

MEASUREMENT REPORT

of

Wi-Fi SIP Phone

Applicant : Inventec Multimedia & Telecom Corporation
EUT : Wi-Fi SIP Phone
Model No. : NW1100, ZEUS, ZEUS2, ZEUS3
FCC ID : SVKZEUS

Tested by :

Training Research Co., Ltd.

TEL : 886-2-26935155 FAX : 886-2-26934440

No. 255, Nanyang Street, Shijr, Taipei Hsien 221, Taiwan, R.O.C.

CERTIFICATION

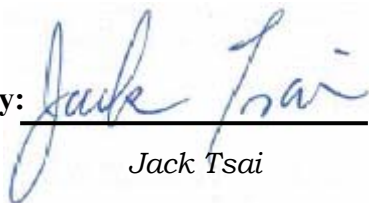
We here by verify that:

The test data, data evaluation, test procedures and equipment configurations shown in this report were made mainly in accordance with the procedures given in ANSI C63.4 (2003) as a reference. All test were conducted by **Training Research Co., Ltd.**, 255 Nanyang Street, Shijr, Taipei Hsien 221, Taiwan, R.O.C. Also, we attest to the accuracy of each.

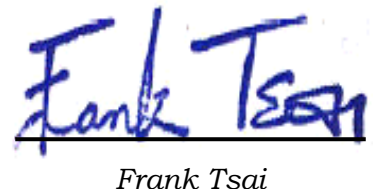
We further submit that the energy emitted by the sample EUT tested as described in the report is **in compliance with** the technical requirements set forth in the FCC Rules Part 15 Subpart C Section 15.247.

Applicant : Inventec Multimedia & Telecom Corporation
Applicant Address : 5F, No.396, Sec.1 Nei-Hu Road, Taipei, Taiwan, R.O.C.
Product Name : Wi-Fi SIP Phone
Model : NW1100, ZEUS, ZEUS2, ZEUS3
Report No. : I2815061147
Test Date : July 17, 2007

Prepared by:


Jack Tsai

Approved by:


Frank Tsai**Conditions of issue :**

- (1) **This test report shall not be reproduced except in full, without written approval of TRC. And the test result contained within this report only relate to the sample submitted for testing.**
- (2) **This report must not be used by the client to claim product endorsement by NVLAP or any agency of U.S. Government.**
- (3) **This test report, measurements made by TRC are traceable to the NIST only Conducted and Radiated Method.**



NVLAP LAB CODE 200174-0

Tables of Contents

I. GENERAL	5
1.1 Introduction	5
1.2 Description of EUT	5
1.3 Test method	6
1.4 Description of Support Equipment	7
1.5 Configuration of System Under Test	9
1.6 Verify the Frequency and Channel	11
1.7 Test Procedure	12
1.8 Location of the Test Site	12
1.9 General Test Condition	12
II. Section 15.203 : Antenna Requirement	13
III. Section 15.207 : Power Line Conducted Emissions for AC Powered Units	14
3.1 Test Condition & Setup	14
3.2 List of Test Instruments	15
3.3 Test Result of Conducted Emissions	16
Charging mode from USB interface of PC	16
Charging mode from Adapter	17
IEEE 802.11b TX mode	18
IEEE 802.11g TX mode	19
IV. Section 15.247(a) : Technical Description of the EUT	21
V. Section 15.247(a)(2) : Bandwidth for Direct Sequence System	22
5.1 Test Condition & Setup	22
5.2 Test Instruments Configuration	22
5.3 List of Test Instruments	22
5.4 Test Result of Bandwidth	22
Channel 01	23
Channel 06	24
Channel 11	25

VI. Section 15.247(b) : Power Output	26
6.1 Test Condition & Setup	26
6.2 List of Test Instruments	26
6.3 Test Result	26
VII. Section 15.247(c) : Spurious Emissions (Radiated)	27
7.1 Test Condition & Setup	27
7.2 List of Test Instruments	29
7.3 Test Result of Spurious Radiated Emissions	30
Charging mode from USB interface of PC	30
Charging mode from Adapter	32
IEEE 802.11b TX mode	34
IEEE 802.11g TX mode	40
7.4 Test Result of Bandedge.....	46
IEEE 802.11b TX mode	47
IEEE 802.11g TX mode	49
VIII. Section 15.247(d) : Power Spectral Density	51
8.1 Test Condition & Setup	51
8.2 Test Instruments Configuration	51
8.3 List of Test Instruments.....	51
8.4 Test Result of Power Spectral Density	52
Channel 01	53
Channel 06	54
Channel 11	55

I . GENERAL

1.1 Introduction

The following measurement report is submitted on behalf of applicant in support that the certification in accordance with Part 2 Subpart J and Part 15 Subpart A and C of the Commission's Rules and Regulations.

1.2 Description of EUT

FCC ID	:	SVKZEUS
Product Name	:	Wi-Fi SIP Phone
Model Name	:	NW1100, ZEUS, ZEUS2, ZEUS3
Frequency Range	:	2.412GHz ~ 2.462GHz
Channel Spacing	:	5MHz
Support Channel	:	11 Channels
Modulation Skill	:	DBPSK, DQPSK, CCK, OFDM
Power Type	:	(1) Battery-powered by the client's device, or (2) Power adapter Manufacture: SAMYA TECHNOLOGY CO.,LTD. Model: TR-06AM I/P: 100-240VAC, 50/60Hz, 0.2A ; O/P: 5VDC (3) Li-Ion Battery Pack Manufacture: MERRY ELECTRONICS CO., LTD. Model: LIN348-001-01 I/P: 4.2VAC O/P: 3.7VDC
Data Cable	:	USB cable: (USB to mini USB) 109cm length, Shielded, no ferrite core

1.3 Test method

A) EUT connected to PC by USB cable : (Charging mode)

- (1) The Mini-USB jack of EUT is connected with the USB cable to USB port of PC.
- (2) The HEADPHONE jack of EUT is connected with the earphone.

B) EUT with AC Adaptor (EUT Stand on three orthogonal planes respectively, record worst-case in report):

- (1) The POWER jack (Mini USB) of EUT is connected with the AC power source via a power adaptor.
- (2) The HEADPHONE jack of EUT is connected with the earphone.

Test setting:

- (1) The Notebook PC and test fixture is connected by USB to RS-232 cable, and then test fixture connected with EUT setting test mode by mini-USB cable.
- (2) The Notebook PC and test fixture is moving when test mode set finish. The software provided by the manufacturer, the test is performed under the specific conditions.
 - (a) Conducted and radiated test:
making EUT to the mode of continuous transmission

1.4 Description of Support Equipment

In order to construct the minimum testing, following equipment were used as the support units.

PC : **HP, IBM 8434**
Model No. : Pavilion t1000; IVG
Serial No. : TWL3320051; 99CCZA3
FCC ID : DoC (Declaration of Confirmation) Approved
BSMI : R33001; R33026
Power type : 100 ~ 127VAC/6A, 200 ~ 240VAC/3A, 50 ~ 60Hz, Switching
Power cord : Non-shielded, 1.8m length, Plastic hood, No ferrite core

Monitor : **HP 15' Color Monitor**
Model No. : D8894A
Serial No. : CN02364355
FCC ID : ARSCM356N
BSMI : 3882A031
Power type : 100 ~ 240 VAC / 1.5A, 50 ~ 60 Hz, Switching
Power cord : Non-shielded, 1.80m length, Plastic hood, No ferrite core
Data cable : Shielded, 1.50m length, Plastic hood, with ferrite core

Printer : **EPSON**
Model No. : B241A
Serial No. : FAPY155090
FCC ID : N/A, DoC Approved
BSMI : R33126
Power type : Switching adaptor
Power cord : Non-shielded, 198cm length, No ferrite core
Data cable : Shielded, 1.50m length, No ferrite core

PS/2 Mouse : **HP**
Model No. : M-UR89, M-S69
Serial No. : LZS21750238, 334684-002 323614-001
FCC ID : DoC Approved
BSMI : 3892D767, R41126
Power type : By PC
Power cord : Shielded, 1.90m length, No ferrite core

PS/2 Keyboard : HP

Model No. : 5187-0343, KB0133
Serial No. : 265987-AB1 Tch 323686-AB1, B69360MGAPW0HF
FCC ID : DoC Approved
BSMI : 3892C981, R31310
Power type : By PC
Data cable : Shielded, 1.85m length, no ferrite core

Modem : ACEEX

Model No. : DM-1414
Serial No. : 9010583
FCC ID : IFAXDM1414
Power type : Linear
Power cord : Non-shielded, 1.9m length, No ferrite cord
Data cable : RS232, Shielded, 1.2m length, No ferrite core
RJ11C x 2, 7' length non-shielded, No ferrite core

Earphones : PHILIPS

Model No. : SBC-HE033
Serial No. : 670904
Power type : By EUT
Data Cable : Non-shielded, 1.05 m length, Plastic hood, No ferrite core

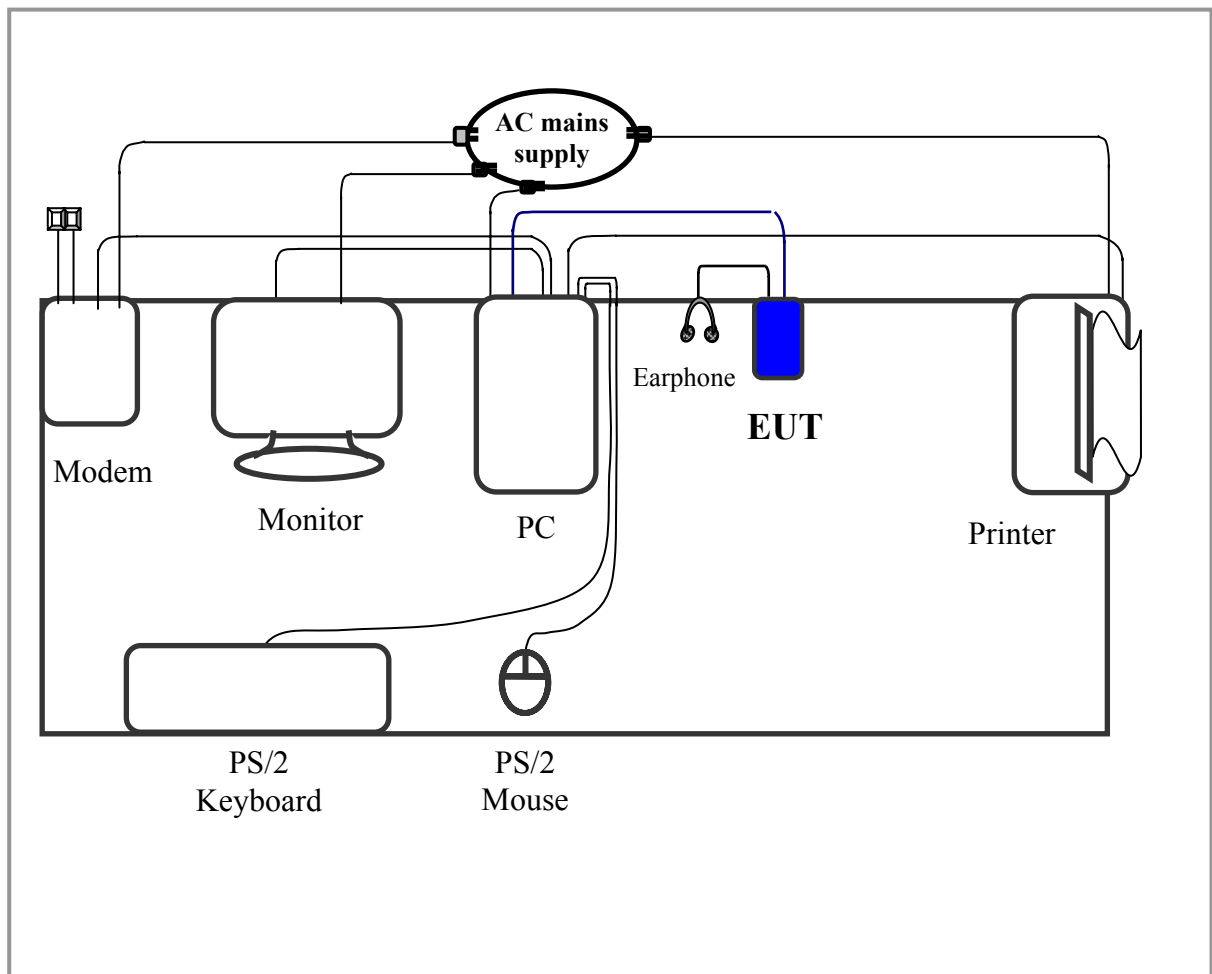
Test fixture

(HS22 Adapter REV2): Inventec Multimedia & Telecom Corporation

Model No. : HS22-8
Serial No. : N/A
Data cable : Shielded, 3.0m length, metal hood, No ferrite core
Power type : By PC

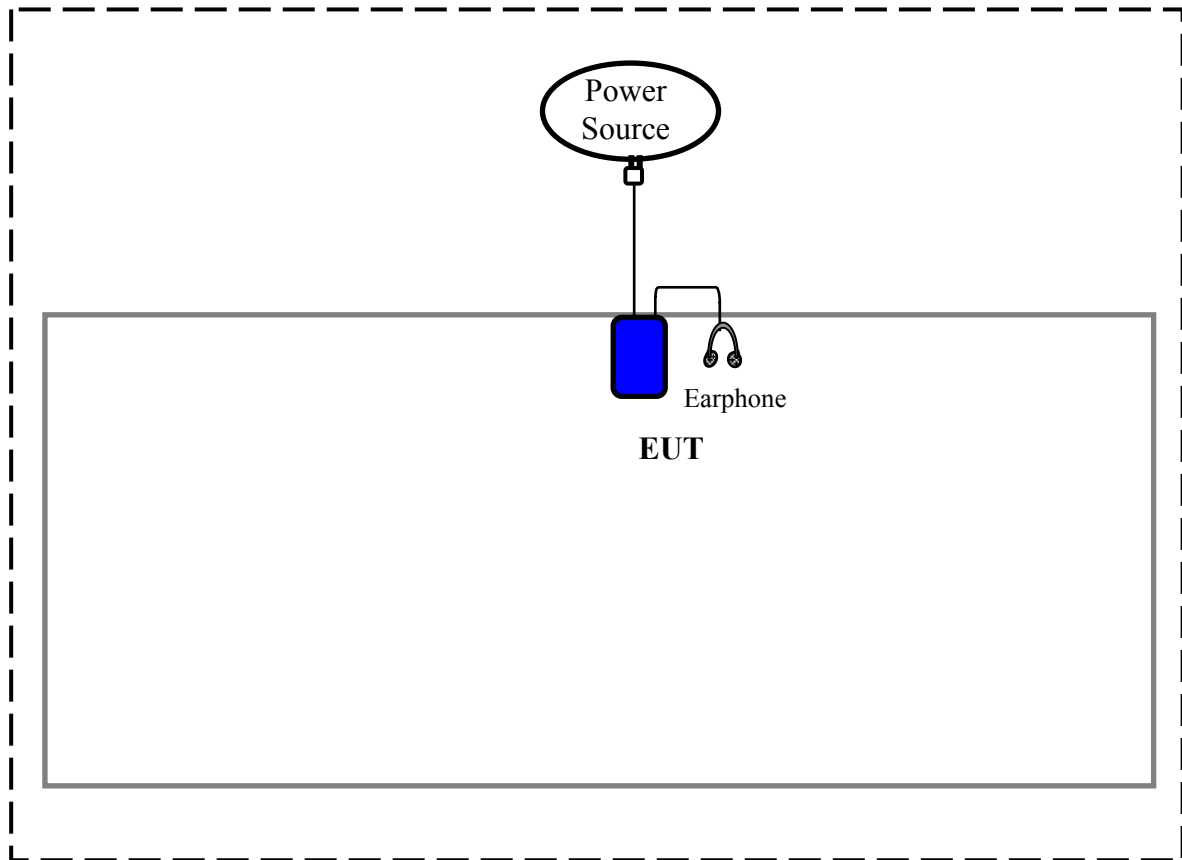
1.5 Configuration of System Under Test

1.5.1 Conducted and Radiated for Charging mode



Connections of Equipment

- PC:**
- *Parallel Port a printer
 - *VGA Port a monitor
 - *Serial Port an external modem
 - *PS/2-key Port a PS/2 keyboard
 - *PS/2-mouse Port a PS/2 mouse
 - *USB Port **EUT**

1.5.2 Conducted and Radiated of Intentional (EUT Only)

The tests below are carried with the EUT transmitter set at high power in TDD mode. The EUT is forced to select of output power level and channel number by LAN port.

The setting up procedure was recorded in 1.3 test method.

1.6 Verify the Frequency and Channel

Channel	Frequency (GHz)
1	2.412
2	2.417
3	2.422
4	2.427
5	2.432
6	2.437
7	2.442
8	2.447
9	2.452
10	2.457
11	2.462

Note:

1. This is for confirming that all frequencies are in 2.412GHz to 2.462GHz.
2. Section 15.31(m): Measurements on intentional radiators or receivers shall be performed at three frequencies for operating frequency range over 10 MHz
(The locations of these frequencies one near the top, one near the middle and one near the bottom.)
3. After test, the EUT operating frequencies are in 2.412GHz to 2.462GHz. So all the items as followed in testing report are need to test these three frequencies:
Top: Channel – 1; Middle: Channel – 6; Bottom: Channel – 11.

1.7 Test Procedure

All measurements contained in this report were performed mainly according to the techniques described in ANSI C63.4 (2003) and the pre-setup was written on 1.3 test method, the detail setup was written on each test item.

1.8 Location of the Test Site

The radiated emissions measurements required by the rules were performed on the **three-meter, Anechoic Chamber (FCC Registration Number: 93906)** maintained by *Training Research Co., Ltd.* 1F, No. 255 Nanyang Street, Shijr, Taipei Hsien 221, Taiwan, R.O.C. Complete description and measurement data have been placed on file with the commission. The conducted power line emissions tests and other test items were performed in a anechoic chamber also located at Training Research Co., Ltd.

No. 255 Nanyang Street, Shijr, Taipei Hsien 221, Taiwan, R.O.C. *Training Research Co., Ltd.* is listed by the FCC as a facility available to do measurement work for others on a contract basis.

1.9 General Test Condition

The conditions under which the EUT operates were varied to determine their effect on the equipment's emission characteristics. The final configuration of the test system and the mode of operation used during these tests were chosen as that which produced the highest emission levels. However, only those conditions, which the EUT was considered likely to encounter in normal use were investigated.

In test, they were set in high power and continuously transmitting mode that controlled by computer. The ch01, ch06 and ch11 of EUT were all tested. The setting up procedure is recorded on 1.3 test method.

II. Section 15.203: Antenna requirement

The EUT can be equipped with un-detachable antenna. The external antenna is affixed to the EUT using a unique connector, which allows for replacement of a broken antenna, but does not use a standard antenna jack or electrical connector. The antenna requirement stated in Section 15.203 is inapplicable to this EUT.

The custom antenna specification of list as below:

Manufacturer	:	SPEED TECH CORP.
Part No	:	DMHP102-0001
Antenna Gain	:	3.00dBi

III. Section 15.207: Power Line Conducted Emissions for AC Powered Units

3.1 Test Condition & Setup

The power line conducted emission measurements were performed in an anechoic chamber. The EUT was assembled on a wooden table, which is 80 centimeters high, was placed 40 centimeters from the backwall and at least 1 meter from the sidewall.

Power was fed to the EUT from the public utility power grid through a line filter and Line Impedance Stabilization Networks (LISNs). The LISN housing, measuring instrumentation case, ground plane, etc., were electrically bonded together at the same RF potential. The Spectrum analyzer (or EMI receiver) was connected to the AC line through an isolation transformer. The 50-ohm output of the LISN was connected to the spectrum analyzer directly. Conducted emission levels were in the CISPR quasi-peak and average detection mode. The analyzer's 6 dB bandwidth was set to 9 KHz. No post-detector video filter was used.

The spectrum was scanned from 150 KHz to 30 MHz. The physical arrangement of the test system and associated cabling was varied (within the scope of arrangements likely to be encountered in actual use) to determine the effect on the unit's emanations in amplitude and frequency. All spurious emission frequencies were observed. The highest emission amplitudes relative to the appropriate limit were measured and have been recorded in paragraph 4.3

There is a test condition apply in this test item, the test procedure description as <1.3>. Three channels were tested, one in the top (CH01), one in the middle (CH06) and the other in bottom (CH11).

3.2 List of Test Instruments

Instrument Name	Model	Brand	Serial No.	Calibration Date
				Next time
EMI Receiver	8546A	HP	3520A00242	09/06/07
RF Filter Section	85460A	HP	3448A00217	09/06/07
LISN (EUT)	LISN-01	TRC	99-05	05/10/08
LISN (Support E.)	LISN-01	TRC	9912-03, 04	06/22/08
Pre-amplifier	15542 ZFL-500	Mini – Circuits	0 0117	04/10/08
6dB Attenuator	MCL BW-S6W2	Mini – Circuits	9915 – Conducted	04/10/08
10dB Attenuator	A5542 VAT010	Mini – Circuits	0215 – Conducted	04/10/08
Coaxial Cable (2.0 meter)	A30A30-0058-50FS-2M	Jyebao	SMA-08	04/10/08
Coaxial Cable (1.1 meter)	A30A30-0058-50FS-1M	Jyebao	SMA-09	04/10/08
Coaxial Cable (20 meter)	RG-214/U	Jyebao	NP-01	04/10/08
Coaxial Cable (20 meter)	RG-214/U	Jyebao	NP-02	04/10/08
Auto Switch Box (< 30MHz)	ASB-01	TRC	9904-01	04/10/08

3.3 Test Result of Power Line Conducted Emissions

The following table shows a summary of the highest emissions of power line conducted emissions on the LIVE and NETURAL conductors of the EUT power cord. Show as follows.

Test Conditions: Temperature : 25 °C Humidity : 73 % RH

Test mode: Charging mode from USB interface of PC

<i>Power Connected Emissions</i>					<i>Class B</i>		
<i>Conductor</i>	<i>Frequency (KHz)</i>	<i>Peak (dBμV)</i>	<i>QP (dBμV)</i>	<i>Average (dBμV)</i>	<i>QP-limit (dBμV)</i>	<i>AVG-limit (dBμV)</i>	<i>Margin (Db)</i>
Line 1	155.130	59.79	51.28	26.77	65.94	55.94	-14.66
	226.000	49.48	---	---	63.83	53.83	-4.35
	669.980	42.14	41.49	34.12	56.00	46.00	-11.88
	781.000	40.51	---	---	56.00	46.00	-5.49
	1230.000	38.88	---	---	56.00	46.00	-7.12
	2115.000	35.06	---	---	56.00	46.00	-10.94
Line 2	153.635	60.81	52.04	26.72	66.00	56.00	-13.96
	171.000	51.60	---	---	65.40	55.40	-3.80
	224.000	48.52	---	---	63.89	53.89	-5.37
	668.000	42.09	---	---	56.00	46.00	-3.91
	1437.000	40.17	---	---	56.00	46.00	-5.83
	2532.000	39.34	---	---	56.00	46.00	-6.66

NOTE:

- (1)Margin = Peak Amplitude – Limit, *The reading amplitudes are all under limit.*
- (2)A "+" sign in the margin column means the emission is OVER the Class B Limit and "-" sign of means UNDER the Class B limit

Test mode: Charging mode from Adapter

Power Connected Emissions					Class B		
Conductor	Frequency (KHz)	Peak (dBμV)	QP (dBμV)	Average (dBμV)	QP-limit (dBμV)	AVG-limit (dBμV)	Margin (Db)
Line 1	417.000	40.96	---	---	58.37	48.37	-7.41
	537.000	41.24	---	---	56.00	46.00	-4.76
	710.000	42.97	---	---	56.00	46.00	-3.03
	952.650	45.41	42.46	35.53	56.00	46.00	-10.47
	1540.390	51.83	48.17	38.53	56.00	46.00	-7.47
	2398.760	43.89	42.55	37.77	56.00	46.00	-8.23
Line 2	413.000	38.57	---	---	58.49	48.49	-9.92
	537.000	37.39	---	---	56.00	46.00	-8.61
	774.000	39.39	---	---	56.00	46.00	-6.61
	1183.875	46.48	45.00	33.58	56.00	46.00	-11.00
	1505.475	53.22	51.33	40.13	56.00	46.00	-4.67
	2394.000	40.65	---	---	56.00	46.00	-5.35

Test mode: IEEE 802.11b Channel 1

Power Connected Emissions					Class B		
Conductor	Frequency (KHz)	Peak (dBμV)	QP (dBμV)	Average (dBμV)	QP-limit (dBμV)	AVG-limit (dBμV)	Margin (dB)
Line 1	417.000	39.04	---	---	58.37	48.37	-9.33
	717.000	39.92	---	---	56.00	46.00	-6.08
	1184.190	46.52	43.61	32.59	56.00	46.00	-12.39
	1553.645	53.40	49.55	38.04	56.00	46.00	-6.45
	2394.000	42.03	---	---	56.00	46.00	-3.97
	4171.000	37.16	---	---	56.00	46.00	-8.84
Line 2	417.000	36.39	---	---	58.37	48.37	-11.98
	717.000	37.48	---	---	56.00	46.00	-8.52
	1135.900	44.77	39.70	30.44	56.00	46.00	-15.56
	1505.565	55.51	54.08	42.65	56.00	46.00	-1.92
	2394.000	40.73	---	---	56.00	46.00	-5.27
	3638.000	36.70	---	---	56.00	46.00	-9.30

Test mode: IEEE 802.11b Channel 6

Power Connected Emissions					Class B		
Conductor	Frequency (KHz)	Peak (dBμV)	QP (dBμV)	Average (dBμV)	QP-limit (dBμV)	AVG-limit (dBμV)	Margin (dB)
Line 1	352.000	44.14	---	---	60.23	50.23	-6.09
	537.000	34.69	---	---	56.00	46.00	-11.31
	717.000	39.89	---	---	56.00	46.00	-6.11
	1140.495	45.60	40.20	30.68	56.00	46.00	-15.32
	1597.640	52.89	51.86	37.53	56.00	46.00	-4.14
	2394.000	41.32	---	---	56.00	46.00	-4.68
Line 2	366.000	41.49	---	---	59.83	49.83	-8.34
	413.000	41.79	---	---	58.49	48.49	-6.70
	717.510	38.48	---	---	56.00	46.00	-7.52
	1192.610	46.69	37.61	27.35	56.00	46.00	-18.39
	1505.000	53.36	51.20	39.93	56.00	46.00	-4.80
	2394.000	39.69	---	---	56.00	46.00	-6.31

Test mode: IEEE 802.11b Channel 11

Power Connected Emissions					Class B		
Conductor	Frequency (KHz)	Peak (dBμV)	QP (dBμV)	Average (dBμV)	QP-limit (dBμV)	AVG-limit (dBμV)	Margin (dB)
Line 1	417.000	42.66	---	---	58.37	48.37	-5.71
	774.000	39.45	---	---	56.00	46.00	-6.55
	1166.000	42.91	---	---	56.00	46.00	-3.09
	1519.710	51.39	45.74	38.36	56.00	46.00	-7.64
	2394.000	42.42	---	---	56.00	46.00	-3.58
	4171.000	37.37	---	---	56.00	46.00	-8.63
Line 2	352.000	42.85	---	---	60.23	50.23	-7.38
	717.000	37.20	---	---	56.00	46.00	-8.80
	1199.945	44.89	40.51	30.89	56.00	46.00	-15.11
	1556.390	53.77	48.87	38.39	56.00	46.00	-7.13
	2394.000	40.84	---	---	56.00	46.00	-5.16
	3638.000	33.72	---	---	56.00	46.00	-12.28

Test mode: IEEE 802.11g Channel 1

Power Connected Emissions					Class B		
Conductor	Frequency (KHz)	Peak (dBμV)	QP (dBμV)	Average (dBμV)	QP-limit (dBμV)	AVG-limit (dBμV)	Margin (dB)
Line 1	366.000	43.64	---	---	59.83	49.83	-6.19
	592.000	35.11	---	---	56.00	46.00	-10.89
	717.000	40.29	---	---	56.00	46.00	-5.71
	1182.480	44.29	41.72	31.45	56.00	46.00	-14.28
	1536.250	53.52	51.39	39.74	56.00	46.00	-4.61
	2394.000	41.42	---	---	56.00	46.00	-4.58
Line 2	352.000	43.17	---	---	60.23	50.23	-7.06
	774.000	37.90	---	---	56.00	46.00	-8.10
	1176.000	42.94	---	---	56.00	46.00	-3.06
	1587.400	51.86	48.43	37.60	56.00	46.00	-7.57
	2394.000	39.43	---	---	56.00	46.00	-6.57
	3638.000	33.54	---	---	56.00	46.00	-12.46

Test mode: IEEE 802.11g Channel 6

Power Connected Emissions					Class B		
Conductor	Frequency (KHz)	Peak (dBμV)	QP (dBμV)	Average (dBμV)	QP-limit (dBμV)	AVG-limit (dBμV)	Margin (dB)
Line 1	380.000	42.71	---	---	59.43	49.43	-6.72
	774.000	38.86	---	---	56.00	46.00	-7.14
	1203.805	44.87	37.99	31.95	56.00	46.00	-14.05
	1598.180	53.86	51.78	38.13	56.00	46.00	-4.22
	2394.000	39.59	---	---	56.00	46.00	-6.41
	3094.000	36.47	---	---	56.00	46.00	-9.53
Line 2	352.000	42.39	---	---	60.23	50.23	-7.84
	717.000	38.62	---	---	56.00	46.00	-7.38
	1183.695	44.10	41.28	31.30	56.00	46.00	-14.70
	1505.565	52.80	49.69	37.32	56.00	46.00	-6.31
	2394.000	38.96	---	---	56.00	46.00	-7.04
	3702.000	34.20	---	---	56.00	46.00	-11.80

Test mode: IEEE 802.11g Channel 11

Power Connected Emissions					FCC Class B		
Conductor	Frequency (KHz)	Peak (dBμV)	QP (dBμV)	Average (dBμV)	QP-limit (dBμV)	AVG-limit (dBμV)	Margin (dB)
Line 1	384.000	40.89	---	---	59.31	49.31	-8.42
	717.000	37.92	---	---	56.00	46.00	-8.08
	1591.115	63.49	48.02	37.91	56.00	46.00	-7.98
	2394.000	39.87	---	---	56.00	46.00	-6.13
	4171.000	36.90	---	---	56.00	46.00	-9.10
	20960.000	39.92	---	---	60.00	50.00	-10.08
Line 2	413.000	42.35	---	---	58.49	48.49	-6.14
	717.000	37.43	---	---	56.00	46.00	-8.57
	1144.000	42.41	---	---	56.00	46.00	-3.59
	1536.400	53.47	49.63	38.79	56.00	46.00	-6.37
	2394.000	39.64	---	---	56.00	46.00	-6.36
	2872.000	34.79	---	---	56.00	46.00	-11.21

IV. Section 15.247 (a): Technical description of the EUT

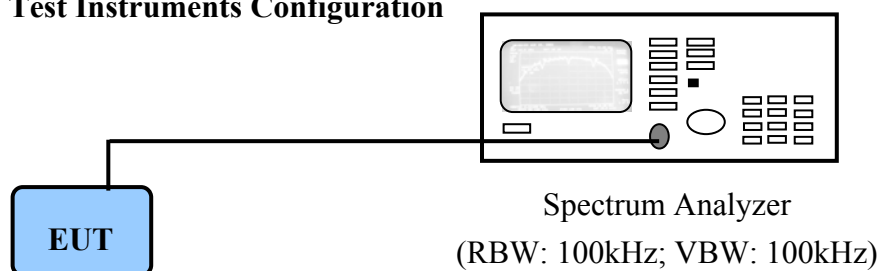
Direct Sequence System is a spread spectrum system in which the carrier has been modulated by a high speed spreading code and an information data stream. The high speed code sequence dominates the “modulating function” and is the direct cause of the wide spreading of the transmitted signal. In the operational description demonstrates the operation principles of the Baseband processor employed by the EUT, shows that which is a complete DSSS baseband processor and meets the definition of the direct sequence spread spectrum system.

V. Section 15.247(a)(2): Bandwidth for Direct Sequence System.

5.1 Test Condition & Setup

The transmitter bandwidth measurements were performed by the contact manner. The EUT was set to transmit continuously, also various channels were investigated to find the maximum occupied bandwidth. The output of the EUT was connected to the spectrum analyzer. The bandwidth of the fundamental frequency is observed by the spectrum analyzer with 100kHz RBW and 100kHz VBW.

5.2 Test Instruments Configuration



PC to control the EUT at maximal power output and channel number and set antenna kit

5.3 List of Test Instruments

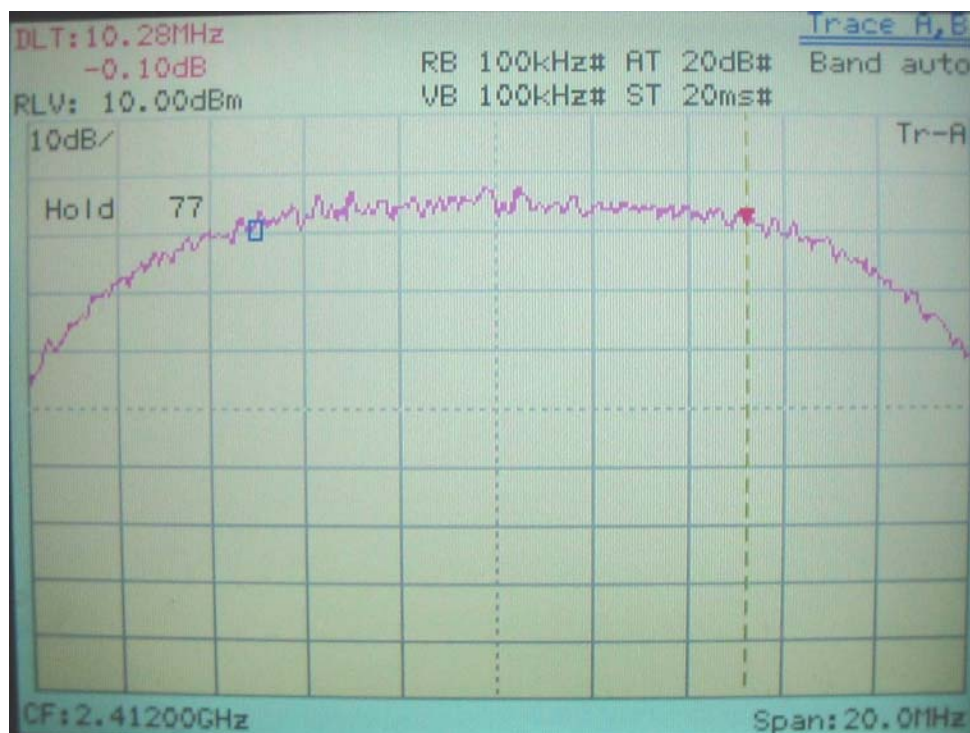
Instrument Name	Model No.	Brand	Serial No.	Next time
Spectrum Analyzer	MS2665C	ANRITSU	6200175476	12/11/07

5.4 Test Result of Bandwidth

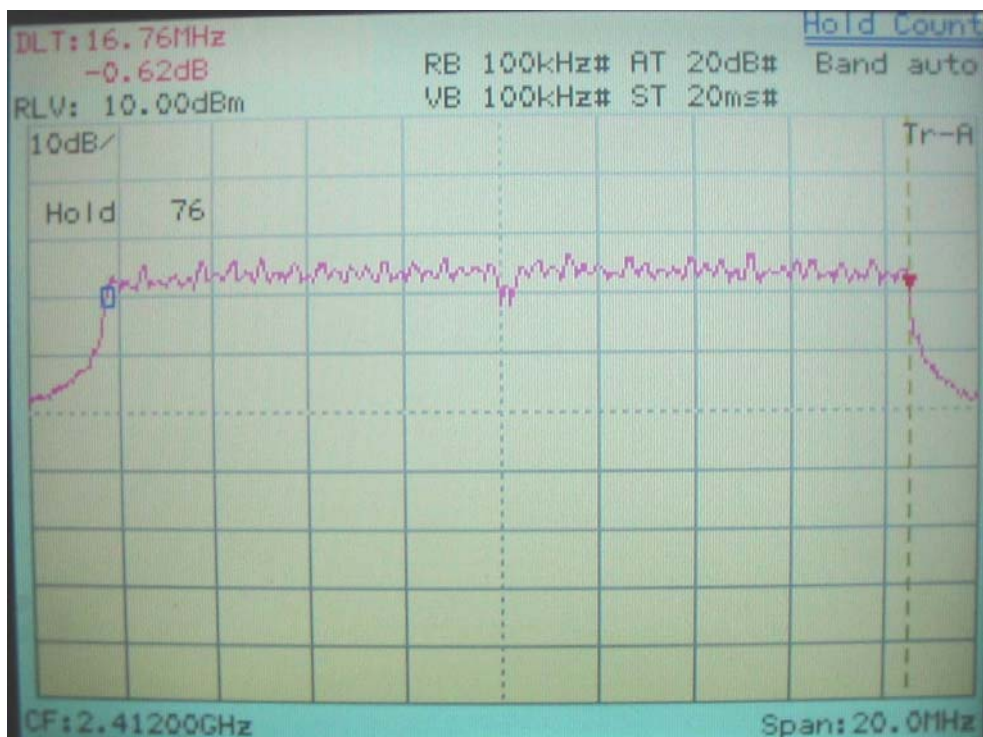
Channel	802.11b	802.11g
01	10.28 MHz	16.76 MHz
06	10.28 MHz	16.80 MHz
11	10.32 MHz	16.76 MHz

- Note:
1. The data in the above table are summarizing the following attachment spectrum analyzer hard copy. According to the guidance, we'd made the measurement with the spectrum analyzer's resolution bandwidth (RBW)=100kHz and set the $span \gg RBW$. The results show the measured 6dB bandwidth comply with the minimum 500kHz requirement.
 2. The attachments show these on the following pages.

6dB Bandwidth of Channel 1 (The minimum 6dB BW at least 500kHz)



IEEE 802.11b



IEEE 802.11g

6dB Bandwidth of Channel 6 (The minimum 6dB BW at least 500kHz)

IEEE 802.11b



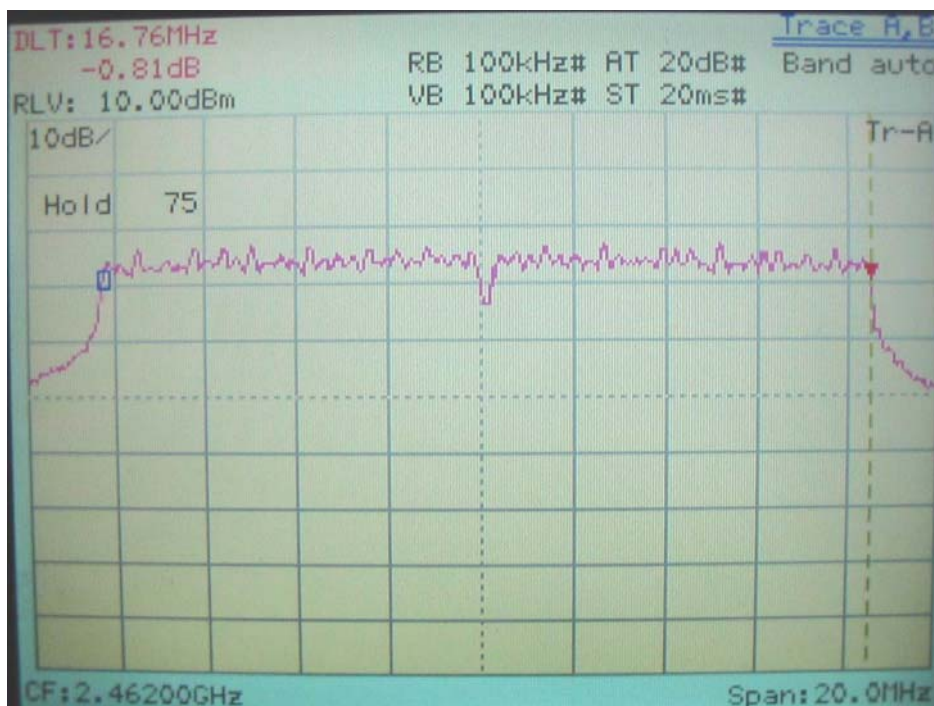
IEEE 802.11g



6dB Bandwidth of Channel 11 (The minimum 6dB BW at least 500kHz)



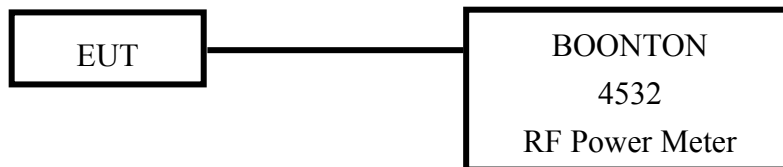
IEEE 802.11b



IEEE 802.11g

VI. Section 15.247(b): Power Output

6.1 Test Condition & Setup



1. The output of the transmitter is connected to the BOONTON RF Power Meter.
2. The calibration is performed before every test. The values of the output power of the EUT will shown in the dBm directly are the transmitter output peak power. Recording as follows.

6.2 List of Test Instruments

Instrument Name	Model	Brand	Serial No.	Next time
RF Power Meter	4532	BOONTON	117501	06/11/08
Peak Power Sensor	57340	BOONTON	2696	06/11/08

6.3 Test Result

Formula:

RF Output of EUT + |Cable Loss| = Output Peak Power

Channel	RF Output	Cable Loss	Output Peak Power	
			dBm	mW
802.11b CH01	8.60	1.50	10.10	10.233
802.11b CH06	8.81	1.50	10.31	10.740
802.11b CH11	8.95	1.50	10.45	11.092
802.11g CH01	8.82	1.50	10.32	10.765
802.11g CH06	8.53	1.50	10.03	10.069
802.11g CH11	9.20	1.50	10.70	11.749

VII. Section 15.247 (C): Spurious Emissions (Radiated)

7.1 Test Condition & Setup

We'd performed the test by the *radiated emission* skill: The EUT was placed in an anechoic chamber, and set the EUT transmitting continuously and scanned at 3-meter distance to determine its emission characteristics. The physical arrangement of the EUT was varied (within the scope of arrangements likely to be encountered in actual use) to determine the effect on the unit's emanations in amplitude, directivity, and frequency. The exact system configuration, which produced the highest emissions was noted so it could be reproduced later during the final tests. For the measurement above 1GHz, according to the guidance we'd set the spectrum analyzer's 6dB bandwidth RBW to 1MHz.

This was done to ensure that the final measurements would demonstrate the worst-case interference potential of the EUT.

Final radiation measurements were made on a three-meter, anechoic chamber. The EUT system was placed on a nonconductive turntable, which is 0.8 meters height, top surface 1.0 x 1.5 meter.

The spectrum was examined from 30MHz to 1000MHz using an Hewlett Packard 85460A EMI Receiver, SCHWARZECK whole range Small Biconical Antenna (Model No.: UBAA9114 & BBVU9135) is used to measure frequency from 30 MHz to 1GHz. The final test is used the HP 85460A spectrum and 8564E spectrum was examined from 1GHz to 25GHz using an Hewlett Packard Spectrum Analyzer, EMCO/HP Horn Antenna (Model 3115 / 84125-80008) for 1G - 25GHz.

At each frequency, the EUT was rotated 360 degrees, and the antenna was raised and lowered from one to four meters to find the maximum emission levels. Measurements were taken using both horizontal and vertical antenna polarization.

Appropriate preamplifiers were used for improving sensitivity and precautions were taken to avoid overloading or desensitizing the spectrum analyzer. There are two spectrum analyzers use on this testing, HP 85460A for frequency 30MHz to 1000MHz, and 8564E for frequency 1GHz to 25GHz. No post-detector video filters were used in the test. The spectrum analyzer's 6dB bandwidth was set to 120KHz (spectrum was examined from 30 MHz to 1000 MHz), the spectrum analyzer's 6 dB bandwidth was set to 1 MHz (spectrum was examined from 1GHz to 25GHz) and the analyzer was operated in the maximum hold mode. There is a test condition applies in this test item, the test procedure description as the following:

Three channels were tested, one in the top (CH01), one in the middle (CH06) and the other in bottom (CH11). The setting up procedure is recorded on <1.3>

With the transmitter operating from a AC source and using the internal of EUT, radiates spurious emissions falling within the restricted bands of 15.209 were measured at operating frequencies corresponding to upper, middle and bottom channels in the 2400 ~ 2483.5 MHz band.

The actual field intensity in decibels referenced to 1 microvolt per meter (dBμV/m) is determined by algebraically adding the measured reading in dBμV, the antenna factor (dB), and cable loss (dB) at the appropriate frequency. Since the EUT was set to transmit continuously, no *duty cycle* is present.

For frequency between 30MHz to 1000MHz

$$F_{Ia} \text{ (dBuV/m)} = F_{Ir} \text{ (dB}\mu\text{V)} + \text{Correction Factors}$$

F_{Ia} : Actual Field Intensity

F_{Ir} : Reading of the Field Intensity

Correction Factors = Antenna Factor + (Cable Loss – Amplifier Gain) + Switching Box Loss

For frequency between 1GHz to 25GHz

$$F_{Ia} \text{ (dB}\mu\text{V/m)} = F_{Ir} \text{ (dB}\mu\text{V)} + \text{Correction Factor}$$

F_{Ia} : Actual Field Intensity

F_{Ir} : Reading of the Field Intensity

Correction Factors = Antenna Factor + (Cable Loss – Amplifier Gain) + Switching Box Loss

7.2 List of Test Instruments

Instrument Name	Model	Brand	Serial No.	Calibration Date
				Next time
EMI Receiver	8546A	HP	3520A00242	09/06/07
RF Filter Section	85460A	HP	3448A00217	09/06/07
Small Biconical Antenna	UBAA9114 & BBVU9135	SCHWARZECK	127	12/07/07
Pre-amplifier	PA1F	TRC	1FAC	04/10/08
Auto Switch Box (>30MHz)	ASB-01	TRC	9904-01	04/10/08
Coaxial Cable (Double shielded, 15 meter)	A30A30-0058-50FS-15M	JYEBAO	SMA-01	04/10/08
Coaxial Cable (1.1 meter)	A30A30-0058-50FS-1M	JYEBAO	SMA-02	04/10/08
Spectrum Analyzer	8564E	HP	3720A00840	12/11/07
Microwave Preamplifier	84125C	HP	US36433002	11/07/07
Horn Antenna	3115	EMCO	9104-3668	02/05/08
Standard Guide Horn Antenna	84125-80008	HP	18-26.5GHz	12/12/07
Standard Guide Horn Antenna	84125-80001	HP	26.5-40GHz	12/12/07
Horn Antenna	1196E (3115)	HP (EMCO)	9704-5178	02/12/08
Pre-amplifier	PA2F	TRC	2F1GZ	04/10/08
Coaxial Cable (3 miter)	A30A30-0058-50FST118	JYEBAO	MSA-05	04/10/08
Coaxial Cable (1 meter)	A30A30-0058-50FST118	JYEBAO	MSA-04	04/10/08

7.3 Test Result of Spurious Radiated Emissions

The highest peak values of radiated emissions from the EUT at various antenna heights, antenna polarizations, EUT orientation, etc. are recorded on the following.

Test Conditions: Temperature : 25 ° C Humidity : 73 % RH

Test mode: Charging mode from USB interface of PC for 30MHz to 1GHz [Horizontal]

Radiated Emission				Correction Factors	Corrected Amplitude	Class B (3 m)	
Frequency (MHz)	Amplitude (dBμV)	Ant. H. (m)	Table ()			Limit (dBμV/m)	Margin (dB)
300.39	29.71	1.00	223	-2.90	26.81	46.00	-19.19
339.19	29.91	1.00	180	-2.41	27.50	46.00	-18.50
433.76	27.30	1.00	287	0.45	27.75	46.00	-18.25
501.66	34.26	1.00	300	1.85	36.11	46.00	-9.89
631.40	27.24	1.00	107	7.43	34.67	46.00	-11.33
830.25	24.07	1.00	190	12.62	36.69	46.00	-9.31

Test mode: Charging mode from USB interface of PC for 30MHz to 1GHz [Vertical]

Radiated Emission				Correction Factors	Corrected Amplitude	Class B (3 m)	
Frequency (MHz)	Amplitude (dBμV)	Ant. H. (m)	Table ()			Limit (dBμV/m)	Margin (dB)
247.04	40.32	1.00	103	-3.32	37.00	46.00	-9.00
317.36	37.40	1.00	213	-2.68	34.72	46.00	-11.28
564.71	29.37	1.00	246	5.47	34.84	46.00	-11.16
631.40	26.34	1.00	273	7.43	33.77	46.00	-12.23
696.87	27.29	1.00	190	9.44	36.73	46.00	-9.27
830.25	24.41	1.00	80	12.62	37.03	46.00	-8.97

Note:

1. Margin = Amplitude – limit, if margin is minus means under limit.
2. Corrected Amplitude = Reading Amplitude + Correction Factors
3. Correction factor = Antenna factor + (Cable Loss – Amplitude gain) + Switching Box Loss

Test mode: Charging mode from USB interface of PC for 1GHz to 26.5GHz [Horizontal]

Frequency	Ant. H.	Table	Amplitude		Correction	Corrected		Limit		Margin
			Peak / Ave.			Amplitude		Peak / Ave.		
MHz	m	degree	dBμV		dB/m	dBμV/m		dBμV/m		dB
6007.92	1.00	79	26.41	---	18.00	44.41	---	73.96	53.96	-9.55
9592.08	1.00	85	21.57	---	23.11	44.68	---	73.96	53.96	-9.28
19714.17	1.00	248	46.59	---	1.84	48.43	---	73.96	53.96	-5.53
21934.79	1.00	67	45.94	---	3.09	49.03	---	73.96	53.96	-4.93
24506.04	1.00	112	47.18	---	2.32	49.50	---	73.96	53.96	-4.46

Test mode: Charging mode from USB interface of PC for 1GHz to 26.5GHz [Vertical]

Frequency	Ant. H.	Table	Amplitude		Correction	Corrected		Limit		Margin
			Peak / Ave.			Amplitude		Peak / Ave.		
MHz	m	degree	dBμV		dB/m	dBμV/m		dBμV/m		dB
4711.67	1.00	214	29.07	---	14.25	43.32	---	73.96	53.96	-10.64
11787.92	1.00	51	23.58	---	21.32	44.90	---	73.96	53.96	-9.06
19381.25	1.00	109	46.54	---	1.60	48.14	---	73.96	53.96	-5.82
22356.25	1.00	141	44.17	---	3.43	47.60	---	73.96	53.96	-6.36
24764.58	1.00	295	46.13	---	2.28	48.41	---	73.96	53.96	-5.55

Note:

1. Margin = Corrected - Limit.
2. The EUT utilizes a *permanently attached antenna*. In addition the spurious RF radiated emissions levels do comply with the *20dBc limit* both at its bandedges and other spurious emissions.
3. As stated in Section 15.35(b), for any frequencies above 1000MHz, radiated limits shown are based upon the use of measurement instrumentation employing an average detector function. As the results of our test, the peak amplitudes are already below the FCC limit. Thus the average amplitudes of the rest are omitted.

Test mode: Charging mode from Adapter for 30MHz to 1GHz [Horizontal]

Radiated Emission				Correction Factors	Corrected Amplitude	Class B (3 m)	
Frequency (MHz)	Amplitude (dBμV)	Ant. H. (m)	Table ()			Limit (dBμV/m)	Margin (dB)
169.44	38.81	1.00	152	-4.11	34.70	43.50	-8.80
179.14	43.76	1.00	92	-3.99	39.77	43.50	-3.73
257.95	36.28	1.00	102	-3.73	32.55	46.00	-13.45
344.04	36.07	1.00	334	-2.35	33.72	46.00	-12.28
385.26	42.40	1.00	324	-1.43	40.97	46.00	-5.03
441.04	34.29	1.00	26	0.78	35.07	46.00	-10.93

Test mode: Charging mode from Adapter for 30MHz to 1GHz [Vertical]

Radiated Emission				Correction Factors	Corrected Amplitude	Class B (3 m)	
Frequency (MHz)	Amplitude (dBμV)	Ant. H. (m)	Table ()			Limit (dBμV/m)	Margin (dB)
169.44	32.25	1.00	103	-4.11	28.14	43.50	-15.36
176.71	35.05	1.00	113	-4.02	31.03	43.50	-12.47
322.21	27.12	1.00	167	-2.62	24.50	46.00	-21.50
384.05	31.88	1.00	167	-1.46	30.42	46.00	-15.58
394.96	27.13	1.00	67	-1.20	25.93	46.00	-20.07
603.51	20.86	1.00	152	6.57	27.43	46.00	-18.57

Test mode: Charging mode from Adapter for 1GHz to 26.5GHz [Horizontal]

<i>Frequency</i>	<i>Ant. H.</i>	<i>Table</i>	<i>Amplitude</i>		<i>Correction</i>	<i>Corrected</i>		<i>Limit</i>		<i>Margin</i>
			<i>Peak / Ave.</i>			<i>Peak / Ave.</i>		<i>Peak / Ave.</i>		
<i>MHz</i>	<i>m</i>	<i>degree</i>	<i>dBμV</i>		<i>dB/m</i>	<i>dBμV/m</i>		<i>dBμV/m</i>		<i>dB</i>
6815.42	1.00	293	24.24	---	19.96	44.20	---	73.96	53.96	-9.76
11773.75	1.00	178	23.24	---	21.39	44.63	---	73.96	53.96	-9.33
19388.33	1.00	325	46.01	---	1.60	47.61	---	73.96	53.96	-6.35
21747.08	1.00	346	46.53	---	2.80	49.33	---	73.96	53.96	-4.63
24024.37	1.00	258	46.61	---	3.16	49.77	---	73.96	53.96	-4.19

Test mode: Charging mode from Adapter for 1GHz to 26.5GHz [Vertical]

<i>Frequency</i>	<i>Ant. H.</i>	<i>Table</i>	<i>Amplitude</i>		<i>Correction</i>	<i>Corrected</i>		<i>Limit</i>		<i>Margin</i>
			<i>Peak / Ave.</i>			<i>Peak / Ave.</i>		<i>Peak / Ave.</i>		
<i>MHz</i>	<i>m</i>	<i>degree</i>	<i>dBμV</i>		<i>dB/m</i>	<i>dBμV/m</i>		<i>dBμV/m</i>		<i>dB</i>
6638.33	1.00	88	24.74	---	19.26	44.00	---	73.96	53.96	-9.96
11717.08	1.00	90	23.07	---	21.39	44.46	---	73.96	53.96	-9.50
19568.96	1.00	171	46.89	---	1.70	48.59	---	73.96	53.96	-5.37
21995.00	1.00	353	45.77	---	2.82	48.59	---	73.96	53.96	-5.37
24746.87	1.00	159	48.72	---	2.34	51.06	---	73.96	53.96	-2.90

Test mode: IEEE 802.11b CH01 for 30MHz to 1GHz [Horizontal] Z-axis

Radiated Emission				Correction Factors	Corrected Amplitude	Class B (3 m)	
Frequency (MHz)	Amplitude (dBμV)	Ant. H. (m)	Table ()			Limit (dBμV/m)	Margin (dB)
342.82	28.26	1.00	230	-2.36	25.90	46.00	-20.10
352.52	28.49	1.00	267	-2.21	26.28	46.00	-19.72
371.93	28.62	1.00	264	-1.75	26.87	46.00	-19.13
382.23	27.75	1.00	45	-1.50	26.25	46.00	-19.75
431.34	23.21	1.00	216	0.34	23.55	46.00	-22.45
681.72	21.47	1.00	45	8.97	30.44	46.00	-15.56

Test mode: IEEE 802.11b CH01 for 30MHz to 1GHz [Vertical] X-axis

Radiated Emission				Correction Factors	Corrected Amplitude	Class B (3 m)	
Frequency (MHz)	Amplitude (dBμV)	Ant. H. (m)	Table ()			Limit (dBμV/m)	Margin (dB)
147.01	26.29	1.00	62	-4.11	22.18	43.50	-21.32
176.71	31.73	1.00	138	-4.02	27.71	43.50	-15.79
342.82	31.11	1.00	178	-2.36	28.75	46.00	-17.25
371.93	29.66	1.00	168	-1.75	27.91	46.00	-18.09
440.43	25.25	1.00	75	0.76	26.01	46.00	-19.99
864.81	21.05	1.00	209	13.83	34.88	46.00	-11.12

Test mode: IEEE 802.11b CH01 for 1GHz to 26.5GHz [Horizontal] Z-axis

Frequency	Ant. H.	Table	Amplitude		Correction Factor	Corrected Amplitude		Limit		Margin
			Peak / Ave.			Peak / Ave.		Peak / Ave.		
MHz	m	degree	dBμV		dB/m	dBμV/m		dBμV/m		dB
2952.08	1.00	62	34.50	---	10.34	44.84	---	73.96	53.96	-9.12
4823.12	1.00	312	44.27	---	3.76	48.03	---	73.96	53.96	-5.93
9650.42	1.00	61	36.44	---	11.47	47.91	---	73.96	53.96	-6.05
12061.04	1.00	299	37.94	---	9.81	47.75	---	73.96	53.96	-6.21
19296.25	1.00	49	47.24	---	1.60	48.84	---	73.96	53.96	-5.12
21708.12	1.00	29	47.43	---	2.87	50.30	---	73.96	53.96	-3.66

Test mode: IEEE 802.11b CH01 for 1GHz to 26.5GHz [Vertical] X-axis

Frequency	Ant. H.	Table	Amplitude		Correction Factor	Corrected Amplitude		Limit		Margin
			Peak / Ave.			Peak / Ave.		Peak / Ave.		
MHz	m	degree	dBμV		dB/m	dBμV/m		dBμV/m		dB
2152.08	1.00	226	36.00	---	8.52	44.52	---	73.96	53.96	-9.44
4823.97	1.00	106	51.27	41.37	3.76	55.03	41.37	73.96	53.96	-12.59
7233.75	1.00	2	40.11	---	10.07	50.18	---	73.96	53.96	-3.78
12061.04	1.00	178	38.60	---	9.81	48.41	---	73.96	53.96	-5.55
19296.25	1.00	52	47.28	---	1.60	48.88	---	73.96	53.96	-5.08
21708.12	1.00	38	47.49	---	2.87	50.36	---	73.96	53.96	-3.60

Test mode: IEEE 802.11b CH06 for 30MHz to 1GHz [Horizontal] Z-axis

Radiated Emission				Correction Factors (dB)	Corrected Amplitude (dBμV/m)	Class B (3 m)	
Frequency (MHz)	Amplitude (dBμV)	Ant. H. (m)	Table ()			Limit (dBμV/m)	Margin (dB)
176.71	22.27	1.00	222	-4.02	18.25	43.50	-25.25
207.02	22.41	1.00	128	-3.59	18.82	43.50	-24.68
343.43	27.18	1.00	255	-2.35	24.83	46.00	-21.17
353.13	28.67	1.00	251	-2.20	26.47	46.00	-19.53
372.53	31.28	1.00	228	-1.73	29.55	46.00	-16.45
382.84	30.98	1.00	251	-1.49	29.49	46.00	-16.51

Test mode: IEEE 802.11b CH06 for 30MHz to 1GHz [Vertical] X-axis

Radiated Emission				Correction Factors (dB)	Corrected Amplitude (dBμV/m)	Class B (3 m)	
Frequency (MHz)	Amplitude (dBμV)	Ant. H. (m)	Table ()			Limit (dBμV/m)	Margin (dB)
167.62	29.86	1.00	288	-4.10	25.76	43.50	-17.74
176.71	33.56	1.00	175	-4.02	29.54	43.50	-13.96
235.52	31.20	1.00	168	-3.78	27.42	46.00	-18.58
265.23	32.15	1.00	141	-3.90	28.25	46.00	-17.75
342.82	30.29	1.00	156	-2.36	27.93	46.00	-18.07
371.93	28.90	1.00	146	-1.75	27.15	46.00	-18.85

Test mode: IEEE 802.11b CH06 for 1GHz to 26.5GHz [Horizontal] Z-axis

Frequency	Ant. H.	Table	Amplitude		Correction Factor	Corrected Amplitude		Limit		Margin
			Peak / Ave.			Peak / Ave.		Peak / Ave.		
MHz	m	degree	dBμV		dB/m	dBμV/m		dBμV/m		dB
2795.83	1.00	150	33.50	---	10.05	43.55		73.96	53.96	-10.41
7312.08	1.00	235	38.27	---	10.30	48.57	---	73.96	53.96	-5.39
12187.92	1.00	356	39.27	---	9.74	49.01	---	73.96	53.96	-4.95
19494.58	1.00	254	46.33	---	1.69	48.02	---	73.96	53.96	-5.94
21934.79	1.00	141	46.71	---	3.09	49.80	---	73.96	53.96	-4.16
24371.46	1.00	343	47.04	---	3.26	50.30	---	73.96	53.96	-3.66

Test mode: IEEE 802.11b CH06 for 1GHz to 26.5GHz [Vertical] X-axis

Frequency	Ant. H.	Table	Amplitude		Correction Factor	Corrected Amplitude		Limit		Margin
			Peak / Ave.			Peak / Ave.		Peak / Ave.		
MHz	m	degree	dBμV		dB/m	dBμV/m		dBμV/m		dB
2247.92	1.00	175	35.67	---	8.78	44.45		73.96	53.96	-9.51
4871.46	1.00	107	45.44	---	3.95	49.39	---	73.96	53.96	-4.57
7312.29	1.00	1	39.11	---	10.30	49.41	---	73.96	53.96	-4.55
12187.92	1.00	275	40.60	---	9.74	50.34	---	73.96	53.96	-3.62
21934.79	1.00	30	46.33	---	3.09	49.42	---	73.96	53.96	-4.54
24371.46	1.00	316	45.64	---	3.26	48.90	---	73.96	53.96	-5.06

Test mode: IEEE 802.11b CH11 for 30MHz to 1GHz [Horizontal] Z-axis

Radiated Emission				Correction Factors	Corrected Amplitude	Class B (3 m)	
Frequency (MHz)	Amplitude (dBμV)	Ant. H. (m)	Table ()			Limit (dBμV/m)	Margin (dB)
32.42	20.18	1.00	313	7.13	27.31	40.00	-12.69
108.21	23.60	1.00	0	-1.62	21.98	43.50	-21.52
189.44	23.05	1.00	81	-3.75	19.30	43.50	-24.20
199.75	22.06	1.00	195	-3.31	18.75	43.50	-24.75
316.15	23.09	1.00	254	-2.70	20.39	46.00	-25.61
593.21	21.11	1.00	242	6.27	27.38	46.00	-18.62

Test mode: IEEE 802.11b CH11 for 30MHz to 1GHz [Vertical] Y-axis

Radiated Emission				Correction Factors	Corrected Amplitude	Class B (3 m)	
Frequency (MHz)	Amplitude (dBμV)	Ant. H. (m)	Table ()			Limit (dBμV/m)	Margin (dB)
108.21	24.09	1.00	260	-1.62	22.47	43.50	-21.03
125.79	25.83	1.00	93	-2.76	23.07	43.50	-20.43
179.74	26.27	1.00	256	-3.98	22.29	43.50	-21.21
200.96	24.18	1.00	138	-3.34	20.84	43.50	-22.66
320.39	24.25	1.00	357	-2.64	21.61	46.00	-24.39
462.86	21.16	1.00	360	1.33	22.49	46.00	-23.51

Test mode: IEEE 802.11b CH11 for 1GHz to 26.5GHz [Horizontal] Z-axis

<i>Frequency</i>	<i>Ant. H.</i>	<i>Table</i>	<i>Amplitude</i>		<i>Correction</i>	<i>Corrected</i>		<i>Limit</i>		<i>Margin</i>
			<i>Peak / Ave.</i>			<i>Peak / Ave.</i>		<i>Peak / Ave.</i>		
<i>MHz</i>	<i>m</i>	<i>degree</i>	<i>dBμV</i>		<i>dB/m</i>	<i>dBμV/m</i>		<i>dBμV/m</i>		<i>dB</i>
2677.08	1.00	193	34.50	---	9.82	44.32		73.96	53.96	-9.64
7384.79	1.00	119	39.28	---	10.42	49.70	---	73.96	53.96	-4.26
12308.75	1.00	323	39.11	---	9.56	48.67	---	73.96	53.96	-5.29
19696.46	1.00	53	46.42	---	1.81	48.23	---	73.96	53.96	-5.73
22157.92	1.00	222	45.35	---	3.25	48.60	---	73.96	53.96	-5.36
24619.37	1.00	62	46.85	---	3.01	49.86	---	73.96	53.96	-4.10

Test mode: IEEE 802.11b CH11 for 1GHz to 26.5GHz [Vertical] Y-axis

<i>Frequency</i>	<i>Ant. H.</i>	<i>Table</i>	<i>Amplitude</i>		<i>Correction</i>	<i>Corrected</i>		<i>Limit</i>		<i>Margin</i>
			<i>Peak / Ave.</i>			<i>Peak / Ave.</i>		<i>Peak / Ave.</i>		
<i>MHz</i>	<i>m</i>	<i>degree</i>	<i>dBμV</i>		<i>dB/m</i>	<i>dBμV/m</i>		<i>dBμV/m</i>		<i>dB</i>
2152.08	1.00	305	36.66	---	8.52	45.18		73.96	53.96	-8.78
7384.79	1.00	141	38.94	---	10.42	49.36	---	73.96	53.96	-4.60
9849.79	1.00	26	36.11	---	11.93	48.04	---	73.96	53.96	-5.92
19696.46	1.00	60	46.79	---	1.81	48.60	---	73.96	53.96	-5.36
22157.92	1.00	230	45.39	---	3.25	48.64	---	73.96	53.96	-5.32
24619.37	1.00	62	46.48	---	3.01	49.49	---	73.96	53.96	-4.47

Test mode: IEEE 802.11g CH01 for 30MHz to 1GHz [Horizontal] Z-axis

Radiated Emission				Correction Factors	Corrected Amplitude	Class B (3 m)	
Frequency (MHz)	Amplitude (dBμV)	Ant. H. (m)	Table ()			Limit (dBμV/m)	Margin (dB)
157.31	24.54	1.00	337	-4.14	20.40	43.50	-23.10
199.75	22.47	1.00	228	-3.31	19.16	43.50	-24.34
256.74	22.87	1.00	258	-3.64	19.23	46.00	-26.77
345.25	28.04	1.00	92	-2.33	25.71	46.00	-20.29
385.26	32.78	1.00	92	-1.43	31.35	46.00	-14.65
433.76	24.25	1.00	92	0.45	24.70	46.00	-21.30

Test mode: IEEE 802.11g CH01 for 30MHz to 1GHz [Vertical] X-axis

Radiated Emission				Correction Factors	Corrected Amplitude	Class B (3 m)	
Frequency (MHz)	Amplitude (dBμV)	Ant. H. (m)	Table ()			Limit (dBμV/m)	Margin (dB)
167.62	29.04	1.00	294	-4.10	24.94	43.50	-18.56
176.71	32.63	1.00	315	-4.02	28.61	43.50	-14.89
255.52	34.50	1.00	218	-3.55	30.95	46.00	-15.05
371.93	32.42	1.00	182	-1.75	30.67	46.00	-15.33
382.23	32.46	1.00	182	-1.50	30.96	46.00	-15.04
433.76	27.17	1.00	89	0.45	27.62	46.00	-18.38

Test mode: IEEE 802.11g CH01 for 1GHz to 26.5GHz [Horizontal] Z-axis

<i>Frequency</i>	<i>Ant. H.</i>	<i>Table</i>	<i>Amplitude</i>		<i>Correction</i>	<i>Corrected</i>		<i>Limit</i>		<i>Margin</i>
			<i>Peak / Ave.</i>			<i>Peak / Ave.</i>		<i>Peak / Ave.</i>		
<i>MHz</i>	<i>m</i>	<i>degree</i>	<i>dBμV</i>		<i>dB/m</i>	<i>dBμV/m</i>		<i>dBμV/m</i>		<i>dB</i>
2939.58	1.00	15	35.00	---	10.32	45.32	---	73.96	53.96	-8.64
9650.42	1.00	312	34.94	---	11.47	46.41	---	73.96	53.96	-7.55
12061.04	1.00	151	37.27	---	9.81	47.08	---	73.96	53.96	-6.88
19296.25	1.00	34	47.16	---	1.60	48.76	---	73.96	53.96	-5.20
21708.12	1.00	41	47.43	---	2.87	50.30	---	73.96	53.96	-3.66
24120.00	1.00	66	43.98	---	3.40	47.38	---	73.96	53.96	-6.58

Test mode: IEEE 802.11g CH01 for 1GHz to 26.5GHz [Vertical] X-axis

<i>Frequency</i>	<i>Ant. H.</i>	<i>Table</i>	<i>Amplitude</i>		<i>Correction</i>	<i>Corrected</i>		<i>Limit</i>		<i>Margin</i>
			<i>Peak / Ave.</i>			<i>Peak / Ave.</i>		<i>Peak / Ave.</i>		
<i>MHz</i>	<i>m</i>	<i>degree</i>	<i>dBμV</i>		<i>dB/m</i>	<i>dBμV/m</i>		<i>dBμV/m</i>		<i>dB</i>
2197.92	1.00	296	36.17	---	8.64	44.81		73.96	53.96	-9.15
9650.42	1.00	360	35.77	---	11.47	47.24	---	73.96	53.96	-6.72
12061.04	1.00	331	38.27	---	9.81	48.08	---	73.96	53.96	-5.88
19296.25	1.00	47	47.61	---	1.60	49.21	---	73.96	53.96	-4.75
21708.12	1.00	26	47.49	---	2.87	50.36	---	73.96	53.96	-3.60
24120.00	1.00	66	44.37	---	3.40	47.77	---	73.96	53.96	-6.19

Test mode: IEEE 802.11g CH06 for 30MHz to 1GHz [Horizontal] Z-axis

Radiated Emission				Correction Factors	Corrected Amplitude	Class B (3 m)	
Frequency (MHz)	Amplitude (dBμV)	Ant. H. (m)	Table ()			Limit (dBμV/m)	Margin (dB)
130.64	23.38	1.00	211	-3.05	20.33	43.50	-23.17
197.32	22.35	1.00	53	-3.42	18.93	43.50	-24.57
345.25	27.50	1.00	284	-2.33	25.17	46.00	-20.83
385.26	32.38	1.00	66	-1.43	30.95	46.00	-15.05
424.06	27.38	1.00	96	0.01	27.39	46.00	-18.61
431.34	27.11	1.00	86	0.34	27.45	46.00	-18.55

Test mode: IEEE 802.11g CH06 for 30MHz to 1GHz [Vertical] X-axis

Radiated Emission				Correction Factors	Corrected Amplitude	Class B (3 m)	
Frequency (MHz)	Amplitude (dBμV)	Ant. H. (m)	Table ()			Limit (dBμV/m)	Margin (dB)
168.22	33.90	1.00	162	-4.10	29.80	43.50	-13.70
179.14	36.45	1.00	261	-3.99	32.46	43.50	-11.04
257.95	34.64	1.00	221	-3.73	30.91	46.00	-15.09
345.25	30.38	1.00	254	-2.33	28.05	46.00	-17.95
385.26	33.43	1.00	56	-1.43	32.00	46.00	-14.00
507.72	27.61	1.00	357	2.25	29.86	46.00	-16.14

Test mode: IEEE 802.11g CH06 for 1GHz to 26.5GHz [Horizontal] Z-axis

Frequency	Ant. H.	Table	Amplitude		Correction Factor	Corrected Amplitude		Limit		Margin
			Peak / Ave.			Peak / Ave.		Peak / Ave.		
MHz	m	degree	dBμV		dB/m	dBμV/m		dBμV/m		dB
2752.08	1.00	122	34.67	---	9.96	44.63	---	73.96	53.96	-9.33
9747.08	1.00	333	36.60	---	11.89	48.49	---	73.96	53.96	-5.47
12187.92	1.00	262	38.60	---	9.74	48.34	---	73.96	53.96	-5.62
19494.58	1.00	251	46.45	---	1.69	48.14	---	73.96	53.96	-5.82
21934.79	1.00	139	46.87	---	3.09	49.96	---	73.96	53.96	-4.00
24371.46	1.00	347	46.59	---	3.26	49.85	---	73.96	53.96	-4.11

Test mode: IEEE 802.11g CH06 for 1GHz to 26.5GHz [Vertical] X-axis

Frequency	Ant. H.	Table	Amplitude		Correction Factor	Corrected Amplitude		Limit		Margin
			Peak / Ave.			Peak / Ave.		Peak / Ave.		
MHz	m	degree	dBμV		dB/m	dBμV/m		dBμV/m		dB
2758.33	1.00	27	34.83	---	9.98	44.81	---	73.96	53.96	-9.15
9747.08	1.00	138	35.44	---	11.89	47.33	---	73.96	53.96	-6.63
12187.92	1.00	211	39.44	---	9.74	49.18	---	73.96	53.96	-4.78
19494.58	1.00	99	46.56	---	1.69	48.25	---	73.96	53.96	-5.71
21934.79	1.00	40	46.30	---	3.09	49.39	---	73.96	53.96	-4.57
24371.46	1.00	313	45.75	---	3.26	49.01	---	73.96	53.96	-4.95

Test mode: IEEE 802.11g CH11 for 30MHz to 1GHz [Horizontal] Y-axis

Radiated Emission				Correction Factors	Corrected Amplitude	Class B (3 m)	
Frequency (MHz)	Amplitude (dBμV)	Ant. H. (m)	Table ()			Limit (dBμV/m)	Margin (dB)
177.92	42.73	1.00	83	-4.00	38.73	43.50	-4.77
227.64	39.51	1.00	7	-3.80	35.71	46.00	-10.29
257.95	43.96	1.00	132	-3.73	40.23	46.00	-5.77
285.84	38.70	1.00	132	-3.48	35.22	46.00	-10.78
384.05	44.12	1.00	106	-1.46	42.66	46.00	-3.34
433.76	35.63	1.00	0	0.45	36.08	46.00	-9.92

Test mode: IEEE 802.11g CH11 for 30MHz to 1GHz [Vertical] X-axis

Radiated Emission				Correction Factors	Corrected Amplitude	Class B (3 m)	
Frequency (MHz)	Amplitude (dBμV)	Ant. H. (m)	Table ()			Limit (dBμV/m)	Margin (dB)
176.71	31.43	1.00	261	-4.02	27.41	43.50	-16.09
227.64	30.01	1.00	152	-3.80	26.21	46.00	-19.79
257.95	34.29	1.00	152	-3.73	30.56	46.00	-15.44
322.21	28.87	1.00	185	-2.62	26.25	46.00	-19.75
382.84	37.02	1.00	175	-1.49	35.53	46.00	-10.47
443.46	25.61	1.00	56	0.89	26.50	46.00	-19.50

Test mode: IEEE 802.11g CH11 for 1GHz to 26.5GHz [Horizontal] Y-axis

Frequency	Ant. H.	Table	Amplitude		Correction Factor	Corrected Amplitude		Limit		Margin
			Peak / Ave.			Peak / Ave.		Peak / Ave.		
MHz	m	degree	dBμV		dB/m	dBμV/m		dBμV/m		dB
2704.17	1.00	75	35.00	---	9.87	44.87	---	73.96	53.96	-9.09
9849.79	1.00	275	36.05	---	11.93	47.98	---	73.96	53.96	-5.98
12308.75	1.00	323	38.09	---	9.56	47.65	---	73.96	53.96	-6.31
19696.46	1.00	76	46.44	---	1.81	48.25	---	73.96	53.96	-5.71
22157.92	1.00	223	45.70	---	3.25	48.95	---	73.96	53.96	-5.01
24619.37	1.00	72	46.95	---	3.01	49.96	---	73.96	53.96	-4.00

Test mode: IEEE 802.11g CH11 for 1GHz to 26.5GHz [Vertical] X-axis

Frequency	Ant. H.	Table	Amplitude		Correction Factor	Corrected Amplitude		Limit		Margin
			Peak / Ave.			Peak / Ave.		Peak / Ave.		
MHz	m	degree	dBμV		dB/m	dBμV/m		dBμV/m		dB
2666.67	1.00	152	35.00	---	9.80	44.80	---	73.96	53.96	-9.16
9849.79	1.00	70	35.44	---	11.93	47.37	---	73.96	53.96	-6.59
12308.75	1.00	173	38.27	---	9.56	47.83	---	73.96	53.96	-6.13
19696.46	1.00	307	47.41	---	1.81	49.22	---	73.96	53.96	-4.74
22157.92	1.00	314	46.65	---	3.25	49.90	---	73.96	53.96	-4.06
24619.37	1.00	140	47.54	---	3.01	50.55	---	73.96	53.96	-3.41

7.4 Test Result of the Bandedge

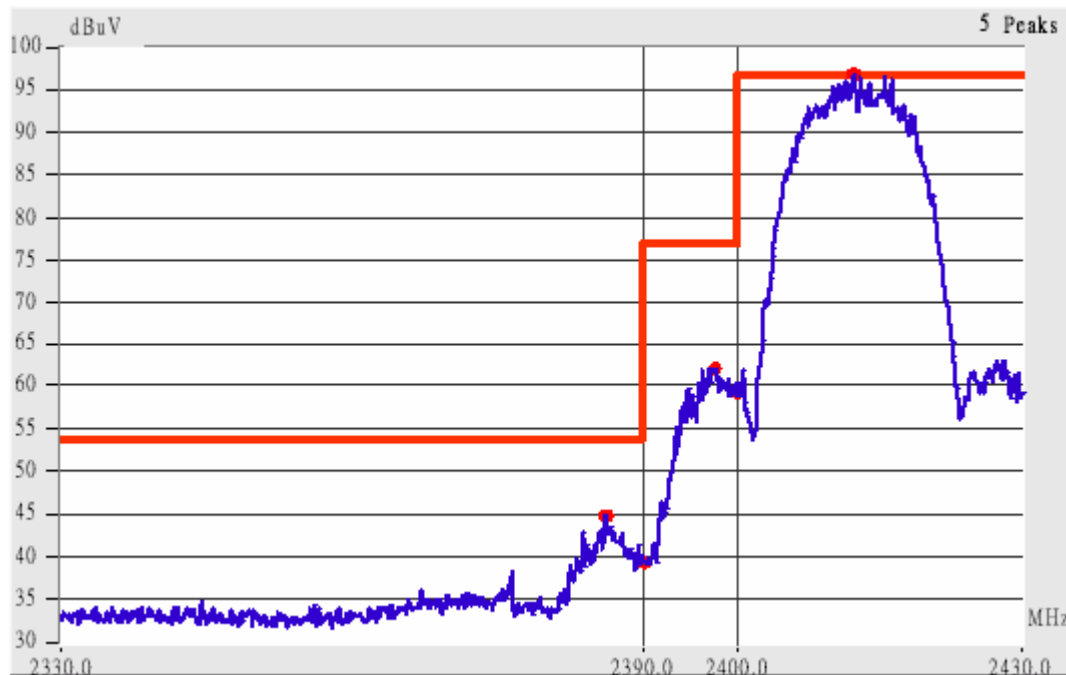
If any 100 kHz bandwidth outside these frequency bands, the radio frequency power that is produced by the modulation products of the spreading sequence, the information sequence and the carrier frequency shall be either *at least 20 dB below that in any 100 kHz bandwidth within the band that contains the highest level of the desired power or shall not exceed the general levels specified in §15.209(a)*,

We perform this section by the *radiated manner*, the RBW is set to 100kHz and VBW>RBW. We'd made the observation *up to 10th harmonics and the criterion is all the harmonic/spurious emissions must be 20dB below the highest emission level measured*. If the emissions fall in the restricted bands stated in the Part15.205(a) must also *comply with the radiated emission limits specified in Part15.209(a)*. (*Peak mode: RBW=VBW=1MHz, Average mode: RBW=1MHz; VBW=10Hz*)

The following pages show our observations referring to the channel 1 and 11 respectively.

Test Condition & Setup: same as < 8.1 >

Channel 1 of IEEE 802.11b



This is the hard copy of our bandedge measurement generated by our bandedge testing program. The plot shown above is the bandedge of channel 1.

1. The lobe left by the fundamental side is already 20dB below the highest emission level.
2. The emissions recorded in the restricted band is do comply with the Part 15.209(a) – as below.

Radiated Emission					Corrected Amplitude		Class B (3m)		
Frequency (MHz)	Ant. P.	Ant. H. (m)	Table ()	Factors (dB)	(dBuV/m)		Limit (dBuV/m)		Margin (dB)
					Peak	Average	Peak	Ave.	
2386.22	Hor	1.00	94	9.17	52.84	43.00	73.96	53.96	-10.96
2390.02	Hor	1.00	89	9.18	50.02	---	73.96	53.96	-3.94
2385.68	Ver	1.00	143	9.17	50.67	---	73.96	53.96	-3.29
2390.02	Ver	1.00	146	9.18	47.85	---	73.96	53.96	-6.11

Channel 11 of IEEE 802.11b

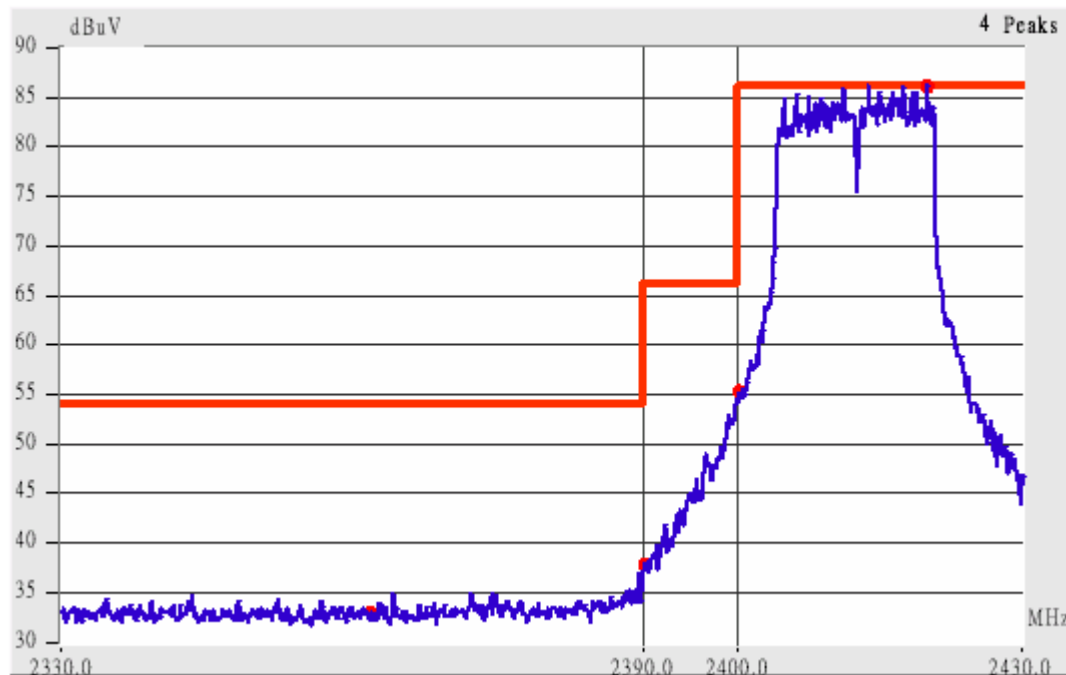


This is the hard copy of our bandedge measurement generated by our bandedge testing program. The plot shown above is the bandedge of channel 11.

3. The lobe right by the fundamental side is already 20dB below the highest emission level.
4. The emissions recorded in the restricted band is do comply with the Part 15.209(a) – as below

Radiated Emission					Corrected Amplitude		Class B (3m)		
Frequency (MHz)	Ant. P.	Ant. H. (m)	Table ()	Factors (dB)	(dBμV/m)		Limit (dBμV/m)		Margin (dB)
					Peak	Average	Peak	Ave.	
2483.15	Hor	1.00	341	9.44	52.11	42.94	73.96	53.96	-11.02
2487.77	Hor	1.00	35	9.46	55.79	44.96	73.96	53.96	-9.00
2500.01	Hor	1.00	343	9.49	47.66	---	73.96	53.96	-6.30
2508.47	Hor	1.00	343	9.51	48.84	---	73.96	53.96	-5.12
2483.50	Ver	1.00	281	9.44	49.44	---	73.96	53.96	-4.52
2487.78	Ver	1.00	271	9.46	53.29	42.29	73.96	53.96	-11.67
2500.01	Ver	1.00	278	9.49	46.66	---	73.96	53.96	-7.30
2509.52	Ver	1.00	276	9.51	47.17	---	73.96	53.96	-6.79

Channel 1 of IEEE 802.11g

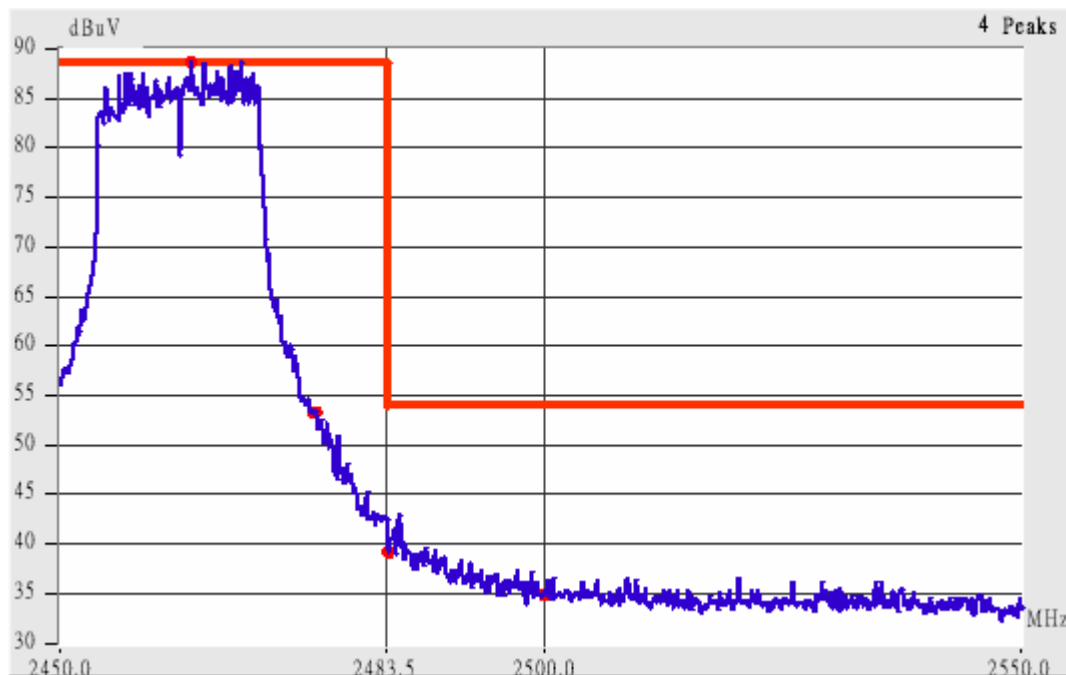


This is the hard copy of our bandedge measurement generated by our bandedge testing program. The plot shown above is the bandedge of channel 1.

5. The lobe left by the fundamental side is already 20dB below the highest emission level.
6. The emissions recorded in the restricted band is do comply with the Part 15.209(a) – as below.

Radiated Emission					Corrected Amplitude		Class B (3m)		
Frequency (MHz)	Ant. P.	Ant. H. (m)	Table ()	Factors (dB)	(dBμV/m)		Limit (dBμV/m)		Margin (dB)
					Peak	Average	Peak	Ave.	
2378.32	Hor	1.00	198	9.15	45.48	---	73.96	53.96	-8.48
2390.02	Hor	1.00	173	9.18	49.85	---	73.96	53.96	-4.11
2381.68	Ver	1.00	264	9.16	44.16	---	73.96	53.96	-9.80
2390.02	Ver	1.00	167	9.18	46.85	---	73.96	53.96	-7.11

Channel 11 of IEEE 802.11g



This is the hard copy of our bandedge measurement generated by our bandedge testing program. The plot shown above is the bandedge of channel 11.

7. The lobe right by the fundamental side is already 20dB below the highest emission level.
8. The emissions recorded in the restricted band is do comply with the Part 15.209(a) – as below

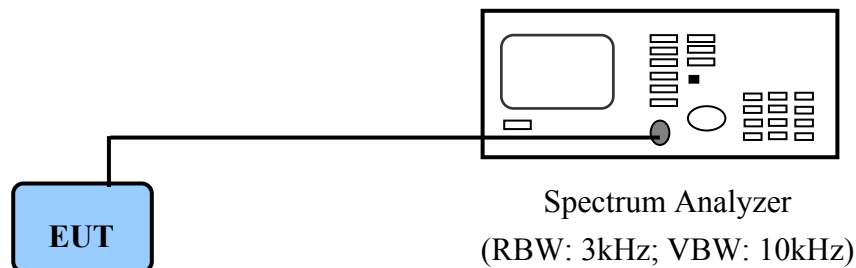
Radiated Emission					Corrected Amplitude		Class B (3m)		
Frequency (MHz)	Ant. P.	Ant. H. (m)	Table ()	Factors (dB)	(dBμV/m)		Limit (dBμV/m)		Margin (dB)
					Peak	Average	Peak	Ave.	
2483.19	Hor	1.00	292	9.44	53.11	40.77	73.96	53.96	-13.19
2491.61	Hor	1.00	290	9.47	50.13	---	73.96	53.96	-3.83
2500.01	Hor	1.00	290	9.49	46.99	---	73.96	53.96	-6.97
2511.21	Hor	1.00	289	9.51	46.34	---	73.96	53.96	-7.62
2483.50	Ver	1.00	209	9.44	50.28	---	73.96	53.96	-3.68
2491.84	Ver	1.00	273	9.47	47.80	---	73.96	53.96	-6.16
2500.01	Ver	1.00	204	9.49	44.99	---	73.96	53.96	-8.97
2513.72	Ver	1.00	274	9.52	46.68	---	73.96	53.96	-7.28

VIII. Section 15.247(d): Power Spectral Density

8.1 Test Condition & Setup

The tests below are running with the EUT transmitter set at high power in TDD mode. The EUT is needed to force selection of output power level and channel number. While testing, the EUT was set to transmit continuously and to be tested by the contact manner with the spectrum analyzer.

8.2 Test Instruments Configuration



PC to control the EUT at maximal power output and channel number and set antenna kit

8.3 List of Test Instruments

Instrument Name	Model No.	Brand	Serial No.	Next time
Spectrum Analyzer	MS2665C	ANRITSU	6200175476	12/11/07

8.4 Test Result of Power spectral density

The following table shows a summary of the test results of the Power Spectral Density.

IEEE 802.11b

<i>Channel</i>	<i>Ppr (dBm)</i>	<i>Cable Loss (dB)</i>	<i>Ppq (dBm)</i>	<i>Limit (dB)</i>	<i>Margin (dB)</i>
CH 01	-19.23	1.50	-17.73	8.00	-25.73
CH 06	-19.42	1.50	-17.92	8.00	-25.92
CH 11	-19.09	1.50	-17.59	8.00	-25.59

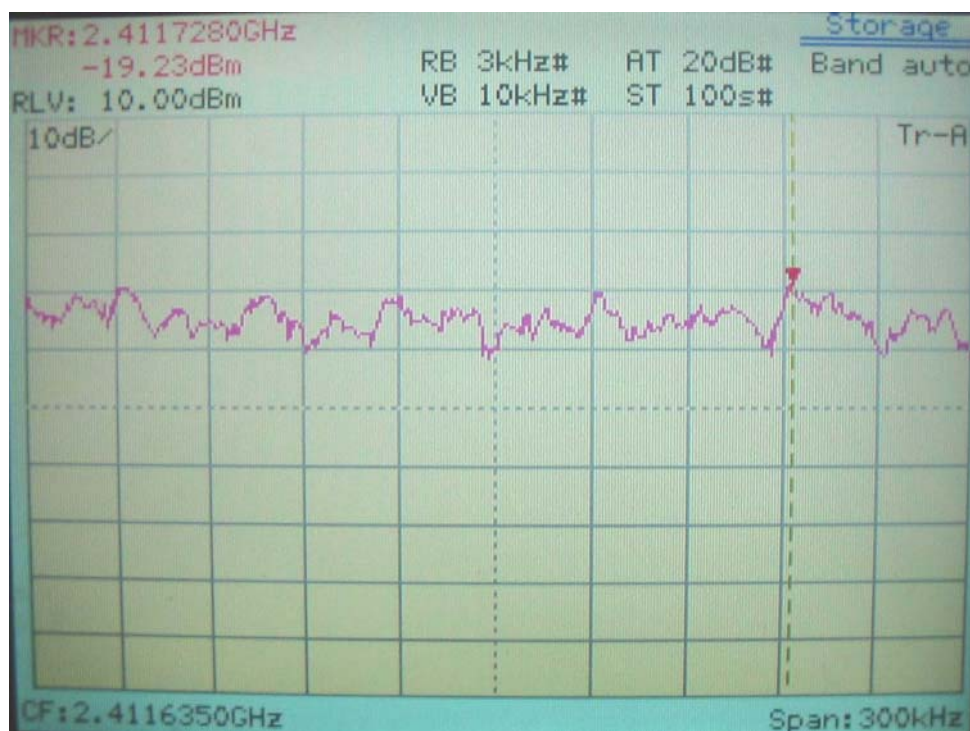
IEEE 802.11g

<i>Channel</i>	<i>Ppr (dBm)</i>	<i>Cable Loss (dB)</i>	<i>Ppq (dBm)</i>	<i>Limit (dB)</i>	<i>Margin (dB)</i>
CH 01	-27.34	1.50	-25.84	8.00	-33.84
CH 06	-27.59	1.50	-26.09	8.00	-34.09
CH 11	-26.49	1.50	-24.99	8.00	-32.99

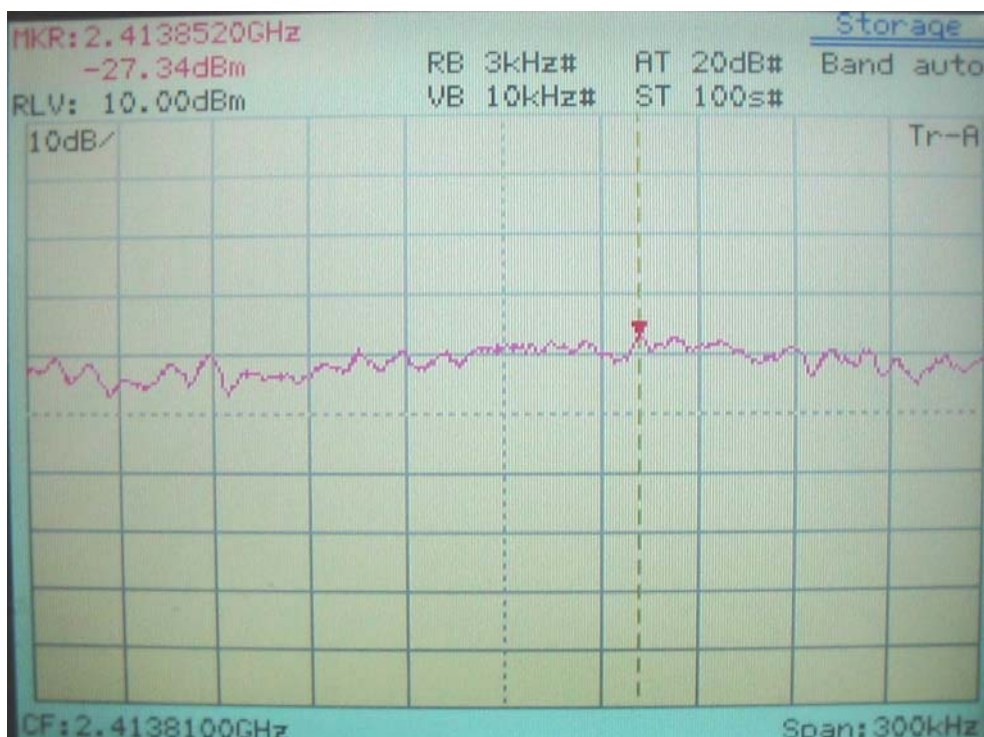
Note:

1. The following pages show the results of spectrum reading.
2. Ppr: spectrum read power density (using peak search mode),
Ppq: actual peak power density in the spread spectrum band.
3. $Ppq = Ppr + |Cable Loss|$

Power Spectral Density for Channel 01

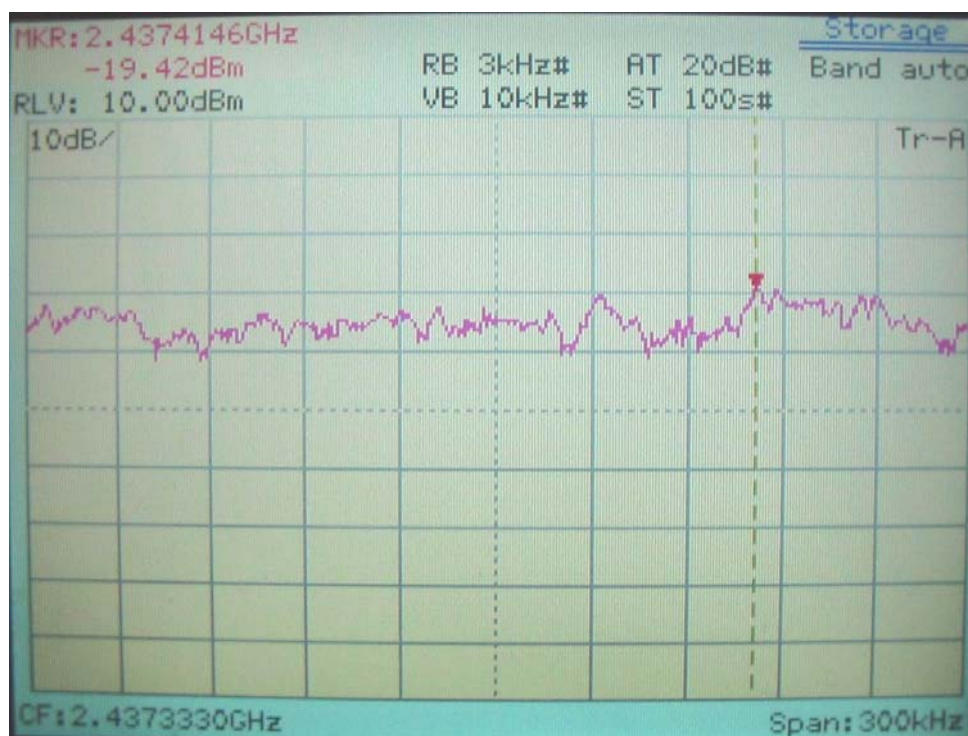


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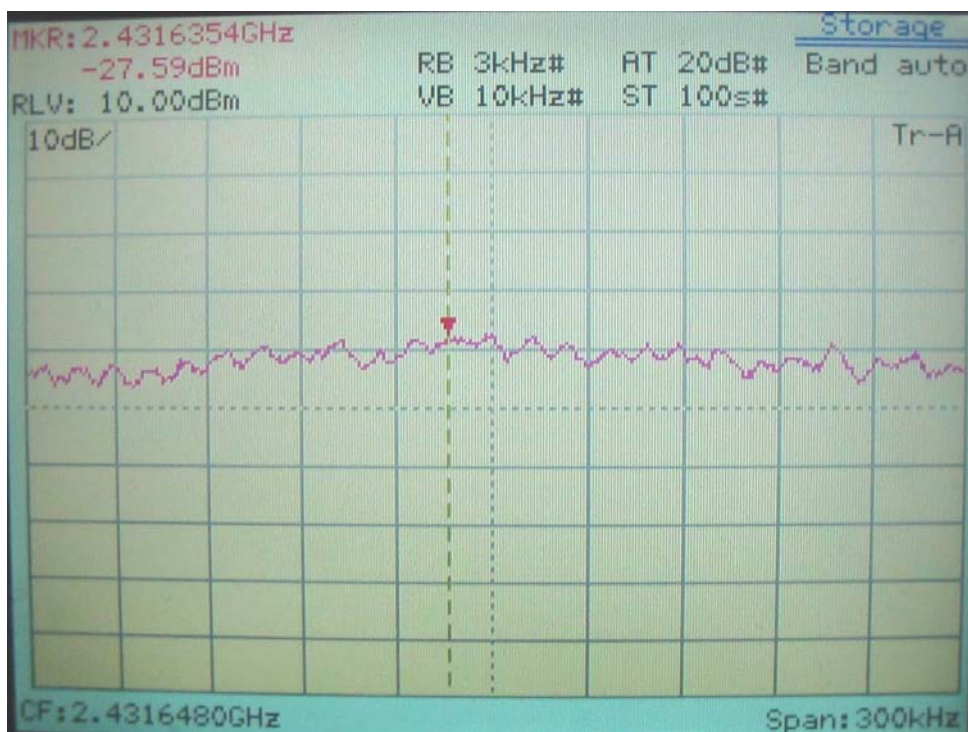


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Power Spectral Density for Channel 06



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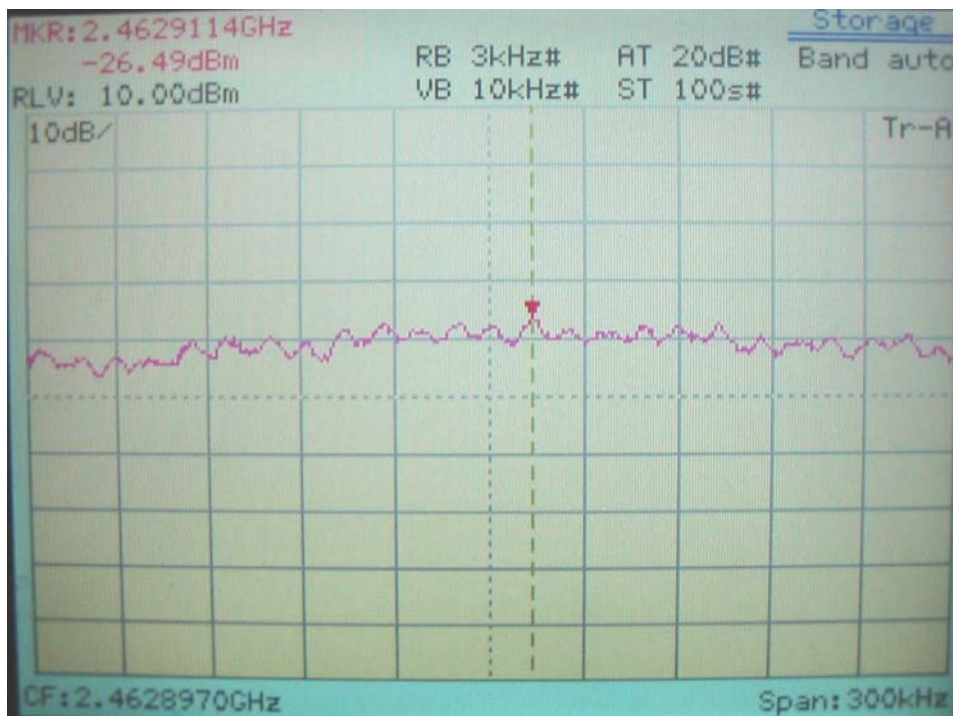


IEEE 802.11g

Power Spectral Density for Channel 11



IEEE 802.11b



IEEE 802.11g