

Report No.: EH/2011/60024 Issue Date: Jul. 05, 2011

Page: 1 of 58

# ELECTROMAGNETIC EMISSIONS COMPLIANCE REPORT

# INTENTIONAL RADIATOR CERTIFICATION TO FCC PART 15 SUBPART C REQUIREMENT

OF

**Product Name:** CDMA FJ001

**Brand Name:** N/A

**Model Name:** FJ001

**Model Difference:** N/A

FCC ID: YUW-FJ001

**Report No.:** EH/2011/60024

**Issue Date:** Jul. 05, 2011

**FCC Rule Part:** §15.247, Cat: DSS

Prepared for: **Fujitsu Toshiba Mobile Communications** 

Limited

1-1, Kamiodanaka 4-chome, Nakahara-ku, Ka-

wasaki

SGS Taiwan Ltd. Prepared by:

**Electronics & Communication Laboratory** 

No. 134, Wu Kung Rd., Wuku Industrial Zone,

Taipei County, Taiwan





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Report No.: EH/2011/60024 Issue Date: Jul. 05, 2011

Page: 2 of 58

# VERIFICATION OF COMPLIANCE

**Applicant:** Fujitsu Toshiba Mobile Communications Limited

1-1, Kamiodanaka 4-chome, Nakahara-ku, Kawasaki

CDMA FJ001 **Product Name:** 

**Brand Name:** N/A Model No.: FJ001 **Model Difference:** N/A

FCC ID: YUW-FJ001

EH/2011/60024 File Number:

Date of test: Jun. 21, 2011 ~ Jul. 05, 2011

**Date of EUT Received:** Jun. 21, 2011

# We hereby certify that:

The above equipment was tested by SGS Taiwan Ltd. The test data, data evaluation, test procedures, and equipment configurations shown in this report were made in accordance with the procedures given in ANSI C63.4:2003 and 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:	Lion Wang	Date:	Jul. 05, 2011	
Prepared By:	Lion Wang / Engineer  Cherry Cherry	Date:	Jul. 05, 2011	
Approved By:	Cherry Chen / Clerk  Jim Chang / Supervisor	Date:	Jul. 05, 2011	

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Report No.: EH/2011/60024 Issue Date: Jul. 05, 2011

Page: 3 of 58

### Version

Version No.	Date	Description
00	Jul. 05, 2011	Initial creation of document

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Report No.: EH/2011/60024 Issue Date: Jul. 05, 2011

Page: 4 of 58

### **Table of Contents**

1.	GEN	ERAL INFORMATION	6
	1.1.	Related Submittal(s) / Grant (s)	7
	1.2.	Test Methodology	7
	1.3.	Test Facility	7
	1.4.	Special Accessories	7
	1.5.	Equipment Modifications	7
2.	SYST	TEM TEST CONFIGURATION	8
	2.1.	EUT Configuration	8
	2.2.	EUT Exercise	8
	2.3.	Test Procedure	8
	2.4.	Configuration of Tested System	9
3.	SUM	MARY OF TEST RESULTS	10
4.	DES	CRIPTION OF TEST MODES	10
5.	CON	DUCTED EMISSION TEST	11
	5.1.	Standard Applicable	11
	5.2.	EUT Setup.	11
	5.3.	Measurement Procedure	11
	5.4.	Measurement Equipment Used:	12
	5.5.	Measurement Result	12
6.	PEA	K OUTPUT POWER MEASUREMENT	15
	6.1.	Standard Applicable	15
	6.2.	Measurement Equipment Used	15
	6.3.	Test Set-up:	15
	6.4.	Measurement Procedure:	16
	6.5.	Measurement Result	16
7.	20dB	BAND WIDTH	20
	7.1.	Standard Applicable	20
	7.2.	Measurement Equipment Used	20
	7.3.	Test Set-up	20
	7.4.	Measurement Procedure:	20
	7.5.	Measurement Result:	21
8.	100K	Hz BANDWIDTH OF BAND EDGES MEASUREMENT	26
	8.1.	Standard Applicable	
	8 2	Measurement Equipment Used	26

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Report No.: EH/2011/60024 Issue Date: Jul. 05, 2011

Page: 5 of 58

	8.3.	Test SET-UP:	27
	8.4.	Measurement Procedure	28
	8.5.	Field Strength Calculation	28
	8.6.	Measurement Result.	28
9.	SPUR	RIOUS RADIATED EMISSION TEST	33
	9.1.	Standard Applicable	33
	9.2.	Measurement Equipment Used:	33
	9.3.	Test SET-UP:	33
	9.4.	Measurement Procedure:	33
	9.5.	Field Strength Calculation	34
	9.6.	Measurement Result:	34
10.	FRE(	QUENCY SEPARATION	47
	10.1.	_	
	10.2.	Measurement Equipment Used:	47
	10.3.	Test Set-up:	47
	10.4.	Measurement Procedure:	47
	10.5.	Measurement Result:	47
11.	NUM	BER OF HOPPING FREQUENCY	49
	11.1.	Standard Applicable	
	11.2.	Measurement Equipment Used:	49
	11.3.	Test Set-up:	49
	11.4.	Measurement Procedure:	49
	11.5.	Measurement Result:	49
12.	TIME	E OF OCCUPANCY (DWELL TIME)	51
	12.1.	•	
	12.2.	Measurement Equipment Used:	51
	12.3.	Test Set-up:	51
	12.4.	Measurement Procedure:	51
	12.5.	Measurement Result	52
13.	ANTI	ENNA REQUIREMENT	58
•	13.1.	Standard Applicable	
	13.2.	Antenna Connected Construction	58

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

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Report No.: EH/2011/60024 Issue Date: Jul. 05, 2011

Page: 6 of 58

### **GENERAL INFORMATION**

#### General:

General.			
Product Name	CDMA FJ	J001	
Brand Name	N/A		
Model Name	FJ001		
Model Difference	N/A		
Hardware Version:	Ver.2.0.0		
Software Version:	V68.21.01		
	3.7 Vdc re	e-chargeable battery or 5Vdc by AC/DC power adapter	
Power Supply	Battery: Model No.: FJ001UAA, Supplier: SANYO Electric		
	Adapter: Model No.: 0203PQA, Supplier: MITSUMI		

#### Bluetooth:

Bluetooth Version:	$V2.1 + EDR (GFSK + \pi/4DQPSK + 8DPSK)$		
Channel number:	79 channels		
Modulation type:	Frequency Hopping Spread Spectrum		
Transmit Power:	6.19dBm		
Frequency Range:	2.402GHz – 2.480GHz		
Dwell Time:	<= 0.4s		
Operating Mode:	Point-to-Point		
Antenna Designation:	Monopole antenna 2.3dBi(MAX)		

The EUT is compliance with Bluetooth 2.1 + EDR

The test report compliance for Bluetooth.

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Report No.: EH/2011/60024 Issue Date: Jul. 05, 2011

Page: 7 of 58

#### 1.1. Related Submittal(s) / Grant (s)

This submittal(s) (test report) is intended for FCC ID: YUW-FJ001 filing to comply with Section 15.247 of the FCC Part 15, Subpart C Rules. The composite system (digital device) is compliance with Subpart B is authorized under a Doc procedure.

### 1.2. Test Methodology

Both conducted and radiated testing were performed according to the procedures in ANSI C63.4: 2003. Radiated testing was performed at an antenna to EUT distance 3 meters.

Tested in accordance with FCC Public Notice DA 00-705

### 1.3. 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 Rd., Wuku Industrial Zone, Taipei Country, Taiwan which are constructed and calibrated to meet the FCC requirements in documents ANSI C63.4: 2003. FCC Registration Number are: 990257 and 236194, Canada Registration Number: 4620A-4

The 10 m Open Area Test Sites located on the address of SGS Taiwan Ltd. Electronics & Communication Laboratory No. 29, Pau-Tou-Tsuo Valley Chia-Pau Tsuen, Linkou Hsiang, Taipei county, which is constructed and calibrated to meet the CISPR 22/EN 55022 requirements. SGS Site No. 1(3 &10 meters) and FCC Registration Number: 94644.

### 1.4. Special Accessories

Not available for this EUT intended for grant.

#### 1.5. Equipment Modifications

Not available for this EUT intended for grant.

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Report No.: EH/2011/60024 Issue Date: Jul. 05, 2011

Page: 8 of 58

#### 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

The EUT (Transmitter) was operated in the engineering mode to fix the Tx frequency that was for the purpose of the measurements.

#### 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 requirements in Section 7 and 13 of ANSI C63.4: 2003. Conducted emissions from the EUT measured in the frequency range between 0.15 MHz and 30MHz using CISPR Quasi-Peak and Average detector mode.

#### 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 reguirements in Section 8 and 13 and Subclause 8.3.1.2 of ANSI C63.4: 2003.

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Report No.: EH/2011/60024 Issue Date: Jul. 05, 2011

Page: 9 of 58

# 2.4. Configuration of Tested System

Fig. 2-1 AC Power line and Radiated Emission Configuration

**EUT** 

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

Item	Equipment	Mfr/Brand	Model/ Type No.	Series No.	Data Cable	Power Cord
1	N/A					

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Report No.: EH/2011/60024 Issue Date: Jul. 05, 2011

Page: 10 of 58

# 3. SUMMARY OF TEST RESULTS

FCC Rules	<b>Description Of Test</b>	Result
§15.207(a)	Conducted Emission	N/A
§15.247(b)(1)	Peak Output Power	Compliant
§15.247(a)	20dB Bandwidth	No Limit
§15.247I	100 KHz Bandwidth Of	Compliant
	Frequency Band Edges	
§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, §15.247(b)(4)(i)	Antenna Requirement	Compliant

#### 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 lowest 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 H position was reported.

In comparison with BDR and EDR mode, emission carried out by BDR is chosen as the most representative measurement to perform measurement of every test item pursuant to Part 15C.

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Report No.: EH/2011/60024 Issue Date: Jul. 05, 2011

Page: 11 of 58

#### 5. CONDUCTED EMISSION TEST

### 5.1. Standard Applicable

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

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

#### Note

- 1. The lower limit shall apply at the transition frequencies
- 2. The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.50 MHz.

### 5.2. EUT Setup

- 1. The conducted emission tests were performed in the test site, using the setup in accordance with the ANSI C63.4: 2003.
- 2. The EUT was plug-in the AC/DC Power adapter. The host system was placed on the center of the back edge on the test table. The peripherals was placed on the side of the host PC system. The rear of the EUT and peripherals were placed flushed with the rear of the tabletop.
- 3. The spacing between the peripherals was 10 centimeters.
- 4. External I/O cables were draped along the edge of the test table and bundle when necessary.
- 5. The host system was connected with 120Vac/60Hz power source.

#### **5.3.** 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.

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Report No.: EH/2011/60024 Issue Date: Jul. 05, 2011

Page: 12 of 58

### 5.4. Measurement Equipment Used:

Conducted Emission Test Site					
EQUIPMENT	MFR	MODEL	SERIAL	LAST	CAL DUE.
TYPE		NUMBER	NUMBER	CAL.	
EMI Test Receiver	R&S	ESCS30	828985/004	09/16/2010	09/15/2011
LISN	Rolf-Heine	NNB-2/16Z	99012	02/02/2011	02/01/2012
LISN	FCC	FCC-LISN-50/250-25-2-01	04034	02/02/2011	02/01/2012
Coaxial Cables	N/A	WK CE Cable	N/A	11/28/2010	11/27/2011

#### 5.5. Measurement Result

The initial step in collecting conducted data is a spectrum analyzer peak scan of the measurement range. Significant peaks are then marked as shown on the following data page, and these signals are then quasi-peaked.

Test result: Please refer to next pages.

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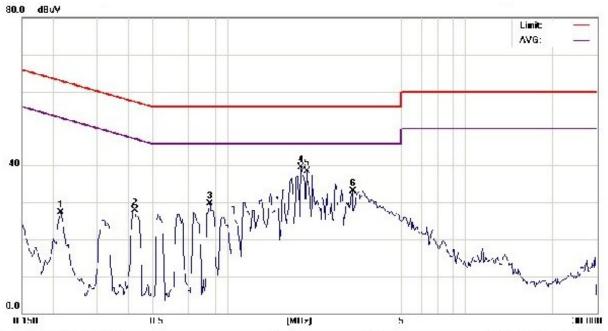


Report No.: EH/2011/60024 Issue Date: Jul. 05, 2011

Page: 13 of 58

# AC POWER LINE CONDUCTED EMISSION TEST DATA

Operation Mode:	Operation			Test Date:	June 30, 2011
Temperature:	24 °C	Humidity:	59 %	Test By:	Lion



Site SGS CONDUCTED #1

Limit: FCC Class B Conduction(QP)

EUT: Mobile Phone

M/N: FJ001 Note: BT

Phase:	ase: <b>L1</b> Temperature:		24 °C
Power:	AC 120V/60Hz	Humidity:	59 %
Distance	a·	Air Pressure:	hpa

No. Mk.	Freq.	Reading Level	Factor	Measure- ment	Limit	Over			
	MHz	dBu∀	dB	dBu∀	dBu∀	dB	Detector	Comment	
1	0.2150	27.23	0.12	27.35	63.01	-35.66	peak		
2	0.4250	27.83	0.12	27.95	57.35	-29.40	peak		
3	0.8500	29.69	0.11	29.80	56.00	-26.20	peak		
4 *	1.9800	39.36	0.15	39.51	56.00	-16.49	peak		
5	2.0800	38.39	0.15	38.54	56.00	-17.46	peak		
6	3.1800	32.97	0.16	33.13	56.00	-22.87	peak		

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t (886-2) 2299-3279

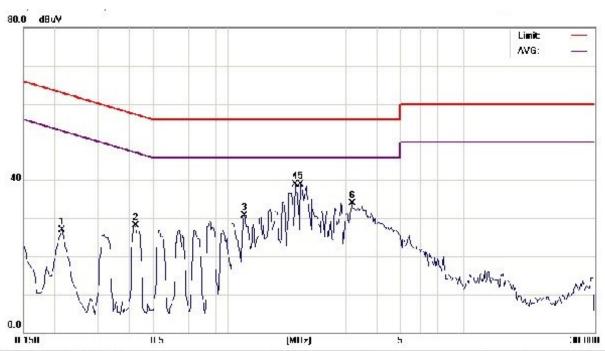
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Page: 14 of 58



Site SGS CONDUCTED #1

Limit: FCC Class B Conduction(QP)

EUT: Mobile Phone

M/N: FJ001 Note: BT

Phase: 24 °C N Temperature: AC 120V/60Hz Humidity: Power: 59 %

Air Pressure: Distance: hpa

Freq.	Reading Level	Factor	Measure- ment	Limit	Over		
MHz	dBu∀	dB	dBu∀	dBu∀	dB	Detector	Comment
0.2150	26.79	0.16	26.95	63.01	-36.06	peak	
0.4250	27.99	0.16	28.15	57.35	-29.20	peak	
1.1700	30.48	0.16	30.64	56.00	-25.36	peak	
1.8700	38.66	0.18	38.84	56.00	-17.16	peak	
1.9800	38.67	0.18	38.85	56.00	-17.15	peak	
3.1800	33.68	0.20	33.88	56.00	-22.12	peak	
	MHz 0.2150 0.4250 1.1700 1.8700 1.9800	Freq. Level MHz dBuV 0.2150 26.79 0.4250 27.99 1.1700 30.48 1.8700 38.66 1.9800 38.67	Freq.         Level         Factor           MHz         dBuV         dB           0.2150         26.79         0.16           0.4250         27.99         0.16           1.1700         30.48         0.16           1.8700         38.66         0.18           1.9800         38.67         0.18	Freq.         Level         Factor         ment           MHz         dBuV         dB         dBuV           0.2150         26.79         0.16         26.95           0.4250         27.99         0.16         28.15           1.1700         30.48         0.16         30.64           1.8700         38.66         0.18         38.84           1.9800         38.67         0.18         38.85	Freq.         Level         Factor         ment         Limit           MHz         dBuV         dB         dBuV         dBuV           0.2150         26.79         0.16         26.95         63.01           0.4250         27.99         0.16         28.15         57.35           1.1700         30.48         0.16         30.64         56.00           1.8700         38.66         0.18         38.84         56.00           1.9800         38.67         0.18         38.85         56.00	Freq.         Level         Factor         ment         Limit         Over           MHz         dBuV         dB         dBuV         dBuV         dB           0.2150         26.79         0.16         26.95         63.01         -36.06           0.4250         27.99         0.16         28.15         57.35         -29.20           1.1700         30.48         0.16         30.64         56.00         -25.36           1.8700         38.66         0.18         38.84         56.00         -17.16           1.9800         38.67         0.18         38.85         56.00         -17.15	Freq.         Level         Factor         ment         Limit         Over           MHz         dBuV         dB         dBuV         dBuV         dB         Detector           0.2150         26.79         0.16         26.95         63.01         -36.06         peak           0.4250         27.99         0.16         28.15         57.35         -29.20         peak           1.1700         30.48         0.16         30.64         56.00         -25.36         peak           1.8700         38.66         0.18         38.84         56.00         -17.16         peak           1.9800         38.67         0.18         38.85         56.00         -17.15         peak

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Report No.: EH/2011/60024 Issue Date: Jul. 05, 2011

Page: 15 of 58

# 6. PEAK OUTPUT POWER MEASUREMENT

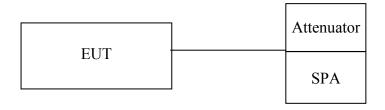
# 6.1. Standard Applicable

For frequency hopping systems operating in the 2400-2483.5 MHz band employing at least 75 hopping channels, and all frequency hopping systems in the 5725-5850MHz band: 1Watt. For all other frequency hopping systems in the 2400-2483.5MHz band: 0.125 Watts.

6.2. Measurement Equipment Used

	Conducted Emission Test Site										
EQUIPMENT	MFR	MODEL	SERIAL	LAST	CAL DUE.						
TYPE		NUMBER	NUMBER	CAL.							
Power Sensor	Anritsu	MA2411B	917032	01/21/2010	01/20/2012						
Power Meter	Anritsu	ML2495A	1005007	02/17/2010	02/16/2012						
Spectrum Analyzer	Agilent	E4446A	MY43360126	04/19/2010	04/18/2012						
Spectrum Analyzer	Agilent	E4440A	MY45304525	01/25/2011	01/24/2012						
DC Block	Agilent	BLK-18	155452	07/05/2011	07/04/2012						
Low Loss Cable	HUBER+SUHNER	SUCOFLEX 104PEA	N/A	01/05/2011	01/04/2012						
Attenuator	Mini-Circuit	BW-S6W5	001	07/05/2011	07/04/2012						
Attenuator	Mini-Circuit	BW-S10W5	001	07/05/2011	07/04/2012						
Attenuator	Mini-Circuit	BW-S20W5	001	07/05/2011	07/04/2012						
Splitter	Agilent	11636B	N/A	07/05/2011	07/04/2012						

### 6.3. Test Set-up:



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Report No.: EH/2011/60024 Issue Date: Jul. 05, 2011

Page: 16 of 58

#### **6.4.** 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 peak function, >20dB bandwidth, >=RBW)
- 3. Record the max. reading.
- 4. Repeat above procedures until all frequency measured were complete.

#### 6.5. Measurement Result

BDR mode:

Frequency (MHz)	Reading Power (dBm)	Cable Loss	Output Power (dBm)	Output Power (W)	Limit (W)
2402.00	5.40	0.00	5.40	0.00347	1
2441.00	6.19	0.00	6.19	0.00416	1
2480.00	5.76	0.00	5.76	0.00377	1

EDR mode:

Frequency (MHz)	Reading Power (dBm)	Cable Loss	Output Power (dBm)	Output Power (W)	Limit (W)
2402.00	4.32	0.00	4.32	0.00270	1
2441.00	4.93	0.00	4.93	0.00311	1
2480.00	4.57	0.00	4.57	0.00286	1

NOTE: offset: 1.5dB

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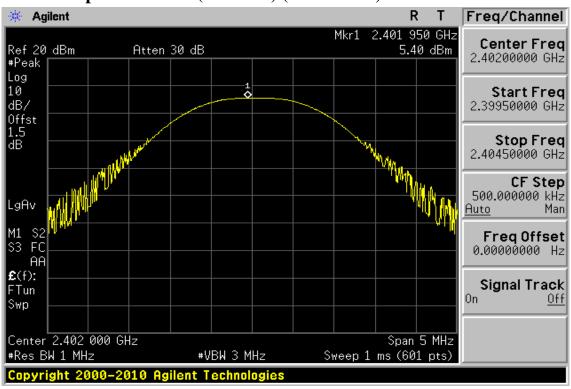
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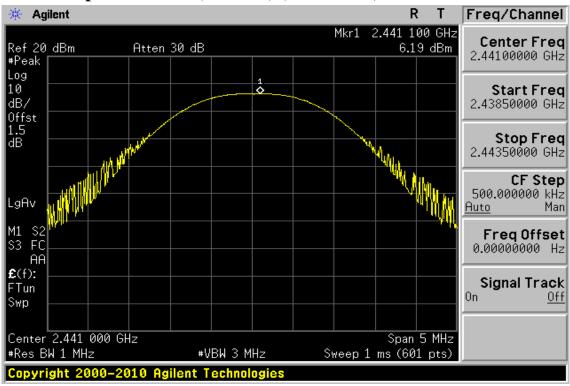
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Page: 17 of 58

# Peak Power Output Data Plot (CH Low) (BDR mode)



# Peak Power Output Data Plot (CH Mid) (BDR mode)



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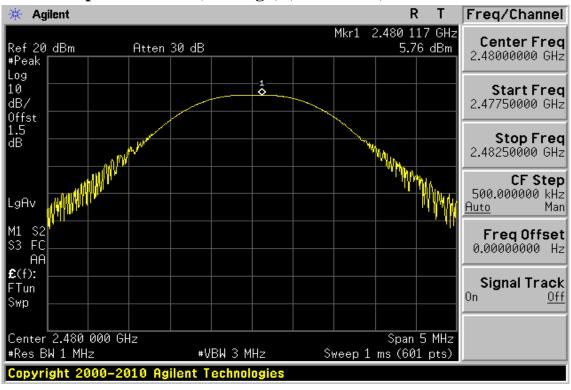
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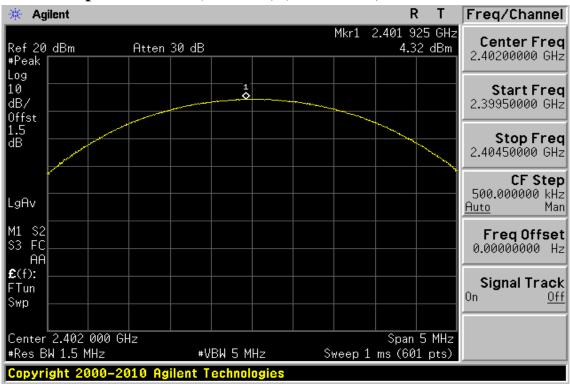
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Page: 18 of 58

# Peak Power Output Data Plot (CH High) (BDR mode)



# Peak Power Output Data Plot (CH Low) (EDR mode)



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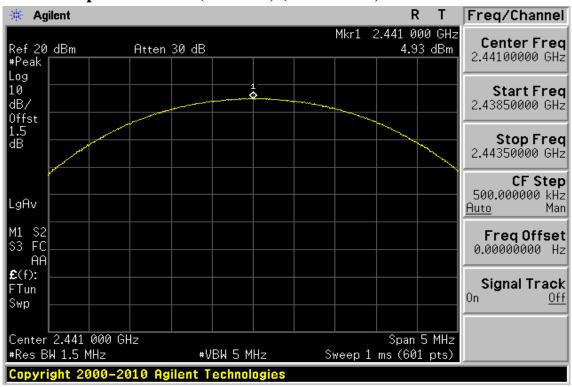
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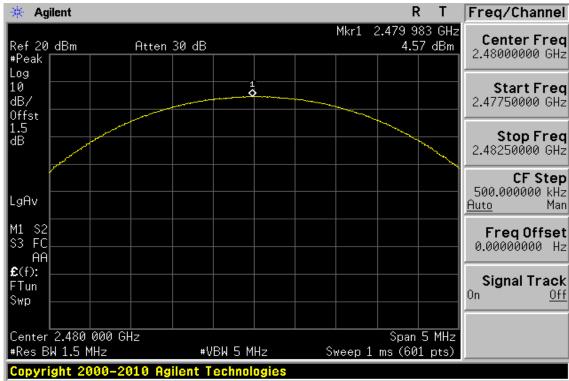
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Page: 19 of 58

# Peak Power Output Data Plot (CH Mid) (EDR mode)



# Peak Power Output Data Plot (CH High) (EDR mode)



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Report No.: EH/2011/60024 Issue Date: Jul. 05, 2011

Page: 20 of 58

#### 7. 20dB BAND WIDTH

#### 7.1. Standard Applicable

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

# 7.2. Measurement Equipment Used

Refer to section 6.2 for details.

#### 7.3. Test Set-up

Refer to section 6.3 for details.

#### 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 spectrum analyzer.
- 3. Set the spectrum analyzer as RBW=10KHz (1 % of Bandwidth.), Span= 3MHz, Sweep=auto
- 4. Mark the peak frequency and –20dB (upper and lower) frequency.
- 5. Repeat above procedures until all frequency measured were complete.

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Report No.: EH/2011/60024 Issue Date: Jul. 05, 2011

Page: 21 of 58

#### 7.5. Measurement Result:

BDR mode:

СН	Bandwidth (KHz)
Lower	951.606
Mid	955.945
Higher	957.539

EDR mode:

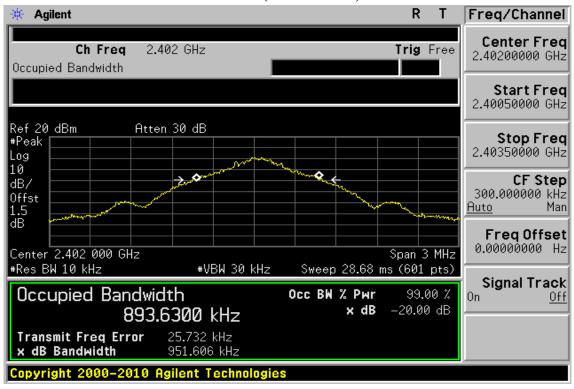
СН	Bandwidth	2/3 Bandwidth
	(MHz)	(MHz)
Lower	1.273	0.849
Mid	1.288	0.859
Higher	1.285	0.857



Report No.: EH/2011/60024 Issue Date: Jul. 05, 2011

Page: 22 of 58

# **20dB Band Width Test Data CH-Low (BDR mode)**



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



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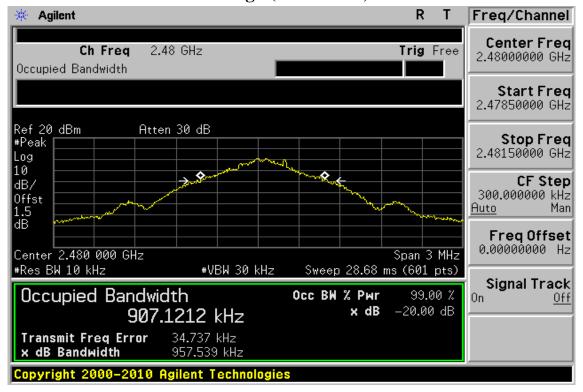
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Report No.: EH/2011/60024 Issue Date: Jul. 05, 2011

Page: 23 of 58

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



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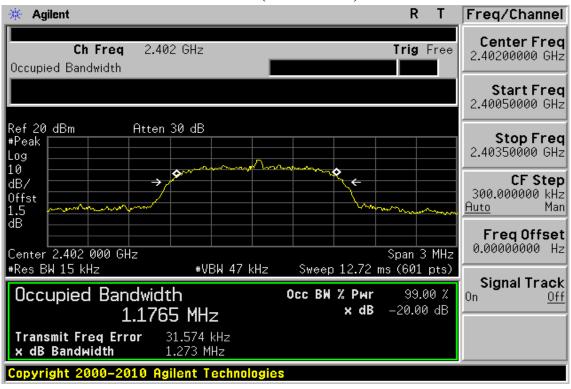
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Report No.: EH/2011/60024 Issue Date: Jul. 05, 2011

Page: 24 of 58

# **20dB Band Width Test Data CH-Low (EDR mode)**



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



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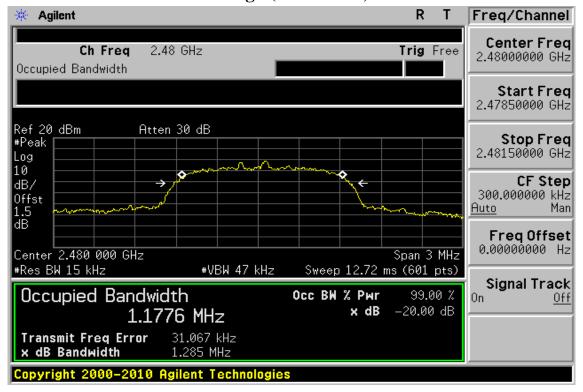
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Report No.: EH/2011/60024 Issue Date: Jul. 05, 2011

Page: 25 of 58

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



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Report No.: EH/2011/60024 Issue Date: Jul. 05, 2011

Page: 26 of 58

#### 8. 100KHz BANDWIDTH OF BAND EDGES MEASUREMENT

# 8.1. Standard Applicable

According to §15.247(c), 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 100KHz 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).

### 8.2. Measurement Equipment Used

### **8.2.1.** Conducted Emission at antenna port:

Refer to section 6.2 for details.

#### 8.2.2. Radiated emission:

966 Chamber										
<b>EQUIPMENT</b>	MFR	MODEL	SERIAL	LAST	CAL DUE.					
TYPE		NUMBER	NUMBER	CAL.						
Spectrum Analyzer	R&S	FSP 40	100034	02/12/2011	02/11/2012					
Loop antenna	MESSTEC	FLA30	03/10086	07/08/2011	07/07/2013					
Bilog Antenna	SCHWAZBECK	VULB9160	9160-3136	11/19/2010	11/18/2011					
Horn antenna	SCHWAZBECK	BBHA 9120D	9120D-673	05/09/2010	05/08/2012					
Pre-Amplifier	Agilent	8447D	1937A02834	11/28/2010	11/27/2011					
Pre-Amplifier	Agilent	8449B	3008A01973	01/05/2012	01/04/2012					
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	SUCOFLEX 104PEA-10M	10m	01/05/2011	01/04/2012					
Low Loss Cable	HUBER+SUHNER	SUCOFLEX 104PEA-3M	3m	01/05/2011	01/04/2012					
3m Site	SGS	966 chamber	N/A	11/08/2010	11/09/2011					

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Page: 27 of 58

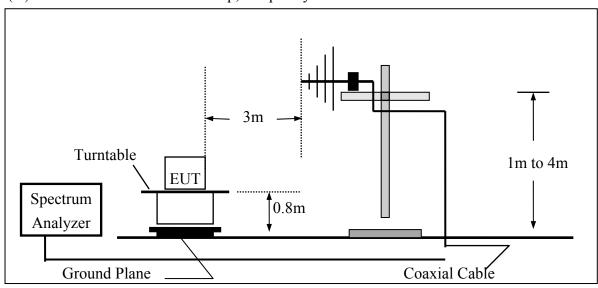
#### 8.3. Test SET-UP:

#### **8.3.1.** Conducted Emission at antenna port:

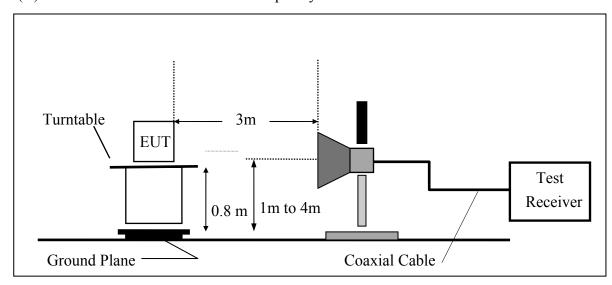
Refer to section 6.3 for details.

#### 8.3.2. 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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Report No.: EH/2011/60024 Issue Date: Jul. 05, 2011

Page: 28 of 58

#### **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 center frequency of spectrum analyzer = operating frequency.
- 4. Set the spectrum analyzer as RBW, VBW=100KHz, Span=25MHz, 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.
- 7. Radiated Emission refer to section 9.

### 8.5. 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	

#### 8.6. Measurement Result

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

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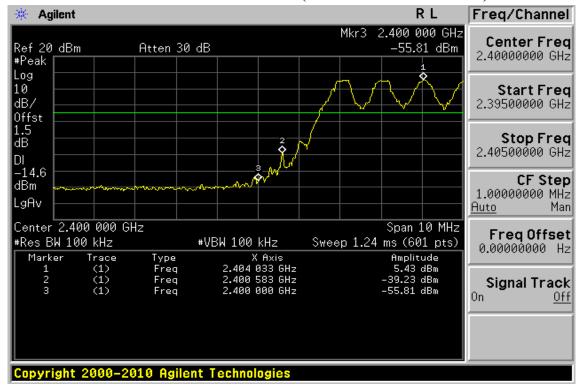
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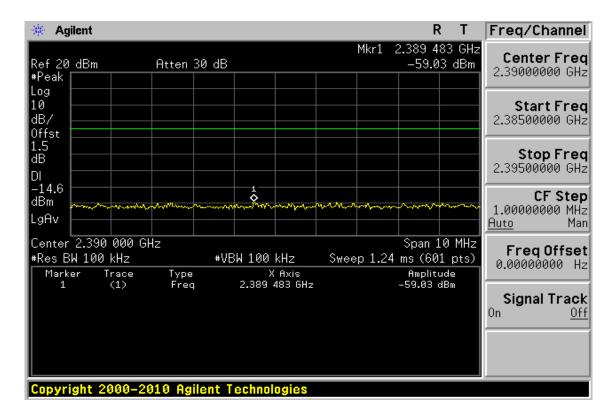


Report No.: EH/2011/60024 Issue Date: Jul. 05, 2011

Page: 29 of 58

# Conducted Emission: Test Data CH-Low (worse case BDR mode)





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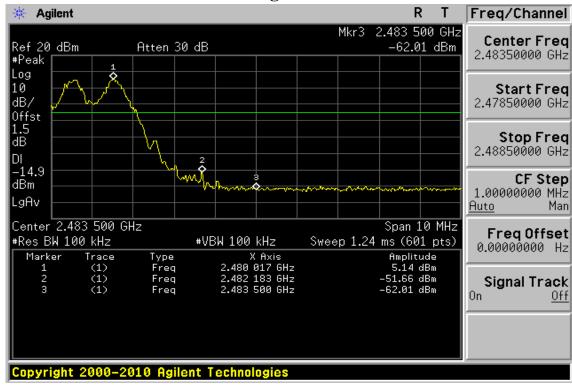
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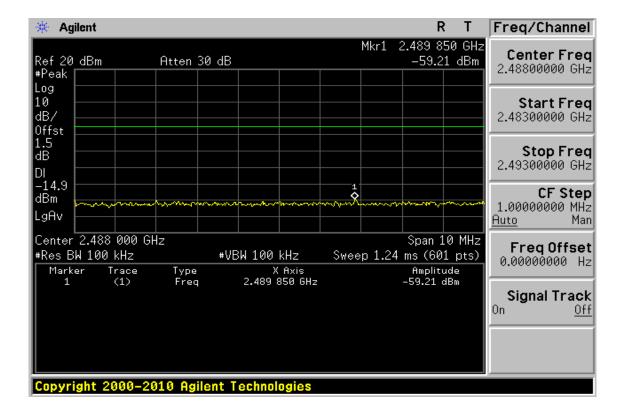


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Page: 30 of 58

# **Conducted Emission: Test Data CH-High**





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Report No.: EH/2011/60024 Issue Date: Jul. 05, 2011

Page: 31 of 58

Radiated Emission: (worse case BDR mode)

Operation Mode TX CH Low **Test Date** Jun. 30, 2011

Fundamental Frequency 2402 MHz Test By Lion Temperature 25 °C Pol Ver.

65 % Humidity

	Peak	$\mathbf{AV}$		Actu	ıal FS	Peak	$\mathbf{AV}$		
Freq.	Reading	Reading	Ant./CL	Peak	AV	Limit	Limit	Margin	Remark
(MHz)	(dBuV)	(dBuV)	CF(dB)	(dBuV/m)	(dBuV/m)	(dBuV/m)	(dBuV/m	(dB)	
2390.00	45.07		-0.67	44.40		74.00	54.00	-29.60	Peak
Operation	Mode	TX C	CH Low			Test	Date	Jun. 30, 20	111
Fundamen			MHz			Test		Lion	/11
Temperatu	1	25 °C				Pol	J	Hor.	
	пС					1 01		1101.	
Humidity		65 %							
	Peak	$\mathbf{AV}$		Actu	ıal FS	Pea k	$\mathbf{AV}$		
Freq.	Reading	Reading	Ant./CL	Peak	$\mathbf{A}\mathbf{V}$	Limit	Limit	Margin	Remark
(MHz)	(dBuV)	(dBuV)	CF(dB)	(dBuV/m)	(dBuV/m)	(dBuV/m)	(dBuV/m	(dB)	
2390.00	44.61		-0.67	43.94		74.00	54.00	-30.06	Peak

#### Remark:

- (1) Data of measurement within this frequency range shown "-" in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
- (2) Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column o
- (3) Spectrum Peak Setting: 1GHz-26GHz, RBW=1MHz, VBW=3MHz, Sweep time=200 ms.
- (4) Spectrum AV Setting: 1GHz-26GHz, RBW=1MHz, VBW=10Hz, Sweep time=200 ms.

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Report No.: EH/2011/60024 Issue Date: Jul. 05, 2011

Page: 32 of 58

Radiated Emission: (worse case BDR mode)

Operation Mode TX CH High **Test Date** Jun. 30, 2011

Fundamental Frequency 2480 MHz Test By Lion Temperature 25 °C Pol Ver.

Humidity 65 %

	Peak	$\mathbf{AV}$		Actu	al FS	Peak	$\mathbf{AV}$		
Freq.	Reading	Reading	Ant./CL	Peak	AV	Limit	Limit	Margin	Remark
(MHz)	(dBuV)	(dBuV)	CF(dB)	(dBuV/m)	(dBuV/m)	(dBuV/m)	(dBuV/n	<b>a</b> ) ( <b>dB</b> )	
2483.50	45.67		-0.52	45.15		74.00	54.00	-28.85	Peak
						_	_		
Operation	Mode	TX C	H High			Test	Date	Jun. 30, 20	011
Fundamen	tal Freque	ncy 2480	MHz			Test	By	Lion	
Temperatu	ire	25 ℃				Pol		Hor.	
Humidity		65 %							

	Peak	$\mathbf{AV}$		Actu	al FS	Pea k	$\mathbf{AV}$		
Freq.	Reading	Reading	Ant./CL	Peak	AV	Limit	Limit	Margin	Remark
(MHz)	(dBuV)	(dBuV)	CF(dB)	(dBuV/m)	(dBuV/m)	(dBuV/m)	(dBuV/m	( <b>dB</b> )	
2483.50	44.72		-0.52	44.20		74.00	54.00	-29.80	Peak

#### Remark:

- (1) Data of measurement within this frequency range shown "-" in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
- (2) Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column o
- (3) Spectrum Peak Setting: 1GHz-26GHz, RBW=1MHz, VBW=3MHz, Sweep time=200 ms.
- (4) Spectrum AV Setting: 1GHz-26GHz, RBW=1MHz, VBW=10Hz, Sweep time=200 ms.

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Report No.: EH/2011/60024 Issue Date: Jul. 05, 2011

Page: 33 of 58

#### 9. SPURIOUS RADIATED EMISSION TEST

### 9.1. Standard Applicable

According to §15.247(c), all other emissions outside these bands shall not exceed the general radiated emission limits specified in §15.209(a). 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.

### 9.2. Measurement Equipment Used:

#### 9.2.1. Conducted Emission at antenna port:

Refer to section 6.2 for details.

#### 9.2.2. Radiated emission:

Refer to section 7.2 for details.

#### 9.3. Test SET-UP:

#### 9.3.1. Conducted Emission at antenna port:

Refer to section 6.3 for details.

#### 9.3.2. Radiated emission:

Refer to section 7.3 for details.

#### 9.4. Measurement Procedure:

- 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 measured were complete.

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Report No.: EH/2011/60024 Issue Date: Jul. 05, 2011

Page: 34 of 58

### 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:

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

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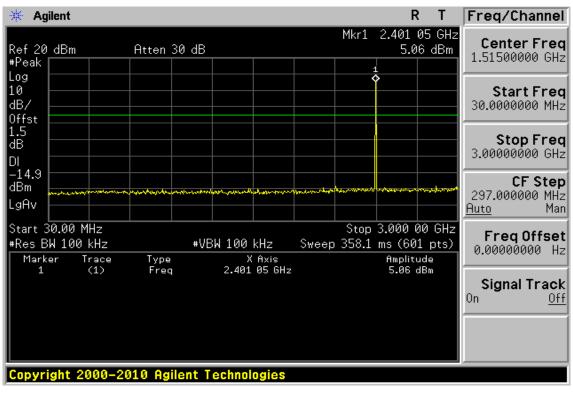
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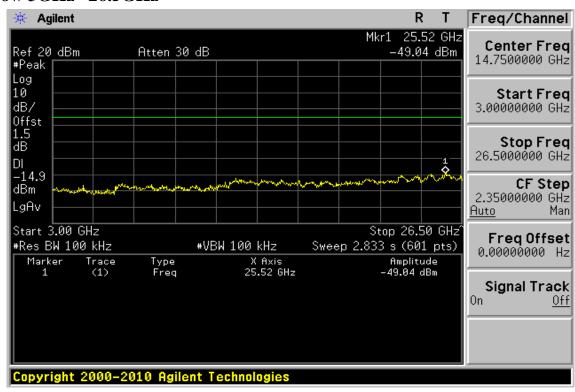
Report No.: EH/2011/60024 Issue Date: Jul. 05, 2011

Page: 35 of 58

# Conducted Spurious Emission Measurement Result (BDR mode worst case) Ch Low 30MHz – 3GHz



### Ch Low 3GHz -26.5GHz



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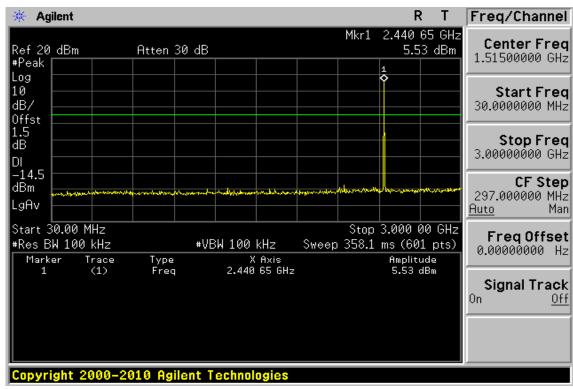
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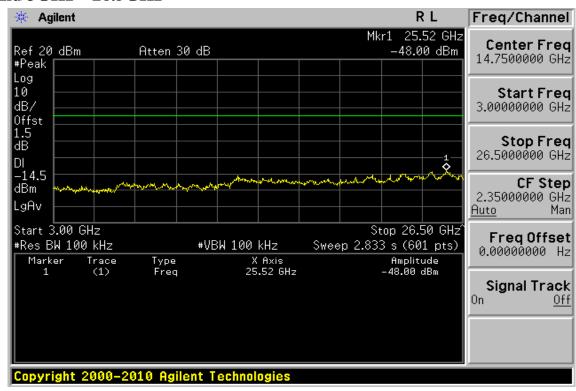
Report No.: EH/2011/60024 Issue Date: Jul. 05, 2011

Page: 36 of 58

### Ch Mid 30MHz - 3GHz



#### Ch Mid 3GHz – 26.5GHz



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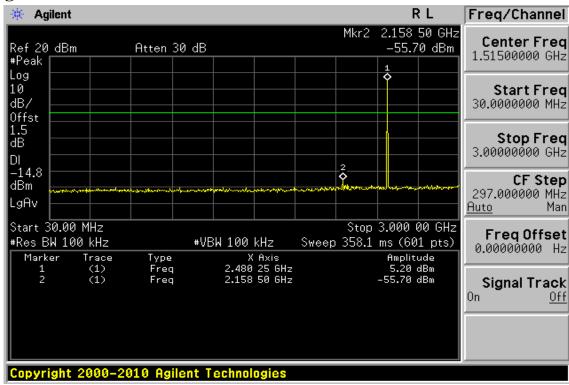
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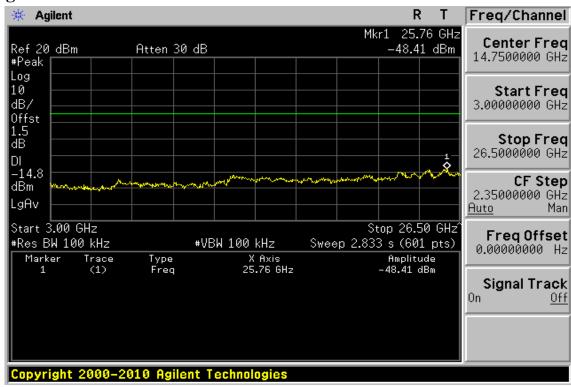
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Page: 37 of 58

# Ch High 30MHz - 3GHz



### Ch High 3GHz – 26.5GHz



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Report No.: EH/2011/60024 Issue Date: Jul. 05, 2011

Page: 38 of 58

### Radiated Spurious Emission Measurement Result (below 1GHz) (BDR mode worst case)

Operation Mode TX CH Low **Test Date** Jun. 30, 2011

Fundamental Frequency 2402MHz Test By Lion Temperature 25 °C Pol Ver./Hor.

Humidity 65 %

Freq.	Ant.Pol.	Detector Mode	Reading	Factor	Actual FS	Limit3m	Safe Margin
(MHz)	H/V	(PK/QP)	(dBuV)	(dB)	(dBuV/m)	(dBuV/m)	(dB)
53.28	V	Peak	30.12	-14.08	16.04	40.00	-23.96
146.40	V	Peak	29.42	-12.51	16.91	43.50	-26.59
346.22	V	Peak	28.12	-11.58	16.54	46.00	-29.46
487.84	V	Peak	29.72	-9.33	20.39	46.00	-25.61
789.51	V	Peak	28.90	-3.76	25.14	46.00	-20.86
971.87	V	Peak	28.41	-1.55	26.86	54.00	-27.14
41.64	Н	Peak	28.26	-13.51	14.75	40.00	-25.25
160.95	Н	Peak	28.78	-11.98	16.80	43.50	-26.70
286.08	Н	Peak	30.12	-12.81	17.31	46.00	-28.69
475.23	Н	Peak	29.51	-9.48	20.03	46.00	-25.97
802.12	Н	Peak	29.45	-3.64	25.81	46.00	-20.19
929.19 Remark:	Н	Peak	29.14	-1.77	27.37	46.00	-18.63

Remark :

- 1 Measuring frequencies from 30 MHz to the 1GHz •
- 2 Radiated emissions measured in frequency range from 30 MHz to 1000MHz were made with an instrument using Peak/QP detector mode.
- 3 Data of measurement within this frequency range shown " " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
- 4 The IF bandwidth of SPA between 30MHz to 1GHz was 100KHz.

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Report No.: EH/2011/60024 Issue Date: Jul. 05, 2011

Page: 39 of 58

### Radiated Spurious Emission Measurement Result (below 1GHz)

Operation Mode TX CH Mid **Test Date** Jun. 30, 2011 Fundamental Frequency 2441MHz Test By Lion

Temperature 25 °C Pol Ver./Hor.

Humidity 65 %

Freq.	Ant.Pol.	Detector Mode	Reading	Factor	Actual FS	Limit3m	Safe Margin
(MHz)	H/V	(PK/QP)	(dBuV)	(dB)	(dBuV/m)	(dBuV/m)	(dB)
53.28	V	Peak	29.28	-14.08	15.20	40.00	-24.80
128.94	V	Peak	32.17	-13.97	18.20	43.50	-25.30
339.43	V	Peak	29.15	-11.77	17.38	46.00	-28.62
500.45	V	Peak	28.84	-9.09	19.75	46.00	-26.25
792.42	V	Peak	28.67	-3.74	24.93	46.00	-21.07
971.87	V	Peak	28.76	-1.55	27.21	54.00	-26.79
61.04	Н	Peak	30.46	-14.90	15.56	40.00	-24.44
156.10	Н	Peak	28.93	-12.01	16.92	43.50	-26.58
286.08	Н	Peak	31.41	-12.81	18.60	46.00	-27.40
500.45	Н	Peak	29.15	-9.09	20.06	46.00	-25.94
801.15	Н	Peak	29.19	-3.65	25.54	46.00	-20.46
967.02 Remark:	Н	Peak	28.87	-1.54	27.33	54.00	-26.67

Remark :

- 2 Radiated emissions measured in frequency range from 30 MHz to 1000MHz were made with an instrument using Peak/QP detector mode.
- 3 Data of measurement within this frequency range shown " " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
- 4 The IF bandwidth of SPA between 30MHz to 1GHz was 100KHz.

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<sup>1</sup> Measuring frequencies from 30 MHz to the 1GHz •



Report No.: EH/2011/60024 Issue Date: Jul. 05, 2011

Page: 40 of 58

46.00

54.00

-20.90

-26.43

### Radiated Spurious Emission Measurement Result (below 1GHz)

Operation Mode TX CH High **Test Date** Jun. 30, 2011

Fundamental Frequency 2480MHz Test By Lion Temperature Pol Ver./Hor. 25 °C Humidity 65 %

**Detector** Freq. Ant.Pol. Reading **Factor Actual FS** Limit3m Safe Margin Mode (MHz) H/V (PK/QP) (dBuV) (dB) (dBuV/m) (dBuV/m) (dB) V 61.04 Peak 29.70 -14.9014.80 40.00 -25.20 160.95 V Peak 28.10 -11.98 16.12 43.50 -27.38 339.43 V Peak 28.20 -11.77 16.43 46.00 -29.57 29.79 443.22 V Peak -9.96 19.83 46.00 -26.17 V 801.15 Peak 28.48 -3.6524.83 46.00 -21.17 974.78 V Peak 28.80 -1.55 27.25 54.00 -26.7539.70 Η Peak 27.99 -13.38 14.61 40.00 -25.39146.40 Η Peak 28.48 -12.5115.97 43.50 -27.53 286.08 Η Peak 30.43 -12.8146.00 -28.38 17.62 498.51 28.60 -9.16 19.44 46.00 -26.56 Η Peak

968.96 Remark:

766.23

Η

Η

1 Measuring frequencies from 30 MHz to the 1GHz •

Peak

Peak

29.14

29.12

2 Radiated emissions measured in frequency range from 30 MHz to 1000MHz were made with an instrument using Peak/QP detector mode.

-4.04

-1.55

25.10

27.57

- 3 Data of measurement within this frequency range shown " " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
- 4 The IF bandwidth of SPA between 30MHz to 1GHz was 100KHz.

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Report No.: EH/2011/60024 Issue Date: Jul. 05, 2011

Page: 41 of 58

### Radiated Spurious Emission Measurement Result (above 1GHz)

Operation Mode TX CH Low **Test Date** Jun. 30, 2011

Fundamental Frequency 2402 MHz Test By Lion Temperature 25 °C Pol Ver.

Humidity 65 %

	Peak	$\mathbf{AV}$		Actu	al FS	Peak	$\mathbf{AV}$	
Freq.	Reading	Reading	Ant./CL	Peak	$\mathbf{AV}$	Limit	Limit	Margin
(MHz)	(dBuV)	(dBuV)	CF(dB)	(dBuV/m)	(dBuV/m)	(dBuV/m)	(dBuV/m)	(dB)
4804.0	27.91		5.25	33.16		74.00	54.00	-20.84
7206.0						74.00	54.00	
9608.0						74.00	54.00	
12010.0						74.00	54.00	
14412.0						74.00	54.00	
16814.0						74.00	54.00	
19216.0						74.00	54.00	
21618.0						74.00	54.00	
24020.0						74.00	54.00	

#### Remark:

- (1) Measuring frequencies from 1GHz to the 10th harmonic of highest fundamental frequency.
- (2) Data of measurement within this frequency range shown "-" in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
- (3) Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.
- (4) Spectrum Peak Setting: 1GHz-26GHz, RBW=1MHz, VBW=3MHz, Sweep time=200
- Spectrum AV Setting: 1GHz-26GHz, RBW=1MHz, VBW=10Hz, Sweep time=200 ms.

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Page: 42 of 58

### Radiated Spurious Emission Measurement Result (above 1GHz)

Operation Mode TX CH Low **Test Date** Jun. 30, 2011

Fundamental Frequency 2402 MHz Test By Lion Temperature 25 °C Pol Hor.

Humidity 65 %

	Peak	$\mathbf{AV}$		Actu	al FS	Peak	$\mathbf{AV}$	
Freq.	Reading	Reading	Ant./CL	Peak	$\mathbf{AV}$	Limit	Limit	Margin
(MHz)	(dBuV)	(dBuV)	CF(dB)	(dBuV/m)	(dBuV/m)	(dBuV/m)	(dBuV/m)	(dB)
4804.0	26.42		5.25	31.67		74.00	54.00	-22.33
7206.0						74.00	54.00	
9608.0						74.00	54.00	
12010.0						74.00	54.00	
14412.0						74.00	54.00	
16814.0						74.00	54.00	
19216.0						74.00	54.00	
21618.0						74.00	54.00	
24020.0						74.00	54.00	

#### Remark:

- (1) Measuring frequencies from 1GHz to the 10th harmonic of highest fundamental frequency.
- (2) Data of measurement within this frequency range shown "-" in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
- (3) Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.
- (4) Spectrum Peak Setting: 1GHz-26GHz, RBW=1MHz, VBW=3MHz, Sweep time=200
- Spectrum AV Setting: 1GHz-26GHz, RBW=1MHz, VBW=10Hz, Sweep time=200 ms.

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Report No.: EH/2011/60024 Issue Date: Jul. 05, 2011

Page: 43 of 58

### Radiated Spurious Emission Measurement Result (above 1GHz)

Operation Mode TX CH Mid **Test Date** Jun. 30, 2011

Fundamental Frequency 2441 MHz Test By Lion Temperature 25 °C Pol Ver.

Humidity 65 %

	Peak	$\mathbf{AV}$		Actu	al FS	Peak	$\mathbf{AV}$	
Freq.	Reading	Reading	Ant./CL	Peak	$\mathbf{AV}$	Limit	Limit	Margin
(MHz)	(dBuV)	(dBuV)	CF(dB)	(dBuV/m)	(dBuV/m)	(dBuV/m)	(dBuV/m)	(dB)
4882.0	26.82		5.43	32.25		74.00	54.00	-21.75
7323.0						74.00	54.00	
9764.0						74.00	54.00	
12205.0						74.00	54.00	
14646.0						74.00	54.00	
17087.0						74.00	54.00	
19528.0						74.00	54.00	
21969.0						74.00	54.00	
24410.0						74.00	54.00	

#### Remark:

- (1) Measuring frequencies from 1GHz to the 10th harmonic of highest fundamental frequency.
- (2) Data of measurement within this frequency range shown "-" in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
- (3) Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.
- (4) Spectrum Peak Setting: 1GHz-26GHz, RBW=1MHz, VBW=3MHz, Sweep time=200
- Spectrum AV Setting: 1GHz-26GHz, RBW=1MHz, VBW=10Hz, Sweep time=200 ms.

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Report No.: EH/2011/60024 Issue Date: Jul. 05, 2011

Page: 44 of 58

### Radiated Spurious Emission Measurement Result (above 1GHz)

Operation Mode TX CH Mid **Test Date** Jun. 30, 2011

Fundamental Frequency 2441 MHz Test By Lion Temperature 25 °C Pol Hor.

Humidity 65 %

	Peak	$\mathbf{AV}$		Actu	al FS	Peak	$\mathbf{AV}$	
Freq.	Reading	Reading	Ant./CL	Peak	$\mathbf{AV}$	Limit	Limit	Margin
(MHz)	(dBuV)	(dBuV)	CF(dB)	(dBuV/m)	(dBuV/m)	(dBuV/m)	(dBuV/m)	(dB)
4882.0	26.76		5.43	32.19		74.00	54.00	-21.81
7323.0						74.00	54.00	
9764.0						74.00	54.00	
12205.0						74.00	54.00	
14646.0						74.00	54.00	
17087.0						74.00	54.00	
19528.0						74.00	54.00	
21969.0						74.00	54.00	
24410.0						74.00	54.00	

#### Remark:

- (1) Measuring frequencies from 1GHz to the 10th harmonic of highest fundamental frequency.
- (2) Data of measurement within this frequency range shown "-" in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
- (3) Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.
- (4) Spectrum Peak Setting: 1GHz-26GHz, RBW=1MHz, VBW=3MHz, Sweep time=200
- Spectrum AV Setting: 1GHz-26GHz, RBW=1MHz, VBW=10Hz, Sweep time=200 ms.

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Report No.: EH/2011/60024 Issue Date: Jul. 05, 2011

Page: 45 of 58

### **Radiated Spurious Emission Measurement Result (above 1GHz)**

Operation Mode TX CH High Test Date Jun. 30, 2011

Fundamental Frequency 2480 MHz Test By Lion Temperature 25  $^{\circ}$ C Pol Ver.

Humidity 65 %

		Peak	$\mathbf{AV}$		Actu	al FS	Peak	$\mathbf{AV}$	
	Freq.	Reading	Reading	Ant./CL	Peak	$\mathbf{AV}$	Limit	Limit	Margin
_	(MHz)	(dBuV)	(dBuV)	CF(dB)	(dBuV/m)	(dBuV/m)	(dBuV/m)	(dBuV/m)	(dB)
	4960.0	28.21		5.62	33.83		74.00	54.00	-20.17
	7440.0						74.00	54.00	
	9920.0						74.00	54.00	
	12400.0						74.00	54.00	
	14880.0						74.00	54.00	
	17360.0						74.00	54.00	
	19840.0						74.00	54.00	
	22320.0						74.00	54.00	
	24800.0						74.00	54.00	

#### Remark:

- (1) Measuring frequencies from 1GHz to the 10th harmonic of highest fundamental frequency.
- (2) Data of measurement within this frequency range shown "-" in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
- (3) Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.
- (4) Spectrum Peak Setting: 1GHz- 26GHz, RBW= 1MHz, VBW= 3MHz, Sweep time= 200 ms
- (5) Spectrum AV Setting: 1GHz-26GHz, RBW=1MHz, VBW=10Hz, Sweep time=200 ms.

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Report No.: EH/2011/60024 Issue Date: Jul. 05, 2011

Page: 46 of 58

### Radiated Spurious Emission Measurement Result (above 1GHz)

Operation Mode TX CH High **Test Date** Jun. 30, 2011

Fundamental Frequency 2480 MHz Test By Lion Temperature 25 °C Pol Hor.

Humidity 65 %

	Peak	$\mathbf{AV}$		Actu	al FS	Peak	$\mathbf{AV}$	
Freq.	Reading	Reading	Ant./CL	Peak	$\mathbf{AV}$	Limit	Limit	Margin
(MHz)	(dBuV)	(dBuV)	CF(dB)	(dBuV/m)	(dBuV/m)	(dBuV/m)	(dBuV/m)	(dB)
4960.0	28.54		5.62	34.16		74.00	54.00	-19.84
7440.0						74.00	54.00	
9920.0						74.00	54.00	
12400.0						74.00	54.00	
14880.0						74.00	54.00	
17360.0						74.00	54.00	
19840.0						74.00	54.00	
22320.0						74.00	54.00	
24800.0						74.00	54.00	

#### Remark:

- (1) Measuring frequencies from 1GHz to the 10th harmonic of highest fundamental frequency.
- (2) Data of measurement within this frequency range shown "-" in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
- (3) Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.
- (4) Spectrum Peak Setting: 1GHz-26GHz, RBW=1MHz, VBW=3MHz, Sweep time=200
- Spectrum AV Setting: 1GHz-26GHz, RBW=1MHz, VBW=10Hz, Sweep time=200 ms.

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Report No.: EH/2011/60024 Issue Date: Jul. 05, 2011

Page: 47 of 58

# 10. FREQUENCY SEPARATION

## 10.1. Standard Applicable

According to §15.247(a)(1), Frequency hopping systems shall have hopping channel carrier frequencies separated by minimum of 25KHz or the 2/3\*20dB bandwidth of the hopping channel, whichever is greater.

# 10.2. Measurement Equipment Used:

Refer to section 6.2 for details.

#### 10.3. Test Set-up:

Refer to section 6.3 for details.

#### 10.4. 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=100KHz, Adjust Span to 3.0 MHz, Sweep = auto.
- 5. Max hold. Mark 3 Peaks of hopping channel and record the 3 peaks frequency.

#### 10.5. Measurement Result:

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

Note: Refer to next page for plots.

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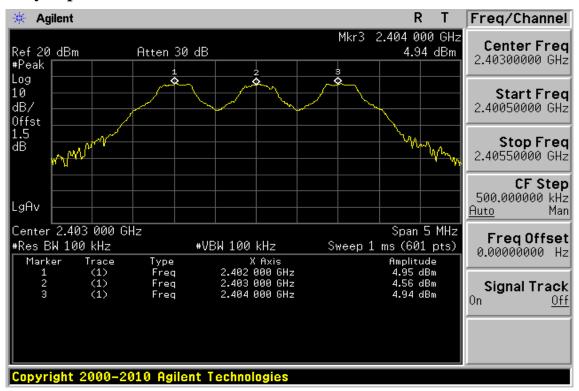
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Report No.: EH/2011/60024 Issue Date: Jul. 05, 2011

Page: 48 of 58

## **Frequency Separation Test Data**



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Report No.: EH/2011/60024 Issue Date: Jul. 05, 2011

Page: 49 of 58

# 11. NUMBER OF HOPPING FREQUENCY

## 11.1. 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.

### 11.2. Measurement Equipment Used:

Refer to section 6.2 for details.

### 11.3. Test Set-up:

Refer to section 6.3 for details.

#### 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 spectrum analyzer Start=2400MHz, Stop = 2483.5MHz, Sweep = auto.
- 4. Set the spectrum analyzer as RBW=430KHz, VBW=1MHz.
- 5. Max hold, view and count how many channel in the band.

#### 11.5. Measurement Result:

Note: Refer to next page for plots.

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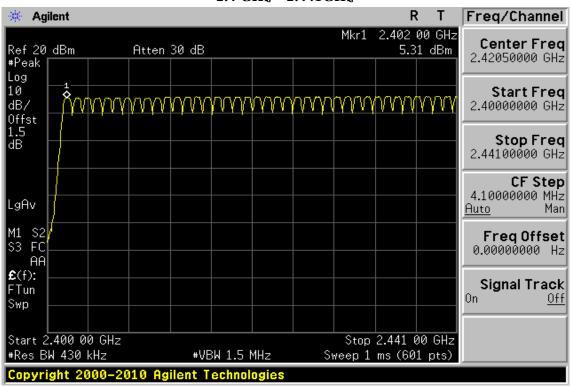


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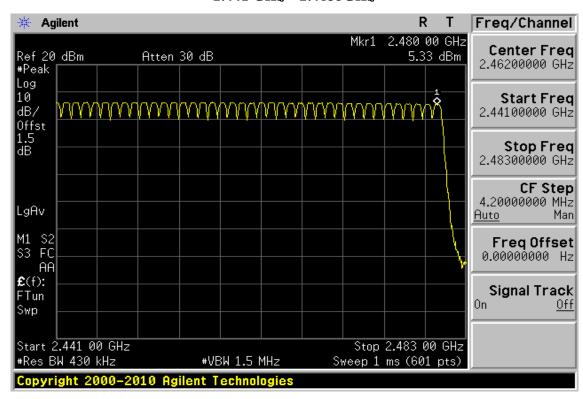
Page: 50 of 58

#### **Channel Number**

#### 2.4 GHz - 2.441GHz



2.441 GHz - 2.4835GHz



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Report No.: EH/2011/60024 Issue Date: Jul. 05, 2011

Page: 51 of 58

## 12. TIME OF OCCUPANCY (DWELL TIME)

### 12.1. 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.

### 12.2. Measurement Equipment Used:

Refer to section 6.2 for details.

### 12.3. Test Set-up:

Refer to section 6.3 for details.

#### 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 center frequency of spectrum analyzer = operating frequency.
- 4. Set the spectrum analyzer as RBW, VBW=100KHz, Span = 0Hz, Adjust Sweep =  $2\sim7$ ms.
- 5. Repeat above procedures until all frequency measured were complete.

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Report No.: EH/2011/60024 Issue Date: Jul. 05, 2011

Page: 52 of 58

#### 12.5. Measurement Result

A period time = 0.4 (ms) \* 79 = 31.6 (s)DH1 time slot = 0.387 (ms) \* (1600(2\*79) \* 31.6 = 123.84 (ms)DH3 time slot = 1.642 (ms) \* (1600(4\*79) \* 31.6 = 262.72 (ms)DH5 time slot = 2.895 (ms) \* (1600(6\*79) \* 31.6 = 308.80 (ms)CH Mid DH1 time slot =0.390 (ms) \* (1600(2\*79)\*31.6 = 124.80 (ms)1.642 (ms) \* (1600(4\*79) \* 31.6 = DH3 time slot =262.72 (ms) DH5 time slot =2.883 (ms) \* (1600(6\*79)\*31.6 = 307.52 (ms)DH1 time slot = 0.390 (ms) \* (1600(2\*79) \* 31.6 = 124.80 (ms)CH High DH3 time slot = 1.642 (ms) \* (1600(4\*79) \* 31.6 = 262.72 (ms)DH5 time slot = 2.883 (ms) \* (1600(6\*79)\*31.6 = 307.52 (ms)

Note: Refer to next page for plots.

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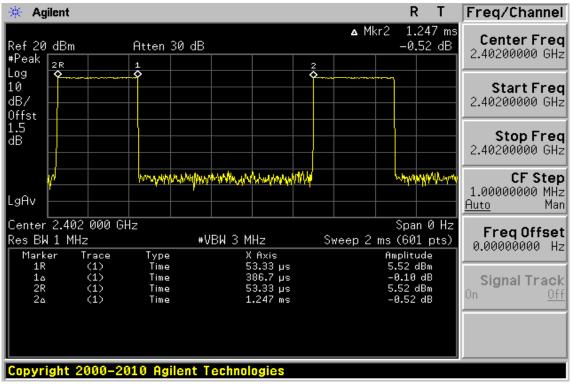
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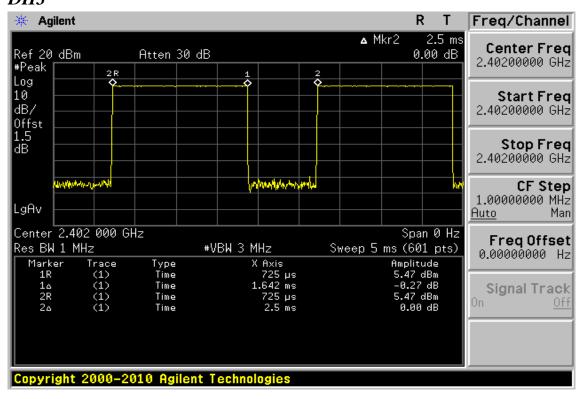
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Page: 53 of 58

## CH-Low DH1



## DH3



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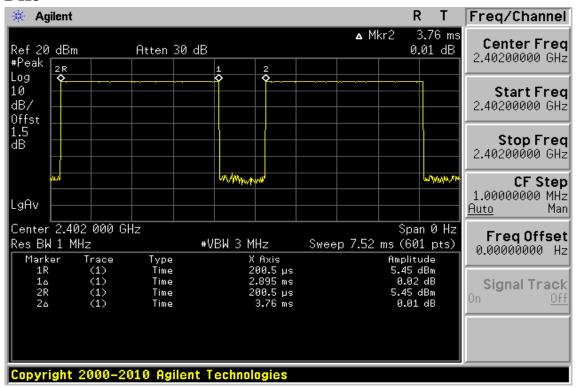
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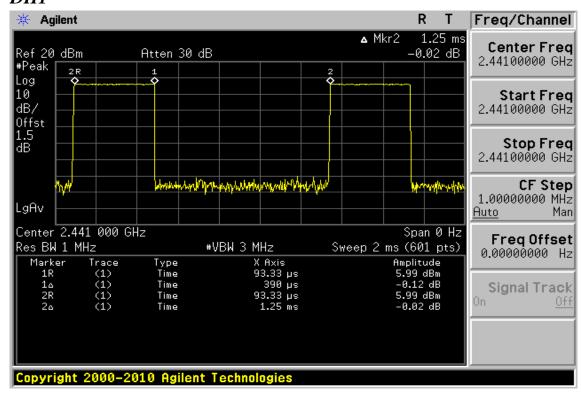
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Page: 54 of 58

#### DH5



# CH-Mid DH1



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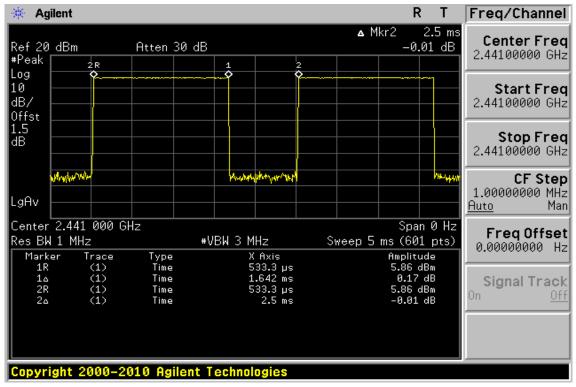
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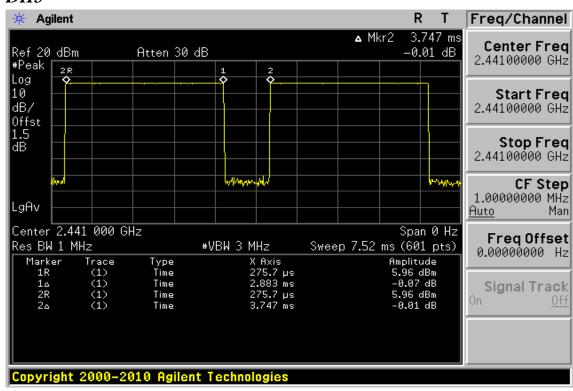
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Page: 55 of 58

#### DH3



#### DH5



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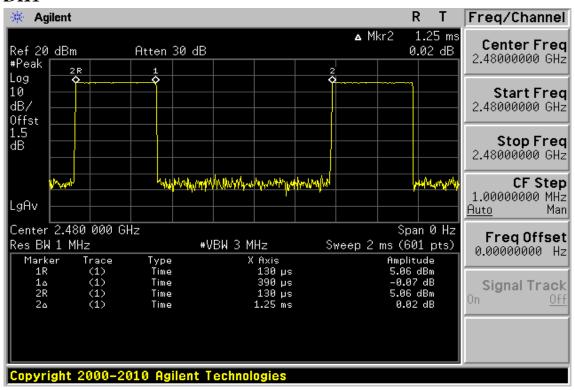
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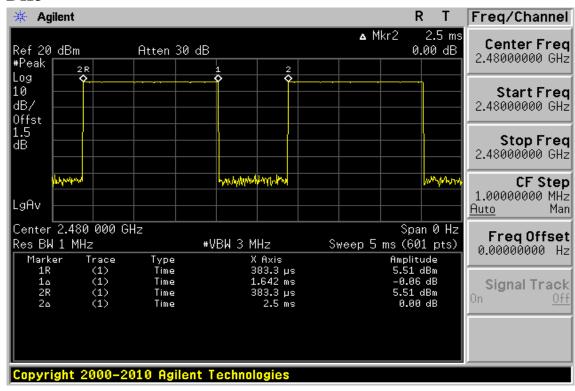
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Page: 56 of 58

# CH-High DH1



#### DH3



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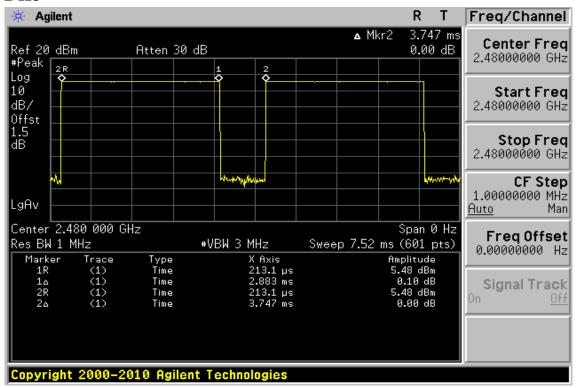
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Page: 57 of 58

#### DH5



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Report No.: EH/2011/60024 Issue Date: Jul. 05, 2011

Page: 58 of 58

# 13. ANTENNA REQUIREMENT

### 13.1. 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.

And according to §15.247(4)(1), system operating in the 2400-2483.5MHz bands that are used exclusively for fixed, point-to-point operations may employ transmitting antennas with directional gain greater than 6dBi provided the maximum peak output power of the intentional radiator is reduced by 1 dB for every 3 dB that the directional gain of the antenna exceeds 6 dBi.

#### 13.2. Antenna Connected Construction

The directional gains of antenna used for transmitting is 2.3dBi, and the antenna connector is designed with permanent attachment and no consideration of replacement. Please see EUT photo for details.

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