

FCC PART 15.247

TEST REPORT

For

SDATAWAY SA.

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FCC ID: QFHB10READER

Report Type: Original Report	Product Type: B10 Reader
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Report Number:	R1XM121127051-00A
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Note: This test report is prepared for the customer shown above and for the device described herein. It may not be duplicated or used in part without prior written consent from Bay Area Compliance Laboratories Corp. (Dongguan).

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GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

The SDATAWAY SA.'s product, model number: B10 Reader (*FCC ID: QFHB10READER*) or ("EUT") in this report is a B10 Reader, which was measured approximately: 23.0 cm (L) x11.0 cm (W) x8.4 cm (H), rated input voltage: DC 3.7V from lithium battery or DC 5V from adapter.

Adapter Information:

MODEL: KSAS0060500100D5D

INPUT: 100-240V, 50/60Hz, 0.18A

OUTPUT: 5.0V, 1.0A

** All measurement and test data in this report was gathered from production sample serial number: 121127051 (Assigned by BACL, Dongguan). The EUT was received on 2012-12-04.*

Objective

This report is prepared on behalf of SDATAWAY SA.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 the compliance of the EUT with FCC Part 15-Subpart C, section 15.203, 15.205, 15.207, 15.209 and 15.247 rules.

Related Submittal(s)/Grant(s)

FCC Part 15B JBP submissions with FCC ID: QFHB10READER

FCC Part 15C DXX submissions with FCC ID: QFHB10READER for RFID.

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. (Dongguan). The radiated testing was performed at an antenna-to-EUT distance of 3 meters.

The uncertainty of any RF tests which use conducted method measurement is ± 0.96 dB, the uncertainty of any radiation on emissions measurement is ± 4.0 dB

Test Facility

The Test site used by Bay Area Compliance Laboratories Corp. (Dongguan) to collect test data is located on the No.69 Pulongcun, Puxinhu Industrial Zone, Tangxia, Dongguan, Guangdong, China

Test site at Bay Area Compliance Laboratories Corp. (Dongguan) 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 February 02, 2012. 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.: 273710. 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

The EUT was configured for testing in an engineering mode which was provided by the manufacturer.

For 802.11b and 802.11g, 802.11n20 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 802.11 n20 modes were tested with Channel 1, 6 and 11.

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

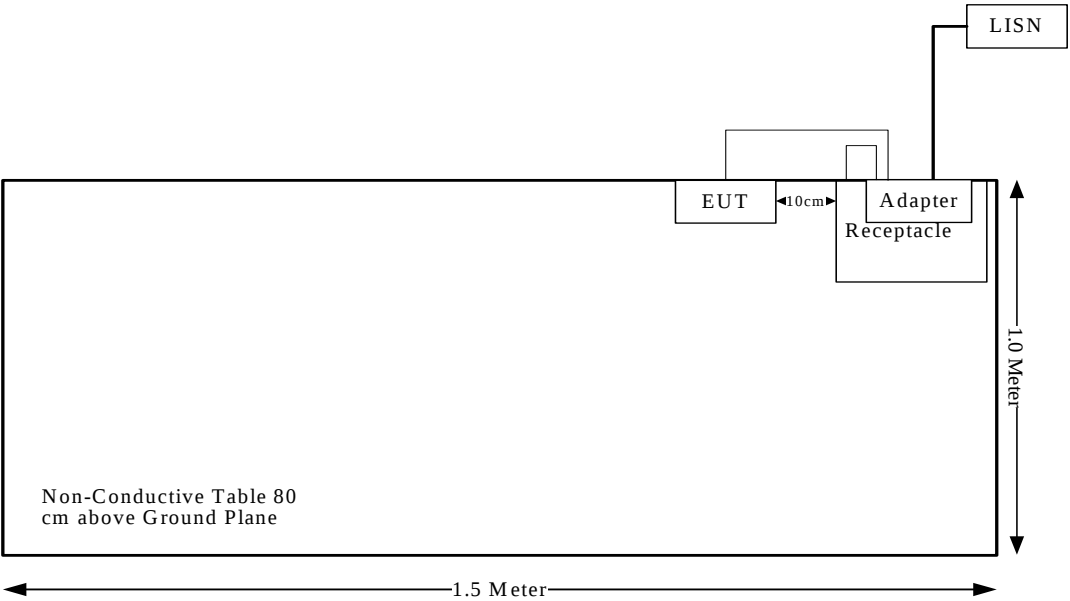
EUT Exercise Software

The test was performed under “RT5350 AP V1.0.1.0”, which was provided by the manufacturer.

Equipment Modifications

No modification.

Block Diagram of Test Setup



SUMMARY OF TEST RESULTS

FCC Rules	Description of Test	Result
§1.1307 (b) (1) & §2.1091	Maximum Permissible exposure (MPE)	Compliance
§15.203	Antenna Requirement	Compliance
§15.207 (a)	AC Line 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 Emission 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) & §2.1091- MAXIMUM PERMISSIBLE EXPOSURE (MPE)

Applicable Standard

According to subpart 15.247(i) and subpart §1.1307(b)(1), systems operating under the provisions of this section shall be operated in a manner that ensures that the public is not exposed to radio frequency energy level in excess of the Commission's guidelines.

Limits for Maximum Permissible Exposure (MPE) (§1.1310, §2.1091)

(B) Limits for General Population/Uncontrolled Exposure				
Frequency Range (MHz)	Electric Field Strength (V/m)	Magnetic Field Strength (A/m)	Power Density (mW/cm ²)	Averaging Time (minutes)
0.3–1.34	614	1.63	*(100)	30
1.34–30	824/f	2.19/f	*(180/f ²)	30
30–300	27.5	0.073	0.2	30
300–1500	/	/	f/1500	30
1500–100,000	/	/	1.0	30

f = frequency in MHz; * = Plane-wave equivalent power density;

According to §1.1310 and §2.1091 RF exposure is calculated.

Calculated Formulary:

Predication of MPE limit at a given distance

$S = PG/4\pi R^2$ = power density (in appropriate units, e.g. mW/cm²);

P = power input to the antenna (in appropriate units, e.g., mW);

G = power gain of the antenna in the direction of interest relative to an isotropic radiator, the power gain factor, is normally numeric gain;

R = distance to the center of radiation of the antenna (appropriate units, e.g., cm);

Calculated Data:

Mode	Frequency (MHz)	Antenna Gain		Conducted Power		Evaluation Distance (cm)	Power Density (mW/cm ²)	MPE Limit (mW/cm ²)
		(dBi)	(numeric)	(dBm)	(mW)			
802.11b	2412	1	1.26	18.8	75.86	20	0.0190	1.0
802.11g	2462	1	1.26	14.87	30.69	20	0.0077	1.0
802.11n ht20	2462	1	1.26	14.72	29.65	20	0.0074	1.0

Result: The device meet FCC MPE at 20 cm distance

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.

Antenna Connector Construction

The EUT has an internal Antenna, which complied with 15.203, the maximum gain is 1.0 dBi, please refer to the internal photos.

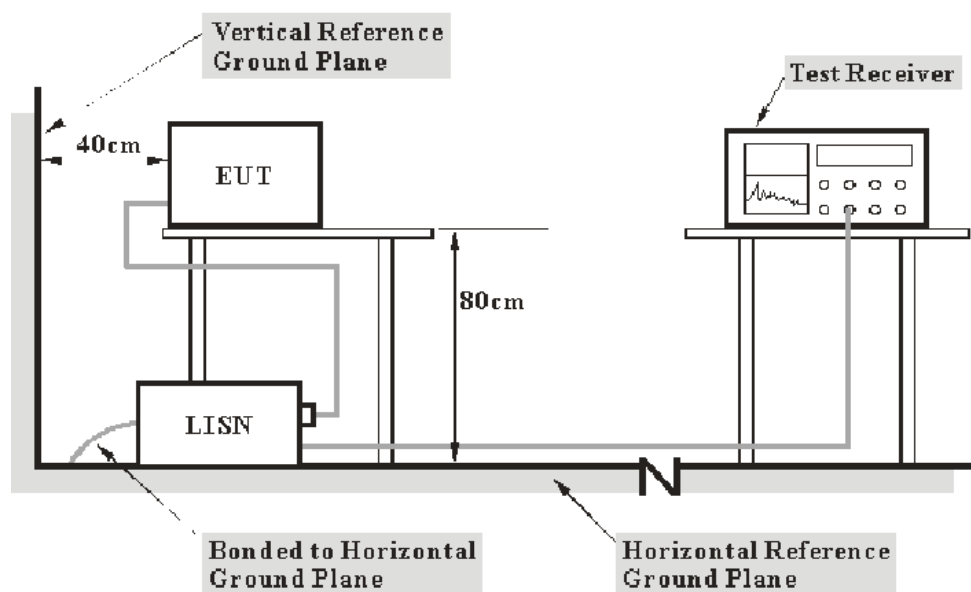
Result: Compliance.

Applicable Standard

Measurement Uncertainty

Based on NIS 81, The Treatment of Uncertainty in EMC Measurements, the best estimate of the uncertainty of any conducted emissions measurement at Bay Area Compliance Laboratory Corp. (Dongguan) is ± 2.4 dB (k=2, 95% level of confidence), and the uncertainty will not be taken into consideration for all 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 spacing between the peripherals was 10 cm.

The adapter 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:

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

Test Procedure

During the conducted emission test, the adapter 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 Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R&S	EMI Test Receiver	ESCS 30	830245/006	2012-11-29	2013-11-28
R&S	LISN1	ESH3-Z5	843331/015	2012-09-17	2013-09-16
R&S	LISN2	ESH3-Z5	100113	2012-11-29	2013-11-28

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:

13.24 dB at 1.285 MHz in the **Neutral** conducted mode.

Test Data

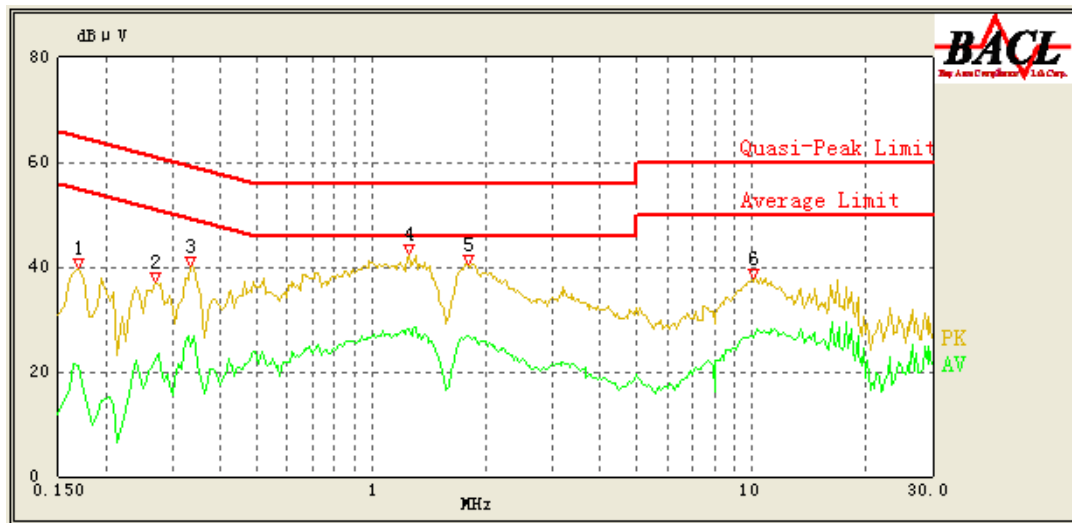
Environmental Conditions

Temperature:	23.8 ° C
Relative Humidity:	52 %
ATM Pressure:	101.3 kPa

The testing was performed by Leon Chen on 2012-12-12.

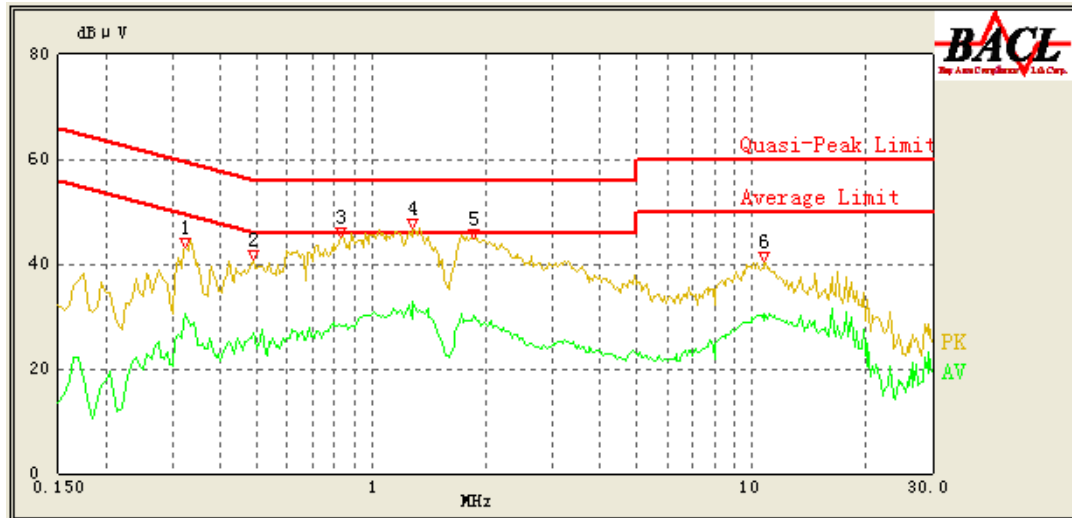
Test Mode: Transmitting

AC 120V/60 Hz, Line



Frequency (MHz)	Corrected Amplitude (dBμV)	Correction Factor (dB)	Limit (dBμV)	Margin (dB)	Detector (PK/ QP/Ave.)
1.260	28.07	0.33	46.00	17.93	AV
1.260	37.12	0.33	56.00	18.88	QP
1.790	26.81	0.36	46.00	19.19	AV
1.795	36.46	0.36	56.00	19.54	QP
10.165	26.39	0.91	50.00	23.61	AV
0.335	36.23	0.34	60.71	24.48	QP
10.165	34.96	0.91	60.00	25.04	QP
0.335	24.98	0.34	50.71	25.73	AV
0.270	33.50	0.36	62.57	29.07	QP
0.170	35.85	0.43	65.43	29.58	QP
0.270	22.33	0.36	52.57	30.24	AV
0.170	21.24	0.43	55.43	34.19	AV

AC 120V/60 Hz, Neutral



Frequency (MHz)	Corrected Amplitude (dBμV)	Correction Factor (dB)	Limit (dBμV)	Margin (dB)	Detector (PK/ QP/Ave.)
1.285	32.76	0.24	46.00	13.24	AV
1.285	41.07	0.24	56.00	14.93	QP
1.865	40.58	0.26	56.00	15.42	QP
1.865	30.25	0.26	46.00	15.75	AV
0.830	39.45	0.22	56.00	16.55	QP
0.830	28.13	0.22	46.00	17.87	AV
0.490	26.92	0.21	46.29	19.37	AV
10.840	30.39	0.84	50.00	19.61	AV
0.490	36.34	0.21	56.29	19.95	QP
0.325	30.35	0.23	51.00	20.65	AV
0.325	40.32	0.23	61.00	20.68	QP
10.840	36.26	0.84	60.00	23.74	QP

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

Applicable Standard

FCC §15.247 (d); §15.209; §15.205;

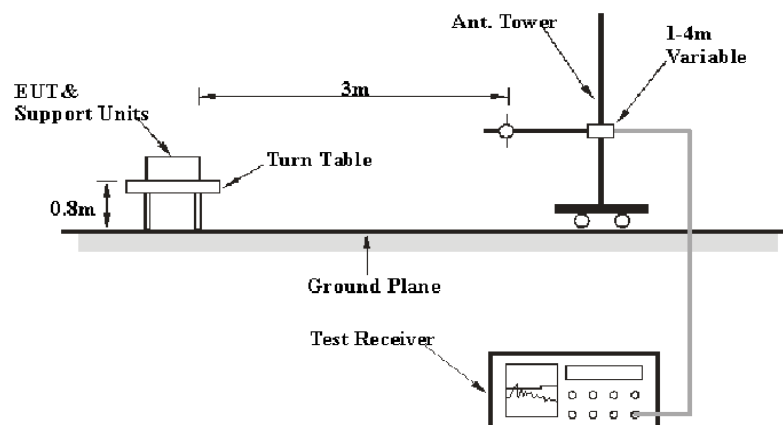
Measurement Uncertainty

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.

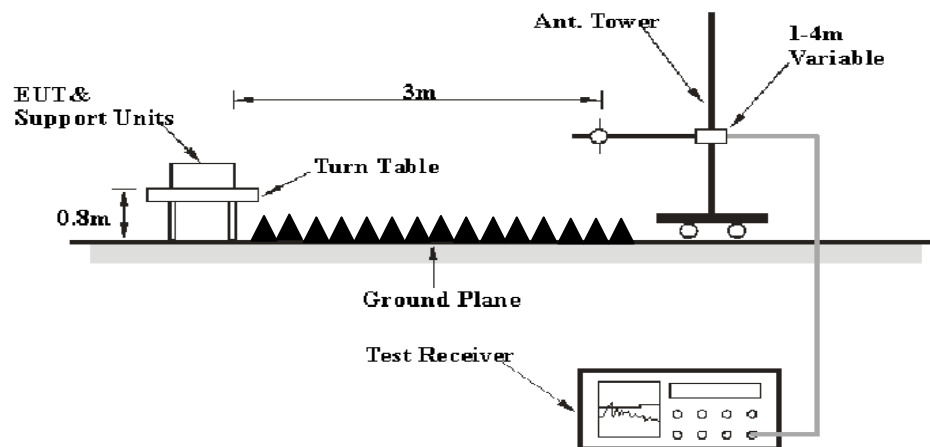
Based on CISPR 16-4-4, The Treatment of Uncertainty in EMC Measurements, the best estimate of the uncertainty of a radiation emissions measurement at Bay Area Compliance Laboratories Corp. (Dongguan) is 4.0 dB(k=2, 95% level of confidence) , and the uncertainty will not be taken into consideration for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

EUT Setup

Below 1GHz:



Above 1GHz:



The radiated emission tests were performed in the 3 meters chamber 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.

The spacing between the peripherals was 10 cm.

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

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:

<i>Frequency Range</i>	<i>RBW</i>	<i>Video B/W</i>	<i>Detector</i>
30 MHz – 1000 MHz	100 kHz	300 kHz	QP
1000 MHz – 25 GHz	1 MHz	3 MHz	PK
1000 MHz – 25 GHz	1 MHz	10 Hz	Ave.

Test Procedure

During the radiated emission test, the adapter 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.

Data was recorded in Quasi-peak detection mode for frequency range of 30 MHz-1 GHz, 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 Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	EMI Test Receiver	ESCI	100035	2012-05-14	2013-05-13
Sunol Sciences	Hybrid Antennas	JB3	A060611-1	2011-09-06	2013-09-05
HP	Pre-amplifier	8447E	2434A02181	2012-10-08	2013-10-07
R&S	Spectrum Analyzer	FSEM 30	DE31388	2012-03-15	2013-03-14
ETS-LINDGREN	Horn Antenna	3115	000 527 35	2012-09-06	2014-09-05
PICOSECOND	Amplifier	5828	2708	N/A	N/A

Test Results Summary

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

0.59 dB at 7236 MHz in the Horizontal polarization of 802.11b mode

Test Data**Environmental Conditions**

Temperature:	26.1 ° C
Relative Humidity:	52 %
ATM Pressure:	100.9 kPa

The testing was performed by Leon Chen on 2012-12-09.

Mode: Transmitting

802.11b Mode:

Frequency	Receiver		Rx Antenna		Cable loss (dB)	Amplifier Gain (dB)	Corrected Amplitude (dBμV/m)	FCC 15.247	
(MHz)	Reading (dBμV)	Detector (PK/QP/AV)	Polar (H/V)	Factor (dB(1/m))				Limit (dBμV/m)	Margin (dB)
Low Channel:2412MHz									
7236	19.74	AV	V	34.17	6.56	7.05	53.41	54.00	0.59
9648	15.35	AV	V	33.06	8.70	6.09	52.02	54.00	1.98
4824	22.33	AV	V	30.64	4.73	7.38	50.32	54.00	3.68
2689.8	27.45	AV	V	26.39	4.10	7.70	50.24	54.00	3.76
9648	34.17	PK	V	33.06	8.70	6.09	69.84	74.00	4.16
366.59	45.21	QP	H	15.69	2.32	21.69	41.53	46.00	4.47
7236	32.76	PK	V	34.17	6.56	7.05	66.43	74.00	7.57
2390	19.25	AV	V	25.61	3.84	8.53	40.18	54.00	13.82
2689.8	37.35	PK	V	26.39	4.10	7.70	60.14	74.00	13.86
4824	30.71	PK	V	30.64	4.73	7.38	58.70	74.00	15.30
2390	32.53	PK	V	25.61	3.84	8.53	53.46	74.00	20.54
2412	78.36	AV	H	25.67	3.93	8.45	99.51	N/A	N/A
2412	82.44	PK	H	25.67	3.93	8.45	103.59	N/A	N/A
2412	80.98	AV	V	25.67	3.93	8.45	102.13	N/A	N/A
2412	85.53	PK	V	25.67	3.93	8.45	106.68	N/A	N/A
Middle Channel:2437MHz									
9748	16.34	AV	V	33.30	8.60	6.49	51.75	54.00	2.25
380.17	46.84	QP	H	15.77	2.35	21.72	43.24	46.00	2.76
7311	17.17	AV	V	34.35	6.70	7.17	51.05	54.00	2.95
4874	22.02	AV	V	30.77	4.76	7.33	50.22	54.00	3.78
2690.1	27.27	AV	V	26.39	4.10	7.70	50.06	54.00	3.94
9748	34.58	PK	V	33.30	8.60	6.49	69.99	74.00	4.01
6645.3	18.14	AV	V	32.68	5.59	8.24	48.17	54.00	5.83
7311	32.57	PK	V	34.35	6.70	7.17	66.45	74.00	7.55
6645.3	32.95	PK	V	32.68	5.59	8.24	62.98	74.00	11.02
2690.1	38.42	PK	V	26.39	4.10	7.70	61.21	74.00	12.79
4874	30.15	PK	V	30.77	4.76	7.33	58.35	74.00	15.65
2437	79.24	AV	H	25.74	3.98	8.35	100.61	N/A	N/A
2437	83.68	PK	H	25.74	3.98	8.35	105.05	N/A	N/A
2437	82.03	AV	V	25.74	3.98	8.35	103.40	N/A	N/A
2437	86.73	PK	V	25.74	3.98	8.35	108.10	N/A	N/A
High Channel:2462MHz									
9848	16.36	AV	V	33.54	8.49	6.92	51.47	54.00	2.53
7386	17.17	AV	V	34.53	6.84	7.28	51.26	54.00	2.74
4924	22.12	AV	V	30.90	4.70	7.28	50.44	54.00	3.56
2689.4	27.17	AV	V	26.39	4.10	7.70	49.96	54.00	4.04
9848	34.47	PK	V	33.54	8.49	6.92	69.58	74.00	4.42
460.68	41.19	QP	V	17.52	2.61	21.92	39.40	46.00	6.60
2483.5	24.83	AV	V	25.86	3.80	8.17	46.32	54.00	7.68
7386	31.28	PK	V	34.53	6.84	7.28	65.37	74.00	8.63
2689.4	37.35	PK	V	26.39	4.10	7.70	60.14	74.00	13.86
4924	30.51	PK	V	30.90	4.70	7.28	58.83	74.00	15.17
2483.5	34.72	PK	V	25.86	3.80	8.17	56.21	74.00	17.79
2462	74.76	AV	H	25.80	3.93	8.25	96.24	N/A	N/A
2462	79.52	PK	H	25.80	3.93	8.25	101.00	N/A	N/A
2462	80.7	AV	V	25.80	3.93	8.25	102.18	N/A	N/A
2462	85.39	PK	V	25.80	3.93	8.25	106.87	N/A	N/A

802.11g Mode:

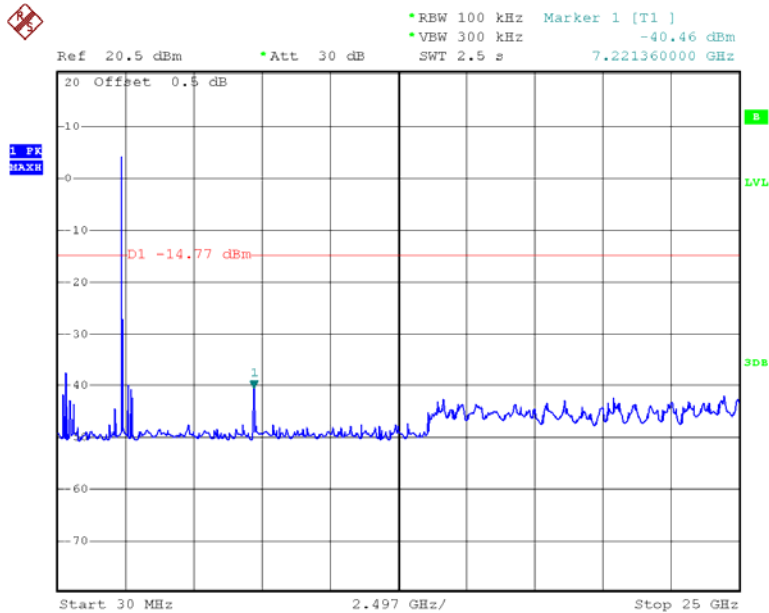
Frequency	Receiver		Rx Antenna		Cable loss (dB)	Amplifier Gain (dB)	Corrected Amplitude (dBµV/m)	FCC 15.247	
(MHz)	Reading (dBµV)	Detector (PK/QP/AV)	Polar (H/V)	Factor (dB(1/m))				Limit (dBµV/m)	Margin (dB)
Low Channel:2412MHz									
9648	16.36	AV	V	33.06	8.70	6.09	52.03	54.00	1.97
7236	18.17	AV	V	34.17	6.56	7.05	51.84	54.00	2.16
9648	34.25	PK	V	33.06	8.70	6.09	69.92	74.00	4.08
4824	21.11	AV	V	30.64	4.73	7.38	49.10	54.00	4.90
2689.9	25.45	AV	V	26.39	4.10	7.70	48.24	54.00	5.76
366.59	43.22	QP	H	15.69	2.32	21.69	39.54	46.00	6.46
7236	31.61	PK	V	34.17	6.56	7.05	65.28	74.00	8.72
2390	18.17	AV	V	25.61	3.84	8.53	39.10	54.00	14.90
2689.9	35.77	PK	V	26.39	4.10	7.70	58.56	74.00	15.44
4824	30.08	PK	V	30.64	4.73	7.38	58.07	74.00	15.93
2390	31.47	PK	V	25.61	3.84	8.53	52.40	74.00	21.60
2412	76.47	AV	H	25.67	3.93	8.45	97.62	N/A	N/A
2412	80.26	PK	H	25.67	3.93	8.45	101.41	N/A	N/A
2412	79.38	AV	V	25.67	3.93	8.45	100.53	N/A	N/A
2412	83.19	PK	V	25.67	3.93	8.45	104.34	N/A	N/A
Middle Channel:2437MHz									
9748	16.34	AV	V	33.30	8.60	6.49	51.75	54.00	2.25
380.17	46.81	QP	H	15.77	2.35	21.72	43.21	46.00	2.79
7311	17.24	AV	V	34.35	6.70	7.17	51.12	54.00	2.88
2690.1	27.27	AV	V	26.39	4.10	7.70	50.06	54.00	3.94
9748	34.58	PK	V	33.30	8.60	6.49	69.99	74.00	4.01
4874	21.27	AV	V	30.77	4.76	7.33	49.47	54.00	4.53
6645.3	18.14	AV	V	32.68	5.59	8.24	48.17	54.00	5.83
7311	32.61	PK	V	34.35	6.70	7.17	66.49	74.00	7.51
6645.3	32.95	PK	V	32.68	5.59	8.24	62.98	74.00	11.02
2690.1	38.42	PK	V	26.39	4.10	7.70	61.21	74.00	12.79
4874	30.28	PK	V	30.77	4.76	7.33	58.48	74.00	15.52
2437	76.82	AV	H	25.74	3.98	8.35	98.19	N/A	N/A
2437	80.55	PK	H	25.74	3.98	8.35	101.92	N/A	N/A
2437	79.64	AV	V	25.74	3.98	8.35	101.01	N/A	N/A
2437	83.04	PK	V	25.74	3.98	8.35	104.41	N/A	N/A
High Channel:2462MHz									
7386	18.06	AV	V	34.53	6.84	7.28	52.15	54.00	1.85
9848	16.35	AV	V	33.54	8.49	6.92	51.46	54.00	2.54
4924	21.19	AV	V	30.90	4.70	7.28	49.51	54.00	4.49
9848	34.11	PK	V	33.54	8.49	6.92	69.22	74.00	4.78
2689.4	24.91	AV	V	26.39	4.10	7.70	47.70	54.00	6.30
460.68	39.72	QP	V	17.52	2.61	21.92	37.93	46.00	8.07
7386	31.27	PK	V	34.53	6.84	7.28	65.36	74.00	8.64
2483.5	17.59	AV	V	25.86	3.80	8.17	39.08	54.00	14.92
4924	30.18	PK	V	30.90	4.70	7.28	58.50	74.00	15.50
2689.4	35.44	PK	V	26.39	4.10	7.70	58.23	74.00	15.77
2483.5	31.28	PK	V	25.86	3.80	8.17	52.77	74.00	21.23
2462	76.59	AV	H	25.80	3.93	8.25	98.07	N/A	N/A
2462	80.38	PK	H	25.80	3.93	8.25	101.86	N/A	N/A
2462	79.18	AV	V	25.80	3.93	8.25	100.66	N/A	N/A
2462	82.21	PK	V	25.80	3.93	8.25	103.69	N/A	N/A

802.11n20 Mode:

Frequency	Receiver		Rx Antenna		Cable loss (dB)	Amplifier Gain (dB)	Corrected Amplitude (dBμV/m)	FCC 15.247	
(MHz)	Reading (dBμV)	Detector (PK/QP/AV)	Polar (H/V)	Factor (dB(1/m))				Limit (dBμV/m)	Margin (dB)
Low Channel:2412MHz									
9648	16.33	AV	V	33.06	8.70	6.09	52.00	54.00	2.00
7236	18.14	AV	V	34.17	6.56	7.05	51.81	54.00	2.19
9648	34.19	PK	V	33.06	8.70	6.09	69.86	74.00	4.14
4824	21.21	AV	V	30.64	4.73	7.38	49.20	54.00	4.80
366.59	44.61	QP	H	15.69	2.32	21.69	40.93	46.00	5.07
2689.8	24.81	AV	V	26.39	4.10	7.70	47.60	54.00	6.40
7236	31.45	PK	V	34.17	6.56	7.05	65.12	74.00	8.88
2390	18.2	AV	V	25.61	3.84	8.53	39.13	54.00	14.87
4824	30.17	PK	V	30.64	4.73	7.38	58.16	74.00	15.84
2689.8	34.88	PK	V	26.39	4.10	7.70	57.67	74.00	16.33
2390	31.49	PK	V	25.61	3.84	8.53	52.42	74.00	21.58
2412	76.55	AV	H	25.67	3.93	8.45	97.70	N/A	N/A
2412	80.35	PK	H	25.67	3.93	8.45	101.50	N/A	N/A
2412	79.44	AV	V	25.67	3.93	8.45	100.59	N/A	N/A
2412	83.28	PK	V	25.67	3.93	8.45	104.43	N/A	N/A
Middle Channel:2437MHz									
9748	16.35	AV	V	33.30	8.60	6.49	51.76	54.00	2.24
380.17	47.17	QP	H	15.77	2.35	21.72	43.57	46.00	2.43
7311	17.01	AV	V	34.35	6.70	7.17	50.89	54.00	3.11
9748	35.03	PK	V	33.30	8.60	6.49	70.44	74.00	3.56
2690.1	27.08	AV	V	26.39	4.10	7.70	49.87	54.00	4.13
4874	21.1	AV	V	30.77	4.76	7.33	49.30	54.00	4.70
6645.3	17.48	AV	V	32.68	5.59	8.24	47.51	54.00	6.49
7311	31.17	PK	V	34.35	6.70	7.17	65.05	74.00	8.95
6645.3	31.18	PK	V	32.68	5.59	8.24	61.21	74.00	12.79
2690.1	37.81	PK	V	26.39	4.10	7.70	60.60	74.00	13.40
4874	30.11	PK	V	30.77	4.76	7.33	58.31	74.00	15.69
2437	75.91	AV	H	25.74	3.98	8.35	97.28	N/A	N/A
2437	80.14	PK	H	25.74	3.98	8.35	101.51	N/A	N/A
2437	79.17	AV	V	25.74	3.98	8.35	100.54	N/A	N/A
2437	82.77	PK	V	25.74	3.98	8.35	104.14	N/A	N/A
High Channel:2462MHz									
7386	18.04	AV	V	34.53	6.84	7.28	52.13	54.00	1.87
9848	16.34	AV	V	33.54	8.49	6.92	51.45	54.00	2.55
4924	21.27	AV	V	30.90	4.70	7.28	49.59	54.00	4.41
9848	34.21	PK	V	33.54	8.49	6.92	69.32	74.00	4.68
2689.4	23.17	AV	V	26.39	4.10	7.70	45.96	54.00	8.04
7386	31.18	PK	V	34.53	6.84	7.28	65.27	74.00	8.73
460.68	38.63	QP	V	17.52	2.61	21.92	36.84	46.00	9.16
2483.5	17.61	AV	V	25.86	3.80	8.17	39.10	54.00	14.90
4924	30.27	PK	V	30.90	4.70	7.28	58.59	74.00	15.41
2689.4	34.48	PK	V	26.39	4.10	7.70	57.27	74.00	16.73
2483.5	31.48	PK	V	25.86	3.80	8.17	52.97	74.00	21.03
2462	76.27	AV	H	25.80	3.93	8.25	97.75	N/A	N/A
2462	80.17	PK	H	25.80	3.93	8.25	101.65	N/A	N/A
2462	78.91	AV	V	25.80	3.93	8.25	100.39	N/A	N/A
2462	81.73	PK	V	25.80	3.93	8.25	103.21	N/A	N/A

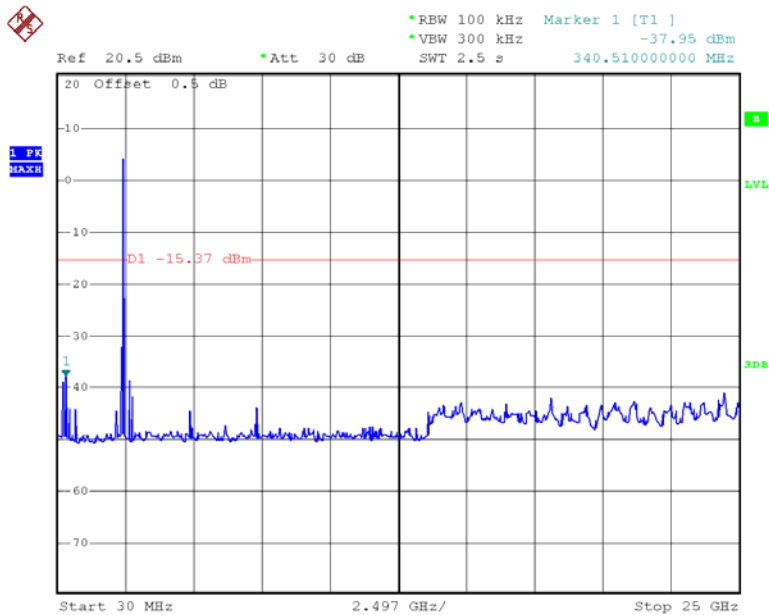
Conducted Spurious Emissions at Antenna Port

802.11b Low Channel



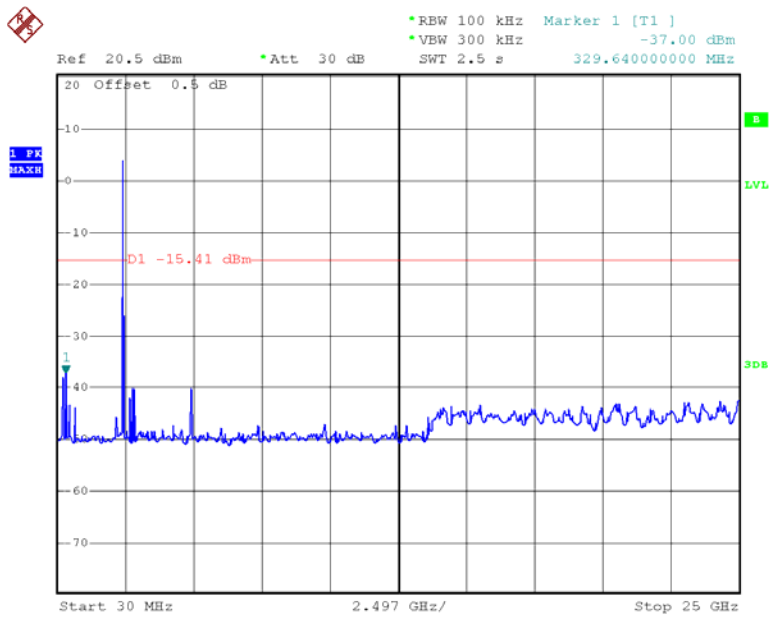
Date: 9.DEC.2012 17:38:42

802.11b Middle Channel



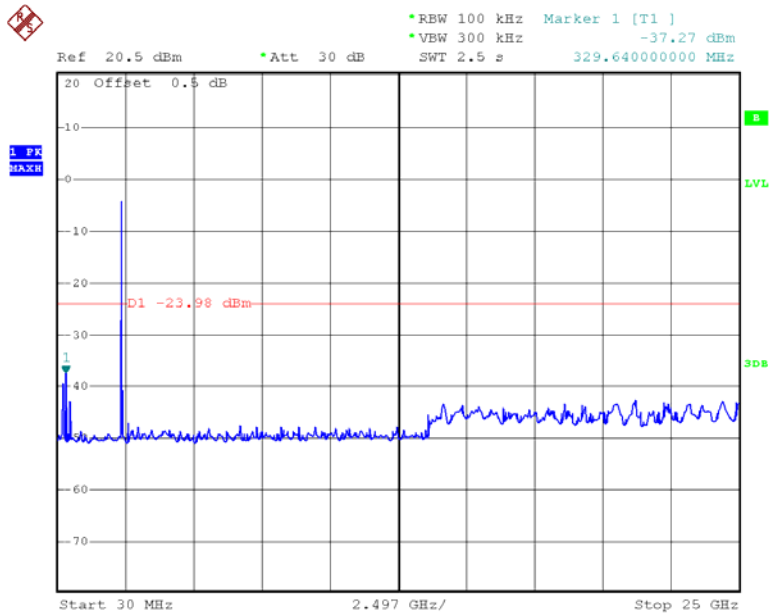
Date: 9.DEC.2012 17:56:03

802.11b High Channel



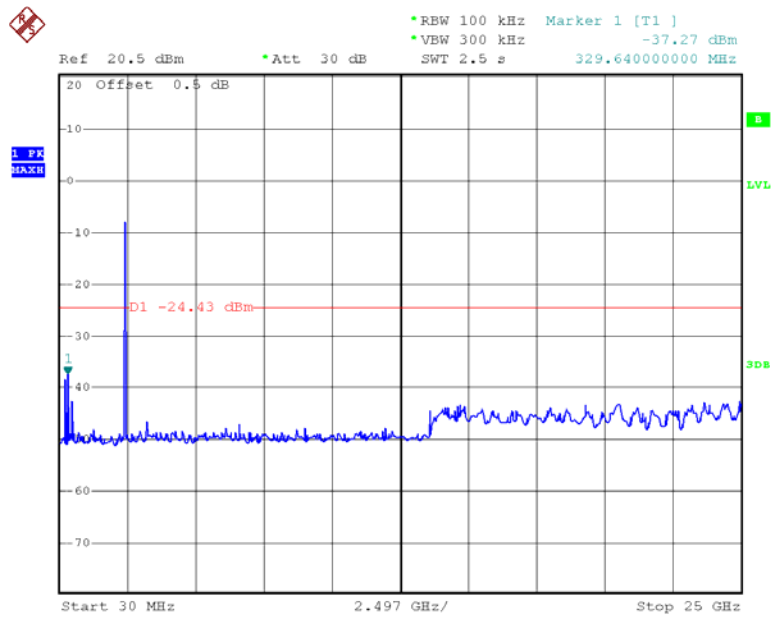
Date: 9.DEC.2012 17:58:48

802.11g Low Channel



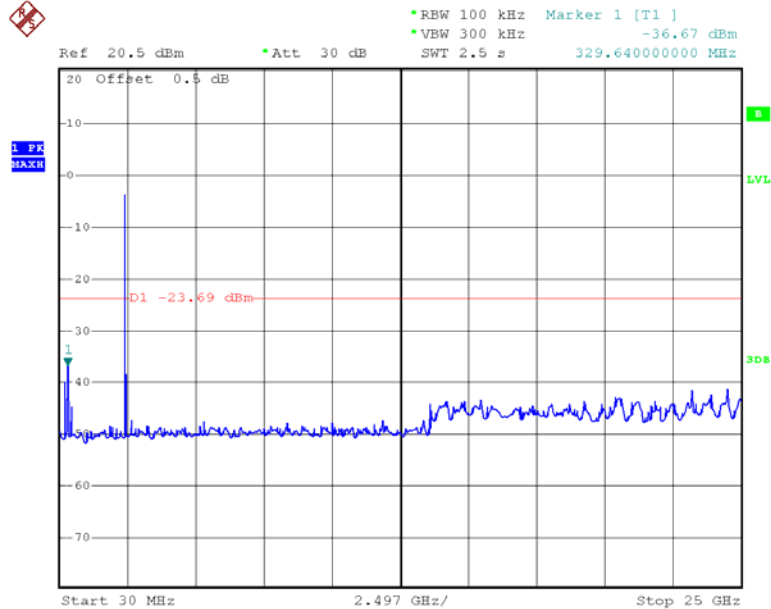
Date: 9.DEC.2012 18:16:54

802.11g Middle Channel



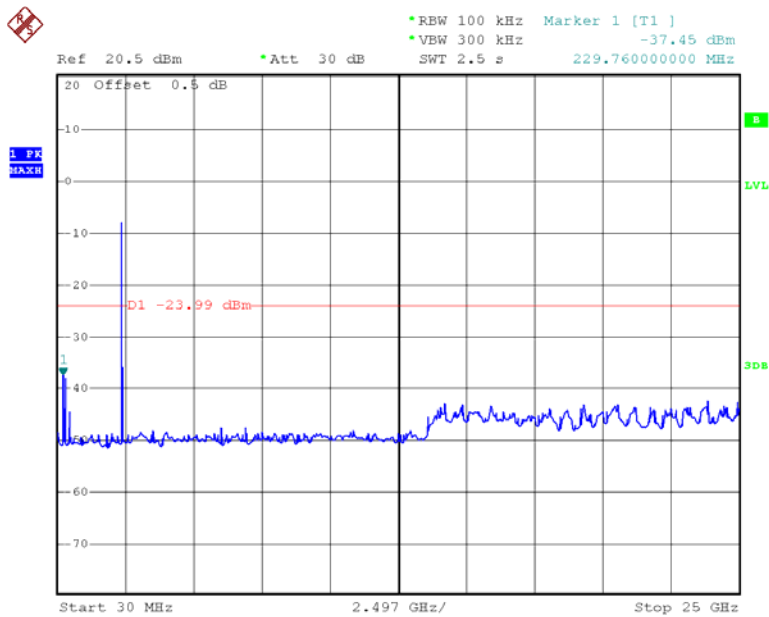
Date: 9.DEC.2012 18:14:26

802.11g High Channel



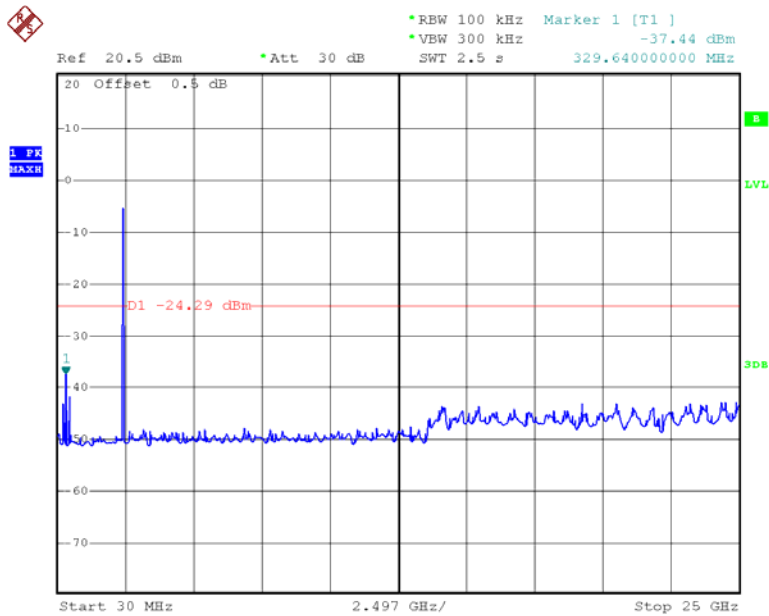
Date: 9.DEC.2012 18:09:56

802.11n20 Low Channel



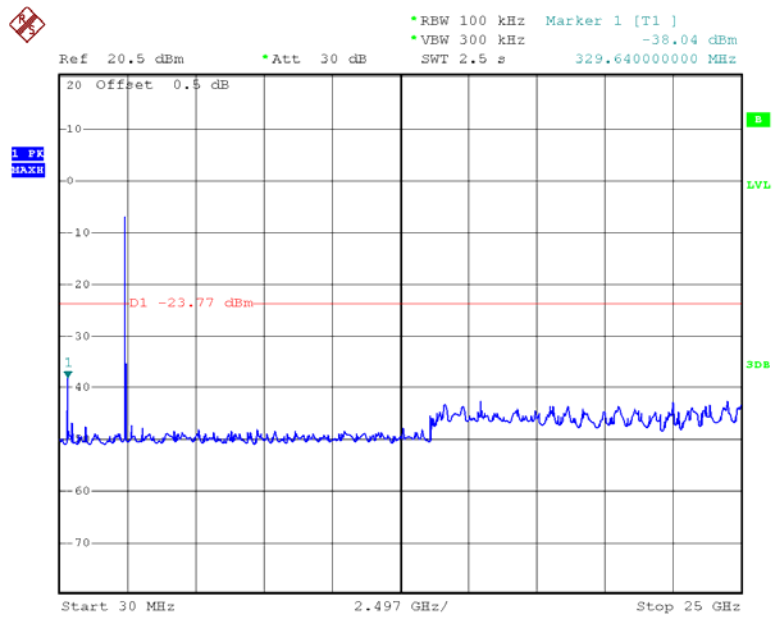
Date: 9.DEC.2012 18:22:37

802.11n20 Middle Channel



Date: 9.DEC.2012 18:26:10

802.11n20 High Channel



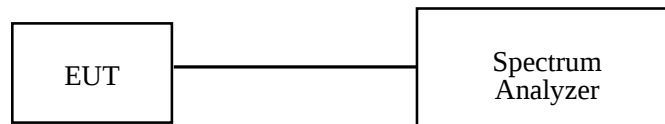
Date: 9.DEC.2012 18:28:13

FCC §15.247(a) (2) – 6 dB EMISSION BANDWIDTH**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	Spectrum Analyzer	FSP38	100478	2012-5-14	2013-5-13

Test Data**Environmental Conditions**

Temperature:	26.1 ° C
Relative Humidity:	52 %
ATM Pressure:	100.9 kPa

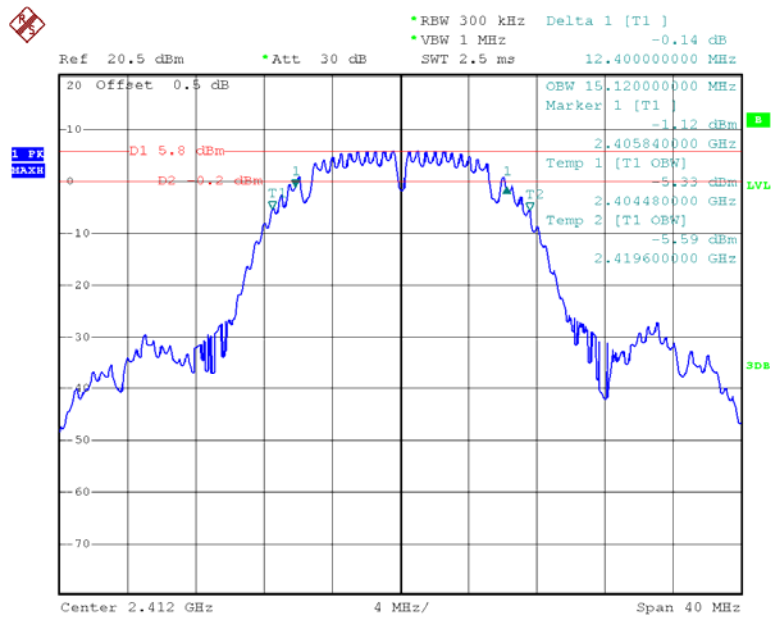
The testing was performed by Leon Chen on 2012-12-09.

Test Result: Pass.

Please refer to the following tables and plots.

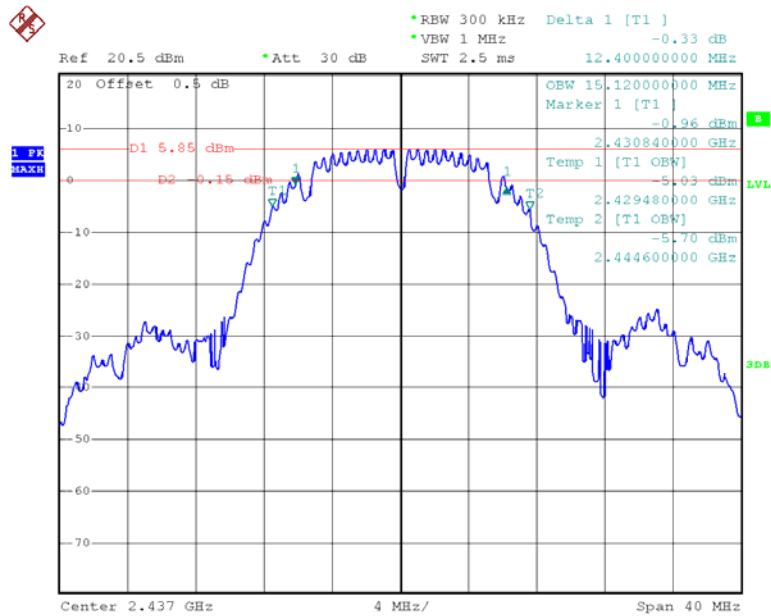
Channel	Frequency	6 dB Bandwidth	Limit
	(MHz)	(MHz)	(kHz)
802.11b mode			
Low	2412	12.40	>500
Middle	2437	12.40	>500
High	2462	12.40	>500
802.11g mode			
Low	2412	16.72	>500
Middle	2437	16.72	>500
High	2462	16.72	>500
802.11n20 mode			
Low	2412	17.84	>500
Middle	2437	17.84	>500
High	2462	17.84	>500

802.11b Low Channel

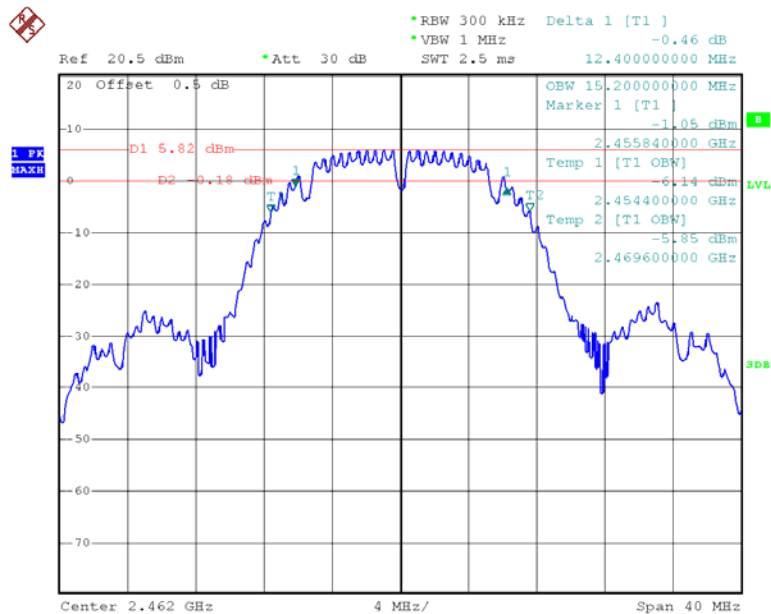


Date: 9.DEC.2012 17:52:55

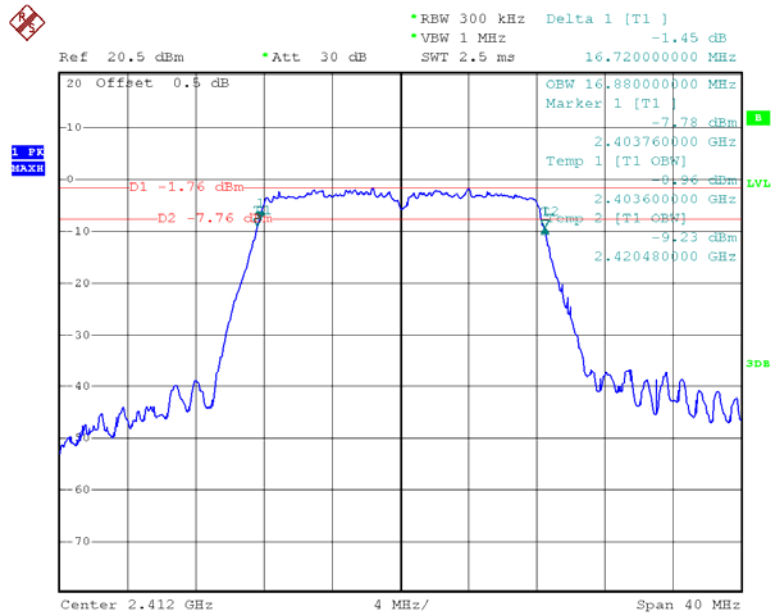
802.11b Middle Channel



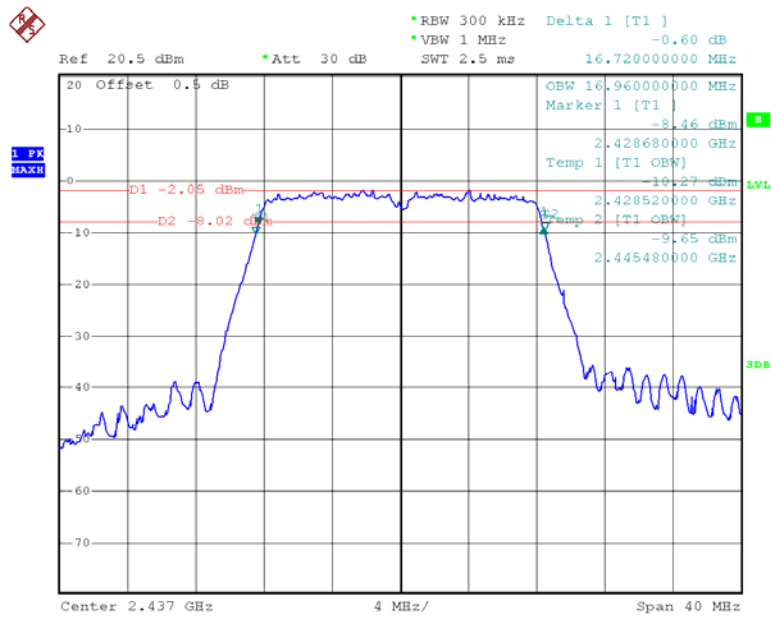
Date: 9.DEC.2012 17:54:36

802.11b High Channel

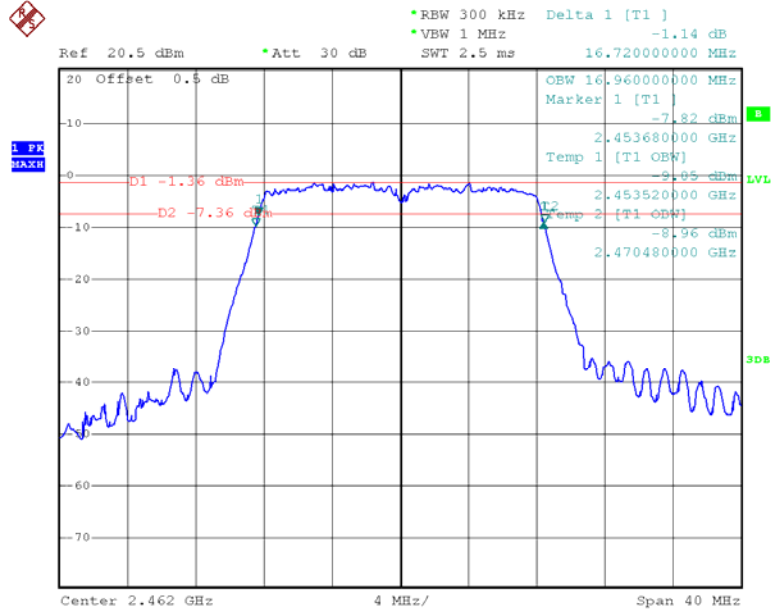
Date: 9.DEC.2012 17:57:58

802.11g Low Channel

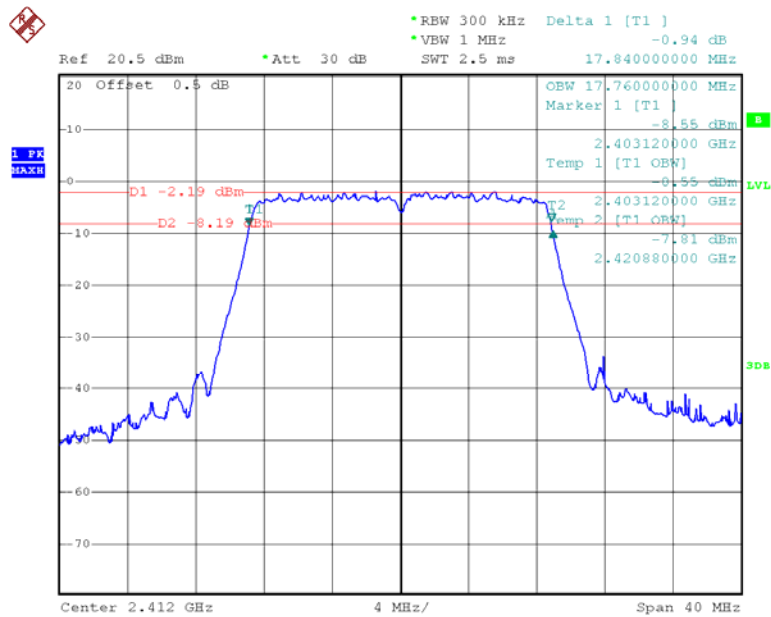
Date: 9.DEC.2012 18:16:05

802.11g Middle Channel

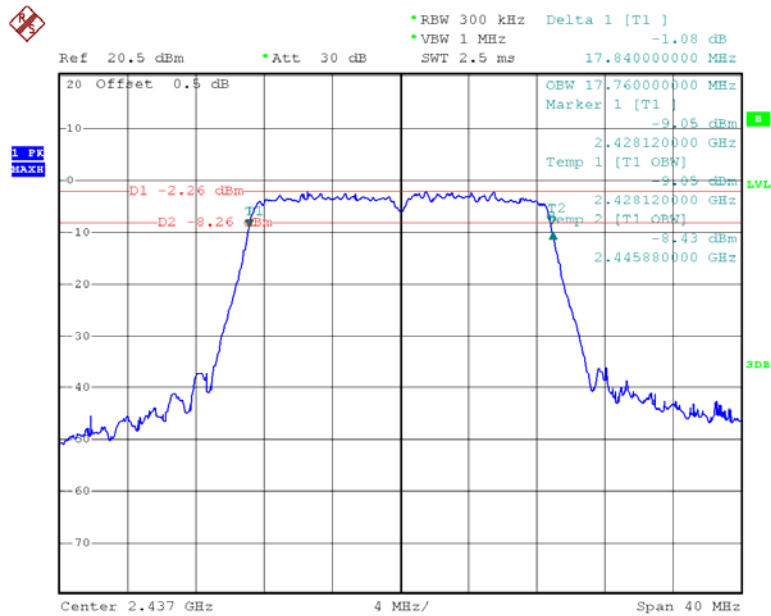
Date: 9.DEC.2012 18:13:39

802.11g High Channel

Date: 9.DEC.2012 18:08:14

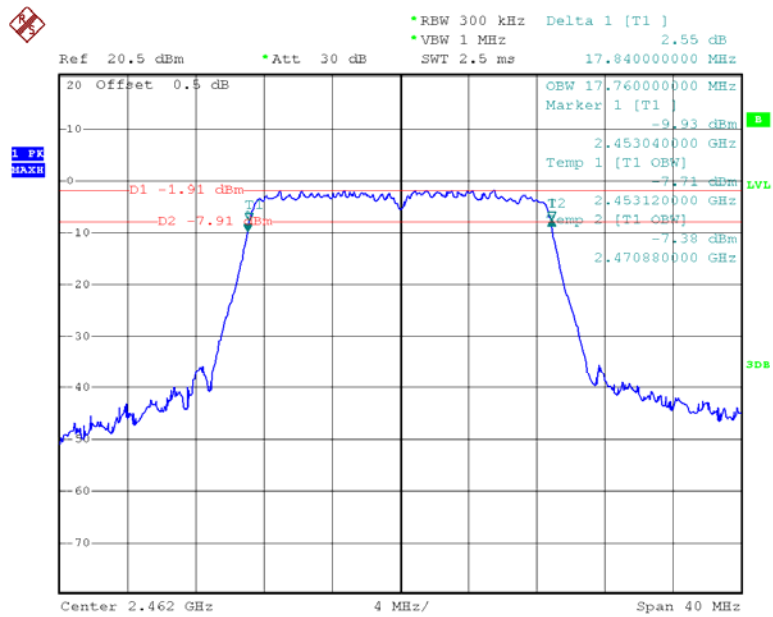
802.11n20 Low Channel

Date: 9.DEC.2012 18:20:49

802.11n20 Middle Channel

Date: 9.DEC.2012 18:25:10

802.11n20 High Channel



Date: 9.DEC.2012 18:29:49

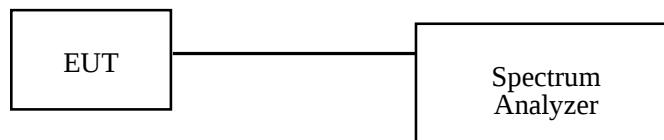
FCC §15.247(b) (3) - MAXIMUM PEAK OUTPUT POWER

Applicable Standard

According to FCC §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	Spectrum Analyzer	FSP38	100478	2012-5-14	2013-5-13

Test Data

Environmental Conditions

Temperature:	26.1° C
Relative Humidity:	52 %
ATM Pressure:	100.9 kPa

The testing was performed by Leon Chen on 2012-12-09.

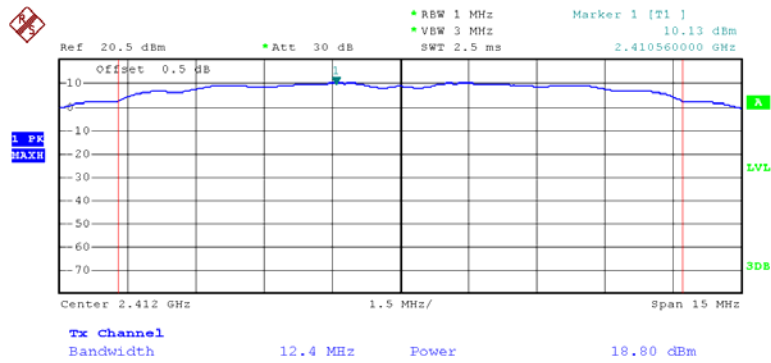
Test Mode: Transmitting

Channel	Frequency	Conducted Output Power	Limit	Result
	(MHz)	(dBm)	(dBm)	
802.11b mode				
Low	2412	18.80	30	PASS
Middle	2437	18.18	30	PASS
High	2462	18.15	30	PASS
802.11g mode				
Low	2412	14.47	30	PASS
Middle	2437	14.23	30	PASS
High	2462	14.87	30	PASS
802.11n20 mode				
Low	2412	14.47	30	PASS
Middle	2437	14.18	30	PASS
High	2462	14.72	30	PASS

The antenna gain is 1.0 dBi.

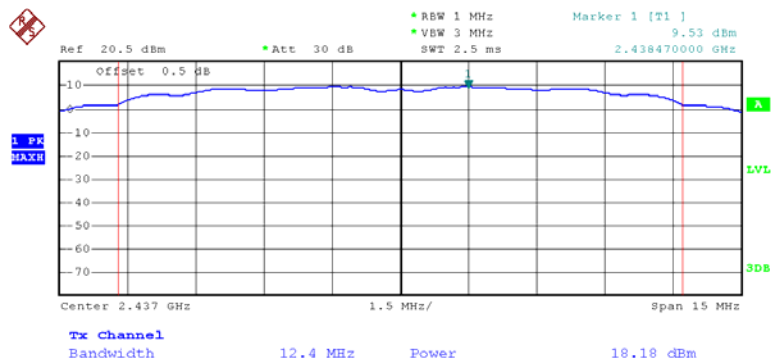
Please refer to the following plots

802.11b RF Output Power, Low Channel



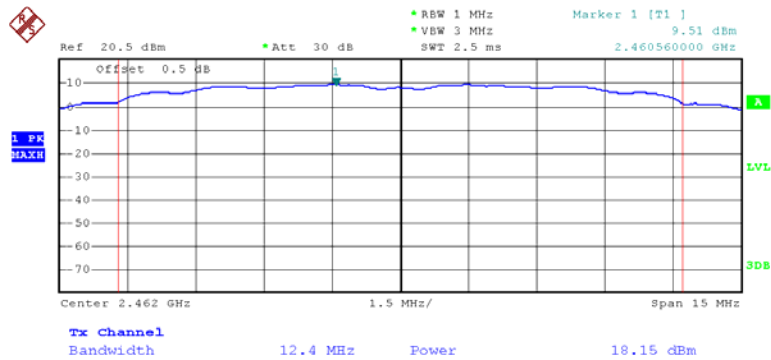
Date: 9.DEC.2012 17:35:24

802.11b RF Output Power, Middle Channel



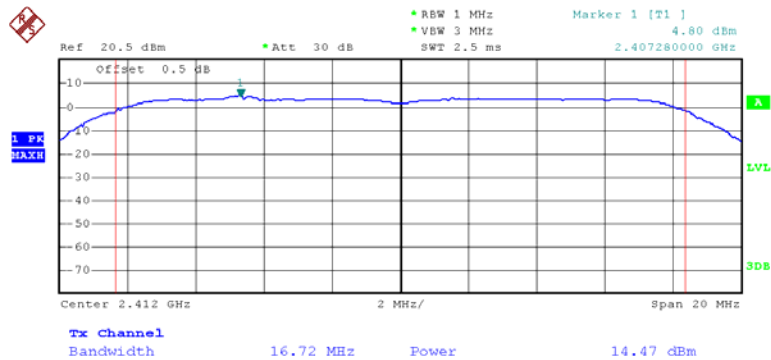
Date: 9.DEC.2012 17:54:46

802.11b RF Output Power, High Channel



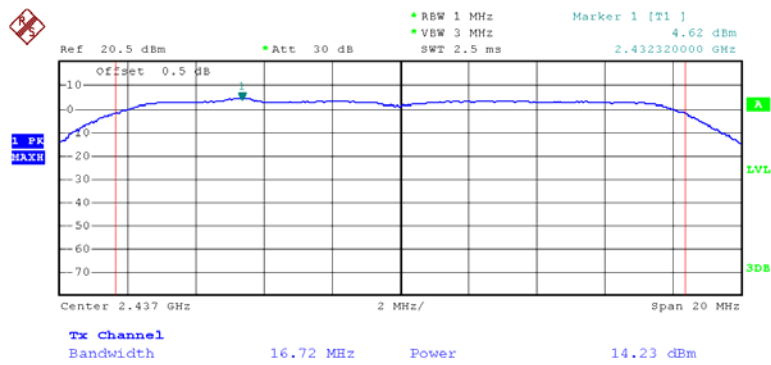
Date: 9.DEC.2012 17:56:58

802.11g RF Output Power, Low Channel



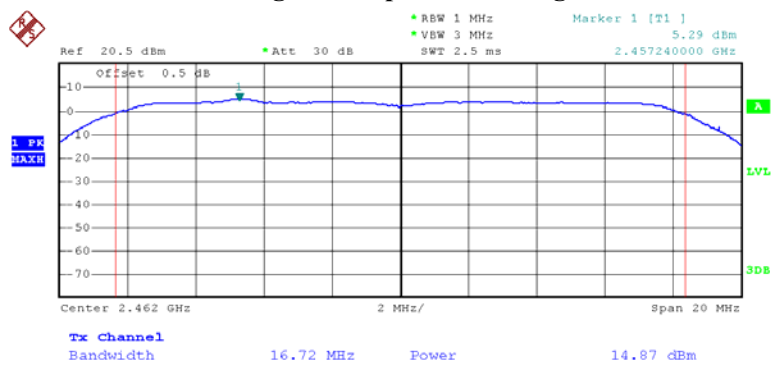
Date: 9.DEC.2012 18:18:25

802.11g RF Output Power, Middle Channel



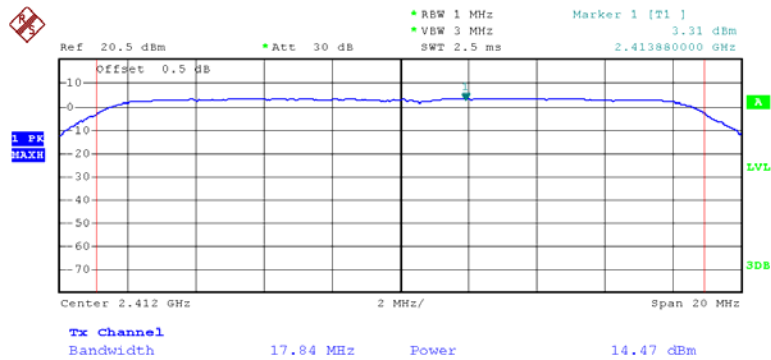
Date: 9.DEC.2012 18:14:43

802.11g RF Output Power, High Channel



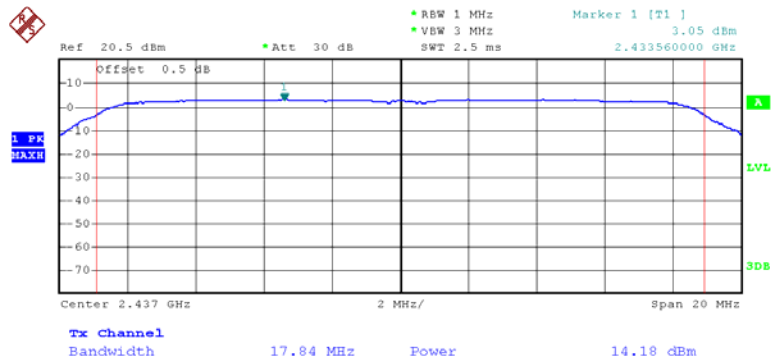
Date: 9.DEC.2012 18:09:04

802.11n20 RF Output Power, Low Channel



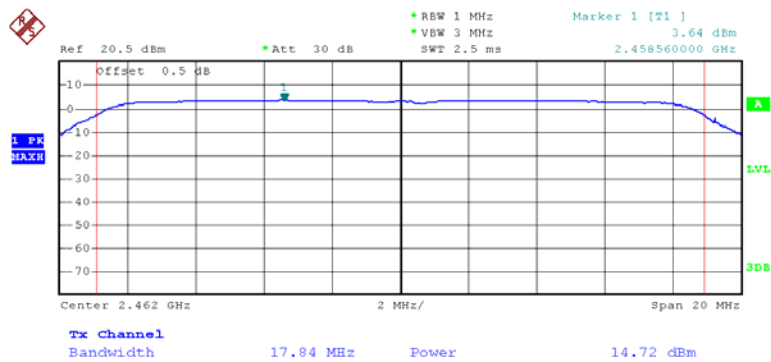
Date: 9.DEC.2012 18:21:12

802.11n20 RF Output Power, Middle Channel



Date: 9.DEC.2012 18:26:33

802.11n20 RF Output Power, High Channel



Date: 9.DEC.2012 18:27:20

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	Spectrum Analyzer	FSP38	100478	2012-5-14	2013-5-13

Test Data**Environmental Conditions**

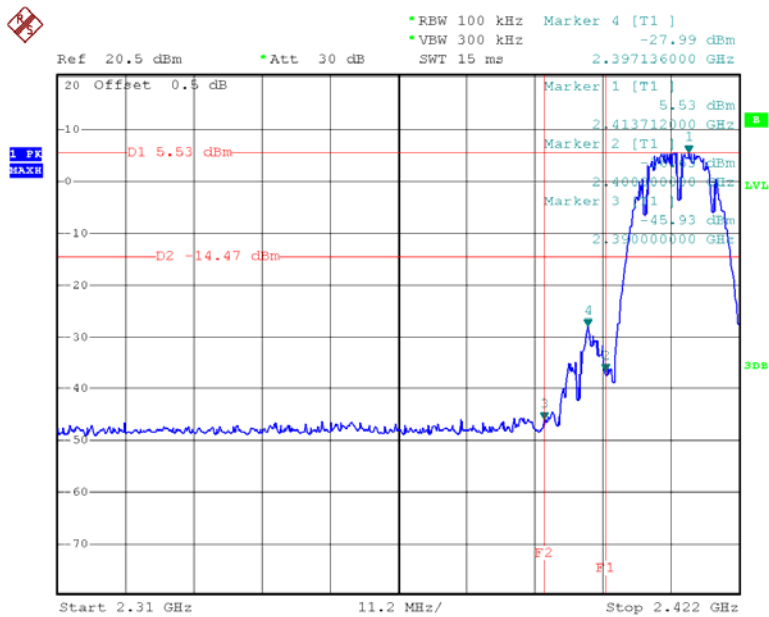
Temperature:	26.1 ° C
Relative Humidity:	52 %
ATM Pressure:	100.9kPa

The testing was performed by Leon Chen on 2012-12-09.

Test Result: Compliance

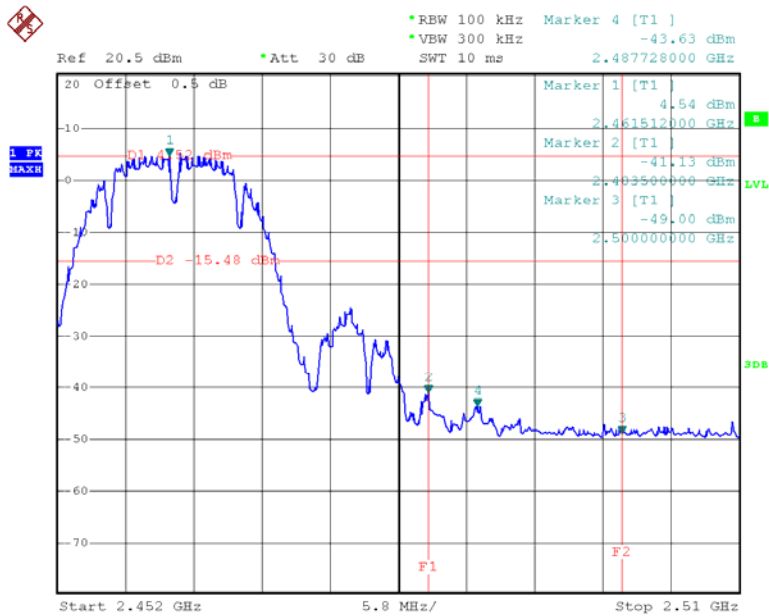
Please refer to following plots.

802.11b: Band Edge, Left Side



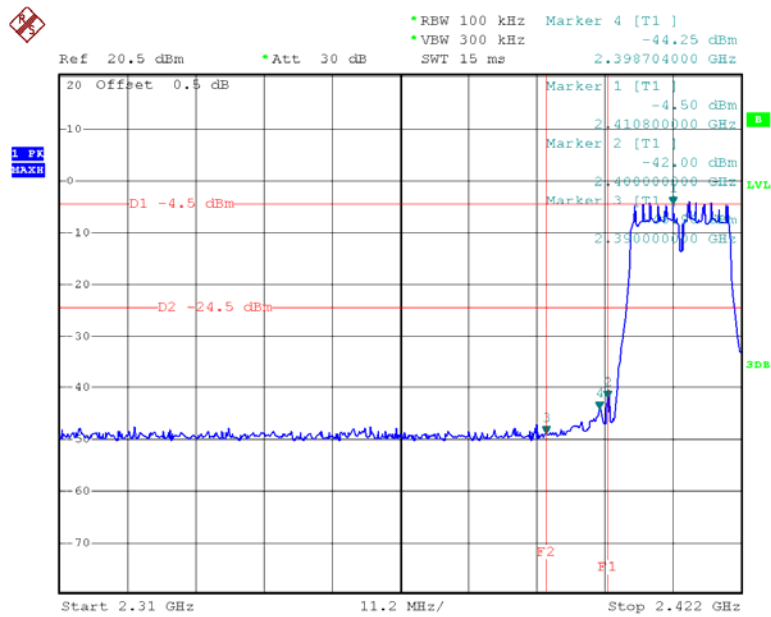
Date: 9.DEC.2012 17:45:18

802.11b: Band Edge, Right Side



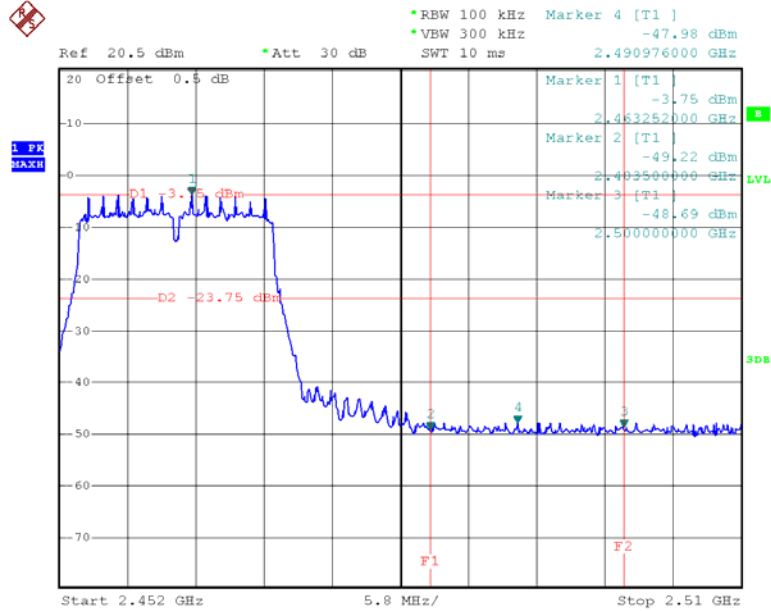
Date: 9.DEC.2012 18:03:47

802.11g: Band Edge, Left Side

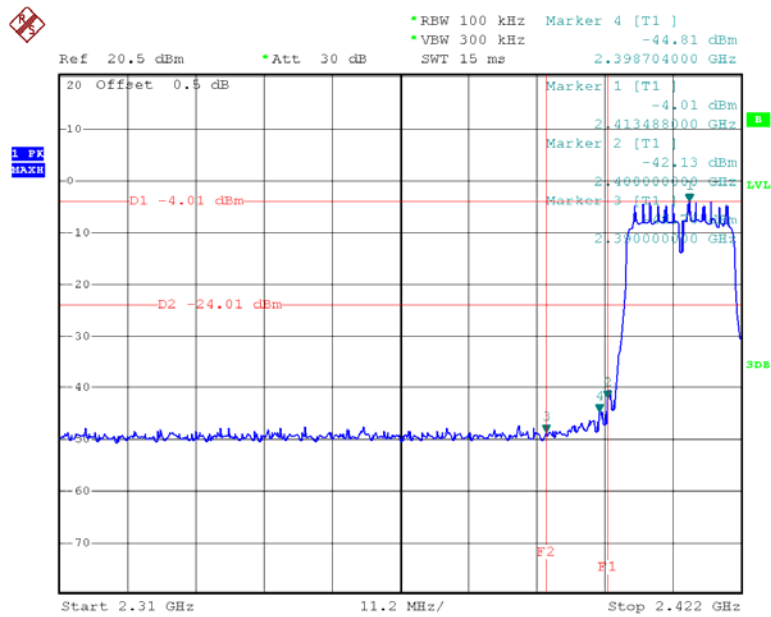


Date: 9.DEC.2012 18:18:00

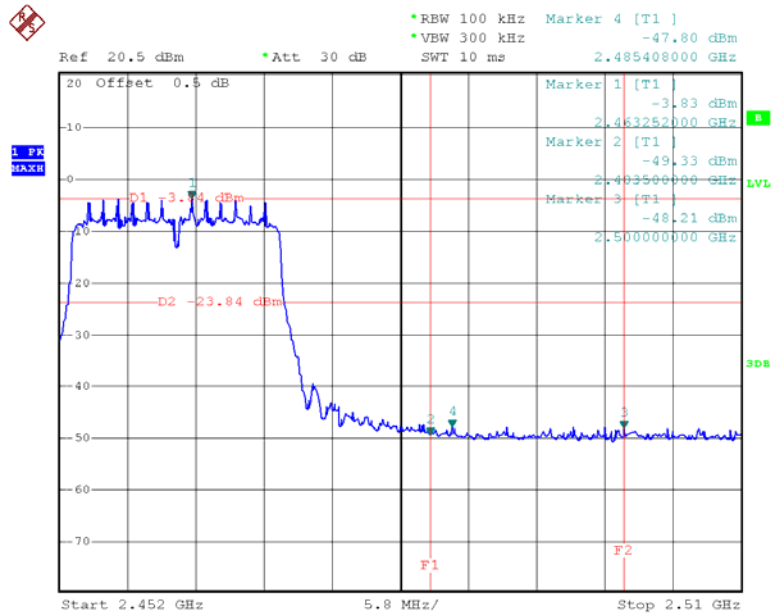
802.11g: Band Edge, Right Side



Date: 9.DEC.2012 18:11:21

802.11n20: Band Edge, Left Side

Date: 9.DEC.2012 18:23:31

802.11n20: Band Edge, Right Side

Date: 9.DEC.2012 18:29:00

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. According to KDB 558074 D01 DTS Meas Guidance v01, set the RBW = 100 kHz, VBW $\geq$ 300 kHz, set the span to 5-30 % greater than the EBW.
4. Use the peak marker function to determine the maximum power level in any 100 kHz band segment within the fundamental EBW.
5. Scale the observed power level to an equivalent value in 3 kHz by adjusting (reducing) the measured power by a bandwidth correction factor (BWCF) where $BWCF = 10\log(3\text{ kHz}/100\text{ kHz} = -15.2\text{ dB})$.

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	Spectrum Analyzer	FSP38	100478	2012-5-14	2013-5-13

Test Data

Environmental Conditions

Temperature:	26.1 ° C
Relative Humidity:	52 %
ATM Pressure:	100.9 kPa

The testing was performed by Leon Chen on 2012-12-09.

Test Mode: Transmitting

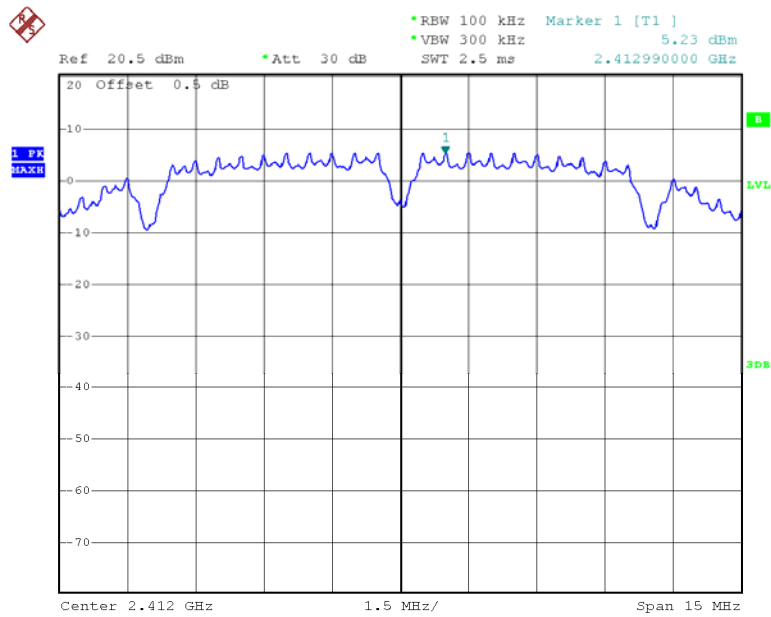
Test Result: Pass

Channel	Reading Level	PSD	Limit	Result
	(dBm/100kHz)	(dBm/3kHz)	(dBm/3kHz)	
802.11b mode				
Low	5.23	-9.97	8	PASS
Middle	4.63	-10.57	8	PASS
High	4.59	-10.61	8	PASS
802.11g mode				
Low	-3.98	-19.18	8	PASS
Middle	-4.43	-19.63	8	PASS
High	-3.69	-18.89	8	PASS
802.11n20 mode				
Low	-3.99	-19.19	8	PASS
Middle	-4.29	-19.49	8	PASS
High	-3.77	-18.97	8	PASS

Note: the antenna gain is 1.0 dBi.

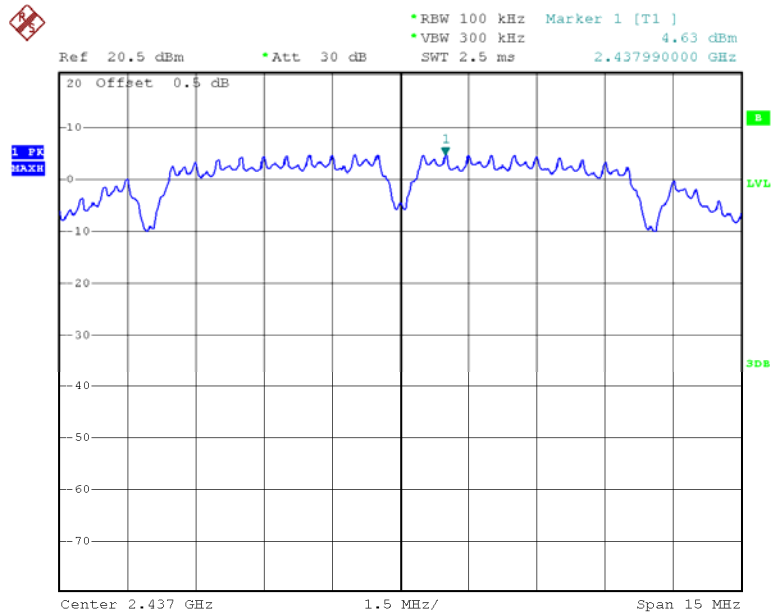
Please refer to the following plots

Power Spectral Density, 802.11b Low Channel



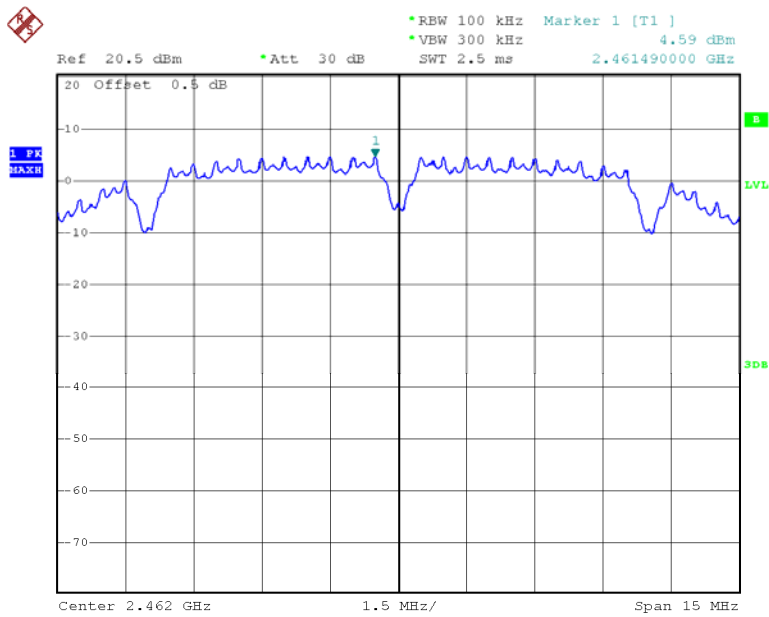
Date: 9.DEC.2012 17:36:28

Power Spectral Density, 802.11b Middle Channel



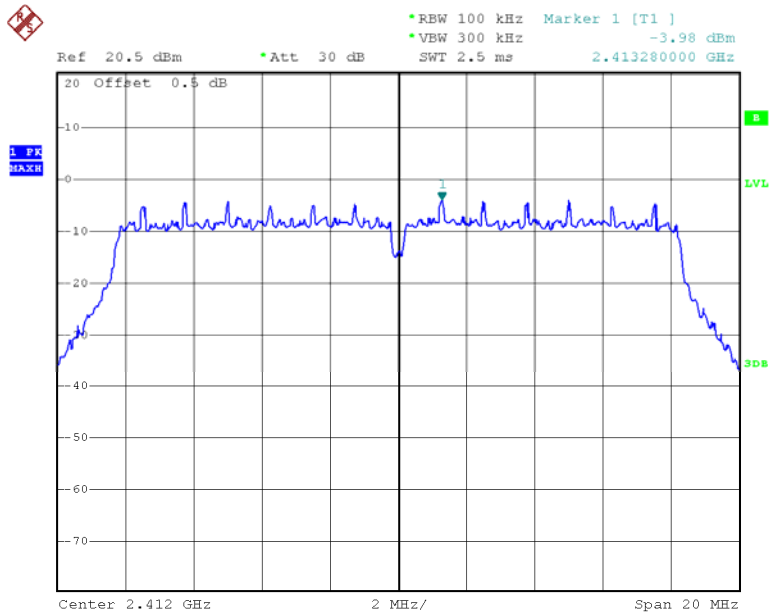
Date: 9.DEC.2012 17:55:08

Power Spectral Density, 802.11b High Channel



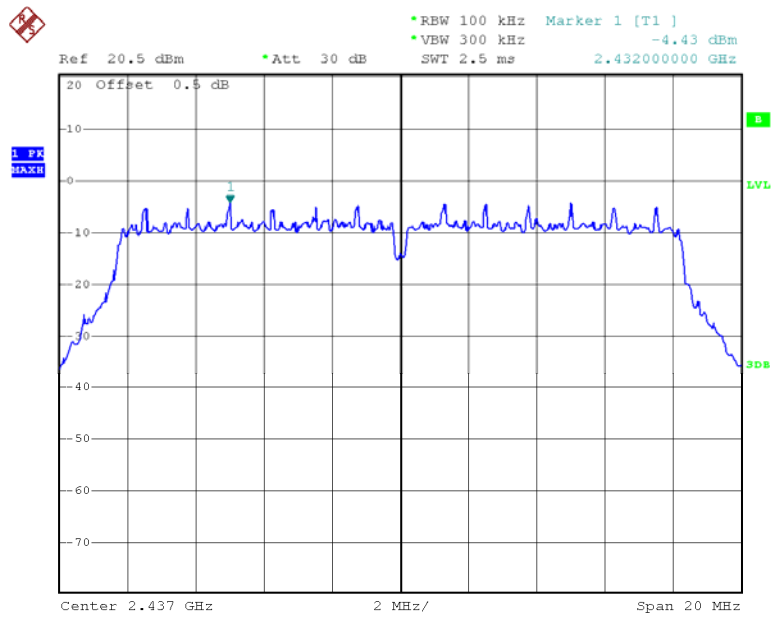
Date: 9.DEC.2012 17:58:22

Power Spectral Density, 802.11g Low Channel



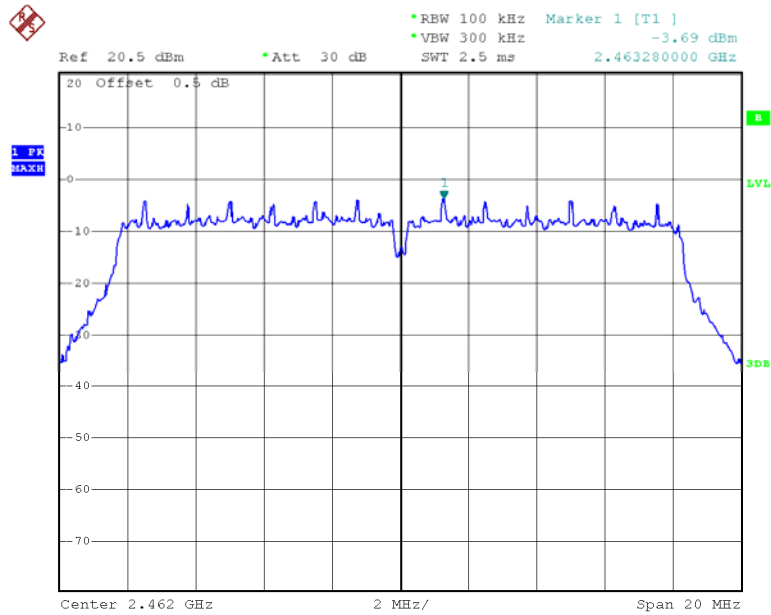
Date: 9.DEC.2012 18:16:31

Power Spectral Density, 802.11g Middle Channel



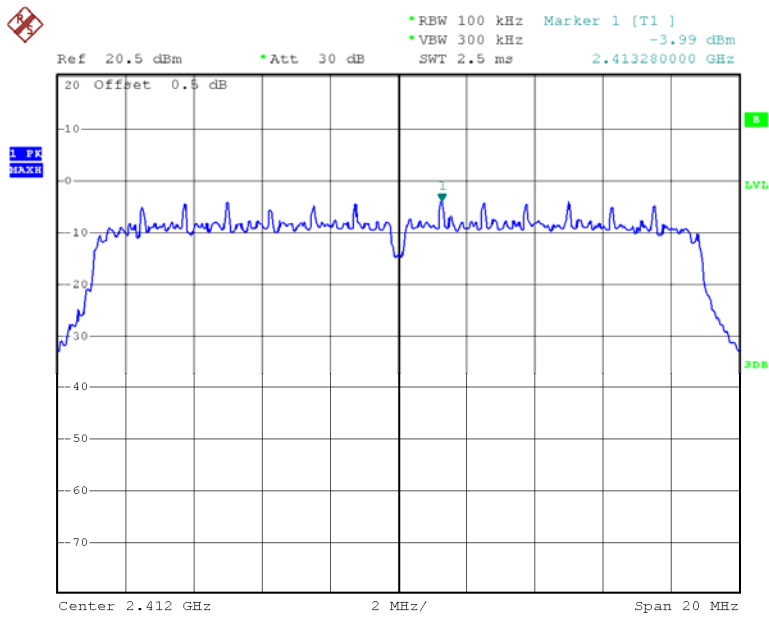
Date: 9.DEC.2012 18:14:02

Power Spectral Density, 802.11g High Channel



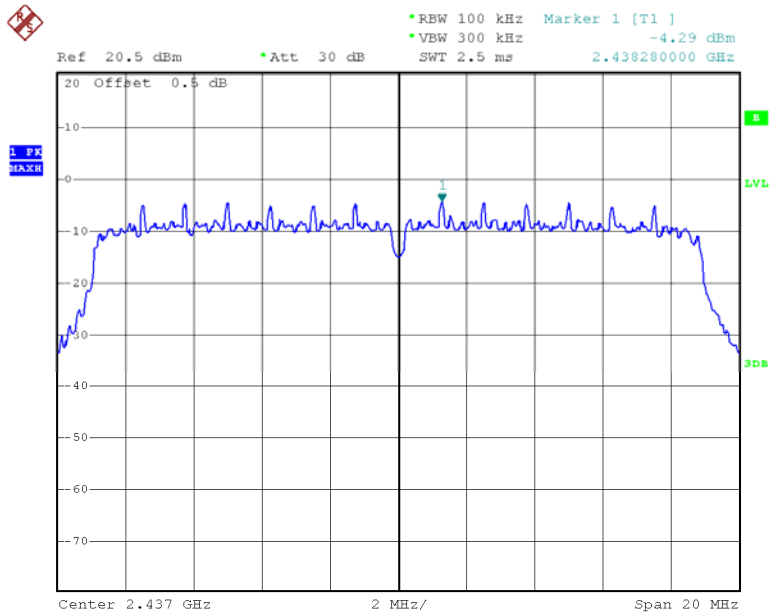
Date: 9.DEC.2012 18:09:30

Power Spectral Density, 802.11n20 Low Channel



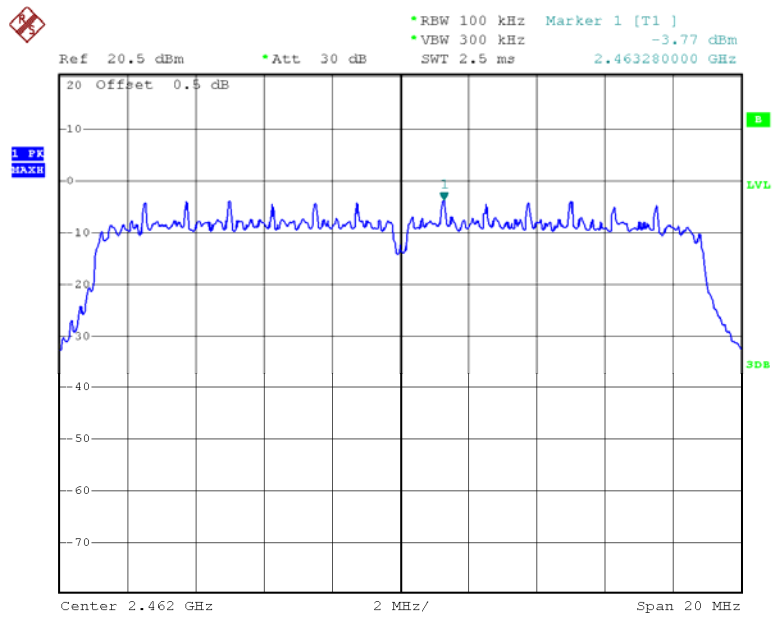
Date: 9.DEC.2012 18:22:19

Power Spectral Density, 802.11n20 Middle Channel



Date: 9.DEC.2012 18:25:43

Power Spectral Density, 802.11n20 High Channel



Date: 9.DEC.2012 18:27:52

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