ELECTROMAGNETIC EMISSIONS COMPLIANCE REPORT

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

OF

Product Name:	**2.4GHz Wireless Digital Transceiver Module**
Brand Name:	**N/A**
Model Name:	**FCC: LW2110, LW2110PK2B** **IC: LW2110**
Model difference:	**Different model For different customer**
FCC ID:	**UCZMC2110**
IC:	**8575A-LW2110**
Report No.:	**ER/2011/20003**
Issue Date:	**Mar. 04, 2011**
FCC Rule Part:	**§15.247, Cat: DTS**
IC Rule Part:	**RSS-210 issue 8:2010, Annex 8**
Prepared for:	**Lorex Technology Inc** **250 Royal Crest Court, Markham, Ontario L3R 3S1,Canada**
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:	Lorex Technology Inc 250 Royal Crest Court, Markham, Ontario L3R 3S1,Canada
Product Name:	2.4GHz Wireless Digital Transceiver Module
Brand Name:	N/A
FCC ID:	UCZMC2110
IC:	8575A-LW2110
Model No.:	FCC: LW2110, LW2110PK2B IC: LW2110
Model difference:	Different model For different customer
File Number:	ER/2011/20003
Date of test:	Feb. 11, 2011 ~ Mar. 04, 2011
Date of EUT Received:	Feb. 11, 2011

We hereby certify that:

The above equipment was tested by SGS Taiwan Ltd. Electronics & Communication Laboratory The test data, data evaluation, test procedures, and equipment configurations shown in this report were made in accordance with the procedures given in ANSI C63.4 (2003) and the energy emitted by the sample EUT tested as described in this report is in compliance with conducted and radiated emission limits of FCC Rules Part 15.247 and IC RSS 210 issue 8: 2010 Annex 8.
The test results of this report relate only to the tested sample identified in this report.

Test By:		***Date:***	Mar. 04, 2011
	Eric Su / Asst. Supervisor		
Prepared By:		***Date:***	Mar. 04, 2011
	Cherry Chen / Clerk		
Approved By:		***Date:***	Mar. 04, 2011
	Jim Chang / Supervisor		

Version

Version No.	Date	Description
00	Mar. 04, 2011	Initial creation of document
01	Aug. 05, 2011	Correct frequency range to 2402 – 2478MHz.

Table of Contents

1 GENERAL INFORMATION

1.1 Product Description

General:

Product Name	2.4GHz Wireless Digital Transceiver Module	
Brand Name	N/A	
Model Name	FCC: LW2110, LW2110PK2B IC: LW2110	
Model Difference:	Different model For different customer	
Coaxial Cable:	Model No.: CS38F1L-BNC-CABLE-001	
Power Supply	Adapter:	Model No.: GQ07-120050-BU Supplier: GANG QI

Operation mode:

Frequency Range:	2402 – 2478MHz
Channel number:	40 channels
Max. Output Power:	9.50 dBm
Modulation type:	GFSK
Antenna Designation:	Dipole Antenna, 1.8 dBi.

1.2 Related Submittal(s) / Grant (s)

This submittal(s) (test report) is intended for **FCC ID: UCZMC2110** filing to comply with Section 15.247 of the FCC Part 15, Subpart E Rules and **IC: 8575A- LW2110** filing to comply with Industry Canada RSS-210 issue 8: 2010 Annex 8. The composite system (digital device) is compliance with Subpart B is authorized under a DoC procedure.

1.3 Test Methodology

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

Tested in accordance with Oct 2002 KDB558074 for compliance to FCC 47CFR 15.247 requirements

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. Electronics & Communication Laboratory No. 134, Wu Kung Rd., Wuku Industrial Zone, Taipei Country, Taiwan which are constructed and calibrated to meet the FCC requirements in documents ANSI C63.4: 2003. FCC Registration Number are: 990257 and 236194, Canada Registration Number: 4620A-1.

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

1.5 Special Accessories

Not available for this EUT intended for grant.

1.6 Equipment Modifications

Not available for this EUT intended for grant.

2 SYSTEM TEST CONFIGURATION

2.1 EUT Configuration

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

2.2 EUT Exercise

The EUT (Transmitter) was operated in the engineering mode to fix the Tx frequency that was for the purpose of the measurements.

2.3 Test Procedure

2.3.1 Conducted Emissions

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

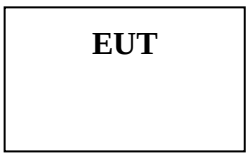
2.3.2 Radiated Emissions

The EUT is a placed on as turn table which is 0.8 m above ground plane. The turn table shall rotate 360 degrees to determine the position of maximum emission level. EUT is set 3m away from the receiving antenna which varied from 1m to 4m to find out the highest emission. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical. In order to find out the max. emission, the relative positions of this hand-held transmitter (EUT) was rotated through three orthogonal axes and measurement procedures for electric field radiated emissions above 1 GHz the EUT measurement is to be made “while keeping the antenna in the ‘cone of radiation’ from that area and pointed at the area both in azimuth and elevation, with polarization oriented for maximum response.” is still within the 3dB illumination BW of the measurement antenna. According to the requirements in Section 8 and 13 of ANSI C63.4-2003 and KDB558074.

2.4 Configuration of Tested System

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

TX



Remote side

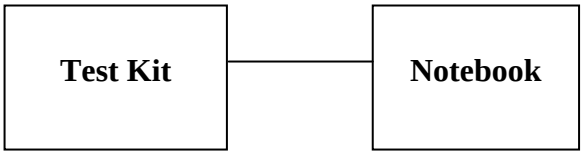


Table 2-1 Equipment Used in Tested System

Item	Equipment	Mfr/Brand	Model/ Type No.	Series No.	Data Cable	Power Cord
1.	Notebook	IBM	R61	L3A9050	N/A	N/A
2.	Test Kit	N/A	N/A	N/A	N/A	N/A

3 SUMMARY OF TEST RESULTS

FCC Rules	Description Of Test	Result
§15.207(a)/ RSS-Gen §7.2.2	AC Power Line Conducted Emission	Compliant
§15.247(a)(2)(b)/ §A8.4(4)	Peak Output Power	Compliant
§15.247(a)(2)/ §A8.(a) RSS-Gen §4.4.1	6dB Bandwidth & 99% Power Bandwidth	Compliant
§15.247(c)/ §A8.5	100 KHz Bandwidth Of Frequency Band Edges	Compliant
§15.247(c)/ §A8.5	Spurious Emission	Compliant
§15.247/,§A8.2(b)	Peak Power Density	Compliant
§15.203/ RSS-GEN 7.1.4, RSS-210 issue 7,§A8.4	Antenna Requirement	Compliant

4 DESCRIPTION OF TEST MODES

The EUT has been tested under operating condition.
Test program used to control the EUT for staying in continuous transmitting and receiving mode is programmed.

Channel low (2402MHz)、mid (2440MHz) and high (2478MHz) 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. 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	09/15/2010	09/14/2011
LISN	Rolf-Heine	NNB-2/16Z	99012	02/02/2011	02/01/2012
LISN	FCC	FCC-LISN-50/250-25-2-01	04034	02/02/2011	02/01/2012
Coaxial Cables	N/A	WK CE Cable	N/A	11/28/2010	11/27/2011

5.3. EUT Setup:

1. The conducted emission tests were performed in the test site, using the setup in accordance with the ANSI C63.4-2003.
2. The AC/DC Power adaptor of EUT was plug-in LISN. The EUT was placed flushed with the rear of the table.
3. The LISN was connected with 120Vac/60Hz power source.

5.4. Measurement Procedure:

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

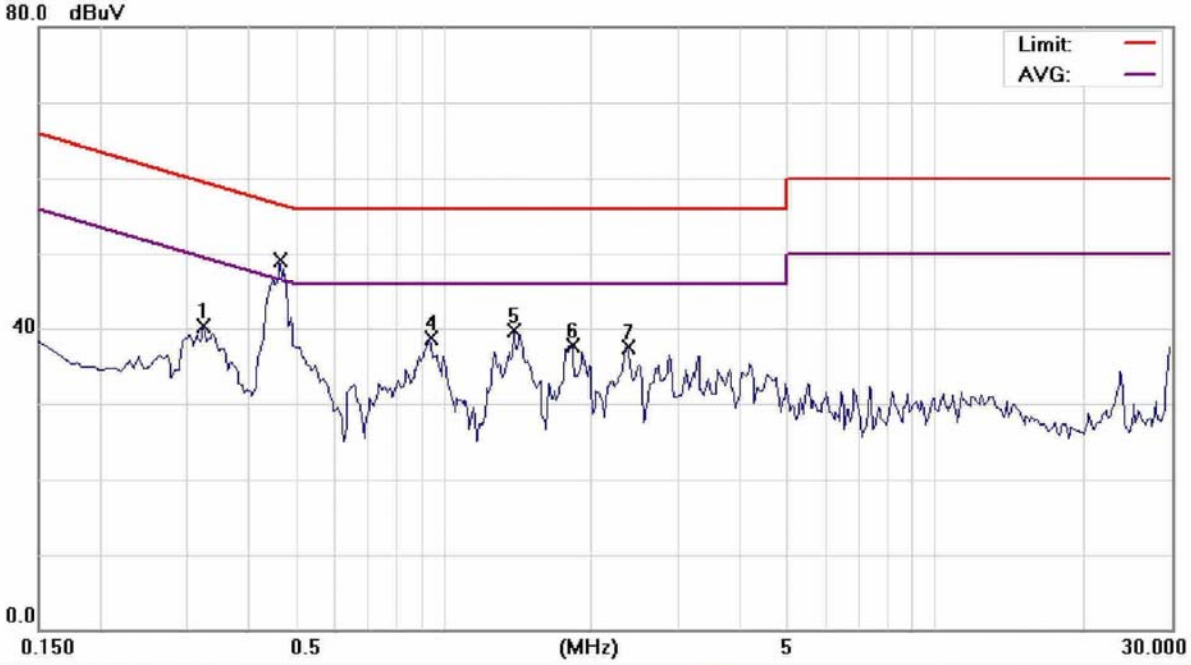
5.5. Measurement Result:

The initial step in collecting conducted data is a spectrum analyzer peak scan of the measurement range. Significant peaks are then marked as shown on the following data page, and these signals are then quasi-peaked.

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

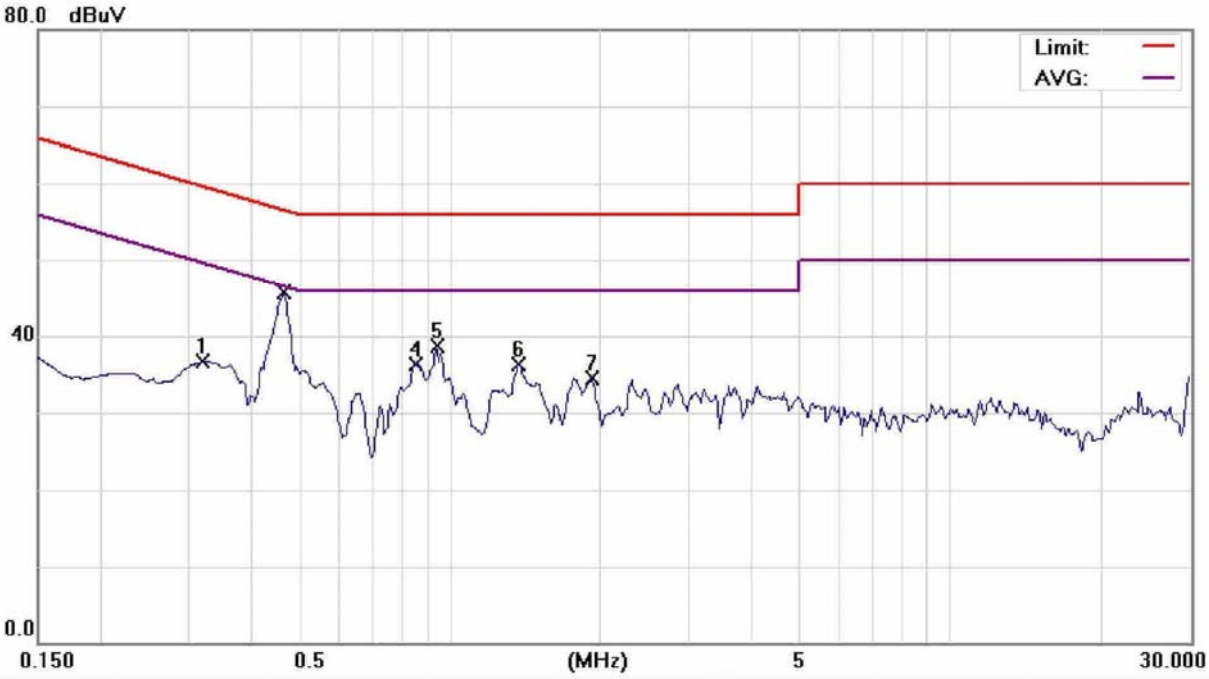
AC POWER LINE CONDUCTED EMISSION TEST DATA

Operation Mode:	Operation mode			Test Date:	Mar. 04, 2011
Temperature:	22 ℃	Humidity:	58 %	Test By:	Eric



Site SGS CONDUCTED #1 Phase: L1 Temperature: 22 ℃
Limit: FCC Class B Conduction(QP) Power: AC 120V/60Hz Humidity: 58 %
EUT: 2.4GHz Wireless Digital Transceiver Module Air Pressure: hpa
M/N: DRF-TR001
Note: Operation mode

No.	Mk.	Freq.	Reading Level	Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1		0.3250	40.16	0.12	40.28	59.58	-19.30	peak	
2	*	0.4577	40.82	0.12	40.94	56.73	-15.79	QP	
3		0.4577	29.49	0.12	29.61	46.73	-17.12	AVG	
4		0.9400	38.62	0.12	38.74	56.00	-17.26	peak	
5		1.3900	39.51	0.14	39.65	56.00	-16.35	peak	
6		1.8300	37.64	0.15	37.79	56.00	-18.21	peak	
7		2.3800	37.40	0.17	37.57	56.00	-18.43	peak	



Site SGS CONDUCTED #1 Phase: N Temperature: 22 ℃
Limit: FCC Class B Conduction(QP) Power: AC 120V/60Hz Humidity: 58 %
EUT: 2.4GHz Wireless Digital Transceiver Module Air Pressure: hpa
M/N: DRF-TR001
Note: Operation mode

No.	Mk.	Freq.	Reading Level	Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1		0.3200	36.61	0.12	36.73	59.71	-22.98	peak	
2		0.4645	42.89	0.12	43.01	56.61	-13.60	QP	
3	*	0.4645	36.10	0.12	36.22	46.61	-10.39	AVG	
4		0.8500	36.20	0.13	36.33	56.00	-19.67	peak	
5		0.9400	38.52	0.13	38.65	56.00	-17.35	peak	
6		1.3700	36.23	0.14	36.37	56.00	-19.63	peak	
7		1.9200	34.42	0.16	34.58	56.00	-21.42	peak	

6 PEAK OUTPUT POWER MEASUREMENT

6.1 Standard Applicable:

According to §15.247(a)(2), (b)

(3) For systems using digital modulation in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz bands: 1 Watt. As an alternative to a peak power measurement, compliance with the one Watt limit can be based on a measurement of the maximum conducted output power. Maximum Conducted Output Power is defined as the total transmit power delivered to all antennas and antenna elements averaged across all symbols in the signaling alphabet when the transmitter is operating at its maximum power control level. Power must be summed across all antennas and antenna elements. The average must not include any time intervals during which the transmitter is off or is transmitting at a reduced power level. If multiple modes of operation are possible (e.g., alternative modulation methods), the maximum conducted output power is the highest total transmit power occurring in any mode.

(4) The conducted output power limit specified in paragraph (b) of this section is based on the use of antennas with directional gains that do not exceed 6 dBi. Except as shown in paragraph (c) of this section, if transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced below the stated values in paragraphs (b)(1), (b)(2), and (b)(3) of this section, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

(c) Operation with directional antenna gains greater than 6 dBi.

(1) Fixed point-to-point operation:

(i) Systems operating in the 2400-2483.5 MHz band that are used exclusively for fixed, point-to-point operations may employ transmitting antennas with directional gain greater than 6 dBi provided the maximum conducted output power of the intentional radiator is reduced by 1 dB for every 3 dB that the directional gain of the antenna exceeds 6 dBi.

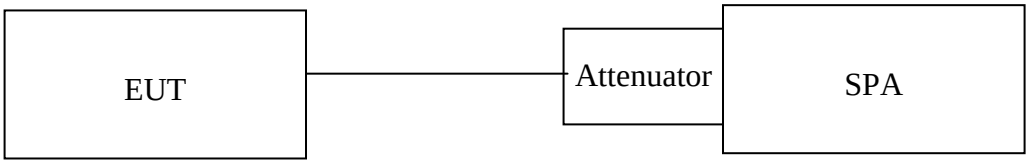
(ii) Systems operating in the 5725-5850 MHz band that are used exclusively for fixed, point-to-point operations may employ transmitting antennas with directional gain greater than 6 dBi without any corresponding reduction in transmitter conducted output power.

According to RSS-210 issue 7,§A8.4(4), For systems employing digital modulation techniques operating in the bands 902-928 MHz, 2400-2483.5 MHz and 5725-5850 MHz, the maximum peak conducted output power shall not exceed 1 W. Except as provided in Section A8.4(5), the e.i.r.p. shall not exceed 4 W.

6.2 Measurement Equipment Used:

Conducted Emission Test Site					
EQUIPMENT TYPE	**MFR**	**MODEL NUMBER**	**SERIAL NUMBER**	**LAST CAL.**	**CAL DUE.**
Spectrum Analyzer	Agilent	E4446A	MY43360126	04/19/2011	04/18/2013
Spectrum Analyzer	Agilent	E4440A	MY45304525	01/25/2011	01/24/2012
DC Block	Agilent	BLK-18	155452	07/05/2010	07/04/2011
Low Loss Cable	HUBER+SUHNER	SUCOFLEX 104PEA	N/A	01/05/2011	01/04/2012
Attenuator	Mini-Circuit	BW-S6W5	001	07/05/2010	07/04/2011
Attenuator	Mini-Circuit	BW-S10W5	001	07/05/2010	07/04/2011
Attenuator	Mini-Circuit	BW-S20W5	001	07/05/2010	07/04/2011
Splitter	Agilent	11636B	N/A	07/05/2010	07/04/2011

6.3 .Test Set-up:



6.4 Measurement Procedure:

1. Place the EUT on the table and set it in transmitting mode.
2. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the power meter or spectrum. (Channel power function, RBW, VBW = 1MHz,Bandwidth=26dB occupied Bandwidth)
3. Record the max. reading.
4. Repeat above procedures until all frequency measured were complete.

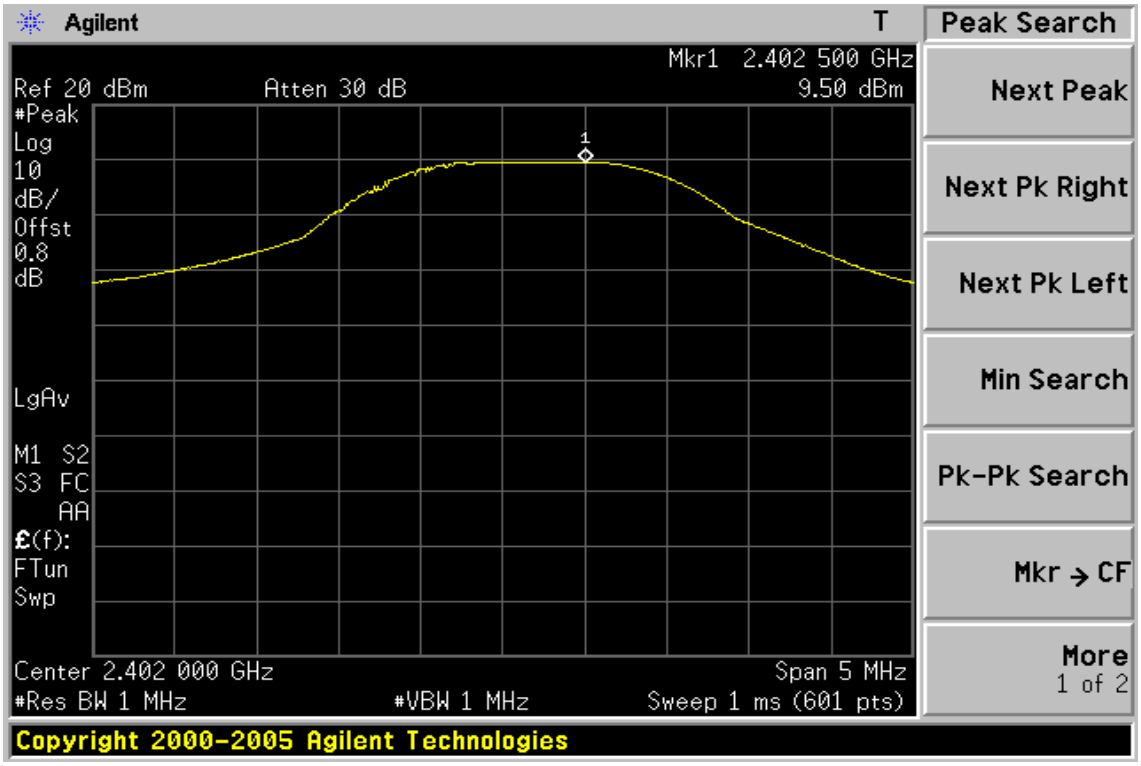
6.5 Measurement Result:

Frequency (MHz)	Reading Power (dBm)	Output Power (dBm)	Output Power (W)	Limit (W)
2402	9.50	9.50	0.00891	1
2440	8.89	8.89	0.00774	1
2478	8.33	8.33	0.00681	1

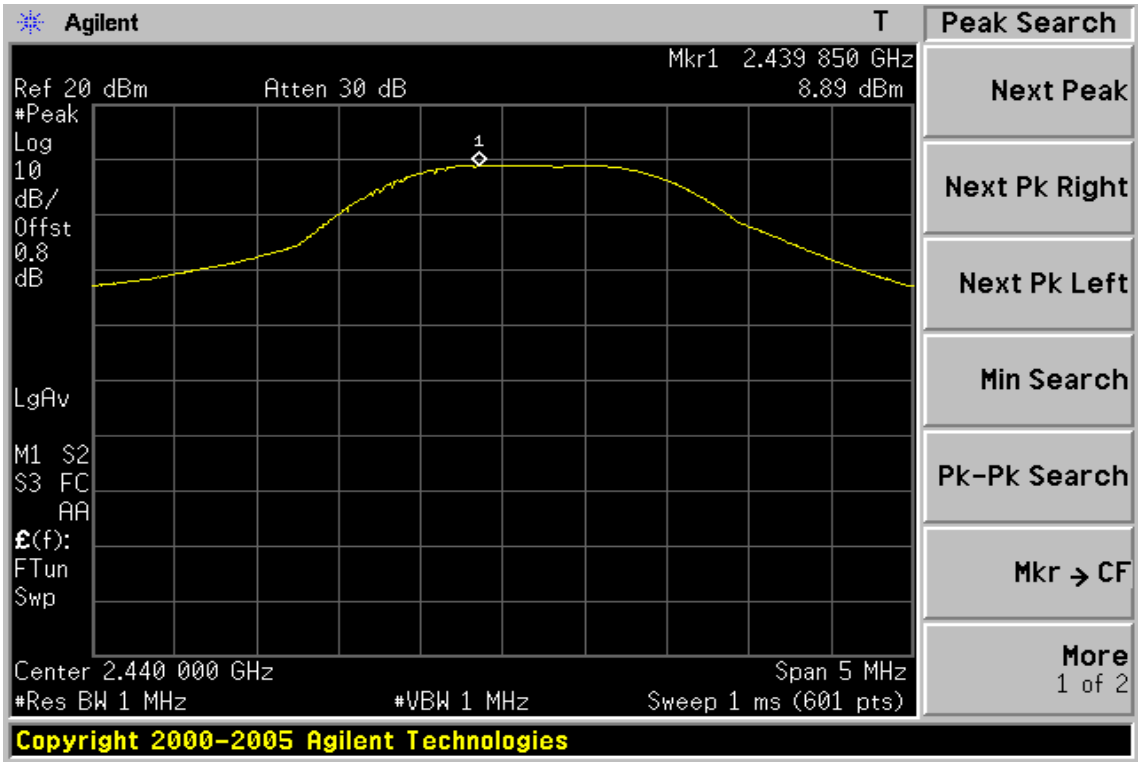
Cable loss = 0

**Note: Offset 0.8dB*

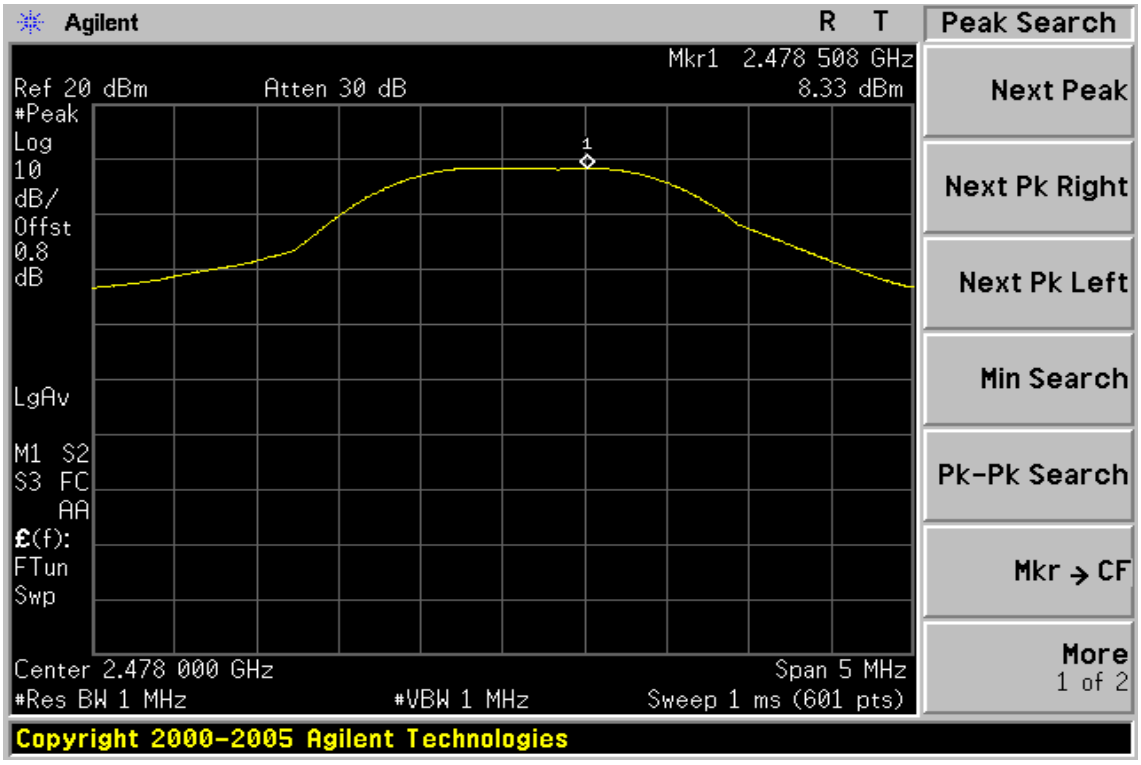
Power Output Plot (CH Low)



Power Output Plot (CH Mid)



Power Output Plot (CH High)



7 6dB Bandwidth & 99% Bandwidth

7.1 Standard Applicable:

According to §15.247(a)(2), Systems using digital modulation techniques may operate in the 902 - 928 MHz,2400 - 2483.5 MHz, and 5725 - 5850 MHz bands. The minimum 6 dB bandwidth shall be at least 500kHz.

According to RSS 210 issue 7: 2007 Annex 8.2. Systems employing digital modulation techniques (which includes direct sequence) can now be certified under RSS-210 provided they comply with the following requirements: The minimum 6 dB bandwidth shall be at least 500 kHz.

7.2 Measurement Equipment Used:

Refer to section 6.2 for details.

7.3 Test Set-up:

Refer to section 6.3 for details.

7.4 Measurement Procedure:

1.Place the EUT on the table and set it in transmitting mode.

2.Remove the antenna from the EUT and then connect a low loss RF cable from the 3.antenna port to the spectrum analyzer.

3.Set the spectrum analyzer as RBW≧1% of emission Bandwidth, VBW = 3*RBW, Span= 50MHz, Sweep=auto

4. Mark the peak frequency and –6dB (upper and lower) frequency.

5. Repeat above procedures until all frequency measured were complete.

7.5 Measurement Result:

6dB Bandwidth

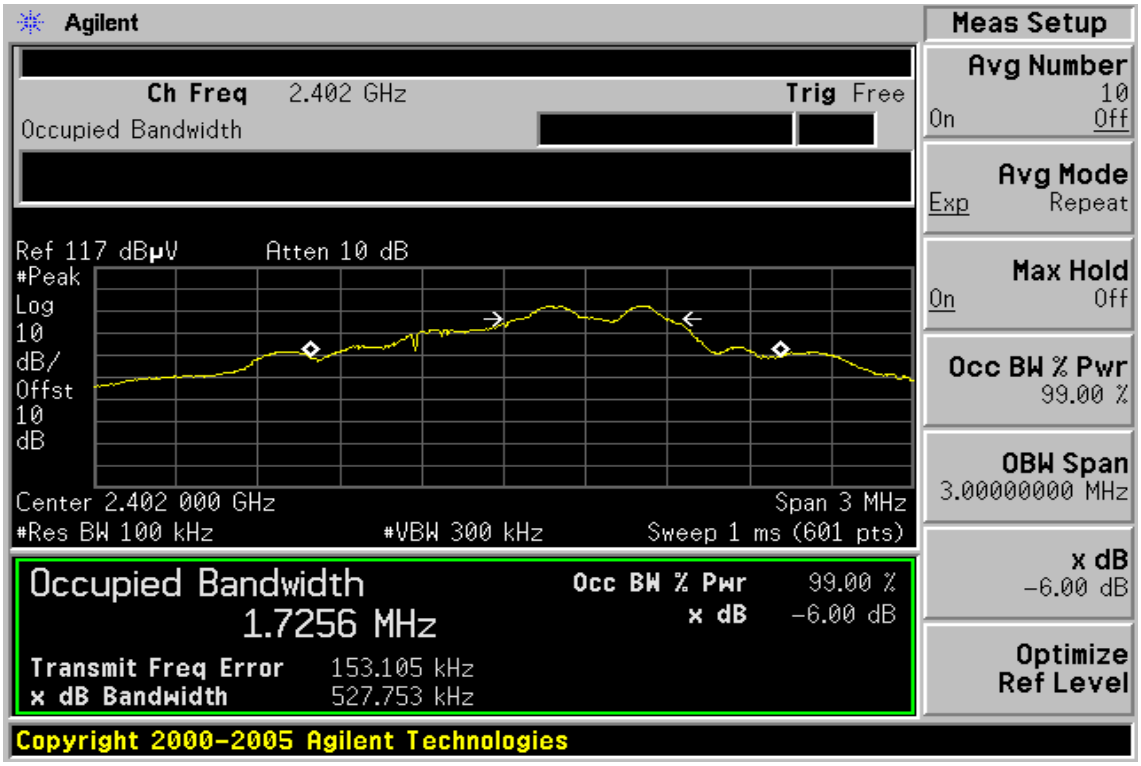
CH	Bandwidth (MHz)	Bandwidth (KHz)	Result
Lower	0.528	> 500	PASS
Mid	0.567	> 500	PASS
Higher	0.564	> 500	PASS

99% Bandwidth

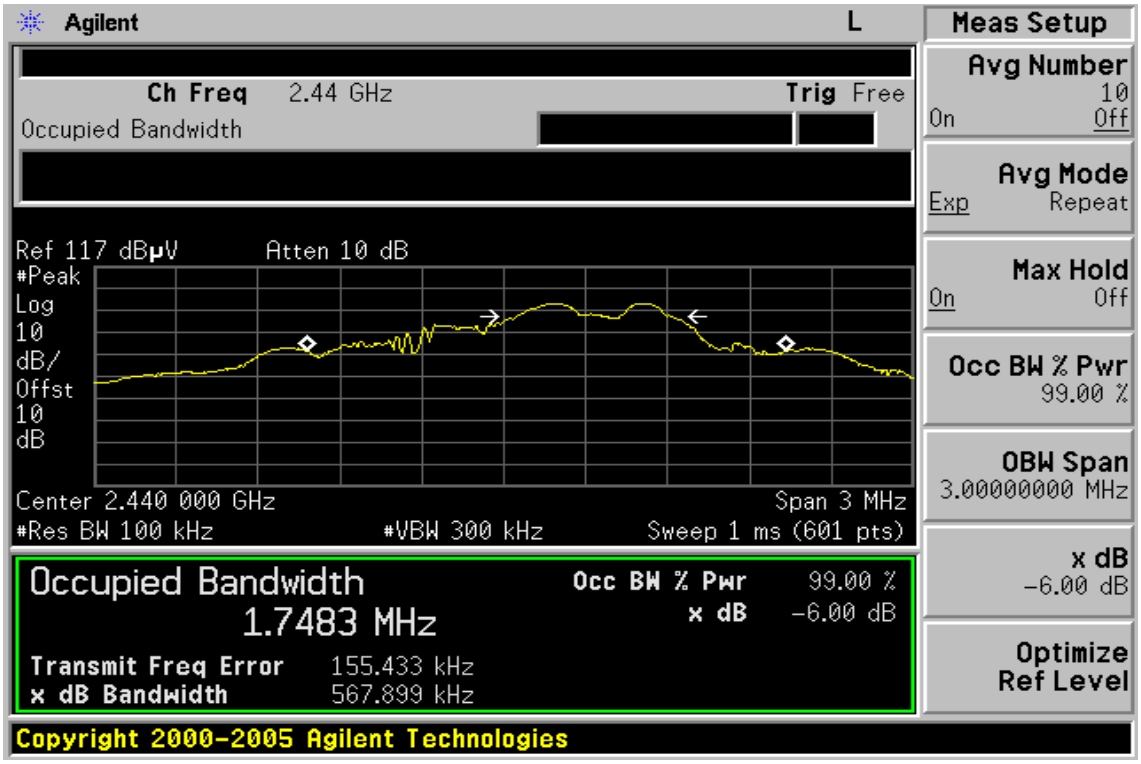
Frequency MHz	Bandwidth (MHz)
2402	1.73
2440	1.75
2478	1.76

Note: Refer to next page for plots.

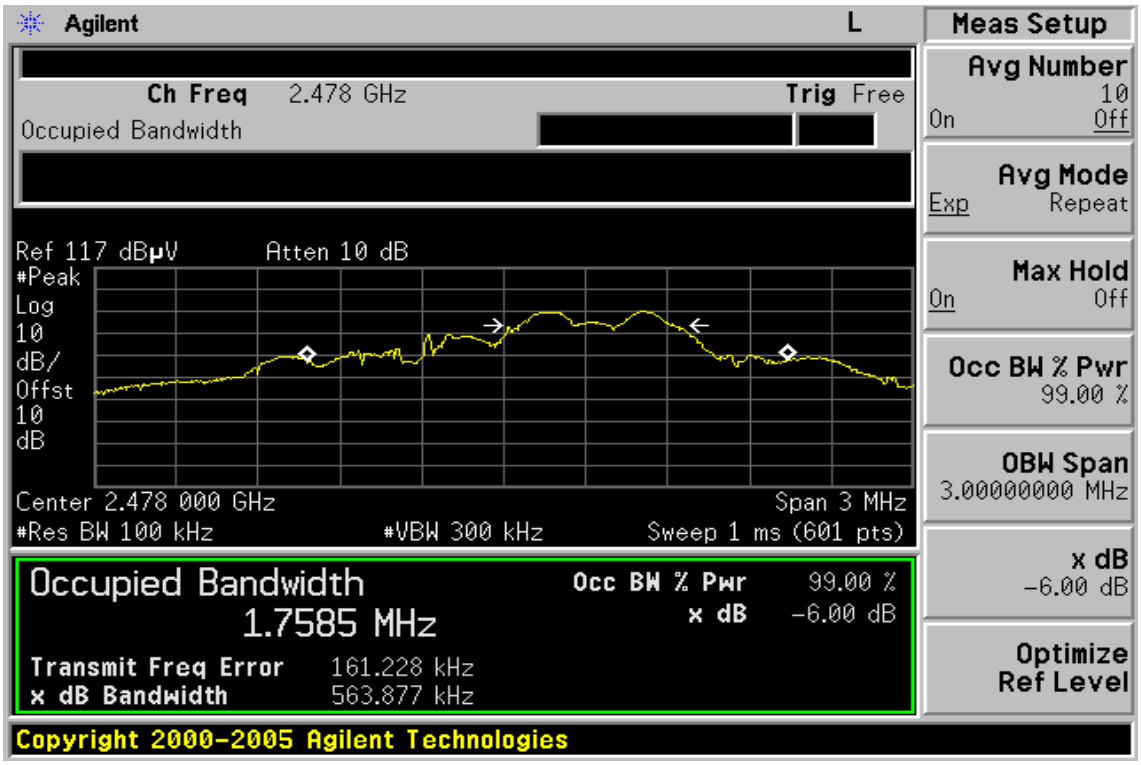
6dB Band Width & 99% Bandwidth Test Data CH-Low



6dB Band Width & 99% Bandwidth Test Data CH-Mid



6dB Band Width & 99% 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 Equipment Used:

8.2.1. Conducted Emission at antenna port:

Refer to section 6.2 for details.

8.2.2. Radiated emission:

966 Chamber					
EQUIPMENT TYPE	**MFR**	**MODEL NUMBER**	**SERIAL NUMBER**	**LAST CAL.**	**CAL DUE.**
Spectrum Analyzer	R&S	FSP 40	100034	02/12/2011	02/11/2012
Loop antenna	MESSTEC	FLA30	03/10086	07/08/2009	07/07/2011
Bilog Antenna	SCHWAZBECK	VULB9160	3136	09/15/2010	09/14/2011
Horn antenna	SCHWAZBECK	BBHA 9120D	9120D-673	05/09/2011	05/08/2013
Pre-Amplifier	Agilent	8447D	1937A02834	11/28/2010	11/27/2011
Pre-Amplifier	Agilent	8449B	3008A01973	01/05/2011	01/04/2012
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	01/05/2011	01/04/2012
Low Loss Cable	HUBER+SUHNER	SUCOFLEX 104PEA-3M	3m	01/05/2011	01/04/2012
3m Site	SGS	966 chamber	N/A	11/08/2010	11/09/2011

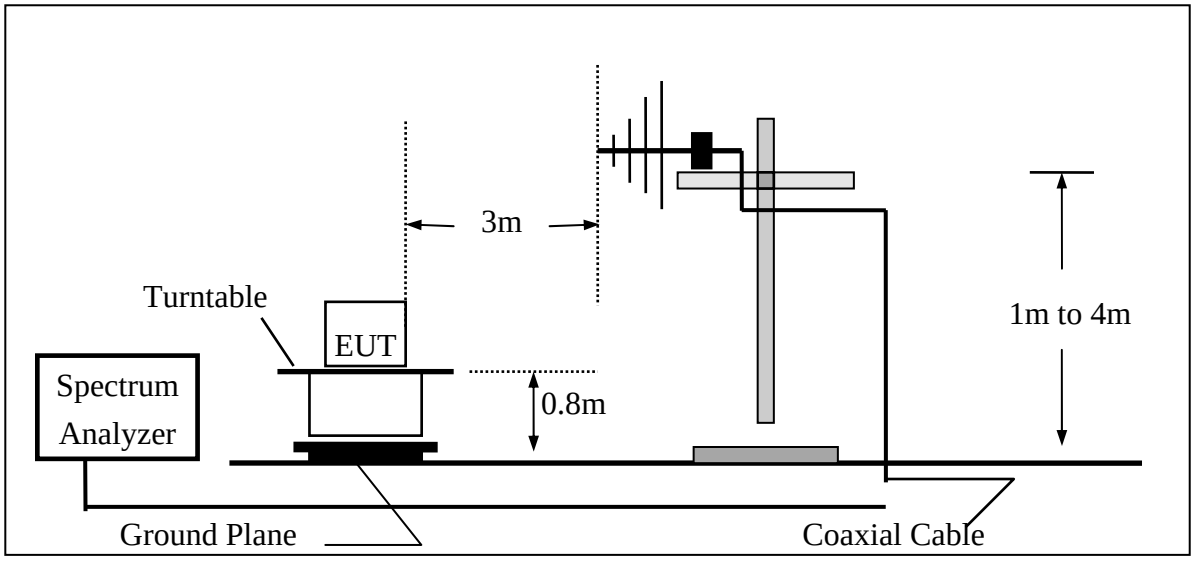
8.3 Test SET-UP:

8.3.1 Conducted Emission at antenna port:

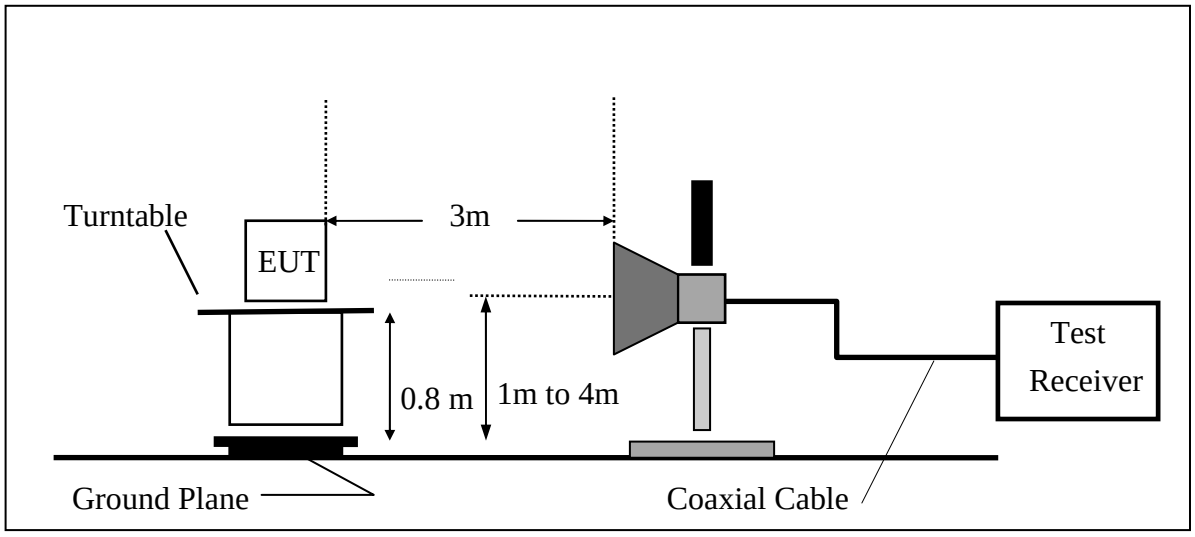
Refer to section 6.3 for details.

8.3.2 Radiated emission:

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



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



8.4 Measurement Procedure:

1. Place the EUT on the table and set it in transmitting mode.
2. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.
3. Set center frequency of spectrum analyzer = operating frequency.
4. Set the spectrum analyzer as RBW, VBW=100KHz, Span=50MHz, 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.

8.5 Field Strength Calculation:

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

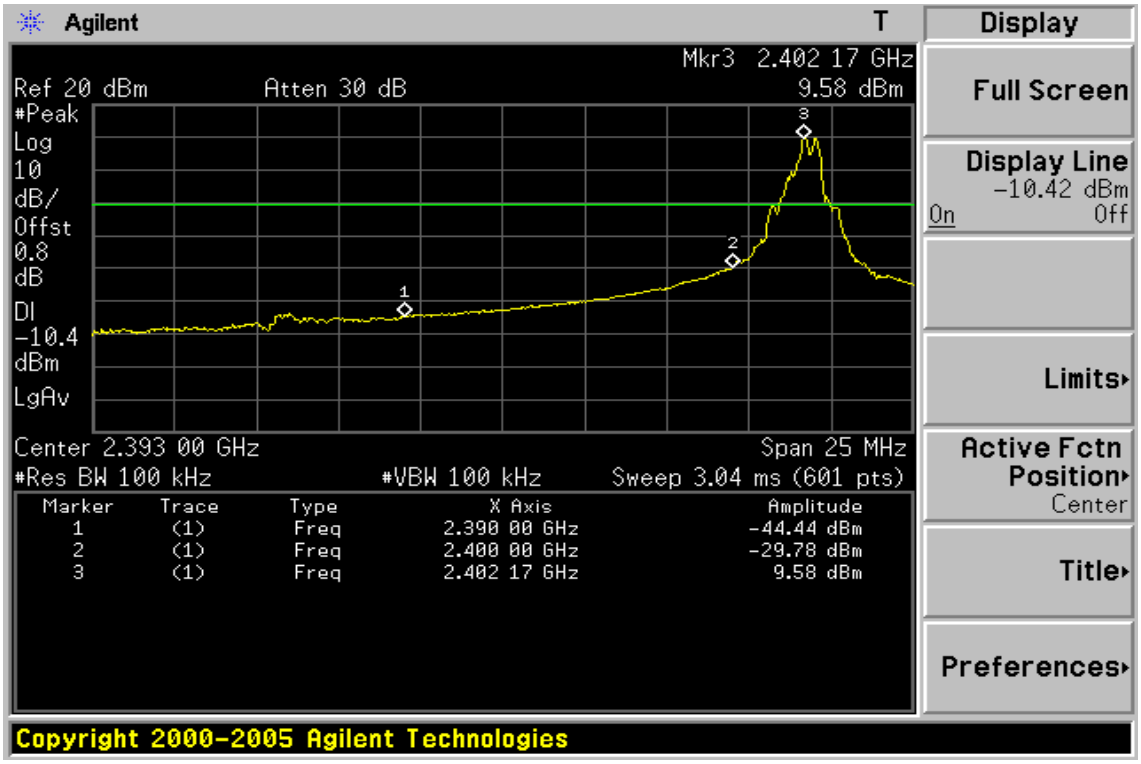
FS = RA + AF + CL - AG

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

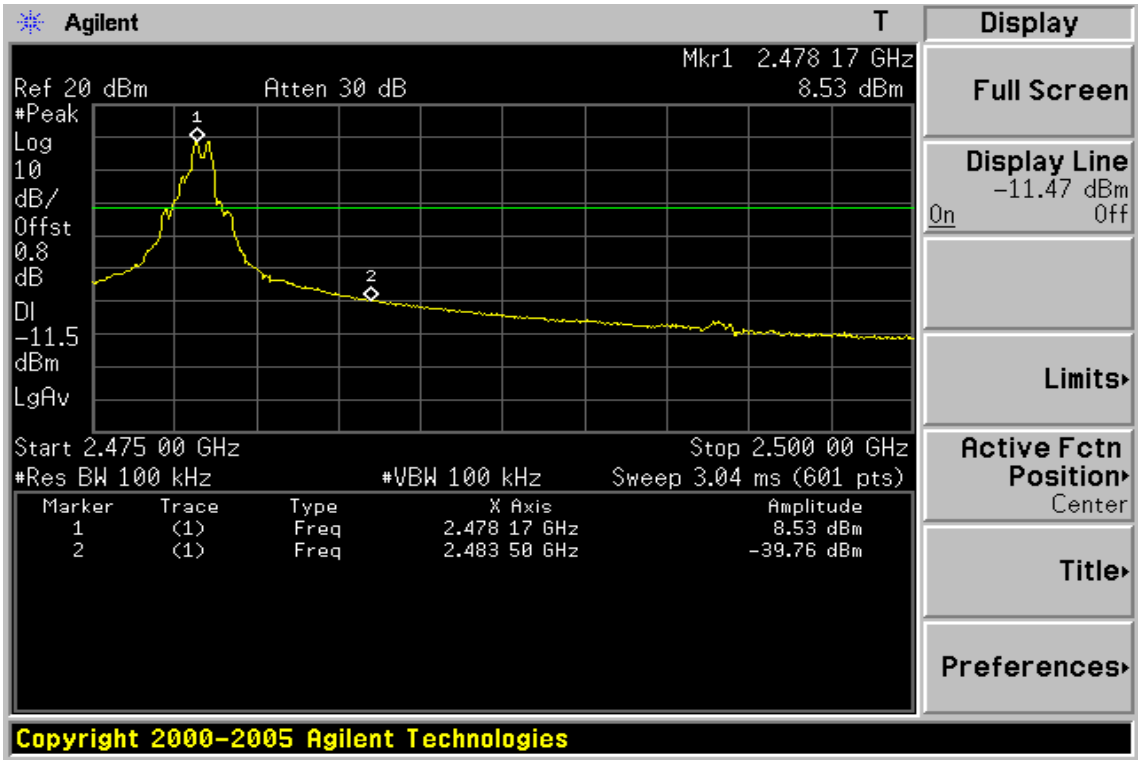
8.6 Measurement Result:

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

Band Edges Test Data CH-Low



Band Edges Test Data CH-High



Radiated Emission:

Operation Mode	TX CH Low	Test Date	Mar. 04, 2011
Fundamental Frequency	2412 MHz	Test By	Eric
Tmperature	25 ℃	Pol	Ver.
Humidity	62 %		

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
2390.00	73.91	48.80	-1.06	72.85	47.74	74.00	54.00	-6.26	AV

Operation Mode	TX CH Low	Test Date	Mar. 04, 2011
Fundamental Frequency	2412 MHz	Test By	Eric
Temperature	25 ℃	Pol	Hor.
Humidity	62 %		

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
2390.00	64.52	35.07	-1.06	63.46	34.01	74.00	54.00	-19.99	AV

Remark：

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

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

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

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

Radiated Emission:

Operation Mode	TX CH High	Test Date	Mar. 04, 2011
Fundamental Frequency	2478 MHz	Test By	Eric
Temperature	25 ℃	Pol	Ver.
Humidity	62 %		

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	73.24	45.71	-0.59	72.65	45.12	74.00	54.00	-8.88	AV

Operation Mode	TX CH High	Test Date	Mar. 04, 2011
Fundamental Frequency	2478 MHz	Test By	Eric
Temperature	25 ℃	Pol	Hor.
Humidity	62 %		

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	68.98	49.14	-0.59	68.39	48.55	74.00	54.00	-5.45	AV

Remark：

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

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

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

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

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 Measurement Equipment Used:

9.2.1. Conducted Emission at antenna port:

Refer to section 6.2 for details.

9.2.2. Radiated emission:

Refer to section 7.2 for details.

9.3 Test SET-UP:

9.3.1. Conducted Emission at antenna port:

Refer to section 6.3 for details.

9.3.2. Radiated emission:

Refer to section 7.3 for details.

9.4 Measurement Procedure:

1. The EUT was placed on a turn table which is 0.8m above ground plane.
2. The turn table shall rotate 360 degrees to determine the position of maximum emission level.
3. EUT is set 3m away from the receiving antenna which varied from 1m to 4m to find out the highest emissions.
4. When measurement procedures for electric field radiated emissions above 1 GHz the EUT measurement is to be made “while keeping the antenna in the ‘cone of radiation’ from that area and pointed at the area both in azimuth and elevation, with polarization oriented for maximum response.” is still within the 3dB illumination BW of the measurement antenna.
5. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
6. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
7. Repeat above procedures until all frequency measured were complete.

9.5 Field Strength Calculation

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

FS = RA + AF + CL - AG

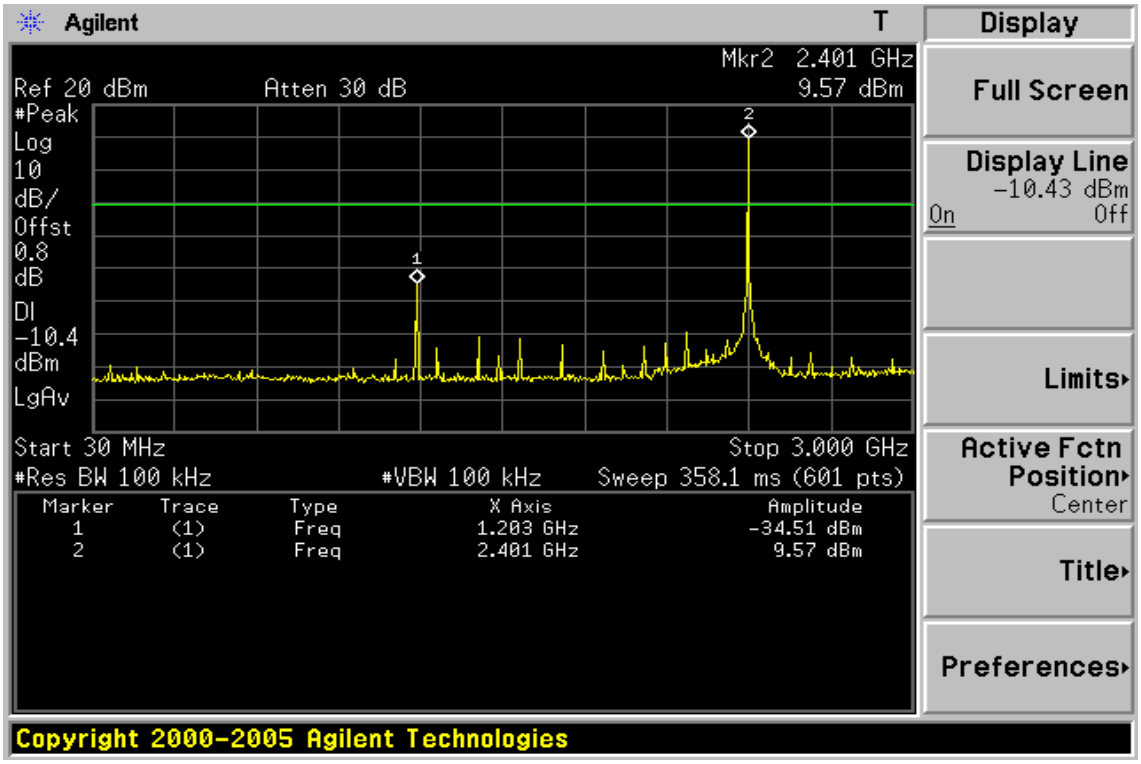
Where	FS = Field Strength	CL = Cable Attenuation Factor (Cable Loss)
	RA = Reading Amplitude	AG = Amplifier Gain
	AF = Antenna Factor	

9.6 Measurement Result:

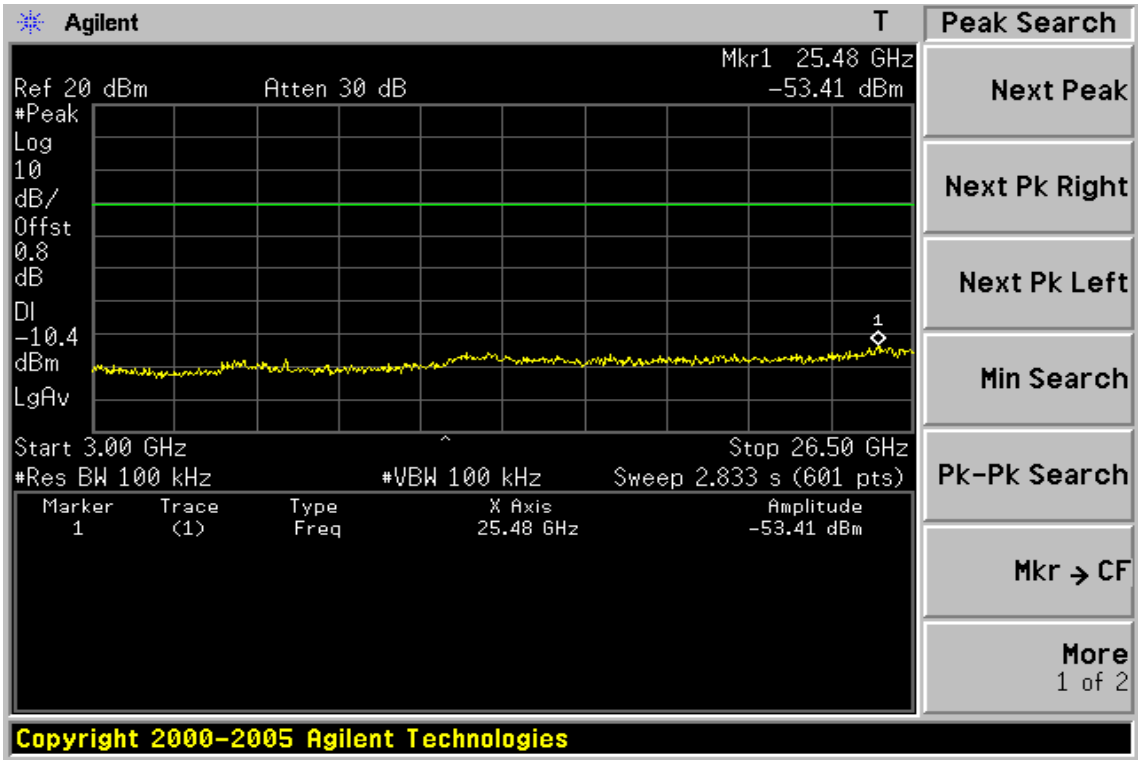
Note: Refer to next page spectrum analyzer data chart and tabular data sheets.

Conducted Spurious Emission Measurement Result

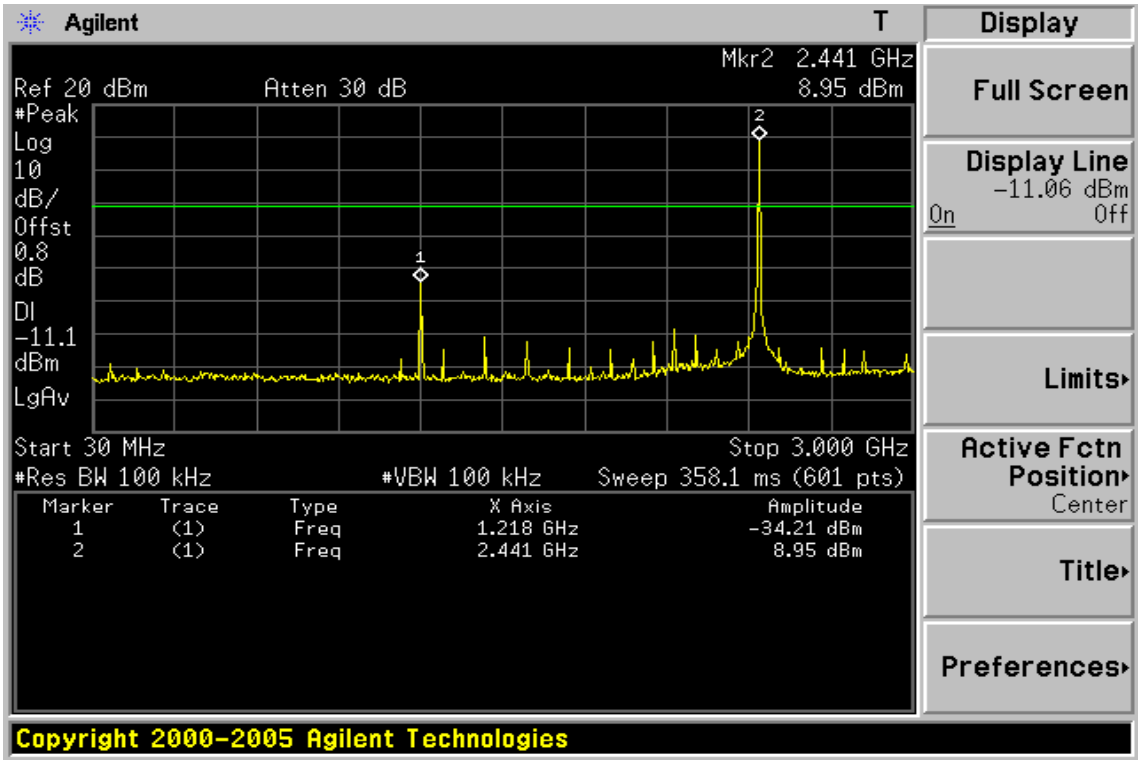
Ch Low 30MHz – 3GHz



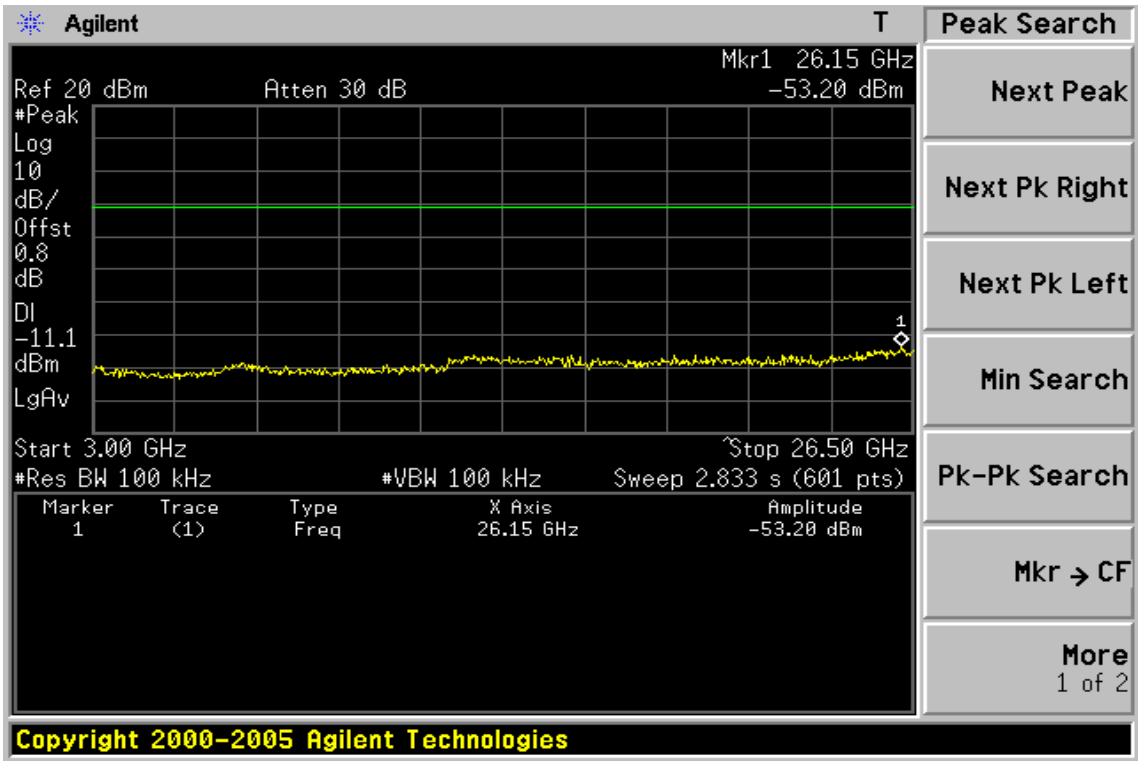
Ch Low 3GHz – 26.5GHz



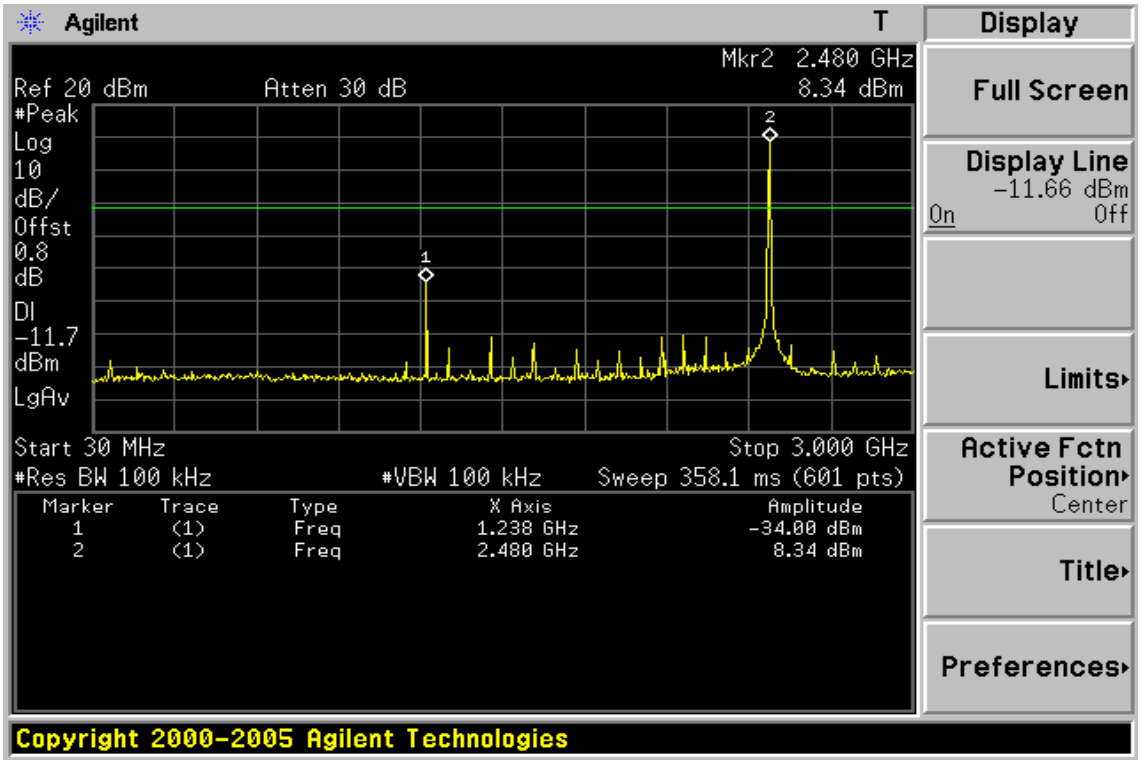
Ch Mid 30MHz – 3GHz



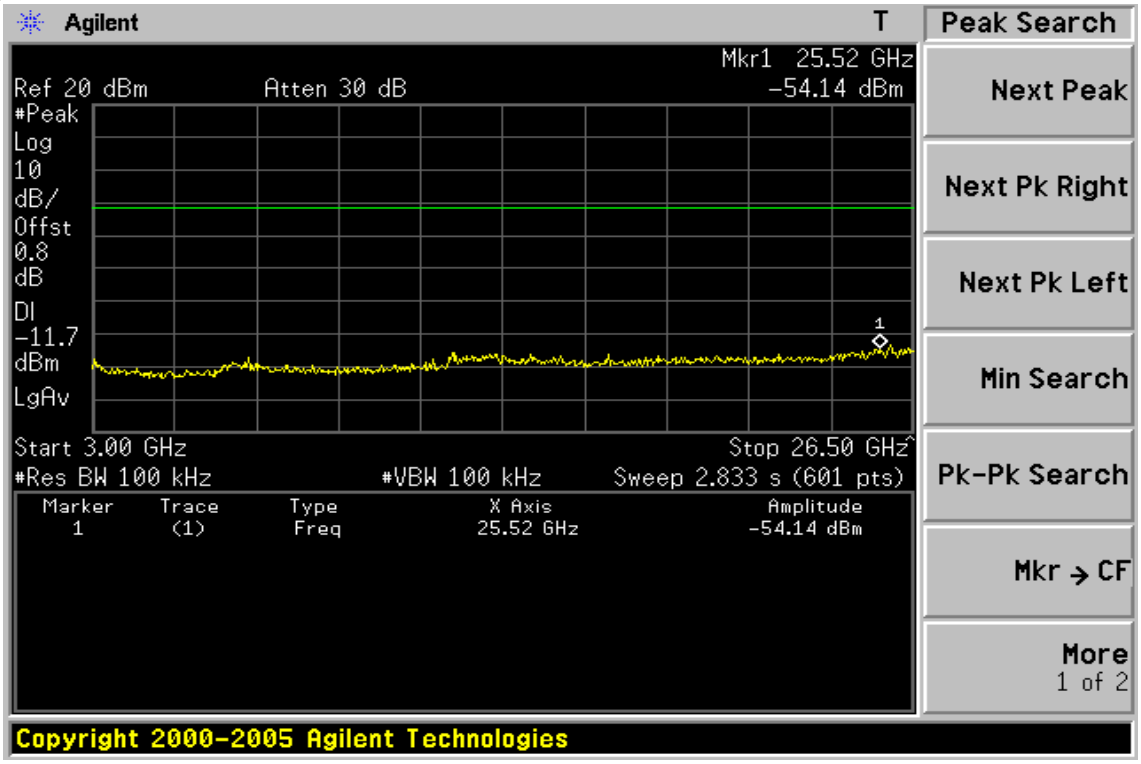
Ch Mid 3GHz – 26.5GHz



Ch High 30MHz – 3GHz



Ch High 3GHz – 26.5GHz



Radiated Spurious Emission Measurement Result (below 1GHz)

Operation Mode	TX CH Low	Test Date	Mar. 04, 2011
Fundamental Frequency	2402MHz	Test By	Eric
Temperature	25 ℃	Pol	Ver./Hor
Humidity	62 %		

Freq. (MHz)	Ant.Pol. H/V	Detector Mode (PK/QP)	Reading (dBuV)	Factor (dB)	Actual FS (dBuV/m)	Limit3m (dBuV/m)	Safe Margin (dB)
144.46	V	Peak	45.95	-12.66	33.29	43.50	-10.21
191.99	V	Peak	45.26	-15.57	29.69	43.50	-13.81
233.70	V	Peak	50.19	-14.32	35.87	46.00	-10.13
293.84	V	Peak	49.20	-12.58	36.62	46.00	-9.38
367.56	V	Peak	50.36	-11.31	39.05	46.00	-6.95
384.05	V	Peak	48.04	-11.08	36.96	46.00	-9.04
51.34	H	Peak	43.85	-13.93	29.92	40.00	-10.08
144.46	H	Peak	39.02	-12.66	26.36	43.50	-17.14
192.96	H	Peak	43.47	-15.56	27.91	43.50	-15.59
306.45	H	Peak	45.23	-12.29	32.94	46.00	-13.06
335.55	H	Peak	48.50	-11.82	36.68	46.00	-9.32
354.95	H	Peak	46.68	-11.50	35.18	46.00	-10.82

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 Mid	Test Date	Mar. 04, 2011
Fundamental Frequency	2440MHz	Test By	Eric
Temperature	25 ℃	Pol	Ver./Hor
Humidity	62 %		

Freq. (MHz)	Ant.Pol. H/V	Detector Mode (PK/QP)	Reading (dBuV)	Factor (dB)	Actual FS (dBuV/m)	Limit3m (dBuV/m)	Safe Margin (dB)
144.46	V	Peak	42.23	-12.66	29.57	43.50	-13.93
193.93	V	Peak	45.81	-15.68	30.13	43.50	-13.37
233.70	V	Peak	49.71	-14.32	35.39	46.00	-10.61
343.31	V	Peak	50.20	-11.62	38.58	46.00	-7.42
367.56	V	Peak	48.64	-11.31	37.33	46.00	-8.67
481.05	V	Peak	42.26	-9.40	32.86	46.00	-13.14
49.40	H	Peak	44.46	-13.93	30.53	40.00	-9.47
193.93	H	Peak	48.51	-15.68	32.83	43.50	-10.67
245.34	H	Peak	47.03	-13.96	33.07	46.00	-12.93
306.45	H	Peak	46.22	-12.29	33.93	46.00	-12.07
334.58	H	Peak	48.38	-11.81	36.57	46.00	-9.43
384.05	H	Peak	45.19	-11.08	34.11	46.00	-11.89

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	Mar. 04, 2011
Fundamental Frequency	2478MHz	Test By	Eric
Temperature	25 ℃	Pol	Ver./Hor
Humidity	62 %		

Freq. (MHz)	Ant.Pol. H/V	Detector Mode (PK/QP)	Reading (dBuV)	Factor (dB)	Actual FS (dBuV/m)	Limit3m (dBuV/m)	Safe Margin (dB)
193.93	V	Peak	46.41	-15.68	30.73	43.50	-12.77
241.46	V	Peak	49.74	-14.03	35.71	46.00	-10.29
329.73	V	Peak	50.00	-11.88	38.12	46.00	-7.88
367.56	V	Peak	48.59	-11.31	37.28	46.00	-8.72
432.55	V	Peak	42.90	-10.21	32.69	46.00	-13.31
481.05	V	Peak	44.13	-9.40	34.73	46.00	-11.27
41.64	H	Peak	40.54	-13.51	27.03	40.00	-12.97
191.99	H	Peak	46.50	-15.57	30.93	43.50	-12.57
241.46	H	Peak	43.93	-14.03	29.90	46.00	-16.10
330.70	H	Peak	48.34	-11.85	36.49	46.00	-9.51
342.34	H	Peak	47.63	-11.62	36.01	46.00	-9.99
427.70	H	Peak	43.30	-10.29	33.01	46.00	-12.99

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	Mar. 04, 2011
Fundamental Frequency	2402MHz	Test By	Eric
Temperature	25 ℃	Pol	Ver.
Humidity	62 %		

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)	
1201.0	57.60	49.05	-5.34	52.26	43.71	74.00	54.00	-10.29	AV
2105.0	43.55	43.55	-2.55	41.00	---	74.00	54.00	-13.00	Peak
2183.0	44.50	44.50	-1.87	42.63	---	74.00	54.00	-11.37	Peak
4802.5	42.83	42.83	5.19	48.02	---	74.00	54.00	-5.98	Peak
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		

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- 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	Mar. 04, 2011
Fundamental Frequency	2402MHz	Test By	Eric
Temperature	25 ℃	Pol	Hor
Humidity	62 %		

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)	
1201.0	58.45	50.05	-5.34	53.11	44.71	74.00	54.00	-9.29	AV
1442.0	37.53	---	-4.89	32.64	---	74.00	54.00	-21.36	Peak
1585.0	38.88	---	-4.18	34.70	---	74.00	54.00	-19.30	Peak
2105.0	36.19	---	-2.55	33.64	---	74.00	54.00	-20.36	Peak
4802.5	39.25	---	5.19	44.44	---	74.00	54.00	-9.56	Peak
14412.0	----					74.00	54.00		
16814.0	----					74.00	54.00		
19216.0	----					74.00	54.00		
21618.0	----					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- 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	Mar. 04, 2011
Fundamental Frequency	2440MHz	Test By	Eric
Temperature	25 ℃	Pol	Ver
Humidity	62 %		

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)	
1227.5	55.39	---	-5.20	50.19	---	74.00	54.00	-3.81	Peak
3137.5	45.73	---	-2.18	43.55	---	74.00	54.00	-10.45	Peak
4887.0	41.19	---	5.41	46.60	---	74.00	54.00	-7.40	Peak
9760.0	----					74.00	54.00		
12200.0	----					74.00	54.00		
14640.0	----					74.00	54.00		
17080.0	----					74.00	54.00		
19520.0	----					74.00	54.00		
21960.0	----					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- 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	Mar. 04, 2011
Fundamental Frequency	2440MHz	Test By	Eric
Temperature	25 ℃	Pol	Hor
Humidity	62 %		

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)	
1227.5	56.06	---	-5.20	50.86	---	74.00	54.00	-3.14	Peak
1598.0	38.53	---	-4.11	34.42	---	74.00	54.00	-19.58	Peak
2137.5	40.01	---	-2.18	37.83	---	74.00	54.00	-16.17	Peak
4887.0	39.03	---	5.41	44.44	---	74.00	54.00	-9.56	Peak
12200.0	----					74.00	54.00		
14640.0	----					74.00	54.00		
17080.0	----					74.00	54.00		
19520.0	----					74.00	54.00		
21960.0	----					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- 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	Mar. 04, 2011
Fundamental Frequency	2478MHz	Test By	Eric
Temperature	25 ℃	Pol	Ver
Humidity	62%		

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)	
1247.00	53.06	---	-5.03	48.03	---	74.00	54.00	-5.97	Peak
2092.00	45.10	---	-2.61	42.49	---	74.00	54.00	-11.51	Peak
4965.0	37.24	---	5.61	42.85	---	74.00	54.00	-11.15	Peak
9912.0	----					74.00	54.00		
12390.0	----					74.00	54.00		
14868.0	----					74.00	54.00		
17346.0	----					74.00	54.00		
19824.0	----					74.00	54.00		
22302.0	----					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- 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	Mar. 04, 2011
Fundamental Frequency	2478MHz	Test By	Eric
Temperature	25 ℃	Pol	Hor
Humidity	62 %		

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)	
1239.0	57.58	50.08	-5.18	52.40	44.90	74.00	54.00	-9.10	AV
1468.0	39.97	---	-4.74	35.23	---	74.00	54.00	-18.77	Peak
2092.0	38.03	---	-2.61	35.42	---	74.00	54.00	-18.58	Peak
9912.0	----					74.00	54.00		
12390.0	----					74.00	54.00		
14868.0	----					74.00	54.00		
17346.0	----					74.00	54.00		
19824.0	----					74.00	54.00		
22302.0	----					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- 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

Operation Mode	RX CH Low	Test Date	Mar. 04, 2011
Fundamental Frequency	2402MHz	Test By	Eric
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)
193.92	V	Peak	48.23	-15.68	32.55	43.50	-10.95
241.46	V	Peak	48.30	-14.03	34.27	46.00	-11.73
289.96	V	Peak	51.08	-12.68	38.40	46.00	-7.60
350.10	V	Peak	48.74	-11.54	37.20	46.00	-8.80
384.05	V	Peak	47.44	-11.08	36.36	46.00	-9.64
432.55	V	Peak	43.25	-10.21	33.04	46.00	-12.96
41.64	H	Peak	43.65	-13.51	30.14	40.00	-9.86
144.46	H	Peak	39.30	-12.66	26.64	43.50	-16.86
193.93	H	Peak	46.69	-15.68	31.01	43.50	-12.49
241.46	H	Peak	44.29	-14.03	30.26	46.00	-15.74
335.55	H	Peak	43.43	-11.82	31.61	46.00	-14.39
432.55	H	Peak	42.71	-10.21	32.50	46.00	-13.50

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

Operation Mode	RX CH Mid	Test Date	Mar. 04, 2011
Fundamental Frequency	2440MHz	Test By	Eric
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)
235.64	V	Peak	49.26	-14.18	35.08	46.00	-10.92
296.75	V	Peak	47.09	-12.49	34.60	46.00	-11.40
331.67	V	Peak	45.59	-11.86	33.73	46.00	-12.27
350.10	V	Peak	45.14	-11.54	33.60	46.00	-12.40
427.70	V	Peak	45.15	-10.29	34.86	46.00	-11.14
481.05	V	Peak	43.04	-9.40	33.64	46.00	-12.36
44.55	H	Peak	44.53	-13.62	30.91	40.00	-9.09
144.46	H	Peak	39.11	-12.66	26.45	43.50	-17.05
193.93	H	Peak	46.46	-15.68	30.78	43.50	-12.72
241.46	H	Peak	44.20	-14.03	30.17	46.00	-15.83
350.10	H	Peak	44.37	-11.54	32.83	46.00	-13.17
427.70	H	Peak	43.88	-10.29	33.59	46.00	-12.41

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

Operation Mode	RX CH High	Test Date	Mar. 04, 2011
Fundamental Frequency	2478MHz	Test By	Eric
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)
144.46	V	Peak	42.50	-12.66	29.84	43.50	-13.66
193.93	V	Peak	48.57	-15.68	32.89	43.50	-10.61
241.46	V	Peak	49.17	-14.03	35.14	46.00	-10.86
296.75	V	Peak	47.47	-12.49	34.98	46.00	-11.02
432.55	V	Peak	42.90	-10.21	32.69	46.00	-13.31
481.05	V	Peak	43.29	-9.40	33.89	46.00	-12.11
144.46	H	Peak	39.16	-12.66	26.50	43.50	-17.00
193.93	H	Peak	45.21	-15.68	29.53	43.50	-13.97
235.64	H	Peak	44.47	-14.18	30.29	46.00	-15.71
289.96	H	Peak	41.62	-12.68	28.94	46.00	-17.06
335.55	H	Peak	42.67	-11.82	30.85	46.00	-15.15
432.55	H	Peak	41.68	-10.21	31.47	46.00	-14.53

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

Operation Mode	RX CH Low	Test Date	Mar. 04, 2011
Fundamental Frequency	2402 MHz	Test By	Eric
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)	
1442.0	36.59	---	-4.89	31.70	---	74.00	54.00	-22.30	Peak
2755.0	35.38	---	0.07	35.45	---	75.00	54.00	-18.55	Peak
7206.0	----					74.00	54.00		
9608.0	----					74.00	54.00		
12010.0	----					74.00	54.00		
14412.0	----					74.00	54.00		
16814.0	----					74.00	54.00		
19216.0	----					74.00	54.00		
21618.0	----					74.00	54.00		
24020.0	----					74.00	54.00		

Remark：

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

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

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

(4) Spectrum Peak Setting : 1GHz- 40GHz, RBW= 3MHz, VBW= 1MHz, 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	802.11b RX CH Low	Test Date	Mar. 04, 2011
Fundamental Frequency	2402 MHz	Test By	Eric
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)	
1013.0	38.12	---	-5.69	32.43	---	74.00	54.00	-21.57	Peak
1442.0	37.17	---	-4.89	32.28	---	75.00	54.00	-21.72	Peak
7206.0	----					74.00	54.00		
9608.0	----					74.00	54.00		
12010.0	----					74.00	54.00		
14412.0	----					74.00	54.00		
16814.0	----					74.00	54.00		
19216.0	----					74.00	54.00		
21618.0	----					74.00	54.00		
24020.0	----					74.00	54.00		

Remark：

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

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

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

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

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

Radiated Spurious Emission Measurement Result

Operation Mode	RX CH Mid	Test Date	Mar. 04, 2011
Fundamental Frequency	2440 MHz	Test By	Eric
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)	
1442.0	39.57	---	-4.89	34.68	---	74.00	54.00	-19.32	Peak
2755.0	35.49	---	0.07	35.56	---	75.00	54.00	-18.44	Peak
7323.0	----					74.00	54.00		
9764.0	----					74.00	54.00		
12205.0	----					74.00	54.00		
14646.0	----					74.00	54.00		
17087.0	----					74.00	54.00		
19528.0	----					74.00	54.00		
21969.0	----					74.00	54.00		
24410.0	----					74.00	54.00		

Remark：

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

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

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

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

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

Radiated Spurious Emission Measurement Result

Operation Mode	RX CH Mid	Test Date	Mar. 04, 2011
Fundamental Frequency	2440MHz	Test By	Eric
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)	
1013.0	38.08	---	-5.69	32.39	---	74.00	54.00	-21.61	Peak
1442.0	37.48	---	-4.89	32.59	---	75.00	54.00	-21.41	Peak
7323.0	----					74.00	54.00		
9764.0	----					74.00	54.00		
12205.0	----					74.00	54.00		
14646.0	----					74.00	54.00		
17087.0	----					74.00	54.00		
19528.0	----					74.00	54.00		
21969.0	----					74.00	54.00		
24410.0	----					74.00	54.00		

Remark：

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

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

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

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

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

Radiated Spurious Emission Measurement Result

Operation Mode	RX CH High	Test Date	Mar. 04, 2011
Fundamental Frequency	2478 MHz	Test By	Eric
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)	
1442.0	38.40	---	-4.89	33.51	---	74.00	54.00	-20.49	Peak
2755.0	36.06	---	0.07	36.13	---	75.00	54.00	-17.87	Peak
7434.0	----					74.00	54.00		
9912.0	----					74.00	54.00		
12390.0	----					74.00	54.00		
14868.0	----					74.00	54.00		
17346.0	----					74.00	54.00		
19824.0	----					74.00	54.00		
22302.0	----					74.00	54.00		
24780.0	----					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- 40GHz, RBW= 3MHz, VBW= 1MHz, Sweep time= 200 ms.

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

Radiated Spurious Emission Measurement Result

Operation Mode	RX CH High	Test Date	Mar. 04, 2011
Fundamental Frequency	2478 MHz	Test By	Eric
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)	
1013.0	37.78	---	-5.69	32.09	---	74.00	54.00	-21.91	Peak
1442.0	37.12	---	-4.89	32.23	---	75.00	54.00	-21.77	Peak
7434.0	----					74.00	54.00		
9912.0	----					74.00	54.00		
12390.0	----					74.00	54.00		
14868.0	----					74.00	54.00		
17346.0	----					74.00	54.00		
19824.0	----					74.00	54.00		
22302.0	----					74.00	54.00		
24780.0	----					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- 40GHz, RBW= 3MHz, VBW= 1MHz, Sweep time= 200 ms.

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

10 Peak Power Spectral Density

10.1 Standard Applicable:

According to §15.247(e) For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission. This power spectral density shall be determined in accordance with the provisions of paragraph (b) of this section. The same method of determining the conducted output power shall be used to determine the power spectral density.

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.

10.2 Measurement Equipment Used:

Refer to section 6.2 for details.

10.3 Test Set-up:

Refer to section 6.3 for details.

10.4 Measurement Procedure:

1. Place the EUT on the table and set it in transmitting mode.
2. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.
3. Set the spectrum analyzer as RBW = 3KHz, VBW = 10KHz, Span = 300MHz, Sweep=100s
4. Record the max. reading.
5. Repeat above procedures until all frequency measured were complete.

10.5 Measurement Result:

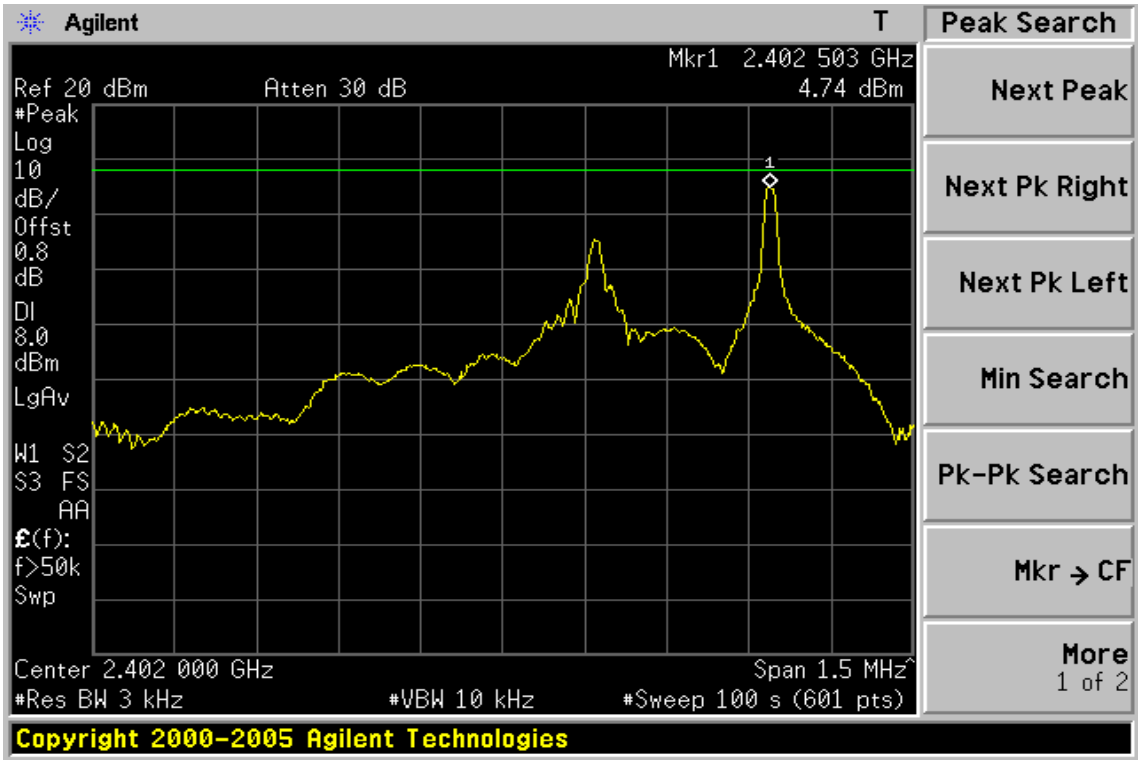
802.11b

CH	RF Power Density Reading (dBm)	Cable loss (dB)	RF Power Density Level (dBm)	Maximum Limit (dBm)
Low	4.74	0.00	4.74	8
Mid	4.10	0.00	4.10	8
High	3.54	0.00	3.54	8

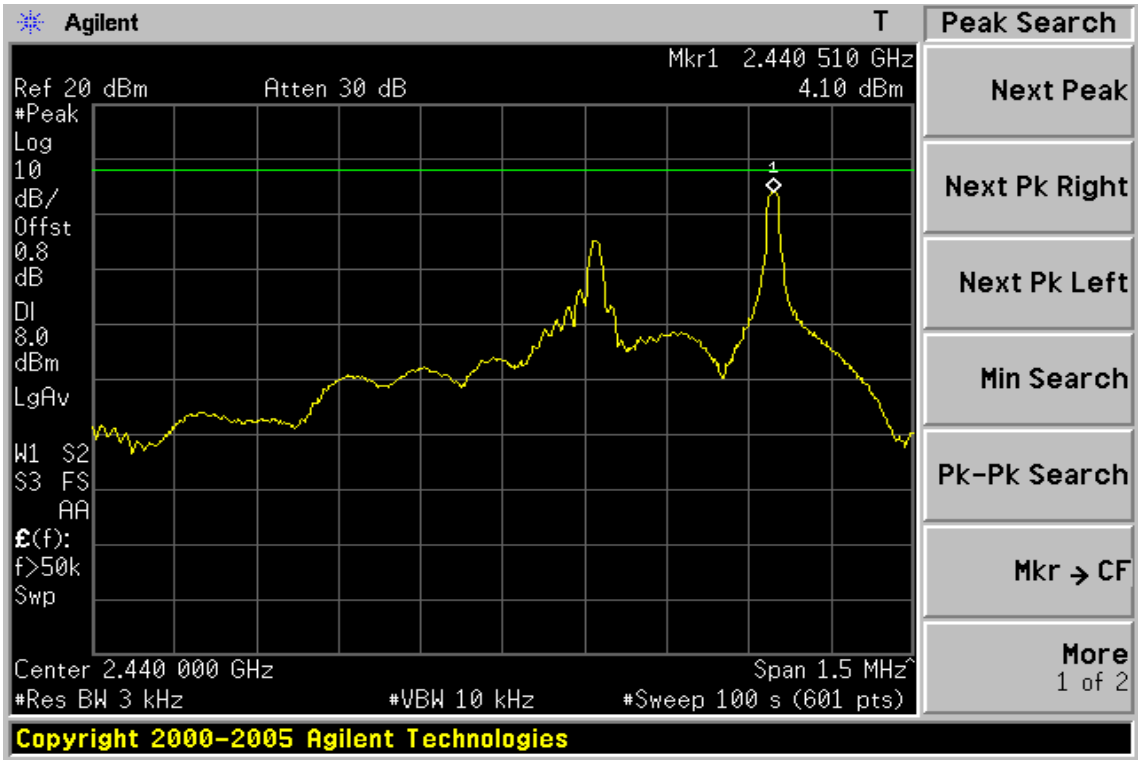
Note: offset 0.8 dB

Note: Refer to next page for plots.

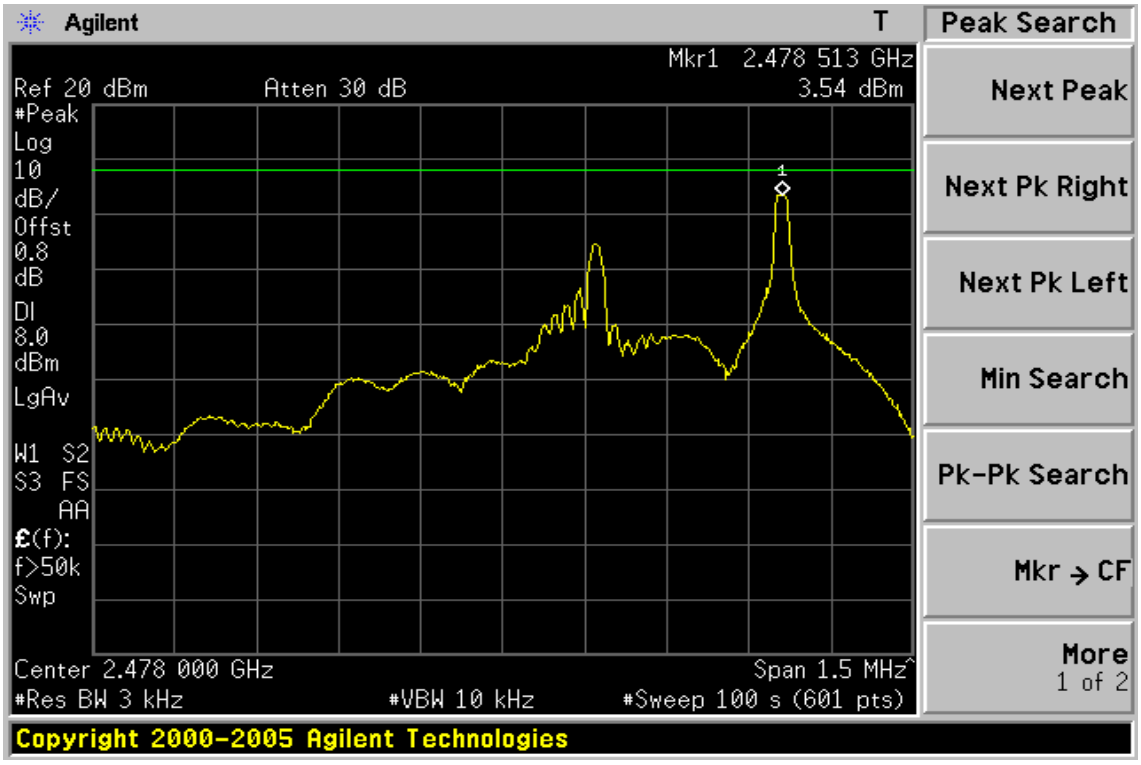
Power Spectral Density Test Plot (CH-Low)



Power Spectral Density Test Plot (CH-Mid)



Power Spectral Density Test Plot (CH-High)



11 ANTENNA REQUIREMENT

11.1. Standard Applicable:

According to §15.203, Antenna requirement.

An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this Section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited. This requirement does not apply to carrier current devices or to devices operated under the provisions of Sections 15.211, 15.213, 15.217, 15.219, or 15.221. Further, this requirement does not apply to intentional radiators that must be professionally installed, such as perimeter protection systems and some field disturbance sensors, or to other intentional radiators which, in accordance with Section 15.31(d), must be measured at the installation site. However, the installer shall be responsible for ensuring that the proper antenna is employed so that the limits in this Part are not exceeded.

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.

11.2. Antenna Connected Construction:

The directional gains of antenna used for transmitting is 1.8 dBi, and the antenna connector is designed with permanent attachment and no consideration of replacement. Please see EUT photo for details.

~ End of Report ~