FCC PART 15.247

MEASUREMENT AND TEST REPORT

For

ShenZhen Gospell Smarthome Electronic Co., Ltd

F12 F518 Idea Land Baoyuan Road Baoan Central Area shenzhen City P.R China

FCC ID: TW5GD8723

Report Type:	**Product Type:**
Original Report	WIFI REARVIEW CAMERA

Test Engineer:	Mike Hu
Report Number:	RSZ140627006-00B
Report Date:	2014-07-23
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GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

The *ShenZhen Gospell Smarthome Electronic Co., Ltd*'s product, model number: *GD8723 (FCC ID: TW5GD8723)* or the "EUT" in this report was a *WIFI REARVIEW CAMERA*, which was measured approximately: 26.4 cm (L) x 4.6 cm (W) x 4.0 cm (H), rated with input voltage: DC 4*1.5V AA battery.

**All measurement and test data in this report was gathered from production sample serial number: 1406211 (Assigned by BACL, Shenzhen). The EUT supplied by the applicant was received on 2014-06-27.*

Objective

This report is prepared on behalf of *ShenZhen Gospell Smarthome Electronic 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 compliance 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.

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

Measurement uncertainty with radiated emission is 5.91 dB for 30MHz-1GHz.and 4.92 dB for above 1GHz, 1.95dB for conducted measurement.

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	/	/

For 802.11b, 802.11g, 802.11n-HT20 mode, EUT was tested with Channel 1, 6 and 11.

For 802.11n-HT40 mode, 7 channels are provided to testing:

Channel	Frequency (MHz)	Channel	Frequency (MHz)
1	2422	6	2447
2	2427	7	2452
3	2432	/	/
4	2437	/	/
5	2442	/	/

EUT was tested with Channel 1, 4 and 7.

EUT Exercise Software

Test software: DutApiBridgeUART8782.exe

802.11b: Data rate: 11MHz, power level: 15
802.11g: Data rate: 54 MHz, power level: 13
802.11n-HT20: Data rate: MCS0, power level: 15
802.11n-HT40: Data rate: MCS7, power level: 15

Equipment Modifications

No modification was made to the EUT tested.

Support Equipment List and Details

Manufacturer	Description	Model	Serial Number
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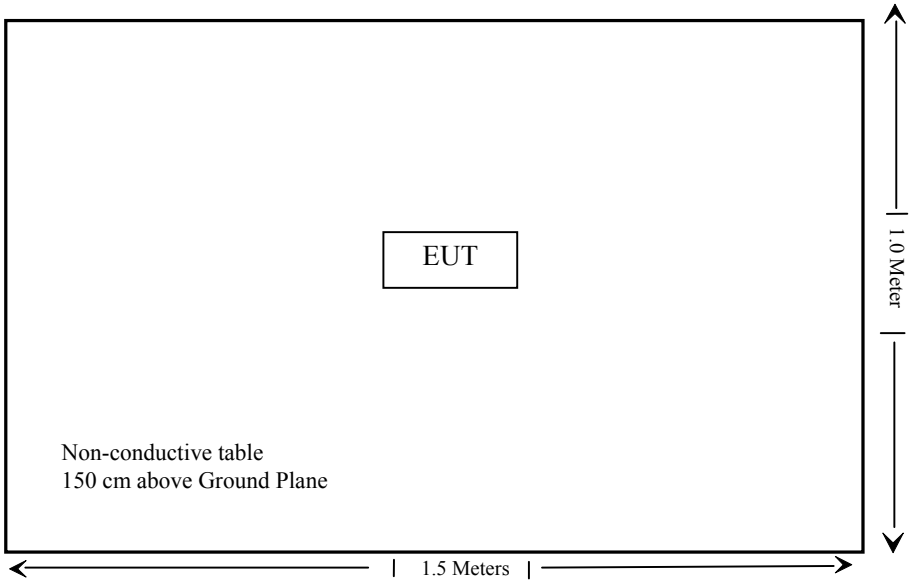
Block Diagram of Test Setup



SUMMARY OF TEST RESULTS

FCC Rules	Description of Test	Result
§15.247 (i) & §2.1093	RF Exposure	Compliance
§15.203	Antenna Requirement	Compliance
§15.207 (a)	Conducted Emissions	Not Applicable
§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 Output Power	Compliance
§15.247(d)	100kHz Bandwidth of Frequency Band Edge	Compliance
§15.247(e)	Power Spectral Density	Compliance

Not Applicable: the EUT was supplied by battery only.

FCC §15.247 (i) & §2.1093 – RF EXPOSURE

Applicable Standard

According to§15.247(i) and §1.1310, 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 KDB447498 D01 General RF Exposure Guidance v05r02:

The 1-g and 10-g SAR test exclusion thresholds for 100 MHz to 6 GHz at test separation distances ≤ 50 mm are determined by:
[(max. power of channel, including tune-up tolerance, mW)/(min. test separation distance, mm)] • [√ f(GHz)] ≤ 3.0 for 1-g SAR and ≤ 7.5 for 10-g extremity SAR, where

- f(GHz) is the RF channel transmit frequency in GHz
- Power and distance are rounded to the nearest mW and mm before calculation
- The result is rounded to one decimal place for comparison
- 3 and 7.5 are referred to as the numeric thresholds in the step 2 below

The test exclusions are applicable only when the minimum test separation distance is ≤ 50 mm and for transmission frequencies between 100 MHz and 6 GHz. When the minimum test separation distance is < 5 mm, a distance of 5 mm according to 5) in section 4.1 is applied to determine SAR test exclusion.

Measurement Result

The maximum conducted output power=13.58 dBm=22.8 mW at 2412MHz
[(max. power of channel, mW)/(min. test separation distance, mm)] • [√ f(GHz)] = 22.8/5*(√ 2.412) = 7.08 <7.5

So the stand-alone SAR evaluation is not necessary.

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 a monopole antenna arrangement for WiFi, which was permanently attached and the gain was 0 dBi, fulfill the requirement of this section. Please refer to the internal photos.

Result: Compliance.

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

Applicable Standard

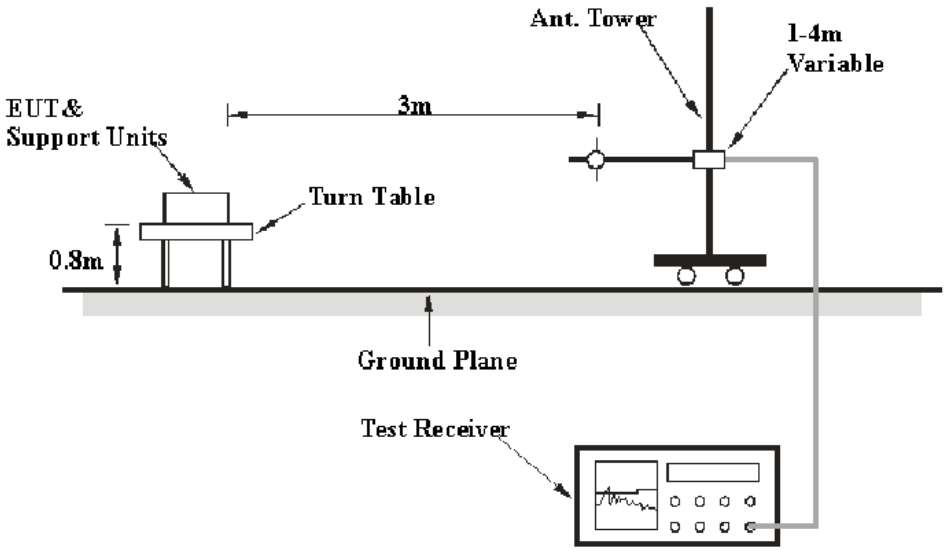
FCC §15.247 (d); §15.209; §15.205;

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 16-4-2:2011, the expended combined standard uncertainty of radiation emissions at Bay Area Compliance Laboratories Corp. (Shenzhen) is 5.91 dB for 30MHz-1GHz.and 4.92 dB for above 1GHz, and it 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
30 MHz – 1000 MHz	100 kHz	300 kHz	120 kHz	QP
Above 1 GHz	1MHz	3 MHz	/	PK
	1MHz	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 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:

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
HP	Amplifier	8447E	1937A01046	2014-05-06	2015-05-06
Rohde & Schwarz	EMI Test Receiver	ESCI	101122	2013-09-25	2014-09-25
Sunol Sciences	Broadband Antenna	JB1	A040904-2	2011-11-28	2014-11-27
Mini	Pre-amplifier	ZVA-183-S+	5969001149	2014-04-23	2015-04-23
Sunol Sciences	Horn Antenna	DRH-118	A052304	2011-12-01	2014-11-30
Rohde & Schwarz	Signal Analyzer	FSIQ26	8386001028	2013-11-12	2014-11-12
DUCOMMUN	Pre-amplifier	ALN-22093530-01	991373-01	2014-08-03	2015-08-03
the electro-Mechanics Co.	Horn Antenna	3116	9510-2270	2013-10-14	2016-10-13

*** 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 Results Summary

According to the data in the following table, the worst margin reading as below:

11.30 dB at **9748.0 MHz** in the **Horizontal** polarization for 802.11b mode

Refer to CISPR16-4-2:2011 and CISPR 16-4-1:2009, the measured level complies with the limit if

$$L_m + U_{(Lm)} \leq L_{lim} + U_{cispr}$$

In BACL, $U_{(Lm)}$ is less than U_{cispr}, if L_m is less than L_{lim}, it implies that the EUT complies with the limit.

Test Data

Environmental Conditions

Temperature:	25~26 ℃
Relative Humidity:	55~60 %
ATM Pressure:	101.0 kPa

The testing was performed by Mike Hu from 2014-08-19 to 2014-08-20.

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)									
371.8	43.06	QP	201	1.3	H	-11.5	31.56	46.0	14.44
2412.0	91.67	PK	129	1.2	H	6.13	97.80	/	/
2412.0	85.62	Ave.	129	1.2	H	6.13	91.75	/	/
2412.0	92.67	PK	9	1.5	V	6.13	98.80	/	/
2412.0	85.83	Ave.	9	1.5	V	6.13	91.96	/	/
2362.0	36.52	PK	123	1.3	H	5.48	42.00	74	32.00
2362.0	23.50	Ave.	123	1.3	H	5.48	28.98	54	25.02
2387.5	36.42	PK	290	1.3	V	5.48	41.90	74	32.10
2387.5	23.22	Ave.	290	1.3	V	5.48	28.70	54	25.30
2490.0	36.72	PK	228	1.3	H	7.21	43.93	74	30.07
2490.0	23.42	Ave.	228	1.3	H	7.21	30.63	54	23.37
4824.0	37.42	PK	327	1.2	H	12.44	49.86	74	24.14
4824.0	24.52	Ave.	327	1.2	H	12.44	36.96	54	17.04
7236.0	35.88	PK	214	1.5	V	17.06	52.94	74	21.06
7236.0	23.21	Ave.	214	1.5	V	17.06	40.27	54	13.73
9648.0	36.50	PK	338	1.3	V	19.28	55.78	74	18.22
9648.0	22.33	Ave.	338	1.3	V	19.28	41.61	54	12.39
Middle Channel (2437 MHz)									
371.8	41.97	QP	108	1.3	H	-11.5	30.47	46	15.53
2437.0	91.53	PK	292	1.2	H	6.13	97.66	/	/
2437.0	85.00	Ave.	292	1.2	H	6.13	91.13	/	/
2437.0	91.82	PK	85	1.2	V	6.13	97.95	/	/
2437.0	84.51	Ave.	85	1.2	V	6.13	90.64	/	/
2364.2	36.50	PK	107	1.3	V	5.48	41.98	74	32.02
2364.2	23.12	Ave.	107	1.3	V	5.48	28.60	54	25.40
2389.5	36.10	PK	344	1.4	H	5.48	41.58	74	32.42
2389.5	23.32	Ave.	344	1.4	H	5.48	28.80	54	25.20
2485.8	36.72	PK	125	1.3	V	7.21	43.93	74	30.07
2485.8	23.22	Ave.	125	1.3	V	7.21	30.43	54	23.57
4874.0	38.02	PK	358	1.3	V	12.4	50.42	74	23.58
4874.0	25.10	Ave.	358	1.3	V	12.4	37.50	54	16.50
7311.0	37.53	PK	195	1.4	V	16.62	54.15	74	19.85
7311.0	23.32	Ave.	195	1.4	V	16.62	39.94	54	14.06
9748.0	37.21	PK	270	1.3	H	19.4	56.61	74	17.39
9748.0	23.30	Ave.	270	1.3	H	19.4	42.70	54	11.30

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)									
371.8	42.70	QP	19	1.0	H	-11.5	31.20	46	14.80
2462.0	91.60	PK	249	1.5	H	6.13	97.73	/	/
2462.0	84.60	Ave.	249	1.5	H	6.13	90.73	/	/
2462.0	92.38	PK	132	1.3	V	6.13	98.51	/	/
2462.0	85.32	Ave.	132	1.3	V	6.13	91.45	/	/
2370.2	37.22	PK	10	1.4	H	5.48	42.70	74	31.30
2370.2	24.23	Ave.	10	1.4	H	5.48	29.71	54	24.29
2485.2	38.11	PK	152	1.2	V	7.21	45.32	74	28.68
2485.2	25.33	Ave.	152	1.2	V	7.21	32.54	54	21.46
2489.2	37.45	PK	127	1.4	V	7.21	44.66	74	29.34
2489.2	23.26	Ave.	127	1.4	V	7.21	30.47	54	23.53
4924.0	36.55	PK	217	1.2	H	12.46	49.01	74	24.99
4924.0	23.50	Ave.	217	1.2	H	12.46	35.96	54	18.04
7386.0	36.79	PK	243	1.5	V	15.91	52.70	74	21.30
7386.0	23.24	Ave.	243	1.5	V	15.91	39.15	54	14.85
9848.0	36.62	PK	301	1.2	V	19.29	55.91	74	18.09
9848.0	22.70	Ave.	301	1.2	V	19.29	41.99	54	12.01

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)									
371.8	42.83	QP	116	1.1	H	-11.5	31.33	46	14.67
2412.0	89.34	PK	290	1.4	H	6.13	95.47	/	/
2412.0	82.30	Ave.	290	1.4	H	6.13	88.43	/	/
2412.0	90.32	PK	55	1.3	V	6.13	96.45	/	/
2412.0	83.20	Ave.	55	1.3	V	6.13	89.33	/	/
2384.0	36.27	PK	101	1.4	H	5.48	41.75	74	32.25
2384.0	22.52	Ave.	101	1.4	H	5.48	28.00	54	26.00
2492.4	35.09	PK	296	1.4	H	7.21	42.30	74	31.70
2492.4	22.68	Ave.	296	1.4	H	7.21	29.89	54	24.11
4824.0	37.54	PK	170	1.3	V	12.44	49.98	74	24.02
4824.0	24.15	Ave.	170	1.3	V	12.44	36.59	54	17.41
7236.0	36.40	PK	354	1.3	V	17.06	53.46	74	20.54
7236.0	22.37	Ave.	354	1.3	V	17.06	39.43	54	14.57
9648.0	34.71	PK	271	1.3	H	19.28	53.99	74	20.01
9648.0	22.54	Ave.	271	1.3	H	19.28	41.82	54	12.18
Middle Channel(2437 MHz)									
371.8	42.40	QP	74	1.0	H	-11.5	30.90	46	15.10
2437.0	90.54	PK	200	1.4	H	6.13	96.67	/	/
2437.0	83.11	Ave.	200	1.4	H	6.13	89.24	/	/
2437.0	91.34	PK	115	1.4	V	6.13	97.47	/	/
2437.0	84.30	Ave.	115	1.4	V	6.13	90.43	/	/
2388.5	36.62	PK	125	1.4	V	5.48	42.10	74	31.90
2388.5	22.17	Ave.	125	1.4	V	5.48	27.65	54	26.35
2484.8	37.20	PK	196	1.4	H	7.21	44.41	74	29.59
2484.8	23.57	Ave.	196	1.4	H	7.21	30.78	54	23.22
4874.0	36.39	PK	82	1.5	H	12.4	48.79	74	25.21
4874.0	23.20	Ave.	82	1.5	H	12.4	35.60	54	18.40
7311.0	35.90	PK	76	1.3	V	16.62	52.52	74	21.48
7311.0	23.35	Ave.	76	1.3	V	16.62	39.97	54	14.03
9748.0	35.68	PK	110	1.3	H	19.4	55.08	74	18.92
9748.0	22.81	Ave.	110	1.3	H	19.4	42.21	54	11.79

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)									
371.8	43.58	QP	157	1.2	H	-11.5	32.08	46	13.92
2462.0	90.26	PK	271	1.2	H	6.13	96.39	/	/
2462.0	83.40	Ave.	271	1.2	H	6.13	89.53	/	/
2462.0	91.37	PK	67	1.4	V	6.13	97.50	/	/
2462.0	84.50	Ave.	67	1.4	V	6.13	90.63	/	/
2380.1	35.84	PK	354	1.5	H	5.48	41.32	74	32.68
2380.1	23.80	Ave.	354	1.5	H	5.48	29.28	54	24.72
2489.8	36.83	PK	147	1.3	V	7.21	44.04	74	29.96
2489.8	22.96	Ave.	147	1.3	V	7.21	30.17	54	23.83
4924.0	36.52	PK	354	1.5	H	12.46	48.98	74	25.02
4924.0	23.14	Ave.	354	1.5	H	12.46	35.60	54	18.40
7386.0	35.12	PK	165	1.3	H	15.91	51.03	74	22.97
7386.0	22.50	Ave.	165	1.3	H	15.91	38.41	54	15.59
9848.0	35.58	PK	179	1.4	V	19.29	54.87	74	19.13
9848.0	22.20	Ave.	179	1.4	V	19.29	41.49	54	12.51

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)									
371.8	43.68	QP	207	1.0	H	-11.5	32.18	46	13.82
2412.0	91.88	PK	82	1.3	H	6.13	98.01	/	/
2412.0	84.60	Ave.	82	1.3	H	6.13	90.73	/	/
2412.0	91.21	PK	205	1.4	V	6.13	97.34	/	/
2412.0	84.00	Ave.	205	1.4	V	6.13	90.13	/	/
2372.0	37.04	PK	323	1.4	H	5.48	42.52	74	31.48
2372.0	23.11	Ave.	323	1.4	H	5.48	28.59	54	25.41
2488.8	35.80	PK	323	1.5	H	7.21	43.01	74	30.99
2488.8	23.21	Ave.	323	1.5	H	7.21	30.42	54	23.58
4824.0	35.37	PK	83	1.5	V	12.44	47.81	74	26.19
4824.0	22.50	Ave.	83	1.5	V	12.44	34.94	54	19.06
7236.0	36.44	PK	215	1.4	V	17.06	53.50	74	20.50
7236.0	23.22	Ave.	215	1.4	V	17.06	40.28	54	13.72
9648.0	34.86	PK	126	1.4	H	19.28	54.14	74	19.86
9648.0	23.10	Ave.	126	1.4	H	19.28	42.38	54	11.62
Middle Channel(2437 MHz)									
371.8	44.55	QP	283	1.1	H	-11.5	33.05	46	12.95
2437.0	90.52	PK	128	1.2	H	6.13	96.65	/	/
2437.0	83.27	Ave.	128	1.2	H	6.13	89.40	/	/
2437.0	90.72	PK	230	1.3	V	6.13	96.85	/	/
2437.0	83.56	Ave.	230	1.3	V	6.13	89.69	/	/
2385.7	35.70	PK	108	1.2	V	5.48	41.18	74	32.82
2385.7	22.37	Ave.	108	1.2	V	5.48	27.85	54	26.15
2489.0	35.26	PK	206	1.3	H	7.21	42.47	74	31.53
2489.0	23.00	Ave.	206	1.3	H	7.21	30.21	54	23.79
4874.0	35.74	PK	185	1.2	H	12.4	48.14	74	25.86
4874.0	23.10	Ave.	185	1.2	H	12.4	35.50	54	18.50
7311.0	35.50	PK	176	1.4	H	16.62	52.12	74	21.88
7311.0	23.21	Ave.	176	1.4	H	16.62	39.83	54	14.17
9748.0	35.52	PK	180	1.4	V	19.4	54.92	74	19.08
9748.0	22.32	Ave.	180	1.4	V	19.4	41.72	54	12.28

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)									
371.8	44.35	QP	135	1.0	H	-11.5	32.85	46	13.15
2462.0	90.60	PK	350	1.5	H	6.13	96.73	/	/
2462.0	84.25	Ave.	350	1.5	H	6.13	90.38	/	/
2462.0	91.28	PK	146	1.4	V	6.13	97.41	/	/
2462.0	84.17	Ave.	146	1.4	V	6.13	90.3	/	/
2372.4	35.72	PK	28	1.5	H	5.48	41.20	74	32.80
2372.4	23.56	Ave.	28	1.5	H	5.48	29.04	54	24.96
2484.0	35.70	PK	191	1.4	H	7.21	42.91	74	31.09
2484.0	23.42	Ave.	191	1.4	H	7.21	30.63	54	23.37
4924.0	36.80	PK	127	1.4	H	12.46	49.26	74	24.74
4924.0	24.51	Ave.	127	1.4	H	12.46	36.97	54	17.03
7386.0	35.14	PK	280	1.3	H	15.91	51.05	74	22.95
7386.0	23.40	Ave.	280	1.3	H	15.91	39.31	54	14.69
9848.0	35.38	PK	206	1.4	V	19.29	54.67	74	19.33
9848.0	22.31	Ave.	206	1.4	V	19.29	41.60	54	12.40

802.11n-HT40 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(2422 MHz)									
371.8	43.89	QP	84	1.0	H	-11.5	32.39	46	13.61
2422.0	91.25	PK	43	1.2	H	6.13	97.38	/	/
2422.0	84.20	Ave.	43	1.2	H	6.13	90.33	/	/
2422.0	91.66	PK	315	1.4	V	6.13	97.79	/	/
2422.0	84.53	Ave.	315	1.4	V	6.13	90.66	/	/
2370.4	35.40	PK	219	1.2	H	5.48	40.88	74	33.12
2370.4	22.98	Ave.	219	1.2	H	5.48	28.46	54	25.54
2492.1	35.34	PK	176	1.4	V	7.21	42.55	74	31.45
2492.1	22.76	Ave.	176	1.4	V	7.21	29.97	54	24.03
4844.0	36.99	PK	290	1.3	H	12.4	49.39	74	24.61
4844.0	23.10	Ave.	290	1.3	H	12.4	35.50	54	18.50
7266.0	35.02	PK	286	1.4	H	16.62	51.64	74	22.36
7266.0	22.30	Ave.	286	1.4	H	16.62	38.92	54	15.08
9688.0	33.41	PK	113	1.4	V	19.29	52.70	74	21.30
9688.0	22.24	Ave.	113	1.4	V	19.29	41.53	54	12.47
Middle Channel(2437 MHz)									
371.8	44.00	QP	124	1.1	H	-11.5	32.50	46	13.50
2437.0	90.31	PK	43	1.4	H	6.13	96.44	/	/
2437.0	83.07	Ave.	43	1.4	H	6.13	89.20	/	/
2437.0	91.82	PK	324	1.3	V	6.13	97.95	/	/
2437.0	84.11	Ave.	324	1.3	V	6.13	90.24	/	/
2386.2	36.27	PK	193	1.2	V	5.48	41.75	74	32.25
2386.2	22.80	Ave.	193	1.2	V	5.48	28.28	54	25.72
2489.7	35.72	PK	134	1.4	H	7.21	42.93	74	31.07
2489.7	22.70	Ave.	134	1.4	H	7.21	29.91	54	24.09
4874.0	36.32	PK	306	1.4	V	12.4	48.72	74	25.28
4874.0	22.58	Ave.	306	1.4	V	12.4	34.98	54	19.02
7311.0	35.42	PK	279	1.3	V	16.62	52.04	74	21.96
7311.0	23.21	Ave.	279	1.3	V	16.62	39.83	54	14.17
9748.0	34.67	PK	128	1.4	V	19.4	54.07	74	19.93
9748.0	22.33	Ave.	128	1.4	V	19.4	41.73	54	12.27

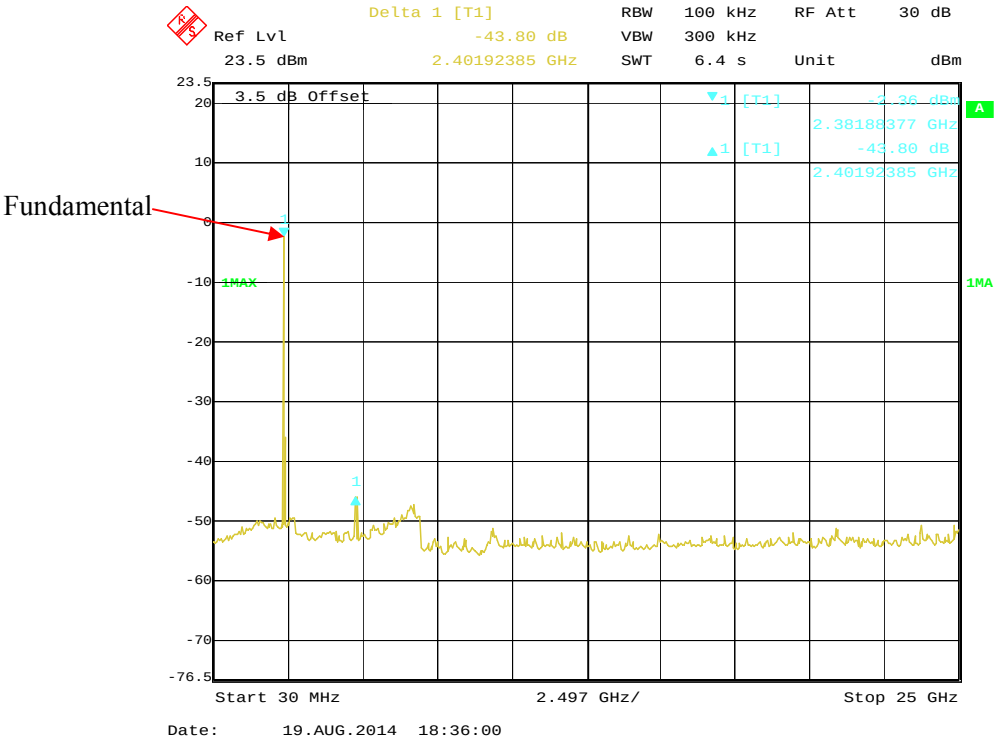
Frequency (MHz)	Receiver		Turntable Degree	Rx Antenna		Corrected Factor (dB)	Corrected Amplitude (dBμV/m)	FCC Part 15.247/15.205/15.209	
	Reading (dBμV)	Detector (PK/QP/Ave.)		Height (m)	Polar (H/V)			Limit (dBμV/m)	Margin (dB)
High Channel(2452 MHz)									
371.8	42.99	QP	167	1.0	H	-11.5	31.49	46	14.51
2452.0	91.20	PK	315	1.3	H	6.13	97.33	/	/
2452.0	84.11	Ave.	315	1.3	H	6.13	90.24	/	/
2452.0	92.04	PK	78	1.3	V	6.13	98.17	/	/
2452.0	84.80	Ave.	78	1.3	V	6.13	90.93	/	/
2382.2	36.13	PK	168	1.5	H	5.48	41.61	74	32.39
2382.2	23.40	Ave.	168	1.5	H	5.48	28.88	54	25.12
2485.8	37.25	PK	84	1.4	V	7.21	44.46	74	29.54
2485.5	23.71	Ave.	84	1.4	V	7.21	30.92	54	23.08
4904.0	36.20	PK	172	1.4	H	12.46	48.66	74	25.34
4904.0	23.35	Ave.	172	1.4	H	12.46	35.81	54	18.19
7356.0	36.82	PK	276	1.5	V	16.49	53.31	74	20.69
7356.0	23.11	Ave.	276	1.5	V	16.49	39.60	54	14.40
9808.0	34.20	PK	192	1.4	V	19.29	53.49	74	20.51
9808.0	23.24	Ave.	192	1.4	V	19.29	42.53	54	11.47

Note:
Corrected Amplitude = Corrected Factor + Reading
Corrected Factor=Antenna factor (RX) + cable loss – amplifier factor
Margin = Limit- Corr. Amplitude

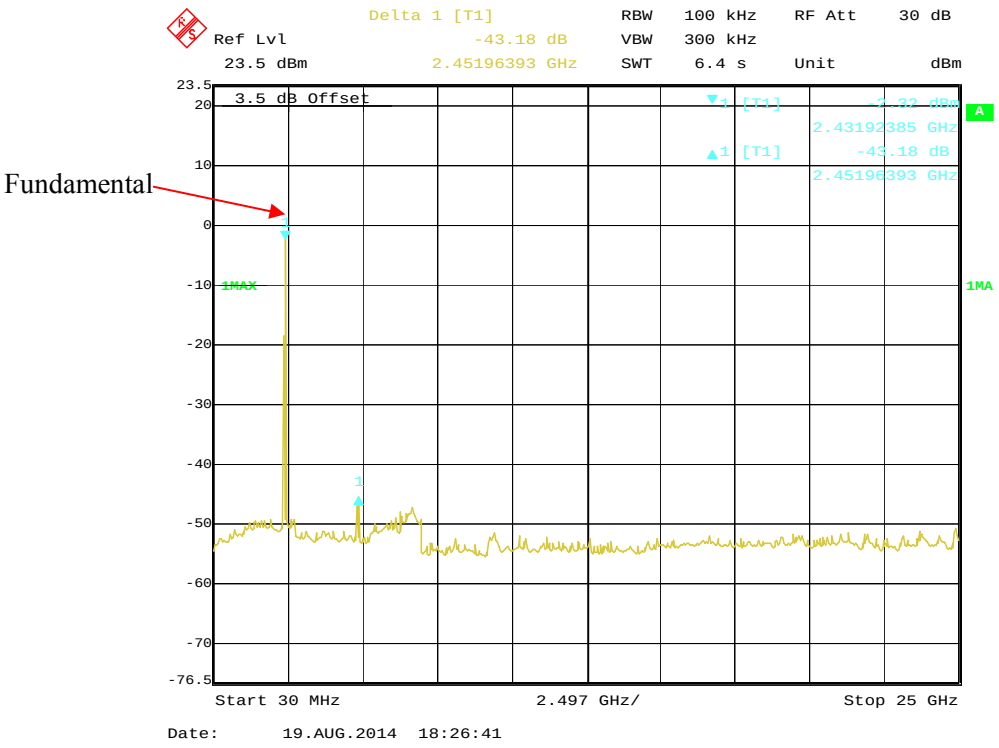
Conducted Spurious Emissions at Antenna Port:

Mode	channel	Delta Peak to band emission (dBc)	Limit (dBc)
802.11b	L	43.80	20
	M	43.18	20
	H	40.83	20
802.11g	L	39.47	20
	M	38.01	20
	H	37.64	20
802.11n20	L	38.22	20
	M	36.47	20
	H	35.26	20
802.11n40	L	33.66	20
	M	34.49	20
	H	35.05	20

802.11b Low Channel

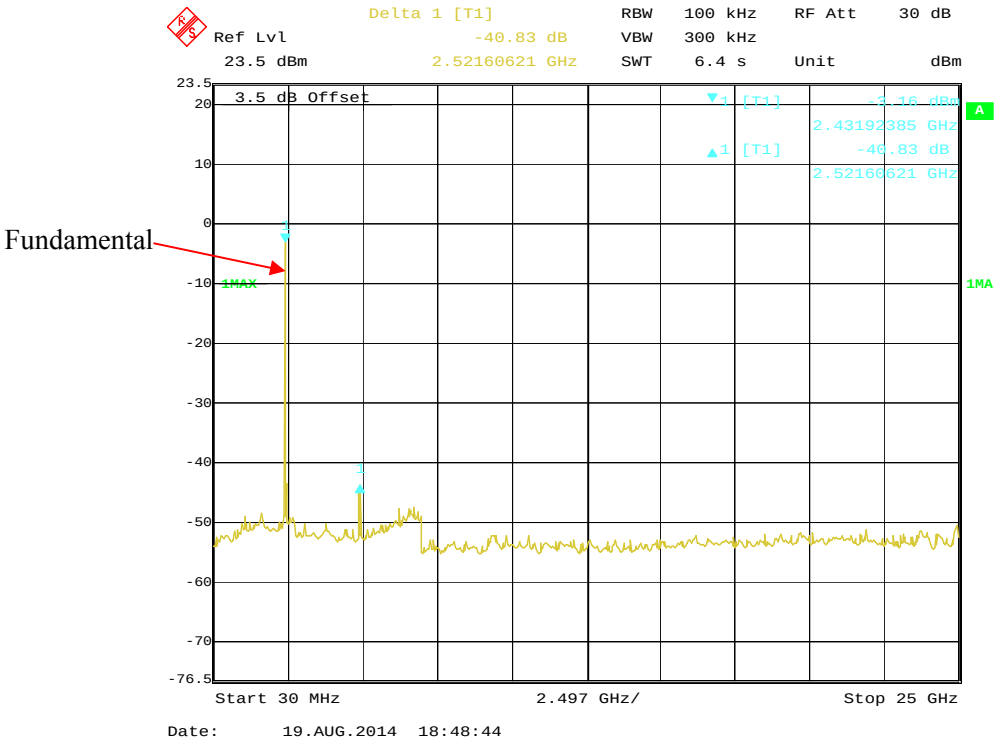


802.11b Middle Channel



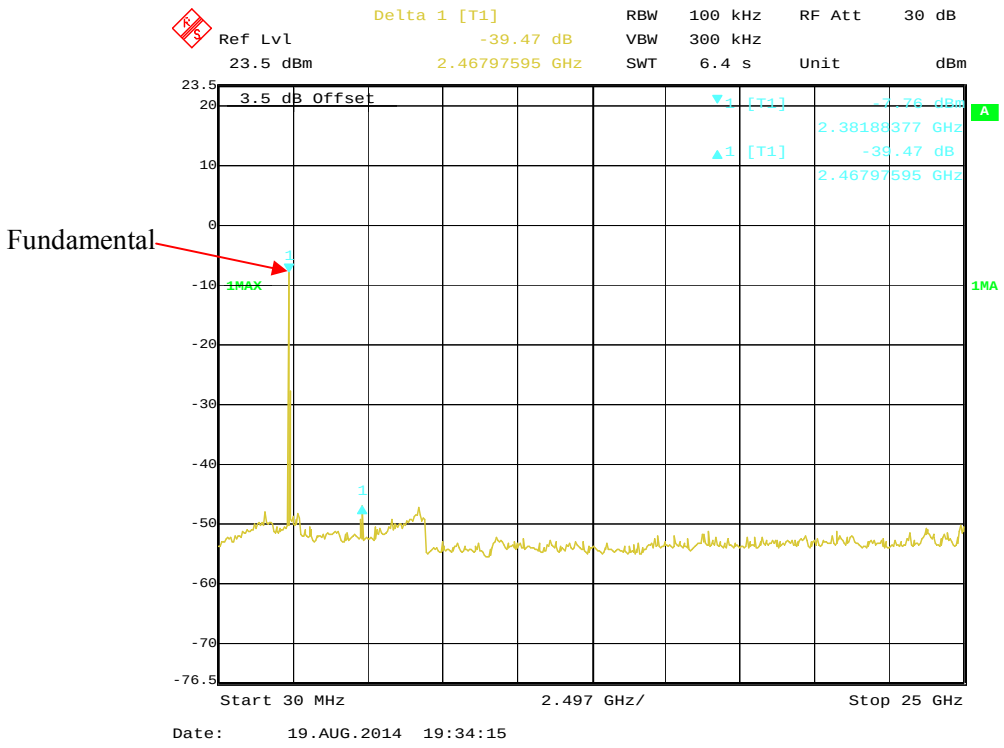
Fundamental

802.11b High Channel

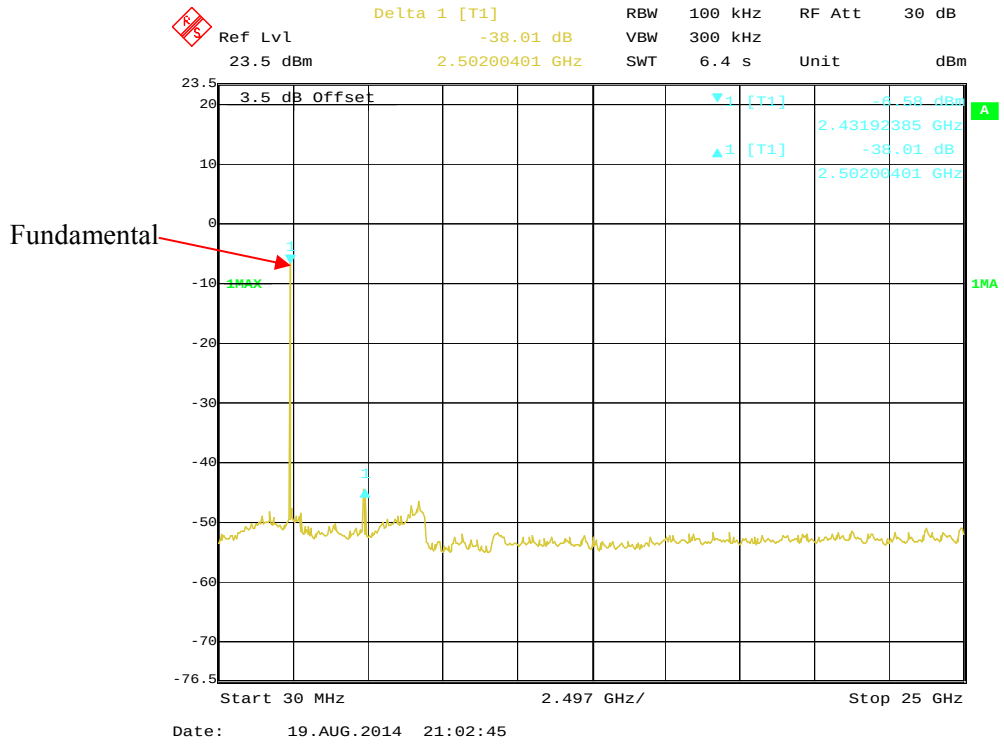


Fundamental

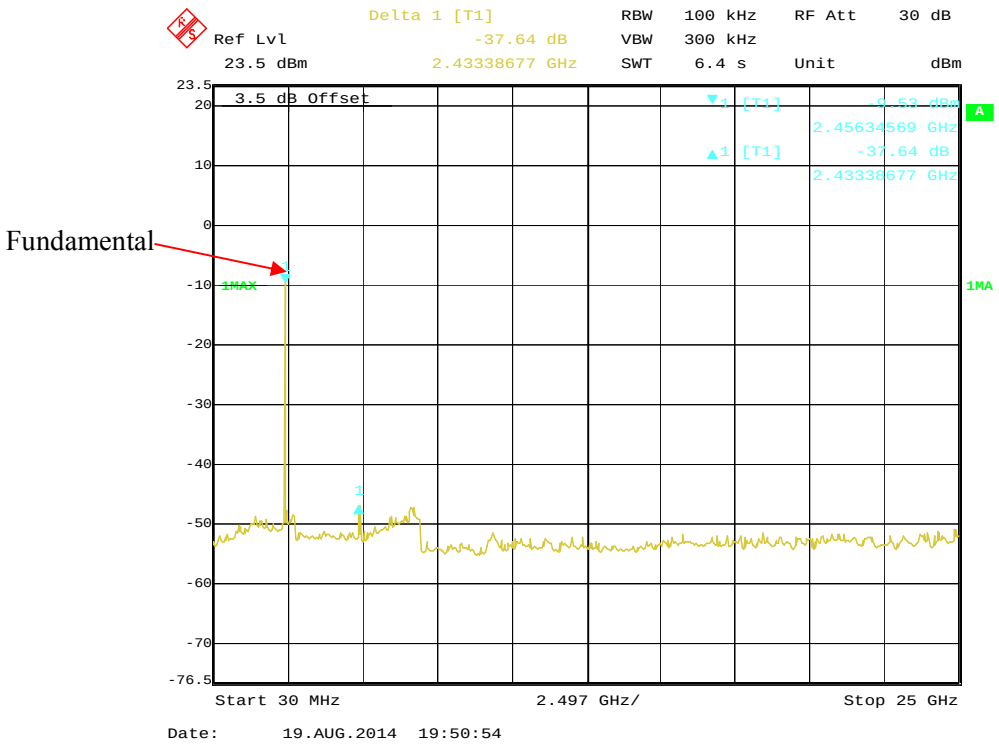
802.11g Low Channel



802.11g Middle Channel

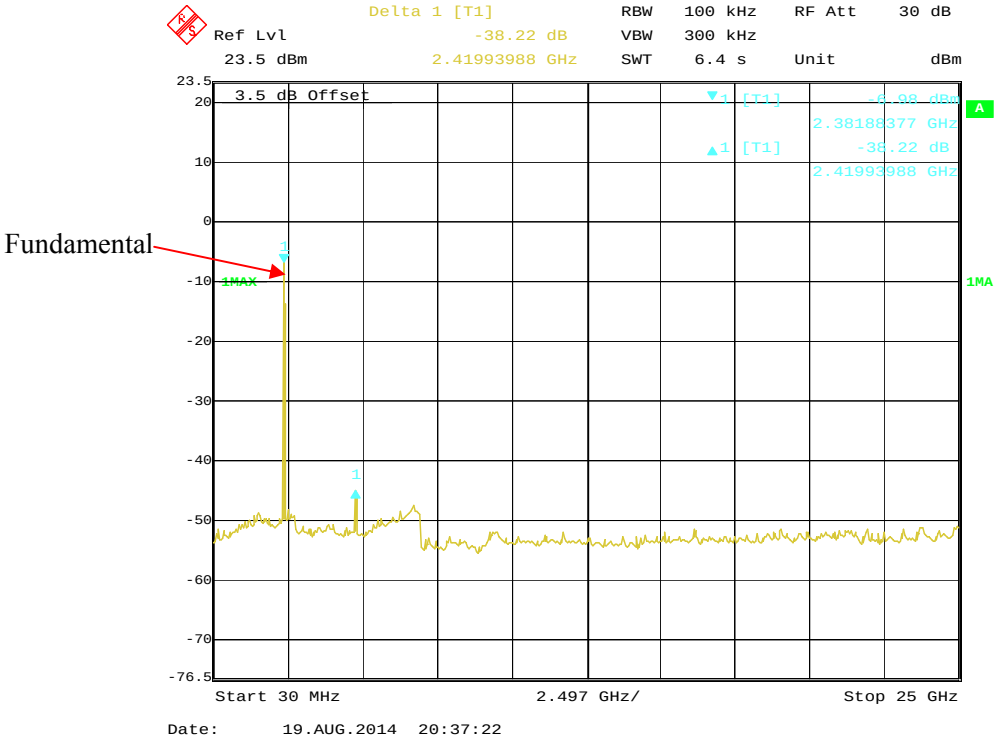


802.11g High Channel



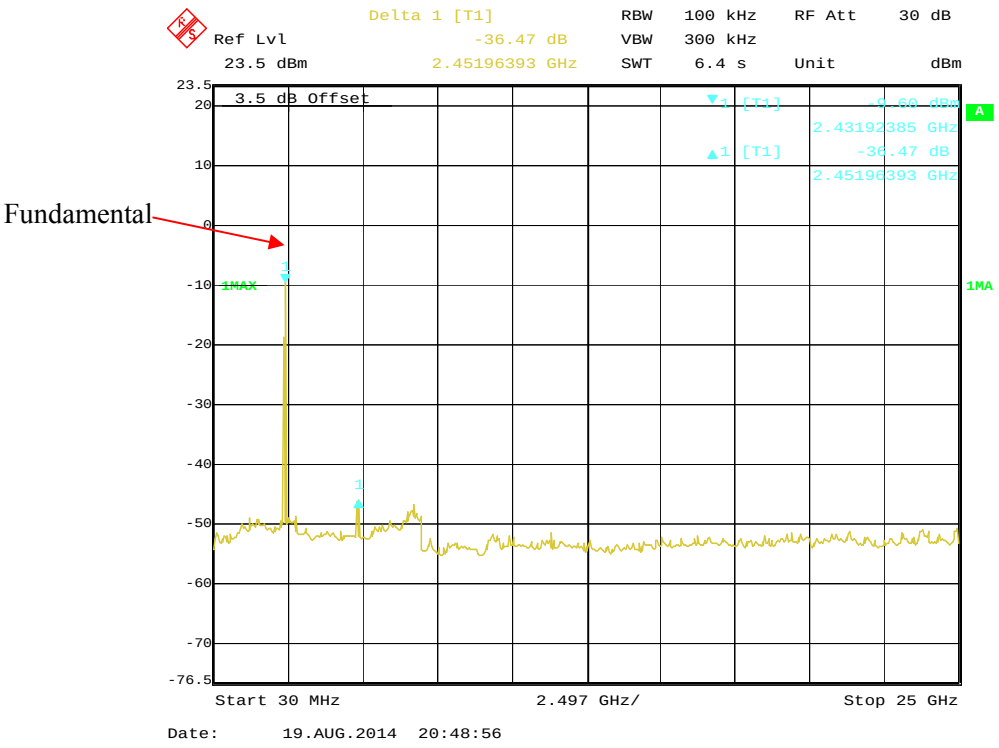
Fundamental

802.11n-HT20 Low Channel

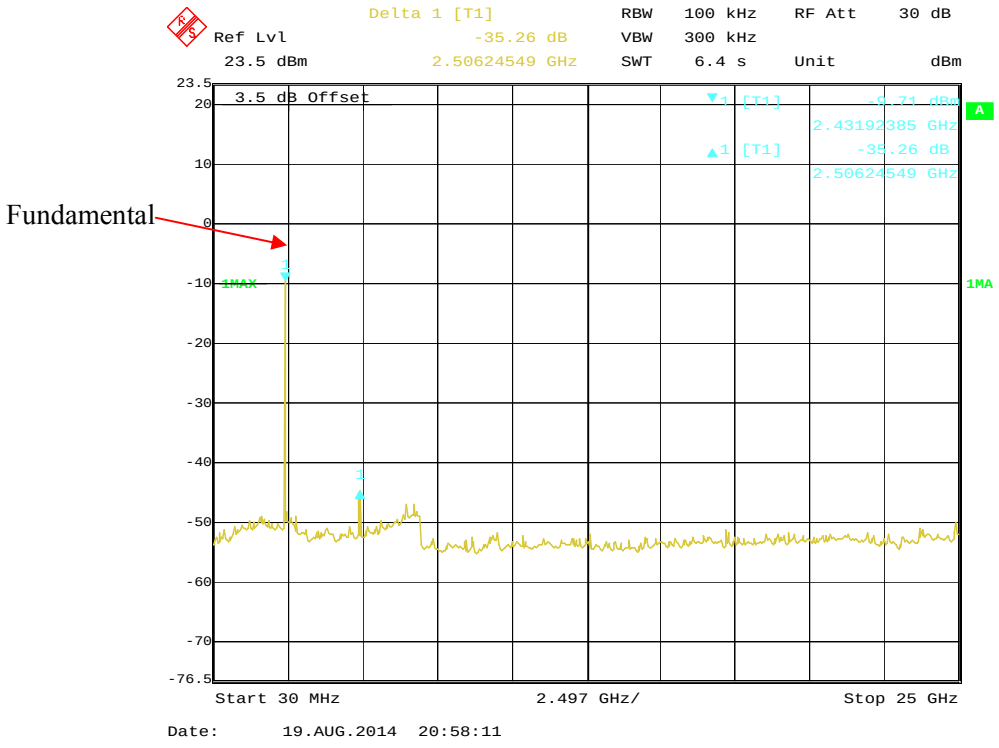


Fundamental

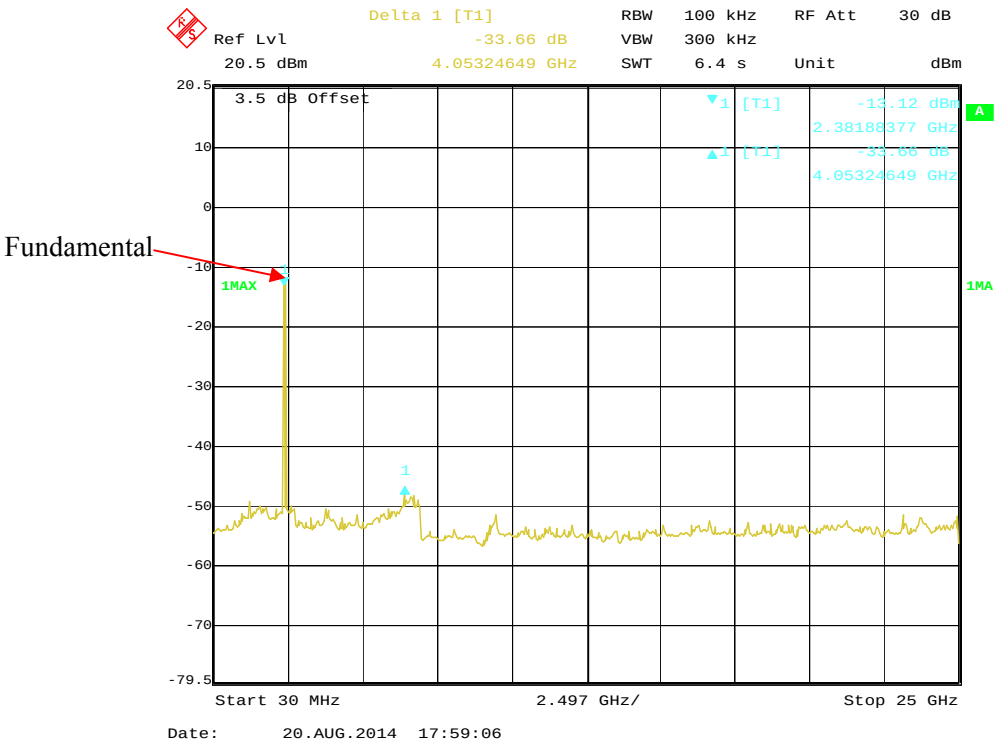
802.11n-HT20 Middle Channel



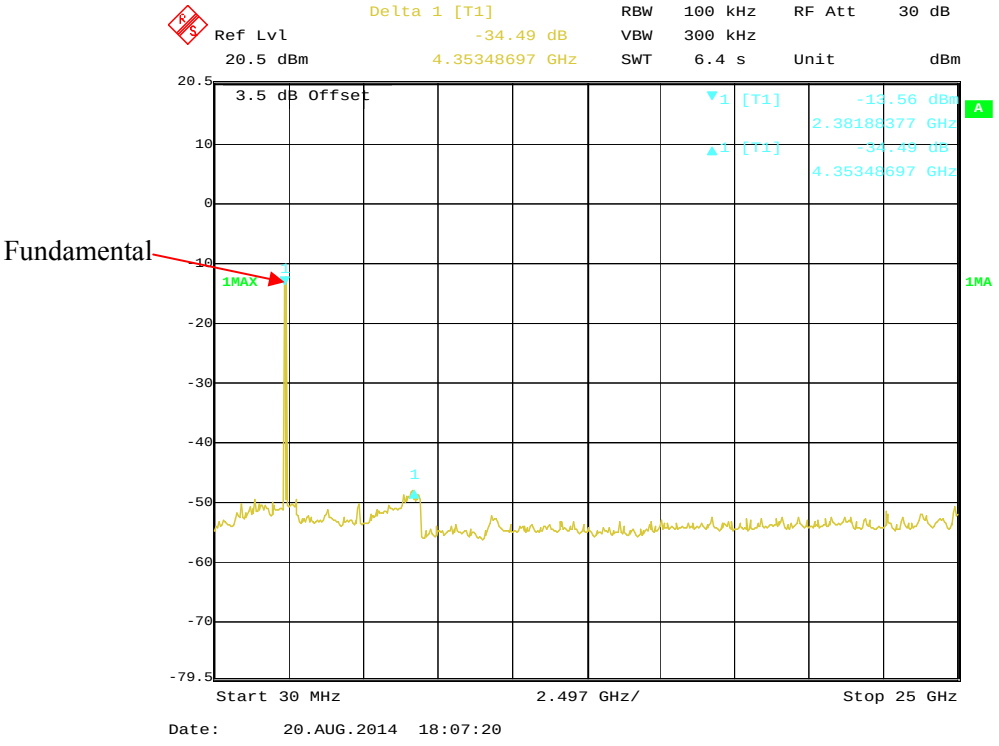
802.11n-HT20 High Channel



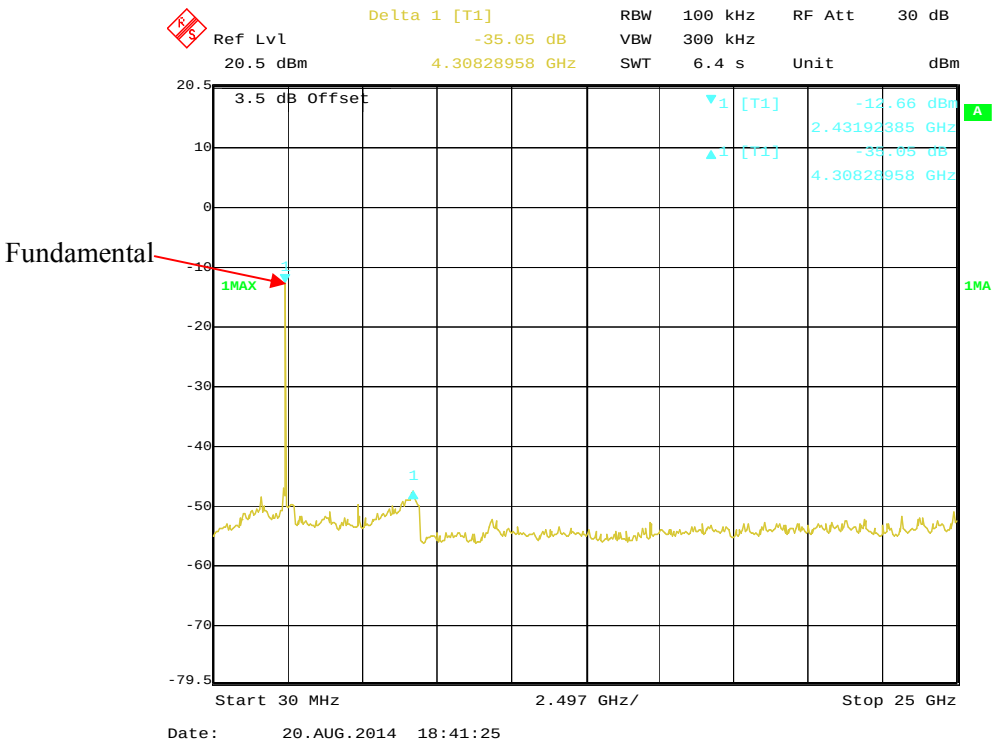
802.11n-HT40 Low Channel



802.11n-HT40 Middle Channel



802.11n-HT40 High Channel



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

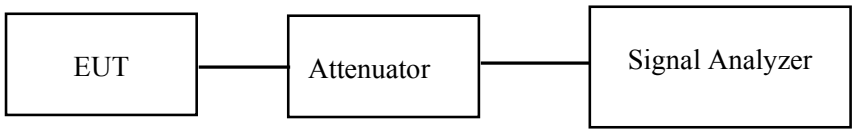
Applicable Standard

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

According to KDB 558074 D01 DTS Meas Guidance v03r02

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	2013-11-12	2014-11-12

*** 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:	25~26 ℃
Relative Humidity:	55~60 %
ATM Pressure:	101.0 kPa

The testing was performed by Mike Hu from 2014-08-19 to 2014-08-20.

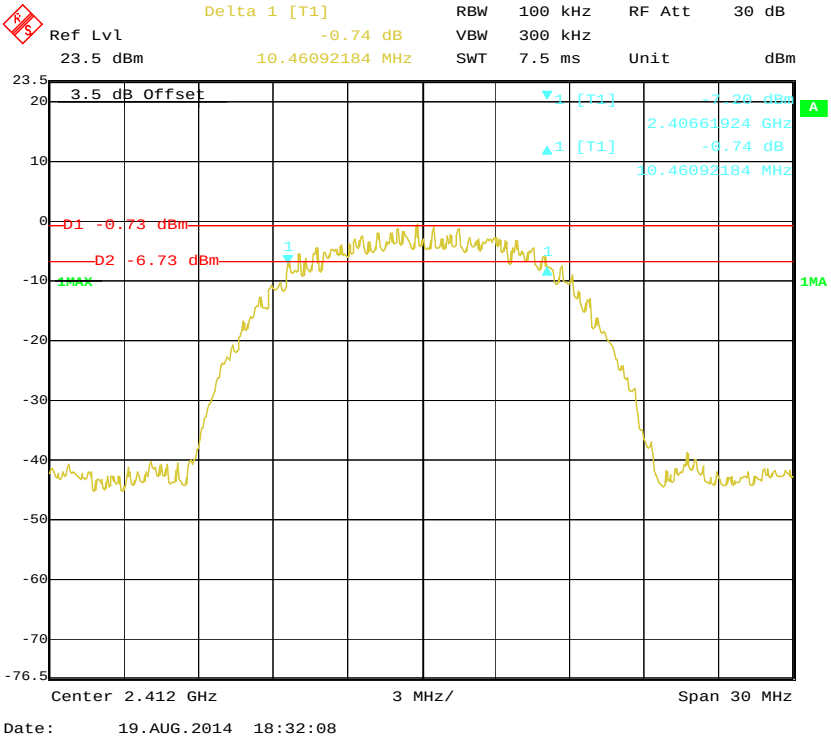
EUT operation mode: Transmitting

Test Result: Pass.

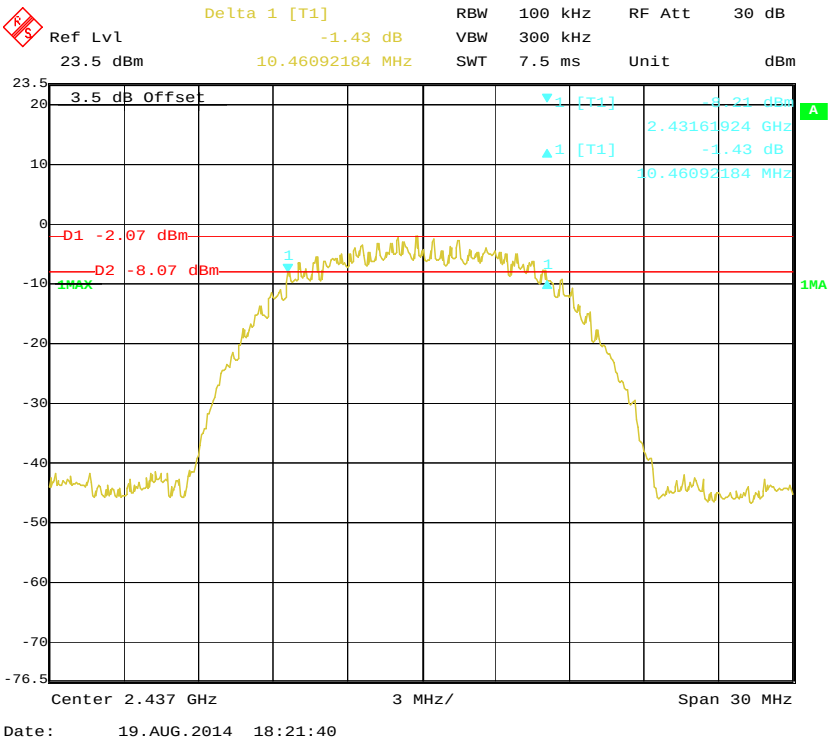
Please refer to the following tables and plots.

Channel	Frequency (MHz)	Data Rate (Mbps)	6dB Emissions Bandwidth (MHz)	Limit (kHz)	Result
802.11b mode					
Low	2412	11	10.46	≥500	Pass
Middle	2437	11	10.46	≥500	Pass
High	2462	11	10.46	≥500	Pass
802.11g mode					
Low	2412	54	16.59	≥500	Pass
Middle	2437	54	16.59	≥500	Pass
High	2462	54	16.59	≥500	Pass
802.11n-HT20 mode					
Low	2412	MCS0	17.68	≥500	Pass
Middle	2437	MCS0	17.68	≥500	Pass
High	2462	MCS0	17.68	≥500	Pass
802.11n-HT40 mode					
Low	2422	MCS7	36.67	≥500	Pass
Middle	2437	MCS7	36.67	≥500	Pass
High	2452	MCS7	36.67	≥500	Pass

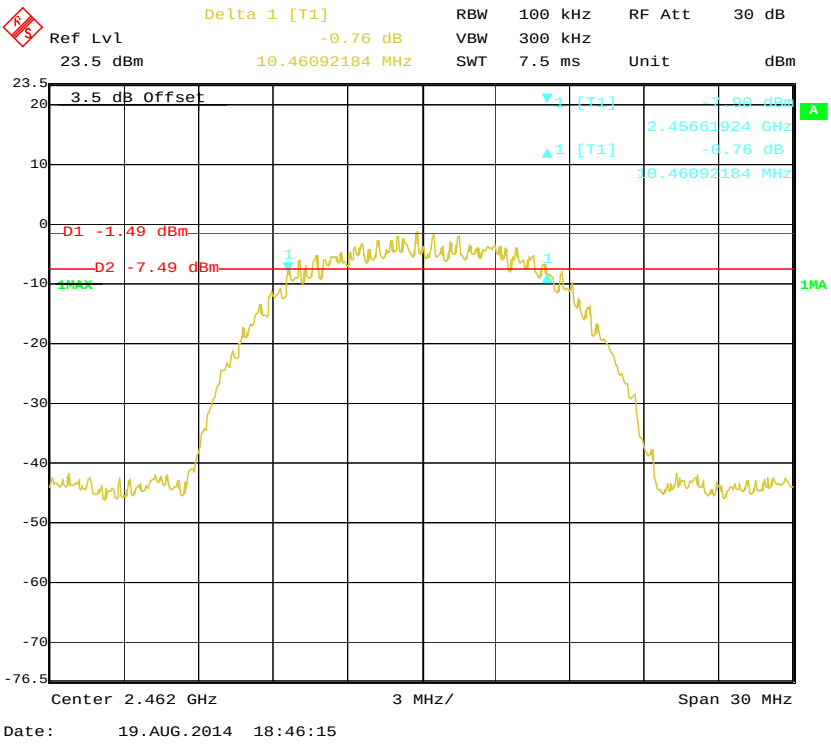
802.11b Low Channel



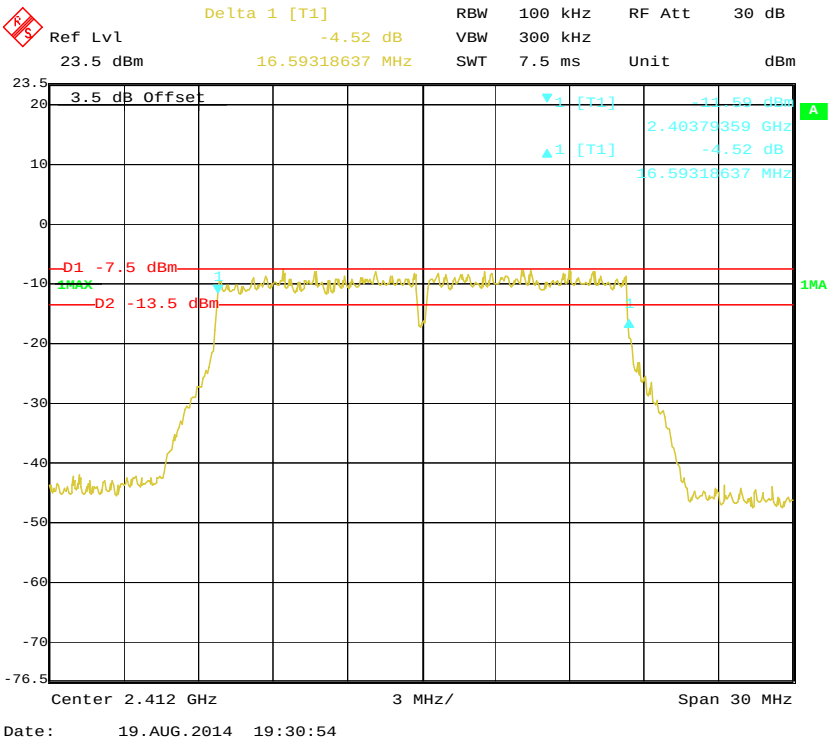
802.11b Middle Channel



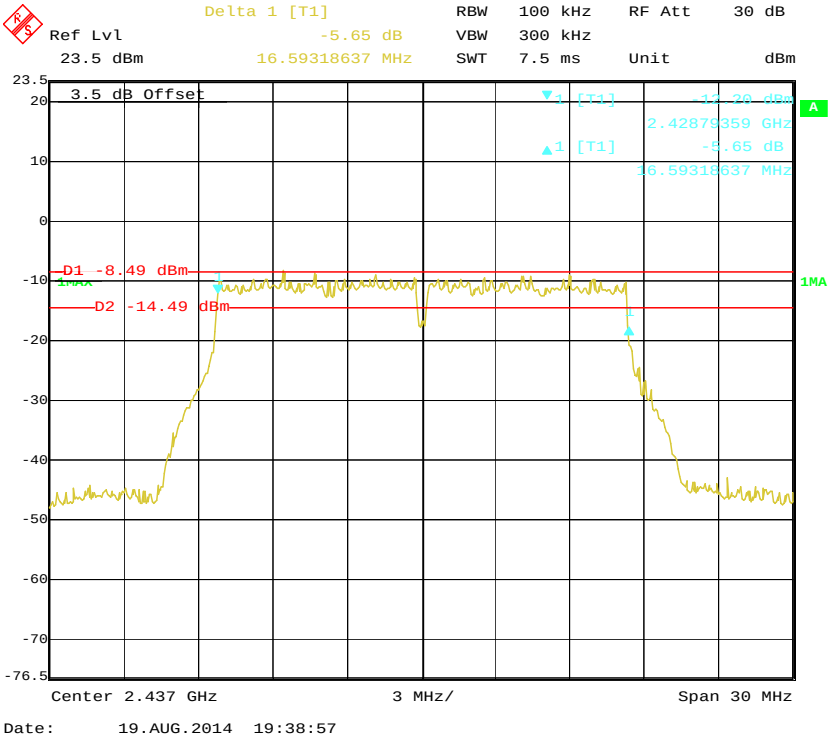
802.11b High Channel



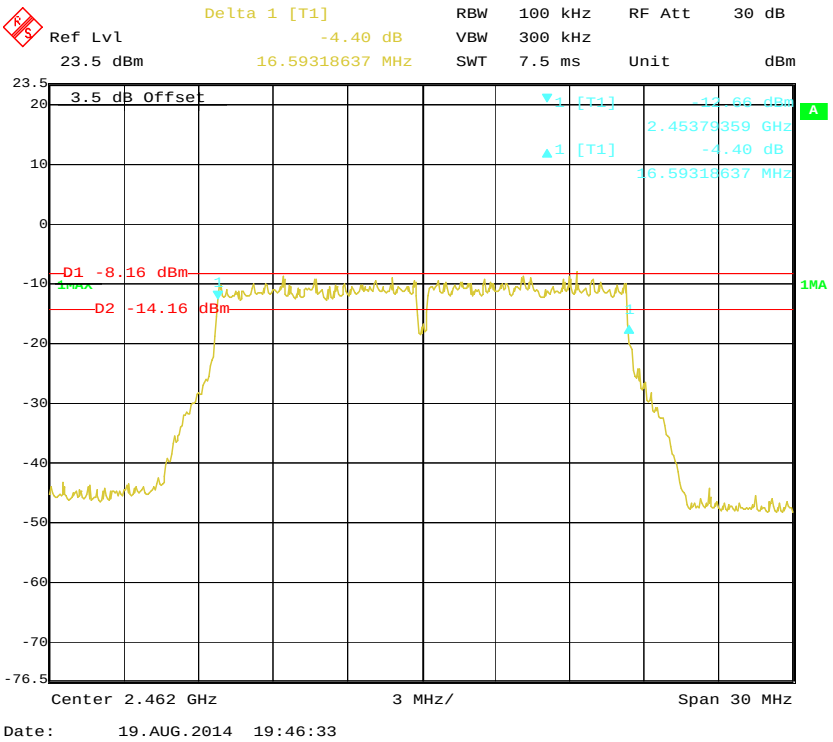
802.11g Low Channel



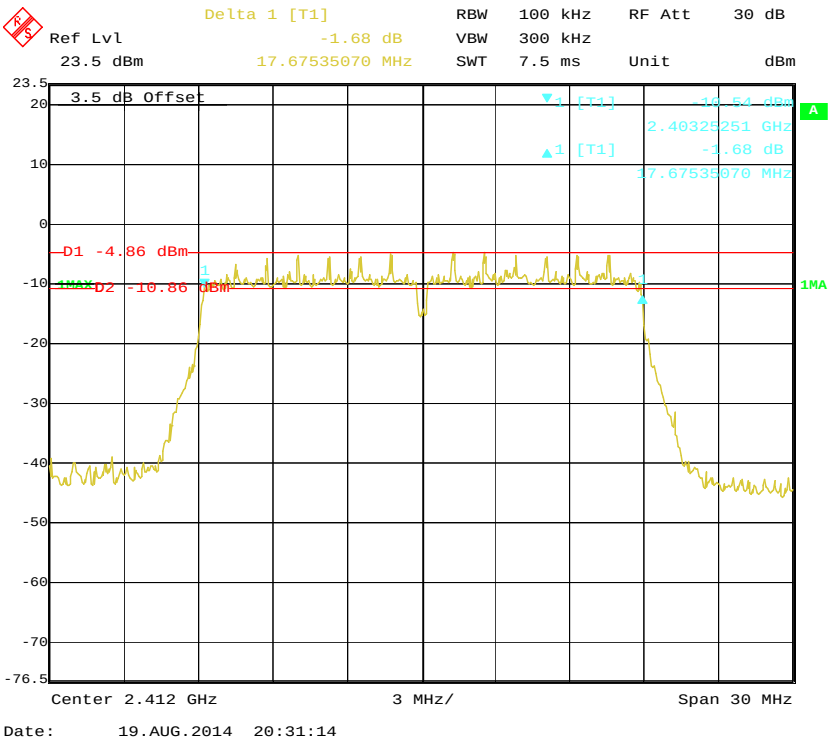
802.11g Middle Channel



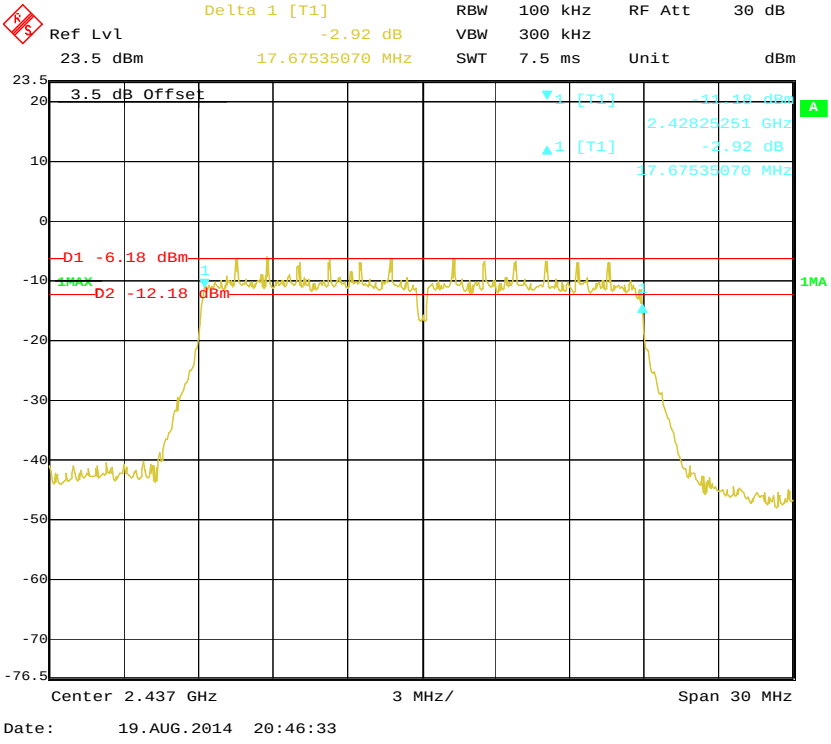
802.11g High Channel



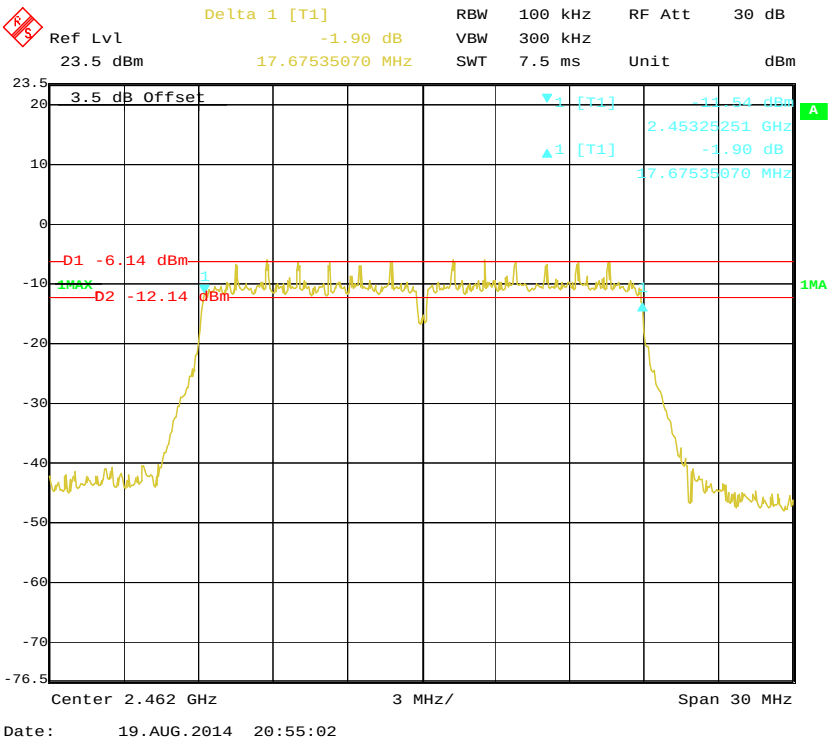
802.11n-HT20 Low Channel



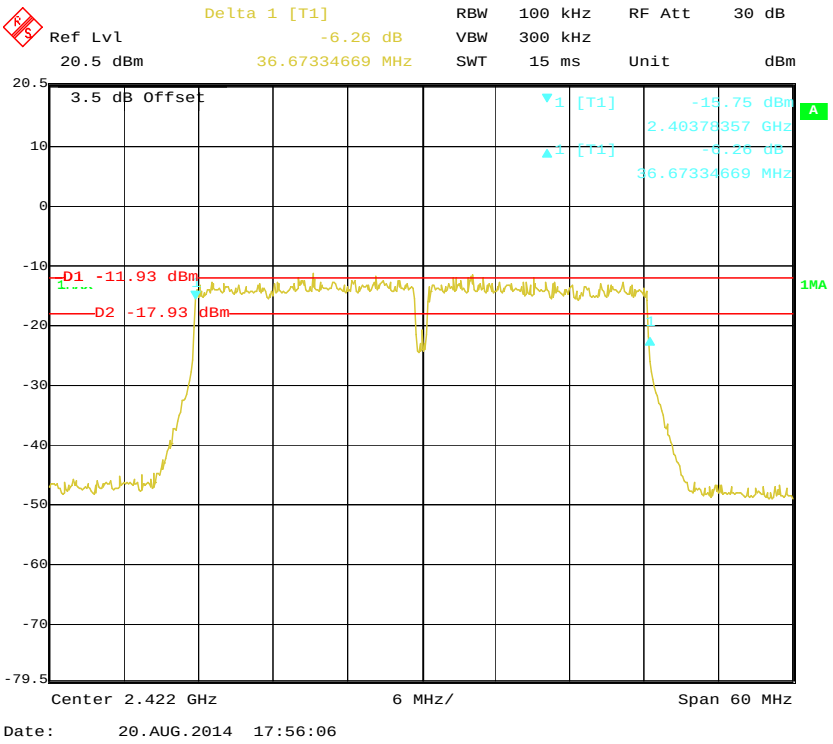
802.11n-HT20 Middle Channel



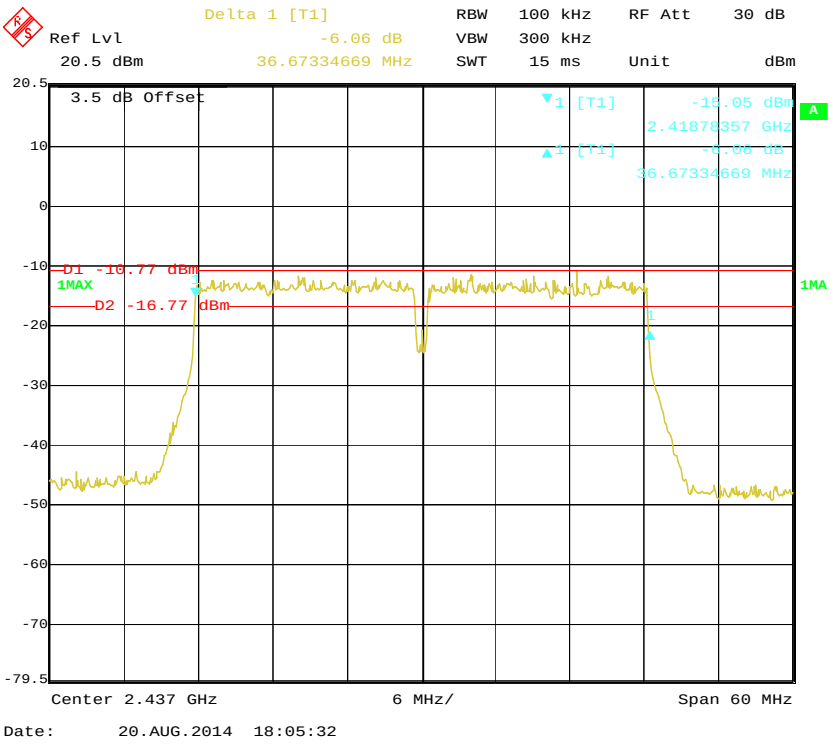
802.11n-HT20 High Channel



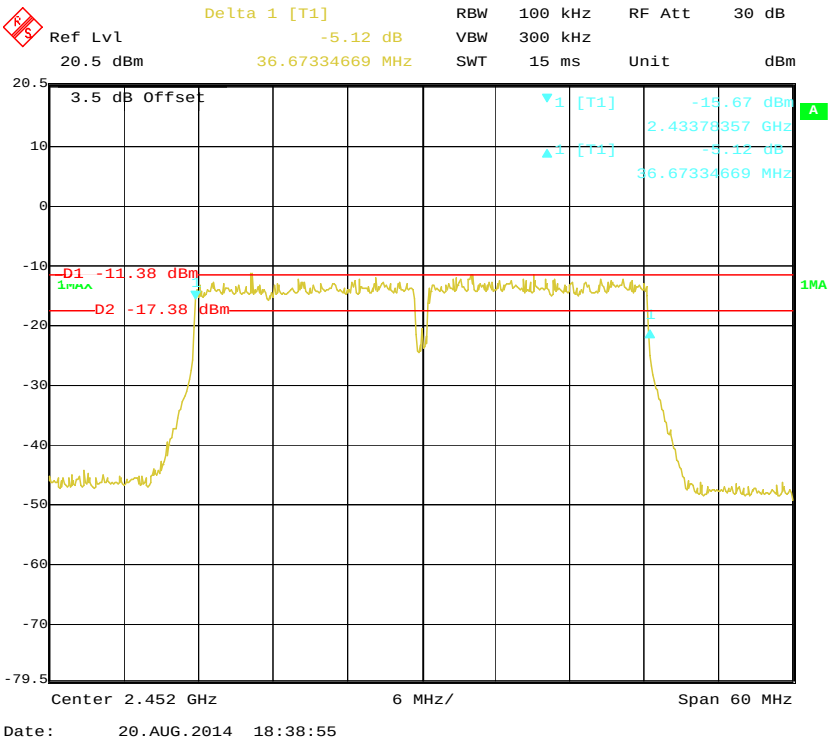
802.11n-HT40 Low Channel



802.11n-HT40 Middle Channel



802.11n-HT40 High Channel



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

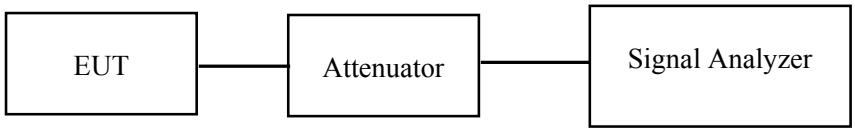
Applicable Standard

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

According to KDB 558074 D01 DTS Meas Guidance v03r02

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
HP	Power Meter	EPM-441A	GB37481494	2013-11-24	2014-11-24
HP	Power Sensor	EPM-441A	GB37481494	2013-11-24	2014-11-24

*** 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:	26 ℃
Relative Humidity:	64 %
ATM Pressure:	101.0 kPa

The testing was performed by Mike Hu on 2014-08-20.

EUT operation mode: Transmitting

Channel	Frequency (MHz)	Max Conducted Peak Output Power (dBm)	Limit (dBm)
802.11b			
Low	2412	13.58	30
Middle	2437	12.64	30
High	2462	13.13	30
802.11g			
Low	2412	13.42	30
Middle	2437	12.03	30
High	2462	11.96	30
802.11n-HT20			
Low	2412	13.44	30
Middle	2437	13.02	30
High	2462	13.12	30
802.11n-HT40			
Low	2422	12.09	30
Middle	2437	12.16	30
High	2452	12.14	30

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

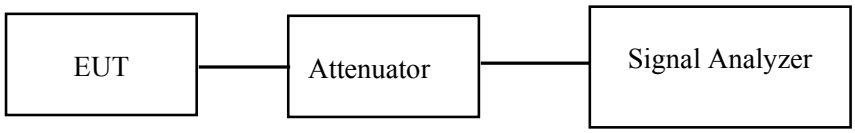
Applicable Standard

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

According to KDB 558074 D01 DTS Meas Guidance v03r02

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	2013-11-12	2014-11-12

*** 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:	25~26 ℃
Relative Humidity:	55~60 %
ATM Pressure:	101.0 kPa

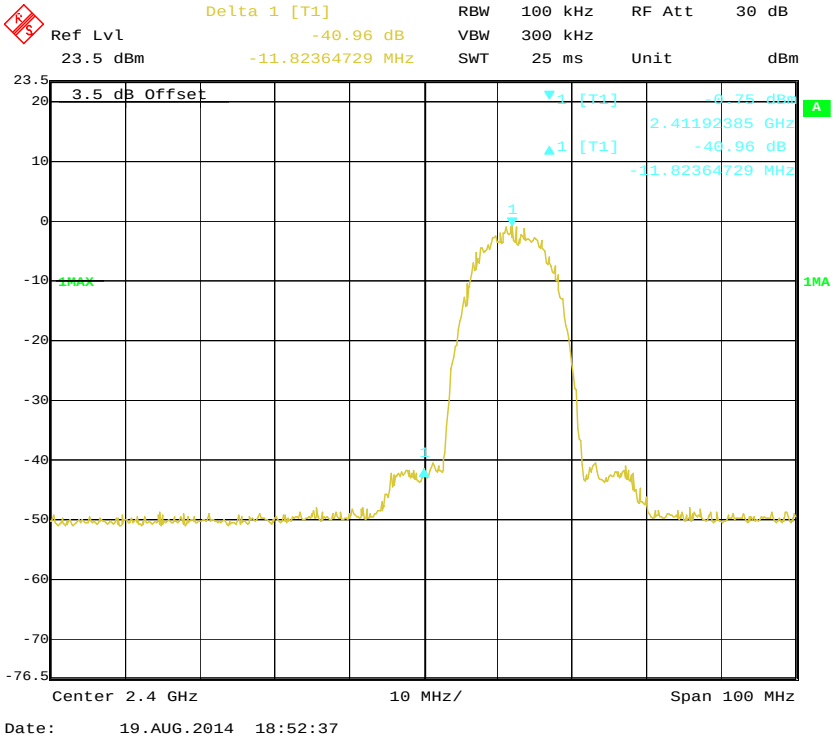
The testing was performed by Mike Hu from 2014-08-19 to 2014-08-20.

EUT operation mode: Transmitting

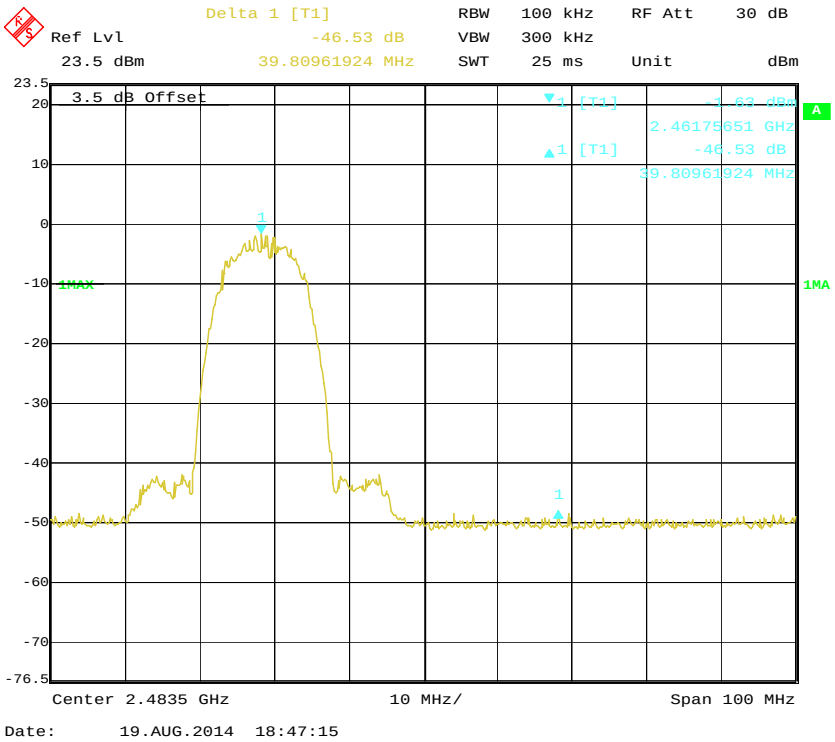
Test Result: *Compliance.* Please refer to following plots.

Mode	Band edges	Delta Peak to band emission (dBc)	Limit (dBc)
802.11b	Left Band	40.96	20
	Right Band	46.53	20
802.11g	Left Band	35.38	20
	Right Band	39.56	20
802.11n20	Left Band	35.10	20
	Right Band	41.62	20
802.11n40	Left Band	34.13	20
	Right Band	36.14	20

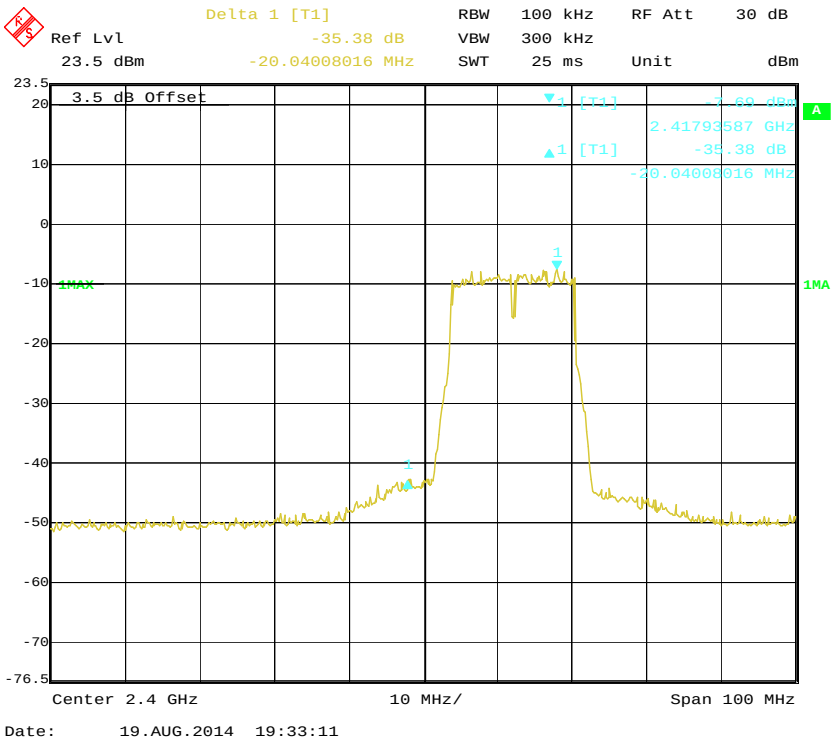
802.11b Band Edge, Left Side



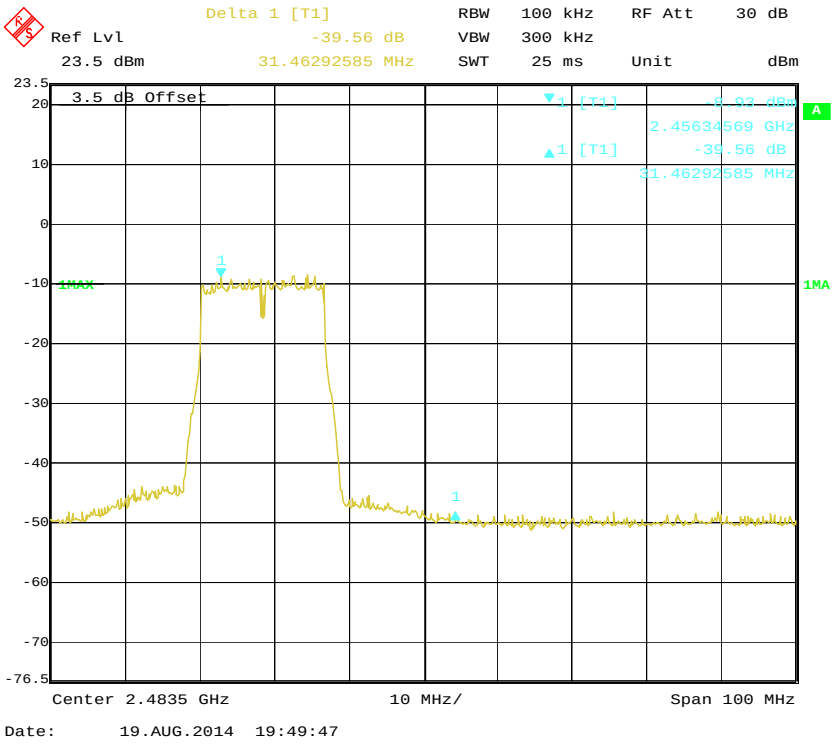
802.11b Band Edge, Right Side



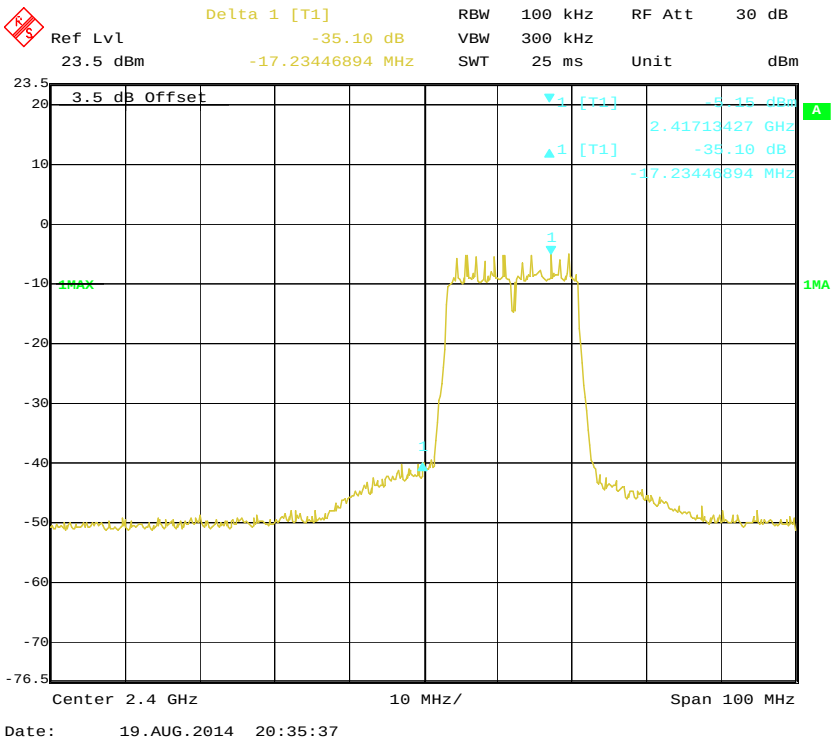
802.11g Band Edge, Left Side



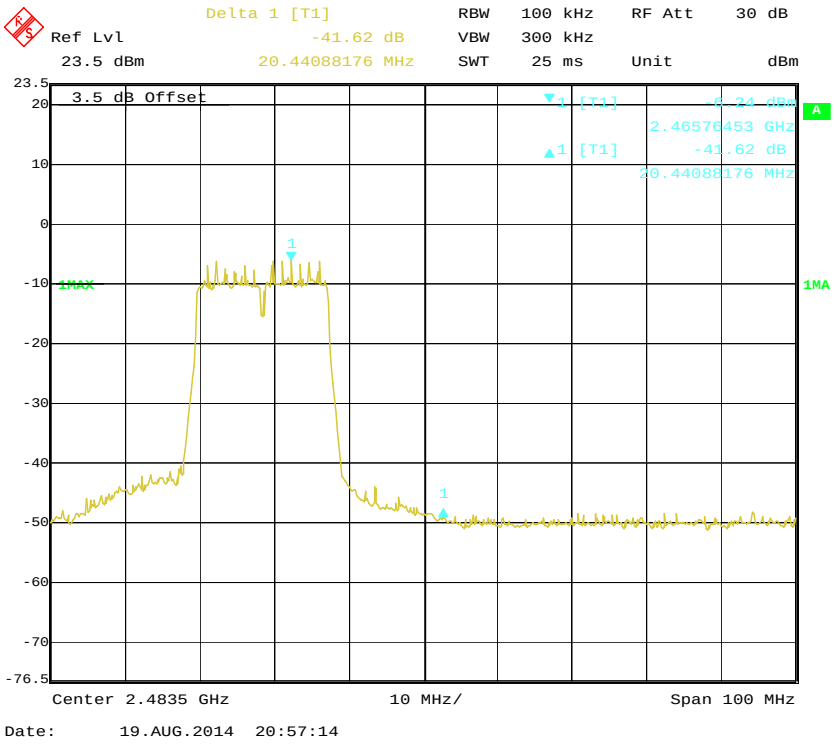
802.11g Band Edge, Right Side



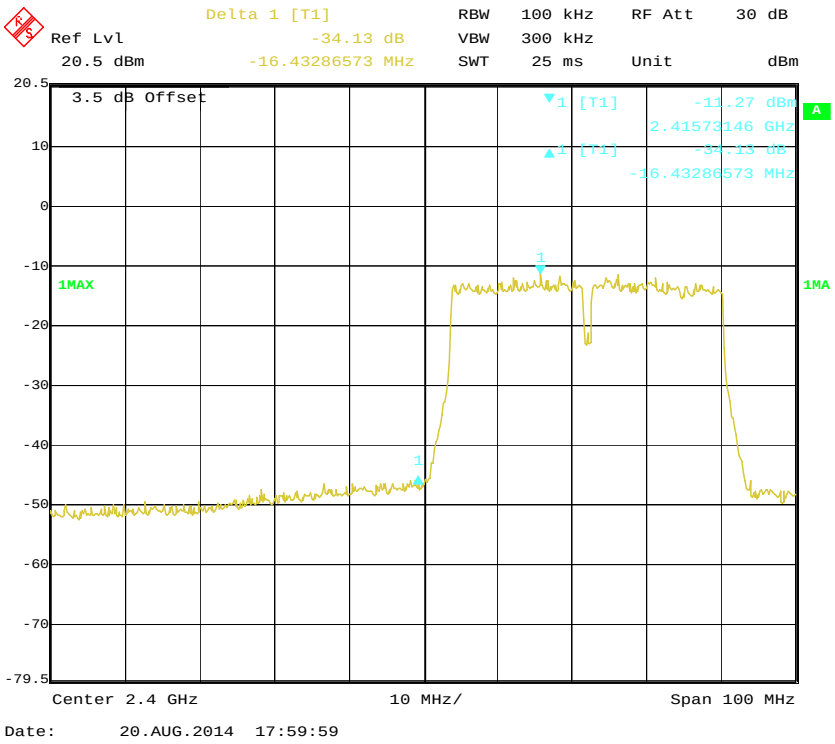
802.11n-HT20 Band Edge, Left Side



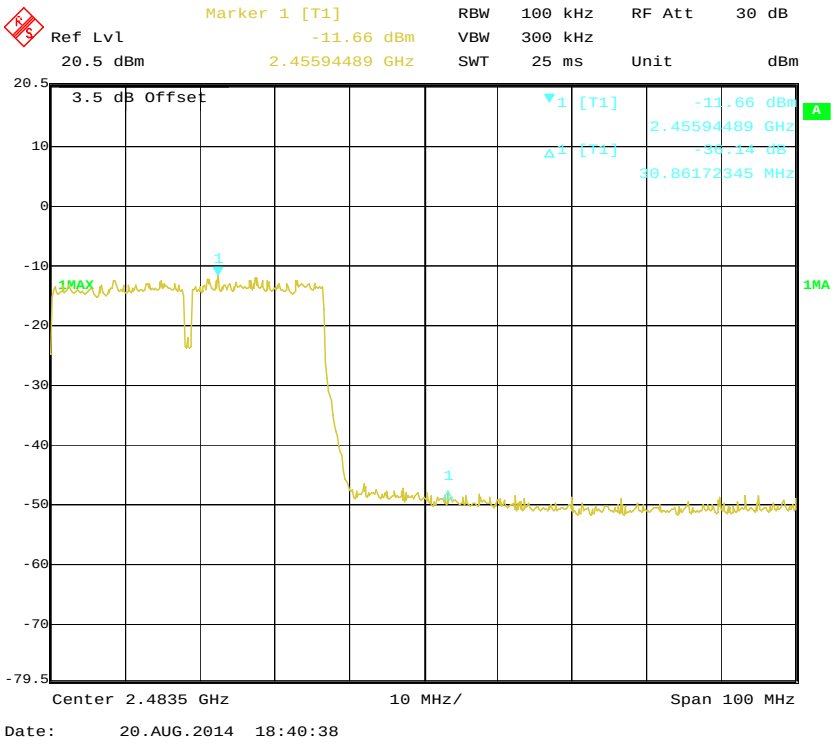
802.11n-HT20 Band Edge, Right Side



802.11n-HT40 Band Edge, Left Side



802.11n-HT40 Band Edge, Right Side



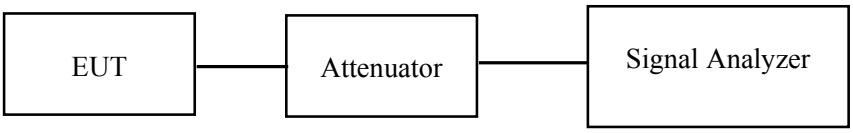
FCC §15.247(e) - POWER SPECTRAL DENSITY

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

According to KDB 558074 D01 DTS Meas Guidance v03r02
1. Set analy center frequency to DTS channel center frequency.
2. Set the span to 1.5 times the DTS channel bandwidth.
3. Set the RBW ≥ 3 kHz.
4. Set the VBW ≥ 3 x RBW.
5. Detector = peak.
6. Sweep time = auto couple.
7. Trace mode = max hold.
8. Allow trace to fully stabilize.
9. Use the peak marker function to determine the maximum power level.
10. If measurement value exceeds limit, reduce RBW (no less than 3 kHz) and repeat.



Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	Signal Analyzer	FSIQ26	8386001028	2013-11-12	2014-11-12

*** 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:	25~26 ℃
Relative Humidity:	55~60 %
ATM Pressure:	101.0 kPa

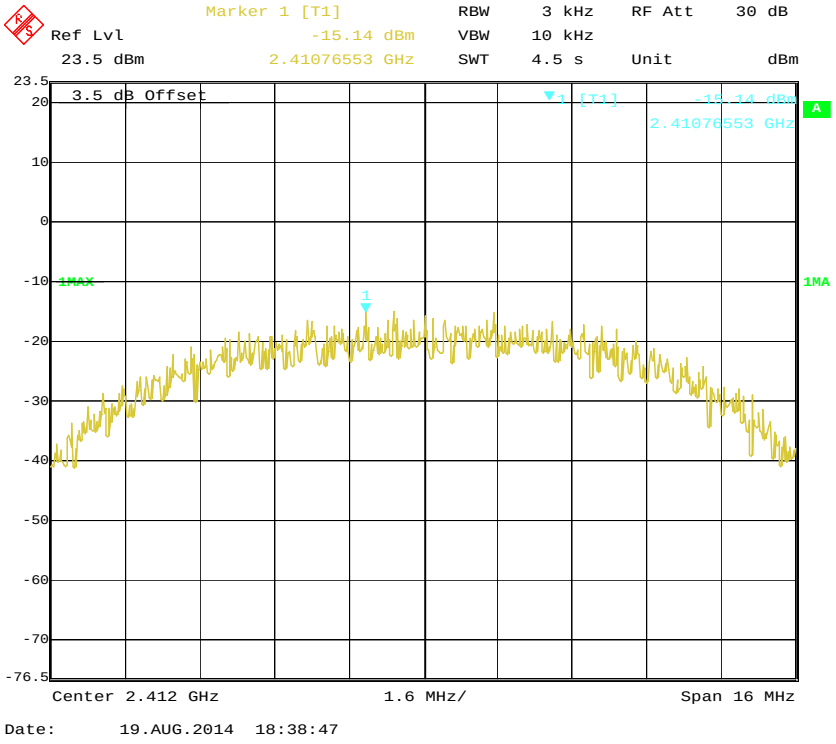
The testing was performed by Mike Hu from 2014-08-19 to 2014-08-20.

EUT operation mode: Transmitting

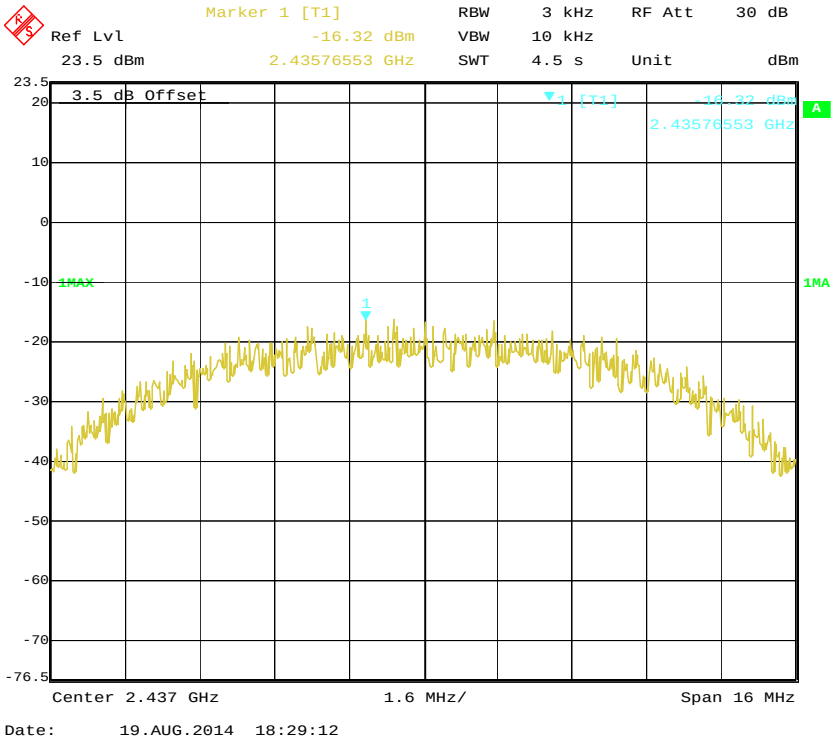
Test Result: Pass

Channel	Frequency (MHz)	PSD (dBm/3kHz)	Limit (dBm/3kHz)
802.11b mode			
Low	2412	-15.14	≤8
Middle	2437	-16.32	≤8
High	2462	-15.98	≤8
802.11g mode			
Low	2412	-21.44	≤8
Middle	2437	-23.27	≤8
High	2462	-22.74	≤8
802.11n-HT20 mode			
Low	2412	-20.33	≤8
Middle	2437	-21.85	≤8
High	2462	-19.21	≤8
802.11n-HT40 mode			
Low	2422	-24.59	≤8
Middle	2437	-24.73	≤8
High	2452	-24.94	≤8

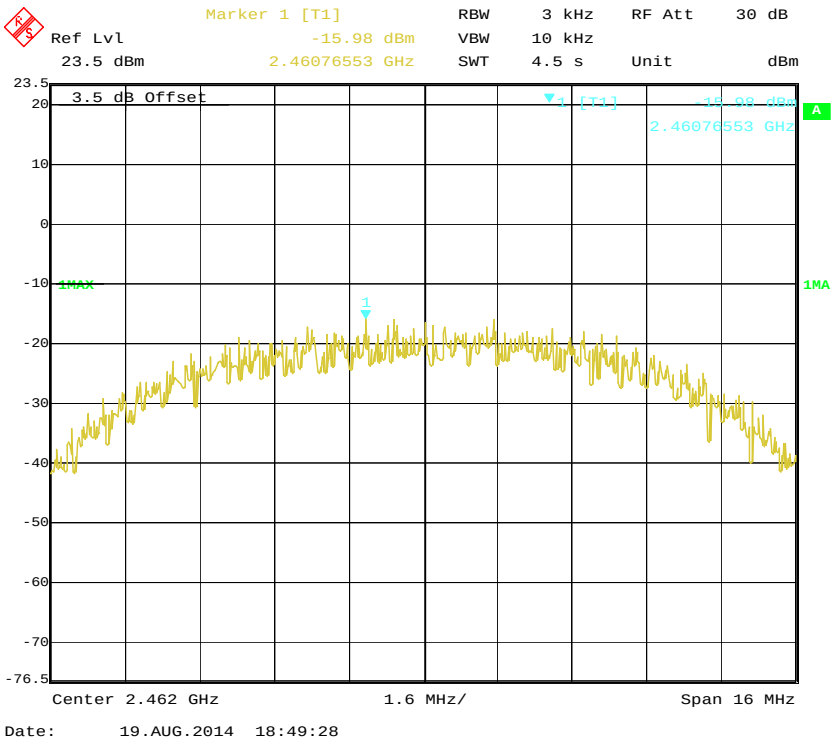
Power Spectral Density, 802.11b Low Channel



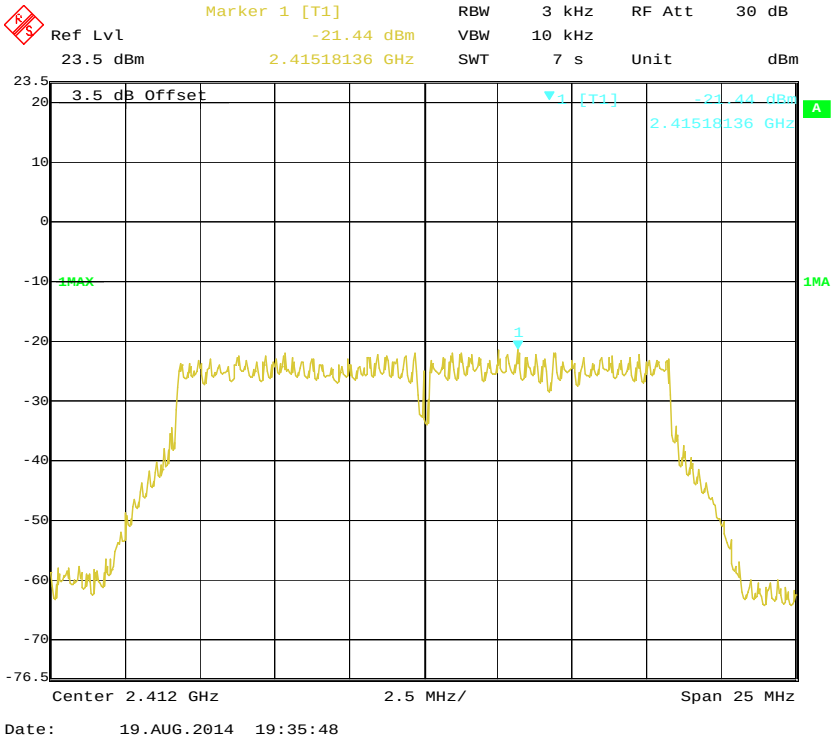
Power Spectral Density, 802.11b Middle Channel



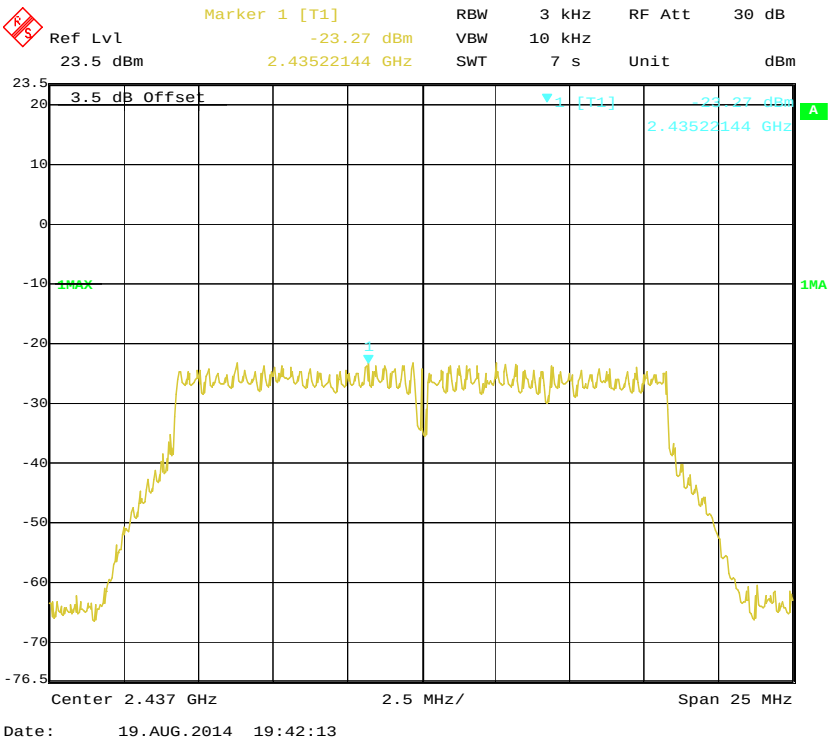
Power Spectral Density, 802.11b High Channel



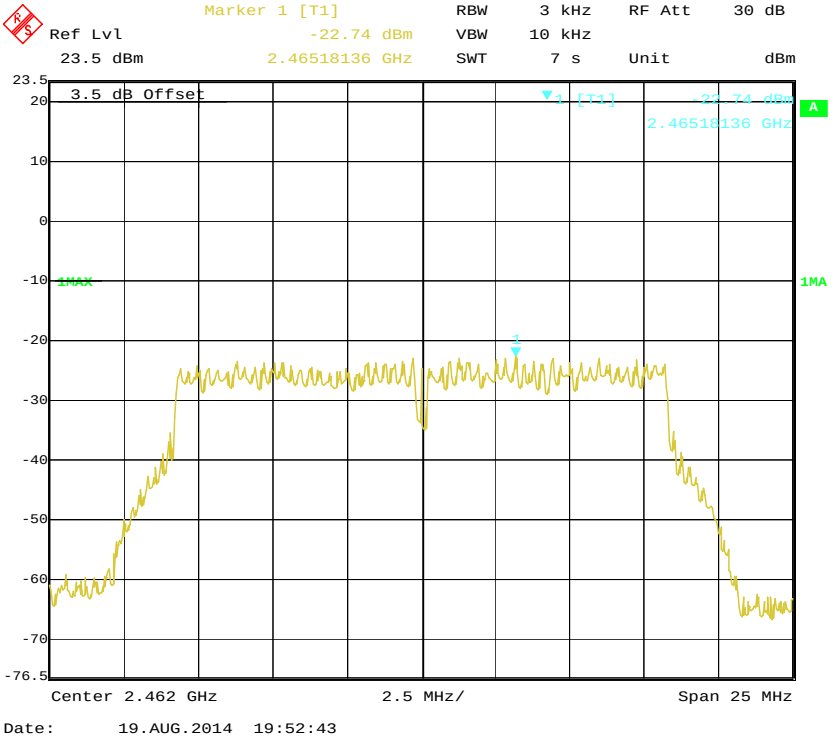
Power Spectral Density, 802.11g Low Channel



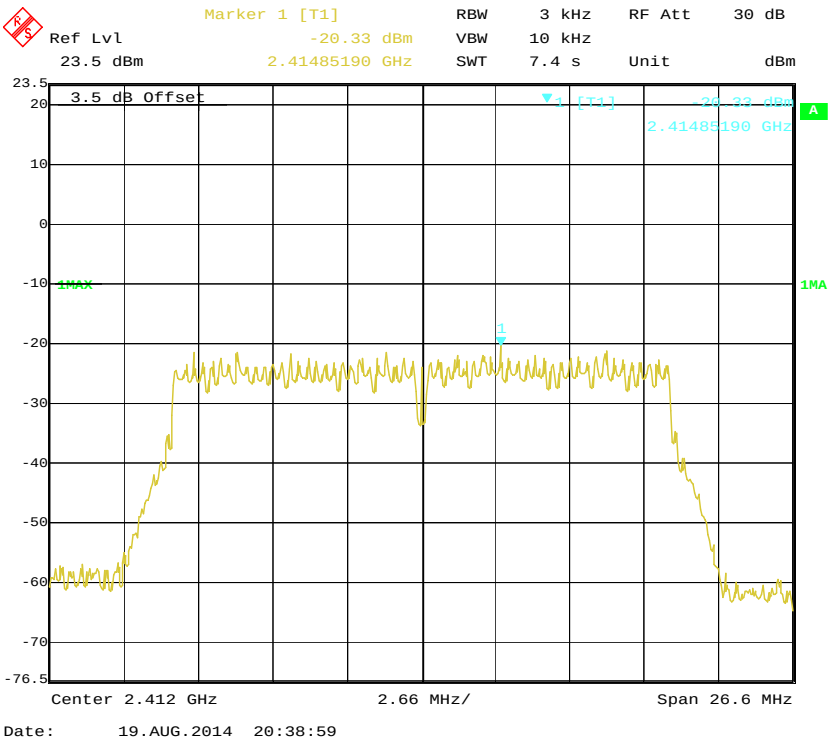
Power Spectral Density, 802.11g Middle Channel



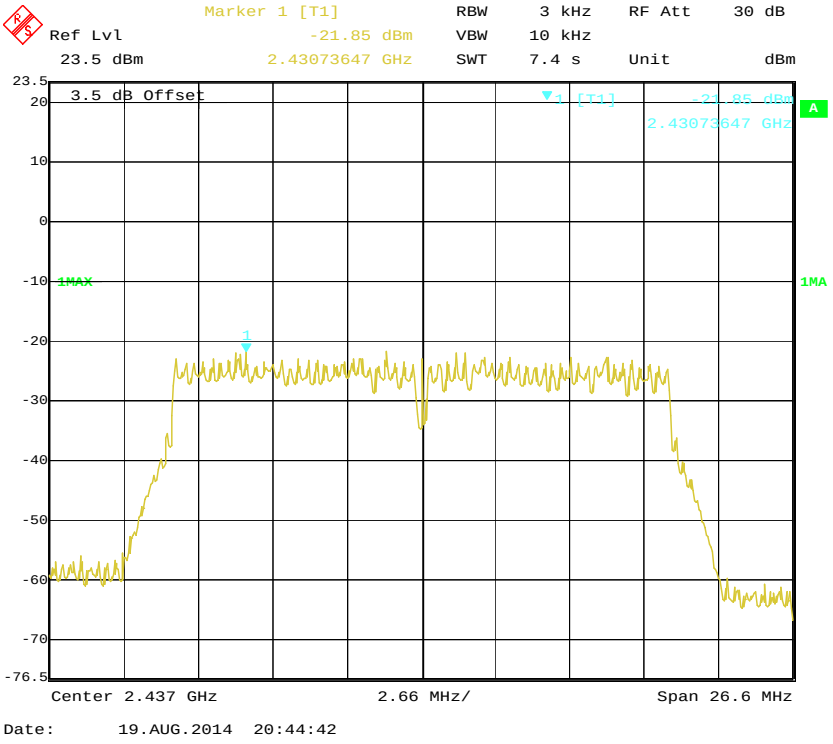
Power Spectral Density, 802.11g High Channel



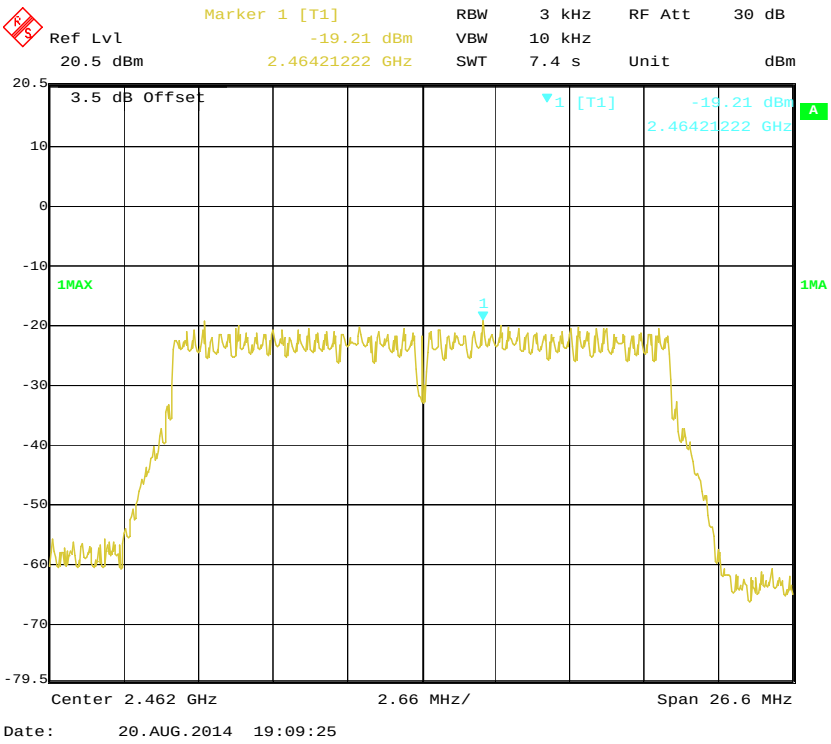
Power Spectral Density, 802.11n-HT20 Low Channel



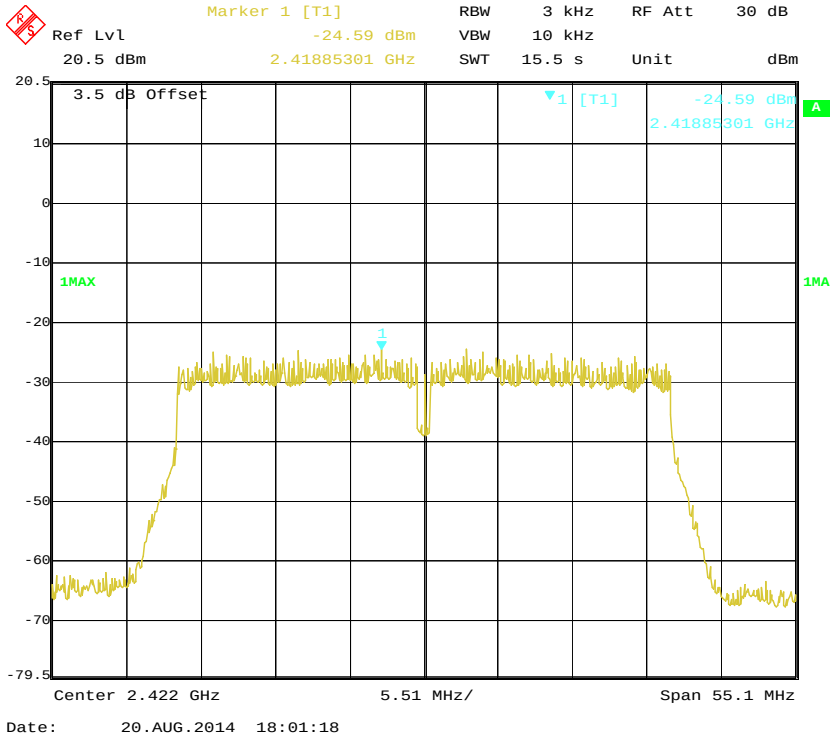
Power Spectral Density, 802.11n-HT20 Middle Channel



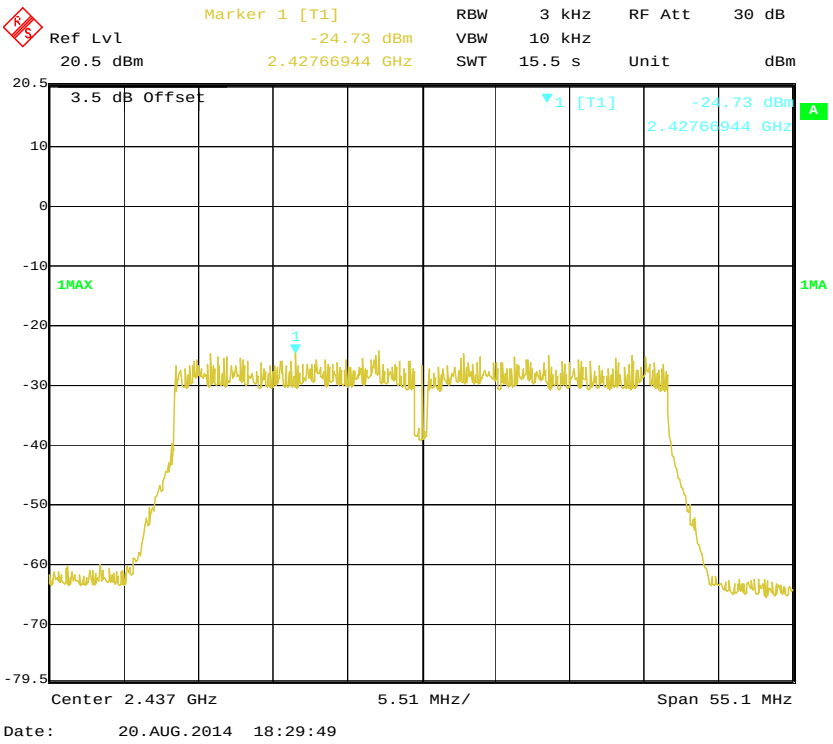
Power Spectral Density, 802.11n-HT20 High Channel



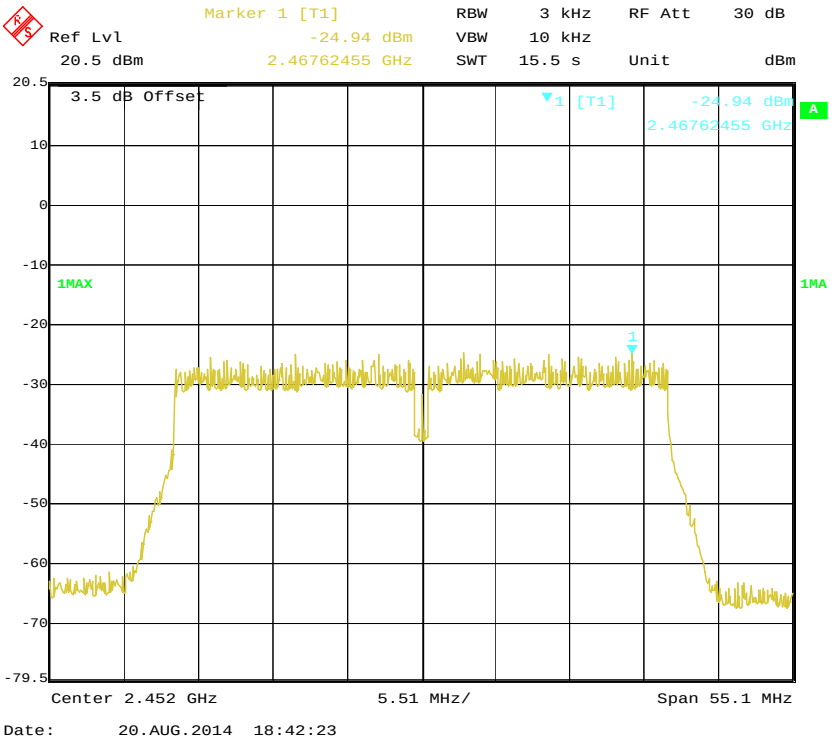
Power Spectral Density, 802.11n-HT40 Low Channel



Power Spectral Density, 802.11n-HT40 Middle Channel



Power Spectral Density, 802.11n-HT40 High Channel



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