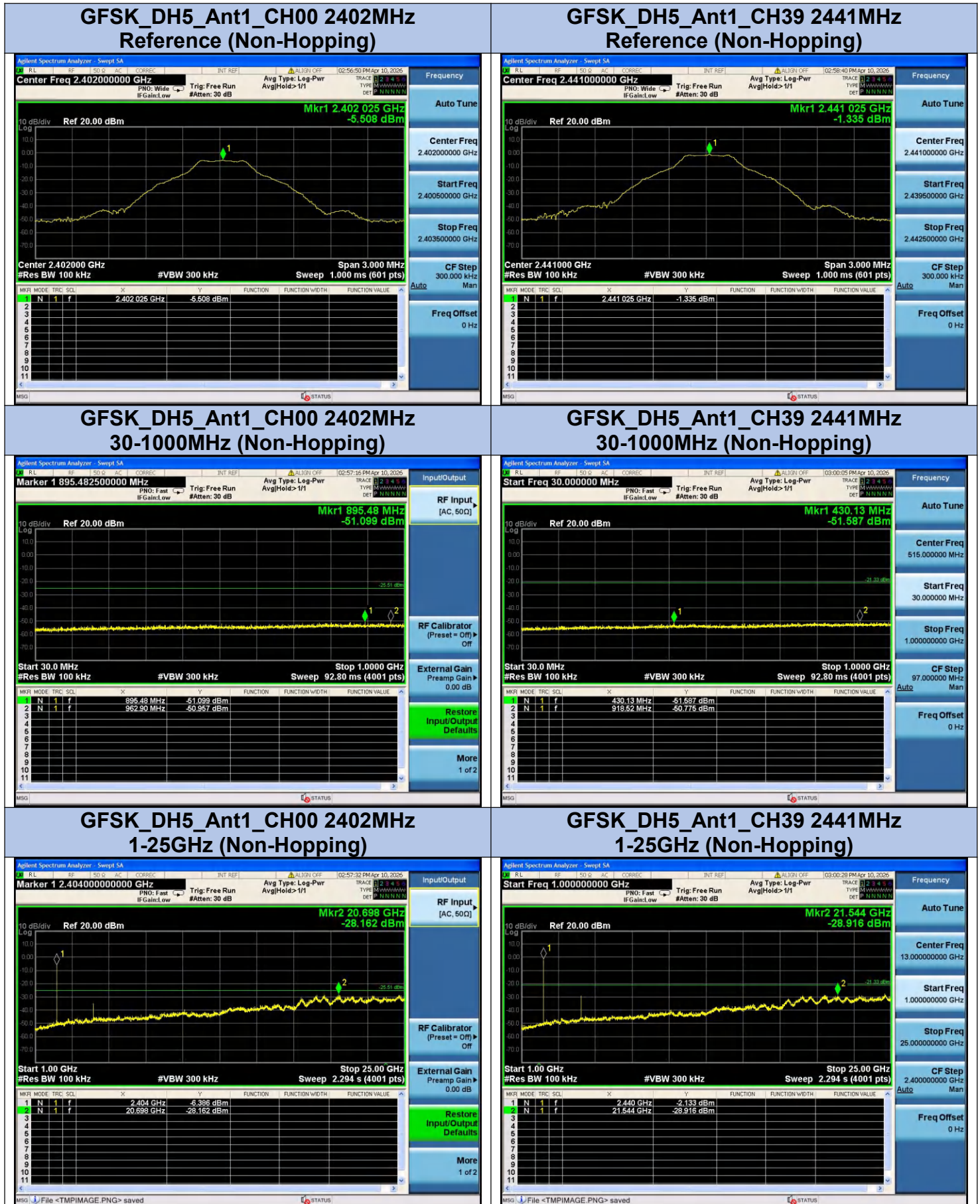
9.3.Spectrum Analyzer Setting

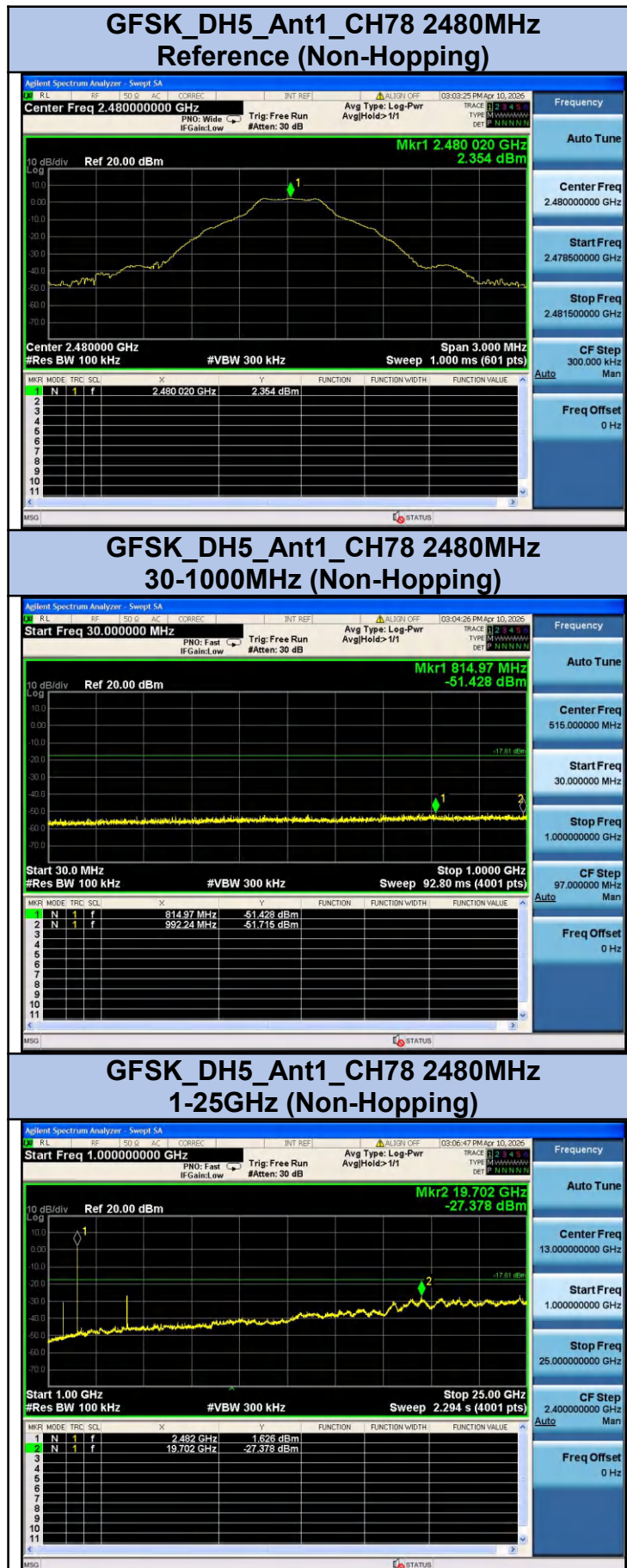
Spectrum Parameters	Setting
RBW	100KHz
VBW	300KHz
Start frequency	30MHz
Stop frequency	25.0GHz
Sweep Time	Auto
Detector	Peak
Trace Mode	Max Hold

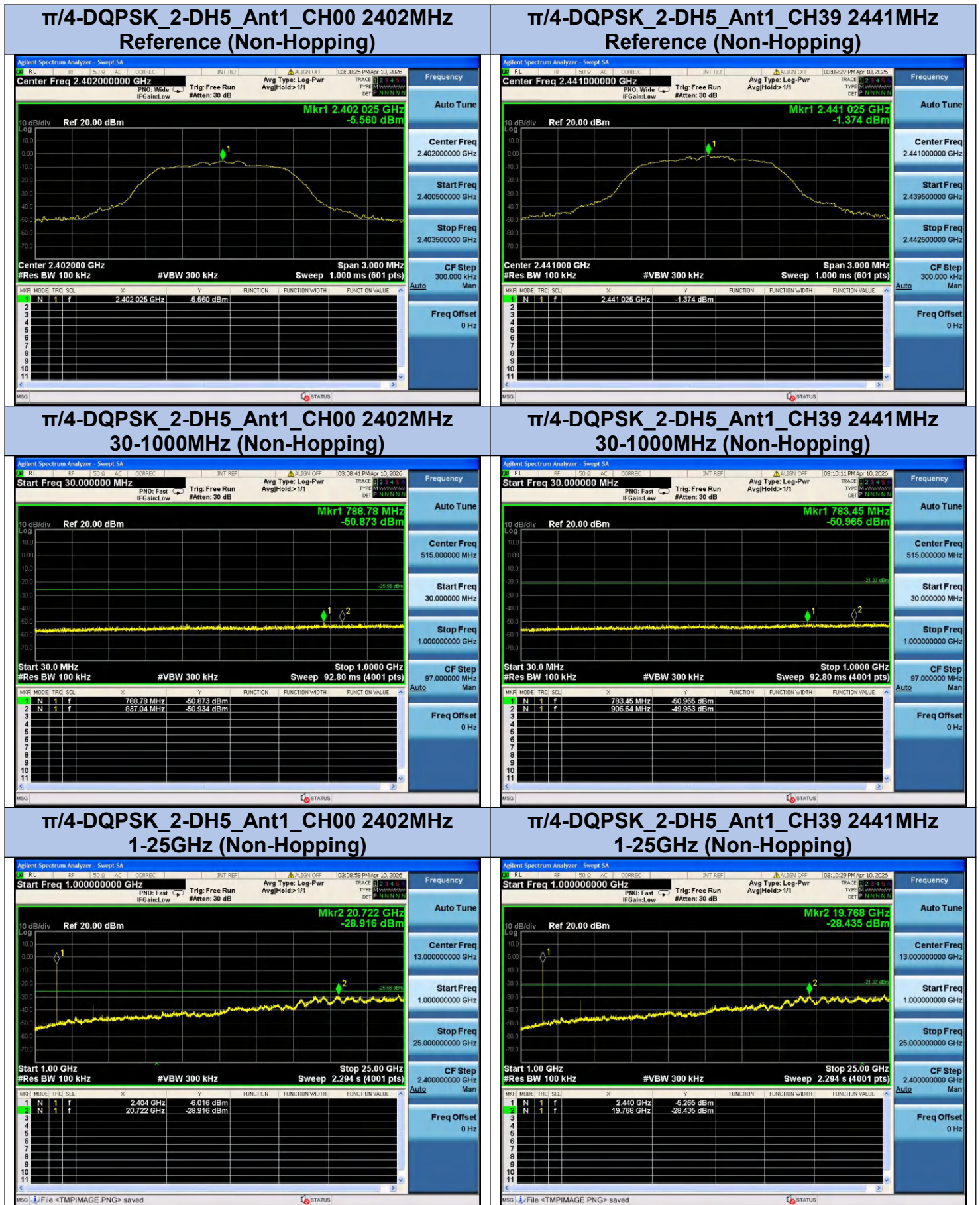
9.4.Test Procedure

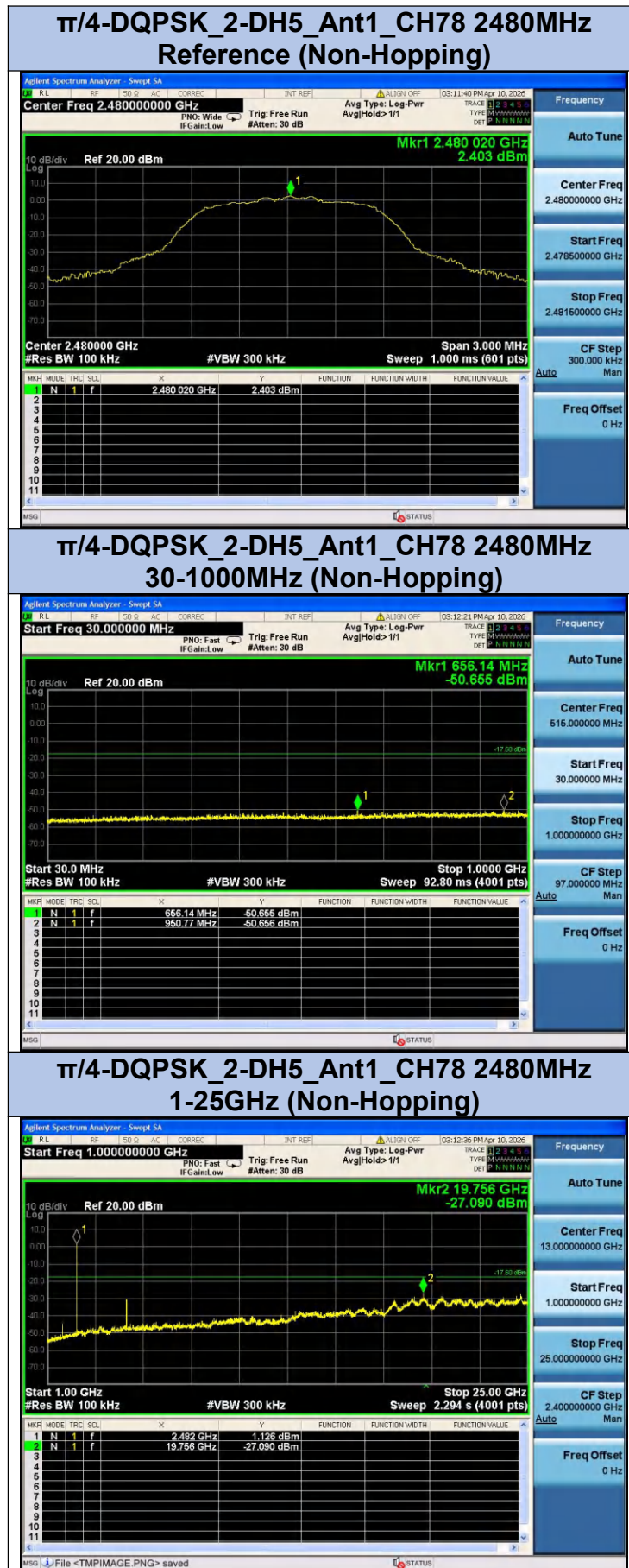
- Connect EUT antenna terminal to the spectrum analyzer with RF cable.
- Spectrum analyzer setting parameters in accordance with section 9.3.
- Set the EUT transmit continuously with maximum output power over fixed single hopping channel.
- Allow trace to stabilize, use the marker function to mark the highest emission level outside the authorized band.
- Repeat above procedures until all channels and test modes were measured.
- Record the results in the test report.

9.5. Test Result

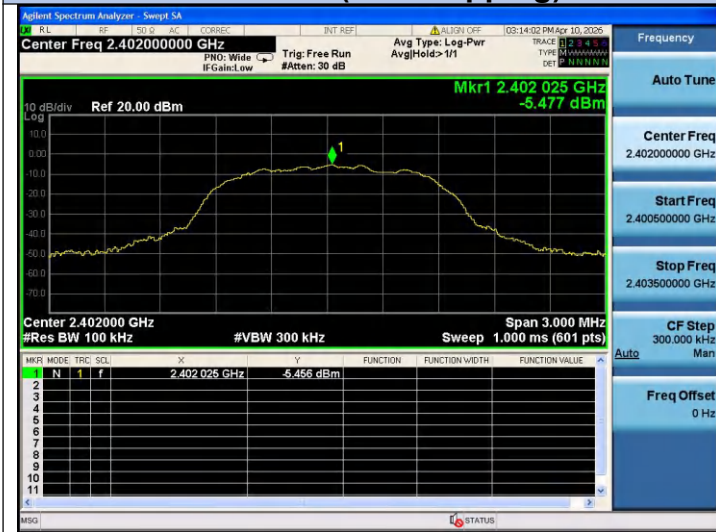








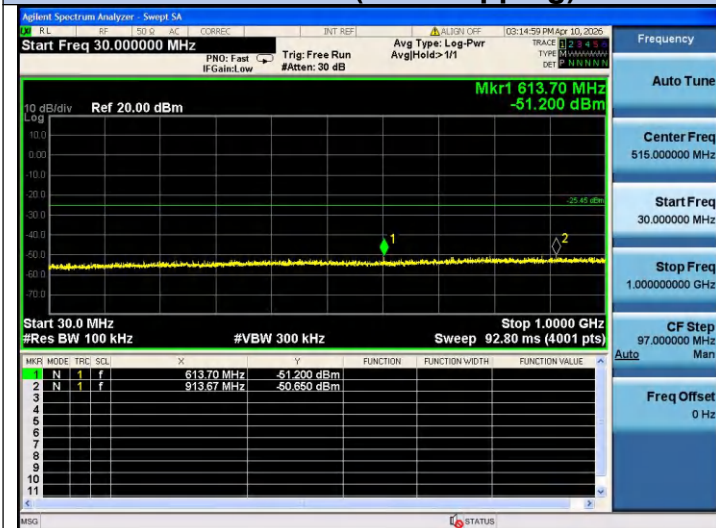
8-DPSK_3-DH5_Ant1_CH00 2402MHz Reference (Non-Hopping)



8-DPSK_3-DH5_Ant1_CH39 2441MHz Reference (Non-Hopping)



8-DPSK_3-DH5_Ant1_CH00 2402MHz 30-1000MHz (Non-Hopping)



8-DPSK_3-DH5_Ant1_CH39 2441MHz 30-1000MHz (Non-Hopping)



8-DPSK_3-DH5_Ant1_CH00 2402MHz 1-25GHz (Non-Hopping)



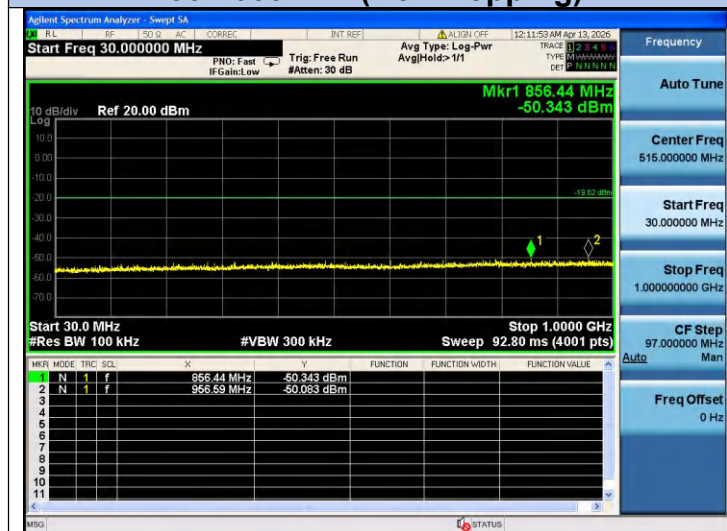
8-DPSK_3-DH5_Ant1_CH39 2441MHz 1-25GHz (Non-Hopping)



8-DPSK_3-DH5_Ant1_CH78 2480MHz Reference (Non-Hopping)



8-DPSK_3-DH5_Ant1_CH78 2480MHz 30-1000MHz (Non-Hopping)



8-DPSK_3-DH5_Ant1_2480MHz 1-25GHz (Non-Hopping)



10. RADIATED SPURIOUS EMISSIONS AND BAND EDGE

10.1. Limit

All the emissions appearing within 15.205 restricted frequency bands shall not exceed the limits shown in 15.209, all the other emissions shall be at least 20dB below the fundamental emissions, or comply with 15.209 limits.

15.205 Restricted frequency band			
MHZ	MHz	MHZ	GHZ
0.090-0.110	16.42-16.423	399.9-410	4.5-5.15
0.495-0.505	16.69475-16.69525	608-614	5.35-5.46
2.1735-2.1905	16.80425-16.80475	960-1240	7.25-7.75
4.125-4.128	25.5-25.67	1300-1427	8.025-8.5
4.17725-4.17775	37.5-38.25	1435-1626.5	9.0-9.2
4.20725-4.20775	73-74.6	1645.5-1646.5	9.3-9.5
6.215-6.218	74.8-75.2	1660-1710	10.6-12.7
6.26775-6.26825	108-121.94	1718.8-1722.2	13.25-13.4
6.31175-6.31225	123-138	2200-2300	14.47-14.5
8.291-8.294	149.9-150.05	2310-2390	15.35-16.2
8.362-8.366	156.52475-156.52525	2483.5-2500	17.7-21.4
8.37625-8.38675	156.7-156.9	2690-2900	22.01-23.12
8.41425-8.41475	162.0125-167.17	3260-3267	23.6-24.0
12.29-12.293	167.72-173.2	3332-3339	31.2-31.8
12.51975-12.52025	240-285	3345.8-3358	36.43-36.5
12.57675-12.57725	322-335.4	3600-4400	(2)

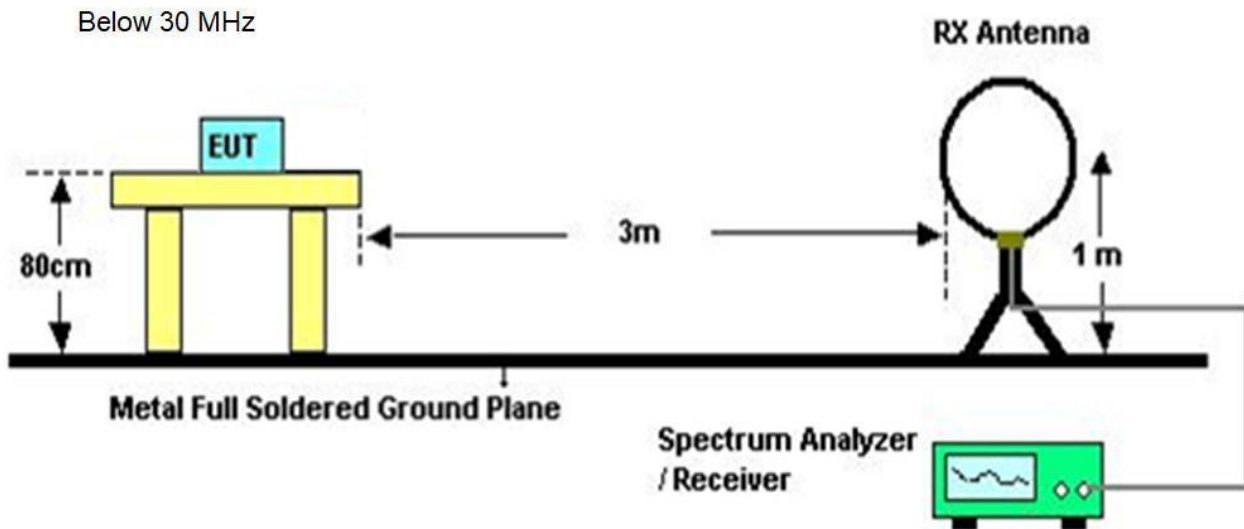
15.209 Limit		
Frequency (MHz)	Field Strength($\mu\text{V/m}$)	Distance(m)
0.009-0.490	2400/F(kHz)	300
0.490-1.705	24000/F(kHz)	30
1.705-30	30	30
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3

Note:

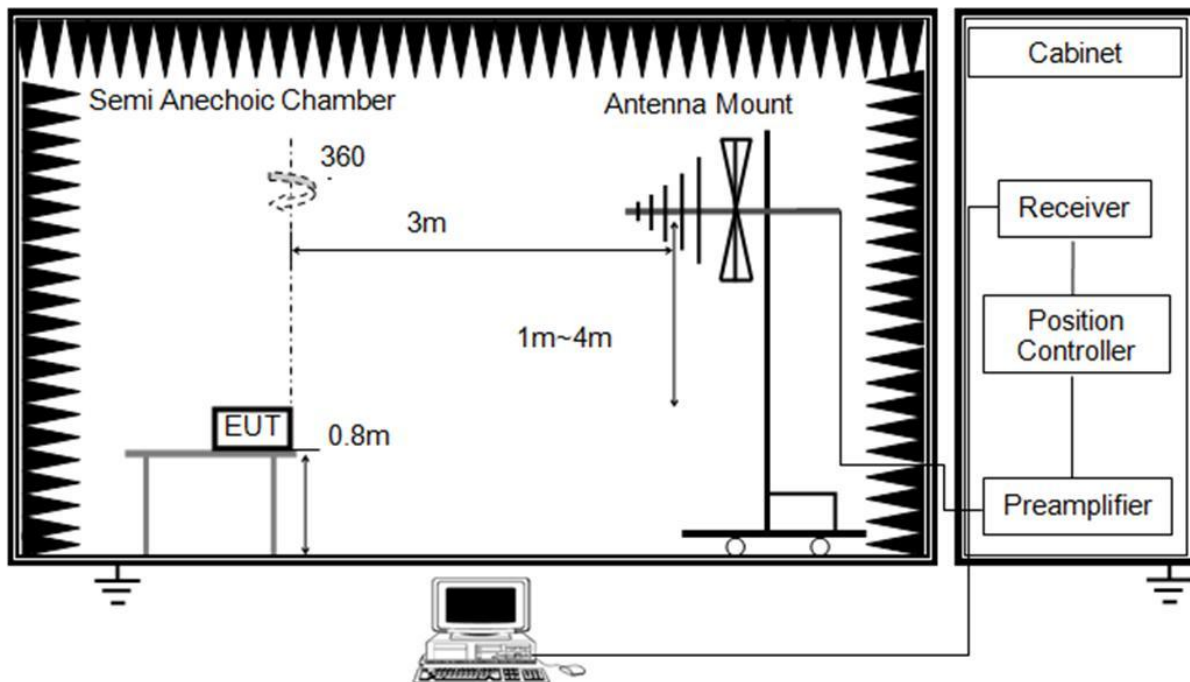
- (1) Emission level $\text{dB}\mu\text{V} = 20 \log \text{Emission level } \mu\text{V/m}$.
- (2) The smaller limit shall apply at the cross point between two frequency bands.
- (3) Distance is the distance in meters between the measuring instrument, antenna and the closest point of any part of the device or system.

10.2. Test Setup

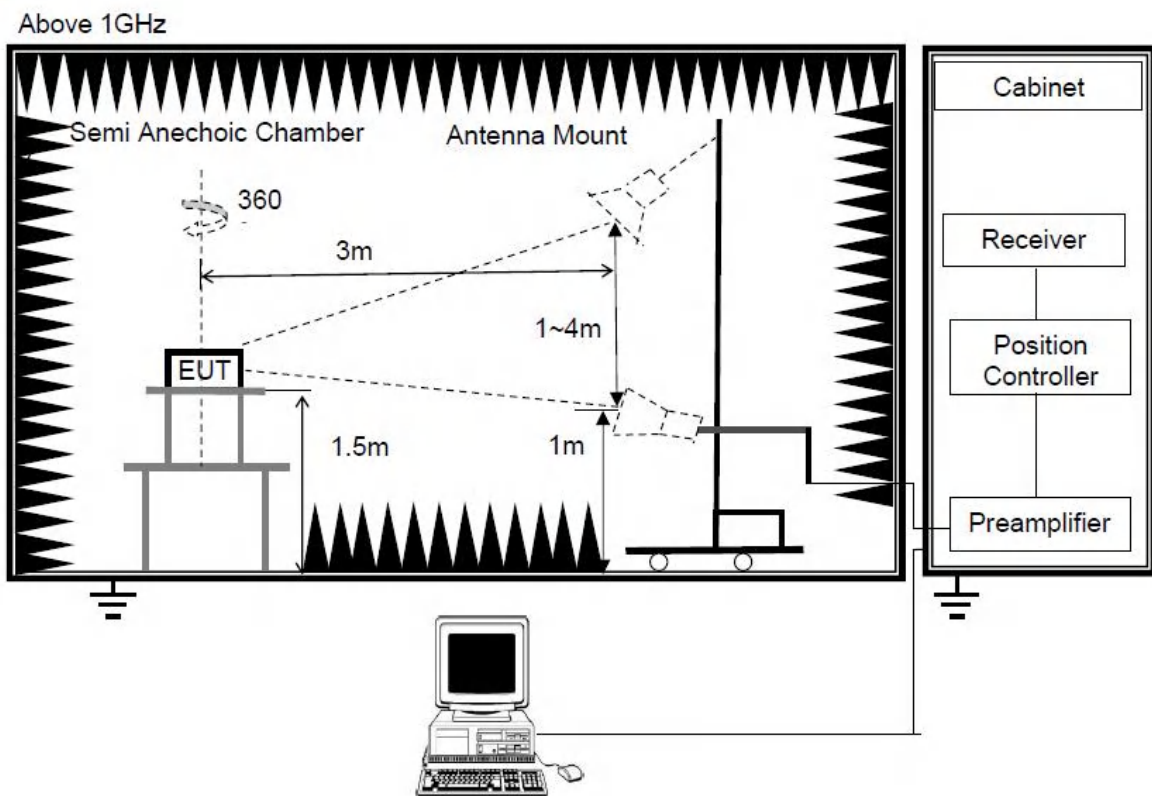
(A) Radiated Emission Test Set-Up, Frequency Below 30MHz



(B) Radiated Emission Test Set-Up, Frequency below 1000MHz Below 1 GHz and above 30 MHz



(C) Radiated Emission Test Set-Up, Frequency above 1GHz



10.3. Spectrum Analyzer Setting

For 9KHz-150KHz	
Spectrum Parameters	Setting
RBW	300Hz (for Peak&AVG)/CISPR 200Hz (for QP)
VBW	300Hz (for Peak&AVG)/CISPR 200Hz (for QP)
Start frequency	9KHz
Stop frequency	150KHz
Sweep Time	Auto
Detector	PEAK/QP/AVG
Trace Mode	Max Hold

Note: For 9KHz-90KHz&110KHz-150KHz,the detector is average,other frequency is CISPR QP detector.

For 150KHz-30MHz	
Spectrum Parameters	Setting
RBW	9KHz
VBW	9KHz
Start frequency	150KHz
Stop frequency	30MHz
Sweep Time	Auto
Detector	QP
Trace Mode	Max Hold

Note: For 150KHz-490KHz,the detector is average,other frequency is CISPR QP detector.

For 30MHz-1GHz	
Spectrum Parameters	Setting
RBW	120KHz
VBW	300KHz
Start frequency	30MHz
Stop frequency	1GHz
Sweep Time	Auto
Detector	QP
Trace Mode	Max Hold

For Above 1GHz		
Spectrum Parameters	Setting	
RBW	1MHz	
VBW	PEAK Measurement	AVG Measurement
	3MHz	Duty cycle $\geq$ 98%, VBW=10Hz
		Duty cycle $<$ 98%,VBW $\geq$ 1/T
Start frequency	1GHz	
Stop frequency	40GHz	
Sweep Time	Auto	
Detector	PEAK	
Trace Mode	Max Hold	

Note: T is the on-time time of the duty cycle, when EUT transmit continuously with maximum output power, unit is seconds. reference section 3 for the on-time time.

10.4. Test Procedure

- a. EUT was placed on a turn table, which is 0.8 meter high above ground for below 1GHz test, and which is 1.5 meter high above ground for above 1GHz test.
- b. The diameter of the turntable is 2 meters. The EUT is located at the center of the edge of the test support table. Since the turntable is large enough, the EUT is placed at the center of the edge of the test support table as well as at the center of the turntable.
- c. EUT is set 3 meters away from the receiving antenna, which is mounted on a antenna tower.
- d. Set the EUT transmit continuously with maximum output power.
- e. The turn table can rotate 360 degrees to determine the position of the maximum emission level.
- f. The antenna can be moved up and down between 1 meter and 4 meters to find out the maximum emission level. Both horizontal and vertical polarization of the antenna are set on test.
- g. Spectrum analyzer setting parameters in accordance with section 10.3.
- h. Repeat above procedures until all channels and test modes were measured.
- i. Record the results in the test report.

Note:

1. For emissions above 1GHz, if peak level comply with average limit, then the average level is deemed to comply with average limit.
2. The frequency 2402MHz, 2441MHz and 2480MHz is fundamental frequency which no limit, the limit on plots is automatically generated by the software, it's not fundamental limit, we can't remove it.
3. For 30-1000MHz Radiation emissions, GFSK, $\pi/4$ -DQPSK and 8-DPSK mode all have been tested, it was conducted under both AC 120V/60Hz and AC 240V/50Hz input voltages, there was no significant change in radiation emission. Only worse case: 8-DPSK mode with CH78 2480MHz with AC 120V/60Hz voltage is reported.
4. Radiated emission test from 9KHz to 10th harmonic of fundamental was verified, and no emission found except system noise floor in 9KHz to 30MHz and not Recorded in this report.
5. The amplitude of-18GHz to 25GHz spurious emission-that-is attenuated by more than 20dB below the-permissible-limit has no need-to-be-reported.

10.5. Test Result

Radiated Emissions 30-1000MHz

EUT: Bluetooth audio
M/N: HY11050-402701
Test Voltage: DC 5V by ADAPTER Input: AC 120V/60Hz
Ant. Pol.: Vertical
Test Mode: TX Mode
Note: only worse case: 8-DPSK mode with CH78 2480MHz is reported

Detailed results are shown below



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg.)	P/F	Remark
1	31.620	4.32	18.84	23.16	40.00	-16.84	QP			P	
2	42.900	3.97	19.33	23.30	40.00	-16.70	QP			P	
3 *	92.787	11.66	15.83	27.49	43.50	-16.01	QP			P	
4	104.903	7.02	16.98	24.00	43.50	-19.50	QP			P	
5	170.195	7.47	19.44	26.91	43.50	-16.59	QP			P	
6	195.136	6.06	16.60	22.66	43.50	-20.84	QP			P	

Remarks: 1). Level (dBμV/m) = Reading (dBμV/m) + Factor (dB/m)
2). Factor(dB/m) =Antenna Factor (dB/m) + Cable loss (dB)
3). Margin(dB) = Limit (dBμV/m) - Level (dBμV/m)

EUT: Bluetooth audio
M/N: HY11050-402701
Test Voltage: DC 5V by ADAPTER Input: AC 120V/60Hz
Ant. Pol.: Horizontal
Test Mode: TX Mode
Note: only worse case: 8-DPSK mode with CH78 2480MHz is reported
Detailed results are shown below



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg.)	P/F	Remark
1	45.535	1.51	19.95	21.46	40.00	-18.54	QP			P	
2	60.280	2.53	18.99	21.52	40.00	-18.48	QP			P	
3	163.755	2.51	20.47	22.98	43.50	-20.52	QP			P	
4	308.913	2.49	20.61	23.10	46.00	-22.90	QP			P	
5	413.271	2.43	22.82	25.25	46.00	-20.75	QP			P	
6 *	734.491	4.02	28.79	32.81	46.00	-13.19	QP			P	

Remarks: 1). Level (dBuV/m) = Reading (dBuV/m) + Factor (dB/m)
2). Factor(dB/m) = Antenna Factor (dB/m) + Cable loss (dB)
3). Margin(dB) = Limit (dBuV/m) - Level (dBuV/m)

Radiated Emissions Above 1GHz - GFSK

GFSK-CH00 2402MHz (Non-Hopping)										
No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	2191.095	41.06	-19.99	74.0	32.94	Peak	288.00	100	Vertical	Pass
1**	2191.095	31.96	-19.99	54.0	22.04	AV	288.00	100	Vertical	Pass
2	4779.000	48.87	-10.48	74.0	25.13	Peak	288.00	100	Vertical	Pass
2**	4779.000	40.22	-10.48	54.0	13.78	AV	288.00	100	Vertical	Pass
3	4804.250	48.08	-11.06	74.0	25.92	Peak	36.00	100	Vertical	Pass
3**	4804.250	40.38	-11.06	54.0	13.62	AV	36.00	100	Vertical	Pass
4	7206.000	50.31	-6.86	74.0	23.69	Peak	288.00	100	Vertical	Pass
4**	7206.000	42.25	-6.86	54.0	11.75	AV	288.00	100	Vertical	Pass
5	7671.000	52.30	-6.28	74.0	21.70	Peak	72.00	100	Vertical	Pass
5**	7671.000	43.68	-6.28	54.0	10.32	AV	72.00	100	Vertical	Pass
6	17925.501	53.17	1.30	74.0	20.83	Peak	216.00	100	Vertical	Pass
6**	17925.501	43.79	1.30	54.0	10.21	AV	216.00	100	Vertical	Pass

GFSK-CH00 2402MHz (Non-Hopping)										
No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	2375.888	41.92	-19.38	74.0	32.08	Peak	324.00	150	Horizontal	Pass
1**	2375.888	35.70	-19.38	54.0	18.30	AV	324.00	150	Horizontal	Pass
2	4766.750	48.57	-10.55	74.0	25.43	Peak	108.00	150	Horizontal	Pass
2**	4766.750	40.70	-10.55	54.0	13.30	AV	108.00	150	Horizontal	Pass
3	4804.250	51.57	-11.06	74.0	22.43	Peak	216.00	150	Horizontal	Pass
3**	4804.250	47.55	-11.06	54.0	6.45	AV	216.00	150	Horizontal	Pass
4	7206.500	49.02	-6.86	74.0	24.98	Peak	360.00	150	Horizontal	Pass
4**	7206.500	41.96	-6.86	54.0	12.04	AV	360.00	150	Horizontal	Pass
5	7917.750	52.47	-6.26	74.0	21.53	Peak	36.00	150	Horizontal	Pass
5**	7917.750	42.25	-6.26	54.0	11.75	AV	36.00	150	Horizontal	Pass
6	17927.000	52.76	1.41	74.0	21.24	Peak	360.00	150	Horizontal	Pass
6**	17927.000	44.87	1.41	54.0	9.13	AV	360.00	150	Horizontal	Pass

GFSK-CH39 2441MHz (Non-Hopping)										
No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	2343.571	40.74	-19.70	74.0	33.26	Peak	108.00	150	Vertical	Pass
1**	2343.571	30.61	-19.70	54.0	23.39	AV	108.00	150	Vertical	Pass
2	4379.250	48.71	-12.74	74.0	25.29	Peak	360.00	150	Vertical	Pass
2**	4379.250	37.24	-12.74	54.0	16.76	AV	360.00	150	Vertical	Pass
3	4882.000	51.26	-10.72	74.0	22.74	Peak	252.00	150	Vertical	Pass
3**	4882.000	46.67	-10.72	54.0	7.33	AV	252.00	150	Vertical	Pass
4	7323.000	48.08	-6.78	74.0	25.92	Peak	360.00	150	Vertical	Pass
4**	7323.000	40.95	-6.78	54.0	13.05	AV	360.00	150	Vertical	Pass
5	7729.000	51.76	-6.31	74.0	22.24	Peak	324.00	150	Vertical	Pass
5**	7729.000	41.78	-6.31	54.0	12.22	AV	324.00	150	Vertical	Pass
6	17941.000	52.79	1.48	74.0	21.21	Peak	72.00	150	Vertical	Pass
6**	17941.000	42.79	1.48	54.0	11.21	AV	72.00	150	Vertical	Pass

GFSK-CH39 2441MHz (Non-Hopping)

No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	2324.062	41.36	-19.64	74.0	32.64	Peak	180.00	150	Horizontal	Pass
1**	2324.062	30.91	-19.64	54.0	23.09	AV	180.00	150	Horizontal	Pass
2	4760.750	48.65	-10.57	74.0	25.35	Peak	108.00	150	Horizontal	Pass
2**	4760.750	39.34	-10.57	54.0	14.66	AV	108.00	150	Horizontal	Pass
3	4882.000	54.26	-10.72	74.0	19.74	Peak	288.00	150	Horizontal	Pass
3**	4882.000	51.81	-10.72	54.0	2.19	AV	288.00	150	Horizontal	Pass
4	7323.000	48.90	-6.78	74.0	25.10	Peak	36.00	150	Horizontal	Pass
4**	7323.000	42.15	-6.78	54.0	11.85	AV	36.00	150	Horizontal	Pass
5	7931.750	52.71	-5.94	74.0	21.29	Peak	180.00	150	Horizontal	Pass
5**	7931.750	42.87	-5.94	54.0	11.13	AV	180.00	150	Horizontal	Pass
6	17928.499	52.51	1.53	74.0	21.49	Peak	360.00	150	Horizontal	Pass
6**	17928.499	43.62	1.53	54.0	10.38	AV	360.00	150	Horizontal	Pass

GFSK-CH78 2480MHz (Non-Hopping)

No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	2342.371	40.43	-19.70	74.0	33.57	Peak	216.00	150	Horizontal	Pass
1**	2342.371	31.79	-19.70	54.0	22.21	AV	216.00	150	Horizontal	Pass
2	4762.250	49.21	-10.56	74.0	24.79	Peak	144.00	150	Horizontal	Pass
2**	4762.250	39.41	-10.56	54.0	14.59	AV	144.00	150	Horizontal	Pass
3	4960.250	58.69	-10.87	74.0	15.31	Peak	324.00	150	Horizontal	Pass
3**	4960.250	46.13	-10.87	54.0	7.87	AV	324.00	150	Horizontal	Pass
4	7440.500	50.65	-6.79	74.0	23.35	Peak	144.00	150	Horizontal	Pass
4**	7440.500	42.06	-6.79	54.0	11.94	AV	144.00	150	Horizontal	Pass
5	7597.500	52.16	-6.76	74.0	21.84	Peak	252.00	150	Horizontal	Pass
5**	7597.500	42.58	-6.76	54.0	11.42	AV	252.00	150	Horizontal	Pass
6	17934.500	52.64	1.61	74.0	21.36	Peak	360.00	150	Horizontal	Pass
6**	17934.500	43.17	1.61	54.0	10.83	AV	360.00	150	Horizontal	Pass

GFSK-CH78 2480MHz (Non-Hopping)

No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	2315.257	40.67	-19.57	74.0	33.33	Peak	108.00	150	Vertical	Pass
1**	2315.257	31.02	-19.57	54.0	22.98	AV	108.00	150	Vertical	Pass
2	2534.167	55.10	-19.39	74.0	18.90	Peak	288.00	150	Vertical	Pass
2**	2534.167	41.39	-19.39	54.0	12.61	AV	288.00	150	Vertical	Pass
3	4959.500	53.43	-10.89	74.0	20.57	Peak	36.00	150	Vertical	Pass
3**	4959.500	46.92	-10.89	54.0	7.08	AV	36.00	150	Vertical	Pass
4	7441.000	51.07	-6.80	74.0	22.93	Peak	360.00	150	Vertical	Pass
4**	7441.000	41.50	-6.80	54.0	12.50	AV	360.00	150	Vertical	Pass
5	7816.000	51.95	-6.54	74.0	22.05	Peak	324.00	150	Vertical	Pass
5**	7816.000	42.57	-6.54	54.0	11.43	AV	324.00	150	Vertical	Pass
6	17942.000	51.67	1.44	74.0	22.33	Peak	252.00	150	Vertical	Pass
6**	17942.000	42.96	1.44	54.0	11.04	AV	252.00	150	Vertical	Pass

Radiated Emissions Above 1GHz - $\pi/4$ -DQPSK

$\pi/4$ -DQPSK-CH00 2402MHz (Non-Hopping)										
No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	2375.888	40.65	-19.38	74.0	33.35	Peak	324.00	150	Horizontal	Pass
1**	2375.888	33.04	-19.38	54.0	20.96	AV	324.00	150	Horizontal	Pass
2	4331.000	48.43	-12.10	74.0	25.57	Peak	144.00	150	Horizontal	Pass
2**	4331.000	39.33	-12.10	54.0	14.67	AV	144.00	150	Horizontal	Pass
3	4804.500	50.27	-11.06	74.0	23.73	Peak	288.00	150	Horizontal	Pass
3**	4804.500	44.52	-11.06	54.0	9.48	AV	288.00	150	Horizontal	Pass
4	7205.500	49.91	-6.87	74.0	24.09	Peak	288.00	150	Horizontal	Pass
4**	7205.500	41.83	-6.87	54.0	12.17	AV	288.00	150	Horizontal	Pass
5	7780.750	52.82	-6.22	74.0	21.18	Peak	324.00	150	Horizontal	Pass
5**	7780.750	42.79	-6.22	54.0	11.21	AV	324.00	150	Horizontal	Pass
6	17931.000	52.31	1.64	74.0	21.69	Peak	252.00	150	Horizontal	Pass
6**	17931.000	44.36	1.64	54.0	9.64	AV	252.00	150	Horizontal	Pass

$\pi/4$ -DQPSK-CH00 2402MHz (Non-Hopping)										
No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	2300.750	40.92	-19.51	74.0	33.08	Peak	108.00	150	Vertical	Pass
1**	2300.750	30.75	-19.51	54.0	23.25	AV	108.00	150	Vertical	Pass
2	4754.000	48.65	-10.45	74.0	25.35	Peak	288.00	150	Vertical	Pass
2**	4754.000	38.03	-10.45	54.0	15.97	AV	288.00	150	Vertical	Pass
3	4803.750	46.52	-11.07	74.0	27.48	Peak	72.00	150	Vertical	Pass
3**	4803.750	39.15	-11.07	54.0	14.85	AV	72.00	150	Vertical	Pass
4	7205.250	50.08	-6.88	74.0	23.92	Peak	288.00	150	Vertical	Pass
4**	7205.250	41.97	-6.88	54.0	12.03	AV	288.00	150	Vertical	Pass
5	7759.750	51.40	-6.43	74.0	22.60	Peak	144.00	150	Vertical	Pass
5**	7759.750	41.81	-6.43	54.0	12.19	AV	144.00	150	Vertical	Pass
6	17930.500	52.33	1.64	74.0	21.67	Peak	360.00	150	Vertical	Pass
6**	17930.500	43.58	1.64	54.0	10.42	AV	360.00	150	Vertical	Pass

$\pi/4$ -DQPSK-CH 38 2441MHz (Non-Hopping)										
No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	2233.917	40.96	-19.77	74.0	33.04	Peak	72.00	150	Horizontal	Pass
1**	2233.917	32.48	-19.77	54.0	21.52	AV	72.00	150	Horizontal	Pass
2	4751.250	48.57	-10.40	74.0	25.43	Peak	324.00	150	Horizontal	Pass
2**	4751.250	39.51	-10.40	54.0	14.49	AV	324.00	150	Horizontal	Pass
3	4882.000	56.32	-10.72	74.0	17.68	Peak	108.00	150	Horizontal	Pass
3**	4882.000	52.15	-10.72	54.0	1.85	AV	108.00	150	Horizontal	Pass
4	7323.000	49.45	-6.78	74.0	24.55	Peak	180.00	150	Horizontal	Pass
4**	7323.000	41.64	-6.78	54.0	12.36	AV	180.00	150	Horizontal	Pass
5	7776.250	51.77	-6.27	74.0	22.23	Peak	216.00	150	Horizontal	Pass
5**	7776.250	43.51	-6.27	54.0	10.49	AV	216.00	150	Horizontal	Pass
6	17941.500	52.41	1.46	74.0	21.59	Peak	144.00	150	Horizontal	Pass
6**	17941.500	43.71	1.46	54.0	10.29	AV	144.00	150	Horizontal	Pass

$\pi/4$ -DQPSK-CH39 2441MHz (Non-Hopping)

No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	2186.093	40.80	-20.04	74.0	33.20	Peak	288.00	150	Vertical	Pass
1**	2186.093	30.64	-20.04	54.0	23.36	AV	288.00	150	Vertical	Pass
2	4756.000	48.86	-10.49	74.0	25.14	Peak	360.00	150	Vertical	Pass
2**	4756.000	39.36	-10.49	54.0	14.64	AV	360.00	150	Vertical	Pass
3	4882.000	50.08	-10.72	74.0	23.92	Peak	144.00	150	Vertical	Pass
3**	4882.000	43.95	-10.72	54.0	10.05	AV	144.00	150	Vertical	Pass
4	7323.000	47.79	-6.78	74.0	26.21	Peak	360.00	150	Vertical	Pass
4**	7323.000	41.20	-6.78	54.0	12.80	AV	360.00	150	Vertical	Pass
5	7685.250	51.69	-6.48	74.0	22.31	Peak	360.00	150	Vertical	Pass
5**	7685.250	41.60	-6.48	54.0	12.40	AV	360.00	150	Vertical	Pass
6	17529.000	52.72	1.01	74.0	21.28	Peak	180.00	150	Vertical	Pass
6**	17529.000	42.84	1.01	54.0	11.16	AV	180.00	150	Vertical	Pass

$\pi/4$ -DQPSK-CH78 2480MHz (Non-Hopping)

No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	2283.241	40.34	-19.45	74.0	33.66	Peak	324.00	150	Vertical	Pass
1**	2283.241	30.66	-19.45	54.0	23.34	AV	324.00	150	Vertical	Pass
2	4758.000	48.60	-10.53	74.0	25.40	Peak	72.00	150	Vertical	Pass
2**	4758.000	38.74	-10.53	54.0	15.26	AV	72.00	150	Vertical	Pass
3	4959.750	54.32	-10.88	74.0	19.68	Peak	144.00	150	Vertical	Pass
3**	4959.750	48.36	-10.88	54.0	5.64	AV	144.00	150	Vertical	Pass
4	7440.250	49.60	-6.78	74.0	24.40	Peak	72.00	150	Vertical	Pass
4**	7440.250	41.65	-6.78	54.0	12.35	AV	72.00	150	Vertical	Pass
5	7814.000	51.87	-6.59	74.0	22.13	Peak	216.00	150	Vertical	Pass
5**	7814.000	42.83	-6.59	54.0	11.17	AV	216.00	150	Vertical	Pass
6	17932.501	52.13	1.62	74.0	21.87	Peak	108.00	150	Vertical	Pass
6**	17932.501	43.30	1.62	54.0	10.70	AV	108.00	150	Vertical	Pass

$\pi/4$ -DQPSK-CH78 2480MHz (Non-Hopping)

No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	2252.926	41.09	-19.60	74.0	32.91	Peak	108.00	150	Horizontal	Pass
1**	2252.926	31.65	-19.60	54.0	22.35	AV	108.00	150	Horizontal	Pass
2	4780.750	48.25	-10.48	74.0	25.75	Peak	216.00	150	Horizontal	Pass
2**	4780.750	39.26	-10.48	54.0	14.74	AV	216.00	150	Horizontal	Pass
3	4959.750	61.10	-10.88	74.0	12.90	Peak	252.00	150	Horizontal	Pass
3**	4959.750	45.42	-10.88	54.0	8.58	AV	252.00	150	Horizontal	Pass
4	7440.250	50.03	-6.78	74.0	23.97	Peak	144.00	150	Horizontal	Pass
4**	7440.250	42.30	-6.78	54.0	11.70	AV	144.00	150	Horizontal	Pass
5	7894.750	51.65	-6.11	74.0	22.35	Peak	108.00	150	Horizontal	Pass
5**	7894.750	42.99	-6.11	54.0	11.01	AV	108.00	150	Horizontal	Pass
6	17924.000	52.29	1.18	74.0	21.71	Peak	72.00	150	Horizontal	Pass
6**	17924.000	43.37	1.18	54.0	10.63	AV	72.00	150	Horizontal	Pass

Radiated Emissions Above 1GHz - 8-DPSK

8-DPSK-CH00 2402MHz (Non-Hopping)										
No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	2388.394	40.67	-19.28	74.0	33.33	Peak	360.00	150	Vertical	Pass
1**	2388.394	30.98	-19.28	54.0	23.02	AV	360.00	150	Vertical	Pass
2	4767.500	47.81	-10.55	74.0	26.19	Peak	72.00	150	Vertical	Pass
2**	4767.500	39.79	-10.55	54.0	14.21	AV	72.00	150	Vertical	Pass
3	4804.250	47.88	-11.06	74.0	26.12	Peak	216.00	150	Vertical	Pass
3**	4804.250	41.31	-11.06	54.0	12.69	AV	216.00	150	Vertical	Pass
4	7205.250	49.14	-6.88	74.0	24.86	Peak	144.00	150	Vertical	Pass
4**	7205.250	41.40	-6.88	54.0	12.60	AV	144.00	150	Vertical	Pass
5	7357.000	52.42	-7.02	74.0	21.58	Peak	144.00	150	Vertical	Pass
5**	7357.000	42.10	-7.02	54.0	11.90	AV	144.00	150	Vertical	Pass
6	17525.500	51.95	1.00	74.0	22.05	Peak	360.00	150	Vertical	Pass
6**	17525.500	42.80	1.00	54.0	11.20	AV	360.00	150	Vertical	Pass

8-DPSK-CH00 2402MHz (Non-Hopping)										
No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	2375.788	41.30	-19.39	74.0	32.70	Peak	288.00	150	Horizontal	Pass
1**	2375.788	34.36	-19.39	54.0	19.64	AV	288.00	150	Horizontal	Pass
2	4779.500	48.03	-10.48	74.0	25.97	Peak	288.00	150	Horizontal	Pass
2**	4779.500	39.54	-10.48	54.0	14.46	AV	288.00	150	Horizontal	Pass
3	4804.000	53.37	-11.07	74.0	20.63	Peak	144.00	150	Horizontal	Pass
3**	4804.000	47.13	-11.07	54.0	6.87	AV	144.00	150	Horizontal	Pass
4	7206.000	50.14	-6.86	74.0	23.86	Peak	144.00	150	Horizontal	Pass
4**	7206.000	42.05	-6.86	54.0	11.95	AV	144.00	150	Horizontal	Pass
5	7656.250	51.74	-6.40	74.0	22.26	Peak	288.00	150	Horizontal	Pass
5**	7656.250	41.86	-6.40	54.0	12.14	AV	288.00	150	Horizontal	Pass
6	17927.500	52.22	1.45	74.0	21.78	Peak	360.00	150	Horizontal	Pass
6**	17927.500	43.06	1.45	54.0	10.94	AV	360.00	150	Horizontal	Pass

8-DPSK-CH39 2441MHz (Non-Hopping)										
No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	2336.868	41.32	-19.71	74.0	32.68	Peak	216.00	150	Vertical	Pass
1**	2336.868	30.57	-19.71	54.0	23.43	AV	216.00	150	Vertical	Pass
2	4772.250	48.85	-10.53	74.0	25.15	Peak	144.00	150	Vertical	Pass
2**	4772.250	40.96	-10.53	54.0	13.04	AV	144.00	150	Vertical	Pass
3	4882.000	50.45	-10.72	74.0	23.55	Peak	252.00	150	Vertical	Pass
3**	4882.000	44.30	-10.72	54.0	9.70	AV	252.00	150	Vertical	Pass
4	7323.000	49.14	-6.78	74.0	24.86	Peak	36.00	150	Vertical	Pass
4**	7323.000	41.94	-6.78	54.0	12.06	AV	36.00	150	Vertical	Pass
5	7631.250	52.20	-6.63	74.0	21.80	Peak	108.00	150	Vertical	Pass
5**	7631.250	41.86	-6.63	54.0	12.14	AV	108.00	150	Vertical	Pass
6	17526.499	52.39	1.00	74.0	21.61	Peak	180.00	150	Vertical	Pass
6**	17526.499	42.16	1.00	54.0	11.84	AV	180.00	150	Vertical	Pass

8-DPSK-CH39 2441MHz (Non-Hopping)										
No.	Frequency (MHz)	Results (dBUV/m)	Factor (dB/m)	Limit (dBUV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	2347.974	40.09	-19.69	74.0	33.91	Peak	252.00	150	Horizontal	Pass
1**	2347.974	30.68	-19.69	54.0	23.32	AV	252.00	150	Horizontal	Pass
2	4758.750	48.51	-10.54	74.0	25.49	Peak	216.00	150	Horizontal	Pass
2**	4758.750	39.45	-10.54	54.0	14.55	AV	216.00	150	Horizontal	Pass
3	4882.000	58.30	-10.72	74.0	15.70	Peak	252.00	150	Horizontal	Pass
3**	4882.000	44.58	-10.72	54.0	9.42	AV	252.00	150	Horizontal	Pass
4	7323.000	48.41	-6.78	74.0	25.59	Peak	216.00	150	Horizontal	Pass
4**	7323.000	41.50	-6.78	54.0	12.50	AV	216.00	150	Horizontal	Pass
5	7633.250	53.92	-6.64	74.0	20.08	Peak	288.00	150	Horizontal	Pass
5**	7633.250	41.84	-6.64	54.0	12.16	AV	288.00	150	Horizontal	Pass
6	17929.001	52.74	1.57	74.0	21.26	Peak	36.00	150	Horizontal	Pass
6**	17929.001	44.04	1.57	54.0	9.96	AV	36.00	150	Horizontal	Pass

8-DPSK-CH78 2480MHz (Non-Hopping)										
No.	Frequency (MHz)	Results (dBUV/m)	Factor (dB/m)	Limit (dBUV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	2291.445	40.63	-19.49	74.0	33.37	Peak	324.00	150	Horizontal	Pass
1**	2291.445	31.43	-19.49	54.0	22.57	AV	324.00	150	Horizontal	Pass
2	4744.250	48.59	-10.55	74.0	25.41	Peak	180.00	150	Horizontal	Pass
2**	4744.250	38.06	-10.55	54.0	15.94	AV	180.00	150	Horizontal	Pass
3	4960.000	66.30	-10.88	74.0	7.70	Peak	72.00	150	Horizontal	Pass
3**	4960.000	47.22	-10.88	54.0	6.78	AV	72.00	150	Horizontal	Pass
4	7439.250	49.84	-6.78	74.0	24.16	Peak	360.00	150	Horizontal	Pass
4**	7439.250	41.94	-6.78	54.0	12.06	AV	360.00	150	Horizontal	Pass
5	7602.500	51.96	-6.67	74.0	22.04	Peak	144.00	150	Horizontal	Pass
5**	7602.500	41.83	-6.67	54.0	12.17	AV	144.00	150	Horizontal	Pass
6	17927.999	51.53	1.49	74.0	22.47	Peak	360.00	150	Horizontal	Pass
6**	17927.999	43.10	1.49	54.0	10.90	AV	360.00	150	Horizontal	Pass

8-DPSK-CH78 2480MHz (Non-Hopping)										
No.	Frequency (MHz)	Results (dBUV/m)	Factor (dB/m)	Limit (dBUV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	2251.425	41.32	-19.63	74.0	32.68	Peak	180.00	150	Vertical	Pass
1**	2251.425	30.28	-19.63	54.0	23.72	AV	180.00	150	Vertical	Pass
2	4715.500	48.46	-10.92	74.0	25.54	Peak	72.00	150	Vertical	Pass
2**	4715.500	38.42	-10.92	54.0	15.58	AV	72.00	150	Vertical	Pass
3	4959.500	52.01	-10.89	74.0	21.99	Peak	144.00	150	Vertical	Pass
3**	4959.500	44.07	-10.89	54.0	9.93	AV	144.00	150	Vertical	Pass
4	7439.500	49.27	-6.78	74.0	24.73	Peak	360.00	150	Vertical	Pass
4**	7439.500	42.57	-6.78	54.0	11.43	AV	360.00	150	Vertical	Pass
5	7724.500	52.37	-6.30	74.0	21.63	Peak	72.00	150	Vertical	Pass
5**	7724.500	43.76	-6.30	54.0	10.24	AV	72.00	150	Vertical	Pass
6	17933.500	51.71	1.61	74.0	22.29	Peak	180.00	150	Vertical	Pass
6**	17933.500	43.89	1.61	54.0	10.11	AV	180.00	150	Vertical	Pass

Note:

1. Results (dBUV/m) = Raw Value (dBUV) + Factor (dB/m)
2. Factor (dB/m) = Antenna Factor (dB/m) + Cable Loss (dB) - Pre-amplifier
3. Margin value = Limit - Results.

Radiated Band Edge – GFSK (Non-Hopping)**GFSK-CH00 2402MHz-Low Band Edge-(Non-Hopping)**

No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	2375.780	42.14	-19.63	74.0	31.86	Peak	324.00	100	Horizontal	Pass
1**	2375.780	34.05	-19.63	54.0	19.95	AV	324.00	100	Horizontal	Pass
2	2389.970	39.72	-19.56	74.0	34.28	Peak	180.00	100	Horizontal	Pass
2**	2389.970	31.51	-19.56	54.0	22.49	AV	180.00	100	Horizontal	Pass
3	2399.980	46.92	-19.64	74.0	27.08	Peak	216.00	100	Horizontal	Pass
3**	2399.980	34.03	-19.64	54.0	19.97	AV	216.00	100	Horizontal	Pass

GFSK-CH00 2402MHz-Low Band Edge-(Non-Hopping)

No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	2370.885	41.99	-19.66	74.0	32.01	Peak	144.00	150	Vertical	Pass
1**	2370.885	29.42	-19.66	54.0	24.58	AV	144.00	150	Vertical	Pass
2	2389.970	40.14	-19.56	74.0	33.86	Peak	216.00	150	Vertical	Pass
2**	2389.970	29.58	-19.56	54.0	24.42	AV	216.00	150	Vertical	Pass
3	2399.980	42.86	-19.64	74.0	31.14	Peak	72.00	150	Vertical	Pass
3**	2399.980	30.82	-19.64	54.0	23.18	AV	72.00	150	Vertical	Pass

GFSK-CH78 2480MHz-High Band Edge-(Non-Hopping)

No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	2483.485	41.07	-19.50	74.0	32.93	Peak	216.00	150	Vertical	Pass
1**	2483.485	30.52	-19.50	54.0	23.48	AV	216.00	150	Vertical	Pass
2	2487.790	41.61	-19.50	74.0	32.39	Peak	144.00	150	Vertical	Pass
2**	2487.790	30.12	-19.50	54.0	23.88	AV	144.00	150	Vertical	Pass
3	2495.125	42.50	-19.48	74.0	31.50	Peak	288.00	150	Vertical	Pass
3**	2495.125	30.43	-19.48	54.0	23.57	AV	288.00	150	Vertical	Pass

GFSK-CH78 2480MHz-High Band Edge-(Non-Hopping)

No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	2483.485	42.97	-19.50	74.0	31.03	Peak	360.00	150	Horizontal	Pass
1**	2483.485	32.55	-19.50	54.0	21.45	AV	360.00	150	Horizontal	Pass
2	2483.800	45.84	-19.50	74.0	28.16	Peak	288.00	150	Horizontal	Pass
2**	2483.800	32.44	-19.50	54.0	21.56	AV	288.00	150	Horizontal	Pass
3	2499.790	42.31	-19.46	74.0	31.69	Peak	360.00	150	Horizontal	Pass
3**	2499.790	30.18	-19.46	54.0	23.82	AV	360.00	150	Horizontal	Pass

Radiated Band Edge – $\pi/4$ -DQPSK (Non-Hopping)

$\pi/4$ -DQPSK-CH00 2402MHz-Low Band Edge-(Non-Hopping)										
No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	2350.260	41.27	-19.66	74.0	32.73	Peak	36.00	150	Vertical	Pass
1**	2350.260	29.85	-19.66	54.0	24.15	AV	36.00	150	Vertical	Pass
2	2389.970	38.73	-19.56	74.0	35.27	Peak	216.00	150	Vertical	Pass
2**	2389.970	29.60	-19.56	54.0	24.40	AV	216.00	150	Vertical	Pass
3	2399.980	44.07	-19.64	74.0	29.93	Peak	144.00	150	Vertical	Pass
3**	2399.980	33.63	-19.64	54.0	20.37	AV	144.00	150	Vertical	Pass

$\pi/4$ -DQPSK-CH002402MHz-Low Band Edge-(Non-Hopping)										
No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	2340.305	41.87	-19.65	74.0	32.13	Peak	180.00	150	Horizontal	Pass
1**	2340.305	29.84	-19.65	54.0	24.16	AV	180.00	150	Horizontal	Pass
2	2389.970	38.93	-19.56	74.0	35.07	Peak	180.00	150	Horizontal	Pass
2**	2389.970	30.17	-19.56	54.0	23.83	AV	180.00	150	Horizontal	Pass
3	2399.980	49.05	-19.64	74.0	24.95	Peak	288.00	150	Horizontal	Pass
3**	2399.980	38.94	-19.64	54.0	15.06	AV	288.00	150	Horizontal	Pass

$\pi/4$ -DQPSK-CH78 2480MHz-High Band Edge-(Non-Hopping)										
No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	2483.485	40.41	-19.50	74.0	33.59	Peak	288.00	150	Horizontal	Pass
1**	2483.485	30.41	-19.50	54.0	23.59	AV	288.00	150	Horizontal	Pass
2	2484.835	43.23	-19.50	74.0	30.77	Peak	144.00	150	Horizontal	Pass
2**	2484.835	30.63	-19.50	54.0	23.37	AV	144.00	150	Horizontal	Pass
3	2492.635	41.34	-19.50	74.0	32.66	Peak	36.00	150	Horizontal	Pass
3**	2492.635	30.52	-19.50	54.0	23.48	AV	36.00	150	Horizontal	Pass

$\pi/4$ -DQPSK-CH78 2480MHz-High Band Edge-(Non-Hopping)										
No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	2483.485	39.44	-19.50	74.0	34.56	Peak	360.00	150	Vertical	Pass
1**	2483.485	30.20	-19.50	54.0	23.80	AV	360.00	150	Vertical	Pass
2	2485.270	42.55	-19.50	74.0	31.45	Peak	108.00	150	Vertical	Pass
2**	2485.270	30.14	-19.50	54.0	23.86	AV	108.00	150	Vertical	Pass
3	2498.050	41.89	-19.47	74.0	32.11	Peak	360.00	150	Vertical	Pass
3**	2498.050	30.24	-19.47	54.0	23.76	AV	360.00	150	Vertical	Pass

Radiated Band Edge – 8-DPSK (Non-Hopping)

8-DPSK-CH00 2402MHz-Low Band Edge-(Non-Hopping)										
No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	2376.330	42.07	-19.63	74.0	31.93	Peak	324.00	150	Horizontal	Pass
1**	2376.330	33.84	-19.63	54.0	20.16	AV	324.00	150	Horizontal	Pass
2	2389.970	40.32	-19.56	74.0	33.68	Peak	252.00	150	Horizontal	Pass
2**	2389.970	31.63	-19.56	54.0	22.37	AV	252.00	150	Horizontal	Pass
3	2399.980	39.56	-19.64	74.0	34.44	Peak	216.00	150	Horizontal	Pass
3**	2399.980	30.12	-19.64	54.0	23.88	AV	216.00	150	Horizontal	Pass

8-DPSK-CH00 2402MHz-Low Band Edge-(Non-Hopping)										
No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	2376.165	41.94	-19.63	74.0	32.06	Peak	252.00	150	Vertical	Pass
1**	2376.165	32.86	-19.63	54.0	21.14	AV	252.00	150	Vertical	Pass
2	2389.970	40.58	-19.56	74.0	33.42	Peak	72.00	150	Vertical	Pass
2**	2389.970	30.87	-19.56	54.0	23.13	AV	72.00	150	Vertical	Pass
3	2399.980	44.03	-19.64	74.0	29.97	Peak	252.00	150	Vertical	Pass
3**	2399.980	33.21	-19.64	54.0	20.79	AV	252.00	150	Vertical	Pass

8-DPSK-CH78 2480MHz-High Band Edge-(Non-Hopping)										
No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	2483.485	39.55	-19.50	74.0	34.45	Peak	36.00	150	Vertical	Pass
1**	2483.485	30.30	-19.50	54.0	23.70	AV	36.00	150	Vertical	Pass
2	2484.895	41.92	-19.50	74.0	32.08	Peak	360.00	150	Vertical	Pass
2**	2484.895	30.20	-19.50	54.0	23.80	AV	360.00	150	Vertical	Pass
3	2490.790	41.69	-19.50	74.0	32.31	Peak	144.00	150	Vertical	Pass
3**	2490.790	30.26	-19.50	54.0	23.74	AV	144.00	150	Vertical	Pass

8-DPSK-CH78 2480MHz-High Band Edge-(Non-Hopping)										
No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	2483.485	40.29	-19.50	74.0	33.71	Peak	252.00	150	Horizontal	Pass
1**	2483.485	31.59	-19.50	54.0	22.41	AV	252.00	150	Horizontal	Pass
2	2483.620	43.81	-19.50	74.0	30.19	Peak	144.00	150	Horizontal	Pass
2**	2483.620	31.44	-19.50	54.0	22.56	AV	144.00	150	Horizontal	Pass
3	2494.750	41.68	-19.49	74.0	32.32	Peak	108.00	150	Horizontal	Pass
3**	2494.750	30.30	-19.49	54.0	23.70	AV	108.00	150	Horizontal	Pass

Radiated Band Edge – GFSK (Hopping On)

GFSK-Low Band Edge-(Hopping On)										
No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	2338.985	41.67	-19.65	74.0	32.33	Peak	216.00	150	Horizontal	Pass
1**	2338.985	30.31	-19.65	54.0	23.69	AV	216.00	150	Horizontal	Pass
2	2389.970	38.31	-19.56	74.0	35.69	Peak	36.00	150	Horizontal	Pass
2**	2389.970	30.51	-19.56	54.0	23.49	AV	36.00	150	Horizontal	Pass
3	2399.980	42.38	-19.64	74.0	31.62	Peak	288.00	150	Horizontal	Pass
3**	2399.980	32.16	-19.64	54.0	21.84	AV	288.00	150	Horizontal	Pass

GFSK-Low Band Edge-(Hopping On)										
No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	2314.070	41.98	-19.40	74.0	32.02	Peak	72.00	150	Vertical	Pass
1**	2314.070	30.18	-19.40	54.0	23.82	AV	72.00	150	Vertical	Pass
2	2389.970	38.66	-19.56	74.0	35.34	Peak	36.00	150	Vertical	Pass
2**	2389.970	29.55	-19.56	54.0	24.45	AV	36.00	150	Vertical	Pass
3	2399.980	38.81	-19.64	74.0	35.19	Peak	36.00	150	Vertical	Pass
3**	2399.980	29.43	-19.64	54.0	24.57	AV	36.00	150	Vertical	Pass

GFSK-High Band Edge-(Hopping On)										
No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	2483.485	39.95	-19.50	74.0	34.05	Peak	252.00	150	Vertical	Pass
1**	2483.485	30.12	-19.50	54.0	23.88	AV	252.00	150	Vertical	Pass
2	2488.930	41.53	-19.51	74.0	32.47	Peak	360.00	150	Vertical	Pass
2**	2488.930	30.28	-19.51	54.0	23.72	AV	360.00	150	Vertical	Pass
3	2496.655	41.68	-19.48	74.0	32.32	Peak	360.00	150	Vertical	Pass
3**	2496.655	30.30	-19.48	54.0	23.70	AV	360.00	150	Vertical	Pass

GFSK-High Band Edge-(Hopping On)										
No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	2483.485	41.40	-19.50	74.0	32.60	Peak	252.00	150	Horizontal	Pass
1**	2483.485	31.22	-19.50	54.0	22.78	AV	252.00	150	Horizontal	Pass
2	2484.685	44.37	-19.50	74.0	29.63	Peak	324.00	150	Horizontal	Pass
2**	2484.685	37.75	-19.50	54.0	16.25	AV	324.00	150	Horizontal	Pass
3	2490.190	44.36	-19.51	74.0	29.64	Peak	216.00	150	Horizontal	Pass
3**	2490.190	38.89	-19.51	54.0	15.11	AV	216.00	150	Horizontal	Pass

Radiated Band Edge – $\pi/4$ -DQPSK (Hopping On)

$\pi/4$ -DQPSK-Low Band Edge-(Hopping On)										
No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	2313.520	41.67	-19.40	74.0	32.33	Peak	144.00	150	Vertical	Pass
1**	2313.520	29.97	-19.40	54.0	24.03	AV	144.00	150	Vertical	Pass
2	2389.970	38.84	-19.56	74.0	35.16	Peak	144.00	150	Vertical	Pass
2**	2389.970	30.38	-19.56	54.0	23.62	AV	144.00	150	Vertical	Pass
3	2399.980	41.18	-19.64	74.0	32.82	Peak	72.00	150	Vertical	Pass
3**	2399.980	33.63	-19.64	54.0	20.37	AV	144.00	150	Vertical	Pass

$\pi/4$ -DQPSK-Low Band Edge-(Hopping On)										
No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	2388.155	41.69	-19.55	74.0	32.31	Peak	72.00	150	Horizontal	Pass
1**	2388.155	34.82	-19.55	54.0	19.18	AV	72.00	150	Horizontal	Pass
2	2389.970	39.34	-19.56	74.0	34.66	Peak	324.00	150	Horizontal	Pass
2**	2389.970	29.93	-19.56	54.0	24.07	AV	324.00	150	Horizontal	Pass
3	2399.980	41.79	-19.64	74.0	32.21	Peak	216.00	150	Horizontal	Pass
3**	2399.980	35.62	-19.64	54.0	18.38	AV	216.00	150	Horizontal	Pass

$\pi/4$ -DQPSK-High Band Edge-(Hopping On)										
No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	2483.485	39.58	-19.50	74.0	34.42	Peak	288.00	150	Horizontal	Pass
1**	2483.485	30.75	-19.50	54.0	23.25	AV	288.00	150	Horizontal	Pass
2	2487.820	44.34	-19.50	74.0	29.66	Peak	144.00	150	Horizontal	Pass
2**	2487.820	37.19	-19.50	54.0	16.81	AV	144.00	150	Horizontal	Pass
3	2491.135	45.02	-19.50	74.0	28.98	Peak	180.00	150	Horizontal	Pass
3**	2491.135	37.68	-19.50	54.0	16.32	AV	180.00	150	Horizontal	Pass

$\pi/4$ -DQPSK-High Band Edge-(Hopping On)										
No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	2483.485	41.16	-19.50	74.0	32.84	Peak	324.00	150	Vertical	Pass
1**	2483.485	33.02	-19.50	54.0	20.98	AV	324.00	150	Vertical	Pass
2	2484.790	42.90	-19.50	74.0	31.10	Peak	252.00	150	Vertical	Pass
2**	2484.790	33.83	-19.50	54.0	20.17	AV	252.00	150	Vertical	Pass
3	2499.295	43.10	-19.47	74.0	30.90	Peak	108.00	150	Vertical	Pass
3**	2499.295	31.96	-19.47	54.0	22.04	AV	108.00	150	Vertical	Pass

Radiated Band Edge – 8-DPSK (Hopping On)

8-DPSK-Low Band Edge-(Hopping On)										
No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	2388.925	42.56	-19.55	74.0	31.44	Peak	72.00	150	Horizontal	Pass
1**	2388.925	34.17	-19.55	54.0	19.83	AV	72.00	150	Horizontal	Pass
2	2389.970	39.97	-19.56	74.0	34.03	Peak	36.00	150	Horizontal	Pass
2**	2389.970	34.39	-19.56	54.0	19.61	AV	36.00	150	Horizontal	Pass
3	2399.980	39.40	-19.64	74.0	34.60	Peak	288.00	150	Horizontal	Pass
3**	2399.980	30.51	-19.64	54.0	23.49	AV	288.00	150	Horizontal	Pass

8-DPSK-Low Band Edge-(Hopping On)										
No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	2382.710	41.53	-19.58	74.0	32.47	Peak	360.00	150	Vertical	Pass
1**	2382.710	32.52	-19.58	54.0	21.48	AV	360.00	150	Vertical	Pass
2	2389.970	38.64	-19.56	74.0	35.36	Peak	216.00	150	Vertical	Pass
2**	2389.970	30.54	-19.56	54.0	23.46	AV	216.00	150	Vertical	Pass
3	2399.980	42.80	-19.64	74.0	31.20	Peak	288.00	150	Vertical	Pass
3**	2399.980	33.39	-19.64	54.0	20.61	AV	288.00	150	Vertical	Pass

8-DPSK-High Band Edge-(Hopping On)										
No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	2483.485	40.64	-19.50	74.0	33.36	Peak	360.00	150	Vertical	Pass
1**	2483.485	33.68	-19.50	54.0	20.32	AV	360.00	150	Vertical	Pass
2	2483.800	43.32	-19.50	74.0	30.68	Peak	360.00	150	Vertical	Pass
2**	2483.800	34.85	-19.50	54.0	19.15	AV	360.00	150	Vertical	Pass
3	2491.060	43.19	-19.50	74.0	30.81	Peak	72.00	150	Vertical	Pass
3**	2491.060	34.73	-19.50	54.0	19.27	AV	72.00	150	Vertical	Pass

8-DPSK-High Band Edge-(Hopping On)										
No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	2483.485	42.67	-19.50	74.0	31.33	Peak	252.00	150	Horizontal	Pass
1**	2483.485	35.51	-19.50	54.0	18.49	AV	252.00	150	Horizontal	Pass
2	2489.140	44.45	-19.51	74.0	29.55	Peak	144.00	150	Horizontal	Pass
2**	2489.140	37.29	-19.51	54.0	16.71	AV	144.00	150	Horizontal	Pass
3	2491.120	44.58	-19.50	74.0	29.42	Peak	36.00	150	Horizontal	Pass
3**	2491.120	37.35	-19.50	54.0	16.65	AV	36.00	150	Horizontal	Pass

Note:

- Results (dBuV/m) = Raw Value (dBuV) + Factor (dB/m)
- Factor (dB/m) = Antenna Factor (dB/m) + Cable Loss (dB) - Pre-amplifier
- Margin value = Limit - Results.

11. AC POWER LINE CONDUCTED EMISSIONS

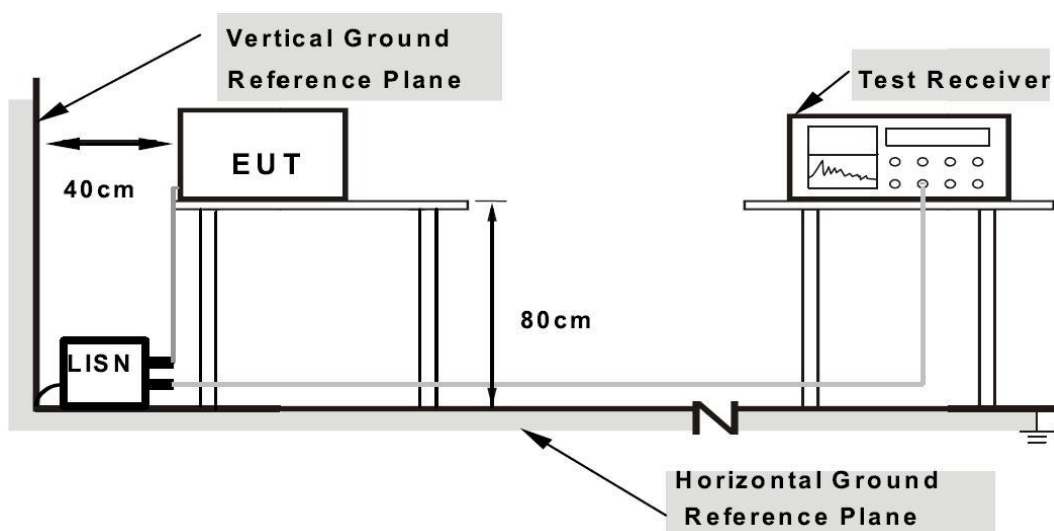
11.1. Limit

Frequency	Maximum RF Line Voltage	
	Quasi-Peak Level dB(μ V)	Average Level dB(μ V)
150kHz ~ 500kHz	66 ~ 56*	56 ~ 46*
500kHz ~ 5MHz	56	46
5MHz ~ 30MHz	60	50

Note:

1. * Decreasing linearly with logarithm of frequency.
2. The lower limit shall apply at the transition frequencies.

11.2. Test Setup



11.3. Spectrum Analyzer Setting

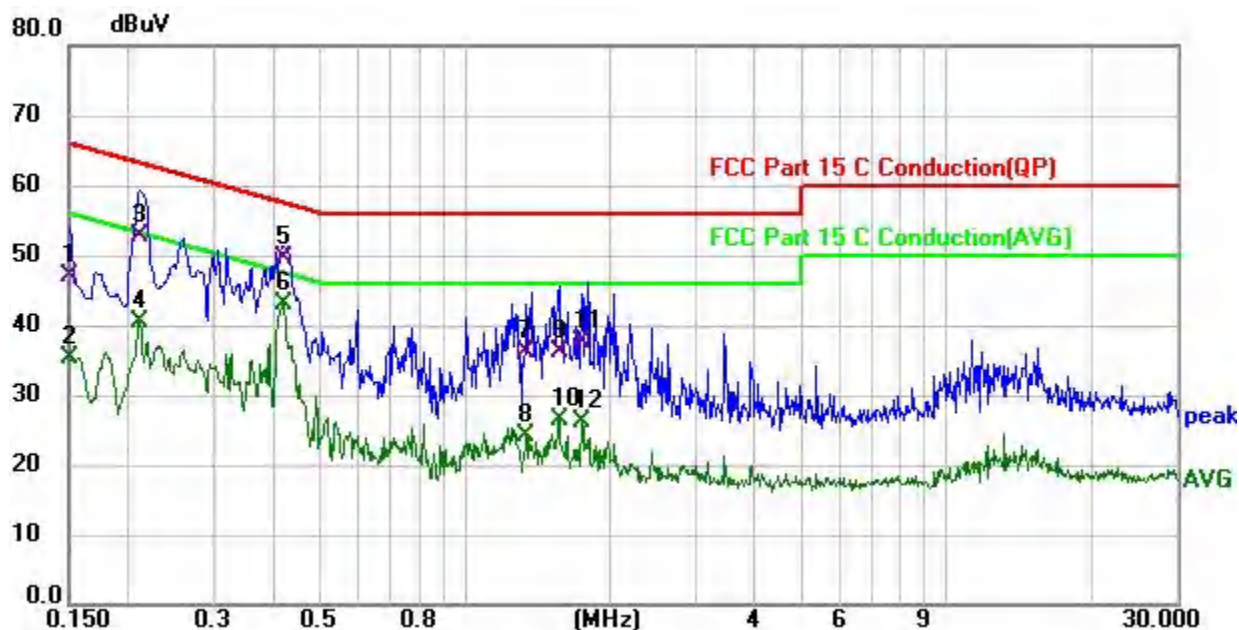
Spectrum Parameters	Setting
RBW	9KHz
VBW	9KHz
Start frequency	150KHz
Stop frequency	30MHz
Sweep Time	Auto
Detector	QP/AVG
Trace Mode	Max Hold

11.4. Test Procedure

- a. The EUT was placed on a non-metallic table, 80cm above the ground plane.
- b. The EUT Power connected to the power mains through a line impedance stabilization network.
- c. Provides a 50 ohm coupling impedance for the EUT (Please refer the block diagram of the test setup and photographs).
- d. Set the EUT transmit continuously with maximum output power.
- e. Spectrum analyzer setting parameters in accordance with section 11.3.
- f. The AC line are checked to find out the maximum conducted emission. In order to find the maximum emission levels, the relative positions of equipment and all of the interface cables shall be changed according to ANSI C63.10:2020 on Conducted Emission Test.
- g. It was conducted under both AC 120V/60Hz and AC 240V/50Hz input voltages, there was no significant change in radiation emission. Only worse case: 8-DPSK mode with CH78 2480MHz with AC 120V/60Hz voltage is reported.

11.5. Test Result

EUT: Bluetooth audio
M/N: HY11050-402701
Test Voltage: DC 5V by ADAPTER Input: AC 120V/60Hz
Phase: Live
Test Mode: TX Mode
Note: only worse case: 8-DPSK mode with CH78 2480MHz is reported
Detailed results are shown below

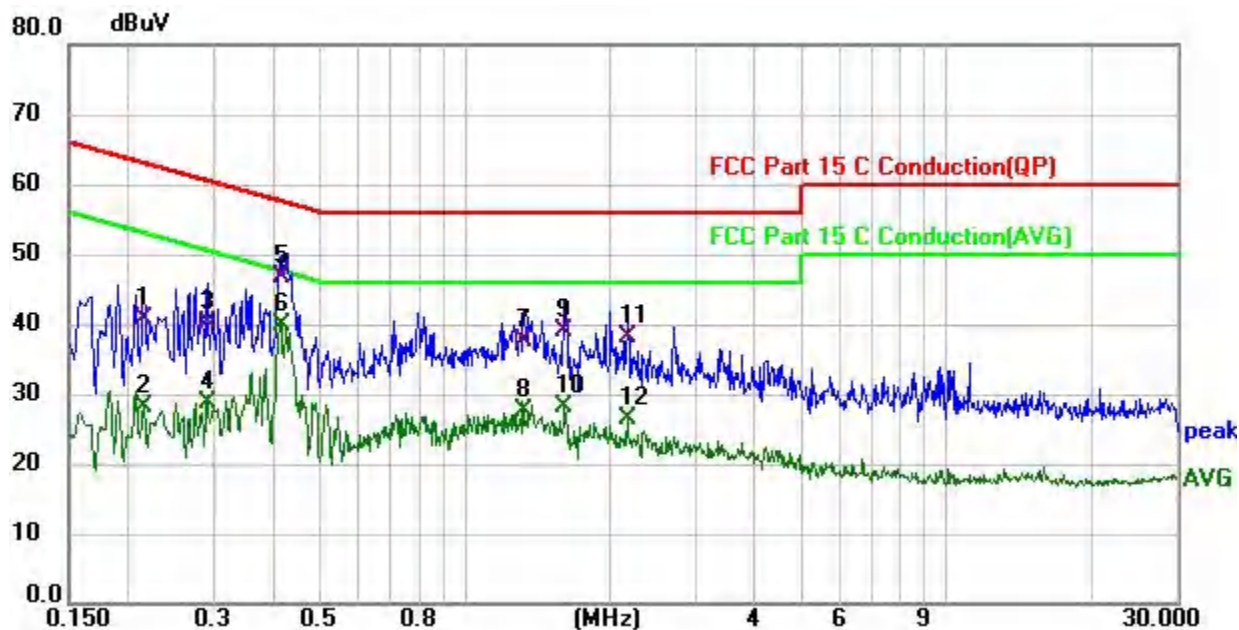


No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	P/F	Remark
1	0.150	26.33	20.61	46.94	66.00	-19.06	QP	P	
2	0.150	14.57	20.61	35.18	56.00	-20.82	AVG	P	
3	0.210	32.13	20.56	52.69	63.21	-10.52	QP	P	
4	0.210	19.73	20.56	40.29	53.21	-12.92	AVG	P	
5	0.418	29.11	20.54	49.65	57.49	-7.84	QP	P	
6 *	0.418	22.49	20.54	43.03	47.49	-4.46	AVG	P	
7	1.338	15.51	20.70	36.21	56.00	-19.79	QP	P	
8	1.338	3.46	20.70	24.16	46.00	-21.84	AVG	P	
9	1.574	15.29	20.72	36.01	56.00	-19.99	QP	P	
10	1.574	5.78	20.72	26.50	46.00	-19.50	AVG	P	
11	1.750	16.74	20.72	37.46	56.00	-18.54	QP	P	
12	1.750	5.39	20.72	26.11	46.00	-19.89	AVG	P	

Remark: The test Result=Reading+ Lisn+ Cab L.

If the average limit is met when using a quasi-peak detector, the EUT shall be deemed to meet both limits and measurement with average detector is unnecessary.

EUT: Bluetooth audio
M/N: HY11050-402701
Test Voltage: DC 5V by ADAPTER Input: AC 120V/60Hz
Phase: Neutral
Test Mode: TX Mode
Note: only worse case: 8-DPSK mode with CH78 2480MHz is reported
Detailed results are shown below



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	P/F	Remark
1	0.214	20.16	20.53	40.69	63.05	-22.36	QP	P	
2	0.214	7.62	20.53	28.15	53.05	-24.90	AVG	P	
3	0.290	19.68	20.53	40.21	60.52	-20.31	QP	P	
4	0.290	8.17	20.53	28.70	50.52	-21.82	AVG	P	
5	0.414	26.16	20.53	46.69	57.57	-10.88	QP	P	
6 *	0.414	19.27	20.53	39.80	47.57	-7.77	AVG	P	
7	1.318	17.05	20.62	37.67	56.00	-18.33	QP	P	
8	1.318	6.88	20.62	27.50	46.00	-18.50	AVG	P	
9	1.606	18.30	20.63	38.93	56.00	-17.07	QP	P	
10	1.606	7.48	20.63	28.11	46.00	-17.89	AVG	P	
11	2.174	17.47	20.64	38.11	56.00	-17.89	QP	P	
12	2.174	5.91	20.64	26.55	46.00	-19.45	AVG	P	

Remark: The test Result=Reading+ Lisn+ Cab L.

If the average limit is met when using a quasi-peak detector, the EUT shall be deemed to meet both limits and measurement with average detector is unnecessary.

12. ANTENNA REQUIREMENTS

12.1. Limit

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 shall be considered sufficient to comply with the provisions of this section. 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. This requirement does not apply to carrier current devices or to devices operated under the provisions of §§15.211, 15.213, 15.217, 15.219, 15.221, or §15.236. Further, this requirement does not apply to intentional radiators that must be professionally installed, such as perimeter protection systems and some field disturbance sensors, or to other intentional radiators which, in accordance with §15.31(d), must be measured at the installation site. However, the installer shall be responsible for ensuring that the proper antenna is employed so that the limits in this part are not exceeded.

12.2. Test Result

The antennas used for this product is internal antenna (PCB Antenna), so compliance with antenna requirements. (Please refer to the **Annex B. EUT Internal Photos** for details)

13.APPENDIX

"EUT of External Photos, EUT Internal Photos & Test Setup Photos" Please refer to the Annex A, Annex B& Annex C document.

CTSL2620330272E Annex A. EUT External Photos

CTSL2620330272E Annex B. EUT Internal Photos

CTSL2620330272E Annex C. Test Setup Photos

-----**End of Test Report**-----