ELECTROMAGNETIC EMISSIONS COMPLIANCE REPORT

INTENTIONAL RADIATOR CERTIFICATION TO FCC PART 15 SUBPART C REQUIREMENT AND INDUSTRY CANADA RSS 210

OF

Product Name:	**Bluetooth Stereo Headset**
Brand Name:	**N/A**
Model Name:	**BTA-820**
IC Number:	**5442A-BTH820**
ID Number:	**RIDBTH-820**
Report No.:	**ER/2005/B0013~14**
Issue Date:	**Dec. 02, 2005**
Rule Part:	**FCC §15.247, RSS 210, Section 6.2.2(o)**
Prepared for	**Globalsat Technology Corporation** **16F, No. 186, Jian Yi Road., Far East Century Park, Chung Ho City, Taipei Hsien, Taiwan.**
Prepared by	**SGS Taiwan Ltd.** **No. 134, Wu Kung Rd., Wuku Industrial Zone, Taipei County, Taiwan.**

VERIFICATION OF COMPLIANCE

Applicant:	Globalsat Technology Corporation 16F, No. 186, Jian Yi Road., Far East Century Park, Chung Ho City, Tapei Hsien, Taiwan.
Equipment Under Test:	Bluetooth Stereo Headset
Brand Name:	N/A
IC Number:	5442A-BTH820
ID Number:	RIDBTH-820
Model No.:	BTA-830
Model Difference:	N/A
File Number:	ER/2005/B0013~14
Date of test:	Nov. 14, 2005 ~ Dec. 01, 2005
Date of EUT Received:	Nov. 14, 2005

We hereby certify that:

The above equipment was tested by SGS Taiwan Ltd. The test data, data evaluation, test procedures, and equipment configurations shown in this report were made in accordance with the procedures given in ANSI C63.4 (2003) and the energy emitted by the sample EUT tested as described in this report is in compliance with conducted and radiated emission limits of FCC Rules Part 15.247 and issue 6 of IC RSS 210 and issue 5 section 6.2.2(o).

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

Test By:	Sky Wang	***Date***	Dec. 02, 2005
	Sky Wang		
Prepared By:	Gigi yeh	***Date***	Dec. 02, 2005
	Gigi Yeh		
Approved By:	Vincent Su	***Date***	Dec. 02, 2005
	Vincent Su		

Version

Version No.	Date
00	Dec. 02, 2005

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1. GENERAL INFORMATION

1.1 Product Description

The Globalsat Technology Corporation Model: BTA-820 (referred to as the EUT in this report) is Bluetooth Stereo Headset.

A major technical descriptions of EUT is described as following:

A). Operation Frequency: 2402 – 2480MHz, 79 channels
B). Rated output power: 3.30dBm
C). Modulation type: Frequency Hopping Spread Spectrum (GFSK)
D). Antenna Designation: PIFA Antenna, 0.14 dBi, Non-User Replaceable (Fixed)
E). Power Supply: 5 Vdc from AC/DC Power Adaptor model name:SA0105-D or 3.7Vdc re-chargeable battery

1.2 Related Submittal(s) / Grant (s)

This submittal(s) (test report) is intended for FCC ID: **RIDBTH-820** filing to comply with Section 15.247 of the FCC Part 15, Subpart C Rules. And **IC: 5442A-BTH820** filing to comply with issue 6 of Industry Canada RSS 210 and issue 5 section 6.2.2(o).

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 open area test site and conducted measurement facility used to collect the radiated data is located on the address of SGS Taiwan Ltd. No. 134, Wu Kung Rd., Wuku Industrial Zone, Taipei Country, Taiwan. The Open Area Test Sites and the Line Conducted labs are constructed and calibrated to meet the FCC requirements in documents ANSI C63.4: 2003 and CISPR 22/EN 55022 requirements.

1.5 Accreditation and Listing

The test facilities used to perform radiated and conducted emissions tests are listed In Canada, Certification and Engineering Bureau, IC4620. for 3m & 10m Open Area Test Site. FCC Site No. 1(3 &10 meters) Registration Number: 94644, Both OATS and Anechoic chamber (3 meters) was accredited by CNLA(0513) and NVLAP (200704-0).

1.6 Special Accessories

Not available for this EUT intended for grant.

1.7 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, 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 according to the requirements in Section 8, 13 of ANSI C63.4-2003.

2.4 Configuration of Tested System

Fig. 2-1 Configuration of Tested System(Radiated Emission)

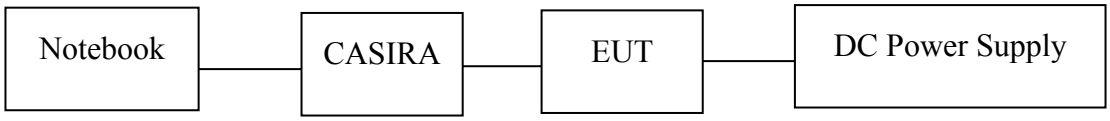


Table 2-1 Equipment Used in Tested System

Item	Equipment	Mfr/Brand	Model/ Type No.	FCC ID	Series No.	Data Cable	Power Cord
1.	Notebook	IBM	T2367	DOC	99GLD64	120cm , shielded	Un-shield
2.	BT development kit	CSR/CASIRA	BCES301199	DOC	7383-07-04-03	30cm, un-shielded	Un-shield
3.	DC Power Supply	Topward	3303A	N/A	715856	30cm, un-shielded	Un-shield

3. SUMMARY OF TEST RESULTS

FCC Rules	Description Of Test	Result
§15.207(a)/ §6.6	Conducted Emission	Compliant
§15.247(b)/ §6.2.2(o)(a3)	Peak Output Power	Compliant
§6.2.2(o)(a3)	20dB Bandwidth	Compliant
§15.247(c) §6.2.2(o)(e1)	100 KHz Bandwidth Of Frequency Band Edges	Compliant
§15.247(c) §6.2.2(o)(e1)	Spurious Emission	Compliant
§15.247(a)(1) §6.2.2(o)(a1)	Frequency Separation	Compliant
§15.247(a)(1)(iii) §6.2.2(o)(a3)	Number of hopping frequency	Compliant
§15.247(a)(1)(ii) §6.2.2(o)(a3)	Time of Occupancy	Compliant
§15.247	Peak Power Density	Compliant
§15.203 §5.5	Antenna Requirement	Compliant
§5.9.1	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 741k 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.		

According to section RSS 210, section 6.6 Transmitter AC Wireline Conducted Emissions. Limits is as following.

Frequency range MHz	Limits dB (uV)
	Average
0.45 to 30	48
Note: 1. if the level of the emission measured using the quasi-peak instrumentation is 6 dB, or more, higher than the level of the same emission measured with instrumentation having an average detector and a 9 kHz minimum bandwidth, that emission is considered broadband and the level obtained with the quasi-peak detector may be reduced by 13 dB for comparison to the limits.	

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 AC/DC Power adaptor of EUT was plug-in LISN. The rear of the EUT and peripherals were placed flushed with the rear of the tabletop.
3. The LISN 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	09/02/2005	09/03/2006
EMI Test Receiver	R&S	ESCS30	828985/004	06/09/2005	06/10/2006
Transient Limiter	HP	11947A	3107A02062	09/02/2005	09/03/2006
LISN	Rolf-Heine	NNB-2/16Z	99012	12/31/2004	12/30/2005
LISN	Rolf-Heine	NNB-2/16Z	99013	12/24/2004	12/23/2005
Coaxial Cables	N/A	No. 3, 4	N/A	12/01/2004	12/01/2205

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 Operating			Test Date :	Nov. 21, 2005
Temperature :	20 ℃	Humidity:	55%	Test By:	Sky

FREQ MHz	Q.P. Raw dBuV	AVG Raw dBuV	Q.P. Limit dBuV	AVG Limit dBuV	Q.P. Margin dB	AVG Margin dB	NOTE
0.197	42.14	---	63.74	53.74	-21.60	---	L1
0.486	37.36	---	56.24	46.24	-18.88	---	L1
0.974	37.13	---	56.00	46.00	-18.87	---	L1
1.658	38.80	---	56.00	46.00	-17.20	---	L1
2.439	38.89	---	56.00	46.00	-17.11	---	L1
3.513	37.94	---	56.00	46.00	-18.06	---	L1
0.193	40.81	---	63.91	53.91	-23.10	---	L2
0.388	38.77	---	58.10	48.10	-19.33	---	L2
0.584	37.92	---	56.00	46.00	-18.08	---	L2
1.658	38.92	---	56.00	46.00	-17.08	---	L2
2.439	38.87	---	56.00	46.00	-17.13	---	L2
3.513	38.04	---	56.00	46.00	-17.96	---	L2

Remark：

(1) Measuring frequencies from 0.15 MHz to 30MHz。

(2) The emissions measured in frequency range from 0.15 MHz to 30MHz were made with an instrument using Qusia-Peak detector and Average detector.

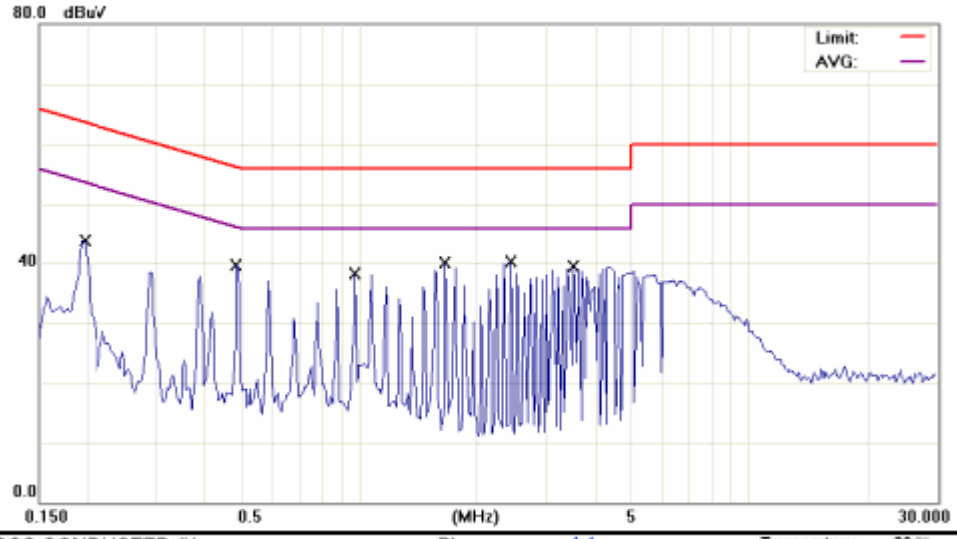
(3) "---" denotes the emission level was or more than 2dB below the Average limit, so no re-check anymore.

(4) The IF bandwidth of SPA between 0.15MHz to 30MHz was 10KHz;
The IF bandwidth of Test Receiver between 0.15MHz to 30MHz was 9KHz;

(5) L1 = Line One (Hot side) / L2 = Line Two (Neutral side)

Conducted Emission Test Plot Line

Conducted Emission Measurement



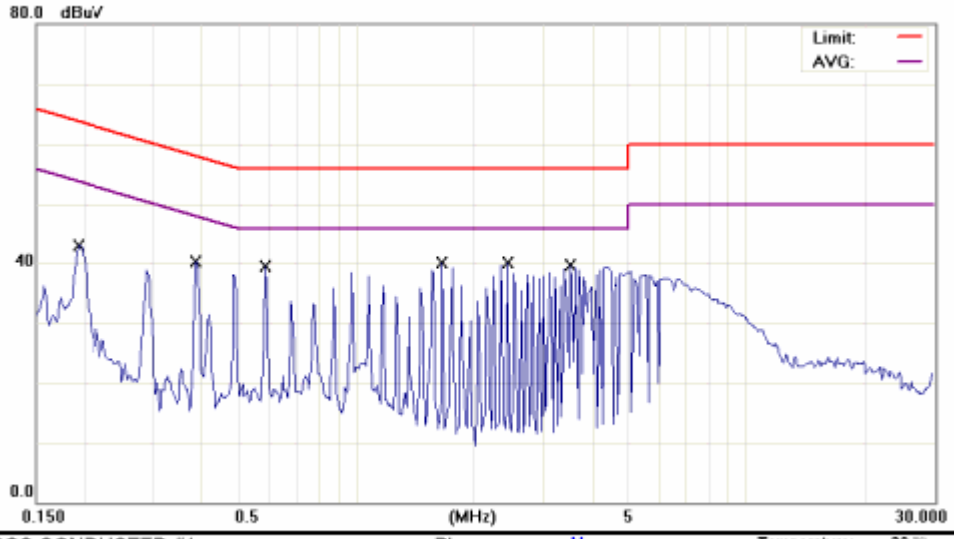
Site SGS CONDUCTED #1
Limit: CISPR22 Class B Conduction(QP)
EUT: BLUETOOTH STEREO HEADSET
M/N: BTH-820
Note: CHARGE MODE

Phase: L1
Power: AC 120V/60Hz
Distance:

Temperature: 23 ℃
Humidity: 57 %
Air Pressure: hpa

No.	Mk.	Freq.	Reading Level	Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1		0.1969	41.54	0.60	42.14	63.74	-21.60	QP	
2		0.1969	32.66	0.60	33.26	53.74	-20.48	AVG	
3		0.4859	36.75	0.61	37.36	56.24	-18.88	QP	
4		0.4859	32.25	0.61	32.86	46.24	-13.38	AVG	
5		0.9742	36.51	0.62	37.13	56.00	-18.87	QP	
6		0.9742	30.83	0.62	31.45	46.00	-14.55	AVG	
7		1.6578	38.16	0.64	38.80	56.00	-17.20	QP	
8	*	1.6578	32.46	0.64	33.10	46.00	-12.90	AVG	
9		2.4391	38.23	0.66	38.89	56.00	-17.11	QP	
10		2.4391	31.66	0.66	32.32	46.00	-13.68	AVG	
11		3.5133	37.24	0.70	37.94	56.00	-18.06	QP	
12		3.5133	32.22	0.70	32.92	46.00	-13.08	AVG	

Conducted Emission Measurement



Site SGS CONDUCTED #1
Limit: CISPR22 Class B Conduction(QP)
EUT: BLUETOOTH STEREO HEADSET
M/N: BTH-820
Note: CHARGE MODE

Phase: N
Power: AC 120V/60Hz
Distance:

Temperature: 23 ℃
Humidity: 57 %
Air Pressure: hpa

No.	Mk.	Freq.	Reading Level	Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1		0.1930	40.21	0.60	40.81	63.91	-23.10	QP	
2		0.1930	28.19	0.60	28.79	53.91	-25.12	AVG	
3		0.3883	38.16	0.61	38.77	58.10	-19.33	QP	
4		0.3883	34.12	0.61	34.73	48.10	-13.37	AVG	
5		0.5836	37.31	0.61	37.92	56.00	-18.08	QP	
6	*	0.5836	33.07	0.61	33.68	46.00	-12.32	AVG	
7		1.6578	38.28	0.64	38.92	56.00	-17.08	QP	
8		1.6578	32.88	0.64	33.52	46.00	-12.48	AVG	
9		2.4391	38.21	0.66	38.87	56.00	-17.13	QP	
10		2.4391	31.83	0.66	32.49	46.00	-13.51	AVG	
11		3.5133	37.34	0.70	38.04	56.00	-17.96	QP	
12		3.5133	32.17	0.70	32.87	46.00	-13.13	AVG	

6. PEAK OUTPUT POWER MEASUREMENT

6.1 Standard Applicable

According to §15.247(b), 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 §6.2.2(o)(a3), For frequency hopping systems operating in the 2400-2483.5 MHz band employing at least 75 hopping channels, the transmitter output power shall not exceed 1.0Watt. For all other frequency hopping systems in the 2400 – 2483.5MHz band the transmitter output power shall not exceed 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.

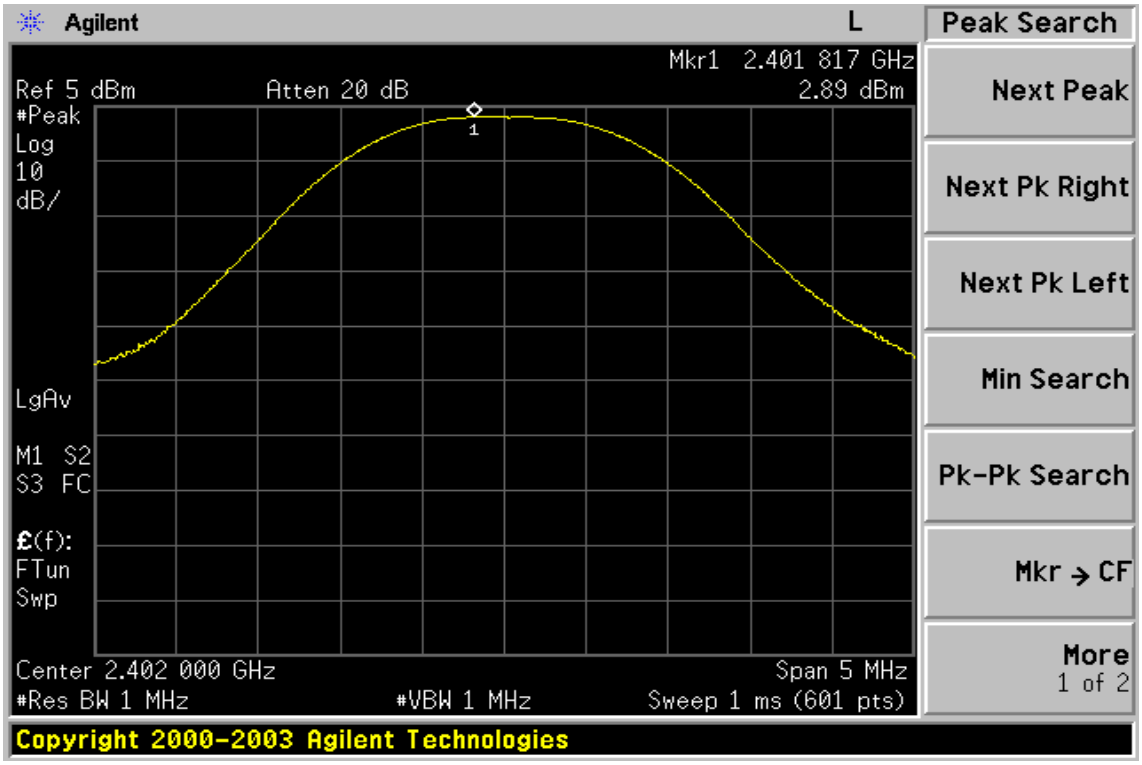
6.3 Measurement Result

CH	Frequency (MHz)	Reading Power dBm	Cabble Loss	Output Power dBm	Output Power W	Limit (W)
LOW	2402.00	2.89	0.10	2.99	0.00199	1
MID	2441.00	3.20	0.10	3.30	0.00214	1
HIGH	2480.00	3.06	0.10	3.16	0.00207	1

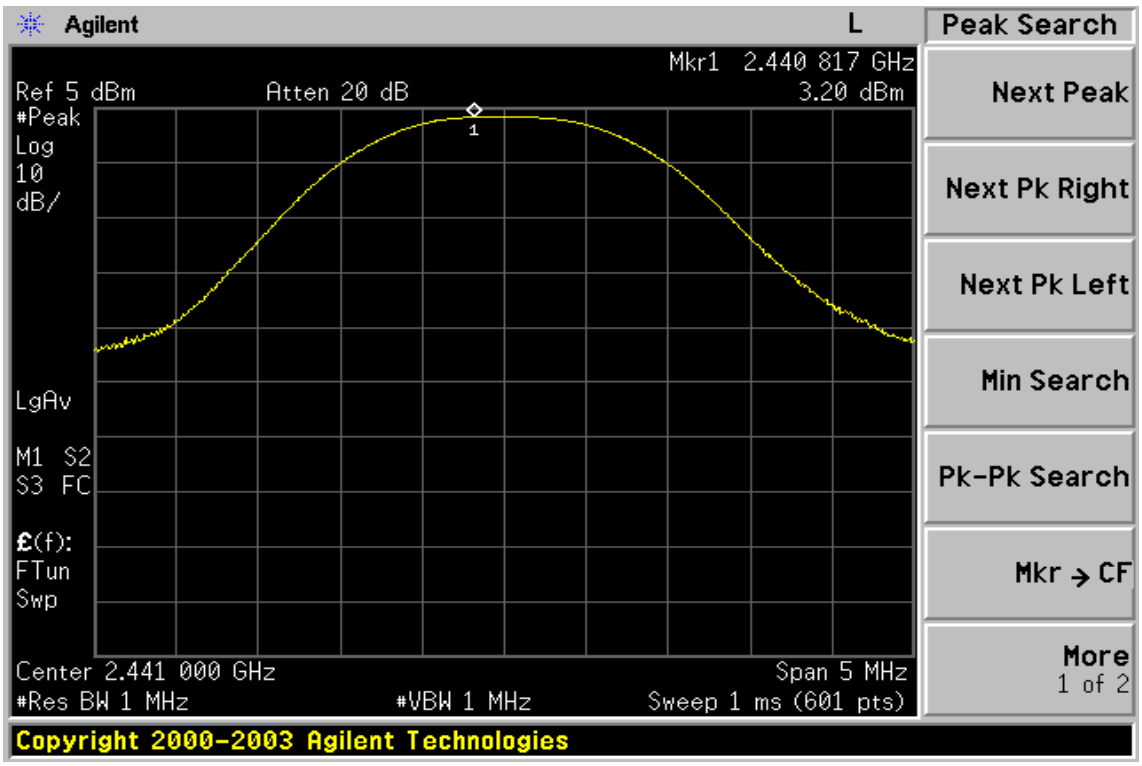
6.4 Measurement Equipment Used:

EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
Spectrum Analyzer	R&S	FSP 40	100034	05/27/2005	05/26/2006
Spectrum Analyzer	Agilent	E7405A	US41160416	08/27/2005	08/27/2006
Low Loss Cable	HUBER+SUHNER	SUCOFLEX 104PEA	N/A	N/A	N/A
Attenuator	Mini-Circult	BW-S6W5	N/A	10/07/2005	10/06/2006

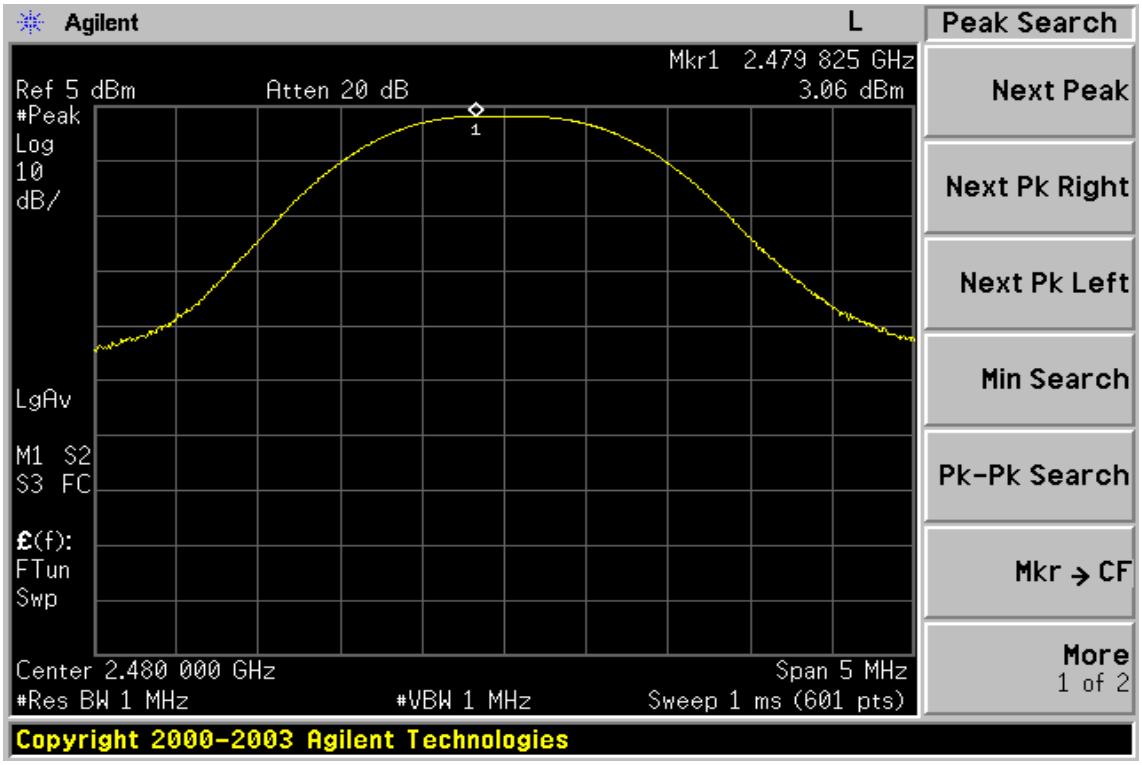
Peak Power Output Data Plot (CH Low)



Peak Power Output Data Plot (CH Mid)



Peak Power Output Data Plot (CH High)



7. 20dB Bandwidth

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= 2MHz, Sweep=auto
4. Mark the peak frequency and –20dB (upper and lower) frequency.
5. Repeat above procedures until all frequency measured were complete.

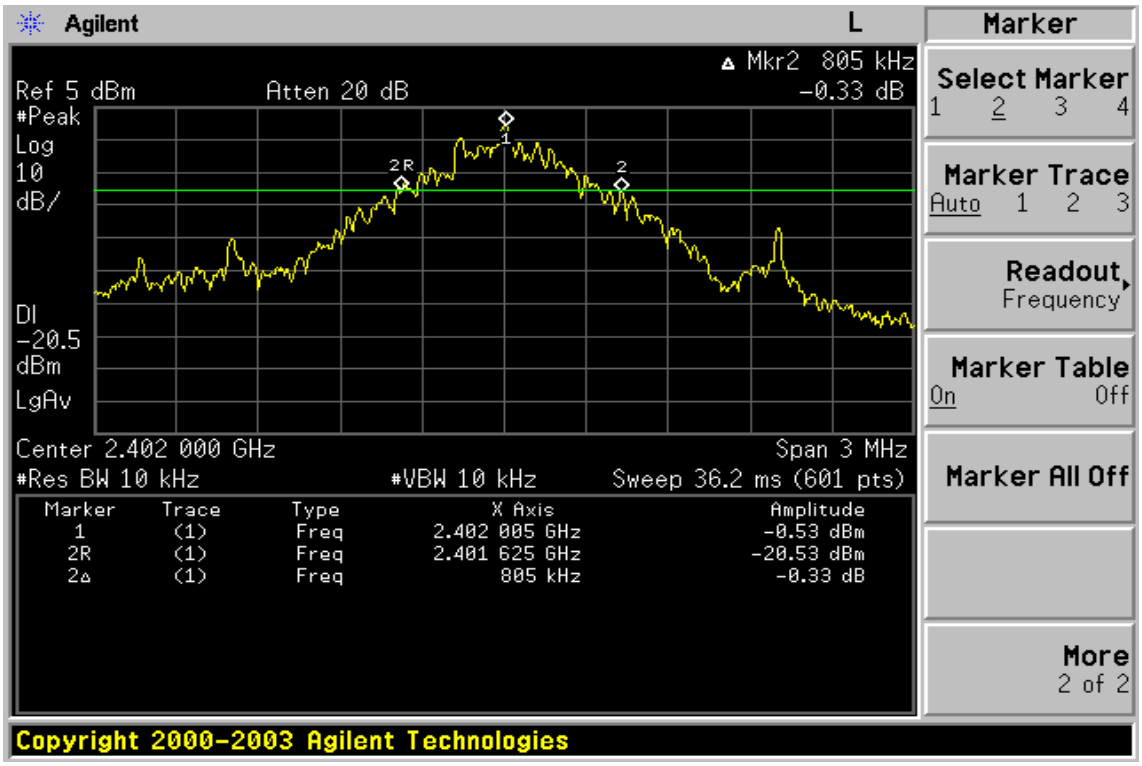
7.3 Measurement Result

CH	Bandwidth (MHz)
Lower	0.805
Mid	0.830
Higher	0.830

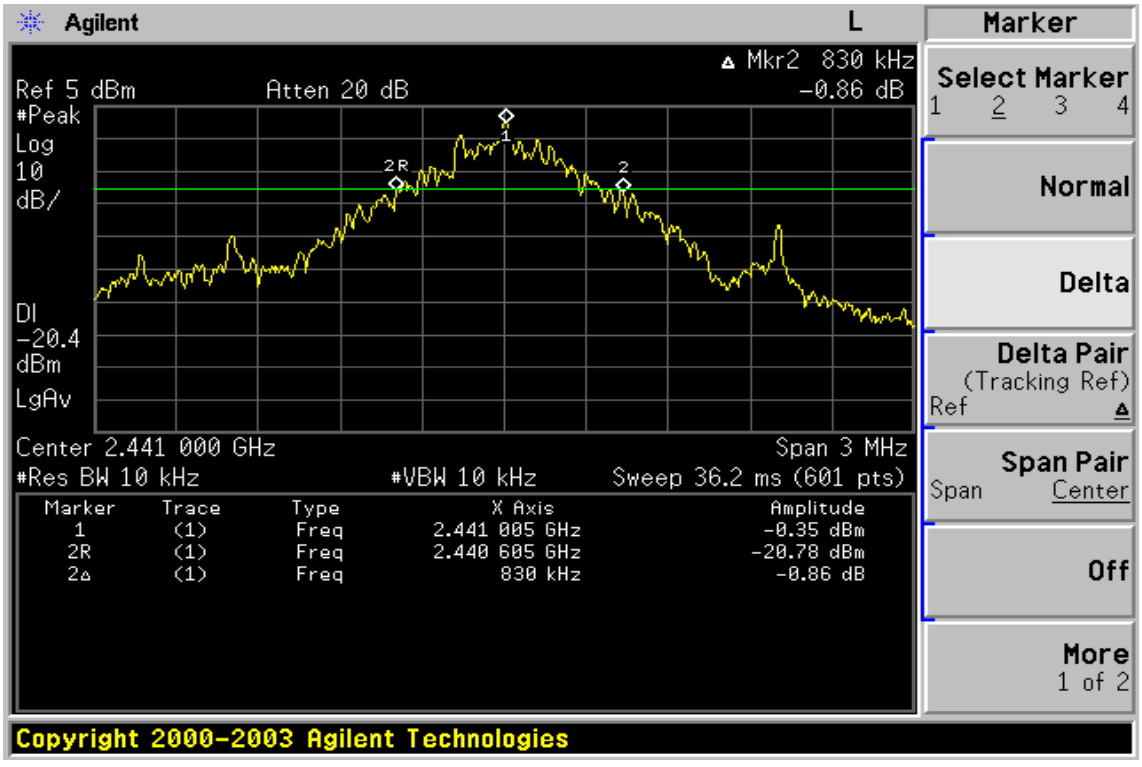
7.4 Measurement Equipment Used:

EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
Spectrum Analyzer	R&S	FSP 40	100034	05/27/2005	05/26/2006
Spectrum Analyzer	Agilent	E7405A	US41160416	08/27/2005	08/27/2006
Low Loss Cable	HUBER+SUHNER	SUCOFLEX 104PEA	N/A	N/A	N/A
Attenuator	Mini-Circult	BW-S6W5	N/A	10/07/2005	10/06/2006

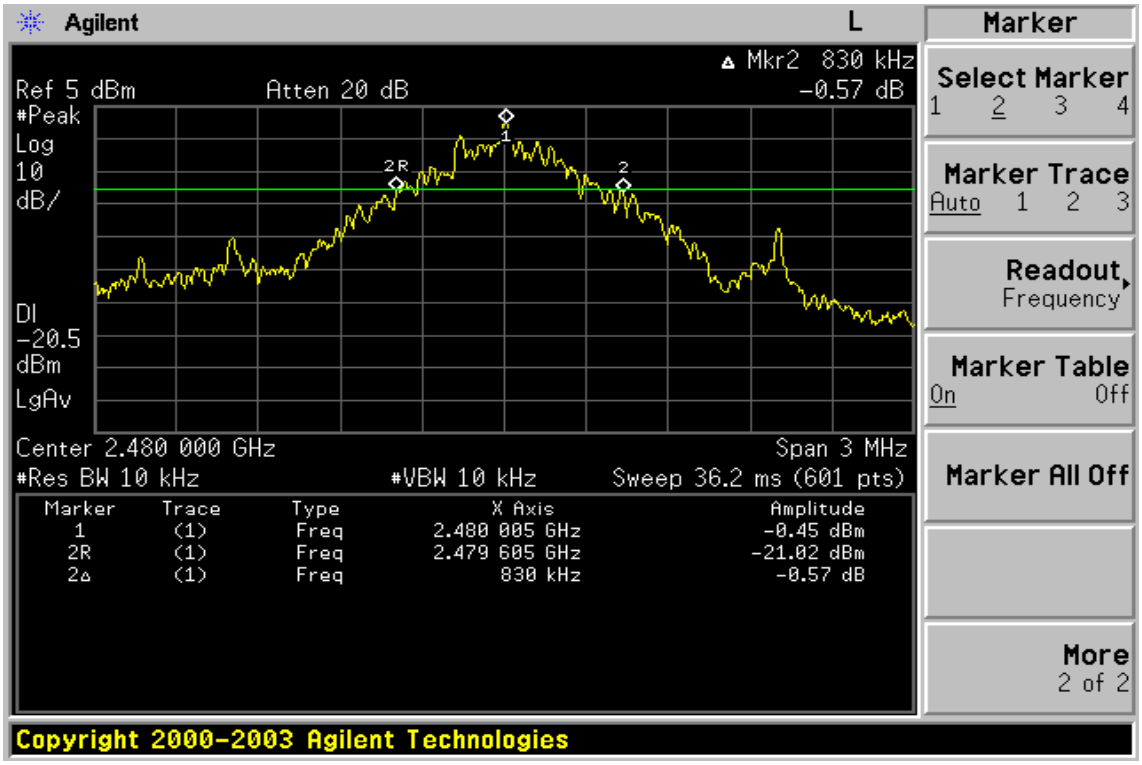
20dB Band Width Test Data CH-Low



20dB Band Width Test Data CH-Mid



20dB Band Width Test Data CH-High



8. 100KHz BANDWIDTH OF BAND EDGES MEASUREMENT

8.1 Standard Applicable

According to §15.247(c), in any 100 KHz bandwidth outside the frequency bands in which the spread spectrum intentional radiator in operating, the radio frequency power that is produced by the intentional radiator shall be at least 20dB below that in the 100KHz bandwidth within the band that contains the highest level of the desired power, In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in15.209(a).

According to §6.2.2(o)(e1), In any 100 kHz bandwidth outside the operating frequency bands, between 30 MHz and 5 times the carrier frequency, the unwanted emission spectral density shall be either at least 20 dB below the inband spectral density, or shall not exceed the levels specified in Table 3, whichever is less stringent.

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 2.488GHz and record the max. level.
6. Repeat above procedures until all frequency measured were complete.

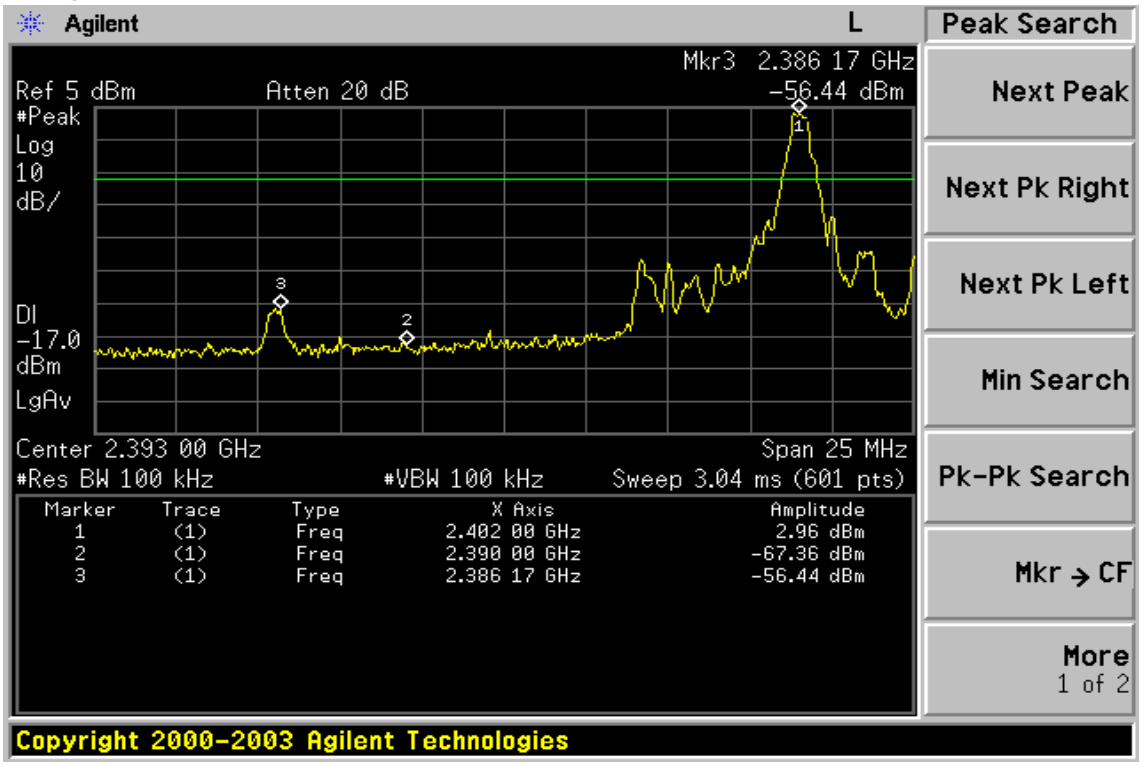
8.3 Measurement Result

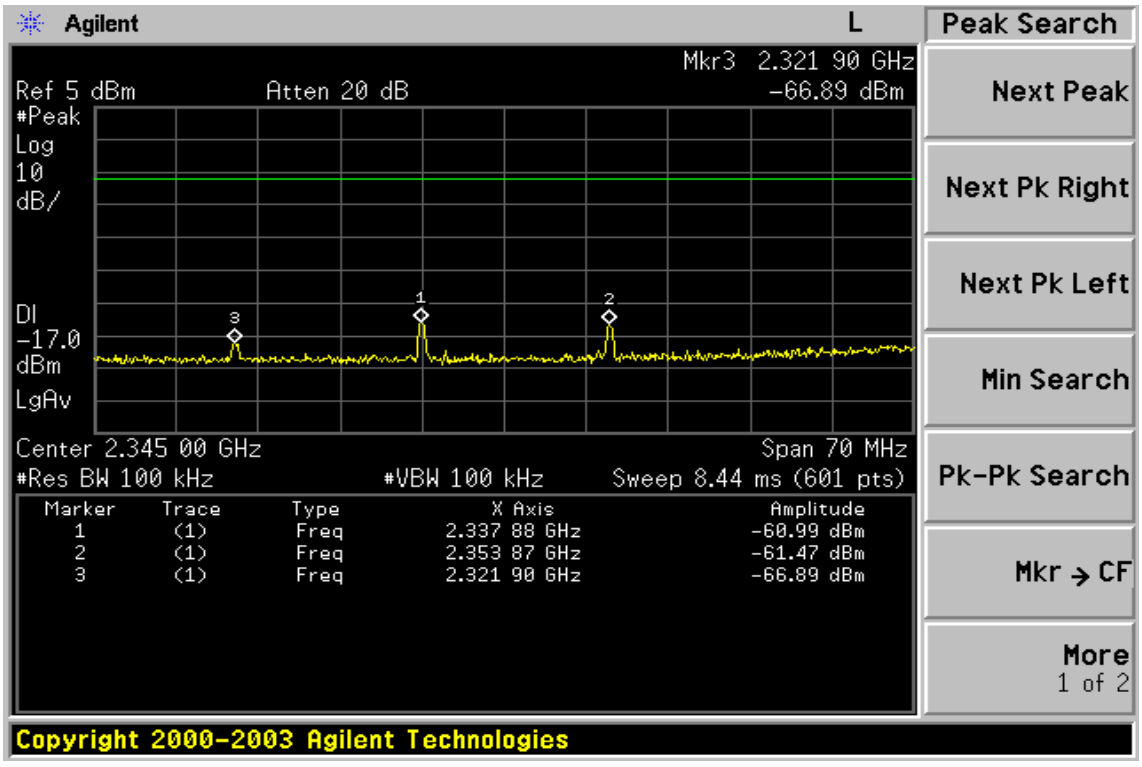
Refer to attach spectrum analyzer data chart.

8.4 Measurement Equipment Used:

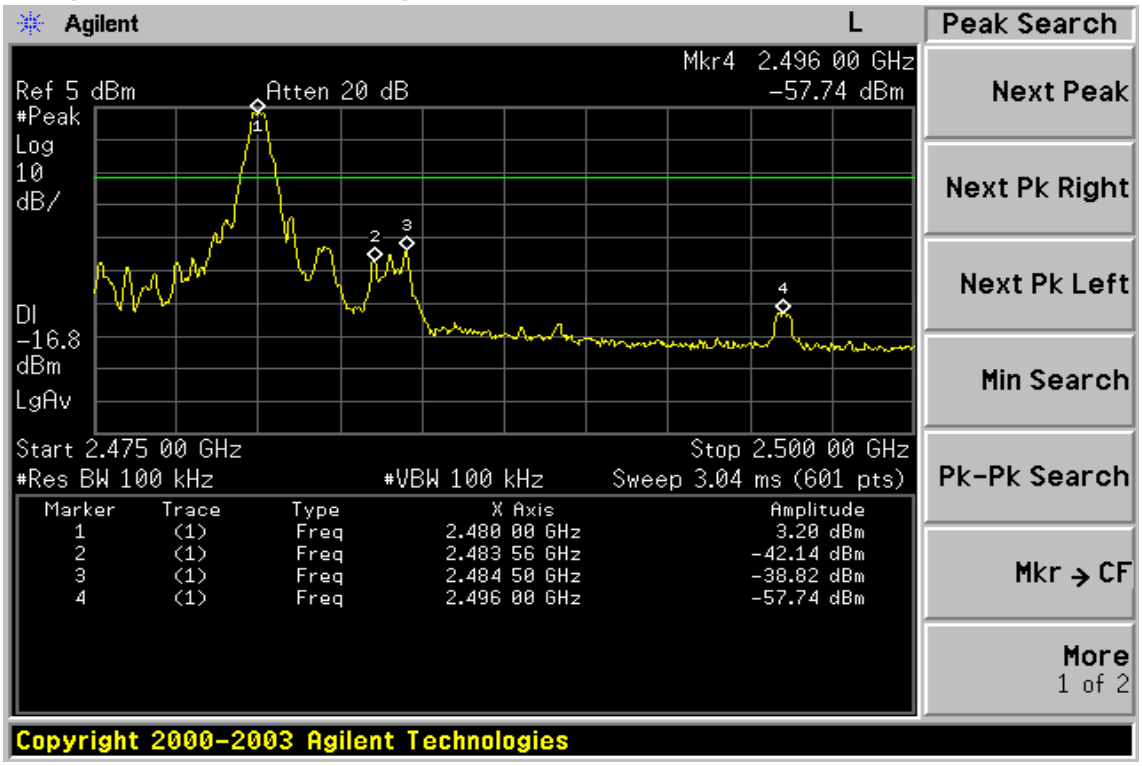
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
Spectrum Analyzer	R&S	FSP 40	100034	05/27/2005	05/26/2006
Spectrum Analyzer	Agilent	E7405A	US41160416	08/27/2005	08/27/2006
Low Loss Cable	HUBER+SUHNER	SUCOFLEX 104PEA	N/A	N/A	N/A
Attenuator	Mini-Circult	BW-S6W5	N/A	10/07/2005	10/06/2006

Band Edges Test Data CH-Low





Band Edges Test Data CH-High



Radiated Emission:

Operation Mode	TX CH Low	Test Date	Nov. 21, 2005
Fundamental Frequency	2402 MHz	Test By	Danny
Temperature	23 ℃	Pol	Ver.
Humidity	54 %		

Freq. (MHz)	Peak Reading (dBuV)	AV Reading (dBuV)	Ant./CL CF(dB)	Actual FS Peak (dBuV/m)	Actual FS AV (dBuV/m)	Peak Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)	Remark
2386.17	36.98	---	-3.43	33.55	---	74.00	54.00	-20.45	Peak
2390.00	34.19	---	-3.40	30.79	---	74.00	54.00	-23.21	Peak

Operation Mode	TX CH Low	Test Date	Nov. 21, 2005
Fundamental Frequency	2402 MHz	Test By	Danny
Temperature	23 ℃	Pol	Hor.
Humidity	54 %		

Freq. (MHz)	Peak Reading (dBuV)	AV Reading (dBuV)	Ant./CL CF(dB)	Actual FS Peak (dBuV/m)	Actual FS AV (dBuV/m)	Peak Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)	Remark
2386.17	41.24	---	-3.43	37.81	---	74.00	54.00	-16.19	Peak
2390.00	34.61	---	-3.40	31.21	---	74.00	54.00	-22.79	Peak

Remark：

(1) Datas 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	Nov. 21, 2005
Fundamental Frequency	2480 MHz	Test By	Danny
Temperature	23 ℃	Pol	Ver.
Humidity	54 %		

Freq. (MHz)	Peak Reading (dBuV)	AV Reading (dBuV)	Ant./CL CF(dB)	Actual FS Peak (dBuV/m)	Actual FS AV (dBuV/m)	Peak Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)	Remark
2483.56	39.29	---	-3.04	36.25	---	74.00	54.00	-17.75	Peak
2484.50	42.35	---	-3.04	39.31	---	74.00	54.00	-14.69	Peak
2496.00	35.54	---	-2.95	32.59	---	74.00	54.00	-21.41	Peak

Operation Mode	TX CH High	Test Date	Nov. 21, 2005
Fundamental Frequency	2480 MHz	Test By	Danny
Temperature	23 ℃	Pol	Hor.
Humidity	54 %		

Freq. (MHz)	Peak Reading (dBuV)	AV Reading (dBuV)	Ant./CL CF(dB)	Actual FS Peak (dBuV/m)	Actual FS AV (dBuV/m)	Peak Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)	Remark
2483.56	49.00	---	-3.04	45.96	---	74.00	54.00	-8.04	Peak
2484.50	52.17	---	-3.04	49.13	---	74.00	54.00	-4.87	Peak
2496.04	38.53	---	-2.95	35.58	---	74.00	54.00	-18.42	Peak

Remark：

(1) Datas 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.

According to §6.2.2(o)(e1), In any 100 kHz bandwidth outside the operating frequency bands, between 30 MHz and 5 times the carrier frequency, the unwanted emission spectral density shall be either at least 20 dB below the inband spectral density, or shall not exceed the levels specified in Table 3, whichever is less stringent.

9.2 EUT Setup

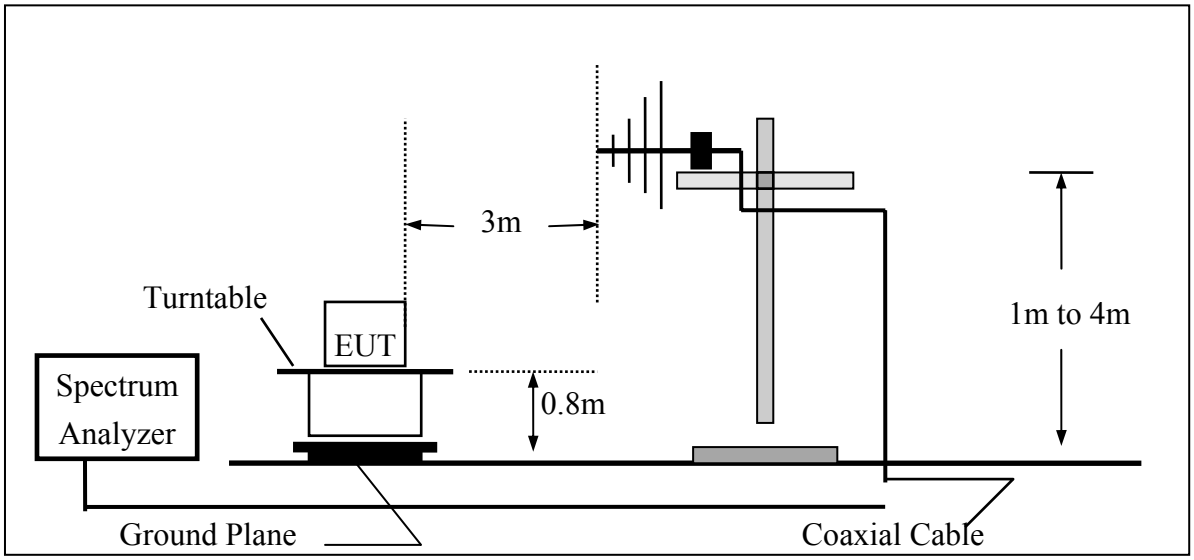
1. The radiated emission tests were performed in the 3 meter open-test site, using the setup in accordance with the ANSI C63.4-2003.
2. The EUT was put in the front of the test table. The rear of the EUT and peripherals were placed flushed with the rear of the tabletop.
3. The spacing between the peripherals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

9.3 Measurement Procedure

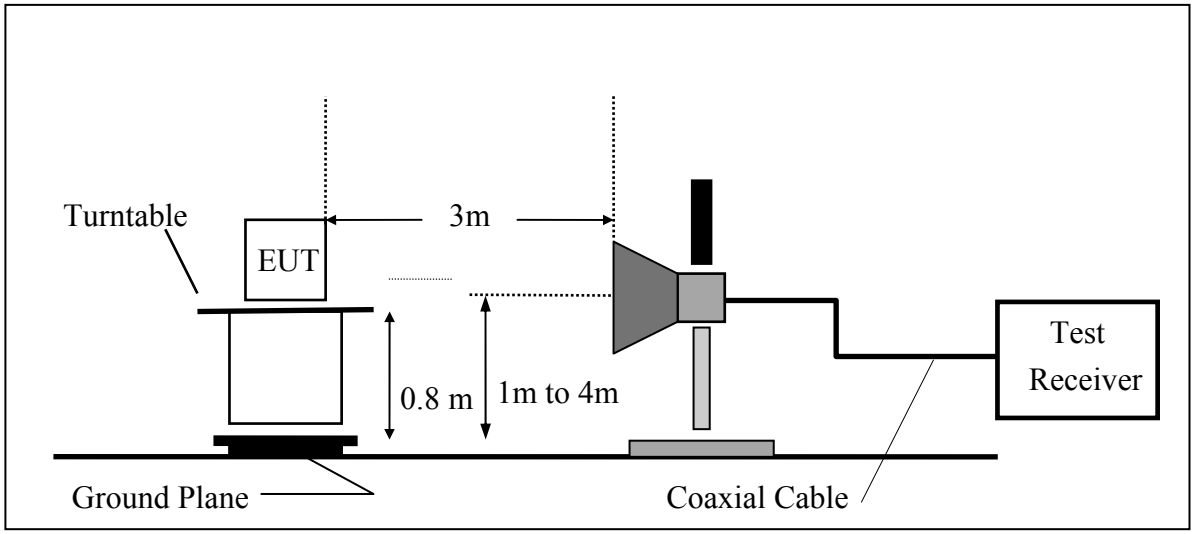
1. The EUT was placed on a turn table which is 0.8m above ground plane.
2. The turn table shall rotate 360 degrees to determine the position of maximum emission level.
3. EUT is set 3m away from the receiving antenna which varied from 1m to 4m to find out the highest emissions.
4. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
5. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
6. 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 1000MHz



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



9.5 Measurement Equipment Used:

966 Chamber					
EQUIPMENT TYPE	**MFR**	**MODEL NUMBER**	**SERIAL NUMBER**	**LAST CAL.**	**CAL DUE.**
Spectrum Analyzer	R&S	FSP 40	100034	05/27/2005	05/26/2006
Spectrum Analyzer	Agilent	E7405A	US41160416	08/27/2005	08/27/2006
Bilog Antenna	SCHWAZBECK	VULB9163	152	06/03/2005	06/02/2006
Horn antenna	Schwarzbeck	BBHA 9120D	309/320	08/16/2005	08/15/2006
Horn antenna	Schwarzbeck	BBHA 9170	184/185	07/04/2005	07/03/2006
Pre-Amplifier	HP	8447D	2944A09469	07/19/2005	07/18/2006
Pre-Amplifier	HP	8494B	3008A00578	02/26/2005	02/25/2006
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	10/09/2005	10/08/2006
Low Loss Cable	HUBER+SUHNER	SUCOFLEX 104PEA-3M	3m	10/09/2005	10/08/2006
Site NSA	SGS	966 chamber	N/A	11/17/2005	11/16/2006

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.

Radiated Spurious Emission Measurement Result (below 1GHz)

Operation Mode	TX CH Low	Test Date	Nov. 21, 2005
Fundamental Frequency	2402MHz	Test By	Danny
Temperature	25 ℃	Pol	Ver./Hor
Humidity	60 %		

Freq. (MHz)	Ant.Pol. H/V	Detector Mode (PK/QP)	Reading (dBuV)	Factor (dB)	Actual FS (dBuV/m)	Limit3m (dBuV/m)	Safe Margin (dB)
55.22	V	Peak	38.98	-14.99	23.99	40.00	-16.01
198.78	V	Peak	39.11	-16.60	22.51	43.50	-20.99
498.51	V	Peak	33.21	-9.31	23.90	46.00	-22.10
194.90	H	Peak	45.36	-16.30	29.06	43.50	-14.44
497.54	H	Peak	37.37	-9.32	28.05	46.00	-17.95
625.58	H	Peak	36.43	-7.05	29.38	46.00	-16.62

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) Datas 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	Nov. 21, 2005
Fundamental Frequency	2441MHz	Test By	Danny
Temperature	23 ℃	Pol	Ver./Hor
Humidity	54 %		

Freq. (MHz)	Ant.Pol. H/V	Detector Mode (PK/QP)	Reading (dBuV)	Factor (dB)	Actual FS (dBuV/m)	Limit3m (dBuV/m)	Safe Margin (dB)
75.59	V	Peak	41.56	-17.66	23.90	40.00	-16.10
198.78	V	Peak	39.93	-16.60	23.33	43.50	-20.17
498.51	V	Peak	35.84	-9.31	26.53	46.00	-19.47
199.75	H	Peak	43.57	-16.68	26.89	43.50	-16.61
299.66	H	Peak	42.54	-13.40	29.14	46.00	-16.86
432.55	H	Peak	38.81	-10.01	28.80	46.00	-17.20
497.54	H	Peak	41.64	-9.32	32.32	46.00	-13.68
625.58	H	Peak	42.34	-7.05	35.29	46.00	-10.71

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) Datas 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	Nov. 21, 2005
Fundamental Frequency	2480MHz	Test By	Danny
Temperature	23 ℃	Pol	Ver./Hor
Humidity	54 %		

Freq. (MHz)	Ant.Pol. H/V	Detector Mode (PK/QP)	Reading (dBuV)	Factor (dB)	Actual FS (dBuV/m)	Limit3m (dBuV/m)	Safe Margin (dB)
56.19	V	Peak	38.76	-14.95	23.81	40.00	-16.19
195.87	H	Peak	45.11	-16.37	28.74	43.50	-14.76
498.51	H	Peak	38.51	-9.31	29.20	46.00	-16.80
599.39	H	Peak	38.99	-7.64	31.35	46.00	-14.65
625.58	H	Peak	38.84	-7.05	31.79	46.00	-14.21

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) Datas 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.

(5) X Mode means the EUT in stand-up position; Y Mode means the EUT in lie-on position

Radiated Spurious Emission Measurement Result (above 1GHz)

Operation Mode	TX CH Low	Test Date	Nov. 21, 2005
Fundamental Frequency	2402 MHz	Test By	Danny
Temperature	23 ℃	Pol	Ver.
Humidity	54 %		

Freq. (MHz)	Peak Reading (dBuV)	AV Reading (dBuV)	Ant./CL CF(dB)	Actual FS Peak (dBuV/m)	Actual FS AV (dBuV/m)	Peak Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)
1591.5	43.98	--	-6.81	37.17	--	74.00	54.00	-16.83
4809.0	42.49	--	-3.40	39.09	--	74.00	54.00	-14.91
4804.0	----							
7206.0	----							
9608.0	----							
12010.0	----							
14412.0	----							
16814.0	----							
19216.0	----							
21618.0	----							
24020.0	----							

Remark：

(1) Measuring frequencies scanned from 1GHz to the 10th harmonic of highest fundamental frequency。

(2) Datas 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	Nov. 21, 2005
Fundamental Frequency	2402 MHz	Test By	Danny
Temperature	23 ℃	Pol	Hor
Humidity	54 %		

Freq. (MHz)	Peak Reading (dBuV)	AV Reading (dBuV)	Ant./CL CF(dB)	Actual FS Peak (dBuV/m)	Actual FS AV (dBuV/m)	Peak Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)
4809.0	46.19	--	2.99	49.18	--	74.00	54.00	-4.82
4804.0	----							
7206.0	----							
9608.0	----							
12010.0	----							
14412.0	----							
16814.0	----							
19216.0	----							
21618.0	----							
24020.0	----							

Remark：

(1) Measuring frequencies scanned from 1GHz to the 10th harmonic of highest fundamental frequency。

(2) Datas 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	Nov. 21, 2005
Fundamental Frequency	2441 MHz	Test By	Danny
Temperature	23 ℃	Pol	Ver
Humidity	54 %		

Freq. (MHz)	Peak Reading (dBuV)	AV Reading (dBuV)	Ant./CL CF(dB)	Actual FS Peak (dBuV/m)	Actual FS AV (dBuV/m)	Peak Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)
1643.5	42.75	--	-6.60	36.15	--	74.00	54.00	-17.85
4965.0	43.00	--	3.40	46.40	--	74.00	54.00	-7.60
4882.0	----							
7323.0	----							
9764.0	----							
12205.0	----							
14646.0	----							
17087.0	----							
19528.0	----							
21969.0	----							
24410.0	----							

Remark：

(1) Measuring frequencies scanned from 1GHz to the 10th harmonic of highest fundamental frequency。

(2) Datas 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	Nov. 21, 2005
Fundamental Frequency	2441 MHz	Test By	Danny
Temperature	23 ℃	Pol	Hor
Humidity	54 %		

Freq. (MHz)	Peak Reading (dBuV)	AV Reading (dBuV)	Ant./CL CF(dB)	Actual FS Peak (dBuV/m)	Actual FS AV (dBuV/m)	Peak Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)
1617.5	42.15	--	-6.72	35.43	--	74.00	54.00	-18.57
4887.0	42.33	--	3.21	45.54	--	74.00	54.00	-8.46
4882.0	----							
7323.0	----							
9764.0	----							
12205.0	----							
14646.0	----							
17087.0	----							
19528.0	----							
21969.0	----							
24410.0	----							

Remark：

(1) Measuring frequencies scanned from 1GHz to the 10th harmonic of highest fundamental frequency。

(2) Datas 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	Nov. 21, 2005
Fundamental Frequency	2480 MHz	Test By	Danny
Temperature	23 ℃	Pol	Ver
Humidity	54 %		

Freq. (MHz)	Peak Reading (dBuV)	AV Reading (dBuV)	Ant./CL CF(dB)	Actual FS Peak (dBuV/m)	Actual FS AV (dBuV/m)	Peak Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)
1643.5	42.75	--	-6.60	36.15	--	74.00	54.00	-17.85
4965.0	43.00	--	3.40	46.40	--	74.00	54.00	-7.60
4960.0	----							
7440.0	----							
9920.0	----							
12400.0	----							
14880.0	----							
17360.0	----							
19840.0	----							
22320.0	----							
24800.0	----							

Remark：

(1) Measuring frequencies scanned from 1GHz to the 10th harmonic of highest fundamental frequency。

(2) Datas 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	Nov. 21, 2005
Fundamental Frequency	2480 MHz	Test By	Danny
Temperature	23 ℃	Pol	Hor.
Humidity	54 %		

Freq. (MHz)	Peak Reading (dBuV)	AV Reading (dBuV)	Ant./CL CF(dB)	Actual FS Peak (dBuV/m)	Actual FS AV (dBuV/m)	Peak Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)
1643.5	42.92	--	-6.60	36.32	--	74.00	54.00	-17.68
4965.0	41.43	--	-3.04	38.39	--	74.00	54.00	-15.61
4960.0	----							
7440.0	----							
9920.0	----							
12400.0	----							
14880.0	----							
17360.0	----							
19840.0	----							
22320.0	----							
24800.0	----							

Remark：

(1) Measuring frequencies scanned from 1GHz to the 10th harmonic of highest fundamental frequency。

(2) Datas 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	Nov. 21, 2005
Fundamental Frequency	2402MHz	Test By	Danny
Temperature	23 ℃	Pol	Ver./Hor
Humidity	54 %		

Freq. (MHz)	Ant.Pol. H/V	Detector Mode (PK/QP)	Reading (dBuV)	Factor (dB)	Actual FS (dBuV/m)	Limit3m (dBuV/m)	Safe Margin (dB)
202.66	V	Peak	41.03	-16.60	24.43	43.50	-19.07
299.66	V	Peak	42.69	-13.40	29.29	46.00	-16.71
498.51	V	Peak	34.72	-9.31	25.41	46.00	-20.59
207.51	H	Peak	44.98	-16.47	28.51	43.50	-14.99
299.66	H	Peak	42.39	-13.40	28.99	46.00	-17.01
432.55	H	Peak	40.51	-10.01	30.50	46.00	-15.50
498.51	H	Peak	39.70	-9.31	30.39	46.00	-15.61
598.42	H	Peak	39.83	-7.65	32.18	46.00	-13.82
625.58	H	Peak	40.29	-7.05	33.24	46.00	-12.76

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) Datas 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	Nov. 21, 2005
Fundamental Frequency	2441MHz	Test By	Danny
Temperature	23 ℃	Pol	Ver./Hor
Humidity	54 %		

Freq. (MHz)	Ant.Pol. H/V	Detector Mode (PK/QP)	Reading (dBuV)	Factor (dB)	Actual FS (dBuV/m)	Limit3m (dBuV/m)	Safe Margin (dB)
199.75	V	Peak	40.42	-16.68	23.74	43.50	-19.76
299.66	V	Peak	38.78	-13.40	25.38	46.00	-20.62
188.11	H	Peak	43.65	-15.79	27.86	43.50	-15.64
299.66	H	Peak	40.32	-13.40	26.92	46.00	-19.08
432.55	H	Peak	38.42	-10.01	28.41	46.00	-17.59
498.51	H	Peak	40.10	-9.31	30.79	46.00	-15.21
598.42	H	Peak	40.88	-7.65	33.23	46.00	-12.77
625.58	H	Peak	41.31	-7.05	34.26	46.00	-11.74

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) Datas 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	Nov. 21, 2005
Fundamental Frequency	2480MHz	Test By	Danny
Temperature	23 ℃	Pol	Ver./Hor
Humidity	54 %		

Freq. (MHz)	Ant.Pol. H/V	Detector Mode (PK/QP)	Reading (dBuV)	Factor (dB)	Actual FS (dBuV/m)	Limit3m (dBuV/m)	Safe Margin (dB)
199.75	V	Peak	37.91	-16.68	21.23	43.50	-22.27
323.91	V	Peak	36.77	-12.69	24.08	46.00	-21.92
199.75	H	Peak	43.01	-16.68	26.33	43.50	-17.17
299.66	H	Peak	42.21	-13.40	28.81	46.00	-17.19
432.55	H	Peak	39.52	-10.01	29.51	46.00	-16.49
498.51	H	Peak	39.66	-9.31	30.35	46.00	-15.65
599.39	H	Peak	39.80	-7.64	32.16	46.00	-13.84
625.58	H	Peak	39.48	-7.05	32.43	46.00	-13.57

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) Datas 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	Nov. 21, 2005
Fundamental Frequency	2402 MHz	Test By	Danny
Temperature	23 ℃	Pol	Ver.
Humidity	54 %		

Freq. (MHz)	Peak Reading (dBuV)	AV Reading (dBuV)	Ant./CL CF(dB)	Actual FS Peak (dBuV/m)	Actual FS AV (dBuV/m)	Peak Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)
1591.5	43.28	---	-6.81	36.47	---	74.00	54.00	-17.53
4804.0	----							
7206.0	----							
9608.0	----							
12010.0	----							
14412.0	----							
16814.0	----							
19216.0	----							
21618.0	----							
24020.0	----							

Remark：

(1) Measuring frequencies from 1GHz to the 10th harmonic of highest fundamental frequency。

(2) Datas 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= 3MHz, VBW= 1MHz, 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	RX CH Low	Test Date	Nov. 21, 2005
Fundamental Frequency	2402 MHz	Test By	Danny
Temperature	23 ℃	Pol	Hor
Humidity	54 %		

Freq. (MHz)	Peak Reading (dBuV)	AV Reading (dBuV)	Ant./CL CF(dB)	Actual FS Peak (dBuV/m)	Actual FS AV (dBuV/m)	Peak Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)
1591.5	41.58	---	-6.81	34.77	---	74.00	54.00	-19.23
4804.0	----							
7206.0	----							
9608.0	----							
12010.0	----							
14412.0	----							
16814.0	----							
19216.0	----							
21618.0	----							
24020.0	----							

Remark：

(1) Measuring frequencies from 1GHz to the 10th harmonic of highest fundamental frequency。

(2) Datas 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= 3MHz, VBW= 1MHz, 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	RX CH Mid	Test Date	Nov. 21, 2005
Fundamental Frequency	2441 MHz	Test By	Danny
Temperature	23 ℃	Pol	Ver
Humidity	54 %		

Freq. (MHz)	Peak Reading (dBuV)	AV Reading (dBuV)	Ant./CL CF(dB)	Actual FS Peak (dBuV/m)	Actual FS AV (dBuV/m)	Peak Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)
1617.5	43.58	---	-6.72	36.86	---	74.00	54.00	-17.14
2443.0	----							
4882.0	----							
7323.0	----							
9764.0	----							
12205.0	----							
14646.0	----							
17087.0	----							
19528.0	----							
21969.0	----							
24410.0	----							

Remark：

(1) Measuring frequencies from 1GHz to the 10th harmonic of highest fundamental frequency。

(2) Datas 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= 3MHz, VBW= 1MHz, 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	RX CH Mid	Test Date	Nov. 21, 2005
Fundamental Frequency	2441 MHz	Test By	Danny
Temperature	23 ℃	Pol	Hor
Humidity	54 %		

Freq. (MHz)	Peak Reading (dBuV)	AV Reading (dBuV)	Ant./CL CF(dB)	Actual FS Peak (dBuV/m)	Actual FS AV (dBuV/m)	Peak Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)
1617.5	40.66	---	-6.72	33.94	---	74.00	54.00	-20.06
2443.0	----							
4882.0	----							
7323.0	----							
9764.0	----							
12205.0	----							
14646.0	----							
17087.0	----							
19528.0	----							
21969.0	----							
24410.0	----							

Remark：

(1) Measuring frequencies from 1GHz to the 10th harmonic of highest fundamental frequency。

(2) Datas 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= 3MHz, VBW= 1MHz, 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	RX CH High	Test Date	Nov. 21, 2005
Fundamental Frequency	2480 MHz	Test By	Danny
Temperature	23 ℃	Pol	Ver
Humidity	54 %		

Freq. (MHz)	Peak Reading (dBuV)	AV Reading (dBuV)	Ant./CL CF(dB)	Actual FS Peak (dBuV/m)	Actual FS AV (dBuV/m)	Peak Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)
1643.5	42.45	---	-6.60	35.85	---	74.00	54.00	-18.15
2475.5	----							
4960.0	----							
7440.0	----							
9920.0	----							
12400.0	----							
14880.0	----							
17360.0	----							
19840.0	----							
22320.0	----							
24800.0	----							

Remark：

(1) Measuring frequencies from 1GHz to the 10th harmonic of highest fundamental frequency。

(2) Datas 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= 3MHz, VBW= 1MHz, 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	RX CH High	Test Date	Nov. 21, 2005
Fundamental Frequency	2480 MHz	Test By	Danny
Temperature	23 ℃	Pol	Hor
Humidity	54 %		

Freq. (MHz)	Peak Reading (dBuV)	AV Reading (dBuV)	Ant./CL CF(dB)	Actual FS Peak (dBuV/m)	Actual FS AV (dBuV/m)	Peak Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)
1487.5	39.84	---	-7.25	32.59	---	74.00	54.00	-21.41
2475.5	----							
4960.0	----							
7440.0	----							
9920.0	----							
12400.0	----							
14880.0	----							
17360.0	----							
19840.0	----							
22320.0	----							
24800.0	----							

Remark：

(1) Measuring frequencies from 1GHz to the 10th harmonic of highest fundamental frequency。

(2) Datas 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= 3MHz, VBW= 1MHz, Sweep time= 200 ms.

(5) Spectrum AV Setting : 1GHz- 26GHz, RBW= 1MHz, VBW= 10Hz, Sweep time= 200 ms.

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 20dB bandwidth of the hopping channel, whichever is greater.

According to issue 6 A8.1(2) of RSS 210,and issue 5 §6.2.2(o)(a3), frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater. Alternatively, 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.

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

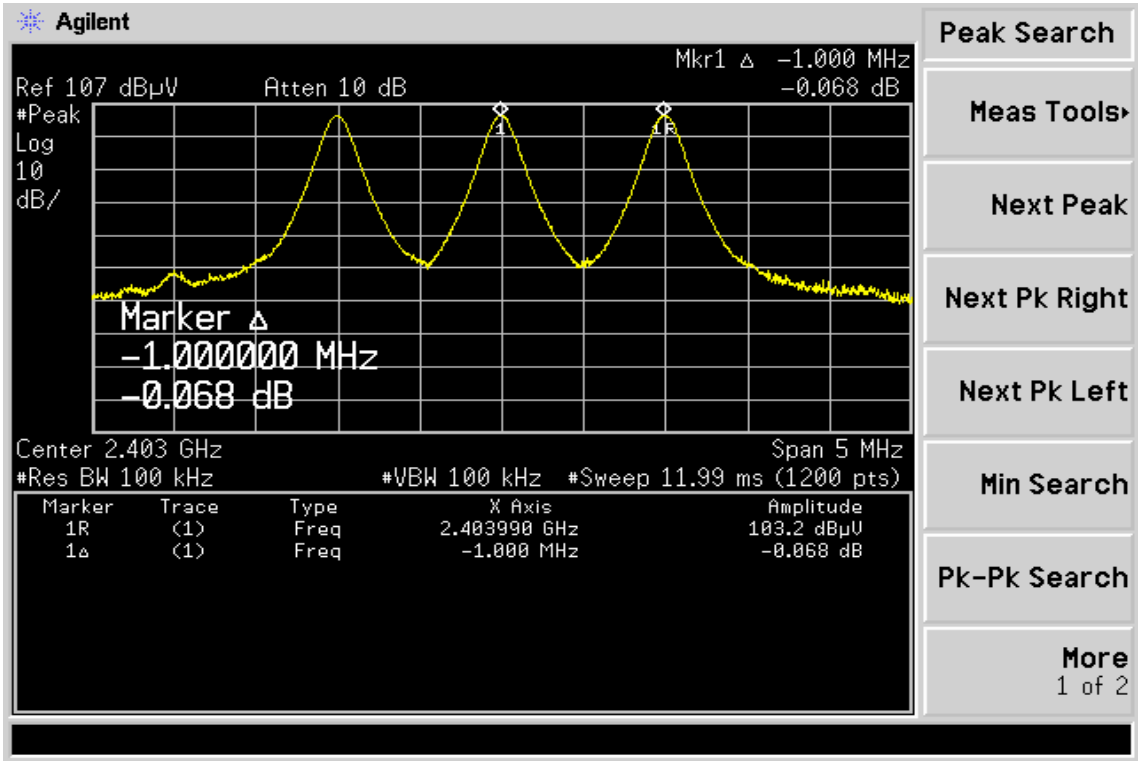
10.3 Measurement Result

Channel separation (MHz)	Limit	Result
1	2/3 times 20dB bandwidth	PASS

10.4 Measurement Equipment Used:

EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
Spectrum Analyzer	R&S	FSP 40	100034	05/27/2005	05/26/2006
Spectrum Analyzer	Agilent	E7405A	US41160416	08/27/2005	08/27/2006
Low Loss Cable	HUBER+SUHNER	SUCOFLEX 104PEA	N/A	N/A	N/A
Attenuator	Mini-Circult	BW-S6W5	N/A	10/07/2005	10/06/2006

Frequency Separation Test Data



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.

According to §6.2.2(o)(a3), Frequency hopping systems in the 2400-2483.5 MHz band may utilize hopping channels whose 20 dB bandwidth is greater than 1 MHz provided the systems use at least 15 non-overlapping.

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

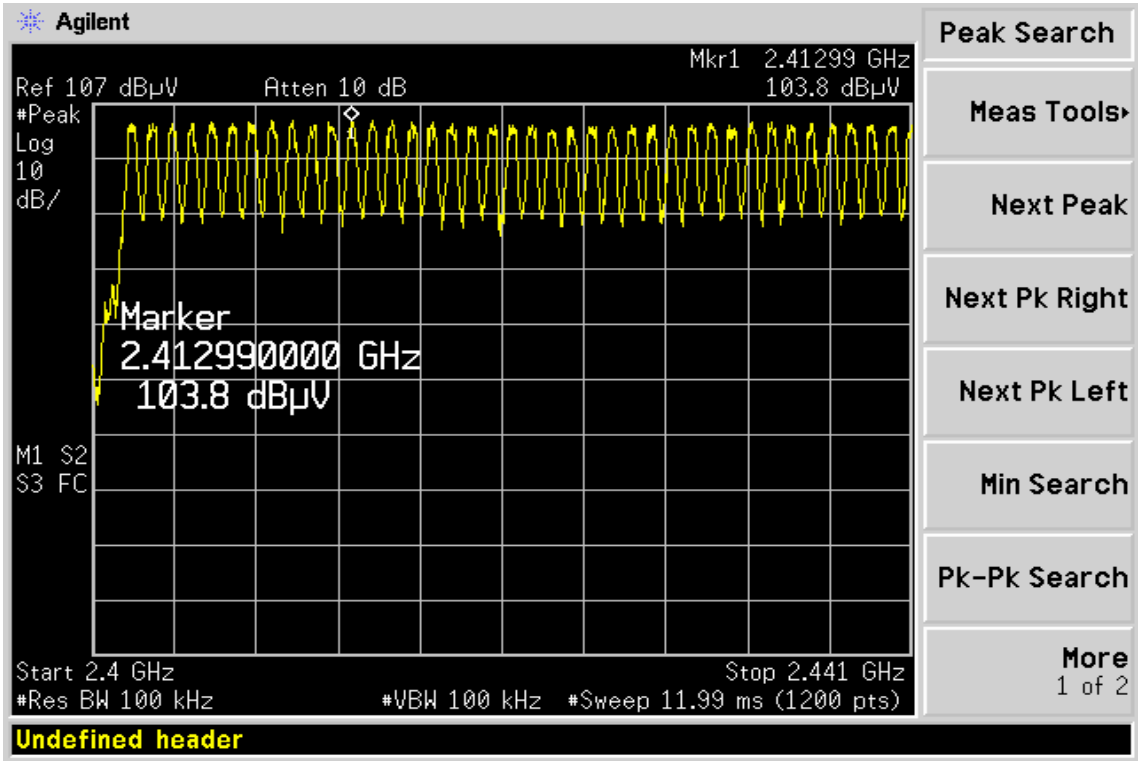
Refer to next page for the plots.

11.4 Measurement Equipment Used:

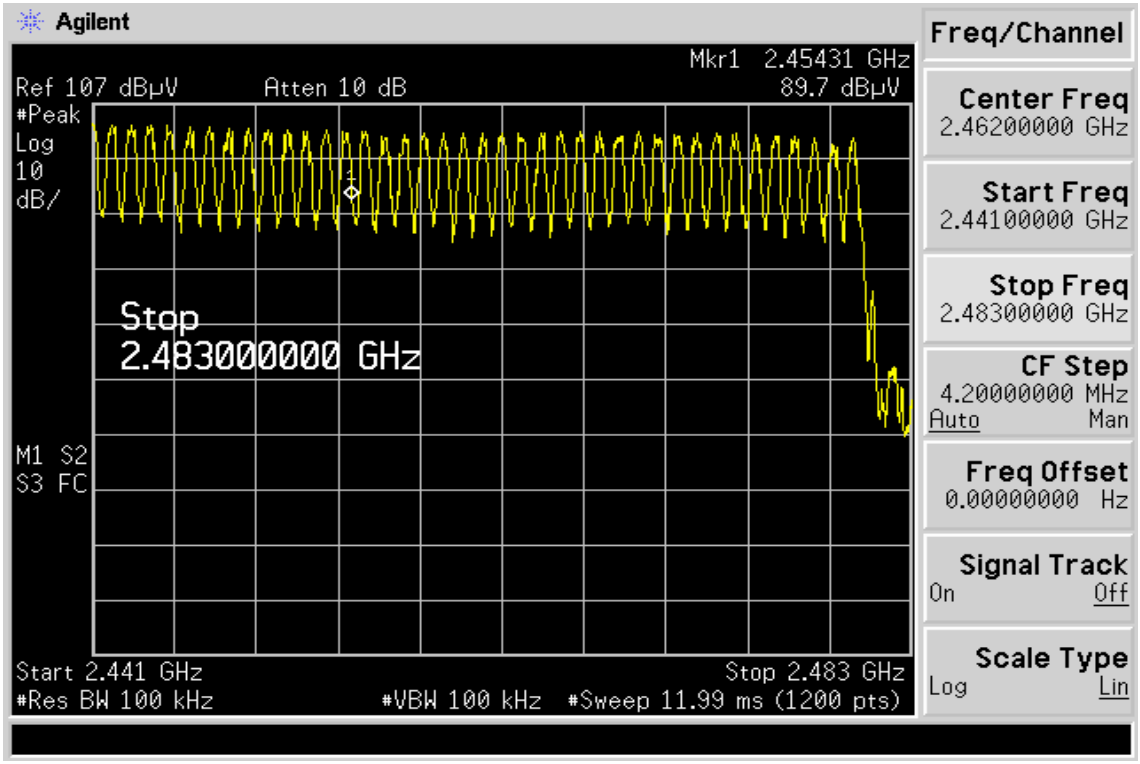
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
Spectrum Analyzer	R&S	FSP 40	100034	05/27/2005	05/26/2006
Spectrum Analyzer	Agilent	E7405A	US41160416	08/27/2005	08/27/2006
Low Loss Cable	HUBER+SUHNER	SUCOFLEX 104PEA	N/A	N/A	N/A
Attenuator	Mini-Circult	BW-S6W5	N/A	10/07/2005	10/06/2006

Channel Number

2.4 GHz – 2.441GHz



2.441 GHz – 2.4835GHz



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.

According to §6.2.2(o)(a3), The time of occupancy on any one channel shall be no greater than 0.4 seconds within the time period required to hop through all channels and each of the hopping channels must be used equally on the average.

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/(2*79)) * 31.6 = 129.6 (ms)
DH3 time slot = 1.675 (ms) * (1600/(4*79)) * 31.6 = 268 (ms)
DH5 time slot = 2.295 (ms) * (1600/(6*79)) * 31.6 = 312 (ms)

CH Mid: DH1 time slot = 0.405 (ms) * (1600/(2*79)) * 31.6 = 129.6 (ms)
DH3 time slot = 1.675 (ms) * (1600/(4*79)) * 31.6 = 268 (ms)
DH5 time slot = 2.906 (ms) * (1600/(6*79)) * 31.6 = 309.97 (ms)

CH High: DH1 time slot = 0.416 (ms) * (1600/(2*79)) * 31.6 = 129.6 (ms)
DH3 time slot = 1.662 (ms) * (1600/(4*79)) * 31.6 = 265.92 (ms)
DH5 time slot = 2.906 (ms) * (1600/(6*79)) * 31.6 = 309.97 (ms)

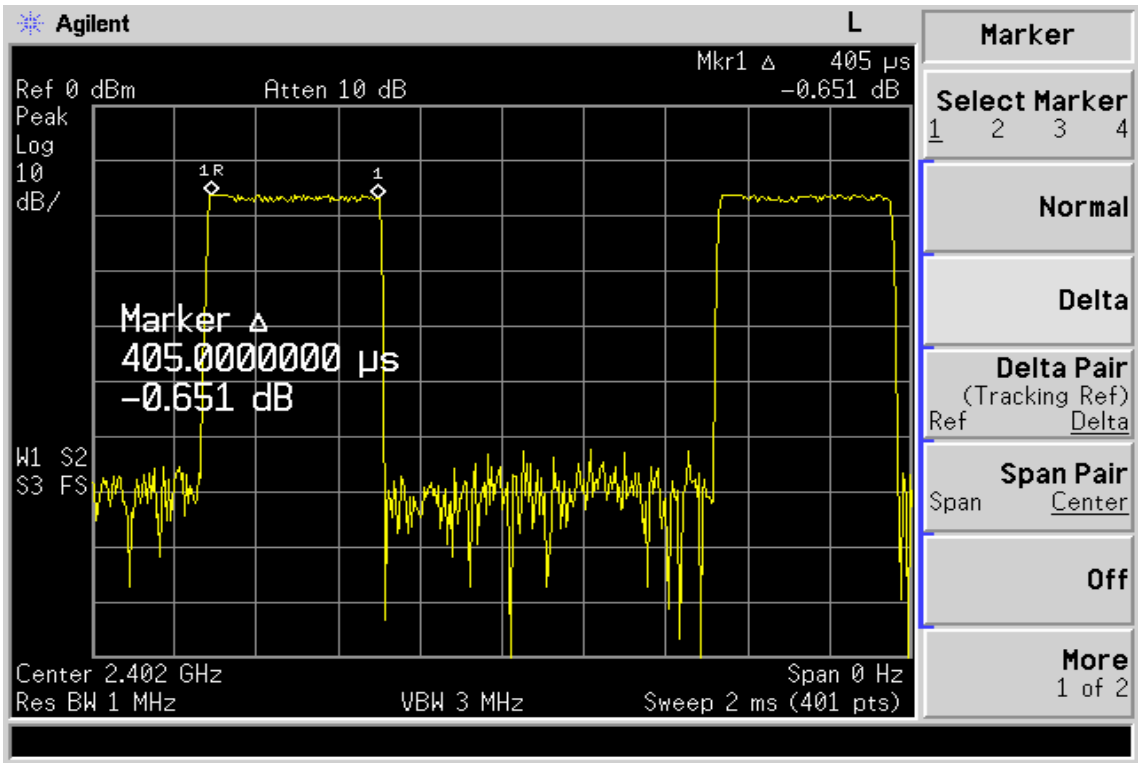
12.4. Measurement Equipment Used:

EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
Spectrum Analyzer	R&S	FSP 40	100034	05/27/2005	05/26/2006
Spectrum Analyzer	Agilent	E7405A	US41160416	08/27/2005	08/26/2006
Low Loss Cable	HUBER+SUHNER	SUCOFLEX 104PEA	N/A	N/A	N/A
Attenuator	Mini-Circult	BW-S6W5	N/A	10/07/2005	10/06/2006

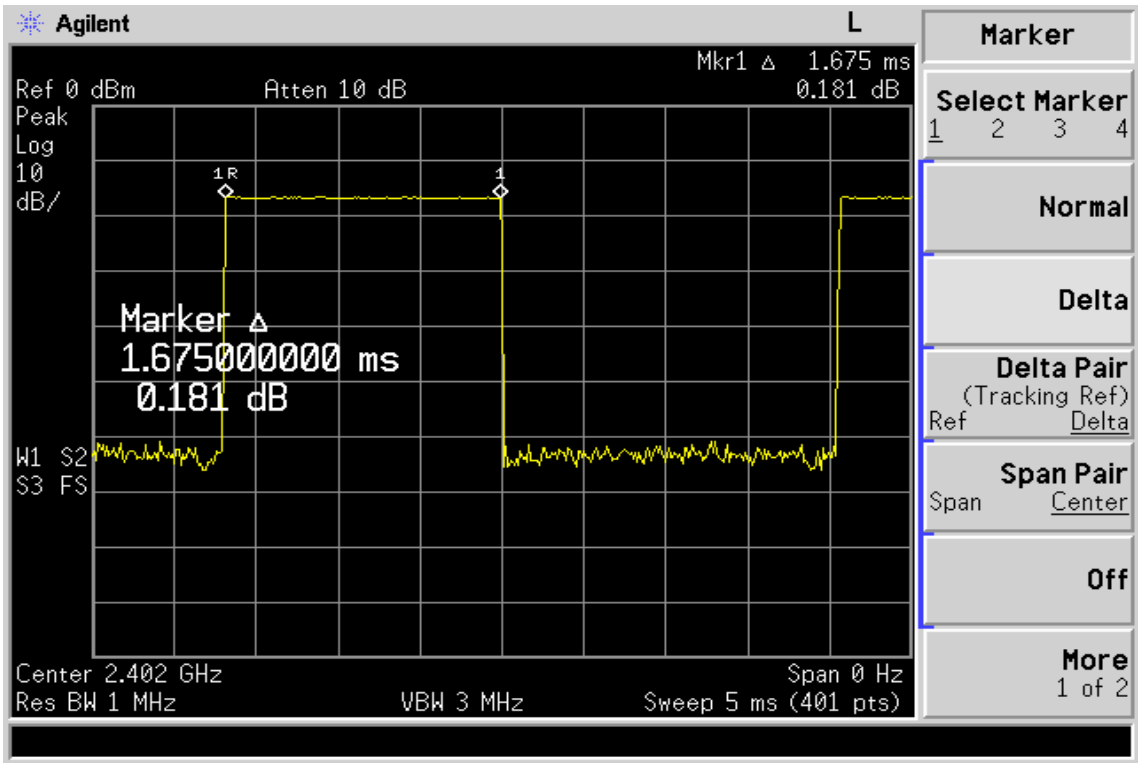
Dwell Time Test Data

CH-Low

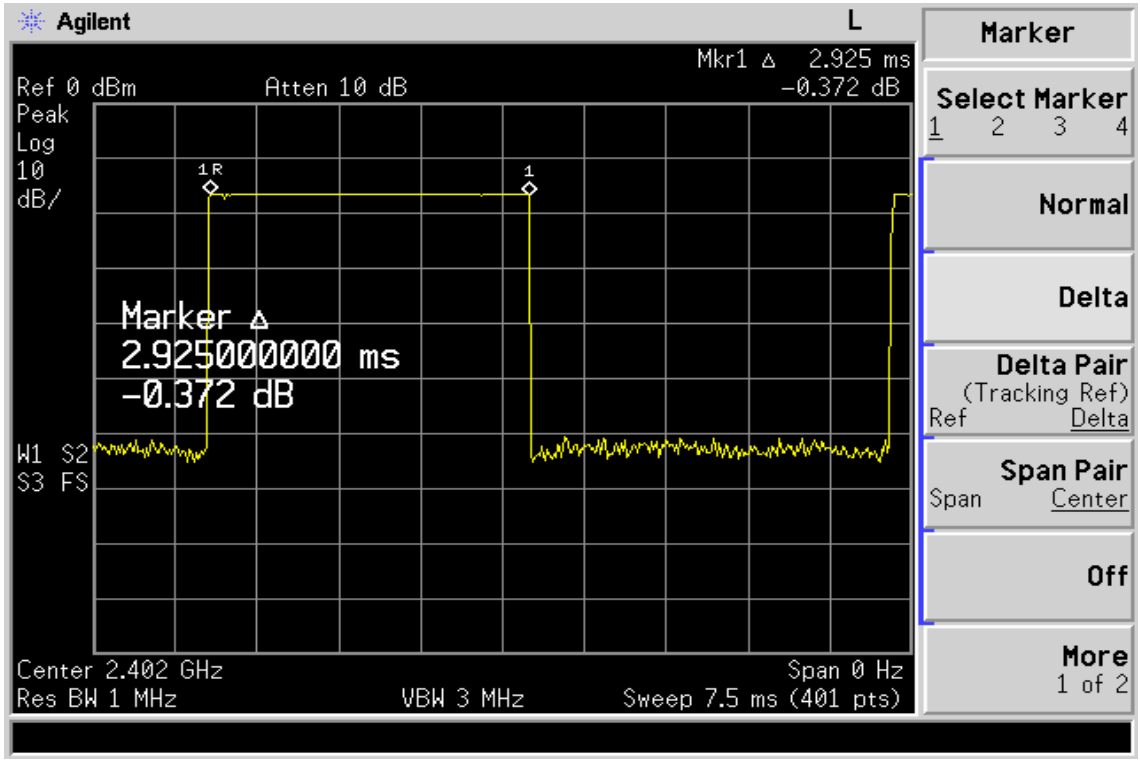
DH1



DH3

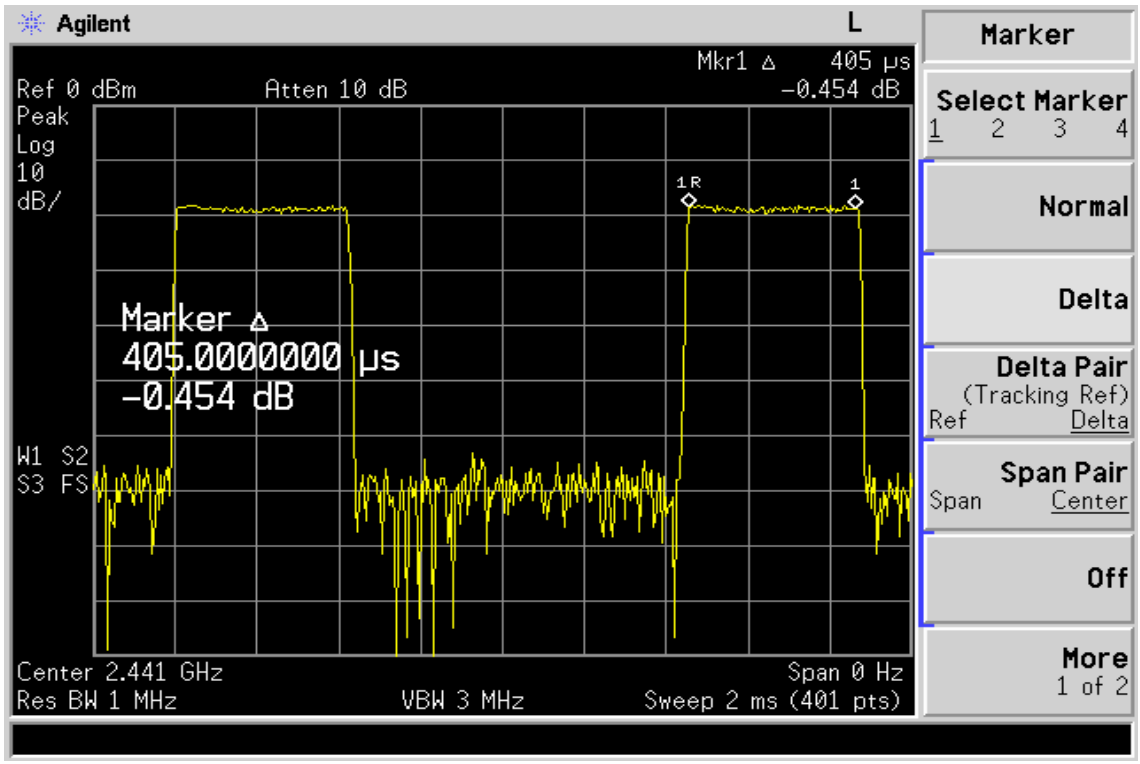


DH5

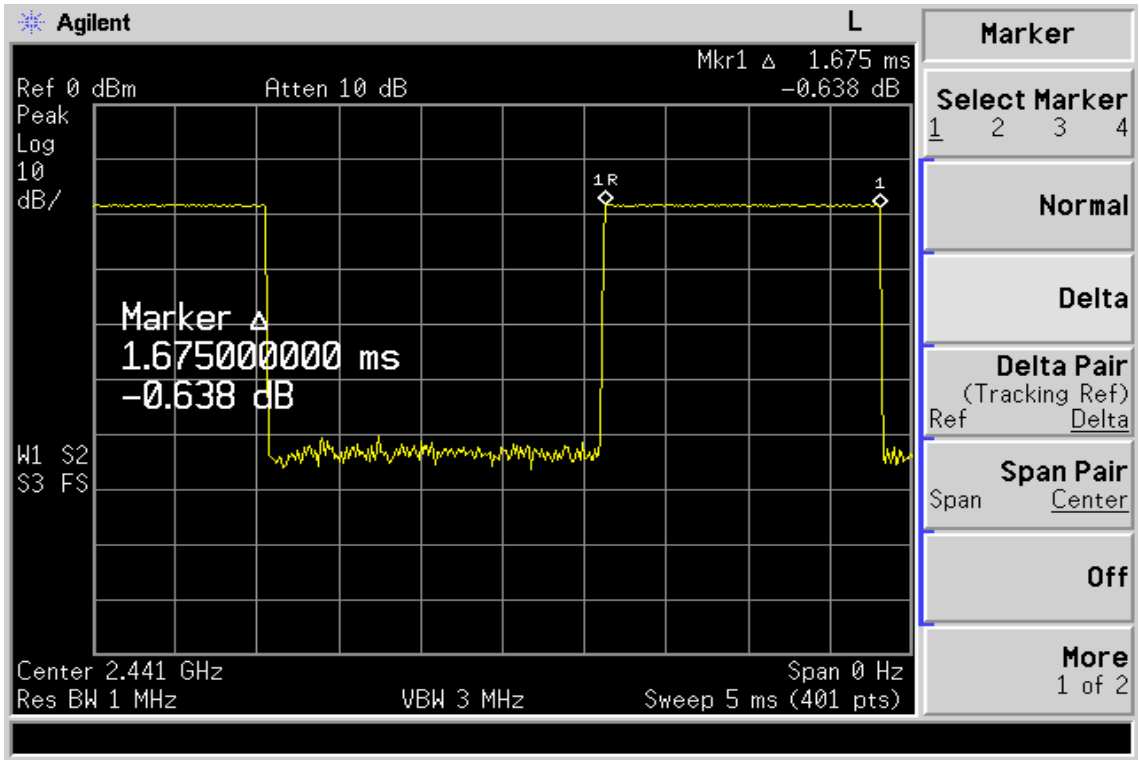


CH-Mid

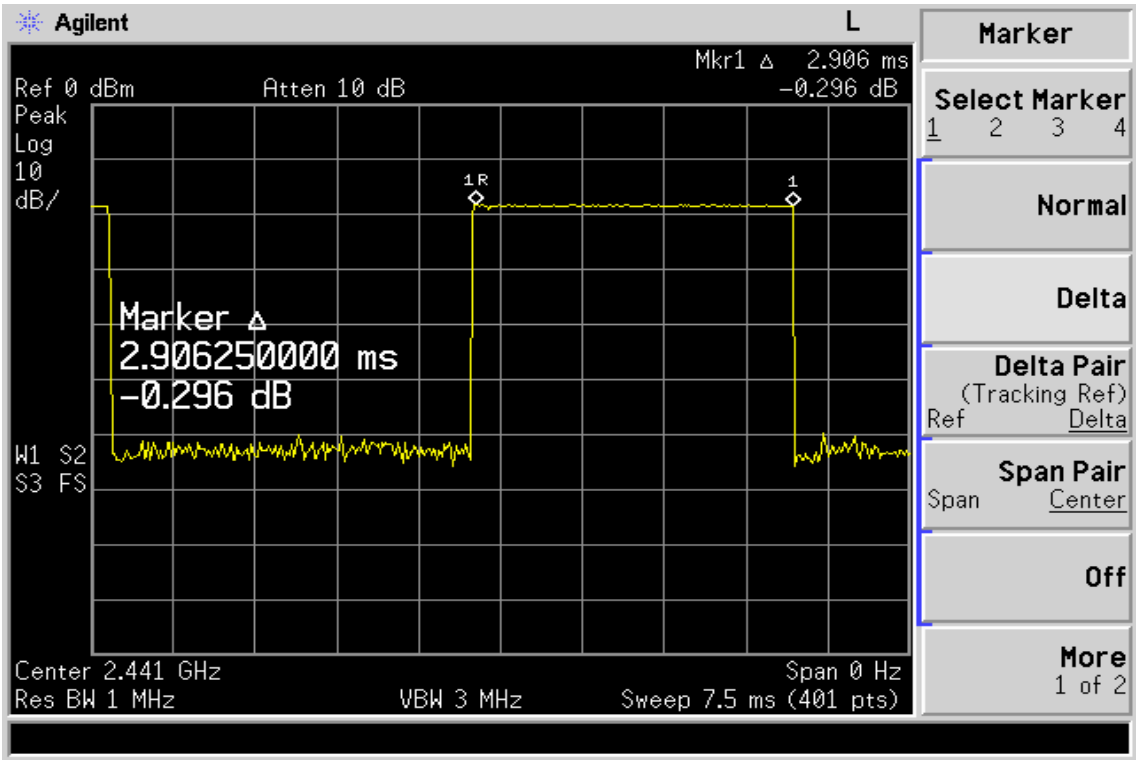
DH1



DH3

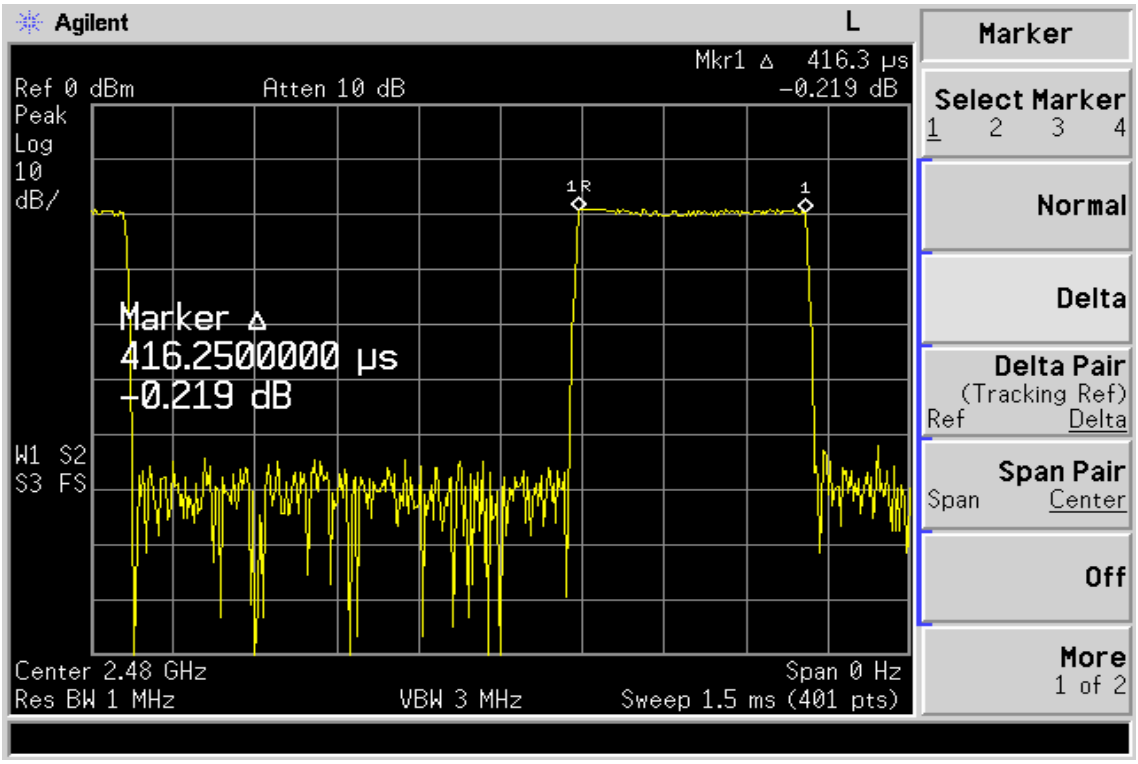


DH5

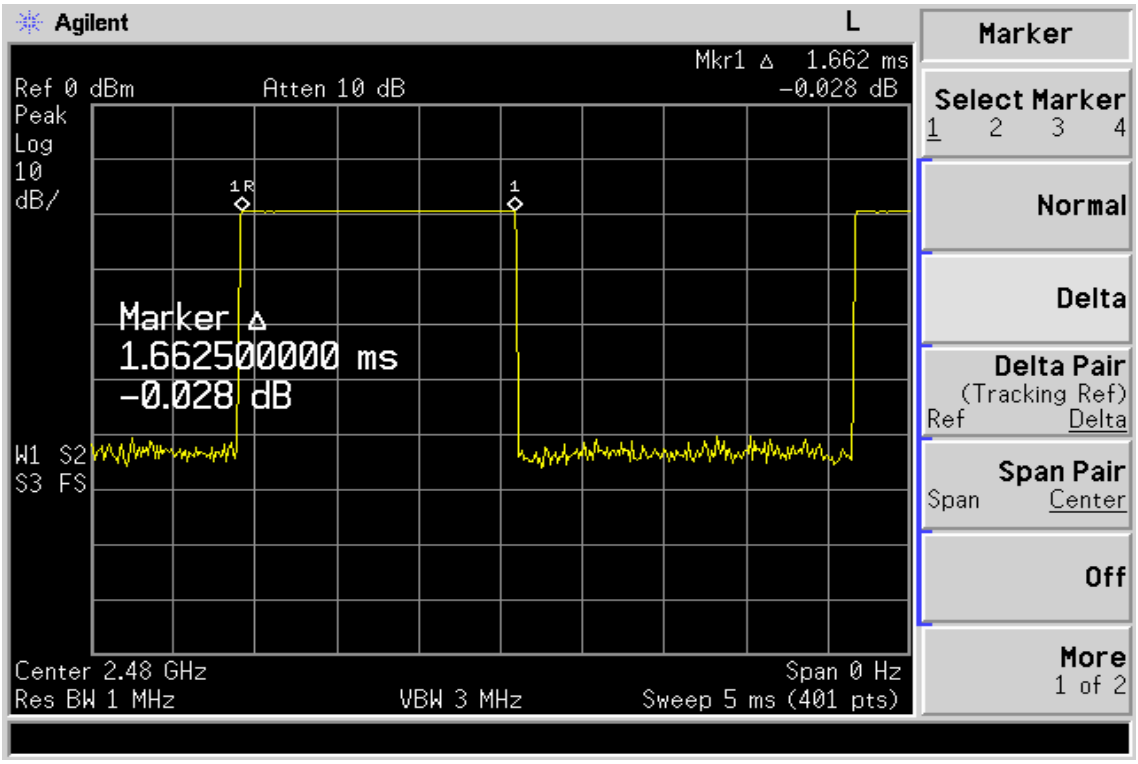


CH-High

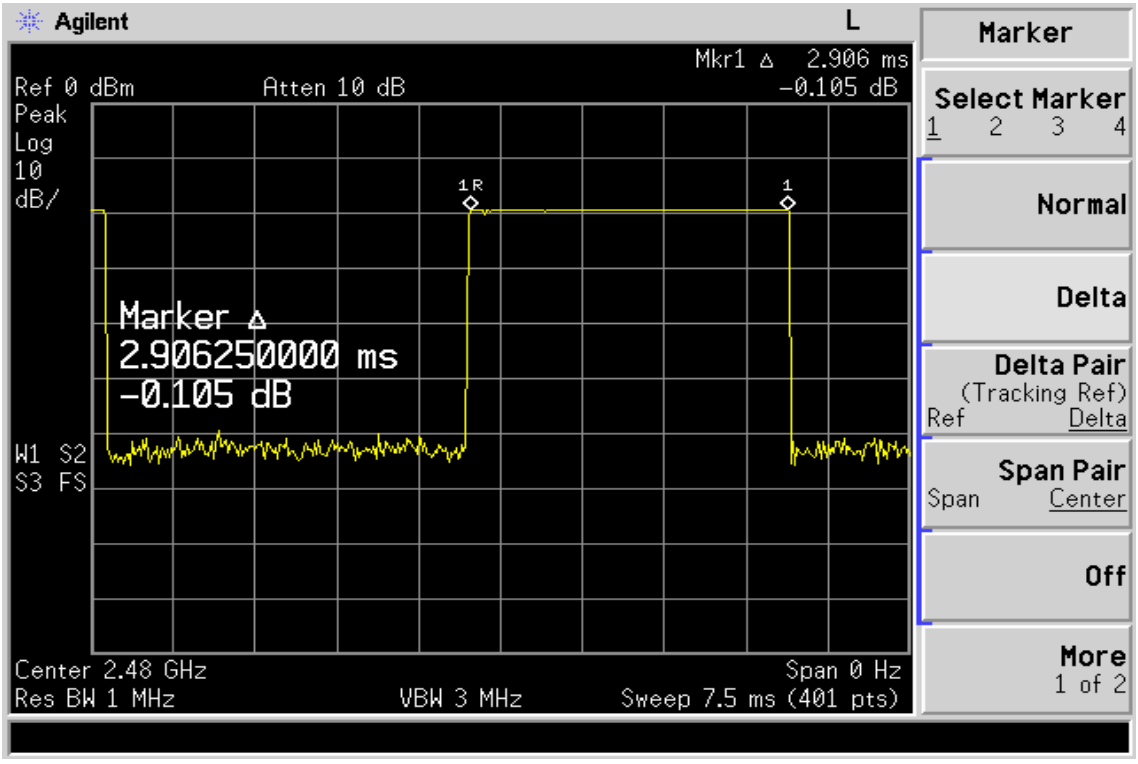
DH1



DH3



DH5



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 = 3KHz, Span = 300KHz, Sweep=100s
4. Record the max. reading.
5. Repeat above procedures until all frequency measured were complete.

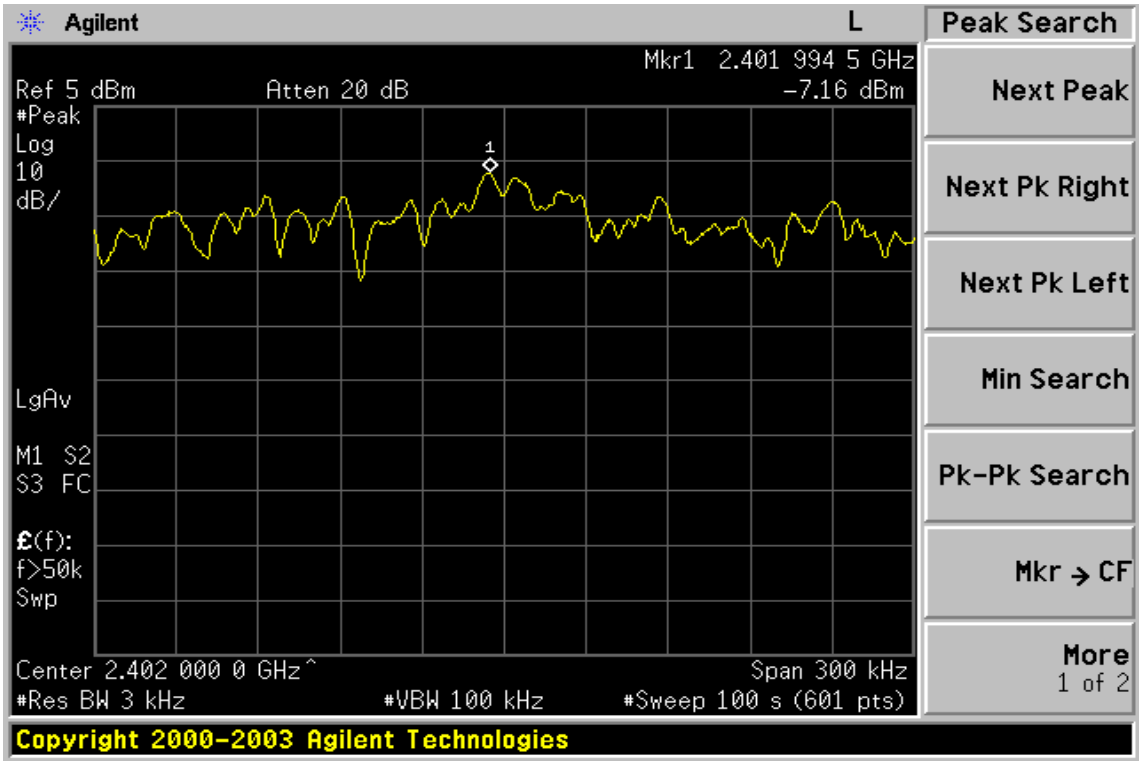
13.3. Measurement Result

CH	RF Power Density Reading (dBm)	Cable loss (dB)	RF Power Density Level (dBm)	Maximum Limit (dBm)
Low	-7.16	0.10	-7.06	8
Mid	-6.87	0.10	-6.77	8
High	-6.95	0.10	-6.85	8

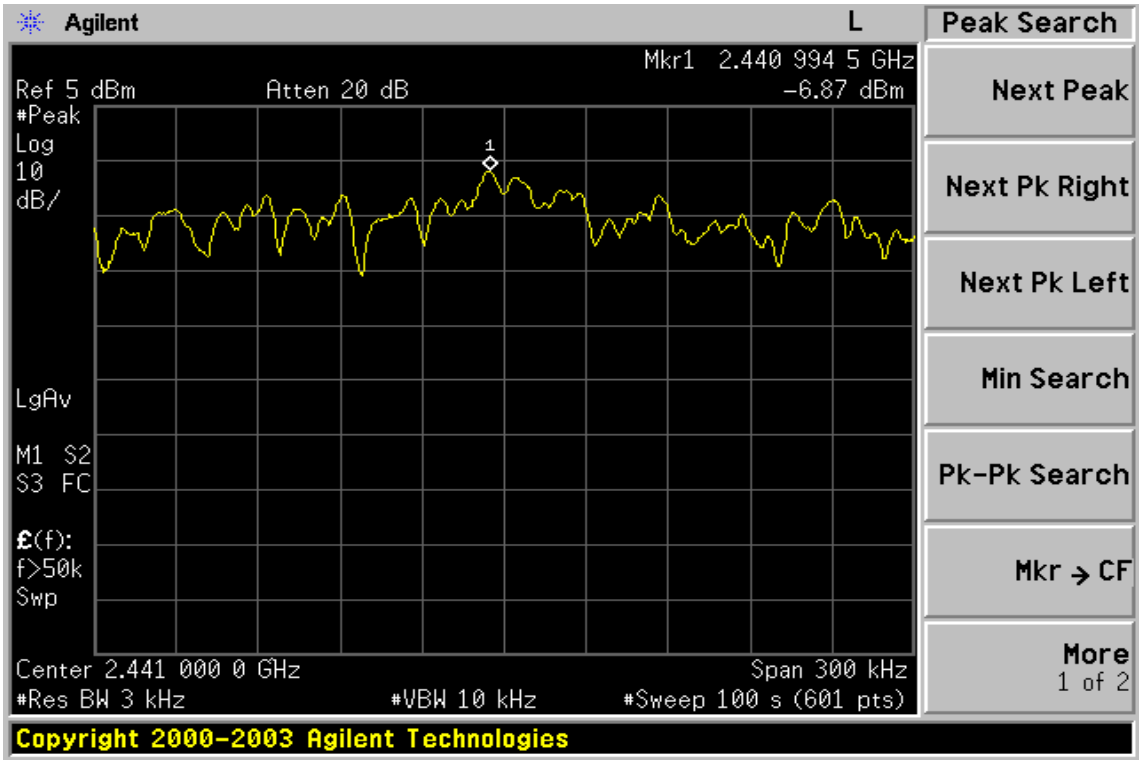
13.4. Measurement Equipment Used:

EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
Spectrum Analyzer	R&S	FSP 40	100034	05/27/2005	05/26/2006
Spectrum Analyzer	Agilent	E7405A	US41160416	08/27/2005	08/27/2006
Low Loss Cable	HUBER+SUHNER	SUCOFLEX 104PEA	N/A	N/A	N/A
Attenuator	Mini-Circult	BW-S6W5	N/A	10/07/2005	10/06/2006

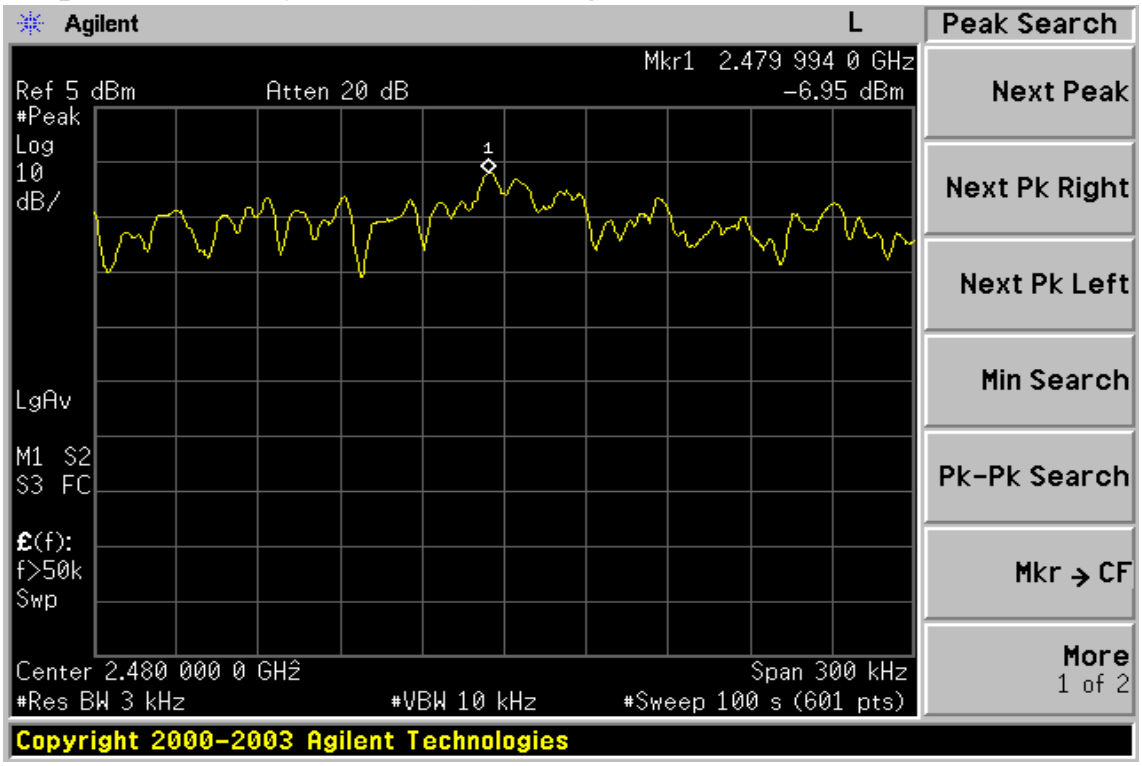
Power Spectral Density Test Plot (CH-Low)



Power Spectral Density Test Plot (CH-Mid)



Power Spectral Density Test Plot (CH-High)



14. 99% Bandwidth Measurement

14.1. Standard Applicable

RSS 210, section 5.9.1, An alternative to the 20 dB bandwidth is the 99% emission bandwidth. This bandwidth is determined such that below the lower and above the upper frequency limits, the mean powers emitted are each equal to 0.5% of the total mean power of the emission.

14.2. Measurement Equipment Used:

EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
Spectrum Analyzer	R&S	FSP 40	100034	05/27/2005	05/26/2006
Spectrum Analyzer	Agilent	E7405A	US41160416	08/27/2005	08/27/2006
Low Loss Cable	HUBER+SUHNER	SUCOFLEX 104PEA	N/A	N/A	N/A
Attenuator	Mini-Circult	BW-S6W5	N/A	10/07/2005	10/06/2006

14.3. Test Set-up:

Refer to section 2.4.

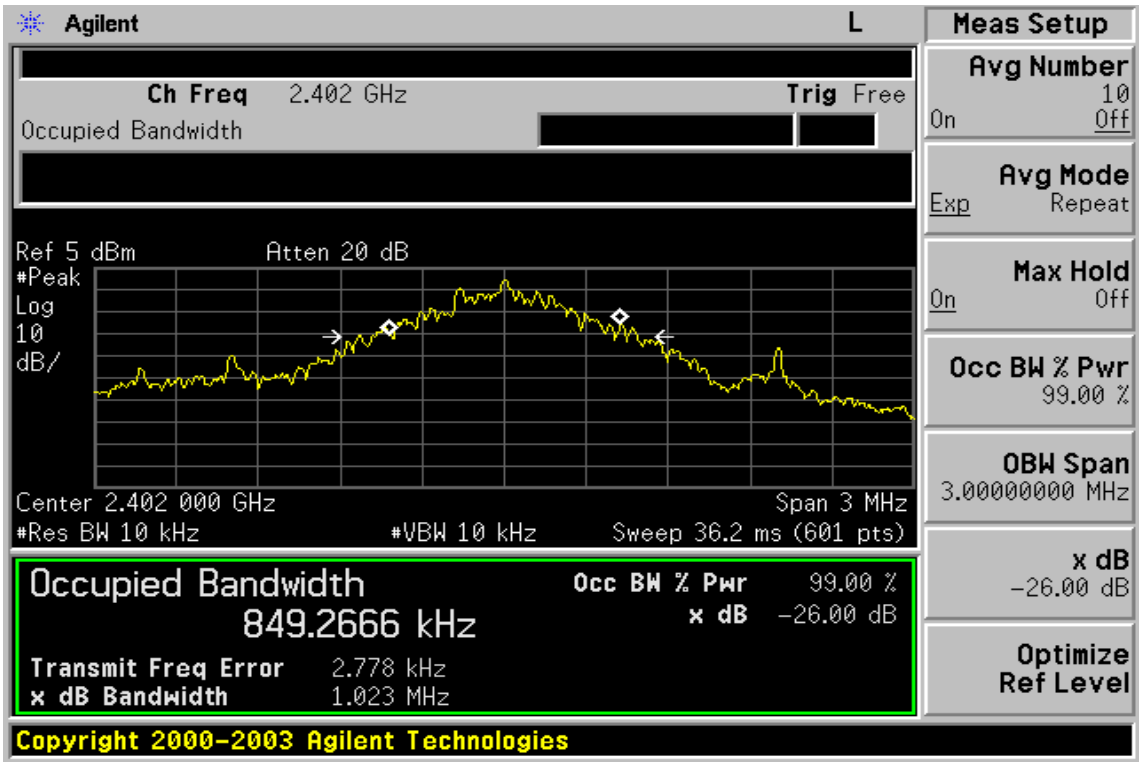
14.4. Measurement Procedure

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.

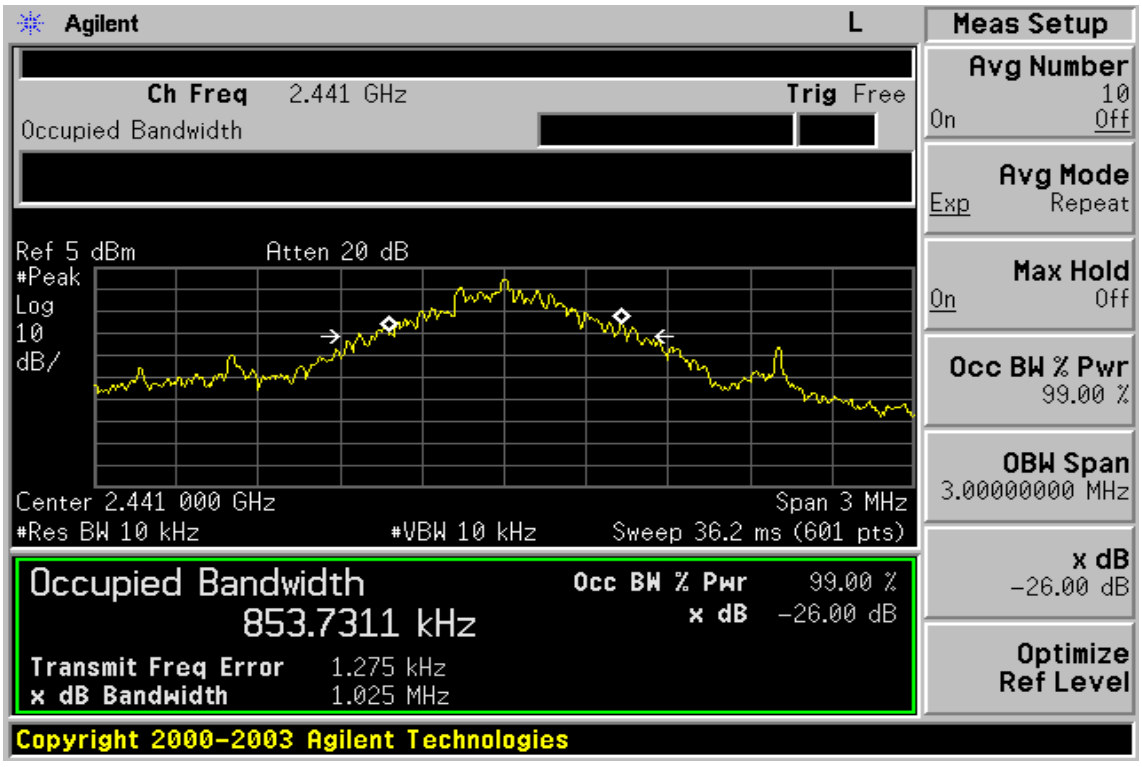
14.5. Measurement Result

CH	Bandwidth (KHz)
Lower	849.2666
Mid	853.7311
Higher	847.4059

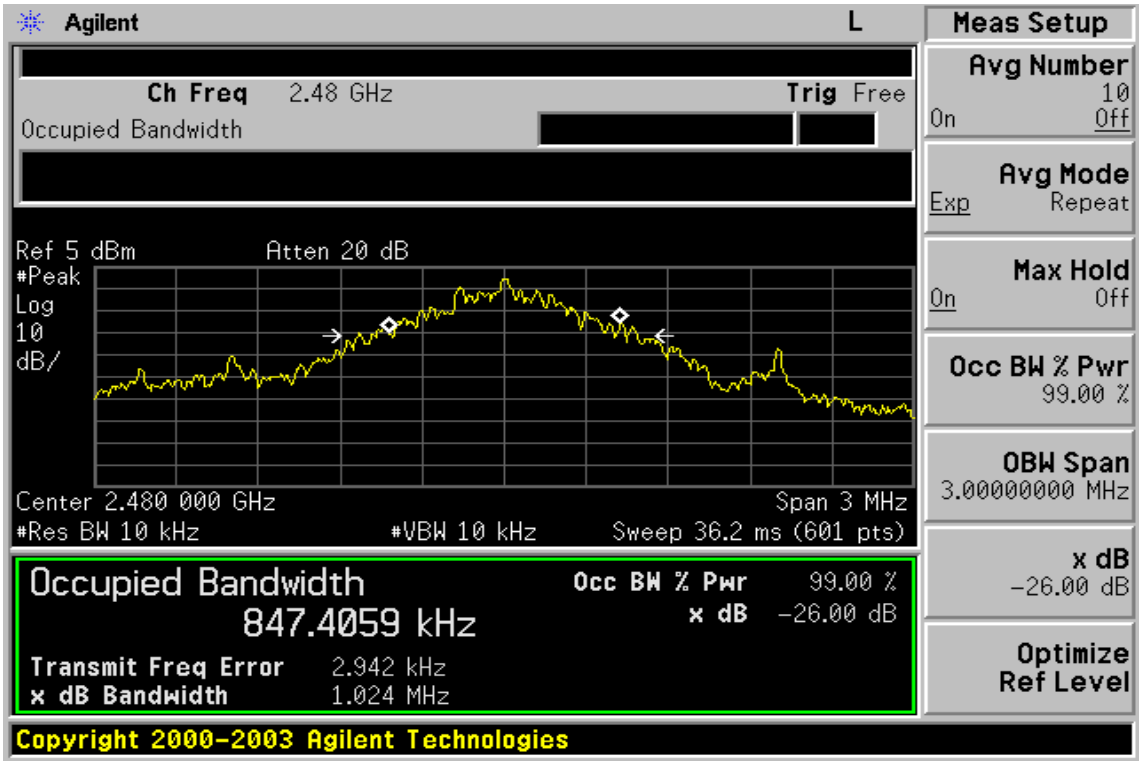
99% Band Width Test Data CH-Low



99% Band Width Test Data CH-Mid



99% Band Width Test Data CH-High



15. ANTENNA REQUIREMENT

15.1. 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 210 , section 5.5, The transmitter antenna shall be integral with the device, or the antenna coupling be so designed that no antenna other than that furnished by the party responsible for compliance shall be used.

15.2. Antenna Connected Construction

The directional gins of antenna used for transmitting is 0.14dBi, and the antenna connector is designed with permanent attachment and no consideration of replacement. Please see EUT photo for details.