ELECTROMAGNETIC EMISSIONS COMPLIANCE REPORT

INTENTIONAL RADIATOR CERTIFICATION TO FCC PART 15 SUBPART C REQUIREMENT

OF

Equipment Under Test:	MTX connect	
Marketing Name:	MTX connect	
Brand Name:	N/A	
Model No.:	BP3NF1-2B	
Model Difference:	N/A	
FCC ID:	U7I-BP3NF1-2B	
Report No.:	ER/2014/A0040	
Issue Date:	Oct. 13, 2014	
FCC Rule Part:	§15.247, Cat: DSS	
Prepared for:	Microlife Corporation 9F, 431, RuiGuang Road, Nei-Hu, Taipei, 114, Taiwan, R.O.C.	
Prepared by:	SGS Taiwan Ltd. Electronics & Communication Laboratory No.134, Wu Kung Road, New Taipei Industrial Park, Wuku District, New Taipei City, Taiwan 24803	
Taff Testing Laboratory 0513	<i>Note:</i> This report shall not be reproduced except in full, without the written approval of SGS Taiwan Ltd. This docu- ment may be altered or revised by SGS Taiwan Ltd. person- nel only, and shall be noted in the revision section of the document.	

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VERIFICATION OF COMPLIANCE

Applicant:	Microlife Corporation 9F, 431, RuiGuang Road, Nei-Hu, Taipei, 114, Taiwan, R.O.C.
Equipment Under Test:	MTX connect
Marketing Name:	MTX connect
Brand Name:	N/A
Model No.:	BP3NF1-2B
Model Difference:	N/A
FCC ID:	U7I-BP3NF1-2B
File Number:	ER/2014/A0040
Date of test:	Oct. 07, 2014 ~ Oct. 13, 2014
Date of EUT Received:	Oct. 07, 2014

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 C63.4:2009 the energy emitted by the sample EUT tested as described in this report is in compliance with conducted and radiated emission limits of FCC Rules Part 15.247.

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

Test By:	Marcus Tseng	Date:	Oct. 13, 2014	
Prepared By:	Marcus Tseng / Engineer Sui him	Date:	Oct. 13, 2014	
Approved By:	Sui Lim / Clerk Jim Chang	Date:	Oct. 13, 2014	

Jim Chang / Supervisor

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Version

Version No.	Date	Description
00	Oct. 13, 2014	Initial creation of document

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GENERAL INFORMATION 1.

Product description 1.1.

General:

Product Name:	MTX connect
Marketing Name:	MTX connect
Brand Name:	N/A
Model No.:	BP3NF1-2B
Model difference:	N/A
Hardware Version:	N/A
Software Version:	N/A
Data Cable (USB):	Model No.: USB – MINI 5P Cable, Supplier: Shenzhen Yongsheng Technology,Co.,Ltd
Power Supply:	6.0Vdc from 1.5V AA battery*4 or 6Vdc from AC/DC adapter

Bluetooth_BR+EDR:

Bluetooth Version	Bluetooth V3.0
Frequency Range	2402 – 2480MHz
Channel number	79 channels max.
Rated Power	1.24dBm (Peak)
Modulation type	FHSS
Antenna Designation:	Chip Antenna; Gain: 0dBi

The EUT is compliance with Bluetooth standard.

This test report applies for Bluetooth function.

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1.2. Related Submittal(s) / Grant (s)

This submittal(s) (test report) is intended for FCC ID: U7I-BP3NF1-2B filing to comply with Section 15.247 of the FCC Part 15, Subpart C Rules. The composite system (digital device) is compliance with FCC part 15; Subpart B is authorized under the DoC procedure.

1.3. Test Methodology

Both conducted and radiated testing was performed according to the procedures in ANSI C63.4:2009. Radiated testing was performed at an antenna to EUT distance 3 meters. Tested in accordance with FCC Public Notice DA 00-705 - Filing and Measurement Guidelines for Frequency Hopping Spread Spectrum Systems

1.4. Test Facility

The measurement facilities used to collect the 3m Radiated Emission and AC power line conducted data are located on the address of SGS Taiwan Ltd. Electronics & Communication Laboratory No.134, Wu Kung Road, Wuku Industrial Zone, Taipei County, Taiwan which are constructed and calibrated to meet the FCC requirements in documents ANSI C63.4:2009. FCC Registration Number is: 990257. The address of SGS Taiwan Ltd. Electronics & Communication Laboratory 1F, No.134, Wukung Road New Taipei City TAIWAN 24803, Canada Registration Number: 4620A-5

The 10 m Open Area Test Sites located on the address of SGS Taiwan Ltd. Electronics & Communication Laboratory No.2, Keji 1st Rd., Guishan Township, Taoyuan County, Taiwan which is constructed and calibrated to meet the CISPR 22/EN 55022 requirements. FCC Registration Number: 455997. The address of SGS Taiwan Ltd. Electronics & Communication Laboratory 1F, No.134, Wukung Road New Taipei City TAIWAN 24803, IC Registration Number: 4620A-6.

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 plane. According to the general criterion in Section 7.1 of ANSI C63.4:2009.Conducted emissions from the EUT measured in the frequency range between 0.15 MHz and 30MHz, and the measurement procedure 7.3 in ANSI 63.4:2009 is followed to carry out the test. The CISPR Quasi-Peak and Average detector mode is employed according to §15.107

2.3.2 Radiated Emissions

The EUT is a placed on as turn table which is 0.8 m above ground plane. 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 according to the requirements in Section 8 and 13 and of ANSI C63.4:2009.

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2.4. Configuration of Tested System

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

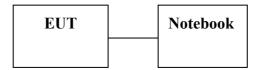


Table 2-1 Equipment Used in Tested System

Item	Equipment	Mfr/Brand	Model/Type No.	Series No.	Data Cable	Power Cord
1.	Bluetooth Test Software	N/A	N/A	N/A	N/A	N/A
2.	Notebook	Lenovo	L412	LR-957X7	N/A	N/A

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3. SUMMARY OF TEST RESULTS

FCC Rules	Description Of Test	Result
§15.207(a)	AC Power Line Conducted Emission	Compliant
§15.247(b)(1)	Peak Output Power	Compliant
§15.247(a)(1)	20dB Bandwidth	Compliant
§15.247(d)	100 kHz Bandwidth Of Frequency Band Edges	Compliant
\$15.247(d) \$15.209(a) (f)	Spurious Emission	Compliant
§15.247(a)(1)	Frequency Separation	Compliant
§15.247(a)(1)(iii)	Number of hopping frequency	Compliant
§15.247(a)(1)(iii)	Time of Occupancy	Compliant
§15.203,	Antenna Requirement	Compliant

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4. DESCRIPTION OF TEST MODES

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.

Channel Low, Mid and High with highest rated data rate were chosen as worst case for full testing. The field strength of spurious radiation emission was measured as EUT stand-up position (H mode) and lie down position (E1, E2 mode) for Bluetooth Transmitter for channel Low, Mid and High the worst case E1 position was reported.

Channel Low: channel 1 at 2402MHz Channel Mid: channel 39 at 2441MHz Channel High: channel 78 at 2480MHz

In comparison with BR and EDR mode, emission carried out by EDR is chosen as the most representative measurement to perform measurement of radiated spurious emission pursuant to Part 15C.Modulation, EDR, is selected to be performed for 100 kHz Bandwidth Band Edge, Conducted Spurious Emission, Frequency Separation, Number of hopping frequency due to its characteristics of wider bandwidth.

Data type being used to conduct the measurement: DH1/DH3/DH5 (GFSK) with 1Mbps 2DH1/2DH3/2DH5 (/4 DQPSK) with 2Mbps 3DH1/3DH3/3DH5 (8DPSK) with 3Mbps

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5. MEASUREMENT UNCERTAINTY

Test Items	Uncertainty
AC Power Line Conducted Emission	+/- 2.586 dB
Peak Output Power	+/- 1.55 dB
20dB Bandwidth & 99% Power Bandwidth	+/- 123.36 Hz
100 KHz Bandwidth Of Frequency Band Edges	+/- 1.55 dB
Frequency Separation	+/- 123.36 Hz
Number of hopping frequency	+/- 123.36 Hz
Time of Occupancy	+/- 123.36 Hz
Temperature	+/- 0.8 °C
Humidity	+/- 4.7 %
DC / AC Power Source	DC= +/- 1%, AC= +/- 0.2%

Radiated Spurious Emission:

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

	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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6. **CONDUCTED EMISSION TEST**

6.1. Standard Applicable

According to §15.207, frequency within 150 kHz to 30MHz shall not exceed the limit table as below.

	Limits			
Frequency range	dB((uV)		
MHz	Quasi-peak	Average		
0.15 to 0.50	66 to 56	56 to 46		
0.50 to 5	56	46		
5 to 30	60	50		
Note				
1. The lower limit shall apply at the	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.
ТҮРЕ		NUMBER	NUMBER	CAL.	
EMI Test Receiver	R&S	ESCI7	100760	05/26/2014	05/25/2015
LISN	Rolf-Heine	NNB-2/16Z	99012	03/26/2014	03/25/2015
LISN	FCC	FCC-LISN-50/250-25-2-01	04034	03/19/2014	03/18/2015
Coaxial Cables	N/A	WK CE Cable	N/A	11/26/2013	11/25/2014

6.3. EUT Setup

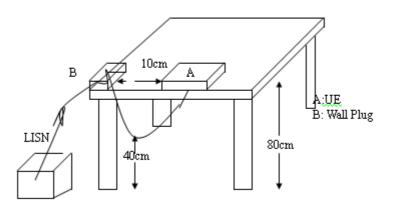
- 1. The conducted emission tests were performed in the test site, using the setup in accordance with the ANSI C63.4:2009.
- 2. The AC/DC Power adaptor of EUT was plug-in LISN. The EUT was placed flushed with the rear of the table.
- 3. The LISN was connected with 120Vac/60Hz power source.

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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 plane.
- 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

N/A, EUT powered from 1.5V AA battery x2.

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PEAK OUTPUT POWER MEASUREMENT 7.

7.1. Standard Applicable

According to §15.247(b)(1), 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.

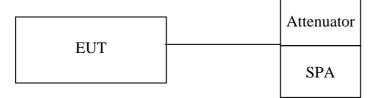
7.2. Measurement Equipment Used

Conducted Emission Test Site					
EQUIPMENT	MFR	MODEL	SERIAL	LAST	CAL DUE.
ТҮРЕ		NUMBER	NUMBER	CAL.	
Power Meter	Anritsu	ML2495A	1005007	01/13/2014	01/12/2015
Power Sensor	Anritsu	MA2411B	917032	01/13/2014	01/12/2015
Spectrum Analyzer	Agilent	E4446A	MY51100003	05/19/2014	05/18/2015
Spectrum Analyzer	Agilent	E4440A	MY45304525	03/08/2014	03/07/2015
DC Block	Mini-Circuits	BLK-18-S+	1	02/27/2014	02/26/2015
Low Loss Cable	HUBER+SUHNER	SUCOFLEX 104PEA	N/A	01/03/2014	01/02/2015
Attenuator	Mini-Circuit	BW-S10W2+	002	02/27/2014	02/26/2015
Splitter	Agilent	11636B	N/A	02/27/2014	02/26/2015

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7.3. Test Set-up:



7.4. Measurement Procedure:

- 1. Place the EUT on the table and set it in transmitting mode.
- 2. 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)
- 3. Record the max. reading.
- 4. Repeat above procedures until all default test channel is completed.

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7.5. Measurement Result

BR mode (GFSK):

Frequency (MHz)	Reading Power (dBm)	Output Power (W)	Limit (W)
2402.00	1.16	0.00131	1
2441.00	0.60	0.00115	1
2480.00	-0.12	0.00097	1

EDR mode (π /4DQPSK):

Frequency (MHz)	Reading Power (dBm)	Output Power (W)	Limit (W)
2402.00	1.12	0.00129	0.125
2441.00	0.60	0.00115	0.125
2480.00	-0.09	0.00098	0.125

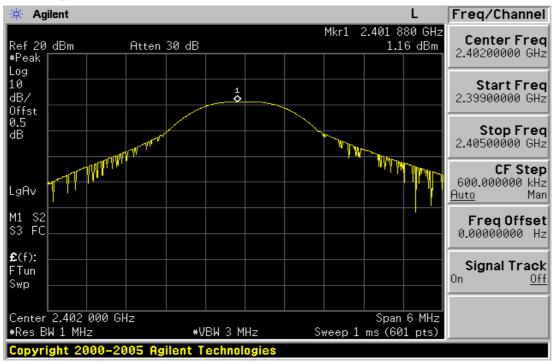
EDR mode (8DPSK):

Frequency (MHz)	Reading Power (dBm)	Output Power (W)	Limit (W)
2402.00	1.24	0.00133	0.125
2441.00	0.64	0.00116	0.125
2480.00	-0.05	0.00099	0.125

*Note: offset 0.5dB. *Note: Refer to next page for plots.

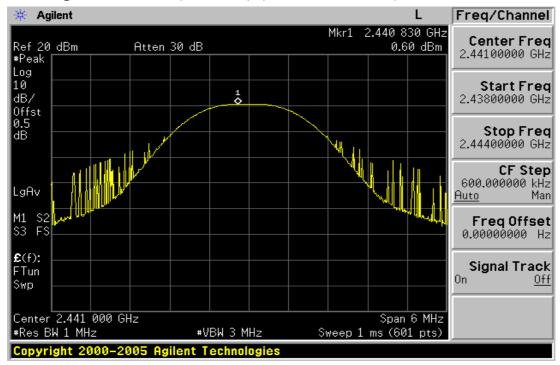
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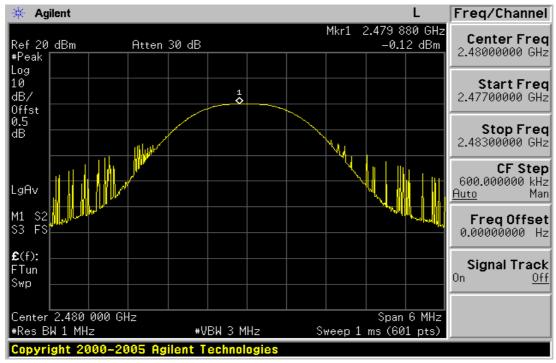
Peak Power Output Data Plot (CH Low) (BR mode GFSK)

Peak Power Output Data Plot (CH Mid) (BR mode GFSK)



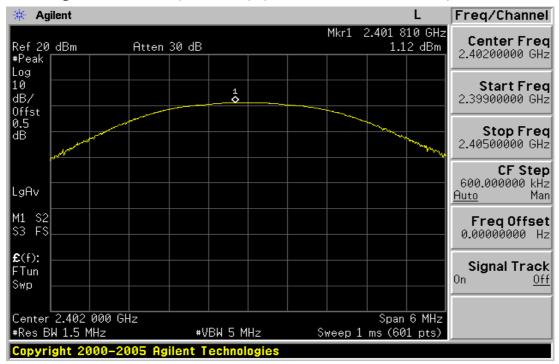
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Peak Power Output Data Plot (CH High) (BR mode GFSK)

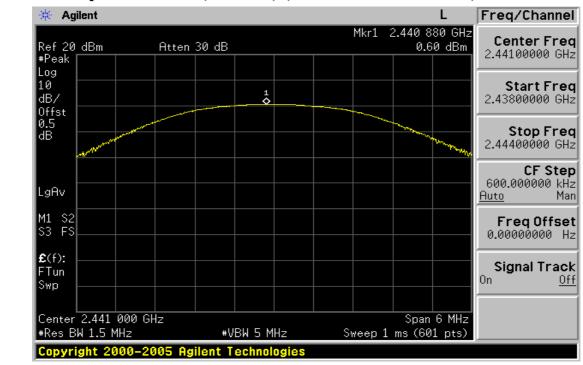
Peak Power Output Data Plot (CH Low) (EDR mode $\pi/4DQPSK$)



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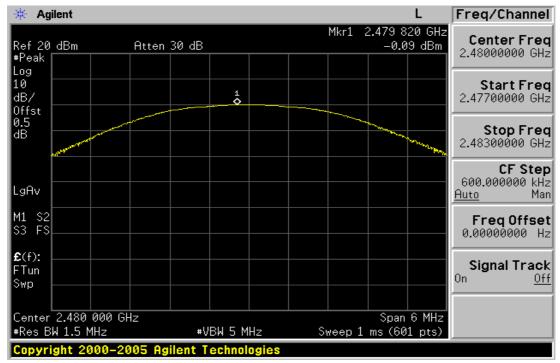
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Peak Power Output Data Plot (CH Mid) (EDR mode $\pi/4DQPSK$)

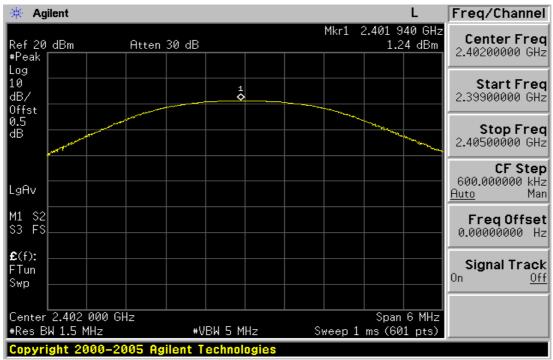
Peak Power Output Data Plot (CH High) (EDR mode $\pi/4DQPSK$)



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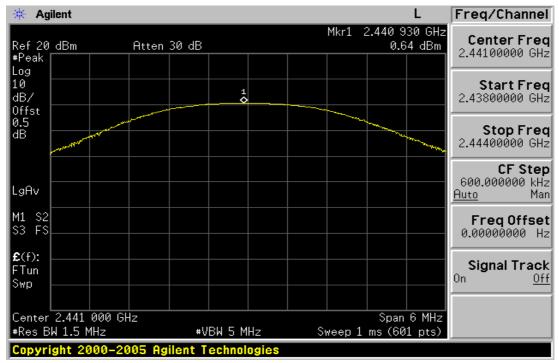
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Peak Power Output Data Plot (CH Low) (EDR mode 8DPSK)

Peak Power Output Data Plot (CH Mid) (EDR mode 8DPSK)



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🔆 Agilent Freq/Channel Mkr1 2.479 940 GHz **Center Freq** Ref 20 dBm Atten 30 dB -0.05 dBm 2.48000000 GHz #Peak Log 10 Start Freq dB/ 2.47700000 GHz Offst 0.5 dB Stop Freq 2.48300000 GHz **CF Step** 600.000000 kHz LgAv Auto Man M1 S2 **Freq Offset** \$3 FS 0.00000000 Hz £(f): Signal Track FTun 0n <u>Off</u> Swp Center 2.480 000 GHz Span 6 MHz #Res BW 1.5 MHz ₩VBW 5 MHz Sweep 1 ms (601 pts) 00-2005 Agilent opyright 20

Peak Power Output Data Plot (CH High) (EDR mode 8DPSK)

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8. 20dB BANDWIDTH

8.1. Standard Applicable

For 20dB Bandwidth

According to §15.247(a)(1), for frequency hopping systems operating in the 2400MHz-2483.5 MHz no limit for 20dB bandwidth.

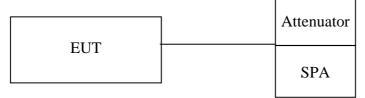
8.2. **Measurement Equipment Used**

Conducted Emission Test Site					
EQUIPMENT	MFR	MODEL	SERIAL	LAST	CAL DUE.
ТҮРЕ		NUMBER	NUMBER	CAL.	
Power Meter	Anritsu	ML2495A	1005007	01/13/2014	01/12/2015
Power Sensor	Anritsu	MA2411B	917032	01/13/2014	01/12/2015
Spectrum Analyzer	Agilent	E4446A	MY51100003	05/19/2014	05/18/2015
Spectrum Analyzer	Agilent	E4440A	MY45304525	03/08/2014	03/07/2015
DC Block	Mini-Circuits	BLK-18-S+	1	02/27/2014	02/26/2015
Low Loss Cable	HUBER+SUHNER	SUCOFLEX 104PEA	N/A	01/03/2014	01/02/2015
Attenuator	Mini-Circuit	BW-S10W2+	002	02/27/2014	02/26/2015
Splitter	Agilent	11636B	N/A	02/27/2014	02/26/2015

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8.3. Test Set-up



8.4. Measurement Procedure:

- 1. Place the EUT on the table and set it in transmitting mode.
- 2. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.
- 3. 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.
- 4. Mark the peak frequency and –20dB (upper and lower) frequency and Turn on the 99% bandwidth function, max reading.
- 5. Repeat above procedures until all test default channel is completed

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

NOTE2: For the plot of bandwidth measurement, the marker of the 20dB BW is arrow-mark

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8.5. Measurement Result:

20dB Bandwidth: BR mode (GFSK)

СН	Bandwidth
	(kHz)
Lower	887.894
Mid	923.043
Higher	924.929

20dB Bandwidth: EDR mode (π /4DQPSK)

СН	Bandwidth	2/3 Bandwidth
	(MHz)	(MHz)
Lower	1.278	0.852
Mid	1.314	0.876
Higher	1.313	0.875

20dB Bandwidth: EDR mode (8DPSK)

СН	Bandwidth	2/3 Bandwidth
	(MHz)	(MHz)
Lower	1.257	0.838
Mid	1.266	0.844
Higher	1.267	0.845

Note: Refer to next page for plots.

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BR Mode (GFSK) 20dB Bandwidth Test Data CH-Low

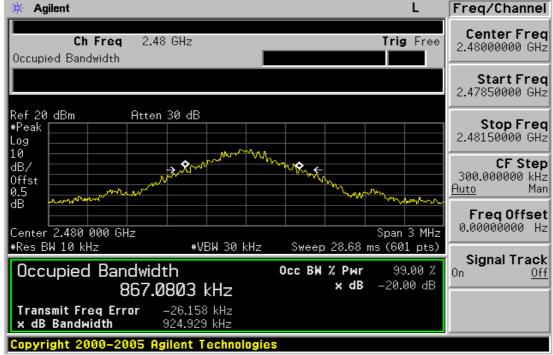


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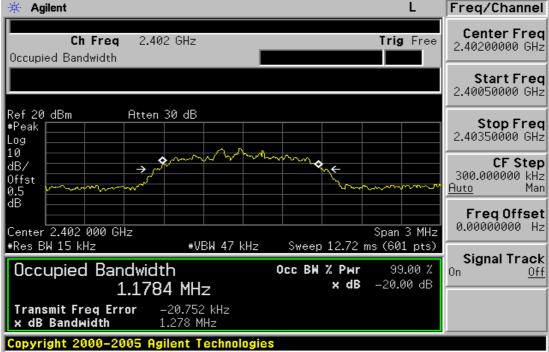
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20dB Bandwidth Test Data CH-High



EDR Mode (π /4DQPSK) 20dB Bandwidth Test Data CH-Low

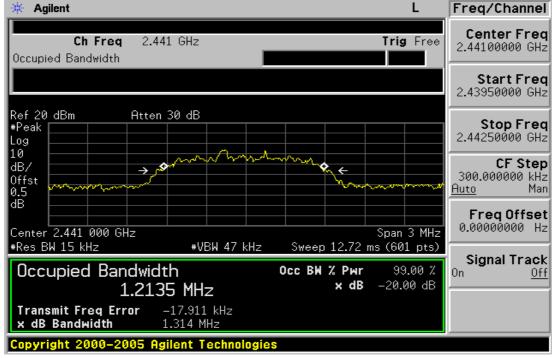


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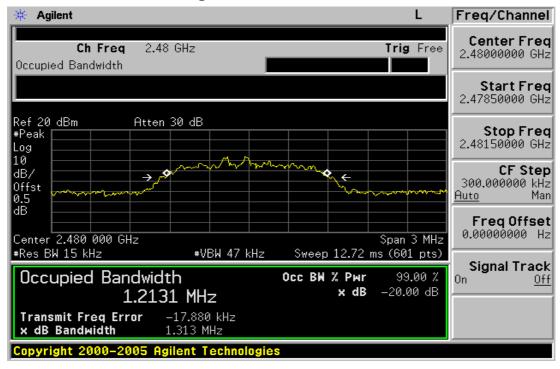
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20dB Bandwidth Test Data CH-Mid



20dB Bandwidth Test Data CH-High

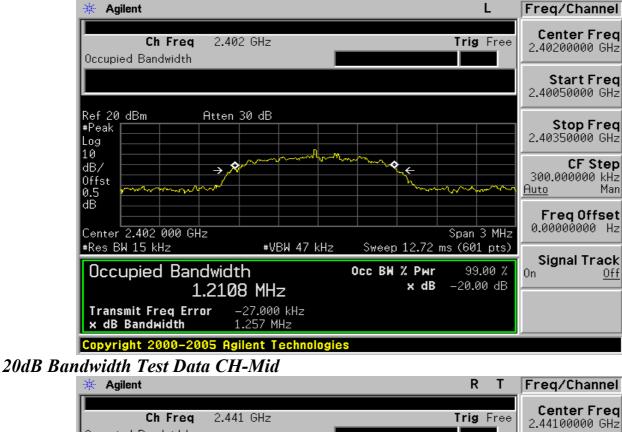


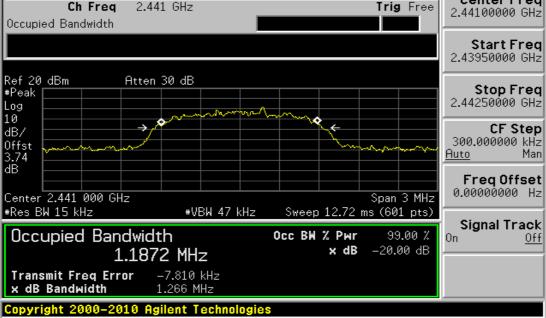
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EDR Mode (8DPSK) 20dB Bandwidth Test Data CH-Low



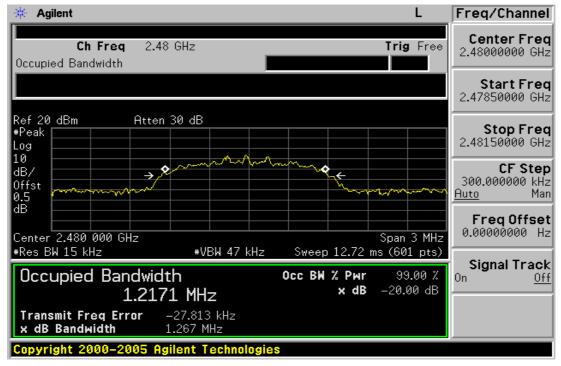


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20dB Bandwidth Test Data CH-High



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9. BAND EDGES EMISSION MEASUREMENT

9.1. Standard Applicable

According to §15.247(d), in any 100 kHz bandwidth outside the frequency bands in which the spread spectrum intentional radiator in operating, the radio frequency power that is produced by the intentional radiator shall be at least 20dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power. 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 in15.209(a).

9.2. Measurement Equipment Used

9.2.1. Conducted Emission at antenna port:

Conducted Emission Test Site						
EQUIPMENT	MFR	MODEL	SERIAL	LAST	CAL DUE.	
ТҮРЕ		NUMBER	NUMBER	CAL.		
Power Meter	Anritsu	ML2495A	1005007	01/13/2014	01/12/2015	
Power Sensor	Anritsu	MA2411B	917032	01/13/2014	01/12/2015	
Spectrum Analyzer	Agilent	E4446A	MY51100003	05/19/2014	05/18/2015	
Spectrum Analyzer	Agilent	E4440A	MY45304525	03/08/2014	03/07/2015	
DC Block	Mini-Circuits	BLK-18-S+	1	02/27/2014	02/26/2015	
Low Loss Cable	HUBER+SUHNER	SUCOFLEX 104PEA	N/A	01/03/2014	01/02/2015	
Attenuator	Mini-Circuit	BW-S10W2+	002	02/27/2014	02/26/2015	
Splitter	Agilent	11636B	N/A	02/27/2014	02/26/2015	

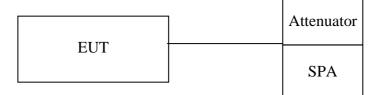
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9.3. Test SET-UP:

9.3.1. Conducted Emission at antenna port:



9.4. Measurement Procedure

100 kHz BANDWIDTH OF BAND EDGES:

- 1. Place the EUT on the table and set it in transmitting mode.
- 2. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.
- 3. Set center frequency of spectrum analyzer = operating frequency.
- 4. Set the spectrum analyzer as RBW, VBW=300 kHz, Sweep = auto
- 5. Mark Peak, 2.390GHz and 2.4835GHz and record the max. level.
- 6. Repeat above procedures until all frequency measured were complete.

Out-Of-Band EMISSION

- 1. To connect Antenna Port of EUT to Spectrum.
- 2. Set RBW = 100K & VBW = 300K on Spectrum.
- 3. Sweep the frequency to determine spurious emission as seen on spectrum from span of 30MHz to 3G, 3G to 8G, 8G to 13G, 13G to 18G and 18G to 26.5GHz
- 4. Via Software, combine 5 spans of frequency range into two plots containing the range of 30MHz to 3GHz, and 3GHz to 26.5GHz.

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9.5. 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			

9.6. Measurement Result -1 Out-Of-Band EMISSION:

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

NOTE: the occurrence of the spike on the conducted emission is the signal of the fundamental emission.

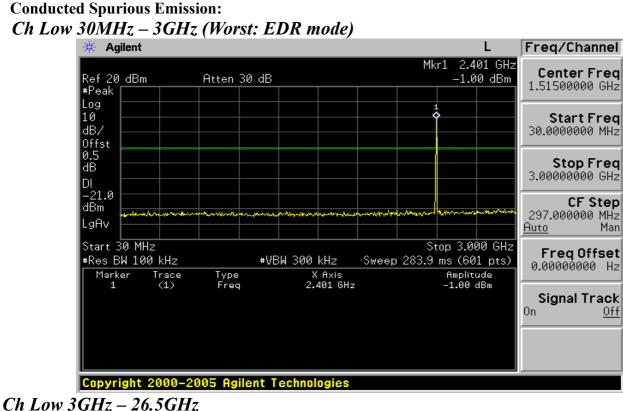
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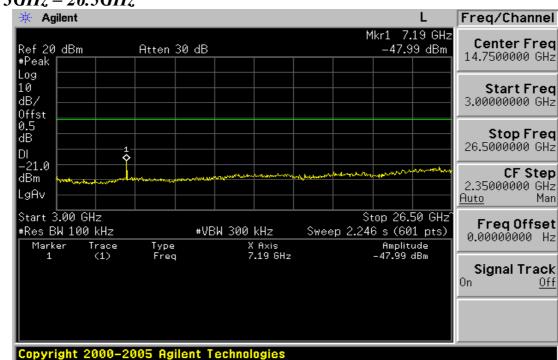
w 非 另 就 明 , 此 報 告 結果 (佳 對 測试之 禄 品 負 奇 、 同時 此 桜 品 僅 係 留) 氏 。 本 報 告 未 極本 公 司 書 面 許 可 , 不可 部 份 複 製 。 This document is issued by the Company subject to its General Conditions of Service printed overleaf, available on request or accessible at <u>www.sqs.com/terms and conditions.htm</u> and, for electronic format documents, subject to Terms and Conditions of Electronic Documents at <u>www.sqs.com/terms e-document.htm</u>. Attention is drawn to the limitation of liability, indemnification and jurisdiction issues defined therein. Any holder of this document is advised that information contained hereon reflects the Company's findings at the time of its intervention only and within the limits of Client's instructions, if any. The Company's sole responsibility is to its Client and this document does not exonerate parties to a transaction from exercising all their rights and obligations under the transaction documents. This document is unlawful and offenders may be prosecuted to the fullest extent of the law.



9.7 Measurement Result -1

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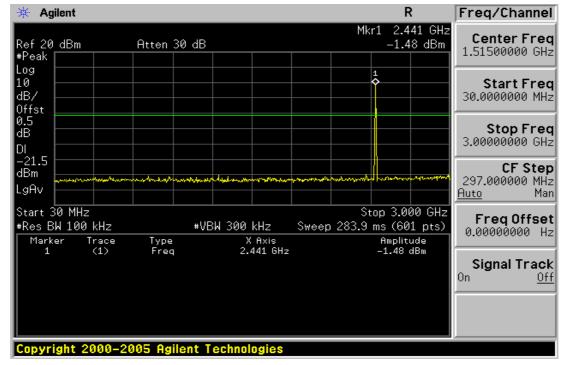


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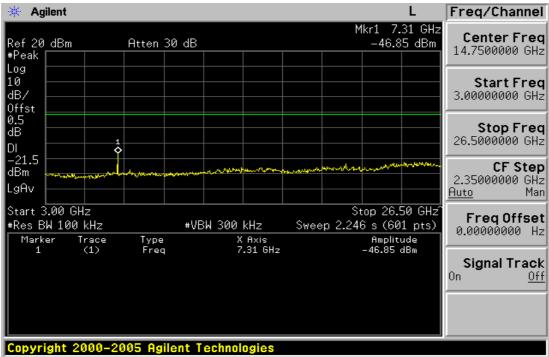
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Ch Mid 30MHz – 3GHz



Ch Mid 3GHz – *26.5GHz*

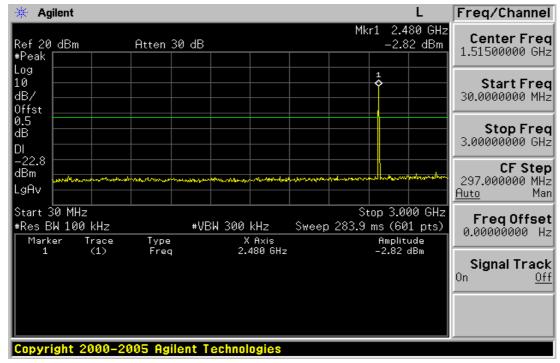


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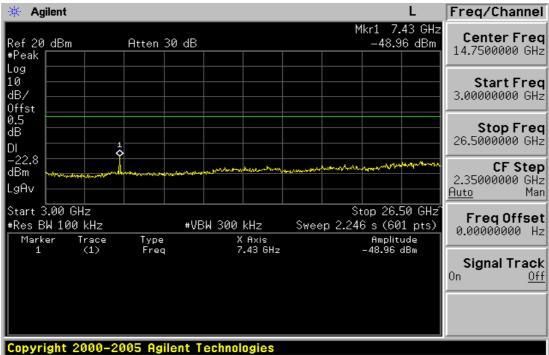
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Ch High 30MHz – 3GHz



Ch High 3GHz – 26.5GHz



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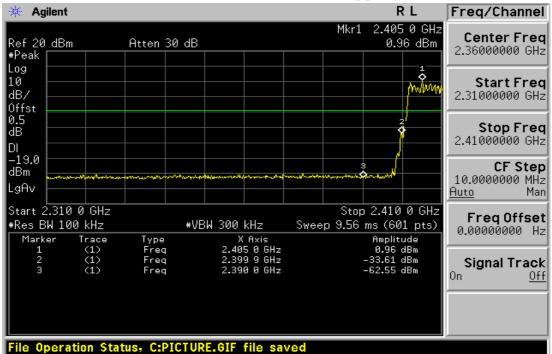
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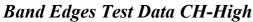
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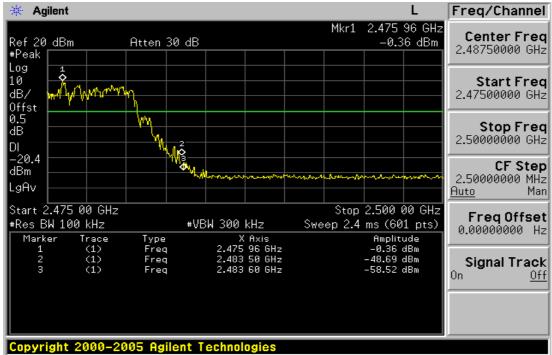
9.7 Measurement Result -2

100kHz Bandwidth of Band Edge:

Band Edges Test Data CH-Low (Worst: EDR mode) Hopping mode

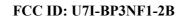




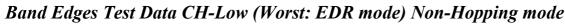


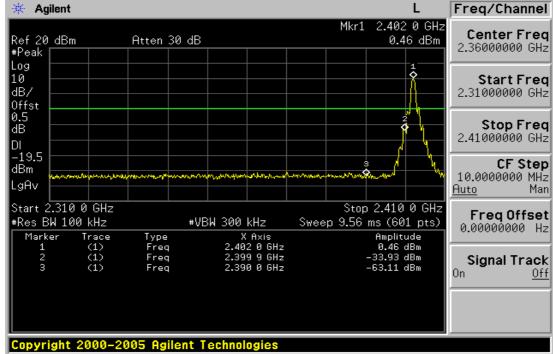
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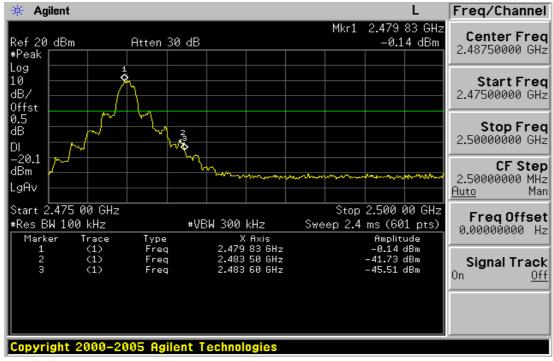








Band Edges Test Data CH-High



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10. SPURIOUS RADIATED EMISSION TEST

10.1. Standard Applicable

According to §15.247(d),

Emission at antenna port:

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. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB.

Radiated Spurious Emission

Attenuation below the general limits specified in § 15.209(a) is not required. 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) (see § 15.205(c)).

And according to §15.33(a) (1), 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.

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10.2. Measurement Equipment Used:

10.2.1. Radiated emission:

966 Chamber							
EQUIPMENT	MFR	MODEL	SERIAL	LAST	CAL DUE.		
ТҮРЕ		NUMBER	NUMBER	CAL.			
EMI Test Receiver	R&S	ESCI7	100759	02/08/2013	02/07/2014		
Spectrum Analyzer	Agilent	E4446A	MY51100003	05/19/2014	05/18/2015		
EXA Spectrum Analyzer	Agilent	N9010A	MY50420195	01/20/2014	01/19/2015		
Spectrum Analyzer	R&S	FSV-30	101398	10/22/2013	10/21/2014		
Loop Antenna	ETS.LINDGREN	6502	00148045	07/03/2014	07/02/2015		
Bilog Antenna	SCHWAZBECK	VULB9168	378	01/02/2014	01/01/2015		
Horn antenna	ETS.LINDGREN	3117	123995	05/19/2014	05/18/2015		
Pre-Amplifier	Agilent	8447D	2944A07676	01/03/2014	01/02/2015		
Pre-Amplifier	EMC Instruments Corp.	EMC0126530	980038	01/03/2014	01/02/2015		
Radio Communication Analyzer	R & S	CMU200	116097	03/11/2014	03/10/2015		
Turn Table	HD	DT420	N/A	N.C.R	N.C.R		
Antenna Tower	HD	MA240-N	240/657	N.C.R	N.C.R		
Controller	HD	HD100	N/A	N.C.R	N.C.R		
Low Loss Cable	Huber Suhner	966_RX	9	01/03/2014	01/02/2015		
3m Site NSA	SGS	966 chamber	N/A	07/15/2014	07/14/2015		
EMI Test Receiver	R&S	ESCI7	100759	02/08/2013	02/07/2014		
Spectrum Analyzer	Agilent	E4446A	MY51100003	05/19/2014	05/18/2015		
EXA Spectrum Analyzer	Agilent	N9010A	MY50420195	01/20/2014	01/19/2015		

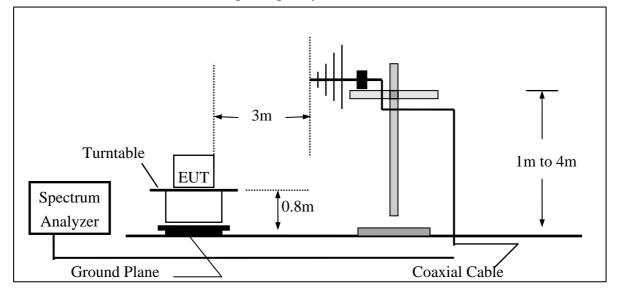
NOTE: N.C.R refers to Not Calibrated Required.



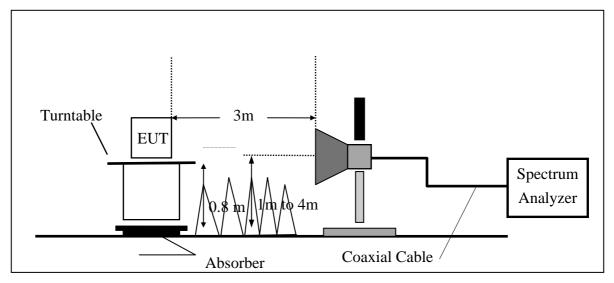
10.3. Test SET-UP:

10.3.1. Radiated emission:

(A) Radiated Emission Test Set-Up, Frequency Below 1000MHz



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



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10.4. Measurement Procedure:

Radiated Emission:

- 1. The EUT was placed on a turn table which is 0.8m above ground plane.
- 2. The turn table shall rotate 360 degrees to determine the position of maximum emission level.
- 3. EUT is set 3m away from the receiving antenna which varied from 1m to 4m to find out the highest emissions.
- 4. 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.
- 5. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
- 6. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
- 7. Repeat above procedures until all frequency of the interest measured were complete.

Auxiliary Procedure (Setting on Spectrum to capture the reading of emission level):

Span = wide enough to fully capture the emission being measured 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

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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	

Remark:

- 1. The limit of the emission level is expressed in dBuV/m, which converts 20*log(uV/m)
- 2. Factor(dB) = Antenna Factor(dB μ V/m) + Cable Loss(dB) Pre Amplifier Gain(dB)

10.6. Measurement Result:

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

Note: For the tabular table as presents below, "F" : denotes Fundamental Frequency. ; "H" : denotes Harmonic Frequency. "E" : denotes Band Edge Frequency. ; "S" : denotes Spurious Frequency.

"---": denotes Noise Floor

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FCC ID: U7I-BP3NF1-2B

10.6.1 Radiated Emission - Band Edge: (Worst: HoppingOperation Band:EDR+HoppingFundamental Frequency:2402 MHzOperation Mode:Band Edge LOWEUT Pol.:E2 Plane		EDR mode) Hopping mode Test Date Temp./Humi. Engineer Measurement Antenna Pol.		:2014-10-13 :20 deg_C / 64 RH :Tin :VERTICAL			
Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Lev	vel	FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
2390.00	Е	Average	30.57	2.48	33.05	54.00	-20.95
2390.00	Е	Peak	42.90	2.48	45.38	74.00	-28.62
Operation Bar Fundamental I Operation Mo EUT Pol.	Frequency	:EDR+Hopp: :2402 MHz :Band Edge I :E2 Plane	LOW	Test Date Temp./Humi. Engineer Measurement An	tenna Pol.	:2014-10- :20 deg_C :Tin :HORIZO	/ 64 RH
Freq.	Note	Detector	Spectrum		Actual FS	Limit @3m	Margin
		Mode	Reading Lev				10
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
2390.00	E	Average	31.09	2.48	33.57	54.00	-20.43
2390.00	Е	Peak	41.98	2.48	44.46	74.00	-29.54

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

 $Factor(dB) = Antenna Factor(dB\mu V/m) + Cable Loss(dB) - Pre_Amplifier Gain(dB)$

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

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

"---": denotes Noise Floor.

The trace on RE(radiation emission) plot is as colored blue, and the detection manner we've employed is peak detector.

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Operation Bar Fundamental I Operation Mo EUT Pol.	Frequency	:EDR+Hopp :2480 MHz :Band Edge I :E2 Plane	C	Test Date Temp./Humi. Engineer Measurement An	itenna Pol.	:2014-10-1 :20 deg_C :Tin :VERTICA	/ 64 RH
Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Lev	vel	FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
2483.50	Е	Average	30.89	2.84	33.73	54.00	-20.27
2483.50	Е	Peak	58.59	2.84	61.43	74.00	-12.57
Operation Bar Fundamental I Operation Mo EUT Pol.	Frequency	:EDR+Hopp :2480 MHz :Band Edge I :E2 Plane	C	Test Date Temp./Humi. Engineer Measurement An	tenna Pol.	:2014-10- :20 deg_C :Tin :HORIZO	/ 64 RH
Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Lev	vel	FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
2483.50	Е	Average	30.87	2.84	33.71	54.00	-20.29
2483.50	Е	Peak	60.73	2.84	63.57	74.00	-10.43

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.

"---": denotes Noise Floor.

The trace on RE(radiation emission) plot is as colored blue, and the detection manner we've employed is peak detector.



Band Edge: (Worst: EDR mode) Non-Hopping mode

Operation Ban Fundamental F Operation Mod EUT Pol.	d Frequency	:EDR :2402 MHz :Band Edge I :E2 Plane	Te LOW Er	est Date emp./Humi. ngineer easurement An	tenna Pol.	:2014-10-13 :20 deg_C / 64 RH :Tin :VERTICAL	
Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
2386.10	S	Average	32.62	2.46	35.08	54.00	-18.92
2386.10	S	Peak	45.59	2.46	48.05	74.00	-25.95
2390.00	E	Average	30.43	2.48	32.91	54.00	-21.09
2390.00	Е	Peak	42.48	2.48	44.96	74.00	-29.04
Operation Ban Fundamental F Operation Mod EUT Pol.	Frequency	:EDR :2402 MHz :Band Edge I :E2 Plane	Te LOW Er	est Date emp./Humi. ngineer easurement An	tenna Pol.	:2014-10-1 :20 deg_C :Tin :HORIZO	/ 64 RH
Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
Freq.	Note	Detector Mode	Spectrum Reading Level		Actual FS	Limit @3m	Margin
Freq. MHz	Note F/H/E/S		±				Margin dB
		Mode	Reading Level		FS	@3m	C
MHz	F/H/E/S	Mode PK/QP/AV	Reading Level dBµV	dB	FS dBµV/m	@3m dBµV/m	dB
MHz 2385.50	F/H/E/S S	Mode PK/QP/AV Average	Reading Level dBµV 33.83	dB 2.46	FS dBµV/m 36.29	@3m <u>dBµV/m</u> 54.00	dB -17.71

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

 $Factor(dB) = Antenna Factor(dB\mu V/m) + Cable Loss(dB) - Pre_Amplifier Gain(dB)$

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

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

"---": denotes Noise Floor.

The trace on RE(radiation emission) plot is as colored blue, and the detection manner we've employed is peak detector.



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Operation Ban Fundamental I Operation Mod EUT Pol.	Frequency	:EDR :2480 MHz :Band Edge I :E2 Plane	HIGH	Test Date Temp./Humi. Engineer Measurement An	tenna Pol.	:2014-10-1 :20 deg_C :Tin :VERTICA	/ 64 RH
Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Lev	/el	FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	$dB\mu V/m$	dBµV/m	dB
2483.58	Е	Average	35.44	2.84	38.28	54.00	-15.72
2483.58	Е	Peak	59.57	2.84	62.41	74.00	-11.59
Operation Ban Fundamental I Operation Mod EUT Pol.	Frequency	:EDR :2480 MHz :Band Edge I :E2 Plane	HIGH	Test Date Temp./Humi. Engineer Measurement An	tenna Pol.	:2014-10-1 :20 deg_C :Tin :HORIZO	/ 64 RH
Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Lev	/el	FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	$dB\mu V/m$	dBµV/m	dB
2483.50	Е	Average	35.89	2.84	38.73	54.00	-15.27
2483.50	Е	Peak	61.52	2.84	64.36	74.00	-9.64

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.

"---": denotes Noise Floor.

The trace on RE(radiation emission) plot is as colored blue, and the detection manner we've employed is peak detector.



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10.6.2 Radiated Spurious Emission Measurement Result (worst case EDR mode)

Operation Band	:EDR	Test Date	:2014-10-13
Fundamental Frequency	:2402 MHz	Temp./Humi.	:20 deg_C / 64 RH
Operation Mode	:TX LOW	Engineer	:Tin
EUT Pol.	:E2 Plane	Measurement Antenna Pol.	:VERTICAL

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.

"---": denotes Noise Floor.

Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
30.97	Н	Peak	48.80	-13.89	34.91	40.00	-5.09
227.88	Н	Peak	39.26	-14.07	25.19	46.00	-20.81
390.84	Н	Peak	37.80	-9.28	28.52	46.00	-17.48
487.84	Н	Peak	31.17	-7.58	23.59	46.00	-22.41
666.32	Н	Peak	32.98	-4.18	28.80	46.00	-17.20
858.38	Н	Peak	29.08	-1.47	27.61	46.00	-18.39
4804.00	Н	Average	33.88	6.75	40.63	54.00	-13.37
4804.00	Н	Peak	43.04	6.75	49.79	74.00	-24.21
7206.00	Н						
9608.00	Н						
12010.00	Н						
14412.00	Н						
16814.00	Н						
19216.00	Н						
21618.00	Н						
24020.00	Н						



Η

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Operation Band	:EDR	Test Date	:2014-10-13
Fundamental Frequency	:2402 MHz	Temp./Humi.	:20 deg_C / 64 RH
Operation Mode	:TX LOW	Engineer	:Tin
EUT Pol.	:E2 Plane	Measurement Antenna Pol.	:HORIZONTAL

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

 $Factor(dB) = Antenna Factor(dB\mu V/m) + Cable Loss(dB) - Pre_Amplifier Gain(dB)$

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

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

"---": denotes Noise Floor.

Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
84.32	Н	Peak	46.02	-17.95	28.07	40.00	-11.93
191.99	Н	Peak	46.01	-14.90	31.11	43.50	-12.39
324.88	Н	Peak	40.23	-10.82	29.41	46.00	-16.59
485.90	Н	Peak	30.26	-7.59	22.67	46.00	-23.33
760.41	Н	Peak	27.58	-2.52	25.06	46.00	-20.94
988.36	Н	Peak	26.87	0.32	27.19	54.00	-26.81
4804.00	Н	Average	32.50	6.75	39.25	54.00	-14.75
4804.00	Н	Peak	43.53	6.75	50.28	74.00	-23.72
7206.00	Н						
9608.00	Н						
12010.00	Н						
14412.00	Н						
16814.00	Н						
19216.00	Н						
21618.00	Н						



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Operation Band	:EDR	Test Date	:2014-10-13
Fundamental Frequency	:2441 MHz	Temp./Humi.	:20 deg_C / 64 RH
Operation Mode	:TX MID	Engineer	:Tin
EUT Pol.	:E2 Plane	Measurement Antenna Pol.	:VERTICAL

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

 $Factor(dB) = Antenna Factor(dB\mu V/m) + Cable Loss(dB) - Pre_Amplifier Gain(dB)$

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

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

"---": denotes Noise Floor.

Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
30.97	Н	Peak	49.19	-13.89	35.30	40.00	-4.70
159.01	Н	Peak	37.11	-12.37	24.74	43.50	-18.76
325.85	Н	Peak	39.16	-10.81	28.35	46.00	-17.65
552.83	Н	Peak	30.46	-7.00	23.46	46.00	-22.54
663.41	Н	Peak	33.54	-4.26	29.28	46.00	-16.72
946.65	Н	Peak	27.86	0.23	28.09	46.00	-17.91
4882.00	Н	Average	29.77	6.93	36.70	54.00	-17.30
4882.00	Н	Peak	41.39	6.93	48.32	74.00	-25.68
7323.00	Н						
9764.00	Н						
12205.00	Н						
14646.00	Н						
17087.00	Н						
19528.00	Н						
21969.00	Н						
24410.00	Н						



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Operation Band :EDR	Test Date	:2014-10-13
Fundamental Frequency :2441 M	Iz Temp./Humi.	:20 deg_C / 64 RH
Operation Mode :TX MII	Engineer	:Tin
EUT Pol. :E2 Plan	Measurement Antenna Pol.	:HORIZONTAL

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

 $Factor(dB) = Antenna Factor(dB\mu V/m) + Cable Loss(dB) - Pre_Amplifier Gain(dB)$

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

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

"---": denotes Noise Floor.

Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
30.97	Н	Peak	41.05	-13.89	27.16	40.00	-12.84
191.99	Н	Peak	46.06	-14.90	31.16	43.50	-12.34
324.88	Н	Peak	41.07	-10.82	30.25	46.00	-15.75
541.19	Н	Peak	29.57	-7.42	22.15	46.00	-23.85
750.71	Н	Peak	28.42	-2.48	25.94	46.00	-20.06
955.38	Н	Peak	27.31	0.32	27.63	46.00	-18.37
4882.00	Н	Average	29.30	6.93	36.23	54.00	-17.77
4882.00	Н	Peak	40.52	6.93	47.45	74.00	-26.55
7323.00	Н						
9764.00	Н						
12205.00	Н						
14646.00	Н						
17087.00	Н						
19528.00	Н						
21969.00	Н						



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Operation Band	:EDR	Test Date	:2014-10-13
Fundamental Frequency	:2480 MHz	Temp./Humi.	:20 deg_C / 64 RH
Operation Mode	:TX HIGH	Engineer	:Tin
EUT Pol.	:E2 Plane	Measurement Antenna Pol.	:VERTICAL

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

 $Factor(dB) = Antenna Factor(dB\mu V/m) + Cable Loss(dB) - Pre_Amplifier Gain(dB)$

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

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

"---": denotes Noise Floor.

Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
30.97	Н	Peak	49.68	-13.89	35.79	40.00	-4.21
227.88	Н	Peak	38.08	-14.07	24.01	46.00	-21.99
324.88	Н	Peak	39.20	-10.82	28.38	46.00	-17.62
486.87	Н	Peak	30.67	-7.58	23.09	46.00	-22.91
663.41	Н	Peak	31.09	-4.26	26.83	46.00	-19.17
989.33	Н	Peak	27.42	0.34	27.76	54.00	-26.24
4960.00	Н	Average	28.33	7.08	35.41	54.00	-18.59
4960.00	Н	Peak	41.41	7.08	48.49	74.00	-25.51
7440.00	Н						
9920.00	Н						
12400.00	Н						
14880.00	Н						
17360.00	Н						
19840.00	Н						
22320.00	Н						



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:EDR	Test Date	:2014-10-13
:2480 MHz	Temp./Humi.	:20 deg_C / 64 RH
:TX HIGH	Engineer	:Tin
:E2 Plane	Measurement Antenna Pol.	:HORIZONTAL
	:2480 MHz :TX HIGH	:2480 MHz Temp./Humi. :TX HIGH Engineer

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

 $Factor(dB) = Antenna Factor(dB\mu V/m) + Cable Loss(dB) - Pre_Amplifier Gain(dB)$

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

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

"---": denotes Noise Floor.

Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
84.32	Н	Peak	45.13	-17.95	27.18	40.00	-12.82
191.99	Н	Peak	46.32	-14.90	31.42	43.50	-12.08
324.88	Н	Peak	40.77	-10.82	29.95	46.00	-16.05
487.84	Н	Peak	30.25	-7.58	22.67	46.00	-23.33
748.77	Н	Peak	27.48	-2.54	24.94	46.00	-21.06
962.17	Н	Peak	27.42	0.35	27.77	54.00	-26.23
4960.00	Н	Average	26.72	7.08	33.80	54.00	-20.20
4960.00	Н	Peak	37.47	7.08	44.55	74.00	-29.45
7440.00	Н						
9920.00	Н						
12400.00	Н						
14880.00	Н						
17360.00	Н						
19840.00	Н						
22320.00	Н						



11. FREQUENCY SEPARATION

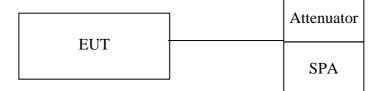
11.1. Standard Applicable

According to §15.247(a)(1), 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	EQUIPMENT MFR MODEL SERIAL				CAL DUE.	
ТҮРЕ		NUMBER	NUMBER	CAL.		
Power Meter	Anritsu	ML2495A	1005007	01/13/2014	01/12/2015	
Power Sensor	Anritsu	MA2411B	917032	01/13/2014	01/12/2015	
Spectrum Analyzer	Agilent	E4446A	MY51100003	05/19/2014	05/18/2015	
Spectrum Analyzer	Agilent	E4440A	MY45304525	03/08/2014	03/07/2015	
DC Block	Mini-Circuits	BLK-18-S+	1	02/27/2014	02/26/2015	
Low Loss Cable	HUBER+SUHNER	SUCOFLEX 104PEA	N/A	01/03/2014	01/02/2015	
Attenuator	Mini-Circuit	BW-S10W2+	002	02/27/2014	02/26/2015	
Splitter	Agilent	11636B	N/A	02/27/2014	02/26/2015	

11.3. Test Set-up:



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FCC ID: U7I-BP3NF1-2B

11.4. Measurement Procedure:

- 1. Place the EUT on the table and set it in transmitting mode.
- 2. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.
- 3. Set center frequency of spectrum analyzer = middle of hopping channel.
- 4. Set the spectrum analyzer as RBW, VBW=100 kHz, Adjust Span to 5MHz, Sweep = auto.
- 5. Max hold. Mark 3 Peaks of hopping channel and record the 3 peaks frequency.

11.5. Measurement Result:

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

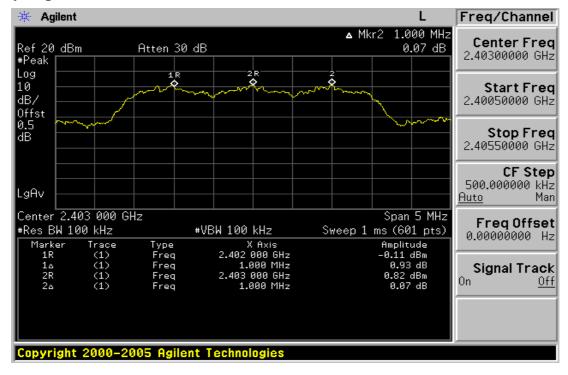
Note: Refer to next page for plots.

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Frequency Separation Test Data



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12. NUMBER OF HOPPING FREQUENCY

12.1. Standard Applicable

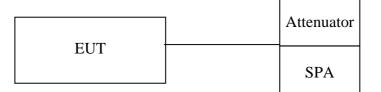
According to §15.247(a)(1)(iii), Frequency hopping systems operating in the 2400MHz-2483.5 MHz bands shall use at least 15 hopping frequencies.

12.2. Measurement Equipment Used:

Conducted Emission Test Site					
EQUIPMENT	MFR	MODEL	SERIAL	LAST	CAL DUE.
ТҮРЕ		NUMBER	NUMBER	CAL.	
Power Meter	Anritsu	ML2495A	1005007	01/13/2014	01/12/2015
Power Sensor	Anritsu	MA2411B	917032	01/13/2014	01/12/2015
Spectrum Analyzer	Agilent	E4446A	MY51100003	05/19/2014	05/18/2015
Spectrum Analyzer	Agilent	E4440A	MY45304525	03/08/2014	03/07/2015
DC Block	Mini-Circuits	BLK-18-S+	1	02/27/2014	02/26/2015
Low Loss Cable	HUBER+SUHNER	SUCOFLEX 104PEA	N/A	01/03/2014	01/02/2015
Attenuator	Mini-Circuit	BW-S10W2+	002	02/27/2014	02/26/2015
Splitter	Agilent	11636B	N/A	02/27/2014	02/26/2015



12.3. Test Set-up:



12.4. Measurement Procedure:

- 1. Place the EUT on the table and set it in transmitting mode.
- 2. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.
- 3. Set spectrum analyzer Start=2400MHz, Stop = 2483.5MHz, Sweep = auto.
- 4. Set the spectrum analyzer as RBW=430 kHz, VBW=1.5MHz., Detector = Peak
- 5. Max hold, view and count how many channel in the band.

12.5. Measurement Result:

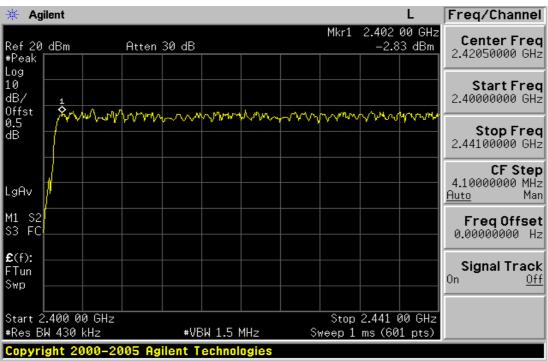
Note: Refer to next page for plots.

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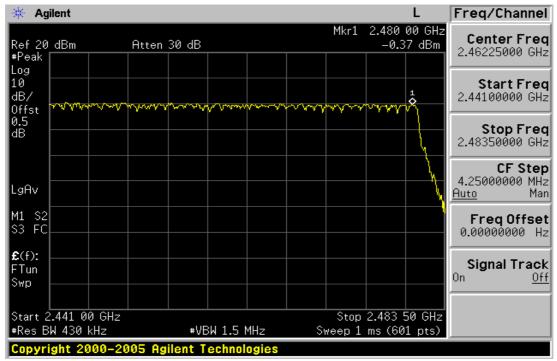


Channel Number



2.4 GHz - 2.441GHz

2.441 GHz – 2.4835GHz



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13. TIME OF OCCUPANCY (DWELL TIME)

13.1. Standard Applicable

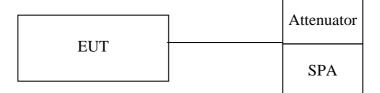
According to §15.247(a)(1)(iii), Frequency hopping systems operating in the 2400MHz-2483.5 MHz. The average time of occupancy on any frequency shall not greater than 0.4 s within period of 0.4 seconds multiplied by the number of hopping channel employed.

Limit: 0.4s = 400ms

13.2. Measurement Equipment Used:

Conducted Emission Test Site					
EQUIPMENT	MFR	MODEL	SERIAL	LAST	CAL DUE.
ТҮРЕ		NUMBER	NUMBER	CAL.	
Power Meter	Anritsu	ML2495A	1005007	01/13/2014	01/12/2015
Power Sensor	Anritsu	MA2411B	917032	01/13/2014	01/12/2015
Spectrum Analyzer	Agilent	E4446A	MY51100003	05/19/2014	05/18/2015
Spectrum Analyzer	Agilent	E4440A	MY45304525	03/08/2014	03/07/2015
DC Block	Mini-Circuits	BLK-18-S+	1	02/27/2014	02/26/2015
Low Loss Cable	HUBER+SUHNER	SUCOFLEX 104PEA	N/A	01/03/2014	01/02/2015
Attenuator	Mini-Circuit	BW-S10W2+	002	02/27/2014	02/26/2015
Splitter	Agilent	11636B	N/A	02/27/2014	02/26/2015

13.3. Test Set-up:



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FCC ID: U7I-BP3NF1-2B

13.4. Measurement Procedure:

- 1. Place the EUT on the table and set it in transmitting mode.
- 2. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.
- 3. Set center frequency of spectrum analyzer = operating frequency.
- 4. Set the spectrum analyzer as RBW, VBW=1MHz, 3MHz, Span = 0Hz , Detector = Peak, Adjust Sweep = $2 \sim 7$ ms.
- 5. 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

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:

1Mbps (GFSK):

Test Channel:	Mode:	Measurement Result (ms):	Limit (ms):
Low:	DH1	125.76	400ms
	DH3	266.72	400ms
	DH5	307.52	400ms
Middle:	DH1	125.76	400ms
	DH3	266.72	400ms
	DH5	307.52	400ms
High:	DH1	125.76	400ms
	DH3	266.72	400ms
	DH5	307.52	400ms

2Mbps (/4 DQPSK):

Test Channel:	Mode:	Measurement Result (ms):	Limit (ms):
Middle:	2DH1	125.76	400ms
	2DH3	266.72	400ms
	2DH5	307.52	400ms

3Mbps (8DPSK):

Test Channel:	Mode:	Measurement Result (ms):	Limit (ms):
Middle:	3DH1	125.76	400ms
	3DH3	266.72	400ms
	3DH5	307.52	400ms

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

CH Low	DH1 time slot =	0.393 (ms) * (1600/2/79)	* 31.6 =	125.76 (ms)
	DH3 time slot =	1.667 (ms) * (1600/4/79)	* 31.6 =	266.72 (ms)
	DH5 time slot =	2.883 (ms) * (1600/6/79)	* 31.6 =	307.52 (ms)

CH Mid DH1 time slot =
$$0.393 \text{ (ms)} * (1600/2/79) * 31.6 = 125.76 \text{ (ms)}$$

DH3 time slot = $1.667 \text{ (ms)} * (1600/4/79) * 31.6 = 266.72 \text{ (ms)}$
DH5 time slot = $2.883 \text{ (ms)} * (1600/6/79) * 31.6 = 307.52 \text{ (ms)}$

CH High DH1 time slot =
$$0.393 \text{ (ms)} * (1600/2/79) * 31.6 = 125.76 \text{ (ms)}$$

DH3 time slot = $1.667 \text{ (ms)} * (1600/4/79) * 31.6 = 266.72 \text{ (ms)}$
DH5 time slot = $2.883 \text{ (ms)} * (1600/6/79) * 31.6 = 307.52 \text{ (ms)}$

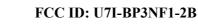
2Mbps:

	CH Mid	2DH1 time slot =	0.393 (ms) * (1600/2/79)	* 31.6 =	125.76 (ms)
		2DH3 time slot =	1.667 (ms) * (1600/4/79)	* 31.6 =	266.72 (ms)
		2DH5 time slot =	2.883 (ms) * (1600/6/79)	* 31.6 =	307.52 (ms)
3Mbps:					
	CH Mid	3DH1 time slot =	0.393 (ms) * (1600/2/79)	* 31.6 =	125.76 (ms)
		3DH3 time slot =	1.667 (ms) * (1600/4/79)	* 31.6 =	266.72 (ms)
		3DH5 time slot =	2.883 (ms) * (1600/6/79)	* 31.6 =	307.52 (ms)

13.6. Measurement Result:

Note: Refer to next page for plots.

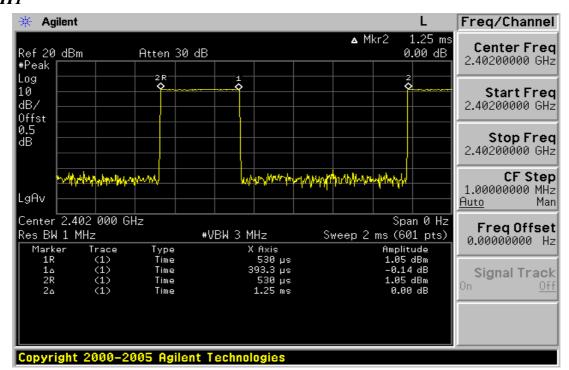
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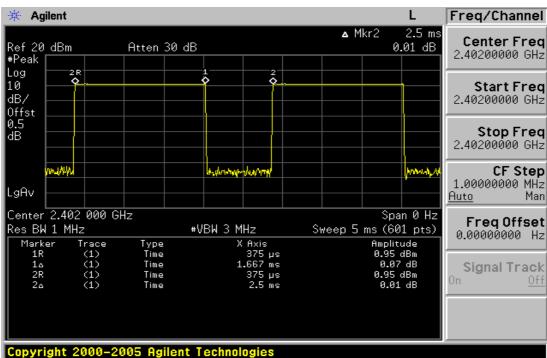


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CH-Low DH1



DH3



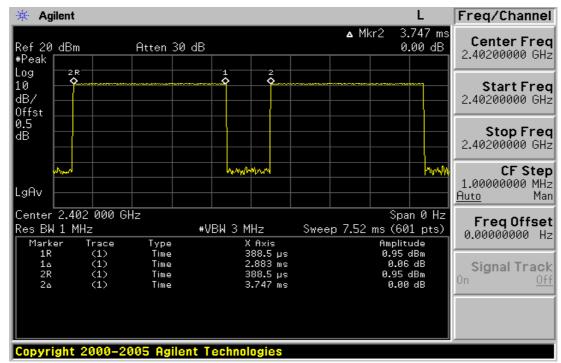
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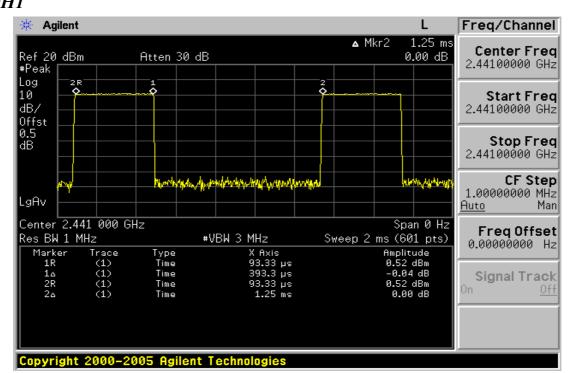
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DH5



CH-Mid DH1



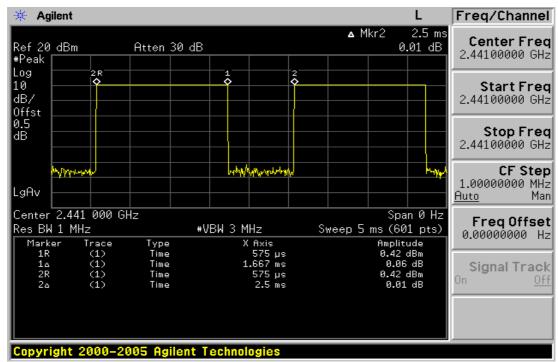
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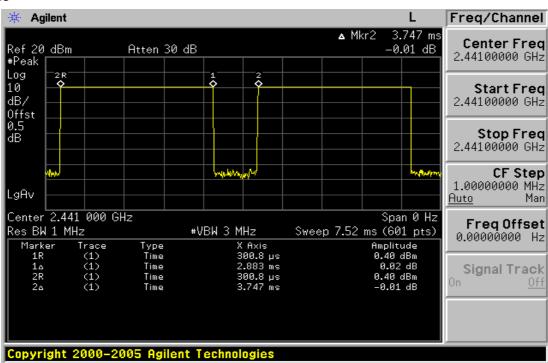
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DH3



DH5



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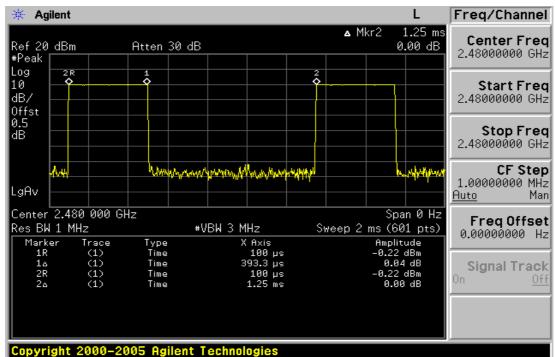
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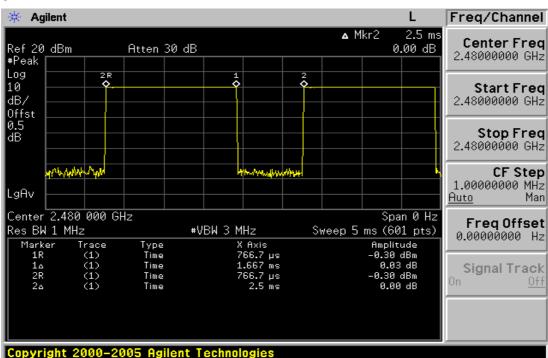


CH-High





DH3



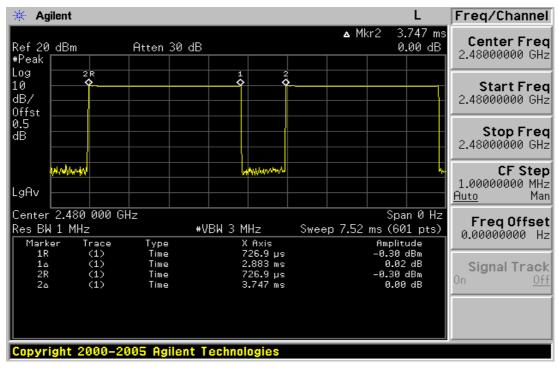
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DH5

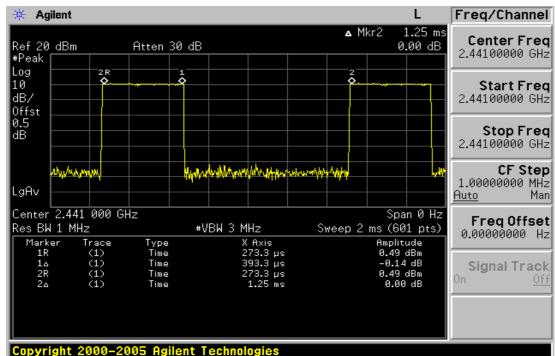


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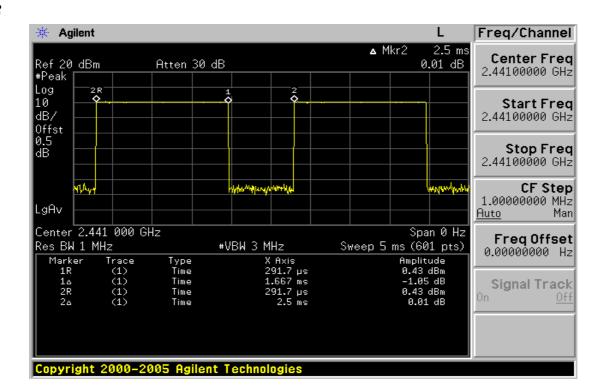
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CH-Mid 2DH1



2DH3



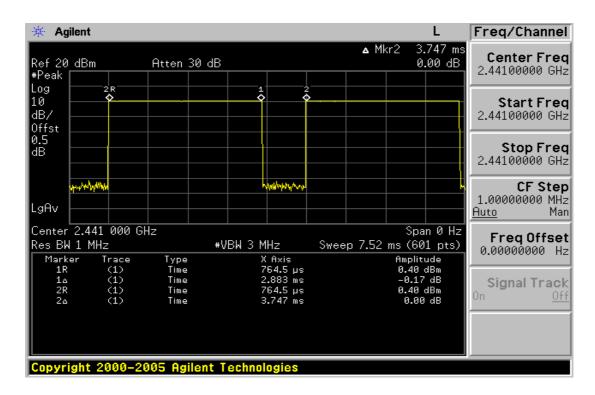
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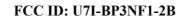


2DH5



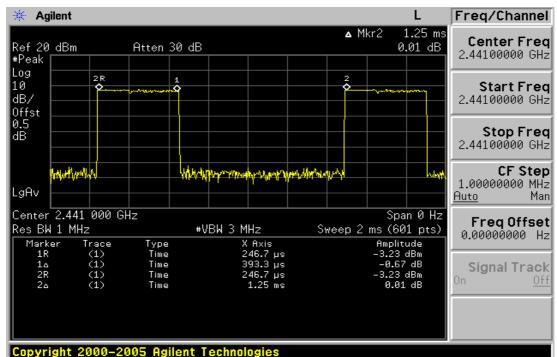
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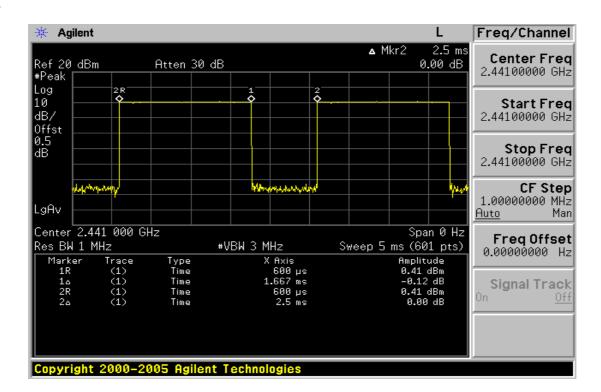




CH-Mid 3DH1



3DH3



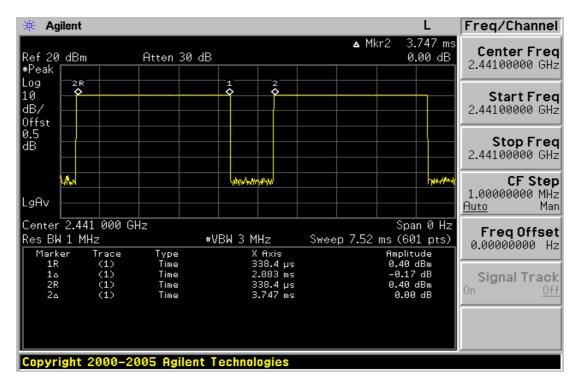
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3DH5



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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.

14.2. Antenna Connected Construction

The directional gains of antenna used for transmitting is 0dBi, and the antenna connector is designed with unique type RF connector and no consideration of replacement. Please see EUT photo and antenna spec. for details.

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15. Maximum Permissible Exposure (MPE) Evaluation

15.1. Standard Applicable

According to §1.1307(b)(1), systems operating under the provisions of this section shall be operated in a manner that ensure that the public is not exposed to radio frequency energy level in excess of the Commission's guideline.

This is a mobile device, the MPE is required.

According to §1.1310 and §2.1093 RF exposure is calculated.

Limits for Maximum Permissive Exposure (MPE)

Frequency Range	Electric Field	Magnetic Field	Power Density	Averaging Time
(MHz)	Strength (V/m)	Strength (A/m)	(mW/cm^2)	(minute)
	Limits for General Population/Uncontrolled Exposure			
0.3-1.34	614	1.63	*(100)	30
1.34-30	824/f	2.19/f	*(180/f ²)	30
30-300	27.5	0.073	0.2	30
300-1500	/	/	F/1500	30
1500-100.000	/	/	1.0	30

F = frequency in MHz

= Plane-wave equipment power density



	1	
Frequency (MHz)	Peak Power Output (dBm)	Required Limit
2402	1.24	1 Watt = 30 dBm
2441	0.64	1 Watt = 30 dBm
2480	-0.05	1 Watt = 30 dBm

15.2. Maximum Permissible Exposure (MPE) Evaluation

MPE Prediction

Prediction of MPE limit at a given distance

Equation from page 18 of OET Bulletin 65, Edition 97-01

S=PG/4 R^2

Where: S = Power density

P = Power input to antenna

- G = Power gain of the antenna in the direction of interest relative to an isotropic radiator
- R = Distance to the center of radiation of the antenna

Maximum peak output power at antenna input terminal:	1.24	(dBm)
Maximum peak output power at antenna input terminal:	1.330454418	(mW)
Duty cycle:	99	(%)
Maximum Pav :	1.317149874	(mW)
Antenna gain (typical):	0	(dBi)
Maximum antenna gain:	1	(numeric)
Prediction distance:	20	(cm)
Prediction frequency:	2402	(MHz)
MPE limit for uncontrolled exposure at prediction	1	(mW/cm2)
Power density at predication frequency at 20 (cm)	0.000262	(mW/cm^2)

Measurement Result

The predicted power density level at 20 cm is 0.000262mW/cm². This is below the uncontrolled exposure limit of 1mW/cm^2 at 2402MHz.

~ End of Report ~

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