FCC PART 15.247

TEST REPORT

For

BYD Precision Manufacture Co., Ltd

Baohe Road, Baolong Industrial, Longgang, Shenzhen, 518116, P.R.China

FCC ID: ZW9-PDM02

Report Type:	**Product Type:**
Original Report	e-book

Test Engineer:	Ares Liu
Report Number:	R1DG121119001-00
Report Date:	2013-02-01
Reviewed By:	Ivan Cao EMC Engineer
Test Laboratory:	Bay Area Compliance Laboratories Corp. (Dongguan) No.69 Pulongcun, Puxinhu Industrial Zone, Tangxia, Dongguan, Guangdong, China Tel: +86-769-86858888 Fax: +86-769-86858891 www.baclcorp.com.cn

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GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

The *BYD Precision Manufacture Co., Ltd*'s product, model number: *BW30 (FCC ID: ZW9-PDM02) or* ("EUT") in this report is an *e-book, (named as PDM02 by applicant),* which was measured approximately: 17.0 cm (L) x11.0 cm (W) x 1.0 cm (H), rated input voltage: DC 3.7V from lithium battery or DC 5.0V from system.

** All measurement and test data in this report was gathered from production sample serial number: 121119001 (Assigned by BACL, Dongguan). The EUT was received on 2012-11-20.*

Objective

This report is prepared on behalf of *BYD Precision Manufacture Co., Ltd* 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)

No related submittal(s).

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 system was configured for testing in a test mode, which was provided by 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.

EUT Exercise Software

The test was performed under "*CMD*", which was provided by the manufacturer.

Equipment Modifications

No modification was made to the EUT tested.

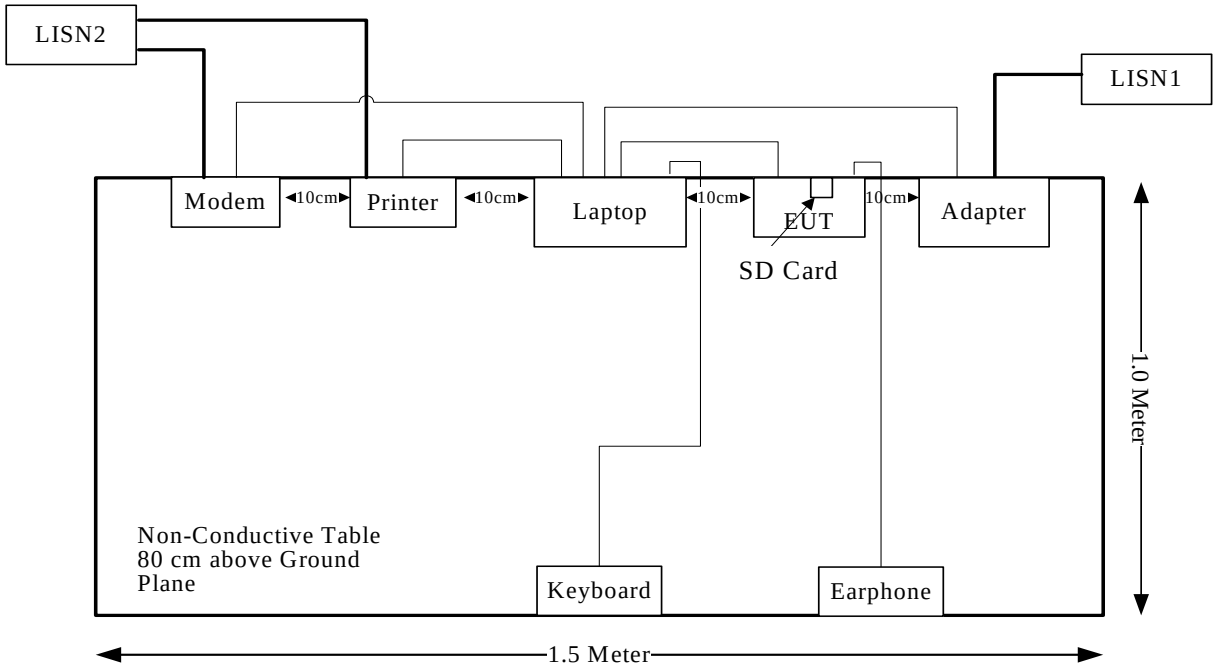
Support Equipment List and Details

Manufacturer	Description	Model	Serial Number
Kingston	Micro SD Card	N/A	N/A
DELL	Laptop	PP11L	QDS-BRCM1017
HP	Printer	C3941A	JPTVOB2337
DELL	Keyboard	L100	CNORH656658907BL05DC
SAST	Modem	AEM-2100	0293
DELL	Monitor	U3011t	CN-OPH5NY-74445-16T-290L

External Cable

Cable Description	Length (m)	From Port	To
Shielded detachable USB cable	0.6	EUT	ADAPTER
Audio cable	0.9	EUT	EARPHONE
Shielded Detachable Serial Cable	1.2	Serial Port of Laptop	Modem
Shielded Detachable Keyboard Cable	1.5	Keyboard Port of Laptop	Keyboard
Shielded Detachable Printer Cable	1.2	Parallel Port of Laptop	Printer

Block Diagram of Test Setup



SUMMARY OF TEST RESULTS

FCC Rules	Description of Test	Result
§1.1307, §2.1093	RF Exposure (SAR)	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

Note: * Please refer to SAR report released by BACL, report number: R1DG121119001-20

FCC §1.1307 & §2.1093 - RF EXPOSURE

Applicable Standard

FCC§1.1307 and §2.1093.

Test Result

Compliance, please refer to the SAR report: R1DG121119001-20

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 soldered on the print circuit board, which complied with 15.203, the maximum gain is 3.0 dBi, please refer to the internal photos.

Result: Compliance.

FCC §15.207 (a) – AC LINE CONDUCTED EMISSIONS

Applicable Standard

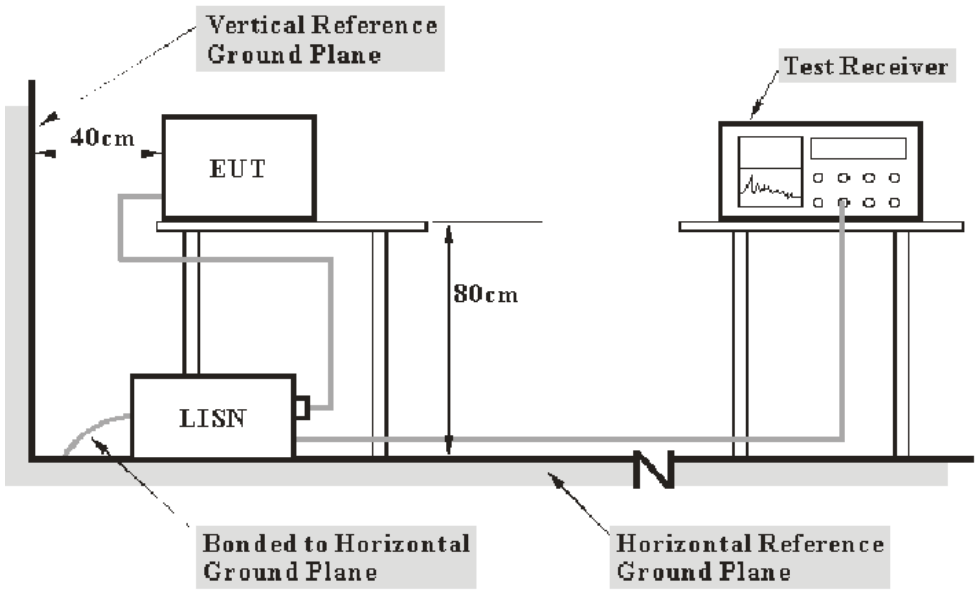
FCC§15.207

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 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 setup of EUT is according with per ANSI C63.4-2009 measurement procedure. The specification used was with the FCC Part 15.207 limits.

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:

Frequency Range	***IF B/W***
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	2012-10-08	2013-10-07
R&S	LISN1	ESH3-Z5	843331/015	2012-09-17	2013-09-16
R&S	LISN2	ESH3-Z5	100113	2012-10-08	2013-10-07

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:

22.60 dB at **1.360 MHz** in the **Neutral** conducted mode

Test Data

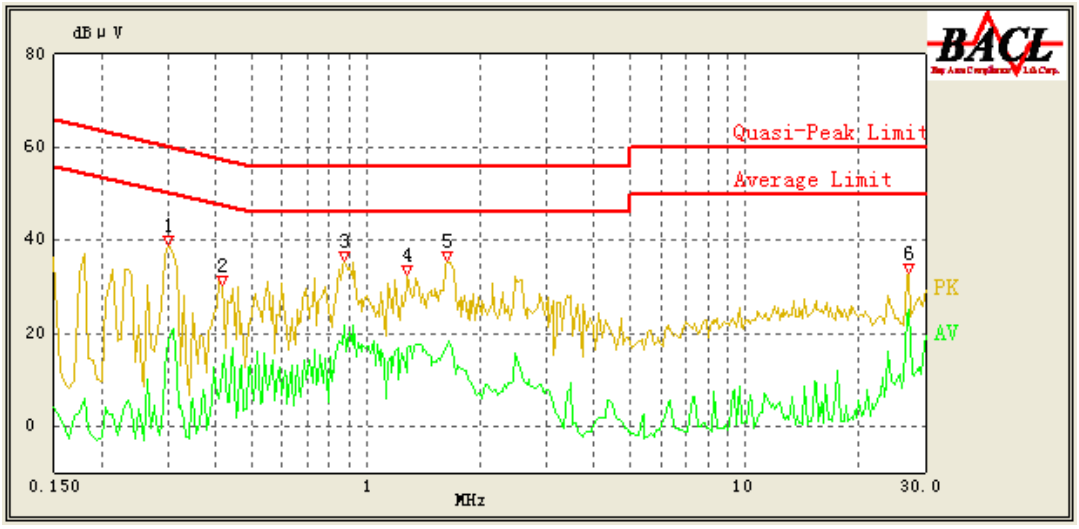
Environmental Conditions

Temperature:	25.7 ° C
Relative Humidity:	48 %
ATM Pressure:	100.1kPa

The testing was performed by Ares Liu on 2012-11-22.

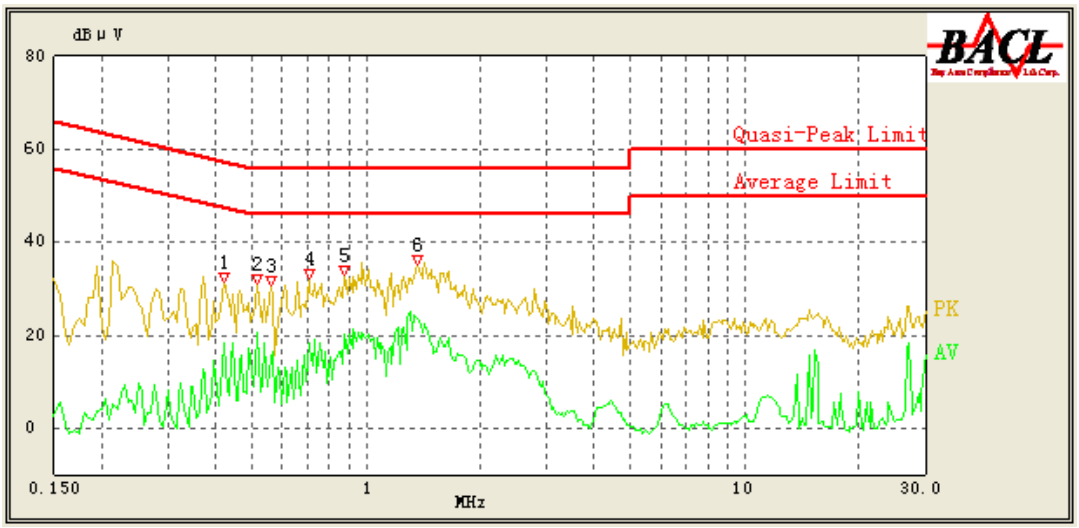
Test Mode: Transmitting

AC 120V/60Hz, Line



Frequency (MHz)	Cord. Reading (dBμV)	Correction Factor (dB)	Limit (dBμV)	Margin (dB)	Detector (PK/AV/QP)
0.875	21.68	0.32	46.00	24.32	AV
27.025	25.13	2.33	50.00	24.87	AV
0.875	29.24	0.32	56.00	26.76	QP
27.025	32.69	2.33	60.00	27.31	QP
0.415	30.38	0.32	58.43	28.05	QP
1.635	27.42	0.35	56.00	28.58	QP
1.630	17.28	0.35	46.00	28.72	AV
1.285	17.00	0.34	46.00	29.00	AV
1.285	26.93	0.34	56.00	29.07	QP
0.300	32.47	0.34	61.71	29.24	QP
0.300	18.24	0.34	51.71	33.47	AV
0.415	11.38	0.32	48.43	37.05	AV

AC 120V/60Hz, Neutral



Frequency (MHz)	Cord. Reading (dBμV)	Correction Factor (dB)	Limit (dBμV)	Margin (dB)	Detector (PK/AV/QP)
1.360	23.40	0.25	46.00	22.60	AV
1.360	32.77	0.25	56.00	23.23	QP
0.515	20.66	0.21	46.00	25.34	AV
0.875	20.15	0.23	46.00	25.85	AV
0.875	28.74	0.23	56.00	27.26	QP
0.705	18.18	0.21	46.00	27.82	AV
0.420	18.48	0.22	48.29	29.81	AV
0.515	25.60	0.21	56.00	30.40	QP
0.560	15.10	0.22	46.00	30.90	AV
0.705	25.01	0.21	56.00	30.99	QP
0.560	24.09	0.22	56.00	31.91	QP
0.420	24.95	0.22	58.29	33.34	QP

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

Applicable Standard

FCC §15.247 (d); §15.209; §15.205;

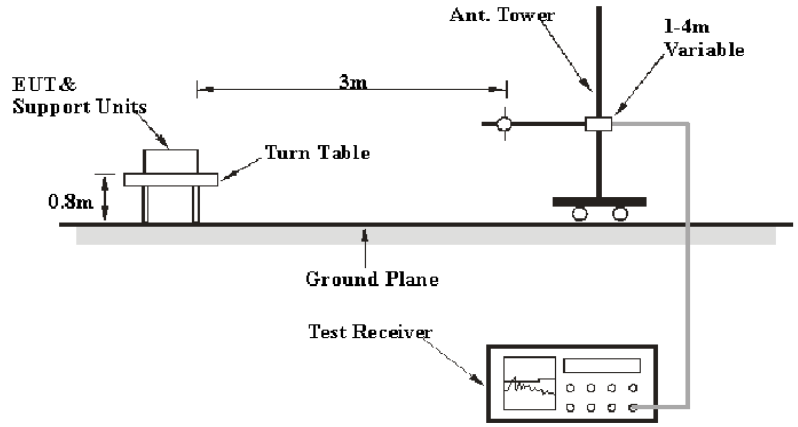
Measurement Uncertainty

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.

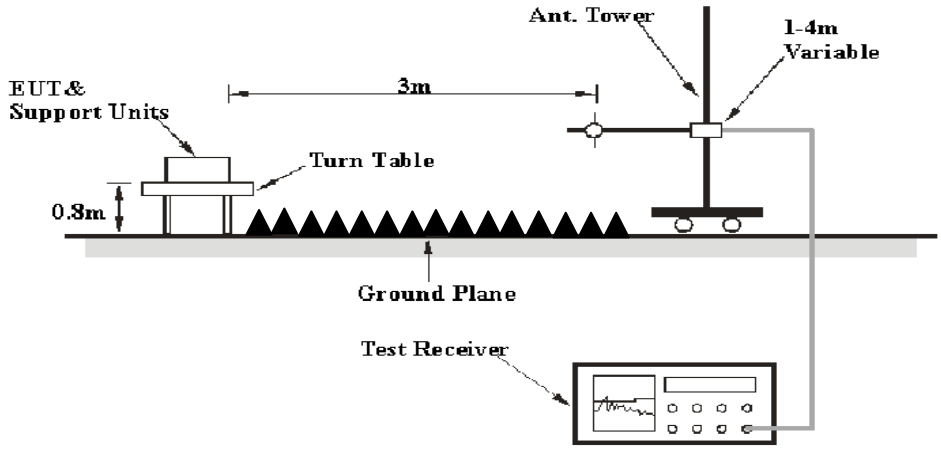
Based on CISPR 16-4-4, The Treatment of Uncertainty in EMC Measurements, the best estimate of the uncertainty of a radiation emissions measurement at Bay Area Compliance Laboratories Corp. (Dongguan) is 4.0 dB(k=2, 95% level of confidence) , and the uncertainty will not be taken into consideration for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

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***	***Detector***
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

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:

Corrected Amplitude = Meter Reading + Antenna Factor + Cable Loss - 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:

Margin = Limit – 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
Mini-Circuits	Wideband Amplifier	ZVA-183-S+	96901149	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:

4.47 dB at **2483.5 MHz** in the **Horizontal** polarization (802.11n mode)

Test Data

Environmental Conditions

Temperature:	25.6 ° C ~25.7 ° C
Relative Humidity:	56 %~57 %
ATM Pressure:	100.4kPa~101.0kPa

The testing was performed by Ares Liu from 2012-11-20 to 2012-11-21.

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									
2412	67.17	AV	H	25.67	3.93	0.00	96.77	N/A	N/A
2412	77.29	PK	H	25.67	3.93	0.00	106.89	N/A	N/A
2412	65.87	AV	V	25.67	3.93	0.00	95.47	N/A	N/A
2412	75.3	PK	V	25.67	3.93	0.00	104.90	N/A	N/A
612.85	37.41	QP	V	19.43	3.03	22.28	37.59	46.00	8.41
2390	14.32	AV	H	25.61	3.84	0.00	43.77	54.00	10.23
2390	28.66	PK	H	25.61	3.84	0.00	58.11	74.00	15.89
4824	28.57	AV	H	30.64	4.73	27.19	36.75	54.00	17.25
9648	17.99	AV	H	36.06	8.70	26.43	36.32	54.00	17.68
7236	18.12	AV	H	34.17	6.56	26.58	32.27	54.00	21.73
4824	41.91	PK	H	30.64	4.73	27.19	50.09	74.00	23.91
9648	31.69	PK	H	36.06	8.70	26.43	50.02	74.00	23.98
7236	32.03	PK	H	34.17	6.56	26.58	46.18	74.00	27.82
2118.3	20.75	AV	H	24.91	3.71	27.73	21.64	54.00	32.36
2118.3	36.04	PK	H	24.91	3.71	27.73	36.93	74.00	37.07
Middle Channel:2437MHz									
2437	67.51	AV	H	25.74	3.98	0.00	97.23	N/A	N/A
2437	77.33	PK	H	25.74	3.98	0.00	107.05	N/A	N/A
2437	66.03	AV	V	25.74	3.98	0.00	95.75	N/A	N/A
2437	75.45	PK	V	25.74	3.98	0.00	105.17	N/A	N/A
612.74	37.55	QP	V	19.43	3.03	22.28	37.73	46.00	8.27
4874	28.81	AV	H	30.77	4.76	27.03	37.31	54.00	16.69
9748	17.89	AV	H	36.30	8.60	26.53	36.26	54.00	17.74
7311	18.19	AV	H	34.35	6.70	26.65	32.59	54.00	21.41
6627.5	19.67	AV	H	32.63	5.57	26.14	31.73	54.00	22.27
4874	42.53	PK	H	30.77	4.76	27.03	51.03	74.00	22.97
9748	32.05	PK	H	36.30	8.60	26.53	50.42	74.00	23.58
7311	33.07	PK	H	34.35	6.70	26.65	47.47	74.00	26.53
6627.5	33.27	PK	H	32.63	5.57	26.14	45.33	74.00	28.67
2118.23	20.35	AV	H	24.91	3.72	27.73	21.25	54.00	32.75
2118.23	35.26	PK	H	24.91	3.72	27.73	36.16	74.00	37.84
High Channel:2462MHz									
2462	66.44	AV	H	25.80	3.93	0.00	96.17	N/A	N/A
2462	76.08	PK	H	25.80	3.93	0.00	105.81	N/A	N/A
2462	64.42	AV	V	25.80	3.93	0.00	94.15	N/A	N/A
2462	74.58	PK	V	25.80	3.93	0.00	104.31	N/A	N/A
2483.5	15.62	AV	H	25.86	3.80	0.00	45.28	54.00	8.72
613.01	37.41	QP	V	19.43	3.03	22.28	37.59	46.00	8.41
2483.5	32.91	PK	H	25.86	3.80	0.00	62.57	74.00	11.43
9848	17.92	AV	H	36.54	8.49	26.63	36.32	54.00	17.68
7386	18.18	AV	H	34.53	6.84	26.73	32.82	54.00	21.18
9848	32.31	PK	H	36.54	8.49	26.63	50.71	74.00	23.29
7386	33.01	PK	H	34.53	6.84	26.73	47.65	74.00	26.35
4924	13.33	AV	H	30.90	4.70	27.17	21.76	54.00	32.24
2118.4	20.41	AV	H	24.91	3.71	27.73	21.30	54.00	32.70
2118.4	35.87	PK	H	24.91	3.71	27.73	36.76	74.00	37.24
4924	27.14	PK	H	30.90	4.70	27.17	35.57	74.00	38.43

802.11g Mode:

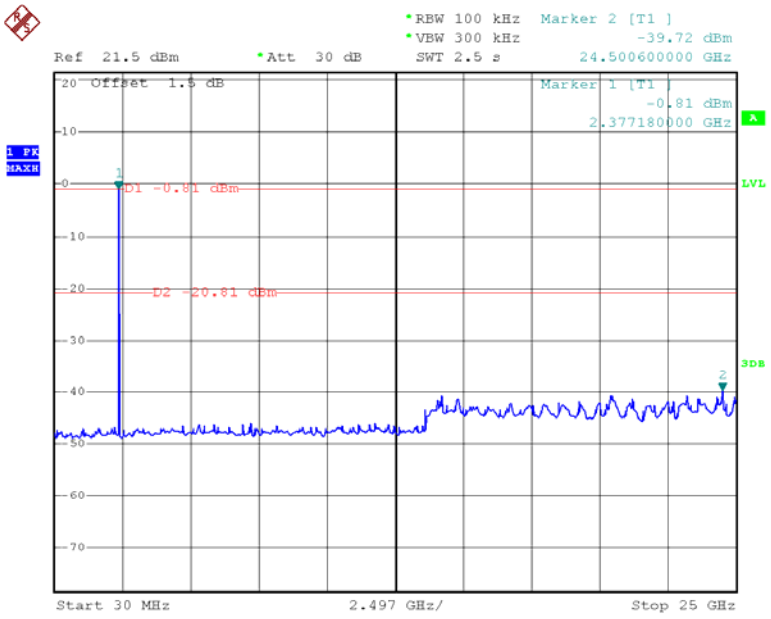
Frequency	Receiver		Rx Antenna		Cable loss (dB)	Amplifier Gain (dB)	Corrected Amplitude (dBμV/m)	FCC 15.247	
(MHz)	Reading (dBμV)	Detector (PK/QP/AV)	Polar (H/V)	Factor (dB(1/m))				Limit (dBμV/m)	Margin (dB)
Low Channel:2412MHz									
2412	67.07	AV	H	25.67	3.93	0.00	96.67	N/A	N/A
2412	77.19	PK	H	25.67	3.93	0.00	106.79	N/A	N/A
2412	65.18	AV	V	25.67	3.93	0.00	94.78	N/A	N/A
2412	75.45	PK	V	25.67	3.93	0.00	105.05	N/A	N/A
2390	39.97	PK	H	25.61	3.84	0.00	69.42	74.00	4.58
2390	16.93	AV	H	25.61	3.84	0.00	46.38	54.00	7.62
609.52	36.99	QP	V	19.44	3.04	22.27	37.20	46.00	8.80
4824	28.45	AV	H	30.64	4.73	27.19	36.63	54.00	17.37
9648	18.01	AV	H	36.06	8.70	26.43	36.34	54.00	17.66
7236	18.14	AV	H	34.17	6.56	26.58	32.29	54.00	21.71
9648	32.19	PK	H	36.06	8.70	26.43	50.52	74.00	23.48
4824	41.83	PK	H	30.64	4.73	27.19	50.01	74.00	23.99
7236	32.73	PK	H	34.17	6.56	26.58	46.88	74.00	27.12
2118.3	20.77	AV	H	24.91	3.71	27.73	21.66	54.00	32.34
2118.3	36.18	PK	H	24.91	3.71	27.73	37.07	74.00	36.93
Middle Channel:2437MHz									
2437	66.47	AV	H	25.74	3.98	0.00	96.19	N/A	N/A
2437	76.78	PK	H	25.74	3.98	0.00	106.50	N/A	N/A
2437	65.14	AV	V	25.74	3.98	0.00	94.86	N/A	N/A
2437	75.13	PK	V	25.74	3.98	0.00	104.85	N/A	N/A
612.31	37.29	QP	V	19.43	3.03	22.27	37.48	46.00	8.52
4874	28.52	AV	H	30.77	4.76	27.03	37.02	54.00	16.98
9748	17.91	AV	H	36.30	8.60	26.53	36.28	54.00	17.72
7311	18.17	AV	H	34.35	6.70	26.65	32.57	54.00	21.43
6628.3	19.63	AV	H	32.63	5.57	26.14	31.69	54.00	22.31
9748	32.16	PK	H	36.30	8.60	26.53	50.53	74.00	23.47
4874	41.53	PK	H	30.77	4.76	27.03	50.03	74.00	23.97
7311	33.18	PK	H	34.35	6.70	26.65	47.58	74.00	26.42
6628.3	33.11	PK	H	32.63	5.57	26.14	45.17	74.00	28.83
2118.23	20.49	AV	H	24.91	3.72	27.73	21.39	54.00	32.61
2118.23	36.07	PK	H	24.91	3.72	27.73	36.97	74.00	37.03
High Channel:2462MHz									
2462	66.57	AV	H	25.80	3.93	0.00	96.30	N/A	N/A
2462	76.48	PK	H	25.80	3.93	0.00	106.21	N/A	N/A
2462	64.46	AV	V	25.80	3.93	0.00	94.19	N/A	N/A
2462	74.76	PK	V	25.80	3.93	0.00	104.49	N/A	N/A
2483.5	39.64	PK	H	25.86	3.80	0.00	69.30	74.00	4.70
2483.5	16.57	AV	H	25.86	3.80	0.00	46.23	54.00	7.77
612.55	37.42	QP	V	19.43	3.03	22.28	37.60	46.00	8.40
4924	28.71	AV	H	30.90	4.70	27.17	37.14	54.00	16.86
9848	18.09	AV	H	36.54	8.49	26.63	36.49	54.00	17.51
7386	18.19	AV	H	34.53	6.84	26.73	32.83	54.00	21.17
9848	32.51	PK	H	36.54	8.49	26.63	50.91	74.00	23.09
4924	42.17	PK	H	30.90	4.70	27.17	50.60	74.00	23.40
7386	33.28	PK	H	34.53	6.84	26.73	47.92	74.00	26.08
2114.8	20.73	AV	H	24.90	3.74	27.73	21.64	54.00	32.36
2114.8	36.08	PK	H	24.90	3.74	27.73	36.99	74.00	37.01

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									
2412	66.04	AV	H	25.67	3.93	0.00	95.64	N/A	N/A
2412	73.99	PK	H	25.67	3.93	0.00	103.59	N/A	N/A
2412	64.19	AV	V	25.67	3.93	0.00	93.79	N/A	N/A
2412	72.07	PK	V	25.67	3.93	0.00	101.67	N/A	N/A
2390	38.47	PK	V	25.61	3.84	0.00	67.92	74.00	6.08
2390	16.84	AV	V	25.61	3.84	0.00	46.29	54.00	7.71
613.81	38.02	QP	V	19.42	3.02	22.28	38.18	46.00	7.82
9648	18.06	AV	H	36.06	8.70	26.43	36.39	54.00	17.61
4824	25.15	AV	H	30.64	4.73	27.19	33.33	54.00	20.67
7236	18.46	AV	H	34.17	6.56	26.58	32.61	54.00	21.39
9648	32.11	PK	H	36.06	8.70	26.43	50.44	74.00	23.56
4824	39.08	PK	H	30.64	4.73	27.19	47.26	74.00	26.74
7236	32.16	PK	H	34.17	6.56	26.58	46.31	74.00	27.69
2118.3	20.73	AV	H	24.91	3.71	27.73	21.62	54.00	32.38
2118.3	36.18	PK	H	24.91	3.71	27.73	37.07	74.00	36.93
Middle Channel:2437MHz									
2437	64.73	AV	H	25.74	3.98	0.00	94.45	N/A	N/A
2437	72.89	PK	H	25.74	3.98	0.00	102.61	N/A	N/A
2437	66.28	AV	V	25.74	3.98	0.00	96.00	N/A	N/A
2437	73.48	PK	V	25.74	3.98	0.00	103.20	N/A	N/A
612.47	37.22	QP	V	19.43	3.03	22.27	37.41	46.00	8.59
9748	17.97	AV	H	36.30	8.60	26.53	36.34	54.00	17.66
4874	25.41	AV	H	30.77	4.76	27.03	33.91	54.00	20.09
7311	18.6	AV	H	34.35	6.70	26.65	33.00	54.00	21.00
6627.5	19.76	AV	H	32.63	5.57	26.14	31.82	54.00	22.18
9748	32.08	PK	H	36.30	8.60	26.53	50.45	74.00	23.55
7311	33.43	PK	H	34.35	6.70	26.65	47.83	74.00	26.17
4874	38.33	PK	H	30.77	4.76	27.03	46.83	74.00	27.17
6627.5	33.37	PK	H	32.63	5.57	26.14	45.43	74.00	28.57
2118.23	20.71	AV	H	24.91	3.72	27.73	21.61	54.00	32.39
2118.23	35.48	PK	H	24.91	3.72	27.73	36.38	74.00	37.62
High Channel:2462MHz									
2462	64.47	AV	H	25.80	3.93	0.00	94.20	N/A	N/A
2462	73.49	PK	H	25.80	3.93	0.00	103.22	N/A	N/A
2462	64.09	AV	V	25.80	3.93	0.00	93.82	N/A	N/A
2462	72.18	PK	V	25.80	3.93	0.00	101.91	N/A	N/A
2483.5	39.87	PK	H	25.86	3.80	0.00	69.53	74.00	4.47
2483.5	16.55	AV	H	25.86	3.80	0.00	46.21	54.00	7.79
612.63	37.45	QP	V	19.43	3.03	22.28	37.63	46.00	8.37
9848	18.09	AV	H	36.54	8.49	26.63	36.49	54.00	17.51
4924	25.47	AV	H	30.90	4.70	27.17	33.90	54.00	20.10
7386	18.45	AV	H	34.53	6.84	26.73	33.09	54.00	20.91
9848	32.37	PK	H	36.54	8.49	26.63	50.77	74.00	23.23
7386	33.41	PK	H	34.53	6.84	26.73	48.05	74.00	25.95
4924	38.08	PK	H	30.90	4.70	27.17	46.51	74.00	27.49
2118.4	20.49	AV	H	24.91	3.71	27.73	21.38	54.00	32.62
2118.4	35.89	PK	H	24.91	3.71	27.73	36.78	74.00	37.22

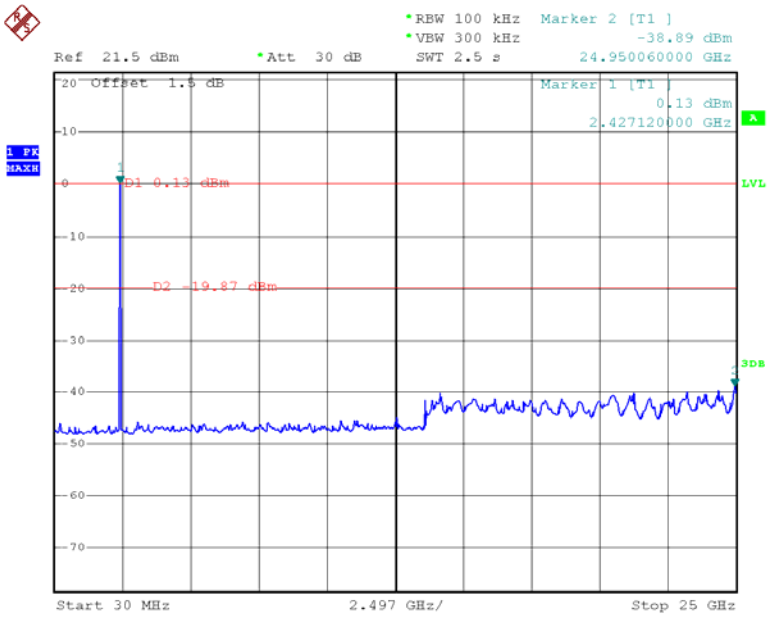
Conducted Spurious Emissions at Antenna Port

802.11b Low Channel



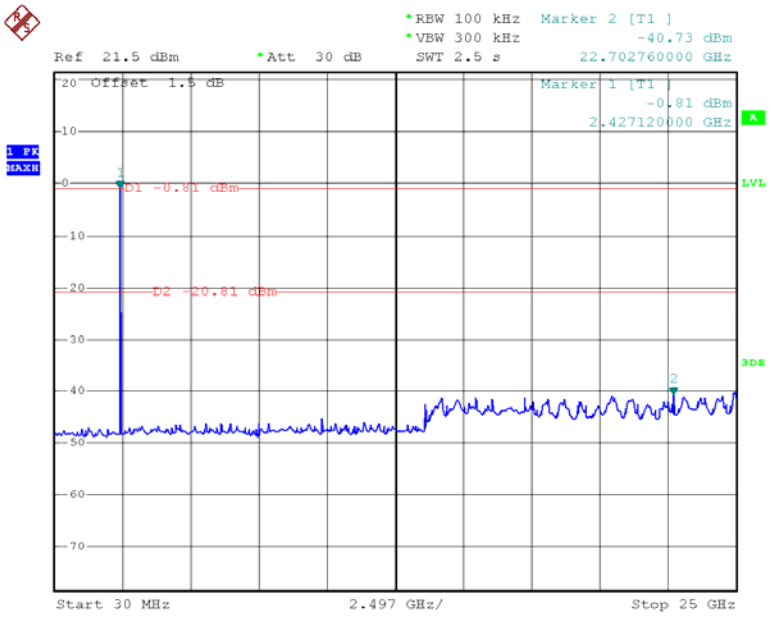
Date: 20.NOV.2012 15:32:38

802.11b Middle Channel



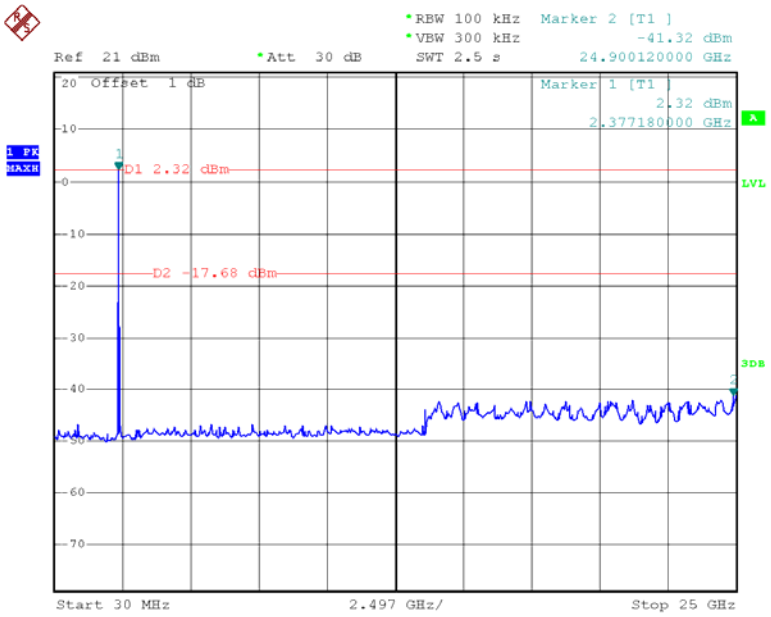
Date: 20.NOV.2012 15:39:22

802.11b High Channel



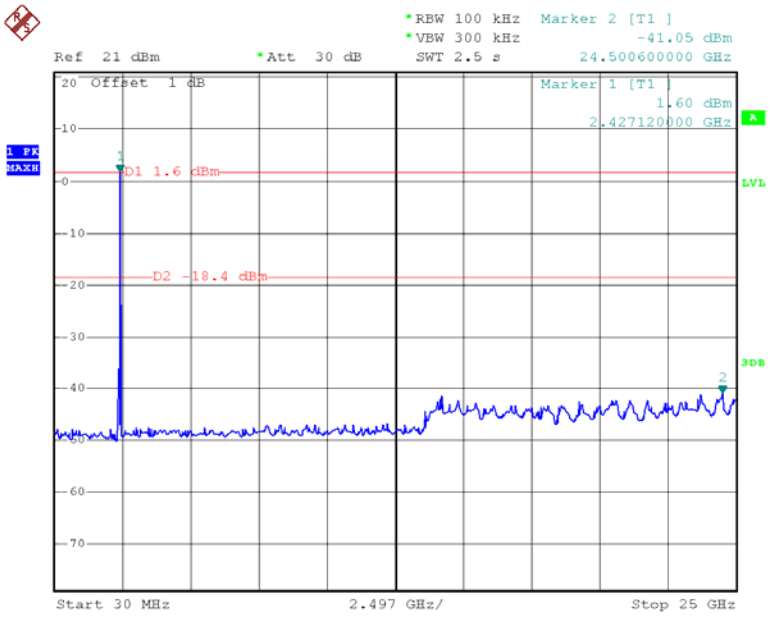
Date: 20.NOV.2012 15:48:54

802.11g Low Channel



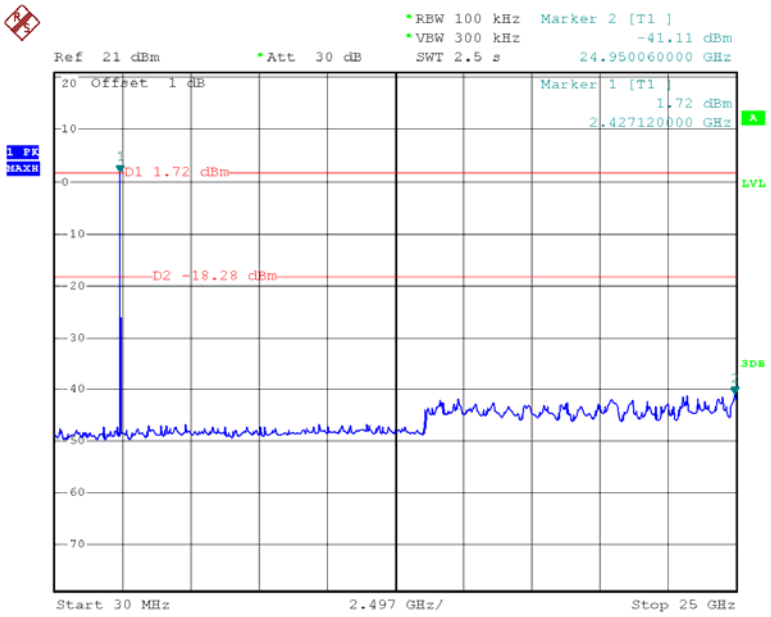
Date: 21.NOV.2012 16:15:40

802.11g Middle Channel



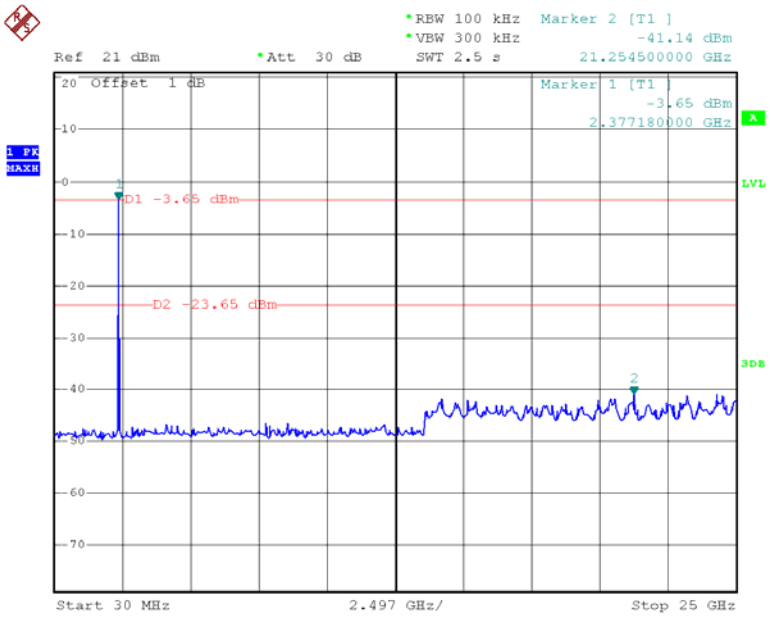
Date: 21.NOV.2012 16:14:18

802.11g High Channel



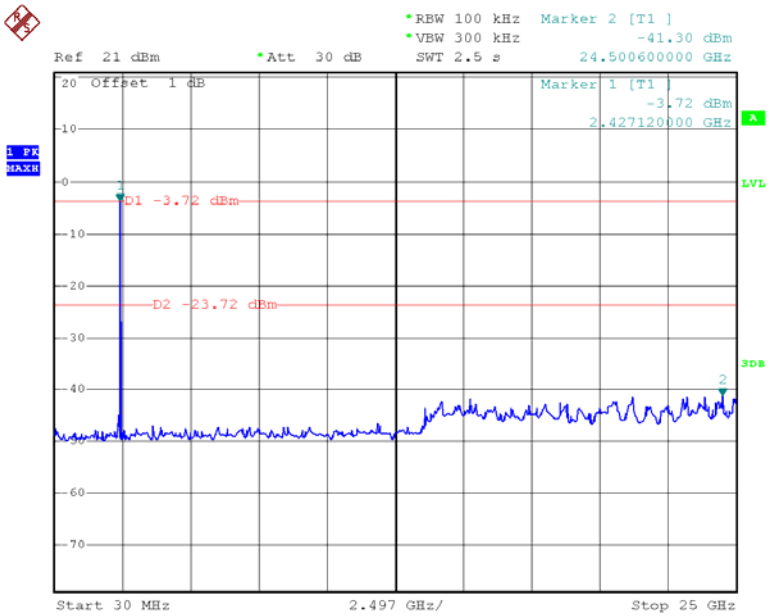
Date: 21.NOV.2012 16:10:44

802.11n20 Low Channel



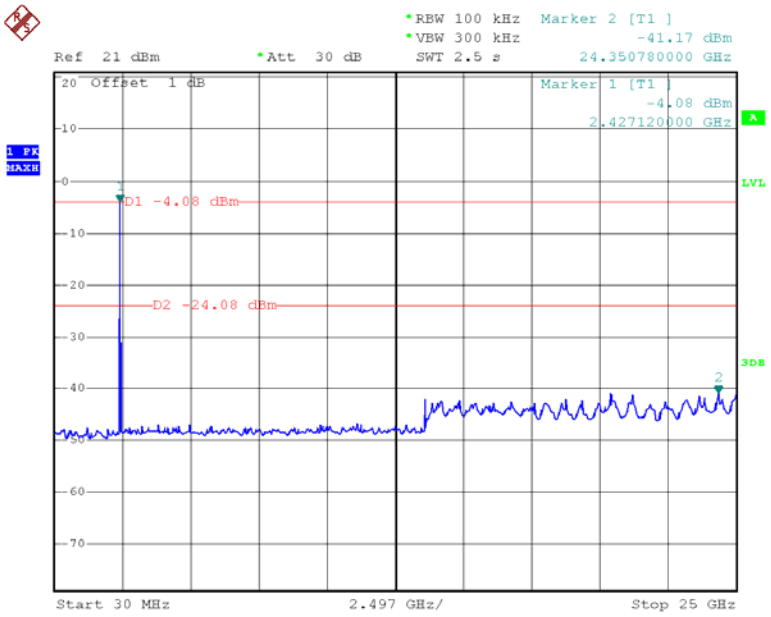
Date: 21.NOV.2012 16:30:52

802.11n20 Middle Channel



Date: 21.NOV.2012 16:32:43

802.11n20 High Channel



Date: 21.NOV.2012 16:40:12

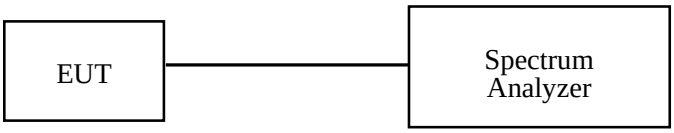
FCC §15.247(a) (2) – 6 dB EMISSION BANDWIDTH

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:	25.5 ° C ~25.8 ° C
Relative Humidity:	47 %~47 %
ATM Pressure:	100.4kPa~101.0kPa

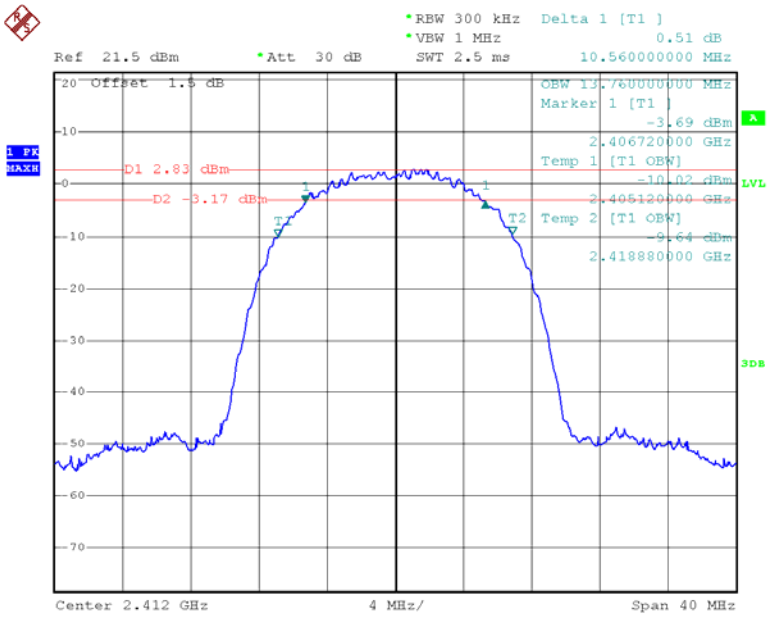
The testing was performed by Ares Liu from 2012-11-20 to 2012-11-21.

Test Result: Pass.

Please refer to the following tables and plots.

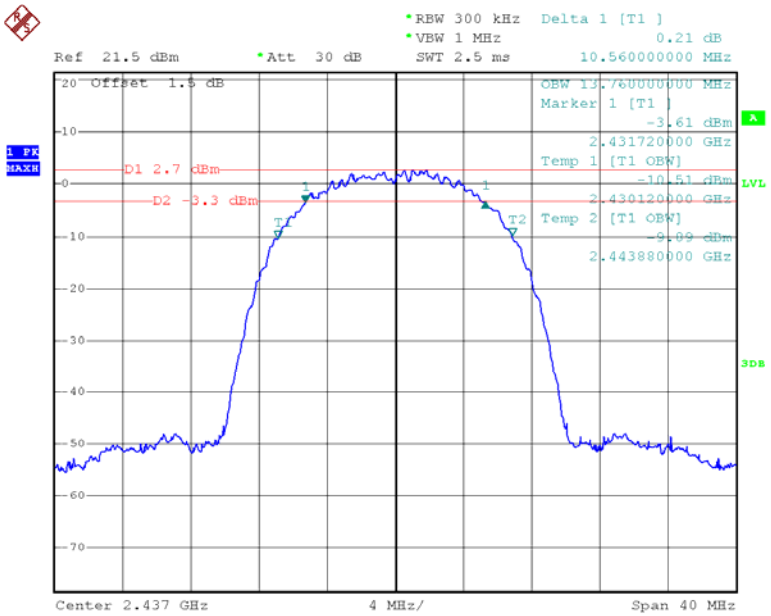
Channel	Frequency	6 dB Bandwidth	Limit
	(MHz)	(MHz)	(kHz)
802.11b mode			
Low	2412	10.56	>500
Middle	2437	10.56	>500
High	2462	10.56	>500
802.11g mode			
Low	2412	16.64	>500
Middle	2437	16.8	>500
High	2462	16.64	>500
802.11n20 mode			
Low	2412	17.84	>500
Middle	2437	17.84	>500
High	2462	17.84	>500

802.11b Low Channel



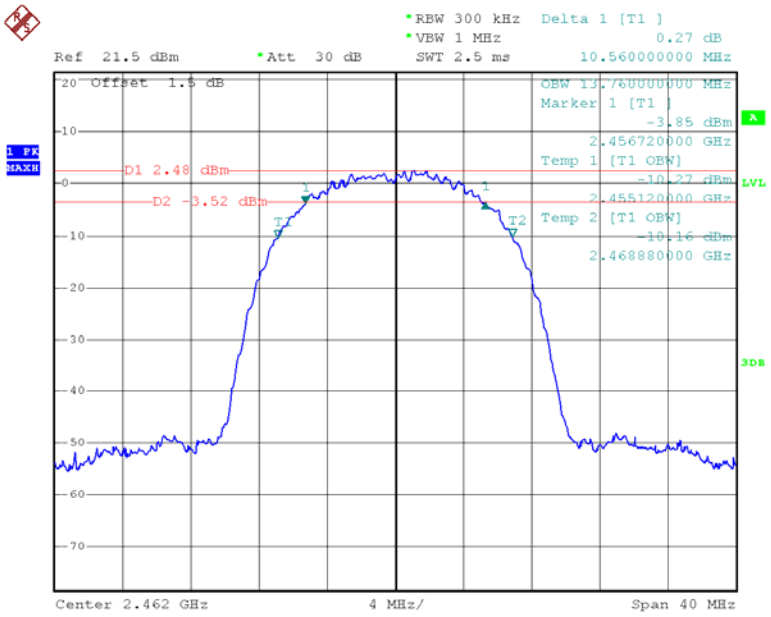
Date: 20.NOV.2012 15:23:58

802.11b Middle Channel



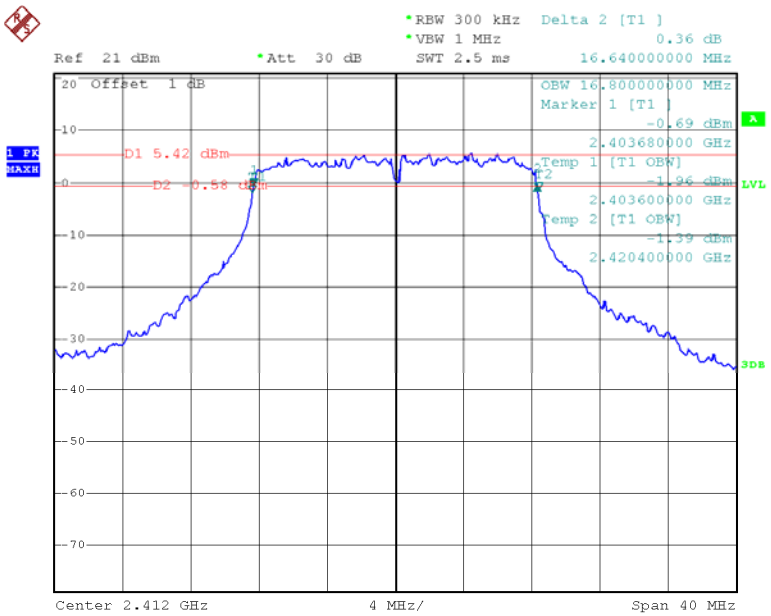
Date: 20.NOV.2012 15:40:43

802.11b High Channel



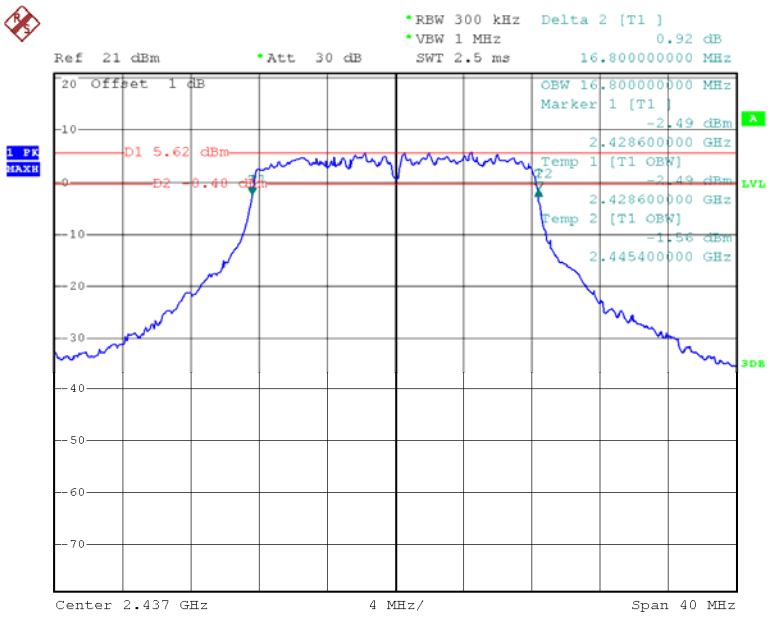
Date: 20.NOV.2012 15:44:28

802.11g Low Channel



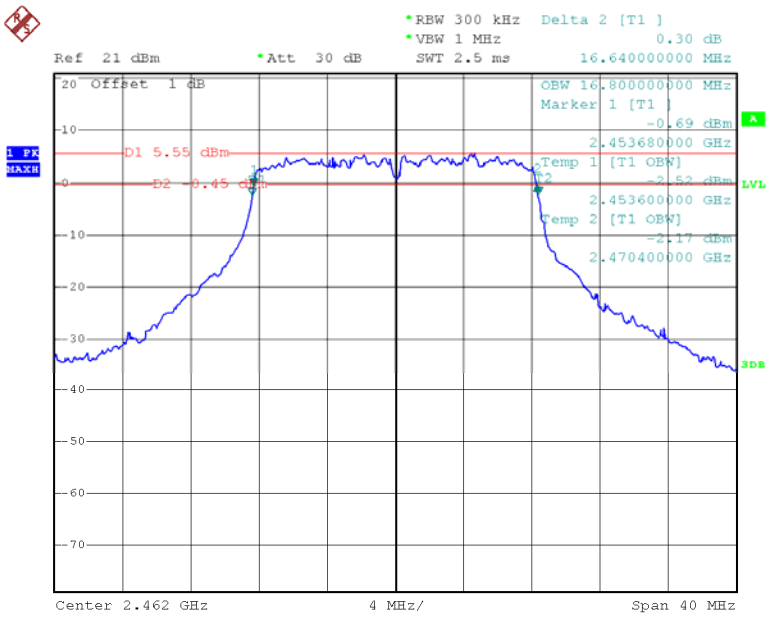
Date: 21.NOV.2012 16:16:31

802.11g Middle Channel



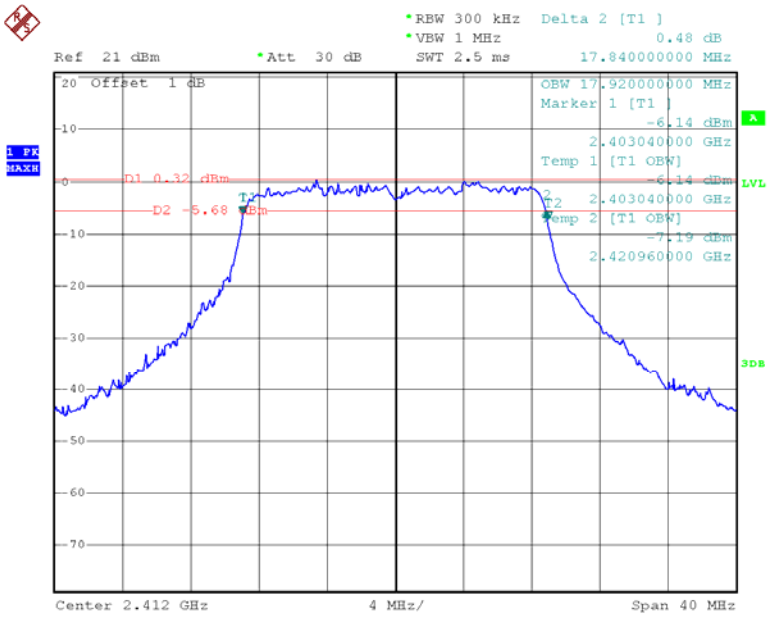
Date: 21.NOV.2012 16:12:28

802.11g High Channel



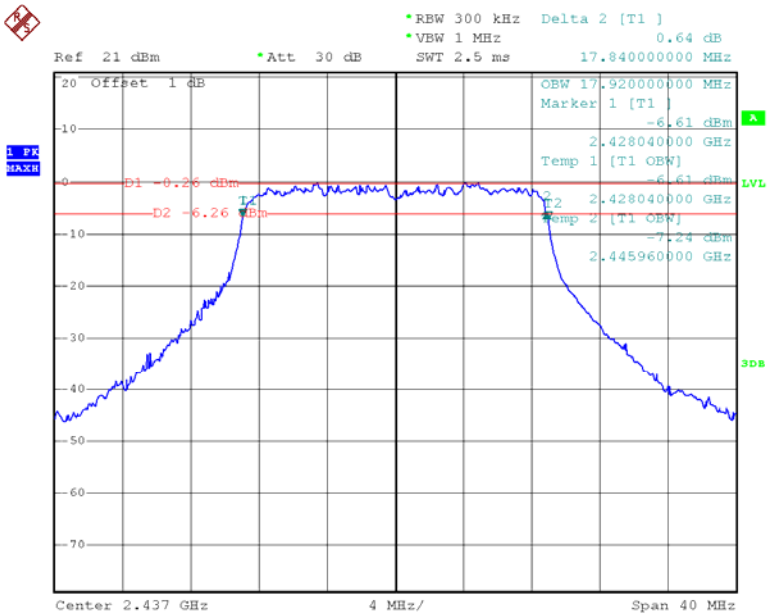
Date: 21.NOV.2012 15:54:24

802.11n20 Low Channel



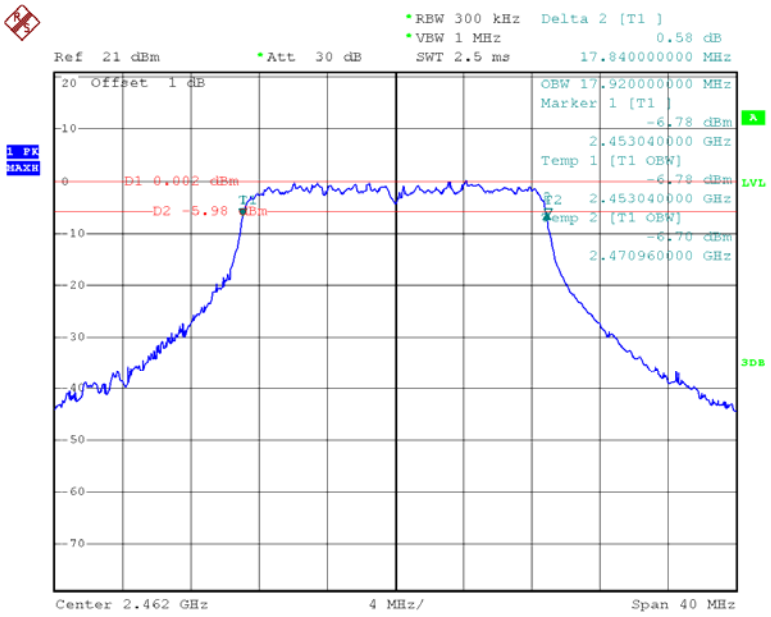
Date: 21.NOV.2012 16:26:52

802.11n20 Middle Channel



Date: 21.NOV.2012 16:33:52

802.11n20 High Channel



Date: 21.NOV.2012 16:36:51

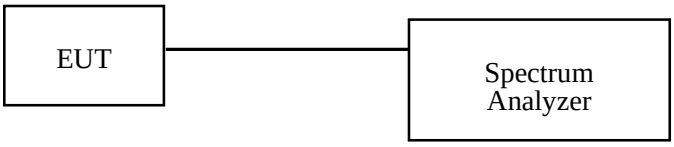
FCC §15.247(b) (3) - MAXIMUM PEAK OUTPUT POWER

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:	25.5 ° C
Relative Humidity:	47 %
ATM Pressure:	100.4kPa

The testing was performed by Ares Liu on 2012-11-21.

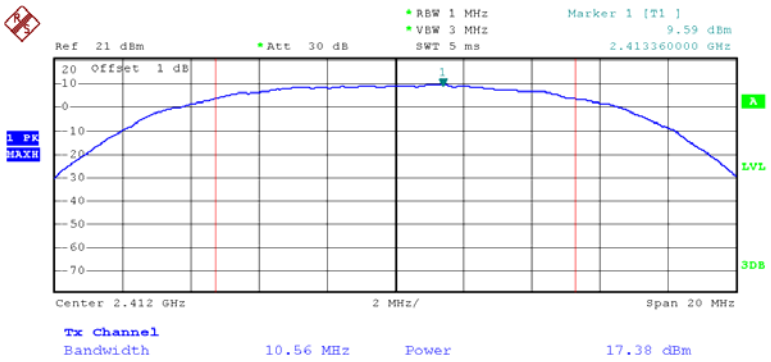
Test Mode: Transmitting

Channel	Frequency	Conducted Output Power	Limit	Result
	(MHz)	(dBm)	(dBm)	
802.11b mode				
Low	2412	17.38	30	PASS
Middle	2437	17.24	30	PASS
High	2462	17.14	30	PASS
802.11g mode				
Low	2412	21.38	30	PASS
Middle	2437	21.41	30	PASS
High	2462	21.40	30	PASS
802.11n20 mode				
Low	2412	15.97	30	PASS
Middle	2437	16.03	30	PASS
High	2462	15.78	30	PASS

The antenna gain is 3.0 dBi.

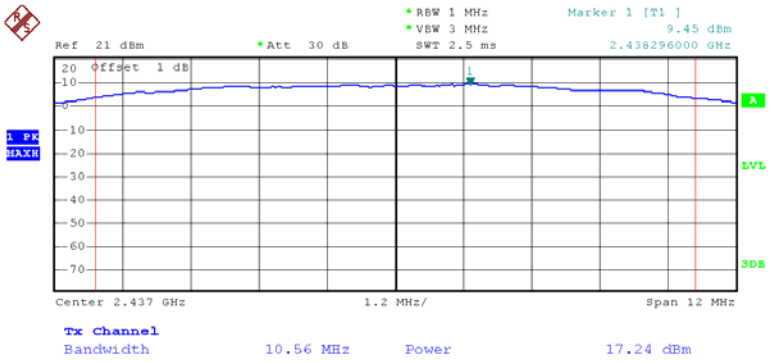
Please refer to the following plots

802.11b RF Output Power, Low Channel



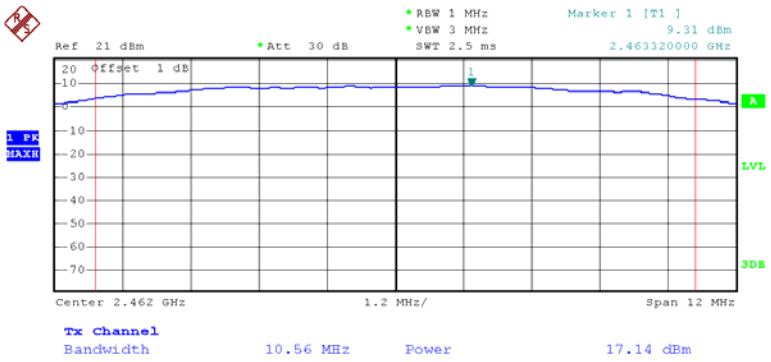
Date: 21.NOV.2012 15:12:43

802.11b RF Output Power, Middle Channel



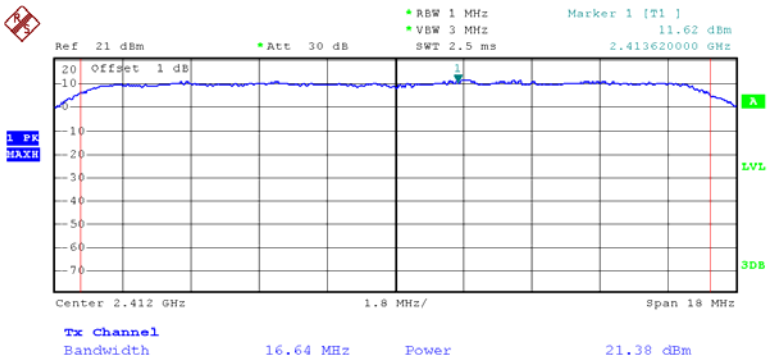
Date: 21.NOV.2012 15:20:15

802.11b RF Output Power, High Channel



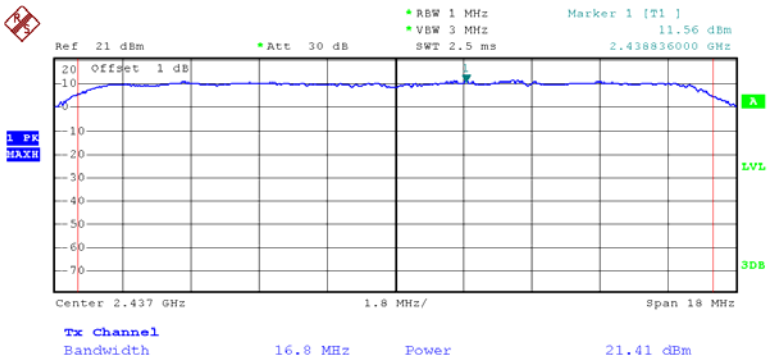
Date: 21.NOV.2012 15:22:27

802.11g RF Output Power, Low Channel



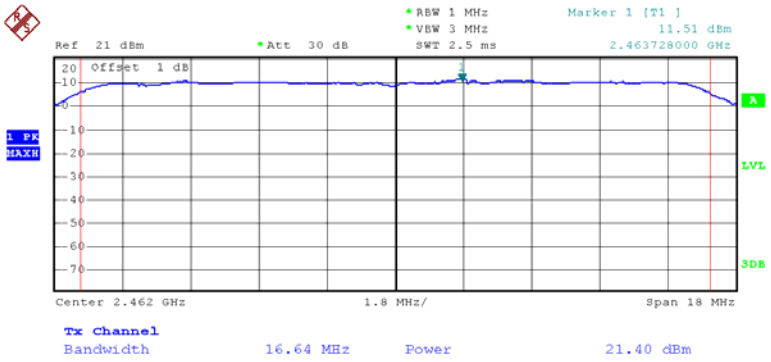
Date: 21.NOV.2012 16:19:59

802.11g RF Output Power, Middle Channel



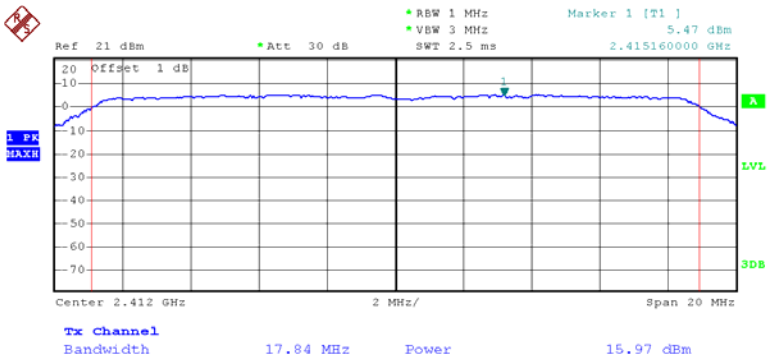
Date: 21.NOV.2012 16:13:05

802.11g RF Output Power, High Channel



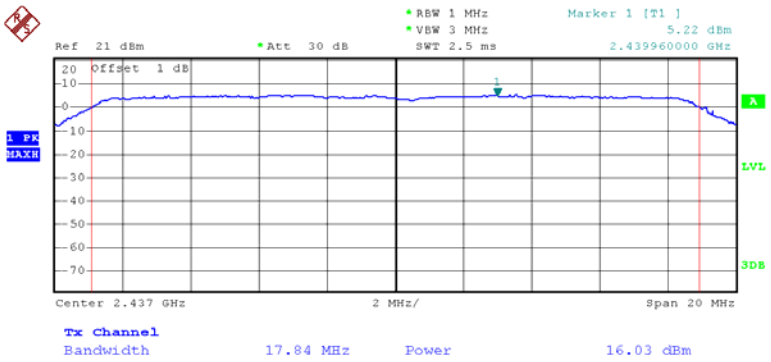
Date: 21.NOV.2012 15:56:18

802.11n20 RF Output Power, Low Channel



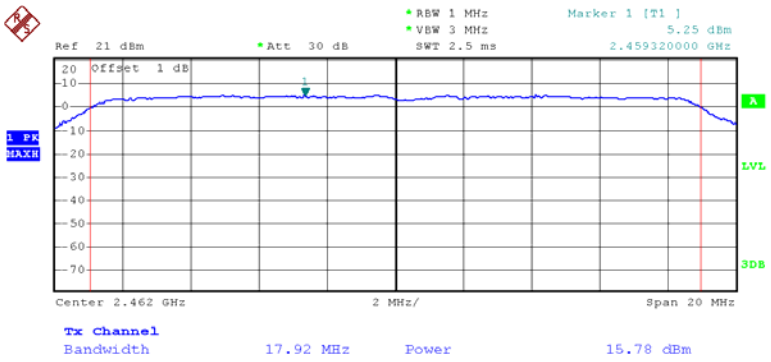
Date: 21.NOV.2012 16:27:30

802.11n20 RF Output Power, Middle Channel



Date: 21.NOV.2012 16:34:40

802.11n20 RF Output Power, High Channel



Date: 21.NOV.2012 16:37:30

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

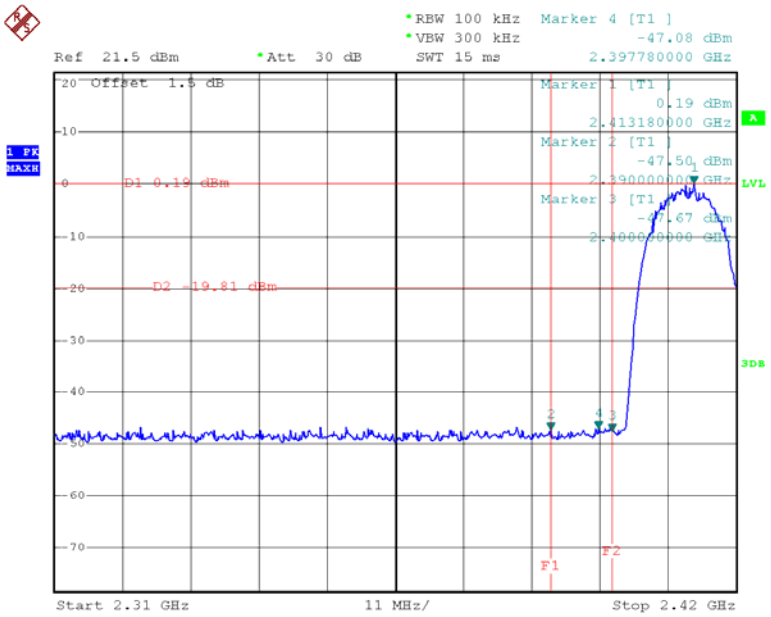
Temperature:	25.5 ° C~25.8 ° C
Relative Humidity:	47 %~47 %
ATM Pressure:	100.4kPa~101.0kPa

The testing was performed by Ares Liu from 2012-11-20 to 2012-11-21

Test Result: *Compliance*

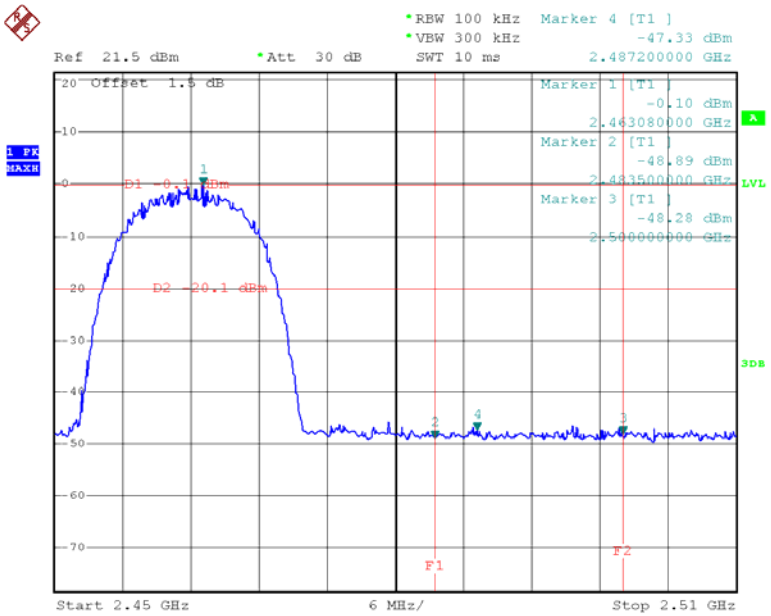
Please refer to following plots.

802.11b: Band Edge, Left Side



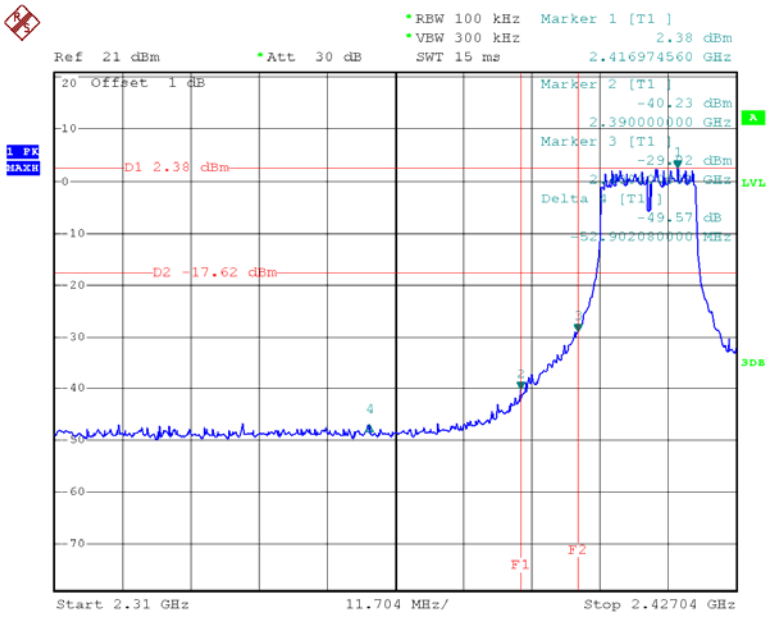
Date: 20.NOV.2012 15:26:37

802.11b: Band Edge, Right Side



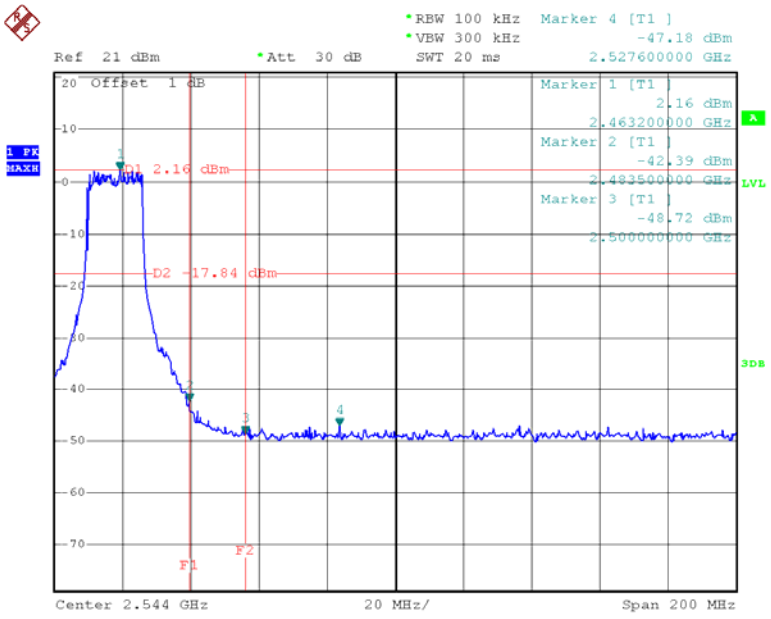
Date: 20.NOV.2012 15:47:38

802.11g: Band Edge, Left Side



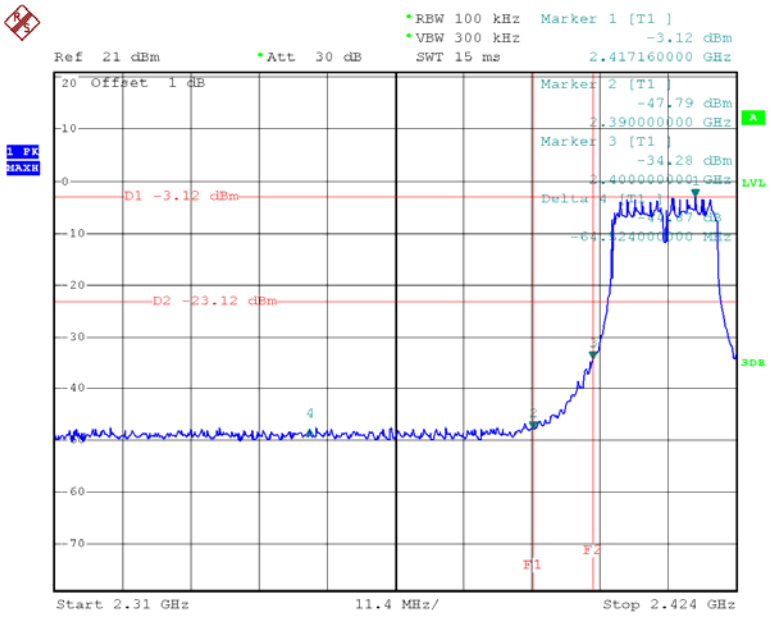
Date: 21.NOV.2012 16:22:55

802.11g: Band Edge, Right Side



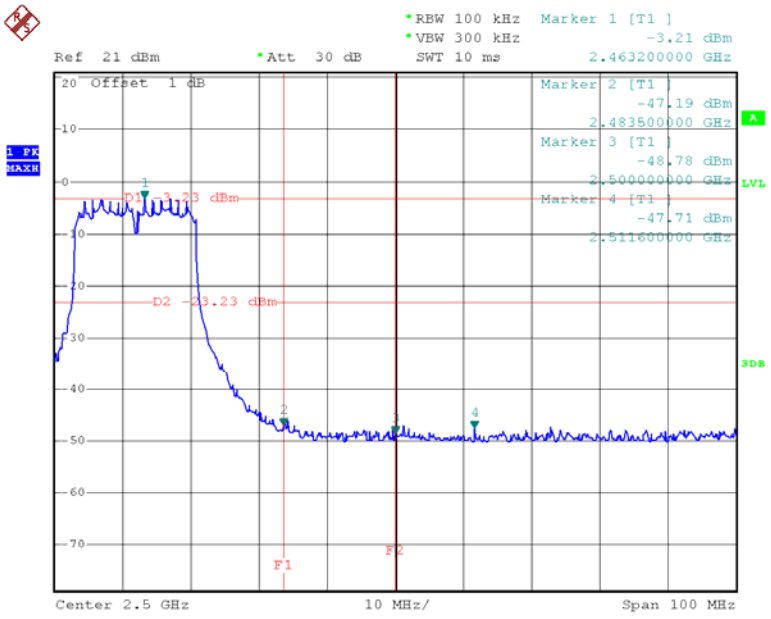
Date: 21.NOV.2012 16:09:37

802.11n20: Band Edge, Left Side



Date: 21.NOV.2012 16:29:00

802.11n20: Band Edge, Right Side



Date: 21.NOV.2012 16:39:08

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 v02, set the RBW = 3 kHz, VBW = 30 kHz, Set the span to 1.5 times the DTS channel bandwidth.
4. Use the peak marker function to determine the maximum power level in any 3 kHz band segment within the fundamental EBW.

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:	25.5 ° C
Relative Humidity:	47 %
ATM Pressure:	100.4kPa

The testing was performed by Ares Liu on 2013-02-01 .

Test Mode: Transmitting

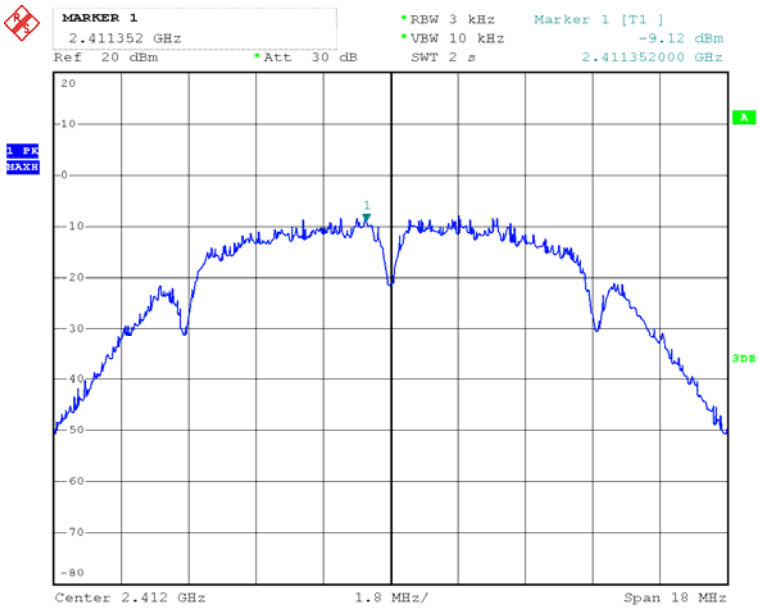
Test Result: Pass

Channel	PSD (dBm/3kHz)	Limit (dBm/3kHz)	Result
802.11b mode			
Low	-9.12	8	PASS
Middle	-8.86	8	PASS
High	-8.31	8	PASS
802.11g mode			
Low	-9.80	8	PASS
Middle	-11.45	8	PASS
High	-10.09	8	PASS
802.11n20 mode			
Low	-16.11	8	PASS
Middle	-17.34	8	PASS
High	-17.23	8	PASS

Note: the antenna gain is 3.0dBi.

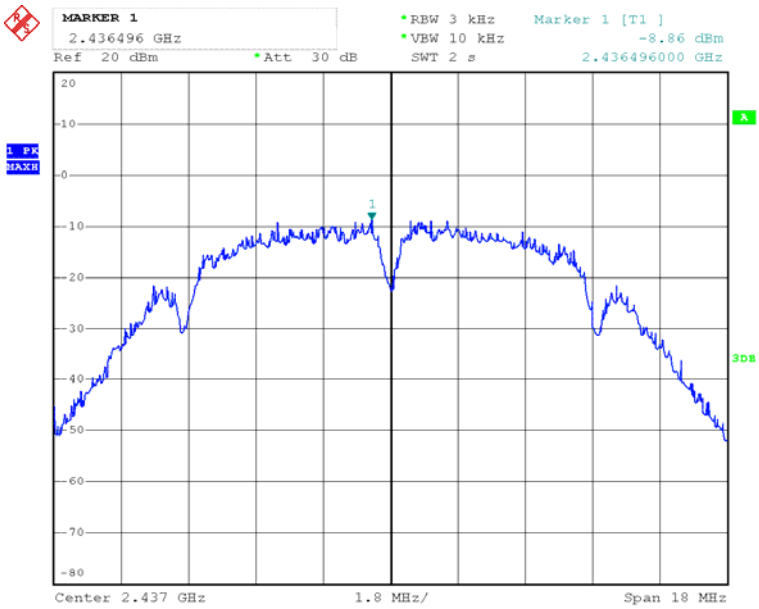
Please refer to the following plots

Power Spectral Density, 802.11b Low Channel



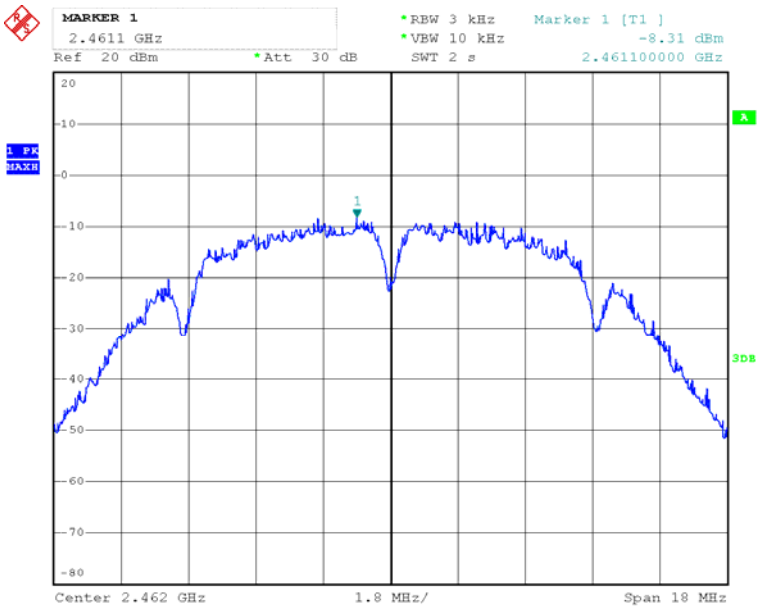
Date: 1.FEB.2013 13:02:23

Power Spectral Density, 802.11b Middle Channel



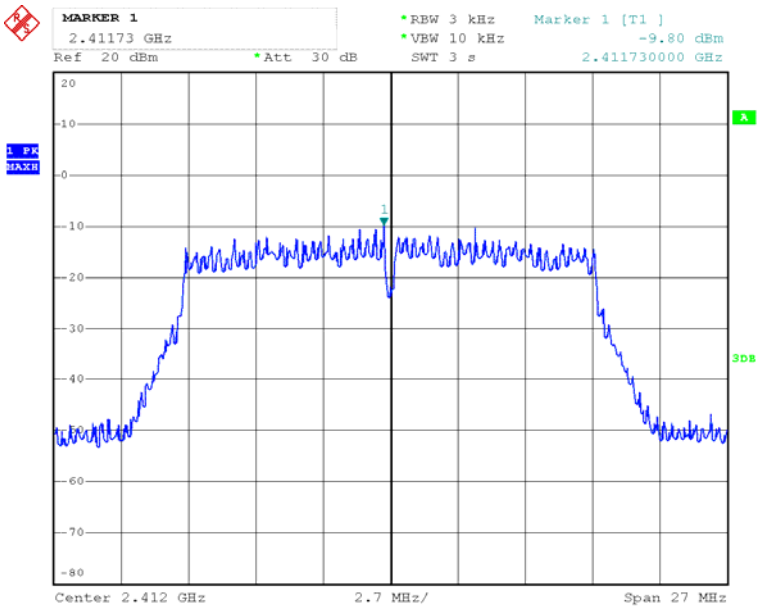
Date: 1.FEB.2013 13:03:23

Power Spectral Density, 802.11b High Channel



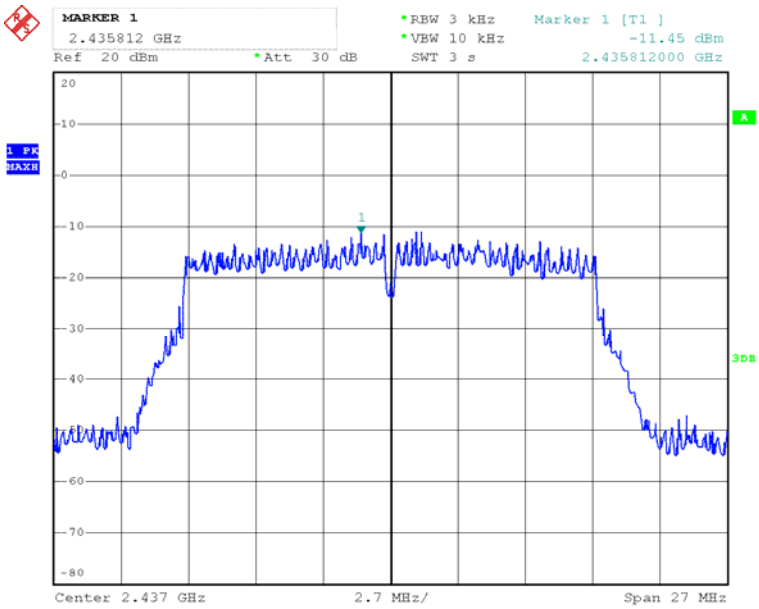
Date: 1.FEB.2013 13:04:08

Power Spectral Density, 802.11g Low Channel



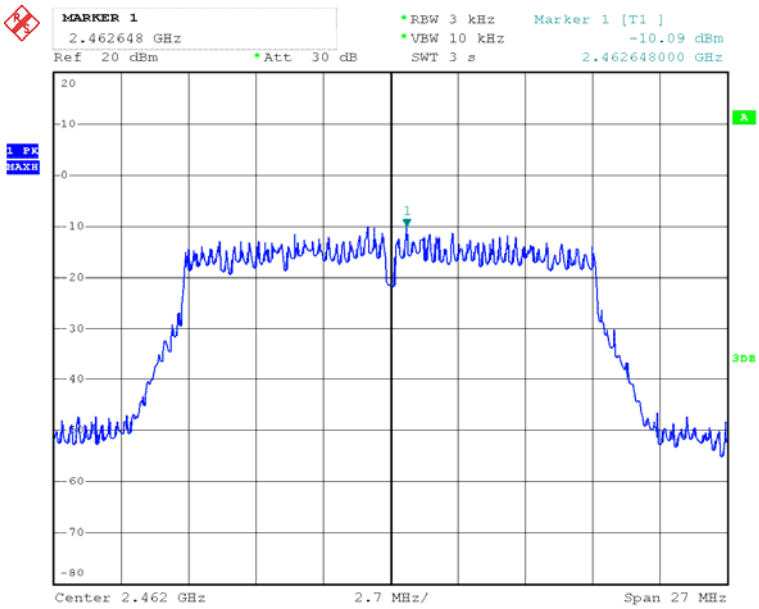
Date: 1.FEB.2013 13:08:12

Power Spectral Density, 802.11g Middle Channel



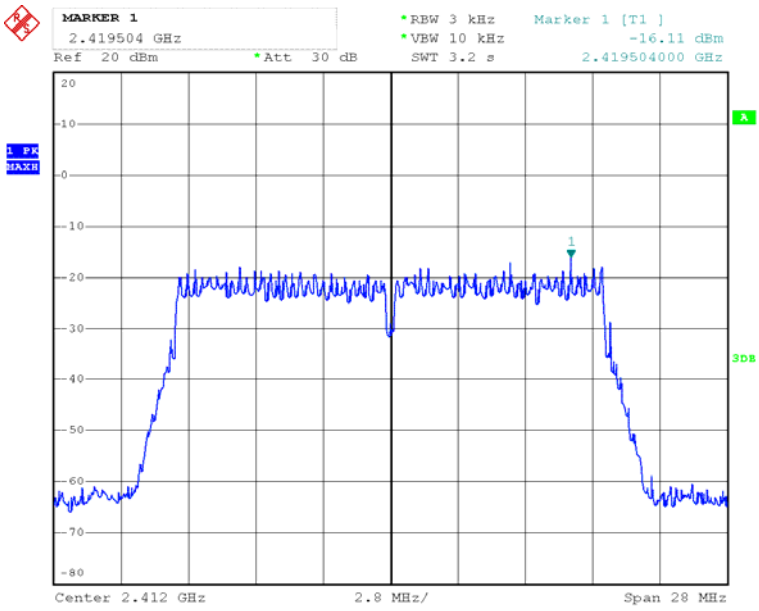
Date: 1.FEB.2013 13:07:05

Power Spectral Density, 802.11g High Channel



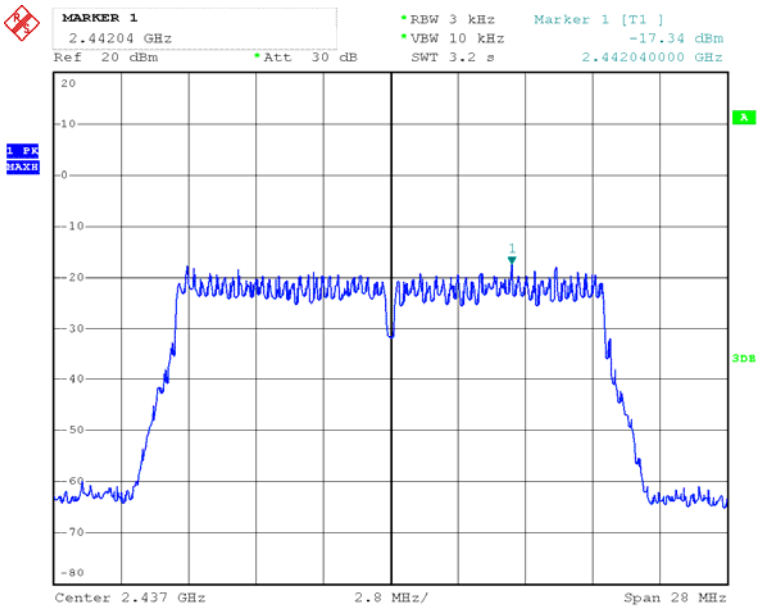
Date: 1.FEB.2013 13:06:11

Power Spectral Density, 802.11n20 Low Channel



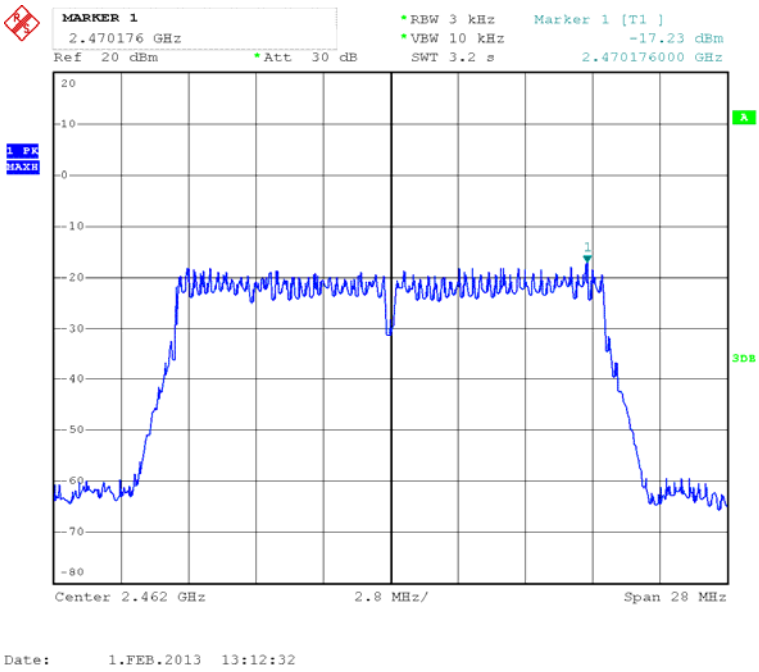
Date: 1.FEB.2013 13:10:58

Power Spectral Density, 802.11n20 Middle Channel



Date: 1.FEB.2013 13:11:42

Power Spectral Density, 802.11n20 High Channel



Date: 1.FEB.2013 13:12:32

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