

ELECTROMAGNETIC EMISSIONS COMPLIANCE REPORT



Applicant: Darfon Electronics Czech s.r.o.
Turanka 1315/112, 627 00 Brno, Czech Republic.

Product Name: Headset

Brand Name: QPAD

Model No.: QH-900

Model Difference: N/A

Report Number: E2/2021/30045

FCC ID 2AZDI-QH-900

IC: 27074-QH900

Issue Date: Jun.30, 2021

Date of Test: Jan.04 , 2021 ~ Apr.16 , 2021

Date of EUT Received: Jan.04 , 2021

Approved By

Jay Lin
Jay Lin/Asst. Supervisor

We hereby certify that:

The above equipment was tested by SGS Taiwan Ltd. Central RF Lab The test data, data evaluation, test procedures, and equipment configurations shown in this report were made in accordance with the procedures given in ANSI C63.10:2013 and the energy emitted by the sample EUT comply with FCC rule part §15.247, ISSED RSS-247.

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Revision History

Report Number	Revision	Description	Issue Date	Revised By
E2/2021/30045	Rev.00	Original	Jun.30, 2021	Viola Su

Note:

- 1、Antenna information is provided by the applicant, test results of this report are applicable to the sample EUT received.

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1 GENERAL INFORMATION

1.1 Product Description

Product Name:	Headset
Brand Name:	QPAD
Model No.:	QH-900
Model Difference:	N/A
Hardware Version:	R0C
Firmware Version:	1.0.3
EUT Series No.:	N/A
Power Supply:	3.7 Vdc Li-ion Polymer Battery

1.2 RF Specification

Radio Technology:	BT BR+EDR
Channel number:	79 channels
Modulation type:	GFSK + $\pi/4$ DQPSK + 8DPSK
Transmit Power:	9.99 dBm
Frequency Range:	2.402GHz – 2.480GHz
Dwell Time:	$\leq 0.4s$

1.3 Antenna Designation

Antenna Type	Supplier	Antenna Part No.	Freq. (MHz)	Peak Antenna Gain (dBi)
PCB	N/A	N/A	2402~2480	3.1

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1.4 Test Methodology of Applied Standards

FCC Part 15, Subpart C §15.247

FCC KDB 558074 D01 15.247 Meas. Guidance v05r02

RSS-247 issue 2 Feb. 2017

RSS-Gen Issue 5, Amendment 2, February 2021

ANSI C63.10:2013

1.5 Test Facility

Laboratory	Test Site Address	Test Site Name	FCC Designation number	IC CAB identifier
SGS Taiwan Ltd. Central RF Lab. (TAF code 3702)	No.134, Wu Kung Road, New Taipei Industrial Park, Wuku District, New Taipei City, Taiwan.	SAC 1	TW0027	TW3702
		SAC 3		
		Conduction 1		
		Conducted 1		
		Conducted 2		
		Conducted 3		
		Conducted 4		
		Conducted 5		
		Conducted 6		
	No.2, Keji 1st Rd., Guishan District, Taoyuan City, Taiwan 333	Conduction A	TW0028	
		SAC C		
		SAC D		
		SAC G		
		Conducted A		
		Conducted B		
		Conducted C		
		Conducted D		
		Conducted E		
		Conducted F		
		Conducted G		

Note: Test site name is remarked on the equipment list in each section of this report as an indication where measurements occurred in specific test site and address.

1.6 Special Accessories

There is no special accessory used while test was conducted.

1.7 Equipment Modifications

There was no modification incorporated into the EUT.

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2 SYSTEM TEST CONFIGURATION

2.1 EUT Configuration

The EUT configuration for testing is installed on RF field strength measurement to meet the Commissions requirement and operating in a manner which intends to maximize its emission characteristics in a continuous normal application.

2.2 EUT Exercise

An engineering test mode (software/firmware) that applicant provided was utilized to manipulate the EUT into transmit, selection of the test channel, and modulation scheme.

2.3 Test Procedure

2.3.1 Conducted Emissions

The EUT is placed on a table which is 0.8 m above ground plane. Conducted emissions from the EUT measured in the frequency range between 0.15 MHz and 30MHz. The CISPR Quasi-Peak and Average detector mode is employed. The two LISNs provide 50uH/50 ohm of coupling impedance for the measuring instrument. Both lines of the power mains connected to the EUT were checked for maximum conducted interference.

2.3.2 Conducted Test (RF)

The active antenna port of the unlicensed wireless device is connected to the spectrum analyzer with attenuator to protect the instrumentation. If a second antenna port is available, it is tested at one operating frequency, with other port(s) appropriately terminated, to verify it has similar output characteristics as the fully tested port.

2.3.3 Radiated Emissions

The EUT is placed on a turn table. For emissions testing at or below 1 GHz, the table height shall be 0.8 m above the reference ground plane. For emission measurements above 1 GHz, the table height shall be 1.5 m. The turn table shall rotate 360 degrees to determine the position of maximum emission level. EUT is set 3m away from the receiving antenna which varied from 1m to 4m to find out the highest emission. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical. In order to find out the max. emission, the relative positions of this transmitter (EUT) was rotated through three orthogonal axes and measurement procedures for electric field radiated emissions above 1 GHz the EUT measurement is to be made "while keeping the antenna in the 'cone of radiation' from that area and pointed at the area both in azimuth and elevation, with polarization oriented for maximum response." is still within the 3dB illumination BW of the measurement antenna.

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2.4 Measurement Results Explanation Example

2.4.1 Radiated Emission Test Sites For Measurements From 9 kHz To 30 MHz

Radiated emission below 30MHz is measured in a 9m*9m*6m semi-anechoic chamber, the measurements correspond to those obtained at an open-field test site.

There is a comparison data of both open-field test site and semi-Anechoic chamber, and the result came out very similar.

2.4.2 For all conducted test items:

The offset level is set in the spectrum analyzer to compensate the RF cable loss and attenuation factor between EUT conducted port and spectrum analyzer. With the offset compensation, the spectrum analyzer reading level is exactly EUT RF output level.

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2.5 Configuration of Tested System

Fig. 2-1 Conducted Setup & Radiated Setup & Conduction Setup



Table 2-1 Equipment Used in Tested System

Item	Equipment	MRF/Brand	Model/Type No.	Series No.	Version
1	Avnera Continue Power	N/A	N/A	N/A	RF Power 2020.11.4.1
2	Notebook	Lenovo	L420	S0012467	N/A
3.	Notebook	Lenovo	T470	P0001293	N/A
4.	Notebook	Lenovo	T420	S0012599	N/A

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3 SUMMARY OF TEST RESULTS

FCC Rules	IC Rules	Description Of Test	Result
§15.207(a)	RSS-Gen §8.8	AC Power Line Conducted Emission	Compliant
§15.247(b)(1)	RSS-247 §5.4 b	Peak Output Power	Compliant
§15.247(a)(1)	RSS-247 §5.1 b RSS-Gen §6.7	Emission Bandwidth	Compliant
§15.205 §15.209 §15.247(d)	RSS-247 §5.5 RSS-Gen §8.9 RSS-Gen §8.10	Conducted & Radiated Band Edge and Spurious Emission	Compliant
§15.247(a)(1)	RSS-247 §5.1 b	Frequency Separation	Compliant
§15.247(a)(1)(iii)	RSS-247 §5.1 d	Number of hopping frequency Time of Occupancy	Compliant
§15.203	N/A	Antenna Requirement	Compliant

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4 DESCRIPTION OF TEST MODES

4.1 Operated in 2400 ~ 2483.5MHz Band

79 channels are provided for Bluetooth

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

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4.2 The Worst Test Modes and Channel Details

- 1 The EUT has been tested under operating condition.
- 2 Test program used to control the EUT for staying in continuous transmitting and receiving mode is programmed.
- 3 Investigation has been done on all the possible configurations for searching the worst case.

MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION	PACKET TYPE
RADIATED EMISSION TEST (BELOW 1 GHz)				
Bluetooth	0 to 78	39	GFSK	DH5
RADIATED EMISSION TEST (ABOVE 1 GHz)				
Bluetooth	0 to 78	0,39,78	GFSK	DH5
Note: The field strength of radiation emission was measured as EUT stand-up position (H mode) and lie down position (E1, E2 mode) for channel Low, Mid and High, the worst case E2 position was reported.				

ANTENNA PORT CONDUCTED TEST				
MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION	PACKET TYPE
Peak Output Power, 20dB Band Width				
Bluetooth	0 to 78	0,39,78	GFSK	DH5
	0 to 78	0,39,78	$\pi/4$ -DQPSK	2DH5
	0 to 78	0,39,78	8-DPSK	3DH5
Band Edge				
Bluetooth	0 to 78	0,78	GFSK/8-DPSK	DH5/3DH5
Frequency Separation				
Bluetooth	0 to 78	0,1,2	GFSK	DH5
Number of hopping frequency				
Bluetooth	0 to 78	0 to 78	GFSK	DH5
Time of Occupancy(Dwell time)				
Bluetooth	0 to 78	0,39,78	GFSK	DH1/DH3/DH5
			$\pi/4$ -DQPSK	2DH1/2DH3/2DH5
			8-DPSK	3DH1/3DH3/3DH5

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5 MEASUREMENT UNCERTAINTY

Test Items	Uncertainty
AC Power Line Conducted Emission	+/- 2.34 dB
Peak Output Power	+/- 1 dB
20dB Bandwidth	+/- 1.54 Hz
100 KHz Bandwidth Of Frequency Band Edges	+/- 1.69 dB
Frequency Separation	+/- 1.54 Hz
Number of hopping frequency	+/- 1.54 Hz
Time of Occupancy	+/- 1.54 Hz
Temperature	+/- 0.4 °C
Humidity	+/- 3.5 %
DC / AC Power Source	DC= +/- 1%, AC= +/- 1%

Radiated Spurious Emission Measurement Uncertainty			
Polarization: Vertical	+/- 2.64 dB	9kHz~30MHz: +/-2.3dB	
	+/- 4.93 dB	30MHz - 1000MHz: +/- 3.37dB	
	+/- 4.81 dB	1GHz - 18GHz: +/- 4.04dB	
	+/- 4.52 dB	18GHz - 40GHz: +/- 4.04dB	
Polarization: Horizontal	+/- 2.64 dB	9kHz~30MHz: +/-2.3dB	
	+/- 4.45 dB	30MHz - 1000MHz: +/- 4.22dB	
	+/- 4.81 dB	1GHz - 18GHz: +/- 4.08dB	
	+/- 4.52 dB	18GHz - 40GHz: +/- 4.08dB	

Note:

1. This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.
2. The conformity assessment statement in this report is based solely on the test results, measurement uncertainty is excluded.

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6 CONDUCTED EMISSION TEST

6.1 Standard Applicable

Frequency within 150 kHz to 30MHz shall not exceed the limit table as below.

Frequency range MHz	Limits dB(uV)	
	Quasi-peak	Average
0.15 to 0.50	66 to 56	56 to 46
0.50 to 5	56	46
5 to 30	60	50
Note 1.The lower limit shall apply at the transition frequencies 2.The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.50 MHz.		

6.2 Measurement Equipment Used

Radiated Emission Test Site: Conduction A					
EQUIPMENT TYPE	MFR/BRAND	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
Test Software	audix	e3	Ver. 6.11-20180419c	N.C.R	N.C.R
LISN	SCHWARZBECK Mess-Elektronik	NSLK8127	973	03/25/2021	03/24/2022
EMI Test Receiver	R&S	ESCI	101342	04/28/2020	04/27/2021
Coaxial Cable	EC Lab	RF-HY-CAB-250	RF-HY-CAB-250-01	03/27/2021	03/26/2022
Pulse Limiter	EC Lab	VTSD 9561F-N	485	03/27/2021	03/26/2022

NOTE: N.C.R refers to Not Calibrated Required.

6.3 EUT Setup

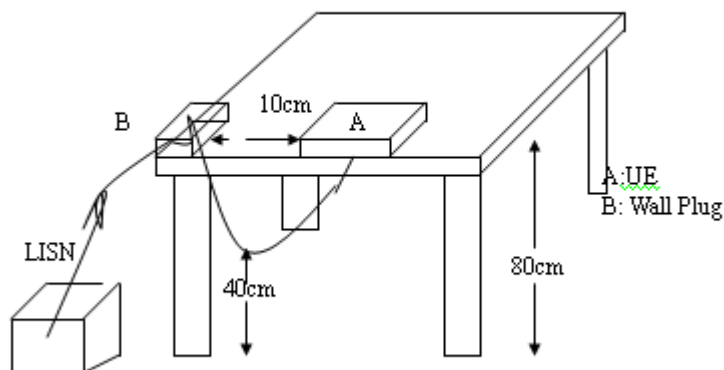
1. The conducted emission tests were performed in the test site, using the setup in accordance with the ANSI 63.10:2013.
2. The AC/DC Power adaptor of EUT was plug-in LISN. The EUT was placed flushed with the rear of the table.
3. The LISN was connected with 120Vac/60Hz power source.

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6.4 Test SET-UP (Block Diagram of Configuration)



6.5 Measurement Procedure

1. The EUT was placed on a table which is 0.8m above ground plan.
2. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
3. Repeat above procedures until all frequency measured were complete.

6.6 Measurement Result

Note: Refer to next page for measurement data and plots.

Note2: The * reveals the worst-case results that closet to the limit.

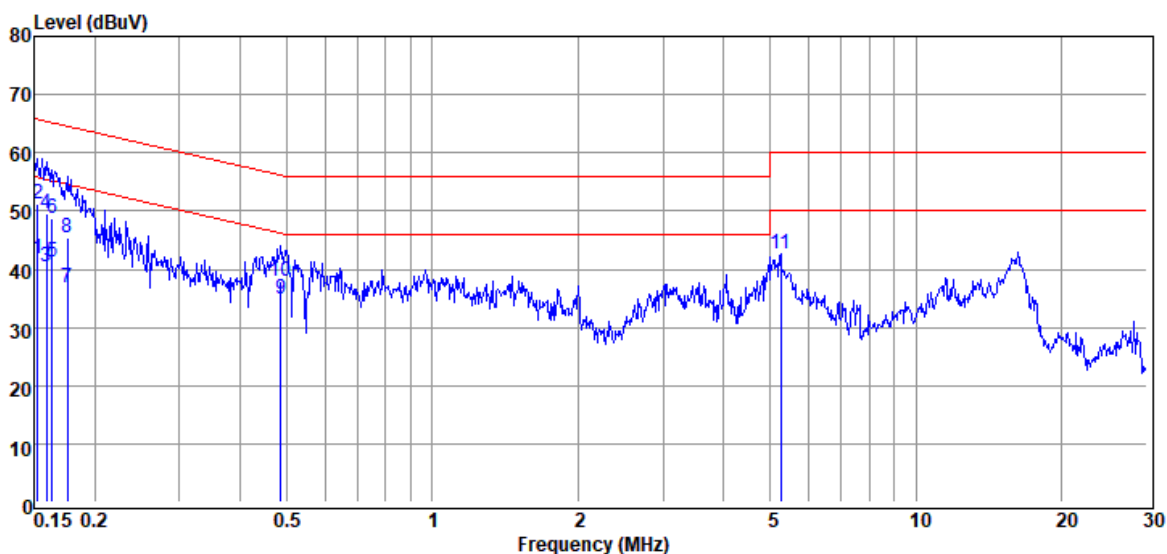
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AC POWER LINE CONDUCTED EMISSION TEST DATA

Report Number	:E2/2021/30045	Test Site	:Conduction Room C
Test Mode	:BT	Test Date	:2021-04-13
Power	:120V/60Hz	Temp./Humi.	:23.9/65
Probe	:L1	Engineer	:Ashton Chiu
Note:	: Headset		



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBuV	Factor dB	Actual FS dBuV	Limit dBuV	Margin dB
0.15	Average	31.40	10.30	41.70	55.87	-14.17
0.15	QP	40.80	10.30	51.10	65.87	-14.77
0.16	Average	30.20	10.30	40.50	55.52	-15.02
0.16	QP	39.20	10.30	49.50	65.52	-16.02
0.16	Average	30.90	10.30	41.20	55.30	-14.10
0.16	QP	38.50	10.30	48.80	65.30	-16.50
0.18	Average	26.40	10.30	36.70	54.68	-17.98
0.18	QP	35.20	10.30	45.50	64.68	-19.18
0.49	Average	24.70	10.31	35.01	46.23	-11.22
0.49	QP	27.50	10.31	37.81	56.23	-18.42
5.25	Peak	32.14	10.56	42.70	60.00	-17.30

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Report Number :E2/2021/30045

Test Site :Conduction Room C

Test Mode :BT

Test Date :2021-04-13

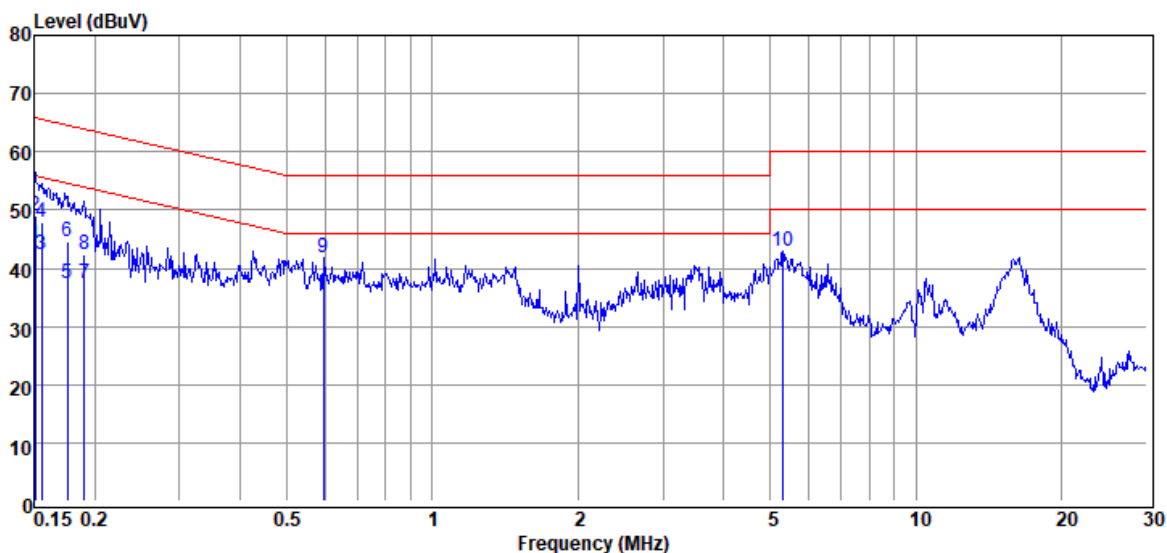
Power :120V/60Hz

Temp./Humi. :23.9/65

Probe :N

Engineer :Ashton Chiu

Note: : Headset



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dB μ V	Factor dB	Actual FS dB μ V	Limit dB μ V	Margin dB
0.15	Average	33.80	10.31	44.11	55.96	-11.85
0.15	QP	38.80	10.31	49.11	65.96	-16.85
0.16	Average	32.00	10.31	42.31	55.69	-13.38
0.16	QP	37.60	10.31	47.91	65.69	-17.78
0.18	Average	27.10	10.30	37.40	54.68	-17.28
0.18	QP	34.40	10.30	44.70	64.68	-19.98
0.19	Average	27.10	10.30	37.40	54.02	-16.62
0.19	QP	32.00	10.30	42.30	64.02	-21.72
0.59	Peak	31.40	10.33	41.73	56.00	-14.27
5.31	Peak	32.26	10.61	42.87	60.00	-17.13

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7 PEAK OUTPUT POWER MEASUREMENT

7.1 Standard Applicable

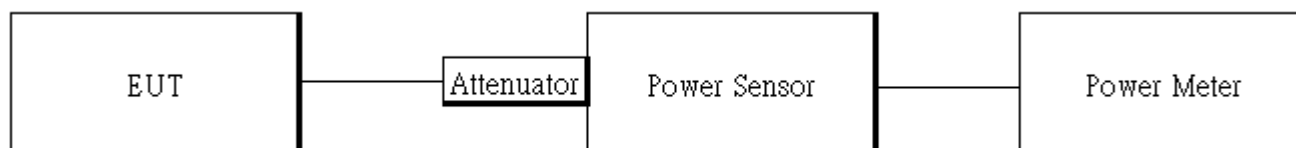
For frequency hopping systems operating in the 2400-2483.5 MHz band employing at least 75 hopping channels, The Limit: 1Watt. For all other frequency hopping systems in the 2400 – 2483.5MHz band: The Limit: 0.125 Watts. The power limit for 1Mbps is 1watt, and 2Mbps, 3Mbps and AFH mode are 0.125 watts.

The e.i.r.p. shall not exceed 4 W.

7.2 Measurement Equipment Used

Conducted Emission Test Site: Conducted C					
EQUIPMENT TYPE	MFR/BRAND	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
Power Meter	Anritsu	ML2496A	1512003	07/23/2020	07/22/2021
Power Sensor	Anritsu	MA2411B	1339378	07/23/2020	07/22/2021
Power Sensor	Anritsu	MA2411B	1339379	07/23/2020	07/22/2021
Coaxial Cables	Woken	00100A1F2A196C	RF51	11/19/2020	11/18/2021

7.3 Test Set-up:



7.4 Measurement Procedure:

1. Place the EUT on the table and set it in transmitting mode.
2. The testing follows ANSI C63.10 Measurement Guidelines.
3. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the power meter or spectrum. (Max Hold, Detector = Peak, RBW >=20dB band-width)
4. Record the max. reading.
5. Repeat above procedures until all default test channel is completed.

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7.5 Peak & Average Power Measurement Result

1M BR mode (Peak):

CH	Freq. (MHz)	Power set	Peak Output Power (dBm)	Output Power (mW)	Limit (mW)
Low	2402	250	9.35	8.610	1000
Mid	2441	250	9.87	9.705	1000
High	2480	250	9.99	9.977	1000

1M BR mode (Average):

CH	Freq. (MHz)	Power set	Max. Output include tune up tolerance Power (dBm)	Output Power (mW)	Limit (mW)
Low	2402	250	9.18	8.273	1000
Mid	2441	250	9.73	9.389	1000
High	2480	250	9.77	9.484	1000

2M EDR mode (Peak):

CH	Freq. (MHz)	Power set	Peak Output Power (dBm)	Output Power (mW)	Limit (mW)
Low	2402	250	9.22	8.356	125
Mid	2441	250	9.77	9.484	125
High	2480	250	9.89	9.750	125

2M EDR mode (Average):

CH	Freq. (MHz)	Power set	Max. Avg. Output include tune up tolerance Power (dBm)	Output Power (mW)	Limit (mW)
Low	2402	250	9.07	8.079	125
Mid	2441	250	9.52	8.962	125
High	2480	250	9.72	9.384	125

3M EDR mode (Peak):

CH	Freq. (MHz)	Power set	Peak Output Power (dBm)	Output Power (mW)	Limit (mW)
Low	2402	250	9.17	8.260	125
Mid	2441	250	9.82	9.594	125
High	2480	250	9.82	9.594	125

3M EDR mode (Average):

CH	Freq. (MHz)	Power set	Max. Avg. Output include tune up tolerance Power (dBm)	Output Power (mW)	Limit (mW)
Low	2402	250	9.08	8.098	125
Mid	2441	250	9.57	9.065	125
High	2480	250	9.76	9.471	125

NOTE: cable loss as 0.8dB that offsets in the spectrum

*Note: Max. Output include tune up tolerance Power measured by using average detector.

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7.6 EIRP Measurement Result

1M BR mode EIRP

Channel	Frequency (MHz)	Power set	Max. Output include tune up tolerance Power (dBm)	Antenna Gain (dBi)	EIRP (mW)	Limit (mW)
Low	2402	250	9.18	3.10	16.890	1000
Mid	2441	250	9.73	3.10	19.171	1000
High	2480	250	9.77	3.10	19.364	1000

2M EDR mode EIRP

Channel	Frequency (MHz)	Power set	Max. Avg. Output include tune up tolerance Power (dBm)	Antenna Gain (dBi)	EIRP (mW)	Limit (mW)
Low	2402	250	9.07	3.10	16.496	4000
Mid	2441	250	9.52	3.10	18.297	4000
High	2480	250	9.72	3.10	19.159	4000

3M EDR mode EIRP

Channel	Frequency (MHz)	Power set	Max. Avg. Output include tune up tolerance Power (dBm)	Antenna Gain (dBi)	EIRP (mW)	Limit (mW)
Low	2402	250	9.08	3.10	16.534	4000
Mid	2441	250	9.57	3.10	18.509	4000
High	2480	250	9.76	3.10	19.337	4000

* **Note:** EIRP = Average Power + Gain

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8 EMISSION BANDWIDTH MEASUREMENT

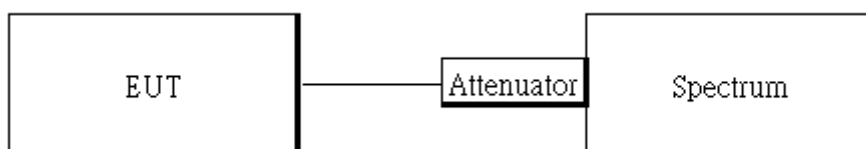
8.1 Standard Applicable

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

8.2 Measurement Equipment Used

Conducted Emission Test Site: Conducted C					
EQUIPMENT TYPE	MFR/BRAND	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
Spectrum Analyzer	KEYSIGHT	N9010A	MY51440113	07/23/2020	07/22/2021
DC Block	PASTERNAK	PE8210	RF152	11/19/2020	11/18/2021
Coaxial Cables	Woken	00100A1F2A196C	RF51	11/19/2020	11/18/2021

8.3 Test Set-up



8.4 Measurement Procedure

1. Place the EUT on the table and set it in transmitting mode.
2. The testing follows ANSI C63.10:2013.
3. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.
4. Set the spectrum analyzer as
 RBW= 1 % to 5% of OBW ,
 VBW = 3 X RBW,
 Span= 2 to 5 times of the OBW,
 Sweep=auto,
 Detector = Peak, and Max hold for 20dB Bandwidth test.
5. Mark the peak frequency and -20dB (upper and lower) frequency
6. Set the spectrum analyzer as
 RBW= 1 % to 5% of 99% Bandwidth ,
 VBW $\geq$ 3 X RBW,
 Span= large enough to capture all products of the modulation process,
 Sweep=auto,
 Detector = Peak, and Max hold for 99% Bandwidth test.
7. Mark the peak frequency and 99%dB (upper and lower) frequency
8. Repeat above procedures until all test default channel is completed

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8.5 20dB Bandwidth

99% Bandwidth

GFSK

CH	20 dB BW (MHz)	2/3 BW (MHz)
Low	0.9288	0.62
Mid	0.9245	0.62
High	0.9243	0.62

$\pi/4$ -DQPSK

CH	20 dB BW (MHz)	2/3 BW (MHz)
Low	1.330	0.89
Mid	1.324	0.88
High	1.324	0.88

8-DPSK

CH	20 dB BW (MHz)	2/3 BW (MHz)
Low	1.316	0.88
Mid	1.318	0.88
High	1.328	0.89

GFSK

CH	99% BW (MHz)
Low	0.86661
Mid	0.86297
High	0.85929

$\pi/4$ -DQPSK

CH	99% BW (MHz)
Low	1.1915
Mid	1.1981
High	1.1917

8-DPSK

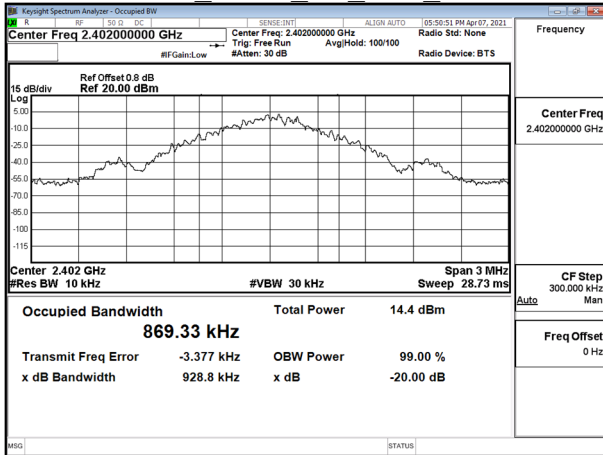
CH	99% BW (MHz)
Low	1.1909
Mid	1.1903
High	1.1896

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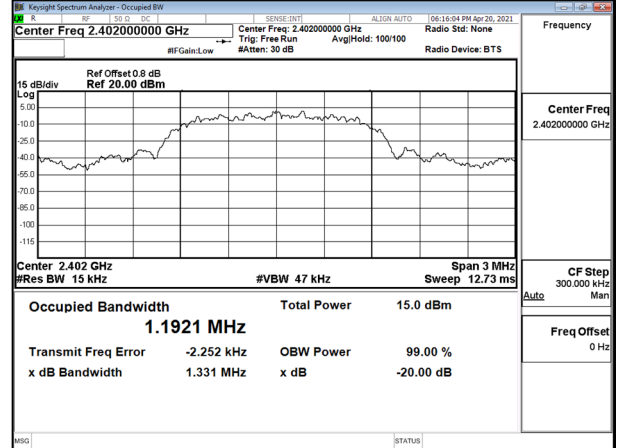
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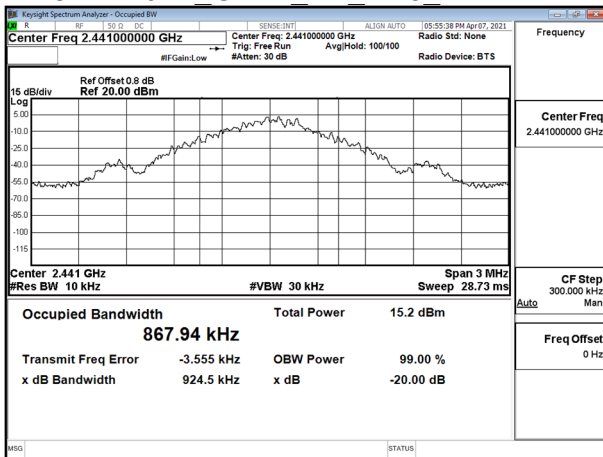
OBW 20dB GFSK 1M DH5 2402MHz



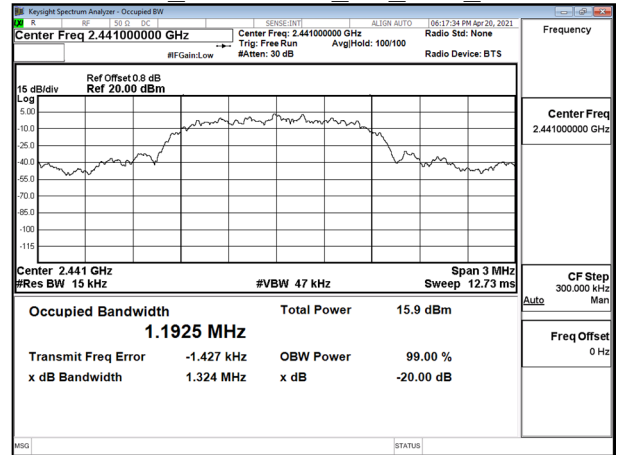
OBW 20dB $\pi/4$ DQPSK 2M DH5 2402MHz



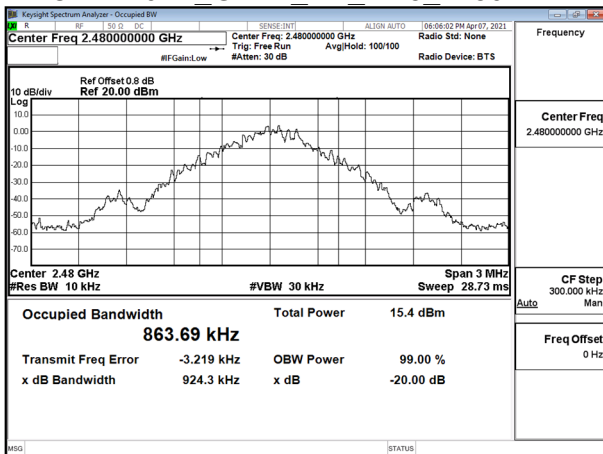
OBW 20dB GFSK 1M DH5 2441MHz



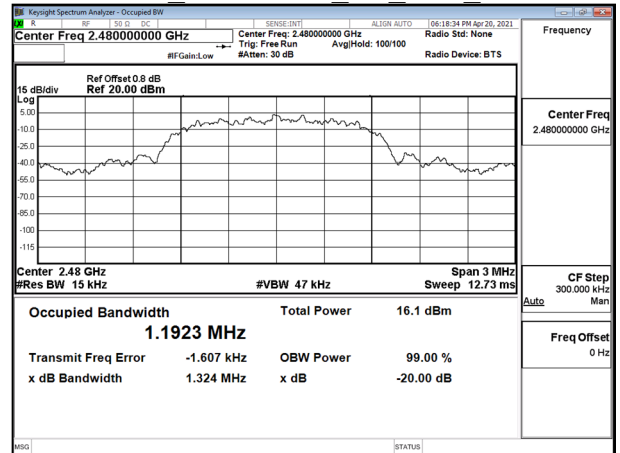
OBW 20dB $\pi/4$ DQPSK 2M DH5 2441MHz



OBW 20dB GFSK 1M DH5 2480MHz



OBW 20dB $\pi/4$ DQPSK 2M DH5 2480MHz

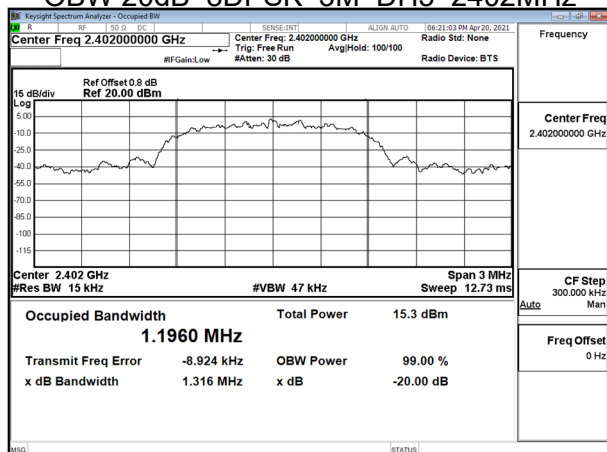


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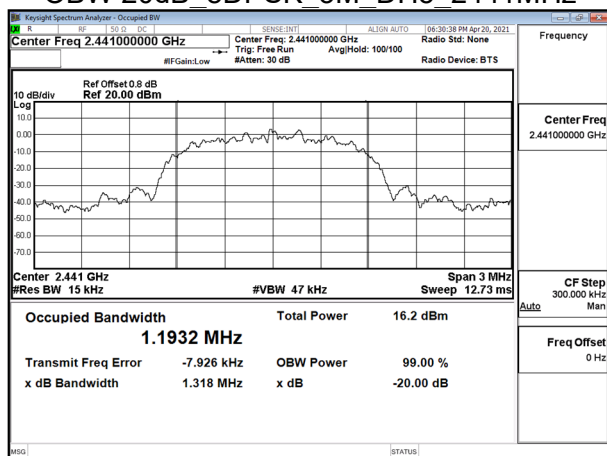
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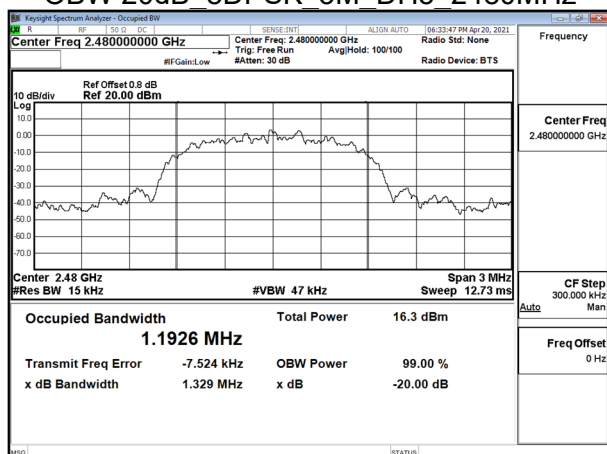
OBW 20dB 8DPSK 3M DH5 2402MHz



OBW 20dB 8DPSK 3M DH5 2441MHz



OBW 20dB 8DPSK 3M DH5 2480MHz

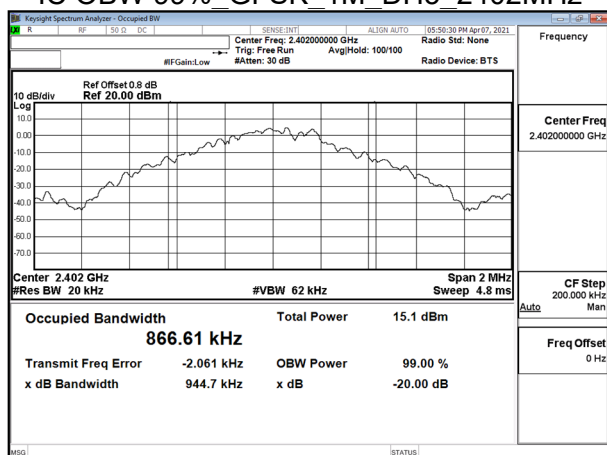


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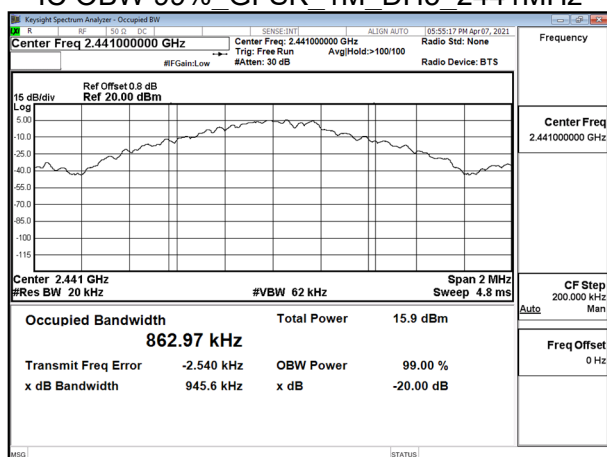
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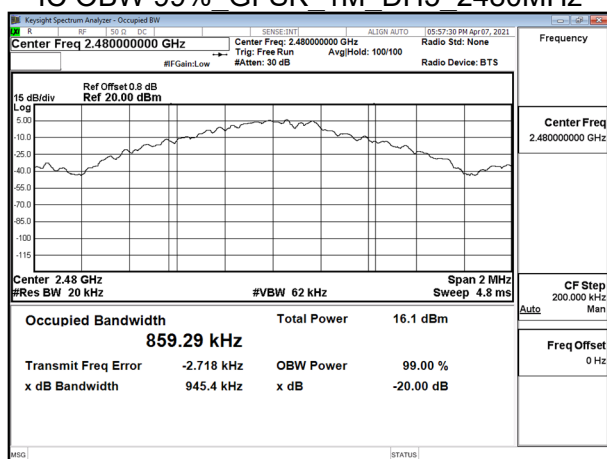
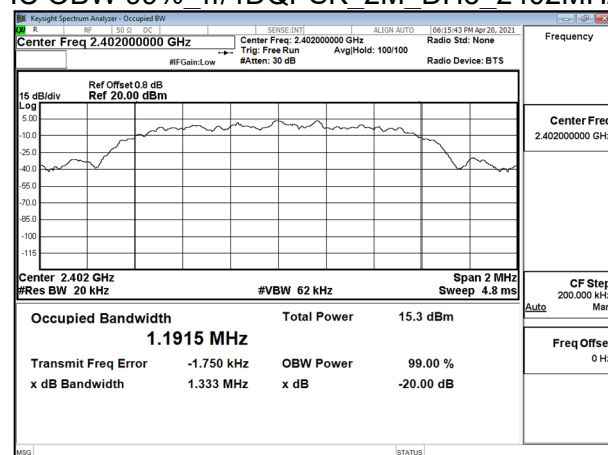
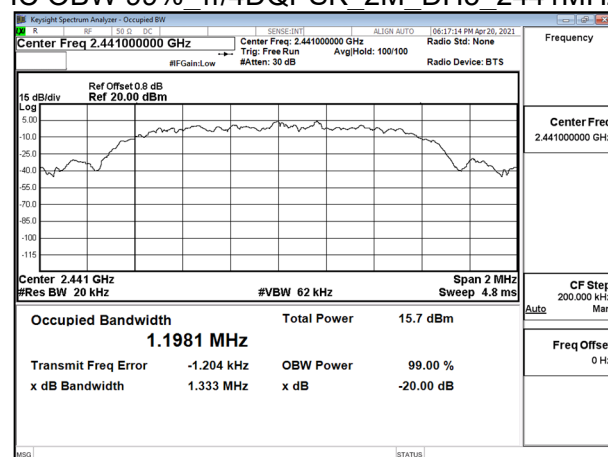
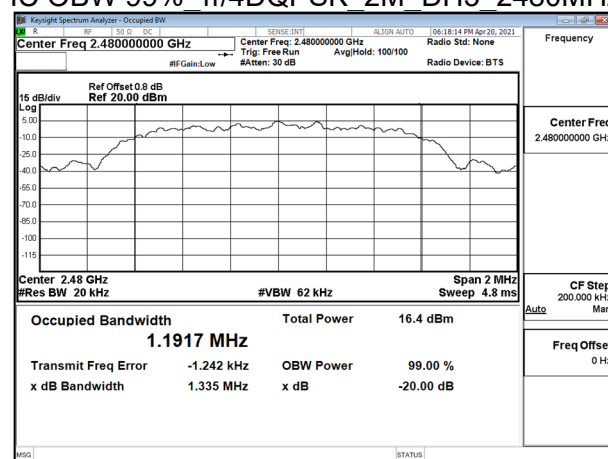
IC OBW 99% GFSK 1M DH5 2402MHz



IC OBW 99% GFSK 1M DH5 2441MHz



IC OBW 99% GFSK 1M DH5 2480MHz

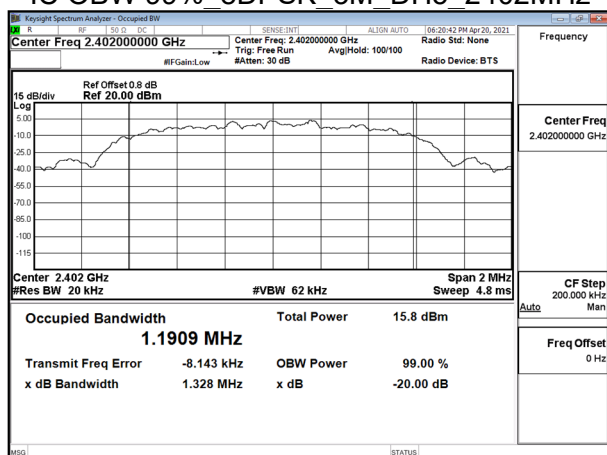

IC OBW 99% π /4DQPSK 2M DH5 2402MHz

IC OBW 99% π /4DQPSK 2M DH5 2441MHz

IC OBW 99% π /4DQPSK 2M DH5 2480MHz


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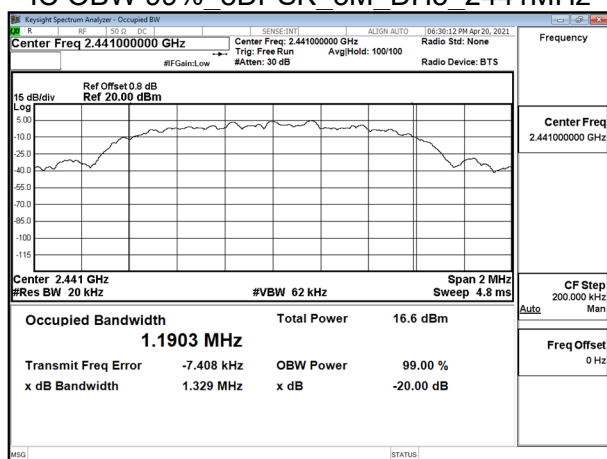
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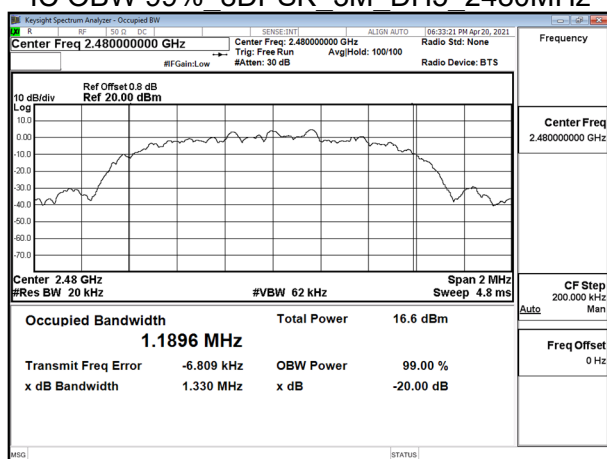
IC OBW 99% 8DPSK 3M DH5 2402MHz



IC OBW 99% 8DPSK 3M DH5 2441MHz



IC OBW 99% 8DPSK 3M DH5 2480MHz



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9 CONDUCTED BAND EDGES AND SPURIOUS EMISSION MEASUREMENT

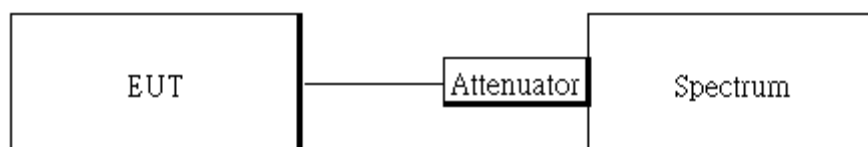
9.1 Standard Applicable

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. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a) & RSS-Gen §8.10, must also comply with the radiated emission limits specified in §15.209(a) & RSS-Gen §8.9.

9.2 Measurement Equipment Used

Conducted Emission Test Site: Conducted C					
EQUIPMENT TYPE	MFR/BRAND	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
Spectrum Analyzer	KEYSIGHT	N9010A	MY51440113	07/23/2020	07/22/2021
DC Block	PASTERNAK	PE8210	RF152	11/19/2020	11/18/2021
Coaxial Cables	Woken	00100A1F2A196C	RF51	11/19/2020	11/18/2021

9.3 Test SET-UP



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9.4 Measurement Procedure

9.4.1 Conducted Band Edge:

1. Place the EUT on the table and set it in transmitting mode.
2. The testing follows ANSI C63.10:2013.
3. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.
4. Set center frequency of spectrum analyzer = operating frequency.
5. Set the spectrum analyzer as RBW=100 kHz, VBW=300 kHz, Sweep = auto
6. Mark Peak, 2.3999GHz and 2.4836GHz and record the max. level.
7. Repeat above procedures until all frequency measured were complete.

9.4.2 Conducted Spurious Emission:

1. To connect Antenna Port of EUT to Spectrum.
2. The testing follows ANSI C63.10:2013.
3. Set RBW = 100 kHz & VBW = 300 kHz, Detector =Peak, Sweep = Auto
4. Allow trace to fully stabilize.
5. Use the peak marker function to determine the maximum power level in any 100 kHz band segment within the fundamental EBW.
6. Repeat above procedures until all default test channel measured were complete.

9.5 Measurement Result

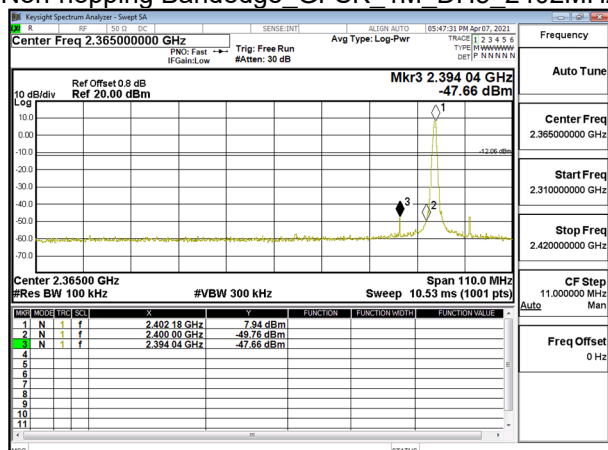
See next page for test plots.

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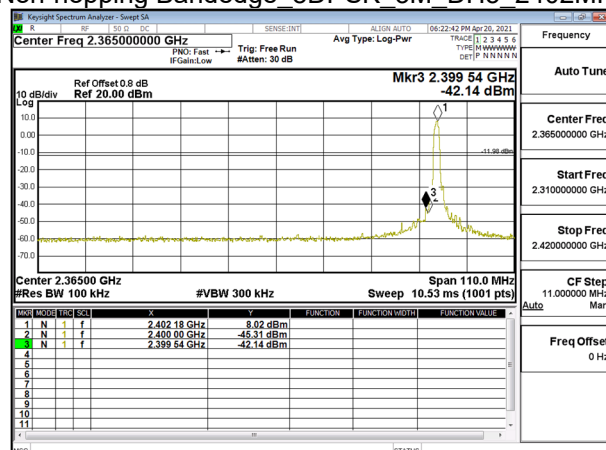
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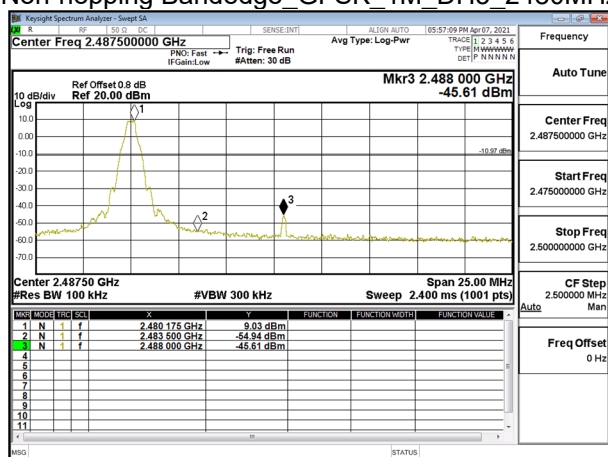
Non-hopping Bandedge GFSK 1M DH5 2402MHz



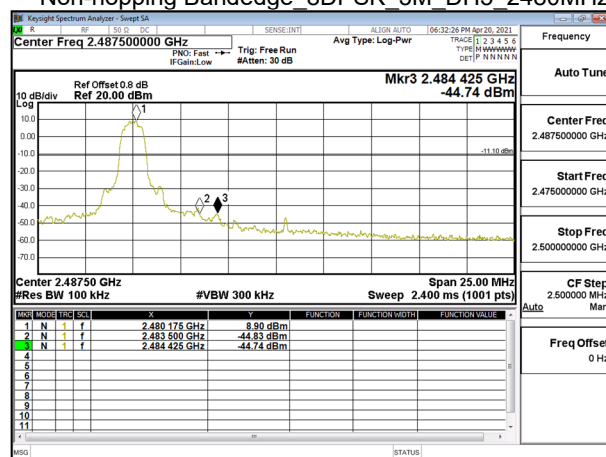
Non-hopping Bandedge 8DPSK 3M DH5 2402MHz



Non-hopping Bandedge GFSK 1M DH5 2480MHz



Non-hopping Bandedge 8DPSK 3M DH5 2480MHz

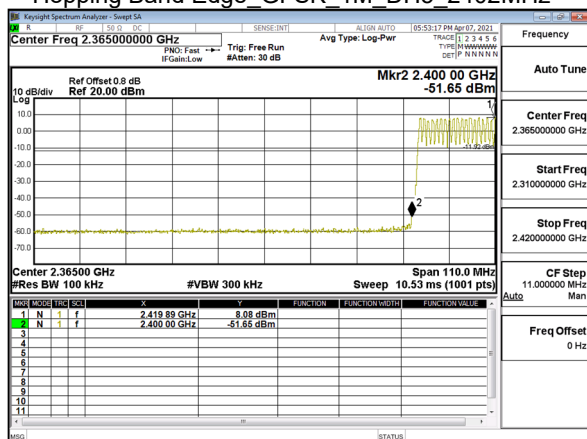


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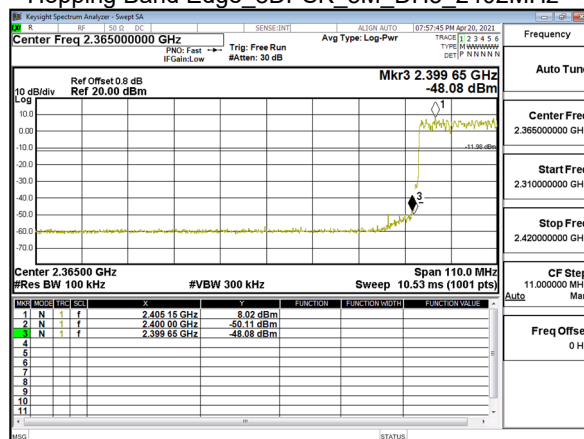
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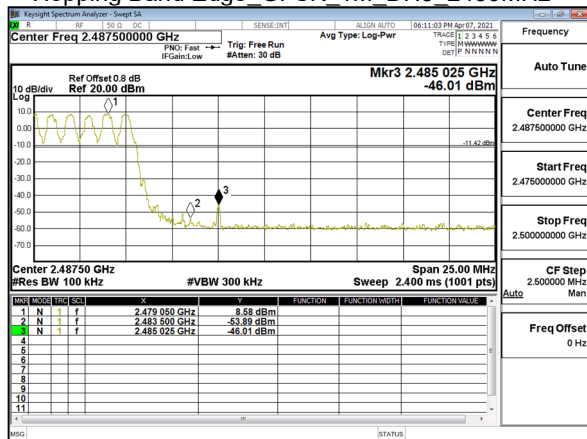
Hopping Band Edge_GFSK_1M_DH5_2402MHz



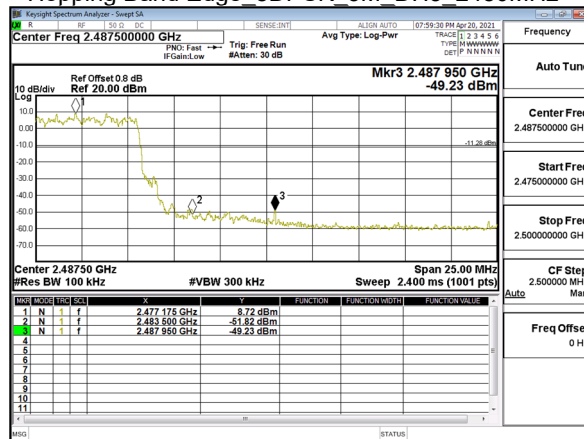
Hopping Band Edge_8DPSK_3M_DH5_2402MHz



Hopping Band Edge_GFSK_1M_DH5_2480MHz



Hopping Band Edge_8DPSK_3M_DH5_2480MHz

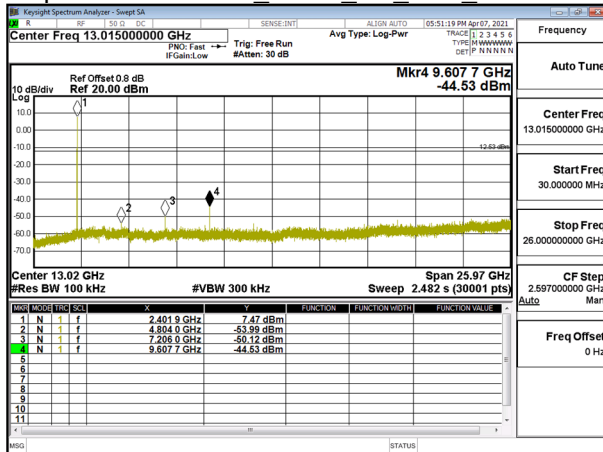


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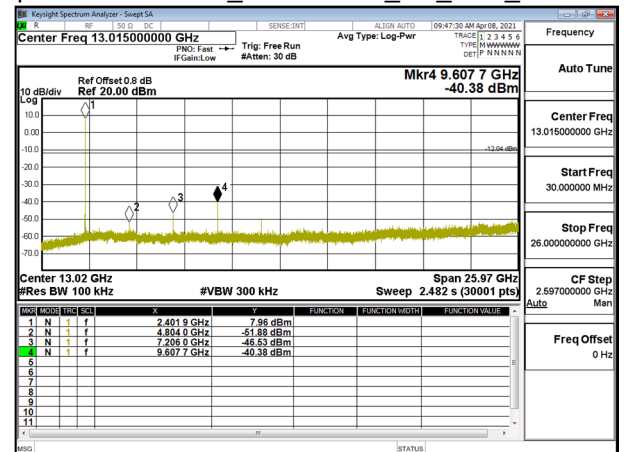
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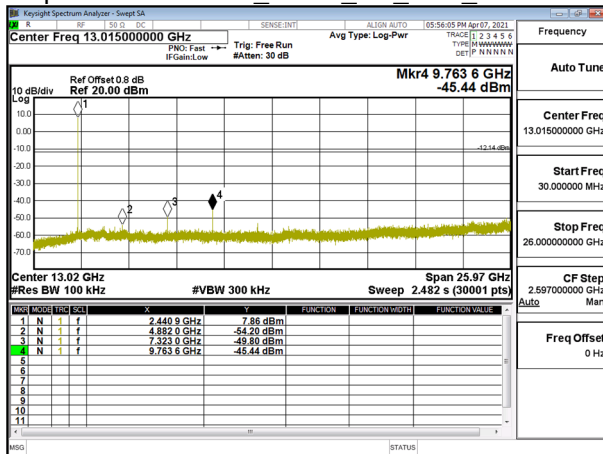
Spurious Emission_GFSK_1M_DH5_2402MHz



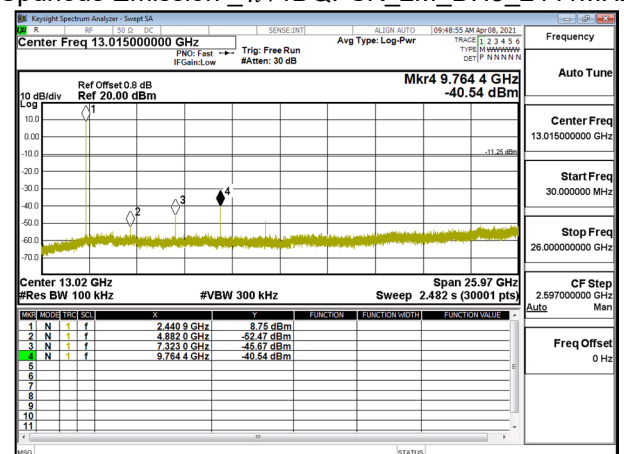
Spurious Emission_π/4DQPSK_2M_DH5_2402MHz



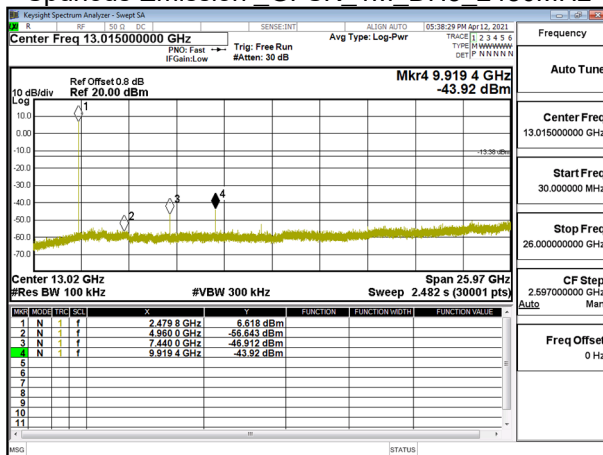
Spurious Emission_GFSK_1M_DH5_2441MHz



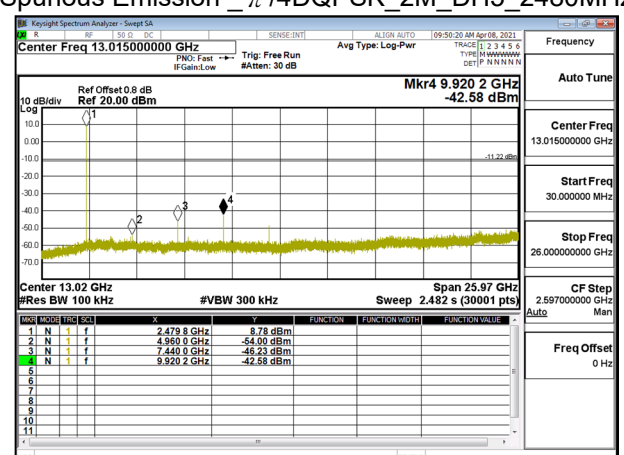
Spurious Emission_π/4DQPSK_2M_DH5_2441MHz



Spurious Emission_GFSK_1M_DH5_2480MHz



Spurious Emission_π/4DQPSK_2M_DH5_2480MHz



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