

# 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/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, ISED 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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#### **GENERAL INFORMATION** 1

#### 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 + π/4DQPSK + 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

#### **Test Facility** 1.5

Laboratory	Test Site Address	Test Site Name	FCC Designa- tion number	IC CAB identifier
		SAC 1		
		SAC 3		
		Conduction 1		
	No.134, Wu Kung Road, New Taipei	Conducted 1		
	Industrial Park, Wuku District, New	Conducted 2	TW0027	
	Taipei City, Taiwan.	Conducted 3		
		Conducted 4		
		Conducted 5		
SGS Taiwan Ltd.		Conducted 6		
Central RF Lab.		Conduction A	TW0028	TW3702
		SAC C		
(TAF code 3702)		SAC D		
		SAC G		
	No.2, Keji 1st Rd., Guishan District, Taoyuan City, Taiwan 333	Conducted A		
		Conducted B		
	labydan Oky, laiwan 555	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 a 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 a 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

ltem	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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#### SUMMARY OF TEST RESULTS 3

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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#### **DESCRIPTION OF TEST MODES** 4

#### 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.
- Investigation has been done on all the possible configurations for searching the worst case. 3

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		
<b>Note:</b> 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.						

ANTNNA PORT CONDUCTED TEST							
MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION	PACKET TYPE			
	Peak Output Power, 20dB Band Width						
	0 to 78	0,39,78	GFSK	DH5			
Bluetooth	0 to 78	0,39,78	π/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			
	I	Frequency Separa	tion				
Bluetooth	0 to 78	0,1,2	GFSK	DH5			
	Num	ber of hopping fre	equency				
Bluetooth	0 to 78	0 to 78	GFSK	DH5			
	Time of Occupancy(Dwell time)						
			GFSK	DH1/DH3/DH5			
Bluetooth	0 to 78	0,39,78	π/4-DQPSK	2DH1/2DH3/2DH5			
			8-DPSK	3DH1/3DH3/3DH5			

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#### **MEASUREMENT UNCERTAINTY** 5

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		
	+/-	2.64	dB	9kHz~30MHz: +-2.3dB		
Polarization: Horizontal	+/-	4.45	dB	30MHz - 1000MHz: +/- 4.22dB		
Polarization. norizontai	+/-	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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#### CONDUCTED EMISSION TEST 6

#### 6.1 **Standard Applicable**

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

Frequency range	Limits dB(uV)			
MHz	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	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**

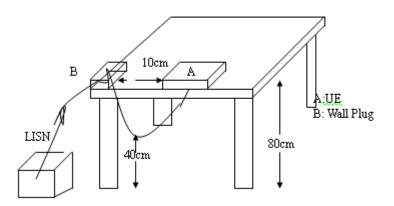
- 1. The conducted emission tests were performed in the test site, using the setup in accordance with the ANSI 63.10:2013.
- 2. The AC/DC Power adaptor of EUT was plug-in LISN. The EUT was placed flushed with the rear of the table.
- 3. The LISN was connected with 120Vac/60Hz power source.

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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.

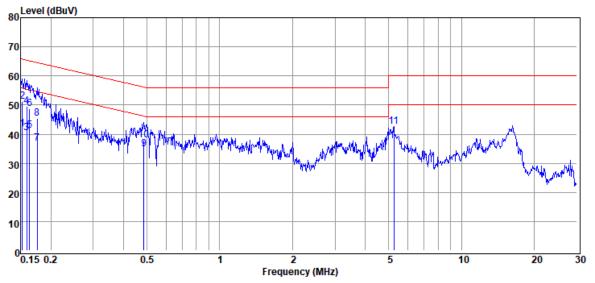
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## AC POWER LINE CONDUCTED EMISSION TEST DATA

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.	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit	Margin
MHz	PK/QP/AV	dBµV	dB	dBµV	dBµV	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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0.59

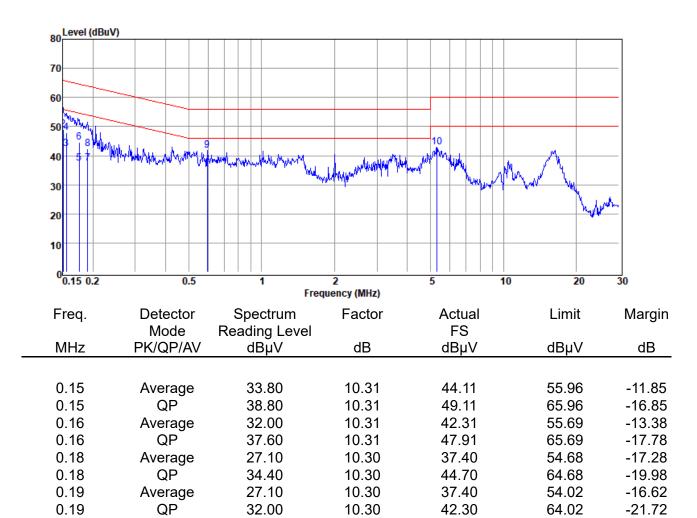
5.31

Peak

Peak

Report Number	:E2/2021/30045	Test Site
Test Mode	:BT	Test Date
Power	:120V/60Hz	Temp./Hu
Probe	:N	Engineer
Note:	: Headset	

Test Site	:Conduction Room C
Test Date	:2021-04-13
Temp./Humi.	:23.9/65
Engineer	:Ashton Chiu



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31.40

32.26

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10.33

10.61

41.73

42.87

56.00

60.00

-14.27

-17.13



## 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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#### Peak & Average Power Measurement Result 7.5

1M BR mode (Peak):

СН	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

#### 2M EDR mode (Peak):

СН	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

#### 3M EDR mode (Peak):

СН	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

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

1M BR mode (Average):

hi Br houe (Average).					
СН	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 (Average):

СН	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 (Average):

СН	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: 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

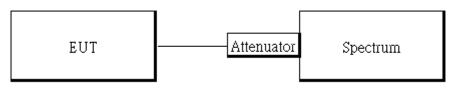
## 8.1 Standard Applicable

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	PASTERNACK	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 ≥ 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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## Report No.: E2/2021/30045 Page: 21 of 71

#### 8.5 20dB Bandwidth

### **GFSK**

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

### π/4-DQPSK

СН	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

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

99% Bandwidth

GFSK			
СН	99% BW		
Сп	(MHz)		
Low	0.86661		
Mid	0.86297		
High	0.85929		
π/4-DQPSK			
	99% BW		
<b>C</b> U	33/0 DVV		
СН	99% ВW (MHz)		
CH Low			
	(MHz)		
Low	<b>(MHz)</b> 1.1915		
Low Mid	<b>(MHz)</b> 1.1915 1.1981		
Low Mid High	<b>(MHz)</b> 1.1915 1.1981		

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

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## Report No.: E2/2021/30045 Page: 22 of 71

### OBW 20dB GFSK 1M DH5 2402MHz

Keysight Spectri	um Analyzer - Occupied E	W									-   # 🔣
X R Center Fre	RF 50 Ω DC q 2.40200000	0 GHz		ENSE:INT Freg: 2.4020	00000		ALIGN AUTO	05:50:51 P	M Apr 07, 2021	Fre	quency
		#IFGain:Low	Trig: Free Ru			Avg Hold: 100/100			vice: BTS		
15 dB/div	Ref Offset 0.8 di Ref 20.00 dB										
- <b>og</b> 5.00				000.04						С	enter Fre
25.0		and a	Jan Will	mm	m	m				2.402	000000 Gł
0.0	man.	Jan 1				-	wy	m			
5.0 mm					-		~	1 °~~			
0.0 5.0					+						
100											
115					-						
enter 2.40 Res BW 1			#V	BW 30 k	Hz				an 3 MHz 28.73 ms		CF Ste 300.000 kl
Occupi	ed Bandwid	th		Total F	owe	r	14.4	dBm		<u>Auto</u>	M
	8	869.33 k	Hz							F	req Offs
Transmi	it Freq Error	-3.377	kHz	OBW F	owe	r	99	.00 %			01
x dB Bar	ndwidth	928.8	kHz	x dB			-20.	00 dB			
G							STATU	3			

### OBW 20dB GFSK 1M DH5 2441MHz



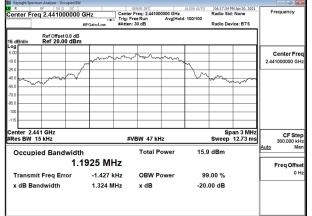
### OBW 20dB GFSK 1M DH5 2480MHz

Keysight Spectr	rum Analyzer - Oco											- # <b>X</b>
Center Fre	RF 50 Ω		lz	Center F	NSE:INT req: 2.48000	00000	GHz	ALIGN AUTO	Radio Std	M Apr 07, 2021 None	F	requency
				#Atten: 3		Av	g Hold:	100/100	Radio Dev	vice: BTS		
10 dB/div	Ref Offset Ref 20.0											
10.0												Center Fred
-10.0				m	LAN Y	1					2.48	0000000 GH2
-20.0		1	when			1VV	m	N.				
-30.0	m	n particul						Min 1	why			
50.0 60.0 Norral	hamed	v √				-		\$~^\	- ~~	mm		
-70.0	_											
Center 2.4 Res BW 1				#VI	3W 30 kH	-lz				an 3 MHz 28.73 ms		CF Stej 300.000 kH
Occupi	ied Band	width			Total P	owe	r	15.4	dBm		<u>Auto</u>	Mar
		8 <b>6</b> 3	.69 k	Hz								Freq Offse
Transmi	it Freq Err	or	-3.219	kHz	OBW P	owe	r	99	.00 %			0 H
x dB Ba	ndwidth		924.3	kHz	x dB			-20.	00 dB			
ISG								STATUS				

### OBW 20dB π/4DQPSK 2M DH5 2402MHz

	rum Analyzer - Occupied BW						- Ø E
N R	RF 50 Ω DC		SENSE:INT Center Freq: 2.40200	ALIGN AU	TO 06:16:04 P Radio Std	PM Apr 20, 2021	Frequency
	q 2.402000000		Trig: Free Run #Atten: 30 dB	Avg Hold: 100/10			
15 dB/div	Ref Offset 0.8 dB Ref 20.00 dBm	L.,					
5.00			-2 10- 0	-	_		Center Fre
-10.0		mon	ship me wa	m			2.402000000 GH
25.0		e			mm		
55.0	~v~ ~			-	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	mar and	
70.0							
85.0							
-100							
						oan 3 MHz	
Center 2.402 GHz #Res BW 15 kHz			#VBW 47 kHz			12.73 ms	CF Ste 300.000 ki
Occupi	ed Bandwidt	h	Total P	ower 1	5.0 dBm		<u>Auto</u> Ma
	1.1	1921 MH	z				Freq Offs
Transmi	it Freq Error	-2.252 kH	z OBW P	ower	99.00 %		01
x dB Ba	ndwidth	1.331 MH	z xdB	-	20.00 dB		
100				07	ATLE		

### OBW 20dB π/4DQPSK 2M DH5 2441MHz



### OBW 20dB m/4DQPSK 2M DH5 2480MHz

rum Analyzer - Occupied BW				01/10/24 00		
		er Freg: 2.4800000	00 GHz			Frequency
•	Trig:		Avg Hold: 100/100	Radio Devid	e: BTS	
D. COT. 100.10						
Ref 20.00 dBm						
						Center Fre
	m	m	m			2.480000000 Gi
	<i>/</i> ~'		~			2.40000000 61
m				V.n.		
~~~				1 · · ·	www.	
8 GHZ I5 kHz	#	VBW 47 kHz				CF Ste 300.000 ki
						Auto Mi
		Total Pov	ver 16	.1 dBm		
1.1	923 MHz					Freq Offs
it Freq Error	-1.607 kHz	OBW Pov	ver 9	9.00 %		0
ndwidth	1.324 MHz	x dB	-20	0.00 dB	ľ	
			_			
			STAT	us		
	Ref Offset 0.8 dB Ref Offset 0.8 dB Ref 20.00 dBm s GHz s GHz s KHz ed Bandwidth 1.1	Ref Offset 02 dB     Center       Ref 20.00 dBm     Artis       Ref 20.00 dBm     Artis       S GHz     5 KHz       S GHz     5 KHz       ed Bandwidth     1.1923 MHz       t Freq Error     -1.607 kHz	P     BOD BC     Lessenant       g2.4800000000000     HE     Lessenant       #FGalcLow     #Red 2.480000000     HE       Ref Officet 0.8 dB     #Ref 20.00 dBm     HE       Ref 20.00 dBm     HE     HE       S GHz     #VBW 47 kHz     WW 47 kHz       ed Bandwidth     Total Pov     1.1923 MHz       t Freq Error     -1.607 kHz     OBW Pov	By a do C     Sector     Adda and and and and and and and and and	Ref Offset 0.8 dB Ref 0.0 dB/m Ref 0.0 dB/m Ref 20.00 dB/m	BY 190 DC 100 LBC <t< td=""></t<>

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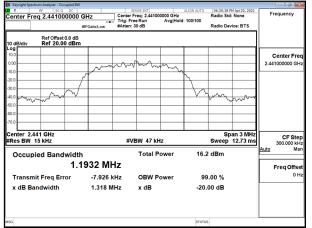
	SGS	Taiwan Ltd.	No.134,Wu Ku	ng Road, New Taipei Industrial Park, Wuku District, New Taipei City,	Taiwan/新北市五股區新北產業園區五工路 134 號
台灣檢驗科技股份有限公	司	t (886-2) 2	2299-3279	f (886-2) 2298-0488	www.sgs.com.tw
					Manahan of COC Onesian



### OBW 20dB 8DPSK 3M DH5 2402MHz

	rum Analyzer - Occupied B	w							
Center Fre	RF 50 Ω DC eq 2.402000000	) GHz	Center F			ALIGN AUTO	Radio Sto		Frequency
15 dB/div	Ref Offset 0.8 dE Ref 20.00 dBr	3	#74401.4				Rudio De		
-og 5.00 10.0				m	m.				Center Free 2.402000000 GH:
25.0		Æ							2.40200000 GH
i0.0		-					-	~~~~	
15.0									
100									
enter 2.4 Res BW 1			#VI	BW 47 kH	Iz			an 3 MHz 12.73 ms	CF Ster 300.000 kH
Occupi	ied Bandwid	th		Total P	ower	15.3	8 dBm		<u>Auto</u> Ma
	1.	1960 M	Hz						Freq Offse
Transmi	it Freq Error	-8.924	kHz	OBW P	ower	99	.00 %		0 H
x dB Ba	ndwidth	1.316	٨Hz	x dB		-20.	00 dB		
sg						STATU	3		

#### OBW 20dB 8DPSK 3M DH5 2441MHz



### OBW 20dB 8DPSK 3M DH5 2480MHz

Keysight Spectr	um Analyzer - Oco RF 50 Ω				NSE:INT		ALIGN AUTO				08
Center Fre				Center F	reg: 2.48000	0000 GHz		Radio Std	M Apr 20, 2021 : None	Fr	equency
		#IF	Gain:Low	#Atten: 3		Avg Hold	1: 100/100	Radio Dev	rice: BTS		
10 dB/div	Ref Offset Ref 20.0										
10.0											Center Freq
0.00			~ ~~~	ww	m	m					0000000 GHz
-10.0		~	~~			1.000	<u></u>				
-20.0		/					1				
-40.0	m	$\sim$						m	A		
-50.0	w							۷ ک	m.v.		
-60.0							<u> </u>				
-70.0							<u> </u>				
Center 2.44 #Res BW 1				#VE	3W 47 kH	łz			an 3 MHz 12.73 ms		CF Step 300.000 kHz
Occupi	ed Band	width			Total P	ower	16.3	dBm		Auto	Mar
		1.19	26 MI	Ηz							Freq Offset
Transmi	it Freg Err	or	-7.524	kHz	OBW P	ower	99	.00 %			0 Ha
x dB Ba	ndwidth		1.329 N	IHz	x dB		-20.	00 dB			
MSG							STATUS				
_											

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	565	Taiwan Ltd.	NO.134,Wu Ki	ung Road, New Taipei Industrial Park, Wuku District, New Taipei City,	Taiwan/新北市五股區新北產業園區五工路 134 號
台灣檢驗科技股份有限。	公司	t (886-2)	2299-3279	f (886-2) 2298-0488	www.sgs.com.tw
_					Member of SGS Group



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### IC OBW 99% GFSK 1M DH5 2402MHz

10 0011	0070		<u> </u>				-	
R     RF     50 Ω     DC	BW	SEI	NSE:INT		ALIGN AUTO	05:50:30	PM Apr 07, 2021	Frequency
		Trig: Free	eq: 2.40200 Run	0000 GHz Avg Hold:	100/100	Radio St		Frequency
	#IFGain:Low	#Atten: 3	0 dB			Radio D	evice: BTS	-l
Ref Offset 0.8 d dB/div Ref 20.00 dB								
og					1			1
0.0		~~~						Center
0.0		n -	- ~~	~~				2.402000000
0.0	AT T			$-\infty$	the second			
					. \	2.		
						1	$\sim$	
0.0								
0.0								
0.0								
enter 2.402 GHz							pan 2 MHz	
Res BW 20 kHz		#VB	SW 62 kH	z		Swe	ep 4.8 ms	200.000
Occupied Bandwid	ith		Total P	ower	15.1	dBm		Auto
8	866.61 kH	Ηz						Freq Of
Transmit Freg Error	-2.061 k	KHz	OBW P	ower	99	.00 %		
x dB Bandwidth	944.7 k		x dB			00 dB		
a					STATUS	8		
a	0.00/			11/			044	
IC OBW		GF	SK_	1M			244	1MHz
a IC OBW Keysght Spectrum Analyzer - Occupied		-	SK_		_DH	15_		
a IC OBW Krysight Spectrum Analyzer - Occupied R PF 50 Q. DC	BM	SEM	VSE:INT eg: 2.44100	0000 GHz	DH ALIGN AUTO	15_	PM Apr 07, 2021	1MHz
a IC OBW Krysight Spectrum Analyzer - Occupied R PF 50 Q. DC	BM	SET	vse:INT  req: 2.44100 e Run		DH ALIGN AUTO	15 05:55:17 Radio St	PM Apr 07, 2021	
TC OBW	BW 10 GHz #IFGain:Low	SEP Center Fr Trig: Free	vse:INT  req: 2.44100 e Run	0000 GHz	DH ALIGN AUTO	15 05:55:17 Radio St	PM Apr 07, 2021 td: None	
IC OBW Registres Males Douget Registres Males Douget enter Freq 2.44100000 Ref 20.00 dB Ref 20.00 dB	BW 10 GHz #IFGain:Low	SEP Center Fr Trig: Free	vse:INT  req: 2.44100 e Run	0000 GHz	DH ALIGN AUTO	15 05:55:17 Radio St	PM Apr 07, 2021 td: None	Frequency
COBBW  Forget Sector Address Portuget Po	BW 10 GHz #IFGain:Low	SEP Center Fr Trig: Free	vse:INT  req: 2.44100 e Run	0000 GHz	DH ALIGN AUTO	15 05:55:17 Radio St	PM Apr 07, 2021 td: None	Frequency Center F
IC OBW Tende Sea 200 enter Freq 2.44100000 Ref 20.00 dB dBlolv Ref 20.00 dB	BW 10 GHz #IFGain:Low	SEP Center Fr Trig: Free	vse:INT  req: 2.44100 e Run	0000 GHz	DH ALIGN AUTO	15 05:55:17 Radio St	PM Apr 07, 2021 td: None	Frequency
a Teoret Seaton Adam Porent Seaton Seaton Porent Sector Sector Seaton Porent Sector Sector Seaton Porent Sector Sector Sec	BW 10 GHz #IFGain:Low	SEP Center Fr Trig: Free	vse:INT  req: 2.44100 e Run	0000 GHz	DH ALIGN AUTO	15 05:55:17 Radio St	PM Apr 07, 2021 td: None	Frequency Center F
Construction Nature Coqued Terging State Nature Coqued Nature State Nature Coqued Nature State Nature Coqued Nature State Nature S	BW 10 GHz #IFGain:Low	SEP Center Fr Trig: Free	vse:INT  req: 2.44100 e Run	0000 GHz	DH ALIGN AUTO	15 05:55:17 Radio St	PM Apr 07, 2021 td: None	Frequency Center F
CODE CODE CODE CODE CODE CODE CODE CODE	BW 10 GHz #IFGain:Low	SEP Center Fr Trig: Free	vse:INT  req: 2.44100 e Run	0000 GHz	DH ALIGN AUTO	15 05:55:17 Radio St	PM Apr 07, 2021 td: None	Frequency Center F
IC OBW Togal Status Advance - Degade Togal Status Advance - Degade Togal Status - Degade Togal Status Ref Offset 0.8 d Ref 20.00 dB	BW 10 GHz #IFGain:Low	SEP Center Fr Trig: Free	vse:INT  req: 2.44100 e Run	0000 GHz	DH ALIGN AUTO	15 05:55:17 Radio St	PM Apr 07, 2021 td: None	Frequency Center F
a Teorget Rest 20 and 10 and	BW 10 GHz #IFGain:Low	SEP Center Fr Trig: Free	vse:INT  req: 2.44100 e Run	0000 GHz	DH ALIGN AUTO	15 05:55:17 Radio St	PM Apr 07, 2021 td: None	Frequency Center F
IC OBW Teople Teop	BW 10 GHz #IFGain:Low	SEP Center Fr Trig: Free	vse:INT  req: 2.44100 e Run	0000 GHz	DH ALIGN AUTO	15 Radio SI Radio D	PM Apr 07, 2021 dd: None evice: BTS	Center F 2.441000000
IC OBW Tendel Status Adams - Degad R 90 000 enter Freq 2.44100000 Ref 07:ex0.00 dB 00 00 00 00 00 00 00 00 00 0	BW 10 GHz #IFGain:Low	SED Center Fr Trig: Free #Atten: 3		0000 GHz Avg Hold	DH ALIGN AUTO	15Radio St	PM Apr 07, 2021 dd: None evvice: BTS	Center F 2.44100000
IC OBW Toget Factors Advance Descent Ref 20:00 dB dB/div Ref 0ffset0.8 d Ref 20:00 dB db db db db db db db db db db	D0 GHz #FGainLow B m 	SED Center Fr Trig: Free #Atten: 3		20000 GHz Avg Hold:		15 Radio St Radio D	PM Apr 07, 2021 dd: None evice: BTS	Center F 2.441000000
Couper Coup	BW PORT	#VE		20000 GHz Avg Hold:		15Radio St	PM Apr 07, 2021 dd: None evvice: BTS	Center F 2.44100000
Couper Coup	D0 GHz #FGainLow B m 	#VE		20000 GHz Avg Hold:		15 Radio St Radio D	PM Apr 07, 2021 dd: None evvice: BTS	CFF 200,000
Couper Lange Couper Cou	BW PORT	#VE		0000 GHz Avg Hold:	DH +116N AUTO >100/100 15.9	15 Radio St Radio D	PM Apr 07, 2021 dd: None evvice: BTS	Center F 2.44100000

### IC OBW 99% GFSK 1M DH5\_2480MHz

	trum Analyzer - Occupied B	w						
	RF 50 Ω DC	) GHz	SENSE:INT Center Freq: 2.4800	000000 GHz	ALIGN AUTO	Radio Std	M Apr 07, 2021 None	Frequency
		#IFGain:Low	Trig: Free Run #Atten: 30 dB	Avg Hold	: 100/100	Radio Dev	ice: BTS	
15 dB/div	Ref Offset 0.8 dE Ref 20.00 dB							
5.00 -10.0			~~~~~	~~	L.			Center Freq 2.48000000 GHz
-25.0							~~~	
-70.0								
-100								
Center 2.4 #Res BW 2			#VBW 62 k	Hz		Sp Swee	an 2 MHz p 4.8 ms	CF Step 200.000 kHz
Occupi	ied Bandwid	th	Total	Power	16.1	dBm		<u>Auto</u> Man
	8	59.29 kH	z					Freq Offset
Transm	it Freq Error	-2.718 k	Hz OBW I	Power	99	.00 %		0 Hz
x dB Ba	ndwidth	945.4 kl	Hz xdB		-20.	00 dB		
MSG					STATUS			

Reysight Spectrum Ana R RF Center Freq 2.4		Trig:	SENSE:INT r Freq: 2.402000000 GHz Free Run Avg Ho h: 30 dB	ALIGN AUTO 06:15:43 PM A Radio Std: N Id: 100/100 Radio Device	one
5 dB/div Re	Offset 0.8 dB f 20.00 dBm				
-og 5.00			han		Center Fre
25.0					2.402000000 GH
40.0	·			++	~~~
70.0					
100					
115					
Center 2.402 GI	lz z	#	VBW 62 kHz	Span Sweep	2 MHz CF Ste
Occupied I			Total Power	15.3 dBm	4.8 ms 200.000 kH
	1.19	915 MHz			FreqOffse
Transmit Fre		-1.750 kHz	OBW Power	99.00 %	0 H
x dB Bandwi	dth	1.333 MHz	x dB	-20.00 dB	
G				STATUS	
	V 99%	ώ_π/4D	QPSK_	2M_DH5	_2441MH
Keysight Spectrum Ana R RF	yzer - Occupied BW 50 Ω DC		SENSE:INT r Freq: 2.441000000 GHz	ALIGN AUTO 06:17:14 PM A Radio Std: N	r 20, 2021 Frequency
enter Freq 2.4		Trig:	r Freq: 2.441000000 GHz Free Run Avg Ho n: 30 dB	Radio Std: N Id: 100/100 Radio Device	
Ref 5 dB/div Re	Offset 0.8 dB f 20.00 dBm				
	20.00 0.001		00		Center Fre
0.0	~~~~	+			2.441000000 GH
					~~
10.0					
15.0					
100					
Center 2.441 Gl				Span	2 MHz CF Ste
Res BW 20 kH		#	VBW 62 kHz Total Power	Sweep 15.7 dBm	4.8 ms Auto Ma
Occupied I		981 MHz	Total Power	15.7 dBm	FreqOffse
Transmit Fre		-1.204 kHz	OBW Power	99.00 %	01
x dB Bandwi	dth	1.333 MHz	x dB	-20.00 dB	
8G				STATUS	
	V 99%	ώ π/4D	QPSK	2M DH5	2480MH
Keysight Spectrum Ana R RF	yzer - Occupied BW		SENSE:INT	ALIGN AUTO 06:18:14 PM A	or 20, 2021
enter Freq 2.4		Tria:	r Freq: 2.480000000 GHz Free Run Avg Ho h: 30 dB	ALIGN AUTO 06:18:14 PM A Radio Std: N Id: 100/100 Radio Device	
Ref	Offset 0.8 dB	Guinzon			
5 dB/div Re	f 20.00 dBm				Center Fre
10.0					2.480000000 GH
40.0	/				
55.0				+ $+$ $+$	
70.0					
100	2			Span	2 MHz CE Sto
2enter 2.48 GH	7	#	VBW 62 kHz	Sweep	
Center 2.48 GH Res BW 20 kH					
115 enter 2.48 GH	Bandwidth	917 MU-	Total Power	16.4 dBm	
Center 2.48 GH Res BW 20 kH	Bandwidth 1.1	917 MHz -1.242 kHz	Total Power OBW Power	16.4 dBm 99.00 %	Freq Offse

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### IC OBW 99% 8DPSK 3M DH5 2402MHz

Keysight Spec	trum Analyzer - Occupied	BW				
	RF 50 Ω DC eq 2.40200000	Trig:	SENSE:INT er Freq: 2.402000000 GHz Free Run Avg Hole en: 30 dB	d: 100/100	06:20:42 PM Apr 20, 2021 Radio Std: None Radio Device: BTS	Frequency
15 dB/div	Ref Offset 0.8 d Ref 20.00 dE					
5.00 -10.0 -25.0		~~~~~~	~~~~~~			Center Free 2.402000000 GH:
-40.0						
-85.0						
Center 2.4 #Res BW			#VBW 62 kHz		Span 2 MHz Sweep 4.8 ms	200.000 kH
Occup	ied Bandwid	ith .1909 MHz	Total Power	15.8	dBm	Auto Mar Freq Offse
	nit Freq Error andwidth	-8.143 kHz 1.328 MHz	OBW Power x dB	99.0 -20.0	00 % 0 dB	0 н:
MSG				STATUS		

### IC OBW 99%\_8DPSK\_3M\_DH5\_2441MHz

	trum Analyzer - Occupied BW							
R	RF 50 Ω DC	011	SENSE:INT Center Freg: 2.44	1000000 CH-	ALIGN AUTO	06:30:12 P	4 Apr 20, 2021	Frequency
enter Fr	eq 2.441000000	GHZ	Trig: Free Run		d: 100/100			
		#IFGain:Low	#Atten: 30 dB	-		Radio Dev	ice: BTS	
	Ref Offset 0.8 dB							
15 dB/div	Ref 20.00 dBm	า						
.og 5.00								Center Fre
0.0	-	~~~~	$\sim\sim\sim\sim\sim\sim$	$\gamma$	how			2.441000000 GH
5.0						~		2.441000000 Gr
0.0	~						~~~~	
							100	
5.0								
0.0								
5.0					-			
00				_	_			
15		_		_				
enter 2.4 Res BW			#VBW 62	kH7			an 2 MHz p 4.8 ms	CF Ste
	20 8112		#4044 02	KI IZ		0466	<b>9</b> 4.0 ma	200.000 kH Auto Ma
Occup	ied Bandwidt	h	Tota	Power	16.	6 dBm		<u>Fuco</u> ma
	1.1	1903 MH	z					Freq Offs
Tranom		-7.408 k		Power		9.00 %		0 H
	nit Freq Error			rower	-			
x dB Ba	andwidth	1.329 M	Hz xdB		-20	.00 dB		

### IC OBW 99% 8DPSK 3M DH5 2480MHz

	trum Analyzer - Occ									
Contor Fre	RF 50 Ω		la la		vse:INT eq: 2.48000	0000 GHz	ALIGN AUTO	Radio Std	M Apr 20, 2021	Frequency
Center Fre	eq 2.48000	0000 GP	1Z →	Trig: Fre	Run	Avg Hold	: 100/100	Raulo atu	. None	
		#IF	Gain:Low	#Atten: 3	0 dB	-		Radio Dev	rice: BTS	
	Ref Offset									
10 dB/div Log	Ref 20.0	Jabm								
10.0						<u> </u>				Center Freq
0.00		~~~	m	$\sim \sim$	$\sim$	m	m			2.48000000 GHz
-10.0		10					- ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	~		
-20.0	- /									
-30.0	$\sim$							$\rightarrow$	2	
-40.0	V							- V	-`\~	
-50.0						<u> </u>				
-60.0										
-70.0										
Center 2.4	8 GHz							Sn	an 2 MHz	
#Res BW				#VE	3W 62 kH	z			p 4.8 ms	CF Step 200.000 kHz
Occup	ied Band	width			Total P	ower	16.6	6 dBm		<u>Auto</u> Man
			96 MH	Ηz						Freq Offset
Transm	it Freq Err	or	-6.809	Hz	OBW P	ower	99	9.00 %		0 Hz
	ndwidth		1.330 N		x dB			00 dB		
	nuwiuui		1.550 W		X UB		-20.	00 UB		
MSG							STATU	۹.		
mana							STATU	9		

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## 9 CONDUCTED BAND EDGES AND SPURIOUS EMISSION MEASUREMENT

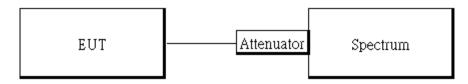
## 9.1 Standard Applicable

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	PASTERNACK	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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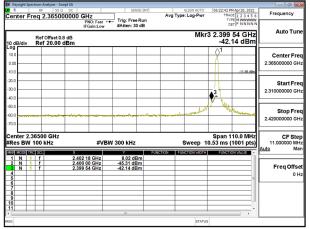
### Non-hopping Bandedge GFSK 1M DH5 2402MHz

	rum Analyzer - Sw						
Center Fre	RF 50 Ω eq 2.36500	00000 GHz	SENSE	Avg Typ	ALIGN AUTO e: Log-Pwr	05:47:31 PM Apr 07 TRACE 1 2 TYPE MW	3456 Frequency
10 dB/div	Ref Offset 0.8 Ref 20.00 (			B	Mkr	3 2.394 04 0 -47.66 d	GHz Auto Tur
10.0 0.00 -10.0						1 	2.365000000 GH
20.0 30.0 40.0					▲ <sup>3</sup> -	<u></u> 2	Start Fre 2.310000000 Gi
-50.0 -60.0		angertie of angeoderstynation		and the state of the	and the second	Y handland	2.420000000 Gi
Center 2.3 #Res BW 1	00 kHz	#\	'BW 300 kHz	FUNCTION FU		Span 110.0 0.53 ms (1001	pts) 11.000000 Mi
1 N 1 2 N 1 3 N 1 4 5 6 7 7 8 9	1 1 1	2.402 18 GHz 2.400 00 GHz 2.394 04 GHz	7.94 dBn -49.76 dBn -47.66 dBn			FUNCTION WAL	Freq Offs
10 11 1							

### Non-hopping Bandedge\_GFSK\_1M\_DH5\_2480MHz

Ref Offset 02 dB     MKR 2 2.488 U0U GHZ       10 dBidly     45.61 dBm       11 M     11 d       11 M     1 d       11 M <t< th=""><th>Keysight Spectrum Analyzer - Swept SA</th><th></th><th></th><th></th><th></th></t<>	Keysight Spectrum Analyzer - Swept SA				
Construction     Construction<				TRACE 1 2 3 4 5 6	Frequency
Log 000 100 100 100 100 100 100 10	Ref Offset 0.8 dB	PNO: Fast Trig: Free Run	Mkr3 2.48	DET P NNNNN	Auto Tune
300     400     33     401     530     407     530     407     530     407     530     407     530     400     530     400     530     530     530     530     530     530     530     530     530     530     530     530     530     530     530     530     530     530     530     530     530     530     530     530     530     530     530     530     530     530     530     530     530     530     530     530     530     530     530     530     530     530     530     530     530     530     530     530     530     530     530     530     530     530     530     530     530     530     530     530     530     530     530     530     530     530     530     530     530     530     530     530     530     530     530     530     530     530     530     530     530	10.0 0.00			-10.97 dBn	Center Freq 2.487500000 GHz
Stop Free     Stop Free <t< td=""><td>-30.0</td><td></td><td></td><td></td><td>Start Freq 2.475000000 GHz</td></t<>	-30.0				Start Freq 2.475000000 GHz
#Res BW 100 kHz     #VBW 300 kHz     Sweep 2.400 ms (1001 pts)     Automatical stress of the s	-50.0		and and a second second		Stop Freq 2.50000000 GHz
1     N     1     2.480 175 GHz     9.03 dBm       2     N     1     7     2.483 000 GHz     4.54 49 dBm       N     1     7     2.483 000 GHz     4.56 1 dBm     01       5     0     0     0     01     01       7     0     0     0     01     01       8     0     0     0     01     01       10     0     0     0     0     0	#Res BW 100 kHz		Sweep 2.400	ms (1001 pts)	CF Step 2.500000 MHz Auto Man
11	1     N     1     f     2.483       2     N     1     f     2.483       3     N     1     f     2.483       4     -     -     2.488       5     -     -     -       6     -     -     -       7     -     -     -       9     -     -     -	175 GHz 9.03 dBm 500 GHz -54.94 dBm		E	Freq Offset 0 Hz
MSG STATUS	11 I		STATIK	•	

#### Non-hopping Bandedge 8DPSK 3M DH5 2402MHz



Non-hopping Bandedge\_8DPSK\_3M\_DH5\_2480MHz

Keysigne spectrum										
R R R R R R R R R R R R R R R R R R R	F 50 Ω 2.487500		z		E:INT	Avg Typ	ALIGN AUTO	TRAC	M Apr 20, 2021	Frequency
Re 10 dB/div R	of Offset 0.8	PN IFG dB	iO: Fast ↔ Gain:Low	#Atten: 30			Mkr3	2.484 4	25 GHz 74 dBm	Auto Tun
10.0 0.00 -10.0		21							-11.10 dBn	Center Fre 2.487500000 GH
20.0		by		3						Start Fre 2.475000000 GF
50.0 × 2 × 2 × 2 × 2 × 2 × 2 × 2 × 2 × 2 ×				how	Anner			and the Case	uniter a discon	Stop Fre 2.50000000 GF
enter 2.487 Res BW 100	) kHz	x		V 300 kHz			Sweep 2	2.400 ms (	5.00 MHz 1001 pts)	CF Ste 2.500000 Mi Auto M
1 N 1 f 2 N 1 f 3 N 1 f 4 5 6 7 8		2.480 175 2.483 500 2.484 425	GHz	8.90 dB -44.83 dB -44.74 dB	m					Freq Offs 01
9 10 11 50				m			STATU	5		

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#### Hopping Band Edge GFSK 1M DH5 2402MHz

📕 Keysight Spectrum Analyze					
Center Freq 2.36	50 Ω DC 5000000 GHz	SENSE:INT	ALIGN AUTO Avg Type: Log-Pwr	05:53:17 PM Apr 07, 2021 TRACE 1 2 3 4 5 6 TYPE M	Frequency
Ref Offse 10 dB/div Ref 20.			Mkr	2 2.400 00 GHz -51.65 dBm	Auto Tune
10.0 -10.0					Center Freq 2.365000000 GHz
-20.0				A2	Start Freq 2.310000000 GHz
-50.0		**************************************	in and a lot of the second	•	Stop Freq 2.420000000 GHz
Center 2.36500 GH #Res BW 100 kHz		BW 300 kHz	Sweep 1	Span 110.0 MHz 0.53 ms (1001 pts)	CF Step 11.000000 MHz Auto Man
1 N 1 f 2 N 1 f 3 4 5 6 7	2,419 89 GHz 2,400 00 GHz	8.08 dBm -51.65 dBm			Freq Offset 0 Hz
8 9 10 11 11 1 1 1 1 1 1 1 1 1 1 1 1 1 1		10	STATUS	······································	

Hopping	Band E	dge_G	FSK_1	M_DH5	2480	MHz
🗱 Keysight Spectrum Analyzer - Swe	pt SA					
Center Freq 2.48750		SENSE:	Avg Type	Log-Pwr T	3 PM Apr 07, 2021 RACE 1 2 3 4 5 6 TYPE M WWWW	Frequency
	PNO: Fast IFGain:Low	#Atten: 30 dl		Mkr3 2.485	DET P N N N N N	Auto Tune
Ref Offset 0.8 10 dB/div Ref 20.00 d					6.01 dBm	
Log 10.0 0.00 -10.0					-11.42 dBn	Center Freq 2.487500000 GHz
-20.0 -30.0 -40.0	A 02	3				Start Freq 2.475000000 GHz
-50.0	Marchen	-	5-11-11-11-11-11-11-11-11-11-11-11-11-11	elterrationalerra	a	Stop Freq 2.50000000 GHz
Center 2.48750 GHz #Res BW 100 kHz	#V ×	BW 300 kHz	S	weep 2.400 m	25.00 MHz 5 (1001 pts)	CF Step 2.500000 MHz Auto Man
1 N 1 f 2 N 1 f 3 N 1 f 5 6	2.479 050 GHz 2.483 500 GHz 2.485 025 GHz	8.58 dBm -53.89 dBm -46.01 dBm				Freq Offset 0 Hz
7 8 9 10 11		17				
MSG				STATUS		

#### Hopping Band Edge 8DPSK 3M DH5 2402MHz R RF 50 st DL Inter Freq 2.365000000 GHz PNO: Fast ---- Trig: Free Ru Trig: Free Ru Auto Tu Mkr3 2.399 65 GHz -48.08 dBm 20 00 Center Fr Start Fre Stop Fre 2.36500 GHz CF Step 110.0 M Span 110.0 MH Sweep 10.53 ms (1001 pts es BW 100 k #VBW 300 kHz 11.00 1 N 2 N 2.405 15 GHz 2.400 00 GHz 2.399 65 GHz 8.02 dBn -50.11 dBn -48.08 dBn Freq Offse 01

Hopping Band Edge 8DPSK 3M DH5 2480MHz

							Analyzer - Swe		
Frequency	TRACE 1 2 3 4 5 6	ALIGN AUTO ype: Log-Pwr	Avg	SENSE:	17	0000 GH		Fred	R nter
Auto Tun	DET P NNNNN		י י	#Atten: 30 dE	NO: Fast ↔ Sain:Low	P	2.10100	1104	
Auto Tun	487 950 GHz -49.23 dBm	Mkr3					f Offset 0.8 f 20.00 c		dB/di
Center Fre						A.,	mutry		
2.487500000 GH	-11.28 dBm						Ner Vern	W	Ľ
Start Fre									0
2.475000000 GH						W			
				mananth	$2^{2}$	$\sim$			0
Stop Fre 2.50000000 GH			WHAT HAD BEEN AND	A. CURVEN					
CF Ste	Span 25.00 MHz						50 GHz	2 4 8 7	
2.500000 MH Auto Ma	0 ms (1001 pts)			300 kHz	#VBW		kHz	W 100	es B
	FUNCTION VALUE	FUNCTION WIDTH	FUNCTION	8.72 dBm		× 2.477 17			N
Freq Offs 0 F				-51.82 dBm -49.23 dBm	0 GHZ 0 GHZ	2.483 500			N N
01	E								
					-		-		
	,	STATUS						-	-

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### Spurious Emission GFSK 1M DH5 2402MHz

	ım Analyzer - Swep								_	- Ø 🛃
R Center Free	RF 50 Ω q 13.01500	DC   00000 GH	lz	SENSI		Avg Typ	ALIGN AUTO e: Log-Pwr	TRAC	Apr07, 2021	Frequency
0 dB/div	Ref Offset 0.8 Ref 20.00 d	dB	D: Fast 🔸	#Atten: 30 (			Mk	r4 9.607	PNNNNN	Auto Tur
og 10.0 (	) <sup>1</sup>								12.53 (6)	Center Fre 13.015000000 GF
0.0		3	♦4							Start Fre 30.000000 Mi
0.0	Ŷ	V	anne i de	u su lu				ernellen sertist		Stop Fr 26.00000000 G
enter 13.02 Res BW 10	0 kHz		#VBW	300 kHz			<u> </u>	2.482 s (3		CF Ste 2.597000000 Gi Auto M
3 N 1		× 2.401 9 4.804 0 7.206 0 9.607 7	GHz GHz	7.47 dBr -53.99 dBn -50.12 dBn -44.53 dBn	n n	TION	NCTION WIDTH	FUNCTIO	E E	Freq Offs 01
7 8 9 0 1										
a							STATUS		,	

#### Spurious Emission \_GFSK\_1M\_DH5\_2441MHz

Keysight Spectrum Analyzer - Swept SA				
R RF 50 Ω DC Center Freq 13.015000000 GHz	SENSE:INT	ALIGN AUTO 0	TRACE 1 2 3 4 5 6	Frequency
enter Freq 13.015000000 GHZ PNO: Fat IFGain:Lo	st Trig: Free Run		DET P NNNN	Auto Tun
Ref Offset 0.8 dB 0 dB/div Ref 20.00 dBm		Mkr4	9.763 6 GHz -45.44 dBm	Auto Tu
				Center Fre
00				13.015000000 G
1.0			-12.14 dBn	
10				Start Fr 30,000000 M
0.0	♦4			50.00000 m
			a decision of subsection	Stop Fr
0.0			and the second second second	26.00000000 G
enter 13.02 GHz Res BW 100 kHz #	VBW 300 kHz	Sweep 2.48	pan 25.97 GHz 2 s (30001 pts)	CF St 2.597000000 G Auto M
R MODE TRC SCL X		FUNCTION WIDTH	FUNCTION VALUE	Auto W
2 N 1 f 4.882 0 GHz 3 N 1 f 7.323 0 GHz	-54.20 dBm			Freq Offs
N 1 f 9.763 6 GHz	-45.44 dBm			. 0
5				
9				
0				
3		STATUS	•	

### Spurious Emission \_GFSK\_1M\_DH5\_2480MHz

Keysight Spectrum Analyzer - Sv					
R R 50 G Center Freg 13.015		SENSE:INT	ALIGN AUTO Avg Type: Log-Pwr	05:38:29 PM Apr 12, 2021 TRACE 1 2 3 4 5 6	Frequency
Ref Offset 0.	PNO: Fast +++ IFGain:Low	<sup>J</sup> Trig: Free Run #Atten: 30 dB	Mk	TYPE WWWWW DET P NNNNN	Auto Tun
10 dB/div Ref 20.00	dBm			-43.92 dBm	Center Free 13.015000000 GH Start Free
-30.0	2 03 ♦4				30.000000 MH Stop Free 26.00000000 GH
Center 13.02 GHz #Res BW 100 kHz	#VBW	300 kHz	Sweep 2	Span 25.97 GHz 2.482 s (30001 pts)	CF Ste 2.59700000 GH Auto Ma
Baseline     Point     Point	2.479 8 GHz	6.618 dBm -56.643 dBm -46.912 dBm -43.92 dBm			Freq Offse 0 H
< MSG	4		STATUS	•	

### Spurious Emission $_{\pi}$ /4DQPSK\_2M\_DH5\_2402MHz

Keysight Spectrum Analy:					
R RE Center Freg 13.	50 Ω DC 015000000 GHz	SENSE:INT	ALIGN AUTO Avg Type: Log-Pwr	09:47:30 AM Apr 08, 2021 TRACE 1 2 3 4 5 6	Frequency
	PNO: Fast IFGain:Low set 0.8 dB 0.00 dBm	Trig: Free Run #Atten: 30 dB	Mk	r4 9.607 7 GHz -40.38 dBm	Auto Tune
0.00 10.0				-12.04.690	Center Free 13.015000000 GH:
80.0		4			Start Free 30.000000 MH
80.0					Stop Fre 26.00000000 GH
enter 13.02 GHz Res BW 100 kHz		300 kHz	· ·	Span 25.97 GHz 2.482 s (30001 pts)	CF Ste 2.597000000 GH Auto Ma
Image: Non-Section     The section       1     N     1     f       2     N     1     f       3     N     1     f       4     N     1     f       5	x 2.401 9 GHz 4.804 0 GHz 7.206 0 GHz 9.607 7 GHz	7.96 dBm -51.88 dBm -46.53 dBm -40.38 dBm	ECTION FUNCTION WOTH	FUNCTION VALUE	Freq Offse
6 7 8 9 10					
sal		н	STATU	•	

Spurious Emission  $_{\pi}$  /4DQPSK\_2M\_DH5\_2441MHz

Keysight Spectrum Analyzer -					- 6 ×
Center Freq 13.01	5000000 GHz	SENSE:INT	ALIGN AUTO Avg Type: Log-Pwr	09:48:55 AM Apr 08, 2021 TRACE 1 2 3 4 5 6	Frequency
Ref Offset		HTrig: Free Run #Atten: 30 dB	Mk	r4 9.764 4 GHz -40.54 dBm	Auto Tune
				-11.25 dBn	Center Free 13.015000000 GH
20.0	3 ♦	4			Start Free 30.000000 MH
50.0	Ŷ <sup>₽</sup> Ĭ				Stop Fre 26.000000000 GH
enter 13.02 GHz Res BW 100 kHz	#VB\	V 300 kHz	Sweep 2	Span 25.97 GHz 2.482 s (30001 pts)	CF Ste 2.597000000 GH Auto Ma
1 N 1 f 2 N 1 f 3 N 1 f 6 6 7	x 2.440 9 GHz 4.882 0 GHz 7.323 0 GHz 9.764 4 GHz	8.75 dBm -52.47 dBm -45.67 dBm -40.54 dBm	FINCHORWIDTH		Freq Offse 0 H
8 9 10					

Spurious Emission  $\pi$  /4DQPSK 2M DH5 2480MHz

- @ <b>-</b>										Analyzer - Swe	ipectrum		
Frequency		M Apr 08, 202 CE 1 2 3 4 5		ALIGN AUTO	A	SE:INT	SE/		DC		R		R
	***	PE MWWW	TY	e: Log-Pwr	Avg	Run dB	Trig: Free #Atten: 3	HZ (O: Fast 🕶 Sain:Low	00000 G Pl IFC	13.0150	Freq	nter	er
Auto Tun		0 2 GH 58 dBr	r4 9.92 -42.	MK						Offset 0.8		IB/div	0 d
Center Fre	1									1	(		og 10.0
13.015000000 GH		-11.22 dE											00
Start Fre													0.0
30.000000 MH													0.0
		and a second							2 ()	0			0.0 0.0
Stop Fre 26.00000000 GH	-		and a loss of the loss					And a strength of the		, and the second		100	0.0
													0.0
CF Ste 2.597000000 GH	s)	25.97 GH 30001 pt		Sweep :			300 kHz	#VBW			13.02 V 100		
<u>Auto</u> Ma	1	ION VALUE	FUNCT	CTION WOTH	CTION		8.78 di	R GHz	x 2.479		TRC SC	MODE N	89 1
Freq Offs	l					im Im	-54.00 dE	0 GHz	4.960 7.440		1 1	N	2
0 H					_	m	-42.58 dE	2 GHz	9.920		1 1	N	4 5 6
					_	-					-	_	78
					_	+		_			+	_	9 0 1
						'							6
				STATUS									G

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