

ELECTROMAGNETIC EMISSIONS COMPLIANCE REPORT

Applicant:	Montblanc-Simplo GmbH Hellgrundweg 100 22525 Hamburg, Germany
Product Name:	Montblanc SUMMIT LITE
Brand Name:	Montblanc
Model No.:	SXL20
Model Difference:	N/A
Report Number:	ER/2020/70077
FCC ID:	2AENP-SXL20
IC:	20163-SXL20
FCC Rule Part:	§15.247, Cat: DSS
IC RSS:	RSS-247 issue 2 Feb 2017
Issue Date:	Oct. 05, 2020
Date of Test:	Jul. 13, 2020 ~ Aug. 14, 2020
Date of EUT Re- ceived: We hereby certify that	Jul. 13, 2020

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 tested as described in this report is in compliance with conducted and radiated emission limits.

The test results of this report relate only to the tested sample identified in this report.

Approved By: CHUN; CHIZEH, CHIEN

Chun Chieh Chen / Supervisor



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Revision History					
Report Number	Revision	Description	Issue Date	Remark	
ER/2020/70077	Rev.00	Original.	Oct. 05, 2020	Revised By: Karen Huang	

Note:

1 · Disclaimer

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 **Product description**

Product Name:	Montblanc SUMMIT LITE			
Brand Name:	Montblanc			
Model No.:	SXL20			
Model Difference:	N/A			
USB Cable:	Model No.: SRB-A004, Supplier: Saibao(Jiangxi) Communication Industrial Co., Ltd.			
Cradle:	Model No.: SRB-A005A, Supplier: Saibao(Jiangxi) Communication Industrial Co., Ltd.			
Power Supply:	3.85Vdc from rechargeable Lithium polymer battery or 5Vdc from USB port Model No.: HAGP482427SD,			
	Battery: Supplier: TIANJIN LISHEN BATTERY JOINT-STOCK CO., LTD.			

Radio Technology:	Bluetooth BR+EDR	
Channel number:	79 channels	
Modulation type:	GFSK + π/4DQPSK + 8DPSK	
Transmit Power:	12.77 dBm	
Frequency Range:	2.402GHz – 2.480GHz	
Dwell Time:	\leq 0.4s	

1.2 **Antenna Designation**

Antenna Type	Brand	Antenna Part No.	Freq. (MHz)	Peak An- tenna Gain (dBi)
Loop	INPAQ	23A1DBW3100	2402~2480	-3.91

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1.3 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 1, March 2019 ANSI C63.10:2013

1.4 Test Facility

SGS Taiwan Ltd. Central RF Lab (TAF code 3702) No.134, Wu Kung Road, New Taipei Industrial Park, Wuku District, New Taipei City, Taiwan 24803

FCC Designation number: TW0027

ISED CAB identifier: TW3702

1.5 Special Accessories

There is no special accessory used while test was conducted.

1.6 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.

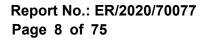
2.4.2 For all conducted test items:

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 Radiated Emission & Conducted (AC powerline) configuration

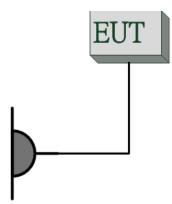


Fig. 2-2 Conducted (Antenna Port) Configuration

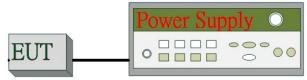


Table 2-1 Equipment Used in Tested System

Item	Equipment	Mfr/Brand	Model/Type No.	Series No.	Data Cable	Power Cord
1	Bluetooth Test Software	N/A	N/A	N/A	N/A	N/A
2.	DC Power Supply	Agilent	E3640A	MY40005907	N/A	N/A
3.	Adapter	Apple	A1385	N/A	N/A	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	20dB & 99% 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

4.1 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		

Note: EUT serial number is MGHL02702.

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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							
Note: The field strength of radiation emission was measured as EUT stand-up position (H mode) and lie down position (E1, E2 mode) for Bluetooth BR+EDR Transmitter for channel Low, Mid and High, the worst case H position was reported.							

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

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MEASUREMENT UNCERTAINTY

Test Items	Uncertainty
AC Power Line Conducted Emission	+/- 2.586 dB
Peak Output Power	+/- 0.84 dB
20dB Bandwidth	+/- 51.33 Hz
100 KHz Bandwidth Of Frequency Band Edges	+/- 0.84 dB
Frequency Separation	+/- 51.33 Hz
Number of hopping frequency	+/- 51.33 Hz
Time of Occupancy	+/- 51.33 Hz
Temperature	+/- 0.65 °C
Humidity	+/- 4.6 %
DC / AC Power Source	DC= +/- 0.13%, AC= +/- 0.2%

Radiated Spurious Emission Measurement Uncertainty			
	9kHz~30MHz: +-2.3dB		
	30MHz - 180MHz: +/- 3.37dB		
Polarization: Vertical	180MHz -417MHz: +/- 3.19dB		
	0.417GHz-1GHz: +/- 3.19dB		
	1GHz - 18GHz: +/- 4.04dB		
	18GHz - 40GHz: +/- 4.04dB		
	9kHz~30MHz: +-2.3dB		
	30MHz - 167MHz: +/- 4.22dB		
Polarization: Horizontal	167MHz -500MHz: +/- 3.44dB		
	0.5GHz-1GHz: +/- 3.39dB		
	1GHz - 18GHz: +/- 4.08dB		
	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	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

Conducted Emission Test Site						
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.	
EMI Test Re- ceiver	R&S	ESCI 7	100759	07/13/2020	07/12/2021	
LISN	SCHWARZBECK	NSLK 8127	8127-465	04/09/2020	04/08/2021	
Coaxial Cables	N/A	Coaxial Cable	161207	12/07/2019	12/06/2020	
Test Software	audix	e3	Ver. 6.11- 20180413	N.C.R	N.C.R	

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.

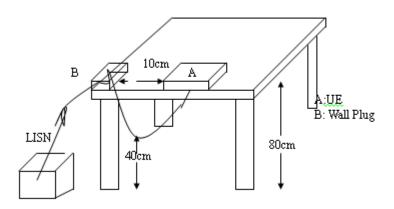
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6.4 Test SET-UP (Block Diagram of Configuration)



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 Test Mode Power Probe Note:	:ER-2020- :BT :AC 120V/0 :L :			Test Site Test Date Temp./Humi. Engineer	:Conduction :2020-08-13 :25.3/56 :Neo	6F
80 Level (d	BuV)					
70						
60						
50 1		3.				
40 40	2	·····		5 M. J. avariatis 1		
30	NM MM IN	WAR AL LANKAR	IN MINING PARA	C. N. M. D. J. Marken	Man Musin	
20	°∦-₩-4	U KAMAA	-\\ f		" WYW W	
10						
0.15 0.2	2 0.	5 1	2	5 10	20 30	
0.15 0.2		is i Fre	equency (MHz)	5 10	20 50	
Freq.	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit	Margin
MHz	PK/QP/AV	dBµV	dB	dBµV	dBµV	dB
0.17	Peak	40.25	2.14	42.39	64.81	-22.42
0.24	Peak	34.16	2.14	36.30	62.13	-25.83
0.77	Peak	39.31	2.17	41.48	56.00	-14.52
0.80 5.31	Peak	37.60	2.17	39.77	56.00	-16.23
5.31	Peak Peak	34.57 32.89	2.57 2.83	37.14 35.72	60.00 60.00	-22.86 -24.28
10.07	L CQV	52.09	2.00	JJ.1Z	00.00	-24.20

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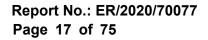
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Report No Test Mode Power Probe Note:		:ER-2020 :BT :AC 120V :N :			Test S Test D Temp. Engine	ate :2020-08 /Humi. :25.3/56	3-13
	80 Level (dB	uV)					
	80						
	70						
	60						_
	50						_
	40	-2		5			
	30	MAMA	MANA WIL	when you we want		Manaparanterstante	 [*
	10						
	0.15 0.2		0.5 1	2 Frequency (MHz)	5	10 20	30
Freq		Detector	Spectrum	Factor	Actua	I Limit	Margin
		Mode	Reading Lev		FS		-
MHz		PK/QP/AV	dBµV	dB	dBµV	′ dBµV	dB
0.16		Peak	42.86	2.21	45.07		-20.18
0.25		Peak	35.98	2.21	38.19		-23.63
0.78		Average	26.30	2.24	28.54		-17.46
0.78		QP	30.30	2.24	32.54		-23.46
2.45		Peak	33.02	2.33	35.35		-20.65
4.20		Peak	33.85	2.42	36.27		-19.73
7.21		Peak	34.33	2.59	36.92	60.00	-23.08

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7 PEAK OUTPUT POWER MEASUREMENT

7.1 Standard Applicable

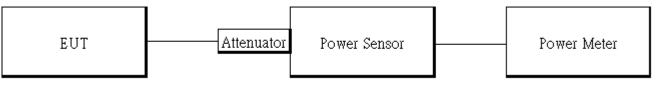
For frequency hopping systems operating in the 2400-2483.5 MHz band employing at least 75 hopping channels, The Limit: 1Watt. For all other frequency hopping systems in the 2400 – 2483.5MHz band: The Limit: 0.125 Watts. The power limit for 1Mbps is 1watt, and 2Mbps, 3Mbps and AFH mode are 0.125 watts.

The e.i.r.p. shall not exceed 4 W. (ISED)

7.2 Measurement Equipment Used

Conducted Emission Test Site					
EQUIPMENT	MFR	MODEL	SERIAL	LAST	CAL DUE.
TYPE		NUMBER	NUMBER	CAL.	
Power Sensor	Agilent	U2021X	MY53480015	04/22/2020	04/21/2021
Power Sensor	Agilent	U2021X	MY53480018	04/22/2020	04/21/2021
Power Sensor	Agilent	U2021X	MY53480009	04/22/2020	04/21/2021
DC Power Supply	Agilent	E3640A	MY40005907	10/22/2019	10/21/2020
Bluetooth Test Set	Anritsu	MT8852B	6k00006107	08/11/2019	08/10/2020

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 bandwidth)
- 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):

СН	Freq. (MHz)	Peak Output Power (dBm)	Output Power (mW)	Limit (mW)
Low	2402	12.33	17.100	125
Mid	2441	12.08	16.144	125
High	2480	11.92	15.560	125

1M BR mode (Average):

СН	Freq. (MHz)	Max. Output include tune up tolerance Power (dBm)	Output Power (mW)	Limit (mW)
Low	2402	11.82	15.219	125
Mid	2441	11.99	15.826	125
High	2480	11.22	13.255	125

2M EDR mode (Average):

СН	Freq. (MHz)	Peak Output Power (dBm)	Output Power (mW)	Limit (mW)
Low	2402	12.45	17.579	125
Mid	2441	12.20	16.596	125
High	2480	12.06	16.069	125

3M EDR mode (Peak):

2M EDR mode (Peak):

СН	Freq. (MHz)	Peak Output Power (dBm)	Output Power (mW)	Limit (mW)
Low	2402	12.77	18.923	125
Mid	2441	12.53	17.906	125
High	2480	12.37	17.258	125

NOTE: cable loss as 4.8dB that offsets in the spectrum

СН	Freq. (MHz)	Max. Avg.Output include tune up tolerance Power (dBm)	Output Power (mW)	Limit (mW)
Low	2402	9.33	8.578	125
Mid	2441	9.63	9.191	125
High	2480	9.69	9.319	125

3M EDR mode (Average):

СН	Freq. (MHz)	Max. Avg.Output include tune up tolerance Power (dBm)	Output Power (mW)	Limit (mW)
Low	2402	9.83	9.625	125
Mid	2441	9.85	9.669	125
High	2480	9.69	9.319	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)	Max. Output include tune up tolerance Power (dBm)	Antenna Gain (dBi)	EIRP (mW)	Limit (mW)
Low	2402	11.82	-3.91	6.186	4000
Mid	2441	11.99	-3.91	6.433	4000
High	2480	11.22	-3.91	5.387	4000

2M EDR mode EIRP

Channel	Frequency (MHz)	Max. Avg.Output include tune up tolerance Power (dBm)	Antenna Gain (dBi)	EIRP (mW)	Limit (mW)
Low	2402	9.33	-3.91	3.486	4000
Mid	2441	9.63	-3.91	3.736	4000
High	2480	9.69	-3.91	3.788	4000

3M EDR mode EIRP

Channel	Frequency (MHz)	Max. Avg.Output include tune up tolerance Power (dBm)	Antenna Gain (dBi)	EIRP (mW)	Limit (mW)
Low	2402	9.83	-3.91	3.912	4000
Mid	2441	9.85	-3.91	3.930	4000
High	2480	9.69	-3.91	3.788	4000

* Note: EIRP = Average Power + Gain

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8 20dB & 99% BANDWIDTH MEASUREMENT

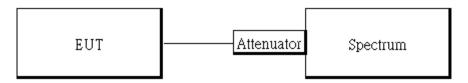
8.1 Standard Applicable

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							
EQUIPMENT TYPE	MFR	MFR MODEL SERIAL NUMBER NUMBER		LAST CAL.	CAL DUE.		
EXA Spectrum Ana- lyzer	Agilent	N9010A	MY50420195	05/06/2020	05/05/2021		
DC Power Supply	Agilent	E3640A	MY40005907	10/22/2019	10/21/2020		
Bluetooth Test Set	Anritsu	MT8852B	6k00006107	08/11/2019	08/10/2020		
DC Block	Mini-Circuits	BLK-18-S+	1	01/02/2020	01/01/2021		

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



8.5 20dB Bandwidth

GFSK

СН	20 dB BW	2/3 BW
	(MHz)	(MHz)
Low	0.9244	0.62
Mid	0.9246	0.62
High	0.9255	0.62

π/4-DQPSK

СН	20 dB BW	2/3 BW	
СП	(MHz)	(MHz)	
Low	1.313	0.88	
Mid	1.313	0.88	
High	1.316	0.88	

8-DPSK

СН	20 dB BW	2/3 BW
СП	(MHz)	(MHz)
Low	1.270	0.85
Mid	1.271	0.85
High	1.268	0.85

8.6 99% Bandwidth (ISED only)

Mid

High

GFSK

СН	99% BW			
	(MHz)			
Low	0.88704			
Mid	0.88801			
High	0.89242			
π/4-DQPSK				
СН	99% BW			
	(MHz)			
Low	1.1682			
Mid	1.1693			
High	1.1686			
8-DPSK				
СН	99% BW			
Сп	(MHz)			
	1.1755			

1.1776

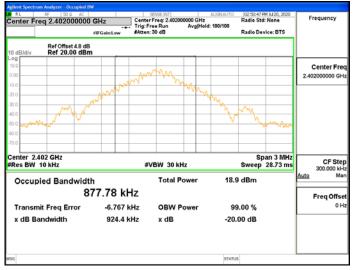
1.1763

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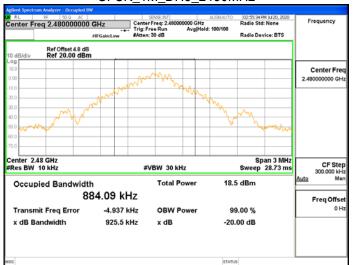
GFSK_1M_DH5_2402MHz



GFSK_1M_DH5_2441MHz



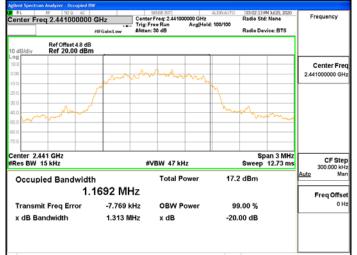
GFSK_1M_DH5_2480MHz



$\pi/4DQPSK_2M_DH5_2402MHz$



π/4DQPSK_2M_DH5_2441MHz



π/4DQPSK_2M_DH5_2480MHz



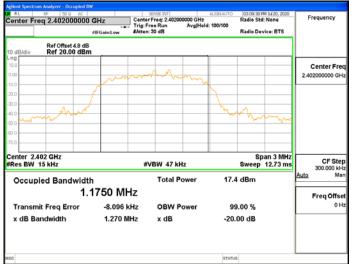
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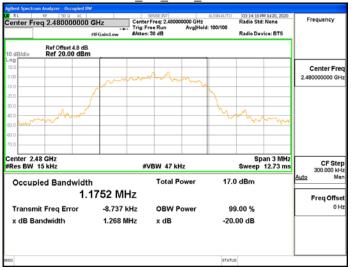
8DPSK 3M DH5 2402MHz



8DPSK_3M_DH5_2441MHz



8DPSK_3M_DH5_2480MHz



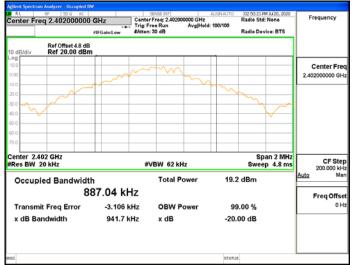
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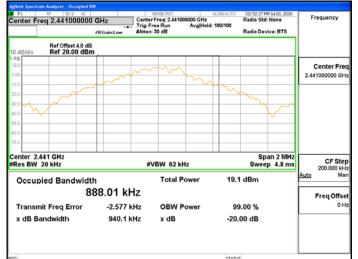
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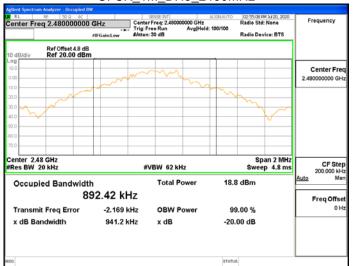
GFSK_1M_DH5_2402MHz



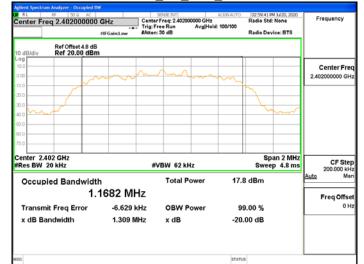
GFSK_1M_DH5_2441MHz



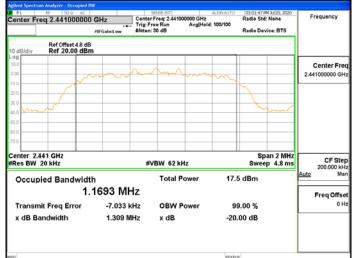
GFSK_1M_DH5_2480MHz



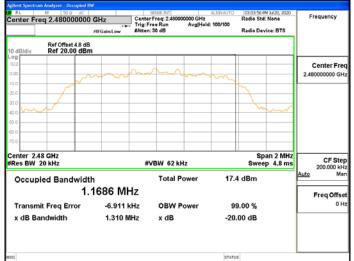
$\pi/4DQPSK_2M_DH5_2402MHz$



π/4DQPSK_2M_DH5_2441MHz



π/4DQPSK_2M_DH5_2480MHz



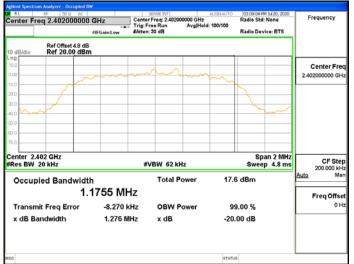
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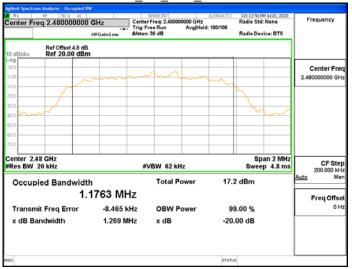
8DPSK_3M_DH5_2402MHz



8DPSK_3M_DH5_2441MHz

RL RF 50 Ω AC Center Freq 2.441000000	T	sense :NT enter Freq: 2.441000000 GH: rig: Free Run Avg He Atten: 30 dB	ALIGN AUTO dd: 100/100	03:11:08 PM 3.420, 2020 Radio Std: None Radio Device: BTS	Frequency
Ref Offset 4.8 dB Ref 20.00 dBm	1				
• 9 10.0 0.00			~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~		Center Free 2.441000000 GHz
0.0					
center 2.441 GHz				Span 2 MHz	
Res BW 20 kHz		#VBW 62 kHz		Sweep 4.8 ms	CF Step 200.000 kHz
Occupied Bandwidt		Total Power	17.3	3 dBm	<u>Auto</u> Mar
1.1	1776 MHz				Freq Offse
Transmit Freq Error	-8.096 kHz	2 OBW Power	99	9.00 %	0 H:
x dB Bandwidth	1.270 MHz	x dB	-20.	00 dB	
10			STATU		

8DPSK_3M_DH5_2480MHz



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9 CONDUCTED BAND EDGES AND SPURIOUS EMISSION MEASUREMENT

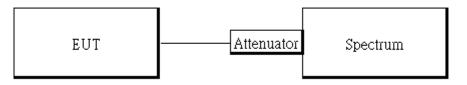
9.1 Standard Applicable

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							
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.		
EXA Spectrum Ana- lyzer	Agilent	N9010A	MY50420195	05/06/2020	05/05/2021		
DC Power Supply	Agilent	E3640A	MY40005907	10/22/2019	10/21/2020		
Bluetooth Test Set	Anritsu	MT8852B	6k00006107	08/11/2019	08/10/2020		
DC Block	Mini-Circuits	BLK-18-S+	1	01/02/2020	01/01/2021		

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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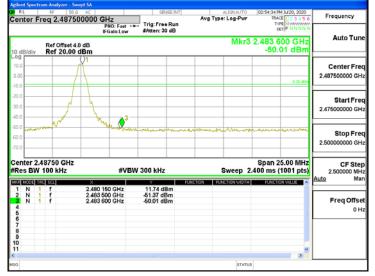
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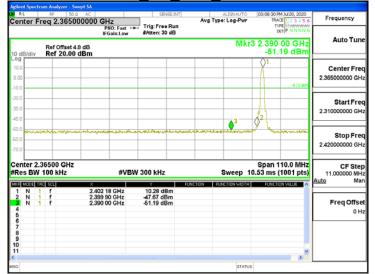
GFSK 1M DH5_2402MHz

Agilent Spectrum Analyzer - Sw					
RL RF 50 & Center Freq 2.36500	AC 00000 GHz PN0: Fast	SENSE:INT	ALIGNAUTO Avg Type: Log-Pwr	02:49:48 PM Jul 20, 2020 TRACE 1 2 3 4 5 6 TYPE	Frequency
Ref Offset 4.6	IFGain:Low	#Atten: 30 dB	Mkr	3 2.390 00 GHz -52.95 dBm	Auto Tune
0.00 10.0				-8.03 dBn	Center Free 2.365000000 GH
20.0					Start Free 2.310000000 GH
60.0 1044 Auto Antonio Autore Autore	an a	andron stational in nation of the physical section	here and the second	- homesoneway	Stop Free 2.420000000 GH
Center 2.36500 GHz Res BW 100 kHz	#VB	W 300 kHz	Sweep 1	Span 110.0 MHz 0.53 ms (1001 pts)	CF Stej 11.000000 MH
NGR MODE TRC SCL	X 2.401 85 GHz	11.97 dBm	NCTION FUNCTION WIDTH	FUNCTION VALUE	Auto Mar
2 N 1 f 31 N 1 f 4 5	2.399 90 GHz 2.390 00 GHz	-45.69 dBm -52.95 dBm			Freq Offse 0 H
7 8 9 10 11					
k Isg			STATUS		

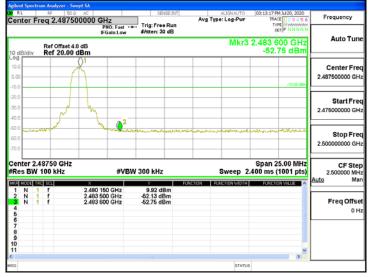
GFSK 1M DH5 2480MHz



8DPSK_3M_DH5_2402MHz



8DPSK 3M DH5 2480MHz



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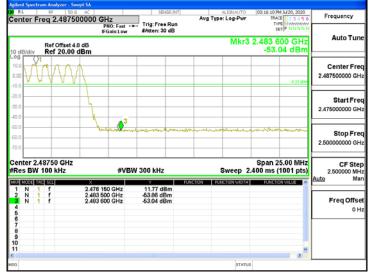
Contention in the state of the state of this document is advised that information contained hereon reflects the Company's findings at the time of its intervention only and within the limits of Client's instructions, if any. The Company's sole responsibility is to its Client and this document does not exonerate parties to a transaction form exercising all their rights and obligations under the transaction document. This document cannot be reproduced except in full, without prior written approval of the Company. Any unauthorized alteration, forgery or falsification of the content or appearance of this document is unlawful and offenders may be prosecuted to the fullest extent of the law.

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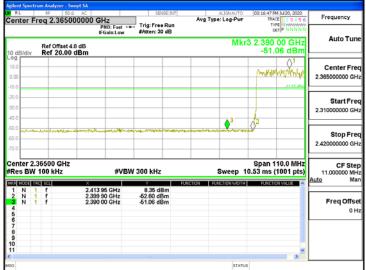
GFSK_1M_DH5_2402MHz (Hopping)

Agilent Spectrum Analyzer					
Center Freq 2.36	50 0 AC 5000000 GHz	SENSE:INT	ALIGNAUTO Avg Type: Log-Pwr	03:19:35 PM Jul 20, 2020 TRACE 1 2 3 4 5 6 TYPE	Frequency
Ref Offse	PN0: Fast IFGain:Low et 4.8 dB 00 dBm	#Atten: 30 dB	Mkr	3 2.390 00 GHz -52.84 dBm	Auto Tune
0.00 10.0					Center Fred 2.365000000 GH:
20.0				2	Start Free 2.310000000 GH:
60.0 60.0 70.0	en alter and a state of the second state of th	ange Jaman and Station Control		<u>у</u> -	Stop Free 2.420000000 GH
Center 2.36500 GH Res BW 100 kHz	#VB1	W 300 kHz		Span 110.0 MHz 0.53 ms (1001 pts)	CF Step 11.000000 MH: Auto Mar
MICE MODE TES SEL 1 N 1 f 2 N 1 f 3 N 1 f 4 5 6 7	2,402 18 GHz 2,399 90 GHz 2,390 00 GHz	12.03 dBm 450.61 dBm 452.84 dBm	FUNCTION FUNCTION WIDTH	FUNCTION VALUE	Freq Offse
8 9 10 11			STATU		

GFSK_1M_DH5_2480MHz (Hopping)



8DPSK_3M_DH5_2402MHz (Hopping)



8DPSK_3M_DH5_2480MHz (Hopping)



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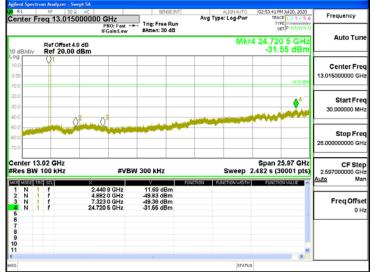
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GFSK_1M_DH5_2402MHz

Agilent Spectr										
Center Fi	_{۶۶} req 13.0	50 R AC 015000000			SE:3NT		LIGNAUTO	TRA	M Jul 20, 2020 CE 1 2 3 4 5 6 PE	Frequency
10 dB/div			PNO: Fast ⊷ Gain:Low	#Atten: 30			Mk	4 25.75	4 2 GHz 13 dBm	Auto Tune
0.00	01								-8.10 dBm	Center Free 13.015000000 GH
20.0 30.0 40.0		A2 . A	3							Start Free 30.000000 MH
50.0 60.0 70.0										Stop Free 26.000000000 GH
Center 13 Res BW			#VB	N 300 kHz			Sweep		25.97 GHz 30001 pts)	CF Ste 2.597000000 GH Auto Ma
X000 M000 M000 <th< td=""><td>ac sol</td><td>4.804</td><td>9 GHz 0 GHz 0 GHz 2 GHz 2 GHz</td><td>11.90 dE 49.40 dE 50.14 dE 32.13 dE</td><td>m m</td><td>ACTION FUN</td><td>ACTION MADTH</td><td>FUNCTI</td><td></td><td>Aute Mai Freq Offse 0 H</td></th<>	ac sol	4.804	9 GHz 0 GHz 0 GHz 2 GHz 2 GHz	11.90 dE 49.40 dE 50.14 dE 32.13 dE	m m	ACTION FUN	ACTION MADTH	FUNCTI		Aute Mai Freq Offse 0 H
a							STATU		2	

GFSK 1M DH5 2441MHz



GFSK 1M DH5 2480MHz

							lyzer - Sw		ectru	
Frequence	02:56:23 PM Jul 20, 2020 TRACE 1 2 3 4 5 6	ALIGNAUTO Type: Log-Pwr		SENS	iHz	2 AC 000000 G		RF ea 1	r Fre	L nter
INNN	DET P NNNNN		n	#Atten: 30	NO: Fast -+ Gain:Low	P				
	4 24.725 7 GHz -31.61 dBm	Mkr					Offset 4. 20.00		iv	B/di
Center								01		
13.01500000						_		_		⊢
26 sBn	-11.26 dBn	_						+		⊢
4 Start	4							+		\vdash
30.000000								+		\vdash
		Andreal Andrea	-		3	0^2 0	. (
Stop										1
26.00000000										
										Ļ
pts) 2.59700000	Span 25.97 GHz 2.482 s (30001 pts)	Sweep 2		300 kHz	#VBV			02 C		
Auto	FUNCTION VALUE	FUNCTION WIDTH	FUNCTI	9.74 dB	8 GHz	×		C SCL	E TRO	
				-51.52 dB	0 GHz	4,960		f	1	N
FreqO				-49.62 dBi -31.61 dBi	0 GHz 7 GHz	24.725		f	-1	N
×	~									
		STATUS								

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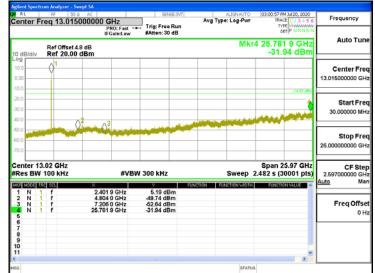
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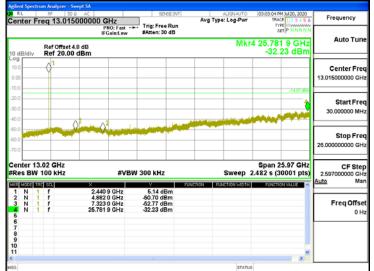
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π/4DQPSK_2M_DH5_2402MHz



π/4DQPSK 2M DH5 2441MHz



π/4DQPSK 2M DH5 2480MHz





8DPSK_3M_DH5_2402MHz

	03:10:18 PM Jul 20, 2020	ALIGNAUTO		SENSE:3N		Swept SA	n Analyzer -	etrun		igiler R
Frequency	TRACE 1 2 3 4 5 6	e: Log-Pwr	Avg T			5000000 G		Fre	ter	en
Auto Tur	24.672 1 GHz -32.28 dBm	Mkr4		#Atten: 30 dB	PNO: Fast = Gain:Low	1FG	Ref Offse Ref 20.0		B/div	
Center Fre 13.015000000 GF							0 ¹	v		10.0 0.00
Start Fre 30.000000 Mi					2	02 03				20.0 30.0 40.0
Stop Fre 26.00000000 Gi									-	50.0 50.0 70.0
CF Ste 2.597000000 G	Span 25.97 GHz 82 s (30001 pts)	Sweep 2		/ 300 kHz	#VB		02 GHz 00 kHz			
<u>Auto</u> Mi	FUNCTION VALUE	NCTION WIDTH	FUNCTION	6.11 dBm -50.68 dBm	9 GHz 0 GHz	4.804 0	SCL f f	1 1	N N	1 2
Freq Offs 01				-52.25 dBm -32.28 dBm	0 GHz 1 GHz	7.206 (24.672	f	1	N N	34567
										8 9 0
	>			ш						

8DPSK_3M_DH5_2441MHz

	um Analyzer -								
Center Fi		0 0 AC		SENSE:	Ave	ALIGNAUTO Type: Log-Pwr	TRA	M 3ul 20, 2020 CE 1 2 3 4 5 6 PE 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	Frequency
10 dB/div	Ref Offset Ref 20.0	1F t 4.8 dB	PNO: Fast 🔸 Gain:Low	#Atten: 30 dB	n	Mki	r4 25.22	6 1 GHz 89 dBm	Auto Tun
-09 10.0 0.00	01								Center Fre 13.015000000 GH
20.0		<u>∧</u> ² ∧	3					.15.33 dbn	Start Fre 30.000000 M⊦
50.0 60.0 70.0									Stop Fre 26.00000000 GH
Center 13 #Res BW			#VBV	V 300 kHz		Sweep		5.97 GHz 0001 pts)	CF Ste 2.597000000 GH Auto Ma
1 N 1 2 N 1 3 N 1 4 N 1 5 6 7 8 9 10	ig sou f f f f	4.882	9 GHz 0 GHz 0 GHz 1 GHz 1 GHz	4.67 dBm 49.93 dBm -51.40 dBm -31.89 dBm	FUNCTION	FUNCTION WIDTH	FUNCTI		Auto Ma Freq Offsi 0 H

8DPSK_3M_DH5_2480MHz

		er - Swept SA				
Center F	⁸⁶ Freq 13.0	50 R AC 015000000 GHz	SENSE 3NT	ALIGNAUTO Avg Type: Log-Pwr	03:15:04 PM Jul 20, 2020 TRACE 1 2 3 4 5 6 TYPE	Frequency
10 dB/div		PNO: Fast IFGain:Low set 4.8 dB 0.00 dBm	#Atten: 30 dB	Mkr	4 25.253 8 GHz -31.69 dBm	Auto Tune
10.0 0.00	01				100 005	Center Free 13.015000000 GH:
-20.0 -30.0 -40.0		∩ ² ∩3				Start Free 30.000000 MH
-50.0 -60.0 -70.0						Stop Free 26.000000000 GH
Center 1 #Res BW			W 300 kHz	Sweep :	Span 25.97 GHz 2.482 s (30001 pts)	CF Step 2.597000000 GH: Auto Mar
Kore Kore I N 1 N 2 N 3 N 3 N 4 N 6 6 6 7 8 9 9 10 10 14	100 SCL 1 f 1 f 1 f 1 f 1 f	2.479 8 GHz 4.960 0 GHz 7.440 0 GHz 25.253 8 GHz	6.93 dBm -49.30 dBm -51.11 dBm -31.69 dBm	FUNCTION WIDTH	FUNCTION VALUE	Auto Mar Freq Offse 0 H:
11 <				STATUS	×	

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10 RADIATED BANDEDGE AND SPURIOUS EMISSION MEASUREMENT

10.1 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 must also comply with the §15.209 and RSS-Gen §8.9 Table 5 and 6 limit as below.

And according to §15.33(a) (1) & RSS-Gen §6.13.2.a, for an intentional radiator operates below 10GHz, the frequency range of measurements: to the tenth harmonic of the highest fundamental frequency or to 40GHz, whichever is lower.

Frequency (MHz)	Field strength (microvolts/meter)	Distance (meters)
0.009-0.490	2400/F(kHz)	300
0.490-1.705	24000/F(kHz)	30
1.705-30	30	30
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3

Note:

- 1. The lower limit shall apply at the transition frequencies.
- 2. Emission level ($dB\mu V/m$) = 20 log Emission level ($\mu V/m$)

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10.2 **Measurement Equipment Used**

966 Chamber										
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.					
Horn Antenna	Schwarzbeck	BBHA9170	184	12/25/2019	12/24/2020					
Horn Antenna	Schwarzbeck	BBHA9120D	D803	12/20/2019	12/19/2020					
Bi-log Antenna	TESEO	CBL 6112D	35242 & AT- N0555	01/13/2020	01/12/2021					
Loop Antenna	ETS.LINDGREN	6502	148045	10/15/2019	10/14/2020					
Spectrum Ana- lyzer	Agilent	E4446A	MY51100003	10/23/2019	10/22/2020					
EMI Test Receiver	R&S	ESCI 7	100759	07/13/2020	07/12/2021					
Pre-Amplifier	EMC Instru- ments	EMC184045B	980135	01/02/2020	01/01/2021					
Pre-Amplifier	EMC Instru- ments	EMC051825	980152	01/02/2020	01/01/2021					
Pre-Amplifier	HP	8447D	2944A09469	01/02/2020	01/01/2021					
Attenuator	Mini-Circuit	BW-S10W2+	4	01/02/2020	01/01/2021					
Filter 2400-2483.5 MHz	EWT	EWT-14-0166	M1	01/02/2020	01/01/2021					
High Pass Filter	WI	WHKX4.0/18G- 10SS	22	01/02/2020	01/01/2021					
Coaxial Cable	Huber Suhner	succoflex 102	MY2622/2	01/02/2020	01/01/2021					
Coaxial Cable	Huber Suhner	succoflex 104A	800086/4a	01/02/2020	01/01/2021					
Coaxial Cable	Huber Suhner	EMC 104-SM- SM-2000	160123	01/02/2020	01/01/2021					

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

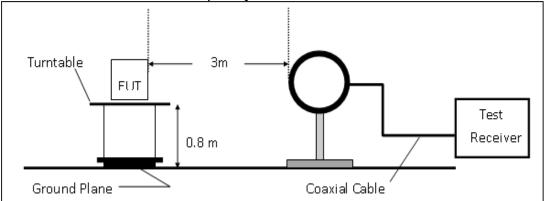
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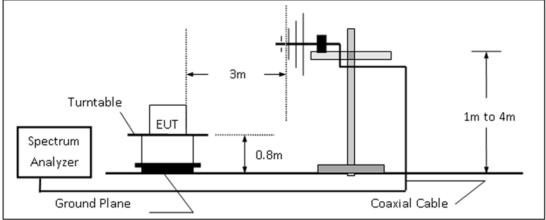


10.3 Test SET-UP

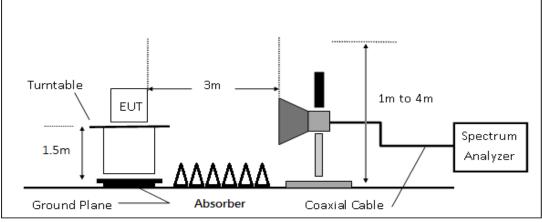
(A) Radiated Emission Test Set-UP Frequency Below 30MHz.



(B) Radiated Emission Test Set-Up, Frequency form 30MHz to 1000MHz



(C) Radiated Emission Test Set-UP Frequency Over 1 GHz



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10.4 Measurement Procedure

10.4.1 Radiated Emission

- 1. The testing follows the Measurement Procedure of ANSI C63.10:2013.
- The EUT was placed on a turn table with 0.8m for frequency< 1GHz and 1.5m for frequency> 1GHz above ground plan.
- 3. The turn table shall rotate 360 degrees to determine the position of maximum emission level.
- 4. EUT is set 3m away from the receiving antenna which varied from 1m to 4m to find out the highest emissions.
- 5. Set the spectrum analyzer as RBW=120 kHz and VBW=300 kHz for Peak Detector (PK) and Quasi-peak (QP) at frequency below 1 GHz.
- 6. Set the spectrum analyzer as RBW=1 MHz, VBW=3 MHz for Peak Detector at frequency above 1 GHz.
- 7. Set the spectrum analyzer as RBW=1 MHz, VBW=10 Hz (Duty cycle > 98%) or VBW ≥ 1/T (Duty cycle < 98%) for Average Detector at frequency above 1 GHz.
- 8. When 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.
- 9. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
- And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical. On spectrum, change spectrum mode in linear display mode, and reduce VBW = 10Hz if average reading is measured.
- 11. Repeat above procedures until all default test channel measured were complete.

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10.5 Field Strength Calculation

The field strength is calculated by adding the Antenna Factor and Cable Factor and subtracting the Amplifier Gain and Duty Cycle Correction Factor (if any) from the measured reading. The basic equation with a sample calculation is as follows:

FS = RA + AF + CL - AG

Where FS = Field Strength RA = Reading Amplitude AF = Antenna Factor CL = Cable Attenuation Factor (Cable Loss) AG = Amplifier Gain

The limit of the emission level is expressed in dBuV/m, which converts 20*log(uV/m)

Actual FS($dB\mu V/m$) = SPA. Reading level($dB\mu V$) + Factor(dB) Factor(dB) = Antenna Factor($dB\mu V/m$) + Cable Loss(dB) – Pre_Amplifier Gain(dB)

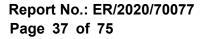
10.6 Test Results of Radiated Spurious Emissions form 9 kHz to 30 MHz

The low frequency, which started from 9 kHz to 30MHz, was pre-scanned and the result which was 20dB lower than the limit per 15.31(o) & RSS-GEN §6.13.2 was not reported.

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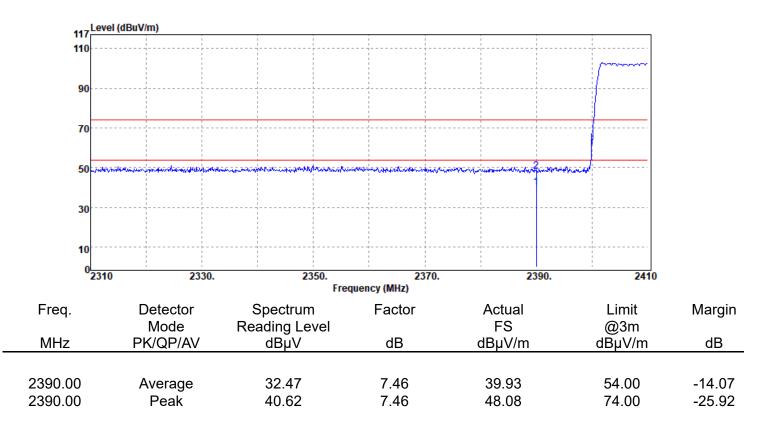
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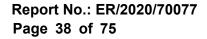


10.7 **Measurement Result:**

10.7.1 Radiate	ed Bandedge Result (Hopping Mode)		
Report Number	:ER/2020/70077	Test Site	:SAC I Chamber
Operation Mode	:BR Hopping	Test Date	:2020-08-11
Test Frequency	:2402 MHz	Temp./Humi.	:26.5/67
Test Mode	:Bandedge CH Low	Antenna Pol.	:VERTICAL
EUT Pol	:H Plane	Engineer	:Neo



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Test Site

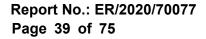


:ER/2020/70077

Report Number

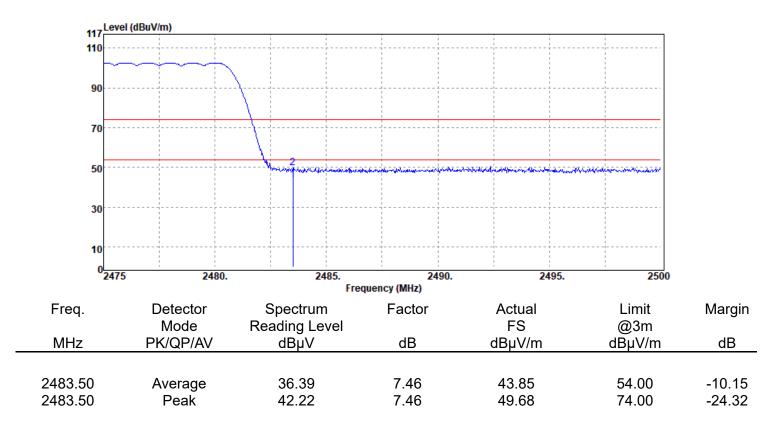
Operation Mode Test Frequency Test Mode EUT Pol	:BR Hoppir :2402 MHz :Bandedge :H Plane			Test Date Temp./Humi. Antenna Pol. Engineer	:2020-08-11 :26.5/67 :HORIZONT :Neo	AL
117	dBuV/m)					
110						
90						
70						
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30						
10						
⁰ 2310	2330.	2350. Fre	2370. quency (MHz)	2390.	2410	
Freq.	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
2390.00	Average	32.46	7.46	39.92	54.00	-14.08
2390.00	Peak	41.71	7.46	49.17	74.00	-24.83

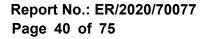
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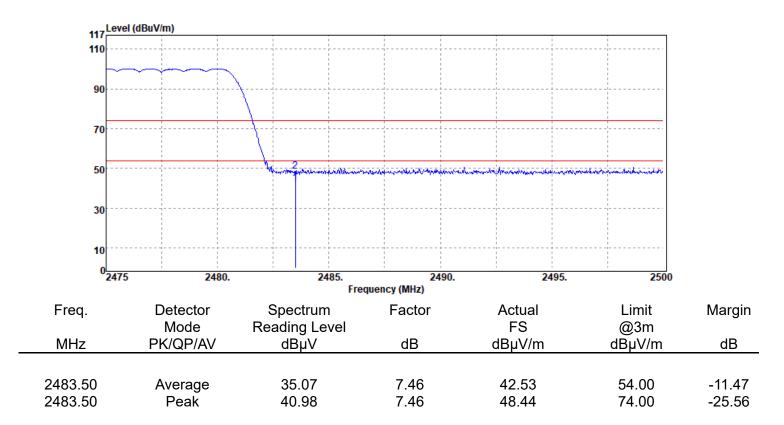
Report Number	:ER/2020/70077	Test Site	:SAC I Chamber
Operation Mode	:BR Hopping	Test Date	:2020-08-11
Test Frequency	:2480 MHz	Temp./Humi.	:26.5/67
Test Mode	:Bandedge CH High	Antenna Pol.	:VERTICAL
EUT Pol	:H Plane	Engineer	:Neo

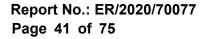






Report Number	:ER/2020/70077	Test Site	:SAC I Chamber
Operation Mode	:BR Hopping	Test Date	:2020-08-11
Test Frequency	:2480 MHz	Temp./Humi.	:26.5/67
Test Mode	:Bandedge CH High	Antenna Pol.	:HORIZONTAL
EUT Pol	:H Plane	Engineer	:Neo





Test Site

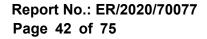


:ER/2020/70077

Report Number

Operation Mode Test Frequency Test Mode EUT Pol	:EDR Hop :2402 MHz :Bandedge :H Plane	<u>Z</u>		Test Date Temp./Humi. Antenna Pol. Engineer	:2020-08-11 :26.5/67 :VERTICAL :Neo	
117 Level (dE	3uV/m)					
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90						
70						
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30						
10						
0 2310	2330.	2350. Fred	2370. Juency (MHz)	2390.	2410	
Freq.	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
2390.00 2390.00	Average Peak	32.37 40.56	7.46 7.46	39.83 48.02	54.00 74.00	-14.17 -25.98

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Test Site

48.22

74.00

-25.78



:ER/2020/70077

Report Number

2390.00

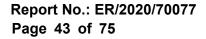
Peak

Operation M Test Freque Test Mode EUT Pol		:EDR H :2402 M :Bande :H Plan	1Hz dge CH	Low				Test Date Temp./Hu Antenna Engineer	umi. Pol.	:2020-08- :26.5/67 :HORIZO :Neo	
117	7 <mark>Level (dBuV</mark>	/m)									
110							 		1 1 7		
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	0		20				70		200	-	0
	2310	23	50.	235	Frequen		70.	2.	390.	241	U
Freq.	0	Detector		Spectrum		Factor		Actual		Limit	Margin
		Mode	Rea	ading Lev	/el			FS		@3m	
MHz	PI	K/QP/AV		dBµV		dB		dBµV/m		dBµV/m	dB
2390.00	A	verage		32.49		7.46		39.95		54.00	-14.05

7.46

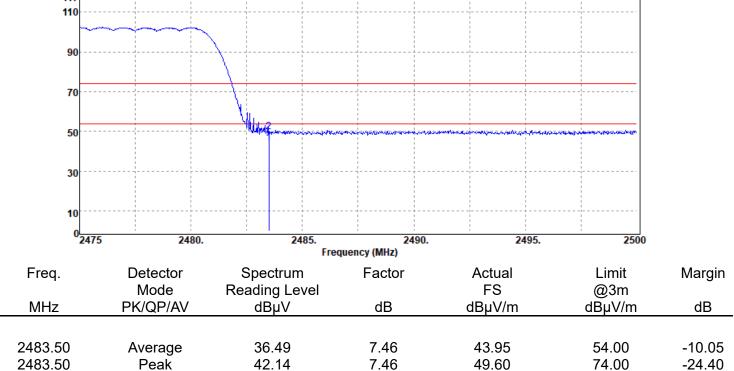
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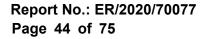
40.76





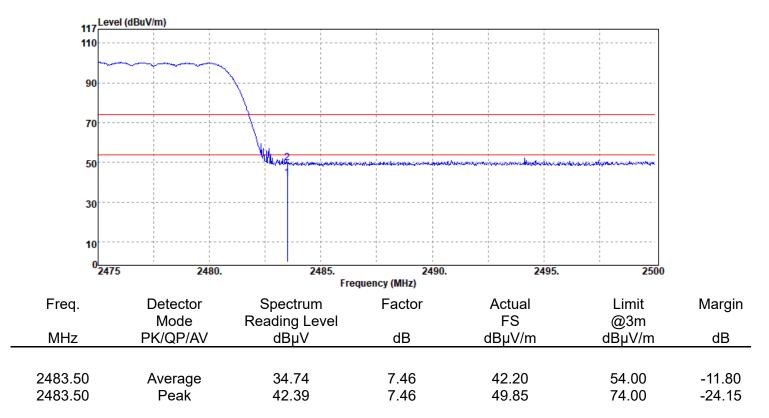
Report Number	:ER/2020/70077				Test Site	:SAC I Chamber
Operation Mode	:EDR Hopping				Test Date	:2020-08-11
Test Frequency	:2480 MHz				Temp./Humi.	:26.5/67
Test Mode	:Bandedge CH High				Antenna Pol.	:VERTICAL
EUT Pol	:H Plane				Engineer	:Neo
117	//m)					
		1	1	1		







Report Number	:ER/2020/70077	Test Site	:SAC I Chamber
Operation Mode	:EDR Hopping	Test Date	:2020-08-11
Test Frequency	:2480 MHz	Temp./Humi.	:26.5/67
Test Mode	:Bandedge CH High	Antenna Pol.	:HORIZONTAL
EUT Pol	:H Plane	Engineer	:Neo

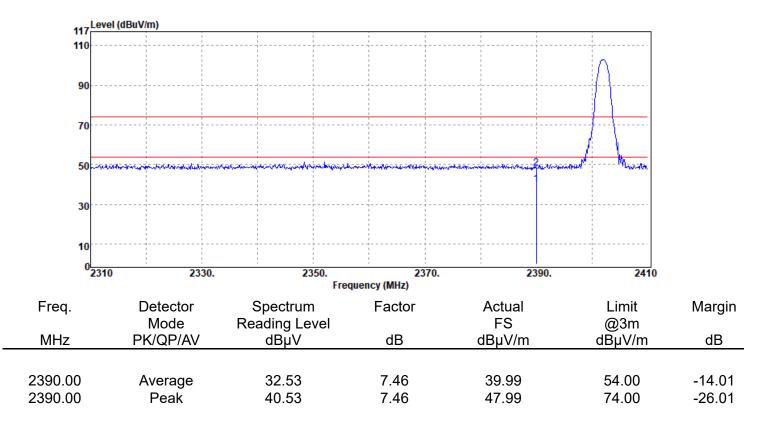


Report No.: ER/2020/70077 Page 45 of 75



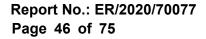
10.7.2 Radiated Bandedge Result (Non-Hopping Mode)

:ER/2020/70077	Test Site	:SAC I Chamber
:BR(1M)	Test Date	:2020-08-11
:2402 MHz	Temp./Humi.	:26.5/67
:Bandedge CH Low	Antenna Pol.	:VERTICAL
:H Plane	Engineer	:Neo
	:BR(1M) :2402 MHz :Bandedge CH Low	:BR(1M)Test Date:2402 MHzTemp./Humi.:Bandedge CH LowAntenna Pol.



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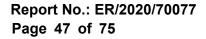
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Report Number Operation Mode Test Frequency Test Mode EUT Pol	:ER/2020/7 :BR(1M) :2402 MHz :Bandedge :H Plane	Z		Test Site Test Date Temp./Humi. Antenna Pol. Engineer	:SAC I Cham :2020-08-11 :26.5/67 :HORIZONT/ :Neo	
117	BuV/m)					
110						
					\wedge	
90						
70						
50		anna an	Androssemmente	www.commencedowners	wart White	
				1		
30						
10						
0 <mark>2310</mark>	2330.	2350. Free	2370. Juency (MHz)	2390.	2410	
Freq.	Detector	Spectrum	Factor	Actual	Limit	Margin
MHz	Mode PK/QP/AV	Reading Level dBµV	dB	FS dBµV/m	@3m dBµV/m	dB
		ασμν	UD	σομν/π	ασμν/π	uD
2390.00	Average	32.41	7.46	39.87	54.00	-14.13
2390.00	Peak	41.84	7.46	49.30	74.00	-24.70

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Test Site

44.15

50.94

54.00

74.00

-9.85

-23.06



:ER/2020/70077

Report Number

2483.50

2483.50

Average

Peak

Operation Mode Test Frequency Test Mode EUT Pol	:BR(1M) :2480 MHz :Bandedge CH :H Plane	l High		Test Date Temp./Humi. Antenna Pol. Engineer	:2020-08-11 :26.5/67 :VERTICAL :Neo	
117 Level (dBu\	//m)					
110						
90						
70		N				
50 sadarand		Manna	an a	al Marine and the stand of the st		
30						
10						
0 2475	2480.	2485. Frequ	2490. Jency (MHz)	2495.	2500	
Freq.		Spectrum	Factor	Actual	Limit	Margin
		eading Level	dD	FS dBu)//m	@3m	٩D
MHz P	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB

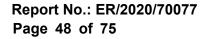
7.46

7.46

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36.69

43.48



na na ke



70

30

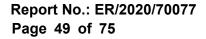
10

50 -----

Report Number	:ER/2020/70077		Test Site	:SAC I Chamber
Operation Mode	:BR(1M)		Test Date	:2020-08-11
Test Frequency	:2480 MHz		Temp./Humi.	:26.5/67
Test Mode	:Bandedge CH Higł	1	Antenna Pol.	:HORIZONTAL
EUT Pol	:H Plane		Engineer	:Neo
117	V/m)			
110		· · · · · · · · · · · · · · · · · · ·		
90				

U	2475 2480.	2485.	2490.	2495.	2500	
		Free	luency (MHz)			
Freq.	Detector	Spectrum	Factor	Actual	Limit	Margin
	Mode	Reading Level		FS	@3m	0
MHz	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
		•				
2483.50	Average	35.31	7.46	42.77	54.00	-11.23
2483.50	Peak	42.74	7.46	50.20	74.00	-23.80
2400.00	1 Call	72.17	7.40	00.20	74.00	20.00

Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 90 days only.



Test Site

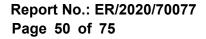


:ER/2020/70077

Report Number

Operation Mo Test Frequence Test Mode	lode :EDR(3M) ncy :2402 MHz :Bandedge CH Low		Test Date Temp./Humi. Antenna Pol.	:2020-08-11 :26.5/67 :VERTICAL		
EUT Pol	:H Plane			Engineer	:Neo	
117 	vel (dBuV/m)					
110			·			
90					\wedge	
90						
70			·			
مبتر 50	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	-albert in the stand and the state of the st	KANGANGUNA KANGUNAN DALAMI	monder and the second	an-state Managana	
30						
10			·			
0 ^L 23	10 2330.	2350. Free	2370. quency (MHz)	2390.	2410	
Freq.	Detector	Spectrum	Factor	Actual	Limit	Margin
	Mode	Reading Level		FS	@3m	· ·
MHz	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
2390.00	Average	32.35	7.46	39.81	54.00	-14.19
2390.00	Peak	41.28	7.46	48.74	74.00	-25.26

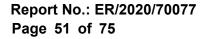
Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 90 days only.





Report Number Operation Mode Test Frequency Test Mode EUT Pol	:ER/2020/70077 :EDR(3M) :2402 MHz :Bandedge CH Low :H Plane			Test Site Test Date Temp./Humi. Antenna Pol. Engineer	:SAC I Cham :2020-08-11 :26.5/67 :HORIZONT/ :Neo	
117	uV/m)					
110						
90						
70						
50 	Quanter material and a	aanaanaanaanaanaanaanaanaanaanaanaanaan	\$1844444000.com.a.c.a.c.a.a.c.a.a.a.a.a.a.a.a.a.a.a.a.	which we we want the stand which where the stand where the sta	0-7	
30						
10						
0 ^L 2310	2330.	2350.	2370.	2390.	2410	
	.		uency (MHz)			
Freq.	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	PK/QP/AV	Reading Level dBµV	dB	dBµV/m	dBµV/m	dB
2390.00	Average	32.26	7.46	39.72	54.00	-14.28
2390.00	Peak	40.87	7.46	48.33	74.00	-25.67

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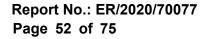




Report Number Operation Mode Test Frequency Test Mode	:ER/2020/70077 :EDR(3M) :2480 MHz :Bandedge CH Hig	gh	Tes Ter	st Site st Date np./Humi. cenna Pol.	:SAC I Chamber :2020-08-11 :26.5/67 :VERTICAL
EUT Pol	:H Plane		End	gineer	:Neo
117 <mark>Level (dBu</mark>				<u></u>	
110					
90					
70					
50-022.000					,0004,000,000,000
30					
10	2422	2405	2400		250
2475	2480.	2485. Frequency (I	2490. MHz)	2495.	2500

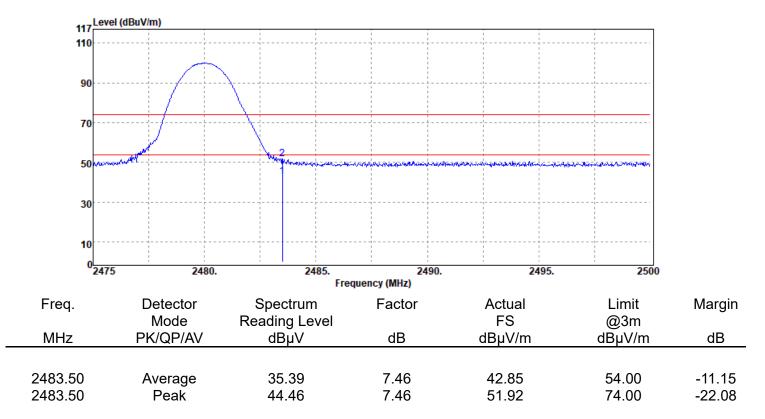
Frequency (MHZ)							
Freq.	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin	
MHz	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB	
2483.50 2483.50	Average Peak	36.76 43.88	7.46 7.46	44.22 51.34	54.00 74.00	-9.78 -22.66	

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Report Number	:ER/2020/70077	Test Site	:SAC I Chamber
Operation Mode	:EDR(3M)	Test Date	:2020-08-11
Test Frequency	:2480 MHz	Temp./Humi.	:26.5/67
Test Mode	:Bandedge CH High	Antenna Pol.	:HORIZONTAL
EUT Pol	:H Plane	Engineer	:Neo





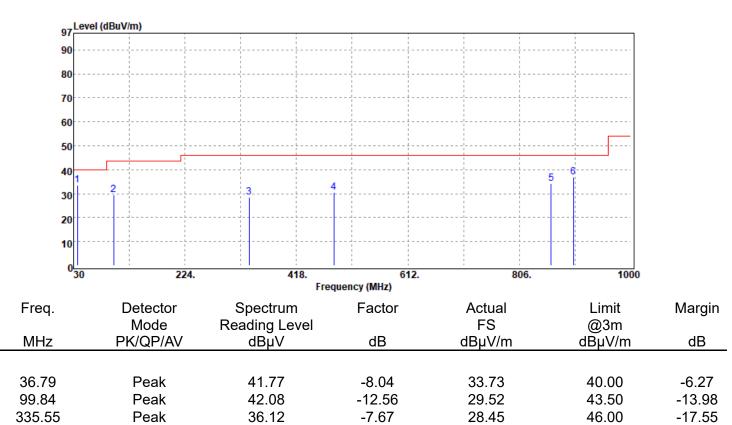
482.99

861.29

900.09

10.7.3 Radiated Spurious Emission form 30MHz to 1000MHz:

Report Number	:ER/2020/70077	Test Site	:SAC I Chamber
Operation Mode	:EDR(3M)	Test Date	:2020-08-13
Test Frequency	:2441 MHz	Temp./Humi.	:25.0/66
Test Mode	:Tx CH Mid	Antenna Pol.	:VERTICAL
EUT Pol	:H Plane	Engineer	:Neo



-5.32

0.03

1.12

30.41

34.27

36.98

46.00

46.00

46.00

-15.59

-11.73

-9.02

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35.73

34.24

35.86

Peak

Peak

Peak

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20 10 ſ

Report Number :ER/2020/70077		Test Site	:SAC I Chamber	
Operation Mode	:EDR(3M)		Test Date	:2020-08-13
Test Frequency	:2441 MHz		Temp./Humi.	:25.0/66
Test Mode	:Tx CH Mid		Antenna Pol.	:HORIZONTAL
EUT Pol	:H Plane		Engineer	:Neo
97	//m)			
90				
80				
70				
60				
50	· · · · · · · · · · · · · · · · · · ·			
40 1			0 04	5 6
30	J			

~ 30) 224.	418. Freq	612. Juency (MHz)	806.	1000	
Freq.	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
76.56	Peak	47.23	-16.61	30.62	40.00	-9.38
750.71	Peak	30.03	-1.21	28.82	46.00	-17.18
818.61	Peak	29.43	-0.85	28.58	46.00	-17.42
839.95	Peak	29.53	0.36	29.89	46.00	-16.11
915.61	Peak	29.46	0.74	30.20	46.00	-15.80
964.11	Peak	29.38	1.97	31.35	54.00	-22.65

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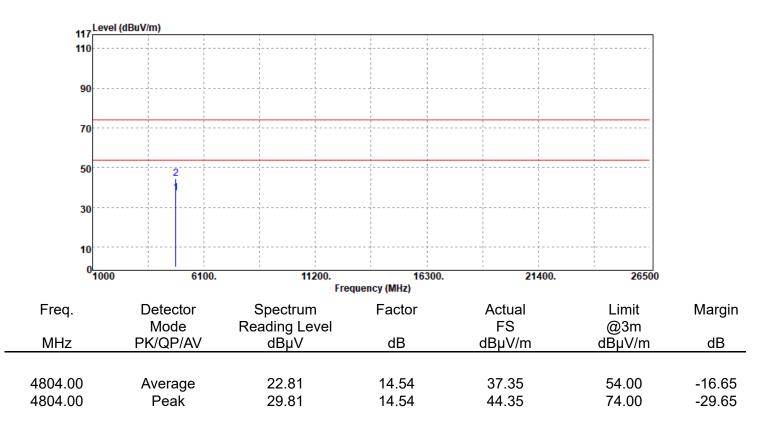


10.7.4 Radiated Spurious Emission above 1 GHz:

Report Number	:
Operation Mode	:
Test Frequency	:
Test Mode	:
EUT Pol	:

ER/2020/70077 EDR(3M) 2402 MHz Tx CH Low:

Test Site	:SAC I Chamber
Test Date	:2020-08-12
Temp./Humi.	:26.5/71
Antenna Pol.	:VERTICAL
Engineer	:Neo



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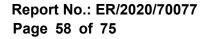
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Report Number Operation Mode Test Frequency Test Mode EUT Pol	e :EDR(3M)			Test Site Test Date Temp./Humi. Antenna Pol. Engineer	:SAC I Cham :2020-08-12 :26.5/71 :HORIZONT, :Neo	
11- Level	l (dBuV/m)					
110						
90						
70						
50	2					
30						
10						
0 <mark></mark>	6100.	11200.	16300.	21400.	26500	
			luency (MHz)	• / •		
Freq.	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
4804.00 4804.00	Average Peak	22.85 30.55	14.54 14.54	37.39 45.09	54.00 74.00	-16.61 -28.91



Report Number Operation Mode Test Frequency Test Mode EUT Pol	:ER/2020/7 :EDR(3M) :2441 MHz :Tx CH Mic :H Plane	<u>r</u>		Test Site Test Date Temp./Humi. Antenna Pol. Engineer	:SAC I Cham :2020-08-12 :26.5/71 :VERTICAL :Neo	ıber
117	BuV/m)					
110						
90						
70						
50	2					
30						
10						
0 <mark>0</mark> 0	6100.	11200. Fred	16300. quency (MHz)	21400.	26500	
Freq.	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
4882.00 4882.00	Average Peak	21.17 30.32	14.96 14.96	36.13 45.28	54.00 74.00	-17.87 -28.72

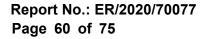




Report Number Operation Mode Test Frequency Test Mode EUT Pol	:ER/2020/ :EDR(3M) :2441 MHz :Tx CH Mi :H Plane	Z		Test Site Test Date Temp./Humi. Antenna Pol. Engineer	:SAC I Chan :2020-08-12 :26.5/71 :HORIZONT :Neo	
117 Level (d	BuV/m)					
117						
90						
70						
50	2					
30						
10						
0 1000	6100.	11200. Free	16300. quency (MHz)	21400.	26500	
Freq.	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
4882.00 4882.00	Average Peak	21.12 30.79	14.96 14.96	36.08 45.75	54.00 74.00	-17.92 -28.25



Report Number Operation Mode Test Frequency Test Mode EUT Pol	:ER/2020/7 :EDR(3M) :2480 MHz :Tx CH Hig :H Plane	:		Test Site Test Date Temp./Humi. Antenna Pol. Engineer	:SAC I Cham :2020-08-12 :26.5/71 :VERTICAL :Neo	ıber
117 Level (d	BuV/m)					
110						
90						
70						
50	<u>2</u>					
30						
10						
0 <mark></mark> 1000	6100.	11200. Free	16300. Juency (MHz)	21400.	26500	
Freq.	Detector Mode	Spectrum	Factor	Actual FS	Limit	Margin
MHz	PK/QP/AV	Reading Level dBµV	dB	dBµV/m	@3m dBµV/m	dB
4960.00 4960.00	Average Peak	20.24 30.99	14.75 14.75	34.99 45.74	54.00 74.00	-19.01 -28.26





Report Number Operation Mode Test Frequency Test Mode EUT Pol	:ER/2020/ :EDR(3M) :2480 MHz :Tx CH Hig :H Plane	Z		Test Site Test Date Temp./Humi. Antenna Pol. Engineer	:SAC I Cham :2020-08-12 :26.5/71 :HORIZONT :Neo	
117_Level (dB	uV/m)					
110						
90						
70						
50	2					
30						
10						
0 <mark>0</mark>	6100.	11200. Free	16300. quency (MHz)	21400.	26500	
Freq.	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
4960.00 4960.00	Average Peak	20.28 30.61	14.75 14.75	35.03 45.36	54.00 74.00	-18.97 -28.64

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11 FREQUENCY SEPARATION

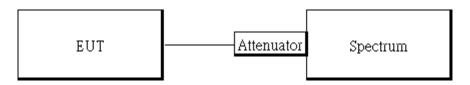
11.1 Standard Applicable

Frequency hopping systems shall have hopping channel carrier frequencies separated by minimum of 25 kHz or the 2/3*20dB bandwidth of the hopping channel, whichever is greater.

11.2 Measurement Equipment Used

	Conducted Emission Test Site								
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.				
EXA Spectrum Ana- lyzer	Agilent	N9010A	MY50420195	05/06/2020	05/05/2021				
DC Power Supply	Agilent	E3640A	MY40005907	10/22/2019	10/21/2020				
Bluetooth Test Set	Anritsu	MT8852B	6k00006107	08/11/2019	08/10/2020				
DC Block	Mini-Circuits	BLK-18-S+	1	01/02/2020	01/01/2021				

11.3 Test Set-up



11.4 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 center frequency of spectrum analyzer = middle of hopping channel.
- 5. Set the spectrum analyzer as RBW, VBW=100 kHz, Adjust Span to 5MHz, Sweep = auto.
- 6. Max hold. Mark 3 Peaks of hopping channel and record the 3 peaks frequency.

11.5 Measurement Result

Channel separation (MHz)	Limit	Result
1	\ge 25 kHz or 2/3 times 20dB bandwidth	PASS

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11.6 **Frequency Separation Test Plots**

	ım Analyzer - Swe	ept SA							
XI RL Center Fr	RF 50 Ω Teq 2.40300	00000 GHz	_	SENSE:INT		ALIGN AUTO :: Log-Pwr		20, 2020 2 3 4 5 6	Frequency
	Ref Offset 4.8	IFGain:		Atten: 30 dB				NNNNN	Auto Tun
10 dB/div	Ref 20.00 (3.9	99 dB	
10.0		mannikan	~~~~~~	1 <u>02</u>	mon	3∆4 M~~y	mm	hom	Center Fre 2.403000000 G⊦
20.0									
20.0	mm								Start Fre 2.400500000 GF
50.0									Stop Fre
70.0									2.405500000 GH
enter 2.4 Res BW	03000 GHz 100 kHz	:	#VBW 10	00 kHz		Sweep 1	Span 5.00 .000 ms (10	01 pts)	CF Ste 500.000 ki
IKR MODE TR	CSCL f (Δ)	× 1.000 MH	tz (Δ)	Y 2.59 dB	FUNCTION FUN	ICTION WIDTH	FUNCTION V.	ALUE	<u>Auto</u> Ma
2 F 1 3 Δ4 1 4 F 1 5	f f (Δ) f	2.402 000 GH 1.000 MH 2.403 000 GH	lz lz (Δ)	2.59 dBm 3.99 dB 5.18 dBm					Freq Offs 0 H
6 7 8 9									
10 11								~	
SG						STATUS	;		

8DPSK_3M_DH5

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12 NUMBER OF HOPPING FREQUENCY

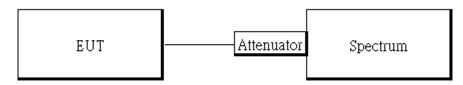
12.1 Standard Applicable

Frequency hopping systems operating in the 2400MHz-2483.5 MHz bands shall use at least 15 hopping frequencies.

12.2 Measurement Equipment Used

	Conducted Emission Test Site								
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.				
EXA Spectrum Ana- lyzer	Agilent	N9010A	MY50420195	05/06/2020	05/05/2021				
DC Power Supply	Agilent	E3640A	MY40005907	10/22/2019	10/21/2020				
Bluetooth Test Set	Anritsu	MT8852B	6k00006107	08/11/2019	08/10/2020				
DC Block	Mini-Circuits	BLK-18-S+	1	01/02/2020	01/01/2021				

12.3 Test Set-up



12.4 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 spectrum analyzer Start=2400MHz, Stop = 2483.5MHz, Sweep = auto.
- 5. Set the spectrum analyzer as RBW=430kHz, VBW=1.5MHz., Detector = Peak
- 6. Max hold, view and count how many channel in the band.

12.5 Measurement Result

Tabular Data of Total Channel Number

	Channel Number	Limit
2.4 GHz – 2.441 GHz	40	
2.441 GHz – 2.4835 GHz	39	>15
2.4 GHz ~2.4835 GHz	(40+39) = 79	

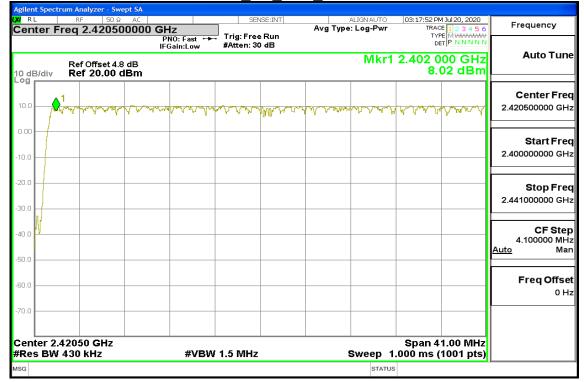
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12.6 Channel Number Test Plots



8DPSK 3M DH5 2400-2441

8DPSK_3M_DH5_2441-2480

Agilent	t Spectru	im Analyzer - Sv	wept SA								
Cent	ter Fr	RF 50: eq 2.4622	Ω AC 250000 G	Hz	1	ISE:INT		ALIGNAUTO E: Log-Pwr		20, 2020 2 3 4 5 6	Frequency
10 dB	3/div	Ref Offset 4 Ref 20.00	II .8 dB	PNO: Fast 😱 FGain:Low	Trig: Free #Atten: 30			Mkr1 2	DET P	NNNNN	Auto Tune
10.0 s	ᢩ᠂᠂ᢦᡃᠯ	vvvvv	all a land	And New Andrew	V V WW	hur Artu	A Maria	Jan Ala Carl	y vy wy	1 \	Center Freq 2.462250000 GHz
0.00 -											Start Freq 2.441000000 GHz
-20.0 - -30.0 -											Stop Freq 2.483500000 GHz
-40.0 -										4 Vie Jyr	CF Step 4.250000 MHz <u>Auto</u> Man
-60.0 -											Freq Offset 0 Hz
-70.0 - Start	t 2.44 1	00 GHz							Stop 2.483	50 GHz	
		130 kHz		#VBW	1.5 MHz				.000 ms (10		

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TIME OF OCCUPANCY (DWELL TIME) 13

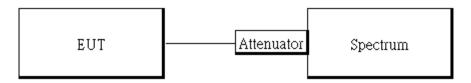
13.1 Standard Applicable

Frequency hopping systems operating in the 2400MHz-2483.5MHz. The average time of occupancy on any frequency shall not greater than 0.4 s within period of 0.4 seconds multiplied by the number of hopping channel employed.

13.2 Measurement Equipment Used

Conducted Emission Test Site								
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.			
EXA Spectrum Ana- lyzer	Agilent		MY50420195		05/05/2021			
DC Power Supply	Agilent	E3640A	MY40005907	10/22/2019	10/21/2020			
Bluetooth Test Set	Anritsu	MT8852B	6k00006107	08/11/2019	08/10/2020			
DC Block	Mini-Circuits	BLK-18-S+	1	01/02/2020	01/01/2021			

13.3 **Test Set-up**



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13.4 Measurement Procedure

- 1. Place the EUT on the table and set it in transmitting mode.
- 2. The testing follows ANSI C6310:2015.
- 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, VBW=1MHz, 3MHz, Span = 0Hz , Detector = Peak, Adjust Sweep = 2~8ms.

6. Repeat above procedures until all frequency of the interest measured were complete.

Formula Deduced: time occupancy of one time slot X Hopping rate / total slot in one channel / total channel that hops X period of working channels.

Where, standard hopping rate is 1600 hops/s, slot in one channel for DH1, DH3, and DH5 is 2, 4, and 6, respectively.

DH1 consists of single time slot of the uplink, and one slot of the downlink Total Slot: 2 DH3 consists of three time slot of the uplink, and one slot of the downlink. Total Slot: 4 DH5 consists of five time slot of the uplink, and one slot of the downlink. Total Slot: 6

In AFH mode, hopping rate is 800 hop/s with 6 slots in 20 hopping channels with channel hopping rate (800 / 6 / 20) in Occupancy Time Limit (0.4 * 20) (S), Hop Over Occupancy Time comes to $(800 / 6 / 20)^*(0.4 * 20) = 53.33$

Note: the result of the complete test default channel at 1Mbps is recorded on the test report, 2Mbps, and 3Mbps only records the measurement result at middle channel that reveals no much deviation.

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13.5 Tabular Result of the Measurement

GFSK (1Mbps)

Channel	PACKET TYPE	Measurement Result (ms)	Limit (ms)	1/T (kHz)	VBW setting (kHz)
	DH1	121.60	400ms	2.632	3.00
Low	DH3	262.40	400ms	0.610	1.00
	DH5	307.20	400ms	0.347	1.00
	DH1	123.20	400ms	2.597	3.00
Mid	DH3	262.40	400ms	0.610	1.00
	DH5	308.80	400ms	0.345	1.00
	DH1	123.20	400ms	2.597	3.00
High	DH3	262.40	400ms	0.610	1.00
	DH5	308.80	400ms	0.003	1.00

π/4 DQPSK (2Mbps)

Channel	PACKET TYPE	Measurement Result (ms)	Limit (ms)	1/T (kHz)	VBW setting (kHz)
	2DH1	124.80	400ms	2.564	3.00
Mid	2DH3	262.40	400ms	0.610	1.00
	2DH5	308.80	400ms	0.345	1.00

8-DPSK (3Mbps)

Channel	PACKET TYPE	Measurement Result (ms)	Limit (ms)	1/T (kHz)	VBW setting (kHz)
	3DH1	124.80	400ms	2.564	3.00
Mid	3DH3	262.40	400ms	0.610	1.00
	3DH5	308.80	400ms	0.345	1.00

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GFSK (1Mbps):

CH Low	DH1 time slot	=	0.380 *	(1600/2/79)	*	31.6	=	121.60 (ms))
	DH3 time slot	=	1.640 *	(1600/4/79)	*	31.6	=	262.40 (ms))
	DH5 time slot	=	2.880 *	(1600/6/79)	*	31.6	=	307.20 (ms))
CH Mid	DH1 time slot	=	0.385 *	(1600/2/79)	*	31.6	=	123.20 (ms))
	DH3 time slot	=	1.640 *	(1600/4/79)	*	31.6	=	262.40 (ms)	
	DH5 time slot	=	2.895 *	(1600/6/79)	*	31.6	=	308.80 (ms))
CH High	DH1 time slot	=	0.385 *	(1600/2/79)	*	31.6	=	123.20 (ms))
	DH3 time slot	=	1.640 *	(1600/4/79)	*	31.6	=	262.40 (ms)	
	DH5 time slot	=	2.895 *	(1600/6/79)	*	31.6	=	308.80 (ms))

$\pi/4$ -DQPSK (2Mbps):

CH Mid	2DH1 time slot $=$	0.390 *	(1600/2/79) *	31.6 =	124.80 (ms)
	2DH3 time slot $=$	1.640 *	(1600/4/79) *	31.6 =	262.40 (ms)
	2DH5 time slot $=$	2.895 *	(1600/6/79) *	31.6 =	308.80 (ms)

8-DPSK (3Mbps):

CH Mid	3DH1 time slot =	0.390 *	(1600/2/79) *	31.6 =	124.80 (ms)
	3DH3 time slot =	1.640 *	(1600/4/79) *	31.6 =	262.40 (ms)
	3DH5 time slot =	2.895 *	(1600/6/79) *	31.6 =	308.80 (ms)

A period time = 0.4 (s) * 79 = 31.6 (s)

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	GFSK (1Mbps) for AFH Mode	
Hopping Channel	PACKET TYPE	Measurement Result	Limit
Number	PACKETTIPE	(ms)	(ms)
20	DH5	154.40	400ms
	π/4 DQPSK (2Mb	ps) for AFH Mode	
Hopping Channel	PACKET TYPE	Measurement Result	Limit
Number	PACKETTIPE	(ms)	(ms)
20	2DH5	154.40	400ms
	8-DPSK (3Mbps	s) for AFH Mode	
Hopping Channel	PACKET TYPE	Measurement Result	Limit
Number	FAGRETTIFE	(ms)	(ms)
20	3DH5	154.40	400ms

13.6 **Measurement Result**

Note: Refer to next page for plots.

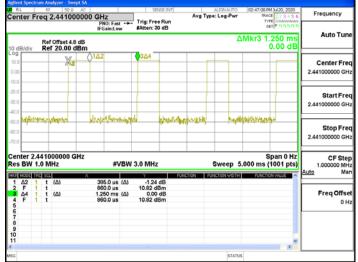
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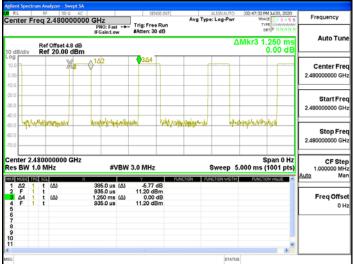
GFSK_1M_DH1_2402MHz

RL	trum Ar	salyzer - Swept S											
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			-										Start Fr 2.402000000 G
	hantia	odinatagiya, did		- Alter	entropy:	nyyld	4	esterstri	inaliyadi d	n!	lanning	gezilligegeti	Stop Fr 2.402000000 G
s BW	1.0 N	000000 GHz IHz	!	#V	BW 3.0	MHz			_	<u> </u>	5.000 ms	Span 0 Hz (1001 pts)	CF St 1.000000 M Auto M
1 Δ2 2 F 3 Δ4	1 t 1 t 1 t 1 t	(Δ) (Δ)	1.	80.0 µs 165 ms 250 ms 165 ms	(<u>(</u>)	0.02 d 2.05 dB 0.01 d 2.05 dB	IB m IB	UNCTION	FUNC	TION WIDTH	H FUNC		Freq Offs 0
4 F 5 7													

GFSK_1M_DH1_2441MHz



GFSK_1M_DH1_2480MHz



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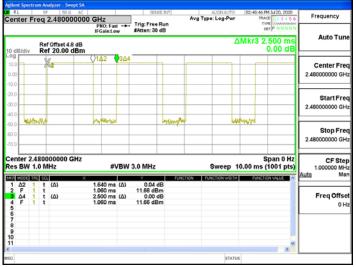
GFSK_1M_DH3_2402MHz



GFSK_1M_DH3_2441MHz



GFSK_1M_DH3_2480MHz



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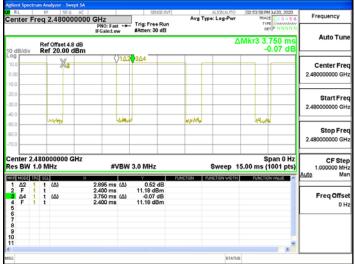
GFSK_1M_DH5_2402MHz



GFSK_1M_DH5_2441MHz

	trum	Analyz	er - Swept													
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0 dB/div			set 4.8 d 0.00 dE									ΔMk		750 n 0.00 c		Auto Tur
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1.00		-	+++	+								-			Η	2.441000000 G
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0.0																Stop Fr
0.0																2.441000000 G
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C2 DAA				x	#	VDVV	3.0 10	12	FUNCTION	_	monwoo	_				Auto M
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2 F 3 Δ4	ł	t t (Δ)			3.375 ms 3.750 ms			2 dBm								Freq Offs
3 ∆4 4 F 5	1	t			3.375 ms		11.8	2 dBm								
6																
7																
9																
9 10 11																
10											STA			,		

GFSK_1M_DH5_2480MHz



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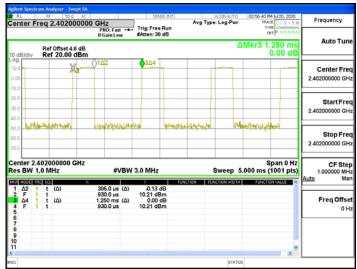
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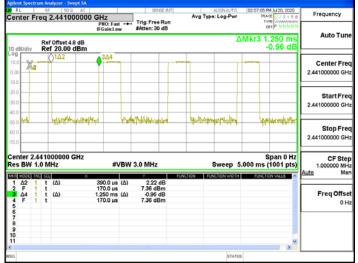
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π /4DQPSK_2M_DH1_2402MHz



π /4DQPSK_2M_DH1_2441MHz



π /4DQPSK_2M_DH1_2480MHz

RL	RJ	50.9 AC		SENSE:INT	ALION AUTO	02:57:29 PM 3ul 20, 2020	
nter F	req	2.48000000	GHz PNO: Fast → IFGain:Low		Avg Type: Log-Pwr	TRACE 123456 TYPE PNNNNN	Frequency
Bídiv		f Offset 4.8 dB f 20.00 dBm			۵	Mkr3 1.250 ms. -0.01 dB	Auto Tune
	7	*	r ∲ ^{1∆2}	34		η	Center Free
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							Start Fre 2.480000000 GH
	er)	en series and a series of the	harphede	international and	were with the second second	NUTERAL AND	Stop Fre 2.480000000 GH
nter 2. s BW		000000 GHz IHz	#VBV	/ 3.0 MHz	Sweep 5	Span 0 Hz .000 ms (1001 pts)	CF Ste 1.000000 MH
M0000 ∆2	AC SC 1 t	× (Δ)	390.0 μs (Δ)	-3.24 dB	FUNCTION FUNCTION WIDTH	FUNCTION VALUE	<u>Auto</u> Ma
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						M	1

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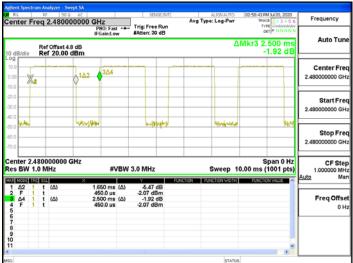
π /4DQPSK_2M_DH3_2402MHz

enter Freq 2.40		SENSE:INT	ALIGNAUTO Avg Type: Log-Pwr	02:57:54 PM 3ul 20, 2020 TRACE 1 2 3 4 5 6 TYPE	Frequency
	PNO: Fast IFGain:Lov		Δ	Mkr3 2.500 ms 0.21 dB	Auto Tur
0 dB/div Ref 20	.00 dBm ⊘1∆2 ∳3∆4				Center Fre 2.402000000 GH
0.0					Start Fre 2.402000000 Gi
0.0 44 0.0 0.0	later wild	lentem (ep)		lined).	Stop Fr 2.402000000 G
enter 2.4020000 es BW 1.0 MHz		/BW 3.0 MHz		Span 0 Hz 0.00 ms (1001 pts)	CF Ste 1.000000 M Auto M
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	x 260.0 µs 2.500 ms 260.0 µs	(Δ) 2.07 dB 8.56 dBm	FUNCTION FUNCTION WIDTH		Freq Offs 01
8 9 10				×	

π /4DQPSK_2M_DH3_2441MHz



π /4DQPSK_2M_DH3_2480MHz



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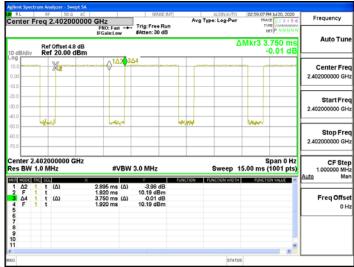
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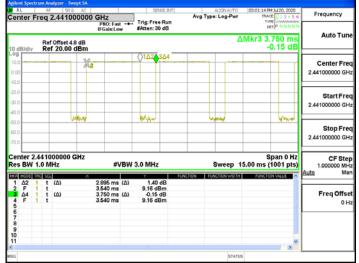
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π /4DQPSK_2M_DH5_2402MHz



π /4DQPSK_2M_DH5_2441MHz



π /4DQPSK_2M_DH5_2480MHz

RL	RF 50 Q A		SENSE			Frequency
nter Fi	req 2.4800000	PNO: Fast IFGain:Low	Trig: Free F	Avg Type: Log-Pw Run	TRACE 123456 TYPE WANNAN	Frequency
dBídiv	Ref Offset 4.8 dE Ref 20.00 dBr	3	practil. OF 0		∆Mkr3 3.750 ms 0.00 dB	Auto Tun
9 .0 00	Xa)1 <u>∆2</u> _3∆4			Center Fre 2.480000000 GH
						Start Fre 2.48000000 Gi
.0	YALA		lynund) () () () () () () () () () (Stop Fre 2.48000000 G
	480000000 GHz .0 MHz		3W 3.0 MHz		Span 0 Hz 15.00 ms (1001 pts)	CF Ste 1.000000 MI Auto M
Δ2 1 F 1 Δ4 1 F 1	t (Δ) t t t (Δ) t	2.880 ms (/ 2.670 ms 3.750 ms (/ 2.670 ms	9.78 dBn	n 3		Freq Offs 0 H

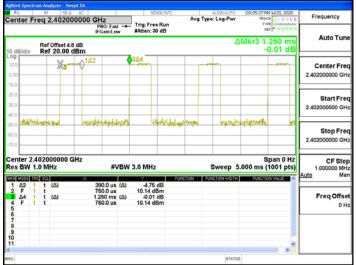
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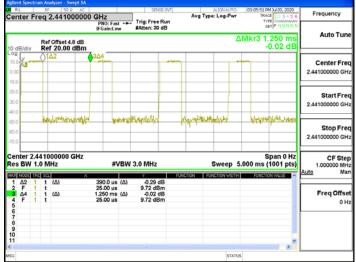
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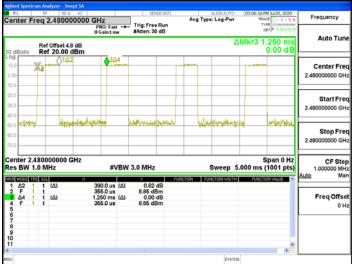
8DPSK_3M_DH1_2402MHz



8DPSK_3M_DH1_2441MHz



8DPSK_3M_DH1_2480MHz



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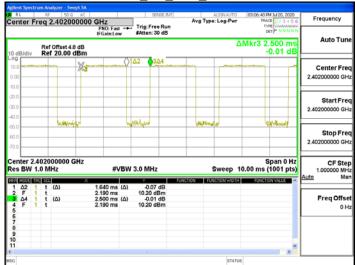
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8DPSK_3M_DH3_2402MHz



8DPSK_3M_DH3_2441MHz



8DPSK_3M_DH3_2480MHz





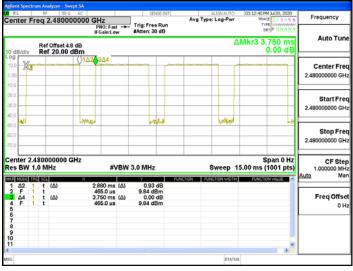
8DPSK_3M_DH5_2402MHz

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	3.750 ms 0.00 dB		Δ						t 4.8 dB 00 dBm				div
Center F					7		3∆4	{1∆2		(.	-)	1	
2.402000000											-	┝	
Start Fr													
2.402000000 0												t	
		brand			Juppi			Angles .			ديهها	10	
Stop Fr 2.402000000 0							-				+		
CFS	Span 0 Hz								0 GHz				
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	TION WILDE	PONCT	STICK WIDTH	TON FOR	FUNC	0.46 dE	(Δ)	2.880 ms	Х	(∆)		1	2
Freq Off						10.25 dBm 0.00 dB 10.25 dBm	(۵)	1.605 ms 3.750 ms 1.605 ms		(Δ)	t t	1	4

8DPSK_3M_DH5_2441MHz

	RF			SENSE:INT	ALIGN AL		
ter Fr	eq	2.441000000	GHz PNO: Fast ++	Trig: Free Run	Avg Type: Log-F	TYPE WWW	
			IFGain:Low	#Atten: 30 dB		ΔMkr3 3.750	Auto Tu
Bídiv		Offset 4.8 dB	dB				
				1Δ2			
				3∆4			Center Fr 2.441000000 G
		Xa					2.441000000
<u> </u>	-						Start Fr
<u> </u>	-						2,441000000 G
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\vdash	-	www	,	an an	Leholori .	147844	Stop Fr
<u> </u>	-						2.441000000 G
	-						
		00000 GHz				Span	
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MODE 18	c sci t	× (Δ)	2.895 ms (Δ)	11.76 dB	FUNCTION FUNCTION W	10 TH FUNCTION VALU	
E 1	t	(Δ)	2.910 ms 3.750 ms (Δ)	-1.27 dBm -0.19 dB			Freq Offs
A4 1	÷	(104)	2.910 ms	-1.27 dBm			0
∆4 1 F 1							
Δ4 1 F 1	Ċ						
64 1 F 1							
Δ4 1 F 1							
Δ4 1 F 1							

8DPSK 3M DH5 2480MHz



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14 ANTENNA REQUIREMENT

14.1 Standard Applicable

For intentional device, according to §15.203, an intentional radiator shall be designed to ensure that no antenna other than furnished by the responsible party shall be used with the device.

If the transmitting antenna is greater than 6dBi, the power shall be reduced by the same level in dB comparing to gain minus 6dBi.

14.2 Antenna Connected Construction

The antenna is designed with unique RF connector and no consideration of replacement. Please see EUT photo for details.

~ End of Report ~

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