

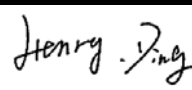
FCC PART 15.247
MEASUREMENT AND TEST REPORT

For

Advance Tech Communications Sdn Bhd

Persoft Tower, Level 6, 6B, Persiaran Tropicana, Tropicana Golf and Country Resort, Petaling
Jaya , Selangor DE , Malaysia .

FCC ID: QTTATCMAGICW3

Report Type: Original Report	Product Type: Microcomputer with integrated Telephony
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Report Number: <u>RSZ121120005-00B</u>	
Report Date: <u>2012-12-31</u>	
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Note: This test report is prepared for the customer shown above and for the equipment described herein. It may not be duplicated or used in part without prior written consent from Bay Area Compliance Laboratories Corp.

TABLE OF CONTENTS

GENERAL INFORMATION.....	4
PRODUCT DESCRIPTION FOR EQUIPMENT UNDER TEST (EUT)	4
OBJECTIVE	4
RELATED SUBMITTAL(S)/GRANT(S).....	4
TEST METHODOLOGY	4
TEST FACILITY	5
SYSTEM TEST CONFIGURATION.....	6
DESCRIPTION OF TEST CONFIGURATION	6
EUT EXERCISE SOFTWARE	6
EQUIPMENT MODIFICATIONS	6
SUPPORT EQUIPMENT LIST AND DETAILS	6
EXTERNAL I/O CABLE.....	6
BLOCK DIAGRAM OF TEST SETUP	7
SUMMARY OF TEST RESULTS	8
FCC§15.247 (i), §1.1307 (b) (1) &§2.1093 – RF EXPOSURE	9
APPLICABLE STANDARD	9
RESULT	9
FCC §15.203 - ANTENNA REQUIREMENT.....	10
APPLICABLE STANDARD	10
ANTENNA CONNECTOR CONSTRUCTION	10
FCC §15.207 (a) - CONDUCTED EMISSIONS	11
APPLICABLE STANDARD	11
MEASUREMENT UNCERTAINTY.....	11
EUT SETUP	11
EMI TEST RECEIVER SETUP.....	12
TEST EQUIPMENT LIST AND DETAILS.....	12
TEST PROCEDURE	12
TEST RESULTS SUMMARY	12
TEST DATA	12
FCC §15.209, §15.205 & §15.247(d) - SPURIOUS EMISSIONS.....	15
APPLICABLE STANDARD	15
MEASUREMENT UNCERTAINTY.....	15
EUT SETUP	15
EMI TEST RECEIVER & SPECTRUM ANALYZER SETUP	16
TEST EQUIPMENT LIST AND DETAILS.....	16
TEST PROCEDURE	16
CORRECTED AMPLITUDE & MARGIN CALCULATION	17
TEST RESULTS SUMMARY	17
TEST DATA	17
FCC §15.247(a) (2) – 6 dB BANDWIDTH TESTING.....	29
APPLICABLE STANDARD	29
TEST PROCEDURE	29
TEST EQUIPMENT LIST AND DETAILS.....	29
TEST DATA	29
FCC §15.247(b) (3) - MAXIMUM PEAK OUTPUT POWER	35

APPLICABLE STANDARD	35
TEST PROCEDURE	35
TEST EQUIPMENT LIST AND DETAILS.....	35
TEST DATA	35
FCC §15.247(d) – 100 kHz BANDWIDTH OF FREQUENCY BAND EDGE.....	41
APPLICABLE STANDARD	41
TEST PROCEDURE	41
TEST EQUIPMENT LIST AND DETAILS.....	41
TEST DATA	42
FCC §15.247(e) - POWER SPECTRAL DENSITY	46
APPLICABLE STANDARD	46
TEST PROCEDURE	46
TEST EQUIPMENT LIST AND DETAILS.....	46
TEST DATA	46

GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

The *Advance Tech Communications Sdn Bhd*'s product, model number: *W3* (FCC ID: *QTTATCMAGICW3*) or the "EUT" in this report was a *Microcomputer with integrated Telephony*, which was measured approximately: 14.0 cm (L) x 8.0 cm (W) x 2.5 cm (H), rated input voltage: DC 3.7 V Li-ion battery or DC 5V charging from adapter.

Adapter Information: AC/DC ADAPTER

Model: EN15-050-3000

Input: 100-240V~0.8A 50-60 Hz

Output: DC 5.0V/3A

** All measurement and test data in this report was gathered from production sample serial number: 1211115 (Assigned by BACL, Shenzhen). The EUT supplied by the applicant was received on 2012-11-20.*

Objective

This report is prepared on behalf of *Advance Tech Communications Sdn Bhd* in accordance with Part 2-Subpart J, Part 15- Subparts A, B and C of the Federal Communication Commissions rules.

The tests were performed in order to determine compliance with FCC Part 15, Subpart C, and section 15.203, 15.205, 15.207, 15.209 and 15.247 rules.

Related Submittal(s)/Grant(s)

FCC Part 22H&24E PCE and Part 15B JBP submissions with FCC ID: QTTATCMAGICW3.

Test Methodology

All measurements contained in this report were conducted 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.

All emissions measurement was performed and Bay Area Compliance Laboratories Corp. (Shenzhen). The radiated testing was performed at an antenna-to-EUT distance of 3 meters.

Test Facility

The Test site used by Bay Area Compliance Laboratories Corp. (Shenzhen) to collect test data is located in the 6/F, the 3rd Phase of WanLi Industrial Building, Shihua Road, Futian Free Trade Zone Shenzhen, Guangdong, China.

Test site at Bay Area Compliance Laboratories Corp. (Shenzhen) has been fully described in reports submitted to the Federal Communication Commission (FCC). The details of these reports have been found to be in compliance with the requirements of Section 2.948 of the FCC Rules on December 06, 2010. The facility also complies with the radiated and AC line conducted test site criteria set forth in ANSI C63.4-2009.

The Federal Communications Commission has the reports on file and is listed under FCC Registration No.: 382179. The test site has been approved by the FCC for public use and is listed in the FCC Public Access Link (PAL) database.

SYSTEM TEST CONFIGURATION

Description of Test Configuration

For 802.11b, 802.11g and 802.11n-HT20 mode, 11 channels are provided to testing:

Channel	Frequency (MHz)	Channel	Frequency (MHz)
1	2412	7	2442
2	2417	8	2447
3	2422	9	2452
4	2427	10	2457
5	2432	11	2462
6	2437	/	/

EUT for 802.11b, 802.11g and 802.11n-HT20 modes were tested with Channel 1, 6 and 11.

EUT Exercise Software

Test software: REALTEK 11n Single chip 9xC USB WLAN NIC Massproduction kit the EUT.

The test was performed under:

802.11b: Data rate: 1 Mbps.

802.11g: Data rate: 6 Mbps.

802.11n-HT20: Data rate: MCS0.

The power of software set level is “35”

Equipment Modifications

No modification was made to the EUT tested.

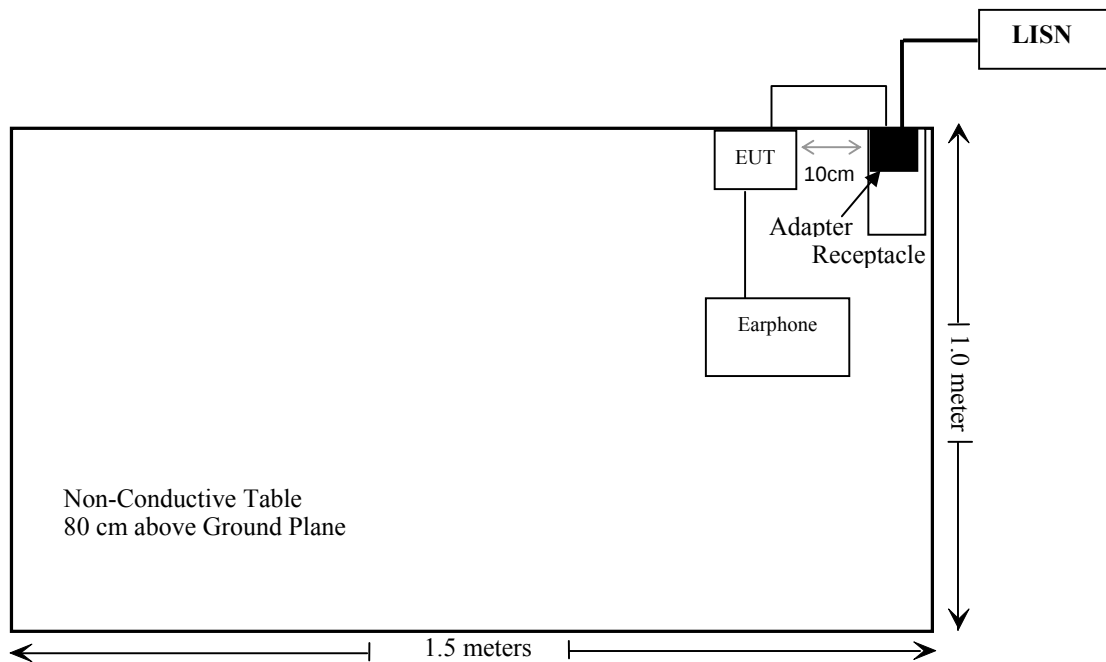
Support Equipment List and Details

Manufacturer	Description	Model	Serial Number
/	/	/	/

External I/O Cable

Cable Description	Length (m)	From/Port	To
Unshielding Detachable DC Cable	1.8	EUT	Adapter

Block Diagram of Test Setup



SUMMARY OF TEST RESULTS

FCC Rules	Description of Test	Result
§15.247 (i), §1.1307 (b) (1)& §2.1093	RF Exposure	Compliance
§15.203	Antenna Requirement	Compliance
§15.207 (a),	Conducted Emissions	Compliance
§15.247(d)	Spurious Emissions at Antenna Port	Compliance
§15.205, §15.209, §15.247(d)	Spurious Emissions	Compliance
§15.247 (a)(2)	6 dB Bandwidth	Compliance
§15.247(b)(3)	Maximum Peak Output Power	Compliance
§15.247(d)	100 kHz Bandwidth of Frequency Band Edge	Compliance
§15.247(e)	Power Spectral Density	Compliance

FCC§15.247 (i), §1.1307 (b) (1) &§2.1093 – RF EXPOSURE

Applicable Standard

According to FCC §2.1093 and §1.1307(b) (1), systems operating under the provisions of this section shall be operated in a manner that ensure that the public is not exposed to radio frequency energy level in excess of the Commission's guideline.

According to KDB 447498 D01 General RF Exposure Guidance v05

Result

According to FCC KDB 447498 D01 General RF Exposure Guidance v05 generic portable criteria

The distance between antenna and test point is 5 mm

The Max output power: 4.33 mW

According to the Appendix A of KDB 447498, the exclusion thresholds for 2450 MHz is 10 mW

Conclusion:

The time-averaged output power is 4.33 mW < the exclusion thresholds 10 mW, so stand-alone SAR evaluation is not required.

FCC §15.203 - ANTENNA REQUIREMENT

Applicable Standard

According to § 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the user of a standard antenna jack or electrical connector is prohibited. The structure and application of the EUT were analyzed to determine compliance with section §15.203 of the rules. §15.203 state that the subject device must meet the following criteria:

- a. Antenna must be permanently attached to the unit.
- b. Antenna must use a unique type of connector to attach to the EUT.

Unit must be professionally installed, and installer shall be responsible for verifying that the correct antenna is employed with the unit.

And according to FCC 47 CFR section 15.247 (b), if the transmitting antennas of directional gain greater than 6dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

Antenna Connector Construction

The EUT has an integral antenna arrangement for WiFi, which was permanently attached and the gain was 0.5 dBi, fulfill the requirement of this section. Please refer to the internal photos.

Result: Compliant.

FCC §15.207 (a) - CONDUCTED EMISSIONS

Applicable Standard

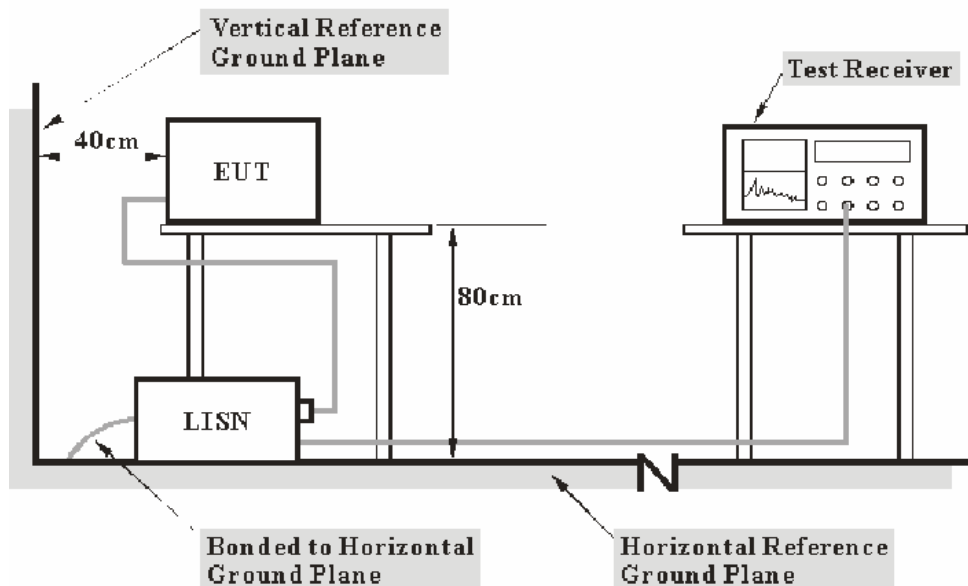
FCC§15.207

Measurement Uncertainty

All measurements involve certain levels of uncertainties, especially in field of EMC. The factors contributing to uncertainties are spectrum analyzer, cable loss, and LISN.

Based on CISPR 16-4-2, The Treatment of Uncertainty in EMC Measurements, the best estimate of the uncertainty of any conducted emissions measurement at Bay Area Compliance Laboratories Corp. (Shenzhen) is 2.4 dB(k=2, 95% level of confidence), and the uncertainty will not be taken into consideration for the test data recorded in the report.

EUT Setup



- Note: 1. Support units were connected to second LISN.
2. Both of LISNs (AMN) 80 cm from EUT and at the least 80 cm from other units and other metal planes support units.

The measurement procedure of EUT setup is according with per ANSI C63.4-2009. The related limit was specified in FCC Part 15.207.

The spacing between the peripherals was 10 cm.

The receptacle was connected to a 120 VAC/60 Hz power source.

EMI Test Receiver Setup

The EMI test receiver was set to investigate the spectrum from 150 kHz to 30 MHz.

During the conducted emission test, the EMI test receiver was set with the following configurations:

Frequency Range	IF B/W
150 kHz – 30 MHz	9 kHz

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	EMI Test Receiver	ESCS30	100176	2012-11-24	2013-11-23
Rohde & Schwarz	L.I.S.N.	ESH2-Z5	892107/021	2012-08-22	2013-08-21
Rohde & Schwarz	Pulse limiter	ESH3Z2	DE25985	2012-07-08	2013-07-07
BACL	CE Test software	BACL-CE	V1.0	-	-

* **Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Shenzhen) attests that all calibrations have been performed in accordance to requirements that traceable to National Primary Standards and International System of Units (SI).

Test Procedure

During the conducted emission test, the receptacle was connected to the LISN.

Maximizing procedure was performed on the six (6) highest emissions of the EUT.

All data was recorded in the Quasi-peak and average detection mode.

Test Results Summary

According to the recorded data in following table, the EUT complied with the FCC Part 15.207, with the worst margin reading of:

8.27 dB at 0.180 MHz in the Neutral conducted mode

Test Data

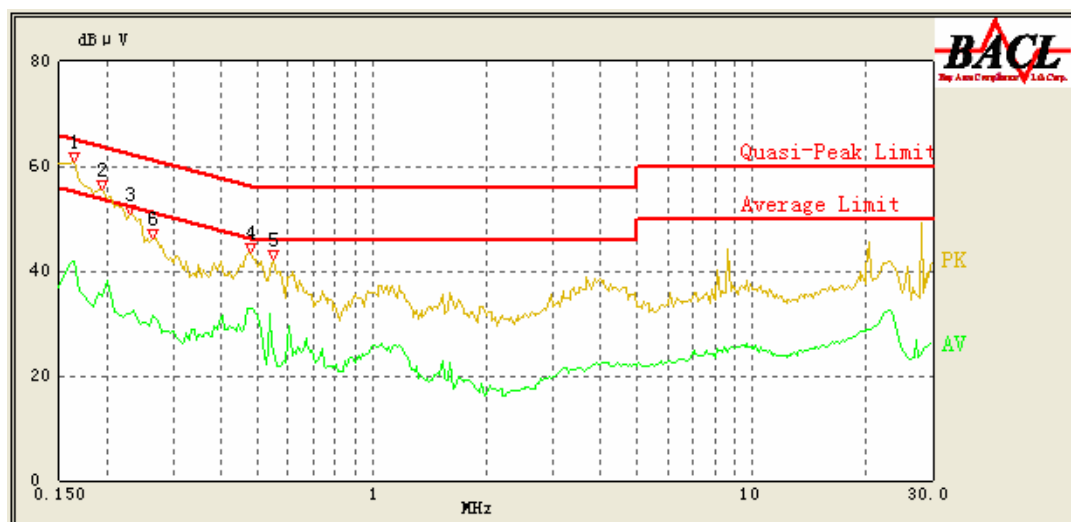
Environmental Conditions

Temperature:	25 ° C
Relative Humidity:	56 %
ATM Pressure:	100.0 kPa

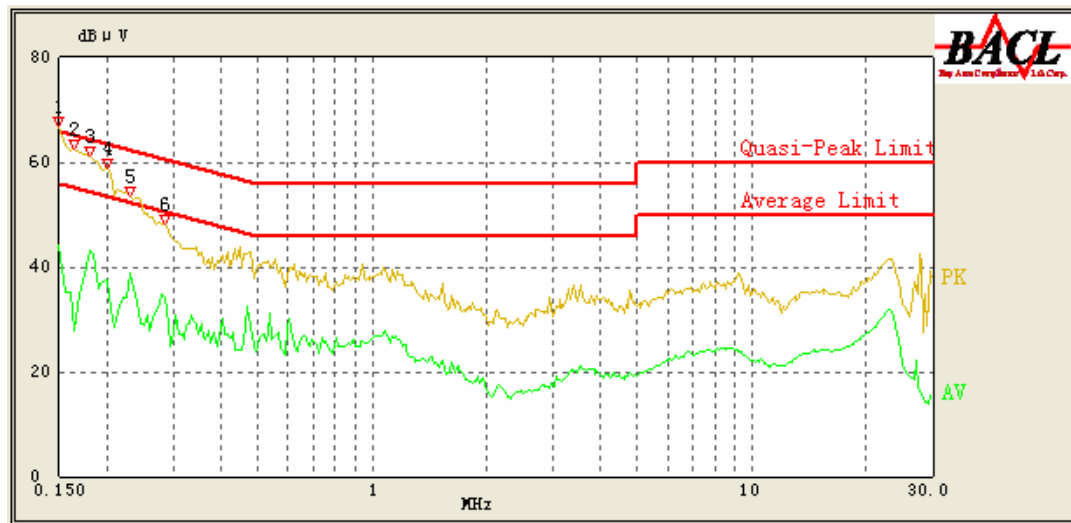
The testing was performed by Henry Ding on 2012-12-14.

EUT operation mode: Running (WiFi transmitting)

AC 120V / 60Hz, Line



Frequency (MHz)	Corrected Amplitude (dBμV)	Corrected Factor (dB)	Limit (dBμV)	Margin (dB)	Detector (PK/QP/Ave.)
0.195	53.80	10.27	64.71	10.91	QP
0.165	52.52	10.27	65.57	13.05	QP
0.480	32.85	10.26	46.57	13.72	Ave.
0.165	41.81	10.27	55.57	13.76	Ave.
0.230	48.32	10.26	63.71	15.39	QP
0.480	40.54	10.26	56.57	16.03	QP
0.550	38.67	10.24	56.00	17.33	QP
0.195	35.14	10.27	54.71	19.57	Ave.
0.550	24.92	10.24	46.00	21.08	Ave.
0.265	31.39	10.26	52.71	21.32	Ave.
0.230	31.91	10.26	53.71	21.80	Ave.
0.265	40.59	10.26	62.71	22.12	QP

AC 120V / 60Hz, Neutral:

Frequency (MHz)	Corrected Amplitude (dBμV)	Corrected Factor (dB)	Limit (dBμV)	Margin (dB)	Detector (PK /QP/Ave.)
0.180	56.87	10.24	65.14	8.27	QP
0.165	56.50	10.24	65.57	9.07	QP
0.150	55.28	10.24	66.00	10.72	QP
0.150	44.10	10.24	56.00	11.90	Ave.
0.180	43.12	10.24	55.14	12.02	Ave.
0.230	49.02	10.25	63.71	14.69	QP
0.230	38.99	10.25	53.71	14.72	Ave.
0.200	47.72	10.24	64.57	16.85	QP
0.200	37.37	10.24	54.57	17.20	Ave.
0.285	34.24	10.25	52.14	17.90	Ave.
0.285	42.65	10.25	62.14	19.49	QP
0.165	27.70	10.24	55.57	27.87	Ave.

Note:

- 1) Corrected Amplitude = Reading + Correction Factor
- 2) Correction Factor = LISN/ISN VDF (Voltage Division Factor) + Cable Loss + Pulse Limiter Attenuation
The corrected factor has been input into the transducer of the test software.
- 3) Margin = Limit – Corrected Amplitude

FCC §15.209, §15.205 & §15.247(d) - SPURIOUS EMISSIONS

Applicable Standard

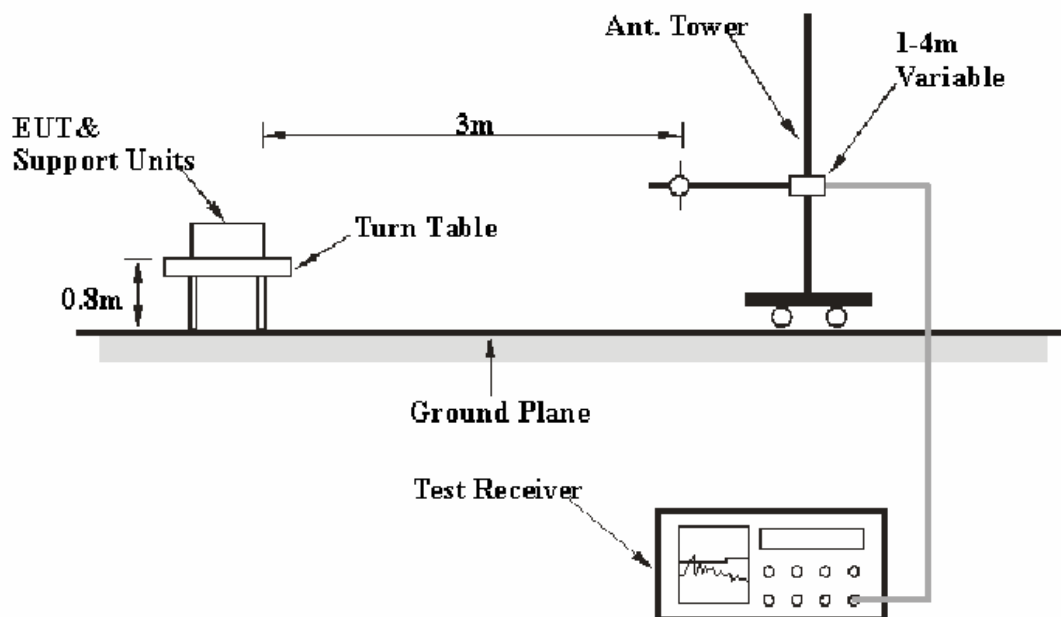
FCC §15.247 (d); §15.209; §15.205;

Measurement Uncertainty

All measurements involve certain levels of uncertainties, especially in 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.

Based on CISPR 16-4-2, the Treatment of Uncertainty in EMC Measurements, the estimation of the uncertainty of radiation emissions measurement at Bay Area Compliance Laboratories Corp. (Shenzhen) is 4.0 dB(k=2, 95% level of confidence), and the uncertainty will not be taken into consideration for the test data recorded in the report.

EUT Setup



The radiated emission tests were performed in the 3 meters test site, using the setup accordance with the ANSI C63.4-2009. The specification used was the FCC 15.209, and FCC 15.247 limits.

The external I/O cables were draped along the test table and formed a bundle 30 to 40 cm long in the middle.

EMI Test Receiver & Spectrum Analyzer Setup

The system was investigated from 30 MHz to 25 GHz.

During the radiated emission test, the EMI test receiver & Spectrum Analyzer Setup were set with the following configurations:

Frequency Range	RBW	Video B/W	IF B/W	Detector
30MHz – 1000 MHz	100 kHz	300 kHz	120kHz	QP
Above 1 GHz	1MHz	3 MHz	/	PK
	1MHz	10 Hz	/	Ave.

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
HP	Amplifier	8447E	1937A01046	2012-11-24	2013-11-23
Rohde & Schwarz	EMI Test Receiver	ESCI	101122	2012-08-08	2013-08-07
Sunol Sciences	Broadband Antenna	JB1	A040904-2	2011-11-28	2014-11-27
SUPER ULTRA	Amplifier	ZVA-213+	N/A	2012-11-24	2013-11-23
Sunol Sciences	Horn Antenna	DRH-118	A052304	2011-12-01	2014-11-30
Rohde & Schwarz	Signal Analyzer	FSIQ26	8386001028	2012-11-24	2013-11-23
Agilent	Spectrum Analyzer	8564E	3943A01781	2012-05-17	2013-05-17
the electro-Mechanics Co.	Horn Antenna	3116	9510-2270	2010-10-14	2013-10-13

* **Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Shenzhen) attests that all calibrations have been performed in accordance to requirements that traceable to National Primary Standards and International System of Units (SI).

Test Procedure

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

Data was recorded in Quasi-peak detection mode for frequency range of 30 MHz-1GHz and peak and Average detection modes for frequencies above 1 GHz.

Corrected Amplitude & Margin Calculation

The Corrected Amplitude is calculated by adding the Antenna Factor and Cable Loss, and subtracting the Amplifier Gain from the Meter Reading. The basic equation is as follows:

$$\text{Corrected Amplitude} = \text{Meter Reading} + \text{Antenna Factor} + \text{Cable Loss} - \text{Amplifier Gain}$$

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

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

Test Results Summary

According to the recorded data in following table, the EUT complied with the FCC Title 47, Part 15, Subpart C, section 15.205, 15.209 and 15.247, with the worst margin reading of:

3.79dB at **4924.0 MHz** in the **Horizontal** polarization for 802.11b mode

Test Data

Environmental Conditions

Temperature:	25 ° C
Relative Humidity:	56 %
ATM Pressure:	100.0 kPa

The testing was performed by Henry Ding on 2012-12-28.

EUT operation mode: Transmitting

30 MHz-25 GHz**802.11b mode:**

Frequency (MHz)	Receiver		Turntable Degree	Rx Antenna		Corrected Factor (dB)	Corrected Amplitude (dBμV/m)	FCC Part 15.247/15.205/15.209	
	Reading (dBμV)	Detector (PK/QP/Ave.)		Height (m)	Polar (H / V)			Limit (dBμV/m)	Margin (dB)
Low Channel(2412 MHz)									
2412.0	90.93	PK	12	1.2	H	6.13	97.06	/	/
2412.0	82.96	Ave.	12	1.2	H	6.13	89.09	/	/
2412.0	90.63	PK	33	1.3	V	6.13	96.76	/	/
2412.0	83.27	Ave.	33	1.3	V	6.13	89.40	/	/
4824.0	36.76	Ave.	125	1.2	H	12.40	49.16	54	4.84
112.47	44.60	QP	167	1.4	V	-14.4	30.20	43.5	13.20
9648.0	18.25	Ave.	12	1.1	V	19.29	37.54	54	16.46
112.47	39.27	QP	79	1.3	H	-14.4	24.87	43.5	18.63
7236.0	18.15	Ave.	54	1.2	H	16.62	34.77	54	19.23
2483.5	26.97	Ave.	11	1.2	V	6.81	33.78	54	20.22
9648.0	33.87	PK	12	1.1	V	19.29	53.16	74	20.84
4824.0	40.25	PK	125	1.2	H	12.40	52.65	74	21.35
2389.1	25.98	Ave.	25	1.3	H	6.13	32.11	54	21.89
2331.6	26.34	Ave.	36	1.2	V	5.48	31.82	54	22.18
7236.0	33.92	PK	54	1.2	H	16.62	50.54	74	23.46
2483.5	39.66	PK	11	1.2	V	6.81	46.47	74	27.53
2331.6	39.66	PK	36	1.2	V	5.48	45.14	74	28.86
2389.1	38.75	PK	25	1.3	H	6.13	44.88	74	29.12
Middle Channel (2437 MHz)									
2437.0	90.25	PK	15	1.3	H	6.13	96.38	/	/
2437.0	83.94	Ave.	15	1.3	H	6.13	90.07	/	/
2437.0	91.57	PK	23	1.3	V	6.13	97.70	/	/
2437.0	84.44	Ave.	23	1.3	V	6.13	90.57	/	/
4874.0	37.26	Ave.	12	1.2	H	12.46	49.72	54	4.28
9748.0	18.15	Ave.	41	1.1	V	19.40	37.55	54	16.45
7311.0	17.41	Ave.	225	1.1	H	16.49	33.90	54	20.10
2490.2	26.88	Ave.	36	1.1	V	6.81	33.69	54	20.31
4874.0	41.15	PK	12	1.2	H	12.46	53.61	74	20.39
9748.0	33.96	PK	41	1.1	V	19.40	53.36	74	20.64
2344.1	26.33	Ave.	221	1.2	V	5.48	31.81	54	22.19
2385.1	25.29	Ave.	15	1.3	H	6.13	31.42	54	22.58
7311.0	32.28	PK	225	1.1	H	16.49	48.77	74	25.23
2490.2	39.69	PK	36	1.1	V	6.81	46.50	74	27.50
2344.1	39.62	PK	221	1.2	V	5.48	45.10	74	28.90
2385.1	38.71	PK	15	1.3	H	6.13	44.84	74	29.16

Frequency (MHz)	Receiver		Turntable Degree	Rx Antenna		Corrected Factor (dB)	Corrected Amplitude (dBμV/m)	FCC Part 15.247/15.205/15.209	
	Reading (dBμV)	Detector (PK/QP/Ave.)		Height (m)	Polar (H /V)			Limit (dBμV/m)	Margin (dB)
High Channel(2462 MHz)									
2462.0	89.99	PK	41	1.3	H	7.21	97.20	/	/
2462.0	83.02	Ave.	41	1.3	H	7.21	90.23	/	/
2462.0	90.25	PK	33	1.3	V	6.81	97.06	/	/
2462.0	83.26	Ave.	33	1.3	V	6.81	90.07	/	/
4924.0	37.71	Ave.	125	1.2	H	12.50	50.21	54	3.79
9848.0	17.44	Ave.	12	1.1	V	19.39	36.83	54	17.17
7386.0	18.81	Ave.	63	1.2	H	15.91	34.72	54	19.28
4924.0	41.93	PK	125	1.2	H	12.50	54.43	74	19.57
2491.1	26.91	Ave.	46	1.2	V	6.81	33.72	54	20.28
2387.1	27.15	Ave.	44	1.3	H	6.13	33.28	54	20.72
9848.0	32.28	PK	12	1.1	V	19.39	51.67	74	22.33
2335.5	26.01	Ave.	5	1.1	V	5.48	31.49	54	22.51
7386.0	33.25	PK	63	1.2	H	15.91	49.16	74	24.84
2491.1	39.66	PK	46	1.2	V	6.81	46.47	74	27.53
2387.1	39.89	PK	44	1.3	H	6.13	46.02	74	27.98
2335.5	39.06	PK	5	1.1	V	5.48	44.54	74	29.46

802.11g mode:

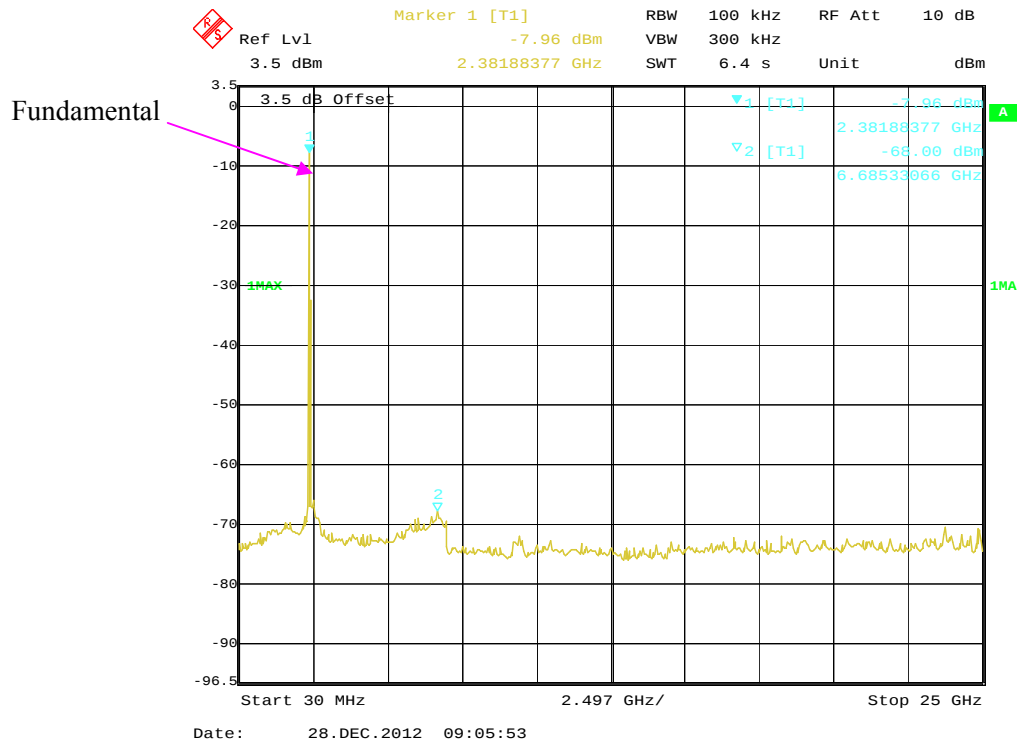
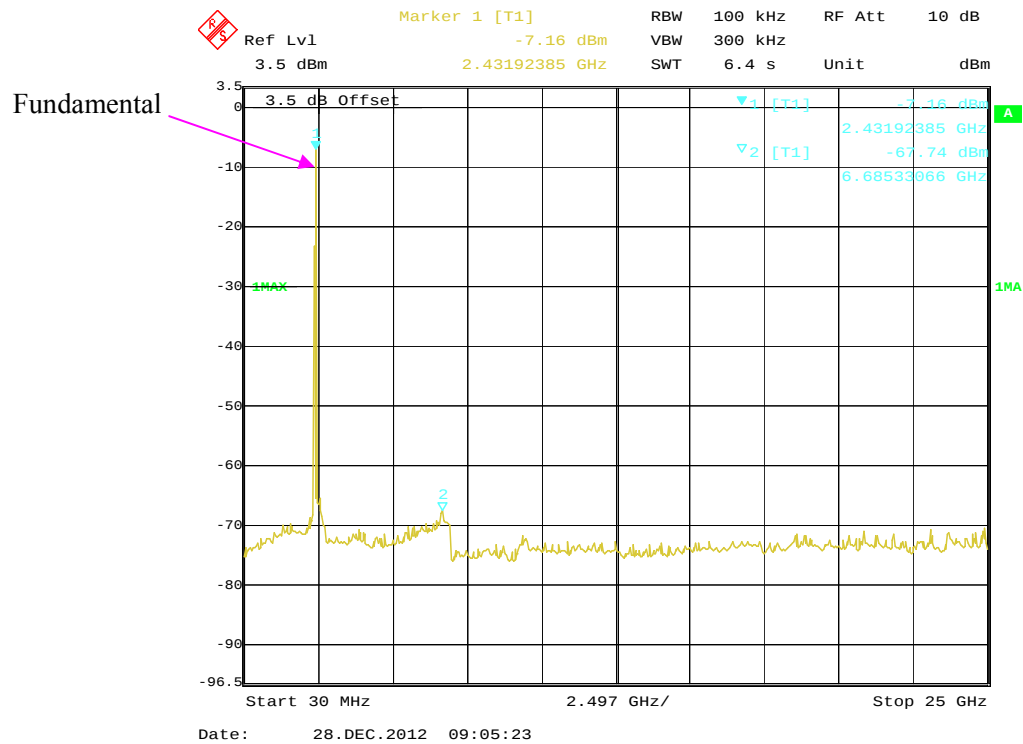
Frequency (MHz)	Receiver		Turntable Degree	Rx Antenna		Corrected Factor (dB)	Corrected Amplitude (dBμV/m)	FCC Part 15.247/15.205/15.209	
	Reading (dBμV)	Detector (PK/QP/Ave.)		Height (m)	Polar (H /V)			Limit (dBμV/m)	Margin (dB)
Low Channel(2412 MHz)									
2412.0	81.69	PK	32	1.1	H	6.13	87.82	/	/
2412.0	70.39	Ave.	32	1.1	H	6.13	76.52	/	/
2412.0	82.33	PK	15	1.2	V	6.13	88.46	/	/
2412.0	70.81	Ave.	15	1.2	V	6.13	76.94	/	/
4824.0	27.15	Ave.	221	1.2	H	12.40	39.55	54	14.45
9648.0	17.84	Ave.	26	1.3	V	19.29	37.13	54	16.87
7236.0	18.87	Ave.	36	1.2	H	16.62	35.49	54	18.51
9648.0	32.99	PK	26	1.3	V	19.29	52.28	74	21.72
4824.0	38.55	PK	221	1.2	H	12.40	50.95	74	23.05
7236.0	33.69	PK	36	1.2	H	16.62	50.31	74	23.69
2483.7	22.14	Ave.	25	1.2	V	6.81	28.95	54	25.05
2335.2	22.95	Ave.	42	1.1	V	5.48	28.43	54	25.57
2389.8	22.15	Ave.	132	1.0	H	6.13	28.28	54	25.72
2483.7	36.59	PK	25	1.2	V	6.81	43.40	74	30.60
2389.8	35.88	PK	132	1.0	H	6.13	42.01	74	31.99
2335.2	35.69	PK	42	1.1	V	5.48	41.17	74	32.83
Middle Channel(2437 MHz)									
2437.0	82.26	PK	23	1.2	H	6.13	88.39	/	/
2437.0	71.15	Ave.	23	1.2	H	6.13	77.28	/	/
2437.0	81.63	PK	112	1.2	V	6.13	87.76	/	/
2437.0	70.22	Ave.	112	1.2	V	6.13	76.35	/	/
4874.0	25.58	Ave.	85	1.4	H	12.46	38.04	54	15.96
9748.0	17.49	Ave.	42	1.2	V	19.40	36.89	54	17.11
7311.0	18.15	Ave.	36	1.2	H	16.49	34.64	54	19.36
9748.0	32.26	PK	42	1.2	V	19.40	51.66	74	22.34
7311.0	33.69	PK	36	1.2	H	16.49	50.18	74	23.82
4874.0	36.67	PK	85	1.4	H	12.46	49.13	74	24.87
2342.1	22.94	Ave.	12	1.1	V	5.48	28.42	54	25.58
2385.8	22.06	Ave.	142	1.1	H	6.13	28.19	54	25.81
2490.7	21.19	Ave.	32	1.2	V	6.81	28.00	54	26.00
2385.8	36.69	PK	142	1.1	H	6.13	42.82	74	31.18
2490.7	35.81	PK	32	1.2	V	6.81	42.62	74	31.38
2342.1	35.14	PK	12	1.1	V	5.48	40.62	74	33.38

Frequency (MHz)	Receiver		Turntable Degree	Rx Antenna		Corrected Factor (dB)	Corrected Amplitude (dBμV/m)	FCC Part 15.247/15.205/15.209	
	Reading (dBμV)	Detector (PK/QP/Ave.)		Height (m)	Polar (H /V)			Limit (dBμV/m)	Margin (dB)
High Channel(2462 MHz)									
2462.0	83.27	PK	26	1.3	H	7.21	90.48	/	/
2462.0	72.11	Ave.	26	1.3	H	7.21	79.32	/	/
2462.0	83.94	PK	33	1.1	V	6.81	90.75	/	/
2462.0	72.18	Ave.	33	1.1	V	6.81	78.99	/	/
4924.0	28.01	Ave.	7	1.2	H	12.50	40.51	54	13.49
9848.0	17.85	Ave.	123	1.3	V	19.39	37.24	54	16.76
7386.0	19.02	Ave.	59	1.3	H	15.91	34.93	54	19.07
4924.0	39.22	PK	7	1.2	H	12.50	51.72	74	22.28
9848.0	32.02	PK	123	1.3	V	19.39	51.41	74	22.59
7386.0	34.15	PK	59	1.3	H	15.91	50.06	74	23.94
2488.6	21.73	Ave.	95	1.0	V	6.81	28.54	54	25.46
2381.5	21.88	Ave.	63	1.1	H	6.13	28.01	54	25.99
2335.5	21.11	Ave.	54	1.1	V	5.48	26.59	54	27.41
2488.6	35.69	PK	95	1.0	V	6.81	42.50	74	31.50
2381.5	35.98	PK	63	1.1	H	6.13	42.11	74	31.89
2335.5	35.26	PK	54	1.1	V	5.48	40.74	74	33.26

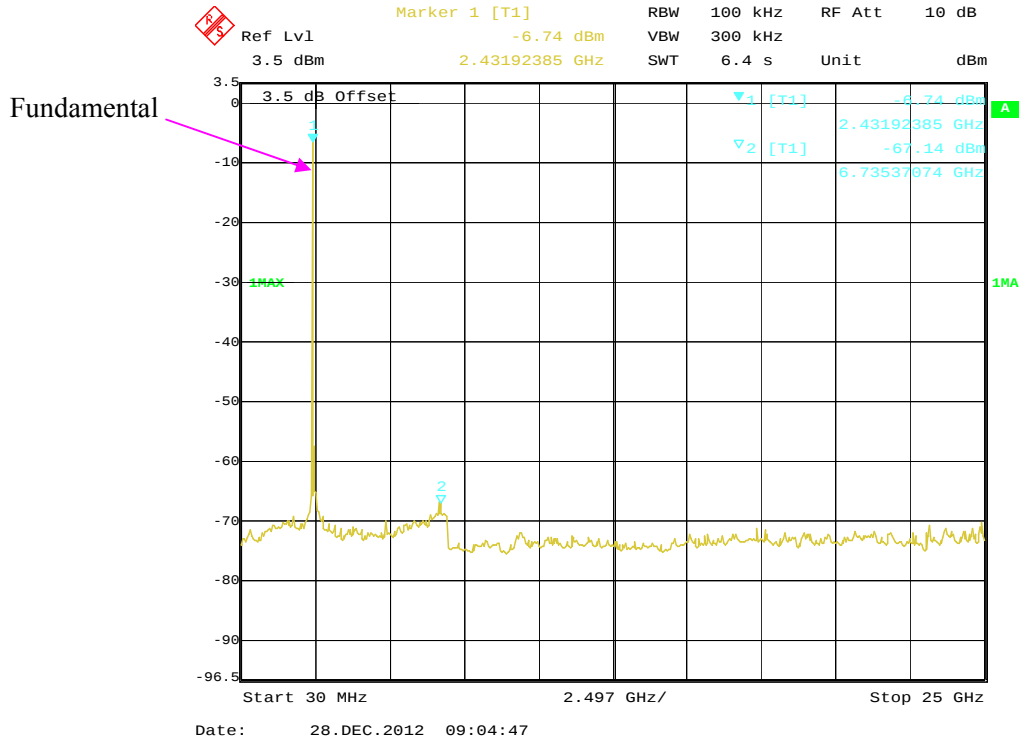
802.11n-HT20 mode:

Frequency (MHz)	Receiver		Turntable Degree	Rx Antenna		Corrected Factor (dB)	Corrected Amplitude (dBμV/m)	FCC Part 15.247/15.205/15.209	
	Reading (dBμV)	Detector (PK/QP/Ave.)		Height (m)	Polar (H /V)			Limit (dBμV/m)	Margin (dB)
Low Channel(2412 MHz)									
2412.0	80.77	PK	45	1.1	H	6.13	86.90	/	/
2412.0	66.39	Ave.	45	1.1	H	6.13	72.52	/	/
2412.0	80.03	PK	36	1.3	V	6.13	86.16	/	/
2412.0	66.88	Ave.	36	1.3	V	6.13	73.01	/	/
4824.0	25.19	Ave.	112	1.2	H	12.40	37.59	54	16.41
9648.0	17.43	Ave.	32	1.3	V	19.29	36.72	54	17.28
7236.0	18.15	Ave.	62	1.0	H	16.62	34.77	54	19.23
9648.0	32.98	PK	32	1.3	V	19.29	52.27	74	21.73
7236.0	33.96	PK	62	1.0	H	16.62	50.58	74	23.42
2483.5	22.18	Ave.	25	1.2	V	6.81	28.99	54	25.01
4824.0	36.25	PK	112	1.2	H	12.40	48.65	74	25.35
2389.8	21.22	Ave.	12	1.1	H	6.13	27.35	54	26.65
2332.2	21.17	Ave.	114	1.3	V	5.48	26.65	54	27.35
2483.5	36.69	PK	25	1.2	V	6.81	43.50	74	30.50
2389.8	35.29	PK	12	1.1	H	6.13	41.42	74	32.58
2332.2	35.62	PK	114	1.3	V	5.48	41.10	74	32.90
Middle Channel(2437 MHz)									
2437.0	81.12	PK	22	1.1	H	6.13	87.25	/	/
2437.0	67.41	Ave.	22	1.1	H	6.13	73.54	/	/
2437.0	81.26	PK	54	1.2	V	6.13	87.39	/	/
2437.0	67.78	Ave.	54	1.2	V	6.13	73.91	/	/
4874.0	27.78	Ave.	36	1.1	H	12.46	40.24	54	13.76
9748.0	18.02	Ave.	221	1.3	V	19.40	37.42	54	16.58
7311.0	17.85	Ave.	23	1.0	H	16.49	34.34	54	19.66
4874.0	39.65	PK	36	1.1	H	12.46	52.11	74	21.89
9748.0	32.29	PK	221	1.3	V	19.40	51.69	74	22.31
7311.0	33.26	PK	23	1.0	H	16.49	49.75	74	24.25
2490.2	22.81	Ave.	63	1.2	V	6.81	29.62	54	24.38
2387.4	22.55	Ave.	32	1.3	H	6.13	28.68	54	25.32
2343.3	21.14	Ave.	15	1.1	V	5.48	26.62	54	27.38
2490.2	36.29	PK	63	1.2	V	6.81	43.10	74	30.90
2387.4	36.69	PK	32	1.3	H	6.13	42.82	74	31.18
2343.3	35.59	PK	15	1.1	V	5.48	41.07	74	32.93

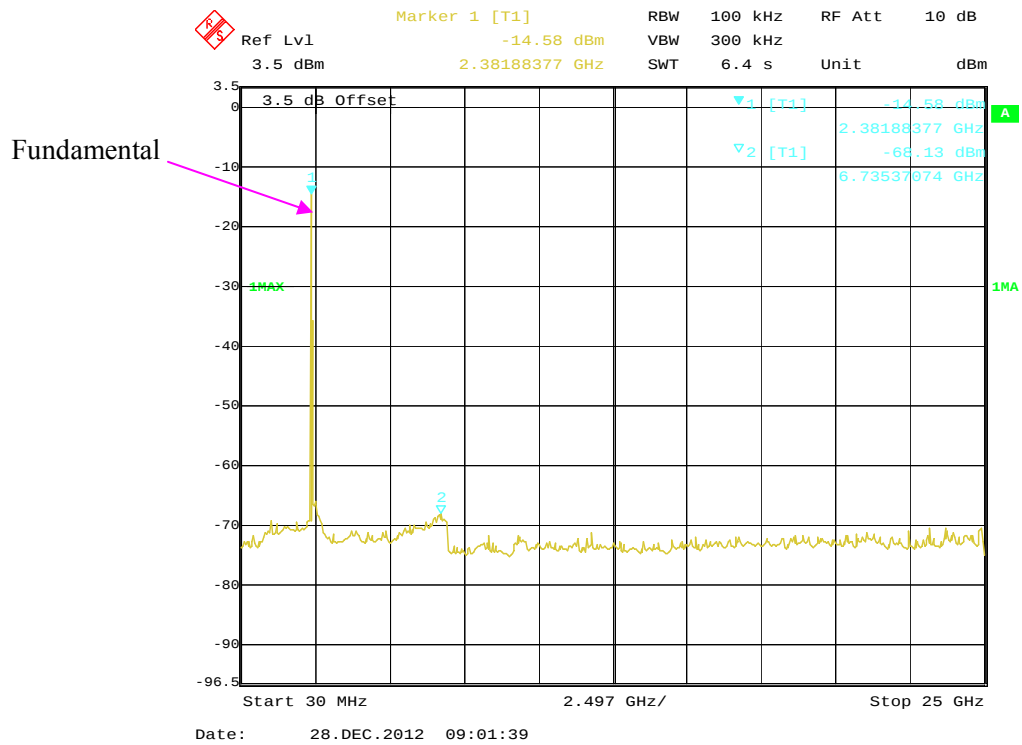
Frequency (MHz)	Receiver		Turntable Degree	Rx Antenna		Corrected Factor (dB)	Corrected Amplitude (dBμV/m)	FCC Part 15.247/15.205/15.209	
	Reading (dBμV)	Detector (PK/QP/Ave.)		Height (m)	Polar (H /V)			Limit (dBμV/m)	Margin (dB)
High Channel(2462 MHz)									
2462.0	82.62	PK	123	1.4	H	7.21	89.83	/	/
2462.0	69.33	Ave.	123	1.4	H	7.21	76.54	/	/
2462.0	81.89	PK	52	1.2	V	6.81	88.70	/	/
2462.0	67.92	Ave.	52	1.2	V	6.81	74.73	/	/
4924.0	25.23	Ave.	38	1.2	H	12.50	37.73	54	16.27
9848.0	17.77	Ave.	221	1.2	V	19.39	37.16	54	16.84
7386.0	18.12	Ave.	25	1.0	H	15.91	34.03	54	19.97
9848.0	32.28	PK	221	1.2	V	19.39	51.67	74	22.33
4924.0	36.89	PK	38	1.2	H	12.50	49.39	74	24.61
7386.0	33.28	PK	25	1.0	H	15.91	49.19	74	24.81
2382.7	22.98	Ave.	256	1.2	H	6.13	29.11	54	24.89
2491.1	22.13	Ave.	34	1.2	V	6.81	28.94	54	25.06
2335.8	21.11	Ave.	36	1.1	V	5.48	26.59	54	27.41
2491.1	36.67	PK	34	1.2	V	6.81	43.48	74	30.52
2382.7	36.61	PK	256	1.2	H	6.13	42.74	74	31.26
2335.8	35.98	PK	36	1.1	V	5.48	41.46	74	32.54

Conducted Spurious Emissions at Antenna Port:**802.11b Low Channel****802.11b Middle Channel**

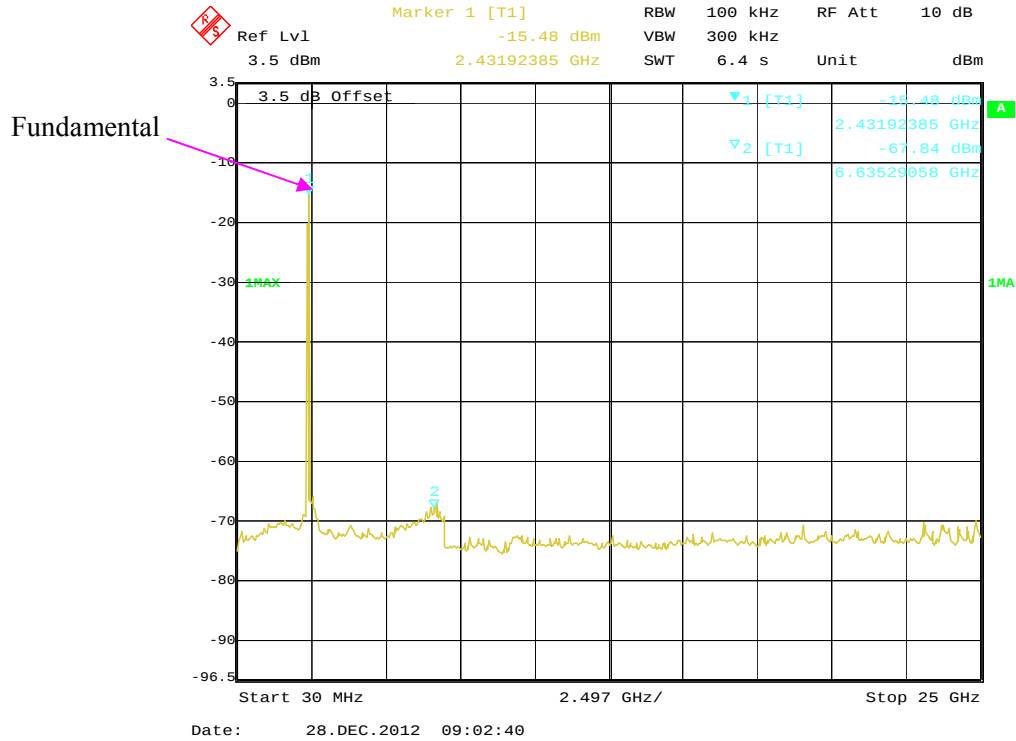
802.11b High Channel



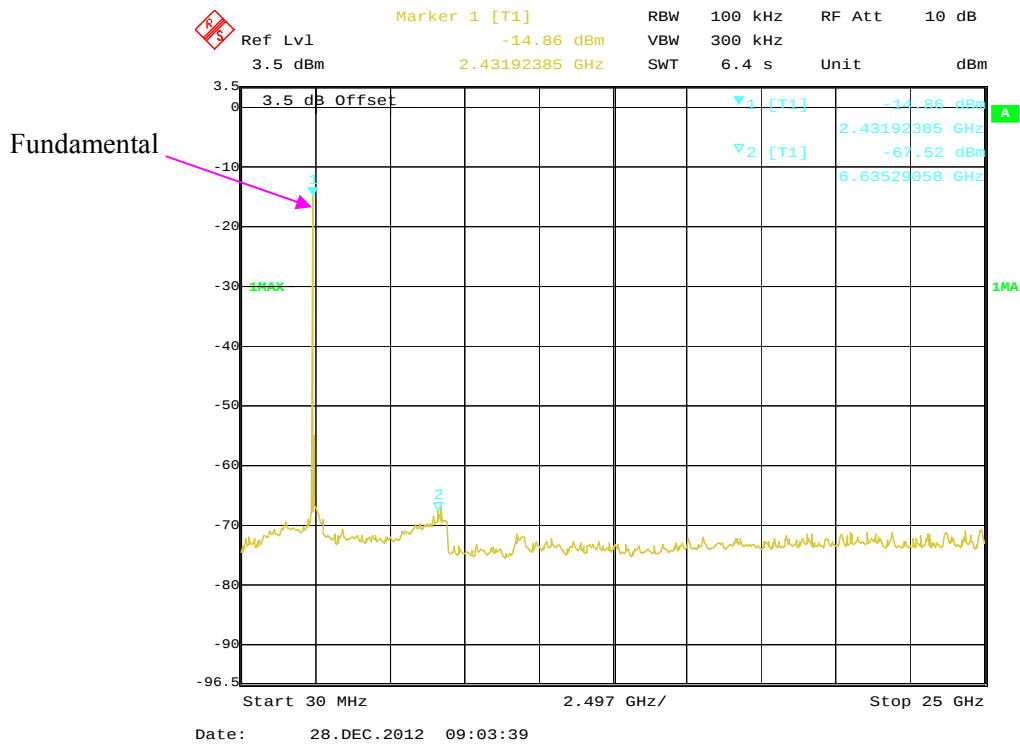
802.11g Low Channel



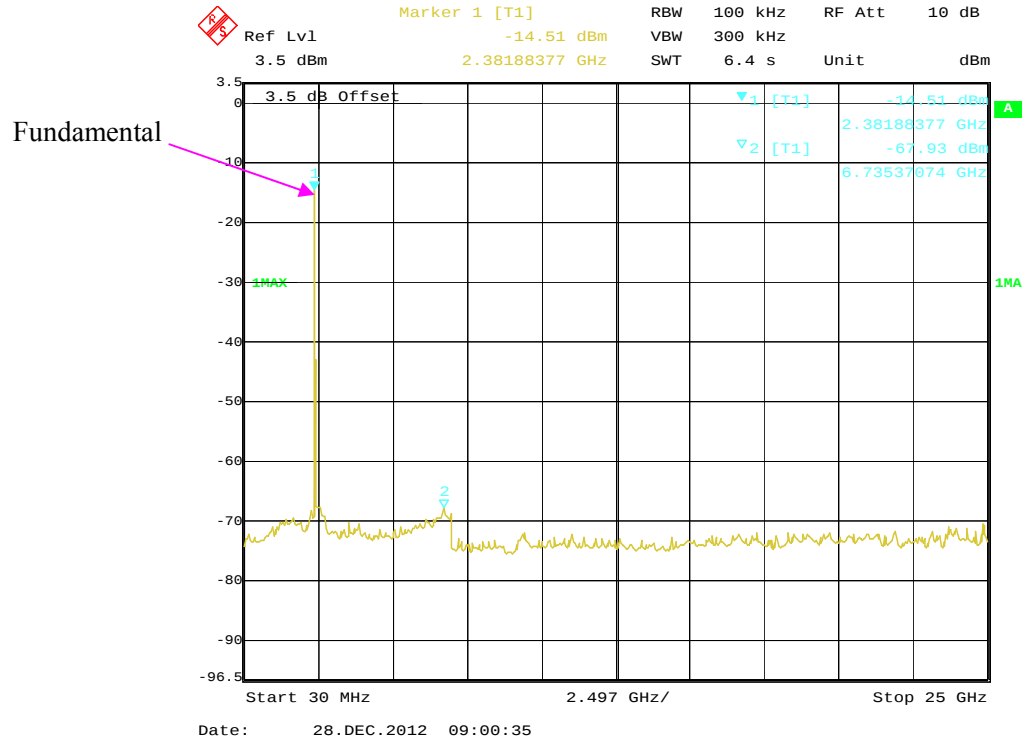
802.11g Middle Channel



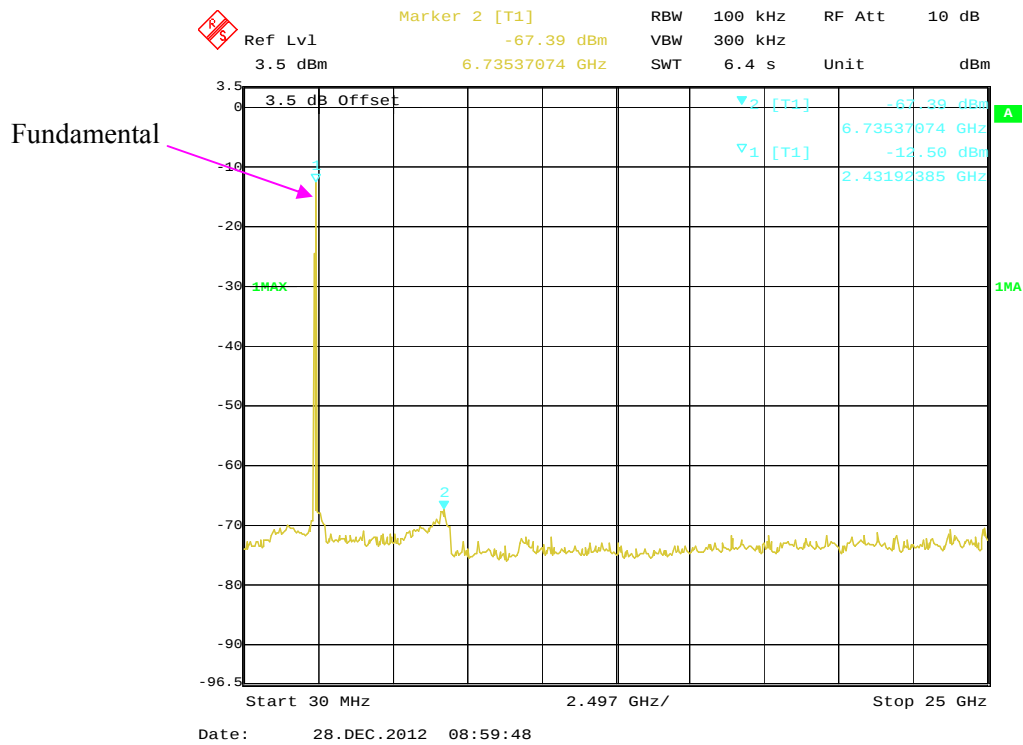
802.11g High Channel



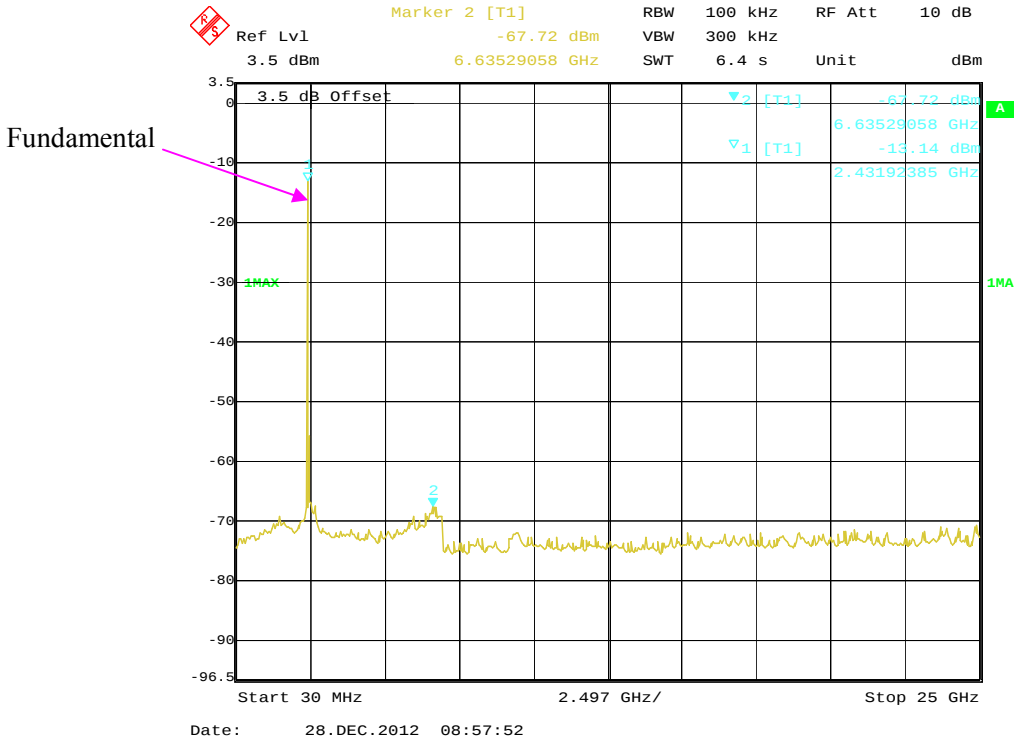
802.11n-HT20 Low Channel



802.11n-HT20 Middle Channel



802.11n-HT20 High Channel



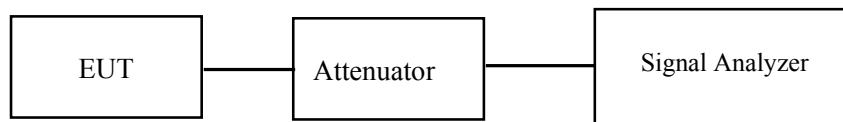
FCC §15.247(a) (2) – 6 dB BANDWIDTH TESTING

Applicable Standard

Systems using digital modulation techniques may operate in the 902–928 MHz, 2400–2483.5 MHz, and 5725–5850 MHz bands. The minimum 6 dB bandwidth shall be at least 500 kHz.

Test Procedure

1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. Position the EUT without connection to measurement instrument. Turn on the EUT and connect it to measurement instrument. Then set it to any one convenient frequency within its operating range. Set a reference level on the measuring instrument equal to the highest peak value.
3. Measure the frequency difference of two frequencies that were attenuated 6 dB from the reference level. Record the frequency difference as the emission bandwidth.
4. Repeat above procedures until all frequencies measured were complete.



Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	Signal Analyzer	FSIQ26	8386001028	2012-11-24	2013-11-23

* **Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Shenzhen) attests that all calibrations have been performed in accordance to requirements that traceable to National Primary Standards and International System of Units (SI).

Test Data

Environmental Conditions

Temperature:	25 °C
Relative Humidity:	56%
ATM Pressure:	100.0kPa

The testing was performed by Henry Ding on 2012-12-26.

EUT operation mode: Transmitting

Test Result: Compliance

Channel	Channel Frequency (MHz)	6 dB Bandwidth (MHz)	Limit (kHz)
802.11b mode			
Low	2412	10.10	≥500
Middle	2437	10.10	≥500
High	2462	10.10	≥500
802.11g mode			
Low	2412	16.35	≥500
Middle	2437	16.35	≥500
High	2462	16.35	≥500
802.11n-HT20 mode			
Low	2412	17.49	≥500
Middle	2437	17.49	≥500
High	2462	17.49	≥500

Delta 1 [T1] 0.23 dB
 Ref Lvl 13.5 dBm
 10.10020040 MHz
 RBW 100 kHz
 VBW 300 kHz
 RF Att 20 dB
 SWT 7.5 ms
 Unit dBm

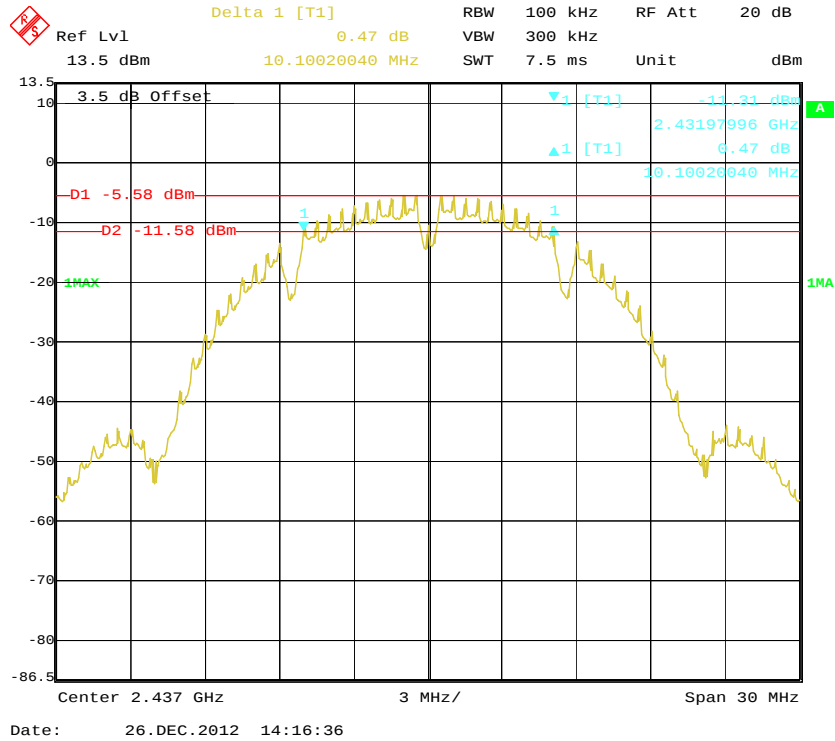
3.5 dB Offset: -11.53 dBm
 2.40697996 GHz
 0.23 dB
 10.10020040 MHz

D1 -5.96 dBm
 D2 -11.96 dBm
 1MAX
 1A

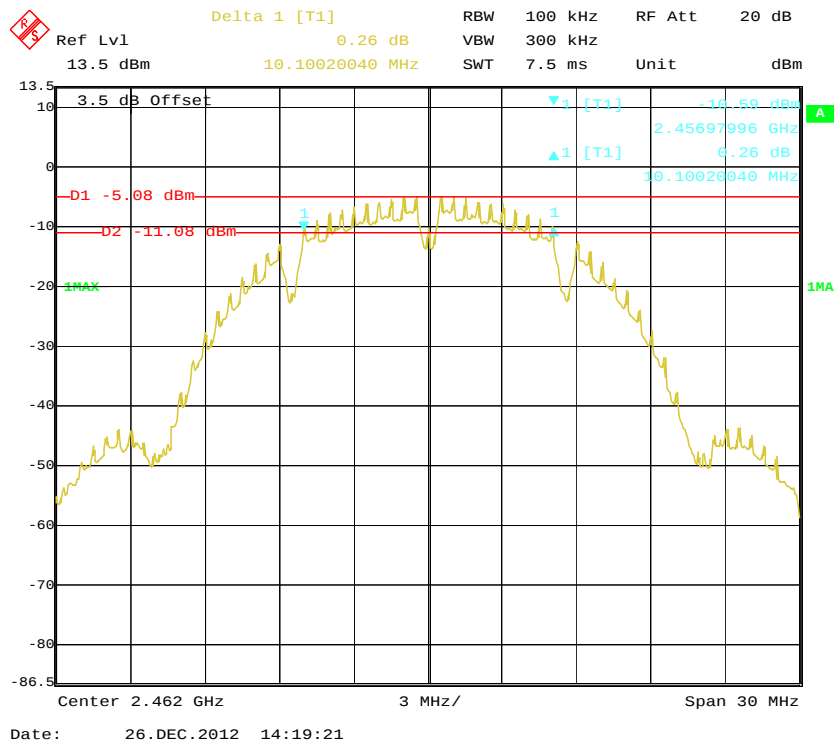
Center 2.412 GHz
 3 MHz/
 Span 30 MHz

Date: 26.DEC.2012 14:14:10

802.11b Middle Channel



802.11b High Channel



Ref Lvl 13.5 dBm
Delta 1 [T1] 0.79 dB
RBW 100 kHz
VBW 300 kHz
RF Att 20 dB
SWT 7.5 ms
Unit dBm

3.5 dB Offset
-D1 -13.56 dBm
-D2 -19.5 dBm
-MAX
-18.92 dBm
2.40385371 GHz
0.79 dB
16.35270541 MHz
1MA

Center 2.412 GHz
3 MHz/
Span 30 MHz

Date: 26.DEC.2012 14:24:51

Ref Lvl 13.5 dBm Delta 1 [T1] 1.02 dB RBW 100 kHz RF Att 20 dB

3.5 dB Offset 16.35270541 MHz VBW 300 kHz Unit dBm

SWT 7.5 ms

13.5 dBm 10 dB 0 dB -10 dB -20 dB -30 dB -40 dB -50 dB -60 dB -70 dB -86.5 dBm

3.5 dB Offset

1 [T1] -18.82 dBm 2.42885371 GHz 1.02 dB 16.35270541 MHz

D1 -12.82 dBm D2 -18.82 dBm

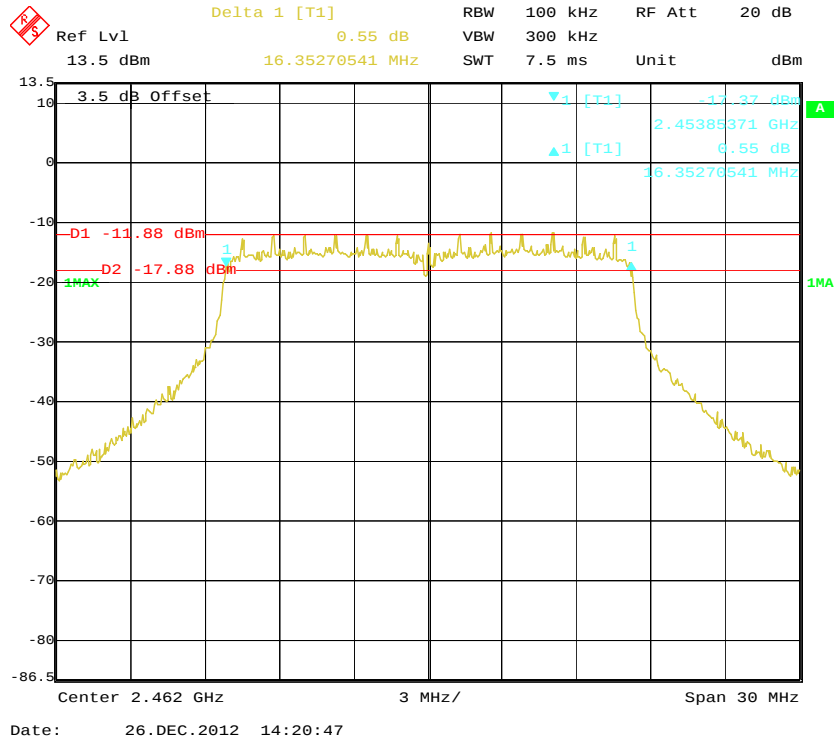
1MAX

1MA

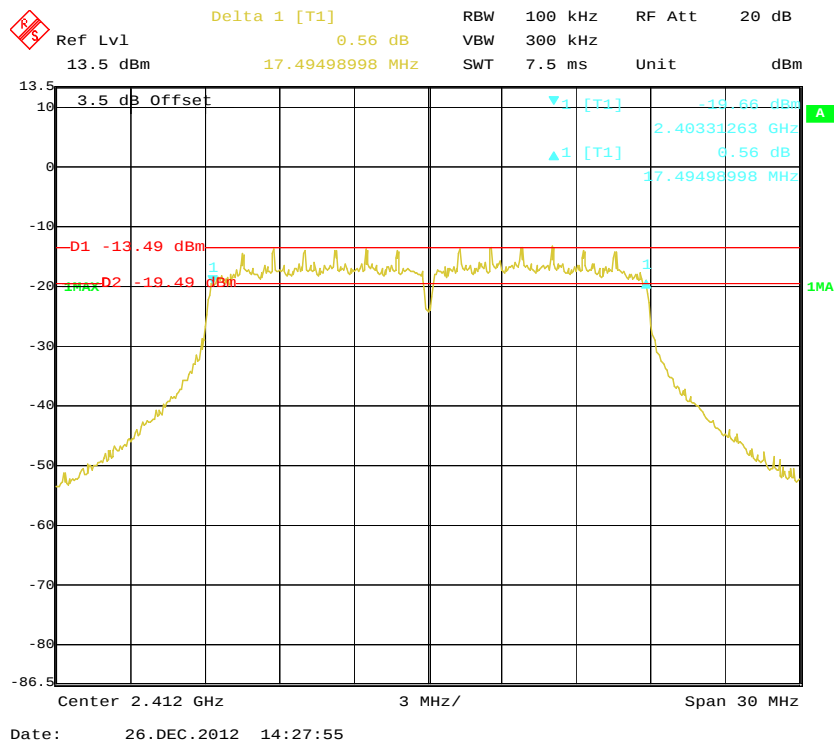
Center 2.437 GHz 3 MHz/ Span 30 MHz

Date: 26.DEC.2012 14:23:24

802.11g High Channel



802.11n-HT20 Low Channel



[illegible]

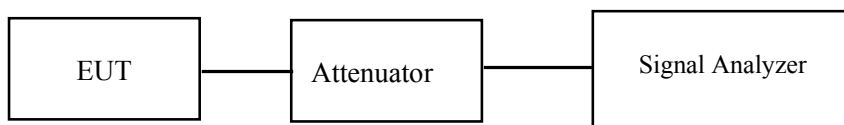
FCC §15.247(b) (3) - MAXIMUM PEAK OUTPUT POWER

Applicable Standard

According to §15.247(b) (3), for systems using digital modulation in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz bands: 1 Watt. As an alternative to a peak power measurement, compliance with the one Watt limit can be based on a measurement of the maximum conducted output power. Maximum Conducted Output Power is defined as the total transmit power delivered to all antennas and antenna elements averaged across all symbols in the signaling alphabet when the transmitter is operating at its maximum power control level. Power must be summed across all antennas and antenna elements. The average must not include any time intervals during which the transmitter is off or is transmitting at a reduced power level. If multiple modes of operation are possible (e.g., alternative modulation methods), the maximum conducted output power is the highest total transmit power occurring in any mode.

Test Procedure

1. Place the EUT on a bench and set it in transmitting mode.
2. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to an EMI Test Receiver.
3. Add a correction factor to the display.



Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	Signal Analyzer	FSIQ26	8386001028	2012-11-24	2013-11-23

* **Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Shenzhen) attests that all calibrations have been performed in accordance to requirements that traceable to National Primary Standards and International System of Units (SI).

Test Data

Environmental Conditions

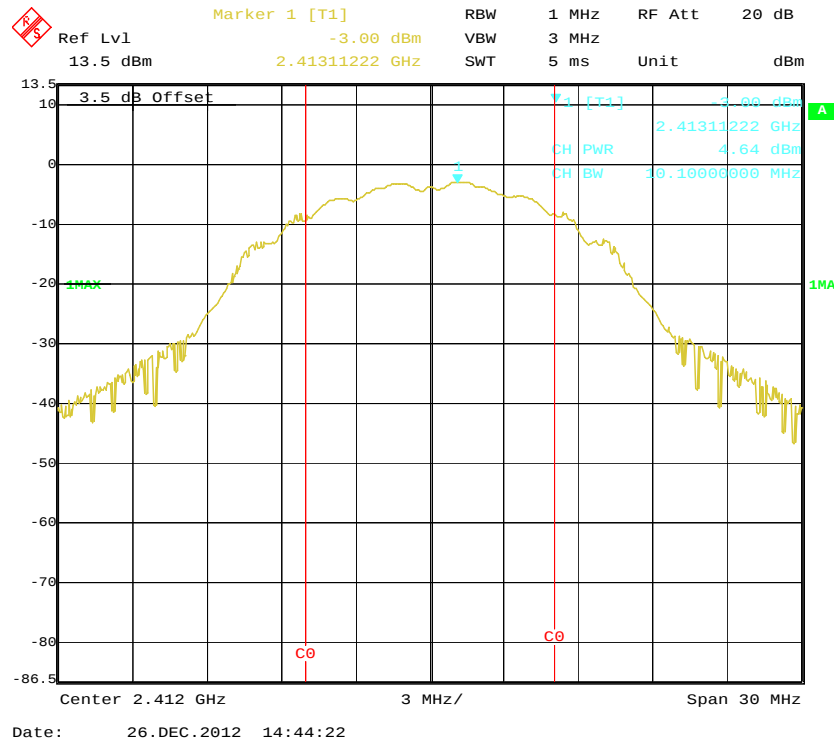
Temperature:	25 ° C
Relative Humidity:	56 %
ATM Pressure:	100.0 kPa

The testing was performed by Henry Ding on 2012-12-26.

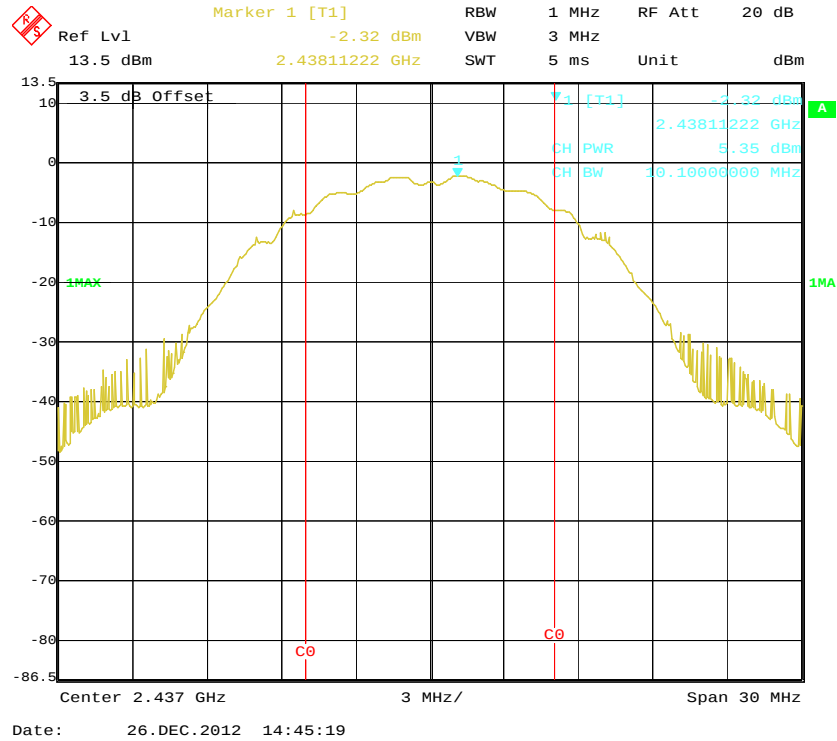
EUT operation mode: Transmitting

Channel	Frequency (MHz)	Output Power (dBm)	Limit (dBm)	Result
802.11b mode				
Low	2412	4.64	30	Pass
Middle	2437	5.35	30	Pass
High	2462	6.01	30	Pass
802.11g mode				
Low	2412	5.42	30	Pass
Middle	2437	5.75	30	Pass
High	2462	6.36	30	Pass
802.11n-HT20 mode				
Low	2412	5.05	30	Pass
Middle	2437	5.62	30	Pass
High	2462	6.17	30	Pass

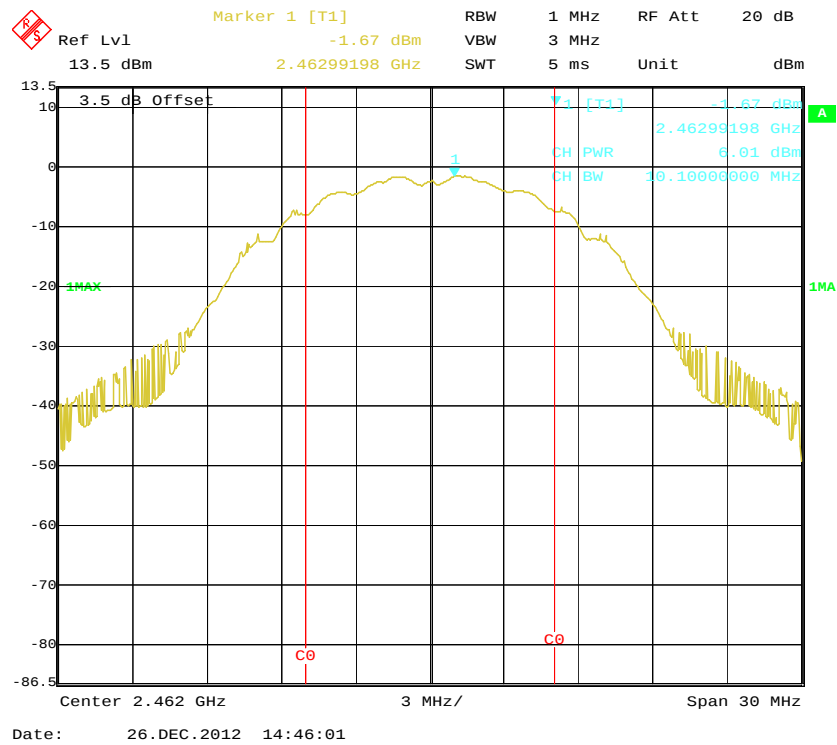
802.11b RF Output Power, Low Channel



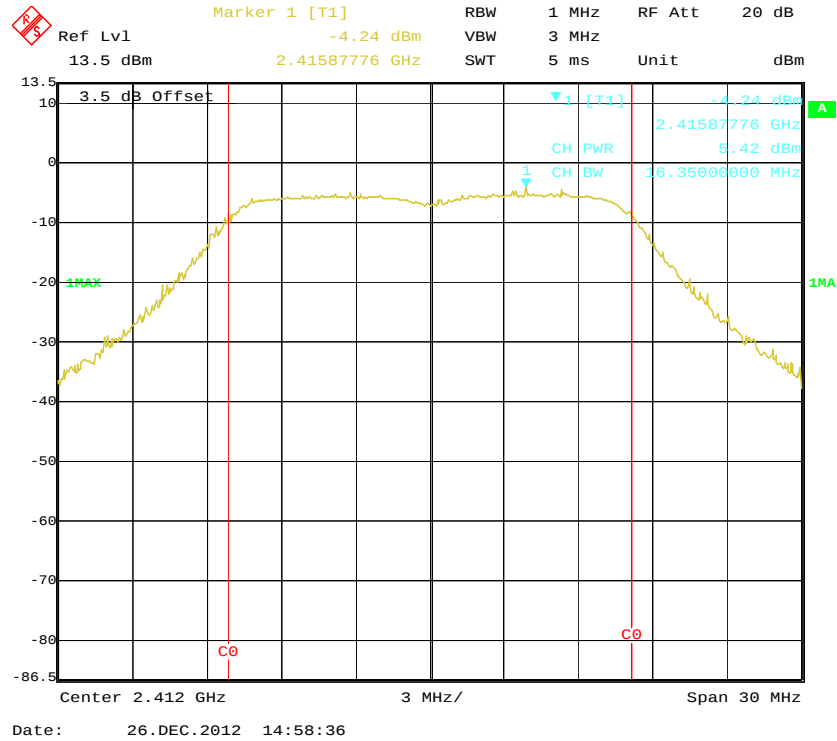
802.11b RF Output Power, Middle Channel



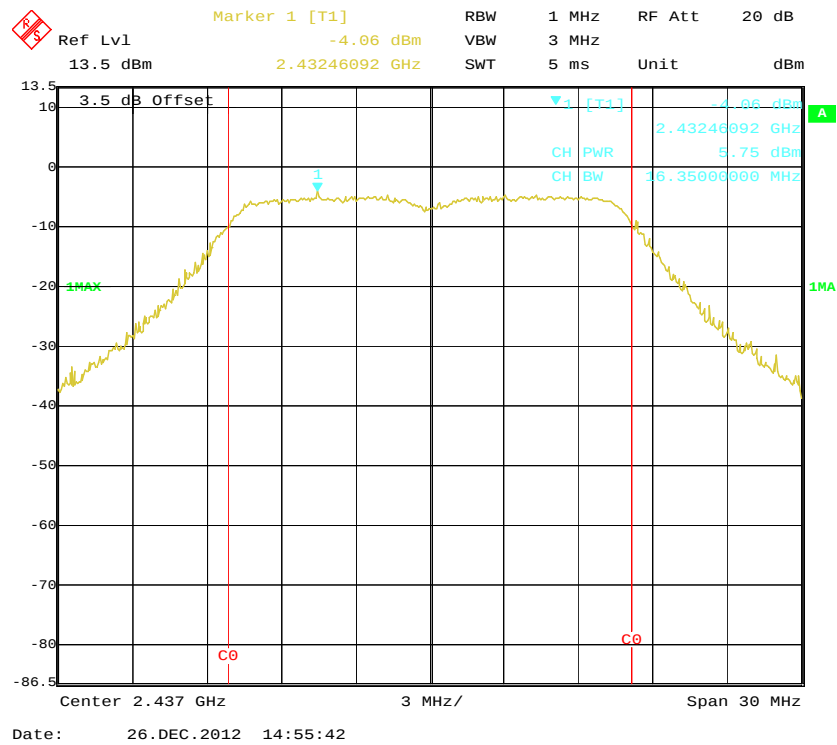
802.11b RF Output Power, High Channel



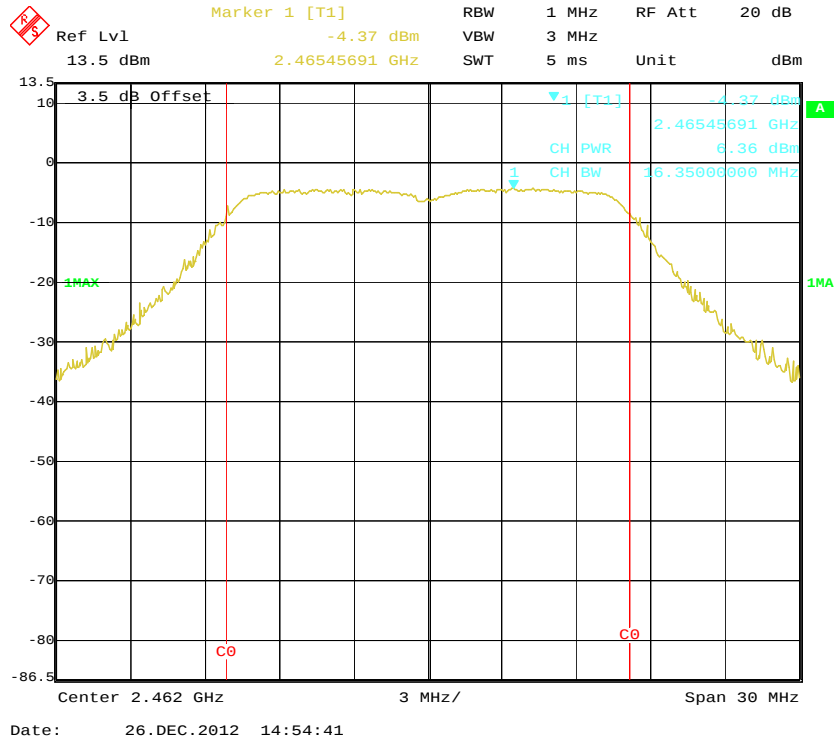
802.11g RF Output Power, Low Channel



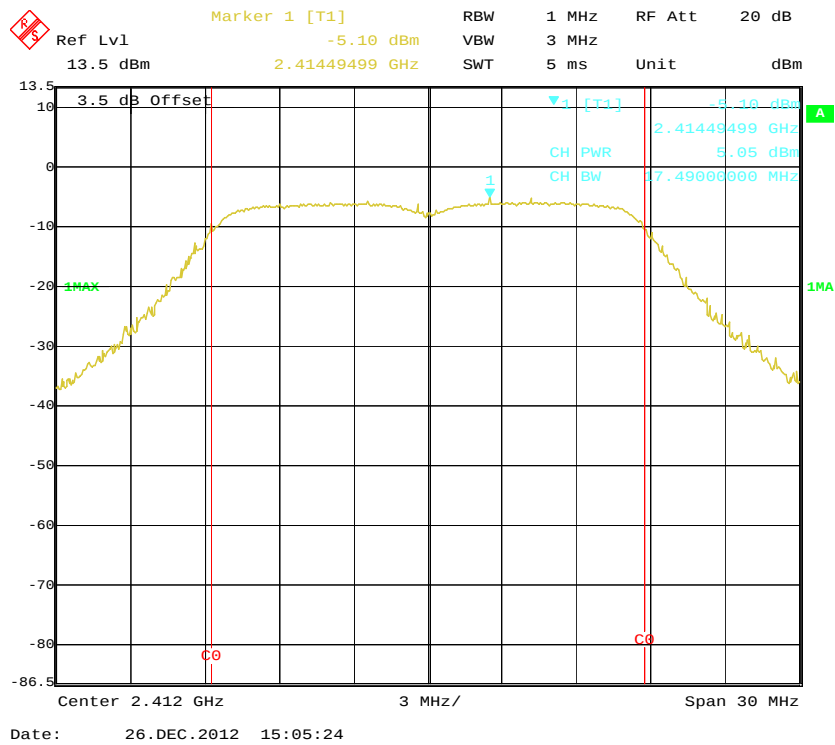
802.11g RF Output Power, Middle Channel



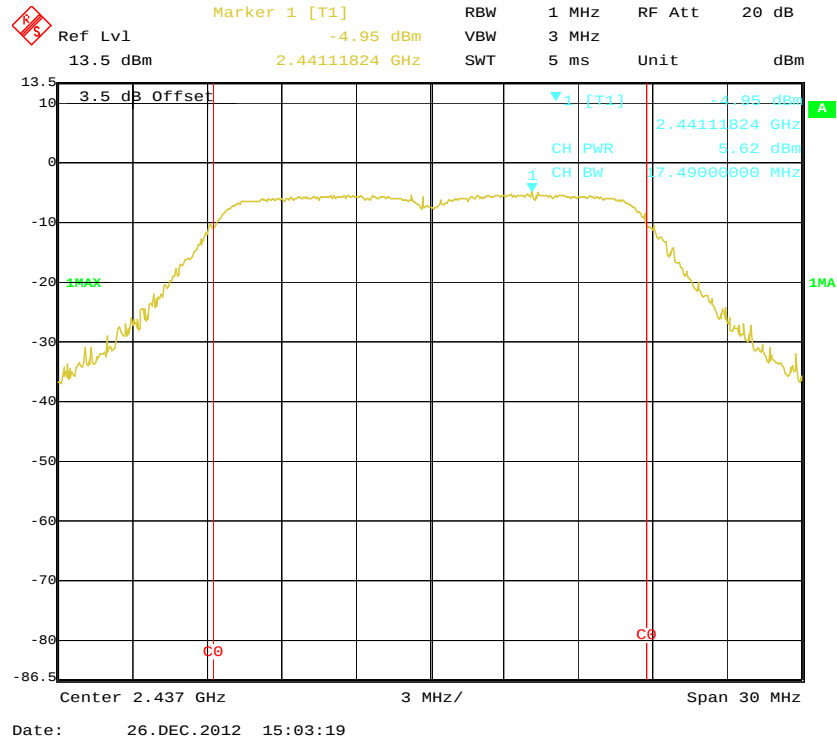
802.11g RF Output Power, High Channel



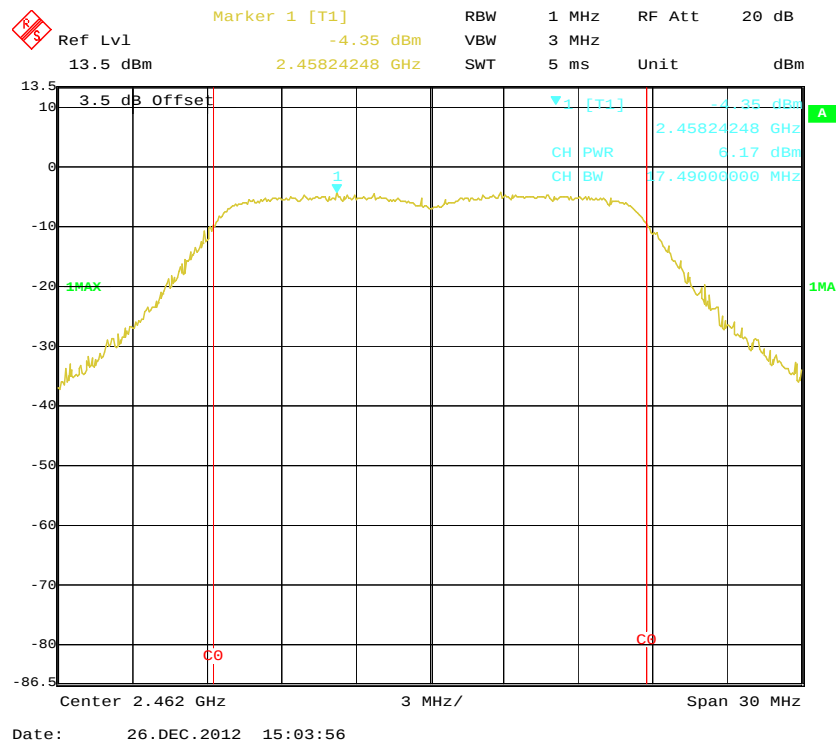
802.11n-HT20 RF Output Power, Low Channel



802.11 n-HT20 RF Output Power, Middle Channel



802.11 n-HT20 RF Output Power, High Channel

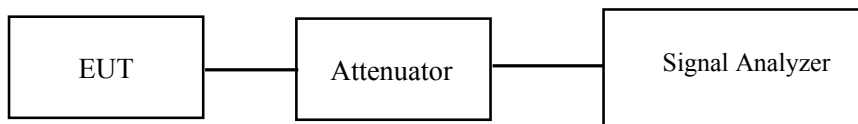


FCC §15.247(d) – 100 kHz BANDWIDTH OF FREQUENCY BAND EDGE**Applicable Standard**

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)).

Test Procedure

1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. Position the EUT without connection to measurement instrument. Turn on the EUT and connect its antenna terminal to measurement instrument via a low loss cable. Then set it to any one measured frequency within its operating range, and make sure the instrument is operated in its linear range.
3. Set RBW to 100 kHz and VBW of spectrum analyzer to 300 kHz with a convenient frequency span including 100 kHz bandwidth from band edge.
4. Measure the highest amplitude appearing on spectral display and set it as a reference level. Plot the graph with marking the highest point and edge frequency.
5. Repeat above procedures until all measured frequencies were complete.

**Test Equipment List and Details**

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	Signal Analyzer	FSIQ26	8386001028	2012-11-24	2013-11-23

* **Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Shenzhen) attests that all calibrations have been performed in accordance to requirements that traceable to National Primary Standards and International System of Units (SI).

Test Data**Environmental Conditions**

Temperature:	25 ° C
Relative Humidity:	56 %
ATM Pressure:	100.0 kPa

The testing was performed by Henry Ding on 2012-12-28.

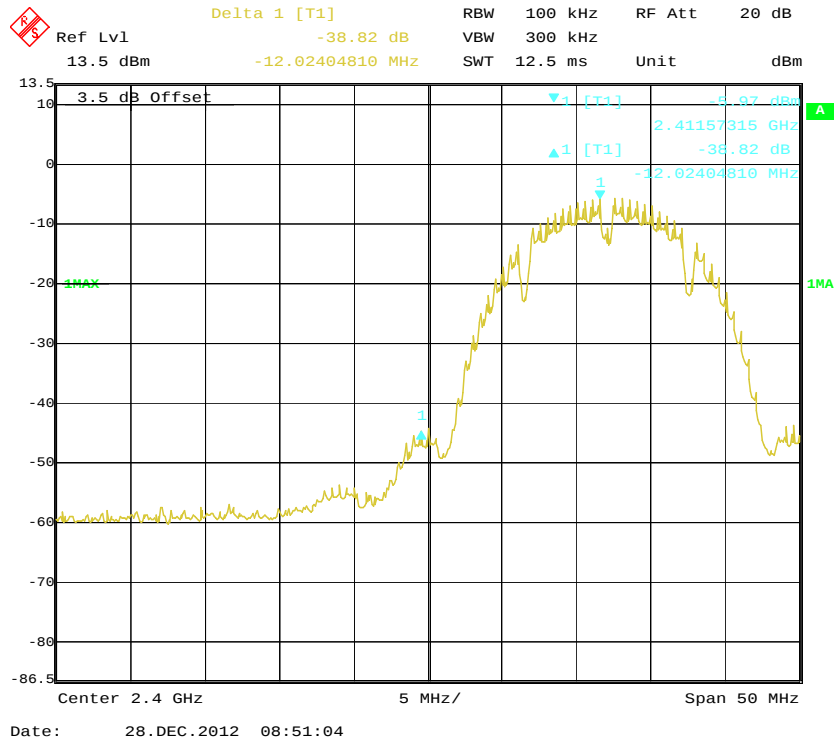
Test mode: Transmitting

Test Result: Compliance.

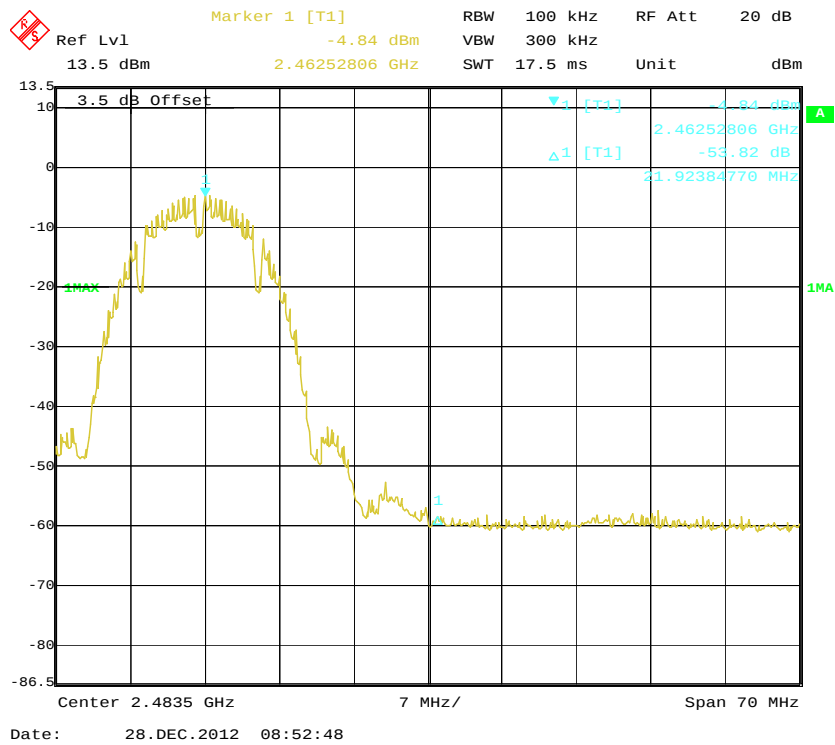
Please refer to following plots.

Frequency Band	Delta Peak to band emission (dBc)	Limit (dBc)	Result
802.11b mode			
Left-band	38.82	20	Pass
Right-band	53.82	20	Pass
802.11g mode			
Left-band	33.28	20	Pass
Right-band	46.68	20	Pass
802.11n mode			
Left-band	32.91	20	Pass
Right-band	47.46	20	Pass

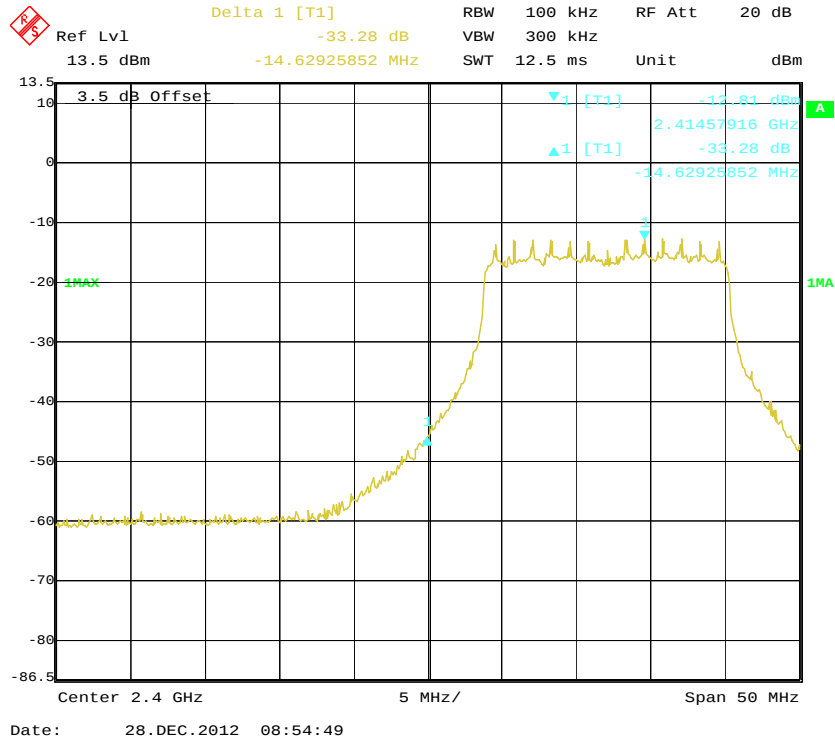
802.11b: Band Edge, Left Side



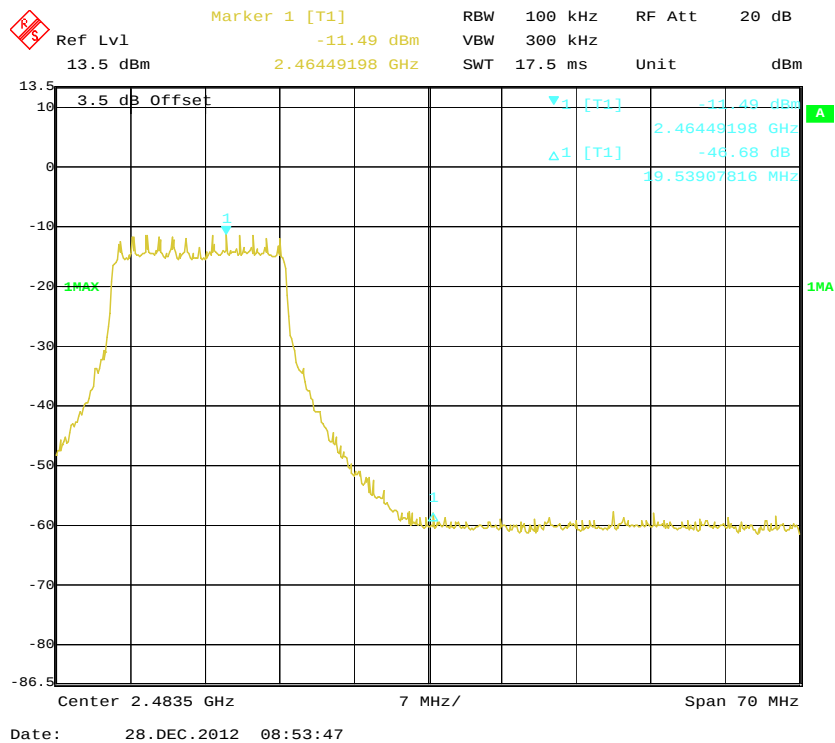
802.11b: Band Edge, Right Side



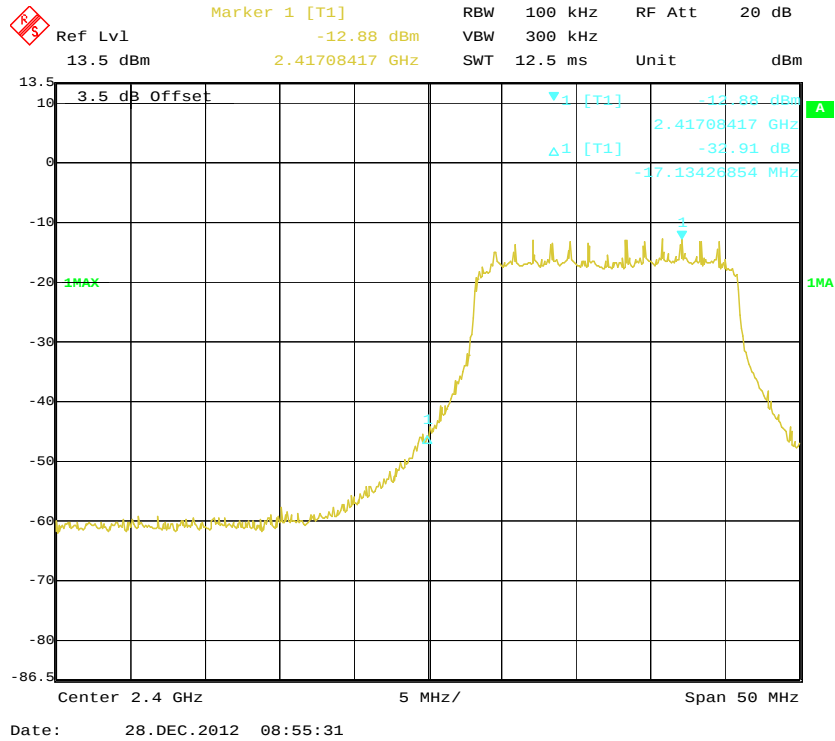
802.11g: Band Edge, Left Side



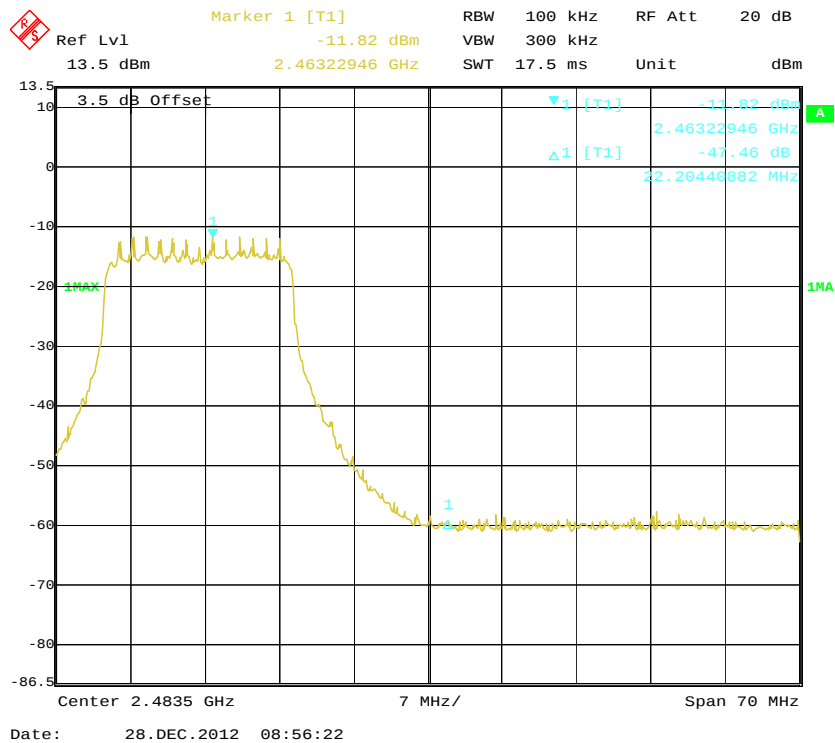
802.11g: Band Edge, Right Side



802.11n-HT20: Band Edge, Left Side



802.11n-HT20: Band Edge, Right Side



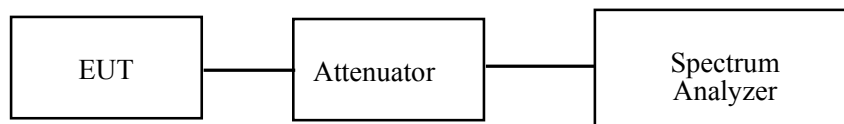
FCC §15.247(e) - POWER SPECTRAL DENSITY

Applicable Standard

For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission. This power spectral density shall be determined in accordance with the provisions of paragraph (b) of this section. The same method of determining the conducted output power shall be used to determine the power spectral density.

Test Procedure

1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. Position the EUT was set without connection to measurement instrument. Turn on the EUT and connect its antenna terminal to measurement instrument via a low loss cable. Then set it to any one measured frequency within its operating range, and make sure the instrument is operated in its linear range.
3. Adjust the center frequency of SA on any frequency be measured and set SA to 1.5MHz span mode. And then, set RBW and VBW of spectrum analyzer to proper value. (DTS)
4. Repeat above procedures until all frequencies measured were complete.



Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	Signal Analyzer	FSIQ26	8386001028	2012-11-24	2013-11-23

* **Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Shenzhen) attests that all calibrations have been performed in accordance to requirements that traceable to National Primary Standards and International System of Units (SI).

Test Data

Environmental Conditions

Temperature:	25 ° C
Relative Humidity:	56 %
ATM Pressure:	100.0 kPa

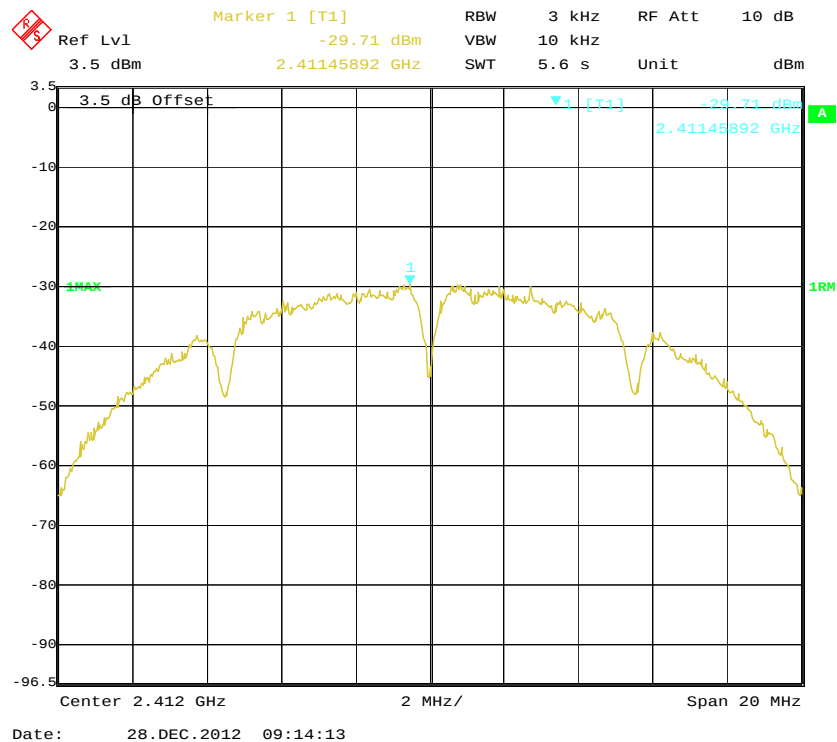
The testing was performed by Henry Ding on 2012-12-28.

EUT operation mode: Transmitting

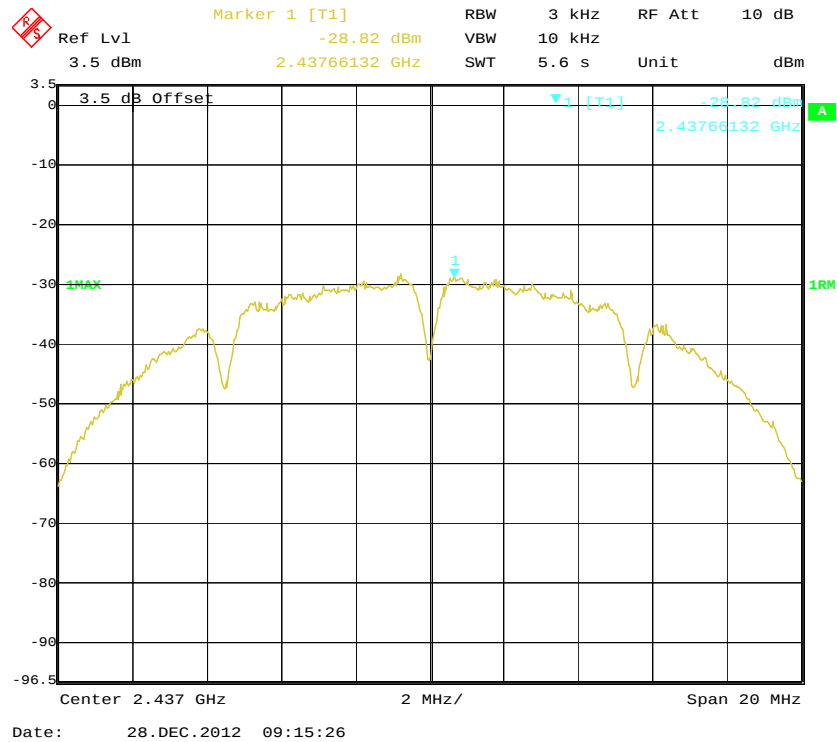
Test Result: Pass

Channel	Frequency (MHz)	Power spectral density (dBm/3kHz)	Limit (dBm/3kHz)
802.11b mode			
Low	2412	-14.51	8
Middle	2437	-13.62	8
High	2462	-8.28	8
802.11g mode			
Low	2412	-11.76	8
Middle	2437	-12.82	8
High	2462	-11.99	8
802.11n-HT20 mode			
Low	2412	-14.22	8
Middle	2437	-13.40	8
High	2462	-12.03	8

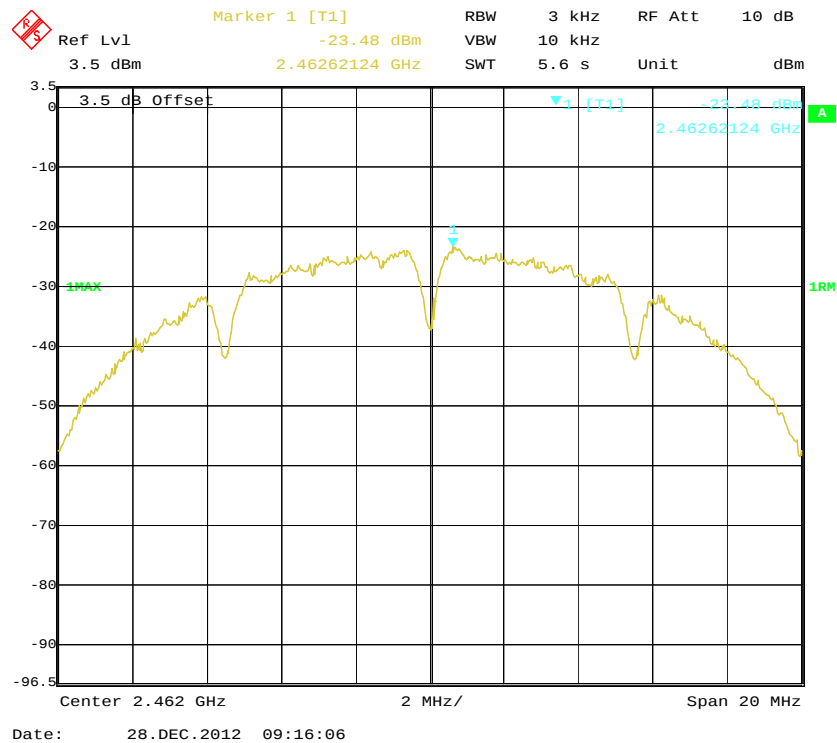
Power Spectral Density, 802.11b Low Channel



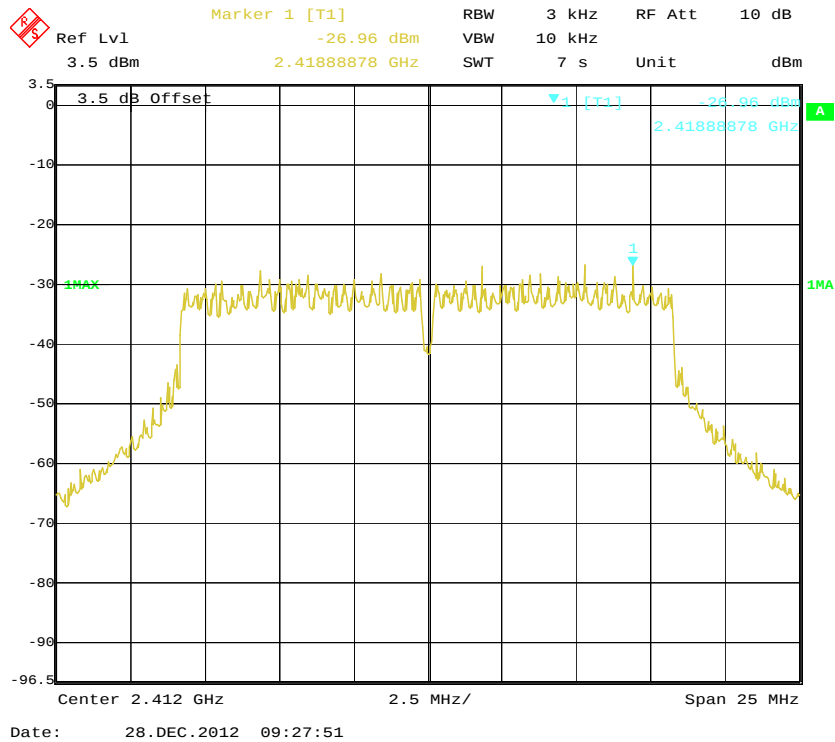
Power Spectral Density, 802.11b Middle Channel



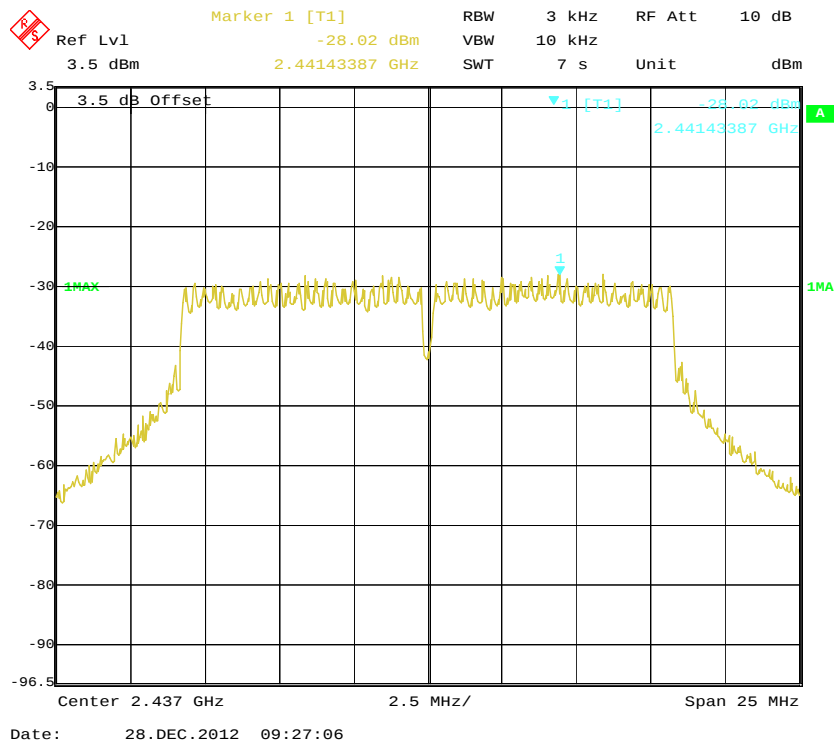
Power Spectral Density, 802.11b High Channel



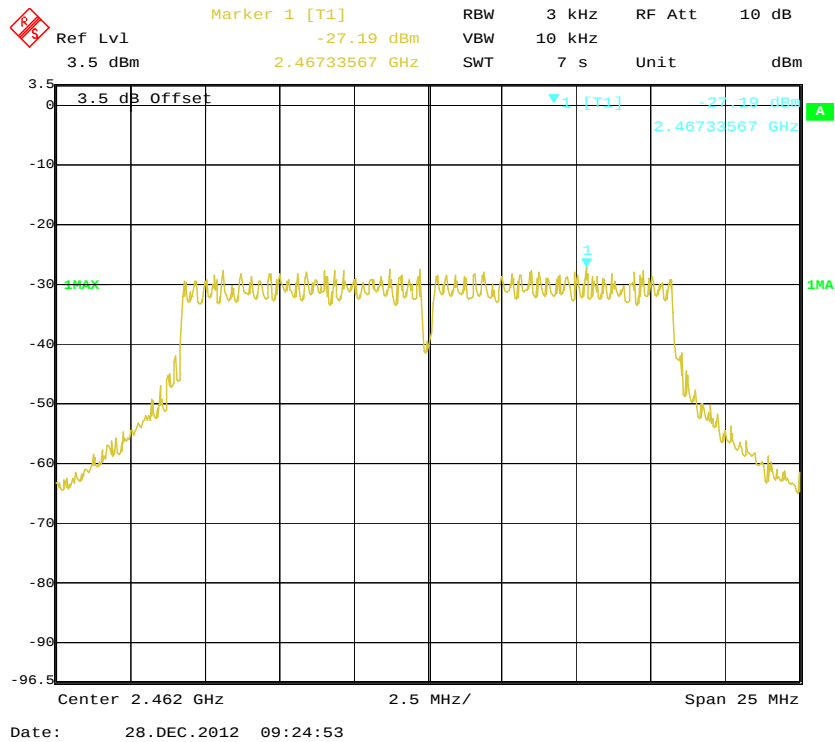
Power Spectral Density, 802.11g Low Channel



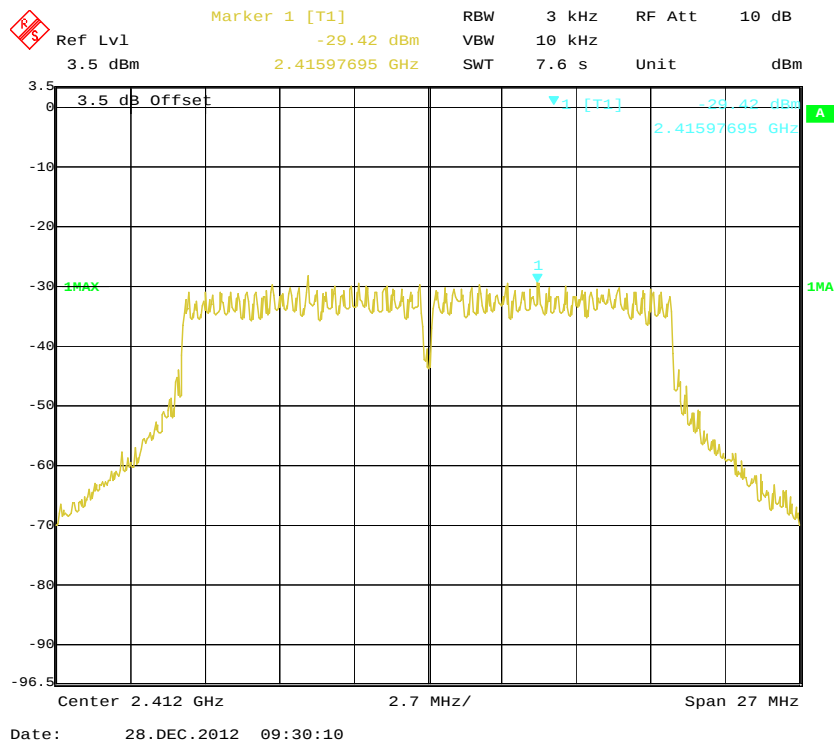
Power Spectral Density, 802.11g Middle Channel



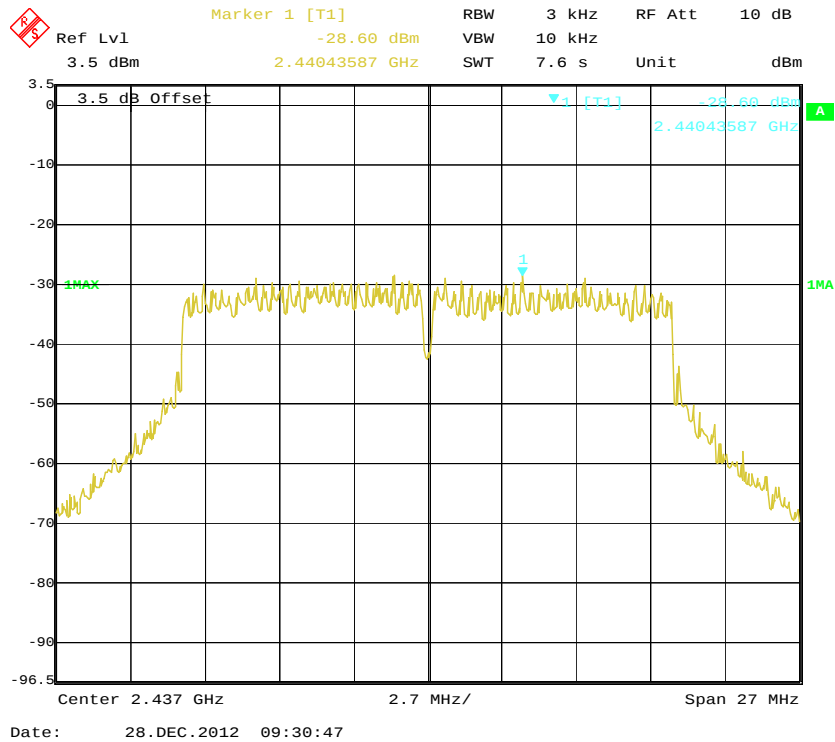
Power Spectral Density, 802.11g High Channel



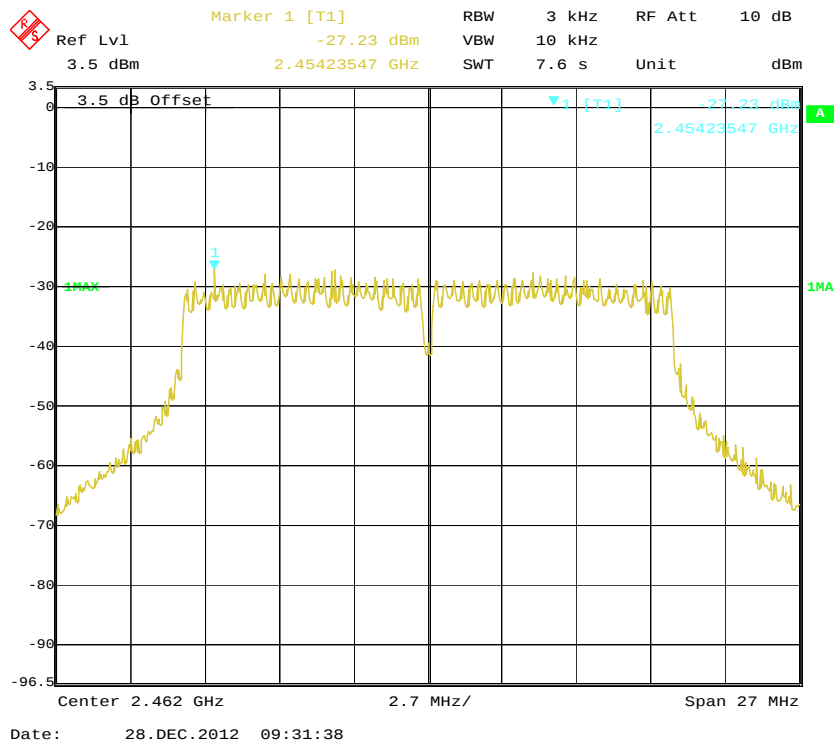
Power Spectral Density, 802.11n-HT20 Low Channel



Power Spectral Density, 802.11n-HT20 Middle Channel



Power Spectral Density, 802.11n-HT20 High Channel



***** END OF REPORT *****