

ELECTROMAGNETIC EMISSIONS COMPLIANCE REPORT

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

OF

Product Name: ASSY PCB RF Module
Brand Name: CHRISTIE®
Model Name: CRMX-100
Model Different: N/A
FCC ID: XU6-CRMX100
IC: 8691A-CRMX100
Report No.: ER/2009/A0057~58
Issue Date: Nov. 10, 2009
FCC Rule Part: §15.247, Cat: DTS
IC Rule Part: RSS-210 issue 7:2007, Annex 8
Prepared for: Christie Digital Systems Canada, Inc.
809 Wellington Street North, Kitchener, Ontario,
N2G 4Y7, Canada
Prepared by: SGS Taiwan Ltd.
Electronics & Communication Laboratory
No. 134, Wu Kung Rd., Wuku Industrial Zone,
Taipei County, Taiwan.



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VERIFICATION OF COMPLIANCE

Applicant: Christie Digital Systems Canada, Inc.
809 Wellington Street North, Kitchener, Ontario, N2G 4Y7, Canada

Product Name: ASSY PCB RF Module

Brand Name: CHRISTIE®

FCC ID: XU6-CRMX100

IC: 8691A-CRMX100

Model No.: CRMX-100

Model Difference: N/A

File Number: ER/2009/A0057~58

Date of test: Oct. 23, 2009 ~ Nov. 06, 2009

Date of EUT Received: Oct. 23, 2009

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 7: 2007 Annex 8.

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

Test By:**Date:**

Nov. 10, 2009

Brain Chang / Engineer**Prepared By:****Date:**

Nov. 10, 2009

Gigi Yeh / Clerk**Approved By:****Date:**

Nov. 10, 2009

Vincent Su / Manager

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Version

Version No.	Date	Description
00	Nov. 10, 2009	Initial creation of document

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1 GENERAL INFORMATION

1.1 Product Description

General:

Product Name	ASSY PCB RF Module
Brand Name	CHRISTIE®
Model Name	CRMX-100
Rated Power	8.80 dBm
Model Difference	N/A
Frequency Range:	2405~2480 MHz
Channel number:	16 channels
Power Supply	3.3V
Antenna Designation:	Chip Antenna: 5.5dBi / Dipole Antenna: 2 dBi

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1.2 Related Submittal(s) / Grant (s)

This submittal(s) (test report) is intended for **FCC ID: XU6-CRMX100** filing to comply with Section 15.247 of the FCC Part 15, Subpart E Rules and **IC: 8691A-CRMX100** filing to comply with Industry Canada RSS-210 issue 7: 2007 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.

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.

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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.

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2.4 Configuration of Tested System

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

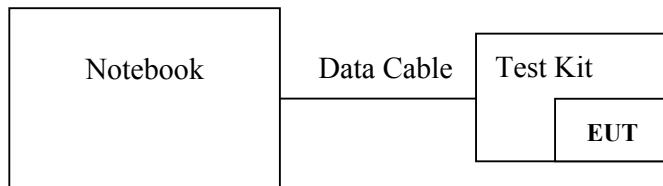


Table 2-1 Equipment Used in Tested System

Item	Equipment	Mfr/Brand	Model/ Type No.	Series No.	Data Cable	Power Cord
1.	Notebook	IBM	T40	N/A	Un-Shielding	Un-Shielding
2.	Test Kit	CHRISTIE	N/A	N/A	N/A	N/A
3.	Data Cable	CHRISTIE	N/A	N/A	N/A	N/A

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3 SUMMARY OF TEST RESULTS

FCC Rules	Description Of Test	Result
§15.207(a)/ RSS-Gen §7.2.2	AC Power Line Conducted Emission	Compliant
§15.247(b)/ §A8.4(2)	Peak Output Power	Compliant
§15.247(b)/ §A8.2	6dB 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/,§A8.3(2)	Peak Power Density	Compliant
§15.203/ RSS-GEN 7.1.4, RSS-210 issue 7,§A8.4	Antenna Requirement	Compliant
RSS-Gen §4.4.1	99% Power Bandwidth	Compliant

4 DESCRIPTION OF TEST MODES

The EUT has been tested under operating condition.

EUT is staying in continuous transmitting mode is programmed.

Channel low (2405MHz)、mid (2445MHz) and high (2480MHz) with highest data rate are chosen for full testing.

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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:

AC Power Line Conducted Emission Test Site					
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
EMI Test Receiver	R&S	ESCS30	828985/004	09/15/2009	09/14/2010
LISN	Rolf-Heine	NNB-2/16Z	99012	02/18/2009	02/17/2010
LISN	FCC	FCC-LISN-50/250-25-2-01	04034	02/18/2009	02/17/2010
Coaxial Cables	N/A	WK CE Cable	N/A	10/30/2009	10/29/2010

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.

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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:

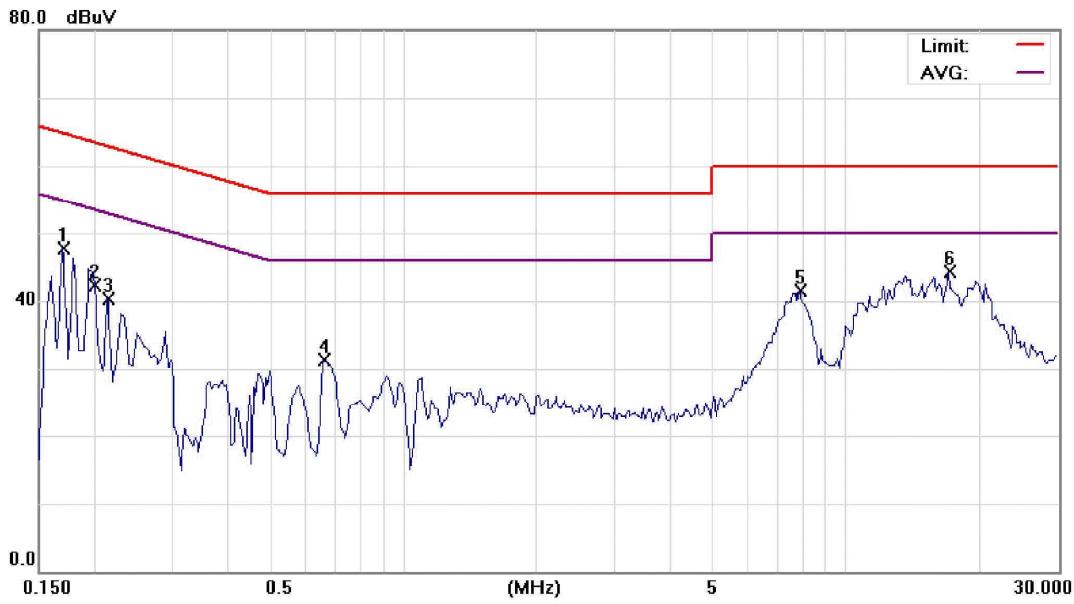
The initial step in collecting conducted data is a spectrum analyzer peak scan of the measurement range. Significant peaks are then marked as shown on the following data page, and these signals are then quasi-peaked.

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

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AC POWER LINE CONDUCTED EMISSION TEST DATA

Operation Mode:	Link mode		Test Date:	Nov. 02, 2009
Temperature:	25 °C	Humidity:	62 %	Test By: Brain


 Site SGS CONDUCTED #1 Phase: **L1** Temperature: 25 °C

Limit: CISPR22 Class B Conduction(QP)

Power: AC 120V/60Hz

Humidity: 62 %

EUT: ASSY PCB RF Module

Distance:

Air Pressure: hpa

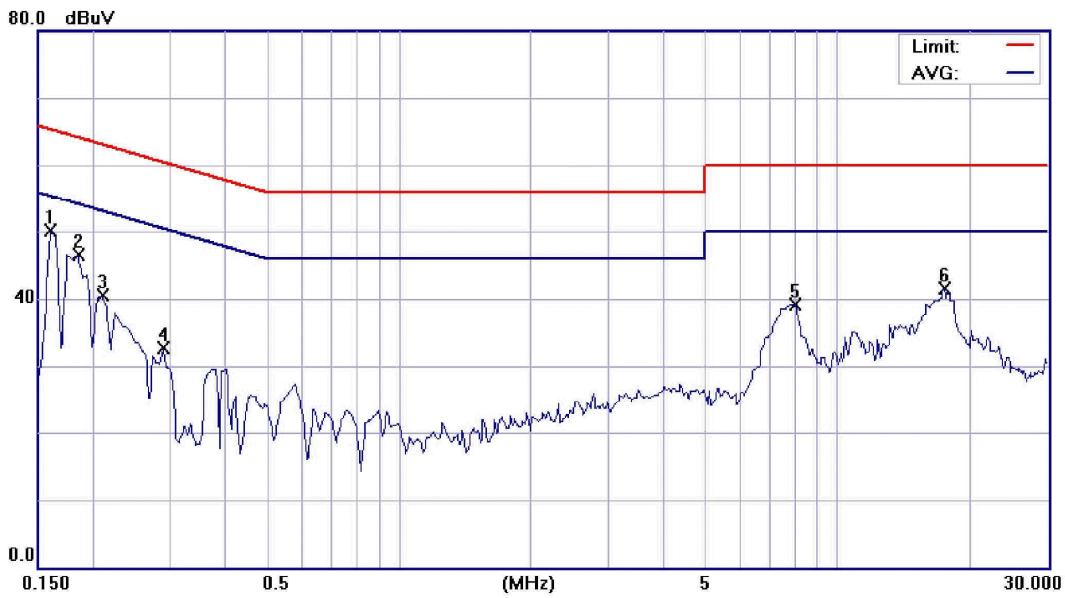
M/N: CRMX-100

Note: Link Mode

No.	Mk.	Freq.	Reading	Factor	Measure-	Limit	Over	Detector	Comment
			Level		ment				
MHz		dBuV	dB		dBuV	dBuV	dB		
1		0.1700	47.24	0.48	47.72	64.96	-17.24	peak	
2		0.2007	41.79	0.52	42.31	63.58	-21.27	peak	
3		0.2150	39.77	0.53	40.30	63.01	-22.71	peak	
4		0.6600	30.63	0.70	31.33	56.00	-24.67	peak	
5		7.8800	40.44	1.08	41.52	60.00	-18.48	peak	
6	*	17.1200	43.09	1.21	44.30	60.00	-15.70	peak	

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Site SGS CONDUCTED #1 Phase: **N** Temperature: 25 °C
 Limit: CISPR22 Class B Conduction(QP) Power: AC 120V/60Hz Humidity: 62 %
 EUT: ASSY PCB RF Module Distance: Air Pressure: hpa
 M/N: CRMX-100
 Note: Link Mode

No.	Mk.	Freq.	Reading	Factor	Measure-	Limit	Over	Detector	Comment
			Level		ment				
		MHz	dBuV	dB	dBuV	dB			
1	*	0.1600	49.59	0.46	50.05	65.46	-15.41	peak	
2		0.1850	46.07	0.50	46.57	64.26	-17.69	peak	
3		0.2100	39.93	0.53	40.46	63.21	-22.75	peak	
4		0.2900	32.15	0.56	32.71	60.52	-27.81	peak	
5		8.0000	38.01	1.19	39.20	60.00	-20.80	peak	
6		17.5200	40.12	1.32	41.44	60.00	-18.56	peak	

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

6.2 Measurement Equipment Used:

Conducted Emission Test Site					
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
Power Meter	Anritsu	ML2487A	6K00002070	05/28/2008	05/27/2010
Low Loss Cable	HUBER+SUHNER	SUCOFLEX 104PEA	N/A	01/05/2009	01/04/2010
Attenuator	Mini-Circuit	BW-S6W5	N/A	07/05/2009	07/04/2010

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
3. Record the max. reading.
4. Repeat above procedures until all frequency measured were complete.

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6.5 Measurement Result:

Frequency (MHz)	Reading Power (dBm)	Output Power (W)	Limit
2405.00	8.31	0.00678	30dBm
2445.00	8.66	0.00735	30dBm
2480.00	8.80	0.00759	30dBm

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7 6dB 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=100KHz, 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.

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7.5 Measurement Result:

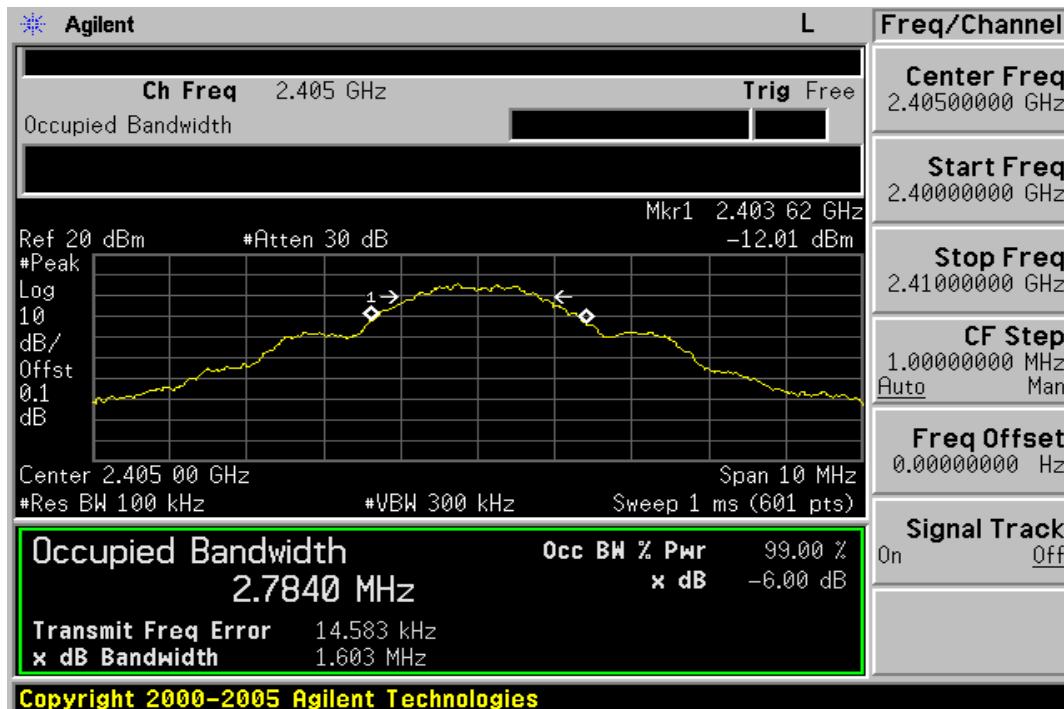
Frequency (MHz)	Bandwidth (MHz)	Bandwidth (KHz)	Result
2405	1.603	> 500	PASS
2445	1.671	> 500	PASS
2480	1.617	> 500	PASS

*Offset 0.1dB

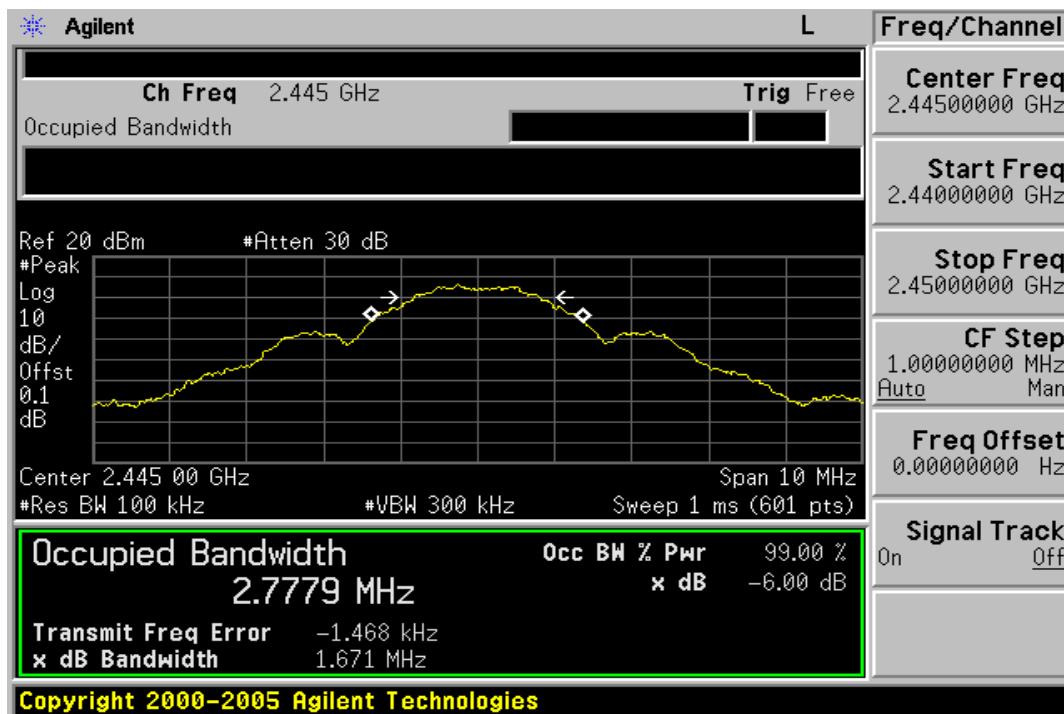
Note: Refer to next page for plots.

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6dB Band Width Test Data CH-Low

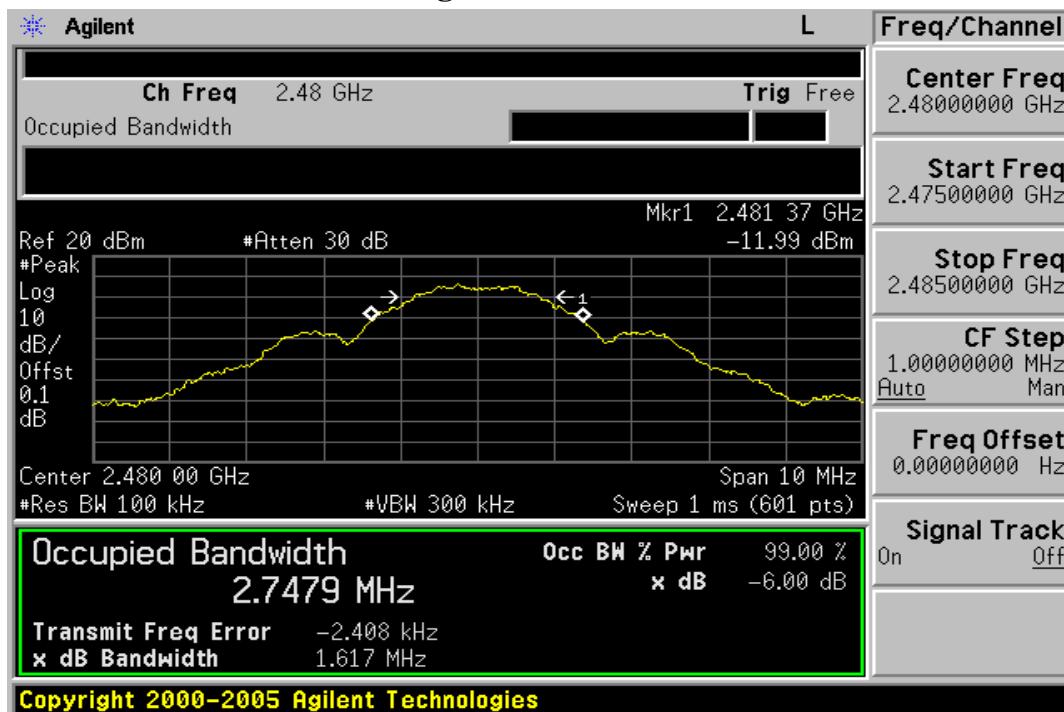


6dB Band Width Test Data CH-Mid



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6dB Band Width Test Data CH-High



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8 100KHz BANDWIDTH OF BAND EDGES MEASUREMENT

8.1 Standard Applicable:

According to §15.247(c), in any 100 KHz bandwidth outside the frequency bands in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20dB below that in the 100KHz bandwidth within the band that contains the highest level of the desired power. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in 15.209(a).

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:

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	07/04/2009	07/03/2010
Spectrum Analyzer	R&S	FSP 40	100034	02/22/2009	02/21/2010
Low Loss Cable	HUBER+SUHNER	SUCOFLEX 104PEA	N/A	01/05/2009	01/04/2010
Attenuator	Mini-Circuit	BW-S6W5	N/A	07/05/2009	07/04/2010

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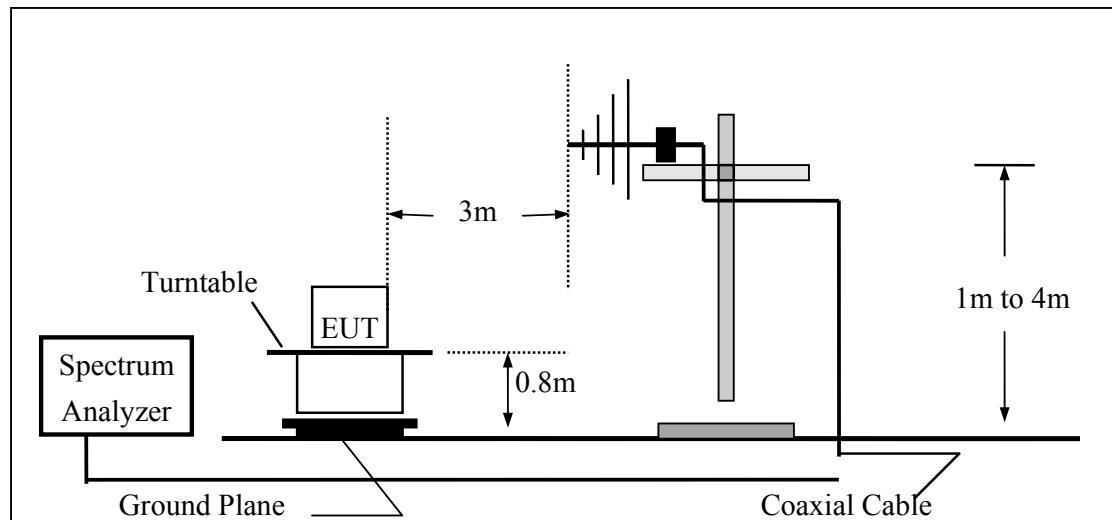
8.3 Test SET-UP:

8.3.1 Conducted Emission at antenna port:

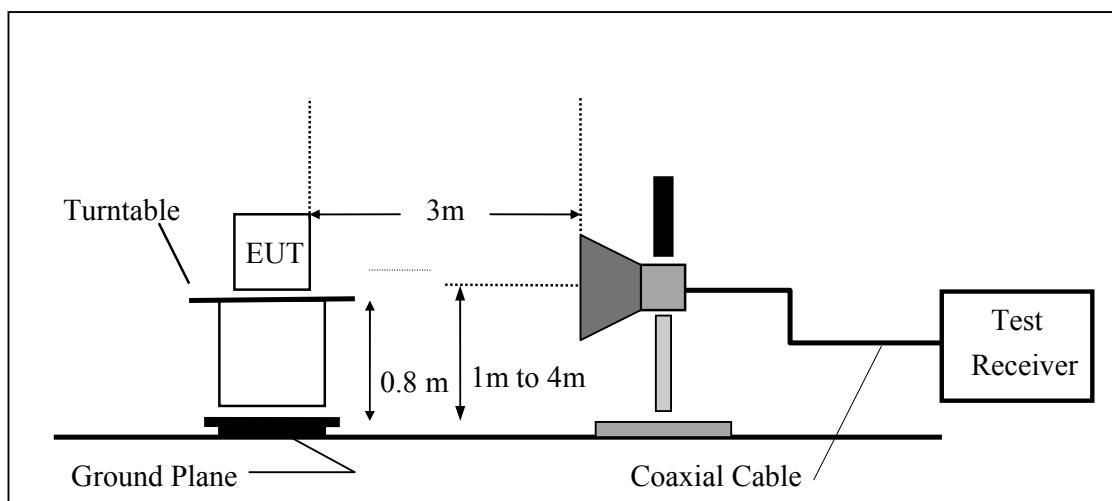
Refer to section 6.3 for details.

8.3.2 Radiated emission:

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



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



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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:

$$\mathbf{FS = RA + AF + CL - AG}$$

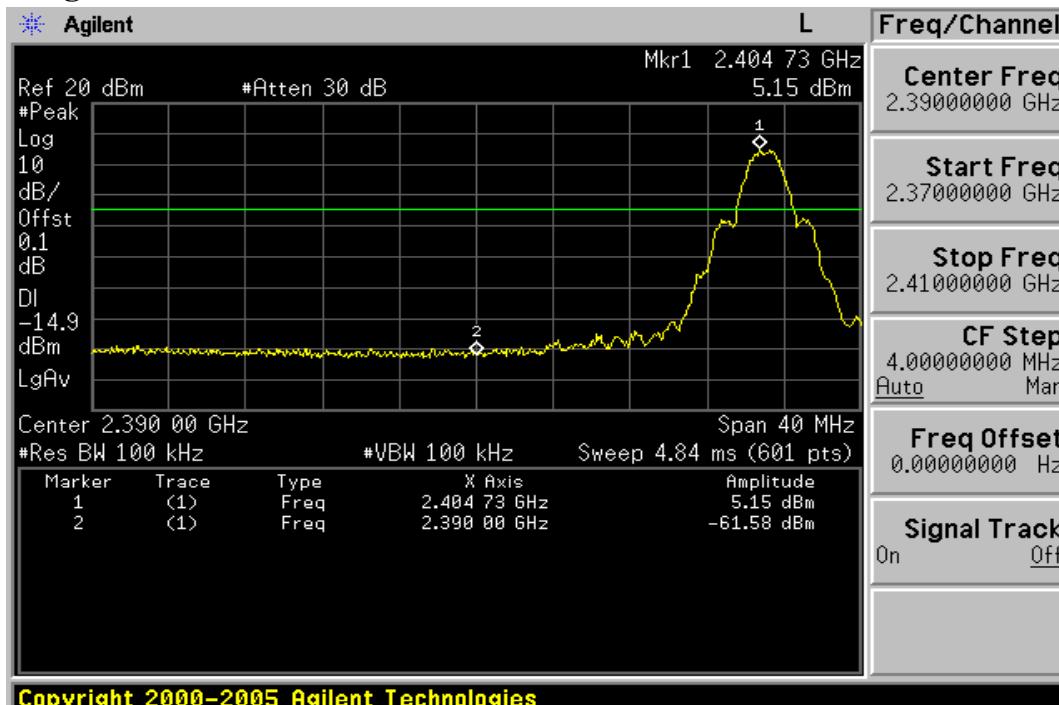
Where	FS = Field Strength	CL = Cable Attenuation Factor (Cable Loss)
	RA = Reading Amplitude	AG = Amplifier Gain
	AF = Antenna Factor	

8.6 Measurement Result:

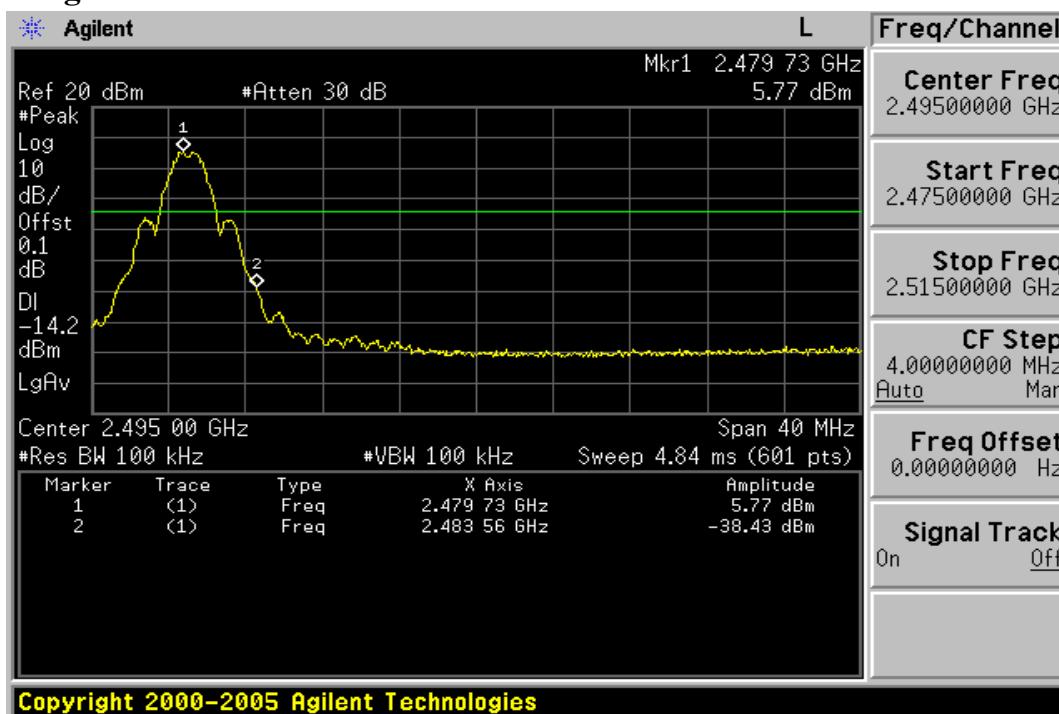
Note: Refer to next page spectrum analyzer data chart and tabular data sheets.

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Band Edges Test Data CH-2405



Band Edges Test Data CH-2480



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Radiated Emission: Chip Antenna

Operation Mode TX CH Low
Fundamental Frequency 2405 MHz
Temperature 25 °C
Humidity 65 %

Test Date Nov. 02, 2009
Test By Brain
Pol Ver.

Freq. (MHz)	Peak	AV	Actual FS		Peak	AV	Margin (dB)	Remark
	Reading (dBuV)	Reading (dBuV)	Ant./CL CF(dB)	Peak (dBuV/m)	AV (dBuV/m)	Limit (dBuV/m)		
2390.00	53.00	40.18	-1.39	51.61	38.79	74.00	54.00	-15.21 AV

Operation Mode TX CH Low
Fundamental Frequency 2412 MHz
Temperature 25 °C
Humidity 65 %

Test Date Nov. 02, 2009
Test By Brain
Pol Hor.

Freq. (MHz)	Peak	AV	Actual FS		Peak	AV	Margin (dB)	Remark
	Reading (dBuV)	Reading (dBuV)	Ant./CL CF(dB)	Peak (dBuV/m)	AV (dBuV/m)	Limit (dBuV/m)		
2390.00	52.20	42.13	-1.39	50.81	40.74	74.00	54.00	-13.26 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 o.
- (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.

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Radiated Emission: Chip Antenna

Operation Mode TX CH High
Fundamental Frequency 2480 MHz
Temperature 25 °C
Humidity 65 %

Test Date Nov. 02, 2009
Test By Brain
Pol Ver.

Freq. (MHz)	Peak	AV	Actual FS		Peak	AV	Margin (dB)	Remark
	Reading (dBuV)	Reading (dBuV)	Ant./CL CF(dB)	Peak (dBuV/m)	AV (dBuV/m)			
2483.56	54.27	45.39	-0.92	53.35	44.47	74.00	54.00	-9.53 AV

Operation Mode TX CH High
Fundamental Frequency 2480MHz
Temperature 25 °C
Humidity 65 %

Test Date Nov. 02, 2009
Test By Brain
Pol Hor.

Freq. (MHz)	Peak	AV	Actual FS		Peak	AV	Margin (dB)	Remark
	Reading (dBuV)	Reading (dBuV)	Ant./CL CF(dB)	Peak (dBuV/m)	AV (dBuV/m)			
2483.56	61.94	53.17	-0.92	61.02	52.25	74.00	54.00	-1.75 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.

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Radiated Emission: Dipole Antenna

Operation Mode TX CH Low
Fundamental Frequency 2405 MHz
Temperature 25 °C
Humidity 65 %

Test Date Nov. 02, 2009
Test By Brain
Pol Ver.

Freq. (MHz)	Peak	AV	Actual FS		Peak	AV	Margin (dB)	Remark
	Reading (dBuV)	Reading (dBuV)	Ant./CL CF(dB)	Peak (dBuV/m)	AV (dBuV/m)			
2390.00	54.81	49.91	-1.39	53.42	48.52	74.00	54.00	-5.48 AV

Operation Mode TX CH Low
Fundamental Frequency 2405 MHz
Temperature 25 °C
Humidity 65 %

Test Date Nov. 02, 2009
Test By Brain
Pol Hor.

Freq. (MHz)	Peak	AV	Actual FS		Peak	AV	Margin (dB)	Remark
	Reading (dBuV)	Reading (dBuV)	Ant./CL CF(dB)	Peak (dBuV/m)	AV (dBuV/m)			
2390.00	50.85	46.65	-1.39	49.46	45.26	74.00	54.00	-8.74 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 o.
- (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.

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Radiated Emission: Dipole Antenna

Operation Mode TX CH High
Fundamental Frequency 2480 MHz
Temperature 25 °C
Humidity 65 %

Test Date Nov. 02, 2009
Test By Brain
Pol Ver.

Freq. (MHz)	Peak	AV	Actual FS		Peak	AV	Margin (dB)	Remark
	Reading (dBuV)	Reading (dBuV)	Ant./CL CF(dB)	Peak (dBuV/m)	AV (dBuV/m)			
2483.56	57.74	51.85	-0.92	56.82	50.93	74.00	54.00	-3.07 AV

Operation Mode TX CH High
Fundamental Frequency 2480MHz
Temperature 25 °C
Humidity 65 %

Test Date Nov. 02, 2009
Test By Brain
Pol Hor.

Freq. (MHz)	Peak	AV	Actual FS		Peak	AV	Margin (dB)	Remark
	Reading (dBuV)	Reading (dBuV)	Ant./CL CF(dB)	Peak (dBuV/m)	AV (dBuV/m)			
2483.56	49.00	44.98	-0.92	48.08	44.06	74.00	54.00	-9.94 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.

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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.

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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:

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

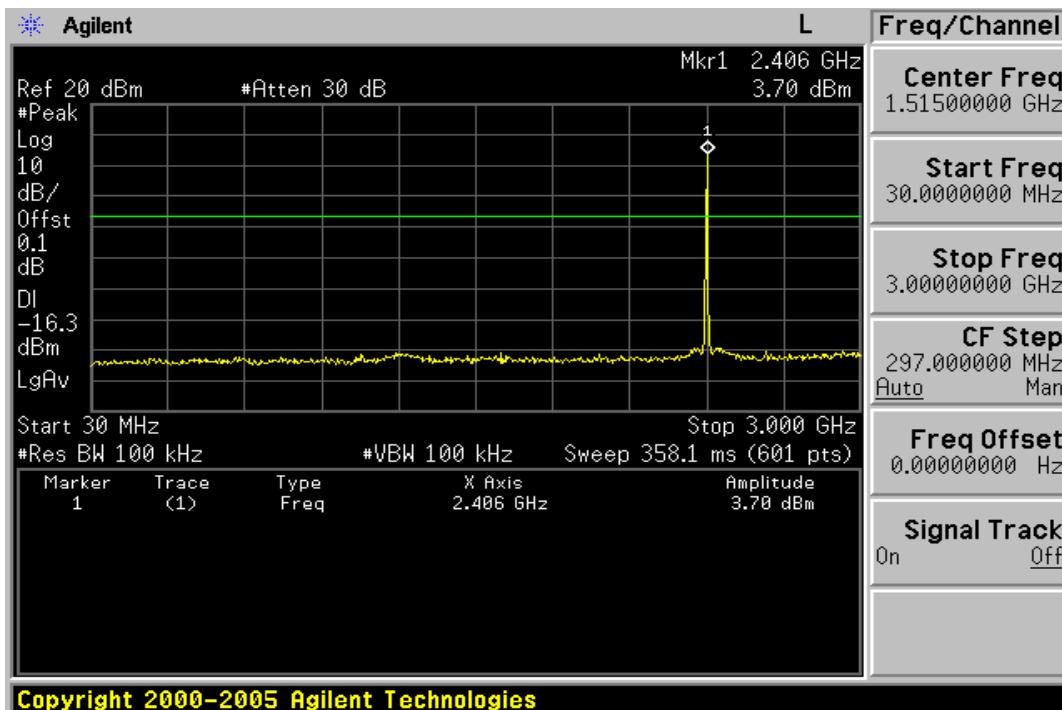
Where	FS = Field Strength	CL = Cable Attenuation Factor (Cable Loss)
	RA = Reading Amplitude	AG = Amplifier Gain
	AF = Antenna Factor	

9.6 Measurement Result:

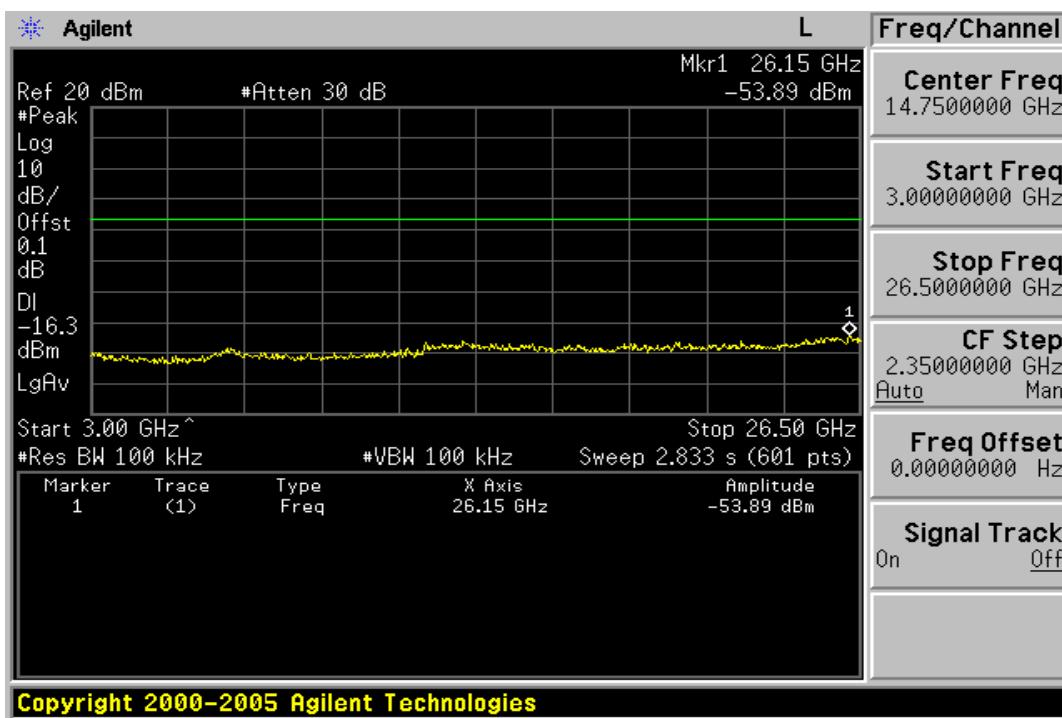
Note: Refer to next page spectrum analyzer data chart and tabular data sheets.

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

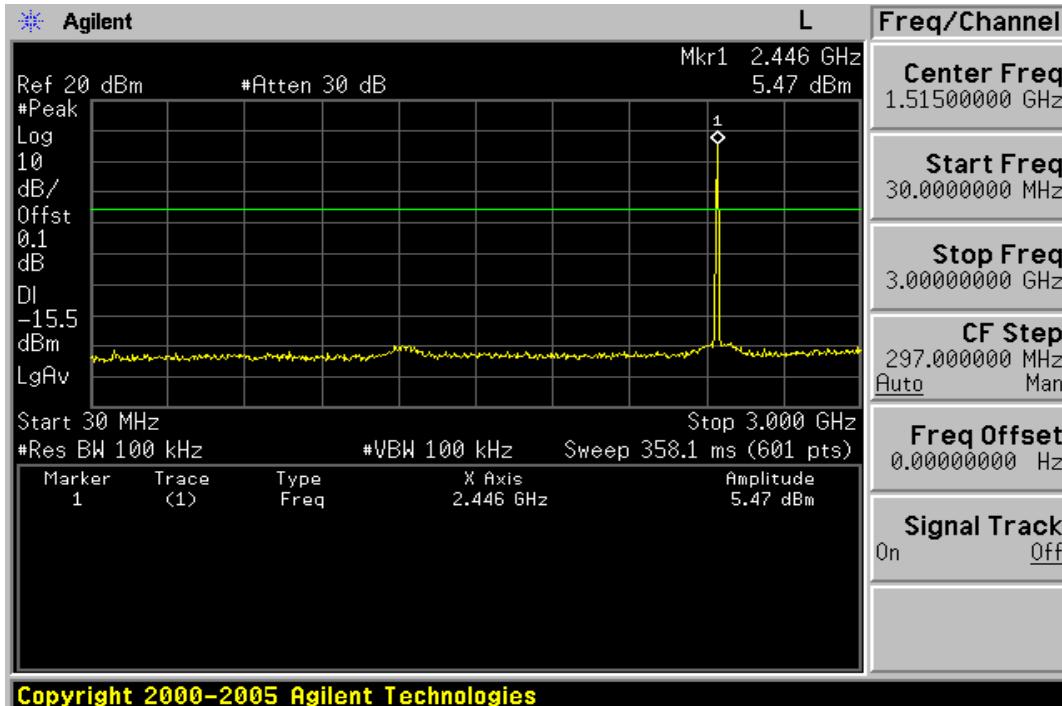


Ch Low 3GHz – 26.5GHz

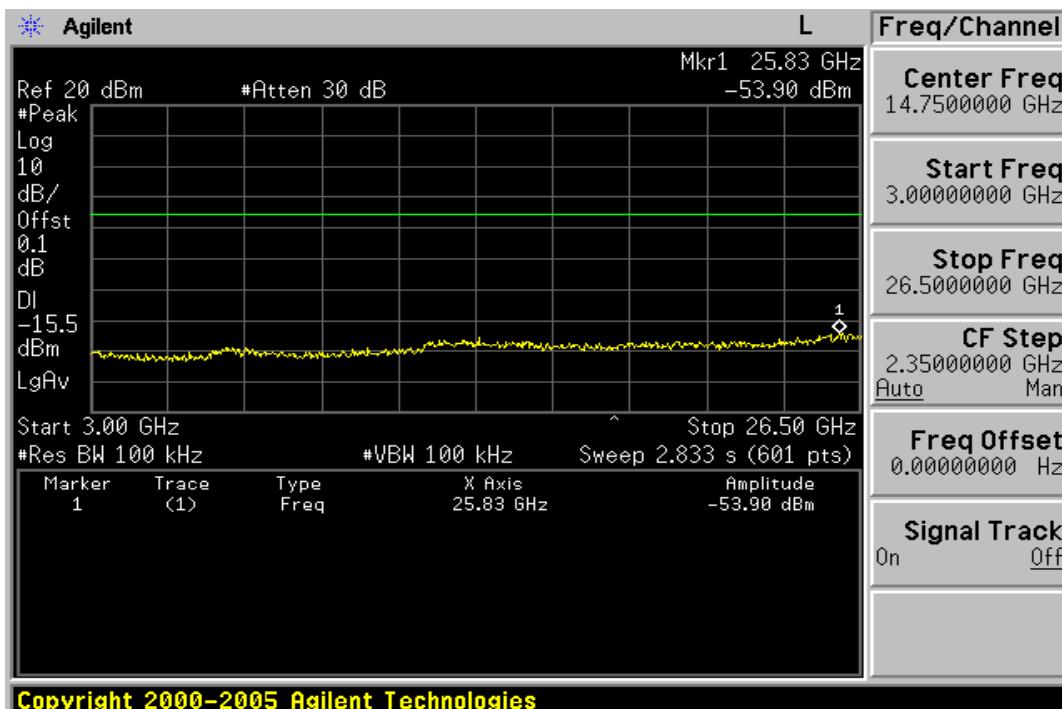


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Ch Mid 30MHz – 3GHz

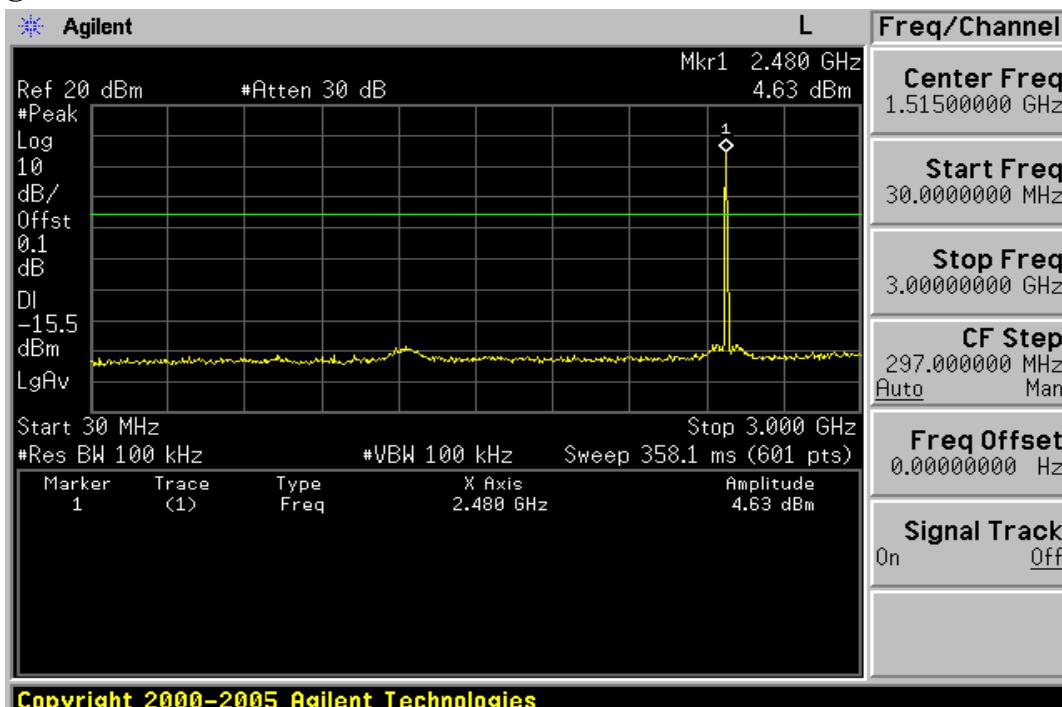


Ch Mid 3GHz – 26.5GHz

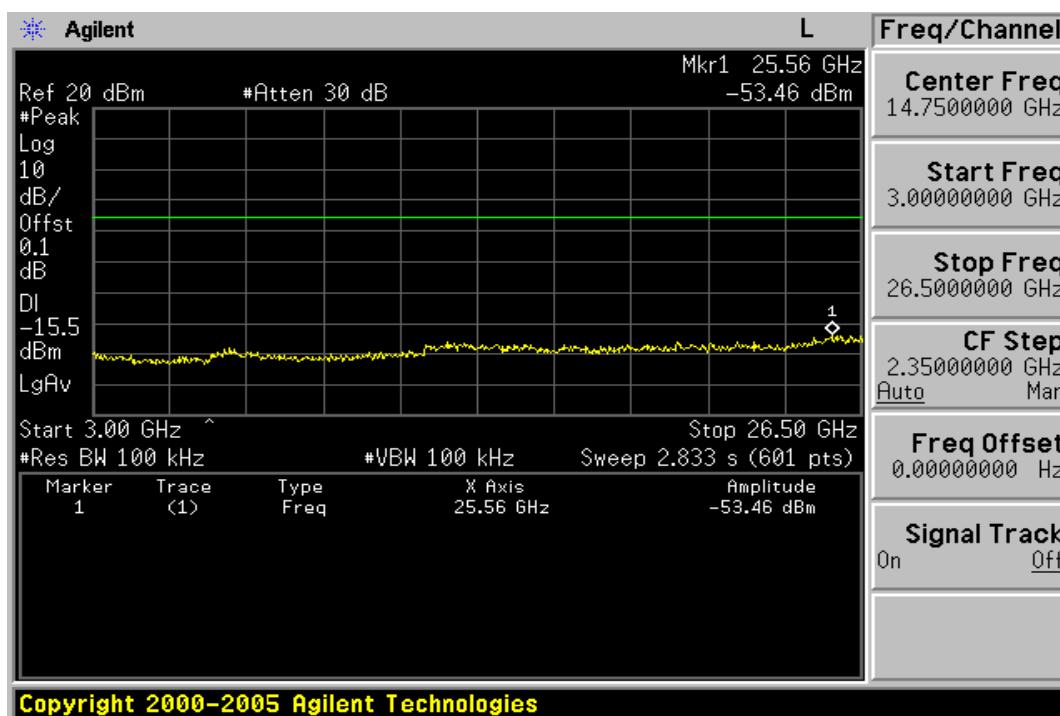


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Ch High 30MHz – 3GHz



Ch High 3GHz – 26.5GHz



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Radiated Spurious Emission Measurement Result (below 1GHz) Chip Antenna

Operation Mode	TX CH Low	Test Date	Nov. 02, 2009
Fundamental Frequency	2405MHz	Test By	Brain
Temperature	25 °C	Pol	Ver./Hor
Humidity	60 %		

Freq. (MHz)	Ant.Pol. H/V	Detector Mode (PK/QP)	Reading (dBuV)	Factor (dB)	Actual FS (dBuV/m)	Limit3m (dBuV/m)	Safe Mar- gin (dB)
67.83	V	Peak	42.93	-15.60	27.33	40.00	-12.67
104.69	V	Peak	45.02	-16.63	28.39	43.50	-15.11
177.44	V	Peak	41.66	-14.38	27.28	43.50	-16.22
385.99	V	Peak	36.67	-10.47	26.20	46.00	-19.80
800.18	V	Peak	32.78	-3.04	29.74	46.00	-16.26
870.99	V	Peak	32.11	-1.58	30.53	46.00	-15.47
65.89	H	Peak	42.15	-15.09	27.06	40.00	-12.94
92.08	H	Peak	46.21	-17.38	28.83	43.50	-14.67
385.99	H	Peak	38.09	-10.47	27.62	46.00	-18.38
611.03	H	Peak	35.54	-5.79	29.75	46.00	-16.25
657.59	H	Peak	36.86	-4.98	31.88	46.00	-14.12
866.14	H	Peak	32.46	-1.65	30.81	46.00	-15.19

Remark :

- (1) Measuring frequencies from 30 MHz to the 1GHz .
- (2) Radiated emissions measured in frequency range from 30 MHz to 1000MHz were made with an instrument using Peak/QP detector mode.
- (3) Data of measurement within this frequency range shown “ - ” in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
- (4) The IF bandwidth of SPA between 30MHz to 1GHz was 100KHz.

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Radiated Spurious Emission Measurement Result (below 1GHz) Chip Antenna

Operation Mode	TX CH Mid	Test Date	Nov. 02, 2009
Fundamental Frequency	2445MHz	Test By	Brain
Temperature	25 °C	Pol	Ver./Hor
Humidity	60 %		

Freq. (MHz)	Ant.Pol. H/V	Detector Mode (PK/QP)	Reading (dBuV)	Factor (dB)	Actual FS (dBuV/m)	Limit3m (dBuV/m)	Safe Mar- gin (dB)
67.83	V	Peak	43.40	-15.60	27.80	40.00	-12.20
92.08	V	Peak	46.10	-17.38	28.72	43.50	-14.78
104.69	V	Peak	45.13	-16.63	28.50	43.50	-15.00
332.64	V	Peak	39.14	-12.16	26.98	46.00	-19.02
800.18	V	Peak	33.32	-3.04	30.28	46.00	-15.72
924.34	V	Peak	32.12	-1.04	31.08	46.00	-14.92
58.13	H	Peak	43.14	-14.66	28.48	40.00	-11.52
99.84	H	Peak	45.57	-17.01	28.56	43.50	-14.94
385.99	H	Peak	38.34	-10.47	27.87	46.00	-18.13
609.09	H	Peak	35.28	-5.83	29.45	46.00	-16.55
657.59	H	Peak	35.31	-4.98	30.33	46.00	-15.67
877.78	H	Peak	31.96	-1.49	30.47	46.00	-15.53

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.

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Radiated Spurious Emission Measurement Result (below 1GHz) Chip Antenna

Operation Mode	TX CH High	Test Date	Nov. 02, 2009
Fundamental Frequency	2480MHz	Test By	Brain
Temperature	25 °C	Pol	Ver./Hor
Humidity	60 %		

Freq. (MHz)	Ant.Pol. H/V	Detector Mode (PK/QP)	Reading (dBuV)	Factor (dB)	Actual FS (dBuV/m)	Limit3m (dBuV/m)	Safe Mar- gin (dB)
72.68	V	Peak	44.28	-16.62	27.66	40.00	-12.34
92.08	V	Peak	45.57	-17.38	28.19	43.50	-15.31
121.18	V	Peak	42.53	-15.17	27.36	43.50	-16.14
342.34	V	Peak	38.22	-11.87	26.35	46.00	-19.65
800.18	V	Peak	34.99	-3.04	31.95	46.00	-14.05
880.69	V	Peak	31.70	-1.44	30.26	46.00	-15.74
67.83	H	Peak	43.74	-15.60	28.14	40.00	-11.86
92.08	H	Peak	46.04	-17.38	28.66	43.50	-14.84
264.74	H	Peak	38.72	-13.59	25.13	46.00	-20.87
266.68	H	Peak	39.39	-13.57	25.82	46.00	-20.18
385.99	H	Peak	38.42	-10.47	27.95	46.00	-18.05
644.97	H	Peak	34.64	-5.10	29.54	46.00	-16.46
873.90	H	Peak	31.37	-1.54	29.83	46.00	-16.17

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) Data of measurement within this frequency range shown “ - ” in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
- (4) The IF bandwidth of SPA between 30MHz to 1GHz was 100KHz.

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Radiated Spurious Emission Measurement Result (below 1GHz) Dipole Antenna

Operation Mode	TX CH Low	Test Date	Nov. 02, 2009
Fundamental Frequency	2405MHz	Test By	Brain
Temperature	25 °C	Pol	Ver./Hor
Humidity	60 %		

Freq. (MHz)	Ant.Pol. H/V	Detector Mode (PK/QP)	Reading (dBuV)	Factor (dB)	Actual FS (dBuV/m)	Limit3m (dBuV/m)	Safe Mar- gin (dB)
70.74	V	Peak	43.59	-16.27	27.32	40.00	-12.68
92.08	V	Peak	46.47	-17.38	29.09	43.50	-14.41
104.69	V	Peak	44.76	-16.63	28.13	43.50	-15.37
179.38	V	Peak	39.94	-14.49	25.45	43.50	-18.05
385.02	V	Peak	35.86	-10.51	25.35	46.00	-20.65
800.18	V	Peak	33.51	-3.04	30.47	46.00	-15.53
64.92	V	Peak	41.33	-14.83	26.50	40.00	-13.50
99.84	V	Peak	45.85	-17.01	28.84	43.50	-14.66
385.99	V	Peak	39.27	-10.47	28.80	46.00	-17.20
555.74	V	Peak	35.81	-7.47	28.34	46.00	-17.66
654.68	V	Peak	34.50	-4.97	29.53	46.00	-16.47
795.33	V	Peak	32.93	-3.15	29.78	46.00	-16.22

Remark :

- (1) Measuring frequencies from 30 MHz to the 1GHz .
- (2) Radiated emissions measured in frequency range from 30 MHz to 1000MHz were made with an instrument using Peak/QP detector mode.
- (3) Data of measurement within this frequency range shown “ - ” in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
- (4) The IF bandwidth of SPA between 30MHz to 1GHz was 100KHz.

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Radiated Spurious Emission Measurement Result (below 1GHz) Dipole Antenna

Operation Mode	TX CH Mid	Test Date	Nov. 02, 2009
Fundamental Frequency	2445MHz	Test By	Brain
Temperature	25 °C	Pol	Ver./Hor
Humidity	60 %		

Freq. (MHz)	Ant.Pol. H/V	Detector Mode (PK/QP)	Reading (dBuV)	Factor (dB)	Actual FS (dBuV/m)	Limit3m (dBuV/m)	Safe Mar- gin (dB)
70.74	V	Peak	45.44	-16.27	29.17	40.00	-10.83
92.08	V	Peak	46.04	-17.38	28.66	43.50	-14.84
104.69	V	Peak	44.32	-16.63	27.69	43.50	-15.81
295.78	V	Peak	40.49	-13.17	27.32	46.00	-18.68
385.99	V	Peak	36.61	-10.47	26.14	46.00	-19.86
798.24	V	Peak	34.40	-3.08	31.32	46.00	-14.68
62.98	H	Peak	42.32	-14.85	27.47	40.00	-12.53
96.93	H	Peak	45.90	-17.16	28.74	43.50	-14.76
385.99	H	Peak	38.19	-10.47	27.72	46.00	-18.28
647.89	H	Peak	35.45	-4.99	30.46	46.00	-15.54
795.33	H	Peak	33.04	-3.15	29.89	46.00	-16.11
890.39	H	Peak	32.45	-1.20	31.25	46.00	-14.75

Remark :

- (1) Measuring frequencies from 30 MHz to the 1GHz .
- (2) Radiated emissions measured in frequency range from 30 MHz to 1000MHz were made with an instrument using Peak/QP detector mode.
- (3) Data of measurement within this frequency range shown “ - ” in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
- (4) The IF bandwidth of SPA between 30MHz to 1GHz was 100KHz.

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Radiated Spurious Emission Measurement Result (below 1GHz) Dipole Antenna

Operation Mode	TX CH High	Test Date	Nov. 02, 2009
Fundamental Frequency	2480MHz	Test By	Brain
Temperature	25 °C	Pol	Ver./Hor
Humidity	60 %		

Freq. (MHz)	Ant.Pol. H/V	Detector Mode (PK/QP)	Reading (dBuV)	Factor (dB)	Actual FS (dBuV/m)	Limit3m (dBuV/m)	Safe Mar- gin (dB)
70.74	V	Peak	43.67	-16.27	27.40	40.00	-12.60
92.08	V	Peak	46.38	-17.38	29.00	43.50	-14.50
104.69	V	Peak	44.24	-16.63	27.61	43.50	-15.89
179.38	V	Peak	40.93	-14.49	26.44	43.50	-17.06
298.69	V	Peak	39.67	-13.13	26.54	46.00	-19.46
327.79	V	Peak	39.36	-12.36	27.00	46.00	-19.00
795.33	V	Peak	33.50	-3.15	30.35	46.00	-15.65
67.83	H	Peak	43.92	-15.60	28.32	40.00	-11.68
96.93	H	Peak	45.59	-17.16	28.43	43.50	-15.07
385.99	H	Peak	38.65	-10.47	28.18	46.00	-17.82
604.24	H	Peak	34.95	-5.92	29.03	46.00	-16.97
788.54	H	Peak	32.38	-3.30	29.08	46.00	-16.92

Remark :

- (1) Measuring frequencies from 30 MHz to the 1GHz。
- (2) Radiated emissions measured in frequency range from 30 MHz to 1000MHz were made with an instrument using Peak/QP detector mode.
- (3) Data of measurement within this frequency range shown “ - ” in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
- (4) The IF bandwidth of SPA between 30MHz to 1GHz was 100KHz.

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Radiated Spurious Emission Measurement Result (above 1GHz) Chip Antenna

Operation Mode	TX CH Low	Test Date	Nov. 02, 2009
Fundamental Frequency	2405MHz	Test By	Brain
Temperature	23 °C	Pol	Ver.
Humidity	54 %		

Freq. (MHz)	Peak	AV	Actual FS		Peak	AV	Limit	Limit	Margin
	Reading (dBuV)	Reading (dBuV)	Ant./CL CF(dB)	Peak (dBuV/m)	AV (dBuV/m)				
4810.0	45.69	---	6.02	51.71	---	74.00	54.00	-2.29	Peak
7215.0	----					74.00	54.00		
9620.0	----					74.00	54.00		
12025.0	----					74.00	54.00		
14430.0	----					74.00	54.00		
16835.0	----					74.00	54.00		
19240.0	----					74.00	54.00		
21645.0	----					74.00	54.00		
24050.0	----					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.

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Radiated Spurious Emission Measurement Result (above 1GHz) Chip Antenna

Operation Mode	TX CH Low	Test Date	Nov. 02, 2009
Fundamental Frequency	2405MHz	Test By	Brain
Temperature	23 °C	Pol	Hor
Humidity	54 %		

Freq. (MHz)	Peak	AV	Actual FS			Peak	AV	Margin (dB)
	Reading (dBuV)	Reading (dBuV)	Ant./CL CF(dB)	Peak (dBuV/m)	AV (dBuV/m)	Limit (dBuV/m)	Limit (dBuV/m)	
4810.0	47.18	45.57	6.02	53.20	51.59	74.00	54.00	-2.41 AV
7215.0	----					74.00	54.00	
9620.0	----					74.00	54.00	
12025.0	----					74.00	54.00	
14430.0	----					74.00	54.00	
16835.0	----					74.00	54.00	
19240.0	----					74.00	54.00	
21645.0	----					74.00	54.00	
24050.0	----					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.

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Radiated Spurious Emission Measurement Result (above 1GHz) Chip Antenna

Operation Mode	TX CH Mid	Test Date	Nov. 02, 2009
Fundamental Frequency	2445MHz	Test By	Brain
Temperature	23 °C	Pol	Ver
Humidity	54 %		

Freq. (MHz)	Peak	AV	Actual FS		Peak	AV	Margin (dB)	
	Reading (dBuV)	Reading (dBuV)	Ant./CL CF(dB)	Peak (dBuV/m)	AV (dBuV/m)	Limit (dBuV/m)	Limit (dBuV/m)	
4890.0	41.89	---	6.17	48.06	---	74.00	54.00	-5.94 Peak
7335.0	----					74.00	54.00	
9780.0	----					74.00	54.00	
12225.0	----					74.00	54.00	
14670.0	----					74.00	54.00	
17115.0	----					74.00	54.00	
19560.0	----					74.00	54.00	
22005.0	----					74.00	54.00	
24450.0	----					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.

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Radiated Spurious Emission Measurement Result (above 1GHz) Chip Antenna

Operation Mode	TX CH Mid	Test Date	Nov. 02, 2009
Fundamental Frequency	2440MHz	Test By	Brain
Temperature	23 °C	Pol	Hor
Humidity	54 %		

Freq. (MHz)	Peak	AV	Actual FS			Peak	AV	Margin (dB)
	Reading (dBuV)	Reading (dBuV)	Ant./CL CF(dB)	Peak (dBuV/m)	AV (dBuV/m)	Limit (dBuV/m)	Limit (dBuV/m)	
4890.0	46.77	44.44	6.17	52.94	50.61	74.00	54.00	-3.39 AV
7335.0	----					74.00	54.00	
9780.0	----					74.00	54.00	
12225.0	----					74.00	54.00	
14670.0	----					74.00	54.00	
17115.0	----					74.00	54.00	
19560.0	----					74.00	54.00	
22005.0	----					74.00	54.00	
24450.0	----					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.

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Radiated Spurious Emission Measurement Result (above 1GHz) Chip Antenna

Operation Mode	TX CH High	Test Date	Nov. 02, 2009
Fundamental Frequency	2480MHz	Test By	Brain
Temperature	23 °C	Pol	Ver
Humidity	54 %		

Freq. (MHz)	Peak	AV	Actual FS		Peak	AV	Margin (dB)	
	Reading (dBuV)	Reading (dBuV)	Ant./CL CF(dB)	Peak (dBuV/m)	AV (dBuV/m)	Limit (dBuV/m)	Limit (dBuV/m)	
4960.0	37.80	---	6.36	44.16	---	74.00	54.00	-9.84 Peak
7440.0	----					74.00	54.00	
9920.0	----					74.00	54.00	
12400.0	----					74.00	54.00	
14880.0	----					74.00	54.00	
17360.0	----					74.00	54.00	
19840.0	----					74.00	54.00	
22320.0	----					74.00	54.00	
24800.0	----					74.00	54.00	

Remark:

- (1) Measuring frequencies 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.

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Radiated Spurious Emission Measurement Result (above 1GHz) Chip Antenna

Operation Mode	TX CH High	Test Date	Nov. 02, 2009
Fundamental Frequency	2480MHz	Test By	Brain
Temperature	23 °C	Pol	Hor
Humidity	54 %		

Freq. (MHz)	Peak	AV	Actual FS			Peak	AV	Margin (dB)
	Reading (dBuV)	Reading (dBuV)	Ant./CL CF(dB)	Peak (dBuV/m)	AV (dBuV/m)	Limit (dBuV/m)	Limit (dBuV/m)	
4960.0	41.83	39.25	6.36	48.19	45.61	74.00	54.00	-8.39 AV
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 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.

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Radiated Spurious Emission Measurement Result (above 1GHz) Dipole Antenna

Operation Mode	TX CH Low	Test Date	Nov. 02, 2009
Fundamental Frequency	2405MHz	Test By	Brain
Temperature	25 °C	Pol	Ver.
Humidity	60 %		

Freq. (MHz)	Peak	AV	Actual FS		Peak	AV	Limit	Limit	Margin
	Reading (dBuV)	Reading (dBuV)	Ant./CL CF(dB)	Peak (dBuV/m)	AV (dBuV/m)				
4810.0	40.69	---	6.02	46.71	---	74.00	54.00	-7.29	Peak
7215.0	----					74.00	54.00		
9620.0	----					74.00	54.00		
12025.0	----					74.00	54.00		
14430.0	----					74.00	54.00		
16835.0	----					74.00	54.00		
19240.0	----					74.00	54.00		
21645.0	----					74.00	54.00		
24050.0	----					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.

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Radiated Spurious Emission Measurement Result (above 1GHz) Dipole Antenna

Operation Mode	TX CH Low	Test Date	Nov. 02, 2009
Fundamental Frequency	2405MHz	Test By	Brain
Temperature	23 °C	Pol	Hor
Humidity	54 %		

Freq. (MHz)	Peak	AV	Actual FS		Peak	AV	Margin (dB)	
	Reading (dBuV)	Reading (dBuV)	Ant./CL CF(dB)	Peak (dBuV/m)	AV (dBuV/m)	Limit (dBuV/m)	Limit (dBuV/m)	
4810.0	39.27	---	6.02	45.29	---	74.00	54.00	-8.71 Peak
7215.0	----					74.00	54.00	
9620.0	----					74.00	54.00	
12025.0	----					74.00	54.00	
14430.0	----					74.00	54.00	
16835.0	----					74.00	54.00	
19240.0	----					74.00	54.00	
21645.0	----					74.00	54.00	
24050.0	----					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.

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Radiated Spurious Emission Measurement Result (above 1GHz) Dipole Antenna

Operation Mode	TX CH Mid	Test Date	Nov. 02, 2009
Fundamental Frequency	2440MHz	Test By	Brain
Temperature	23 °C	Pol	Ver
Humidity	54 %		

Freq. (MHz)	Peak	AV	Actual FS		Peak	AV	Margin (dB)	
	Reading (dBuV)	Reading (dBuV)	Ant./CL CF(dB)	Peak (dBuV/m)	AV (dBuV/m)	Limit (dBuV/m)		
4890.0	39.88	---	6.17	46.05	---	74.00	54.00	-7.95 Peak
7335.0	----					74.00	54.00	
9780.0	----					74.00	54.00	
12225.0	----					74.00	54.00	
14670.0	----					74.00	54.00	
17115.0	----					74.00	54.00	
19560.0	----					74.00	54.00	
22005.0	----					74.00	54.00	
24450.0	----					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.

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Radiated Spurious Emission Measurement Result (above 1GHz) Dipole Antenna

Operation Mode	TX CH Mid	Test Date	Nov. 02, 2009
Fundamental Frequency	2440MHz	Test By	Brain
Temperature	23 °C	Pol	Hor
Humidity	54 %		

Freq. (MHz)	Peak	AV	Actual FS			Peak	AV	Margin (dB)
	Reading (dBuV)	Reading (dBuV)	Ant./CL CF(dB)	Peak (dBuV/m)	AV (dBuV/m)	Limit (dBuV/m)	Limit (dBuV/m)	
4890.0	39.26	---	6.17	45.43	---	74.00	54.00	-8.57 Peak
7335.0	----					74.00	54.00	
9780.0	----					74.00	54.00	
12225.0	----					74.00	54.00	
14670.0	----					74.00	54.00	
17115.0	----					74.00	54.00	
19560.0	----					74.00	54.00	
22005.0	----					74.00	54.00	
24450.0	----					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.

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Radiated Spurious Emission Measurement Result (above 1GHz) Dipole Antenna

Operation Mode	TX CH High	Test Date	Nov. 02, 2009
Fundamental Frequency	2480MHz	Test By	Brain
Temperature	23 °C	Pol	Ver
Humidity	54 %		

Freq. (MHz)	Peak	AV	Actual FS		Peak	AV	Limit	Limit	Margin
	Reading (dBuV)	Reading (dBuV)	Ant./CL CF(dB)	Peak (dBuV/m)	AV (dBuV/m)				
4960.0	37.94	---	6.36	44.30	---	74.00	54.00	-9.70	Peak
7440.0	----					74.00	54.00		
9920.0	----					74.00	54.00		
12400.0	----					74.00	54.00		
14880.0	----					74.00	54.00		
17360.0	----					74.00	54.00		
19840.0	----					74.00	54.00		
22320.0	----					74.00	54.00		
24800.0	----					74.00	54.00		

Remark:

- (1) Measuring frequencies 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.

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Radiated Spurious Emission Measurement Result (above 1GHz) Dipole Antenna

Operation Mode TX CH High Test Date Nov. 02, 2009
Fundamental Frequency 2480MHz Test By Brain
Temperature 23 °C Pol
Humidity 54 % Hor

Freq. (MHz)	Peak	AV	Actual FS		Peak	AV	Margin (dB)	
	Reading (dBuV)	Reading (dBuV)	Ant./CL CF(dB)	Peak (dBuV/m)	AV (dBuV/m)	Limit (dBuV/m)		
4960.0	37.86	---	6.36	44.22	---	74.00	54.00	-9.78 Peak
7440.0	----					74.00	54.00	
9920.0	----					74.00	54.00	
12400.0	----					74.00	54.00	
14880.0	----					74.00	54.00	
17360.0	----					74.00	54.00	
19840.0	----					74.00	54.00	
22320.0	----					74.00	54.00	
24800.0	----					74.00	54.00	

Remark:

- (1) Measuring frequencies 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.

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Radiated Spurious Emission Measurement Result (below 1GHz) Chip Antenna

Operation Mode	RX CH Low	Test Date	Nov. 02, 2009
Fundamental Frequency	2412MHz	Test By	Brain
Temperature	25 °C	Pol	Ver./Hor
Humidity	65 %		

Freq. (MHz)	Ant.Pol.	Detector Mode	Reading (dBuV)	Factor (dB)	Actual FS (dBuV/m)	Limit3m (dBuV/m)	Safe Margin (dB)
67.83	V	Peak	44.03	-15.60	28.43	40.00	-11.57
111.48	V	Peak	45.64	-16.10	29.54	43.50	-13.96
179.38	V	Peak	41.18	-14.49	26.69	43.50	-16.81
385.99	V	Peak	38.14	-10.47	27.67	46.00	-18.33
798.24	V	Peak	34.88	-3.08	31.80	46.00	-14.20
866.14	V	Peak	33.70	-1.65	32.05	46.00	-13.95
67.83	H	Peak	45.72	-15.60	30.12	40.00	-9.88
99.84	H	Peak	47.54	-17.01	30.53	43.50	-12.97
269.59	H	Peak	42.30	-13.55	28.75	46.00	-17.25
385.99	H	Peak	39.11	-10.47	28.64	46.00	-17.36
647.89	H	Peak	35.88	-4.99	30.89	46.00	-15.11
798.24	H	Peak	33.71	-3.08	30.63	46.00	-15.37

Remark :

- (1) Measuring frequencies from 30 MHz to the 1GHz .
- (2) Radiated emissions measured in frequency range from 30 MHz to 1000MHz were made with an instrument using Peak/QP detector mode.
- (3) Data of measurement within this frequency range shown “ - ” in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
- (4) The IF bandwidth of SPA between 30MHz to 1GHz was 100KHz.

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Radiated Spurious Emission Measurement Result (below 1GHz) Chip Antenna

Operation Mode	RX CH Mid	Test Date	Nov. 02, 2009
Fundamental Frequency	2405MHz	Test By	Brain
Temperature	25°C	Pol	Ver./Hor
Humidity	65 %		

Freq. (MHz)	Ant.Pol.	Detector Mode	Reading (dBuV)	Factor (dB)	Actual FS (dBuV/m)	Limit3m (dBuV/m)	Safe Margin (dB)
70.74	V	Peak	44.90	-16.27	28.63	40.00	-11.37
92.08	V	Peak	47.29	-17.38	29.91	43.50	-13.59
109.54	V	Peak	45.74	-16.25	29.49	43.50	-14.01
182.29	V	Peak	41.26	-14.67	26.59	43.50	-16.91
385.99	V	Peak	38.19	-10.47	27.72	46.00	-18.28
795.33	V	Peak	35.97	-3.15	32.82	46.00	-13.18
67.83	H	Peak	45.18	-15.60	29.58	40.00	-10.42
96.93	H	Peak	47.62	-17.16	30.46	43.50	-13.04
266.68	H	Peak	41.94	-13.57	28.37	46.00	-17.63
385.99	H	Peak	39.31	-10.47	28.84	46.00	-17.16
654.68	H	Peak	36.27	-4.97	31.30	46.00	-14.70
798.24	H	Peak	34.49	-3.08	31.41	46.00	-14.59

Remark :

- (1) Measuring frequencies from 30 MHz to the 1GHz。
- (2) Radiated emissions measured in frequency range from 30 MHz to 1000MHz were made with an instrument using Peak/QP detector mode.
- (3) Data of measurement within this frequency range shown “ - ” in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
- (4) The IF bandwidth of SPA between 30MHz to 1GHz was 100KHz.

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Radiated Spurious Emission Measurement Result (below 1GHz) Chip Antenna

Operation Mode	RX CH High	Test Date	Nov. 02, 2009
Fundamental Frequency	2440MHz	Test By	Brain
Temperature	25 °C	Pol	Ver./Hor
Humidity	65%		

Freq. (MHz)	Ant.Pol. H/V	Detector Mode (PK/QP)	Reading (dBuV)	Factor (dB)	Actual FS (dBuV/m)	Limit3m (dBuV/m)	Safe Margin (dB)
90.14	V	Peak	48.01	-17.62	30.39	43.50	-13.11
104.69	V	Peak	46.21	-16.63	29.58	43.50	-13.92
182.29	V	Peak	41.08	-14.67	26.41	43.50	-17.09
290.93	V	Peak	40.76	-13.21	27.55	46.00	-18.45
385.99	V	Peak	38.15	-10.47	27.68	46.00	-18.32
795.33	V	Peak	36.69	-3.15	33.54	46.00	-12.46
58.13	H	Peak	42.71	-14.66	28.05	40.00	-11.95
96.93	H	Peak	47.11	-17.16	29.95	43.50	-13.55
259.89	H	Peak	38.87	-13.64	25.23	46.00	-20.77
604.24	H	Peak	34.30	-5.92	28.38	46.00	-17.62
800.18	H	Peak	34.51	-3.04	31.47	46.00	-14.53
919.49	H	Peak	32.62	-1.04	31.58	46.00	-14.42

Remark :

- (1) Measuring frequencies from 30 MHz to the 1GHz。
- (2) Radiated emissions measured in frequency range from 30 MHz to 1000MHz were made with an instrument using Peak/QP detector mode.
- (3) Data of measurement within this frequency range shown “ - ” in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
- (4) The IF bandwidth of SPA between 30MHz to 1GHz was 100KHz.

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Radiated Spurious Emission Measurement Result (below 1GHz) Dipole Antenna

Operation Mode	RX CH Low	Test Date	Nov. 02, 2009
Fundamental Frequency	2405MHz	Test By	Brain
Temperature	25 °C	Pol	Ver./Hor
Humidity	65 %		

Freq. (MHz)	Ant.Pol. H/V	Detector Mode (PK/QP)	Reading (dBuV)	Factor (dB)	Actual FS (dBuV/m)	Limit3m (dBuV/m)	Safe Margin (dB)
70.74	V	Peak	45.00	-16.27	28.73	40.00	-11.27
90.14	V	Peak	48.21	-17.62	30.59	43.50	-12.91
104.69	V	Peak	46.88	-16.63	30.25	43.50	-13.25
179.38	V	Peak	40.89	-14.49	26.40	43.50	-17.10
385.99	V	Peak	37.81	-10.47	27.34	46.00	-18.66
798.24	V	Peak	35.11	-3.08	32.03	46.00	-13.97
67.83	H	Peak	45.18	-15.60	29.58	40.00	-10.42
99.84	H	Peak	46.89	-17.01	29.88	43.50	-13.62
264.74	H	Peak	42.15	-13.59	28.56	46.00	-17.44
385.99	H	Peak	38.74	-10.47	28.27	46.00	-17.73
794.36	H	Peak	34.16	-3.16	31.00	46.00	-15.00
795.33	H	Peak	36.84	-3.15	33.69	46.00	-12.31

Remark :

- (1) Measuring frequencies from 30 MHz to the 1GHz .
- (2) Radiated emissions measured in frequency range from 30 MHz to 1000MHz were made with an instrument using Peak/QP detector mode.
- (3) Data of measurement within this frequency range shown “ - ” in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
- (4) The IF bandwidth of SPA between 30MHz to 1GHz was 100KHz.

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Radiated Spurious Emission Measurement Result (below 1GHz) Dipole Antenna

Operation Mode	RX CH Mid	Test Date	Nov. 02, 2009
Fundamental Frequency	2440MHz	Test By	Brain
Temperature	25°C	Pol	Ver./Hor
Humidity	65 %		

Freq. (MHz)	Ant.Pol.	Detector Mode	Reading (dBuV)	Factor (dB)	Actual FS (dBuV/m)	Limit3m (dBuV/m)	Safe Margin (dB)
70.74	V	Peak	44.98	-16.27	28.71	40.00	-11.29
92.08	V	Peak	47.91	-17.38	30.53	43.50	-12.97
121.18	V	Peak	44.96	-15.17	29.79	43.50	-13.71
279.29	V	Peak	40.66	-13.33	27.33	46.00	-18.67
385.99	V	Peak	38.25	-10.47	27.78	46.00	-18.22
795.33	V	Peak	35.00	-3.15	31.85	46.00	-14.15
67.83	H	Peak	45.29	-15.60	29.69	40.00	-10.31
99.84	H	Peak	47.05	-17.01	30.04	43.50	-13.46
266.68	H	Peak	41.74	-13.57	28.17	46.00	-17.83
385.99	H	Peak	39.21	-10.47	28.74	46.00	-17.26
654.68	H	Peak	36.32	-4.97	31.35	46.00	-14.65
795.33	H	Peak	34.38	-3.15	31.23	46.00	-14.77

Remark :

- (1) Measuring frequencies from 30 MHz to the 1GHz .
- (2) Radiated emissions measured in frequency range from 30 MHz to 1000MHz were made with an instrument using Peak/QP detector mode.
- (3) Data of measurement within this frequency range shown “ - ” in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
- (4) The IF bandwidth of SPA between 30MHz to 1GHz was 100KHz.

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Radiated Spurious Emission Measurement Result (below 1GHz) Dipole Antenna

Operation Mode	RX CH High	Test Date	Nov. 02, 2009
Fundamental Frequency	2480MHz	Test By	Brain
Temperature	25 °C	Pol	Ver./Hor
Humidity	65%		

Freq. (MHz)	Ant.Pol. H/V	Detector Mode (PK/QP)	Reading (dBuV)	Factor (dB)	Actual FS (dBuV/m)	Limit3m (dBuV/m)	Safe Margin (dB)
67.83	V	Peak	43.90	-15.60	28.30	40.00	-11.70
92.08	V	Peak	47.75	-17.38	30.37	43.50	-13.13
104.69	V	Peak	46.73	-16.63	30.10	43.50	-13.40
182.29	V	Peak	41.79	-14.67	27.12	43.50	-16.38
320.03	V	Peak	40.48	-12.55	27.93	46.00	-18.07
800.18	V	Peak	34.76	-3.04	31.72	46.00	-14.28
67.83	H	Peak	46.01	-15.60	30.41	40.00	-9.59
99.84	H	Peak	46.89	-17.01	29.88	43.50	-13.62
266.68	H	Peak	42.37	-13.57	28.80	46.00	-17.20
385.99	H	Peak	39.30	-10.47	28.83	46.00	-17.17
649.83	H	Peak	35.73	-4.95	30.78	46.00	-15.22
795.33	H	Peak	35.22	-3.15	32.07	46.00	-13.93

Remark :

- (1) Measuring frequencies from 30 MHz to the 1GHz .
- (2) Radiated emissions measured in frequency range from 30 MHz to 1000MHz were made with an instrument using Peak/QP detector mode.
- (3) Data of measurement within this frequency range shown “ - ” in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
- (4) The IF bandwidth of SPA between 30MHz to 1GHz was 100KHz.

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Radiated Spurious Emission Measurement Result (above 1GHz) Chip Antenna

Operation Mode RX CH Low Test Date Nov. 02, 2009
Fundamental Frequency 2405MHz Test By Brain
Temperature 25 °C Pol Ver. / Hor
Humidity 65 %

Freq. (MHz)	Ant.Pol. H/V	Peak	AV	Actual FS		Peak	AV	Margin (dB)	Remark
		Reading (dBuV)	Reading (dBuV)	Ant./CL CF(dB)	Peak (dBuV/m)	AV (dBuV/m)			
4810.0	V	38.92	---	6.02	44.94	---	74.00	54.00	-9.06 Peak
7215.0	V	---	---				74.00	54.00	
9620.0	V	---	---				74.00	54.00	
12025.0	V	---	---				74.00	54.00	
4810.0	H	39.49	---	6.02	45.51	---	74.00	54.00	-8.49 Peak
7215.0	H	---	---				74.00	54.00	
9620.0	H	---	---				74.00	54.00	
12025.0	H	---	---				74.00	54.00	

Remark:

- 1 Measuring frequencies from 1GHz to the 10th harmonic of highest fundamental frequency.
- 2 Data of measurement within this frequency range shown “ - ” in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
- 3 Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.
- 4 Spectrum Peak Setting : 1GHz- 26GHz, RBW= 1MHz, VBW= 3MHz, Sweep time= 200 ms.
- 5 Spectrum AV Setting : 1GHz- 26GHz, RBW= 1MHz, VBW= 10Hz, Sweep time= 200 ms.

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Radiated Spurious Emission Measurement Result (above 1GHz) Chip Antenna

Operation Mode RX CH Mid Test Date Nov. 02, 2009
Fundamental Frequency 2440MHz Test By Brain
Temperature 25 °C Pol Ver. / Hor.
Humidity 65 %

Freq. (MHz)	Ant.Pol. H/V	Peak	AV	Actual FS		Peak	AV	Margin (dB)	Remark
		Reading (dBuV)	Reading (dBuV)	Ant./CL CF(dB)	Peak (dBuV/m)	AV (dBuV/m)			
4890.0	V	40.13	---	6.17	46.30	---	74.00	54.00	-7.70 Peak
7335.0	V	---	---				74.00	54.00	
9780.0	V	---	---				74.00	54.00	
12225.0	V	---	---				74.00	54.00	
4890.0	H	38.88	---	6.17	45.05	---	74.00	54.00	-8.95 Peak
7335.0	H	---	---				74.00	54.00	
9780.0	H	---	---				74.00	54.00	
12225.0	H	---	---				74.00	54.00	

Remark:

- 1 Measuring frequencies from 1GHz to the 10th harmonic of highest fundamental frequency.
- 2 Data of measurement within this frequency range shown “ - ” in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
- 3 Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.
- 4 Spectrum Peak Setting : 1GHz- 26GHz, RBW= 1MHz, VBW= 3MHz, Sweep time= 200 ms.
- 5 Spectrum AV Setting : 1GHz- 26GHz, RBW= 1MHz, VBW= 10Hz, Sweep time= 200 ms.

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Radiated Spurious Emission Measurement Result (above 1GHz) Chip Antenna

Operation Mode RX CH High Test Date Nov. 02, 2009
Fundamental Frequency 2480MHz Test By Brain
Temperature 25 °C Pol Ver. / Hor.
Humidity 65 %

Freq. (MHz)	Ant.Pol. H/V	Peak	AV	Actual FS		Peak	AV	Margin (dB)	Remark
		Reading (dBuV)	Reading (dBuV)	Ant./CL CF(dB)	Peak (dBuV/m)	AV (dBuV/m)			
4960.0	V	39.48	---	6.36	45.84	---	74.00	54.00	-8.16 Peak
7440.0	V	---	---				74.00	54.00	
9920.0	V	---	---				74.00	54.00	
12400.0	V	---	---				74.00	54.00	
4960.0	H	38.26	---	6.36	44.62	---	74.00	54.00	-9.38 Peak
7440.0	H	---	---				74.00	54.00	
9920.0	H	---	---				74.00	54.00	
12400.0	H	---	---				74.00	54.00	

Remark:

- 1 Measuring frequencies from 1GHz to the 10th harmonic of highest fundamental frequency.
- 2 Data of measurement within this frequency range shown “ - ” in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
- 3 Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.
- 4 Spectrum Peak Setting : 1GHz- 26GHz, RBW= 1MHz, VBW= 3MHz, Sweep time= 200 ms.
- 5 Spectrum AV Setting : 1GHz- 26GHz, RBW= 1MHz, VBW= 10Hz, Sweep time= 200 ms.

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Radiated Spurious Emission Measurement Result (above 1GHz) Dipole Antenna

Operation Mode RX CH Low Test Date Nov. 02, 2009
Fundamental Frequency 2405MHz Test By Brain
Temperature 25 °C Pol Ver. / Hor
Humidity 65 %

Freq. (MHz)	Ant.Pol. H/V	Peak	AV	Actual FS		Peak	AV	Margin (dB)	Remark
		Reading (dBuV)	Reading (dBuV)	Ant./CL CF(dB)	Peak (dBuV/m)	AV (dBuV/m)			
4810.0	V	40.74	---	6.02	46.76	---	74.00	54.00	-7.24 Peak
7215.0	V	---	---				74.00	54.00	
9620.0	V	---	---				74.00	54.00	
12025.0	V	---	---				74.00	54.00	
4810.0	H	39.00	---	6.02	45.02	---	74.00	54.00	-8.98 Peak
7215.0	H	---	---				74.00	54.00	
9620.0	H	---	---				74.00	54.00	
12025.0	H	---	---				74.00	54.00	

Remark:

- 1 Measuring frequencies from 1GHz to the 10th harmonic of highest fundamental frequency.
- 2 Data of measurement within this frequency range shown “ - ” in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
- 3 Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.
- 4 Spectrum Peak Setting : 1GHz- 26GHz, RBW= 1MHz, VBW= 3MHz, Sweep time= 200 ms.
- 5 Spectrum AV Setting : 1GHz- 26GHz, RBW= 1MHz, VBW= 10Hz, Sweep time= 200 ms.

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Radiated Spurious Emission Measurement Result (above 1GHz) Dipole Antenna

Operation Mode RX CH Mid Test Date Nov. 02, 2009
Fundamental Frequency 2440MHz Test By Brain
Temperature 25 °C Pol Ver. / Hor.
Humidity 65 %

Freq. (MHz)	Ant.Pol. H/V	Peak	AV	Actual FS		Peak	AV	Margin (dB)	Remark
		Reading (dBuV)	Reading (dBuV)	Ant./CL CF(dB)	Peak (dBuV/m)	AV (dBuV/m)			
4890.0	V	38.33	---	6.17	44.50	---	74.00	54.00	-9.50 Peak
7335.0	V	---	---				74.00	54.00	
9780.0	V	---	---				74.00	54.00	
12225.0	V	---	---				74.00	54.00	
4890.0	H	38.86	---	6.17	45.03	---	74.00	54.00	-8.97 Peak
7335.0	H	---	---				74.00	54.00	
9780.0	H	---	---				74.00	54.00	
12225.0	H	---	---				74.00	54.00	

Remark:

- 1 Measuring frequencies from 1GHz to the 10th harmonic of highest fundamental frequency.
- 2 Data of measurement within this frequency range shown “ - ” in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
- 3 Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.
- 4 Spectrum Peak Setting : 1GHz- 26GHz, RBW= 1MHz, VBW= 3MHz, Sweep time= 200 ms.
- 5 Spectrum AV Setting : 1GHz- 26GHz, RBW= 1MHz, VBW= 10Hz, Sweep time= 200 ms.

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Radiated Spurious Emission Measurement Result (above 1GHz) Dipole Antenna

Operation Mode	RX CH High	Test Date	Nov. 02, 2009
Fundamental Frequency	2480MHz	Test By	Brain
Temperature	25 °C	Pol	Ver. / Hor.
Humidity	65 %		

Freq. (MHz)	Ant.Pol. H/V	Peak	AV	Actual FS		Peak	AV	Margin (dB)	Remark	
		Reading (dBuV)	Reading (dBuV)	Ant./CL CF(dB)	Peak (dBuV/m)	AV (dBuV/m)				
4960.0	V	39.42	---	6.36	45.78	---	74.00	54.00	-8.22	Peak
7440.0	V	---	---				74.00	54.00		
9920.0	V	---	---				74.00	54.00		
12400.0	V	---	---				74.00	54.00		
4960.0	H	38.16	---	6.36	44.52	---	74.00	54.00	-9.48	Peak
7440.0	H	---	---				74.00	54.00		
9920.0	H	---	---				74.00	54.00		
12400.0	H	---	---				74.00	54.00		

Remark:

- 1 Measuring frequencies from 1GHz to the 10th harmonic of highest fundamental frequency.
- 2 Data of measurement within this frequency range shown “ - ” in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
- 3 Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.
- 4 Spectrum Peak Setting : 1GHz- 26GHz, RBW= 1MHz, VBW= 3MHz, Sweep time= 200 ms.
- 5 Spectrum AV Setting : 1GHz- 26GHz, RBW= 1MHz, VBW= 10Hz, Sweep time= 200 ms.

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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 = 1.5MHz, Sweep=100s
4. Record the max. reading.
5. Repeat above procedures until all frequency measured were complete.

10.5 Measurement Result:

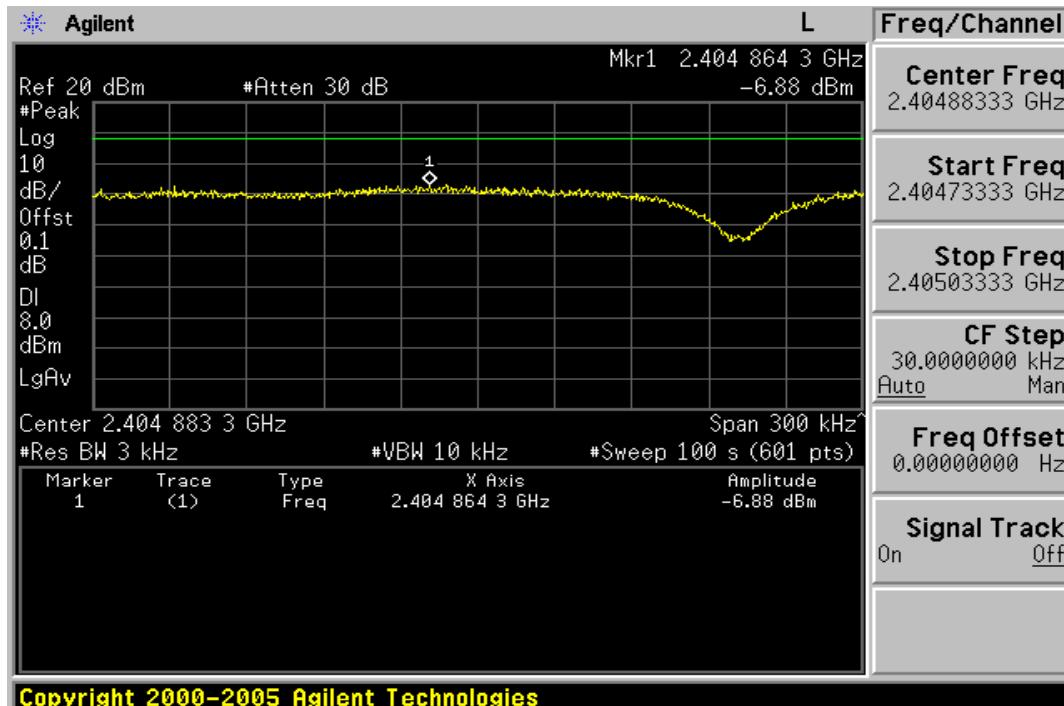
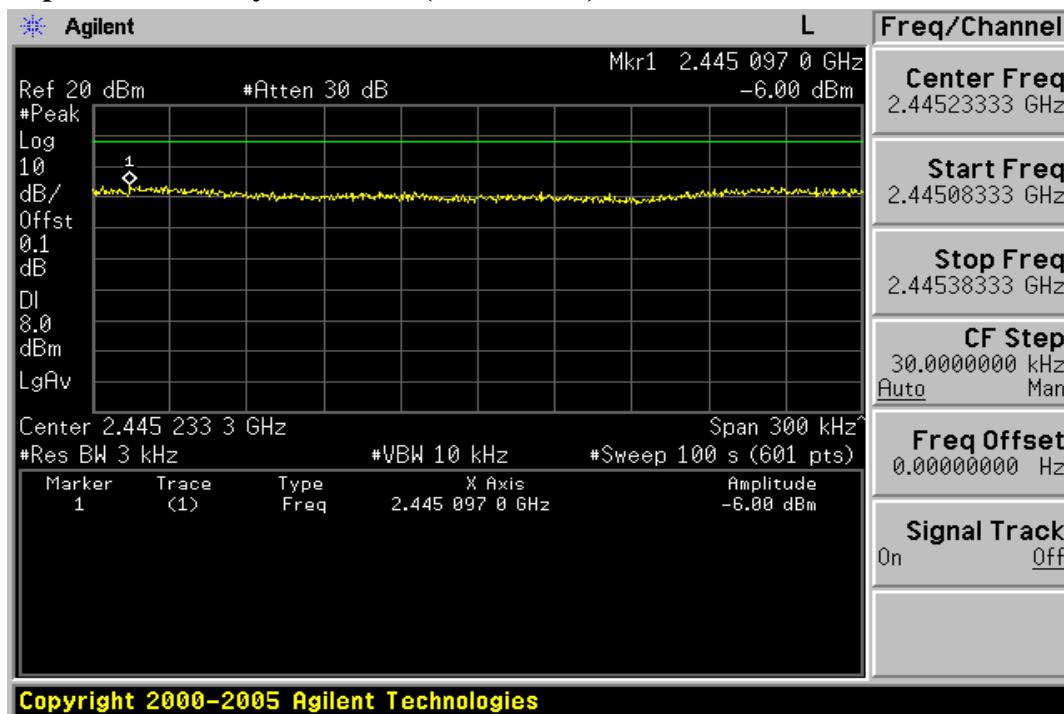
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Frequency (MHz)	RF Power Density Reading (dBm)	Cable loss (dB)	RF Power Density Level (dBm)	Maximum Limit (dBm)
2405	-6.88	0.00	-6.88	8
2440	-6.00	0.00	-6.00	8
2480	-6.00	0.00	-6.00	8

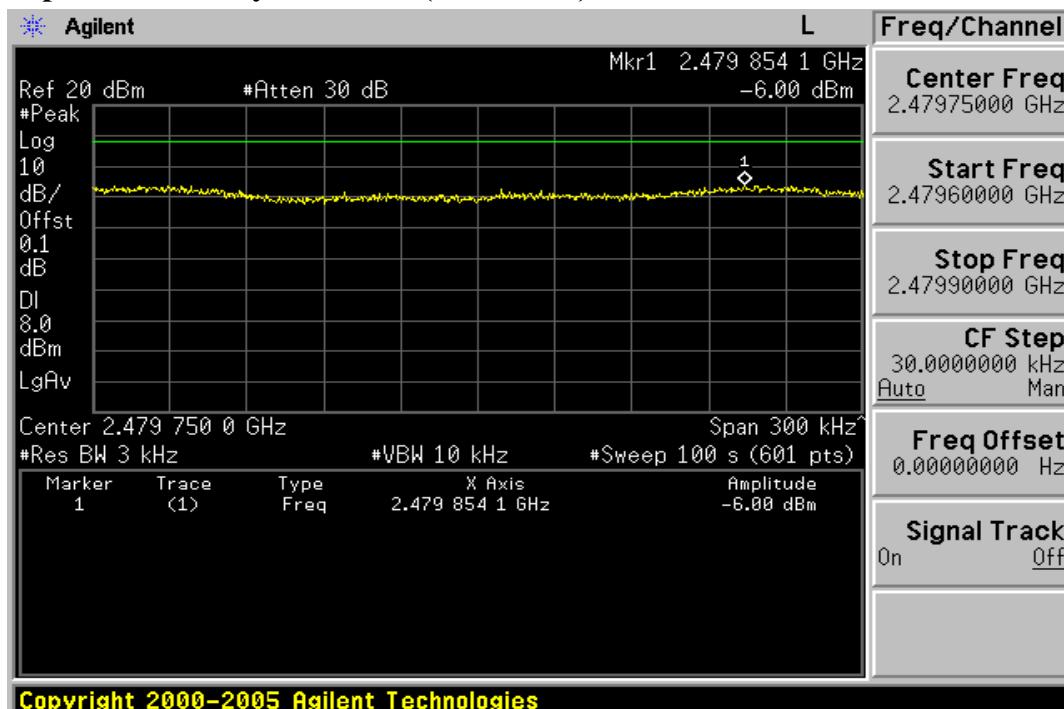
Offst: 0.1dB

Note: Refer to next page for plots.

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Power Spectral Density Test Plot (2405 MHz)**Power Spectral Density Test Plot (2440 MHz)**

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Power Spectral Density Test Plot (2480MHz)

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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

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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 5.5 dBi (Chip Antenna) / 2 dBi (Dipole Antenna) and the antenna connector is designed with permanent attachment and no consideration of replacement. Please see EUT photo for details.

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12 99% Bandwidth Measurement

12.1. 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.

12.2. Measurement Equipment Used:

Refer to section 6.2 for details.

12.3. Test Set-up:

Refer to section 6.3 for details.

12.4. Measurement Procedure:

1. Place the EUT on the table and set it in transmitting mode.
2. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.
3. Set the spectrum analyzer as RBW=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.

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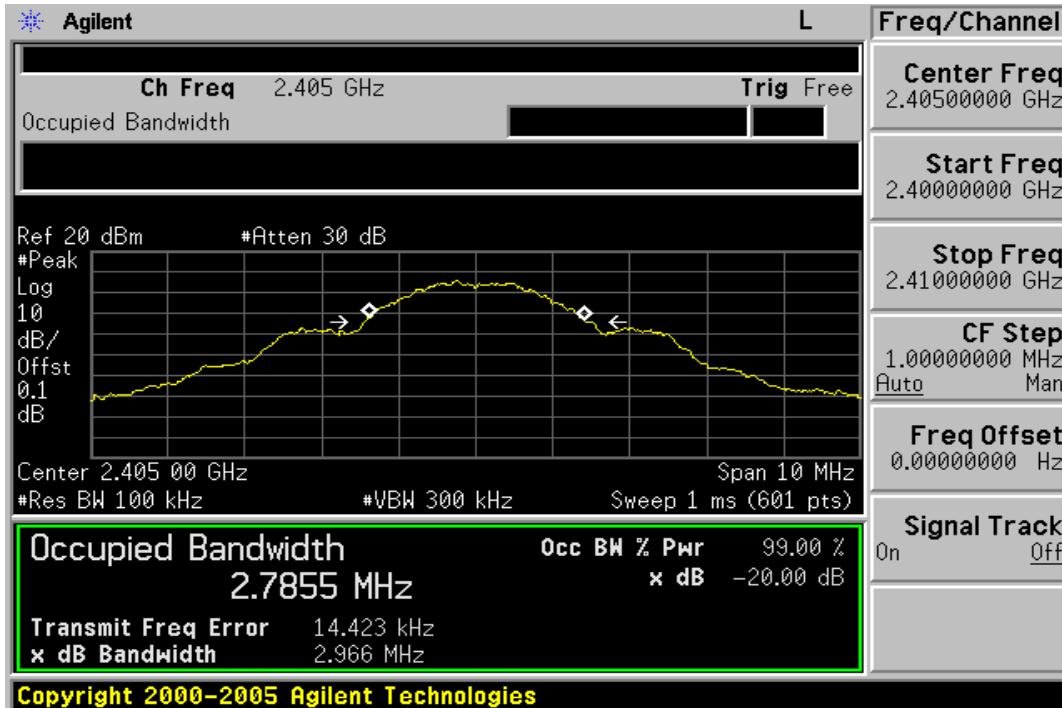
12.5. Measurement Result:

Frequency MHz	Bandwidth (MHz)
2405	2.7855
2440	2.7788
2480	2.7777

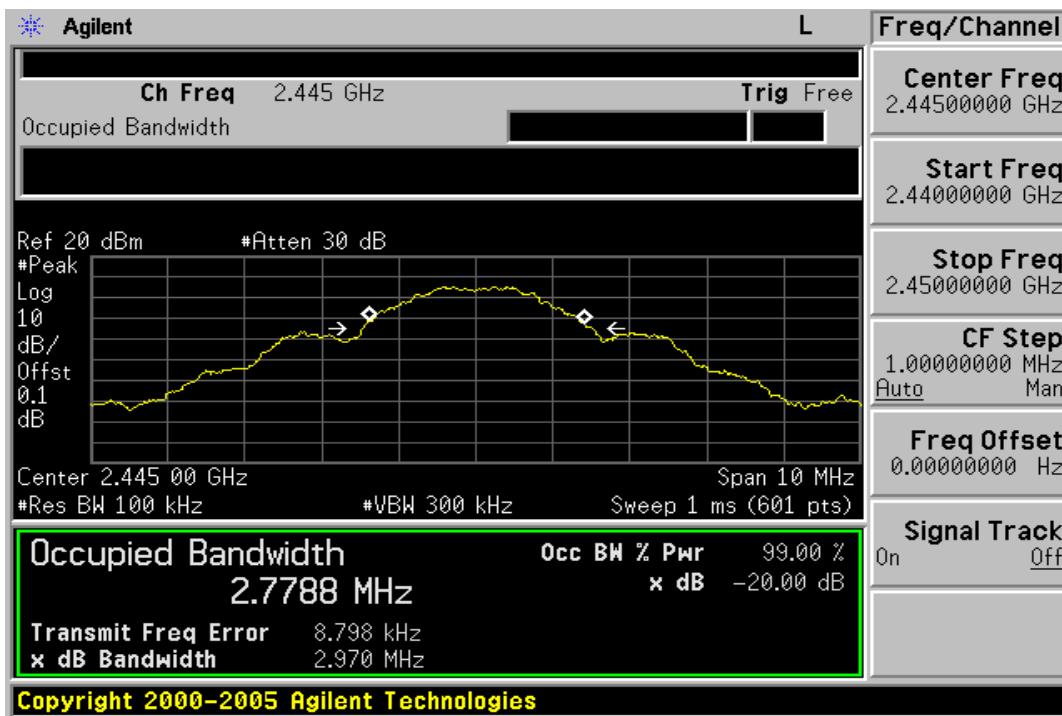
Note: Refer to next page for plots.

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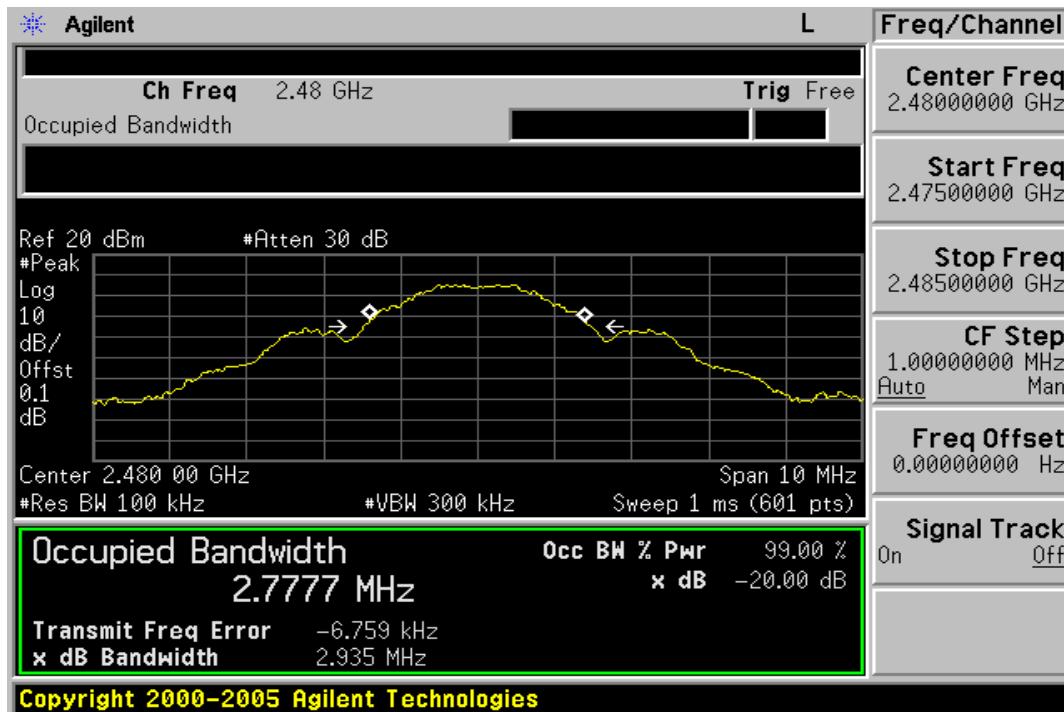
99% Band Width Test Data 2405 MHz



99% Band Width Test Data 2440 MHz



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99% Band Width Test Data 2480 MHz

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13 Maximum Permissible Exposure (MPE)

13.1 Standard Applicable

According to §1.1307(b)(1), systems operating under the provisions of this section shall be operated in a manner that ensure that the public is not exposed to radio frequency energy level in excess of the Commission's guideline.

This is a Mobile device, the MPE is required.

According to §1.1310 and §2.1093 RF exposure is calculated.

Limits for Maximum Permissive Exposure (MPE)

Frequency Range (MHz)	Electric Field Strength (V/m)	Magnetic Field Strength (A/m)	Power Density (mW/cm ²)	Averaging Time (minute)
Limits for General Population/Uncontrolled Exposure				
0.3-1.34	614	1.63	*(100)	30
1.34-30	824/f	2.19/f	*(180/f ²)	30
30-300	27.5	0.073	0.2	30
300-1500	/	/	F/1500	30
1500-15000	/	/	1.0	30

F = frequency in MHz

* = Plane-wave equipment power density

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13.2 Maximum Permissible Exposure (MPE) Evaluation

Power Table

Frequency (MHz)	Reading Power (dBm)	Cable Loss	Output Power (dBm)	Output Power (W)	Limit (W)
2405.00	8.31	0.00	8.31	0.00678	1
2445.00	8.66	0.00	8.66	0.00735	1
2480.00	8.80	0.00	8.80	0.00759	1

MPE Prediction

Prediction of MPE limit at a given distance

Equation from page 18 of OET Bulletin 65, Edition 97-01

$$S = PG/4\pi R^2$$

Where: S = Power density

P = Power input to antenna

G = Power gain of the antenna in the direction of interest relative to an isotropic radiator

R = Distance to the center of radiation of the antenna

Maximum peak output power at antenna input terminal:	8.8	(dBm)
Maximum peak output power at antenna input terminal:	7.58577575	(mW)
Duty cycle:	100	(%)
Maximum Pav :	7.58577575	(mW)
Antenna gain (typical):	5.5	(dBi)
Maximum antenna gain:	3.548133892	(numeric)
Prediction distance:	20	(cm)
Prediction frequency:	2480	(MHz)
MPE limit for uncontrolled exposure at prediction	1	(mW/cm ²)
Power density at predication frequency at 20 (cm)	0.0053574	(mW/cm ²)

Measurement Result

The predicted power density level at 20 cm is 0.00536 mW/cm². This is below the uncontrolled exposure limit of 1 mW/cm² at 2412MHz.

The SAR measurement is not necessary.

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