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 Products

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<i>Test Report No.:</i>			
Auftraggeber: <i>Client:</i>	Mitsumi Electric Co Ltd 1601, Sakai, Atsugi-shi. Kanagawa-ken 243, Japan		
Gegenstand der Prüfung: <i>Test item:</i>	Wireless LAN Module		
Bezeichnung: <i>Identification:</i>	DWM-W015	Serien-Nr.: <i>Serial No.:</i>	MAC 00 25 A0 9D 0A 06
Wareneingangs-Nr.: <i>Receipt No.:</i>	PT213097530-1	Eingangsdatum: <i>Date of receipt:</i>	2009-12-28
Prüfört: <i>Testing location:</i>	TÜV Rheinland Japan Ltd. - Global Technology Assessment Center 4-25-2 Kita-Yamata, Tsuzuki-ku, Yokohama 224-0021, Japan		
Prüfgrundlage: <i>Test specification:</i>	47 CFR Part 15.247 (Subpart: C), 2008-10 ANSI C63.4-2003 KDB Publication No. 558074: Guidance on Measurements for Digital Transmission Systems (47 CFR 15.247), March 23, 2005 RSS-210 (Issue 7): 2007 RSS-Gen (Issue 2): 2007		
Prüfergebnis: <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:	
			
2010-01-19	Y. Sasaki / Inspector	2010-01-19	T. Cheung / 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 deals with the Permissive Change II on the existing Limited Single Module of Intentional radiator 802.11 and 802.11.b/g of the grant, details refer to Section 1: General remarks			
Abkürzungen:	<i>P(ass) = entspricht Prüfgrundlage</i>	Abbreviations:	<i>P(ass) = passed</i>
	<i>F(ail) = entspricht nicht Prüfgrundlage</i>		<i>F(ail) = failed</i>
	<i>N/A = nicht anwendbar</i>		<i>N/A = not applicable</i>
	<i>N/T = nicht getestet</i>		<i>N/T = not tested</i>
<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>			

TEST SUMMARY

3.2.1 VOLTAGE REQUIREMENTS, FCC 15.31(E)

RESULT: PASS

3.2.2 ANTENNA REQUIREMENTS, FCC 15.203, FCC 15.204 AND RSS-GEN 7.1.4

RESULT: PASS

5.1.1 MAINS TERMINAL CONTINUOUS DISTURBANCE VOLTAGE OF TRANSMITTER, FCC 15.207 AND RSS-GEN 7.2.2

RESULT: PASS

6.1.1 BAND EDGE RADIATED EMISSION, FCC 15.247(D) AND RSS- 210 2.2

RESULT: PASS

6.1.2 RADIATED EMISSION, OUT-OF-BAND AND SPURIOUS EMISSION, FCC 15.247(D), FCC 15.205, FCC 15.209, RSS-210 2.2, RSS-210 A8.5 AND RSS-GEN 7.2.1

RESULT: PASS

6.2.1 RADIATED EMISSION OF RECEIVER, FCC 15.109, RSS-210 2.2, RSS-210 2.6, RSS-210 A8.5, RSS-GEN 7.2.3.2

RESULT: PASS

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1. General Remarks

It is a permissive change project which is classified as **Permissive Change II** for the existing FCC Grant (FCC ID: EW4DWMW015) and as modification for IC certificate (IC: 4250A-DWMW015) by additional host is applied to this Limited Modular Approval. Conducted Emission and Radiated Emission were conducted for the additional host. Refer to the exhibits for the technical details of the host. Previous technical test data of the module refer to the test report of the original application.

1.1 Complementary Materials

All attachments are integral parts of this test report.

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.

2.2 List of Test and Measurement Instruments

Table 1: List of Test and Measurement Equipment

Kind of Equipment	Manufacturer	Model Name	Serial Number	Equipment ID	Calibrated until
For AC Power Line Conducted Emission					
Receiver	Rohde & Schwarz	ESU 8	100025	RF-0020	2010-02
LISN	Rohde & Schwarz	ENV216	100276	RF-0016	2010-05
For Radiated Emission					
Receiver	Rohde & Schwarz	ESU 40	100025	-	2010-09
RF Selector (10m)	Toyo Corporation	NS4900	0703-182	RF-0029	2010-05
3dB Attenuator 50Ohm	Tamagawa Electronics Co., Ltd.	CFA-01	-	RF-0265	2010-05
Low Noise Pre-Amplifier	TSJ	MLA-10K01-B01-35	1370750	RF-0253	2010-05
Microwave Pre-Amplifier, 1-8GHz	Toyo Corporation	TPA0108-40	0634	RF-0052	2010-11
Band Reject Filter	Nitsuki	NF-49BT	027	RF-0131	2010-11
Trilog Antenna, 30-1000MHz	Schwarzbeck	VULB9168	0245	RF-0019	2010-05
Horn Antenna, 1-10GHz	Schwarzbeck	BBHA9120B	419	RF-0050	2010-05
Horn Antenna with Pre-Amplifier, 2-18GHz	Toyo Corporation	HAP06-18W	00000025	RF-0065	2010-05
Horn Antenna with Pre-Amplifier, 18-26.5GHz	Toyo Corporation	HAP18-26N	00000010	RF-0070	2010-05
Constant Voltage Constant Frequency Stabilizers					
CVCF (Shielded Room)	NF Corporation	ESU2000S	9075612	RF-0210	N/A
CVCF Booster (Shielded Room)	NF Corporation	ESU2000B	9074403	RF-0211	N/A
CVCF (10m chamber)	NF Corporation	ESU2000S	9067307	RF-0212	N/A
CVCF Booster (10m chamber)	NF Corporation	ESU2000B	9074408	RF-0213	N/A

2.3 Measurement Uncertainty

Table 2: Emission Measurement Uncertainty

Measurement Type	Frequency	Uncertainty
AC Power Line Conducted Emission	150kHz - 30MHz	±3.0dB
Radiated Emission	30MHz - 1GHz	±4.7dB
	> 1GHz	±4.5dB

3. General Product Information

3.1 Product Function and Intended Use

The **EUT** (Equipment Under Test) is a Wireless LAN Module certified as Limited Single Module Approval grant (FCC ID: EW4DWMW015 and IC: 4250A-DWMW015). There are 2 chips using the same antenna. One is the 802.11 b/g radio will be one of the functions available to this product. Second is the 802.11 radio, which can be connected with Wii, Nintendo DS or WLAN Access Point. The two radios cannot transmit at the same time.

3.2 System Details

Radio standard:	IEEE 802.11.b/g
Specified power output:	7.65dBm (802.11.b) 12.31dBm (802.11.g)
Antenna gain:	0.879dBi
Antenna type:	Dipole antenna (Foxconn)
Mounting type:	External, fixed location
Frequency range:	2412 – 2462 MHz
Number of channel:	11
Channel spacing:	5 MHz
Modulation type:	BPSK, QPSK, CCK (802.11.b) BPSK, QPSK, 16 QAM, 64 QAM (802.11.g)
FCC Classification:	DTS
Classification:	G1D
System Input Voltage:	DC 12V or AC 110-240V, 50/60Hz via AC adaptor
Protection Class:	II

Radio standard:	IEEE 802.11
Specified power output:	2.93dBm
Antenna gain:	0.879dBi
Antenna type:	Dipole antenna (Foxconn)
Mounting type:	External, fixed location
Frequency range:	2412 – 2472 MHz
Number of channel:	13
Channel spacing:	5 MHz
Modulation type:	DBPSK, DQPSK
FCC Classification:	DTS
Classification:	G1D
System Input Voltage:	DC 12V or AC 110-240V, 50/60Hz via AC adaptor
Protection Class:	II

Table 3: Interfaces present on the EUT

No.	Interface	Cable Length for Testing, Shielding	Interface Classification
1.	AC Mains input [AC Mains -> AC/DC adaptor]	1.5m, un-shielded	AC Power Input Port
2.	DC power input [AC/DC adaptor -> Host]	1m, un-shielded	DC Power Input Port
3.	USB 2.0 cable [Host PC <-> EUT]	1m, un-shielded	DC and Signal Port

3.2.1 Voltage Requirements, FCC 15.31(e)

RESULT:

PASS

The EUT has an internal voltage regulator to supply the RF circuit. Hence it complies with the power supply requirements.

3.2.2 Antenna Requirements, FCC 15.203, FCC 15.204 and RSS-Gen 7.1.4

RESULT:

PASS

The EUT has a permanent external antenna, details refer to the exhibits.

3.3 Clock Frequencies

The highest clock frequency generated by the EUT is 26 MHz

3.4 Independent Operation Modes

The system was configured for testing in a typical fashion (as a customer would normally use it).

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 or 2472 MHz).

The basic operation modes are:

802.11 radio

- A1. EUT continuously transmits at lowest Channel (2412 MHz)
- A2. EUT continuously transmits at middle Channel (2442 MHz)
- A3. EUT continuously transmits at highest Channel (2472 MHz)
- A4. EUT receives packets with 802.11 radio

802.11.b radio

- B1. EUT continuously transmits at lowest Channel (2412 MHz)
- B2. EUT continuously receives at middle Channel (2437 MHz)
- B3. EUT continuously receives at highest Channel (2462 MHz)
- B4. EUT receives packets with 802.11 b radio

802.11.g radio

- C1. EUT continuously transmits at lowest Channel (2412 MHz)
- C2. EUT continuously receives at middle Channel (2437 MHz)
- C3. EUT continuously receives at highest Channel (2462 MHz)
- C4. EUT receives packets with 802.11 g radio

The worst-case data rate for each mode is determined to be as follows, based on preliminary test of above radios.

All final tests were conducted at 1Mbps in the 802.11 mode.

All final tests were conducted at 5.5Mbps in the 802.11.b mode.

All final tests were conducted at 6Mbps in the 802.11.g mode.

The worst-case position was investigated for X/Y and Z orientation with highest emission, the worst-position was X/Y orientation. Therefore, all tests were conducted in X/Y orientation.

3.5 Noise Suppressing Parts

Refer to the schematic

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, sections 15.31, 15.33, 15.35, 15.205, 15.209 and Measurement of Digital Transmission Systems Operating under Section 15.247.

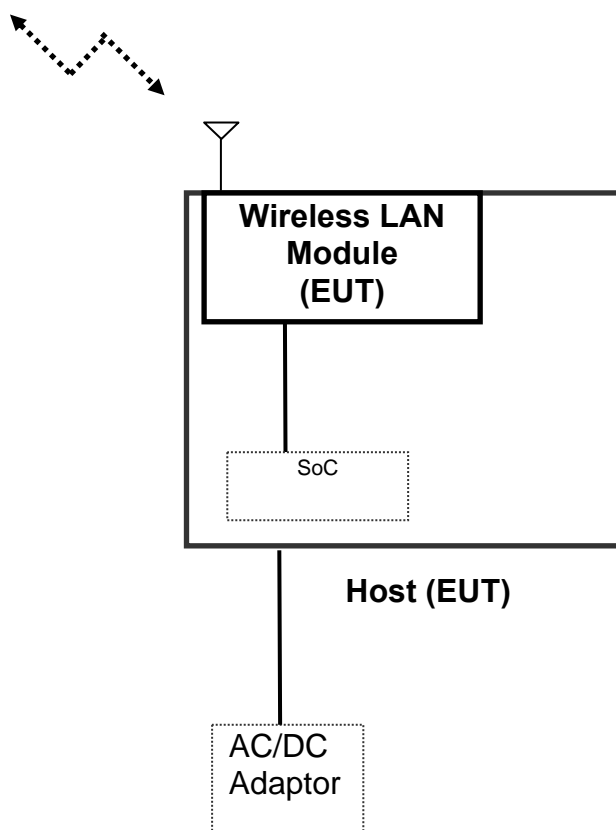
The test methods, which have been used, are based on ANSI C63.4:2003 and RSS-Gen.

For details, see under each test item.

4.2 Physical Configuration for Testing

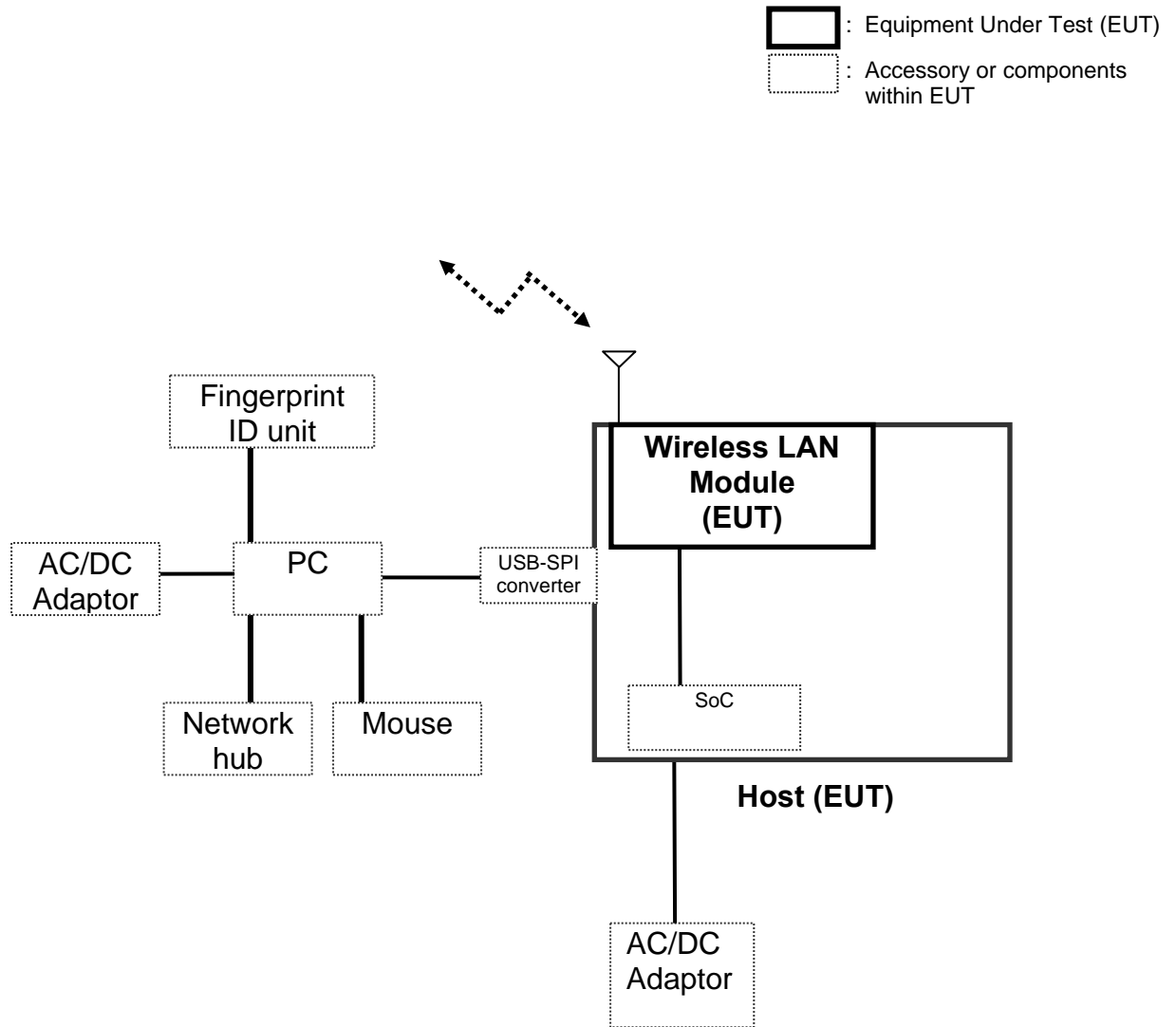
Figure 1: Test setup

 : Equipment Under Test (EUT)
 : Accessory or components within EUT



Note: All AC input power ports of accessories are not shown.

Figure 2: Test setup of 802.11b/g



Note: The PC is necessary for operation mode setting. All AC input power ports of accessories are not shown.

For more details, refer to section: Photographs of the Test Set-Up.

4.3 Test Operation and Test Software

Following software were used for testing provided by Nintendo Co., Ltd.

1. The test program used for 11b/g test is "USB-ART".
USB-ART consists of the software on PC and the program on DS Card.
The version of "USB-ART" is 1.5.1.
2. The test program used for 11 test is "WM Test".
We identify the version of WM Test by build time-stamp.
The time-stamp of "WM Test" is Jun 10 2009 12:58:27.
3. The firmware of RF Module is "Generic firmware"
The version is 0x2300008C.
4. The software of HOST is "System software"
The version is 1.4J.

The software is used to enable on the EUT the test operation mode specified in section 3.4 as appropriate.

4.4 Special Accessories and Auxiliary Equipment

The product has been tested together with the following additional accessories:

1. Product: Host
Manufacturer: Nintendo Co., Ltd.
Model: Nintendo DS CTR Target Board
Rated voltage: DC 12V
Input current: 3.7A
Frequency: -
Serial number: C-0451
2. Product: AC Adapter for the Host
Manufacturer: Mitsumi Co Ltd
Model: RVL-002
Rating: AC 120V (input)/ DC 12V (output) at 95VA/3.7A
Frequency: 60Hz

3. Product: Laptop PC
Manufacturer: Panasonic
Model: CF-Y7
Rated voltage: DC 16.0V
Frequency: -
Serial number: 8FKSA62036

4. Product: AC Adapter for the Laptop PC
Manufacturer: Pansonic
Model: CF-AA1632A
Rated voltage: AC 100-240V (input)/ DC 16.0V (output)
Rated current: 1.2A/ 3.75A
Frequency: 50-60Hz
Protection class:II
Serial number: 1632M208600465A

5. Product: Network hub
Manufacturer: Buffelo
Model: LSW3-GT-5NS(D1)
Rated voltage: AC 100V
Input power: 5.0W
Frequency: 50/60Hz
Protection class:II
Serial number: 16485784211186

6. Product: Fingerprint ID unit
Manufacturer: Sony
Model: FIO-810-N03
Rated voltage: via USB port
Serial number: 0032715

7. Product: Flash memory card
Manufacturer: Nintendo
Model: E203088
Serial number: No.358

8. Product: SD memory card
Manufacturer: Adata
Serial number: G02GCB19A0002

9. Product: USB-SPI Converter
Manufacturer: Nintendo

4.5 Countermeasures to achieve EMC Compliance

None

5. Test Results AC Mains Conducted Emission

5.1 AC Mains Conducted Emission of Transmitter

5.1.1 Mains Terminal Continuous Disturbance Voltage of Transmitter, FCC 15.207 and RSS-Gen 7.2.2

RESULT: **PASS**

Date of testing:	2010-01-14
Ambient temperature:	22°C
Relative humidity:	25%
Atmospheric pressure:	1010hPa
Frequency range:	0.15 – 30MHz
Kind of test site:	Shielded Room

Requirements:

The AC power line on any frequency within the band 150 kHz to 30MHz shall not exceed the limits specified in FCC 15.207 and RSS-Gen 7.2.2.

Test procedure:

ANSI C63.4-2003

The EUT was placed on a wooden table raised 80cm above the reference ground plane. A vertical conducting plane of the screened room was located 40cm to the rear of the EUT. The AC adapter of the laptop computer was connected to a Line Impedance Stabilization Network (LISN) / Artificial Mains Network (AMN).

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 and frequency in order to ensure that maximum emission amplitudes were attained.

The measurements were performed using a CISPR quasi-peak detector and average detector.

Disturbances other than those mentioned are small or not detectable.

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Table 4: Conducted Emission, 150kHz – 30MHz, Quasi Peak and Average Data, Phase N (N) and L1 (L), Mode A1, 802.11

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]
0.181	N	38.2	34.7	9.7	47.9	44.4	64.4	54.4	16.5	10.0
0.302	N	36.1	30.8	9.7	45.8	40.5	60.2	50.2	14.4	9.7
0.361	N	40.4	38.5	9.7	50.1	48.2	58.7	48.7	8.6	0.5*
0.362	L1	40.6	38.7	9.7	50.3	48.4	58.7	48.7	8.4	0.3*
0.423	L1	33.7	32.7	9.7	43.4	42.4	57.4	47.4	14.0	5.0
1.084	L1	34.5	33.5	9.7	44.2	43.2	56.0	46.0	11.8	2.8*
1.564	N	33.2	25.9	9.7	42.9	35.6	56.0	46.0	13.1	10.4

Notes: Level QP = Reading QP + Factor
 Level AV = Reading AV + Factor

Uncertainty

(*) The measured result is below the specification limit by a margin less than the measurement uncertainty; it is not therefore possible to determine compliance at a level of confidence of 95%. However, the measured result indicates a higher probability that the product tested complies with the specification limit.

Table 5: Conducted Emission, 150kHz – 30MHz, Quasi Peak and Average Data, Phase N (N) and L1 (L), Mode A3, 802.11

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]
0.180	N	37.7	34.4	9.7	47.4	44.1	64.5	54.5	17.1	10.4
0.300	N	35.7	30.4	9.7	45.4	40.1	60.2	50.2	14.8	10.1
0.362	L1	40.6	38.6	9.7	50.3	48.3	58.7	48.7	8.4	0.4*
0.363	N	40.3	38.4	9.7	50.0	48.1	58.7	48.7	8.7	0.6*
0.962	L1	34.1	32.2	9.7	43.8	41.9	56.0	46.0	12.2	4.1
1.505	N	33.3	24.7	9.7	43.0	34.4	56.0	46.0	13.0	11.6
2.530	N	32.0	29.4	9.8	41.8	39.2	56.0	46.0	14.2	6.8

Notes: Level QP = Reading QP + Factor
 Level AV = Reading AV + Factor

Uncertainty

(*) The measured result is below the specification limit by a margin less than the measurement uncertainty; it is not therefore possible to determine compliance at a level of confidence of 95%. However, the measured result indicates a higher probability that the product tested complies with the specification limit.

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Table 6: Conducted Emission, 150kHz – 30MHz, Quasi Peak and Average Data, Phase N (N) and L1 (L), Mode B1, 802.11.b

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]
0.181	L1	38.4	33.8	9.7	48.1	43.5	64.4	54.4	16.3	10.9
0.240	N	33.8	31.9	9.7	43.5	41.6	62.1	52.1	18.6	10.5
0.361	L1	31.6	28.8	9.7	41.3	38.5	58.7	48.7	17.4	10.2
0.962	L1	26.7	25.0	9.7	36.4	34.7	56.0	46.0	19.6	11.3
1.807	N	27.4	25.6	9.7	37.1	35.3	56.0	46.0	18.9	10.7
10.903	N	30.9	26.8	10.1	41.0	36.9	60.0	50.0	19.0	13.1

Notes: Level QP = Reading QP + Factor
 Level AV = Reading AV + Factor

Table 7: Conducted Emission, 150kHz – 30MHz, Quasi Peak and Average Data, Phase N (N) and L1 (L), Mode B3, 802.11.b

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]
0.179	N	38.0	33.5	9.7	47.7	43.2	64.5	54.5	16.8	11.3
0.241	N	34.1	32.2	9.7	43.8	41.9	62.1	52.1	18.3	10.2
0.359	N	30.6	27.5	9.7	40.3	37.2	58.7	48.7	18.4	11.5
0.965	L1	26.9	25.2	9.7	36.6	34.9	56.0	46.0	19.4	11.1
1.807	L1	27.5	25.6	9.7	37.2	35.3	56.0	46.0	18.8	10.7
11.869	N	30.1	28.2	10.1	40.2	38.3	60.0	50.0	19.8	11.7

Notes: Level QP = Reading QP + Factor
 Level AV = Reading AV + Factor

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Table 8: Conducted Emission, 150kHz – 30MHz, Quasi Peak and Average Data, Phase N (N) and L1 (L), Mode C1, 802.11.g

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]
0.181	N	38.5	33.8	9.7	48.2	43.5	64.4	54.4	16.2	10.9
0.243	N	33.2	31.2	9.7	42.9	40.9	62.0	52.0	19.1	11.1
0.362	N	31.5	28.8	9.7	41.2	38.5	58.7	48.7	17.5	10.2
1.025	L1	27.7	26.6	9.7	37.4	36.3	56.0	46.0	18.6	9.7
3.256	N	26.4	21.9	9.8	36.2	31.7	56.0	46.0	19.8	14.3
11.274	N	31.3	27.4	10.1	41.4	37.5	60.0	50.0	18.6	12.5

Notes: Level QP = Reading QP + Factor
 Level AV = Reading AV + Factor

Table 9: Conducted Emission, 150kHz – 30MHz, Quasi Peak and Average Data, Phase N (N) and L1 (L), Mode C3, 802.11.g

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]
0.179	L1	37.2	32.8	9.7	46.9	42.5	64.5	54.5	17.6	12.0
0.241	N	34.1	32.0	9.7	43.8	41.7	62.0	52.0	18.2	10.3
0.362	L1	31.6	28.9	9.7	41.3	38.6	58.7	48.7	17.4	10.1
1.023	L1	27.1	26.0	9.7	36.8	35.7	56.0	46.0	19.2	10.3
1.808	N	27.4	25.7	9.7	37.1	35.4	56.0	46.0	18.9	10.6
11.269	N	31.3	29.3	10.1	41.4	39.4	60.0	50.0	18.6	10.6

Notes: Level QP = Reading QP + Factor
 Level AV = Reading AV + Factor

6. Test Results Radiated Emission

6.1 Radiated Emission of Transmitter

6.1.1 Band Edge Radiated Emission, FCC 15.247(d) and RSS- 210 2.2

RESULT: PASS

Date of testing: 2010-01-15

Ambient temperature: 24°C

Relative humidity: 41%

Atmospheric pressure: 1015hPa

Measurement distance: 3m

Kind of test site: Semi Anechoic Chamber

Requirements:

Radiated emissions which fall in the restricted bands, as defined in FCC 15.205(a) and RSS-210 2.7 (Table 1), must comply with the radiated emission limits specified in FCC 15.209(a) and RSS-210 2.7 (Table 2 and 3).

Test procedure:

ANSI C63.4-2003, RSS-Gen 4.9, 4.10 and Measurement of Digital Transmission Systems Operating under Section 15.247

Measurements were made in a Semi Anechoic Chamber at a measurement distance of 3m. The EUT was placed on a nonconductive turntable 0.8m 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.

Pre-check measurements were taken using both horizontal and vertical antenna polarizations for host orientations (X/Y and Z) in order to ensure that maximum emission amplitudes were attained.

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

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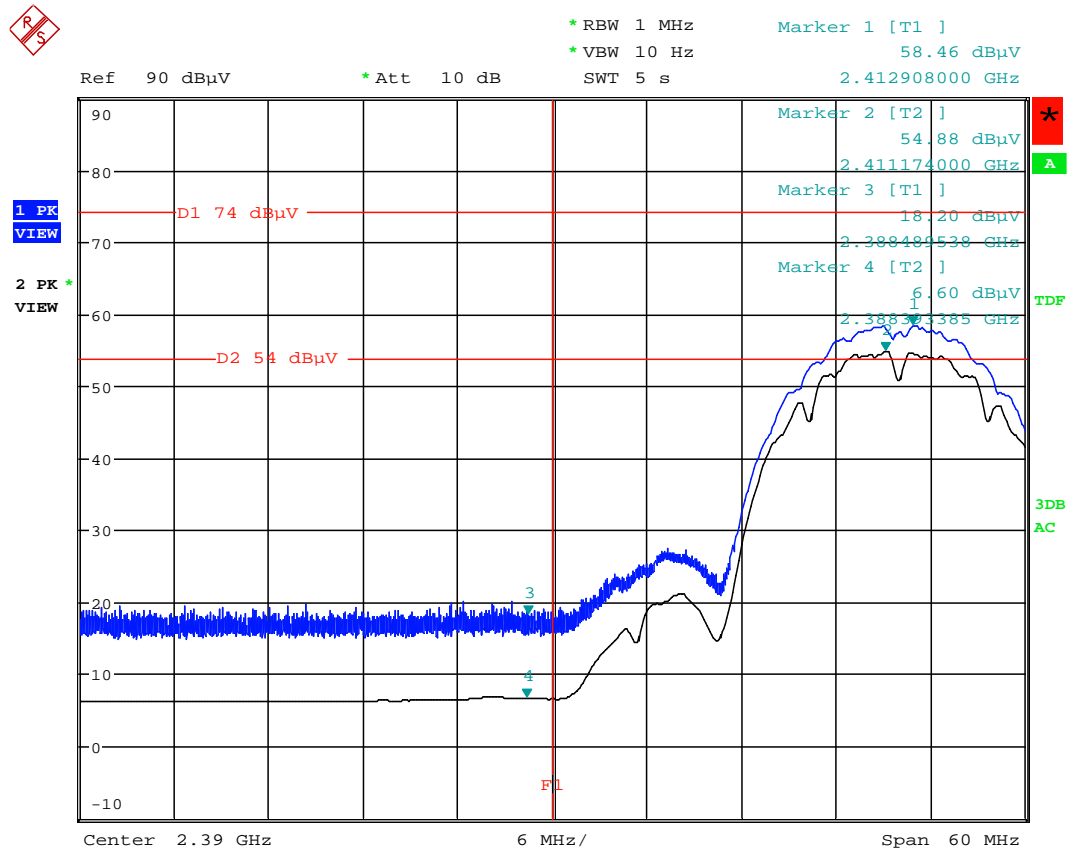
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Table 10: Band Edge Radiated Emission, 802.11

Operating Frequency [MHz]	EUT / Antenna Orient.	Peak Value [dBuV/m]	Average Value [dBuV/m]	Peak Limit [dBuV/m]	Average Limit [dBuV/m]	Peak Margin [dB]	Average Margin [dB]
2412	X/Y / V	18.20	6.60	74.0	54.0	55.8	47.4
2462	X/Y / V	26.15	18.47	74.0	54.0	47.85	35.53

Notes: All correction factors (antenna, cable, pre-amplifier) are included in the measurement values.
 Average limit in dBuV/m is calculated as follows: Average limit = 20 x log(500uV/m).
 Peak limit in dBuV/m is calculated as follows: Peak limit = Average limit + 20dB.

Figure 3: Band Edge Radiated Emission, Mode A1 (2412MHz), Peak and Average



Mode A1, V

Date: 15.JAN.2010 13:07:07

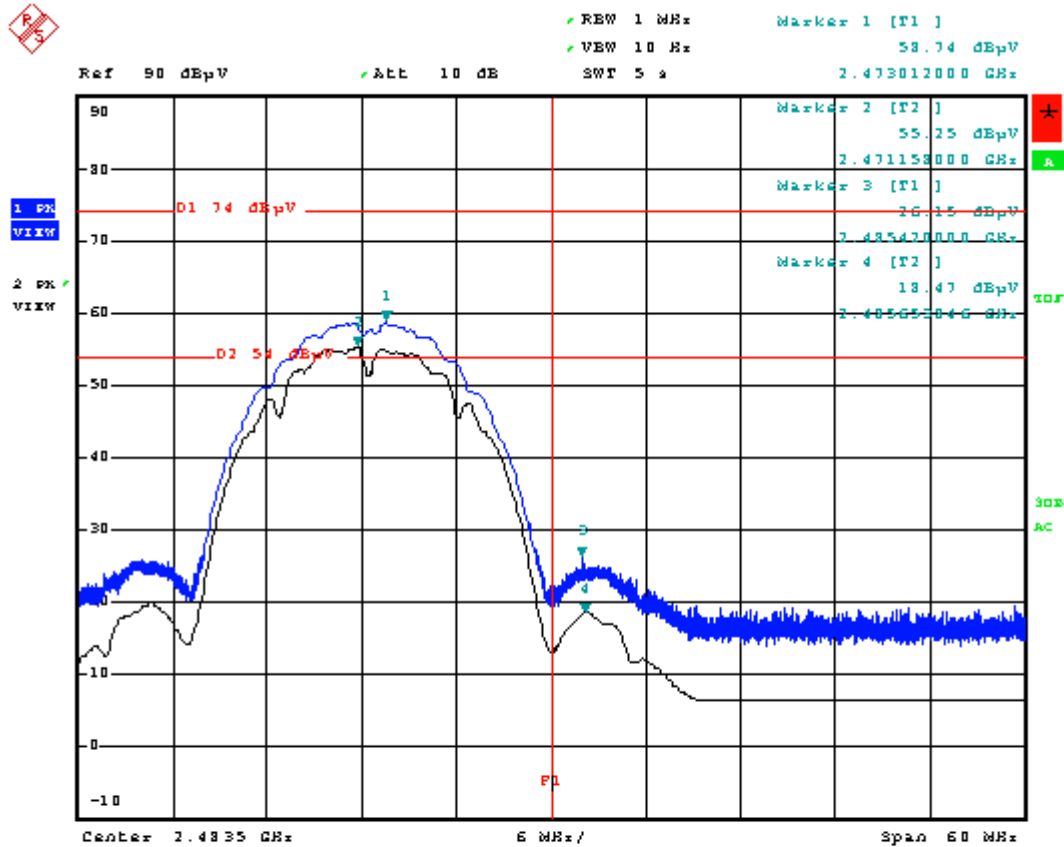
Note: The upper trace shows the peak value and the lower trace shows the average value.

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Figure 4: Band Edge Radiated Emission, Mode A3 (2462MHz), Peak and Average



Mode A3, V
 Date: 15. JAN. 2010 13:23:40

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

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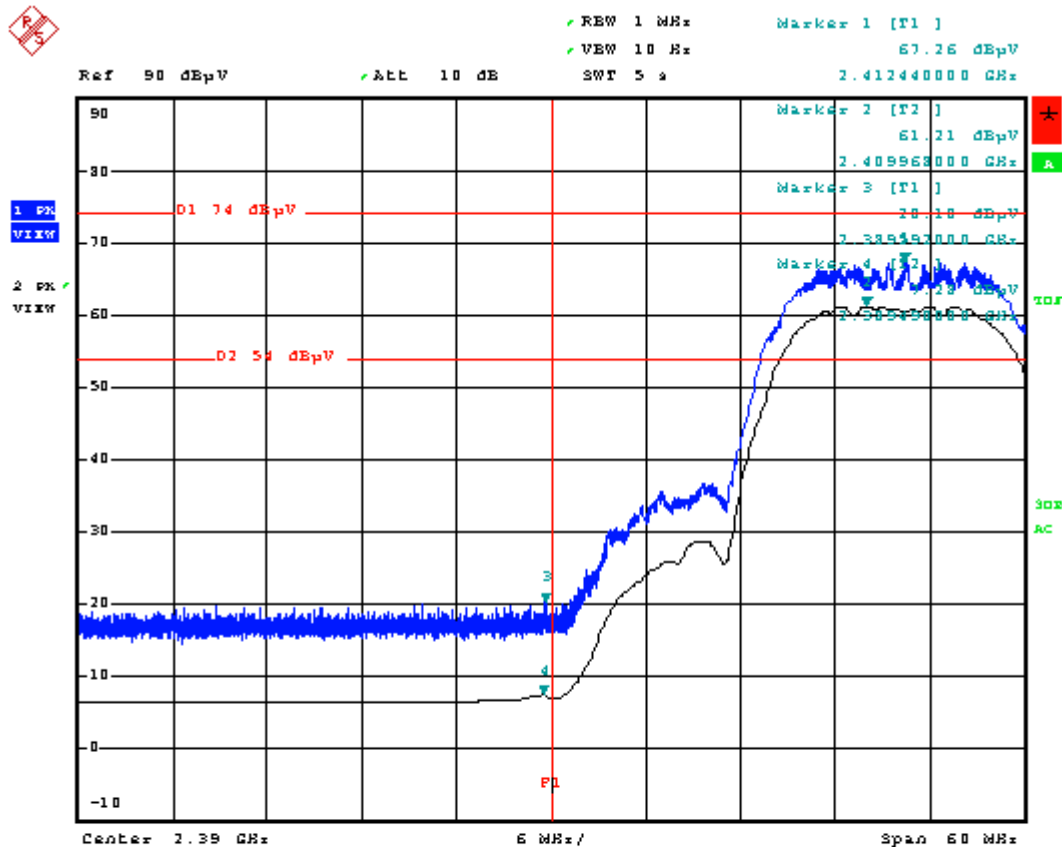
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Table 11: Band Edge Radiated Emission, 802.11.b

Operating Frequency [MHz]	EUT / Antenna Orient.	Peak Value [dBuV/m]	Average Value [dBuV/m]	Peak Limit [dBuV/m]	Average Limit [dBuV/m]	Peak Margin [dB]	Average Margin [dB]
2412	X/Y / V	20.10	7.28	74.0	54.0	53.9	46.72
2462	X/Y / V	19.88	6.39	74.0	54.0	54.12	47.61

Notes: All correction factors (antenna, cable, pre-amplifier) are included in the measurement values.
 Average limit in dBuV/m is calculated as follows: Average limit = 20 x log(500uV/m).
 Peak limit in dBuV/m is calculated as follows: Peak limit = Average limit + 20dB.

Figure 5: Band Edge Radiated Emission, Mode B1 (2412MHz), Peak and Average



Mode B1, V

Date: 15. JAN. 2010 13:39:23

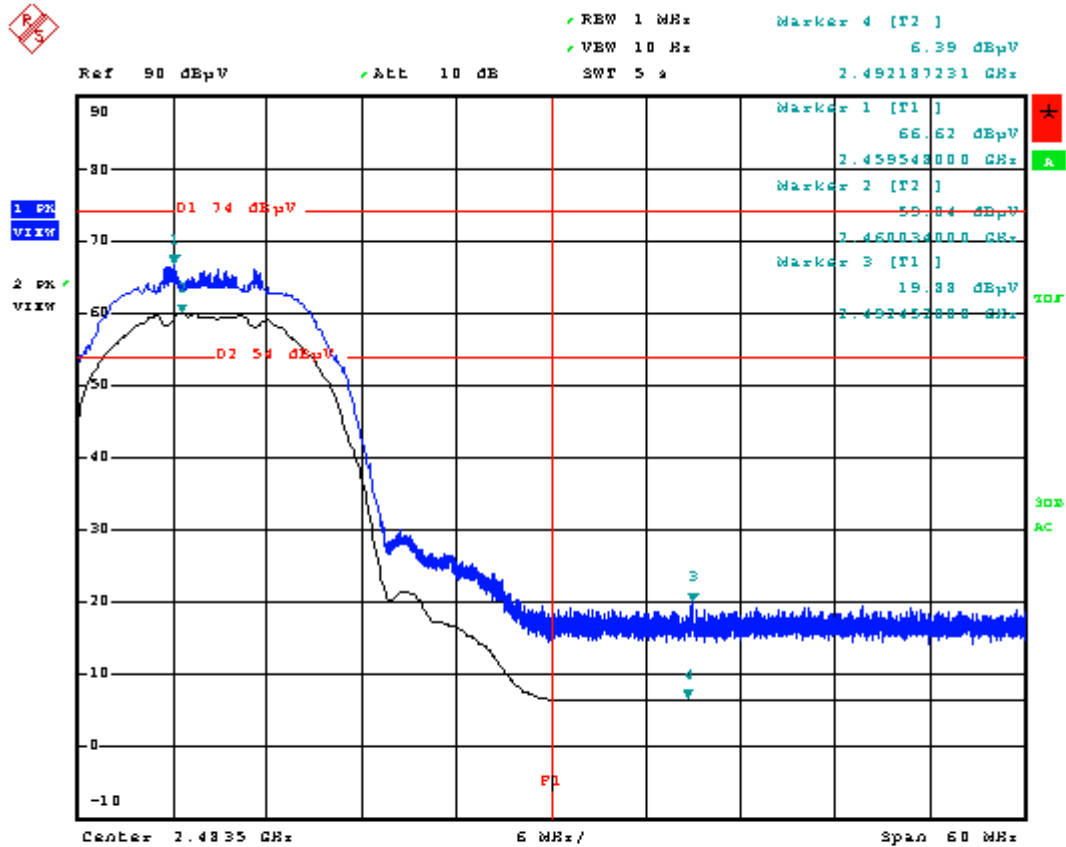
Note: The upper trace shows the peak value and the lower trace shows the average value.

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Figure 6: Band Edge Radiated Emission, Mode B3 (2462MHz), Peak and Average



Mode B3, V

Date: 15. JAN. 2010 13:46:09

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

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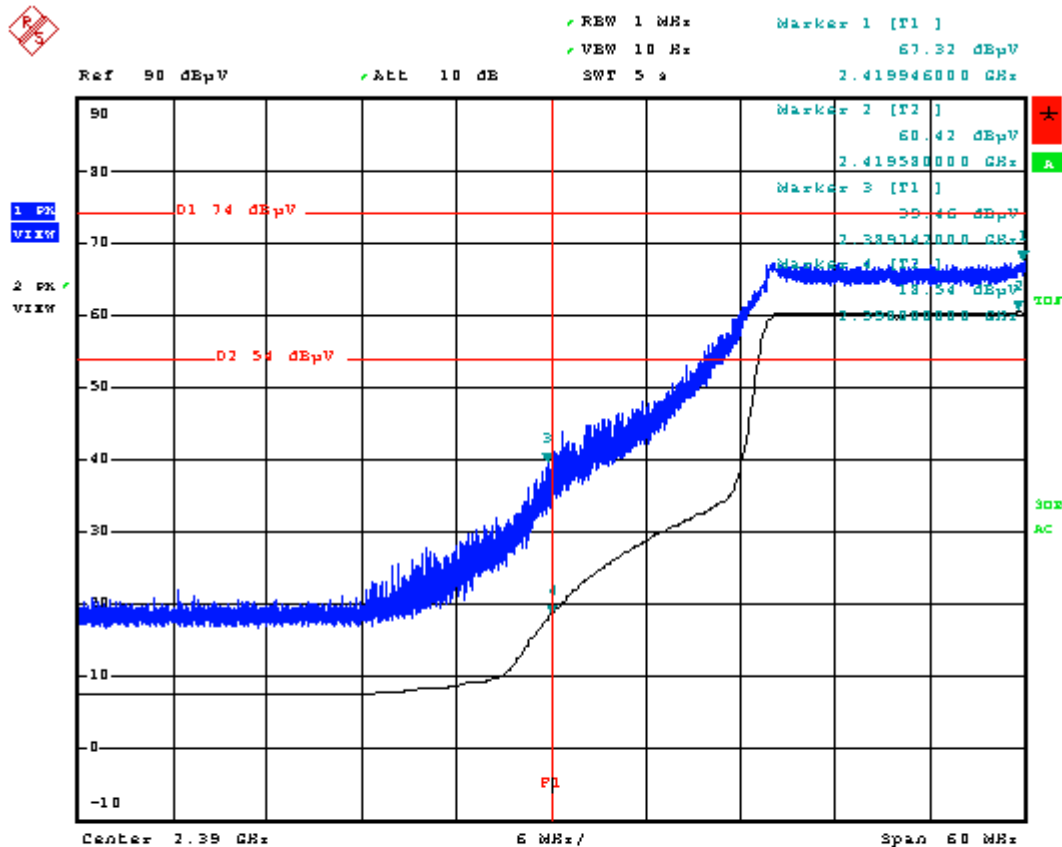
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Table 12: Band Edge Radiated Emission, 802.11.g

Operating Frequency [MHz]	EUT / Antenna Orient.	Peak Value [dBuV/m]	Average Value [dBuV/m]	Peak Limit [dBuV/m]	Average Limit [dBuV/m]	Peak Margin [dB]	Average Margin [dB]
2412	X/Y / H	39.46	18.54	74.0	54.0	34.54	35.46
2462	X/Y / H	29.33	13.65	74.0	54.0	44.67	40.35

Notes: All correction factors (antenna, cable, pre-amplifier) are included in the measurement values.
 Average limit in dBuV/m is calculated as follows: Average limit = 20 x log(500uV/m).
 Peak limit in dBuV/m is calculated as follows: Peak limit = Average limit + 20dB.

Figure 7: Band Edge Radiated Emission, Mode C1 (2412MHz), Peak and Average



Mode C1, H

Date: 15. JAN. 2010 14:10:54

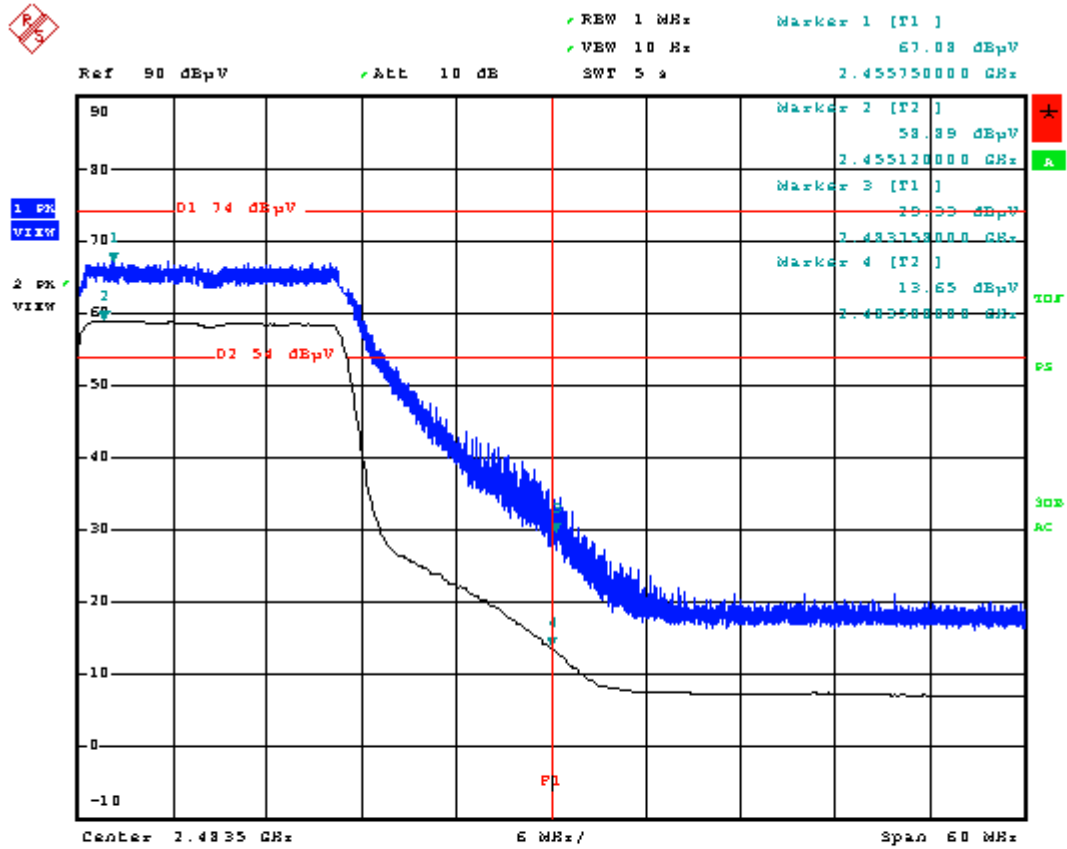
Note: The upper trace shows the peak value and the lower trace shows the average value.

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Figure 8: Band Edge Radiated Emission, Mode C3 (2462MHz), Peak and Average



Mode C3, H

Date: 15. JAN. 2010 14:29:30

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

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6.1.2 Radiated Emission, Out-of-Band and Spurious Emission, FCC 15.247(d), FCC 15.205, FCC 15.209, RSS-210 2.2, RSS-210 A8.5 and RSS-Gen 7.2.1

RESULT: PASS

Date of testing:	2010-01-14	2010-01-15	2010-01-16
Ambient temperature:	22°C	24°C	20°C
Relative humidity:	37%	41%	34%
Atmospheric pressure:	1010hPa	1015hPa	1019hPa
Frequency range:	9kHz – 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 FCC 15.209(a) and RSS-210 2.7.

Test procedure:

ANSI C63.4-2003, RSS-Gen 4.9, 4.10 and Measurement of Digital Transmission Systems Operating under Section 15.247

Before final measurements of radiated emissions were made in Semi Anechoic Chamber, the EUT was scanned to determine its emission spectrum profile. The physical arrangement of the test system, the associated cabling and the host orientation (X/Y and Z) were varied in order to ensure that maximum emission amplitudes were attained. X/Y orientation was found to conduct the final measurement.

The EUT was placed on a nonconductive turntable 0.8m above the ground plane. Final radiated emission measurements were made at 3m. 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.

For frequencies between 30MHz and 1GHz, 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 1GHz, emissions were measured using following settings: Peak: RBW=1MHz, VBW=1MHz, Average: RBW=1MHz, VBW=10Hz.

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 13: Radiated Emission 30MHz – 1GHz, Horizontal & Vertical Antenna Orientations, Quasi Peak Data, Mode A1, 802.11

Freq. [MHz]	Antenna polarity	Reading QP [dB(µV)]	Factor [dB(1/m)]	Level QP [dB(µV/m)]	Limit [dB(µV/m)]	Margin QP [dB]	Height [cm]	Angle [°]
30.623	V	46.5	-24.7	21.8	40.0	18.2	105	60
100.580	V	51.7	-26.5	25.2	43.5	18.3	100	130
167.583	H	51.6	-22.4	29.2	43.5	14.3	186	38
268.094	H	49.8	-22.4	27.4	46.0	18.6	128	168
352.005	H	53.1	-19.6	33.5	46.0	12.5	100	353
435.682	H	46.3	-17.6	28.7	46.0	17.3	227	250
572.002	H	48.9	-14.2	34.7	46.0	11.3	150	270
726.004	H	40.6	-12.8	27.8	46.0	18.2	121	52

Note: Level QP = Reading QP + Factor

Table 14: Radiated Emission 1GHz – 25GHz, Horizontal & Vertical Antenna Orientations, Peak and Average Data, Mode A1, 802.11

Freq. [MHz]	Antenna polarity	Reading AV [dB(µV)]	Reading PK [dB(µV)]	Factor [dB(1/m)]	Level AV [dB(µV/m)]	Level PK [dB(µV/m)]	Limit AV / PK [dB(µV/m)]	Margin AV [dB]	Margin PK [dB]	Height [cm]	Angle [°]
1607.944	V	45.6	54.0	-14.3	31.3	39.7	54.0 / 74.0	22.7	34.3	199	277
2098.924	V	37.3	51.6	-13.6	23.7	38.0	54.0 / 74.0	30.3	36.0	142	82
3563.617	H	38.4	52.0	-10.4	28.0	41.7	54.0 / 74.0	26.0	32.3	100	286
4823.975	V	49.7	56.0	-9.6	40.1	46.4	54.0 / 74.0	13.9	27.6	145	7
6552.147	V	38.1	51.9	-6.0	32.1	45.9	54.0 / 74.0	21.9	28.1	152	234
7220.007	H	38.2	52.8	-4.9	33.3	47.9	54.0 / 74.0	20.7	26.1	194	233

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

Table 15: Radiated Emission 30MHz – 1GHz, Horizontal & Vertical Antenna Orientations, Quasi Peak Data, Mode A2, 802.11

Freq. [MHz]	Antenna polarity	Reading QP [dB(µV)]	Factor [dB(1/m)]	Level QP [dB(µV/m)]	Limit [dB(µV/m)]	Margin QP [dB]	Height [cm]	Angle [°]
31.099	V	46.9	-24.7	22.2	40.0	17.8	101	102
75.080	H	52.2	-26.2	26.0	40.0	14.0	279	100
95.951	V	51.8	-27.1	24.7	43.5	18.8	122	268
167.568	H	52.1	-22.4	29.7	43.5	13.8	184	37
351.995	H	53.1	-19.6	33.5	46.0	12.5	100	355
572.001	H	49.0	-14.2	34.8	46.0	11.2	149	269

Note: Level QP = Reading QP + Factor

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Table 16: Radiated Emission 1GHz – 25GHz, Horizontal & Vertical Antenna Orientations, Peak and Average Data, Mode A2, 802.11

Freq. [MHz]	Antenna polarity	Reading AV [dB(µV)]	Reading PK [dB(µV)]	Factor [dB(1/m)]	Level AV [dB(µV/m)]	Level PK [dB(µV/m)]	Limit AV / PK [dB(µV/m)]	Margin AV [dB]	Margin PK [dB]	Height [cm]	Angle [°]
1029.324	H	38.4	52.5	-16.0	22.4	36.4	54.0 / 74.0	31.6	37.6	195	319
1627.978	V	46.2	53.7	-14.2	32.0	39.5	54.0 / 74.0	22.0	34.5	138	353
3255.968	V	51.2	56.2	-11.4	39.8	44.8	54.0 / 74.0	14.2	29.2	136	347
4883.983	V	52.5	57.5	-9.3	43.2	48.2	54.0 / 74.0	10.8	25.8	121	11
7290.525	H	37.9	51.7	-5.0	32.9	46.7	54.0 / 74.0	21.1	27.3	133	139
7881.167	H	37.3	51.9	-3.4	33.9	48.5	54.0 / 74.0	20.1	25.5	103	108

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

Table 17: Radiated Emission 30MHz – 1GHz, Horizontal & Vertical Antenna Orientations, Quasi Peak Data, Mode A3, 802.11

Freq. [MHz]	Antenna polarity	Reading QP [dB(µV)]	Factor [dB(1/m)]	Level QP [dB(µV/m)]	Limit [dB(µV/m)]	Margin QP [dB]	Height [cm]	Angle [°]
30.748	V	46.6	-24.7	21.9	40.0	18.1	100	62
147.895	H	50.0	-22.6	27.4	43.5	16.1	212	43
167.590	H	51.8	-22.4	29.4	43.5	14.1	191	26
352.016	H	52.7	-19.6	33.1	46.0	12.9	100	359
435.654	H	45.4	-17.6	27.8	46.0	18.2	216	83
571.998	H	49.0	-14.2	34.8	46.0	11.2	149	268

Note: Level QP = Reading QP + Factor

Table 18: Radiated Emission 1GHz – 25GHz, Horizontal & Vertical Antenna Orientations, Peak and Average Data, Mode A3, 802.11

Freq. [MHz]	Antenna polarity	Reading AV [dB(µV)]	Reading PK [dB(µV)]	Factor [dB(1/m)]	Level AV [dB(µV/m)]	Level PK [dB(µV/m)]	Limit AV / PK [dB(µV/m)]	Margin AV [dB]	Margin PK [dB]	Height [cm]	Angle [°]
1038.894	V	41.2	52.8	-16.2	25.0	36.6	54.0 / 74.0	29.0	37.4	100	351
1648.002	V	46.4	53.7	-14.1	32.3	39.6	54.0 / 74.0	21.7	34.4	185	345
3296.001	V	50.9	56.5	-11.4	39.5	45.1	54.0 / 74.0	14.5	28.9	101	9
4431.073	H	37.7	52.0	-10.0	27.7	42.0	54.0 / 74.0	26.3	32.0	114	247
4943.995	V	47.3	54.8	-9.1	38.2	45.7	54.0 / 74.0	15.8	28.3	115	9
7493.657	V	37.9	51.9	-4.8	33.1	47.0	54.0 / 74.0	20.9	27.0	118	168

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

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Table 19: Radiated Emission 30MHz – 1GHz, Horizontal & Vertical Antenna Orientations, Quasi Peak Data, Mode B1, 802.11.b

Freq. [MHz]	Antenna polarity	Reading QP [dB(µV)]	Factor [dB(1/m)]	Level QP [dB(µV/m)]	Limit [dB(µV/m)]	Margin QP [dB]	Height [cm]	Angle [°]
36.061	V	59.6	-24.5	35.1	40.0	4.9	100	119
78.602	V	63.0	-26.3	36.7	40.0	3.3*	100	139
150.234	V	57.2	-22.7	34.5	43.5	9.0	100	151
348.092	H	53.3	-19.7	33.6	46.0	12.4	101	267
530.856	V	42.6	-14.7	27.9	46.0	18.1	117	16
796.356	V	39.1	-11.6	27.5	46.0	18.5	126	159

Note: Level QP = Reading QP + Factor

Uncertainty

(*) The measured result is below the specification limit by a margin less than the measurement uncertainty; it is not therefore possible to determine compliance at a level of confidence of 95%. However, the measured result indicates a higher probability that the product tested complies with the specification limit.

Table 20: Radiated Emission 1GHz – 25GHz, Horizontal & Vertical Antenna Orientations, Peak and Average Data, Mode B1, 802.11.b

Freq. [MHz]	Antenna polarity	Reading AV [dB(µV)]	Reading PK [dB(µV)]	Factor [dB(1/m)]	Level AV [dB(µV/m)]	Level PK [dB(µV/m)]	Limit AV / PK [dB(µV/m)]	Margin AV [dB]	Margin PK [dB]	Height [cm]	Angle [°]
1063.278	V	45.8	66.4	-16.6	29.2	49.8	54.0 / 74.0	24.8	24.2	103	185
1330.441	V	42.8	64.9	-15.1	27.7	49.8	54.0 / 74.0	26.3	24.2	103	334
1440.225	V	59.8	63.3	-15.1	44.7	48.2	54.0 / 74.0	9.3	25.8	112	11
1597.193	V	41.1	66.0	-14.4	26.7	51.6	54.0 / 74.0	27.3	22.4	106	110
2322.182	H	46.9	59.4	-13.5	33.4	45.9	54.0 / 74.0	20.6	28.1	174	173
4818.742	V	41.8	54.2	-9.7	32.1	44.6	54.0 / 74.0	21.9	29.4	197	205

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

Table 21: Radiated Emission 30MHz – 1GHz, Horizontal & Vertical Antenna Orientations, Quasi Peak Data, Mode B2, 802.11.b

Freq. [MHz]	Antenna polarity	Reading QP [dB(µV)]	Factor [dB(1/m)]	Level QP [dB(µV/m)]	Limit [dB(µV/m)]	Margin QP [dB]	Height [cm]	Angle [°]
72.015	V	58.6	-24.9	33.7	40.0	6.3	100	163
149.060	V	56.6	-22.7	33.9	43.5	9.6	100	146
348.020	H	53.1	-19.7	33.4	46.0	12.6	101	60
432.023	V	43.0	-17.0	26.0	46.0	20.0	120	188
533.091	V	44.3	-14.7	29.6	46.0	16.4	125	13
796.315	V	38.5	-11.6	26.9	46.0	19.1	101	49

Note: Level QP = Reading QP + Factor

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Table 22: Radiated Emission 1GHz – 25GHz, Horizontal & Vertical Antenna Orientations, Peak and Average Data, Mode B2, 802.11.b

Freq. [MHz]	Antenna polarity	Reading AV [dB(µV)]	Reading PK [dB(µV)]	Factor [dB(1/m)]	Level AV [dB(µV/m)]	Level PK [dB(µV/m)]	Limit AV / PK [dB(µV/m)]	Margin AV [dB]	Margin PK [dB]	Height [cm]	Angle [°]
1064.539	V	47.1	67.7	-16.6	30.5	51.1	54.0 / 74.0	23.5	22.9	112	139
1329.373	H	41.9	66.2	-15.1	26.8	51.1	54.0 / 74.0	27.2	22.9	103	262
1440.226	V	59.8	63.0	-15.1	44.7	47.9	54.0 / 74.0	9.3	26.1	112	8
1597.382	V	42.0	66.5	-14.4	27.6	52.1	54.0 / 74.0	26.4	21.9	100	162
4868.814	V	41.4	53.5	-9.4	32.0	44.1	54.0 / 74.0	22.0	29.9	142	243
7615.241	H	37.7	51.3	-4.5	33.2	46.8	54.0 / 74.0	20.8	27.2	133	242

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

Table 23: Radiated Emission 30MHz – 1GHz, Horizontal & Vertical Antenna Orientations, Quasi Peak Data, Mode B3, 802.11.b

Freq. [MHz]	Antenna polarity	Reading QP [dB(µV)]	Factor [dB(1/m)]	Level QP [dB(µV/m)]	Limit [dB(µV/m)]	Margin QP [dB]	Height [cm]	Angle [°]
72.288	V	55.3	-25.0	30.3	40.0	9.7	101	150
148.377	V	58.3	-22.8	35.5	43.5	8.0	102	148
532.266	V	39.2	-14.7	24.5	46.0	21.5	103	182
666.424	V	39.4	-12.7	26.7	46.0	19.3	101	177
798.158	V	34.6	-11.6	23.0	46.0	23.0	104	51
930.665	V	33.0	-10.1	22.9	46.0	23.1	119	191

Note: Level QP = Reading QP + Factor

Table 24: Radiated Emission 1GHz – 25GHz, Horizontal & Vertical Antenna Orientations, Peak and Average Data, Mode B3, 802.11.b

Freq. [MHz]	Antenna polarity	Reading AV [dB(µV)]	Reading PK [dB(µV)]	Factor [dB(1/m)]	Level AV [dB(µV/m)]	Level PK [dB(µV/m)]	Limit AV / PK [dB(µV/m)]	Margin AV [dB]	Margin PK [dB]	Height [cm]	Angle [°]
1064.292	V	45.7	67.2	-16.6	29.1	50.6	54.0 / 74.0	24.9	23.4	112	183
1330.673	V	40.8	63.1	-15.1	25.7	48.0	54.0 / 74.0	28.3	26.0	112	302
1440.220	V	60.2	63.9	-15.1	45.1	48.8	54.0 / 74.0	8.9	25.2	106	10
1598.706	V	41.9	66.1	-14.4	27.5	51.7	54.0 / 74.0	26.5	22.3	105	166
3840.622	V	52.7	57.2	-10.5	42.2	46.7	54.0 / 74.0	11.8	27.3	168	300
7194.921	V	38.1	52.0	-5.0	33.1	47.0	54.0 / 74.0	20.9	27.0	103	206

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

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Table 25: Radiated Emission 30MHz – 1GHz, Horizontal & Vertical Antenna Orientations, Quasi Peak Data, Mode C1, 802.11.g

Freq. [MHz]	Antenna polarity	Reading QP [dB(µV)]	Factor [dB(1/m)]	Level QP [dB(µV/m)]	Limit [dB(µV/m)]	Margin QP [dB]	Height [cm]	Angle [°]
147.403	V	56.2	-22.9	33.3	43.5	10.2	100	146
331.640	V	45.2	-20.4	24.8	46.0	21.2	115	120
347.981	H	49.4	-19.7	29.7	46.0	16.3	308	74
453.685	V	44.5	-16.3	28.2	46.0	17.8	121	177
533.051	V	43.6	-14.7	28.9	46.0	17.1	100	164
666.421	V	39.4	-12.7	26.7	46.0	19.3	101	178

Note: Level QP = Reading QP + Factor

Table 26: Radiated Emission 1GHz – 25GHz, Horizontal & Vertical Antenna Orientations, Peak and Average Data, Mode C1, 802.11.g

Freq. [MHz]	Antenna polarity	Reading AV [dB(µV)]	Reading PK [dB(µV)]	Factor [dB(1/m)]	Level AV [dB(µV/m)]	Level PK [dB(µV/m)]	Limit AV / PK [dB(µV/m)]	Margin AV [dB]	Margin PK [dB]	Height [cm]	Angle [°]
1065.099	V	45.9	66.9	-16.6	29.3	50.3	54.0 / 74.0	24.7	23.7	179	149
1440.240	V	59.9	63.1	-15.1	44.8	48.0	54.0 / 74.0	9.2	26.0	111	10
1597.285	V	43.6	68.2	-14.4	29.2	53.8	54.0 / 74.0	24.8	20.2	100	284
1865.326	V	38.7	61.8	-13.9	24.8	47.9	54.0 / 74.0	29.2	26.1	106	77
2317.592	H	48.5	62.6	-13.5	35.0	49.1	54.0 / 74.0	19.0	24.9	135	172
4825.086	V	44.5	59.6	-9.6	34.9	50.0	54.0 / 74.0	19.1	24.0	112	201
1065.099	V	45.9	66.9	-16.6	29.3	50.3	54.0 / 74.0	24.7	23.7	179	149

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

Table 27: Radiated Emission 30MHz – 1GHz, Horizontal & Vertical Antenna Orientations, Quasi Peak Data, Mode C2, 802.11.g

Freq. [MHz]	Antenna polarity	Reading QP [dB(µV)]	Factor [dB(1/m)]	Level QP [dB(µV/m)]	Limit [dB(µV/m)]	Margin QP [dB]	Height [cm]	Angle [°]
143.987	V	59.5	-23.1	36.4	43.5	7.1	101	127
221.916	V	60.2	-25.0	35.2	46.0	10.8	101	151
348.125	H	53.0	-19.7	33.3	46.0	12.7	101	264
528.024	V	45.0	-14.8	30.2	46.0	15.8	107	167
666.008	V	37.9	-12.7	25.2	46.0	20.8	102	38
796.398	V	36.3	-11.6	24.7	46.0	21.3	111	52

Note: Level QP = Reading QP + Factor

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Table 28: Radiated Emission 1GHz – 25GHz, Horizontal & Vertical Antenna Orientations, Peak and Average Data, Mode C2, 802.11.g

Freq. [MHz]	Antenna polarity	Reading AV [dB(µV)]	Reading PK [dB(µV)]	Factor [dB(1/m)]	Level AV [dB(µV/m)]	Level PK [dB(µV/m)]	Limit AV / PK [dB(µV/m)]	Margin AV [dB]	Margin PK [dB]	Height [cm]	Angle [°]
1063.539	V	45.3	66.5	-16.6	28.7	49.9	54.0 / 74.0	25.3	24.1	181	157
1440.217	V	60.2	64.1	-15.1	45.1	49.0	54.0 / 74.0	8.9	25.0	103	11
1598.197	V	42.0	66.6	-14.4	27.6	52.2	54.0 / 74.0	26.4	21.8	100	281
1861.839	V	40.8	62.3	-13.9	26.9	48.5	54.0 / 74.0	27.1	25.5	103	72
3840.637	V	50.0	56.2	-10.5	39.5	45.7	54.0 / 74.0	14.5	28.3	100	72
7209.082	V	38.1	53.1	-4.9	33.2	48.1	54.0 / 74.0	20.8	25.9	176	336

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

Table 29: Radiated Emission 30MHz – 1GHz, Horizontal & Vertical Antenna Orientations, Quasi Peak Data, Mode C3, 802.11.g

Freq. [MHz]	Antenna polarity	Reading QP [dB(µV)]	Factor [dB(1/m)]	Level QP [dB(µV/m)]	Limit [dB(µV/m)]	Margin QP [dB]	Height [cm]	Angle [°]
148.516	V	57.3	-22.8	34.5	43.5	9.0	100	133
228.128	V	60.8	-24.7	36.1	46.0	9.9	100	26
442.014	V	39.7	-16.6	23.1	46.0	22.9	101	165
533.090	V	42.8	-14.7	28.1	46.0	17.9	137	10
611.384	V	40.2	-13.3	26.9	46.0	19.1	117	23
799.785	H	39.2	-11.7	27.5	46.0	18.5	101	73

Note: Level QP = Reading QP + Factor

Table 30: Radiated Emission 1GHz – 25GHz, Horizontal & Vertical Antenna Orientations, Peak and Average Data, Mode C3, 802.11.g

Freq. [MHz]	Antenna polarity	Reading AV [dB(µV)]	Reading PK [dB(µV)]	Factor [dB(1/m)]	Level AV [dB(µV/m)]	Level PK [dB(µV/m)]	Limit AV / PK [dB(µV/m)]	Margin AV [dB]	Margin PK [dB]	Height [cm]	Angle [°]
1064.363	V	46.1	67.0	-16.6	29.5	50.4	54.0 / 74.0	24.5	23.6	100	150
1440.233	V	60.3	64.0	-15.1	45.2	48.9	54.0 / 74.0	8.8	25.1	106	11
1596.035	V	41.9	66.3	-14.4	27.5	51.9	54.0 / 74.0	26.5	22.1	102	312
3282.648	V	51.4	56.3	-11.4	40.0	44.9	54.0 / 74.0	14.0	29.1	124	11
3840.610	V	48.7	55.4	-10.5	38.2	44.9	54.0 / 74.0	15.8	29.1	100	74
7855.847	V	37.5	51.5	-3.5	34.0	48.0	54.0 / 74.0	20.0	26.0	106	191

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

6.2 Radiated Emission of Receiver

6.2.1 Radiated Emission of Receiver, FCC 15.109, RSS-210 2.2, RSS-210 2.6, RSS-210 A8.5, RSS-Gen 7.2.3.2

RESULT:

PASS

Date of testing:	2010-01-14	2010-01-15	2010-01-16
Ambient temperature:	22°C	24°C	20°C
Relative humidity:	37%	41%	34%
Atmospheric pressure:	1010hPa	1015hPa	1019hPa
Frequency range:	30MHz – 12.5GHz		
Equipment classification:	Class B		
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) and RSS-210 Table 2 (and RSS-Gen Table 1).

Test procedure:

ANSI C63.4-2003, RSS-Gen 4.9, 4.10

Before final measurements of radiated emissions were made in Semi Anechoic Chamber, the EUT was scanned to determine its emission spectrum profile. The physical arrangement of the test system, the associated cabling and the antenna orientation (X/Y & Z) of the EUT were varied in order to ensure that maximum emission amplitudes were attained. X/Y orientation was found to conduct the final measurement.

The EUT was placed on a nonconductive turntable 0.8m above the ground plane. Final radiated emission measurements were made at 3m. The spectrum was examined from 30 MHz to the 5th harmonic of the highest fundamental transmitter frequency (12.5 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.

For frequencies between 30MHz and 1GHz, 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 1GHz, emissions were measured using following settings: Peak: RBW=1MHz, VBW=1MHz, Average: RBW=1MHz, VBW=10Hz.

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 31: Radiated Emission 30MHz – 1GHz, Horizontal & Vertical Antenna Orientations, Quasi Peak Data, Mode A4, 802.11

Freq. [MHz]	Antenna polarity	Reading QP [dB(µV)]	Factor [dB(1/m)]	Level QP [dB(µV/m)]	Limit [dB(µV/m)]	Margin QP [dB]	Height [cm]	Angle [°]
30.589	H	43.4	-24.4	19.0	40.0	21.0	102	260
45.336	V	49.2	-23.5	25.7	40.0	14.3	100	173
129.908	V	49.4	-24.2	25.2	43.5	18.3	109	35
351.993	H	53.9	-19.6	34.3	46.0	11.7	111	336
430.057	H	45.6	-17.8	27.8	46.0	18.2	100	96
572.000	H	48.2	-14.2	34.0	46.0	12.0	181	279

Note: Level QP = Reading QP + Factor

Table 32: Radiated Emission 1GHz – 12.5GHz, Horizontal & Vertical Antenna Orientations, Peak and Average Data, Mode A4, 802.11

Freq. [MHz]	Antenna polarity	Reading AV [dB(µV)]	Reading PK [dB(µV)]	Factor [dB(1/m)]	Level AV [dB(µV/m)]	Level PK [dB(µV/m)]	Limit AV / PK [dB(µV/m)]	Margin AV [dB]	Margin PK [dB]	Height [cm]	Angle [°]
1056.157	V	38.7	52.6	-16.5	22.2	36.1	54.0 / 74.0	31.8	37.9	107	317
1519.719	H	37.8	52.9	-14.9	22.9	38.0	54.0 / 74.0	31.1	36.0	100	137
2884.192	V	38.2	52.0	-11.7	26.5	40.2	54.0 / 74.0	27.5	33.8	134	23
3563.893	V	38.4	52.4	-10.4	28.0	42.0	54.0 / 74.0	26.0	32.0	188	101
5535.797	V	37.9	51.8	-7.7	30.2	44.1	54.0 / 74.0	23.8	29.9	136	64
7751.427	V	37.7	52.1	-3.9	33.8	48.2	54.0 / 74.0	20.2	25.8	106	349

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

Table 33: Radiated Emission 30MHz – 1GHz, Horizontal & Vertical Antenna Orientations, Quasi Peak Data, Mode B4, 802.11.b

Freq. [MHz]	Antenna polarity	Reading QP [dB(µV)]	Factor [dB(1/m)]	Level QP [dB(µV/m)]	Limit [dB(µV/m)]	Margin QP [dB]	Height [cm]	Angle [°]
36.020	V	54.9	-24.5	30.4	40.0	9.6	100	140
83.029	V	58.1	-27.2	30.9	40.0	9.1	142	139
168.263	V	58.4	-22.6	35.8	43.5	7.7	104	183
384.056	H	55.8	-18.8	37.0	46.0	9.0	101	58
500.083	V	53.7	-15.4	38.3	46.0	7.7	122	163
750.104	V	51.7	-11.9	39.8	46.0	6.2	101	214

Note: Level QP = Reading QP + Factor

Table 34: Radiated Emission 1GHz – 25GHz, Horizontal & Vertical Antenna Orientations, Peak and Average Data, Mode B4, 802.11.b

Freq. [MHz]	Antenna polarity	Reading AV [dB(µV)]	Reading PK [dB(µV)]	Factor [dB(1/m)]	Level AV [dB(µV/m)]	Level PK [dB(µV/m)]	Limit AV / PK [dB(µV/m)]	Margin AV [dB]	Margin PK [dB]	Height [cm]	Angle [°]
1329.854	H	41.2	65.8	-15.1	26.1	50.7	54.0 / 74.0	27.9	23.3	101	102
1596.063	V	42.2	67.7	-14.4	27.8	53.3	54.0 / 74.0	26.2	20.7	113	52
1835.319	V	40.5	60.1	-13.8	26.7	46.3	54.0 / 74.0	27.3	27.7	100	264
2394.069	V	37.8	51.9	-13.5	24.3	38.4	54.0 / 74.0	29.7	35.6	101	322
2656.942	V	38.3	58.1	-13.1	25.2	45.0	54.0 / 74.0	28.8	29.0	102	77
3840.638	V	53.4	58.1	-10.5	42.9	47.6	54.0 / 74.0	11.1	26.4	124	294

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

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Table 35: Radiated Emission 30MHz – 1GHz, Horizontal & Vertical Antenna Orientations, Quasi Peak Data, Mode C4, 802.11.g

Freq. [MHz]	Antenna polarity	Reading QP [dB(µV)]	Factor [dB(1/m)]	Level QP [dB(µV/m)]	Limit [dB(µV/m)]	Margin QP [dB]	Height [cm]	Angle [°]
36.052	V	54.6	-24.5	30.1	40.0	9.9	101	142
168.032	V	60.2	-22.6	37.6	43.5	5.9	103	180
300.080	V	54.2	-21.5	32.7	46.0	13.3	165	189
407.979	H	47.2	-18.3	28.9	46.0	17.1	101	62
581.136	H	49.0	-14.0	35.0	46.0	11.0	147	79
686.980	V	43.4	-12.5	30.9	46.0	15.1	101	174

Note: Level QP = Reading QP + Factor

Table 36: Radiated Emission 1GHz – 25GHz, Horizontal & Vertical Antenna Orientations, Peak and Average Data, Mode C4, 802.11.g

Freq. [MHz]	Antenna polarity	Reading AV [dB(µV)]	Reading PK [dB(µV)]	Factor [dB(1/m)]	Level AV [dB(µV/m)]	Level PK [dB(µV/m)]	Limit AV / PK [dB(µV/m)]	Margin AV [dB]	Margin PK [dB]	Height [cm]	Angle [°]
1332.070	V	41.0	64.8	-15.1	25.9	49.7	54.0 / 74.0	28.1	24.3	103	306
1440.237	H	52.7	58.1	-15.1	37.6	43.0	54.0 / 74.0	16.4	31.0	139	29
1595.596	V	41.0	64.6	-14.4	26.6	50.2	54.0 / 74.0	27.4	23.8	169	53
1846.160	V	39.6	59.4	-13.8	25.8	45.6	54.0 / 74.0	28.2	28.4	101	260
3840.620	V	52.1	57.7	-10.5	41.6	47.2	54.0 / 74.0	12.4	26.8	123	292
5493.488	V	38.2	52.2	-7.6	30.6	44.6	54.0 / 74.0	23.4	29.4	146	177

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

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