

# ELECTROMAGNETIC EMISSIONS COMPLIANCE REPORT

## INTENTIONAL RADIATOR CERTIFICATION TO FCC PART 15 SUBPART C REQUIREMENT

OF

**Product Name:** RP8-J01  
**Brand Name:** Toshiba  
**Model Name:** RP8-J01  
**Marketing Name:** TSI01  
**Model Different:** N/A  
**FCC ID:** WVS-RP8-J01  
**Report No.:** EH/2010/30062  
**Issue Date:** Apr. 09, 2010  
**FCC Rule Part:** §15.247, Cat: DSS  
**Prepared for:** Toshiba Corporation, Mobile Communications Co., Quality Management Division  
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## VERIFICATION OF COMPLIANCE

**Applicant:** Toshiba Corporation, Mobile Communications Co.,  
Quality Management Division  
1-1, Asahigaoka 3-Chome, Hino-Shi, Tokyo, 191-8555, Japan

**Equipment Under Test:** RP8-J01

**Brand Name:** Toshiba

**Model No.:** RP8-J01

**Marketing Name:** TSI01

**Model Difference:** N/A

**FCC ID:** WVS-RP8-J01

**File Number:** EH/2010/30062

**Date of test:** Mar. 25, 2010 ~ Apr. 07, 2010

**Date of EUT Received:** Mar. 25, 2010

**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:**



**Date:**

Apr. 09, 2010

*Jason Wu / Asst. Supervisor*

**Prepared By:**



**Date:**

Apr. 09, 2010

*Alex Hsieh / Sr. Engineer*

**Approved By:**



**Date:**

Apr. 09, 2010

*Vincent Su / Manager*

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## Version

Version No.	Date	Description
00	Apr. 09, 2010	Initial creation of document

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## 1. GENERAL INFORMATION

### General:

Product Name	RP8-J01	
Brand Name	Toshiba	
Model Name	RP8-J01	
Power Supply	3.7 Vdc re-chargeable battery	
	Battery:	Model No.: TSI01UAA, Supplier: Sanyo GS

### CDMA:

DUT Standards And Power:	CDMA2000	Frequency Range		Maximum Rated ERP Power	
	Cellular	TX:	824.70-848.31 MHz		
		RX:	869.70-893.31 MHz		
Type of Emission	CDMA2000 Cellular: 1M25F9W				
Hardware Version	CS1				
Software Version	5006.1907.05				
Antenna Type	PIFA Type				

### Final Amplifier Voltage and Current Information:

Test Mode	DC voltage (V)	DC current (mA)
CDMA2000 Cellular	3.7Vdc	865

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**WLAN: 802.11 b/g:**

Frequency Range:	2412 – 2462 MHz
Channel number:	11 channels
Output Power:	<input checked="" type="checkbox"/> 802.11 b: 16.63dBm (Peak) <input checked="" type="checkbox"/> 802.11 g: 21.92dBm (Peak)
Modulation Technology:	<input checked="" type="checkbox"/> DSSS, <input checked="" type="checkbox"/> OFDM
Modulation type:	CCK, DQPSK, DBPSK for DSSS 64QAM, 16QAM, QPSK, BPSK for OFDM
Transition Rate:	802.11 b: 1/2/5.5/11 Mbps; 802.11 g: 6/9/12/18/24/36/48/54 Mbps
Antenna Designation:	PIFA Antenna, 1.2dBi.

**Bluetooth:**

Bluetooth Version:	V2.0 + EDR (GFSK + $\pi/4$ DQPSK + 8DPSK)
Channel number:	79 channels
Modulation type:	Frequency Hopping Spread Spectrum
Transmit Power:	0.37 dBm (Peak)
Frequency Range:	2.402GHz – 2.480GHz
Dwell Time:	<= 0.4s
Operating Mode:	Point-to-Point
Antenna Designation:	PIFA Antenna, 1.2dBi.

**GPS:**

Receiver Frequency	L1 Band, 1575.42MHz
Frequency Conversion oscillator	19.2MHz
Antenna Designation	PIFA Antenna

The EUT is compliance with Bluetooth 2.0 + EDR Standard.

This report applies for Bluetooth

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

This submittal(s) (test report) is intended for FCC ID: **WVS-RP8-J01** filing to comply with Section 15.247 of the FCC Part 15, Subpart C Rules.

### 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-1

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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## 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 placed on a 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 placed on a 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.

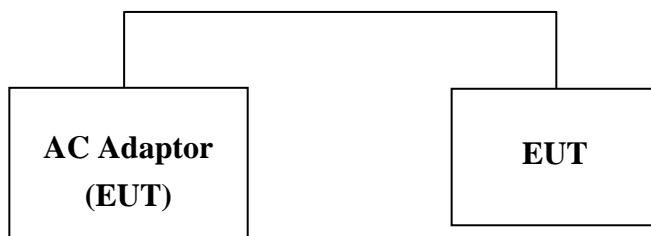
EUT is set 3m away from the receiving antenna which varied from 1m to 4m to find out the highest emission. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical. In order to find out the max. emission, the relative positions of this 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 Subclause 8.3.1.2 of ANSI C63.4: 2003 and DA 00-705.

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## 2.4. Configuration of Tested System

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



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

Item	Equipment	Mfr/Brand	Model/ Type No.	Series No.	Data Cable	Power Cord
1	Bluetooth Software	Bluesuite 1.22	CSR	Version 1.22	N/A	N/A
2.	Adaptor	AU by KDDI	HS-ZAA	N/A	N/A	Un-shielded

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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(d)	100 KHz Bandwidth Of Frequency Band Edges	Compliant
§15.247(c)	TX Spurious Emission	Compliant
§15.247(a)(1)	Frequency Separation	Compliant
§15.247(a)(1)(iii)	Number of hopping frequency	Compliant
§15.247(a)(1)(ii)	Time of Occupancy	Compliant
§15.247	Peak Power Density	Compliant
§15.247(a)(1)	20dB Bandwidth	No Limit
§15.203, §15.247(c)	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 is programmed.

Channel low (2402MHz)、mid (2441MHz) and high (2480MHz) with highest data rate are chosen 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.

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## 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 MHz	Limits dB(uV)	
	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.

### 1.1. Measurement Equipment Used:

AC Power Line Conducted Emission Test Site					
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
EMI Test Receiver	R&S	ESCS30	828985/004	09/15/2009	09/14/2010
LISN	Rolf-Heine	NNB-2/16Z	99012	02/02/2010	02/01/2011
LISN	FCC	FCC-LISN-50/250-25-2-01	04034	02/02/2010	02/01/2011
Coaxial Cables	N/A	WK CE Cable	N/A	11/28/2009	11/27/2010

### 1.2. 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 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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### 1.3. 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.

### 1.4. 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.

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

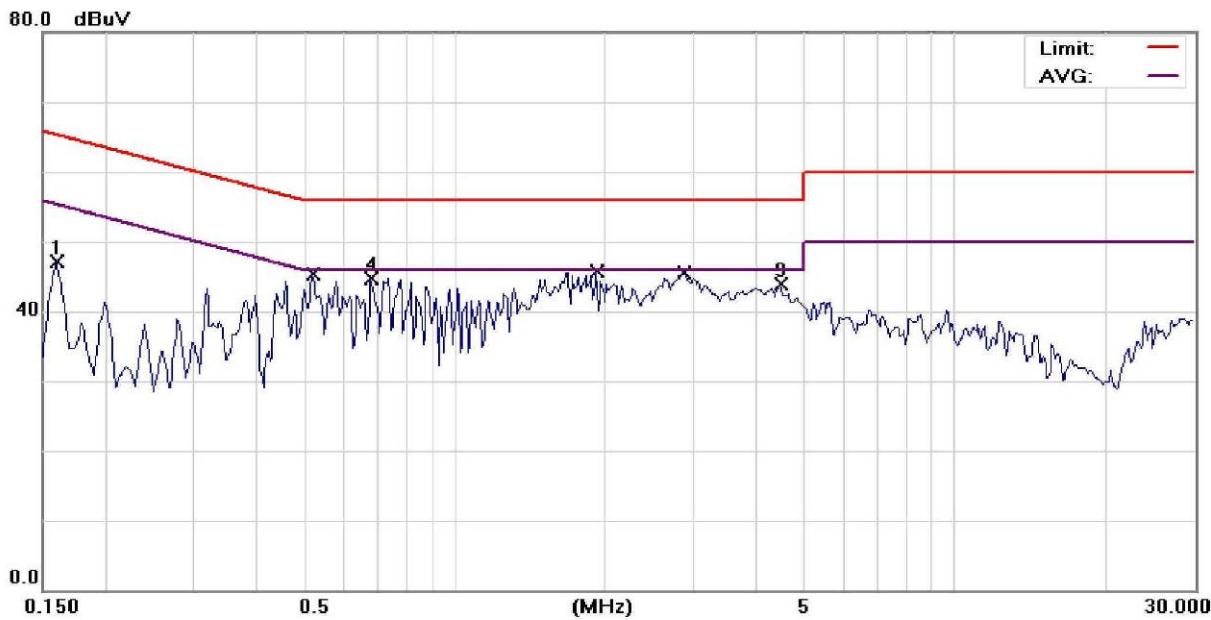
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## AC POWER LINE CONDUCTED EMISSION TEST DATA

Operation Mode:	Normal mode			Test Date:	Apr. 01, 2010
Temperature:	23 °C	Humidity:	59 %	Test By:	Jason



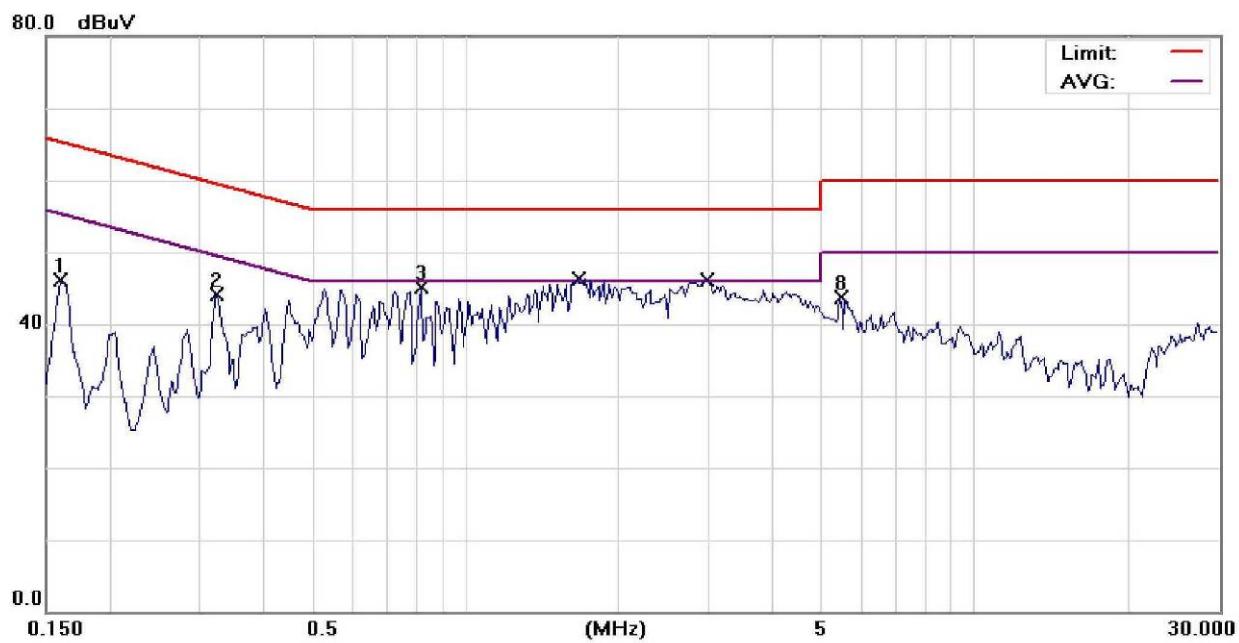
Site	SGS CONDUCTED #1	Phase:	<b>L1</b>	Temperature:	23 °C
Limit:	CISPR22/11/EN55022 Class B	Power:	AC 120V/60Hz	Humidity:	58 %
EUT:	Mobile Phone	Distance:		Air Pressure:	hpa
M/N:	K01-KD				
Note:	BT Operation				

No.	Mk.	Freq. MHz	Reading Level dBuV	Factor dB	Measure- ment dBuV	Limit dBuV	Over	
							Detector	Comment
1	0.1600	47.07	0.11	47.18	65.46	-18.28	peak	
2	0.5216	43.39	0.09	43.48	56.00	-12.52	QP	
3	0.5216	33.87	0.09	33.96	46.00	-12.04	AVG	
4 *	0.6800	44.60	0.09	44.69	56.00	-11.31	peak	
5	1.9225	43.98	0.13	44.11	56.00	-11.89	QP	
6	1.9225	33.03	0.13	33.16	46.00	-12.84	AVG	
7	2.8708	44.34	0.14	44.48	56.00	-11.52	QP	
8	2.8708	29.76	0.14	29.90	46.00	-16.10	AVG	
9	4.4800	43.75	0.16	43.91	56.00	-12.09	peak	

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Site: SGS CONDUCTED #1      Phase: **N**      Temperature: 23 °C  
 Limit: CISPR22/11/EN55022 Class B      Power: AC 120V/60Hz      Humidity: 58 %  
 EUT: Mobile Phone      Distance:  
 M/N: K01-KD      Air Pressure: hpa  
 Note: BT Operation

No.	Mk.	Freq.	Reading	Measure-	Limit	Over	Detector	Comment
			Level	Factor				
		MHz	dBuV	dB	dBuV	dB		
1		0.1600	45.92	0.12	46.04	65.46	-19.42	peak
2		0.3250	43.93	0.10	44.03	59.58	-15.55	peak
3 *		0.8200	45.09	0.10	45.19	56.00	-10.81	peak
4		1.6700	42.98	0.12	43.10	56.00	-12.90	QP
5		1.6700	28.44	0.12	28.56	46.00	-17.44	AVG
6		2.9739	41.00	0.14	41.14	56.00	-14.86	QP
7		2.9739	28.43	0.14	28.57	46.00	-17.43	AVG
8		5.4600	43.46	0.19	43.65	60.00	-16.35	peak

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## 6. PEAK OUTPUT POWER MEASUREMENT

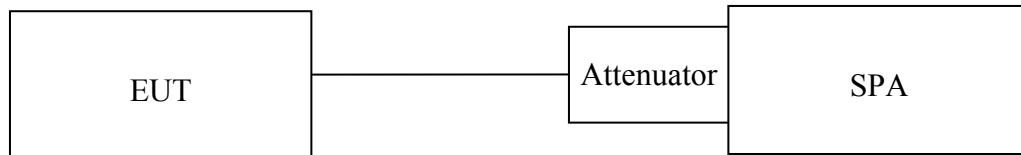
### 6.1. Standard Applicable

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 TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
Spectrum Analyzer	Agilent	E4446A	MY43360126	04/19/2008	04/18/2010
Spectrum Analyzer	Agilent	E4440A	MY45304525	01/23/2010	01/22/2012
DC Block	Agilent	BLK-18	155452	07/05/2009	07/04/2010
Low Loss Cable	HUBER+SUHNER	SUCOFLEX 104PEA	N/A	01/05/2010	01/04/2011
Attenuator	Mini-Circuit	BW-S6W5	001	07/05/2009	07/04/2010
Attenuator	Mini-Circuit	BW-S10W5	001	07/05/2009	07/04/2010
Attenuator	Mini-Circuit	BW-S20W5	001	07/05/2009	07/04/2010
Splitter	Agilent	11636B	N/A	07/05/2009	07/04/2010

### 6.3. Test Set-up:



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#### 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, RBW, VBW =>20dB bandwidth)
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)	Output Power (dBm)	Output Power (W)	Limit (W)
2402.00	-0.43	-0.43	0.00091	1
2441.00	0.37	0.37	0.00109	1
2480.00	-0.68	-0.68	0.00086	1

EDR mode:

Frequency (MHz)	Reading Power (dBm)	Output Power (dBm)	Output Power (W)	Limit (W)
2402.00	-3.35	-3.35	0.00046	1
2441.00	-2.61	-2.61	0.00055	1
2480.00	-3.64	-3.64	0.00043	1

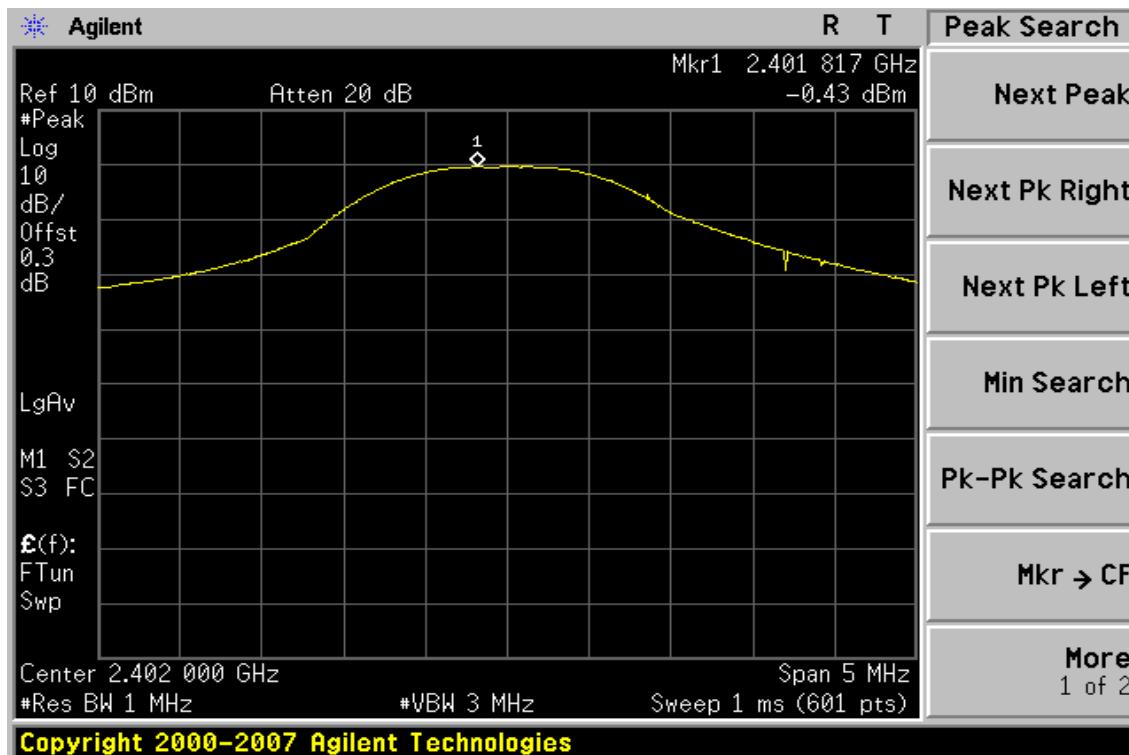
NOTE: offset: 0.3dB

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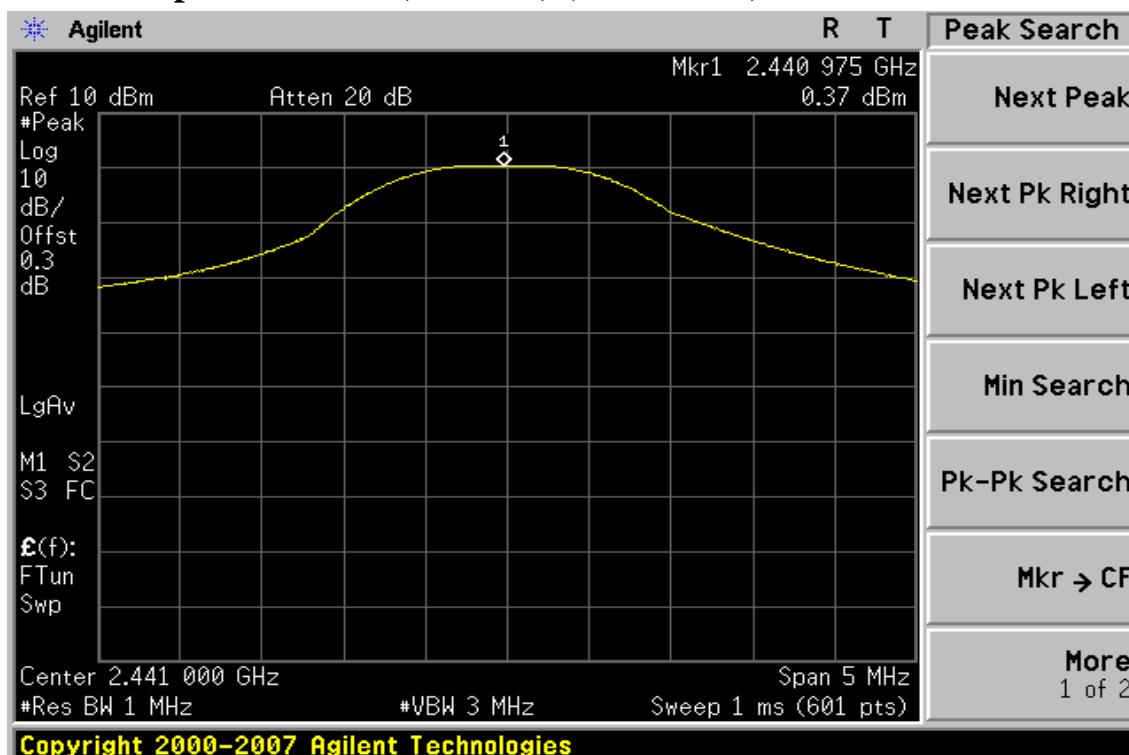
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## Peak Power Output Data Plot (CH Low) (BDR mode)



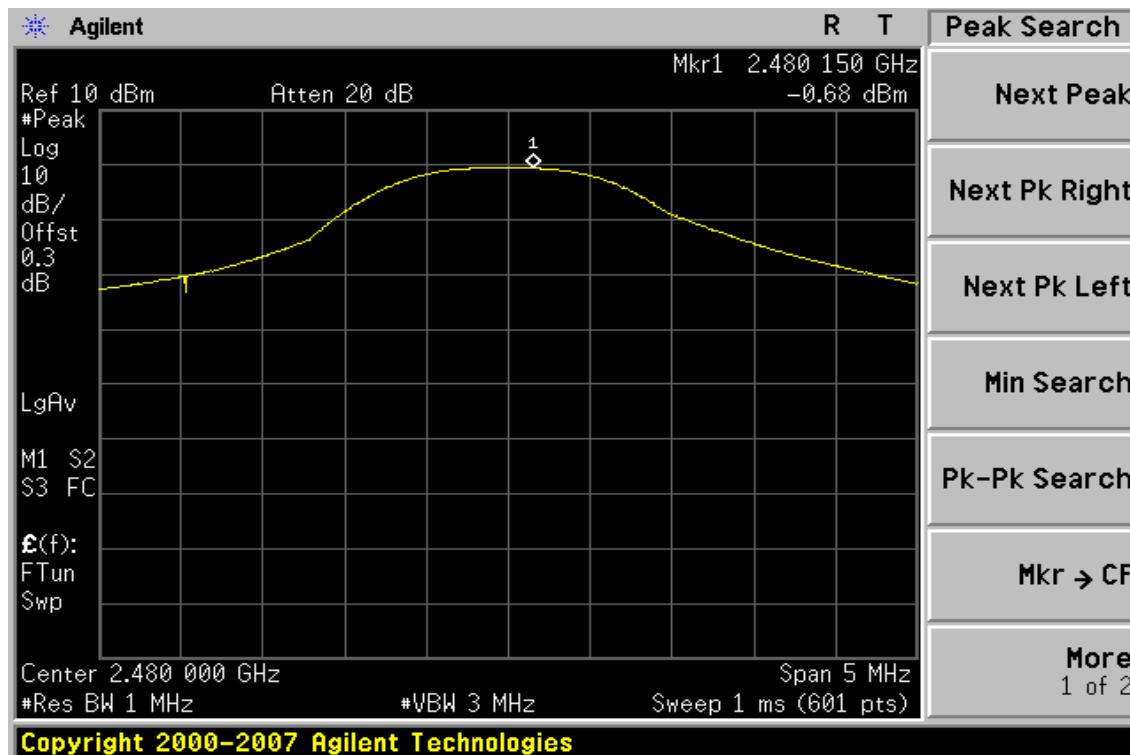
## Peak Power Output Data Plot (CH Mid) (BDR mode)



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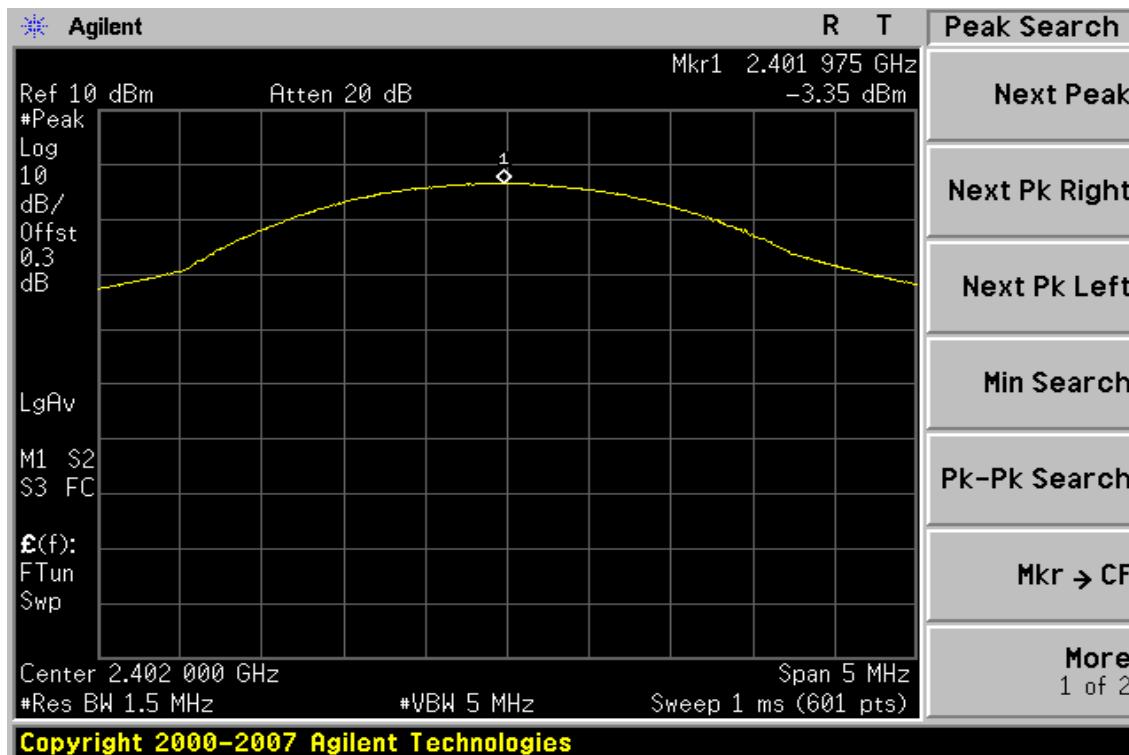
## Peak Power Output Data Plot (CH High) (BDR mode)



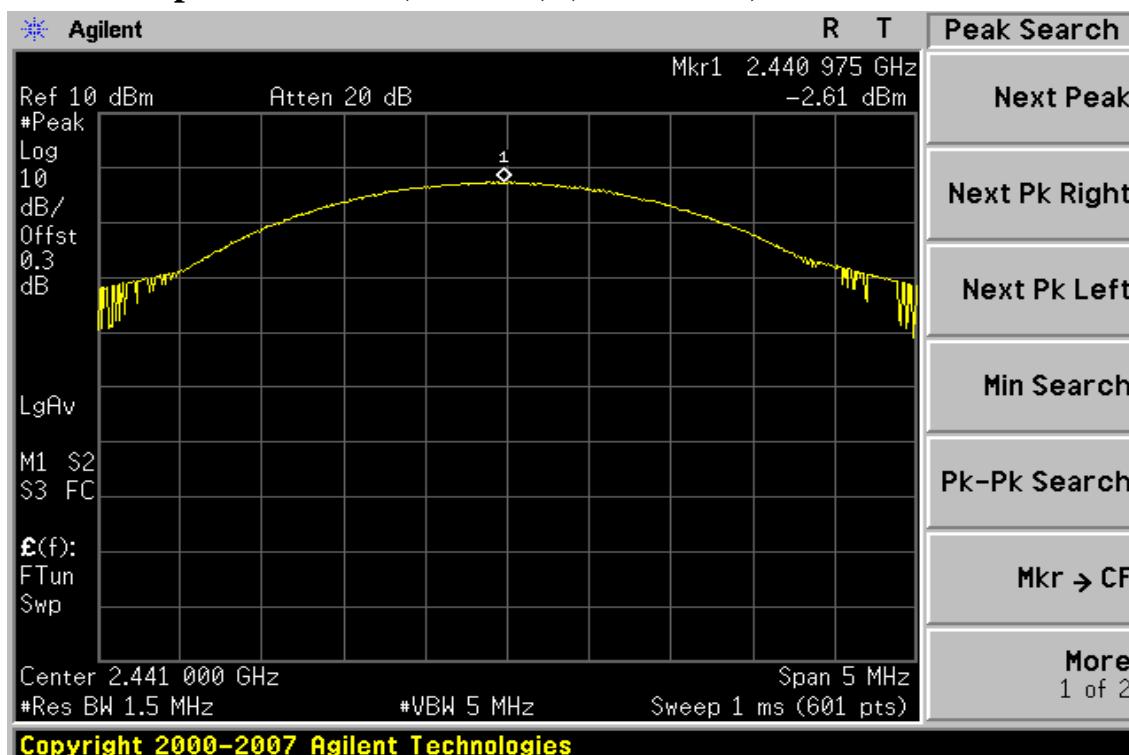
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## Peak Power Output Data Plot (CH Low) (EDR mode)



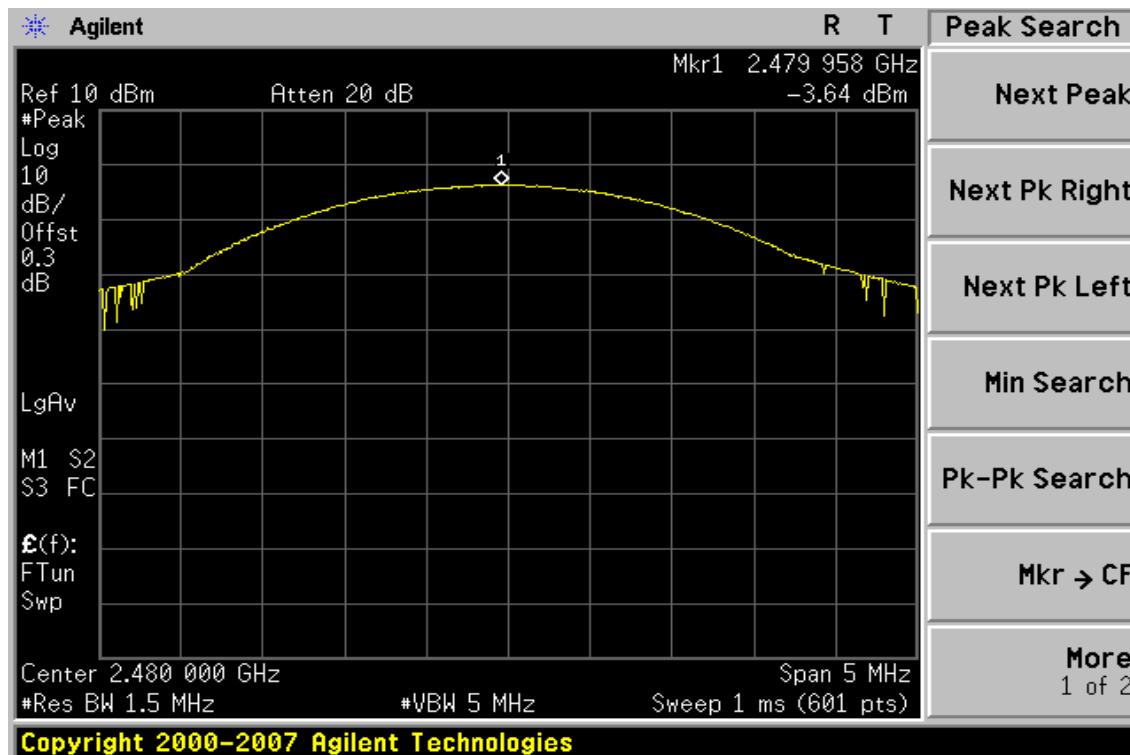
## Peak Power Output Data Plot (CH Mid) (EDR mode)



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



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## 7. 100KHz BANDWIDTH OF BAND EDGES MEASUREMENT

### 7.1. Standard Applicable

According to §15.247(d), in any 100 KHz bandwidth outside the frequency bands in which the spread spectrum intentional radiator is 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 in 15.209(a).

### 7.2. Measurement Equipment Used

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

Refer to section 6.2 for details.

#### 7.2.2. Radiated emission:

966 Chamber					
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
Spectrum Analyzer	R&S	FSP 40	100034	02/12/2010	02/11/2011
Loop antenna	MESSTEC	FLA30	03/10086	07/08/2009	07/07/2011
Bilog Antenna	SCHWAZBECK	VULB9160	9160-3136	11/19/2009	11/18/2010
Horn antenna	SCHWAZBECK	BBHA 9120D	9120D-673	05/09/2008	05/08/2010
Pre-Amplifier	Agilent	8447D	1937A02834	11/28/2009	11/27/2010
Pre-Amplifier	Agilent	8449B	3008A01973	01/05/2010	01/04/2011
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	01/05/2010	01/04/2011
Low Loss Cable	HUBER+SUHNER	SUCOFLEX 104PEA-3M	3m	01/05/2010	01/04/2011
3m Site	SGS	966 chamber	N/A	11/08/2009	11/09/2010

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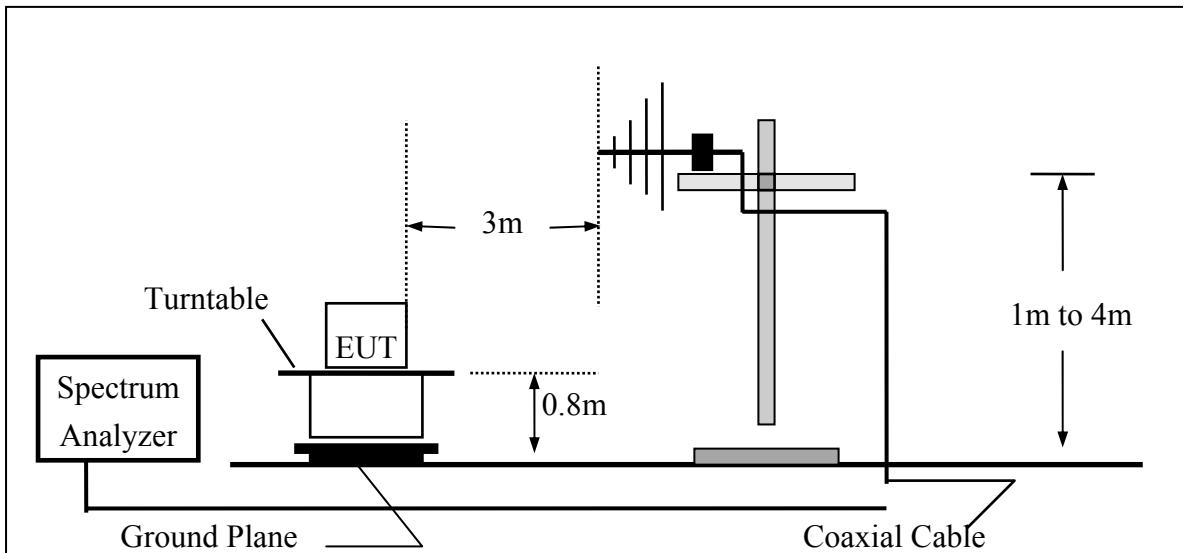
### 7.3. Test SET-UP:

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

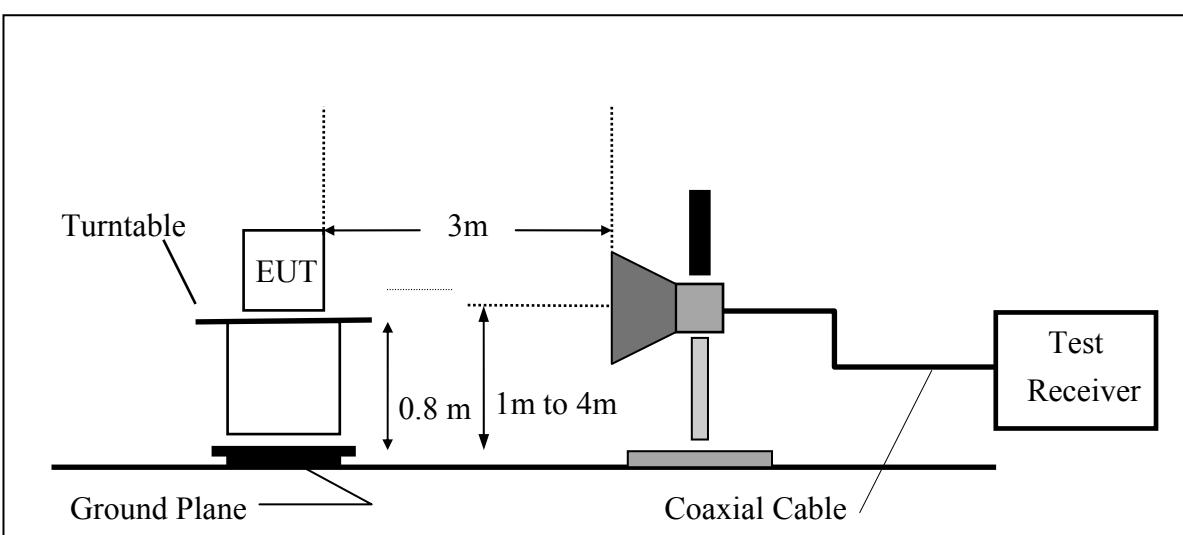
Refer to section 6.3 for details.

#### 7.3.2. 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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## 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 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.

## 7.5. 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:

$$\mathbf{FS = RA + AF - CL - AG}$$

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

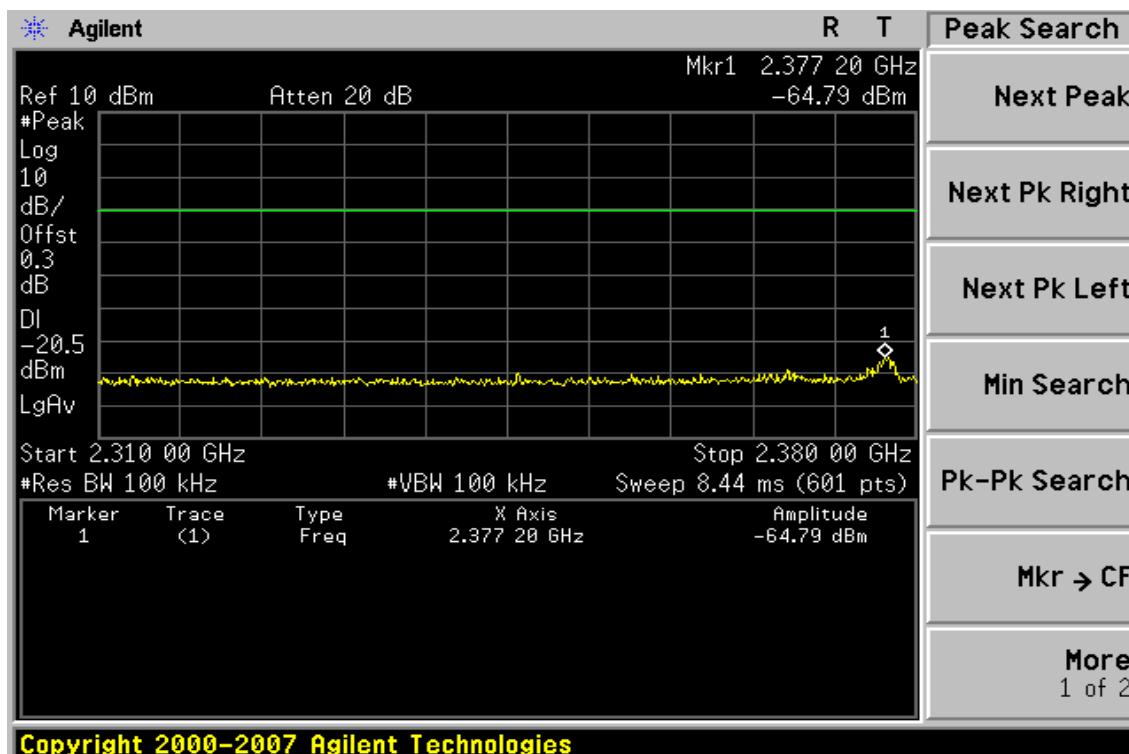
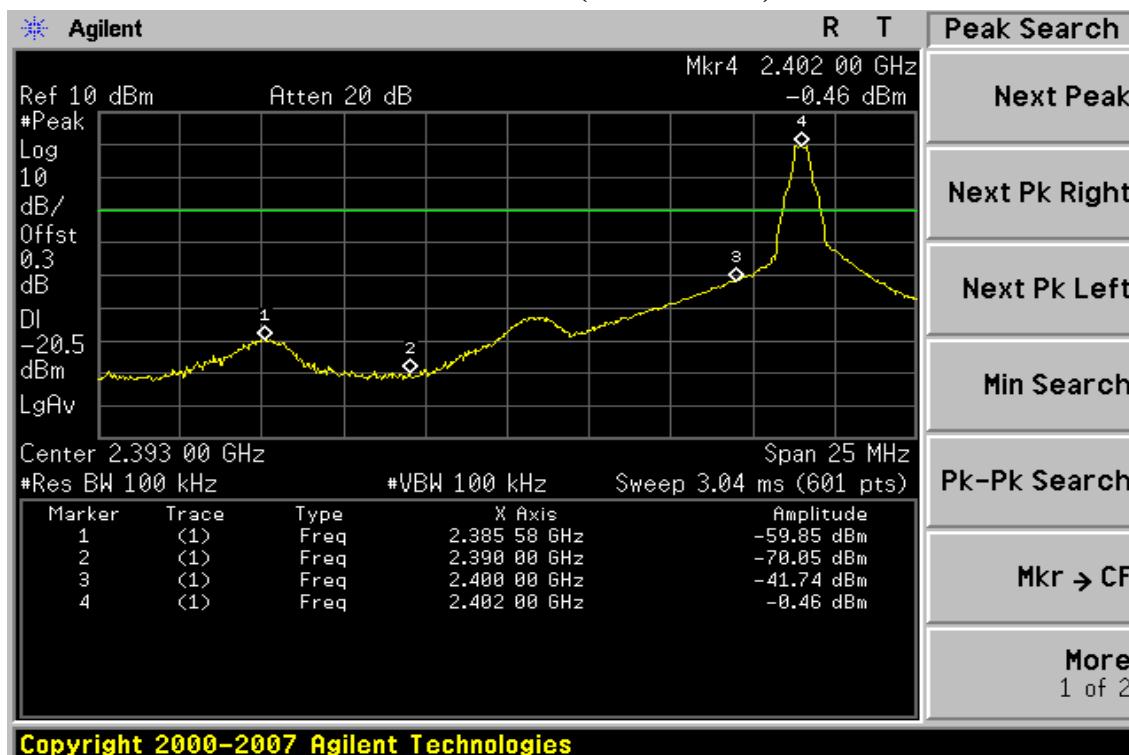
## 7.6. Measurement Result

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

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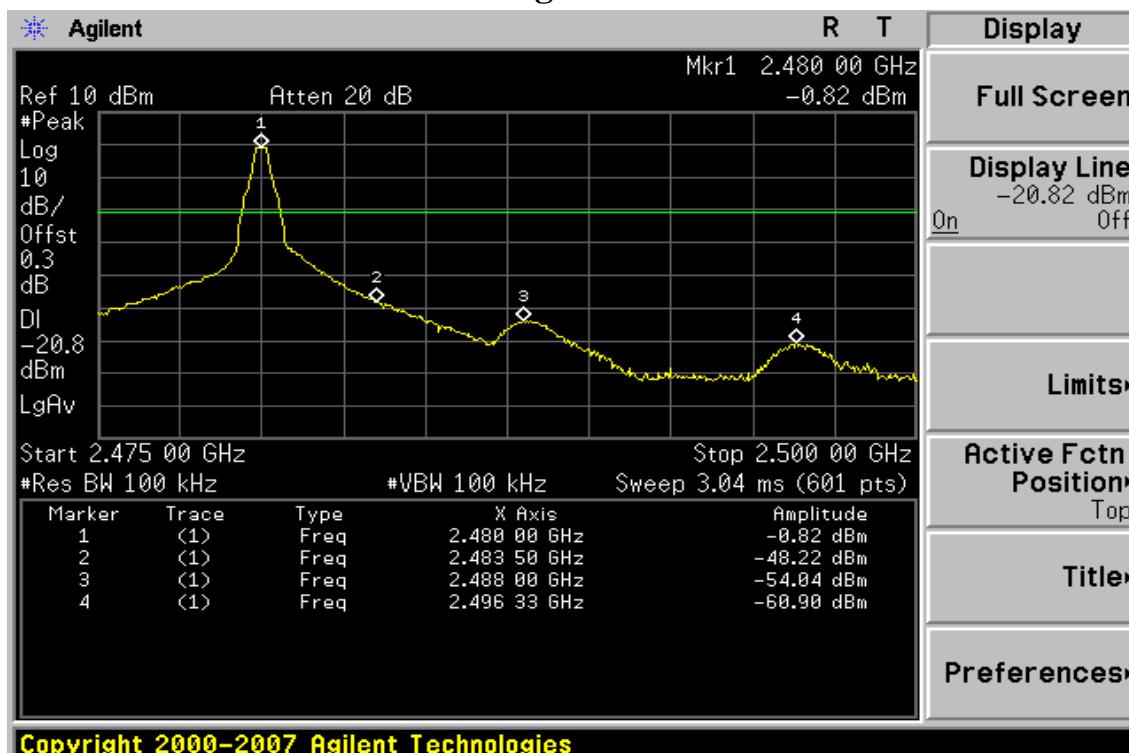
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## Conducted Emission: Test Data CH-Low (BDR mode)



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

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**Radiated Emission: (BDR mode)**

Operation Mode	TX CH Low	Test Date	Apr. 06, 2010
Fundamental Frequency	2402 MHz	Test By	Jason
Temperature	25 °C	Pol	Ver.
Humidity	65 %		

Freq. (MHz)	Peak	AV	Actual FS		Peak	AV	Margin (dB)	Remark	
	Reading (dBuV)	Reading (dBuV)	Ant./CL CF(dB)	Peak (dBuV/m)	AV (dBuV/m)	Limit (dBuV/m)	Limit (dBuV/m)		
2385.23	46.04	---	-1.46	44.58	---	74.00	54.00	-9.42	Peak
2390.00	44.44	---	-1.39	43.05	---	74.00	54.00	-10.95	Peak

Operation Mode	TX CH Low	Test Date	Apr. 06, 2010
Fundamental Frequency	2402 MHz	Test By	Jason
Temperature	25 °C	Pol	Hor.
Humidity	65 %		

Freq. (MHz)	Peak	AV	Actual FS		Peak	AV	Margin (dB)	Remark	
	Reading (dBuV)	Reading (dBuV)	Ant./CL CF(dB)	Peak (dBuV/m)	AV (dBuV/m)	Limit (dBuV/m)	Limit (dBuV/m)		
2385.05	50.04	---	-1.46	48.58	---	74.00	54.00	-5.42	Peak
2390.00	43.79	---	-1.39	42.40	---	74.00	54.00	-11.60	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.
- (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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**Radiated Emission: (BDR mode)**

Operation Mode TX CH High  
Fundamental Frequency 2480 MHz  
Temperature 25 °C  
Humidity 65 %

Test Date Apr. 06, 2010  
Test By Jason  
Pol Ver.

Freq. (MHz)	Peak	AV	Actual FS		Peak	AV	Margin (dB)	Remark
	Reading (dBuV)	Reading (dBuV)	Ant./CL CF(dB)	Peak (dBuV/m)	AV (dBuV/m)	Limit (dBuV/m)		
2483.56	52.81	42.25	-0.92	51.89	41.33	74.00	54.00	-12.67 Av

Operation Mode TX CH High  
Fundamental Frequency 2480 MHz  
Temperature 25 °C  
Humidity 65 %

Test Date Apr. 06, 2010  
Test By Jason  
Pol Hor.

Freq. (MHz)	Peak	AV	Actual FS		Peak	AV	Margin (dB)	Remark
	Reading (dBuV)	Reading (dBuV)	Ant./CL CF(dB)	Peak (dBuV/m)	AV (dBuV/m)	Limit (dBuV/m)		
2483.56	59.80	49.07	-0.92	58.88	48.15	74.00	54.00	-5.85 Av
2483.98	68.79	45.35	-0.92	67.87	44.43	74.00	54.00	-9.57 Av
2484.73	57.85	39.73	-0.92	56.93	38.81	74.00	54.00	-15.19 Av

**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.
- (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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## 8. SPURIOUS RADIATED EMISSION TEST

### 8.1. 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.

### 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:

Refer to section 7.2 for details.

### 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:

Refer to section 7.3 for details.

### 8.4. 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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## 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.

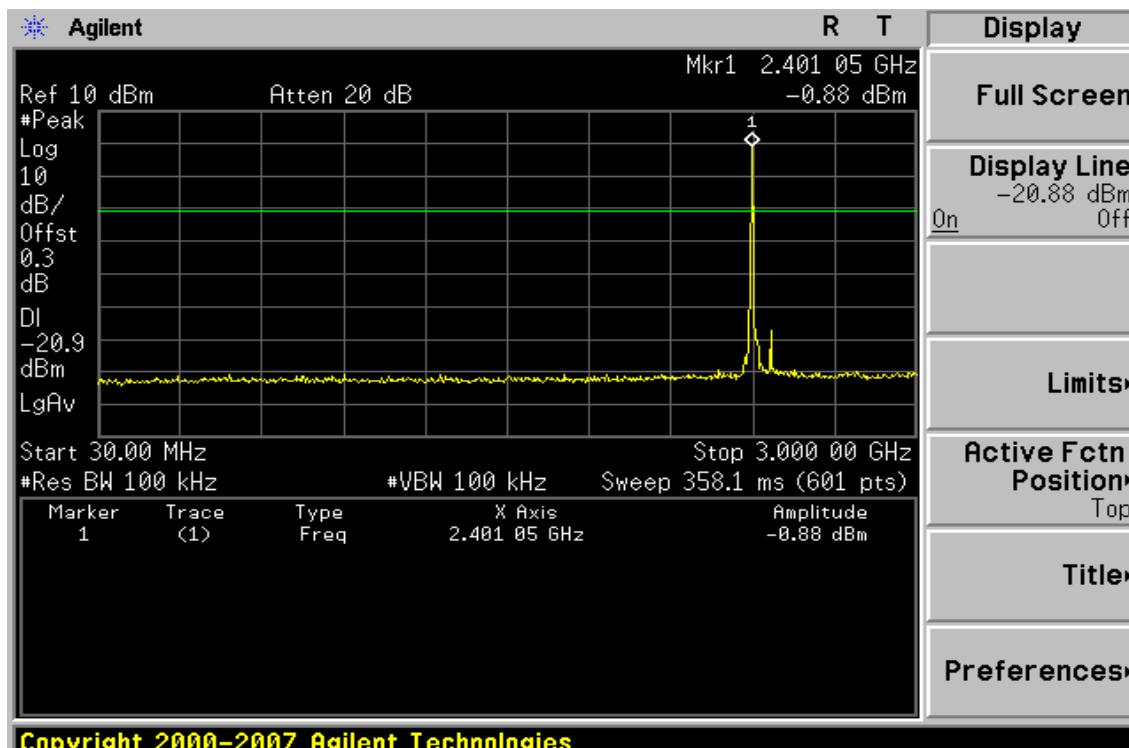
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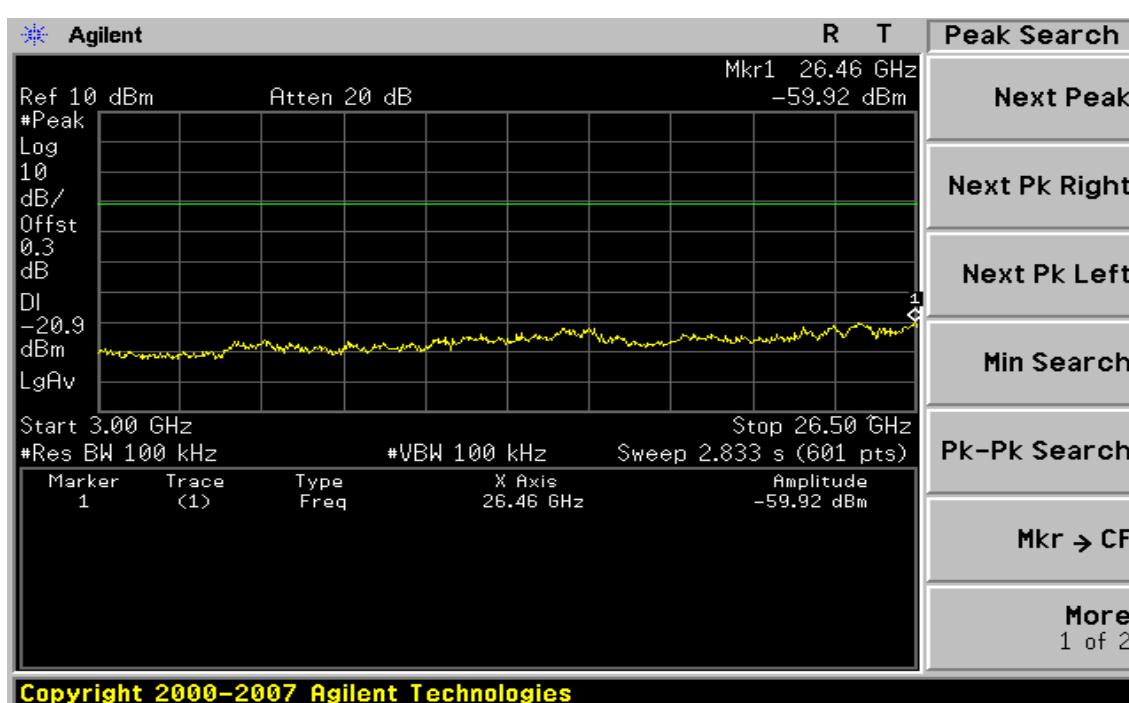
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## Conducted Spurious Emission Measurement Result (BDR mode)

### Ch Low 30MHz – 3GHz



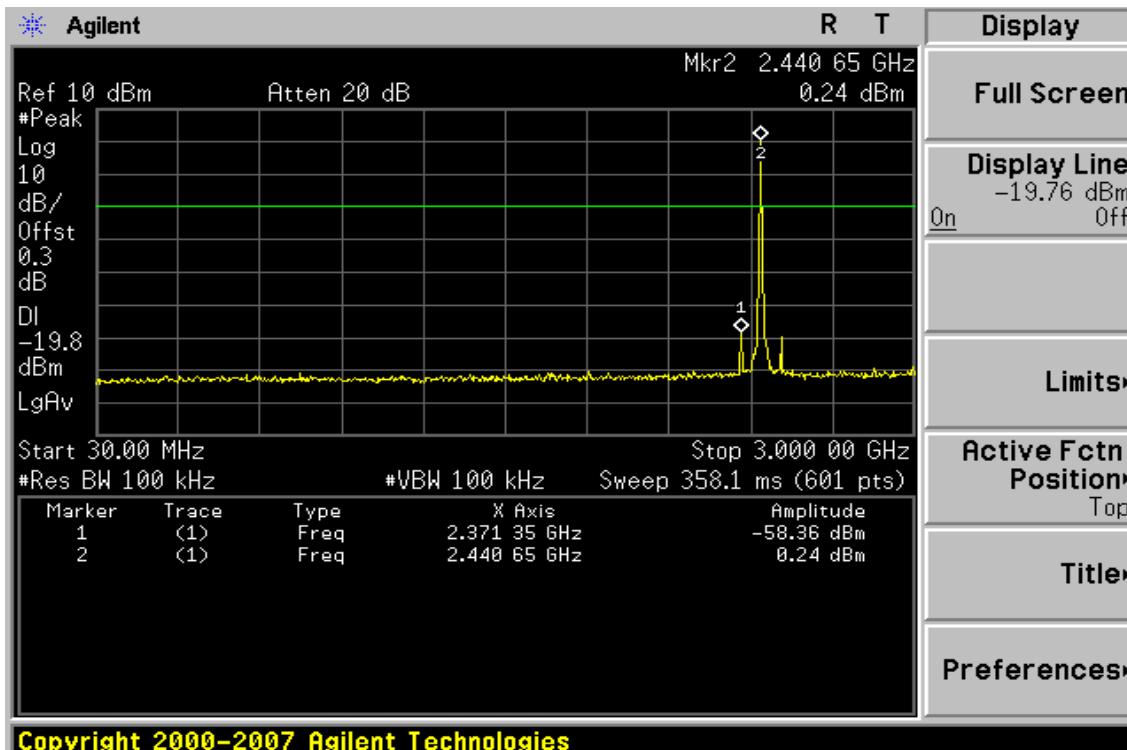
### Ch Low 3GHz – 26.5GHz



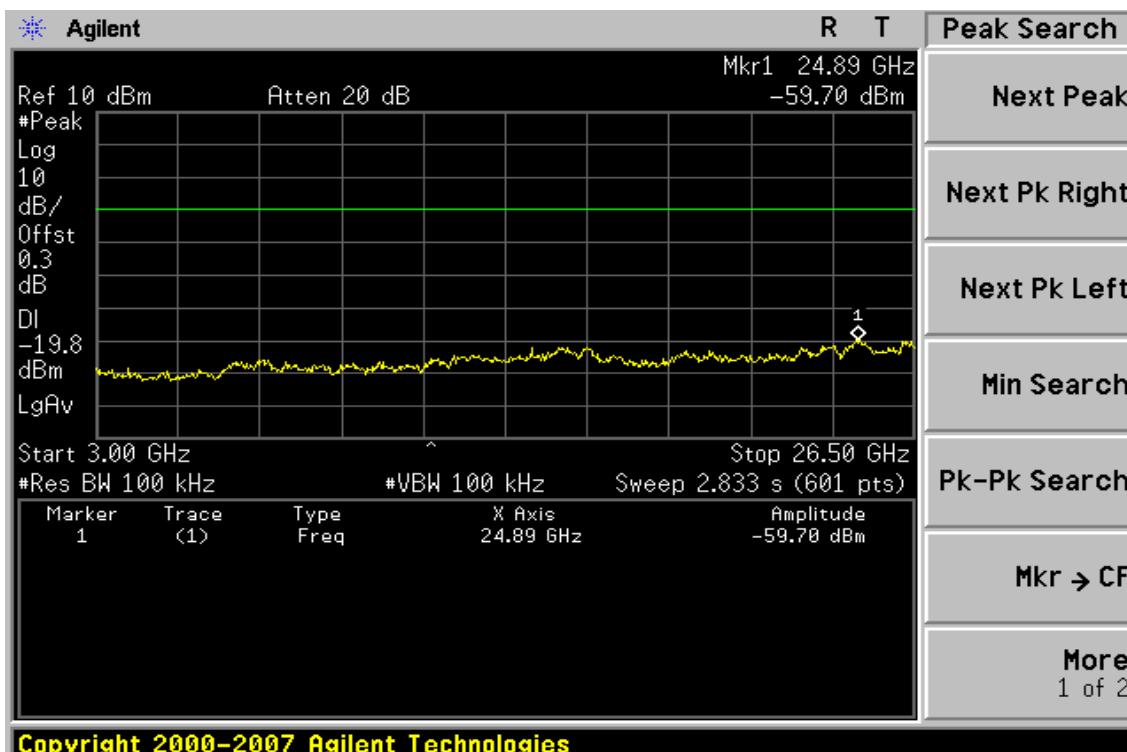
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## Ch Mid 30MHz – 3GHz



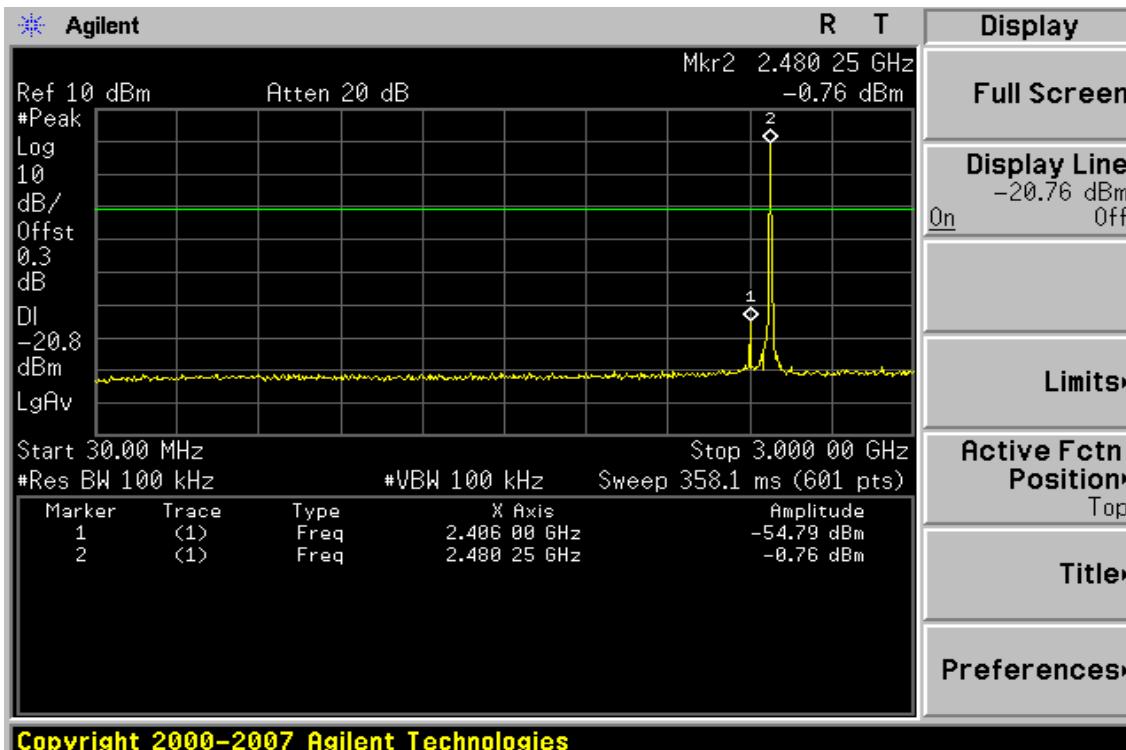
## Ch Mid 3GHz – 26.5GHz



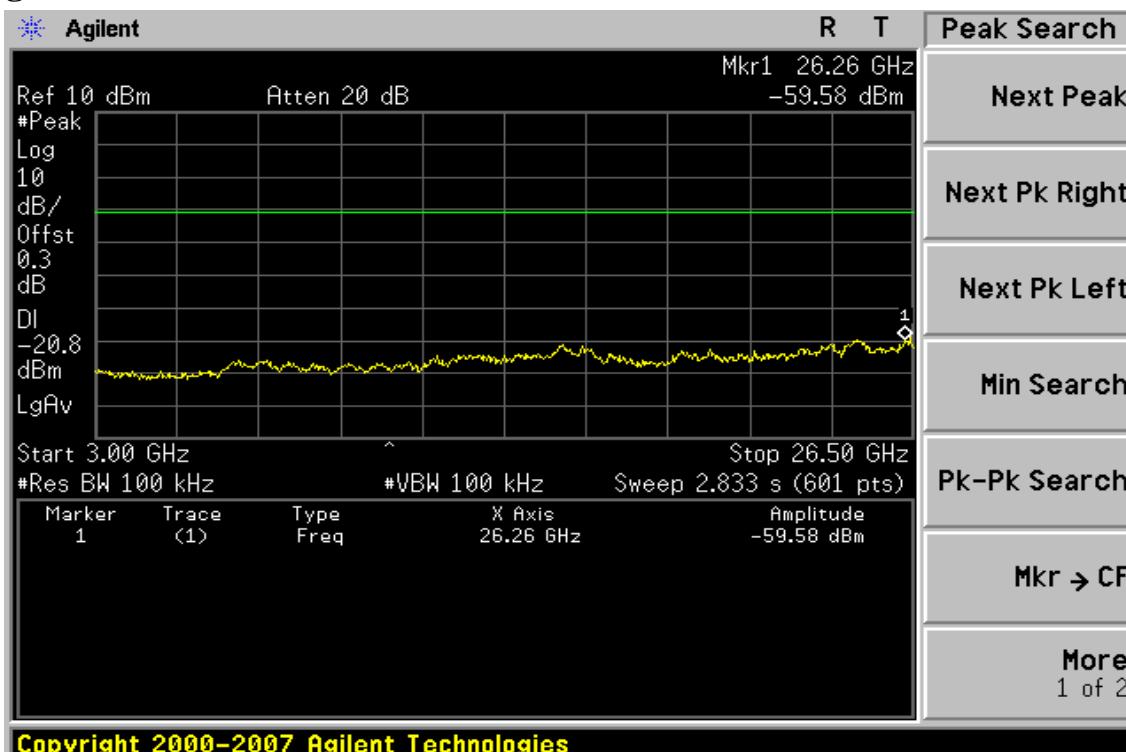
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## Ch High 30MHz – 3GHz



## Ch High 3GHz – 26.5GHz



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**Radiated Spurious Emission Measurement Result (below 1GHz) (BDR mode)**

Operation Mode	TX CH Low	Test Date	Apr. 06, 2010
Fundamental Frequency	2402MHz	Test By	Jason
Temperature	25 °C	Pol	Ver./Hor.
Humidity	65 %		

Freq. (MHz)	Ant.Pol. H/V	Detector Mode (PK/QP)	Reading (dBuV)	Factor (dB)	Actual FS (dBuV/m)	Limit3m (dBuV/m)	Safe Margin (dB)
33.88	V	Peak	45.29	-14.65	30.64	40.00	-9.36
53.28	V	Peak	42.84	-14.40	28.44	40.00	-11.56
90.14	V	Peak	49.33	-17.62	31.71	43.50	-11.79
104.69	V	Peak	43.41	-16.63	26.78	43.50	-16.72
153.19	V	Peak	33.76	-13.00	20.76	43.50	-22.74
589.69	V	Peak	32.68	-6.36	26.32	46.00	-19.68
53.28	H	Peak	40.85	-14.40	26.45	40.00	-13.55
75.59	H	Peak	39.48	-17.13	30.74	40.00	-9.26
92.08	H	Peak	40.90	-17.38	23.52	43.50	-19.98
150.28	H	Peak	32.64	-12.83	19.81	43.50	-23.69
358.83	H	Peak	32.80	-11.43	31.28	46.00	-14.72
625.58	H	Peak	32.49	-5.47	27.02	46.00	-18.98

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

Operation Mode	TX CH Mid	Test Date	Apr. 06, 2010
Fundamental Frequency	2441MHz	Test By	Jason
Temperature	25 °C	Pol	Ver./Hor.
Humidity	65 %		

Freq. (MHz)	Ant.Pol. H/V	Detector Mode (PK/QP)	Reading (dBuV)	Factor (dB)	Actual FS (dBuV/m)	Limit3m (dBuV/m)	Safe Margin (dB)
33.88	V	Peak	45.79	-14.65	31.14	40.00	-8.86
58.13	V	Peak	41.99	-14.66	27.33	40.00	-12.67
77.53	V	Peak	43.06	-17.46	25.60	40.00	-14.40
90.14	V	Peak	49.08	-17.62	31.13	43.50	-12.37
101.78	V	Peak	43.53	-16.87	26.66	43.50	-16.84
441.28	V	Peak	32.83	-8.76	31.32	46.00	-14.68
53.28	H	Peak	40.32	-14.40	25.92	40.00	-14.08
75.59	H	Peak	41.12	-17.13	23.99	40.00	-16.01
92.08	H	Peak	40.06	-17.38	22.68	43.50	-20.82
158.04	H	Peak	33.12	-13.28	19.84	43.50	-23.66
431.58	H	Peak	32.46	-9.09	23.37	46.00	-22.63
594.54	H	Peak	32.35	-6.18	26.17	46.00	-19.83

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

Operation Mode TX CH High Test Date Apr. 06, 2010  
Fundamental Frequency 2480MHz Test By Jason  
Temperature 25 °C Pol Ver./Hor.  
Humidity 65 %

Freq. (MHz)	Ant.Pol. H/V	Detector Mode (PK/QP)	Reading (dBuV)	Factor (dB)	Actual FS (dBuV/m)	Limit3m (dBuV/m)	Safe Margin (dB)
36.79	V	Peak	43.49	-14.36	29.13	40.00	-10.87
56.19	V	Peak	42.92	-14.63	28.29	40.00	-11.71
64.92	V	Peak	42.29	-14.83	27.46	40.00	-12.54
82.38	V	Peak	44.45	-17.93	26.52	40.00	-13.48
90.14	V	Peak	49.27	-17.62	31.65	43.50	-11.85
465.53	V	Peak	31.63	-8.55	23.08	46.00	-22.92
31.94	H	Peak	42.90	-14.82	28.08	40.00	-11.92
53.28	H	Peak	41.75	-14.40	27.35	40.00	-12.65
90.14	H	Peak	41.44	-17.62	23.82	43.50	-19.68
150.28	H	Peak	32.24	-12.83	19.41	43.50	-24.09
439.34	H	Peak	32.53	-8.80	23.73	46.00	-22.27
676.99	H	Peak	32.59	-4.98	27.61	46.00	-18.39

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

Operation Mode	TX CH Low	Test Date	Apr. 06, 2010
Fundamental Frequency	2402 MHz	Test By	Jason
Temperature	25 °C	Pol	Ver.
Humidity	65 %		

Freq. (MHz)	Peak	AV	Actual FS			Peak	AV	Margin (dB)
	Reading (dBuV)	Reading (dBuV)	Ant./CL CF(dB)	Peak (dBuV/m)	AV (dBuV/m)	Limit (dBuV/m)	Limit (dBuV/m)	
3626.0	36.14	---	2.46	38.60	---	74.00	54.00	-15.40
4804.0	34.03	---	6.04	40.07	---	74.00	54.00	-13.93
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 ms.
- (5) Spectrum AV Setting : 1GHz- 26GHz, RBW= 1MHz, VBW= 10Hz, Sweep time= 200 ms.

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

Operation Mode	TX CH Low	Test Date	Apr. 06, 2010
Fundamental Frequency	2402 MHz	Test By	Jason
Temperature	25 °C	Pol	Hor.
Humidity	65 %		

Freq. (MHz)	Peak	AV	Actual FS		Peak	AV	Margin (dB)	
	Reading (dBuV)	Reading (dBuV)	Ant./CL CF(dB)	Peak (dBuV/m)	AV (dBuV/m)	Limit (dBuV/m)	Limit (dBuV/m)	
3203.5	37.38	---	1.07	38.45	---	74.00	54.00	-15.55
4804.0	34.23	---	6.04	40.27	---	74.00	54.00	-13.73
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 ms.
- (5) Spectrum AV Setting : 1GHz- 26GHz, RBW= 1MHz, VBW= 10Hz, Sweep time= 200 ms.

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

Operation Mode	TX CH Mid	Test Date	Apr. 06, 2010
Fundamental Frequency	2441 MHz	Test By	Jason
Temperature	25 °C	Pol	Ver.
Humidity	65 %		

Freq. (MHz)	Peak	AV	Actual FS		Peak	AV	Margin (dB)	
	Reading (dBuV)	Reading (dBuV)	Ant./CL CF(dB)	Peak (dBuV/m)	AV (dBuV/m)	Limit (dBuV/m)	Limit (dBuV/m)	
3203.5	36.88	---	1.07	37.95	---	74.00	54.00	-16.05
4882.0	34.57	---	6.17	40.74	---	74.00	54.00	-13.26
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 ms.
- (5) Spectrum AV Setting : 1GHz- 26GHz, RBW= 1MHz, VBW= 10Hz, Sweep time= 200 ms.

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

Operation Mode	TX CH Mid	Test Date	Apr. 06, 2010
Fundamental Frequency	2441 MHz	Test By	Jason
Temperature	25 °C	Pol	Hor.
Humidity	65 %		

Freq. (MHz)	Peak	AV	Actual FS		Peak	AV	Margin (dB)	
	Reading (dBuV)	Reading (dBuV)	Ant./CL CF(dB)	Peak (dBuV/m)	AV (dBuV/m)	Limit (dBuV/m)	Limit (dBuV/m)	
3106.0	36.95	---	0.77	37.72	---	74.00	54.00	-16.28
4882.0	34.54	---	6.17	40.71	---	74.00	54.00	-13.29
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 ms.
- (5) Spectrum AV Setting : 1GHz- 26GHz, RBW= 1MHz, VBW= 10Hz, Sweep time= 200 ms.

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

Operation Mode	TX CH High	Test Date	Apr. 06, 2010
Fundamental Frequency	2480 MHz	Test By	Jason
Temperature	25 °C	Pol	Ver.
Humidity	65 %		

Freq. (MHz)	Peak	AV	Actual FS		Peak	AV	Margin (dB)	
	Reading (dBuV)	Reading (dBuV)	Ant./CL CF(dB)	Peak (dBuV/m)	AV (dBuV/m)	Limit (dBuV/m)	Limit (dBuV/m)	
3203.5	37.46	---	1.07	38.53	---	74.00	54.00	-15.47
4960.0	33.75	---	6.36	40.11	---	74.00	54.00	-13.89
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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**Radiated Spurious Emission Measurement Result (above 1GHz)**

Operation Mode	TX CH High	Test Date	Apr. 06, 2010
Fundamental Frequency	2480 MHz	Test By	Jason
Temperature	25 °C	Pol	Hor.
Humidity	65 %		

Freq. (MHz)	Peak	AV	Actual FS		Peak	AV	Margin (dB)	
	Reading (dBuV)	Reading (dBuV)	Ant./CL CF(dB)	Peak (dBuV/m)	AV (dBuV/m)	Limit (dBuV/m)	Limit (dBuV/m)	
3190.5	37.14	---	1.06	38.20	---	74.00	54.00	-15.80
4960.0	33.92	---	6.36	40.28	---	74.00	54.00	-13.72
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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## 9. FREQUENCY SEPARATION

### 9.1. Standard Applicable

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

### 9.2. Measurement Equipment Used:

Refer to section 6.2 for details.

### 9.3. Test Set-up:

Refer to section 6.3 for details.

### 9.4. 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.

### 9.5. Measurement Result:

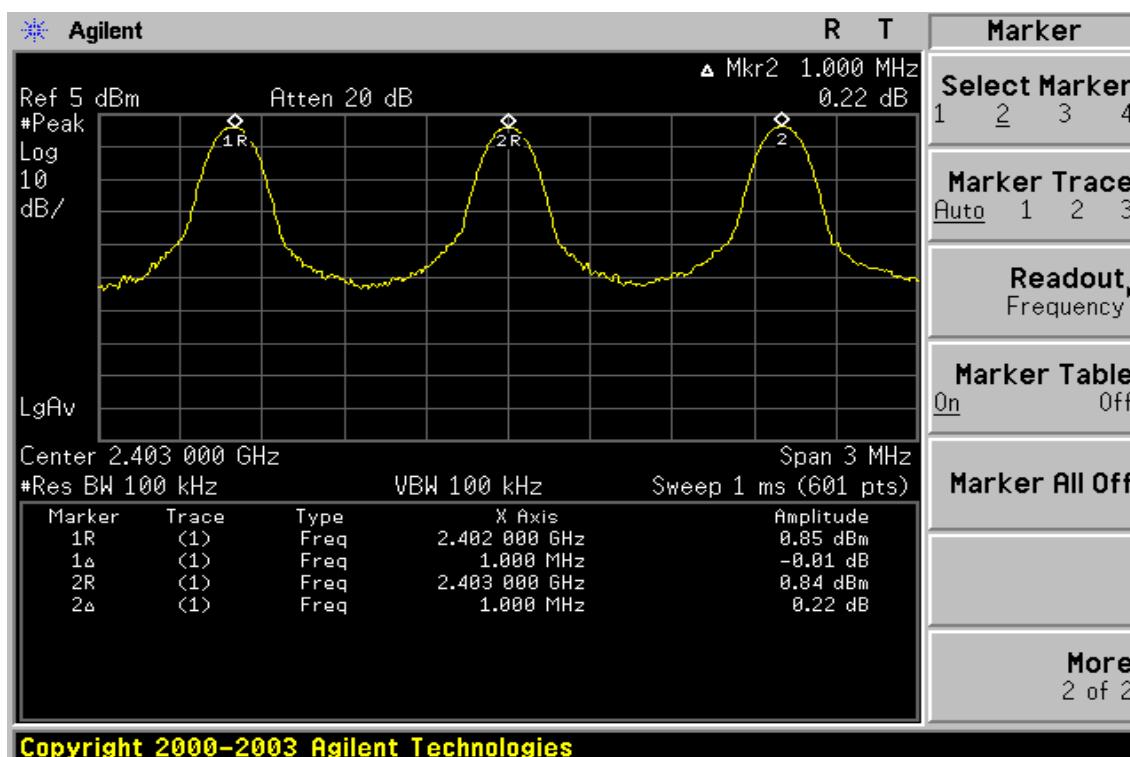
Channel separation (MHz)	Limit	Result
1	>=25KHz or 2/3 times 20dB bandwidth	PASS

Note: Refer to next page for plots.

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## Frequency Separation Test Data



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## 10. NUMBER OF HOPPING FREQUENCY

### 10.1. 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.

### 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 spectrum analyzer Start=2400MHz, Stop = 2483.5MHz, Sweep = auto.
4. Set the spectrum analyzer as RBW=430KHz,, VBW=1.3MHz.
5. Max hold, view and count how many channel in the band.

### 10.5. Measurement Result:

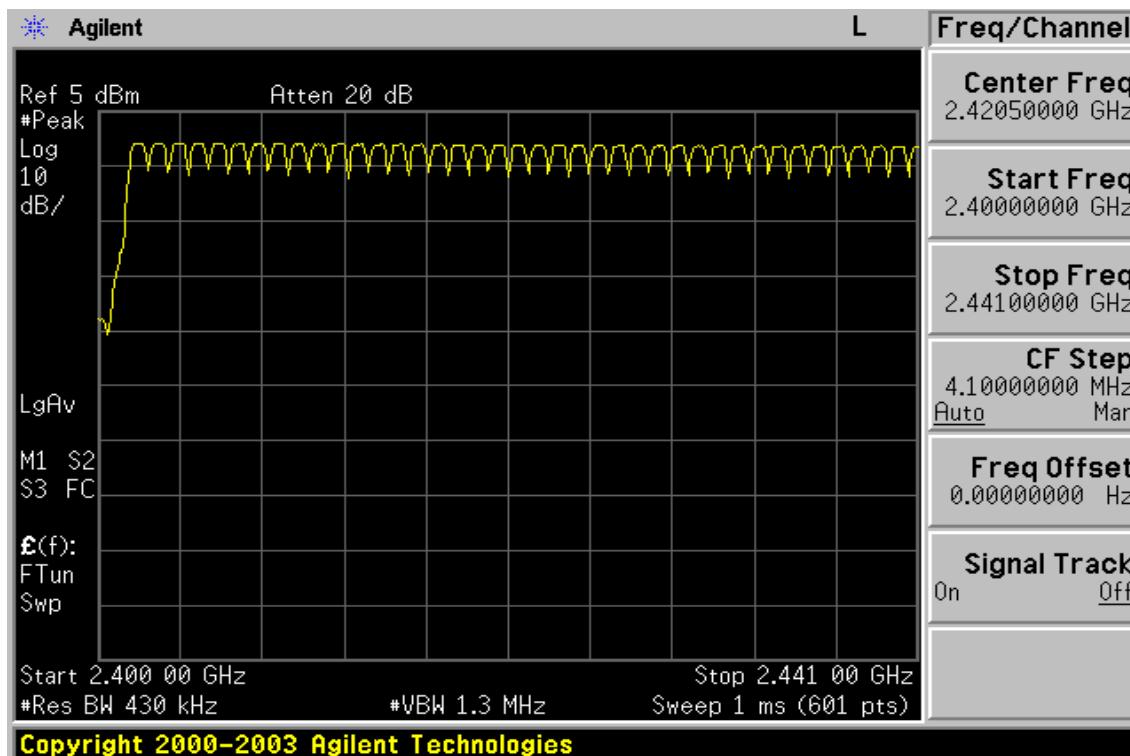
Note: Refer to next page for plots.

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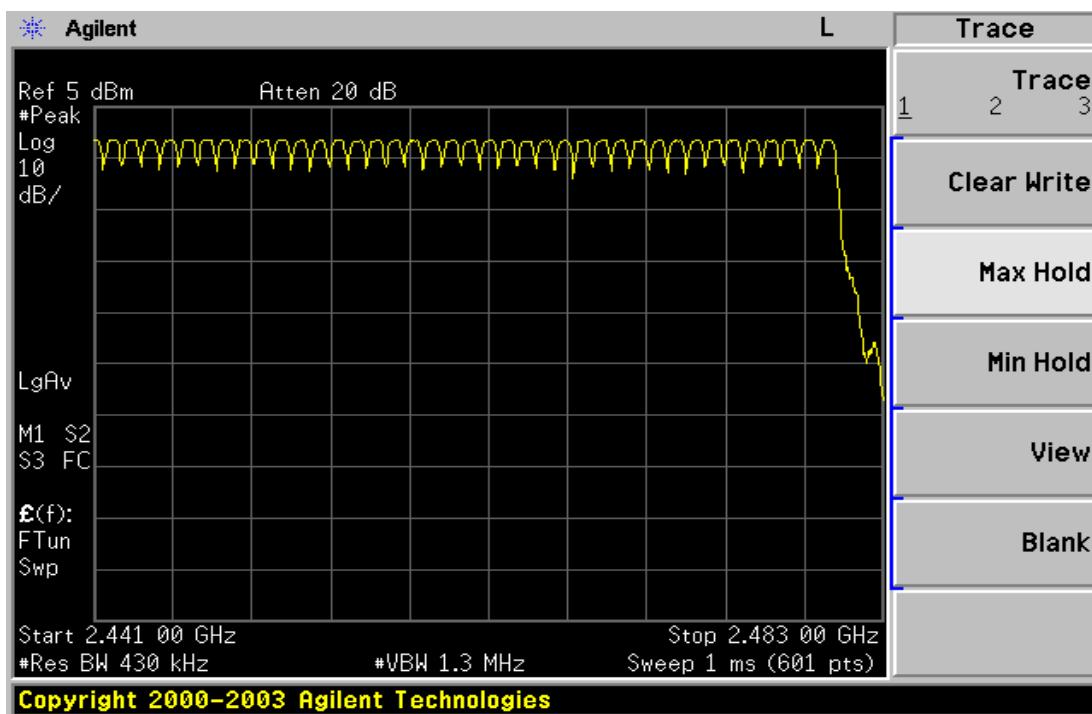
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## Channel Number

2.4 GHz – 2.441GHz



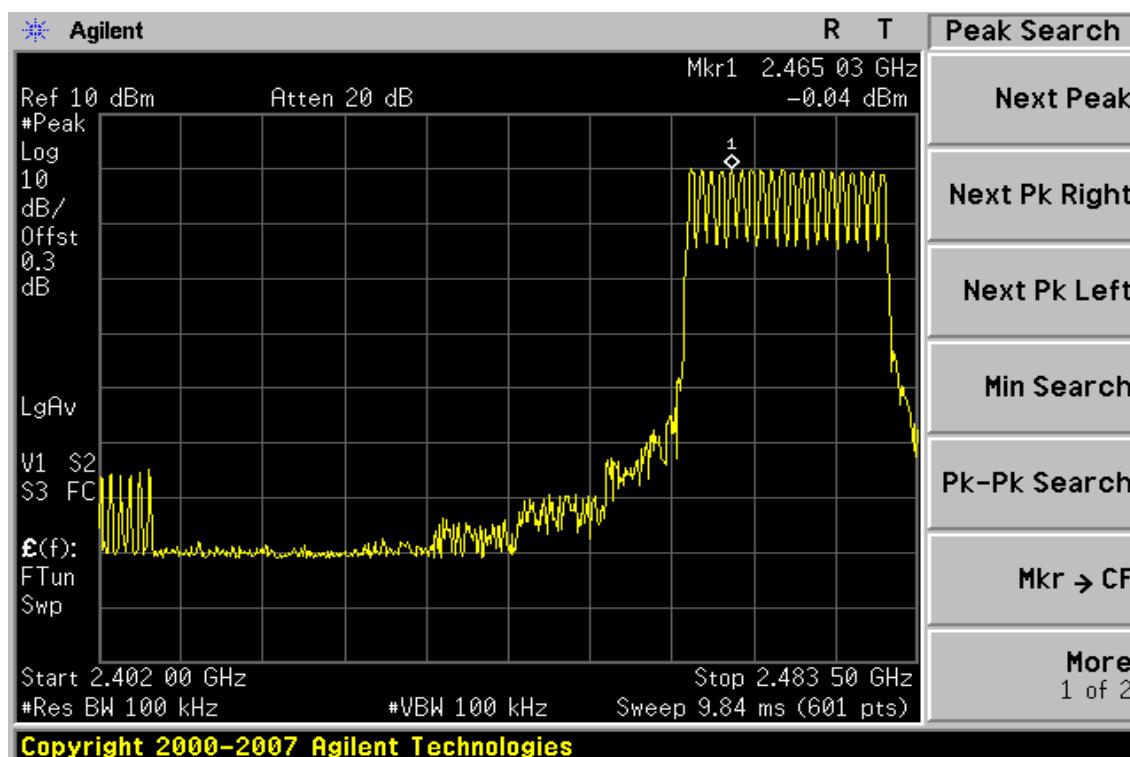
2.441 GHz – 2.4835GHz



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## 11. TIME OF OCCUPANCY (DWELL TIME)

### 11.1. 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.

### 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 center frequency of spectrum analyzer = operating frequency.
4. Set the spectrum analyzer as RBW,VBW=1MHz, Span = 0Hz , Adjust Sweep = 15s.
5. Repeat above procedures until all frequency measured were complete.

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## 11.5. Measurement Result

A period time =  $0.4 \text{ (ms)} * 79 = 31.6 \text{ (s)}$

CH Low: DH1 time slot =  $0.417 \text{ (ms)} * (1600/(2*79)) * 31.6 = 133.44 \text{ (ms)}$

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

DH5 time slot =  $2.925 \text{ (ms)} * (1600/(6*79)) * 31.6 = 312.00 \text{ (ms)}$

CH Mid: DH1 time slot =  $0.417 \text{ (ms)} * (1600/(2*79)) * 31.6 = 133.44 \text{ (ms)}$

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

DH5 time slot =  $2.925 \text{ (ms)} * (1600/(6*79)) * 31.6 = 312.00 \text{ (ms)}$

CH High: DH1 time slot =  $0.417 \text{ (ms)} * (1600/(2*79)) * 31.6 = 133.44 \text{ (ms)}$

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

DH5 time slot =  $2.925 \text{ (ms)} * (1600/(6*79)) * 31.6 = 312.00 \text{ (ms)}$

Note: Refer to next page for plots.

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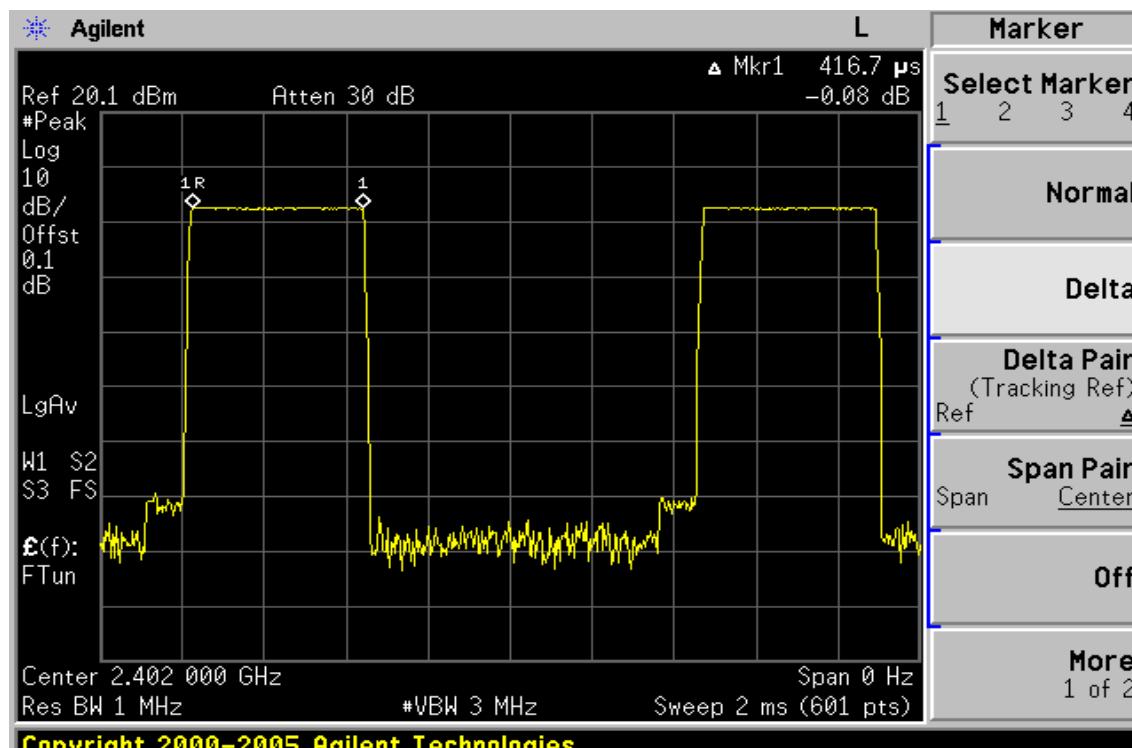
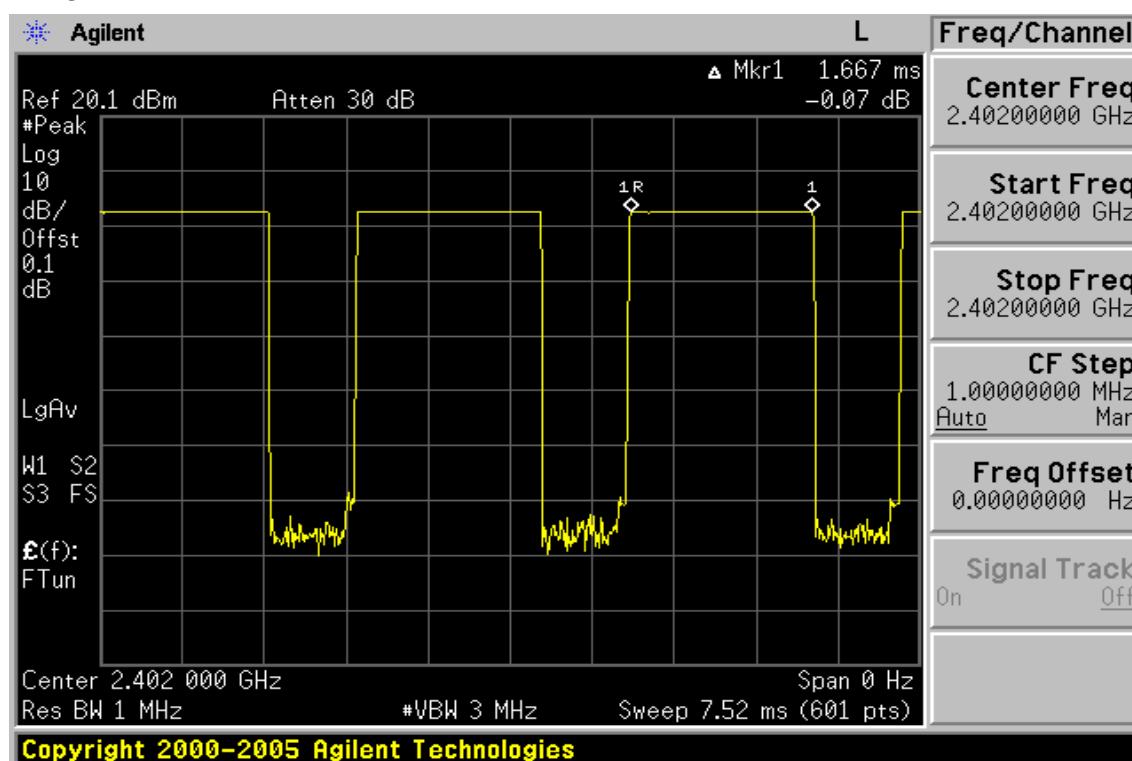
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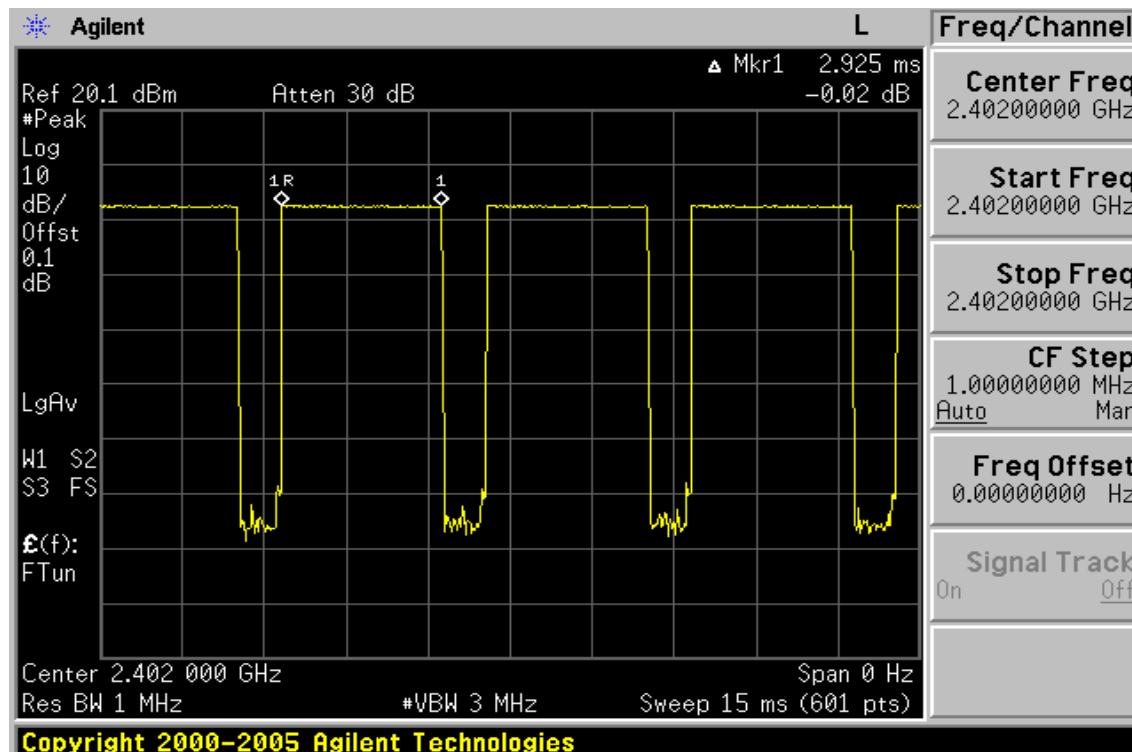
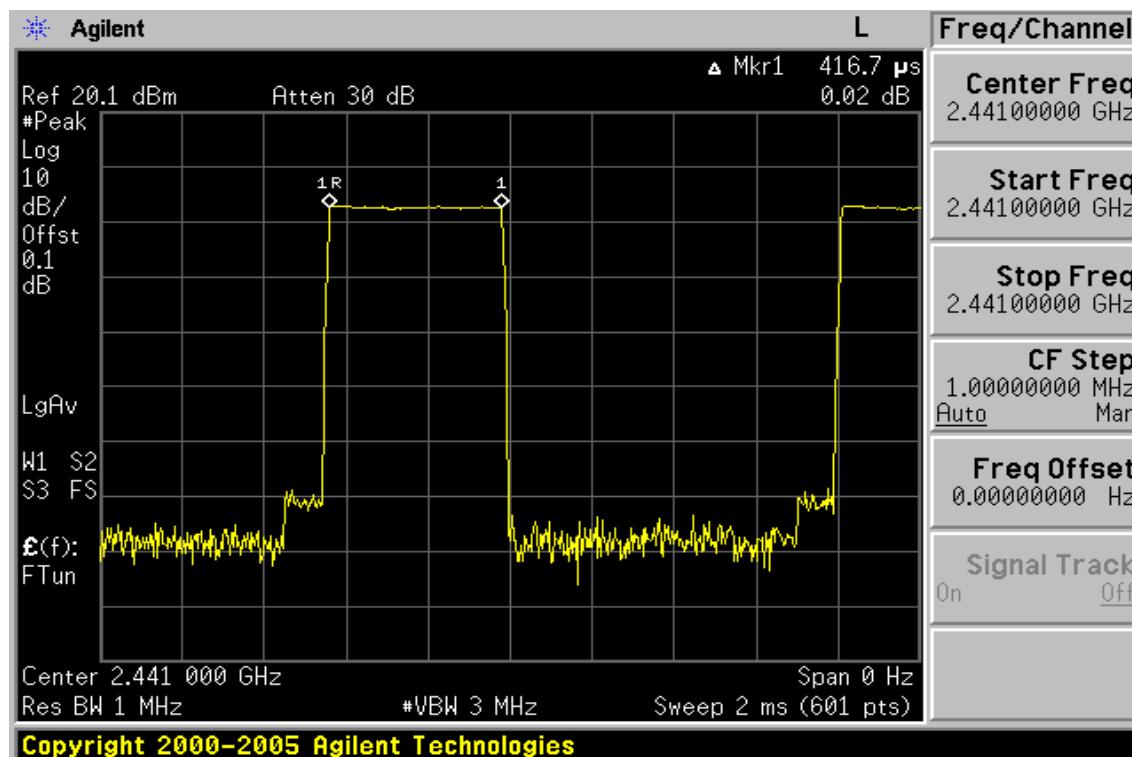
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**CH-Low**
**DH1**

**DH3**


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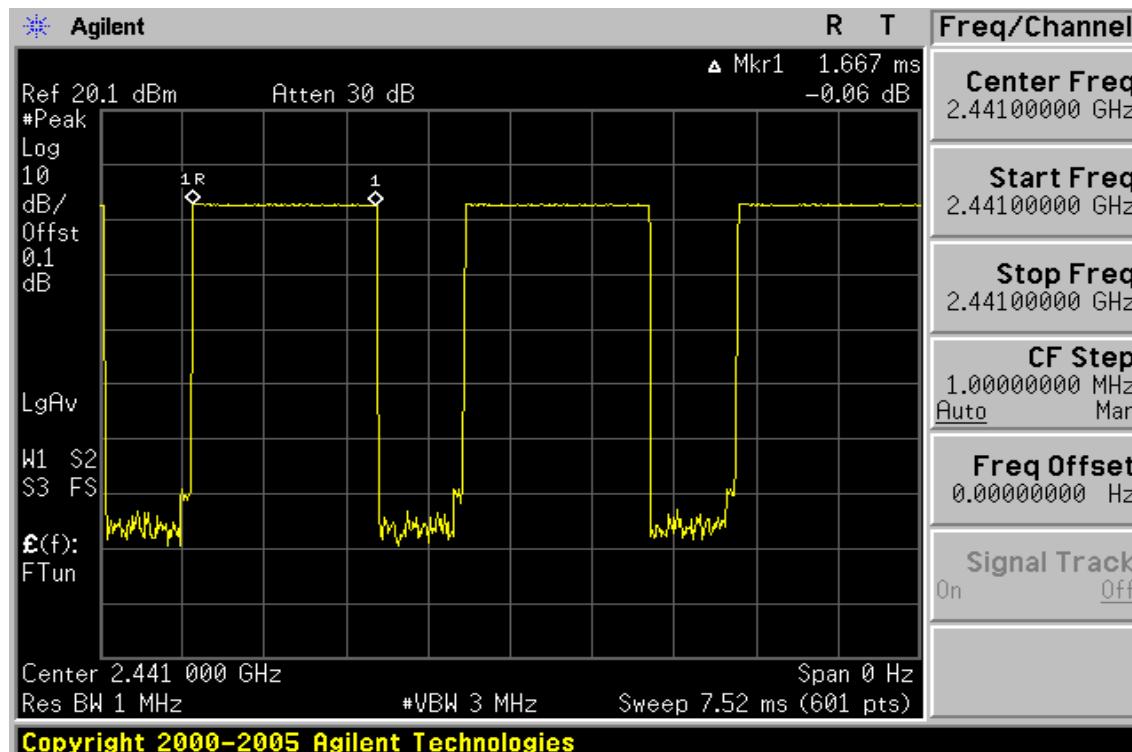
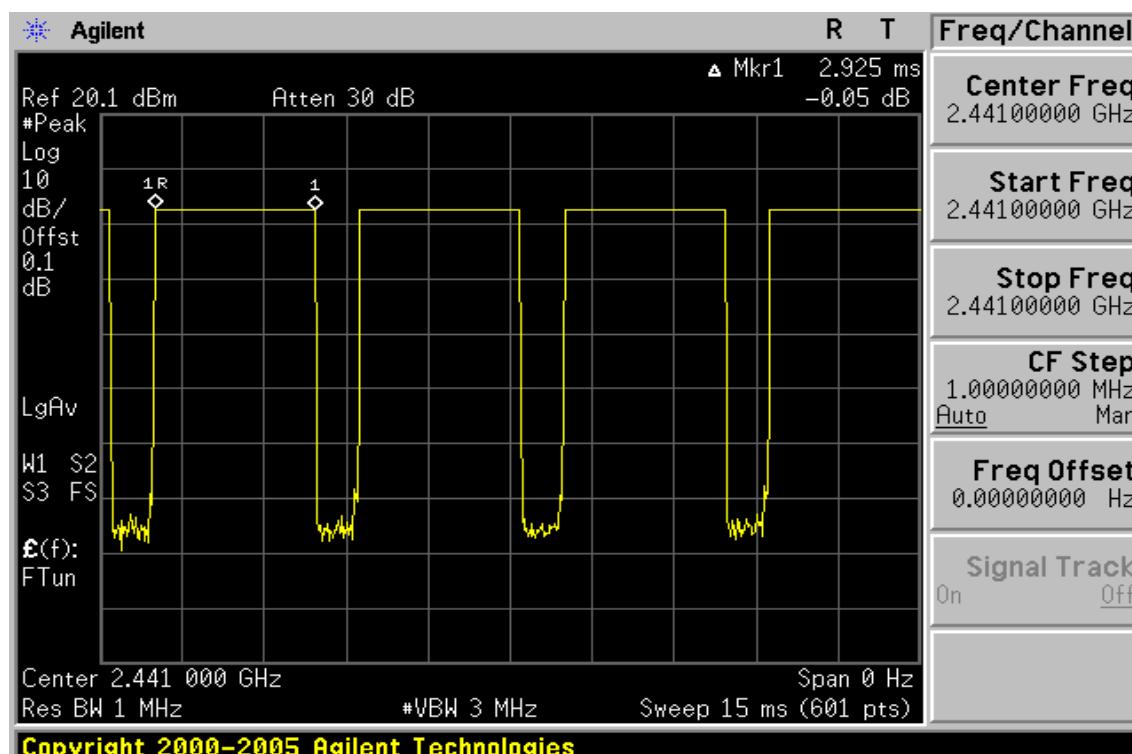
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**DH5**

**CH-Mid**
**DH1**


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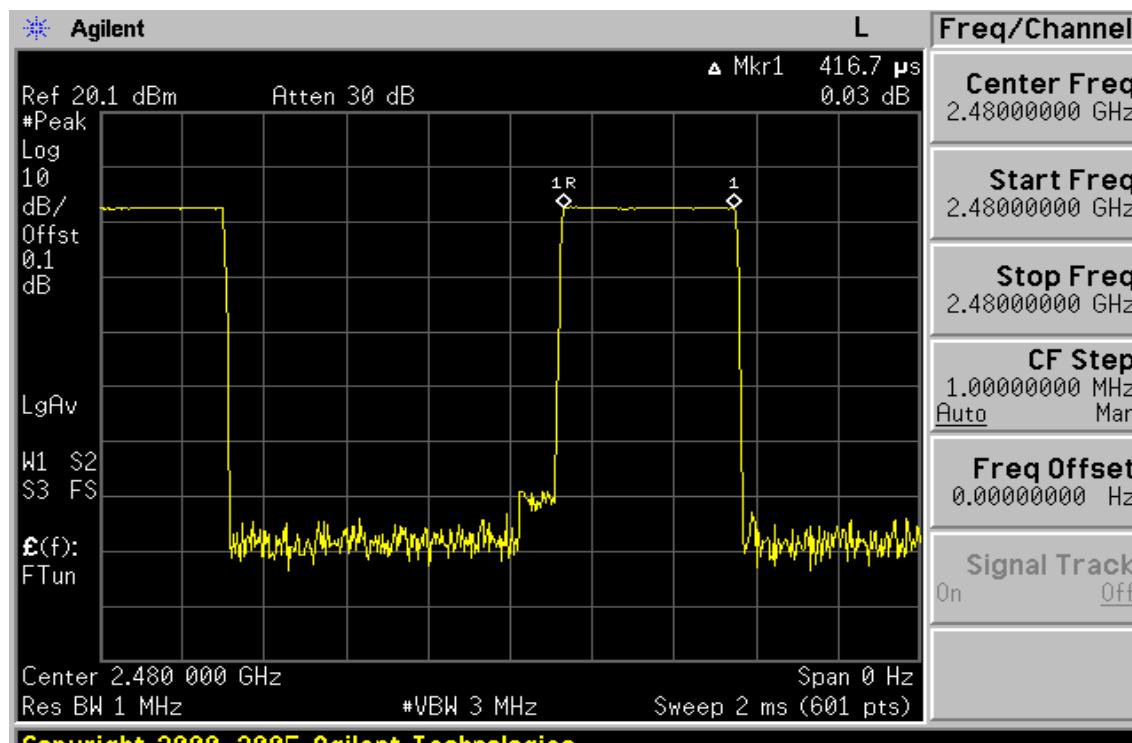
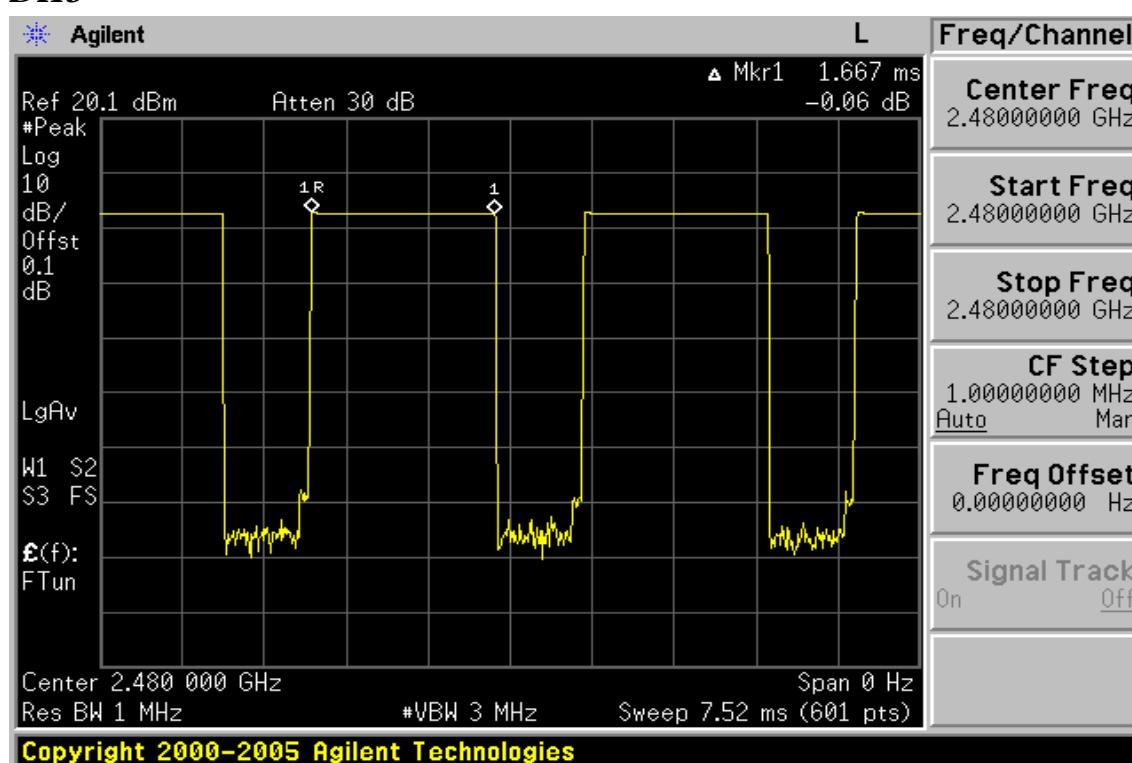
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**DH3**

**DH5**


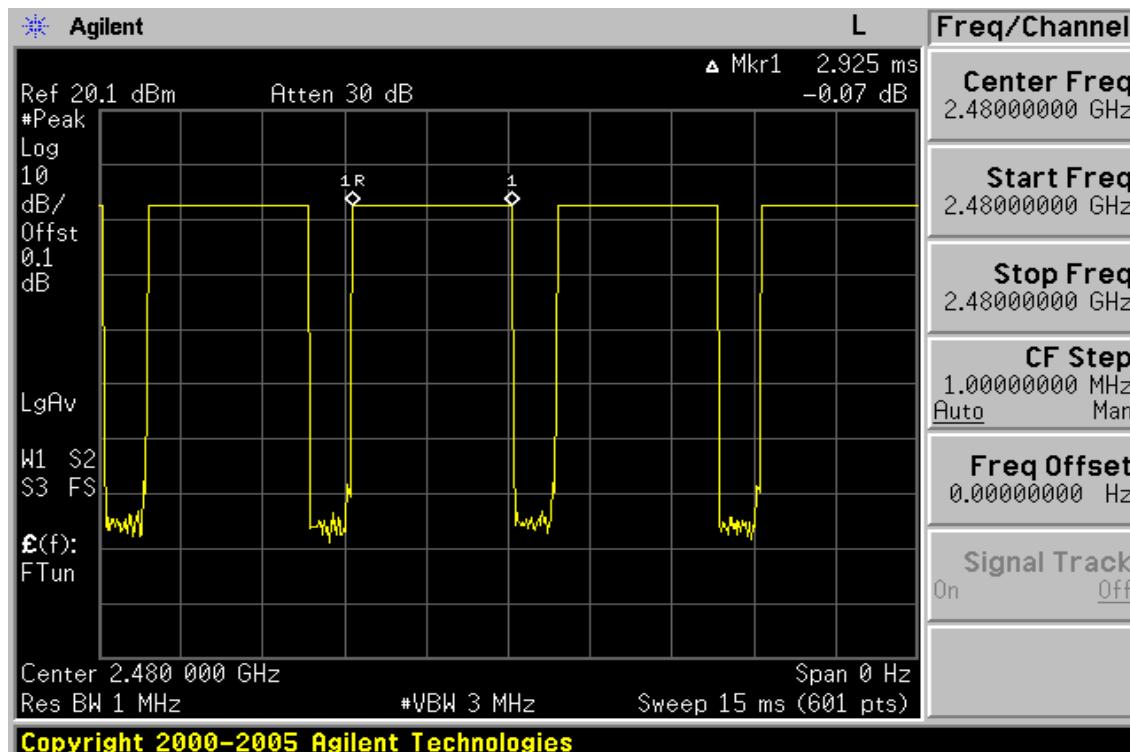
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**CH-High  
DH1**

**DH3**


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**DH5**

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## 12. Peak Power Spectral Density

### 12.1. Standard Applicable:

According to §15.247(d), for direct sequence systems, the peak power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3kHz band during any time interval of continuous transmission.

### 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 the spectrum analyzer as RBW = 3KHz, VBW = 10KHz, Span = 1.5MHz, Sweep=100s
4. Record the max. reading.
5. Repeat above procedures until all frequency measured were complete.

### 12.5. Measurement Result:

BDR Mode

CH	RF Power Density Reading (dBm)	Cable loss (dB)	RF Power Density Level (dBm)	Maximum Limit (dBm)
Low	-9.87	0.00	-9.87	8
Mid	-9.08	0.00	-9.08	8
High	-10.14	0.00	-10.14	8

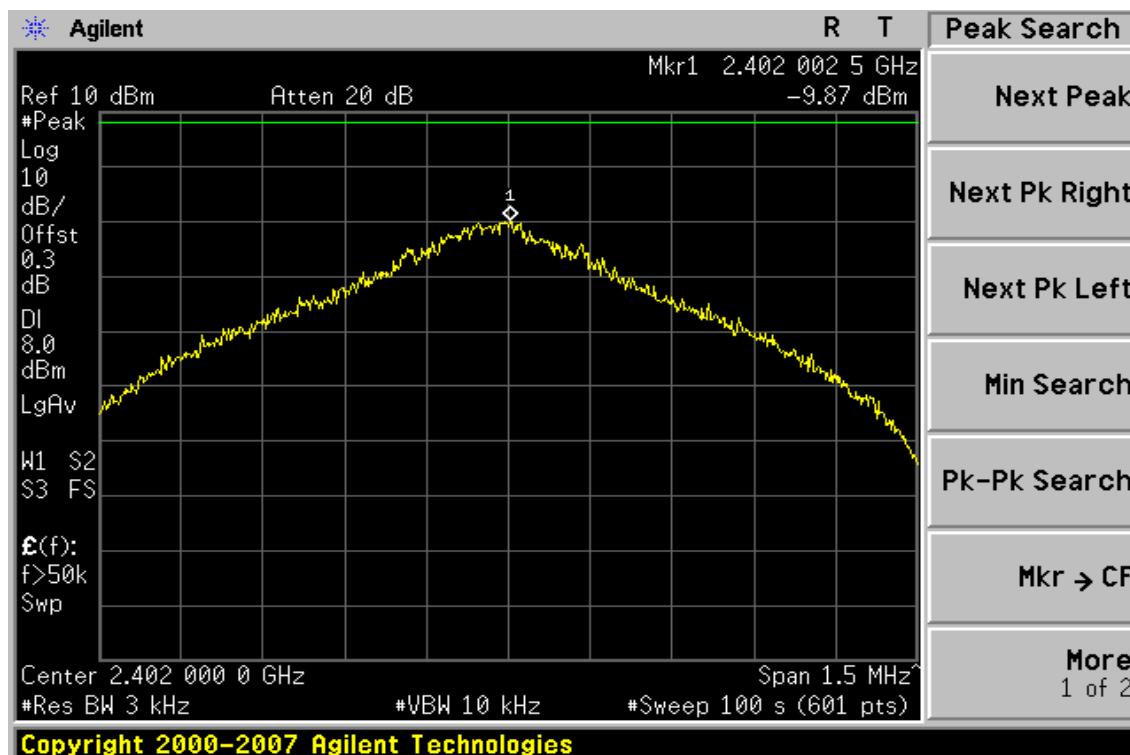
*offset  
0.3dB*

Note: Refer to next page for plots.

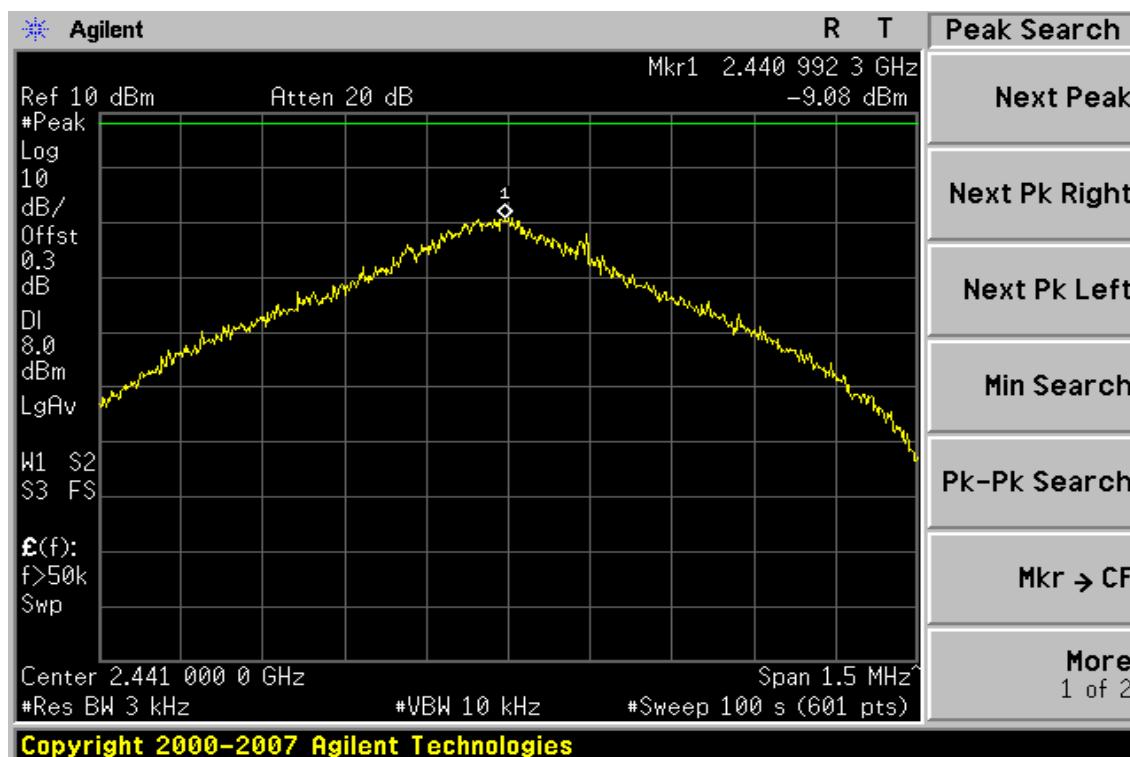
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## Power Spectral Density Test Plot (CH-Low) (BDR)

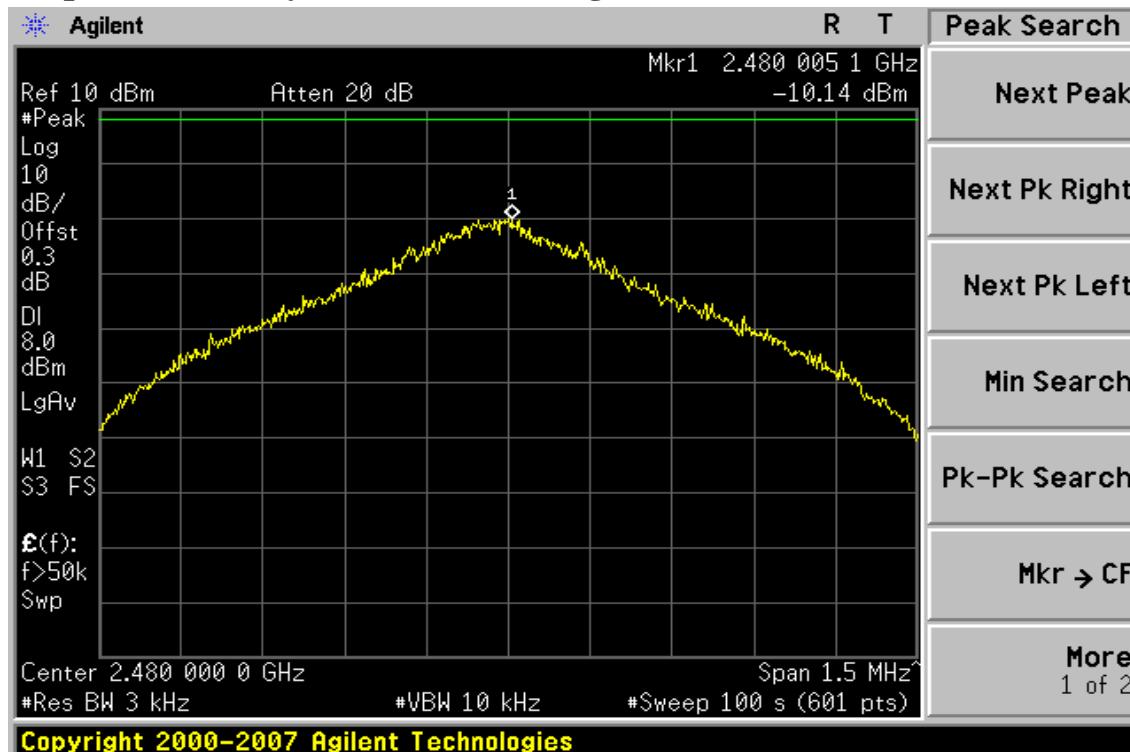


## Power Spectral Density Test Plot (CH-Mid) (BDR)



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**Power Spectral Density Test Plot (CH-High) (BDR)**

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## 13. 20dB BAND WIDTH

### 13.1. Standard Applicable

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

### 13.2. Measurement Equipment Used

Refer to section 6.2 for details.

### 13.3. Test Set-up

Refer to section 6.3 for details.

### 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 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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### 13.5. Measurement Result:

BDR mode:

CH	Bandwidth (kHz)
Lower	937.241
Mid	947.639
Higher	942.560

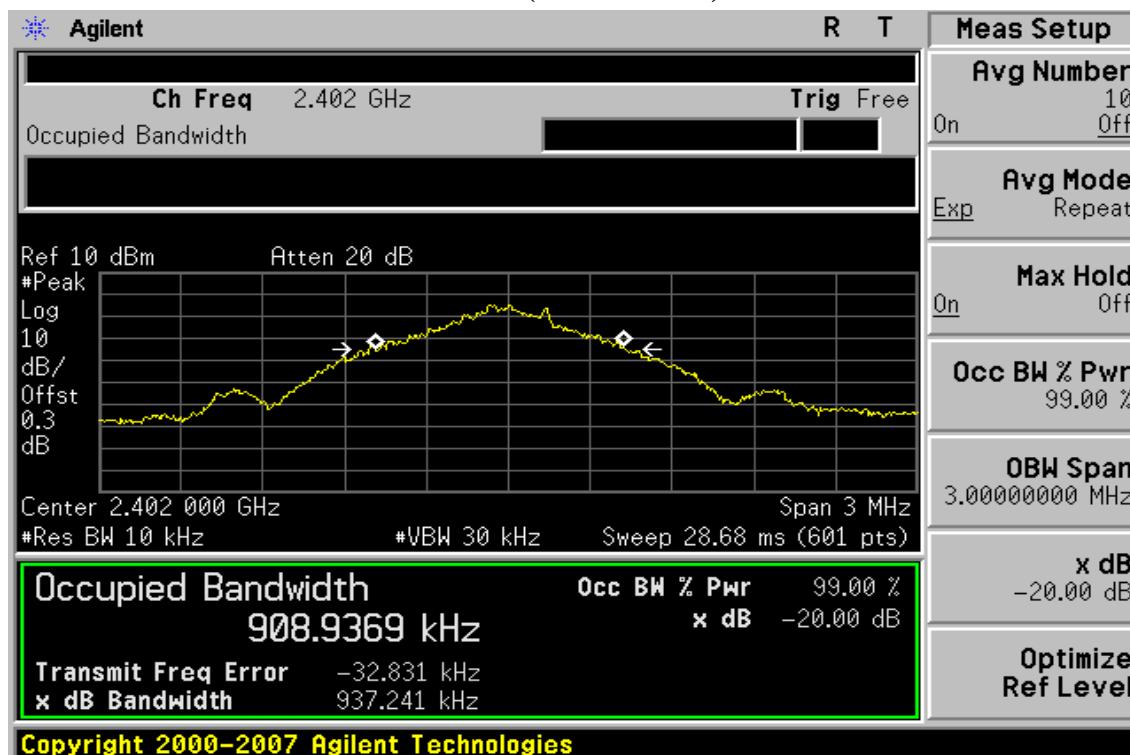
EDR mode:

CH	Bandwidth (MHz)	2/3 Bandwidth (MHz)
Lower	1.288	0.859
Mid	1.290	0.860
Higher	1.289	0.859

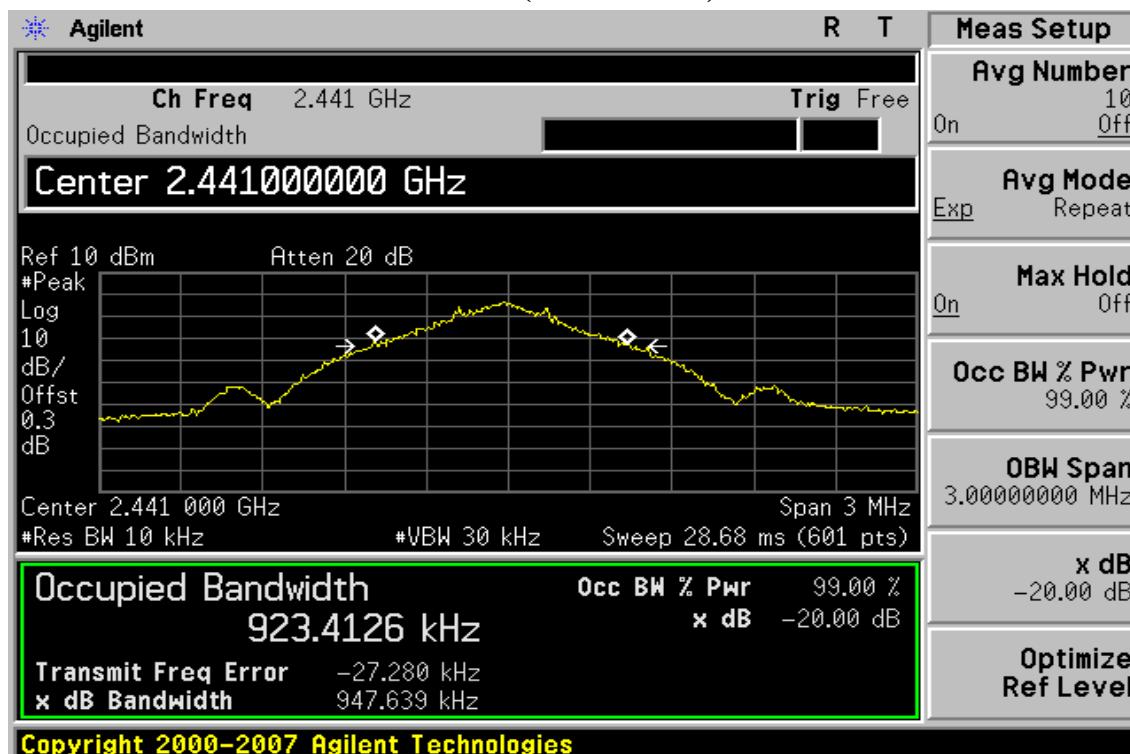
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## 20dB Band Width Test Data CH-Low (BDR mode)

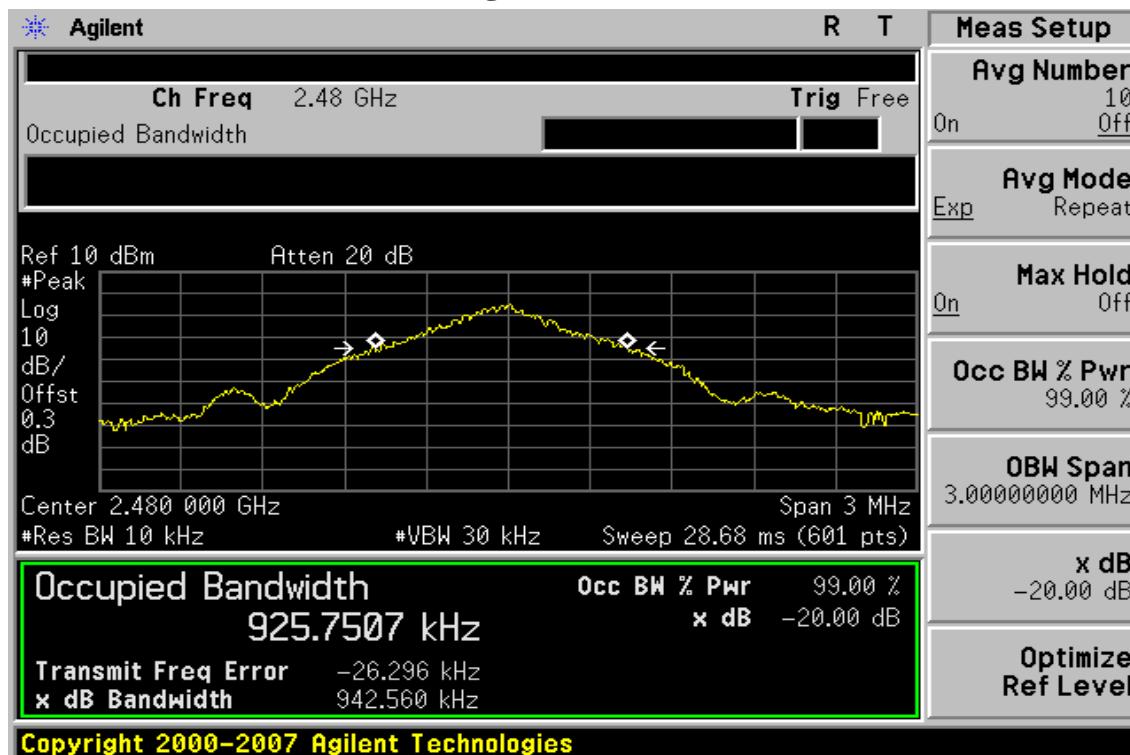


## 20dB Band Width Test Data CH-Mid (BDR mode)



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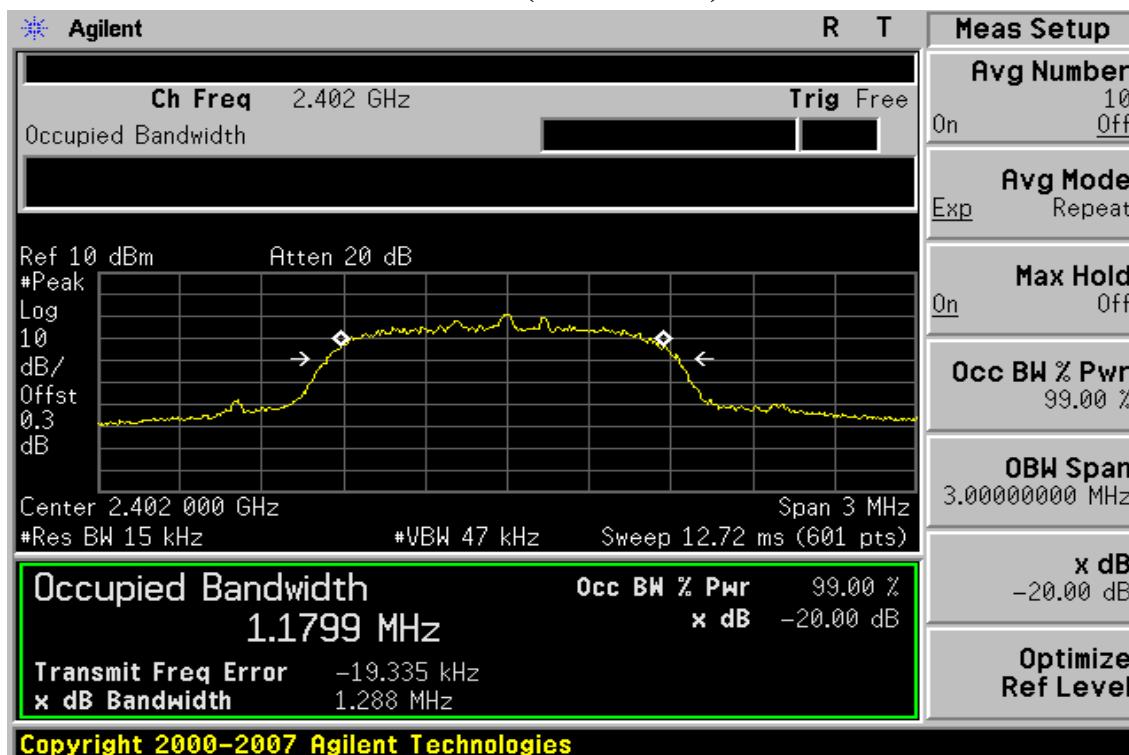
**20dB Band Width Test Data CH-High (BDR mode)**

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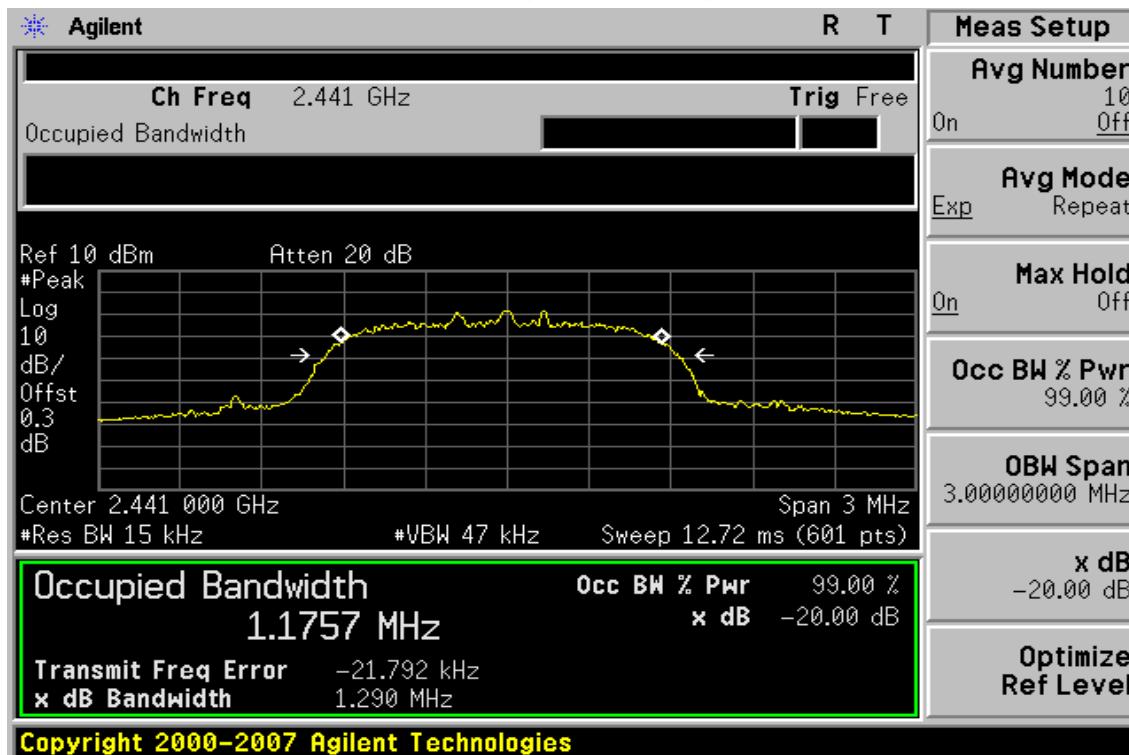
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## 20dB Band Width Test Data CH-Low (EDR mode)

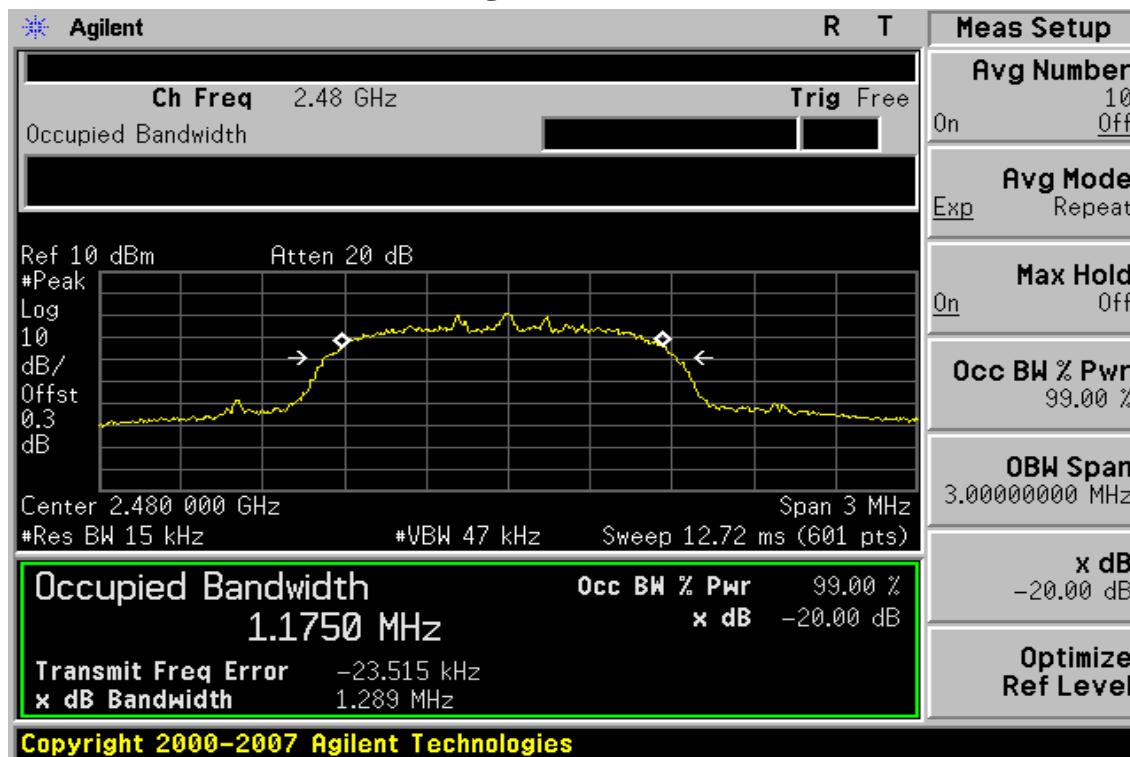


## 20dB Band Width Test Data CH-Mid (EDR mode)



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

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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.

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.

### 14.2. Antenna Connected Construction

The directional gains of antenna used for transmitting is 1.2dBi, and the antenna connector is designed with permanent attachment and no consideration of replacement. Please see EUT photo for details.

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