



FCC PART 15 SUBPART C
IC RSS-210, ISSUE 8, DECEMBER 2010

TEST AND MEASUREMENT REPORT

For

GainSpan Corporation

3590 N. First Street, Suite 300,

San Jose, CA 95134, USA

FCC ID: YOPGS2100MIP
IC: 9154A-GS2100MIP

Report Type: CIIPC Report	Product Type: 802.11 b/g/n (HT20) Module
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<div>Report Number: <u>R1410298-247</u></div>	
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* This report may contain data that are not covered by the A2LA accreditation and are marked with an asterisk "*" (BAC-1)

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DOCUMENT REVISION HISTORY

Revision Number	Report Number	Description of Revision	Date of Revision
0	R1410298-247	CIIPC Report	2014-12-03

1 General Description

1.1 Product Description for Equipment Under Test (EUT)

This test and measurement report was prepared on behalf of *GainSpan Corporation.*, and their product model: GS2100MIP, FCC ID: YOPGS2100MIP, IC: 9154A-GS2100MIP or the “EUT” as referred on this report. The EUT is a Low Power Wi-Fi Module with 802.11 b/g/n (HT-20).

1.2 Mechanical Description of EUT

The “EUT” measures approximately “2.5”cm (L) x “1.8”cm (W) x “0.3”cm (H), and weighs approximately 2.3g

The test data gathered are from typical production sample, serial number: 2992088001, provided by the manufacturer.

1.3 Objective

This report is prepared on behalf of *GainSpan Corporation* in accordance with Part 2, Subpart J, and Part 15, Subparts B and C of the Federal Communication Commission’s rules and IC RSS-210 Issue 8, Dec 2010.

The objective is to determine compliance with FCC Part 15.247 and IC RSS-210 rules for Output Power, Antenna Requirements, 6 dB Bandwidth, and power spectral density, 100 kHz Bandwidth of Band Edges Measurement, Spurious Emissions, Conducted and Radiated Spurious Emissions.

1.4 Related Submittal(s)/Grant(s)

N/A

1.5 Test Methodology

All measurements contained in this report were conducted in accordance with ANSI C63.4-2009, American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the range of 9 kHz to 40 GHz and FCC KDB 558074 D01 DTS Meas Guidance v03r01: Guidance for Performing Compliance Measurements on Digital Transmission Systems (DTS) Operating Under §15.247

1.6 Measurement Uncertainty

All measurements involve certain levels of uncertainties, especially in the field of EMC. The factors contributing to uncertainties are spectrum analyzer, cable loss, antenna factor calibration, antenna directivity, antenna factor variation with height, antenna phase center variation, antenna factor frequency interpolation, measurement distance variation, site imperfections, mismatch (average), and system repeatability.

The following calculation follows the procedures as set forth in clause 7.2.3, ETSI TR 100 028-1 V1.4.1 (2001-12), the expression of Uncertainty in Radiated RF Testing is in accordance to ISO/IEC 17025 and TR 100 028-1 V1.4.1 (2001-12).

The expanded Measurement Uncertainty value having a confidence factor of 95%, is within a range of 5.48 dB. This means that the value of conducted RF carrier power test will be within +/- 2.74 dB of the measuring radiated emissions power versus the expected value.

The expected value is defined as the power at the antenna of the Transmitter under Test.

1.7 Test Facility

Bay area compliance Laboratories Corp. (BACL) is:

1- An independent Commercial Test Laboratory accredited to **ISO 17025:2005** by **A2LA**, in the fields of: Electromagnetic Compatibility & Telecommunications covering Emissions, Immunity, Radio, RF Exposure, Safety and Telecom. This includes NEBS (Network Equipment Building System), Wireless RF, Telecommunications Terminal Equipment (TTE); Network Equipment; Information Technology Equipment (ITE); Medical Electrical Equipment; Industrial, Commercial, and Medical Test Equipment; Professional Audio and Video Equipment; Electronic (Digital) Products; Industrial and Scientific Instruments; Cabled Distribution Systems and Energy Efficiency Lighting.

2- An ENERGY STAR Recognized Laboratory, for the LM80 Testing, a wide variety of Luminaires and Computers.

3- A NIST Designated Phase-I and Phase-II CAB including: ACMA (Australian Communication and Media Authority), BSMI (Bureau of Standards, Metrology and Inspection of Taiwan), IDA (Infocomm Development Authority of Singapore), IC(Industry Canada), Korea (Ministry of Communications Radio Research Laboratory), NCC (Formerly DGT; Directorate General of Telecommunication of Chinese Taipei) OFTA (Office of the Telecommunications Authority of Hong Kong), Vietnam, VCCI - Voluntary Control Council for Interference of Japan and a designated EU CAB (Conformity Assessment Body) (Notified Body) for the EMC and R&TTE Directives.

4- A Product Certification Body accredited to **ISO Guide 65:1996** by **A2LA** to certify:

1- Unlicensed, Licensed radio frequency devices and Telephone Terminal Equipment for the FCC. Scope A1, A2, A3, A4, B1, B2, B3, B4 & C.

2. Radio Standards Specifications (RSS) in the Category I Equipment Standards List and All Broadcasting Technical Standards (BETS) in Category I Equipment Standards List for Industry Canada.

3. Radio Communication Equipment for Singapore.

4. Radio Equipment Specifications, GMDSS Marine Radio Equipment Specifications, and Fixed Network Equipment Specifications for Hong Kong.

5. Japan MIC Telecommunication Business Law (A1, A2) and Radio Law (B1, B2 and B3).

6. Audio/Video, Battery Charging Systems, Computers, Displays, Enterprise Servers, Imaging Equipment, Set-Top Boxes, Telephony, Televisions, Ceiling Fans, CFLs (Including GU24s), Decorative Light Strings, Integral LED Lamps, Luminaires, Residential Ventilating Fans.

The test site used by BACL Corp. to collect radiated and conducted emissions measurement data is located at its facility in Sunnyvale, California, USA.

The test site at BACL Corp. has been fully described in reports submitted to the Federal Communication Commission (FCC) and Voluntary Control Council for Interference (VCCI). The details of these reports have been found to be in compliance with the requirements of Section 2.948 of the FCC Rules on February 11 and December 10, 1997, and Article 8 of the VCCI regulations on December 25, 1997. The test site also complies with the test methods and procedures set forth in CISPR 22:2008 §10.4 for measurements below 1 GHz and §10.6 for measurements above 1 GHz as well as ANSI C63.4-2009, ANSI C63.4-2009, TIA/EIA-603 & CISPR 24:2010.

The Federal Communications Commission and Voluntary Control Council for Interference have the reports on file and they are listed under FCC registration number: 90464 and VCCI Registration No.: A-0027. The test site has been approved by the FCC and VCCI for public use and is listed in the FCC Public Access Link (PAL) database.

Additionally, BACL Corp. is an American Association for Laboratory Accreditation (A2LA) accredited laboratory (Lab Code 3297-02). The current scope of accreditations can be found at <http://www.a2la.org/scopepdf/3297-02.pdf?CFID=1132286&CFTOKEN=e42a3240dac3f6ba-6DE17DCB-1851-9E57-477422F667031258&jsessionid=8430d44f1f47cf2996124343c704b367816b>

2 System Test Configuration

2.1 Justification

The EUT was configured for testing according to ANSI C63.4-2009 and FCC KDB 558074 D01 DTS Meas Guidance v03r01 .

The EUT was tested in a testing mode to represent worst-case results during the final qualification test.

The worst-case data rates are determined to be as follows for each mode based upon investigation by measuring the average power, peak power and PPSD across all data rates bandwidths, and modulations.

2.2 EUT Exercise Software

The test utility used was “Tera Term” was provided by GainSpan Corporation., and was verified Chen Ge to comply with the standard requirements being tested against.

2.3 Special Equipment

There were no special accessories were required, included, or intended for use with EUT during these tests.

2.4 Equipment Modifications

No modifications were made to the EUT.

2.5 Local Support Equipment

Manufacturer	Description	Model	Serial Number
Dell	Laptop	D650	-

2.6 EUT Internal Configuration Details

Manufacturer	Description	Model	Serial Number
GainSpan	Motherboard	GS2100M-Daughter Card Rev 0	-
GainSpan	Module	GS2100MIP Rev 3.3	-

2.7 Interface Ports and Cables

Cable Description	Length (m)	To	From
RS-232/USB	<1.0	EUT	Laptop

2.8 External I/O Cabling List and AC Cord

Cable Description	Length (m)	From	To
RF Cable	<1.0	EUT	PSA

2.9 Power Supply List and Details

Manufacturer	Description	Model	Serial Number
PHIHONG	Switching Power Supply	PSA05R-033	-

3 Summary of Test Results

Results reported relate only to the product tested.

FCC & IC Rules	Description of Test	Results
FCC §15.247(i), §2.1091 IC RSS-102	RF Exposure	Compliant*
FCC §15.203 IC RSS-Gen §7.1.2	Antenna Requirement	Compliant*
FCC §15.207(a) IC RSS-Gen §7.2.4	AC Line Conducted Emissions	Compliant*
FCC §15.247(d) IC RSS-210 §A8.5	Spurious Emissions at Antenna Port	Compliant*
FCC §15.209, §15.247(d) IC RSS-210 §A8.5	Radiated Spurious Emissions	Compliant
FCC §15.247(a)(2) IC RSS-210 §A8.2	6 dB Emission Bandwidth	Compliant*
FCC §15.247(b)(3) IC RSS-210 §A8.4	Maximum Peak Output Power	Compliant
FCC §15.247(d) IC RSS-210 §A8.5	100 kHz Bandwidth of Frequency Band Edge	Compliant*
FCC §15.247(e) IC RSS-210 §A8.2(b)	Power Spectral Density	Compliant*
IC RSS-210 §2.3 & RSS-Gen §4.10	Receiver Spurious Emission	Compliant*

Compliant*: Please refer to original reports released by BACL (Report #: R1404032-247).

4 FCC §15.247(b) & IC RSS-210 §A8.4 – Peak Output Power Measurement

4.1 Applicable Standard

According to FCC §15.247(b) and IC RSS-210 §A8.4 (4) for systems using digital modulation in the 902~928 MHz, 2400~2483.5 MHz, and 5725~5850 MHz bands: 1 Watt.

4.2 Measurement Procedure

The measurements are base on FCC KDB 558074 D01 DTS Meas Guidance v03r01: Guidance for Performing Compliance Measurements on Digital Transmission Systems (DTS) Operating Under §15.247 section 9: Fundamental emission output power

4.3 Test Equipment List and Details

Manufacturer	Description	Model No.	Serial No.	Calibration Date	Calibration Interval
Agilent	Spectrum Analyzer	E4446A	US44300386	2014-09-29	1 year

Statement of Traceability: BACL Corp. attests that all calibrations have been performed per the A2LA requirements, traceable to the NIST.

4.4 Test Environmental Conditions

Temperature:	21 °C
Relative Humidity:	32 %
ATM Pressure:	101.84 kPa

The testing was performed by Chen Ge on 2014-11-11 in RF site.

4.5 Test Results

Channel	Frequency (MHz)	Conducted Output Power (dBm)	FCC/IC Limit (dBm)	Margin (dB)	Power Settings
802.11b mode					
Low	2412	18.06	30	-11.94	19
Middle	2437	17.57	30	-12.43	18
High	2462	17.50	30	-12.50	18
802.11g mode					
Low	2412	19.18	30	-10.82	25
Middle	2437	18.90	30	-11.10	24
High	2462	18.29	30	-11.71	23
802.11n-HT20 mode					
Low	2412	19.13	30	-10.87	25
Middle	2437	18.67	30	-11.33	24
High	2462	18.68	30	-11.32	24

Note: The output power levels are consistent with the original certified product.

5 FCC §15.247(d) & IC RSS-210 §A8.5 – Spurious Radiated Emissions

5.1 Applicable Standard

As per FCC §15.35(d): Unless otherwise specified, on any frequency or frequencies above 1000 MHz, the radiated emission limits are based on the use of measurement instrumentation employing an average detector function. Unless otherwise specified, measurements above 1000 MHz shall be performed using a minimum resolution bandwidth of 1 MHz.

As per FCC §15.209(a) and RSS-210: Except as provided elsewhere in this Subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table

Frequency (MHz)	Field Strength (micro volts/meter)	Measurement Distance (meters)
0.009 - 0.490	2400/F(kHz)	300
0.490 - 1.705	24000/F(kHz)	30
1.705 - 30.0	30	30
30 - 88	100**	3
88 - 216	150**	3
216 - 960	200**	3
Above 960	500	3

** Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this Section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections of this Part, e.g., Sections 15.231 and 15.241.

As Per FCC §15.205(a) except as show in paragraph (d) of this section, only spurious emissions are permitted in any of the frequency bands listed below:

MHz	MHz	MHz	GHz
0.090 – 0.110	16.42 – 16.423	960 – 1240	4.5 – 5.15
0.495 – 0.505	16.69475 – 16.69525	1300 – 1427	5.35 – 5.46
2.1735 – 2.1905	25.5 – 25.67	1435 – 1626.5	7.25 – 7.75
4.125 – 4.128	37.5 – 38.25	1645.5 – 1646.5	8.025 – 8.5
4.17725 – 4.17775	73 – 74.6	1660 – 1710	9.0 – 9.2
4.20725 – 4.20775	74.8 – 75.2	1718.8 – 1722.2	9.3 – 9.5
6.215 – 6.218	108 – 121.94	2200 – 2300	10.6 – 12.7
6.26775 – 6.26825	123 – 138	2310 – 2390	13.25 – 13.4
6.31175 – 6.31225	149.9 – 150.05	2483.5 – 2500	14.47 – 14.5
8.291 – 8.294	156.52475 – 156.52525	2690 – 2900	15.35 – 16.2
8.362 – 8.366	156.7 – 156.9	3260 – 3267	17.7 – 21.4
8.37625 – 8.38675	162.0125 – 167.17	3.332 – 3.339	22.01 – 23.12
8.41425 – 8.41475	167.72 – 173.2	3.3458 – 3.358	23.6 – 24.0
12.29 – 12.293	240 – 285	3.600 – 4.400	31.2 – 31.8
12.51975 – 12.52025	322 – 335.4		36.43 – 36.5
12.57675 – 12.57725	399.9 – 410		Above 38.6
13.36 – 13.41	608 – 614		

As per FCC §15.247 (d) In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).

5.2 Test Setup

The radiated emissions tests were performed in the 5-meter Chamber, using the setup in accordance with ANSI C63.4-2009. The specification used was the FCC 15 Subpart C and IC RSS-210 limits.

The spacing between the peripherals was 3 centimeters.

External I/O cables were draped along the edge of the test table and bundle when necessary.

5.3 Test Procedure

For the radiated emissions test, the EUT host, and all support equipment power cords was connected to the AC floor outlet.

Maximizing procedure was performed on the highest emissions to ensure that the EUT complied with all installation combinations.

The EUT is set 3 meter away from the testing antenna, which is varied from 1-4 meter, and the EUT is placed on a turntable, which is 0.8 meter above ground plane, the table shall be rotated for 360 degrees to find out the highest emission. The receiving antenna should be changed the polarization both of horizontal and vertical.

The spectrum analyzer or receiver is set as:

Below 1000 MHz:

$$\text{RBW} = 100 \text{ kHz} / \text{VBW} = 300 \text{ kHz} / \text{Sweep} = \text{Auto}$$

Above 1000 MHz:

- (1) Peak: RBW = 1MHz / VBW = 1MHz / Sweep = Auto
- (2) Average: RBW = 1MHz / VBW = 10Hz / Sweep = Auto

5.4 Corrected Amplitude & Margin Calculation

The Corrected Amplitude (CA) is calculated by adding the Antenna Factor (AF), the Cable Loss (CL), the Attenuator Factor (Atten) and subtracting the Amplifier Gain (Ga) to indicated Amplitude (Ai) reading. The basic equation is as follows:

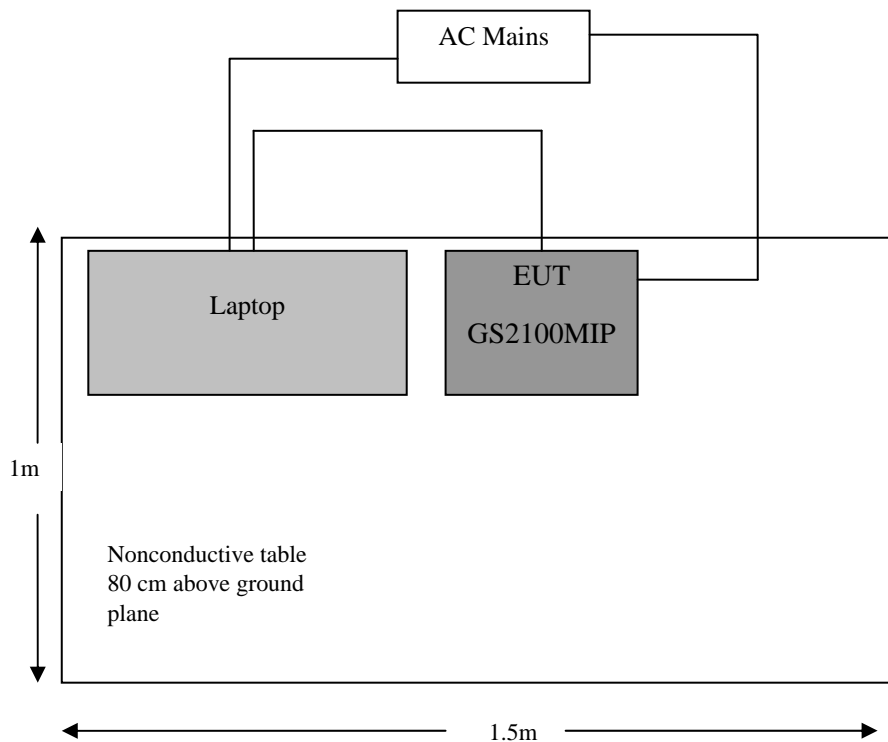
$$CA = Ai + AF + CL + Atten - Ga$$

For example, a corrected amplitude of 40.3 dBuV/m = Indicated Reading (32.5 dBuV) + Antenna Factor (+23.5dB) + Cable Loss (3.7 dB) + Attenuator (10 dB) - Amplifier Gain (29.4 dB)

The “**Margin**” column of the following data tables indicates the degree of compliance within the applicable limit. For example, a margin of -7 dB means the emission is 7 dB below the maximum limit. The equation for margin calculation is as follows:

$$\text{Margin} = \text{Corrected Amplitude} - \text{Limit}$$

5.5 Test Setup Block Diagram



5.6 Test Equipment List and Details

Manufacturer	Description	Model No.	Serial No.	Calibration Date	Calibration Interval
Sunol Science Corp	System Controller	SC99V	122303-1	N/R	N/R
Sunol Science Corp	Combination Antenna	JB3	A020106-3	2014-06-18	1 year
Hewlett Packard	Pre-amplifier	8447D	2944A06639	2014-06-09	1 year
Agilent	Pre-amplifier	8449B	3008A01978	2014-02-04	1 year
WiseWave	Horn Antenna	ARH-4223-02	10555-01	2012-08-09	3 years
Agilent	Spectrum Analyzer	E4446A	US44300386	2014-09-29	1 year
EMCO	Horn Antenna	3315	9511-4627	2014-10-17	1 year
Rohde & Schwarz	EMI Test Receiver	ESCI 1166.5950K03	100337	2014-03-28	1 year

Statement of Traceability: BACL attests that all calibrations have been performed per the A2LA requirements, traceable to NIST.

5.7 Test Environmental Conditions

Temperature:	22 °C
Relative Humidity:	36 %
ATM Pressure:	101.55 kPa

The testing was performed by Chen Ge on 2014-11-12 in 5m chamber 3.

5.8 Summary of Test Results

According to the data hereinafter, the EUT complied with the FCC Title 47, Part 15C and IC RSS-210 standard's radiated emissions limits, and had the worst margin of:

30-1000 MHz:

Mode: Transmitting			
Margin (dB)	Frequency (MHz)	Polarization (Horizontal/Vertical)	Mode
-6.54	263.0868	Vertical	802.11n HT20

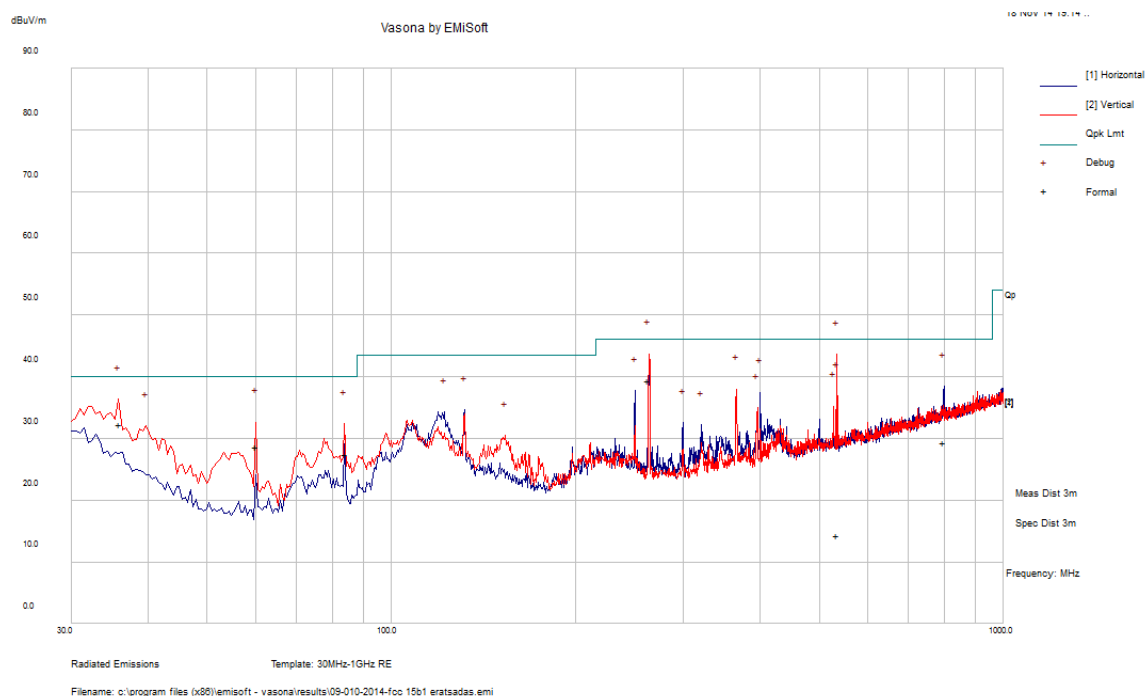
1 – 25 GHz:

Mode: Transmitting			
Margin (dB)	Frequency (MHz)	Polarization (Horizontal/Vertical)	Mode, Channel
-3.574	2483.5	Horizontal	802.11n HT20, High Channel

Please refer to the following table and plots for specific test result details

5.9 Radiated Emissions Test Data and Plots

1) 30 MHz – 1 GHz, Measured at 3 meters (Worst case)



Frequency MHz	Cord. Reading (dBμV/m)	Measurement Type	Antenna Polarity (H/V)	Antenna Height (cm)	Turntable Azimuth (degrees)	Limit (dBμV/m)	Margin (dB)
263.0868	39.46	QP	V	173	163	46	-6.54
534.192	14.36	QP	V	329	130	46	-31.64
36.04625	32.33	QP	V	112	35	40	-7.67
60.0515	28.75	QP	V	100	56	40	-11.25
799.8473	29.44	QP	H	114	213	46	-16.56
84.0535	27.47	QP	V	107	148	40	-12.53

2) 1–25 GHz, Measured at 3 meters

802.11b mode

Frequency (MHz)	S.A. Reading (dBμV)	Turntable Azimuth (degrees)	Test Antenna			Cable Loss (dB)	Pre- Amp. (dB)	Cord. Reading (dBμV/m)	FCC/IC		Comments
			Height (cm)	Polarity (H/V)	Factor (dB/m)				Limit (dBμV/m)	Margin (dB)	
Low Channel 2412 MHz, measured at 3 meters											
2412	57.83	210	100	V	28.197	2.919	0	88.946	-	-	Peak
2412	62.35	159	100	H	28.197	2.919	0	93.466	-	-	Peak
2412	52.85	210	100	V	28.197	2.919	0	83.966	-	-	Ave
2412	61.57	159	100	H	28.197	2.919	0	92.686	-	-	Ave
2390	29.42	185	100	V	28.197	2.919	0	60.536	74	-13.464	Peak
2390	28.89	127	100	H	28.197	2.919	0	60.006	74	-13.994	Peak
2390	14.45	185	100	V	28.197	2.919	0	45.566	54	-8.434	Ave
2390	15.34	127	100	H	28.197	2.919	0	46.456	54	-7.544	Ave
4824	50.69	96	100	V	33.354	4.241	34.29	53.995	74	-20.005	Peak
4824	51.63	165	101	H	33.354	4.241	34.29	54.935	74	-19.065	Peak
4824	42.86	96	100	V	33.354	4.241	34.29	46.165	54	-7.835	Ave
4824	43.46	165	101	H	33.354	4.241	34.29	46.765	54	-7.235	Ave
7236	48.38	0	100	V	37.356	5.495	34.43	56.801	68.946	-12.145	Peak
7236	47.79	0	100	H	37.356	5.495	34.43	56.211	73.466	-17.255	Peak
7236	33.1	0	100	V	37.356	5.495	34.43	41.521	63.966	-22.445	Ave
7236	32.94	0	100	H	37.356	5.495	34.43	41.361	72.686	-31.325	Ave
9648	48.55	0	100	V	38.913	6.241	34.95	58.754	68.946	-10.192	Peak
9648	48.89	0	100	H	38.913	6.241	34.95	59.094	73.466	-14.372	Peak
9648	34.04	0	100	V	38.913	6.241	34.95	44.244	63.966	-19.722	Ave
9648	34.09	0	100	H	38.913	6.241	34.95	44.294	72.686	-28.392	Ave
Middle Channel 2437 MHz, measured at 3 meters											
2437	56.85	210	107	V	28.197	2.919	0	87.966	-	-	Peak
2437	61.91	159	100	H	28.197	2.919	0	93.026	-	-	Peak
2437	52.83	210	107	V	28.197	2.919	0	83.946	-	-	Ave
2437	58.72	159	100	H	28.197	2.919	0	89.836	-	-	Ave
4874	50.54	71	100	V	33.354	4.241	34.29	53.845	74	-20.155	Peak
4874	51.48	128	100	H	33.354	4.241	34.29	54.785	74	-19.215	Peak
4874	41.38	71	100	V	33.354	4.241	34.29	44.685	54	-9.315	Ave
4874	42.7	128	100	H	33.354	4.241	34.29	46.005	54	-7.995	Ave
7311	46.41	0	100	V	37.356	5.495	34.43	54.831	74	-19.169	Peak
7311	46.67	0	100	H	37.356	5.495	34.43	55.091	74	-18.909	Peak
7311	33.07	0	100	V	37.356	5.495	34.43	41.491	54	-12.509	Ave
7311	33.14	0	100	H	37.356	5.495	34.43	41.561	54	-12.439	Ave
9748	48.68	0	100	V	38.913	6.241	34.95	58.884	67.966	-9.082	Peak
9748	48.4	0	100	H	38.913	6.241	34.95	58.604	73.026	-14.422	Peak
9748	34.09	0	100	V	38.913	6.241	34.95	44.294	63.946	-19.652	Ave
9748	33.54	0	100	H	38.913	6.241	34.95	43.744	69.836	-26.092	Ave

Frequency (MHz)	S.A. Reading (dBμV)	Turntable Azimuth (degrees)	Test Antenna			Cable Loss (dB)	Pre- Amp. (dB)	Cord. Reading (dBμV/m)	FCC/IC		Comments
			Height (cm)	Polarity (H/V)	Factor (dB/m)				Limit (dBμV/m)	Margin (dB)	
High Channel 2462 MHz, measured at 3 meters											
2462	56.94	68	100	V	28.197	2.919	0	88.056	-	-	Peak
2462	63.46	159	100	H	28.197	2.919	0	94.576	-	-	Peak
2462	53.13	68	100	V	28.197	2.919	0	84.246	-	-	Ave
2462	60.11	159	100	H	28.197	2.919	0	91.226	-	-	Ave
2483.5	28.96	43	100	V	28.197	2.919	0	60.076	74	-13.924	Peak
2483.5	30.51	127	100	H	28.197	2.919	0	61.626	74	-12.374	Peak
2483.5	14.87	43	100	V	28.197	2.919	0	45.986	54	-8.014	Ave
2483.5	16.39	127	100	H	28.197	2.919	0	47.506	54	-6.494	Ave
4924	50.29	69	100	V	33.354	4.241	34.29	53.595	74	-20.405	Peak
4924	51.35	161	100	H	33.354	4.241	34.29	54.655	74	-19.345	Peak
4924	41.34	69	100	V	33.354	4.241	34.29	44.645	54	-9.355	Ave
4924	42.41	161	100	H	33.354	4.241	34.29	45.715	54	-8.285	Ave
7386	47.09	0	100	V	37.356	5.495	34.43	55.511	74	-18.489	Peak
7386	48.68	0	100	H	37.356	5.495	34.43	57.101	74	-16.899	Peak
7386	33.68	0	100	V	37.356	5.495	34.43	42.101	54	-11.899	Ave
7386	33.76	0	100	H	37.356	5.495	34.43	42.181	54	-11.819	Ave
9848	48.38	0	100	V	38.913	6.241	34.95	58.584	68.056	-9.472	Peak
9848	49.02	0	100	H	38.913	6.241	34.95	59.224	74.576	-15.352	Peak
9848	34.86	0	100	V	38.913	6.241	34.95	45.064	64.246	-19.182	Ave
9848	34.96	0	100	H	38.913	6.241	34.95	45.164	71.226	-26.062	Ave

802.11g mode

Frequency (MHz)	S.A. Reading (dBμV)	Turntable Azimuth (degrees)	Test Antenna			Cable Loss (dB)	Pre- Amp. (dB)	Cord. Reading (dBμV/m)	FCC/IC		Comments
			Height (cm)	Polarity (H/V)	Factor (dB/m)				Limit (dBμV/m)	Margin (dB)	
Low Channel 2412 MHz, measured at 3 meters											
2412	55.13	210	109	V	28.197	2.919	0	86.246	-	-	Peak
2412	61.06	161	100	H	28.197	2.919	0	92.176	-	-	Peak
2412	44.42	210	109	V	28.197	2.919	0	75.536	-	-	Ave
2412	50.7	161	100	H	28.197	2.919	0	81.816	-	-	Ave
2390	28.25	185	109	V	28.197	2.919	0	59.366	74	-14.634	Peak
2390	28.63	129	100	H	28.197	2.919	0	59.746	74	-14.254	Peak
2390	13.79	185	109	V	28.197	2.919	0	44.906	54	-9.094	Ave
2390	14	129	100	H	28.197	2.919	0	45.116	54	-8.884	Ave
4824	50.47	98	100	V	33.354	4.241	34.29	53.775	74	-20.225	Peak
4824	51.76	157	100	H	33.354	4.241	34.29	55.065	74	-18.935	Peak
4824	40.94	98	100	V	33.354	4.241	34.29	44.245	54	-9.755	Ave
4824	43.32	157	100	H	33.354	4.241	34.29	46.625	54	-7.375	Ave
7236	47.16	0	100	V	37.356	5.495	34.43	55.581	66.246	-10.665	Peak
7236	46.95	0	100	H	37.356	5.495	34.43	55.371	72.176	-16.805	Peak
7236	33.53	0	100	V	37.356	5.495	34.43	41.951	55.536	-13.585	Ave
7236	33.48	0	100	H	37.356	5.495	34.43	41.901	61.816	-19.915	Ave
9648	48.44	0	100	V	38.913	6.241	34.95	58.644	66.246	-7.602	Peak
9648	48.86	0	100	H	38.913	6.241	34.95	59.064	72.176	-13.112	Peak
9648	34.42	0	100	V	38.913	6.241	34.95	44.624	55.536	-10.912	Ave
9648	34.53	0	100	H	38.913	6.241	34.95	44.734	61.816	-17.082	Ave
Middle Channel 2437 MHz, measured at 3 meters											
2437	56.03	210	107	V	28.197	2.919	0	87.146	-	-	Peak
2437	62.69	159	100	H	28.197	2.919	0	93.806	-	-	Peak
2437	45.49	210	107	V	28.197	2.919	0	76.606	-	-	Ave
2437	52.12	159	100	H	28.197	2.919	0	83.236	-	-	Ave
4874	50.54	73	100	V	33.354	4.241	34.29	53.845	74	-20.155	Peak
4874	51.66	125	100	H	33.354	4.241	34.29	54.965	74	-19.035	Peak
4874	40.48	73	100	V	33.354	4.241	34.29	43.785	54	-10.215	Ave
4874	43.51	125	100	H	33.354	4.241	34.29	46.815	54	-7.185	Ave
7311	46.84	0	100	V	37.356	5.495	34.43	55.261	74	-18.739	Peak
7311	47.29	0	100	H	37.356	5.495	34.43	55.711	74	-18.289	Peak
7311	33.18	0	100	V	37.356	5.495	34.43	41.601	54	-12.399	Ave
7311	33.12	0	100	H	37.356	5.495	34.43	41.541	54	-12.459	Ave
9748	48	0	100	V	38.913	6.241	34.95	58.204	67.146	-8.942	Peak
9748	48.11	0	100	H	38.913	6.241	34.95	58.314	73.806	-15.492	Peak
9748	34.52	0	100	V	38.913	6.241	34.95	44.724	56.606	-11.882	Ave
9748	34.43	0	100	H	38.913	6.241	34.95	44.634	63.236	-18.602	Ave

Frequency (MHz)	S.A. Reading (dBμV)	Turntable Azimuth (degrees)	Test Antenna			Cable Loss (dB)	Pre- Amp. (dB)	Cord. Reading (dBμV/m)	FCC/IC		Comments
			Height (cm)	Polarity (H/V)	Factor (dB/m)				Limit (dBμV/m)	Margin (dB)	
High Channel 2462 MHz, measured at 3 meters											
2462	57.92	68	100	V	28.197	2.919	0	89.036	-	-	Peak
2462	64.47	159	100	H	28.197	2.919	0	95.586	-	-	Peak
2462	46.73	68	100	V	28.197	2.919	0	77.846	-	-	Ave
2462	53.83	159	100	H	28.197	2.919	0	84.946	-	-	Ave
2483.5	30.21	43	100	V	28.197	2.919	0	61.326	74	-12.674	Peak
2483.5	35.11	127	100	H	28.197	2.919	0	66.226	74	-7.774	Peak
2483.5	14.97	43	100	V	28.197	2.919	0	46.086	54	-7.914	Ave
2483.5	18.38	127	100	H	28.197	2.919	0	49.496	54	-4.504	Ave
4924	51.18	74	100	V	33.354	4.241	34.29	54.485	74	-19.515	Peak
4924	52.44	157	100	H	33.354	4.241	34.29	55.745	74	-18.255	Peak
4924	41.93	74	100	V	33.354	4.241	34.29	45.235	54	-8.765	Ave
4924	45.03	157	100	H	33.354	4.241	34.29	48.335	54	-5.665	Ave
7386	48.14	0	100	V	37.356	5.495	34.43	56.561	74	-17.439	Peak
7386	48.13	0	100	H	37.356	5.495	34.43	56.551	74	-17.449	Peak
7386	33.74	0	100	V	37.356	5.495	34.43	42.161	54	-11.839	Ave
7386	33.68	0	100	H	37.356	5.495	34.43	42.101	54	-11.899	Ave
9848	49.53	0	100	V	38.913	6.241	34.95	59.734	69.036	-9.302	Peak
9848	48.95	0	100	H	38.913	6.241	34.95	59.154	75.586	-16.432	Peak
9848	34.93	0	100	V	38.913	6.241	34.95	45.134	57.846	-12.712	Ave
9848	34.75	0	100	H	38.913	6.241	34.95	44.954	64.946	-19.992	Ave

802.11n HT20 mode

Frequency (MHz)	S.A. Reading (dBμV)	Turntable Azimuth (degrees)	Test Antenna			Cable Loss (dB)	Pre- Amp. (dB)	Cord. Reading (dBμV/m)	FCC/IC		Comments
			Height (cm)	Polarity (H/V)	Factor (dB/m)				Limit (dBμV/m)	Margin (dB)	
Low Channel 2412 MHz, measured at 3 meters											
2412	54.69	210	100	V	28.197	2.919	0	85.806	-	-	Peak
2412	60.99	161	100	H	28.197	2.919	0	92.106	-	-	Peak
2412	43.55	210	100	V	28.197	2.919	0	74.666	-	-	Ave
2412	50.17	161	100	H	28.197	2.919	0	81.286	-	-	Ave
2390	28.3	185	100	V	28.197	2.919	0	59.416	74	-14.584	Peak
2390	27.95	129	100	H	28.197	2.919	0	59.066	74	-14.934	Peak
2390	13.86	185	100	V	28.197	2.919	0	44.976	54	-9.024	Ave
2390	14.26	129	100	H	28.197	2.919	0	45.376	54	-8.624	Ave
4824	51.41	99	100	V	33.354	4.241	34.29	54.715	74	-19.285	Peak
4824	51.78	157	100	H	33.354	4.241	34.29	55.085	74	-18.915	Peak
4824	41.52	99	100	V	33.354	4.241	34.29	44.825	54	-9.175	Ave
4824	43.63	157	100	H	33.354	4.241	34.29	46.935	54	-7.065	Ave
7236	47.93	0	100	V	37.356	5.495	34.43	56.351	65.806	-9.455	Peak
7236	47.75	0	100	H	37.356	5.495	34.43	56.171	72.106	-15.935	Peak
7236	33.61	0	100	V	37.356	5.495	34.43	42.031	54.666	-12.635	Ave
7236	33.43	0	100	H	37.356	5.495	34.43	41.851	61.286	-19.435	Ave
9648	49.34	0	100	V	38.913	6.241	34.95	59.544	65.806	-6.262	Peak
9648	49.39	0	100	H	38.913	6.241	34.95	59.594	72.106	-12.512	Peak
9648	34.43	0	100	V	38.913	6.241	34.95	44.634	54.666	-10.032	Ave
9648	34.51	0	100	H	38.913	6.241	34.95	44.714	61.286	-16.572	Ave
Middle Channel 2437 MHz, measured at 3 meters											
2437	56.14	210	108	V	28.197	2.919	0	87.256	-	-	Peak
2437	62.05	161	100	H	28.197	2.919	0	93.166	-	-	Peak
2437	45.6	210	108	V	28.197	2.919	0	76.716	-	-	Ave
2437	51.79	161	100	H	28.197	2.919	0	82.906	-	-	Ave
4874	51.01	49	100	V	33.354	4.241	34.29	54.315	74	-19.685	Peak
4874	51.6	125	100	H	33.354	4.241	34.29	54.905	74	-19.095	Peak
4874	41.96	49	100	V	33.354	4.241	34.29	45.265	54	-8.735	Ave
4874	44.07	125	100	H	33.354	4.241	34.29	47.375	54	-6.625	Ave
7311	47.16	0	100	V	37.356	5.495	34.43	55.581	74	-18.419	Peak
7311	47.22	0	100	H	37.356	5.495	34.43	55.641	74	-18.359	Peak
7311	33.14	0	100	V	37.356	5.495	34.43	41.561	54	-12.439	Ave
7311	33.18	0	100	H	37.356	5.495	34.43	41.601	54	-12.399	Ave
9748	48.89	0	100	V	38.913	6.241	34.95	59.094	67.256	-8.162	Peak
9748	48.7	0	100	H	38.913	6.241	34.95	58.904	73.166	-14.262	Peak
9748	34.54	0	100	V	38.913	6.241	34.95	44.744	56.716	-11.972	Ave
9748	34.42	0	100	H	38.913	6.241	34.95	44.624	62.906	-18.282	Ave

Frequency (MHz)	S.A. Reading (dBμV)	Turntable Azimuth (degrees)	Test Antenna			Cable Loss (dB)	Pre- Amp. (dB)	Cord. Reading (dBμV/m)	FCC/IC		Comments
			Height (cm)	Polarity (H/V)	Factor (dB/m)				Limit (dBμV/m)	Margin (dB)	
High Channel 2462 MHz, measured at 3 meters											
2462	59.24	166	104	V	28.197	2.919	0	90.356	-	-	Peak
2462	64.32	159	100	H	28.197	2.919	0	95.436	-	-	Peak
2462	48.28	166	104	V	28.197	2.919	0	79.396	-	-	Ave
2462	53.34	159	100	H	28.197	2.919	0	84.456	-	-	Ave
2483.5	33.55	141	104	V	28.197	2.919	0	64.666	74	-9.334	Peak
2483.5	39.25	127	100	H	28.197	2.919	0	70.366	74	-3.634	Peak
2483.5	16.25	141	104	V	28.197	2.919	0	47.366	54	-6.634	Ave
2483.5	19.31	127	100	H	28.197	2.919	0	50.426	54	-3.574	Ave
4924	51.22	68	100	V	33.354	4.241	34.29	54.525	74	-19.475	Peak
4924	52.13	160	100	H	33.354	4.241	34.29	55.435	74	-18.565	Peak
4924	38.78	68	100	V	33.354	4.241	34.29	42.085	54	-11.915	Ave
4924	42.95	160	100	H	33.354	4.241	34.29	46.255	54	-7.745	Ave
7386	48.7	0	100	V	37.356	5.495	34.43	57.121	74	-16.879	Peak
7386	47.39	0	100	H	37.356	5.495	34.43	55.811	74	-18.189	Peak
7386	33.29	0	100	V	37.356	5.495	34.43	41.711	54	-12.289	Ave
7386	33.22	0	100	H	37.356	5.495	34.43	41.641	54	-12.359	Ave
9848	49.26	0	100	V	38.913	6.241	34.95	59.464	70.356	-10.892	Peak
9848	48.82	0	100	H	38.913	6.241	34.95	59.024	75.436	-16.412	Peak
9848	34.56	0	100	V	38.913	6.241	34.95	44.764	59.396	-14.632	Ave
9848	34.51	0	100	H	38.913	6.241	34.95	44.714	64.456	-19.742	Ave