

ELECTROMAGNETIC EMISSIONS COMPLIANCE REPORT**INTENTIONAL RADIATOR CERTIFICATION TO
FCC PART 15 SUBPART C REQUIREMENT
AND INDUSTRY CANADA RSS-210**

OF

Product Name: POS terminal

Brand Name: ingenico

Model Name: iWP250

Model Difference: N/A

IC: 2586D-IWP250

FCC ID: XKBIWP250

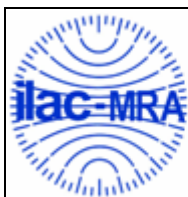
Report No.: EH/2009/30030

Issue Date: Jul. 28, 2009

Rule Part: FCC Part 15C:2007, §15.247,
RSS-210 issue 7:2007, Annex 8

Prepared for: INGENICO
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CERTIFICATION OF COMPLIANCE

Applicant: INGENICO
1 rue Claude Chappe BP346 Guilhaierand-Granges France

Product Name: POS terminal

Brand Name: ingenico

IC: 2586D-IWP250

FCC ID: XKBIWP250

Model No.: iWP250

Model Difference: N/A

File Number: EH/2009/30030




Date of test: Jul. 17, 2009 ~ Jul. 27, 2009

Date of EUT Received: Mar. 27, 2009

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 RSS-Gen. issue 2:2007, 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 15C:2007, §15.247 and RSS-210 issue 7: 2007 Annex 8.

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

Test By:		Date:	Jul. 28, 2009
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Prepared By:		Date:	Jul. 28, 2009
	_____ <i>Gigi Yeh / Clerk</i>		_____
Approved By:		Date:	Jul. 28, 2009
	_____ <i>Jim Chang / Supervisor</i>		_____

Version

Version No.	Date	Description
00	Jul. 28, 2009	Initial creation of document

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1. GENERAL INFORMATION

1.1. Product Description

General:

Product Name:	POS terminal	
Brand Name:	ingenico	
Model Name:	iWP250	
Model Difference:	N/A	
Power Supply	24Vdc by AC/DC power adapter	
	Adapter:	Model: EA11002B, Supplier: EDAC

GSM / DCS:

Cellular Phone Standards Frequency Range and Power	Operation Band	Frequency Range	Rated Power
	GSM/EDGE 850, class10	824 MHz– 849MHz	33dBm
	DCS/EDGE 1900, class10	1850MHz – 1910MHz	30dBm
Final Amplifier Voltage and Current Information	DC voltage (V)		DC current (mA)
	GSM 850, class10	24Vdc	325
	DCS1900, class10	24Vdc	310
	DEGE 850	24Vdc	315
	EDGE 1900	24Vdc	305
Antenna Designation:	PIFA Antenna / -2.3 dBi.		
Type of Emission	300KGXW		
IMEI	354060011204555		

WLAN:

Frequency Range:	2412 – 2462 MHz
Channel number:	11 channels
Max. Output Power:	802.11 b: 16.61 dBm (Peak) 802.11 g: 16.54 dBm (Peak)
Modulation Technology:	DSSS, 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 / -3.6dBi.

The EUT is compliance with IEEE 802.11 b/g Standard.

Bluetooth:

Bluetooth Version	<input type="checkbox"/> V1.1 (GFSK) <input type="checkbox"/> V1.2 (GFSK) <input type="checkbox"/> V2.0 (GFSK) <input type="checkbox"/> V2.0 + EDR (GFSK + /4DQPSK + 8DPSK) <input checked="" type="checkbox"/> V2.1 + EDR (GFSK + /4DQPSK + 8DPSK)
Frequency Range	2402 – 2480MHz
Channel number	79 channels max.
Rated Power	1.93 dBm (Peak)
Modulation type	Frequency Hopping Spread Spectrum
Antenna Designation	PIFA Antenna / -3.9dBi.

The EUT is compliance with Bluetooth 2.1 Standard.

RFID:

Operating Frequency	13.56MHz
Transmit Power	< 123dBuV/m at 3m.
Number of Channels	1
Operating Mode	Point-to-Point
Antenna Type	A permanent fixed antenna, which is built-In, designed as an indispensable part of the EUT.
Module Type	ASK

The EUT is compliance with RFID Standard.

This report applies for Bluetooth

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

This submittal(s) (test report) is intended for **FCC ID: XKBIWP250** filing to comply with Section 15.247 of the FCC Part 15C, Subpart C Rules. And **IC: 2586D-IWP250** filing to comply with Industry Canada RSS-210 issue 7: 2007 Annex 8.

1.3. Test Methodology

Both conducted and radiated testing were performed according to the procedures in ANSI C63.4 (2003) and RSS-Gen: 2007. Radiated testing was performed at an antenna to EUT distance 3 meters.

1.4. Test Facility

The measurement facilities used to collect the 3m Radiated Emission and AC power line conducted data are located on the address of SGS Taiwan Ltd. 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. 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.

1.5. Special Accessories

Not available for this EUT intended for grant.

1.6. Equipment Modifications

Not available for this EUT intended for grant.

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 tested with a test program to fix the Tx/RX frequency that was for the purpose of the measurements. For more information please see test data and APPENDIX 1 for set-up photographs.

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, 13 of ANSI C63.4-2003 and RSS-Gen:2007. 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 requirements in Section 8 and 13 of ANSI C63.4-2003.

2.4. Configuration of Tested System

Fig. 2-1 Configuration of Tested System (Fixed channel)

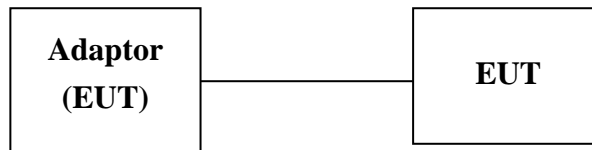


Table 2-1 Equipment Used in Tested System

Item	Equipment	Mfr/Brand	Model/ Type No.	Series No.
1.	AC Adaptor	EDAC	EA11002B	N/A
2.	Test software	Broadcom	C&D	N/A

3. SUMMARY OF TEST RESULTS

FCC Rules	Description Of Test	Result
§15.207(a)/ RSS-Gen §7.2.2	AC Power line Conducted Emission	Compliant
§15.247(b)(1)/ RSS-210 issue 7, §A8.4(2)	Peak Output Power	Compliant
§15.247(d) RSS-210 issue 7, §A8.5	100 KHz Bandwidth Of Frequency Band Edges	Compliant
§15.247(c) RSS-Gen §7.2.3 RSS-210 issue 7, §A2.9	TX/RX Spurious Emission	Compliant
§15.247(a)(1)/ RSS-210 issue 7, §A8.1(b)	Frequency Separation	Compliant
§15.247(a)(1)(iii)/ RSS-210 issue 7, §A8.1(d)	Number of hopping frequency	Compliant
§15.247(a)(1)(ii)/ RSS-210 issue 7, §A8.1(d)	Time of Occupancy	Compliant
§15.247/ RSS-210 issue 7, §A8.2(b)	Peak Power Density	Compliant
§15.247(a)(1)	20dB Bandwidth	No Limit
§15.203, §15.247(c)/ RSS-GEN 7.1.4, RSS-210 issue 7, §A8.4	Antenna Requirement	Compliant
RSS-Gen §4.4.1	99% Power Bandwidth	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 (2402MHz) 、mid (2441MHz) and high (2480MHz) with highest data rate are chosen for full testing.

5. AC POWER LINE CONDUCTED EMISSION TEST

5.1. Standard Applicable:

According to §15.207 and RSS-Gen §7.2.2, frequency range 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

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

5.2. 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	09/16/2008	09/15/2009
LISN	Rolf-Heine	NNB-2/16Z	99012	04/28/2009	04/27/2010
LISN	FCC	FCC-LISN-50/250-25-2-01	04034	04/28/2009	04/27/2010
Coaxial Cables	N/A	WK CE Cable	N/A	10/30/2008	10/29/2009

5.3. EUT Setup:

- The conducted emission tests were performed in the test site, using the setup in accordance with the ANSI C63.4-2003.
- The AC/DC Power adaptor of EUT was plug-in LISN. The EUT was placed flushed with the rear of the table.
- The LISN was connected with 110Vac/60Hz power source.

5.4. 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.

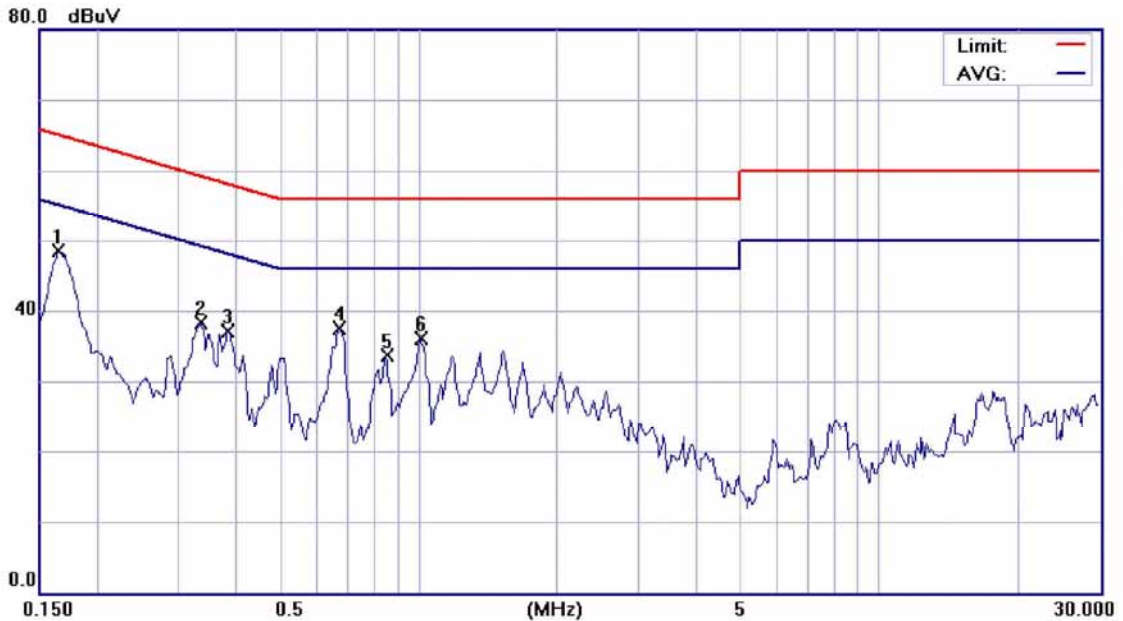
5.5. Measurement Result:

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.

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

AC POWER LINE CONDUCTED EMISSION TEST DATA

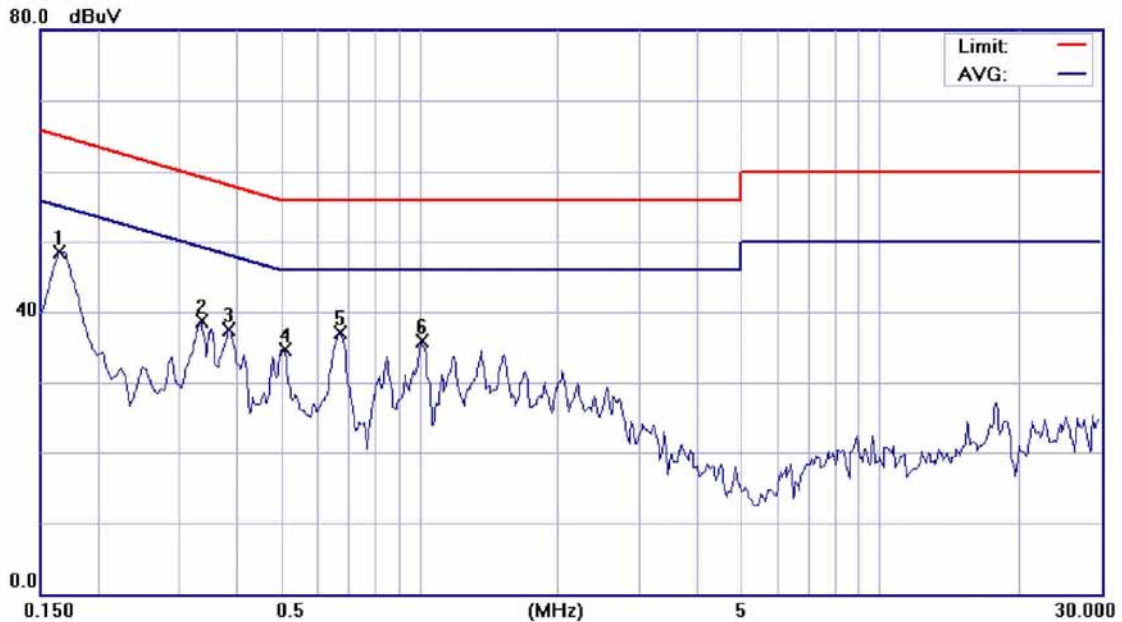
Operation Mode:	Bluetooth Mode	Test Date:	Jul. 24, 2009
Temperature:	24	Humidity:	60 %
		Test By:	Jason



Site: SGS CONDUCTED #1	Phase: L1	Temperature: 23 °C
Limit: FCC Class B Conduction(QP)	Power: AC 120V/60Hz	Humidity: 60 %
EUT: POS terminal	Distance:	Air Pressure: hpa
M/N: M82-250		
Note: BT Normal Link Mode		

No.	Mk.	Freq.	Reading Level	Factor	Measurement	Limit	Over	Detector	Comment
		MHz	dBuV	dB	dBuV	dBuV	dB		
1	*	0.1650	48.26	0.16	48.42	65.21	-16.79	peak	
2		0.3350	38.27	0.09	38.36	59.33	-20.97	peak	
3		0.3850	37.09	0.08	37.17	58.17	-21.00	peak	
4		0.6700	37.36	0.08	37.44	56.00	-18.56	peak	
5		0.8500	33.72	0.08	33.80	56.00	-22.20	peak	
6		1.0100	36.04	0.09	36.13	56.00	-19.87	peak	

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Site SGS CONDUCTED #1

Phase: **N**

Temperature: 23 °C

Limit: FCC Class B Conduction(QP)

Power: AC 120V/60Hz

Humidity: 60 %

EUT: POS terminal

Distance:

Air Pressure: hpa

M/N: M82-250

Note: BT Normal Link Mode

No.	Mk.	Freq. MHz	Reading Level dBuV	Factor dB	Measure- ment dBuV	Limit dBuV	Over dB	Detector	Comment
1	*	0.1650	48.40	0.18	48.58	65.21	-16.63	peak	
2		0.3350	38.67	0.12	38.79	59.33	-20.54	peak	
3		0.3850	37.48	0.11	37.59	58.17	-20.58	peak	
4		0.5100	34.54	0.10	34.64	56.00	-21.36	peak	
5		0.6700	36.97	0.11	37.08	56.00	-18.92	peak	
6		1.0100	35.70	0.12	35.82	56.00	-20.18	peak	

6. PEAK OUTPUT POWER MEASUREMENT

6.1. Standard Applicable:

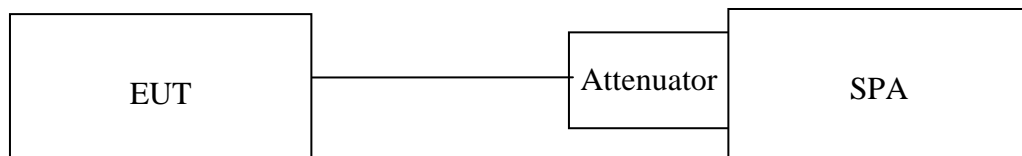
According to §15.247(b)(1), For frequency hopping systems operating in the 2400-2483.5 MHz band employing at least 75 hopping channels, and all frequency hopping systems in the 5725-5850MHz band: 1Watt. For all other frequency hopping systems in the 2400 – 2483.5MHz band: 0.125 Watts.

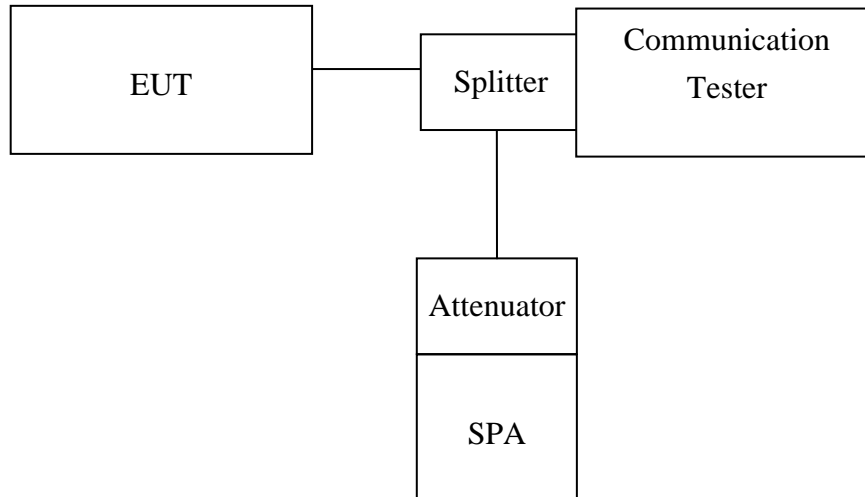
According to RSS-210 issue 7,§A8.4(2), For frequency hopping systems operating in the 2400-2483.5 MHz band employing at least 75 hopping channels, the maximum conducted output power shall not exceed 1 W. For all other frequency hopping systems, the maximum peak conducted output power shall not exceed 0.125 W.

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	E7405A	US41160416	07/04/2007	07/03/2009
Spectrum Analyzer	R&S	FSP 40	100034	02/22/2008	02/21/2009
Low Loss Cable	HUBER+SUHNER	SUCOFLEX 104PEA	N/A	02/13/2008	02/12/2009
Attenuator	Mini-Circuit	BW-S6W5	N/A	07/05/2008	07/04/2009

6.3. Test Set-up:





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. (Channel power function, RBW, VBW = 1MHz)
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	0.91	0.00	0.91	0.00123	1
2441.00	1.93	0.00	1.93	0.00156	1
2480.00	1.40	0.00	1.40	0.00138	1

**Note: offset 6dB*

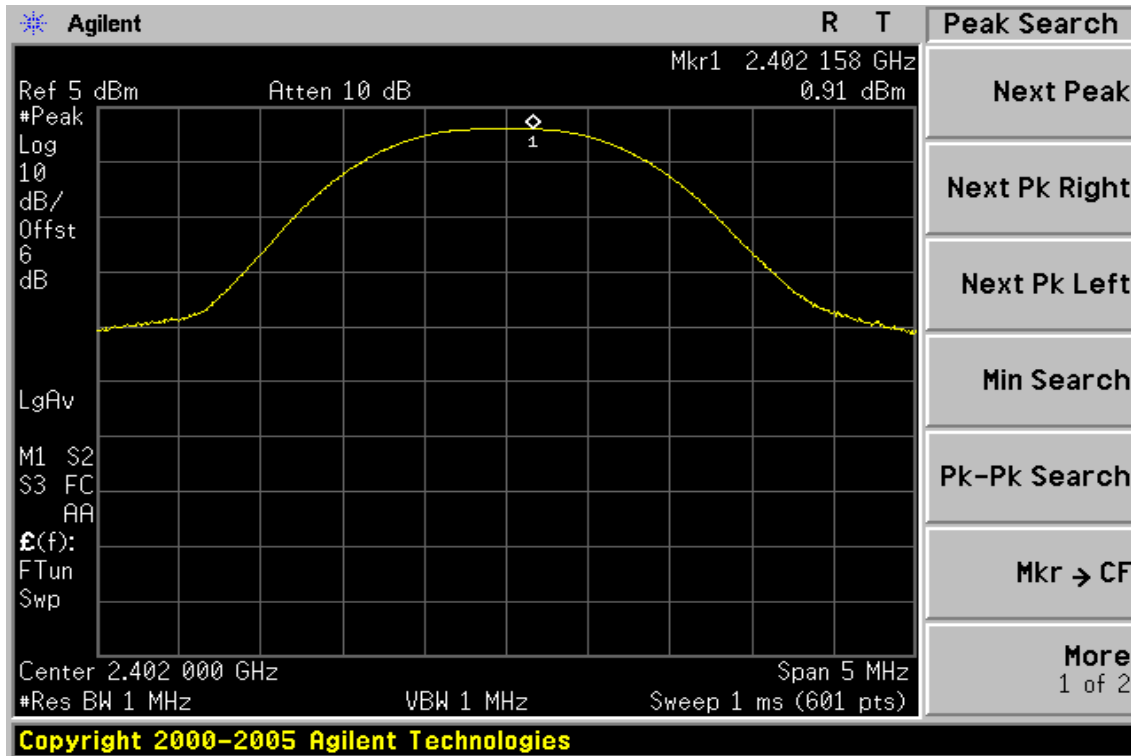
EDR mode:

Frequency (MHz)	Reading Power (dBm)	Cable Loss	Output Power (dBm)	Output Power (W)	Limit (W)
2402.00	0.33	0.00	0.33	0.00108	1
2441.00	1.48	0.00	1.48	0.00141	1
2480.00	0.71	0.00	0.71	0.00118	1

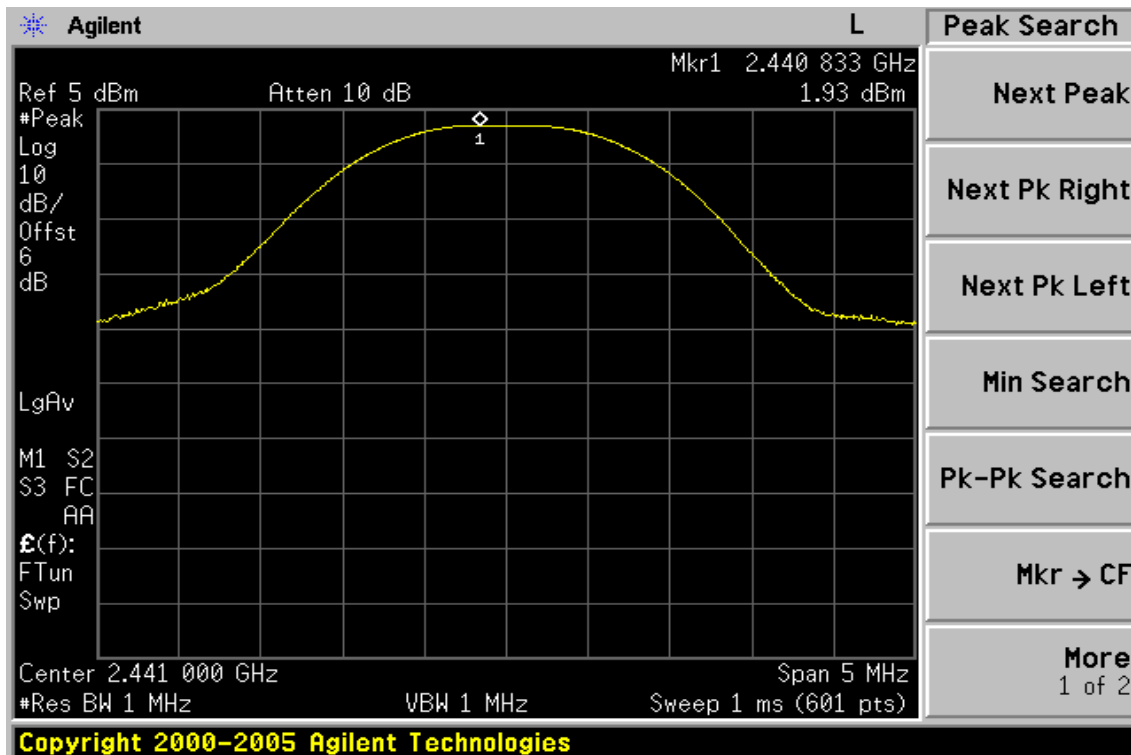
**Note: offset 6dB*

Note: Refer to next page for plots.

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

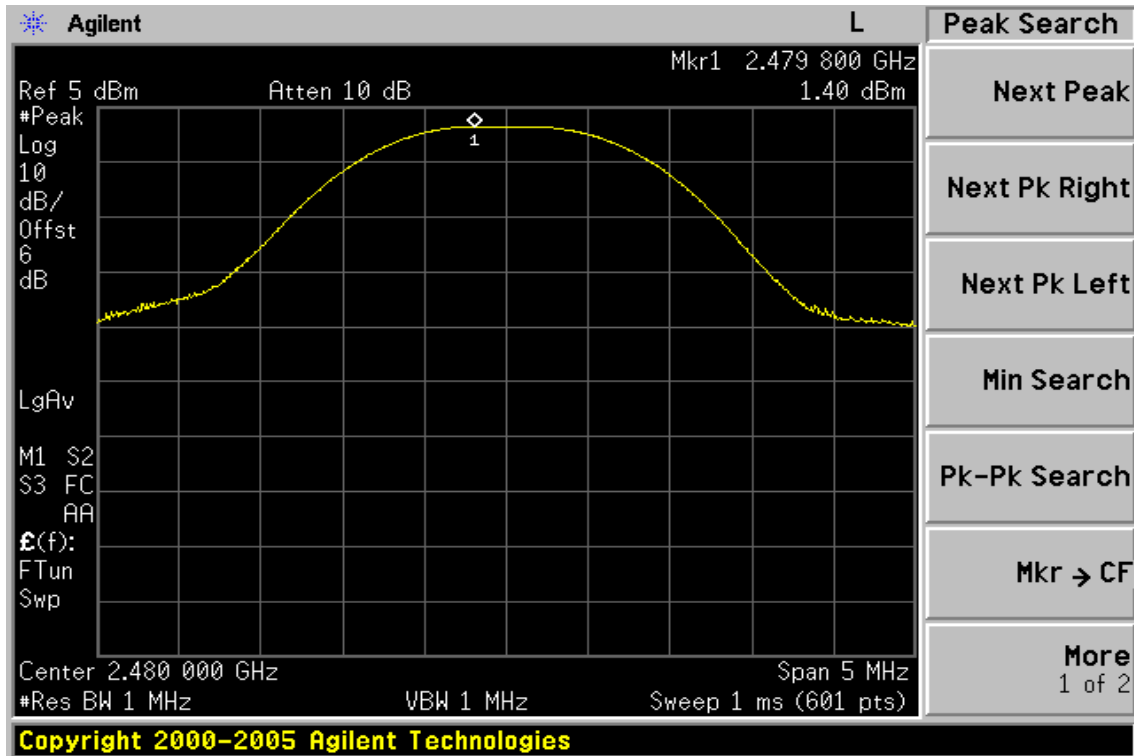


Peak Power Output Data Plot (CH Mid) (BDR mode)



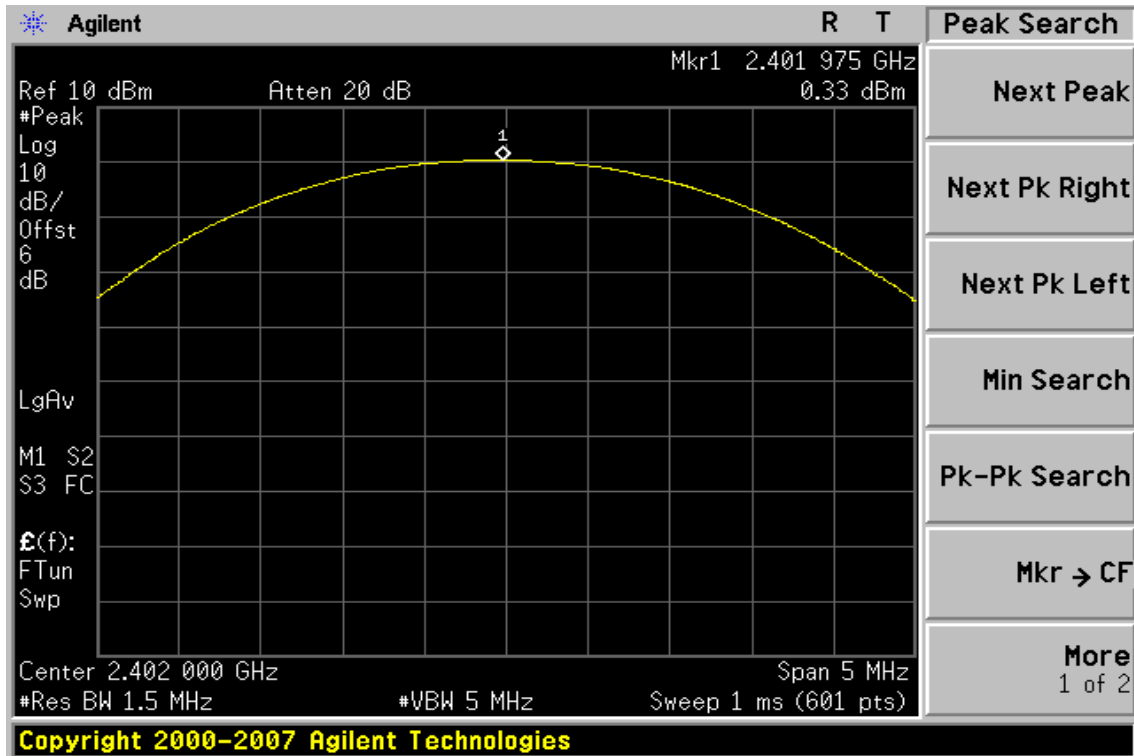
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Peak Power Output Data Plot (CH High) (BDR mode)

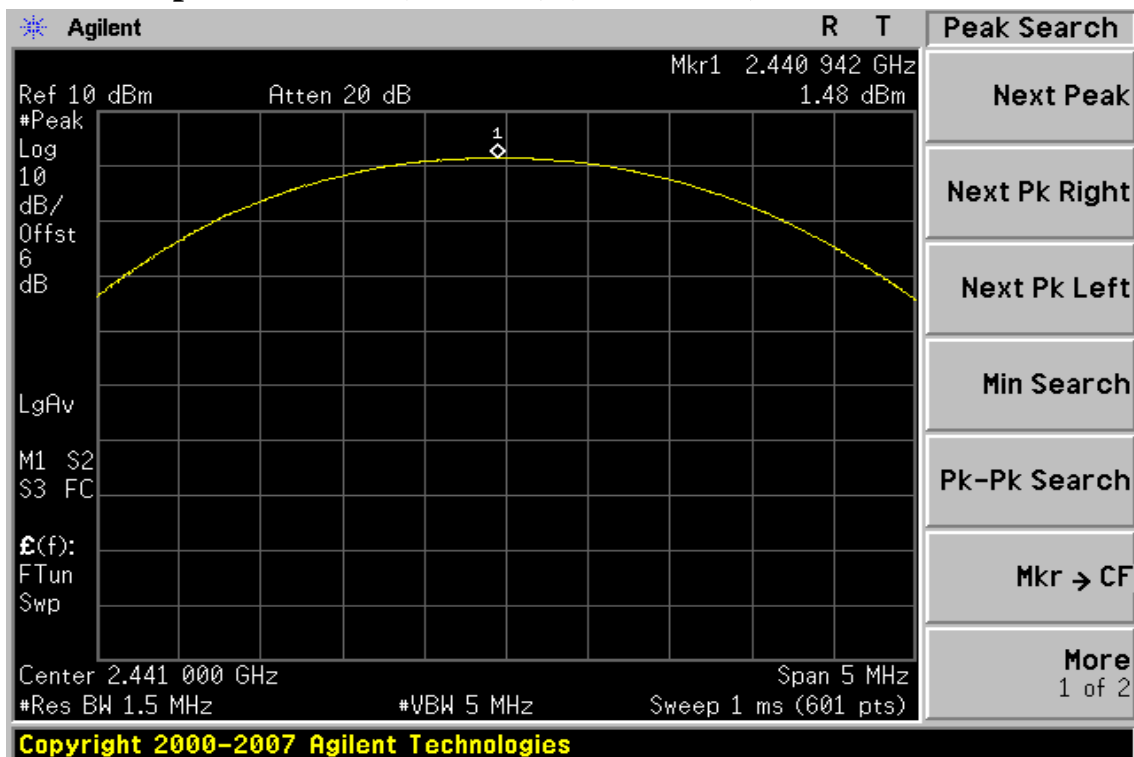


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Peak Power Output Data Plot (CH Low) (EDR mode)

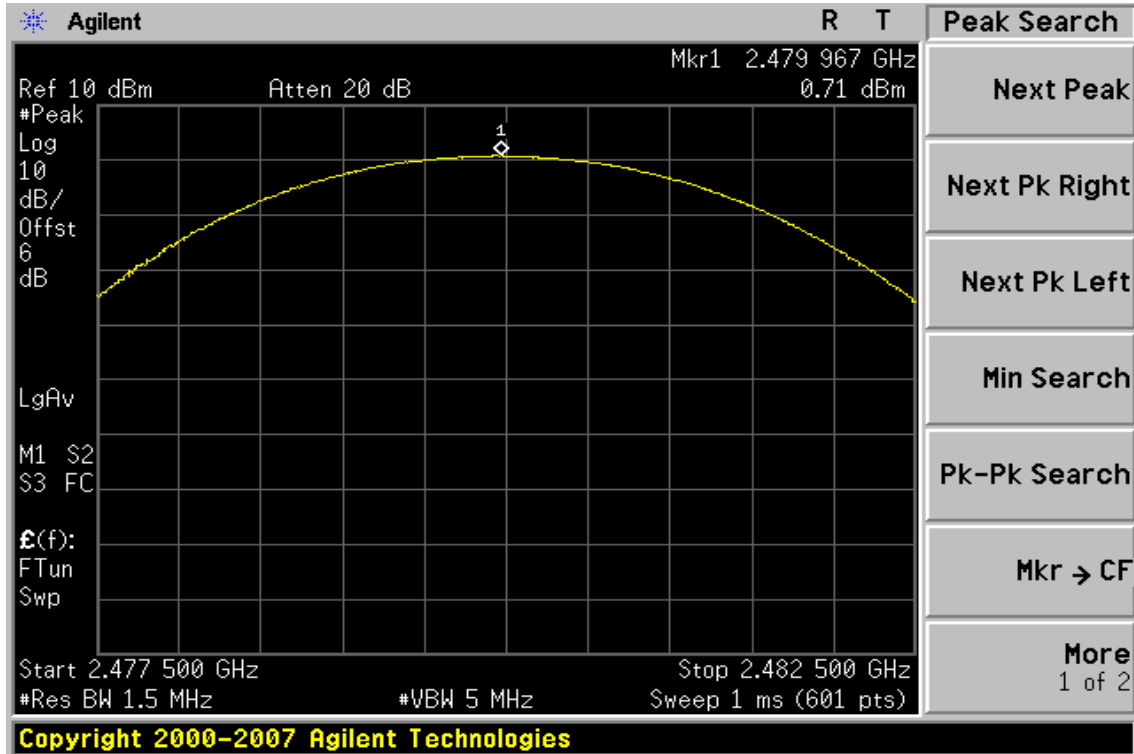


Peak Power Output Data Plot (CH Mid) (EDR mode)



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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).

According to RSS-210 issue 7, §A8.5, In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated device is operating, the radio frequency power that is produced shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under section A8.4(4), the attenuation required shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in Tables 2 and 3 is not required. In addition, radiated emissions which fall in the restricted bands of Table 1 must also comply with the radiated emission limits specified in Tables 2 and 3.

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	02/22/2008	02/21/2009
Spectrum Analyzer	Agilent	E7405A	US41160416	07/04/2007	07/03/2009
Spectrum Analyzer	Agilent	E4446A	MY43360126	04/19/2008	04/18/2010
Bi-log Antenna	SCHWAZBECK	VULB9160	9160-3158	11/29/2007	11/28/2008
Horn antenna	Schwarzbeck	BBHA 9120D	9120D-673	05/09/2008	05/10/2010
Horn antenna	Schwarzbeck	BBHA 9170	184/185	12/31/2007	12/30/2008
Pre-Amplifier	HP	8447F	3113A06892	01/05/2008	01/04/2009
Pre-Amplifier	HP	8449B	3008A01973	01/05/2008	01/04/2009
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	01/05/2008	01/04/2009
Low Loss Cable	HUBER+SUHNER	SUCOFLEX 104PEA-3M	3m	01/05/2008	01/04/2009

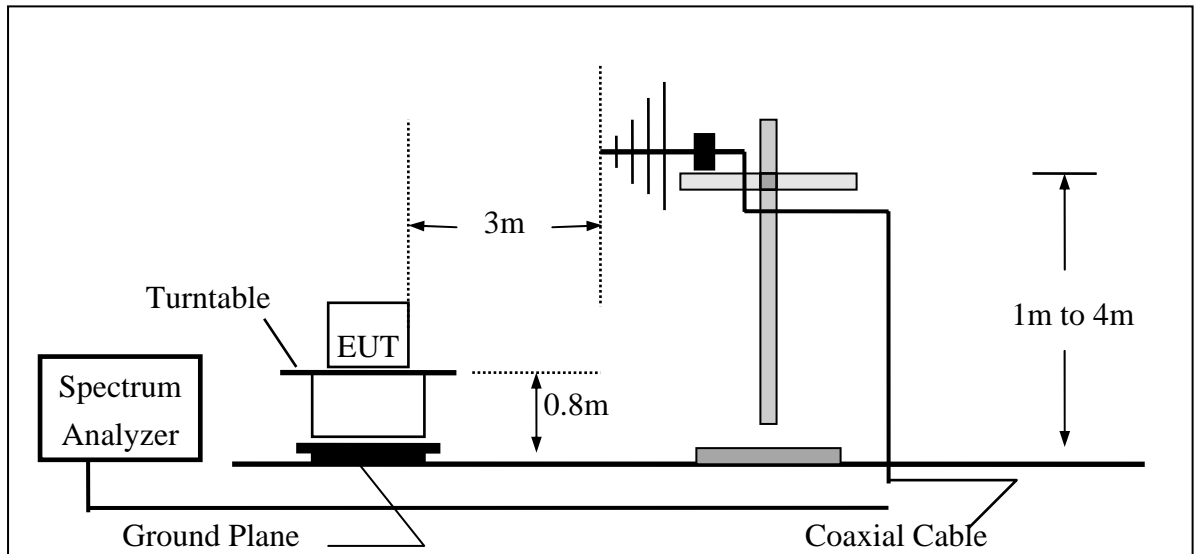
7.3. Test SET-UP:

7.3.1. Conducted Emission at antenna port:

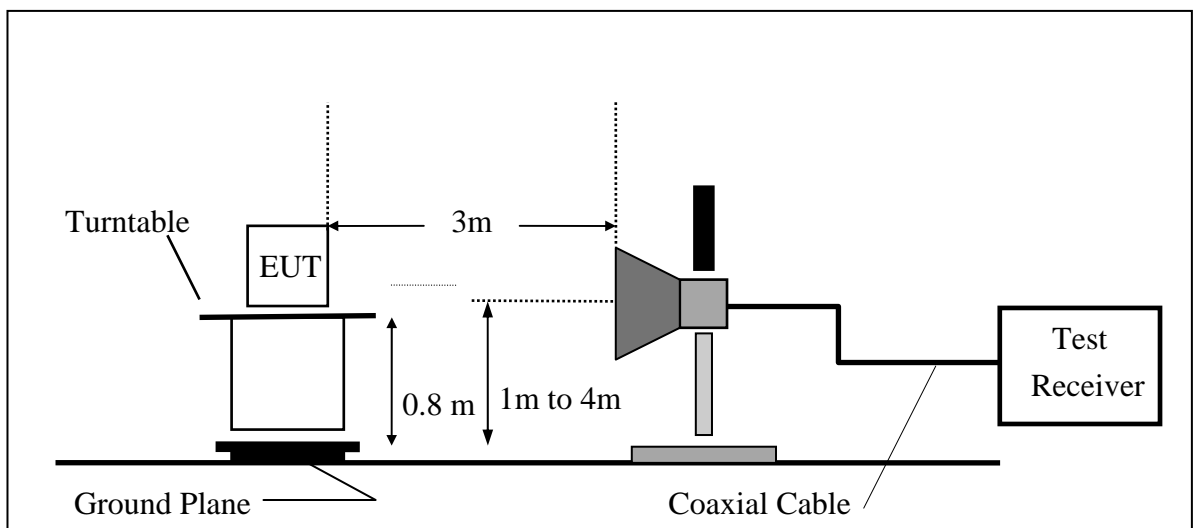
Refer to section 6.3 for details.

7.3.2. Radiated emission:

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



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



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:

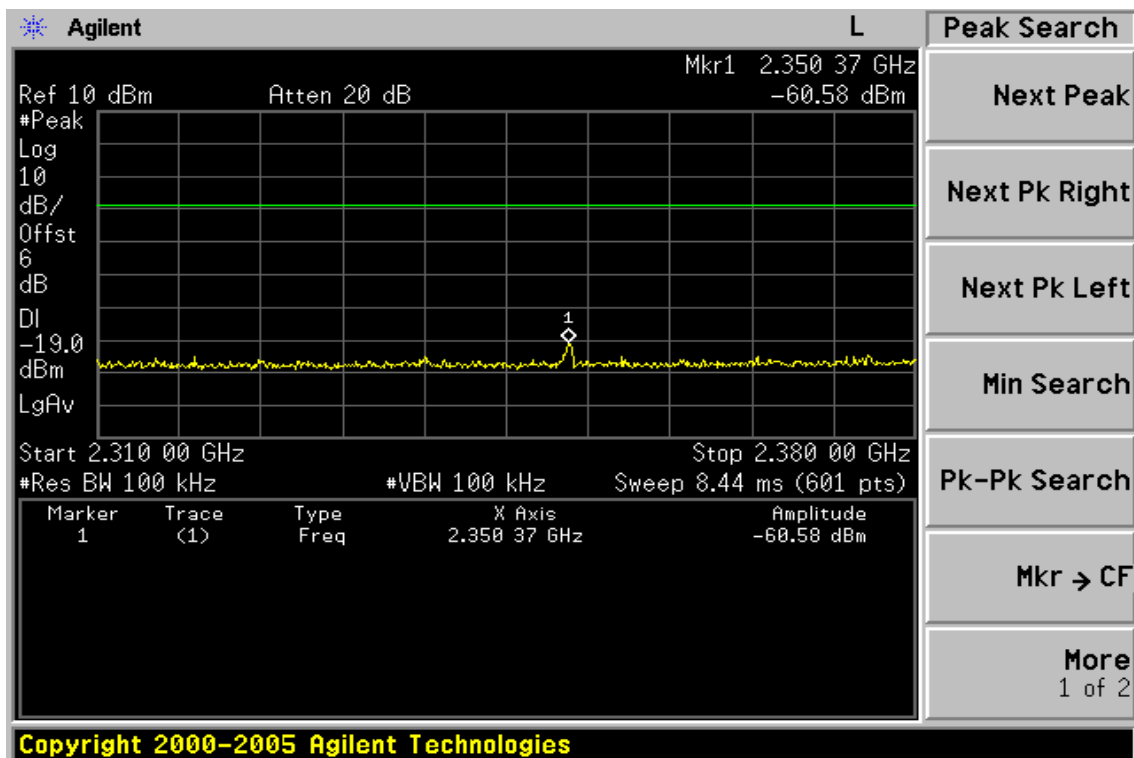
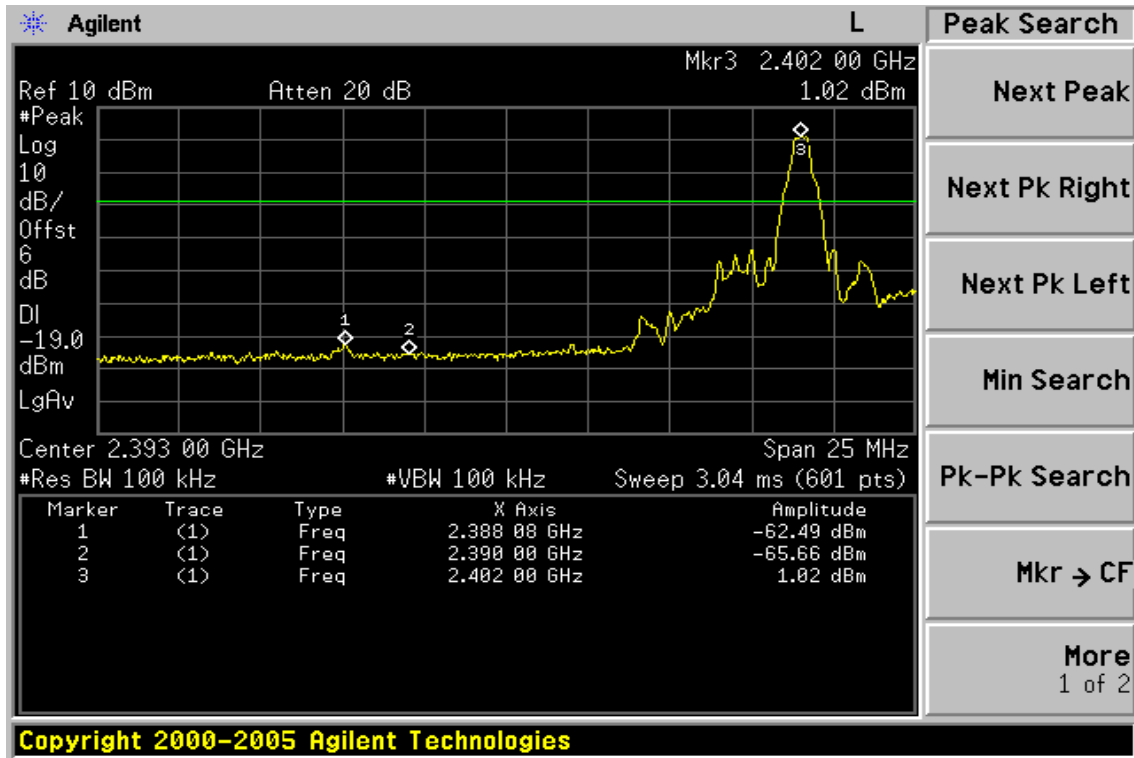
$$FS = RA + AF + CL - AG$$

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

7.6. Measurement Result:

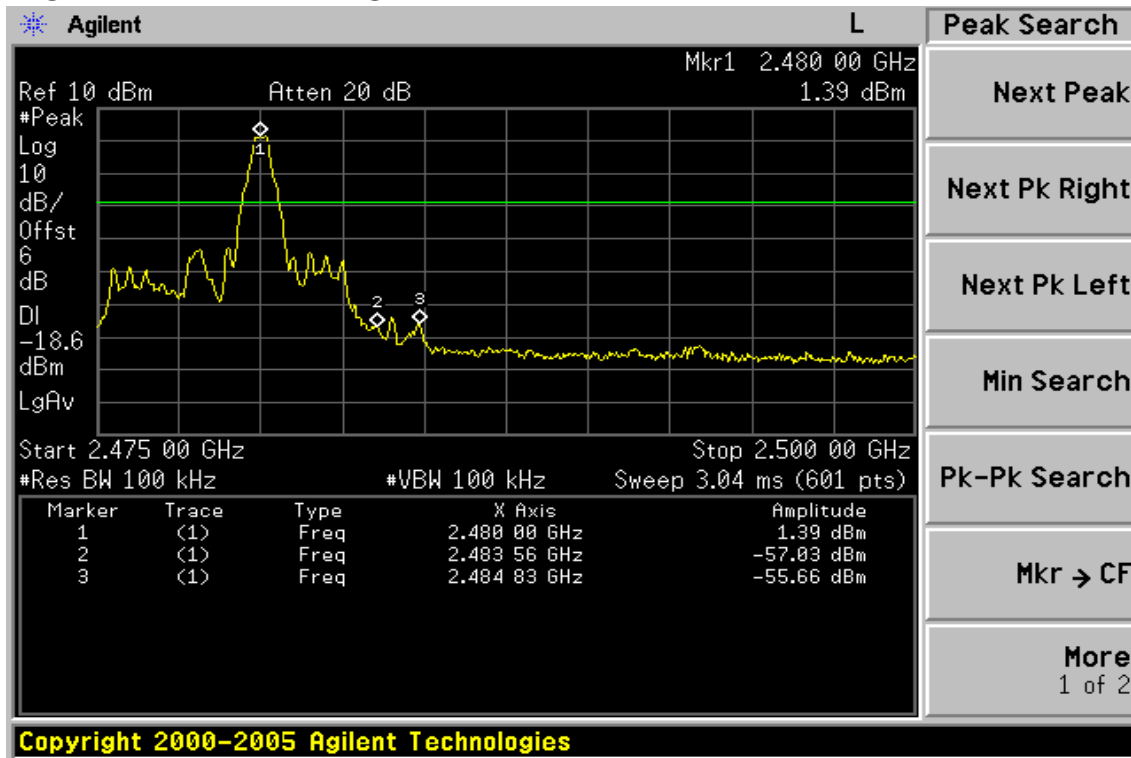
Note: Refer to next page spectrum analyzer data chart and tabular data sheets.

BDR Mode
Band Edges Test Data CH-Low



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Band Edges Test Data CH-High



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Radiated Emission: (BDR mode)

Operation Mode	TX CH Low	Test Date	Jul. 24, 2009
Fundamental Frequency	2402 MHz	Test By	Jason
Temperature	25 °C	Pol	Ver.
Humidity	65 %		

Freq. (MHz)	Peak	AV	Ant./CL CF(dB)	Actual FS		Peak	AV	Margin (dB)	Remark
	Reading (dBuV)	Reading (dBuV)		Peak (dBuV/m)	AV (dBuV/m)	Limit (dBuV/m)	Limit (dBuV/m)		
2316.93	37.91	---	-1.79	36.12	---	74.00	54.00	-17.88	Peak
2350.37	35.16	---	-1.62	33.54	---	74.00	54.00	-20.46	Peak
2390.00	33.26	---	-1.39	31.87	---	74.00	54.00	-22.13	Peak

Operation Mode	TX CH Low	Test Date	Jul. 24, 2009
Fundamental Frequency	2402 MHz	Test By	Jason
Temperature	25	Pol	Hor.
Humidity	65 %		

Freq. (MHz)	Peak	AV	Ant./CL CF(dB)	Actual FS		Peak	AV	Margin (dB)	Remark
	Reading (dBuV)	Reading (dBuV)		Peak (dBuV/m)	AV (dBuV/m)	Limit (dBuV/m)	Limit (dBuV/m)		
2342.83	46.66	---	-1.62	45.04	---	74.00	54.00	-8.96	Peak
2375.22	45.52	---	-1.46	44.06	---	74.00	54.00	-9.94	Peak
2390.00	44.05	---	-1.39	42.66	---	74.00	54.00	-11.34	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.

Radiated Emission:

Operation Mode	TX CH High	Test Date	Jul. 24, 2009
Fundamental Frequency	2480 MHz	Test By	Jason
Temperature	25	Pol	Ver.
Humidity	65 %		

Freq. (MHz)	Peak	AV	Ant./CL CF(dB)	Actual FS		Peak	AV	Margin (dB)	Remark
	Reading (dBuV)	Reading (dBuV)		Peak (dBuV/m)	AV (dBuV/m)	Limit (dBuV/m)	Limit (dBuV/m)		
2483.56	35.47	---	-0.92	34.55	---	74.00	54.00	-19.45	Peak
2484.83	35.86	---	-0.92	34.94	---	74.00	54.00	-19.06	Peak

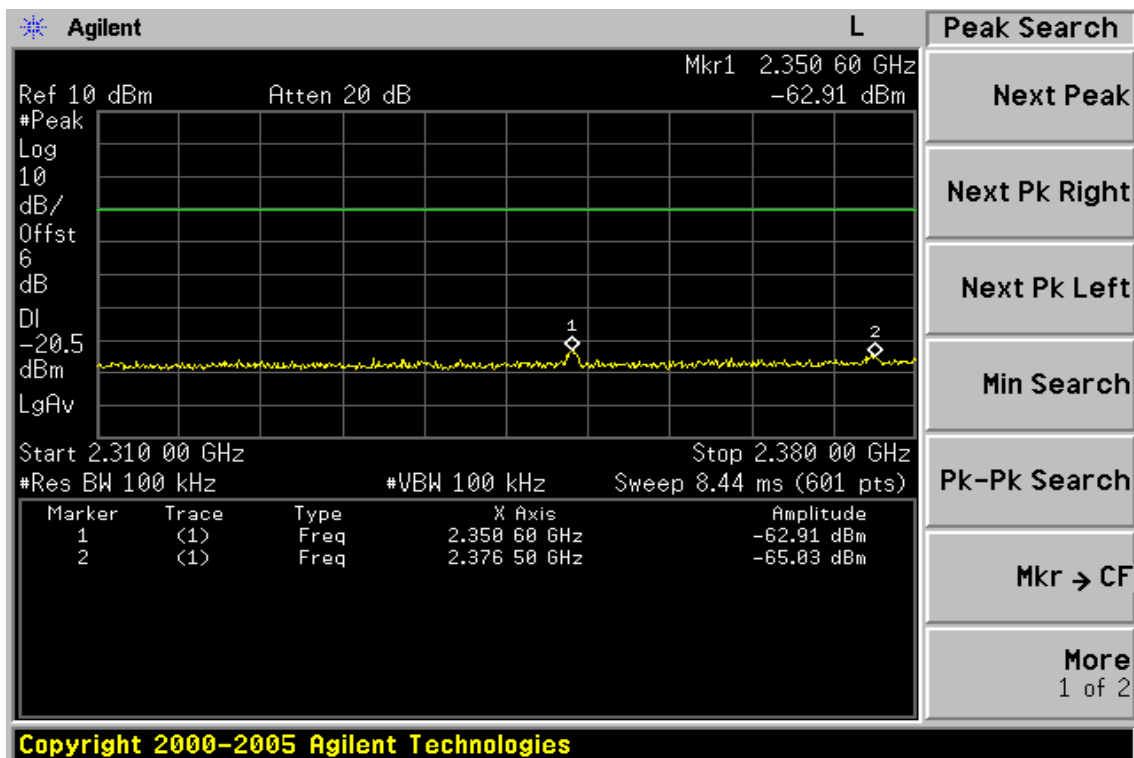
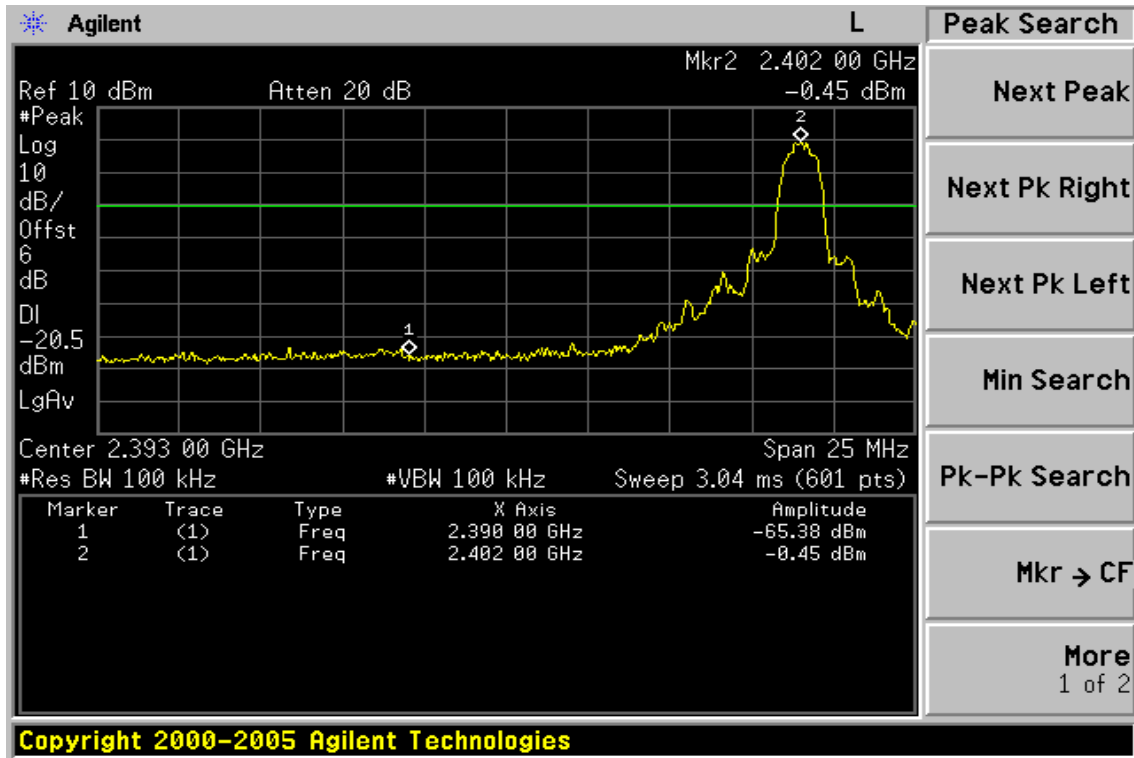
Operation Mode	TX CH High	Test Date	Jul. 24, 2009
Fundamental Frequency	2480 MHz	Test By	Jason
Temperature	25	Pol	Hor.
Humidity	65 %		

Freq. (MHz)	Peak	AV	Ant./CL CF(dB)	Actual FS		Peak	AV	Margin (dB)	Remark
	Reading (dBuV)	Reading (dBuV)		Peak (dBuV/m)	AV (dBuV/m)	Limit (dBuV/m)	Limit (dBuV/m)		
2483.56	36.26	---	-0.92	35.34	---	74.00	54.00	-18.66	Peak
2484.83	36.37	---	-0.92	35.45	---	74.00	54.00	-18.55	Peak

Remark :

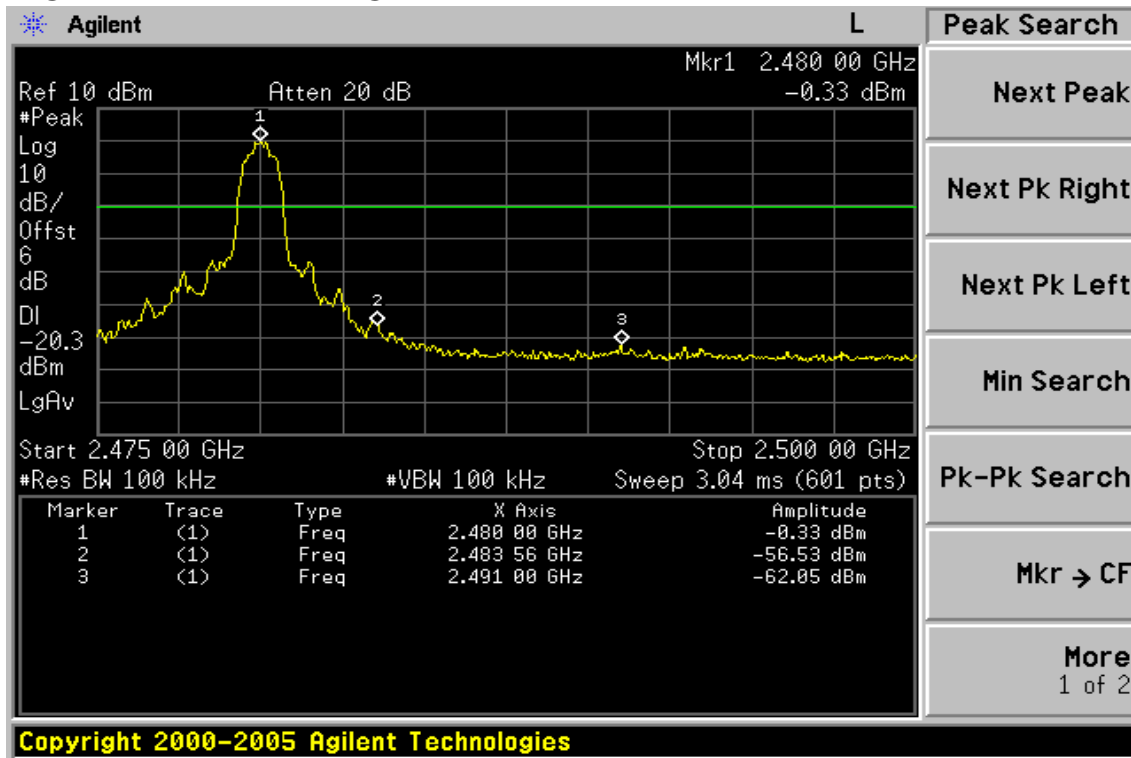
- (1) Data of measurement within this frequency range shown “ - ” in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
- (2) Radiated emissions measured in frequency above 1000MHz were made with 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.

EDR Mode
Band Edges Test Data CH-Low



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Band Edges Test Data CH-High



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Radiated Emission:

Operation Mode	TX CH Low	Test Date	Jul. 24, 2009
Fundamental Frequency	2402 MHz	Test By	Jason
Temperature	25 °C	Pol	Ver.
Humidity	65 %		

Freq. (MHz)	Peak	AV	Ant./CL CF(dB)	Actual FS		Peak	AV	Margin (dB)	Remark
	Reading (dBuV)	Reading (dBuV)		Peak (dBuV/m)	AV (dBuV/m)	Limit (dBuV/m)	Limit (dBuV/m)		
2350.60	35.08	---	-1.62	33.46	---	74.00	54.00	-20.54	Peak
2376.50	34.63	---	-1.46	33.17	---	74.00	54.00	-20.83	Peak
2390.00	34.46	---	-1.39	33.07	---	74.00	54.00	-20.93	Peak

Operation Mode	TX CH Low	Test Date	Jul. 24, 2009
Fundamental Frequency	2402 MHz	Test By	Jason
Temperature	25	Pol	Hor.
Humidity	65 %		

Freq. (MHz)	Peak	AV	Ant./CL CF(dB)	Actual FS		Peak	AV	Margin (dB)	Remark
	Reading (dBuV)	Reading (dBuV)		Peak (dBuV/m)	AV (dBuV/m)	Limit (dBuV/m)	Limit (dBuV/m)		
2350.60	34.59	---	-1.62	32.97	---	74.00	54.00	-21.03	Peak
2376.50	34.45	---	-1.46	32.99	---	74.00	54.00	-21.01	Peak
2390.00	33.35	---	-1.39	31.96	---	74.00	54.00	-22.04	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.

Radiated Emission:

Operation Mode	TX CH High	Test Date	Jul. 24, 2009
Fundamental Frequency	2480 MHz	Test By	Jason
Temperature	25	Pol	Ver.
Humidity	65 %		

Freq. (MHz)	Peak	AV	Ant./CL CF(dB)	Actual FS		Peak	AV	Margin (dB)	Remark
	Reading (dBuV)	Reading (dBuV)		Peak (dBuV/m)	AV (dBuV/m)	Limit (dBuV/m)	Limit (dBuV/m)		
2483.56	34.79	---	-0.92	33.87	---	74.00	54.00	-20.13	Peak
2490.93	34.90	---	-0.86	34.04	---	74.00	54.00	-19.96	Peak

Operation Mode	TX CH High	Test Date	Jul. 24, 2009
Fundamental Frequency	2480 MHz	Test By	Jason
Temperature	25	Pol	Hor.
Humidity	65 %		

Freq. (MHz)	Peak	AV	Ant./CL CF(dB)	Actual FS		Peak	AV	Margin (dB)	Remark
	Reading (dBuV)	Reading (dBuV)		Peak (dBuV/m)	AV (dBuV/m)	Limit (dBuV/m)	Limit (dBuV/m)		
2483.56	35.28	---	-0.92	34.36	---	74.00	54.00	-19.64	Peak
2491.00	33.69	---	-0.86	32.83	---	74.00	54.00	-21.17	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.

8. SPURIOUS 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.

According to RSS-Gen §7.2.3 and RSS-210 issue 7, §A2.9, In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated device is operating, the radio frequency power that is produced shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under section A8.4(4), the attenuation required shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in Tables 2 and 3 is not required. In addition, radiated emissions which fall in the restricted bands of Table 1 must also comply with the radiated emission limits specified in Tables 2 and 3.

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.

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:

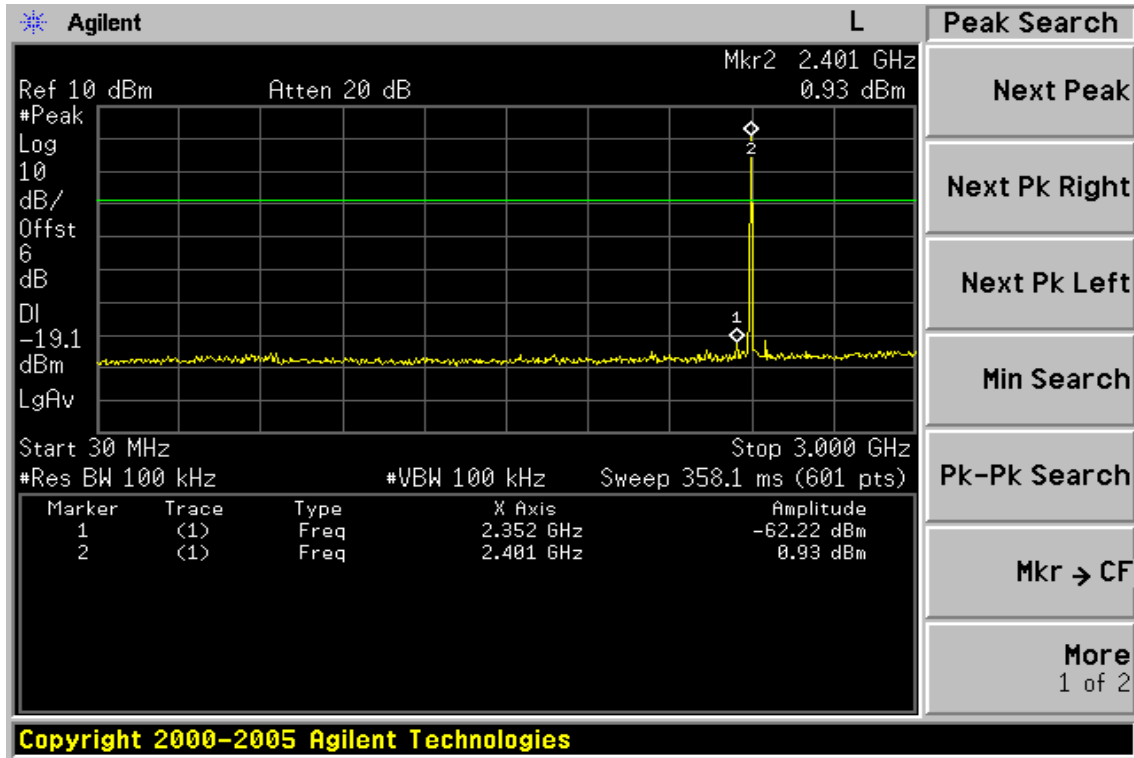
$$FS = RA + AF + CL - AG$$

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

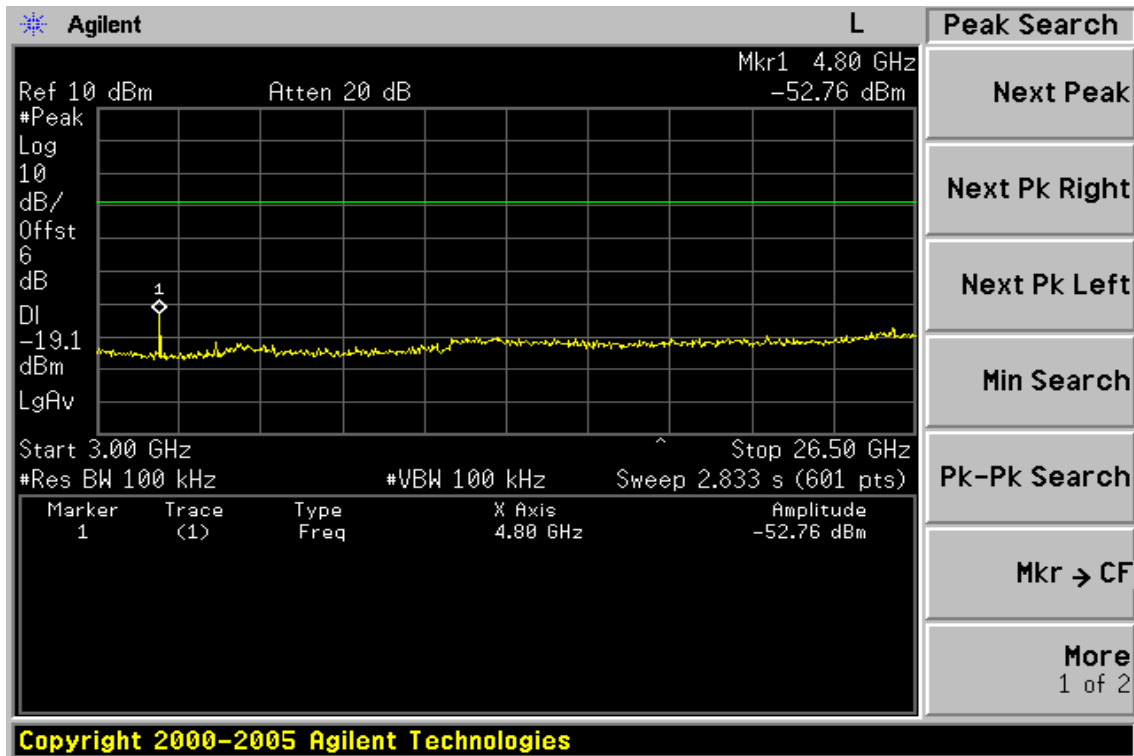
8.6. Measurement Result:

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

BDR Mode Conducted Spurious Emission Measurement Result
Ch Low 30MHz – 3GHz

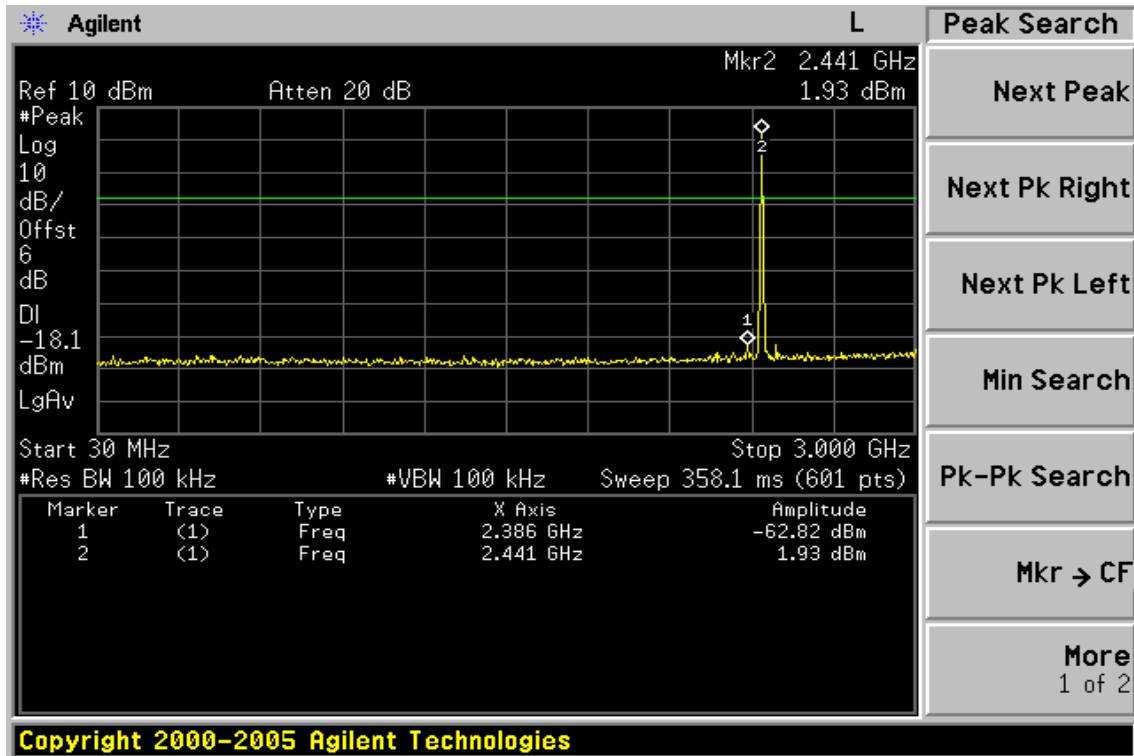


Ch Low 3GHz – 26.5GHz

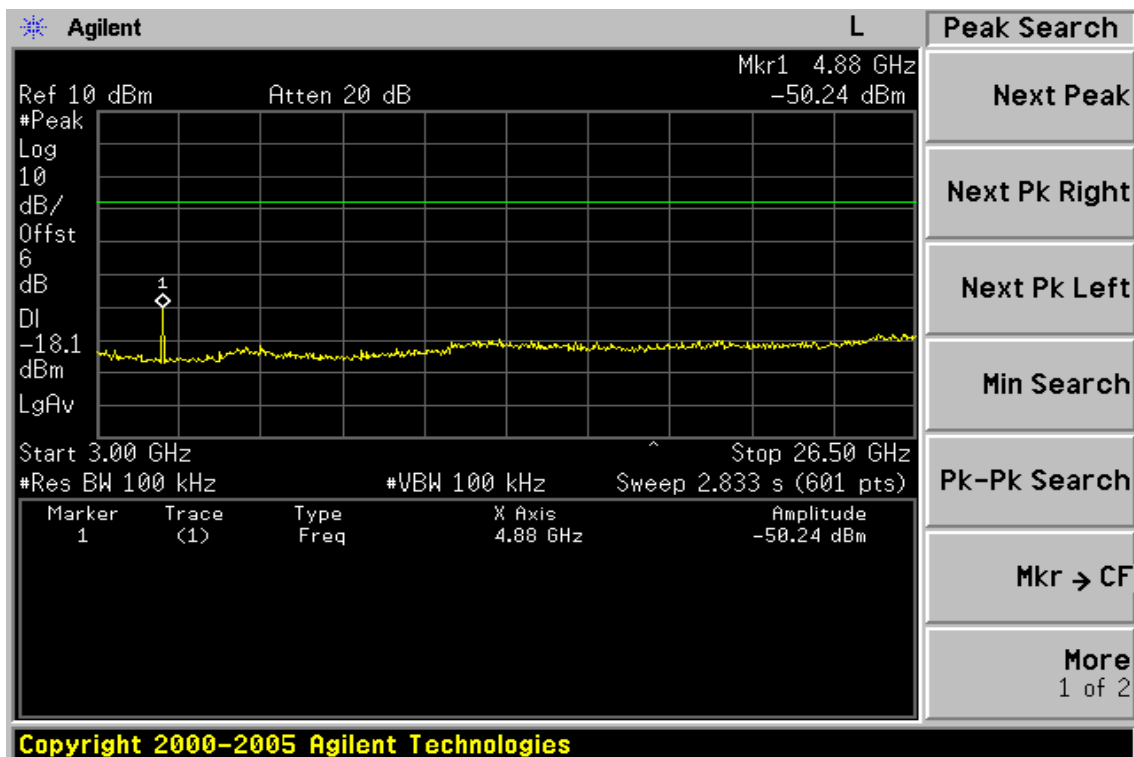


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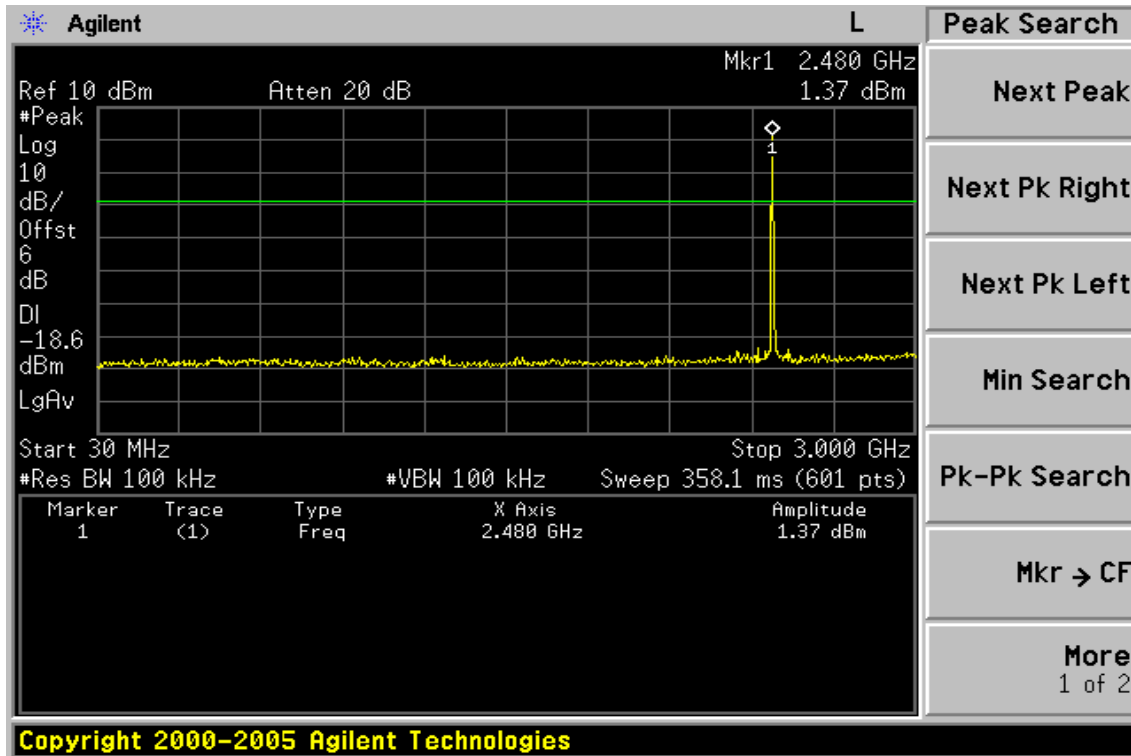
Ch Mid 30MHz – 3GHz



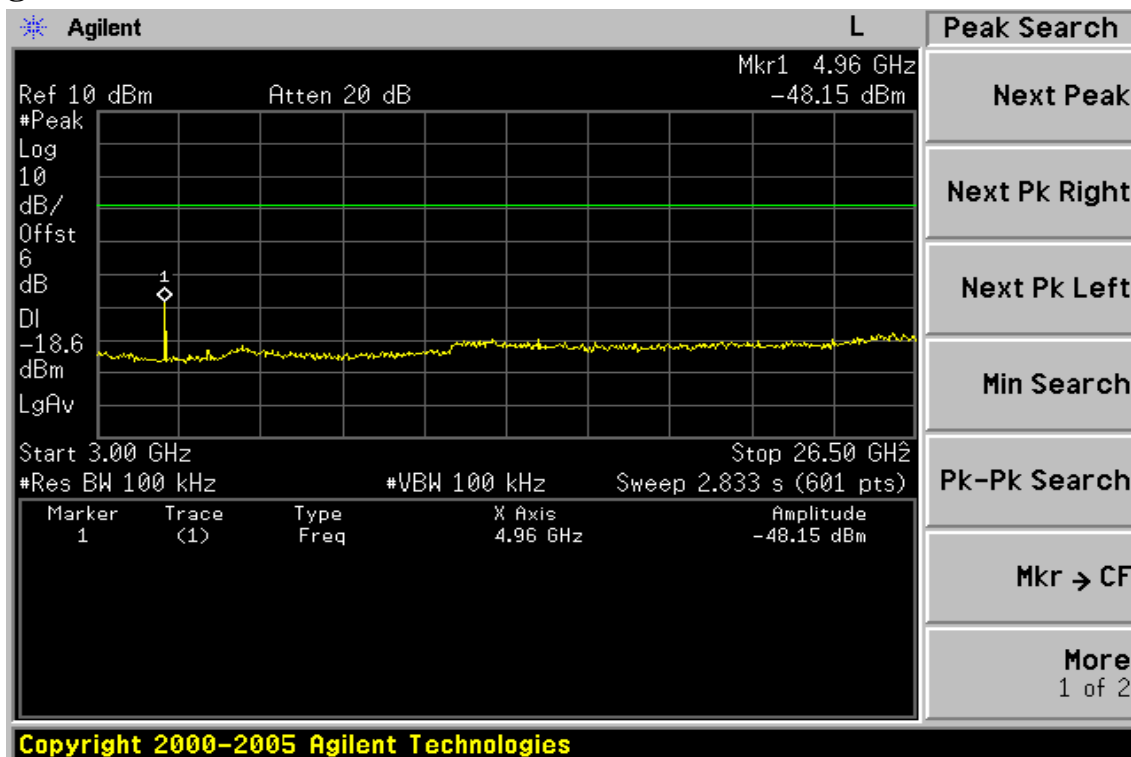
Ch Mid 3GHz – 26.5GHz



Ch High 30MHz – 3GHz

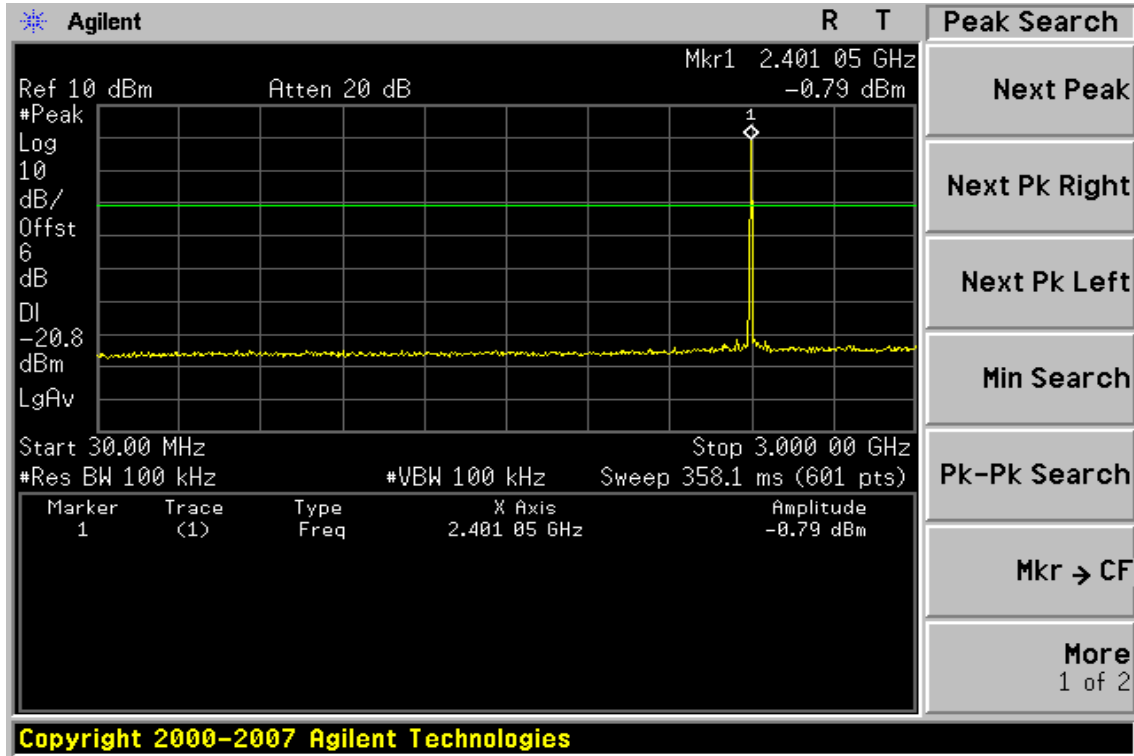


Ch High 3GHz – 26.5GHz

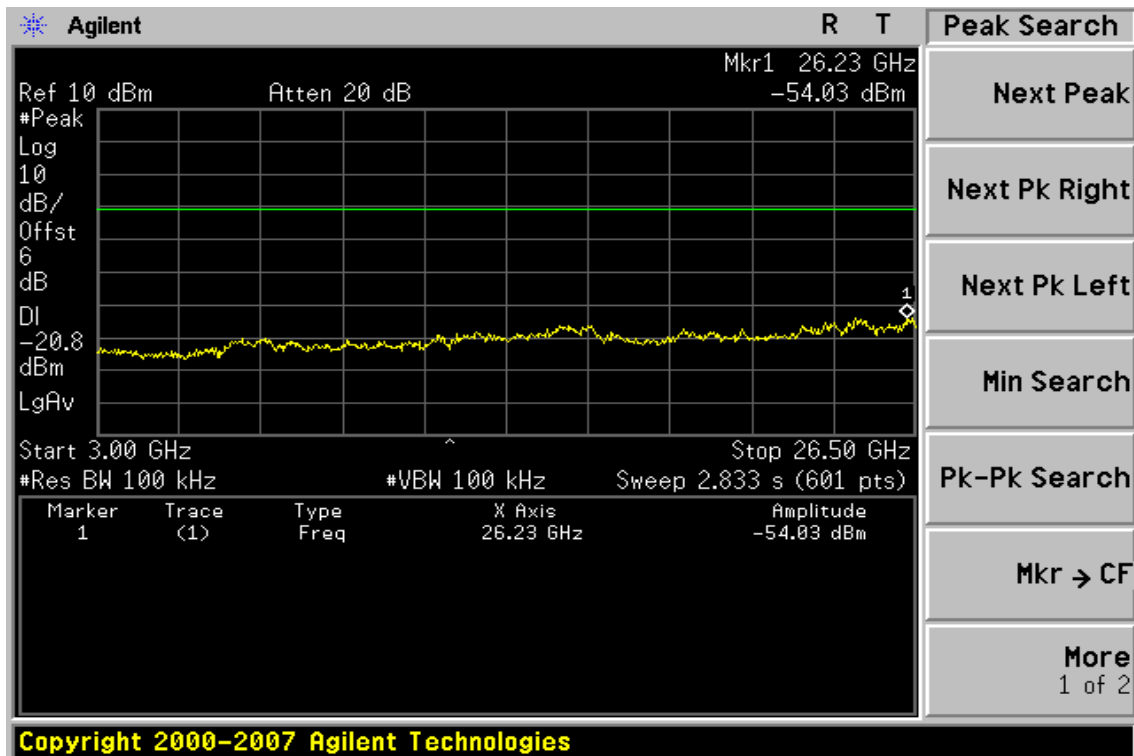


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Conducted Spurious Emission Measurement Result (EDR mode)
Ch Low 30MHz – 3GHz

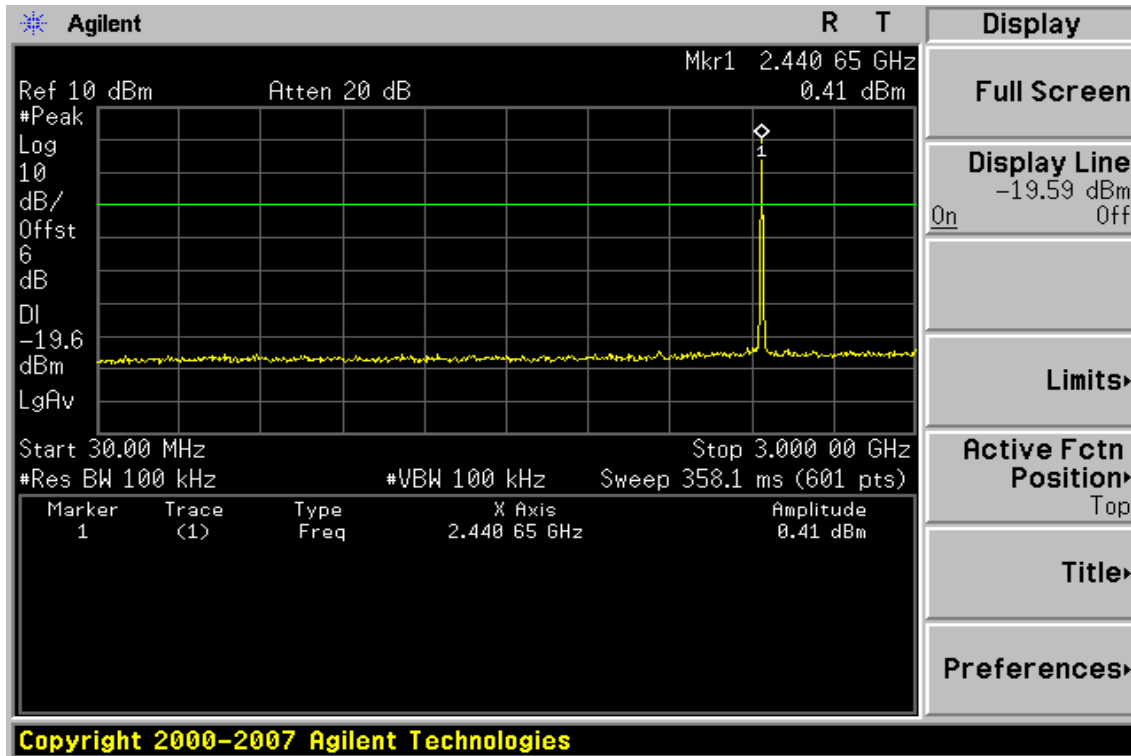


Ch Low 3GHz – 26.5GHz

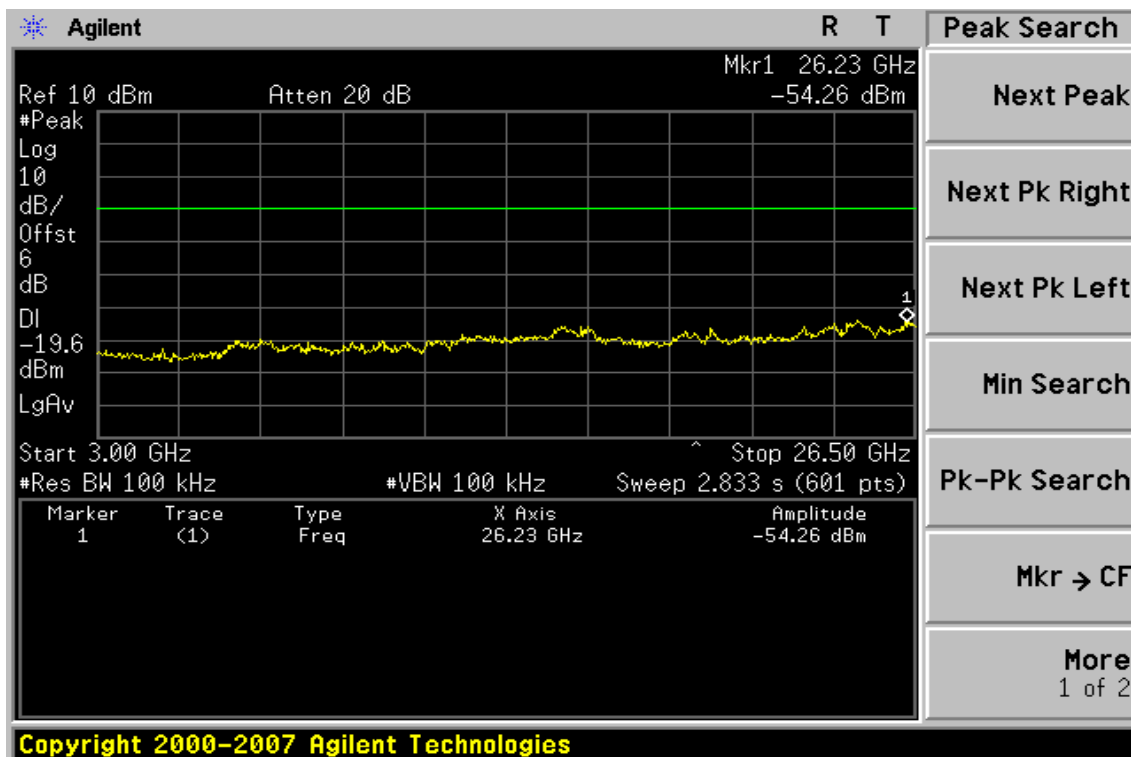


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Ch Mid 30MHz – 3GHz

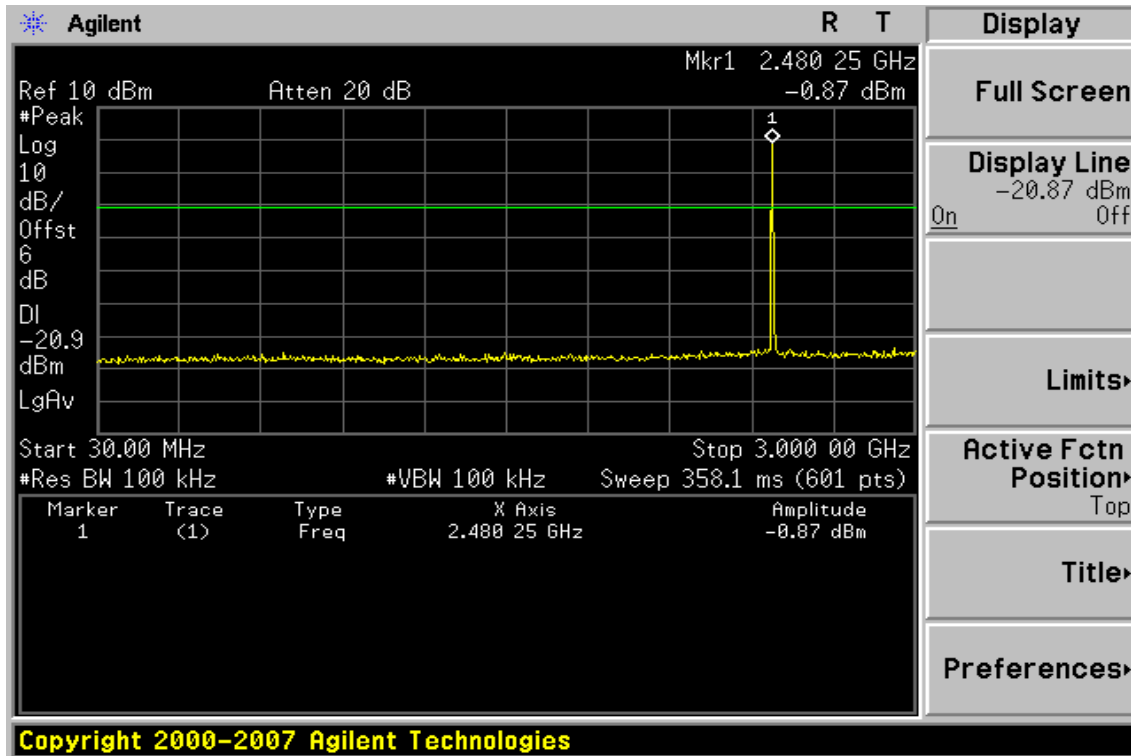


Ch Mid 3GHz – 26.5GHz

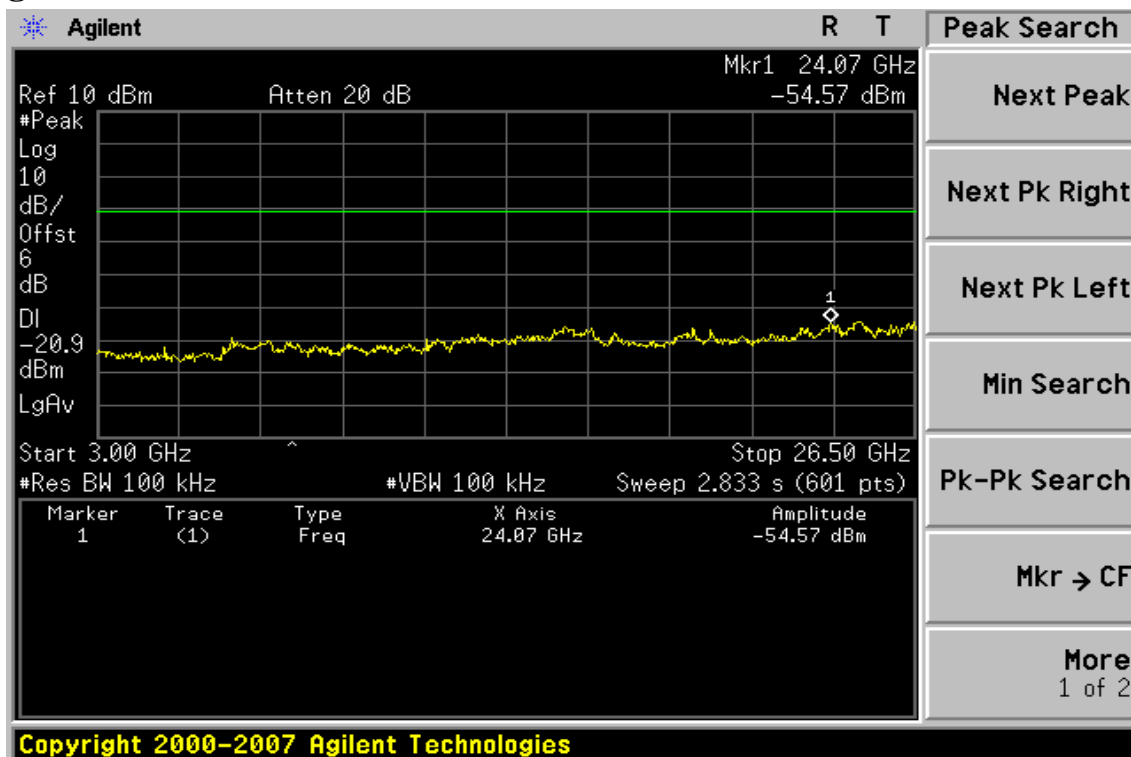


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Ch High 30MHz – 3GHz



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	Jul. 24, 2009
Fundamental Frequency	2402MHz	Test By	Jason
Temperature	25	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)
43.58	V	Peak	45.73	-13.79	31.94	40.00	-8.06
65.89	V	Peak	49.07	-15.09	33.98	40.00	-6.02
72.68	V	Peak	54.42	-16.62	37.80	40.00	-2.20
90.14	V	Peak	49.20	-17.62	31.58	43.50	-11.92
211.39	V	Peak	39.17	-15.22	23.95	43.50	-19.55
895.24	V	Peak	35.31	-1.13	34.18	46.00	-11.82
53.28	H	Peak	43.49	-14.40	29.09	40.00	-10.91
72.68	H	Peak	49.96	-16.62	33.34	40.00	-6.66
158.04	H	Peak	37.19	-13.28	23.91	43.50	-19.59
216.40	H	Peak	43.52	-15.05	28.47	46.00	-17.53
470.38	H	Peak	32.91	-8.55	24.36	46.00	-21.64
843.83	H	Peak	33.70	-2.10	31.60	46.00	-14.40

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.

Radiated Spurious Emission Measurement Result (below 1GHz)

Operation Mode	TX CH Mid	Test Date	Jul. 24, 2009
Fundamental Frequency	2441MHz	Test By	Jason
Temperature	25	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)
65.89	V	Peak	47.69	-15.09	32.60	40.00	-7.40
72.68	V	Peak	54.14	-16.62	37.52	40.00	-2.48
90.14	V	Peak	49.10	-17.62	31.48	43.50	-12.02
208.48	V	Peak	40.14	-15.32	24.82	43.50	-18.68
431.58	V	Peak	33.97	-9.09	24.88	46.00	-21.12
900.09	V	Peak	34.70	-1.07	33.63	46.00	-12.37
53.28	H	Peak	43.33	-14.40	28.93	40.00	-11.07
72.68	H	Peak	49.36	-16.62	32.74	40.00	-7.26
158.04	H	Peak	36.89	-13.28	23.61	43.50	-19.89
211.39	H	Peak	43.87	-15.22	28.65	43.50	-14.85
274.44	H	Peak	37.18	-13.50	23.68	46.00	-22.32
470.38	H	Peak	33.77	-8.55	25.22	46.00	-20.78

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.

Radiated Spurious Emission Measurement Result (below 1GHz)

Operation Mode	TX CH High	Test Date	Jul. 24, 2009
Fundamental Frequency	2480MHz	Test By	Jason
Temperature	25	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)
65.89	V	Peak	47.99	-15.09	32.90	40.00	-7.10
72.68	V	Peak	54.35	-16.62	37.73	40.00	-2.27
90.14	V	Peak	49.69	-17.62	32.07	43.50	-11.43
211.39	V	Peak	39.69	-15.22	24.47	43.50	-19.03
315.18	V	Peak	36.38	-12.66	23.72	46.00	-22.28
431.58	V	Peak	34.02	-9.09	24.93	46.00	-21.07
38.73	H	Peak	42.87	-13.84	29.03	40.00	-10.97
72.68	H	Peak	49.29	-16.62	32.67	40.00	-7.33
158.04	H	Peak	37.24	-13.28	23.96	43.50	-19.54
208.48	H	Peak	43.20	-15.32	27.88	43.50	-15.62
470.38	H	Peak	33.49	-8.55	24.94	46.00	-21.06
669.23	H	Peak	32.34	-5.03	27.31	46.00	-18.69

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.

Radiated Spurious Emission Measurement Result (above 1GHz)

Operation Mode	TX CH Low	Test Date	Jul. 24, 2009
Fundamental Frequency	2402 MHz	Test By	Jason
Temperature	25	Pol	Ver.
Humidity	65 %		

Freq. (MHz)	Peak	AV	Ant./CL CF(dB)	Actual FS		Peak	AV	Margin (dB)	Remark
	Reading (dBuV)	Reading (dBuV)		Peak (dBuV/m)	AV (dBuV/m)	Limit (dBuV/m)	Limit (dBuV/m)		
1000.0	44.56	---	-7.74	36.82	---	74.00	54.00	-17.18	Peak
1338.0	42.93	---	-6.62	36.31	---	74.00	54.00	-17.69	Peak
1611.0	39.37	---	-5.37	34.00	---	74.00	54.00	-20.00	Peak
2605.5	38.13	---	-0.60	37.53	---	74.00	54.00	-16.47	Peak
4804.0	35.88	---	5.99	41.87	---	74.00	54.00	-12.13	Peak
5920.5	35.01	---	8.58	43.59	---	74.00	54.00	-10.41	Peak
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.

Radiated Spurious Emission Measurement Result (above 1GHz)

Operation Mode	TX CH Low	Test Date	Jul. 24, 2009
Fundamental Frequency	2402 MHz	Test By	Jason
Temperature	25	Pol	Hor.
Humidity	65 %		

Freq. (MHz)	Peak	AV	Ant./CL CF(dB)	Actual FS		Peak	AV	Margin (dB)	Remark
	Reading (dBuV)	Reading (dBuV)		Peak (dBuV/m)	AV (dBuV/m)	Limit (dBuV/m)	Limit (dBuV/m)		
1000.0	52.61	---	-7.74	44.87	---	74.00	54.00	-9.13	Peak
1091.0	45.20	---	-7.75	37.45	---	74.00	54.00	-16.55	Peak
1338.0	44.44	---	-6.62	37.82	---	74.00	54.00	-16.18	Peak
1611.0	39.84	---	-5.37	34.47	---	74.00	54.00	-19.53	Peak
2670.5	38.20	---	-0.40	37.80	---	74.00	54.00	-16.20	Peak
4804.0	35.81	---	5.99	41.80	---	74.00	54.00	-12.20	Peak
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.

Radiated Spurious Emission Measurement Result (above 1GHz)

Operation Mode	TX CH Mid	Test Date	Jul. 24, 2009
Fundamental Frequency	2441 MHz	Test By	Jason
Temperature	25	Pol	Ver.
Humidity	65 %		

Freq. (MHz)	Peak	AV	Ant./CL CF(dB)	Actual FS		Peak	AV	Margin (dB)	Remark
	Reading (dBuV)	Reading (dBuV)		Peak (dBuV/m)	AV (dBuV/m)	Limit (dBuV/m)	Limit (dBuV/m)		
1000.0	46.98	---	-7.74	39.24	---	74.00	54.00	-14.76	Peak
1253.5	43.21	---	-7.01	36.20	---	74.00	54.00	-17.80	Peak
1338.0	43.07	---	-6.62	36.45	---	74.00	54.00	-17.55	Peak
1611.0	41.47	---	-5.37	36.10	---	74.00	54.00	-17.90	Peak
2605.5	37.98	---	-0.60	37.38	---	74.00	54.00	-16.62	Peak
4882.0	34.93	---	6.17	41.10	---	74.00	54.00	-12.90	Peak
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.

Radiated Spurious Emission Measurement Result (above 1GHz)

Operation Mode	TX CH Mid	Test Date	Jul. 24, 2009
Fundamental Frequency	2441 MHz	Test By	Jason
Temperature	25	Pol	Hor.
Humidity	65 %		

Freq. (MHz)	Peak	AV	Ant./CL CF(dB)	Actual FS		Peak	AV	Margin (dB)	Remark
	Reading (dBuV)	Reading (dBuV)		Peak (dBuV/m)	AV (dBuV/m)	Limit (dBuV/m)	Limit (dBuV/m)		
1000.0	53.18	---	-7.74	45.44	---	74.00	54.00	-8.56	Peak
1370.5	42.41	---	-6.47	35.94	---	74.00	54.00	-18.06	Peak
1611.0	40.68	---	-5.37	35.31	---	74.00	54.00	-18.69	Peak
2586.0	38.44	---	-0.62	37.82	---	74.00	54.00	-16.18	Peak
4848.0	34.60	---	6.10	40.70	---	74.00	54.00	-13.30	Peak
4882.0	----					74.00	54.00		
6570.5	35.07	---	10.12	45.19	---	74.00	54.00	-8.81	Peak
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.

Radiated Spurious Emission Measurement Result (above 1GHz)

Operation Mode	TX CH High	Test Date	Jul. 24, 2009
Fundamental Frequency	2480 MHz	Test By	Jason
Temperature	25	Pol	Ver.
Humidity	65 %		

Freq. (MHz)	Peak	AV	Ant./CL CF(dB)	Actual FS		Peak	AV	Margin (dB)	Remark
	Reading (dBuV)	Reading (dBuV)		Peak (dBuV/m)	AV (dBuV/m)	Limit (dBuV/m)	Limit (dBuV/m)		
1253.5	41.78	---	-7.01	34.77	---	74.00	54.00	-19.23	Peak
1338.0	42.90	---	-6.62	36.28	---	74.00	54.00	-17.72	Peak
1676.0	38.93	---	-5.04	33.89	---	74.00	54.00	-20.11	Peak
2586.0	38.42	---	-0.62	37.80	---	74.00	54.00	-16.20	Peak
4503.5	34.81	---	5.32	40.13	---	74.00	54.00	-13.87	Peak
4960.0	34.39	---	6.36	40.75	---	74.00	54.00	-13.25	Peak
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.

Radiated Spurious Emission Measurement Result (above 1GHz)

Operation Mode	TX CH High	Test Date	Jul. 24, 2009
Fundamental Frequency	2480 MHz	Test By	Jason
Temperature	25	Pol	Hor.
Humidity	65 %		

Freq. (MHz)	Peak	AV	Ant./CL CF(dB)	Actual FS		Peak	AV	Margin (dB)	Remark
	Reading (dBuV)	Reading (dBuV)		Peak (dBuV/m)	AV (dBuV/m)	Limit (dBuV/m)	Limit (dBuV/m)		
1000.0	51.28	---	-7.74	43.54	---	74.00	54.00	-10.46	Peak
1058.5	45.24	---	-7.91	37.33	---	74.00	54.00	-16.67	Peak
1318.5	42.77	---	-6.72	36.05	---	74.00	54.00	-17.95	Peak
1806.0	38.64	---	-4.43	34.21	---	74.00	54.00	-19.79	Peak
2586.0	39.09	---	-0.62	38.47	---	74.00	54.00	-15.53	Peak
4960.0	35.15	---	6.36	41.51	---	74.00	54.00	-12.49	Peak
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.

Radiated Spurious Emission Measurement Result (below 1GHz)

Operation Mode	RX CH Low	Test Date	Jul. 24, 2009
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)
65.89	V	Peak	48.31	-15.09	33.22	40.00	-6.78
72.68	V	Peak	55.34	-16.62	38.72	40.00	-1.28
90.14	V	Peak	49.06	-17.62	31.44	43.50	-12.06
211.39	V	Peak	38.52	-15.22	23.30	43.50	-20.20
431.58	V	Peak	34.81	-9.09	25.72	46.00	-20.28
795.33	V	Peak	32.89	-3.15	29.74	46.00	-16.26
38.73	H	Peak	42.47	-13.84	28.63	40.00	-11.37
72.68	H	Peak	49.57	-16.62	32.95	40.00	-7.05
158.04	H	Peak	36.40	-13.28	23.12	43.50	-20.38
211.39	H	Peak	43.73	-15.22	28.51	43.50	-14.99
470.38	H	Peak	33.38	-8.55	24.83	46.00	-21.17
615.88	H	Peak	32.97	-5.70	27.27	46.00	-18.73

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.

Radiated Spurious Emission Measurement Result (below 1GHz)

Operation Mode	RX CH Mid	Test Date	Jul. 24, 2009
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)
65.89	V	Peak	48.43	-15.09	33.34	40.00	-6.66
72.68	V	Peak	54.68	-16.62	38.06	40.00	-1.94
90.14	V	Peak	48.99	-17.62	31.37	43.50	-12.13
213.33	V	Peak	39.48	-15.16	24.32	43.50	-19.18
353.98	V	Peak	35.59	-11.67	23.92	46.00	-22.08
431.58	V	Peak	33.97	-9.09	24.88	46.00	-21.12
53.28	H	Peak	43.29	-14.40	28.89	40.00	-11.11
72.68	H	Peak	51.21	-16.62	34.59	40.00	-5.41
158.04	H	Peak	36.19	-13.28	22.91	43.50	-20.59
218.18	H	Peak	44.21	-14.99	29.22	46.00	-16.78
274.44	H	Peak	37.30	-13.50	23.80	46.00	-22.20
470.38	H	Peak	32.95	-8.55	24.40	46.00	-21.60

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.

Radiated Spurious Emission Measurement Result (below 1GHz)

Operation Mode	RX CH High	Test Date	Jul. 24, 2009
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)
65.89	V	Peak	48.97	-15.09	33.88	40.00	-6.12
72.68	V	Peak	54.67	-16.62	38.05	40.00	-1.95
90.14	V	Peak	48.13	-17.62	30.51	43.50	-12.99
431.58	V	Peak	33.67	-9.09	24.58	46.00	-21.42
509.18	V	Peak	34.34	-8.38	25.96	46.00	-20.04
715.79	V	Peak	32.82	-4.78	28.04	46.00	-17.96
53.28	H	Peak	43.59	-14.40	29.19	40.00	-10.81
72.68	H	Peak	51.04	-16.62	34.42	40.00	-5.58
158.04	H	Peak	36.78	-13.28	23.50	43.50	-20.00
208.48	H	Peak	42.89	-15.32	27.57	43.50	-15.93
470.38	H	Peak	33.65	-8.55	25.10	46.00	-20.90
824.43	H	Peak	32.71	-2.52	30.19	46.00	-15.81

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.

Radiated Spurious Emission Measurement Result (above 1GHz)

Operation Mode	RX CH Low	Test Date	Jul. 24, 2009
Fundamental Frequency	2402 MHz	Test By	Jason
Temperature	25°C	Pol	Ver.
Humidity	65 %		

Freq. (MHz)	Peak	AV	Ant./CL CF(dB)	Actual FS		Peak	AV	Margin (dB)	
	Reading (dBuV)	Reading (dBuV)		Peak (dBuV/m)	AV (dBuV/m)	Limit (dBuV/m)	Limit (dBuV/m)		
1000.0	46.25	---	-7.74	38.51	---	74.00	54.00	-15.49	Peak
1370.5	43.09	---	-6.47	36.62	---	74.00	54.00	-17.38	Peak
1676.0	39.71	---	-5.04	34.67	---	74.00	54.00	-19.33	Peak
2391.0	38.86	---	-1.39	37.47	---	74.00	54.00	-16.53	Peak
2605.5	38.77	---	-0.60	38.17	---	74.00	54.00	-15.83	Peak
4360.5	35.30	---	4.88	40.18	---	74.00	54.00	-13.82	Peak
4804.0	----					74.00	54.00		
7206.0	----					74.00	54.00		
9608.0	----					74.00	54.00		
12010.0	----					74.00	54.00		
14412.0	----					74.00	54.00		

Remark:

- (1) Measuring frequencies scanned 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- 40GHz, RBW= 1MHz, VBW= 3MHz, Sweep time= 200 ms.
- (5) Spectrum AV Setting : 1GHz- 40GHz, RBW= 1MHz, VBW= 10Hz, Sweep time= 200 ms.

Radiated Spurious Emission Measurement Result (above 1GHz)

Operation Mode	RX CH Low	Test Date	Jul. 24, 2009
Fundamental Frequency	2402 MHz	Test By	Jason
Temperature	25 °C	Pol	Hor
Humidity	65 %		

Freq. (MHz)	Peak	AV	Ant./CL CF(dB)	Actual FS		Peak	AV	Margin (dB)	
	Reading (dBuV)	Reading (dBuV)		Peak (dBuV/m)	AV (dBuV/m)	Limit (dBuV/m)	Limit (dBuV/m)		
1013.0	46.98	---	-7.68	39.30	---	74.00	54.00	-14.70	Peak
1058.5	44.88	---	-7.91	36.97	---	74.00	54.00	-17.03	Peak
1338.0	43.49	---	-6.62	36.87	---	74.00	54.00	-17.13	Peak
1676.0	39.77	---	-5.04	34.73	---	74.00	54.00	-19.27	Peak
2391.0	39.98	---	-1.39	38.59	---	74.00	54.00	-15.41	Peak
4804.0	---	---	---	---	---	74.00	54.00	---	---
5186.0	34.38	---	6.83	41.21	---	74.00	54.00	-12.79	Peak
7206.0	---	---	---	---	---	74.00	54.00	---	---
9608.0	---	---	---	---	---	74.00	54.00	---	---
12010.0	---	---	---	---	---	74.00	54.00	---	---
14412.0	---	---	---	---	---	74.00	54.00	---	---

Remark:

- (1) Measuring frequencies scanned 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- 40GHz, RBW= 1MHz, VBW= 3MHz, Sweep time= 200 ms.
- (5) Spectrum AV Setting : 1GHz- 40GHz, RBW= 1MHz, VBW= 10Hz, Sweep time= 200 ms.

Radiated Spurious Emission Measurement Result (above 1GHz)

Operation Mode	RX CH Mid	Test Date	Jul. 24, 2009
Fundamental Frequency	2441 MHz	Test By	Jason
Temperature	25 °C	Pol	Ver
Humidity	65 %		

Freq. (MHz)	Peak	AV	Ant./CL CF(dB)	Actual FS		Peak	AV	Margin (dB)	
	Reading (dBuV)	Reading (dBuV)		Peak (dBuV/m)	AV (dBuV/m)	Limit (dBuV/m)	Limit (dBuV/m)		
1000.0	46.26	---	-7.74	38.52	---	74.00	54.00	-15.48	Peak
1338.0	43.57	---	-6.62	36.95	---	74.00	54.00	-17.05	Peak
1676.0	40.62	---	-5.04	35.58	---	74.00	54.00	-18.42	Peak
2443.0	38.67	---	-1.12	37.55	---	74.00	54.00	-16.45	Peak
3093.0	36.62	---	0.72	37.34	---	74.00	54.00	-16.66	Peak
4882.0	35.01	---	6.36	41.37	---	74.00	54.00	-12.63	Peak
7323.0	----					74.00	54.00		
9764.0	----					74.00	54.00		
12205.0	----					74.00	54.00		
14646.0	----					74.00	54.00		

Remark:

- (1) Measuring frequencies scanned 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- 40GHz, RBW= 1MHz, VBW= 3MHz, Sweep time= 200 ms.
- (5) Spectrum AV Setting : 1GHz- 40GHz, RBW= 1MHz, VBW= 10Hz, Sweep time= 200 ms.

Radiated Spurious Emission Measurement Result (above 1GHz)

Operation Mode	RX CH Mid	Test Date	Jul. 24, 2009
Fundamental Frequency	2441 MHz	Test By	Jason
Temperature	25 °C	Pol	Hor
Humidity	65%		

Freq. (MHz)	Peak	AV	Ant./CL CF(dB)	Actual FS		Peak	AV	Margin (dB)	
	Reading (dBuV)	Reading (dBuV)		Peak (dBuV/m)	AV (dBuV/m)	Limit (dBuV/m)	Limit (dBuV/m)		
1006.5	46.39	---	-7.74	38.65	---	74.00	54.00	-15.35	Peak
1338.0	43.15	---	-6.62	36.53	---	74.00	54.00	-17.47	Peak
1611.0	40.34	---	-5.37	34.97	---	74.00	54.00	-19.03	Peak
2313.0	38.66	---	-1.83	36.83	---	74.00	54.00	-17.17	Peak
2443.0	41.06	---	-1.12	39.94	---	74.00	54.00	-14.06	Peak
4685.0	35.31	---	5.72	41.03	---	74.00	54.00	-12.97	Peak
4882.0	----					74.00	54.00		
7323.0	----					74.00	54.00		
9764.0	----					74.00	54.00		
12205.0	----					74.00	54.00		
14646.0	----					74.00	54.00		

Remark:

- (1) Measuring frequencies scanned 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- 40GHz, RBW= 1MHz, VBW= 3MHz, Sweep time= 200 ms.
- (5) Spectrum AV Setting : 1GHz- 40GHz, RBW= 1MHz, VBW= 10Hz, Sweep time= 200 ms.

Radiated Spurious Emission Measurement Result (above 1GHz)

Operation Mode	RX CH High	Test Date	Jul. 24, 2009
Fundamental Frequency	2480 MHz	Test By	Jason
Temperature	25 °C	Pol	Ver
Humidity	65 %		

Freq. (MHz)	Peak	AV	Ant./CL CF(dB)	Actual FS		Peak	AV	Margin (dB)	
	Reading (dBuV)	Reading (dBuV)		Peak (dBuV/m)	AV (dBuV/m)	Limit (dBuV/m)	Limit (dBuV/m)		
1000.0	46.15	---	-7.74	38.41	---	74.00	54.00	-15.59	Peak
1338.0	42.71	---	-6.62	36.09	---	74.00	54.00	-17.91	Peak
1890.5	38.59	---	-4.03	34.56	---	74.00	54.00	-19.44	Peak
2475.5	40.30	---	-0.92	39.38	---	74.00	54.00	-14.62	Peak
3743.0	35.17	---	2.81	37.98	---	74.00	54.00	-16.02	Peak
4796.0	35.34	---	5.99	41.33	---	74.00	54.00	-12.67	Peak
4960.0	----					74.00	54.00		
7440.0	----					74.00	54.00		
9920.0	----					74.00	54.00		
12400.0	----					74.00	54.00		
14880.0	----					74.00	54.00		

Remark:

- (1) Measuring frequencies scanned 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- 40GHz, RBW= 1MHz, VBW= 3MHz, Sweep time= 200 ms.
- (5) Spectrum AV Setting : 1GHz- 40GHz, RBW= 1MHz, VBW= 10Hz, Sweep time= 200 ms.

Radiated Spurious Emission Measurement Result (above 1GHz)

Operation Mode	RX CH High	Test Date	Jul. 24, 2009
Fundamental Frequency	2480 MHz	Test By	Jason
Temperature	25 °C	Pol	Hor
Humidity	65 %		

Freq. (MHz)	Peak	AV	Ant./CL CF(dB)	Actual FS		Peak	AV	Margin (dB)	
	Reading (dBuV)	Reading (dBuV)		Peak (dBuV/m)	AV (dBuV/m)	Limit (dBuV/m)	Limit (dBuV/m)		
1013.0	46.20	---	-7.68	38.52	---	74.00	54.00	-15.48	Peak
1058.5	44.65	---	-7.91	36.74	---	74.00	54.00	-17.26	Peak
1338.0	43.52	---	-6.62	36.90	---	74.00	54.00	-17.10	Peak
2475.5	39.71	---	-0.92	38.79	---	74.00	54.00	-15.21	Peak
2586.0	39.57	---	-0.62	38.95	---	74.00	54.00	-15.05	Peak
4490.5	34.72	---	5.29	40.01	---	74.00	54.00	-13.99	Peak
4960.0	----					74.00	54.00		
7440.0	----					74.00	54.00		
9920.0	----					74.00	54.00		
12400.0	----					74.00	54.00		
14880.0	----					74.00	54.00		

Remark:

- (1) Measuring frequencies scanned 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- 40GHz, RBW= 1MHz, VBW= 3MHz, Sweep time= 200 ms.
- (5) Spectrum AV Setting : 1GHz- 40GHz, RBW= 1MHz, VBW= 10Hz, Sweep time= 200 ms.

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.

According to RSS 210 issue 6, A8.1(b), frequency hopping systems operating in the 2400-2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB 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:

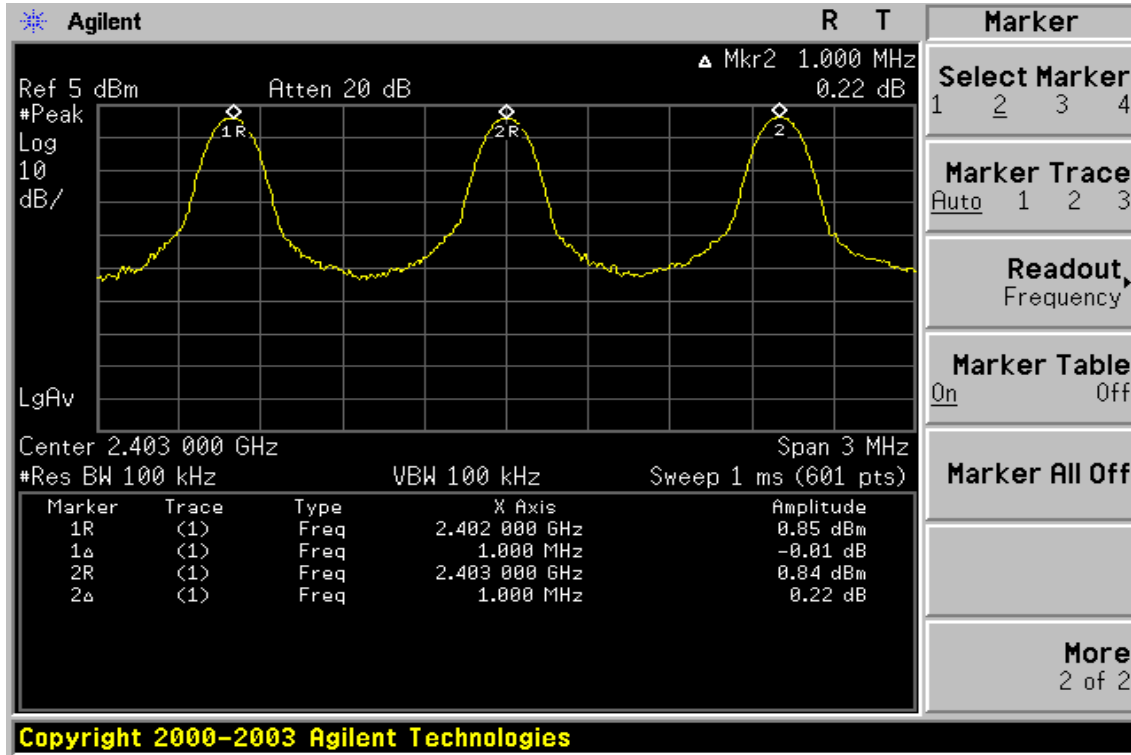
1. Place the EUT on the table and set it in transmitting mode.
2. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.
3. Set center frequency of spectrum analyzer = middle of hopping channel .
4. Set the spectrum analyzer as RBW,VBW=3KHz, 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	$\geq 25\text{KHz}$ or 2/3 times 20dB bandwidth	PASS

Note: Refer to next page for plots.

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.

According to RSS-210 issue 7, §A8.1(d), For frequency hopping systems operating in the 2400-2483.5 MHz band employing at least 75 hopping channels, the maximum conducted output power shall not exceed 1 W. For all other frequency hopping systems, the maximum peak conducted output power shall not exceed 0.125 W.

10.2. Measurement Equipment Used:

Refer to section 6.2 for details.

10.3. Test Set-up:

Refer to section 6.3 for details.

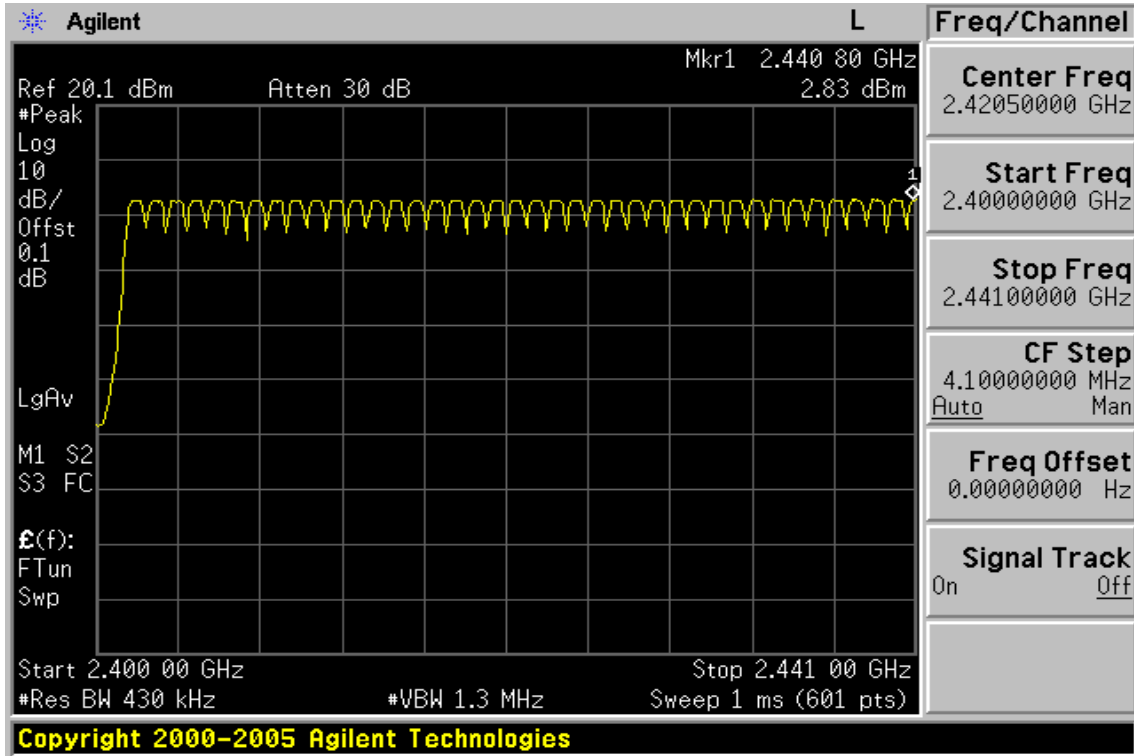
10.4. Measurement Procedure:

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, VBW=100KHz,
5. Max hold, view and count how many channel in the band.

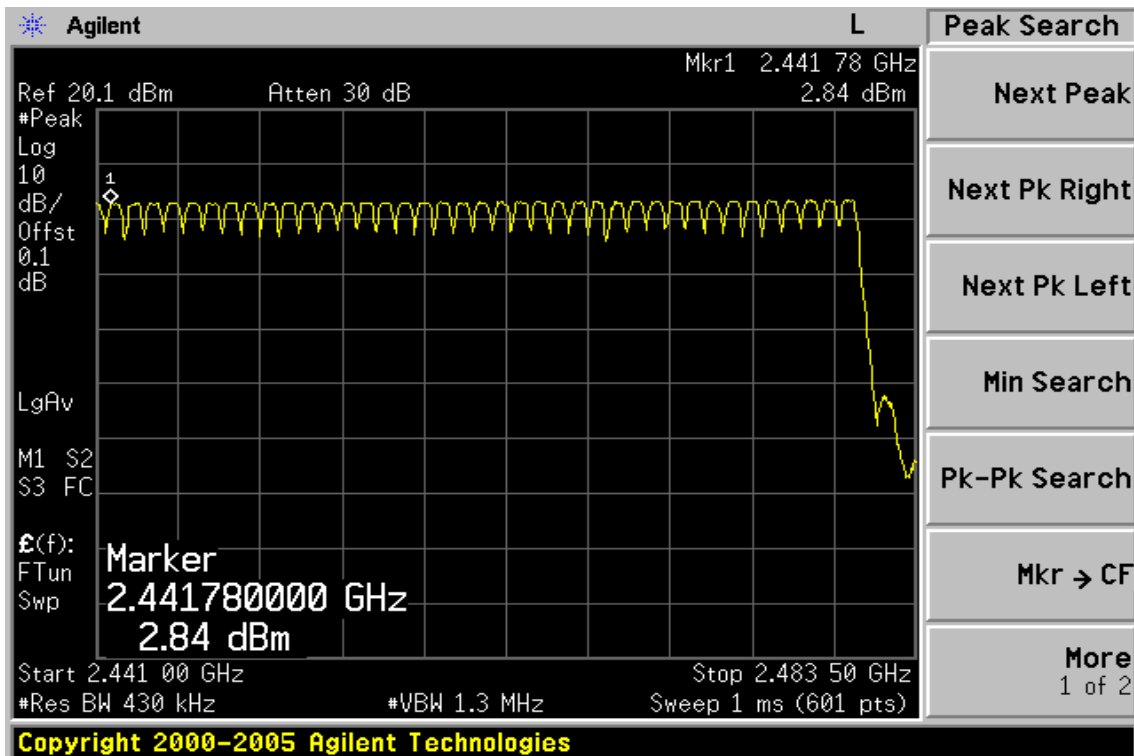
10.5. Measurement Result:

Note: Refer to next page for plots.

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.

According to RSS-210 issue 7, §A8.1(d), Frequency hopping systems operating in the 2400-2483.5 MHz band shall use at least 15 hopping channels. The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed. Transmissions on particular hopping frequencies may be avoided or suppressed provided that a minimum of 15 hopping channels are used.

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=100KHz, Span = 0Hz , Adjust Sweep = 30s.
5. Repeat above procedures until all frequency measured were complete.

11.5. Measurement Result:

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

CH Low: DH1 time slot = 0.417 (ms) * (1600/(2*79)) * 31.6 = 133.44 (ms)

DH3 time slot = 1.667 (ms) * (1600/(4*79)) * 31.6 = 266.72 (ms)

DH5 time slot = 2.925 (ms) * (1600/(6*79)) * 31.6 = 312.00 (ms)

CH Mid: DH1 time slot = 0.417 (ms) * (1600/(2*79)) * 31.6 = 133.44 (ms)

DH3 time slot = 1.667 (ms) * (1600/(4*79)) * 31.6 = 266.72 (ms)

DH5 time slot = 2.925 (ms) * (1600/(6*79)) * 31.6 = 312.00 (ms)

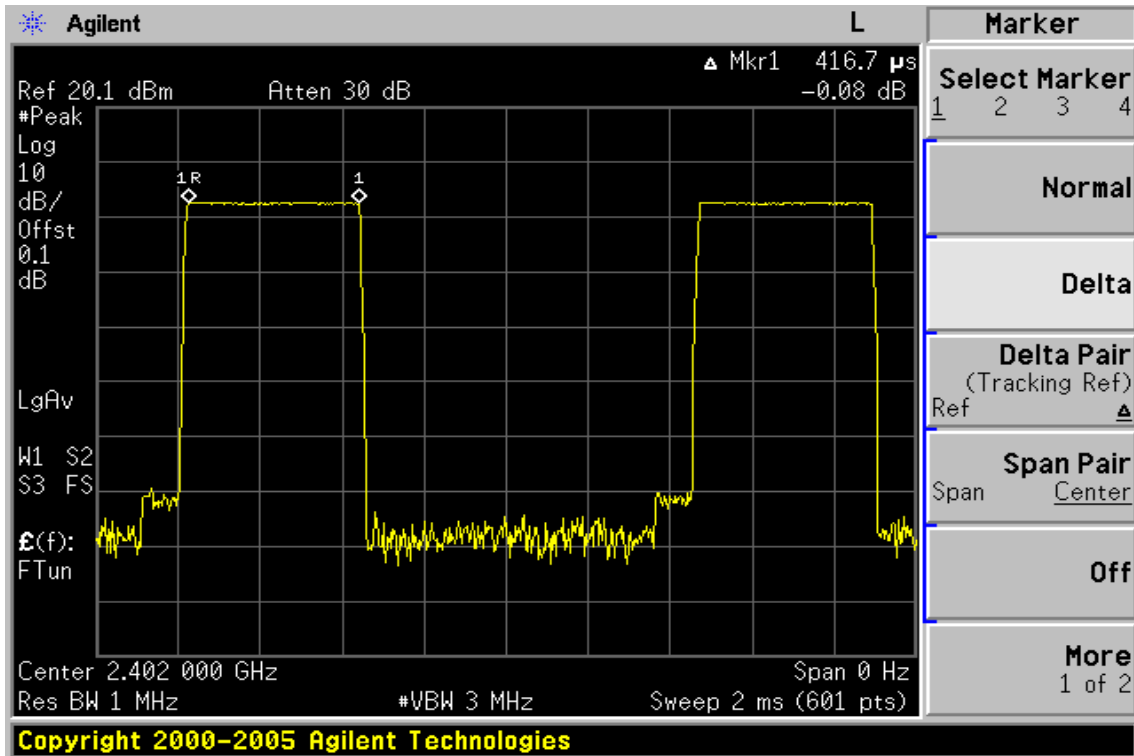
CH High: DH1 time slot = 0.417 (ms) * (1600/(2*79)) * 31.6 = 133.44 (ms)

DH3 time slot = 1.667 (ms) * (1600/(4*79)) * 31.6 = 266.72 (ms)

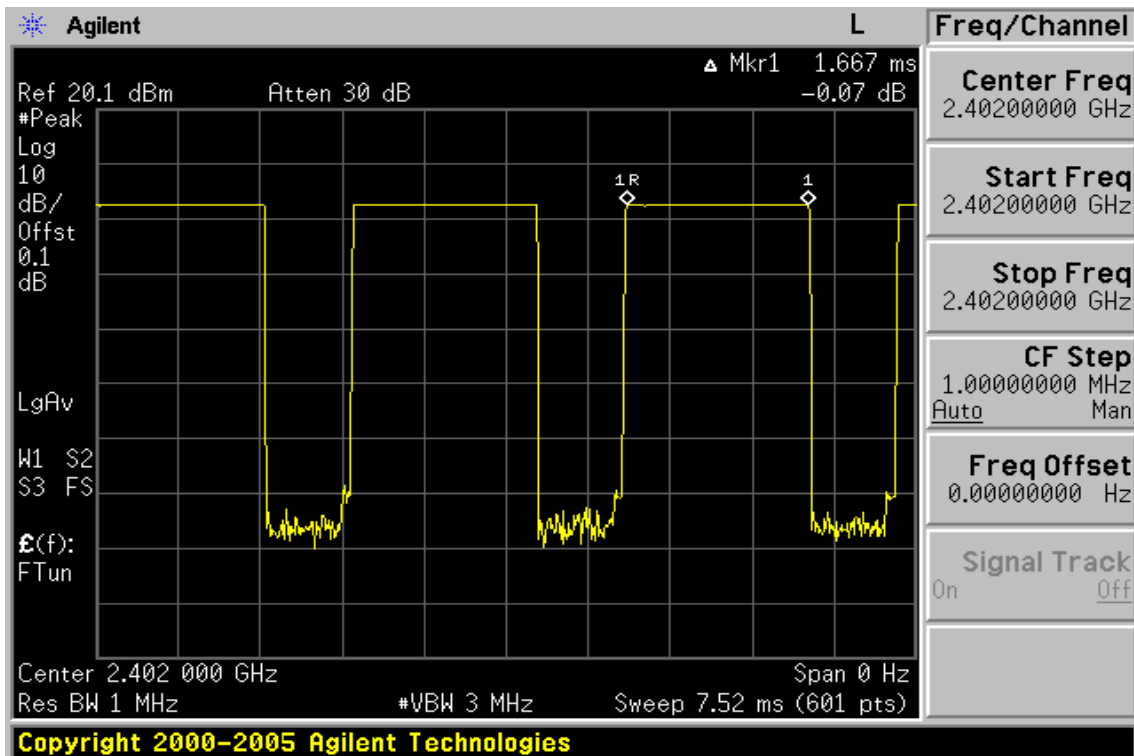
DH5 time slot = 2.925 (ms) * (1600/(6*79)) * 31.6 = 312.00 (ms)

Note: Refer to next page for plots.

CH-Low
DH1

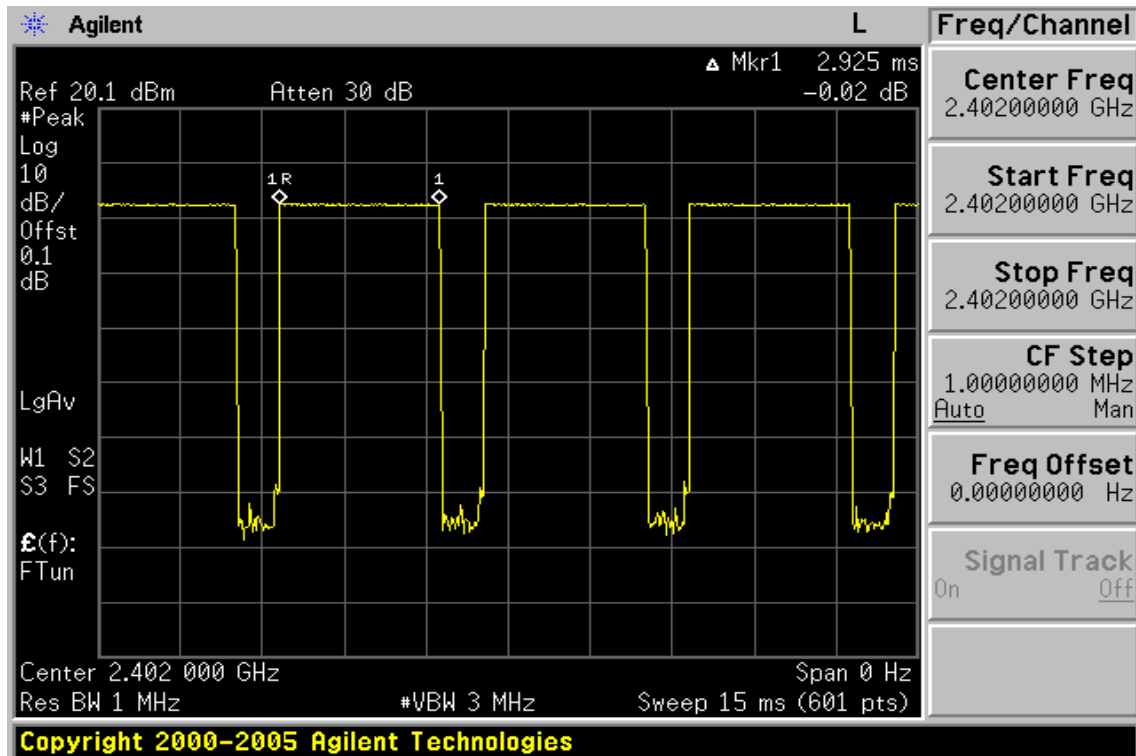


DH3

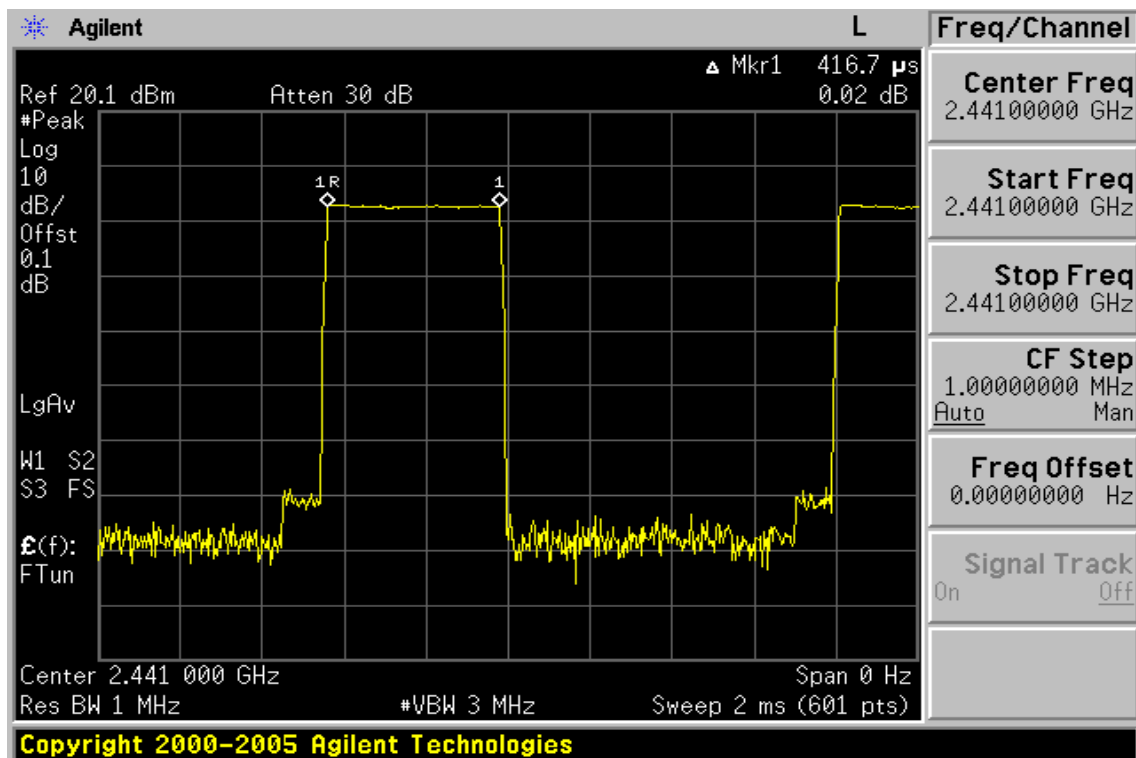


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DH5

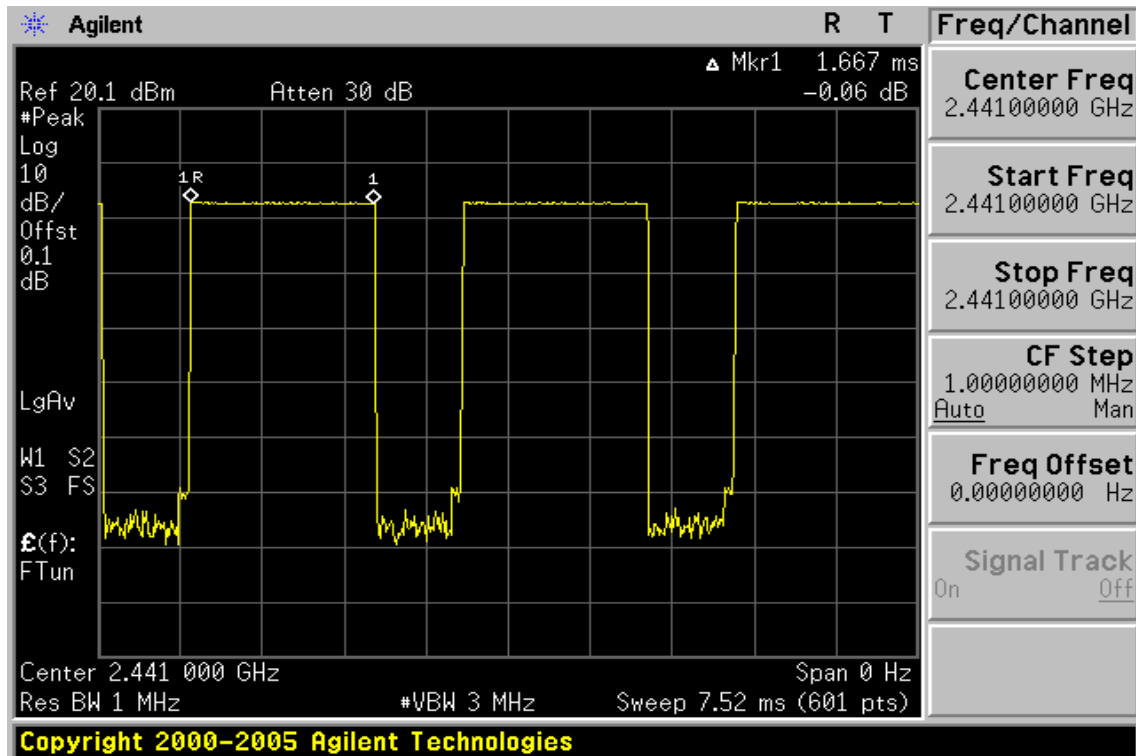


CH-Mid
DH1

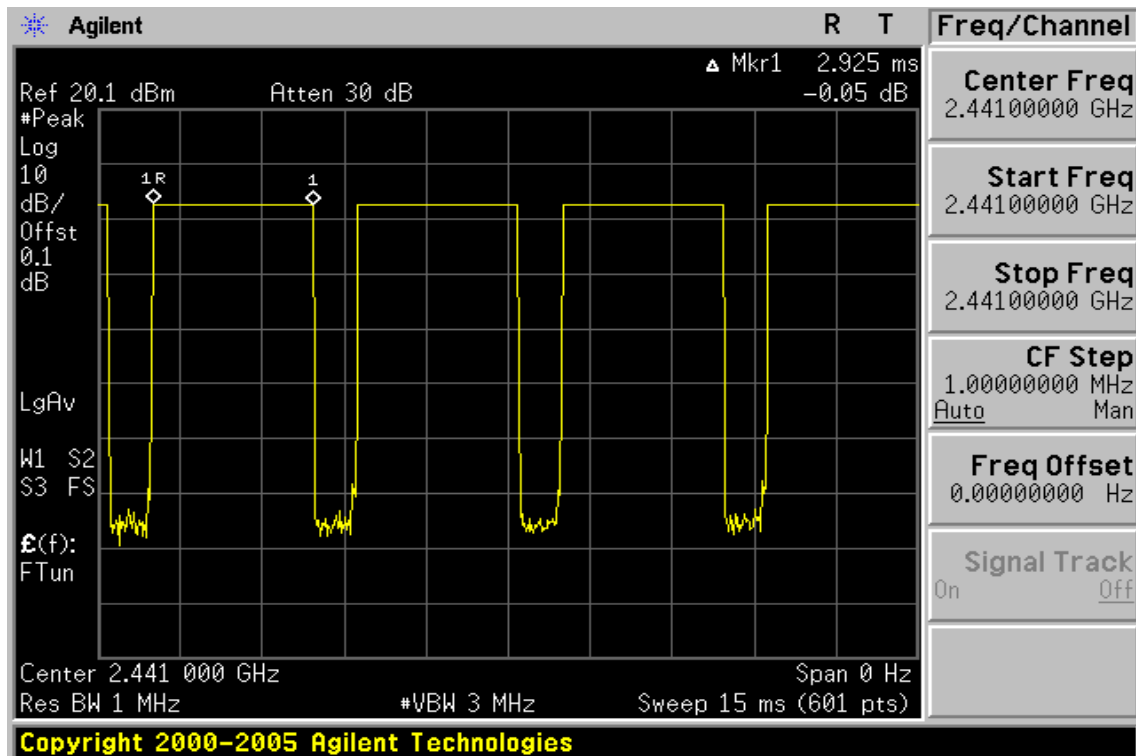


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DH3

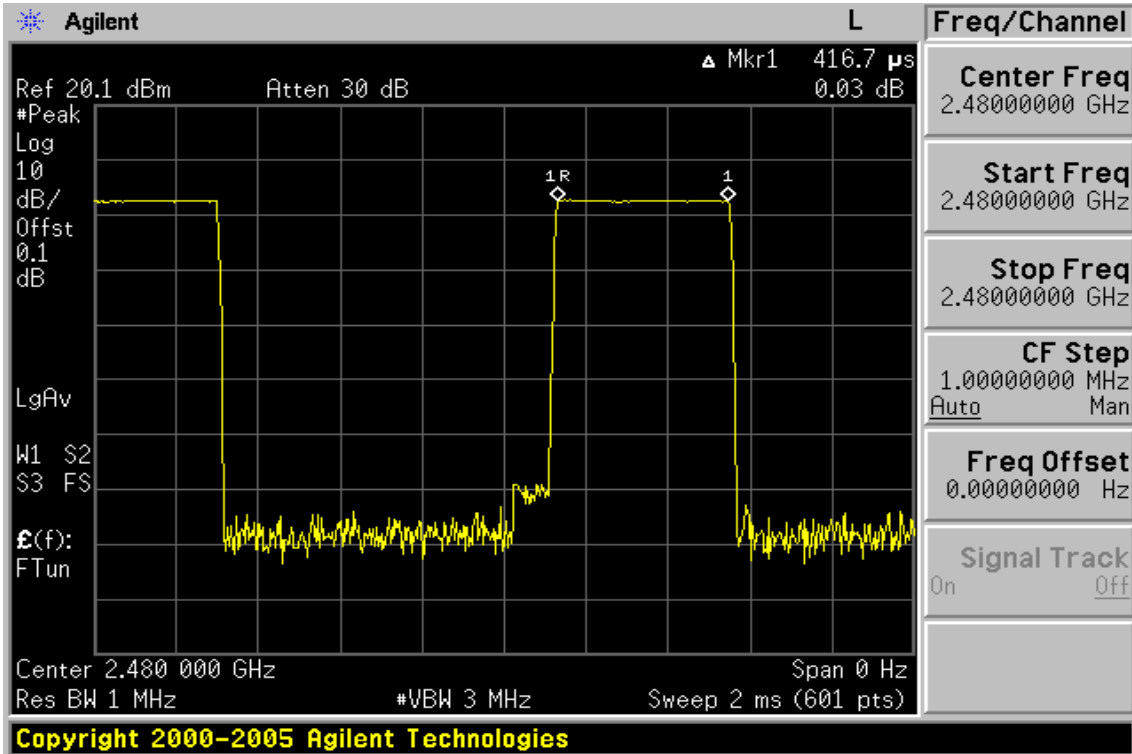


DH5

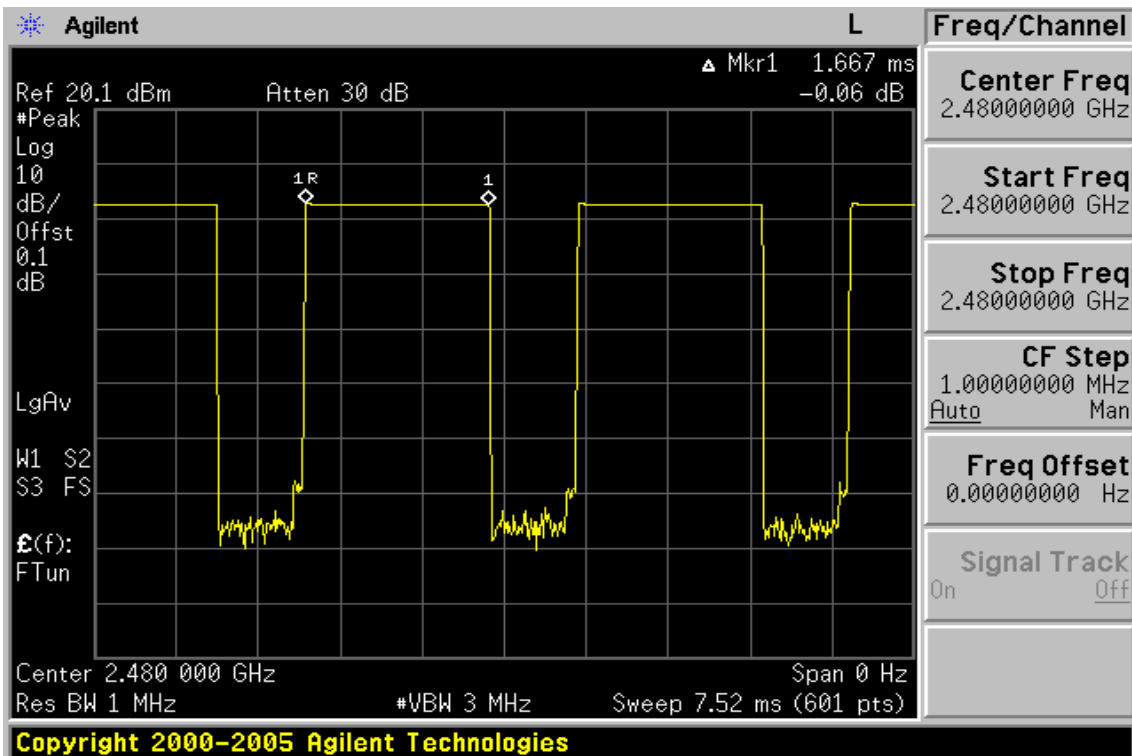


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CH-High DH1

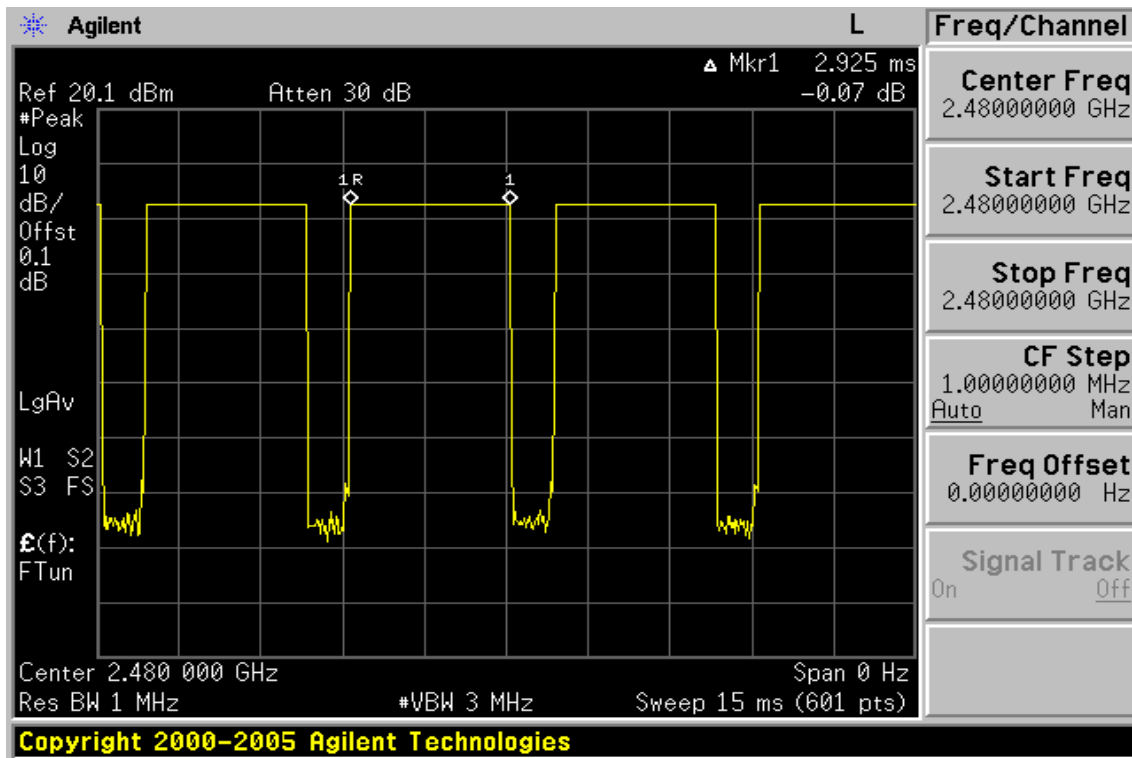


DH3



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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.

According to RSS-210 issue 7, §A8.2(b) and §A8.3(2), The transmitter power spectral density (into the antenna) shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission or over 1.0 second if the transmission exceeds 1.0-second duration.

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:

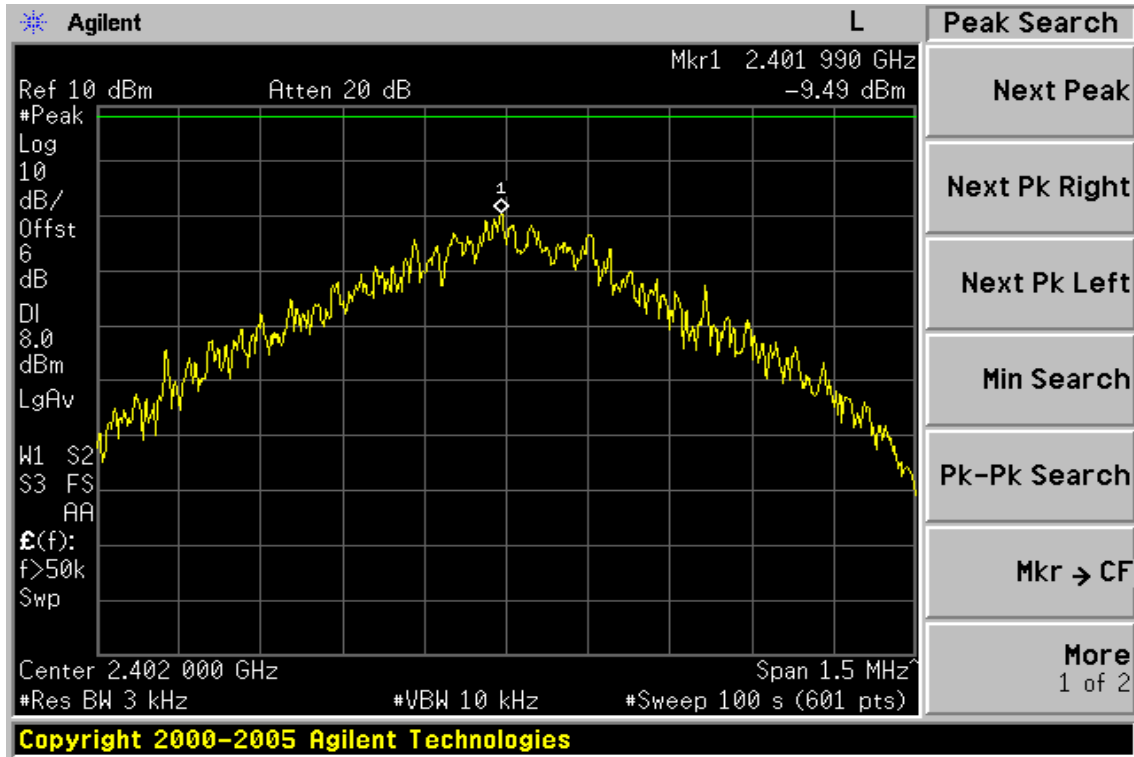
BDR Mode

CH	RF Power Density Reading (dBm)	Cable loss (dB)	RF Power Density Level (dBm)	Maximum Limit (dBm)
Low	-9.49	0.00	-9.49	8
Mid	-8.53	0.00	-8.53	8
High	-9.39	0.00	-9.39	8

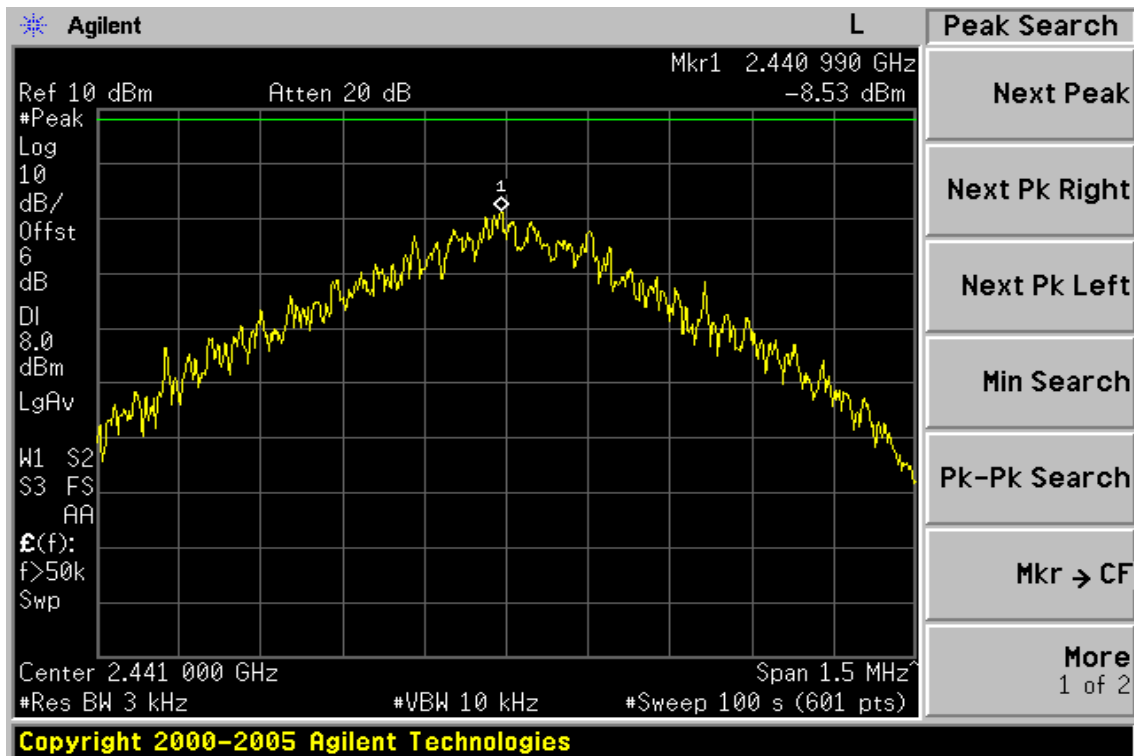
Note: offset 6dB for path lose.

Note: Refer to next page for plots.

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

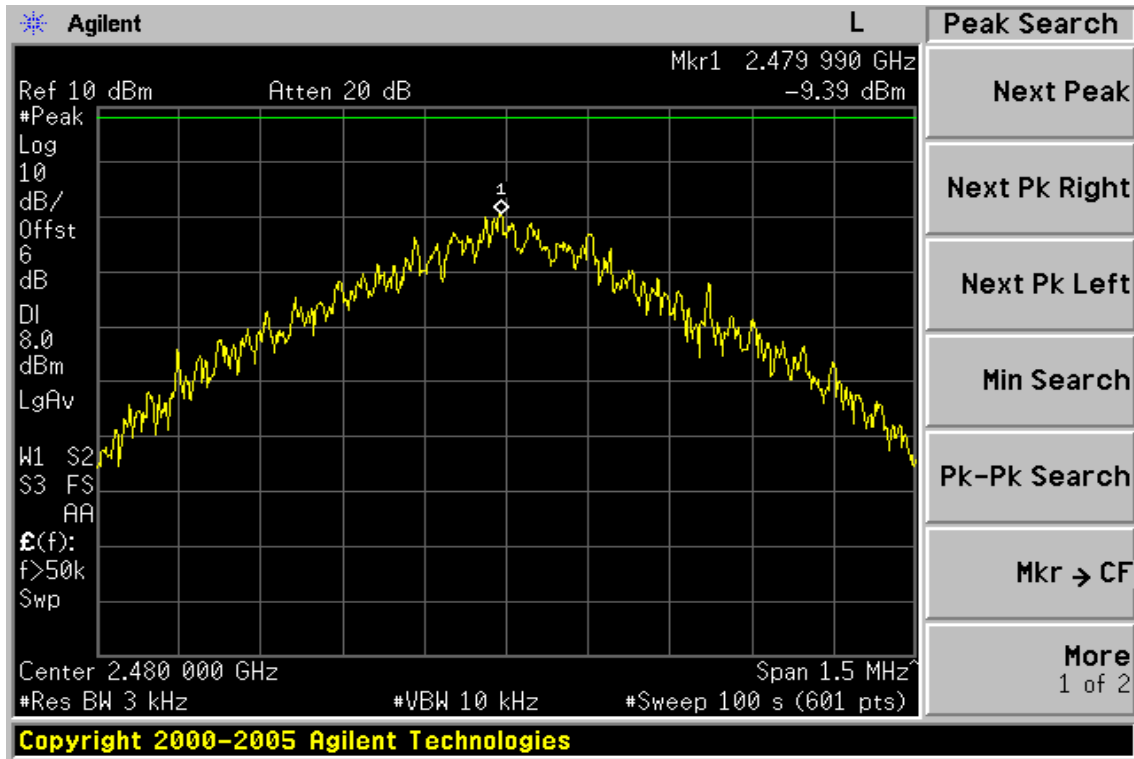


Power Spectral Density Test Plot (CH-Mid) (BDR)



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



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13. 20dB Bandwidth

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.

13.5. Measurement Result:

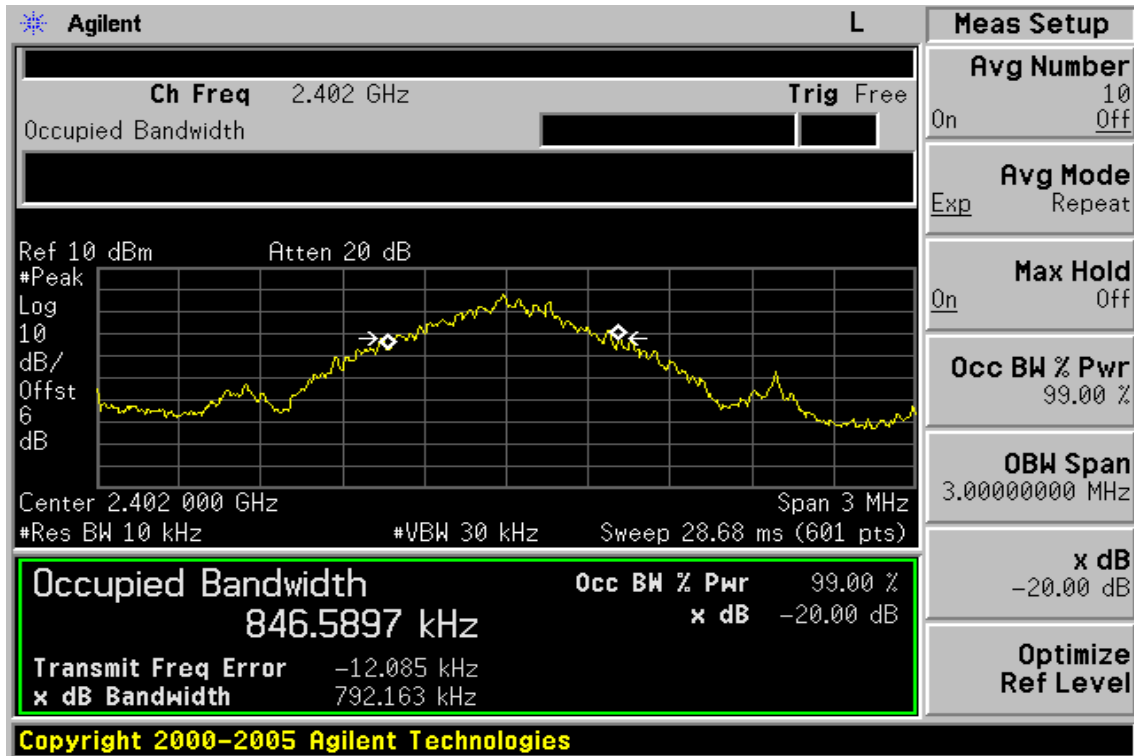
BDR mode:

CH	Bandwidth (kHz)
Lower	792.163
Mid	792.919
Higher	793.511

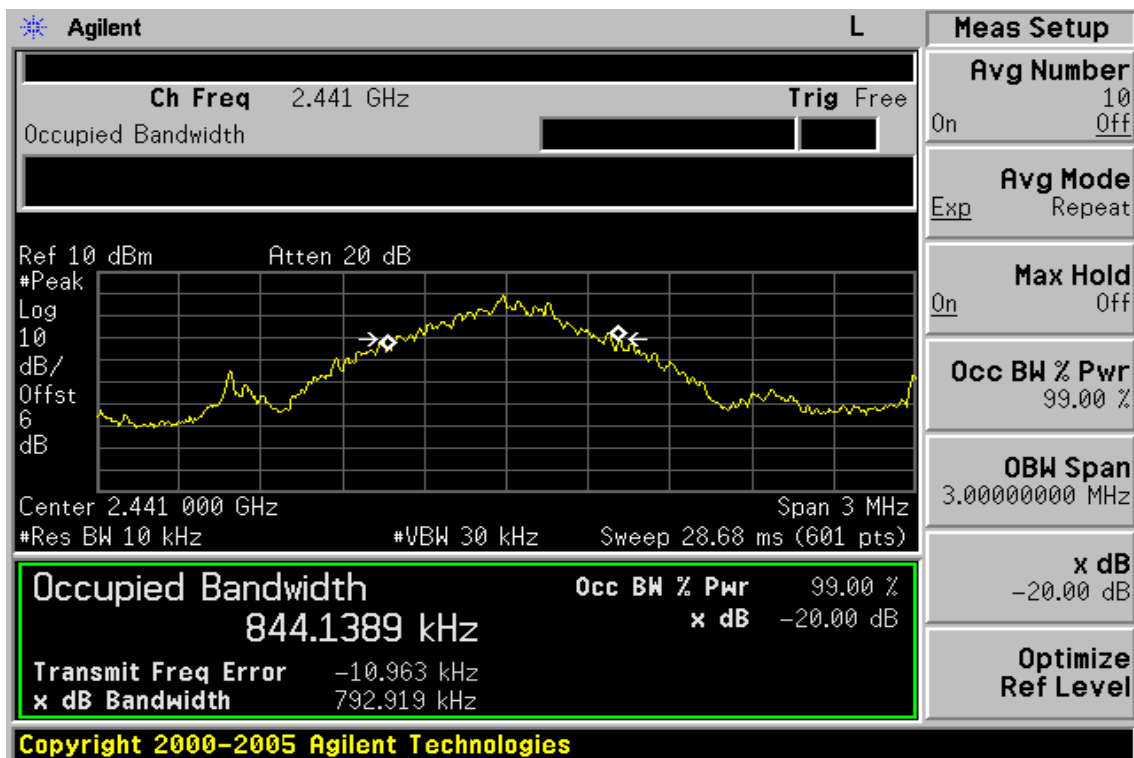
EDR mode:

CH	Bandwidth (MHz)	2/3 Bandwidth (MHz)
Lower	1.219	0.813
Mid	1.228	0.819
Higher	1.225	0.817

BDR Mode
20dB Bandwidth Test Data CH-Low

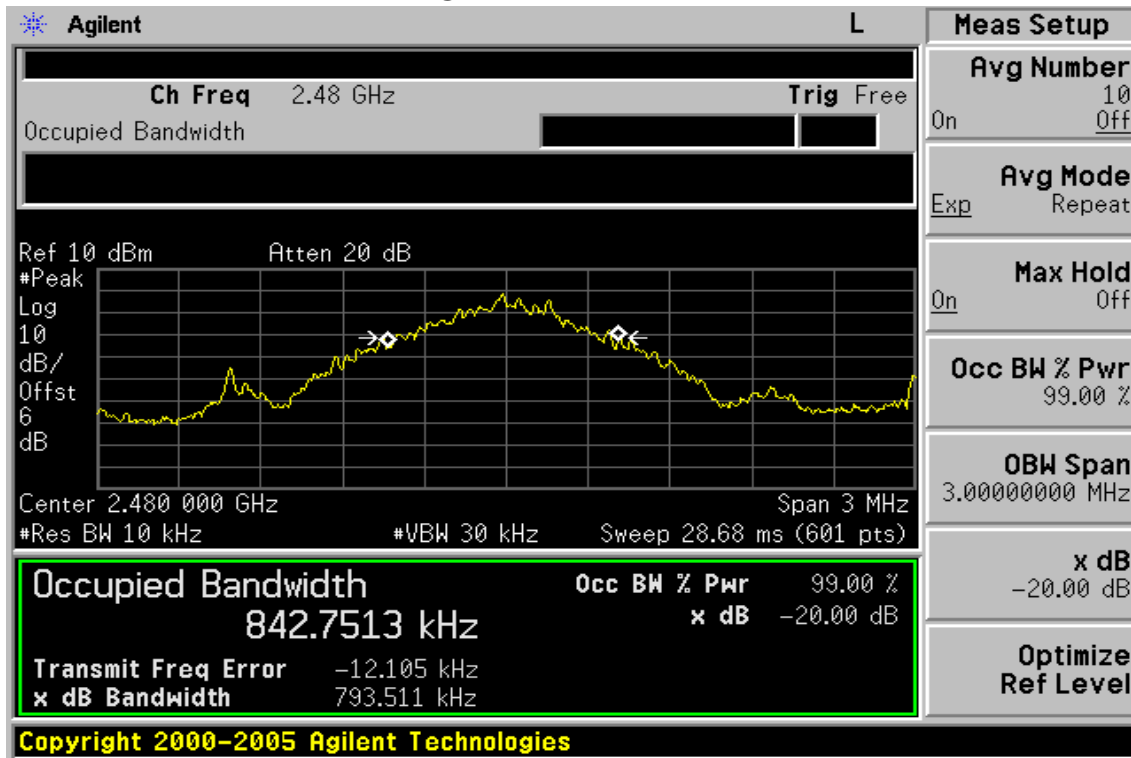


20dB Bandwidth Test Data CH-Mid



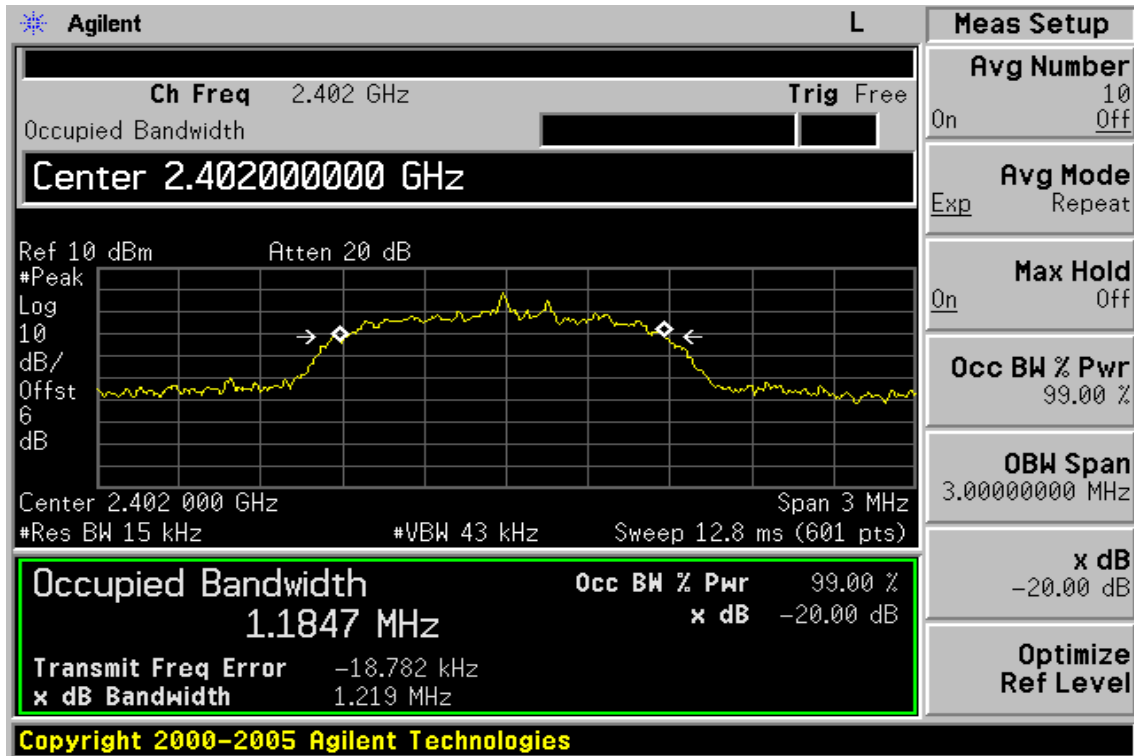
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20dB Bandwidth Test Data CH-High

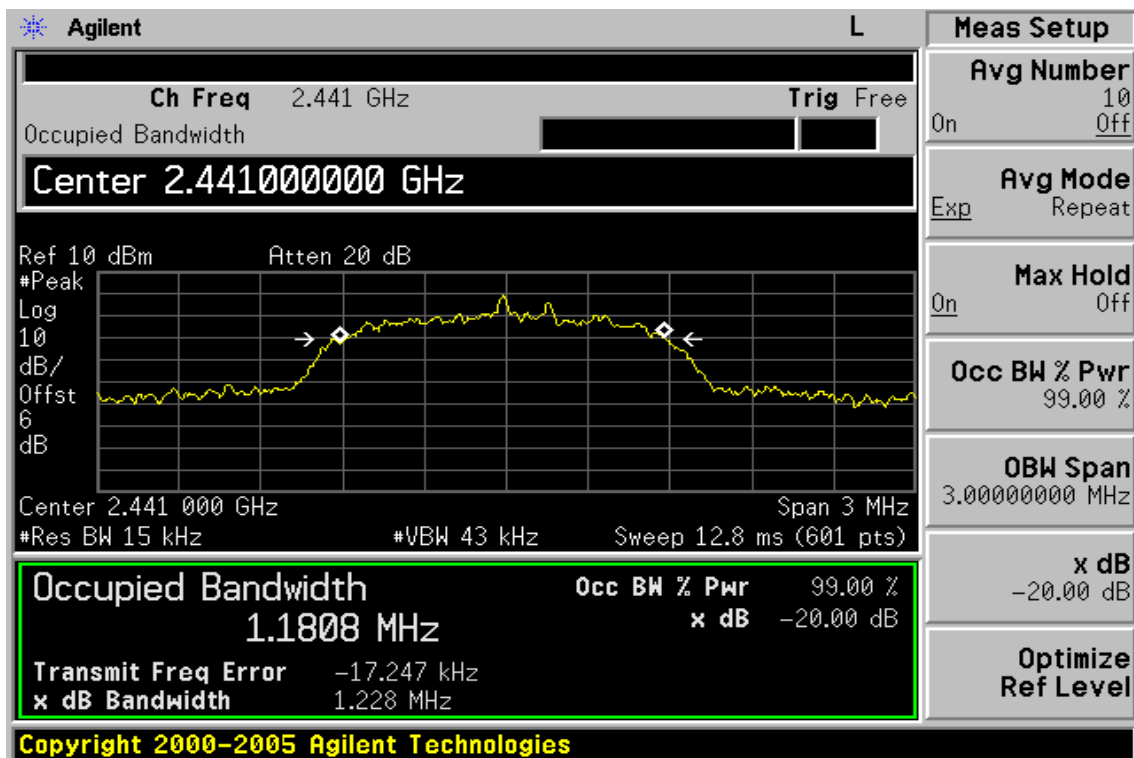


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EDR Mode
20dB Bandwidth Test Data CH-Low

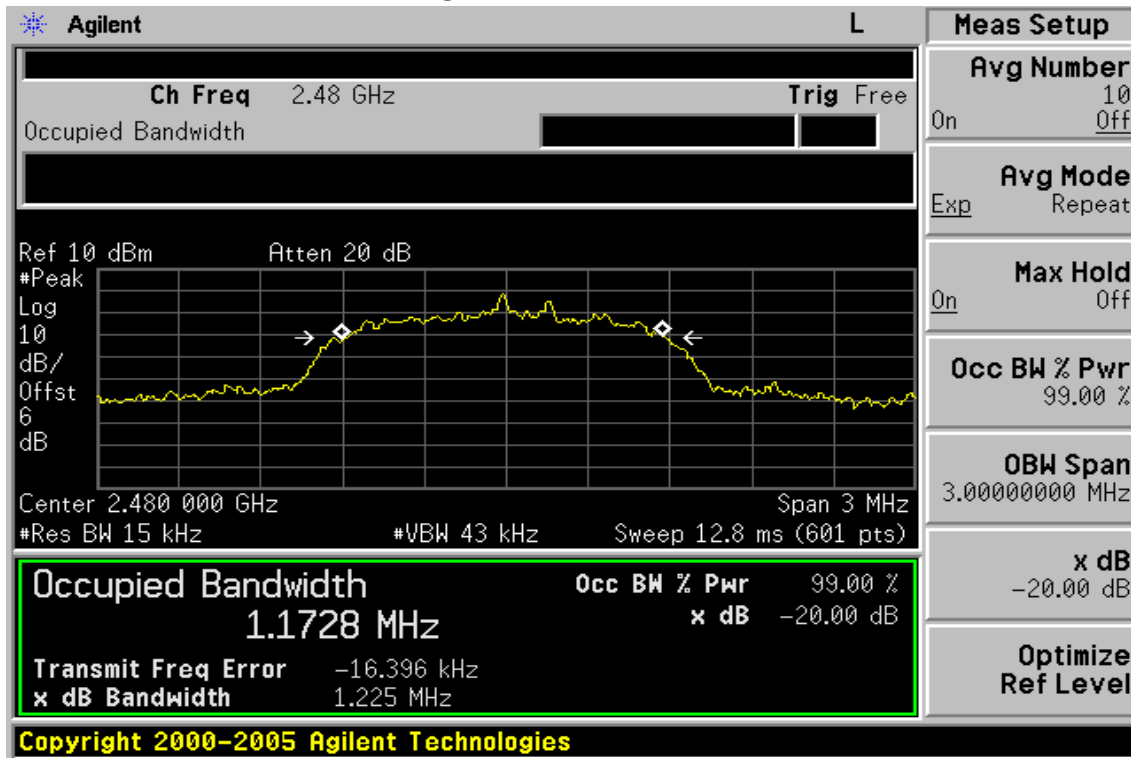


20dB Bandwidth Test Data CH-Mid



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20dB Bandwidth Test Data CH-High



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14. ANTENNA REQUIREMENT

14.1. Standard Applicable:

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 §15.246(1), if transmitting antennas of directional gain greater than 6dBi are used the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

According to RSS-GEN 7.1.4, a transmitter can only be sold or operated with antennas with which it was certified. A transmitter may be certified with multiple antenna types. An antenna type comprises antennas having similar in-band and out-of-band radiation patterns. Testing shall be performed using the highest-gain antenna of each combination of transmitter and antenna type for which certification is being sought, with the transmitter output power set at the maximum level. Any antenna of the same type and having equal or lesser gain as an antenna that had been successfully tested for certification with the transmitter, will also be considered certified with the transmitter, and may be used and marketed with the transmitter. The manufacturer shall include with the application for certification a list of acceptable antenna types to be used with the transmitter.

When a measurement at the antenna connector is used to determine RF output power, the effective gain of the device's antenna shall be stated, based on measurement or on data from the antenna manufacturer. Any antenna gain in excess of 6 dBi (6 dB above isotropic gain) shall be added to the measured RF output power before using the power limits specified in RSS-210 or RSS-310 for devices of RF output powers of 10 milliwatts or less. For devices of output powers greater than 10 milliwatts, except devices subject to RSS-210 Annex 8 (Frequency Hopping and Digital Modulation Systems Operating in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz Bands) or RSS-210 Annex 9 (Local Area Network Devices), the total antenna gain shall be added to the measured RF output power before using the specified power limits. For devices subject to RSS-210 Annex 8 or Annex 9, the antenna gain shall not be added.

14.2. Antenna Connected Construction:

The directional gains of antenna used for transmitting is -3.9dBi, and the antenna connector is designed with permanent attachment and no consideration of replacement. Please see EUT photo for details.

15. 99% Bandwidth Measurement

15.1. Standard Applicable:

RSS-Gen §4.4.1, the transmitter shall be operated at its maximum carrier power measured under normal test conditions. The span of the analyzer shall be set to capture all products of the modulation process, including the emission skirts. The resolution bandwidth shall be set to as close to 1% of the selected span as is possible without being below 1%. The video bandwidth shall be set to 3 times the resolution bandwidth. Video averaging is not permitted. Where practical, a sampling detector shall be used since a peak or, peak hold, may produce a wider bandwidth than actual.

The trace data points are recovered and are directly summed in linear terms. The recovered amplitude data points, beginning at the lowest frequency, are placed in a running sum until 0.5% of the total is reached and that frequency recorded. The process is repeated for the highest frequency data points. This frequency is recorded.

The span between the two recorded frequencies is the occupied bandwidth.

15.2. Measurement Equipment Used:

Refer to section 6.2 for details.

15.3. Test Set-up:

Refer to section 6.3 for details.

15.4. 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=1% of the approximate emission bandwidth, VBW = 3 times RBW, Span= approximately 20dB below the peak level. Sweep=auto
4. Turn on the 99% bandwidth function, max reading..
5. Repeat above procedures until all frequency measured were complete.

15.5. Measurement Result:

BDR Mode

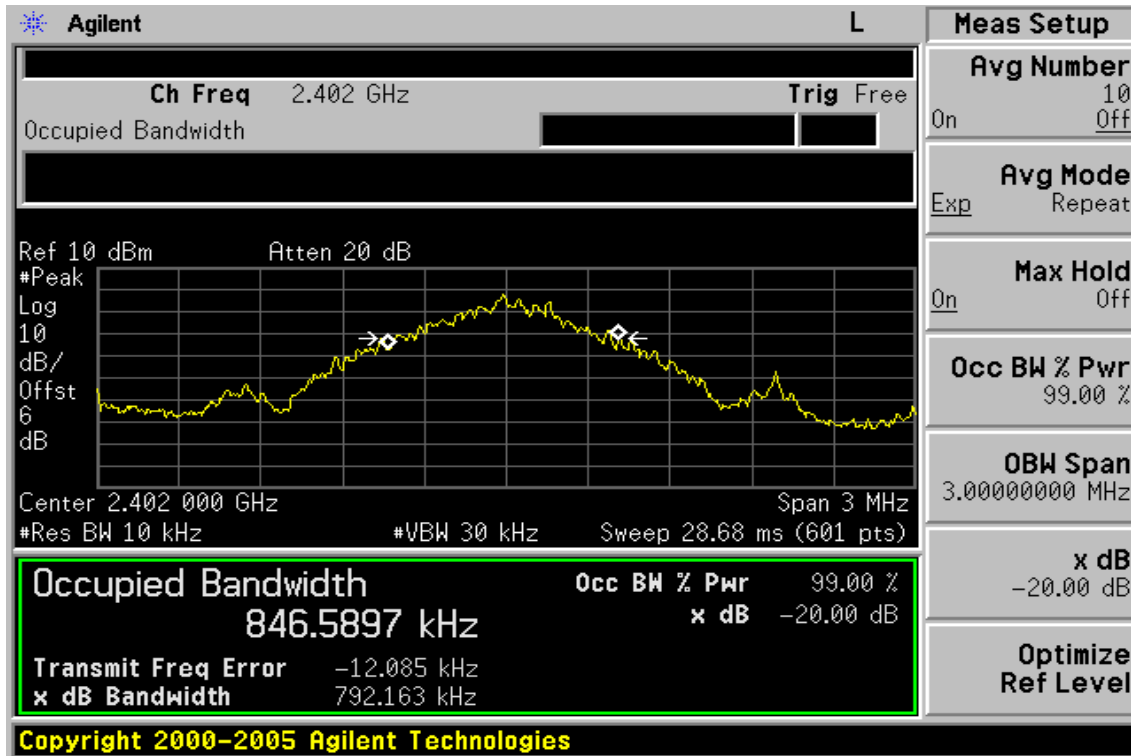
CH	Bandwidth (kHz)
Lower	846.5897
Mid	844.1389
Higher	842.7513

EDR Mode

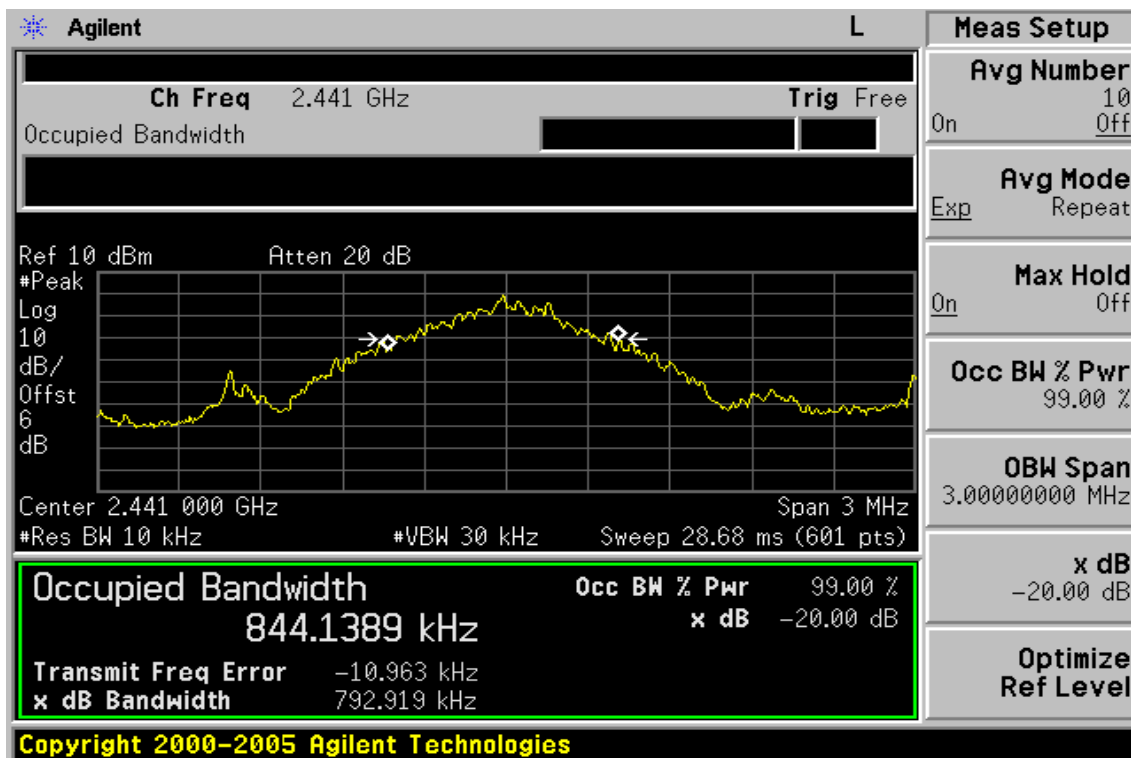
CH	Bandwidth (MHz)
Lower	1.1847
Mid	1.1808
Higher	1.1728

Note: Refer to next page for plots.

BDR Mode
99% Band Width Test Data CH-Low

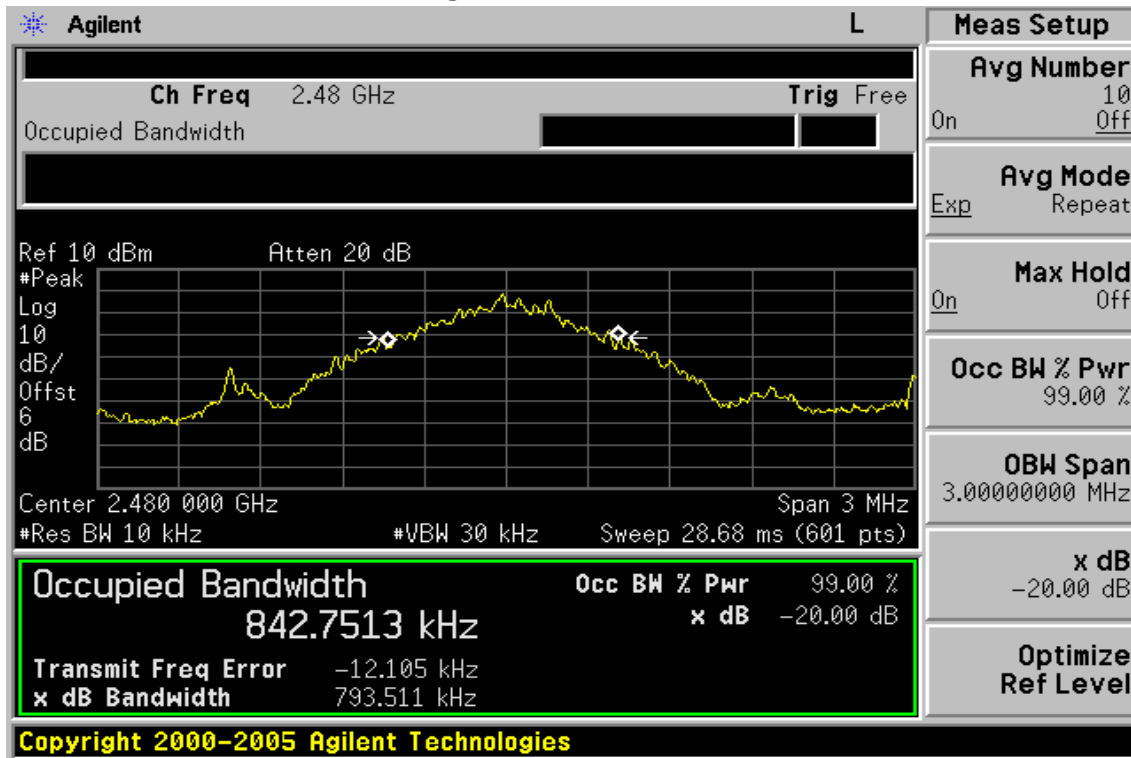


99% Band Width Test Data CH-Mid

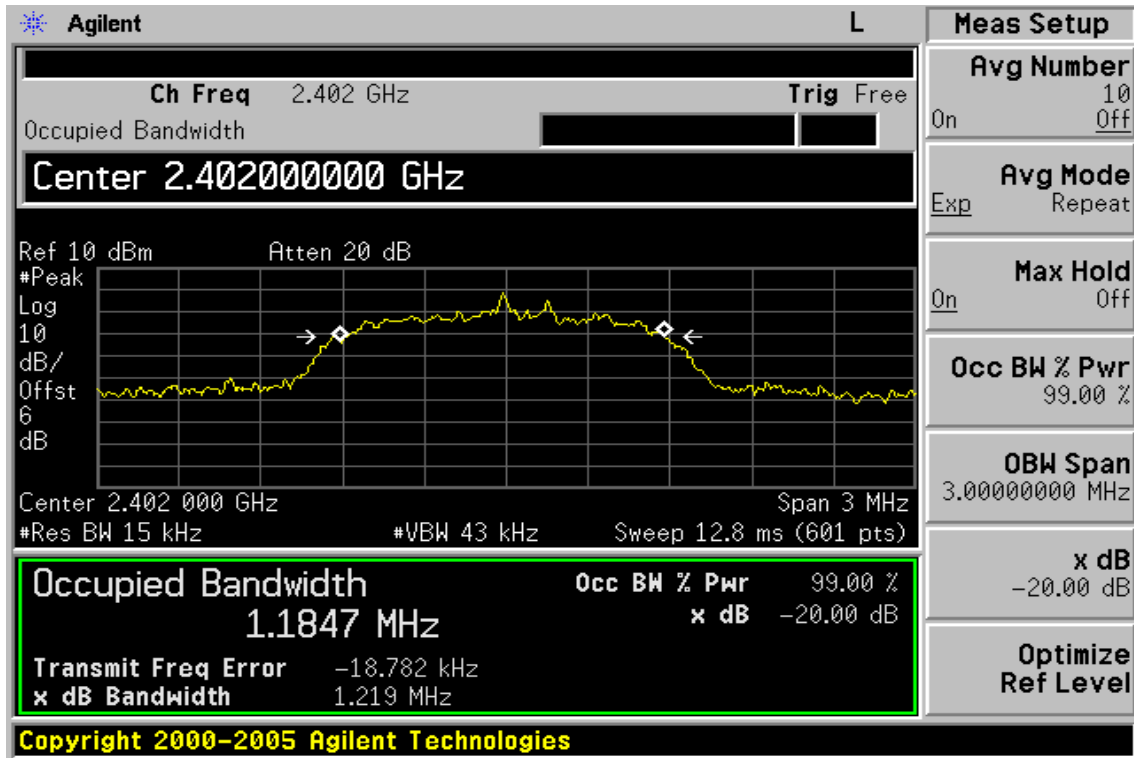


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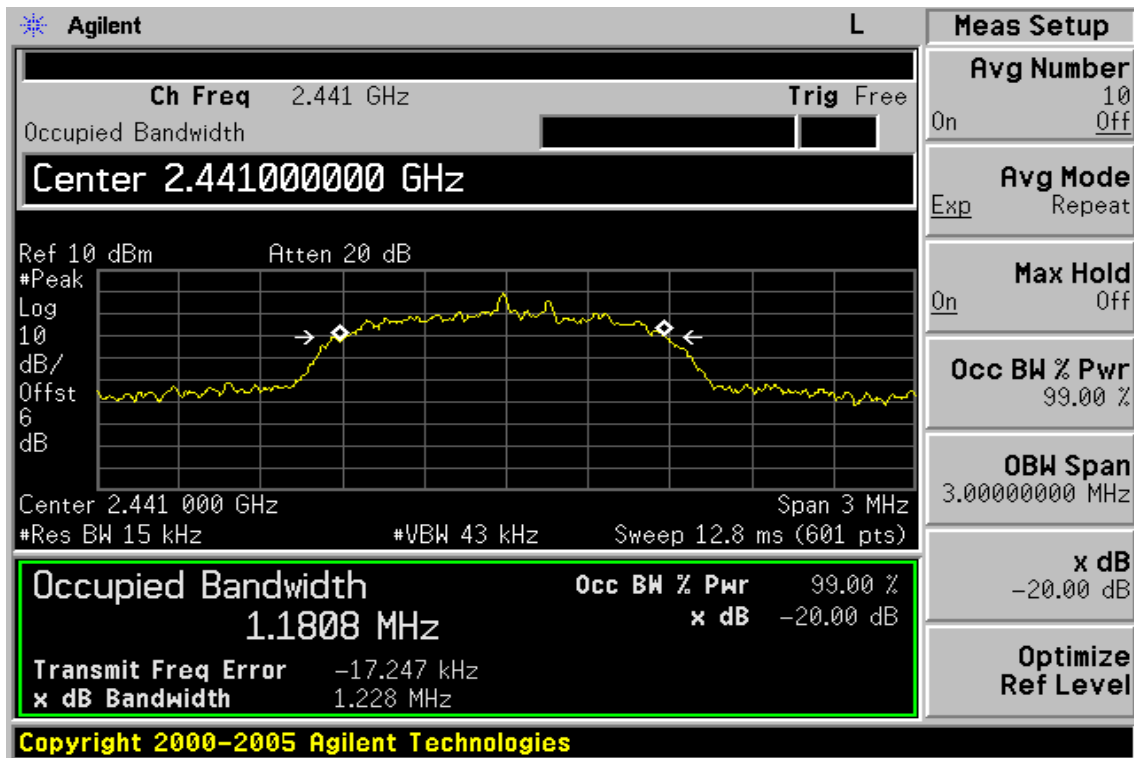
99% Band Width Test Data CH-High



EDR Mode
99% Band Width Test Data CH-Low



99% Band Width Test Data CH-Mid



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99% Band Width Test Data CH-High

