

Report No.: ER/2008/20002 **Issue Date: Feb. 27, 2008** 

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## ELECTROMAGNETIC EMISSIONS COMPLIANCE REPORT

# INTENTIONAL RADIATOR CERTIFICATION TO FCC PART 15 SUBPART C REQUIREMENT

**Product Name: PDA Phone** 

**Brand Name:** hTC

**Model Name:** KAIS140

**Model Different:** N/A

**ID Number:** NM8KSJ

**Report No.:** ER/2008/20002

**Issue Date:** Feb. 27, 2008

**Rule Part: §15.247** 

HIGH TECH COMPUTER CORP.

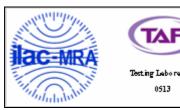
Prepared for

No. 23 Xinghua Rd., Taoyuan 330, Taiwan

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:** HIGH TECH COMPUTER CORP.

No. 23 Xinghua Rd., Taoyuan 330, Taiwan

**Equipment Under Test:** PDA Phone **Brand Name:** NM8KSJ

hTC **FCC ID Number:** 

KAIS140 Model No.:

**Model Difference:** N/A

File Number: ER/2008/20002

Feb. 02, 2008 ~ Feb. 22, 2008 Date of test:

Feb. 01, 2008 **Date of EUT Received:** 

## 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.

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

Test By:	Bondi Jin	Date	Feb. 27, 2008	
_	Bondi Liu / Engineer	_		
Prepared By:	Alex Hsieh	Date	Feb. 27, 2008	
Approved By:	Alex Hsieh / Sr. Engineer		Feb. 27, 2008	
_	Vincent Su / Manager	_		

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# Version

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### GENERAL INFORMATION

## 1.1. Product Description

#### General:

	Jeneral.			
Product Name:	PDA Phone			
Brand Name:	hTC			
Model Name:	KAIS140			
Model Difference:	N/A			
Simple Hands-Free (SHF):	Mode No. G-EP-A404:, Supplier: MEC Mode No. CHM-311STV08002:, Supplier: COTRON			
Data Cable (USB):	1 cable, model: N/A			
Cigar Lighter Adaptor (CLA):	Model No.: CLM10D-050-R			
	3.7 Vdc re-chtor	nargeable battery or 5Vdc from AC/DC power Adap-		
Power Supply:	Battery:	Model No.: KAIS160, Supplier: Dynapack, or Model No.: KAIS160, Supplier: Samsung		
	Adapter:	Model: PSAA05A-050, Supplier: Phihong, or Model: ADP-5FH B,, Supplier: DELTA.		

### GSM and WCDMA:

Cellular Phone Standards:	GSM 850, 900, 1800, 1900 and WCDMA Band IX Mobile Phone		
	GSM 850: 824MHz –849MHz	33 dBm	
Frequency Range and Power:	GSM 1900: 1850MHz –1910MHz	30 dBm	
	WCDMA Band IX: TX:1749.90MHz – 1784.9MHz	24 dBm	
Hardware Version:	XA02		
Software Version:	25.64.40.01H		
IMEI:	35972801001035601		
Antenna Gain:  GSM: PIFA Antenna, 1.5dBi WCDMA: PIFA Antenna, 1.5dBi			

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### WLAN:

Frequency Range:	2412 – 2462 MHz
Channel number:	11 channels
Max. Output Power:	802.11b : 16.66 dBm (Peak) 802.11g : 14.51 dBm (Peak)
Modulation Technology:	DSSS, OFDM
Modulation type:	CCK, DQPSK, DBPSK for DSSS 64QAM. 16QAM, QPSK, BPSK for OFDM
Transition Rate:	802.11 b: 1/2/5.5/11 Mbps; 802.11 g: 6/9/12/18/24/36/48/54 Mbps
Antenna Designation:	PIFA Antenna, 1.50 dBi

The EUT is compliance with IEEE 802.11 b/g Standard.

### Bluetooth:

Frequency Range:	2402 – 2480MHz
Channel number:	79 channels
Transmit Power:	-0.33 dBm.(Peak)
Modulation type:	Frequency Hopping Spread Spectrum (GFSK) (FHSS) (4/πQPSK) (8QPSK)
Frequency Range:	2.402GHz – 2.480GHz
Dwell Time:	<=0.4s
Operating Mode:	Point-to-Point
Antenna Designation:	PIFA Antenna, 1.50 dBi

The EUT is compliance with Bluetooth 2.0 + EDR Standard. Bluetooth share with the same antenna with WLAN.

This test report applies for 80211b/g WLAN.



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

This submittal(s) (test report) is intended for FCC ID: NM8KSJ filing to comply with Section 15.247 of the FCC Part 15, Subpart C Rules. 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). 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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### 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 according to the requirements in Section 8 and 13 of ANSI C63.4-2003.

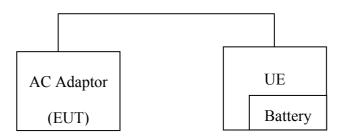


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# 2.4. Configuration of Tested System

Fig. 2-1 Configuration of Tested System



**Table 2-1 Equipment Used in Tested System** 

Item	Equipment	Mfr/Brand	Model/ Type No.	Series No.	Data Cable	Power Cord
1	n/a					

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### 3. SUMMARY OF TEST RESULTS

FCC Rules Description Of Test		Result
§15.207(a)	AC Power Line Conducted Emission	Compliant
§15.247(b) (3),(4)(c)	Peak Output Power	Compliant
§15.247(a)(2)	6dB Bandwidth	Compliant
	100 KHz Bandwidth Of	G 11
§15.247(d)	Frequency Band Edges	Compliant
§15.247(d)	Spurious Emission	Compliant
§15.247(e)	Peak Power Density	Compliant
§15.203	Antenna Requirement	Compliant

#### Co-Antenna test

FCC Rules	Description Of Test	Result
§15.207(a)	AC Power Line Conducted Emission	N/A
§15.247(b) (3),(4)(c)	Peak Output Power	N/A
§15.247(a)(2)	6dB Bandwidth	N/A
	100 KHz Bandwidth Of	
§15.247(d)	Frequency Band Edges	Compliant
§15.247(d)	Spurious Emission	Compliant
§15.247(e)	Peak Power Density	N/A
§15.203	Antenna Requirement	N/A



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### 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.

The field strength of radiation emission was measured as EUT stand-up position (H mode) and lie down position (E1, E2 mode) for 802.11b/g WLAN Transmitter for channel Low, Mid and High, the worst case H position was reported. All tests were carried out for worst adaptor: PSAA05A-050.

802.11 b mode: Channel low (2412MHz) · mid (2437MHz) and high (2462MHz) with 1Mbps data rate are chosen for full testing.

802.11 g mode: Channel low (2412MHz) · mid (2437MHz) and high (2462MHz) with 6Mbps data rate are chosen for full testing.

Co-Antenna test, the worst case of WLAN lowest channel with BT lowest channel, WLAN middle channel with BT middle channel, WLAN highest channel with BT highest channel were reported.



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### CONDUCTED EMISSION TEST

### 5.1. Standard Applicable

According to §15.207. frequency within 150KHz to 30MHz shall not exceed the Limit table as below.

Frequency range	Lir dB(	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.

<sup>1.</sup> The lower limit shall apply at the transition frequencies

<sup>2.</sup> 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	НР	8594EM	3624A00203	09/02/2007	09/03/2008						
EMI Test Receiver	R&S	ESCS30	828985/004	06/09/2007	06/10/2008						
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	Rolf-Heine	NNB-2/16Z	99013	01/10/2008	01/09/2009						
Coaxial Cables	FCC	FCC-LISN-50/250-25-2-01	04034	01/11/2008	01/10/2009						

### 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.

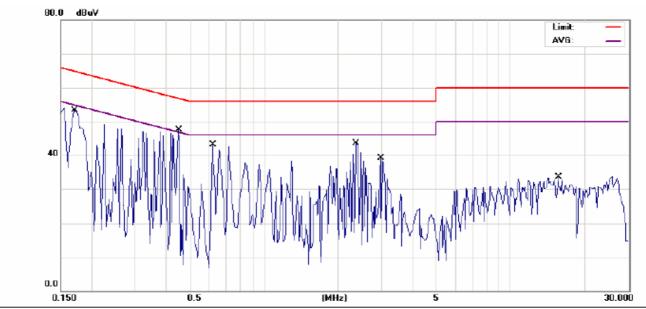


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### AC POWER LINE CONDUCTED EMISSION TEST DATA

Operation Mode:	Normal Operatio	n Mode	Test Date:	Feb. 18, 2008
Temperature:	25 ℃	Humidity:	Test By:	Sky
Adaptor:	Supply: DELTA	/ model: ADP-5FF		



Site SGS CONDUCTED #1

Limit: CISPR22 Class B Conduction(QP)

EUT: Mobile

M/N: kais 140

Note: Wireless operation+charger mode (DELTA)

Phase:	L1	Temperature:	22 °C
Power:	AC 120V/60Hz	Humidity:	57 %
Distance:		Air Pressure:	hpa

No.	Mk.	Freq.	Reading Level	Factor	Measure- ment	Limit	Over		
		MHz	dBu∀	dB	dBu∀	dBu∀	dB	Detector	Comment
1		0.1700	52.51	0.72	53.23	64.96	-11.73	QP	
2		0.1700	42.00	0.72	42.72	54.96	-12.24	AVG	
3		0.4500	47.42	0.02	47.44	56.88	-9.44	QP	
4		0.4500	22.00	0.02	22.02	46.88	-24.86	AVG	
5		0.6200	43.07	0.02	43.09	56.00	-12.91	QP	
6		0.6200	28.00	0.02	28.02	46.00	-17.98	AVG	
7		2.3600	43.36	0.05	43.41	56.00	-12.59	QP	
8	*	2.3600	39.00	0.05	39.05	46.00	-6.95	AVG	
9		2.9800	38.99	0.06	39.05	56.00	-16.95	QP	
10		15.6400	33.07	0.37	33.44	60.00	-26.56	QP	

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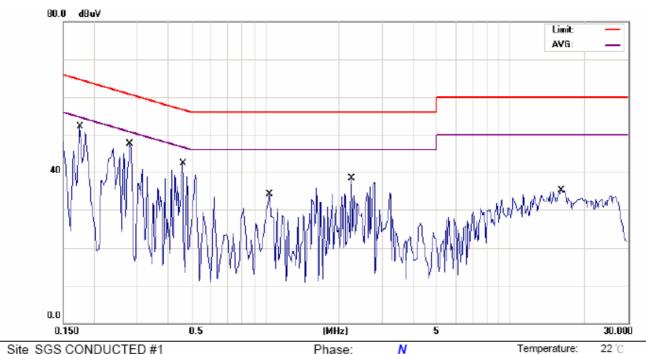
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Humidity:

Air Pressure:

57 %

hpa



Power:

Distance:

AC 120V/60Hz

Site SGS CONDUCTED #1

Limit: CISPR22 Class B Conduction(QP)

EUT: Mobile

M/N: kais 140

Note: Wireless operation+charger mode (DELTA)

No.	Mk.	Freq.	Reading Level	Factor	Measure- ment	Limit	Over		
		MHz	dBu∨	dB	dBu∀	dBu∀	dB	Detector	Comment
1	*	0.1750	52.03	0.01	52.04	64.72	-12.68	QP	
2		0.1750	38.00	0.01	38.01	54.72	-16.71	AVG	
3		0.2800	47.44	0.02	47.46	60.82	-13.36	QP	
4		0.2800	20.00	0.02	20.02	50.82	-30.80	AVG	
5		0.4600	42.25	0.02	42.27	56.69	-14.42	QP	
6		0.4600	16.00	0.02	16.02	46.69	-30.67	AVG	
7		1.0400	34.03	0.01	34.04	56.00	-21.96	QP	
8		1.0400	24.00	0.01	24.01	46.00	-21.99	AVG	
9		2.2400	38.35	0.04	38.39	56.00	-17.61	QP	
10		2.2400	31.00	0.04	31.04	46.00	-14.96	AVG	
11		16.1200	34.81	0.29	35.10	60.00	-24.90	QP	
12		16.1200	33.00	0.29	33.29	50.00	-16.71	AVG	

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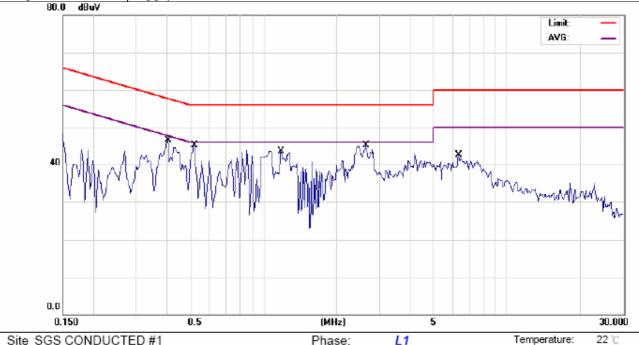
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Humidity: Air Pressure:

hpa

### AC POWER LINE CONDUCTED EMISSION TEST DATA

Operation Mode:	Normal Operation	n Mode	Test Date:	Feb. 18, 2008	
Temperature:	25 °C	Humidity:	Test By:	Sky	
Adaptor:	Supply: PHIHO?	NG / model: PSAA	05A-050		



Power:

Distance:

AC 120V/60Hz

Site SGS CONDUCTED #1

Limit: CISPR22 Class B Conduction(QP)

EUT: Mobile

M/N: kais 140

Note: Wireless operation+charger mode (PHIHONG)

No. M	۸k.	Freq.	Reading Level	Factor	Measure- ment	Limit	Over		
		MHz	dBu∀	dB	dBu∀	dBu∀	dB	Detector	Comment
1		0.4050	46.45	0.02	46.47	57.75	-11.28	QP	
2		0.4050	35.00	0.02	35.02	47.75	-12.73	AVG	
3		0.5200	45.14	0.02	45.16	56.00	-10.84	QP	
4 *		0.5200	37.00	0.02	37.02	46.00	-8.98	AVG	
5		1.1800	43.58	0.02	43.60	56.00	-12.40	QP	
6		1.1800	31.50	0.02	31.52	46.00	-14.48	AVG	
7		2.6400	45.15	0.05	45.20	56.00	-10.80	QP	
8		2.6400	33.00	0.05	33.05	46.00	-12.95	AVG	
9		6.3200	42.34	0.14	42.48	60.00	-17.52	QP	

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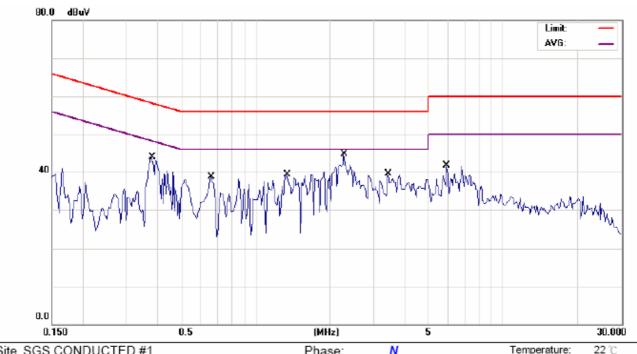
Temperature:

Air Pressure:

hpa

Humidity:

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Phase:

Power:

Distance:

Ν

AC 120V/60Hz

Site SGS CONDUCTED #1

Limit: CISPR22 Class B Conduction(QP)

EUT: Mobile

M/N: kais 140

Note: Wireless operation+charger mode (PHIHONG)

No.	Mk.	Freq.	Reading Level	Factor	Measure- ment	Limit	Over		
		MHz	dBu∀	dB	dBu∀	dBu∀	dB	Detector	Comment
1		0.3800	43.94	0.02	43.96	58.28	-14.32	QP	
2		0.3800	34.00	0.02	34.02	48.28	-14.26	AVG	
3		0.6600	38.72	0.02	38.74	56.00	-17.26	QP	
4		1.3400	39.27	0.02	39.29	56.00	-16.71	QP	
5	*	2.2800	44.67	0.04	44.71	56.00	-11.29	QP	
6		2.2800	32.00	0.04	32.04	46.00	-13.96	AVG	
7		3.4200	39.51	0.06	39.57	56.00	-16.43	QP	
8		5.9200	41.50	0.13	41.63	60.00	-18.37	QP	
9		5.9200	28.00	0.13	28.13	50.00	-21.87	AVG	

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### PEAK OUTPUT POWER MEASUREMENT

## 6.1. Standard Applicable

According to  $\S15.247(a)(2)$ , (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.



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#### **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= 1MHz, VBW = 3MHz, Bandwidth=26dB occupied Bandwidth)
- 3. Record the max. reading.
- 4. Repeat above procedures until all frequency measured were complete.

## 6.3. Measurement Equipment Used:

	Conducted Emission Test Site										
EQUIPMENT	MFR	MODEL	SERIAL	LAST	CAL DUE.						
TYPE		NUMBER	NUMBER	CAL.							
Spectrum Analyzer	Agilent	E4446A	MY43360126	04/27/2007	04/27/2008						
Spectrum Analyzer	Agilent	E7405A	US41160416	07/04/2007	07/03/2008						
Spectrum Analyzer	R&S	FSP 40	100034	11/09/2007	11/10/2008						
Low Loss Cable	HUBER+SUHNER	SUCOFLEX 104PEA	N/A	N/A	N/A						
Attenuator	Mini-Circuit	BW-S6W5	N/A	01/05/2008	01/04/2009						



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### 6.4. Measurement Result

#### 802.11b

Frequency (MHz)	Reading Power (dBm)	Cable Loss	Output Power (dBm)	Output Power (W)	Limit (W)
2412.00	16.66	0.00	16.66	0.04634	1
2437.00	16.23	0.00	16.23	0.04198	1
2462.00	15.44	0.00	15.44	0.03499	1

\*Note: Offset 0.1dB

### 802.11g

Frequency (MHz)	Reading Power (dBm)	Cable Loss	Output Power (dBm)	Output Power (W)	Limit (W)
2412.00	14.40	0.00	14.40	0.02754	1
2437.00	14.51	0.00	14.51	0.02825	1
2462.00	13.83	0.00	13.83	0.02415	1

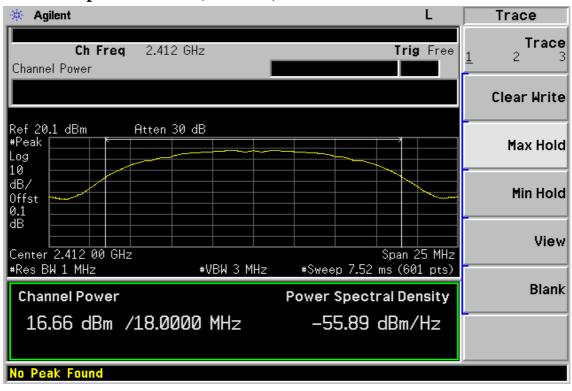
\*Note: Offset 0.1dB



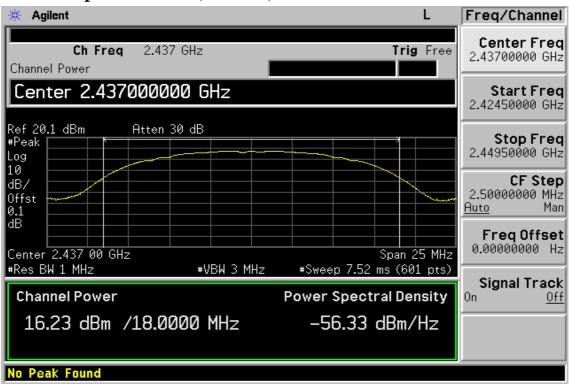
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802.11b
Peak Power Output Data Plot (CH Low)



## Peak Power Output Data Plot (CH Mid)



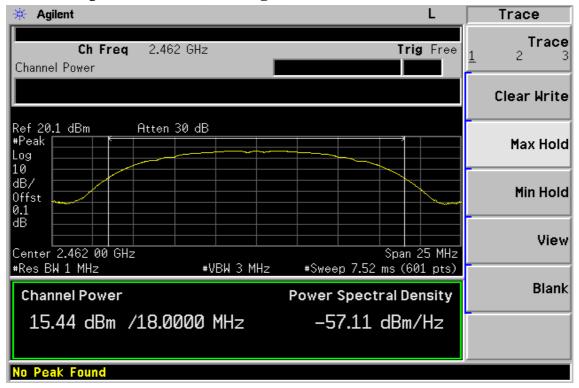
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## **Peak Power Output Data Plot (CH High)**

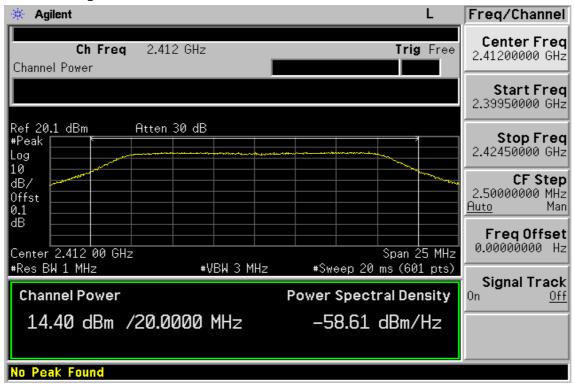




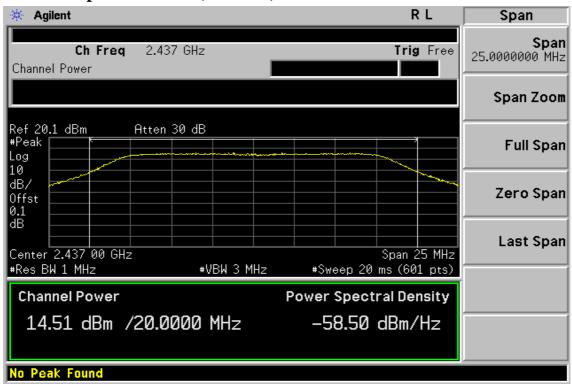
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802.11g Peak Power Output Data Plot (CH Low)



## Peak Power Output Data Plot (CH Mid)



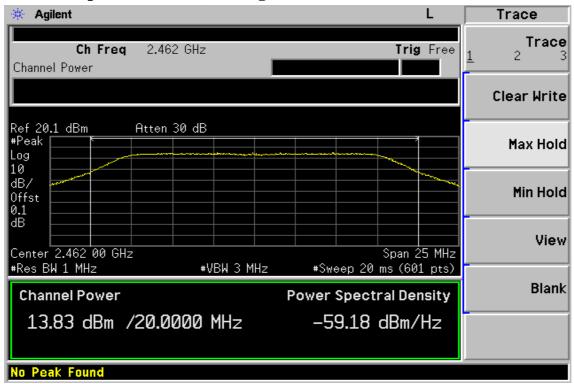
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## **Peak Power Output Data Plot (CH High)**





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### 7. 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.

#### 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 3.antenna port to the spectrum analyzer.
- 3.Set the spectrum analyzer as RBW=1% bandwidth, VBW =3\* RBW, Span= 50MHz, Sweep=auto
- 4. Mark the peak frequency and –6dB (upper and lower) frequency.
- 5. Repeat above procedures until all frequency measured were complete.

### 7.3. Measurement Equipment Used:

	Conducted Emission Test Site										
EQUIPMENT	MFR	MODEL	SERIAL	LAST	CAL DUE.						
TYPE		NUMBER	NUMBER	CAL.							
Spectrum Analyzer	Agilent	E4446A	MY43360126	04/27/2007	04/27/2008						
Spectrum Analyzer	Agilent	E7405A	US41160416	07/04/2007	07/03/2008						
Spectrum Analyzer	R&S	FSP 40	100034	11/09/2008	11/10/2009						
Low Loss Cable	HUBER+SUHNER	SUCOFLEX 104PEA	N/A	N/A	N/A						
Attenuator	Mini-Circuit	BW-S6W5	N/A	01/05/2008	01/04/2009						



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### 7.4. Measurement Result

#### 802.11b

СН	Bandwidth (MHz)	Bandwidth (KHz)	Result		
Lower	10.114	> 500	PASS		
Mid	10.082	> 500	PASS		
Higher	10.161	> 500	PASS		

### 802,11g

0020115			
СН	Bandwidth (MHz)	Bandwidth (KHz)	Result
Lower	16.422	> 500	PASS
Mid	16.407	> 500	PASS
Higher	16.427	> 500	PASS

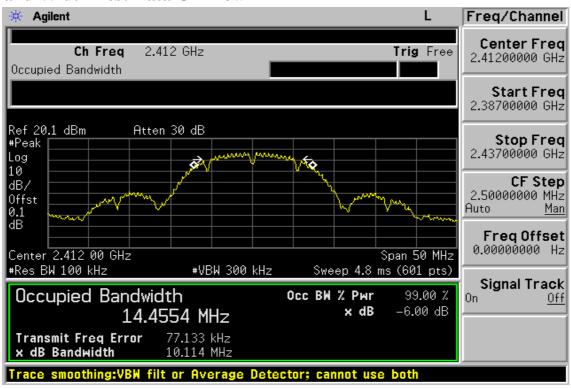


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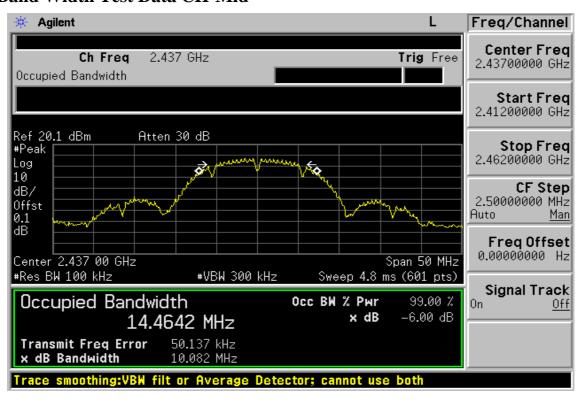
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### 802.11b

#### 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



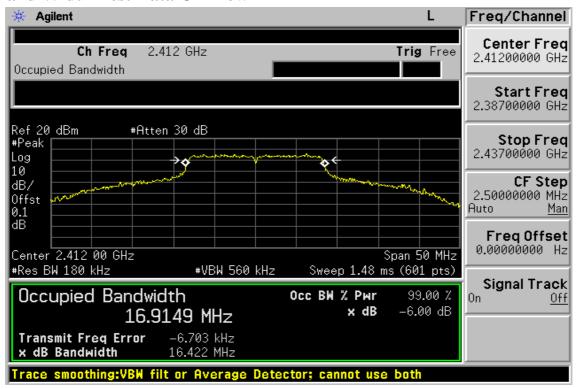


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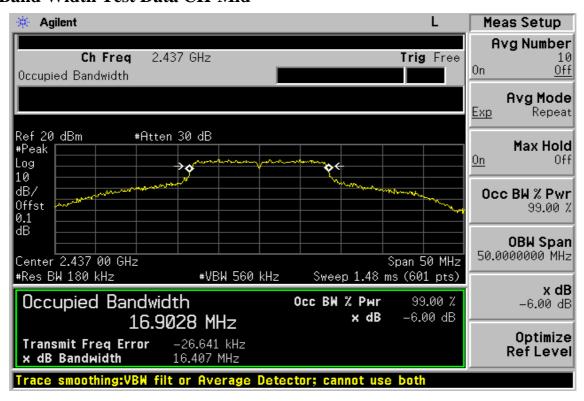
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## 802.11g

### 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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### 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).

#### 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=30MHz, 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 Equipment Used:

Conducted Emission Test Site										
EQUIPMENT	MFR	MODEL	SERIAL	LAST	CAL DUE.					
TYPE		NUMBER	NUMBER	CAL.						
Spectrum Analyzer	Agilent	E4446A	MY43360126	04/27/2007	04/27/2008					
Spectrum Analyzer	Agilent	E7405A	US41160416	07/04/2007	07/03/2008					
Spectrum Analyzer	R&S	FSP 40	100034	11/09/2007	11/10/2008					
Low Loss Cable	HUBER+SUHNER	SUCOFLEX 104PEA	N/A	N/A	N/A					
Attenuator	Mini-Circuit	BW-S6W5	N/A	01/05/2008	01/04/2009					

### 8.4. Measurement Result

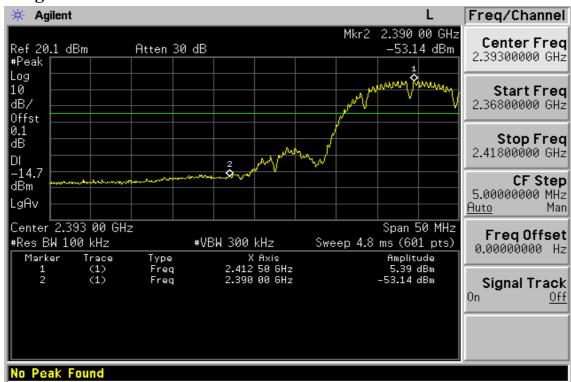
Refer to attach spectrum analyzer data chart.



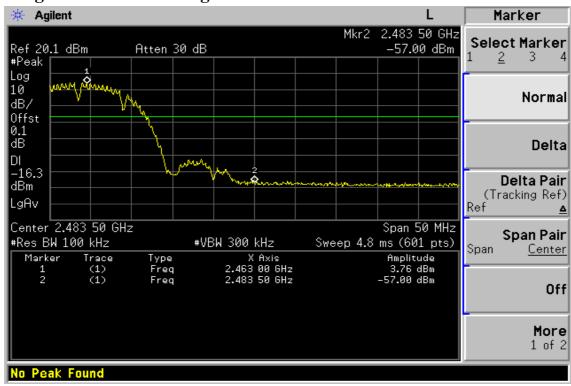
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# 802.11b Band Edges Test Data CH-Low



## **Band Edges Test Data CH-High**



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### Radiated Emission: 802.11 b mode

Operation Mode TX CH Low Test Date Feb. 18, 2008 Fundamental Frequency 2412 MHz Test By Bondi Pol Ver. Tmperature 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)	
2390.00	38.39		-1.39	37.00		74.00	54.00	-17.00	Peak
Operation Fundament Temperatu	tal Frequer	ncy 2412 25 °C				Test Test Pol	By	Feb. 18, 20 Bondi Hor.	008
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	( <b>dB</b> )	
2390.00	38.39		-1.39	37.00		74.00	54.00	-17.00	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
- (4) Spectrum AV Setting: 1GHz-26GHz, RBW=1MHz, VBW=10Hz, Sweep time=200 ms.



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### Radiated Emission: 802.11 b mode

Operation Mode TX CH High Test Date Feb. 18, 2008 Fundamental Frequency 2462 MHz Test By Bondi Pol Temperature 25 °C Ver. Humidity 65 %

	Peak	$\mathbf{AV}$		Actu	ıal 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/r	(dB)	
2483.56	35.53		-0.92	34.61		74.00	54.00	-19.39	Peak
Operation Fundamen Temperatu Humidity	tal Frequer					Test Test Pol	Date By	Feb. 18, 20 Bondi Hor.	008

	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 56	38 43		-0.92	37 51		74 00	54 00	-16 49	Peak

#### Remark:

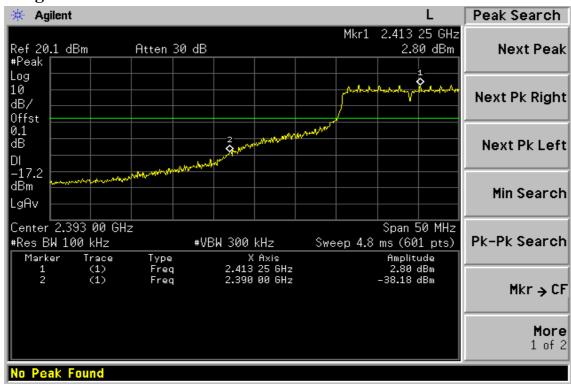
- (1) Data of measurement within this frequency range shown "-" in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
- (2) Radiated emissions measured in frequency above 1000MHz were made with an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



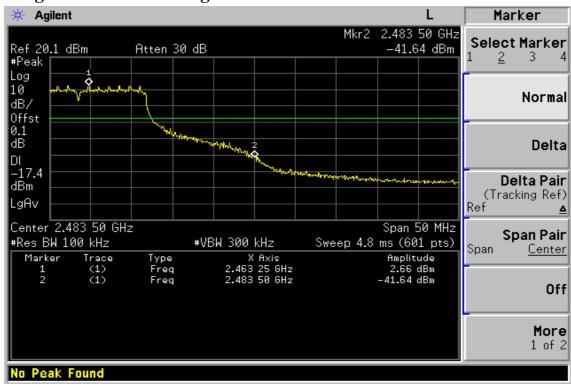
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802.11g Band Edges Test Data CH-Low



## **Band Edges Test Data CH-High**



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# Radiated Emission: 802.11 g mode

Operation Mode TX CH Low Test Date Feb. 18, 2008 Fundamental Frequency 2412 MHz Test By Bondi Tmperature 25  $^{\circ}$ C Pol Ver. Humidity 65  $^{\circ}$ 

	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/n	(dB)	
2390.00	36.11		-1.39	34.72		74.00	54.00	-19.28	Peak
Operation Fundament Temperatu Humidity	tal Frequer					Test Test Pol		Feb. 18, 20 Bondi Hor.	008

	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	( <b>dB</b> )	
2390.00	41.39		-1.39	40.00		74.00	54.00	-14.00	Peak

- (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: 802.11 g mode

Operation Mode TX CH High Test Date Feb. 18, 2008 Fundamental Frequency 2462 MHz Test By Bondi Pol Temperature 25 °C Ver. 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/r	$\mathbf{n}$ ( $\mathbf{d}\mathbf{B}$ )	
2483.56	35.86		-0.92	34.94		74.00	54.00	-19.06	Peak
Operation	Mode	TX C	H High			Test	Date	Feb. 18, 20	008
Fundamen			MHz			Test		Bondi	,,,,
Temperatu	-	25 ℃				Pol	J	Hor.	
Humidity		65 %							
	Dark	A <b>T</b> 7		A - 4	-1.150	D I-	A <b>X</b> 7		
	Peak	$\mathbf{AV}$		Actu	al FS	Peak	$\mathbf{AV}$		
Freq.	Reading	Reading	Ant./CL	Peak	$\mathbf{AV}$	Limit	Limit	Margin	Remark

	Peak	$\mathbf{AV}$		Actu	ıal 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	( <b>dB</b> )	
2483.56	38.15		-0.92	37.23		74.00	54.00	-16.77	Peak

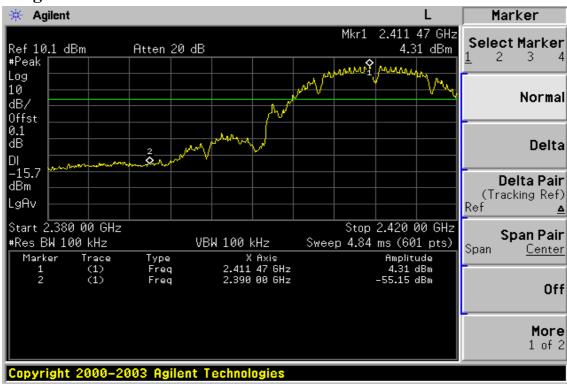
- (1) Data of measurement within this frequency range shown "-" in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
- (2) Radiated emissions measured in frequency above 1000MHz were made with an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



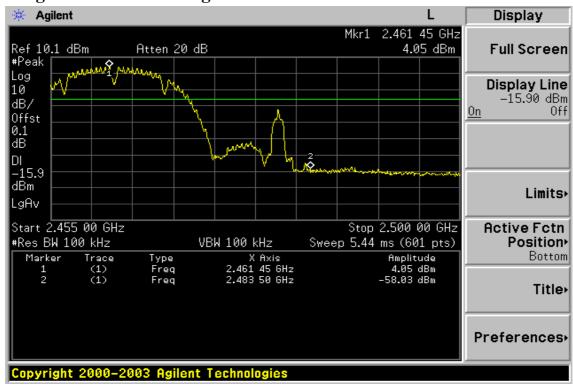
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# Co-Location (802.11b / Bluetooth) **Band Edges Test Data CH-Low**



# **Band Edges Test Data CH-High**



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# **Radiated Emission: Co-Location mode**

Operation Mode 802.11b TX CH Low / BT TX CH Low Test Date Feb. 18, 2008

Fundamental Frequency 2412MHz / 2402MHz Test By Bondi Tmperature 25 Pol Ver.

Humidity 65 %

	Peak	$\mathbf{AV}$		Actu	ial 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/r	<b>n</b> ) ( <b>dB</b> )	
2390.00	39.36		-1.39	37.97		74.00	54.00	-16.03	Peak
Operation 1	Mode	802.1	1b TX CI	H Low / BT	TX CH Low	Test	Date	Feb. 18, 20	008
Fundament	tal Frequer	ncy 2412	MHz / 240	02MHz		Test	By	Bondi	
Temperatu	re	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	Remark
	(MHz)	(dBuV)	(dBuV)	CF(dB)	(dBuV/m)	(dBuV/m)	(dBuV/m	)(dBuV/m)	(dB)	
,	2390.00	40.56		-1 39	39 17		74 00	54 00	-14 83	Peak

- (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: Co-Location mode**

Operation Mode 802.11b TX CH High / BT TX CH High Test Date Feb. 18, 2008

Fundamental Frequency 2462MHz / 2480MHz 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	Remark
(MHz)	(dBuV)	(dBuV)	CF(dB)	(dBuV/m)	(dBuV/m)	dBuV/m	)(dBuV/n	(dB)	
2483.56	38.99		-0.92	38.07		74.00	54.00	-15.93	Peak
Operation 1	Mode	802.1	1b TX CI	H High / BT	TX CH Hig	h Tes	t Date	Feb. 18, 20	800
Fundament	tal Frequer	ncy 2462	MHz / 248	80MHz		Tes	t By	Bondi	
Temperatu	re	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	Remark
(MHz)	(dBuV)	(dBuV)	CF(dB)	(dBuV/m)	(dBuV/m)	(dBuV/m	(dBuV/m)	(dB)	
2483 56	39.76		-0.92	38 84		74 00	54.00	-15 16	Peak

- (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<sub>o</sub>
- (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.

# 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.

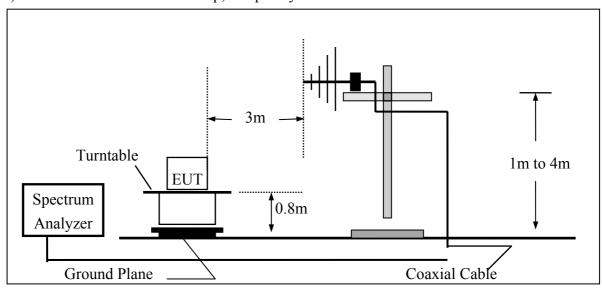


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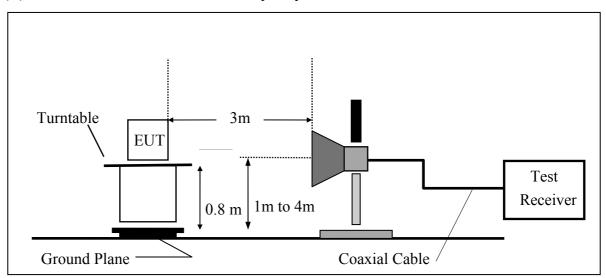
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# 9.4. Test SET-UP (Block Diagram of Configuration)

(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:**

	9	66 Chamber			
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
Spectrum Analyzer	Agilent	E4446A	MY43360126	04/27/2007	04/27/2008
Spectrum Analyzer	R&S	FSP 40	100034	11/09/2007	11/08/2008
Spectrum Analyzer	Agilent	E7405A	US41160416	07/04/2007	07/03/2008
Bi-log Antenna	SCHWAZBECK	VULB9160	3224	11/14/2007	11/13/2008
Horn antenna	SCHWAZBECK	BBHA 9120D	309/320	12/14/2007	12/13/2008
Horn antenna	SCHWAZBECK	BBHA 9170	184/185	12/13/2007	12/12/2008
Pre-Amplifier	HP	8447D	2944A09469	07/19/2007	07/18/2008
Pre-Amplifier	HP	8494B	3008A00578	02/26/2008	02/25/2009
Turn Table	HD	DT420	N/A	N.C.R	N.C.R
Antenna Tower	HD	MA240-N	240/657	N.C.R	N.C.R
Controller	HD	HD100	N/A	N.C.R	N.C.R
Low Loss Cable	HUBER+SUHNER	SUCOFLEX 104PEA-10M	10m	10/09/2007	10/08/2008
Low Loss Cable	HUBER+SUHNER	SUCOFLEX 104PEA-3M	3m	10/09/2007	10/08/2008
Site NSA	SGS	966 chamber	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.

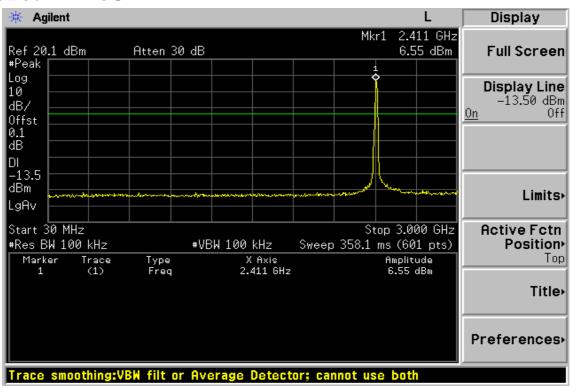
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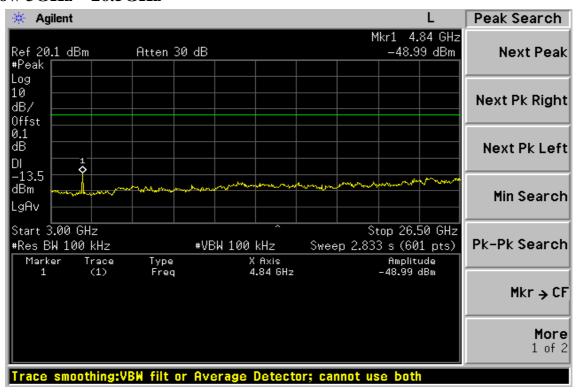
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# Conducted Spurious Emission Measurement Result (802.11b) Ch Low 30MHz – 3GHz



## Ch Low 3GHz - 26.5GHz



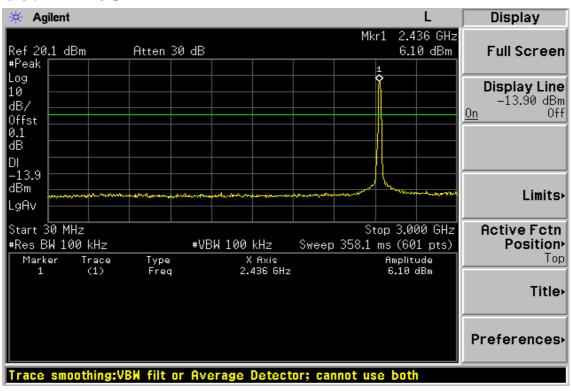
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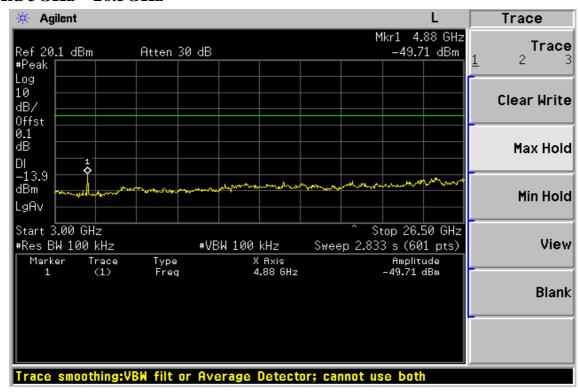
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# Ch Mid 30MHz - 3GHz



# Ch Mid 3GHz - 26.5GHz



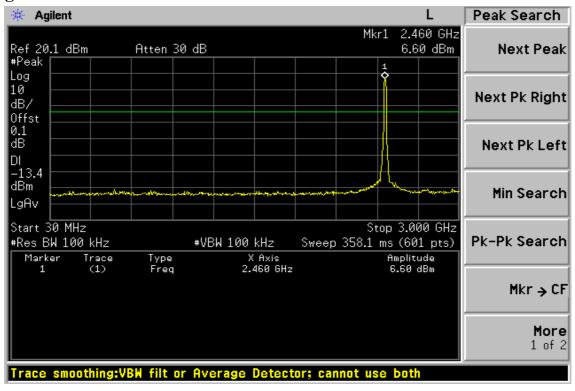
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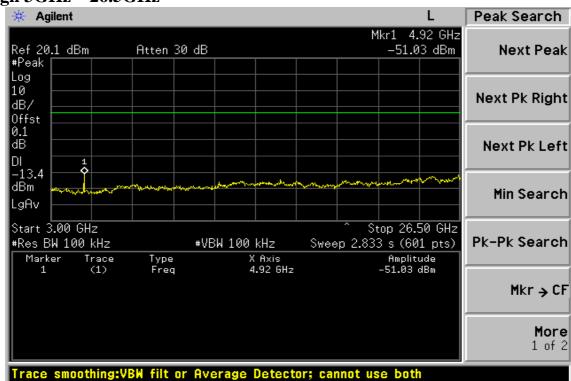
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# Ch High 30MHz – 3GHz



# Ch High 3GHz – 26.5GHz



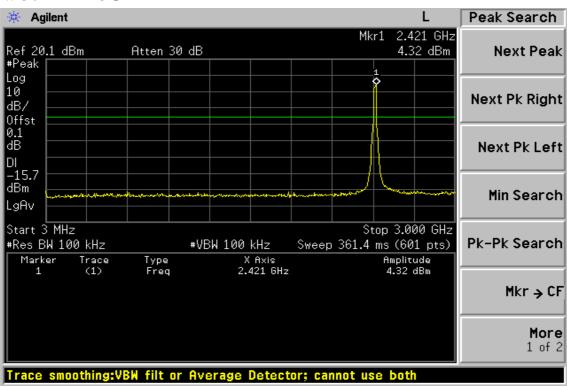
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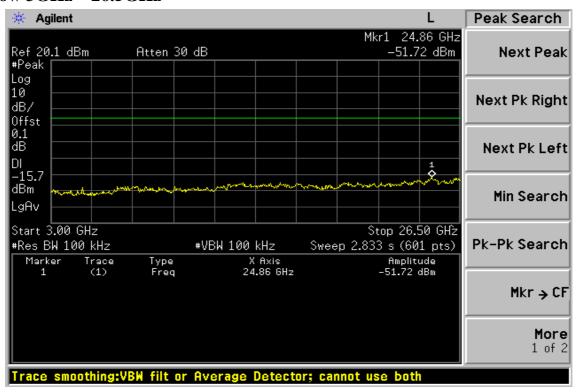
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# Conducted Spurious Emission Measurement Result (802.11g) Ch Low 30MHz – 3GHz



## Ch Low 3GHz - 26.5GHz



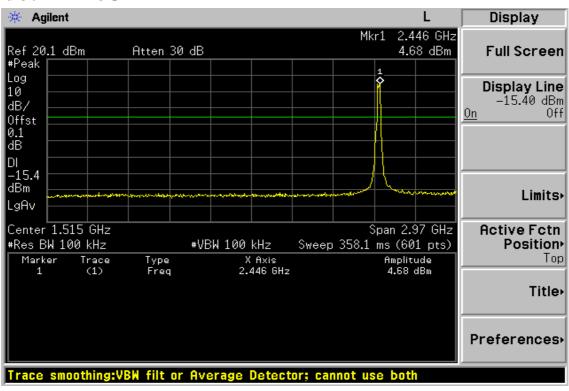
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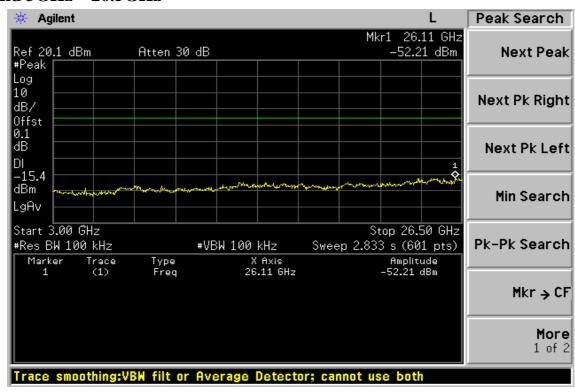
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## Ch Mid 30MHz - 3GHz



# Ch Mid 3GHz - 26.5GHz



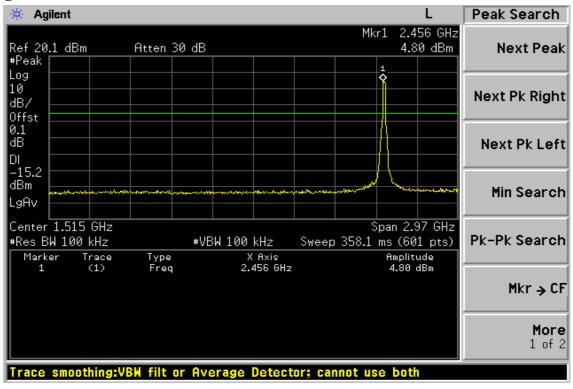
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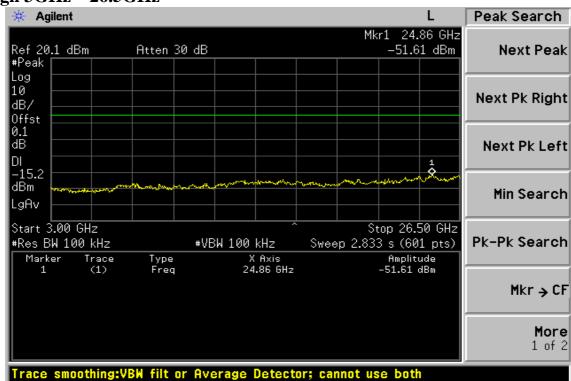
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# Ch High 30MHz – 3GHz



# Ch High 3GHz – 26.5GHz



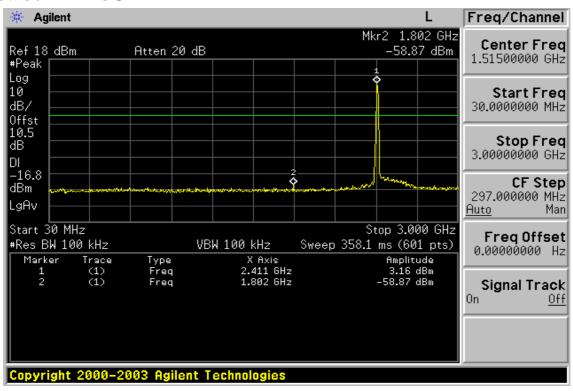
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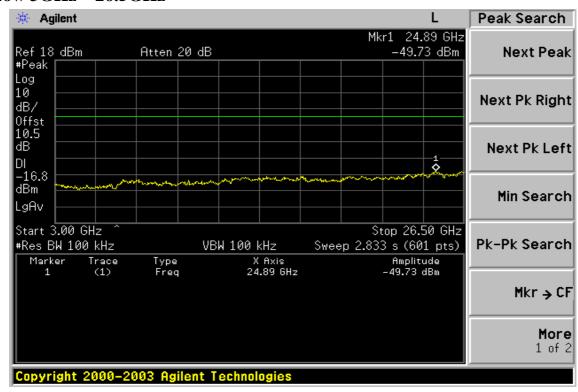
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# Conducted Spurious Emission Measurement Result (Co-Location) (802.11b / BT) Ch Low 30MHz – 3GHz



## Ch Low 3GHz - 26.5GHz



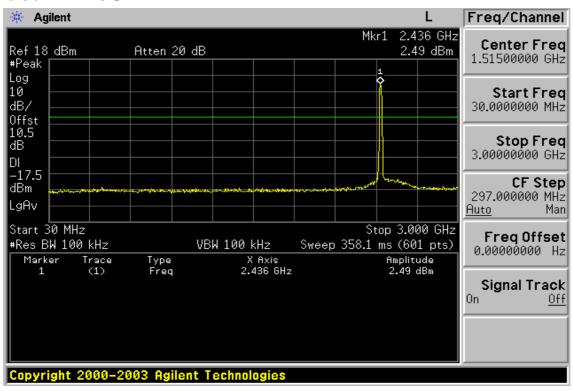
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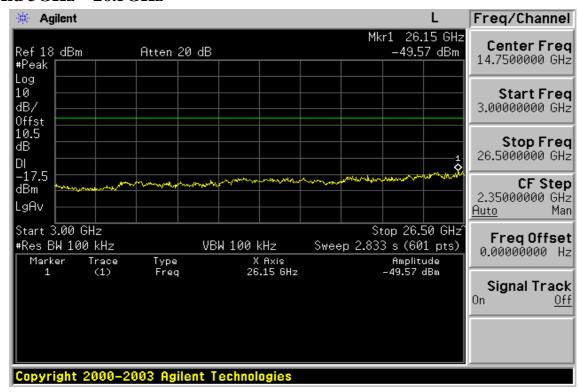
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# Ch Mid 30MHz - 3GHz



## Ch Mid 3GHz - 26.5GHz



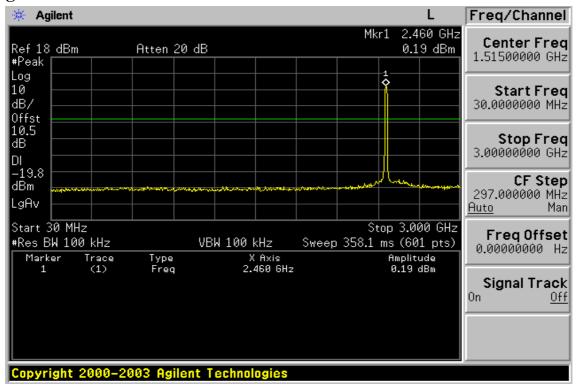
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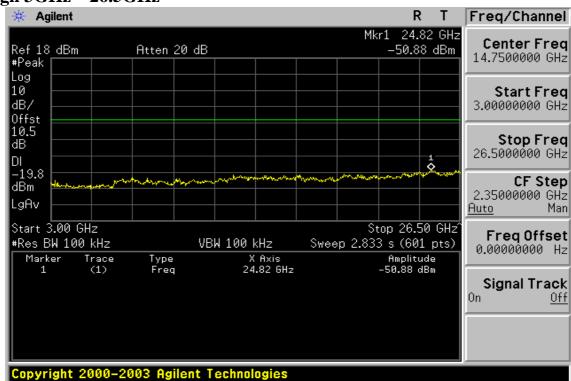
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# Ch High 30MHz – 3GHz



# Ch High 3GHz – 26.5GHz



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# Radiated Spurious Emission Measurement Result (below 1GHz) (802.11b)

Operation Mode 802.11b TX CH Low Test Date Feb. 18, 2008

Fundamental Frequency 2412MHz Test By Bondi Ver./Hor Temperature 25 °C Pol

Humidity 60 %

Freq.	Ant.Pol.	Detector Mode	Reading	Factor	Actual FS	Limit3m	Safe Mar- gin
(MHz)	H/V	(PK/QP)	(dBuV)	(dB)	(dBuV/m)	(dBuV/m)	(dB)
65.89	V	Peak	45.67	-14.66	31.01	40.00	-8.99
104.69	V	Peak	41.41	-16.63	24.78	43.50	-18.72
153.19	V	Peak	33.29	-13.00	20.29	43.50	-23.21
65.89	Н	Peak	44.36	-14.75	29.61	40.00	-10.39
101.78	Н	Peak	37.77	-17.62	20.15	43.50	-23.35
162.89	Н	Peak	32.65	-16.87	15.78	43.50	-27.72

- (1) Measuring frequencies from 30 MHz to the 1GHz<sub>o</sub>
- (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) (802.11b)

Operation Mode 802.11b TX CH Mid **Test Date** Feb. 18, 2008

Fundamental Frequency 2437MHz Test By Bondi Ver./Hor Temperature 25 °C Pol

Humidity 60 %

Freq.	Ant.Pol.	Detector Mode	Reading	Factor	Actual FS	Limit3m	Safe Mar- gin
(MHz)	H/V	(PK/QP)	(dBuV)	(dB)	(dBuV/m)	(dBuV/m)	(dB)
101.78	V	Peak	42.59	-14.66	27.93	43.50	-15.57
155.13	V	Peak	37.83	-17.62	20.21	43.50	-23.29
101.78	Н	Peak	38.55	-14.69	23.86	43.50	-19.64
153.19	Н	Peak	32.35	-17.62	14.73	43.50	-28.77

- (1) Measuring frequencies from 30 MHz to the 1GHz<sub>o</sub>
- (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) (802.11b)

Operation Mode 802.11b TX CH High Test Date Feb. 18, 2008

Fundamental Frequency 2462MHz Test By Bondi Pol Ver./Hor Temperature 25 °C

Humidity 60 %

Freq.	Ant.Pol.	Detector Mode	Reading	Factor	Actual FS	Limit3m	Safe Mar- gin
(MHz)	H/V	(PK/QP)	(dBuV)	(dB)	(dBuV/m)	(dBuV/m)	(dB)
65.89	V	Peak	43.58	-14.66	28.92	40.00	-11.08
101.78	V	Peak	41.93	-17.62	24.31	43.50	-19.19
150.28	V	Peak	40.19	-13.28	26.91	43.50	-16.59
101.78	Н	Peak	38.40	-14.75	23.65	43.50	-19.85
155.13	Н	Peak	32.11	-17.62	14.49	43.50	-29.01

- (1) Measuring frequencies from 30 MHz to the 1GHz<sub>o</sub>
- (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) (802.11g)

Operation Mode 802.11g TX CH Low **Test Date** Feb. 18, 2008

Fundamental Frequency 2412MHz Test By Bondi 25 °C Pol Ver./Hor Temperature

Humidity 60 %

	Freq.	Ant.Pol.	Detector Mode	Reading	Factor	Actual FS	Limit3m	Safe Mar- gin
_	(MHz)	H/V	(PK/QP)	(dBuV)	(dB)	(dBuV/m)	(dBuV/m)	(dB)
	101.78	V	Peak	40.67	-14.63	26.04	43.50	-17.46
	153.19	V	Peak	34.83	-16.63	18.20	43.50	-25.30
	104.69	Н	Peak	38.93	-14.63	24.30	43.50	-19.20
	155.13	Н	Peak	32.49	-16.63	15.86	43.50	-27.64

- (1) Measuring frequencies from 30 MHz to the 1GHz<sub>o</sub>
- (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) (802.11g)

Operation Mode 802.11g TX CH Mid **Test Date** Feb. 18, 2008

Fundamental Frequency 2437MHz Test By Bondi Ver./Hor Temperature 25 °C Pol

Humidity 60 %

	Freq.	Ant.Pol.	Detector Mode	Reading	Factor	Actual FS	Limit3m	Safe Mar- gin
_	(MHz)	H/V	(PK/QP)	(dBuV)	(dB)	(dBuV/m)	(dBuV/m)	(dB)
	101.78	V	Peak	41.47	-14.64	26.83	43.50	-16.67
	153.19	V	Peak	34.04	-16.63	17.41	43.50	-26.09
	106.63	Н	Peak	39.11	-14.67	24.44	43.50	-19.06
	153.19	Н	Peak	32.21	-16.63	15.58	43.50	-27.92

- (1) Measuring frequencies from 30 MHz to the 1GHz<sub>o</sub>
- (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) (802.11g)

Operation Mode 802.11g TX CH High **Test Date** Feb. 18, 2008

Fundamental Frequency 2462MHz Test By Bondi Ver./Hor Temperature 25 °C Pol

Humidity 60 %

Freq.	Ant.Pol.	Detector Mode	Reading	Factor	Actual FS	Limit3m	Safe Mar- gin
(MHz)	H/V	(PK/QP)	(dBuV)	(dB)	(dBuV/m)	(dBuV/m)	(dB)
101.78	V	Peak	40.58	-14.63	25.95	43.50	-17.55
407.33	V	Peak	32.72	-16.63	16.09	46.00	-29.91
221.09	Н	Peak	31.92	-14.66	17.26	46.00	-28.74
609.09	Н	Peak	33.10	-16.63	16.47	46.00	-29.53

- (1) Measuring frequencies from 30 MHz to the 1GHz<sub>o</sub>
- (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) (Co-Location)

Operation Mode 802.11b TX CH Low / BT TX CH Low Test Date Feb. 18, 2008

Fundamental Frequency 2412MHz / 2402MHz Test By Bondi Temperature 25 Pol Ver./Hor

Humidity 60 %

	Freq.	Ant.Pol.	Detector Mode	Reading	Factor	Actual FS	Limit3m	Safe Mar- gin
_	(MHz)	H/V	(PK/QP)	(dBuV)	(dB)	(dBuV/m)	(dBuV/m)	(dB)
	65.89	V	Peak	43.19	-16.87	26.32	40.00	-13.68
	128.94	V	Peak	40.34	-13.12	27.22	43.50	-16.28
	67.83	Н	Peak	43.26	-16.87	26.39	40.00	-13.61
	153.19	Н	Peak	40.12	-12.83	27.29	43.50	-16.21

# Remark:

- (1) Measuring frequencies from 30 MHz to the 1GHz<sub>o</sub>
- (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) (Co-Location)

Operation Mode 802.11b TX CH Mid / BT TX CH Mid Test Date Feb. 18, 2008

Fundamental Frequency 2437MHz / 2441MHz Test By Bondi Pol Ver./Hor Temperature 25

60 % Humidity

F	req.	Ant.Pol.	Detector Mode	Reading	Factor	Actual FS	Limit3m	Safe Mar- gin
(N	(IHz)	H/V	(PK/QP)	(dBuV)	(dB)	(dBuV/m)	(dBuV/m)	(dB)
12	8.94	V	Peak	41.40	-16.87	24.53	43.50	-18.97
45	5.83	V	Peak	43.19	-12.90	30.29	46.00	-15.71
13	0.88	Н	Peak	43.91	-16.87	27.04	43.50	-16.46
49	7.54	Н	Peak	40.32	-12.83	27.49	46.00	-18.51

- (1) Measuring frequencies from 30 MHz to the 1GHz<sub>o</sub>
- (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) (Co-Location)

Operation Mode 802.11b TX CH High / BT TX CH High Test Date Feb. 18, 2008

Fundamental Frequency 2462MHz / 2480MHz Test By Bondi Pol Ver./Hor Temperature 25

60 % Humidity

Freq.	Ant.Pol.	Detector Mode	Reading	Factor	Actual FS	Limit3m	Safe Mar- gin
(MHz)	H/V	(PK/QP)	(dBuV)	(dB)	(dBuV/m)	(dBuV/m)	(dB)
453.89	V	Peak	40.16	-16.87	23.29	46.00	-22.71
128.94	Н	Peak	41.82	-16.87	24.95	43.50	-18.55
337.49	Н	Peak	40.72	-12.83	27.89	46.00	-18.11

- (1) Measuring frequencies from 30 MHz to the 1GHz<sub>o</sub>
- (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) (802.11b)

Operation Mode 802.11b TX CH Low Test Date Feb. 18, 2008

Fundamental Frequency 2412MHz Test By Bondi Temperature 23 °C Pol Ver.

Humidity 54 %

	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)	
4824.0	34.24		6.05	40.29		74.00	54.00	-13.71	Peak
7236.0						74.00	54.00		
9648.0						74.00	54.00		
12060.0						74.00	54.00		
14472.0						74.00	54.00		
16884.0						74.00	54.00		
19296.0						74.00	54.00		
21708.0						74.00	54.00		
24120.0						74.00	54.00		

- (1) Measuring frequencies scanned from 1GHz to the 10th harmonic of highest fundamental frequency<sub>o</sub>
- (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) (802.11b)

Operation Mode 802.11b TX CH Low **Test Date** Feb. 18, 2008

Fundamental Frequency 2412MHz Test By Bondi Pol **Temperature** 23 °C Hor

Humidity 54 %

		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)	
	4824.0	34.56		6.05	40.61		74.00	54.00	-13.39	Peak
	7236.0						74.00	54.00		
	9648.0						74.00	54.00		
	12060.0						74.00	54.00		
	14472.0						74.00	54.00		
	16884.0						74.00	54.00		
	19296.0						74.00	54.00		
	21708.0						74.00	54.00		
	24120.0						74.00	54.00		

- (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) (802.11b)

Operation Mode 802.11b TX CH Mid Test Date Feb. 18, 2008

Fundamental Frequency 2437MHz Test By Bondi Pol Ver **Temperature** 23 °C

Humidity 54 %

	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)	_
4874.0	34.21		6.17	40.38		74.00	54.00	-13.62	Peak
7311.0						74.00	54.00		
9748.0						74.00	54.00		
12185.0						74.00	54.00		
14622.0						74.00	54.00		
17059.0						74.00	54.00		
19496.0						74.00	54.00		
21933.0						74.00	54.00		
24370.0						74.00	54.00		

- (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) (802.11b)

Operation Mode 802.11b TX CH Mid Test Date Feb. 18, 2008

Fundamental Frequency 2437MHz Test By Bondi Pol **Temperature** 23 °C Hor

Humidity 54 %

	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)	
4874.0	34.18		6.17	40.35		74.00	54.00	-13.65	Peak
7311.0						74.00	54.00		
9748.0						74.00	54.00		
12185.0						74.00	54.00		
14622.0						74.00	54.00		
17059.0						74.00	54.00		
19496.0						74.00	54.00		
21933.0						74.00	54.00		
24370.0						74.00	54.00		

- (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) (802.11b)

Operation Mode 802.11b TX CH High Test Date Feb. 18, 2008

Fundamental Frequency 2462MHz Test By Bondi Temperature 23 °C Pol Ver

Humidity 54 %

	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)	
4924.0	33.99		6.28	40.27		74.00	54.00	-13.73	Peak
7386.0						74.00	54.00		
9848.0						74.00	54.00		
12310.0						74.00	54.00		
14772.0						74.00	54.00		
17234.0						74.00	54.00		
19696.0						74.00	54.00		
22158.0						74.00	54.00		
24620.0						74.00	54.00		

- (1) Measuring frequencies scanned from 1GHz to the 10th harmonic of highest fundamental frequency<sub>o</sub>
- (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) (802.11b)

Operation Mode 802.11b TX CH High Test Date Feb. 18, 2008

Fundamental Frequency 2462MHz Test By Bondi Temperature 23 °C Pol Hor

Humidity 54 %

	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)	
4924.0	34.18		6.28	40.46		74.00	54.00	-13.54	Peak
7386.0						74.00	54.00		
9848.0						74.00	54.00		
12310.0						74.00	54.00		
14772.0						74.00	54.00		
17234.0						74.00	54.00		
19696.0						74.00	54.00		
22158.0						74.00	54.00		
24620.0						74.00	54.00		

- (1) Measuring frequencies scanned from 1GHz to the 10th harmonic of highest fundamental frequency<sub>o</sub>
- (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 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) (802.11g)

Operation Mode 802.11g TX CH Low Test Date Feb. 18, 2008

Fundamental Frequency 2412MHz Test By Bondi Temperature 23 Pol Ver.

Humidity 54 %

	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)	_
4824.0	34.02		6.05	40.07		74.00	54.00	-13.93	Peak
7236.0						74.00	54.00		
9648.0						74.00	54.00		
12060.0						74.00	54.00		
14472.0						74.00	54.00		
16884.0						74.00	54.00		
19296.0						74.00	54.00		
21708.0						74.00	54.00		
24120.0						74.00	54.00		

- (1) Measuring frequencies scanned from 1GHz to the 10th harmonic of highest fundamental frequency<sub>o</sub>
- (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<sub>o</sub>
- (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) (802.11g)

Operation Mode 802.11g TX CH Low **Test Date** Feb. 18, 2008

Fundamental Frequency 2412MHz Test By Bondi Pol Hor Temperature 23

54 % 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)	
4824.0	34.13		6.05	40.18		74.00	54.00	-13.82	Peak
7236.0						74.00	54.00		
9648.0						74.00	54.00		
12060.0						74.00	54.00		
14472.0						74.00	54.00		
16884.0						74.00	54.00		
19296.0						74.00	54.00		
21708.0						74.00	54.00		
24120.0						74.00	54.00		

- (1) Measuring frequencies scanned from 1GHz to the 10th harmonic of highest fundamental frequency<sub>o</sub>
- (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<sub>o</sub>
- (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) (802.11g)

Operation Mode 802.11g TX CH Mid Test Date Feb. 18, 2008

Fundamental Frequency 2437MHz Test By Bondi Temperature 23 Pol Ver

Humidity 54 %

	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)	
4874.0	33.98		6.17	40.15		74.00	54.00	-13.85	Peak
7311.0						74.00	54.00		
9748.0						74.00	54.00		
12185.0						74.00	54.00		
14622.0						74.00	54.00		
17059.0						74.00	54.00		
19496.0						74.00	54.00		
21933.0						74.00	54.00		
24370.0						74.00	54.00		

- (1) Measuring frequencies scanned from 1GHz to the 10th harmonic of highest fundamental frequency<sub>o</sub>
- (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<sub>o</sub>
- (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) (802.11g)

Operation Mode 802.11g TX CH Mid Test Date Feb. 18, 2008

Fundamental Frequency 2437MHz Test By Bondi Temperature 23 Pol Hor

Humidity 54 %

	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)	_
4874.0	34.23		6.17	40.40		74.00	54.00	-13.60	Peak
7311.0						74.00	54.00		
9748.0						74.00	54.00		
12185.0						74.00	54.00		
14622.0						74.00	54.00		
17059.0						74.00	54.00		
19496.0						74.00	54.00		
21933.0						74.00	54.00		
24370.0						74.00	54.00		

- (1) Measuring frequencies scanned from 1GHz to the 10th harmonic of highest fundamental frequency<sub>o</sub>
- (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<sub>o</sub>
- (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) (802.11g)

Operation Mode 802.11g TX CH High **Test Date** Feb. 18, 2008

Fundamental Frequency 2462MHz Test By Bondi Ver Pol Temperature 23

54 % 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)	
4924.0	33.98		6.17	40.15		74.00	54.00	-13.85	Peak
7386.0						74.00	54.00		
9848.0						74.00	54.00		
12310.0						74.00	54.00		
14772.0						74.00	54.00		
17234.0						74.00	54.00		
19696.0						74.00	54.00		
22158.0						74.00	54.00		
24620.0						74.00	54.00		

- (1) Measuring frequencies scanned from 1GHz to the 10th harmonic of highest fundamental fre-
- (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<sub>o</sub>
- (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) (802.11g)

Operation Mode 802.11g TX CH High **Test Date** Feb. 18, 2008

Fundamental Frequency 2462MHz Test By Bondi Pol Hor Temperature 23

54 % 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)	
4924.0	34.13		6.17	40.30		74.00	54.00	-13.70	Peak
7386.0						74.00	54.00		
9848.0						74.00	54.00		
12310.0						74.00	54.00		
14772.0						74.00	54.00		
17234.0						74.00	54.00		
19696.0						74.00	54.00		
22158.0						74.00	54.00		
24620.0						74.00	54.00		

- (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<sub>o</sub>
- (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) (Co-Location)

Operation Mode 802.11b TX CH Low / BT TX CH Low Test Date Feb. 18, 2008

Fundamental Frequency 2412MHz / 2402MHz Test By Bondi Pol Ver Temperature 23

Humidity 54 %

	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	35.33		-5.26	30.07		74.00	54.00	-23.93	Peak
4824.0						74.00	54.00		
7236.0						74.00	54.00		
9648.0						74.00	54.00		
12060.0						74.00	54.00		
14472.0						74.00	54.00		
16884.0						74.00	54.00		
19296.0						74.00	54.00		
21708.0						74.00	54.00		
24120.0						74.00	54.00		

- (1) Measuring frequencies scanned from 1GHz to the 10th harmonic of highest fundamental frequency<sub>o</sub>
- (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<sub>o</sub>
- (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) (Co-Location)

Operation Mode 802.11b TX CH Low / BT TX CH Low Test Date Feb. 18, 2008

Fundamental Frequency 2412MHz / 2402MHz Test By Bondi Pol Hor Temperature 23

Humidity 54 %

	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	35.64		-5.26	30.38		74.00	54.00	-23.62	Peak
4824.0						74.00	54.00		
7236.0						74.00	54.00		
9648.0						74.00	54.00		
12060.0						74.00	54.00		
14472.0						74.00	54.00		
16884.0						74.00	54.00		
19296.0						74.00	54.00		
21708.0						74.00	54.00		
24120.0						74.00	54.00		

- (1) Measuring frequencies scanned from 1GHz to the 10th harmonic of highest fundamental frequency<sub>o</sub>
- (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<sub>o</sub>
- (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) (Co-Location)

Operation Mode 802.11b TX CH Mid / BT TX CH Mid Test Date Feb. 18, 2008

Fundamental Frequency 2437MHz / 2441MHz Test By Bondi Pol Ver Temperature 23

Humidity 54 %

	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)	
1663.0	37.72		-5.11	32.61		74.00	54.00	-21.39	Peak
4874.0						74.00	54.00		
7311.0						74.00	54.00		
9748.0						74.00	54.00		
12185.0						74.00	54.00		
14622.0						74.00	54.00		
17059.0						74.00	54.00		
19496.0						74.00	54.00		
21933.0						74.00	54.00		
24370.0						74.00	54.00		

- (1) Measuring frequencies scanned from 1GHz to the 10th harmonic of highest fundamental frequency<sub>o</sub>
- (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<sub>o</sub>
- (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) (Co-Location)

Operation Mode 802.11b TX CH Mid / BT TX CH Mid Test Date Feb. 18, 2008

Fundamental Frequency 2437MHz / 2441MHz Test By Bondi Pol Hor Temperature 23

Humidity 54 %

	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)	
1760.5	35.79		-4.61	31.18		74.00	54.00	-22.82	Peak
4874.0						74.00	54.00		
7311.0						74.00	54.00		
9748.0						74.00	54.00		
12185.0						74.00	54.00		
14622.0						74.00	54.00		
17059.0						74.00	54.00		
19496.0						74.00	54.00		
21933.0						74.00	54.00		
24370.0						74.00	54.00		

- (1) Measuring frequencies scanned from 1GHz to the 10th harmonic of highest fundamental frequency<sub>o</sub>
- (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<sub>o</sub>
- (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) (Co-Location)

Operation Mode 802.11b TX CH High / BT TX CH High Test Date Feb. 18, 2008

Fundamental Frequency 2462MHz / 2480MHz Test By Bondi Pol Ver Temperature 23

54 % 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	35.73		-5.48	30.25		74.00	54.00	-23.75	Peak
4924.0						74.00	54.00		
7386.0						74.00	54.00		
9848.0						74.00	54.00		
12310.0						74.00	54.00		
14772.0						74.00	54.00		
17234.0						74.00	54.00		
19696.0						74.00	54.00		
22158.0						74.00	54.00		
24620.0						74.00	54.00		

- (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<sub>o</sub>
- (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) (Co-Location)

Operation Mode 802.11b TX CH High / BT TX CH High Test Date Feb. 18, 2008

Fundamental Frequency 2462MHz / 2480MHz Test By Bondi Pol Hor Temperature 23

Humidity 54 %

	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	37.01		-5.48	31.53		74.00	54.00	-22.47	Peak
4924.0						74.00	54.00		
7386.0						74.00	54.00		
9848.0						74.00	54.00		
12310.0						74.00	54.00		
14772.0						74.00	54.00		
17234.0						74.00	54.00		
19696.0						74.00	54.00		
22158.0						74.00	54.00		
24620.0						74.00	54.00		

- (1) Measuring frequencies scanned from 1GHz to the 10th harmonic of highest fundamental frequency<sub>o</sub>
- (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<sub>o</sub>
- (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.

### 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 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.

## 10.3. Measurement Equipment Used:

Conducted Emission Test Site									
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.				
	Agilent				0.4/2=/2000				
Spectrum Analyzer	Agnent	E4446A	MY43360126	04/27/2007	04/27/2008				
Spectrum Analyzer	Agilent	E7405A	US41160416	07/04/2007	07/03/2008				
Spectrum Analyzer	R&S	FSP 40	100034	11/09/2007	11/10/2008				
Low Loss Cable	HUBER+SUHNER	SUCOFLEX 104PEA	N/A	N/A	N/A				
Attenuator	Mini-Circuit	BW-S6W5	N/A	01/05/2008	01/04/2009				



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### 10.4. Measurement Result

### 802.11b

СН	RF Power Density	Cable loss	RF Power Density	Maximum Limit
	Reading (dBm)	(dB)	Level (dBm)	(dBm)
Low	-9.52	0.00	-9.52	8
Mid	-9.82	0.00	-9.82	8
High	-10.56	0.00	-10.56	8

802.11g

<u> </u>				
СН	RF Power Density	Cable loss	RF Power Density	Maximum Limit
	Reading (dBm)	(dB)	Level (dBm)	(dBm)
Low	-17.75	0.00	-17.75	8
Mid	-18.15	0.00	-18.15	8
High	-18.21	0.00	-18.21	8

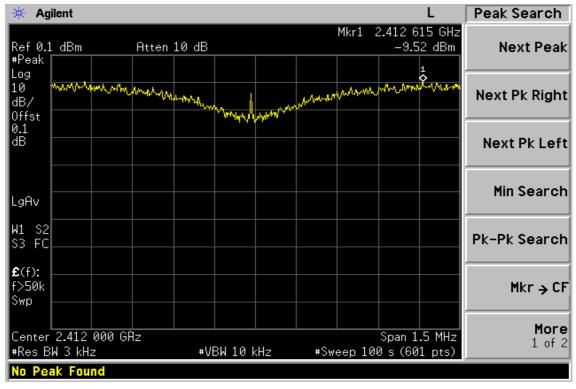
Note: offset 0.1 dB



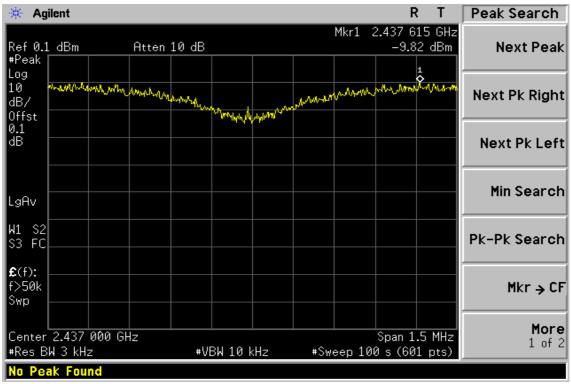
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802.11b Power Spectral Density Test Plot (CH-Low)



# **Power Spectral Density Test Plot (CH-Mid)**



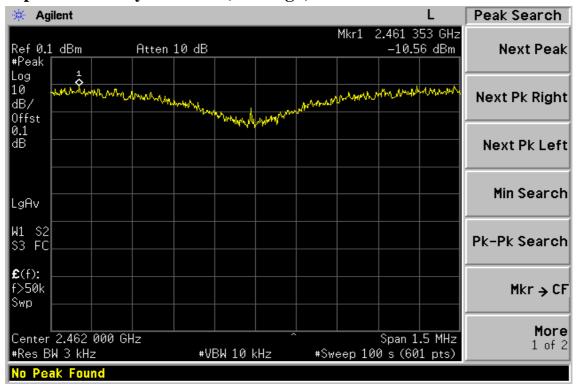
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# **Power Spectral Density Test Plot (CH-High)**



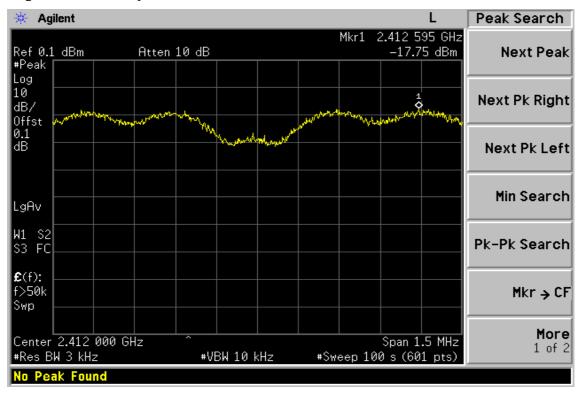
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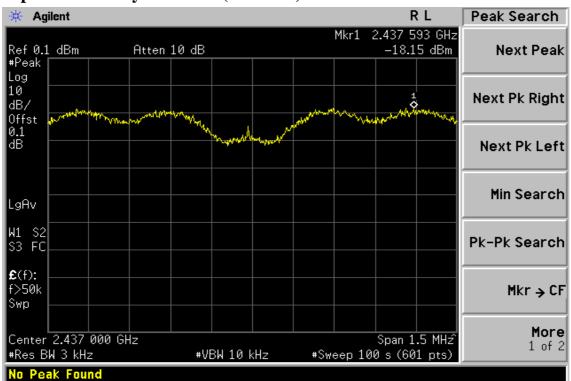
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802.11g Power Spectral Density Test Plot (CH-Low)



# **Power Spectral Density Test Plot (CH-Mid)**



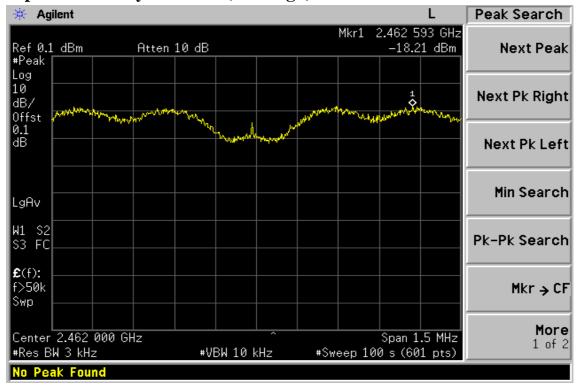
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# **Power Spectral Density Test Plot (CH-High)**



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# 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.

### 11.2. Antenna Connected Construction

The directional gains of antenna used for transmitting is 1.5 dBi, and the antenna connector is designed with permanent attachment and no consideration of replacement. Please see EUT photo for details.