

Produkte
Products

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<i>Test Report No.:</i>		<i>Page 1 of 75</i>			
Auftraggeber: <i>Client:</i>	Matsushita Electric Industrial Co., Ltd., Network Business Group 1-15, Matsuo-cho, Kadoma-city, Osaka, 571-8504 Japan				
Gegenstand der Prüfung: <i>Test item:</i>	Digital Still Camera				
Bezeichnung: DMC-TZ50 <i>Identification:</i>	Serien-Nr.: <i>Serial No.:</i>	000051, 000082			
Wareneingangs-Nr.: 213074370 <i>Receipt No.:</i>	Eingangsdatum: <i>Date of receipt:</i>	2008-03-06			
Prüfort: <i>Testing location:</i>	4-25-2 Kita-Yamata, Tsuzuki-ku, Yokohama 224-0021, Japan				
Prüfgrundlage: 47 CFR Part 15.247 (Subpart: C) <i>Test specification:</i> 47 CFR Part 15 Subpart: B [*] Refer to Note below ANSI C63.4-2003 Measurement of Digital Transmission Systems of March 23, 2005					
Prüfresultat: <i>Test Result:</i>	Der Prüfgegenstand entspricht oben genannter Prüfgrundlage(n). <i>The test item passed the test specification(s).</i>				
Prüflaboratorium: <i>Testing Laboratory:</i>	TÜV Rheinland Japan Ltd. - Global Technology Assessment Center 4-25-2 Kita-Yamata, Tsuzuki-ku, Yokohama 224-0021, Japan				
geprüft/ tested by:	kontrolliert/ reviewed by:				
2008-03-26 J.Baba / Inspector 	2008-03-26	M. Zietz / Reviewer 			
Datum <i>Date</i>	Name/Stellung <i>Name/Position</i>	Unterschrift <i>Signature</i>	Datum <i>Date</i>	Name/Stellung <i>Name/Position</i>	Unterschrift <i>Signature</i>
Sonstiges / Other Aspects:					
This test report covers the original application for the Digital Camera DMC-TZ50 (FCC ID: ACJ-DMC-TZ50)					
Note[*]: this part was only applied to the receiver part of the radio					
Abkürzungen: P(ass) = entspricht Prüfgrundlage F(ail) = entspricht nicht Prüfgrundlage N/A = nicht anwendbar N/T = nicht getestet		Abbreviations: P(ass) = passed F(ail) = failed N/A = not applicable N/T = not tested			
<p>Dieser Prüfbericht bezieht sich nur auf das o.g. Prüfmuster und darf ohne Genehmigung der Prüfstelle nicht auszugsweise vervielfältigt werden. Dieser Bericht berechtigt nicht zur Verwendung eines Prüfzeichens. <i>This test report relates to the a. m. test sample. Without permission of the test center this test report is not permitted to be duplicated in extracts. This test report does not entitle to carry any safety mark on this or similar products.</i></p>					

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TEST SUMMARY

3.2.1 ANTENNA REQUIREMENTS FCC 15.203, FCC 15.204

RESULT: PASS

5.1.1 CONDUCTED OUTPUT POWER AT ANTENNA TERMINALS FCC 15.247(B)(3)

RESULT: PASS

5.1.2 6dB BANDWIDTH FCC 15.247(A)(2)

RESULT: PASS

5.1.3 CONDUCTED SPURIOUS EMISSIONS FCC 15.247(D)

RESULT: PASS

5.1.4 PEAK POWER SPECTRAL DENSITY FCC 15.247(E)

RESULT: PASS

6.1.1 BAND EDGE RADIATED EMISSION FCC 15.247(D)

RESULT: Pass

6.1.2 MAINS TERMINAL CONTINUOUS DISTURBANCE VOLTAGE FCC PART 15.207

RESULT: PASS

**6.1.3 RADIATED EMISSION OUT-OF-BAND AND SPURIOUS EMISSION FCC PART
15.247(D)/15.205/15.209**

RESULT: PASS

6.1.4 RADIATED EMISSION SPURIOUS EMISSION FOR RECEIVER FCC PART 15.109

RESULT: PASS

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1. General Remarks

1.1 Complementary Materials

All attachments are integral parts of this test report.

1.2 FCC Cross-Reference Table

The results of emission measurements and product related information contained in this test report and the attached materials relate to the contents of the FCC standard report in the following way:

FCC § / Heading

1.1 Product Description	See 3.1
1.2 Tested System Details	See 4.2
1.3 Test Methodology	See 4.1
1.4 Test Facility	See 2.1
3.2 EUT Exercise Software	See 4.3
3.3 Special Accessories	See 4.4
3.4 Equipment Modifications	See 4.5
3.5 Configuration of Tested System	See 4.2

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2. Test Sites

2.1 Test Facilities

TÜV Rheinland Japan Ltd. - Global Technology Assessment Center
4-25-2 Kita-Yamata, Tsuzuki-ku, Yokohama 224-0021, Japan

The used test equipment is in accordance with CISPR 16 for measurement of radio interference.

The Federal Communication Commission has reviewed the technical characteristics of the radiated and conducted emission facility, and has found these test facilities to be in compliance with the requirements of section 2.948 of the FCC rules.

The description of the test facility is listed under FCC registration number 299054

The Industry Canada has reviewed the technical characteristics of the radiated and conducted emission facility, and has found these test facilities to be in compliance
The description of the test facility is listed under O.A.T.S filing number 3466B.

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2.2 List of Test and Measurement Instruments

Test Equipment calibration is traceable to NIST

Table 1: List of Test and Measurement Equipment

kind of equipment	manufacturer	type	S/N	calibrated until
RECEIVER	ROHDE & SCHWARZ	ESU8	100025	2009-02
RECEIVER	ROHDE & SCHWARZ	ESU40	100029	2009-01
SPECTRUM ANALYZER	ROHDE & SCHWARZ	FSP30	10006/30	2008-08
ANTENNA	SCHWARZBECK	VULB9168 (30 - 1000M)	0245	2008-04
ANTENNA	SCHWARZBECK	BBHA9120B	419	2008-03
ANTENNA	TOYO	HAP06-18W	00000025	2008-03
ANTENNA	TOYO	HAP18-26N	00000010	2008-03
PRE AMPLIFIER	HEWLETT PACKARD	8447D	2944A08481	2009-01
PRE AMPLIFIER	TOYO	TPA0108-40	0634	2008-03
POWER METER	Agilent	N1911A	MY45101408	2009-01
POWER SENSOR	Agilent	N1921A	MY45241752	2009-01
Band Reject Filter	TOYO CORPORATION	NF-49BT	027	-/-
RF SELECTOR	TOYO CORPORATION	NS4900	N/A	2009-01

2.3 Measurement Uncertainty

Measurement Type	Frequency	Uncertainty
Antenna Port Conducted Emissions	< 1GHz	±0.39dB
	> 1GHz	±0.68dB
AC Conducted Emission	150kHz-30MHz	±3.17dB
Radiated Emission	9kHz-30MHz	±4.77dB
	30-1000MHz	±5.11dB
	1-40GHz	±5.19dB

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3. General Product Information

3.1 Product Function and Intended Use

The **EUT** (Equipment Under Test) DMC-TZ50 is a digital camera intended to be produced for the general market. The 802.11 b/g radio will be one of the functions available to this product in order to transfer data.

3.2 System Details

Radio Standard:	IEEE 802.11b/g
Specified power output:	22.0dBm peak (12.9dBm average)
Antenna gain:	+0 dBi
Antenna type:	PCB stripline antenna
Mounting type:	Internal
Frequency range:	2412 – 2462 MHz
Number of channel:	11
Channel spacing:	5 MHz
Modulation type:	802.11 b BPSK, QPSK, CCK 802.11 g BPSK, QPSK, 16 QAM, 64 QAM
FCC Classification:	DTS
Protection Class:	I

Type	Model	Rated Voltage	Rated Current	Supply
(EUT) Digital Camera	DMC-TZ50	5.1V	Unspecified	Via Internal Battery or to AC adapter
(EUT) AC power supply	DMW-AC5PP	(110-240)V	Unspecified	Mains Direct
(EUT) Battery Charger	DE-A45B	(110-240)V	Unspecified	Mains Direct
(EUT) Battery Pack	CGA-S007A	3.7V	Unspecified	N/A

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3.2.1 Antenna Requirements FCC 15.203, FCC 15.204

RESULT:**PASS**

The EUT has an internal antenna which is not user accessible. Hence it complies with the requirements.

3.3 Clock Frequencies

The EUT generates internally following clock frequencies:

24 MHz(external PCB)
38.4 MHz

3.4 Independent Operation Modes

The justification and manipulation of cables and equipment in order to simulate a worst-case behavior of the test setup has been carried out as prescribed in ANSI C63.4: 2003. Testing was performed at the lowest operating frequency (2412 MHz), the operating frequency in the middle of the specified frequency band (2437 MHz) and the highest operating frequency (2462 MHz).

The basic operation modes are:

- A. EUT transmits at lowest Channel (2412 MHz) modulation ON, continuous data streaming with 100% duty cycle.
- B. EUT transmits at middle Channel (2437 MHz) modulation ON, continuous data streaming with 100% duty cycle.
- C. EUT transmits at highest Channel (2462 MHz) modulation ON, continuous data streaming with 100% duty cycle.
- D. EUT receives packets with 802.11 b radio
- E. EUT receives packets with 802.11 g radio

3.5 Noise Suppressing Parts

None mentioned explicitly.

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4. Test Set-up and Operation Modes

4.1 Test Methodology

The test methodology used is based on the requirements of 47 CFR Part 15 (2007-04-05), sections 15.31, 15.33, 15.35, 15.205, 15.209 and Measurement of Digital Transmission Systems Operating under Section 15.247.

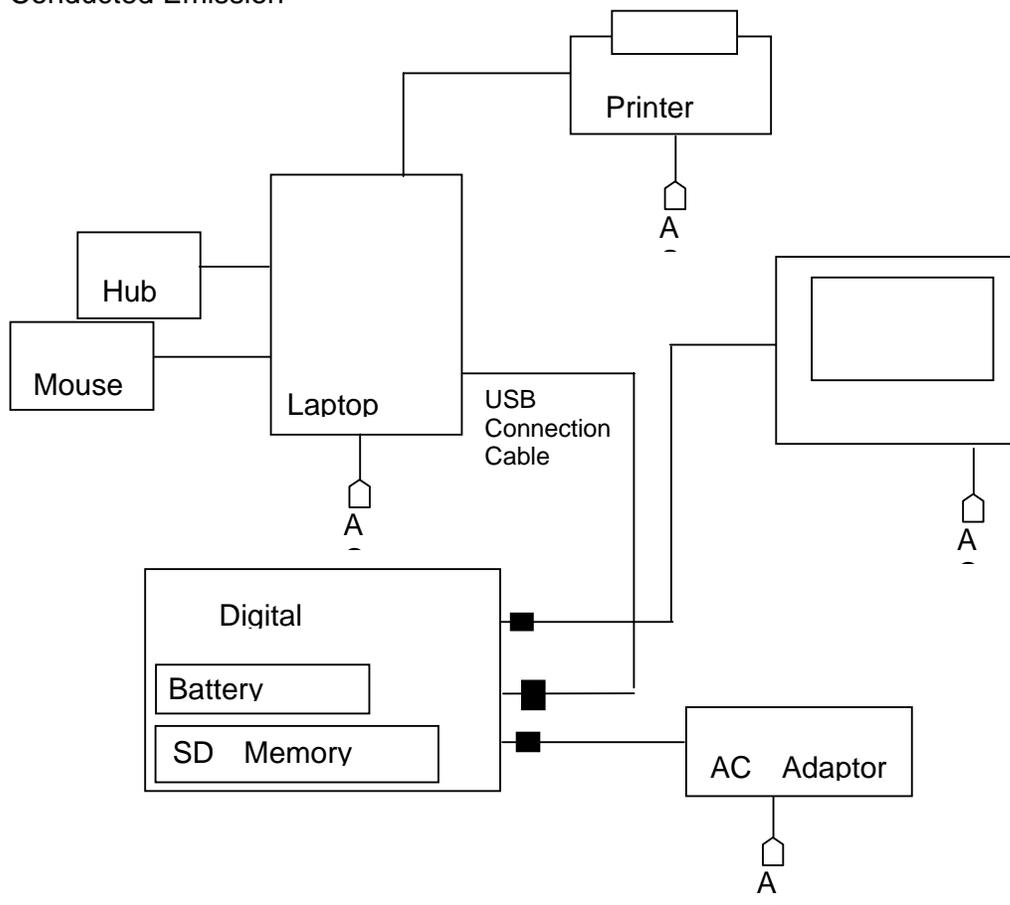
The test methods, which have been used, are based on ANSI C63.4: 2003.
Details see under each test.

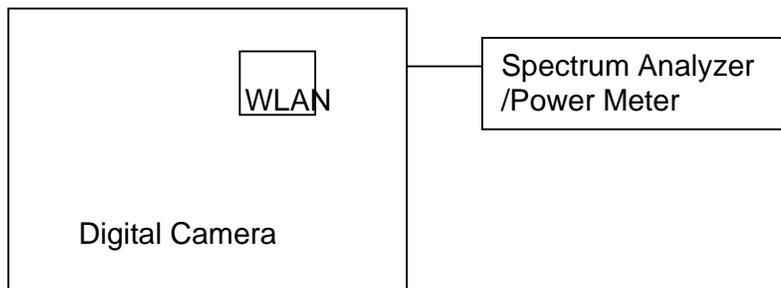
4.2 Physical Configuration for Testing

Refer to section: Photographs of the Test Set-Up

Figure 1: Test setup

Radiated Emission (diagram without the printer)
Conducted Emission



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*Page 12 of 75***Conducted testing****4.3 Test Operation and Test Software**

The EUT had built-in test modes.

The EUT was exercised in the operation modes listed under 3.3 as appropriate.

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4.4 Special Accessories and Auxiliary Equipment

The product has been tested together with the following additional accessory

Product:	Manufacturer:	Model:	Serial Number:	Voltage/Rating:
TV	SHARP	LC-15S4-S	4709366	100-240 50/60Hz
Laptop	IBM	0639-A3J	L3-AK121 07/02	100-240 50/60Hz
Mouse	DELL	OYH933	G0601Z2O	-
Hub	Buffalo	BBR-4WG	86471276112009[[G]]	100-240 50/60Hz
Printer	Hewlett Packard	C4224A	USDG022308	AC100-127V, 50/60Hz

4.5 Countermeasures to achieve EMC Compliance

No additional measures were employed to achieve compliance.

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5. Test Results Conducted Testing At Antenna Port

For conducted tests were performed at the test port available on the PCB..

5.1.1 Conducted Output Power at Antenna Terminals FCC 15.247(b)(3)

RESULT:**PASS**

Date of testing: 2008-03-11

Ambient temperature: 22.0 °C

Relative humidity: 28 %

Requirements:

For systems using digital modulation in the 2400-2483.5MHz band the maximum peak output power is 1 watt (30 dBm).

Test procedure:

ANSI C63.4-2003 and Measurement of Digital Transmission Systems Operating under Section 15.247.

The maximum peak and average output power (conducted) was measured directly (without additional cable) at the antenna connector with the power meter.

The EUT was connected to its dedicated AC power supply during testing.

Table 2: Conducted output power

Power (dBm) 802.11(b) Average					Limit (dBm)
	1Mbps	2Mbps	5.5Mbps	11Mbps	
Lo (2412MHz)	10.80	10.70	10.70	10.75	30
Mid (2437MHz)	11.50	11.50	11.85	11.50	30
Hi (2462MHz)	12.70	12.55	12.90	12.90	30
Power (dBm) 802.11(b) Peak					Limit (dBm)
	1Mbps	2Mbps	5.5Mbps	11Mbps	
Lo (2412MHz)	13.27	12.88	12.32	13.33	30
Mid (2437MHz)	14.14	14.58	13.54	14.56	30
Hi (2462MHz)	15.27	15.23	14.60	15.70	30

Power (dBm) 802.11(g) Average									Limit (dBm)
	6Mbps	9Mbps	12Mbps	18Mbps	24Mbps	36Mbps	48Mbps	54Mbps	
Lo (2412MHz)	9.90	10.50	10.50	10.00	9.95	10.50	10.00	10.05	30
Mid (2437MHz)	11.10	11.25	11.20	11.25	11.15	11.20	10.65	11.25	30
Hi (2462MHz)	12.75	12.75	12.25	12.25	12.20	12.30	12.30	12.70	30
Power (dBm) 802.11(g) Peak									Limit (dBm)
	6Mbps	9Mbps	12Mbps	18Mbps	24Mbps	36Mbps	48Mbps	54Mbps	
Lo (2412MHz)	19.29	20.33	20.17	19.80	19.73	20.30	19.71	20.26	30
Mid (2437MHz)	20.60	20.78	20.90	20.81	20.64	20.92	20.78	20.88	30
Hi (2462MHz)	21.50	21.75	21.90	21.59	21.88	22.00	21.65	22.00	30

The worst case configuration was found for the power output of the 802.11(b) radio at 11Mbps and 802.11(g) at 54Mbps. These two test modes will be used for the rest of evaluation of the product.

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5.1.2 6dB Bandwidth FCC 15.247(a)(2)
RESULT:
PASS

Date of testing: 2008-02-21

Ambient temperature: 18.4 °C

Relative humidity: 38 %

Requirements:

For systems using digital modulation in the 2400-2483.5MHz band the minimum 6dB bandwidth shall be at least 500 kHz.

Test procedure:

ANSI C63.4-2003

The output connector is connected to a spectrum analyzer. The spectrum analyzer resolution bandwidth was set at 100kHz. In order to make an accurate measurement, set the span greater than RBW.

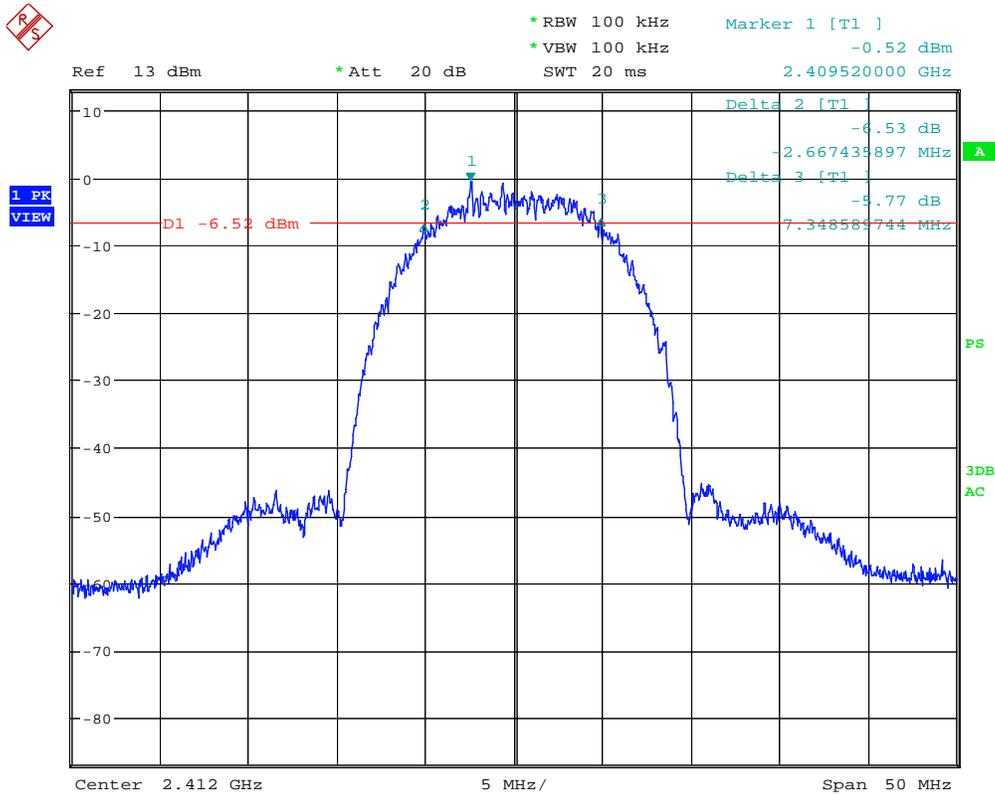
The 6dBc Bandwidth was measured by using the DELTA MARKER function of the analyzer.

The EUT was connected to its dedicated AC power supply during testing.

Table 3: 6dB Bandwidth

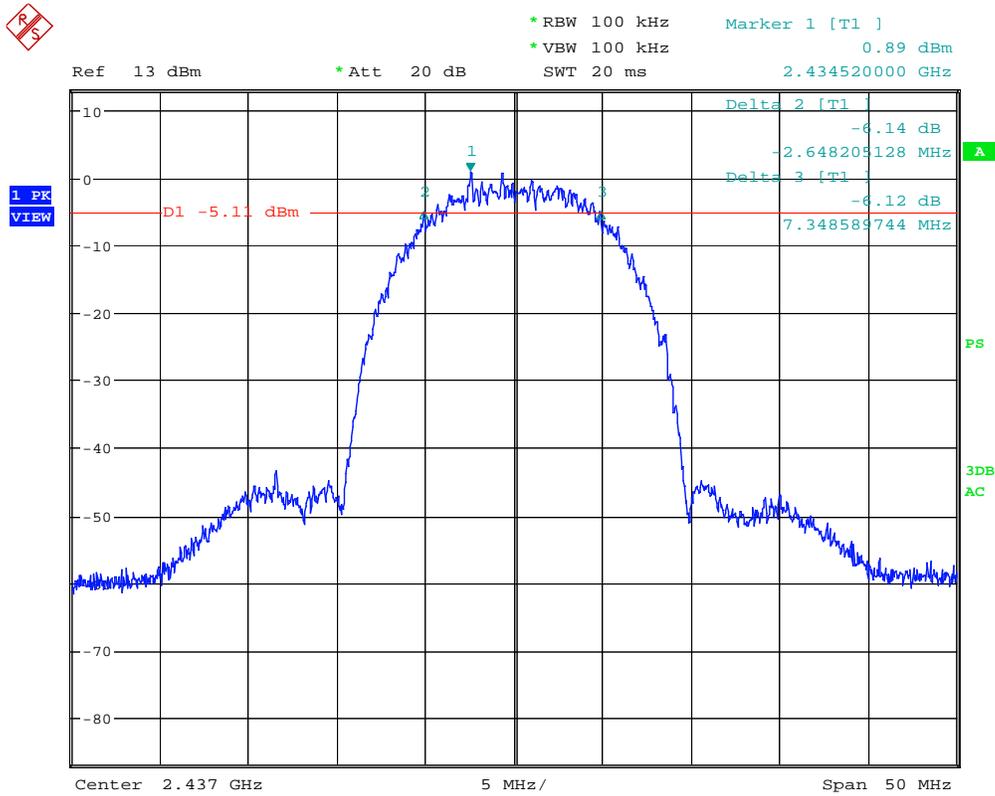
Bandwidth 802.11(b) Radio		
Frequency (MHz)	Lower Limit (kHz)	6dB Bandwidth (MHz)
2412	500	10.02
2437	500	10.00
2462	500	10.02
Bandwidth 802.11(g) Radio		
Frequency (MHz)	Lower Limit (kHz)	6dB Bandwidth (MHz)
2412	500	16.57
2437	500	16.61
2462	500	16.55

Figure 2: 6dB Bandwidth of 2412MHz 802.11(b) (Channel 1)



AC 01ch 6dB 11b(11M)
Date: 21.MAR.2008 14:11:18

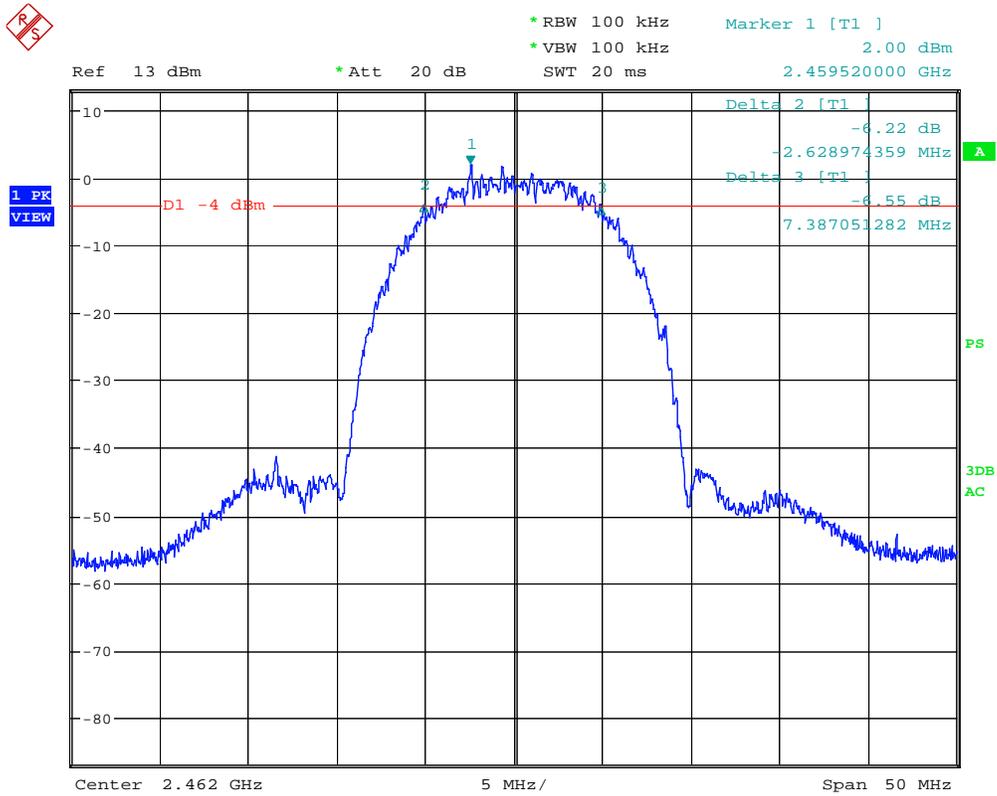
Figure 3: 6dB Bandwidth of 2437MHz 802.11(b) (Channel 6)



AC 06ch 6dB 11b(11M)

Date: 21.MAR.2008 14:13:14

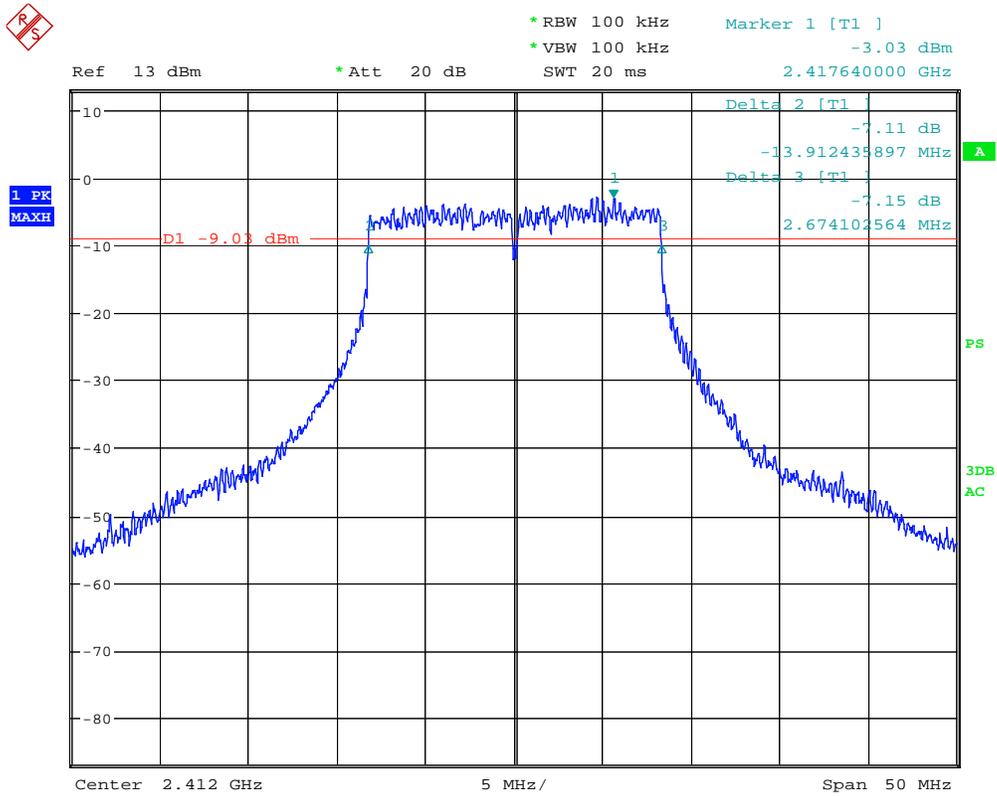
Figure 4: 6dB Bandwidth of 2462MHz 802.11(b) (Channel 11)



AC 11ch 6dB 11b(11M)

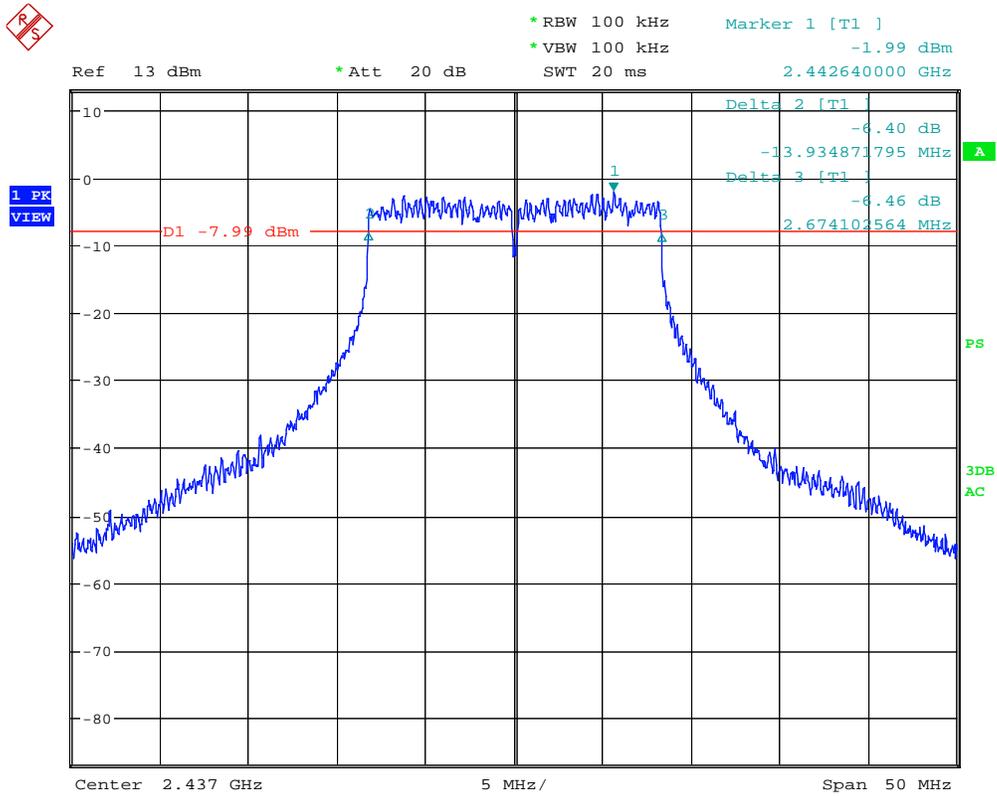
Date: 21.MAR.2008 14:21:04

Figure 5: 6dB Bandwidth of 2412MHz 802.11(g) (Channel 1)



AC 01ch 6dB 11g(54M)
Date: 21.MAR.2008 13:59:33

Figure 6: 6dB Bandwidth of 2437MHz 802.11(g) (Channel 6)



AC 06ch 6dB 11g(54M)

Date: 21.MAR.2008 14:02:03

5.1.3 Conducted Spurious Emissions FCC 15.247(d)

RESULT: PASS

Date of testing: 2008-03-06 and 2008-03-17

Ambient temperature: 22.0 °C and 22.0 °C

Relative humidity: 29 % and 34%

Requirements:

In any 100 kHz bandwidth outside the frequency band, the RF power shall be at least 20 dB below that of the maximum in-band 100 kHz emission.

Test procedure:

ANSI C63.4-2003

A spectrum analyzer was connected to the antenna port of the transmitter. Analyzer Resolution Bandwidth was set to 100 kHz. For each channel investigated, the in-band and out-of-band emission measurements were performed. The out-of-band emissions were measured from 30 MHz to 25 GHz (10th harmonics).

The EUT was connected to its dedicated AC power supply during testing.

Table 4: Conducted Spurious Emissions of 2412MHz 802.11(b) (Mode A)

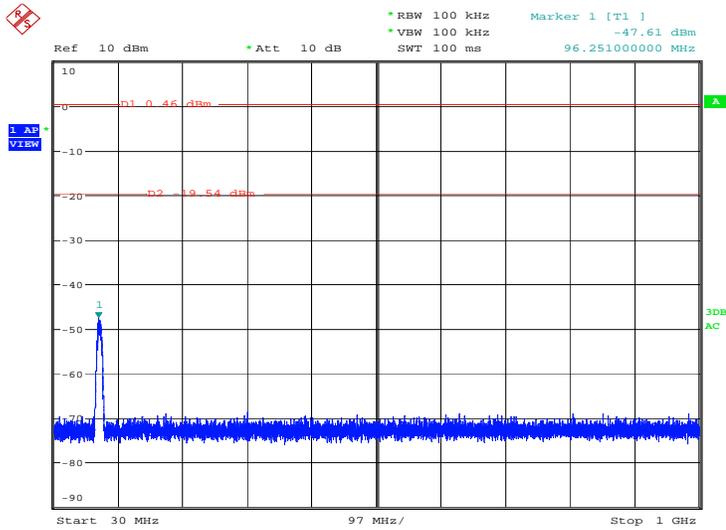
Frequency (MHz)	Reading (dBm)	Correction factor (dB)	Emission level (dBm)	Limit (dBm)	Margin (dB)
2409.60	0.46	1.16	1.62	N/A	N/A
96.25	-47.61	0.23	-47.38	-18.38	29.00
4824.40	-58.72	1.70	-57.02	-18.38	38.64
9648.50	-67.79	2.44	-65.35	-18.38	46.97
19025.00	-68.21	3.13	-65.08	-18.38	46.70
21445.00	-68.09	3.59	-64.50	-18.38	46.12

Notes : 1) Limit = (Reading fundamental) + (Correction factor) – 20

2) Emission level = (Reading) + (Correction factor)

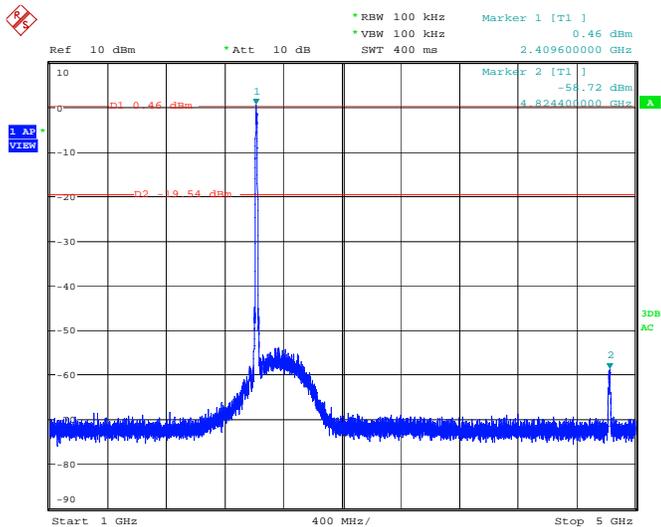
3) Correction factor = Cable loss

Figure 8: Operating 2412MHz 802.11(b) (Channel 1) spurious from 30MHz to 1GHz



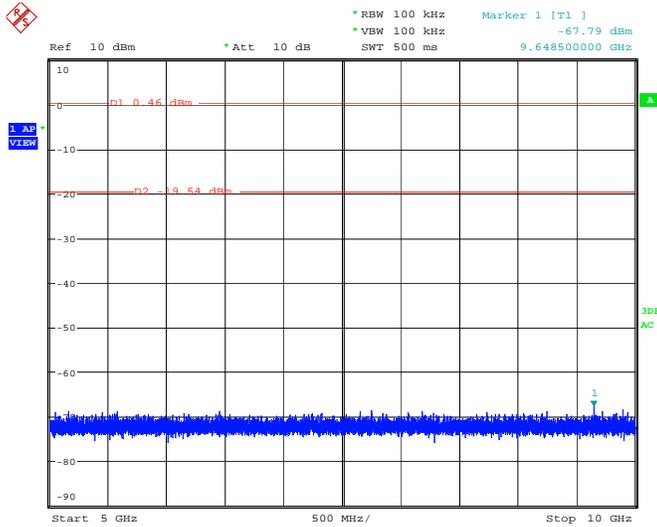
AC 01ch
Date: 6.MAR.2008 15:33:53

Figure 9: Operating 2412MHz 802.11(b) (Channel 1) spurious from 1GHz to 5GHz



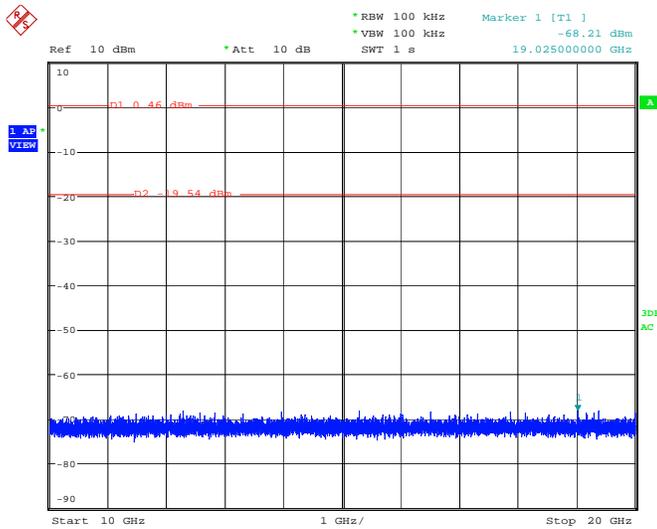
AC 01ch
Date: 6.MAR.2008 15:33:22

Figure 10: Operating 2412MHz 802.11(b) (Channel 1) spurious from 5GHz to 10GHz



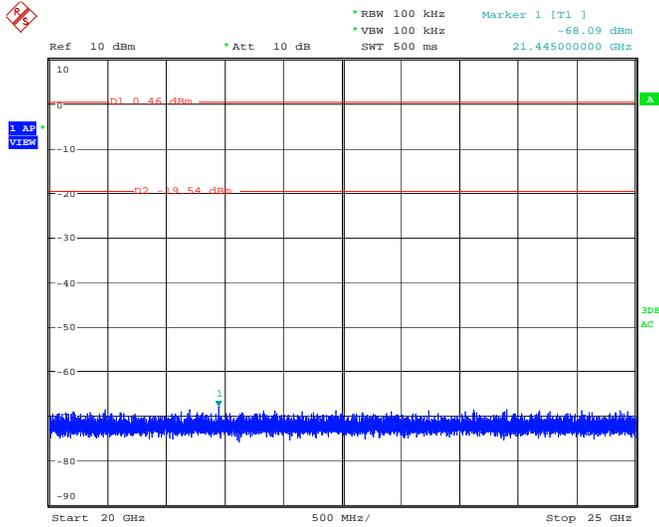
AC 01ch
Date: 6.MAR.2008 15:34:28

Figure 11: Operating 2412MHz 802.11(b) (Channel 1) spurious from 10GHz to 20GHz



AC 01ch
Date: 6.MAR.2008 15:35:08

Figure 12: Operating 2412MHz 802.11(b) (Channel 1) spurious from 20GHz to 25GHz



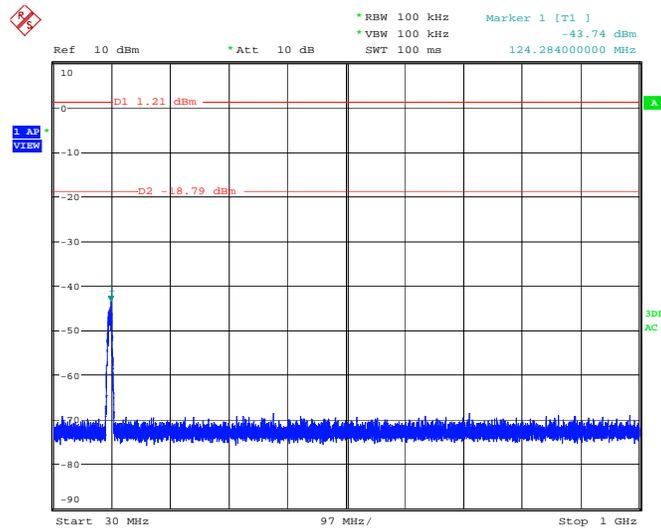
AC 01ch
Date: 6.MAR.2008 15:35:37

Table 5: Conducted Spurious Emissions of 2437MHz 802.11(b) (Channel 6)

Frequency (MHz)	Reading (dBm)	Correction factor (dB)	Emission level (dBm)	Limit (dBm)	Margin (dB)
2436.40	1.21	1.17	2.38	N/A	N/A
124.28	-43.74	0.27	-43.47	-17.62	25.85
4877.20	-58.74	1.70	-57.04	-17.62	39.41
9748.50	-67.95	2.49	-65.46	-17.62	47.83
19497.00	-66.56	3.16	-63.40	-17.62	45.78
22806.00	-68.59	4.27	-64.32	-17.62	46.70

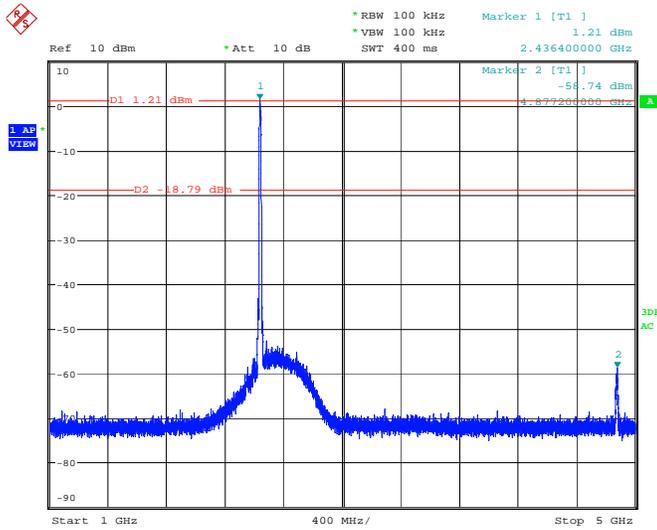
- Notes :
- 1) Limit = (Reading fundamental) + (Correction factor) – 20
 - 2) Emission level = (Reading) + (Correction factor)
 - 3) Correction factor = Cable loss

Figure 13: Operating 2437MHz 802.11(b) (Channel 6) spurious from 30MHz to 1GHz



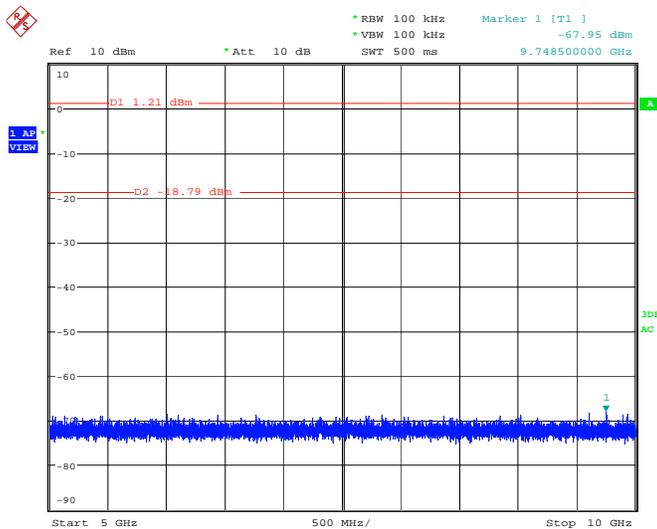
AC 06ch
Date: 6.MAR.2008 15:28:48

Figure 14: Operating 2437MHz 802.11(b) (Channel 6) spurious from 1GHz to 5GHz



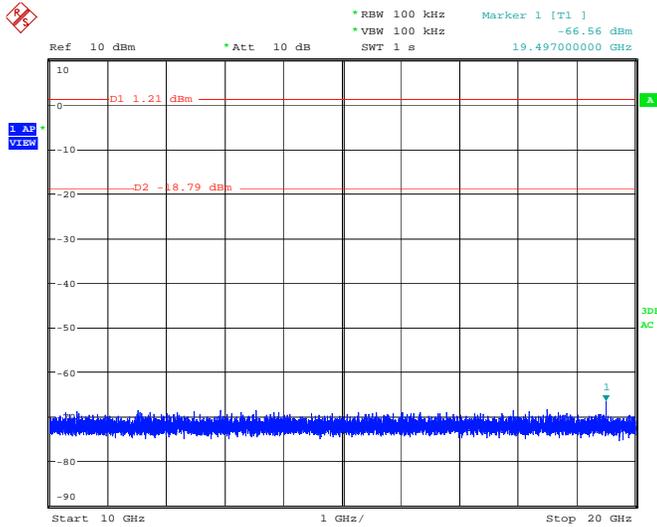
AC 06ch
Date: 6.MAR.2008 15:28:00

Figure 15: Operating 2437MHz 802.11(b) (Channel 6) spurious from 5GHz to 10GHz



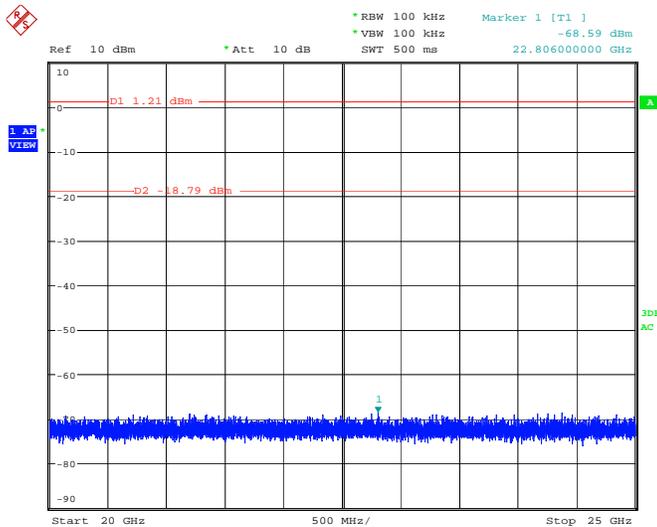
AC 06ch
Date: 6.MAR.2008 15:29:19

Figure 16: Operating 2437MHz 802.11(b) (Channel 6) spurious from 10GHz to 20GHz



AC 06ch
Date: 6.MAR.2008 15:29:52

Figure 17: Operating 2437MHz 802.11(b) (Channel 6) spurious from 20GHz to 25GHz



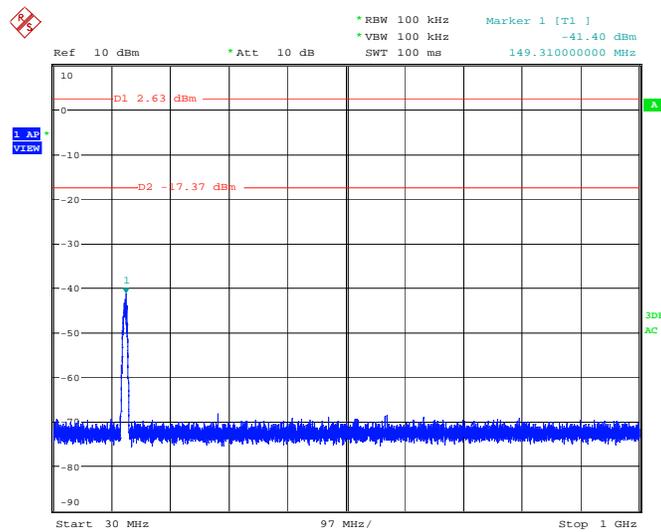
AC 06ch
Date: 6.MAR.2008 15:30:37

Table 6: Conducted Spurious Emissions of 2462MHz 802.11(b) (Channel 11)

Frequency (MHz)	Reading (dBm)	Correction factor (dB)	Emission level (dBm)	Limit (dBm)	Margin (dB)
2459.60	2.63	1.17	3.80	N/A	N/A
149.31	-41.4	0.29	-41.11	-16.20	24.91
4927.20	-57.26	1.72	-55.54	-16.20	39.34
9848.50	-67.17	2.55	-64.62	-16.20	48.42
12310.00	-66.82	2.82	-64.00	-16.20	47.80
19697.00	-67.6	3.35	-64.25	-16.20	48.05
21347.50	-67.37	3.65	-63.72	-16.20	47.52

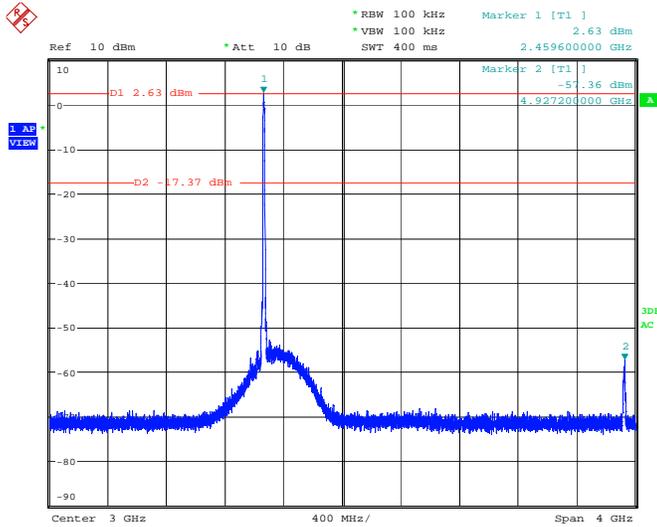
- Notes :
- 1) Limit = (Reading fundamental) + (Correction factor) – 20
 - 2) Emission level = (Reading) + (Correction factor)
 - 3) Correction factor = Cable loss

Figure 18: Operating 2462MHz 802.11(b) (Channel 11) spurious from 30MHz to 1GHz



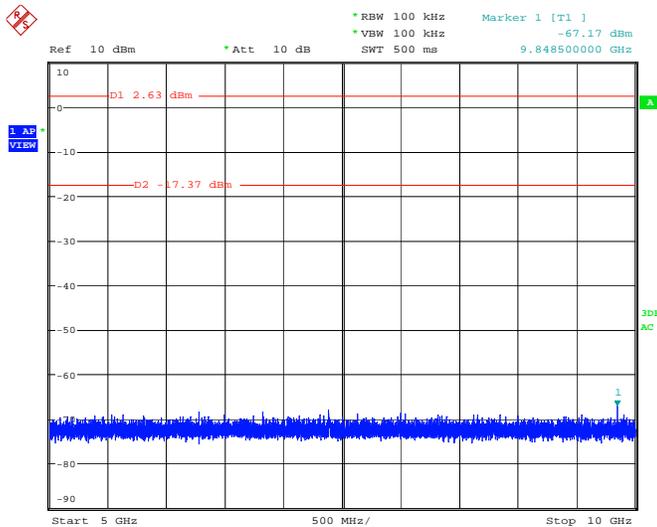
AC 11ch
Date: 6.MAR.2008 15:24:37

Figure 19: Operating 2462MHz 802.11(b) (Channel 11) spurious from 1GHz to 5GHz



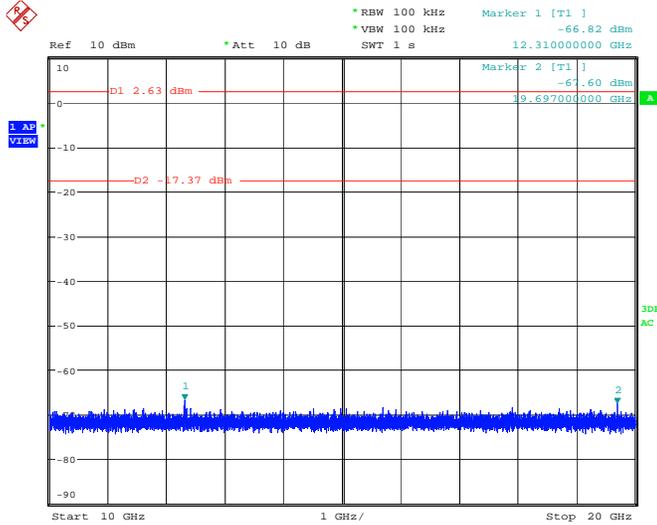
AC 11ch
Date: 6.MAR.2008 15:23:52

Figure 20: Operating 2462MHz 802.11(b) (Channel 11) spurious from 5GHz to 10GHz



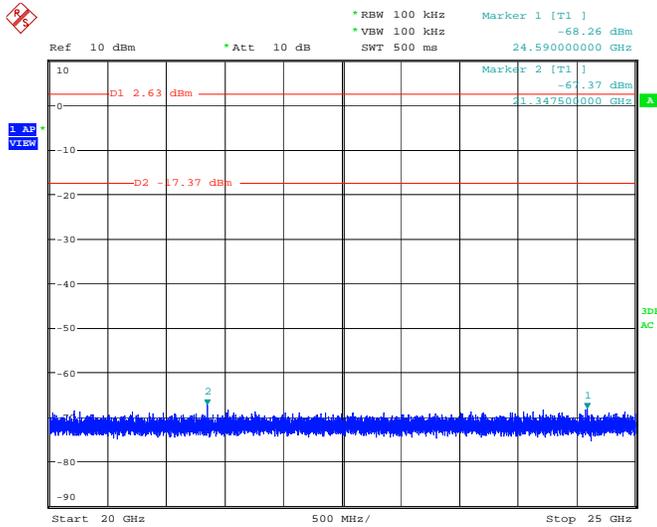
AC 11ch
Date: 6.MAR.2008 15:25:07

Figure 21: Operating 2462MHz 802.11(b) (Channel 11) spurious from 10GHz to 20GHz



AC 11ch
Date: 6.MAR.2008 15:25:54

Figure 22: Operating 2462MHz 802.11(b) (Channel 11) spurious from 20GHz to 25GHz



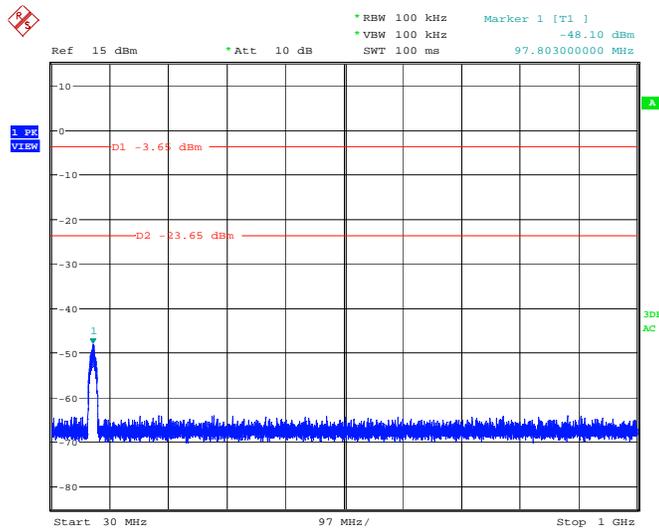
AC 11ch
Date: 6.MAR.2008 15:26:38

Table 7: Conducted Spurious Emissions of 2412MHz 802.11(g) (Channel 1)

Frequency (MHz)	Reading (dBm)	Correction factor (dB)	Emission level (dBm)	Limit (dBm)	Margin (dB)
2416.40	-3.65	1.17	-2.48	N/A	N/A
97.80	-48.10	0.23	-47.87	-22.48	25.38
4824.40	-60.67	1.70	-58.97	-22.48	36.48
7584.50	-63.71	2.23	-61.48	-22.48	39.00
10246.00	-63.41	2.56	-60.85	-22.48	38.36
16688.00	-63.41	2.91	-60.50	-22.48	38.02
22662.00	-63.58	3.80	-59.78	-22.48	37.30

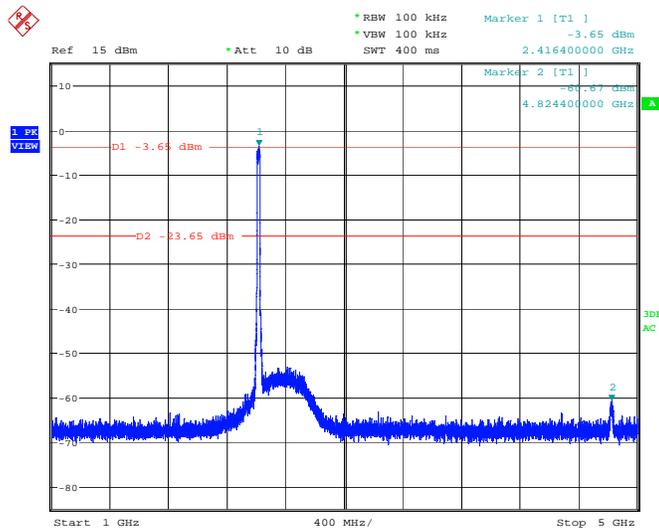
- Notes :
- 1) Limit = (Reading fundamental) + (Correction factor) – 20
 - 2) Emission level = (Reading) + (Correction factor)
 - 3) Correction factor = Cable loss

Figure 23: Operating 2412MHz 802.11(g) (Channel 1) spurious from 30MHz to 1GHz



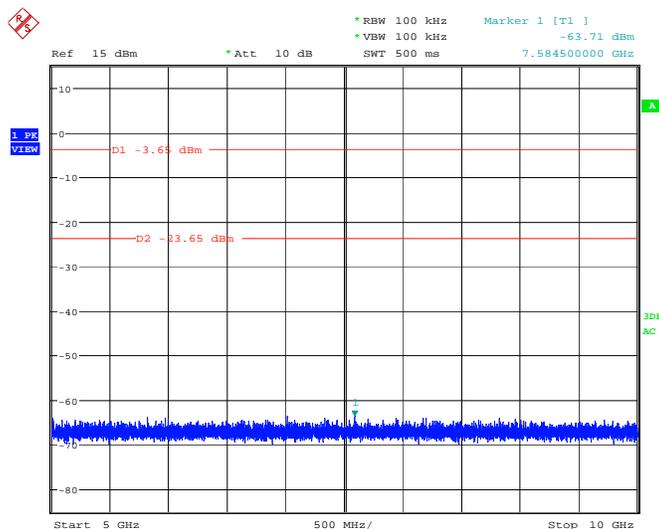
ch01
Date: 17.MAR.2008 11:28:11

Figure 24: Operating 2412MHz 802.11(g) (Channel 1) spurious from 1GHz to 5GHz



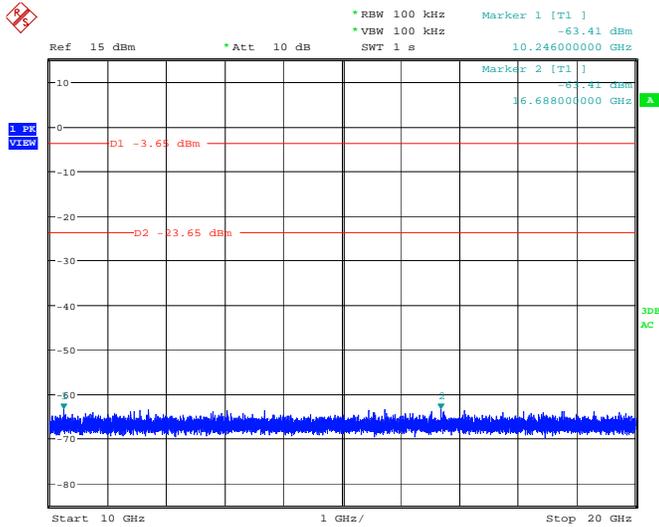
ch01
Date: 17.MAR.2008 11:23:29

Figure 25: Operating 2412MHz 802.11(g) (Channel 1) spurious from 5GHz to 10GHz



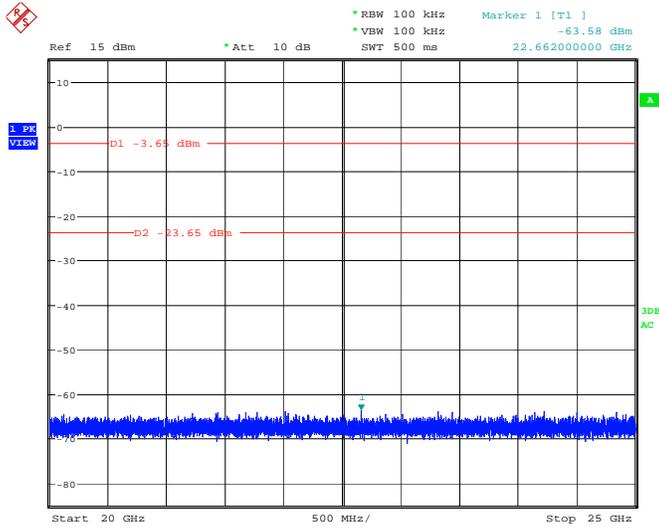
ch01
Date: 17.MAR.2008 11:24:34

Figure 26: Operating 2412MHz 802.11(g) (Channel 1) spurious from 10GHz to 20GHz



ch01
Date: 17.MAR.2008 11:26:24

Figure 27: Operating 2412MHz 802.11(g) (Channel 1) spurious from 20GHz to 25GHz



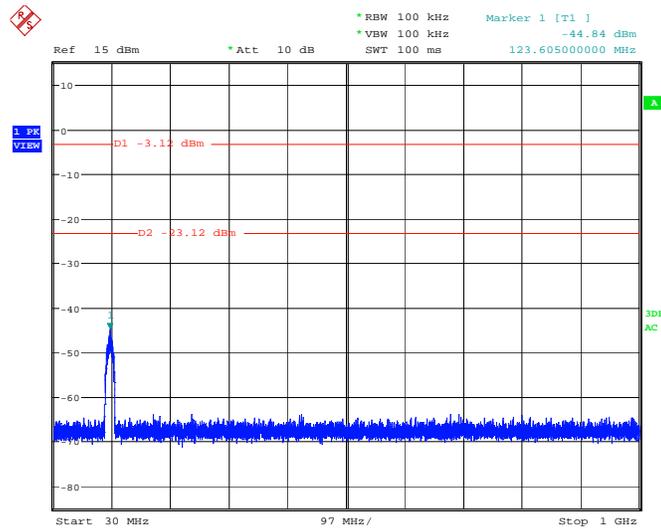
ch01
Date: 17.MAR.2008 11:27:36

Table 8: Conducted Spurious Emissions of 2437MHz 802.11(g) (Channel 6)

Frequency (MHz)	Reading (dBm)	Correction factor (dB)	Emission level (dBm)	Limit (dBm)	Margin (dB)
2442.80	-3.12	1.17	-1.95	N/A	N/A
123.6	-44.84	0.27	-44.57	-21.95	22.63
4876.40	-59.57	1.70	-57.87	-21.95	35.92
6915.50	-63.44	2.14	-61.30	-21.95	39.35
15562.00	-63.14	2.94	-60.20	-21.95	38.25
22063.00	-63.36	3.65	-59.71	-21.95	37.77

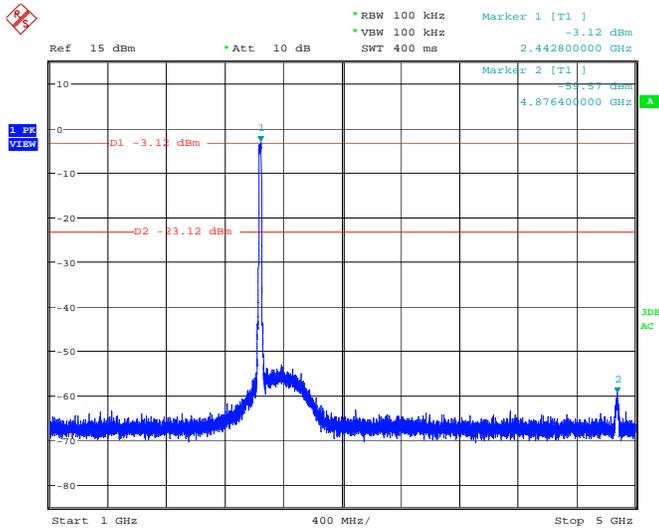
- Notes :
- 1) Limit = (Reading fundamental) + (Correction factor) – 20
 - 2) Emission level = (Reading) + (Correction factor)
 - 3) Correction factor = Cable loss

Figure 28: Operating 2437MHz 802.11(g) (Channel 6) spurious from 30MHz to 1GHz



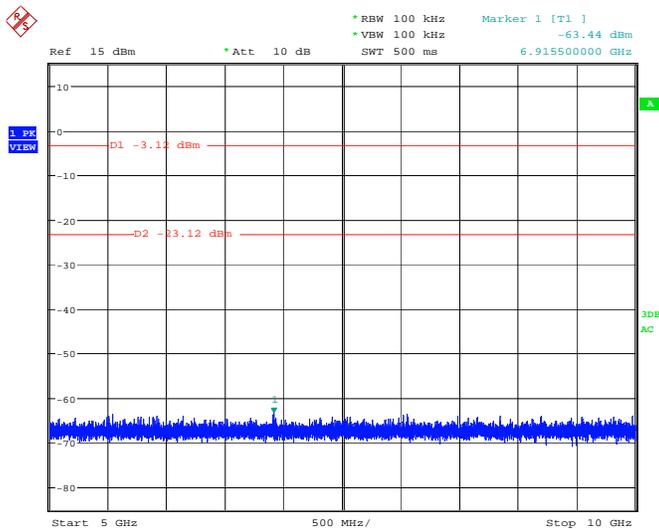
ch06
Date: 17.MAR.2008 11:33:15

Figure 29: Operating 2437MHz 802.11(g) (Channel 6) spurious from 1GHz to 5GHz



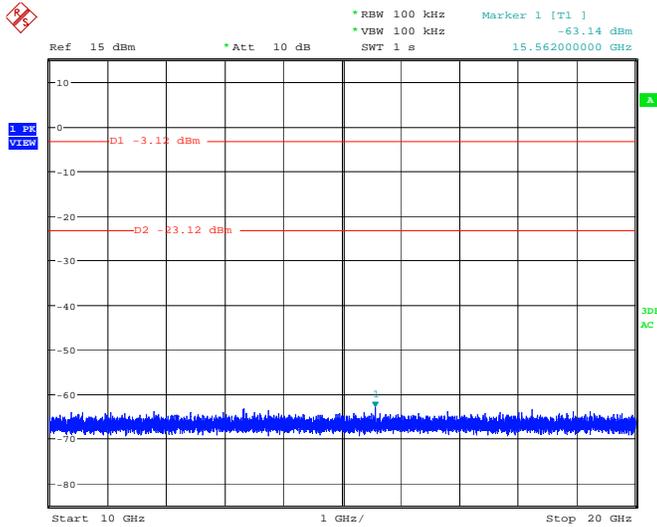
ch06
Date: 17.MAR.2008 11:29:50

Figure 30: Operating 2437MHz 802.11(g) (Channel 6) spurious from 5GHz to 10GHz



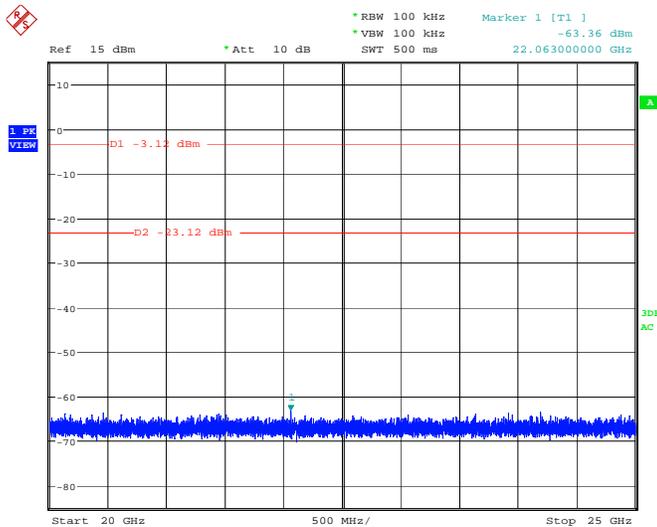
ch06
Date: 17.MAR.2008 11:30:36

Figure 31: Operating 2437MHz 802.11(g) (Channel 6) spurious from 10GHz to 20GHz



ch06
Date: 17.MAR.2008 11:31:36

Figure 32: Operating 2437MHz 802.11(g) (Channel 6) spurious from 20GHz to 25GHz



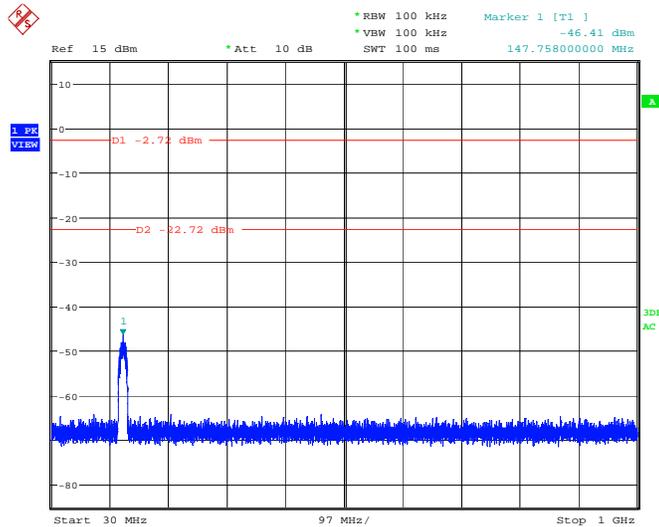
ch06
Date: 17.MAR.2008 11:32:31

Table 9: Conducted Spurious Emissions of 2462MHz 802.11(g) (Channel 11)

Frequency (MHz)	Reading (dBm)	Correction factor (dB)	Emission level (dBm)	Limit (dBm)	Margin (dB)
2466.80	-2.72	1.18	-1.54	N/A	N/A
147.85	-43.17	0.29	-42.88	-21.54	21.34
4924.00	-60.09	1.72	-58.37	-21.54	36.83
5722.50	-63.53	1.91	-61.62	-21.54	40.08
13848.00	-63.61	2.85	-60.76	-21.54	39.22
20264.50	-63.73	3.59	-60.14	-21.54	38.59

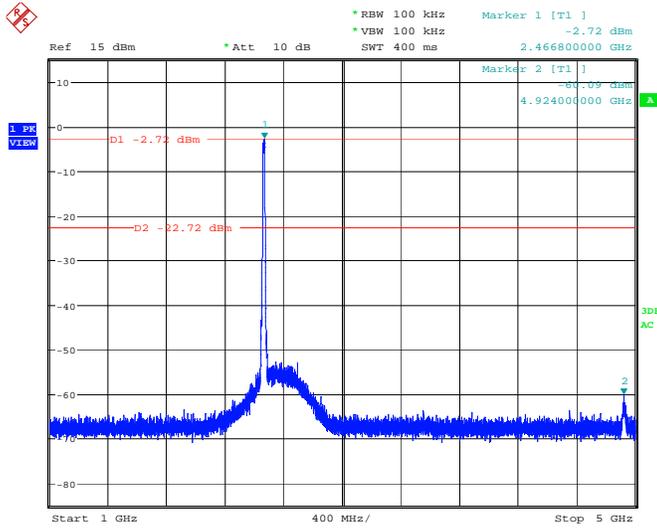
- Notes :
- 1) Limit = (Reading fundamental) + (Correction factor) – 20
 - 2) Emission level = (Reading) + (Correction factor)
 - 3) Correction factor = Cable loss

Figure 33: Operating 2462MHz 802.11(g) (Channel 11) spurious from 30MHz to 1GHz



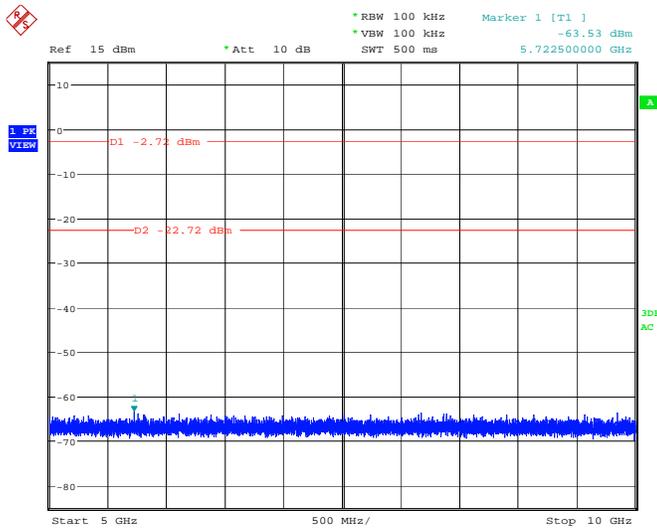
ch11
Date: 17.MAR.2008 11:38:23

Figure 34: Operating 2462MHz 802.11(g) (Channel 11) spurious from 1GHz to 5GHz



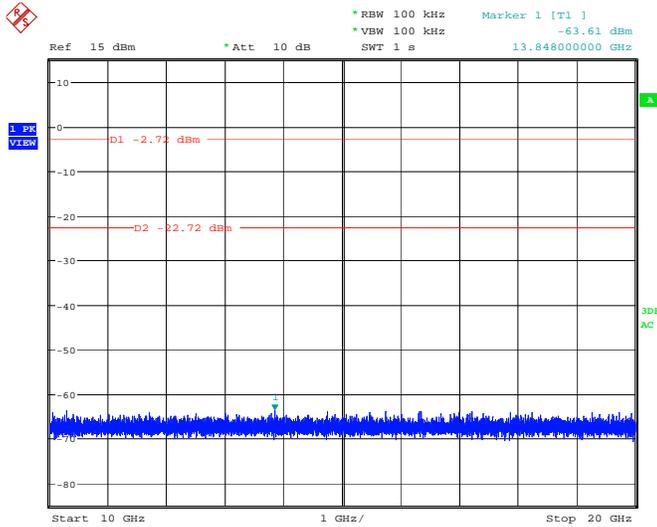
ch11
Date: 17.MAR.2008 11:35:04

Figure 35: Operating 2462MHz 802.11(g) (Channel 11) spurious from 5GHz to 10GHz



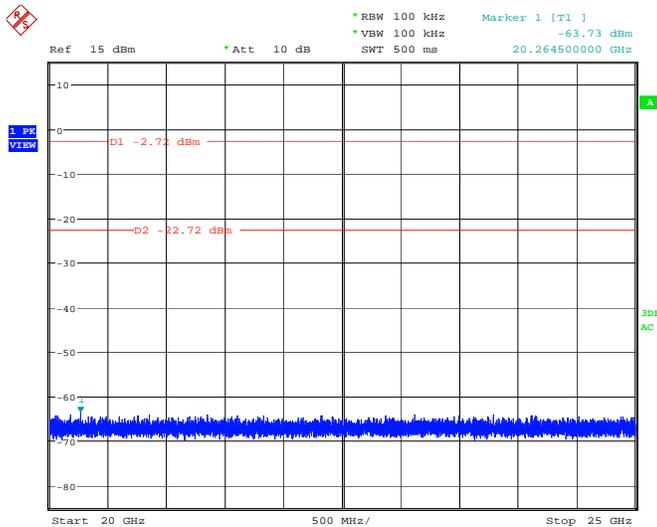
ch11
Date: 17.MAR.2008 11:36:02

Figure 36: Operating 2462MHz 802.11(g) (Channel 11) spurious from 10GHz to 20GHz



ch11
Date: 17.MAR.2008 11:36:58

Figure 37: Operating 2462MHz 802.11(g) (Channel 11) spurious from 20GHz to 25GHz



ch11
Date: 17.MAR.2008 11:37:37

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5.1.4 Peak Power Spectral Density FCC 15.247(e)

RESULT:
PASS

Date of testing: 2008-03-06 and 2008-03-17

Ambient temperature: 22.0 °C and 19.0 °C

Relative humidity: 29 % and 34.0%

Requirements:

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.

Test procedure:

ANSI C63.4-2003

A spectrum analyzer was connected to the antenna port of the transmitter. Analyzer Resolution Bandwidth was set to 3 kHz. The Video Bandwidth was set to 10 kHz, and the sweep time was set to 500sec.

The EUT was connected to its dedicated AC power supply during testing.

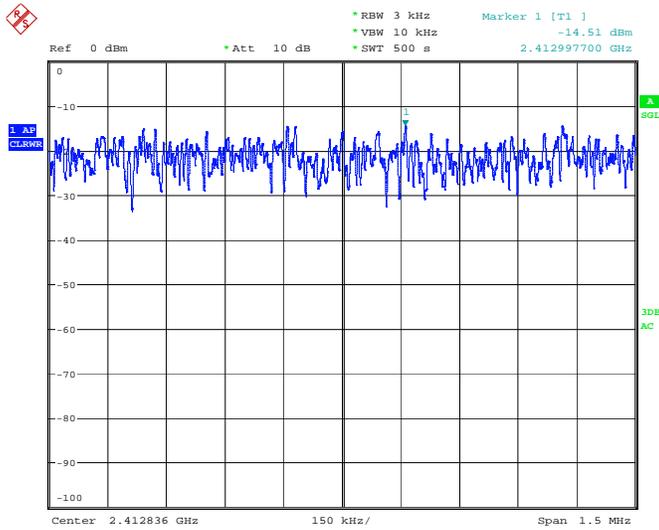
Table 10: Peak Power Spectral Density

Bandwidth 802.11(b) Radio					
Frequency (MHz)	Limit (dBm)	Reading (dBm)	Correction factor (dB)	Power Density (dBm)	Margin (dB)
2412	8	-14.51	1.17	-13.34	21.34
2437		-14.85	1.17	-13.68	21.68
2462		-12.36	1.18	-11.18	19.18
Bandwidth 802.11(g) Radio					
Frequency (MHz)	Limit (dBm)	Reading (dBm)	Correction factor (dB)	Power Density (dBm)	Margin (dB)
2412	8	-16.39	1.17	-15.22	23.22
2437		-15.08	1.17	-13.91	21.91
2462		-14.87	1.18	-13.69	21.69

Notes : 1) Power density = (Reading) + (Correction factor)

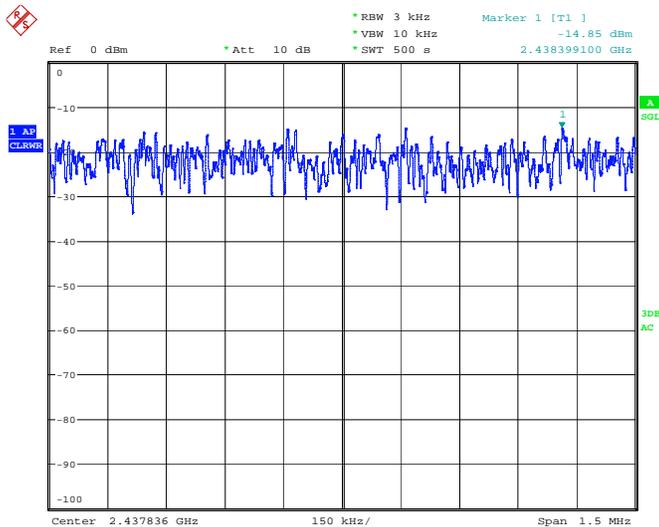
2) Correction factor = Cable loss

Figure 38: Power Spectral Density of 2412MHz 802.11(b) (Channel 1)



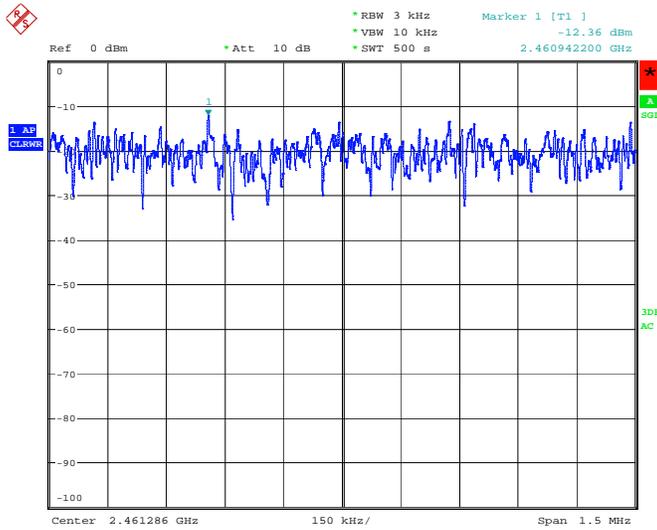
AC 01ch Power Density
Date: 6.MAR.2008 18:00:37

Figure 39: Power Spectral Density of 2437MHz 802.11(b) (Channel 6)



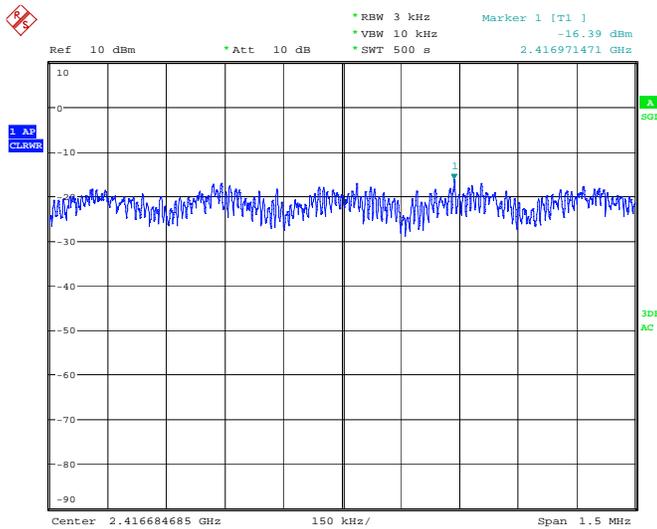
AC 06ch Power Density
Date: 6.MAR.2008 18:10:37

Figure 40: Power Spectral Density of 2462MHz 802.11(b) (Channel 11)



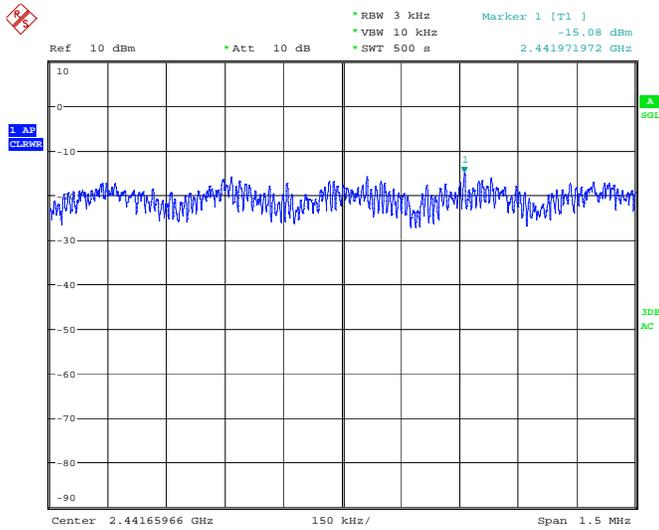
AC 11ch Power Density
Date: 6.MAR.2008 18:20:25

Figure 41: Power Spectral Density of 2412MHz 802.11(g) (Channel 1)



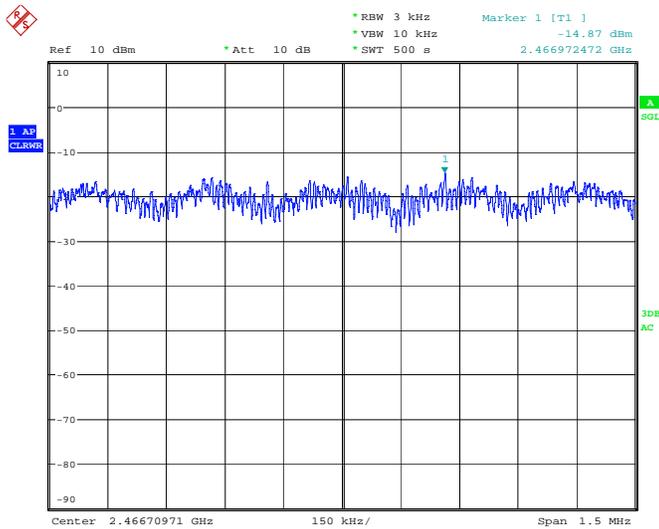
ch01 Power Spectral Density
Date: 17.MAR.2008 11:57:48

Figure 42: Power Spectral Density of 2437MHz 802.11(g) (Channel 6)



ch06 Power Spectral Density
Date: 17.MAR.2008 12:08:09

Figure 43: Power Spectral Density of 2462MHz 802.11(g) (Channel 11)



ch11 Power Spectral Density
Date: 17.MAR.2008 12:26:55

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6. Test Results Radiated Emissions

6.1.1 Band edge Radiated Emission FCC 15.247(d)

RESULT:**Pass**

Date of testing: 2008-03-12

Ambient temperature: 22.0°C

Relative humidity: 31%

Requirements:

Radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a).

Test procedure:

ANSI C63.4-2003

Measurements were made in a Semi Anechoic Chamber at a measurement distance of 3m.

The EUT was placed on a nonconductive turntable 0.8 meters above the ground plane. The EUT was rotated 360°, and the antenna was raised and lowered from 1 to 4 meters in order to determine the emission's maximum level. Measurements were taken using both horizontal and vertical antenna polarizations at 3 EUT positions (X, Y and Z).

Peak (1 MHz RBW/VBW) and average (1 MHz RBW/10 Hz VBW) radiated measurements were taken with a suitable span to encompass the peak of the fundamental. The EUT was arranged in order to maximize emissions.

The EUT was connected to its dedicated AC power supply during testing.

The highest emission amplitudes relative to the appropriate limit were recorded in this report.

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Table 11: Maximum Band Edge Radiated Emission 802.11(b)

Operating Frequency (MHz)	Polarity/ Axis	Peak Value (dBuV/m)	Average Value (dBuV/m)	Peak Limit (dBuV/m)	Average Limit (dBuV/m)	Peak Margin (dB)	Average Margin (dB)
2412	Hori X	45.85	34.87	74.0	54.0	28.15	19.13
2462	Vert Y	43.59	30.06	74.0	54.0	30.41	23.94

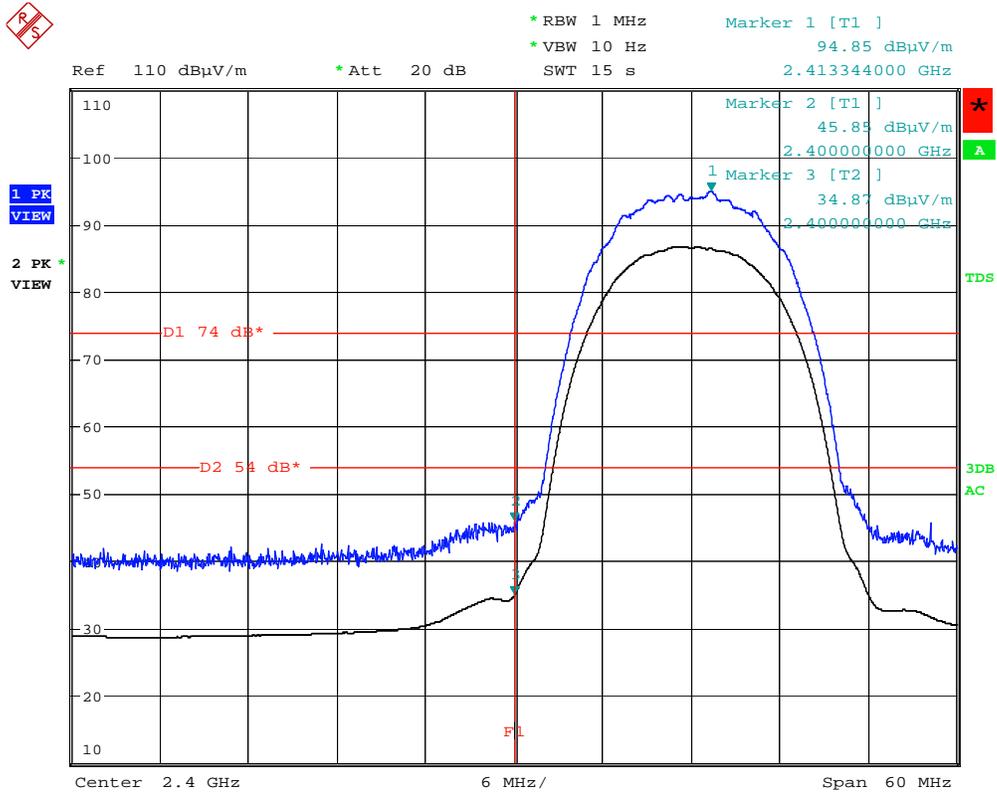
Table 12: Maximum Band Edge Radiated Emission 802.11(g)

Operating Frequency (MHz)	Polarity/ Axis	Peak Value (dBuV/m)	Average Value (dBuV/m)	Peak Limit (dBuV/m)	Average Limit (dBuV/m)	Peak Margin (dB)	Average Margin (dB)
2412	Vert Y	66.03	43.42	74.0	54.0	7.97	10.58
2462	Vert Y	46.81	32.12	74.0	54.0	27.19	22.88

Notes : 1) Duty cycle correction was not applied.

2) All correction factors (antenna, cable, pre-amplifier) are included in the measurement values.

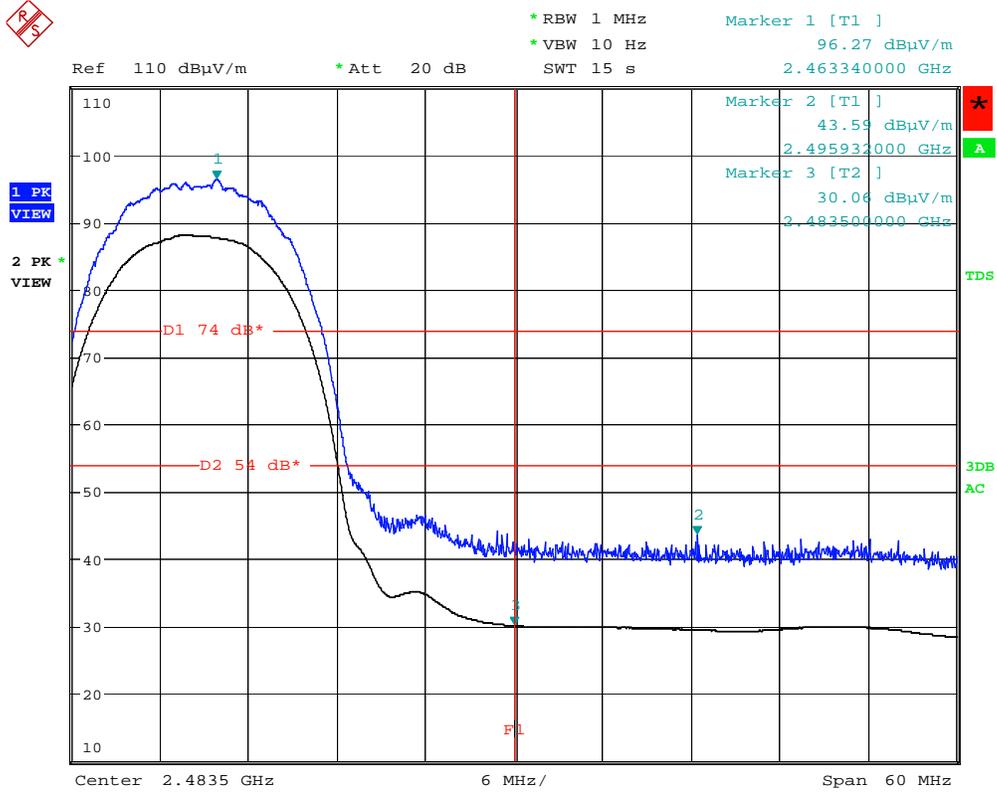
Figure 44: Band edge radiated emission of 2412MHz 802.11(b) (Channel 1), Peak and average



Band Edge (Lo), Hor, Mode A, Position X
Direct/Fundamental
Date: 12.MAR.2008 11:44:54

Note: The upper trace shows peak, the lower trace shows average value.

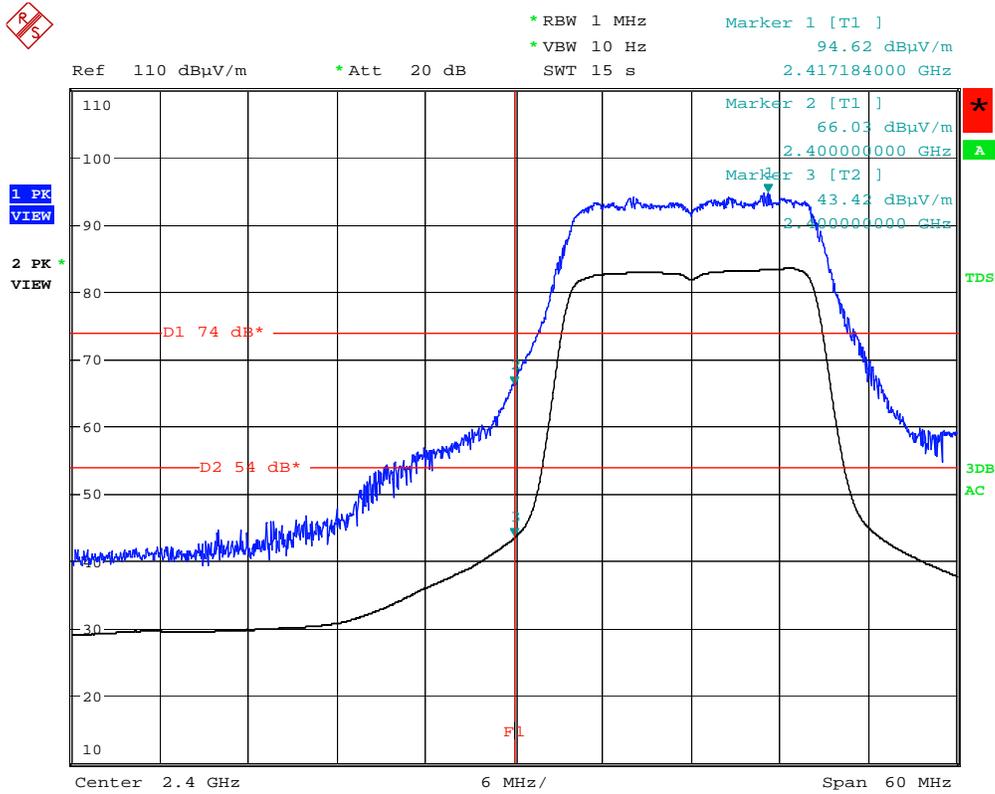
Figure 45: Band edge radiated emission of 2462MHz 802.11(b)(Channel 11), Peak and average



Band Edge (Hi), Vert, Mode C, Position Y
Direct/Fundamental
Date: 12.MAR.2008 13:54:55

Note: The upper trace shows peak, the lower trace shows average value.

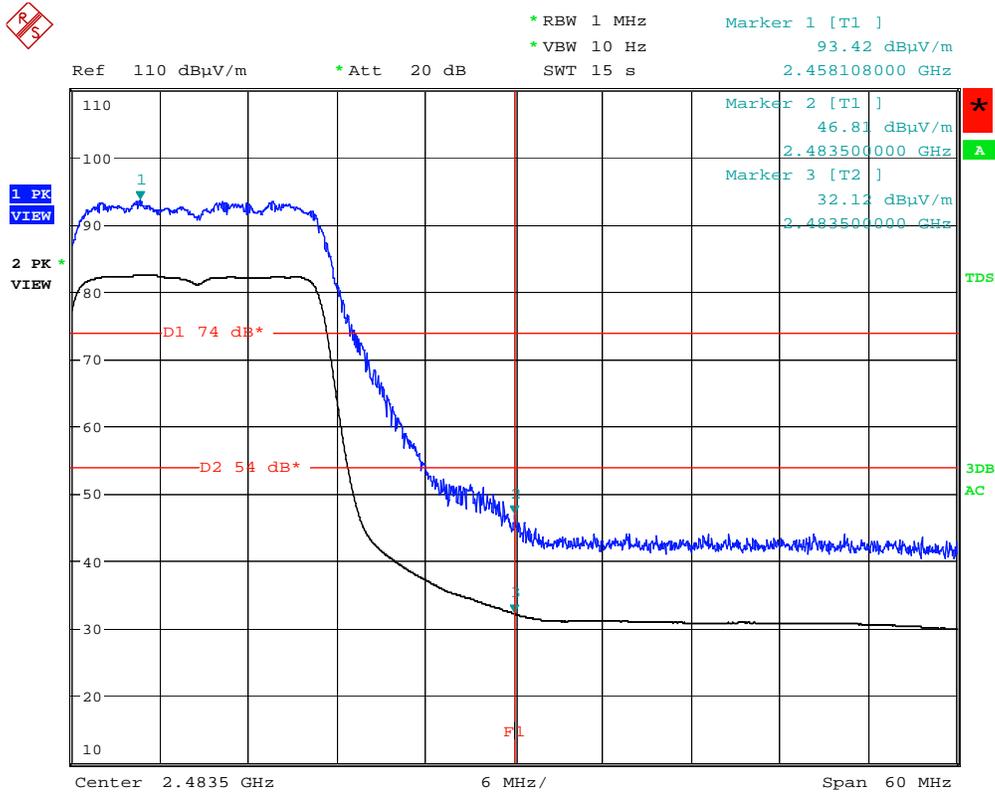
Figure 46: Band edge radiated emission of 2412MHz 802.11(g) (Channel 1), Peak and average



Band Edge (Lo), Vert, Mode C, Position Y
 Direct/Fundamental
 Date: 12.MAR.2008 12:16:57

Note: The upper trace shows peak, the lower trace shows average value.

Figure 47: Band edge radiated emission of 2462MHz 802.11(g) (Channel 11), Peak and average



Band Edge (Hi), Vert, Mode C, Position Y
 Direct/Fundamental
 Date: 12.MAR.2008 12:27:51

Note: The upper trace shows peak, the lower trace shows average value.

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6.1.2 Mains Terminal Continuous Disturbance Voltage FCC part 15.207**RESULT:****PASS**

Date of testing: 2008-03-14

Ambient temperature: 22.0°C

Relative humidity: 31%

Frequency range: (0.15 - 30)MHz

Kind of test site: Shielded Room

Requirements:

The emissions from the intentional radiator shall not exceed the field strength specified in 15.207(a).

Test procedure:

ANSI C63.4-2003

The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN.

The two LISNs provide 50 ohm/ 50uH of coupling impedance for the measuring instrument. Both lines of the power mains connected to the EUT were checked for maximum conducted interference.

The frequency range from 150kHz to 30MHz was investigated. Emission levels under (Limit - 20dB) were not recorded.

Pre-scan has been performed for all channels, the worst case channels for the 802.11(b) and (g) radios have been shown on this test report.

Disturbances other than those mentioned are small or not detectable. Discontinuous noise emission exceeding the limit for continuous disturbances has not been observed.

Figure 48: Spectral Diagrams, Conducted Emission 802.11(b) radio Channel 11, (0.15 - 30)MHz, Phase N (N)

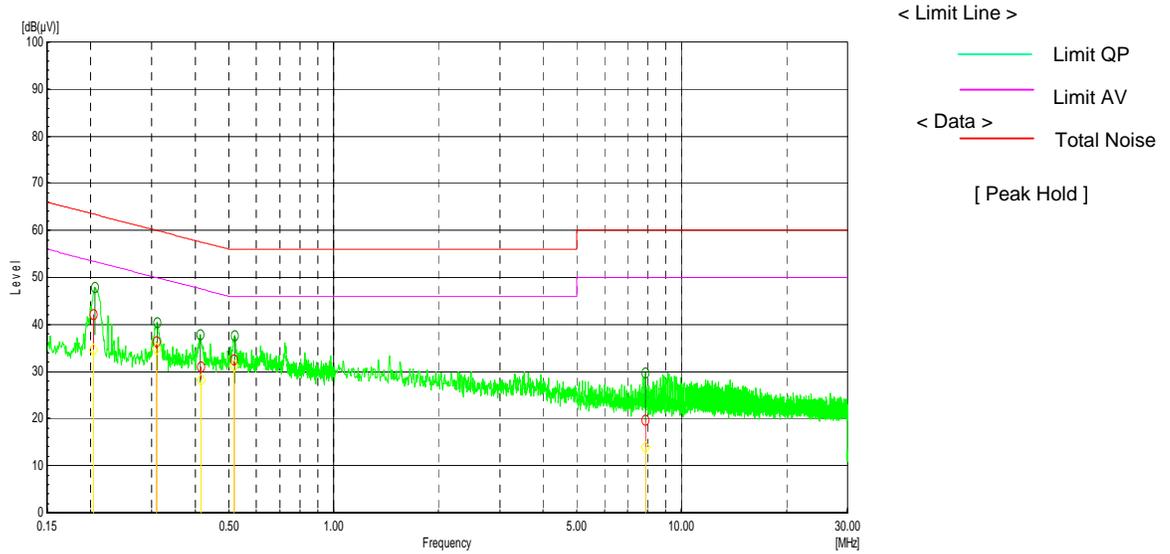
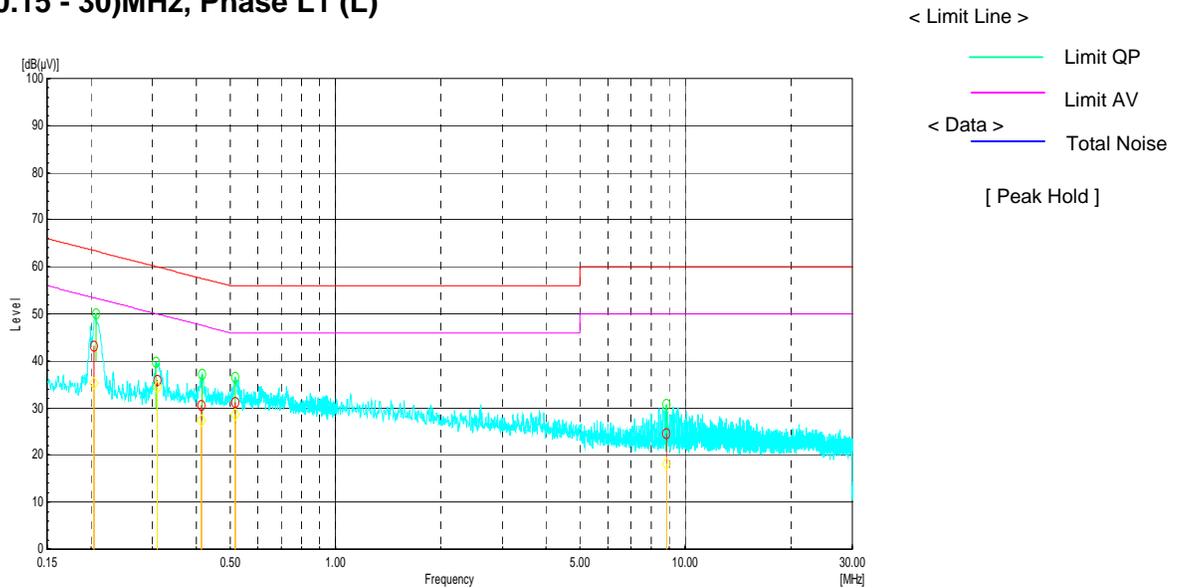


Figure 49: Spectral Diagrams, Conducted Emission 802.11(b) radio Channel 11, (0.15 - 30)MHz, Phase L1 (L)



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Table 13: Conducted Emission, 150kHz - 30MHz, Quasi Peak and Average Data, 802.11(b) radio Channel 11, Phase N (N) and L1 (L)

Freq. [MHz]	Phase	Reading QP [dB(μV)]	Reading AV [dB(μV)]	Factor [dB]	Level QP [dB(μV)]	Level AV [dB(μV)]	Limit QP [dB(μV)]	Limit AV [dB(μV)]	Margin QP [dB]	Margin AV [dB]
0.2038	N	32.6	25.1	9.6	42.2	34.7	63.5	53.5	21.3	18.8
0.2037	L1	33.5	25.6	9.6	43.1	35.2	63.5	53.5	20.4	18.3
0.30972	L1	26.2	24.8	9.6	35.8	34.4	60	50	24.2	15.6
0.31008	N	26.7	25.3	9.6	36.3	34.9	60	50	23.7	15.1
0.41539	N	21.4	18.7	9.6	31	28.3	57.5	47.5	26.5	19.2
0.41461	L1	21	17.7	9.6	30.6	27.3	57.6	47.6	27	20.3
0.5165	L1	21.5	19	9.6	31.1	28.6	56	46	24.9	17.4
0.51737	N	22.9	21.7	9.6	32.5	31.3	56	46	23.5	14.7
7.88437	N	9.9	3.9	9.9	19.8	13.8	60	50	40.2	36.2
8.81045	L1	14.6	8.2	10	24.6	18.2	60	50	35.4	31.8

Final test data was taken for the operation mode generating the highest emission only.

Figure 50: Spectral Diagrams, Conducted Emission 802.11(g) radio Channel 6, (0.15 - 30)MHz, Phase N (N)

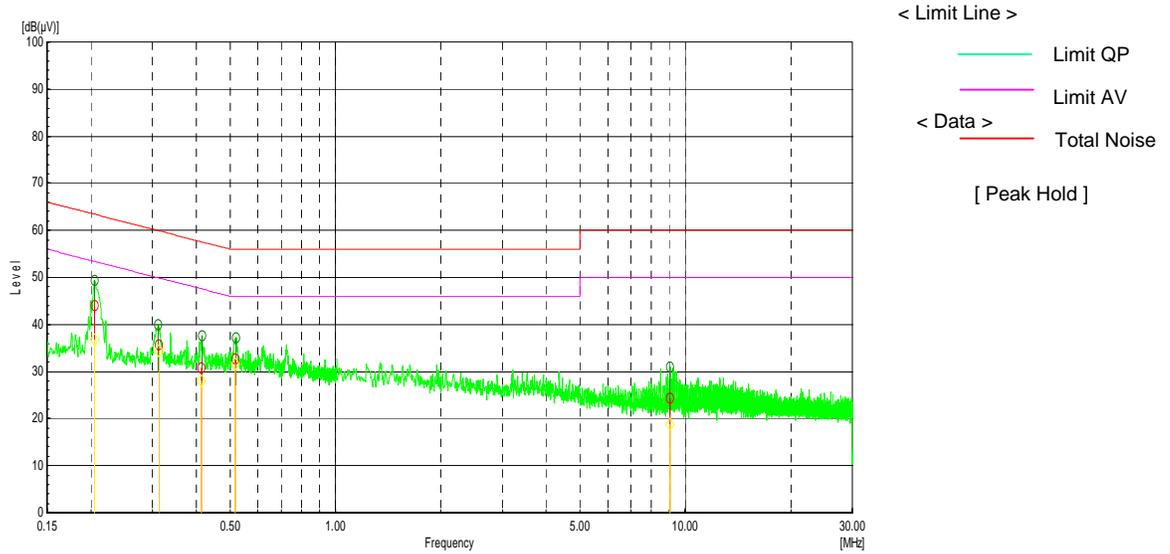
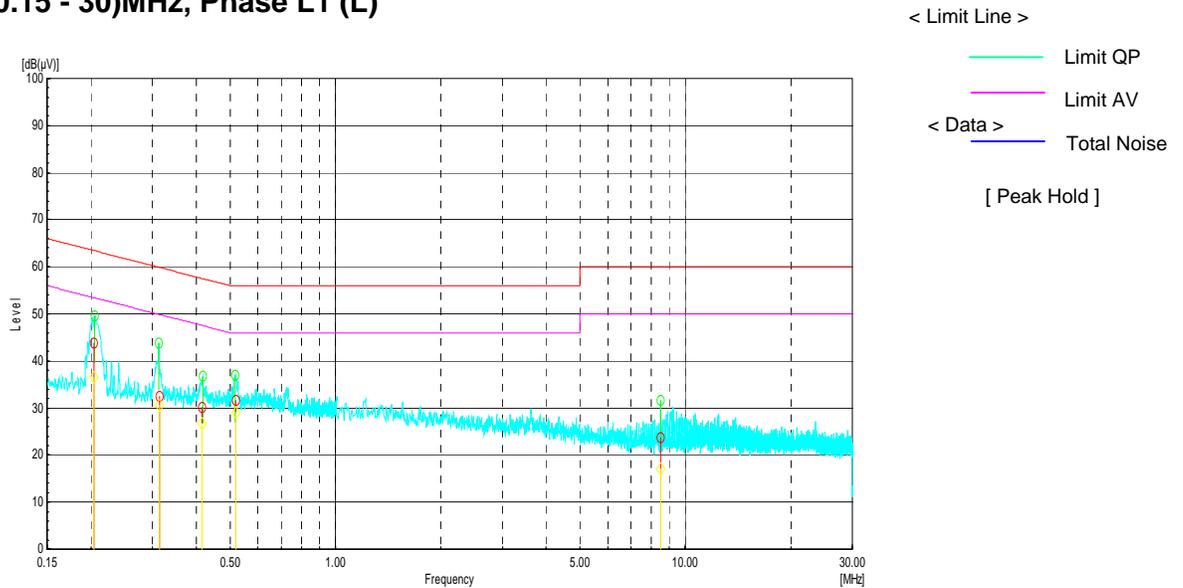


Figure 51: Spectral Diagrams, Conducted Emission 802.11(g) radio Channel 6, (0.15 - 30)MHz, Phase L1 (L)



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Table 14: Conducted Emission, 150kHz - 30MHz, Quasi Peak and Average Data, 802.11(g) radio Channel 6, Phase N (N) and L1 (L)

Freq. [MHz]	Phase	Reading QP [dB(μV)]	Reading AV [dB(μV)]	Factor [dB]	Level QP [dB(μV)]	Level AV [dB(μV)]	Limit QP [dB(μV)]	Limit AV [dB(μV)]	Margin QP [dB]	Margin AV [dB]
0.20434	L1	34.3	26.8	9.6	43.9	36.4	63.4	53.4	19.5	17
0.20508	N	34.4	27.2	9.6	44	36.8	63.4	53.4	19.4	16.6
0.31256	N	26.2	24.8	9.6	35.8	34.4	59.9	49.9	24.1	15.5
0.31481	L1	22.9	20.9	9.6	32.5	30.5	59.8	49.8	27.3	19.3
0.41333	N	21.2	18.4	9.6	30.8	28	57.6	47.6	26.8	19.6
0.41613	L1	20.6	17.2	9.6	30.2	26.8	57.5	47.5	27.3	20.7
0.51952	L1	22.1	19.6	9.6	31.7	29.2	56	46	24.3	16.8
0.51809	N	23.2	22	9.6	32.8	31.6	56	46	23.2	14.4
8.50131	L1	13.7	7.3	9.9	23.6	17.2	60	50	36.4	32.8
9.02063	N	14.6	8.9	9.9	24.5	18.8	60	50	35.5	31.2

Final test data was taken for the operation mode generating the highest emission only.

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6.1.3 Radiated Emission out-of-band and spurious emission FCC part 15.247(d)/15.205/15.209

RESULT:**PASS**

Date of testing:	2008-03-14
Ambient temperature:	22.0°C
Relative humidity:	29%
Atmospheric pressure:	1010hPa
Frequency range:	30MHz – 25GHz
Measurement distance:	3m
Kind of test site:	Semi Anechoic Chamber

Requirements:

The emissions from the intentional radiator shall not exceed the field strength specified in 15.209(a).

Test procedure:

ANSI C63.4-2003

Before final measurements of radiated emissions were made in Semi Anechoic Chamber, the EUT was scanned before final testing. This was done in order to determine its emissions spectrum profile. The physical arrangement of the test system and associated cabling was varied in order to determine the effect on the EUT's emissions in amplitude, direction and frequency. This process was repeated during final radiated emissions measurements, at each frequency, in order to ensure that maximum emission amplitudes were attained.

Final radiated emissions measurements were made at 3meters. The EUT was placed on a nonconductive turntable 0.8 meters above the ground plane. The spectrum was examined from 30 MHz to the 10th harmonic of the highest fundamental transmitter frequency (25 GHz).

At each frequency, the EUT was rotated 360°, and the antenna was raised and lowered from 1 to 4 meters in order to determine the emission's maximum level. Measurements were taken using both horizontal and vertical antenna polarizations and 3 EUT positions(X, Y, and Z). For frequencies between 30 and 1000 MHz, the spectrum analyzer's 6 dB bandwidth was set to 120 kHz, and the analyzer was operated in the CISPR quasi-peak detection mode.

For emissions above 1000 MHz, emissions are measured using following settings:

Peak: RBW=1MHz, VBW=1MHz

Average: RBW=1MHz, VBW=10Hz

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The EUT was connected to its dedicated AC power supply during testing.

The EUT radiated interference was investigated from 9kHz to 30MHz, the emission was found to be 20dB the limit.

The highest emission amplitudes relative to the appropriate limit were recorded in this report. Emissions other than those mentioned are small or not detectable.

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Table 15: Radiated Emission 30MHz - 1GHz, Horizontal & Vertical Antenna Orientations, Quasi Peak Data, 802.11(b), Channel 1

Freq. [MHz]	Antenna Orientation	Result (Measured) QP [dB(μV)]	Factor [dB(1/m)]	Level QP [dB(μV/m)]	Limit [dB(μV/m)]	Margin QP [dB]	Height [cm]	Angle [°]
32.659	V	49.96	-19.6	30.36	40.0	9.64	385	309
218.782	V	44.06	-20.4	23.66	46.0	22.34	122	330
277.724	H	51.26	-17.1	34.16	46.0	11.84	337	301
393.428	H	53.66	-13.6	40.06	46.0	5.94	221	141
439.726	H	54.66	-12.1	42.56	46.0	3.44	206	146
486.022	V	47.66	-10.7	36.96	46.0	9.04	350	12
486.022	H	50.56	-10.7	39.86	46.0	6.14	198	153
532.284	V	50.26	-9.6	40.66	46.0	5.34	325	23
532.282	H	51.76	-9.6	42.16	46.0	3.84	152	151
955.264	H	40.16	-2.4	37.76	46.0	8.24	384	353

Table 16: Radiated Emission 1GHz-25GHz, Horizontal & Vertical Antenna Orientations, Peak and Average Data, 802.11(b), Channel 1

Freq. [MHz]	Antenna Orientation/ Axis	Level AV [dB(μV/m)]	Level PK [dB(μV/m)]	Limit AV [dB(μV/m)]	Limit PK [dB(μV/m)]	Margin AV [dB]	Margin PK [dB]
1249.9	H X	N/A	36.21	54.0	74.0	17.79	37.79
19296.4	H Z	N/A	39.68	54.0	74.0	14.32	34.32

Notes : 1) All correction factors (antenna, cable, pre-amplifier) are included in the measurement values.

2) AV: average, PK: peak

3) The peak measured value complies with the average limit hence measurement of the AV value can be omitted.

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Table 17: Radiated Emission 30MHz - 1GHz, Horizontal & Vertical Antenna Orientations, Quasi Peak Data, 802.11(b), Channel 6

Freq. [MHz]	Antenna Orientation	Result (Measured) QP [dB(μV)]	Factor [dB(1/m)]	Level QP [dB(μV/m)]	Limit [dB(μV/m)]	Margin QP [dB]	Height [cm]	Angle [°]
32.665	V	49.76	-19.6	30.16	40.0	9.84	391	350
217.914	V	43.96	-20.4	23.56	46.0	22.44	118	337
277.692	H	50.56	-17.1	33.46	46.0	12.54	400	298
393.441	H	53.36	-13.6	39.76	46.0	6.24	228	141
439.719	H	54.46	-12.1	42.36	46.0	3.64	194	144
486.003	H	51.16	-10.7	40.46	46.0	5.54	200	151
532.269	H	51.66	-9.6	42.06	46.0	3.94	149	150
532.287	V	50.26	-9.6	40.66	46.0	5.34	320	21
578.556	H	49.26	-8.4	40.86	46.0	5.14	162	27
671.165	H	47.66	-6.9	40.76	46.0	5.24	160	328
671.174	V	44.46	-6.9	37.56	46.0	8.44	288	146
717.452	H	46.96	-6.1	40.86	46.0	5.14	140	27
955.475	V	40.16	-2.4	37.76	46.0	8.24	171	108

Table 18: Radiated Emission 1GHz-25GHz, Horizontal & Vertical Antenna Orientations, Peak and Average Data, 802.11(b), Channel 6

Freq. [MHz]	Antenna Orientation/ Axis	Level AV [dB(μV/m)]	Level PK [dB(μV/m)]	Limit AV [dB(μV/m)]	Limit PK [dB(μV/m)]	Margin AV [dB]	Margin PK [dB]
1109.2	H Z	N/A	35.91	54.0	74.0	18.09	38.09
19496.6	H Z	N/A	38.37	54.0	74.0	15.63	35.63

Notes : 1) All correction factors (antenna, cable, pre-amplifier) are included in the measurement values.

2) AV: average, PK: peak

3) The peak measured value complies with the average limit hence measurement of the AV value can be omitted.

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Table 19: Radiated Emission 30MHz - 1GHz, Horizontal & Vertical Antenna Orientations, Quasi Peak Data, 802.11(b), Channel 11

Freq. [MHz]	Antenna Orientation	Result (Measured) QP [dB(μV)]	Factor [dB(1/m)]	Level QP [dB(μV/m)]	Limit [dB(μV/m)]	Margin QP [dB]	Height [cm]	Angle [°]
32.841	V	49.36	-19.5	29.86	40.0	10.14	394	332
393.414	H	51.56	-13.6	37.96	46.0	8.04	266	142
439.709	H	55.16	-12.1	43.06	46.0	2.94	195	147
439.723	V	51.26	-12.1	39.16	46.0	6.84	100	309
485.991	H	54.46	-10.7	43.76	46.0	2.24	176	150
485.98	V	48.36	-10.7	37.66	46.0	8.34	379	69
532.282	H	52.66	-9.6	43.06	46.0	2.94	154	148
532.265	V	49.36	-9.6	39.76	46.0	6.24	332	29
874.722	V	40.26	-3.8	36.46	46.0	9.54	103	140
956.441	H	40.06	-2.4	37.66	46.0	8.34	184	152

Table 20: Radiated Emission 1GHz-25GHz, Horizontal & Vertical Antenna Orientations, Peak and Average Data, 802.11(b), Channel 11

Freq. [MHz]	Antenna Orientation/ Axis	Level AV [dB(μV/m)]	Level PK [dB(μV/m)]	Limit AV [dB(μV/m)]	Limit PK [dB(μV/m)]	Margin AV [dB]	Margin PK [dB]
1203.7	H Z	N/A	36.96	54.0	74.0	17.04	37.04
19696.8	H Z	N/A	37.50	54.0	74.0	16.50	36.50

Notes : 1) All correction factors (antenna, cable, pre-amplifier) are included in the measurement values.

2) AV: average, PK: peak

3) The peak measured value complies with the average limit hence measurement of the AV value can be omitted.

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Table 21: Radiated Emission 30MHz - 1GHz, Horizontal & Vertical Antenna Orientations, Quasi Peak Data, 802.11(g), Channel 1

Freq. [MHz]	Antenna Orientation	Result (Measured) QP [dB(μV)]	Factor [dB(1/m)]	Level QP [dB(μV/m)]	Limit [dB(μV/m)]	Margin QP [dB]	Height [cm]	Angle [°]
32.761	V	49.76	-19.5	30.26	40.0	9.74	396	341
218.873	V	46.96	-20.4	26.56	46.0	19.44	101	257
277.705	V	53.06	-17.1	35.96	46.0	10.04	101	214
393.438	H	52.26	-13.6	38.66	46.0	7.34	264	144
439.713	V	51.26	-12.1	39.16	46.0	6.84	102	309
439.73	H	55.06	-12.1	42.96	46.0	3.04	194	148
486.001	H	54.16	-10.7	43.46	46.0	2.54	174	149
532.293	V	49.96	-9.6	40.36	46.0	5.64	100	5
532.314	H	52.56	-9.6	42.96	46.0	3.04	153	149
938.009	H	39.96	-2.7	37.26	46.0	8.74	210	145

Table 22: Radiated Emission 1GHz-25GHz, Horizontal & Vertical Antenna Orientations, Peak and Average Data, 802.11(g), Channel 1

Freq. [MHz]	Antenna Orientation/ Axis	Level AV [dB(μV/m)]	Level PK [dB(μV/m)]	Limit AV [dB(μV/m)]	Limit PK [dB(μV/m)]	Margin AV [dB]	Margin PK [dB]
1088.2	V Z	N/A	36.99	54.0	74.0	17.01	37.01
19296.4	H Z	N/A	38.84	54.0	74.0	15.16	35.16

Notes : 1) All correction factors (antenna, cable, pre-amplifier) are included in the measurement values.

2) AV: average, PK: peak

3) The peak measured value complies with the average limit hence measurement of the AV value can be omitted.

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Table 23: Radiated Emission 30MHz - 1GHz, Horizontal & Vertical Antenna Orientations, Quasi Peak Data, 802.11(g), Channel 6

Freq. [MHz]	Antenna Orientation	Result (Measured) QP [dB(μV)]	Factor [dB(1/m)]	Level QP [dB(μV/m)]	Limit [dB(μV/m)]	Margin QP [dB]	Height [cm]	Angle [°]
532.279	H	56.86	-9.6	47.26	67.5	20.24*	153	315
485.994	H	52.26	-10.7	41.56	46.0	4.44	207	234
439.706	H	53.36	-12.1	41.26	46.0	4.74	227	248
532.286	V	50.46	-9.6	40.86	46.0	5.14	321	75
578.564	H	48.86	-8.4	40.46	46.0	5.54	163	30
485.973	V	50.56	-10.7	39.86	46.0	6.14	383	102
578.581	V	47.26	-8.4	38.86	46.0	7.14	302	104
946.659	H	40.16	-2.5	37.66	46.0	8.34	396	194

Note*: this emission is located in the non restricted band therefore the 20dBc limit could be applied.(carrier frequency was found at 87.5dBuV/m for channel 6)

Table 24: Radiated Emission 1GHz-25GHz, Horizontal & Vertical Antenna Orientations, Peak and Average Data, 802.11(g), Channel 6

Freq. [MHz]	Antenna Orientation/ Axis	Level AV [dB(μV/m)]	Level PK [dB(μV/m)]	Limit AV [dB(μV/m)]	Limit PK [dB(μV/m)]	Margin AV [dB]	Margin PK [dB]
1203.7	V X	N/A	37.65	54.0	74.0	16.35	36.35
19496.6	H Z	N/A	37.94	54.0	74.0	16.06	36.06

Notes : 1) All correction factors (antenna, cable, pre-amplifier) are included in the measurement values.

2) AV: average, PK: peak

3) The peak measured value complies with the average limit hence measurement of the AV value can be omitted.

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Table 25: Radiated Emission 30MHz - 1GHz, Horizontal & Vertical Antenna Orientations, Quasi Peak Data, 802.11(g), Channel 11

Freq. [MHz]	Antenna Orientation	Result (Measured) QP [dB(μV)]	Factor [dB(1/m)]	Level QP [dB(μV/m)]	Limit [dB(μV/m)]	Margin QP [dB]	Height [cm]	Angle [°]
34.12	V	49.06	-19.4	29.66	40.0	10.34	400	19
219.223	V	44.46	-20.4	24.06	46.0	21.94	105	276
393.445	H	54.86	-13.6	41.26	46.0	4.74	263	143
439.706	H	56.06	-12.1	43.96	46.0	2.04	199	148
439.713	V	51.36	-12.1	39.26	46.0	6.74	100	263
486.015	H	53.36	-10.7	42.66	46.0	3.34	203	53
532.286	H	52.26	-9.6	42.66	46.0	3.34	152	145
671.123	H	47.46	-6.9	40.56	46.0	5.44	149	177
873.884	H	40.26	-3.8	36.46	46.0	9.54	230	103
957.608	H	40.06	-2.4	37.66	46.0	8.34	284	192

Table 26: Radiated Emission 1GHz-25GHz, Horizontal & Vertical Antenna Orientations, Peak and Average Data, 802.11(g), Channel 11

Freq. [MHz]	Antenna Orientation/ Axis	Level AV [dB(μV/m)]	Level PK [dB(μV/m)]	Limit AV [dB(μV/m)]	Limit PK [dB(μV/m)]	Margin AV [dB]	Margin PK [dB]
1110.6	V Y	N/A	36.33	54.0	74.0	17.67	37.67
19696.1	H Z	N/A	36.50	54.0	74.0	17.50	37.50

Notes : 1) All correction factors (antenna, cable, pre-amplifier) are included in the measurement values.

2) AV: average, PK: peak

3) The peak measured value complies with the average limit hence measurement of the AV value can be omitted.

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6.1.4 Radiated Emission spurious emission for Receiver FCC part 15.109

RESULT:**PASS**

Date of testing:	2008-03-24
Ambient temperature:	22.0°C
Relative humidity:	29%
Atmospheric pressure:	1010hPa
Frequency range:	30MHz – 13GHz
Measurement distance:	3m
Kind of test site:	Semi Anechoic Chamber

Requirements:

The emissions from the unintentional radiator shall not exceed the field strength specified in 15.109(a).

Test procedure:

ANSI C63.4-2003

Before final measurements of radiated emissions were made in Semi Anechoic Chamber, the EUT was scanned before final testing. This was done in order to determine its emissions spectrum profile. The physical arrangement of the test system and associated cabling was varied in order to determine the effect on the EUT's emissions in amplitude, direction and frequency. This process was repeated during final radiated emissions measurements, at each frequency, in order to ensure that maximum emission amplitudes were attained.

Final radiated emissions measurements were made at 3meters. The limit was recalculated accordingly using a factor of 20dB/decade. The EUT was placed on a nonconductive turntable 0.8 meters above the ground plane. The spectrum was examined from 30 MHz to the 10th harmonic of the highest fundamental transmitter frequency (25 GHz).

At each frequency, the EUT was rotated 360°, and the antenna was raised and lowered from 1 to 4 meters in order to determine the emission's maximum level. Measurements were taken using both horizontal and vertical antenna polarizations and 3 EUT positions(X, Y, and Z). For frequencies between 30 and 1000 MHz, the spectrum analyzer's 6 dB bandwidth was set to 120 kHz, and the analyzer was operated in the CISPR quasi-peak detection mode.

For emissions above 1000 MHz, emissions are measured using following settings:

Peak: RBW=1MHz, VBW=1MHz

Average: RBW=1MHz, VBW=10Hz

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Pre-scan has been performed for all channels, the worst case channels for the 802.11 (g) radios for Z axis has been shown on this test report.

The EUT was connected to its dedicated AC power supply during testing.

The highest emission amplitudes relative to the appropriate limit were recorded in this report. Emissions other than those mentioned are small or not detectable.

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Table 27: Radiated Emission 30MHz - 1GHz, Horizontal & Vertical Antenna Orientations, Quasi Peak Data, 802.11(g), Channel 6

Freq. [MHz]	Antenna Orientation	Result (Measured) QP [dB(μV)]	Factor [dB(1/m)]	Level QP [dB(μV/m)]	Limit [dB(μV/m)]	Margin QP [dB]	Height [cm]	Angle [°]
74.474	V	46.96	-20.8	26.16	40.0	13.84	271	1
393.428	H	54.26	-13.6	40.66	46.0	5.34	258	295
439.72	H	56.06	-12.1	43.96	46.0	2.04	199	144
486.008	H	54.06	-10.7	43.36	46.0	2.64	208	179
532.279	H	51.96	-9.6	42.36	46.0	3.64	238	139
949.045	H	40.06	-2.5	37.56	46.0	8.44	114	340

Table 28: Radiated Emission 1GHz-25GHz, Horizontal & Vertical Antenna Orientations, Peak and Average Data, 802.11(g), Channel 6

Freq. [MHz]	Antenna Orientation	Level AV [dB(μV/m)]	Level PK [dB(μV/m)]	Limit AV [dB(μV/m)]	Limit PK [dB(μV/m)]	Margin AV [dB]	Margin PK [dB]
1087.7	V	32.1	38.9	54.0	74.0	21.8	35.1
2250.1	V	25.8	37.3	54.0	74.0	28.2	36.7
9647.9	H	35.2	45.2	54.0	74.0	18.7	28.7

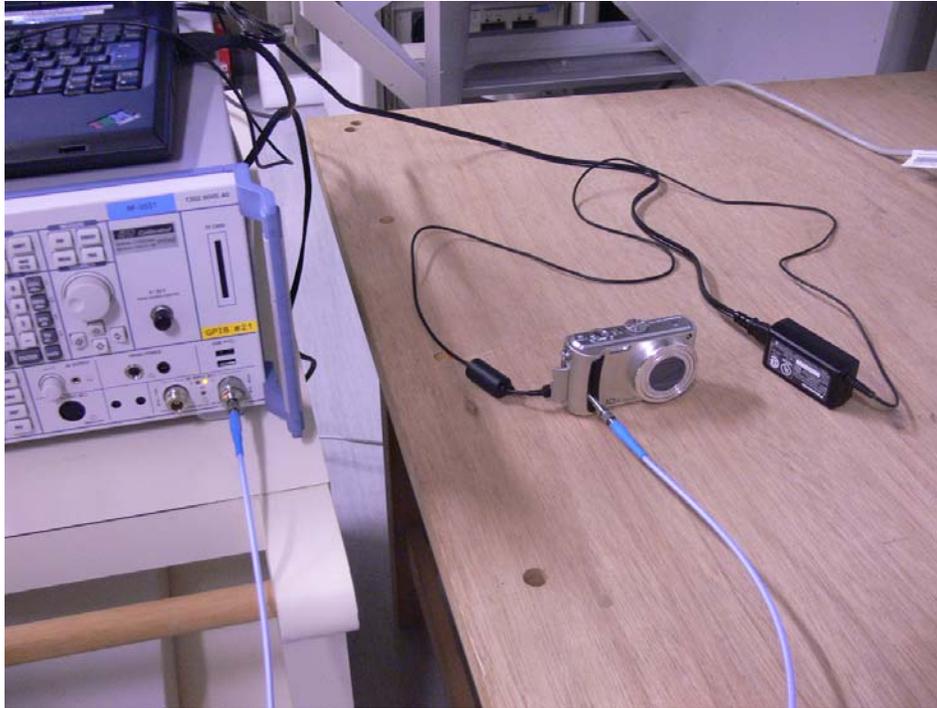
Notes : 1) All correction factors (antenna, cable, pre-amplifier) are included in the measurement values.

2) AV: average, PK: peak

3) The peak measured value complies with the average limit hence measurement of the AV value can be omitted.

7. Photographs of test setup

Photograph 1: Set-up for Conducted Testing



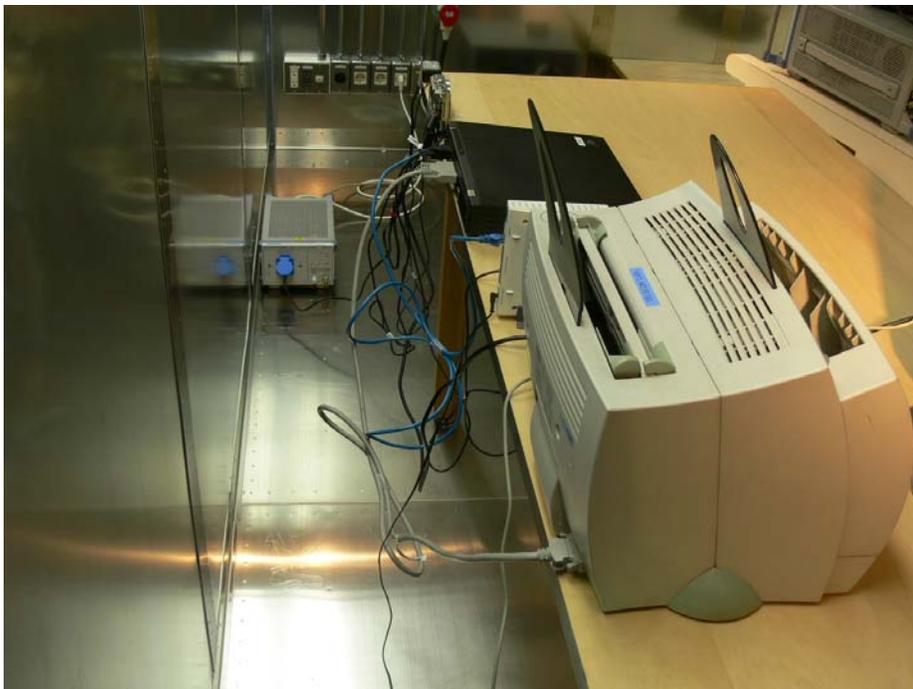
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Photograph 2: Set-up for AC Conducted Emission, EUT Configuration Front View



Photograph 3: Set-up for AC Conducted Emission, EUT Configuration Back View



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Photograph 4: Set-up for Radiated Emission, EUT Configuration X-axis



Photograph 5: Set-up for Radiated Emission, EUT Configuration Y-axis



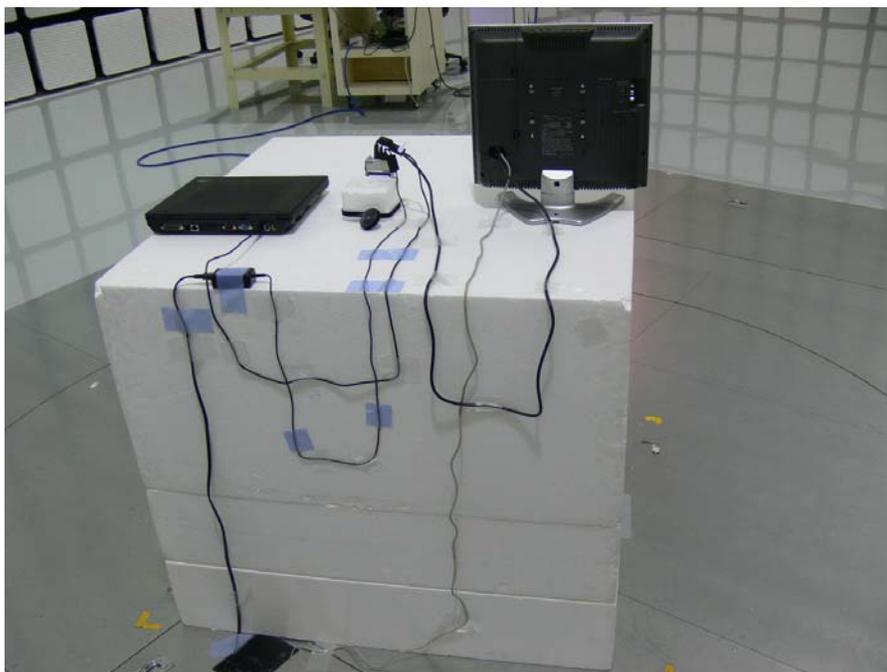
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Photograph 6: Set-up for Radiated Emission, EUT Configuration Z-axis



Photograph 7: Set-up for Radiated Emission, EUT Configuration back view



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