

Page 1 of 127

ELECTROMAGNETIC EMISSIONS COMPLIANCE REPORT

INTENTIONAL RADIATOR CERTIFICATION TO FCC PART 15 SUBPART C AND RSS 247 REQUIREMENT

OF

Product Name: WLAN/BT USB Module

WIESON Brand Name:

FCC Model No.: WM2020CU, WM2020CU-XX (X=0~9 or A~Z)

IC Model No.: WM2020CU

Model Difference: Different models for market segmentation.

FCC ID: **2AAK6WM2020CU**

IC: 20126-WM2020CU

Report No.: ER/2017/20139

Issue Date: Mar. 29, 2017

FCC Rule Part: §15.247, Cat: DSS

IC Rule: RSS-247 issue 2 Feb. 2017

WIESON INTERNATIONAL CO., LTD.

6F, No.276-1, Sec.1, Datong Rd., Xizhi Dist., New **Prepared for:**

Taipei City 221, Taiwan, R.O.C.

SGS Taiwan Ltd.

Electronics & Communication Laboratory

Prepared by: No.134, Wu Kung Road, New Taipei Industrial

Park, Wuku District, New Taipei City, Taiwan

24803





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Page 2 of 127

VERIFICATION OF COMPLIANCE

WIESON INTERNATIONAL CO., LTD.

Applicant for: 6F, No.276-1, Sec.1, Datong Rd., Xizhi Dist., New Taipei City 221,

Taiwan, R.O.C.

Product Name: WLAN/BT USB Module

WIESON **Brand Name:**

FCC Model No.: WM2020CU, WM2020CU-XX (X=0~9 or A~Z)

IC Model No.:

Model Difference: Different models for market segmentation.

FCC ID: 2AAK6WM2020CU IC: 20126-WM2020CU

Report Number: ER/2017/20139

Date of test: Mar. 09, 2017 ~ Mar. 22, 2017

Date of EUT Received: Mar. 09, 2017

We hereby certify that:

The above equipment was tested by SGS Taiwan Ltd. Electronics & Communication Laboratory 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.

Test By:	(on Li	Date:	Mar. 29, 2017
Prepared By:	Tin Lin/Engineer V-roletta Tang	Date:	Mar. 29, 2017
Approved By:	Violetta Tang / Clerk Jim Chang / Asst. Manager	Date:	Mar. 29, 2017

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Page 3 of 127

Revision History

Report Number	Revision	Description	Issue Date
ER/2017/20139	Rev.00	Initial creation of document	Mar. 29, 2017

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Page 4 of 127

Contents

1	GENERAL INFORMATION	5
2	SYSTEM TEST CONFIGURATION	8
3	SUMMARY OF TEST RESULTS	10
4	DESCRIPTION OF TEST MODES	11
5	MEASUREMENT UNCERTAINTY	14
6	CONDUCTED EMISSION TEST	15
7	PEAK OUTPUT POWER MEASUREMENT	19
8	20dB & 99% BANDWIDTH MEASUREMENT	22
9	CONDUCTED BAND EDGES AND SPURIOUS EMISSION MEASUREMENT	35
10	RADIATED BANDEDGE AND SPURIOUS EMISSION MEASUREMENT	47
11	FREQUENCY SEPARATION	108
12	NUMBER OF HOPPING FREQUENCY	110
13	TIME OF OCCUPANCY (DWELL TIME)	113
14	ANTENNA REQUIREMENT	127

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Page 5 of 127

GENERAL INFORMATION

1.1 Product description

General:

Jeneral.	
Product Name:	WLAN/BT USB Module
Brand Name:	WIESON
FCC Model No.:	WM2020CU, WM2020CU-XX (X=0~9 or A~Z)
IC Model No.:	WM2020CU
Model Difference:	Different models for market segmentation.
Product SW/HW version:	v1.0 / v1.0
Radio SW/HW version:	N/A / N/A
Test SW Version:	N/A
RF power setting in TEST SW:	N/A
Power Supply:	3.3V from DC Power Supply

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Page 6 of 127

Bluetooth BR+EDR:

Bluetooth Version	BT V4.2 (dual mode)
Channel number:	79 channels
Modulation type:	GFSK + π/4DQPSK + 8DPSK
Transmit Power:	8.79dBm
Frequency Range:	2.402GHz – 2.480GHz
Antenna Designation:	 Dipole Antenna, Antenna Gain: 1.6dBi, Part No.: N/A Supplier: WIESON INTERNATIONAL CO., LTD. PCB Antenna, Antenna Gain: 3.64dBi, Part No.: N/A Supplier: PEGATRON PCB Antenna, ANT1 Gain: 4.51dBi / ANT2 Gain: 3.77dBi, Part No.: 290-30552 / 290-30553 Supplier: PEGATRON PCB Antenna, Antenna Gain: 3.8dBi, Part No.: ALX17P-221XX0-01, Supplier: LYNwave PCB Antenna: ANT1 Gain: 3.13dBi / ANT2 Gain: 3.08dBi Part No.: ALX17P-221XX1-A, Supplier: LYNwave

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Page 7 of 127

1.2 Test Methodology of Applied Standards

FCC Part 15, Subpart C §15.247

FCC Public Notice DA 00-705 Measurement Guidelines

Canada RSS-247 issue 2 Feb. 2017

Canada RSS-Gen Issue 4:2014

ANSI C63.10:2013

Note: All test items have been performed and record as per the above standards.

1.3 Test Facility

SGS Taiwan Ltd. Electronics & Communication Laboratory No.134, Wu Kung Road, New Taipei Industrial Park, Wuku District, New Taipei City, Taiwan 24803 (TAF code 0513)

FCC Registration Numbers are: 509634

Canada Registration Number: 4620A-5.

1.4 Special Accessories

There is no special accessory used while test was conducted.

1.5 Equipment Modifications

There was no modification incorporated into the EUT.

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Page 8 of 127

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 as turn table which is 0.8 m above ground plan. 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 according to §15.207. The two LISNs provide 50 ohm/ 50uH 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 Radiated Emissions

The EUT is a placed on as turn table. For emissions testing at or below 1 GHz, the table height shall be 0.8 m above the reference ground plan. 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 hand-held 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.

2.4 Measurement Results Explanation Example

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.

The spectrum analyzer offset is derived from RF cable loss 1dB.

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Page 9 of 127

2.5 Configuration of Tested System

Fig. 2-1 Radiated & AC Power Line & Conducted (Antenna Port) Emission

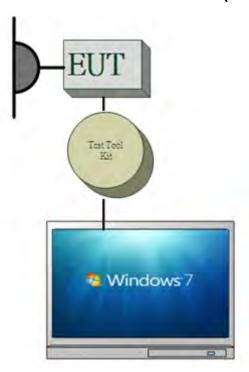


Table 2-1 Equipment Used in Tested System

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.	Notebook	Lenovo	L420	LR-7HXZA	Shielded	Un-shielded
3.	Test Tool Kit	N/A	N/A	N/A	N/A	N/A

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Page 10 of 127

SUMMARY OF TEST RESULTS

FCC Rules	IC Rules	Description Of Test	Result
§15.207(a)	RSS-Gen §8.8	AC Power Line Conducted Emission	Compliant
§15.247(b)(1)	RSS-247 §5.4 (2)	Peak Output Power	Compliant
§15.247(a)(1)	RSS-247 §5.1 (1) RSS-Gen §6.6	20dB & 99% Bandwidth	Compliant
§15.247(d)	RSS-247 §5.5	Conducted Band Edge and Spurious Emission	Compliant
§15.247(d)	RSS-247 §5.5	Radiated Band Edge and Spurious Emission	Compliant
§15.247(a)(1)	RSS-247 §5.1 (2)	Frequency Separation	Compliant
§15.247(a)(1)(iii)	RSS-247 §5.1 (4)	Number of hopping frequency	Compliant
§15.247(a)(1)(iii)	RSS-247 §5.1 (4)	Time of Occupancy	Compliant
§15.203 §15.247(b)	RSS- Gen §8.3	Antenna Requirement	Compliant

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Page 11 of 127

DESCRIPTION OF TEST MODES

4.1 Operated in 2400 ~ 2483.5MHz Band

79 channels are provided for Bluetooth

7 0 0110	79 Charmers are provided for Bidetooth						
СН	FREQUENCY	CH	FREQUENCY	CH	FREQUENCY	CH	FREQUENCY
0	2402 MHz	20	2422 MHz	40	2442 MHz	70	2462 MHz
1	2403 MHz	21	2423 MHz	41	2443 MHz	71	2463 MHz
2	2404 MHz	22	2424 MHz	42	2444 MHz	72	2464 MHz
3	2405 MHz	23	2425 MHz	43	2445 MHz	73	2465 MHz
4	2406 MHz	24	2426 MHz	44	2446 MHz	74	2466 MHz
5	2407 MHz	25	2427 MHz	45	2447 MHz	75	2467 MHz
6	2408 MHz	26	2428 MHz	46	2448 MHz	76	2468 MHz
7	2409 MHz	27	2429 MHz	47	2449 MHz	77	2469 MHz
8	2410 MHz	28	2430 MHz	48	2450 MHz	78	2470 MHz
9	2411 MHz	29	2431 MHz	49	2451 MHz	79	2471 MHz
10	2412 MHz	30	2432 MHz	50	2452 MHz	70	2472 MHz
11	2413 MHz	31	2433 MHz	51	2453 MHz	71	2473 MHz
12	2414 MHz	32	2434 MHz	52	2454 MHz	72	2474 MHz
13	2415 MHz	33	2435 MHz	53	2455 MHz	73	2475 MHz
14	2416 MHz	34	2436 MHz	54	2456 MHz	74	2476 MHz
15	2417 MHz	35	2437 MHz	55	2457 MHz	75	2477 MHz
16	2418 MHz	36	2438 MHz	56	2458 MHz	76	2478 MHz
17	2419 MHz	37	2439 MHz	57	2459 MHz	77	2479 MHz
18	2420 MHz	38	2440 MHz	58	2460 MHz	78	2480 MHz
19	2421 MHz	39	2441 MHz	59	2461 MHz		

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Page 12 of 127

4.2 The Worst Test Modes and Channel Details

- The EUT has been tested under operating condition.
- 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.

	RADIATED TEST					
	Radiated Emission Test (BELOW 1 GHz) (Worst case)					
MODE	AVAILABLE	TESTED	MODULATION	PACKET		
MODE	CHANNEL	CHANNEL	WODULATION	TYPE		
Bluetooth	0 to 78	39	8-DPSK	3DH5		
	Radiated Emission Test (ABOVE 1 GHz) (Worst case)					
MODE	AVAILABLE	TESTED	MODULATION	PACKET		
MODE	CHANNEL	CHANNEL	WODOLATION	TYPE		
Bluetooth	0 to 78	0,39,78	8-DPSK	3DH5		
Band Edge						
Bluetooth	0 to 78	0,78	GFSK	DH5		
Bluetooth	0 to 78	0,78	8-DPSK	3DH5		

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.

Pre-scanned was done on Dipole antenna & PCB antenna set 290-30552 / 290-30553, ALX17P-221XX0-01 and ALX17P-221XX1-A. The Dipole & PCB antenna 290-30552 results higher emission at 2.4GHz. Therefore, the completed set of measurement was done on both antennas to be presented on this test report.

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Page 13 of 127

	ANTENNA PORT CONDUCTED TEST					
	Peak Output Power, 20dB Band Width					
MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION	PACKET TYPE		
	0 to 78	0,39,78	GFSK	DH5		
Bluetooth	0 to 78	0,39,78	π/4-DQPSK	DH5		
	0 to 78	0,39,78	8-DPSK	DH5		
Band Edge & Conducted Emission						
Bluetooth	0 to 78	0,78	GFSK	DH5		
Bluetooth	0 to 78	0,78	8-DPSK	3DH5		
		Frequen	cy Separation			
Bluetooth	0 to 78	0,1,2	8-DPSK	3DH5		
		Number of h	opping frequency			
Bluetooth	0 to 78	0 to 78	8-DPSK	3DH5		
	Time of Occupancy (Dwell time)					
Bluetooth	0 to 78	0,39,78	GFSK	DH1/DH3/DH5		
Bluetooth	0 to 78	39	π/4-DQPSK	DH1/DH3/DH5		
Bluetooth	0 to 78	39	8-DPSK	DH1/DH3/DH5		

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Page 14 of 127

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:

radiated opariode Emicolom				
Measurement uncertainty (Polarization : Vertical)	9kHz – 30MHz: +/- 2.87 dB			
	30MHz - 180MHz: +/- 3.37dB			
	180MHz -417MHz: +/- 3.19dB			
	0.417GHz-1GHz: +/- 3.19dB			
	1GHz - 18GHz: +/- 4.04dB			
	18GHz - 40GHz: +/- 4.04dB			

	9kHz – 30MHz: +/- 2.87 dB
	30MHz - 167MHz: +/- 4.22dB
Measurement uncertainty	167MHz -500MHz: +/- 3.44dB
(Polarization : Horizontal)	0.5GHz-1GHz: +/- 3.39dB
	1GHz - 18GHz: +/- 4.08dB
	18GHz - 40GHz: +/- 4.08dB

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

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Page 15 of 127

CONDUCTED EMISSION TEST

6.1 Standard Applicable

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

Frequency range	Lin dB(nits (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	MFR	MODEL	SERIAL	LAST	CAL DUE.		
TYPE		NUMBER	NUMBER	CAL.			
EMI Test Receiver	R&S	ESCI7	100760	05/10/2016	05/09/2017		
LISN	SCHWARZBECK	NSLK 8127	8127-649	05/16/2016	05/15/2017		
LISN	MESS TEC	FCC-LISN-50/250- 25-2-01	4034	05/16/2016	05/15/2017		
Coaxial Cables	N/A	WK CE Cable	N/A	11/26/2016	11/25/2017		

6.3 EUT Setup

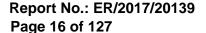
- 1. The conducted emission tests were performed in the test site, using the setup in accordance with the ANSI 63.10:2013.
- 2. The AC/DC Power adaptor of EUT was plug-in LISN. The EUT was placed flushed with the rear of the table.
- 3. The LISN was connected with 120Vac/60Hz power source.

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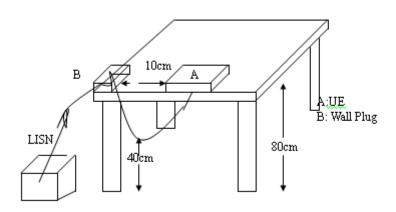
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6.4 Test SET-UP (Block Diagram of Configuration)



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

Operation Mode:	Operation mode		Test By:	Curry	
Temperature:	26	Humidity:	60 %	Phase:	L1 / N

26 (Site ConductionRoom Phase: L1 Temperature: AC 120V/60Hz 60% Limit: FCC Class B Conduction(QP) Humidity: Power: Mode: Operationmode Note: Conducted Emission 80.0 dBaV FCC Class II Conduction(GP) 0.0 0.150 30 000 (MHz) Reading Correct Measure-Limit Over Mk. Freq. No. Level Factor ment dBu// dBuV MHz dB dBuW dB Detector Comment 1 0.1500 49.44 0.16 49.60 66.00 -16.40peak peak 2 0.2200 39.09 0.16 39.25 62.82 -23.573 0.5700 3262 0.17 32.79 56.00 -23.21 peak 4 2.8200 0.23 -21.76 34.01 34 24 56.00 peak 32.30 5 6.7200 0.31 32.61 60.00 -27.39 peak 6 17.6800 42.32 0.42 42.74 60.00 -17.26 peak

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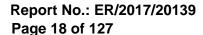
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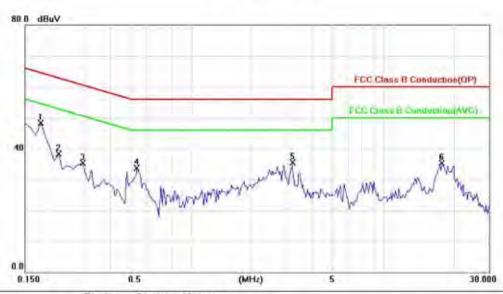


Phase: 26 T Temperature: Site ConductionRoom Limit: FCC Class B Conduction(QP) Power: AC 120V/60Hz Humidity: 60%

Mode: Operationmode

Note:

Conducted Emission



No. Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over				
		MHz	dBuV	dB	dBuV	dBuV	ďΒ	Detector	Comment	
- 1		0.1800	48.07	0.19	48.26	64.49	-16.23	peak		
2		0.2200	38.05	0.19	38.24	62.82	-24.58	peak		
3		0.2900	35.07	0.20	35.27	60.52	-25.25	peak		
4		0.5400	33.57	0.19	33.76	56.00	-22.24	peak		
5		3.1800	35.13	0.28	35,41	56.00	-20.59	peak		
6	9	17.5200	34.68	0.53	35.21	60.00	-24.79	peak		

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Page 19 of 127

7 PEAK OUTPUT POWER MEASUREMENT

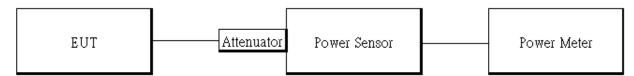
7.1 Standard Applicable

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.

7.2 Measurement Equipment Used

SGS Conducted Room							
EQUIPMENT	MFR	MODEL	SERIAL	LAST	CAL DUE.		
TYPE		NUMBER	NUMBER	CAL.			
Power Meter	Anritsu	ML2495A	1005007	12/15/2016	12/14/2017		
Power Sensor	Anritsu	MA2411B	917032	12/15/2016	12/14/2017		
EXA Spectrum Analyzer	Agilent	N9030A	MY53120760	02/26/2017	02/25/2018		
DC Block	Mini-Circuits	BLK-18-S+	1	01/05/2017	01/04/2018		
Coaxial Cable	HUBER+SUH NER	SUCOFLEX 102	23670/2	01/05/2017	01/04/2018		
Attenuator	Mini-Circuit	BW-S10W2+	2	01/05/2017	01/04/2018		
Splitter	Agilent	11636B	N/A	01/05/2017	01/04/2018		
DC Power Supply	Agilent	E3640A	MY52410006	11/21/2016	11/20/2017		
Temperature Chamber	TERCHY	MHG-120LF	911009	05/17/2016	05/16/2017		

7.3 Test Set-up:



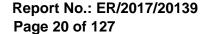
7.4 Measurement Procedure:

- 1. Place the EUT on the table and set it in transmitting mode.
- 2. The testing follows FCC Public Notice DA 00-705 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 Measurement Result

1M BR mode (Peak):

TIVI DIK MOUC (T Cak).							
СН	Freq. (MHz)	Peak Output Power (dBm)	Output Power (mW)	Limit (mW)			
0	2402	7.54	5.675	125			
39	2441	8.17	6.561	125			
78	2480	8.66	7.345	125			

1M BR mode (Average):

2							
СН	Freq. (MHz)	Avg. Output Power (dBm)	Output Power (mW)	Limit (mW)			
0	2402	5.45	3.508	125			
39	2441	6.12	4.093	125			
78	2480	6.96	4.966	125			

2M EDR mode (Peak):

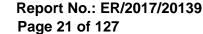
СН	Freq. (MHz)	Peak Output Power (dBm)	Output Power (mW)	Limit (mW)				
0	2402	7.66	5.834	125				
39	2441	8.46	7.015	125				
78	2480	8.56	7.178	125				

2M EDR mode (Average):

СН	Freq. (MHz)	Avg. Output Power (dBm)	Output Power (mW)	Limit (mW)
0	2402	4.44	2.780	125
39	2441	5.19	3.304	125
78	2480	5.92	3.908	125

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3M FDR mode (Peak):

JIVI LUK IIIOUE (FEAK).						
СН	Freq. (MHz)	Peak Output Power (dBm)	Output Power (mW)	Limit (mW)		
0	2402	7.53	5.662	125		
39	2441	8.17	6.561	125		
78	2480	8.79	7.568	125		

3M EDR mode (Average):

СН	Freq. (MHz)	Avg. Output Power (dBm)	Output Power (mW)	Limit (mW)
0	2402	4.43	2.773	125
39	2441	5.15	3.273	125
78	2480	5.94	3.926	125

NOTE: cable loss as 1dB that offsets in the spectrum

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Page 22 of 127

20DB & 99% BANDWIDTH MEASUREMENT

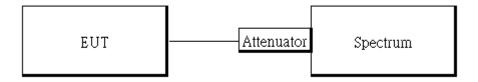
8.1 Standard Applicable

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

8.2 Measurement Equipment Used

SGS Conducted Room					
EQUIPMENT	MFR	MODEL	SERIAL	LAST	CAL DUE.
TYPE		NUMBER	NUMBER	CAL.	
Power Meter	Anritsu	ML2495A	1005007	12/15/2016	12/14/2017
Power Sensor	Anritsu	MA2411B	917032	12/15/2016	12/14/2017
EXA Spectrum Analyzer	Agilent	N9030A	MY53120760	02/26/2017	02/25/2018
DC Block	Mini-Circuits	BLK-18-S+	1	01/05/2017	01/04/2018
Coaxial Cable	HUBER+SUH NER	SUCOFLEX 102	23670/2	01/05/2017	01/04/2018
Attenuator	Mini-Circuit	BW-S10W2+	2	01/05/2017	01/04/2018
Splitter	Agilent	11636B	N/A	01/05/2017	01/04/2018
DC Power Supply	Agilent	E3640A	MY52410006	11/21/2016	11/20/2017
Temperature Chamber	TERCHY	MHG-120LF	911009	05/17/2016	05/16/2017

8.3 Test Set-up



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Page 23 of 127

8.4 Measurement Procedure

- 1. Place the EUT on the table and set it in transmitting mode.
- 2. The testing follows FCC Public Notice DA 00-705 Measurement Guidelines.
- 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=10 kHz (1 % of 20 dB Bandwidth.), VBW = 30 kHz, Span= 3MHz, Sweep=auto, Detector = Peak, and Max hold for 20dB Bandwidth test.
- 5. Mark the peak frequency and -20dB (upper and lower) frequency
- 6. Turn on the 99% bandwidth function, max reading.
- 7. Repeat above procedures until all test default channel is completed

NOTE: For the plot of bandwidth measurement, the marker of the 20dB BW is arrow-mark.

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Page 24 of 127

8.5 Measurement Result

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GFSK				
	20 dB	2/3		
СН	BW	BW		
	(MHz)	(MHz)		
Low	0.936	0.62		
Mid	0.937	0.62		
High	0.937	0.62		

T//_DODSK

11/4-レ	II/4-DQF3K			
	20 dB	2/3		
СН	BW	BW		
	(MHz)	(MHz)		
Low	1.249	0.83		
Mid	1.248	0.83		
High	1.251	0.83		

8-DPSK

	20 dB	2/3	
СН	BW	BW	
	(MHz)	(MHz)	
Low	1.274	0.85	
Mid	1.275	0.85	
High	1.277	0.85	

GFSK

				
	99%			
CH	Bandwidth			
	(MHz)			
Low	0.89998			
Mid	0.89969			
High	0.90004			

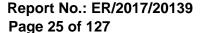
π/4-DQPSK

СН	99% Bandwidth (MHz)
Low	1.1725
Mid	1.1735
High	1.1762

8-DPSK

	99%
CH	Bandwidth
	(MHz)
Low	1.1739
Mid	1.1753
High	1.1773

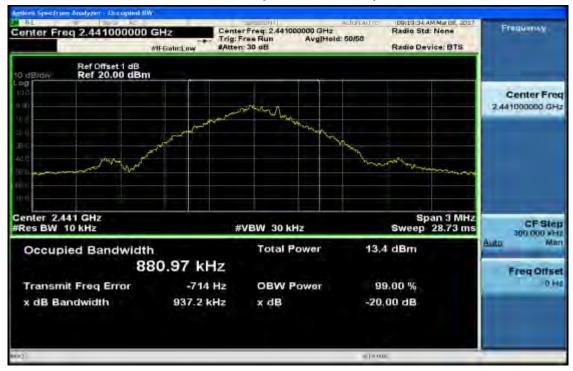
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20dB Band Width Test Data CH-Low (GFSK mode)



20dB Band Width Test Data CH-Mid (GFSK mode)



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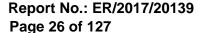
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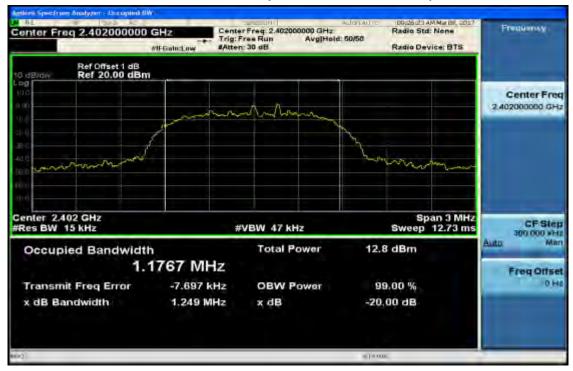




20dB Band Width Test Data CH-High (GFSK mode)



20dB Band Width Test Data CH-Low (π/4-DQPSK mode)



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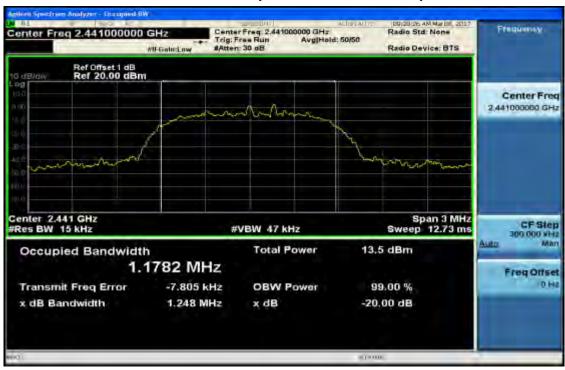
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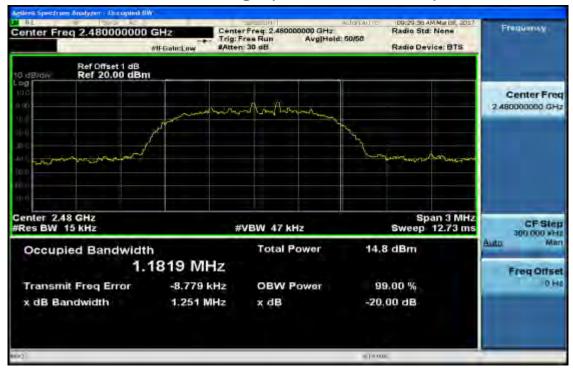
Page 27 of 127



20dB Band Width Test Data CH-Mid (π/4-DQPSK mode)



20dB Band Width Test Data CH-High (π/4-DQPSK mode)



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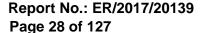
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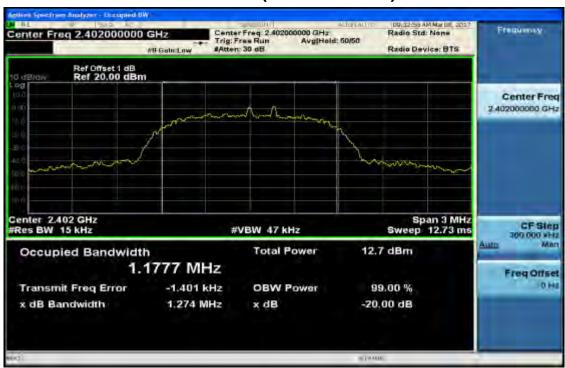
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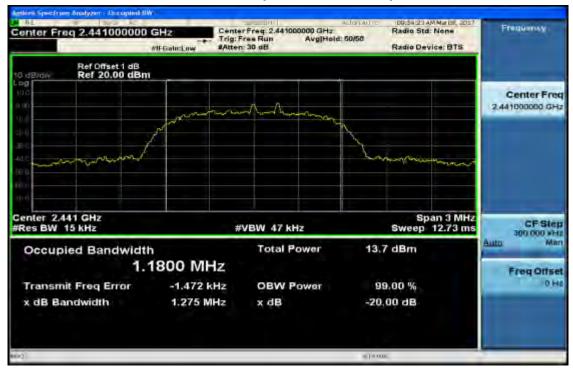




20dB Band Width Test Data CH-Low (8-DPSK mode)



20dB Band Width Test Data CH-Mid (8-DPSK mode)



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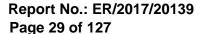
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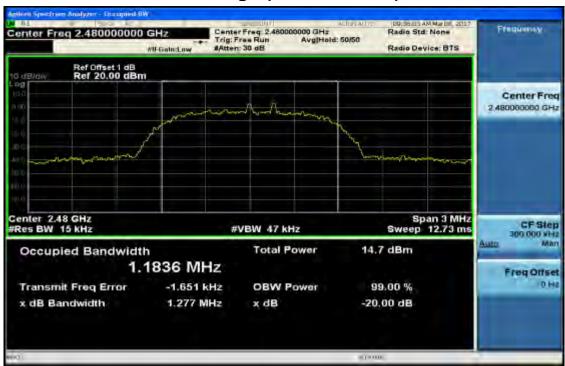
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20dB Band Width Test Data CH-High (8-DPSK mode)



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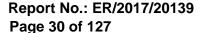
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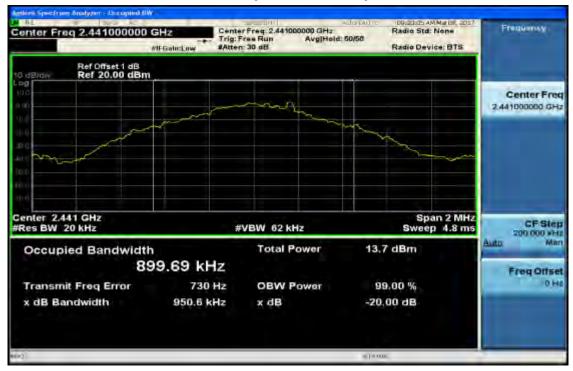




99% Band Width Test Data CH-Low (GFSK mode)



99% Band Width Test Data CH-Mid (GFSK mode)



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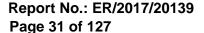
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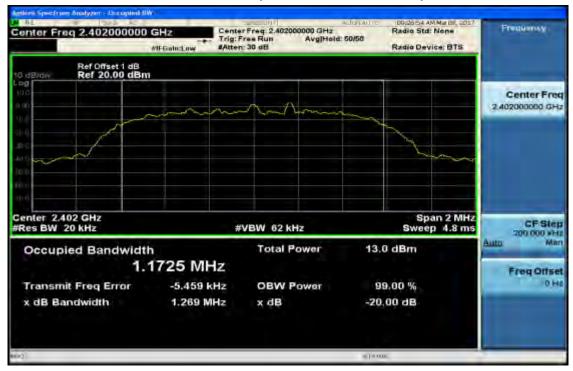
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99% Band Width Test Data CH-High (GFSK mode)



99% Band Width Test Data CH-Low (π/4-DQPSK mode)



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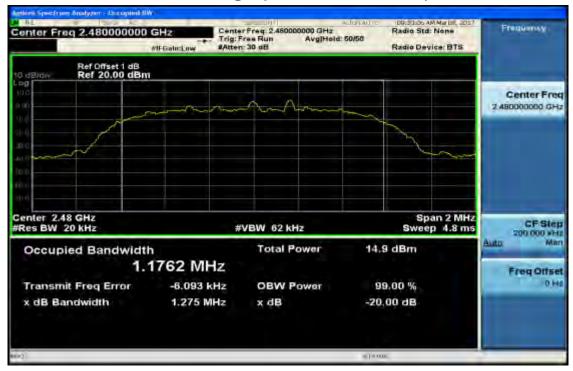
Page 32 of 127



99% Band Width Test Data CH-Mid (π/4-DQPSK mode)



99% Band Width Test Data CH-High (π/4-DQPSK mode)



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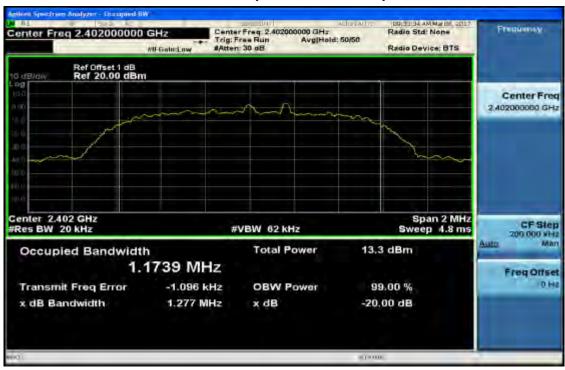
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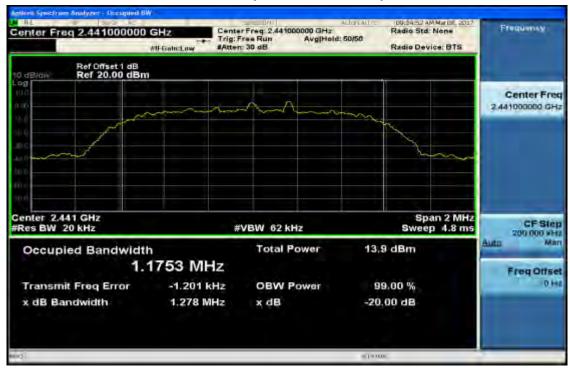
Page 33 of 127



99% Band Width Test Data CH-Low (8-DPSK mode)



99% Band Width Test Data CH-Mid (8-DPSK mode)



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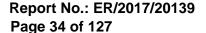
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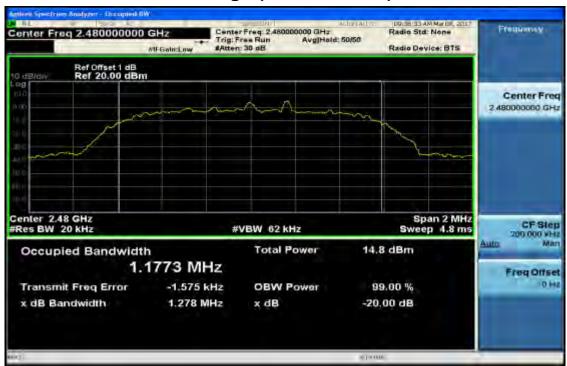
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99% Band Width Test Data CH-High (8-DPSK mode)



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Page 35 of 127

CONDUCTED BAND EDGES AND SPURIOUS EMISSION MEASUREMENT

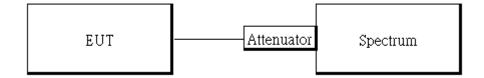
9.1 Standard Applicable

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), must also comply with the radiated emission limits specified in §15.209(a) & RSS-Gen §8.9 limit.

9.2 Measurement Equipment Used

SGS Conducted Room					
EQUIPMENT	MFR	MODEL	SERIAL	LAST	CAL DUE.
TYPE		NUMBER	NUMBER	CAL.	
Power Meter	Anritsu	ML2495A	1005007	12/15/2016	12/14/2017
Power Sensor	Anritsu	MA2411B	917032	12/15/2016	12/14/2017
EXA Spectrum	A sella se t	NICOCOA	MV50400700	00/00/0047	00/05/0040
Analyzer	Agilent	N9030A	MY53120760	02/26/2017	02/25/2018
DC Block	Mini-Circuits	BLK-18-S+	1	01/05/2017	01/04/2018
Coaxial Cable	HUBER+SUH NER	SUCOFLEX 102	23670/2	01/05/2017	01/04/2018
Attenuator	Mini-Circuit	BW-S10W2+	2	01/05/2017	01/04/2018
Splitter	Agilent	11636B	N/A	01/05/2017	01/04/2018
DC Power Supply	Agilent	E3640A	MY52410006	11/21/2016	11/20/2017
Temperature Chamber	TERCHY	MHG-120LF	911009	05/17/2016	05/16/2017

9.3 Test SET-UP



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Page 36 of 127

9.4 Measurement Procedure

Conducted Band Edge:

- Place the EUT on the table and set it in transmitting mode.
- 2. The testing follows FCC Public Notice DA 00-705 Measurement Guidelines.
- 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.

Conducted Spurious Emission:

- 1. To connect Antenna Port of EUT to Spectrum.
- 2. The testing follows FCC Public Notice DA 00-705 Measurement Guidelines.
- 3. Set RBW = 100 kHz & VBW = 300 kHz, Detector = Peak, Sweep = Auto
- 4. Allow trace to fully stabilize.
- 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.

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	S .	CL = Cable Attenuation Factor (Cable Loss)
	RA = Reading Amplitude	AG = Amplifier Gain
	AF = Antenna Factor	

9.5 Measurement Result

Note: Refer to next page spectrum analyzer data chart and tabular data sheets.

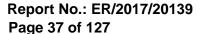
1. The occurrence of the spike on the conducted emission is the signal of the fundamental emission.

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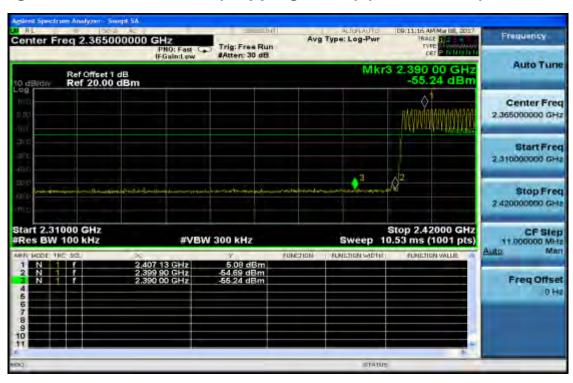
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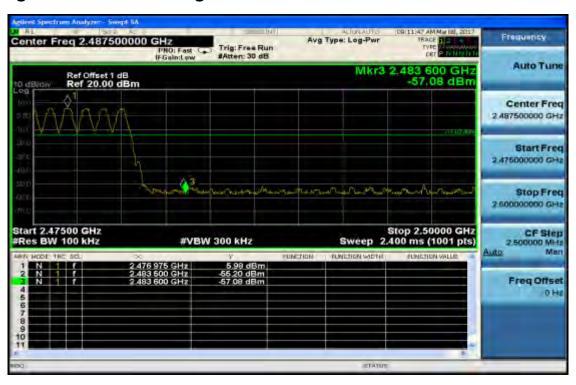




Band Edges Test Data CH-Low (Hopping mode) (GFSK mode)



Band Edges Test Data CH-High



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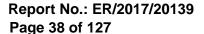
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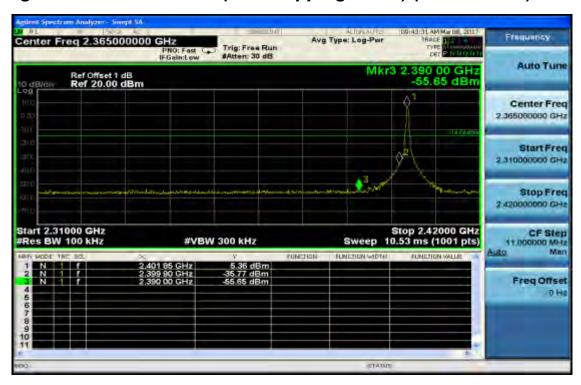
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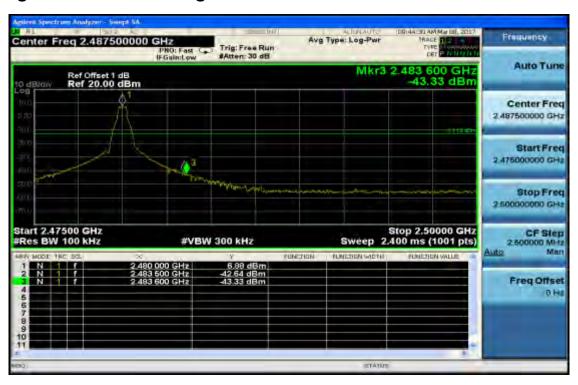




Band Edges Test Data CH-Low (Non-Hopping mode) (GFSK mode)



Band Edges Test Data CH-High



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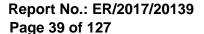
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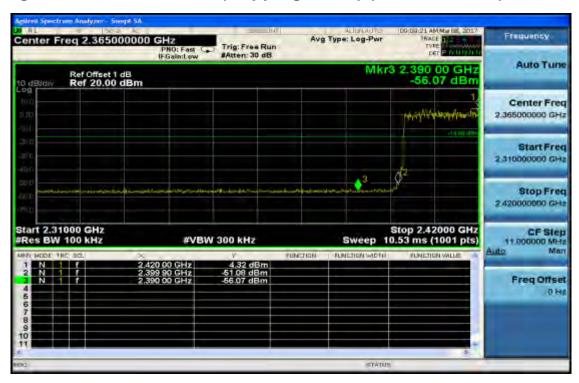
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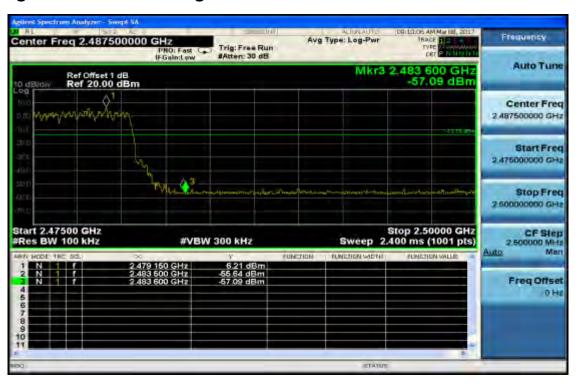




Band Edges Test Data CH-Low (Hopping mode) (8-DPSK mode)



Band Edges Test Data CH-High



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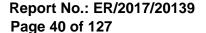
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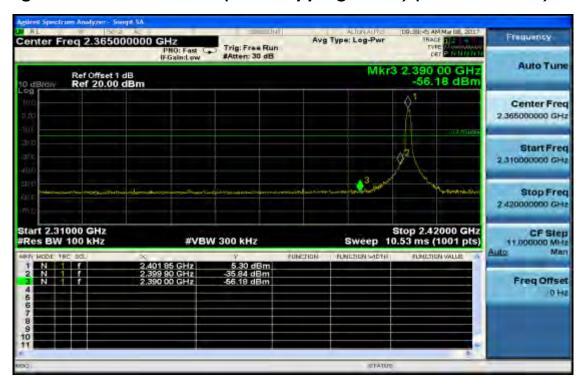
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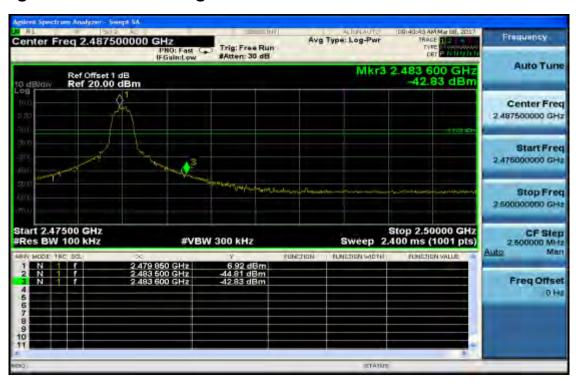




Band Edges Test Data CH-Low (Non-Hopping mode) (8-DPSK mode)



Band Edges Test Data CH-High



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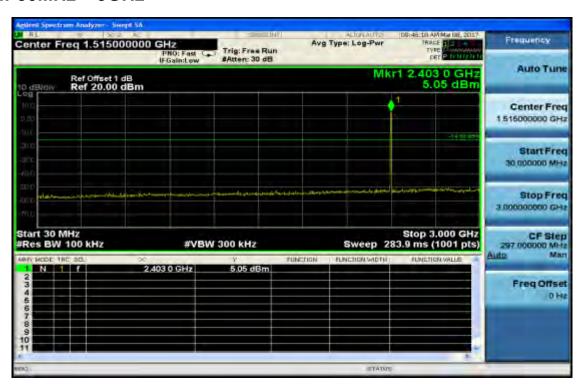
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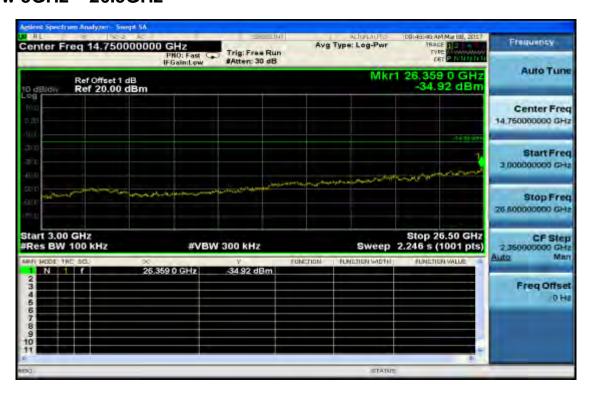
Page 41 of 127



Conducted Spurious Emission Measurement Result (GFSK mode) Ch Low 30MHz - 3GHz



Ch Low 3GHz - 26.5GHz



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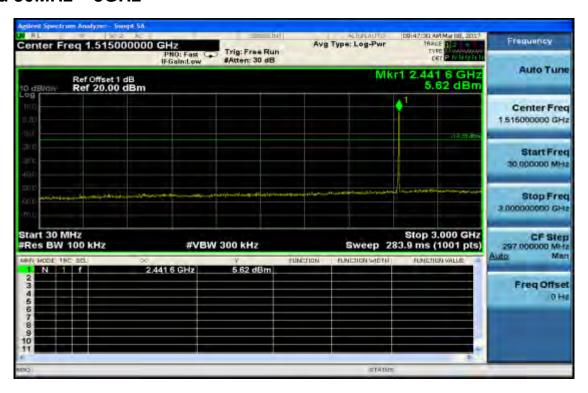
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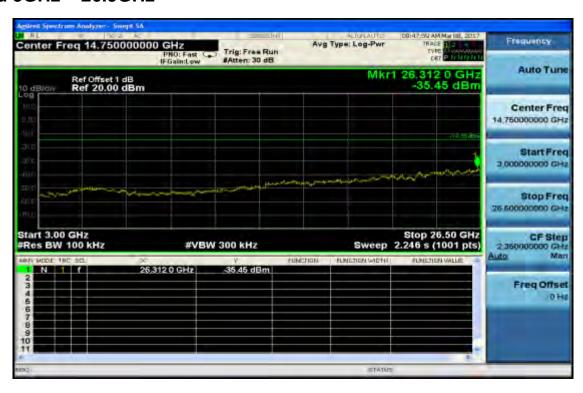
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Ch Mid 30MHz - 3GHz



Ch Mid 3GHz - 26.5GHz

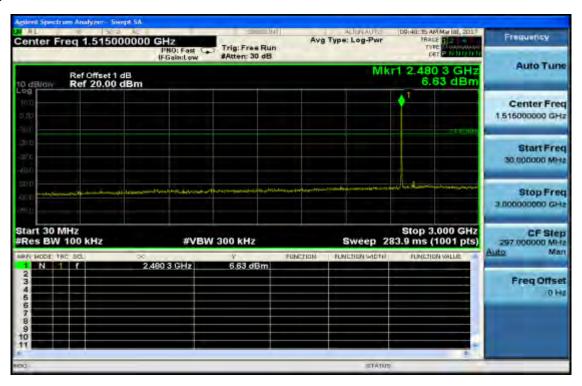


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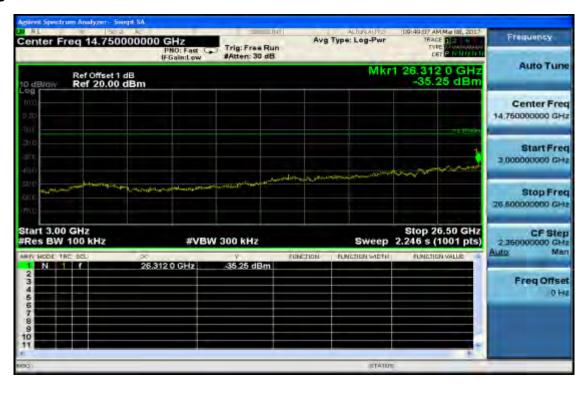
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Ch High 30MHz - 3GHz



Ch High 3GHz - 26.5GHz



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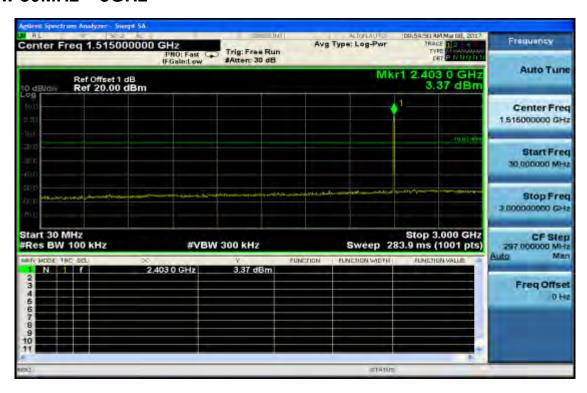
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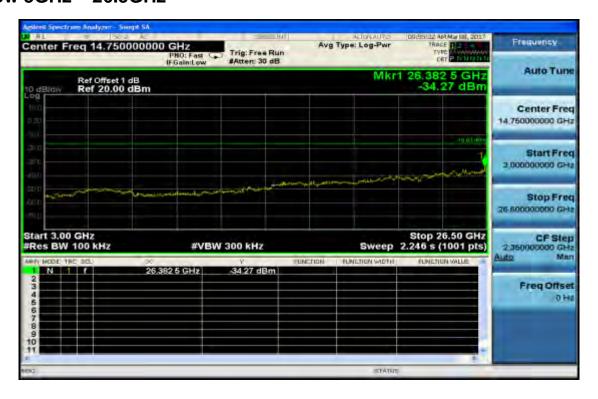
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Conducted Spurious Emission Measurement Result (8DPSK mode) Ch Low 30MHz - 3GHz



Ch Low 3GHz - 26.5GHz



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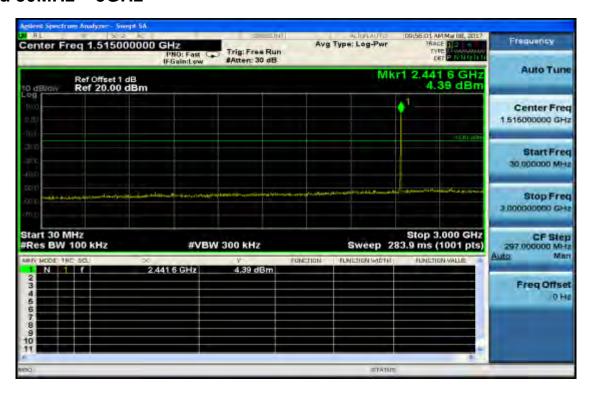
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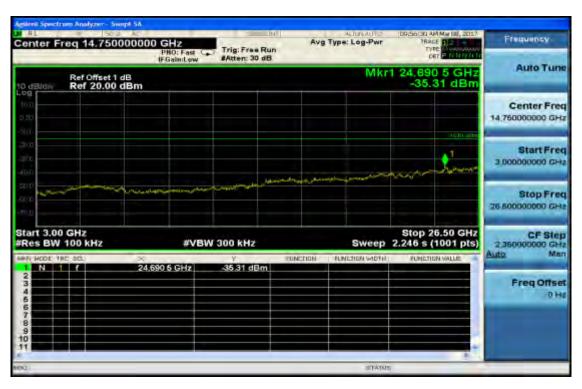
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Ch Mid 30MHz - 3GHz



Ch Mid 3GHz - 26.5GHz



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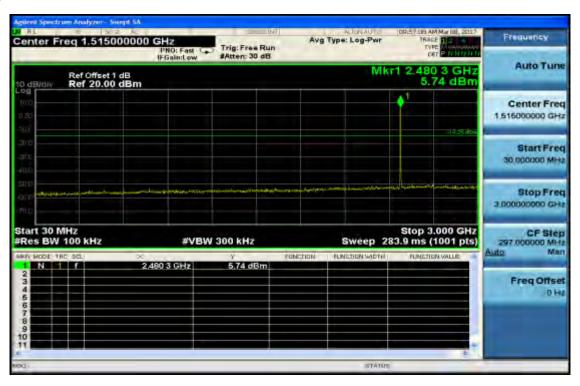
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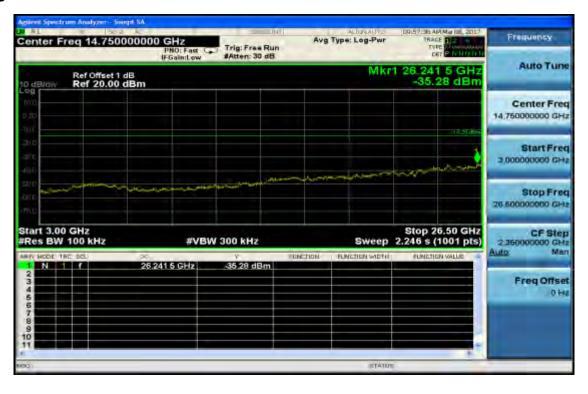
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Ch High 30MHz - 3GHz



Ch High 3GHz - 26.5GHz



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Page 47 of 127

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 & RSS-Gen §8.10 Table 6 limit.

And according to §15.33(a) (1) & RSS-Gen §8.9 Table 4 & 5, 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.
- Emission level (dBµV/m) = 20 log Emission level (dBµV/m)

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Page 48 of 127

10.2 Measurement Equipment Used

	SGS SAC-III									
EQUIPMENT	MFR	MODEL	SERIAL	LAST	CAL DUE.					
TYPE		NUMBER	NUMBER	CAL.						
EMI Test Receiver	R&S	ESCI7	100760	05/10/2016	05/09/2017					
Spectrum Analyzer	Agilent	E4446A	MY51100003	04/21/2016	04/20/2017					
Loop Antenna	ETS-Lindgren	6502	148045	09/20/2016	09/19/2017					
Bilog Antenna	SCHWAZBECK	VULB9168	378	12/19/2016	12/18/2017					
Horn Antenna	Schwarzbeck	BBHA9120D	1441	08/01/2016	07/31/2017					
Pre-Amplifier	Agilent	8447D	2944A07676	01/05/2017	01/04/2018					
Pre-Amplifier	EMC Instruments Corp.	EMC0126530	980038	01/05/2017	01/04/2018					
Turn Table	HD DT420		N/A	N.C.R	N.C.R					
Antenna Tower	ChamPro	AM-BS-4500-B	060776-ABS	N.C.R	N.C.R					
Controller	ChamPro	EM1000	60776	N.C.R	N.C.R					
Low Loss Cable	Huber Suhner	966_RX	9	01/05/2017	01/04/2018					
3m Site NSA	SGS	966 chamber	N/A	07/01/2016	06/30/2017					
Low Loss Cable	Huber Suhner	966 TX	1	01/05/2017	01/04/2018					
Horn Antenna	Schwarzbeck	BBHA9170	184	12/12/2016	12/11/2017					
Pre-Amplifier	EMC Instruments Corp.	EMC184045	980135	01/05/2017	01/04/2018					

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

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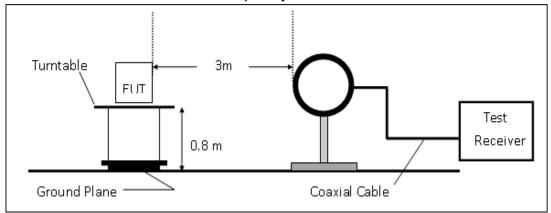
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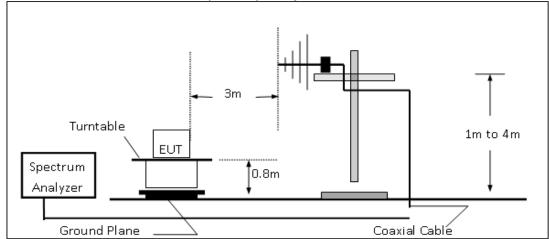
Page 49 of 127

10.3 Test SET-UP

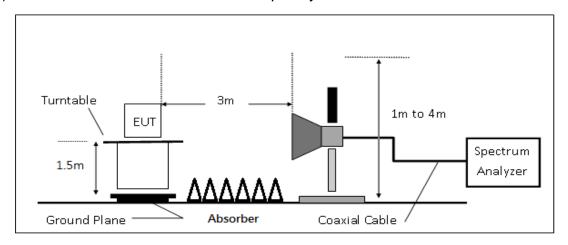
(A) Radiated Emission Test Set-UP Frequency Below 30MHz.



(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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Page 50 of 127

10.4 Measurement Procedure

Radiated Emission

- 1. The testing follows FCC Public Notice DA 00-705 Measurement Guidelines.
- 2. The EUT was placed on a turn table with 0.8m for frequency< 1GHz and 0.8m 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. Use the follow spectrum analyzer setting:
 - (1) Span = wide enough to fully capture the emission being measured
 - (2) RBW = 1 MHz for $f \ge 1$ GHz, 100 kHz for f < 1 GHz, VBW \ge RBW, Sweep = auto, Detector function = peak, Trace = max hold
 - (3) For average measurement: use duty cycle correction factor method per 15.35(c) Duty Cycle = On time/100 milliseconds

On time = N1*L1=N2*L2+...+N(n-1)*LN(n-1)+N(n)*L(n)

Where N1 is number of type 1 pulses, L1 is length of type 1 pulses, etc.

Average Emission Level = Peak Emission Level + 20*log (duty Cycle)

- 6. 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.
- 7. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
- 8. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
- 9. Repeat above procedures until all frequency of the interest measured were complete.

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Page 51 of 127

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

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

Actual FS(dB μ V/m) = SPA. Reading level(dB μ V) + Factor(dB)

Factor(dB) = Antenna Factor(dBµV/m) + Cable Loss(dB) - Pre Amplifier Gain(dB)

Note:

"F": denotes Fundamental Frequency.; "H": denotes Harmonic Frequency.

"E": denotes Band Edge Frequency.; "S": denotes Spurious Frequency.

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) was not reported.

10.7 Measurement Result

Note: Refer to next page spectrum analyzer data chart and tabular data sheets.

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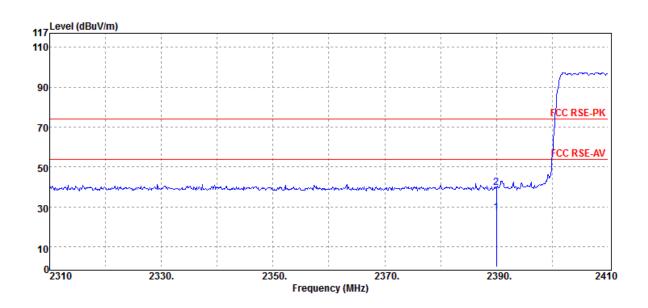
Page 52 of 127

Radiated Band Edge Measurement Result: (Hopping Mode) *Dipole Antenna

:2017-03-13 **Operation Band** :BR Hopping Test Date **Fundamental Frequency** :2402 MHz Temp./Humi. :22 deg C / 61 RH

Operation Mode :Bandedge CH LOW Engineer :Tin

EUT Pol. :H Plane Measurement Antenna Pol. :VERTICAL



Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBμV/m	dBµV/m	dB
2390.00	E	Average	28.85	-1.74	27.11	54.00	-26.89
2390.00	Е	Peak	41.58	-1.74	39.84	74.00	-34.16

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Page 53 of 127

Operation Band Fundamental Frequency **Operation Mode** EUT Pol.

:BR Hopping :2402 MHz

:Bandedge CH LOW

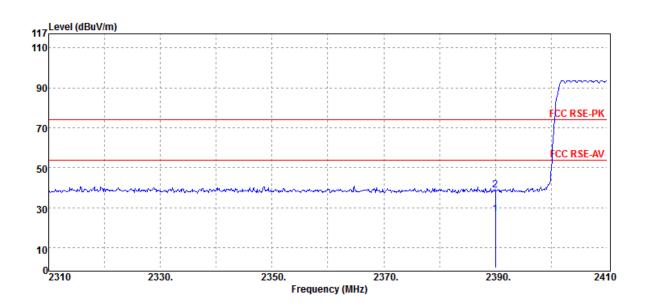
:H Plane

Test Date :2017-03-13

Temp./Humi. :22 deg_C / 61 RH

Engineer

Measurement Antenna Pol. :HORIZONTAL



Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBµV/m	dBµV/m	dB
2390.00	E	Average	28.42	-1.74	26.68	54.00	-27.32
2390.00	Е	Peak	40.46	-1.74	38.72	74.00	-35.28

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Operation Band Fundamental Frequency **Operation Mode** EUT Pol.

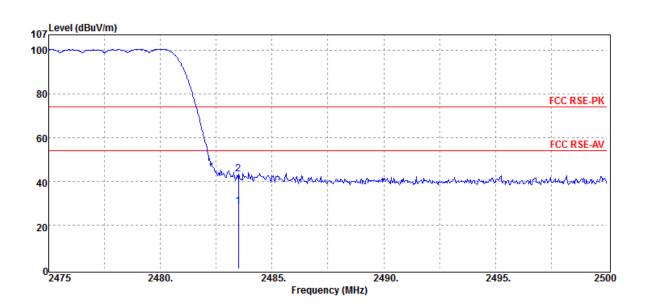
:BR Hopping :2480 MHz :Bandedge CH HIGH **Test Date** Temp./Humi. :2017-03-13

:22 deg_C / 61 RH

Engineer

:H Plane

Measurement Antenna Pol. :VERTICAL



Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin	
		Mode	Reading Level		FS	@3m		
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBµV/m	dBµV/m	dB	
2483.50	E	Average	30.17	-1.62	28.55	54.00	-25.45	
2483.50	Ε	Peak	44.77	-1.62	43.15	74.00	-30.85	

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Page 55 of 127

Operation Band Fundamental Frequency **Operation Mode** EUT Pol.

:BR Hopping :2480 MHz

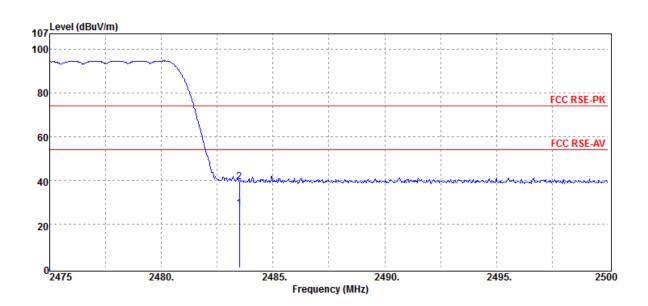
:Bandedge CH HIGH

:H Plane

Test Date :2017-03-13 :22 deg_C / 61 RH

Temp./Humi. Engineer

Measurement Antenna Pol. :HORIZONTAL



Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBµV/m	dBµV/m	dB
2483.50	E	Average	28.61	-1.62	26.99	54.00	-27.01
2483.50	Е	Peak	40.98	-1.62	39.36	74.00	-34.64

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台灣檢驗科技股份有限公司



Page 56 of 127

Operation Band Fundamental Frequency **Operation Mode** EUT Pol.

:EDR Hopping :2402 MHz

:Bandedge CH LOW

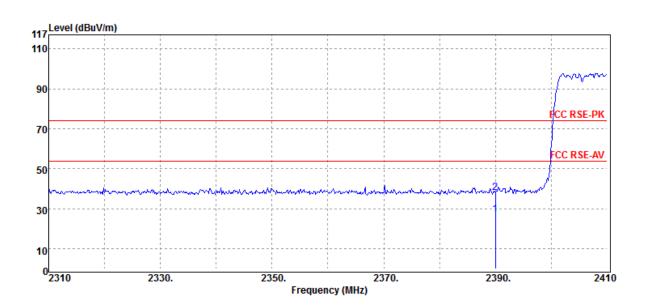
:H Plane

Test Date :2017-03-13

Temp./Humi. :22 deg_C / 61 RH

Engineer

:VERTICAL Measurement Antenna Pol.



Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin	
		Mode	Reading Level		FS	@3m		
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBµV/m	dBµV/m	dB	
2390.00	E	Average	28.75	-1.74	27.01	54.00	-26.99	
2390.00	Ε	Peak	39.82	-1.74	38.08	74.00	-35.92	

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Page 57 of 127

Operation Band Fundamental Frequency **Operation Mode** EUT Pol.

:EDR Hopping :2402 MHz

:Bandedge CH LOW

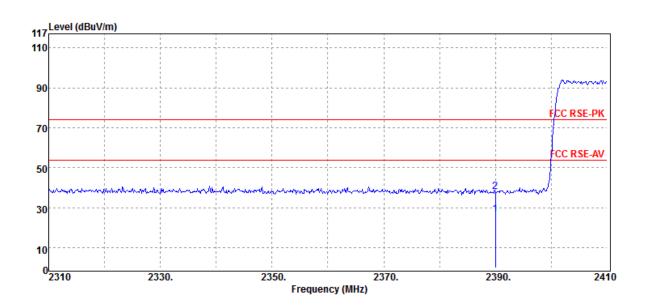
:H Plane

Test Date :2017-03-13

Temp./Humi. :22 deg_C / 61 RH

Engineer

Measurement Antenna Pol. :HORIZONTAL



Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBµV/m	dBµV/m	dB
2390.00	E	Average	28.42	-1.74	26.68	54.00	-27.32
2390.00	Е	Peak	39.69	-1.74	37.95	74.00	-36.05

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Page 58 of 127

Operation Band Fundamental Frequency **Operation Mode** EUT Pol.

:EDR Hopping :2480 MHz

:Bandedge CH HIGH

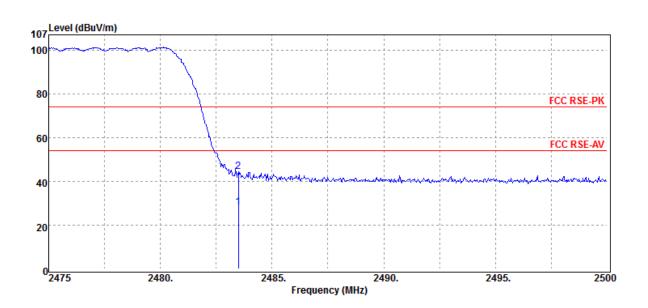
:H Plane

Test Date :2017-03-13

Temp./Humi. :22 deg_C / 61 RH

Engineer

Measurement Antenna Pol. :VERTICAL



Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin	
		Mode	Reading Level		FS	@3m		
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBµV/m	dBµV/m	dB	
2483.50	E	Average	29.73	-1.62	28.11	54.00	-25.89	
2483.50	Ε	Peak	46.20	-1.62	44.58	74.00	-29.42	

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Page 59 of 127

Operation Band Fundamental Frequency **Operation Mode** EUT Pol.

:EDR Hopping :2480 MHz

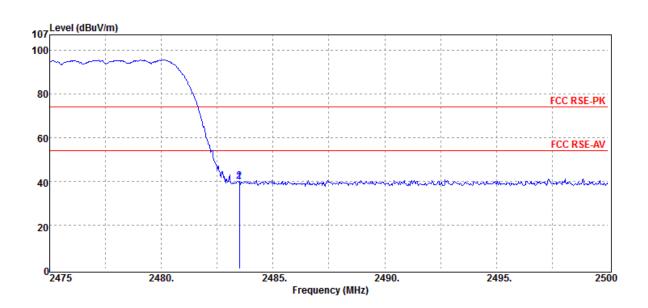
:Bandedge CH HIGH

:H Plane

Test Date :2017-03-13 Temp./Humi. :22 deg_C / 61 RH

Engineer

Measurement Antenna Pol. :HORIZONTAL



Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin	
		Mode	Reading Level		FS	@3m		
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBµV/m	dBµV/m	dB	
2483.50	E	Average	41.14	-1.62	39.52	54.00	-14.48	
2483.50	Ε	Peak	41.61	-1.62	39.99	74.00	-34.01	

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Page 60 of 127

*PCB Antenna

Operation Band Fundamental Frequency Operation Mode

EUT Pol.

:BR Hopping :2402 MHz

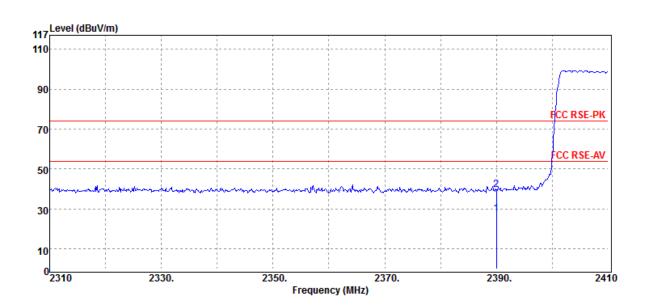
:Bandedge CH LOW

:H Plane

:2017-03-13 **Test Date**

Temp./Humi. :22 deg_C / 61 RH Engineer :Tin

:VERTICAL Measurement Antenna Pol.



Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBµV/m	dBµV/m	dB
2390.00	E	Average	29.45	-1.74	27.71	54.00	-26.29
2390.00	Е	Peak	41.42	-1.74	39.68	74.00	-34.32

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Page 61 of 127

Operation Band Fundamental Frequency **Operation Mode** EUT Pol.

:BR Hopping :2402 MHz

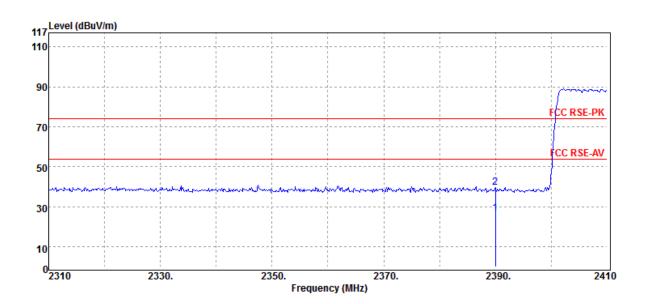
:Bandedge CH LOW

:H Plane

Test Date :2017-03-13

Temp./Humi. :22 deg_C / 61 RH Engineer

Measurement Antenna Pol. :HORIZONTAL



Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin	
		Mode	Reading Level		FS	@3m		
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBµV/m	dBµV/m	dB	
2390.00	Е	Average	28.33	-1.74	26.59	54.00	-27.41	
2390.00	Ε	Peak	41.26	-1.74	39.52	74.00	-34.48	

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Page 62 of 127

Operation Band Fundamental Frequency **Operation Mode** EUT Pol.

:BR Hopping :2480 MHz

:Bandedge CH HIGH

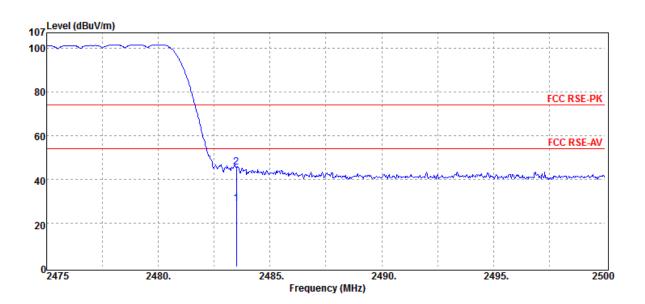
:H Plane

Test Date :2017-03-13

Temp./Humi. :22 deg_C / 61 RH

Engineer

Measurement Antenna Pol. :VERTICAL



Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBμV/m	dBµV/m	dB
2483.50	E	Average	30.66	-1.62	29.04	54.00	-24.96
2483.50	E	Peak	47.18	-1.62	45.56	74.00	-28.44

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Page 63 of 127

Operation Band Fundamental Frequency **Operation Mode** EUT Pol.

:BR Hopping :2480 MHz :Bandedge CH HIGH

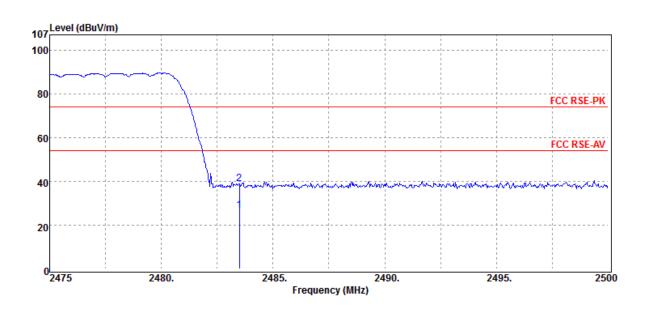
:H Plane

Test Date Temp./Humi. :2017-03-13

:22 deg_C / 61 RH

Engineer

Measurement Antenna Pol. :HORIZONTAL



Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBµV/m	dBµV/m	dB
2483.50	E	Average	28.12	-1.62	26.50	54.00	-27.50
2483.50	Е	Peak	40.45	-1.62	38.83	74.00	-35.17

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Page 64 of 127

Operation Band Fundamental Frequency **Operation Mode** EUT Pol.

:EDR Hopping :2402 MHz :Bandedge CH LOW

:H Plane

Temp./Humi.

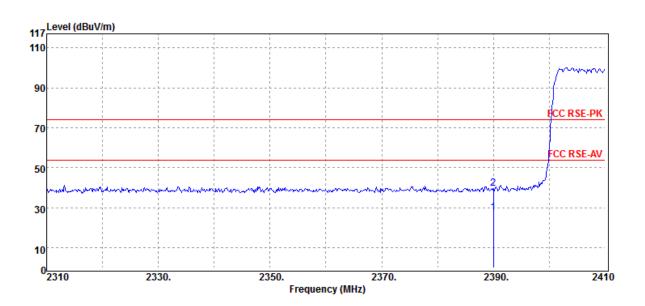
Test Date

:2017-03-13

:22 deg_C / 61 RH

Engineer

:VERTICAL Measurement Antenna Pol.



	Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
			Mode	Reading Level		FS	@3m	
_	MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBµV/m	dBµV/m	dB
	2390.00	E	Average	29.20	-1.74	27.46	54.00	-26.54
	2390.00	Е	Peak	41.43	-1.74	39.69	74.00	-34.31

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Page 65 of 127

Operation Band Fundamental Frequency **Operation Mode** EUT Pol.

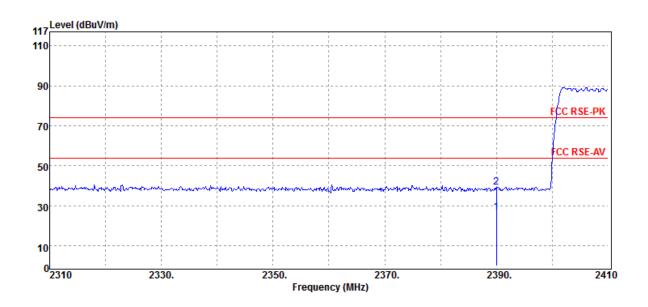
:EDR Hopping :2402 MHz :Bandedge CH LOW

:H Plane

Test Date Temp./Humi. Engineer

:2017-03-13 :22 deg_C / 61 RH

Measurement Antenna Pol. :HORIZONTAL



Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBµV/m	dBµV/m	dB
2390.00	E	Average	28.32	-1.74	26.58	54.00	-27.42
2390.00	Е	Peak	40.82	-1.74	39.08	74.00	-34.92

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Page 66 of 127

Operation Band Fundamental Frequency **Operation Mode** EUT Pol.

:EDR Hopping :2480 MHz

:Bandedge CH HIGH

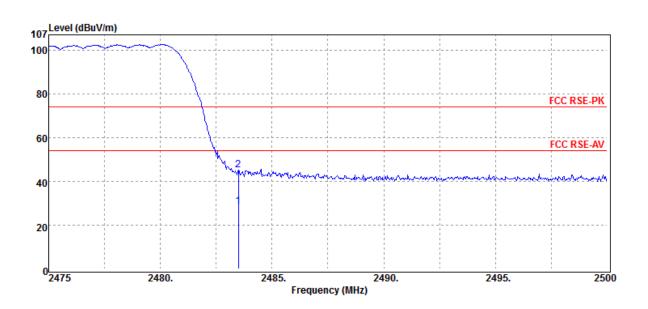
:H Plane

Test Date :2017-03-13

Temp./Humi. :22 deg_C / 61 RH

Engineer

Measurement Antenna Pol. :VERTICAL



Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin	
		Mode	Reading Level		FS	@3m		
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBµV/m	dBµV/m	dB	
2483.50	E	Average	30.11	-1.62	28.49	54.00	-25.51	
2483.50	Ε	Peak	46.81	-1.62	45.19	74.00	-28.81	

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Page 67 of 127

Operation Band Fundamental Frequency **Operation Mode** EUT Pol.

:EDR Hopping :2480 MHz

:Bandedge CH HIGH

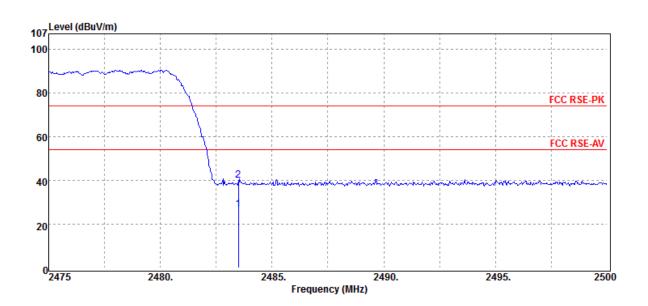
:H Plane

Test Date :2017-03-13

Temp./Humi. :22 deg_C / 61 RH

Engineer

Measurement Antenna Pol. :HORIZONTAL



Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBµV/m	dBµV/m	dB
2483.50	E	Average	28.15	-1.62	26.53	54.00	-27.47
2483.50	Е	Peak	41.61	-1.62	39.99	74.00	-34.01

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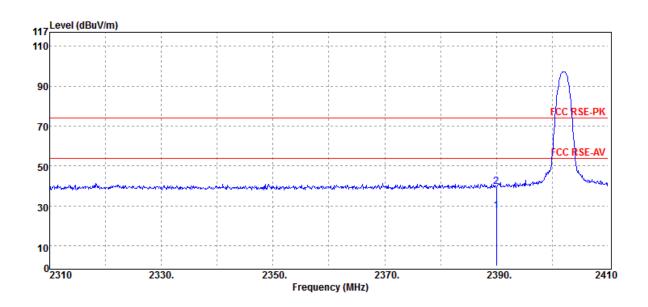
Page 68 of 127

Radiated Band Edge Measurement Result: (Non-Hopping Mode) *Dipole Antenna

Operation Band Test Date :BR(1M) :2017-03-13 Fundamental Frequency :2402 MHz Temp./Humi. :22 deg_C / 61 RH

Operation Mode :Bandedge CH LOW Engineer

EUT Pol. :H Plane Measurement Antenna Pol. :VERTICAL



Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBµV/m	dBµV/m	dB
2390.00	E	Average	29.40	-1.74	27.66	54.00	-26.34
2390.00	Е	Peak	41.38	-1.74	39.64	74.00	-34.36

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Page 69 of 127

Operation Band Fundamental Frequency **Operation Mode** EUT Pol.

:BR(1M) :2402 MHz

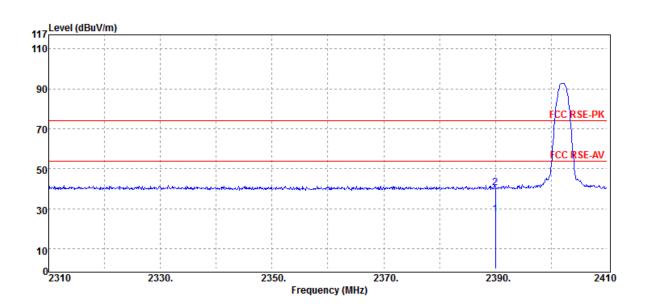
:Bandedge CH LOW

:H Plane

Test Date :2017-03-13

Temp./Humi. :22 deg_C / 61 RH Engineer

Measurement Antenna Pol. :HORIZONTAL



Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBµV/m	dBµV/m	dB
2390.00	E	Average	28.75	-1.74	27.01	54.00	-26.99
2390.00	Е	Peak	42.23	-1.74	40.49	74.00	-33.51

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Page 70 of 127

Operation Band Fundamental Frequency **Operation Mode** EUT Pol.

:BR(1M) :2480 MHz

:Bandedge CH HIGH

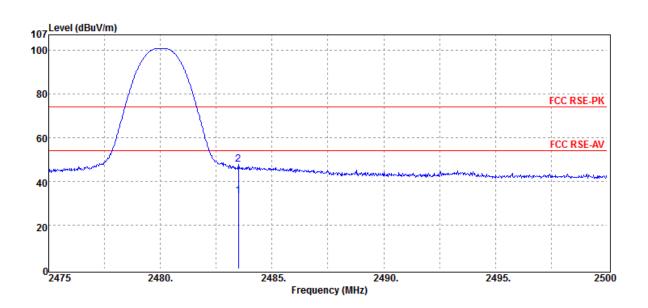
:H Plane

Test Date :2017-03-13

Temp./Humi. :22 deg_C / 61 RH

Engineer

Measurement Antenna Pol. :VERTICAL



Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin	
		Mode	Reading Level		FS	@3m		
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBµV/m	dBµV/m	dB	
2483.50	Е	Average	35.10	-1.62	33.48	54.00	-20.52	
2483.50	Ε	Peak	49.33	-1.62	47.71	74.00	-26.29	

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Page 71 of 127

Operation Band Fundamental Frequency **Operation Mode** EUT Pol.

:BR(1M) :2480 MHz

:Bandedge CH HIGH

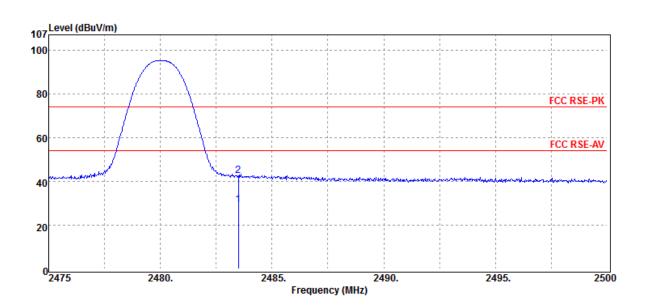
:H Plane

Test Date :2017-03-13

Temp./Humi. :22 deg_C / 61 RH

Engineer

Measurement Antenna Pol. :HORIZONTAL



Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBµV/m	dBµV/m	dB
2483.50	E	Average	30.74	-1.62	29.12	54.00	-24.88
2483.50	Е	Peak	44.15	-1.62	42.53	74.00	-31.47

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Page 72 of 127

Operation Band Fundamental Frequency **Operation Mode**

EUT Pol.

:EDR(3M) :2402 MHz

:Bandedge CH LOW

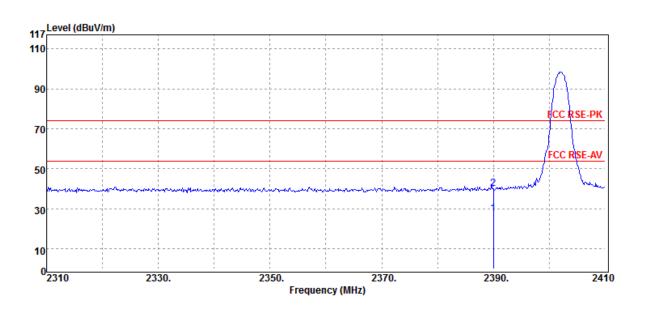
:H Plane

Test Date :2017-03-13

Temp./Humi. :22 deg_C / 61 RH

Engineer

:VERTICAL Measurement Antenna Pol.



Fre	eq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
			Mode	Reading Level		FS	@3m	
MI	Ηz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBμV/m	dBµV/m	dB
239	0.00	E	Average	29.29	-1.74	27.55	54.00	-26.45
239	0.00	Ε	Peak	41.92	-1.74	40.18	74.00	-33.82

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Page 73 of 127

Operation Band Fundamental Frequency **Operation Mode** EUT Pol.

:EDR(3M) :2402 MHz

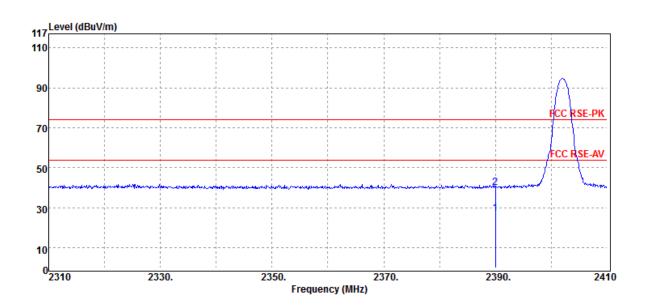
:Bandedge CH LOW

:H Plane

Test Date :2017-03-13 Temp./Humi. :22 deg_C / 61 RH

Engineer

Measurement Antenna Pol. :HORIZONTAL



Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBµV/m	dBµV/m	dB
2390.00	Е	Average	28.70	-1.74	26.96	54.00	-27.04
2390.00	Ε	Peak	41.78	-1.74	40.04	74.00	-33.96

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Page 74 of 127

Operation Band Fundamental Frequency **Operation Mode** EUT Pol.

:EDR(3M) :2480 MHz

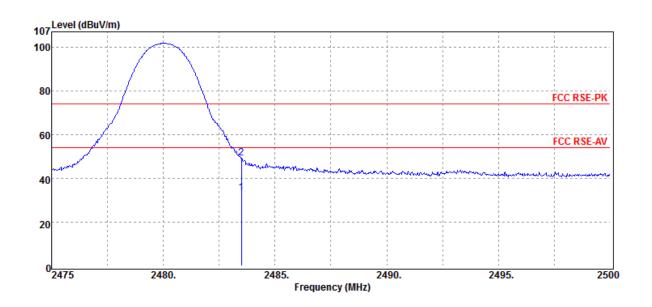
:Bandedge CH HIGH

:H Plane

Test Date :2017-03-13 Temp./Humi. :22 deg_C / 61 RH

Engineer

Measurement Antenna Pol. :HORIZONTAL



Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBμV/m	dBµV/m	dB
2483.50	Е	Average	35.10	-1.62	33.48	54.00	-20.52
2483.50	Ε	Peak	50.83	-1.62	49.21	74.00	-24.79

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Page 75 of 127

Operation Band Fundamental Frequency **Operation Mode** EUT Pol.

:EDR(3M) :2480 MHz

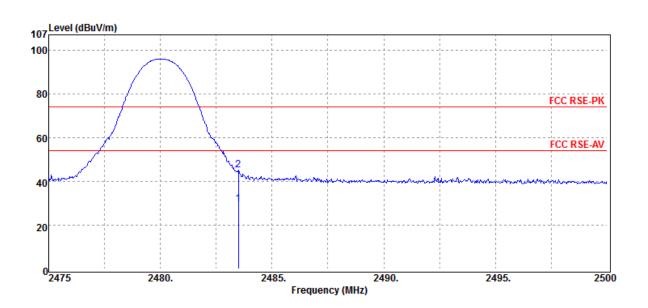
:Bandedge CH HIGH

:H Plane

Test Date :2017-03-13 Temp./Humi. :22 deg_C / 61 RH

Engineer

Measurement Antenna Pol. :VERTICAL



Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBµV/m	dBµV/m	dB
2483.50	E	Average	31.10	-1.62	29.48	54.00	-24.52
2483.50	Ε	Peak	46.72	-1.62	45.10	74.00	-28.90

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Page 76 of 127

*PCB Antenna

Operation Band :BR(1M) Fundamental Frequency :2402 MHz

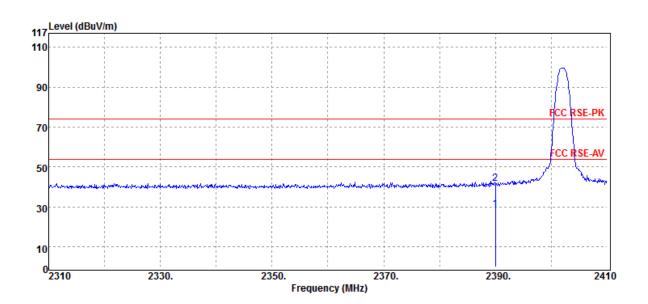
Operation Mode :Bandedge CH LOW

EUT Pol. :H Plane **Test Date** :2017-03-13

Temp./Humi. :22 deg_C / 61 RH

Engineer

Measurement Antenna Pol. :VERTICAL



Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBµV/m	dBµV/m	dB
2390.00	E	Average	30.57	-1.74	28.83	54.00	-25.17
2390.00	Е	Peak	43.27	-1.74	41.53	74.00	-32.47

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Page 77 of 127

Operation Band Fundamental Frequency **Operation Mode** EUT Pol.

:BR(1M) :2402 MHz

:Bandedge CH LOW

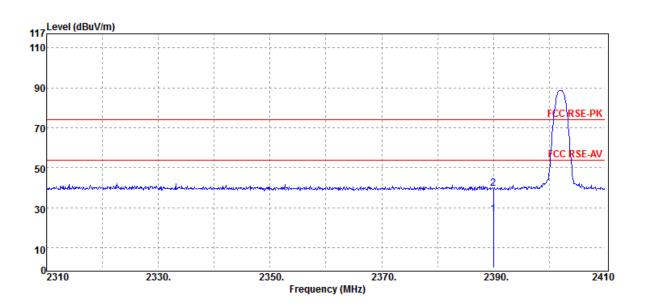
:H Plane

Test Date :2017-03-13

Temp./Humi. :22 deg_C / 61 RH

Engineer

Measurement Antenna Pol. :HORIZONTAL



	Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
			Mode	Reading Level		FS	@3m	
	MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBµV/m	dBµV/m	dB
2	2390.00	E	Average	28.42	-1.74	26.68	54.00	-27.32
2	2390.00	Ε	Peak	41.59	-1.74	39.85	74.00	-34.15

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Page 78 of 127

Operation Band Fundamental Frequency **Operation Mode** EUT Pol.

:BR(1M) :2480 MHz

:Bandedge CH HIGH

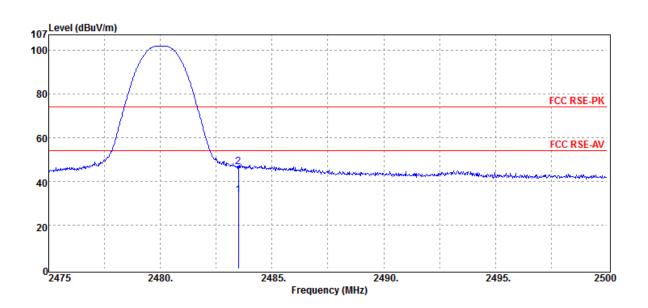
:H Plane

Test Date :2017-03-13

Temp./Humi. :22 deg_C / 61 RH

Engineer

Measurement Antenna Pol. :VERTICAL



Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin	
		Mode	Reading Level		FS	@3m		
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBµV/m	dBµV/m	dB	
2483.50	E	Average	35.45	-1.62	33.83	54.00	-20.17	
2483.50	Ε	Peak	48.21	-1.62	46.59	74.00	-27.41	

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Page 79 of 127

Operation Band Fundamental Frequency **Operation Mode** EUT Pol.

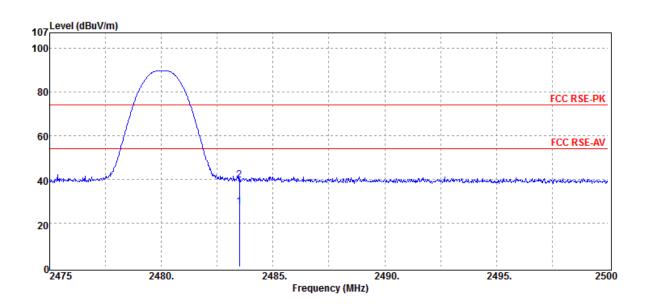
:BR(1M) :2480 MHz :Bandedge CH HIGH

:H Plane

Test Date Temp./Humi. :2017-03-13 :22 deg_C / 61 RH

Engineer

Measurement Antenna Pol. :HORIZONTAL



Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBµV/m	dBµV/m	dB
2483.50	E	Average	28.94	-1.62	27.32	54.00	-26.68
2483.50	Е	Peak	41.24	-1.62	39.62	74.00	-34.38

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Page 80 of 127

Operation Band Fundamental Frequency **Operation Mode** EUT Pol.

:EDR(3M) :2402 MHz

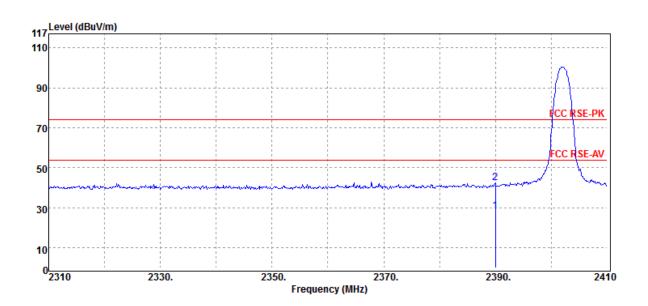
:Bandedge CH LOW

:H Plane

Test Date :2017-03-13

Temp./Humi. :22 deg_C / 61 RH Engineer

:VERTICAL Measurement Antenna Pol.



Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin	
		Mode	Reading Level		FS	@3m		
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBµV/m	dBµV/m	dB	
2390.00	E	Average	30.10	-1.74	28.36	54.00	-25.64	
2390.00	Ε	Peak	44.17	-1.74	42.43	74.00	-31.57	

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Page 81 of 127

Operation Band Fundamental Frequency **Operation Mode**

EUT Pol.

:EDR(3M) :2402 MHz

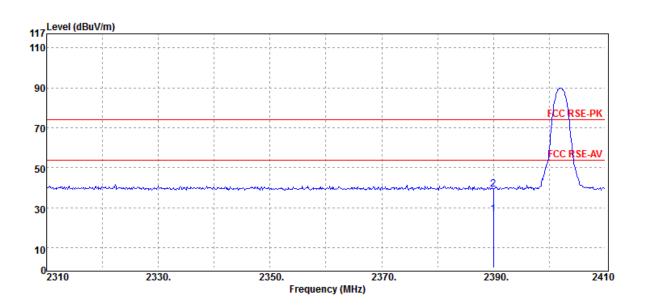
:Bandedge CH LOW

:H Plane

Test Date :2017-03-13 Temp./Humi. :22 deg_C / 61 RH

Engineer

Measurement Antenna Pol. :HORIZONTAL



Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin	
		Mode	Reading Level		FS	@3m		
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBµV/m	dBµV/m	dB	
2390.00	E	Average	28.41	-1.74	26.67	54.00	-27.33	
2390.00	Ε	Peak	41.06	-1.74	39.32	74.00	-34.68	

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Page 82 of 127

Operation Band Fundamental Frequency **Operation Mode** EUT Pol.

:EDR(3M) :2480 MHz

:Bandedge CH HIGH

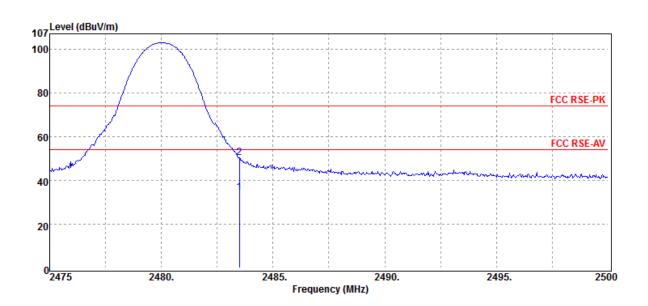
:H Plane

Test Date :2017-03-13

Temp./Humi. :22 deg_C / 61 RH

Engineer

Measurement Antenna Pol. :HORIZONTAL



Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBµV/m	dBµV/m	dB
2483.50	E	Average	35.90	-1.62	34.28	54.00	-19.72
2483.50	Е	Peak	52.07	-1.62	50.45	74.00	-23.55

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Page 83 of 127

Operation Band Fundamental Frequency **Operation Mode** EUT Pol.

:EDR(3M) :2480 MHz

:Bandedge CH HIGH

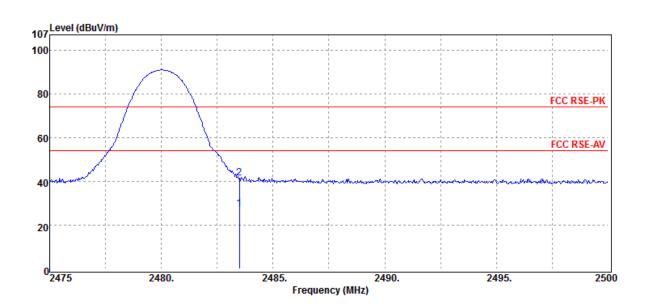
:H Plane

Test Date :2017-03-13

Temp./Humi. :22 deg_C / 61 RH

Engineer

Measurement Antenna Pol. :VERTICAL



Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBµV/m	dBµV/m	dB
2483.50	E	Average	29.18	-1.62	27.56	54.00	-26.44
2483.50	Е	Peak	43.14	-1.62	41.52	74.00	-32.48

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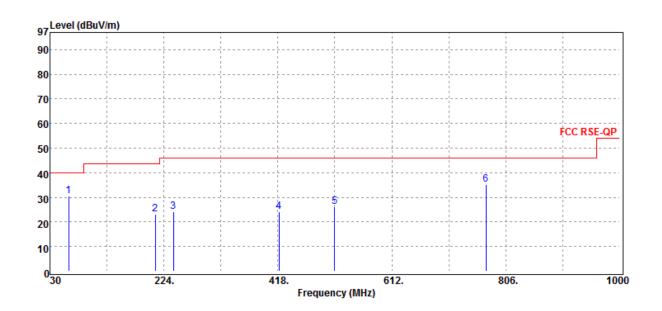
Page 84 of 127

Radiated Spurious Emission Measurement Result: (Worst Case) *Dipole Antenna For Frequency below 1 GHz

Operation Band **Test Date** :EDR(3M) :2017-03-20 Fundamental Frequency :2402 MHz Temp./Humi. :22 deg_C / 61 RH

Operation Mode :Tx CH LOW Engineer :Tin

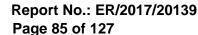
EUT Pol. :H Plane Measurement Antenna Pol. :VERTICAL



Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin	
		Mode	Reading Level		FS	@3m		
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBμV/m	dBµV/m	dB	
62.01	S	Peak	39.16	-8.47	30.69	40.00	-9.31	
209.45	S	Peak	33.03	-9.77	23.26	43.50	-20.24	
240.49	S	Peak	32.17	-8.04	24.13	46.00	-21.87	
419.94	S	Peak	27.45	-3.39	24.06	46.00	-21.94	
515.00	S	Peak	28.04	-1.94	26.10	46.00	-19.90	
772.05	S	Peak	32.44	2.68	35.12	46.00	-10.88	

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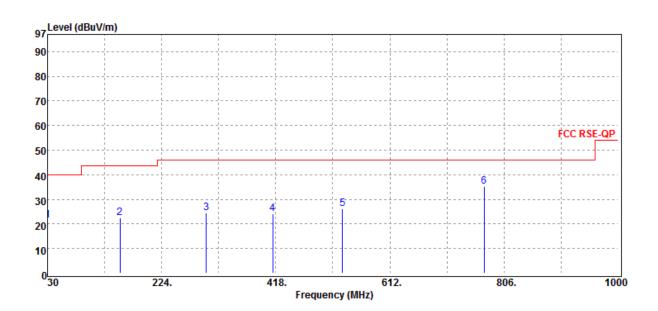
:EDR(3M) :2402 MHz :Tx CH LOW :H Plane

Test Date :2017-03-20

Temp./Humi. :22 deg_C / 61 RH

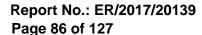
Engineer

Measurement Antenna Pol. :HORIZONTAL



Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBμV/m	dBµV/m	dB
30.00	S	Peak	30.63	-9.19	21.44	40.00	-18.56
153.19	S	Peak	30.12	-7.71	22.41	43.50	-21.09
299.66	S	Peak	30.42	-5.93	24.49	46.00	-21.51
413.15	S	Peak	27.44	-3.38	24.06	46.00	-21.94
531.49	S	Peak	27.69	-1.57	26.12	46.00	-19.88
772.05	S	Peak	32.68	2.68	35.36	46.00	-10.64

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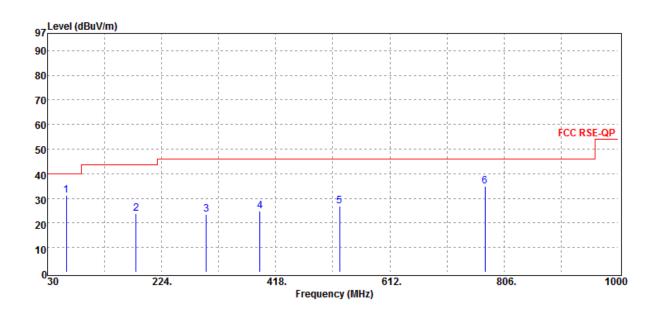
:EDR(3M) :2441 MHz :Tx CH MID :H Plane

Test Date :2017-03-20

Temp./Humi. :22 deg_C / 61 RH

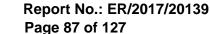
Engineer

Measurement Antenna Pol. :VERTICAL



Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBµV/m	dBµV/m	dB
62.01	S	Peak	39.79	-8.47	31.32	40.00	-8.68
180.35	S	Peak	32.51	-8.69	23.82	43.50	-19.68
299.66	S	Peak	29.54	-5.93	23.61	46.00	-22.39
390.84	S	Peak	29.18	-4.18	25.00	46.00	-21.00
526.64	S	Peak	28.33	-1.44	26.89	46.00	-19.11
773.99	S	Peak	31.99	2.78	34.77	46.00	-11.23

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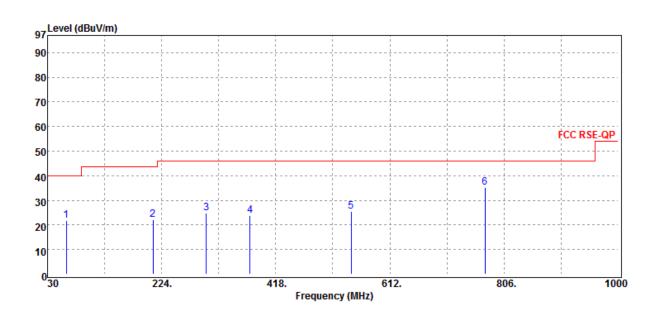


:EDR(3M) :2441 MHz :Tx CH MID :H Plane

Test Date :2017-03-20 Temp./Humi. :22 deg_C / 61 RH

Engineer

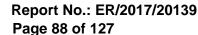
Measurement Antenna Pol. :HORIZONTAL



Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBμV/m	dBµV/m	dB
62.01	S	Peak	30.32	-8.47	21.85	40.00	-18.15
209.45	S	Peak	31.89	-9.77	22.12	43.50	-21.38
299.66	S	Peak	30.80	-5.93	24.87	46.00	-21.13
374.35	S	Peak	28.30	-4.54	23.76	46.00	-22.24
546.04	S	Peak	26.91	-1.55	25.36	46.00	-20.64
773.99	S	Peak	32.62	2.78	35.40	46.00	-10.60

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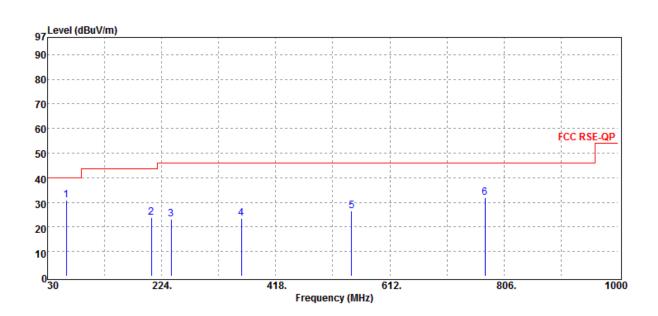
:EDR(3M) :2480 MHz :Tx CH HIGH :H Plane

Test Date :2017-03-20

Temp./Humi. :22 deg_C / 61 RH

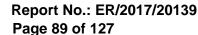
Engineer

Measurement Antenna Pol. :VERTICAL



Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBμV/m	dBµV/m	dB
62.01	S	Peak	39.51	-8.47	31.04	40.00	-8.96
206.54	S	Peak	33.62	-9.71	23.91	43.50	-19.59
240.49	S	Peak	31.09	-8.04	23.05	46.00	-22.95
359.80	S	Peak	28.35	-4.79	23.56	46.00	-22.44
547.01	S	Peak	28.35	-1.68	26.67	46.00	-19.33
773.99	S	Peak	29.06	2.78	31.84	46.00	-14.16

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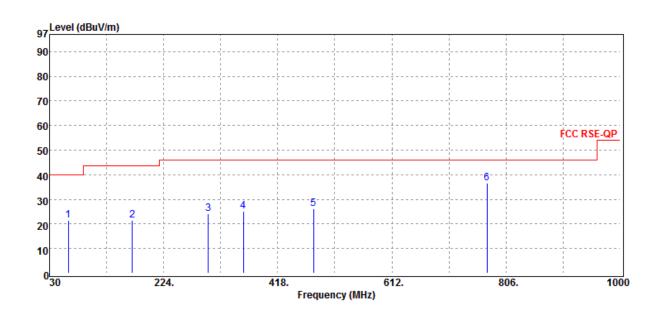


:EDR(3M) :2480 MHz :Tx CH HIGH :H Plane

Test Date :2017-03-20 Temp./Humi. :22 deg_C / 61 RH

Engineer

Measurement Antenna Pol. :HORIZONTAL



Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBμV/m	dBµV/m	dB
62.01	S	Peak	29.87	-8.47	21.40	40.00	-18.60
170.65	S	Peak	29.23	-7.66	21.57	43.50	-21.93
299.66	S	Peak	29.99	-5.93	24.06	46.00	-21.94
359.80	S	Peak	30.00	-4.79	25.21	46.00	-20.79
479.11	S	Peak	28.71	-2.39	26.32	46.00	-19.68
773.99	S	Peak	33.83	2.78	36.61	46.00	-9.39

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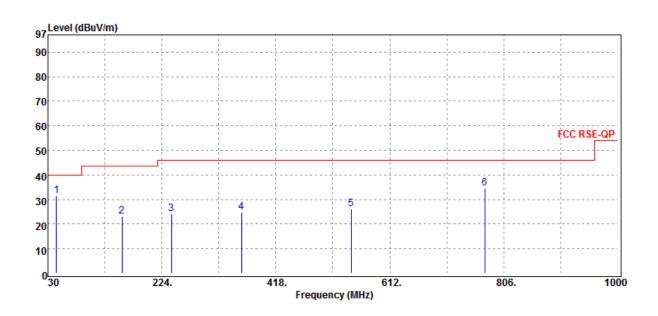
Page 90 of 127

*PCB Antenna

Operation Band :EDR(3M) **Test Date** :2017-03-20 Fundamental Frequency :2402 MHz :22 deg_C / 61 RH

Temp./Humi. **Operation Mode** :Tx CH LOW Engineer

EUT Pol. :H Plane Measurement Antenna Pol. :VERTICAL



Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBμV/m	dBµV/m	dB
44.55	S	Peak	39.67	-8.09	31.58	40.00	-8.42
156.10	S	Peak	30.70	-7.61	23.09	43.50	-20.41
240.49	S	Peak	32.21	-8.04	24.17	46.00	-21.83
359.80	S	Peak	29.61	-4.79	24.82	46.00	-21.18
546.04	S	Peak	27.75	-1.55	26.20	46.00	-19.80
773.99	S	Peak	31.80	2.78	34.58	46.00	-11.42

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Page 91 of 127

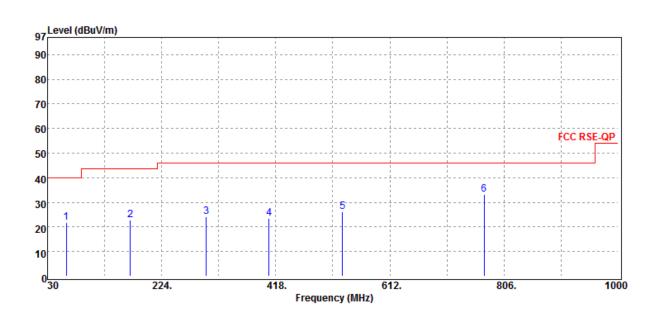
Operation Band Fundamental Frequency Operation Mode EUT Pol.

:EDR(3M) :2402 MHz :Tx CH LOW :H Plane

Test Date :2017-03-20 Temp./Humi. :22 deg_C / 61 RH

Engineer

Measurement Antenna Pol. :HORIZONTAL



Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBµV/m	dBµV/m	dB
62.01	S	Peak	30.26	-8.47	21.79	40.00	-18.21
170.65	S	Peak	30.62	-7.66	22.96	43.50	-20.54
299.66	S	Peak	30.04	-5.93	24.11	46.00	-21.89
406.36	S	Peak	27.23	-3.59	23.64	46.00	-22.36
531.49	S	Peak	27.85	-1.57	26.28	46.00	-19.72
772.05	S	Peak	30.42	2.68	33.10	46.00	-12.90

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Page 92 of 127

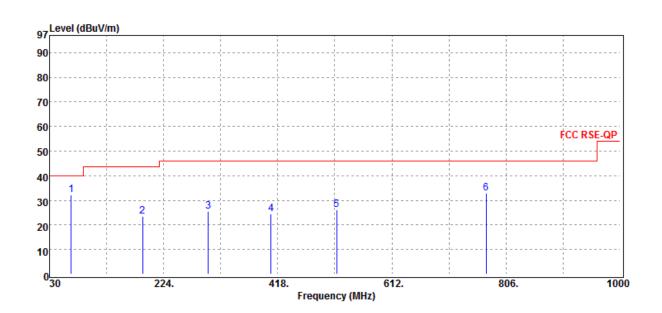
Operation Band Fundamental Frequency **Operation Mode** EUT Pol.

:EDR(3M) :2441 MHz :Tx CH MID :H Plane

Test Date :2017-03-20 Temp./Humi. :22 deg_C / 61 RH

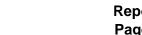
Engineer

Measurement Antenna Pol. :VERTICAL



Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBμV/m	dBµV/m	dB
66.86	S	Peak	41.90	-9.58	32.32	40.00	-7.68
188.11	S	Peak	32.79	-9.20	23.59	43.50	-19.91
299.66	S	Peak	31.35	-5.93	25.42	46.00	-20.58
406.36	S	Peak	28.19	-3.59	24.60	46.00	-21.40
517.91	S	Peak	28.04	-1.82	26.22	46.00	-19.78
772.05	S	Peak	30.10	2.68	32.78	46.00	-13.22

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Page 93 of 127

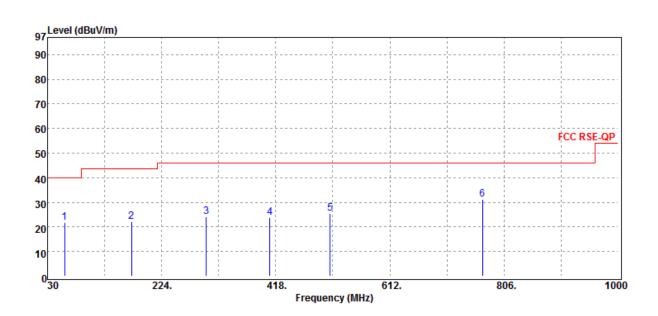
Operation Band Fundamental Frequency **Operation Mode** EUT Pol.

:EDR(3M) :2441 MHz :Tx CH MID :H Plane

Test Date :2017-03-20 Temp./Humi. :22 deg_C / 61 RH

Engineer

Measurement Antenna Pol. :HORIZONTAL



Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBμV/m	dBµV/m	dB
59.10	S	Peak	29.75	-8.03	21.72	40.00	-18.28
172.59	S	Peak	30.07	-7.86	22.21	43.50	-21.29
299.66	S	Peak	30.14	-5.93	24.21	46.00	-21.79
408.30	S	Peak	27.20	-3.53	23.67	46.00	-22.33
510.15	S	Peak	27.69	-2.19	25.50	46.00	-20.50
769.14	S	Peak	28.40	2.77	31.17	46.00	-14.83

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Page 94 of 127

Operation Band Fundamental Frequency Operation Mode EUT Pol.

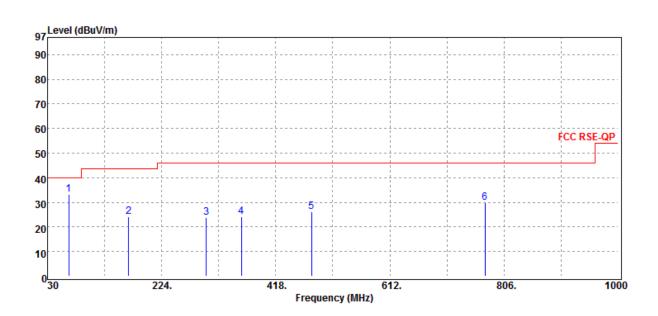
:EDR(3M) :2480 MHz :Tx CH HIGH :H Plane

Test Date :2017-03-20

Temp./Humi. :22 deg_C / 61 RH

Engineer

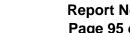
Measurement Antenna Pol. :VERTICAL



Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBμV/m	dBµV/m	dB
65.89	S	Peak	42.67	-9.38	33.29	40.00	-6.71
167.74	S	Peak	31.57	-7.46	24.11	43.50	-19.39
299.66	S	Peak	29.91	-5.93	23.98	46.00	-22.02
359.80	S	Peak	28.98	-4.79	24.19	46.00	-21.81
479.11	S	Peak	28.56	-2.39	26.17	46.00	-19.83
773.99	S	Peak	26.99	2.78	29.77	46.00	-16.23

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Page 95 of 127

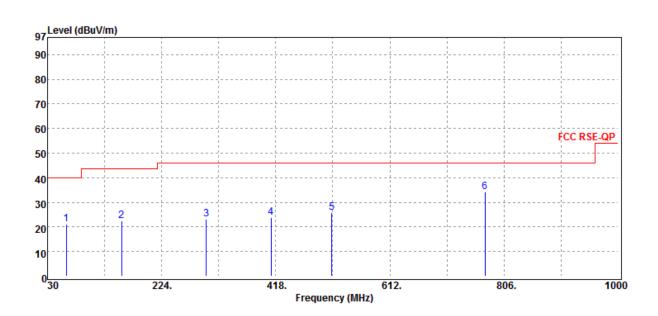
Operation Band Fundamental Frequency Operation Mode EUT Pol.

:EDR(3M) :2480 MHz :Tx CH HIGH :H Plane

Test Date :2017-03-20 Temp./Humi. :22 deg_C / 61 RH

Engineer

Measurement Antenna Pol. :HORIZONTAL



Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBμV/m	dBµV/m	dB
62.01	S	Peak	29.56	-8.47	21.09	40.00	-18.91
156.10	S	Peak	30.16	-7.61	22.55	43.50	-20.95
299.66	S	Peak	29.00	-5.93	23.07	46.00	-22.93
410.24	S	Peak	27.31	-3.62	23.69	46.00	-22.31
513.06	S	Peak	27.75	-1.89	25.86	46.00	-20.14
773.99	S	Peak	31.41	2.78	34.19	46.00	-11.81

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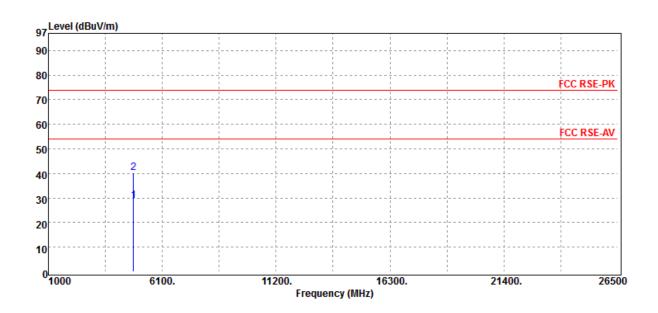
Page 96 of 127

Radiated Spurious Emission Measurement Result: (Worst Case) *Dipole Antenna For Frequency above 1 GHz

Operation Band **Test Date** :EDR(3M) :2017-03-13

Fundamental Frequency :2402 MHz Temp./Humi. :22 deg_C / 61 RH **Operation Mode** :Tx CH LOW Engineer :Tin

EUT Pol. :H Plane Measurement Antenna Pol. :VERTICAL



	Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Safe	
			Mode	Reading Level		FS	@3m	Margin	
_	MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBµV/m	dBμV/m	dB	
-									
	4804.00	Н	Average	24.07	4.92	28.99	54.00	-25.01	
	4804.00	Н	Peak	35.36	4.92	40.28	74.00	-33.72	

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Page 97 of 127

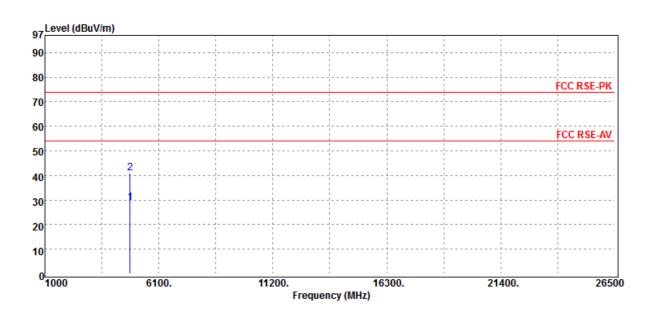
Operation Band Fundamental Frequency Operation Mode EUT Pol.

:EDR(3M) :2402 MHz :Tx CH LOW :H Plane

Test Date :2017-03-13 Temp./Humi. :22 deg_C / 61 RH

Engineer

Measurement Antenna Pol. :HORIZONTAL



Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Safe
		Mode	Reading Level		FS	@3m	Margin
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBµV/m	dBµV/m	dB
4804.00	Н	Average	24.07	4.92	28.99	54.00	-25.01
4804.00	Н	Peak	36.05	4.92	40.97	74.00	-33.03

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Page 98 of 127

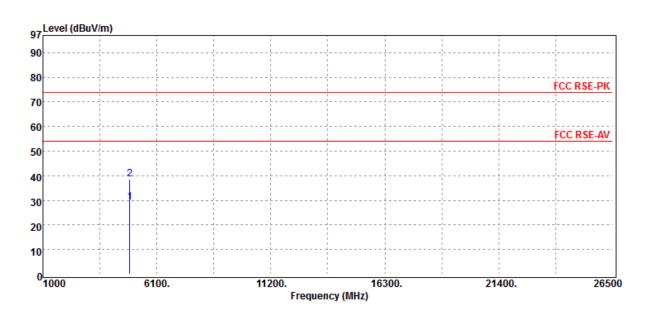
Operation Band Fundamental Frequency **Operation Mode** EUT Pol.

:EDR(3M) :2441 MHz :Tx CH MID :H Plane

Test Date :2017-03-13 Temp./Humi. :22 deg_C / 61 RH

Engineer

Measurement Antenna Pol. :VERTICAL



Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Safe	
		Mode	Reading Level		FS	@3m	Margin	
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBµV/m	dBµV/m	dB	
4882.00	Н	Average	24.03	5.18	29.21	54.00	-24.79	
4882.00	Н	Peak	33.38	5.18	38.56	74.00	-35.44	

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Page 99 of 127

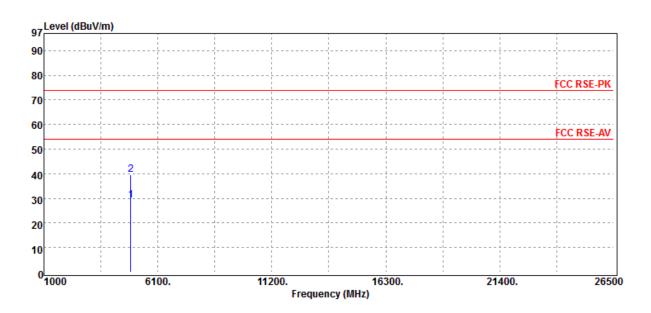
Operation Band Fundamental Frequency **Operation Mode** EUT Pol.

:EDR(3M) :2441 MHz :Tx CH MID :H Plane

Test Date :2017-03-13 Temp./Humi. :22 deg_C / 61 RH

Engineer

Measurement Antenna Pol. :HORIZONTAL



Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Safe	
		Mode	Reading Level		FS	@3m	Margin	
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBµV/m	dBµV/m	dB	
4882.00	Н	Average	24.05	5.18	29.23	54.00	-24.77	
4882.00	Н	Peak	34.40	5.18	39.58	74.00	-34.42	

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Page 100 of 127

Operation Band Fundamental Frequency **Operation Mode** EUT Pol.

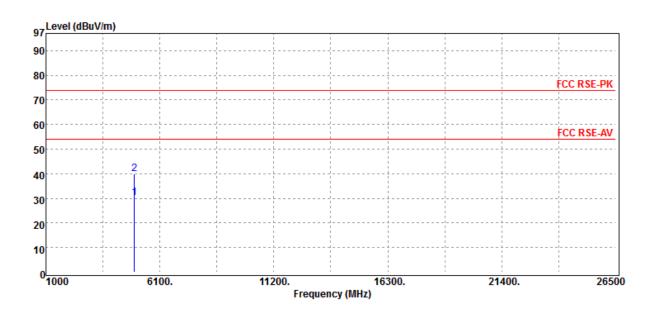
:EDR(3M) :2480 MHz :Tx CH HIGH :H Plane

Test Date :2017-03-13

Temp./Humi. :22 deg_C / 61 RH

Engineer

Measurement Antenna Pol. :VERTICAL



Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Safe	
		Mode	Reading Level		FS	@3m	Margin	
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBµV/m	dBµV/m	dB	
4960.00	Н	Average	24.81	5.29	30.10	54.00	-23.90	
4960.00	Н	Peak	34.57	5.29	39.86	74.00	-34.14	

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Page 101 of 127

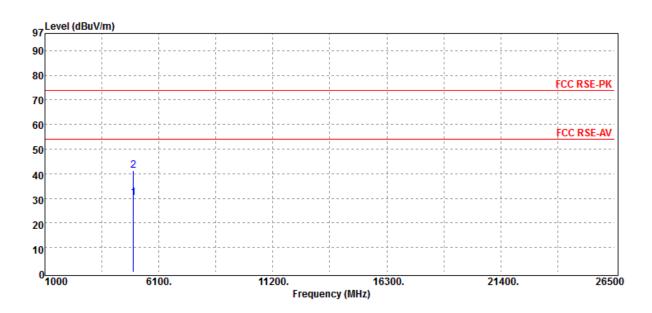
Operation Band Fundamental Frequency **Operation Mode** EUT Pol.

:EDR(3M) :2480 MHz :Tx CH HIGH :H Plane

Test Date :2017-03-13 Temp./Humi. :22 deg_C / 61 RH

Engineer

Measurement Antenna Pol. :HORIZONTAL



	Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Safe	
			Mode	Reading Level		FS	@3m	Margin	
	MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBµV/m	dBµV/m	dB	
4	4960.00	Н	Average	24.79	5.29	30.08	54.00	-23.92	
4	4960.00	Н	Peak	35.91	5.29	41.20	74.00	-32.80	

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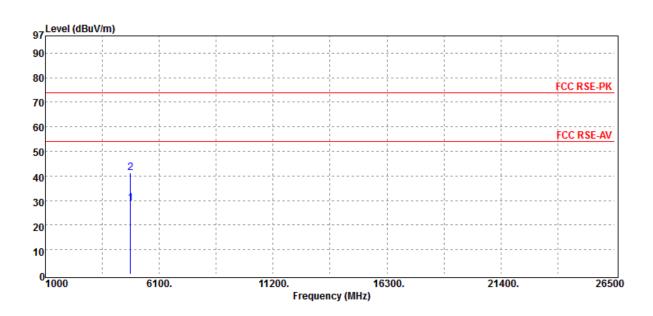
Page 102 of 127

*PCB Antenna

Operation Band :EDR(3M) **Test Date** :2017-03-13

Fundamental Frequency :2402 MHz Temp./Humi. :22 deg C / 61 RH **Operation Mode** :Tx CH LOW Engineer :Tin

EUT Pol. :H Plane Measurement Antenna Pol. :VERTICAL



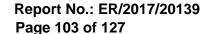
Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Safe	
		Mode	Reading Level		FS	@3m	Margin	
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBµV/m	dΒμV/m	dB	
4804.00	Н	Average	24.00	4.92	28.92	54.00	-25.08	
4804.00	Н	Peak	36.51	4.92	41.43	74.00	-32.57	
	MHz 4804.00	MHz F/H/E/S 4804.00 H	Mode MHz F/H/E/S PK/QP/AV 4804.00 H Average	Mode Reading Level MHz F/H/E/S PK/QP/AV dBμV 4804.00 H Average 24.00	Mode Reading Level MHz F/H/E/S PK/QP/AV dBμV dB 4804.00 H Average 24.00 4.92	MHz F/H/E/S PK/QP/AV dBμV dB dBμV/m 4804.00 H Average 24.00 4.92 28.92	Mode Reading Level FS @3m MHz F/H/E/S PK/QP/AV dBμV dB dBμV/m dBμV/m 4804.00 H Average 24.00 4.92 28.92 54.00	Mode MHz Reading Level FS @3m Margin Margin dBμV/m 4804.00 H Average 24.00 4.92 28.92 54.00 -25.08

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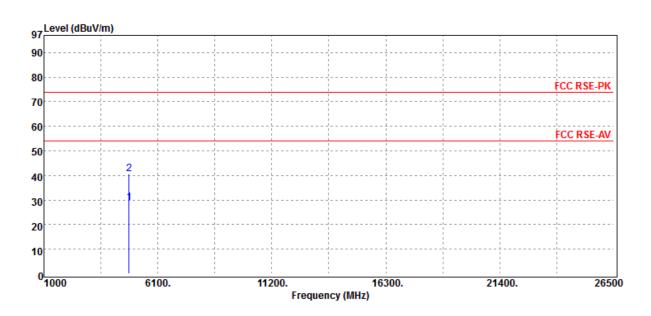


:EDR(3M) :2402 MHz :Tx CH LOW :H Plane

Test Date :2017-03-13 Temp./Humi. :22 deg_C / 61 RH

Engineer

Measurement Antenna Pol. :HORIZONTAL



Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Safe
		Mode	Reading Level		FS	@3m	Margin
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBµV/m	dBµV/m	dB
4804.00	Н	Average	24.02	4.92	28.94	54.00	-25.06
4804.00	Н	Peak	35.80	4.92	40.72	74.00	-33.28

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Page 104 of 127

Operation Band Fundamental Frequency **Operation Mode** EUT Pol.

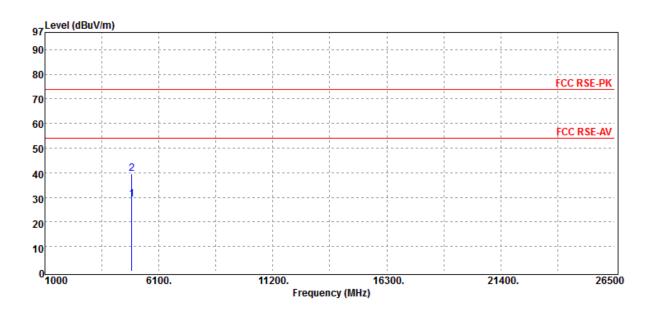
:EDR(3M) :2441 MHz :Tx CH MID :H Plane

Test Date :2017-03-13

Temp./Humi. :22 deg_C / 61 RH

Engineer

Measurement Antenna Pol. :VERTICAL

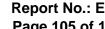


Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Safe	
		Mode	Reading Level		FS	@3m	Margin	
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBµV/m	dBµV/m	dB	
4882.00	Н	Average	23.96	5.18	29.14	54.00	-24.86	
4882.00	Н	Peak	34.51	5.18	39.69	74.00	-34.31	

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Page 105 of 127

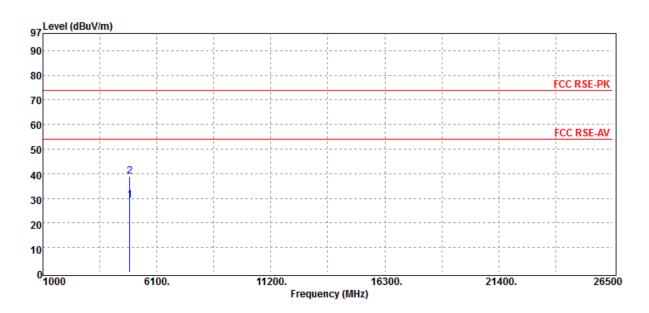
Operation Band Fundamental Frequency **Operation Mode** EUT Pol.

:EDR(3M) :2441 MHz :Tx CH MID :H Plane

Test Date :2017-03-13 Temp./Humi. :22 deg_C / 61 RH

Engineer

Measurement Antenna Pol. :HORIZONTAL



Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Safe	
		Mode	Reading Level		FS	@3m	Margin	
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBµV/m	dBµV/m	dB	
4882.00	Н	Average	24.00	5.18	29.18	54.00	-24.82	
4882.00	Н	Peak	33.60	5.18	38.78	74.00	-35.22	

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Page 106 of 127

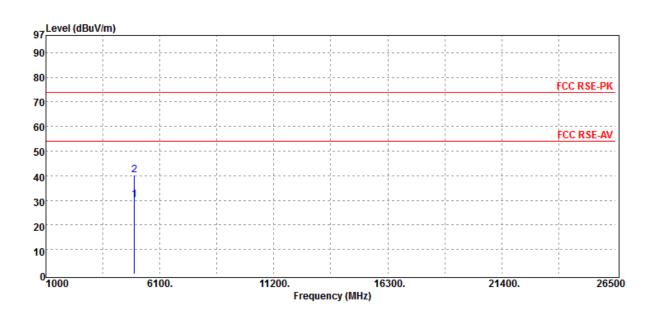
Operation Band Fundamental Frequency **Operation Mode** EUT Pol.

:EDR(3M) :2480 MHz :Tx CH HIGH :H Plane

Test Date :2017-03-13

Temp./Humi. :22 deg_C / 61 RH Engineer

Measurement Antenna Pol. :VERTICAL



Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Safe	
		Mode	Reading Level		FS	@3m	Margin	
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBµV/m	dBμV/m	dB	
4960.00	Н	Average	24.78	5.29	30.07	54.00	-23.93	
4960.00	Н	Peak	34.87	5.29	40.16	74.00	-33.84	

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Page 107 of 127

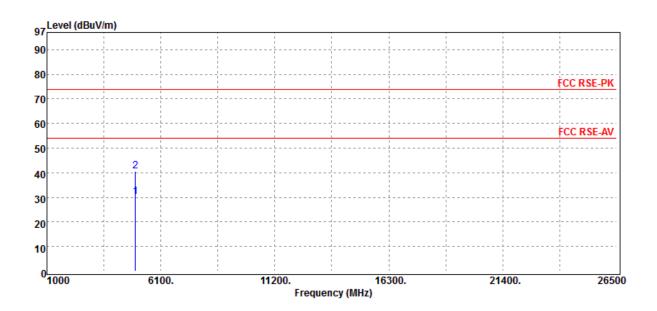
Operation Band Fundamental Frequency **Operation Mode** EUT Pol.

:EDR(3M) :2480 MHz :Tx CH HIGH :H Plane

Test Date :2017-03-13 Temp./Humi. :22 deg_C / 61 RH

Engineer

Measurement Antenna Pol. :HORIZONTAL



Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Safe	
		Mode	Reading Level		FS	@3m	Margin	
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBµV/m	dBµV/m	dB	
4960.00	Н	Average	24.79	5.29	30.08	54.00	-23.92	
4960.00	Н	Peak	35.31	5.29	40.60	74.00	-33.40	

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Page 108 of 127

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

	SGS Conducted Room									
EQUIPMENT	MFR	MODEL	SERIAL	LAST	CAL DUE.					
TYPE		NUMBER	NUMBER	CAL.						
Power Meter	Anritsu	ML2495A	1005007	12/15/2016	12/14/2017					
Power Sensor	Anritsu	MA2411B	917032	12/15/2016	12/14/2017					
EXA Spectrum Analyzer	Agilent	N9030A	MY53120760	02/26/2017	02/25/2018					
DC Block	Mini-Circuits	BLK-18-S+	1	01/05/2017	01/04/2018					
Coaxial Cable	HUBER+SUH NER	SUCOFLEX 102	23670/2	01/05/2017	01/04/2018					
Attenuator	Mini-Circuit	BW-S10W2+	2	01/05/2017	01/04/2018					
Splitter	Agilent	11636B	N/A	01/05/2017	01/04/2018					
DC Power Supply	Agilent	E3640A	MY52410006	11/21/2016	11/20/2017					
Temperature Chamber	TERCHY	MHG-120LF	911009	05/17/2016	05/16/2017					

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 FCC Public Notice DA 00-705 Measurement Guidelines.
- 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.

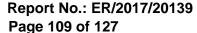
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11.5 Measurement Result

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

Frequency Separation Test Data



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Page 110 of 127

12 NUMBER OF HOPPING FREQUENCY

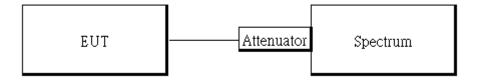
12.1 Standard Applicable

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

12.2 Measurement Equipment Used

SGS Conducted Room						
EQUIPMENT	MFR	MODEL	SERIAL	LAST	CAL DUE.	
TYPE		NUMBER	NUMBER	CAL.		
Power Meter	Anritsu	ML2495A	1005007	12/15/2016	12/14/2017	
Power Sensor	Anritsu	MA2411B	917032	12/15/2016	12/14/2017	
EXA Spectrum Analyzer	Agilent	N9030A	MY53120760	02/26/2017	02/25/2018	
DC Block	Mini-Circuits	BLK-18-S+	1	01/05/2017	01/04/2018	
Coaxial Cable	HUBER+SUH NER	SUCOFLEX 102	23670/2	01/05/2017	01/04/2018	
Attenuator	Mini-Circuit	BW-S10W2+	2	01/05/2017	01/04/2018	
Splitter	Agilent	11636B	N/A	01/05/2017	01/04/2018	
DC Power Supply	Agilent	E3640A	MY52410006	11/21/2016	11/20/2017	
Temperature Chamber	TERCHY	MHG-120LF	911009	05/17/2016	05/16/2017	

12.3 Test Set-up



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Page 111 of 127

12.4 Measurement Procedure

- 1. Place the EUT on the table and set it in transmitting mode.
- 2. The testing follows FCC Public Notice DA 00-705 Measurement Guidelines.
- 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=430 kHz, 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

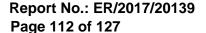
	Channel Number	Limit
2.4 GHz – 2.441GHz	40	
2.441 GHz – 2.4835GHz	39	>15
2.4GHz ~2.4835GHz	(40+39) = 79	

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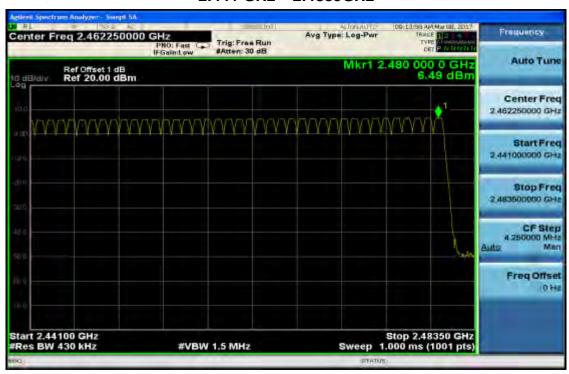


Channel Number

2.4 GHz - 2.441GHz



2.441 GHz - 2.4835GHz



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Page 113 of 127

13 TIME OF OCCUPANCY (DWELL TIME)

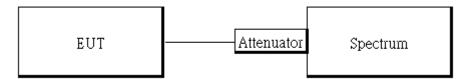
13.1 Standard Applicable

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

SGS Conducted Room					
EQUIPMENT	MFR	MODEL	SERIAL	LAST	CAL DUE.
TYPE		NUMBER	NUMBER	CAL.	
Power Meter	Anritsu	ML2495A	1005007	12/15/2016	12/14/2017
Power Sensor	Anritsu	MA2411B	917032	12/15/2016	12/14/2017
EXA Spectrum Analyzer	Agilent	N9030A	MY53120760	02/26/2017	02/25/2018
DC Block	Mini-Circuits	BLK-18-S+	1	01/05/2017	01/04/2018
Coaxial Cable	HUBER+SUH NER	SUCOFLEX 102	23670/2	01/05/2017	01/04/2018
Attenuator	Mini-Circuit	BW-S10W2+	2	01/05/2017	01/04/2018
Splitter	Agilent	11636B	N/A	01/05/2017	01/04/2018
DC Power Supply	Agilent	E3640A	MY52410006	11/21/2016	11/20/2017
Temperature Chamber	TERCHY	MHG-120LF	911009	05/17/2016	05/16/2017

13.3 Test Set-up



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Page 114 of 127

13.4 Measurement Procedure

- 1. Place the EUT on the table and set it in transmitting mode.
- 2. The testing follows FCC Public Notice DA 00-705 Measurement Guidelines.
- 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 = $2\sim8$ ms.
- 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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Page 115 of 127

13.5 Tabular Result of the Measurement

GESK (1Mbps)

Channel	DACKET TYPE	Measurement Result	Limit
Channel	PACKET TYPE	(ms)	(ms)
	DH1	108.80	400ms
0	DH3	256.00	400ms
	DH5	304.00	400ms
	DH1	108.80	400ms
39	DH3	256.00	400ms
	DH5	304.00	400ms
	DH1	112.00	400ms
78	DH3	256.00	400ms
	DH5	304.00	400ms

π/4 DQPSK (2Mbps)

Channel	PACKET TYPE	Measurement Result (ms)	Limit (ms)
	DH1	115.20	400ms
39	DH3	256.00	400ms
	DH5	304.00	400ms

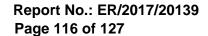
8-DPSK (3Mbps)

Channel	PACKET TYPE	Measurement Result (ms)	Limit (ms)
	DH1	112.00	400ms
39	DH3	257.60	400ms
	DH5	304.00	400ms

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

GFSK (1Mbps):

•	. ,				
CH Low	DH1 time slot =	0.340 *	(1600/2/79) *	31.6 =	108.80 (ms)
	DH3 time slot =	1.600 *	(1600/4/79) *	31.6 =	256.00 (ms)
	DH5 time slot =	2.850 *	(1600/6/79) *	31.6 =	304.00 (ms)
CH Mid	DH1 time slot =	n 34n *	(1600/2/79) *	316 =	108.80 (ms)
Offivila	DH3 time slot =	1.600 *	,		256.00 (ms)
	DI IS time slot =	1.000	(1000/4/13)	31.0 -	230.00 (1113)
	DH5 time slot =	2.850 *	(1600/6/79) *	31.6 =	304.00 (ms)
CH High	DH1 time slot =	0.350 *	(1600/2/79) *	316 -	112 00 (ms)
Cirrigii			,		` ,
	DH3 time slot =	1.600 *	(1600/4/79) *	31.6 =	256.00 (ms)
	DH5 time slot =	2.850 *	(1600/6/79) *	31.6 =	304.00 (ms)
π/4 -DQPS	SK (2Mbps):				
CH Mid	2DH1 time slo =	0.360 *	(1600/2/79) *	31.6 =	115.20 (ms)
	2DH3 time slo =	1.600 *	(1600/4/79) *		, ,
	2DH5 time slo =		(1600/6/79) *		
	22.10 11110 010 -	000	(1000/0/10)	31.0 -	33 1.00 (1113)

8-DPSK (3Mbps):

CH Mid	3DH1 time slo =	0.350 *	(1600/2/79) *	31.6 =	112.00 (ms)
	3DH3 time slo =	1.610 *	(1600/4/79) *	31.6 =	257.60 (ms)
	3DH5 time slo =	2.850 *	(1600/6/79) *	31.6 =	304.00 (ms)

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Page 117 of 127

GFSK (1Mbps) for AFH Mode					
Hopping Channel Number	PACKET TYPE	Measurement Result (ms)	Limit (ms)		
20	DH5	152.00	400ms		
	π/4 DQPSK (2N	Abps) for Mode			
Hopping Channel Number	PACKET TYPE	Measurement Result (ms)	Limit (ms)		
20	DH5	152.00	400ms		
	8-DPSK (3Mbps) for AFH Mode				
Hopping Channel Number	PACKET TYPE	Measurement Result (ms)	Limit (ms)		
20	DH5	152.00	400ms		

GFSK (1Mbps):

DH5 time sl= (800/6/20) * 8 = 152.00 (ms) 2.850 (ms) *

π/4 -DQPSK (2Mbp!

2.850 (800/6/20) * 8 =2DH5 time =(ms) * 152.00 (ms)

8-DPSK (3Mbps):

(800/6/20) * 8 = 152.00 (ms) 3DH5 time =2.850 (ms) *

13.6 Measurement Result

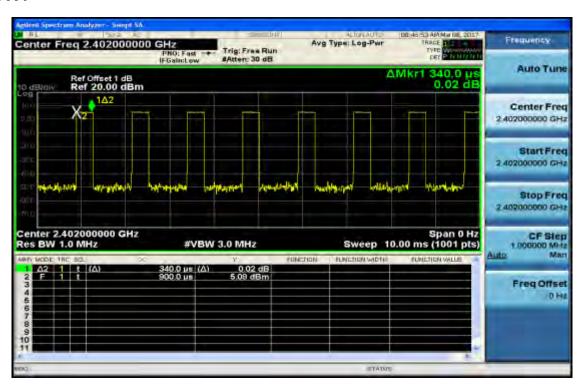
Note: Refer to next page for plots.

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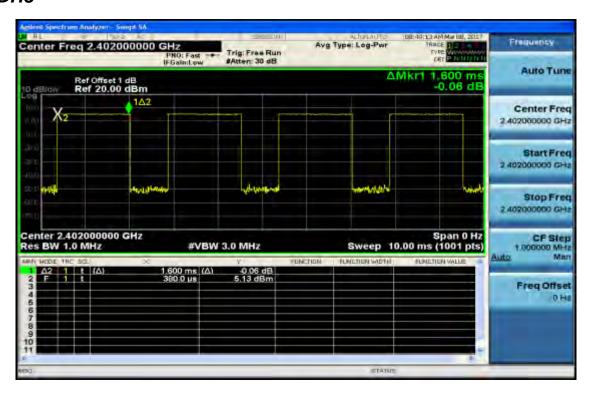
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CH-Low DH1



DH3

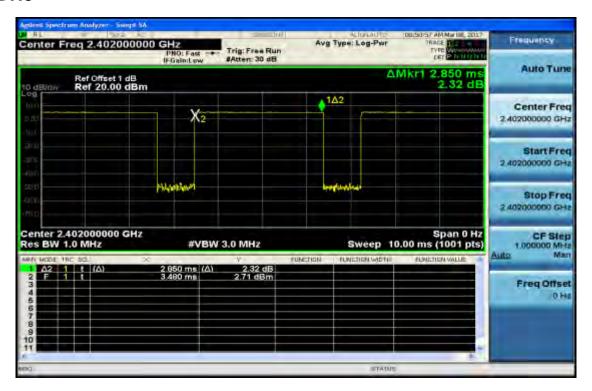


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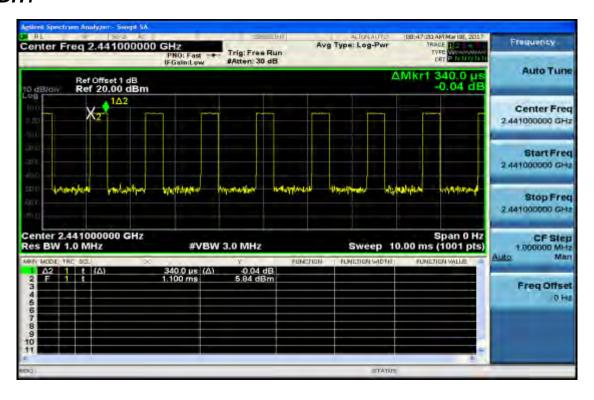
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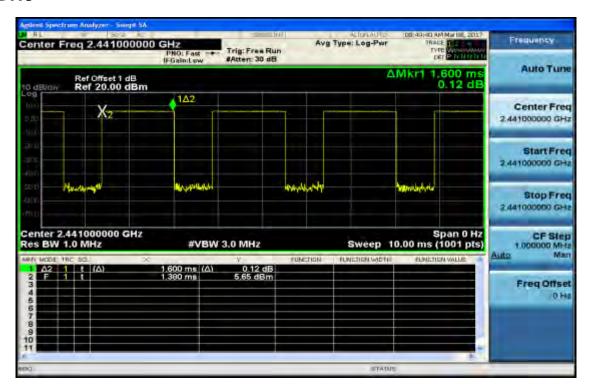
CH-Mid DH1



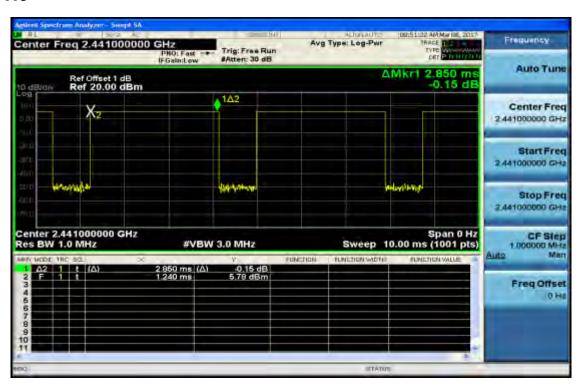
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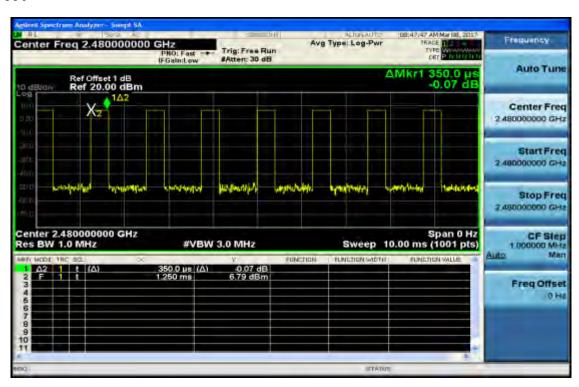
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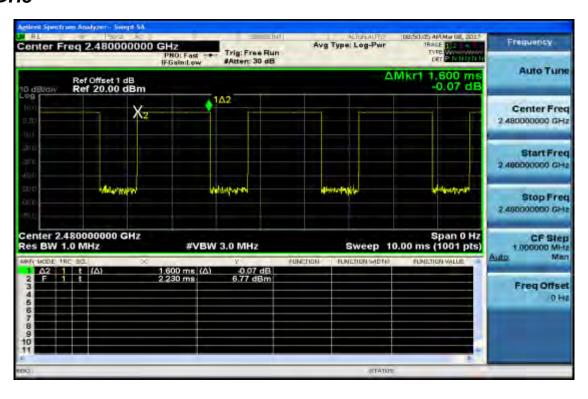
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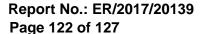
CH-High DH1



DH3

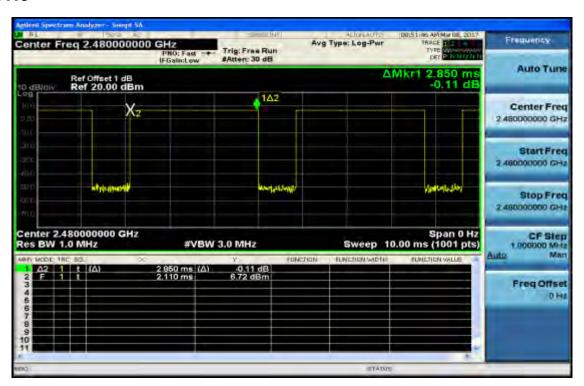


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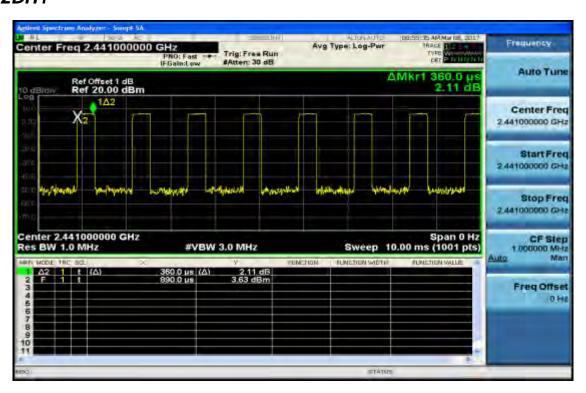
DH₅



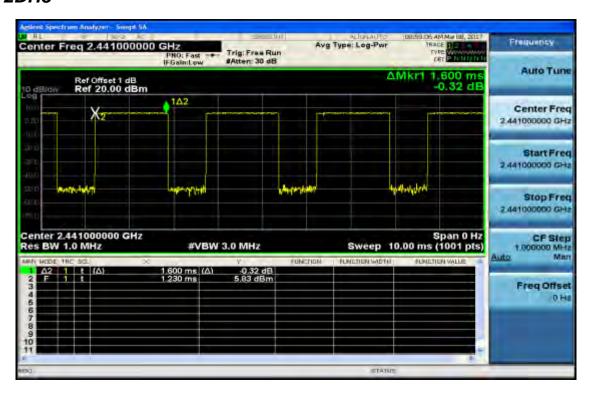
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CH-Mid 2DH1



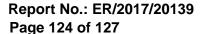
2DH3



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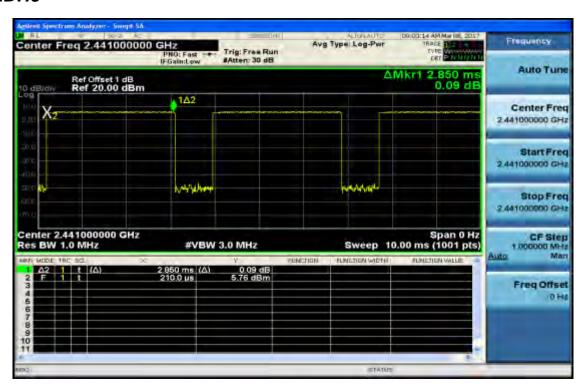
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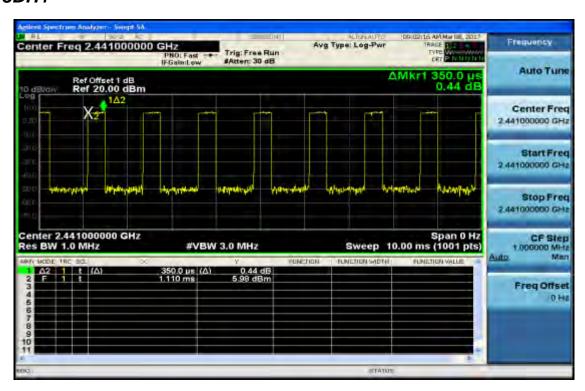
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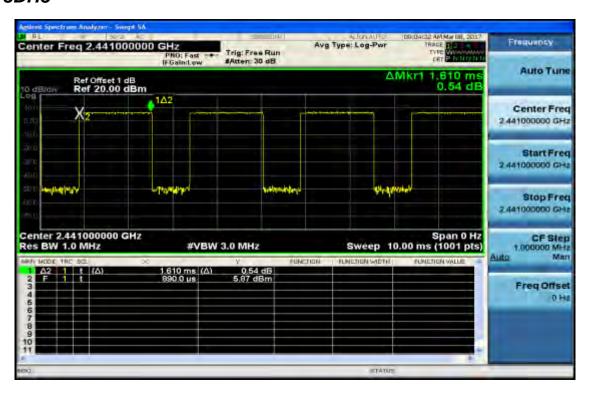
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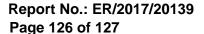
CH-Mid 3DH1



3DH3

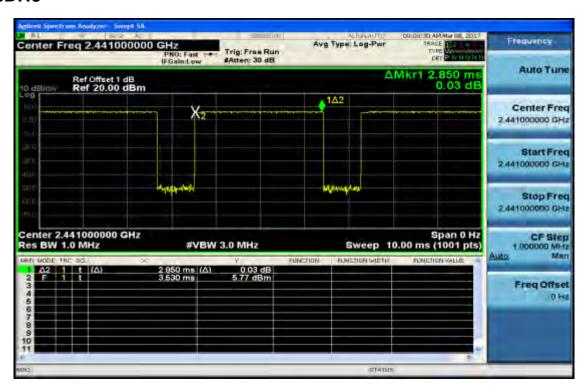


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3DH5



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Page 127 of 127

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.

According to RSS-GEN 8.3

The applicant for equipment certification, as per RSP-100, must provide a list of all antenna types that may be used with the licence-exempt transmitter, indicating the maximum permissible antenna gain (in dBi) and the required impedance for each antenna.

Licence-exempt transmitters that have received equipment certification may operate with different types of antennas. However, it is not permissible to exceed the maximum equivalent isotropically radiated power (e.i.r.p.) limits specified in the applicable standard (RSS) for the licence-exempt apparatus.

Testing shall be performed using the highest gain antenna of each combination of licence-exempt transmitter and antenna type, with the transmitter output power set at the maximum level.9 When a measurement at the antenna connector is used to determine RF output power, the effective gain of the device's antenna shall be stated, based on a measurement or on data from the antenna manufacturer.

14.2 Antenna Connected Construction

An embedded-in antenna design is used.

The antenna is designed as permanently attached and no consideration of replacement. Please see EUT photo and antenna spec. for details.

The antenna gain is less than 6dBi. Therefore, it is not necessary to reduce maximum output power limit.

~ End of Report ~

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