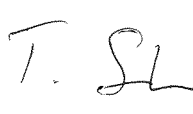
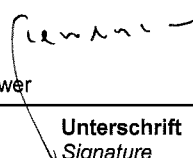


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<i>Test Report No.:</i>			
Auftraggeber: <i>Client:</i>	Mitsumi Electric Co Ltd 1601, Sakai, Atsugi-shi, Kanagawa-ken 243, Japan		
Gegenstand der Prüfung: <i>Test item:</i>	Wireless LAN Module		
Bezeichnung: <i>Identification:</i>	DWM-W028	Serien-Nr.: <i>Serial No.:</i>	MAC A4:C0:E1:66:A7:BA
Wareneingangs-Nr.: <i>Receipt No.:</i>	PT214011064-1	Eingangsdatum: <i>Date of receipt:</i>	2011-04-08
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>	FCC 47 CFR Part 15, Subpart C, Section 15.247 (October 1, 2010) ANSI C63.4-2003 KDB Publication No. 558074: Measurement of Digital Transmission Systems Operating under Section 15.247 (March 23, 2005) RSS-210 (Issue 8): 2010 RSS-Gen (Issue 3): 2010 ANSI C63.4-2003		
Prüfergebnis: <i>Test Result:</i>	Der Prüfgegenstand entspricht oben genannter Prüfgrundlage(n). The test item passed the test specification(s).		
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:	
 2011-04-13 T. Sauter / Inspector		 2011-04-13 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 802.11b and 802.11g of the grant, details refer to Section 1: General remarks			
Abkürzungen:	P(ass) = entspricht Prüfgrundlage	Abbreviations:	P(ass) = passed
	F(ail) = entspricht nicht Prüfgrundlage		F(ail) = failed
	N/A = nicht anwendbar		N/A = not applicable
	N/T = nicht getestet		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>			

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 BAND EDGE RADIATED EMISSION

RESULT: PASS

5.1.2 RADIATED SPURIOUS EMISSION OF TRANSMITTER

RESULT: PASS

5.2.1 AC POWER LINE CONDUCTED EMISSION OF TRANSMITTER

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: EW4DWMW028) and as modification for IC certificate (IC: 4250A-DWMW028). An additional host CTR-001(-05) with two antennas 361.00194.005 CS and 361.00194.005 CS2 is applied to this Limited Modular Approval.

CTR-001(-05) is a CUSTOM Nintendo3DS placed into game stores. It will be used for trial hardware in game stores.

The differences between CTR-001(-01) and CTR-001(-05) are following:

1. The battery is removed from CTR-001(-05), power is supplied by ROM Emulator. The voltage to the WLAN module is the same since the internal power electric circuit is the same as CTR-001(-01).
2. The basic circuitry of the digital interface of CTR-001(-05) is the same as that of CTR-001(-01). Slight change was made between two models, for example: disable the function of the Power button.
3. The accessories configuration of CTR-001(-05) is different to that of CTR-001(-01).

The type of the antenna 361.00194.005 CS is the same as that of 361.00194.005 CS2. Since the antenna gain of 361.00194.005 CS is higher than that of 361.00194.005 CS2, the host was tested with representative antenna 361.00194.005 CS. No additional test is considered for 361.00194.005 CS2.

Conducted Emission and Radiated Emission were conducted due to the above changes. Refer to the exhibits for the technical details of the changes. For the previous technical test data of the module, refer to the test report of the original application.

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1.1 History

Test report number	Content
12606802 001	Original Application Host: Nintendo DS CTR Target Board Antenna: DCA-P08
12606802 002	Original Application RF Exposure report
12606802 003	Permissive change II Application Additional host: CTR-001(-01) Additional antenna: DCA-P17 ES3, DCA-P17 ES4 and DCA-P17 CS
12606802 004	Permissive change II Application RF Exposure report
12606802 005	Permissive change II Application Additional antenna: Antenna 361.00194.005 CS for the host CTR-001(-01). Antenna CS (DCA-P17 CS), ES3 (DCA-P17 ES3) and ES4 (DCA-P17 ES4) are still used. Modification of the host CTR-001(-01): In the schematic, minor changes of the capacitor, resistor and diode are made by adding or deleting or changing values. Fundamental circuit does not change. Artwork is changed based on schematic change. The locations of major parts (IC, module, connector, etc) are same. Details refer to the exhibits
12606802 006	Permissive change II Application RF Exposure report
12606802 007	Permissive change II Application Additional antennas DCA-P17 CS2 and 361.00194.005 CS2 were added for the host (CTR-001 / CTR-001(-01)). Additional host: CTR-001
12606802 008	Permissive change II Application RF Exposure report
12606802 009	Permissive change II Application For the details, refer to section 1.
12606802 010	Test report of the receiver
12606802 011	Permissive change II Application RF Exposure report

1.2 Complementary Materials

There is no attachment to 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 Communications Commission has reviewed the technical characteristics of the radiated and conducted emission facilities and has found these test sites 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 facilities and has found these test sites to be in compliance with Canadian requirements. The description of the test facility is listed under OATS filing number 3466B-1.

The test facility is accredited by VLAC (member of ILAC) under number VLAC-017 according to ISO/IEC 17025:2005.



TÜV Rheinland Japan Ltd. is accredited by the Federal Communications Commission as a Conformity Assessment Body under Designation Number JP0017 and Test Firm Registration Number 386498.

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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 Mains Conducted Emission (CE)					
Receiver	Rohde & Schwarz	ESU 40	100029	RF-0021	2011-12
LISN	Rohde & Schwarz	ENV216	100276	RF-0016	2011-06
For Radiated Emission (RE)					
Receiver	Rohde & Schwarz	ESU 8	100025	RF-0020	2012-02
Receiver	Rohde & Schwarz	ESU 40	100029	RF-0021	2011-12
RF Selector (10m)	Toyo Corporation	NS4900	0703-182	RF-0029	2011-05
3dB Attenuator 50Ohm	Tamagawa Electronics Co., Ltd.	CFA-01	-	RF-0265	2011-05
Low Noise Pre-Amplifier, 9kHz-1GHz	TSJ	MLA-10K01-B01-35	1370750	RF-0253	2011-05
Microwave Pre-Amplifier, 1-8GHz	Toyo Corporation	TPA0108-40	0634	RF-0052	2011-05
Band Reject Filter, 1-8GHz	Nitsuki	NF-49BT	027	RF-0131	2011-05
Trilog Antenna, 30-1000MHz	Schwarzbeck	VULB9168	0245	RF-0019	2011-05
Horn Antenna, 1-10GHz	Schwarzbeck	BBHA9120B	419	RF-0050	2011-05
Horn Antenna with Pre-Amplifier, 2-18GHz (RX)	Toyo Corporation	HAP06-18W	00000025	RF-0065	2011-05
Horn Antenna with Pre-Amplifier, 18-26.5GHz (RX)	Toyo Corporation	HAP18-26N	00000010	RF-0070	2011-05
Band pass Filter	Micro-Tronics	HPM50107	006	RF-0334	2011-05
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 Module Approval (FCC ID: EW4DWMW028 and IC: 4250A-DWMW028). The module consists of radios 802.11b/g. 802.11b at 1/2Mbps supports NDS series. 802.11b/g supports Nintendo Wii. The two radios cannot transmit at the same time.

3.2 System Details

Radio standard:	IEEE 802.11b/g
Specified power output:	8.26dBm (Peak), 4.38dBm (Average) for 802.11b 14.82dBm (Peak), 4.71dBm (Average) for 802.11g
Antenna gain:	-1.91dBi (DCA-P08) for Nintendo DS CTR Target Board -6.52dBi (DCA-P17 ES3) for CTR-001(-01) -6.20dBi (DCA-P17 ES4) for CTR-001(-01) -6.35dBi (DCA-P17 CS) for CTR-001(-01) +1.15dBi (361.00194.005 CS) for CTR-001(-01) and CTR-001(-05) -5.39dBi (DCA-P17 CS2) for CTR-001 / CTR-001(-01) -5.10dBi (361.00194.005 CS2) for CTR-001 / CTR-001(-01) and CTR-001(-05)
Antenna type:	Inverted F antenna (DCA-P08 and DCA-P17 series) Dipole antenna (361.00194.005 CS and CS2)
Mounting type:	External, fixed location
Frequency range:	2412 – 2472 MHz
Number of channel:	13
Channel spacing:	5 MHz
Modulation type:	BPSK, QPSK, CCK (802.11b) BPSK, QPSK, 16 QAM, 64 QAM (802.11g)
FCC Classification:	DTS
Emission designator:	G1D
System Input rating:	DC 4.2V via ROM Emulator AC 120V, 60Hz for AC adaptor of ROM Emulator
Protection Class:	II
Test voltage:	AC 120V
Test frequency:	60Hz

Remark: Different antennas are for different kinds of the certified typical host. For the details, refer to the section 1.

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]	1.6m, un-shielded	AC Power Input Port
2.	DC Mains input [AC/DC adaptor -> ROM Emulator]	1.0m, un-shielded	AC Power Input Port
3.	HDMI [ROM Emulator -> Host]	1.0m, shielded	DC Power Port and Signal Port
4.	USB (A-plug to B-plug) [Laptop -> UIC]	1.4m, shielded	Signal Port

3.2.1 Voltage Requirements, FCC 15.31(e)

RESULT: **PASS**

The host has a voltage regulator to supply the RF circuit of the module. Hence it complies with the power supply requirements under limited modular approval.

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

RESULT: **PASS**

The antenna cannot be accessible by the end-user as the antenna is inside the host. The EUT has a unique external antenna connector. For the details, refer to the exhibits.

3.3 Clock Frequencies

The highest clock frequency generated by the EUT is 40 MHz

3.4 Independent Operation Modes

Testing was performed at the lowest operating frequency (2412 MHz), the operating frequency in the middle of the specified frequency band (2442 MHz) and the highest operating frequency (2472 MHz).

The basic operation modes are:

802.11b radio

- b1. EUT continuously transmits at lowest Channel (2412MHz)
- b2. EUT continuously transmits at middle Channel (2442MHz)
- b3. EUT continuously transmits at highest Channel (2472MHz)

802.11g radio

- g1. EUT continuously transmits at lowest Channel (2412 MHz)
- g2. EUT continuously transmits at middle Channel (2442 MHz)
- g3. EUT continuously transmits at highest Channel (2472 MHz)

All continuous modulated signals are streaming with 100% duty cycle.

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

Table 4: Worst Case Data Rates

Channel	Modulation/ Data Rate(Mbps)	
	802.11b	802.11g
Lowest: 2412MHz	11	12
Middle: 2442MHz	11	18
Highest: 2472MHz	1	24

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 (Issue 3).

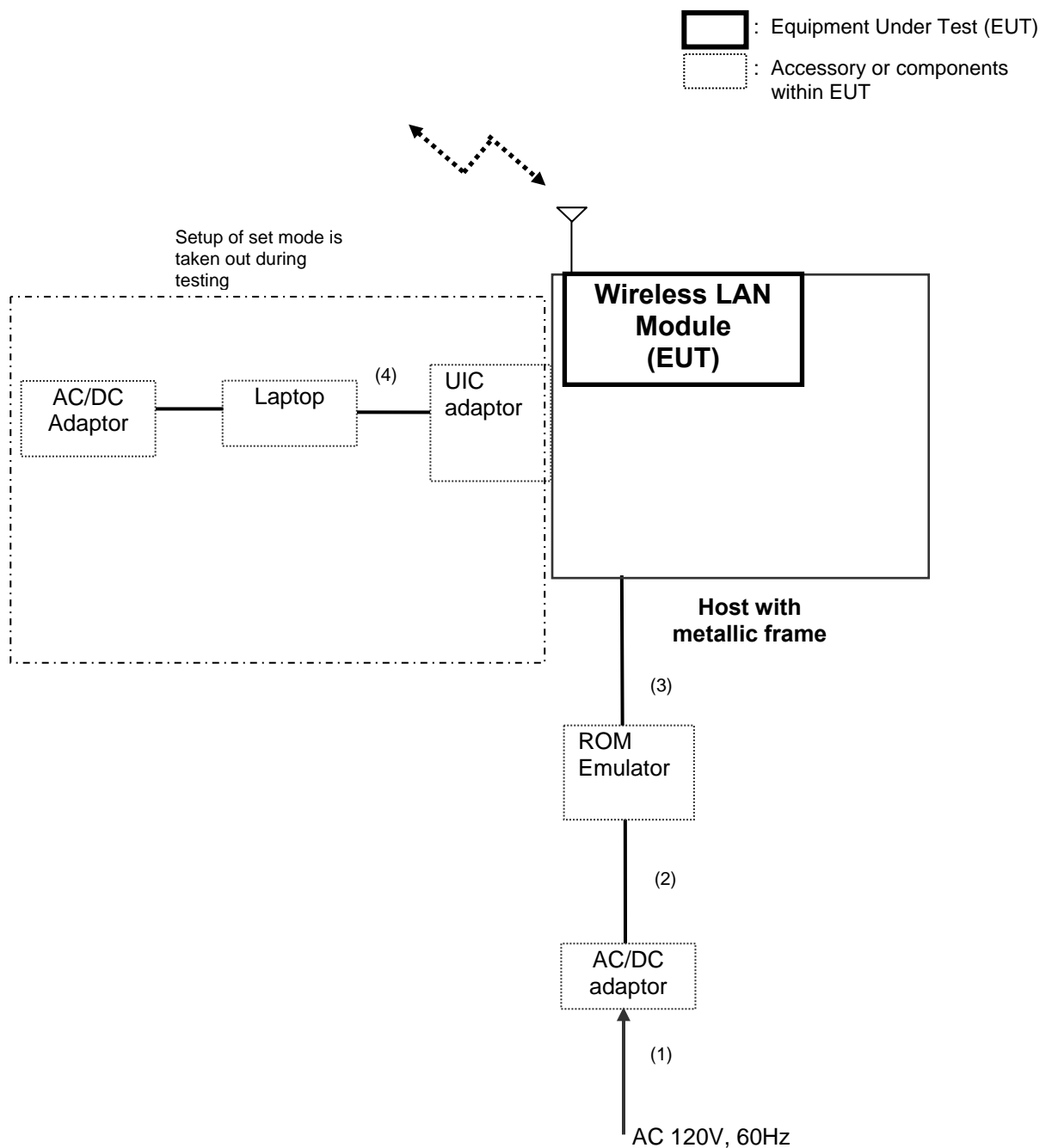
For details, see under each test item.

4.2 Physical Configuration for Testing

The EUT was tested with the host. The test 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.

Figure 1: Block Diagram



Note: All AC input power ports of accessories are not shown.
The Laptop is necessary for operation mode setting. The Laptop set was disconnected after the operation setup was successful.

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

4.3 Test Operation and Test Software

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

1. The test program used for 11b/g test is "HOSTIO-ART".
HOSTIO-ART consists of the software on PC.
The version of "HOSTIO-ART" is 1.8.

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: UIC card
Manufacturer: Kyoto Microcomputer Co., LTD.
Model: PARTNER-CTR, UIC-MIDI
Rated Voltage: via USB of Laptop
Serial Number: I0200126-UBA
2. Product: AC adapter for the ROM Emulator
Manufacturer: Nintendo Co., Ltd.
Model: RVL-002 (USA)
Input rating: AC120V, 52W, 60Hz
Output rating: DC12V, 3.7A
Protection Class: II
Serial Number: DD2LB07
3. Product: Host (Portable Game Machine)
Manufacturer: Nintendo Co., Ltd.
Model: CTR-001(-05)
Rated Voltage: DC 4.2V (via Rom Emulator)
Input Current: 980mA
Protection Class: III
Serial Number: CW10899609

4. Product: ROM Emulator
Manufacturer: Nintendo
Model: CIS-007
Rated Voltage: DC 12V via AC adapter
Input Current: 600mA
Protection Class: III
Serial Number: CIS-RF-CERT-1
5. Product: Laptop computer
Manufacturer: IBM
Model: X41 (2525-5AE)
Rated Voltage: DC 16V
Input Current: 3.5 A
Protection Class: III
Serial Number: LV-D6940
6. Product: AC Adapter for Laptop Computer
Manufacturer: IBM
Model: 02K6810
Rated Voltage: AC 100-240V
Input Current: 1.5A
Frequency: 50/60Hz
Protection Class: II
Serial Number: 11S02K6810Z1Z3BJ59G1JH

4.5 Countermeasures to achieve EMC Compliance

No additional measures were employed to achieve compliance.

5. Test Results RADIO

5.1 Radiated Measurements

5.1.1 Band Edge Radiated Emission

RESULT:

PASS

Date of testing: 2011-04-08

Ambient temperature: 23°C

Relative humidity: 41%

Atmospheric pressure: 1012hPa

Measurement distance: 3m

Kind of test site: Semi Anechoic Chamber

FCC 15.205, FCC 15.209, FCC 15.247(d), RSS-Gen 7.2.2 and 7.2.5 and RSS-210 2.1, 2.2 and 2.5

Radiated emissions which fall in the restricted band near the operation frequency band, as defined in FCC 15.205(a) and RSS-Gen 7.2.2 (table 3), must comply with the radiated emission limits specified in FCC 15.209(a) and RSS-Gen 7.2.5 (tables 5 and 6).

Test procedure:

ANSI C63.4-2003, RSS-Gen 4.9 and 7.2 and KDB Publication No. 558074:

Measurement of Digital Transmission Systems Operating under Section 15.247.

The EUT was placed on a nonconductive turntable 0.8m above the ground plane.

Measurements were made at 3m distance. The EUT was rotated 360° and the antenna was raised and lowered from 1 to 4m in order to determine the emission's maximum level.

Measurements were taken using both horizontal and vertical antenna polarizations for 3 EUT orientations (X and Y/Z).

Measurements were performed using a spectrum analyzer with a suitable span to encompass the peak of the fundamental and using the following settings: Peak: RBW & VBW = 1MHz, Average: RBW = 1MHz, VBW = 10Hz.

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

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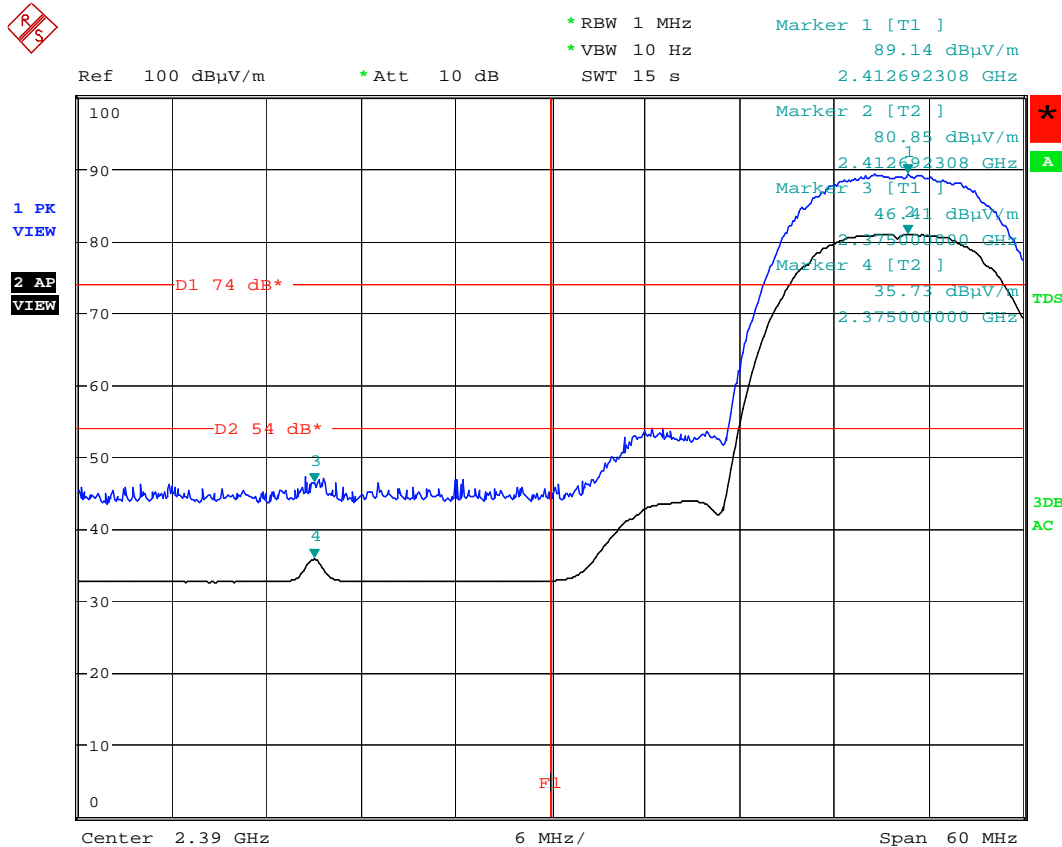
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Table 5: Band Edge Radiated Emission, 802.11b

Operating Frequency [MHz]	EUT / Antenna Orient.	Average Value [dBuV/m]	Peak Value [dBuV/m]	Average Limit [dBuV/m]	Peak Limit [dBuV/m]	Average Margin [dB]	Peak Margin [dB]
2412	Y/Z / H	35.73	46.41	54.00	74.00	18.27	27.59
2472	X / H	43.54	50.23	54.00	74.00	10.46	23.77

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 2: Band Edge Radiated Emission, Mode b1 (2412MHz), Peak and Average



Bandedge, Hor. Mode: b1, Pos.: Y
 Date: 8.APR.2011 16:02:26

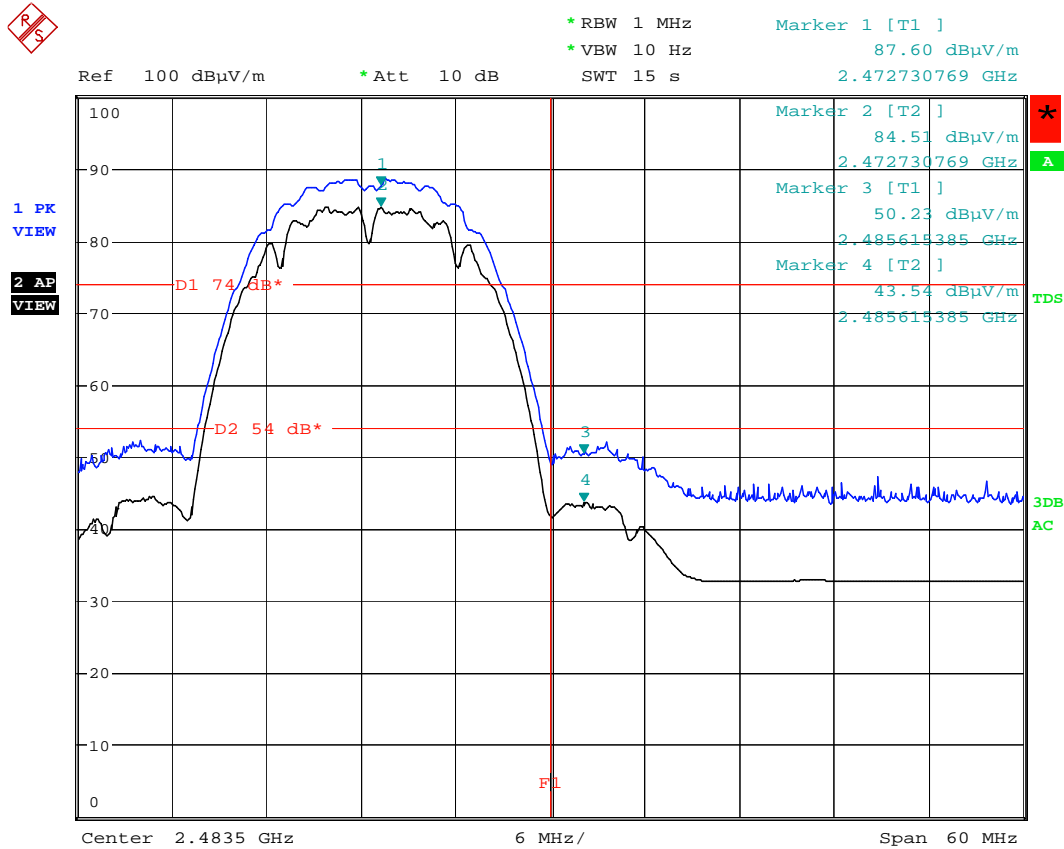
Note: The upper trace shows the peak value and the lower trace shows the average value.

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Figure 3: Band Edge Radiated Emission, Mode b3 (2472MHz), Peak and Average



Bandedge, Hor. Mode: b3, Pos.: X
 Date: 8.APR.2011 15:20:54

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

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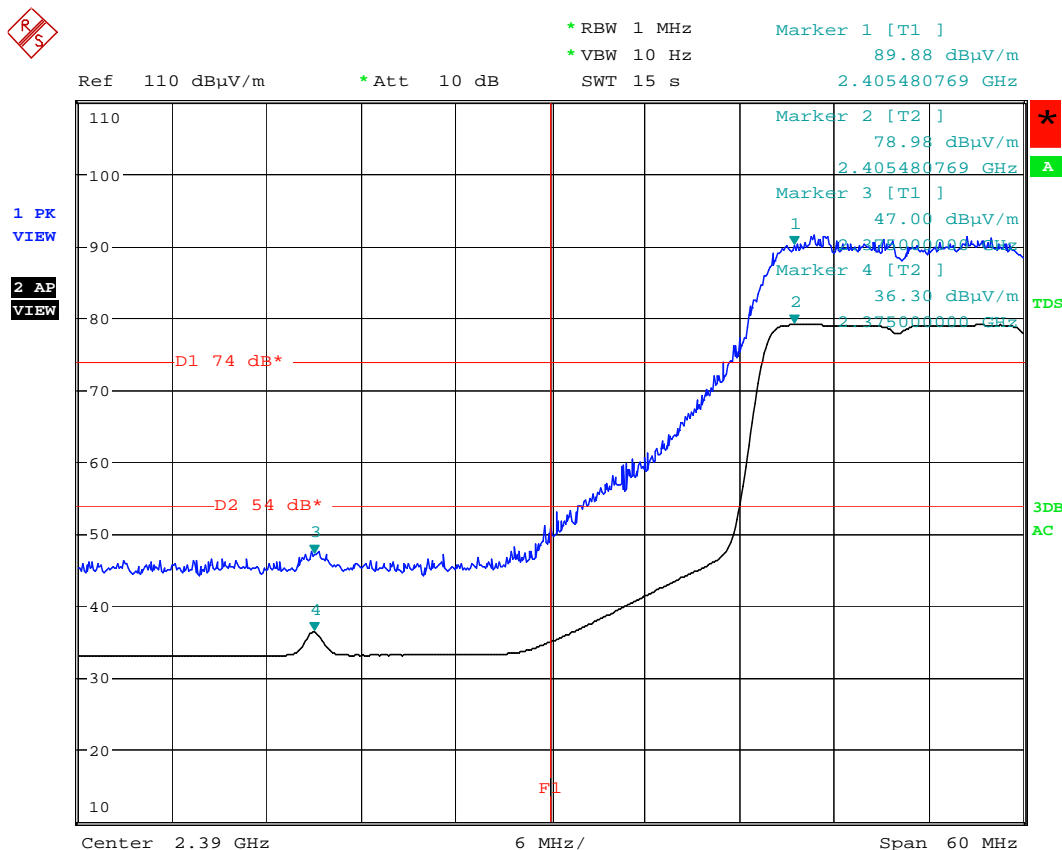
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Table 6: Band Edge Radiated Emission, 802.11g

Operating Frequency [MHz]	EUT / Antenna Orient.	Average Value [dBuV/m]	Peak Value [dBuV/m]	Average Limit [dBuV/m]	Peak Limit [dBuV/m]	Average Margin [dB]	Peak Margin [dB]
2412	Y/Z / H	36.30	47.00	54.00	74.00	17.37	19.85
2472	X / H	46.26	73.27	54.00	74.00	7.74	0.73*

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 4: Band Edge Radiated Emission, Mode g1 (2412MHz), Peak and Average



Bandedge, Hor. Mode: g1, Pos.: Y

Date: 8.APR.2011 16:31:25

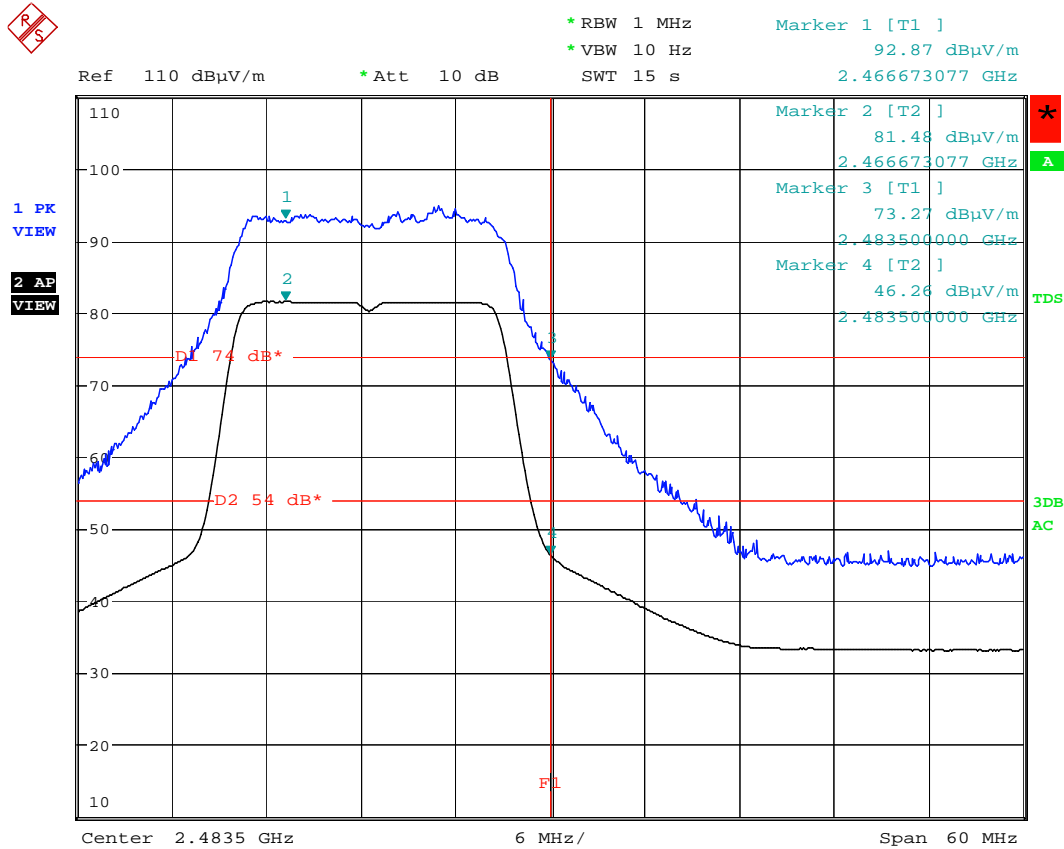
Note: The upper trace shows the peak value and the lower trace shows the average value.

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Figure 5: Band Edge Radiated Emission, Mode g3 (2472MHz), Peak and Average



Bandedge, Hor. Mode: g3, Pos.: X
 Date: 8.APR.2011 17:24:07

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

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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5.1.2 Radiated Spurious Emission of Transmitter

RESULT: **PASS**

Date of testing:	2011-04-08	2011-04-09
Ambient temperature:	23°C	24°C
Relative humidity:	41%	40%
Atmospheric pressure:	1012hPa	1009hPa
Frequency range:	9kHz – 25GHz	
Measurement distance:	3m	
Kind of test site:	Semi Anechoic Chamber	

Requirements:

FCC 15.205, FCC 15.209, FCC 15.247(d), RSS-Gen 7.2.2 and 7.2.5 and RSS-210 2.1, 2.2, 2.5 and A8.5

Radiated emissions which fall in the restricted bands, as defined in FCC 15.205(a) and RSS-Gen 7.2.2 (table 3), must comply with the radiated emission limits specified in FCC 15.209(a) and RSS-Gen 7.2.5 (tables 5 and 6).

Radiated emissions which fall outside the operation frequency band and outside restricted bands shall either meet the limit specified in FCC 15.209(a) and RSS-Gen 7.2.5 or be attenuated at least 20dB below the power level in the 100kHz bandwidth within the band that contains the highest level of the desired power (the less severe limit applies).

Test procedure:

ANSI C63.4-2003, RSS-Gen 4.9 and 7.2 and KDB Publication No. 558074:
Measurement of Digital Transmission Systems Operating under Section 15.247.

The EUT was placed on a nonconductive turntable 0.8m above the ground plane. Before final measurements of radiated emissions were performed, the EUT was scanned to determine its emission spectrum profile. The physical arrangement of the test system, the associated cabling and the EUT orientation (X and Y/Z) were varied in order to ensure that maximum emission amplitudes were attained.

The spectrum was examined from 9kHz to the 10th harmonic of the highest fundamental transmitter frequency (25GHz). Final radiated emission measurements were made at 3m distance.

At each frequency where a spurious emission was found, the EUT was rotated 360° and the antenna was raised and lowered from 1 to 4m 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

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mode. For emissions above 1GHz, measurements were performed using the following settings: Peak: RBW & 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.

No spurious emission was found in the range 9kHz - 30MHz.

Table 7: Radiated Emission, Quasi Peak Data, 30MHz - 1GHz, Horizontal and Vertical Antenna Orientations, Mode b1 (2412MHz), 802.11b

Freq. [MHz]	EUT / 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 [°]
85.599	X / H	56.0	-26.9	29.1	40.0	10.9	392	89
235.752	X / H	50.8	-23.6	27.2	46.0	18.8	136	203
804.327	X / H	49.1	-11.0	38.1	46.0	7.9	100	28
86.749	X / V	57.5	-27.3	30.2	40.0	9.8	103	170
324.775	X / V	39.2	-20.2	19.0	46.0	27.0	101	329
804.332	X / V	43.9	-10.9	33.0	46.0	13.0	138	47

Note: Level QP = Reading QP + Factor

Table 8: Radiated Emission, Average Data, 1 - 25GHz, Horizontal and Vertical Antenna Orientations, Mode b1 (2412MHz), 802.11b

Freq. [MHz]	EUT / Antenna Orientation	Reading AV [dBµV]	Factor [dB(1/m)]	Level AV [dBµV/m]	Limit [dBµV/m]	Margin AV [dB]	Height [cm]	Angle [°]
1029.472	Y/Z / H	39.4	-15.6	23.8	54.0	30.2	137	11
1030.930	Y/Z / H	39.4	-15.6	23.8	54.0	30.2	150	14
1206.483	Y/Z / H	50.3	-15.1	35.2	54.0	18.8	174	206
1250.012	Y/Z / H	50.6	-14.9	35.7	54.0	18.3	106	208

Note: Level AV = Reading AV + Factor

Table 9: Radiated Emission, Peak Data, 1 - 25GHz, Horizontal and Vertical Antenna Orientations, Mode b1 (2412MHz), 802.11b

Freq. [MHz]	EUT / Antenna Orientation	Reading PK [dBµV]	Factor [dB(1/m)]	Level PK [dBµV/m]	Limit [dBµV/m]	Margin PK [dB]	Height [cm]	Angle [°]
1029.472	Y/Z / H	63.6	-15.6	48.0	74.0	26.0	137	11
1030.930	Y/Z / H	62.8	-15.6	47.2	74.0	26.8	150	14
1206.483	Y/Z / H	56.0	-15.1	40.9	74.0	33.1	174	206
1250.012	Y/Z / H	56.6	-14.9	41.7	74.0	32.3	106	208

Note: Level PK = Reading PK + Factor

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Table 10: Radiated Emission, Quasi Peak Data, 30MHz - 1GHz, Horizontal and Vertical Antenna Orientations, Mode b2 (2442MHz), 802.11b

Freq. [MHz]	EUT / 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 [°]
86.774	Y/Z / H	55.8	-27.0	28.8	40.0	11.2	196	105
245.775	Y/Z / H	51.7	-23.1	28.6	46.0	17.4	136	1
444.124	Y/Z / H	35.9	-16.9	19.0	46.0	27.0	202	176
804.317	Y/Z / H	44.8	-11.0	33.8	46.0	12.2	100	35
85.640	Y/Z / V	58.1	-27.2	30.9	40.0	9.1	100	174
804.327	Y/Z / V	48.0	-10.9	37.1	46.0	8.9	144	218

Note: Level QP = Reading QP + Factor

Table 11: Radiated Emission, Average Data, 1 - 25GHz, Horizontal and Vertical Antenna Orientations, Mode b2 (2442MHz), 802.11b

Freq. [MHz]	EUT / Antenna Orientation	Reading AV [dBµV]	Factor [dB(1/m)]	Level AV [dBµV/m]	Limit [dBµV/m]	Margin AV [dB]	Height [cm]	Angle [°]
1029.591	X / H	39.3	-15.6	23.7	54.0	30.3	160	202
1055.969	X / H	39.6	-15.9	23.7	54.0	30.3	159	1
6310.600	X / H	37.5	-6.5	31.0	54.0	23.0	126	192
1029.970	X / V	39.1	-15.6	23.5	54.0	30.5	103	194
1072.435	X / V	51.6	-16.0	35.6	54.0	18.4	101	81
1206.493	X / V	49.7	-15.1	34.6	54.0	19.4	109	90

Note: Level AV = Reading AV + Factor

Table 12: Radiated Emission, Peak Data, 1 - 25GHz, Horizontal and Vertical Antenna Orientations, Mode b2 (2442MHz), 802.11b

Freq. [MHz]	EUT / Antenna Orientation	Reading PK [dBµV]	Factor [dB(1/m)]	Level PK [dBµV/m]	Limit [dBµV/m]	Margin PK [dB]	Height [cm]	Angle [°]
1029.591	X / H	61.5	-15.6	45.9	74.0	28.1	160	202
1055.969	X / H	59.0	-15.9	43.1	74.0	30.9	159	1
6310.600	X / H	51.5	-6.5	45.0	74.0	29.0	126	192
1029.970	X / V	59.1	-15.6	43.5	74.0	30.5	103	194
1072.435	X / V	57.8	-16.0	41.8	74.0	32.2	101	81
1206.493	X / V	57.1	-15.1	42.0	74.0	32.0	109	90

Note: Level PK = Reading PK + Factor

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Table 13: Radiated Emission, Quasi Peak Data, 30MHz - 1GHz, Horizontal and Vertical Antenna Orientations, Mode b3 (2472MHz), 802.11b

Freq. [MHz]	EUT / 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 [°]
84.517	Y/Z / H	54.7	-26.9	27.8	40.0	12.2	394	94
279.624	Y/Z / H	48.8	-21.4	27.4	46.0	18.6	102	102
822.083	Y/Z / H	40.3	-10.7	29.6	46.0	16.4	200	41
85.616	Y/Z / V	57.4	-27.2	30.2	40.0	9.8	103	168
324.400	Y/Z / V	39.7	-20.2	19.5	46.0	26.5	141	328
804.336	Y/Z / V	46.6	-10.9	35.7	46.0	10.3	156	242

Note: Level QP = Reading QP + Factor

Table 14: Radiated Emission, Average Data, 1 - 25GHz, Horizontal and Vertical Antenna Orientations, Mode b3 (2472MHz), 802.11b

Freq. [MHz]	EUT / Antenna Orientation	Reading AV [dBµV]	Factor [dB(1/m)]	Level AV [dBµV/m]	Limit [dBµV/m]	Margin AV [dB]	Height [cm]	Angle [°]
1030.306	Y/Z / H	39.1	-15.6	23.5	54.0	30.5	159	22
1044.292	Y/Z / H	39.6	-15.8	23.8	54.0	30.2	150	9
1029.458	Y/Z / V	39.2	-15.6	23.6	54.0	30.4	122	48
1043.008	Y/Z / V	39.6	-15.8	23.8	54.0	30.2	101	79
1124.974	Y/Z / V	60.9	-15.9	45.0	54.0	9.0	101	107
1425.628	Y/Z / V	39.4	-15.1	24.3	54.0	29.7	143	103

Note: Level AV = Reading AV + Factor

Table 15: Radiated Emission, Peak Data, 1 - 25GHz, Horizontal and Vertical Antenna Orientations, Mode b3 (2472MHz), 802.11b

Freq. [MHz]	EUT / Antenna Orientation	Reading PK [dBµV]	Factor [dB(1/m)]	Level PK [dBµV/m]	Limit [dBµV/m]	Margin PK [dB]	Height [cm]	Angle [°]
1030.306	Y/Z / H	62.5	-15.6	46.9	74.0	27.1	159	22
1044.292	Y/Z / H	60.0	-15.8	44.3	74.0	29.7	150	9
1029.458	Y/Z / V	62.7	-15.6	47.1	74.0	26.9	122	48
1043.008	Y/Z / V	58.6	-15.8	42.8	74.0	31.2	101	79
1124.974	Y/Z / V	64.1	-15.9	48.2	74.0	25.8	101	107
1425.628	Y/Z / V	59.5	-15.1	44.4	74.0	29.6	143	103

Note: Level PK = Reading PK + Factor

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Table 16: Radiated Emission, Quasi Peak Data, 30MHz - 1GHz, Horizontal and Vertical Antenna Orientations, Mode g1 (2412MHz), 802.11g

Freq. [MHz]	EUT / 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 [°]
85.581	X / H	56.1	-26.9	29.2	40.0	10.8	196	107
134.072	X / H	49.1	-23.2	25.9	43.5	17.6	236	148
223.433	X / H	53.3	-24.2	29.1	46.0	16.9	148	167
85.587	X / V	57.8	-27.2	30.6	40.0	9.4	100	182
102.557	X / V	55.8	-26.2	29.6	43.5	13.9	100	118
294.268	X / V	42.9	-21.2	21.7	46.0	24.3	100	252

Note: Level QP = Reading QP + Factor

Table 17: Radiated Emission, Average Data, 1 - 25GHz, Horizontal and Vertical Antenna Orientations, Mode g1 (2412MHz), 802.11g

Freq. [MHz]	EUT / Antenna Orientation	Reading AV [dBµV]	Factor [dB(1/m)]	Level AV [dBµV/m]	Limit [dBµV/m]	Margin AV [dB]	Height [cm]	Angle [°]
1029.145	Y/Z / H	39.2	-15.6	23.6	54.0	30.4	148	341
1072.408	Y/Z / H	54.9	-16.0	38.9	54.0	15.1	147	13
1027.783	Y/Z / V	39.3	-15.6	23.7	54.0	30.3	178	80
1043.352	Y/Z / V	39.4	-15.8	23.6	54.0	30.4	101	61
1206.466	Y/Z / V	50.6	-15.1	35.5	54.0	18.5	104	54
1425.626	Y/Z / V	39.3	-15.1	24.2	54.0	29.8	146	97

Note: Level AV = Reading AV + Factor

Table 18: Radiated Emission, Peak Data, 1 - 25GHz, Horizontal and Vertical Antenna Orientations, Mode g1 (2412MHz), 802.11g

Freq. [MHz]	EUT / Antenna Orientation	Reading PK [dBµV]	Factor [dB(1/m)]	Level PK [dBµV/m]	Limit [dBµV/m]	Margin PK [dB]	Height [cm]	Angle [°]
1029.145	Y/Z / H	61.3	-15.6	45.7	74.0	28.3	148	341
1072.408	Y/Z / H	60.5	-16.0	44.5	74.0	29.5	147	13
1027.783	Y/Z / V	60.8	-15.6	45.2	74.0	28.8	178	80
1043.352	Y/Z / V	59.3	-15.8	43.6	74.0	30.4	101	61
1206.466	Y/Z / V	56.4	-15.1	41.3	74.0	32.7	104	54
1425.626	Y/Z / V	59.7	-15.1	44.7	74.0	29.3	146	97

Note: Level PK = Reading PK + Factor

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Table 19: Radiated Emission, Quasi Peak Data, 30MHz - 1GHz, Horizontal and Vertical Antenna Orientations, Mode g2 (2442MHz), 802.11g

Freq. [MHz]	EUT / 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 [°]
84.516	X / H	54.2	-26.9	27.3	40.0	12.7	210	104
454.947	X / H	36.4	-16.6	19.8	46.0	26.2	198	176
804.329	X / H	48.7	-11.0	37.7	46.0	8.3	100	25
85.607	X / V	57.8	-27.2	30.6	40.0	9.4	100	196
295.402	X / V	42.9	-21.2	21.7	46.0	24.3	100	251
804.325	X / V	42.6	-10.9	31.7	46.0	14.3	142	49

Note: Level QP = Reading QP + Factor

Table 20: Radiated Emission, Average Data, 1 - 25GHz, Horizontal and Vertical Antenna Orientations, Mode g2 (2442MHz), 802.11g

Freq. [MHz]	EUT / Antenna Orientation	Reading AV [dBµV]	Factor [dB(1/m)]	Level AV [dBµV/m]	Limit [dBµV/m]	Margin AV [dB]	Height [cm]	Angle [°]
1055.931	X / H	39.3	-15.9	23.4	54.0	30.6	153	340
1206.474	X / H	51.9	-15.1	36.8	54.0	17.2	129	279
1426.372	X / H	41.0	-15.1	25.9	54.0	28.1	102	68
3255.979	X / H	50.9	-11.0	39.9	54.0	14.1	118	237
1072.403	X / V	51.7	-16.0	35.7	54.0	18.3	103	82
3255.992	X / V	47.0	-11.0	36.0	54.0	18.0	110	343

Note: Level AV = Reading AV + Factor

Table 21: Radiated Emission, Peak Data, 1 - 25GHz, Horizontal and Vertical Antenna Orientations, Mode g2 (2442MHz), 802.11g

Freq. [MHz]	EUT / Antenna Orientation	Reading PK [dBµV]	Factor [dB(1/m)]	Level PK [dBµV/m]	Limit [dBµV/m]	Margin PK [dB]	Height [cm]	Angle [°]
1055.931	X / H	57.7	-15.9	41.8	74.0	32.2	153	340
1206.474	X / H	58.0	-15.1	42.9	74.0	31.1	129	279
1426.372	X / H	59.9	-15.1	44.9	74.0	29.1	102	68
3255.979	X / H	56.9	-11.0	45.9	74.0	28.1	118	237
1072.403	X / V	57.2	-16.0	41.2	74.0	32.8	103	82
3255.992	X / V	54.6	-11.0	43.6	74.0	30.4	110	343

Note: Level PK = Reading PK + Factor

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Table 22: Radiated Emission, Quasi Peak Data, 30MHz - 1GHz, Horizontal and Vertical Antenna Orientations, Mode g3 (2472MHz), 802.11g

Freq. [MHz]	EUT / 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 [°]
85.571	X / H	56.5	-26.9	29.6	40.0	10.4	378	97
187.738	X / H	60.9	-24.1	36.8	43.5	6.7	147	193
290.496	X / H	52.3	-20.9	31.4	46.0	14.6	100	87
804.316	X / H	48.6	-11.0	37.6	46.0	8.4	101	22
85.592	X / V	58.1	-27.2	30.9	40.0	9.1	100	180
115.550	X / V	52.7	-25.1	27.6	43.5	15.9	100	86
295.299	X / V	42.5	-21.2	21.3	46.0	24.7	101	252

Note: Level QP = Reading QP + Factor

Table 23: Radiated Emission, Average Data, 1 - 25GHz, Horizontal and Vertical Antenna Orientations, Mode g3 (2472MHz), 802.11g

Freq. [MHz]	EUT / Antenna Orientation	Reading AV [dBµV]	Factor [dB(1/m)]	Level AV [dBµV/m]	Limit [dBµV/m]	Margin AV [dB]	Height [cm]	Angle [°]
1027.913	X / H	39.1	-15.6	23.5	54.0	30.5	159	352
1072.413	X / H	51.5	-16.0	35.5	54.0	18.5	147	263
1072.438	X / V	51.9	-16.0	35.9	54.0	18.1	114	103
1206.476	X / V	51.2	-15.1	36.1	54.0	17.9	100	87
2278.919	X / V	48.2	-13.2	35.0	54.0	19.0	100	151
6175.733	X / V	37.8	-7.0	30.8	54.0	23.2	195	236
14090.53	X / V	37.9	-5.9	32.0	54.0	22.0	163	359

Note: Level AV = Reading AV + Factor

Table 24: Radiated Emission, Peak Data, 1 - 25GHz, Horizontal and Vertical Antenna Orientations, Mode g3 (2472MHz), 802.11g

Freq. [MHz]	EUT / Antenna Orientation	Reading PK [dBµV]	Factor [dB(1/m)]	Level PK [dBµV/m]	Limit [dBµV/m]	Margin PK [dB]	Height [cm]	Angle [°]
1027.913	X / H	60.4	-15.6	44.8	74.0	29.2	159	352
1072.413	X / H	57.2	-16.0	41.2	74.0	32.8	147	263
1072.438	X / V	57.6	-16.0	41.6	74.0	32.4	114	103
1206.476	X / V	56.6	-15.1	41.5	74.0	32.5	100	87
2278.919	X / V	54.1	-13.2	40.9	74.0	33.1	100	151
6175.733	X / V	51.7	-7.0	44.7	74.0	29.3	195	236
14090.53	X / V	52.7	-5.9	46.8	74.0	27.2	163	359

Note: Level PK = Reading PK + Factor

5.2 AC Power Line Conducted Measurements

5.2.1 AC Power Line Conducted Emission of Transmitter

RESULT: **PASS**

Date of testing: 2011-04-11

Ambient temperature: 22°C
Relative humidity: 37%
Atmospheric pressure: 998hPa

Frequency range: 0.15 – 30MHz
Kind of test site: Shielded Room

Requirements:

FCC 15.207 and RSS-Gen 7.2.4

The AC power line conducted emission on any frequency within the band 150 kHz to 30MHz shall not exceed the limits specified in FCC 15.207 and RSS-Gen 7.2.4 (table 4).

Test procedure:
ANSI C63.4-2003 and RSS-Gen 7.2

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 EUT was connected to a Line Impedance Stabilization Network (LISN).

The physical arrangement of the test system and associated cabling was varied 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 with the spectrum analyzer operating in the CISPR quasi-peak and average detection modes. The analyzer's 6 dB bandwidth was set to 9kHz. No video filter less than 10 times the resolution bandwidth was used.

Disturbances other than those mentioned are small or not detectable.

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Table 25: Conducted Emission, 150kHz – 30MHz, Quasi Peak and Average Data, Phase N (N) and L1 (L), Mode b1, 802.11b

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]
0.21265	N	32.8	27.4	9.7	42.5	37.1	63.1	53.1	20.6	16.0
0.63930	N	29.2	24.4	9.7	38.9	34.1	56.0	46.0	17.1	11.9
7.62554	N	22.6	20.6	10.0	32.6	30.6	60.0	50.0	27.4	19.4
0.21360	L1	32.8	27.3	9.7	42.5	37.0	63.1	53.1	20.6	16.1
0.63904	L1	29.3	24.4	9.7	39.0	34.1	56.0	46.0	17.0	11.9
7.62790	L1	22.6	20.7	10.0	32.6	30.7	60.0	50.0	27.4	19.3

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

Table 26: Conducted Emission, 150kHz – 30MHz, Quasi Peak and Average Data, Phase N (N) and L1 (L), Mode b3, 802.11b

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]
0.16884	N	39.9	32.8	9.6	49.5	42.4	65.0	55.0	15.5	12.6
0.21260	N	31.7	26.3	9.7	41.4	36.0	63.1	53.1	21.7	17.1
0.38050	N	35.1	31.1	9.7	44.8	40.8	58.3	48.3	13.5	7.5
0.16933	L1	39.9	32.9	9.6	49.5	42.5	65.0	55.0	15.5	12.5
0.21154	L1	31.7	26.3	9.7	41.4	36.0	63.1	53.1	21.7	17.1
0.38129	L1	35.1	31.1	9.7	44.8	40.8	58.3	48.3	13.5	7.5

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

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Table 27: Conducted Emission, 150kHz – 30MHz, Quasi Peak and Average Data, Phase N (N) and L1 (L), Mode g1, 802.11g

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]
0.17035	N	40.0	33.3	9.6	49.6	42.9	64.9	54.9	15.3	12.0
0.21535	N	31.8	26.4	9.7	41.5	36.1	63.0	53.0	21.5	16.9
0.38306	N	35.5	32.7	9.7	45.2	42.4	58.2	48.2	13.0	5.8
0.17035	L1	39.9	33.2	9.6	49.5	42.8	64.9	54.9	15.4	12.1
0.21234	L1	32.1	27.2	9.7	41.8	36.9	63.1	53.1	21.3	16.2
0.38287	L1	35.5	32.7	9.7	45.2	42.4	58.2	48.2	13.0	5.8

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

Table 28: Conducted Emission, 150kHz – 30MHz, Quasi Peak and Average Data, Phase N (N) and L1 (L), Mode g3, 802.11g

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]
0.17045	N	39.5	32.9	9.6	49.1	42.5	64.9	54.9	15.8	12.4
0.21416	N	31.6	26.2	9.7	41.3	35.9	63.0	53.0	21.7	17.1
0.38167	N	35.3	31.7	9.7	45.0	41.4	58.2	48.2	13.2	6.8
0.16982	L1	39.7	33.0	9.6	49.3	42.6	65.0	55.0	15.7	12.4
0.21283	L1	31.7	26.7	9.7	41.4	36.4	63.1	53.1	21.7	16.7
0.37992	L1	35.0	31.5	9.7	44.7	41.2	58.3	48.3	13.6	7.1

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

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