Lab Code: 200707-0

FCC PART 15.247

TEST REPORT

For

SHENZHEN TENDA TECHNOLOGY CO., LTD.

Tenda Industrial Park, No. 34-1, Shilong Rd., Shiyan Town, Bao'an District, Shenzhen, P.R.China

FCC ID: V7TN60

Report Type:	**Product Type:**
Original Report	Concurrent Dual Band Wireless N600 Gigabit Router

Test Engineer:	Ares Liu
Report Number:	R1DG120716001-00D
Report Date:	2012-08-02
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GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

The *SHENZHEN TENDA TECHNOLOGY CO.,LTD.*'s product, model number: N60 *(FCC ID: V7TN60) or* ("EUT") in this report is a Concurrent Dual Band Wireless N600 Gigabit Router, which was measured approximately: 17.0 cm (L) x13.5 cm (W) x17.5 cm (H), the operating frequency are 2400-2483.5MHz, 5150~5250MHz, 5725~5850MHz, rated input voltage: DC 9V from adapter.

Adapter information:
Model: TEA09U-09100
Input: 100-240V, 50/60Hz, 0.3A
Output: 9V, 1.0A

** All measurement and test data in this report was gathered from production sample serial number: 120716001 (Assigned by BACL, Dongguan). The EUT was received on 2012-07-17.*

Objective

This report is prepared on behalf of *SHENZHEN TENDA TECHNOLOGY 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)

FCC Part 15C DTS submissions with FCC ID: V7TN60 for 2.400-2483.5MHz band.
FCC Part 15E NII submissions with FCC ID: V7TN60 for 5150-5250MHz band.
FCC Part 15B JBP submissions with FCC ID: V7TN60.

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.

Additionally, Bay Area Compliance Laboratories Corp. (Shenzhen) is an ISO/IEC 17025 accredited laboratory, and is accredited by National Voluntary Laboratory Accredited Program (Lab Code 200707-0).

The current scope of accreditations can be found at http://ts.nist.gov/Standards/scopes/2007070.htm

SYSTEM TEST CONFIGURATION

Description of Test Configuration

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

For 5725~5850MHz band, 802.11a and 802.11n20 mode, 5 channels are provided to testing:

Channel	Frequency (MHz)	Channel	Frequency (MHz)
1	5745	2	5765
3	5785	4	5805
5	5825	/	/

EUT was tested with Channel 1, 3 and 5.

For 802.11n40 mode, 2 channels are provided to testing:

Channel	Frequency (MHz)	Channel	Frequency (MHz)
1	5755	2	5795

EUT was tested with Channel 1, 2 .

EUT Exercise Software

The test was performed under "*Duck 1.1.9*" which was provided by the manufacturer.

Equipment Modifications

No modification was made to the EUT tested.

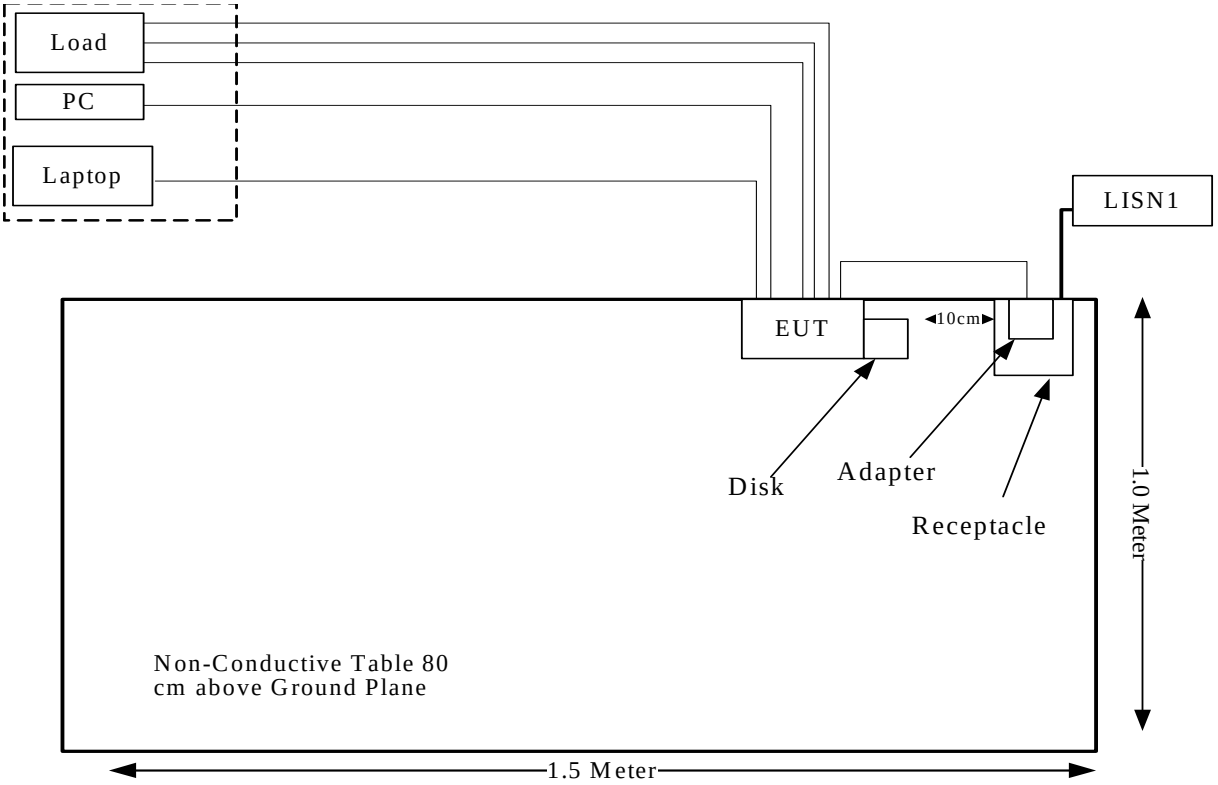
Support Equipment List and Details

Manufacturer	Description	Model	Serial Number
DELL	Laptop	PP11L	QDS-BRCM1017
DELL	PC	GX620	JPTVOB2337
KingSton	USB Flash Disk	DT101G2	0236722

External I/O Cable

Cable Description	Length (m)	From Port	To
RJ45 Cable	1.5	RJ45 Port of Laptop	EUT
RJ45 Cable	10	RJ45 Port of PC	EUT
RJ45 Cable	10	Load	EUT
RJ45 Cable	10	Load	EUT
RJ45 Cable	10	Load	EUT

Block Diagram of Test Setup



SUMMARY OF TEST RESULTS

FCC Rules	Description of Test	Result
§15.247 (i), §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/cm^2);
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)			
802.11a	5785	5.0	3.16	12.75	18.84	20	0.0119	1.0
802.11n ht20	5745	5.0	3.16	12.74	18.79	20	0.0118	1.0
802.11n ht40	5755	5.0	3.16	12.27	16.87	20	0.0106	1.0

Result: The device meet FCC MPE at 20cm 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 two dipole antennas permanently soldered on the printed circuit boards, which complied with 15.203, the maximum gain is 5.0 dBi, please refer to the internal photos.

Result: Compliance.

FCC §15.207 (a) – AC LINE CONDUCTED EMISSIONS

Applicable Standard

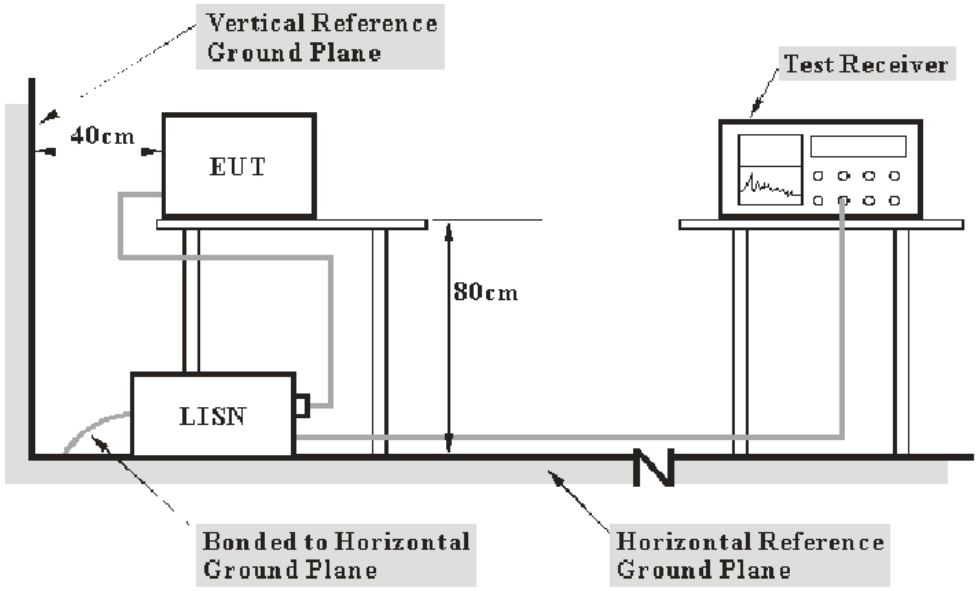
FCC§15.207

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).

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
Rohde & Schwarz	EMI Test Reciever	ESCS 30	830245/006	2011-10-08	2012-10-07
Rohde & Schwarz	LISN	ESH3-Z5	843331/015	2011-10-08	2012-10-07
Rohde & Schwarz	LISN	ESH3-Z5	100113	2011-10-08	2012-10-07

*** Statement of Traceability:** Bay Area Compliance Laboratory Corp. (Dongguan) attests that all calibrations have been performed in accordance to NVLAP requirements, traceable to the NIST.

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:

12.96 dB at **0.455 MHz** in the **Line** conducted mode

Test Data

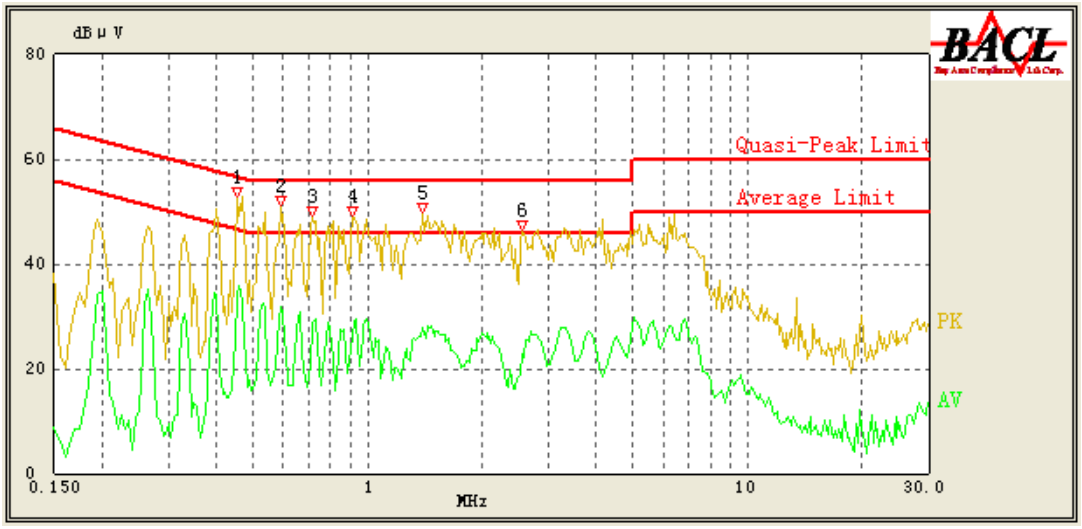
Environmental Conditions

Temperature:	25 ° C
Relative Humidity:	48 %
ATM Pressure:	100.0 kPa

The testing was performed by Ares Liu on 2012-07-31.

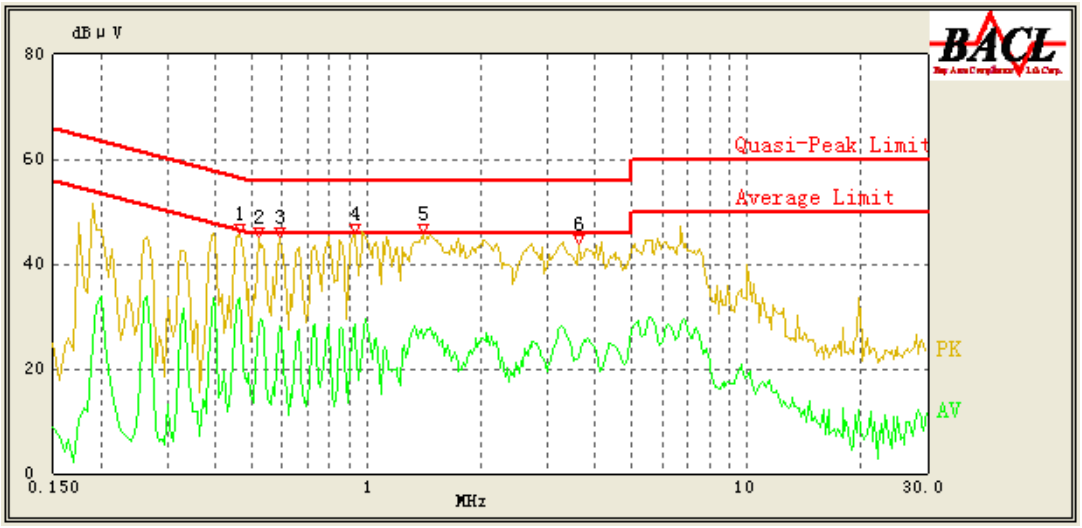
Test Mode: Transmitting

120 V, 60 Hz, Line:



Frequency (MHz)	Corrected Result (dBµV)	Correction Factor (dB)	Limit (dBµV)	Margin (dB)	Detector (PK /QP/Ave.)
0.455	44.33	0.42	57.29	12.96	QP
0.455	33.72	0.42	47.29	13.57	Ave.
0.590	42.20	0.43	56.00	13.80	QP
0.590	31.67	0.43	46.00	14.33	Ave.
0.915	41.55	0.45	56.00	14.45	QP
0.715	41.21	0.44	56.00	14.79	QP
1.395	39.87	0.46	56.00	16.13	QP
0.920	28.89	0.45	46.00	17.11	Ave.
0.715	28.87	0.44	46.00	17.13	Ave.
1.390	27.93	0.46	46.00	18.07	Ave.
2.565	32.69	0.49	56.00	23.31	QP
2.585	22.29	0.49	46.00	23.71	Ave.

120V, 60 Hz, Neutral:



Frequency (MHz)	Corrected Result (dBµV)	Correction Factor (dB)	Limit (dBµV)	Margin (dB)	Detector (PK /QP/Ave.)
0.465	33.46	0.42	47.00	13.54	Ave.
0.930	42.26	0.45	56.00	13.74	QP
0.465	43.21	0.42	57.00	13.79	QP
0.520	41.58	0.42	56.00	14.42	QP
1.405	41.22	0.46	56.00	14.78	QP
0.590	39.91	0.43	56.00	16.09	QP
0.930	28.51	0.45	46.00	17.49	Ave.
0.590	28.22	0.43	46.00	17.78	Ave.
0.520	28.09	0.42	46.00	17.91	Ave.
1.395	27.35	0.46	46.00	18.65	Ave.
3.635	35.21	0.50	56.00	20.79	QP
3.625	22.32	0.50	46.00	23.68	Ave.

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

Applicable Standard

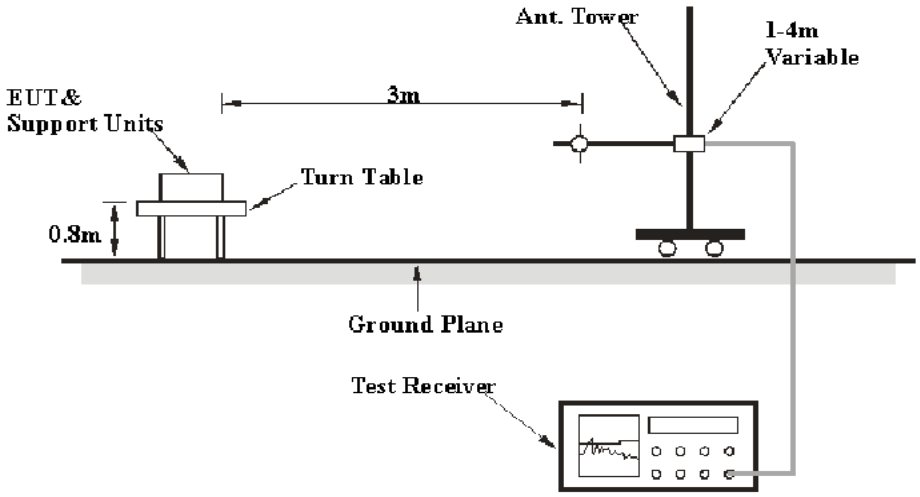
FCC §15.247 (d); §15.209; §15.205;

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) .

EUT Setup



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 40 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 – 40 GHz	1 MHz	3 MHz	PK
1000 MHz – 40 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:

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 Reciever	ESCI	1166.5950.03	2011-10-08	2012-10-07
Sunol Sciences	Hybrid Antennas	JB3	A060611-1	2011-09-06	2012-09-05
HP	Pre-amplifier	8447E	2434A02181	2011-10-08	2012-10-07
R&S	Spectrum Analyzer	FSEM	1079 8500	2011-10-09	2012-10-08
Dayang	Horn Antenna	OMCDH10180	10279001B	2010-07-30	2015-07-29
Mini-Circuits	Wideband Amplifier	ZVA-183-S+	96901149	N/A	N/A
Rohde & Schwarz	Spectrum Analyzer	FSP38	100478	2012-05-27	2013-05-26

*** Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Dongguan) attests that all calibrations have been performed in accordance to NVLAP requirements, traceable to the NIST.

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:

3.07 dB at **5725 MHz** in the **Vertical** polarization for 802.11n20 Mode of transmitting.

Test Data

Environmental Conditions

Temperature:	25 ° C
Relative Humidity:	48 %
ATM Pressure:	100.0 kPa

The testing was performed by Ares Liu from 2012-07-26 to 2012-07-27.

1).30MHz-40GHz

Mode: Transmitting

802.11a Mode:

Frequency	Receiver		Rx Antenna		Cable loss (dB)	Amplifier Gain (dB)	Corrected Amplitude (dBμV/m)	15.247	
(MHz)	Reading (dBμV)	Detector (PK/QP/AV)	Polar (H/V)	Factor (dB)				Limit (dBμV/m)	Margin (dB)
Low Channel:5745(MHz)									
5725	11.25	AV	V	34.64	4.83	0.00	50.71	54.00	3.29*
5725	31.24	PK	V	34.64	4.83	0.00	70.70	74.00	3.30*
11490	27.5	AV	V	40.98	7.85	26.09	50.24	54.00	3.76*
11490	42.36	PK	V	40.98	7.85	26.09	65.10	74.00	8.90
3741.24	32.76	AV	H	32.13	4.72	27.36	42.25	54.00	11.75
625.14	38.42	QP	H	19.88	3.06	27.42	33.94	46.00	12.06
2748.63	33.21	AV	H	31.25	3.95	27.96	40.46	54.00	13.54
3741.24	42.85	PK	H	32.13	4.72	27.36	52.34	74.00	21.66
1468.36	31.14	AV	H	25.47	2.94	27.29	32.26	54.00	21.74
2748.63	42.35	PK	H	31.25	3.95	27.96	49.60	74.00	24.40
1468.36	40.28	PK	H	25.47	2.94	27.29	41.40	74.00	32.60
5745	54.74	AV	H	34.65	5.10	0.00	94.49	N/A	N/A
5745	61.24	PK	H	34.65	5.10	0.00	100.99	N/A	N/A
5745	71.68	AV	V	34.65	5.10	0.00	111.43	N/A	N/A
5745	77.61	PK	V	34.65	5.10	0.00	117.36	N/A	N/A
Middle Channel: 5785(MHz)									
11570	27.66	AV	V	41.13	7.97	26.02	50.73	54.00	3.27*
2756.54	40.31	AV	H	31.24	4.00	27.91	47.64	54.00	6.36
11570	42.06	PK	V	41.13	7.97	26.02	65.13	74.00	8.87
4324.52	30.52	AV	H	32.54	6.42	26.77	42.70	54.00	11.30
3715.27	31.11	AV	H	32.09	4.96	27.37	40.79	54.00	13.21
425.36	34.68	QP	H	16.72	2.49	21.83	32.06	46.00	13.94
1247.25	32.05	AV	H	25.25	2.71	27.20	32.80	54.00	21.20
4324.52	39.82	PK	H	32.54	6.42	26.77	52.00	74.00	22.00
3715.27	40.52	PK	H	32.09	4.96	27.37	50.20	74.00	23.80
2756.54	39.52	PK	H	31.24	4.00	27.91	46.85	74.00	27.15
1247.25	41.38	PK	H	25.25	2.71	27.20	42.13	74.00	31.87
5785	57.58	AV	H	34.67	5.15	0.00	97.40	N/A	N/A
5785	64.32	PK	H	34.67	5.15	0.00	104.14	N/A	N/A
5785	70.24	AV	V	34.67	5.15	0.00	110.06	N/A	N/A
5785	75.42	PK	V	34.67	5.15	0.00	115.24	N/A	N/A

Frequency	Receiver		Rx Antenna		Cable loss (dB)	Amplifier Gain (dB)	Corrected Amplitude (dBμV/m)	15.247	
(MHz)	Reading (dBμV)	Detector (PK/QP/AV)	Polar (H/V)	Factor (dB)				Limit (dBμV/m)	Margin (dB)
High Channel: 5825(MHz)									
5850	30.57	PK	H	34.71	5.56	0.00	70.84	74.00	3.16*
5850	10.39	AV	H	34.71	5.56	0.00	50.66	54.00	3.34*
11650	26.87	AV	V	41.27	8.14	25.92	50.36	54.00	3.64*
11650	40.66	PK	V	41.27	8.14	25.92	64.15	74.00	9.85
375.04	35.46	QP	H	15.72	2.35	21.71	31.82	46.00	14.18
3742.87	29.05	AV	V	32.14	4.71	27.35	38.54	54.00	15.46
2671.52	30.17	AV	H	31.36	4.22	27.64	38.11	54.00	15.89
1423.52	28.78	AV	V	25.42	2.84	27.36	29.68	54.00	24.32
2671.52	40.58	PK	H	31.36	4.22	27.64	48.52	74.00	25.48
3742.87	38.68	PK	V	32.14	4.71	27.35	48.17	74.00	25.83
1423.52	38.62	PK	V	25.42	2.84	27.36	39.52	74.00	34.48
5825	56.22	AV	H	34.70	5.35	0.00	96.27	N/A	N/A
5825	60.87	PK	H	34.70	5.35	0.00	100.92	N/A	N/A
5825	67.35	AV	V	34.70	5.35	0.00	107.40	N/A	N/A
5825	79.98	PK	V	34.70	5.35	0.00	120.03	N/A	N/A

*Within measurement uncertainty!

802.11n20 Mode:

Frequency	Receiver		Rx Antenna		Cable loss (dB)	Amplifier Gain (dB)	Corrected Amplitude (dBμV/m)	15.247	
(MHz)	Reading (dBμV)	Detector (PK/QP/AV)	Polar (H/V)	Factor (dB)				Limit (dBμV/m)	Margin (dB)
Low Channel:5745(MHz)									
5725	31.47	PK	V	34.64	4.83	0.00	70.93	74.00	3.07*
5725	10.86	AV	V	34.64	4.83	0.00	50.32	54.00	3.68*
11490	26.75	AV	V	40.98	7.85	26.09	49.49	54.00	4.51
11490	41.56	PK	V	40.98	7.85	26.09	64.30	74.00	9.70
3645.25	30.38	AV	H	31.96	4.79	27.36	39.77	54.00	14.23
436.65	39.21	QP	H	16.92	2.50	27.42	31.21	46.00	14.79
2571.36	31.62	AV	H	31.50	3.90	27.83	39.19	54.00	14.81
1352.52	30.14	AV	H	25.35	2.92	27.44	30.98	54.00	23.02
3645.25	40.38	PK	H	31.96	4.79	27.36	49.77	74.00	24.23
2571.36	41.23	PK	H	31.50	3.90	27.83	48.80	74.00	25.20
1352.52	39.57	PK	H	25.35	2.92	27.44	40.41	74.00	33.59
5745	54.86	AV	H	34.65	5.10	0.00	94.61	N/A	N/A
5745	61.75	PK	H	34.65	5.10	0.00	101.50	N/A	N/A
5745	70.69	AV	V	34.65	5.10	0.00	110.44	N/A	N/A
5745	78.63	PK	V	34.65	5.10	0.00	118.38	N/A	N/A
Middle Channel: 5785(MHz)									
11570	26.42	AV	V	41.13	7.97	26.02	49.49	54.00	4.51
11570	42.65	PK	V	41.13	7.97	26.02	65.72	74.00	8.28
4324.52	30.33	AV	H	32.54	6.42	26.77	42.51	54.00	11.49
425.36	34.68	QP	H	16.72	2.49	21.83	32.06	46.00	13.94
3947.47	30.55	AV	V	32.51	4.13	27.21	39.97	54.00	14.03
2627.32	28.96	AV	H	31.42	4.17	27.59	36.96	54.00	17.04
4324.52	39.82	PK	H	32.54	6.42	26.77	52.00	74.00	22.00
3947.47	41.63	PK	V	32.51	4.13	27.21	51.05	74.00	22.95
2627.32	38.79	PK	H	31.42	4.17	27.59	46.79	74.00	27.21
1342.34	41.38	PK	H	25.34	2.87	27.41	42.18	74.00	31.82
1342.34	41.38	PK	H	25.34	2.87	27.41	42.18	74.00	31.82
5785	57.68	AV	H	34.67	5.15	0.00	97.50	N/A	N/A
5785	65.12	PK	H	34.67	5.15	0.00	104.94	N/A	N/A
5785	71.42	AV	V	34.67	5.15	0.00	111.24	N/A	N/A
5785	77.35	PK	V	34.67	5.15	0.00	117.17	N/A	N/A

Frequency	Receiver		Rx Antenna		Cable loss (dB)	Amplifier Gain (dB)	Corrected Amplitude (dBμV/m)	15.247	
(MHz)	Reading (dBμV)	Detector (PK/QP/AV)	Polar (H/V)	Factor (dB)				Limit (dBμV/m)	Margin (dB)
High Channel: 5825(MHz)									
5850	10.27	AV	H	34.71	5.56	0.00	50.54	54.00	3.46*
11650	26.37	AV	V	41.27	8.14	25.92	49.86	54.00	4.14
5850	28.96	PK	H	34.71	5.56	0.00	69.23	74.00	4.77
11650	41.75	PK	V	41.27	8.14	25.92	65.24	74.00	8.76
435.21	36.75	QP	H	16.89	2.49	21.86	34.27	46.00	11.73
3846.23	31.86	AV	V	32.32	4.60	27.35	41.43	54.00	12.57
2541.75	30.11	AV	H	31.54	3.86	27.93	37.58	54.00	16.42
1347.32	32.63	AV	V	25.35	2.91	27.43	33.46	54.00	20.54
3846.23	41.36	PK	V	32.32	4.60	27.35	50.93	74.00	23.07
2541.75	39.75	PK	H	31.54	3.86	27.93	47.22	74.00	26.78
1347.32	42.35	PK	V	25.35	2.91	27.43	43.18	74.00	30.82
5825	58.35	AV	H	34.70	5.35	0.00	98.40	N/A	N/A
5825	62.14	PK	H	34.70	5.35	0.00	102.19	N/A	N/A
5825	67.42	AV	V	34.70	5.35	0.00	107.47	N/A	N/A
5825	80.25	PK	V	34.70	5.35	0.00	120.30	N/A	N/A

*Within measurement uncertainty!

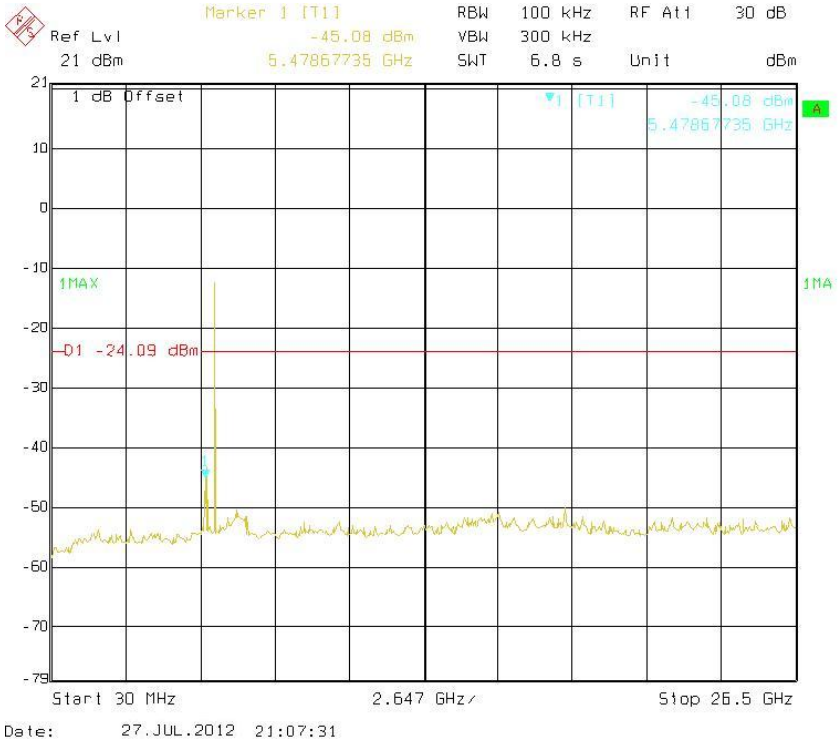
802.11n40 Mode:

Frequency	Receiver		Rx Antenna		Cable loss (dB)	Amplifier Gain (dB)	Corrected Amplitude (dBμV/m)	15.247	
(MHz)	Reading (dBμV)	Detector (PK/QP/AV)	Polar (H/V)	Factor (dB)				Limit (dBμV/m)	Margin (dB)
Low Channel:5755(MHz)									
11510	27.63	AV	V	40.98	7.85	26.09	50.37	54.00	3.63*
5725	9.78	AV	V	34.64	4.83	0.00	49.24	54.00	4.76
5725	28.96	PK	V	34.64	4.83	0.00	68.42	74.00	5.58
11510	42.35	PK	V	40.98	7.85	26.09	65.09	74.00	8.91
642.42	37.65	QP	H	20.17	3.08	27.42	33.48	46.00	12.52
2671.46	32.65	AV	H	31.36	4.22	27.64	40.59	54.00	13.41
3514.52	30.51	AV	H	31.73	4.95	27.36	39.83	54.00	14.17
1426.32	30.62	AV	H	25.43	2.84	27.35	31.54	54.00	22.46
2671.46	42.35	PK	H	31.36	4.22	27.64	50.29	74.00	23.71
3514.52	39.75	PK	H	31.73	4.95	27.36	49.07	74.00	24.93
1426.32	40.25	PK	H	25.43	2.84	27.35	41.17	74.00	32.83
5755	54.63	AV	H	34.65	5.10	0.00	94.38	N/A	N/A
5755	63.24	PK	H	34.65	5.10	0.00	102.99	N/A	N/A
5755	69.51	AV	V	34.65	5.10	0.00	109.26	N/A	N/A
5755	79.24	PK	V	34.65	5.10	0.00	118.99	N/A	N/A
High Channel: 5795(MHz)									
5850	10.21	AV	H	34.71	5.56	0.00	50.48	54.00	3.52*
11590	26.41	AV	V	41.27	8.14	25.92	49.90	54.00	4.10
5850	28.76	PK	H	34.71	5.56	0.00	69.03	74.00	4.97
11590	42.62	PK	V	41.27	8.14	25.92	66.11	74.00	7.89
4523.18	32.65	AV	V	32.55	5.45	27.35	43.30	54.00	10.70
452.36	36.84	QP	H	17.27	2.57	21.90	34.79	46.00	11.21
3425.64	29.96	AV	H	31.58	5.04	27.18	39.40	54.00	14.60
1647.75	31.06	AV	V	26.48	3.17	27.21	33.50	54.00	20.50
4523.18	42.18	PK	V	32.55	5.45	27.35	52.83	74.00	21.17
3425.64	39.57	PK	H	31.58	5.04	27.18	49.01	74.00	24.99
1647.75	40.52	PK	V	26.48	3.17	27.21	42.96	74.00	31.04
5795	57.86	AV	H	34.70	5.35	0.00	97.91	N/A	N/A
5795	63.41	PK	H	34.70	5.35	0.00	103.46	N/A	N/A
5795	66.47	AV	V	34.70	5.35	0.00	106.52	N/A	N/A
5795	78.96	PK	V	34.70	5.35	0.00	119.01	N/A	N/A

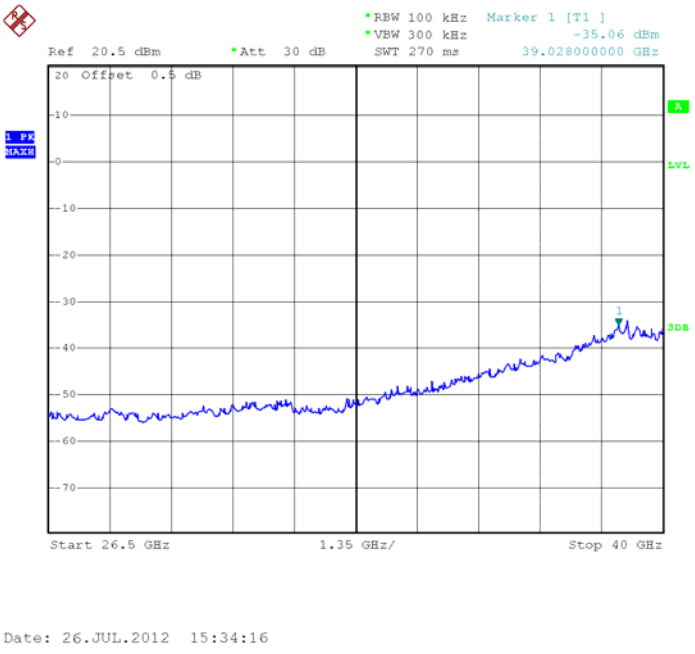
*Within measurement uncertainty!

Conducted Spurious Emissions at Antenna Port

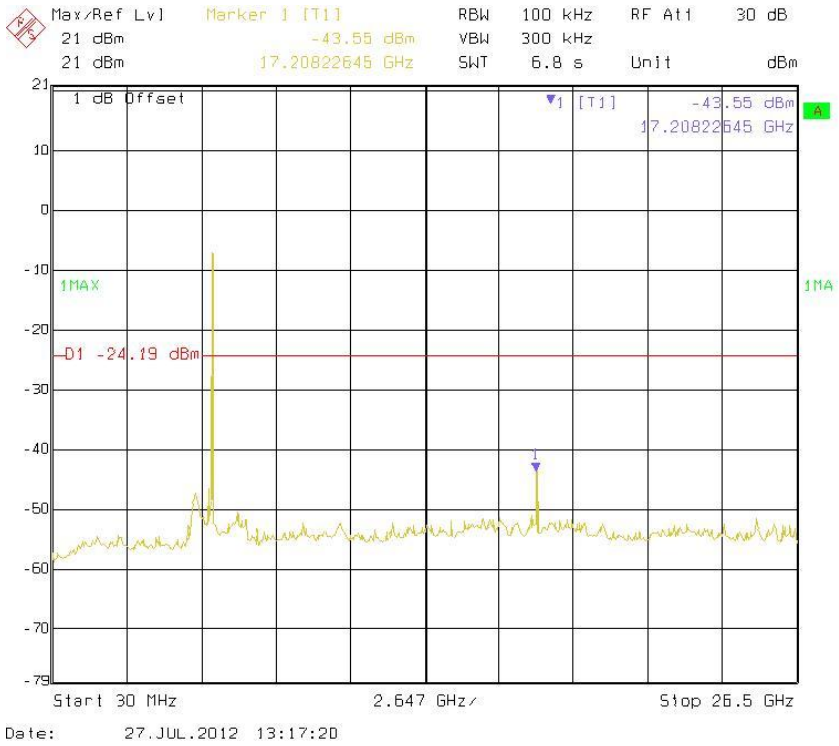
802.11a Low Channel 30M-26.5G



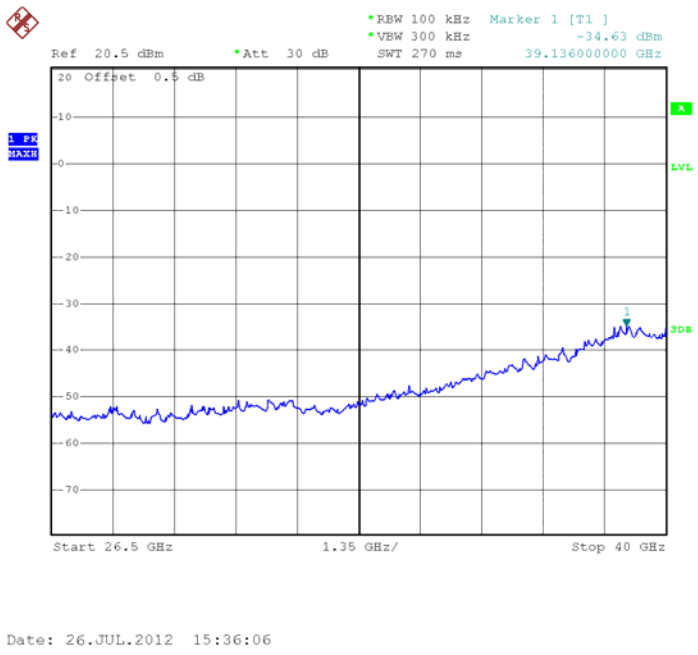
802.11a Low Channel 26.5-40G



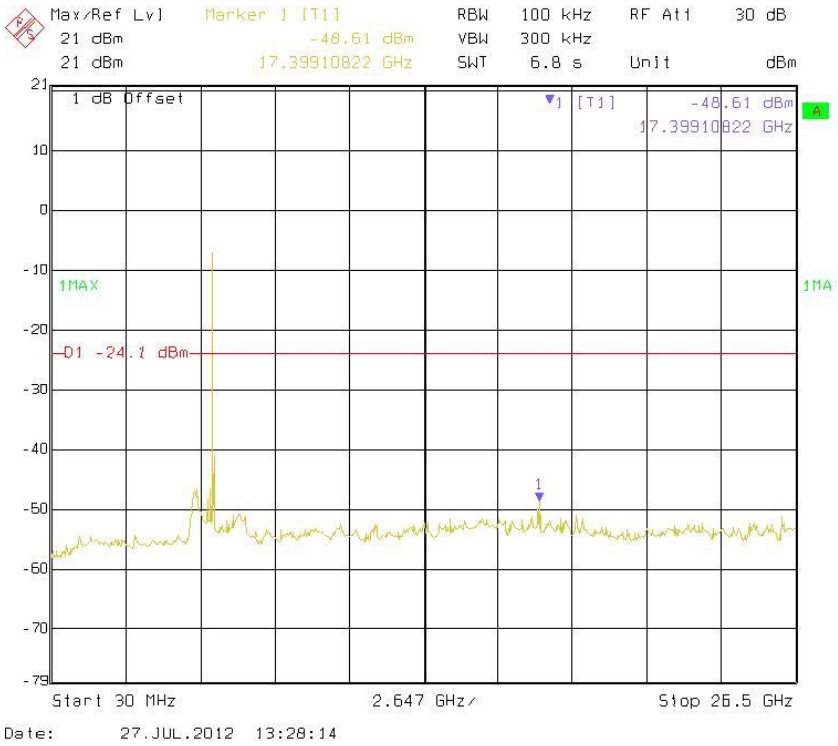
802.11a Middle Channel 30M-26.5G



802.11a Middle Channel 26.5-40G



802.11a High Channel 30M-26.5G



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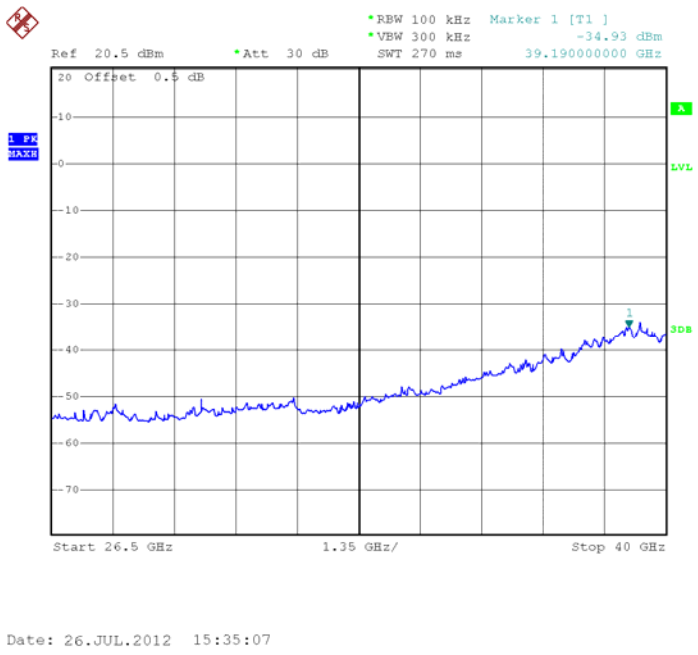
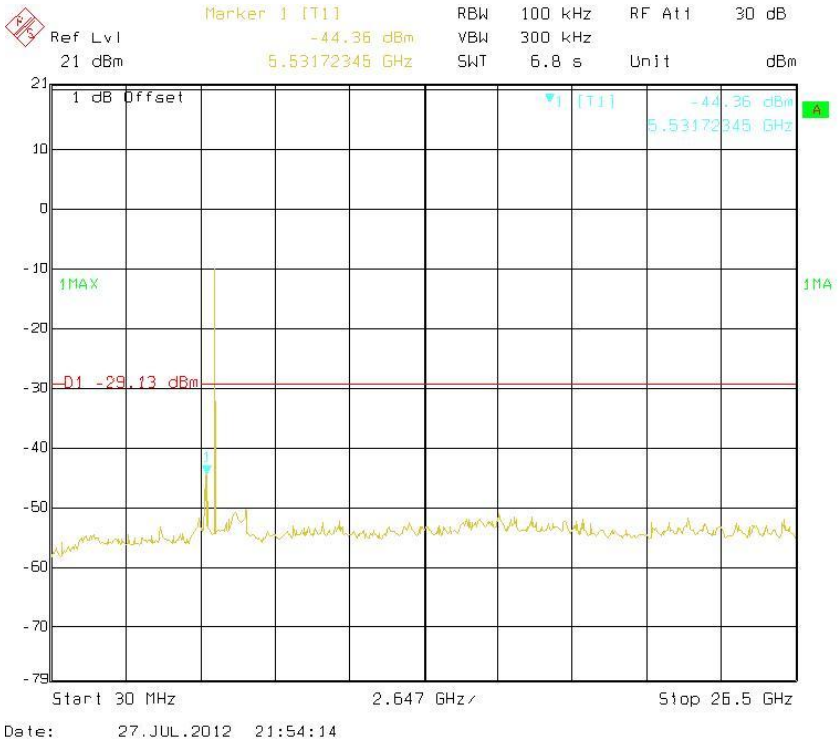


Chain 0:

802.11n20 Low Channel 30M-26.5G



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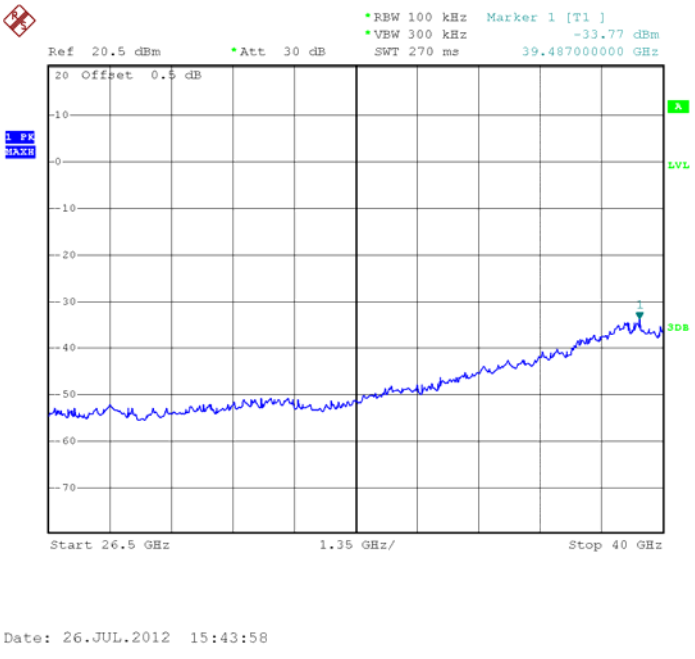

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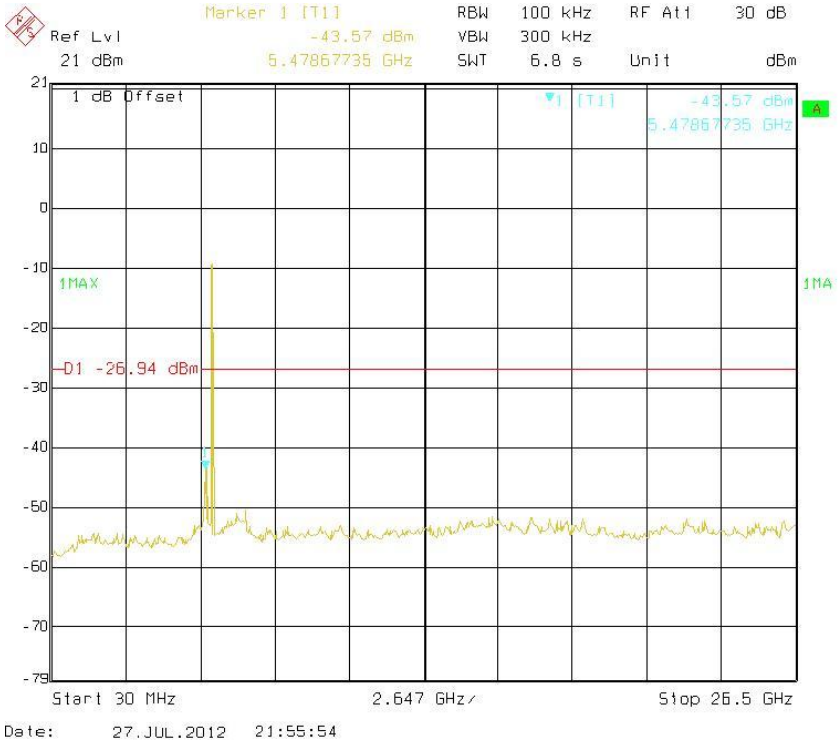

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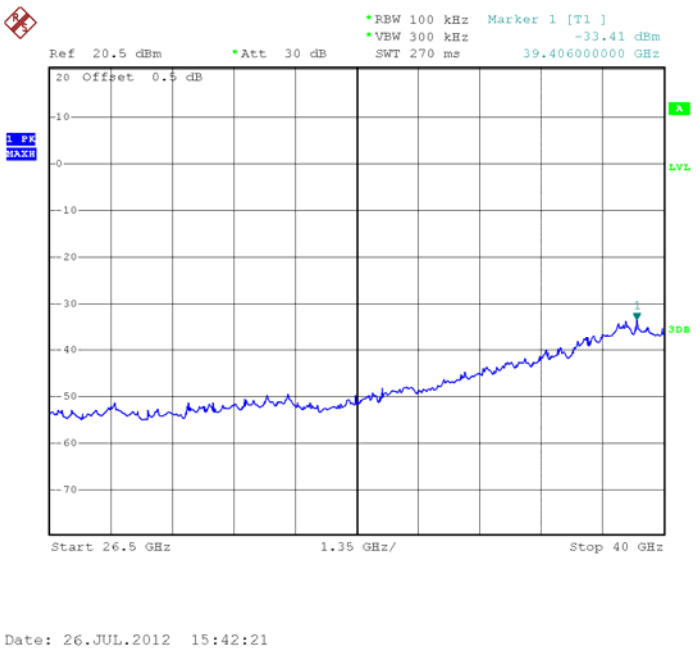
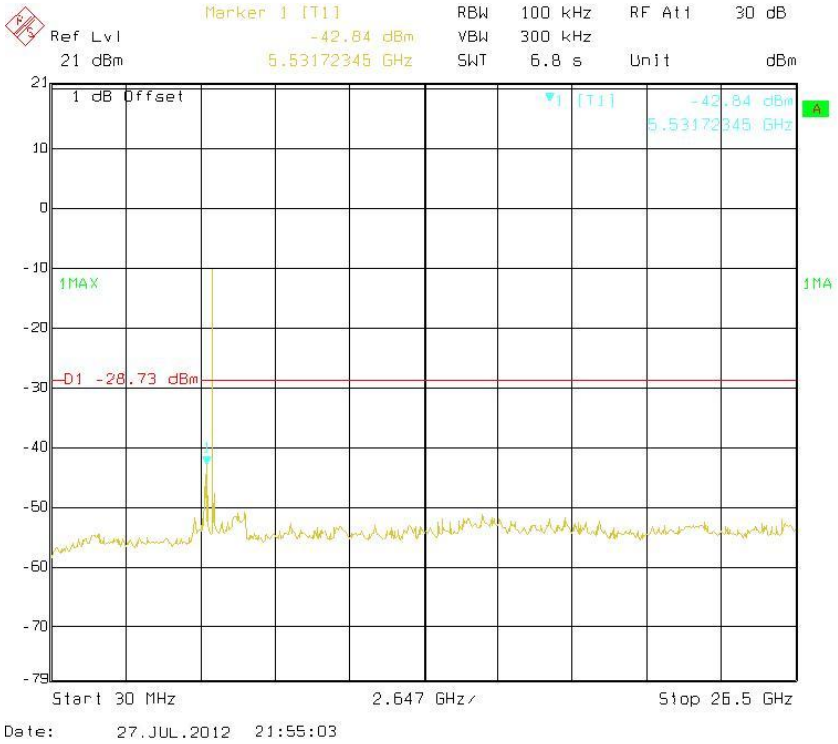
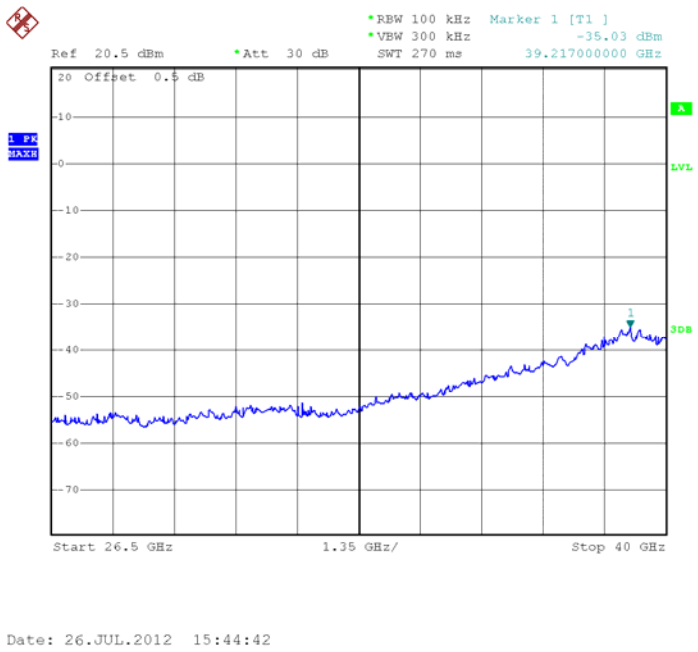


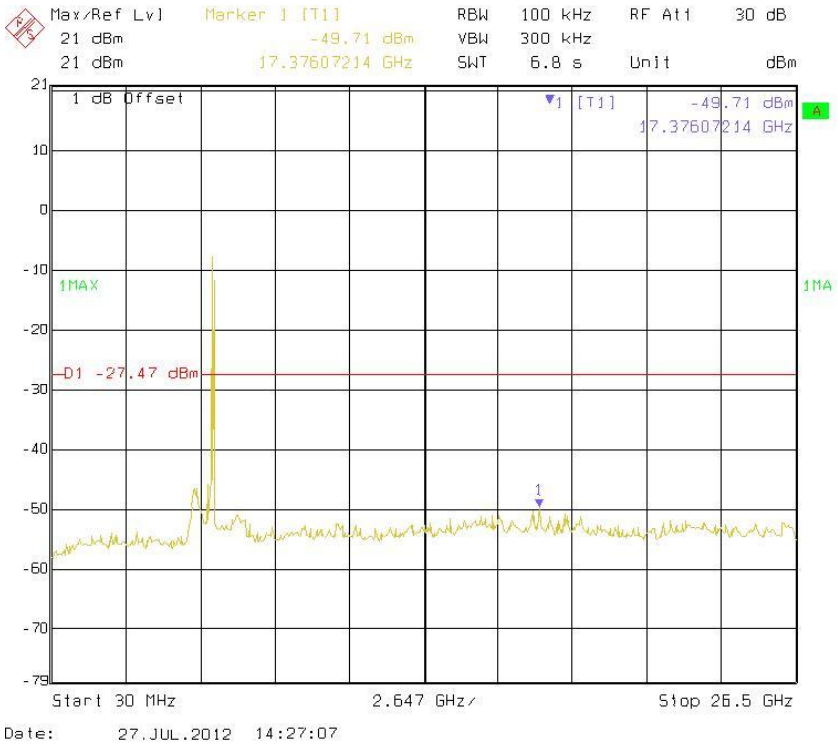
802.11n20 High Channel 30M-26.5G



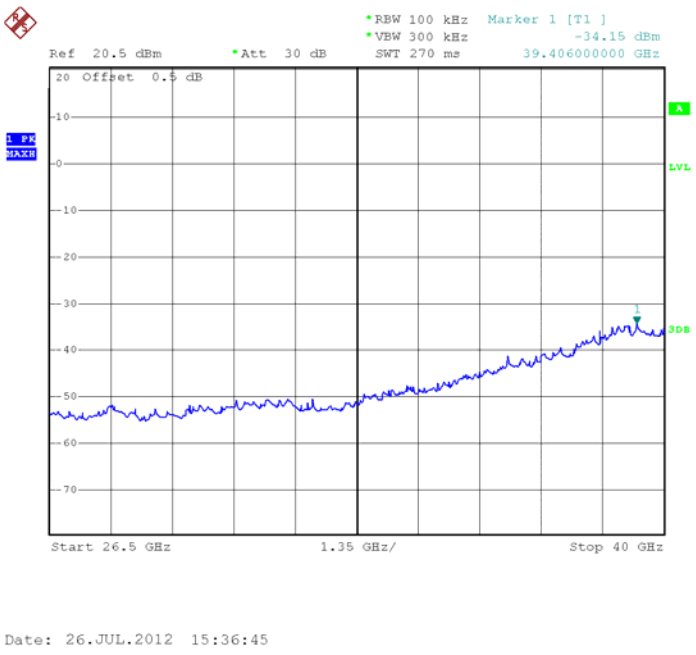
802.11n20 High Channel 26.5-40G



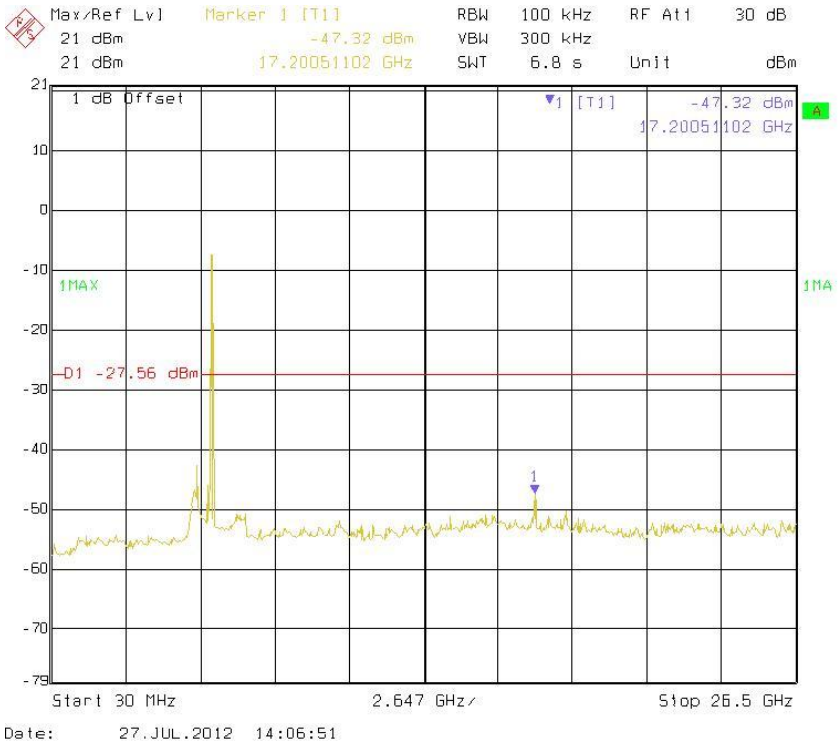
802.11n40 Low Channel 30M-26.5G



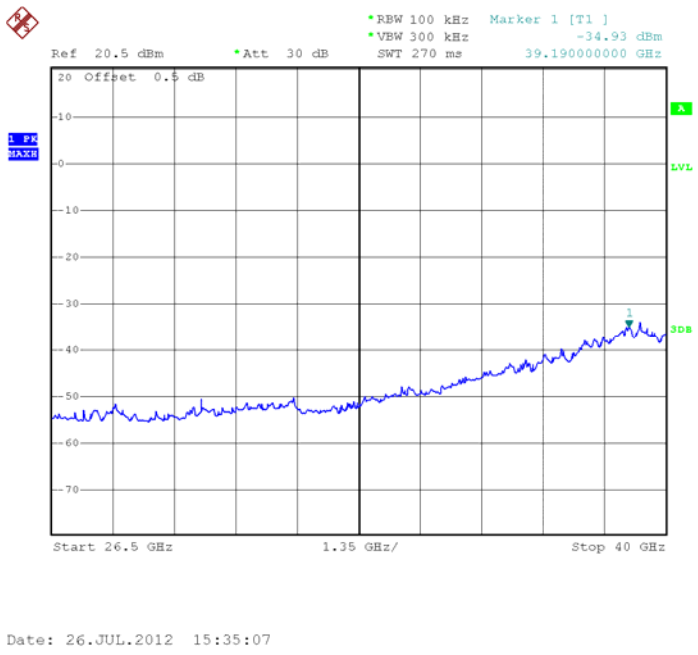
802.11n40 Low Channel 26.5-40G



802.11n40 High Channel 30M-26.5G

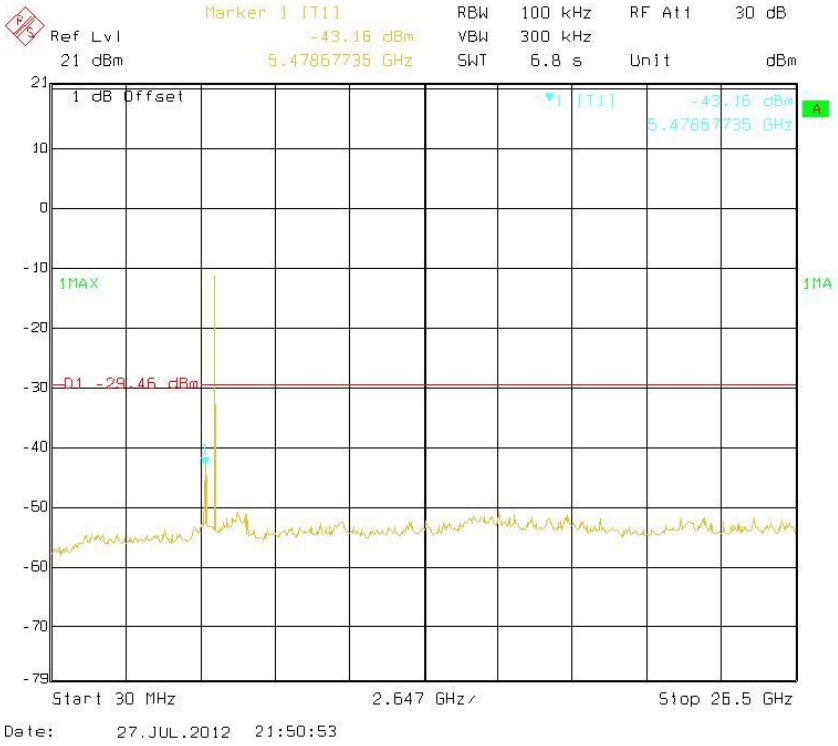


802.11n40 High Channel 26.5-40G

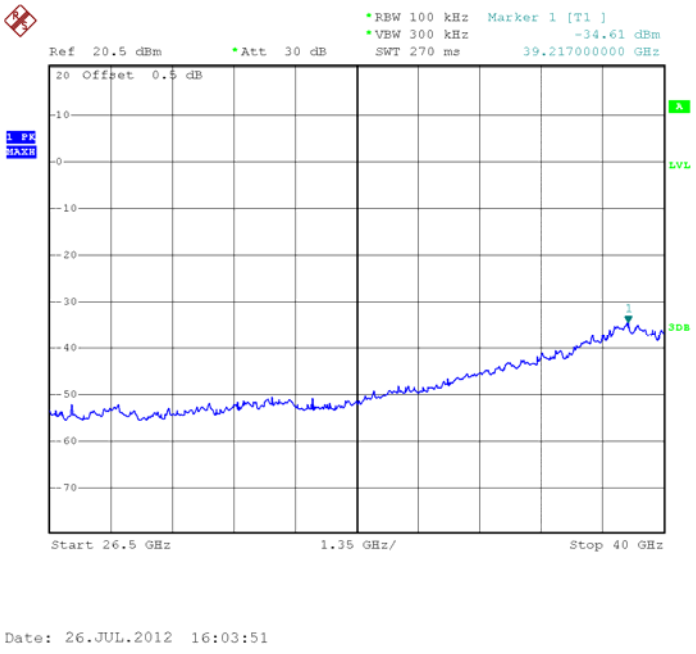


Chain 1:

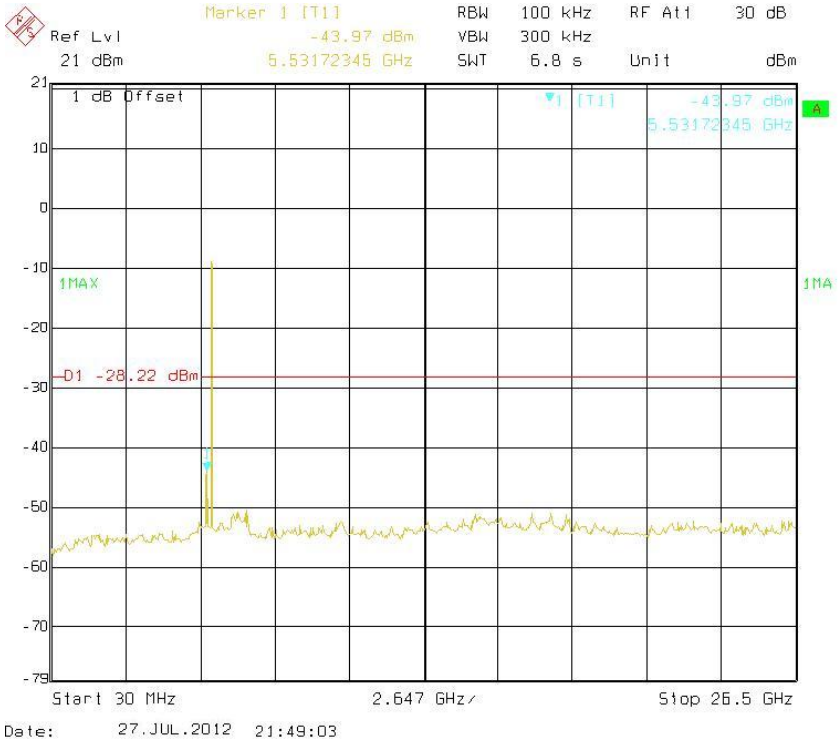
802.11n20 Low Channel 30M-26.5G



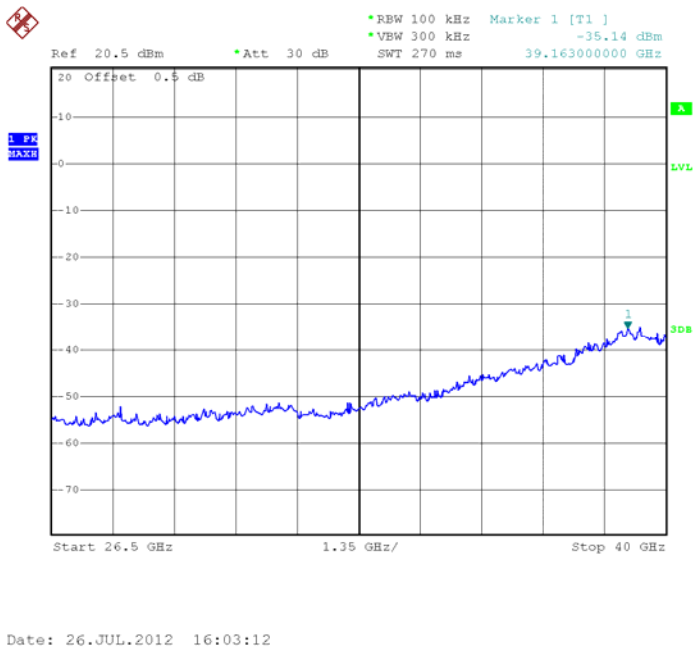
802.11n20 Low Channel 26.5-40G



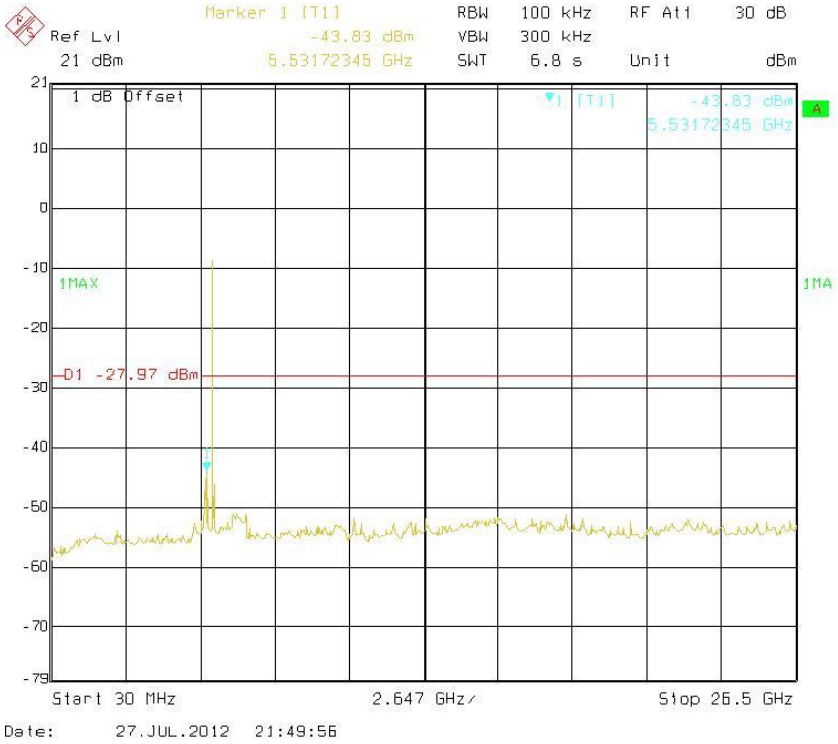
802.11n20 Middle Channel 30M-26.5G



802.11n20 Middle Channel 26.5-40G

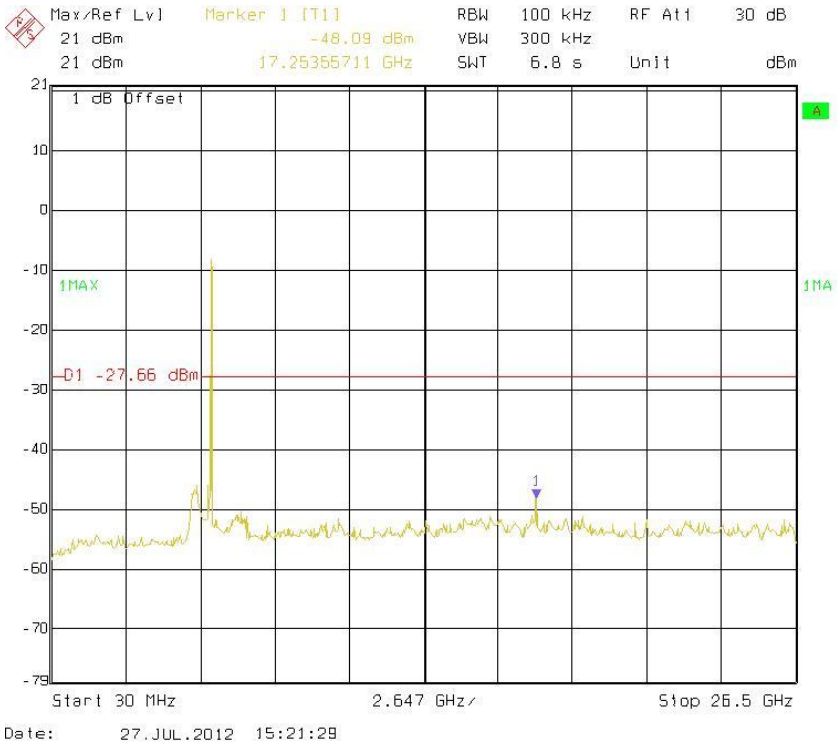


802.11n20 High Channel 30M-26.5G

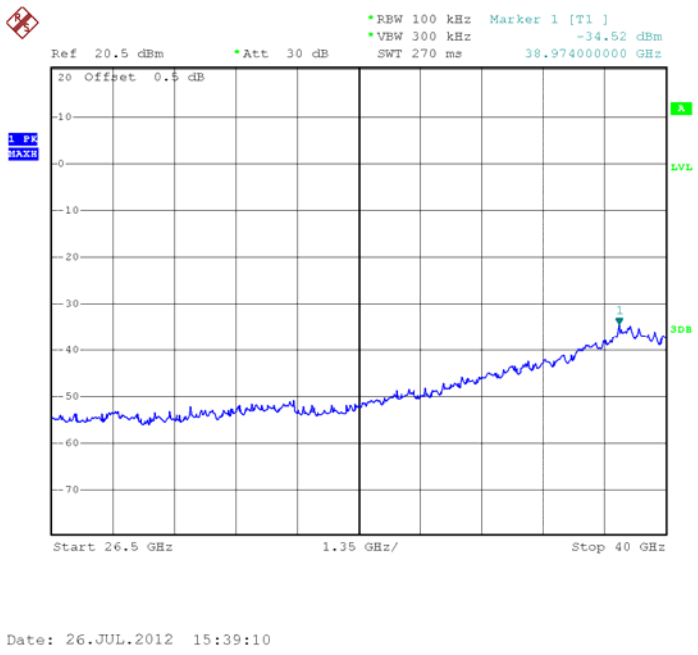


802.11n20 High Channel 26.5-40G

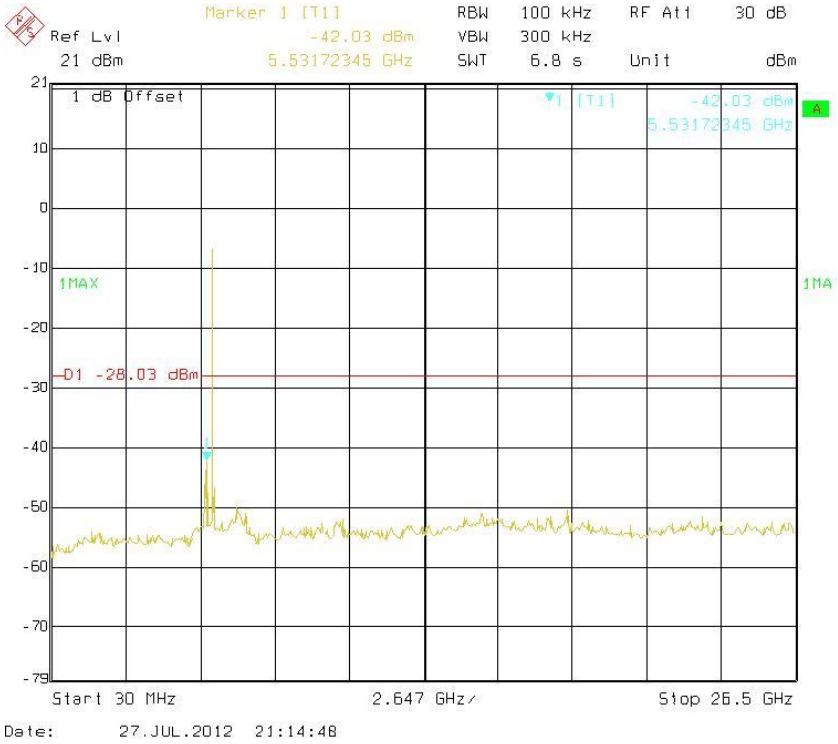
802.11n40 Low Channel 30M-26.5G



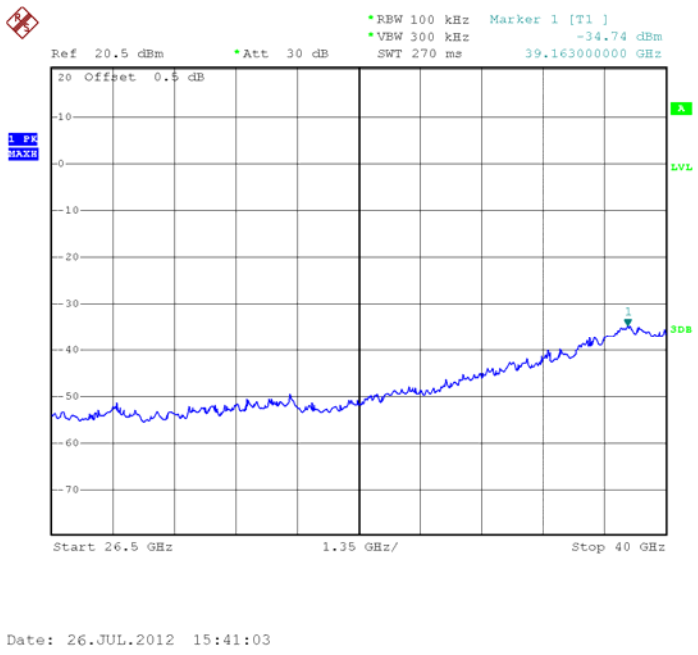
802.11n40 Low Channel 26.5-40G



802.11n40 High Channel 30M-26.5G



802.11n40 High Channel 26.5-40G



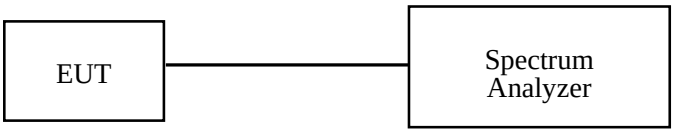
FCC §15.247(a) (2) – 6 dB EMISSION BANDWIDTH

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	100479	2012-05-27	2013-05-26

*** Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Dongguan) attests that all calibrations have been performed in accordance to NVLAP requirements, traceable to the NIST.

Test Data

Environmental Conditions

Temperature:	25 ° C
Relative Humidity:	48 %
ATM Pressure:	100.0kPa

The testing was performed by Ares Liu on 2012-07-20.

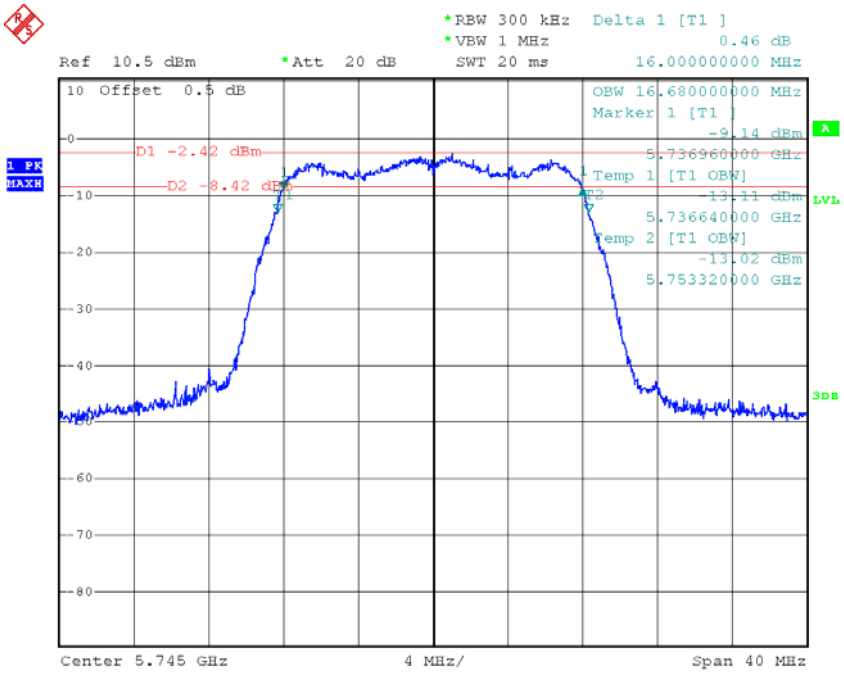
Test Result: Pass.

Please refer to the following tables and plots.

Test mode: Transmitting

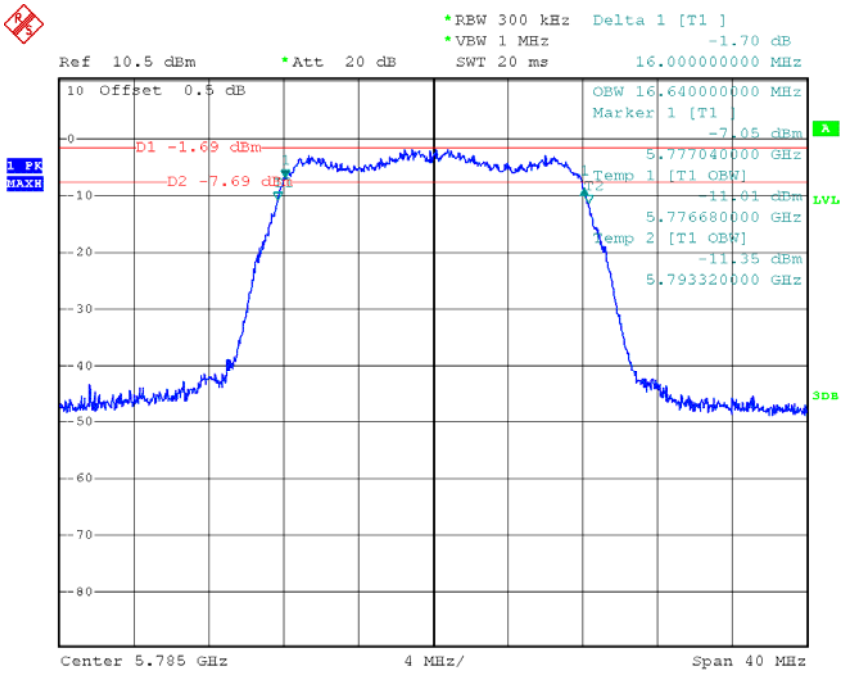
Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Limit (KHz)
802.11a mode			
Low	5745	16.00	>500
Middle	5785	16.00	>500
High	5825	16.00	>500
chain 0:802.11n20 mode			
Low	5745	17.24	>500
Middle	5785	17.24	>500
High	5825	17.28	>500
chain 0:802.11n40 mode			
Low	5755	36.16	>500
High	5795	36.48	>500
chain 1:802.11n20 mode			
Low	5745	17.2	>500
Middle	5785	17.36	>500
High	5825	17.28	>500
chain 1:802.11n40 mode			
Low	5755	36.32	>500
High	5795	36.50	>500

802.11a Low Channel



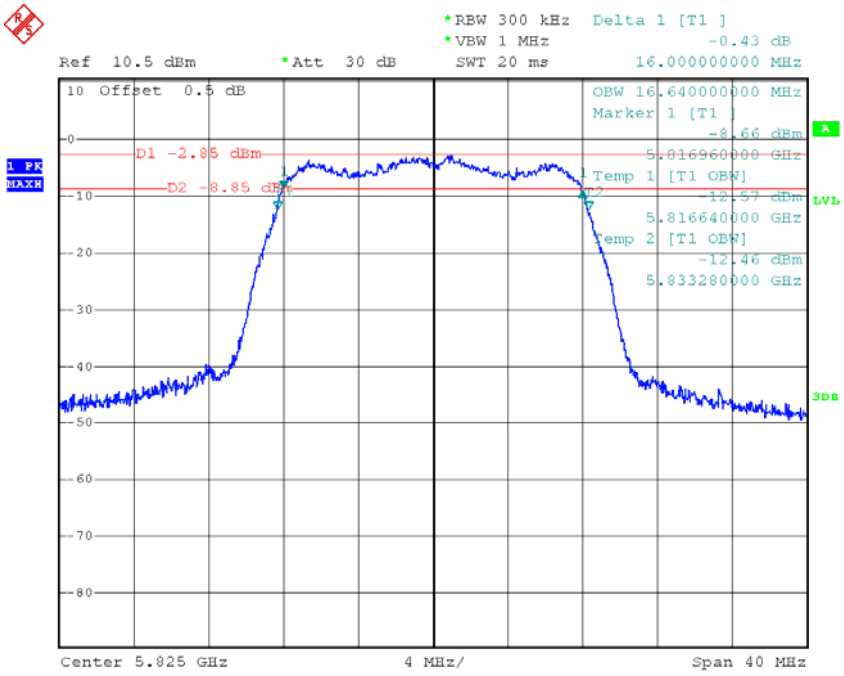
Date: 20.JUL.2012 17:33:13

802.11a Middle Channel



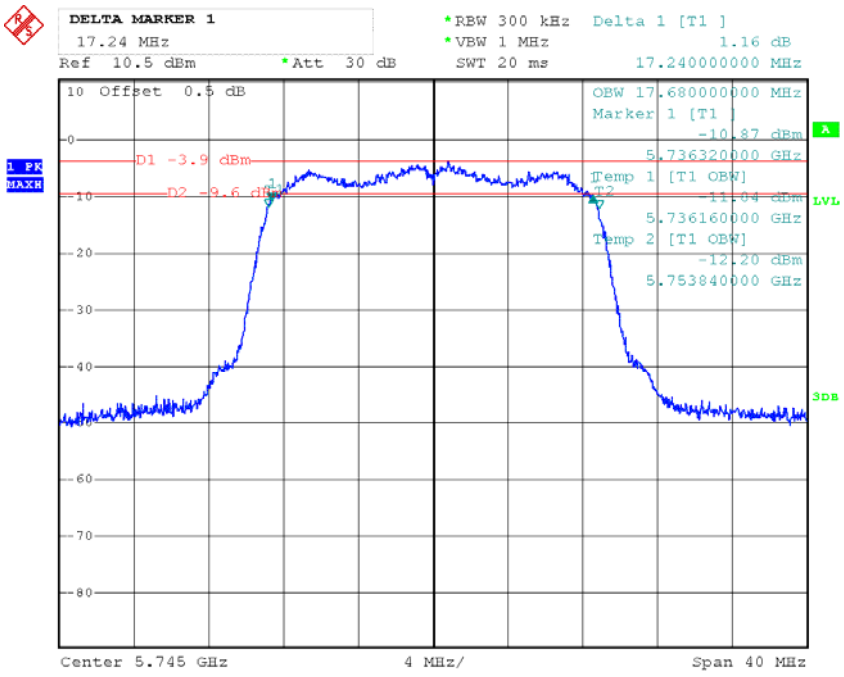
Date: 20.JUL.2012 17:45:36

802.11a High Channel



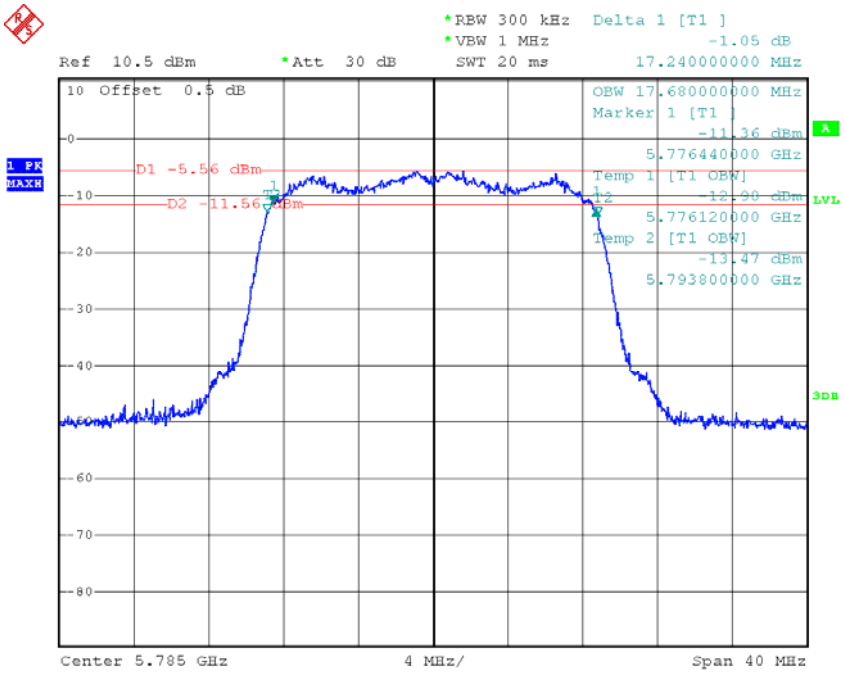
Date: 20.JUL.2012 17:56:41

Chain 0:802.11n20 Low Channel



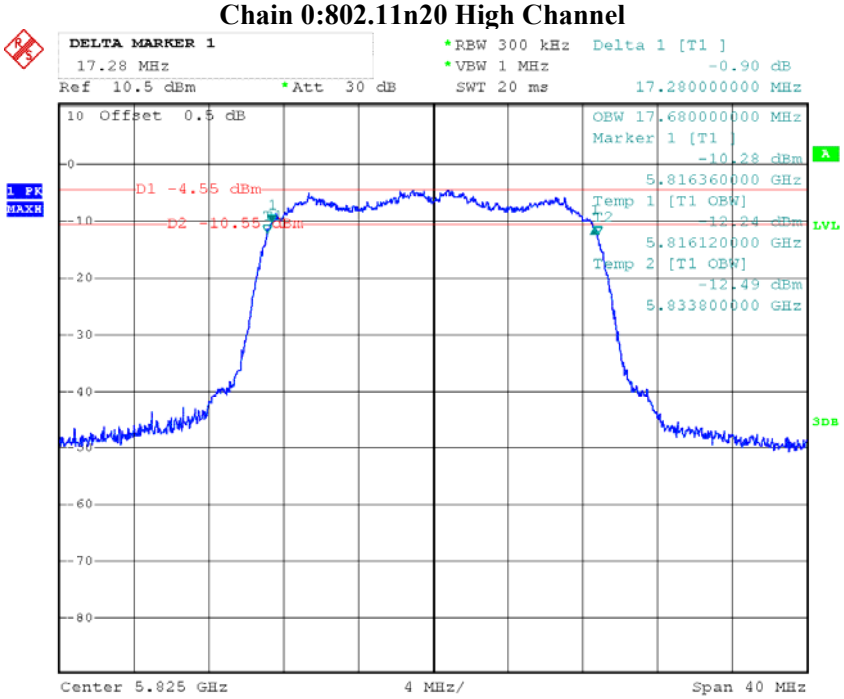
Date: 20.JUL.2012 19:02:11

Chain 0:802.11n20 Middle Channel



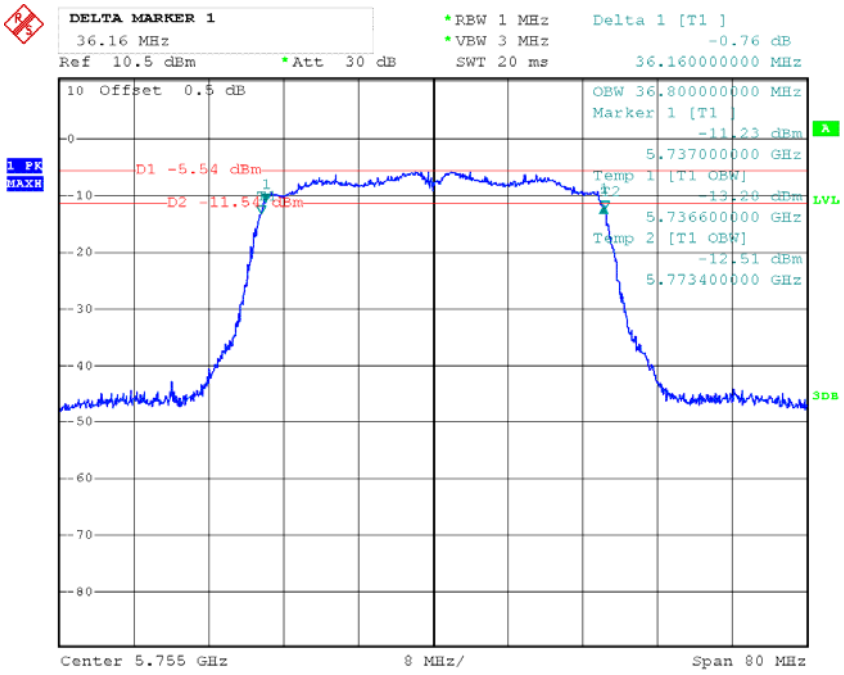
Date: 20.JUL.2012 19:09:44

Chain 0:802.11n20 High Channel



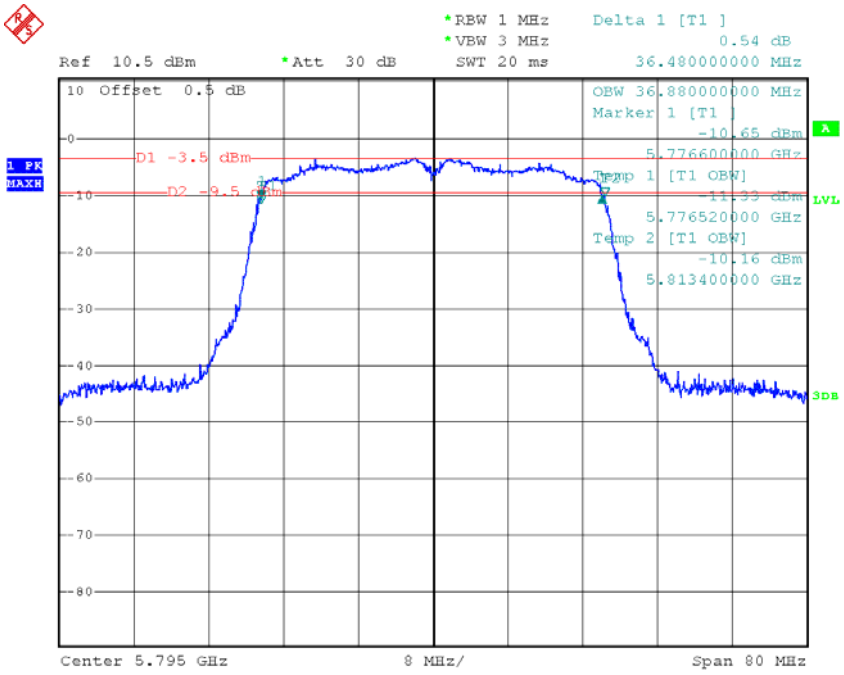
Date: 20.JUL.2012 19:16:42

Chain 0:802.11n40 Low Channel



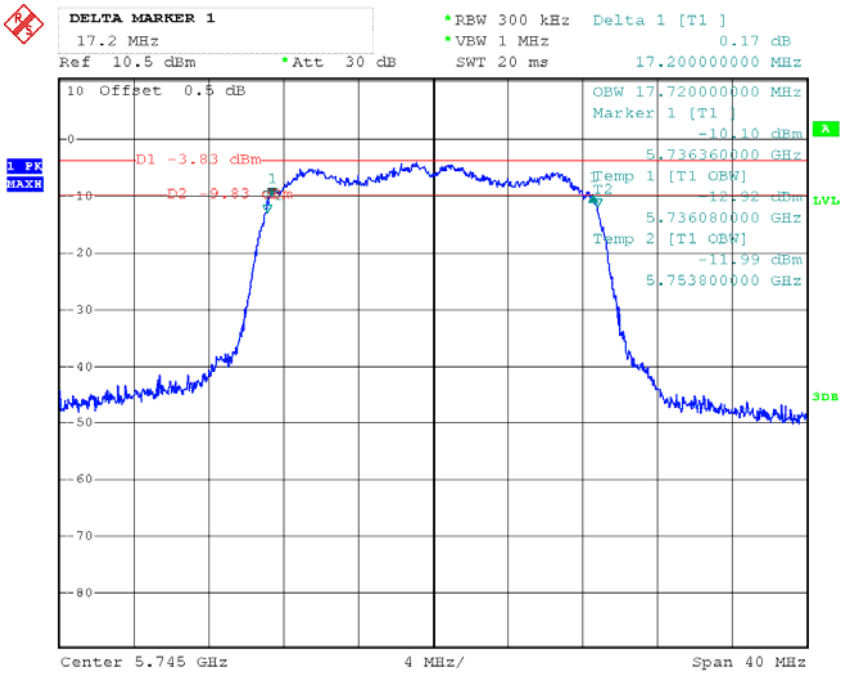
Date: 20.JUL.2012 19:35:30

Chain 0:802.11n40 High Channel



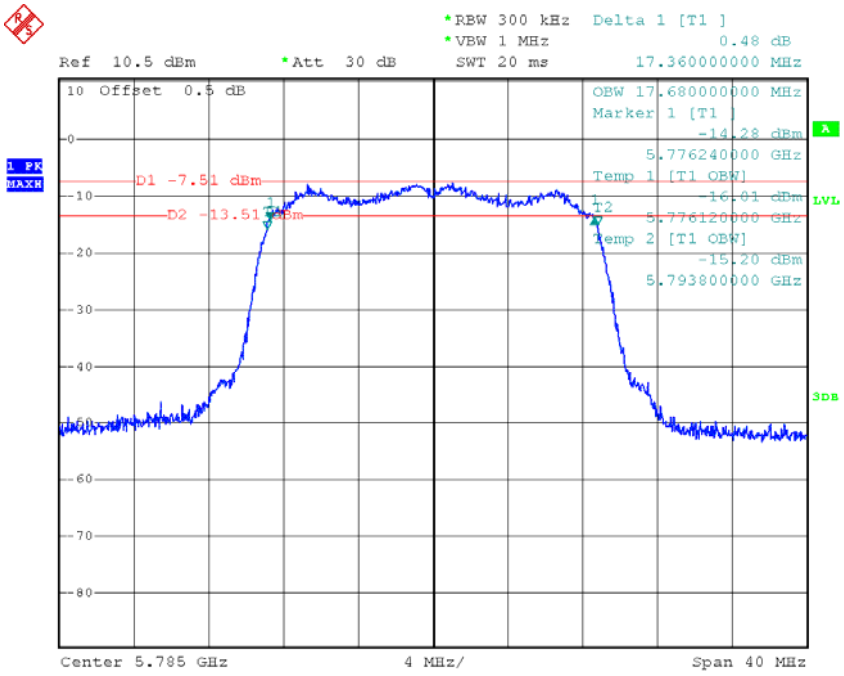
Date: 20.JUL.2012 19:43:29

Chain 1:802.11n20 Low Channel



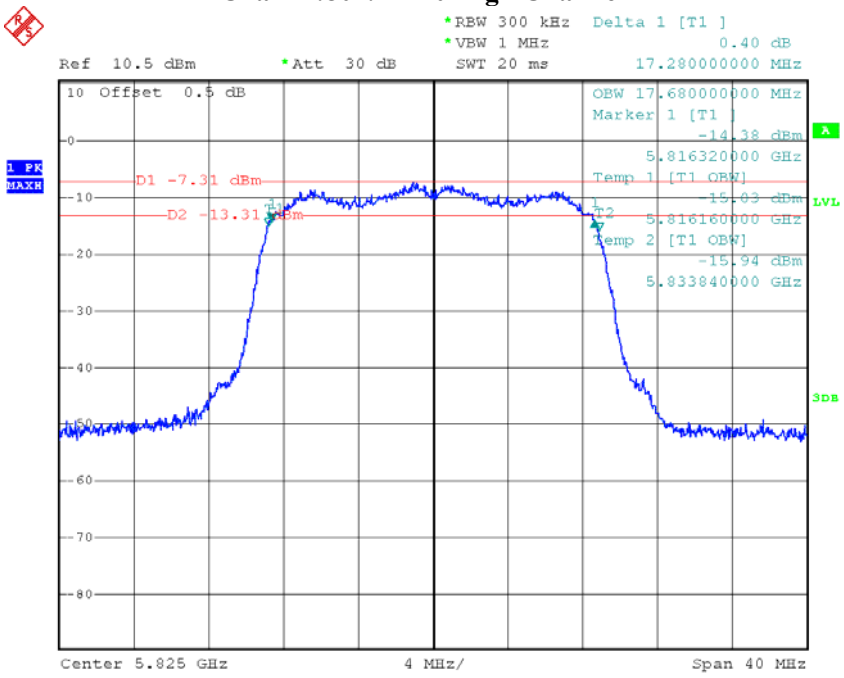
Date: 20.JUL.2012 22:03:03

Chain 1:802.11n20 Middle Channel



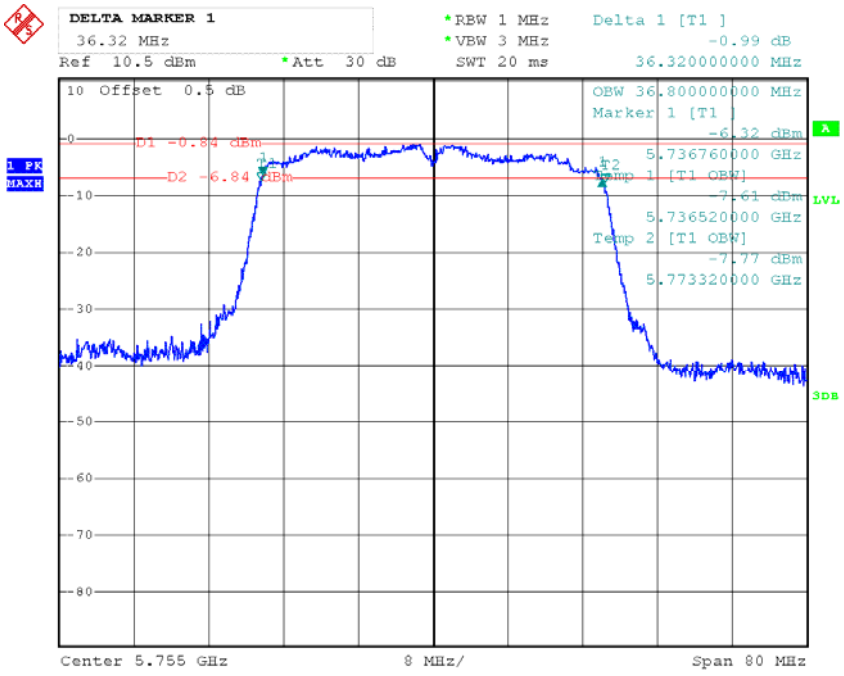
Date: 20.JUL.2012 22:11:38

Chain 1:802.11n20 High Channel



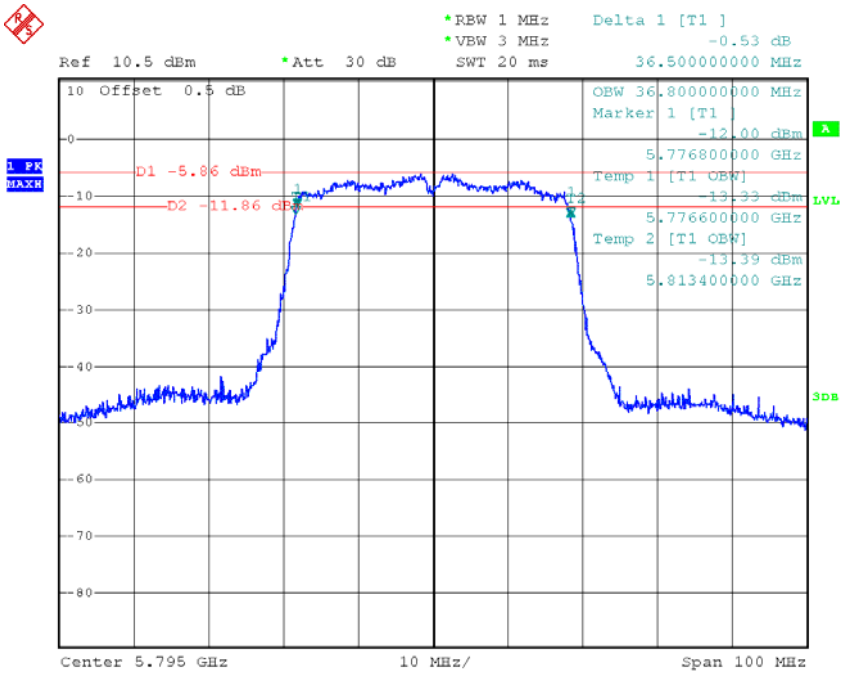
Date: 20.JUL.2012 22:15:37

Chain 1:802.11n40 Low Channel



Date: 20.JUL.2012 22:24:52

Chain 1:802.11n40 High Channel



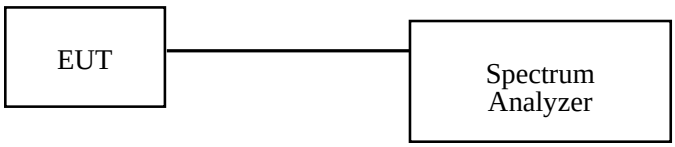
FCC §15.247(b) (3) - MAXIMUM PEAK OUTPUT POWER

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	100479	2012-05-27	2013-05-26

*** Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Dongguan) attests that all calibrations have been performed in accordance to NVLAP requirements, traceable to the NIST.

Test Data

Environmental Conditions

Temperature:	25 ° C
Relative Humidity:	48 %
ATM Pressure:	100.0 kPa

The testing was performed by Ares Liu on 2012-07-20.

Test Mode: Transmitting

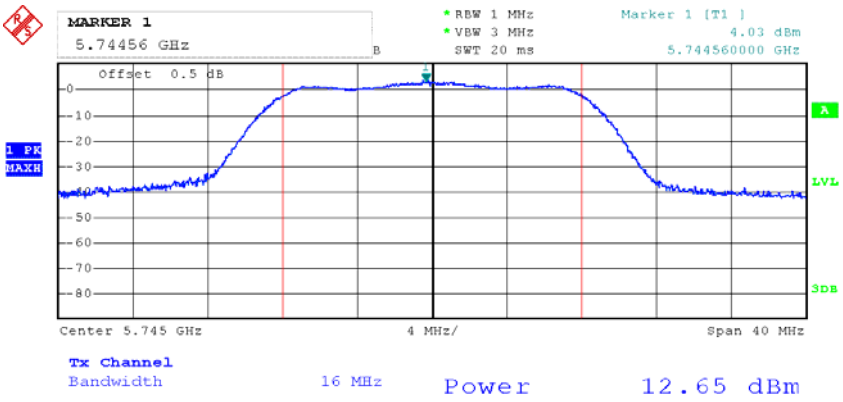
Channel	Frequency	Conducted Output Power	Limit	Result
	(MHz)	(dBm)	(dBm)	
802.11a mode				
Low	5745	12.65	30	PASS
Middle	5785	12.75	30	PASS
High	5825	12.09	30	PASS
chain 0:802.11n20 mode				
Low	5745	9.66	30	PASS
Middle	5785	9.54	30	PASS
High	5825	8.57	30	PASS
chain 1:802.11n20 mode				
Low	5745	9.8	30	PASS
Middle	5785	9.06	30	PASS
High	5825	8.27	30	PASS
chain 0:802.11n40 mode				
Low	5755	9.04	30	PASS
High	5795	9.49	30	PASS
chain 1:802.11n40 mode				
Low	5755	9.46	30	PASS
High	5795	9.01	30	PASS

Total power of 802.11n: chain 0+ chain 1

Channel	Frequency	Conducted Output Power	Limit	Result
	(MHz)	(dBm)	(dBm)	
Total:802.11n20 mode				
Low	5745	12.74	30	PASS
Middle	5785	12.32	30	PASS
High	5825	11.43	30	PASS
Total:802.11n40 mode				
Low	5755	12.27	30	PASS
High	5795	12.27	30	PASS

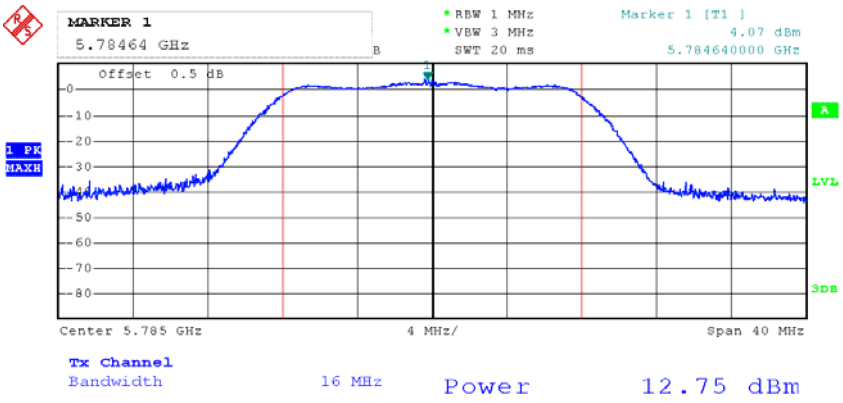
Note: MIMO technology only for 802.11n.

802.11a RF Output Power, Low Channel



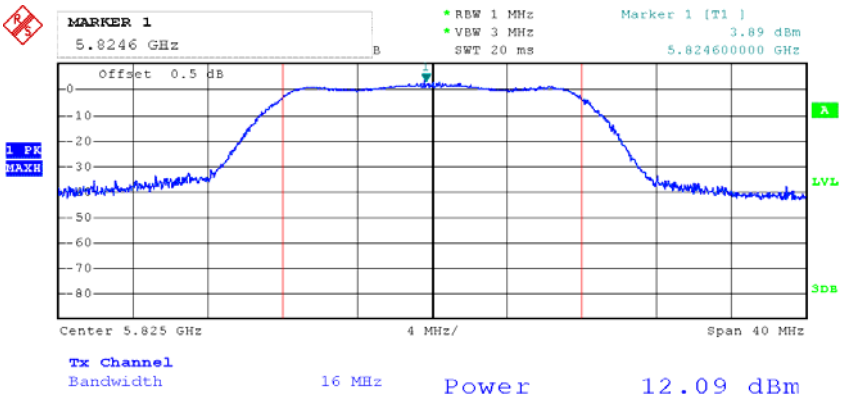
Date: 20.JUL.2012 17:35:37

802.11a RF Output Power, Middle Channel



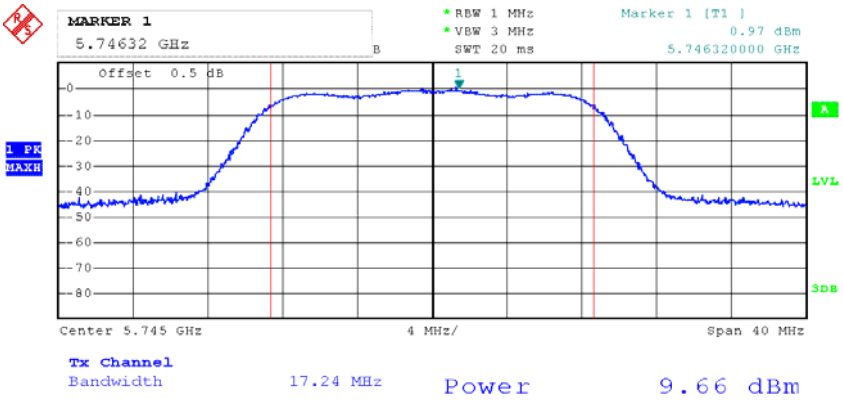
Date: 20.JUL.2012 17:46:56

802.11a RF Output Power, High Channel



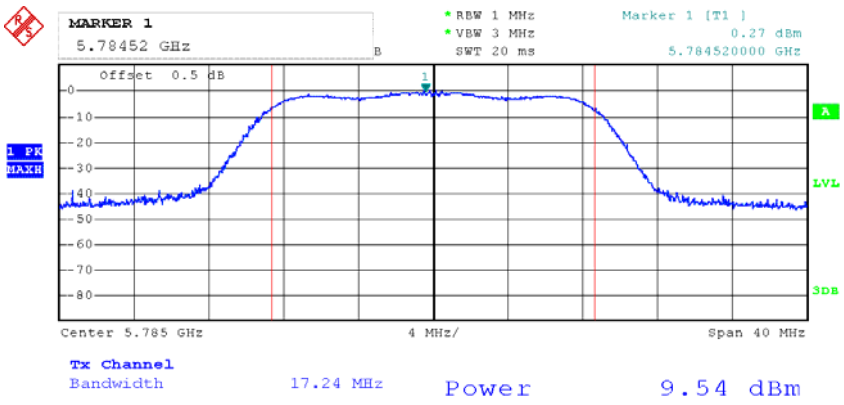
Date: 20.JUL.2012 17:55:17

Chain 0:802.11n20 RF Output Power, Low Channel



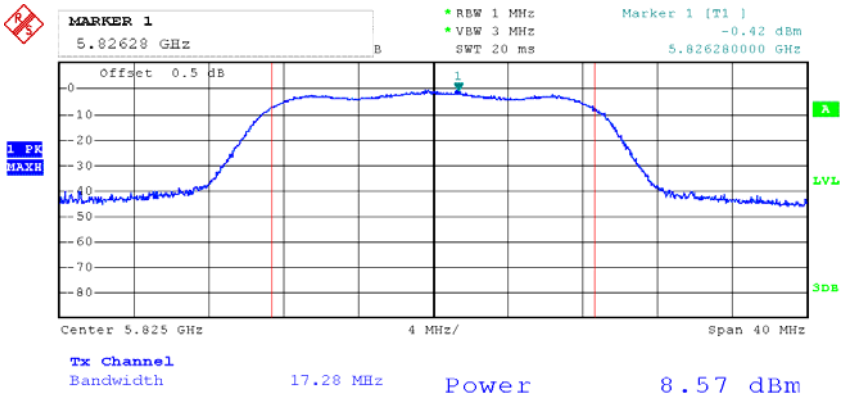
Date: 20.JUL.2012 19:03:35

Chain 0:802.11n20 RF Output Power, Middle Channel



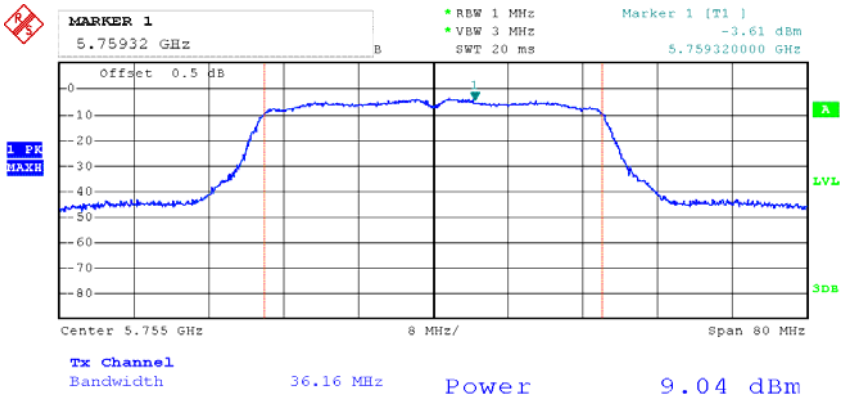
Date: 20.JUL.2012 19:10:42

Chain 0:802.11n20 RF Output Power, High Channel



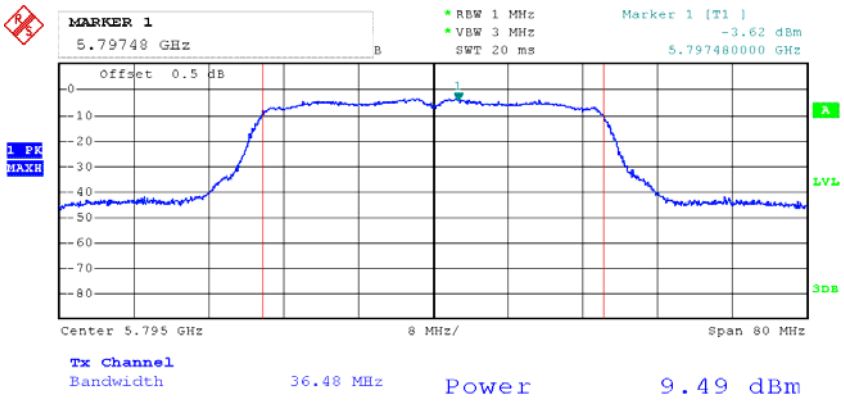
Date: 20.JUL.2012 19:18:22

Chain 0:802.11n40 RF Output Power, Low Channel



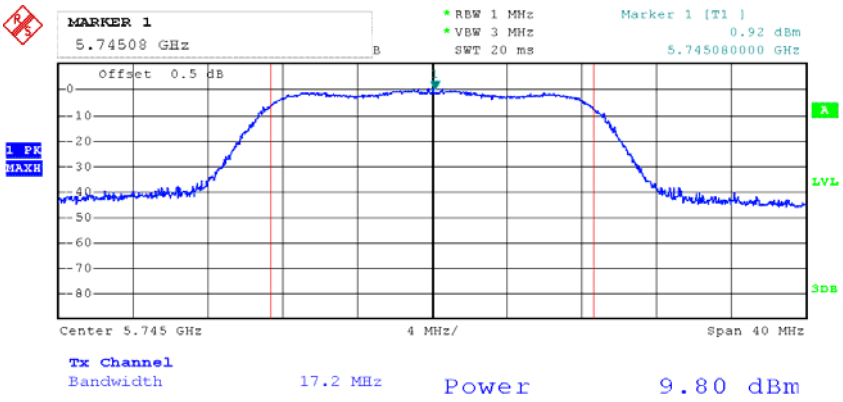
Date: 20.JUL.2012 19:36:51

Chain 0:802.11n40 RF Output Power, High Channel



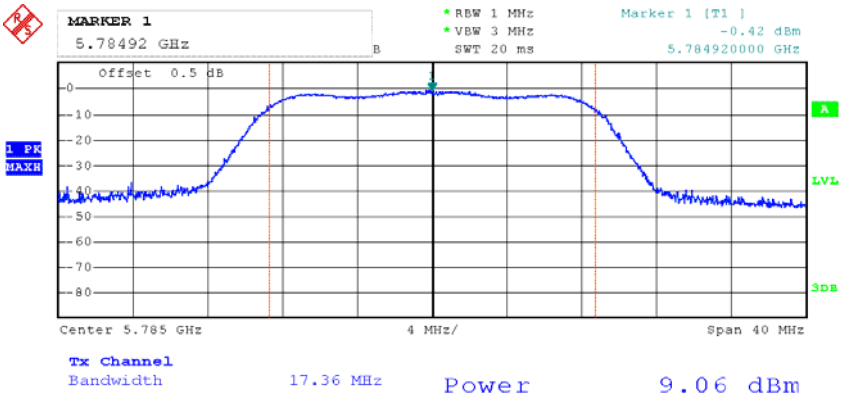
Date: 20.JUL.2012 19:44:08

Chain 1:802.11n20 RF Output Power, Low Channel



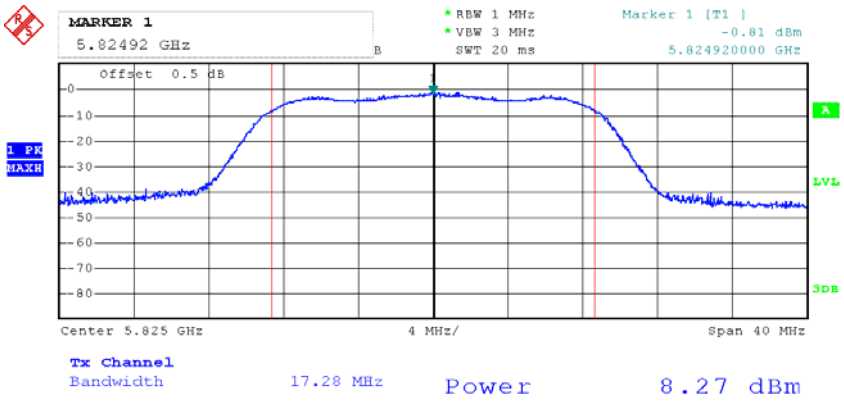
Date: 20.JUL.2012 22:05:37

Chain 1:802.11n20 RF Output Power, Middle Channel



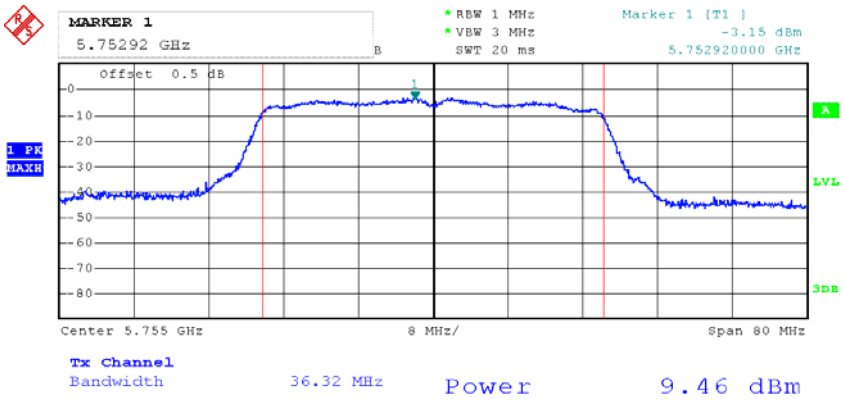
Date: 20.JUL.2012 22:13:21

Chain 1:802.11n20 RF Output Power, High Channel



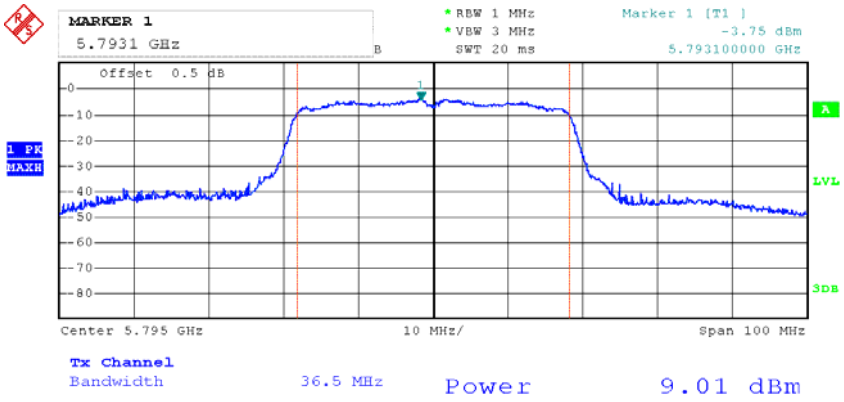
Date: 20.JUL.2012 22:17:23

Chain 1:802.11n40 RF Output Power, Low Channel



Date: 20.JUL.2012 22:27:01

Chain 1:802.11n40 RF Output Power, High Channel



Date: 20.JUL.2012 22:38:28

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	100479	2012-05-27	2013-05-26

*** Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Dongguan) attests that all calibrations have been performed in accordance to NVLAP requirements, traceable to the NIST.

Test Data

Environmental Conditions

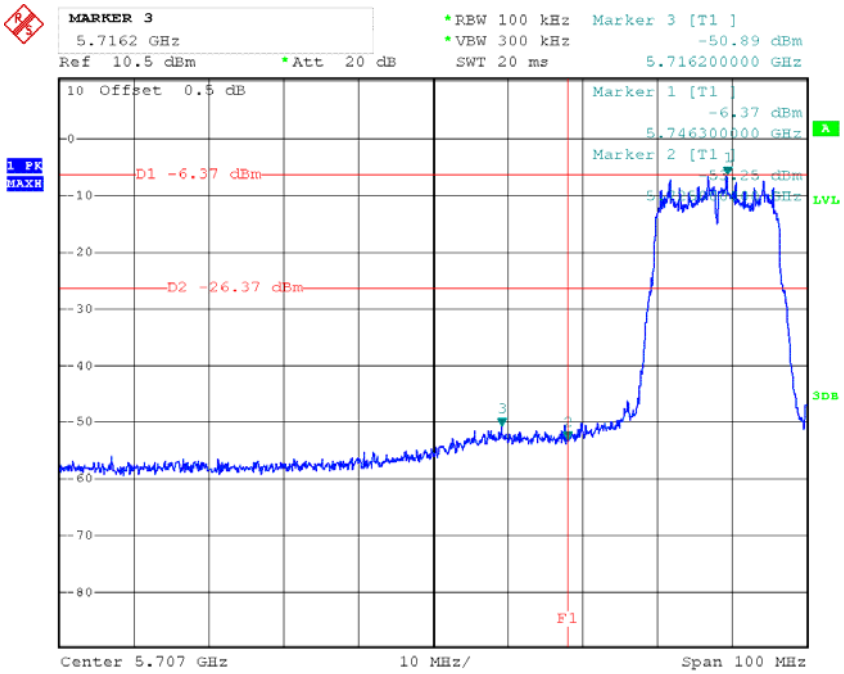
Temperature:	25 ° C
Relative Humidity:	48 %
ATM Pressure:	100.0 kPa

The testing was performed by Ares Liu on 2012-07-20.

Test Result: *Compliance*

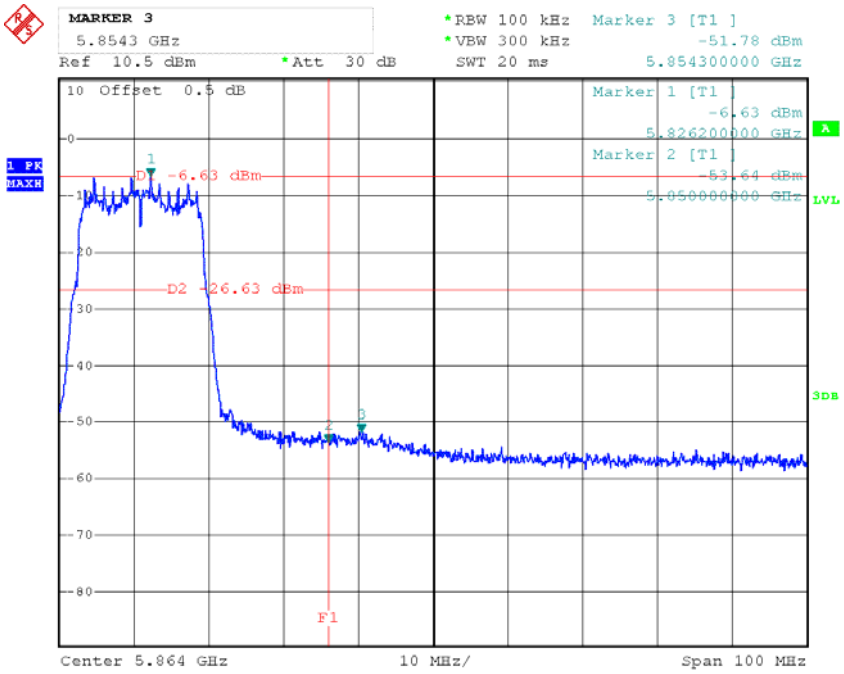
Test mode: Transmitting

Left Band Edge (802.11a mode)



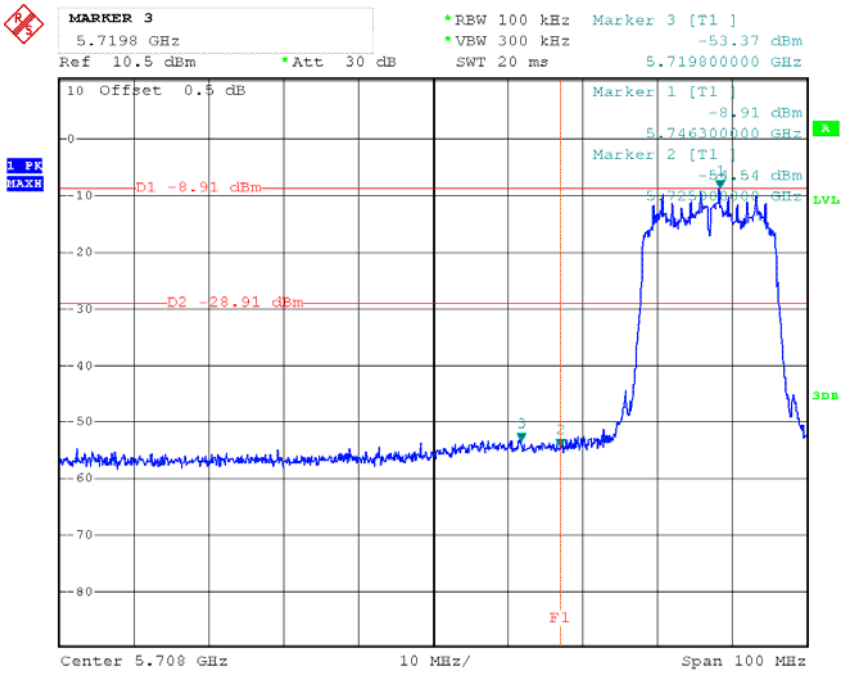
Date: 20.JUL.2012 17:41:59

Right Band Edge (802.11a mode)



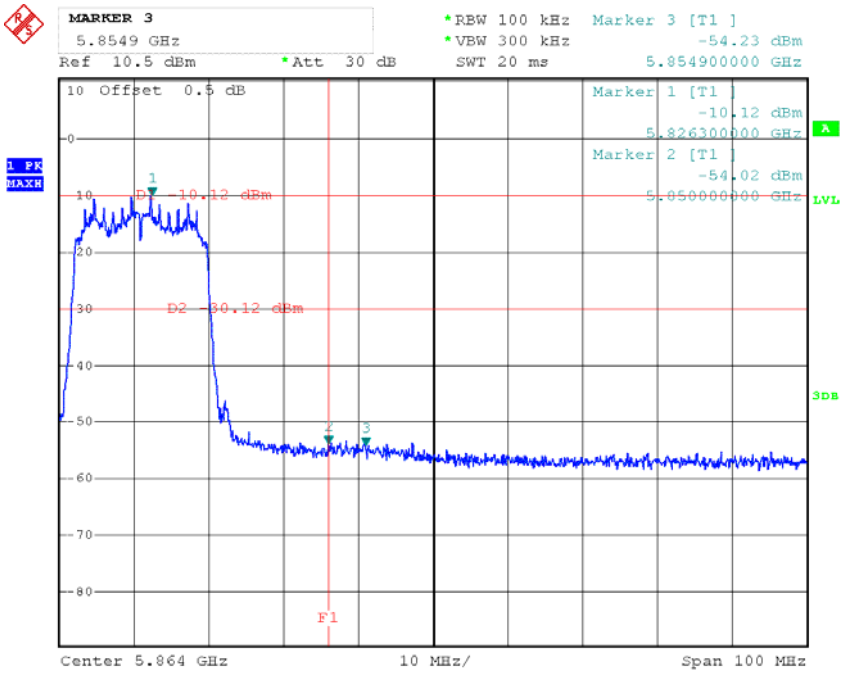
Date: 20.JUL.2012 18:00:52

Chain 0:Left Band Edge (802.11n20 mode)



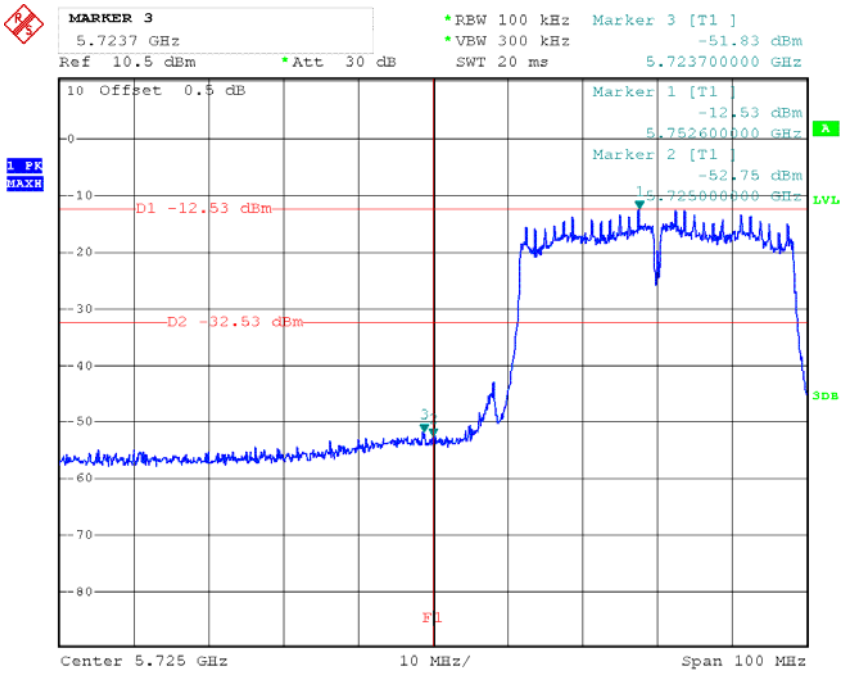
Date: 20.JUL.2012 19:07:15

Chain 0:Right Band Edge (802.11n20 mode)



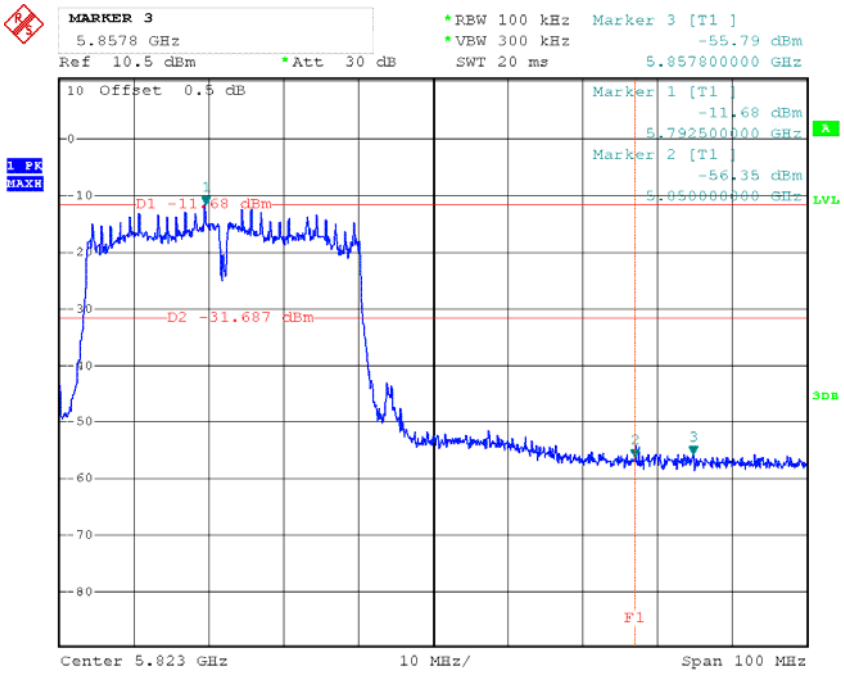
Date: 20.JUL.2012 19:21:39

Chain 0:Left Band Edge (802.11n40 mode)



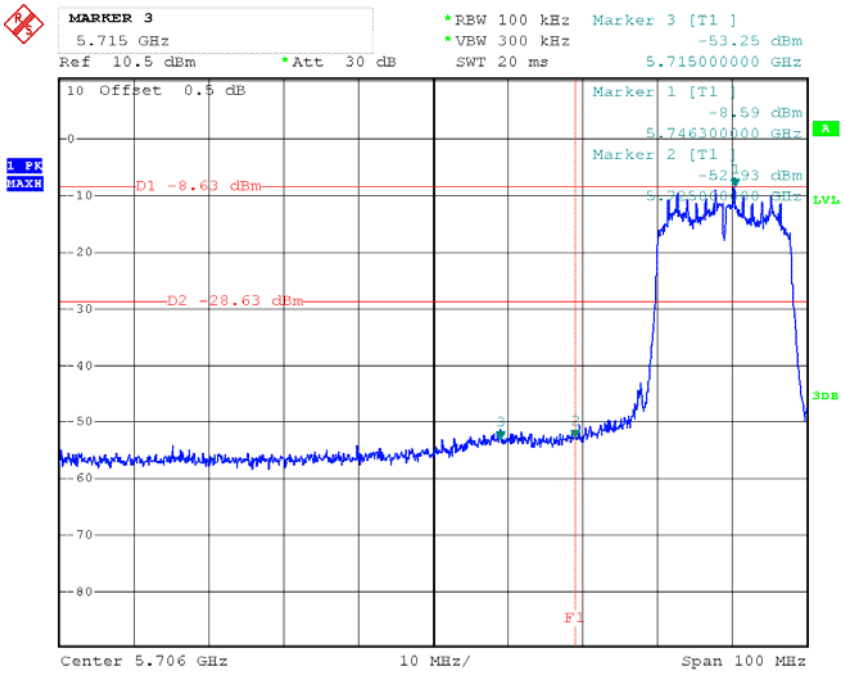
Date: 20.JUL.2012 19:41:41

Chain 0:Right Band Edge (802.11n40 mode)



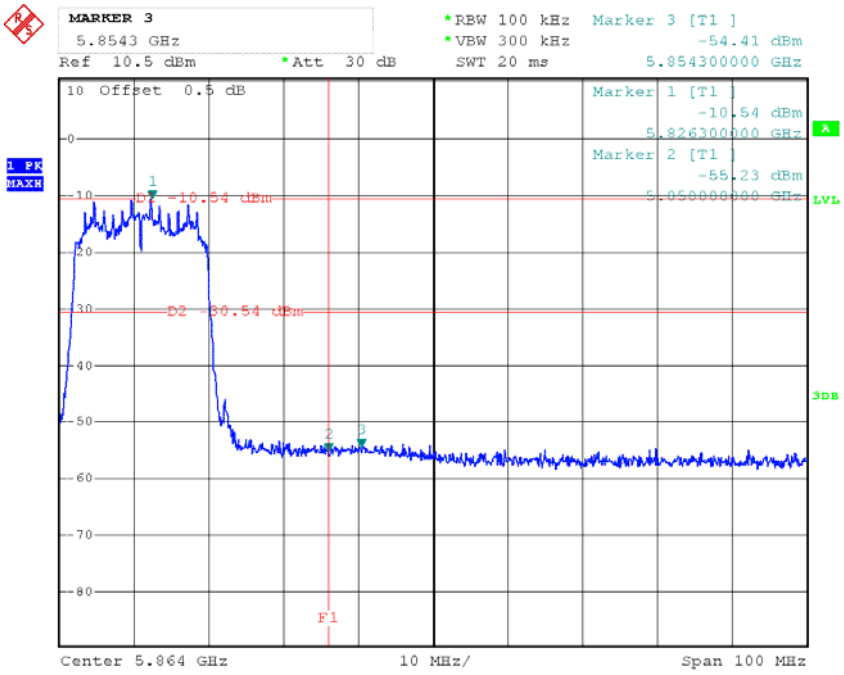
Date: 20.JUL.2012 19:46:29

Chain 1:Left Band Edge (802.11n20 mode)



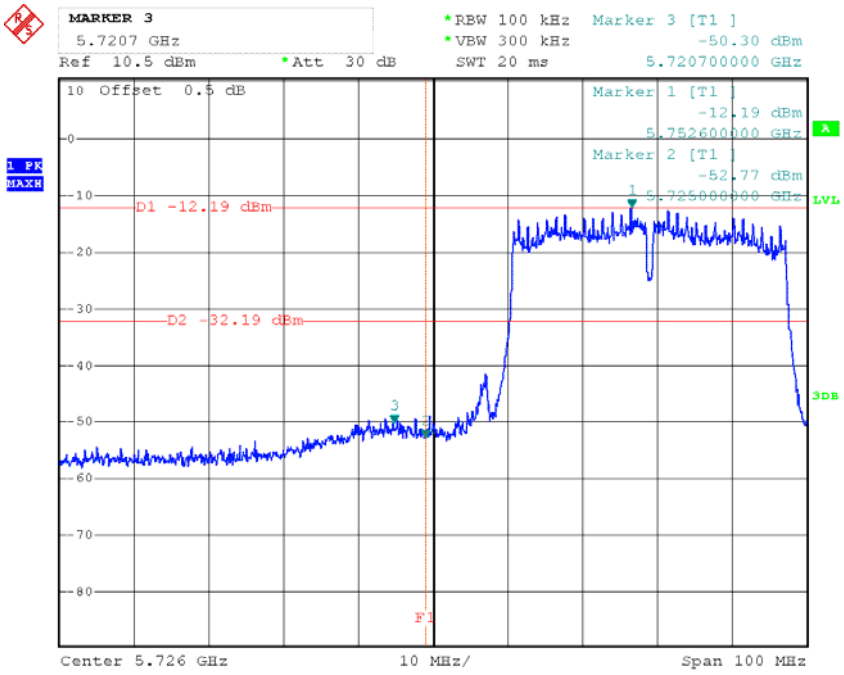
Date: 20.JUL.2012 22:09:35

Chain 1:Right Band Edge (802.11n20 mode)



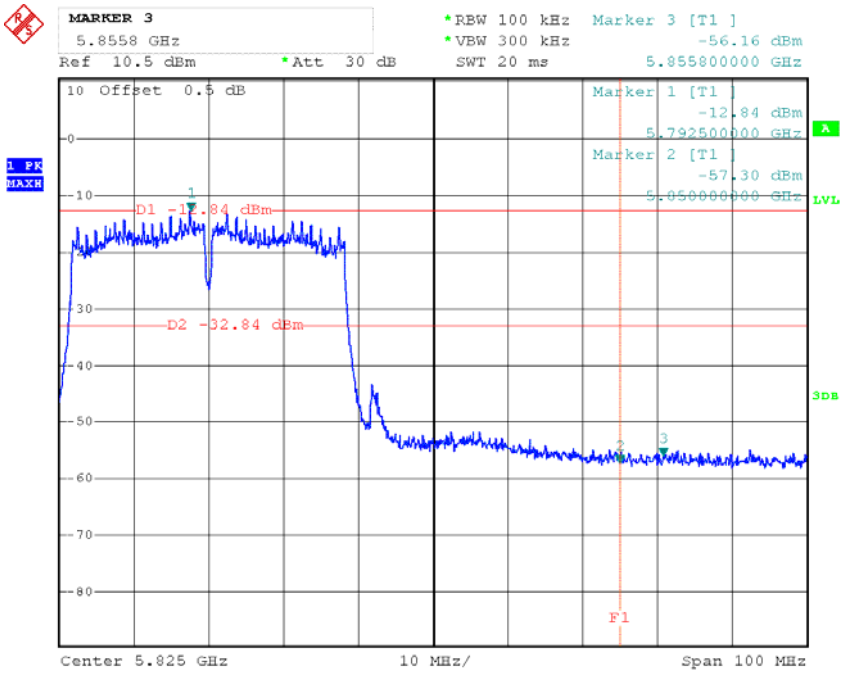
Date: 20.JUL.2012 22:20:37

Chain 1:Left Band Edge (802.11n40 mode)



Date: 20.JUL.2012 22:30:08

Chain 1:Right Band Edge (802.11n40 mode)



Date: 20.JUL.2012 22:41:42

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 ≥ 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 = 10log (3 kHz/100 kHz = -15.2 dB).

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	Spectrum Analyzer	FSP38	100479	2012-05-27	2013-05-26

*** Statement of Traceability:** Bay Area Compliance Lab Corp. (Dongguan) attests that all calibrations have been performed in accordance to NVLAP requirements, traceable to the NIST.

Test Data

Environmental Conditions

Temperature:	25 ° C
Relative Humidity:	48 %
ATM Pressure:	100.0 kPa

The testing was performed by Ares Liu on 2012-07-20.

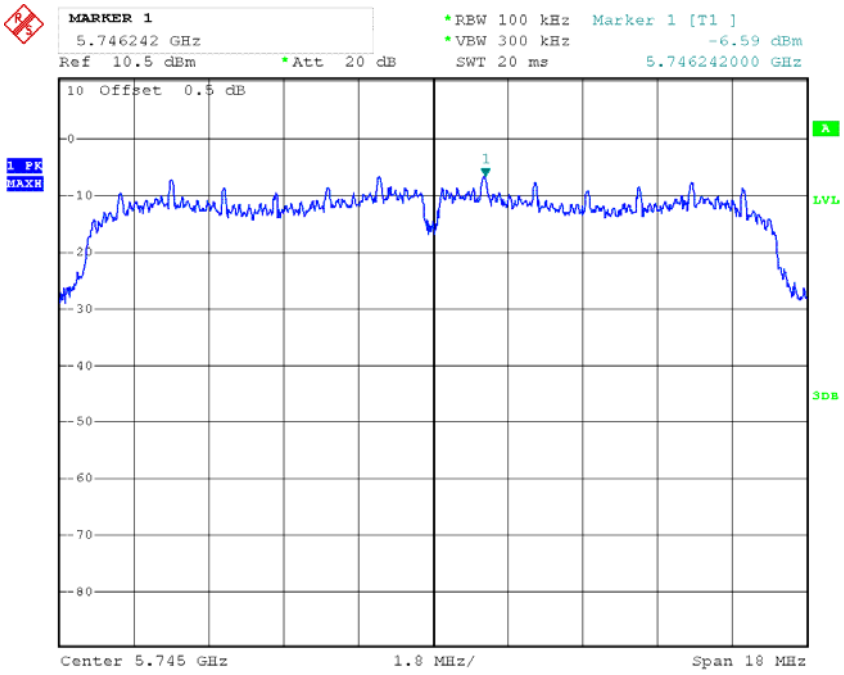
Test Mode: Transmitting

Test Result: Pass

Test mode: Transmitting

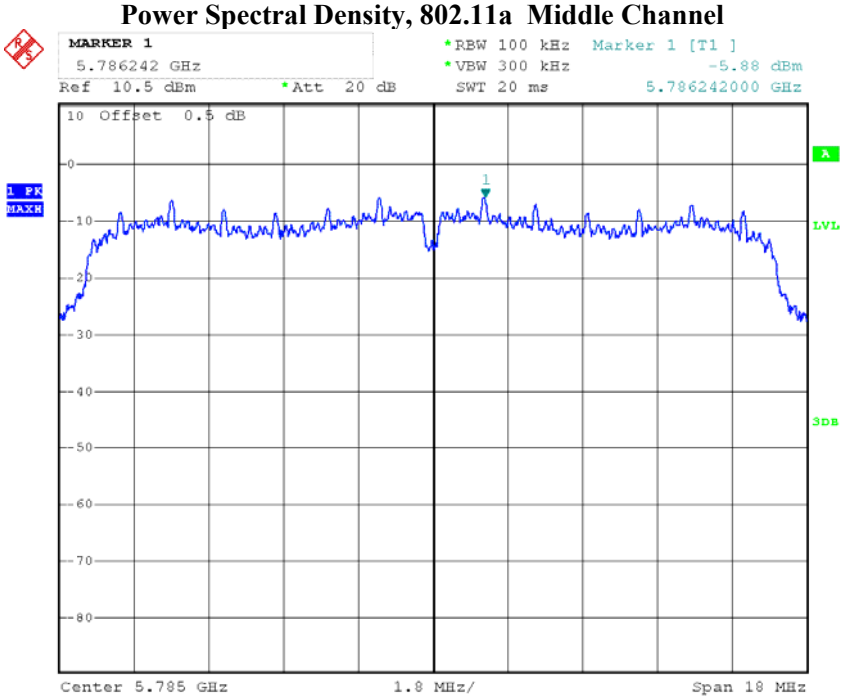
Channel	Reading Level (dBm/100kHz)	PSD (dBm/3kHz)	Limit (dBm/3kHz)	Result
802.11a mode				
Low	-6.59	-21.79	8	PASS
Middle	-5.88	-21.08	8	PASS
High	-6.48	-21.68	8	PASS
Chain 0:802.11n20 mode				
Low	-9.09	-24.29	8	PASS
Middle	-9.06	-24.26	8	PASS
High	-10.27	-25.47	8	PASS
Chain 1:802.11n20 mode				
Low	-8.89	-24.09	8	PASS
Middle	-9.64	-24.84	8	PASS
High	-10.75	-25.95	8	PASS
Chain 0:802.11n40 mode				
Low	-12.4	-27.6	8	PASS
High	-12.06	-27.26	8	PASS
Chain 1:802.11n40 mode				
Low	-12.18	-27.38	8	PASS
High	-12.78	-27.98	8	PASS

Power Spectral Density, 802.11a Low Channel



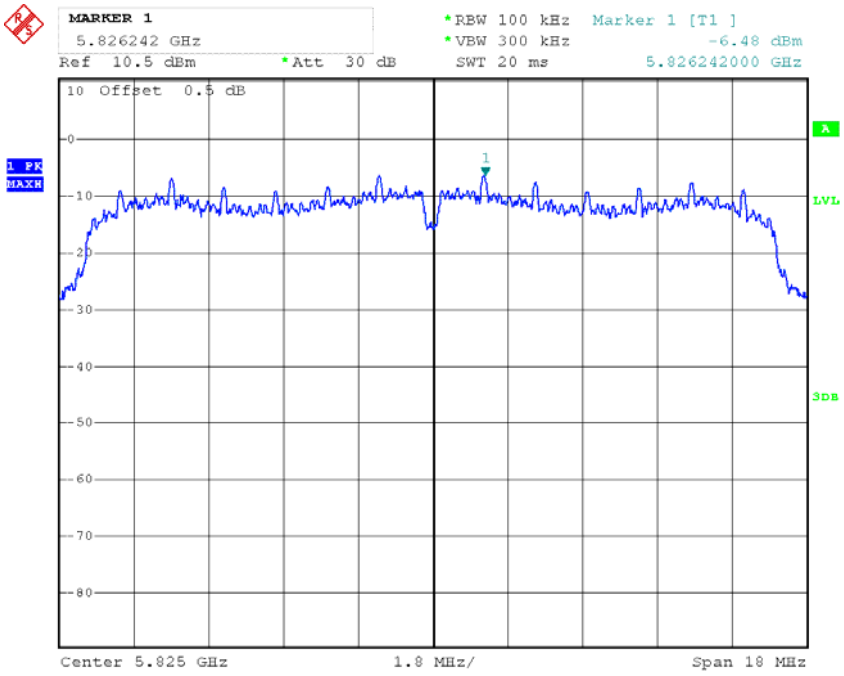
Date: 20.JUL.2012 17:38:23

Power Spectral Density, 802.11a Middle Channel



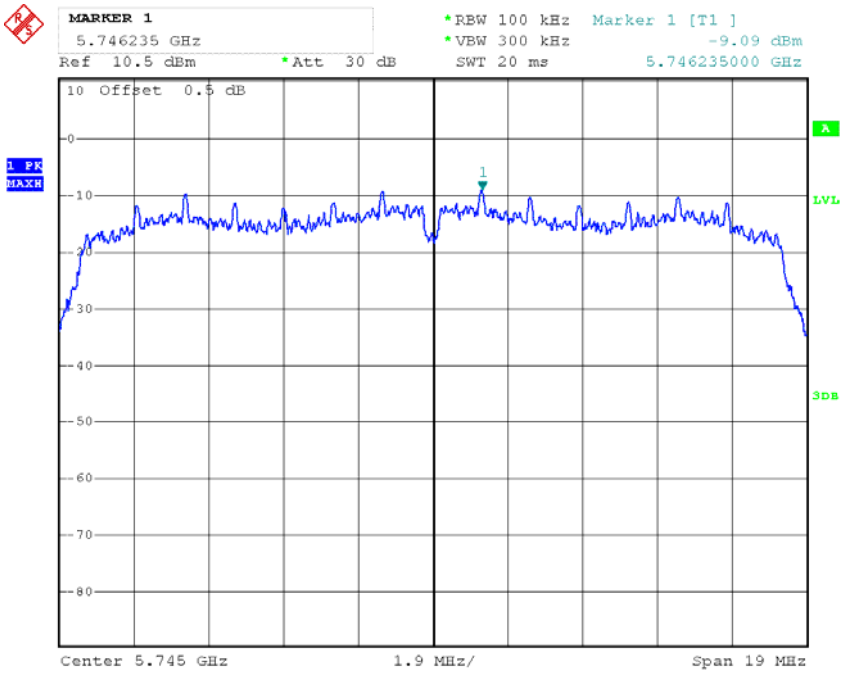
Date: 20.JUL.2012 17:47:40

Power Spectral Density, 802.11a High Channel



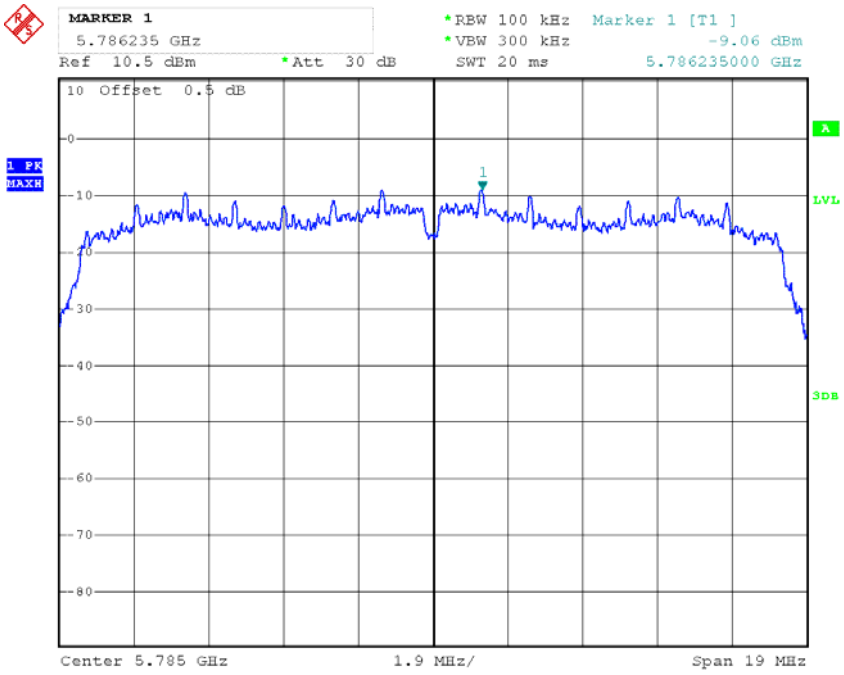
Date: 20.JUL.2012 17:57:36

Chain 0:Power Spectral Density, 802.11 n20 Low Channel



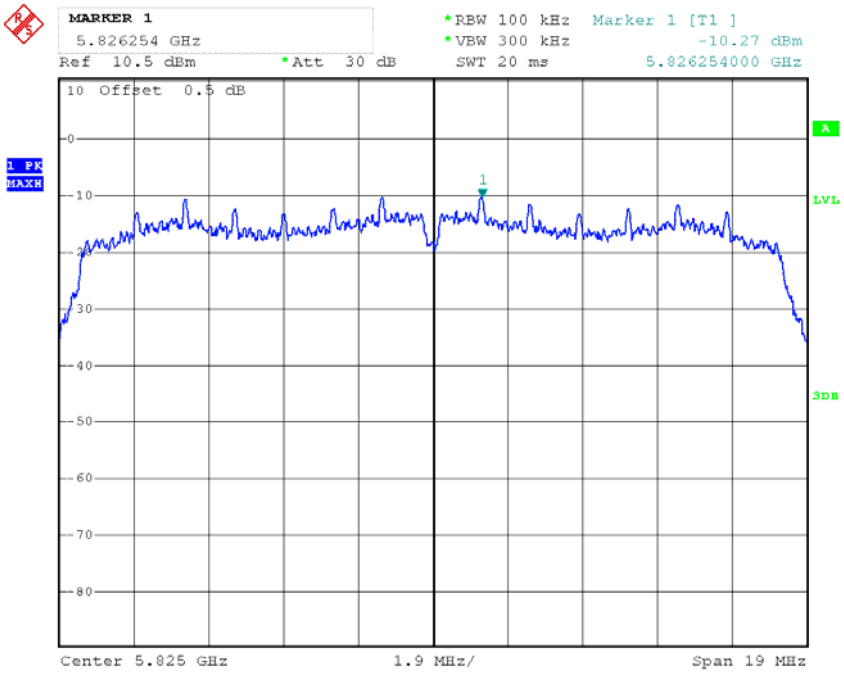
Date: 20.JUL.2012 19:04:28

Chain 0:Power Spectral Density, 802.11n20 Middle Channel



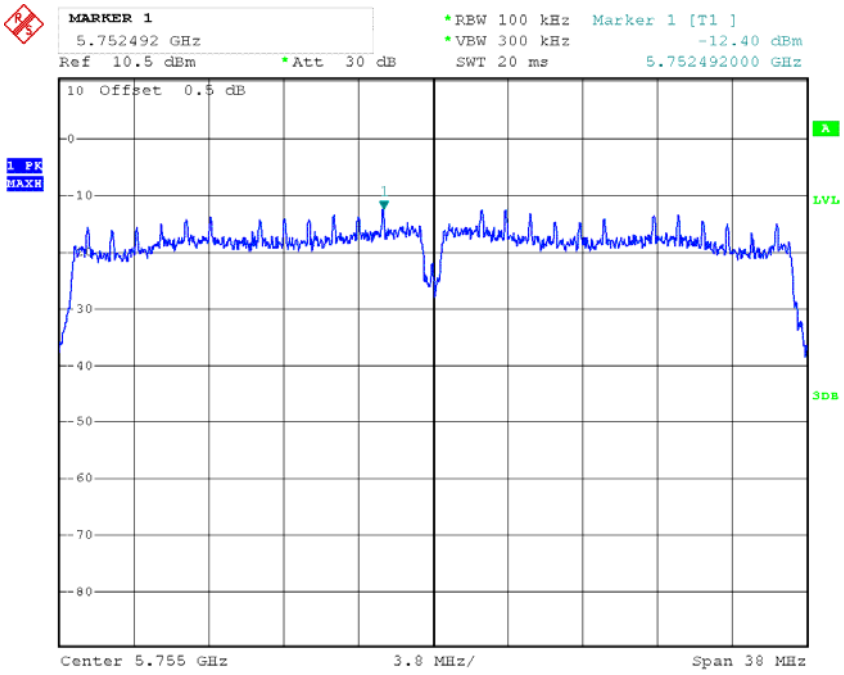
Date: 20.JUL.2012 19:11:49

Chain 0:Power Spectral Density, 802.11n20 High Channel



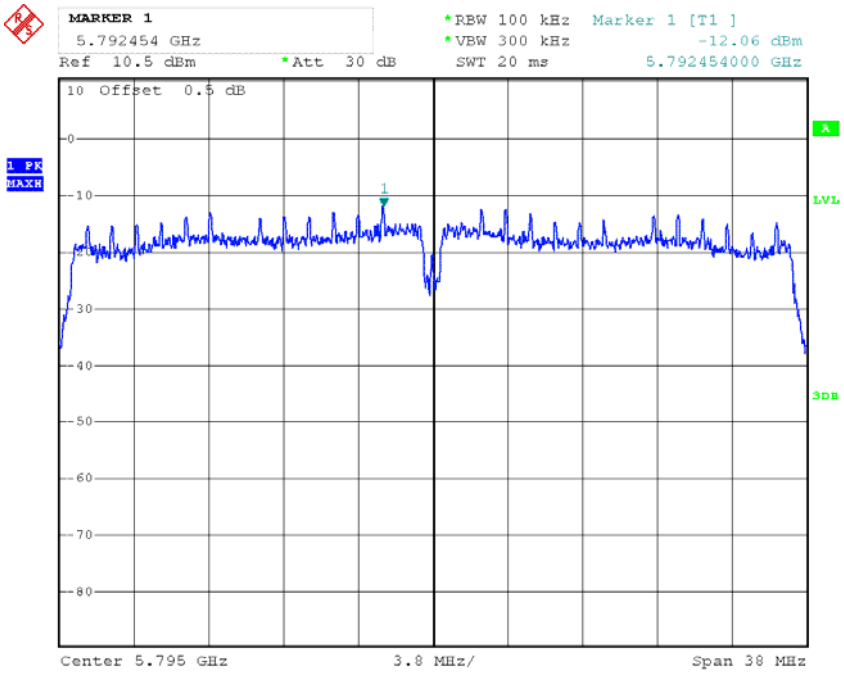
Date: 20.JUL.2012 19:18:51

Chain 0:Power Spectral Density, 802.11n40 Low Channel



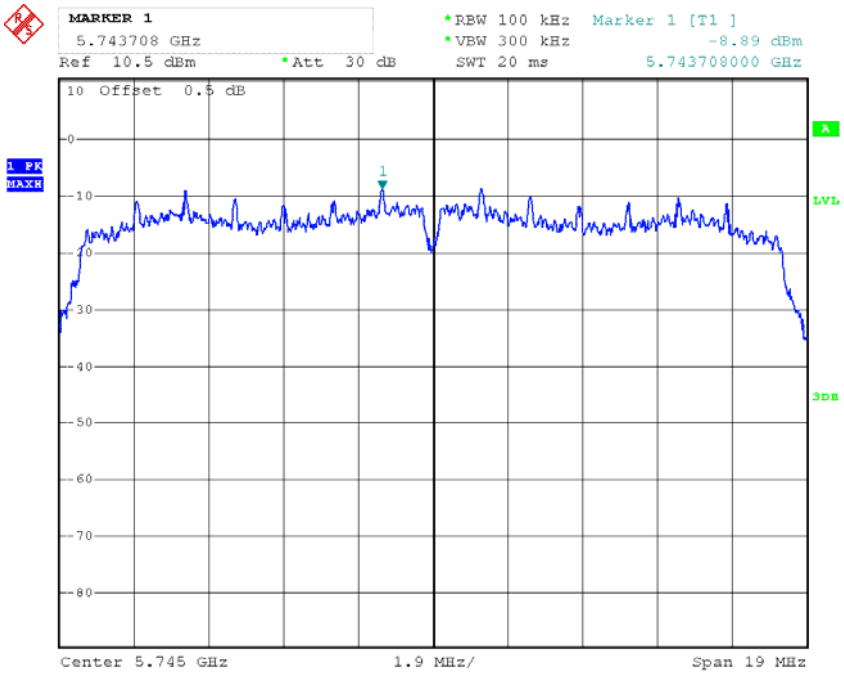
Date: 20.JUL.2012 19:38:27

Chain 0:Power Spectral Density, 802.11n40 High Channel



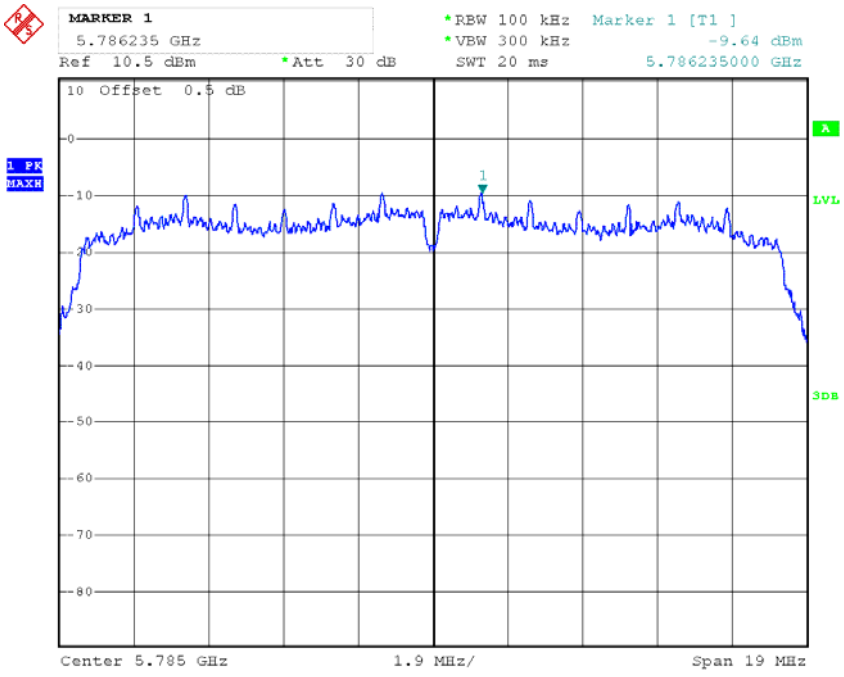
Date: 20.JUL.2012 19:44:40

Chain 1:Power Spectral Density, 802.11 n20 Low Channel



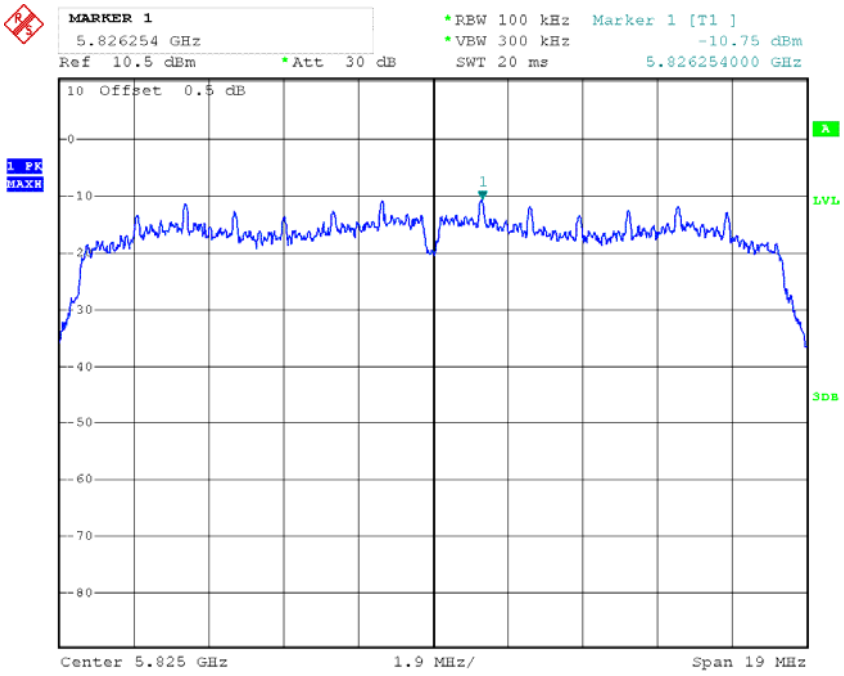
Date: 20.JUL.2012 22:06:47

Chain 1:Power Spectral Density, 802.11n20 Middle Channel



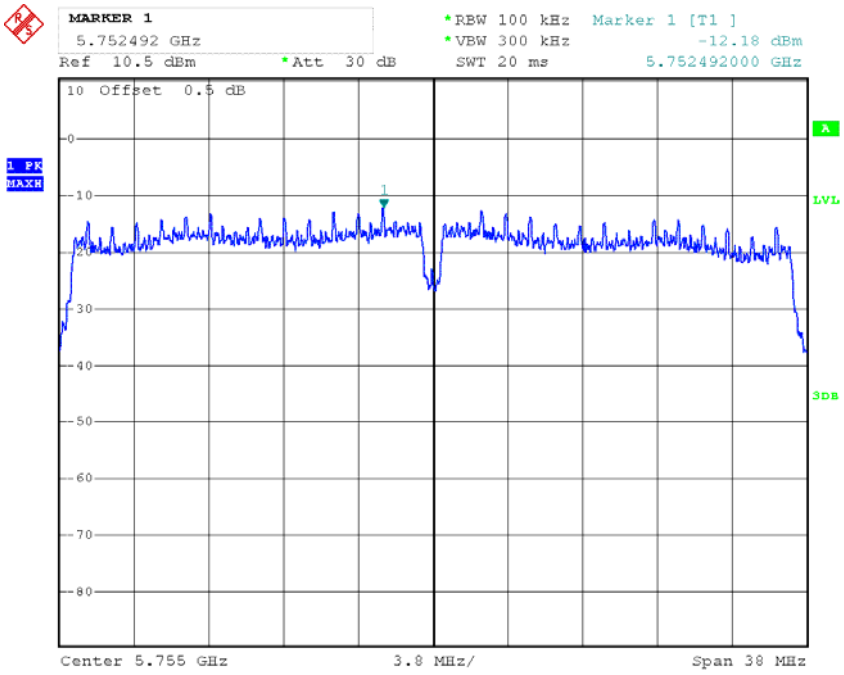
Date: 20.JUL.2012 22:13:54

Chain 1:Power Spectral Density, 802.11n20 High Channel



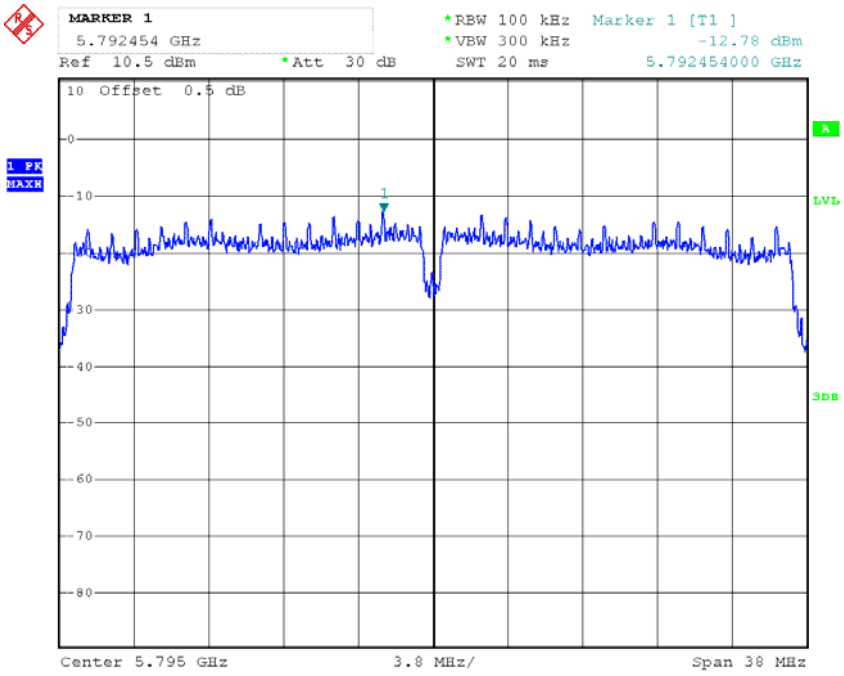
Date: 20.JUL.2012 22:17:52

Chain 1:Power Spectral Density, 802.11n40 Low Channel



Date: 20.JUL.2012 22:27:44

Chain 1:Power Spectral Density, 802.11n40 High Channel



Date: 20.JUL.2012 22:39:07

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