

FCC 15.247 & RSS-247 2.4GHz Test Report

for

LG Electronics Inc.

**222, LG-ro, Jinwi-myeon Pyeongtaek-Si, Gyeonggi-Do,
17709 Republic of Korea**

Product Name : Bluetooth Module
Model Name : GB8773
Brand : LG
FCC ID : BEJ-GB8773
IC : 2703H-GB8773

**Prepared by: : AUDIX Technology Corporation,
EMC Department**



The test report is based on a single evaluation of one sample of the above-mentioned products. It does not imply an assessment of the whole production and does not permit the use of the test lab logo.

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TEST REPORT

Applicant : LG Electronics Inc.
Manufacturer : LG Electronics Inc.
Factory : HUIZHOU GAOSHENGDA TECHNOLOGY CO., LTD.
EUT Description
(1) Product : Bluetooth Module
(2) Model : GB8773
(3) Brand : LG
(4) Power Supply: DC 3.3V

Applicable Standards:

Title 47 CFR FCC Part 15 Subpart C
RSS-Gen (Issue 5), Amendment 2, February 2021
RSS-247 (Issue 2), February 2017

Audix Technology Corp. tested the equipment mentioned in accordance with the requirements set forth in the above standards. Test results indicate that the equipment tested is capable of demonstrating compliance with the requirements as documented within this report.

Audix Technology Corp. does not assume responsibility for any conclusions and generalizations drawn from the test results with regard to other specimens and samples.

Date of Report: 2023. 08. 01

Reviewed by:

Annie Yu

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Approved by:

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1. REVISION RECORD OF TEST REPORT

Edition No	Issued Date	Revision Summary	Report Number
0	2023. 08. 01	Original Report	EM-F230390

2. SUMMARY OF TEST RESULTS

Rule		Description	Results
FCC	IC		
15.207	RSS-Gen §8.8	Conducted Emission	PASS
15.247(d)/15.205	RSS-Gen §8.9 RSS-247 §5.5	Radiated Band Edge and Radiated Spurious Emission	PASS
15.247(a)(1)	RSS-247 §5.1(2)	20dB/Occupied Bandwidth	PASS
15.247(a)(1)	RSS-247 §5.1(2)	Carrier Frequency Separation	PASS
15.247(a)(1)(iii)	RSS-247 §5.1(4)	Time of Occupancy	PASS
15.247(a)(1)(iii)	RSS-247 §5.1(4)	Number of Hopping Channels	PASS
15.247(b)(1)	RSS-247 §5.1(2)	Maximum Peak Output Power	PASS
15.247(d)	RSS-247 §5.5	Conducted Band Edges and Conducted Spurious Emission	PASS
15.203	---	Antenna Requirement	Compliance
Note: 1. Decision rule according to the limit of the test standard chapter, the test value is lower than the limit specified in the test chapter, and it is judged as Pass. 2. The uncertainties value is not used in determining the result. 3. N/A is an abbreviation for Not Applicable.			

3. GENERAL INFORMATION

3.1. Description of Application

Applicant	LG Electronics Inc. 222, LG-ro, Jinwi-myeon Pyeongtaek-Si, Gyeonggi-Do, 17709 Republic of Korea
Manufacturer	LG Electronics Inc. 222, LG-ro, Jinwi-myeon Pyeongtaek-Si, Gyeonggi-Do, 17709 Republic of Korea
Factory	HUIZHOU GAOSHENGDA TECHNOLOGY CO., LTD. NO.2, JIN-DA ROAD, HUINAN HIGH-TECH INDUSTRIAL PARK, HUI-AO AVENUE, HUIZHOU CITY, GUANGDONG, CHINA
Product	Bluetooth Module
Model	GB8773
Brand	LG

3.2. Description of EUT

Model	GB8773		
Serial Number	N/A		
Software Version	N/A		
Power Rating	DC 3.3V		
RF Features	BT and BLE (BT 5.1)		
Transmit Type	1T1R		
Sample Status	Trial sample		
Test Sample	Sample No.	Test Item	Firmware
	01	Output Power	N/A
	02	AC Conduction, RSE	N/A
Date of Receipt	2023. 07. 14		
Date of Test	2023. 07. 18 ~ 24		
Interface Ports of EUT	None		
Accessories Supplied	None		

Note: Pursuant ISO 17025:2017 section 7.8.2, Audix Technology Corp. does not assume responsibility for all EUT's information including RF features, transmit type, antenna information etc are provided by customer.

3.3. Reference Test Guidance

ANSI C63.10:2013

3.4. Antenna Information

No.	Model	Manufacture	Antenna Type	Frequency (MHz)	Gain(dBi)
1.	B12	ZXT	PCB	2400-2500	3.10

3.5. EUT Specifications Assessed in Current Report

Mode	Fundamental Range (MHz)	Channel Number	Modulation	Data Rate (Mbps)
Bluetooth	2402-2480	79	FHSS (GFSK, $\pi/4$ DQPSK, 8-DPSK)	1/2/3

Channel List							
Channel Number	Frequency (MHz)	Channel Number	Frequency (MHz)	Channel Number	Frequency (MHz)	Channel Number	Frequency (MHz)
00	2402	20	2422	40	2442	60	2462
01	2403	21	2423	41	2443	61	2463
02	2404	22	2424	42	2444	62	2464
03	2405	23	2425	43	2445	63	2465
04	2406	24	2426	44	2446	64	2466
05	2407	25	2427	45	2447	65	2467
06	2408	26	2428	46	2448	66	2468
07	2409	27	2429	47	2449	67	2469
08	2410	28	2430	48	2450	68	2470
09	2411	29	2431	49	2451	69	2471
10	2412	30	2432	50	2452	70	2472
11	2413	31	2433	51	2453	71	2473
12	2414	32	2434	52	2454	72	2474
13	2415	33	2435	53	2455	73	2475
14	2416	34	2436	54	2456	74	2476
15	2417	35	2437	55	2457	75	2477
16	2418	36	2438	56	2458	76	2478
17	2419	37	2439	57	2459	77	2479
18	2420	38	2440	58	2460	78	2480
19	2421	39	2441	59	2461		

3.6. Description of Key Components

Item	Supplier/Brand	Model	Specification
RF IC	Realtek	RTL8773CFL	BT and BLE (BT 5.1)

3.7. Test Configuration

Mode	Duty Cycle (dB)	T (ms)	Duty Cycle Correction Factor (x)
BT (8-DPSK)	0.773	2.890	1.124
BT (GFSK)	0.771	2.880	1.118

AC Conduction
Normal operation

Item	Mode	Data Rate	Test Channel
Radiated Test Case Radiated Spurious Emission (30MHz~1GHz)	8-DPSK	3Mbps	39

Item		Modulation	Data Rate	Test Channel
Radiated Test Case	Radiated Band Edge ^{Note 1 & 2}	8-DPSK	3Mbps	00/78
	Radiated Spurious Emission ^{Note1}	8-DPSK	3Mbps	00/39/78
Conducted Test Case	20dB/Occupied Bandwidth	GFSK	1Mbps	00/39/78
		8-DPSK	3Mbps	00/39/78
	Carrier Frequency Separation	GFSK	1Mbps	00/39/78
		8-DPSK	3Mbps	00/39/78
	Time of Occupancy	GFSK	1Mbps	00/39/78
		8-DPSK	3Mbps	00/39/78
	Number of Hopping Channels	GFSK	1Mbps	39
		8-DPSK	3Mbps	39
	Maximum Peak Output Power	GFSK	1Mbps	00/39/78
		8-DPSK	3Mbps	00/39/78
	Band Edges	GFSK	1Mbps	00/78
		8-DPSK	3Mbps	00/78
	Spurious Emission	GFSK	1Mbps	00/39/78
		8-DPSK	3Mbps	00/39/78

Note 1: ☐ Mobile Device ☒ Portable Device, and 3 axis were assessed. The worst scenario for Radiated Spurious Emission as follow: ☒ Lie ☐ Side ☐ Stand

Note 2: We performed testing of the highest and lowest data rate.

3.8. Output Power Setting

Centre Frequency (MHz)	Power Setting	
	GFSK	8-DPSK
2402	Default	Default
2441	Default	Default
2480	Default	Default

3.9. Tested Supporting System List

3.9.1. Support Peripheral Unit

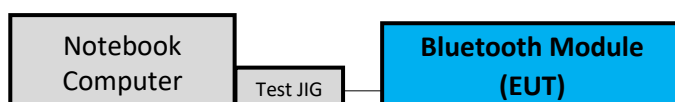
No.	Product	Brand	Model No.	Serial No.	Approval
1.	Notebook Computer	hp	TPN-Q189	5CD8175992	Contains FCC ID: PD93168NG Contains IC: 1000M-3168NG
2.	Test JIG	N/A	N/A	N/A	N/A

3.9.2. Cable Lists

No.	Cable Description Of The Above Support Units
1.	Adapter: hp, M/N PPP-012C-S DC Cord : Shielded, Undetachable, 1.8m, Bonded a ferrite core AC Power Cord : Unshielded, Detachable, 1.0m
2.	Bus Cable: Unshielded, Detachable, 0.5m

3.10. Setup Configuration

3.10.1. EUT Configuration for Power Line & Radiated Emission



3.10.2. EUT Configuration for RF Conducted Test Items



3.11. Operating Condition of EUT

Test program “RTLBTAPP_V5.3.3.9” is used for enabling EUT BT function under continues transmitting and choosing data rate/ channel.

3.12. Description of Test Facility

Name of Test Firm	Audix Technology Corporation / EMC Department No. 491, Zhongfu Rd., Linkou Dist., New Taipei City 244, Taiwan Tel: +886-2-26092133 Fax: +886-2-26099303 Website : www.audixtech.com Contact e-mail: attemc_report@audixtech.com
Accreditations	The laboratory is accredited by following organizations under ISO/IEC 17025:2017 (1) NVLAP(USA) NVLAP Lab Code 200077-0 (2) TAF(Taiwan) No. 1724
Test Facilities	FCC OET Designation Number under APEC MRA by NCC is : TW1724 ISED CAB Identifier Number under APEC TEL MRA by NCC is TW1724 (1) No.8 Shielded Room (2) No.1 3m Semi Anechoic Chamber

3.13.Measurement Uncertainty

The measurement uncertainty levels have been estimated as specified in ETSI TR 100 028-2001

Test Items/Facilities			Frequency Range	Uncertainty
Conduction Test	☐	No. 7 Shielded Room	9kHz-150kHz	±3.7dB
			150kHz-30MHz	±3.4dB
	☒	No. 8 Shielded Room	9kHz-150kHz	±3.7dB
			150kHz-30MHz	±3.5dB
Radiation Test	☒	No.1 3m Semi Anechoic Chamber	30MHz-200MHz, 3m, Horizontal	±3.6dB
			200MHz-1000MHz, 3m, Horizontal	±4.3dB
			30MHz-200MHz, 3m, Vertical	±4.4dB
			200MHz-1000MHz, 3m, Vertical	±4.8dB
			1GHz-6GHz, 3m	±4.8dB
			6GHz-18GHz, 3m	±4.5dB
	☐	No.3 3m Semi Anechoic Chamber	30MHz-200MHz, 3m, Horizontal	±4.0dB
			200MHz-1000MHz, 3m, Horizontal	±4.4dB
			30MHz-200MHz, 3m, Vertical	±4.7dB
			200MHz-1000MHz, 3m, Vertical	±4.5dB
			1GHz-6GHz, 3m	±4.8dB
			6GHz-18GHz, 3m	±4.5dB
	☐	No.4 3m Semi Anechoic Chamber	30MHz-200MHz, 3m, Horizontal	±4.3dB
			200MHz-1000MHz, 3m, Horizontal	±4.2dB
			30MHz-200MHz, 3m, Vertical	±4.8dB
			200MHz-1000MHz, 3m, Vertical	±4.7dB
			1GHz-6GHz, 3m	±4.6dB
			6GHz-18GHz, 3m	±4.4dB
	☐	No.5 3m Semi Anechoic Chamber	30MHz-200MHz, 3m, Horizontal	±4.6dB
			200MHz-1000MHz, 3m, Horizontal	±4.4dB
			30MHz-200MHz, 3m, Vertical	±4.5dB
			200MHz-1000MHz, 3m, Vertical	±4.9dB
			1GHz-6GHz, 3m	±4.9dB
			6GHz-18GHz, 3m	±4.6dB
		Radiated emissions (18GHz-40GHz)		18GHz-40GHz, 3m

Remark : Uncertainty = $ku_c(y)$

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Test Item	Uncertainty
20dB Bandwidth	$\pm 0.2\text{kHz}$
99% Occupied Bandwidth	$\pm 0.38\%$
Carrier Frequency Separation	$\pm 0.2\text{kHz}$
Time of Occupancy	$\pm 0.03\text{sec}$
Maximum peak Output power	$\pm 0.52\text{dB}$
Conducted Emission Limitations	$\pm 0.13\text{dB}$



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4. MEASUREMENT EQUIPMENT LIST

4.1. Conducted Emission Measurement

Item	Type	Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Interval
1.	Test Receiver	R&S	ESR3	101774	2023. 01. 11	1 Year
2.	A.M.N.	R&S	ENV432	101567	2023. 06. 02	1 Year
3.	L.I.S.N.	Kyoritsu	KNW-407	8-855-9	2022. 12. 19	1 Year
4.	Pulse Limiter	R&S	ESH3-Z2	100354	2022. 12. 14	1 Year
5.	Digital Thermo-Hygro Meter	iMax	HTC-1	No.8 S/R	2023. 04. 13	1 Year
6.	Coaxial Cable	Yeida	RG/58AU	CE-08	2022. 09. 07	1 Year
7.	Test Software	Audix	e3	V9 18621a	N.C.R.	N.C.R.

4.2. Radiated Emission Measurement

Item	Type	Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Interval
1.	Spectrum Analyzer	Keysight	N9010A-526	MY53400071	2022.08.24	1 Year
2.	Spectrum Analyzer	Keysight	N9010B-544	MY55460198	2022.03.29	1 Year
3.	Test Receiver	R&S	ESCS30	100338	2023.06.20	1 Year
4.	Amplifier	HP	8447D	2944A06305	2022.12.29	1 Year
5.	Microwave Amplifier	Agilent	8449B	3008A01284	2023.06.06	1 Year
6.	Microwave Amplifier	Keysight	83051A	MY56480113	2022.09.07	1 Year
7.	Loop Antenna	TESEQ	HLA 6121	60478	2023.02.21	1 Year
8.	Bilog Antenna	TESEQ	CBL6112D	33821	2023.06.30	1 Year
9.	Horn Antenna	EMCO	3115	9112-3775	2023.05.04	1 Year
10.	Horn Antenna	COM-POWER	AH-840	101092	2022.12.30	1 Year
11.	2.4GHz Notch Filter	K&L Microwave	7NSL10-2441.5/ E130.5-O/O	2	2023.07.22	1 Year
12.	3GHz Notch Filter	Microwave	H3G018G1	484796	2023.07.22	1 Year
13.	Coaxial Cable	MIYAZAKI	5D2W	RE-11	2023.01.07	1 Year
14.	Coaxial Cable	HUBER+SUHNER	SUCOFLEX 106	RE-14	2023.01.07	1 Year
15.	Coaxial Cable	HUBER+SUHNER	SUCOFLEX 102	RE-30	2022.08.22	1 Year
16.	Digital Thermo-Hygro Meter	iMax	HTC-1	No.1 3m A/C	2023.04.13	1 Year
17.	Test Software	Audix	e3	V9 18621a	N.C.R.	N.C.R.

4.3. RF Conducted Measurement

Item	Type	Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Interval
1.	Spectrum Analyzer	Keysight	N9020B-544	MY57120357	2023.02.22	1 Year
2.	Power Meter	`	ML2495A	2127005	2022. 12. 01	1 Year
3.	Power Sensor	Anritsu	MA2411B	1911360	2022. 12. 07	1 Year
4.	Digital Thermo-Hygro Meter	iMax	HTC-1	RF-03	2023.04.13	1 Year

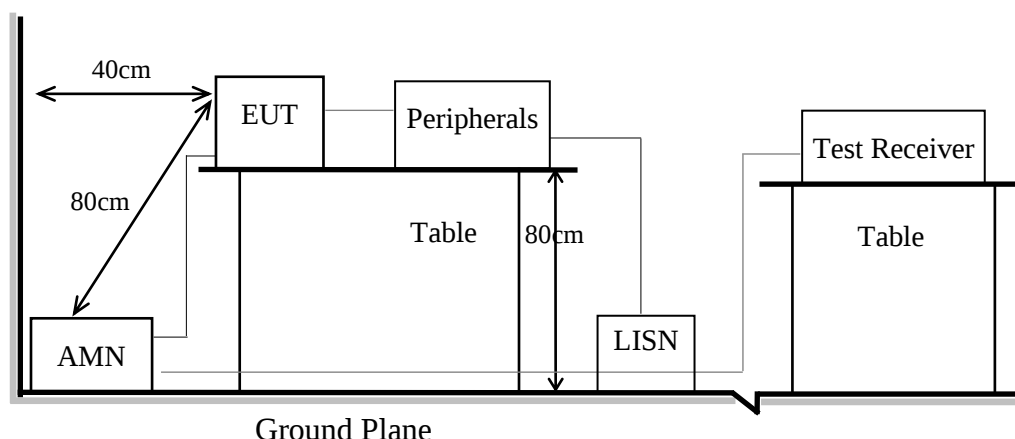
5. CONDUCTED EMISSION

5.1. Block Diagram of Test Setup

5.1.1. Block Diagram of EUT

Indicated as section 3.10

5.1.2. Shielded Room Setup Diagram



5.2. Conducted Emission Limit

Frequency	Conducted Limit	
	Quasi-Peak Level	Average Level
150kHz ~ 500kHz	66 ~ 56 dB μ V	56 ~ 46 dB μ V
500kHz ~ 5MHz	56 dB μ V	46 dB μ V
5MHz ~ 30MHz	60 dB μ V	50 dB μ V

Remark1.: If the average limit is met when using a Quasi-Peak detector, the measurement using the average detector is not required.

2.: The lower limit applies to the band edges.

5.3. Test Procedure

- 5.3.1. To set up the EUT as indicated in ANSI C63.10. The EUT was placed on the table which has 80 cm height to the ground and 40 cm distance to the conducting wall.
- 5.3.2. Power supplier of the EUT was connected to the AC mains through an Artificial Mains Network (A.M.N.).
- 5.3.3. The AC power supplies to all peripheral devices must be provided through line impedance stabilization network (L.I.S.N.).
- 5.3.4. Checking frequency range from 150kHz to 30 MHz and record the emission which does not have 20 dB below limit.

5.4. Test Results

Please refer to Appendix A.

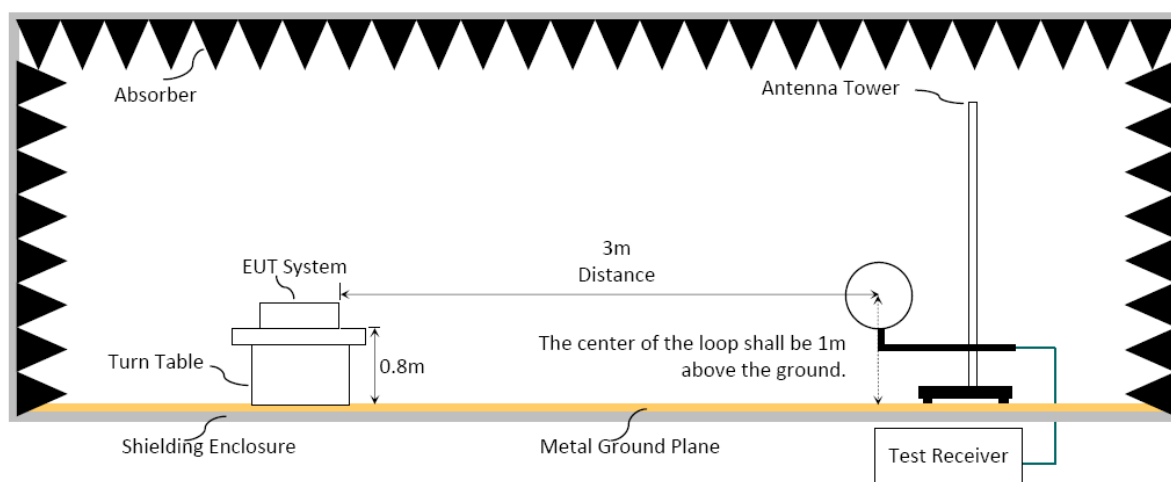
6. RADIATED EMISSION

6.1. Block Diagram of Test Setup

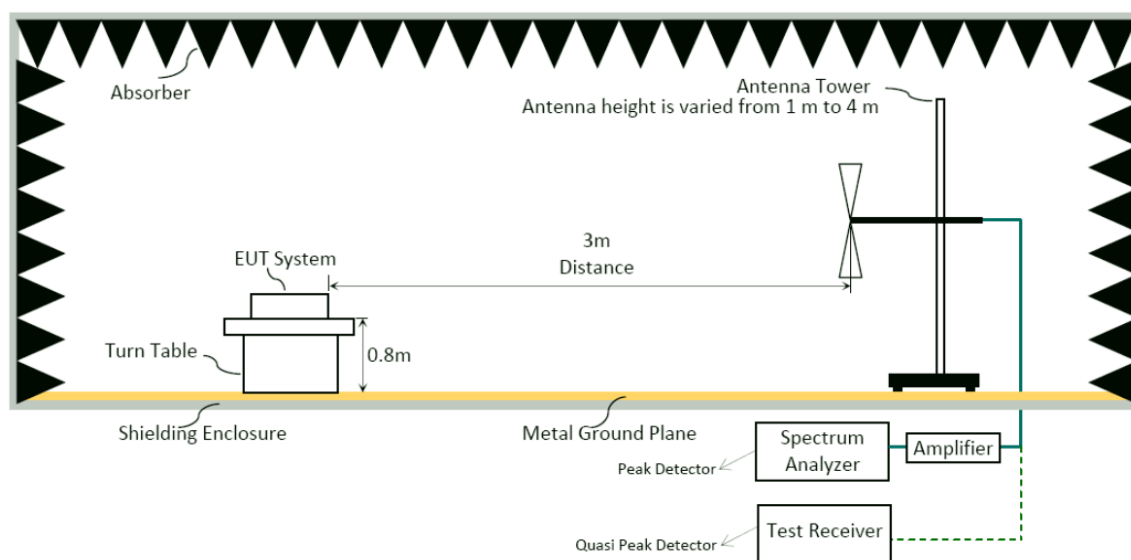
6.1.1. Block Diagram of EUT

Indicated as section 3.10

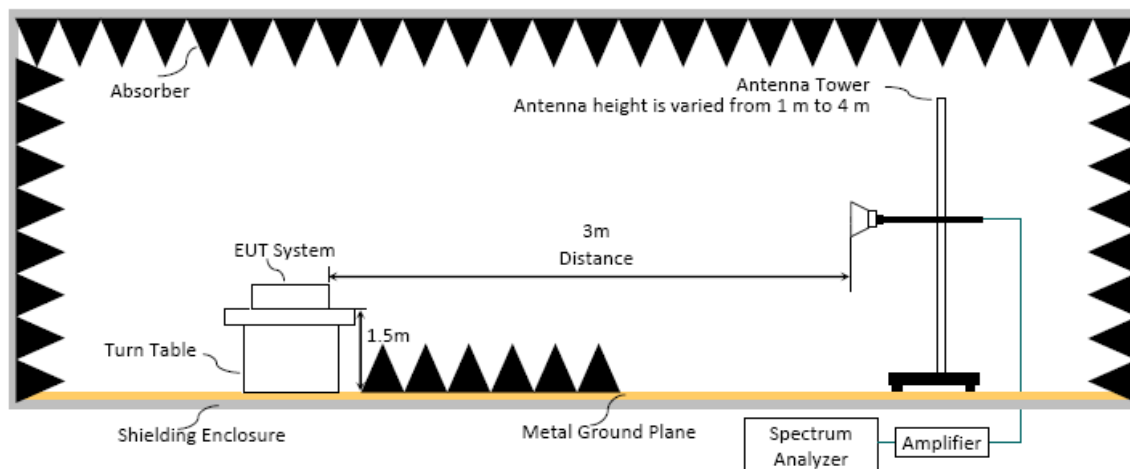
6.1.2. Setup Diagram for 9kHz-30MHz



6.1.3. Setup Diagram for 30-1000MHz



6.1.4. Setup Diagram for above 1GHz



6.2. Radiated Emission Limits

In any 100kHz bandwidth outside the frequency band, the radio frequency power produced by the intentional radiator shall be at least 20dB below that in the 100kHz bandwidth within the band that contains the highest level. In addition, radiated emissions which fall in restricted bands, as defined in Section 15.205/RSS-Gen Section 8.10 table 6, must also comply with the radiated emission limits specified as below.

Frequency (MHz)	Distance(m)	Limits	
		dBμV/m	μV/m
0.009 - 0.490	300	67.6-20 log f(kHz)	2400/f kHz
0.490 - 1.705	30	87.6-20 log f(kHz)	24000/f kHz
1.705 - 30	30	29.5	30
30 - 88	3	40.0	100
88- 216	3	43.5	150
216- 960	3	46.0	200
Above 960	3	54.0	500
Above 1000	3	74.0 dBμV/m (Peak) 54.0 dBμV/m (Average)	

Remark : (1) $\text{dB}\mu\text{V/m} = 20 \log (\mu\text{V/m})$

- (2) The tighter limit applies to the edge between two frequency bands.
- (3) Distance refers to the distance in meters between the measuring instrument antenna and the closed point of any part of the device or system.
- (4) Fundamental and emission fall within operation band are exempted from this section.
- (5) Pursuant to ANSI C63.10: 6.6.4.3, if the maximized peak measured value complies with the average limit, then it is unnecessary to perform an average measurement.

6.3. Test Procedure

Frequency Range 9kHz~30MHz:

The EUT setup on the turntable which has 0.8 m height to the ground. The turn table rotated 360 degrees and antenna fixed to 1 m to find the maximum emission level. In order to find the maximum emission, all of the interface cables were manipulated according to ANSI C63.10-2013 regulation.

- (1) RBW = 9kHz with peak and average detector.
- (2) Detector: average and peak (9kHz-490kHz)
Q.P. (490kHz-30MHz)

Frequency Range 30MHz ~ 25GHz:

The EUT setup on the turn table which has 80cm (for 30-1000MHz) and 1.5m (for above 1GHz) height to the ground. The turn table rotated 360 degrees and antenna varied from 1 m to 4 m to find the maximum emission level. Both horizontal and vertical polarization are required. In order to find the maximum emission, all of the interface cables were manipulated according to ANSI C63.10-2013 regulation.

Frequency below 1GHz:

Spectrum Analyzer is used for pre-testing with following setting:

- (1) RBW = 120KHz
- (2) VBW $\geq 3 \times$ RBW.
- (3) Detector = Peak.
- (4) Sweep time = auto.
- (5) Trace mode = max hold.
- (6) Allow sweeps to continue until the trace stabilizes.

Note 1: When peak-detected value is lower than limit that the measurement using the Q.P. detector is not required, otherwise using Q.P. for final measurement.

Note 2: When the radiated emissions limits are expressed in terms of the average value of the emissions, and pulsed operation is employed, the measurement field strength shall be determined by averaging over one complete pulse train, including blanking intervals, as long as the pulse train does not exceed 0.1 seconds.

Frequency above 1GHz to 10th harmonic(up to 25 GHz):

Peak Detector:

- (1) RBW = 1MHz
- (2) VBW $\geq 3 \times$ RBW.
- (3) Detector = Peak.
- (4) Sweep time = auto.
- (5) Trace mode = max hold.
- (6) Allow sweeps to continue until the trace stabilizes.

Note: When peak-detected value is lower than limit that the measurement using the average detector is not required, otherwise using average detector for final measurement.

Average Detector:**■ Option 1:**

(1) RBW = 1MHz

(2) $VBW \geq 1/T$

Mode	TX _{on} (ms)	1/ TX _{on} (kHz)	VBW(>1/ TX _{on}) (Hz)
BT	2.890	0.346	360

(3) Detector = Peak.

(4) Sweep time = auto.

(5) Trace mode = max hold.

(6) Allow sweeps to continue until the trace stabilizes.

□ Option 2:

Average Emission Level = Peak Emission Level + D.C.C.F.

6.4. Measurement Result Explanation

■ Peak Emission Level(dBμV/m) = Antenna Factor(dB/m) + Cable Loss (dB) – Preamp Gain (dB) + Reading(dBμV).

■ Average Emission Level(dBμV/m) = Antenna Factor(dB/m) + Cable Loss (dB) – Preamp Gain (dB) + Reading(dBμV).

□ Average Emission Level(dBμV/m) = Peak Emission Level(dBμV/m) + DCCF(dB)
Duty Cycle Correction Factor (DCCF)(dB) = $20\log(TX_{on}/TX_{on+off})$ presented in section 3.7.

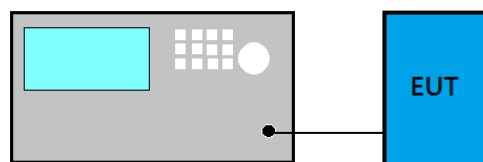
□ ERP(dBm) = Peak Emission Level(dBμV/m) - 95.2dB - 2.14dB

6.5. Test Results

Please refer to Appendix A.

7. 20dB/OCCUPIED BANDWIDTH

7.1. Block Diagram of Test Setup



7.2. Specification Limits

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.

7.3. Test Procedure

Following measurement procedure is reference to ANSI C63.10:2013:

For 20dB Bandwidth

- (1) Set Span range 2~5 times the OBW
- (2) Set RBW close to 1% to 5% of OBW.
- (3) Set $VBW \geq 3 \times RBW$.
- (4) Detector = Peak.
- (5) Trace mode = Max hold.
- (6) Sweep = Auto couple.
- (7) Allow the trace to stabilize.
- (8) Setting channel bandwidth function x dB to -20 dB to record the final bandwidth.

For 99% Occupied Bandwidth

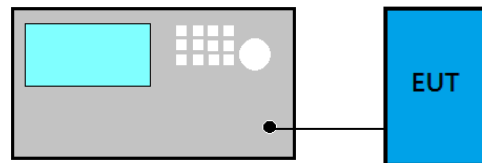
- (9) Set Span range 1.5~5 times the OBW
- (10) Set RBW close to 1% to 5% of OBW.
- (11) Set $VBW \geq 3 \times RBW$.
- (12) Detector = Peak.
- (13) Trace mode = Max hold
- (14) Sweep = Auto couple.
- (15) Allow the trace to stabilize.

7.4. Test Results

Please refer to Appendix A

8. CARRIER FREQUENCY SEPARATION

8.1. Block Diagram of Test Setup



8.2. Specification Limits

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 no greater than 125mW.

8.3. Test Procedure

Following measurement procedure is reference to ANSI C63.10:2013:

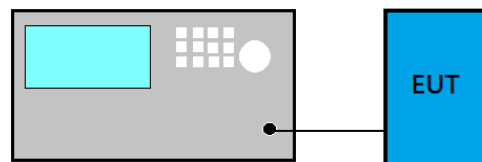
- (1) Span = Wide enough to capture the peaks of two adjacent channels
- (2) RBW: Start with the RBW set to approximately 30% of the channel spacing; adjust as necessary to best identify the center of each individual channel.
- (3) $VBW \geq RBW$
- (4) Sweep = Auto
- (5) Detector function = Peak
- (6) Trace = Max hold
- (7) Allow the trace to stabilize.

8.4. Test Results

Please refer to Appendix A

9. TIME OF OCCUPANCY

9.1. Block Diagram of Test Setup



9.2. Specification Limits

Frequency hopping systems in the 2400-2483.5MHz shall use at least 15 non-overlapping 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 number of hopping channels employed.

9.3. Test Procedure

Following measurement procedure is reference to ANSI C63.10:2013:

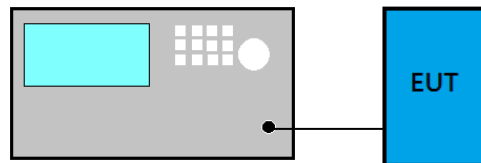
- (1) Span: Zero span, centered on a hopping channel.
- (2) RBW shall be $\leq$ channel spacing and where possible RBW should be set $\gg 1/T$, where T is the expected dwell time per channel.
- (3) Sweep: As necessary to capture the entire dwell time per hopping channel; where possible use a video trigger and trigger delay so that the transmitted signal starts a little to the right of the start of the plot. The trigger level might need slight adjustment to prevent triggering when the system hops on an adjacent channel; a second plot might be needed with a longer sweep time to show two successive hops on a channel.
- (4) Detector function = Peak
- (5) Trace = Max hold

9.4. Test Results

Please refer to Appendix A

10. NUMBER OF HOPPING CHANNELS

10.1. Block Diagram of Test Setup



10.2. Specification Limits

Frequency hopping systems which use fewer than 20 hopping frequencies may employ intelligent hopping techniques to avoid interference to other transmissions. Frequency hopping systems may avoid or suppress transmissions on a particular hopping frequency provided that a minimum of 15 non-overlapping channels.

10.3. Test Procedure

Following measurement procedure is reference to ANSI C63.10:2013:

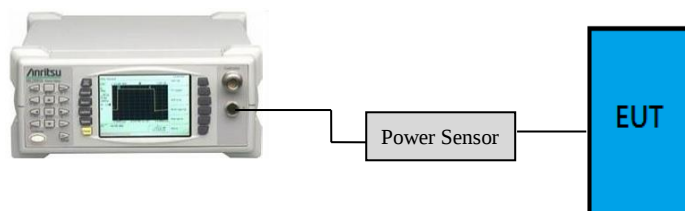
- (1) Span: The frequency band of operation. Depending on the number of channels the device supports, it may be necessary to divide the frequency range of operation across multiple spans, to allow the individual channels to be clearly seen.
- (2) RBW: To identify clearly the individual channels, set the RBW to less than 30% of the channel spacing or the 20 dB bandwidth, whichever is smaller.
- (3) VBW $\geq$ RBW
- (4) Sweep = Auto
- (5) Detector function = Peak
- (6) Trace = m=Max hold
- (7) Allow the trace to stabilize.

10.4. Test Results

Please refer to Appendix A

11. MAXIMUM PEAK OUTPUT POWER

11.1. Block Diagram of Test Setup



11.2. Specification Limits

The Limits of maximum Peak Output Power for frequency hopping systems in 2400-2483.5MHz is: 0.125Watt. (21dBm)

11.3. Test Procedure

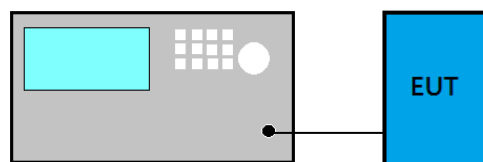
EUT is connected to power sensor and record the maximum output power.

11.4. Test Results

Please refer to Appendix A

12. EMISSION LIMITATIONS

12.1. Block Diagram of Test Setup



12.2. Specification Limits

In any 100kHz 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 20dB below that in the 100kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, that the required attenuation shall be 30 dB instead of 20 dB.

Attenuation below the general limits specified in Section 15.209(a)/RSS-Gen Section 8.9 table 4 is not required. In addition, radiated emissions which fall in restricted bands, as defined in Section 15.205(a)/RSS-Gen Section 8.10 table 6, must also comply with the radiated emission limits specified in Section 15.209(a)/RSS-Gen Section 8.9 table 4 (See Section 15.205(c)).

12.3. Test Procedure

Following measurement procedure is reference to ANSI C63.10:2013:

- (1) Set span wide enough to capture the peak level of the in-band emission and all spurious emissions; up to 10th harmonic.
- (2) RBW = 100 kHz
- (3) VBW $\geq$ RBW
- (4) Sweep = Auto
- (5) Detector function = Peak
- (6) Trace = Max hold

12.4. Test Results

Please refer to Appendix A



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13.DEVIATION TO TEST SPECIFICATIONS

【NONE】



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APPENDIX A

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APPENDIX A

TEST DATA AND PLOTS

(Model: GB8773)

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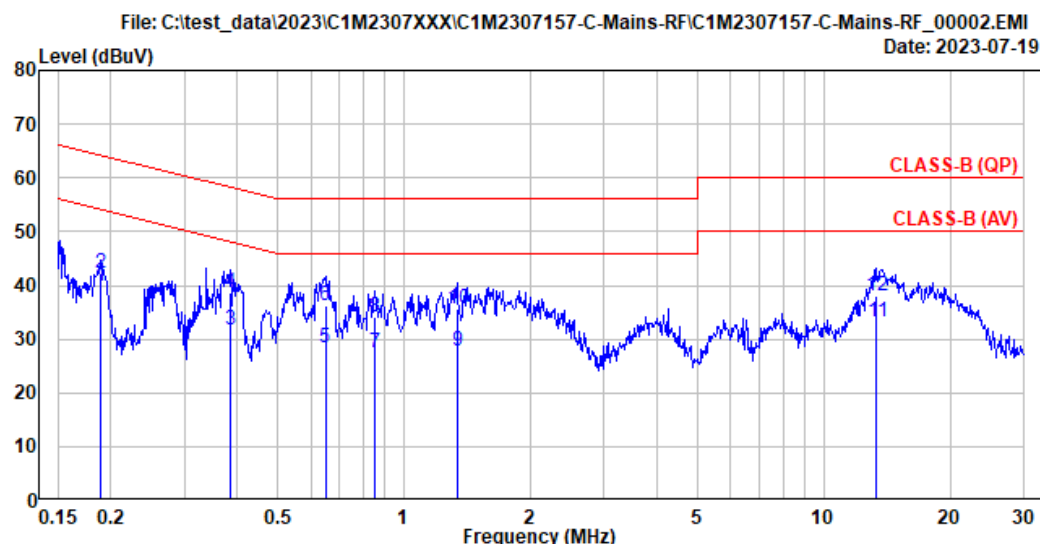
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A.1 CONDUCTED EMISSION

Test Date	2023/07/19	Temp./Hum.	25°C/48%
Test Voltage	DC 3.3V (Through jig via Notebook PC)	Tested By	Bruce Tseng



Site No.	: No.8 Shielded Room	Data No.	: 2
Instrument 1	: Receiver ESR(774)		
Instrument 2	: ENV432 (567)(A) CE-08 ESH3-Z2 (354)		
Limit	: CLASS-B (QP)	Phase	: Neutral
Environment	: 25°C/48%	Test Rating	: 5Vdc
EUT Model	: G88773	Engineer	: Bruce
Test Mode	: operating		

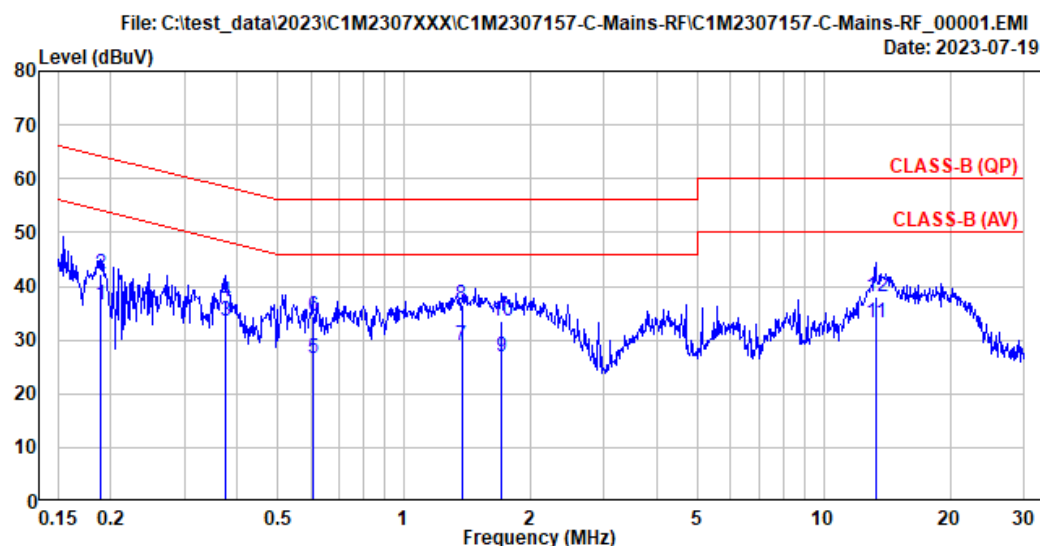
	Freq. (MHz)	AMN Factor (dB)	Cable Loss (dB)	Pulse Att. (dB)	Reading (dBUV)	Emission Level (dBUV)	Limits (dBUV)	Margin (dB)	Remark
1	0.189	10.29	0.03	9.85	19.70	39.87	54.10	14.23	Average
2	0.189	10.29	0.03	9.85	22.01	42.18	64.10	21.92	QP
3	0.385	10.28	0.03	9.85	11.45	31.61	48.18	16.57	Average
4	0.385	10.28	0.03	9.85	18.60	38.76	58.18	19.42	QP
5	0.649	10.29	0.04	9.85	8.34	28.52	46.00	17.48	Average
6	0.649	10.29	0.04	9.85	15.95	36.13	56.00	19.87	QP
7	0.854	10.29	0.04	9.85	7.19	27.37	46.00	18.63	Average
8	0.854	10.29	0.04	9.85	13.94	34.12	56.00	21.88	QP
9	1.338	10.30	0.05	9.85	7.43	27.63	46.00	18.37	Average
10	1.338	10.30	0.05	9.85	15.39	35.59	56.00	20.41	QP
11	13.380	10.74	0.16	9.90	12.35	33.15	50.00	16.85	Average
12	13.380	10.74	0.16	9.90	17.31	38.11	60.00	21.89	QP

Remarks: 1. Emission Level(dBUV)= AMN Factor(dB) + Cable Loss(dB) + Pulse Att.(dB) + Reading(dBUV).

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Test Date	2023/07/19	Temp./Hum.	25°C/48%
Test Voltage	DC 3.3V (Through jig via Notebook PC)	Tested By	Bruce Tseng



Site No.	: No.8 Shielded Room	Data No.	: 1
Instrument 1	: Receiver ESR(774)		
Instrument 2	: ENV432 (567)(A) CE-08 ESH3-Z2 (354)		
Limit	: CLASS-B (QP)	Phase	: Line
Environment	: 25°C/48%	Test Rating	: 5Vdc
EUT Model	: GB8773	Engineer	: Bruce
Test Mode	: operating		

	Freq. (MHz)	AMN Factor (dB)	Cable Loss (dB)	Pulse Att. (dB)	Reading (dBμV)	Emission Level (dBμV)	Limits (dBμV)	Margin (dB)	Remark
1	0.190	10.28	0.03	9.85	16.42	36.58	54.05	17.47	Average
2	0.190	10.28	0.03	9.85	22.14	42.30	64.05	21.75	QP
3	0.375	10.27	0.03	9.85	13.39	33.54	48.38	14.84	Average
4	0.375	10.27	0.03	9.85	17.02	37.17	58.38	21.21	QP
5	0.606	10.27	0.03	9.85	6.52	26.67	46.00	19.33	Average
6	0.606	10.27	0.03	9.85	14.36	34.51	56.00	21.49	QP
7	1.372	10.29	0.05	9.85	8.64	28.83	46.00	17.17	Average
8	1.372	10.29	0.05	9.85	16.33	36.52	56.00	19.48	QP
9	1.708	10.30	0.05	9.86	6.77	26.98	46.00	19.02	Average
10	1.708	10.30	0.05	9.86	13.26	33.47	56.00	22.53	QP
11	13.313	10.57	0.16	9.90	12.45	33.08	50.00	16.92	Average
12	13.313	10.57	0.16	9.90	17.41	38.04	60.00	21.96	QP

Remarks: 1. Emission Level(dBμV)= AMN Factor(dB) + Cable Loss(dB) + Pulse Att.(dB) + Reading(dBμV).

A.2 RADIATED EMISSION

Test Date	2023/07/24	Temp./Hum.	24°C/43%
Test Voltage	DC 3.3V (Through jig via Notebook PC)	Tested By	Hua Wu

A.2.1 Emissions within Restricted Frequency Bands

A.2.1.1 Frequency 9kHz~30MHz

The emissions (9kHz~30MHz) not reported for there is no emission be found.

A.2.1.2 Frequency Below 1GHz

Mode	8-DPSK	Frequency	TX 2441MHz
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Antenna at Horizontal Polarization

Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Gain (dB)	Read Level (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
31.940	23.24	1.46	26.49	31.12	29.33	40.00	10.67	Peak
101.780	16.82	2.63	26.28	33.99	27.17	43.50	16.33	Peak
199.556	15.29	3.70	25.79	41.74	34.93	43.50	8.57	Peak
216.046	16.26	3.89	25.76	41.50	35.90	46.00	10.10	Peak
431.968	22.10	6.22	26.68	35.70	37.33	46.00	8.67	Peak
485.900	22.93	6.65	27.04	34.97	37.51	46.00	8.49	Peak

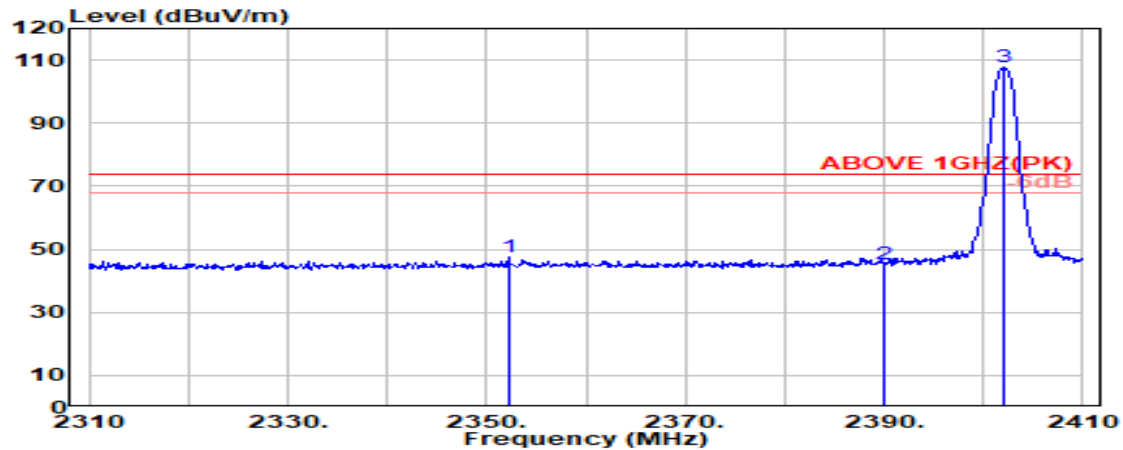
Antenna at Vertical Polarization

Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Gain (dB)	Read Level (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
30.000	23.95	1.41	26.49	31.12	29.99	40.00	10.01	Peak
101.780	16.82	2.63	26.28	33.72	26.90	43.50	16.60	Peak
199.556	15.29	3.70	25.79	35.95	29.14	43.50	14.36	Peak
324.104	19.61	5.02	25.83	34.83	33.62	46.00	12.38	Peak
378.036	21.04	5.69	26.28	35.30	35.74	46.00	10.26	Peak
431.968	22.10	6.22	26.68	36.45	38.09	46.00	7.91	Peak

A.2.1.3 Frequency Above 1 GHz to 10th harmonics

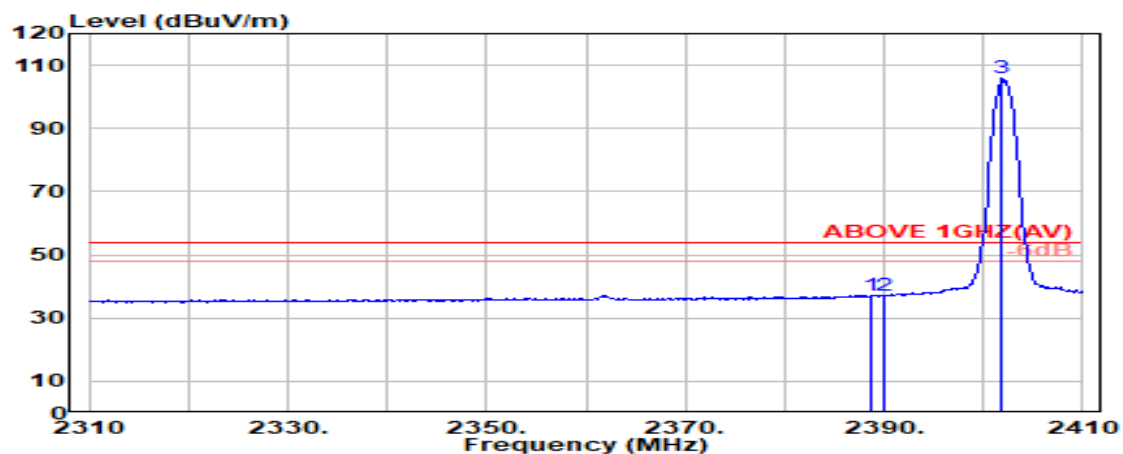
Band Edge:

Mode	8-DPSK	Frequency	TX 2402MHz
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Antenna at Horizontal Polarization

Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Gain (dB)	Read Level (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
2352.200	28.30	5.66	39.93	53.36	47.38	74.00	26.62	Peak
2390.000	28.22	5.72	39.93	51.12	45.13	74.00	28.87	Peak
@ 2402.100	28.20	5.74	39.93	113.60	107.62	---	---	Peak



Antenna at Horizontal Polarization

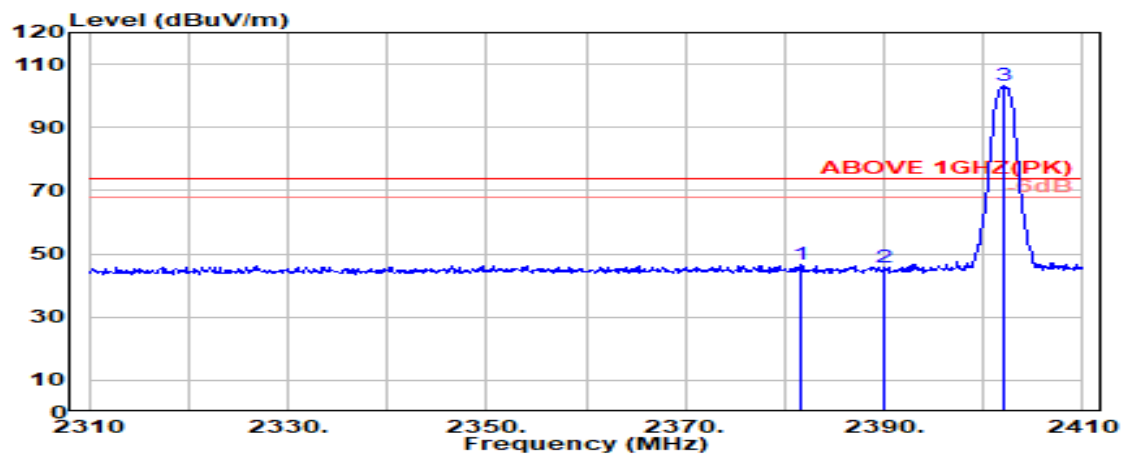
Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Gain (dB)	Read Level (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
2388.700	28.22	5.72	39.93	43.26	37.27	54.00	16.73	Average
2390.000	28.22	5.72	39.93	43.14	37.15	54.00	16.85	Average
@ 2401.900	28.20	5.74	39.93	111.83	105.84	---	---	Average

Remark: The “@” means fundamental frequency, it is ignored in this section.

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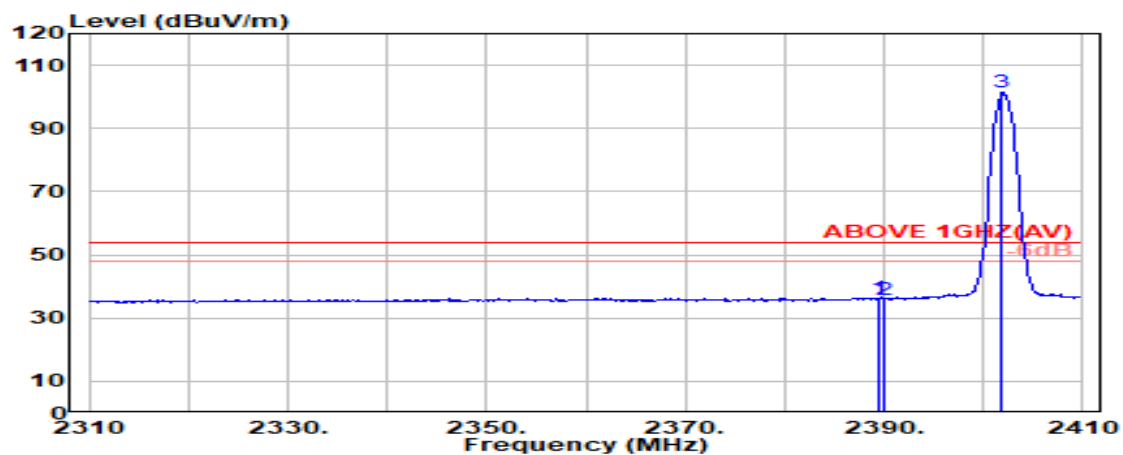
Tel: +886 2 26099301
Fax: +886 2 26099303

Mode	8-DPSK	Frequency	TX 2402MHz
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Antenna at Vertical Polarization

Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Gain (dB)	Read Level (dBμV)	Emission Level (dBUV/m)	Limits (dBUV/m)	Margin (dB)	Detector
2381.700	28.24	5.71	39.93	52.71	46.72	74.00	27.28	Peak
2390.000	28.22	5.72	39.93	51.84	45.85	74.00	28.15	Peak
@ 2402.100	28.20	5.74	39.93	109.05	103.07	---	---	Peak



Antenna at Vertical Polarization

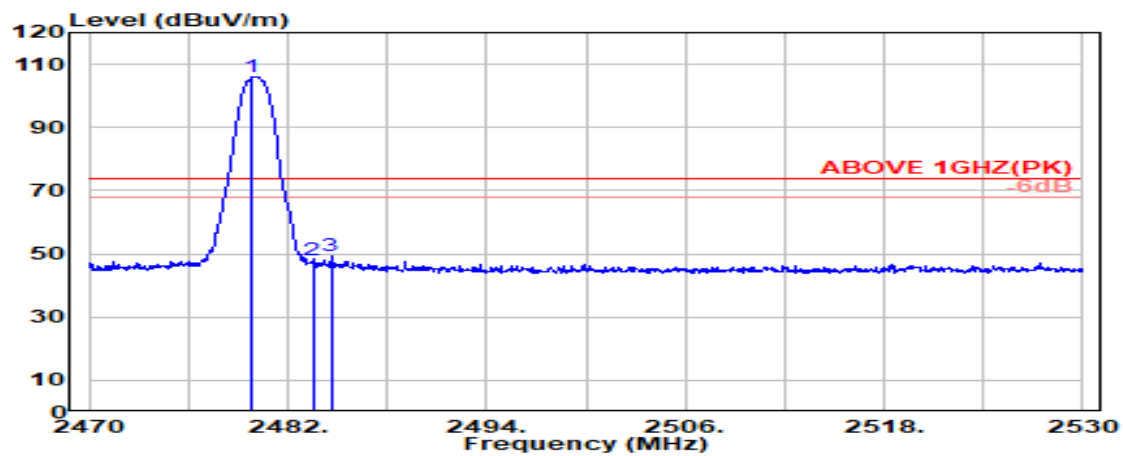
Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Gain (dB)	Read Level (dBμV)	Emission Level (dBUV/m)	Limits (dBUV/m)	Margin (dB)	Detector
2389.500	28.22	5.72	39.93	42.38	36.40	54.00	17.60	Average
2390.000	28.22	5.72	39.93	41.85	35.86	54.00	18.14	Average
@ 2401.900	28.20	5.74	39.93	107.48	101.50	---	---	Average

Remark: The “@” means fundamental frequency, it is ignored in this section.

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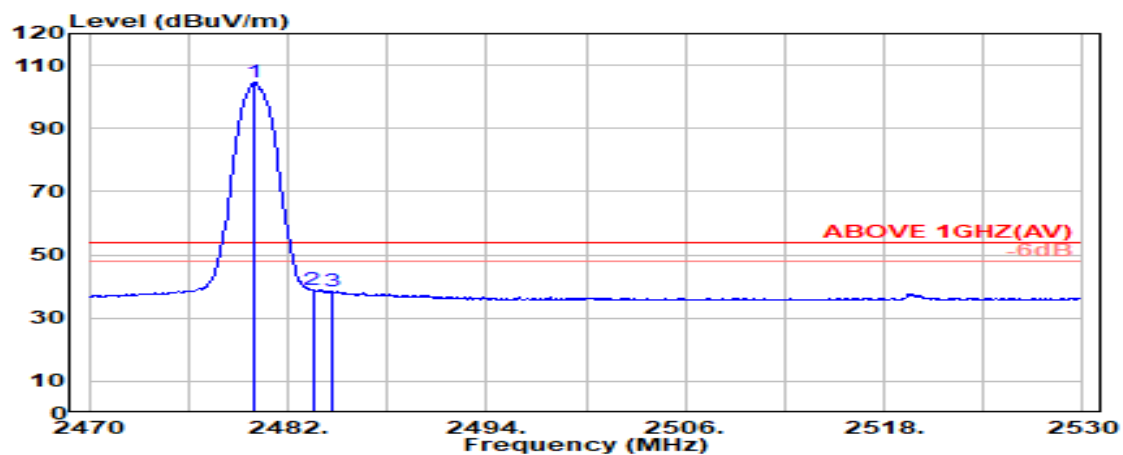
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Fax: +886 2 26099303

Mode	8-DPSK	Frequency	TX 2480MHz
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Antenna at Horizontal Polarization

Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Gain (dB)	Read Level (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
@ 2479.850	28.36	5.86	39.92	111.65	105.95	---	---	Peak
2483.500	28.37	5.87	39.92	53.88	48.19	74.00	25.81	Peak
2484.600	28.37	5.87	39.92	54.84	49.16	74.00	24.84	Peak



Antenna at Horizontal Polarization

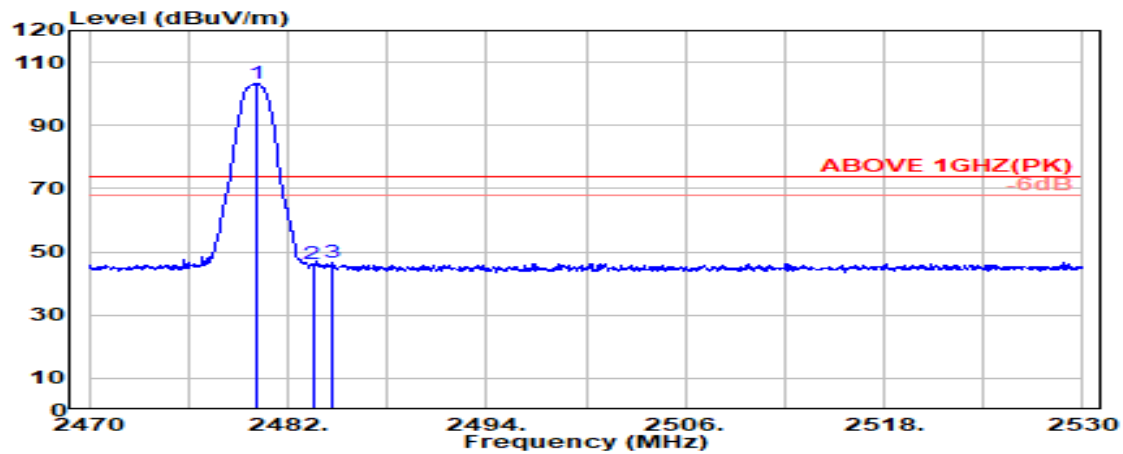
Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Gain (dB)	Read Level (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
@ 2480.000	28.36	5.86	39.92	110.38	104.68	---	---	Average
2483.500	28.37	5.87	39.92	44.57	38.88	54.00	15.12	Average
2484.700	28.37	5.87	39.92	44.24	38.55	54.00	15.45	Average

Remark: The "@" means fundamental frequency, it is ignored in this section.

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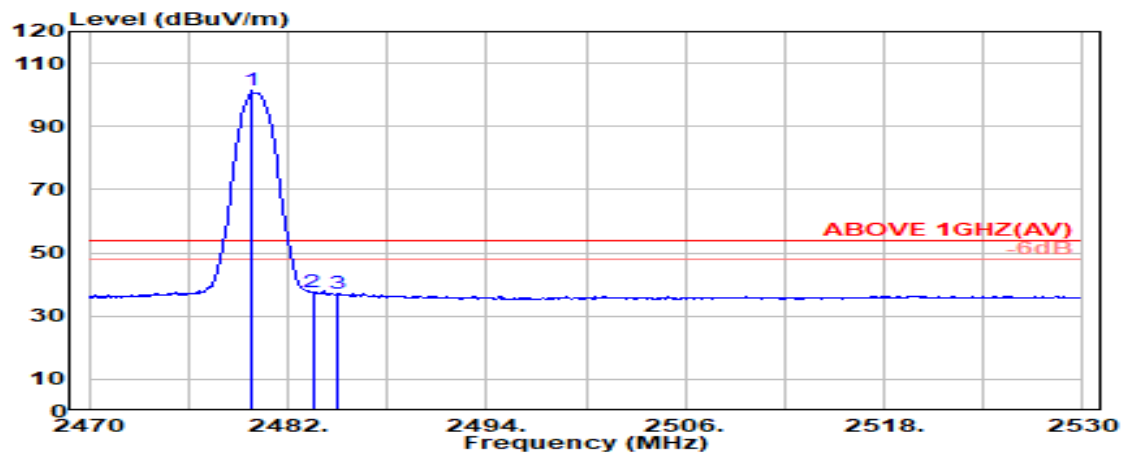
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Fax: +886 2 26099303

Mode	8-DPSK	Frequency	TX 2480MHz
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Antenna at Vertical Polarization

Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Gain (dB)	Read Level (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
@ 2480.100	28.36	5.86	39.92	108.93	103.23	---	---	Peak
2483.500	28.37	5.87	39.92	52.05	46.36	74.00	27.64	Peak
2484.700	28.37	5.87	39.92	52.46	46.78	74.00	27.22	Peak



Antenna at Vertical Polarization

Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Gain (dB)	Read Level (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
@ 2479.850	28.36	5.86	39.92	107.04	101.34	---	---	Average
2483.500	28.37	5.87	39.92	43.38	37.69	54.00	16.31	Average
2484.950	28.37	5.87	39.92	42.98	37.30	54.00	16.70	Average

Remark: The “@” means fundamental frequency, it is ignored in this section.

A.2.2 Emissions outside the frequency band:

The emissions (up to 25GHz) not reported for there is no emission be found.

Mode	8-DPSK	Frequency	TX 2402MHz
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Antenna at Horizontal Polarization

Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Gain (dB)	Read Level (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
4804.000	32.92	8.53	39.39	40.73	42.80	54.00	11.20	Peak

Antenna at Vertical Polarization

Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Gain (dB)	Read Level (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
4804.000	32.92	8.53	39.39	40.31	42.37	54.00	11.63	Peak

Mode	8-DPSK	Frequency	TX 2441MHz
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Antenna at Horizontal Polarization

Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Gain (dB)	Read Level (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
4882.000	33.33	8.64	39.35	43.48	46.09	54.00	7.91	Peak

Antenna at Vertical Polarization

Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Gain (dB)	Read Level (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
4882.000	33.33	8.64	39.35	41.89	44.50	54.00	9.50	Peak

Mode	8-DPSK	Frequency	TX 2480MHz
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Antenna at Horizontal Polarization

Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Gain (dB)	Read Level (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
4960.000	33.32	8.75	39.32	43.01	45.76	54.00	8.24	Peak

Antenna at Vertical Polarization

Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Gain (dB)	Read Level (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
4960.000	33.32	8.75	39.32	41.64	44.39	54.00	9.61	Peak

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A.2.3 Emissions in Non-restricted Frequency Bands:

All emission levels below the FCC 15.209(a)/RSS-Gen Section 8.9 table 4 general radiated emissions limits is not required.

A.3 20dB BANDWIDTH

Test Date	2023/07/18	Temp./Hum.	26°C/54%
Cable Loss	0.50dB	Tested By	Hua Wu
Test Voltage	DC 3.3V (Through jig via Notebook PC)		

A.3.1 20dB Bandwidth Result

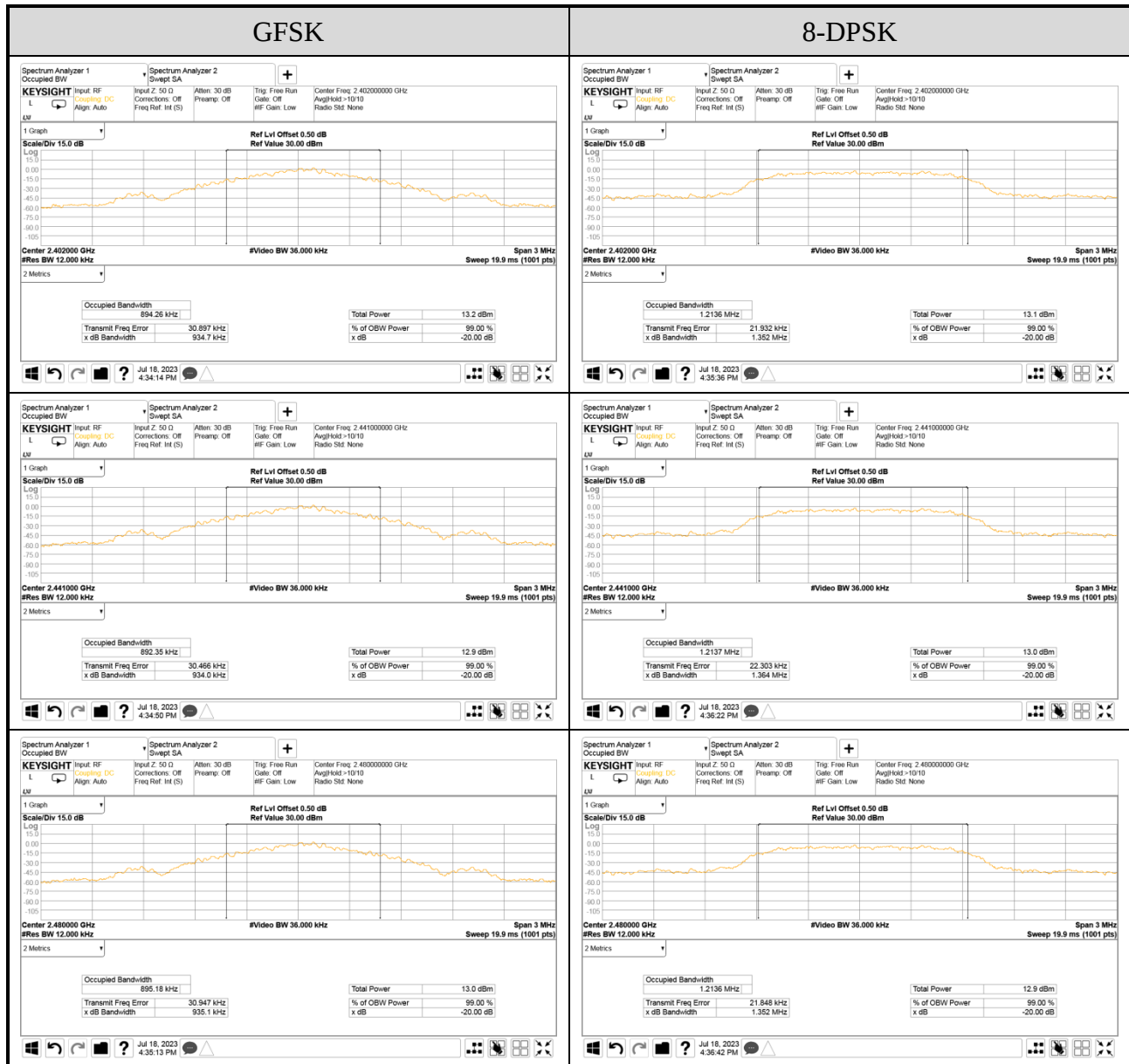
Mode	Centre Frequency (MHz)	20dB Bandwidth (MHz)	99%Occupied Bandwidth (MHz) (Reference only)	2/3 (20dB Bandwidth)
GFSK	2402	0.9347	0.89426	0.623
	2441	0.9340	0.89235	0.623
	2480	0.9351	0.89518	0.623
8-DPSK	2402	1.352	1.2136	0.901
	2441	1.364	1.2137	0.909
	2480	1.352	1.2136	0.901

Remark: The maximum two-thirds of the 20dB bandwidth is the limit for carrier frequency separation presented.

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A.3.2 Measurement Plots

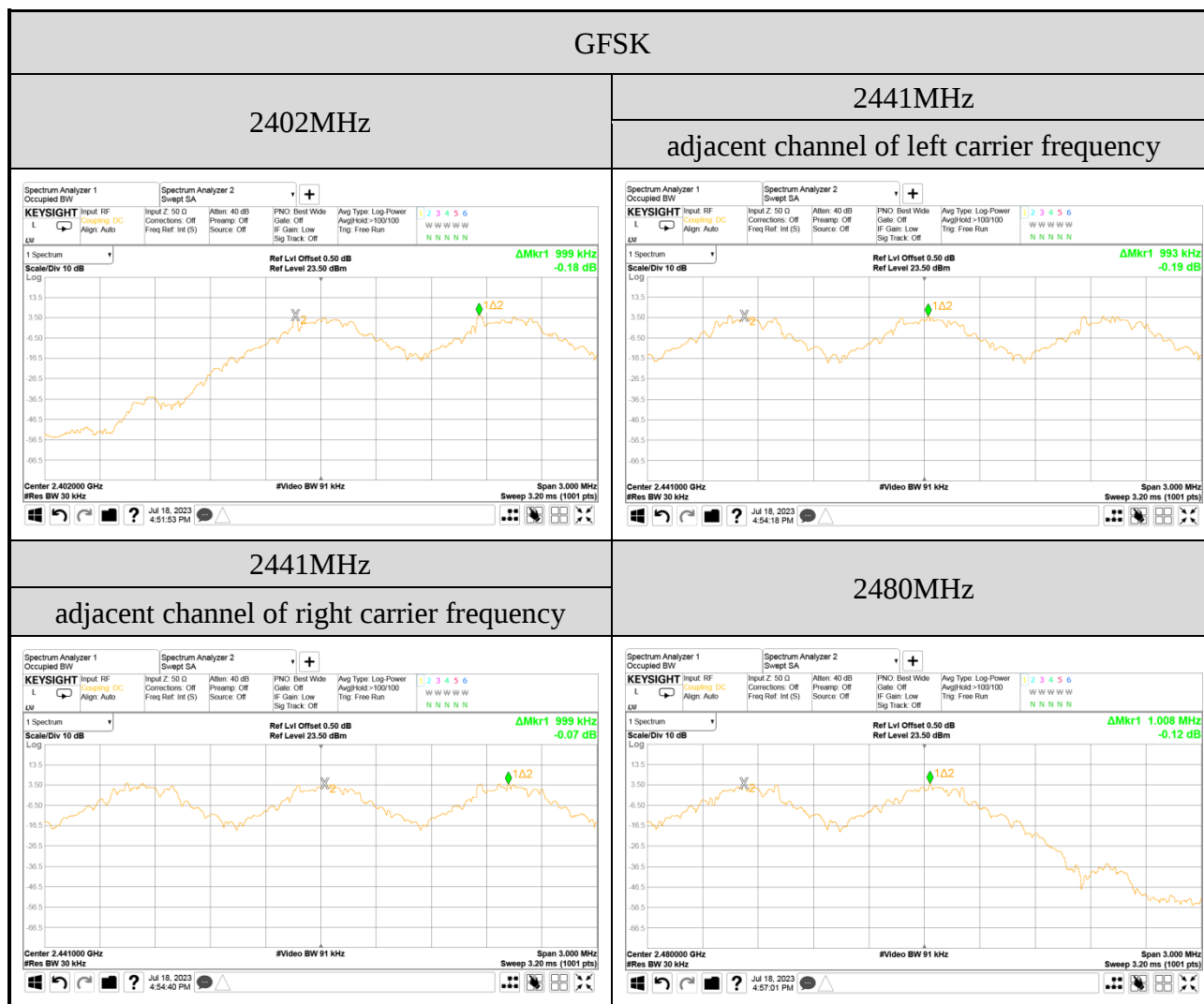


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A.4 CARRIER FREQUENCY SEPARATION

Test Date	2023/07/18	Temp./Hum.	26°C/54%
Cable Loss	0.5dB	Tested By	Hua Wu
Test Voltage	DC 3.3V (Through jig via Notebook PC)		

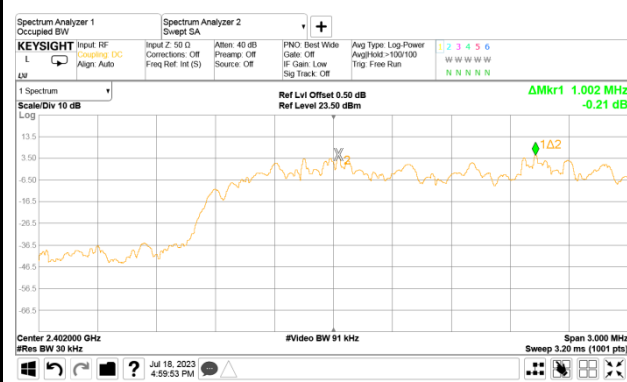


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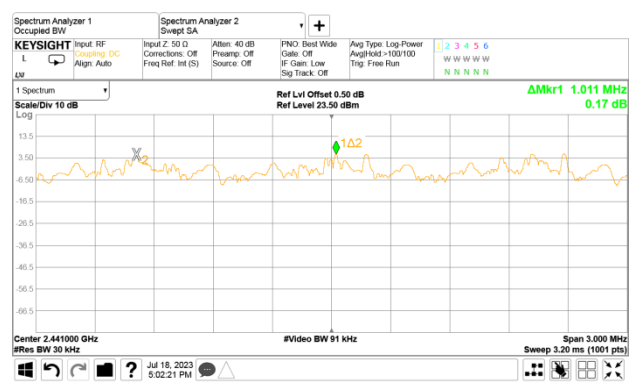
8-DPSK

2402MHz



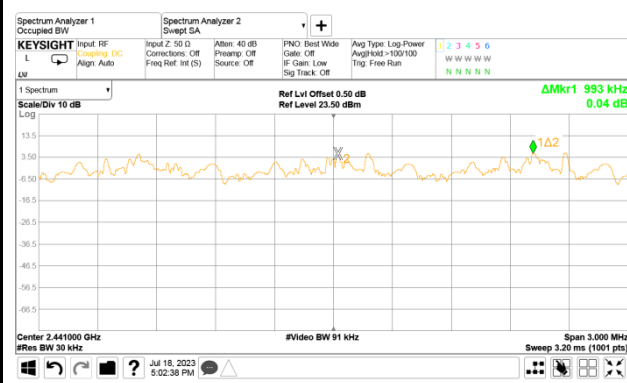
2441MHz

adjacent channel of left carrier frequency

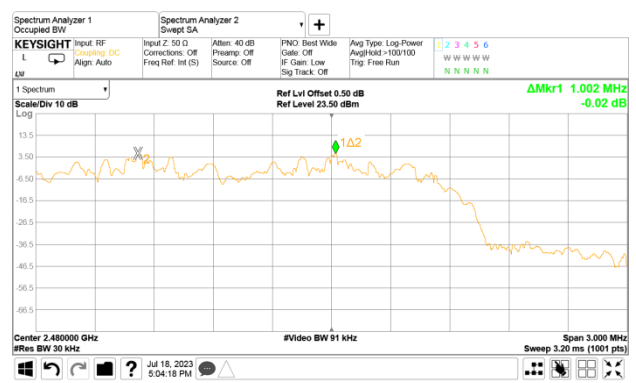


2441MHz

adjacent channel of right carrier frequency



2480MHz



A.5 TIME OF OCCUPANCY

Test Date	2023/07/18	Temp./Hum.	26°C/54%
Cable Loss	0.5dB	Tested By	Hua Wu
Test Voltage	DC 3.3V (Through jig via Notebook PC)		

A.5.1 Time of Occupancy

Mode	Centre Frequency (MHz)	Mode	Each second appearance transmission	Time of Occupancy (ms)	Maximum accumulated Time of Occupancy (ms)	Limit (ms)
GFSK	2402	DH1	10	0.380	120.080	<400
		DH3	4	1.630	206.032	<400
		DH5	3	2.880	273.024	<400

Observation Period:

$$79 \text{ channels} * 0.4 \text{ seconds} = 31.6 \text{ seconds}$$

DH1 Mode

For each second of 10 transmission appearance,the longest time of occupancy is
 $10 \text{ transmission} * 31.6 \text{ seconds} * 0.380 \text{ ms} = 120.080 \text{ ms} (<400\text{ms})$

DH3 Mode

For each second of 4 transmission appearance,the longest time of occupancy is
 $4 \text{ transmission} * 31.6 \text{ seconds} * 1.630 \text{ ms} = 206.032 \text{ ms} (<400\text{ms})$

DH5 Mode

For each second of 3 transmission appearance,the longest time of occupancy is
 $3 \text{ transmission} * 31.6 \text{ seconds} * 2.880 \text{ ms} = 273.024 \text{ ms} (<400\text{ms})$

Mode	Centre Frequency (MHz)	Mode	Each second appearance transmission	Time of Occupancy (ms)	Maximum accumulated Time of Occupancy (ms)	Limit (ms)
GFSK	2441	DH1	10	0.380	120.080	<400
		DH3	4	1.640	207.296	<400
		DH5	3	2.880	273.024	<400

Observation Period:

$$79 \text{ channels} * 0.4 \text{ seconds} = 31.6 \text{ seconds}$$

DH1 Mode

For each second of 10 transmission appearance,the longest time of occupancy is
 $10 \text{ transmission} * 31.6 \text{ seconds} * 0.380 \text{ ms} = 120.080 \text{ ms} (<400\text{ms})$

DH3 Mode

For each second of 4 transmission appearance,the longest time of occupancy is
 $4 \text{ transmission} * 31.6 \text{ seconds} * 1.640 \text{ ms} = 207.296 \text{ ms} (<400\text{ms})$

DH5 Mode

For each second of 3 transmission appearance,the longest time of occupancy is
 $3 \text{ transmission} * 31.6 \text{ seconds} * 2.880 \text{ ms} = 273.024 \text{ ms} (<400\text{ms})$

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Mode	Centre Frequency (MHz)	Mode	Each second appearance transmission	Time of Occupancy (ms)	Maximum accumulated Time of Occupancy (ms)	Limit (ms)
GFSK	2480	DH1	10	0.380	120.080	<400
		DH3	4	1.630	206.032	<400
		DH5	3	2.880	273.024	<400

Observation Period:

79 channels * 0.4 seconds = 31.6 seconds

DH1 Mode

For each second of 10 transmission appearance, the longest time of occupancy is
10 transmission * 31.6 seconds * 0.380 ms = 120.080 ms (<400ms)

DH3 Mode

For each second of 4 transmission appearance, the longest time of occupancy is
4 transmission * 31.6 seconds * 1.630 ms = 206.032 ms (<400ms)

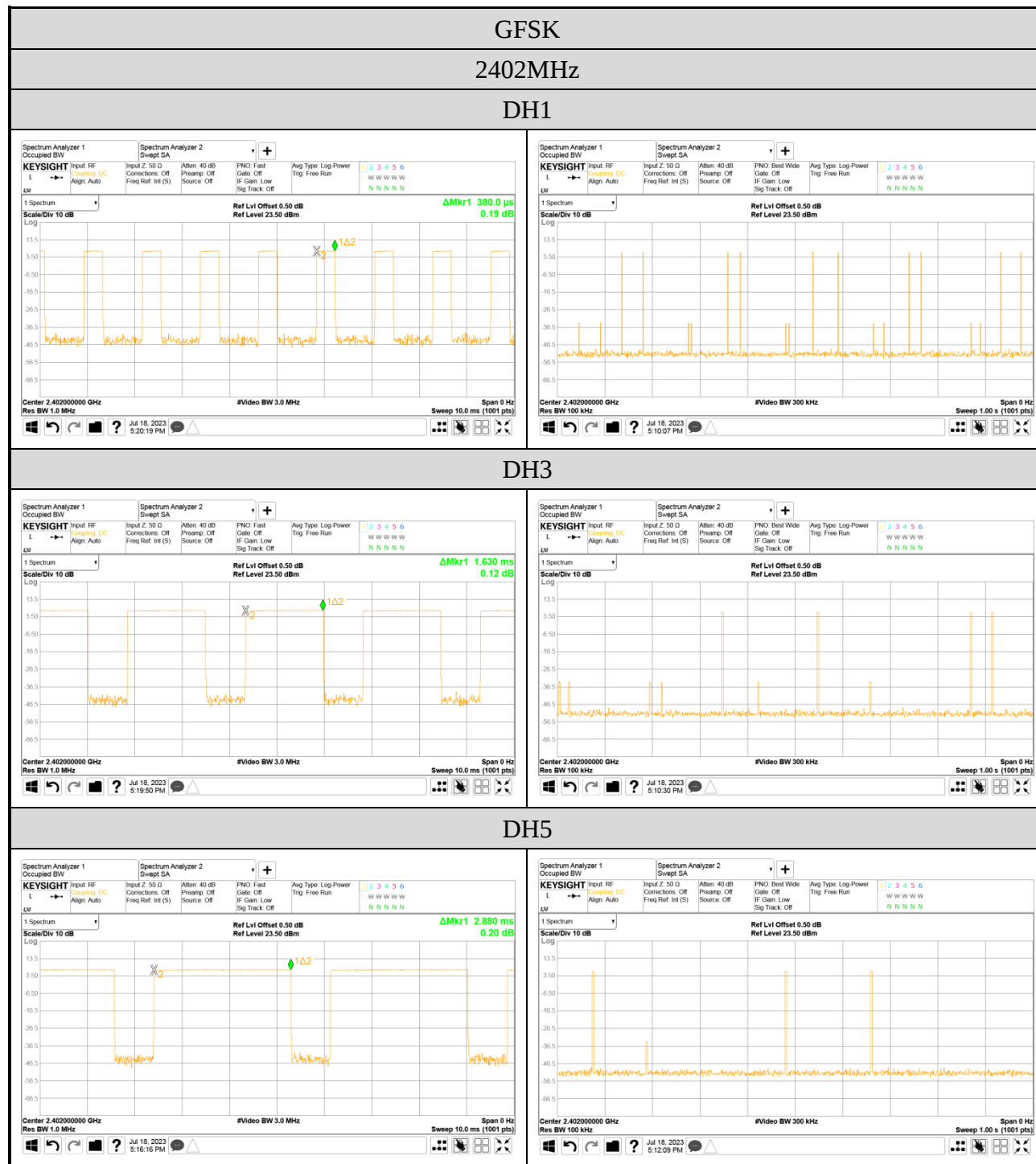
DH5 Mode

For each second of 3 transmission appearance, the longest time of occupancy is
3 transmission * 31.6 seconds * 2.880 ms = 273.024 ms (<400ms)

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● Measurement Plots



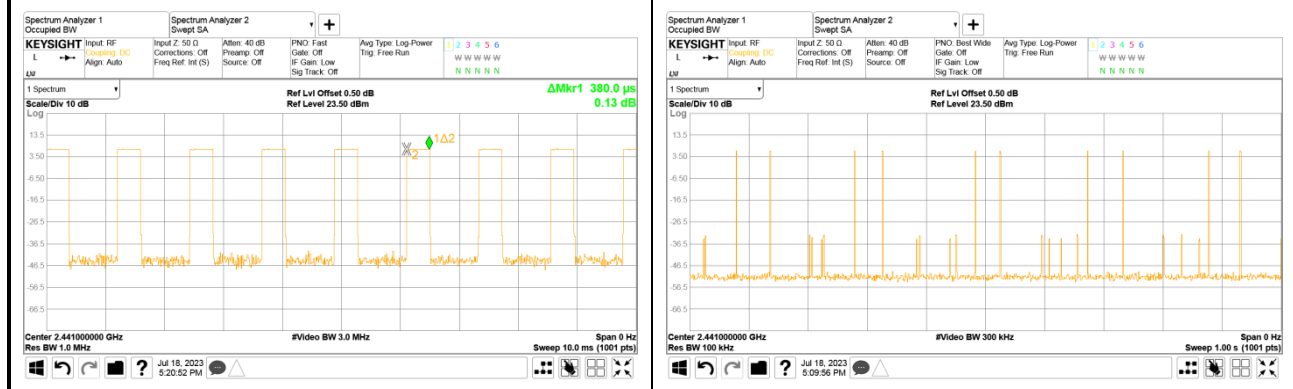
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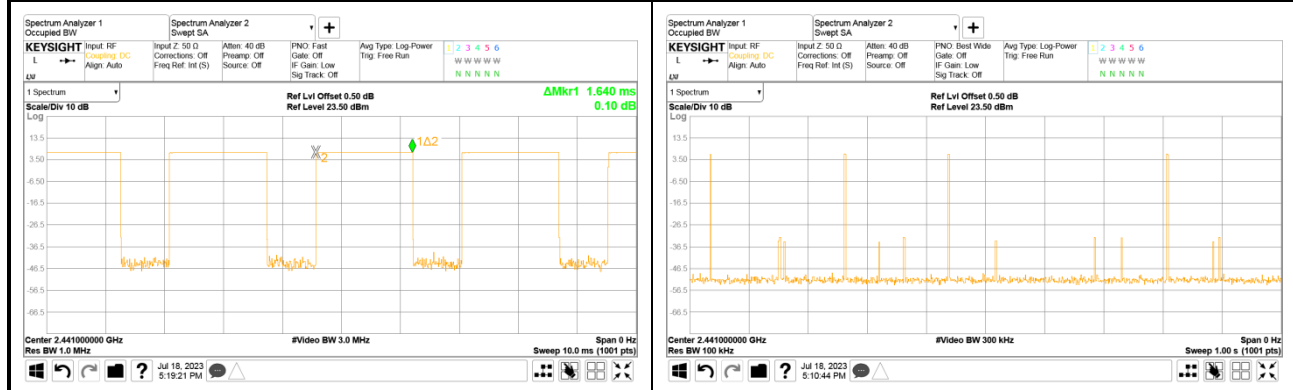
GFSK

2441MHz

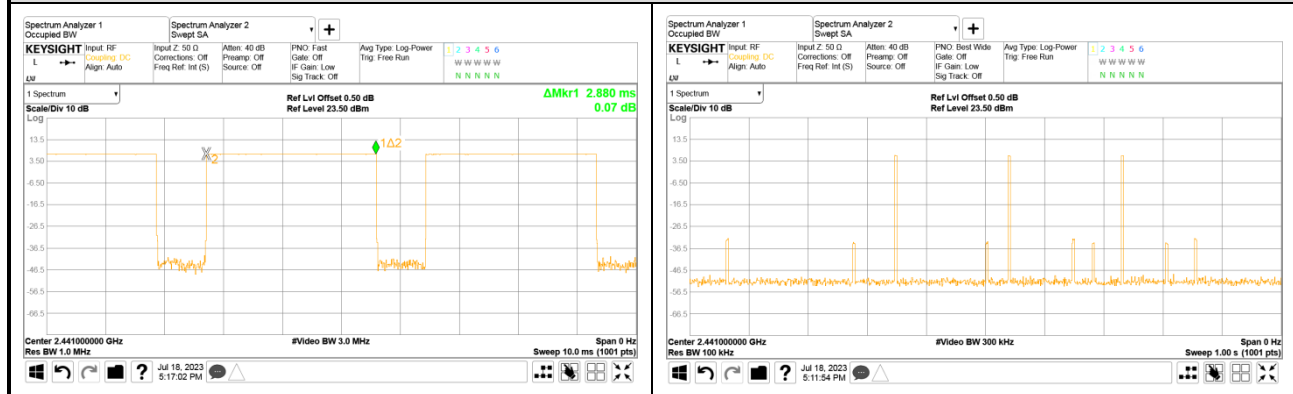
DH1



DH3



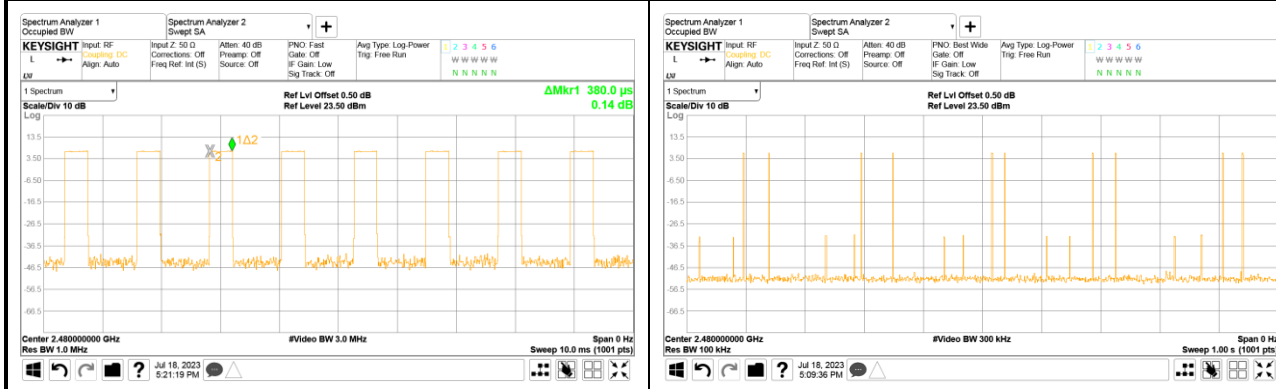
DH5



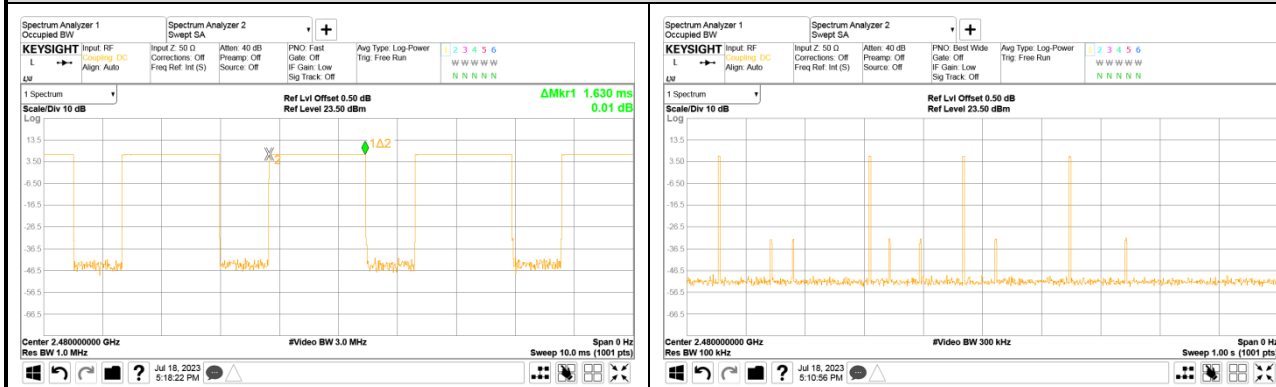
GFSK

2480MHz

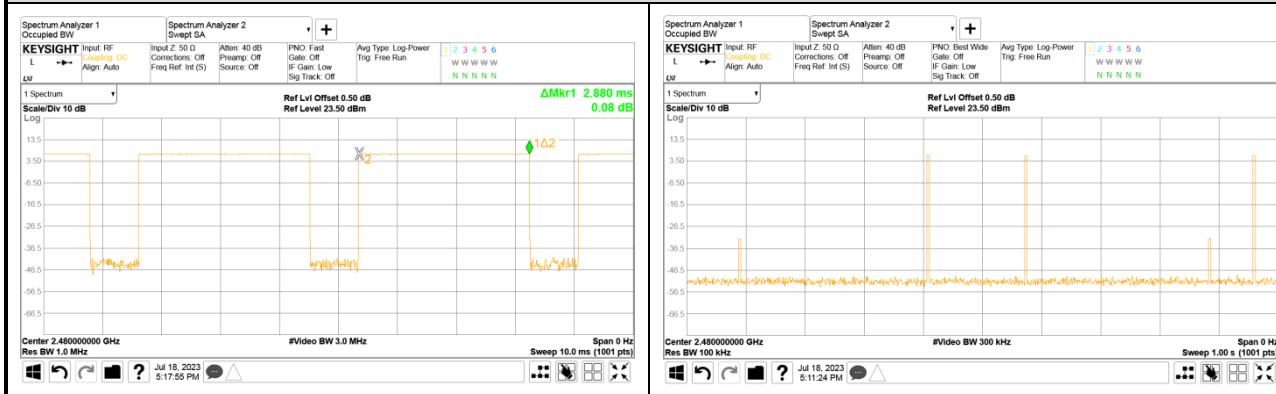
DH1



DH3



DH5



Mode	Centre Frequency (MHz)	Mode	Each second appearance transmission	Time of Occupancy (ms)	Maximum accumulated Time of Occupancy (ms)	Limit (ms)
8-DPSK	2402	3DH1	10	0.380	120.080	<400
		3DH3	4	1.640	207.296	<400
		3DH5	3	2.890	273.972	<400

Observation Period:

79 channels* 0.4 seconds= 31.6 seconds

3DH1 Mode

For each second of 10 transmission appearance,the longest time of occupancy is

10 transmission* 31.6 seconds* 0.380 ms= 120.080 ms (<400ms)

3DH3 Mode

For each second of 4 transmission appearance,the longest time of occupancy is

4 transmission* 31.6 seconds* 1.640 ms= 207.296 ms (<400ms)

3DH5 Mode

For each second of 3 transmission appearance,the longest time of occupancy is

3 transmission* 31.6 seconds* 2.890 ms= 273.972 ms (<400ms)

Mode	Centre Frequency (MHz)	Mode	Each second appearance transmission	Time of Occupancy (ms)	Maximum accumulated Time of Occupancy (ms)	Limit (ms)
8-DPSK	2441	3DH1	10	0.380	120.080	<400
		3DH3	4	1.640	207.296	<400
		3DH5	3	2.890	273.972	<400

Observation Period:

79 channels* 0.4 seconds= 31.6 seconds

3DH1 Mode

For each second of 10 transmission appearance,the longest time of occupancy is

10 transmission* 31.6 seconds* 0.380 ms= 120.080 ms (<400ms)

3DH3 Mode

For each second of 4 transmission appearance,the longest time of occupancy is

4 transmission* 31.6 seconds* 1.640 ms= 207.296 ms (<400ms)

3DH5 Mode

For each second of 3 transmission appearance,the longest time of occupancy is

3 transmission* 31.6 seconds* 2.890 ms= 273.972 ms (<400ms)

Mode	Centre Frequency (MHz)	Mode	Each second appearance transmission	Time of Occupancy (ms)	Maximum accumulated Time of Occupancy (ms)	Limit (ms)
8-DPSK	2480	3DH1	10	0.380	120.080	<400
		3DH3	4	1.640	207.296	<400
		3DH5	3	2.890	273.972	<400

Observation Period:

79 channels* 0.4 seconds= 31.6 seconds

3DH1 Mode

For each second of 10 transmission appearance, the longest time of occupancy is
10 transmission* 31.6 seconds* 0.380 ms = 120.080 ms (<400ms)

3DH3 Mode

For each second of 4 transmission appearance, the longest time of occupancy is
4 transmission* 31.6 seconds* 1.640 ms = 207.296 ms (<400ms)

3DH5 Mode

For each second of 3 transmission appearance, the longest time of occupancy is
3 transmission* 31.6 seconds* 2.890 ms = 273.972 ms (<400ms)

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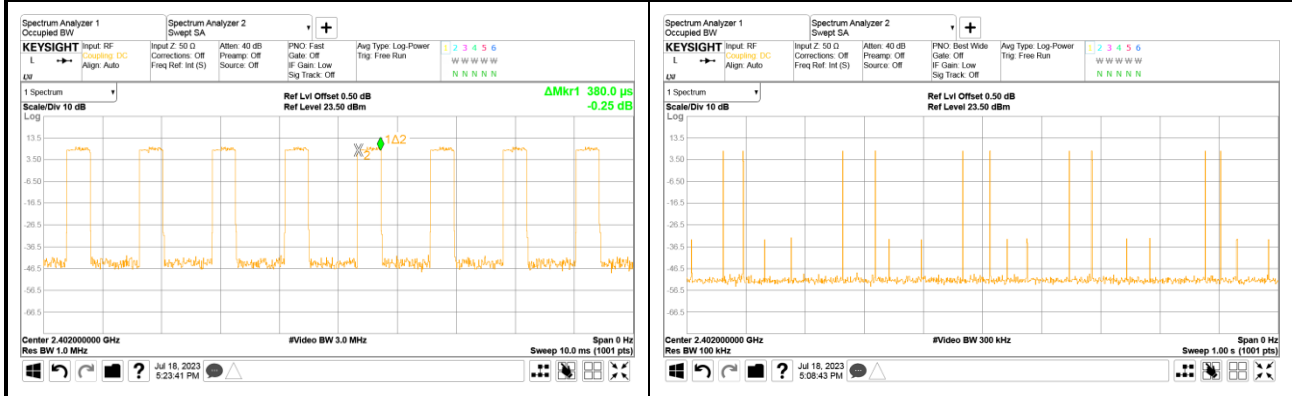
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● Measurement Plots

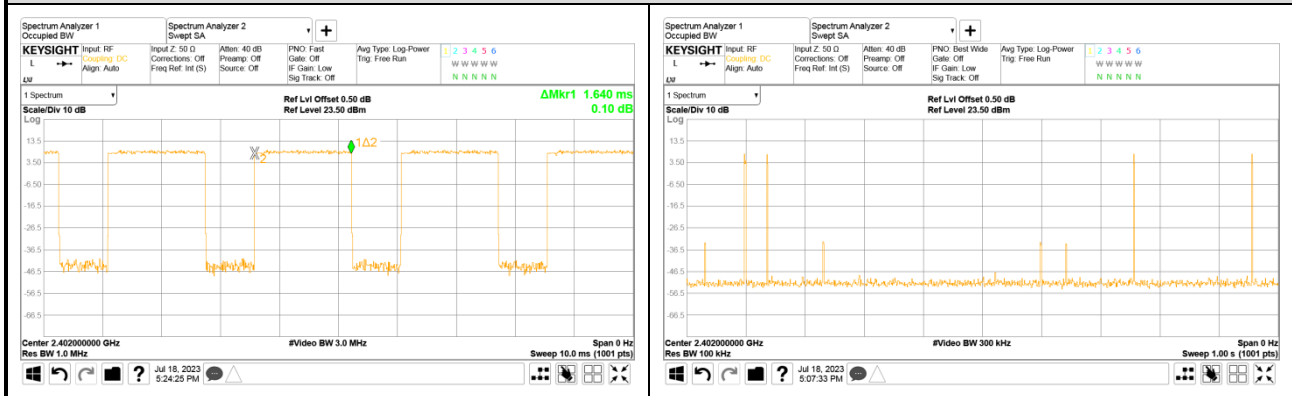
8-DPSK

2402MHz

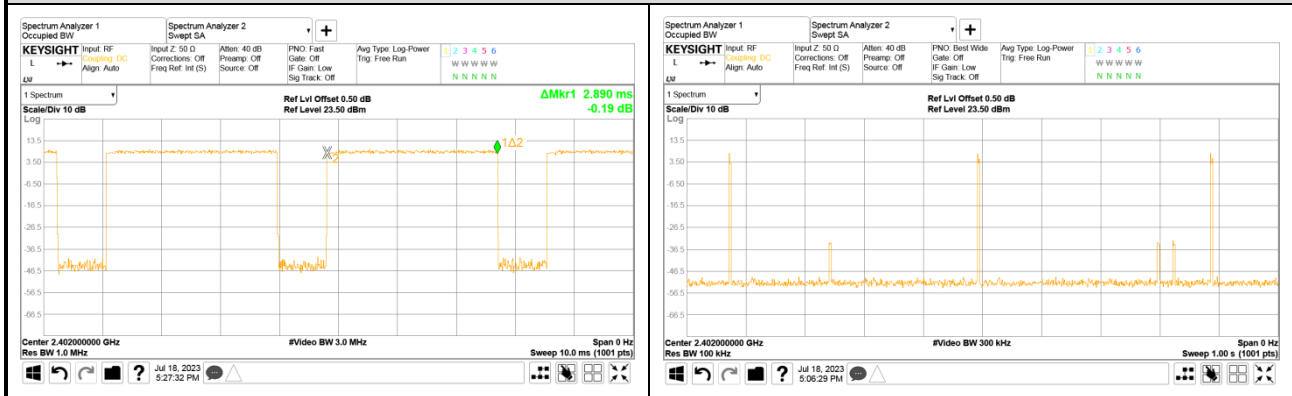
3DH1



3DH3



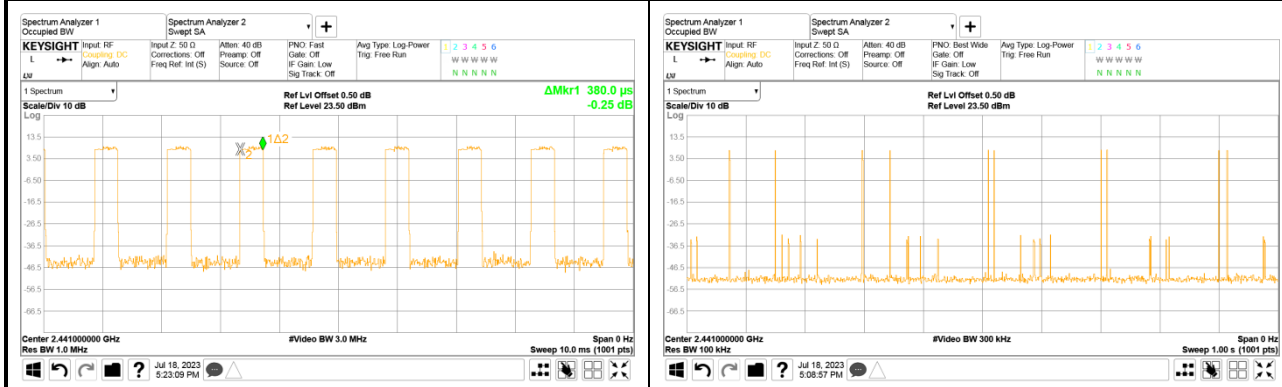
3DH5



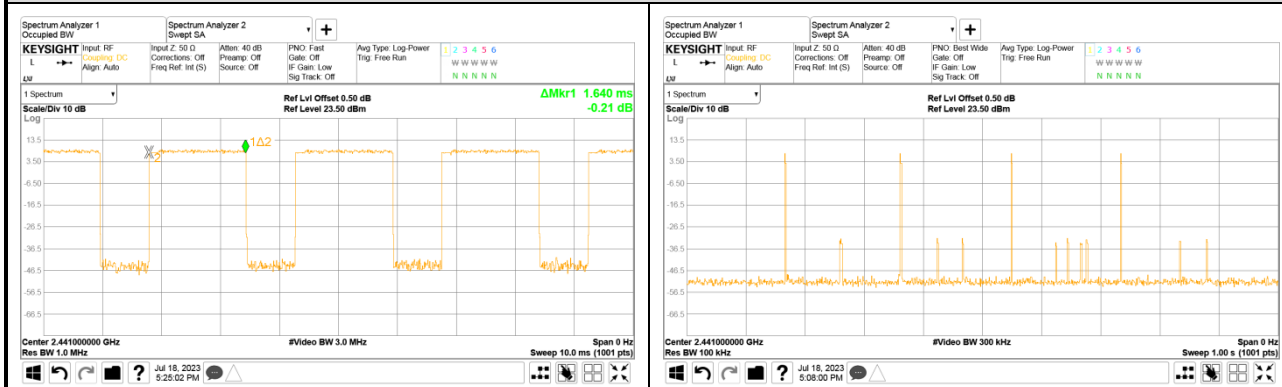
8-DPSK

2441MHz

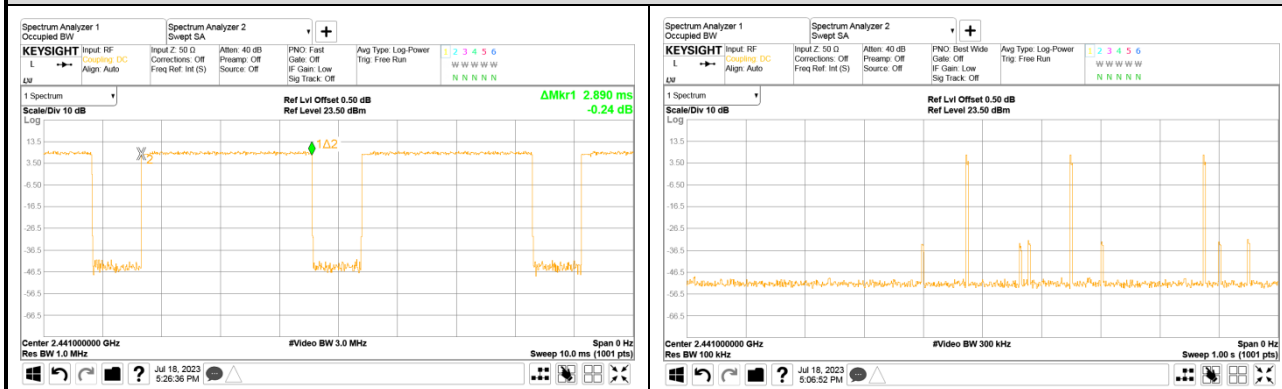
3DH1



3DH3



3DH5



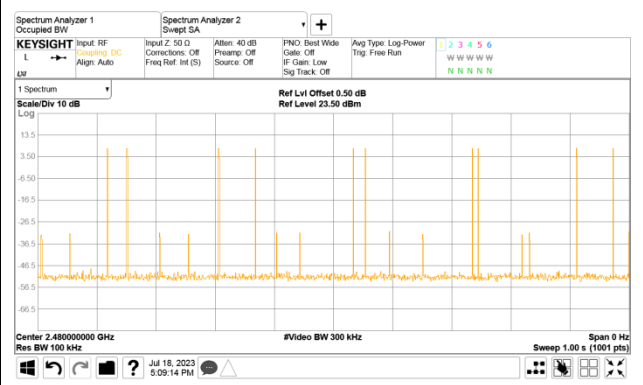
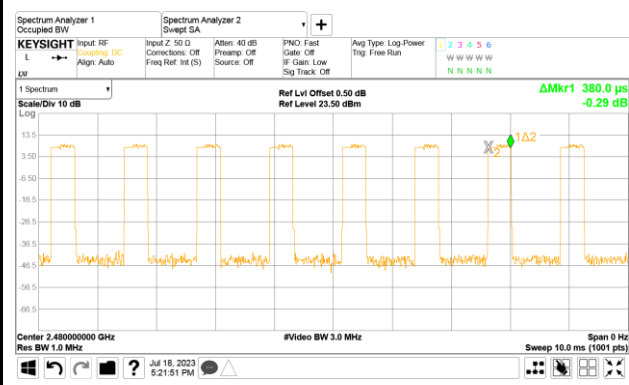
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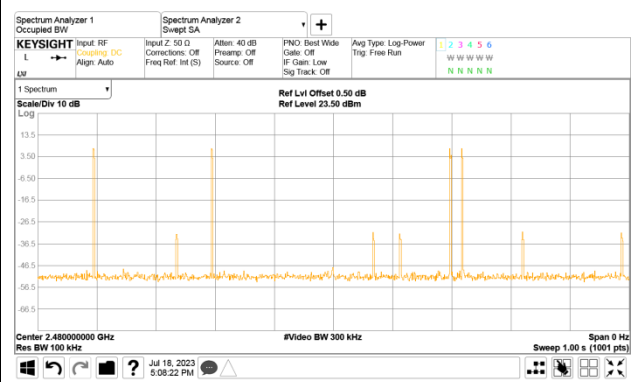
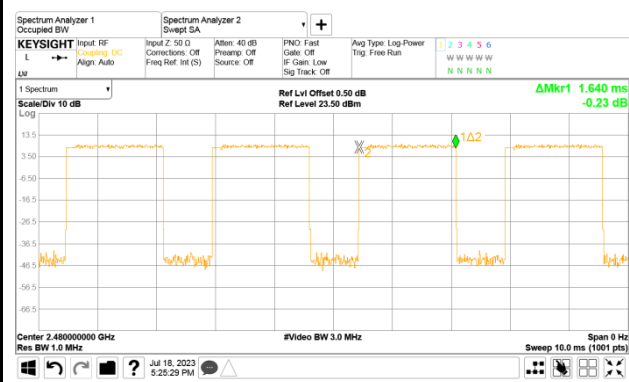
8-DPSK

2480MHz

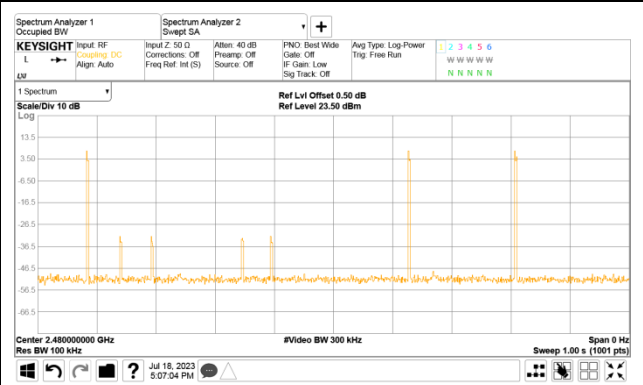
3DH1



3DH3



3DH5

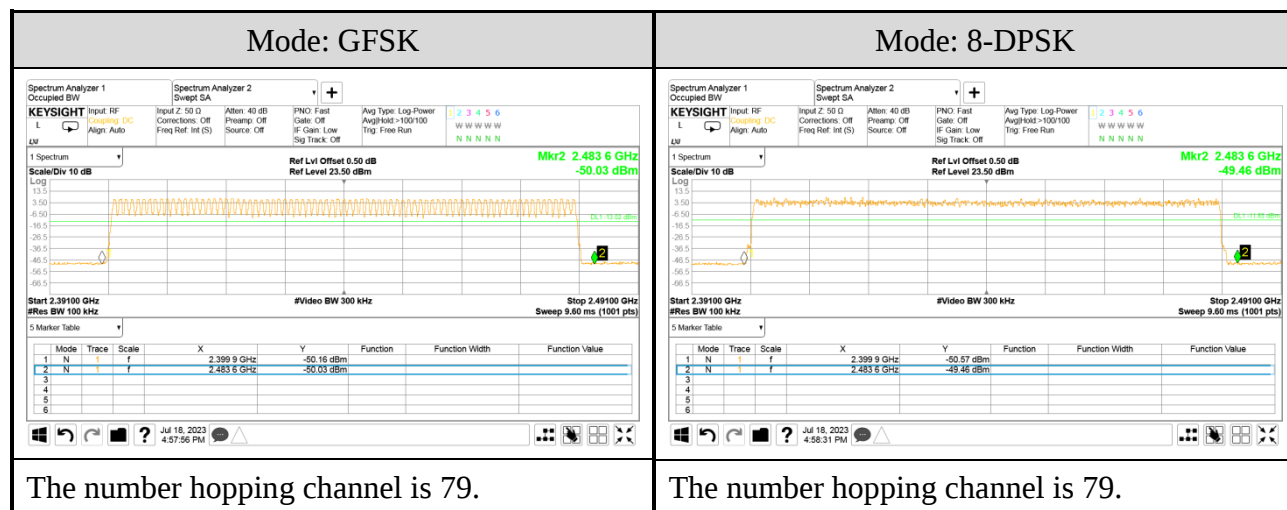


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A.6 NUMBER OF HOPPING CHANNELS

Test Date	2023/07/18	Temp./Hum.	26°C/54%
Cable Loss	0.50dB	Tested By	Hua Wu
Test Voltage	DC 3.3V (Through jig via Notebook PC)		



A.7 MAXIMUM PEAK OUTPUT POWER

Test Date	2023/07/18	Temp./Hum.	26°C/54%
Cable Loss	0.5dB	Tested By	Hua Wu
Test Voltage	DC 3.3V (Through jig via Notebook PC)		

A.7.1 Maximum Peak Output Power

Mode	Centre Frequency (MHz)	Maximum Peak Output Power		Limit
		dBm	W	
GFSK	2402	7.71	0.006	21dBm (0.125W)
	2441	7.73	0.006	
	2480	7.72	0.006	
8-DPSK	2402	10.22	0.011	
	2441	10.32	0.011	
	2480	10.28	0.011	

A.7.2 Maximum Average Output Power (Reporting only)

Mode	Centre Frequency (MHz)	Average Output Power	Duty cycle factor (dB) 10log (1/x) Note 2	Maximum Average Output Power ^{Note}		Limit
				dBm	W	
GFSK	2402	6.33	1.124	7.45	0.006	21dBm (0.125W)
	2441	6.29		7.41	0.006	
	2480	6.25		7.37	0.005	
8-DPSK	2402	6.24	1.118	7.36	0.005	
	2441	6.34		7.46	0.006	
	2480	6.26		7.38	0.005	

Note: Max Average Output Power (dBm) = Average output power (dBm)+ Duty Cycle Factor (dB) when duty cycle is less than 98%.

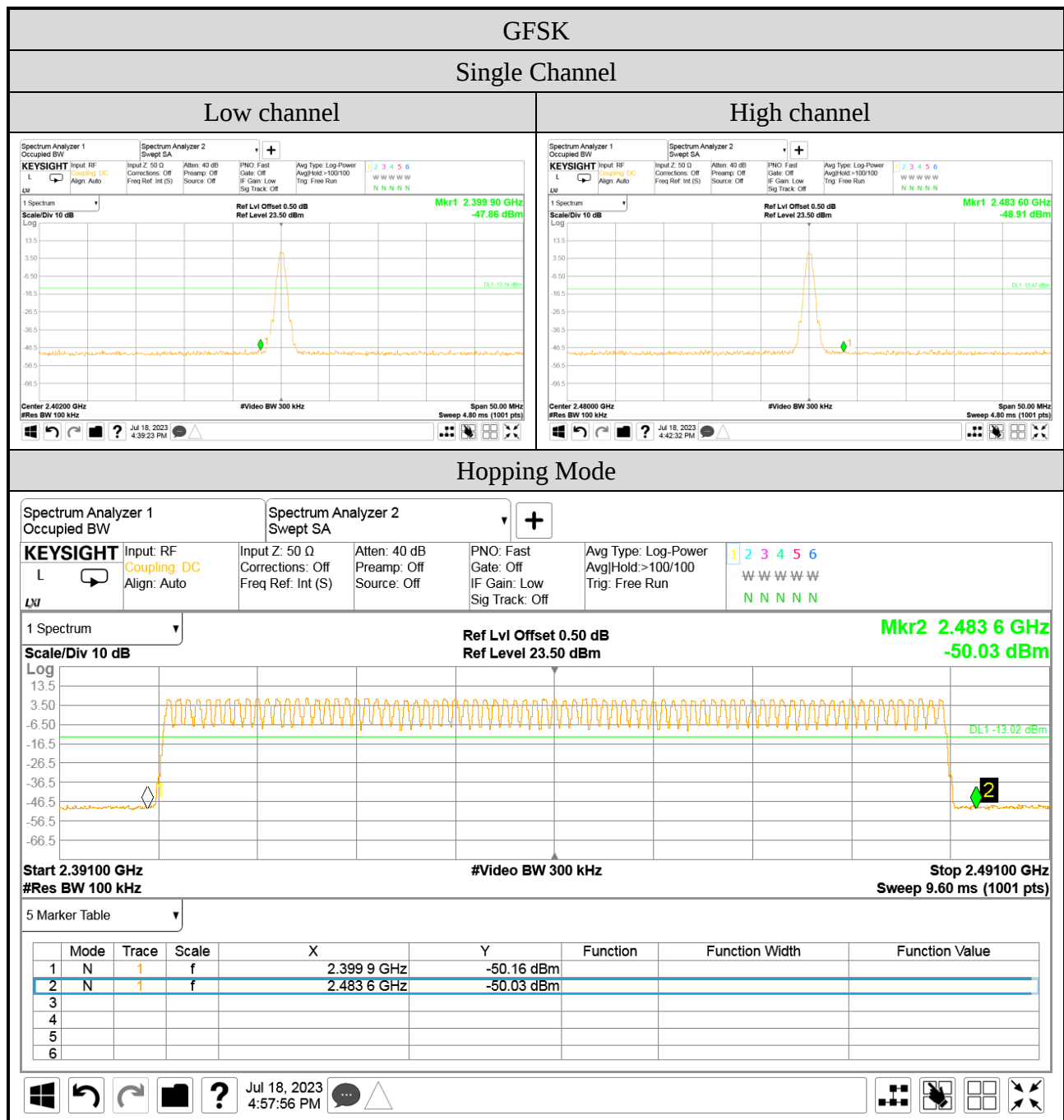
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A.8 EMISSION LIMITATIONS MEASUREMENT

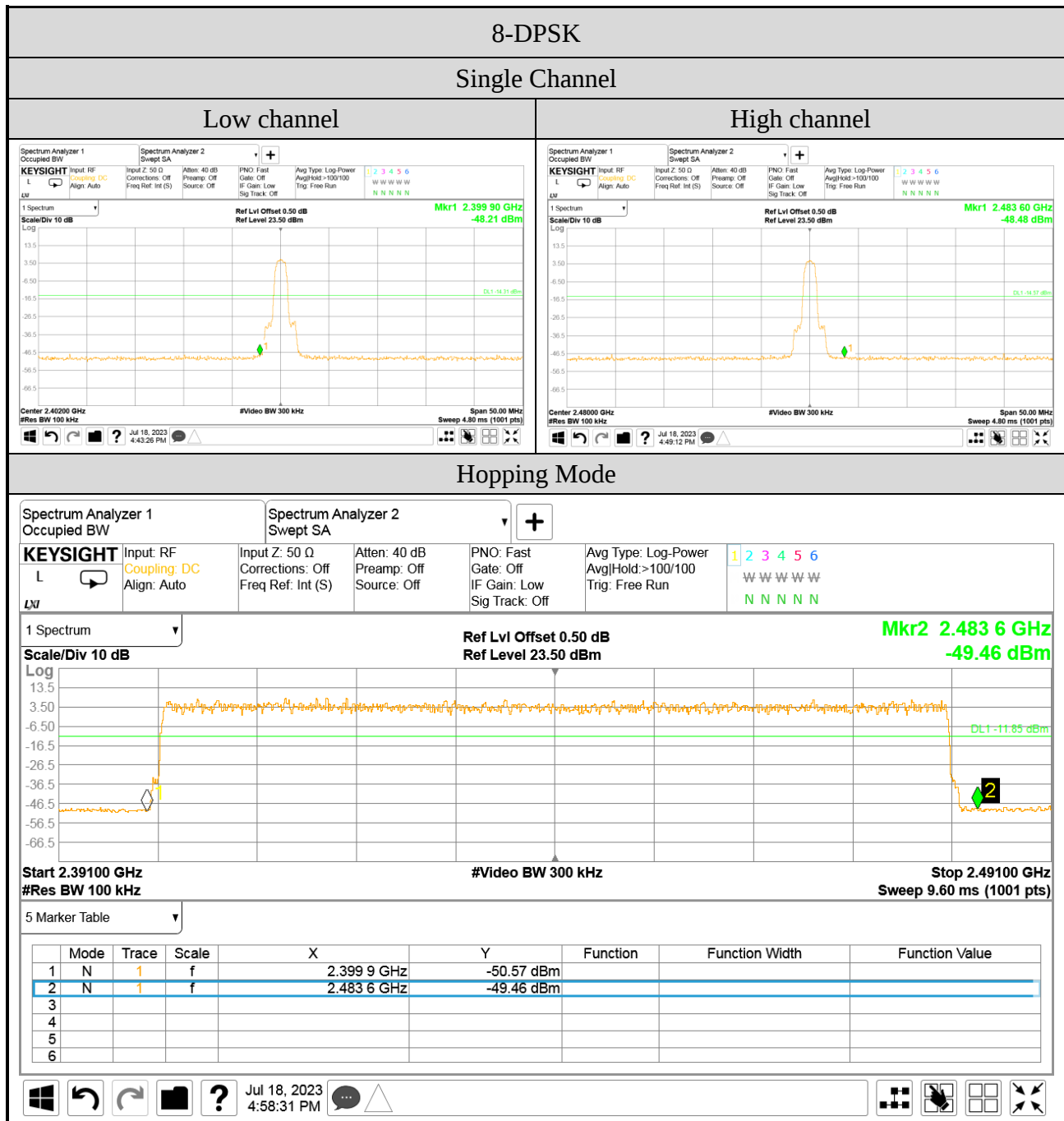
Test Date	2023/07/18	Temp./Hum.	26°C/54%
Cable Loss	0.5dB	Tested By	Hua Wu
Test Voltage	DC 3.3V (Through jig via Notebook PC)		

A.8.1 Band Edge



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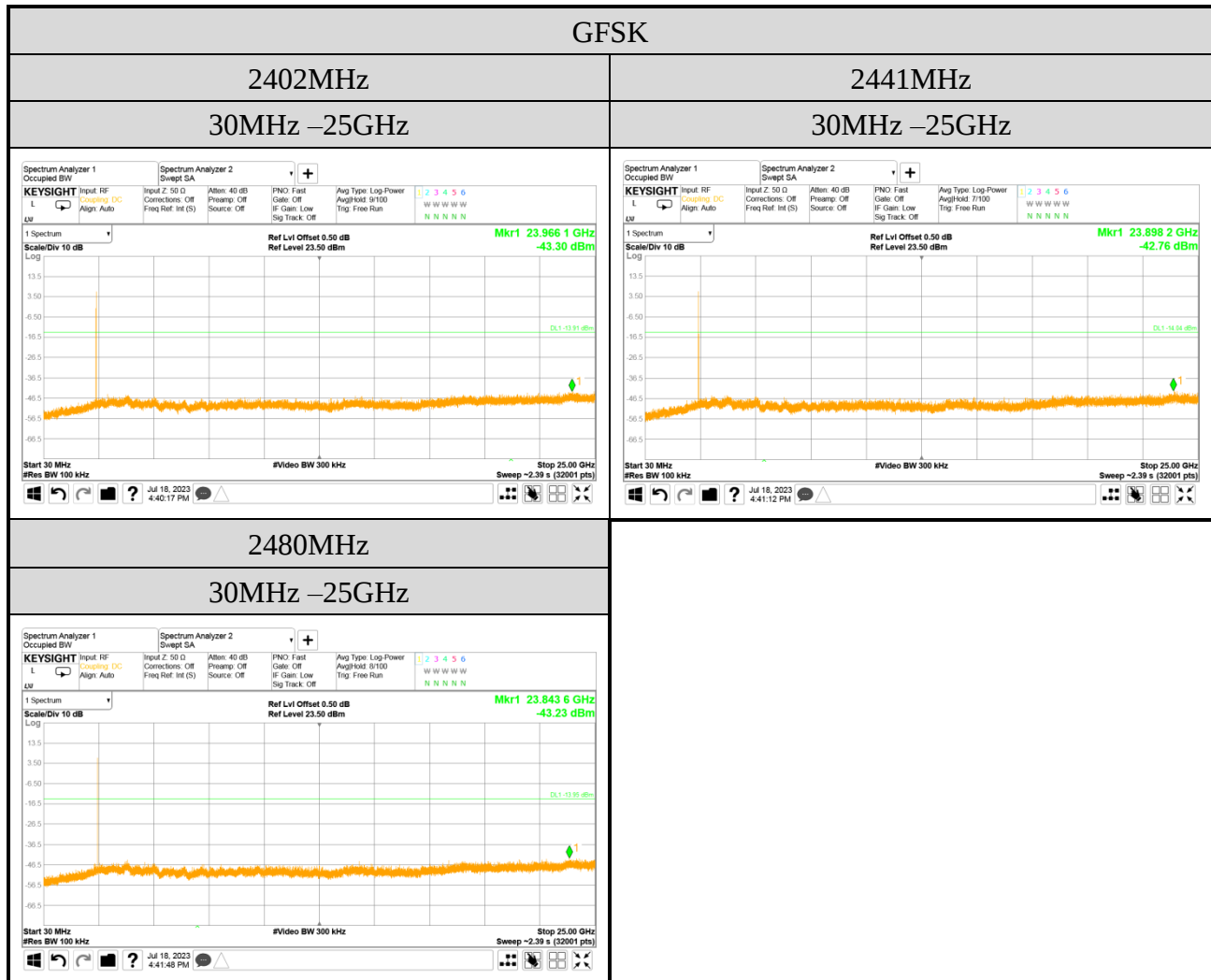
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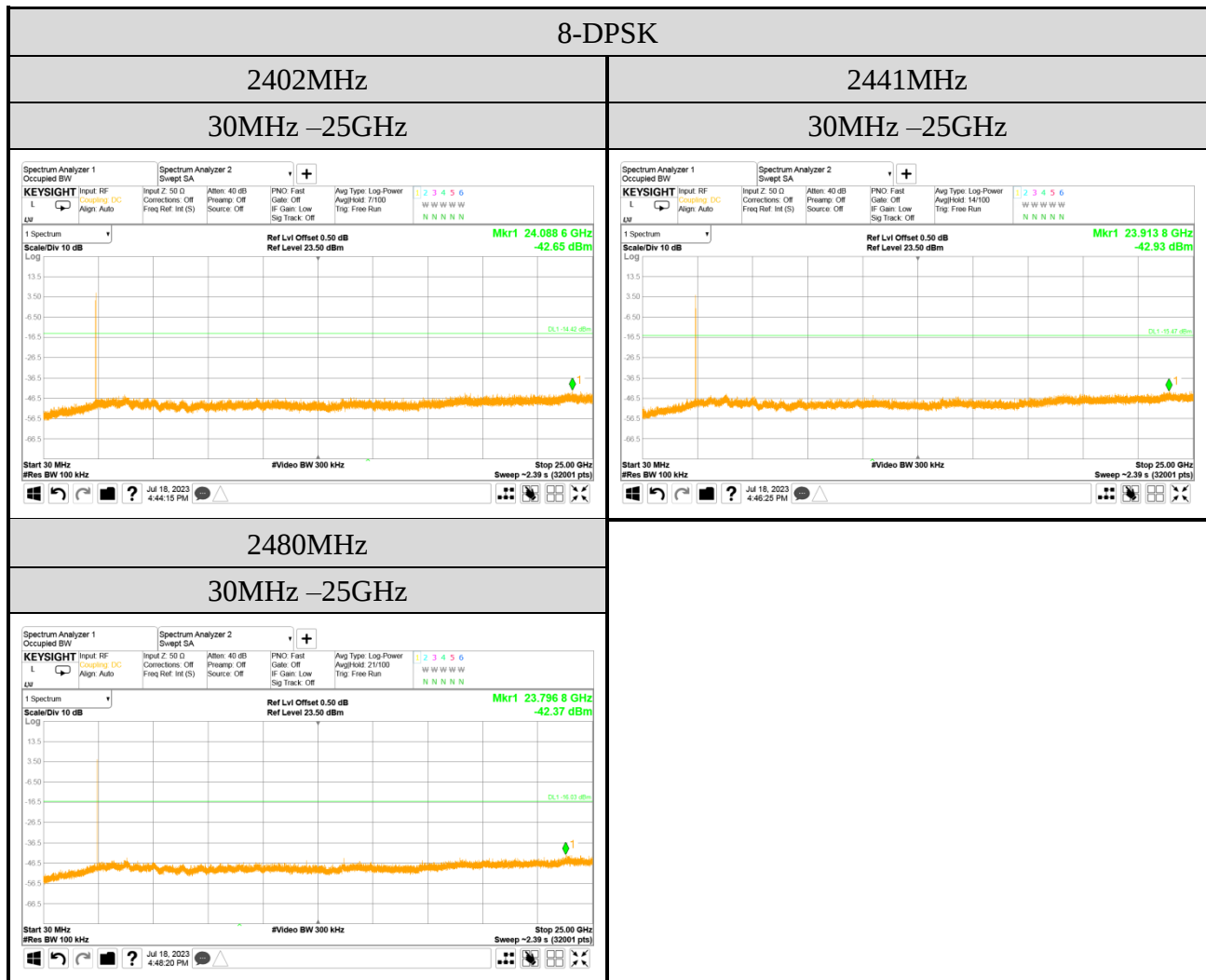
A.8.2 Spurious Emission



Note: All results have been included cable loss.

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Note: All results have been included cable loss.



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APPENDIX B

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APPENDIX B

TEST PHOTOGRAPHS

(Model: GB8773)