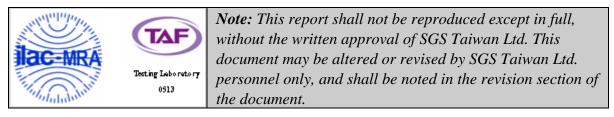


Report No.: EH/2010/50056 Issue Date: Nov. 23, 2010 Page: 1 of 99

# ELECTROMAGNETIC EMISSIONS COMPLIANCE REPORT

# INTENTIONAL RADIATOR CERTIFICATION TO FCC PART 15 SUBPART C REQUIREMENT **AND INDUSTRY CANADA RSS 210 Class II Permissive Change**

OF		
Product Name:	POS terminal	
Brand Name:	ingenico	
Model Name:	iPA280, IPA280-MWLS1019C, IPA280-MWLS1310A	
Model Different:	Different models for different market.	
FCC ID:	XKBIPA280	
IC:	2586D-IPA280	
Report No.:	EH/2010/50056	
Issue Date:	Nov. 23, 2010	
FCC Rule Part:	§15.247	
IC Rule Part:	RSS-210 issue 7:2007, Annex 8	
Prepared for:	INGENICO	
	1 rue Claude Chappe BP346. 07503 Guilher- and-Granges – France	
Prepared by:	SGS Taiwan Ltd.	
	Electronics & Communication Laboratory	
	No. 134, Wu Kung Rd., Wuku Industrial Zone,	
	Taipei County, Taiwan.	



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Report No.: EH/2010/50056 Issue Date: Nov. 23, 2010 Page: 2 of 99

## VERIFICATION OF COMPLIANCE

Applicant:	INGENICO
	1 rue Claude Chappe BP346. 07503 Guilherand-Granges – France
Product Name:	POS terminal
Brand Name:	ingenico
FCC ID:	XKBIPA280
IC:	2586D-IPA280
Model No.:	iPA280, IPA280-MWLS1019C, IPA280-MWLS1310A
Model Difference:	Different models for different market.
File Number:	EH/2010/50056
Date of test:	Nov. 25, 2009 ~ Nov. 03, 2010
Date of EUT Received:	Mar. 27, 2009

## We hereby certify that:

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

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

Test By:	Jazz Huang	Date	Nov. 23, 2010
_	Jazz Huang / Engineer		
Prepared By:	Gigi yeh	Date	Nov. 23, 2010
-	Gigi Yeh / Clerk		
Approved By:	ALNO HSieh	Date	Nov. 23, 2010

Arno Hsieh / Asst. Supervisor

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Report No.: EH/2010/50056 Issue Date: Nov. 23, 2010 Page: 3 of 99

# Version

Version No.	Date	Description
00	Nov. 23, 2010	Initial creation of document

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#### 1 **GENERAL INFORMATION**

#### **Product Description** 1.1

#### General:

Product Name:	POS terminal	
Brand Name:	ingenico	
Model Name:	iPA280, IPA2	80-MWLS1019C, IPA280-MWLS1310A
Model Difference:	Different models for different market.	
	1. Adding new power Connector for charging by new cradle or car	
Class II Permissive change:	kit.	
	2. DC Jack for charging by PSU	
	3.6 Vdc re-chargeable battery or 5Vdc by AC/DC power adapter	
Power Supply	Battery:	Model: IPA200-BAT, Supplier: ingenico
	Adapter:	Model: T010WM0512

### GSM / DCS:

	Operation Band	Frequency Range	Rated Power
	GSM/GPRS/ EDGE 900, class10	824.2 MHz– 848.8 MHz	33 dBm
Cellular Phone Standards Frequency Range and Power	DCS/ GPRS/ EDGE 1800, class10	880.2MHz – 914.8MHz	33 dBm
	GSM/ GPRS/ EDGE 850, class10	1710.2MHz – 1784.8MHz	30 dBm
	DCS/ GPRS/ EDGE 1900, class10	1850.2MHz – 1909.8MHz	30 dBm
Type of Emission	300KGXW		
Hardware Version	DVT		
Software Version	OS v.51		
IMEI	354060011335375		

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### WLAN:

Frequency Range:	2412 – 2462 MHz
Channel number:	11 channels
Max. Output Power:	802.11 b: 15.35 dBm (Peak) 802.11 g: 14.83 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 / -0.51dBi.

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

### Bluetooth:

Bluetooth Version	□       V1.1 (GFSK)         □       V1.2 (GFSK)         □       V2.0 (GFSK)         □       V2.0 + EDR (GFSK + /4DQPSK + 8DPSK)         ○       V2.1 + EDR (GFSK + /4DQPSK + 8DPSK)
Frequency Range	2402 – 2480MHz
Channel number	79 channels max.
Rated Power	1.74 dBm (Peak)
Modulation type	Frequency Hopping Spread Spectrum
Antenna Designation	PIFA Antenna / -0.42dBi.

The EUT is compliance with Bluetooth 2.1 Standard.

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#### **RFID**:

Operating Frequency	13.56MHz
Transmit Power	< 123dBuV/m at 3m.
Number of Channels	1
Operating Mode	Point-to-Point
Antenna Type	Print antenna
Module Type	ASK

GPS:

Receiver Frequency	L1 Band, 1575.42MHz
Frequency Conversion oscil- lator	26MHz
Antenna Designation	mono pole

This test report applies for 802.11b/g WLAN.

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

This submittal(s) (test report) is intended for FCC ID: <u>XKBIPA280</u> filing to comply with Section 15.247 of the FCC Part 15, Subpart C Rules and IC: <u>2586D-IPA280</u> filing to comply with Industry Canada RSS-210 issue 7: 2007 Annex 8. The composite system (digital device) is compliance with Subpart B is authorized under a DoC procedure.

## **1.3 Test Methodology**

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

## 1.4 Test Facility

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

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

## **1.5** Special Accessories

Not available for this EUT intended for grant.

## **1.6 Equipment Modifications**

Not available for this EUT intended for grant.

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#### 2 SYSTEM TEST CONFIGURATION

#### 2.1 **EUT Configuration**

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

#### 2.2 **EUT Exercise**

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

#### 2.3 **Test Procedure**

## **2.3.1 Conducted Emissions**

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

## 2.3.2 Radiated Emissions

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

Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 90 days only.

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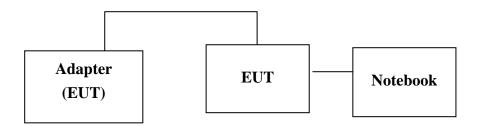
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Taiwan Ltd.



#### **Configuration of Tested System** 2.4

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



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

Item	Equipment	Mfr/Brand	Model/ Type No.	Series No.	Data Cable	Power Cord
1.	WiFi Software	N/A	WLAN eMapi	N/A	N/A	N/A
2.	AC Adaptor	LEI	1U18-2050200-WP	N/A	N/A	180cm, Un-shielded
З.	Notebook	IBM	T40	N/A	Shielded	Un-shielded

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#### SUMMARY OF TEST RESULTS 3

FCC Rules	Description Of Test	Result
§15.207(a)/	AC Power Line Conducted Emis-	Compliant
RSS-Gen §7.2.2	sion	
§15.247(b)/	Peak Output Power	Compliant
§A8.4(2)		
§15.247(b)/	6dB Bandwidth	Compliant
§A8.2		
§15.247(c)/	100 KHz Bandwidth Of	Compliant
§A8.5	Frequency Band Edges	
§15.247(c)/	Spurious Emission	Compliant
§A8.5		
§15.247/,§A8.3(2)	Peak Power Density	Compliant
§15.203/	Antenna Requirement	Compliant
RSS-GEN 7.1.4,		
RSS-210 issue 7,§A8.4		
RSS-Gen §4.4.1	99% Power Bandwidth	Compliant
MPE	Maximum Permissible Exposure	Compliant

#### **DESCRIPTION OF TEST MODES** 4

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.

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) v mid (2437MHz) and high (2462MHz) with 6Mbps data rate are chosen for full testing.

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## **5** CONDUCTED EMISSION TEST

## 5.1. Standard Applicable:

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

<b>F</b>	Limits dB(uV)				
Frequency range	dB	(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					

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.

	AC Power Line Conducted Emission Test Site									
EQUIPMENT MFR MODEL SERIAL LAST CAL										
TYPE		NUMBER	NUMBER	CAL.						
EMI Test Receiver	R&S	ESCS30	828985/004	09/15/20010	09/14/2011					
LISN	Rolf-Heine	NNB-2/16Z	99012	02/02/2010	02/01/2011					
LISN	FCC	FCC-LISN-50/250-25-2-01	04034	02/02/2010	02/01/2011					
Coaxial Cables	N/A	WK CE Cable	N/A	11/28/2009	11/27/2010					

## 5.2. Measurement Equipment Used:

## 5.3. EUT Setup:

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

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## 5.4. Measurement Procedure:

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

## 5.5. Measurement Result:

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

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

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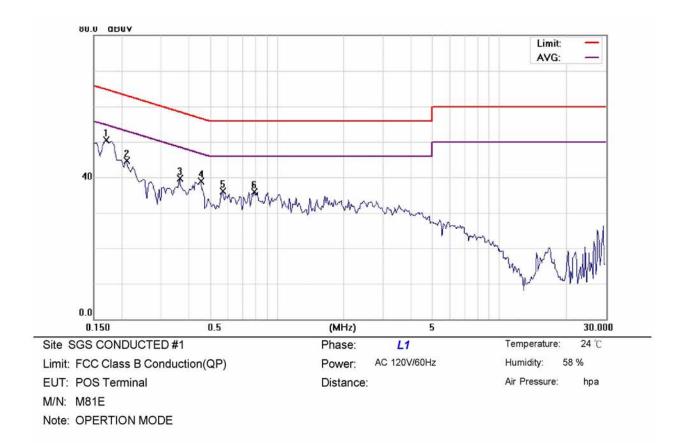
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## AC POWER LINE CONDUCTED EMISSION TEST DATA

Operation Mode:	Operation Link			Test Date:	Nov. 02, 2010
Temperature:	24 °C	Humidity:	58 %	Test By:	Jazz



No. Mk.	Freq.	Reading Level	Factor	Measure- ment	Limit	Over		
	MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1 *	0.1700	50.30	0.13	50.43	64.96	-14.53	peak	
2	0.2100	44.63	0.12	44.75	63.21	-18.46	peak	
3	0.3650	39.49	0.12	39.61	58.61	-19.00	peak	
4	0.4550	38.82	0.12	38.94	56.78	-17.84	peak	
5	0.5700	35.92	0.12	36.04	56.00	-19.96	peak	
6	0.7900	35.84	0.12	35.96	56.00	-20.04	peak	
5953	4520000000000	112-51536379613	1997 C 1997 C 23	Construction of the Constr	90 - 103 E 20 F 2	0.0000000000000000000000000000000000000	<b>1.</b> 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1.	

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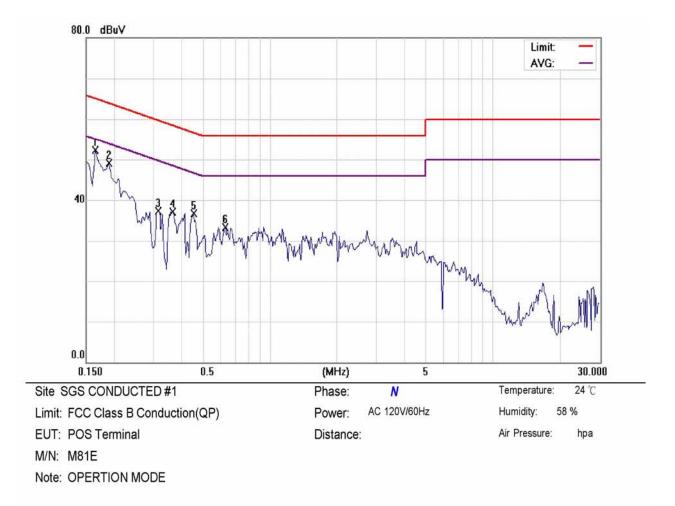
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No.	Mk.	Freq.	Reading Level	Factor	Measure- ment	Limit	Over			
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment	
1	*	0.1650	52.10	0.14	52.24	65.21	-12.97	peak		
2		0.1900	48.92	0.13	49.05	64.04	-14.99	peak		
3		0.3150	37.09	0.12	37.21	59.84	-22.63	peak		
4		0.3650	37.06	0.12	37.18	58.61	-21.43	peak		
5		0.4550	36.67	0.12	36.79	56.78	-19.99	peak		
6		0.6300	33.27	0.12	33.39	56.00	-22.61	peak		

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## **6 PEAK OUTPUT POWER MEASUREMENT**

## 6.1 Standard Applicable:

According to §15.247(a)(2), (b)

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

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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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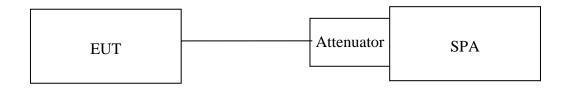


According to RSS-210 issue 7,§A8.4(2), For frequency hopping systems operating in the 2400-2483.5 MHz band employing at least 75 hopping channels, the maximum conducted output power shall not exceed 1 W. For all other frequency hopping systems, the maximum peak conducted output power shall not exceed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

## 6.2 Measurement Equipment Used:

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

## 6.3 .Test Set-up:



## 6.4 Measurement Procedure:

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

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## 6.5 Measurement Result:

## 802.11b

			Peak	Power	Outpu	t
СН	Frequency		Required			
Сп	(MHz)	1	2	5.5	11	Limit
1	2412	15.24	15.1	14.55	14.35	30 dBm
6	2437	15.01	14.98	14.45	14.1	30 dBm
11	2462	15.55	15.25	14.65	14.6	30 dBm

## 802.11g

		Peak Power Output								
СН	Frequency				Data	Rate				Required
Сп	(MHz)	6	9	12	18	24	36	48	54	Limit
1	2412	14.83	14.73	13.87	13.85	12.89	12.85	11.78	11.75	30 dBm
6	2437	14.06	14.53	13.59	13.55	12.75	12.7	11.69	11.56	30 dBm
11	2462	14.60	13.98	13.09	13.02	12.2	12.05	11.29	11.19	30 dBm

Cable loss = 0

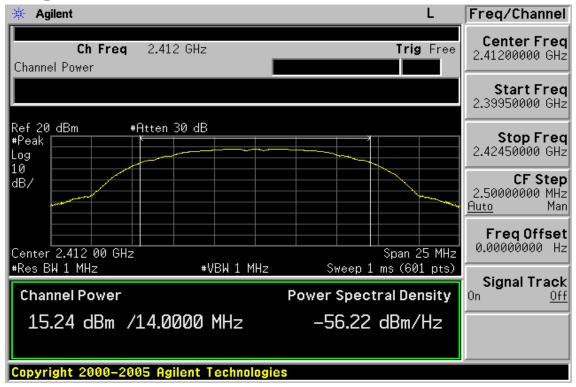
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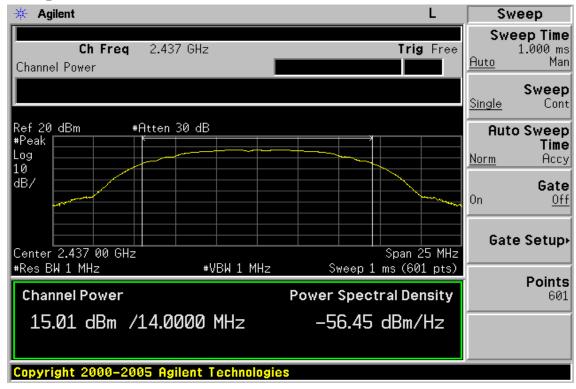


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## 802.11b, 1Mbps **Power Output Plot (CH Low)**



## **Power Output Plot (CH Mid)**



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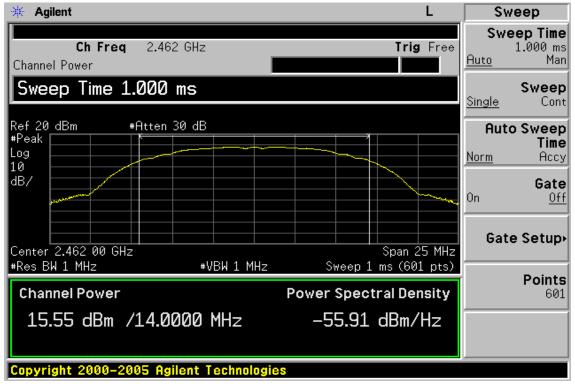
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## Power Output Plot (CH High)

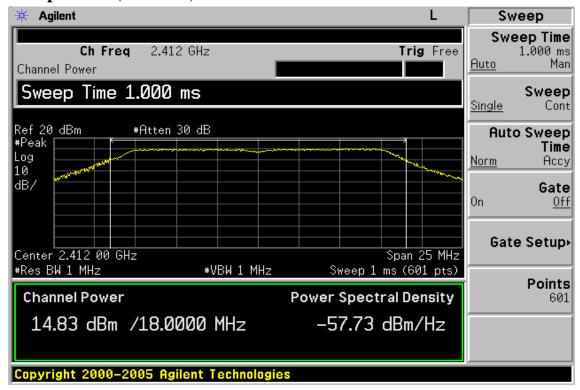


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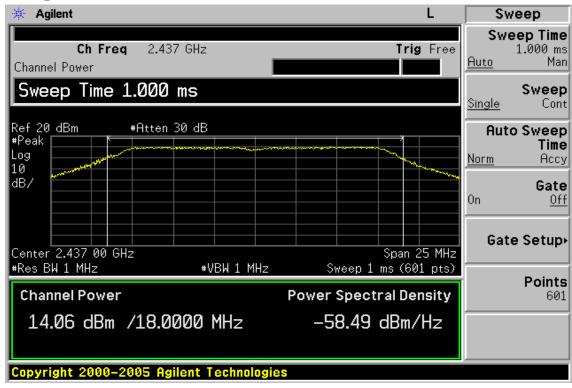


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## 802.11g, 6Mbps **Power Output Plot (CH Low)**



## **Power Output Plot (CH Mid)**



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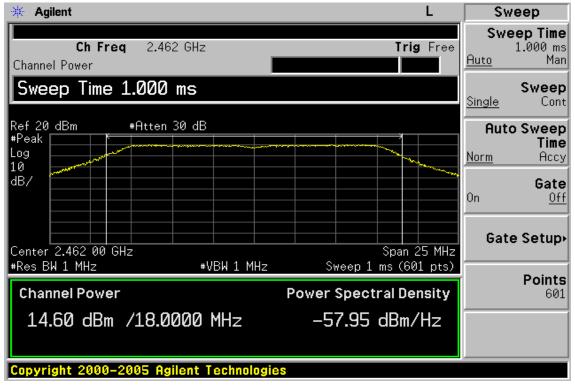
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## Power Output Plot (CH High)



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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.

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

## 7.2 Measurement Equipment Used:

Refer to section 6.2 for details.

## 7.3 Test Set-up:

Refer to section 6.3 for details.

## 7.4 Measurement Procedure:

- 1.Place the EUT on the table and set it in transmitting mode.
- 2.Remove the antenna from the EUT and then connect a low loss RF cable from the 3.antenna port to the spectrum analyzer.
- 3.Set the spectrum analyzer as RBW=100KHz, VBW = 3\*RBW, Span= 30M/50MHz, Sweep=auto
- 4. Mark the peak frequency and –6dB (upper and lower) frequency.
- 5. Repeat above procedures until all frequency measured were complete.

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# 7.5 Measurement Result:

802.11b		1	
СН	Bandwidth	Bandwidth	Result
	(MHz)	(KHz)	
Lower	12.589	> 500	PASS
Mid	12.584	> 500	PASS
Higher	12.626	> 500	PASS

\*Offset 1dB

## 802.11g

СН	Bandwidth (MHz)	Bandwidth (KHz)	Result
Lower	16.453	> 500	PASS
Mid	16.425	> 500	PASS
Higher	16.460	> 500	PASS

\*Offset 1dB

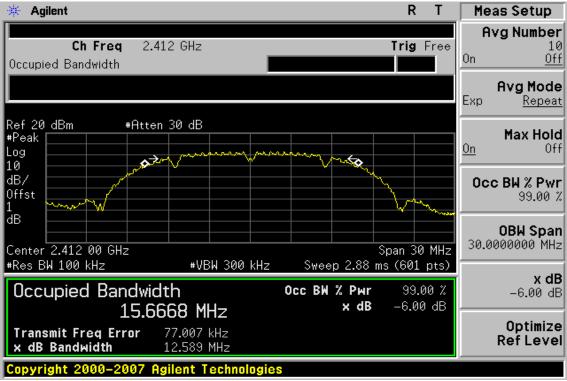
Note: Refer to next page for plots.

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# 802.11b 6dB Band Width Test Data CH-Low



## 6dB Band Width Test Data CH-Mid



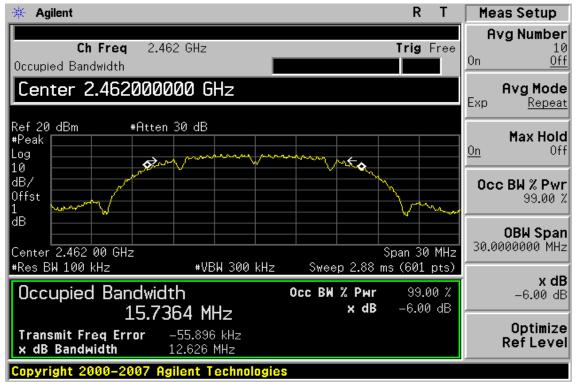
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## 6dB Band Width Test Data CH-High



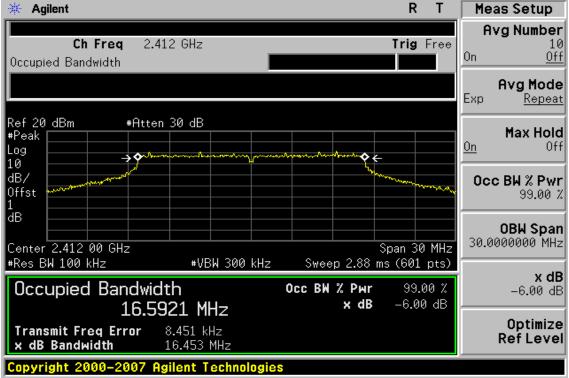
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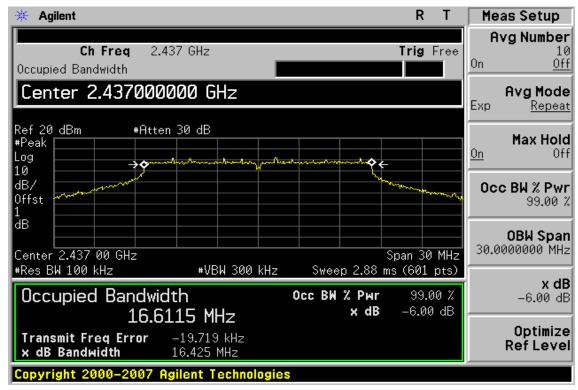


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# 802.11g 6dB Band Width Test Data CH-Low



## 6dB Band Width Test Data CH-Mid



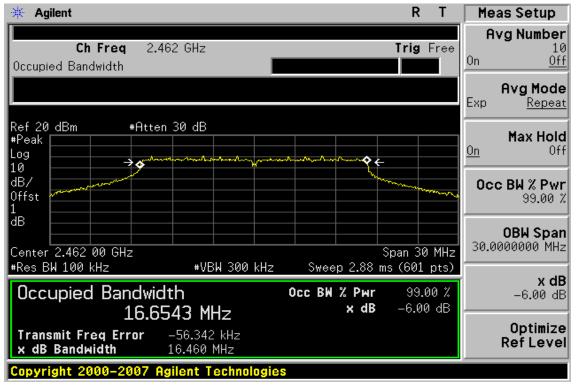
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## 6dB Band Width Test Data CH-High



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#### 8 **100KHz BANDWIDTH OF BAND EDGES MEASUREMENT**

## 8.1 Standard Applicable:

According to §15.247(c), in any 100 KHz bandwidth outside the frequency bands in which the spread spectrum intentional radiator in operating, the radio frequency power that is produced by the intentional radiator shall be at least 20dB below that in the 100KHz bandwidth within the band that contains the highest level of the desired power, In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in15.209(a).

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

## **8.2 Measurement Equipment Used:**

## 8.2.1. Conducted Emission at antenna port:

Refer to section 6.2 for details.

### 8.2.2. Radiated emission:

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

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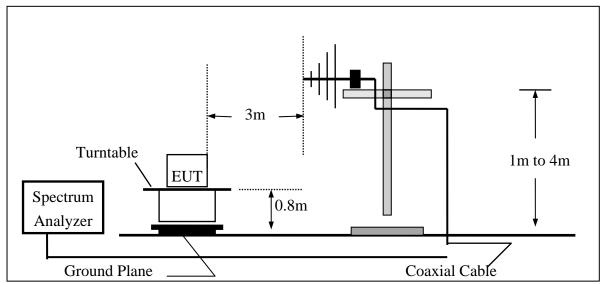
## 8.3 Test SET-UP:

## 8.3.1 Conducted Emission at antenna port:

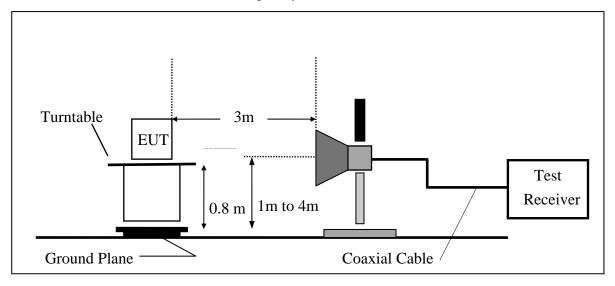
Refer to section 6.3 for details.

## 8.3.2 Radiated emission:

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



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



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## **8.4 Measurement Procedure:**

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

## 8.5 Field Strength Calculation:

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

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

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

## 8.6 Measurement Result:

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

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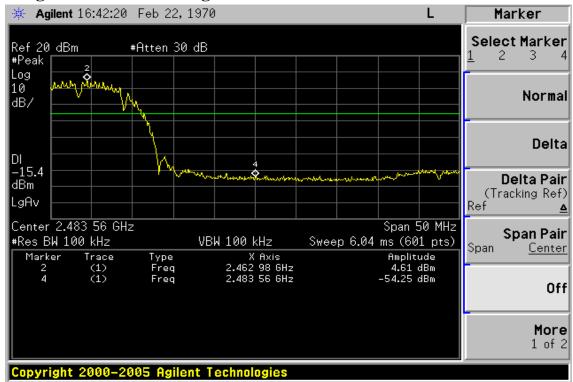


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## 802.11b **Band Edges Test Data CH-Low**



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



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### Radiated Emission: 802.11 b mode

Operation Mode	TX CH Low	Test Date	Nov. 26, 2009
Fundamental Frequency	2412 MHz	Test By	Jazz
Tmperature	25 °C	Pol	Ver.
Humidity	65 %		

	Peak	AV		Actu	al FS	Peak	AV		
Freq.	<b>Read ing</b>	Reading	Ant./CL	Peak	AV	Limit	Limit	Margin	Remark
(MHz)	(dBuV)	(dBuV)	CF(dB)	(dBuV/m)	(dBuV/m)	(dBuV/m)	(dBuV/n	n) ( <b>dB</b> )	
2390.00	34.17		-1.39	32.78		74.00	54.00	-21.22	Peak
							_		
Operation 1	Mode	TX C	'H Low			Test	t Date	Nov. 26, 2	009
Fundament	al Frequer	ncy 2412	MHz			Test	By	Jazz	
Temperatu	re	25				Pol	•	Hor.	
Humidity		65 %							
	Deels	A <b>T</b> 7		<b>A</b> = <b>4</b> -		Deele	A <b>X</b> 7		
	Peak	AV		Acti	al FS	Peak	AV		
Freq.	<b>Read ing</b>	Reading	Ant./CL	Peak	AV	Limit	Limit	Margin	Remark
(MHz)	(d Bu V)	(dBuV)	CF(dB)	(dBuV/m)	(dBuV/m)	(dBuV/m)	(dBuV/n	n) ( <b>dB</b> )	
2390.00	34.94		-1.39	33.55		74.00	54.00	-20.45	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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### Radiated Emission: 802.11 b mode

Operation T Fundament Temperatu Humidity	tal Frequei		CH High MHz			Test Test Pol	t Date By	Nov. 26, 2 Jazz Ver.	009
	Peak	AV		Act	ual FS	Peak	AV		
Freq.	<b>Read ing</b>	Reading	Ant./CL	Peak	AV	Limit	Limit	Margin	Remark
(MHz)	(dBuV)	(dBuV)	CF(dB)	(dBuV/m	) ( <b>dBuV/m</b> )	)(dBuV/m)	(dBuV/r	n) (dB)	
2483.56	33.80		-0.92	32.88		74.00	54.00	-21.12	Peak
Operation Fundament Temperatu Humidity	tal Frequei		CH High MHz			Test Test Pol	: Date : By	Nov. 26, 2 Jazz Hor.	009
	Peak	AV		Act	ual FS	Peak	AV		
Freq.	Reading	Reading	Ant./CL	Peak	AV	Limit	Limit	0	Remark
(MHz)	(d Bu V)	(dBuV)	CF(dB)	(dBuV/m	) (dBuV/m)	(dBuV/m)	(dBuV/r	n) (dB)	
2483.56	34.82		-0.92	33.90		74.00	54.00	-20.10	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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# 802.11g **Band Edges Test Data CH-Low**

🔆 Agilent R Т Display Mkr2 2.390 00 GHz Ref 20 dBm -50.08 dBm #Atten 30 dB Full Screen #Peak Log Display Line 10 A.A.A -21.00 dBm dB/ <u>0n</u> Off <sup>)|</sup> <sub>-21.0</sub> Display Line <sup>||</sup>Bm **-21.00 dBm**⊻ MANY DI dBm Limits⊦ .gAv Center 2.390 00 GHz Span 50 MHz Active Fctn #VBW 100 kHz #Res BW 100 kHz Sweep 6.04 ms (601 pts) Position• X Axis 2.413 25 GHz 2.390 00 GHz Bottom Marker Trace Type Amplitude Freq Freq -0.97 dBm -50.08 dBm (1) (1) 1 2 Title⊦ Preferences+ Printer not responding

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



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#### Radiated Emission: 802.11 g mode

Operation Mode	TX CH Low	Test Date	Nov. 26, 2009
Fundamental Frequency	2412 MHz	Test By	Jazz
Tmperature	25 °C	Pol	Ver.
Humidity	65 %		

	Peak	AV		Actu	al FS	Peak	AV		
Freq.	Reading	Reading	Ant./CL	Peak	AV	Limit	Limit	Margin	Remark
(MHz)	(dBuV)	(dBuV)	CF(dB)	(dBuV/m)	(dBuV/m)	(dBuV/m)	(dBuV/n	n) ( <b>dB</b> )	
2390.00	35.02		-1.39	33.63		74.00	54.00	-20.37	Peak
Operation I Fundament Temperatu Humidity	tal Frequer	-				Test Test Pol	Date By	Nov. 26, 2 Jazz Hor.	009
	Peak	AV		Actu	al FS	Peak	AV		
Freq.	<b>Read ing</b>	Reading	Ant./CL	Peak	AV	Limit	Limit	Margin	Remark
(MHz)	(dBuV)	(dBuV)	CF(dB)	(dBuV/m)	(dBuV/m)	(dBuV/m)	(dBuV/n	n) ( <b>dB</b> )	
2390.00	38.12		-1.39	36.73		74.00	54.00	-17.27	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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#### Radiated Emission: 802.11 g mode

Operation Mode Fundamental Frequency	TX CH High 2462 MHz	Test Date Test By	Nov. 26, 2009 Jazz
Temperature	25 °C	Pol	Ver.
Humidity	65 %		

	Peak	AV		Actu	al FS	Peak	AV		
Freq.	<b>Read ing</b>	Reading	Ant./CL	Peak	AV	Limit	Limit	Margin	Remark
(MHz)	(dBuV)	(dBuV)	CF(dB)	(d BuV/m)	(dBuV/m)	(dBuV/m)	(dBu V/n	n) ( <b>dB</b> )	
2483.56	34.91		-0.92	33.99		74.00	54.00	-20.01	Peak
Operation M Fundamenta Temperatur Humidity	al Frequer					Test Test Pol		Nov. 26, 2 Jazz Hor.	009
	Peak	AV		Actu	al FS	Peak	AV		
Freq.	<b>Read ing</b>	Reading	Ant./CL	Peak	AV	Limit	Limit	Margin	Remark
(MHz)	(dBuV)	(dBuV)	CF(dB)	(dBuV/m)	(dBuV/m)	(dBuV/m)	(dBuV/n	n) ( <b>dB</b> )	
2483.56	36.86		-0.92	35.94		74.00	54.00	-18.06	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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## 9 SPURIOUS RADIATED EMISSION TEST

### 9.1 Standard Applicable

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

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

## 9.2 Measurement Equipment Used:

#### 9.2.1. Conducted Emission at antenna port:

Refer to section 6.2 for details.

#### 9.2.2. Radiated emission:

Refer to section 7.2 for details.

### 9.3 Test SET-UP:

#### 9.3.1. Conducted Emission at antenna port:

Refer to section 6.3 for details.

#### 9.3.2. Radiated emission:

Refer to section 7.3 for details.

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### 9.4 Measurement Procedure:

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

## 9.5 Field Strength Calculation

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

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

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

### 9.6 Measurement Result:

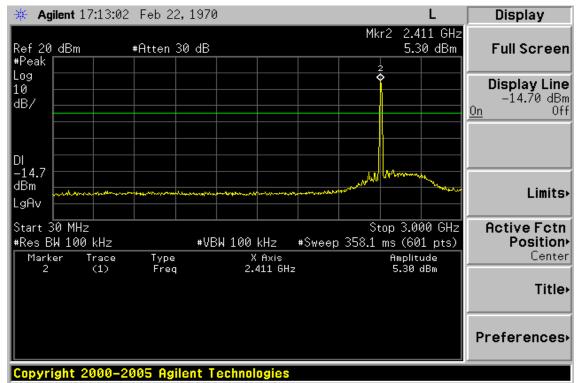
Note: Refer to next page spectrum analyzer data chart and tabular data sheets.

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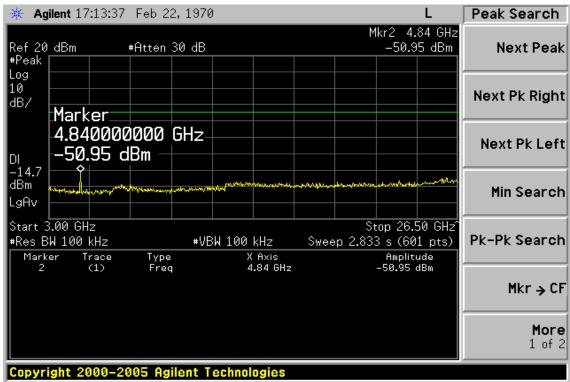


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# **Conducted Spurious Emission Measurement Result (802.11b)** Ch Low 30MHz – 3GHz



### Ch Low 3GHz – 26.5GHz



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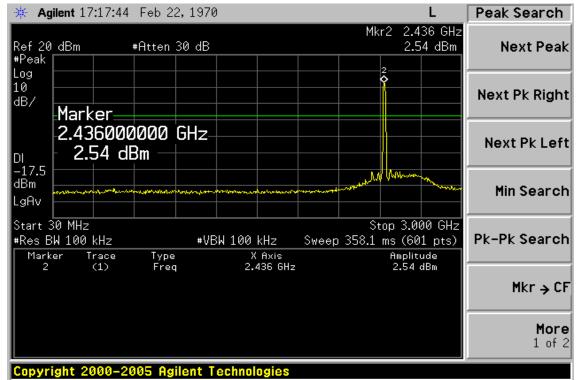
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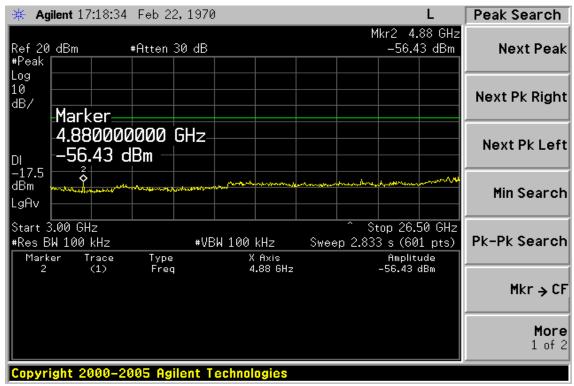


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# Ch Mid 30MHz – 3GHz



#### Ch Mid 3GHz – 26.5GHz



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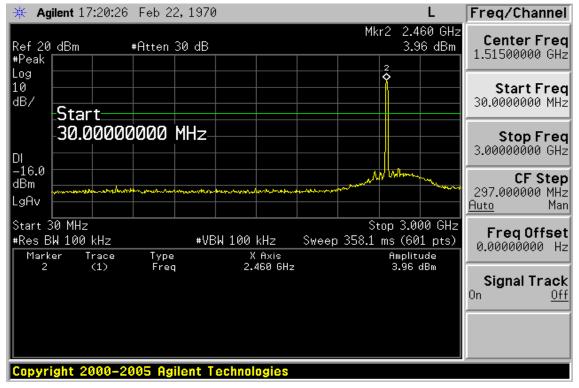
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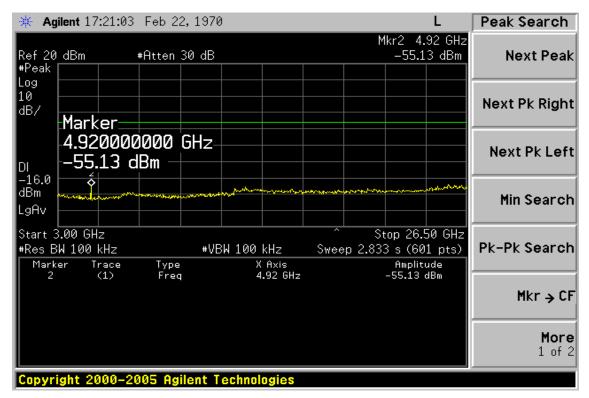


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# Ch High 30MHz – 3GHz



## Ch High 3GHz – 26.5GHz



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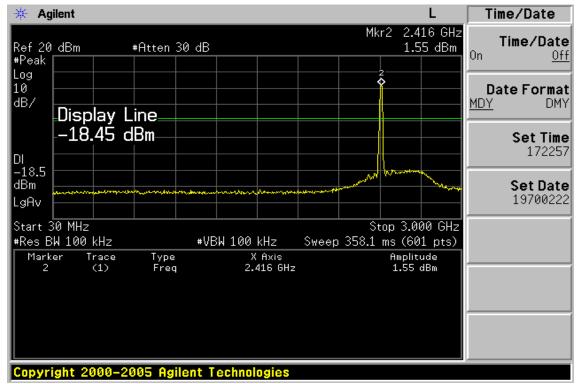
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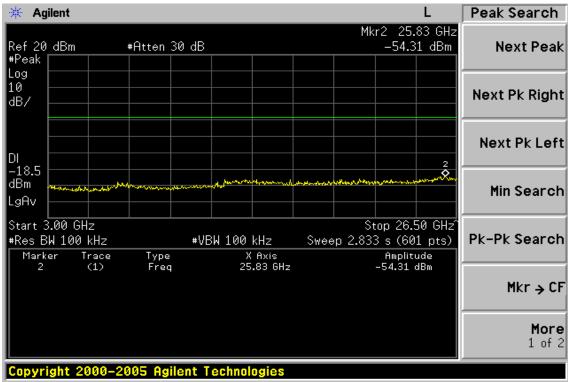


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# **Conducted Spurious Emission Measurement Result (802.11g)** Ch Low 30MHz – 3GHz



### Ch Low 3GHz – 26.5GHz



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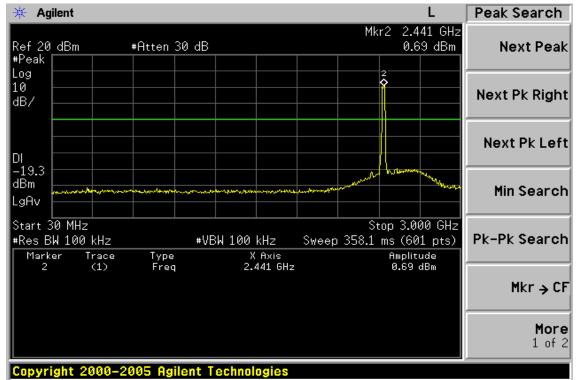
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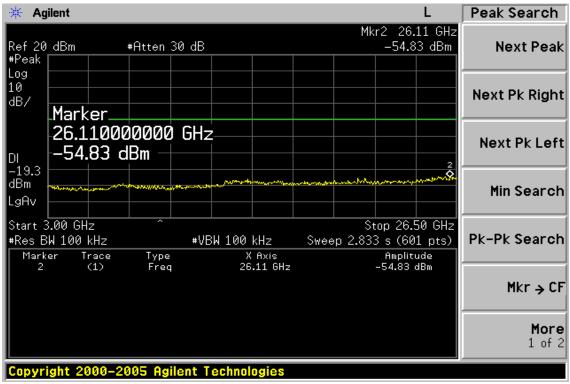


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# Ch Mid 30MHz – 3GHz



### Ch Mid 3GHz – 26.5GHz



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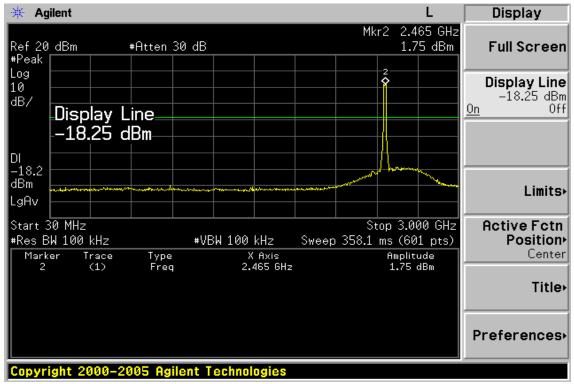
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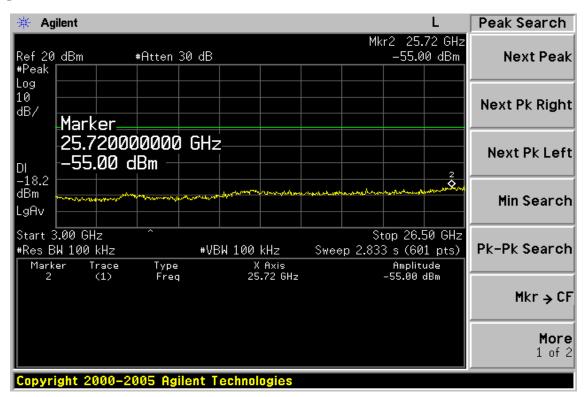


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# Ch High 30MHz – 3GHz



## Ch High 3GHz – 26.5GHz



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Operation Mode	802.11b TX CH Low	Test Date	Nov. 26, 2009
Fundamental Frequency	2412MHz	Test By	Jazz
Temperature	25	Pol	Ver./Hor.
Humidity	60 %		

Ant.Pol.	Detector Mode	Reading	Factor	Actual FS	Limit3m	Safe Mar- gin
H/V	(PK/QP)	(dBuV)	(dB)	(dBuV/m)	(dBuV/m)	( <b>dB</b> )
V	Peak	45.10	-16.27	28.83	40.00	-11.17
V	Peak	46.40	-17.62	28.78	43.50	-14.72
V	Peak	36.76	-13.57	23.19	43.50	-20.31
V	Peak	37.11	-15.55	21.56	43.50	-21.94
V	Peak	38.06	-13.19	24.87	46.00	-21.13
V	Peak	35.51	-9.64	25.87	46.00	-20.13
Н	Peak	42.79	-13.84	28.95	40.00	-11.05
Н	Peak	43.30	-15.09	28.21	40.00	-11.79
Н	Peak	45.29	-13.57	31.72	43.50	-11.78
Н	Peak	46.89	-15.16	31.73	43.50	-11.77
Н	Peak	40.13	-12.16	27.97	46.00	-18.03
Н	Peak	41.35	-11.02	30.33	46.00	-15.67
	H/V V V V V V H H H H H	Ant.Pol.         Mode           H/V         (PK/QP)           V         Peak           H         Peak	Ant.Pol.         Mode         Reading           H/V         (PK/QP)         (dBuV)           V         Peak         45.10           V         Peak         46.40           V         Peak         36.76           V         Peak         36.76           V         Peak         35.71           V         Peak         35.51           H         Peak         42.79           H         Peak         43.30           H         Peak         45.29           H         Peak         46.89           H         Peak         40.13	Ant.Pol.         Mode         Reading         Factor           H/V         (PK/QP)         (dBuV)         (dB)           V         Peak         45.10         -16.27           V         Peak         46.40         -17.62           V         Peak         36.76         -13.57           V         Peak         36.76         -13.57           V         Peak         37.11         -15.55           V         Peak         38.06         -13.19           V         Peak         35.51         -9.64           H         Peak         42.79         -13.84           H         Peak         43.30         -15.09           H         Peak         45.29         -13.57           H         Peak         46.89         -15.16           H         Peak         40.13         -12.16	Ant.Pol.ModeReadingFactorActual FSH/V(PK/QP)(dBuV)(dB)(dBuV/m)VPeak45.10-16.2728.83VPeak46.40-17.6228.78VPeak36.76-13.5723.19VPeak37.11-15.5521.56VPeak38.06-13.1924.87VPeak35.51-9.6425.87HPeak42.79-13.8428.95HPeak43.30-15.0928.21HPeak45.29-13.5731.72HPeak46.89-15.1631.73HPeak40.13-12.1627.97	Ant.Pol.ModeReadingFactorActual FSLimit3mH/V(PK/QP)(dBuV)(dB)(dBuV/m)(dBuV/m)VPeak45.10-16.2728.8340.00VPeak46.40-17.6228.7843.50VPeak36.76-13.5723.1943.50VPeak37.11-15.5521.5643.50VPeak38.06-13.1924.8746.00VPeak35.51-9.6425.8746.00HPeak42.79-13.8428.9540.00HPeak45.29-13.5731.7243.50HPeak45.29-13.5731.7243.50HPeak40.13-12.1627.9746.00

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.



Operation Mode	802.11b TX CH Mid	Test Date	Nov. 26, 2009
Fundamental Frequency	2437MHz	Test By	Jazz
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)	( <b>dB</b> )	(dBuV/m)	(dBuV/m)	( <b>dB</b> )
	70.74	V	Peak	45.29	-16.27	29.02	40.00	-10.98
	90.14	V	Peak	45.86	-17.62	28.24	43.50	-15.26
	213.33	V	Peak	37.57	-15.16	22.41	43.50	-21.09
	293.84	V	Peak	38.16	-13.19	24.97	46.00	-21.03
	410.24	V	Peak	35.40	-9.64	25.76	46.00	-20.24
	487.84	V	Peak	33.92	-8.57	25.35	46.00	-20.65
	38.73	Н	Peak	42.95	-13.84	29.11	40.00	-10.89
	65.89	Н	Peak	42.39	-15.09	27.30	40.00	-12.70
	162.89	Н	Peak	45.50	-13.57	31.93	43.50	-11.57
	213.33	Н	Peak	47.75	-15.16	32.59	43.50	-10.91
	332.64	Н	Peak	40.73	-12.16	28.57	46.00	-17.43
	371.44	Н	Peak	41.55	-11.02	30.53	46.00	-15.47

#### 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.



Operation Mode	802.11b TX CH High	Test Date	Nov. 26, 2009
Fundamental Frequency	2462MHz	Test By	Jazz
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)	( <b>dB</b> )
65.89	V	Peak	45.17	-15.09	30.08	40.00	-9.92
90.14	V	Peak	45.24	-17.62	27.62	43.50	-15.88
201.69	V	Peak	37.21	-15.55	21.66	43.50	-21.84
293.84	V	Peak	37.81	-13.19	24.62	46.00	-21.38
410.24	V	Peak	35.40	-9.64	25.76	46.00	-20.24
487.84	V	Peak	35.13	-8.57	26.56	46.00	-19.44
65.89	Н	Peak	43.84	-15.09	28.75	40.00	-11.25
162.89	Н	Peak	45.36	-13.57	31.79	43.50	-11.71
213.33	Н	Peak	47.35	-15.16	32.19	43.50	-11.31
293.84	Н	Peak	39.43	-13.19	26.24	46.00	-19.76
332.64	Н	Peak	40.66	-12.16	28.50	46.00	-17.50
371.44	Н	Peak	42.03	-11.02	31.01	46.00	-14.99

#### 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.



Operation Mode	802.11g TX CH Low	Test Date	Nov. 26, 2009
Fundamental Frequency	2412MHz	Test By	Jazz
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)	( <b>dB</b> )
	90.14	V	Peak	47.71	-17.62	30.09	43.50	-13.41
	162.89	V	Peak	36.64	-13.57	23.07	43.50	-20.43
	293.84	V	Peak	37.96	-13.19	24.77	46.00	-21.23
	410.24	V	Peak	35.39	-9.64	25.75	46.00	-20.25
	589.69	V	Peak	33.50	-6.36	27.14	46.00	-18.86
	846.74	V	Peak	32.24	-2.04	30.20	46.00	-15.80
	38.73	Н	Peak	43.52	-13.84	29.68	40.00	-10.32
	150.28	Н	Peak	41.32	-12.83	28.49	43.50	-15.01
	162.89	Н	Peak	44.82	-13.57	31.25	43.50	-12.25
	213.33	Н	Peak	46.97	-15.16	31.81	43.50	-11.69
	332.64	Н	Peak	40.49	-12.16	28.33	46.00	-17.67
	371.44	Н	Peak	41.35	-11.02	30.33	46.00	-15.67

#### 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.



Operation Mode	802.11g TX CH Mid	Test Date	Nov. 26, 2009
Fundamental Frequency	2437MHz	Test By	Jazz
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)	( <b>dB</b> )	(dBuV/m)	(dBuV/m)	( <b>dB</b> )
90.14	V	Peak	47.79	-17.62	30.17	43.50	-13.33
162.89	V	Peak	36.70	-13.57	23.13	43.50	-20.37
252.13	V	Peak	35.23	-13.72	21.51	46.00	-24.49
293.84	V	Peak	37.74	-13.19	24.55	46.00	-21.45
410.24	V	Peak	36.00	-9.64	26.36	46.00	-19.64
798.24	V	Peak	32.50	-3.08	29.42	46.00	-16.58
38.73	Н	Peak	43.24	-13.84	29.40	40.00	-10.60
65.89	Н	Peak	41.74	-15.09	26.65	40.00	-13.35
162.89	Н	Peak	44.80	-13.57	31.23	43.50	-12.27
213.33	Н	Peak	46.95	-15.16	31.79	43.50	-11.71
332.64	Н	Peak	40.55	-12.16	28.39	46.00	-17.61
371.44	Н	Peak	41.18	-11.02	30.16	46.00	-15.84
252.13 293.84 410.24 798.24 38.73 65.89 162.89 213.33 332.64	V V V H H H H	Peak Peak Peak Peak Peak Peak Peak Peak	35.23 37.74 36.00 32.50 43.24 41.74 44.80 46.95 40.55	-13.72 -13.19 -9.64 -3.08 -13.84 -15.09 -13.57 -15.16 -12.16	21.51 24.55 26.36 29.42 29.40 26.65 31.23 31.79 28.39	46.00 46.00 46.00 40.00 40.00 43.50 43.50 46.00	-24.49 -21.45 -19.64 -16.58 -10.60 -13.35 -12.27 -11.71 -17.61

#### 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.



Operation Mode	802.11g TX CH High	Test Date	Nov. 26, 2009
Fundamental Frequency	2462MHz	Test By	Jazz
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)	( <b>dB</b> )	(dBuV/m)	(dBuV/m)	( <b>dB</b> )
	90.14	V	Peak	46.93	-17.62	29.31	43.50	-14.19
	162.89	V	Peak	36.38	-13.57	22.81	43.50	-20.69
	293.84	V	Peak	38.06	-13.19	24.87	46.00	-21.13
	410.24	V	Peak	35.26	-9.64	25.62	46.00	-20.38
	487.84	V	Peak	35.69	-8.57	27.12	46.00	-18.88
	710.94	V	Peak	32.14	-4.84	27.30	46.00	-18.70
	38.73	Н	Peak	43.44	-13.84	29.60	40.00	-10.40
	65.89	Н	Peak	41.89	-15.09	26.80	40.00	-13.20
	162.89	Н	Peak	45.03	-13.57	31.46	43.50	-12.04
	213.33	Н	Peak	47.02	-15.16	31.86	43.50	-11.64
	371.44	Н	Peak	41.58	-11.02	30.56	46.00	-15.44
	449.04	Н	Peak	35.60	-8.61	26.99	46.00	-19.01

#### 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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Operation Mode	802.11b TX CH Low	Test Date	Nov. 26, 2009
Fundamental Frequency	2412MHz	Test By	Jazz
Temperature	23	Pol	Ver.
Humidity	54 %		

	Peak	AV		Actu	al FS	Peak	AV		
Freq.	Reading	Reading	Ant./CL	Peak	AV	Limit	Limit	Margin	
(MHz)	(dBuV)	(dBuV)	CF(dB)	(dBuV/m)	(dBuV/m)	(dBuV/m)	(dBuV/m)	( <b>dB</b> )	
4824.0	34.73		6.05	40.78		74.00	54.00	-13.22	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		

#### Remark:

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

Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 90 days only.



Operation Mode	802.11b TX CH Low	Test Date	Nov. 26, 2009
Fundamental Frequency	2412MHz	Test By	Jazz
Temperature	23	Pol	Hor.
Humidity	54 %		

	Peak	AV		Actu	al FS	Peak	AV		
Freq.	Reading	Reading	Ant./CL	Peak	AV	Limit	Limit	Margin	
(MHz)	(dBuV)	(dBuV)	CF(dB)	(dBuV/m)	(dBuV/m)	(dBuV/m)	(dBuV/m)	(dB)	
4824.0	33.19		6.05	39.24		74.00	54.00	-14.76	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		

#### Remark:

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

Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 90 days only.



Operation Mode	802.11b TX CH Mid	Test Date	Nov. 26, 2009
Fundamental Frequency	2437MHz	Test By	Jazz
Temperature	23	Pol	Ver.
Humidity	54 %		

	Peak	AV		Actu	al FS	Peak	AV		
Freq.	Reading	Reading	Ant./CL	Peak	AV	Limit	Limit	Margin	
(MHz)	(dBuV)	(dBuV)	CF(dB)	(dBuV/m)	(dBuV/m)	(dBuV/m)	(dBuV/m)	( <b>dB</b> )	
4874.0	34.06		6.17	40.23		74.00	54.00	-13.77	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		

#### Remark:

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

Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 90 days only.



Operation Mode	802.11b TX CH Mid	Test Date	Nov. 26, 2009
Fundamental Frequency	2437MHz	Test By	Jazz
Temperature	23	Pol	Hor.
Humidity	54 %		

	Peak	AV		Actu	al FS	Peak	AV		
Freq.	Reading	Reading	Ant./CL	Peak	AV	Limit	Limit	Margin	
(MHz)	(dBuV)	(dBuV)	CF(dB)	(dBuV/m)	(dBuV/m)	(dBuV/m)	(dBuV/m)	(dB)	
4874.0	33.80		6.17	39.97		74.00	54.00	-14.03	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		

#### Remark:

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

Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 90 days only.



Operation Mode	802.11b TX CH High	Test Date	Nov. 26, 2009
Fundamental Frequency	2462MHz	Test By	Jazz
Temperature	23	Pol	Ver.
Humidity	54 %		

	Peak	AV		Actu	al FS	Peak	AV		
Freq.	Reading	Reading	Ant./CL	Peak	AV	Limit	Limit	Margin	
(MHz)	(dBuV)	(dBuV)	CF(dB)	(dBuV/m)	(dBuV/m)	(dBuV/m)	(dBuV/m)	( <b>dB</b> )	
4924.0	33.63		6.28	39.91		74.00	54.00	-14.09	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		

#### Remark:

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

Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 90 days only.

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Operation Mode	802.11b TX CH High	Test Date	Nov. 26, 2009
Fundamental Frequency	2462MHz	Test By	Jazz
Temperature	23	Pol	Hor.
Humidity	54 %		

	Peak	AV		Actu	al FS	Peak	AV		
Freq.	Reading	Reading	Ant./CL	Peak	AV	Limit	Limit	Margin	
(MHz)	(dBuV)	(dBuV)	CF(dB)	(dBuV/m)	(dBuV/m)	(dBuV/m)	(dBuV/m)	( <b>dB</b> )	
4924.0	33.65		6.28	39.93		74.00	54.00	-14.07	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		

#### Remark:

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

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Operation Mode	802.11g TX CH Low	Test Date	Nov. 26, 2009
Fundamental Frequency	2412MHz	Test By	Jazz
Temperature	25	Pol	Ver.
Humidity	60 %		

	Peak	AV		Actu	al FS	Peak	AV		
Freq.	Reading	Reading	Ant./CL	Peak	AV	Limit	Limit	Margin	
(MHz)	(dBuV)	(dBuV)	CF(dB)	(dBuV/m)	(dBuV/m)	(dBuV/m)	(dBuV/m)	(dB)	
4824.0	33.31		6.05	39.36		74.00	54.00	-14.64	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		

#### Remark:

- Measuring frequencies scanned from 1GHz to the 10th harmonic of highest fundamental (1)frequency
- Data of measurement within this frequency range shown "-" in the table above means (2)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.
- Spectrum AV Setting : 1GHz- 26GHz, RBW= 1MHz, VBW= 10Hz, Sweep time= 200 (5) ms.

Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 90 days only.

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Operation Mode	802.11g TX CH Low	Test Date	Nov. 26, 2009
Fundamental Frequency	2412MHz	Test By	Jazz
Temperature	23	Pol	Hor.
Humidity	54 %		

	Peak	AV		Actu	al FS	Peak	AV		
Freq.	Reading	Reading	Ant./CL	Peak	AV	Limit	Limit	Margin	
(MHz)	(dBuV)	(dBuV)	CF(dB)	(dBuV/m)	(dBuV/m)	(dBuV/m)	(dBuV/m)	(dB)	
4824.0	32.85		6.05	38.90		74.00	54.00	-15.10	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		

#### Remark:

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

Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 90 days only.



Operation Mode	802.11g TX CH Mid	Test Date	Nov. 26, 2009
Fundamental Frequency	2437MHz	Test By	Jazz
Temperature	23	Pol	Ver.
Humidity	54 %		

	Peak	AV		Actu	al FS	Peak	AV		
Freq.	Reading	Reading	Ant./CL	Peak	AV	Limit	Limit	Margin	
(MHz)	(dBuV)	(dBuV)	CF(dB)	(dBuV/m)	(dBuV/m)	(dBuV/m)	(dBuV/m)	(dB)	
4874.0	33.58		6.17	39.75		74.00	54.00	-14.25	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		

#### Remark:

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

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Operation Mode	802.11g TX CH Mid	Test Date	Nov. 26, 2009
Fundamental Frequency	2437MHz	Test By	Jazz
Temperature	23	Pol	Hor.
Humidity	54 %		

	Peak	AV		Actu	al FS	Peak	AV		
Freq.	Reading	Reading	Ant./CL	Peak	AV	Limit	Limit	Margin	
(MHz)	(dBuV)	(dBuV)	CF(dB)	(dBuV/m)	(dBuV/m)	(dBuV/m)	(dBuV/m)	(dB)	
4874.0	34.12		6.17	40.29		74.00	54.00	-13.71	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		

#### Remark:

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

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Operation Mode	802.11g TX CH High	Test Date	Nov. 26, 2009
Fundamental Frequency	2462MHz	Test By	Jazz
Temperature	23	Pol	Ver.
Humidity	54 %		

	Peak	AV		Actu	al FS	Peak	AV		
Freq.	Reading	Reading	Ant./CL	Peak	AV	Limit	Limit	Margin	
(MHz)	(dBuV)	(dBuV)	CF(dB)	(dBuV/m)	(dBuV/m)	(dBuV/m)	(dBuV/m)	( <b>dB</b> )	
4924.0	32.78		6.28	39.06		74.00	54.00	-14.94	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		

#### Remark:

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

Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 90 days only.



Operation Mode	802.11g TX CH High	Test Date	Nov. 26, 2009
Fundamental Frequency	2462MHz	Test By	Jazz
Temperature	23 °C	Pol	Hor.
Humidity	54 %		

	Peak	AV		Actu	al FS	Peak	AV		
Freq.	Reading	Reading	Ant./CL	Peak	AV	Limit	Limit	Margin	
(MHz)	(dBuV)	(dBuV)	CF(dB)	(dBuV/m)	(dBuV/m)	(dBuV/m)	(dBuV/m)	( <b>dB</b> )	
4924.0	34.46		6.28	40.74		74.00	54.00	-13.26	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		

#### Remark:

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

Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 90 days only.



Detector

Operation Mode	802.11b RX CH Low	Test Date	Nov. 26, 2009
Fundamental Frequency	2412MHz	Test By	Jazz
Temperature	25	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)	( <b>dB</b> )	
65.89	V	Peak	45.02	-15.09	29.93	40.00	-10.07	
90.14	V	Peak	46.58	-17.62	28.96	43.50	-14.54	
162.89	V	Peak	37.33	-13.57	23.76	43.50	-19.74	
293.84	V	Peak	38.23	-13.19	25.04	46.00	-20.96	
410.24	V	Peak	35.81	-9.64	26.17	46.00	-19.83	
647.89	V	Peak	32.26	-4.99	27.27	46.00	-18.73	
65.89	Н	Peak	43.24	-15.09	28.15	40.00	-11.85	
162.89	Н	Peak	45.66	-13.57	32.09	43.50	-11.41	
213.33	Н	Peak	46.55	-15.16	31.39	43.50	-12.11	
293.84	Н	Peak	39.60	-13.19	26.41	46.00	-19.59	
332.64	Н	Peak	40.09	-12.16	27.93	46.00	-18.07	
371.44	Н	Peak	41.93	-11.02	30.91	46.00	-15.09	

#### 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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Operation Mode	802.11b RX CH Mid	Test Date	Nov. 26, 2009
Fundamental Frequency	2437MHz	Test By	Jazz
Temperature	25	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)	( <b>dB</b> )
90.14	V	Peak	45.35	-17.62	27.73	43.50	-15.77
162.89	V	Peak	36.88	-13.57	23.31	43.50	-20.19
255.04	V	Peak	35.09	-13.69	21.40	46.00	-24.60
293.84	V	Peak	38.28	-13.19	25.09	46.00	-20.91
410.24	V	Peak	35.41	-9.64	25.77	46.00	-20.23
623.64	V	Peak	32.14	-5.51	26.63	46.00	-19.37
67.83	Н	Peak	42.96	-15.60	27.36	40.00	-12.64
162.89	Н	Peak	45.20	-13.57	31.63	43.50	-11.87
213.33	Н	Peak	46.56	-15.16	31.40	43.50	-12.10
293.84	Н	Peak	39.73	-13.19	26.54	46.00	-19.46
371.44	Н	Peak	41.59	-11.02	30.57	46.00	-15.43
449.04	Н	Peak	34.90	-8.61	26.29	46.00	-19.71

#### 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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Detector

Operation Mode	802.11b RX CH High	Test Date	Nov. 26, 2009
Fundamental Frequency	2462MHz	Test By	Jazz
Temperature	25	Pol	Ver./Hor.
Humidity	65%		

	Freq.	Ant.Pol.	Detector Mode	Reading	Factor	Actual FS	Limit3m	Safe Margin
_	(MHz)	H/V	(PK/QP)	(dBuV)	( <b>dB</b> )	(dBuV/m)	(dBuV/m)	( <b>dB</b> )
	90.14	V	Peak	47.49	-17.62	29.87	43.50	-13.63
	162.89	V	Peak	37.55	-13.57	23.98	43.50	-19.52
	293.84	V	Peak	38.61	-13.19	25.42	46.00	-20.58
	410.24	V	Peak	35.36	-9.64	25.72	46.00	-20.28
	487.84	V	Peak	34.24	-8.57	25.67	46.00	-20.33
	683.19	V	Peak	32.66	-5.23	27.43	46.00	-18.57
	67.83	Н	Peak	43.57	-15.60	27.97	40.00	-12.03
	162.89	Н	Peak	45.35	-13.57	31.78	43.50	-11.72
	213.33	Н	Peak	46.61	-15.16	31.45	43.50	-12.05
	332.64	Н	Peak	40.46	-12.16	28.30	46.00	-17.70
	371.44	Н	Peak	41.57	-11.02	30.55	46.00	-15.45
	449.04	Н	Peak	35.35	-8.61	26.74	46.00	-19.26

#### 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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Detector

Operation Mode	802.11g RX CH Low	Test Date	Nov. 26, 2009
Fundamental Frequency	2412MHz	Test By	Jazz
Temperature	25	Pol	Ver./Hor.
Humidity	65 %		

	Freq.	Ant.Pol.	Detector Mode	Reading	Factor	Actual FS	Limit3m	Safe Margin
_	(MHz)	H/V	(PK/QP)	(dBuV)	( <b>dB</b> )	(dBuV/m)	(dBuV/m)	( <b>dB</b> )
	65.89	V	Peak	45.23	-15.09	30.14	40.00	-9.86
	90.14	V	Peak	46.35	-17.62	28.73	43.50	-14.77
	162.89	V	Peak	36.83	-13.57	23.26	43.50	-20.24
	293.84	V	Peak	38.45	-13.19	25.26	46.00	-20.74
	410.24	V	Peak	35.79	-9.64	26.15	46.00	-19.85
	487.84	V	Peak	34.27	-8.57	25.70	46.00	-20.30
	65.89	Н	Peak	44.13	-15.09	29.04	40.00	-10.96
	162.89	Н	Peak	45.31	-13.57	31.74	43.50	-11.76
	213.33	Н	Peak	46.65	-15.16	31.49	43.50	-12.01
	332.64	Н	Peak	40.76	-12.16	28.60	46.00	-17.40
	371.44	Н	Peak	40.74	-11.02	29.72	46.00	-16.28
	449.04	Н	Peak	35.70	-8.61	27.09	46.00	-18.91

#### 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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Detector

Operation Mode	802.11g RX CH Mid	Test Date	Nov. 26, 2009
Fundamental Frequency	2437MHz	Test By	Jazz
Temperature	25	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)	( <b>dB</b> )	
	72.68	V	Peak	45.67	-16.62	29.05	40.00	-10.95	
	90.14	V	Peak	48.22	-17.62	30.60	43.50	-12.90	
	162.89	V	Peak	36.87	-13.57	23.30	43.50	-20.20	
	293.84	V	Peak	38.48	-13.19	25.29	46.00	-20.71	
	410.24	V	Peak	35.31	-9.64	25.67	46.00	-20.33	
	523.73	V	Peak	38.56	-8.08	30.48	46.00	-15.52	
	65.89	Н	Peak	42.34	-15.09	27.25	40.00	-12.75	
	162.89	Н	Peak	45.20	-13.57	31.63	43.50	-11.87	
	213.33	Н	Peak	46.71	-15.16	31.55	43.50	-11.95	
	332.64	Н	Peak	40.28	-12.16	28.12	46.00	-17.88	
	371.44	Н	Peak	40.94	-11.02	29.92	46.00	-16.08	
	449.04	Н	Peak	35.80	-8.61	27.19	46.00	-18.81	

#### 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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Detector

Operation Mode	802.11g RX CH High	Test Date	Nov. 26, 2009
Fundamental Frequency	2462MHz	Test By	Jazz
Temperature	25	Pol	Ver./Hor.
Humidity	65%		

	Freq.	Ant.Pol.	Detector Mode	Reading	Factor	Actual FS	Limit3m	Safe Margin
_	(MHz)	H/V	(PK/QP)	(dBuV)	( <b>dB</b> )	(dBuV/m)	(dBuV/m)	( <b>dB</b> )
	90.14	V	Peak	46.69	-17.62	29.07	43.50	-14.43
	162.89	V	Peak	37.38	-13.57	23.81	43.50	-19.69
	293.84	V	Peak	38.63	-13.19	25.44	46.00	-20.56
	410.24	V	Peak	35.11	-9.64	25.47	46.00	-20.53
	487.84	V	Peak	34.49	-8.57	25.92	46.00	-20.08
	848.68	V	Peak	32.02	-2.01	30.01	46.00	-15.99
	67.83	Н	Peak	43.18	-15.60	27.58	40.00	-12.42
	162.89	Н	Peak	45.47	-13.57	31.90	43.50	-11.60
	213.33	Н	Peak	46.53	-15.16	31.37	43.50	-12.13
	332.64	Н	Peak	40.30	-12.16	28.14	46.00	-17.86
	371.44	Н	Peak	41.40	-11.02	30.38	46.00	-15.62
	449.04	Н	Peak	35.71	-8.61	27.10	46.00	-18.90

#### 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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Operation Mode	802.11b RX CH Low	Test Date	Nov. 26, 2009
Fundamental Frequency	2412 MHz	Test By	Jazz
Temperature	25	Pol	Ver.
Humidity	65 %		

	Peak	AV		Actu	al FS	Peak	AV		
Freq.	Reading	Reading	Ant./CL	Peak	AV	Limit	Limit	Margin	
(MHz)	(dBuV)	(dBuV)	CF(dB)	(dBuV/m)	(dBuV/m)	(dBuV/m)	(dBuV/m)	( <b>dB</b> )	
4824.0	32.84		6.05	38.89		74.00	54.00	-15.11	Peak
7236.0						74.00	54.00		
9648.0						74.00	54.00		
12060.0						74.00	54.00		

Remark :

- (1) Measuring frequencies 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- 40GHz, RBW= 3MHz, VBW= 1MHz, Sweep time= 200 ms.
- (5) Spectrum AV Setting : 1GHz- 40GHz, RBW= 1MHz, VBW= 10Hz, Sweep time= 200 ms.

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Operation Mode	802.11b RX CH Low	Test Date	Nov. 26, 2009
Fundamental Frequency	2412 MHz	Test By	Jazz
Temperature	25	Pol	Hor.
Humidity	65 %		

	Peak	AV		Actu	al FS	Peak	AV		
Freq.	Reading	Reading	Ant./CL	Peak	AV	Limit	Limit	Margin	
(MHz)	(dBuV)	(dBuV)	CF(dB)	(dBuV/m)	(dBuV/m)	(dBuV/m)	(dBuV/m)	( <b>dB</b> )	
4824.0	32.99		6.05	39.04		74.00	54.00	-14.96	Peak
7236.0						74.00	54.00		
9648.0						74.00	54.00		
12060.0						74.00	54.00		

#### Remark :

- (1) Measuring frequencies 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- 40GHz, RBW= 3MHz, VBW= 1MHz, Sweep time= 200 ms.
- (5) Spectrum AV Setting : 1GHz- 40GHz, RBW= 1MHz, VBW= 10Hz, Sweep time= 200 ms.

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Operation Mode	802.11b RX CH Mid	Test Date	Nov. 26, 2009
Fundamental Frequency	2437 MHz	Test By	Jazz
Temperature	25	Pol	Ver.
Humidity	65 %		

	Peak	AV		Actu	al FS	Peak	AV		
Freq.	Reading	Reading	Ant./CL	Peak	AV	Limit	Limit	Margin	
(MHz)	(dBuV)	(dBuV)	CF(dB)	(dBuV/m)	(dBuV/m)	(dBuV/m)	(dBuV/m)	( <b>dB</b> )	
4874.0	32.82		6.17	38.99		74.00	54.00	-15.01	Peak
7311.0						74.00	54.00		
9748.0						74.00	54.00		
12185.0						74.00	54.00		

### Remark :

- (1) Measuring frequencies 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- 40GHz, RBW= 3MHz, VBW= 1MHz, Sweep time= 200 ms.
- (5) Spectrum AV Setting : 1GHz- 40GHz, RBW= 1MHz, VBW= 10Hz, Sweep time= 200 ms.

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Operation Mode	802.11b RX CH Mid	Test Date	Nov. 26, 2009
Fundamental Frequency	2437 MHz	Test By	Jazz
Temperature	25	Pol	Hor.
Humidity	65%		

	Peak	AV		Actu	al FS	Peak	AV		
Freq.	Reading	Reading	Ant./CL	Peak	AV	Limit	Limit	Margin	
(MHz)	(dBuV)	(dBuV)	CF(dB)	(dBuV/m)	(dBuV/m)	(dBuV/m)	(dBuV/m)	( <b>dB</b> )	
4874.0	34.38		6.17	40.55		74.00	54.00	-13.45	Peak
7311.0						74.00	54.00		
9748.0						74.00	54.00		
12185.0						74.00	54.00		

### Remark :

- (1) Measuring frequencies 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- 40GHz, RBW= 3MHz, VBW= 1MHz, Sweep time= 200 ms.
- (5) Spectrum AV Setting : 1GHz- 40GHz, RBW= 1MHz, VBW= 10Hz, Sweep time= 200 ms.

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Operation Mode	802.11b RX CH High	Test Date	Nov. 26, 2009
Fundamental Frequency	2462 MHz	Test By	Jazz
Temperature	25	Pol	Ver.
Humidity	65 %		

	Peak	AV		Actu	al FS	Peak	AV		
Freq.	Reading	Reading	Ant./CL	Peak	AV	Limit	Limit	Margin	
(MHz)	(dBuV)	(dBuV)	CF(dB)	(dBuV/m)	(dBuV/m)	(dBuV/m)	(dBuV/m)	( <b>dB</b> )	
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		

### Remark :

- (1) Measuring frequencies 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- 40GHz, RBW= 3MHz, VBW= 1MHz, Sweep time= 200 ms.
- (5) Spectrum AV Setting : 1GHz- 40GHz, RBW= 1MHz, VBW= 10Hz, Sweep time= 200 ms.

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Operation Mode	802.11b RX CH High	Test Date	Nov. 26, 2009
Fundamental Frequency	2462 MHz	Test By	Jazz
Temperature	25	Pol	Hor.
Humidity	65 %		

	Peak	AV		Actu	al FS	Peak	AV		
Freq.	Reading	Reading	Ant./CL	Peak	AV	Limit	Limit	Margin	
(MHz)	(dBuV)	(dBuV)	CF(dB)	(dBuV/m)	(dBuV/m)	(dBuV/m)	(dBuV/m)	( <b>dB</b> )	
4924.0	33.29		6.28	39.57		74.00	54.00	-14.43	Peak
7386.0						74.00	54.00		
9848.0						74.00	54.00		
12310.0						74.00	54.00		

### Remark :

- (1) Measuring frequencies 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- 40GHz, RBW= 3MHz, VBW= 1MHz, Sweep time= 200 ms.
- (5) Spectrum AV Setting : 1GHz- 40GHz, RBW= 1MHz, VBW= 10Hz, Sweep time= 200 ms.

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Operation Mode	802.11g RX CH Low	Test Date	Nov. 26, 2009
Fundamental Frequency	2412 MHz	Test By	Jazz
Temperature	25	Pol	Ver.
Humidity	65 %		

	Peak	AV		Actu	al FS	Peak	AV		
Freq.	Reading	Reading	Ant./CL	Peak	AV	Limit	Limit	Margin	
(MHz)	(dBuV)	(dBuV)	CF(dB)	(dBuV/m)	(dBuV/m)	(dBuV/m)	(dBuV/m)	( <b>dB</b> )	
4824.0	32.80		6.05	38.85		74.00	54.00	-15.15	Peak
7236.0						74.00	54.00		
9648.0						74.00	54.00		
12060.0						74.00	54.00		

### Remark :

- (1) Measuring frequencies 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- 40GHz, RBW= 3MHz, VBW= 1MHz, Sweep time= 200 ms.
- (5) Spectrum AV Setting : 1GHz- 40GHz, RBW= 1MHz, VBW= 10Hz, Sweep time= 200 ms.

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Operation Mode	802.11g RX CH Low	Test Date	Nov. 26, 2009
Fundamental Frequency	2412 MHz	Test By	Jazz
Temperature	25	Pol	Hor.
Humidity	65 %		

	Peak	AV		Actu	al FS	Peak	AV		
Freq.	Reading	Reading	Ant./CL	Peak	AV	Limit	Limit	Margin	
(MHz)	(dBuV)	(dBuV)	CF(dB)	(dBuV/m)	(dBuV/m)	(dBuV/m)	(dBuV/m)	( <b>dB</b> )	
4824.0	32.95		6.05	39.00		74.00	54.00	-15.00	Peak
7236.0						74.00	54.00		
9648.0						74.00	54.00		
12060.0						74.00	54.00		

### Remark :

- (1) Measuring frequencies 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- 40GHz, RBW= 3MHz, VBW= 1MHz, Sweep time= 200 ms.
- (5) Spectrum AV Setting : 1GHz- 40GHz, RBW= 1MHz, VBW= 10Hz, Sweep time= 200 ms.

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Operation Mode	802.11g RX CH Mid	Test Date	Nov. 26, 2009
Fundamental Frequency	2437 MHz	Test By	Jazz
Temperature	25	Pol	Ver.
Humidity	65 %		

	Peak	AV		Actu	al FS	Peak	AV		
Freq.	Reading	Reading	Ant./CL	Peak	AV	Limit	Limit	Margin	
(MHz)	(dBuV)	(dBuV)	CF(dB)	(dBuV/m)	(dBuV/m)	(dBuV/m)	(dBuV/m)	( <b>dB</b> )	
4874.0	32.77		6.17	38.94		74.00	54.00	-15.06	Peak
7311.0						74.00	54.00		
9748.0						74.00	54.00		
12185.0						74.00	54.00		

### Remark :

- (1) Measuring frequencies 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- 40GHz, RBW= 3MHz, VBW= 1MHz, Sweep time= 200 ms.
- (5) Spectrum AV Setting : 1GHz- 40GHz, RBW= 1MHz, VBW= 10Hz, Sweep time= 200 ms.

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Operation Mode	802.11g RX CH Mid	Test Date	Nov. 26, 2009
Fundamental Frequency	2437 MHz	Test By	Jazz
Temperature	25	Pol	Hor.
Humidity	65%		

	Peak	AV		Actu	al FS	Peak	AV		
Freq.	Reading	Reading	Ant./CL	Peak	AV	Limit	Limit	Margin	
(MHz)	(dBuV)	(dBuV)	CF(dB)	(dBuV/m)	(dBuV/m)	(dBuV/m)	(dBuV/m)	( <b>dB</b> )	
4874.0	33.45		6.17	39.62		74.00	54.00	-14.38	Peak
7311.0						74.00	54.00		
9748.0						74.00	54.00		
12185.0						74.00	54.00		

### Remark :

- (1) Measuring frequencies 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- 40GHz, RBW= 3MHz, VBW= 1MHz, Sweep time= 200 ms.
- (5) Spectrum AV Setting : 1GHz- 40GHz, RBW= 1MHz, VBW= 10Hz, Sweep time= 200 ms.

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Operation Mode	802.11g RX CH High	Test Date	Nov. 26, 2009
Fundamental Frequency	2462 MHz	Test By	Jazz
Temperature	25	Pol	Ver.
Humidity	65 %		

	Peak	AV		Actu	al FS	Peak	AV		
Freq.	Reading	Reading	Ant./CL	Peak	AV	Limit	Limit	Margin	
(MHz)	(dBuV)	(dBuV)	CF(dB)	(dBuV/m)	(dBuV/m)	(dBuV/m)	(dBuV/m)	( <b>dB</b> )	
4924.0	33.39		6.28	39.67		74.00	54.00	-14.33	Peak
7386.0						74.00	54.00		
9848.0						74.00	54.00		
12310.0						74.00	54.00		

### Remark :

- (1) Measuring frequencies 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- 40GHz, RBW= 3MHz, VBW= 1MHz, Sweep time= 200 ms.
- (5) Spectrum AV Setting : 1GHz- 40GHz, RBW= 1MHz, VBW= 10Hz, Sweep time= 200 ms.

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Operation Mode	802.11g RX CH High	Test Date	Nov. 26, 2009
Fundamental Frequency	2462 MHz	Test By	Jazz
Temperature	25	Pol	Hor.
Humidity	65 %		

	Peak	AV		Actu	al FS	Peak	AV		
Freq.	Reading	Reading	Ant./CL	Peak	AV	Limit	Limit	Margin	
(MHz)	(dBuV)	(dBuV)	CF(dB)	(dBuV/m)	(dBuV/m)	(dBuV/m)	(dBuV/m)	( <b>dB</b> )	
4924.0	33.48		6.28	39.76		74.00	54.00	-14.24	Peak
7386.0						74.00	54.00		
9848.0						74.00	54.00		
12310.0						74.00	54.00		

### Remark :

- (1) Measuring frequencies 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- 40GHz, RBW= 3MHz, VBW= 1MHz, Sweep time= 200 ms.
- (5) Spectrum AV Setting : 1GHz- 40GHz, RBW= 1MHz, VBW= 10Hz, Sweep time= 200 ms.

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## 10 Peak Power Spectral Density

## **10.1 Standard Applicable:**

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

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

## **10.2 Measurement Equipment Used:**

Refer to section 6.2 for details.

## 10.3 Test Set-up:

Refer to section 6.3 for details.

## **10.4 Measurement Procedure:**

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

#### **Measurement Result:** 10.5

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### 802.11b

СН	<b>RF</b> Power Density	Cable loss	<b>RF</b> Power Density	Maximum Limit
	Reading (dBm)	(dB)	Level (dBm)	(dBm)
Low	-8.69	0.00	-8.69	8
Mid	-8.36	0.00	-8.36	8
High	-6.97	0.00	-6.97	8

### 802.11g

CH	DE Douvon Dongity	Cable loss	DE Douver Density	Movimum Limit
Сп	RF Power Density	Cable loss	RF Power Density	
	Reading (dBm)	(dB)	Level (dBm)	(dBm)
Low	-14.08	0.00	-14.08	8
Mid	-13.05	0.00	-13.05	8
High	-13.41	0.00	-13.41	8

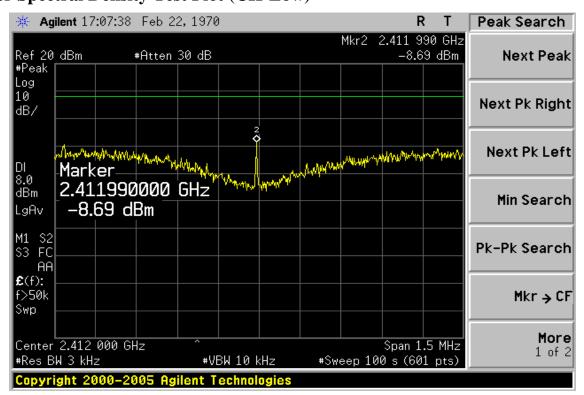
Note: Refer to next page for plots.

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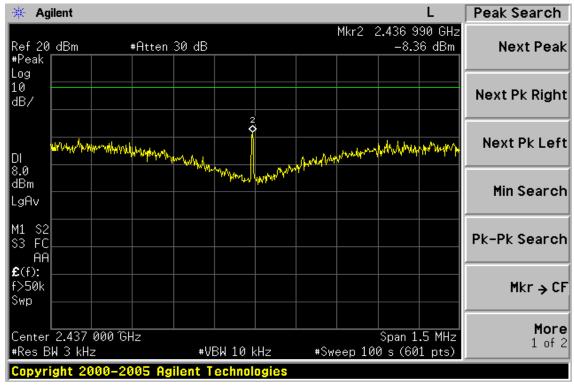


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## 802.11b **Power Spectral Density Test Plot (CH-Low)**



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



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

🔆 Agilent 17:04:47 Feb 2	2,1970		L	Peak Search
Ref 20 dBm #Atten #Peak	30 dB	Mkr2	2.461 990 GHz -6.97 dBm	
Log 10 dB/				Next Pk Right
Man Marker	ичћ <sub>им 1.</sub>	. Brown and	and the second	Next Pk Left
8.0 dBm 2.461990000 LgAv -6.97 dBm	GHz	All a start and a start		Min Search
M1 S2 S3 FC AA				Pk-Pk Search
£(f): f>50k Swp				Mkr→CF
Center 2.462 000 GHz #Res BW 3 kHz	#VBW 10 ki	Hz #Sweep	Span 1.5 MHz 100 s (601 pts)	<b>More</b> 1 of 2
Copyright 2000-2005 Ag	ilent Technolo	gies		

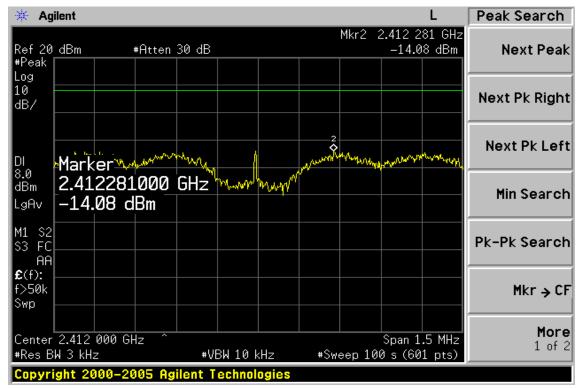
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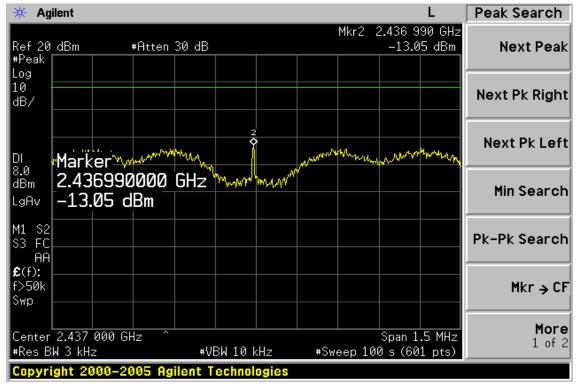
FCC ID: XKBIPA280 IC: 2586D-IPA280

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



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



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Report No.: EH/2010/50056 Issue Date: Nov. 23, 2010 Page: 88 of 99

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

🔆 Agilent 17:00:23 Feb 22	2, 1970	L Peak Search
Ref 20 dBm #Atten 3 #Peak		2 2.461 990 GHz -13.41 dBm Next Peak
Log 10 dB/		Next Pk Right
		Next Pk Left
dBm 2.461990000 ( LgAv -13.41 dBm	GHz 'www.w/wy.yv''	Min Search
M1 S2 S3 FC AA		Pk-Pk Search
€(f): f>50k Swp		Mkr → CF
Center 2.462 000 GHz #Res BW 3 kHz		Span 1.5 MHz         More           100 s (601 pts)         1 of 2
Copyright 2000-2005 Agi	lent Technologies	

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## **11 ANTENNA REQUIREMENT**

## **11.1. Standard Applicable:**

According to §15.203, Antenna requirement.

An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this Section. The manufacturer may design the unit so that a broken antenna can be

replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited. This requirement does not apply to carrier current devices or to devices operated under the provisions of Sections 15.211, 15.213, 15.217, 15.219, or 15.221. Further, this requirement does not apply to intentional radiators that must be professionally installed, such as perimeter protection systems and some

field disturbance sensors, or to other intentional radiators which, in accordance with Section 15.31(d), must be measured at the installation site. However, the installer shall be responsible for ensuring that the

proper antenna is employed so that the limits in this Part are not exceeded.

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

When a measurement at the antenna connector is used to determine RF output power, the effective gain of the device's antenna shall be stated, based on measurement or on data from the antenna manufacturer. Any antenna gain in excess of 6 dBi (6 dB above isotropic gain) shall be added to the measured RF output power before using the power limits specified in RSS-210 or RSS-310 for devices of RF output powers of 10 milliwatts or less. For devices of output powers greater than 10 milliwatts, except devices subject to RSS-210 Annex 8 (Frequency Hopping and Digital Modulation Systems Operating in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz Bands) or RSS-210 Annex 9 (Local Area Network Devices), the total antenna gain shall be added to the measured RF output power before using

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the specified power limits. For devices subject to RSS-210 Annex 8 or Annex 9, the antenna gain shall not be added.

## 11.2. Antenna Connected Construction:

The directional gains of antenna used for transmitting is -0.51 dBi, and the antenna connector is designed with permanent attachment and no consideration of replacement. Please see EUT photo for details.

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## 12 99% Bandwidth Measurement

## 12.1. Standard Applicable:

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

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

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

## 12.2. Measurement Equipment Used:

Refer to section 6.2 for details.

## **12.3.** Test Set-up:

Refer to section 6.3 for details.

## **12.4. Measurement Procedure:**

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

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### 12.5. Measurement Result:

#### 802.11b

Frequency	Bandwidth	
MHz	(MHz)	
2412	13.54	
2437	14.48	
2462	14.47	

802	2.1	1g

Frequency	Bandwidth	
MHz	(MHz)	
2412	16.43	
2437	16.44	
2462	16.44	

Note: Refer to next page for plots.

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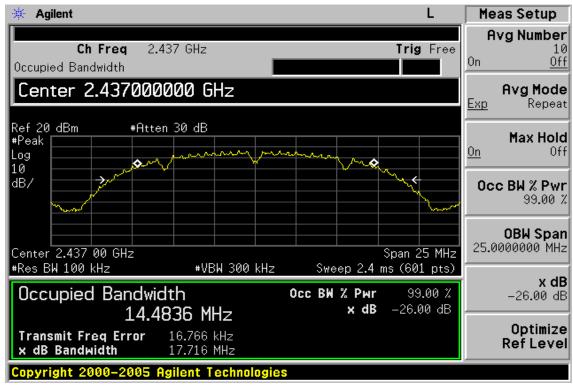
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# 802.11b

## 99% Band Width Test Data CH-Low



99% Band Width Test Data CH-Mid



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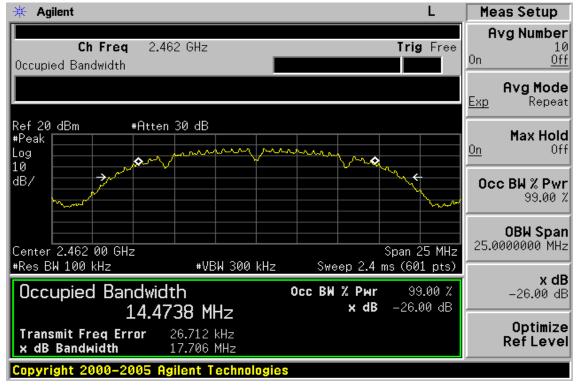
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## 99% Band Width Test Data CH-High



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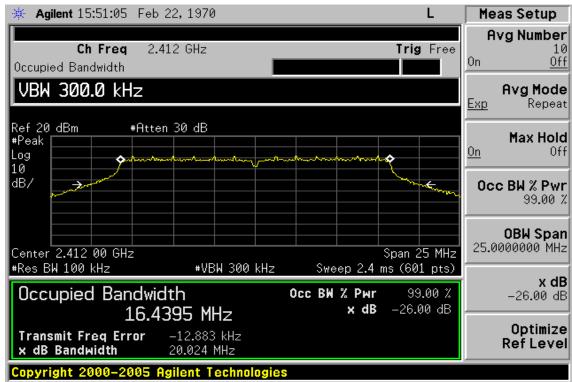
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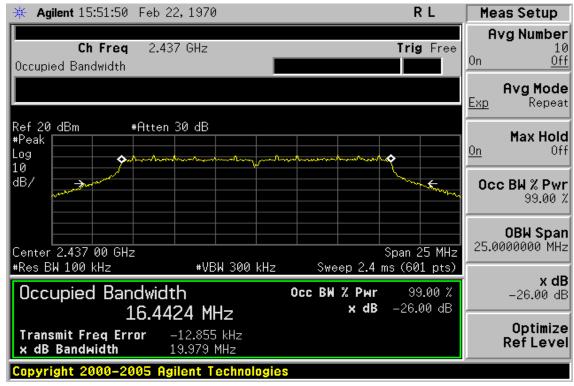
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## 802.11g 99% Band Width Test Data CH-Low



## 99% Band Width Test Data CH-Mid



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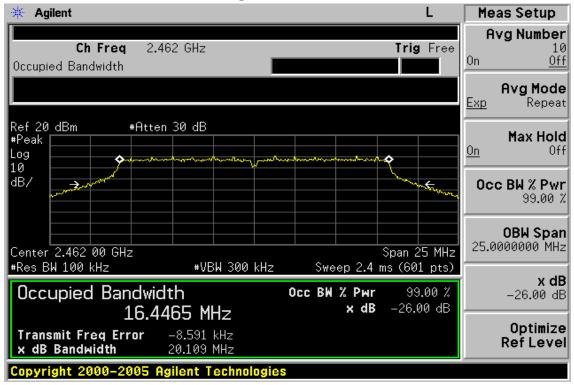
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## 99% Band Width Test Data CH-High



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## **13** Maximum Permissible Exposure (MPE)

## 13.1 Standard Applicable

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

This is a Mobile device, the MPE is required.

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

Limits for Maximum Permissive Exposure (MPE)

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

F = frequency in MHz

\* = Plane-wave equipment power density

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## 13.2 Maximum Permissible Exposure (MPE) Evaluation

### 802.11b Power Table

Frequency (MHz)	Reading Power (dBm)	Cable Loss	Output Power (dBm)	Output Power (W)	Limit (W)
2412.00	15.24	0.00	15.24	0.03041	1
2437.00	15.01	0.00	15.01	0.02547	1
2462.00	15.55	0.00	15.55	0.02884	1

### MPE Prediction (802.11b)

Prediction of MPE limit at a given distance

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

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

Where: S = Power density

 $\mathbf{P} = \mathbf{Power}$  input to antenna

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

R = Distance to the center of radiation of the antenna

Maximum peak output power at antenna input terminal:	15.55	(dBm)
Maximum peak output power at antenna input terminal:	35.89219346	(mW)
Duty cycle:	100	(%)
Maximum Pav :	35.89219346	(mW)
Antenna gain (typical):	-0.51	(dBi)
Maximum antenna gain:	0.889201118	(numeric)
Prediction distance:	20	(cm)
Prediction frequency:	2412	(MHz)
MPE limit for uncontrolled exposure at prediction	1	(mW/cm2)
Power density at predication frequency at 20 (cm)	0.0063526	(mW/cm^2)

### **Measurement Result**

The predicted power density level at 20 cm is  $0.0064 \text{ mW/cm}^2$ . This is below the uncontrolled exposure limit of 1 mW/cm<sup>2</sup> at 2412MHz.

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### 802.11g Power Table

Frequency (MHz)	Reading Power (dBm)	Cable Loss	Output Power (dBm)	Output Power (W)	Limit (W)
2412.00	14.83	0.00	14.83	0.03041	1
2437.00	14.06	0.00	14.06	0.02547	1
2462.00	14.60	0.00	14.60	0.02884	1

## MPE Prediction (802.11g)

Prediction of MPE limit at a given distance

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

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

Where: S = Power density

 $\mathbf{P} = \mathbf{Power}$  input to antenna

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

R = Distance to the center of radiation of the antenna

Maximum peak output power at antenna input terminal:	14.83	(dBm)
Maximum peak output power at antenna input terminal:	30.40885026	(mW)
Duty cycle:	100	(%)
Maximum Pav :	30.40885026	(mW)
Antenna gain (typical):	-0.51	(dBi)
Maximum antenna gain:	0.889201118	(numeric)
Prediction distance:	20	(cm)
Prediction frequency:	2412	(MHz)
MPE limit for uncontrolled exposure at prediction	1	(mW/cm2)
Power density at predication frequency at 20 (cm)	0.0053821	(mW/cm^2)

## **Measurement Result**

The predicted power density level at 20 cm is 0.0054 mW/cm2. This is below the uncontrolled exposure limit of 1 mW/cm2 at 2412.

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