

ELECTROMAGNETIC EMISSIONS COMPLIANCE REPORT

INTENTIONAL RADIATOR CERTIFICATION TO FCC PART 15 SUBPART C REQUIREMENT

OF

Product Name: Bluetooth® Stereo Audio Transmitter

Brand Name: IOGEAR

Model Name: GBMA211

FCC ID: QLEGBMA211

Report No.: EF/2007/C0007

Issue Date: May. 14, 2008

FCC Rule Part: §15.247

Prepared for
 IOGEAR, Inc.
 23 Hubble, Irvine, CA 92618, USA

Prepared by: SGS Taiwan Ltd.
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VERIFICATION OF COMPLIANCE

Applicant: IOGEAR, Inc.
 23 Hubble, Irvine, CA 92618, USA

Product Name: Bluetooth® Stereo Audio Transmitter

Brand Name: IOGEAR

FCC ID Number: QLEGBMA211

Model No.: GBMA211

Model Difference: N/A

File Number: EF/2007/C0007

Date of test: Dec. 25, 2007 ~ May. 09, 2008

Date of EUT Received: Dec. 24, 2007

We hereby certify that:

The above equipment was tested by SGS Taiwan Ltd., Electronics & Communication Laboratory The test data, data evaluation, test procedures, and equipment configurations shown in this report were made in accordance with the procedures given in ANSI C63.4 (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: Bondi Liu *Date* May. 14, 2008

Bondi Liu / Engineer

Prepared By: Gigi yeh *Date* May. 14, 2008

Gigi Yeh / Clerk

Approved By: Vincent Su *Date* May. 14, 2008

Vincent Su / Manager

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Version

Version No.	Date
00	May. 14, 2008

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1. GENERAL INFORMATION

1.1. Product Description

Product Name:	Bluetooth® Stereo Audio Transmitter	
Brand Name:	IOGEAR	
Model Name:	GBMA211	
Model Difference:	N/A	
Data Cable (USB):	1 cable, model: N/A	
Power Supply	3.7 Vdc re-chargeable battery or 5Vdc by AC/DC power adapter	
	Adapter:	<ol style="list-style-type: none"> Model: EADP-5CB A, Supplier: DELTA Model: EADP-5KB A, Supplier: DELTA

Bluetooth:

Frequency Range	2402 – 2480MHz
Channel number	79 channels
Rated Power	1.93dBm (Peak)
Modulation type	Frequency Hopping Spread Spectrum (FHSS)(FGSK)
Antenna Designation	PIFA Type Antenna, 2.66 dBi,

The EUT is compliance with Bluetooth Standard.

This test report applies for Bluetooth.

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

This submittal(s) (test report) is intended for **FCC ID: QLEGBMA211** filing to comply with Section 15.247 of the FCC Part 15, Subpart C Rules. The composite system (digital device) is compliance with Subpart B is authorized under a Doc procedure.

1.3. 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.

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 operated in the engineering mode to fix the Tx frequency that was for the purpose of the measurements.

2.3. Test Procedure

2.3.1 Conducted Emissions

The EUT is a placed on as turn table which is 0.8 m above ground plane. According to the requirements in Section 7 and 13 of ANSI C63.4-2003. Conducted emissions from the EUT measured in the frequency range between 0.15 MHz and 30MHz using CISPR Quasi-Peak and Average detector mode.

2.3.2 Radiated Emissions

The EUT is a placed on as turn table which is 0.8 m above ground plane. The turn table

shall rotate 360 degrees to determine the position of maximum emission level.

EUT is set 3m away from the receiving antenna which varied from 1m to 4m to find out the highest emission. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical. In order to find out the max. emission, the relative positions of this hand-held transmitter (EUT) was rotated

through three orthogonal axes and measurement procedures for electric field radiated emissions above 1 GHz the EUT measurement is to be made “while keeping the antenna in the ‘cone of radiation’ from that area and pointed at the area both in azimuth and elevation, with polarization oriented for maximum response.” is still within the 3dB illumination BW of the measurement antenna. according to the requirements

in Section 8 and 13 and Subclause 8.3.1.2 of ANSI C63.4-2003.

2.4. Configuration of Tested System

Fig. 2-1 Configuration of Tested System

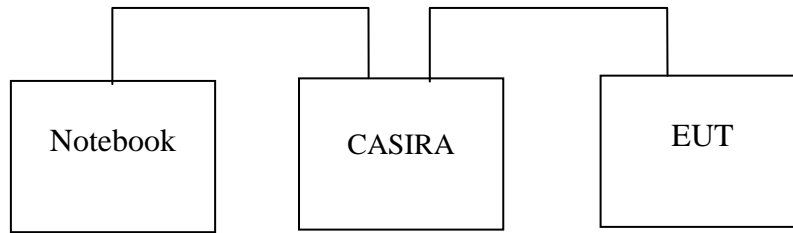


Table 2-1 Equipment Used in Tested System

Item	Equipment	Mfr/Brand	Model/ Type No.	Series No.	Data Cable	Power Cord
1.	CASIRA	CSR	BCES301199/1	8836310305	N/A	N/A
2.	NoteBook	IBM	T40	99HCYF4	Un-shield	Un-shield
3.	Test software	BlueSuite 1.22	CSR	N/A	N/A	N/A

3. SUMMARY OF TEST RESULTS

FCC Rules	Description Of Test	Result
§15.207(a)	Conducted Emission	N/A
§15.247(b)(1)	Peak Output Power	Compliant
§15.247(a)	20dB Bandwidth	No Limit
§15.247I	100 KHz Bandwidth Of Frequency Band Edges	Compliant
§15.209(a) (f)	Spurious Emission	Compliant
§15.247(a)(1)	Frequency Separation	Compliant
§15.247(a)(1)(iii)	Number of hopping frequency	Compliant
§15.247(a)(1)(iii)	Time of Occupancy	Compliant
§15.247	Peak Power Density	Compliant
§15.203, §15.247(b)(4)(i)	Antenna Requirement	Compliant

4. DESCRIPTION OF TEST MODES

The EUT has been tested under operating condition.

Test program used to control the EUT for staying in continuous transmitting mode was programmed.

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

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.

5.2. EUT Setup

1. The conducted emission tests were performed in the test site, using the setup in accordance with the ANSI C63.4-2003.
2. The EUT was plug-in the AC/DC Power adapter. The host system was placed on the center of the back edge on the test table. The peripherals was placed on the side of the host PC system. The rear of the EUT and peripherals were placed flushed with the rear of the tabletop.
3. The spacing between the peripherals was 10 centimeters.
4. External I/O cables were draped along the edge of the test table and bundle when necessary.
5. The host system was connected with 110Vac/60Hz power source.

5.3. Measurement Procedure

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

5.4. Measurement Equipment Used:

Conducted Emission Test Site					
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
EMC Analyzer	HP	8594EM	3624A00203	09/02/2007	09/03/2008
EMI Test Receiver	R&S	ESCS30	828985/004	06/09/2007	06/10/2008
Transient Limiter	HP	11947A	3107A02062	09/02/2007	09/03/2008
LISN	Rolf-Heine	NNB-2/16Z	99012	01/10/2007	01/09/2008
LISN	Rolf-Heine	NNB-2/16Z	99013	01/10/2007	01/09/2008
Coaxial Cables	N/A	No. 3, 4	N/A	12/01/2007	11/30/2008

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.

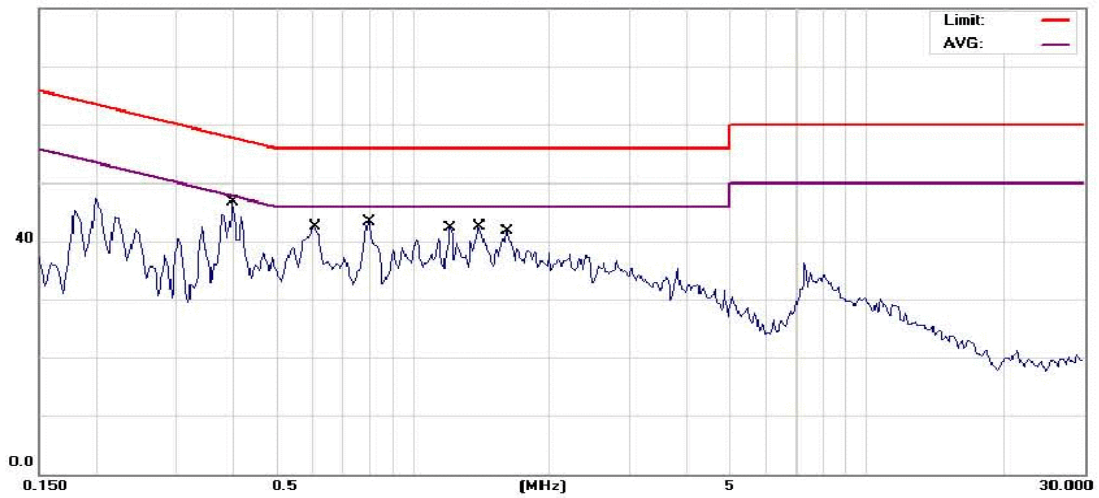
AC POWER LINE CONDUCTED EMISSION TEST DATA

Operation Mode:	Normal Operation Mode		Test Date:	May. 02, 2008	
Temperature:	23	Humidity:	59%	Test By:	Bondi
Model Name:	EADP-5CB A				

Conducted Emission Measurement

上午 11:07:42

80.0 dBuV



Site SGS CONDUCTED #1

Phase: **L1**

Temperature: 23 °C

Limit: CISPR22 Class B Conduction(QP)

Power: AC 120V/60Hz

Humidity: 59 %

EUT: Bluetooth Stereo Transmitter

Distance:

Air Pressure: hpa

M/N: GBMA211

Note: Charge mode

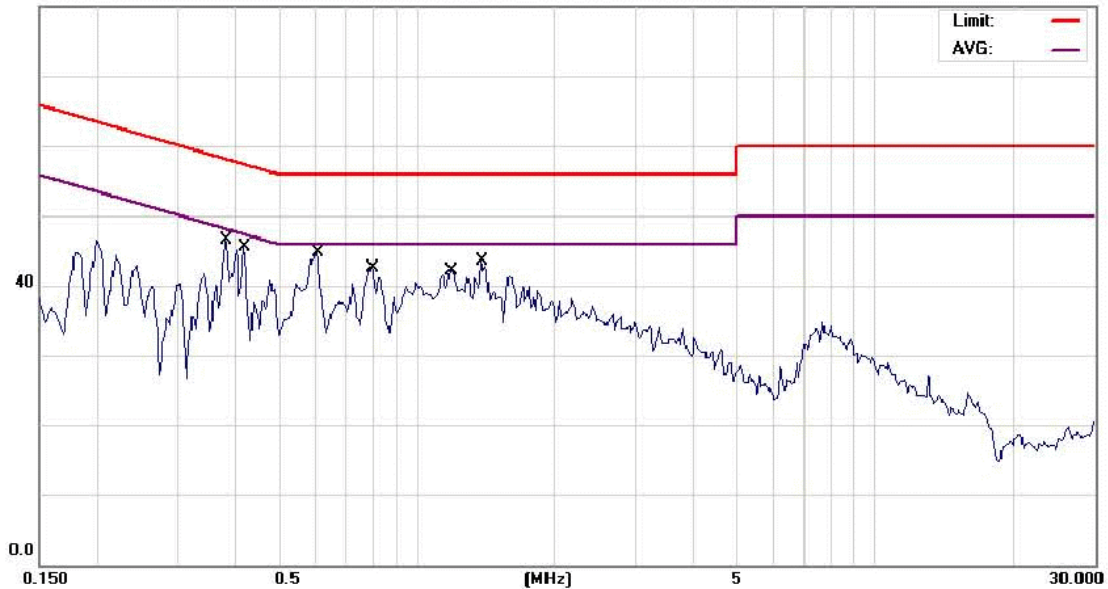
No.	Mk.	Freq. MHz	Reading Level dBuV	Factor dB	Measurement dBuV	Limit dBuV	Over dB	Detector	Comment
1		0.4000	45.51	0.09	45.60	57.85	-12.25	QP	
2	*	0.4000	39.53	0.09	39.62	47.85	-8.23	AVG	
3		0.6050	39.95	0.06	40.01	56.00	-15.99	QP	
4		0.6050	35.78	0.06	35.84	46.00	-10.16	AVG	
5		0.8000	41.23	0.05	41.28	56.00	-14.72	QP	
6		0.8000	33.81	0.05	33.86	46.00	-12.14	AVG	
7		1.2050	39.90	0.04	39.94	56.00	-16.06	QP	
8		1.2050	31.91	0.04	31.95	46.00	-14.05	AVG	
9		1.4000	40.05	0.04	40.09	56.00	-15.91	QP	
10		1.4000	33.21	0.04	33.25	46.00	-12.75	AVG	
11		1.6100	37.73	0.04	37.77	56.00	-18.23	QP	
12		1.6100	29.92	0.04	29.96	46.00	-16.04	AVG	

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Conducted Emission Measurement

上午 11:19:11

80.0 dBuV



Site SGS CONDUCTED #1

Phase: **N**

Temperature: 23 °C

Limit: CISPR22 Class B Conduction(QP)

Power: AC 120V/60Hz

Humidity: 59 %

EUT: Bluetooth Stereo Transmitter

Distance:

Air Pressure: hpa

M/N: GBMA211

Note: Charge mode

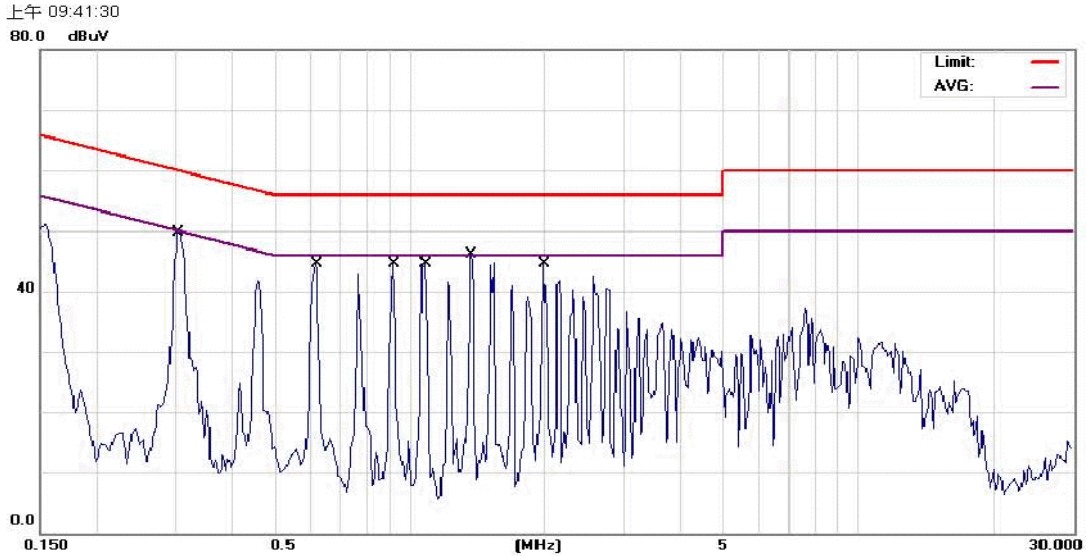
No.	Mk.	Freq.	Reading Level	Factor	Measurement	Limit	Over	Detector	Comment
		MHz	dBuV	dB	dBuV	dBuV	dB		
1		0.3850	44.46	0.10	44.56	58.17	-13.61	QP	
2	*	0.3850	37.47	0.10	37.57	48.17	-10.60	AVG	
3		0.4200	40.92	0.08	41.00	57.45	-16.45	QP	
4		0.4200	34.83	0.08	34.91	47.45	-12.54	AVG	
5		0.6050	42.08	0.06	42.14	56.00	-13.86	QP	
6		0.6050	33.64	0.06	33.70	46.00	-12.30	AVG	
7		0.8000	38.62	0.05	38.67	56.00	-17.33	QP	
8		0.8000	32.17	0.05	32.22	46.00	-13.78	AVG	
9		1.1900	39.66	0.04	39.70	56.00	-16.30	QP	
10		1.1900	28.59	0.04	28.63	46.00	-17.37	AVG	
11		1.3850	39.99	0.04	40.03	56.00	-15.97	QP	
12		1.3850	32.45	0.04	32.49	46.00	-13.51	AVG	

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AC POWER LINE CONDUCTED EMISSION TEST DATA

Operation Mode:	Normal Operation Mode			Test Date:	May. 02, 2008
Temperature:	25	Humidity:	57%	Test By:	Bondi
Model Name:	EADP-5KB A				

Conducted Emission Measurement



Site	SGS CONDUCTED #1	Phase:	L1	Temperature:	25 °C
Limit:	CISPR22/11 Class B Conduction(QP)	Power:	AC 120V/60Hz	Humidity:	57 %
EUT:	Bluetooth Stereo Transmitter	Distance:		Air Pressure:	hpa
MN:	GBMA211				
Note:	Charge Mode , DELTA EADP-5KB A				

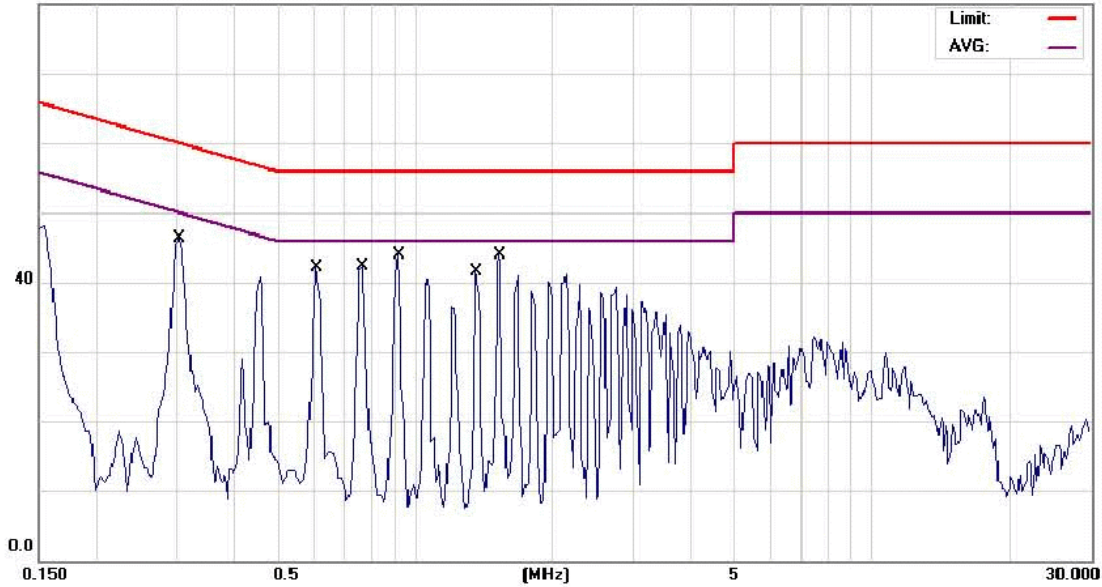
No.	Mk.	Freq.	Reading Level	Factor	Measurement	Limit	Over	Detector	Comment
		MHz	dBuV	dB	dBuV	dBuV	dB		
1		0.3063	47.11	0.12	47.23	60.07	-12.84	QP	
2	*	0.3063	44.54	0.12	44.66	50.07	-5.41	AVG	
3		0.6118	40.76	0.06	40.82	56.00	-15.18	QP	
4		0.6118	37.45	0.06	37.51	46.00	-8.49	AVG	
5		0.9194	42.45	0.04	42.49	56.00	-13.51	QP	
6		0.9194	35.49	0.04	35.53	46.00	-10.47	AVG	
7		1.0702	41.26	0.04	41.30	56.00	-14.70	QP	
8		1.0702	32.87	0.04	32.91	46.00	-13.09	AVG	
9		1.3753	41.32	0.04	41.36	56.00	-14.64	QP	
10		1.3753	31.35	0.04	31.39	46.00	-14.61	AVG	
11		1.9776	37.17	0.04	37.21	56.00	-18.79	QP	
12		1.9776	25.62	0.04	25.66	46.00	-20.34	AVG	

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Conducted Emission Measurement

上午 09:47:14

80.0 dBuV



Site SGS CONDUCTED #1

Phase: **N**

Temperature: 25 °C

Limit: CISPR22/11 Class B Conduction(QP)

Power: AC 120V/60Hz

Humidity: 57 %

EUT: Bluetooth Stereo Transmitter

Distance:

Air Pressure: hpa

M/N: GBMA211

Note: Charge Mode , DELTA EADP-5KB A

No. Mk.	Freq. MHz	Reading Level dBuV	Factor dB	Measure- ment dBuV	Limit dBuV	Over dB	Detector	Comment
1	0.3050	46.25	0.11	46.36	60.11	-13.75	QP	
2	0.6050	42.03	0.05	42.08	56.00	-13.92	QP	
3	0.7700	42.27	0.04	42.31	56.00	-13.69	QP	
4	0.9200	43.86	0.03	43.89	56.00	-12.11	QP	
5	1.3550	41.46	0.03	41.49	56.00	-14.51	QP	
6 *	1.5350	43.87	0.03	43.90	56.00	-12.10	QP	

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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 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.

6.3. Measurement Result

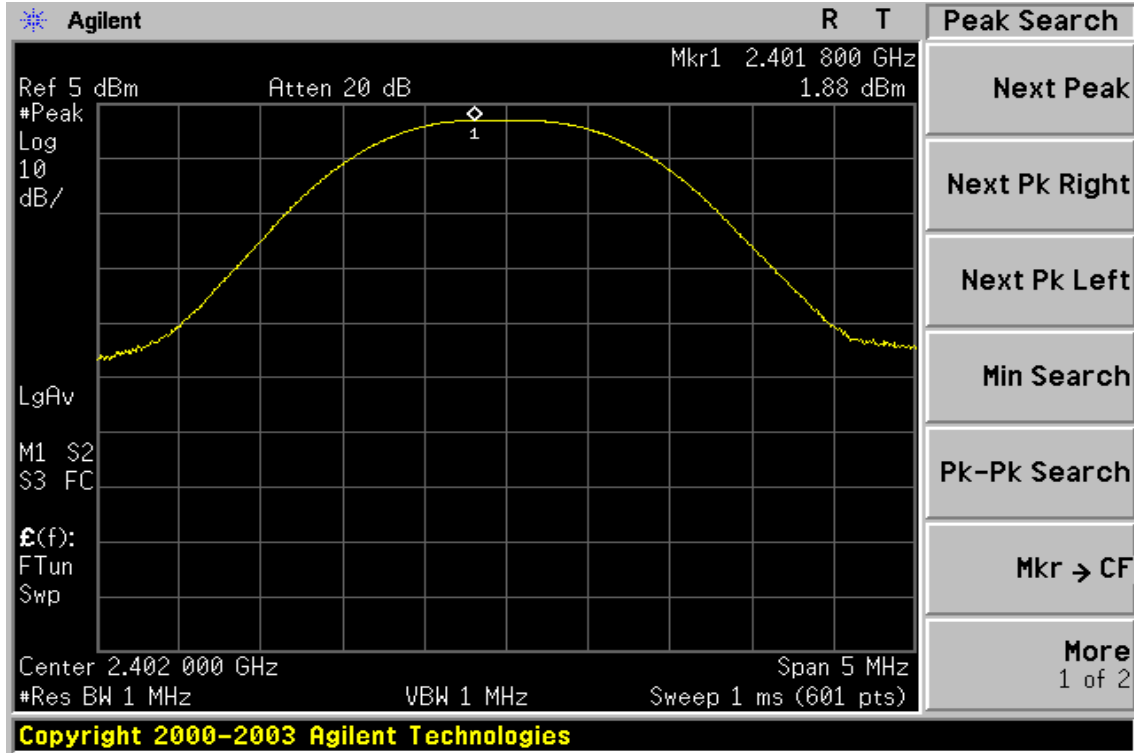
Frequency (MHz)	Reading Power (dBm)	Cable Loss	Output Power (dBm)	Output Power (W)	Limit (W)
2402.00	1.88	0.10	1.98	0.00158	1
2441.00	1.83	0.10	1.93	0.00156	1
2480.00	1.83	0.10	1.93	0.00156	1

6.4. Measurement Equipment Used:

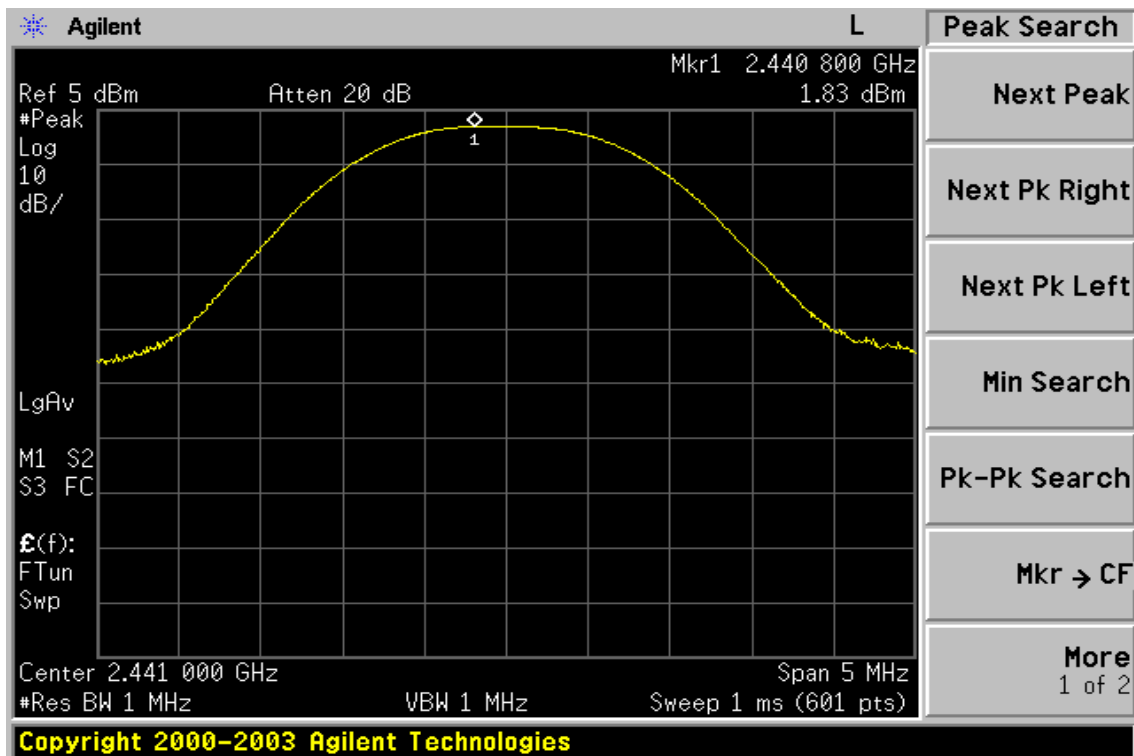
Conducted Emission Test Site					
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
Spectrum Analyzer	Agilent	E4446A	MY43360126	04/27/2008	04/26/2009
Spectrum Analyzer	Agilent	7405A	US41160416	07/04/2007	07/03/2008
Low Loss Cable	HUBER+SUHNER	SUCOFLEX 104PEA	N/A	N/A	N/A
Attenuator	Mini-Circuit	BW-S10W5	N/A	07/05/2007	07/04/2008
Attenuator	Mini-Circuit	BW-S6W5	N/A	07/05/2007	07/04/2008
Splitter	Agilent	Power Biviber	51818	07/05/2007	07/04/2008

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Peak Power Output Data Plot (CH Low)

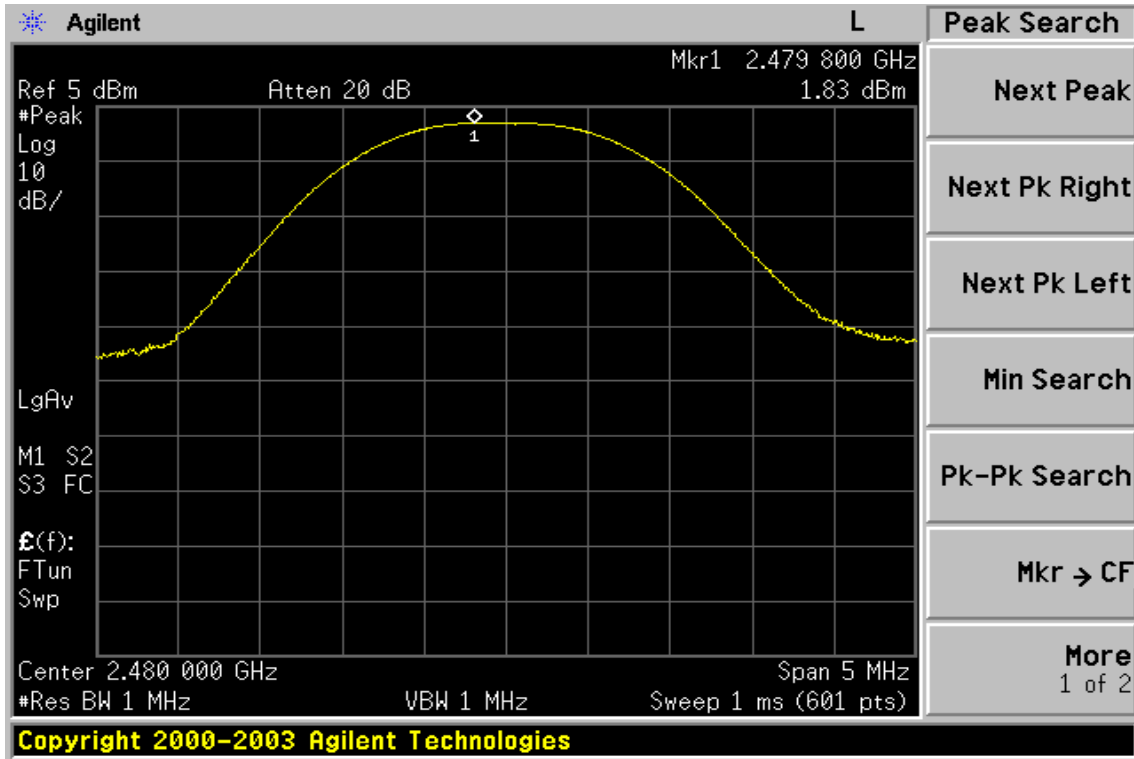


Peak Power Output Data Plot (CH Mid)



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Peak Power Output Data Plot (CH High)



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7. 20dB BAND WIDTH

7.1. Standard Applicable

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

7.2. Measurement 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.

7.3. Measurement Result

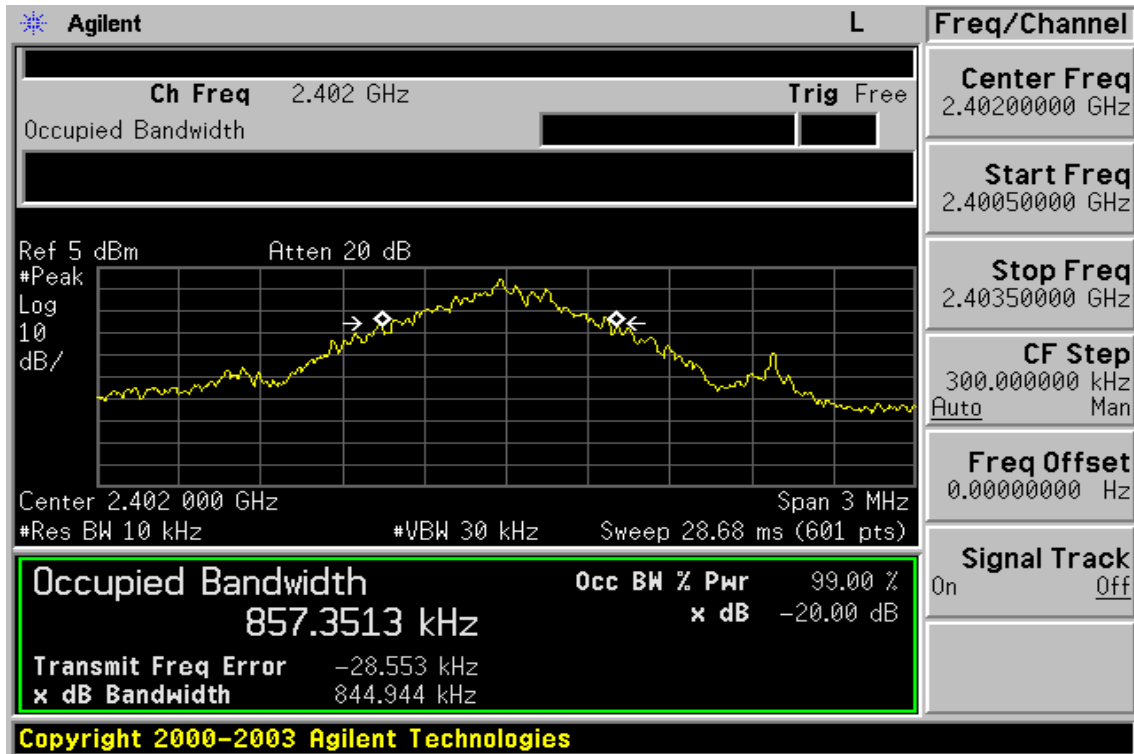
CH	Bandwidth (kHz)
Lower	844.944
Mid	933.603
Higher	932.631

7.4. Measurement Equipment Used:

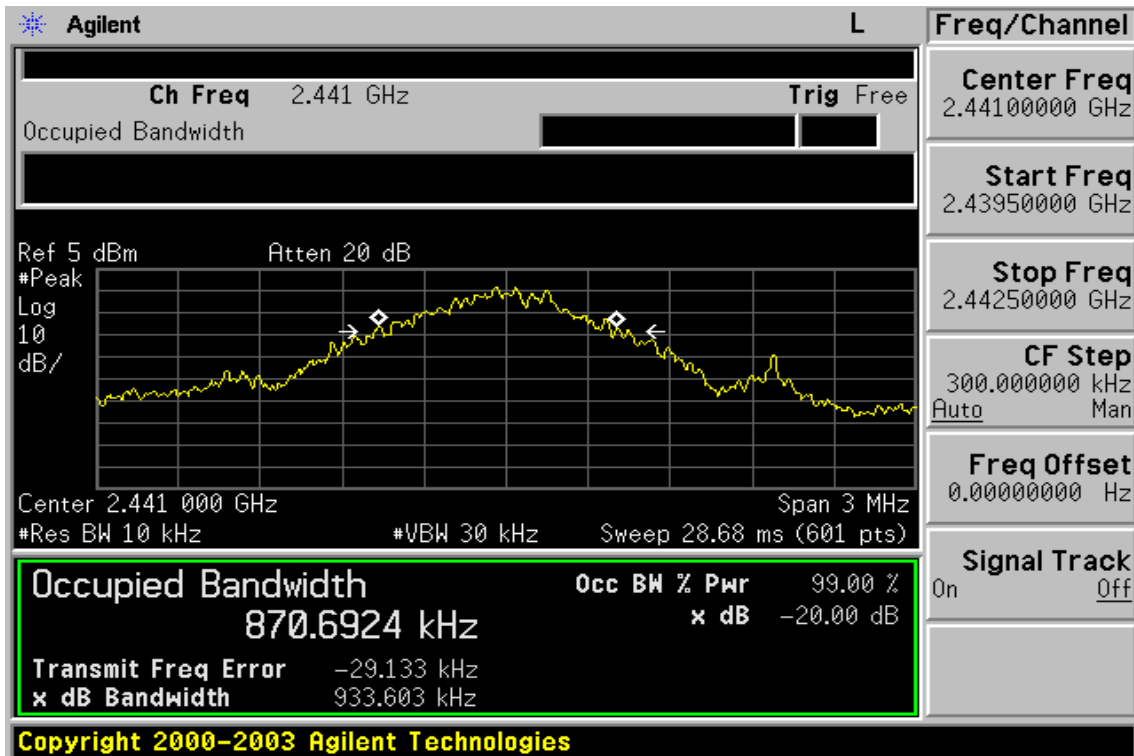
Conducted Emission Test Site					
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
Spectrum Analyzer	Agilent	E4446A	MY43360126	04/27/2008	04/26/2009
Spectrum Analyzer	Agilent	7405A	US41160416	07/04/2007	07/03/2008
Low Loss Cable	HUBER+SUHNER	SUCOFLEX 104PEA	N/A	N/A	N/A
Attenuator	Mini-Circuit	BW-S10W5	N/A	07/05/2007	07/04/2008
Attenuator	Mini-Circuit	BW-S6W5	N/A	07/05/2007	07/04/2008
Splitter	Agilent	Power Biviber	51818	07/05/2007	07/04/2008

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20dB Band Width Test Data CH-Low

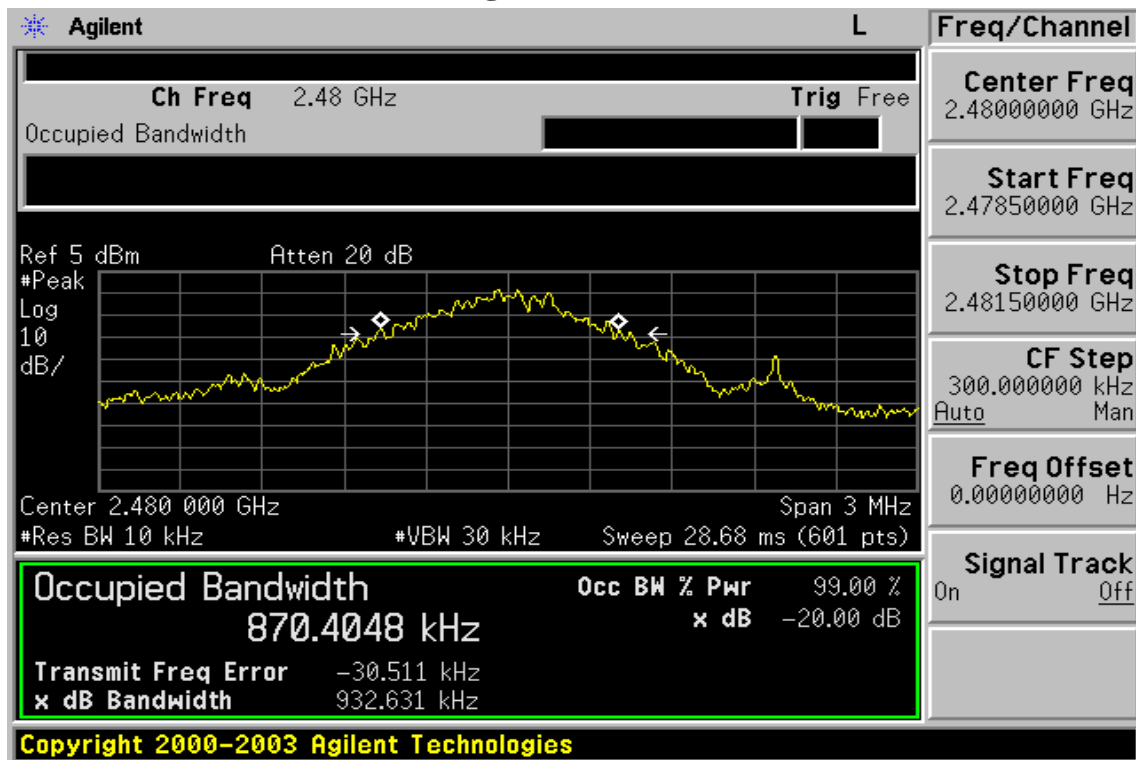


20dB Band Width Test Data CH-Mid



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20dB Band Width Test Data CH-High



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8. 100KHz BANDWIDTH OF BAND EDGES MEASUREMENT

8.1. Standard Applicable

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

8.2. Measurement Procedure

1. Place the EUT on the table and set it in transmitting mode.
2. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.
3. Set center frequency of spectrum analyzer = operating frequency.
4. Set the spectrum analyzer as RBW, VBW=100KHz, Span=25MHz, Sweep = auto
5. Mark Peak, 2.390GHz and 2.4835GHz and record the max. level.
6. Repeat above procedures until all frequency measured were complete.
7. Radiated Emission refer to section 9.

8.3. Measurement Result

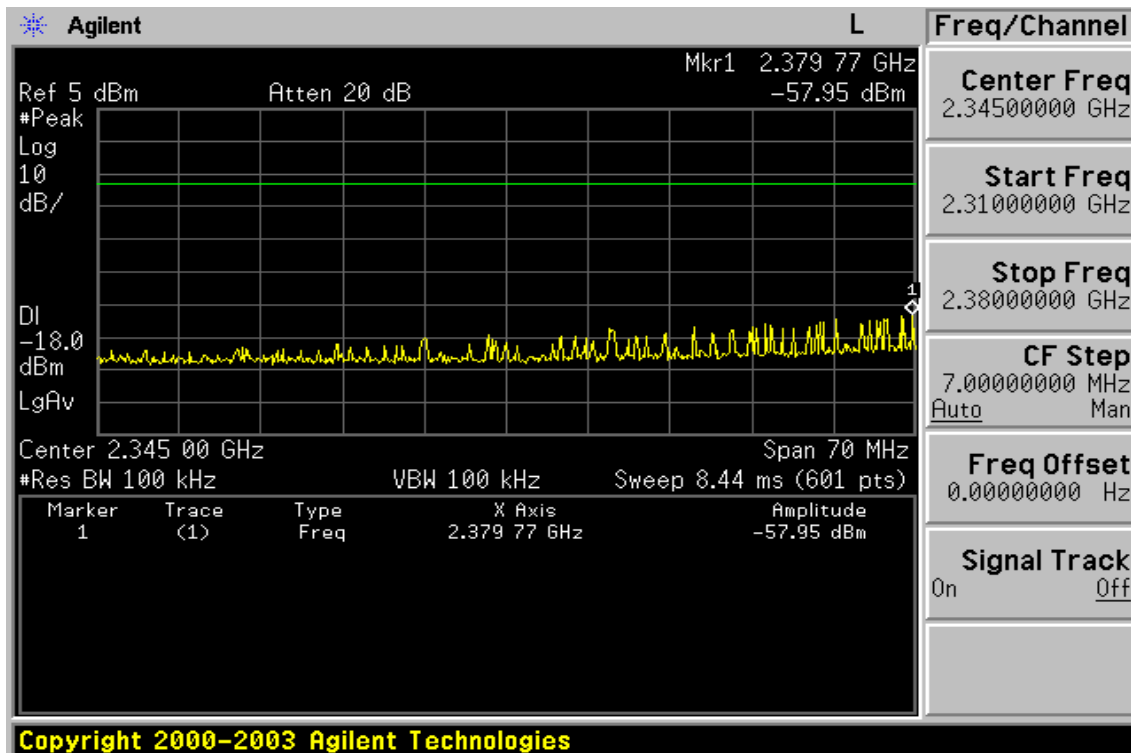
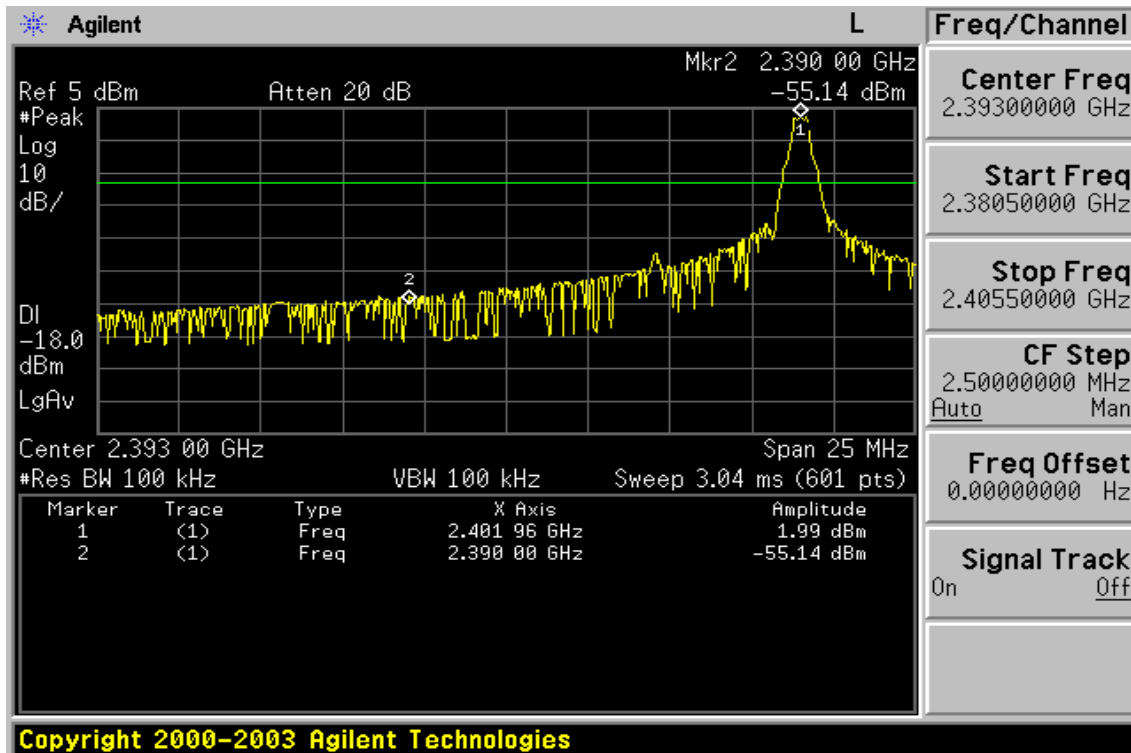
Refer to attach spectrum analyzer data chart.

8.4. Measurement Equipment Used:

Conducted Emission Test Site					
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
Spectrum Analyzer	Agilent	E4446A	MY43360126	04/27/2008	04/26/2009
Spectrum Analyzer	Agilent	7405A	US41160416	07/04/2007	07/03/2008
Low Loss Cable	HUBER+SUHNER	SUCOFLEX 104PEA	N/A	N/A	N/A
Attenuator	Mini-Circuit	BW-S10W5	N/A	07/05/2007	07/04/2008
Attenuator	Mini-Circuit	BW-S6W5	N/A	07/05/2007	07/04/2008
Splitter	Agilent	Power Biviber	51818	07/05/2007	07/04/2008

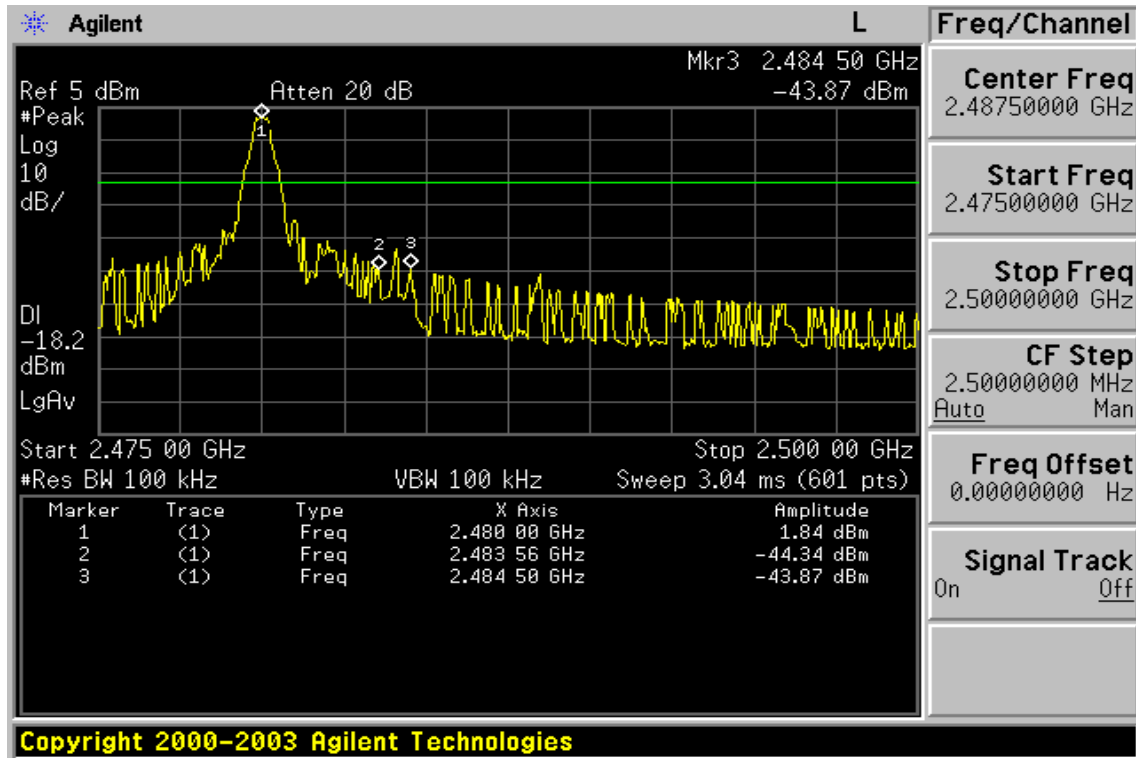
Note: Measurement Equipment for radiated emission refers to section 9.

Conducted Emission: Test Data CH-Low



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Conducted Emission: Test Data CH-High



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Radiated Emission:

Operation Mode	TX CH Low	Test Date	Apr. 23, 2008
Fundamental Frequency	2402 MHz	Test By	Bondi
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)		
2390.00	33.51	---	-1.39	32.12	---	74.00	54.00	-21.88	Peak

Operation Mode	TX CH Low	Test Date	Apr. 23, 2008
Fundamental Frequency	2402 MHz	Test By	Bondi
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)		
2390.00	32.65	---	-1.39	31.26	---	74.00	54.00	-22.74	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	Apr. 23, 2008
Fundamental Frequency	2480 MHz	Test By	Bondi
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	44.27	---	-0.92	43.35	---	74.00	54.00	-10.65	Peak
2484.50	45.84	---	-0.92	44.92	---	74.00	54.00	-9.08	Peak

Operation Mode	TX CH High	Test Date	Apr. 23, 2008
Fundamental Frequency	2480 MHz	Test By	Bondi
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	39.24	---	-0.92	38.32	---	74.00	54.00	-15.68	Peak
2484.50	39.13	---	-0.92	38.21	---	74.00	54.00	-15.79	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.

9. SPURIOUS RADIATED EMISSION TEST

9.1. Standard Applicable

According to §15.247(c), all other emissions outside these bands shall not exceed the general radiated emission limits specified in §15.209(a). And according to §15.33(a)(1), for an intentional radiator operates below 10GHz, the frequency range of measurements: to the tenth harmonic of the highest fundamental frequency or to 40GHz, whichever is lower.

9.2. EUT Setup

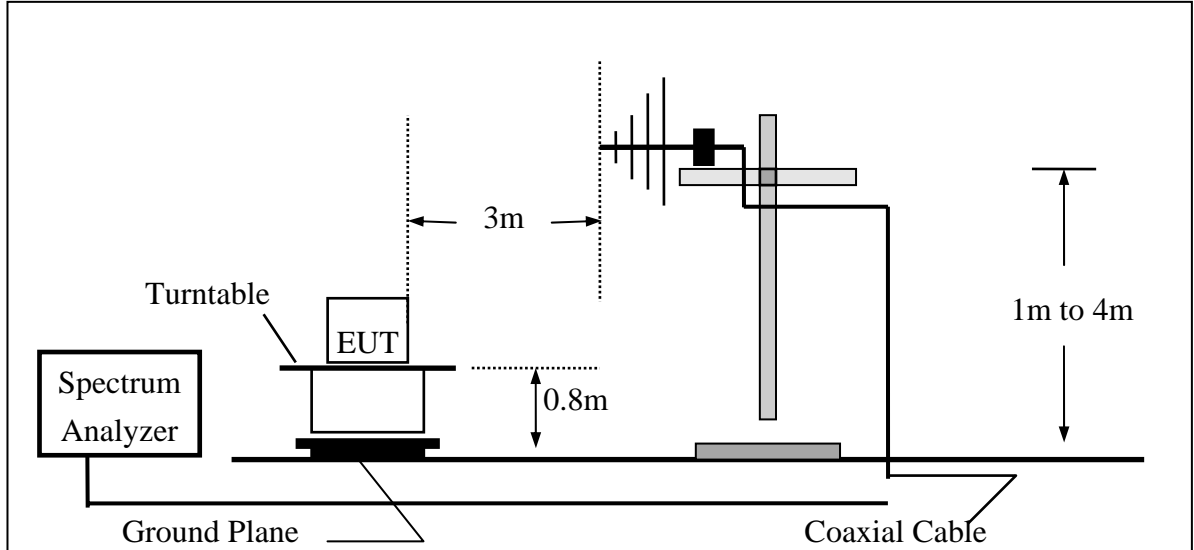
1. The radiated emission tests were performed in the 3 meter open-test site, using the setup in accordance with the ANSI C63.4-2003.
2. The EUT was put in the front of the test table. The peripherals was placed on the side of the host system. The rear of the EUT and peripherals were placed flushed with the rear of the tabletop.
3. The spacing between the peripherals was 10 centimeters.
4. External I/O cables were draped along the edge of the test table and bundle when necessary.
5. The host PC system was connected with 110Vac/60Hz power source.

9.3. Measurement Procedure

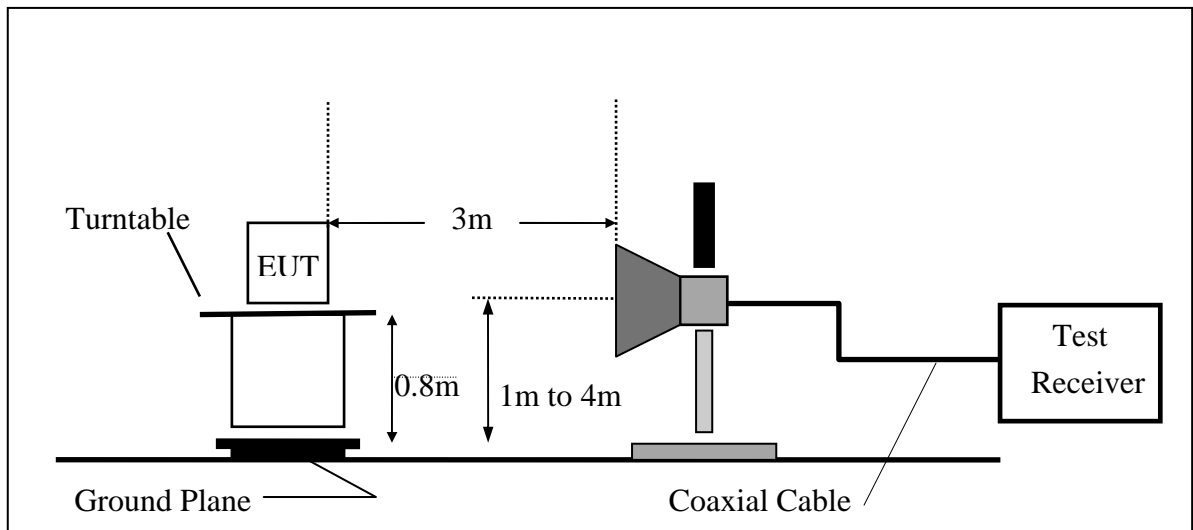
1. The EUT was placed on a turn table which is 0.8m above ground plane.
2. The turn table shall rotate 360 degrees to determine the position of maximum emission level.
3. EUT is set 3m away from the receiving antenna which varied from 1m to 4m to find out the highest emissions.
4. When measurement procedures 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.

9.4. Test SET-UP (Block Diagram of Configuration)

(A) Radiated Emission Test Set-Up, Frequency Below 1GHz



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



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9.5. Measurement Equipment Used:

966 Chamber					
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
Spectrum Analyzer	Agilent	E4446A	MY43360126	04/27/2008	04/27/2009
Spectrum Analyzer	R&S	FSP 40	100034	05/27/2007	05/26/2008
Spectrum Analyzer	Agilent	E7405A	US41160416	07/04/2007	07/03/2008
Bi-log Antenna	SCHWAZBECK	VULB9160	3224	11/14/2007	11/13/2008
Horn antenna	SCHWAZBECK	BBHA 9120D	309/320	12/14/2007	12/13/2008
Horn antenna	SCHWAZBECK	BBHA 9170	184/185	12/13/2007	12/12/2008
Pre-Amplifier	HP	8447D	2944A09469	07/19/2007	07/18/2008
Pre-Amplifier	HP	8494B	3008A00578	02/26/2008	02/25/2009
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	10/09/2007	10/08/2008
Low Loss Cable	HUBER+SUHNER	SUCOFLEX 104PEA-3M	3m	10/09/2007	10/08/2008
Site NSA	SGS	966 chamber	N/A	11/17/2007	11/16/2008

9.6. Field Strength Calculation

The field strength is calculated by adding the Antenna Factor and Cable Factor and subtracting the Amplifier Gain and Duty Cycle Correction Factor(if any) from the measured reading. The basic equation with a sample calculation is as follows:

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

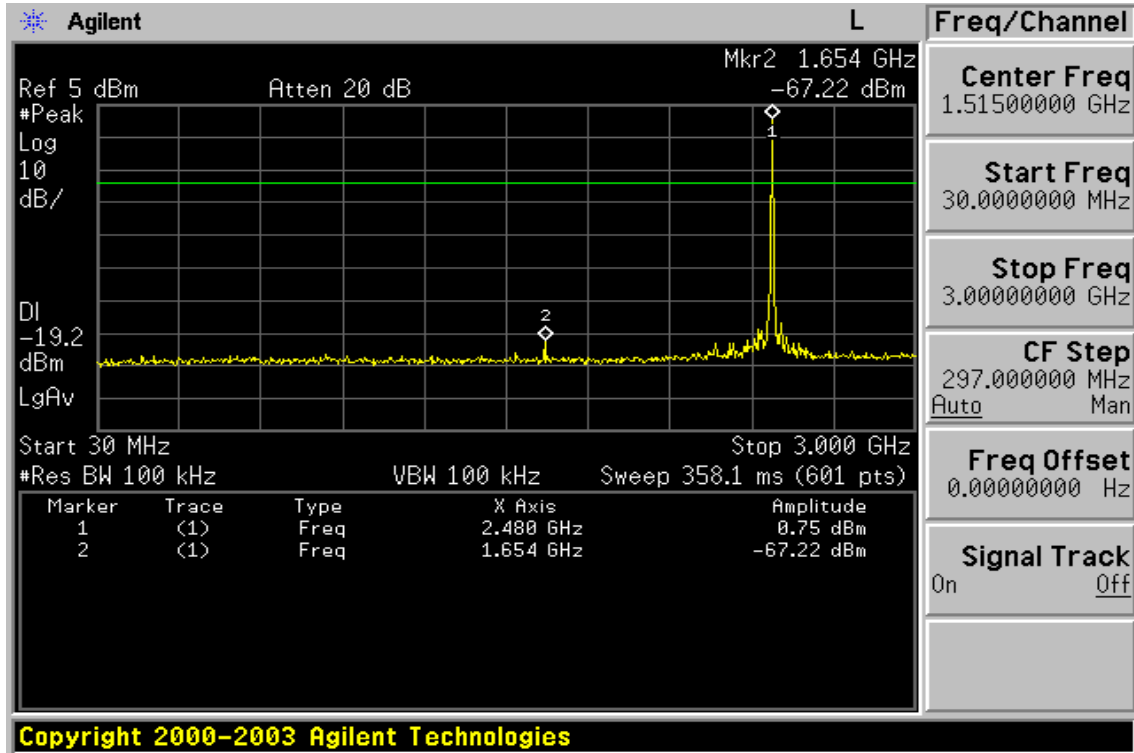
Where	FS = Field Strength	CL = Cable Attenuation Factor (Cable Loss)
	RA = Reading Amplitude	AG = Amplifier Gain
	AF = Antenna Factor	

9.7. Measurement Result

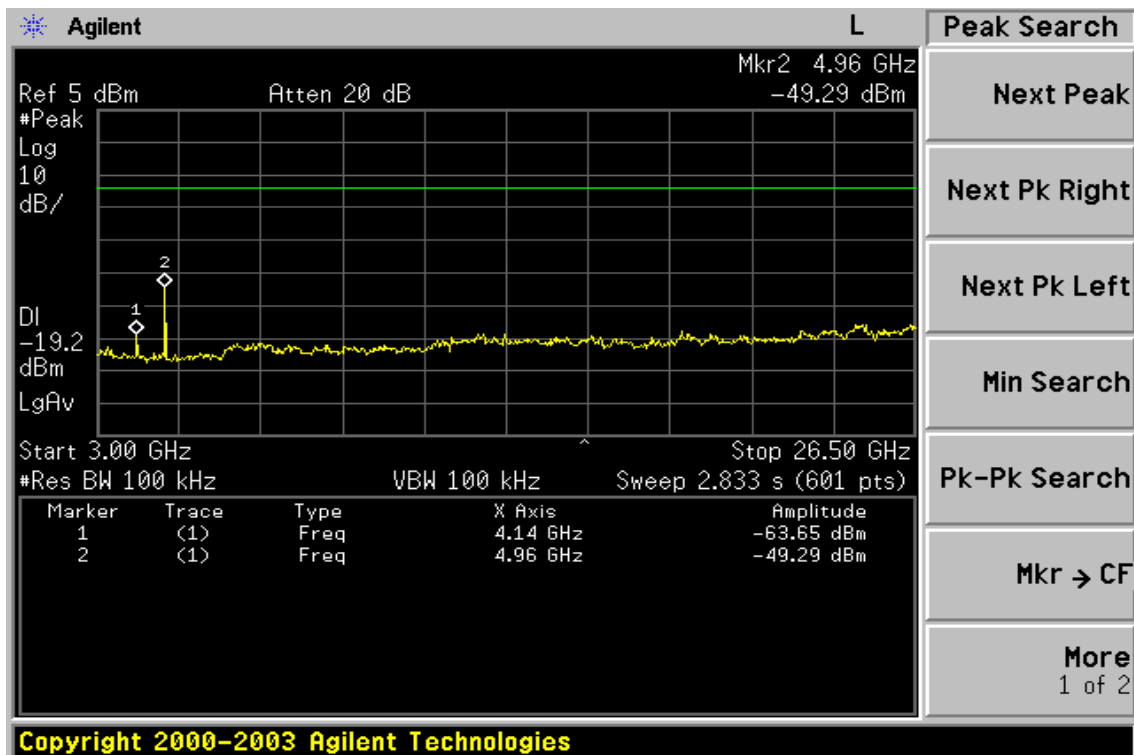
Refer to attach tabular data sheets.

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

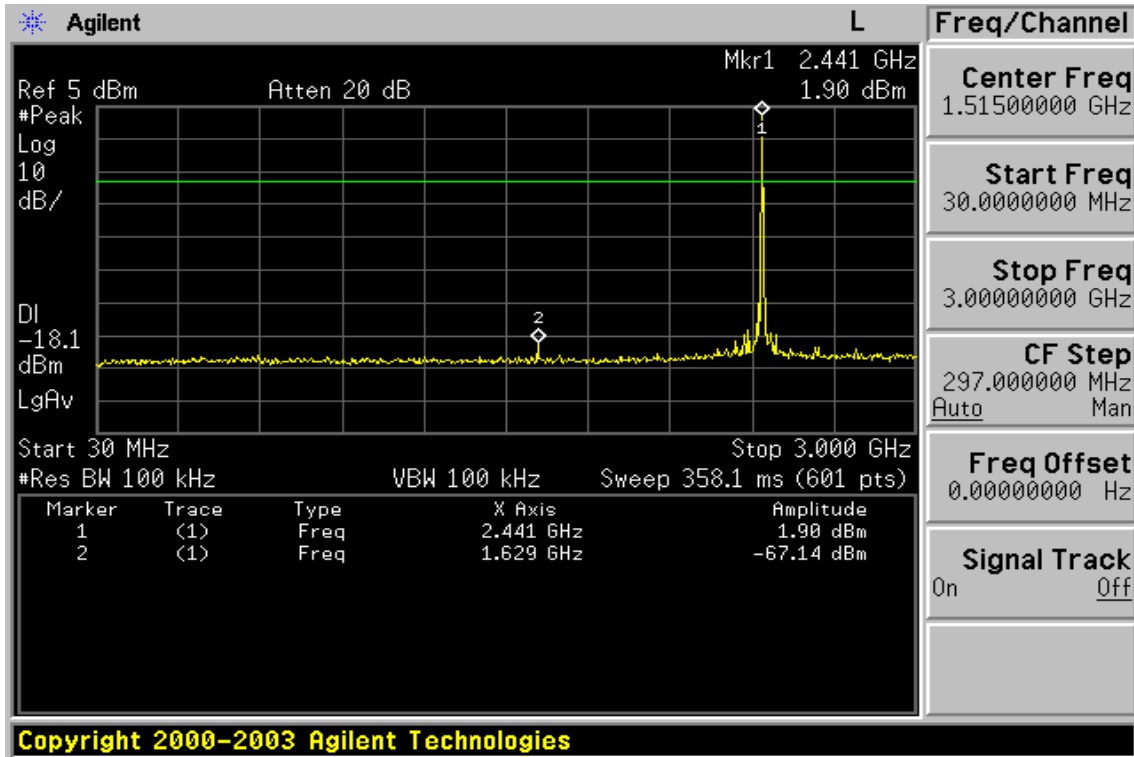


Ch Low 3GHz – 26.5GHz

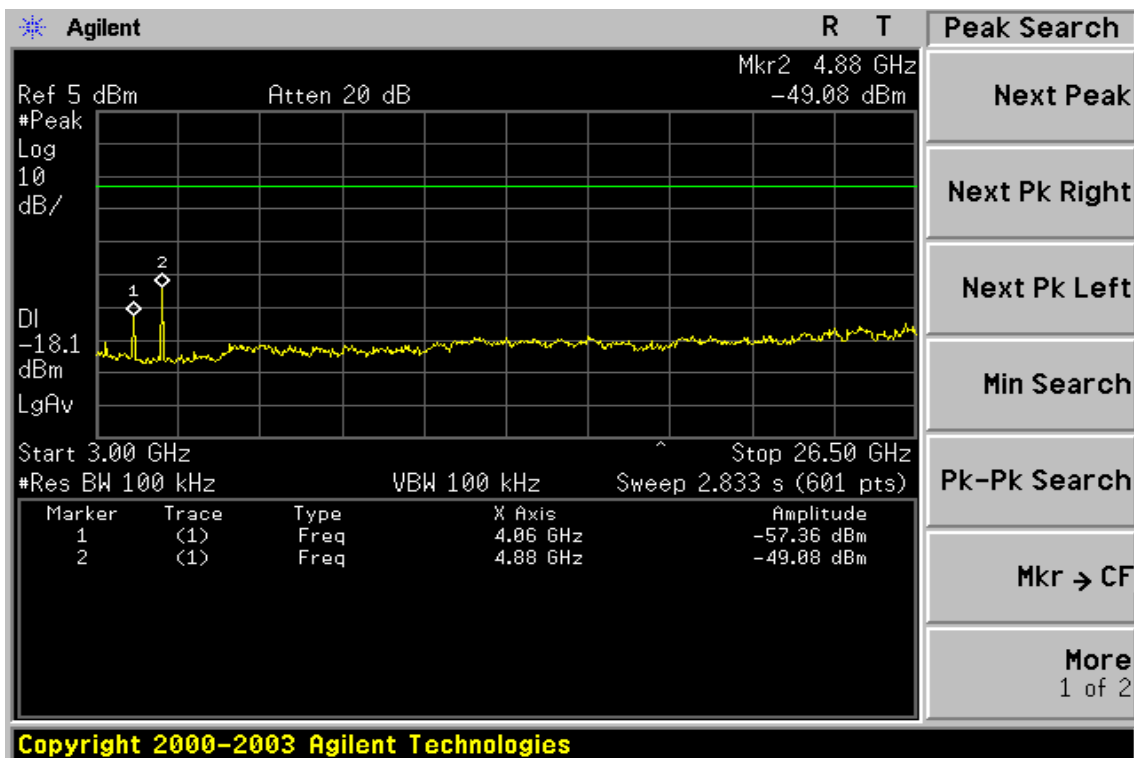


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Ch Mid 30MHz – 3GHz

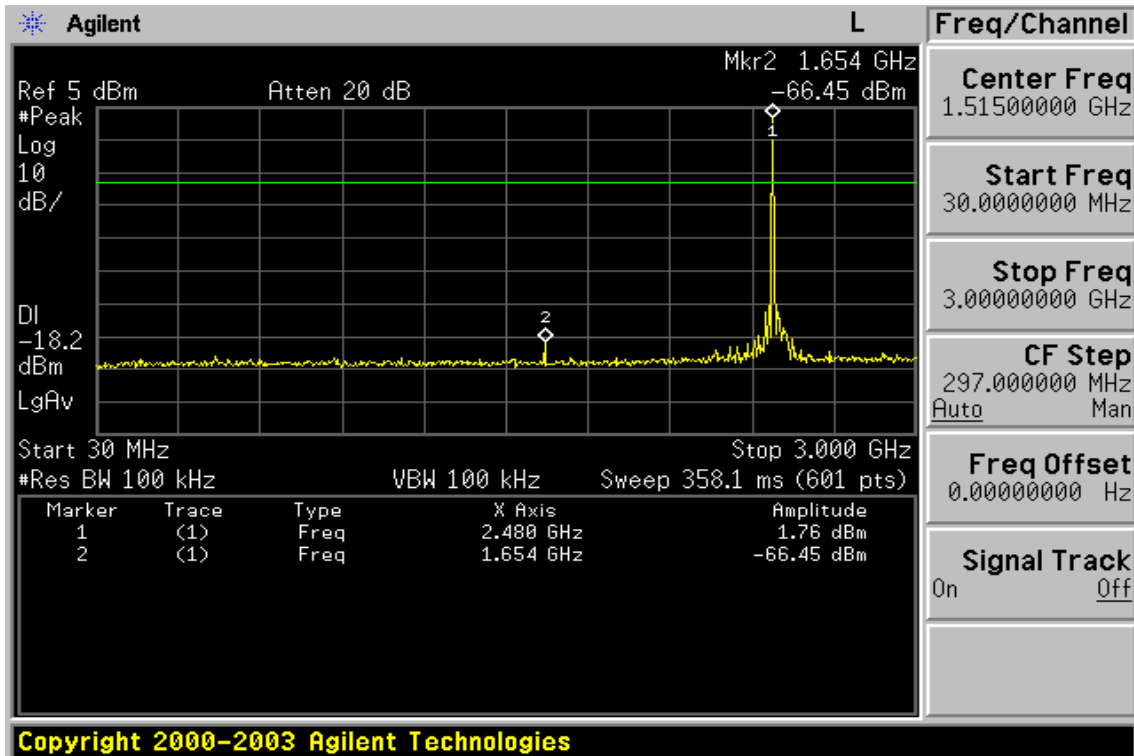


Ch Mid 3GHz – 26.5GHz

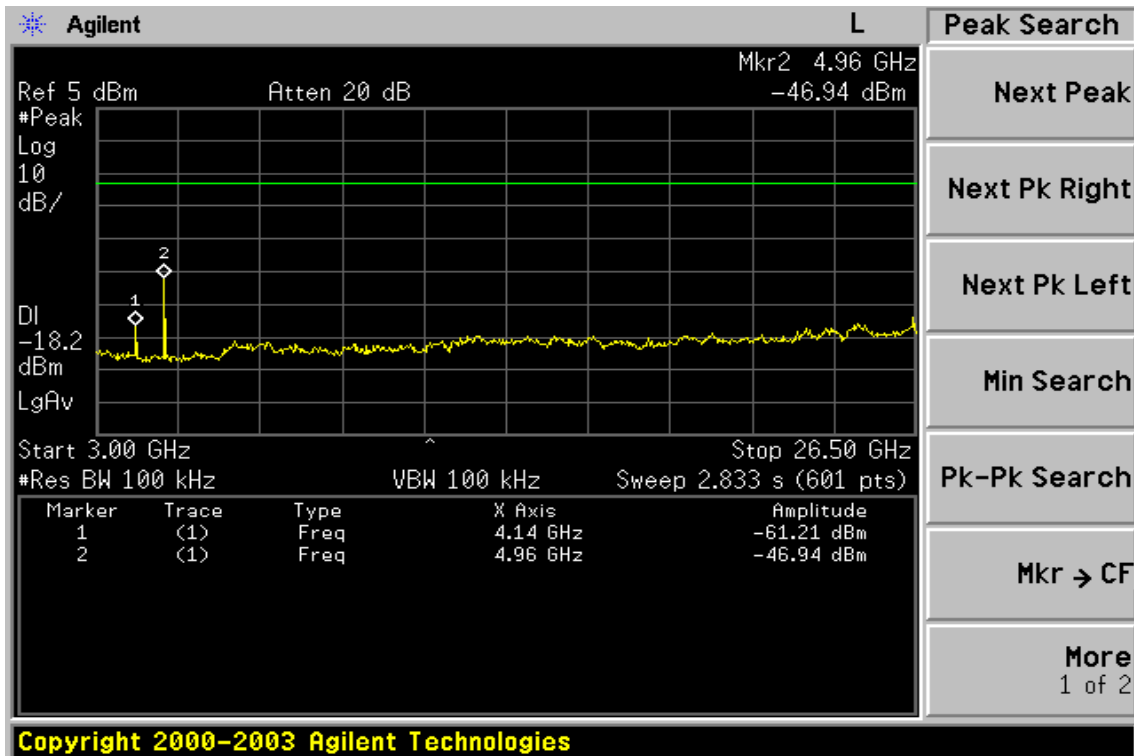


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Ch High 30MHz – 3GHz



Ch High 3GHz – 26.5GHz



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Radiated Spurious Emission Measurement Result (below 1GHz)

Operation Mode	TX CH Low	Test Date	Apr. 23, 2008
Fundamental Frequency	2402MHz	Test By	Bondi
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	43.06	-15.09	27.97	40.00	-12.03
106.63	V	Peak	39.48	-16.48	23.00	43.50	-20.50
140.58	V	Peak	36.79	-13.65	23.14	43.50	-20.36
177.44	V	Peak	35.44	-14.38	21.06	43.50	-22.44
327.79	V	Peak	33.35	-12.36	20.99	46.00	-25.01
62.98	H	Peak	42.15	-14.85	27.30	40.00	-12.70
126.03	H	Peak	35.71	-14.78	20.93	43.50	-22.57
140.58	H	Peak	37.42	-13.65	23.77	43.50	-19.73
177.44	H	Peak	35.23	-14.38	20.85	43.50	-22.65
383.08	H	Peak	35.23	-10.57	24.66	46.00	-21.34

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	Apr. 23, 2008
Fundamental Frequency	2441MHz	Test By	Bondi
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	43.31	-15.09	28.22	40.00	-11.78
106.63	V	Peak	40.29	-16.48	23.81	43.50	-19.69
140.58	V	Peak	36.05	-13.65	22.40	43.50	-21.10
177.44	V	Peak	34.55	-14.38	20.17	43.50	-23.33
426.73	V	Peak	32.96	-9.21	23.75	46.00	-22.25
62.98	H	Peak	42.14	-14.85	27.29	40.00	-12.71
126.03	H	Peak	35.90	-14.78	21.12	43.50	-22.38
140.58	H	Peak	36.65	-13.65	23.00	43.50	-20.50
177.44	H	Peak	34.45	-14.38	20.07	43.50	-23.43
383.08	H	Peak	34.32	-10.57	23.75	46.00	-22.25

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	Apr. 23, 2008
Fundamental Frequency	2480MHz	Test By	Bondi
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	43.54	-15.09	28.45	40.00	-11.55
101.78	V	Peak	38.88	-16.87	22.01	43.50	-21.49
126.03	V	Peak	36.97	-14.78	22.19	43.50	-21.31
138.64	V	Peak	38.55	-13.80	24.75	43.50	-18.75
276.38	V	Peak	33.46	-13.48	19.98	46.00	-26.02
62.98	H	Peak	42.58	-14.85	27.73	40.00	-12.27
126.03	H	Peak	35.41	-14.78	20.63	43.50	-22.87
140.58	H	Peak	36.71	-13.65	23.06	43.50	-20.44
169.68	H	Peak	37.56	-13.97	23.59	43.50	-19.91
383.08	H	Peak	34.89	-10.57	24.32	46.00	-21.68

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	Audio In	Test Date	Apr. 23, 2008
Fundamental Frequency	N/A	Test By	Bondi
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)
64.92	V	Peak	43.31	-14.83	28.48	40.00	-11.52
106.63	V	Peak	38.77	-16.48	22.29	43.50	-21.21
126.03	V	Peak	37.29	-14.78	22.51	43.50	-20.99
140.58	V	Peak	38.29	-13.65	24.64	43.50	-18.86
177.44	V	Peak	35.40	-14.38	21.02	43.50	-22.48
62.98	H	Peak	42.09	-14.85	27.24	40.00	-12.76
126.03	H	Peak	36.44	-14.78	21.66	43.50	-21.84
140.58	H	Peak	37.80	-13.65	24.15	43.50	-19.35
177.44	H	Peak	35.82	-14.38	21.44	43.50	-22.06
252.13	H	Peak	33.58	-13.72	19.86	46.00	-26.14

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. 23, 2008
Fundamental Frequency	2402 MHz	Test By	Bondi
Temperature	25	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)	
1058.5	38.50	----	-7.91	30.59	----	74.00	54.00	-23.41
1598.0	39.29	----	-5.48	33.81	----	74.00	54.00	-20.19
4796.0	39.01	----	5.99	45.00	----	74.00	54.00	-9.00
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	
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. 23, 2008
Fundamental Frequency	2402 MHz	Test By	Bondi
Temperature	25	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)	
1058.5	36.18	----	-7.91	28.27	----	74.00	54.00	-25.73
1630.5	37.83	----	-5.26	32.57	----	74.00	54.00	-21.43
4880.5	41.83	----	6.17	48.00	----	74.00	54.00	-6.00
4882.0	----					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	
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. 23, 2008
Fundamental Frequency	2441 MHz	Test By	Bondi
Temperature	25	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)	
1630.5	37.54	----	-5.26	32.28	----	74.00	54.00	-21.72
4880.5	44.92	----	6.17	51.09	----	74.00	54.00	-2.91
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	
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. 23, 2008
Fundamental Frequency	2441 MHz	Test By	Bondi
Temperature	25	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)	
1630.5	37.54	----	-5.26	32.28	----	74.00	54.00	-21.72
4880.5	44.92	----	6.17	51.09	----	74.00	54.00	-2.91
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	
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. 23, 2008
Fundamental Frequency	2480 MHz	Test By	Bondi
Temperature	25	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)	
1058.5	35.67	----	-7.91	27.76	----	74.00	54.00	-26.24
1643.5	37.92	----	-5.22	32.70	----	74.00	54.00	-21.30
4958.5	43.69	----	6.36	50.05	----	74.00	54.00	-3.95
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	
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. 23, 2008
Fundamental Frequency	2480 MHz	Test By	Bondi
Temperature	25	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)	
1643.5	37.11	----	-5.22	31.89	----	74.00	54.00	-22.11
4958.5	43.44	----	6.36	49.80	----	74.00	54.00	-4.20
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	
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	Audio In	Test Date	Apr. 23, 2008
Fundamental Frequency	N/A	Test By	Bondi
Temperature	25	Pol	Ver. / 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)	
1598.0	39.09	----	-5.48	33.61	----	74.00	54.00	-20.39
4796.0	43.83	----	5.99	49.82	----	74.00	54.00	-4.18
1598.0	39.27	----	-5.48	33.79	----	74.00	54.00	-20.21
4796.0	38.99	----	5.99	44.98	----	74.00	54.00	-9.02

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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10. FREQUENCY SEPARATION

10.1. Standard Applicable

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

10.2. 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 5 MHz, Sweep = auto.
5. Max hold. Mark 3 Peaks of hopping channel and record the 3 peaks frequency.

10.3. Measurement Result

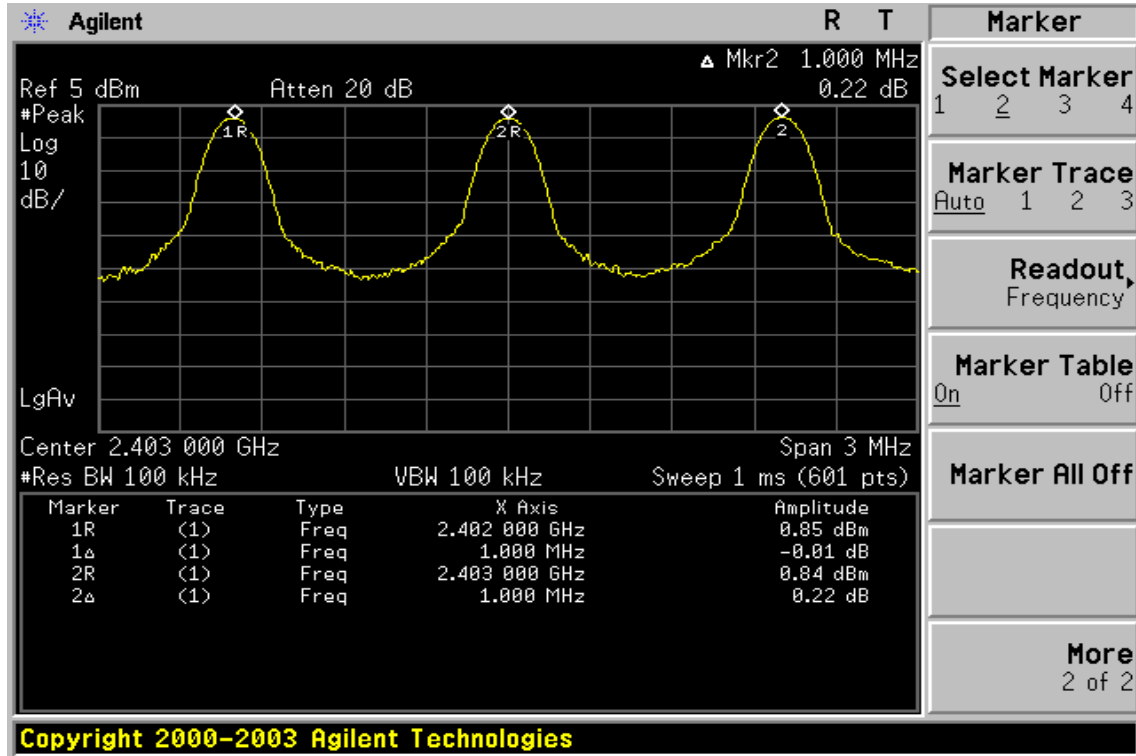
Channel separation	Limit	Result
MHz	kHz	
1	$\geq 25\text{KHz}$ or $2/3 \times 20\text{ dB bandwidth}$	PASS

10.4. Measurement Equipment Used:

Conducted Emission Test Site					
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
Spectrum Analyzer	Agilent	E4446A	MY43360126	04/27/2008	04/26/2009
Spectrum Analyzer	Agilent	7405A	US41160416	07/04/2007	07/03/2008
Low Loss Cable	HUBER+SUHNER	SUCOFLEX 104PEA	N/A	N/A	N/A
Attenuator	Mini-Circuit	BW-S10W5	N/A	07/05/2007	07/04/2008
Attenuator	Mini-Circuit	BW-S6W5	N/A	07/05/2007	07/04/2008
Splitter	Agilent	Power Biviber	51818	07/05/2007	07/04/2008

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Frequency Separation Test Data



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11. NUMBER OF HOPPING FREQUENCY

11.1. Standard Applicable

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

11.2. Measurement 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.

11.3. Measurement Result

Total No of hopping channel	Limit (CH)	Measurement result (CH)	Result
	15	79	Pass

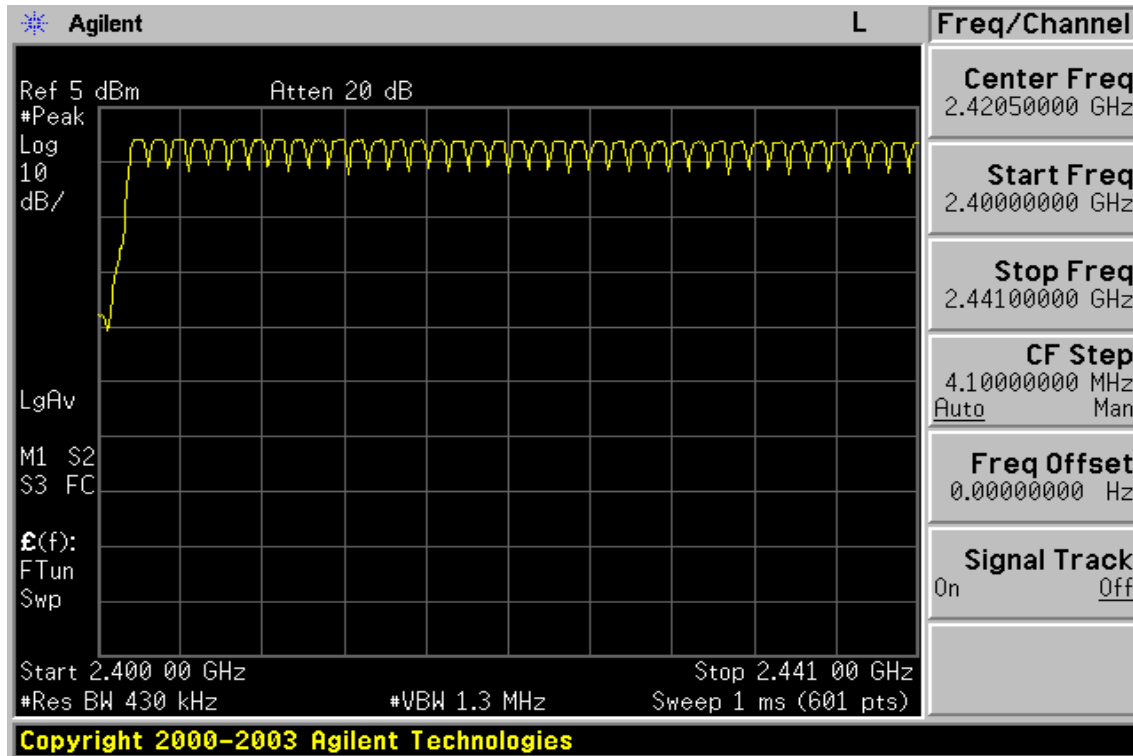
11.4. Measurement Equipment Used:

Conducted Emission Test Site					
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
Spectrum Analyzer	Agilent	E4446A	MY43360126	04/27/2008	04/26/2009
Spectrum Analyzer	Agilent	7405A	US41160416	07/04/2007	07/03/2008
Low Loss Cable	HUBER+SUHNER	SUCOFLEX 104PEA	N/A	N/A	N/A
Attenuator	Mini-Circuit	BW-S10W5	N/A	07/05/2007	07/04/2008
Attenuator	Mini-Circuit	BW-S6W5	N/A	07/05/2007	07/04/2008
Splitter	Agilent	Power Biviber	51818	07/05/2007	07/04/2008

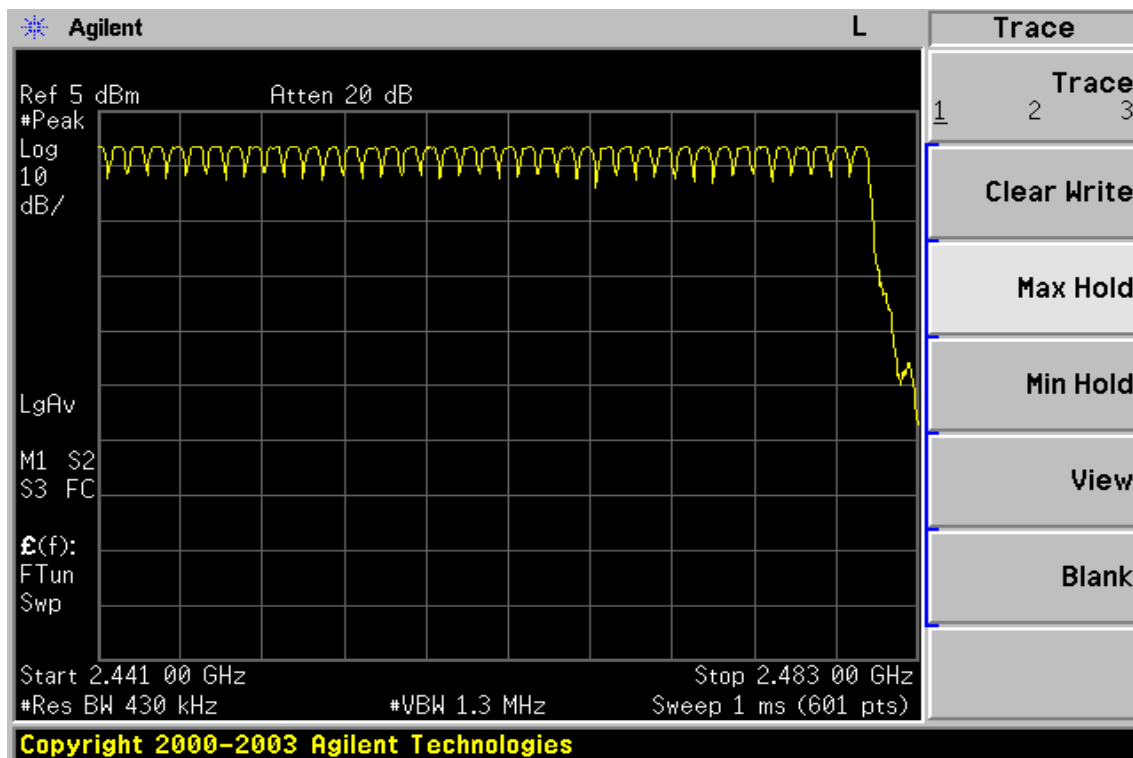
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Channel Number

2.4 GHz – 2.441GHz



2.441 GHz – 2.4835GHz



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12. TIME OF OCCUPANCY (DWELL TIME)

12.1. Standard Applicable

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

12.2. Measurement 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.

12.3. Measurement Result

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

CH Low: DH1 time slot = 0.405 (ms) * (1600/(1*79)) * 31.6 = 259.2 (ms)

DH3 time slot = 1.675 (ms) * (1600/(3*79)) * 31.6 = 357.3 (ms)

DH5 time slot = 2.925 (ms) * (1600/(5*79)) * 31.6 = 374.4 (ms)

CH Mid: DH1 time slot = 0.405 (ms) * (1600/(1*79)) * 31.6 = 259.2 (ms)

DH3 time slot = 1.675 (ms) * (1600/(3*79)) * 31.6 = 357.3 (ms)

DH5 time slot = 2.906 (ms) * (1600/(5*79)) * 31.6 = 371.9 (ms)

CH High: DH1 time slot = 0.405 (ms) * (1600/(1*79)) * 31.6 = 259.2 (ms)

DH3 time slot = 1.662 (ms) * (1600/(3*79)) * 31.6 = 354.5 (ms)

DH5 time slot = 2.906 (ms) * (1600/(5*79)) * 31.6 = 371.9 (ms)

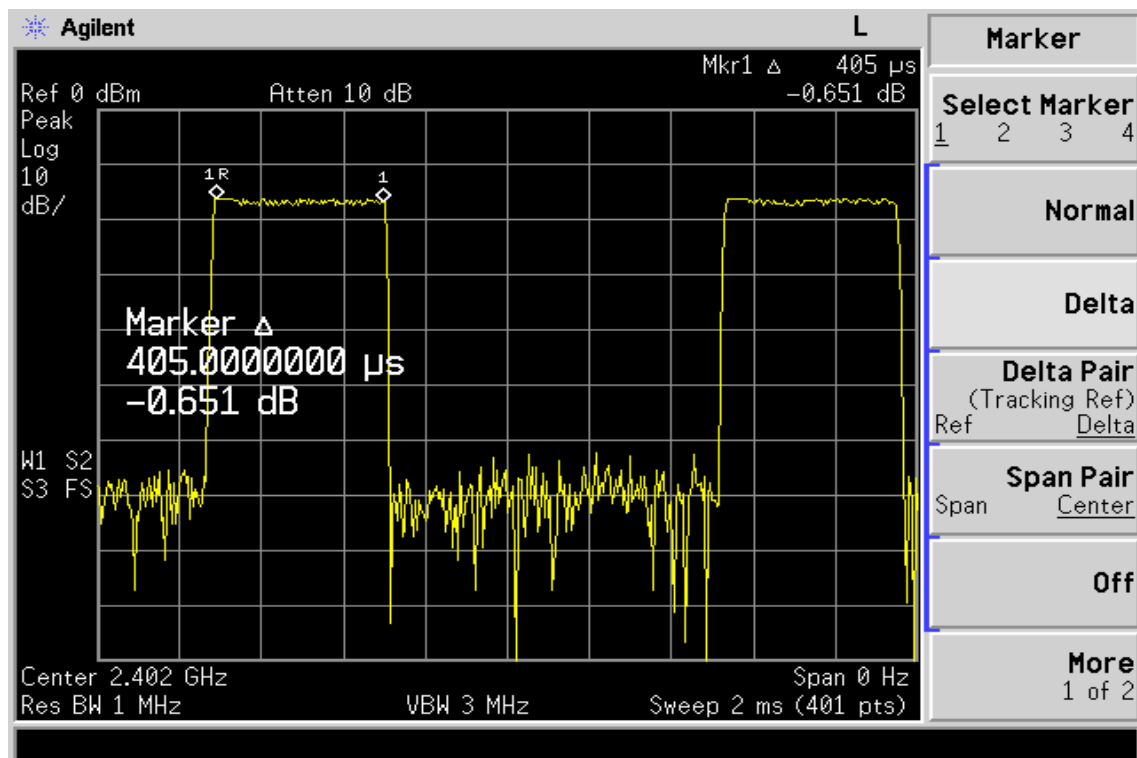
12.4. Measurement Equipment Used:

Conducted Emission Test Site					
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
Spectrum Analyzer	Agilent	E4446A	MY43360126	04/27/2008	04/26/2009
Spectrum Analyzer	Agilent	7405A	US41160416	07/04/2007	07/03/2008
Low Loss Cable	HUBER+SUHNER	SUCOFLEX 104PEA	N/A	N/A	N/A
Attenuator	Mini-Circuit	BW-S10W5	N/A	07/05/2007	07/04/2008
Attenuator	Mini-Circuit	BW-S6W5	N/A	07/05/2007	07/04/2008
Splitter	Agilent	Power Biviber	51818	07/05/2007	07/04/2008

Dwell Time Test Data

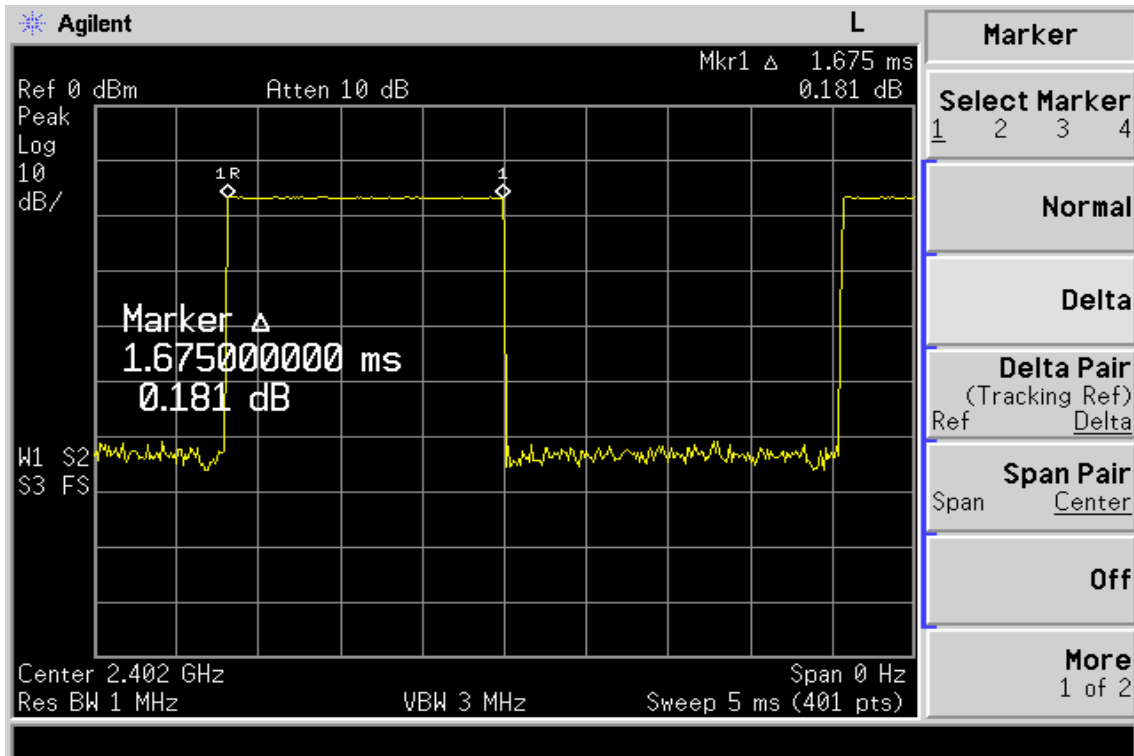
CH-Low

DH1

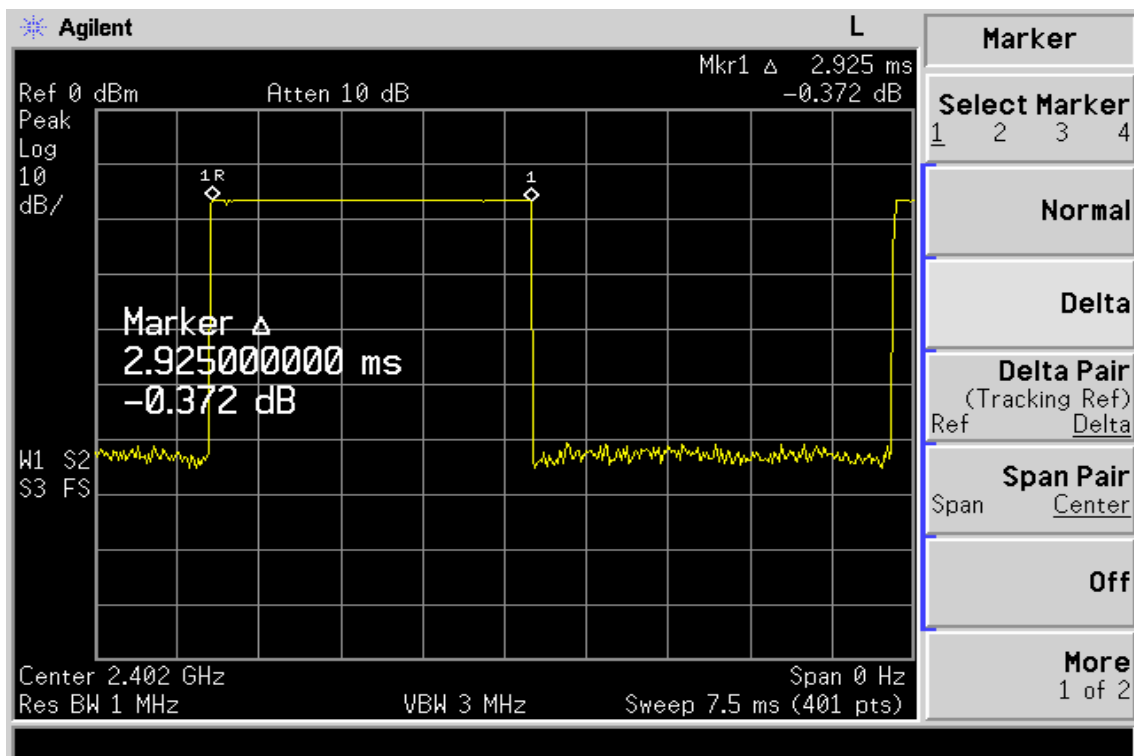


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DH3



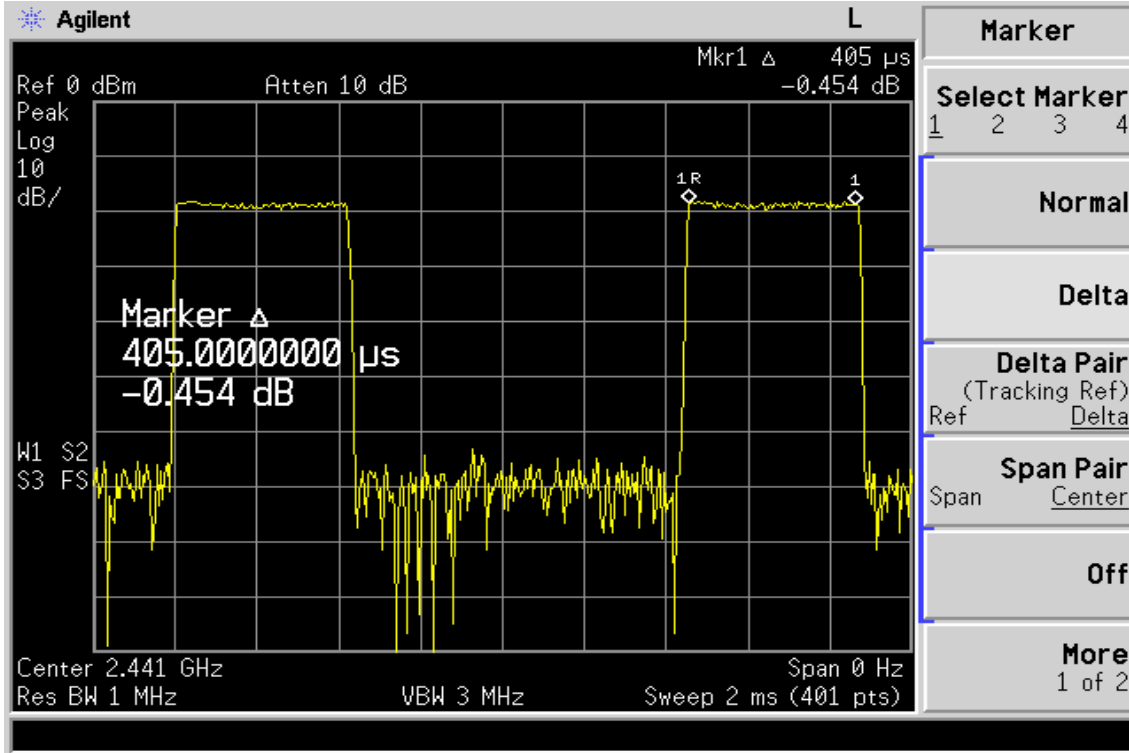
DH5



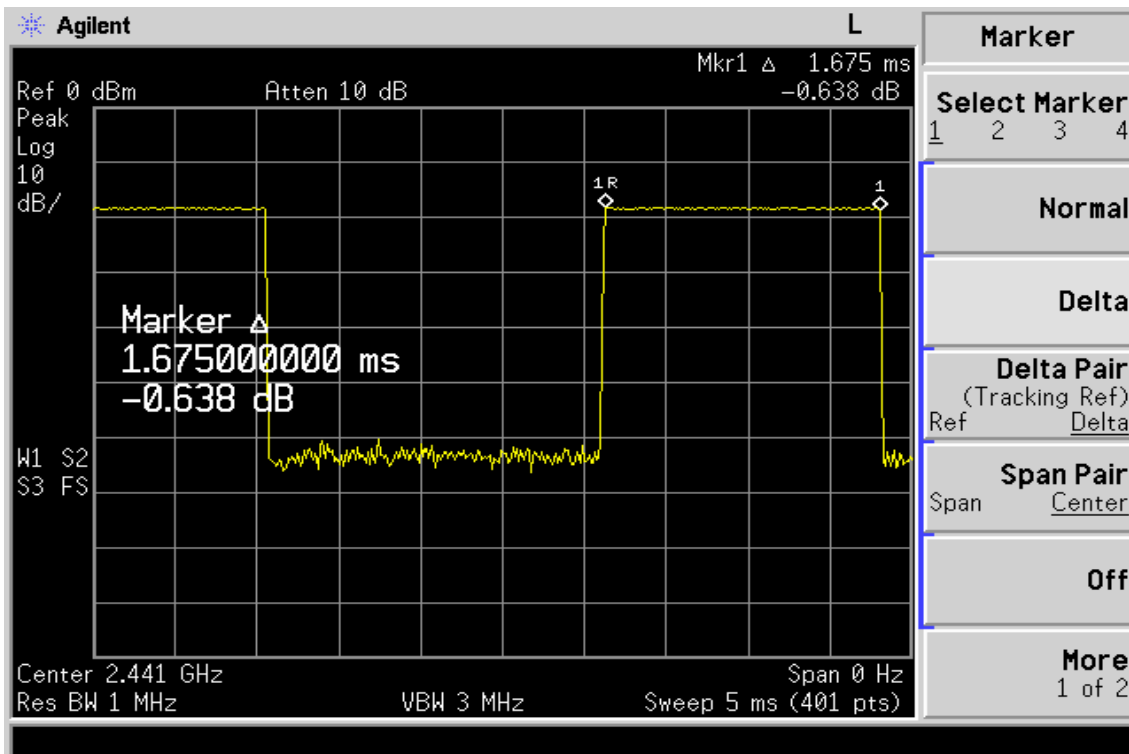
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CH-Mid

DH1

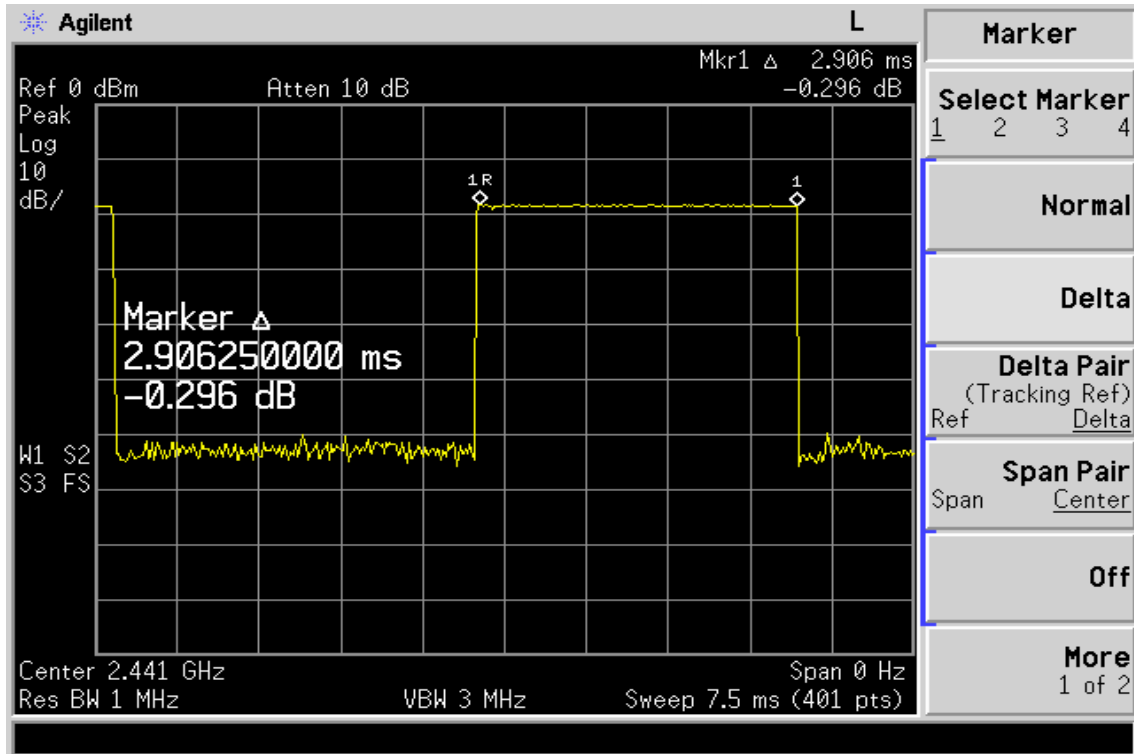


DH3



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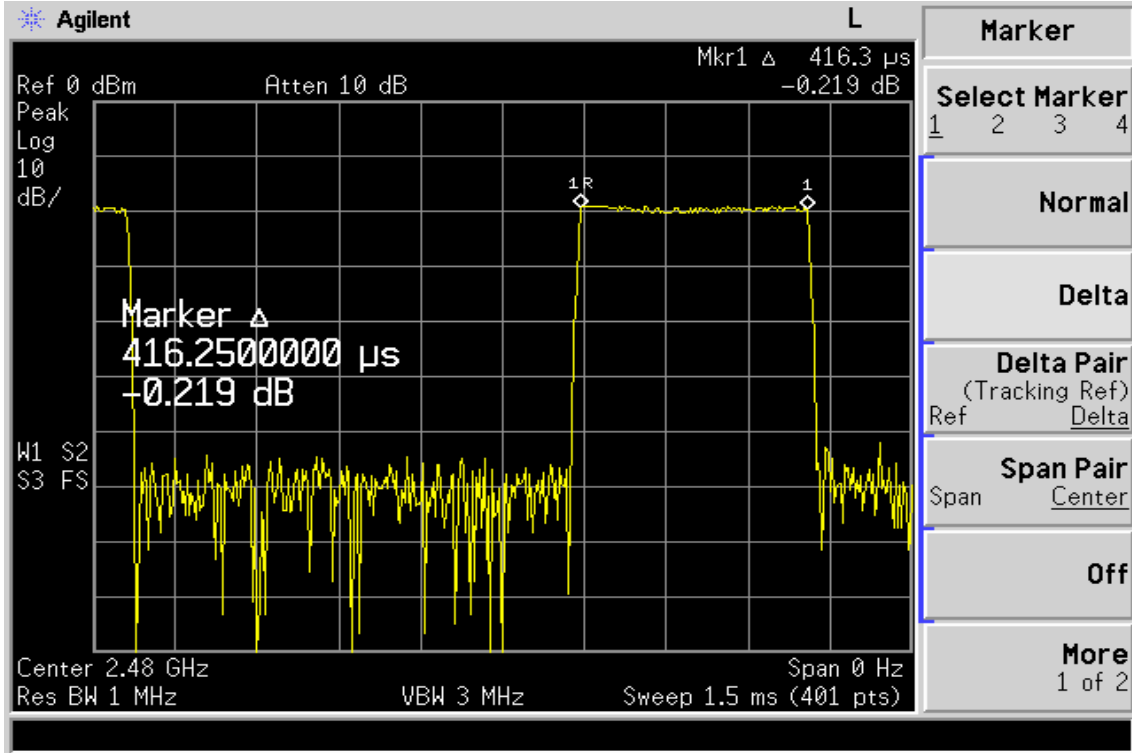
DH5



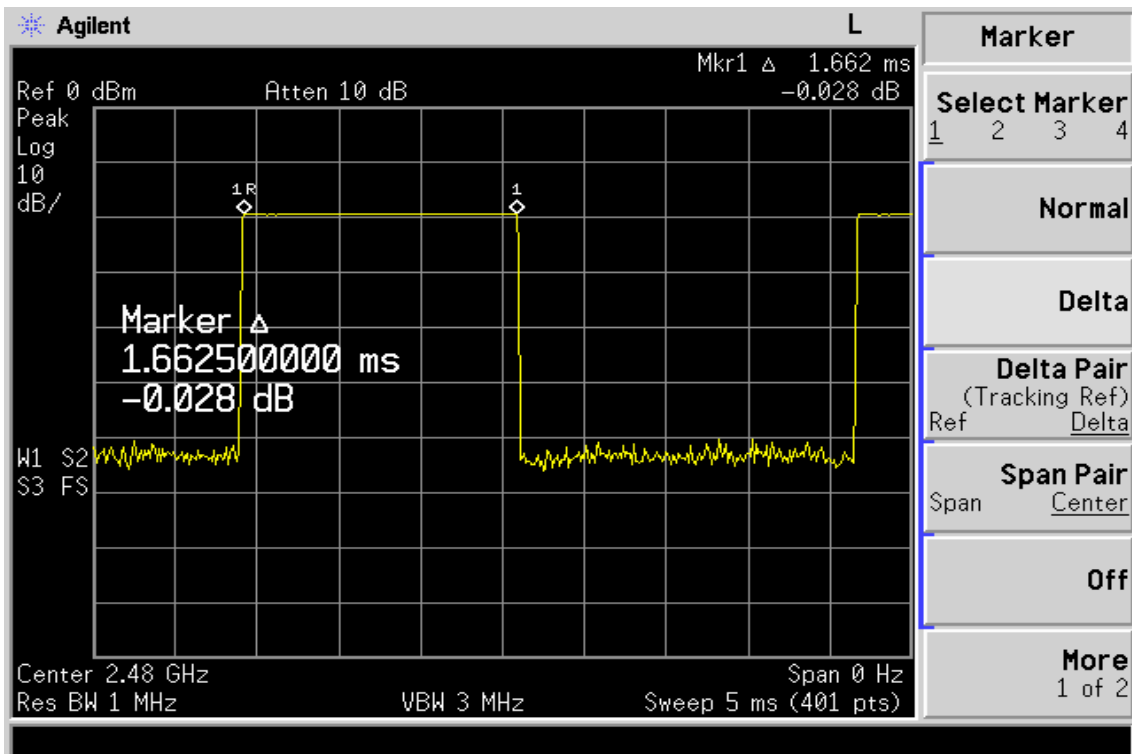
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CH-High

DH1

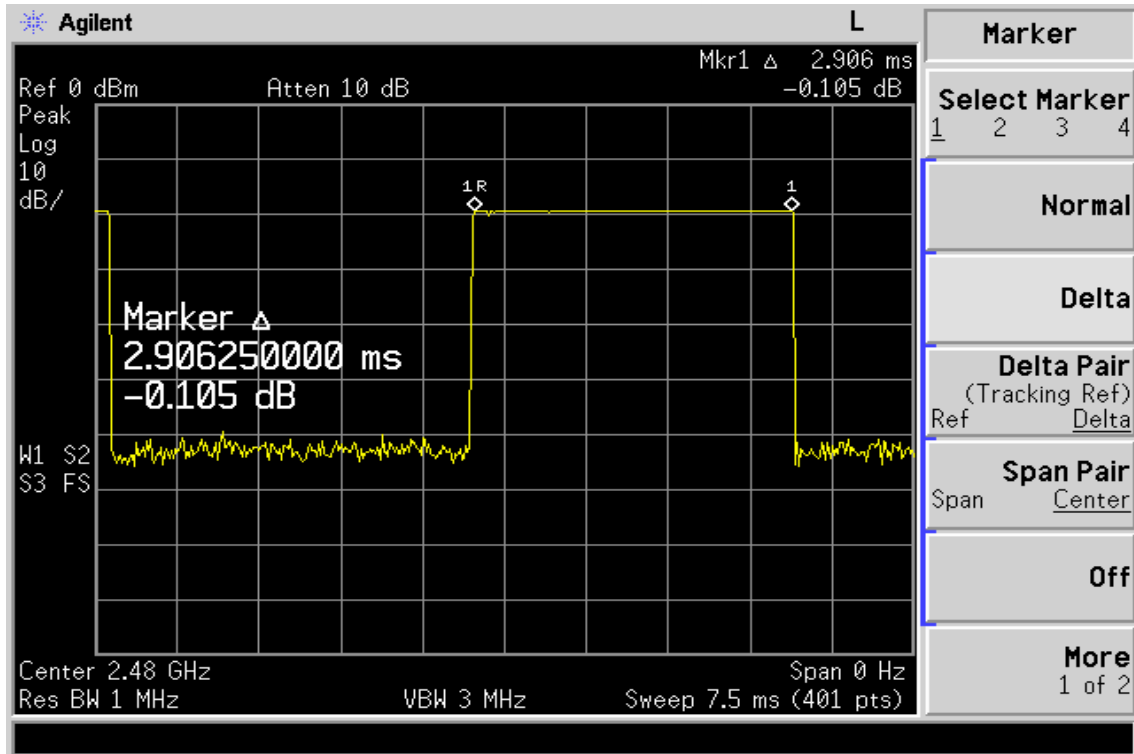


DH3



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DH5



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13. Peak Power Spectral Density

13.1. 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.

13.2. 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.

13.3. Measurement Result

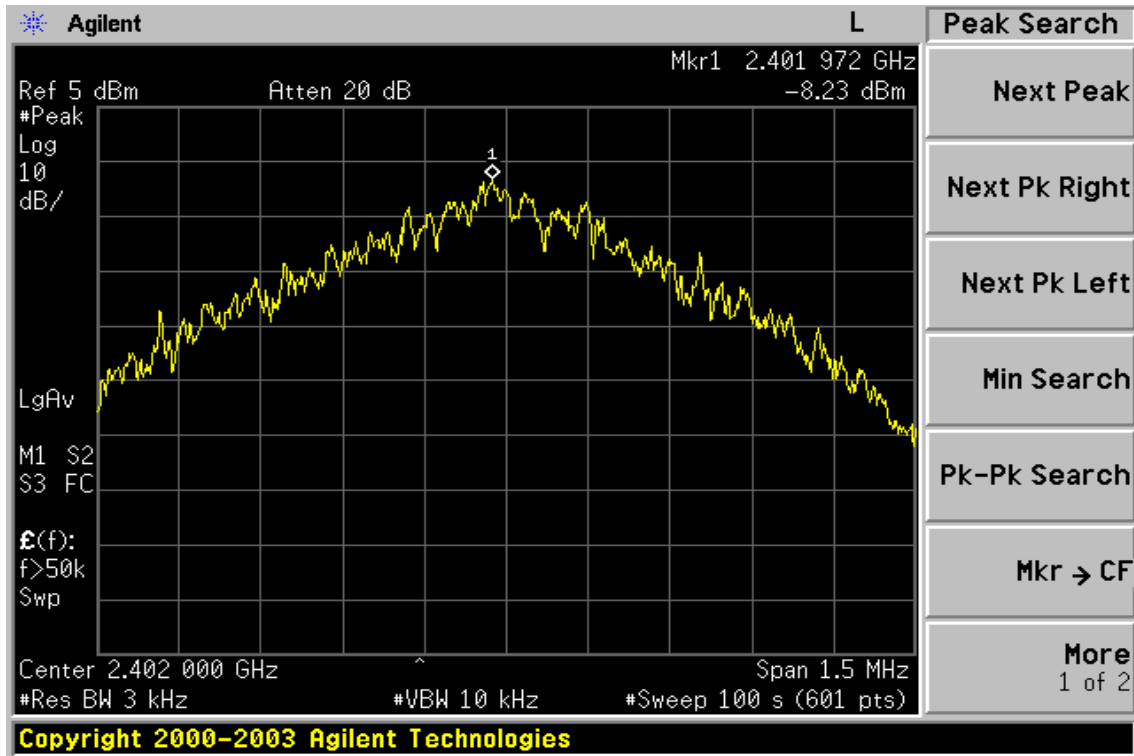
CH	RF Power Density Reading (dBm)	Cable loss (dB)	RF Power Density Level (dBm)	Maximum Limit (dBm)
Low	-8.23	0.10	-8.13	8
Mid	-8.63	0.10	-8.53	8
High	-8.50	0.10	-8.40	8

13.4. Measurement Equipment Used:

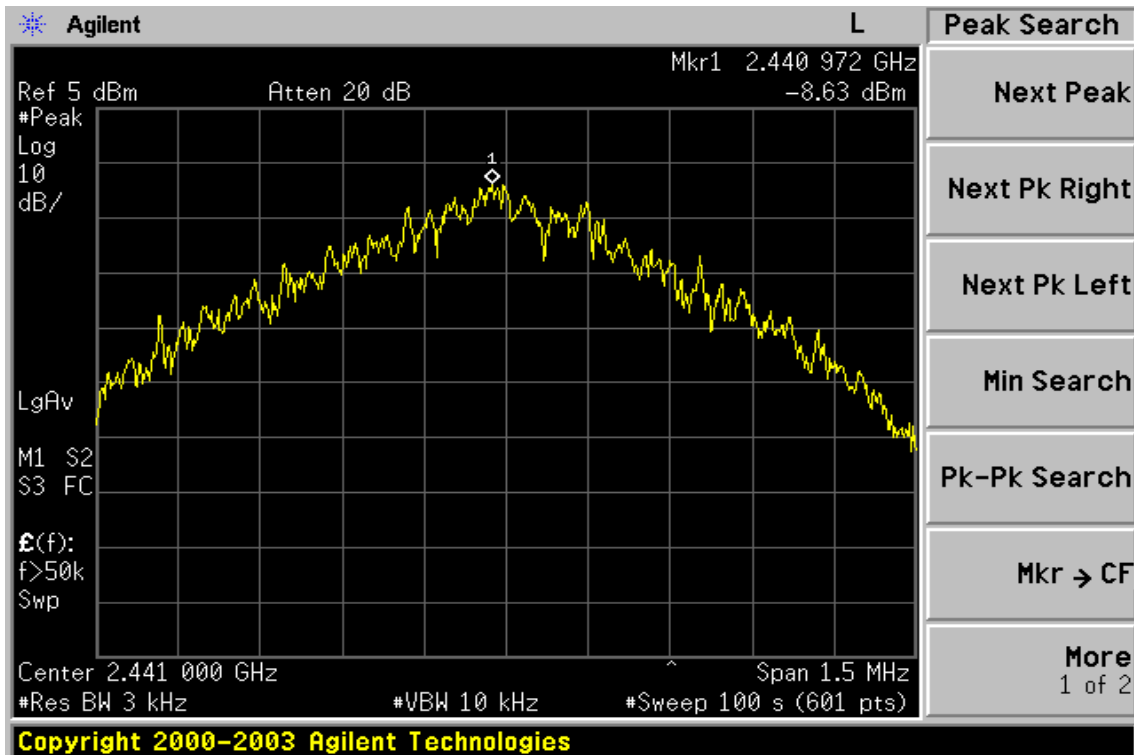
Conducted Emission Test Site					
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
Spectrum Analyzer	Agilent	E4446A	MY43360126	04/27/2007	04/26/2008
Spectrum Analyzer	Agilent	7405A	US41160416	07/04/2007	07/03/2008
Low Loss Cable	HUBER+SUHNER	SUCOFLEX 104PEA	N/A	N/A	N/A
Attenuator	Mini-Circuit	BW-S10W5	N/A	07/05/2007	07/04/2008
Attenuator	Mini-Circuit	BW-S6W5	N/A	07/05/2007	07/04/2008
Splitter	Agilent	Power Biviber	51818	07/05/2007	07/04/2008

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Power Spectral Density Test Plot (CH-Low)

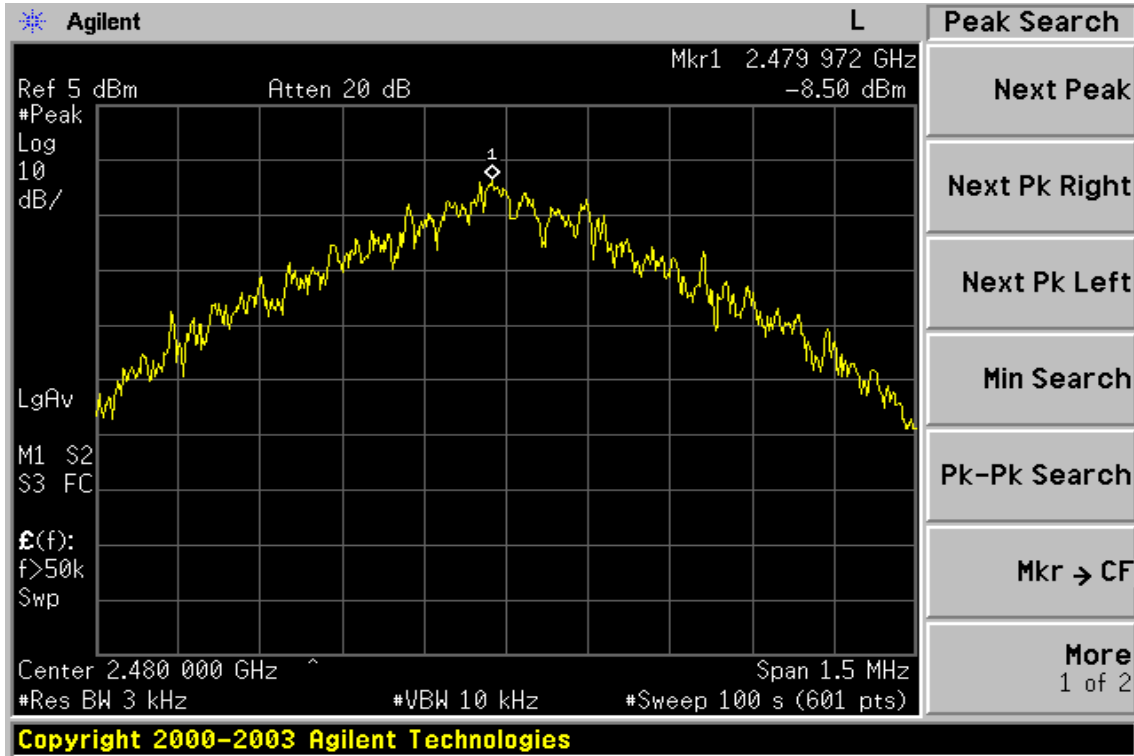


Power Spectral Density Test Plot (CH-Mid)



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Power Spectral Density Test Plot (CH-High)



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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 2.66 dBi, and the antenna connector is designed with permanent attachment and no consideration of replacement. Please see EUT photo for details.