

Report No.: EF/2008/60013~14 **Issue Date: Aug. 05, 2008**

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ELECTROMAGNETIC EMISSIONS COMPLIANCE REPORT

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

OF

Product Name: Bluetooth Plug-play dongle for Music

Brand Name: Logitech

S-00069 **Model Name:**

Model Difference: N/A

IC Number: 1807D-S00069

ID Number: DZL-S00069

Report No.: EF/2008/60013~14

Issue Date: Aug. 05, 2008

Rule Part: FCC Part 15C:2005, §15.247,

RSS-210 issue 7:2007, Annex 8

Prepared for: Logitech, Inc

For FCC: 6505 Kaiser Drive, Fremont, CA 94555

For IC: 1499 SE Tec Center Place, Suite 350 Van-

couver Washington 98683 United States

SGS Taiwan Ltd. Prepared by:

Electronics & Communication Laboratory

No. 134, Wu Kung Rd., Wuku Industrial Zone, Taipei

County, Taiwan.





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VERIFICATION OF COMPLIANCE

Applicant: Logitech, Inc

For FCC: 6505 Kaiser Drive, Fremont, CA 94555

For IC: 1499 SE Tec Center Place, Suite 350 Vancouver Washington

98683 United States

Bluetooth Plug-play dongle for Music **Product Name:**

S-00069

Brand Name: Logitech

IC: 1807D-S00069 FCC ID: DZL-S00069

Model Difference: N/A

Model No.:

File Number: EF/2008/60013~14

Date of test: Jun. 28, 2008 ~ Aug. 01, 2008

Date of EUT Received: Jun. 28, 2008

We hereby certify that:

The above equipment was tested by SGS Taiwan Ltd. The test data, data evaluation, test procedures, and equipment configurations shown in this report were made in accordance with the procedures given in ANSI C63.4 (2003) and the energy emitted by the sample EUT tested as described in this report is in compliance with conducted and radiated emission limits of FCC Rules Part 15C:2005, §15.247 and RSS-210 issue 7: 2007 Annex 8.

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

Test By:	Bondi Jin	Date	Aug. 05, 2008	
Prepared By:	Bondi Liu/Engineer Bondi Liu	Date	Aug. 05, 2008	
Approved By:	Bondi Liu / Engineer Vincent Su / Manager	Date	Aug. 05, 2008	

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Version

Version No.	Date	Description
00	Aug. 05, 2008	Initial creation of document

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GENERAL INFORMATION

1.1. Product Description

Product Name:	Bluetooth Plug-play dongle for Music
Brand Name:	Logitech
Model Name:	S-00069
Model Difference:	N/A
Power Supply:	5Vdc from USB port

Bluetooth:

Frequency Range:	2402 – 2480MHz
Bluetooth Version	V2.0 (GFSK)
Channel number:	79 channels
Modulation type:	Frequency Hopping Spread Spectrum (FHSS)
Transmit Power	2.85 dBm.(Peak)
Dwell Time	<= 0.4s
Operating Mode	Point-to-Point
Antenna Designation:	Chip antenna, 3.5dBi (peak gain)

The EUT is compliance with Bluetooth 2.0

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

This submittal(s) (test report) is intended for FCC ID:DZL-S00069 filing to comply with Section 15.247 of the FCC Part 15C: 2005, Subpart C Rules. And IC:1807D-S00069 filing to comply with Industry Canada RSS-210 issue 7: 2007 Annex 8.

1.3. Test Methodology

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

1.4. Test Facility

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

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

1.5. Special Accessories

Not available for this EUT intended for grant.

1.6. Equipment Modifications

Not available for this EUT intended for grant.

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SYSTEM TEST CONFIGURATION

2.1. EUT Configuration

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

2.2. EUT Exercise

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

2.3. Test Procedure

2.3.1 Conducted Emissions

The EUT is a placed on as turn table which is 0.8 m above ground plane. According to the requirements in Section 7, 13 of ANSI C63.4-2003 and RSS-Gen:2007.Conducted emissions from the EUT measured in the frequency range between 0.15 MHz and 30MHz using CISPR Quasi-Peak and Average detector mode.

2.3.2 Radiated Emissions

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

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2.4. Configuration of Tested System

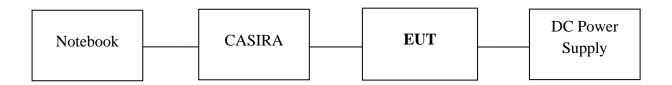


Table 5-1 Equipment Used in Tested System

ltom	Equipment	Mfr/Brand	Model/	Series No.	Data Cable	
item	Equipment	WIII/Brand	Type No.	Series No.	Data Cable	Power Cord
1	Notebook	Compaq	Presarlo 2100	CNF345Q1R	Un-shield	Un-shield
2	Test software	BlueSuite 1.22	CSR	Verson1.22	N/A	N/A
3	CASIRA	CSR	BCES301199/1	7383070403	Un-shield	Un-shield
4	DC Power Supply	Topward	3303A	715856	N/A	Un-shield

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SUMMARY OF TEST RESULTS

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

DESCRIPTION OF TEST MODES

The EUT has been tested under operating condition.

Test program used to control the EUT for staying in continuous transmitting and receiving mode is programmed.

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

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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		mits (uV)
MHz	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

5.2. EUT Setup

- 1. The conducted emission tests were performed in the test site, using the setup in accordance with the ANSI C63.4-2003.
- 2. The AC/DC Power adaptor of EUT was plug-in LISN. The rear of the EUT and peripherals were placed flushed with the rear of the tabletop.
- 3. The LISN was connected with 110Vac/60Hz power source.

5.3. Measurement Procedure

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

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^{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.



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5.4. Measurement Equipment Used:

Conducted Emission Test Site						
EQUIPMENT	MFR	MODEL	SERIAL	LAST	CAL DUE.	
TYPE		NUMBER	NUMBER	CAL.		
EMC Analyzer	HP	8594EM	3624A00203	09/02/2007	09/03/2008	
EMI Test Receiver	R&S	ESCS30	828985/004	06/09/2008	06/10/2009	
Transient Limiter	HP	11947A	3107A02062	09/02/2007	09/03/2008	
LISN	Rolf-Heine	NNB-2/16Z	99012	12/31/2007	12/30/2008	
LISN	FCC	FCC-LISN-50/ 250-25-2-01	04034	02/18/2008	02/17/2009	
Coaxial Cables	N/A	No. 3, 4	N/A	12/01/2007	11/30/2008	

5.5. Measurement Result

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

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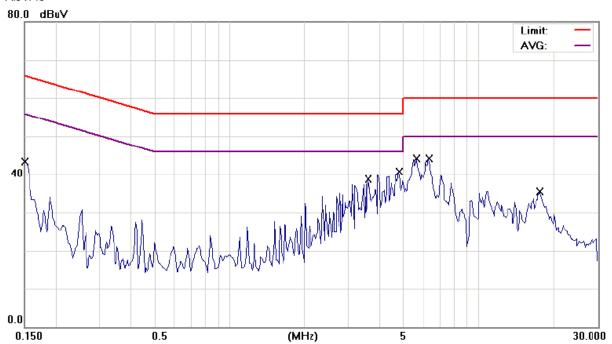
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AC POWER LINE CONDUCTED EMISSION TEST DATA

Operation Mode:	Operation			Test Date:	Aug. 01, 2008
Temperature:	25 ℃	Humidity:	62%	Test By:	Bondi

Conducted Emission Measurement





Site SGS CONDUCTED #1

Limit: CISPR22 Class B Conduction(QP)

EUT: BluetoothPlugplay dongle for Music

M/N: S-00069

Note: OPERATION MODE

Phase.	LT	remperature.	25 (
Power:	AC 120V/60Hz	Humidity:	62 %
Distance:		Air Pressure:	hpa

No. Mk	. Freq.	Reading Level	Factor	Measure- ment	Limit	Over			
	MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment	
1	0.1500	42.95	0.45	43.40	66.00	-22.60	QP		
2	3.6200	37.78	0.95	38.73	56.00	-17.27	QP		
3 *	4.8000	39.70	1.00	40.70	56.00	-15.30	QP		
4	5.6400	43.03	1.02	44.05	60.00	-15.95	QP		
5	6.3521	42.32	1.04	43.36	60.00	-16.64	QP		
6	17.6800	34.34	1.22	35.56	60.00	-24.44	QP		

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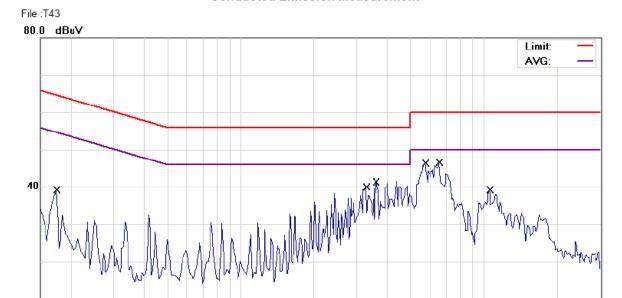
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Conducted Emission Measurement



(MHz)

Site SGS CONDUCTED #1

Limit: CISPR22 Class B Conduction(QP) EUT: BluetoothPlugplay dongle for Music

0.5

M/N: S-00069

0.0 0.150

Note: OPERATION MODE

Phase:	N	I emperature:	25 ℃
Power:	AC 120V/60Hz	Humidity:	62 %
Distance:		Air Pressure:	hpa

30.000

5

No. Mk.	Freq.	Reading Level	Factor	Measure- ment	Limit	Over		
	MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1	0.1750	38.53	0.48	39.01	64.72	-25.71	QP	
2	3.2800	38.97	0.93	39.90	56.00	-16.10	QP	
3	3.6200	40.38	0.95	41.33	56.00	-14.67	QP	
4	5.7200	45.28	1.03	46.31	60.00	-13.69	QP	
5 *	6.5600	45.37	1.05	46.42	60.00	-13.58	QP	
6	10.6000	37.95	1.14	39.09	60.00	-20.91	QP	

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PEAK OUTPUT POWER MEASUREMENT

6.1. Standard Applicable

According to §15.247(b), For frequency hopping systems operating in the 2400-2483.5 MHz band employing at least 75 hopping channels, and all frequency hopping systems in the 5725-5850MHz band: 1Watt. For all other frequency hopping systems in the 2400 – 2483.5MHz band: 0.125 Watts.

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

6.2. Measurement Procedure

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

6.3. Measurement Result

(Normal Mode)

Frequency (MHz)	Reading Power (dBm)	Cable Loss	Output Power (dBm)	Output Power (W)	Limit (W)
2402.00	2.53	0.00	2.53	0.00179	1
2441.00	2.83	0.00	2.83	0.00192	1
2480.00	2.85	0.00	2.85	0.00193	1

^{*}Offset 0.1dB

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6.4. Measurement Equipment Used:

	Conducted Emission Test Site										
EQUIPMENT MFR		MODEL	SERIAL	LAST	CAL DUE.						
TYPE		NUMBER	NUMBER	CAL.							
Spectrum Analyzer	Agilent	E4446A	MY43360126	04/19/2008	04/18/2010						
Spectrum Analyzer	Agilent	E7405A	US41160416	07/04/2008	07/03/2009						
Spectrum Analyzer	R&S	FSP 40	100034	11/09/2007	11/08/2008						
Low Loss Cable	HUBER+SUHNER	SUCOFLEX 104PEA	N/A	02/13/2008	02/12/2009						
Attenuator	Mini-Circuit	BW-S6W5	N/A	07/05/2008	07/04/2009						

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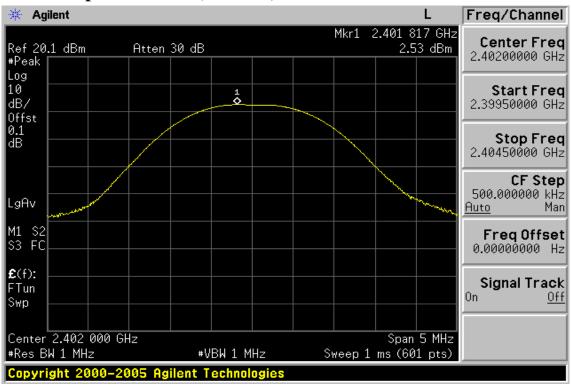


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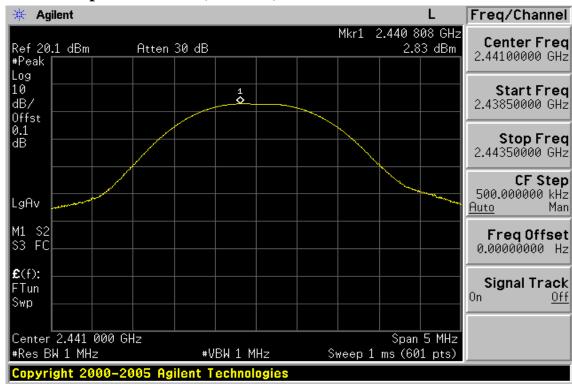
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Peak Power Output Data Plot (CH Low)



Peak Power Output Data Plot (CH Mid)



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Peak Power Output Data Plot (CH High)



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7. 20dB Bandwidth

7.1. Standard Applicable

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

7.2. Measurement Procedure

- 1. Place the EUT on the table and set it in transmitting mode.
- 2. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.
- 3. Set the spectrum analyzer as RBW=10KHz (1 % of Bandwidth.), Span= 3MHz, Sweep=auto
- 4. Mark the peak frequency and –20dB (upper and lower) frequency.
- 5. Repeat above procedures until all frequency measured were complete.

7.3. Measurement Result

(Normal Mode)

СН	Bandwidth
	(MHz)
Lower	0.740
Mid	0.738
Higher	0.740

7.4. Measurement Equipment Used:

7 Transaroment Equipment escat										
Conducted Emission Test Site										
EQUIPMENT	MFR	MODEL	SERIAL	LAST	CAL DUE.					
TYPE		NUMBER	NUMBER	CAL.						
Spectrum Analyzer	Agilent	E4446A	MY43360126	04/19/2008	04/18/2010					
Spectrum Analyzer	Agilent	E7405A	US41160416	07/04/2008	07/03/2009					
Spectrum Analyzer	R&S	FSP 40	100034	11/09/2007	11/08/2008					
Low Loss Cable	HUBER+SUHNER	SUCOFLEX 104PEA	N/A	02/13/2008	02/12/2009					
Attenuator	Mini-Circuit	BW-S6W5	N/A	07/05/2008	07/04/2009					

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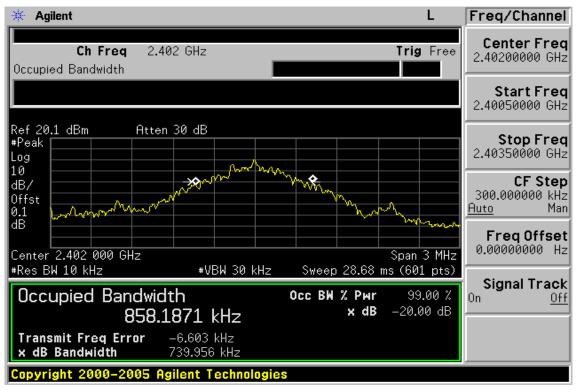
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20dB Band Width Test Data CH-Low



20dB Bandwidth Test Data CH-Mid



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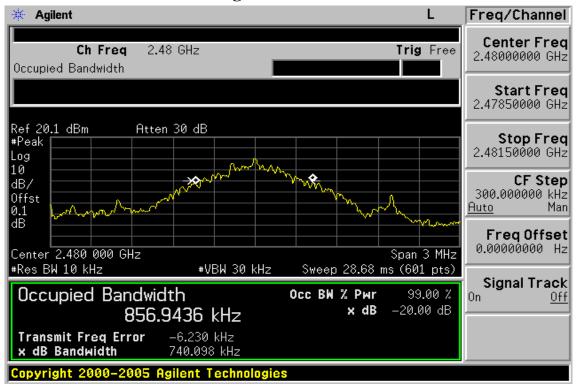


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20dB Bandwidth Test Data CH-High



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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 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 Procedure

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

8.3. Measurement Result

Refer to attach spectrum analyzer data chart.

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8.4. Measurement Equipment Used:

or in the again and an analysis of the state										
Conducted Emission Test Site										
EQUIPMENT	MFR	MODEL	SERIAL	LAST	CAL DUE.					
TYPE		NUMBER	NUMBER	CAL.						
Spectrum Analyzer	Agilent	E4446A	MY43360126	04/19/2008	04/18/2010					
Spectrum Analyzer	Agilent	E7405A	US41160416	07/04/2008	07/03/2009					
Spectrum Analyzer	R&S	FSP 40	100034	11/09/2007	11/08/2008					
Low Loss Cable	HUBER+SUHNER	SUCOFLEX 104PEA	N/A	02/13/2008	02/12/2009					
Attenuator	Mini-Circuit	BW-S6W5	N/A	07/05/2008	07/04/2009					

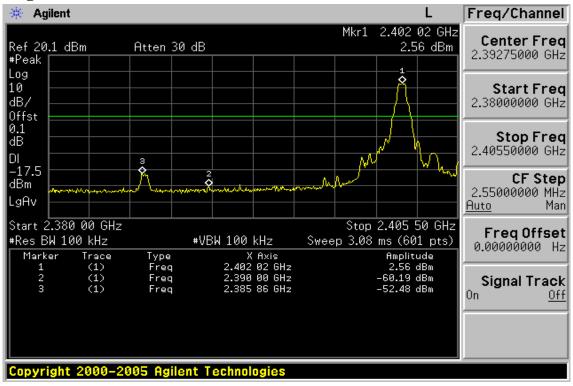
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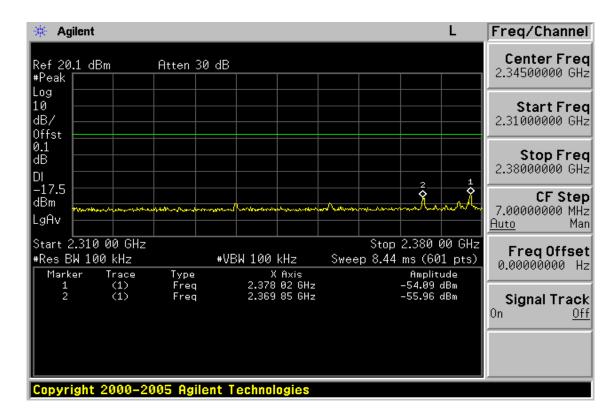


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Band Edges Test Data CH-Low





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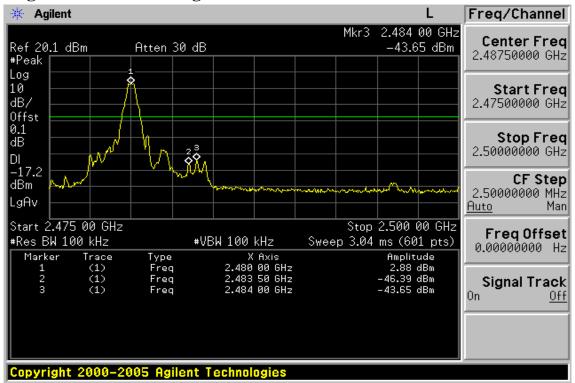


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Band Edges Test Data CH-High



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Radiated Emission:

Operation Mode TX CH Low **Test Date** Jun. 31, 2008

Fundamental Frequency 2402 MHz Test By Bondi Pol Ver. Temperature 25 ℃

Humidity 65 %

	Peak	\mathbf{AV}		Actu	al FS	Peak	\mathbf{AV}		
Freq.	Reading	Reading	Ant./CL	Peak	\mathbf{AV}	Limit	Limit	Margin	Remark
(MHz)	(dBuV)	(dBuV)	CF(dB)	(dBuV/m)	(dBuV/m)	(dBuV/m)	(dBuV/m)	(dB)	
2385.86	39.96		-1.40	38.56		74.00	54.00	-15.44	Peak
2390.00	38.37		-1.39	36.98		74.00	54.00	-17.02	Peak

Operation Mode TX CH Low **Test Date** Jun. 31, 2008 Fundamental Frequency 2402 MHz Test By Bondi Temperature Pol Hor. 25 ℃ Humidity 65 %

 \mathbf{AV} \mathbf{AV} Peak **Actual FS** Peak Freq. Reading Reading Ant./CL **Peak** \mathbf{AV} Limit Limit Margin Remark (MHz) (dBuV) (dBuV) CF(dB) (dBuV/m) (dBuV/m) (dBuV/m)(dB)2385.86 39.86 -1.4038.46 74.00 54.00 -15.54Peak 2390.00 38.00 -1.3936.61 74.00 54.00 -17.39Peak

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 columno
- (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:

Operation Mode TX CH High **Test Date** Jun. 31, 2008 Fundamental Frequency 2480 MHz Test By Bondi Pol Ver. **Temperature** 25 ℃ Humidity 65 %

	Peak	\mathbf{AV}		Actu	al FS	Peak	\mathbf{AV}		
Freq.	Reading	Reading	Ant./CL	Peak	\mathbf{AV}	Limit	Limit	Margin	Remark
(MHz)	(dBuV)	(dBuV)	CF(dB)	(dBuV/m)	(dBuV/m)	(dBuV/m)	(dBuV/m)	(dB)	
2483.50	42.25		-0.92	41.33		74.00	54.00	-12.67	Peak
2484.00	42.19		-0.92	41.27		74.00	54.00	-12.73	Peak

Operation Mode TX CH High Test Date Jun. 31, 2008 Fundamental Frequency 2480 MHz Test By Bondi Temperature Pol Hor. 25 °C Humidity 65 %

	Peak	\mathbf{AV}		Actu	al FS	Peak	\mathbf{AV}		
Freq.	Reading	Reading	Ant./CL	Peak	\mathbf{AV}	Limit	Limit	Margin	Remark
(MHz)	(dBuV)	(dBuV)	CF(dB)	(dBuV/m)	(dBuV/m)	(dBuV/m)	(dBuV/m)	(dB)	
2483.50	41.12		-0.92	40.20		74.00	54.00	-13.80	Peak
2484.00	43.14		-0.92	42.22		74.00	54.00	-11.78	Peak

Remark:

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

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SPURIOUS RADIATED EMISSION TEST

9.1. Standard Applicable

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

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

9.2. EUT Setup

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

9.3. Measurement Procedure

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

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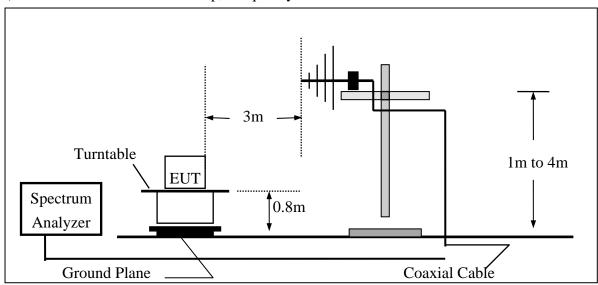


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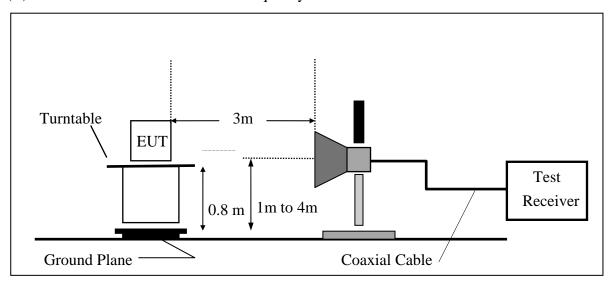
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9.4. Test SET-UP (Block Diagram of Configuration)

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



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



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9.5. Measurement Equipment Used:

966 Chamber								
EQUIPMENT MFR		MODEL	SERIAL	LAST	CAL DUE.			
TYPE		NUMBER	NUMBER	CAL.				
Spectrum Analyzer	R&S	FSP 40	100034	02/22/2008	02/21/2009			
Spectrum Analyzer	Agilent	E7405A	US41160416	07/04/2007	07/03/2009			
Spectrum Analyzer	Agilent	E4446A	MY43360126	04/19/2008	04/18/2010			
Bilog Antenna	SCHWAZBECK	VULB9160	9160-3158	11/29/2007	11/28/2008			
Horn antenna	Schwarzbeck	BBHA 9120D	309/320	03/14/2008	03/13/2009			
Horn antenna	Schwarzbeck	BBHA 9170	184/185	12/31/2007	12/30/2008			
Pre-Amplifier	HP	8447F	3113A06892	01/04/2008	01/03/2009			
Pre-Amplifier	HP	8494B	3008A00578	01/04/2008	01/03/2009			
Turn Table	HD	DT420	N/A	N.C.R	N.C.R			
Antenna Tower	HD	MA240-N	240/657	N.C.R	N.C.R			
Controller	HD	HD100	N/A	N.C.R	N.C.R			
Low Loss Cable	Low Loss Cable HUBER+SUHNER		10m	02/13/2008	02/12/2009			
Low Loss Cable	Low Loss Cable HUBER+SUHNER		3m	02/13/2008	02/12/2009			
Site NSA	Site NSA SGS		N/A	11/17/2007	11/16/2008			

9.6. Field Strength Calculation

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

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

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

9.7. Measurement Result

Refer to attach tabular data sheets.

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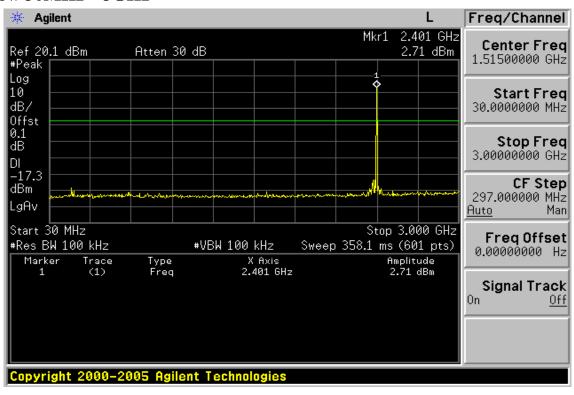
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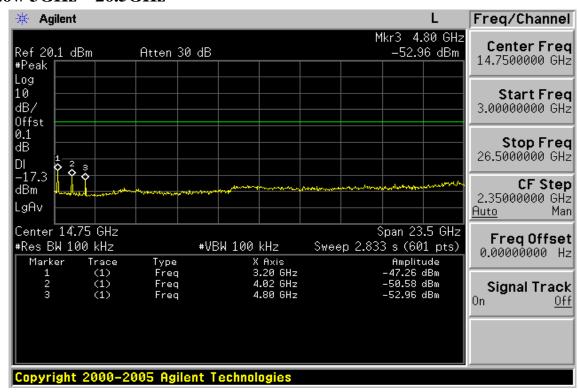
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Conducted Spurious Emission Measurement Result Ch Low 30MHz - 3GHz



Ch Low 3GHz – 26.5GHz



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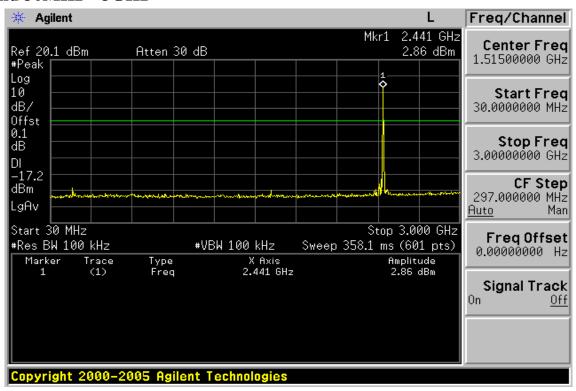
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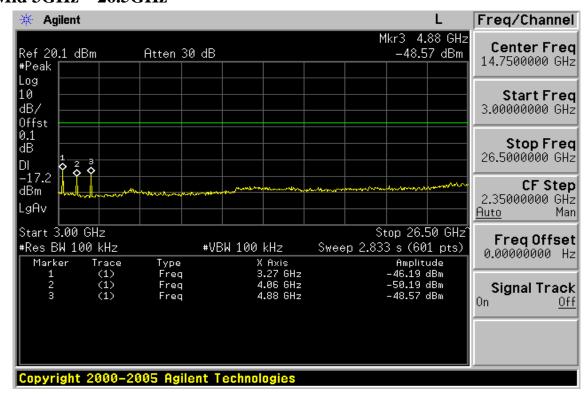
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Ch Mid 30MHz - 3GHz



Ch Mid 3GHz – 26.5GHz



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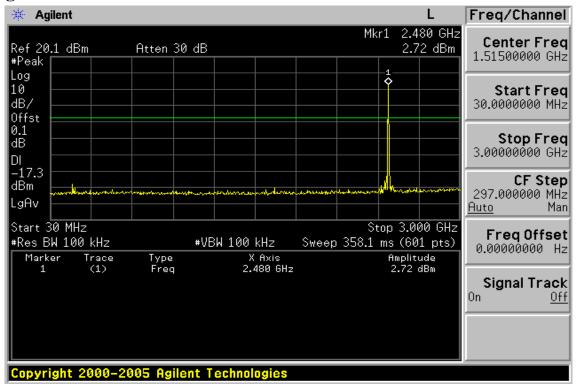


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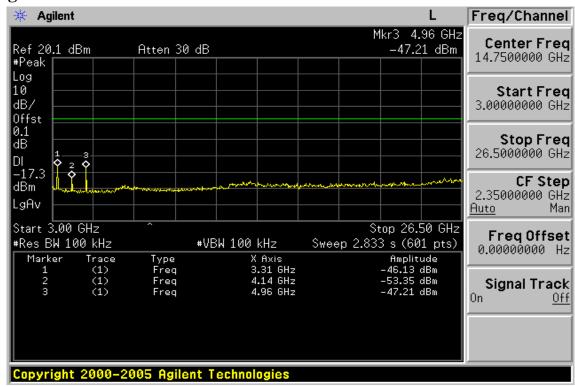
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Ch High 30MHz - 3GHz



Ch High 3GHz - 26.5GHz



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Radiated Spurious Emission Measurement Result (below 1GHz)

TX CH Low **Test Date** Operation Mode Jun. 31, 2008 Fundamental Frequency 2402MHz Test By Bondi Temperature 25 °C Pol Ver./Hor. Humidity 65 %

Freq.	Ant.Pol.	Detector Mode	Reading	Factor	Actual FS	Limit3m	Safe Margin
(MHz)	H/V	(PK/QP)	(dBuV)	(dB)	(dBuV/m)	(dBuV/m)	(dB)
51.34	V	Peak	39.25	-28.27	10.98	40.00	-29.02
75.59	V	Peak	39.01	-29.89	9.12	40.00	-30.88
104.69	V	Peak	41.23	-28.49	12.74	43.50	-30.76
153.19	V	Peak	32.24	-24.96	7.28	43.50	-36.22
211.39	V	Peak	32.56	-22.37	10.19	43.50	-33.31
720.64	V	Peak	48.29	-20.96	27.33	46.00	-18.67
38.73	Н	Peak	43.17	-28.16	15.01	40.00	-24.99
67.83	Н	Peak	42.41	-29.89	12.52	40.00	-27.48
104.69	Н	Peak	42.25	-28.54	13.71	43.50	-29.79
153.19	Н	Peak	30.20	-26.74	3.46	43.50	-40.04
203.63	Н	Peak	37.38	-24.96	12.42	43.50	-31.08
696.39	Н	Peak	47.17	-21.28	25.89	46.00	-20.11

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)

TX CH Mid **Test Date** Jun. 31, 2008 Operation Mode Fundamental Frequency 2441MHz Test By Bondi Temperature 25 °C Pol Ver./Hor. Humidity 65 %

Freq.	Ant.Pol.	Detector Mode	Reading	Factor	Actual FS	Limit3m	Safe Margin
(MHz)	H/V	(PK/QP)	(dBuV)	(dB)	(dBuV/m)	(dBuV/m)	(dB)
130.88	V	Peak	60.99	-28.16	32.83	43.50	-10.67
240.49	V	Peak	64.78	-29.89	34.89	46.00	-11.11
300.63	V	Peak	58.80	-28.49	30.31	46.00	-15.69
366.59	V	Peak	56.37	-26.74	29.63	46.00	-16.37
453.89	V	Peak	60.56	-24.96	35.60	46.00	-10.40
623.64	V	Peak	50.95	-22.37	28.58	46.00	-17.42
128.94	Н	Peak	56.20	-28.27	27.93	43.50	-15.57
240.49	Н	Peak	63.66	-29.89	33.77	46.00	-12.23
298.69	Н	Peak	60.90	-28.54	32.36	46.00	-13.64
337.49	Н	Peak	51.81	-27.41	24.40	46.00	-21.60
453.89	Н	Peak	54.99	-24.96	30.03	46.00	-15.97
911.73	Н	Peak	45.99	-18.85	27.14	46.00	-18.86

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)

Operation Mode TX CH High **Test Date** Jun. 31, 2008

Fundamental Frequency 2480MHz Test By Bondi Temperature 25 °C Pol Ver./Hor.

65 % Humidity

Freq.	Ant.Pol.	Detector Mode	Reading	Factor	Actual FS	Limit3m	Safe Margin
(MHz)	H/V	(PK/QP)	(dBuV)	(dB)	(dBuV/m)	(dBuV/m)	(dB)
96.93	V	Peak	62.73	-30.63	32.10	43.50	-11.40
130.88	V	Peak	60.35	-28.15	32.20	43.50	-11.30
240.49	V	Peak	64.99	-29.89	35.10	46.00	-10.90
324.88	V	Peak	55.56	-27.71	27.85	46.00	-18.15
453.89	V	Peak	59.28	-24.96	34.32	46.00	-11.68
623.64	V	Peak	49.86	-22.37	27.49	46.00	-18.51
143.49	Н	Peak	54.82	-27.31	27.51	43.50	-15.99
240.49	Н	Peak	63.97	-29.89	34.08	46.00	-11.92
298.69	Н	Peak	61.75	-28.54	33.21	46.00	-12.79
366.59	Н	Peak	53.78	-26.74	27.04	46.00	-18.96
453.89	Н	Peak	54.90	-24.96	29.94	46.00	-16.06
696.39	Н	Peak	47.04	-21.28	25.76	46.00	-20.24

Remark:

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

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Radiated Spurious Emission Measurement Result (above 1GHz)

Operation Mode TX CH Low **Test Date** Jun. 31, 2008

Fundamental Frequency 2402 MHz Test By Bondi 25 °C Ver. Temperature Pol

Humidity 65 %

	Peak	\mathbf{AV}		Actu	al FS	Peak	\mathbf{AV}	
Freq.	Reading	Reading	Ant./CL	Peak	\mathbf{AV}	Limit	Limit	Margin
(MHz)	(dBuV)	(dBuV)	CF(dB)	(dBuV/m)	(dBuV/m)	(dBuV/m)	(dBuV/m)	(dB)
1598.0	47.12		-12.73	34.39		74.00	54.00	-19.61
3203.5	45.23		-12.73	32.50		74.00	54.00	-21.50
4804.0	44.01		-6.01	38.00		74.00	54.00	-16.00
7206.0						74.00	54.00	
9608.0						74.00	54.00	
12010.0						74.00	54.00	
14412.0						74.00	54.00	
16814.0						74.00	54.00	
19216.0						74.00	54.00	
21618.0						74.00	54.00	
24020.0						74.00	54.00	

Remark:

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

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Radiated Spurious Emission Measurement Result (above 1GHz)

Operation Mode TX CH Low Test Date Jun. 31, 2008

Fundamental Frequency 2402 MHz Test By Bondi Temperature 25 °C Pol Hor.

65 % Humidity

	Peak	\mathbf{AV}		Actu	al FS	Peak	\mathbf{AV}	
Freq.	Reading	Reading	Ant./CL	Peak	\mathbf{AV}	Limit	Limit	Margin
(MHz)	(dBuV)	(dBuV)	CF(dB)	(dBuV/m)	(dBuV/m)	(dBuV/m)	(dBuV/m)	(dB)
1598.0	46.48		-15.37	31.11		74.00	54.00	-22.89
3203.5	44.46		-15.37	29.09		74.00	54.00	-24.91
4804.0	42.71		-6.01	36.70		74.00	54.00	-17.30
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 frequencyo
- (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 columno
- (4) Spectrum Peak Setting: 1GHz-26GHz, RBW=1MHz, VBW=3MHz, Sweep time=200
- (5) Spectrum AV Setting: 1GHz-26GHz, RBW=1MHz, VBW=10Hz, Sweep time=200 ms.

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Radiated Spurious Emission Measurement Result (above 1GHz)

Operation Mode TX CH Mid **Test Date** Jun. 31, 2008

Fundamental Frequency 2441 MHz Test By Bondi Temperature 25 °C Pol Ver.

65 % Humidity

	Peak	\mathbf{AV}		Actu	al FS	Peak	\mathbf{AV}	
Freq.	Reading	Reading	Ant./CL	Peak	\mathbf{AV}	Limit	Limit	Margin
(MHz)	(dBuV)	(dBuV)	CF(dB)	(dBuV/m)	(dBuV/m)	(dBuV/m)	(dBuV/m)	(dB)
1630.5	45.06		-10.42	34.64		74.00	54.00	-19.36
3255.5	44.00		-10.42	33.58		74.00	54.00	-20.42
4882.0	42.59		-5.93	36.66		74.00	54.00	-17.34
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 frequencyo
- (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 columno
- (4) Spectrum Peak Setting: 1GHz-26GHz, RBW=1MHz, VBW=3MHz, Sweep time=200
- (5) Spectrum AV Setting: 1GHz-26GHz, RBW=1MHz, VBW=10Hz, Sweep time=200 ms.

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Radiated Spurious Emission Measurement Result (above 1GHz)

Operation Mode TX CH Mid **Test Date** Jun. 31, 2008

Fundamental Frequency 2441 MHz Test By Bondi Temperature 25 °C Pol Hor.

65 % Humidity

	Peak	\mathbf{AV}		Actu	al FS	Peak	\mathbf{AV}	
Freq.	Reading	Reading	Ant./CL	Peak	\mathbf{AV}	Limit	Limit	Margin
(MHz)	(dBuV)	(dBuV)	CF(dB)	(dBuV/m)	(dBuV/m)	(dBuV/m)	(dBuV/m)	(dB)
1630.5	47.45		-10.42	37.03		74.00	54.00	-16.97
3255.5	44.96		-10.42	34.54		74.00	54.00	-19.46
4882.0	42.32		-5.93	36.39		74.00	54.00	-17.61
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 frequencyo
- (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 columno
- (4) Spectrum Peak Setting: 1GHz-26GHz, RBW=1MHz, VBW=3MHz, Sweep time=200
- (5) Spectrum AV Setting: 1GHz-26GHz, RBW=1MHz, VBW=10Hz, Sweep time=200 ms.

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Radiated Spurious Emission Measurement Result (above 1GHz)

Operation Mode TX CH High **Test Date** Jun. 31, 2008

Fundamental Frequency 2480 MHz Test By Bondi Temperature 25 °C Pol Ver.

65 % Humidity

	Peak	\mathbf{AV}		Actu	al FS	Peak	\mathbf{AV}	
Freq.	Reading	Reading	Ant./CL	Peak	\mathbf{AV}	Limit	Limit	Margin
(MHz)	(dBuV)	(dBuV)	CF(dB)	(dBuV/m)	(dBuV/m)	(dBuV/m)	(dBuV/m)	(dB)
1643.5	47.05		-10.35	36.70		74.00	54.00	-17.30
3301.0	46.71		-10.35	36.36		74.00	54.00	-17.64
4960.0	44.48		-5.87	38.61		74.00	54.00	-15.39
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	
24800.0						74.00	54.00	

Remark:

- (1) Measuring frequencies from 1GHz to the 10th harmonic of highest fundamental frequencyo
- (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 columno
- (4) Spectrum Peak Setting: 1GHz-26GHz, RBW=1MHz, VBW=3MHz, Sweep time=200
- (5) Spectrum AV Setting: 1GHz-26GHz, RBW=1MHz, VBW=10Hz, Sweep time=200 ms.

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Radiated Spurious Emission Measurement Result (above 1GHz)

Operation Mode TX CH High **Test Date** Jun. 31, 2008

Fundamental Frequency 2480 MHz Test By Bondi Temperature 25 °C Pol Hor.

65 % Humidity

	Peak	\mathbf{AV}		Actu	al FS	Peak	\mathbf{AV}	
Freq.	Reading	Reading	Ant./CL	Peak	\mathbf{AV}	Limit	Limit	Margin
(MHz)	(dBuV)	(dBuV)	CF(dB)	(dBuV/m)	(dBuV/m)	(dBuV/m)	(dBuV/m)	(dB)
1643.5	47.49		-10.35	37.14		74.00	54.00	-16.86
3301.0	46.10		-10.35	35.75		74.00	54.00	-18.25
4960.0	43.59		-5.87	37.72		74.00	54.00	-16.28
4960.0						74.00	54.00	
7440.0						74.00	54.00	
9920.0						74.00	54.00	
12400.0						74.00	54.00	
14880.0						74.00	54.00	
17360.0						74.00	54.00	
19840.0						74.00	54.00	
22320.0						74.00	54.00	
24800.0						74.00	54.00	

Remark:

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

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Radiated Spurious Emission Measurement Result (below 1GHz)

RX CH Low **Test Date** Operation Mode Jun. 31, 2008

Fundamental Frequency 2402MHz Test By Bondi Temperature 25 °C Pol Ver./Hor

Humidity 65 %

Freq.	Ant.Pol.	Detector Mode	Reading	Factor	Actual FS	Limit3m	Safe Margin
(MHz)	H/V	(PK/QP)	(dBuV)	(dB)	(dBuV/m)	(dBuV/m)	(dB)
51.34	V	Peak	39.99	-26.67	13.32	40.00	-26.68
67.83	V	Peak	36.70	-28.27	8.43	40.00	-31.57
104.69	V	Peak	43.46	-29.89	13.57	43.50	-29.93
153.19	V	Peak	33.23	-26.23	7.00	43.50	-36.50
235.64	V	Peak	30.15	-24.95	5.20	46.00	-40.80
623.64	V	Peak	50.00	-22.37	27.63	46.00	-18.37
38.73	Н	Peak	42.48	-28.27	14.21	40.00	-25.79
65.89	Н	Peak	44.14	-29.89	14.25	40.00	-25.75
104.69	Н	Peak	42.87	-28.49	14.38	43.50	-29.12
153.19	Н	Peak	29.97	-26.74	3.23	43.50	-40.27
211.39	Н	Peak	35.68	-24.96	10.72	43.50	-32.78
698.33	Н	Peak	47.94	-21.26	26.68	46.00	-19.32

Remark:

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

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Radiated Spurious Emission Measurement Result (below 1GHz)

RX CH Mid **Test Date** Operation Mode Jun. 31, 2008

Fundamental Frequency 2441MHz Test By Bondi Temperature 25°C Pol Ver./Hor

Humidity 65 %

Freq.	Ant.Pol.	Detector Mode	Reading	Factor	Actual FS	Limit3m	Safe Margin
(MHz)	H/V	(PK/QP)	(dBuV)	(dB)	(dBuV/m)	(dBuV/m)	(dB)
41.64	V	Peak	38.35	-28.16	10.19	40.00	-29.81
75.59	V	Peak	38.52	-29.89	8.63	40.00	-31.37
104.69	V	Peak	42.87	-28.54	14.33	43.50	-29.17
153.19	V	Peak	32.54	-26.74	5.80	43.50	-37.70
203.63	V	Peak	33.09	-24.95	8.14	43.50	-35.36
623.64	V	Peak	50.56	-22.37	28.19	46.00	-17.81
38.73	Н	Peak	42.92	-28.16	14.76	40.00	-25.24
75.59	Н	Peak	42.89	-29.89	13.00	40.00	-27.00
104.69	Н	Peak	42.87	-28.54	14.33	43.50	-29.17
150.28	Н	Peak	29.82	-26.74	3.08	43.50	-40.42
208.48	Н	Peak	35.08	-24.96	10.12	43.50	-33.38
498.51	Н	Peak	49.55	-24.78	24.77	46.00	-21.23

Remark:

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

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Radiated Spurious Emission Measurement Result (below 1GHz)

RX CH High **Test Date** Operation Mode Jun. 31, 2008

Fundamental Frequency 2480MHz Test By Bondi Temperature 25 °C Pol Ver./Hor

Humidity 65%

Freq.	Ant.Pol.	Detector Mode	Reading	Factor	Actual FS	Limit3m	Safe Margin
(MHz)	H/V	(PK/QP)	(dBuV)	(dB)	(dBuV/m)	(dBuV/m)	(dB)
39.70	V	Peak	38.42	-28.16	10.26	40.00	-29.74
56.19	V	Peak	37.28	-29.89	7.39	40.00	-32.61
68.80	V	Peak	36.73	-28.49	8.24	40.00	-31.76
104.69	V	Peak	43.84	-24.95	18.89	43.50	-24.61
153.19	V	Peak	33.05	-22.37	10.68	43.50	-32.82
720.64	V	Peak	48.20	-20.96	27.24	46.00	-18.76
38.73	Н	Peak	42.88	-28.27	14.61	40.00	-25.39
67.83	Н	Peak	40.70	-29.89	10.81	40.00	-29.19
104.69	Н	Peak	42.44	-28.54	13.90	43.50	-29.60
162.89	Н	Peak	30.99	-26.78	4.21	43.50	-39.29
198.78	Н	Peak	35.75	-24.96	10.79	43.50	-32.71
662.44	Н	Peak	45.18	-21.76	23.42	46.00	-22.58

Remark:

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

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Radiated Spurious Emission Measurement Result (above 1GHz)

Operation Mode RX CH Low Test Date Jun. 31, 2008

Fundamental Frequency 2402 MHz Test By Bondi Temperature 25°C Pol Ver.

Humidity 65 %

	Peak	\mathbf{AV}		Actu	al FS	Peak	\mathbf{AV}		
Freq.	Reading	Reading	Ant./CL	Peak	\mathbf{AV}	Limit	Limit	Margin	
(MHz)	(dBuV)	(dBuV)	CF(dB)	(dBuV/m)	(dBuV/m)	(dBuV/m)	(dBuV/m)	(dB)	
1604.5	39.06		-5.37	33.69		74.00	54.00	-20.31	Peak
4804.0						74.00	54.00		
7206.0						74.00	54.00		
9608.0						74.00	54.00		
12010.0						74.00	54.00		

Remark:

- (1) Measuring frequencies scanned from 1GHz to the 10th harmonic of highest fundamental frequency.
- (2) Data of measurement within this frequency range shown "-" in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
- (3) Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column
- (4) Spectrum Peak Setting: 1GHz-40GHz, RBW= 1MHz, VBW= 3MHz, Sweep time= 200 ms.
- (5) Spectrum AV Setting: 1GHz-40GHz, RBW= 1MHz, VBW= 10Hz, Sweep time= 200 ms.

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Radiated Spurious Emission Measurement Result (above 1GHz)

RX CH Low Operation Mode **Test Date** Jun. 31, 2008

Fundamental Frequency 2402 MHz Test By Bondi Temperature 25 °C Pol Hor

Humidity 65 %

	Peak	\mathbf{AV}		Actu	al FS	Peak	\mathbf{AV}		
Freq.	Reading	Reading	Ant./CL	Peak	\mathbf{AV}	Limit	Limit	Margin	
(MHz)	(dBuV)	(dBuV)	CF(dB)	(dBuV/m)	(dBuV/m)	(dBuV/m)	(dBuV/m)	(dB)	
1598.0	38.70		-5.48	33.22		74.00	54.00	-20.78	Peak
4804.0						74.00	54.00		
7206.0						74.00	54.00		
9608.0						74.00	54.00		
12010.0						74.00	54.00		

Remark:

- 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.
- Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column
- (4) Spectrum Peak Setting: 1GHz-40GHz, RBW= 1MHz, VBW= 3MHz, Sweep time= 200 ms.
- (5) Spectrum AV Setting: 1GHz-40GHz, RBW= 1MHz, VBW= 10Hz, Sweep time= 200 ms.

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Radiated Spurious Emission Measurement Result (above 1GHz)

RX CH Mid Jun. 31, 2008 Operation Mode **Test Date** Fundamental Frequency 2441 MHz Test By Bondi

Temperature 25 ℃ Pol Ver

Humidity 65 %

	Peak	\mathbf{AV}		Actu	al FS	Peak	\mathbf{AV}		
Freq.	Reading	Reading	Ant./CL	Peak	\mathbf{AV}	Limit	Limit	Margin	
(MHz)	(dBuV)	(dBuV)	CF(dB)	(dBuV/m)	(dBuV/m)	(dBuV/m)	(dBuV/m)	(dB)	
1630.5	38.41		-5.26	33.15		74.00	54.00	-20.85	Peak
4882.0						74.00	54.00		
7323.0						74.00	54.00		
9764.0						74.00	54.00		
12205.0						74.00	54.00		

Remark:

- 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.
- Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column
- (4) Spectrum Peak Setting: 1GHz-40GHz, RBW= 1MHz, VBW= 3MHz, Sweep time= 200 ms.
- (5) Spectrum AV Setting: 1GHz-40GHz, RBW= 1MHz, VBW= 10Hz, Sweep time= 200 ms.

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Radiated Spurious Emission Measurement Result (above 1GHz)

Operation Mode RX CH Mid **Test Date** Jun. 31, 2008

Fundamental Frequency 2441 MHz Test By Bondi Temperature 25 ℃ Pol Hor

Humidity 65%

	Peak	\mathbf{AV}		Actu	al FS	Peak	\mathbf{AV}		
Freq.	Reading	Reading	Ant./CL	Peak	\mathbf{AV}	Limit	Limit	Margin	
(MHz)	(dBuV)	(dBuV)	CF(dB)	(dBuV/m)	(dBuV/m)	(dBuV/m)	(dBuV/m)	(dB)	
1630.5	39.10		-5.26	33.84		74.00	54.00	-20.16	Peak
4882.0						74.00	54.00		
7323.0						74.00	54.00		
9764.0						74.00	54.00		
12205.0						74.00	54.00		

Remark:

- 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.
- Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column
- (4) Spectrum Peak Setting: 1GHz-40GHz, RBW= 1MHz, VBW= 3MHz, Sweep time= 200 ms.
- (5) Spectrum AV Setting: 1GHz-40GHz, RBW= 1MHz, VBW= 10Hz, Sweep time= 200 ms.

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Radiated Spurious Emission Measurement Result (above 1GHz)

RX CH High Jun. 31, 2008 Operation Mode Test Date

Fundamental Frequency 2480 MHz Test By Bondi Temperature 25 ℃ Pol Ver

Humidity 65 %

	Peak	\mathbf{AV}		Actu	al FS	Peak	\mathbf{AV}		
Freq.	Reading	Reading	Ant./CL	Peak	\mathbf{AV}	Limit	Limit	Margin	
(MHz)	(dBuV)	(dBuV)	CF(dB)	(dBuV/m)	(dBuV/m)	(dBuV/m)	(dBuV/m)	(dB)	
1630.5	38.85		-5.22	33.63		74.00	54.00	-20.37	Peak
4960.0						74.00	54.00		
7440.0						74.00	54.00		
9920.0						74.00	54.00		
12400.0						74.00	54.00		

Remark:

- 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.
- Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column
- (4) Spectrum Peak Setting: 1GHz-40GHz, RBW= 1MHz, VBW= 3MHz, Sweep time= 200 ms.
- (5) Spectrum AV Setting: 1GHz-40GHz, RBW= 1MHz, VBW= 10Hz, Sweep time= 200 ms.

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Radiated Spurious Emission Measurement Result (above 1GHz)

RX CH High Operation Mode Test Date Jun. 31, 2008

Fundamental Frequency 2480 MHz Test By Bondi Temperature 25 ℃ Pol Hor

Humidity 65 %

	Peak	\mathbf{AV}		Actu	al FS	Peak	\mathbf{AV}		
Freq.	Reading	Reading	Ant./CL	Peak	\mathbf{AV}	Limit	Limit	Margin	
(MHz)	(dBuV)	(dBuV)	CF(dB)	(dBuV/m)	(dBuV/m)	(dBuV/m)	(dBuV/m)	(dB)	
1630.5	38.30		-5.22	33.08		74.00	54.00	-20.92	Peak
4960.0						74.00	54.00		
7440.0						74.00	54.00		
9920.0						74.00	54.00		
12400.0						74.00	54.00		

Remark:

- 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.
- Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column
- (4) Spectrum Peak Setting: 1GHz-40GHz, RBW= 1MHz, VBW= 3MHz, Sweep time= 200 ms.
- Spectrum AV Setting: 1GHz-40GHz, RBW= 1MHz, VBW= 10Hz, Sweep time= 200 ms.

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10. FREQUENCY SEPARATION

10.1. Standard Applicable

According to §15.247(a)(1), Frequency hopping systems shall have hopping channel carrier frequencies separated by minimum of 25KHz or the 20dB bandwidth of the hopping channel, whichever is greater.

According to RSS 210 issue 6, A8.1(2), frequency hopping systems operating in the 2400-2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater.

10.2. Measurement Procedure

- 1. Place the EUT on the table and set it in transmitting mode.
- 2. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.
- 3. Set center frequency of spectrum analyzer = middle of hopping channel.
- 4. Set the spectrum analyzer as RBW, VBW=3KHz, Adjust Span to 3.0 MHz, Sweep = auto.
- 5. Max hold. Mark 3 Peaks of hopping channel and record the 3 peaks frequency.

10.3. Measurement Result

Channel separation (MHz)	Limit	Result
	>=25KHz or	
1	2/3 times 20dB bandwidth	PASS

10.4. Measurement Equipment Used:

	Conducted Emission Test Site					
EQUIPMENT	MFR	MODEL	SERIAL	LAST	CAL DUE.	
ТҮРЕ		NUMBER	NUMBER	CAL.		
Spectrum Analyzer	Agilent	E4446A	MY43360126	04/19/2008	04/18/2010	
Spectrum Analyzer	Agilent	E7405A	US41160416	07/04/2008	07/03/2009	
Spectrum Analyzer	R&S	FSP 40	100034	11/09/2007	11/08/2008	
Low Loss Cable	HUBER+SUHNER	SUCOFLEX 104PEA	N/A	02/13/2008	02/12/2009	
Attenuator	Mini-Circuit	BW-S6W5	N/A	07/05/2008	07/04/2009	

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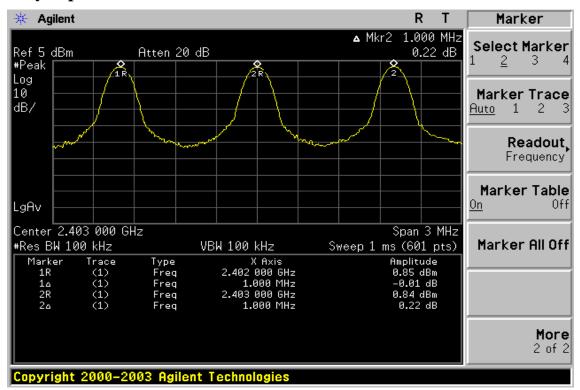
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Frequency Separation Test Data



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11. NUMBER OF HOPPING FREQUENCY

11.1. Standard Applicable

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

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

11.2. Measurement Procedure

- 1. Place the EUT on the table and set it in transmitting mode.
- 2. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.
- 3. Set spectrum analyzer Start=2400MHz, Stop = 2483.5MHz, Sweep = auto.
- 4. Set the spectrum analyzer as RBW, VBW=100KHz,
- 5. Max hold, view and count how many channel in the band.

11.3. Measurement Result

Refer to next page for the plots.

11.4. Measurement Equipment Used:

	Conducted Emission Test Site					
EQUIPMENT	MFR	MODEL	SERIAL	LAST	CAL DUE.	
ТҮРЕ		NUMBER	NUMBER	CAL.		
Spectrum Analyzer	Agilent	E4446A	MY43360126	04/19/2008	04/18/2010	
Spectrum Analyzer	Agilent	E7405A	US41160416	07/04/2008	07/03/2009	
Spectrum Analyzer	R&S	FSP 40	100034	11/09/2007	11/08/2008	
Low Loss Cable	HUBER+SUHNER	SUCOFLEX 104PEA	N/A	02/13/2008	02/12/2009	
Attenuator	Mini-Circuit	BW-S6W5	N/A	07/05/2008	07/04/2009	

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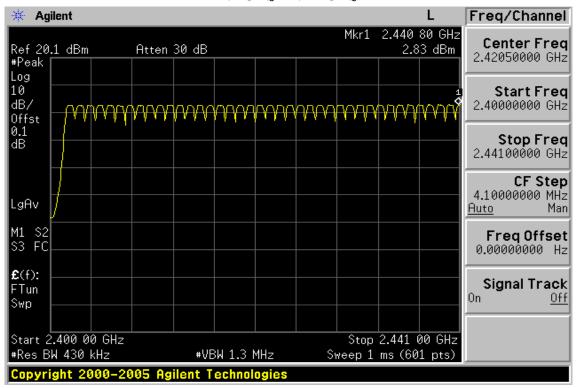


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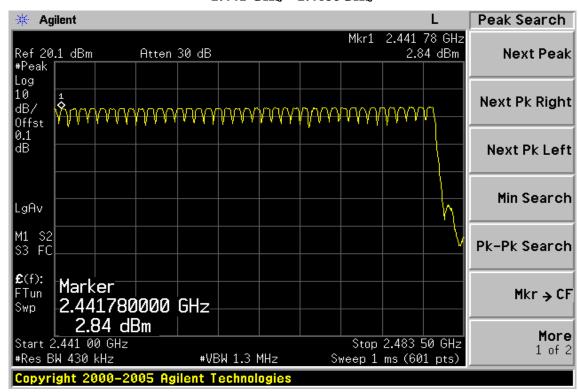
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Channel Number

2.4 GHz - 2.441GHz



2.441 GHz - 2.4835GHz



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12. TIME OF OCCUPANCY (DWELL TIME)

12.1. Standard Applicable

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

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

12.2. Measurement Procedure

- 1. Place the EUT on the table and set it in transmitting mode.
- 2. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.
- 3. Set center frequency of spectrum analyzer = operating frequency.
- 4. Set the spectrum analyzer as RBW, VBW=100KHz, Span = 0Hz, Adjust Sweep = 30s.
- 5. Repeat above procedures until all frequency measured were complete.

12.3. Measurement Result

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

DH1 time slot = 0.417 (ms) * (1600/(2*79)) * 31.6 = 133.4 (ms)CH Low:

DH3 time slot = 1.667 (ms) * (1600/(4*79)) * 31.6 = 266.7 (ms)

DH5 time slot = 2.925 (ms) * (1600/(6*79)) * 31.6 = 312.0 (ms)

CH Mid: DH1 time slot = 0.417 (ms) * (1600/(2*79)) * 31.6 = 133.4 (ms)

DH3 time slot = 1.667 (ms) * (1600/(4*79)) * 31.6 = 266.7 (ms)

DH5 time slot = 2.925 (ms) * (1600/(6*79)) * 31.6 = 312.0 (ms)

CH High: DH1 time slot = 0.417 (ms) * (1600/(2*79)) * 31.6 = 133.4 (ms)

DH3 time slot = 1.667 (ms) * (1600/(4*79)) * 31.6 = 266.7 (ms)

DH5 time slot = 2.925 (ms) * (1600/(6*79)) * 31.6 = 312.0 (ms)

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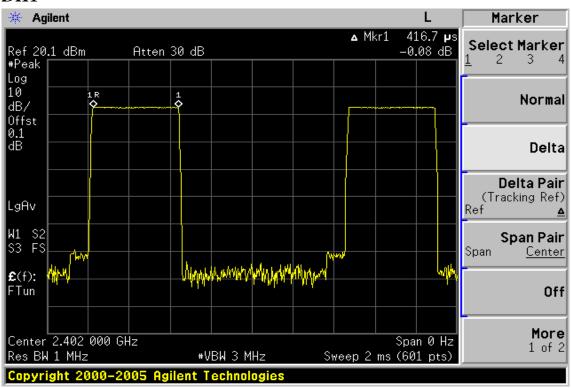
12.4. Measurement Equipment Used:

	Conducted Emission Test Site						
EQUIPMENT	MFR	MODEL	SERIAL	LAST	CAL DUE.		
TYPE		NUMBER	NUMBER	CAL.			
Spectrum Analyzer	Agilent	E4446A	MY43360126	04/19/2008	04/18/2010		
Spectrum Analyzer	Agilent	E7405A	US41160416	07/04/2008	07/03/2009		
Spectrum Analyzer	R&S	FSP 40	100034	11/09/2007	11/08/2008		
Low Loss Cable	HUBER+SUHNER	SUCOFLEX 104PEA	N/A	02/13/2008	02/12/2009		
Attenuator	Mini-Circuit	BW-S6W5	N/A	07/05/2008	07/04/2009		

Dwell Time Test Data

CH-Low

DH1



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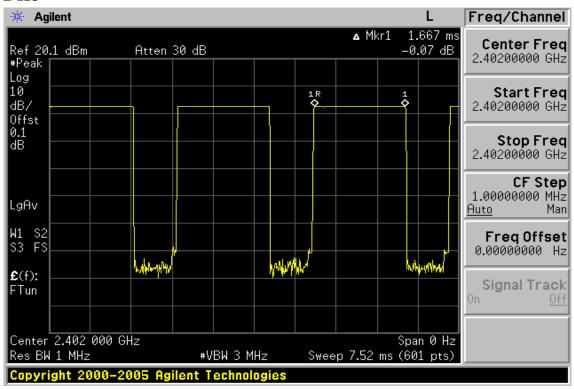
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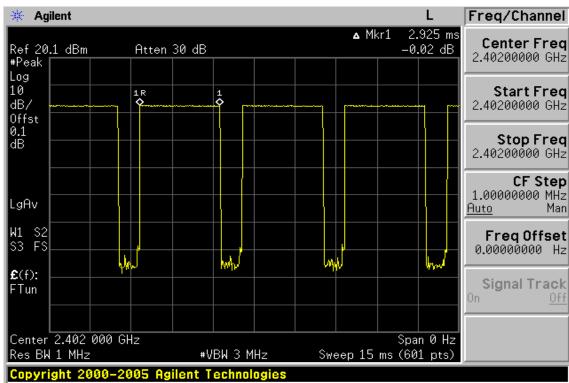
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DH3



DH5



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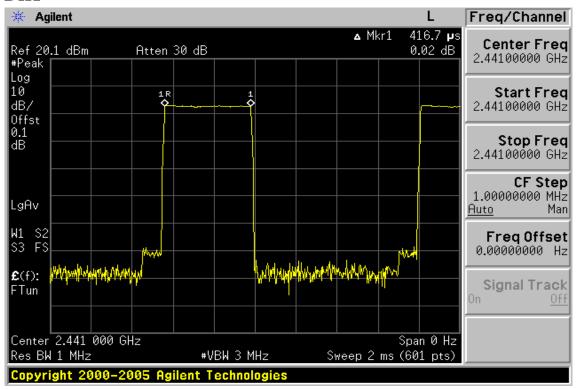


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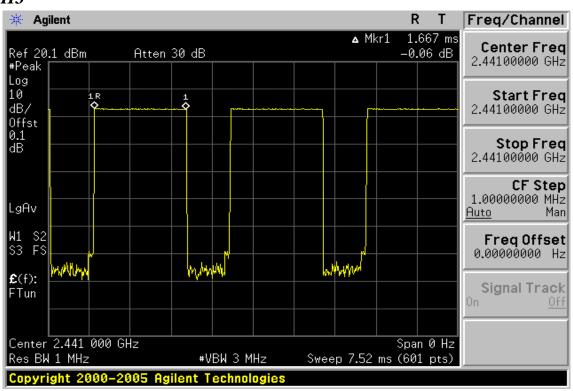
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CH-Mid

DH1



DH3



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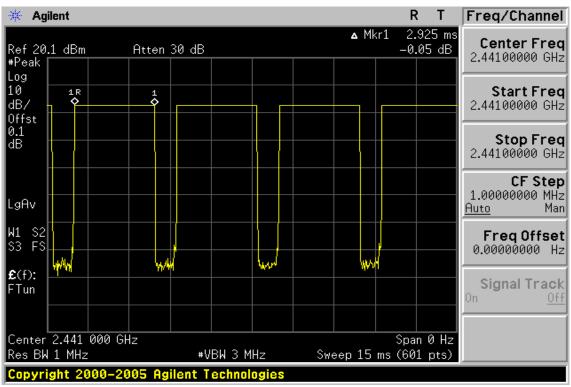
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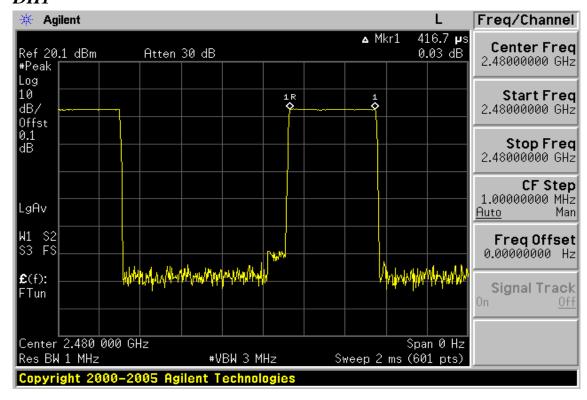
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DH5



CH-High

DH1



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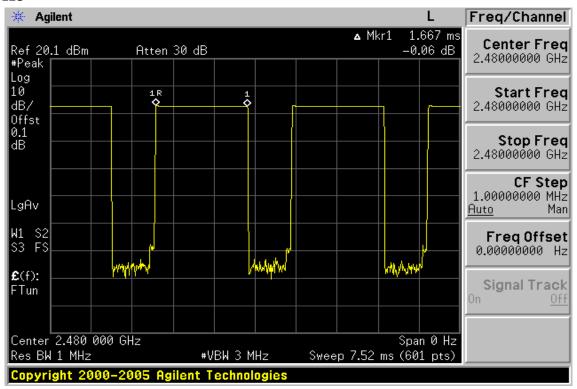
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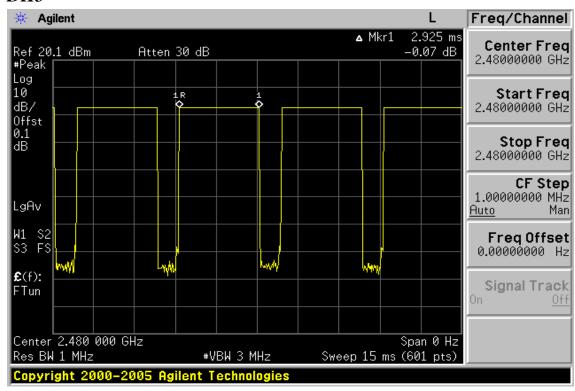
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DH3



DH5



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13. Peak Power Spectral Density

13.1. Standard Applicable

According to §15.247(d), for direct sequence systems, the peak power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3kHz band during any time interval of continuous transmission.

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

13.2. Measurement Procedure

- 1. Place the EUT on the table and set it in transmitting mode.
- 2. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.
- 3. Set the spectrum analyzer as RBW = 3KHz, VBW = 10KHz, Span = 1.5MHz, Sweep=100s
- 4. Record the max. reading.
- 5. Repeat above procedures until all frequency measured were complete.

13.3. Measurement Result

СН	RF Power Density	Cable loss	RF Power Density	Maximum Limit
	Reading (dBm)	(dB)	Level (dBm)	(dBm)
Low	-6.78	0.00	-6.78	8
Mid	-6.70	0.00	-6.70	8
High	-6.84	0.00	-6.84	8

^{*}Offset 0.1dB

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13.4. Measurement Equipment Used:

	Conducted Emission Test Site					
EQUIPMENT	MFR	MODEL	SERIAL	LAST	CAL DUE.	
TYPE		NUMBER	NUMBER	CAL.		
Spectrum Analyzer	Agilent	E4446A	MY43360126	04/19/2008	04/18/2010	
Spectrum Analyzer	Agilent	E7405A	US41160416	07/04/2008	07/03/2009	
Spectrum Analyzer	R&S	FSP 40	100034	11/09/2007	11/08/2008	
Low Loss Cable	HUBER+SUHNER	SUCOFLEX 104PEA	N/A	02/13/2008	02/12/2009	
Attenuator	Mini-Circuit	BW-S6W5	N/A	07/05/2008	07/04/2009	

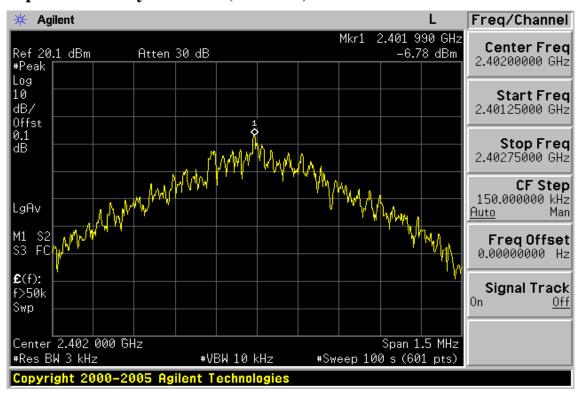
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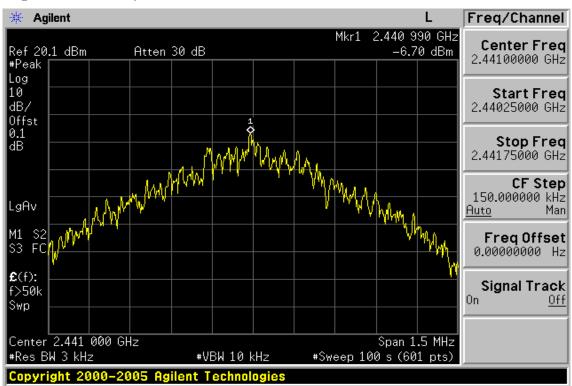
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Power Spectral Density Test Plot (CH-Low)



Power Spectral Density Test Plot (CH-Mid)



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Power Spectral Density Test Plot (CH-High)



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14. 99% Bandwidth Measurement

14.1. Standard Applicable

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

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

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

14.2. Measurement Equipment Used:

	Conducted Emission Test Site					
EQUIPMENT	MFR	MODEL	SERIAL	LAST	CAL DUE.	
ТҮРЕ		NUMBER	NUMBER	CAL.		
Spectrum Analyzer	Agilent	E4446A	MY43360126	04/19/2008	04/18/2010	
Spectrum Analyzer	Agilent	E7405A	US41160416	07/04/2008	07/03/2009	
Spectrum Analyzer	R&S	FSP 40	100034	11/09/2007	11/08/2008	
Low Loss Cable	HUBER+SUHNER	SUCOFLEX 104PEA	N/A	02/13/2008	02/12/2009	
Attenuator	Mini-Circuit	BW-S6W5	N/A	07/05/2008	07/04/2009	

14.3. Test Set-up:

Refer to section 2.4.

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14.4. **Measurement Procedure**

- 1. Place the EUT on the table and set it in transmitting mode.
- 2. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.
- Set the spectrum analyzer as RBW=1% of the approximate emission bandwidth, VBW = 3 times 3. RBW, Span= approximately 20dB below the peak level. Sweep=auto
- Turn on the 99% bandwidth function, max reading... 4.
- 5. Repeat above procedures until all frequency measured were complete.

14.5. **Measurement Result**

Court				
СН	Bandwidth (kHz)			
Lower	858.1871			
Mid	858.7331			
Higher	856.9436			

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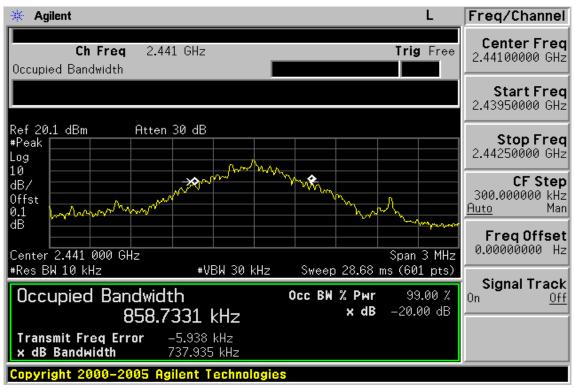
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99% Band Width Test Data CH-Low



99% Band Width Test Data CH-Mid



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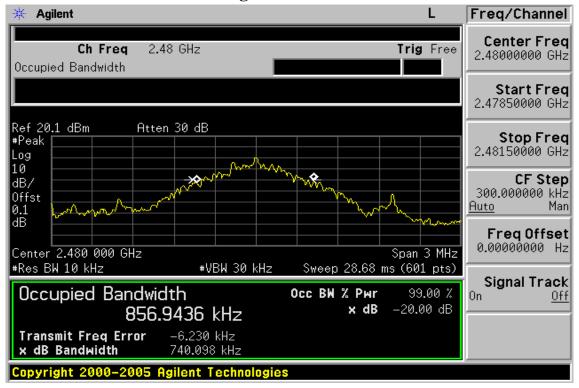


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99% Band Width Test Data CH-High



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15. ANTENNA REQUIREMENT

15.1. Standard Applicable

According to §15.203, an intentional radiator shall be designed to ensure that no antenna other than furnished by the responsible party shall be used with the device.

And according to §15.246(1), if transmitting antennas of directional gain greater than 6dBi are used the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

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

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

15.2. Antenna Connected Construction

The directional gains of antenna used for transmitting is 2dBi, and the antenna connector is designed with permanent attachment and no consideration of replacement. Please see EUT photo for details.

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SGS Taiwan Ltd. No. 134, Wu Kung Rd., Wuku Industrial Zone, Taipei Country, Taiwan. / 台博紀 業品工路134號

台灣檢驗科技股份有限公司 t (886-2) 2299-3279