

# ELECTROMAGNETIC EMISSIONS COMPLIANCE REPORT

OF

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

Product Name:	Tablet Computer			
Brand Name:	acer			
FCC Marketing	SW1-011***(* means 0~9; a-z; A-Z; / ; - ; or			
Name:	blank) / OK0DM			
IC Marketing Name:	SW1-011			
Model No.:	N16P6			
Model Difference:	N/A			
FCC ID:	HLZN16P6			
IC:	1754F-N16P6			
Report No.:	E2/2016/60008			
Issue Date:	Jun. 07, 2016			
FCC Rule Part:	§15.247, Cat: DSS			
IC Rule:	RSS-247 issue 1 May 2015			
FCC Prepared for:	Acer Incorporated			
	8F., No. 88, Sec. 1, Hsin Tai Wu Rd.,			
	Hsichih, Taipei Hsien, 221, Taiwan (R.O.C)			
IC Prepared for:	Acer Incorporated 8F., No. 88, Sec. 1, Xintai 5th Rd., Xizhi, New			
	Taipei City 22181, Taiwan (R.O.C)			
Prepared by:	SGS Taiwan Ltd.			
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	No.2, Keji 1st Rd., Guishan District,			
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# VERIFICATION OF COMPLIANCE

Applicant: Product Name:	Acer Incorporated 8F., No. 88, Sec. 1, Xintai 5th Rd., Xizhi, New Taipei City 22181, Taiwan (R.O.C) Tablet Computer
Brand Name:	acer
FCC Marketing Name:	SW1-011***(* means 0~9; a-z; A-Z; / ; - ; or blank) / OK0DM
IC Marketing Name:	SW1-011
Model No.:	N16P6
Model Difference:	N/A
FCC ID:	HLZN16P6
IC :	1754F-N16P6
Report Number:	E2/2016/60008
Date of test:	May. 27, 2016 ~ May. 31, 2016
Date of EUT Received:	May. 27, 2016

# 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:	Jerry Lu	Date:	Jun. 07, 2016
-	Jerry Lu / Sr.Engineer		
Prepared By:	Allen Isai	Date:	Jun. 07, 2016
Approved By:	Allen Tsai / Engineer Jim Ch ang	Date:	Jun. 07, 2016
	Jim Chang / Asst. Manager		
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# **Revision History**

Report Number	Revision	Description	Issue Date
E2/2016/60008	Rev.00	Initial creation of document	Jun. 07, 2016

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#### **GENERAL INFORMATION** 1

# **1.1 Product description**

### General:

Product Name:	Tablet Co	mputer				
Brand Name:	acer					
FCC Marketing Name:	SW1-011	SW1-011***(* means 0~9; a-z; A-Z; / ; - ; or blank) / OK0DM				
IC Marketing Name:	SW1-011					
Model No.:	N16P6					
Model Difference:	N/A					
Product SW/HW version:	Win 10/ IP3_YP1_MB_V20_0420A					
Radio SW/HW version:	Win7_MP_Kit_RTL11n_8723BS_SDIO_v0.13_20160426(BETA) / RL-SM02BD-8723BS-V1.2					
Test SW Version:	v0.13					
RF power setting in TEST SW:	MP tool and RTLBTAPP					
	3.8Vdc from rechargeable lithium battery, 5Vdc from adapter					
Power Supply:	Battery: Model No.: 309998 Supplier: MBELL.					
	Adapter: Model No.: BA018-050300AXU Supplier: BILLION					

### Bluetooth\_BR+EDR:

Bluetooth Version:	BT4.0 dual mode
Channel number:	79 channels
Modulation type:	GFSK + π/4DQPSK + 8DPSK
Transmit Power:	2.99 dBm
Frequency Range: 2.402GHz – 2.480GHz	
Dwell Time:	<= 0.4s
Antenna Designation:	PIFA Antenna, Part No.: AUKE2935, Supplier: Auden
Antenna Designation.	Gain:1.45dBi

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# **1.2 Product Feature of Equipment Under Test**

The equipment under Test (Hereafter Called: EUT) is supporting below features.

Product Feature				
Bluetooth Version BT4.0 dual mode				
WLAN 802.11 b/g/n				

Note: The above EUT information was declared by manufacturer. Please refer to the specifications or user's manual for more detailed description.

# 1.3 Test Methodology of Applied Standards

Canada RSS-247 issue 1: 2015

RSS-Gen Issue 4:2014

FCC Part 15, Subpart C §15.247

FCC Public Notice DA 00-705 Measurement Guidelines

ANSI C63.10:2013

### Note:

- All test items have been performed and record as per the above standards. 1.
- 2. The composite system is compliance with FCC Subpart B is authorized under a DoC procedure.

# 1.4 Test Facility

SGS Taiwan Ltd. Electronics & Communication Laboratory No.2, Keji 1st Rd., Guishan District, Taoyuan City, Taiwan 333 (TAF code 0513)

FCC Registration Numbers are: 735305

Canada Registration Number: 4620A-5

# 1.5 Special Accessories

There is no special accessory used while test was conducted.

# 1.6 Equipment Modifications

There was no modification incorporated into the EUT.

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# 2 SYSTEM TEST CONFIGURATION

# 2.1 EUT Configuration

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

# 2.2 EUT Exercise

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

# 2.3 Test Procedure

# 2.3.1 Conducted Emissions

The EUT is a placed on 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.

# Note:

The spectrum analyzer offset is derived from RF cable loss 0.5dB

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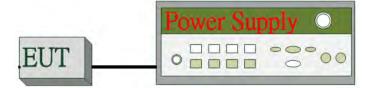
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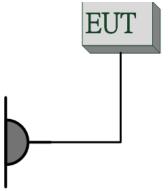


# 2.5 Configuration of Tested System

Fig. 2-1 Conducted (Antenna Port) & Radiated Emission Configuration



# Fig.2-2 Radiated Emission



# **Table 2-1 Equipment Used in Tested System**

Item	Equipment	Mfr/Brand	Model/Type No.	Series No.	Data Cable	Power Cord
1	DC Power Supply	Agilent	E3640A	MY53140006	Shielded	Unshielded
2	Bluetooth Test Software	N/A	N/A	N/A	N/A	N/A

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#### UMMARY OF TEST RESULTS 3

FCC Rules	IC Rules	IC Rules Description Of Test	
§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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#### DESCRIPTION OF TEST MODES 4

### 4.1 Operated in 2400 ~ 2483.5MHz Band

79 channels are provided for Bluetooth

СН	FREQUENCY	СН	FREQUENCY	СН	FREQUENCY	СН	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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# 4.2 The Worst Test Modes and Channel Details

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

# **RADIATED EMISSION TEST:**

RADIATED EMISSION TEST (BELOW 1 GHz)							
MODE	AVAILABLE	TESTED	MODULATION	PACKET			
MODE	CHANNEL	CHANNEL	MODULATION	TYPE			
Bluetooth	0 to 78	0,39,78	GFSK	DH5			
	RADIATED EMISSION TEST (ABOVE 1 GHz)						
MODE	AVAILABLE	TESTED	MODULATION	PACKET			
NODE	CHANNEL	CHANNEL	MODULATION	TYPE			
Bluetooth	0 to 78	0,39,78	GFSK	DH5			

### Note:

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

# ANTENNA PORT CONDUCTED MEASUREMENT:

	CONDUCTED TEST						
	F	Peak Output Pov	ver, 20dB Band Wid	th			
MODE	AVAILABLE	TESTED	MODULATION	PACKET			
NODE	CHANNEL	CHANNEL	MODULATION	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-DQPK	DH5			
		Bai	nd Edge				
Bluetooth	0 to 78	0,78	GFSK	DH5			
		Frequen	cy Separation				
Bluetooth	0 to 78	0,1,2	GFSK	DH5			
		Number of h	opping frequency				
Bluetooth	0 to 78	0 to 78	GFSK	DH5			
	Time of Occupancy (Dwell time)						
Bluetooth	0 to 78	0,39,78	GFSK	DH1/DH3/DH5			
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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#### 5 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:

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

Measurement uncertainty	9kHz – 30MHz: +/- 2.87 dB
	30MHz - 167MHz: +/- 4.22dB
	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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#### CONDUCTED EMISSION TEST 6

# 6.1 Standard Applicable

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

Frequency range	Limits dB(uV)			
MHz	Quasi-peak	Average		
0.15 to 0.50	66 to 56	56 to 46		
0.50 to 5	56	46		
5 to 30	60	50		
Note				

INOTE

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	ESCI 7	100950	12/12/2015	12/11/2016		
Coaxial Cables	N/A	N30N30-1042-150cm	N/A	02/07/2016	02/06/2017		
LISN	Schwarzbeck	NSLK 8127	8127-648	06/09/2015	06/08/2016		
Test Software	Farad	EZ-EMC	Ver. SGS-03A2	N.C.R.	N.C.R.		

# 6.3 EUT Setup

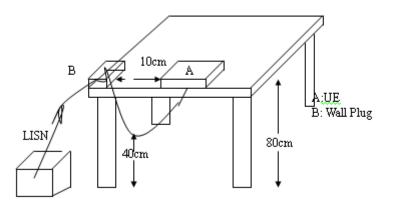
- 1. The conducted emission tests were performed in the test site, using the setup in accordance with the ANSI 63.10:2013.
- 2. The AC/DC Power adaptor of EUT was plug-in LISN. The EUT was placed flushed with the rear of the table.
- 3. The LISN was connected with 120Vac/60Hz power source.

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# 6.4 Test SET-UP (Block Diagram of Configuration)



### 6.5 Measurement Procedure

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

### 6.6 Measurement Result

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

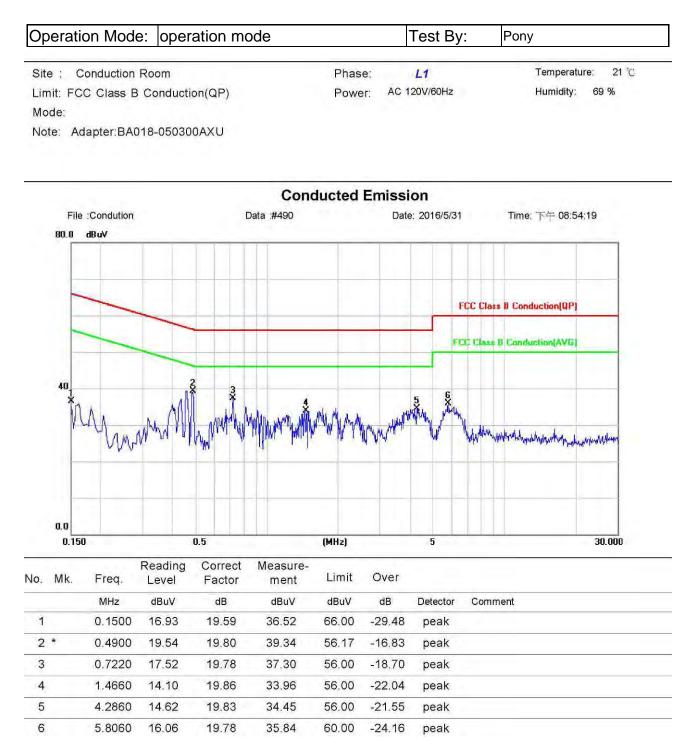
Note2: The \* reveals the worst-case results that closet to the limit

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# AC POWER LINE CONDUCTED EMISSION TEST DATA



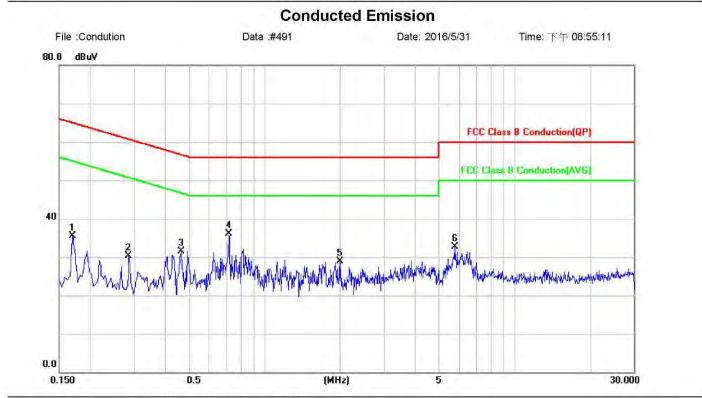
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Site : Conduction Room	Phase: N	Temperature: 21 °C
Limit: FCC Class B Conduction(QP)	Power: AC 120V/60Hz	Humidity: 69 %
Mode:		

Note: Adapter:BA018-050300AXU



No. Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over		
	MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1	0.1700	15.85	19.59	35.44	64.96	-29.52	peak	
2	0.2860	10.59	19.64	30.23	60.64	-30.41	peak	
3	0.4620	11.82	19.77	31.59	56.66	-25.07	peak	
4 *	0.7180	16.40	19.79	36.19	56.00	-19.81	peak	
5	1.9940	8.97	19.98	28.95	56.00	-27.05	peak	
6	5.7540	12.82	19.80	32.62	60.00	-27.38	peak	

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# 7 PEAK OUTPUT POWER MEASUREMENT

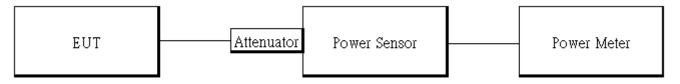
# 7.1 Standard Applicable

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

# 7.2 Measurement Equipment Used

Conducted Emission Test Site						
EQUIPMENT	MFR	MODEL	SERIAL	LAST	CAL DUE.	
TYPE		NUMBER	NUMBER	CAL.		
Power Meter	Anritsu	ML2496A	1326001	06/23/2015	06/22/2016	
Power Sensor	Anritsu	MA2411B	1315048	06/23/2015	06/22/2016	
Power Sensor	Anritsu	MA2411B	1315049	06/23/2015	06/22/2016	
Coaxial Cable 30cm	WOKEN	00100A1F1A195 C	RF01	12/12/2015	12/11/2016	
DC Block	PASTERNACK	PE8210	RF29	12/12/2015	12/11/2016	
Attenuator	WOKEN	218FS-10	RF23	12/12/2015	12/11/2016	
DC Power Supply	Agilent	E3640A	MY53140006	05/04/2016	05/03/2017	

# 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):

Channel	Frequency (MHz)	Peak Output Power (dBm)	Output Power (mW)	Limit (mW)
0	2402.00	2.86	1.932	1000
39	2441.00	2.99	1.991	1000
78	2480.00	2.95	1.972	1000

### 1M BR mode (Average):

Channel	Frequency (MHz)	Max. Output include tune up tolerance Power (dBm)	Output Power (mW)	Limit (mW)
0	2402.00	1.38	1.374	1000
39	2441.00	1.78	1.507	1000
78	2480.00	1.82	1.521	1000

### 2M EDR mode (Peak):

Channel	Frequency (MHz)	Peak Output Power (dBm)	Output Power (mW)	Limit (mW)
0	2402.00	2.87	1.936	125
39	2441.00	1.59	1.442	125
78	2480.00	1.53	1.422	125

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

Channel	Frequency (MHz)	Max. Output include tune up tolerance Power (dBm)	Output Power (mW)	Limit (mW)
0	2402.00	0.86	1.219	125
39	2441.00	0.98	1.253	125
78	2480.00	0.56	1.138	125

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### 3M EDR mode (Peak):

Channel	Frequency (MHz)	Peak Output Power (dBm)	Power Power	
0	2402.00	1.36	1.368	125
39	2441.00	1.61	1.449	125
78	2480.00	2.71	1.866	125

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

Channel	Frequency (MHz)	Max. Output include tune up tolerance Power (dBm)	Output Power (mW)	Limit (mW)
0	2402.00	0.74	1.186	125
39	2441.00	0.76	1.191	125
78	2480.00	1.12	1.294	125

NOTE: cable loss as 0.5dB that offsets in the spectrum

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#### 20DB & 99% BANDWIDTH MEASUREMENT 8

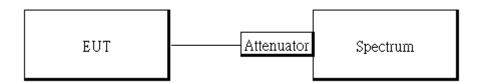
# 8.1 Standard Applicable

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

# 8.2 Measurement Equipment Used

Conducted Emission Test Site								
EQUIPMENT MFR MODEL SERIAL			LAST	CAL DUE.				
TYPE		NUMBER	NUMBER	CAL.				
Spectrum Analyzer	KEYSIGHT	N9010A	MY54510568	04/14/2016	04/13/2017			
DC Block	PASTERNACK	PE8210	RF29	12/12/2015	12/11/2016			
Attenuator	WOKEN	218FS-10	RF23	12/12/2015	12/11/2016			
DC Power Supply	Agilent	E3640A	MY53140006	05/04/2016	05/03/2017			

# 8.3 Test Set-up



# 8.4 Measurement Procedure

- 1. Place the EUT on the table and set it in transmitting mode.
- 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 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

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#### 8.5 Measurement Result

#### **GFSK**

Channel	20 dB Bandwidth (MHz)	2/3 Bandwidth (MHz)	
Low	1.110	0.74	
Mid	1.135	0.76	
High	1.121	0.75	

#### π/4-DQPSK

#### 8-DPSK

Channel	20 dB Bandwidth (MHz)	2/3 Bandwidth (MHz)	Channel	20 dB Bandwidth (MHz)	2/3 Bandwidth (MHz)
Low	1.106	0.74	Low	1.093	0.73
Mid	1.123	0.75	Mid	1.141	0.76
High	1.132	0.75	High	1.130	0.75

GFSK

π/4-DQPSK

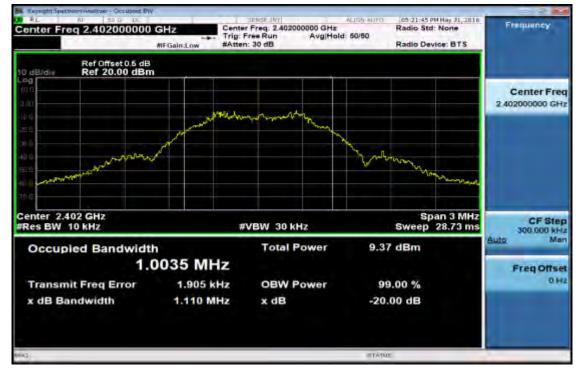
8-DPSK

GFSK			•	0-DF 3K	
СН	99% Bandwidth (MHz)	СН	99% Bandwidth (MHz)	СН	99% Bandwidth (MHz)
Low	1.0035	Low	1.0174	Low	1.0112
Mid	1.0275	Mid	1.0051	Mid	1.0169
High	1.0189	High	1.0271	High	1.0191

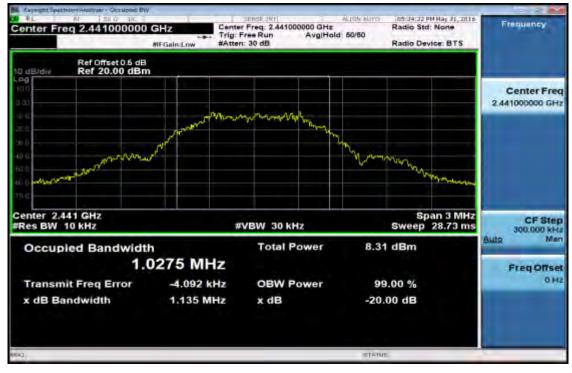
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# **CH-Low (GFSK mode)**



# **CH-Mid (GFSK mode)**



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# **CH-High (GFSK mode)**



# CH-Low (π/4-DQPSK mode)



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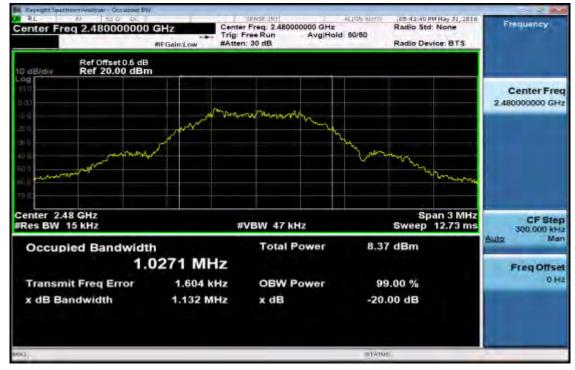
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# CH-Mid (π/4-DQPSK mode)



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



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# CH-Low (8-DPSK mode)



# CH-Mid (8-DPSK mode)

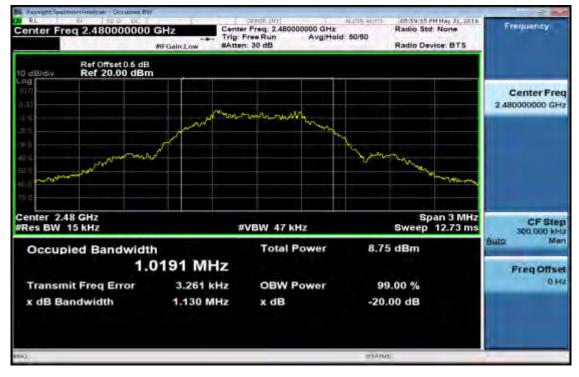


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# CH-High (8-DPSK mode)



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# 9 CONDUCTED BAND EDGES AND SPURIOUS EMISSION MEASUREMENT

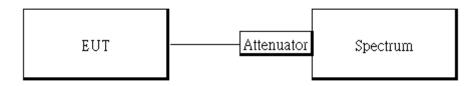
### 9.1 Standard Applicable

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) & RSS-Gen §8.9 limit.

### 9.2 Measurement Equipment Used

Conducted Emission Test Site								
EQUIPMENT	MFR	MODEL	SERIAL	LAST	CAL DUE.			
TYPE		NUMBER	NUMBER	CAL.				
Spectrum Analyzer	KEYSIGHT	N9010A	MY54510568	04/14/2016	04/13/2017			
DC Block	PASTERNACK	PE8210	RF29	12/12/2015	12/11/2016			
Attenuator	WOKEN	218FS-10	RF23	12/12/2015	12/11/2016			
DC Power Supply	Agilent	E3640A	MY53140006	05/04/2016	05/03/2017			

# 9.3 Test SET-UP



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# 9.4 Measurement Procedure

# **Conducted Band Edge:**

- 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=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.
- 5. Use the peak marker function to determine the maximum power level in any 100 kHz band segment within the fundamental EBW.
- 6. Repeat above procedures until all default test channel measured were complete.

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	

# 9.5 Measurement Result

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

- 1. Cable loss as 5.1dB that offsets in the spectrum
- 2. The occurrence of the spike on the conducted emission is the signal of the fundamental emission.

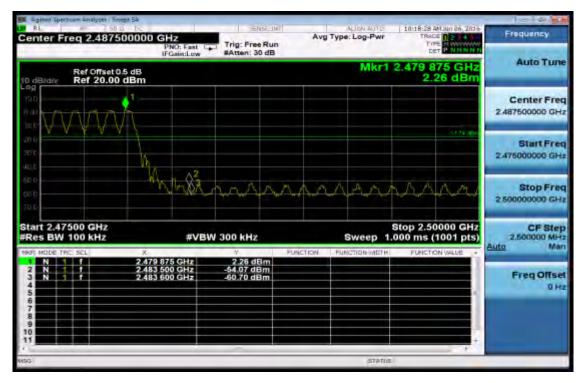
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agten Spectrum Analyzet (Sweet S RL 8 503) Center Freq 2.365000	S	Trig: Free Run #Atten: 30 dB		ALIGN WITS E: Log-Pwr	10:17.56 AM Jun 06, TRACE 12 TITE 2 MAN	Frequency
Ref Offset 0.5 dB         Mkr1 2.414 94 GHz           0 dB/div         Ref 20.00 dBm         2.12 dBm						
190 190 100						Center Fre 2.365000000 GH
20 0 20 0						Start Fre 2.310000000 GH
00 00 <b>m.l</b>	ladadadadadada	dinihahahahadisal	hillinghaltarta	histrelaal.	Å <sup>2</sup>	Stop Fra 2,420000000 GR
tart 2.31000 GHz Res BW 100 kHz	#VBV	V 300 kHz		Sweep 1.	Stop 2.42000 G 000 ms (1001 p	Hz CF Ste 11.000000 Mi Auto Mi
N 1 F 2 N 1 F 3 N 1 F 4 5	2.414 94 GHz 2.399 90 GHz 2.390 00 GHz	2.12 dBm -54.67 dBm -56.77 dBm				Freq Offs 01
6 7 8 9 0 1						
a l		-		STATUS		F C

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

Band Edges Test Data CH-High



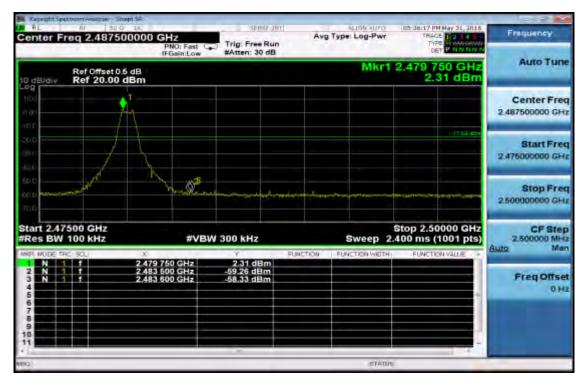
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enter Freq 2.36500000	PNO: Fast	Trig: Free Run #Atten: 30 dB	Avg Type: Log-Pwr	1840E 123 00 PM May 31, 2016 TRACE 123 4 15 TYPE Nonconcentry OFT P No. 1000	Frequency
Ref Offset 0.5 dB dB/div Ref 20.00 dBm	IFG8IN;LOW	ANNUM: JV UD	Mkr	1 2.402 29 GHz 1.92 dBm	Auto Tuni
				1	Center Free 2.365000000 GH
				-11(8)(8)	Start Free 2.310000000 GH
00 00 <mark>100 100 100 100 100 100 100 100 100 </mark>	ن المراجد الم	-	Antone and a second	2 Company damage	Stop Fre 2.420000000 GH
art 2.31000 GHz Res BW 100 kHz R MODE TRC SCL x		300 kHz		Stop 2.42000 GHz 0.53 ms (1001 pts)	CF Ste 11.000000 MH Auto Ma
2 N 1 f 2	402 29 GHz 399 90 GHz 390 00 GHz	1.92 dBm -50.77 dBm -60.15 dBm		-	Freq Offse 0 H
8 9 0 1		-			

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

# Band Edges Test Data CH-High

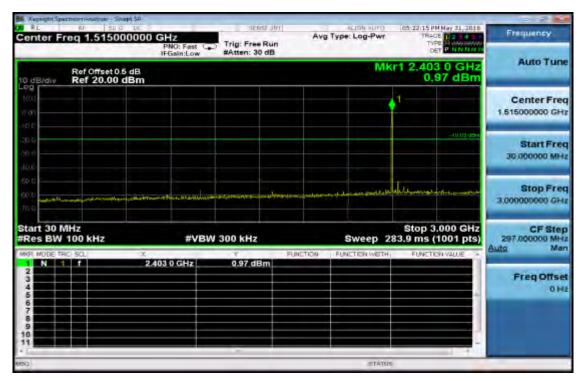


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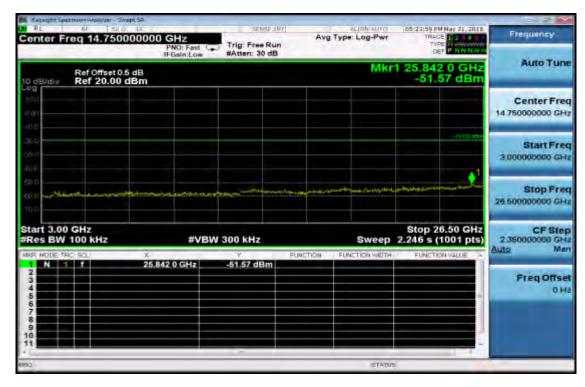
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# **Conducted Spurious Emission Measurement Result** Ch Low 30MHz – 3GHz



# Ch Low 3GHz – 26.5GHz



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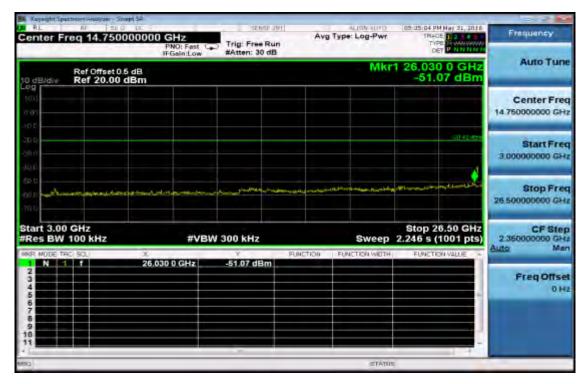
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# Ch Mid 30MHz – 3GHz

Keynight Spectroler Analyzer - Skept SA	-				10.2 M
Center Freq 1.51500000	0 GHz PNO: Fast Ca	Trig: Free Run #Atten: 30 dB	Avg Type: Log-Pwr	CS:34;49 PM May 31, 2016 THEOR 1 2 3 4 3 THEOR 1 3 3 THEOR 1	Frequency
Ref Offset 0.5 dB	Auto Tuni				
1001 0 01				<b>1</b>	Center Free 1.515000000 GH
20 0 				3) 42.054	Start Fre 30.000000 MH
60 0 60 0 70 0	gerist des la grad se la grad se la se	an an a transformer	atiyang gang gang dith		Stop Fre 3.000000000 GH
Start 30 MHz #Res BW 100 kHz	#VBW	300 kHz	Sweep 2	Stop 3.000 GHz 83.9 ms (1001 pts)	CF Step 297.000000 MH Auto Ma
	2.441 6 GHz	-0.42 dBm			Freq Offse 0 H
9 10					
60			STATUS		

# Ch Mid 3GHz – 26.5GHz



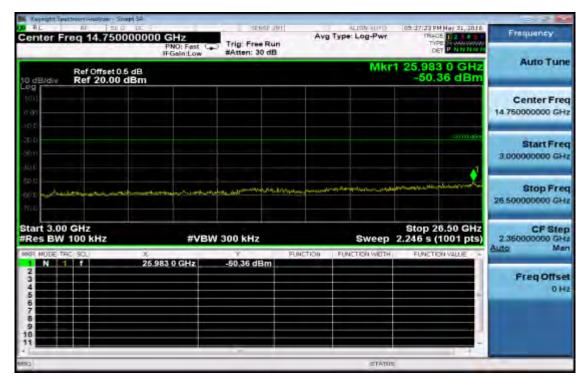
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# Ch High 30MHz – 3GHz

Keynight Spactrater Analyzer - Strapt SA					1
enter Freq 1.515000000	PNO: East ( _ )	Trig: Free Run #Atten: 30 dB	Avg Type: Log-Pwr	THECE 1 2 14 2	Frequency
Ref Offset 0.5 dB	Auto Tun				
eg (0) 107				•	Center Free 1.515000000 GH
				ະເທີໜ້າ	Start Free 30,000000 MH
D D D	an a	Loren aproduce	and the second second	Alexandra and	Stop Free 3.000000000 GH
art 30 MHz Res BW 100 kHz	#VBW :	300 kHz	Sweep 2	Stop 3.000 GHz 83.9 ms (1001 pts)	CF Step 297.000000 MH
N         f         2           1         N         f         2           3         4         5         6           6         7         7         8	480 3 GHz	9.00 dBm	NCTION : FUNCTION WETH	FUNCTION VALUE	Freq Offse 0 H
			STATUS		

# Ch High 3GHz – 26.5GHz



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# **10 RADIATED BANDEDGE AND SPURIOUS EMISSION MEASUREMENT**

# 10.1 Standard Applicable

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. In addition, radiated emissions which fall in the restricted bands, must also comply with the §15.209 & 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.
- 2. Emission level ( $dB\mu V/m$ ) = 20 log Emission level ( $dB\mu V/m$ )

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### **10.2 Measurement Equipment Used**

966 Chamber								
EQUIPMENT	MFR	MODEL	SERIAL	LAST	CAL DUE.			
TYPE		NUMBER	NUMBER	CAL.				
EMI Test Receiver	R&S	ESU 40	100363	04/12/2016	04/11/2017			
Loop Antenna	ETS-Lindgren	6502	00143303	12/23/2015	12/22/2016			
Broadband Antenna	TESEQ	CBL 6112D	35240	10/28/2015	10/27/2016			
Horn Antenna	ETS-Lindgren	3117	00143272	12/16/2015	12/15/2016			
Horn Antenna	Schwarzbeck	BBHA9170	185	07/24/2015	07/23/2016			
Pre Amplifier	EMC Instruments	EMC330	980096	12/12/2015	12/11/2016			
Pre Amplifier	EMC Instruments	EMC0011830	980199	12/12/2015	12/11/2016			
Pre Amplifier	R&S	SCU-18	10204	12/12/2015	12/11/2016			
Pre Amplifier	R&S	SCU-26	100780	12/12/2015	12/11/2016			
Coaxial Cable	Huber+Suhner	RG 214/U	966Rx 9K-30M	12/12/2015	12/11/2016			
Coaxial Cable	Huber+Suhner	RG 214/U SUCOFLEX 104	966Rx 30M-3G	12/12/2015	12/11/2016			
Coaxial Cable	Huber+Suhner	SUCOFLEX 104	966Rx 1G-18G	12/12/2015	12/11/2016			
Coaxial Cable	Huber+Suhner	mini 141-12 SUCOFLEX 104	966Rx 18G-40G	12/12/2015	12/11/2016			
Coaxial Cable	Huber+Suhner	SUCOFLEX 104	966Tx 30M-18G	12/12/2015	12/11/2016			
Coaxial Cable	Huber+Suhner	SUCOFLEX 102	966Tx 18G-40G	12/12/2015	12/11/2016			
Attenuator	WOKEN	218FS-10	RF27	12/12/2015	12/11/2016			
Site NSA	SGS	966 Chamber C	SAC-C	03/04/2016	03/03/2017			
Site VSWR	SGS	966 Chamber C	SAC-C	03/04/2016	03/03/2017			
DC Power Supply	HOLA	DP-3003	D7070035	05/04/2016	05/03/2017			
Controller	MF	MF-7802	N/A	N.C.R.	N.C.R.			
Antenna Master	MF	N/A	N/A	N.C.R.	N.C.R.			
Turn Table	MF	N/A	N/A	N.C.R.	N.C.R.			
Test Software	World-Pallas	Dr. E	V 3.0 Lite	N.C.R.	N.C.R.			

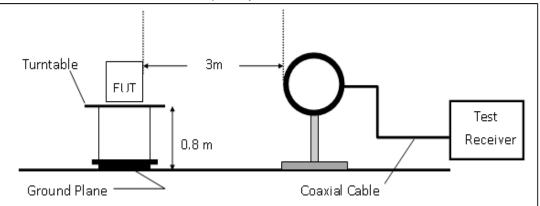
NOTE: N.C.R refers to Not Calibrated Required.

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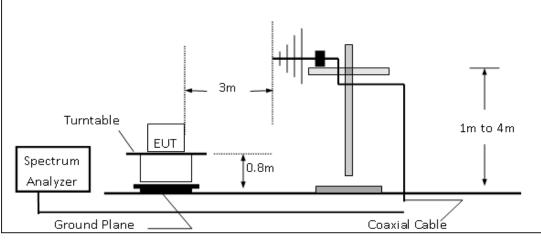


### 10.3 Test SET-UP

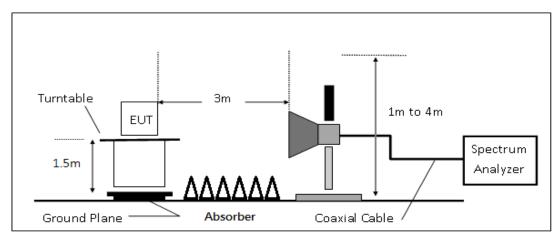
(A) Radiated Emission Test Set-UP Frequency Below 30MHz.



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



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



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#### **10.4 Measurement Procedure**

#### **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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#### **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 $\mu$ V/m) = SPA. Reading level(dB $\mu$ V) + Factor(dB)

Factor(dB) = Antenna Factor(dB $\mu$ V/m) + Cable Loss(dB) – Pre Amplifier Gain(dB)

#### 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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#### Radiated Band Edge Measurement Result: (Hopping Mode)

Fu Op	Operation Mode : Fundamental Frequency : Operation Band : EUT Pol. :		2402 MHz Ten BE CH Low Tes		Date : b. / Humi. : Engineer : urement Ante	enna Pol. :	2016/5/3 22.7deg_ Pony Vertical	
	Freq.	Note	Detector	Spectum	Factor	Actual	Limit	Margin
			Mode	Reading Leve		FS	@3m	
	MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
	2390.00	E	Peak	44.50	0.92	45.42	74	-28.58
	2390.00	Е	Average	32.91	0.92	33.83	54	-20.17
Op	eration Mo	de :	BT BR Ho	opping Test I	Date:		2016/5/3	1
Fu	ndamental	Frequency :	2402 MH	z Temp	o. / Humi. :		22.7deg_	_C/57RH
Op	peration Bai	nd :	BE CH Lo	w Test I	Test Engineer :			
ΕĹ	JT Pol. :		E2	Meas	urement Ante	enna Pol. :	Horizonta	al
	Freq.	Note	Detector	Spectum	Factor	Actual	Limit	Margin
	-		Mode	Reading Leve	l	FS	@3m	-
			INDUE					
	MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
_	MHz 2390.00	F/H/E/S E		•			-	dB -28.73

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Operation Mode : Fundamental Frequency : Operation Band : EUT Pol. :		2480 MHz BE CH High		Test Date : Temp. / Humi. : Test Engineer : Measurement Antenna Pol. :			2016/5/31 22.7deg_C/57RH Pony Vertical		
Fr	req.	Note	Detector	Spec	ctum	Factor	Actual	Limit	Margin
			Mode	Readin	g Level		FS	@3m	
N	1Hz	F/H/E/S	PK/QP/AV	dB	μV	dB	dBµV/m	dBµV/m	dB
248	33.50	E	Peak	51.	53	1.16	52.69	74	-21.31
248	33.50	E	Average	36.	75	1.16	37.91	54	-16.09
248	33.58	S	Peak	57.	47	1.16	58.63	74	-15.37
248	33.58	S	Average	35.	06	1.16	36.22	54	-17.78
Operation Mode : Fundamental Frequency : Operation Band : EUT Pol. :		BT BR Ho 2480 MH BE CH Hi E2	Z	Test En	te : Humi. : gineer : ement Ante	enna Pol. :	2016/5/3 22.7deg_ Pony Horizonta	_C/57RH	
Fr	req.	Note	Detector Mode	Spec Readin		Factor	Actual FS	Limit @3m	Margin
N	1Hz	F/H/E/S	PK/QP/AV	dB	μV	dB	dBµV/m	dBµV/m	dB
248	33.50	E	Peak	49.	97	1.16	51.13	74	-22.87
248	33.50	E	Average	35.	19	1.16	36.35	54	-17.65
248	33.63	S	Peak	56.	49	1.16	57.64	74	-16.36
248	33.63	S	Average	35.	30	1.16	36.46	54	-17.54



Fı O	Operation Mode : Fundamental Frequency : Operation Band : EUT Pol. :		BT EDR Hopping 2402 MHz BE CH Low E2		Test Date: Temp. / Humi.: Test Engineer: Measurement Antenna Pol.:			2016/5/31 22.7deg_C/57RH Pony Vertical	
	Freq.	Note	Detector	Spect	um	Factor	Actual	Limit	Margin
			Mode	Reading	Level		FS	@3m	
	MHz	F/H/E/S	PK/QP/AV	dBµ'	V	dB	dBµV/m	dBµV/m	dB
	2381.90	S	Peak	48.3	0	0.81	49.11	74	-24.89
	2381.90	S	Average	33.1	9	0.81	34.00	54	-20.00
	2390.00	Е	Peak	44.7	9	0.92	45.72	74	-28.28
	2390.00	Е	Average	32.9	6	0.92	33.88	54	-20.12
Operation Mode : Fundamental Frequency : Operation Band : EUT Pol. :		BT EDR H 2402 MHz BE CH Lo E2	2	Test E	/ Humi. : ngineer :	tenna Pol. :	2016/5 22.7de Pony Horizor	g_C/57RH	
	Freq.	Note	Detector Mode	Spect Reading		Factor	Actual FS	Limit @3m	Margin
	MHz	F/H/E/S	PK/QP/AV	dBµ'	V	dB	dBµV/m	dBµV/m	dB
	2388.20	S	Peak	46.6	7	0.90	47.57	74	-26.43
	2388.20	S	Average	32.9	4	0.90	33.84	54	-20.16
	2390.00	Е	Peak	44.4	0	0.92	45.32	74	-28.68
	2390.00	Е	Average	32.8	8	0.92	33.80	54	-20.20



Fi O	Operation Mode : Fundamental Frequency : Operation Band : EUT Pol. :		BT EDR Hopping 2480 MHz BE CH High E2		Test Date: Temp. / Humi.: Test Engineer: Measurement Antenna Pol.:			2016/5/ 22.7de Pony Vertica	g_C/57RH
	Freq.	Note	Detector	Spect		Factor	Actual	Limit	Margin
			Mode	Reading	Level		FS	@3m	
_	MHz	F/H/E/S	PK/QP/AV	dBµ'	V	dB	dBµV/m	dBµV/m	dB
	2483.50	E	Peak	51.5	5	1.16	52.71	74	-21.29
	2483.50	Е	Average	34.7	'5	1.16	35.91	54	-18.09
	2483.85	S	Peak	55.4	1	1.16	56.57	74	-17.43
	2483.85	S	Average	34.7	'4	1.16	35.90	54	-18.10
Fu	Operation Mode : Fundamental Frequency :		BT EDR H 2480 MHz	Z		/ Humi. :			/31 g_C/57RH
	peration Bar JT Pol. :	iu .	BE CH Hi E2	gn	Test Engineer : Measurement Antenna Pol. :			Pony Horizontal	
L,	51 FUL.		LZ		ineasu			11011201	ιιαι
	Freq.	Note	Detector Mode	Spect Reading		Factor	Actual FS	Limit @3m	Margin
	MHz	F/H/E/S	PK/QP/AV	dBµ		dB	dBµV/m	dBµV/m	dB
	2483.50	E	Peak	51.9		1.16	53.11	74	-20.89
	2483.50	E	Average	35.3		1.16	36.50	54	-17.50
	2483.60	S	Peak	56.5		1.16	57.68	74	-16.32
	2483.60	S	Average	34.9		1.16	36.09	54	-17.91
		-		0110	-		50100	• •	



#### Radiated Emission – Band Edge (Non-Hopping Mode):

Operation Mode : Fundamental Frequency Operation Band : EUT Pol. :		BT BR y : 2402 M BE CH E2	Low Test Eng	Humi. :	na Pol. :	2016/5/31 22.7deg_C Pony Vertical	2/57RH
Freq.	Note	Detector	Spectum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
2390.00	E	Peak	44.96	0.92	45.88	74	-28.12
2390.00	E	Average	32.72	0.92	33.64	54	-20.36
Operation Mode : Fundamental Frequency Operation Band :		BT BR y : 2402 M BE CH E2	Low Test Eng	Humi. :		2016/5/31 22.7deg_C Pony Horizontal	:/57RH
EUT Pol. :		LZ	INICASUTEI		ina i 0i	nonzontar	
Freq.	Note	Detector	Spectum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
2390.00	E	Peak	44.42	0.92	45.34	74	-28.66
2390.00	Е	Average	32.53	0.92	33.45	54	-20.55

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Operation Mode : Fundamental Frequency		BT BR /: 2480 M		Test Date : Temp. / Humi. :			57RH		
Operation B		BE CH		Test Engineer :			22.7deg_C/57RH Pony		
EUT Pol. :		E2	•	rement Anten	na Pol. :	Vertical			
Freq.	Note	Detector	Spectum	Factor	Actual	Limit	Margin		
		Mode	Reading Leve		FS	@3m			
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB		
2483.50	E	Peak	57.75	1.16	58.91	74	-15.09		
2483.50	E	Average	45.57	1.16	46.73	54	-7.27		
Operation M		BT BR	Test Da			2016/5/31			
Fundamenta				Temp. / Humi. :		22.7deg_C	:/57RH		
Operation B	and :	BE CH	•	Test Engineer :		Pony			
EUT Pol. :		E2	Measu	rement Anten	na Pol. :	Horizontal			
Freq.	Note	Detector	Spectum	Factor	Actual	Limit	Margin		
		Mode	Reading Leve	1	FS	@3m			
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB		
2483.50	E	Peak	57.61	1.16	58.77	74	-15.23		



Operation Mode :		BT EDR	Test Dat	e :		2016/5/31			
Fundamenta	al Frequency	y: 2402 MH	Hz Temp. /	Temp. / Humi. :			22.7deg_C/57RH		
Operation B	and :	BE CH L	.ow Test Eng	jineer :		Pony			
EUT Pol. :		E2	Measure	ment Anten	na Pol. :	Vertical			
Freq.	Note	Detector	Spectum	Factor	Actual	Limit	Margin		
		Mode	Reading Level		FS	@3m			
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB		
2390.00	E	Peak	44.46	0.92	45.38	74	-28.62		
2390.00	E	Average	32.65	0.92	33.57	54	-20.43		
Operation M	lode :	BT EDR	Test Dat	e :		2016/5/31			
Fundamenta	al Frequency	y: 2402 MH	Hz Temp. /	Temp. / Humi. :		22.7deg_C	;/57RH		
Operation B	and :	BE CH L	.ow Test Eng	Test Engineer :		Pony			
EUT Pol. :		E2	Measure	ment Anten	na Pol. :	Horizontal			
Freq.	Note	Detector	Spectum	Factor	Actual	Limit	Margin		
		Mode	Reading Level		FS	@3m	-		
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB		
0.000.00									
2390.00	E	Peak	44.84	0.92	45.76	74	-28.24		



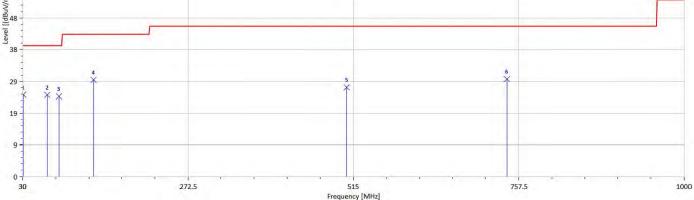
Operation Mode : Fundamental Frequency Operation Band : EUT Pol. :		/: 2480 M	BE CH High Test Eng		na Pol. :	2016/5/31 22.7deg_C Pony Vertical	:/57RH
Freq.	Note	Detector	Spectum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	-
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
2483.50	E	Peak	57.47	1.16	58.63	74	-15.37
2483.50	Е	Average	44.90	1.16	46.06	54	-7.94
Operation Mode : Fundamental Frequency		BT EDF /: 2480 M		-		2016/5/31 22.7deg_C	;/57RH
Operation B	and :	BE CH	High Test Eng	Test Engineer :			
EUT Pol. :		E2	Measure	ment Anten	na Pol.:	Horizontal	
Freq.	Note	Detector	Spectum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
	F/N/E/3		ubhr	<u>ub</u>	αθμι//II		
2483.50	E	Peak	57.62	1.16	58.78	74	-15.22



#### **Radiated Spurious Emission Measurement Result:**

#### For Frequency form 30MHz to 1000MHz

Operation Mode : Fundamental Frequency : Operation Band : EUT Pol. :	BT BR 2402 MHz Tx CH Low E2	Test Date : Temp. / Humi. : Test Engineer : Measurement Antenna Pol. :	2016/5/31 22.7 deg_C/57RH Ashton Vertical
77			
7			
7			
57			
58			FCC RSI

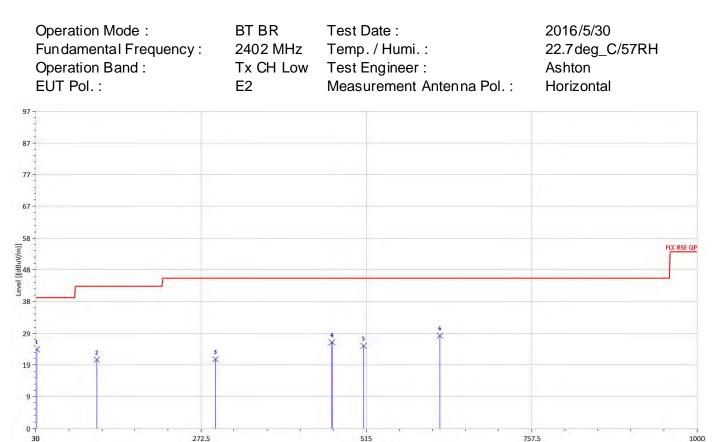


Freq.	Note	Detector Mode	Spectum Reading Level	Factor	Actual FS	Limit @3m	Margin	
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB	_
30.97	S	Peak	32.73	-7.70	25.03	40	-14.97	
65.89	S	Peak	47.24	-22.29	24.95	40	-15.05	
83.35	S	Peak	44.98	-20.47	24.51	40	-15.49	
133.79	S	Peak	45.40	-15.82	29.58	43.5	-13.92	
505.30	S	Peak	35.26	-7.99	27.26	46	-18.74	
740.04	S	Peak	33.91	-4.09	29.82	46	-16.18	

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Frequency [MHz]

Freq.	Note	Detector Mode	Spectum Reading Level	Factor	Actual FS	Limit @3m	Margin	
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB	
31.94	S	Peak	32.38	-8.22	24.16	40	-15.84	
120.21	S	Peak	36.83	-15.84	20.98	43.5	-22.52	
293.84	S	Peak	34.32	-13.23	21.10	46	-24.90	
464.56	S	Peak	34.40	-8.05	26.35	46	-19.65	
511.12	S	Peak	32.71	-7.49	25.23	46	-20.77	
622.67	S	Peak	34.77	-6.37	28.40	46	-17.60	

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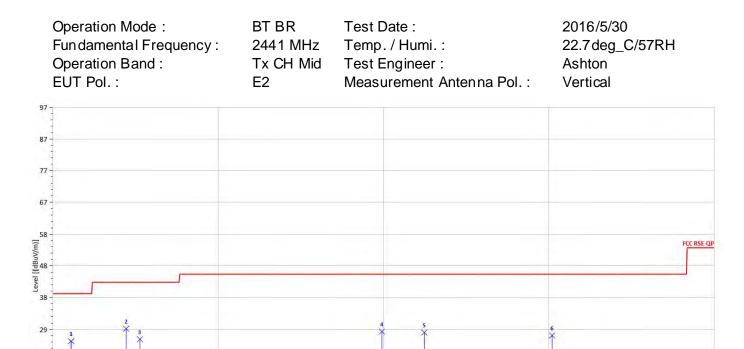
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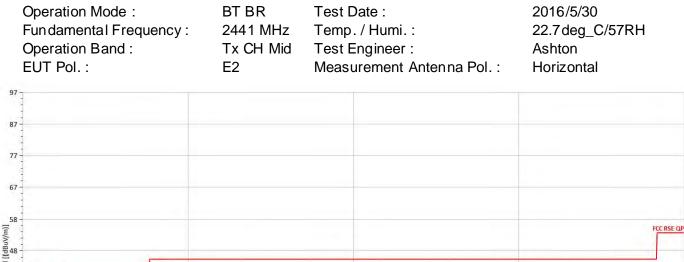
0		272.5	515 Frequency [MHz]		757.5	т. п.	· · · · 1
Freq.	Note	Detector Mode	Spectum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
57.16	S	Peak	47.43	-21.98	25.45	40	-14.55
137.67	S	Peak	45.24	-15.94	29.30	43.5	-14.20
158.04	S	Peak	43.46	-17.40	26.06	43.5	-17.44
513.06	S	Peak	36.10	-7.67	28.43	46	-17.57
575.14	S	Peak	34.38	-6.24	28.14	46	-17.86
762.35	S	Peak	31.38	-4.17	27.21	46	-18.79

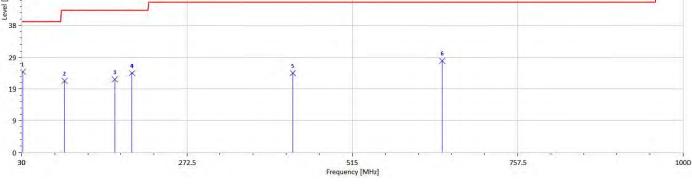
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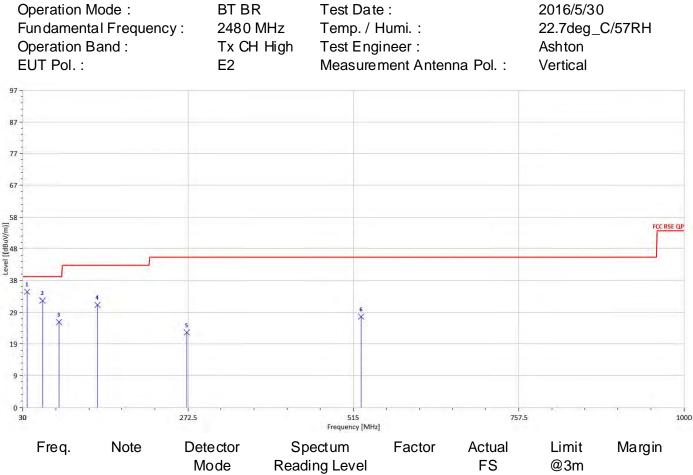


Freq.	Note	Detector	Spectum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
31.94	S	Peak	32.88	-8.22	24.65	40	-15.35
93.05	S	Peak	40.81	-18.95	21.85	43.5	-21.65
166.77	S	Peak	40.26	-17.95	22.31	43.5	-21.19
191.99	S	Peak	42.36	-18.13	24.24	43.5	-19.26
427.70	S	Peak	33.36	-9.12	24.24	46	-21.76
646.92	S	Peak	32.94	-4.92	28.02	46	-17.98

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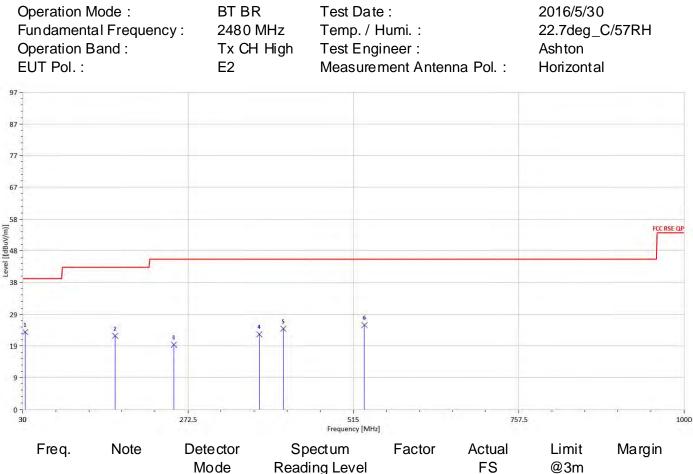




1109.	11010	Dottootor	opoorani	i uotoi	710100		margin	
		Mode	Reading Level		FS	@3m		
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB	
36.79	S	Peak	46.27	-10.93	35.34	40	-4.66	
59.10	S	Peak	55.34	-22.63	32.71	40	-7.29	
83.35	S	Peak	46.59	-20.47	26.12	40	-13.88	
139.61	S	Peak	47.41	-16.02	31.39	43.5	-12.11	
270.56	S	Peak	36.83	-13.91	22.92	46	-23.08	
526.64	S	Peak	35.31	-7.52	27.79	46	-18.21	

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rieq.	NOLE	Delector	Opecium	T actor	Actual	LIIIII	margin	
		Mode	Reading Level		FS	@3m		
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB	_
33.88	S	Peak	32.94	-9.27	23.67	40	-16.33	
165.80	S	Peak	40.41	-17.92	22.49	43.5	-21.01	
252.13	S	Peak	34.20	-14.45	19.75	46	-26.25	
377.26	S	Peak	33.43	-10.47	22.96	46	-23.04	
412.18	S	Peak	34.07	-9.37	24.69	46	-21.31	
531.49	S	Peak	33.01	-7.22	25.79	46	-20.21	

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#### **Radiated Spurious Emission Measurement Result:**

#### For Frequency above 1 GHz

_	Operation Fundamen Operation EUT Pol. :	tal Frequenc	BT BR cy : 2402 M Tx CH E2	/Hz Temp Low Test E	Date : . / Humi. : Engineer : urement Anten	na Pol. :	2016/5/31 22.7 deg_C/ Pon y Vertical	57RH
11	7							
10	15							
g								
c	ii							
c								FCC RSE PK
	/0							
Level [(dBuV/m)]								FCC RSE AV
	16 <u>-</u>	1						
3		×						
-	3	2						
2								
1	1							
	1000		7375		750 Icy [MHz]	2012!	5	26500
	Freq.	Note	Detector	Spectum		Actual	Limit	Margin
	MHz	F/H/E/S	Mode PK/QP/AV	Reading Le dBµV	vel dB	FS dBµV/m	@3m dBµV/m	dB
-	4804.00	Η	Peak	32.36	7.66	40.02	74	-33.98
	4804.00	Н	Average	21.75	7.66	29.41	54	-24.59

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 (	Operation I Fundament Operation I EUT Pol. :	tal Frequenc	BT BR 2402 M Tx CH E2	/Hz Temp Low Test E	Date : . / Humi. : Engineer : urement Anter	nna Pol. :	2016/5/31 22.7 deg_C/ Pon y Horizontal	57RH
117 -	-							
93 -	- - - -							
81 -	-							FCC RSE PK
70 - [(ɯ//ʌŋ								
Level [(dBuV/m)] 85	-							FCC RSE AV
46 -	-	1						
35 -	-	×						
23 -								
11 -	-							
0 - 10			7375		750 Icy [MHz]	2012	25	26500
	Freq.	Note	Detector Mode	Spectum Reading Le		Actual FS	Limit @3m	Margin
	MHz	F/H/E/S	PK/QP/AV	dBµV	dB	rs dBµV/m	dBµV/m	dB
	4804.00 4804.00	H H	Peak	32.38 21.70	10.55 10.55	42.93 32.25	74 54	-31.07 -21.75
	4004.00	П	Average	21.70	10.55	32.23	54	-21.75



Operation Fundamen Operation EUT Pol. :	ital Frequence Band :	BT BR cy : 2441 M Tx CH E2	/IHz Temp Mid Test	Date : o. / Humi. Engineer surement	:	a Pol. :	2016/5/31 22.7 deg_C/ Pon y Vertical	57RH
117								
105 -								
93 -								
81 -								
01								FCC RSE PK
70 - [Ē								
Level [[dBuy/m]]								FCC RSE AV
aa 46 -								
	×							
35 -	×							
23								
11				_				
0								
1000		7375		13750 ency [MHz]	,	20125		26500
Freq.	Note	Detector Mode	Spectur Reading Lo		actor	Actual FS	Limit @3m	Margin
MHz	F/H/E/S	PK/QP/AV	dBµV		dB	dBµV/m	dBµV/m	dB
4882.00	н	Peak	31.68		0.44	42.12	74	-31.88
4882.00	Н	Average	21.48	1	0.44	31.92	54	-22.08



F	Dperation I Fundamen Dperation I EUT Pol. :	tal Frequenc	BT BR y : 2441 M Tx CH E2	/IHz Ten Mid Tes	it Date : np. / Hu it Engin asureme	ımi.:	a Pol. :	2016/5/31 22.7 deg_C/ Pon y Horizontal	′57RH
117 -									
105 -									
93 -									
81 -					_				
70-					_				FCC RSE PK
Level [(dBuV/m)]									FCC RSE AV
Panal 1		1 ×							
35 -		×							
23 -		*							
11 -									
100	00		7375	Fre	13750 equency [MHz]		2012	5	26500
	Freq.	Note	Detector Mode	Spectu Reading		Factor	Actual FS	Limit @3m	Margin
	MHz	F/H/E/S	PK/QP/AV	dBµ\		dB	dBµV/m	dBµV/m	dB
	4882.00 4882.00	H H	Peak Average	31.78 21.5		10.44 10.44	42.22 31.95	74 54	-31.78 -22.05



Fundam	on Mode : ental Frequenc on Band : . :	BT BR y : 2480 M Tx CH E2	Hz Temp High Test I	Date : b. / Humi. : Engineer : urement Anter	nna Pol. :	2016/5/31 22.7deg_0 Pony Horizontal	C/57RH
117							
93							
70							FCC RSE PK
[[wn/\ngp]] I ava1 46	1						FCC RSE AV
35	*						
11							
0	6 J. 1.	7375		750 cy [MHz]	2012	5	26500
Freq.	Note	Detector Mode	Spectum Reading Lev		Actual FS	Limit @3m	Margin
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
4960.0 4960.0		Peak Average	32.25 21.52	10.27 10.27	42.52 31.79	74 54	-31.48 -22.21



Fur Op	eration N ndamenta eration E T Pol. :	al Frequency	BT BR 2480 M Tx CH E2	lHz Te High Te	est Date emp. / H est Engir easure m	umi. :	na Pol. :	2016/5/31 22.7deg_C Pony Vertical	C/57RH
117 -									
105 -									
1									
93 -									
81 -									
70									FCC RSE PK
Level [(dBuV/m)]									FCC RSE AV
a : 46 -		1							
1		×							
35 -		×							
23 -									
11 -									
1									
0 ¬ 1000		. , <u>I</u> , ,	7375	Fr	13750 equency [MHz]	r	20125	.u. 1	26500
	Freq.	Note	Detector	Spect		Factor	Actual	Limit	Margin
			Mode	Reading		10	FS	@3m	ID
	MHz	F/H/E/S	PK/QP/AV	dBµ\		dB	dBµV/m	dBµV/m	dB
	960.00 960.00	H H	Peak Average	30.4 21.5		10.27 10.27	40.73 31.78	74 54	-33.27 -22.22
4	500.00	11	Average	21.0	1	10.21	51.70	J <del>4</del>	-22.22



## **11 FREQUENCY SEPARATION**

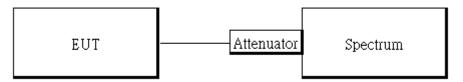
#### **11.1 Standard Applicable**

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

#### **11.2 Measurement Equipment Used**

	Conducted Emission Test Site						
EQUIPMENT	MFR	MODEL	SERIAL	LAST	CAL DUE.		
TYPE		NUMBER	NUMBER	CAL.			
Spectrum Analyzer	KEYSIGHT	N9010A	MY54510568	04/14/2016	04/13/2017		
DC Block	PASTERNACK	PE8210	RF29	12/12/2015	12/11/2016		
Attenuator	WOKEN	218FS-10	RF23	12/12/2015	12/11/2016		
DC Power Supply	Agilent	E3640A	MY53140006	05/04/2016	05/03/2017		

#### 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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## 12 NUMBER OF HOPPING FREQUENCY

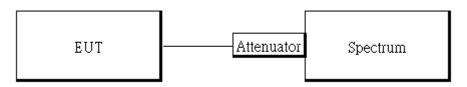
## **12.1 Standard Applicable**

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

#### 12.2 Measurement Equipment Used

Conducted Emission Test Site									
EQUIPMENT	MFR	MODEL	SERIAL	LAST	CAL DUE.				
TYPE		NUMBER	NUMBER	CAL.					
Spectrum Analyzer	KEYSIGHT	N9010A	MY54510568	04/14/2016	04/13/2017				
DC Block	PASTERNACK	PE8210	RF29	12/12/2015	12/11/2016				
Attenuator	WOKEN	218FS-10	RF23	12/12/2015	12/11/2016				
DC Power Supply	Agilent	E3640A	MY53140006	05/04/2016	05/03/2017				

#### 12.3 Test Set-up



#### 12.4 Measurement Procedure

- 1. Place the EUT on the table and set it in transmitting mode.
- 2. The testing follows 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	

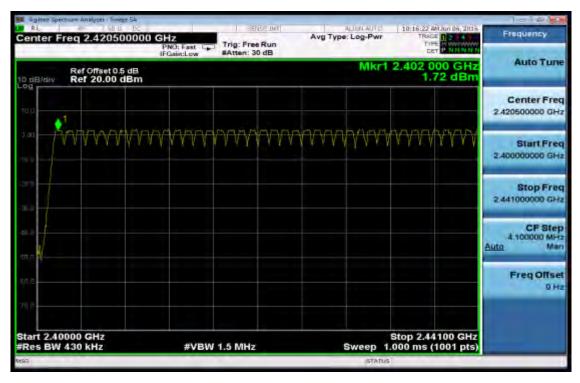
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#### **Channel Number**



#### 2.402GHz - 2.441GHz

#### 2.441GHz - 2.4835GHz



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#### TIME OF OCCUPANCY (DWELL TIME) 13

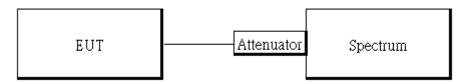
#### **13.1 Standard Applicable**

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

#### **13.2 Measurement Equipment Used**

Conducted Emission Test Site									
EQUIPMENT	LAST	CAL DUE.							
TYPE		NUMBER	NUMBER	CAL.					
Spectrum Analyzer	KEYSIGHT	N9010A	MY54510568	04/14/2016	04/13/2017				
DC Block	PASTERNACK	PE8210	RF29	12/12/2015	12/11/2016				
Attenuator	WOKEN	218FS-10	RF23	12/12/2015	12/11/2016				
DC Power Supply	Agilent	E3640A	MY53140006	05/04/2016	05/03/2017				

#### 13.3 Test Set-up



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#### **13.4 Measurement Procedure**

- 1. Place the EUT on the table and set it in transmitting mode.
- 2. The testing follows 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 = 2~8ms.

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

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

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

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

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

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

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#### 13.5 Tabular Result of the Measurement

#### GFSK (1Mbps)

Channel	PACKET TYPE	Measurement Result (ms)	Limit (ms)
	DH1	125.44	400ms
0	DH3	264.64	400ms
	DH5	309.87	400ms
39	DH1	126.40	400ms
	DH3	264.64	400ms
	DH5	307.95	400ms
78	DH1	126.40	400ms
	DH3	264.64	400ms
	DH5	309.87	400ms

#### π/4 DQPSK (2Mbps)

Channel	PACKET TYPE	PACKET TYPE (ms)	
	DH1	129.60	400ms
39	DH3	264.64	400ms
	DH5	309.87	400ms

#### 8-DPSK (3Mbps)

Channel	PACKET TYPE	Measurement Result (ms)	Limit (ms)
	DH1	129.60	400ms
39	DH3	264.64	400ms
	DH5	309.87	400ms

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

#### GFSK (1Mbps):

CH Low	DH1 time slot =	0.392 *	(1600/2/79) *	31.6 =	125.44 (ms)
	DH3 time slot =	1.654 *	(1600/4/79) *	31.6 =	264.64 (ms)
	DH5 time slot =	2.905 *	(1600/6/79) *	31.6 =	309.87 (ms)
CH Mid	DH1 time slot =	0.395 *	(1600/2/79) *	31.6 =	126.40 (ms)
	DH3 time slot =	1.654 *	(1600/4/79) *	31.6 =	264.64 (ms)
	DH5 time slot =	2.887 *	(1600/6/79) *	31.6 =	307.95 (ms)
CH High	DH1 time slot =	0.395 *	(1600/2/79) *	31.6 =	126.40 (ms)
	DH3 time slot =	1.654 *	(1600/4/79) *	31.6 =	264.64 (ms)
	DH5 time slot =	2.905 *	(1600/6/79) *	31.6 =	309.87 (ms)

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

CH Mid	2DH1 time slot=	0.405 *	(1600/2/79) *	31.6 =	129.60 (ms)
	2DH3 time slot=	1.654 *	(1600/4/79) *	31.6 =	264.64 (ms)
	2DH5 time slot=	2.905 *	(1600/6/79) *	31.6 =	309.87 (ms)

#### 8-DPSK (3Mbps):

CH Mid	3DH1 time slot=	0.405 *	(1600/2/79) *	31.6 =	129.60 (ms)
	3DH3 time slot=	1.654 *	(1600/4/79) *	31.6 =	264.64 (ms)
	3DH5 time slot=	2.905 *	(1600/6/79) *	31.6 =	309.87 (ms)

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GFSK (1Mbps) for AFH Mode						
Hopping Channel Number	PACKET TYPE	Measurement Result (ms)	Limit (ms)			
20	DH5 154.93		400ms			
π/4 DQPSK (2Mbps) for Mode						
Hopping Channel Number			Limit (ms)			
20	DH5	154.93	400ms			
8-DPSK (3Mbps) for AFH Mode						
Hopping Channel Number	PACKET TYPE	Measurement Result (ms)	Limit (ms)			
20	DH5	154.93	400ms			

#### GFSK (1Mbps):

DH5 time sI =	2.905	(ms)	*	(800/6/20)*8 =	154.93	(ms)
π/4 -DQPSK (2Mbps						
2DH5 time :=	2.905	(ms)	*	(800/6/20)*8 =	154.93	(ms)
8-DPSK (3Mbps):						
3DH5 time :=	2.905	(ms)	*	(800/6/20)*8 =	154.93	(ms)

#### **13.6 Measurement Result**

Note: Refer to next page for plots.

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## CH-Low DH1

RL NI Spectration - Shapt SA		The rest of t		ALTON ALTO	104-35135 PM May 31, 2816	Frequency
enter Freq 2.40200000	PNO: Fast	Trig: Free Run #Atten: 30 dB	Avg Typ	e: Log-Pwr	THACE 1 2 3 4 5 TUPE WILLIAM	
Ref Offset 0.5 dB Ref 20.00 dBm	T Cont.Cow	NY SELECT OF COM		Δ!	0.01 dB	Auto Tun
	(1∆2		3Δ4			Center Fre 2.402000000 GH
						Start Fre 2.402000000 GH
an the second second	huspary	haven and	hr	linna	Iproven and way had	Stop Fre 2.402000000 GH
enter 2.402000000 GHz es BW 1.0 MHz	#VBW	3.0 MHz		Sweep 3	Span 0 Hz .013 ms (401 pts)	
KR MODE TRC SCL X	391.7 µs (Δ)	-0.17 dB	UNCTION   FU	NETION WETH	FUNCTION VALUE	Auto Ma
2 F 1 t Δ4 1 t (Δ) 4 F 1 t 5	549.9 μs 1.251 ms (Δ) 549.9 μs	2.32 dBm 0.01 dB 2.32 dBm				Freq Offse 0 H
7 8 9 0						
		-				*

#### DH3



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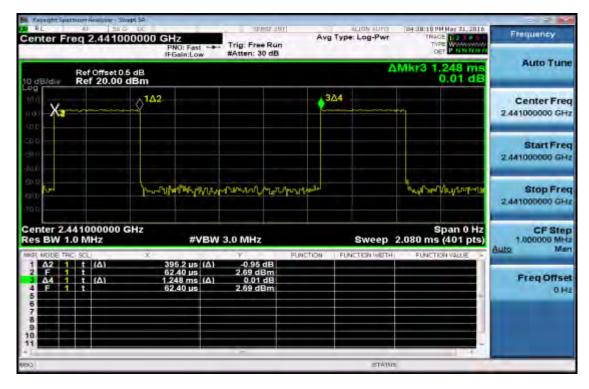


## DH5

Runght Spectrem Analyzer - Skept SA RL RI SD G DC	3163		04-42113 PM May 31, 2016	
enter Freq 2.40200000	PNO: Fast Trig: Free R	Avg Type: Log-Pwr	TRACE 1 2 3 4 9 1	Frequency
Ref Offset 0.5 dB dB/div Ref 20.00 dBm	IFGain:Low #Atten: 30 d		Mkr3 3.754 ms 0.00 dB	Auto Tun
	X		142 344	Center Fre 2.402000000 GH
				Start Fre 2.402000000 GH
80	ally regard		junau-ma	Stop Fre 2.40200000 GH
enter 2.402000000 GHz es BW 1.0 MHz	#VBW 3.0 MHz		Span 0 Hz 7.547 ms (401 pts)	CF Ste 1.000000 Mit
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	2.905 ms (Δ) -0.73 dE 3.641 ms 2.07 dBn 3.754 ms (Δ) 0.00 dE 3.641 ms 2.07 dBn		FUNCTION VALUE	Freq Offs 01
8 9 0 1		atárus		

# CH-Mid

DH1



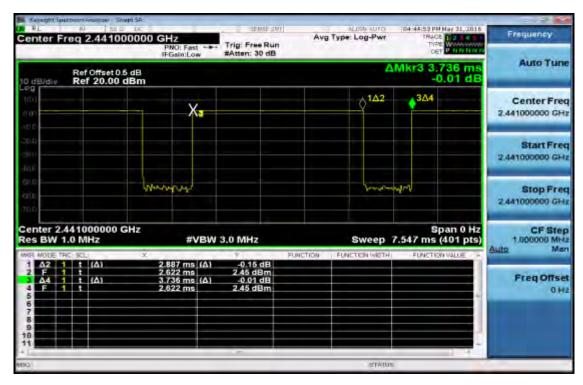
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## DH3

nter Freq 2.4410000	PNO: Fast	Trig: Free Run #Atten: 30 dB	Avg Ty	pe: Log-Pwr	THE WOMMAN DE DET PLAN NOV	Frequency
Ref Offset 0.5 dl				Δ	Mkr3 2.507 ms -0.02 dB	Auto Tune
	Xa		0142	3∆4		Center Free 2.441000000 GH
						Start Free 2.441000000 GH
	يمرن		ABINALATING	martha		Stop Fre 2.441000000 GH
nter 2.441000000 GH; s BW 1.0 MHz		3.0 MHz		Sweep 5	Span 0 Hz .013 ms (401 pts)	CF Ste 1.000000 MH
AZ 1 t (A)	× 1.654 ms (Δ)	-0.43 dB	FUNCTION   F	FUNCTION WETH	FUNCTION VALUE	ina ina
$ \begin{array}{c} F & 1 & t \\ \Delta 4 & 1 & t & (\Delta) \\ F & 1 & t \end{array} $	1.329 ms 2.507 ms (Δ) 1.329 ms	2.62 dBm -0.02 dB 2.52 dBm			_	Freq Offse 0 H

### DH5



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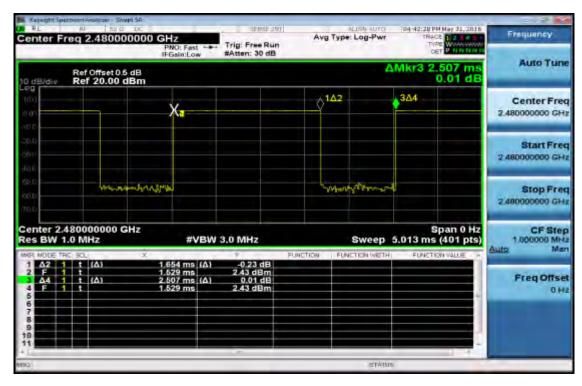
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## CH-High DH1

enter Freq 2.4800000		Avg Type: Log-Pwr	18405 1840 1840 1940 1940 1940 1940 1940 1940 1940 19	Frequency
sincer Freq 2.460000	PNO: Fast Trig: Free Run IFGain:Low #Atten: 30 dB		DET P NITE PINE	
Ref Offset 0.5 dE		Δ٨	1kr3 1.248 ms 0.00 dB	Auto Tun
Xa	142	304		Center Free 2.480000000 GH
				Start Fre 2.480000000 GH
ant-melly	Valutionarytogen	arpornorper	anna	Stop Fre 2.480000000 GH
enter 2.480000000 GHz es BW 1.0 MHz	z #VBW 3.0 MHz	Sweep 2.	Span 0 Hz 080 ms (401 pts)	CF Ste 1.000000 MH
RR MODE TRC SCL	× γ γ γ γ γ	FUNCTION   FUNCTION WETH	FUNCTION VALUE	Auto Ma
2 F 1 t Δ4 1 t (Δ) 4 F 1 t 5	254.8 μs 2.62 dBm 1.248 ms (Δ) 0.00 dB 254.8 μs 2.62 dBm		-	Freq Offse 0 H
7 8 8 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9				

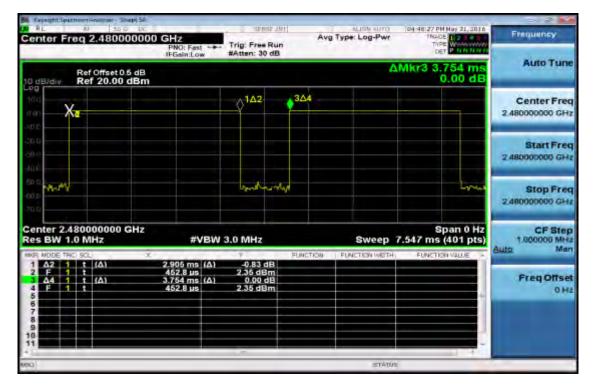
## DH3



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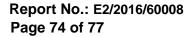
## CH-Mid 2DH1

RL AI SEG DC	-	TVIC REPRESE	ALTON ADTO	104-40:20 PM May 21, 2016	Frequency
enter Freq 2.441000000	PNO: Fast	Trig: Free Run #Atten: 30 dB	Avg Type: Log-Pwr	TYPE Workerwork	
Ref Offset 0.5 dB			4	Mkr3 1.250 ms 0.01 dB	Auto Tun
	X	Q <sup>1,</sup>	12	304	Center Fre 2.441000000 GH
					Start Fre 2.441000000 GP
oo oo oo	y day	yu	montenantique	workland	Stop Fre 2.441000000 GH
enter 2.441000000 GHz es BW 1.0 MHz	#VBW	3.0 MHz	Sweep	Span 0 Hz 2.000 ms (401 pts)	CF Ste 1.000000 MH
RR MODE TRC SCL X	405.0 µs (Δ)	-0.88 dB	UNICTION   FUNCTION WOTH	FUNCTION VALUE	Auto Ma
2 F 1 t $2 A 1 t (\Delta)$ 4 F 1 t 5 6	676.0 μs 1.250 ms (Δ) 676.0 μs	2.72 dBm 0.01 dB 2.72 dBm		-	Freq Offse 0 H
7 8 9 0					
1				-	

## 2DH3



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## 2DH5

Keynight Spectrater Analyzer - Sile					
Center Freq 2.44100	PNO: Fast Trig:	Avg Type:		131 PM May 31, 2016 TRADE 1 2 1 9 TVPE Woodshift	Frequency
Ref Offset 0.0	5 dB	n: 30 dB	ΔMkr	3 3.754 ms -0.01 dB	Auto Tun
001 001	X.			<b>3∆4</b>	Center Fre 2.441000000 GH
					Start Fre 2.441000000 GH
	handpaperia		dur vini		Stop Fre 2.441000000 GH
enter 2.441000000 C les BW 1.0 MHz	#VBW 3.0 M			Span 0 Hz ' ms (401 pts)	CF Ste 1.000000 Mit
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	2.756 ms 2.4 3.754 ms (Δ) -0	FLINCTION FLINC 83 dB 3 dB 01 dB 1 dB 1 dB 1 dB 1 dB 1 dB	TON WOTH F	UNCTION VALUE	Freq Offse 0 H
9	-		ETATUS		

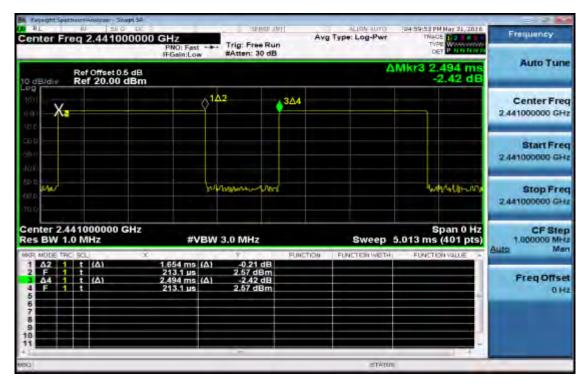
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## CH-Mid **3DH1**

R RL RI Store DC	STING STING	ALION AUTO	04-56:58 PH Hay 21, 2016	212 1
Center Freq 2.441000000	GHz PNO: Fast Trig: Free Run	Avg Type: Log-Pwr	THACE 12305	Frequency
Ref Offset 0.5 dB	IFGain:Low #Atten: 30 dB	۵۸	1kr3 1.250 ms 0.00 dB	Auto Tun
	162	4	Δ4	Center Fre 2.441000000 GH
20.0 				Start Fre 2.441000000 GH
50.0 60.0 0 <sup>M</sup> hruwshiji/Muu	horrower and	ntritionation		Stop Fre 2.441000000 GH
Center 2.441000000 GHz Res BW 1.0 MHz	#VBW 3.0 MHz	Sweep 2.	Span 0 Hz 000 ms (401 pts)	CF Ste 1.000000 MH
MKR MODE TRC SCL X	405.0 μs (Δ) -0.79 dB	NETION   FUNCTION WETH	FUNCTION VALUE	Auto Ma
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	340.0 μs 2.76 dBm 1.250 ms (Δ) 0.00 dB 340.0 μs 2.76 dBm		-	Freq Offse 0 H
8 9 10				
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## 3DH3



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## 3DH5



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## **14 ANTENNA REQUIREMENT**

### 14.1 Standard Applicable

For intentional device, according to §15.203, an intentional radiator shall be designed to ensure that no antenna other than furnished by the responsible party shall be used with the device. If the transmitting antenna is greater than 6dBi, the power shall be reduced by the same level in dB comparing to gain minus 6dBi.

#### 14.2 Antenna Connected Construction

An embedded-in antenna design is used.

The antenna connector is designed with unique type RF connector 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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