Lab Code: 200707-0

FCC PART 15.247

TEST REPORT

For

ALFA NETWORK INC.

4F-1, No. 106 Rueiguang Rd., Neihu District, Taipei City, Taiwan. R.O.C.

FCC ID: UQ29280

Report Type:	**Product Type:**
Original Report	802.11an Long-Range AP/CPE

Test Engineer:	Ares Liu
Report Number:	R1DG120228003-00A Rev. A
Report Date:	2012-05-07
Reviewed By:	Ivan Cao EMC Engineer
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DOCUMENT REVISION HISTORY

Revision Number	Report Number	Description of Revision	Date of Revision
0	R1DG120228003-00A	Original Report	2012-04-28
Rev. A	R1DG120228003-00A	Updated HT40 data	2012-05-07

GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

The *ALFA NETWORK Inc.*'s product, model number: *N5,OAP2258XS,N5PCB,N5C,Solo-N5H,Solo-N5HC,AWAP02O-N5H,AWAP02O-N5HC,WLO-25814N,RP-WAC5330,NE-WAC5330,APE-5002A-P14,RA-N5001L,WCPEn-5000-OAA-DD (FCC ID: UQ29280)* ("EUT") in this report is a transmitter of 802.11an Long-Range AP/CPE, which was measured approximately:28.5 cm (L) x 9.0cm (W) x4.2cm (H), the operating frequency is 5150~5250MHz ,5725~5850MHz, rated input voltage: DC 18V from adapter.

Adapter information: Sunny
Model: SYS1308-2418-W2
Input: 100-240VAC, 50-60Hz
Output: 18V DC 1.0A

Note: The series product, model number: *N5,OAP2258XS,N5PCB,N5C,Solo-N5H,Solo-N5HC,AWAP02O-N5H,AWAP02O-N5HC,WLO-25814N,RP-WAC5330,NE-WAC5330,APE-5002A-P14,RA-N5001L,WCPEn-5000-OAA-DD are electrically identical, the difference between them is just the name, the details was explained in the attached declaration letter.*

** All measurement and test data in this report was gathered from production sample serial number: 1202283 (Assigned by BACL). The EUT was received on 2012-03-02.*

Objective

This report is prepared on behalf of *ALFA NETWORK Inc.* 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 15E NII submissions with FCC ID: UQ29280.

Test Methodology

All measurements contained in this report were conducted with ANSI C63.4-2009, American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the range of 9 kHz to 40 GHz.

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

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 5G 802.11a and 802.11n20 mode, 4 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.

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

EUT Exercise Software

The test was performed under “cmd.exe”

Equipment Modifications

No modification was made to the EUT tested.

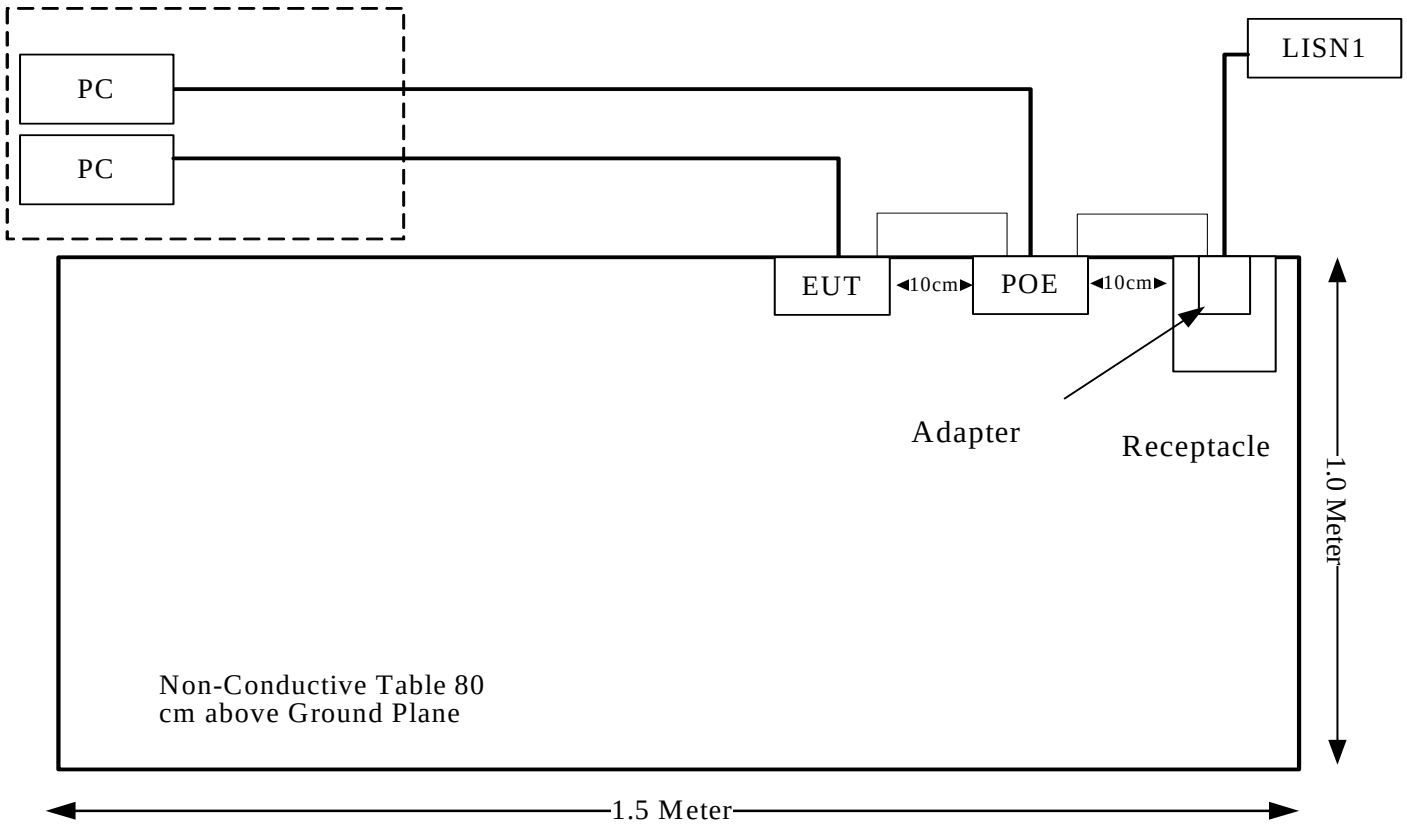
Remote Support Equipment

Manufacturer	Description	Model	Serial Number
DELL	PC	DCNE	CK2Z891
DELL	PC	DCNE	CK2Z677

External Cable

Cable Description	Length (m)	From/Port	To
Un shielded detachable RJ45 cable	1	EUT	Adapter
Un shielded detachable RJ45 cable	10	EUT	PC
Un shielded detachable RJ45 cable	10	POE	PC
Unshielded Power cable	1.8	Adapter	POE

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.

MPE Calculation

Predication of MPE limit at a given distance

$$S = PG/4\pi R^2$$

S = 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);

MPE Results

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	5745	11	12.5893	16.19	41.59	20	0.10422	1.0
802.11n HT20	5745	11	12.5893	18.67	73.62	20	0.18448	1.0
802.11n HT40	5755	11	12.5893	18.45	69.98	20	0.17537	1.0

Result: The device meets FCC MPE at 20 cm distance

FCC §15.203 - ANTENNA REQUIREMENT

Applicable Standard

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

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

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

Antenna Connector Construction

The EUT has two integral antennas, which complied with 15.203, the maximum gain is 11.0 dBi, please refer to the internal photos.

Result: Compliance.

FCC §15.207 (a) – AC LINE CONDUCTED EMISSIONS

Applicable Standard

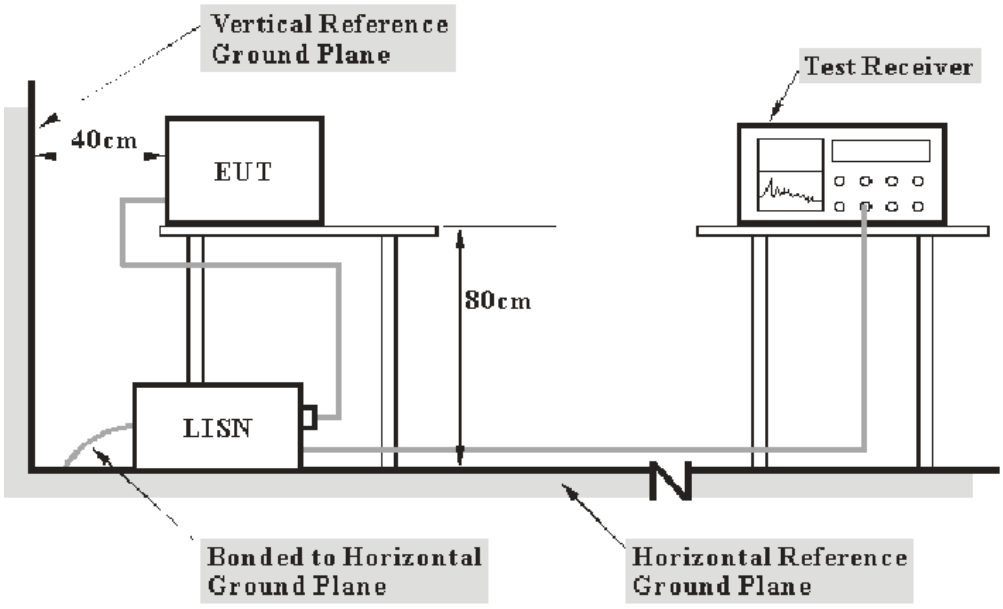
FCC §15.207

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. (Shenzhen) 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 Receiver	ESCS30	830245	2011-11-24	2012-11-23
Rohde & Schwarz	L.I.S.N.	ESH2-Z5	892107/021	2011-04-09	2012-04-08

*** Statement of Traceability:** Bay Area Compliance Laboratory Corp. (Shenzhen) 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:

7.33 dB at **0.200 MHz** in the **Neutral** conducted mode

Test Data

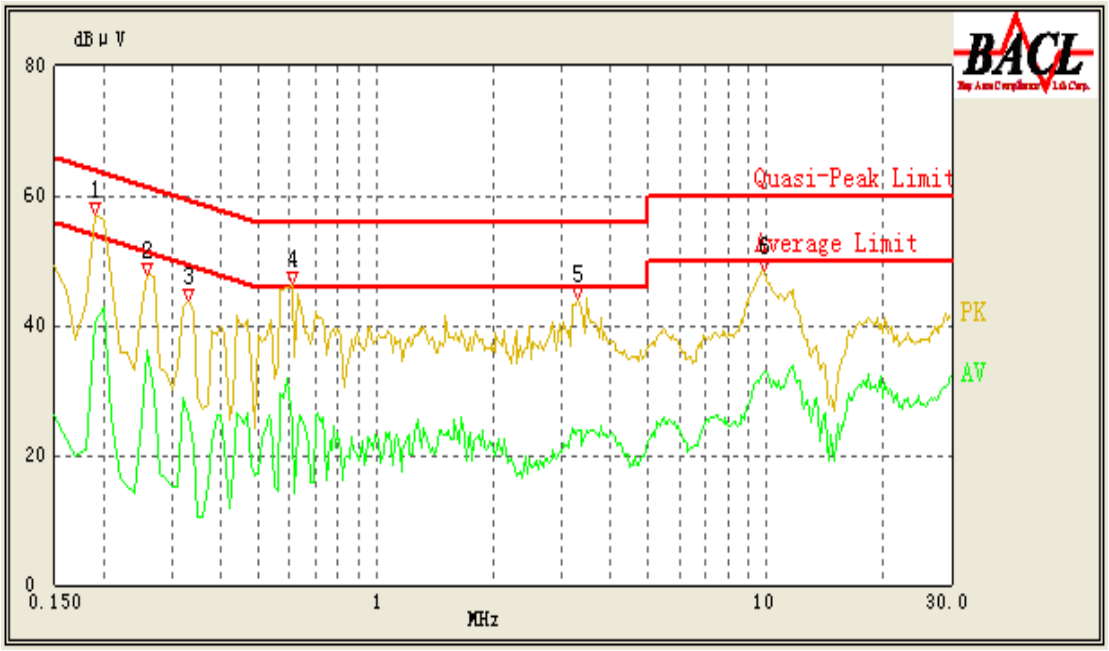
Environmental Conditions

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

The testing was performed by Ares Liu on 2012-03-08.

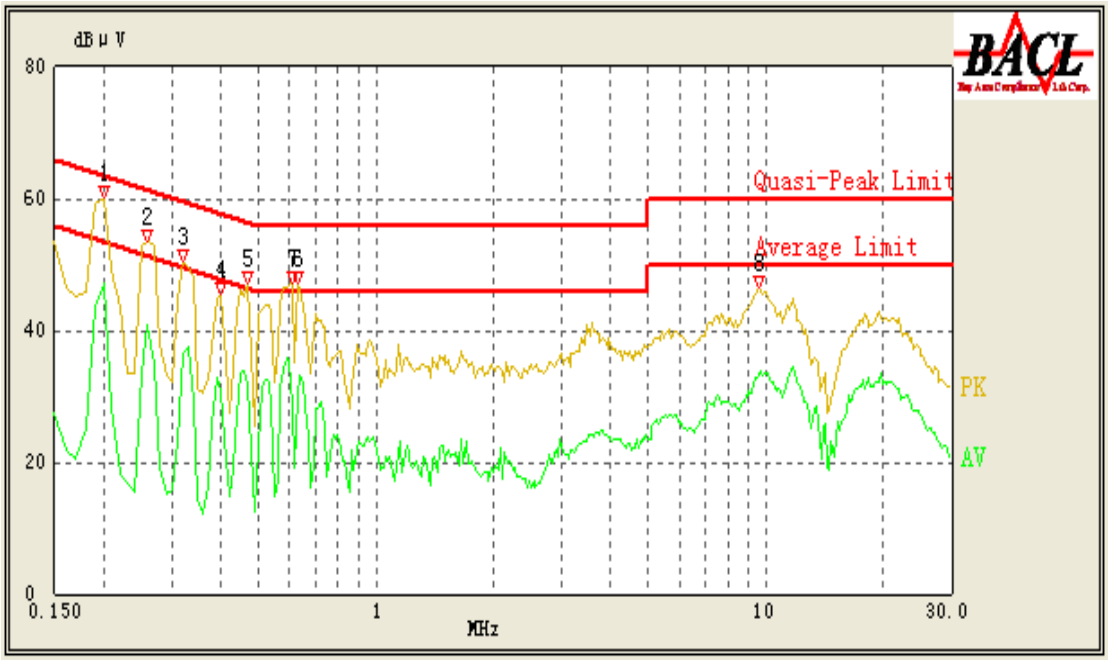
Test Mode: Transmitting

120 V, 60 Hz, Line:



Frequency (MHz)	Corrected Result (dBµV)	Correction Factor (dB)	Limit (dBµV)	Margin (dB)	Detector (PK/QP/Ave.)
0.19	54.88	1.1	64.86	9.98	QP
0.61	44.50	1.1	56.00	11.50	QP
0.19	40.51	1.1	54.86	14.35	Ave.
0.26	36.13	1.1	52.86	16.73	Ave.
9.94	32.67	1.1	50.00	17.33	Ave.
9.94	42.61	1.1	60.00	17.39	QP
0.26	45.33	1.1	62.86	17.53	QP
3.29	37.14	1.1	56.00	18.86	QP
0.33	40.07	1.1	60.86	20.79	QP
0.61	24.82	1.1	46.00	21.18	Ave.
3.29	23.73	1.1	46.00	22.27	Ave.
0.33	26.10	1.1	50.86	24.76	Ave.

120V, 60 Hz, Neutral:



Frequency (MHz)	Corrected Result (dBμV)	Correction Factor (dB)	Limit (dBμV)	Margin (dB)	Detector (PK /QP/Ave.)
0.20	47.24	1.1	54.57	7.33	Ave.
0.20	56.54	1.1	64.57	8.03	QP
0.63	44.70	1.1	56.00	11.30	QP
0.26	40.99	1.1	52.86	11.87	Ave.
0.26	49.86	1.1	62.86	13.00	QP
0.47	43.31	1.1	56.86	13.55	QP
0.32	36.40	1.1	51.14	14.74	Ave.
0.47	31.69	1.1	46.86	15.17	Ave.
0.32	45.74	1.1	61.14	15.40	QP
0.63	29.71	1.1	46.00	16.29	Ave.
0.40	41.22	1.1	58.86	17.64	QP
0.40	30.68	1.1	48.86	18.18	Ave.

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

Applicable Standard

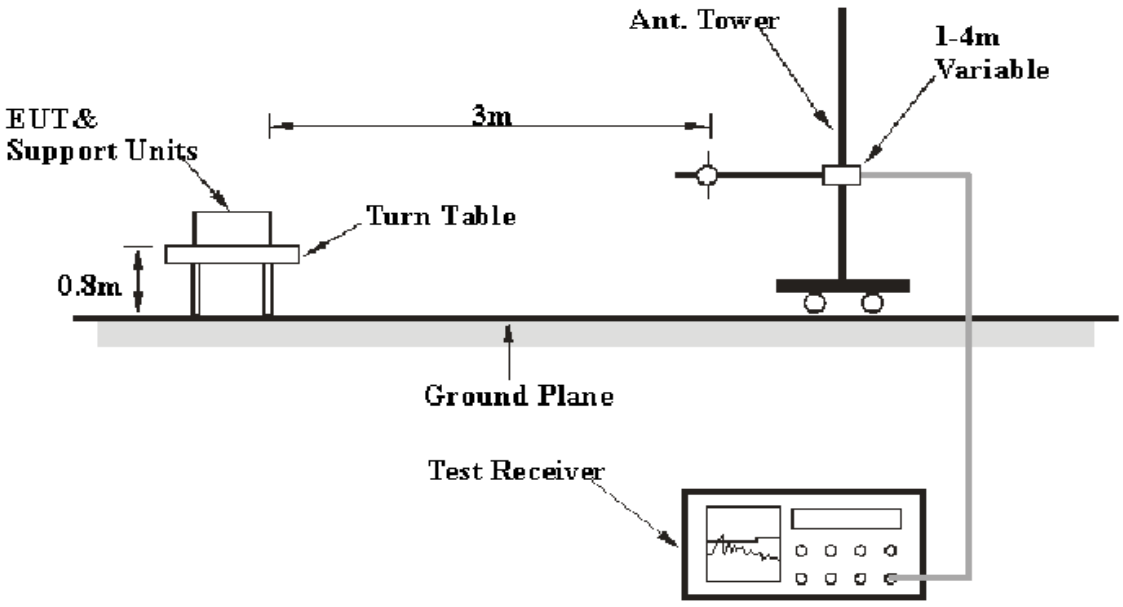
FCC §15.247 (d); §15.209; §15.205;

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. (Shenzhen) 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 7 dB means the emission is 7 dB 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	HP8447D	2944A09795	2011-08-02	2012-08-01
Rohde & Schwarz	EMI Test Receiver	ESCI	100035	2011-11-11	2012-11-10
Sunol Sciences	Broadband Antenna	JB1	A040904-2	2011-07-05	2012-07-04
Mini-circuits	Amplifier	ZVA-213+	T-E27H	2011-11-24	2012-11-23
Sunol Sciences	Horn Antenna	DRH-118	A052604	2011-05-05	2012-05-04
HP	Spectrum Analyzer	8593A	2919A00242	2011-07-09	2012-07-08
Rohde & Schwarz	Signal Analyzer	FSIQ 26	609358	2011-07-08	2012-07-07
Rohde & Schwarz	Spectrum Analyzer	FSP38	100479	2011-05-27	2012-05-26

*** Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Shenzhen) 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:

8.42 dB at **11650 MHz** in the **Horizontal** polarization (802.11a mode)

Test Data

Environmental Conditions

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

The testing was performed by Ares Liu from 2012-03-12 to 2012-04-20.

1).30 MHz-40 GHz

Mode: Transmitting

802.11a Mode:

Frequency (MHz)	S.A. Reading (dBμV)	Detector (PK/QP/Ave.)	Ant. Polar (H/V)	Cord. Factor (dB/m)	Cord. Amp. (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Comment
Low Channel (5745 MHz)								
11490	13.59	Ave.	V	30.81	44.40	54	9.60	Harmonic
11490	13.48	Ave.	H	30.81	44.29	54	9.71	Harmonic
610.67	39.35	QP	H	-5.62	33.73	46	12.27	spurious
610.67	38.15	QP	V	-5.62	32.53	46	13.47	spurious
11490	29.35	PK	V	30.81	60.16	74	13.84	Harmonic
11490	28.74	PK	H	30.81	59.55	74	14.45	Harmonic
5725	14.25	Ave.	V	20.87	35.12	54	18.88	spurious
5725	14.25	Ave.	H	20.87	35.12	54	18.88	spurious
5725	33.15	PK	V	20.87	54.02	74	19.98	spurious
5725	32.23	PK	H	20.87	53.10	74	20.90	spurious
5745	80.13	PK	H	20.61	100.74	N/A	N/A	Fund.
5745	69.20	Ave.	H	20.61	89.81	N/A	N/A	Fund.
5745	78.02	PK	V	20.61	98.63	N/A	N/A	Fund.
5745	68.32	Ave.	V	20.61	88.93	N/A	N/A	Fund.
Middle Channel (5785 MHz)								
11570	13.78	Ave.	V	31.69	45.47	54	8.53	Harmonic
11570	13.48	Ave.	H	31.69	45.17	54	8.83	Harmonic
610.67	38.94	QP	H	-5.62	33.32	46	12.68	spurious
11570	28.78	PK	V	31.69	60.47	74	13.53	Harmonic
11570	28.56	PK	H	31.69	60.25	74	13.75	Harmonic
610.67	37.56	QP	V	-5.62	31.94	46	14.06	spurious
5785	78.54	PK	H	20.74	99.28	N/A	N/A	Fund.
5785	68.21	Ave.	H	20.74	88.95	N/A	N/A	Fund.
5785	78.25	PK	V	20.74	98.99	N/A	N/A	Fund.
5785	67.89	Ave.	V	20.74	88.63	N/A	N/A	Fund.
High Channel (5825 MHz)								
11650	14.29	Ave.	V	32.10	46.39	54	7.61	Harmonic
11650	14.12	Ave.	H	32.10	46.22	54	7.78	Harmonic
11650	30.25	PK	H	32.10	62.35	74	11.65	Harmonic
11650	29.37	PK	V	32.10	61.47	74	12.53	Harmonic
610.67	39.07	QP	H	-5.62	33.45	46	12.55	spurious
610.67	37.95	QP	V	-5.62	32.33	46	13.67	spurious
5850	14.59	Ave.	H	20.96	35.55	54	18.45	spurious
5850	14.58	Ave.	V	20.96	35.54	54	18.46	spurious
5850	31.97	PK	H	20.96	52.93	74	21.07	spurious
5850	31.78	PK	V	20.96	52.74	74	21.26	spurious
5825	78.00	PK	H	20.80	98.80	N/A	N/A	Fund.
5825	68.54	Ave.	H	20.80	89.34	N/A	N/A	Fund.
5825	78.01	PK	V	20.80	98.81	N/A	N/A	Fund.
5825	67.51	Ave.	V	20.80	88.31	N/A	N/A	Fund.

802.11n HT20 Mode:

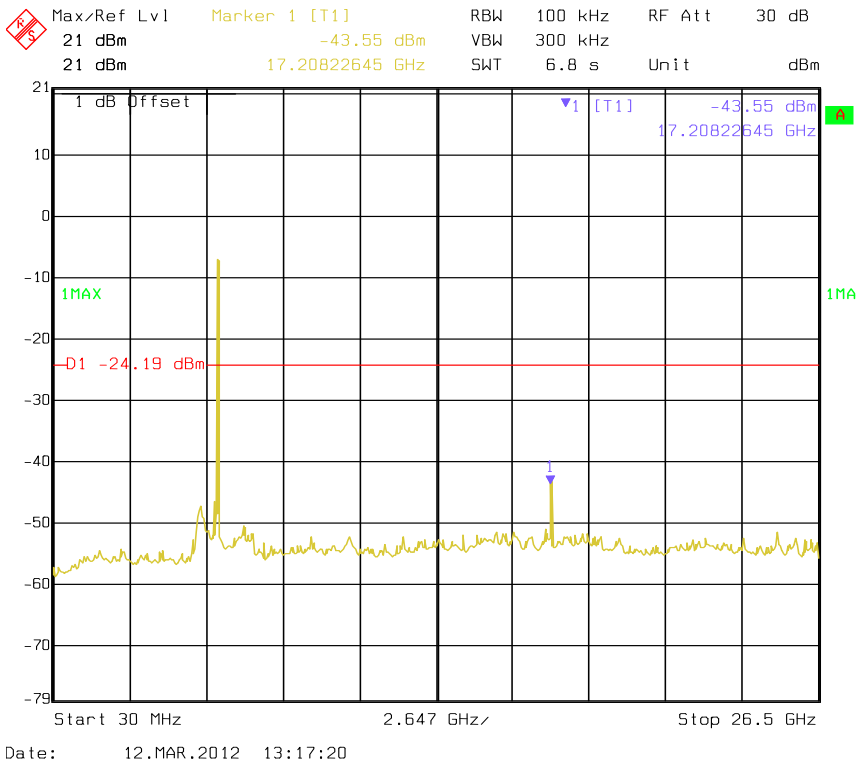
Frequency (MHz)	S.A. Reading (dBµV)	Detector (PK/QP/Ave.)	Ant. Polar (H/V)	Cord. Factor (dB/m)	Cord. Amp. (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Comment
Low Channel (5745 MHz)								
11490	15.69	Ave.	H	30.81	46.5	54	7.5	Harmonic
11490	15.14	Ave.	V	30.81	45.95	54	8.05	Harmonic
610.67	38.35	QP	H	-5.62	32.73	46	13.27	spurious
11490	29.15	PK	V	30.81	59.96	74	14.04	Harmonic
610.67	37.15	QP	V	-5.62	31.53	46	14.47	spurious
11490	28.36	PK	H	30.81	59.17	74	14.83	Harmonic
5725	15.5	Ave.	V	20.87	36.37	54	17.63	spurious
5725	15	Ave.	H	20.87	35.87	54	18.13	spurious
5725	34.23	PK	H	20.87	55.1	74	18.9	spurious
5745	79.66	PK	H	20.61	100.27	74	18.98	spurious
5745	68.7	Ave.	H	20.61	89.31	N/A	N/A	Fund.
5745	78.02	PK	V	20.61	98.63	N/A	N/A	Fund.
5745	68.32	Ave.	V	20.61	88.93	N/A	N/A	Fund.
5745	79.66	PK	H	20.61	100.27	N/A	N/A	Fund.
Middle Channel (5785 MHz)								
11570	15.44	Ave.	V	31.69	47.13	54	6.87	Harmonic
11570	14.97	Ave.	H	31.69	46.66	54	7.34	Harmonic
610.67	38.94	QP	H	-5.62	33.32	46	12.68	spurious
11570	28.78	PK	V	31.69	60.47	74	13.53	Harmonic
11570	28.56	PK	H	31.69	60.25	74	13.75	Harmonic
610.67	37.56	QP	V	-5.62	31.94	46	14.06	spurious
5785	78.36	PK	H	20.74	99.1	N/A	N/A	Fund.
5785	68.15	Ave.	H	20.74	88.89	N/A	N/A	Fund.
5785	78.25	PK	V	20.74	98.99	N/A	N/A	Fund.
5785	67.89	Ave.	V	20.74	88.63	N/A	N/A	Fund.
High Channel (5825 MHz)								
11650	13.48	Ave.	V	32.1	45.58	54	8.42	Harmonic
11650	13.48	Ave.	H	32.1	45.58	54	8.42	Harmonic
11650	30.25	PK	H	32.1	62.35	74	11.65	Harmonic
11650	29.37	PK	V	32.1	61.47	74	12.53	Harmonic
610.67	38.36	QP	H	-5.62	32.74	46	13.26	spurious
610.67	37.54	QP	V	-5.62	31.92	46	14.08	spurious
5850	14.95	Ave.	V	20.96	35.91	54	18.09	spurious
5850	14.28	Ave.	H	20.96	35.24	54	18.76	spurious
5850	32.78	PK	V	20.96	53.74	74	20.26	spurious
5850	32.56	PK	H	20.96	53.52	74	20.48	spurious
5825	77.54	PK	H	20.8	98.34	N/A	N/A	Fund.
5825	67.37	Ave.	H	20.8	88.17	N/A	N/A	Fund.
5825	77.68	PK	V	20.8	98.48	N/A	N/A	Fund.
5825	67.32	Ave.	V	20.8	88.12	N/A	N/A	Fund.

802.11n HT40 Mode:

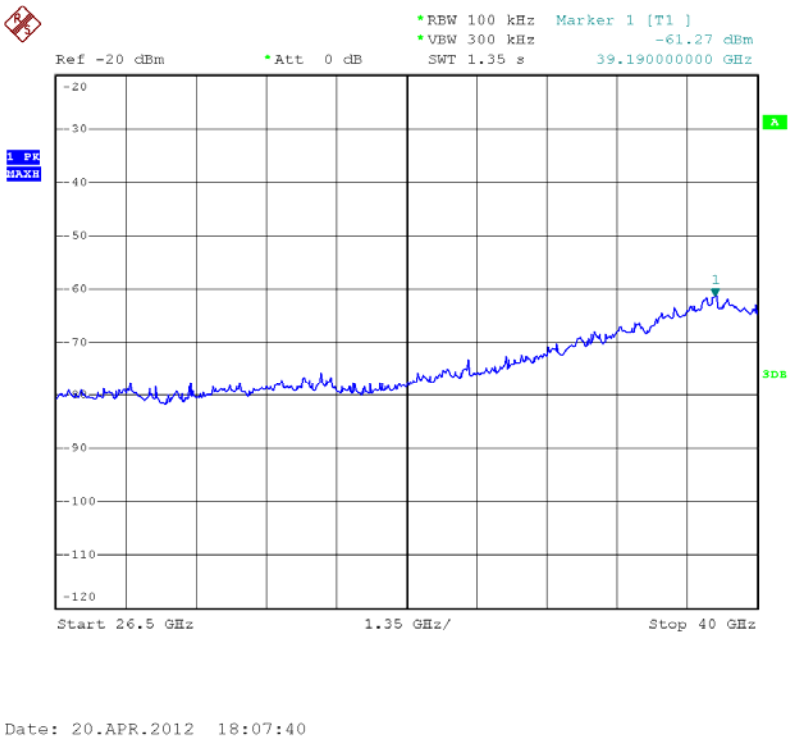
Frequency (MHz)	S.A. Reading (dBμV)	Detector (PK/QP/Ave.)	Ant. Polar (H/V)	Cord. Factor (dB/m)	Cord. Amp. (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Comment
Low Channel (5755 MHz)								
11510	14.78	Ave.	H	30.81	45.59	54	8.41	Harmonic
11510	14.65	Ave.	V	30.81	45.46	54	8.54	Harmonic
610.67	38.48	QP	H	-5.62	32.86	46	13.14	spurious
11510	29.02	PK	V	30.81	59.83	74	14.17	Harmonic
11510	29.36	PK	H	30.81	60.17	74	13.83	Harmonic
610.67	37.02	QP	V	-5.62	31.4	46	14.6	spurious
5725	14.69	Ave.	V	20.87	35.56	54	18.44	spurious
5725	14.03	Ave.	H	20.87	34.9	54	19.1	spurious
5725	33.01	PK	V	20.87	53.88	74	20.12	spurious
5725	32.15	PK	H	20.87	53.02	74	20.98	spurious
5755	76.25	PK	H	20.61	96.86	N/A	N/A	Fund.
5755	67.02	Ave.	H	20.61	87.63	N/A	N/A	Fund.
5755	76.98	PK	V	20.61	97.59	N/A	N/A	Fund.
5755	67.34	Ave.	V	20.61	87.95	N/A	N/A	Fund.
High Channel (5795 MHz)								
11590	13.87	Ave.	V	31.69	45.56	54	8.44	Harmonic
11590	13.59	Ave.	H	31.69	45.28	54	8.72	Harmonic
610.67	38.78	QP	H	-5.62	33.16	46	12.84	spurious
11590	28.79	PK	V	31.69	60.48	74	13.52	Harmonic
11590	28.65	PK	H	31.69	60.34	74	13.66	Harmonic
610.67	38.01	QP	V	-5.62	32.39	46	13.61	spurious
5850	13.56	Ave.	V	20.96	34.52	54	19.48	spurious
5850	13.48	Ave.	H	20.96	34.44	54	19.56	spurious
5850	29.44	PK	H	20.96	50.4	74	23.6	spurious
5850	28.71	PK	V	20.96	49.67	74	24.33	spurious
5795	74.12	PK	H	20.74	94.86	N/A	N/A	Fund.
5795	64.11	Ave.	H	20.74	84.85	N/A	N/A	Fund.
5795	74.14	PK	V	20.74	94.88	N/A	N/A	Fund.
5795	65.02	Ave.	V	20.74	85.76	N/A	N/A	Fund.

Conducted Spurious Emissions at Antenna Port

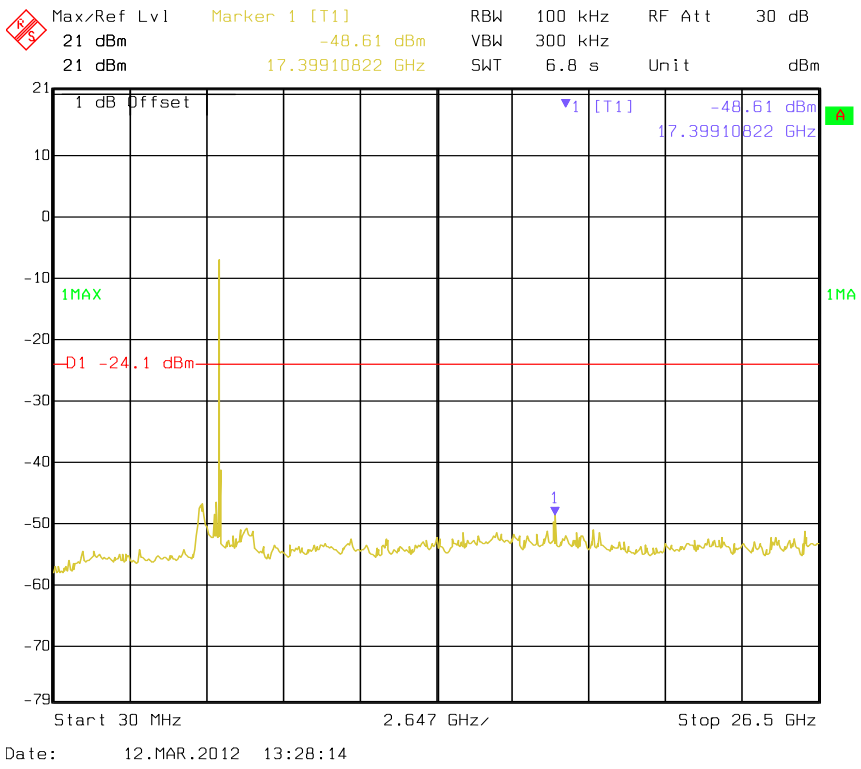
802.11a Low Channel 30MHz-26.5GHz



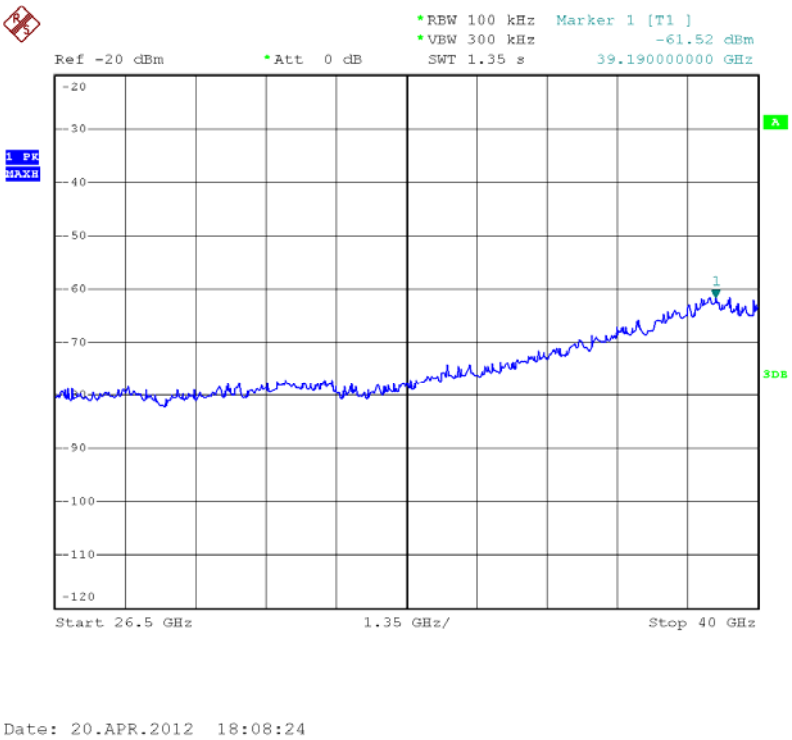
802.11a Low Channel 26.5GHz-40GHz



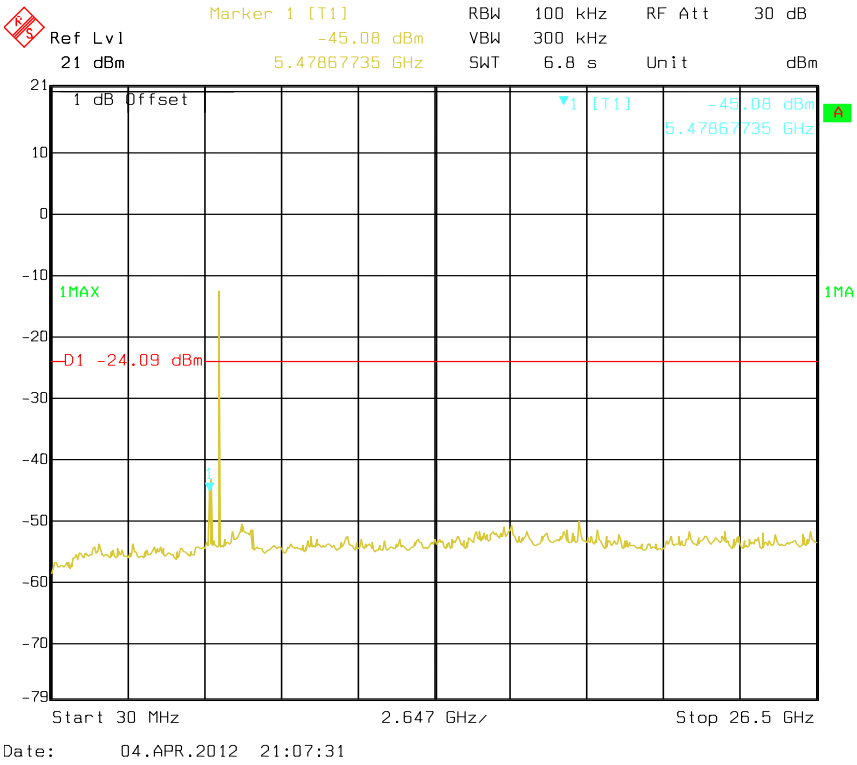
802.11a Middle Channel 30MHz-26.5GHz



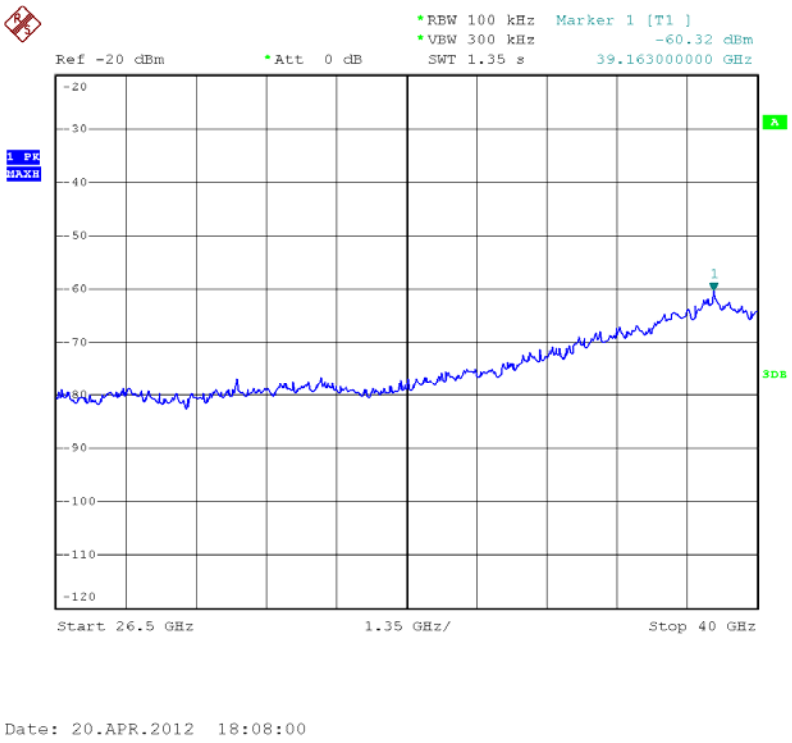
802.11a Middle Channel 26.5GHz-40GHz



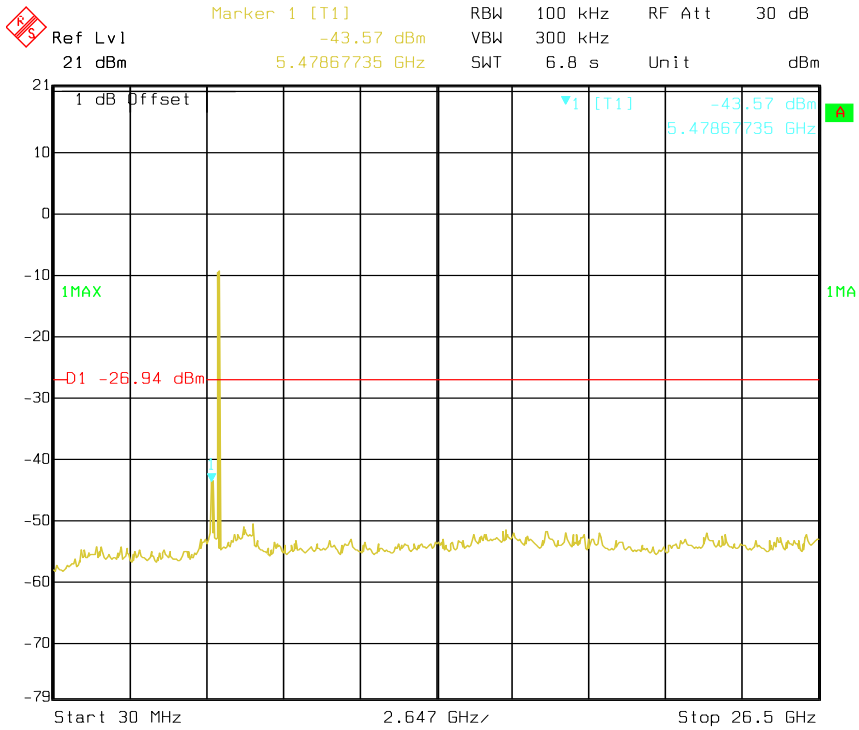
802.11a High Channel 30MHz-26.5GHz



802.11a High Channel 26.5GHz-40GHz

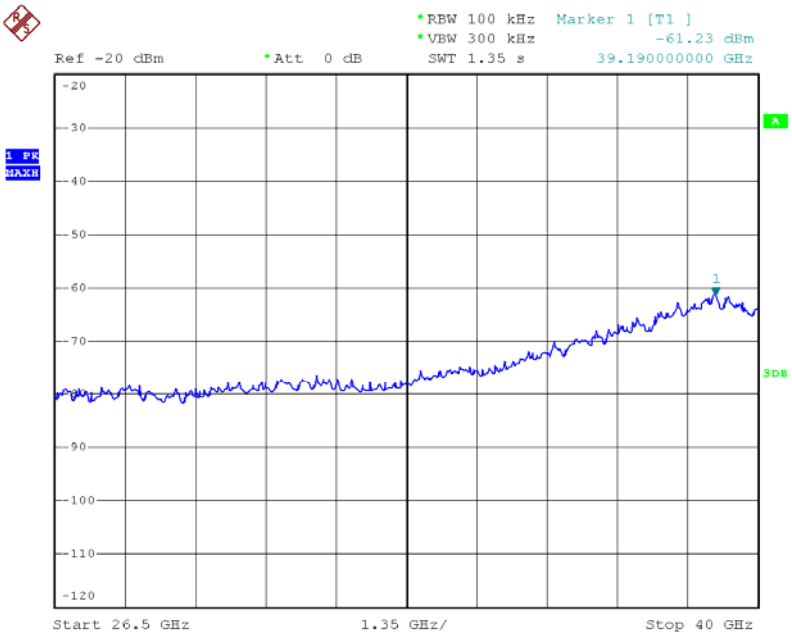


Chain 0 : 802.11n20 Low Channel 30MHz-26.5GHz



Date: 04.APR.2012 21:55:54

Chain 0 : 802.11n20 Low Channel 26.5GHz-40GHz



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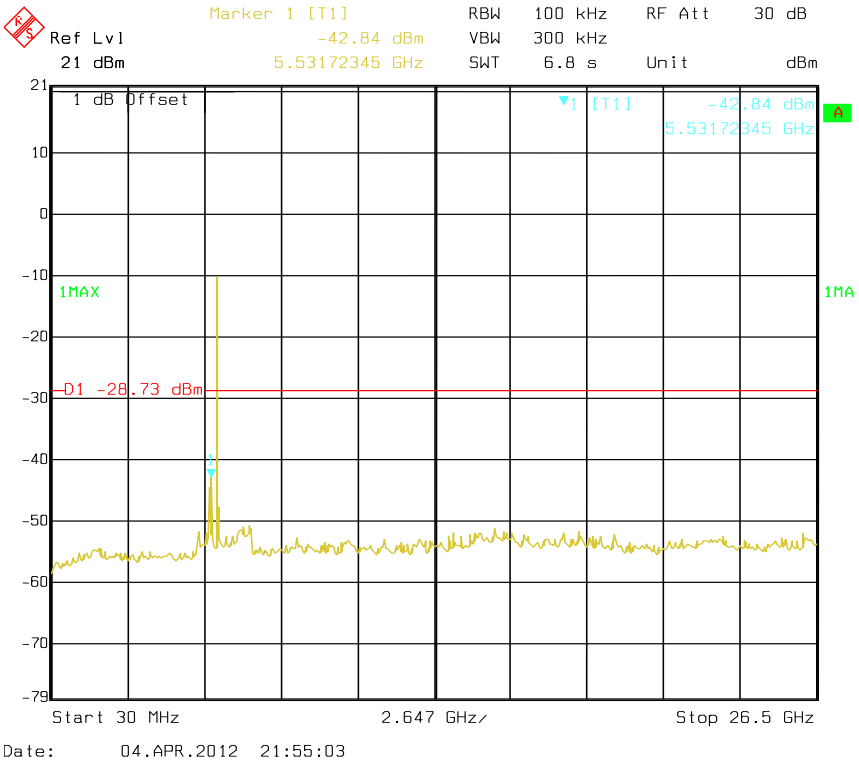
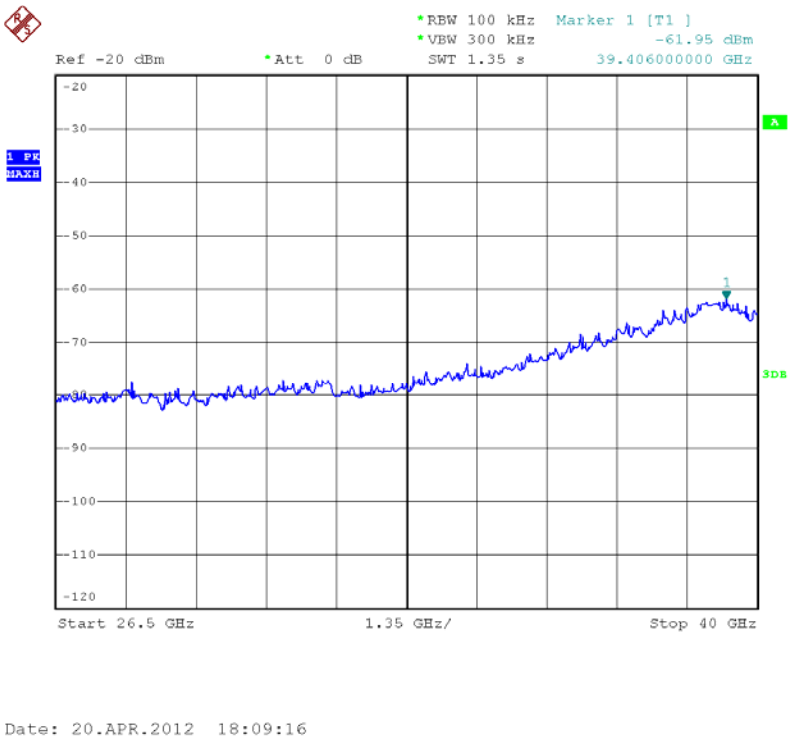
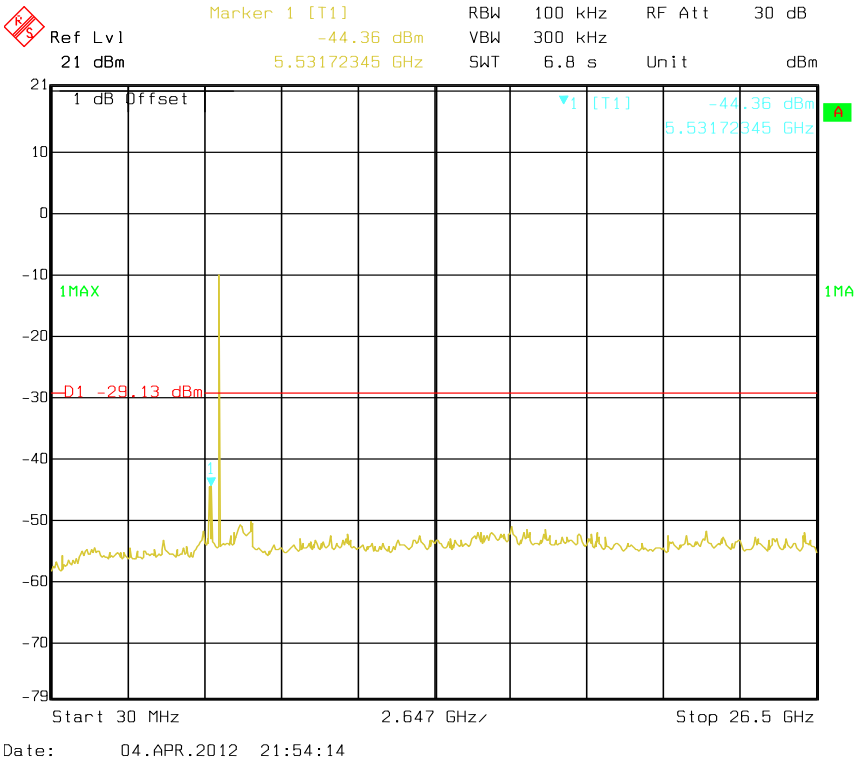
Chain 0: 802.11n20 Middle Channel 30MHz-26.5GHz



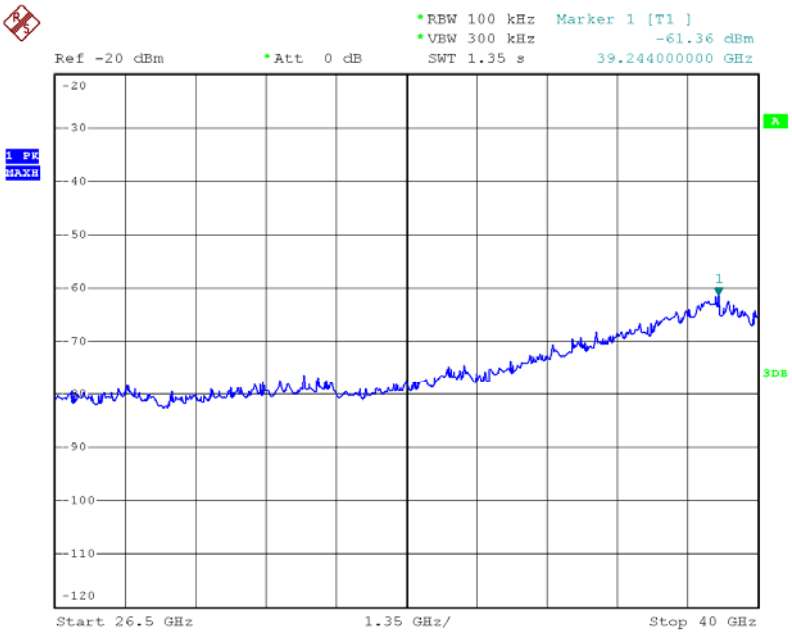
Chain 0: 802.11n20 Middle Channel 26.5GHz-40GHz



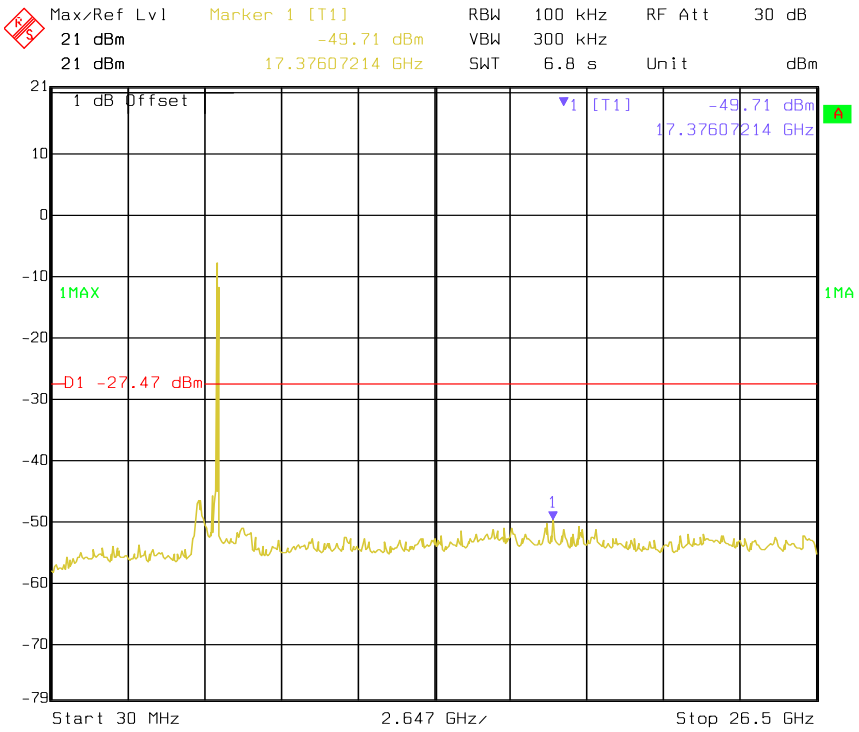
Chain 0: 802.11n20 High Channel 30MHz-26.5GHz



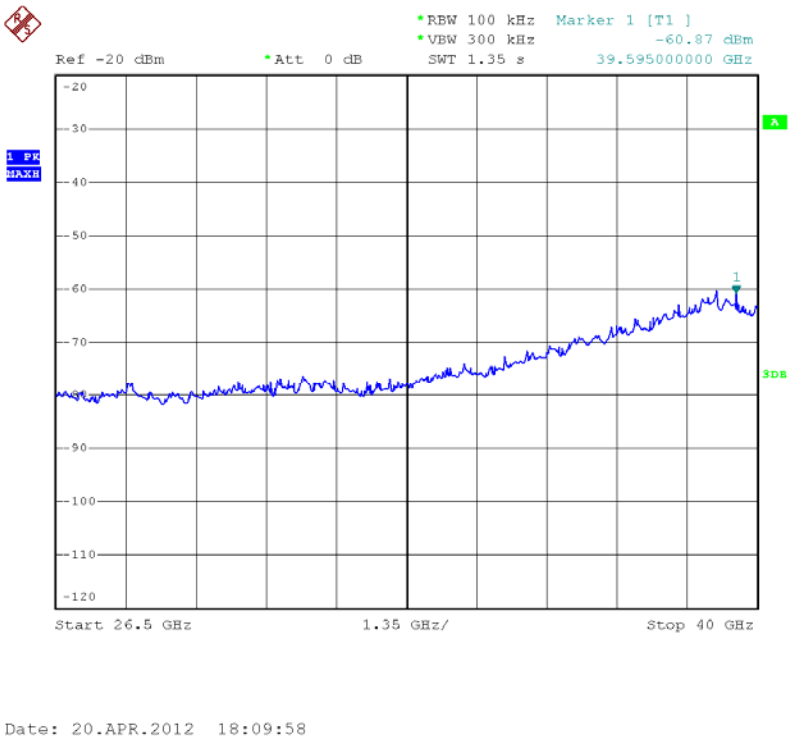
Chain 0: 802.11n20 High Channel 26.5GHz-40GHz



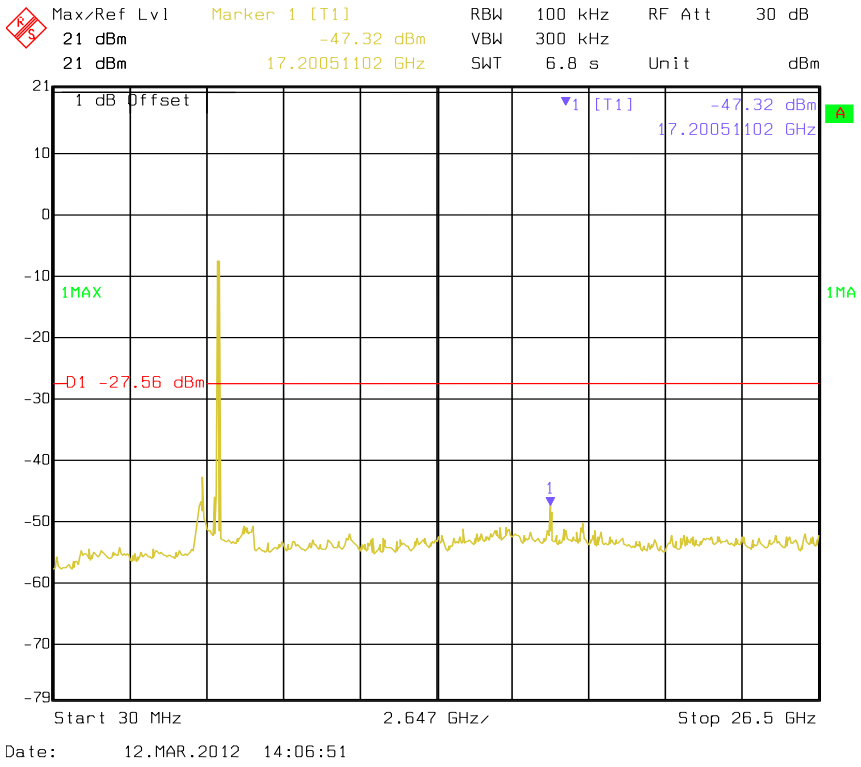
Chain 0: 802.11n40 Low Channel 30MHz-26.5GHz



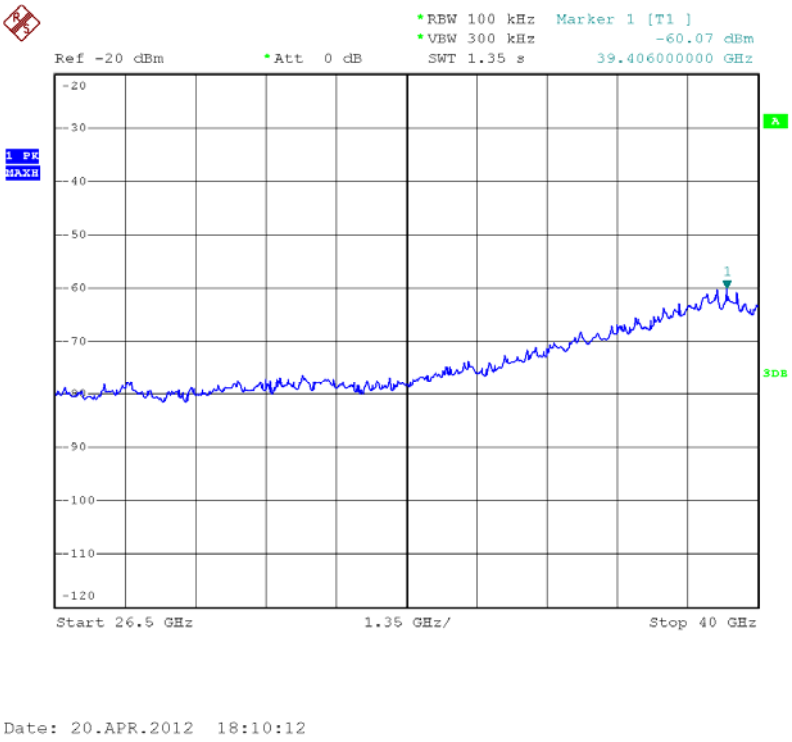
Chain 0: 802.11n40 Low Channel 26.5GHz-40GHz



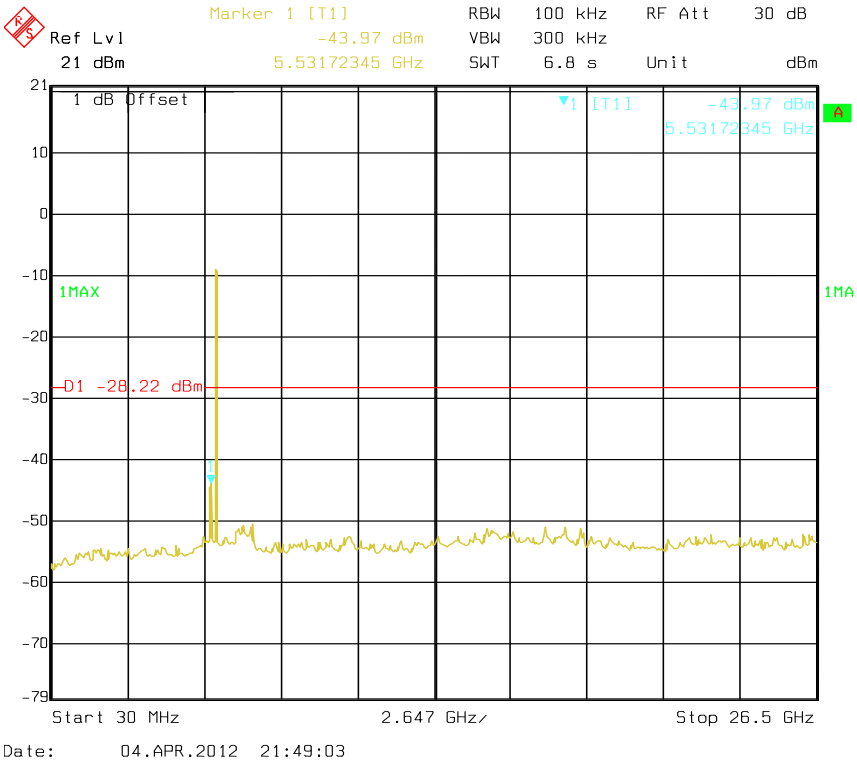
Chain 0 :802.11n40 High Channel 30MHz-26.5GHz



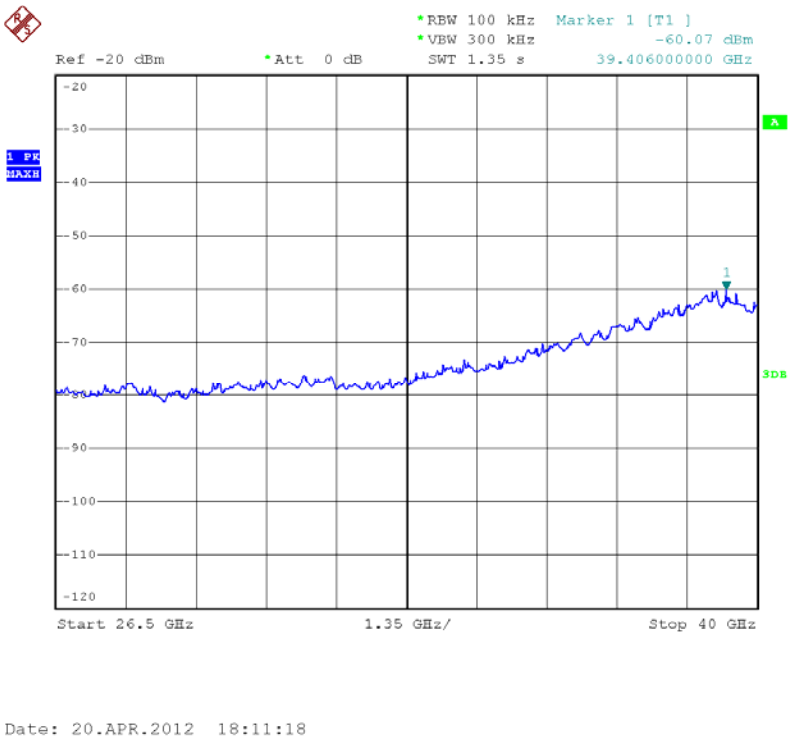
Chain 0: 802.11n40 High Channel 26.5GHz-40GHz



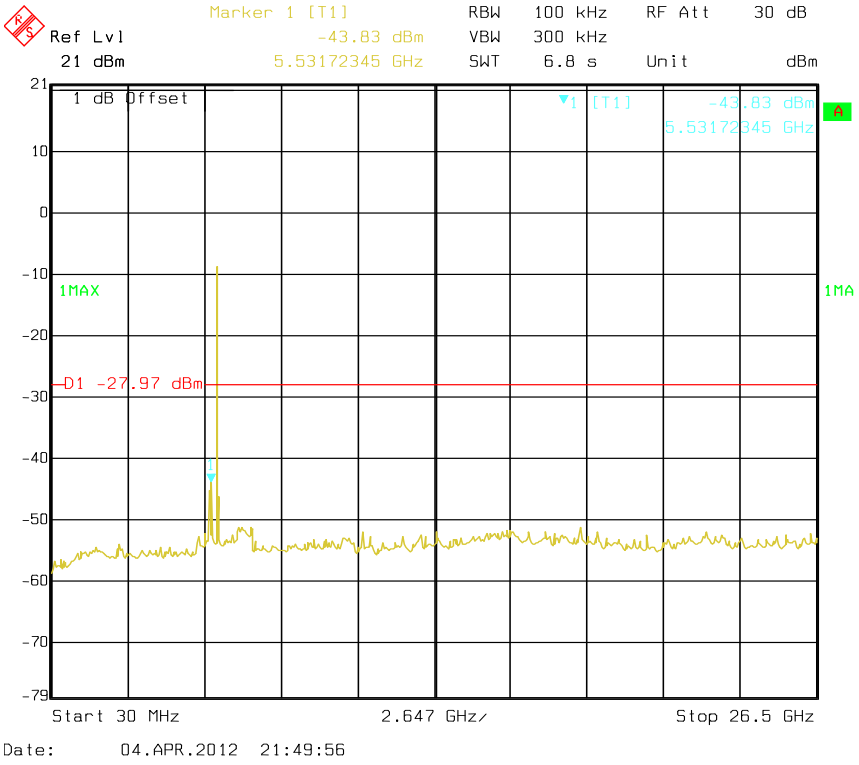
Chain 1: 802.11n20 Low Channel 30MHz-26.5GHz



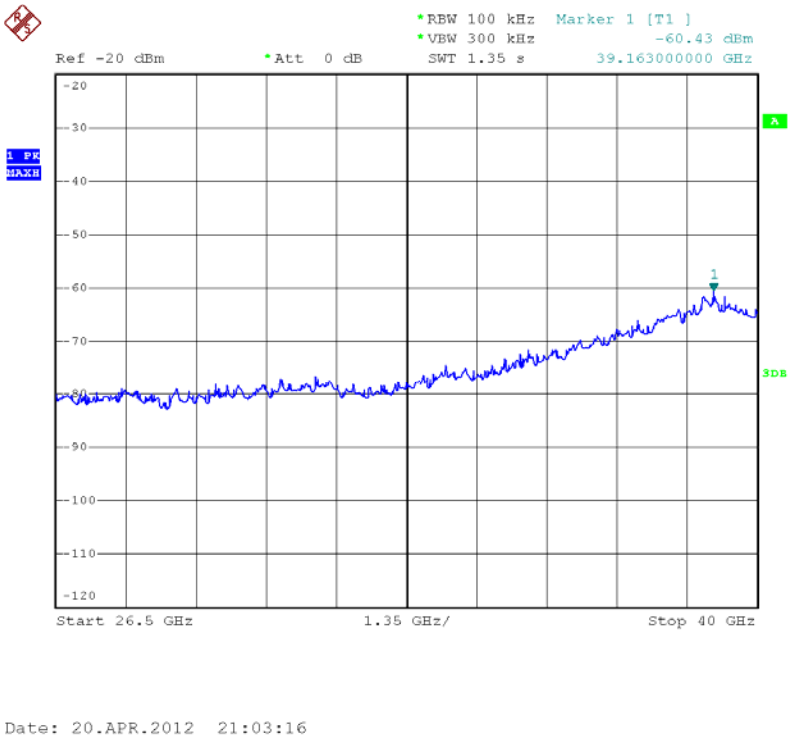
Chain 1: 802.11n20 Low Channel 26.5GHz-40GHz



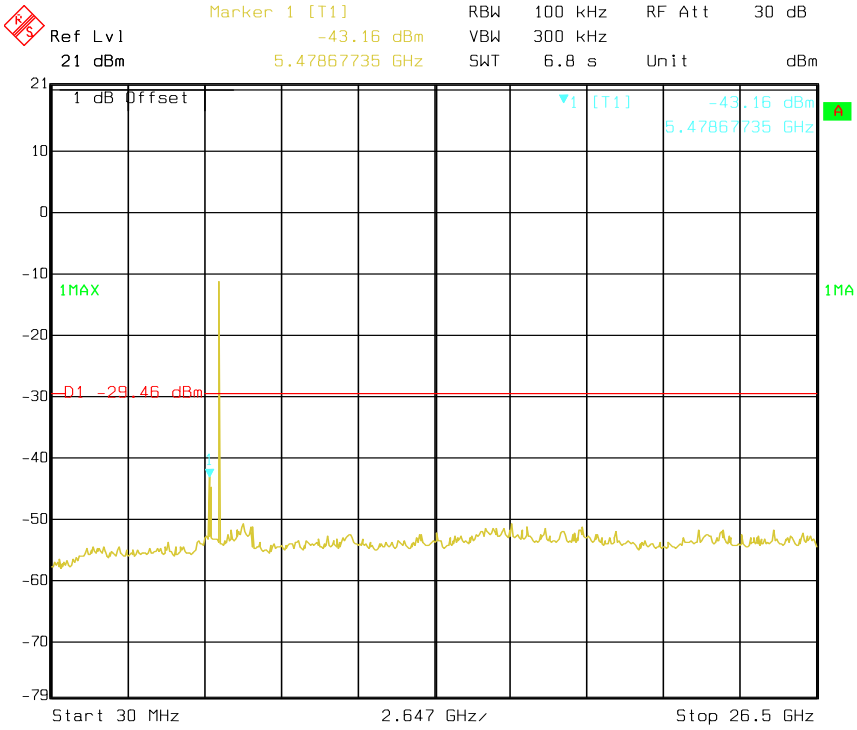
Chain 1: 802.11n20 Middle Channel 30MHz-26.5GHz



Chain 1: 802.11n20 Middle Channel 26.5GHz-40GHz



Chain 1: 802.11n20 High Channel 30MHz-26.5GHz



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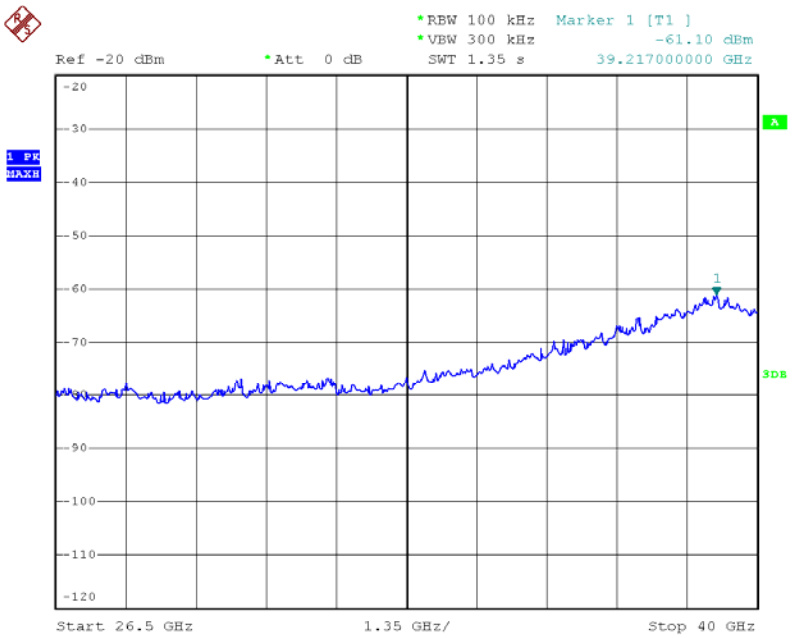
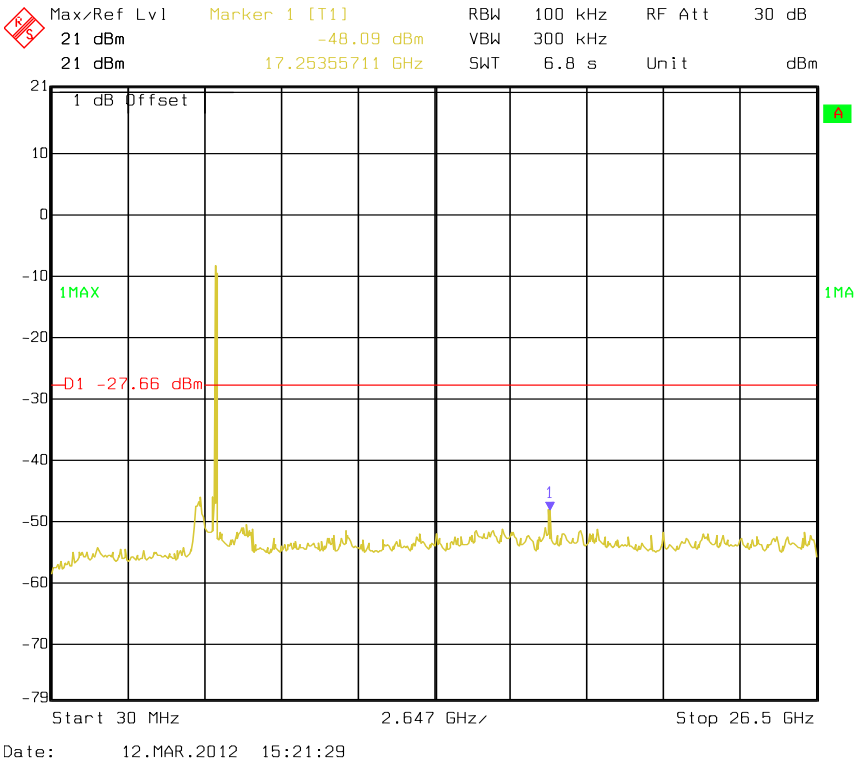
Chain 1: 802.11n20 High Channel 26.5GHz-40GHz

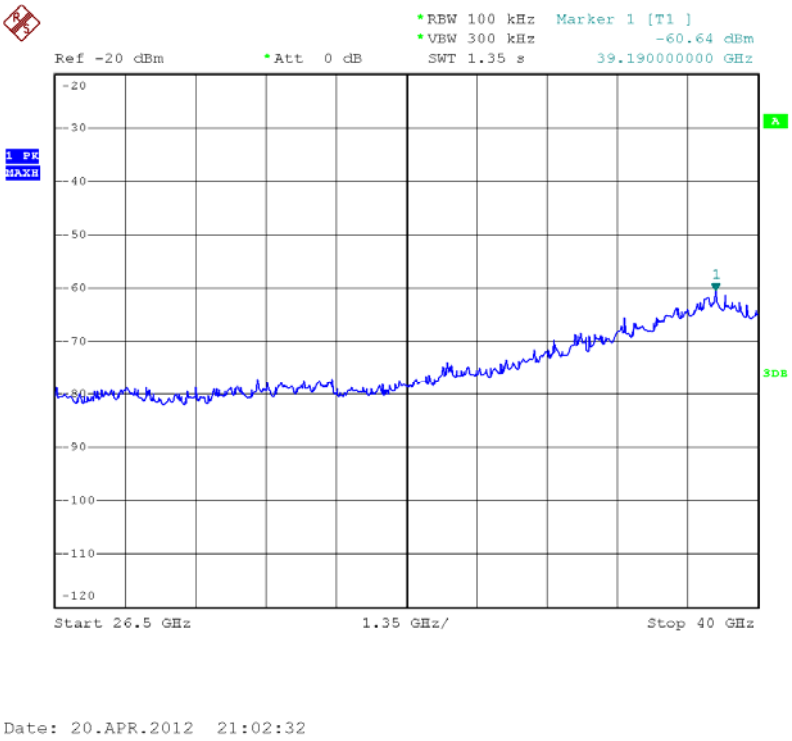


Date: 20.APR.2012 21:02:14

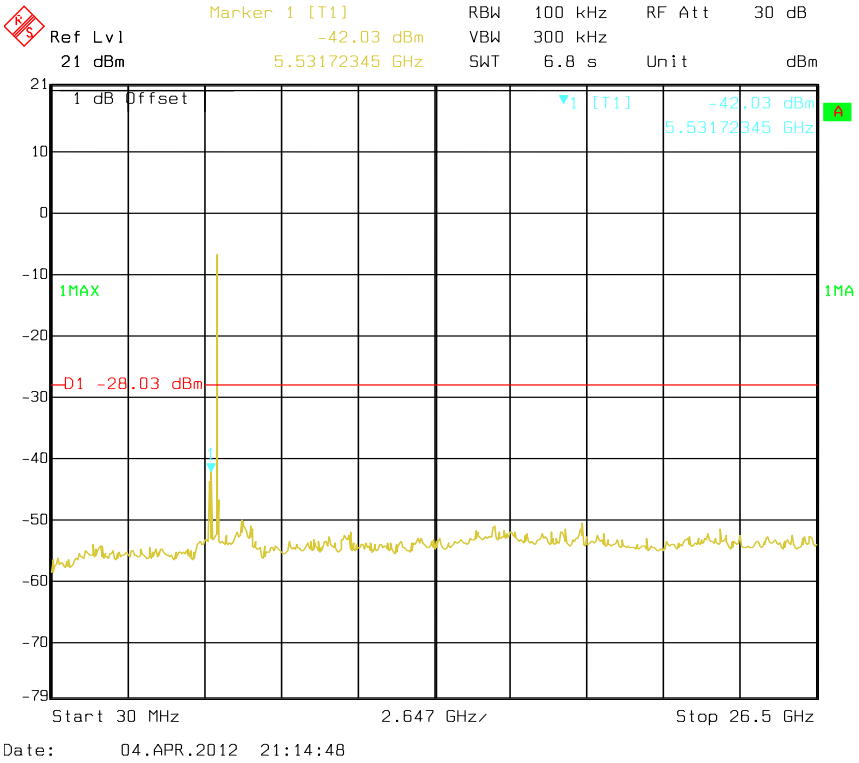
Chain 1: 802.11n40 Low Channel 30MHz-26.5GHz



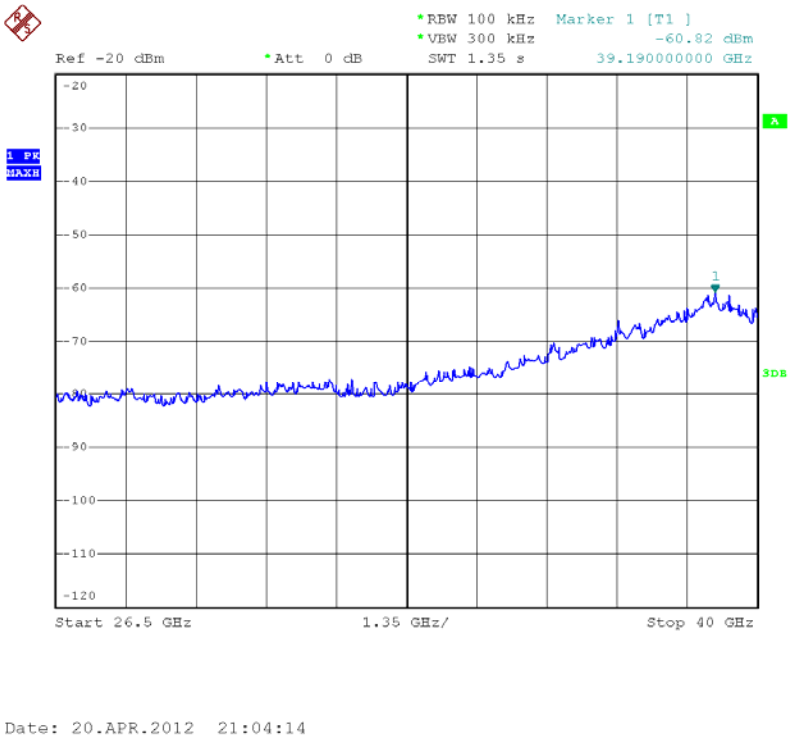
Chain 1: 802.11n40 Low Channel 26.5GHz-40GHz



Chain 1: 802.11n40 High Channel 30MHz-26.5GHz



Chain 1: 802.11n40 High Channel 26.5GHz-40GHz



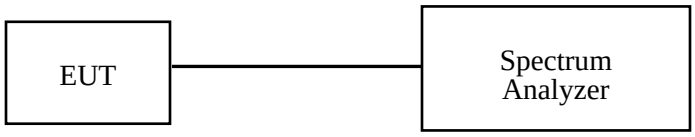
FCC §15.247(a) (2) – 6 dB EMISSION BANDWIDTH

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	Signal Analyzer	FSIQ 26	609358	2011-07-08	2012-07-07
Rohde & Schwarz	Spectrum Analyzer	FSP38	100479	2011-05-27	2012-05-26

*** Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Shenzhen) 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

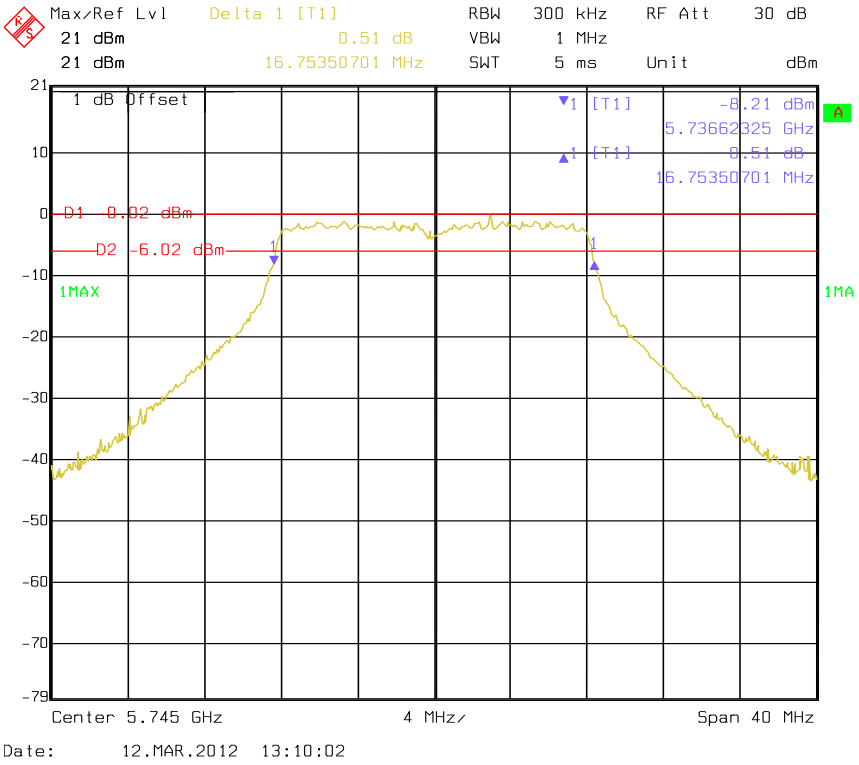
The testing was performed by Ares Liu from 2012-03-12 to 2012-05-07.

Test Result: Pass.

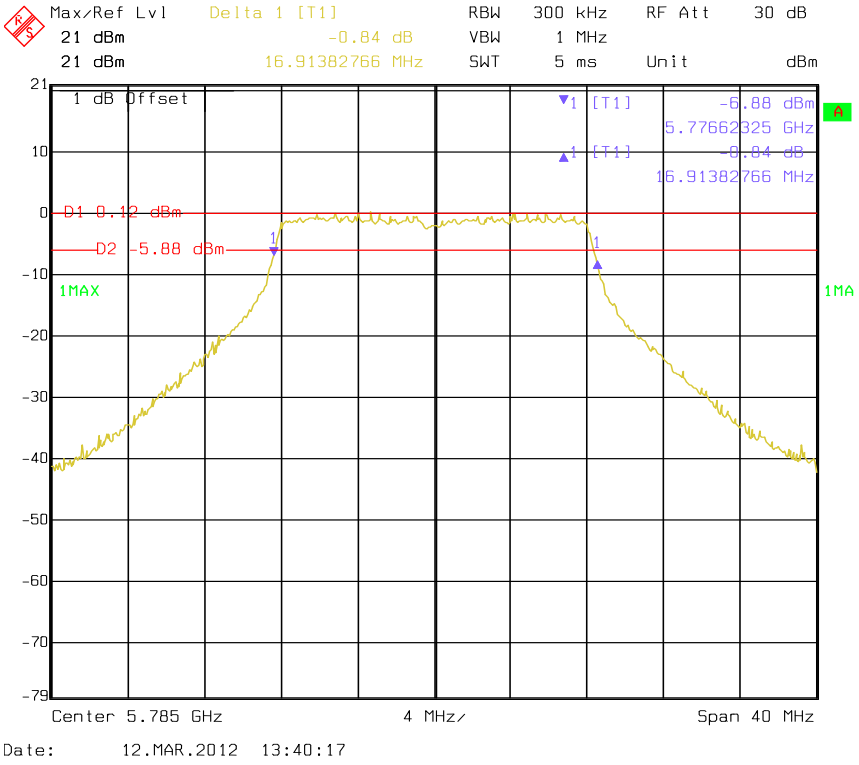
Please refer to the following tables and plots.

Channel	Frequency (MHz)	Data Rate (Mbps)	6 dB Emission Bandwidth (MHz)	Limit (kHz)
802.11a mode				
Low	5745	6.5	16.75	> 500
Middle	5785	6.5	16.91	> 500
High	5825	6.5	16.91	> 500
Chain 0: 802.11n HT20 mode				
Low	5745	6.5	17.96	> 500
Middle	5785	6.5	18.04	> 500
High	5825	6.5	17.96	> 500
Chain 0: 802.11n HT40 mode				
Low	5755	13.5	37.35	> 500
High	5795	13.5	37.19	> 500
Chain 1: 802.11n HT20 mode				
Low	5745	6.5	18.04	> 500
Middle	5785	6.5	18.04	> 500
High	5825	6.5	18.04	> 500
Chain 1: 802.11n HT40 mode				
Low	5755	13.5	37.51	> 500
High	5795	13.5	37.51	> 500

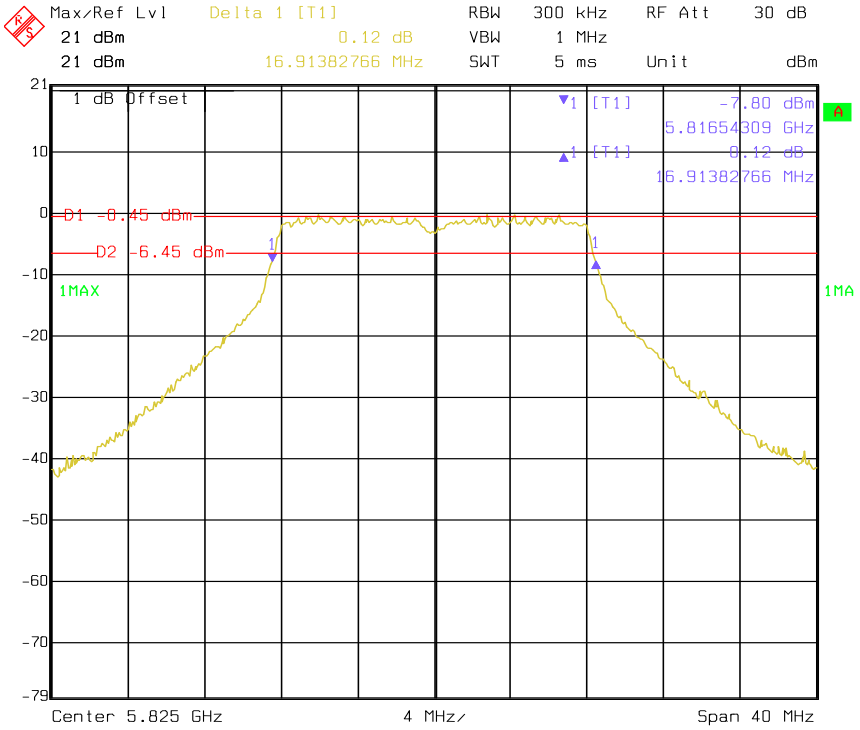
802.11a Low Channel



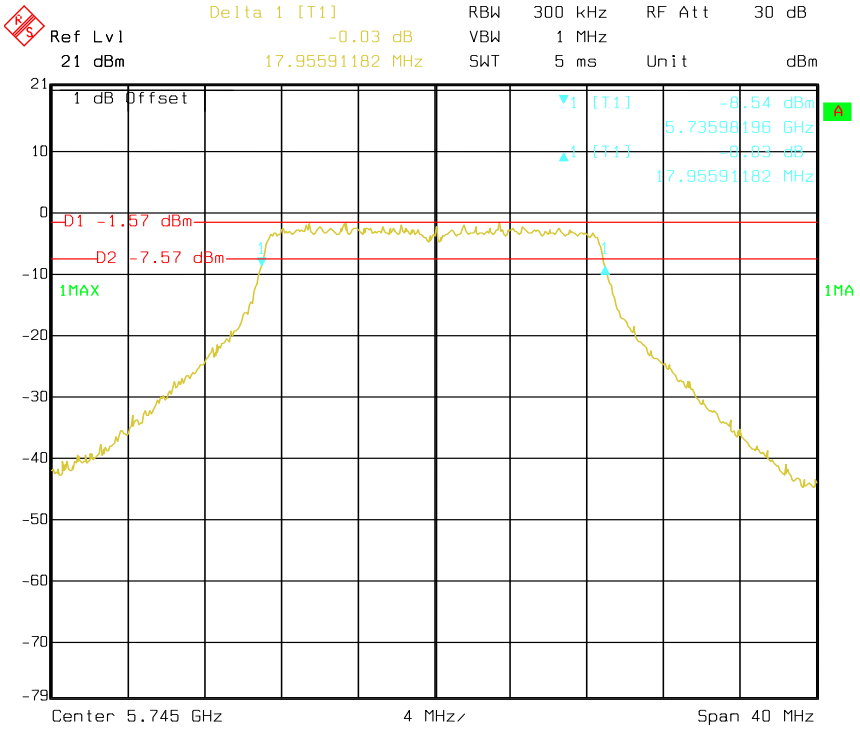
802.11a Middle Channel



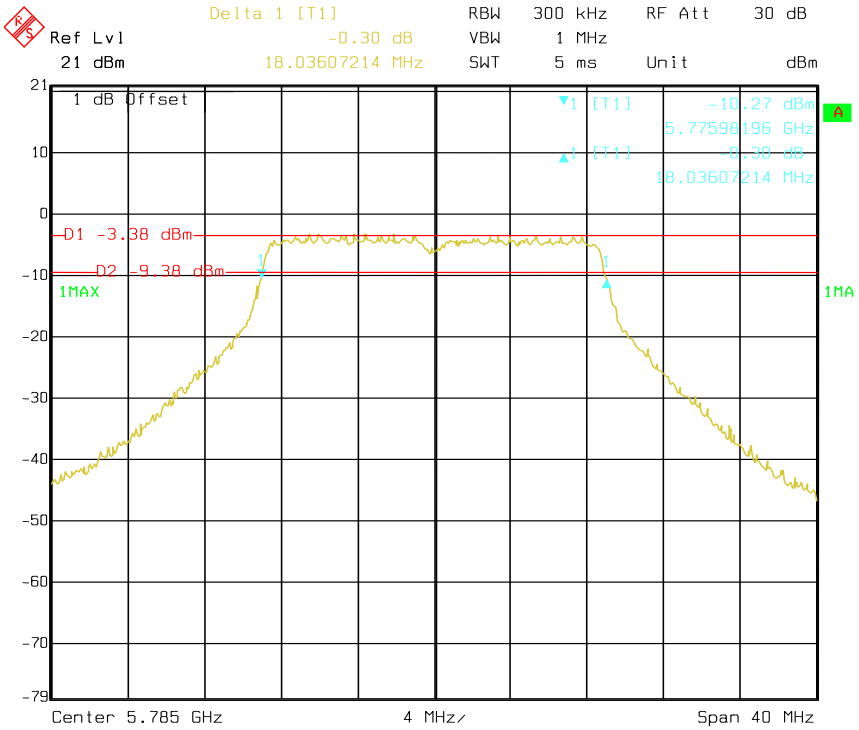
802.11a High Channel



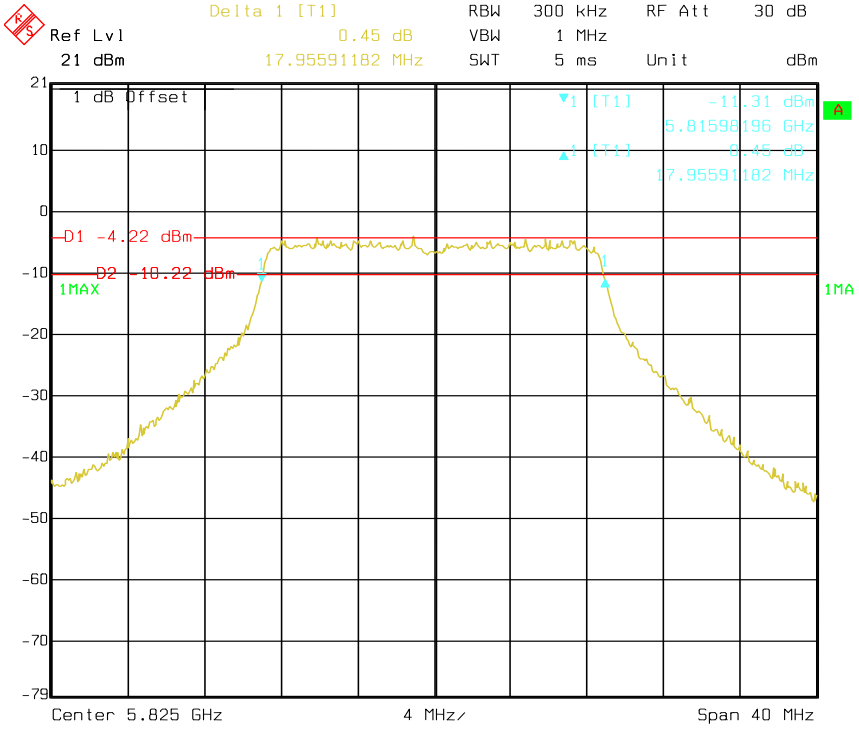
Chain 0 :802.11n20 Low Channel



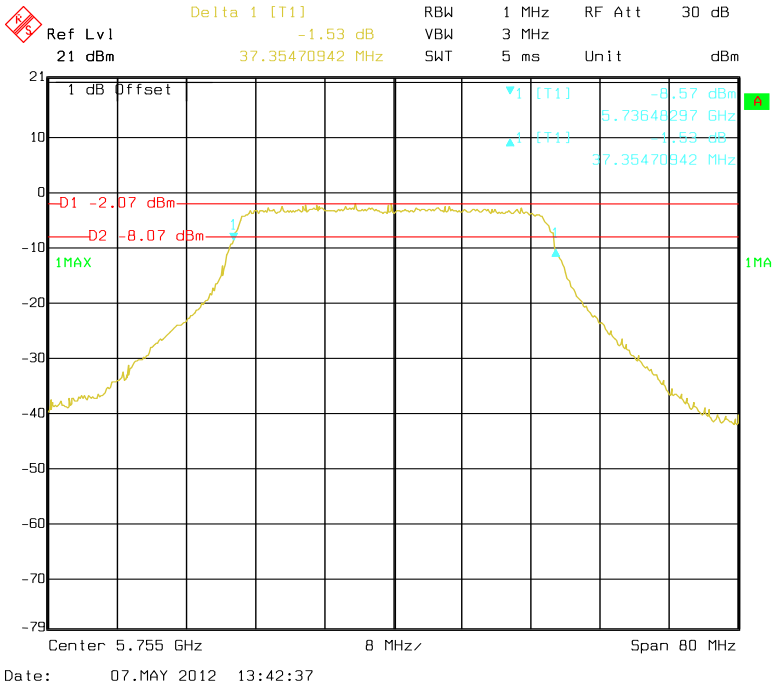
Chain 0 :802.11n20 Middle Channel



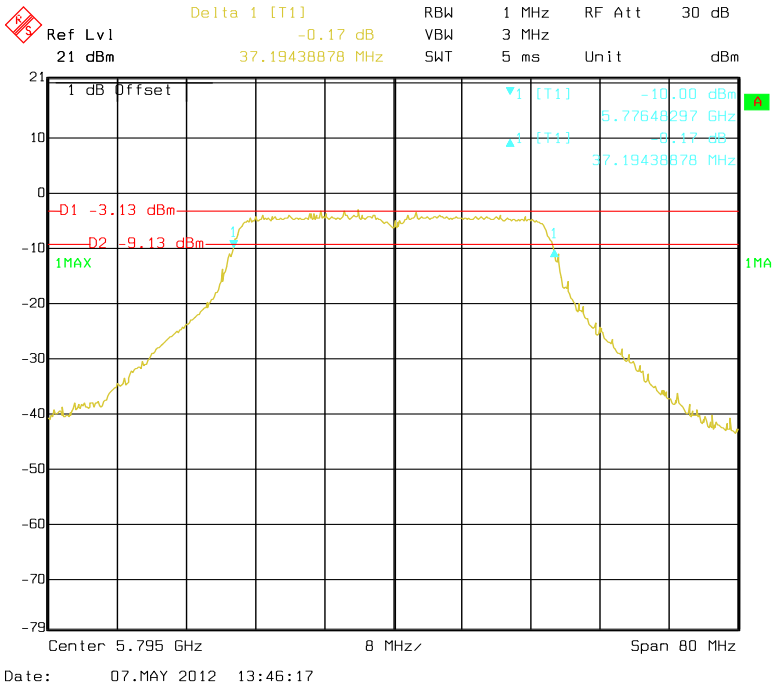
Chain 0 :802.11n20 High Channel



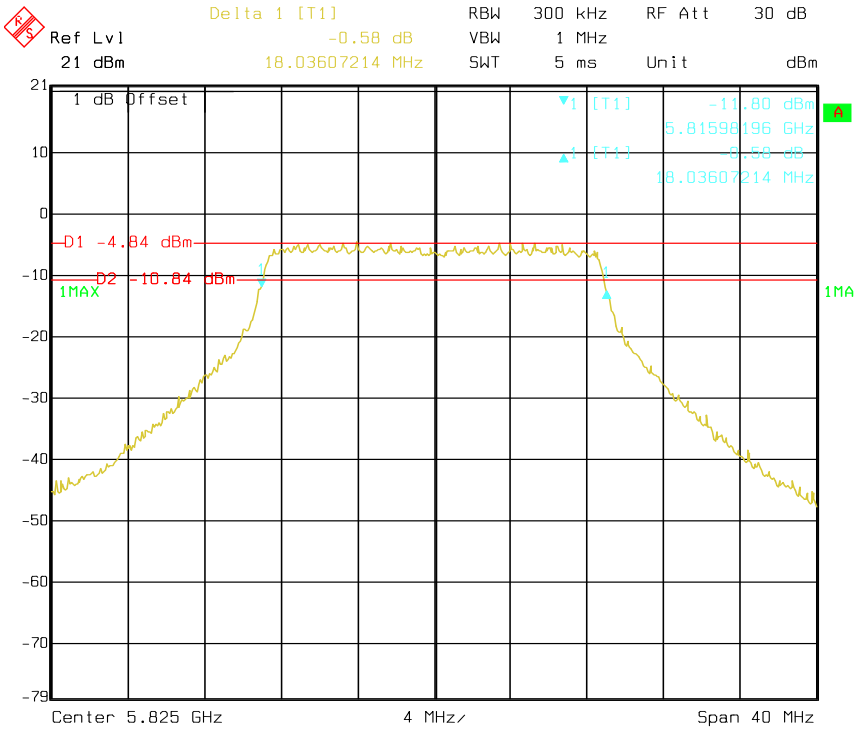
Chain 0 :802.11n40 Low Channel



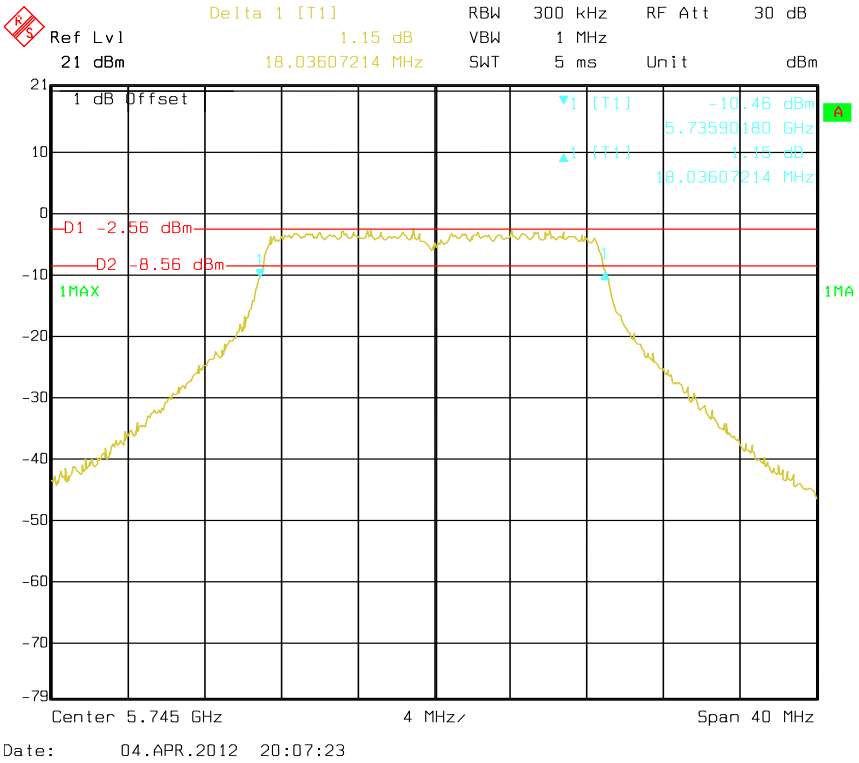
Chain 0 :802.11n40 High Channel



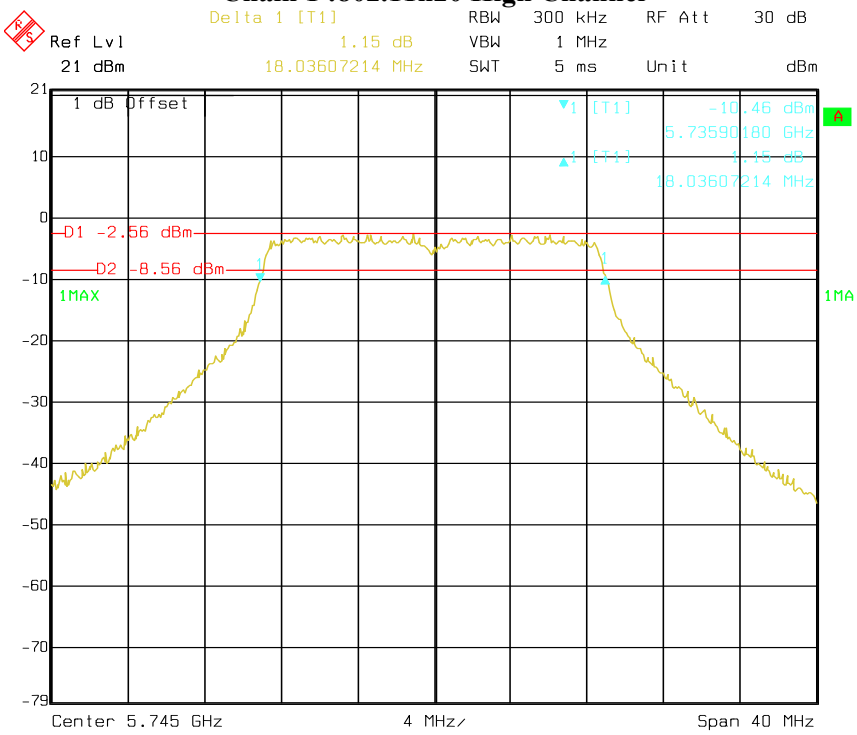
Chain 1 :802.11n20 Low Channel



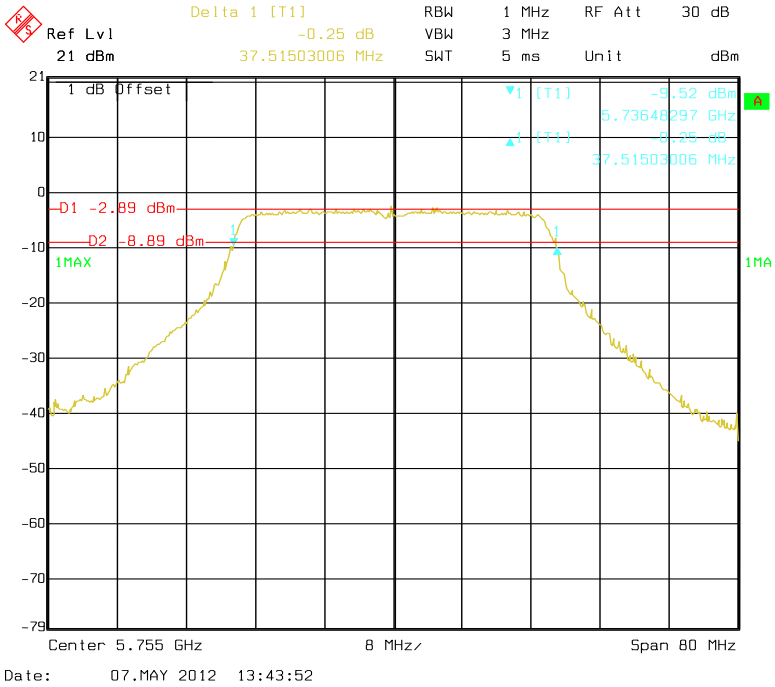
Chain 1 :802.11n20 Middle Channel



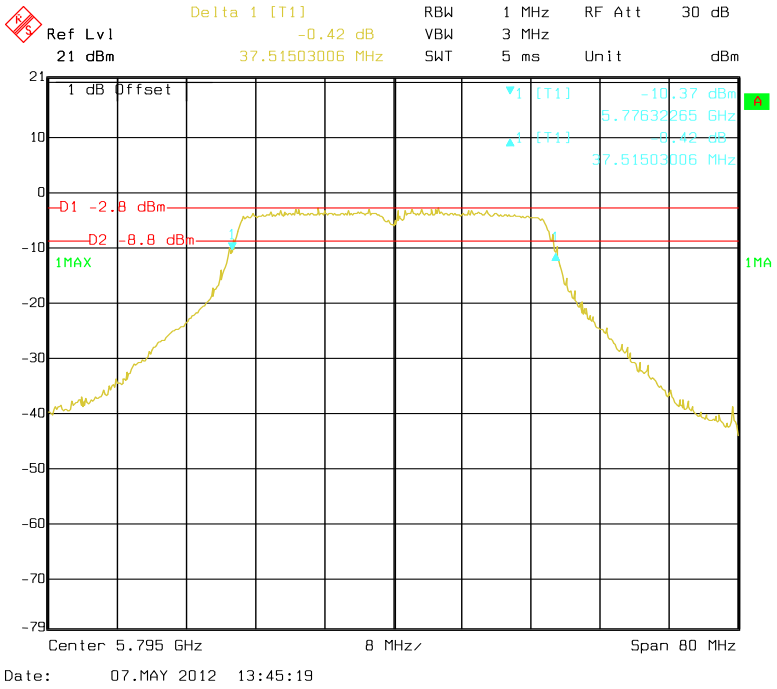
Chain 1 :802.11n20 High Channel



Chain 1 :802.11n40 Low Channel



Chain 1 :802.11n40 High Channel



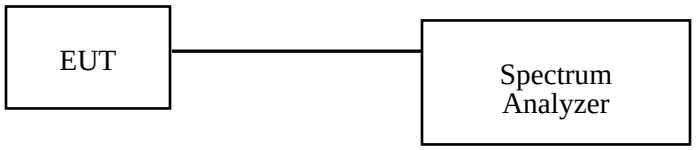
FCC §15.247(b) (3) - MAXIMUM PEAK OUTPUT POWER

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	Signal Analyzer	FSIQ 26	609358	2011-07-08	2012-07-07
Rohde & Schwarz	Spectrum Analyzer	FSP38	100479	2011-05-27	2012-05-26

*** Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Shenzhen) 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 from 2012-03-12 to 2012-05-07.

Test Mode: Transmitting

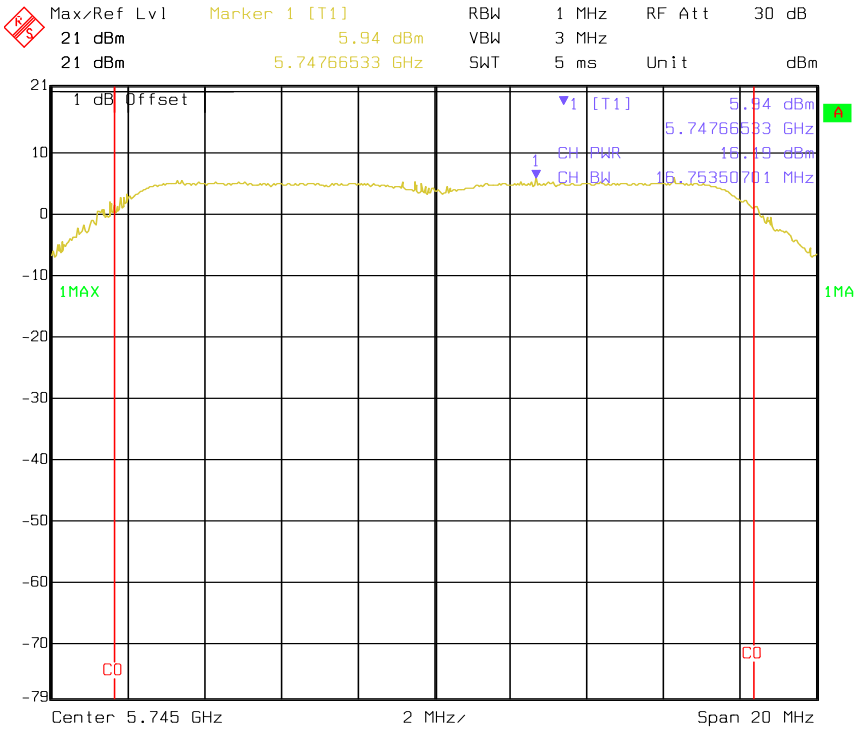
Channel	Frequency (MHz)	Data Rate (Mbps)	Conducted Output Power (dBm)	Limit (dBm)	Result
802.11a					
Low	5745	6.5	16.19	25	pass
Middle	5785	6.5	15.72	25	pass
High	5825	6.5	15.61	25	pass
Chain 0: 802.11n HT20					
Low	5745	6.5	15.43	25	pass
Middle	5785	6.5	14.54	25	pass
High	5825	6.5	14.48	25	pass
Chain 0: 802.11n40					
Low	5755	13.5	15.60	25	pass
High	5795	13.5	14.81	25	pass
Chain 1: 802.11 HTn20					
Low	5745	6.5	15.88	25	pass
Middle	5785	6.5	14.71	25	pass
High	5825	6.5	13.92	25	pass
Chain 1: 802.11n HT40					
Low	5755	13.5	15.27	25	pass
High	5795	13.5	15.57	25	pass

Channel	Frequency (MHz)	Data Rate (Mbps)	Conducted Output Power (dBm)	Limit (dBm)	Result
Chain 0 + Chain 1: 802.11n HT20					
Low	5745	6.5	18.67	25	pass
Middle	5785	6.5	17.63	25	pass
High	5825	6.5	17.21	25	pass
Chain 0 + Chain 1: 802.11n HT40					
Low	5755	13.5	18.45	25	pass
High	5795	13.5	18.22	25	pass

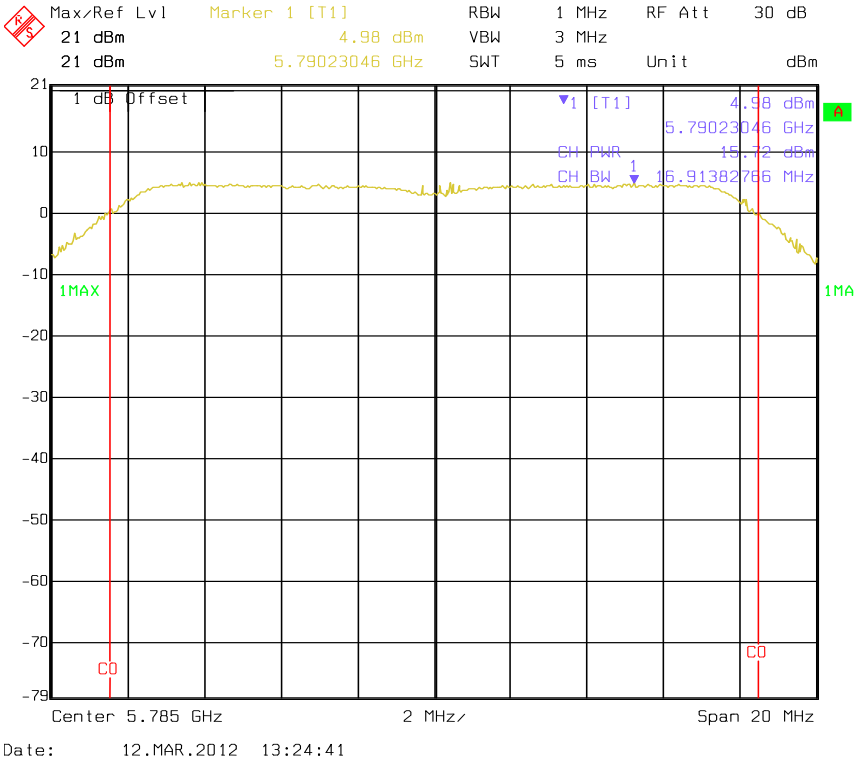
Note: The antenna gain is 11 dBi.

Please refer to the following plots

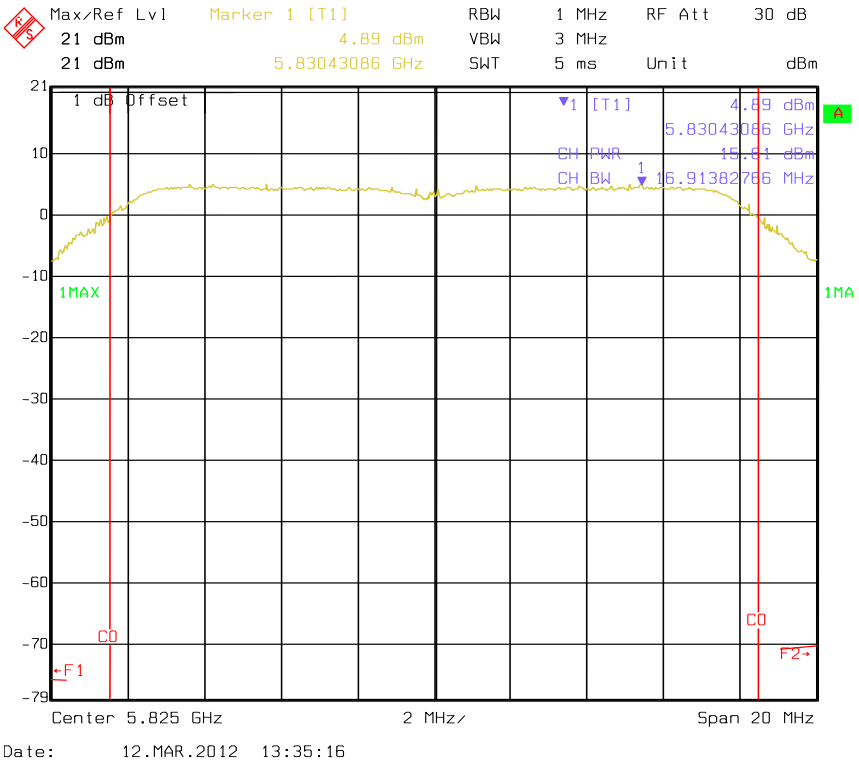
802.11a RF Output Power, Low Channel



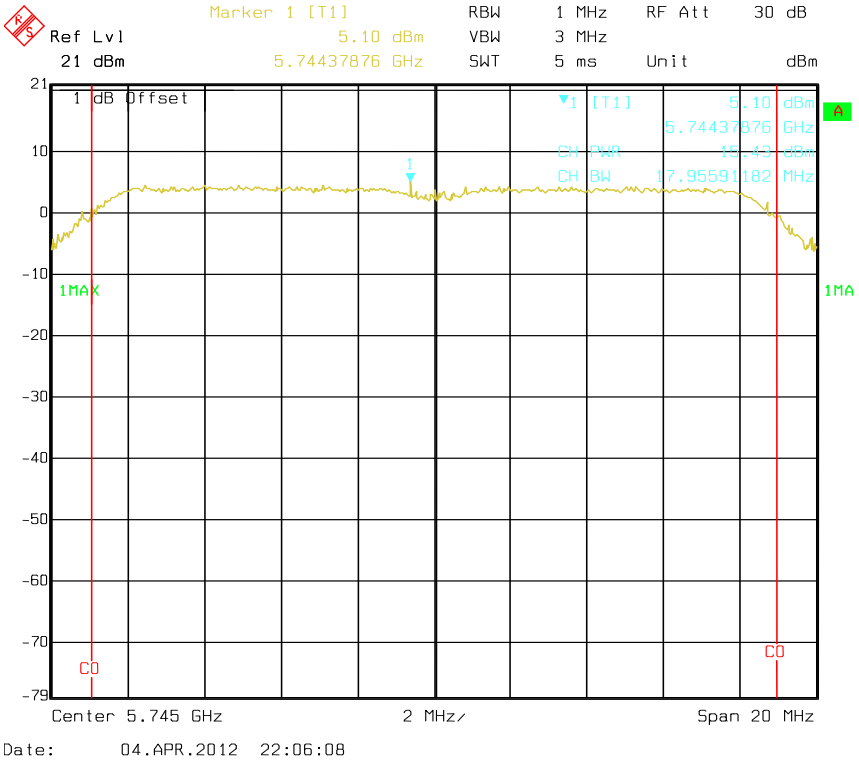
802.11a RF Output Power, Middle Channel



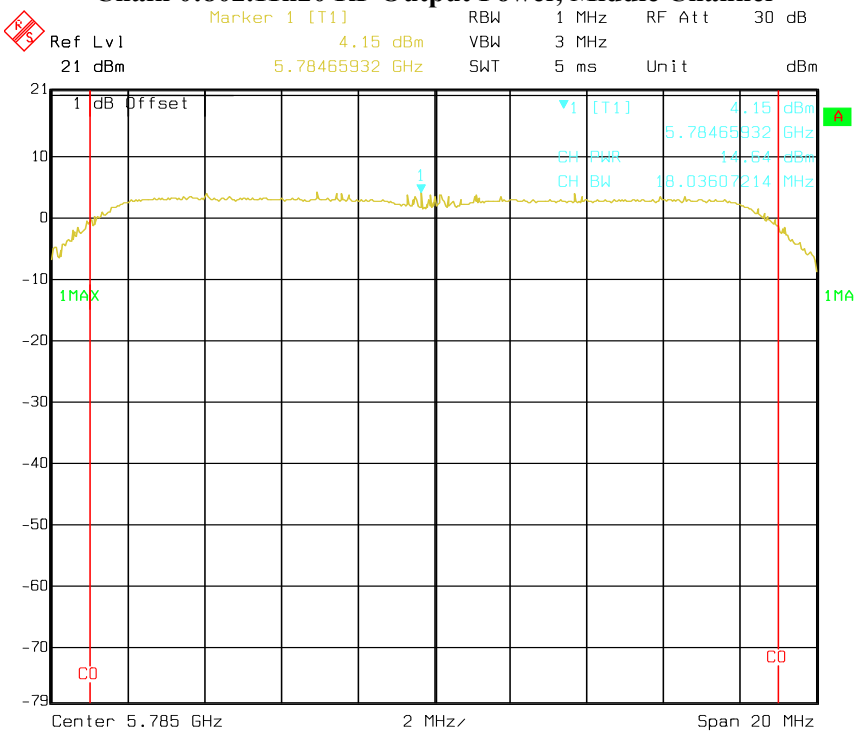
802.11a RF Output Power, High Channel



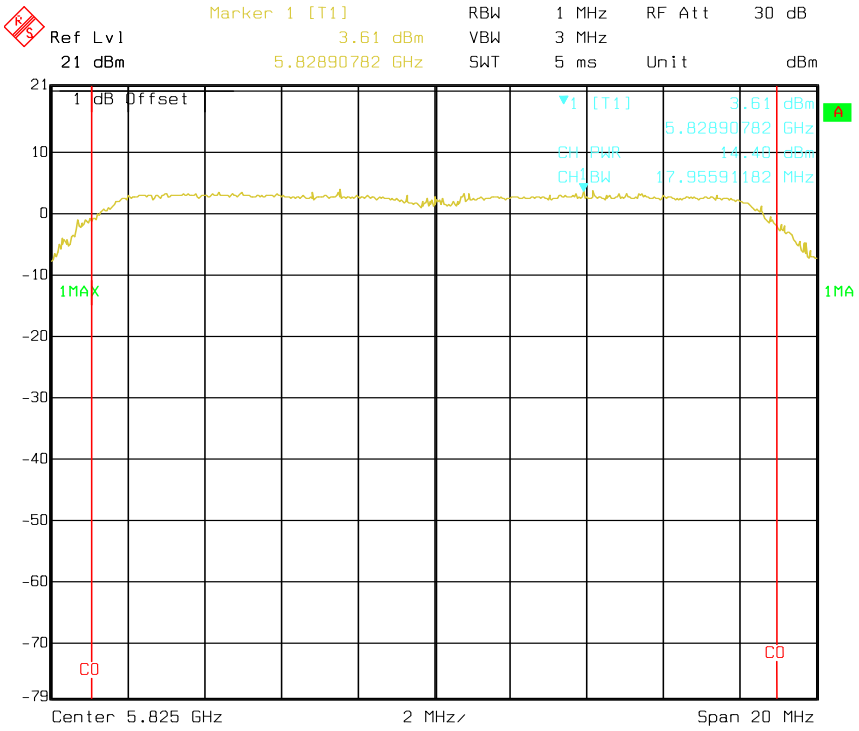
Chain 0:802.11n20 RF Output Power, Low Channel



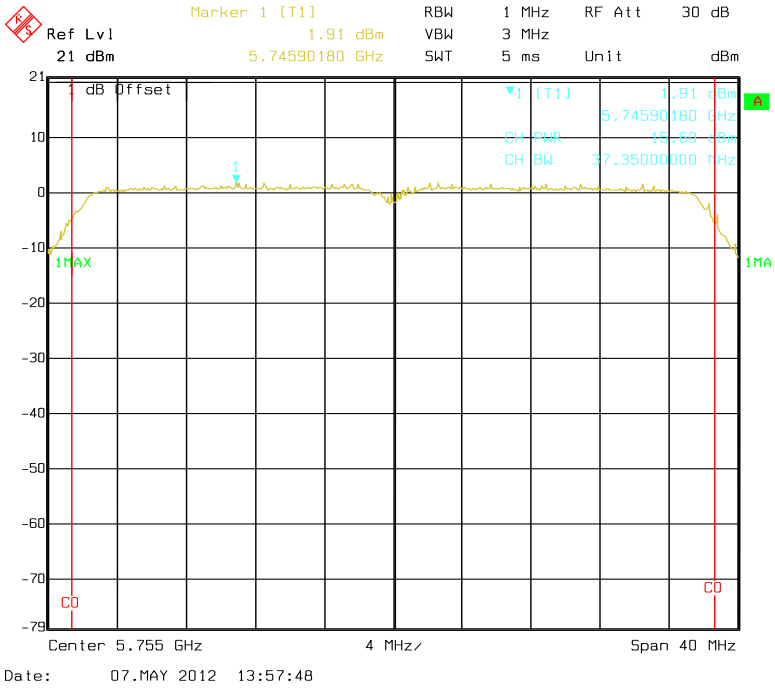
Chain 0:802.11n20 RF Output Power, Middle Channel



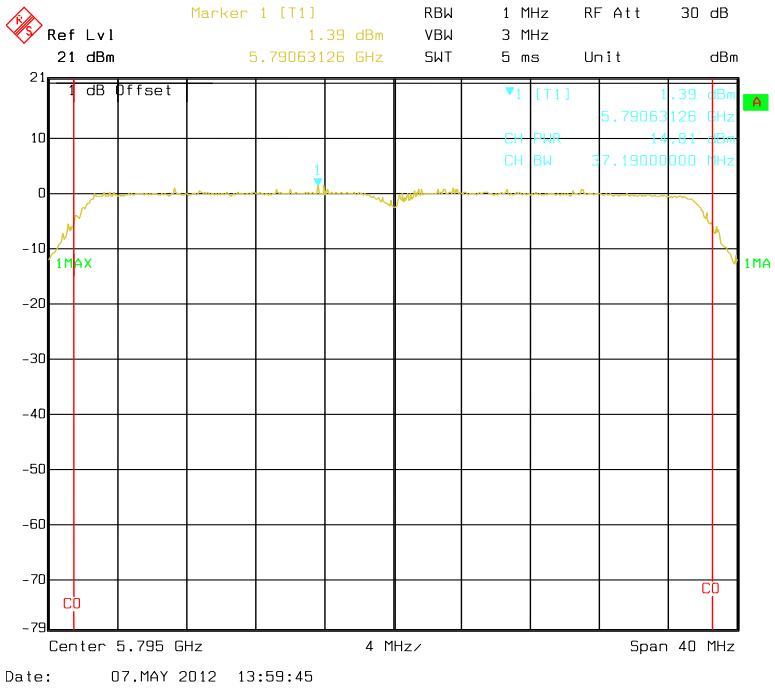
Chain 0:802.11n20 RF Output Power, High Channel



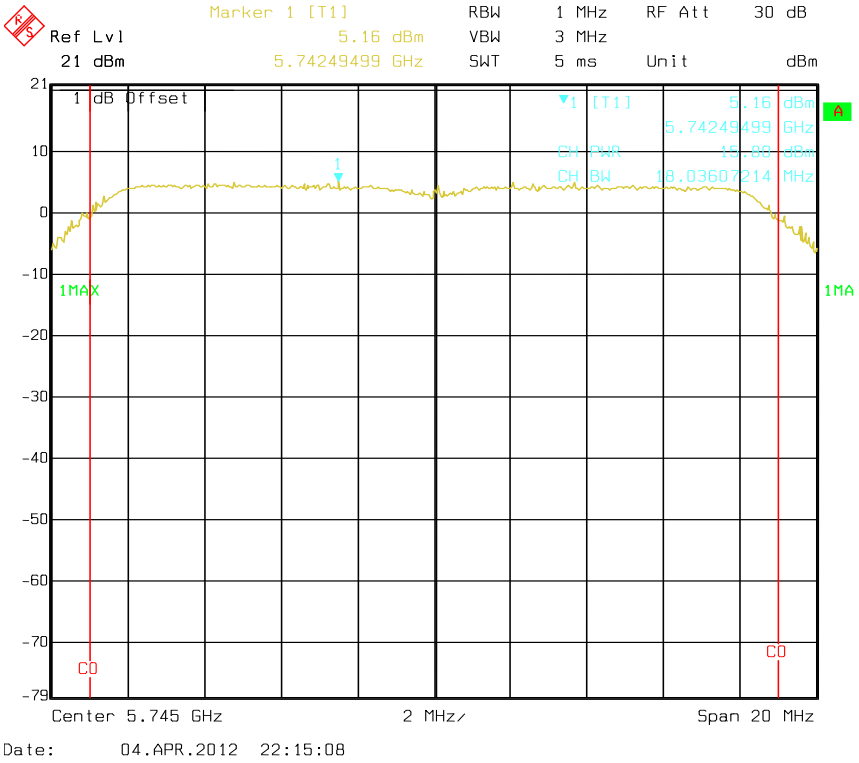
Chain 0:802.11n40 RF Output Power, Low Channel



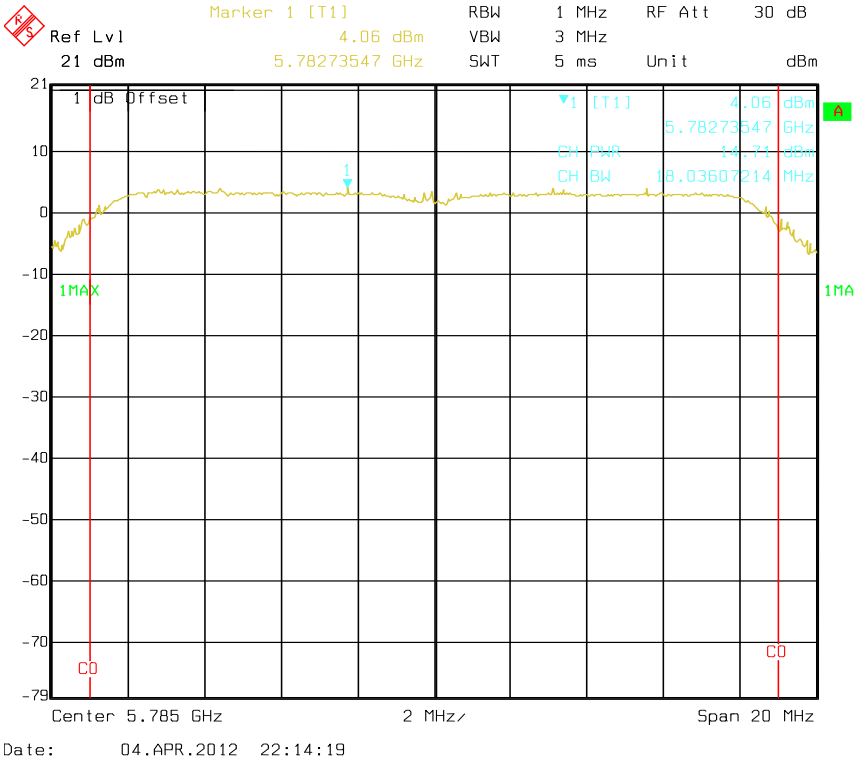
Chain 0:802.11n40 RF Output Power, High Channel



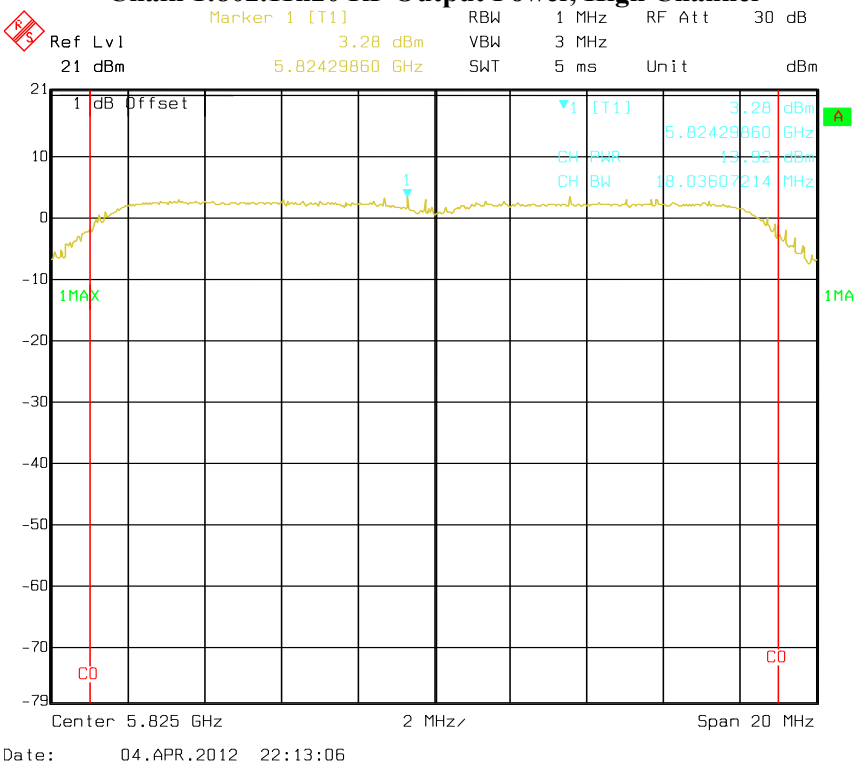
Chain 1:802.11n20 RF Output Power, Low Channel



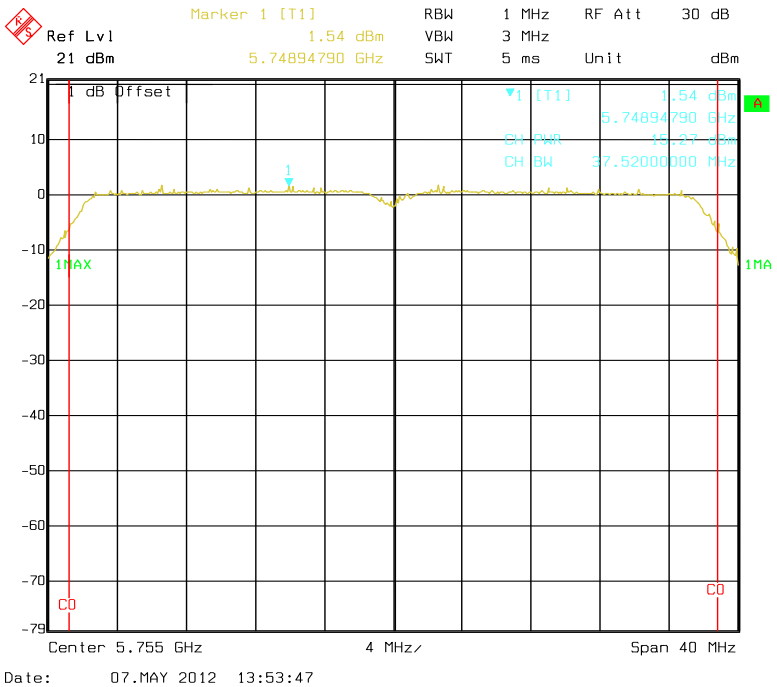
Chain 1:802.11n20 RF Output Power, Middle Channel



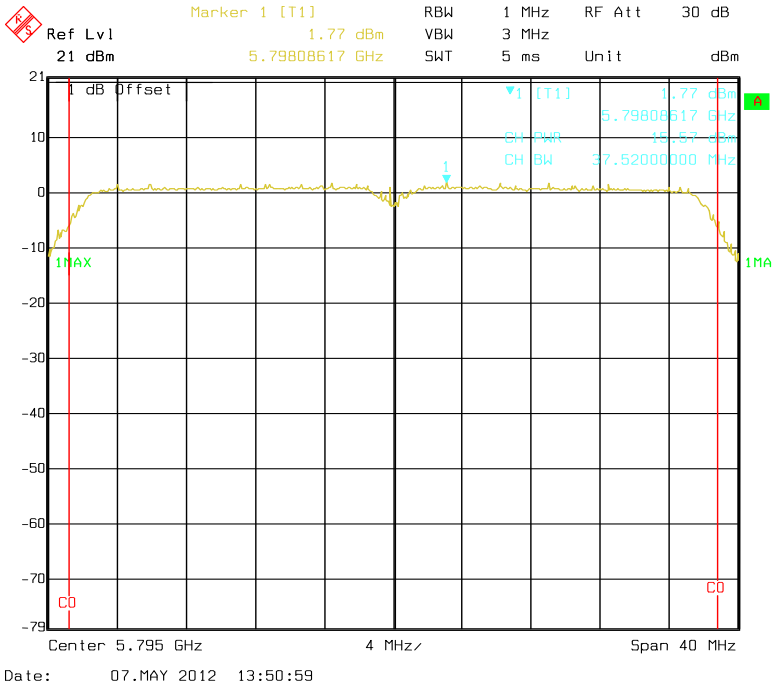
Chain 1:802.11n20 RF Output Power, High Channel



Chain 1:802.11n40 RF Output Power, Low Channel



Chain 1:802.11n40 RF Output Power, High Channel



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

Applicable Standard

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).

Test Procedure

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

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	Signal Analyzer	FSIQ 26	609358	2011-07-08	2012-07-07
Rohde & Schwarz	Spectrum Analyzer	FSP38	100479	2011-05-27	2012-05-26

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

Test Data

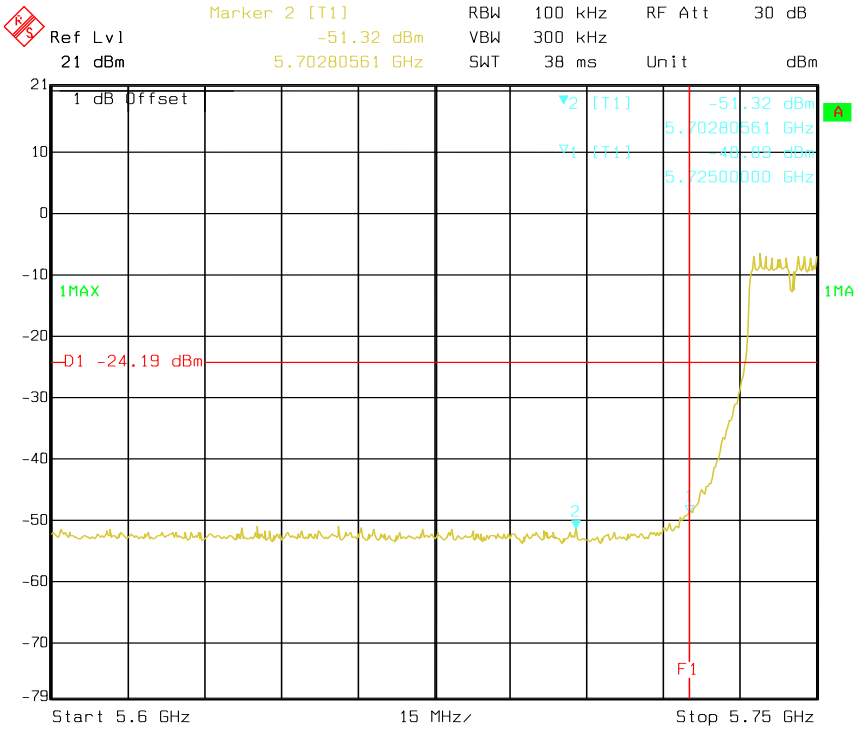
Environmental Conditions

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

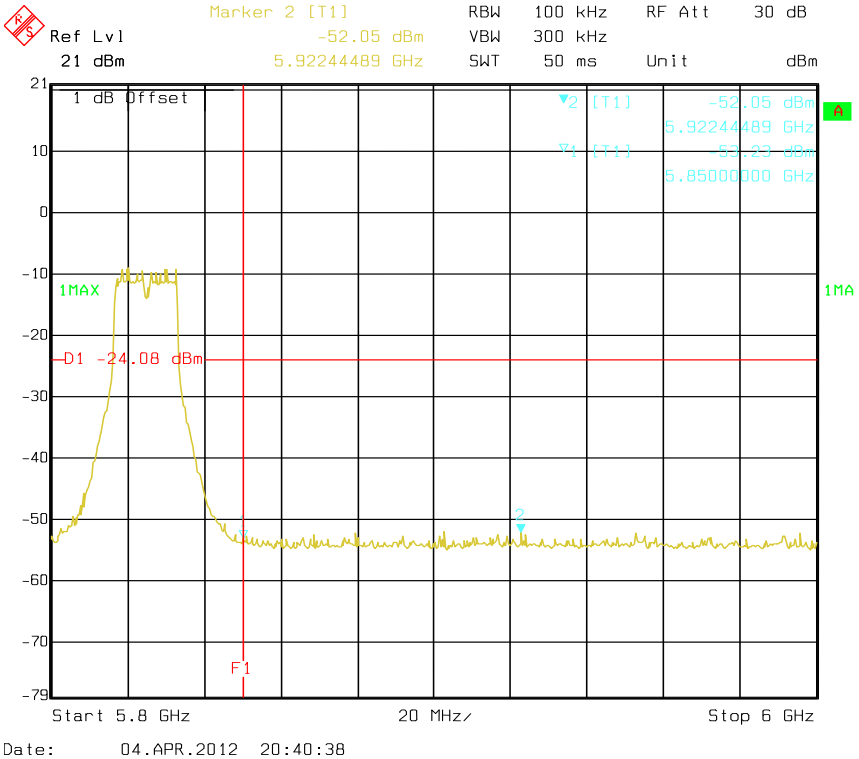
The testing was performed by Ares Liu on 2012-04-04.

Test Result: Compliance, Please refer to following plots.

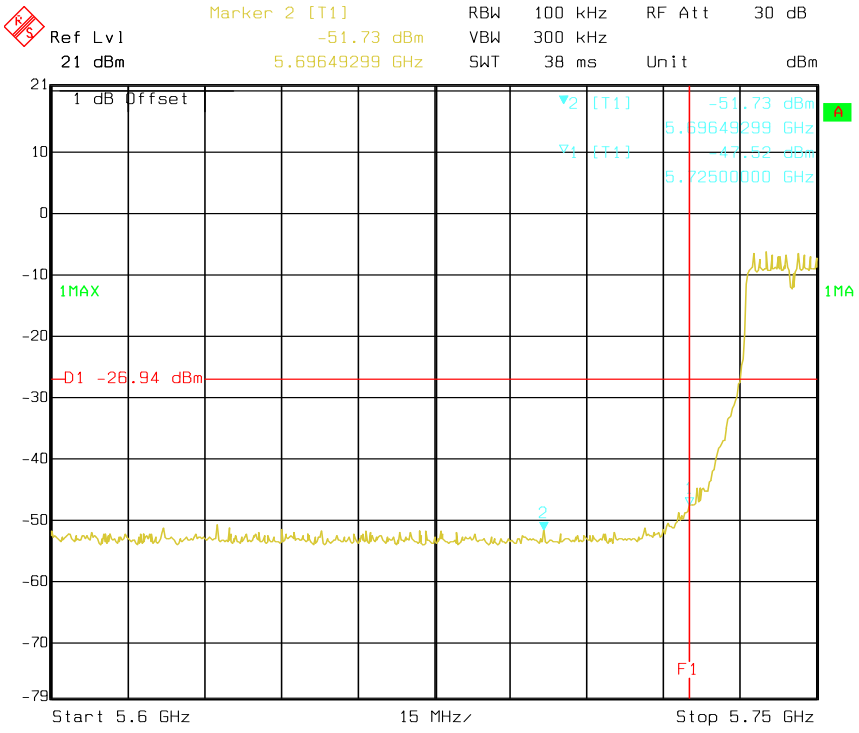
802.11a: Band Edge, Left Side



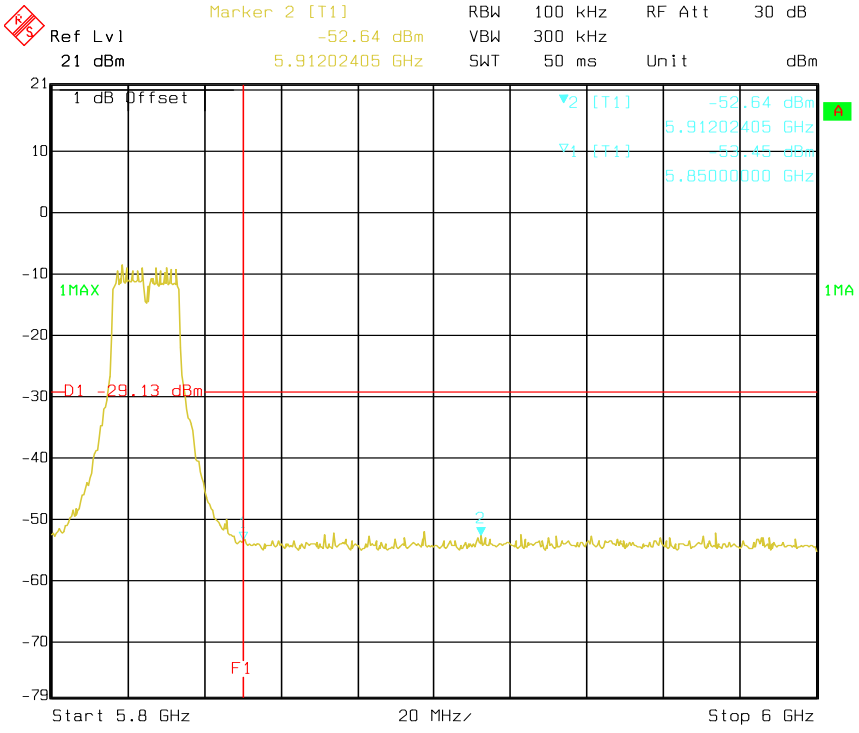
802.11a: Band Edge, Right Side



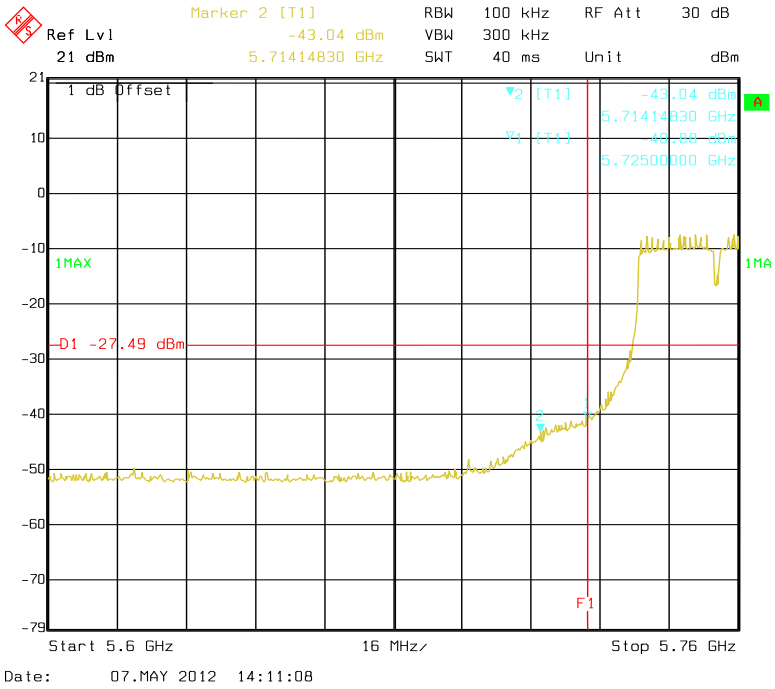
Chain 0 :802.11n20: Band Edge, Left Side



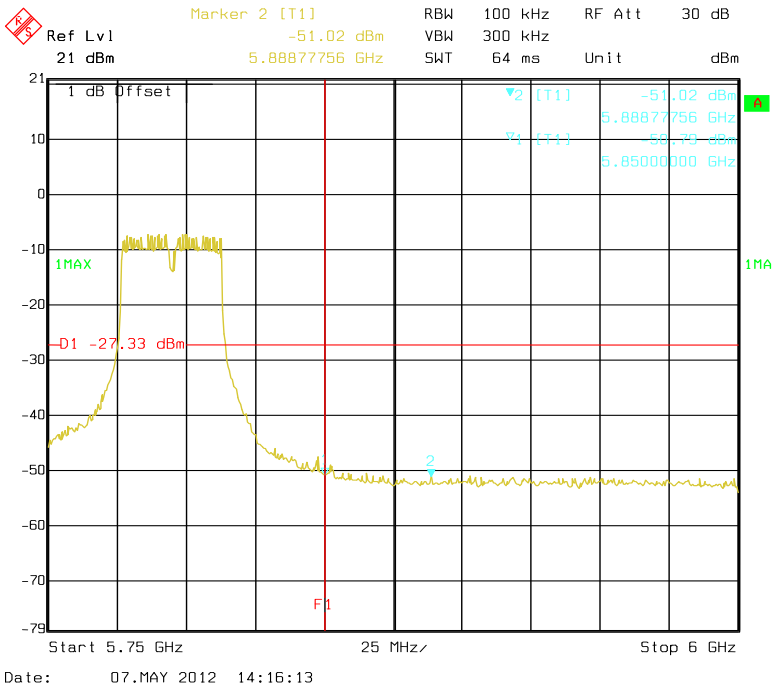
Chain 0 :802.11n20: Band Edge, Right Side



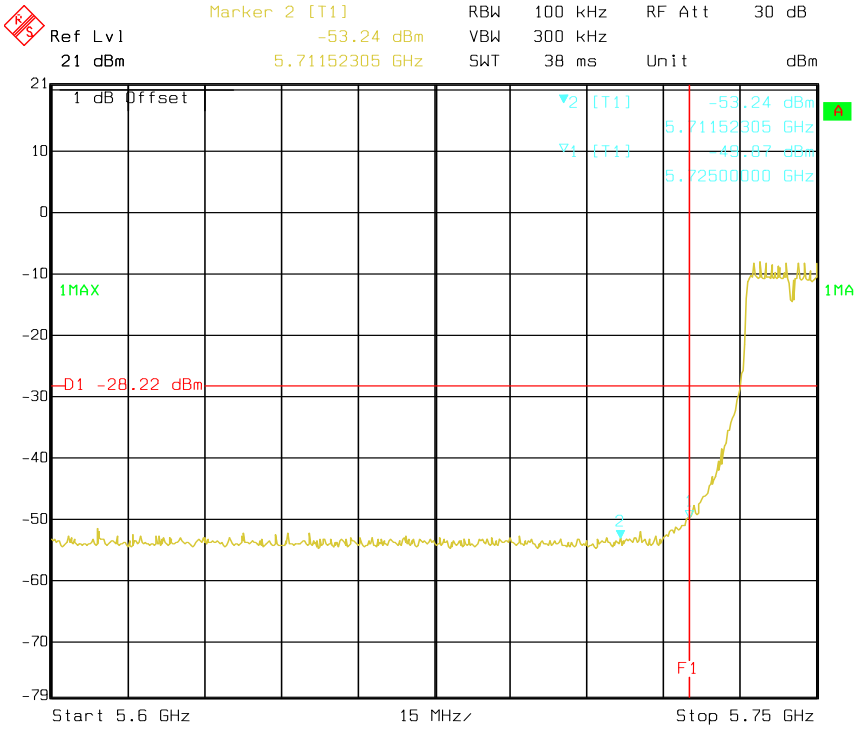
Chain 0 :802.11n40: Band Edge, Left Side



Chain 0 :802.11n40: Band Edge, Right Side

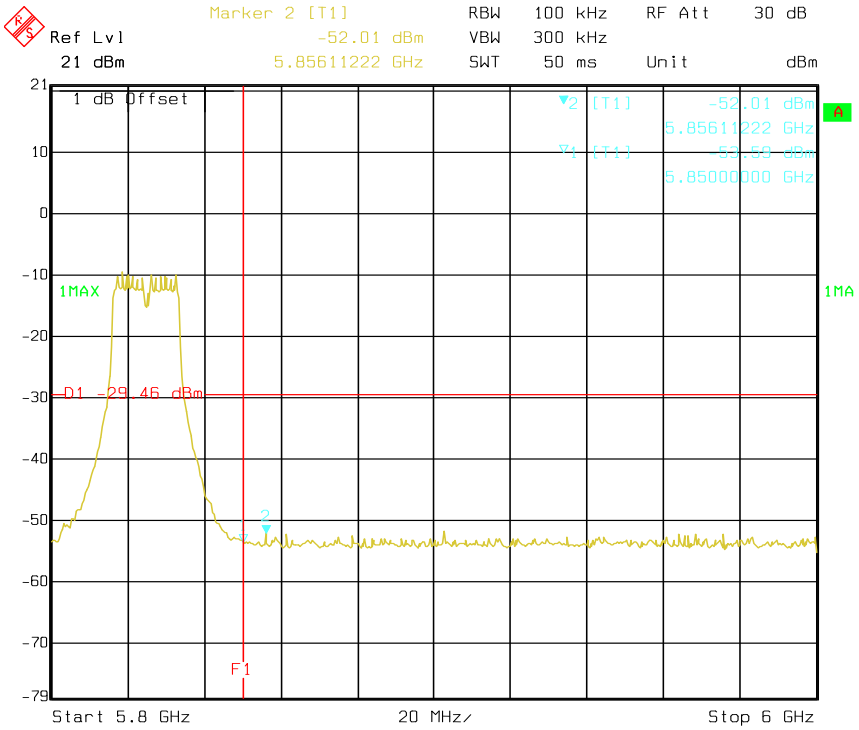


Chain 1 :802.11n20: Band Edge, Left Side



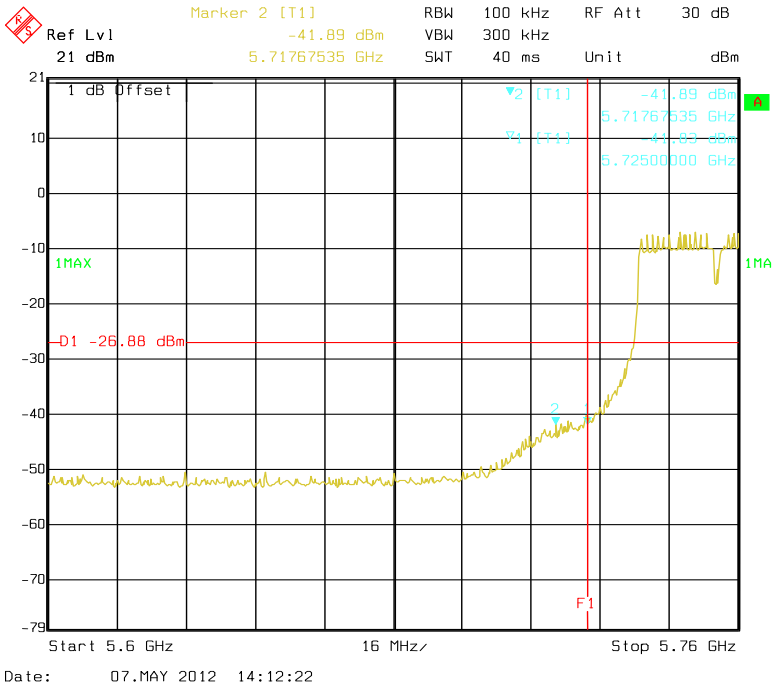
Date: 04.APR.2012 20:51:26

Chain 1 :802.11n20: Band Edge, Right Side

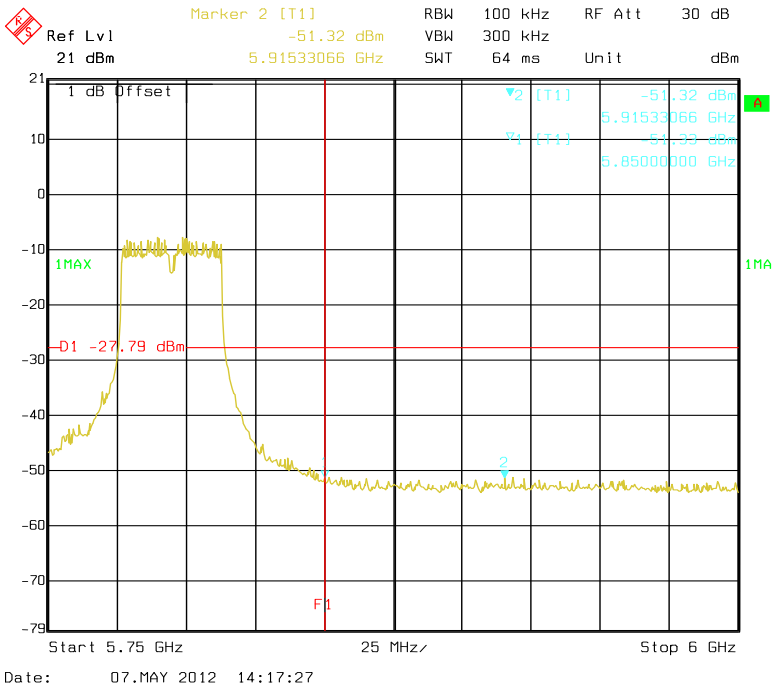


Date: 04.APR.2012 20:53:34

Chain 1 :802.11n40: Band Edge, Left Side



Chain 1 :802.11n40: Band Edge, Right Side



FCC §15.247(e) - POWER SPECTRAL DENSITY

Applicable Standard

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

Test Procedure

1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. Position the EUT was set without connection to measurement instrument. Turn on the EUT and connect its antenna terminal to measurement instrument via a low loss cable. Then set it to any one measured frequency within its operating range, and make sure the instrument is operated in its linear range.
3. According to KDB 558074 D01 DTS Meas Guidance v01, set the RBW = 100 kHz, VBW $\geqslant$ 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	EMI Test Receiver	ESCI	100035	2011-11-11	2012-11-10
Rohde & Schwarz	Signal Analyzer	FSIQ 26	609358	2011-07-08	2012-07-07

*** Statement of Traceability:** Bay Area Compliance Lab Corp. (ShenZhen) 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 form 2012-03-12 to 2012-04-04.

Test Mode: Transmitting

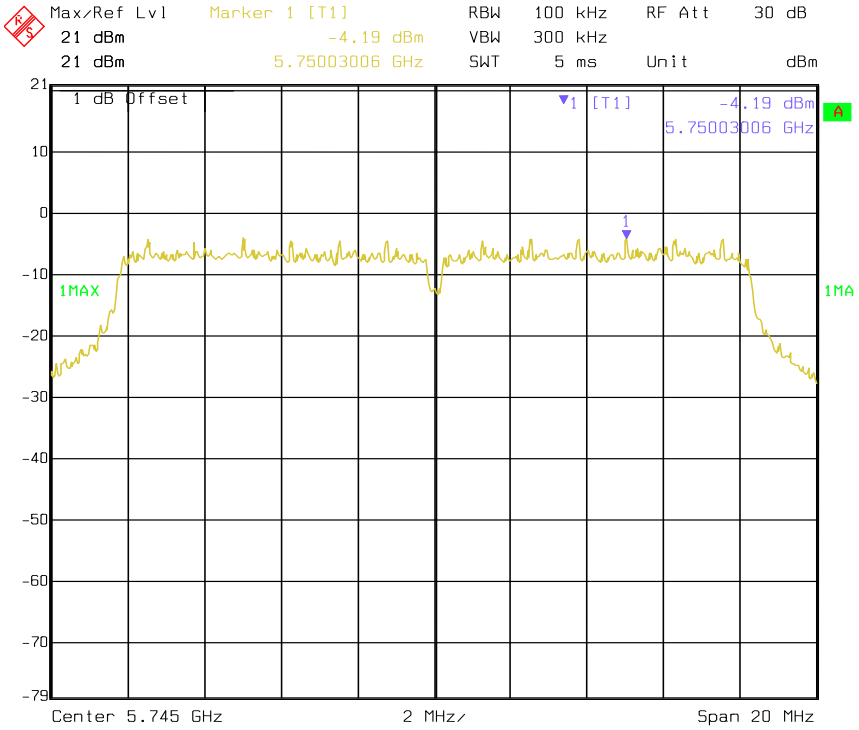
Test Result: Pass

Channel	Frequency (MHz)	Data Rate (Mbps)	S.A. Reading (dBm/100 kHz)	Cord. PSD (dBm/3 kHz)	Limit (dBm/3 kHz)	Result
802.11a						
Low	5745	6.5	-4.19	-19.39	3	pass
Middle	5785	6.5	-4.10	-19.3	3	pass
High	5825	6.5	-4.08	-19.28	3	pass
Chain 0: 802.11n HT20						
Low	5745	6.5	-6.94	-22.14	3	Pass
Middle	5785	6.5	-8.73	-23.93	3	Pass
High	5825	6.5	-9.13	-24.33	3	Pass
Chain 0: 802.11n HT40						
Low	5755	13.5	-7.49	-22.69	3	Pass
High	5795	13.5	-7.33	-22.53	3	Pass
Chain 1: 802.11n HT20						
Low	5745	6.5	-8.22	-23.42	3	Pass
Middle	5785	6.5	-7.97	-23.17	3	Pass
High	5825	6.5	-9.46	-24.66	3	Pass
Chain 1: 802.11n HT40						
Low	5755	13.5	-6.88	-22.08	3	Pass
High	5795	13.5	-7.79	-22.99	3	Pass

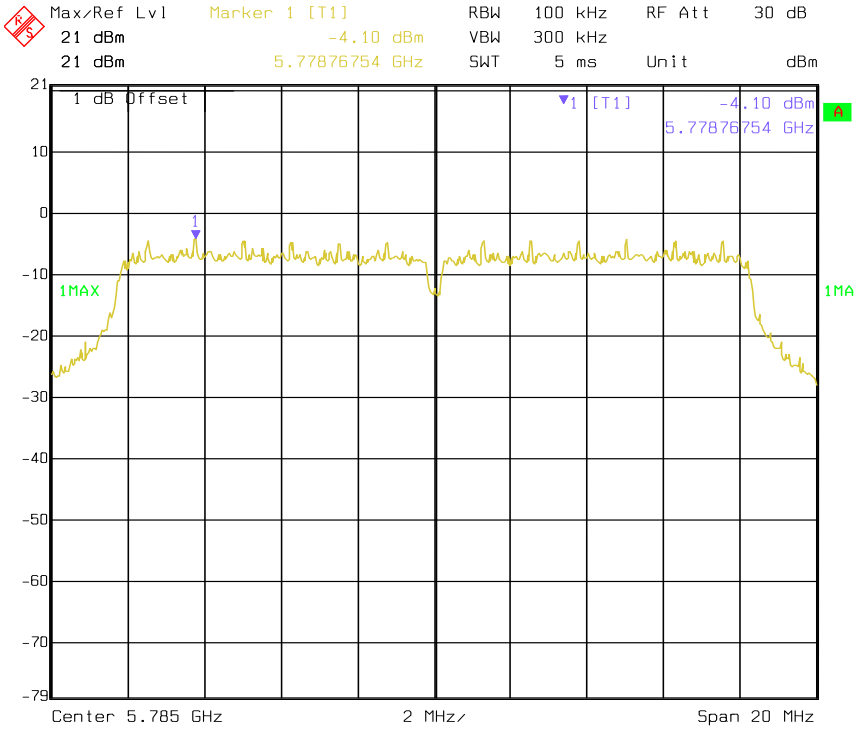
Note: The antenna gain is 11.0 dBi.

Please refer to the following plots

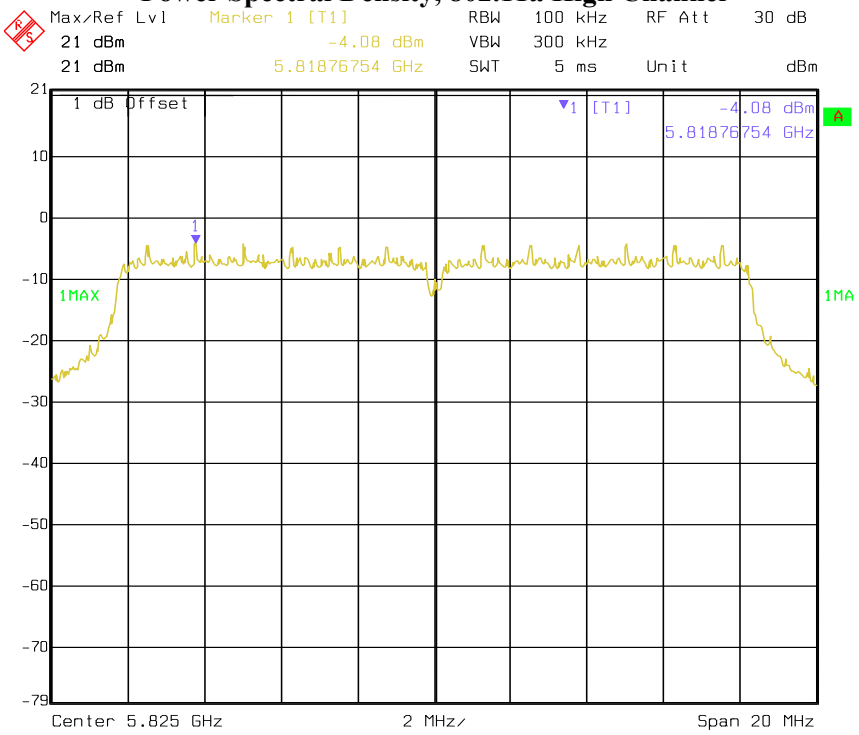
Power Spectral Density, 802.11a Low Channel



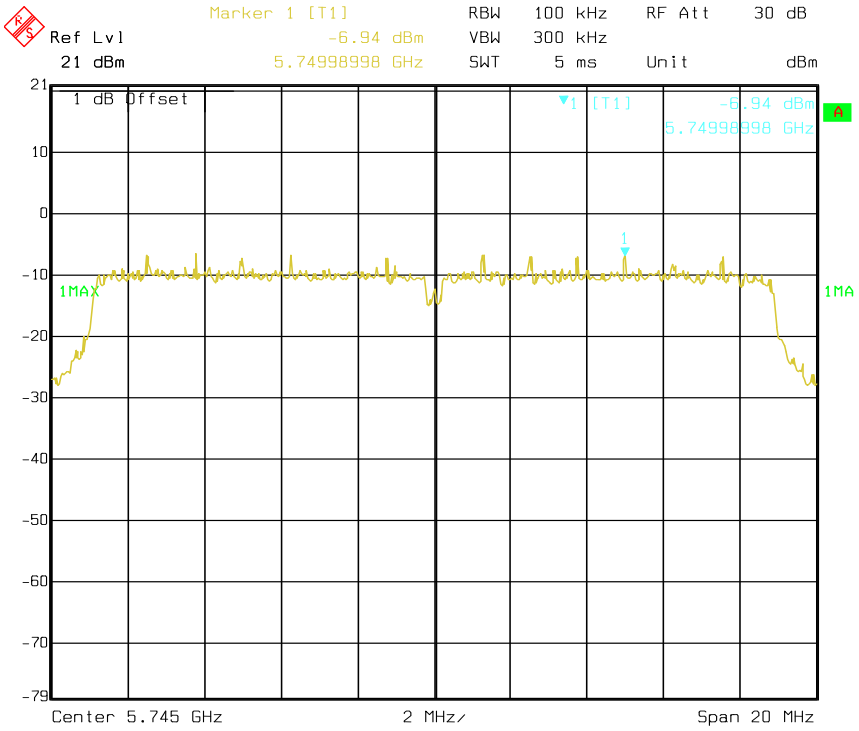
Power Spectral Density, 802.11a Middle Channel



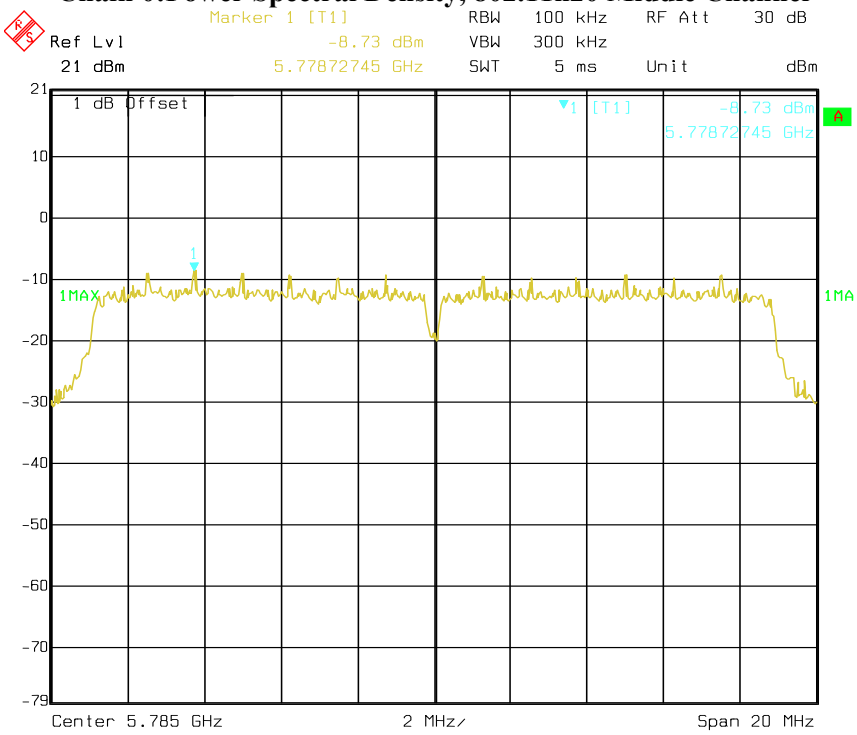
Power Spectral Density, 802.11a High Channel



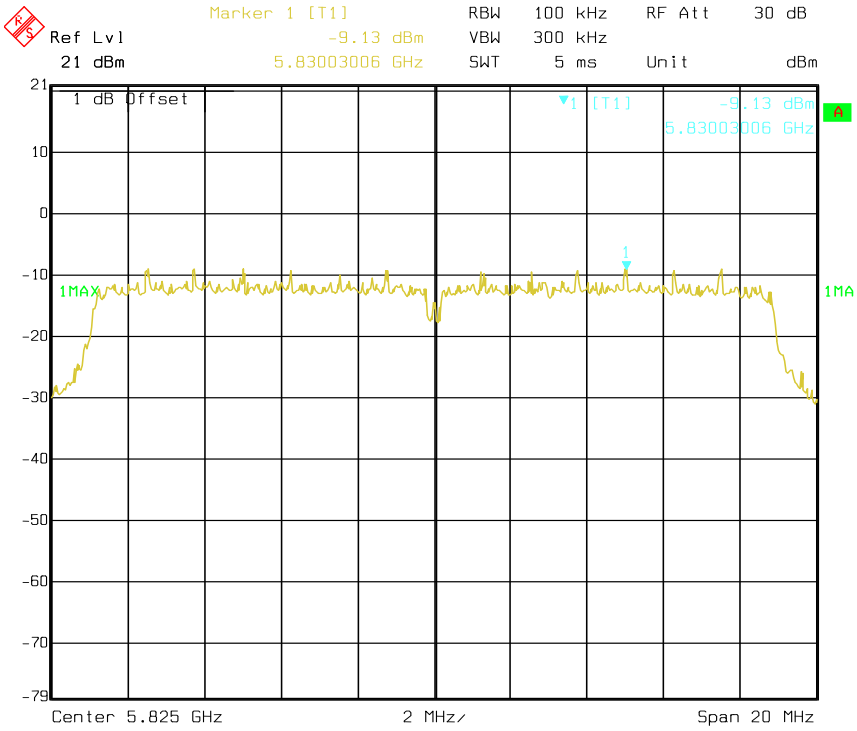
Chain 0:Power Spectral Density, 802.11n20 Low Channel



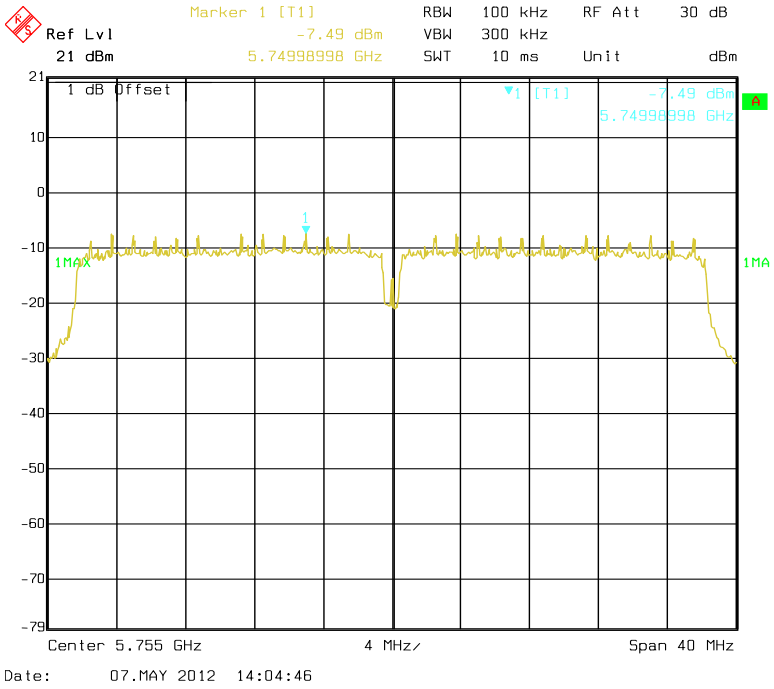
Chain 0:Power Spectral Density, 802.11n20 Middle Channel



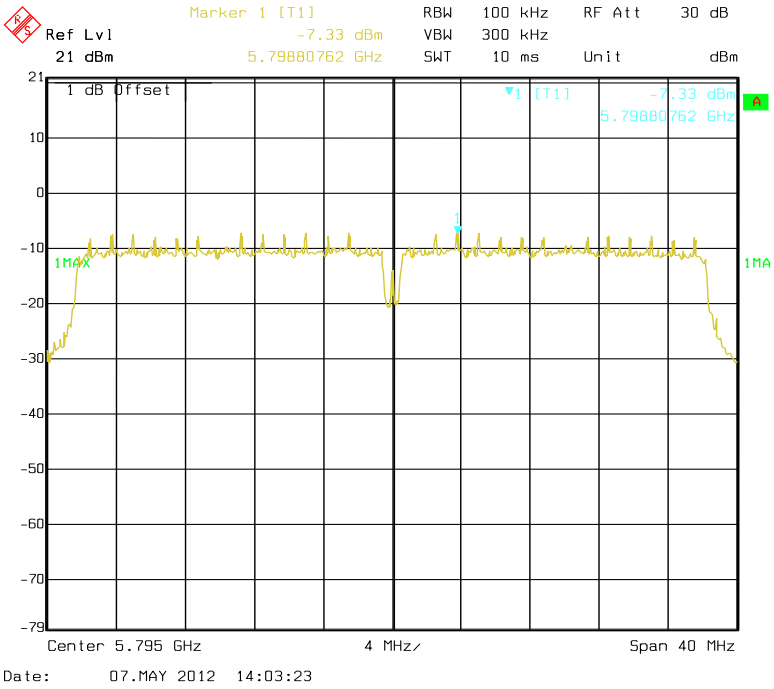
Chain 0:Power Spectral Density, 802.11n20 High Channel



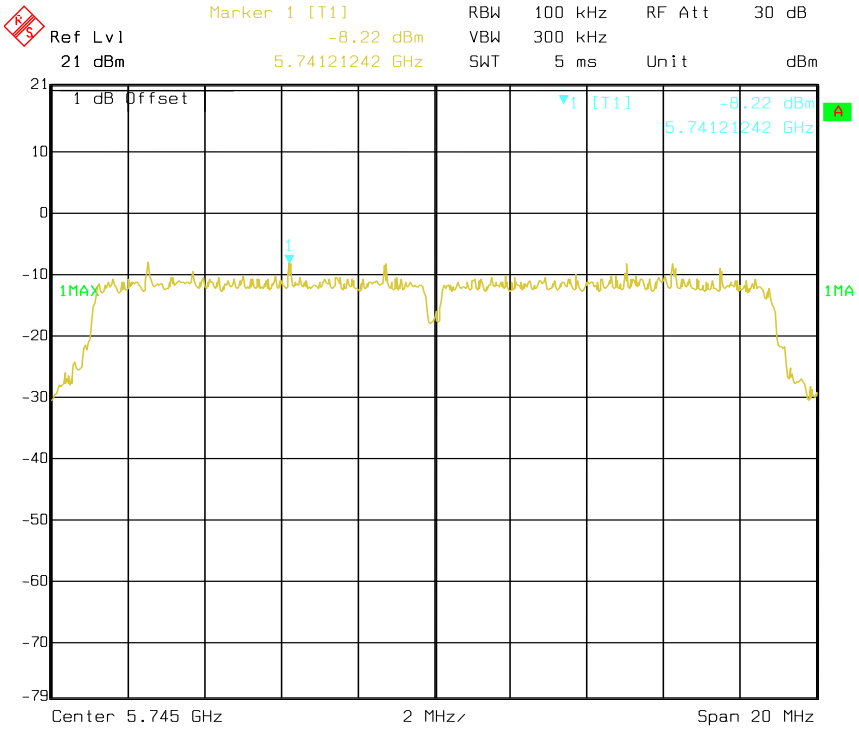
Chain 0:Power Spectral Density, 802.11n40 Low Channel



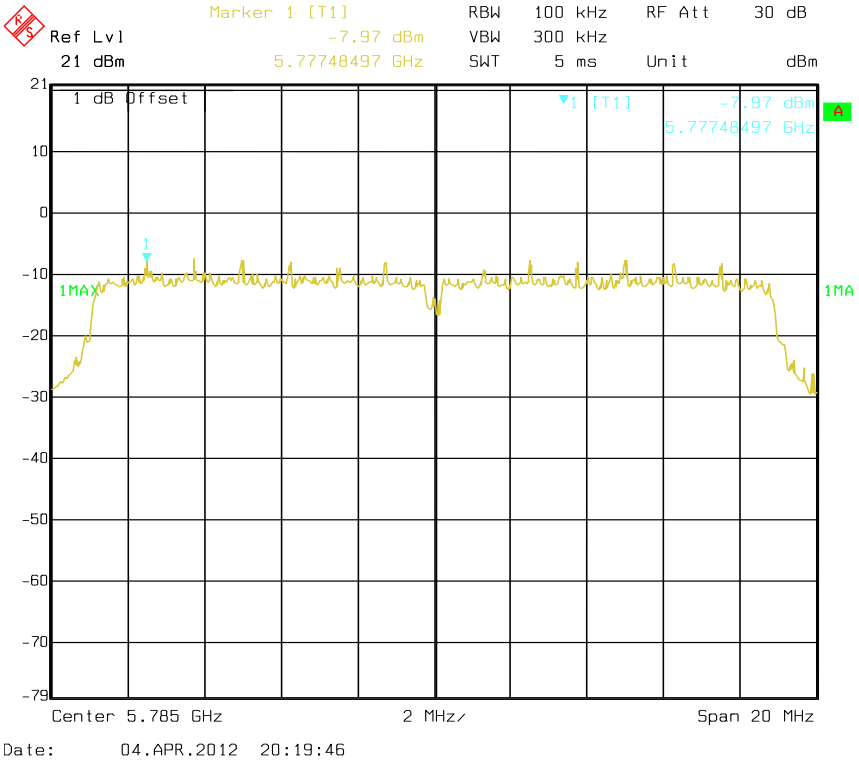
Chain 0:Power Spectral Density, 802.11n40 High Channel



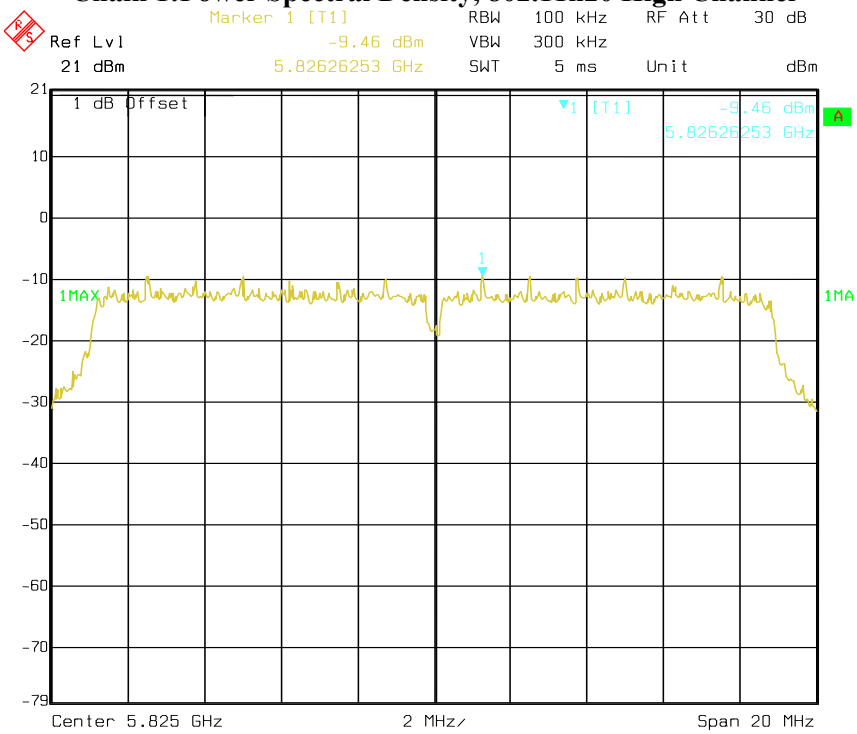
Chain 1:Power Spectral Density, 802.11n20 Low Channel



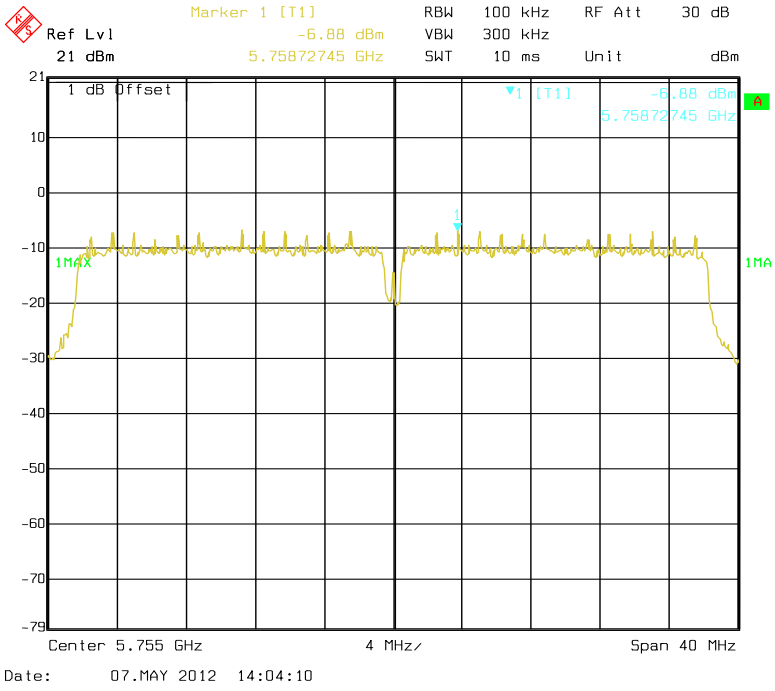
Chain 1:Power Spectral Density, 802.11n20 Middle Channel



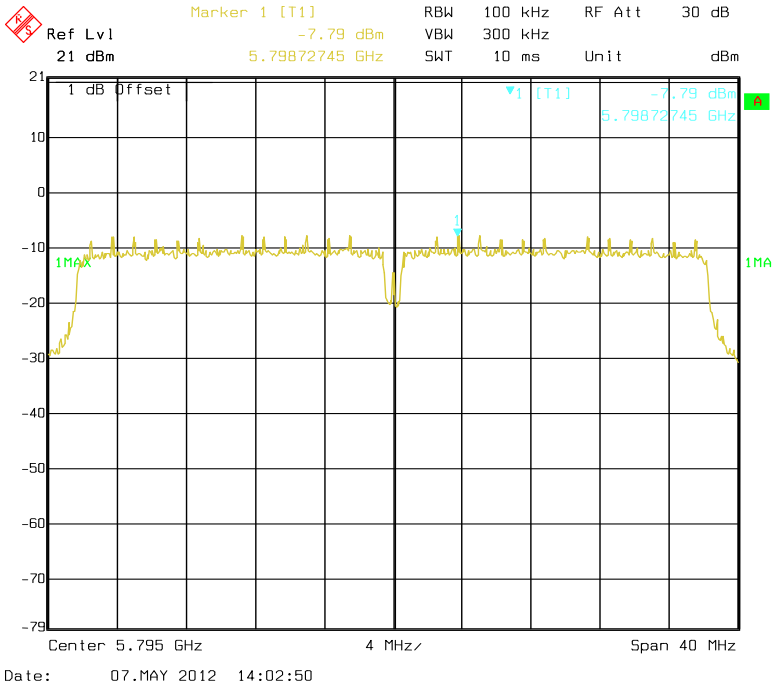
Chain 1:Power Spectral Density, 802.11n20 High Channel



Chain 1:Power Spectral Density, 802.11n40 Low Channel



Chain 1:Power Spectral Density, 802.11n40 High Channel



DECLARATION LETTER

ALFA NETWORK Inc.
Add: 4F-1, No. 106 Rueiguang Rd., Neihu District, Taipei City, Taiwan. R.O.C.
Tel: 886-2-27968477 EX:22 Fax: 886-2-27968478

Product Similarity Declaration

To Whom It May Concern,

We, ALFA NETWORK Inc., hereby declare that our product 802.11an Long-Range outdoor AP/CPE, Model Number: OAP2258XS,N5PCB,N5C,Solo-N5H,Solo-N5HC,AWAP02O-N5H,AWAP02O-N5HC,WLO-25814N,RP-WAC5330,NE-WAC5330,APE-5002A-P14,RA-N5001L,WCPEn-5000-OAA-DD are electrically identical with the Model Number: N5, that was certified by BACL. Their differences are that :The model name are different.

The rest are the same.

Please contact me if you have anyquestion.

Jackie Wen

Jackie Wen /Product Manager

Date :2012-4-6

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