ELECTROMAGNETIC EMISSIONS COMPLIANCE REPORT

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

OF

Product Name:	**Scala-rider**
Brand Name:	**Cardo**
Model Name:	**scala-rider FM, scala-rider solo**
Model Difference:	**scala-rider FM with FM Rx function, scala-rider solo has not.**
IC:	**4668A-ER07**
FCC ID:	**Q95ER07**
Report No.:	**EF/2008/80008**
Issue Date:	**Aug. 14, 2008**
Rule Part:	**FCC Part 15C:2005, §15.247,**
	RSS-210 issue 7:2007, Annex 8
Prepared for:	**Cardo System Inc.**
	100 High Tower St., Pittsburghm PA15205, USA
Prepared by:	**SGS Taiwan Ltd.**
	Electronics & Communication Laboratory
	No. 134, Wu Kung Rd., Wuku Industrial Zone, Taipei County, Taiwan.

Testing Laboratory
0513

VERIFICATION OF COMPLIANCE

Applicant:	Cardo System Inc. 100 High Tower St., Pittsburghm PA15205, USA
Product Name:	Scala-rider SOLO/FM
Brand Name:	Cardo
IC:	4668A-ER07
FCC ID:	Q95ER07
Model No.:	scala-rider FM, scala-rider solo
Model Difference:	scala-rider FM with FM Rx function, scala-rider solo has not.
File Number:	EF/2008/80008
Date of test:	Aug. 01, 2008 ~ Aug. 11, 2008
Date of EUT Received:	Aug. 01, 2008

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 15C:2005, §15.247 and RSS-210 issue 7: 2007 Annex 8.
The test results of this report relate only to the tested sample identified in this report.

Test By:	Bondi Liu	***Date***	Aug. 14, 2008
	Bondi Liu / Engineer		
Prepared By:	Eva Kao	***Date***	Aug. 14, 2008
	Eva Kao / Asst. Supervisor		
Approved By:	Vincent Su	***Date***	Aug. 14, 2008
	Vincent Su / Manager		

Version

Version No.	Date	Description
00	Aug. 14, 2008	Initial creation of document

Table of Contents

1. GENERAL INFORMATION

1.1. Product Description

Product Name:	Scala-rider
Brand Name:	Cardo
Model Name:	scala-rider FM, scala-rider solo
Model Difference:	scala-rider FM with FM Rx function, scala-rider solo has not.
Hardware Version:	1
Software Version:	1
Simple Hands-Free (SHF):	1
Data Cable (USB):	N/A
Power Supply	3.7Vdc re-chargeable battery or 5Vdc form AC adapter, model: KSCFB0900030W1US

Bluetooth:

Bluetooth Version	☐ V1.1 (GFSK) ☐ V1.2 (GFSK) ☒ V2.0 (GFSK) ☐ V2.0 + EDR (GFSK + π/4DQPSK + 8DPSK) ☐ V2.1 + EDR (GFSK + π/4DQPSK + 8DPSK)
Frequency Range	2402 – 2480MHz
Channel number	79 channels max.
Rated Power	3.99 dBm (Peak)
Modulation type	Frequency Hopping Spread Spectrum
Antenna Designation	Micro-Strip Antenna / 0dBi.
Type of Emission	882KF1D

The EUT is compliance with Bluetooth Standard.

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

This submittal(s) (test report) is intended for **FCC ID: Q95ER07** filing to comply with Section 15.247 of the FCC Part 15C, Subpart C Rules. And IC: **4668A-ER07** filing to comply with Industry Canada RSS-210 issue 7: 2007 Annex 8.

1.3. Test Methodology

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

1.4. Test Facility

The measurement facilities used to collect the 3m Radiated Emission and AC power line conducted data are located on the address of SGS Taiwan Ltd. No. 134, Wu Kung Rd., Wuku Industrial Zone, Taipei Country, Taiwan which are constructed and calibrated to meet the FCC requirements in documents ANSI C63.4: 2003. FCC Registration Number are: 990257 and 236194, Canada Registration Number: 4620A-1.

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

1.5. Special Accessories

Not available for this EUT intended for grant.

1.6. Equipment Modifications

Not available for this EUT intended for grant.

2. SYSTEM TEST CONFIGURATION

2.1. EUT Configuration

The EUT configuration for testing is installed on RF field strength measurement to meet the Commissions requirement and operating in a manner which intends to maximize its emission characteristics in a continuous normal application.

2.2. EUT Exercise

The EUT (Transmitter) was 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 and RSS-Gen:2007.Conducted emissions from the EUT measured in the frequency range between 0.15 MHz and 30MHz using CISPR Quasi-Peak and Average detector mode.

2.3.2 Radiated Emissions

The EUT is a placed on as turn table which is 0.8 m above ground plane. The turn table shall rotate 360 degrees to determine the position of maximum emission level. EUT is set 3m away from the receiving antenna which varied from 1m to 4m to find out the highest emission. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical. In order to find out the max. emission, the relative positions of this hand-held transmitter (EUT) was rotated through three orthogonal axes and measurement procedures for electric field radiated emissions above 1 GHz the EUT measurement is to be made “while keeping the antenna in the ‘cone of radiation’ from that area and pointed at the area both in azimuth and elevation, with polarization oriented for maximum response.” is still within the 3dB illumination BW of the measurement antenna. according to the requirements in Section 8 and 13 and Subclause 8.3.1.2 of ANSI C63.4-2003.

2.4. Configuration of Tested System

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

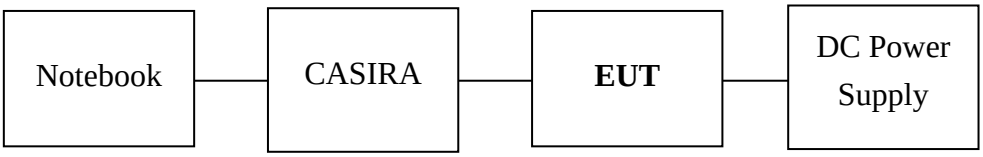


Table 2-1 Equipment Used in Tested System

Item	Equipment	Mfr/Brand	Model/ Type No.	Series No.
1.	Notebook	Compaq	Presarlo 2100	CNF345Q1R
2.	DC Power Supply	Topward	3303D	981327
3.	CASIRA	CSR	BCES301199/1	7383070403
4.	Software	BlueSuite 1.22	CSR	Version 1.22

3. SUMMARY OF TEST RESULTS

FCC Rules	Description Of Test	Result
§15.207(a)/ RSS-Gen §7.2.2	Conducted Emission	Compliant
§15.247(b)/ RSS-210 issue 7,§A8.4(2)	Peak Output Power	Compliant
§15.247(c) RSS-210 issue 7,§A8.5	100 KHz Bandwidth Of Frequency Band Edges	Compliant
§15.247(c) RSS-210 issue 7,§A8.5	TX/RX Spurious Emission	Compliant
§15.247(a)(1)/ RSS-210 issue 7,§A8.1(2)	Frequency Separation	Compliant
§15.247(a)(1)(iii)/ RSS-210 issue 7,§A8.4(2)	Number of hopping frequency	Compliant
§15.247(a)(1)(ii)/ RSS-210 issue 7,§A8.1(4)	Time of Occupancy	Compliant
§15.247/ RSS-210 issue 7,§A8.3(2)	Peak Power Density	Compliant
RSS-Gen §4.4.1	99% Power Bandwidth	Compliant
§15.203, §15.247(c)/ RSS-GEN 7.1.4, RSS-210 issue 7,§A8.4	Antenna Requirement	Compliant
	20dB Bandwidth	No Limit

4. DESCRIPTION OF TEST MODES

The EUT has been tested under operating condition.
Test program used to control the EUT for staying in continuous transmitting and receiving mode is programmed.
Channel low (2402MHz)、mid (2441MHz) and high (2480MHz) with highest data rate are chosen for full testing.

5. CONDUCTED EMISSION TEST

5.1. Standard Applicable

According to §15.207 and RSS-Gen §7.2.2, frequency range within 150KHz to 30MHz shall not exceed the Limit table as below.

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

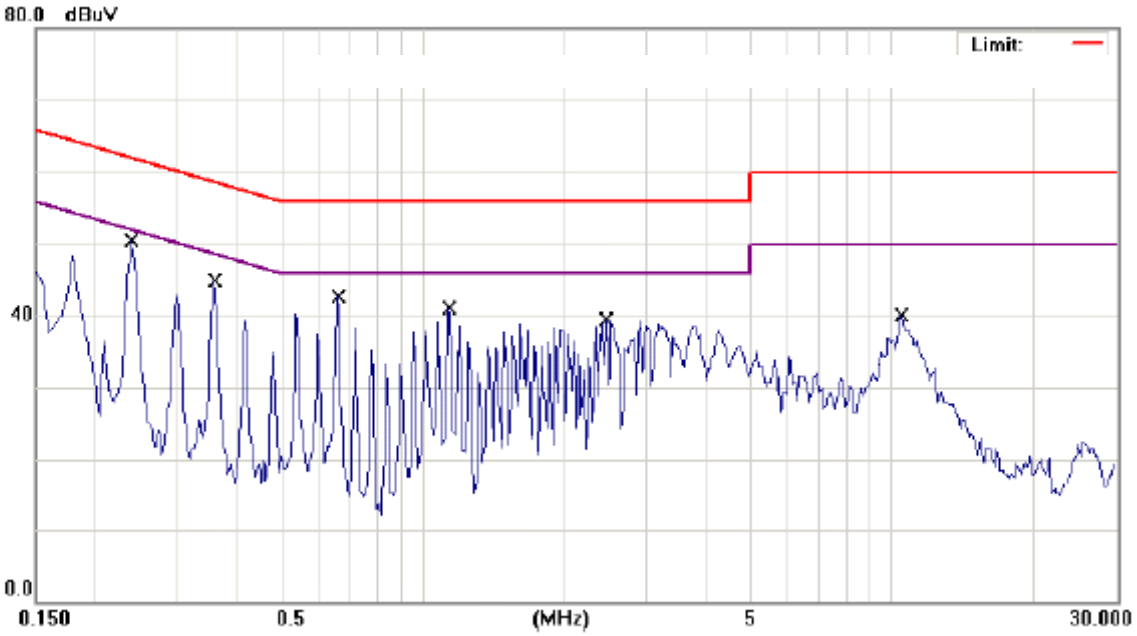
Conducted Emission Test Site					
EQUIPMENT TYPE	**MFR**	**MODEL NUMBER**	**SERIAL NUMBER**	**LAST CAL.**	**CAL DUE.**
EMI Test Receiver	R&S	ESCS30	828985/004	09/15/2007	09/14/2008
LISN	Rolf-Heine	NNB-2/16Z	99012	02/18/2008	02/17/2009
LISN	FCC	FCC-LISN-50/250-25-2-01	04034	02/18/2008	02/17/2009
Coaxial Cables	N/A	WK CE Cable	N/A	10/30/2007	10/29/2008

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:	Charger mode			Test Date:	Aug. 11, 2008
Temperature:	25 ℃	Humidity:	62%	Test By:	Bondi

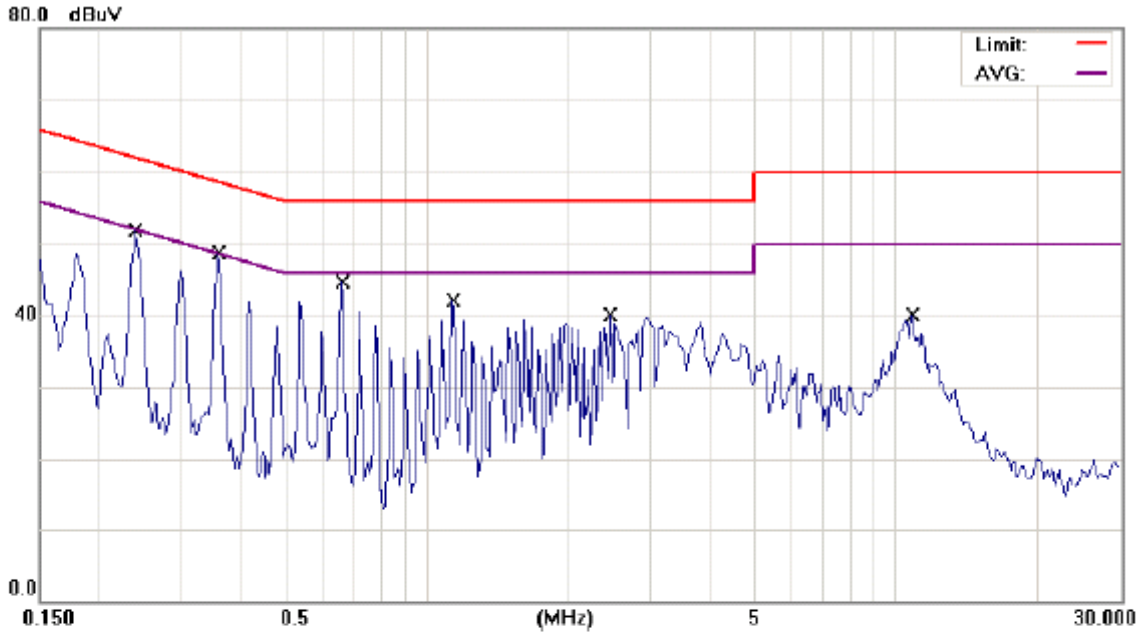


Site SGS CONDUCTED #1
Limit: CISPR22 Class B Conduction(QP)
EUT: scala-rider TeamSet Driver
M/N: scala-rider TeamSet Driver
Note: Charger mode

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

Temperature: 25 ℃
Humidity: 62 %
Air Pressure: hpa

No.	Mk.	Freq.	Reading Level	Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1	*	0.2400	50.30	0.15	50.45	62.10	-11.65	QP	
2		0.2400	39.00	0.15	39.15	52.10	-12.95	AVG	
3		0.3600	44.76	0.10	44.86	58.73	-13.87	QP	
4		0.6600	42.71	0.05	42.76	56.00	-13.24	QP	
5		1.1400	41.11	0.04	41.15	56.00	-14.85	QP	
6		2.4700	39.42	0.04	39.46	56.00	-16.54	QP	
7		10.4750	40.09	0.10	40.19	60.00	-19.81	QP	



Site SGS CONDUCTED #1
Limit: CISPR22 Class B Conduction(QP)
EUT: scala-rider TeamSet Driver
M/N: scala-rider TeamSet Driver
Note: Charger mode

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

Temperature: 25 ℃
Humidity: 62 %
Air Pressure: hpa

No.	Mk.	Freq.	Reading Level	Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1		0.2400	51.83	0.13	51.96	62.10	-10.14	QP	
2		0.2400	41.00	0.13	41.13	52.10	-10.97	AVG	
3	*	0.3600	48.70	0.09	48.79	58.73	-9.94	QP	
4		0.3600	35.00	0.09	35.09	48.73	-13.64	AVG	
5		0.6600	44.69	0.04	44.73	56.00	-11.27	QP	
6		1.1400	42.05	0.03	42.08	56.00	-13.92	QP	
7		2.4700	40.05	0.03	40.08	56.00	-15.92	QP	
8		10.8250	39.98	0.20	40.18	60.00	-19.82	QP	

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

6.2. Measurement 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.

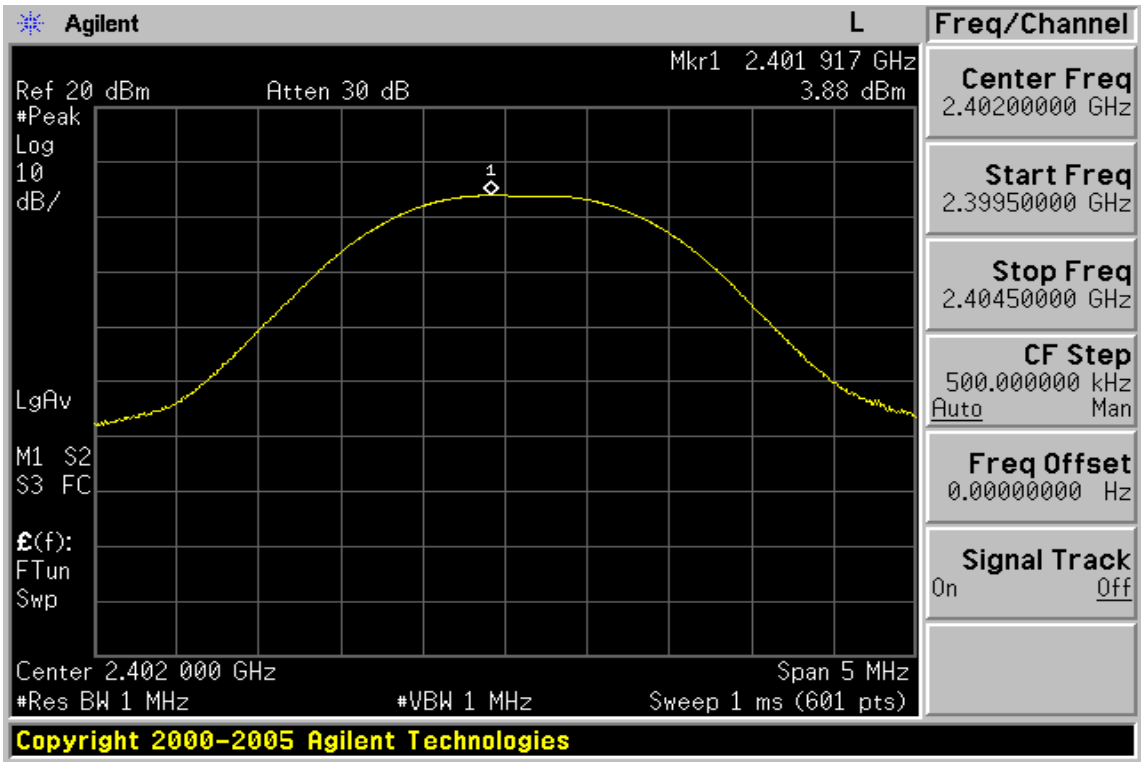
6.3. Measurement Result

Frequency (MHz)	Reading Power (dBm)	Cable Loss	Output Power (dBm)	Output Power (W)	Limit (W)
2402.00	3.88	0.10	3.98	0.00250	1
2441.00	3.89	0.10	3.99	0.00251	1
2480.00	1.93	0.10	2.03	0.00160	1

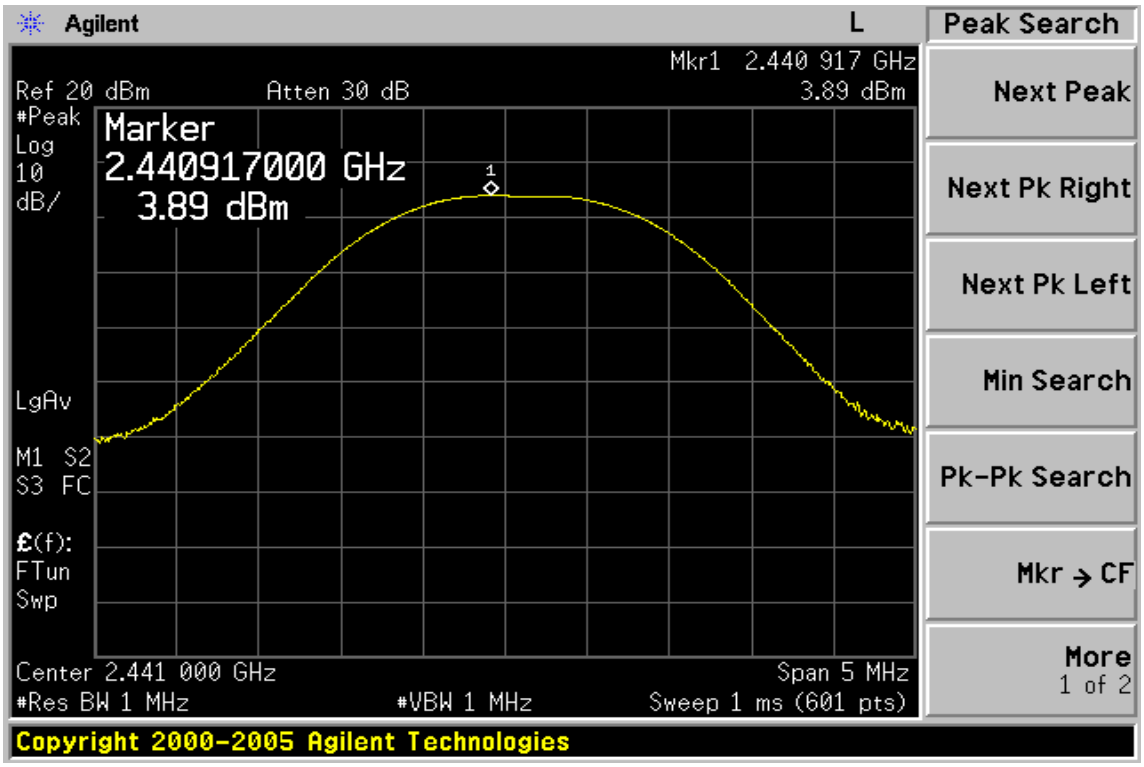
6.4. Measurement Equipment Used:

Conducted Emission Test Site					
EQUIPMENT TYPE	**MFR**	**MODEL NUMBER**	**SERIAL NUMBER**	**LAST CAL.**	**CAL DUE.**
Spectrum Analyzer	Agilent	E4446A	MY43360126	04/19/2008	04/18/2010
Spectrum Analyzer	Agilent	E7405A	US41160416	07/04/2007	07/03/2009
Spectrum Analyzer	R&S	FSP 40	100034	02/22/2008	02/21/2009
Low Loss Cable	HUBER+SUHNER	SUCOFLEX 104PEA	N/A	N/A	N/A
Attenuator	Mini-Circuit	BW-S6W5	N/A	07/05/2008	07/04/2009

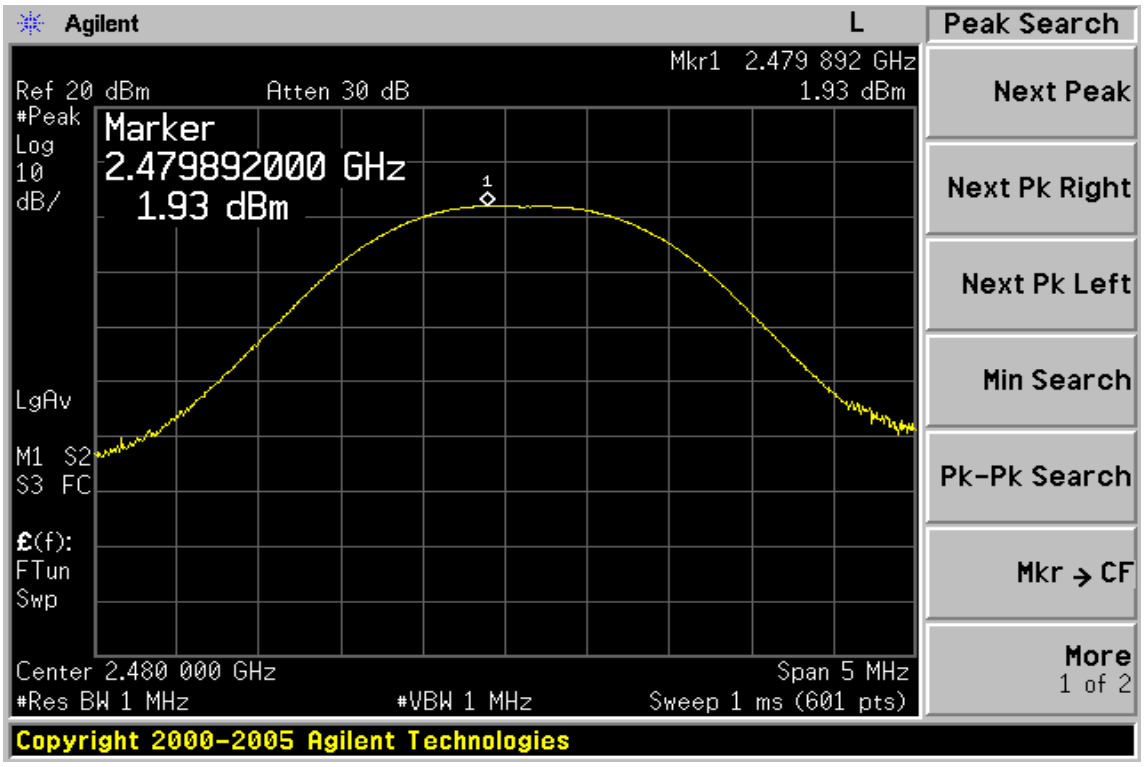
Peak Power Output Data Plot (CH Low)



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= 3MHz, Sweep=auto
4. Mark the peak frequency and –20dB (upper and lower) frequency.
5. Repeat above procedures until all frequency measured were complete.

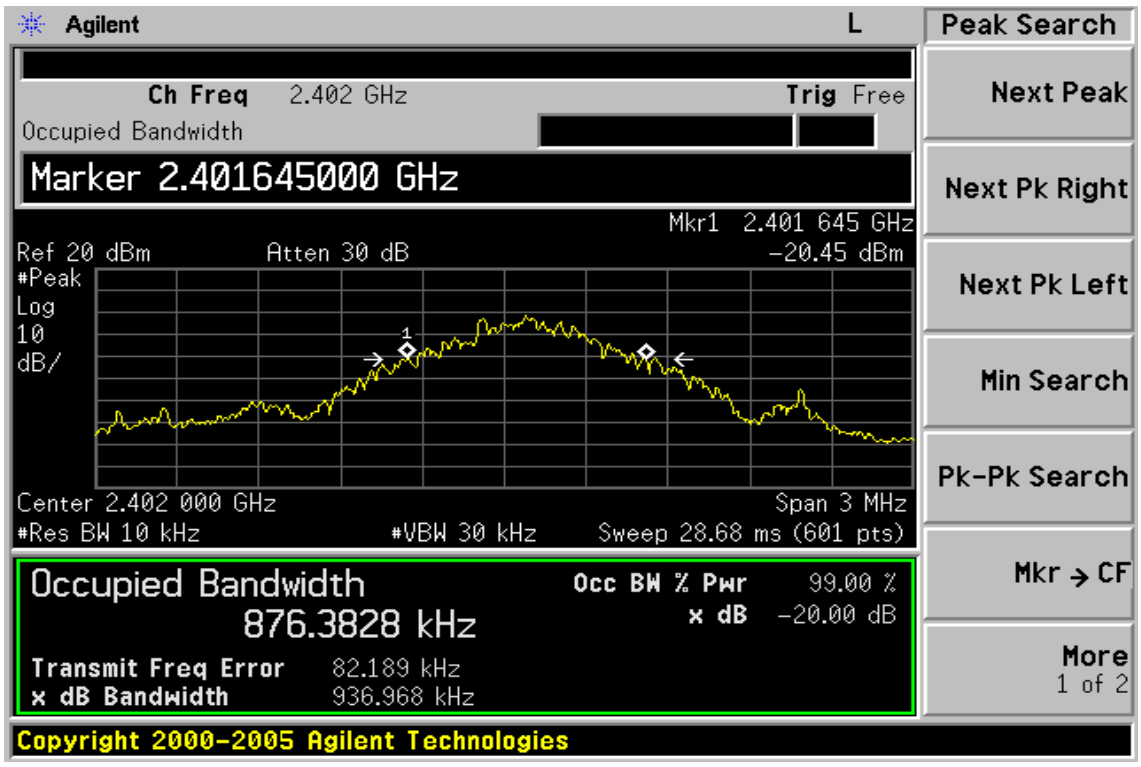
7.3. Measurement Result

CH	Bandwidth (kHz)
Lower	936.968
Mid	944.592
Higher	943.575

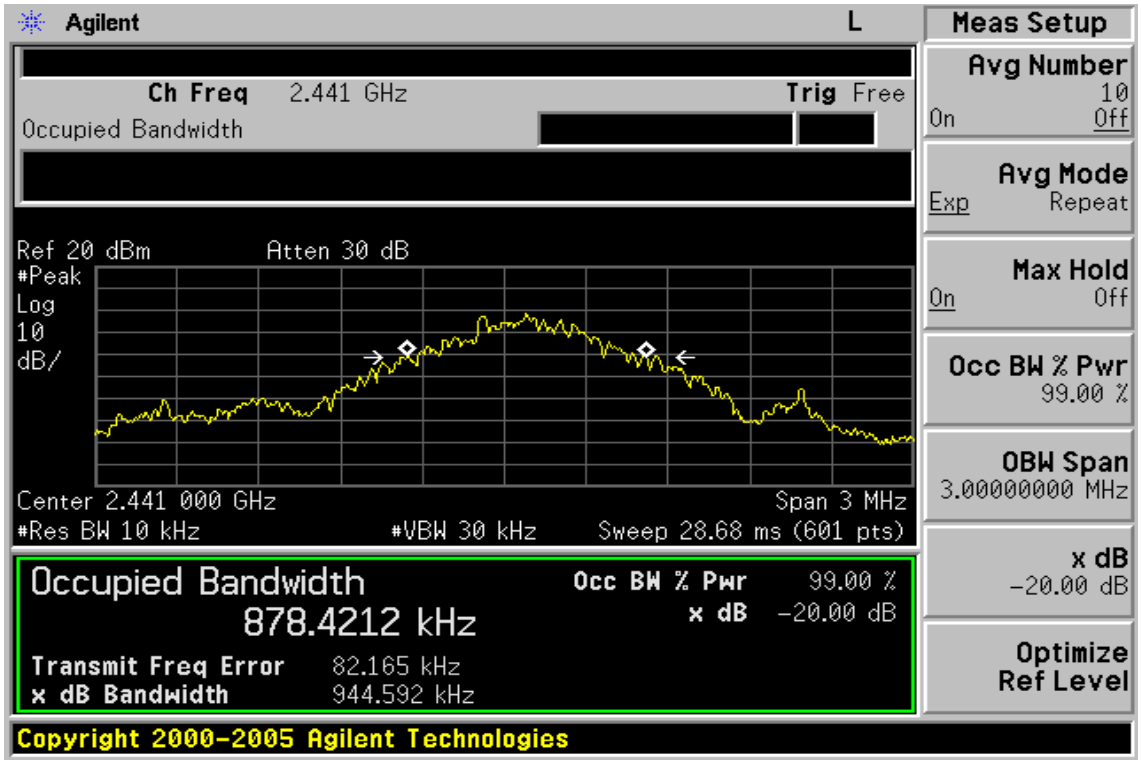
7.4. Measurement Equipment Used:

Conducted Emission Test Site					
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
Spectrum Analyzer	Agilent	E4446A	MY43360126	04/19/2008	04/18/2010
Spectrum Analyzer	Agilent	E7405A	US41160416	07/04/2007	07/03/2009
Spectrum Analyzer	R&S	FSP 40	100034	02/22/2008	02/21/2009
Low Loss Cable	HUBER+SUHNER	SUCOFLEX 104PEA	N/A	N/A	N/A
Attenuator	Mini-Circuit	BW-S6W5	N/A	07/05/2008	07/04/2009

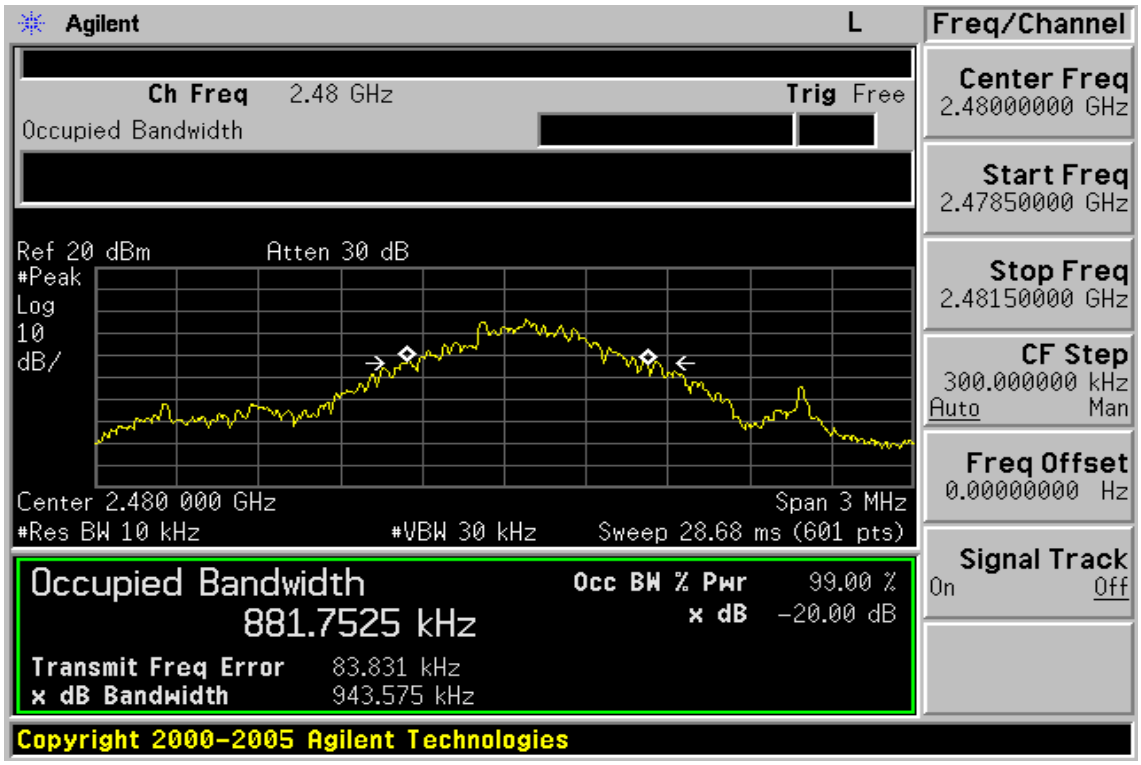
20dB Band Width Test Data CH-Low



20dB Bandwidth Test Data CH-Mid



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

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.

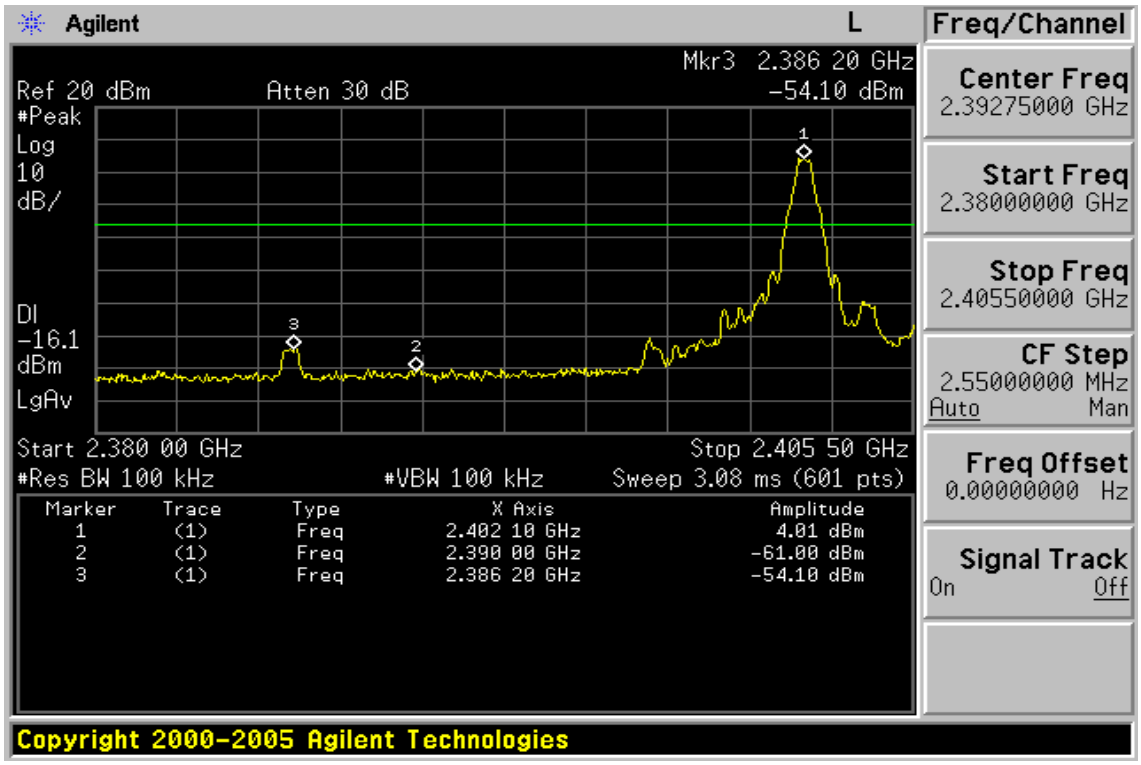
8.3. Measurement Result

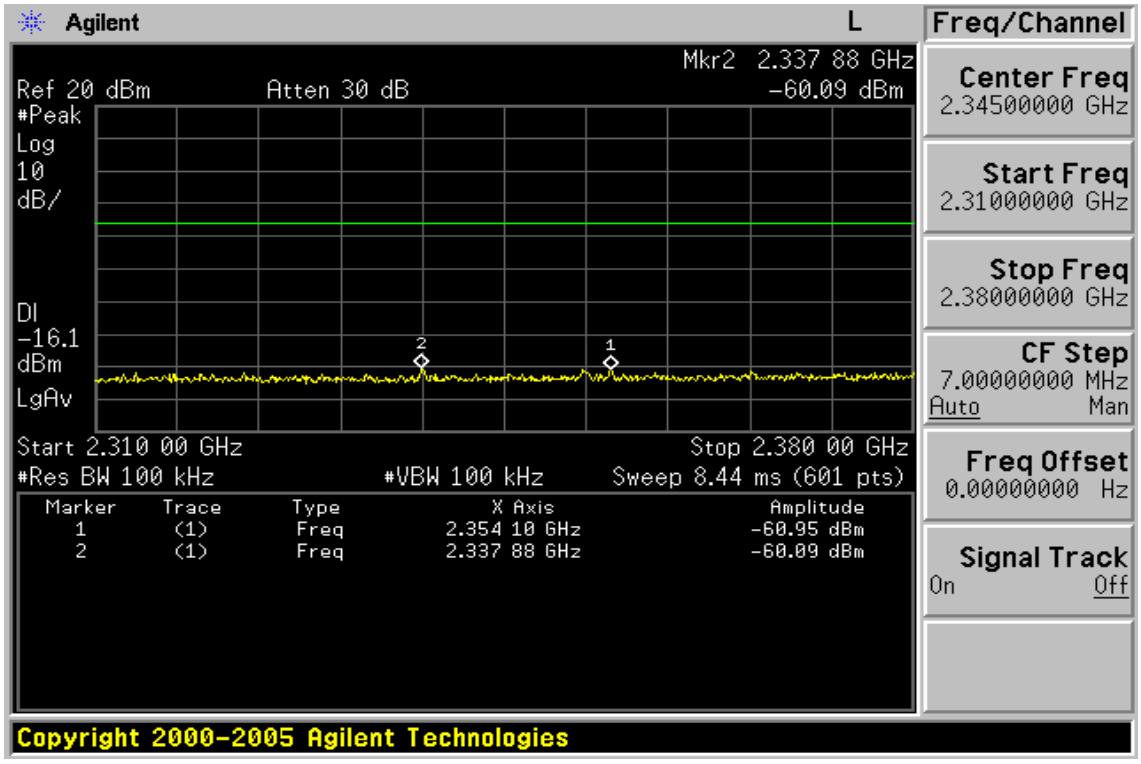
Refer to attach spectrum analyzer data chart.

8.4. Measurement Equipment Used:

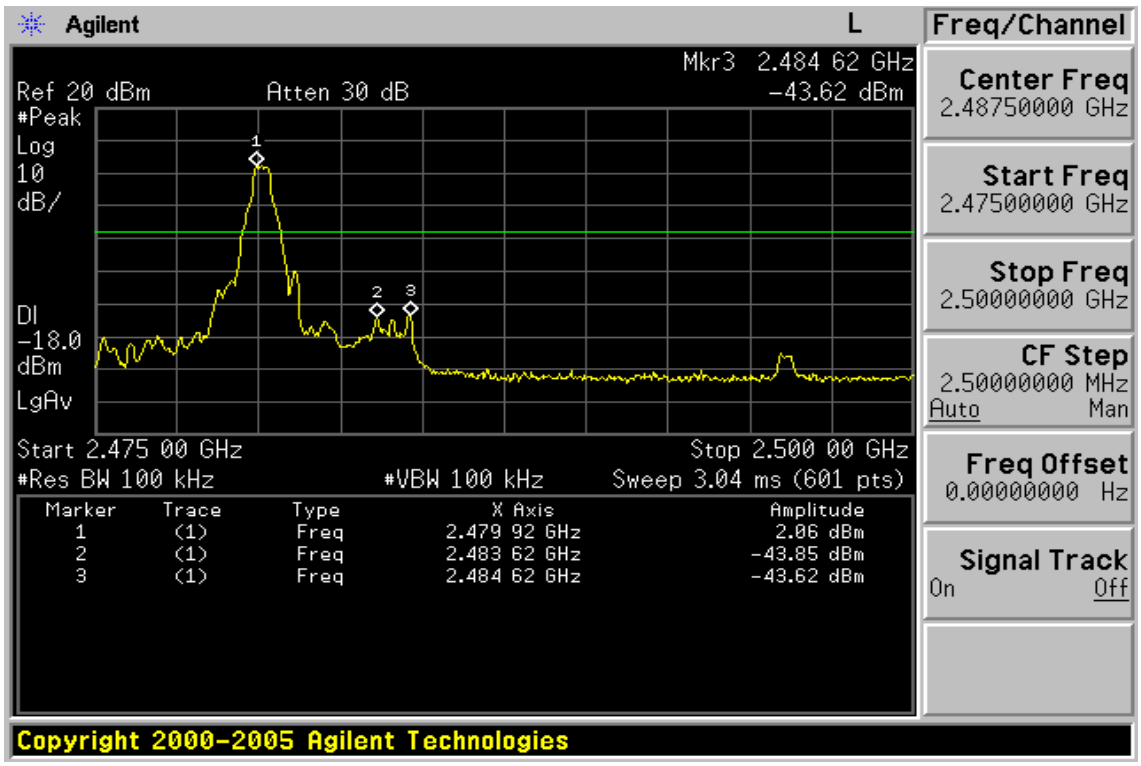
Conducted Emission Test Site					
EQUIPMENT TYPE	**MFR**	**MODEL NUMBER**	**SERIAL NUMBER**	**LAST CAL.**	**CAL DUE.**
Spectrum Analyzer	Agilent	E4446A	MY43360126	04/19/2008	04/18/2010
Spectrum Analyzer	Agilent	E7405A	US41160416	07/04/2007	07/03/2009
Spectrum Analyzer	R&S	FSP 40	100034	02/22/2008	02/21/2009
Low Loss Cable	HUBER+SUHNER	SUCOFLEX 104PEA	N/A	N/A	N/A
Attenuator	Mini-Circuit	BW-S6W5	N/A	07/05/2008	07/04/2009

Band Edges Test Data CH-Low





Band Edges Test Data CH-High



Radiated Emission:

Operation Mode	TX CH Low	Test Date	Aug. 11, 2008
Fundamental Frequency	2402 MHz	Test By	Bondi
Temperature	25 ℃	Pol	Ver.
Humidity	65 %		

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
2386.20	34.19	---	-1.40	32.79	---	74.00	54.00	-21.21	Peak
2390.00	34.55	---	-1.39	33.16	---	74.00	54.00	-20.84	Peak

Operation Mode	TX CH Low	Test Date	Aug. 11, 2008
Fundamental Frequency	2402 MHz	Test By	Bondi
Temperature	25 ℃	Pol	Hor.
Humidity	65 %		

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
2386.20	35.12	---	-1.40	33.72	---	74.00	54.00	-20.28	Peak
2390.00	33.98	---	-1.39	32.59	---	74.00	54.00	-21.41	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	Aug. 11, 2008
Fundamental Frequency	2480 MHz	Test By	Bondi
Temperature	25 ℃	Pol	Ver.
Humidity	65 %		

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
2483.50	41.74	---	-0.92	40.82	---	74.00	54.00	-13.18	Peak
2484.62	38.01	---	-0.92	37.09	---	74.00	54.00	-16.91	Peak

Operation Mode	TX CH High	Test Date	Aug. 11, 2008
Fundamental Frequency	2480 MHz	Test By	Bondi
Temperature	25 ℃	Pol	Hor.
Humidity	65 %		

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
2483.50	41.48	---	-0.92	40.56	---	74.00	54.00	-13.44	Peak
2484.62	38.61	---	-0.92	37.69	---	74.00	54.00	-16.31	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.

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

9.2. EUT Setup

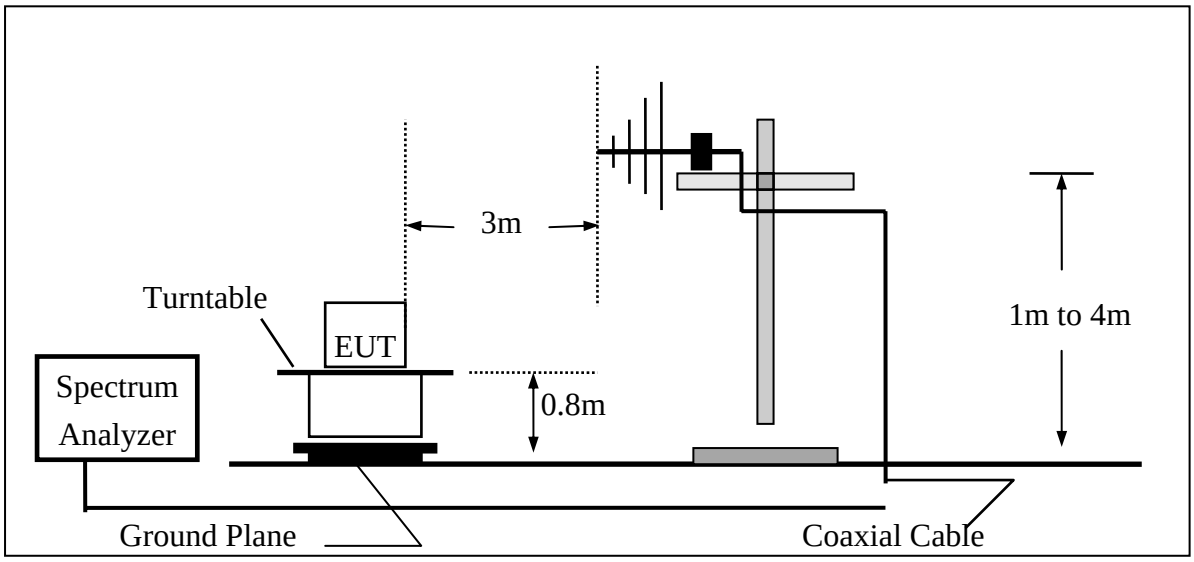
1. The radiated emission tests were performed in the 3 meter open-test site, using the setup in accordance with the ANSI C63.4-2003.
2. The EUT was put in the front of the test table. The rear of the EUT and peripherals were placed flushed with the rear of the tabletop.
3. The spacing between the peripherals 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

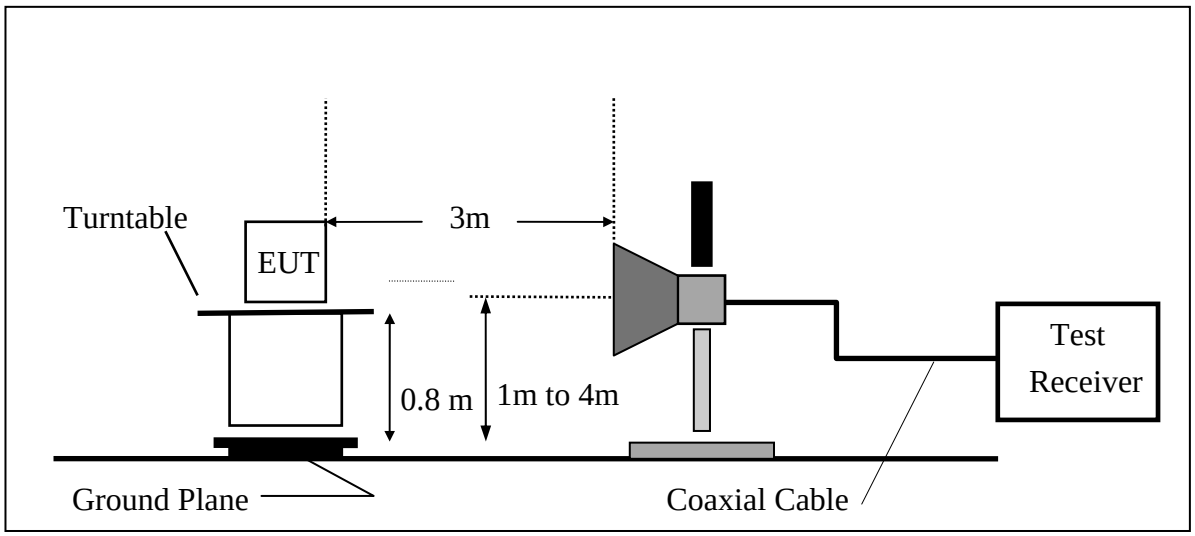
1. The EUT was placed on a turn table which is 0.8m above ground plane.
2. The turn table shall rotate 360 degrees to determine the position of maximum emission level.
3. EUT is set 3m away from the receiving antenna which varied from 1m to 4m to find out the highest emissions.
4. When measurement procedures 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 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	02/22/2008	02/21/2009
Spectrum Analyzer	Agilent	E7405A	US41160416	07/04/2007	07/03/2009
Spectrum Analyzer	Agilent	E4446A	MY43360126	04/19/2008	04/18/2010
Bilog Antenna	SCHWAZBECK	VULB9160	9160-3158	11/29/2007	11/28/2008
Horn antenna	Schwarzbeck	BBHA 9120D	9120D-673	05/09/2008	05/10/2010
Horn antenna	Schwarzbeck	BBHA 9170	184/185	12/31/2007	12/30/2008
Pre-Amplifier	HP	8447F	3113A06892	01/05/2008	01/04/2009
Pre-Amplifier	HP	8449B	3008A01973	01/05/2008	01/04/2009
Turn Table	HD	DT420	N/A	N.C.R	N.C.R
Antenna Tower	HD	MA240-N	240/657	N.C.R	N.C.R
Controller	HD	HD100	N/A	N.C.R	N.C.R
Low Loss Cable	HUBER+SUHNER	SUCOFLEX 104PEA-10M	10m	01/05/2008	01/04/2009
Low Loss Cable	HUBER+SUHNER	SUCOFLEX 104PEA-3M	3m	01/05/2008	01/04/2009

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

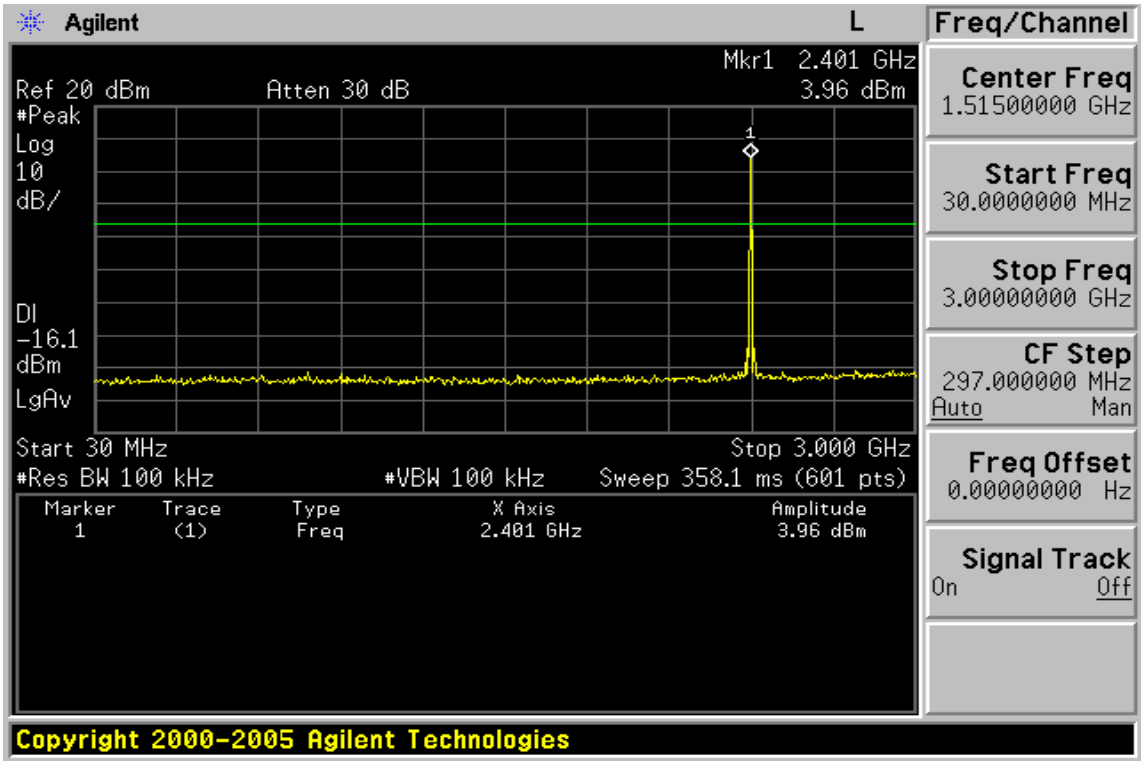
Where	FS = Field Strength	CL = Cable Attenuation Factor (Cable Loss)
	RA = Reading Amplitude	AG = Amplifier Gain
	AF = Antenna Factor	

9.7. Measurement Result

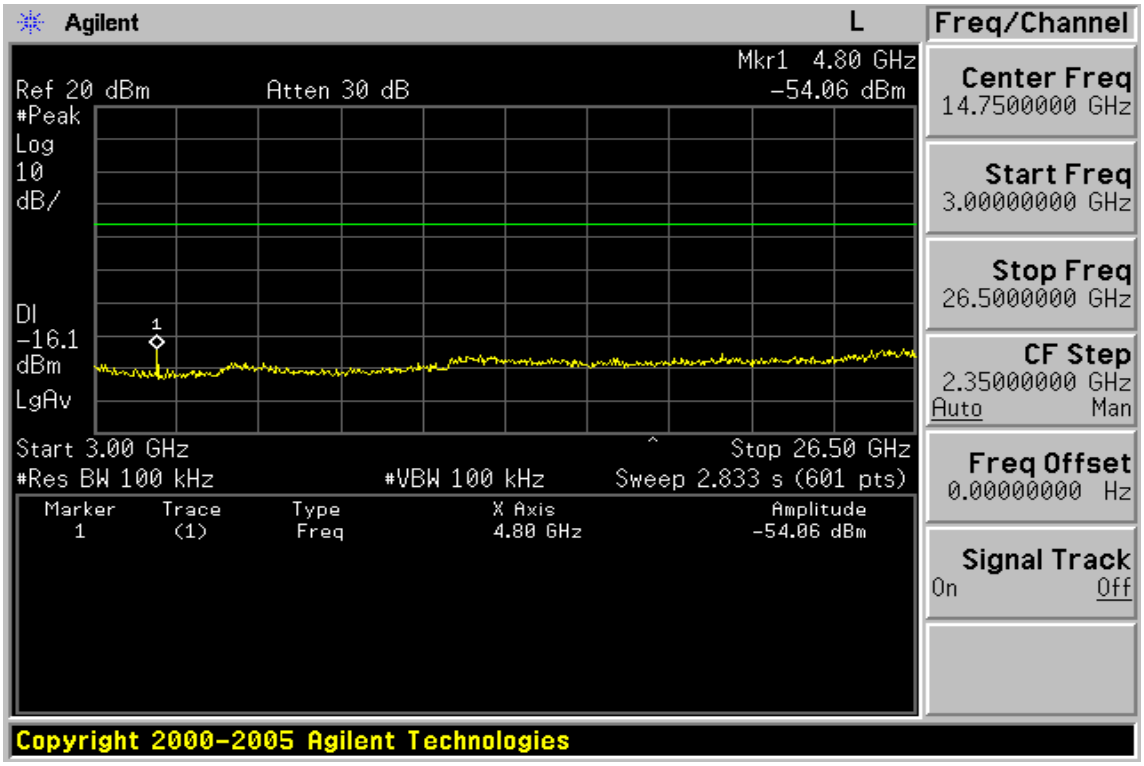
Refer to attach tabular data sheets.

Conducted Spurious Emission Measurement Result

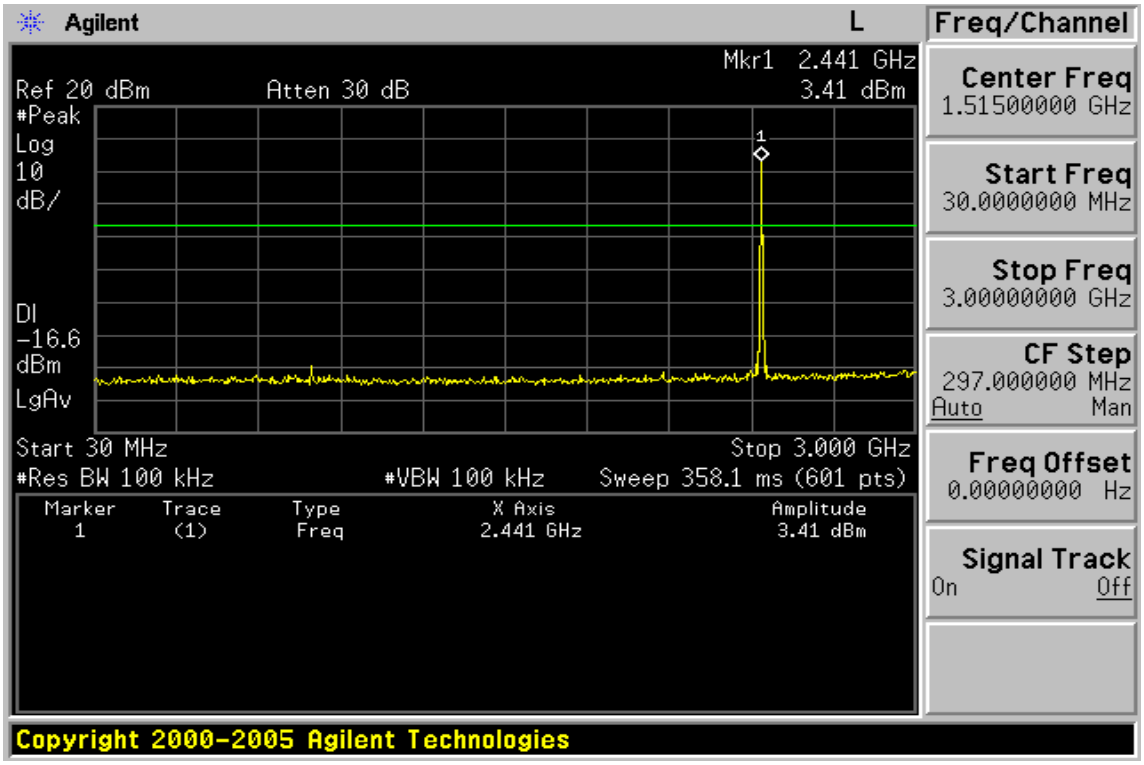
Ch Low 30MHz – 3GHz



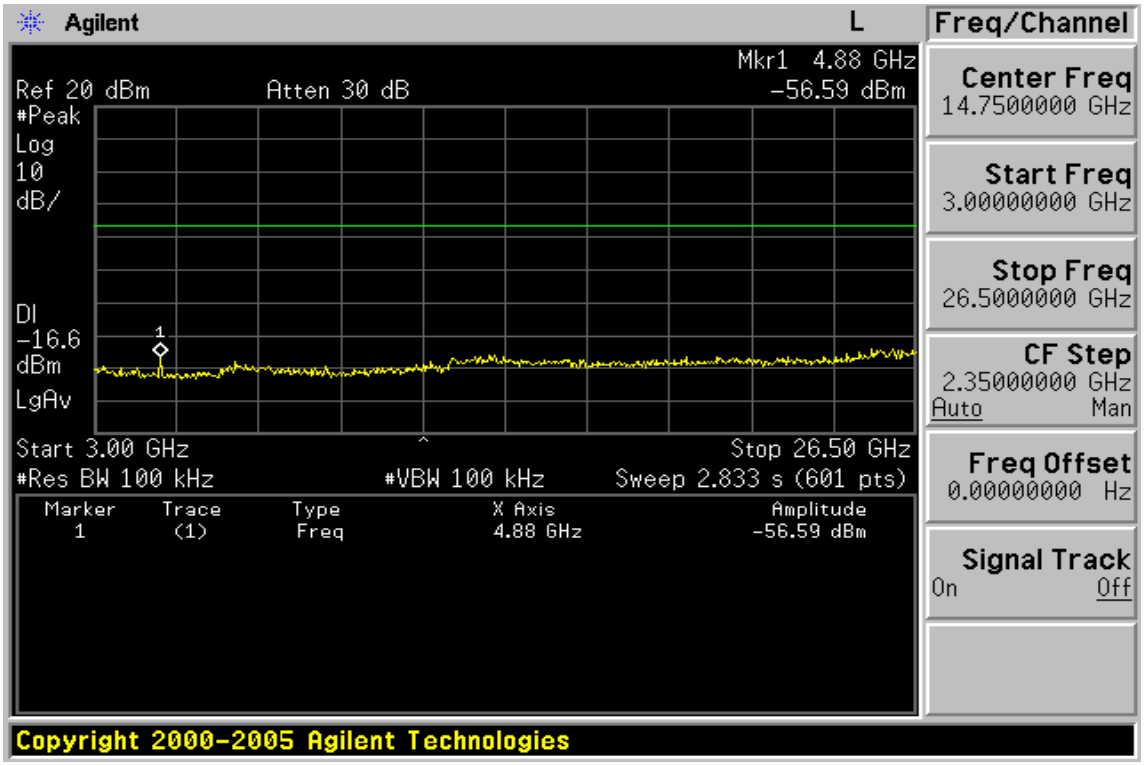
Ch Low 3GHz – 26.5GHz



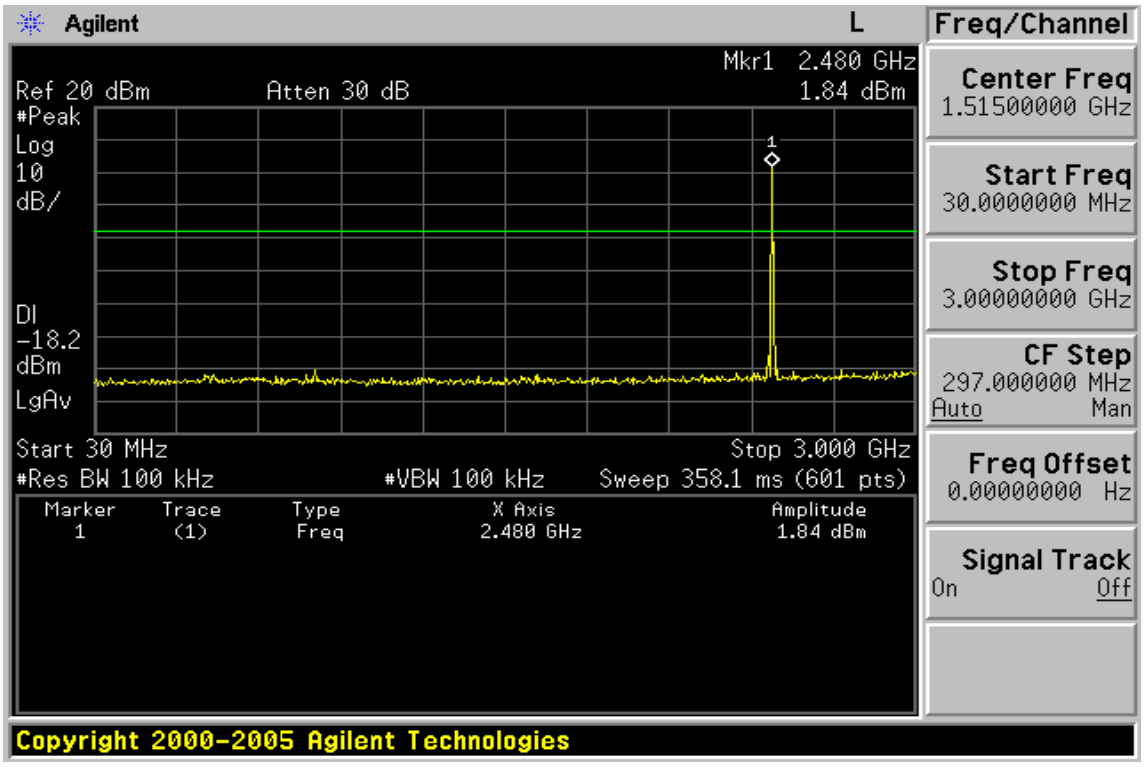
Ch Mid 30MHz – 3GHz



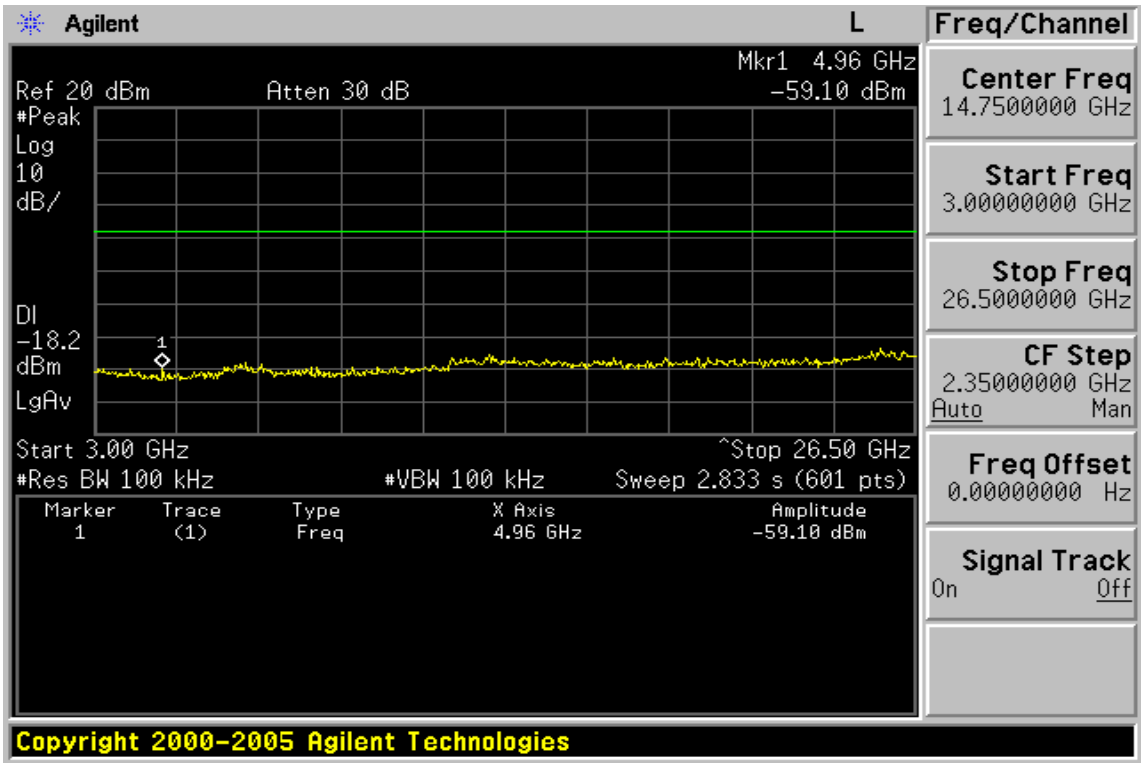
Ch Mid 3GHz – 26.5GHz



Ch High 30MHz – 3GHz



Ch High 3GHz – 26.5GHz



Radiated Spurious Emission Measurement Result (below 1GHz)

Operation Mode	TX CH Low	Test Date	Aug. 11, 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)
56.19	V	Peak	46.69	-14.63	32.06	40.00	-7.94
101.78	V	Peak	42.71	-16.87	25.84	43.50	-17.66
51.34	H	Peak	42.56	-14.19	28.37	40.00	-11.63
104.69	H	Peak	44.72	-16.63	28.09	43.50	-15.41

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	Aug. 11, 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)
56.19	V	Peak	46.88	-14.63	32.25	40.00	-7.75
67.83	V	Peak	41.79	-15.60	26.19	40.00	-13.81
51.34	H	Peak	42.86	-14.19	28.67	40.00	-11.33
70.74	H	Peak	39.94	-16.27	23.67	40.00	-16.33
104.69	H	Peak	43.31	-16.63	26.68	43.50	-16.82

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	Aug. 11, 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)
56.19	V	Peak	46.24	-14.63	31.61	40.00	-8.39
101.78	V	Peak	43.72	-16.87	26.85	43.50	-16.65
51.34	H	Peak	42.86	-14.19	28.67	40.00	-11.33
70.74	H	Peak	39.33	-16.27	23.06	40.00	-16.94
104.69	H	Peak	43.29	-16.63	26.66	43.50	-16.84

Remark：

1 Measuring frequencies from 30 MHz to the 1GHz。

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

3 Data of measurement within this frequency range shown " - " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.

4 The IF bandwidth of SPA between 30MHz to 1GHz was 100KHz.

Radiated Spurious Emission Measurement Result (above 1GHz)

Operation Mode	TX CH Low	Test Date	Aug. 11, 2008
Fundamental Frequency	2402 MHz	Test By	Bondi
Temperature	25 ℃	Pol	Ver.
Humidity	65 %		

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)	
1598.0	41.06	---	-5.48	35.58	---	74.00	54.00	-18.42	Peak
4804.0	----					74.00	54.00		
7206.0	----					74.00	54.00		
9608.0	----					74.00	54.00		
12010.0	----					74.00	54.00		
14412.0	----					74.00	54.00		
16814.0	----					74.00	54.00		
19216.0	----					74.00	54.00		
21618.0	----					74.00	54.00		
24020.0	----					74.00	54.00		

Remark：

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

(2) Data of measurement within this frequency range shown " - " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.

(3) Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column。

(4) Spectrum Peak Setting : 1GHz- 26GHz, RBW= 1MHz, VBW= 3MHz, Sweep time= 200 ms.

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

Radiated Spurious Emission Measurement Result (above 1GHz)

Operation Mode	TX CH Low	Test Date	Aug. 11, 2008
Fundamental Frequency	2402 MHz	Test By	Bondi
Temperature	25 ℃	Pol	Hor.
Humidity	65 %		

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)	
1598.0	49.89	---	-5.48	44.41	---	74.00	54.00	-9.59	Peak
4804.0	----					74.00	54.00		
7206.0	----					74.00	54.00		
9608.0	----					74.00	54.00		
12010.0	----					74.00	54.00		
14412.0	----					74.00	54.00		
16814.0	----					74.00	54.00		
19216.0	----					74.00	54.00		
21618.0	----					74.00	54.00		
24020.0	----					74.00	54.00		

Remark：

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

(2) Data of measurement within this frequency range shown " - " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.

(3) Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column。

(4) Spectrum Peak Setting : 1GHz- 26GHz, RBW= 1MHz, VBW= 3MHz, Sweep time= 200 ms.

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

Radiated Spurious Emission Measurement Result (above 1GHz)

Operation Mode	TX CH Mid	Test Date	Aug. 11, 2008
Fundamental Frequency	2441 MHz	Test By	Bondi
Temperature	25 ℃	Pol	Ver.
Humidity	65 %		

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)	
1630.5	41.31	---	-5.26	36.05	---	74.00	54.00	-17.95	Peak
4882.0	----					74.00	54.00		
7323.0	----					74.00	54.00		
9764.0	----					74.00	54.00		
12205.0	----					74.00	54.00		
14646.0	----					74.00	54.00		
17087.0	----					74.00	54.00		
19528.0	----					74.00	54.00		
21969.0	----					74.00	54.00		
24410.0	----					74.00	54.00		

Remark：

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

(2) Data of measurement within this frequency range shown " - " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.

(3) Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column。

(4) Spectrum Peak Setting : 1GHz- 26GHz, RBW= 1MHz, VBW= 3MHz, Sweep time= 200 ms.

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

Radiated Spurious Emission Measurement Result (above 1GHz)

Operation Mode	TX CH Mid	Test Date	Aug. 11, 2008
Fundamental Frequency	2441 MHz	Test By	Bondi
Temperature	25 ℃	Pol	Hor.
Humidity	65 %		

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)	
1630.5	49.86	---	-5.26	44.60	---	74.00	54.00	-9.40	Peak
4882.0	----					74.00	54.00		
7323.0	----					74.00	54.00		
9764.0	----					74.00	54.00		
12205.0	----					74.00	54.00		
14646.0	----					74.00	54.00		
17087.0	----					74.00	54.00		
19528.0	----					74.00	54.00		
21969.0	----					74.00	54.00		
24410.0	----					74.00	54.00		

Remark：

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

(2) Data of measurement within this frequency range shown " - " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.

(3) Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column。

(4) Spectrum Peak Setting : 1GHz- 26GHz, RBW= 1MHz, VBW= 3MHz, Sweep time= 200 ms.

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

Radiated Spurious Emission Measurement Result (above 1GHz)

Operation Mode	TX CH High	Test Date	Aug. 11, 2008
Fundamental Frequency	2480 MHz	Test By	Bondi
Temperature	25 ℃	Pol	Ver.
Humidity	65 %		

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	42.36	---	-5.22	37.14	---	74.00	54.00	-16.86	Peak
4960.0	----					74.00	54.00		
7440.0	----					74.00	54.00		
9920.0	----					74.00	54.00		
12400.0	----					74.00	54.00		
14880.0	----					74.00	54.00		
17360.0	----					74.00	54.00		
19840.0	----					74.00	54.00		
22320.0	----					74.00	54.00		
24800.0	----					74.00	54.00		

Remark：

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

(2) Data of measurement within this frequency range shown " - " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.

(3) Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column。

(4) Spectrum Peak Setting : 1GHz- 26GHz, RBW= 1MHz, VBW= 3MHz, Sweep time= 200 ms.

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

Radiated Spurious Emission Measurement Result (above 1GHz)

Operation Mode	TX CH High	Test Date	Aug. 11, 2008
Fundamental Frequency	2480 MHz	Test By	Bondi
Temperature	25 ℃	Pol	Hor.
Humidity	65 %		

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	51.49	---	-5.22	46.27	---	74.00	54.00	-7.73	Peak
4960.0	----					74.00	54.00		
7440.0	----					74.00	54.00		
9920.0	----					74.00	54.00		
12400.0	----					74.00	54.00		
14880.0	----					74.00	54.00		
17360.0	----					74.00	54.00		
19840.0	----					74.00	54.00		
22320.0	----					74.00	54.00		
24800.0	----					74.00	54.00		

Remark：

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

(2) Data of measurement within this frequency range shown " - " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.

(3) Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column。

(4) Spectrum Peak Setting : 1GHz- 26GHz, RBW= 1MHz, VBW= 3MHz, Sweep time= 200 ms.

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

Radiated Spurious Emission Measurement Result (below 1GHz)

Operation Mode	RX CH Low	Test Date	Aug. 11, 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)
56.19	V	Peak	43.34	-14.63	28.71	40.00	-11.29
90.14	V	Peak	43.86	-17.62	26.24	43.50	-17.26
51.34	H	Peak	43.06	-14.19	28.87	40.00	-11.13
104.69	H	Peak	42.96	-16.63	26.33	43.50	-17.17

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	Aug. 11, 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)
67.83	V	Peak	48.24	-15.60	32.64	40.00	-7.36
90.14	V	Peak	44.61	-17.62	26.99	43.50	-16.51
51.34	H	Peak	43.23	-14.19	29.04	40.00	-10.96
70.74	H	Peak	39.64	-16.27	23.37	40.00	-16.63

Remark：

1 Measuring frequencies from 30 MHz to the 1GHz。

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

3 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	Aug. 11, 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)
56.19	V	Peak	44.29	-14.63	29.66	40.00	-10.34
90.14	V	Peak	44.78	-17.62	27.16	43.50	-16.34
104.69	V	Peak	42.90	-16.63	26.27	43.50	-17.23
51..34	H	Peak	43.61	-14.19	29.42	54.00	-24.58
70.74	H	Peak	39.53	-16.27	23.26	40.00	-16.74

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 (above 1GHz)

Operation Mode	RX CH Low	Test Date	Aug. 11, 2008
Fundamental Frequency	2402 MHz	Test By	Bondi
Temperature	25℃	Pol	Ver.
Humidity	65 %		

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)	
1598.0	41.27	---	-5.48	35.79	---	74.00	54.00	-18.21	Peak
4804.0	----					74.00	54.00		
7206.0	----					74.00	54.00		
9608.0	----					74.00	54.00		
12010.0	----					74.00	54.00		
14412.0	----					74.00	54.00		

Remark:

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

(2) Data of measurement within this frequency range shown " - " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.

(3) Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column

(4) Spectrum Peak Setting : 1GHz- 40GHz, RBW= 1MHz, VBW= 3MHz, Sweep time= 200 ms.

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

Radiated Spurious Emission Measurement Result (above 1GHz)

Operation Mode	RX CH Low	Test Date	Aug. 11, 2008
Fundamental Frequency	2402 MHz	Test By	Bondi
Temperature	25 ℃	Pol	Hor
Humidity	65 %		

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)	
1598.0	51.39	---	-5.48	45.91	---	74.00	54.00	-8.09	Peak
4804.0	----					74.00	54.00		
7206.0	----					74.00	54.00		
9608.0	----					74.00	54.00		
12010.0	----					74.00	54.00		
14412.0	----					74.00	54.00		

Remark:

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

(2) Data of measurement within this frequency range shown " - " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.

(3) Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column

(4) Spectrum Peak Setting : 1GHz- 40GHz, RBW= 1MHz, VBW= 3MHz, Sweep time= 200 ms.

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

Radiated Spurious Emission Measurement Result (above 1GHz)

Operation Mode	RX CH Mid	Test Date	Aug. 11, 2008
Fundamental Frequency	2441 MHz	Test By	Bondi
Temperature	25 ℃	Pol	Ver
Humidity	65 %		

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)	
1630.5	42.92	---	-5.26	37.66	---	74.00	54.00	-16.34	Peak
4882.0	----					74.00	54.00		
7323.0	----					74.00	54.00		
9764.0	----					74.00	54.00		
12205.0	----					74.00	54.00		
14646.0	----					74.00	54.00		

Remark:

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

(2) Data of measurement within this frequency range shown " - " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.

(3) Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column

(4) Spectrum Peak Setting : 1GHz- 40GHz, RBW= 1MHz, VBW= 3MHz, Sweep time= 200 ms.

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

Radiated Spurious Emission Measurement Result (above 1GHz)

Operation Mode	RX CH Mid	Test Date	Aug. 11, 2008
Fundamental Frequency	2441 MHz	Test By	Bondi
Temperature	25 ℃	Pol	Hor
Humidity	65%		

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)	
1630.5	50.07	---	-5.26	44.81	---	74.00	54.00	-9.19	Peak
4882.0	----					74.00	54.00		
7323.0	----					74.00	54.00		
9764.0	----					74.00	54.00		
12205.0	----					74.00	54.00		
14646.0	----					74.00	54.00		

Remark:

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

(2) Data of measurement within this frequency range shown " - " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.

(3) Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column

(4) Spectrum Peak Setting : 1GHz- 40GHz, RBW= 1MHz, VBW= 3MHz, Sweep time= 200 ms.

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

Radiated Spurious Emission Measurement Result (above 1GHz)

Operation Mode	RX CH High	Test Date	Aug. 11, 2008
Fundamental Frequency	2480 MHz	Test By	Bondi
Temperature	25 ℃	Pol	Ver
Humidity	65 %		

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	45.00	---	-5.22	39.78	---	74.00	54.00	-14.22	Peak
4960.0	----					74.00	54.00		
7440.0	----					74.00	54.00		
9920.0	----					74.00	54.00		
12400.0	----					74.00	54.00		
14880.0	----					74.00	54.00		

Remark:

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

(2) Data of measurement within this frequency range shown " - " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.

(3) Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column

(4) Spectrum Peak Setting : 1GHz- 40GHz, RBW= 1MHz, VBW= 3MHz, Sweep time= 200 ms.

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

Radiated Spurious Emission Measurement Result (above 1GHz)

Operation Mode	RX CH High	Test Date	Aug. 11, 2008
Fundamental Frequency	2480 MHz	Test By	Bondi
Temperature	25 ℃	Pol	Hor
Humidity	65 %		

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	50.20	---	-5.22	44.98	---	74.00	54.00	-9.02	Peak
4960.0	----					74.00	54.00		
7440.0	----					74.00	54.00		
9920.0	----					74.00	54.00		
12400.0	----					74.00	54.00		
14880.0	----					74.00	54.00		

Remark:

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

(2) Data of measurement within this frequency range shown " - " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.

(3) Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column

(4) Spectrum Peak Setting : 1GHz- 40GHz, RBW= 1MHz, VBW= 3MHz, Sweep time= 200 ms.

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

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 RSS 210 issue 6, A8.1(2), 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.

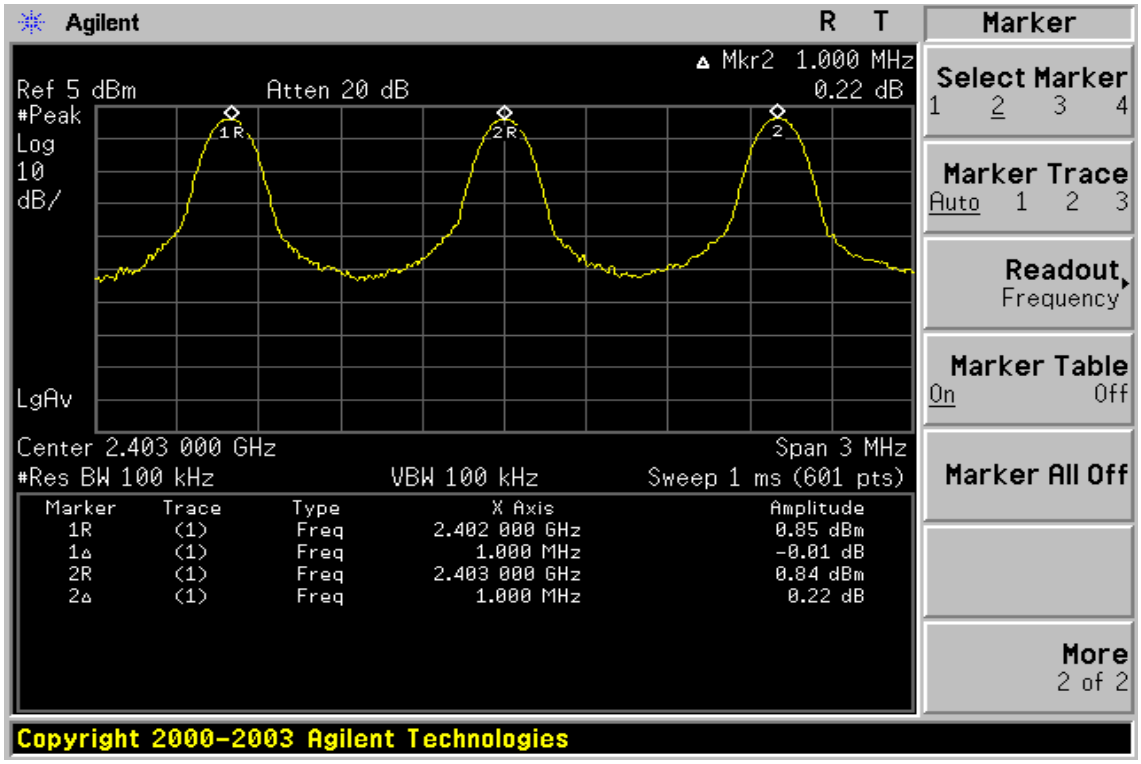
10.3. Measurement Result

Channel separation (MHz)	Limit	Result
1	>=25KHz or 2/3 times 20dB 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	04/19/2008	04/18/2010
Spectrum Analyzer	Agilent	E7405A	US41160416	07/04/2007	07/03/2009
Spectrum Analyzer	R&S	FSP 40	100034	02/22/2008	02/21/2009
Low Loss Cable	HUBER+SUHNER	SUCOFLEX 104PEA	N/A	N/A	N/A
Attenuator	Mini-Circuit	BW-S6W5	N/A	07/05/2008	07/04/2009

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

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

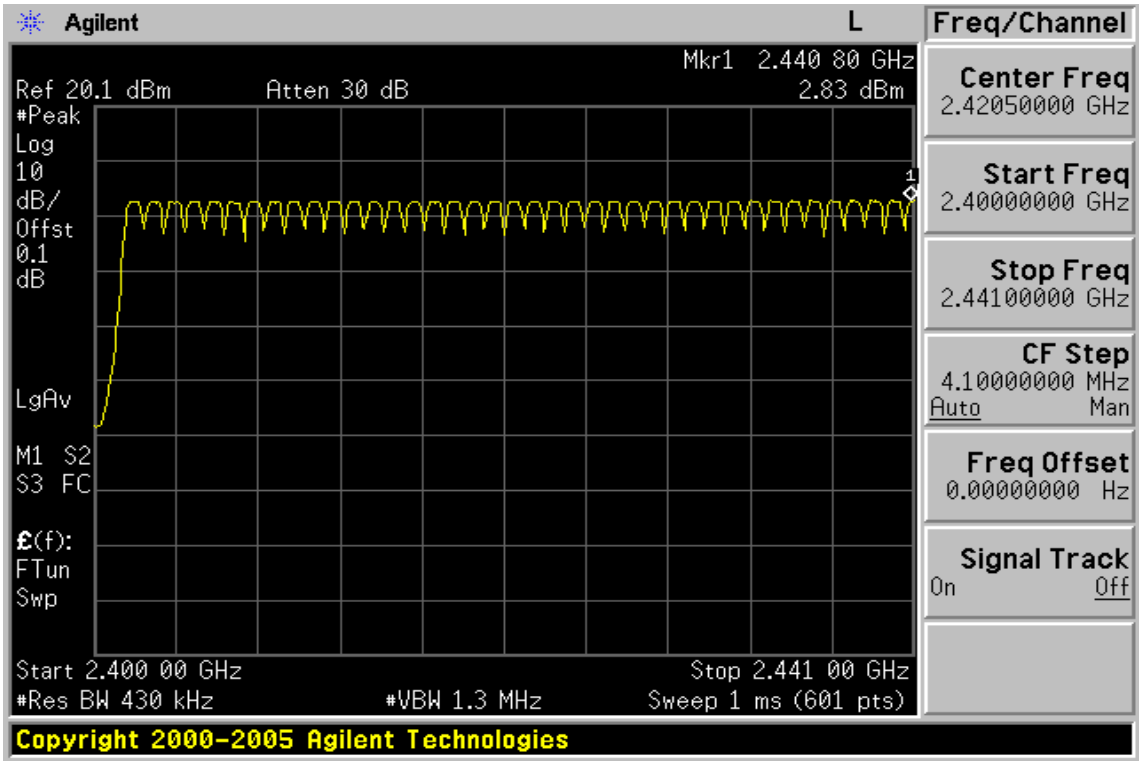
Refer to next page for the plots.

11.4. Measurement Equipment Used:

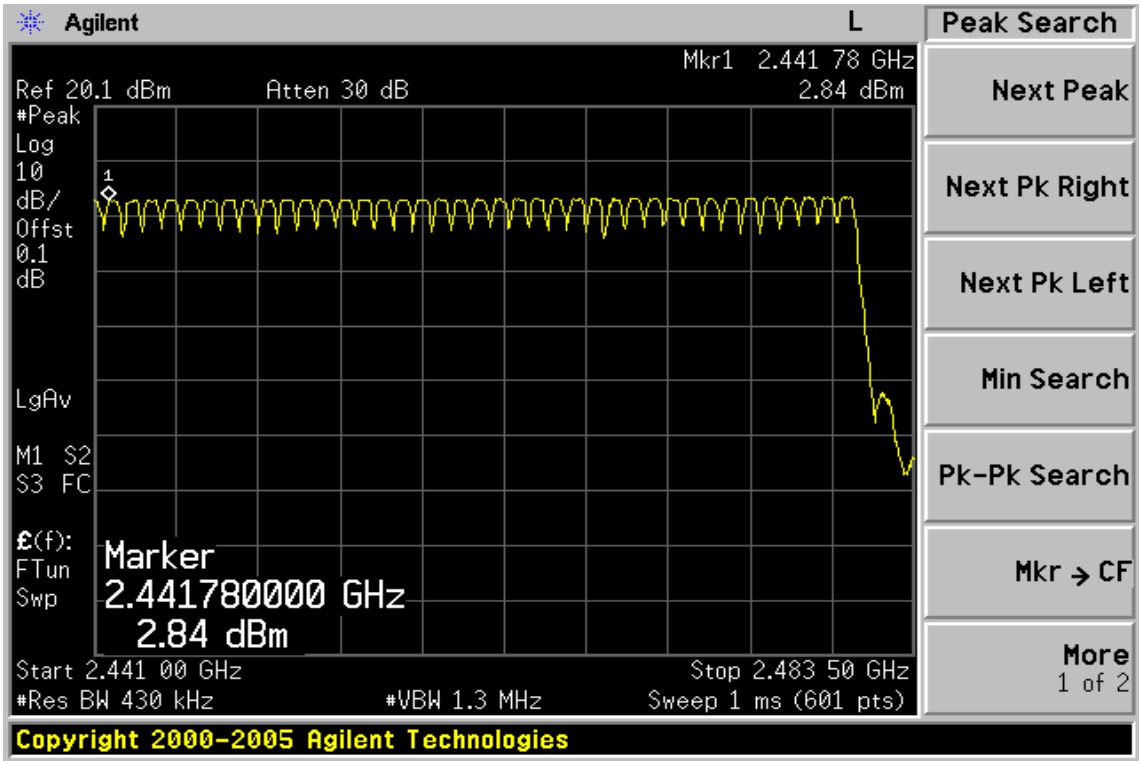
Conducted Emission Test Site					
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
Spectrum Analyzer	Agilent	E4446A	MY43360126	04/19/2008	04/18/2010
Spectrum Analyzer	Agilent	E7405A	US41160416	07/04/2007	07/03/2009
Spectrum Analyzer	R&S	FSP 40	100034	02/22/2008	02/21/2009
Low Loss Cable	HUBER+SUHNER	SUCOFLEX 104PEA	N/A	N/A	N/A
Attenuator	Mini-Circuit	BW-S6W5	N/A	07/05/2008	07/04/2009

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 RSS-210 issue 7,§A8.1(4), Frequency hopping systems operating in the 2400-2483.5 MHz band shall use at least 15 hopping channels. The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed. Transmissions on particular hopping frequencies may be avoided or suppressed provided that a minimum of 15 hopping channels are used.

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 = 0.417 (ms) * (1600/(1*79)) * 31.6 = 266.9 (ms)

DH3 time slot = 1.667 (ms) * (1600/(3*79)) * 31.6 = 355.6 (ms)

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

CH Mid: DH1 time slot = 0.417 (ms) * (1600/(1*79)) * 31.6 = 266.9 (ms)

DH3 time slot = 1.667 (ms) * (1600/(3*79)) * 31.6 = 355.6 (ms)

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

CH High: DH1 time slot = 0.417 (ms) * (1600/(1*79)) * 31.6 = 266.9 (ms)

DH3 time slot = 1.667 (ms) * (1600/(3*79)) * 31.6 = 355.6 (ms)

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

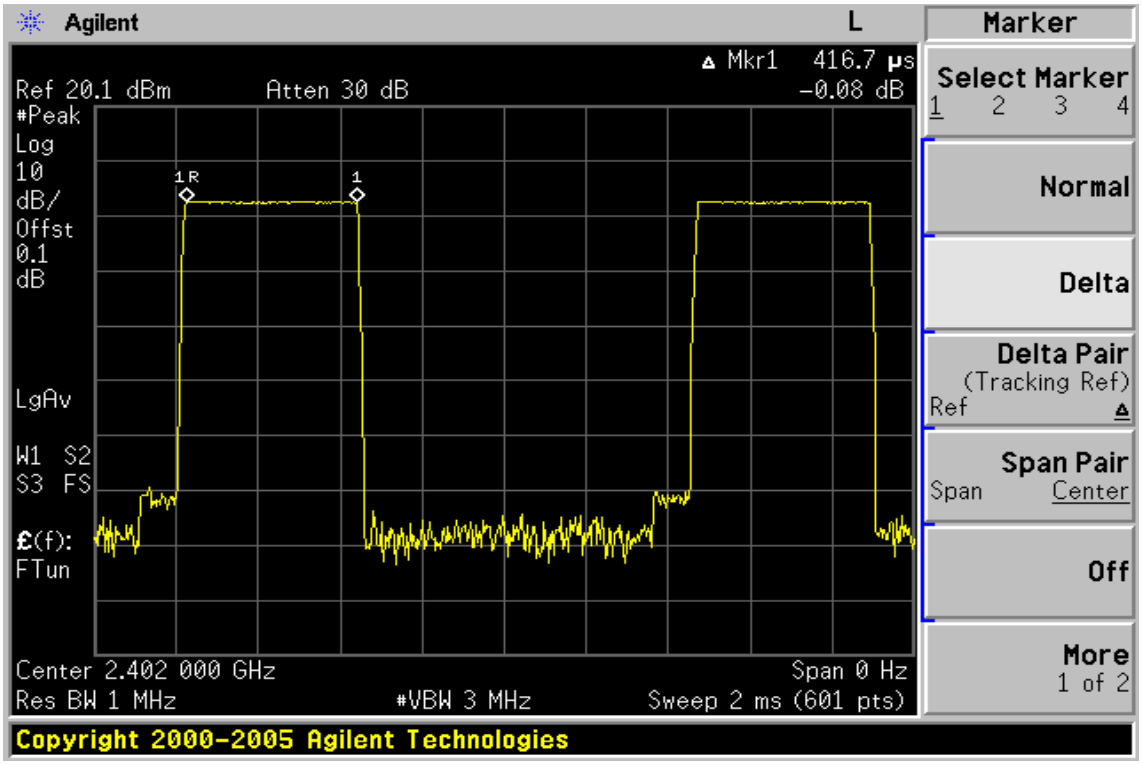
12.4. Measurement Equipment Used:

Conducted Emission Test Site					
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
Spectrum Analyzer	Agilent	E4446A	MY43360126	04/19/2008	04/18/2010
Spectrum Analyzer	Agilent	E7405A	US41160416	07/04/2007	07/03/2009
Spectrum Analyzer	R&S	FSP 40	100034	02/22/2008	02/21/2009
Low Loss Cable	HUBER+SUHNER	SUCOFLEX 104PEA	N/A	N/A	N/A
Attenuator	Mini-Circuit	BW-S6W5	N/A	07/05/2008	07/04/2009

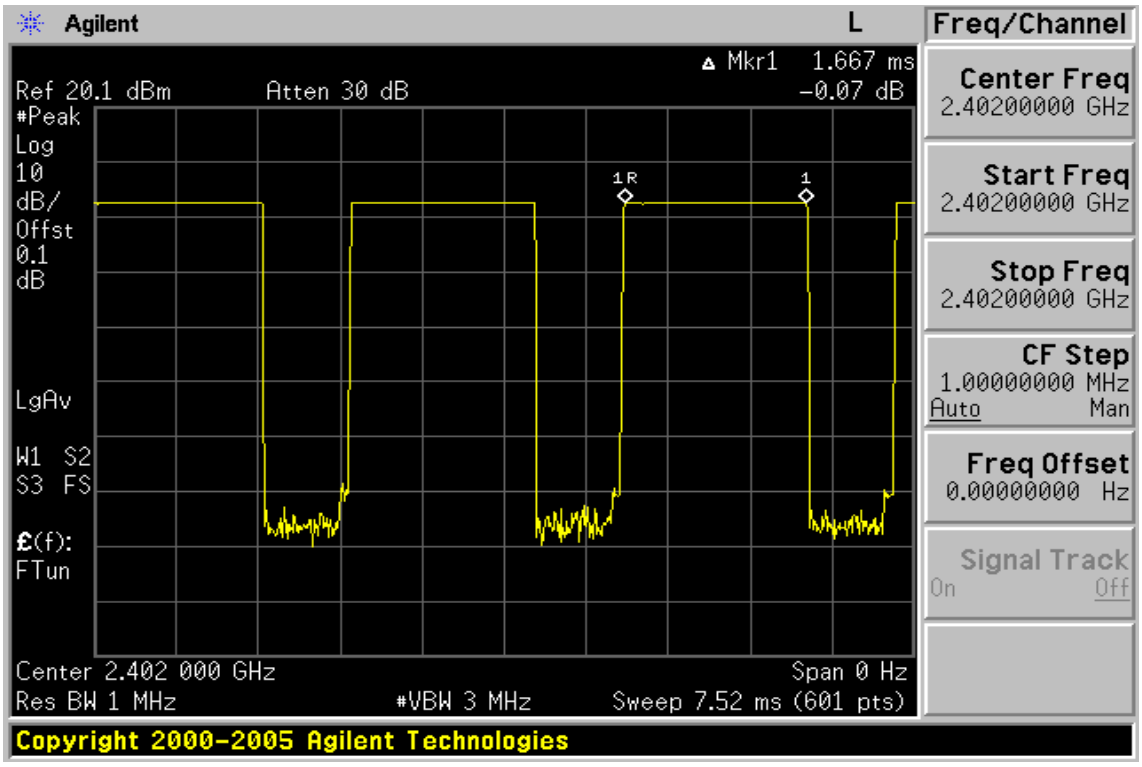
Dwell Time Test Data

CH-Low

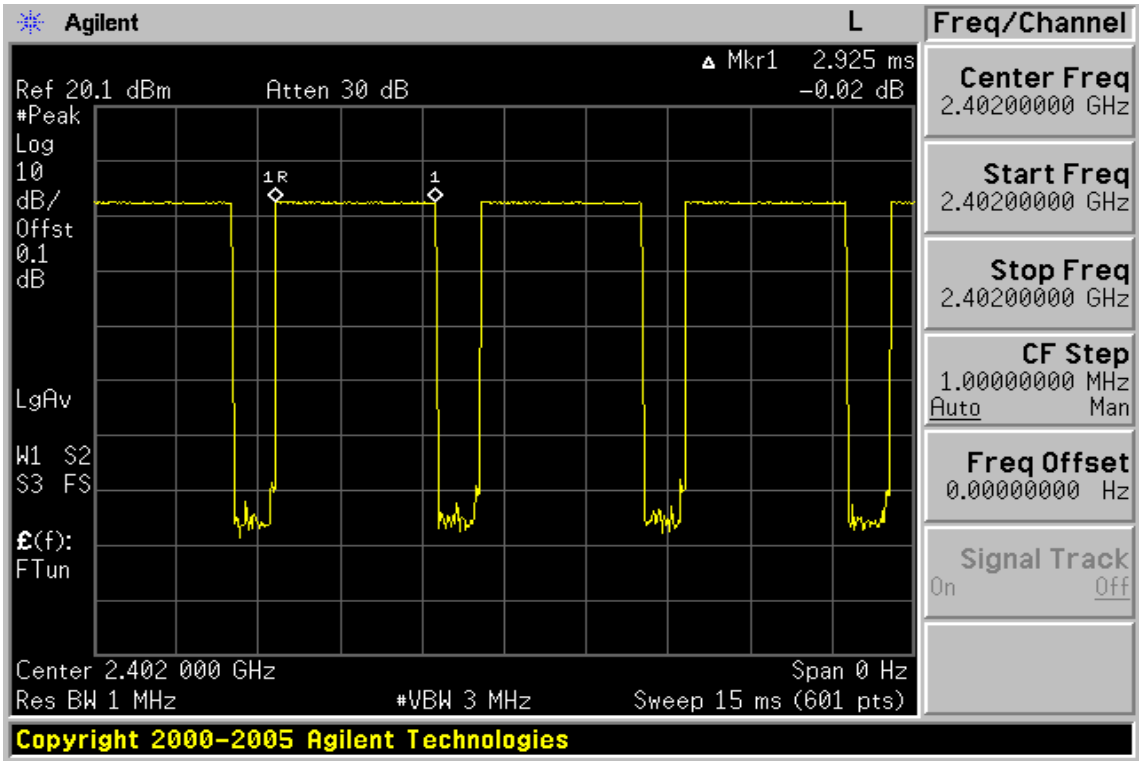
DH1



DH3

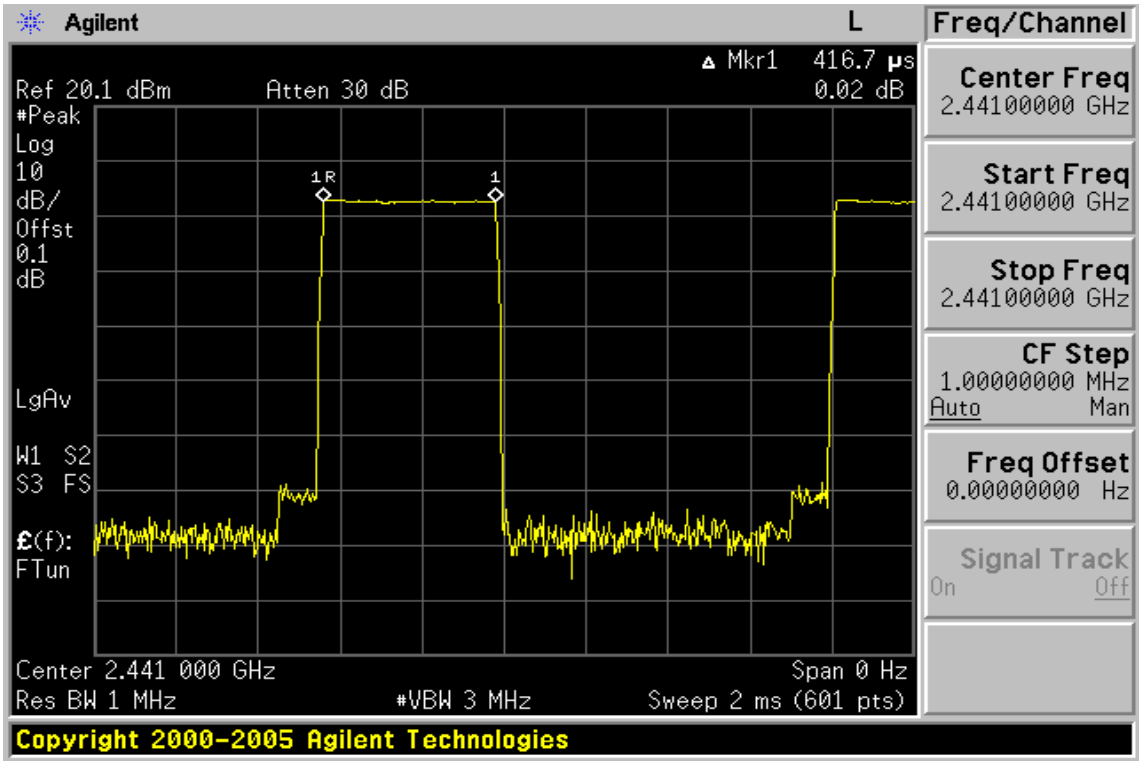


DH5

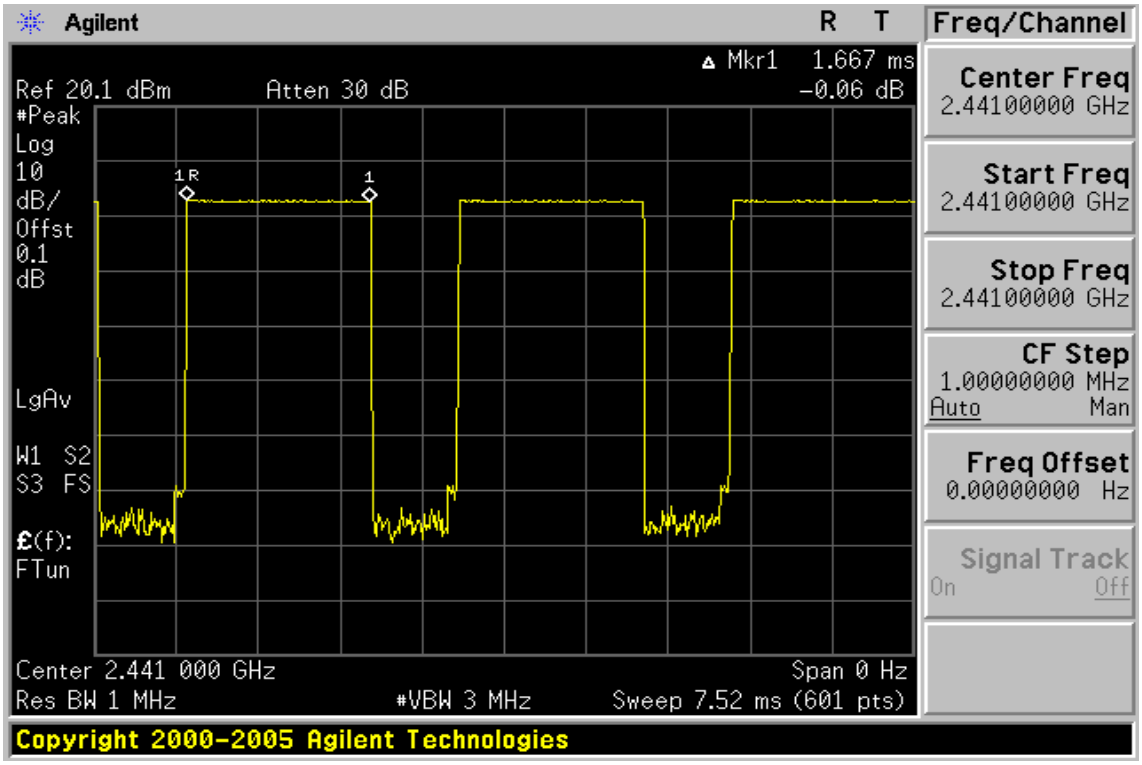


CH-Mid

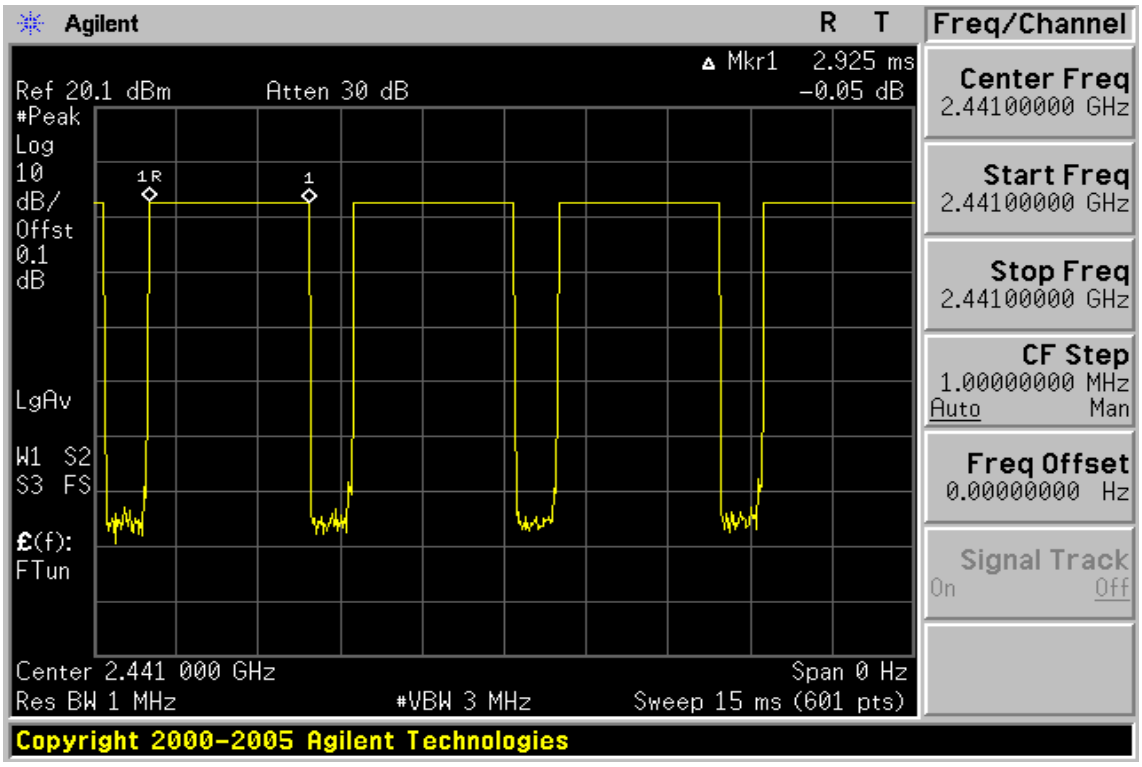
DH1



DH3

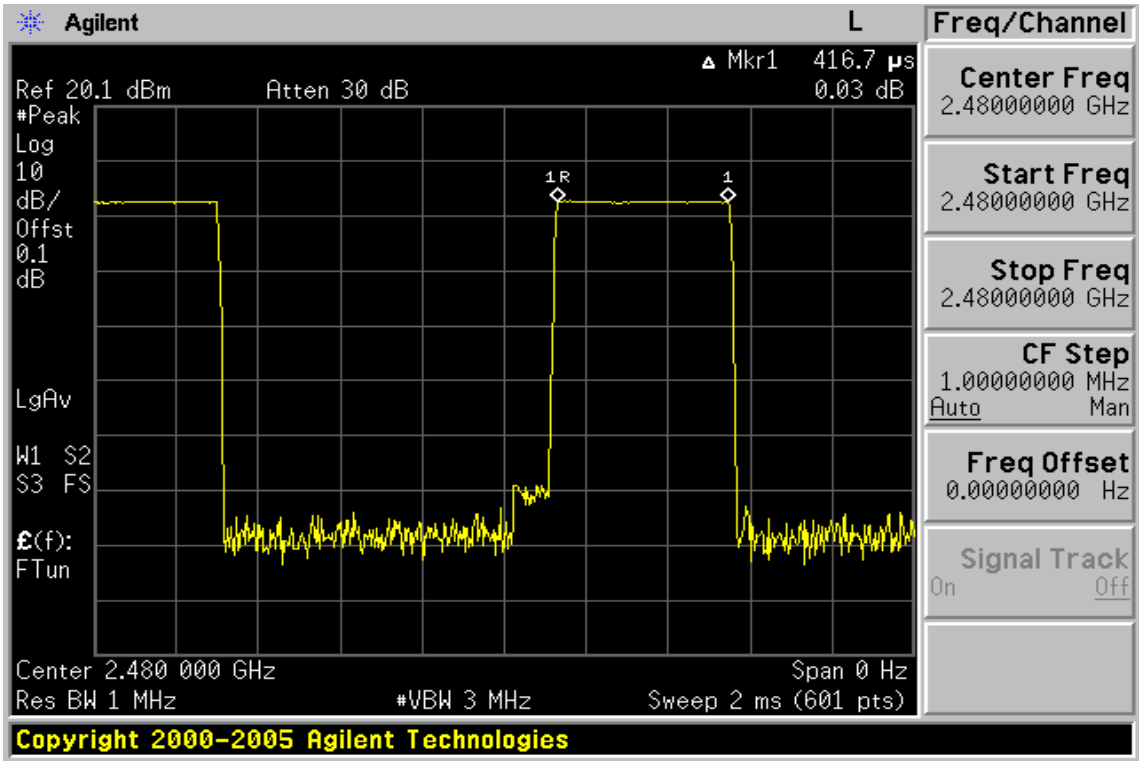


DH5

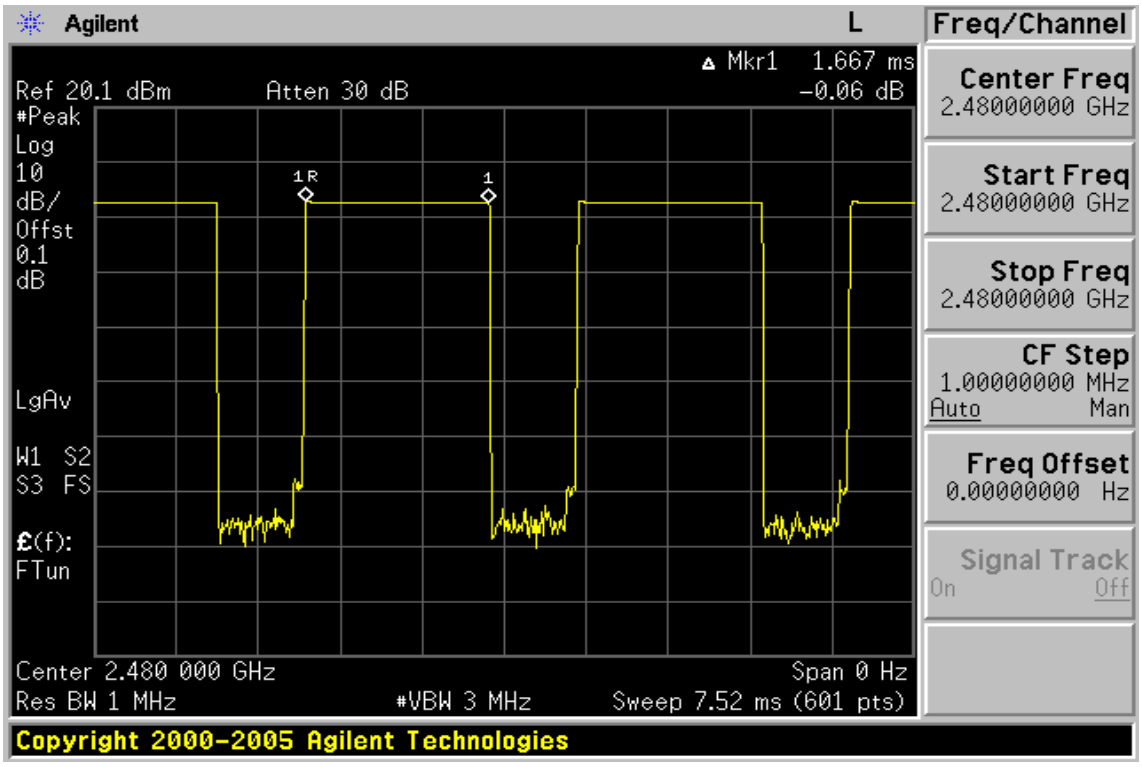


CH-High

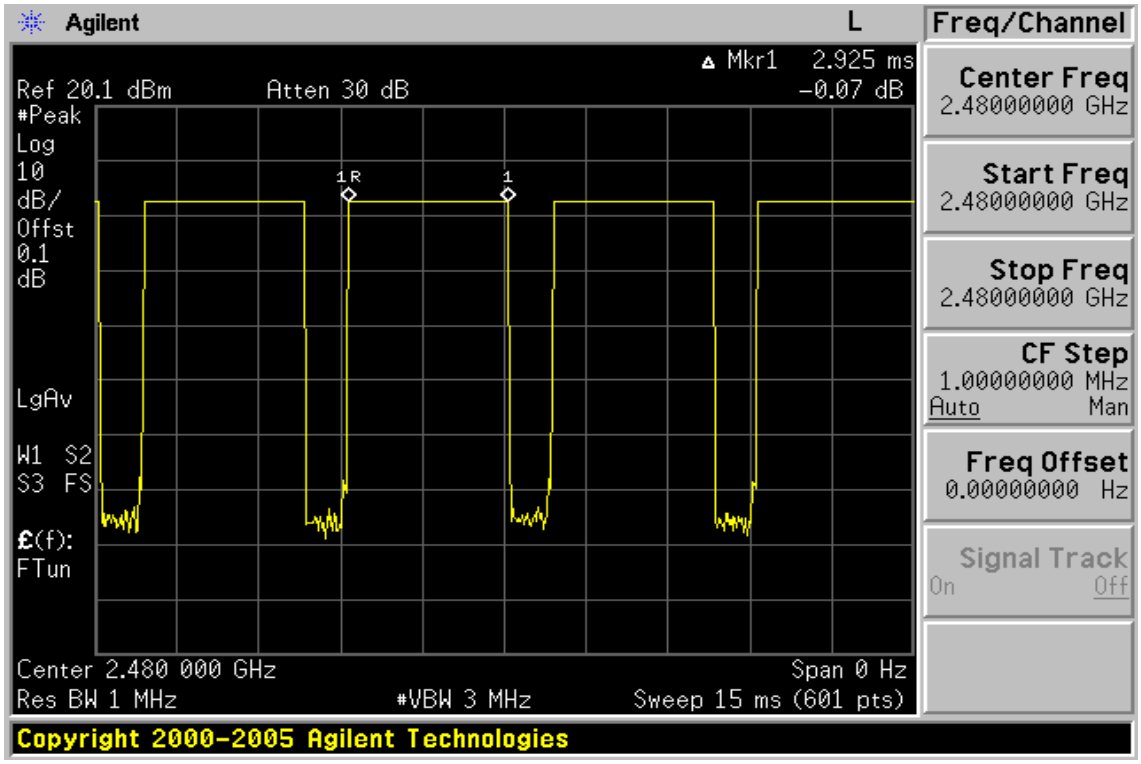
DH1



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.

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

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.

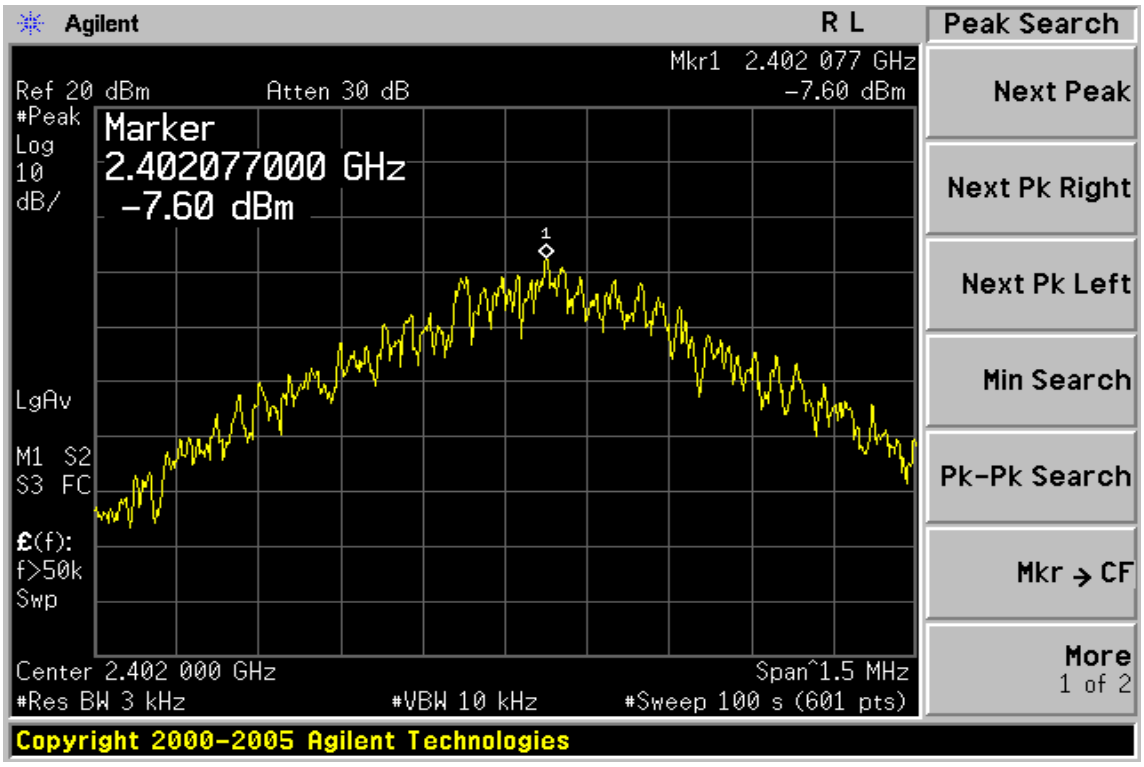
13.3. Measurement Result

CH	RF Power Density Reading (dBm)	Cable loss (dB)	RF Power Density Level (dBm)	Maximum Limit (dBm)
Low	-7.60	0.10	-7.50	8
Mid	-7.42	0.10	-7.32	8
High	-9.40	0.10	-9.30	8

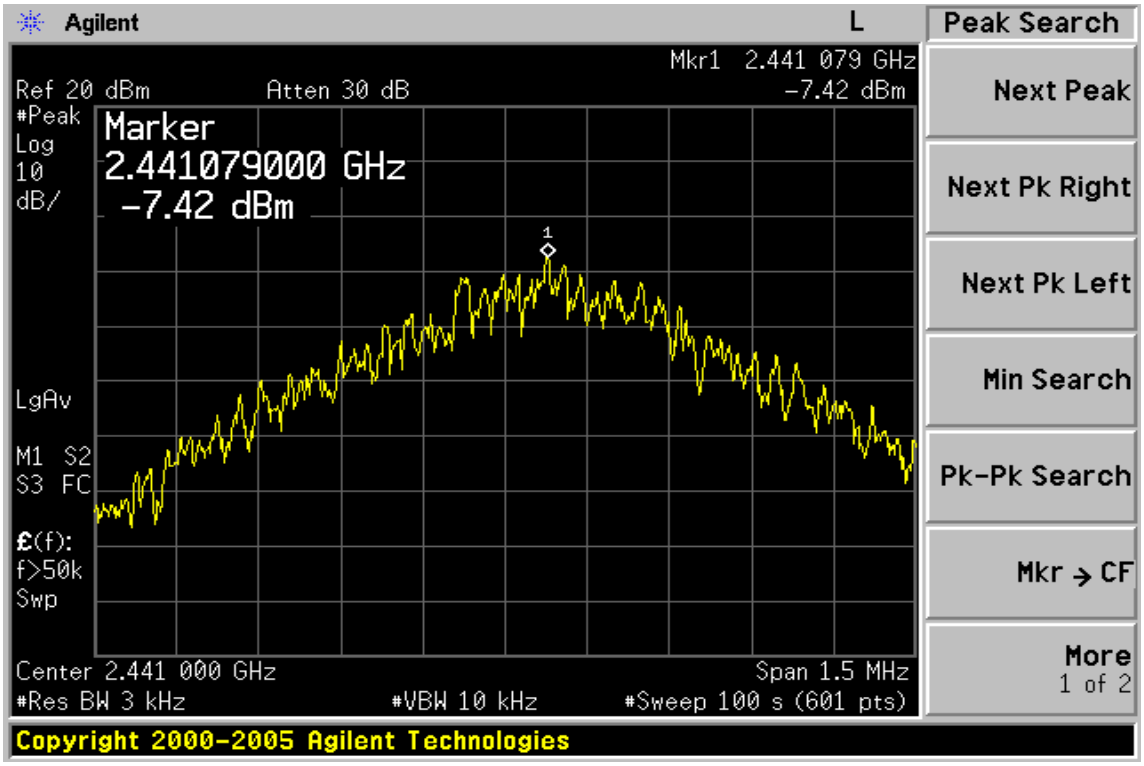
13.4. Measurement Equipment Used:

Conducted Emission Test Site					
EQUIPMENT TYPE	**MFR**	**MODEL NUMBER**	**SERIAL NUMBER**	**LAST CAL.**	**CAL DUE.**
Spectrum Analyzer	Agilent	E4446A	MY43360126	04/19/2008	04/18/2010
Spectrum Analyzer	Agilent	E7405A	US41160416	07/04/2007	07/03/2009
Spectrum Analyzer	R&S	FSP 40	100034	02/22/2008	02/21/2009
Low Loss Cable	HUBER+SUHNER	SUCOFLEX 104PEA	N/A	N/A	N/A
Attenuator	Mini-Circuit	BW-S6W5	N/A	07/05/2008	07/04/2009

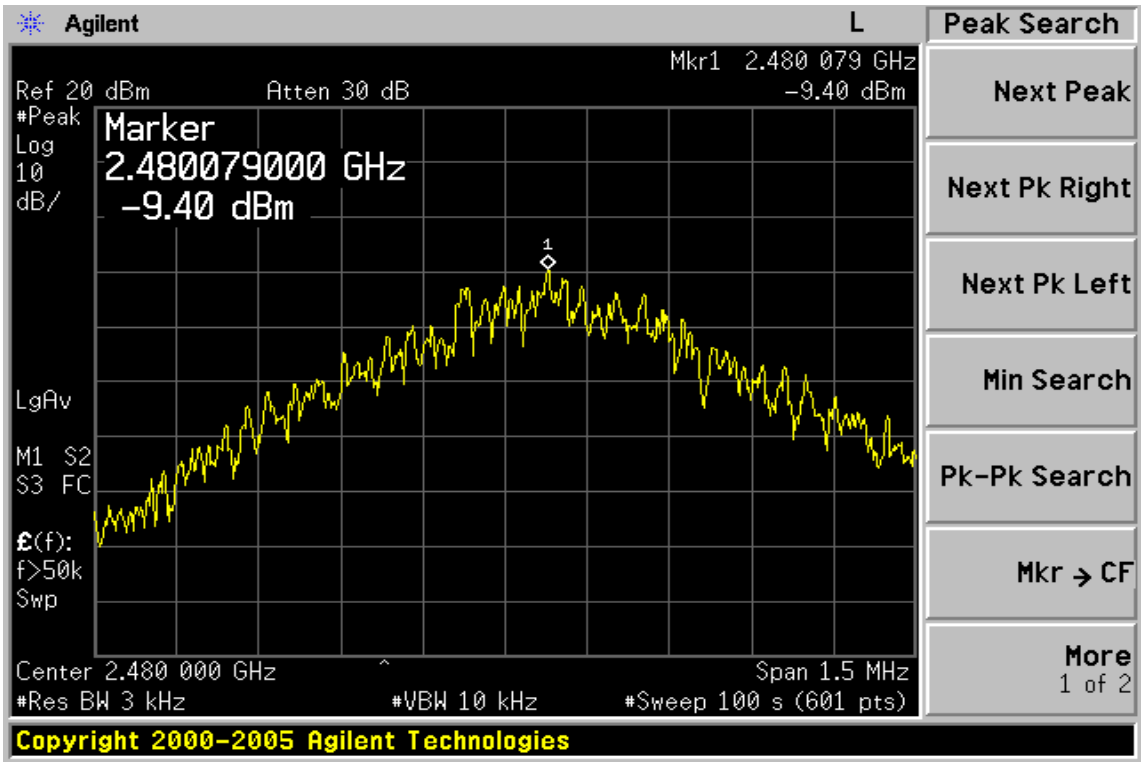
Power Spectral Density Test Plot (CH-Low)



Power Spectral Density Test Plot (CH-Mid)



Power Spectral Density Test Plot (CH-High)



14. 99% Bandwidth Measurement

14.1. Standard Applicable

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

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

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

14.2. Measurement Equipment Used:

Conducted Emission Test Site					
EQUIPMENT TYPE	**MFR**	**MODEL NUMBER**	**SERIAL NUMBER**	**LAST CAL.**	**CAL DUE.**
Spectrum Analyzer	Agilent	E4446A	MY43360126	04/19/2008	04/18/2010
Spectrum Analyzer	Agilent	E7405A	US41160416	07/04/2007	07/03/2009
Spectrum Analyzer	R&S	FSP 40	100034	02/22/2008	02/21/2009
Low Loss Cable	HUBER+SUHNER	SUCOFLEX 104PEA	N/A	N/A	N/A
Attenuator	Mini-Circuit	BW-S6W5	N/A	07/05/2008	07/04/2009

14.3. Test Set-up:

Refer to section 2.4.

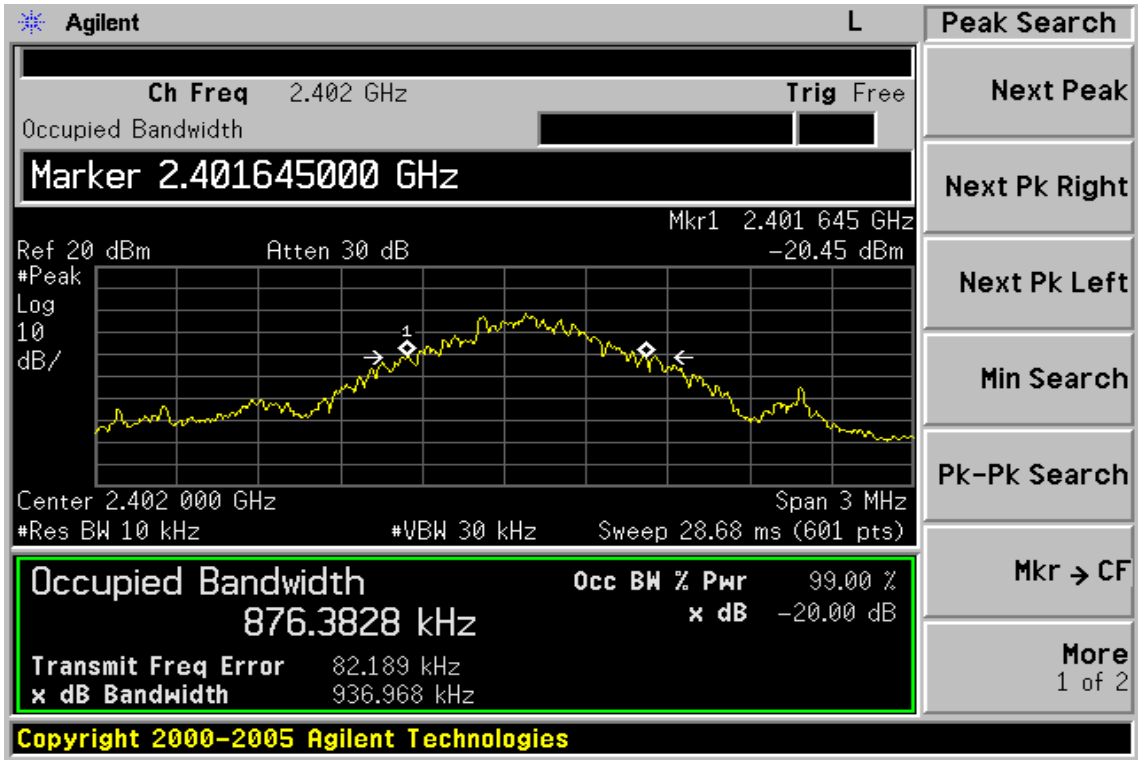
14.4. Measurement Procedure

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.

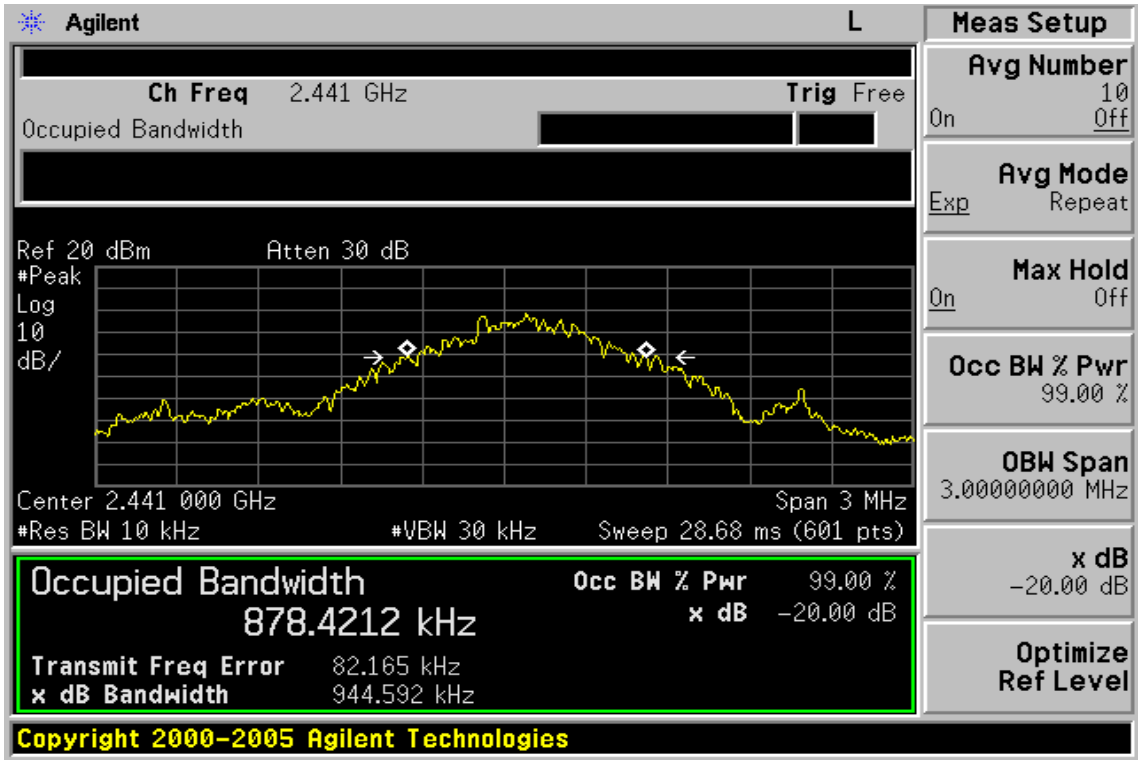
14.5. Measurement Result

CH	Bandwidth (kHz)
Lower	876.3828
Mid	878.4212
Higher	881.7525

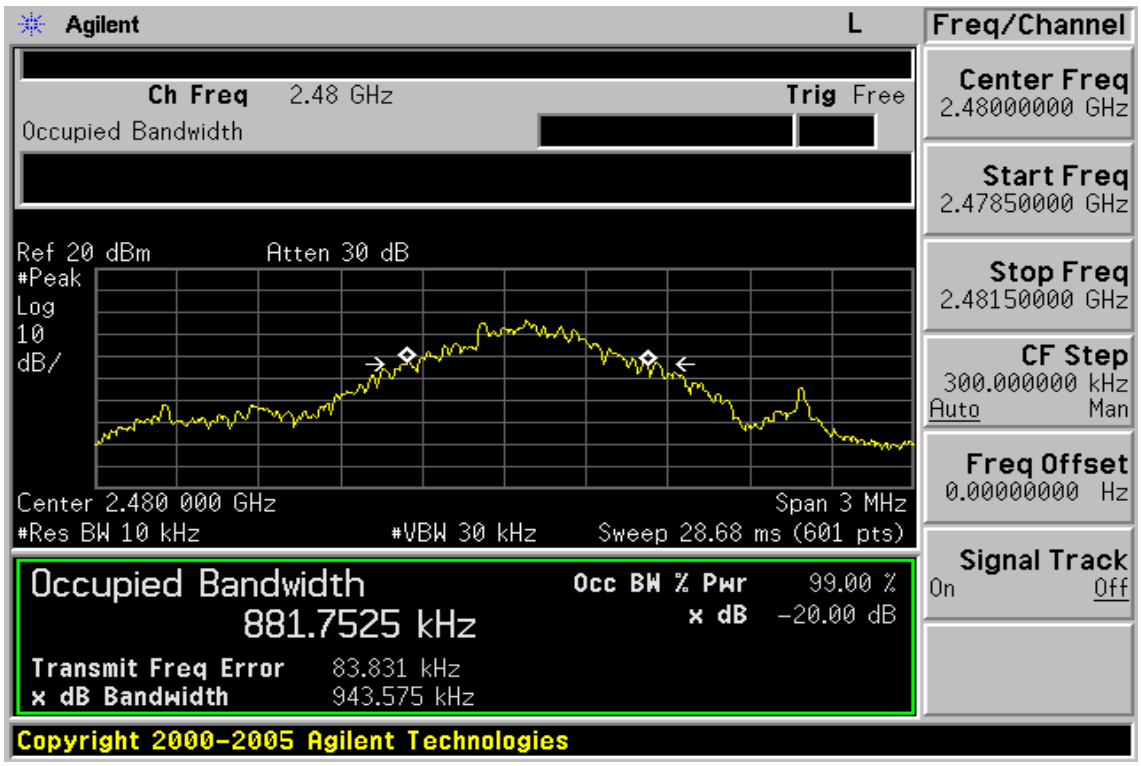
99% Band Width Test Data CH-Low



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

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

15.2. Antenna Connected Construction

The directional gains of antenna used for transmitting is 0dBi, and the antenna connector is designed with permanent attachment and no consideration of replacement. Please see EUT photo for details.