Lab Code: 200707-0

FCC PART 15.247

TEST REPORT

For

Deliberant LLC

138 Mountain Brook Dr Canton, GA 30115 United States

FCC ID: UB8-APCPROP5

Report Type:	Product Type:
Original Report	Broadband Digital Transmission System

Test Engineer:	Tiger Ye
Report Number:	RSZ121221004-00
Report Date:	2013-01-21
Reviewed By:	Alvin Hang EMC Leader
Test Laboratory:	Bay Area Compliance Laboratories Corp. (Shenzhen) 6/F, the 3rd Phase of WanLi Industrial Building, ShiHua Road, FuTian Free Trade Zone Shenzhen, Guangdong, China Tel: +86-755-33320018 Fax: +86-755-33320008 www.baclcorp.com.cn

Note: This test report is prepared for the customer shown above and for the device described herein. It may not be duplicated or used in part without prior written consent from Bay Area Compliance Laboratories Corp. This report **must not** be used by the customer to claim product certification, approval, or endorsement by NVLAP*, NIST, or any agency of the Federal Government.
* This report may contain data that are not covered by the NVLAP accreditation and shall bemarked with an asterisk "★".

TABLE OF CONTENTS

GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

The *Deliberant LLC*'s product, model number: *APC Propeller 5 (FCC ID: UB8-APCPROP5) (*the "EUT") in this report was a *Broadband Digital Transmission System,* which was measured approximately: 17.6 cm (L) x 6.5 cm (W) x 9.5 cm (H), rated input voltage: DC 24V PoE power adapter.

PoE Power Adapter Information:
Model: GRT-240070
Input: AC 100-240V~50/60Hz 0.5A
Output: DC 24V 0.7A

** All measurement and test data in this report was gathered from production sample serial number: 0101101500000021 (Assigned by the applicant). The EUT supplied by the applicant was received on 2012-12-21.*

Objective

This report is prepared on behalf of *Deliberant LLC* in accordance with Part 2-Subpart J, Part 15-Subparts A, B and C of the Federal Communication Commissions rules.

The tests were performed in order to determine compliance with FCC Part 15, Subpart C, and section 15.203, 15.205, 15.207, 15.209 and 15.247 rules.

Related Submittal(s)/Grant(s)

No related submittal(s).

Test Methodology

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

All emissions measurement was performed and Bay Area Compliance Laboratories Corp. (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. (Shenzhen) to collect test data is located on the 6/F, the 3rd Phase of WanLi Industrial Building, ShiHua Road, FuTian Free Trade Zone Shenzhen, Guangdong, China.

Test site at Bay Area Compliance Laboratories Corp. (Shenzhen) has been fully described in reports submitted to the Federal Communication Commission (FCC). The details of these reports have been found to be in compliance with the requirements of Section 2.948 of the FCC Rules on December 06, 2010. The facility also complies with the radiated and AC line conducted test site criteria set forth in ANSI C63.4-2003.

The Federal Communications Commission has the reports on file and is listed under FCC Registration No.: 382179. The test site has been approved by the FCC for public use and is listed in the FCC Public Access Link (PAL) database.

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

For 802.11a, 802.11n-HT20 and 802.11n-HT40 mode, Channel lists as below:

Channel	Frequency (MHz)	Comments
149	5745	802.11a & 802.11n-HT20
153	5765	
157	5785	
161	5805	
165	5825	
151	5755	802.11n-HT40
159	5795	

Channel 149,153,157,161&165 are for 802.11a & 802.11n-HT20 mode, EUT was tested with Channel 149, 157 & 165.For 802.11n-HT40 mode, EUT was tested with Channel 151 & 159.

EUT Exercise Software

Test software: Microsoft CMD.exe
The test was performed under:
802.11a: Data rate: 6.0Mbps
802.11n-HT20: Data rate: 6.5Mbps
802.11n-HT40: Data rate: 13.5Mbps

802.11a: The commend is “iwpriv ra0 set TxPower=21”
802.11n-HT20: The commend is “iwpriv ra0 set TxPower=21”
802.11n-HT40: The commend is “iwpriv ra0 set TxPower=19”

Equipment Modifications

No modification was made to the unit tested.

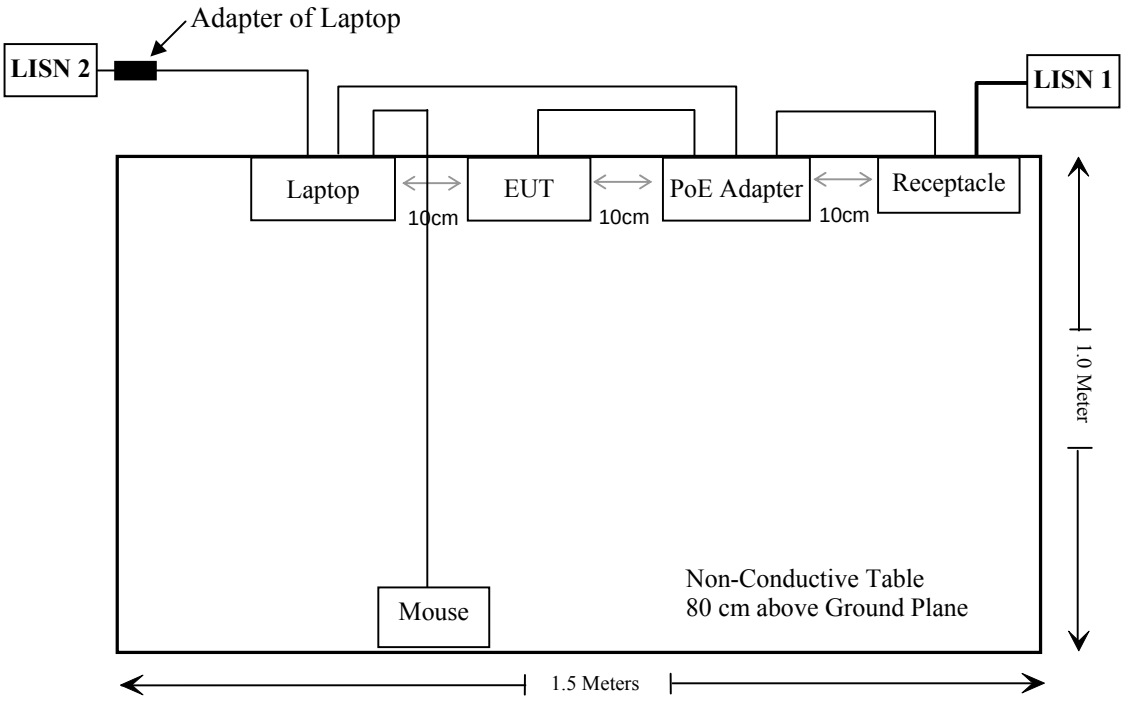
Local Support Equipment List and Details

Manufacturer	Description	Model	Serial Number
IBM	Laptop	2371	N/A
DELL	Mouse	MUC5UO	N/A

External I/O Cable

Cable Description	Length (m)	From Port	To
Unshielded Detachable Power Cable	1.0	PoE Adapter	Receptacle
Shielded Detachable RJ45 Cable	1.0	PoE Adapter	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) (c)	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) & §2.1091- MAXIMUM PERMISSIBLE EXPOSURE (MPE)

Applicable Standard

According to FCC 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;

MPE Calculation

Predication of MPE limit at a given distance

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

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

Calculated Data, worst case as below:

Mode	Frequency (MHz)	Antenna Gain		Conducted Power		Evaluation Distance (cm)	Power Density (mW/cm^2)	MPE Limit (mW/cm^2)
		(dBi)	(numeric)	(dBm)	(mW)			
(B) Limits for General Population/Uncontrolled Exposure								
802.11a	5745	15	31.62	25.75	375.84	265	0.013	1.0
802.11n-HT20	5785	15	31.62	28.21	662.22	265	0.024	1.0
802.11n-HT40	5795	15	31.62	28.16	654.64	265	0.023	1.0

FCC Radiation Exposure Statement:

To comply with FCC RF exposure requirements, a minimum separation distance of 8.7 feet (265cm) is required between the antenna and all public persons.

Result: Compliance

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.

And according to FCC 47 CFR section 15.247 (C)(ii)，Systems operating in the 5725–5850 MHz band that are used exclusively for fixed, point-to-point operations may employ transmitting antennas with directional gain greater than 6 dBi without any corresponding reduction in transmitter conducted output power.

Antenna Connector Construction

This product used two 5.8 GHz band TX/RX antennas which were connected to the main board with I-PEX socket, as follows and please refer to the EUT photos.

Antenna specifications:

Directional antenna (5GHz Dual polarization Panel antenna) 15 dBi

This product is professionally installed equipment; please refer to installation guide for details.

Result: Compliance.

FCC §15.207 (a) – AC LINE CONDUCTED EMISSIONS

Applicable Standard

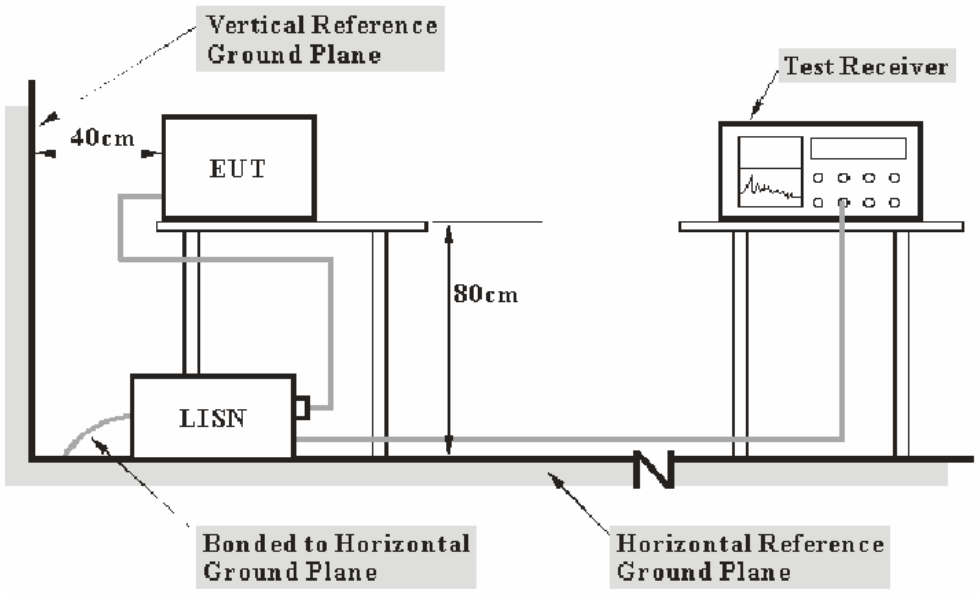
FCC§15.207

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 CISPR 16-4-4, 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), and the uncertainty will not be taken into consideration for all the test data recorded in the report.

EUT Setup



Note: 1. Support units were connected to second LISN.
2. Both of LISNs (AMN) 80 cm from EUT and at the least 80 cm from other units and other metal planes support units.

The setup of EUT is according with per ANSI C63.4-2003 measurement procedure. The specification used was with the FCC Part 15.207 limits.

The spacing between the relevant 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	100176	2012-11-24	2013-11-23
Rohde & Schwarz	L.I.S.N.	ESH2-Z5	892107/021	2012-08-22	2013-08-21
Rohde & Schwarz	Attenuator	ESH3Z2	DE25985	2012-07-08	2013-07-07
BACL	CE Test software	BACL-CE	V1.0	-	-

*** Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Shenzhen) attests that all calibrations have been performed in accordance to NVLAP requirements, traceable to traceable to National Primary Standards and International System of Units (SI).

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:

5.19 dB at **25.155 MHz** in the **Line** conducted mode

Test Data

Environmental Conditions

Temperature:	25℃
Relative Humidity:	56 %
ATM Pressure:	100.0 kPa

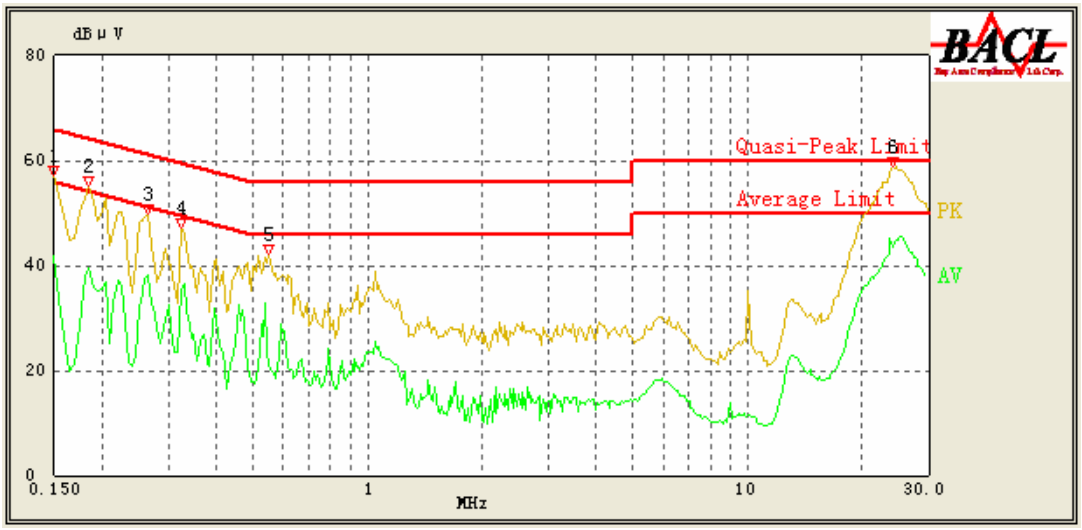
The testing was performed by Tiger Ye on 2013-01-17.

Test Mode: Transmitting

120 V, 60 Hz, Line:

Frequency (MHz)	Corrected Amplitude (dBµV)	Correction Factor (dB)	Limit (dBµV)	Margin (dB)	Detector (PK/Ave./QP)
25.155	44.81	12.00	50.00	5.19	Ave.
23.920	44.25	12.19	50.00	5.75	Ave.
26.665	42.52	11.86	50.00	7.48	Ave.
25.060	52.16	12.01	60.00	7.84	QP
23.000	41.64	12.33	50.00	8.36	Ave.
23.940	49.82	12.18	60.00	10.18	QP
26.980	47.05	11.83	60.00	12.95	QP
23.010	43.66	12.33	60.00	16.34	QP
0.550	38.63	10.24	56.00	17.37	QP
0.505	35.41	10.25	56.00	20.59	QP
0.550	24.06	10.24	46.00	21.94	Ave.
0.505	18.65	10.25	46.00	27.35	Ave.

120V, 60 Hz, Neutral:



Frequency (MHz)	Corrected Amplitude (dBµV)	Correction Factor (dB)	Limit (dBµV)	Margin (dB)	Detector (PK/Ave./QP)
24.170	43.54	12.12	50.00	6.46	Ave.
24.170	51.18	12.12	60.00	8.82	QP
0.150	54.02	10.24	66.00	11.98	QP
0.150	41.68	10.24	56.00	14.32	Ave.
0.265	38.04	10.25	52.71	14.67	Ave.
0.325	35.39	10.25	51.00	15.61	Ave.
0.185	39.38	10.24	55.00	15.62	Ave.
0.185	49.20	10.24	65.00	15.80	QP
0.550	38.48	10.24	56.00	17.52	QP
0.265	44.19	10.25	62.71	18.52	QP
0.325	41.06	10.25	61.00	19.94	QP
0.550	21.07	10.24	46.00	24.93	Ave.

Note:
1) Corrected Amplitude = Reading + Correction Factor
2) Correction Factor =LISN/ISN VDF (Voltage Division Factor) + Cable Loss + Pulse Limiter Attenuation
The corrected factor has been input into the transducer of the test software.
3) Margin = Limit – Corrected Amplitude

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

Applicable Standard

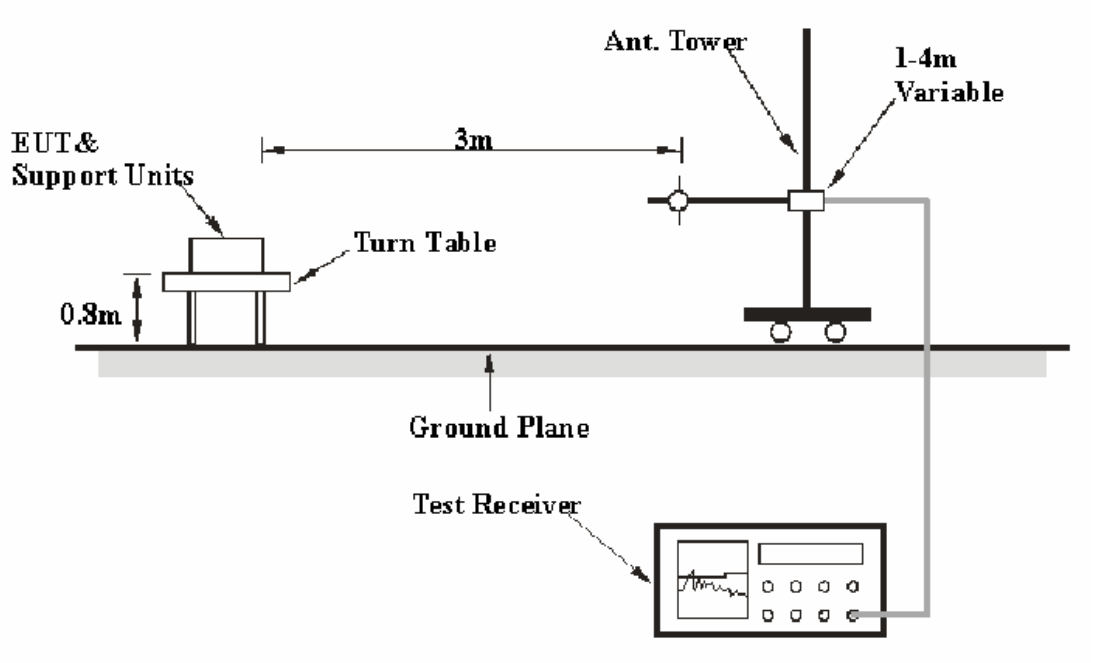
FCC §15.247 (d); §15.209; §15.205;

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), and the uncertainty will not be taken into consideration for all the test data recorded in the report.

EUT Setup



The radiated emission tests were performed in the 3 meters chamber test site, using the setup accordance with the ANSI C63.4-2003. 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 relevant 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	IF B/W	Detector
30MHz – 1000 MHz	100 kHz	300 kHz	120kHz	QP
1000 MHz – 40 GHz	1MHz	3 MHz	/	PK
	1MHz	10 Hz	/	Ave.

Test Procedure

During the conducted emission test, the adapter was connected to the outlet of the LISN.

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
HP	Amplifier	8447E	1937A01046	2012-11-24	2013-11-23
Rohde & Schwarz	EMI Test Receiver	ESCI	101122	2012-08-08	2013-08-07
Sunol Sciences	Broadband Antenna	JB1	A040904-2	2011-11-28	2014-11-27
Mini-Circuits	Amplifier	ZVA-213+	N/A	2012-11-24	2013-11-23
Sunol Sciences	Horn Antenna	DRH-118	A052304	2011-12-01	2014-11-30
Rohde & Schwarz	Signal Analyzer	FSIQ26	8386001028	2012-11-24	2013-11-23
Agilent	Spectrum Analyzer	8564E	3943A01781	2012-05-17	2013-05-17
the electro-Mechanics Co.	Horn Antenna	3116	9510-2270	2010-10-14	2013-10-13

*** Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Shenzhen) attests that all calibrations have been performed in accordance to NVLAP requirements, traceable to traceable to National Primary Standards and International System of Units (SI).

Test Results Summary

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

6.63 dB at **7271.6 MHz** in the **Vertical** polarization

Test Data

Environmental Conditions

Temperature:	25℃
Relative Humidity:	56 %
ATM Pressure:	100.0 kPa

The testing was performed by Tiger Ye on 2013-01-17.

Test Mode: Transmitting (worst case)

Note: For 802.11a, test with two antenna port transmit separately and worst case as below.
For 802.11n-HT20, 802.11n-HT40, test with two antenna ports transmit simultaneously

30 MHz-40 GHz:

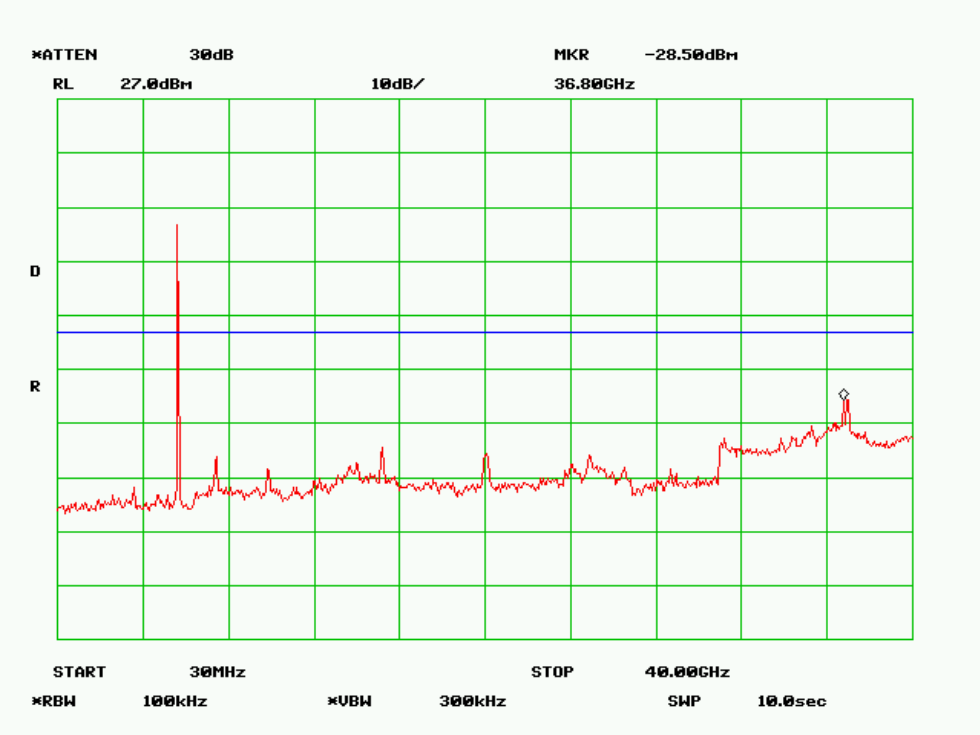
Indicated		Detector (PK/Ave.)	Table Angle Degree	Antenna		Corrected Factor (dB)	FCC Part 15.247/209/205		
Frequency (MHz)	Receiver Reading (dBμV)			Height (m)	Polar (H/V)		Corrected Amplitude (dBμV/m)	Limit (dBμV/m)	Margin (dB)
802.11a, Channel:149									
5745.0	83.25	PK	52	1.3	H	39.5	122.75	\	\
5745.0	78.75	Ave.	52	1.3	H	39.5	118.25	\	\
5745.0	84.54	PK	16	1.2	V	39.5	112.04	\	\
5745.0	79.32	Ave.	16	1.2	V	39.5	118.82	\	\
7273.6	29.66	Ave.	21	1.2	V	16.62	46.28	54	7.72
5396.1	33.12	Ave.	223	1.3	H	12.10	45.22	54	8.78
11490.0	25.12	Ave.	151	1.1	V	20.47	45.59	54	8.41
4919.8	31.25	Ave.	96	1.1	V	12.50	43.75	54	10.25
36.7	37.64	QP	152	1.2	V	-11.1	26.54	40	13.46
501.6	36.98	QP	39	1.2	V	-8.4	28.58	46	17.42
11490.0	32.41	PK	151	1.1	V	20.47	52.88	74	21.12
7273.6	35.87	PK	21	1.2	V	16.62	52.49	74	21.51
5396.1	40.31	PK	223	1.3	H	12.10	52.41	74	21.59
4919.8	38.21	PK	96	1.1	V	12.50	50.71	74	23.29
802.11a, Channel:157									
5785.0	79.54	PK	63	1.3	H	39.9	119.44	\	\
5785.0	73.71	Ave.	63	1.3	H	39.9	113.61	\	\
5785.0	79.91	PK	12	1.1	V	39.9	119.81	\	\
5785.0	73.79	Ave.	12	1.1	V	39.9	113.69	\	\
7272.6	30.33	Ave.	15	1.3	V	16.62	46.95	54	7.05
5391.6	34.22	Ave.	44	1.2	H	12.10	46.32	54	7.68
4920.6	32.41	Ave.	85	1.2	V	12.50	44.91	54	9.09
11570.0	23.74	Ave.	321	1.1	V	20.41	44.15	54	9.85
36.7	36.59	QP	81	1.2	V	-11.1	25.49	40	14.51
501.6	37.11	QP	214	1.2	V	-8.4	28.71	46	17.29
5391.6	41.12	PK	44	1.2	H	12.10	53.22	74	20.78
7272.6	36.31	PK	15	1.3	V	16.62	52.93	74	21.07
11570.0	31.45	PK	321	1.1	V	20.41	51.86	74	22.14
4920.6	38.96	PK	85	1.2	V	12.50	51.46	74	22.54
802.11a, Channel:165									
5825	81.22	PK	63	1.3	H	39.9	121.12	\	\
5825	74.78	Ave.	63	1.3	H	39.9	114.68	\	\
5825	82.84	PK	12	1.1	V	39.9	122.74	\	\
5825	76.32	Ave.	12	1.1	V	39.9	116.22	\	\
7275.5	30.07	Ave.	25	1.3	V	16.62	46.69	54	7.31
5393.8	33.62	Ave.	33	1.2	H	12.10	45.72	54	8.28
11650.0	24.51	Ave.	112	1.2	V	20.94	45.45	54	8.55
4920.7	32.51	Ave.	62	1.2	V	12.50	45.01	54	8.99

36.7	37.44	QP	103	1.2	V	-11.1	26.34	40	13.66
501.6	35.89	QP	189	1.2	V	-8.4	27.49	46	18.51
7275.5	37.15	PK	25	1.3	V	16.62	53.77	74	20.23
5393.8	41.22	PK	33	1.2	H	12.10	53.32	74	20.68
11650.0	31.52	PK	112	1.2	V	20.94	52.46	74	21.54
4920.7	38.62	PK	62	1.2	V	12.50	51.12	74	22.88
802.11n-HT20, Channel:149									
5745.0	82.41	PK	254	1.3	H	39.5	121.91	\	\
5745.0	77.57	Ave.	254	1.3	H	39.5	117.07	\	\
5745.0	83.12	PK	152	1.2	V	39.5	122.62	\	\
5745.0	77.79	Ave.	152	1.2	V	39.5	117.29	\	\
7272.5	28.86	Ave.	297	1.2	V	16.62	45.48	54	8.52
5395.5	31.82	Ave.	358	1.3	H	12.1	43.92	54	10.08
11490.0	23.33	Ave.	8	1.1	V	20.47	43.80	54	10.20
4919.8	29.26	Ave.	121	1.1	V	12.5	41.76	54	12.24
36.7	37.01	QP	74	1.2	V	-11.1	25.91	40	14.09
501.6	36.01	QP	264	1.2	V	-8.4	27.61	46	18.39
11490.0	31.57	PK	8	1.1	V	20.47	52.04	74	21.96
7272.5	34.10	PK	297	1.2	V	16.62	50.72	74	23.28
5395.5	38.38	PK	358	1.3	H	12.1	50.48	74	23.52
4919.8	36.55	PK	121	1.1	V	12.5	49.05	74	24.95
802.11n-HT20, Channel:157									
5785.0	79.59	PK	346	1.5	H	39.9	119.49	\	\
5785.0	71.90	Ave.	346	1.5	H	39.9	111.80	\	\
5785.0	80.49	PK	64	1.2	V	39.9	120.39	\	\
5785.0	72.30	Ave.	64	1.2	V	39.9	112.20	\	\
7271.6	29.70	Ave.	174	1.2	V	16.62	46.32	54	7.68
5392.4	33.53	Ave.	182	1.3	H	12.1	45.63	54	8.37
4921.3	31.47	Ave.	156	1.1	V	12.5	43.97	54	10.03
11570.0	22.82	Ave.	182	1.1	V	20.41	43.23	54	10.77
36.7	35.52	QP	227	1.2	V	-11.1	24.42	40	15.58
501.6	36.59	QP	107	1.2	V	-8.4	28.19	46	17.81
7271.6	35.78	PK	174	1.2	V	16.62	52.40	74	21.60
5392.4	39.22	PK	182	1.3	H	12.1	51.32	74	22.68
11570.0	29.68	PK	182	1.1	V	20.41	50.09	74	23.91
4921.3	37.50	PK	156	1.1	V	12.5	50.00	74	24.00
802.11n-HT20, Channel:165									
5825.0	79.78	PK	195	1.2	H	39.9	119.68	\	\
5825.0	73.75	Ave.	195	1.2	H	39.9	113.65	\	\
5825.0	81.07	PK	130	1.2	V	39.9	120.97	\	\
5825.0	75.00	Ave.	130	1.2	V	39.9	114.90	\	\
7276.0	28.24	Ave.	88	1.2	V	16.62	44.86	54	9.14
5394.5	32.32	Ave.	278	1.3	H	12.1	44.42	54	9.58
4921.7	31.80	Ave.	156	1.1	V	12.5	44.30	54	9.70
11650.0	23.04	Ave.	100	1.1	V	20.94	43.98	54	10.02

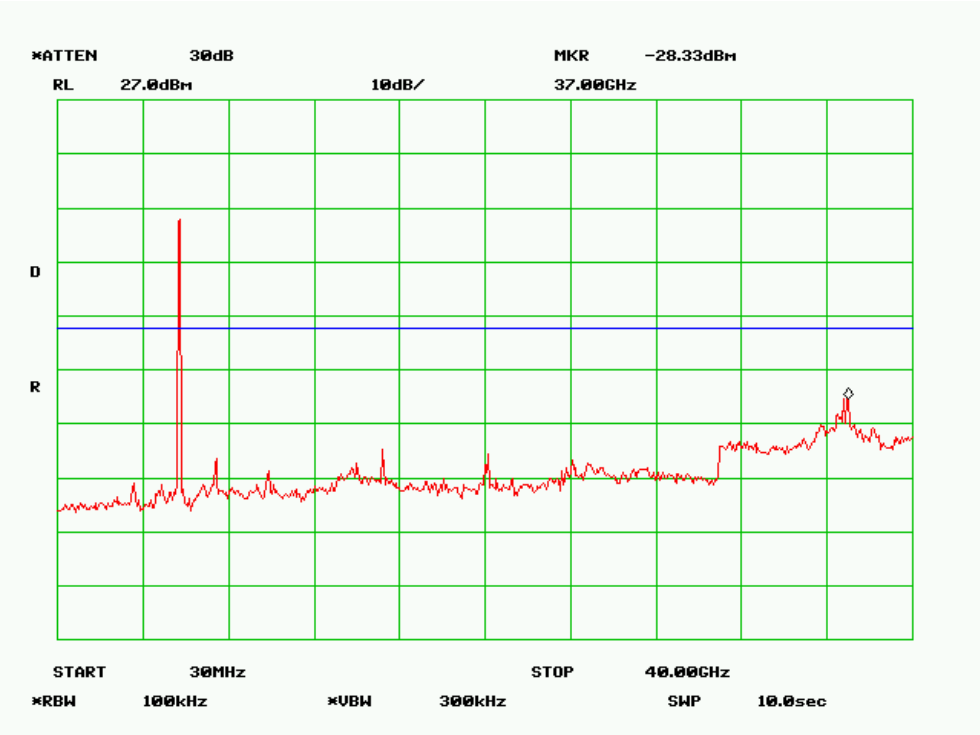
36.7	35.95	QP	75	1.2	V	-11.1	24.85	40	15.15
501.6	35.12	QP	197	1.2	V	-8.4	26.72	46	19.28
7276.0	36.28	PK	88	1.2	V	16.62	52.90	74	21.10
5394.5	39.28	PK	278	1.3	H	12.1	51.38	74	22.62
11650.0	29.85	PK	100	1.1	V	20.94	50.79	74	23.21
4921.7	36.95	PK	156	1.1	V	12.5	49.45	74	24.55
802.11n-HT40, Channel:151									
5755	77.75	PK	63	1.3	H	39.9	117.65	\	\
5755	73.01	Ave.	63	1.3	H	39.9	112.91	\	\
5755	77.81	PK	12	1.1	V	39.9	117.71	\	\
5755	73.24	Ave.	12	1.1	V	39.9	113.14	\	\
7271.6	30.75	Ave.	75	1.2	V	16.62	47.37	54	6.63
5399.6	33.07	Ave.	25	1.3	H	12.10	45.17	54	8.83
4922.1	32.51	Ave.	166	1.3	V	12.50	45.01	54	8.99
36.7	38.56	QP	152	1.2	V	-11.1	27.46	40	12.54
501.6	37.91	QP	39	1.2	V	-8.4	29.51	46	16.49
5399.6	42.25	PK	25	1.3	H	12.10	54.35	74	19.65
11510.0	33.75	PK	15	1.1	V	20.09	53.84	74	20.16
7271.6	36.65	PK	75	1.2	V	16.62	53.27	74	20.73
4922.1	38.75	PK	166	1.3	V	12.50	51.25	74	22.75
4931.6	37.36	PK	302	1.1	V	12.5	49.86	74	24.14
802.11n-HT40, Channel:159									
5795	76.72	PK	63	1.3	H	39.9	116.62	\	\
5795	74.25	Ave.	63	1.3	H	39.9	114.15	\	\
5795	77.91	PK	12	1.1	V	39.9	117.81	\	\
5795	72.78	Ave.	12	1.1	V	39.9	112.68	\	\
5399.1	32.25	Ave.	45	1.2	H	12.10	44.35	54	9.65
7296.8	27.15	Ave.	63	1.3	V	16.62	43.77	54	10.23
4921.5	31.24	Ave.	75	1.3	V	12.50	43.74	54	10.26
11590.0	22.93	Ave.	77	1.0	V	20.41	43.34	54	10.66
36.7	37.53	QP	152	1.2	V	-11.1	26.43	40	13.57
501.6	37.21	QP	39	1.2	V	-8.4	28.81	46	17.19
5399.1	40.57	PK	45	1.2	H	12.10	52.67	74	21.33
7296.8	34.85	PK	63	1.3	V	16.62	51.47	74	22.53
11590.0	30.22	PK	77	1.0	V	20.41	50.63	74	23.37
4921.5	36.96	PK	75	1.3	V	12.50	49.46	74	24.54

Antenna Port Conducted Spurious Emissions:

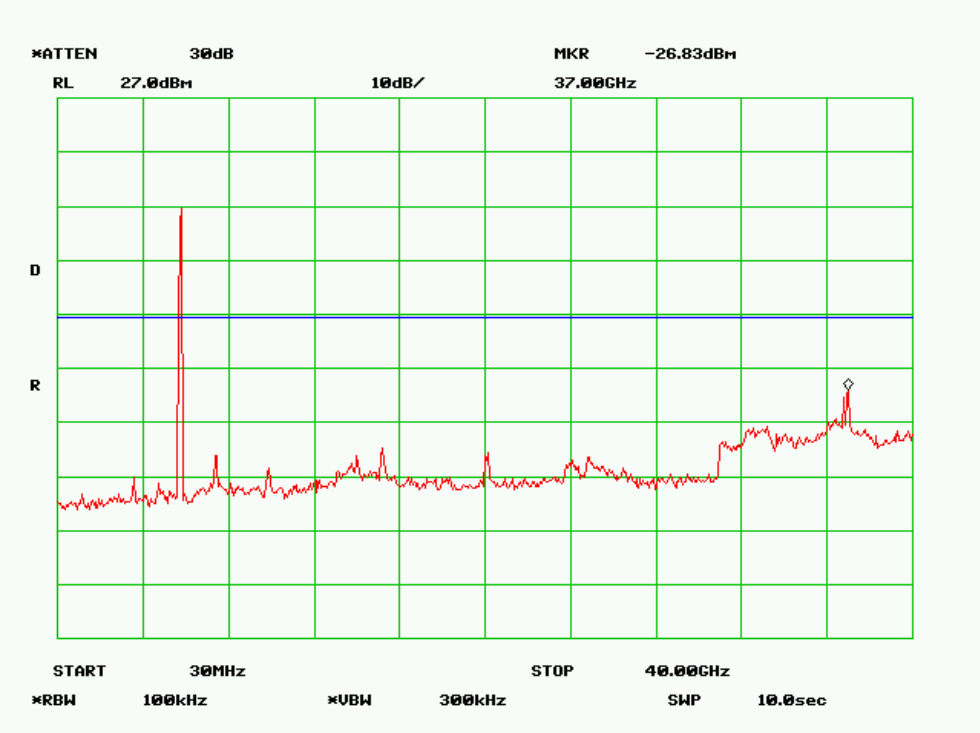
802.11a, Low Channel, Antenna 0



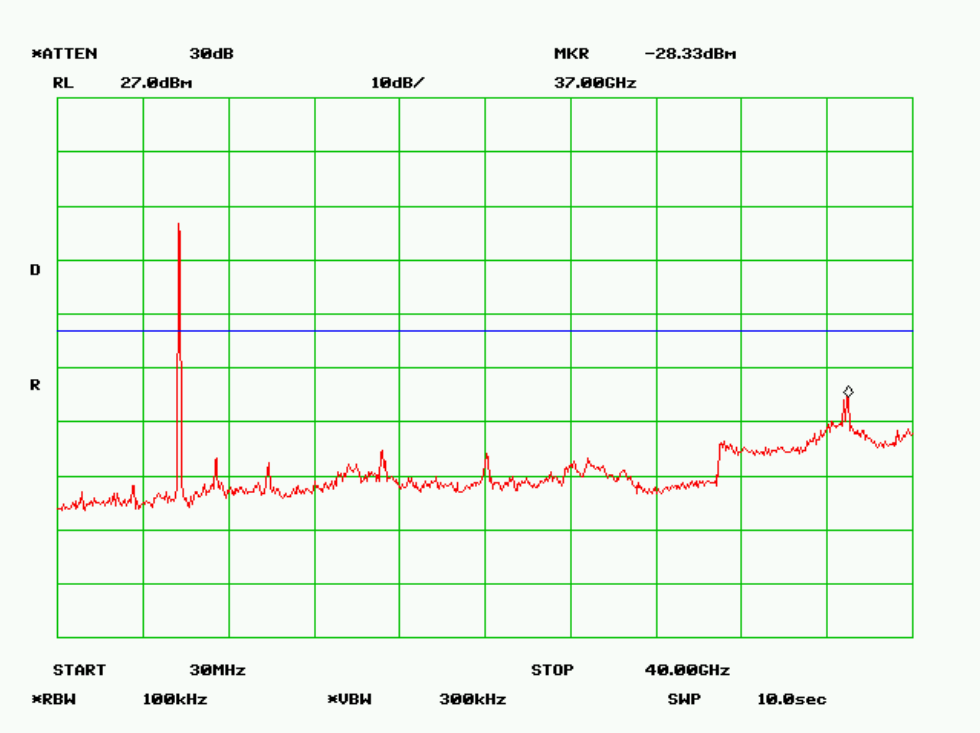
802.11a, Middle Channel, Antenna 0



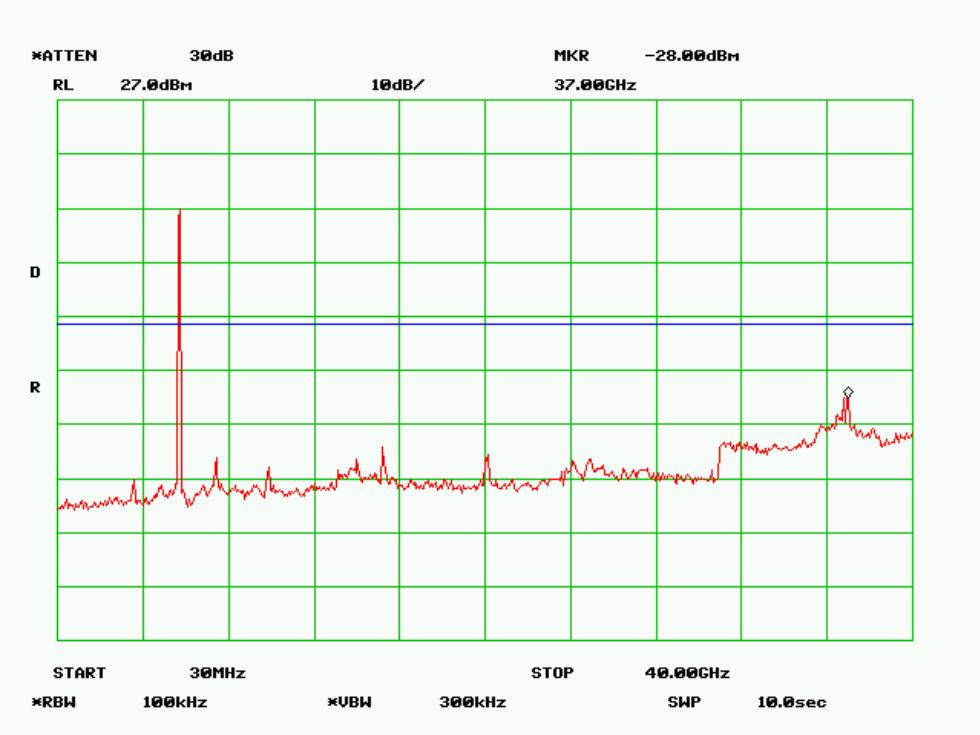
802.11a, High Channel, Antenna 0



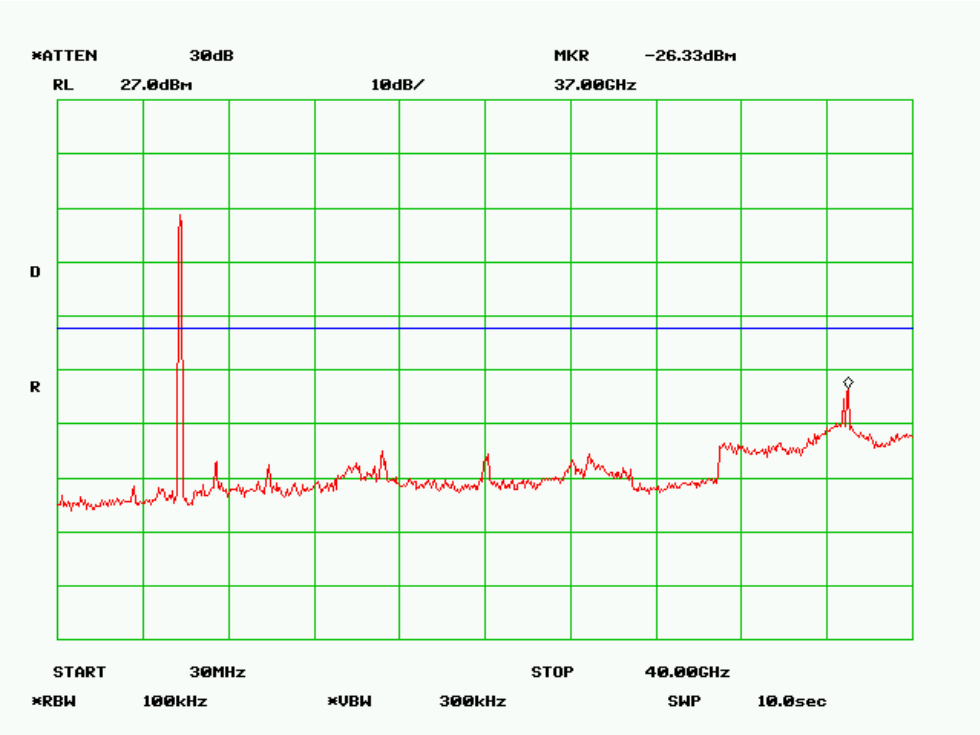
802.11a, Low Channel, Antenna 1



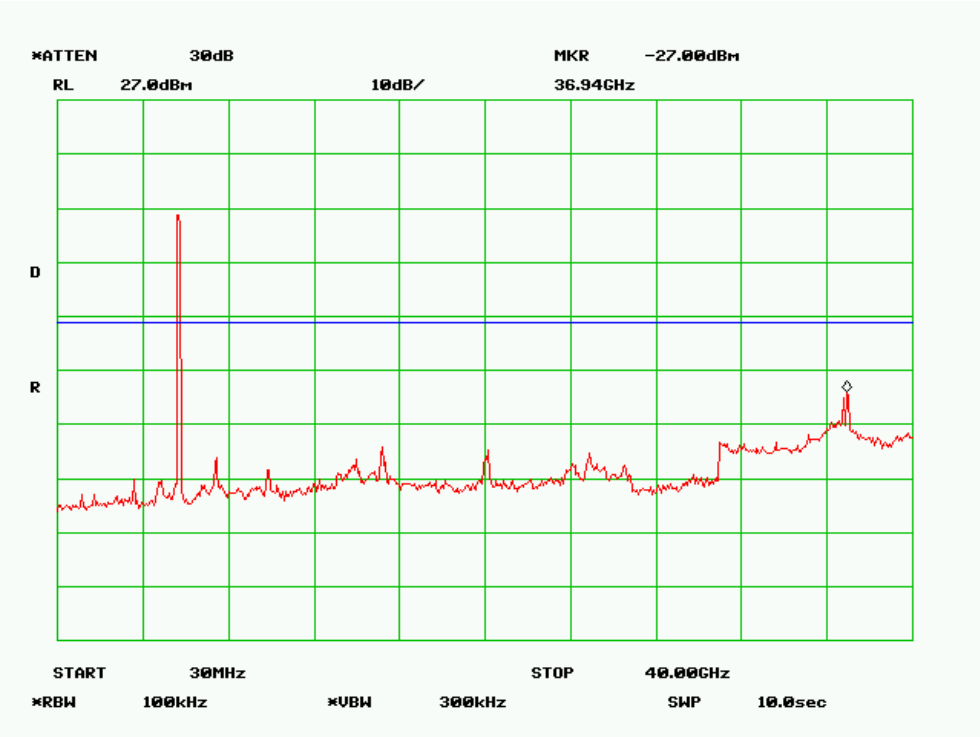
802.11a, Middle Channel, Antenna 1



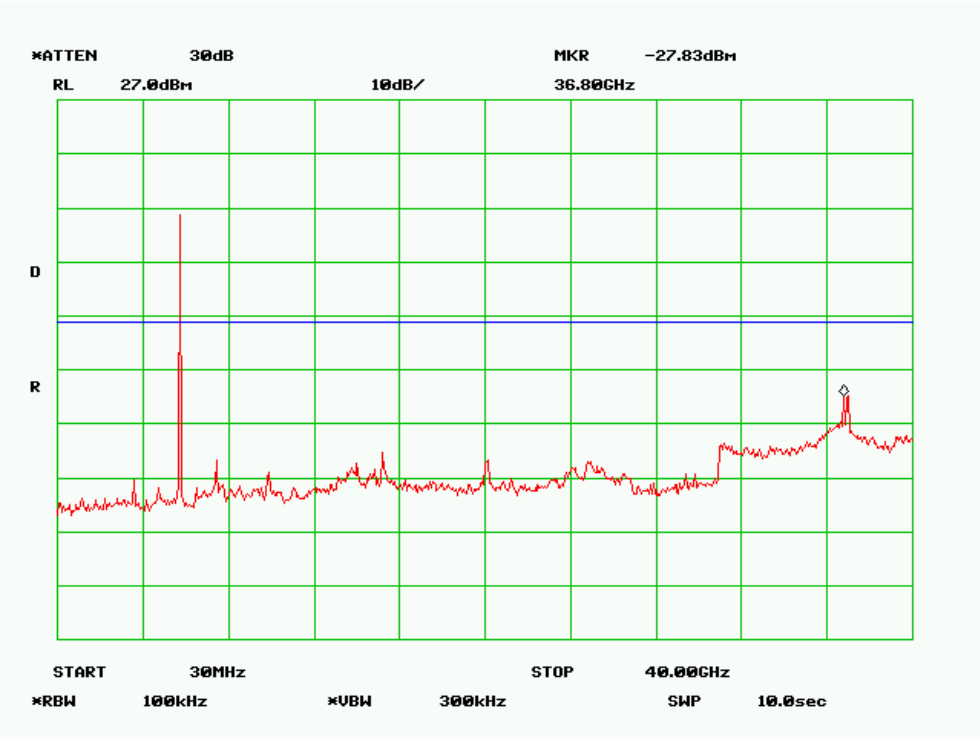
802.11a, High Channel, Antenna 1



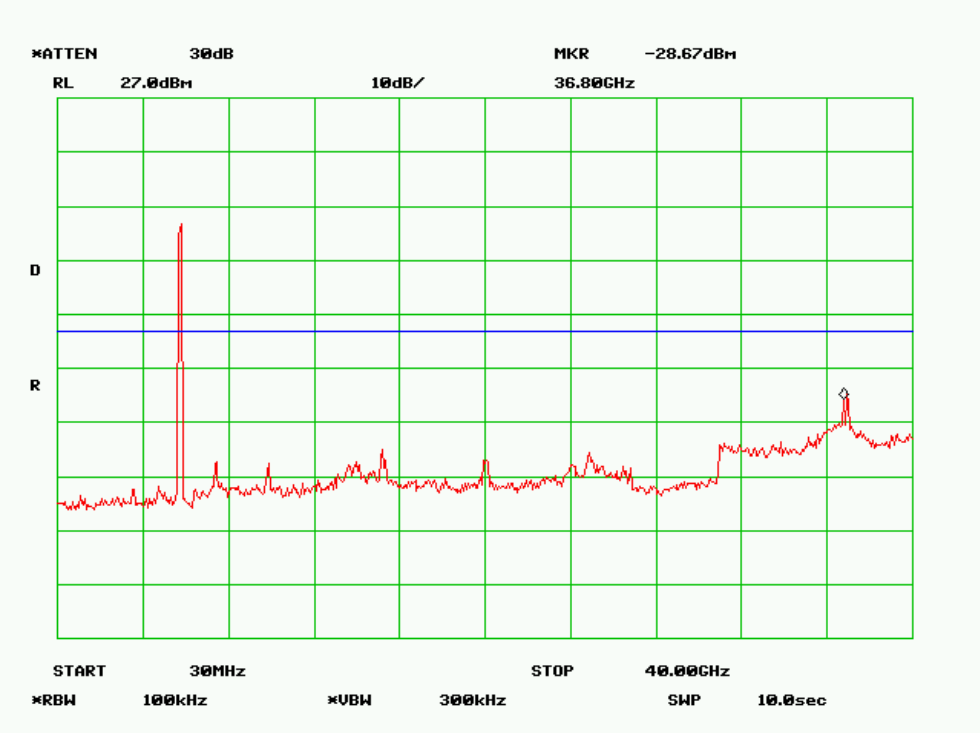
802.11n-HT20, Low Channel, Antenna 0



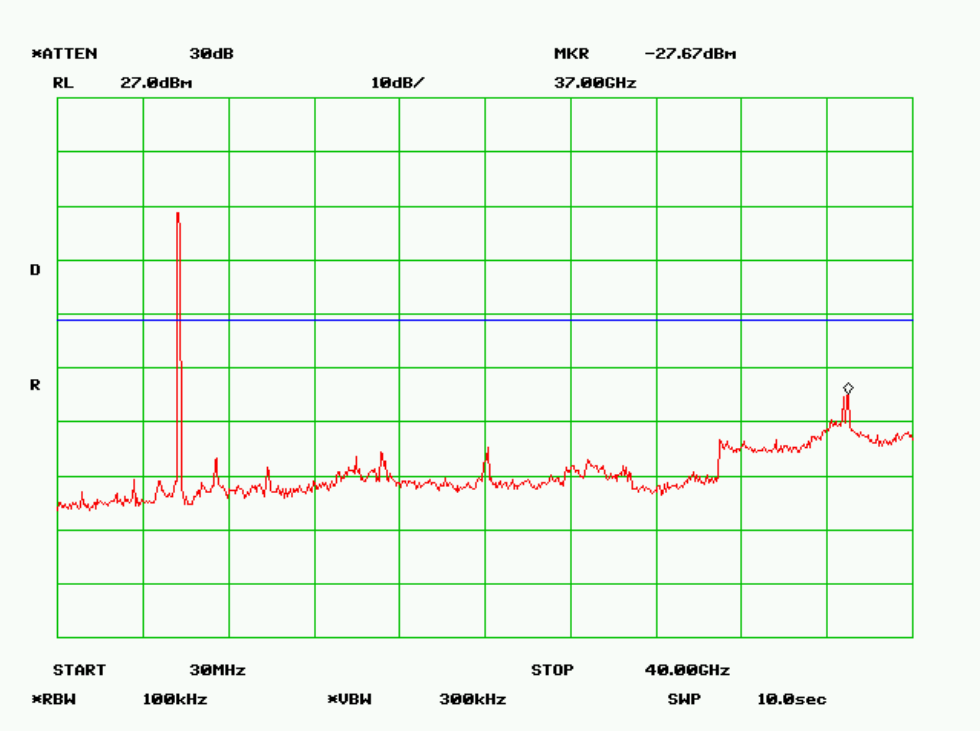
802.11n-HT20, Middle Channel, Antenna 0



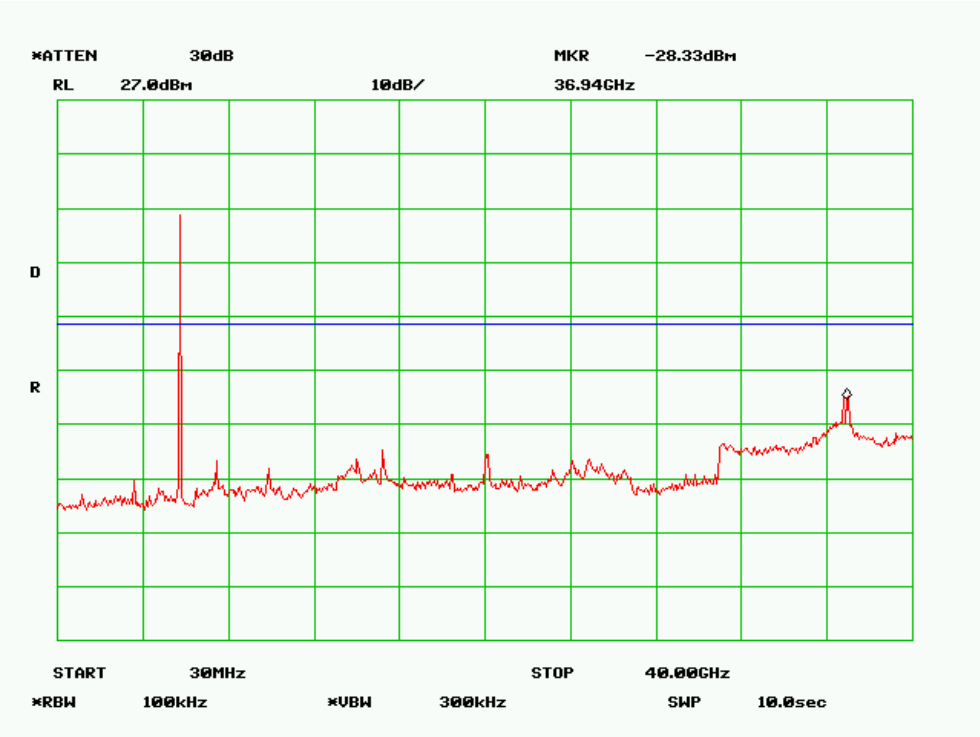
802.11n-HT20, High Channel, Antenna 0



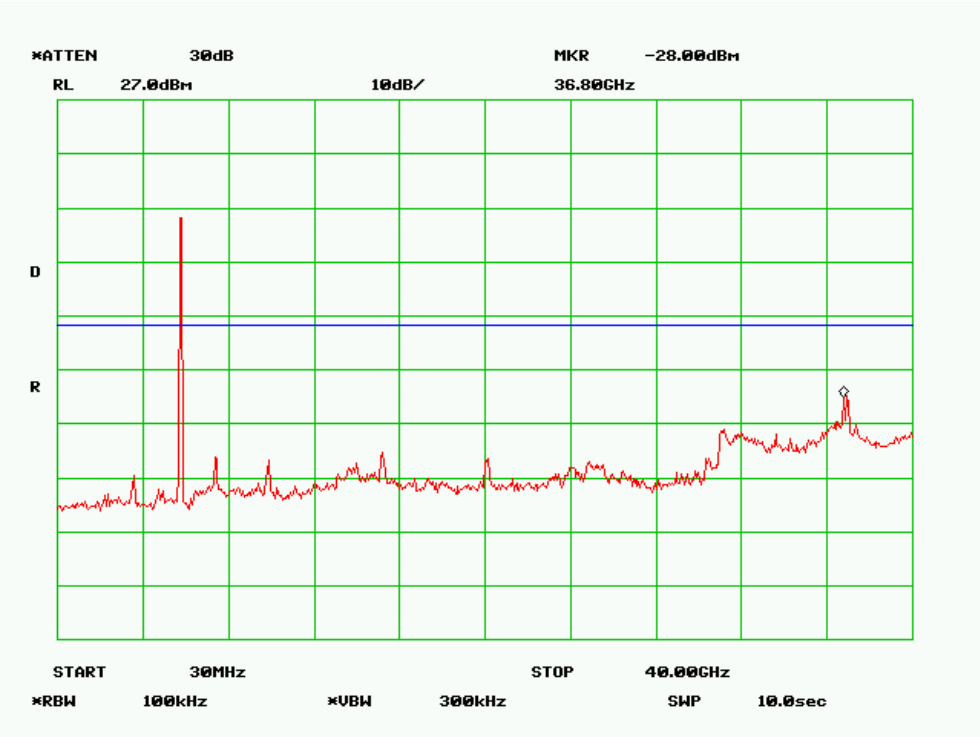
802.11n-HT20, Low Channel, Antenna 1



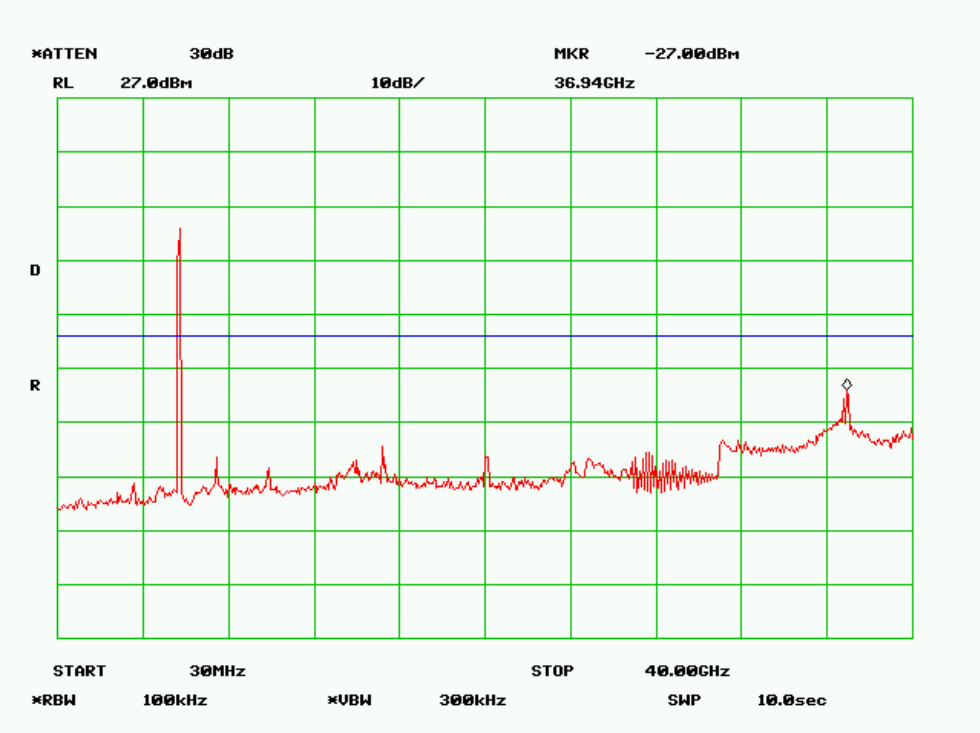
802.11n-HT20, Middle Channel, Antenna 1



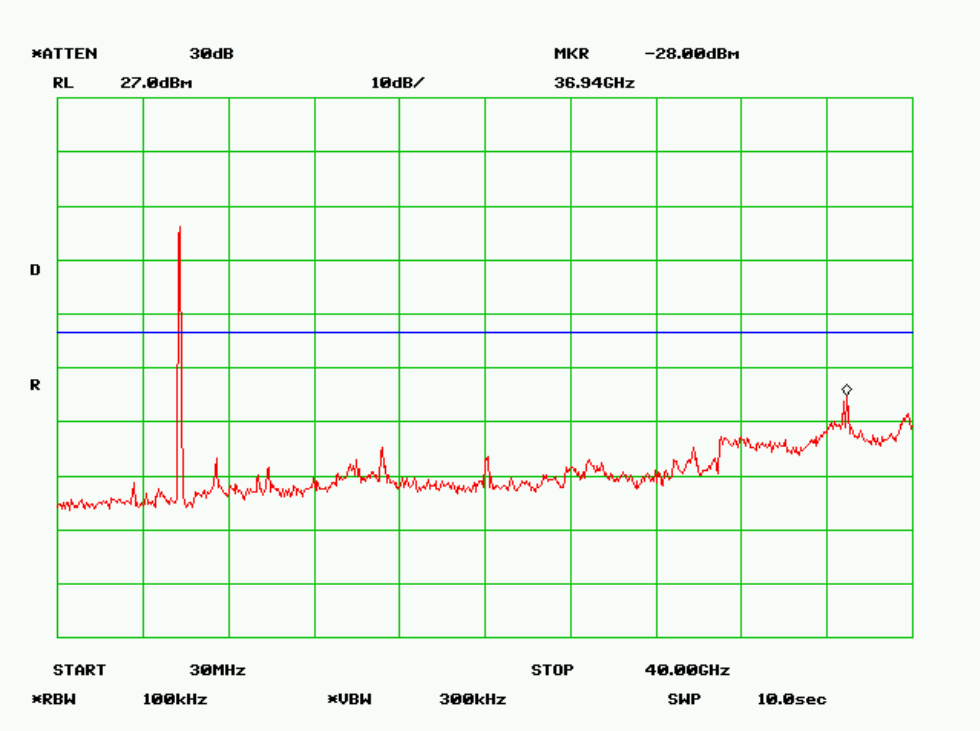
802.11n-HT20, High Channel, Antenna 1



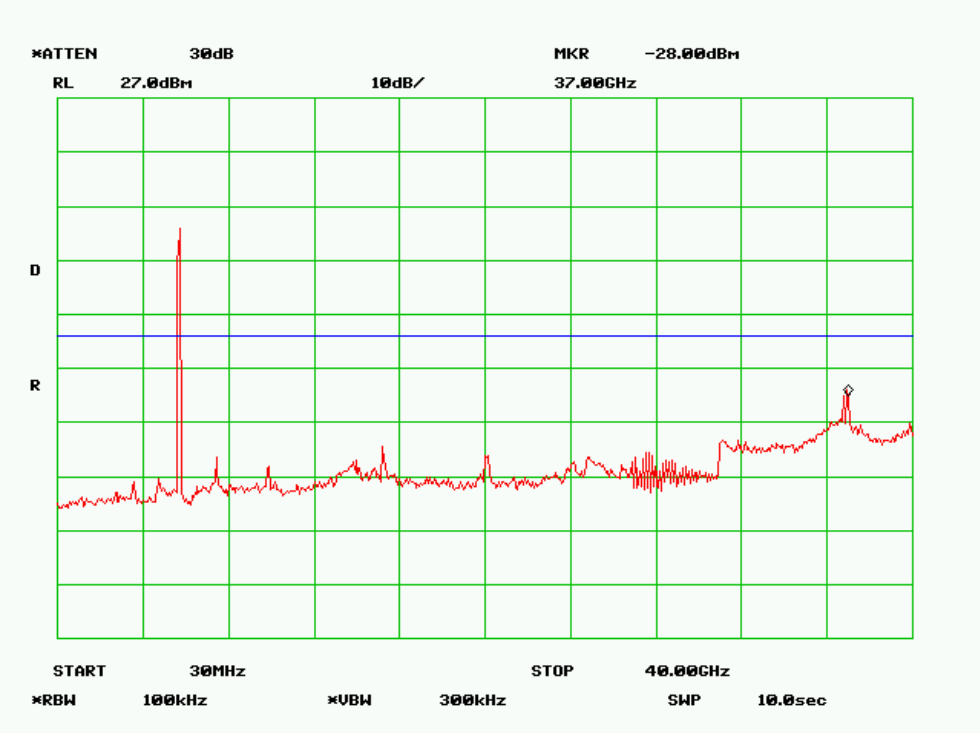
802.11n-HT40, Channel 151, Antenna 0



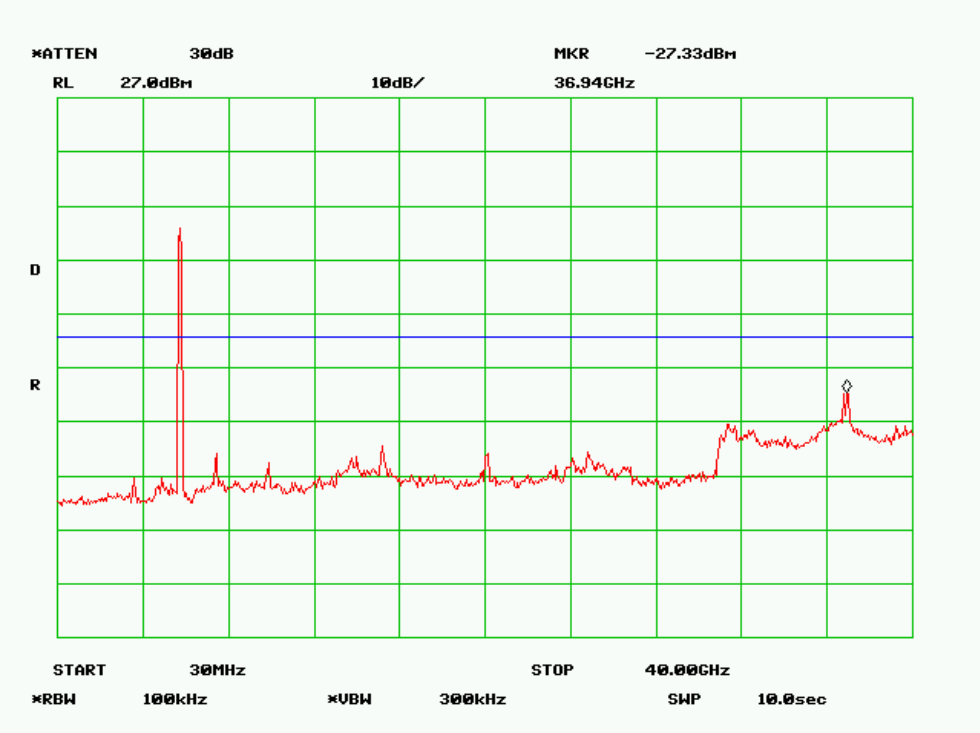
802.11n-HT40, Channel 159, Antenna 0



802.11n-HT40, Channel 151, Antenna 1



802.11n-HT40, Channel 159, Antenna 1



Antenna Port Conducted Spurious Emissions (Combined):

Channel	Frequency (MHz)	Output Power(dBm)			Limit (dBm)	Result
		Antenna 0	Antenna 1	Antenna 0 + Antenna 1		
802.11a mode						
Low	37000	-28.50	-28.33	-	-17.0	Pass
Middle	37000	-28.33	-28.00	-	-17.0	Pass
High	37000	-26.83	-26.33	-	-17.0	Pass
802.11n-HT20 mode						
Low	37000	-27.00	-27.67	-24.31	-18.0	Pass
Middle	37000	-27.83	-28.33	-25.06	-18.0	Pass
High	37000	-28.67	-28.00	-25.31	-18.0	Pass
802.11n-HT40 mode						
Low	37000	-27.00	-28.00	-24.46	-18.5	Pass
High	37000	-28.00	-27.33	-24.64	-18.5	Pass

Note:

The limit =the fundamental level- 20dB

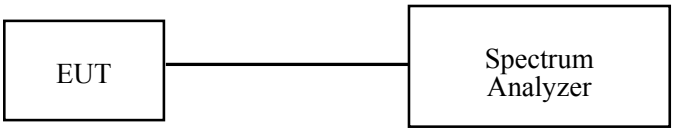
FCC §15.247(a) (2) – 6 dB EMISSION BANDWIDTH

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	FSIQ26	8386001028	2012-11-24	2013-11-23

*** Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Shenzhen) attests that all calibrations have been performed in accordance to NVLAP requirements, traceable to traceable to National Primary Standards and International System of Units (SI).

Test Data

Environmental Conditions

Temperature:	24~25℃
Relative Humidity:	55~56%
ATM Pressure:	100.0~100.1kPa

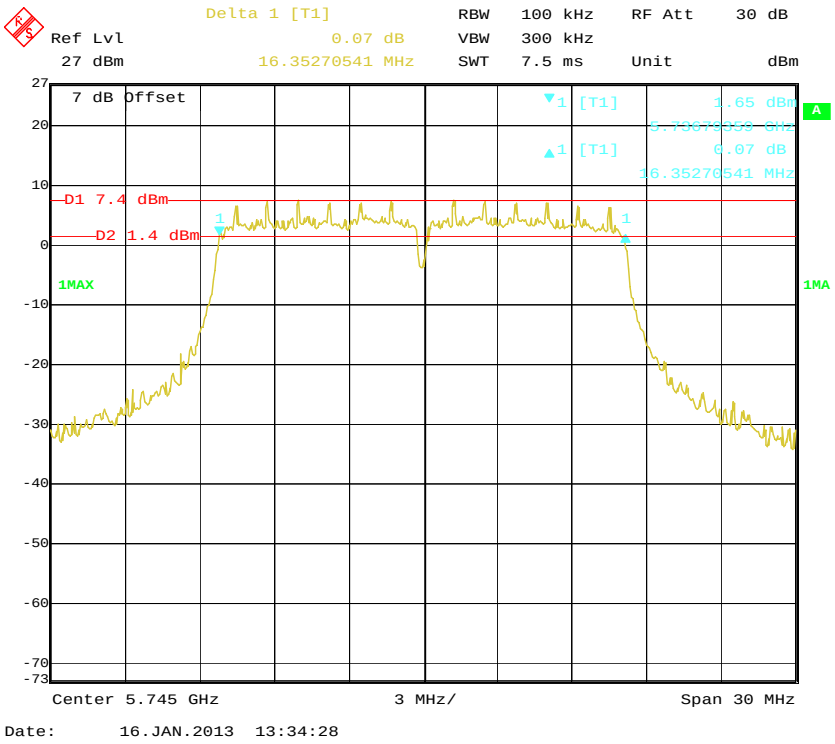
The testing was performed by Tiger Ye on 2013-01-16 and 2013-01-17.

Test Result: Pass.

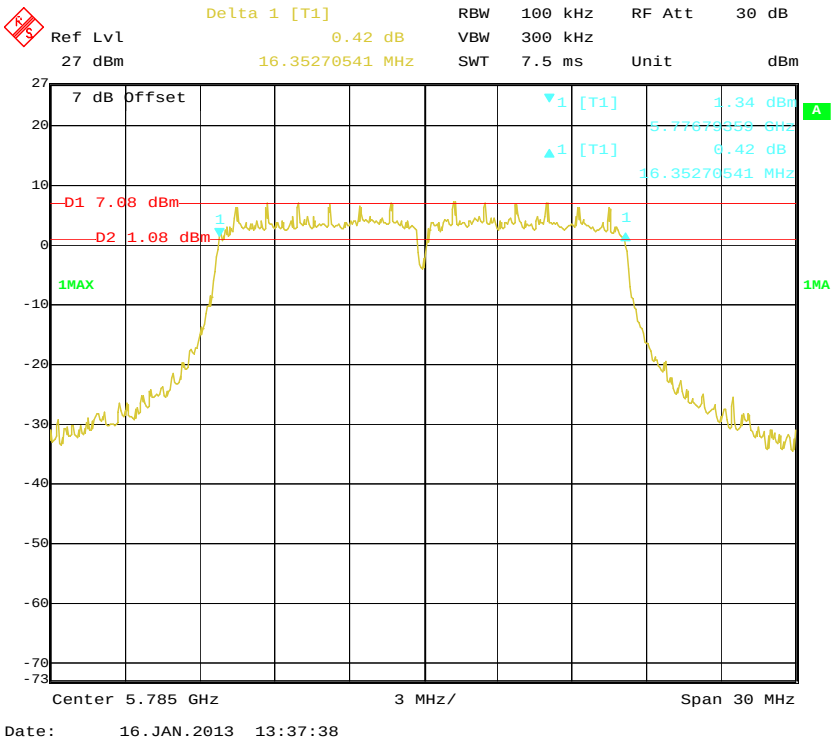
Please refer to the following tables and plots.

Channel	Frequency (MHz)	6 dB Bandwidth(MHz)		Limit (kHz)
		Antenna 0	Antenna 1	
802.11a				
Low	5745	16.35	16.35	≥500
Middle	5785	16.35	16.35	≥500
High	5825	16.35	16.35	≥500
802.11n-HT20				
Low	5745	17.07	17.07	≥500
Middle	5785	17.07	17.07	≥500
High	5825	17.07	17.07	≥500
802.11n-HT40				
Low	5755	35.26	35.26	≥500
High	5795	35.26	35.26	≥500

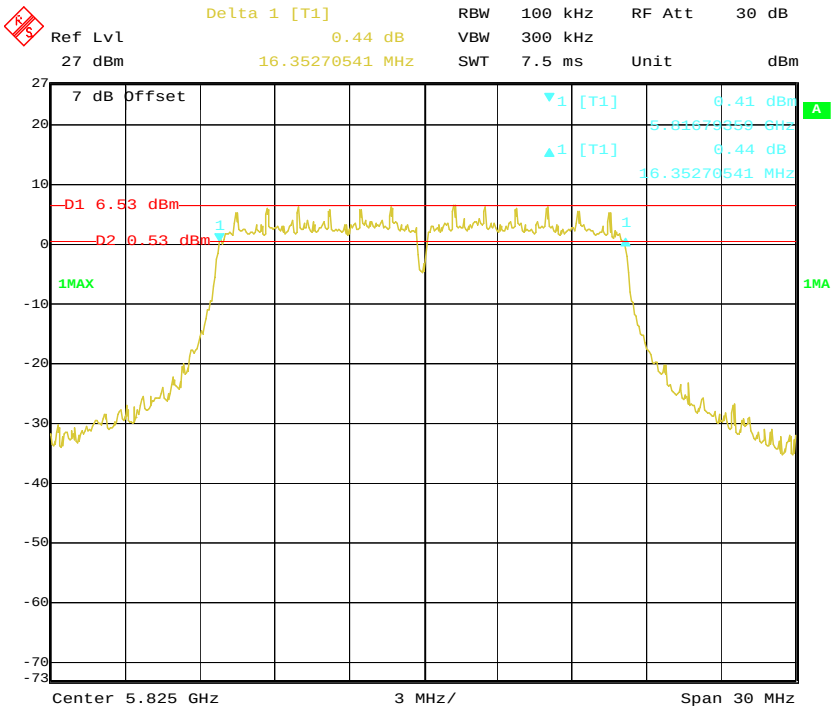
802.11a Low Channel, Antenna 0



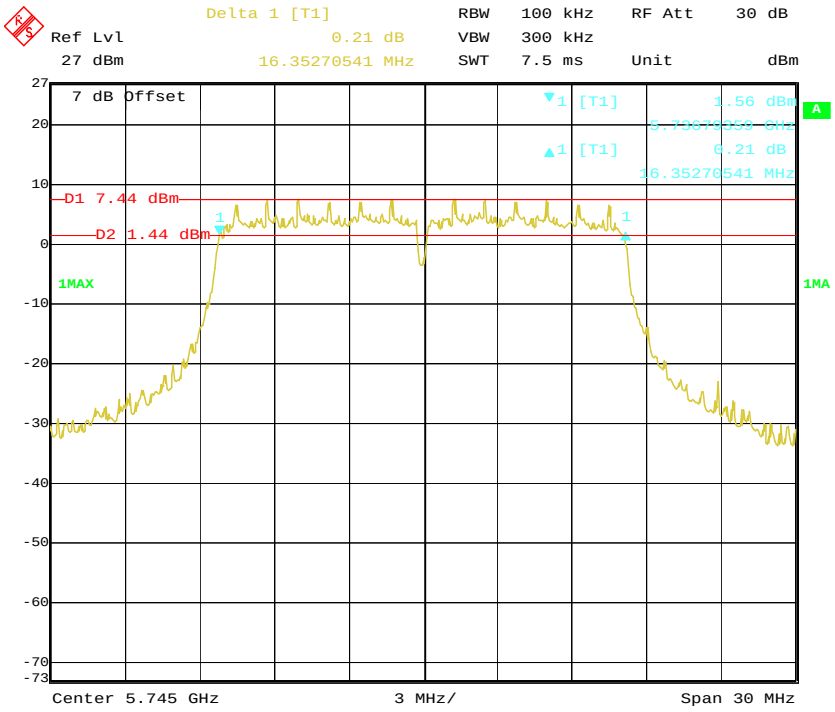
802.11a Middle Channel, Antenna 0



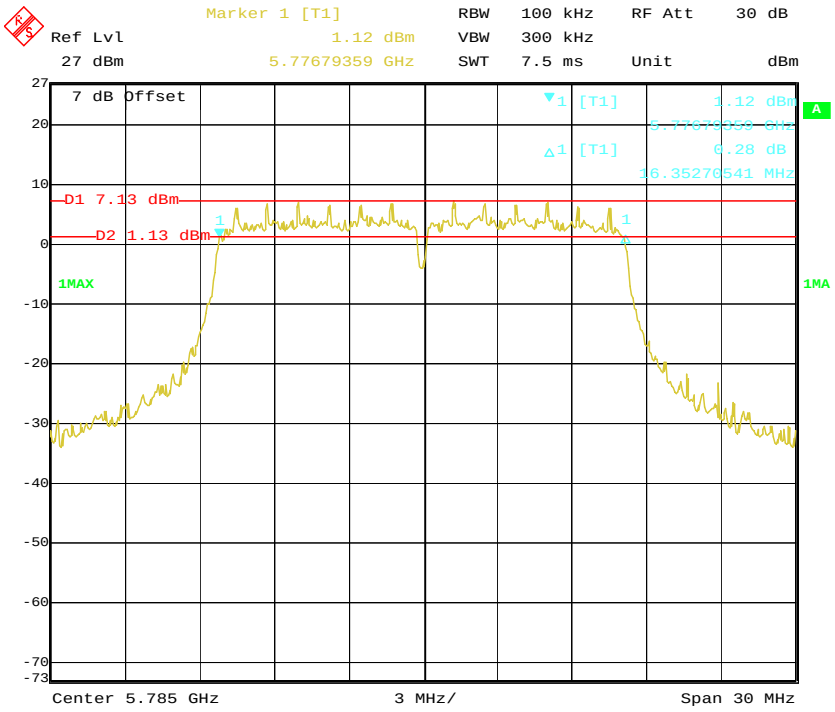
802.11a High Channel, Antenna 0



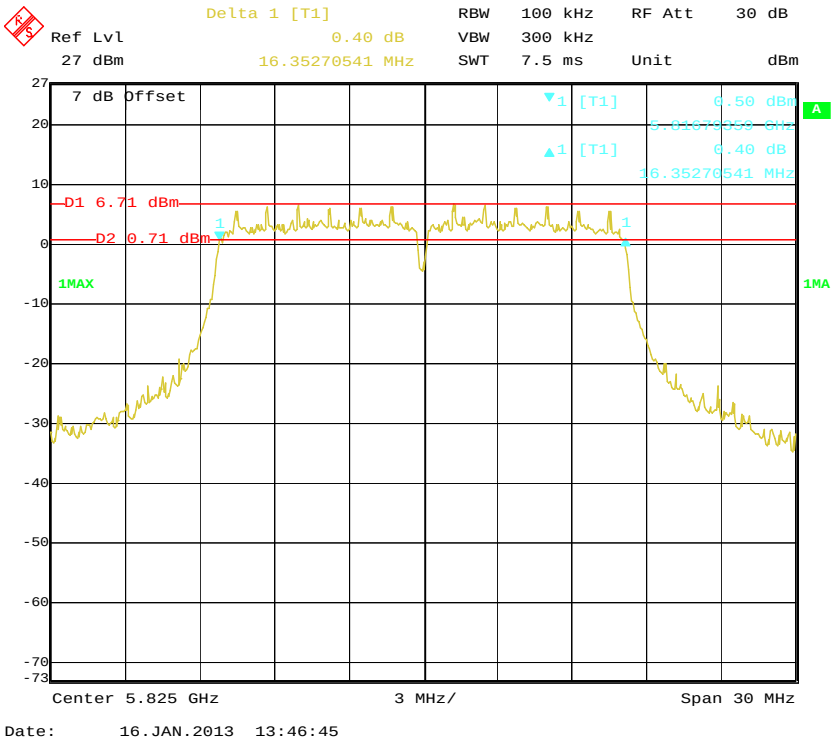
802.11a Low Channel, Antenna 1



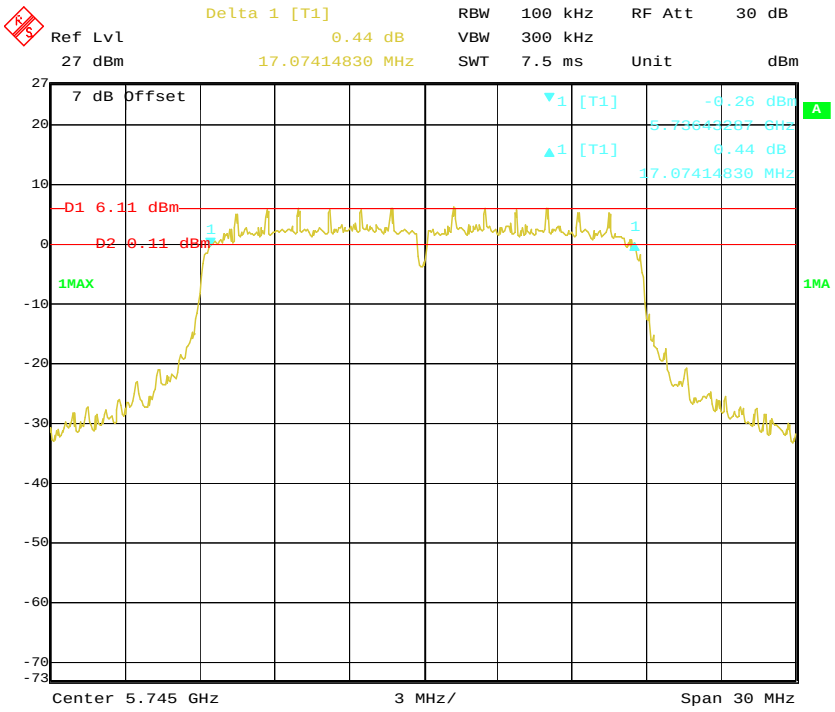
802.11a Middle Channel, Antenna 1



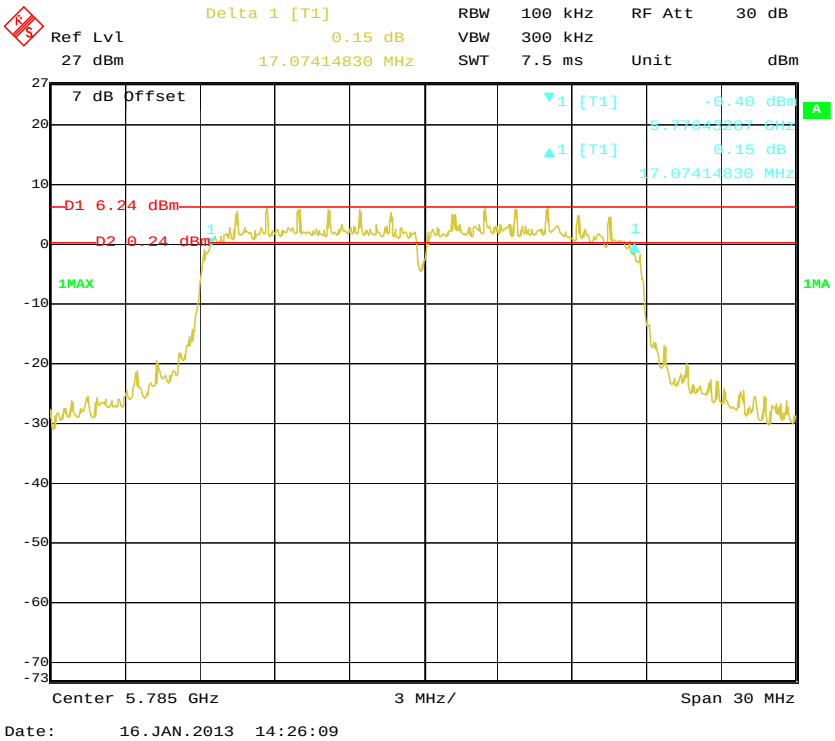
802.11a High Channel, Antenna 1



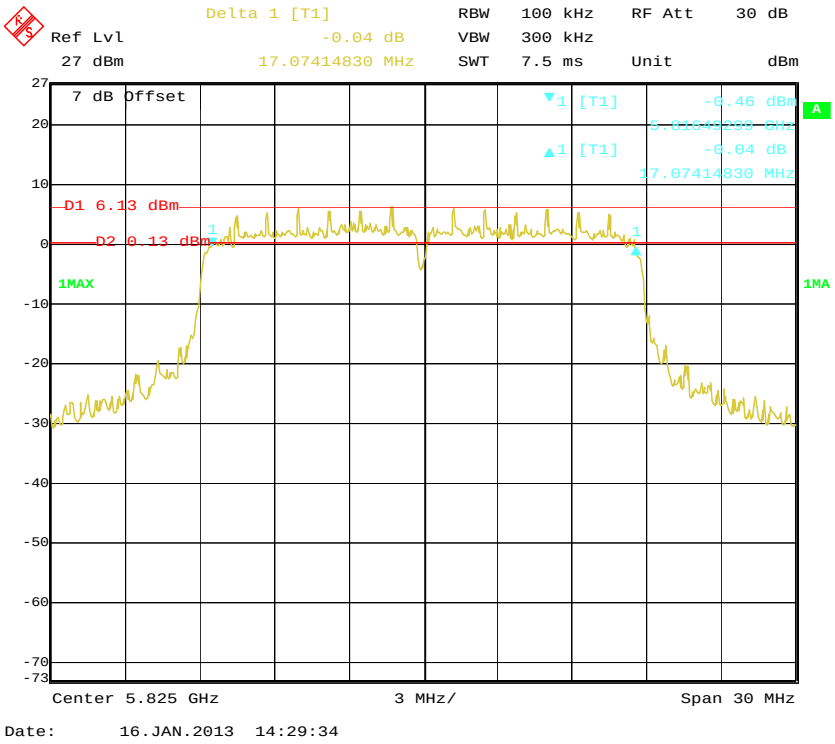
802.11n-HT20 Low Channel, Antenna 0



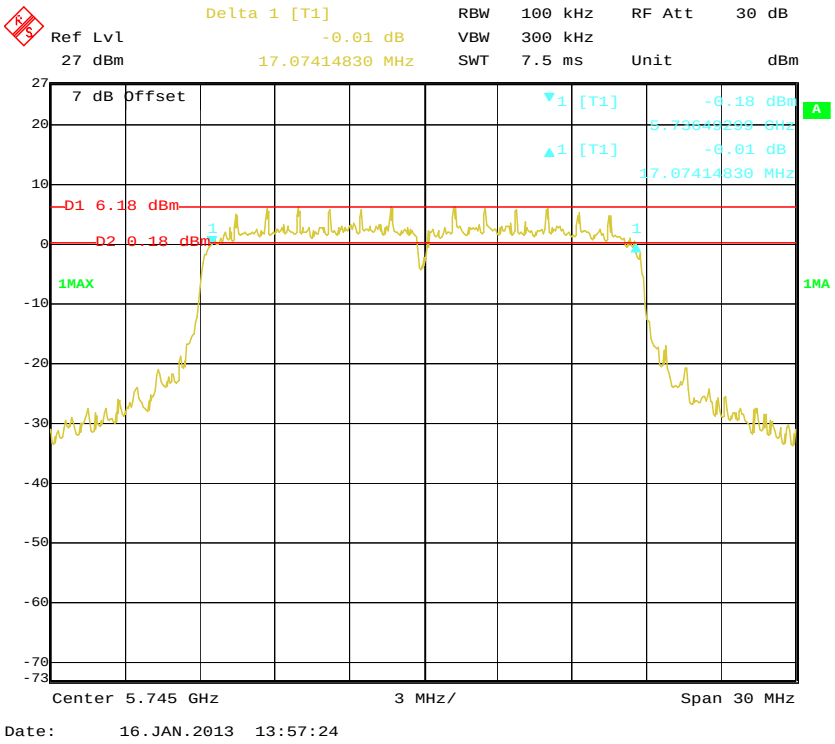
802.11n-HT20 Middle Channel, Antenna 0



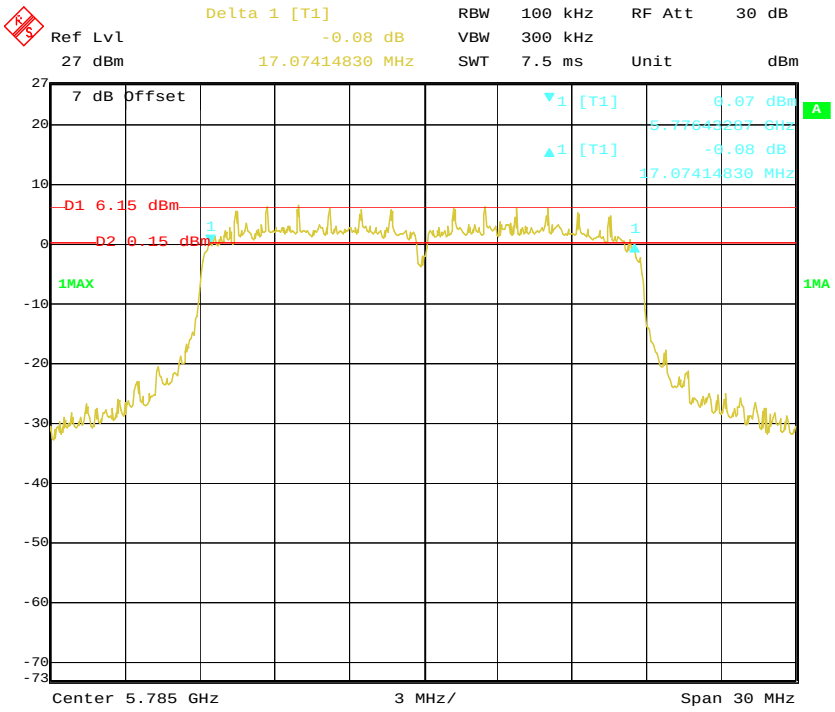
802.11n-HT20 High Channel, Antenna 0



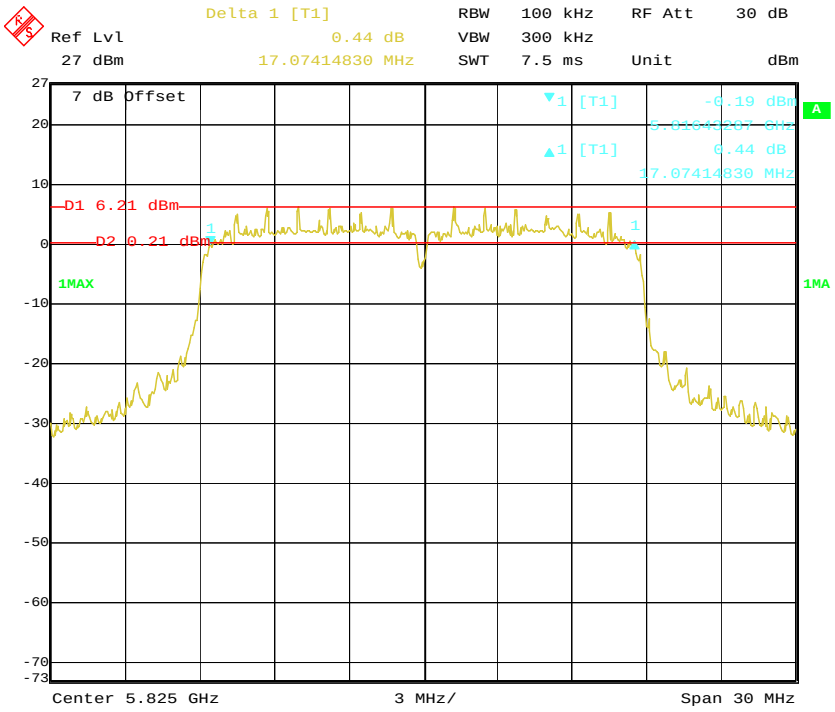
802.11n-HT20 Low Channel, Antenna 1



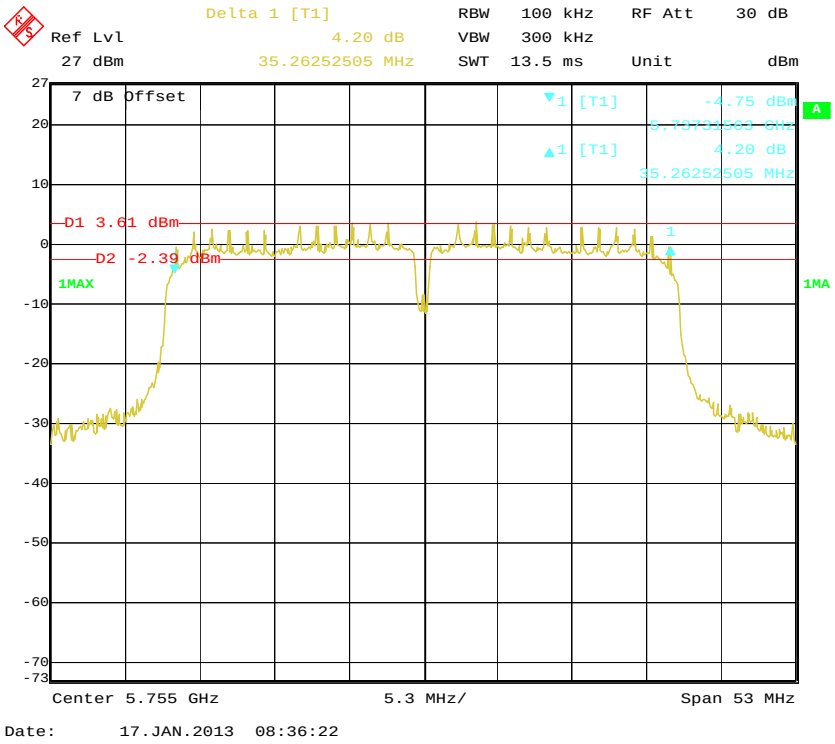
802.11n-HT20 Middle Channel, Antenna 1



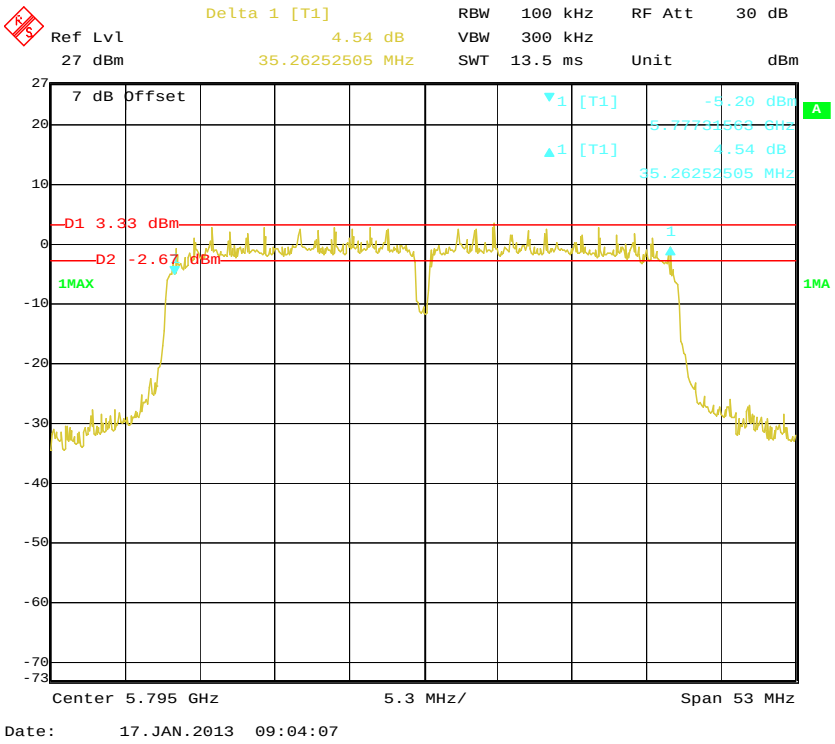
802.11n-HT20 High Channel, Antenna 1



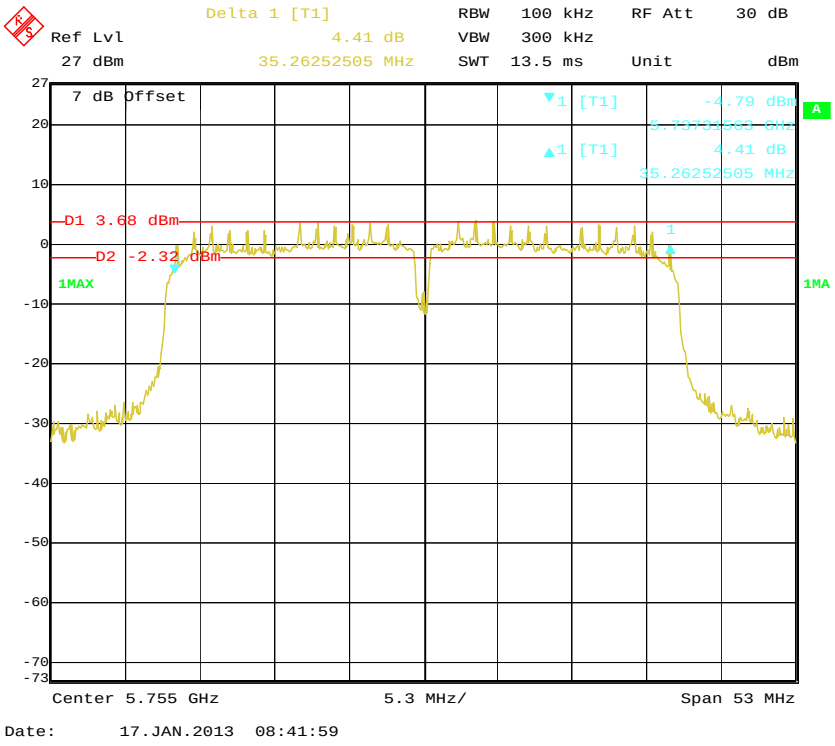
802.11n-HT40 Channel 151, Antenna 0



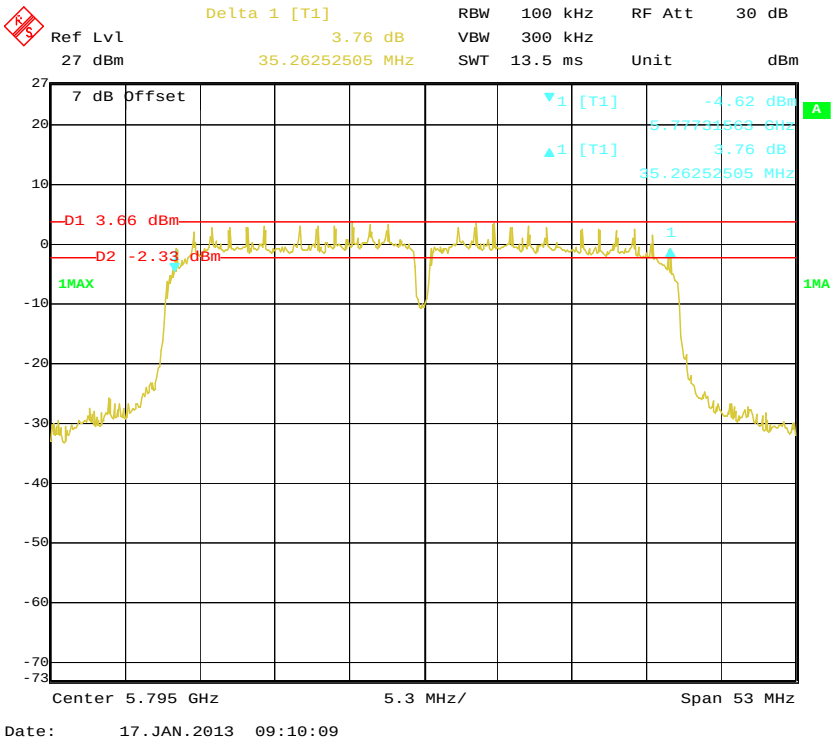
802.11n-HT40 Channel 159, Antenna 0



802.11n-HT40 Channel 151, Antenna 1



802.11n-HT40 Channel 159, Antenna 1



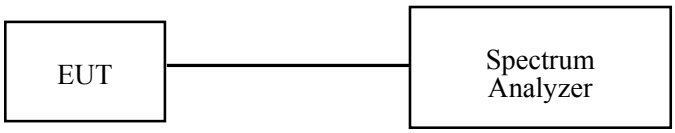
FCC §15.247(b) (c) - MAXIMUM PEAK OUTPUT POWER

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.
According fo FCC §15.247(c), conducted output power of 1 watt is not necessary to reduce.

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	FSIQ26	8386001028	2012-11-24	2013-11-23

*** Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Shenzhen) attests that all calibrations have been performed in accordance to NVLAP requirements, traceable to traceable to National Primary Standards and International System of Units (SI).

Test Data

Environmental Conditions

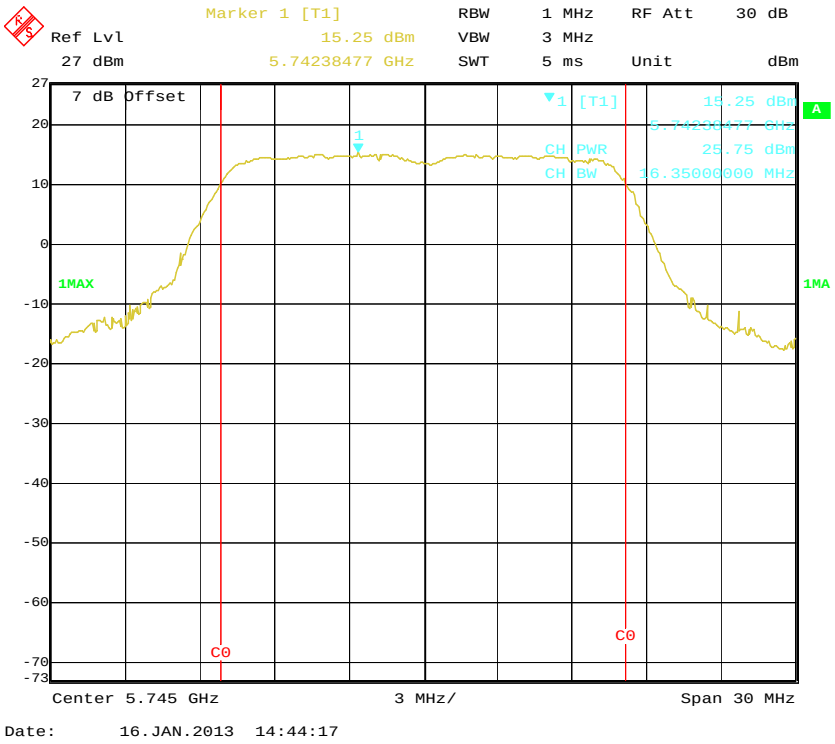
Temperature:	24~25℃
Relative Humidity:	55~56 %
ATM Pressure:	100.0~100.1 kPa

The testing was performed by Tiger Ye on 2013-01-06 and 2013-01-17.

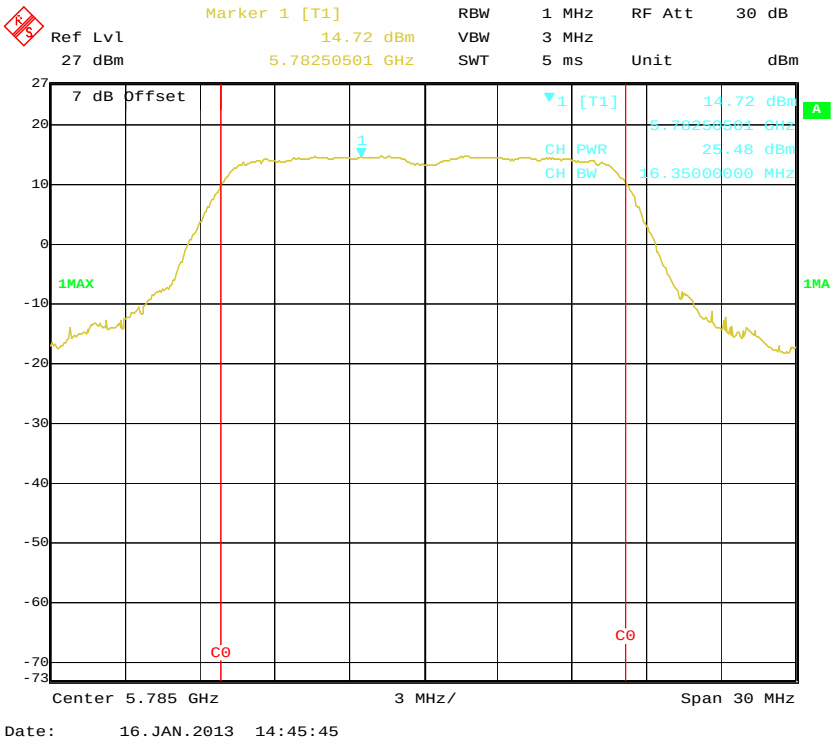
Test Mode: Transmitting

Channel	Frequency (MHz)	Output Power(dBm)			Limit (dBm)
		Antenna 0	Antenna 1	Antenna 0 +Antenna 1	
802.11a					
Low	5745	25.75	25.68	\	30
Middle	5785	25.48	25.41	\	30
High	5825	25.39	25.29	\	30
802.11n-HT20					
Low	5745	25.06	25.13	28.11	30
Middle	5785	25.10	25.30	28.21	30
High	5825	25.10	25.09	28.11	30
802.11n-HT40					
Low	5755	25.15	25.06	28.12	30
High	5795	25.10	25.20	28.16	30

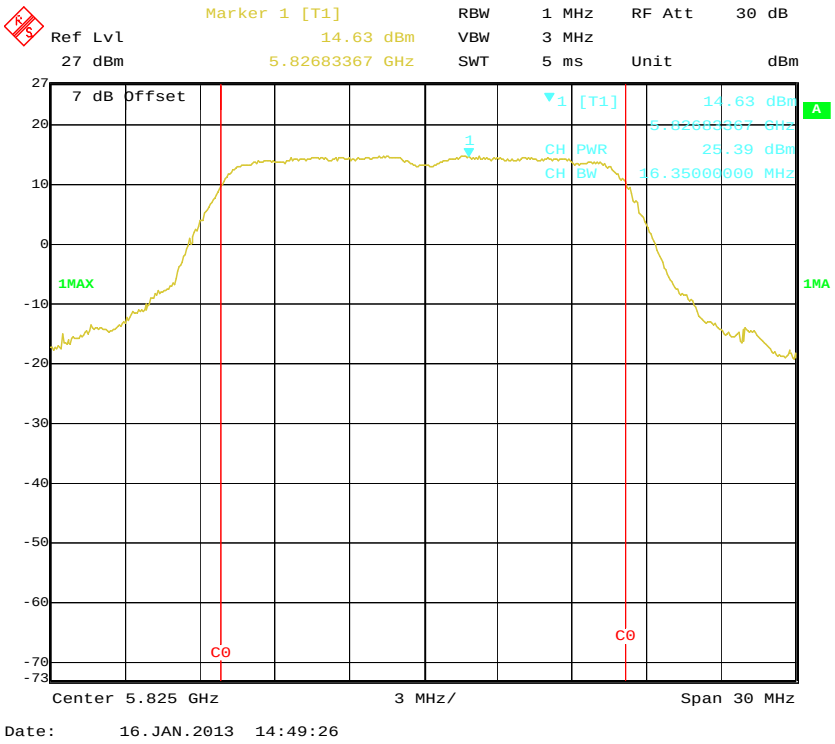
802.11a RF Output Power, Low Channel, Antenna 0



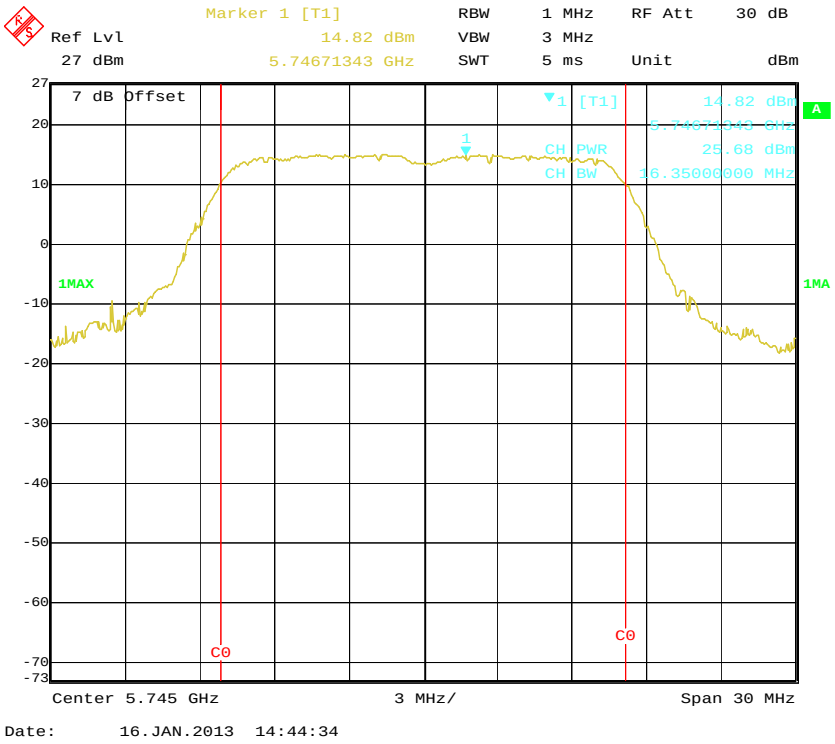
802.11a RF Output Power, Middle Channel, Antenna 0



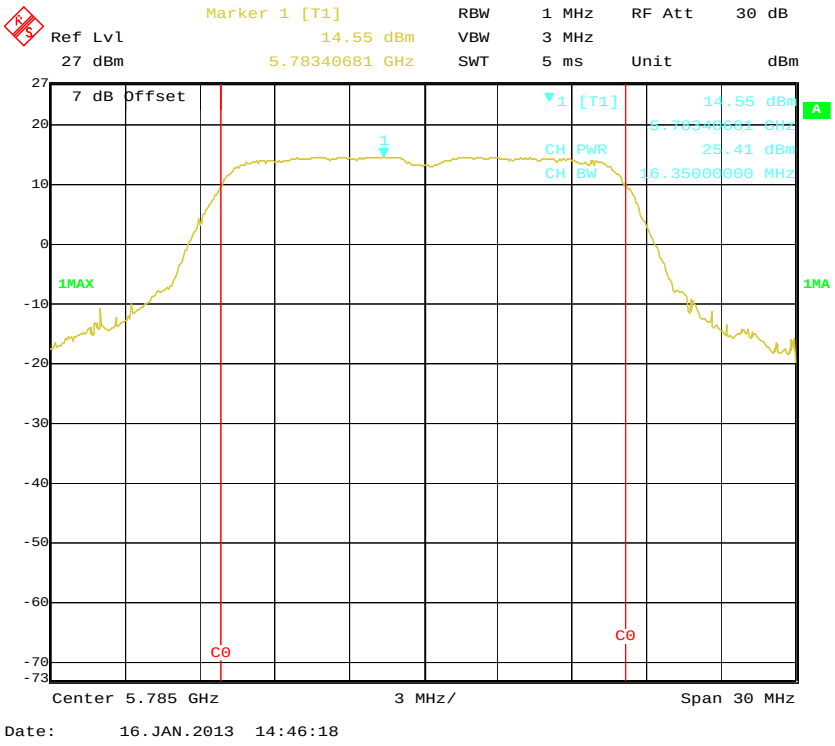
802.11a RF Output Power, High Channel, Antenna 0



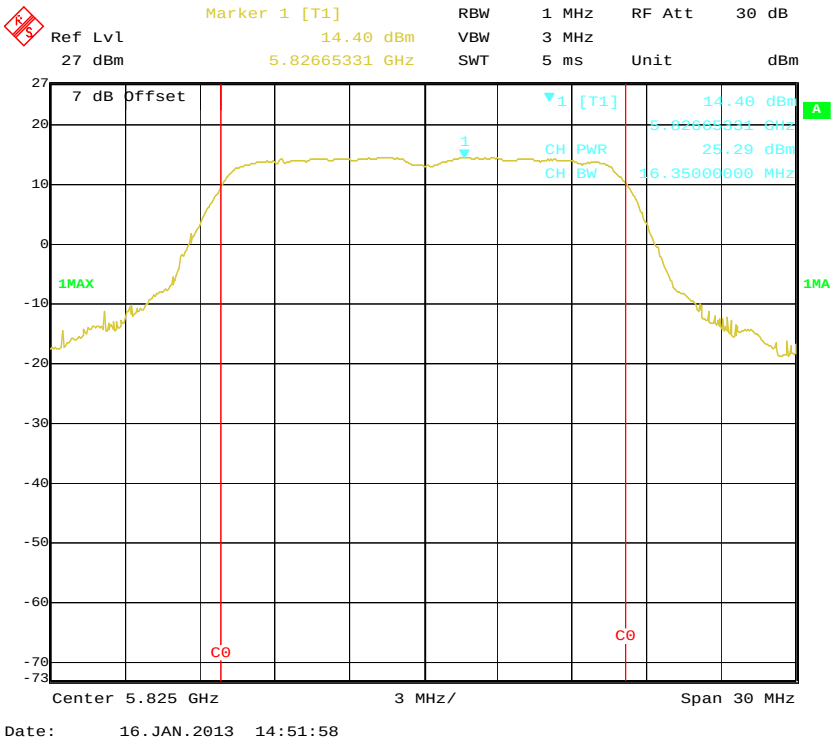
802.11a RF Output Power, Low Channel, Antenna 1



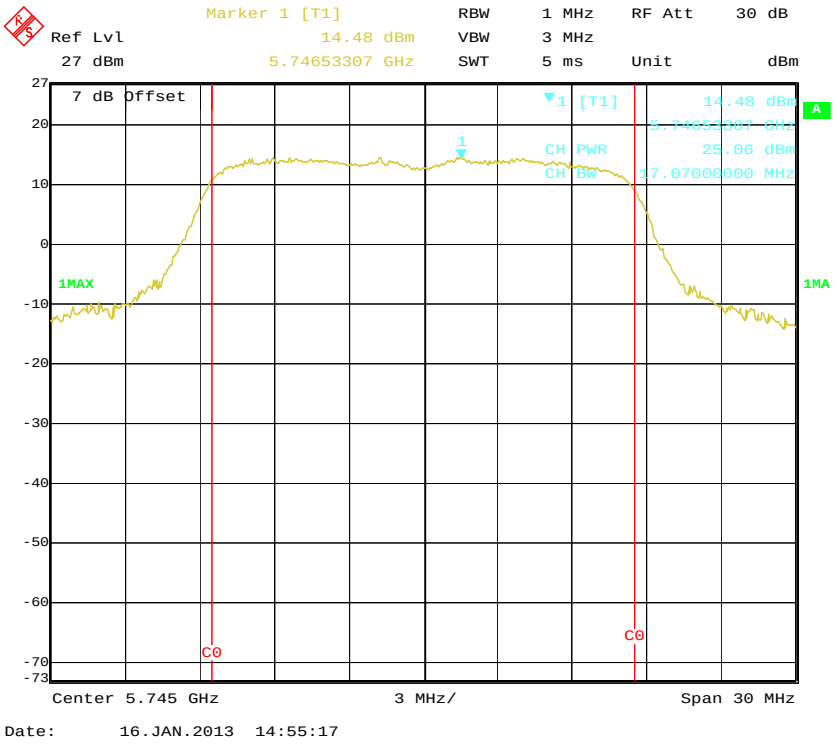
802.11a RF Output Power, Middle Channel, Antenna 1



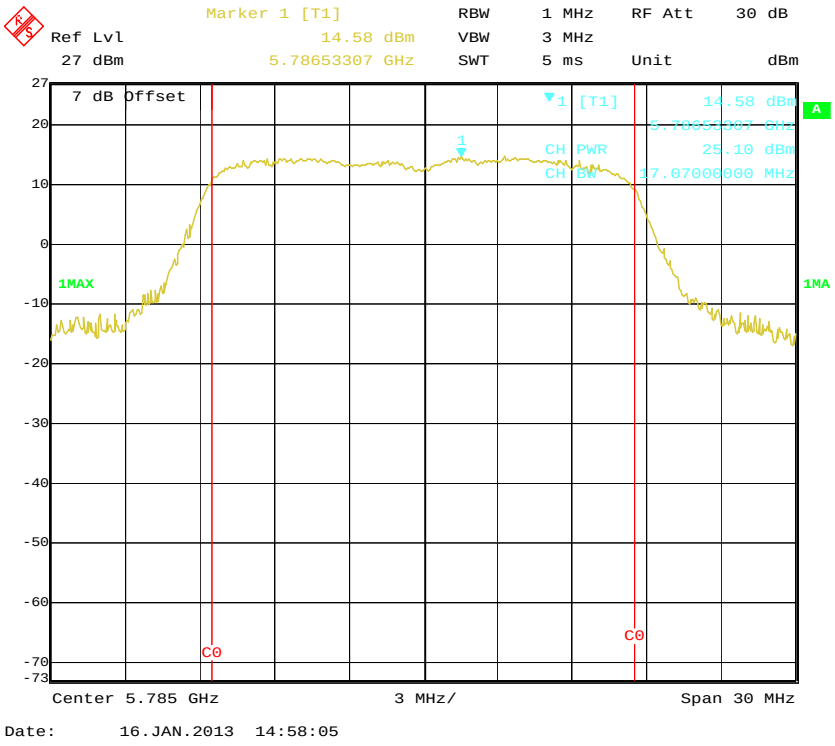
802.11a RF Output Power, High Channel, Antenna 1



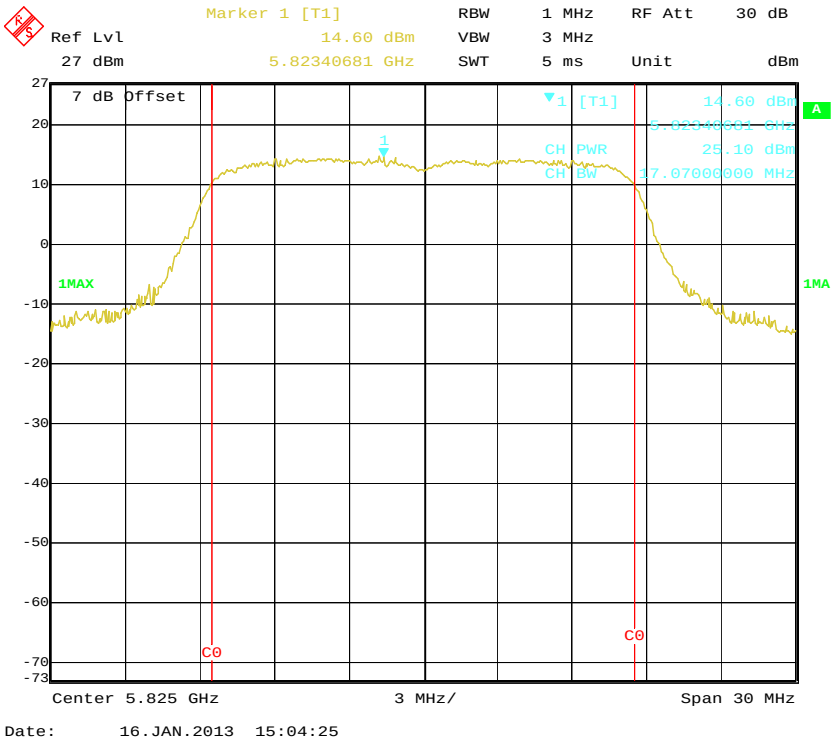
802.11n-HT20 RF Output Power, Low Channel, Antenna 0



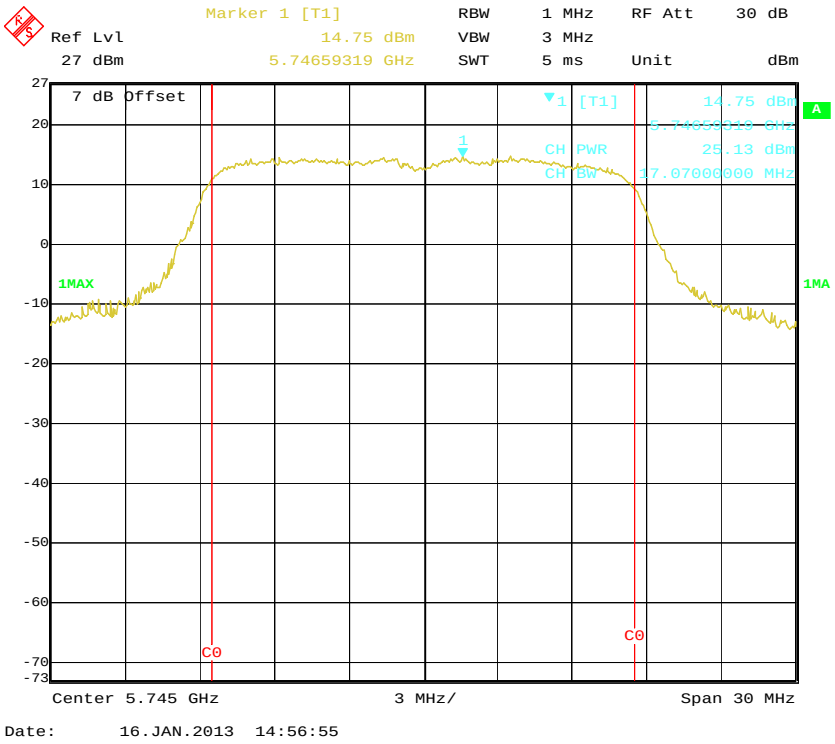
802.11n-HT20 RF Output Power, Middle Channel, Antenna 0



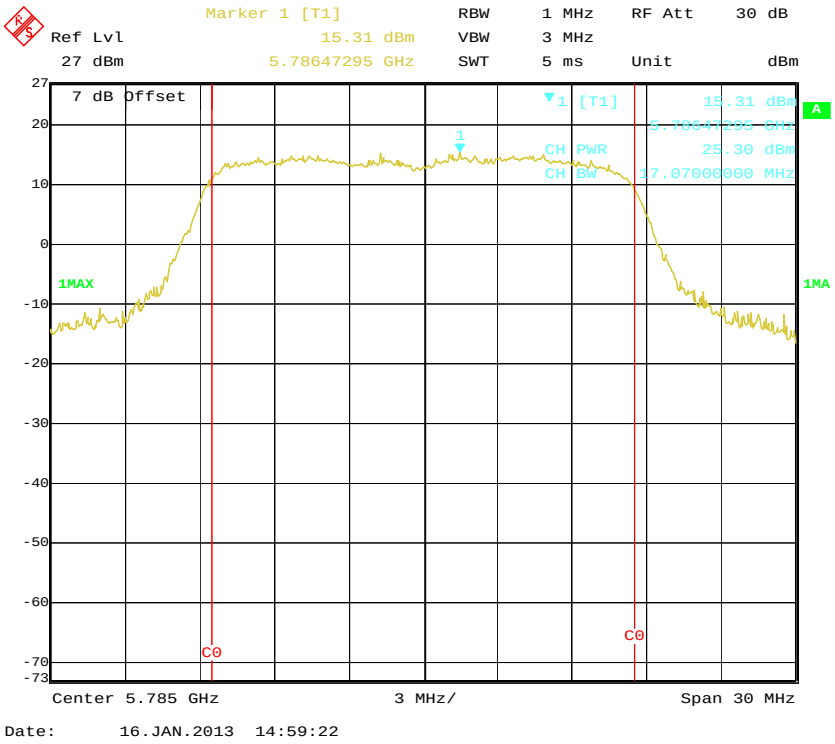
802.11n-HT20 RF Output Power, High Channel, Antenna 0



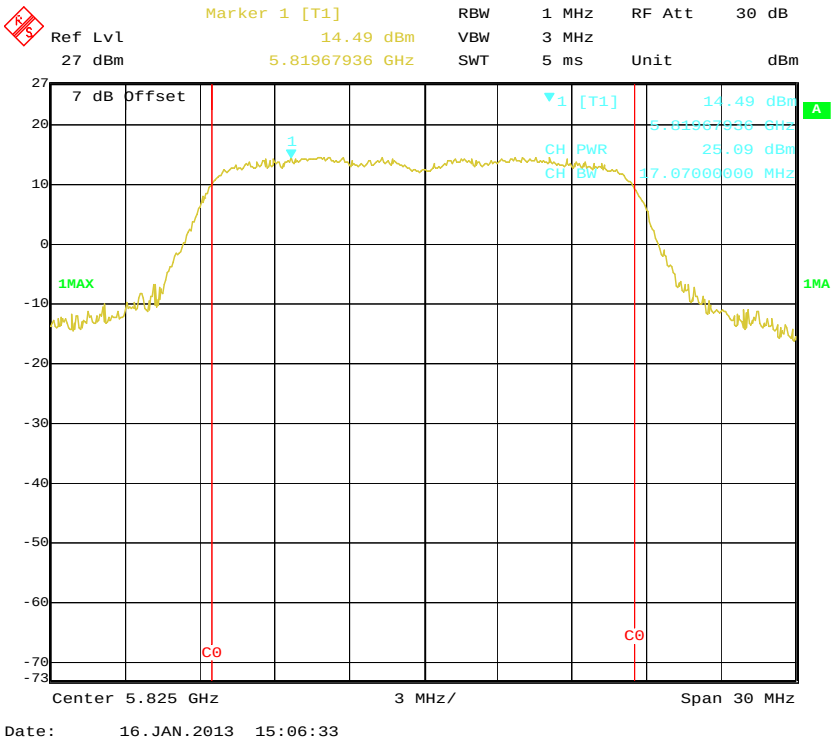
802.11n-HT20 RF Output Power, Low Channel, Antenna 1



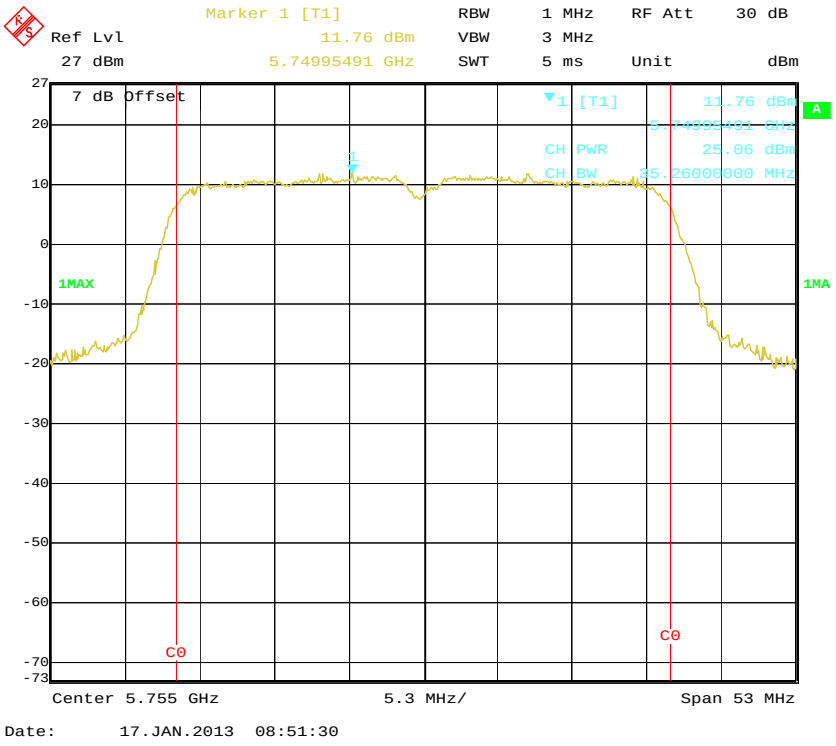
802.11n-HT20 RF Output Power, Middle Channel, Antenna 1



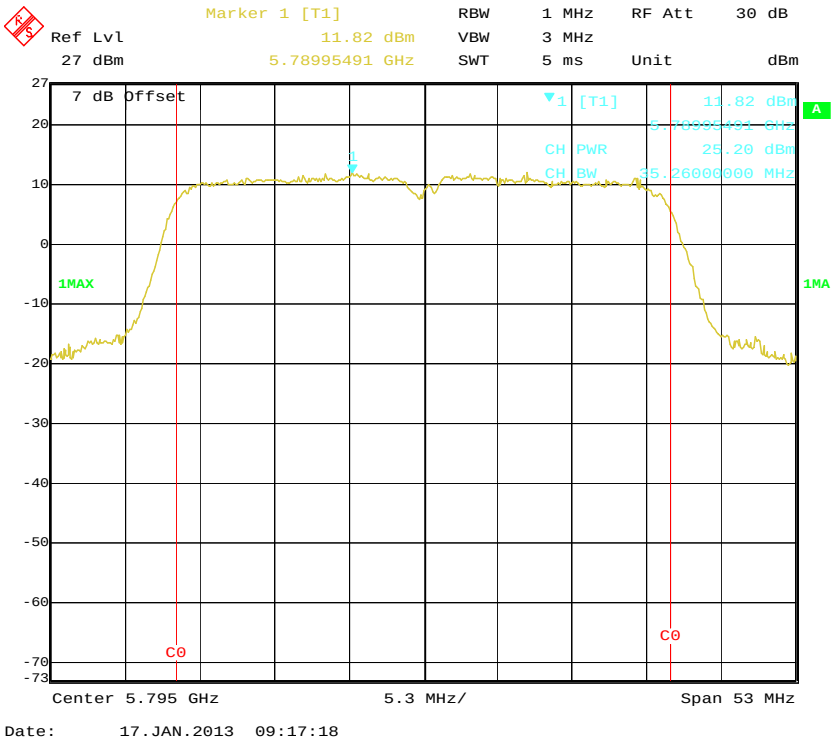
802.11n-HT20 RF Output Power, High Channel, Antenna 1



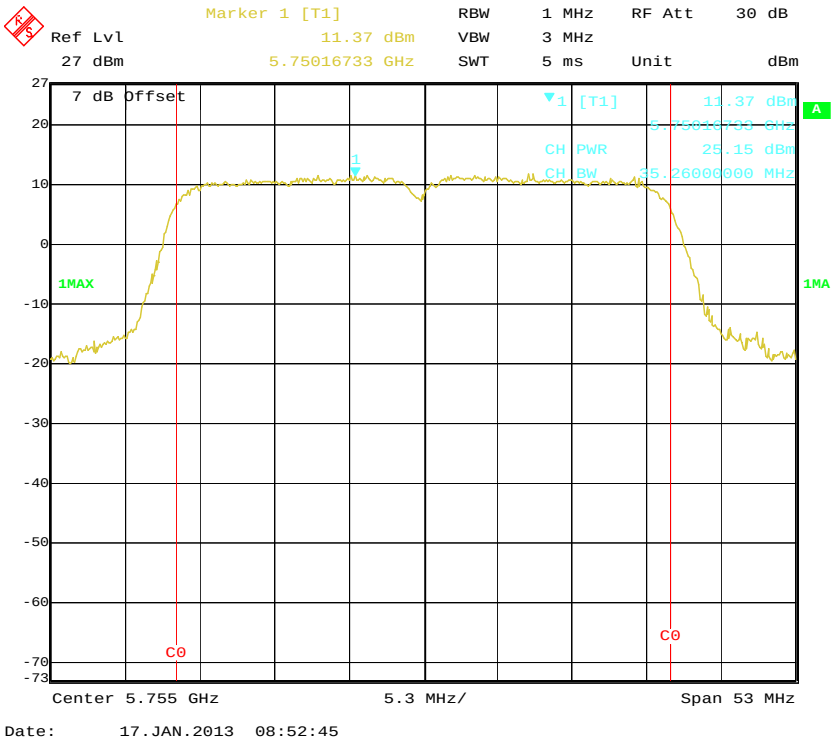
802.11n-HT40 RF Output Power, Channel 151, Antenna 0



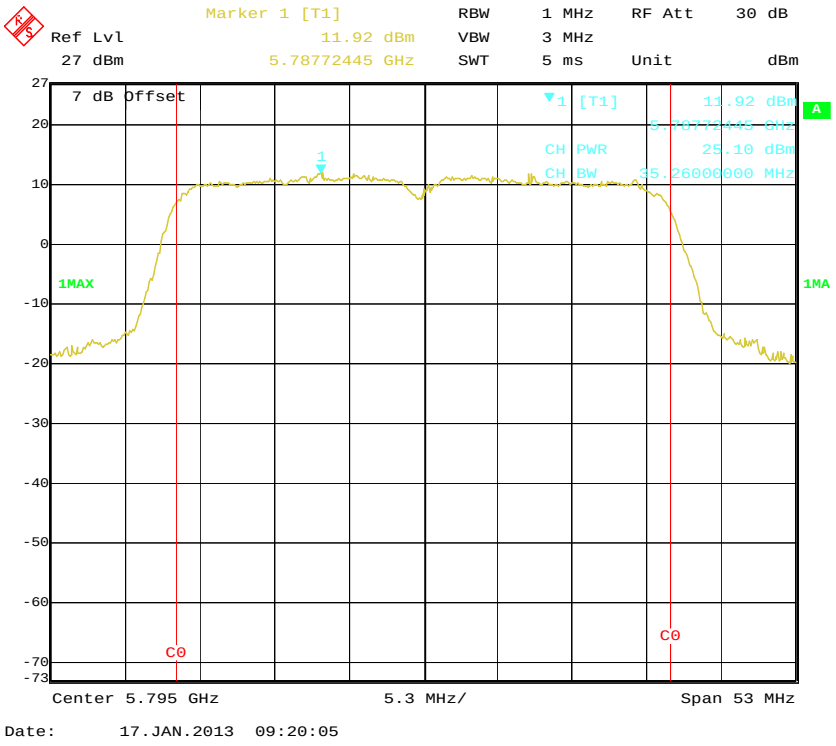
802.11n-HT40 RF Output Power, Channel 159, Antenna 0



802.11n-HT40 RF Output Power, Channel 151, Antenna 1



802.11n-HT40 RF Output Power, Channel 159, Antenna 1



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. 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.
4. Repeat above procedures until all measured frequencies were complete.

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	Signal Analyzer	FSIQ26	8386001028	2012-11-24	2013-11-23

*** Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Shenzhen) attests that all calibrations have been performed in accordance to NVLAP requirements, traceable to traceable to National Primary Standards and International System of Units (SI).

Test Data

Environmental Conditions

Temperature:	24~25℃
Relative Humidity:	55~56 %
ATM Pressure:	100.0~100.1 kPa

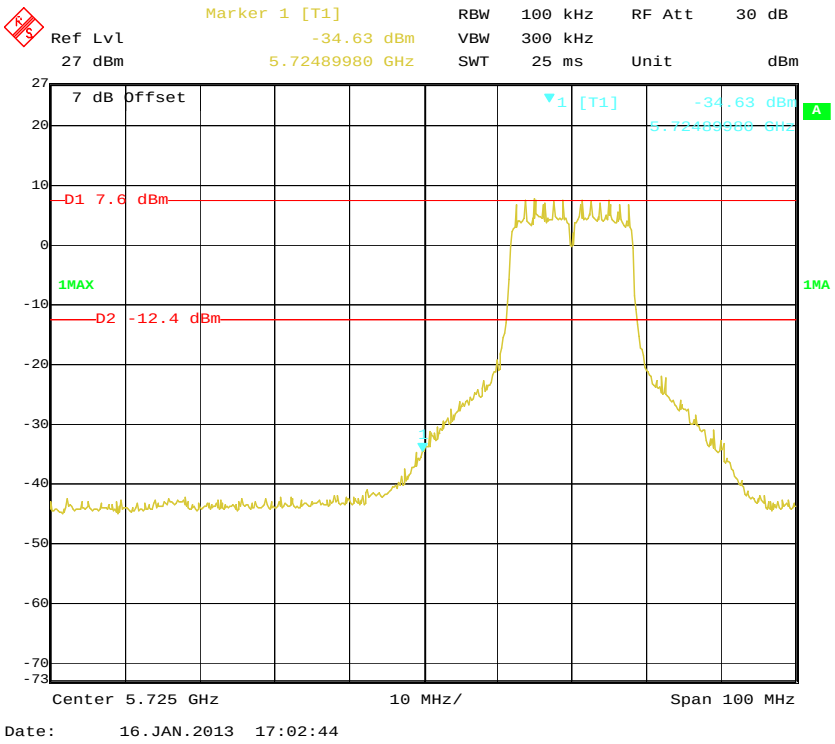
The testing was performed by Tiger Ye on 2013-01-16 and 2013-01-17.

Test Result: *Compliance*

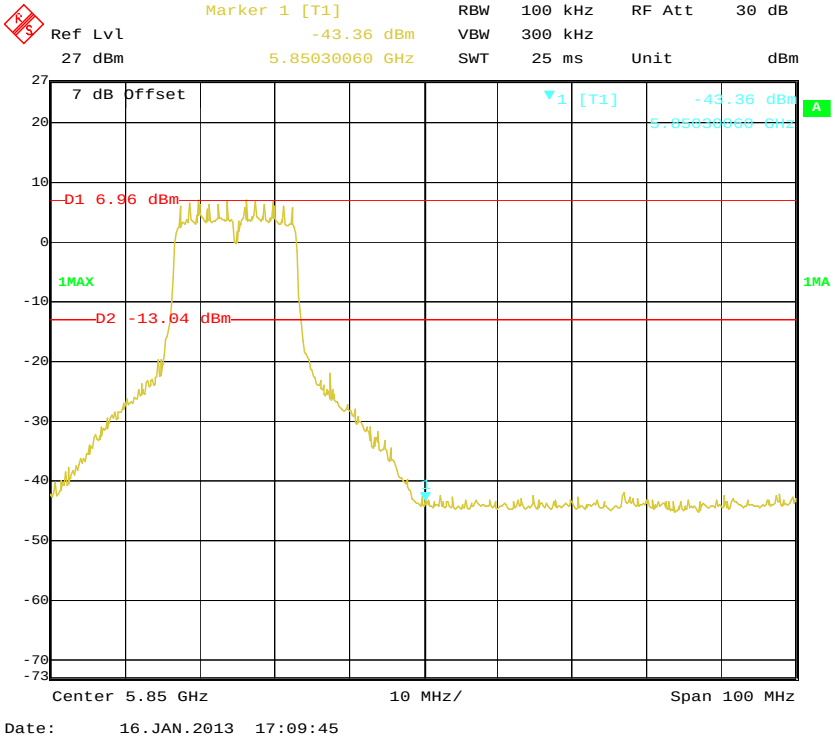
Band edge	Delta Peak to band emission(dBc)		Limit (dBc)	Result
	Antenna 0	Antenna 1		
802.11a				
L	42.23	42.39	≥20	Pass
R	50.32	50.03	≥20	Pass
802.11n-HT20				
L	46.51	41.19	≥20	Pass
R	49.20	49.43	≥20	Pass
802.11n-HT40				
L	35.27	34.12	≥20	Pass
R	46.22	46.19	≥20	Pass

Please refer to following plots.

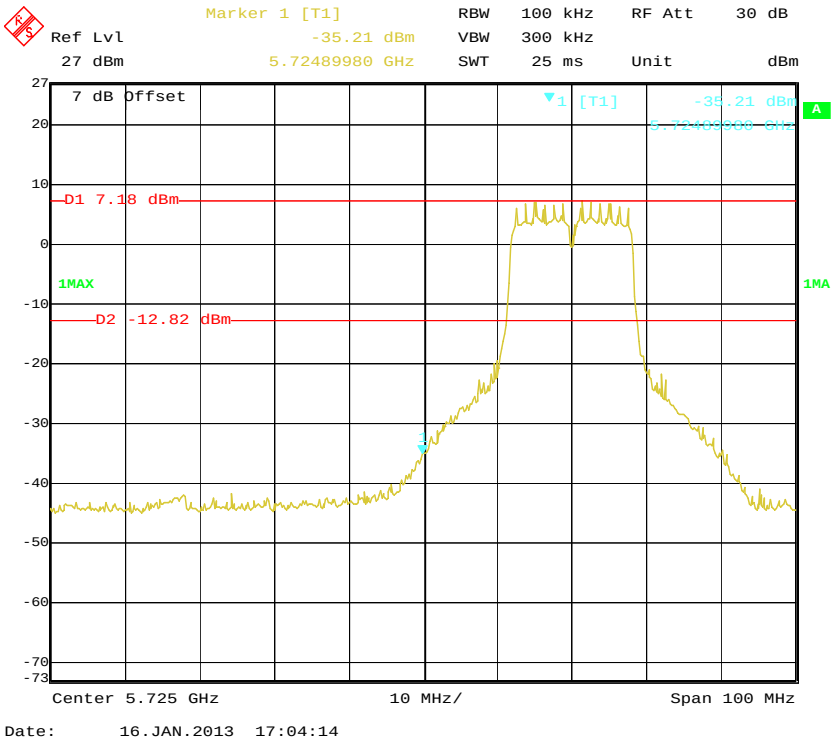
802.11a: Band Edge, Left Side, Antenna 0



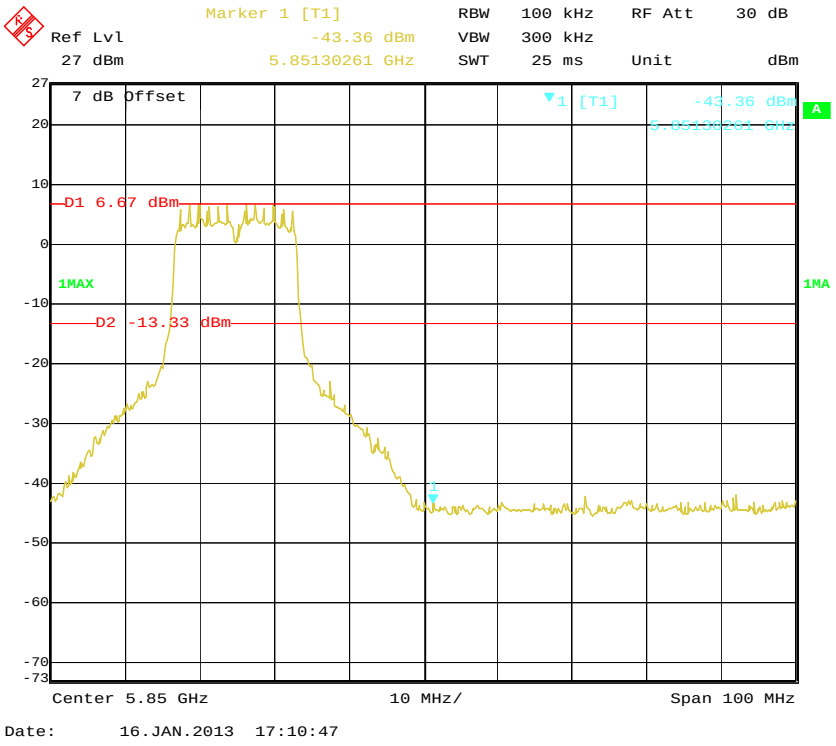
802.11a: Band Edge, Right Side, Antenna 0



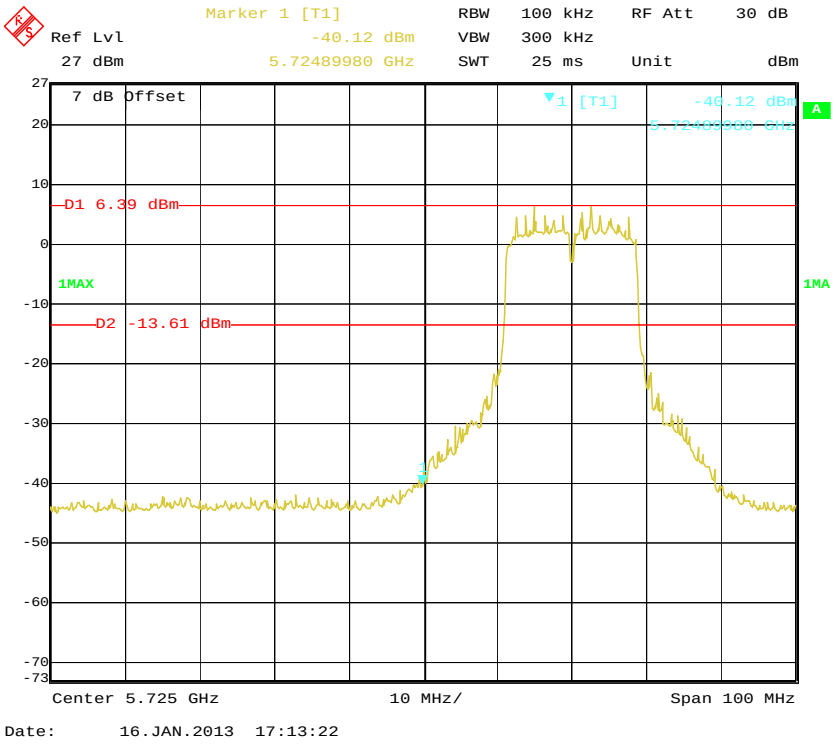
802.11a: Band Edge, Left Side, Antenna 1



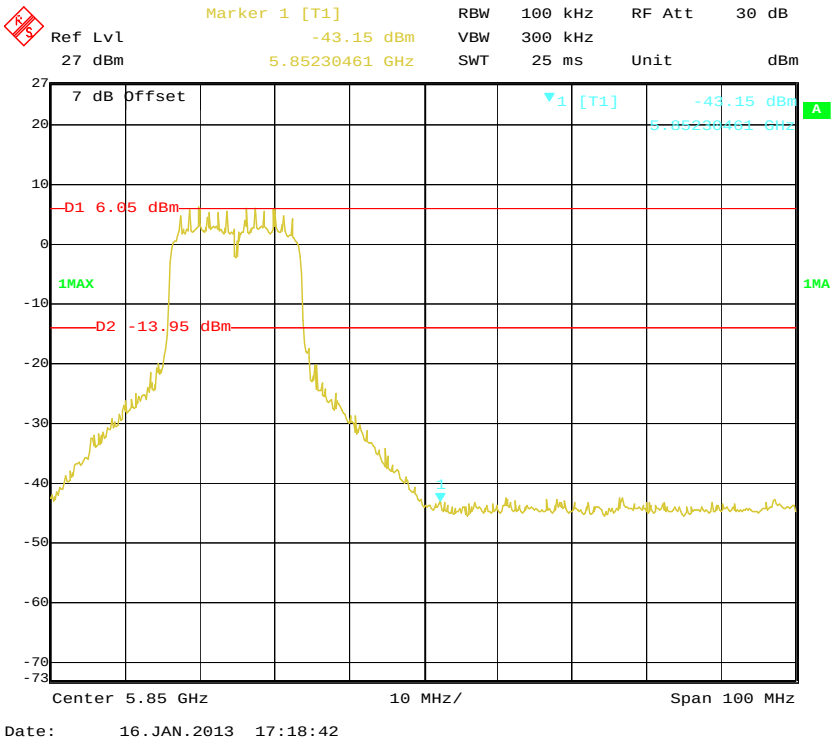
802.11a: Band Edge, Right Side, Antenna 1



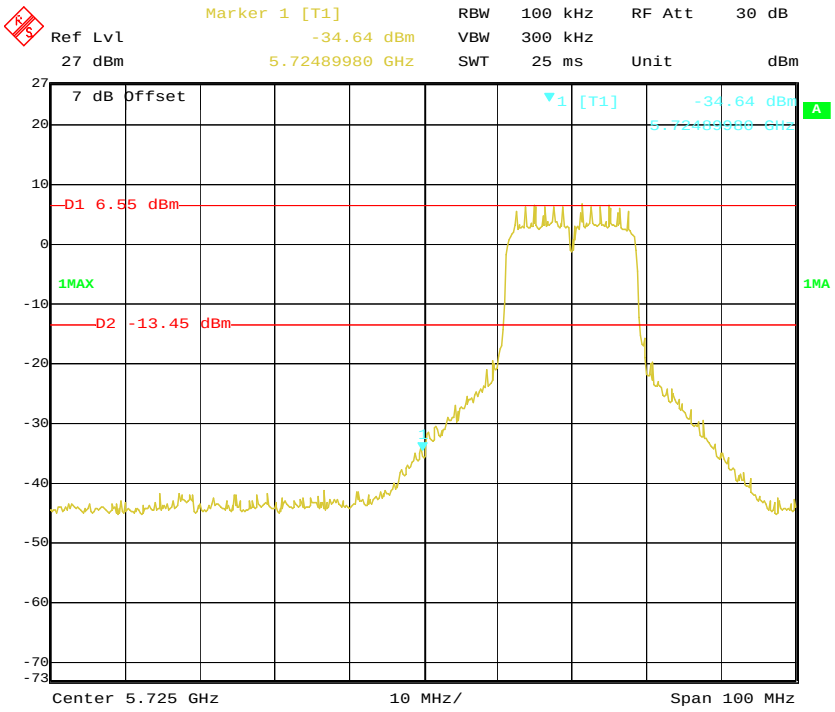
802.11n-HT20: Band Edge, Left Side, Antenna 0



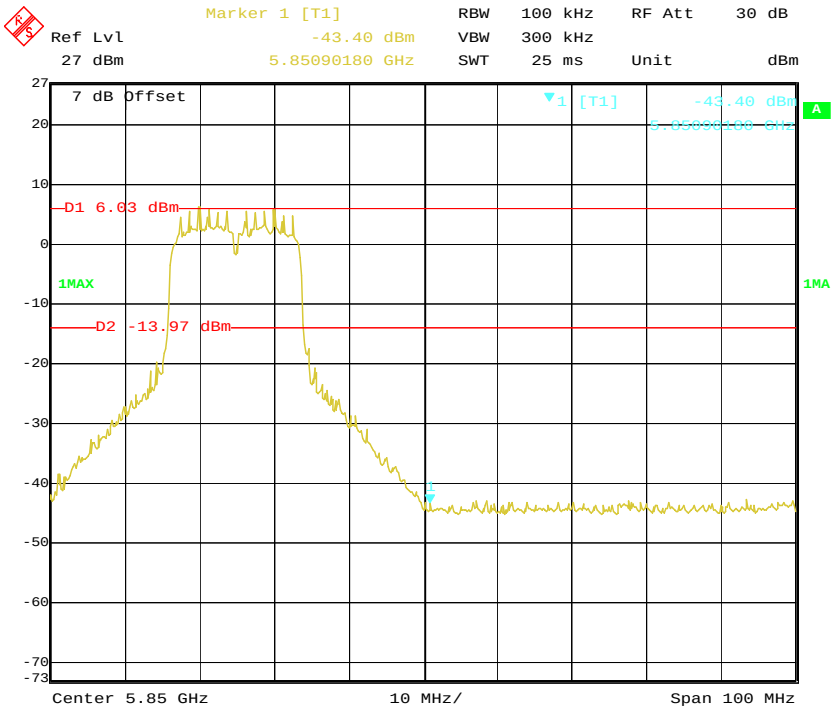
802.11n-HT20: Band Edge, Right Side, Antenna 0



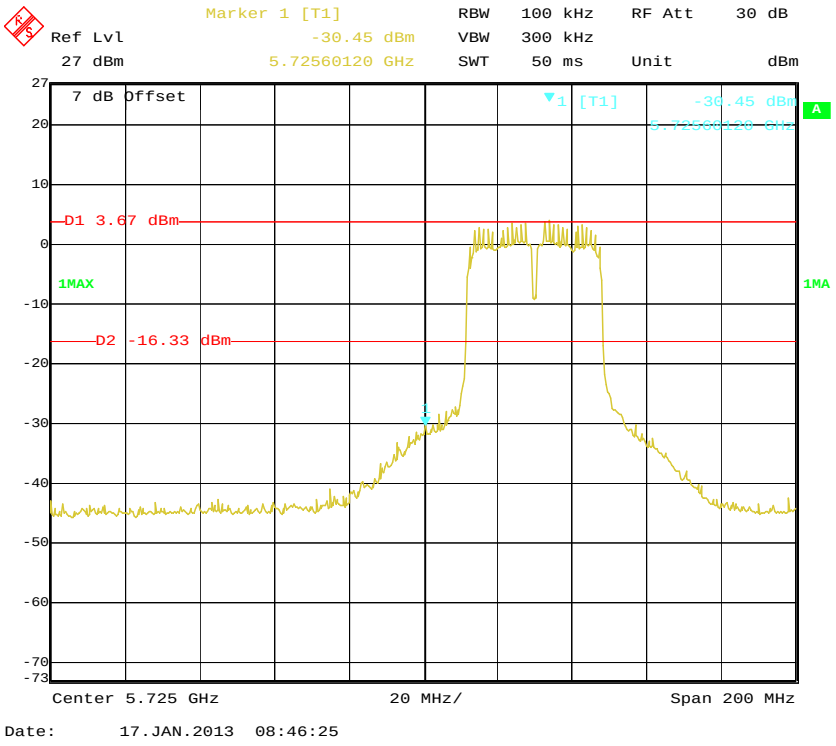
802.11n-HT20: Band Edge, Left Side, Antenna 1



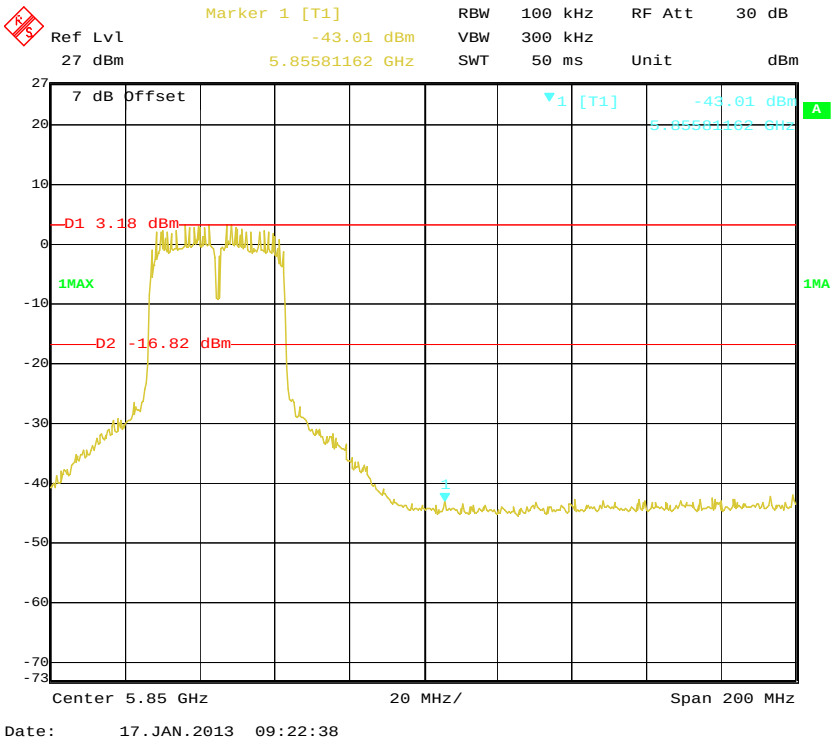
802.11n-HT20: Band Edge, Right Side, Antenna 1



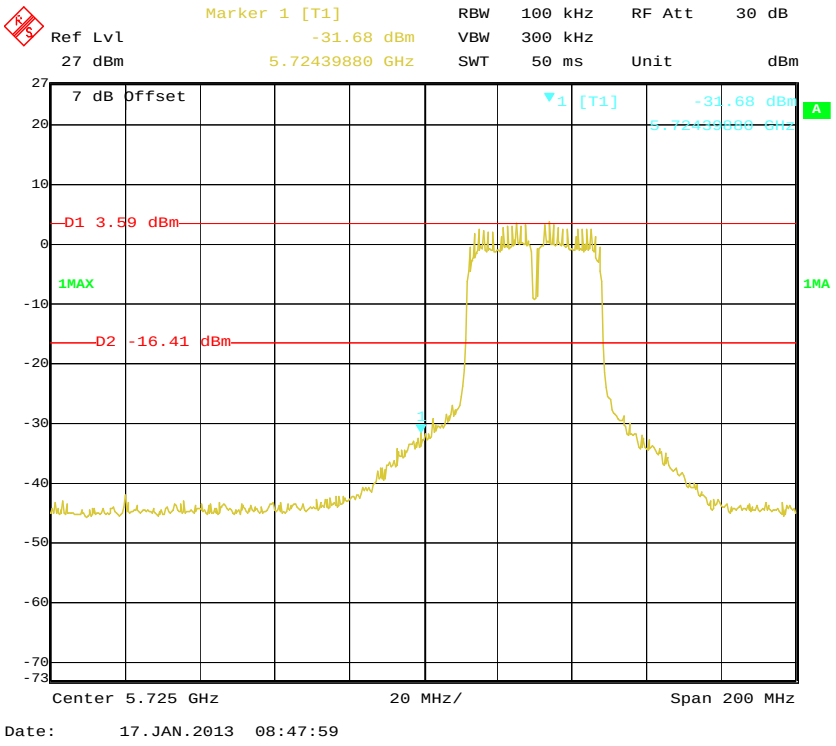
802.11n-HT40: Band Edge, Left Side, Antenna 0



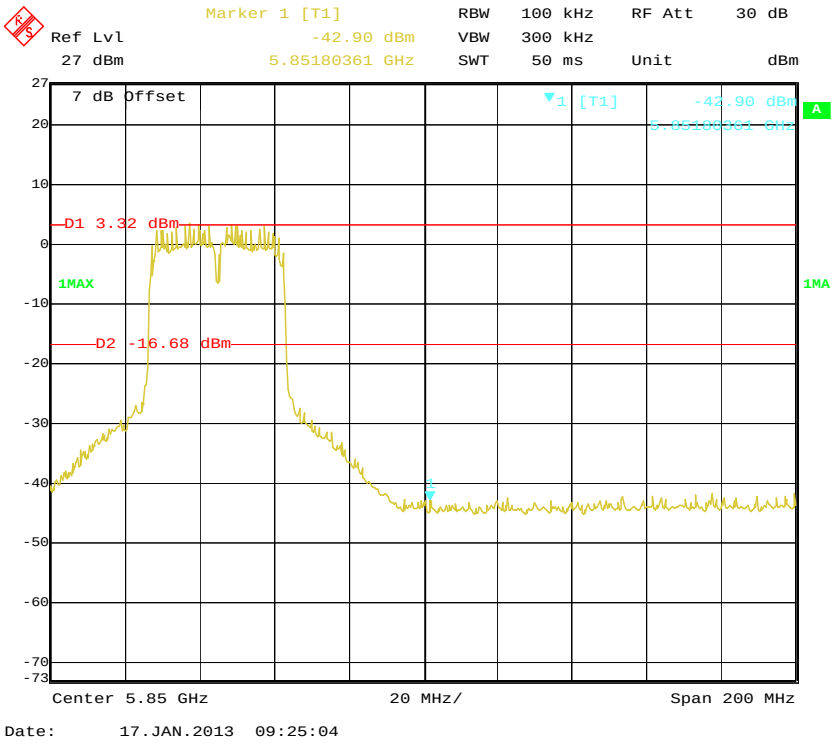
802.11n-HT40: Band Edge, Right Side, Antenna 0



802.11n-HT40: Band Edge, Left Side, Antenna 1



802.11n-HT40: Band Edge, Right Side, Antenna 1



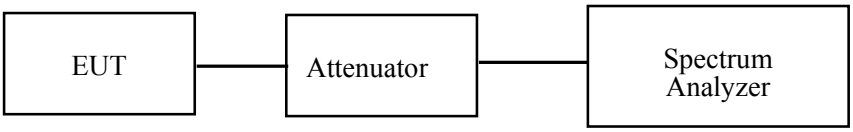
FCC §15.247(e) - POWER SPECTRAL DENSITY

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

Set analyzer center frequency to DTS channel center frequency.
Set the span to 1.5 times the DTS channel bandwidth.
Set the RBW ≥ 3 kHz.
Set the VBW ≥ 3 x RBW.
Detector = peak.
Sweep time = auto couple.
Trace mode = max hold.
Allow trace to fully stabilize.
Use the peak marker function to determine the maximum amplitude level.
If measured value exceeds limit, reduce RBW (no less than 3 kHz) and repeat.



Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	Signal Analyzer	FSIQ26	8386001028	2012-11-24	2013-11-23

*** Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Shenzhen) attests that all calibrations have been performed in accordance to NVLAP requirements, traceable to traceable to National Primary Standards and International System of Units (SI).

Test Data

Environmental Conditions

Temperature:	24~25℃
Relative Humidity:	55~56 %
ATM Pressure:	100.0~100.1 kPa

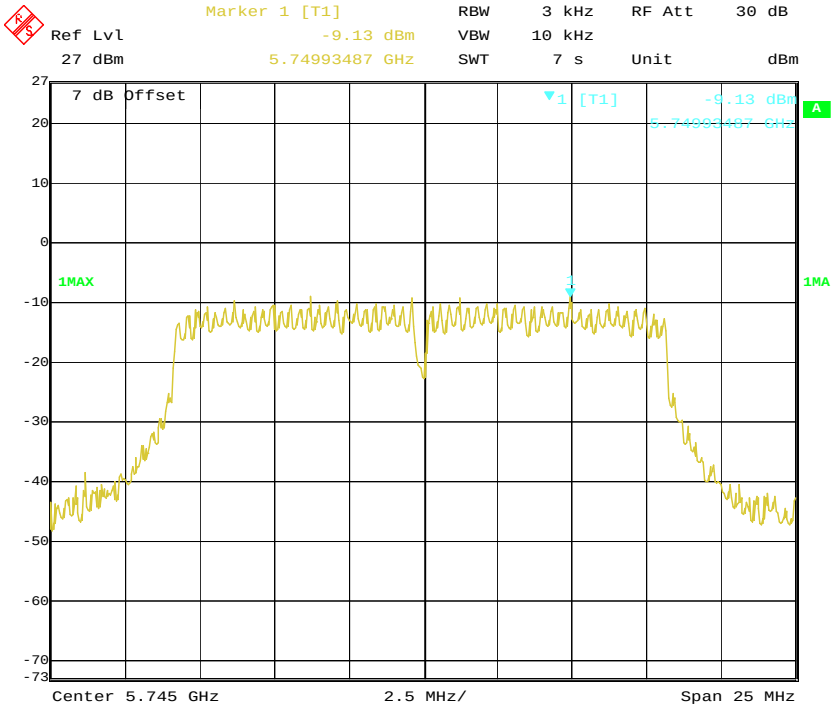
The testing was performed by Tiger Ye on 2013-01-16 and 2013-01-17.

Test Mode: Transmitting

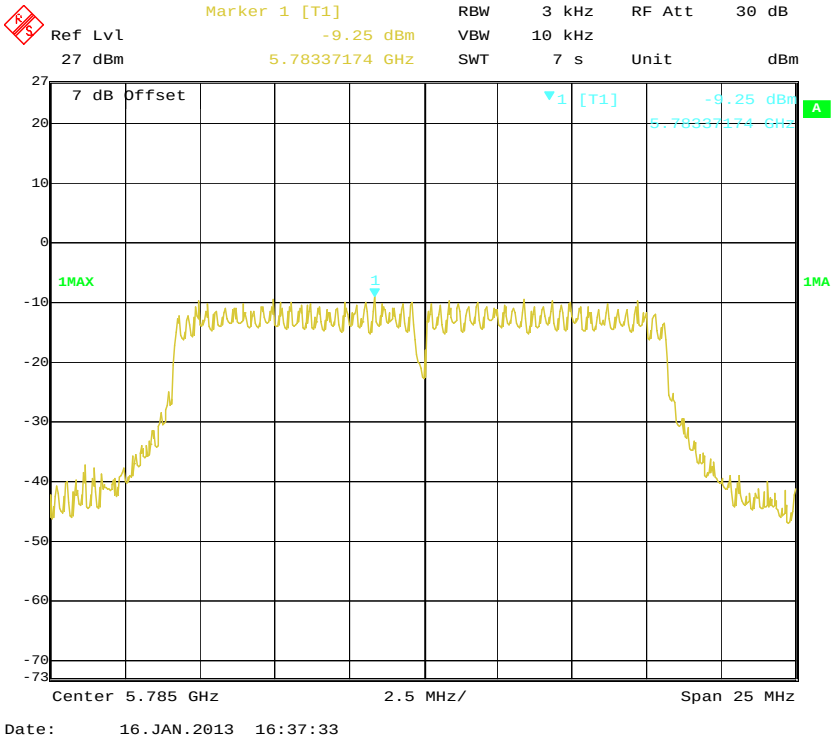
Test Result: Pass

Channel	Frequency (MHz)	PSD(dBm/3kHz)			Limit (dBm/3kHz)
		Antenna 0	Antenna 1	Antenna 0 +Antenna 1	
802.11a					
Low	5745	-9.13	-9.33	\	≤8
Middle	5785	-9.25	-9.07	\	≤8
High	5825	-9.13	-9.54	\	≤8
802.11n-HT20					
Low	5745	-10.11	-10.32	-7.20	≤8
Middle	5785	-10.05	-9.80	-6.91	≤8
High	5825	-10.11	-10.45	-7.27	≤8
802.11n-HT40					
Low	5755	-12.84	-13.11	-9.96	≤8
High	5795	-12.93	-12.88	-9.89	≤8

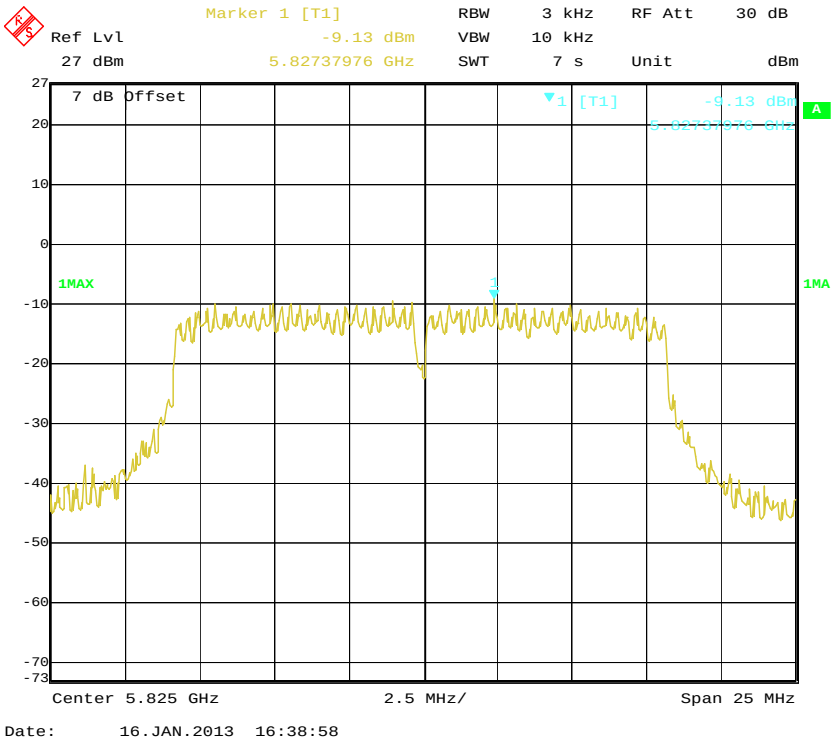
Power Spectral Density, 802.11a Low Channel, Antenna 0



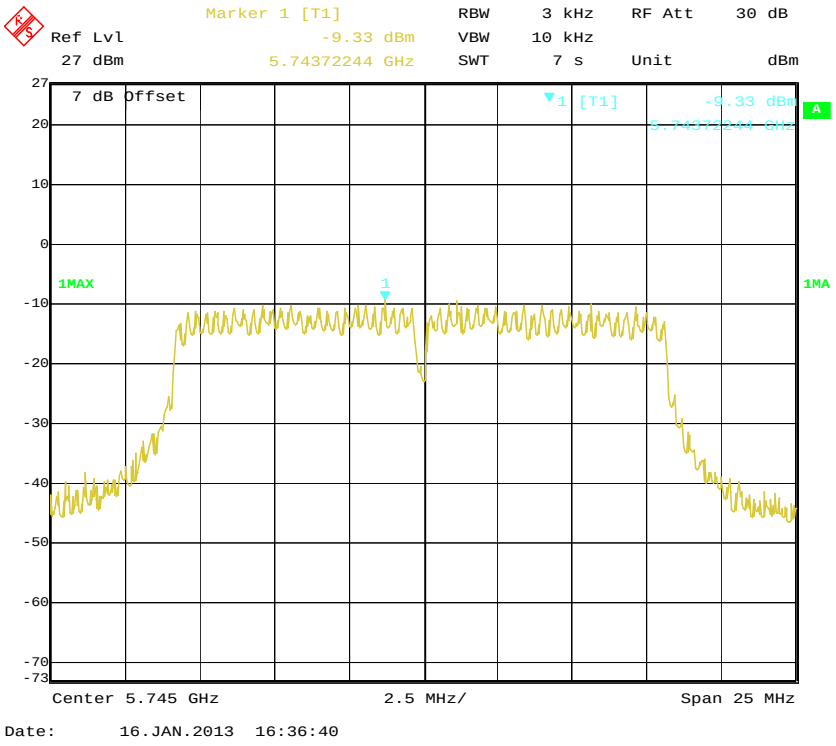
Power Spectral Density, 802.11a Middle Channel, Antenna 0



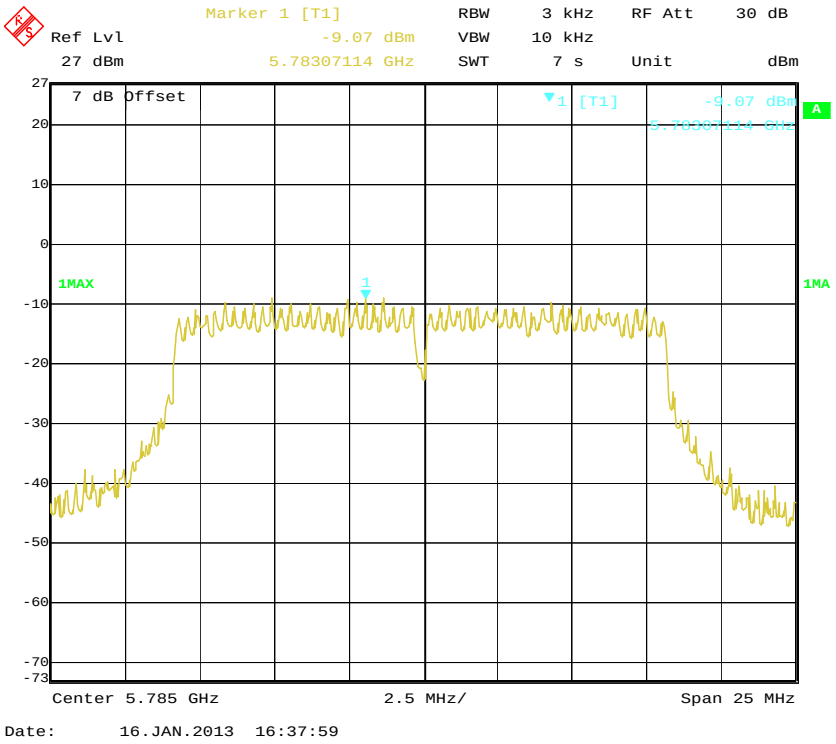
Power Spectral Density, 802.11a High Channel, Antenna 0



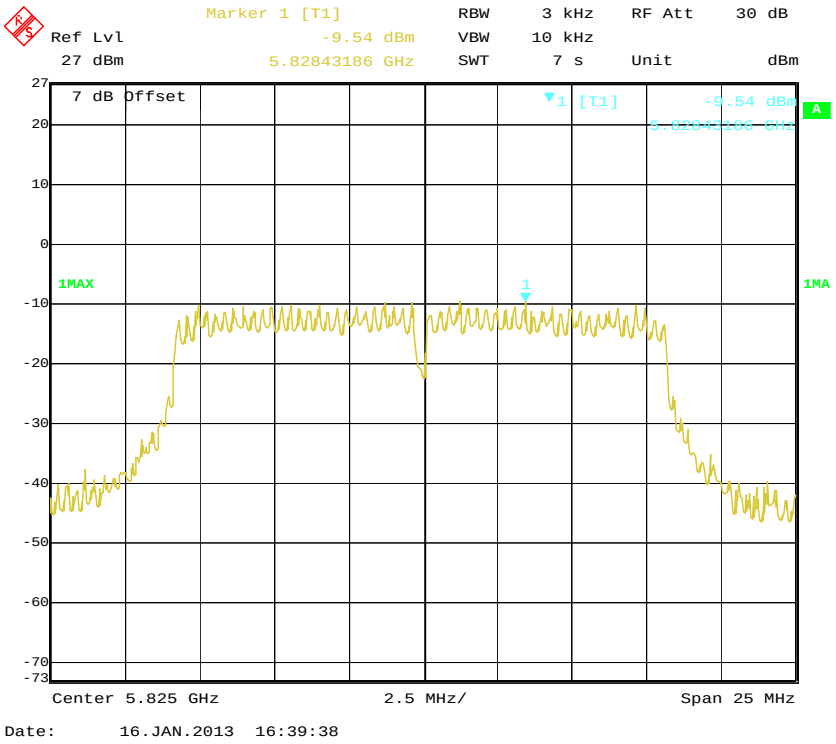
Power Spectral Density, 802.11a Low Channel, Antenna 1



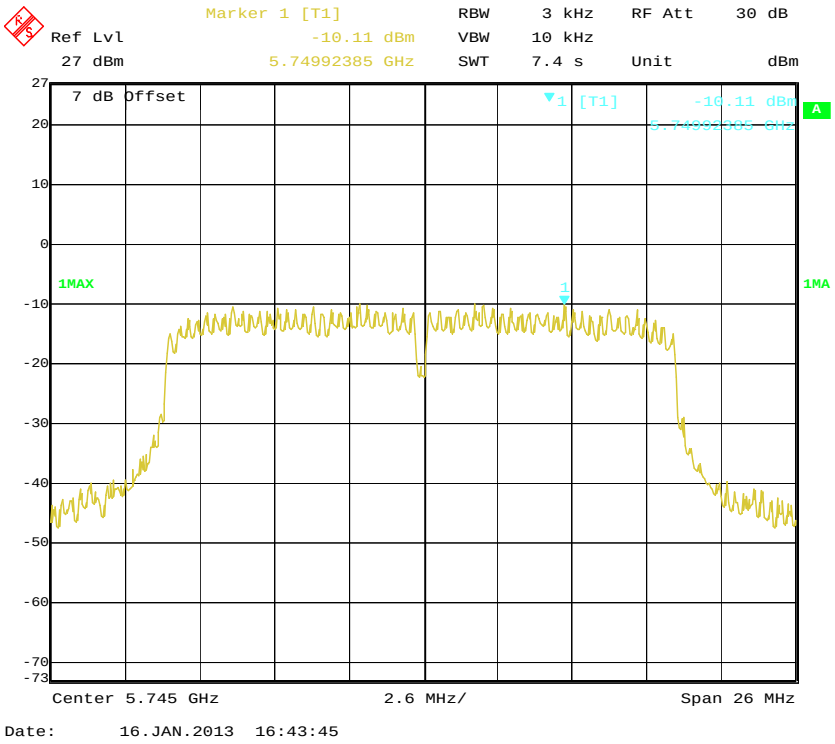
Power Spectral Density, 802.11a Middle Channel, Antenna 1



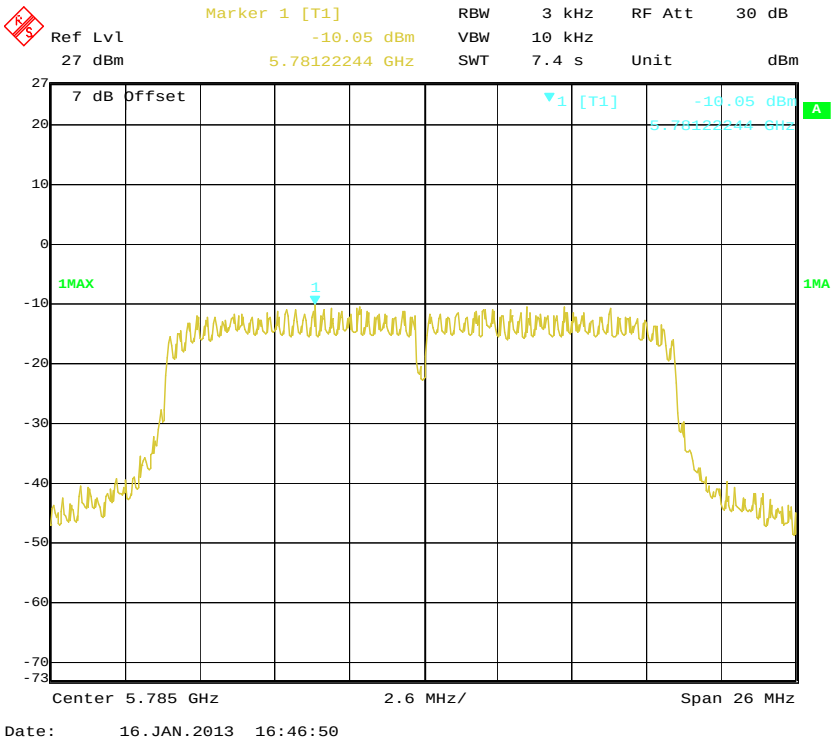
Power Spectral Density, 802.11a High Channel, Antenna 1



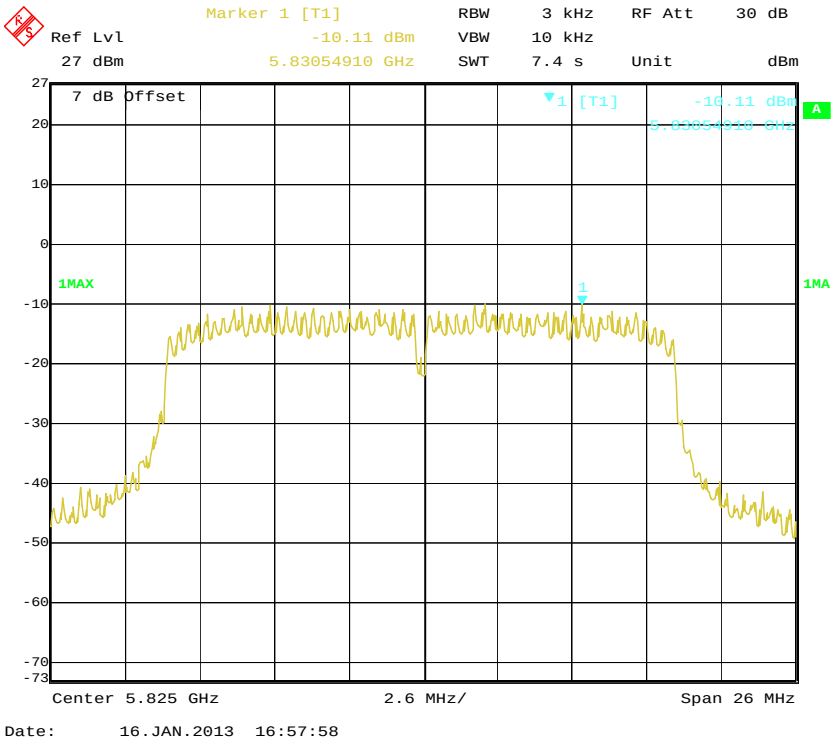
Power Spectral Density, 802.11n-HT20 Low Channel, Antenna 0



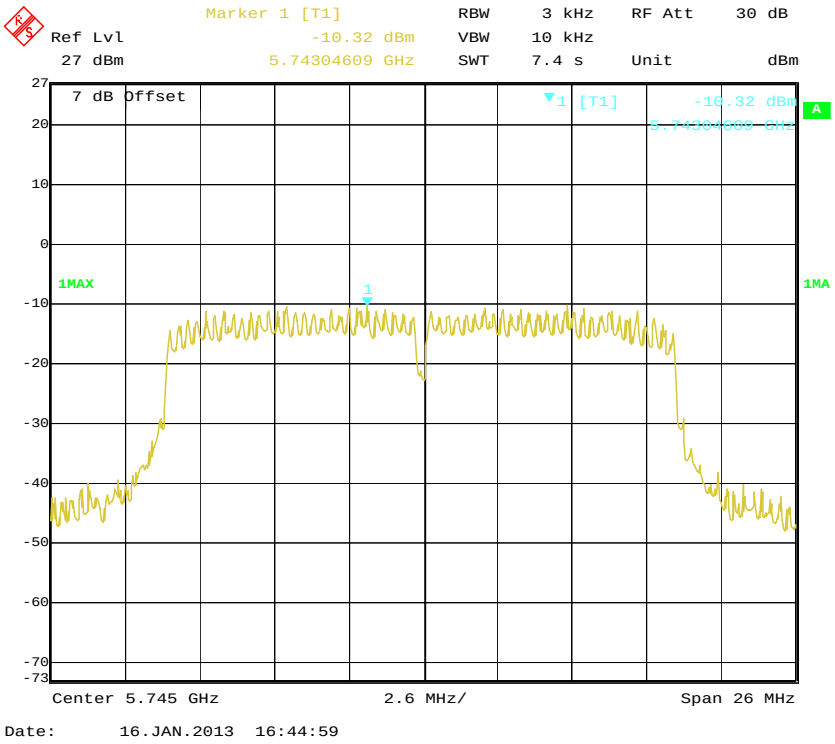
Power Spectral Density, 802.11n-HT20 Middle Channel, Antenna 0



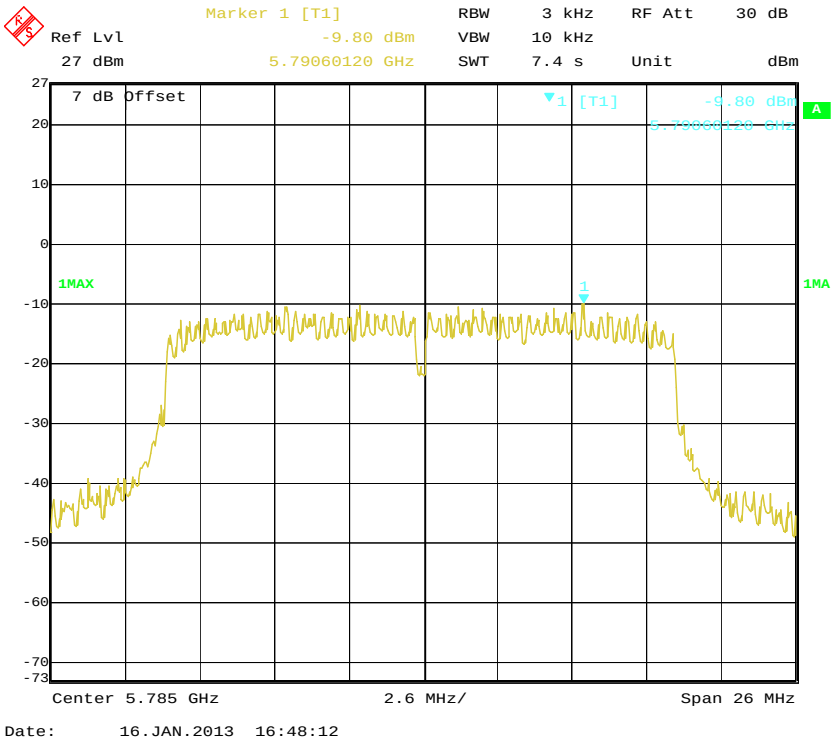
Power Spectral Density, 802.11n-HT20 High Channel, Antenna 0



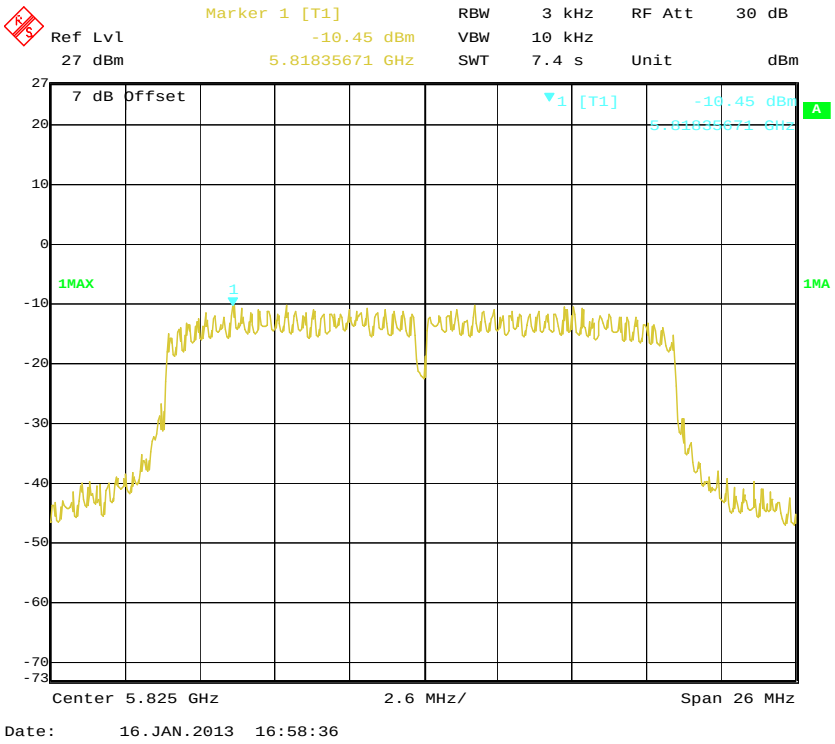
Power Spectral Density, 802.11n-HT20 Low Channel, Antenna 1



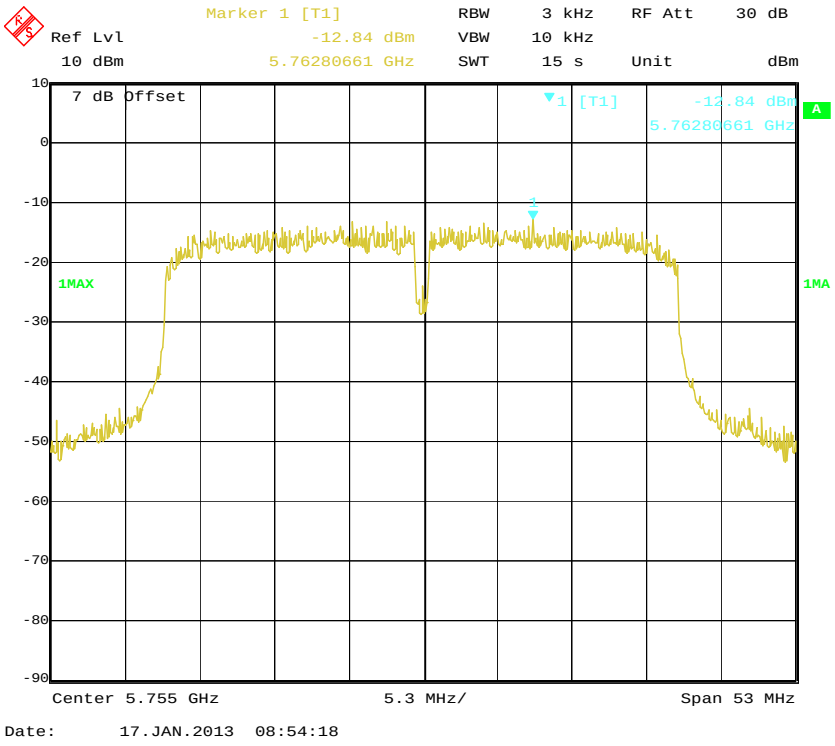
Power Spectral Density, 802.11n-HT20 Middle Channel, Antenna 1



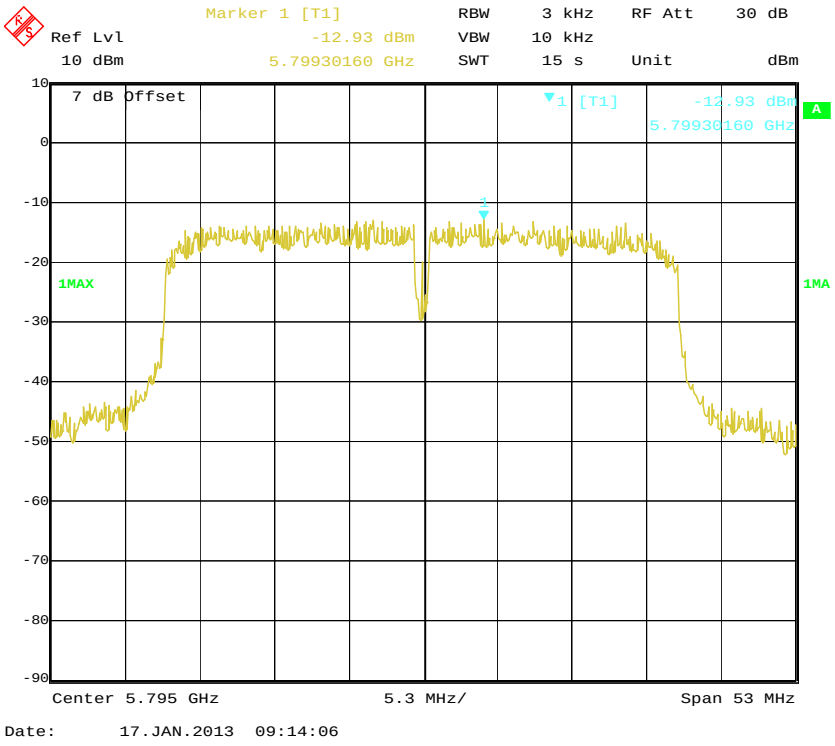
Power Spectral Density, 802.11n-HT20 High Channel, Antenna 1



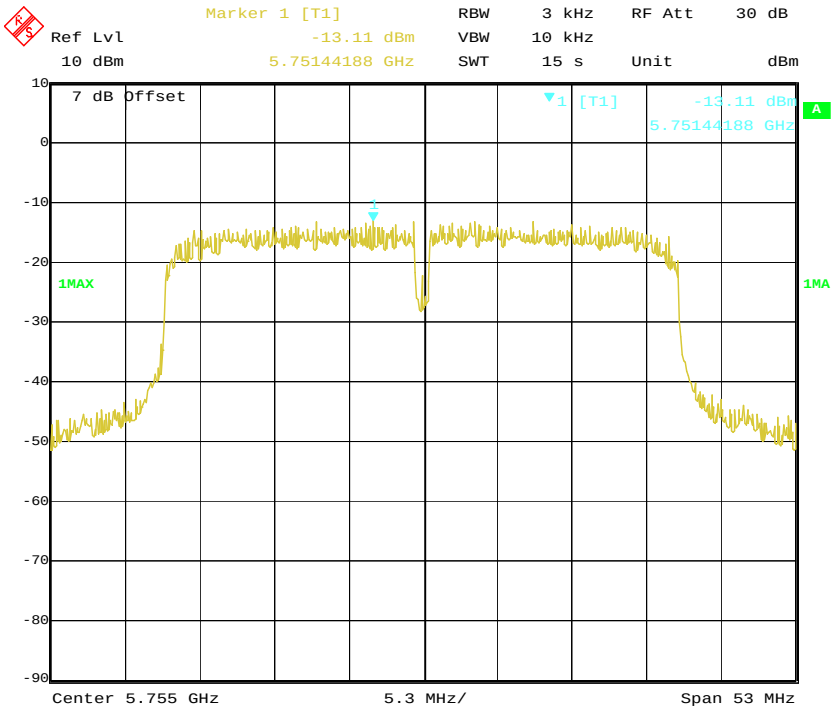
Power Spectral Density, 802.11n-HT40 Channel 151, Antenna 0



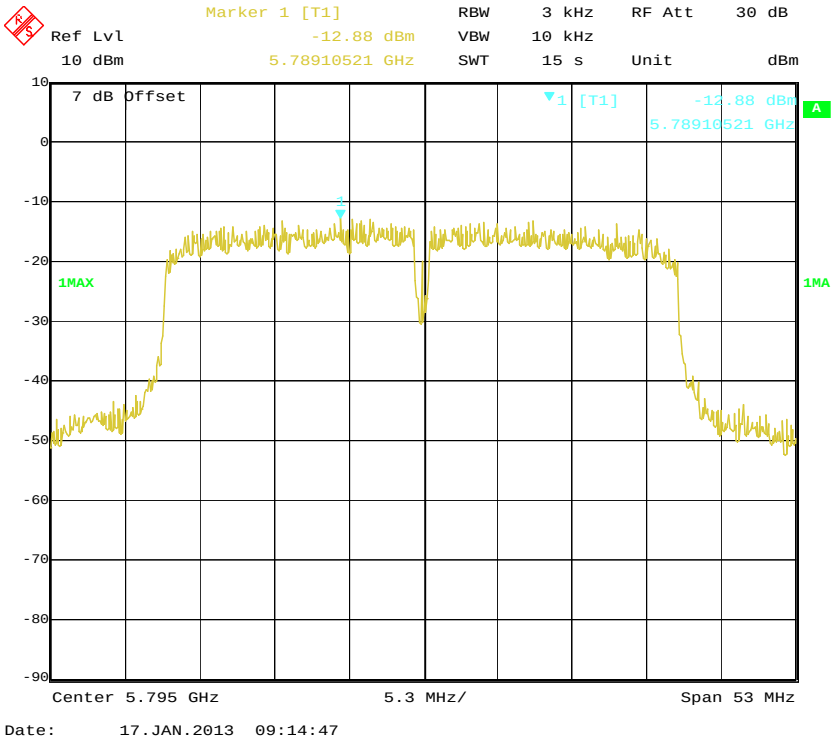
Power Spectral Density, 802.11n-HT40 Channel 159, Antenna 0



Power Spectral Density, 802.11n-HT40 Channel 151, Antenna 1



Power Spectral Density, 802.11n-HT40 Channel 159, Antenna 1



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