FCC PART 15.247

TEST REPORT

For

SHENZHEN TENDA TECHNOLOGY CO.,LTD.

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

FCC ID: V7TW900U

Report Type:	**Product Type:**
Original Report	Wireless 11ac Dual-band usb Adapter

Test Engineer:	Leon Chen
Report Number:	R2DG130130002-00B
Report Date:	2013-03-14
Reviewed By:	Ivan Cao RF Leader
Test Laboratory:	Bay Area Compliance Laboratories Corp. (Dongguan) No.69 Pulongcun, Puxinhu Industrial Zone, Tangxia, Dongguan, Guangdong, China Tel: +86-769-86858888 Fax: +86-769-86858891 www.baclcorp.com.cn

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GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

The *SHENZHEN TENDA TECHNOLOGY CO.,LTD.*'s product, model number: *W900U (FCC ID: V7TW900U)* (the "EUT") in this report was a *Wireless 11ac Dual-band usb Adapter,* which was measured approximately: 9.2 cm (L) x 2.8 cm (W) x 1.1 cm (H), rated input voltage: DC 5.0 V from system.

** All measurement and test data in this report was gathered from production sample serial number: 130130002 (Assigned by BACL.Dongguan). The EUT was received on 2013-02-01.*

Objective

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

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

Related Submittal(s)/Grant(s)

FCC Part 15C DTS submissions with FCC ID: *V7TW900U* for 2412-2462MHz band.
FCC Part 15E NII submissions with FCC ID: *V7TW900U* for 5180-5240MHz band.

Test Methodology

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

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

The uncertainty of any RF tests which use conducted method measurement is ±3.46 dB, the uncertainty of any radiation on emissions measurement is:
30M~200MHz: 5.0 dB
200M~1GHz: 6.2 dB
1G~6GHz: 4.45 dB
6G~18GHz: 5.23 dB
And the uncertainty will not be taken into consideration for all test data recorded in the report.

Test Facility

The Test site used by Bay Area Compliance Laboratories Corp. (Dongguan) to collect test data is located on the No.69 Pulongcun, Puxinhu Industrial Zone, Tangxia, Dongguan, Guangdong, China

Test site at Bay Area Compliance Laboratories Corp. (Dongguan) has been fully described in reports submitted to the Federal Communication Commission (FCC). The details of these reports have been found to be in compliance with the requirements of Section 2.948 of the FCC Rules on February 02, 2012. The facility also complies with the radiated and AC line conducted test site criteria set forth in ANSI C63.4-2009.

The Federal Communications Commission has the reports on file and is listed under FCC Registration No.: 273710. The test site has been approved by the FCC for public use and is listed in the FCC Public Access Link (PAL) database.

SYSTEM TEST CONFIGURATION

Description of Test Configuration

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

For 5725~5850MHz band, 8 channels are provided to testing:

Channel	Frequency (MHz)	Channel	Frequency (MHz)
149	5745	159	5795
151	5755	161	5805
153	5765	165	5825
155	5775	/	/
157	5785	/	/

For 802.11a ,802.11n20 and 802.11 ac vht 20 ,Channel 149,153, 157,161 and 165 was used , we choosed the channel 149,157,165 for test, for 802.11n40 and 802.11ac vht 40 Channel 151, 159 was tested, for 802.11ac vht80 mode channel 155 was tested.

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

For 802.11a,the EUT can transmitting with chain 0 or chain 1, therefore investigated worst case to representative chain 0 in test report.

EUT Exercise Software

The software ‘Broadcom MTool 2.0.0.3’ was used for testing, which was provided by manufacturer.

Equipment Modifications

No modification was made to the EUT tested.

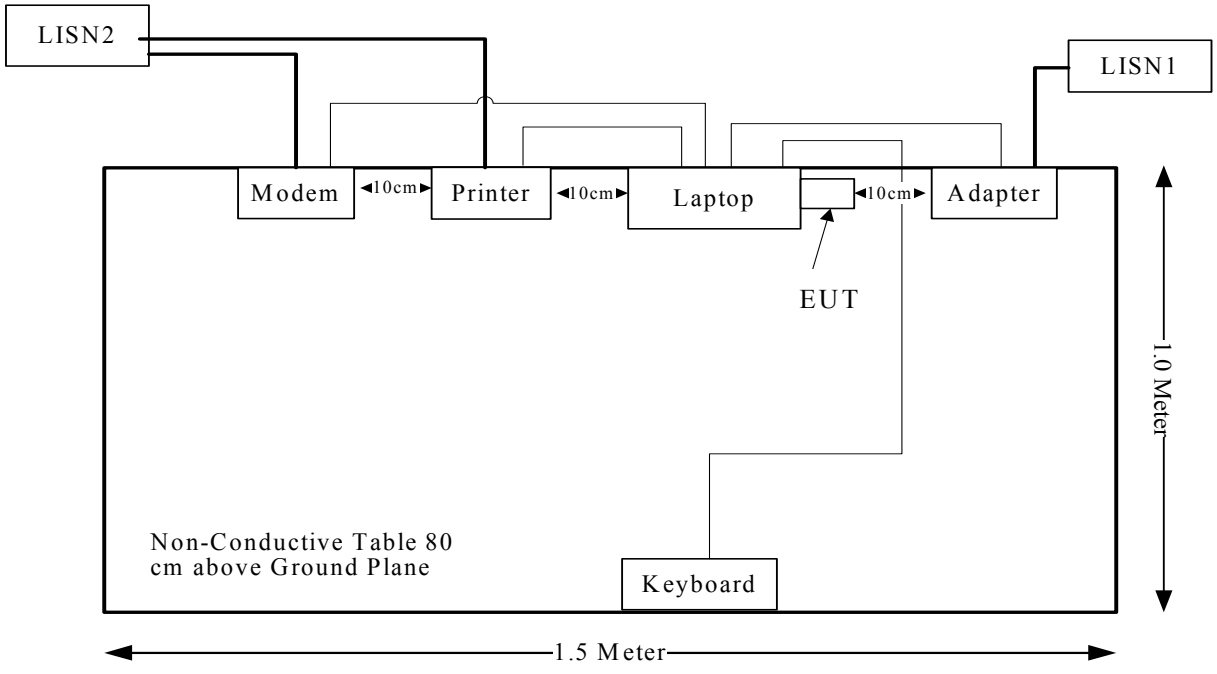
Support Equipment List and Details

Manufacturer	Description	Model	Serial Number
DELL	Laptop	PP11L	QDS-BRCM1017
HP	Printer	C3941A	JPTVOB2337
DELL	Keyboard	L100	CNORH656658907BL05DC
SAST	Modem	AEM-2100	0293

External Cable

Cable Description	Length (m)	From Port	To
Shielded Detachable Printer Cable	1.2	Parallel Port of Laptop	Printer
Shielded Detachable Serial Cable	1.2	Serial Port of Laptop	Modem
Shielded Detachable Keyboard Cable	1.5	Keyboard Port of Laptop	Keyboard

Block Diagram of Test Setup



SUMMARY OF TEST RESULTS

FCC Rules	Description of Test	Result
§15.247 (i), §1.1307(b) (1), §2.1093	RF Exposure	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) & §2.1093- RF EXPOSURE

Applicable Standard

According to§15.247(e)(i) and §1.1307(b)(1), systems operating under the provisions of this section shall be operated in a manner that ensure that the public is not exposed to radio frequency energy level in excess of the Commission's guideline.

According to KDB 447498 D01 Mobile Portable RF Exposure V05 Appendix A, SAR can be exempted if the output power is less than the SAR exclusion threshold:

For f=5800MHz, the output power is less 6mW at distance of 5mm.

Measurement Result

Peak conducted output power= 7.17 dBm
Antenna gain = 3.0 dBi
SAR exclusion threshold 6 mW (7.78 dBm) > 7.17 dBm

So the SAR evaluation is not necessary.

FCC §15.203 - ANTENNA REQUIREMENT

Applicable Standard

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

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

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

Antenna Connector Construction

The EUT has two printed antennas, which were permanently attached on the PCB, and the maximum gain is 3.0dBi, please refer to the internal photos.

Result: Compliance.

FCC §15.207 (a) – AC LINE CONDUCTED EMISSIONS

Applicable Standard

FCC§15.207

Measurement Uncertainty

Compliance or non- compliance with a disturbance limit shall be determined in the following manner：

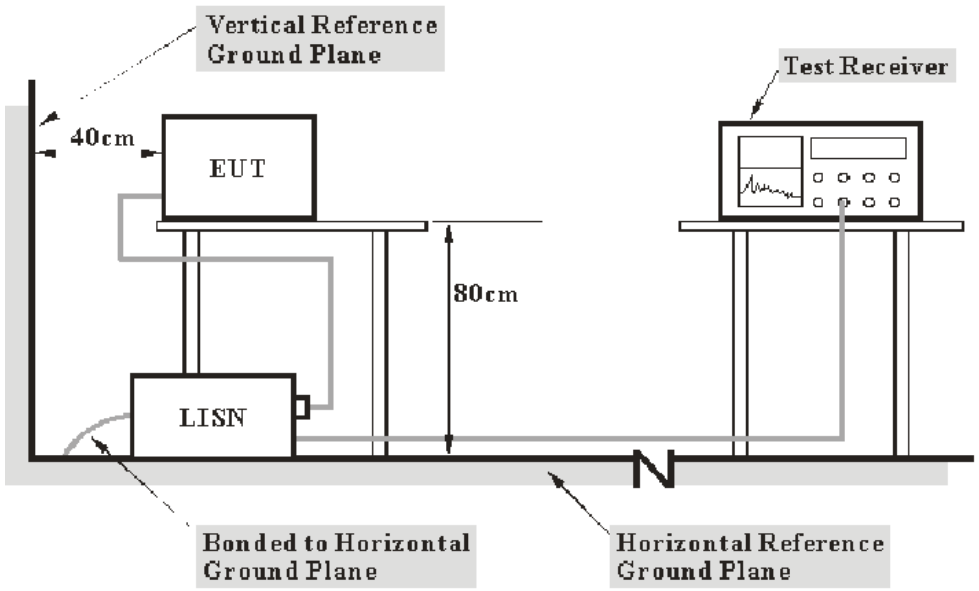
If U_{lab} is less than or equal to U_{cispr} of Table 1, then:
– compliance is deemed to occur if no measured disturbance level exceeds the disturbance limit;
– non - compliance is deemed to occur if any measured disturbance level exceeds the disturbance limit.
If U_{lab} is greater than U_{cispr} of Table 1, then:
– compliance is deemed to occur if no measured disturbance level, increased by ($U_{lab} - U_{cispr}$), exceeds the disturbance limit;
– non - compliance is deemed to occur if any measured disturbance level, increased by ($U_{lab} - U_{cispr}$), exceeds the disturbance limit.

Based on CISPR 16-4-2-2011, measurement uncertainty of conducted disturbance at mains port using AMN at Bay Area Compliance Laboratories Corp. (Dongguan) is 3.46 dB (150 kHz to 30 MHz).

Table 1 – Values of U_{cispr}

Measurement	U_{cispr}
Conducted disturbance at mains port using AMN (150 kHz to 30 MHz)	3.4 dB

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.

Corrected Amplitude & Margin Calculation

The basic equation is as follows:

$V_C = V_R + A_C + VDF$
$C_f = A_C + VDF$

Herein,
V_C (cord. Reading): corrected voltage amplitude
V_R: reading voltage amplitude
A_c: attenuation caused by cable loss
VDF: voltage division factor of AMN
C_f: Correction Factor

The "**Margin**" column of the following data tables indicates the degree of compliance within the applicable limit. For example, a margin of 7dB means the emission is 7dB below the maximum 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
R&S	EMI Test Receiver	ESCS 30	830245/006	2012-11-29	2013-11-28
R&S	LISN1	ESH3-Z5	843331/015	2012-09-17	2013-09-16
R&S	LISN2	ESH3-Z5	100113	2012-11-29	2013-11-28
BACL	Test Software	BACL-EMC	V1.0-2010	N/A	N/A

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:

10.66 dB at **0.310MHz** in the **Line** conducted mode

Test Data

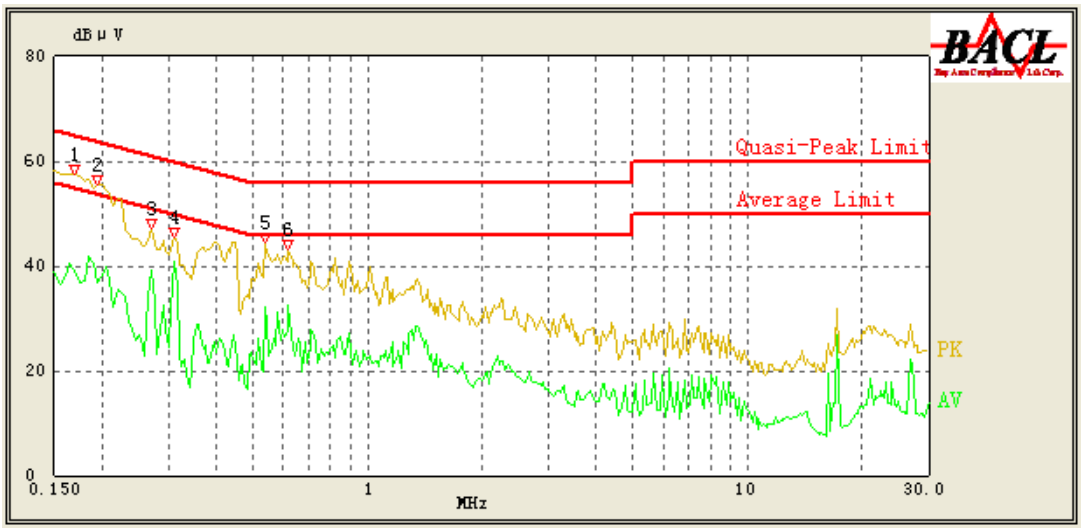
Environmental Conditions

Temperature:	23.6 ° C
Relative Humidity:	49 %
ATM Pressure:	101.5kPa

The testing was performed by Leon Chen on 2013-02-01.

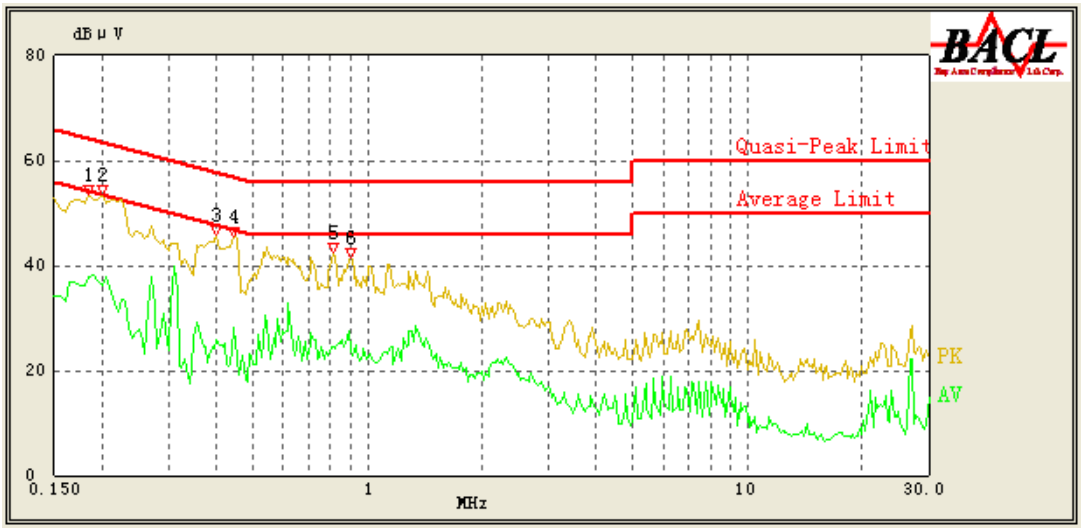
Test Mode: Transmitting

120 V, 60 Hz, Line:



Frequency (MHz)	Cord. Reading (dBµV)	Correction Factor (dB)	Limit (dBµV)	Margin (dB)	Detector (PK/AV/QP)
0.170	53.04	0.43	65.43	12.39	QP
0.170	39.19	0.43	55.43	16.24	AV
0.195	51.93	0.41	64.71	12.78	QP
0.195	36.82	0.41	54.71	17.89	AV
0.270	42.88	0.36	62.57	19.69	QP
0.270	39.27	0.36	52.57	13.30	AV
0.310	42.44	0.34	61.43	18.99	QP
0.310	40.77	0.34	51.43	10.66	AV
0.540	41.31	0.31	56.00	14.69	QP
0.540	32.33	0.31	46.00	13.67	AV
0.620	37.79	0.32	56.00	18.21	QP
0.620	32.58	0.32	46.00	13.42	AV

120 V, 60 Hz, Neutral:



Frequency (MHz)	Cord. Reading (dBµV)	Correction Factor (dB)	Limit (dBµV)	Margin (dB)	Detector (PK/AV/QP)
0.185	48.29	0.25	65.00	16.71	QP
0.185	37.70	0.25	55.00	17.30	AV
0.200	48.52	0.25	64.57	16.05	QP
0.200	36.18	0.25	54.57	18.39	AV
0.400	41.19	0.22	58.86	17.67	QP
0.400	25.81	0.22	48.86	23.05	AV
0.445	41.35	0.22	57.57	16.22	QP
0.445	28.04	0.22	47.57	19.53	AV
0.815	37.51	0.22	56.00	18.49	QP
0.810	24.60	0.22	46.00	21.40	AV
0.900	36.80	0.23	56.00	19.20	QP
0.900	24.28	0.23	46.00	21.72	AV

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

Applicable Standard

FCC §15.247 (d); §15.209; §15.205;

Measurement Uncertainty

Compliance or non- compliance with a disturbance limit shall be determined in the following manner：

If U_{lab} is less than or equal to U_{cispr} of Table 2, then:
- compliance is deemed to occur if no measured disturbance level exceeds the disturbance limit;
- non - compliance is deemed to occur if any measured disturbance level exceeds the disturbance limit.

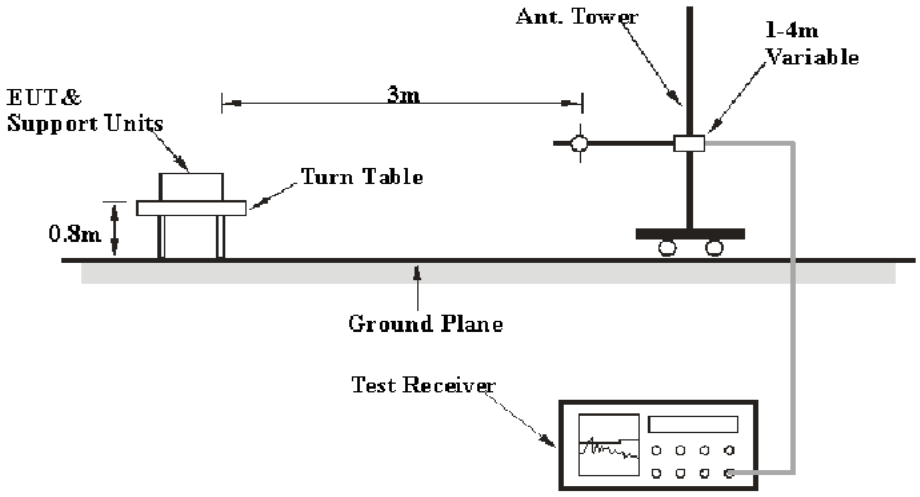
If U_{lab} is greater than U_{cispr} of Table 2, then:
- compliance is deemed to occur if no measured disturbance level, increased by ($U_{lab} - U_{cispr}$), exceeds the disturbance limit;
- non - compliance is deemed to occur if any measured disturbance level, increased by ($U_{lab} - U_{cispr}$), exceeds the disturbance limit.

Based on CISPR 16-4-2-2011, measurement uncertainty of radiated emission at a distance of 3m at Bay Area Compliance Laboratories Corp. (Dongguan) is:
30M~200MHz: 5.0 dB
200M~1GHz: 6.2 dB
1G~6GHz: 4.45 dB
6G~18GHz: 5.23 dB

Table 2 – Values of U_{cispr}

Measurement	U_{cispr}
Radiated disturbance (electric field strength at an OATS or in a SAC) (30 MHz to 1000 MHz)	6.3 dB
Radiated disturbance (electric field strength in a FAR) (1 GHz to 6 GHz)	5.2 dB
Radiated disturbance (electric field strength in a FAR) (6 GHz to 18 GHz)	5.5 dB

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 Loss and Cable Loss, and subtracting the Amplifier Gain from the Meter Reading. The basic equation is as follows:

Corrected Amplitude = Meter Reading + Antenna Loss + Cable Loss - Amplifier Gain

The "**Margin**" column of the following data tables indicates the degree of compliance with the applicable limit. For example, a margin of 7dB means the emission is 7dB below the limit. The equation for margin calculation is as follows:

Margin = Limit – Corrected Amplitude

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	EMI Test Receiver	ESCI	100035	2012-05-14	2013-05-13
Sunol Sciences	Hybrid Antennas	JB3	A060611-1	2011-09-06	2013-09-05
HP	Pre-amplifier	8447E	2434A02181	2012-10-08	2013-10-07
R&S	Spectrum Analyzer	FSEM 30	DE31388	2012-03-15	2013-03-14
ETS-LINDGREN	Horn Antenna	3115	000 527 35	2012-09-06	2014-09-05
Mini-Circuit	Amplifier	ZVA-213-S+	054201245	2013-01-30	2014-01-29
Rohde & Schwarz	Spectrum Analyzer	FSP38	100478	2012-5-14	2013-5-13

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:

0.92 dB at **5850 MHz** in the **Horizontal** polarization for 802.11ac20 Mode

Test Data

Environmental Conditions

Temperature:	22.6~28.1 ° C
Relative Humidity:	29~64 %
ATM Pressure:	100.8~101.9 kPa

The testing was performed by Leon Chen from 2013-02-17 to 2013-03-14.

Mode: Transmitting

802.11a Mode:

Frequency	Receiver		Rx Antenna		Cable loss (dB)	Amplifier Gain (dB)	Corrected Amplitude (dBμV/m)	FCC 15.247	
(MHz)	Reading (dBμV)	Detector (PK/QP/AV)	Polar (H/V)	Factor (dB)				Limit (dBμV/m)	Margin (dB)
Low Channel:5745MHz									
5745	47.47	AV	H	32.15	5.10	0.00	84.72	N/A	N/A
5745	60.31	PK	H	32.15	5.10	0.00	97.56	N/A	N/A
5745	42.62	AV	V	32.15	5.10	0.00	79.87	N/A	N/A
5745	54.94	PK	V	32.15	5.10	0.00	92.19	N/A	N/A
17235	18.77	AV	H	40.91	12.63	24.94	47.37	54.00	6.63
250.19	44.36	QP	H	12.17	1.92	21.49	36.96	46.00	9.04
17235	32.61	PK	H	40.91	12.63	24.94	61.21	74.00	12.79
11490	17.95	AV	H	37.89	7.85	25.92	37.77	54.00	16.23
11490	32.76	PK	H	37.89	7.85	25.92	52.58	74.00	21.42
5725	15.02	AV	H	32.15	4.83	26.78	25.22	54.00	28.78
5725	29.24	PK	H	32.15	4.83	26.78	39.44	74.00	34.56
328.21	33.71	QP	V	15.75	2.35	21.72	30.09	46.00	15.91
4974	32.59	PK	V	31.03	4.73	27.27	41.08	74.00	32.92
4974	24.14	AV	V	31.03	4.73	27.27	32.63	54.00	21.37
3818	32.25	PK	V	29.50	4.87	27.41	39.21	74.00	34.79
3818	20.69	AV	V	29.50	4.87	27.41	27.65	54.00	26.35
Middle Channel: 5785MHz									
5785	47.49	AV	H	32.16	5.15	0.00	84.80	N/A	N/A
5785	60.45	PK	H	32.16	5.15	0.00	97.76	N/A	N/A
5785	42.71	AV	V	32.16	5.15	0.00	80.02	N/A	N/A
5785	55.03	PK	V	32.16	5.15	0.00	92.34	N/A	N/A
17355	18.79	AV	H	41.63	12.26	24.68	48.00	54.00	6.00
250.19	46.08	QP	H	12.17	1.92	21.49	38.68	46.00	7.32
17355	32.66	PK	H	41.63	12.26	24.68	61.87	74.00	12.13
11570	17.98	AV	H	37.90	7.97	25.91	37.94	54.00	16.06
11570	32.81	PK	H	37.90	7.97	25.91	52.77	74.00	21.23
610.05	31.25	QP	V	19.45	3.04	22.27	31.47	46.00	14.53
4979	33.59	PK	V	31.05	4.74	27.27	42.11	74.00	31.89
4979	24.02	AV	V	31.05	4.74	27.27	32.54	54.00	21.46
3810	34.59	PK	V	29.48	4.95	27.42	41.60	74.00	32.40
3810	23.42	AV	V	29.48	4.95	27.42	30.43	54.00	23.57

High Channel: 5825MHz									
5825	47.38	AV	H	32.17	5.35	0.00	84.90	N/A	N/A
5825	60.12	PK	H	32.17	5.35	0.00	97.64	N/A	N/A
5825	42.61	AV	V	32.17	5.35	0.00	80.13	N/A	N/A
5825	54.89	PK	V	32.17	5.35	0.00	92.41	N/A	N/A
17475	18.71	AV	H	42.35	11.89	24.27	48.68	54.00	5.32
250.19	46.52	QP	H	12.17	1.92	21.49	39.12	46.00	6.88
17475	32.51	PK	H	42.35	11.89	24.27	62.48	74.00	11.52
11650	17.82	AV	H	37.90	8.14	25.78	38.08	54.00	15.92
11650	32.59	PK	H	37.90	8.14	25.78	52.85	74.00	21.15
5850	15.61	AV	H	32.17	5.56	26.69	26.65	54.00	27.35
5850	30.21	PK	H	32.17	5.56	26.69	41.25	74.00	32.75
610.05	35.21	QP	V	19.45	3.04	22.27	35.43	46.00	10.57
4979	34.22	PK	V	31.05	4.74	27.27	42.74	74.00	31.26
4979	21.95	AV	V	31.05	4.74	27.27	30.47	54.00	23.53
3810	35.03	PK	V	29.48	4.95	27.42	42.04	74.00	31.96
3810	23.44	AV	V	29.48	4.95	27.42	30.45	54.00	23.55

802.11n20 Mode:

Frequency	Receiver		Rx Antenna		Cable loss (dB)	Amplifier Gain (dB)	Corrected Amplitude (dBμV/m)	FCC 15.247	
(MHz)	Reading (dBμV)	Detector (PK/QP/AV)	Polar (H/V)	Factor (dB)				Limit (dBμV/m)	Margin (dB)
Low Channel:5745MHz									
5745	44.51	AV	H	32.15	5.10	0.00	81.76	N/A	N/A
5745	59.74	PK	H	32.15	5.10	0.00	96.99	N/A	N/A
5745	39.84	AV	V	32.15	5.10	0.00	77.09	N/A	N/A
5745	54.51	PK	V	32.15	5.10	0.00	91.76	N/A	N/A
250.19	46.33	QP	H	12.17	1.92	21.49	38.93	46.00	7.07
17235	18.27	AV	H	40.91	12.63	24.94	46.87	54.00	7.13
17235	32.21	PK	H	40.91	12.63	24.94	60.81	74.00	13.19
11490	16.6	AV	H	37.89	7.85	25.92	36.42	54.00	17.58
11490	30.58	PK	H	37.89	7.85	25.92	50.40	74.00	23.60
5725	15.07	AV	H	32.15	4.83	26.78	25.27	54.00	28.73
5725	29.51	PK	H	32.15	4.83	26.78	39.71	74.00	34.29
610.05	34.98	QP	V	19.45	3.04	22.27	35.20	46.00	10.80
4979	35.26	PK	V	31.05	4.74	27.27	43.78	74.00	30.22
4979	24.06	AV	V	31.05	4.74	27.27	32.58	54.00	21.42
3810	33.15	PK	V	29.48	4.95	27.42	40.16	74.00	33.84
3810	23.26	AV	V	29.48	4.95	27.42	30.27	54.00	23.73
Middle Channel: 5785MHz									
5785	44.59	AV	H	32.16	5.15	0.00	81.90	N/A	N/A
5785	59.91	PK	H	32.16	5.15	0.00	97.22	N/A	N/A
5785	39.89	AV	V	32.16	5.15	0.00	77.20	N/A	N/A
5785	54.58	PK	V	32.16	5.15	0.00	91.89	N/A	N/A
17355	18.31	AV	H	41.63	12.26	24.68	47.52	54.00	6.48
250.19	43.57	QP	H	12.17	1.92	21.49	36.17	46.00	9.83
17355	32.26	PK	H	41.63	12.26	24.68	61.47	74.00	12.53
11570	16.52	AV	H	37.90	7.97	25.91	36.48	54.00	17.52
11570	30.51	PK	H	37.90	7.97	25.91	50.47	74.00	23.53
610.05	36.22	QP	V	19.45	3.04	22.27	36.44	46.00	9.56
4979	35.14	PK	V	31.05	4.74	27.27	43.66	74.00	30.34
4979	25.61	AV	V	31.05	4.74	27.27	34.13	54.00	19.87
3810	34.26	PK	V	29.48	4.95	27.42	41.27	74.00	32.73
3810	24.35	AV	V	29.48	4.95	27.42	31.36	54.00	22.64

High Channel: 5825MHz									
5825	44.51	AV	H	32.17	5.35	0.00	82.03	N/A	N/A
5825	59.74	PK	H	32.17	5.35	0.00	97.26	N/A	N/A
5825	39.84	AV	V	32.17	5.35	0.00	77.36	N/A	N/A
5825	54.51	PK	V	32.17	5.35	0.00	92.03	N/A	N/A
5850	15.08	AV	H	32.17	5.56	26.69	26.12	54.00	27.88
17475	18.79	AV	H	42.35	11.89	24.27	48.76	54.00	5.24
5850	29.71	PK	H	32.17	5.56	26.69	40.75	74.00	33.25
250.19	43.82	QP	H	12.17	1.92	21.49	36.42	46.00	9.58
17475	32.66	PK	H	42.35	11.89	24.27	62.63	74.00	11.37
11650	17.95	AV	H	37.90	8.14	25.78	38.21	54.00	15.79
11650	32.76	PK	H	37.90	8.14	25.78	53.02	74.00	20.98
610.05	35.22	QP	V	19.45	3.04	22.27	35.44	46.00	10.56
4979	35.26	PK	V	31.05	4.74	27.27	43.78	74.00	30.22
4979	24.18	AV	V	31.05	4.74	27.27	32.70	54.00	21.30
3810	35.25	PK	V	29.48	4.95	27.42	42.26	74.00	31.74
3810	23.74	AV	V	29.48	4.95	27.42	30.75	54.00	23.25

*Within measurement uncertainty!

802.11n40 Mode:

Frequency	Receiver		Rx Antenna		Cable loss (dB)	Amplifier Gain (dB)	Corrected Amplitude (dBμV/m)	FCC 15.247	
(MHz)	Reading (dBμV)	Detector (PK/QP/AV)	Polar (H/V)	Factor (dB)				Limit (dBμV/m)	Margin (dB)
Low Channel:5755MHz									
5755	44.39	AV	H	32.15	5.17	0.00	81.71	N/A	N/A
5755	60.13	PK	H	32.15	5.17	0.00	97.45	N/A	N/A
5755	40.08	AV	V	32.15	5.17	0.00	77.40	N/A	N/A
5755	55.21	PK	V	32.15	5.17	0.00	92.53	N/A	N/A
17265	18.61	AV	H	41.09	12.54	24.88	47.36	54.00	6.64
250.19	43.91	QP	H	12.17	1.92	21.49	36.51	46.00	9.49
17265	32.81	PK	H	41.09	12.54	24.88	61.56	74.00	12.44
11510	16.71	AV	H	37.90	7.84	25.92	36.53	54.00	17.47
11510	30.31	PK	H	37.90	7.84	25.92	50.13	74.00	23.87
5725	15.09	AV	H	32.15	4.83	26.78	25.29	54.00	28.71
5725	29.33	PK	H	32.15	4.83	26.78	39.53	74.00	34.47
610.05	35.27	QP	V	19.45	3.04	22.27	35.49	46.00	10.51
4979	34.26	PK	V	31.05	4.74	27.27	42.78	74.00	31.22
4979	23.47	AV	V	31.05	4.74	27.27	31.99	54.00	22.01
3810	34.15	PK	V	29.48	4.95	27.42	41.16	74.00	32.84
3810	22.62	AV	V	29.48	4.95	27.42	29.63	54.00	24.37
High Channel: 5795MHz									
5795	44.37	AV	H	32.16	5.14	0.00	81.67	N/A	N/A
5795	60.08	PK	H	32.16	5.14	0.00	97.38	N/A	N/A
5795	40.05	AV	V	32.16	5.14	0.00	77.35	N/A	N/A
5795	55.18	PK	V	32.16	5.14	0.00	92.48	N/A	N/A
17385	18.81	AV	H	41.81	12.17	24.61	48.18	54.00	5.82
250.19	44.08	QP	H	12.17	1.92	21.49	36.68	46.00	9.32
17385	32.36	PK	H	41.81	12.17	24.61	61.73	74.00	12.27
11590	16.77	AV	H	37.90	8.01	25.91	36.77	54.00	17.23
11590	30.52	PK	H	37.90	8.01	25.91	50.52	74.00	23.48
5850	15.61	AV	H	32.17	5.56	26.69	26.65	54.00	27.35
5850	29.45	PK	H	32.17	5.56	26.69	40.49	74.00	33.51
610.05	34.22	QP	V	19.45	3.04	22.27	34.44	46.00	11.56
4979	34.01	PK	V	31.05	4.74	27.27	42.53	74.00	31.47
4979	22.34	AV	V	31.05	4.74	27.27	30.86	54.00	23.14
3810	33.62	PK	V	29.48	4.95	27.42	40.63	74.00	33.37
3810	21.59	AV	V	29.48	4.95	27.42	28.60	54.00	25.40

802.11ac20 Mode:

Frequency	Receiver		Rx Antenna		Cable loss (dB)	Amplifier Gain (dB)	Corrected Amplitude (dBμV/m)	FCC 15.247	
(MHz)	Reading (dBμV)	Detector (PK/QP/AV)	Polar (H/V)	Factor (dB)				Limit (dBμV/m)	Margin (dB)
Low Channel:5745MHz									
5745	43.63	AV	H	32.15	5.10	0.00	80.88	N/A	N/A
5745	59.21	PK	H	32.15	5.10	0.00	96.46	N/A	N/A
5745	39.89	AV	V	32.15	5.10	0.00	77.14	N/A	N/A
5745	54.11	PK	V	32.15	5.10	0.00	91.36	N/A	N/A
11490	30.21	PK	H	37.89	7.85	25.92	50.03	74.00	23.97
11490	17.18	AV	H	37.89	7.85	25.92	37.00	54.00	17.00
17235	31.99	PK	H	40.91	12.63	24.94	60.59	74.00	13.41
17235	18.64	AV	H	40.91	12.63	24.94	47.24	54.00	6.76
5725	29.40	PK	H	32.15	4.83	26.78	39.60	74.00	34.40
5725	14.49	AV	H	32.15	4.83	26.78	24.69	54.00	29.31
250.19	46.56	QP	H	12.17	1.92	21.49	39.16	46.00	6.84
610.05	33.25	QP	V	19.45	3.04	22.27	33.47	46.00	12.53
4979	34.21	PK	V	31.05	4.74	27.27	42.73	74.00	31.27
4979	21.26	AV	V	31.05	4.74	27.27	29.78	54.00	24.22
3810	34.21	PK	V	29.48	4.95	27.42	41.22	74.00	32.78
3810	20.39	AV	V	29.48	4.95	27.42	27.40	54.00	26.60
Middle Channel: 5785MHz									
5785	45.22	AV	H	32.16	5.15	0.00	82.53	N/A	N/A
5785	60.23	PK	H	32.16	5.15	0.00	97.54	N/A	N/A
5785	39.79	AV	V	32.16	5.15	0.00	77.10	N/A	N/A
5785	54.68	PK	V	32.16	5.15	0.00	91.99	N/A	N/A
11570	29.70	PK	H	37.90	7.97	25.91	49.66	74.00	24.34
11570	16.17	AV	H	37.90	7.97	25.91	36.13	54.00	17.87
17355	32.13	PK	H	41.63	12.26	24.68	61.34	74.00	12.66
17355	18.69	AV	H	41.63	12.26	24.68	47.90	54.00	6.10
250.19	43.64	QP	H	12.17	1.92	21.49	36.24	46.00	9.76
610.05	34.28	QP	V	19.45	3.04	22.27	34.50	46.00	11.50
4979	35.69	PK	V	31.05	4.74	27.27	44.21	74.00	29.79
4979	22.14	AV	V	31.05	4.74	27.27	30.66	54.00	23.34
3810	34.26	PK	V	29.48	4.95	27.42	41.27	74.00	32.73
3810	21.69	AV	V	29.48	4.95	27.42	28.70	54.00	25.30

High Channel: 5825MHz									
5825	43.93	AV	H	32.17	5.35	0.00	81.45	N/A	N/A
5825	59.11	PK	H	32.17	5.35	0.00	96.63	N/A	N/A
5825	40.75	AV	V	32.17	5.35	0.00	78.27	N/A	N/A
5825	55.03	PK	V	32.17	5.35	0.00	92.55	N/A	N/A
5850	29.64	PK	H	32.17	5.56	0.00	67.37	74.00	6.63
5850	15.35	AV	H	32.17	5.56	0.00	53.08	54.00	0.92*
11650	31.91	PK	H	37.90	8.14	25.78	52.17	74.00	21.83
11650	18.22	AV	H	37.90	8.14	25.78	38.48	54.00	15.52
17475	33.56	PK	H	42.35	11.89	24.27	63.53	74.00	10.47
17475	19.67	AV	H	42.35	11.89	24.27	49.64	54.00	4.36*
250.19	43.70	QP	H	12.17	1.92	21.49	36.30	46.00	9.70
610.05	34.22	QP	V	19.45	3.04	22.27	34.44	46.00	11.56
4979	34.29	PK	V	31.05	4.74	27.27	42.81	74.00	31.19
4979	23.69	AV	V	31.05	4.74	27.27	32.21	54.00	21.79
3810	35.06	PK	V	29.48	4.95	27.42	42.07	74.00	31.93
3810	22.47	AV	V	29.48	4.95	27.42	29.48	54.00	24.52

*Within measurement uncertainty!

802.11ac40 Mode:

Frequency	Receiver		Rx Antenna		Cable loss (dB)	Amplifier Gain (dB)	Corrected Amplitude (dBμV/m)	FCC 15.247	
(MHz)	Reading (dBμV)	Detector (PK/QP/AV)	Polar (H/V)	Factor (dB)				Limit (dBμV/m)	Margin (dB)
Low Channel:5755MHz									
5755	44.94	AV	H	32.15	5.17	0.00	82.26	N/A	N/A
5755	60.99	PK	H	32.15	5.17	0.00	98.31	N/A	N/A
5755	39.63	AV	V	32.15	5.17	0.00	76.95	N/A	N/A
5755	54.49	PK	V	32.15	5.17	0.00	91.81	N/A	N/A
11510	30.15	PK	H	37.90	7.84	25.92	49.97	74.00	24.03
11510	16.14	AV	H	37.90	7.84	25.92	35.96	54.00	18.04
17265	32.16	PK	H	41.09	12.54	24.88	60.91	74.00	13.09
17265	19.06	AV	H	41.09	12.54	24.88	47.81	54.00	6.19
5725	29.65	PK	H	32.15	4.83	26.78	39.85	74.00	34.15
5725	14.83	AV	H	32.15	4.83	26.78	25.03	54.00	28.97
250.19	44.91	QP	H	12.17	1.92	21.49	37.51	46.00	8.49
610.05	35.22	QP	V	19.45	3.04	22.27	35.44	46.00	10.56
4979	34.12	PK	V	31.05	4.74	27.27	42.64	74.00	31.36
4979	23.47	AV	V	31.05	4.74	27.27	31.99	54.00	22.01
3810	35.26	PK	V	29.48	4.95	27.42	42.27	74.00	31.73
3810	24.12	AV	V	29.48	4.95	27.42	31.13	54.00	22.87
High Channel: 5795MHz									
5795	45.27	AV	H	32.16	5.14	0.00	82.57	N/A	N/A
5795	60.76	PK	H	32.16	5.14	0.00	98.06	N/A	N/A
5795	40.27	AV	V	32.16	5.14	0.00	77.57	N/A	N/A
5795	54.22	PK	V	32.16	5.14	0.00	91.52	N/A	N/A
5850	29.58	PK	H	32.17	5.56	26.69	40.62	74.00	33.38
5850	15.00	AV	H	32.17	5.56	26.69	26.04	54.00	27.96
11590	30.46	PK	H	37.90	8.01	25.91	50.46	74.00	23.54
11590	16.94	AV	H	37.90	8.01	25.91	36.94	54.00	17.06
17385	31.37	PK	H	41.81	12.17	24.61	60.74	74.00	13.26
17385	19.10	AV	H	41.81	12.17	24.61	48.47	54.00	5.53
250.19	44.60	QP	H	12.17	1.92	21.49	37.20	46.00	8.80
610.05	35.22	QP	V	19.45	3.04	22.27	35.44	46.00	10.56
4979	36.25	PK	V	31.05	4.74	27.27	44.77	74.00	29.23
4979	25.64	AV	V	31.05	4.74	27.27	34.16	54.00	19.84
3810	36.2	PK	V	29.48	4.95	27.42	43.21	74.00	30.79
3810	25.17	AV	V	29.48	4.95	27.42	32.18	54.00	21.82

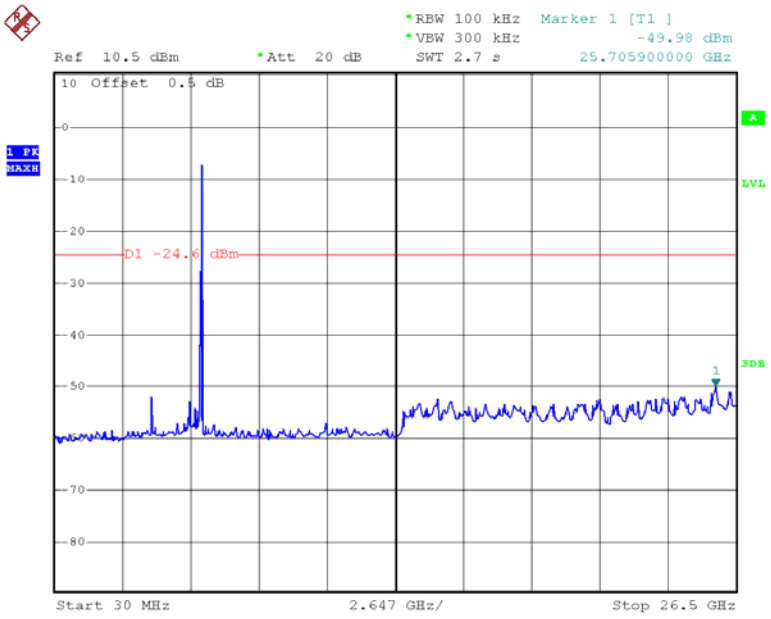
802.11 ac80MHz Mode:

Frequency	Receiver		Rx Antenna		Cable loss (dB)	Amplifier Gain (dB)	Corrected Amplitude (dBμV/m)	FCC 15.247	
(MHz)	Reading (dBμV)	Detector (PK/QP/AV)	Polar (H/V)	Factor (dB)				Limit (dBμV/m)	Margin (dB)
Channel:5775MHz									
5775	43.88	AV	H	32.16	5.16	0.00	81.19	N/A	N/A
5775	59.58	PK	H	32.16	5.16	0.00	96.89	N/A	N/A
5775	39.79	AV	V	32.16	5.16	0.00	77.10	N/A	N/A
5775	54.34	PK	V	32.16	5.16	0.00	91.65	N/A	N/A
5725	29.28	PK	H	32.15	4.83	26.78	39.48	74.00	34.52
17325	18.66	AV	H	41.45	12.35	24.75	47.71	54.00	6.29
5725	15.17	AV	H	32.15	4.83	26.78	25.37	54.00	28.63
250.19	43.28	QP	H	12.17	1.92	21.49	35.88	46.00	10.12
17325	32.61	PK	H	41.45	12.35	24.75	61.66	74.00	12.34
11550	16.72	AV	H	37.90	7.93	25.91	36.64	54.00	17.36
11550	30.28	PK	H	37.90	7.93	25.91	50.20	74.00	23.80
5850	15.42	AV	H	32.17	5.56	26.69	26.46	54.00	27.54
5850	29.37	PK	H	32.17	5.56	26.69	40.41	74.00	33.59
610.05	34.25	QP	V	19.45	3.04	22.27	34.47	46.00	11.53
4979	35.26	PK	V	31.05	4.74	27.27	43.78	74.00	30.22
4979	22.34	AV	V	31.05	4.74	27.27	30.86	54.00	23.14
3810	34.26	PK	V	29.48	4.95	27.42	41.27	74.00	32.73
3810	23.01	AV	V	29.48	4.95	27.42	30.02	54.00	23.98

*Within measurement uncertainty!

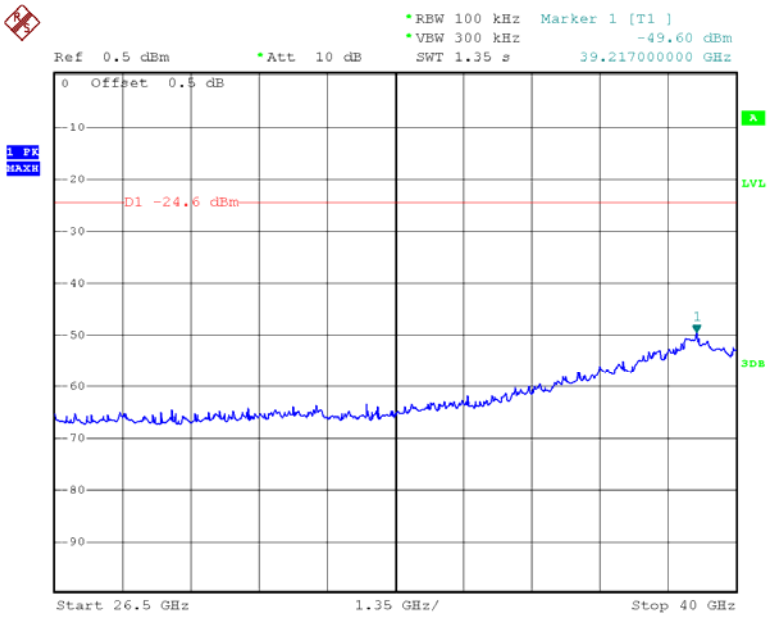
Conducted Spurious Emissions at Antenna Port

802.11a Low Channel 30M-26.5G



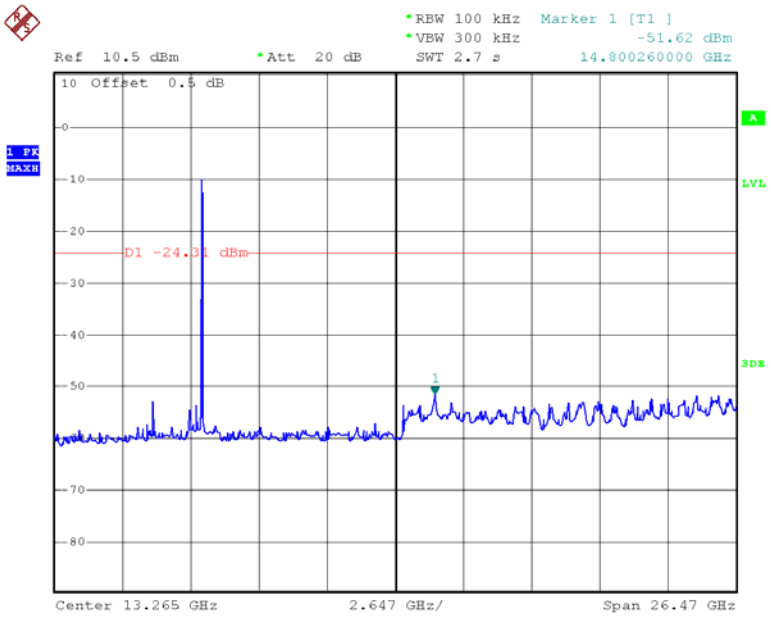
Date: 17.FEB.2013 13:14:10

802.11a Low Channel 26.5-40G



Date: 17.FEB.2013 10:17:28

802.11a Middle Channel 30M-26.5G



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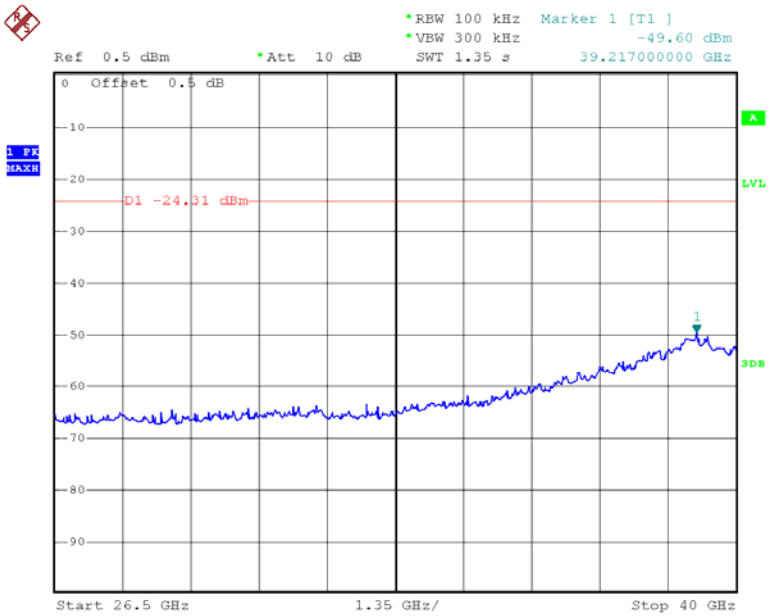
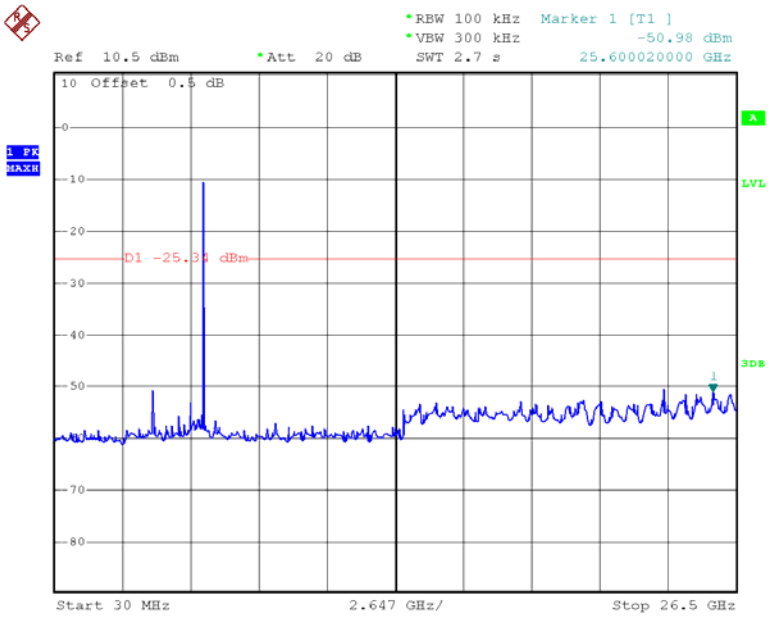
802.11a Middle Channel 26.5-40G



Date: 17.FEB.2013 10:17:50

802.11a High Channel 30M-26.5G



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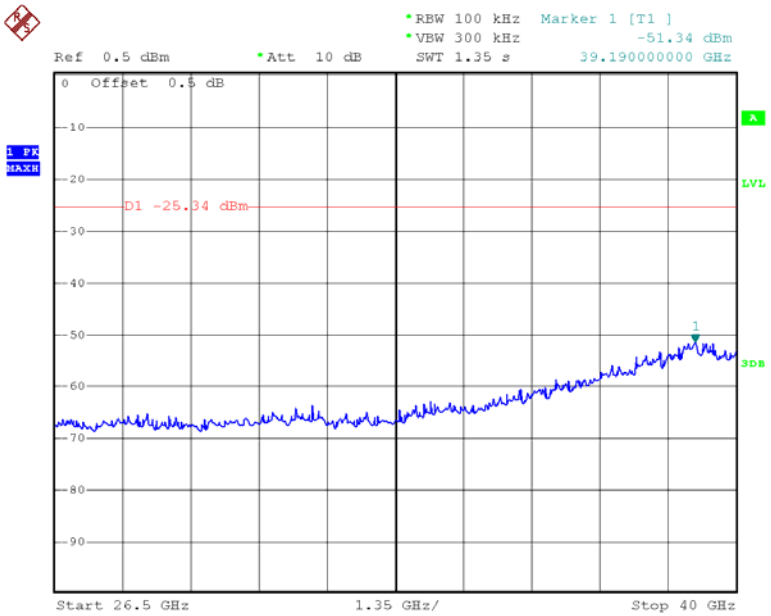
802.11a High Channel 26.5-40G



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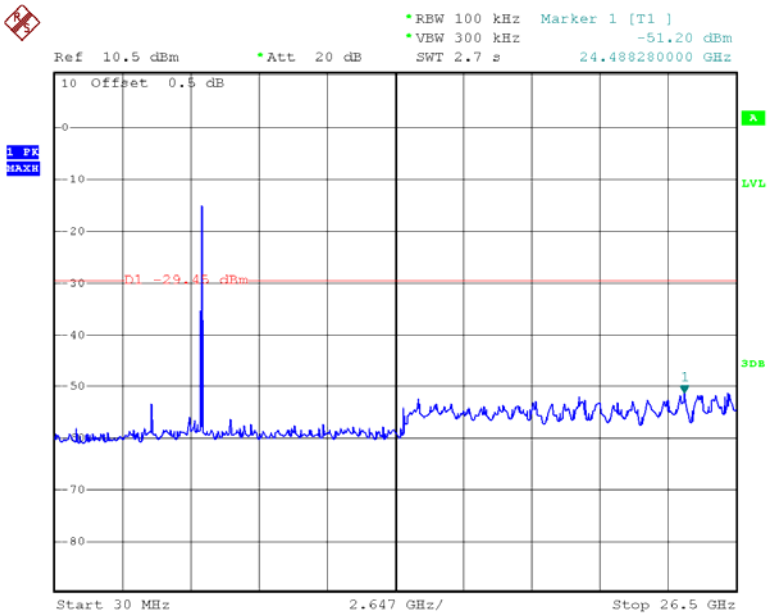
Chain 0:

802.11n20 Low Channel 30M-26.5G



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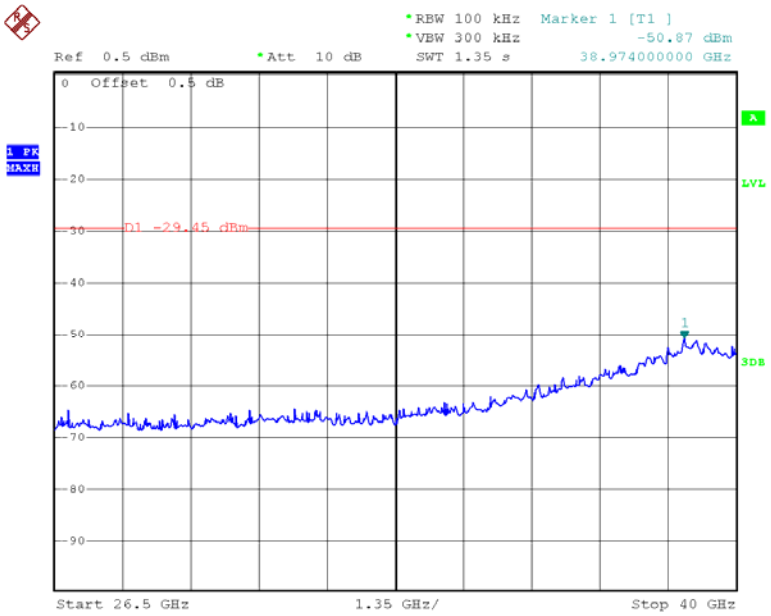
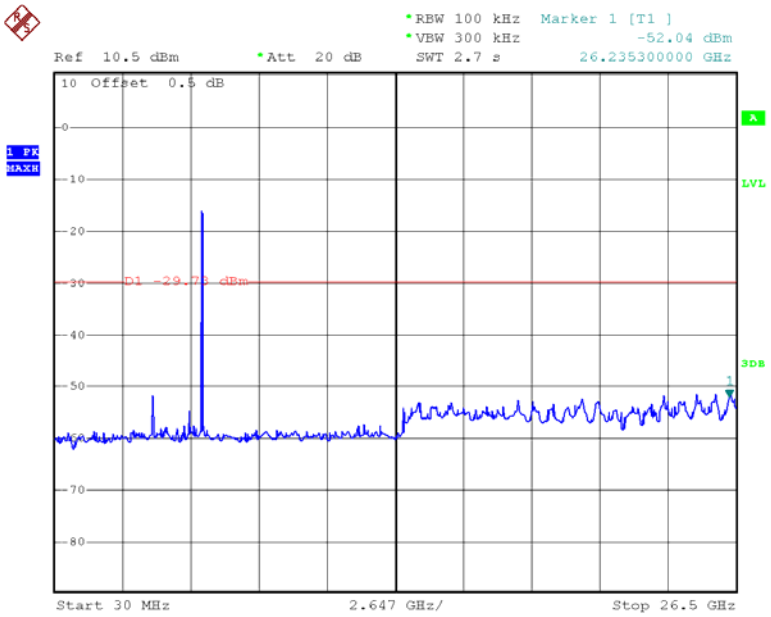
802.11n20 Low Channel 26.5-40G



802.11n20 Middle Channel 30M-26.5G



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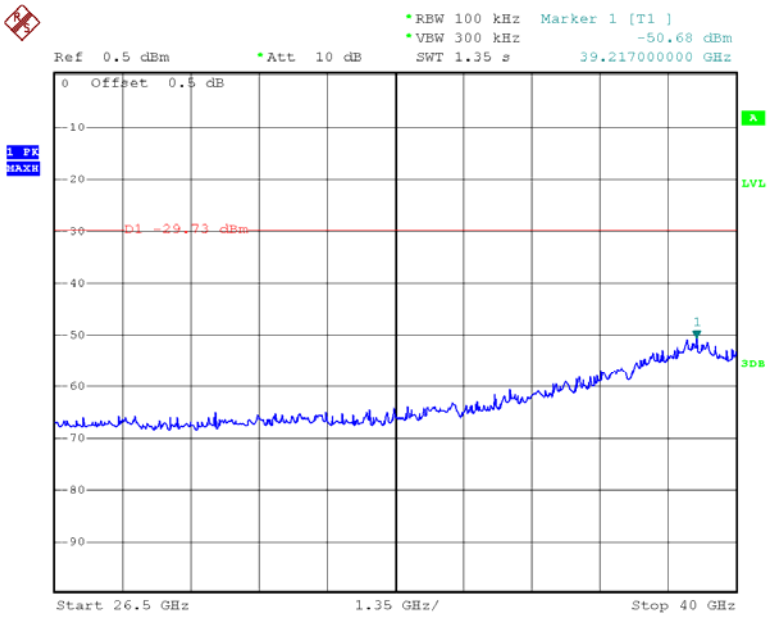
802.11n20 Middle Channel 26.5-40G



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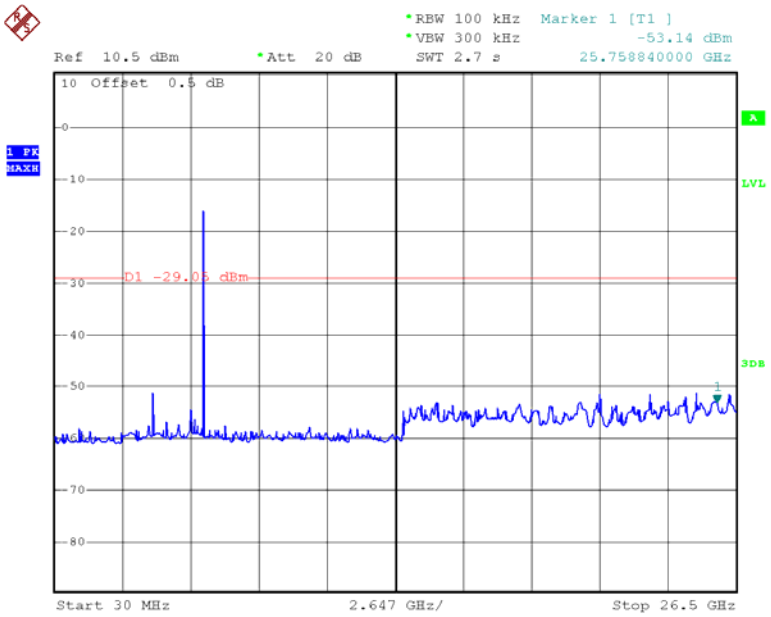
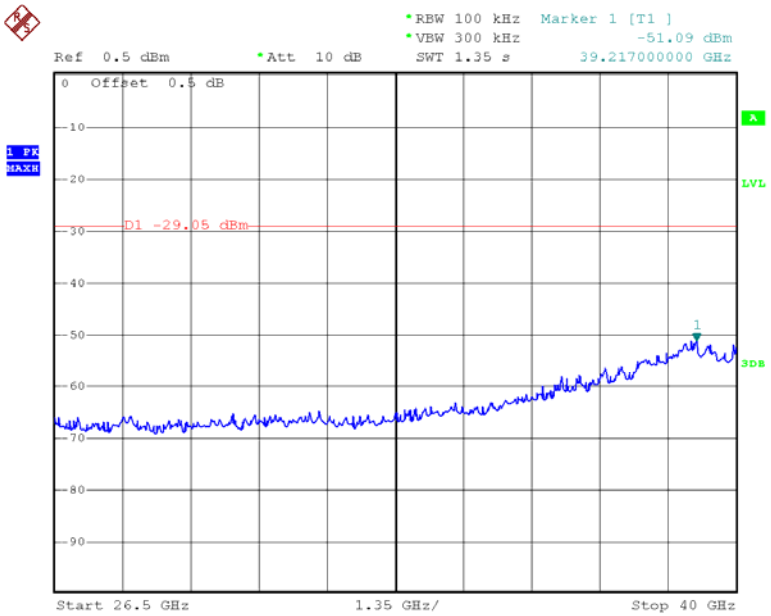
802.11n20 High Channel 30M-26.5G



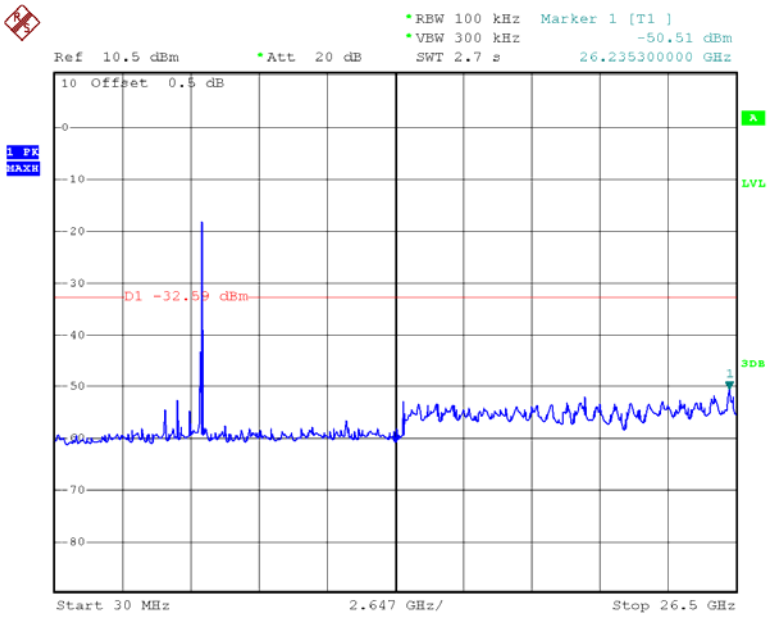
Date: 17.FEB.2013 13:18:12

802.11n20 High Channel 26.5-40G



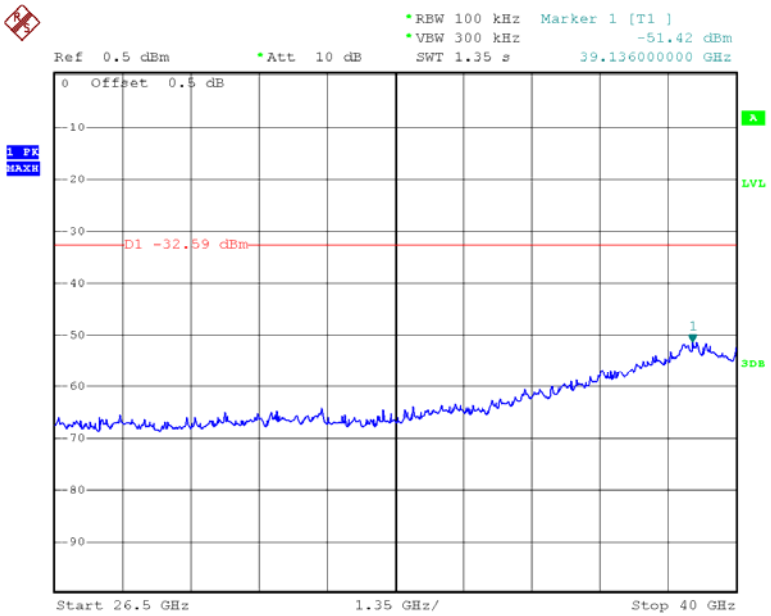
Date: 17.FEB.2013 10:20:11

802.11n40 Low Channel 30M-26.5G



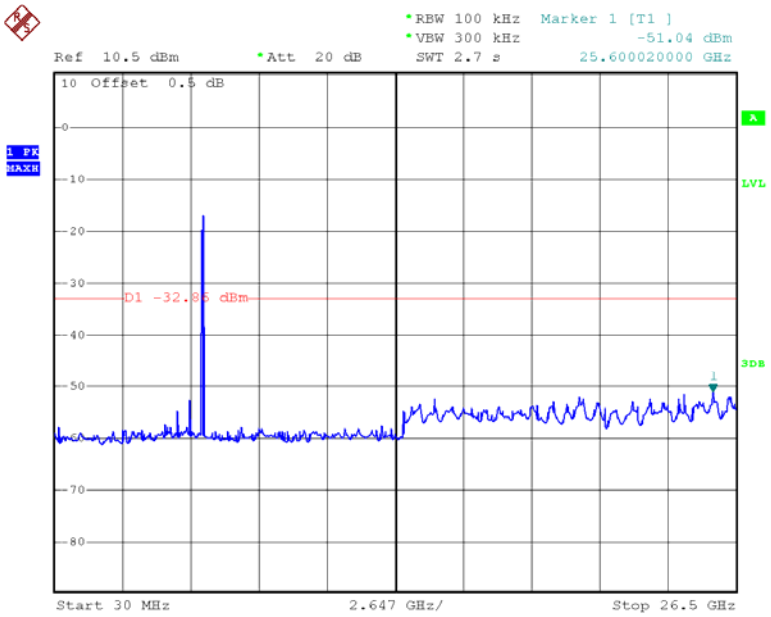
Date: 17.FEB.2013 13:21:49

802.11n40 Low Channel 26.5-40G



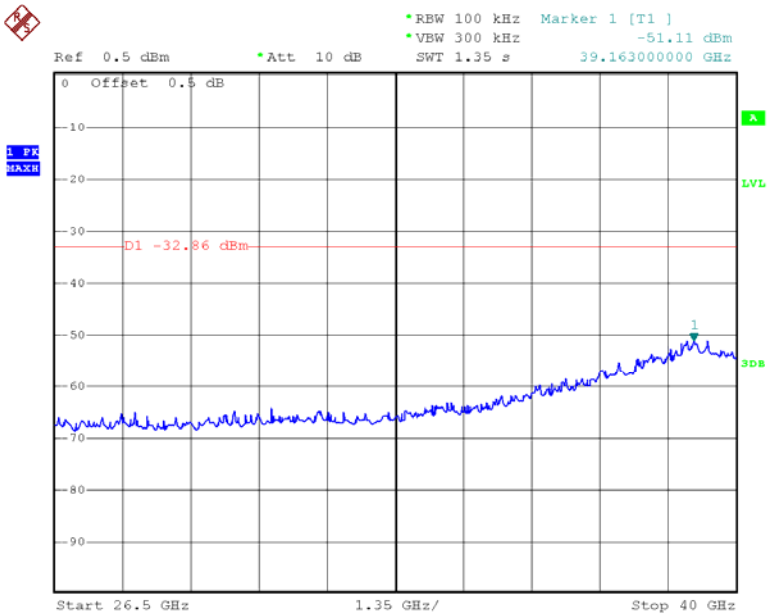
Date: 17.FEB.2013 10:23:39

802.11n40 High Channel 30M-26.5G



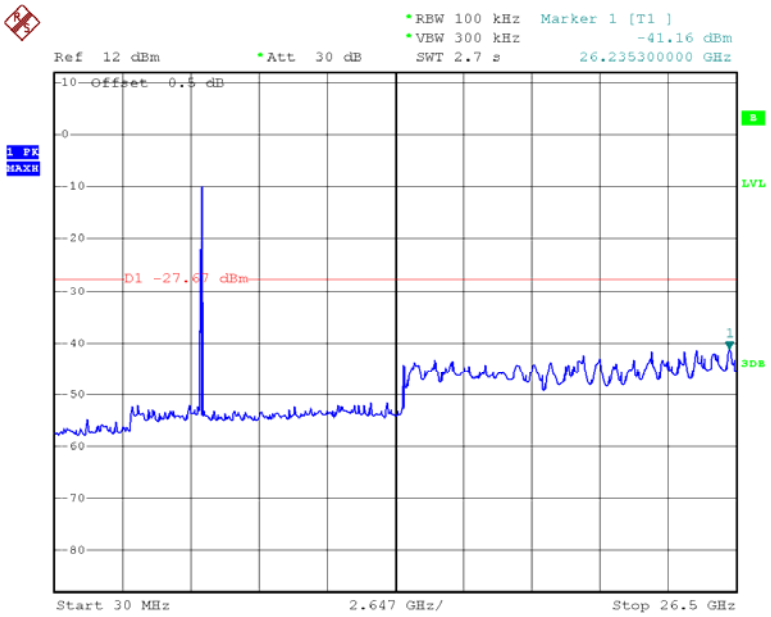
Date: 17.FEB.2013 13:22:20

802.11n40 High Channel 26.5-40G



Date: 17.FEB.2013 10:24:00

802.11ac20 Low Channel 30M-26.5G



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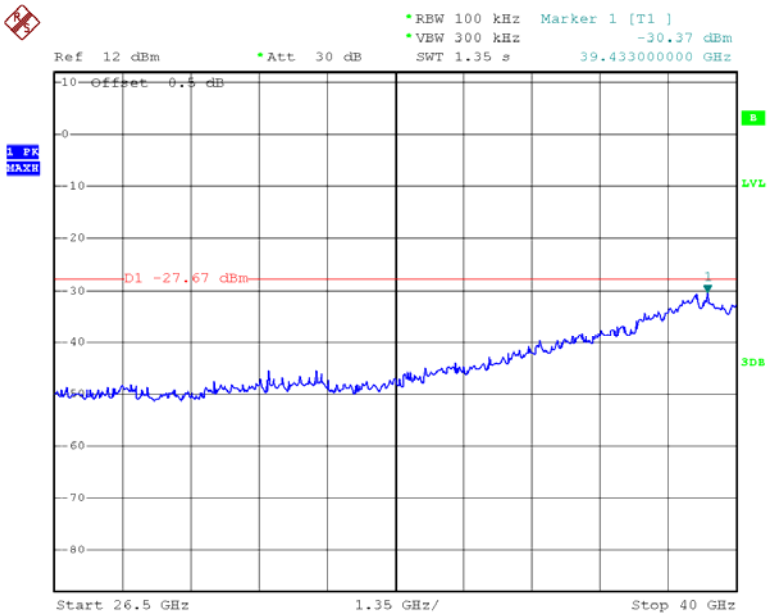
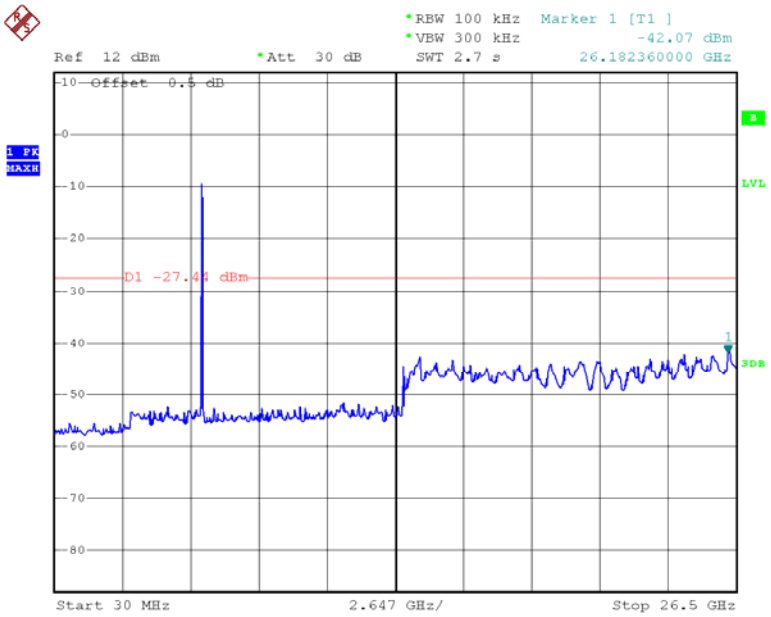
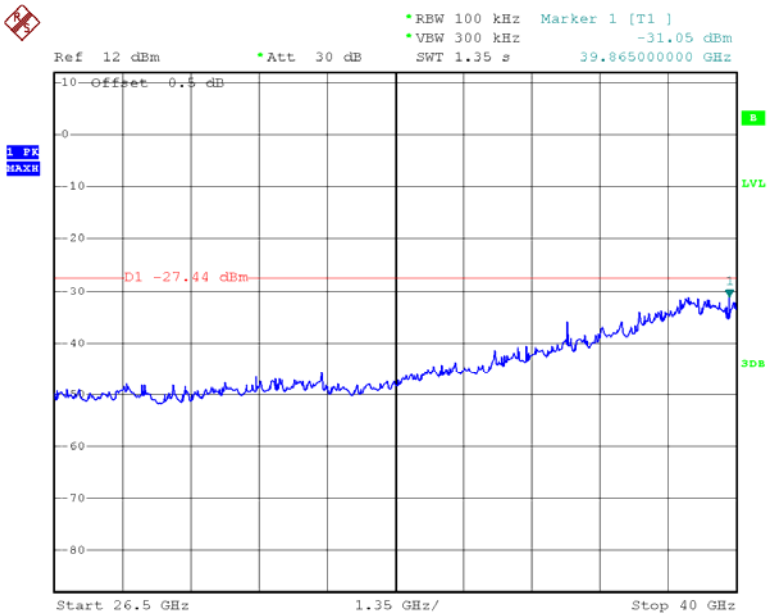


802.11ac20 Middle Channel 30M-26.5G



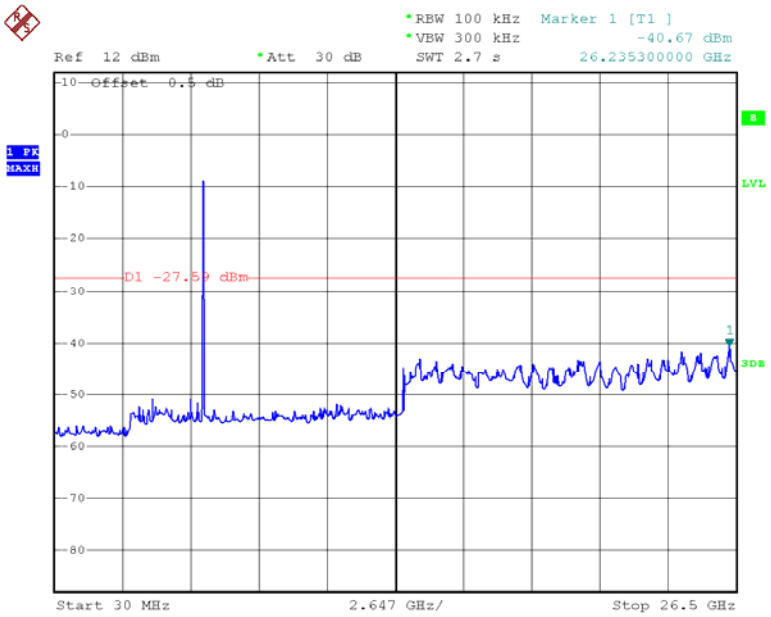
Date: 14.MAR.2013 11:28:05

802.11ac20 Middle Channel 26.5-40G



Date: 14.MAR.2013 11:28:24

802.11ac20 High Channel 30M-26.5G



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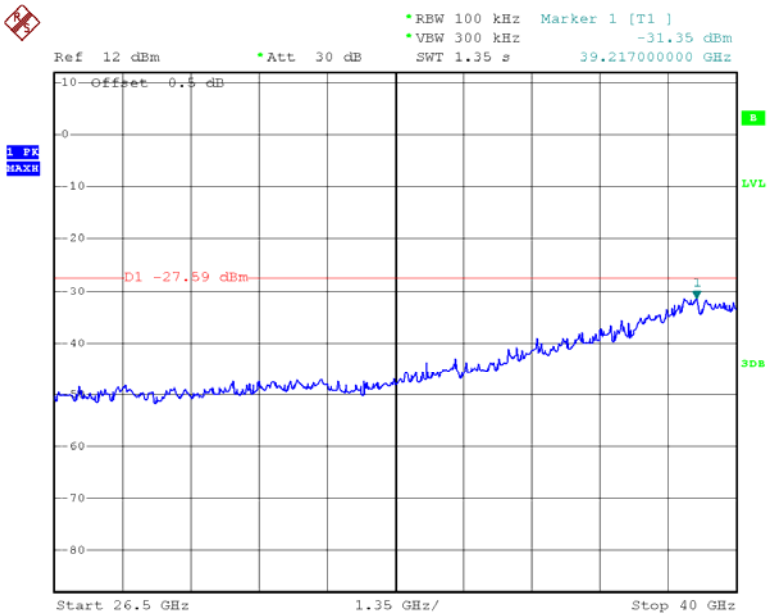

Date: 14.MAR.2013 11:35:12

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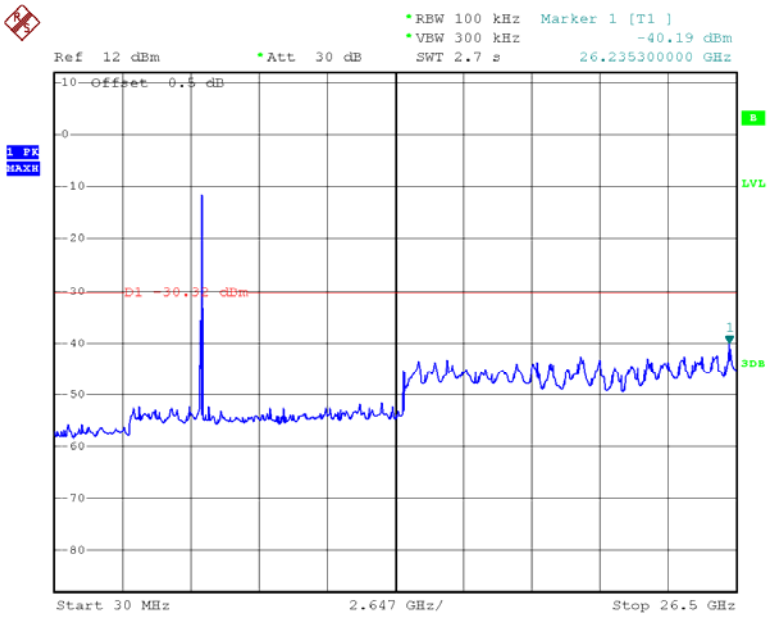

Date: 14.MAR.2013 11:53:17

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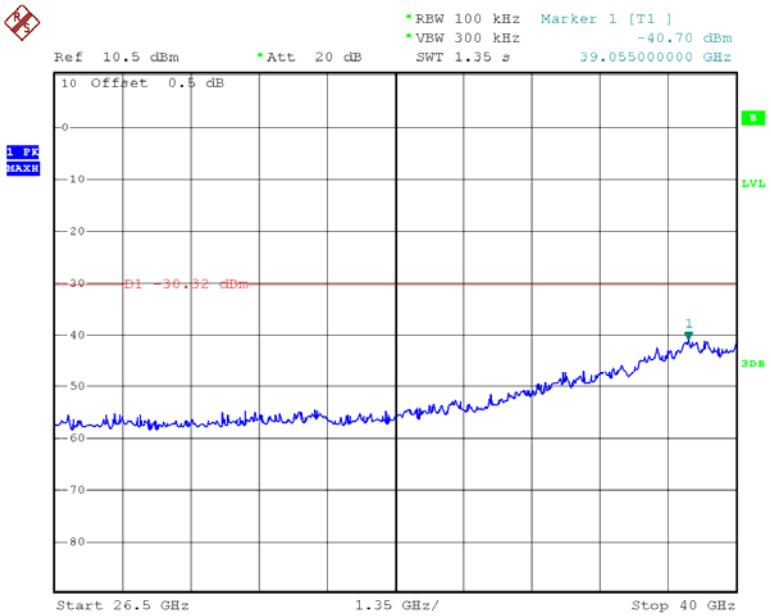

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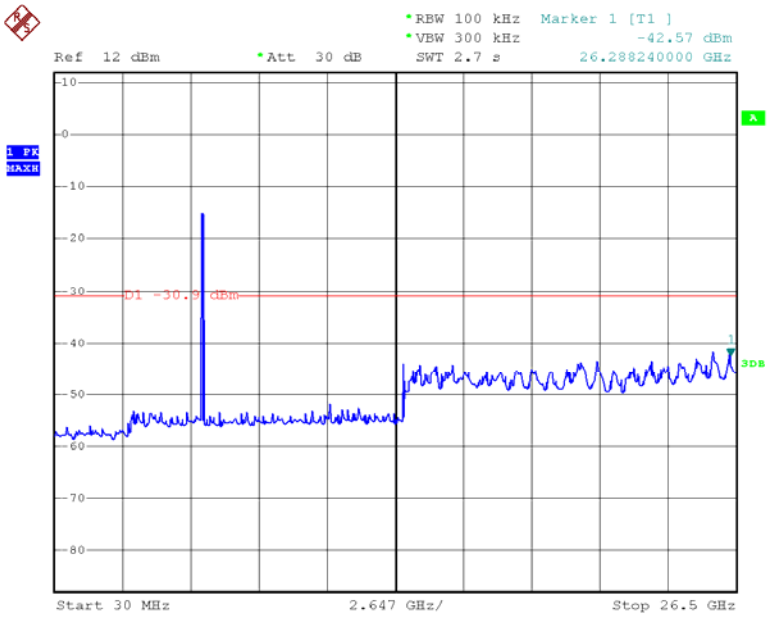
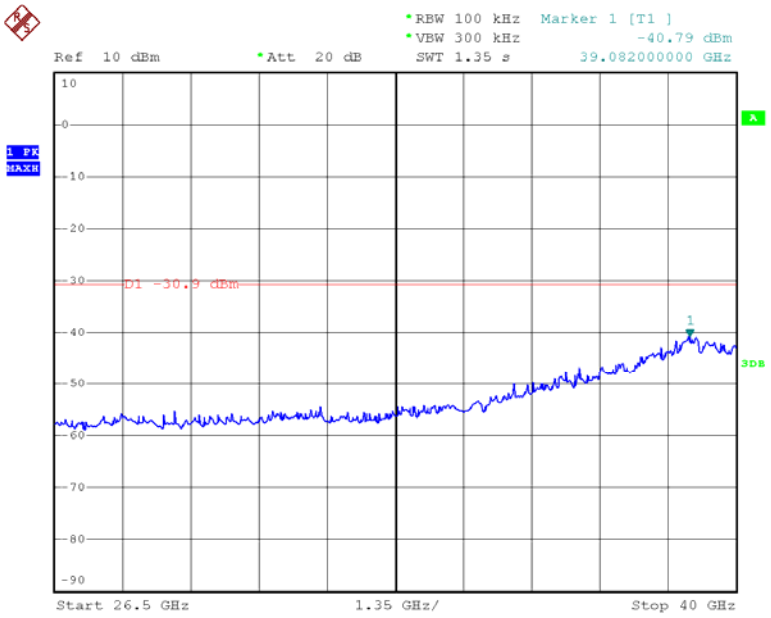


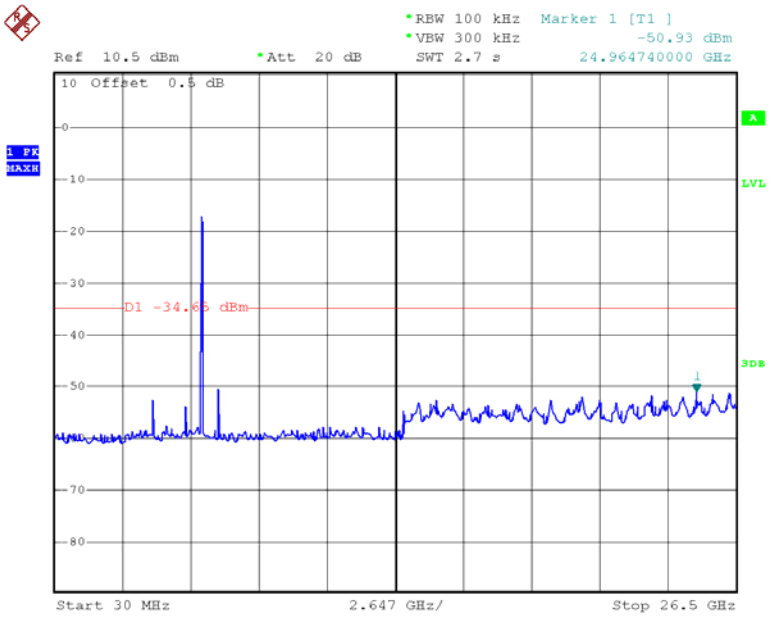
Date: 14.MAR.2013 13:47:28

802.11ac40 High Channel 26.5-40G



Date: 14.MAR.2013 13:48:06

802.11ac80 Low Channel 30M-26.5G



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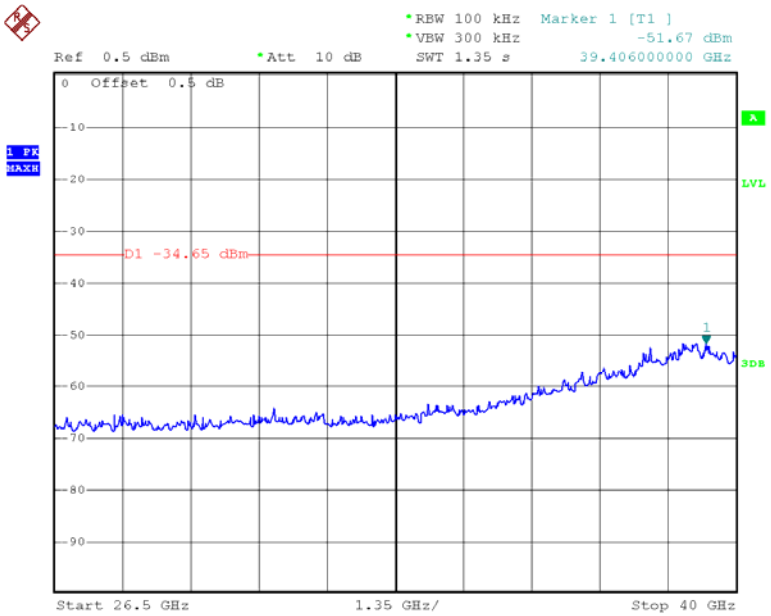
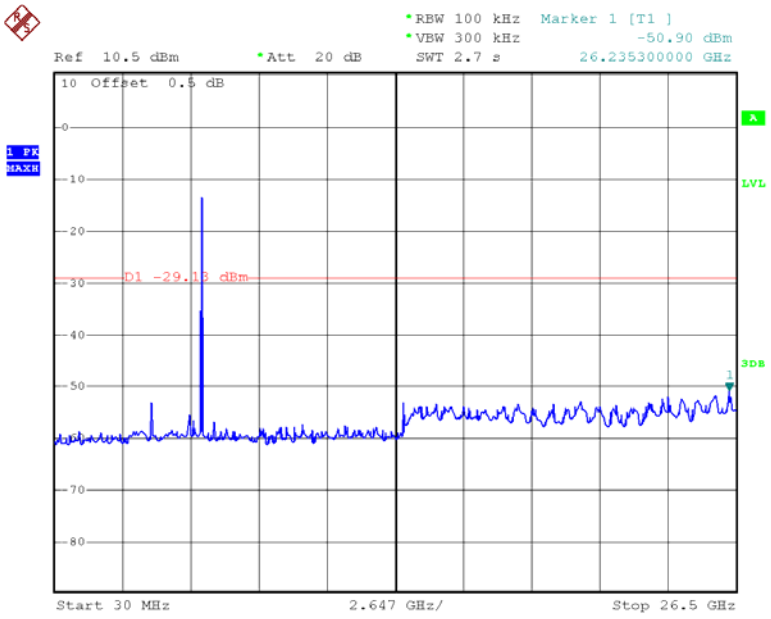
802.11ac80 Low Channel 26.5-40G



Date: 17.FEB.2013 10:25:38

Chain 1:

802.11n20 Low Channel 30M-26.5G



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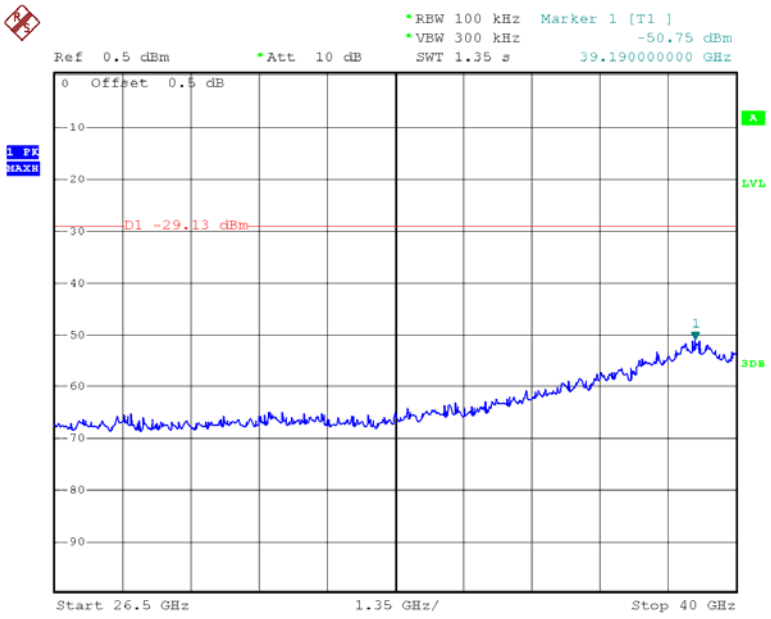
802.11n20 Low Channel 26.5-40G



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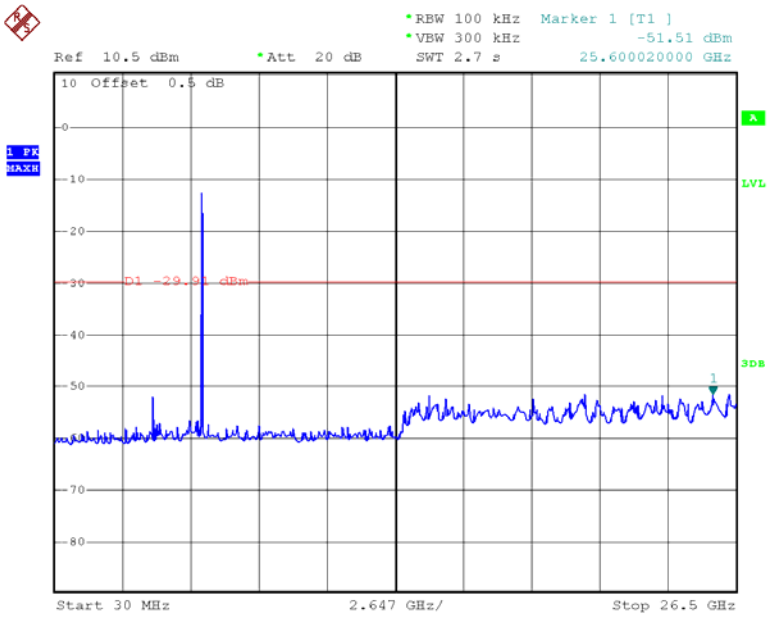
802.11n20 Middle Channel 30M-26.5G



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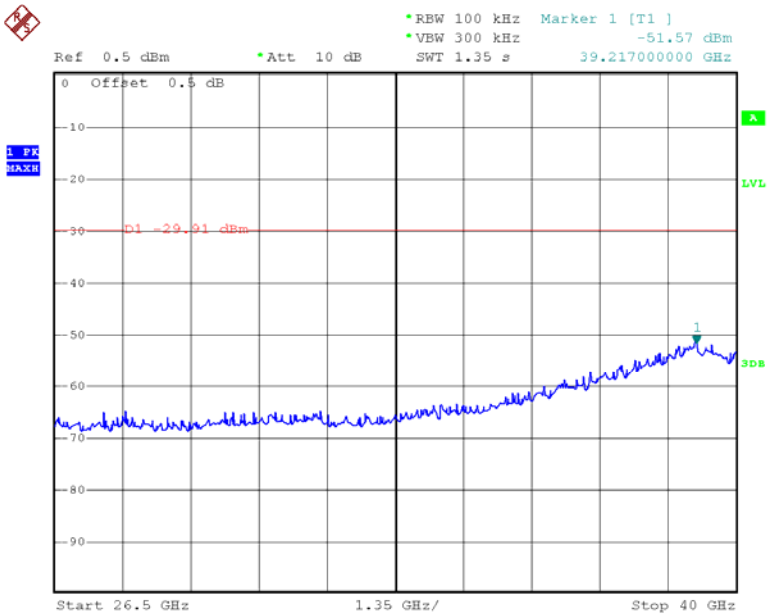

Date: 17.FEB.2013 10:21:13

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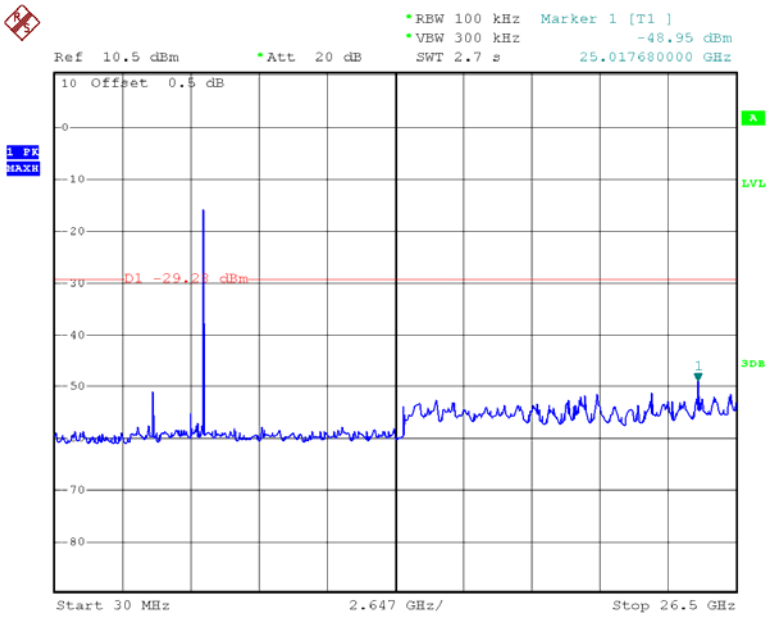

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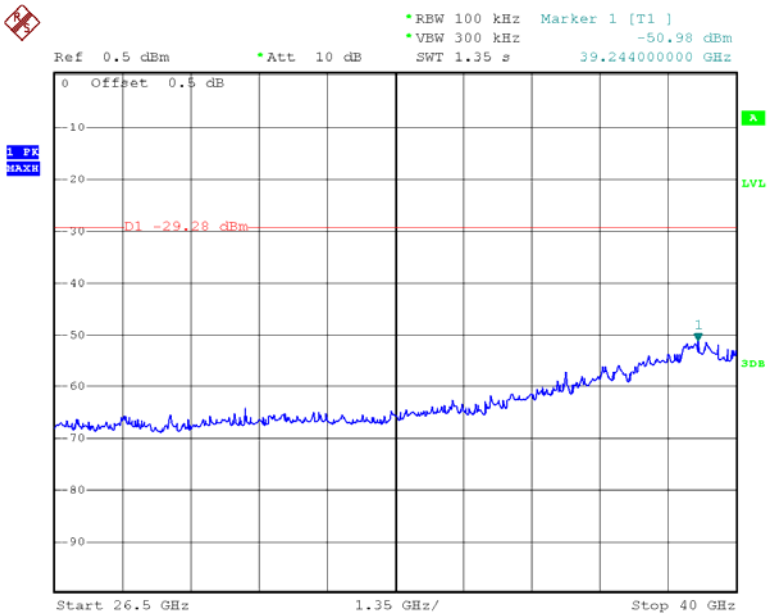

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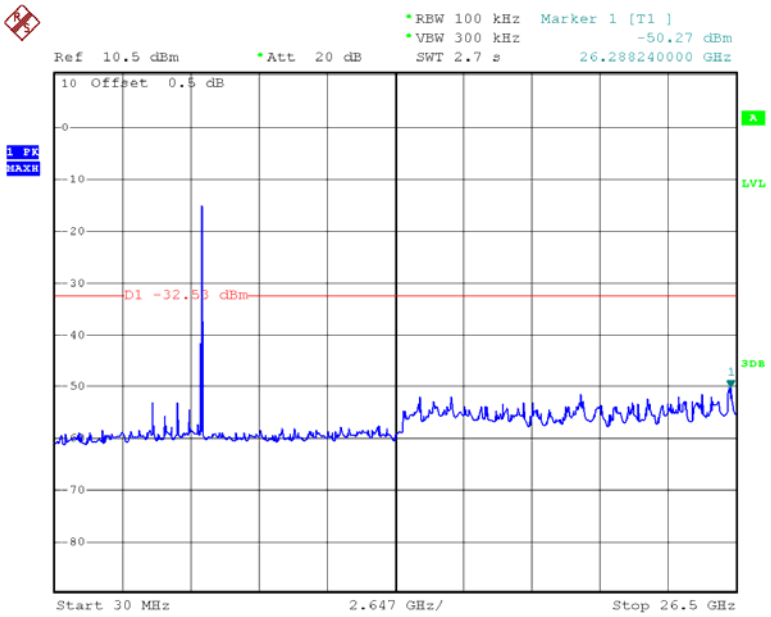
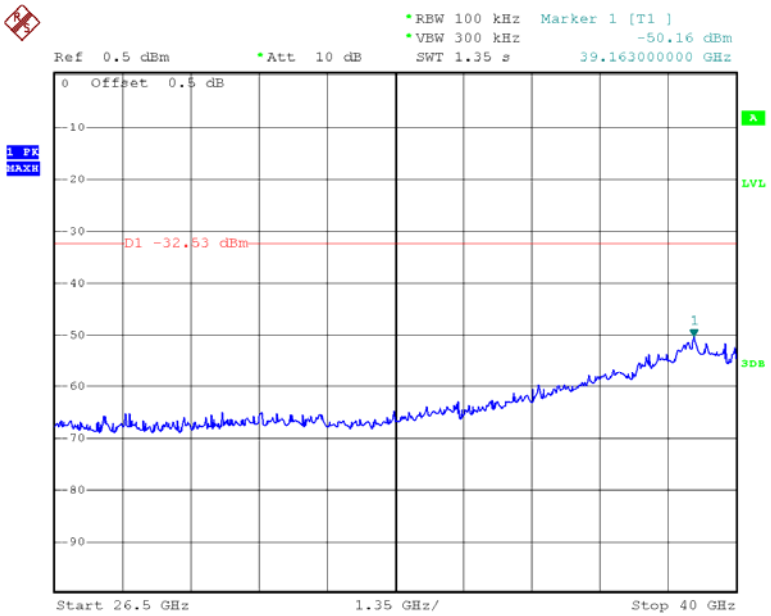


Date: 17.FEB.2013 13:23:30

802.11n40 Low Channel 26.5-40G



Date: 17.FEB.2013 10:24:32

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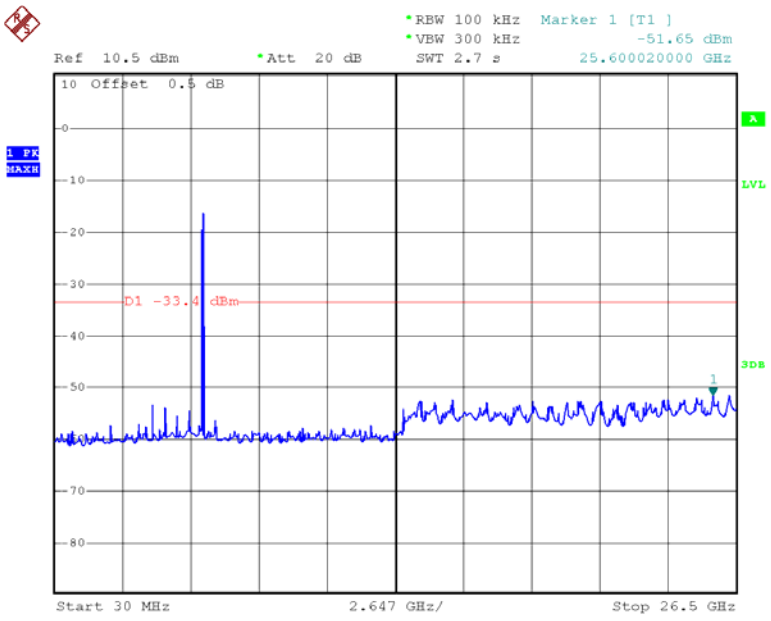

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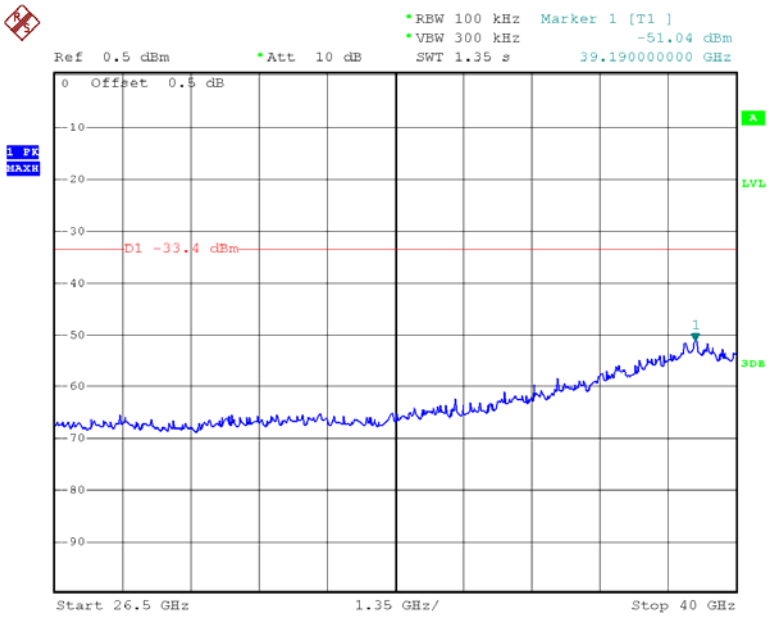
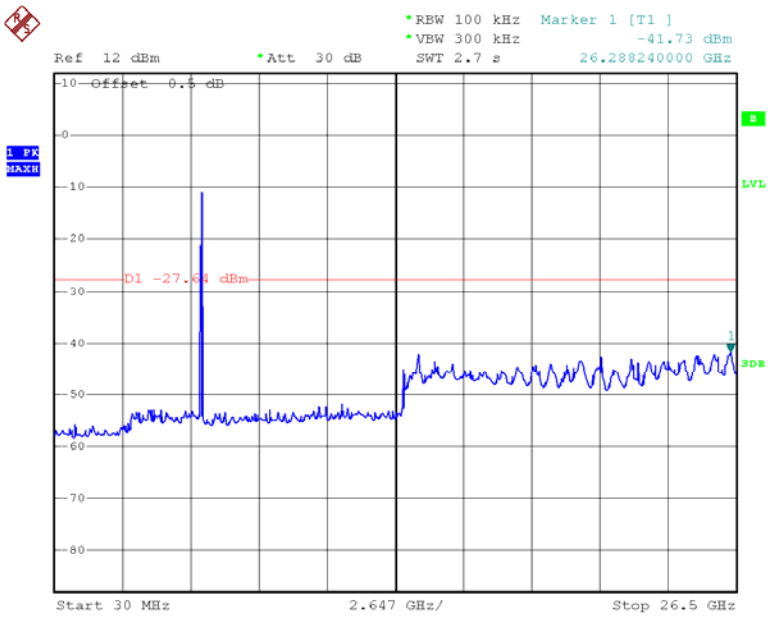


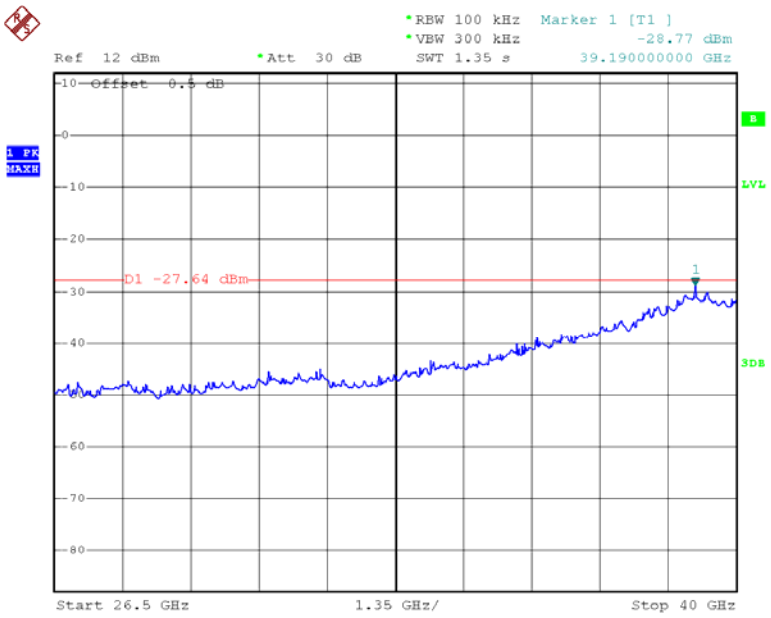
Date: 17.FEB.2013 10:24:59

802.11ac20 Low Channel 30M-26.5G

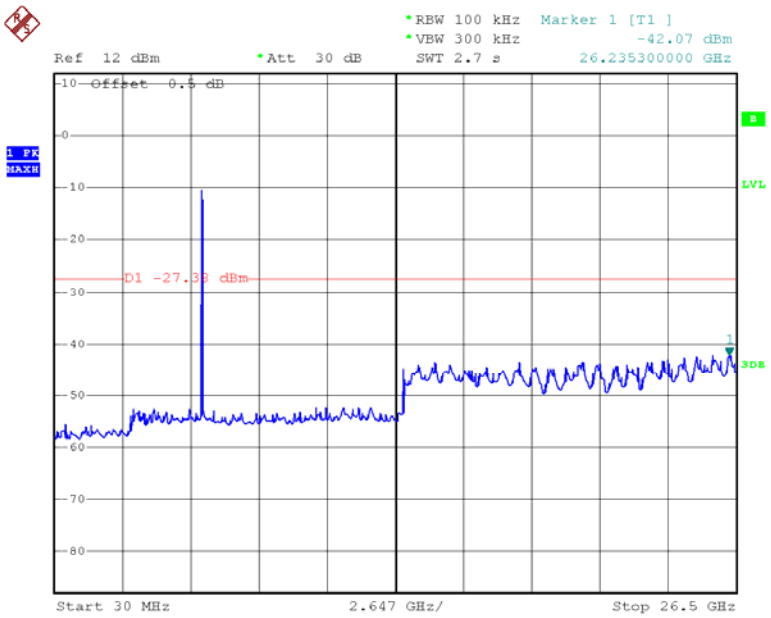


Date: 14.MAR.2013 11:20:15

802.11ac20 Low Channel 26.5-40G



802.11ac20 Middle Channel 30M-26.5G



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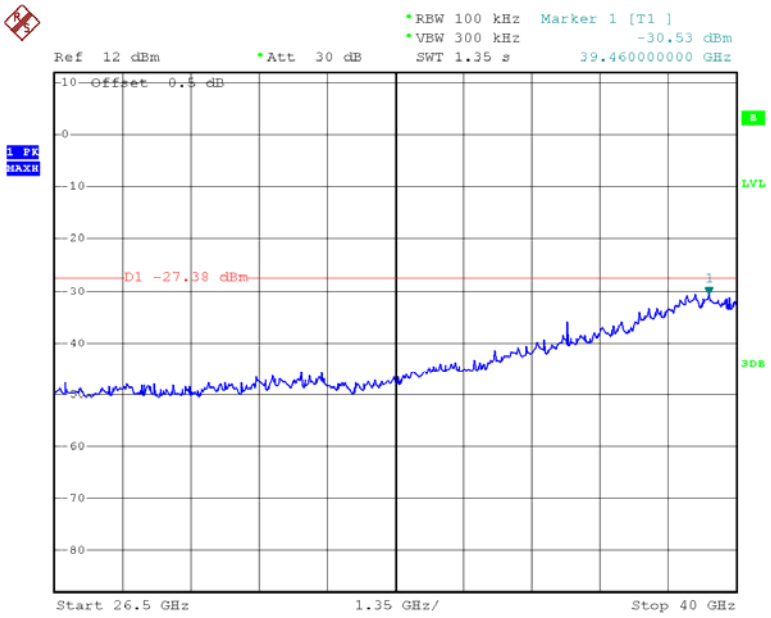

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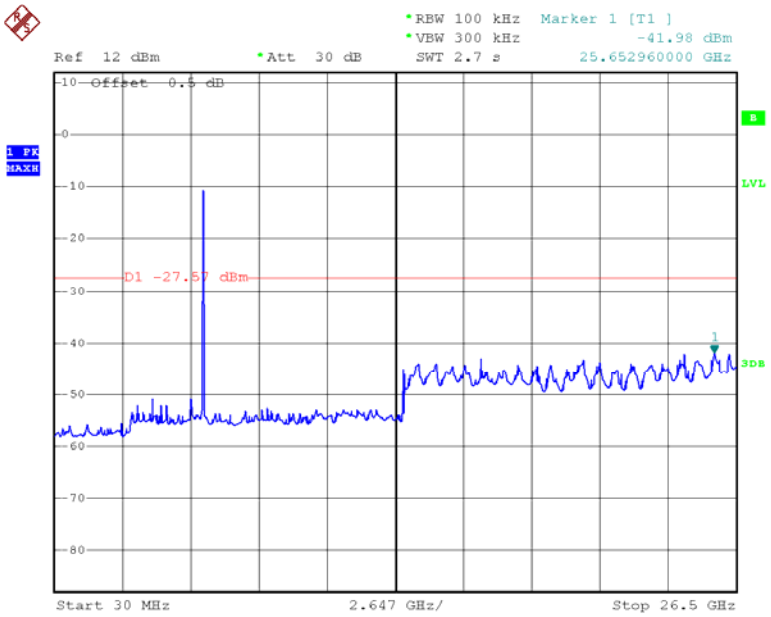
802.11ac20 High Channel 30M-26.5G



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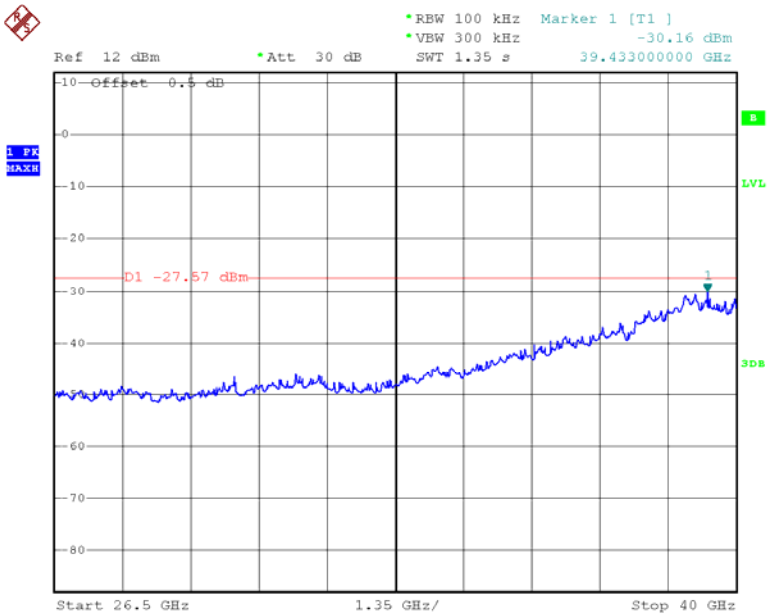
802.11ac20 High Channel 26.5-40G



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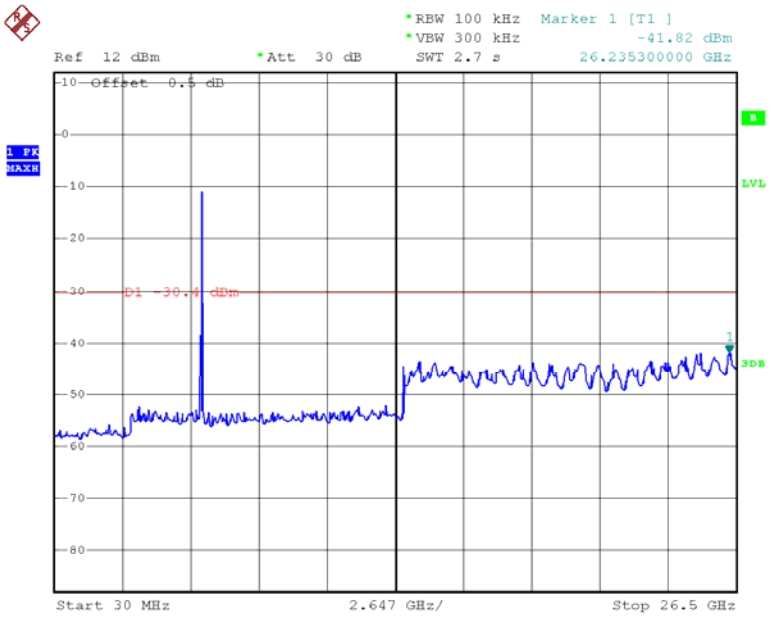
802.11ac40 Low Channel 30M-26.5G



Date: 14.MAR.2013 11:54:38

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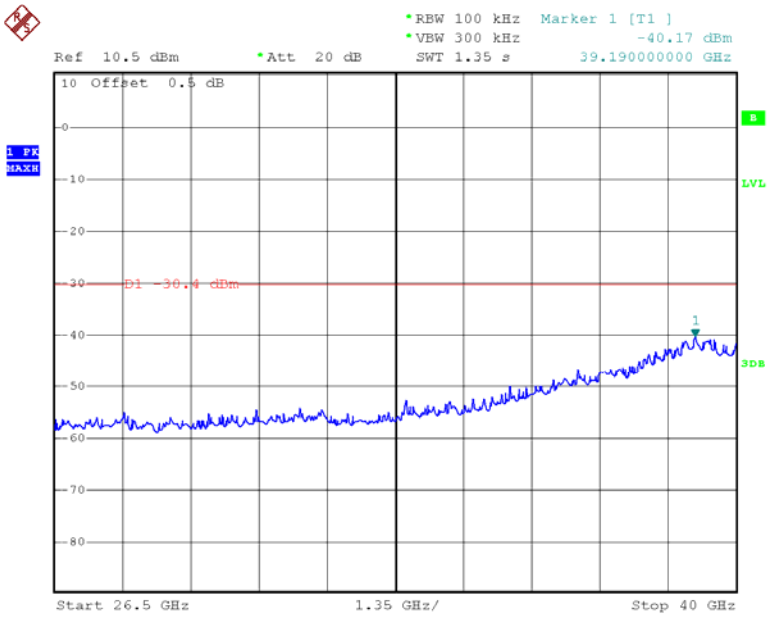
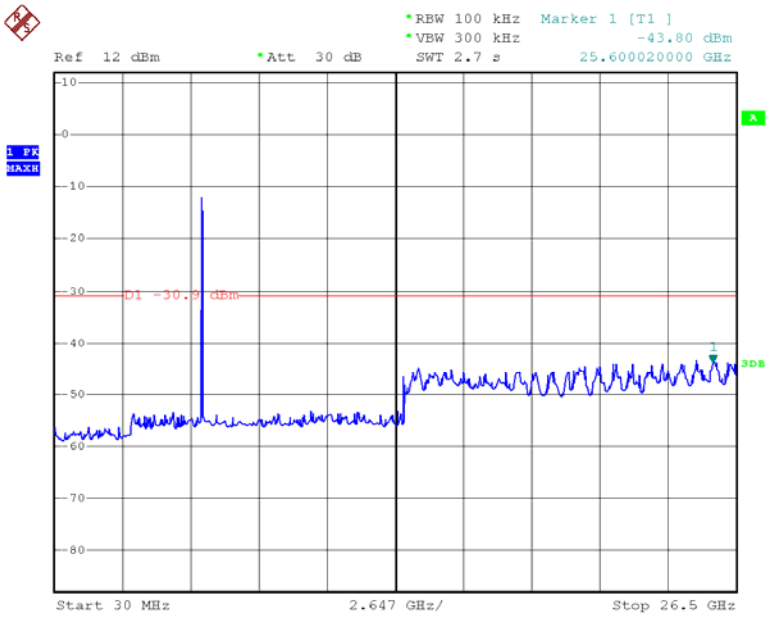


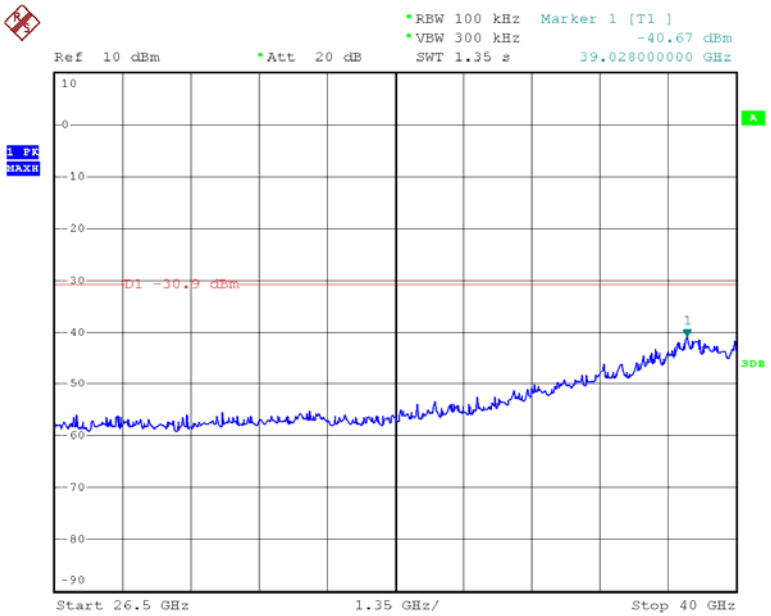
Date: 14.MAR.2013 11:54:03

802.11ac40 High Channel 30M-26.5G



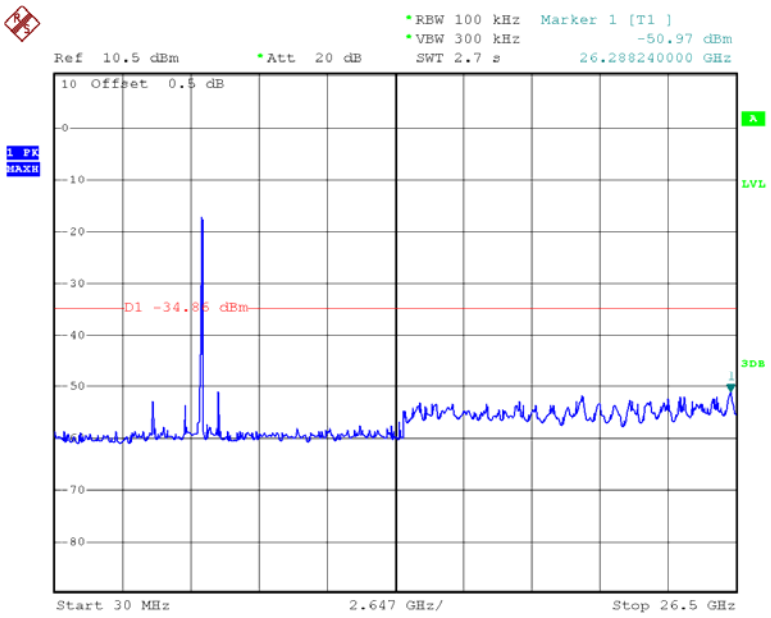
Date: 14.MAR.2013 13:47:38

802.11ac40 High Channel 26.5-40G



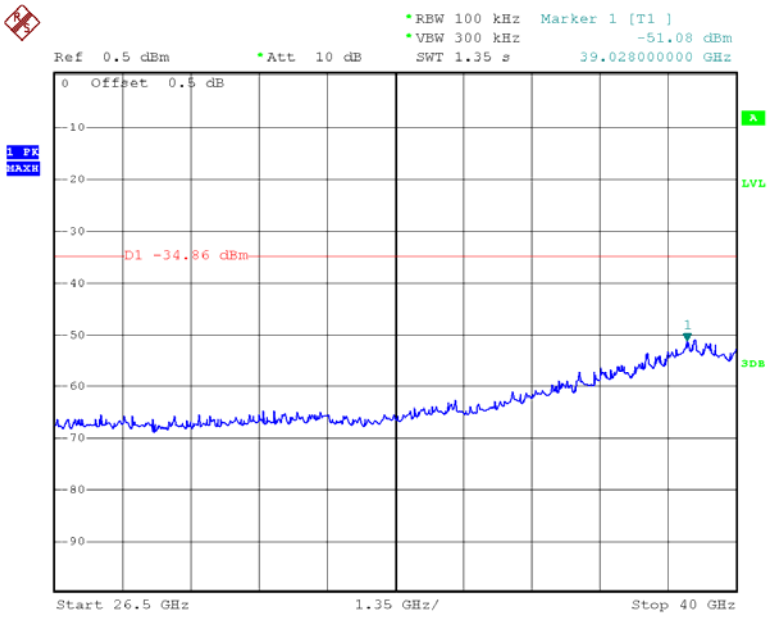
Date: 14.MAR.2013 13:48:14

802.11ac80 Low Channel 30M-26.5G



Date: 17.FEB.2013 13:26:00

802.11ac80 Low Channel 26.5-40G



Date: 17.FEB.2013 10:26:11

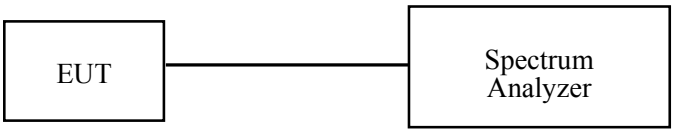
FCC §15.247(a) (2) – 6 dB EMISSION BANDWIDTH

Applicable Standard

Systems using digital modulation techniques may operate in the 902–928 MHz, 2400–2483.5 MHz, and 5725–5850 MHz bands. The minimum 6 dB bandwidth shall be at least 500 kHz.

Test Procedure

1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. Position the EUT without connection to measurement instrument. Turn on the EUT and connect it to measurement instrument. Then set it to any one convenient frequency within its operating range. Set a reference level on the measuring instrument equal to the highest peak value.
3. Measure the frequency difference of two frequencies that were attenuated 6 dB from the reference level. Record the frequency difference as the emission bandwidth.
4. Repeat above procedures until all frequencies measured were complete.



Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	Spectrum Analyzer	FSP38	100478	2012-5-14	2013-5-13

Test Data

Environmental Conditions

Temperature:	22.6 ~28.1 ° C
Relative Humidity:	29~65 %
ATM Pressure:	100.8~101.9kPa

The testing was performed by Leon Chen from 2013-02-07 to 2013-03-14.

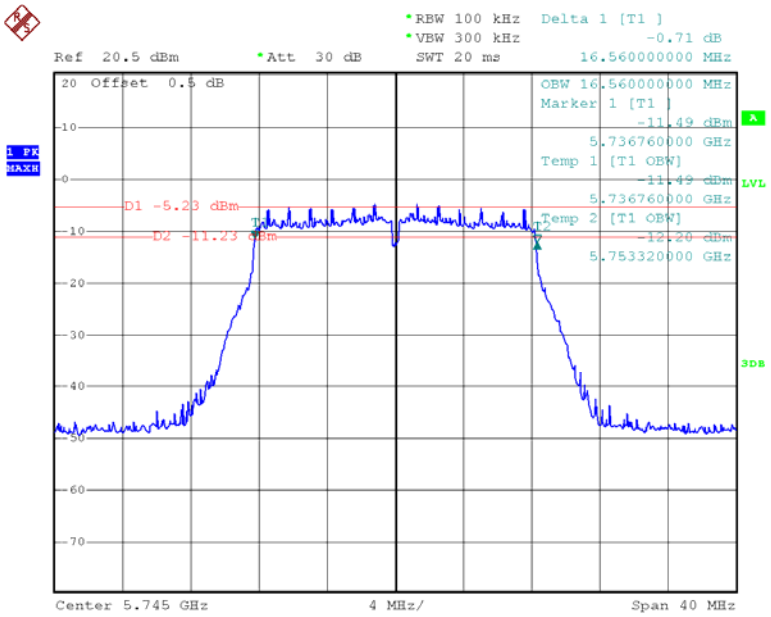
Test Result: Pass.

Please refer to the following tables and plots.

Test mode: Transmitting

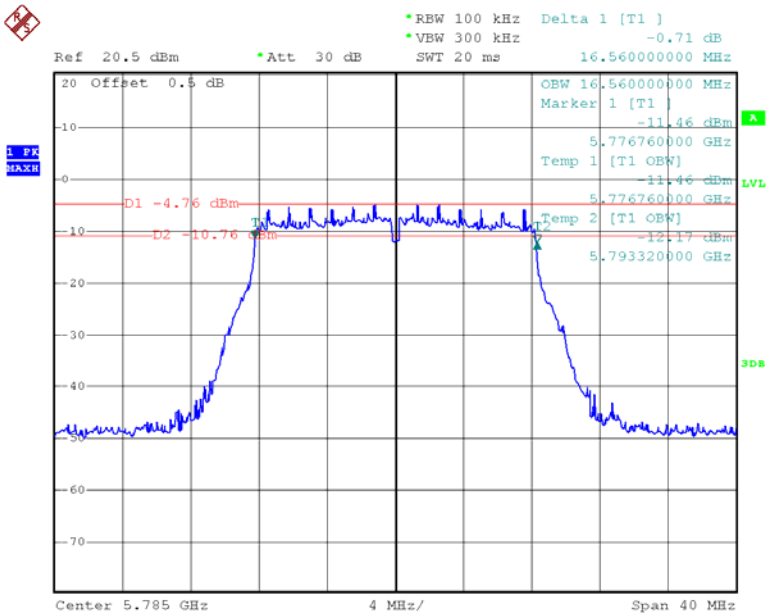
Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Limit (kHz)
802.11a mode			
Low	5745	16.56	>500
Middle	5785	16.56	>500
High	5825	16.56	>500
chain 0:802.11n20 mode			
Low	5745	17.76	>500
Middle	5785	17.76	>500
High	5825	17.76	>500
chain 0:802.11n40 mode			
Low	5755	36.64	>500
High	5795	36.32	>500
chain 0:802.11ac20 mode			
Low	5745	17.76	>500
Middle	5785	17.76	>500
High	5825	17.76	>500
chain 0:802.11ac40 mode			
Low	5755	36.64	>500
High	5795	36.32	>500
chain 0:802.11ac80 mode			
Low	5775	76.8	>500
chain 1:802.11n20 mode			
Low	5745	17.76	>500
Middle	5785	17.76	>500
High	5825	17.76	>500
chain 1:802.11n40 mode			
Low	5755	36.64	>500
High	5795	36.32	>500
chain 1:802.11ac20 mode			
Low	5745	17.76	>500
Middle	5785	17.76	>500
High	5825	17.76	>500
chain 1:802.11ac40 mode			
Low	5755	36.64	>500
High	5795	36.32	>500
chain 1:802.11ac80 mode			
Low	5775	76.8	>500

802.11a Low Channel



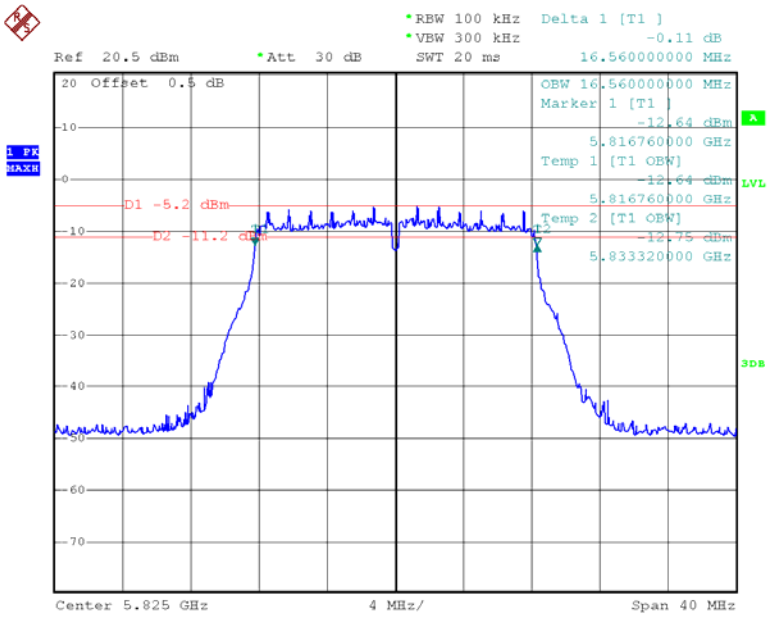
Date: 7.FEB.2013 11:42:30

802.11a Middle Channel



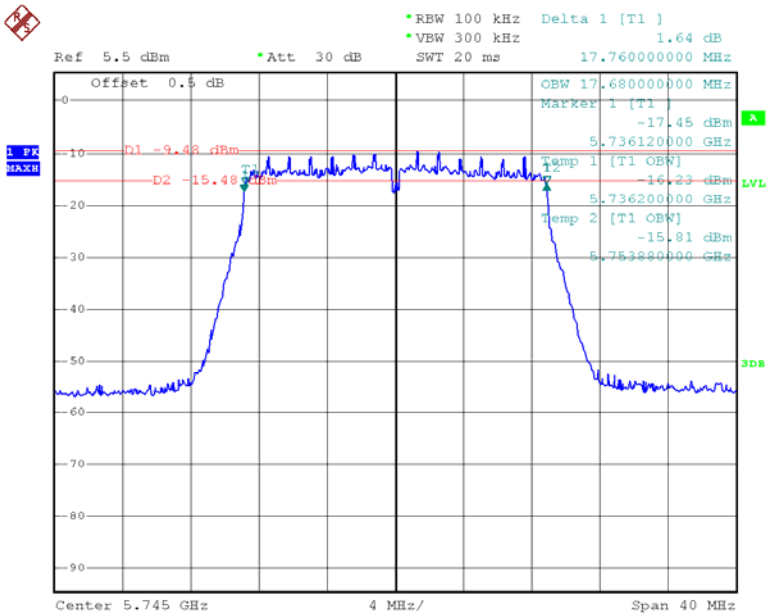
Date: 7.FEB.2013 11:55:03

802.11a High Channel



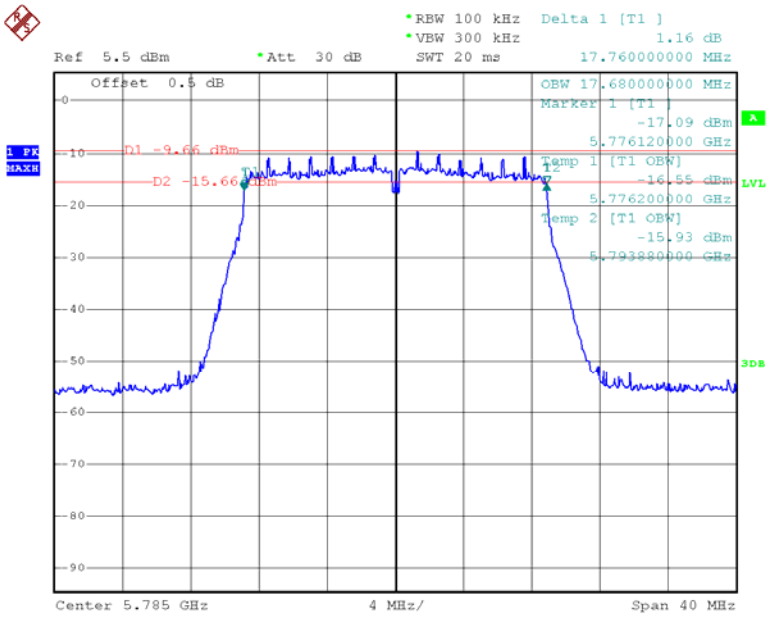
Date: 7.FEB.2013 13:13:29

Chain 0:802.11n20 Low Channel



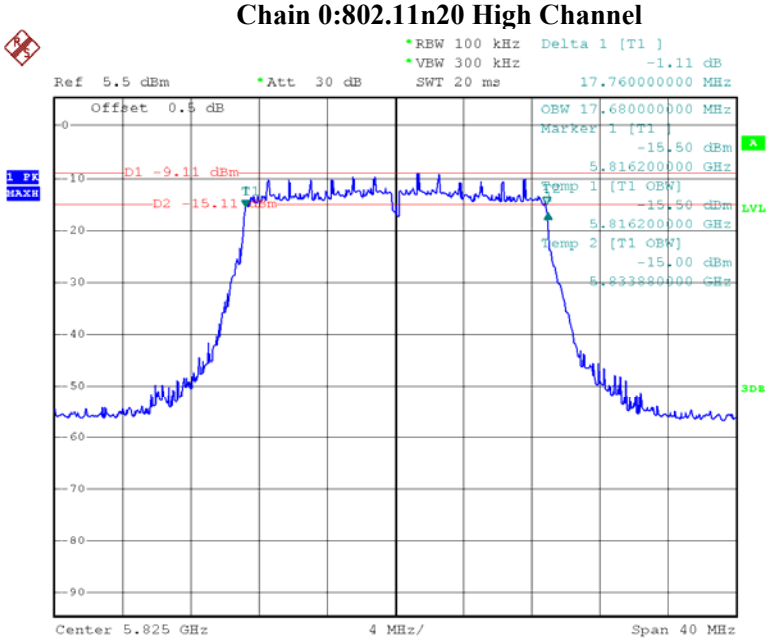
Date: 7.FEB.2013 13:27:39

Chain 0:802.11n20 Middle Channel



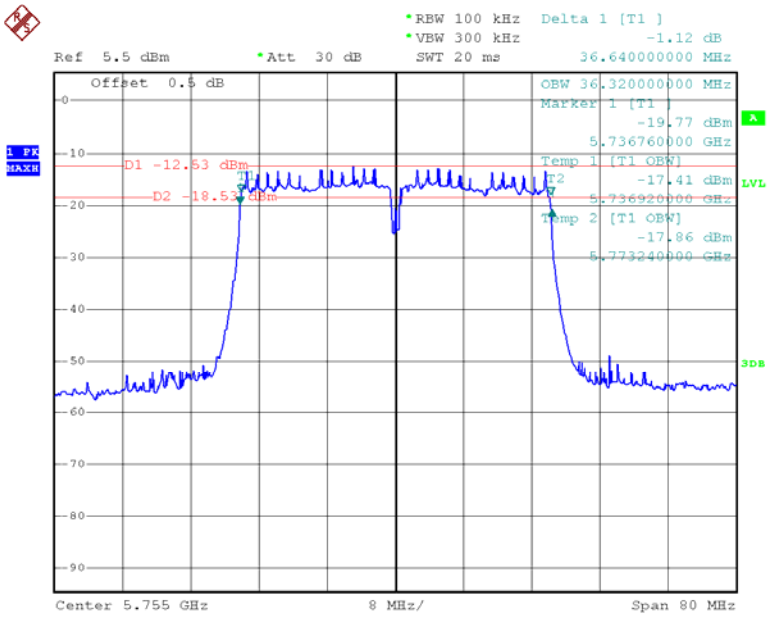
Date: 7.FEB.2013 13:42:21

Chain 0:802.11n20 High Channel



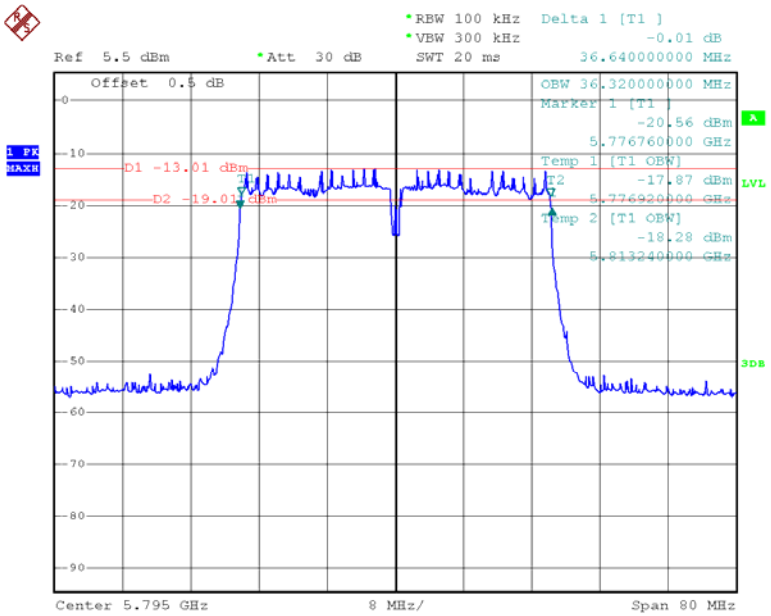
Date: 7.FEB.2013 13:55:01

Chain 0:802.11n40 Low Channel



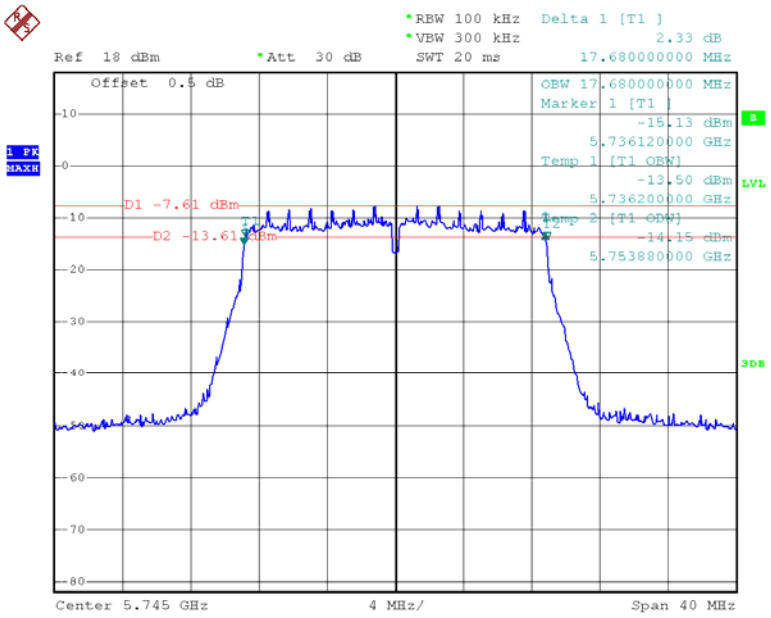
Date: 16.FEB.2013 17:01:04

Chain 0:802.11n40 High Channel



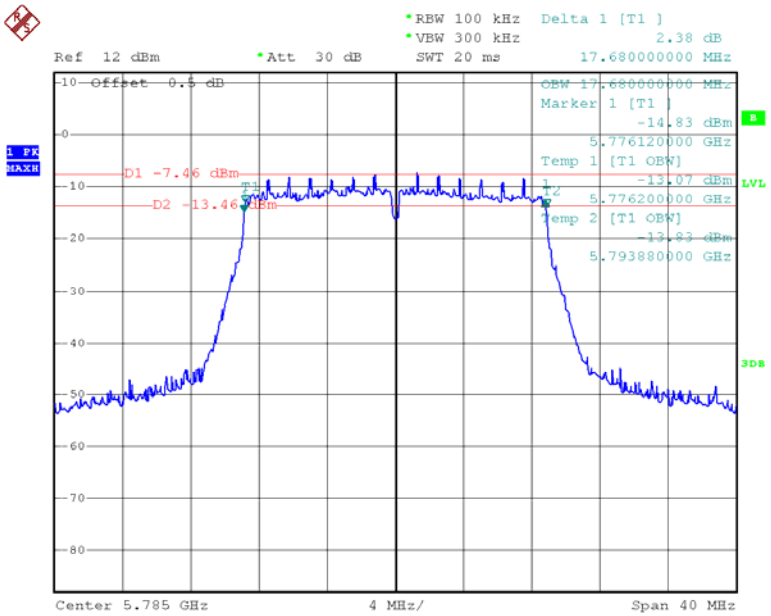
Date: 16.FEB.2013 17:15:26

Chain 0:802.11ac20 Low Channel



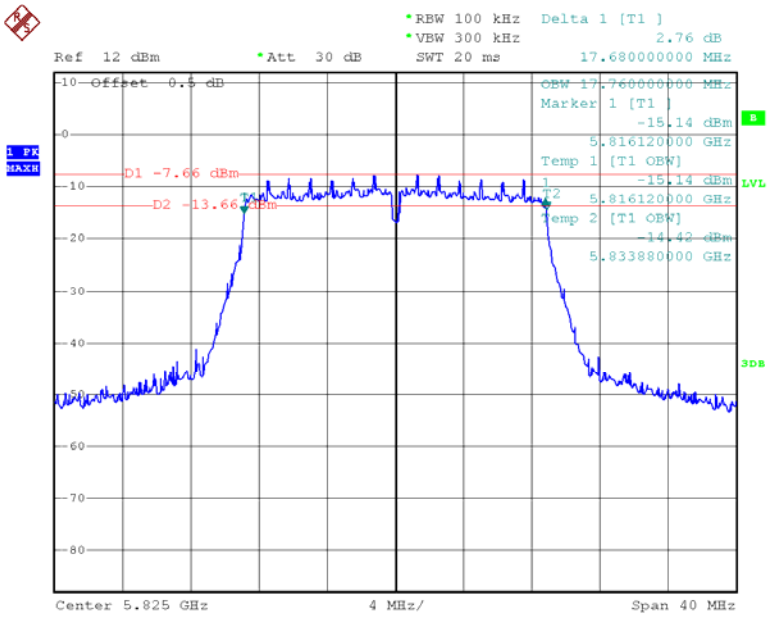
Date: 14.MAR.2013 11:02:41

Chain 0:802.11ac20 Middle Channel



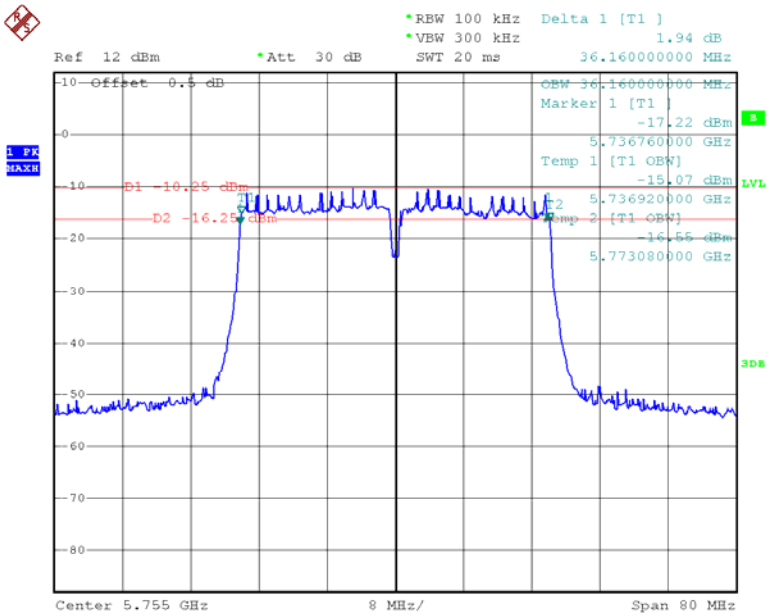
Date: 14.MAR.2013 11:24:07

Chain 0:802.11ac20 High Channel



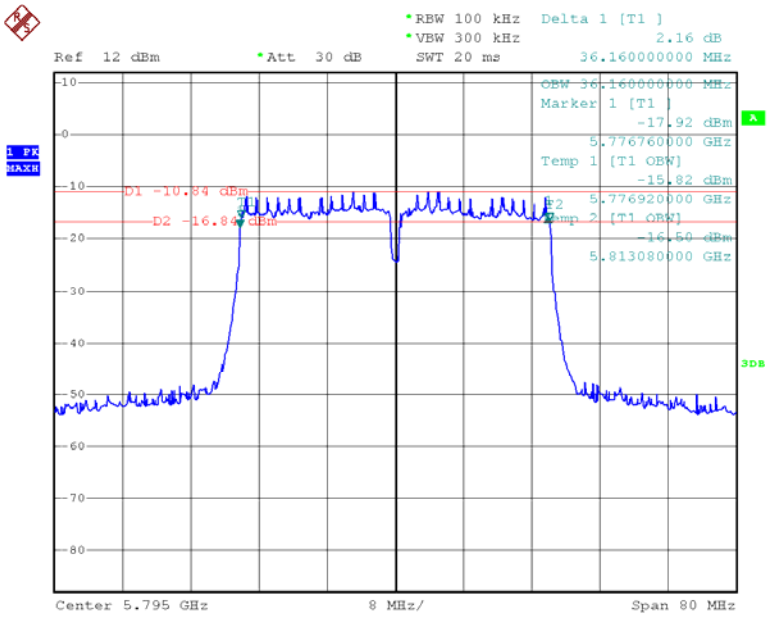
Date: 14.MAR.2013 11:30:58

Chain 0:802.11ac40 Low Channel



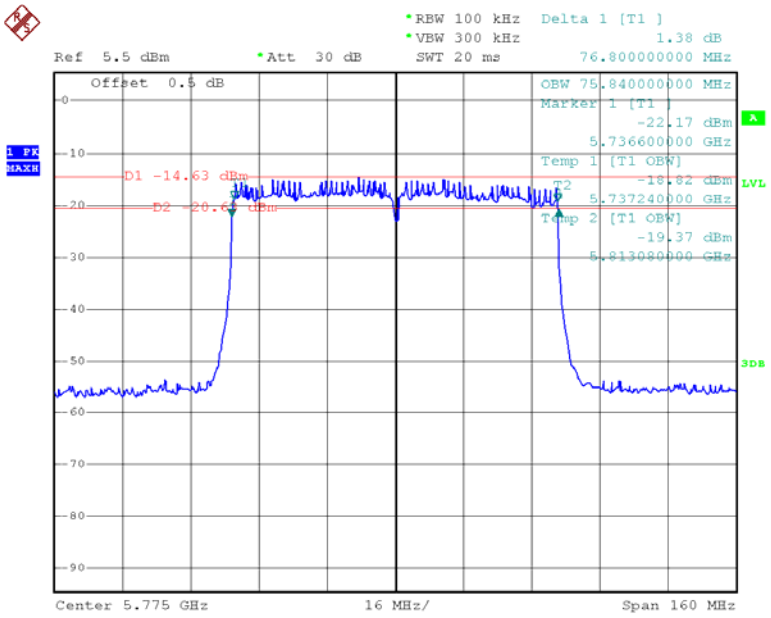
Date: 14.MAR.2013 11:49:09

Chain 0:802.11ac40 High Channel



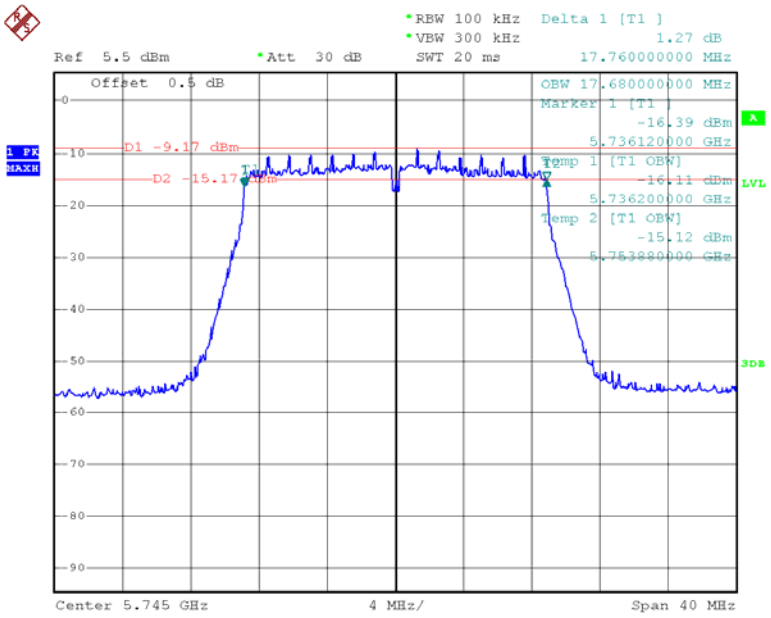
Date: 14.MAR.2013 13:39:44

Chain 0:802.11ac80 Low Channel



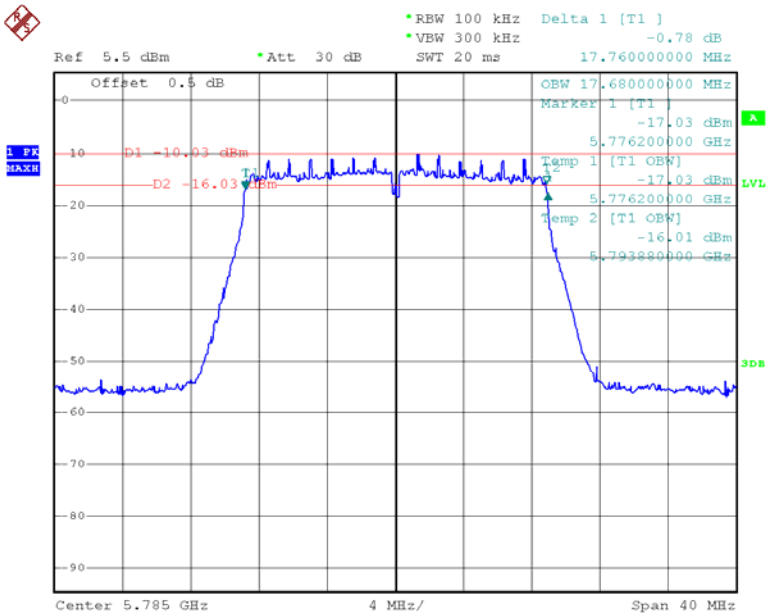
Date: 16.FEB.2013 17:28:57

Chain 1:802.11n20 Low Channel



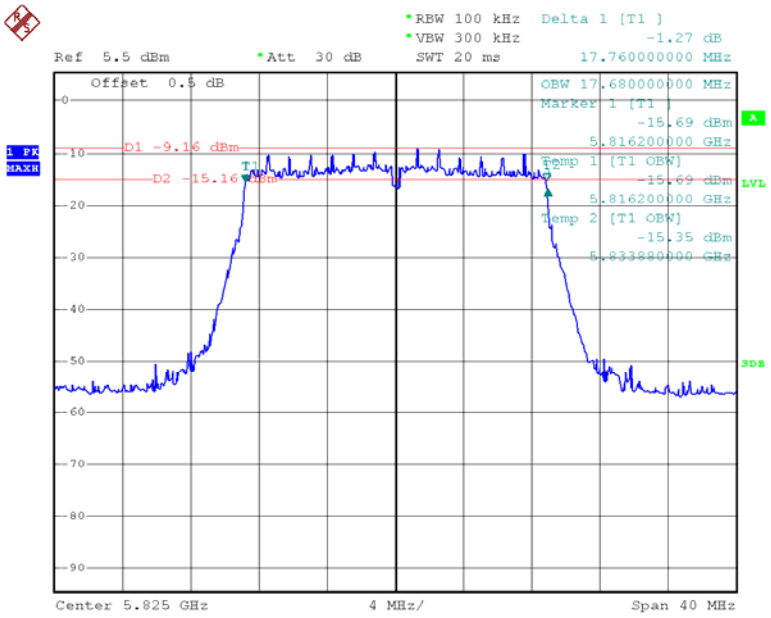
Date: 7.FEB.2013 13:35:35

Chain 1:802.11n20 Middle Channel



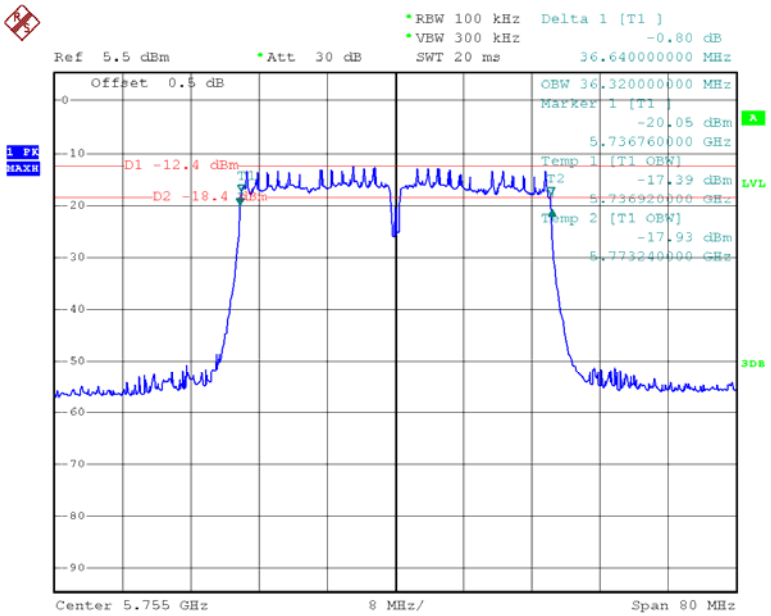
Date: 7.FEB.2013 13:48:28

Chain 1:802.11n20 High Channel



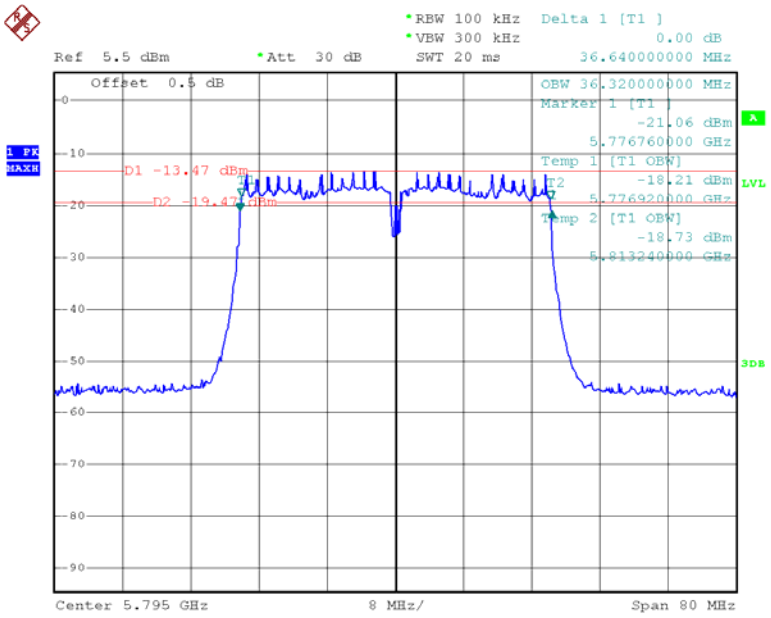
Date: 7.FEB.2013 14:01:21

Chain 1:802.11n40 Low Channel



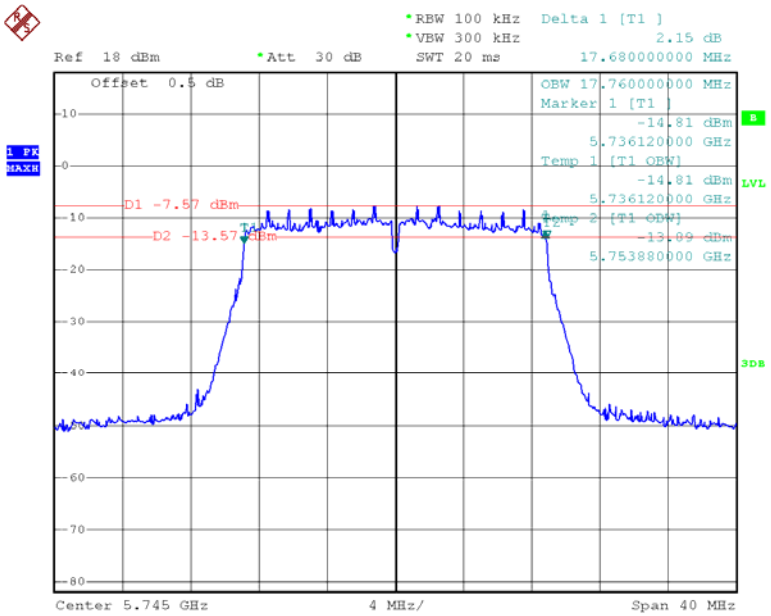
Date: 16.FEB.2013 17:08:19

Chain 1:802.11n40 High Channel



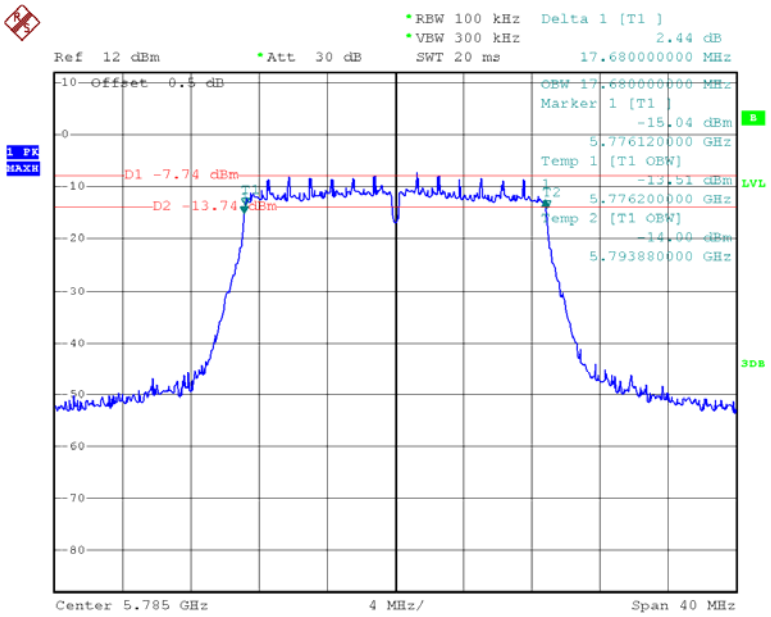
Date: 16.FEB.2013 17:22:44

Chain 1:802.11ac20 Low Channel



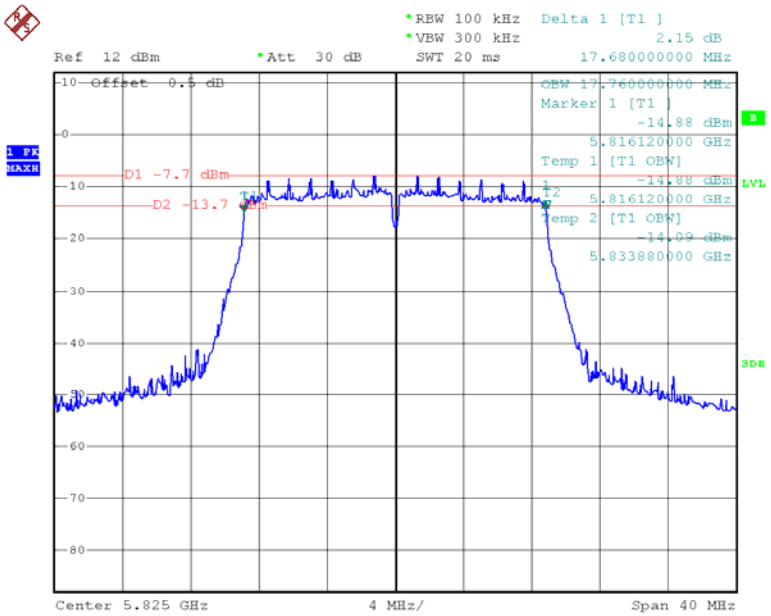
Date: 14.MAR.2013 11:03:52

Chain 1:802.11ac20 Middle Channel



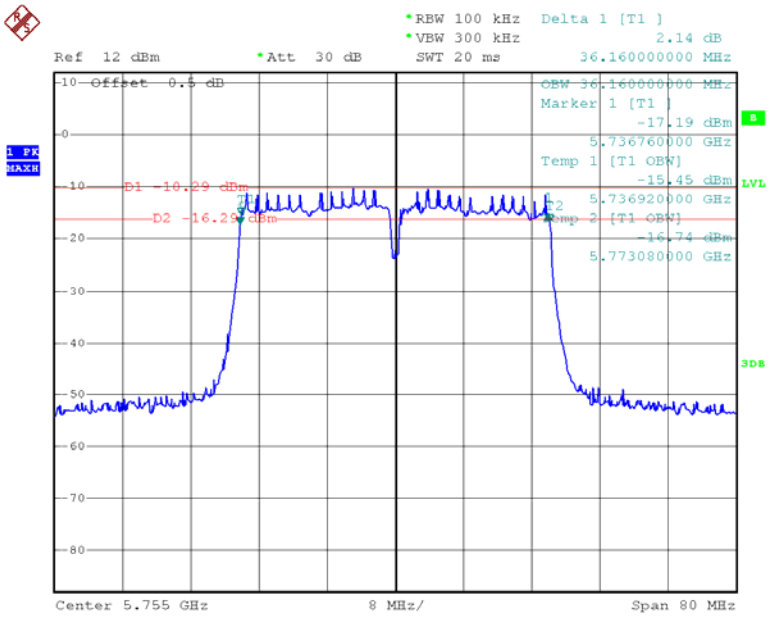
Date: 14.MAR.2013 11:24:40

Chain 1:802.11ac20 High Channel



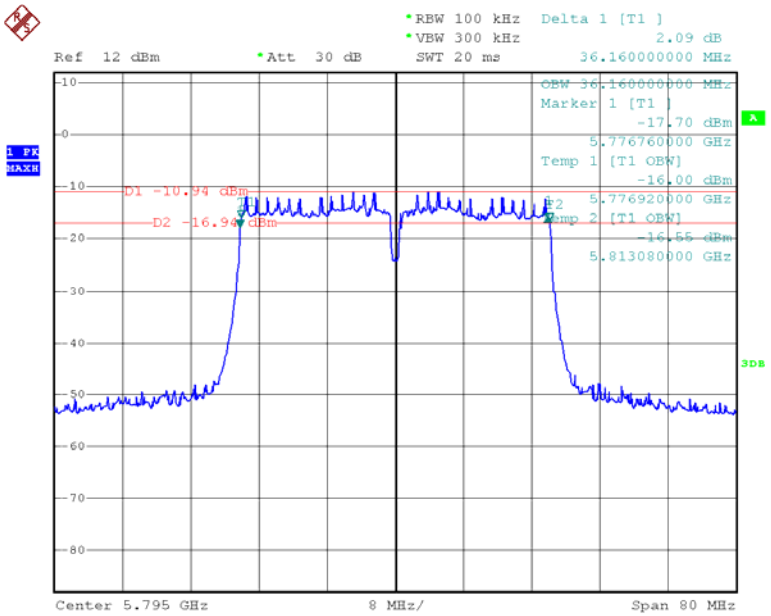
Date: 14.MAR.2013 11:31:32

Chain 1:802.11ac40 Low Channel



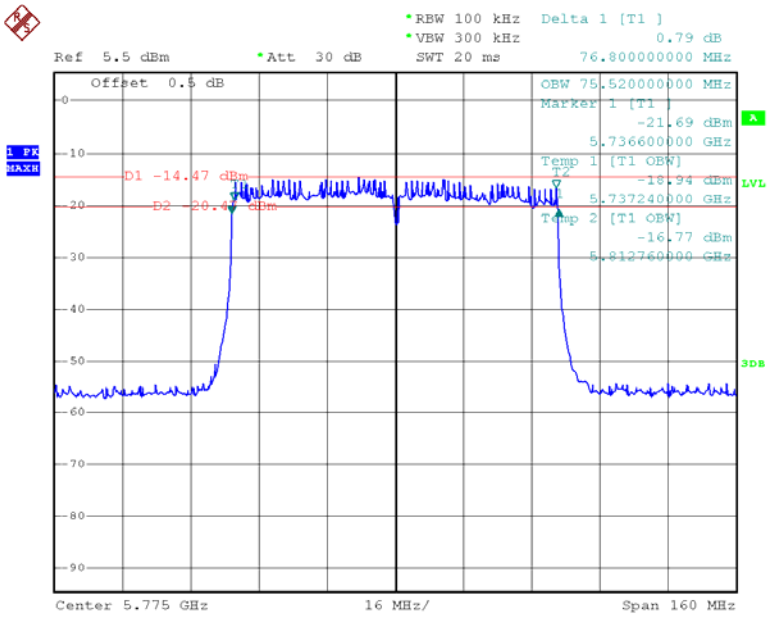
Date: 14.MAR.2013 11:49:50

Chain 1:802.11ac40 High Channel



Date: 14.MAR.2013 13:40:35

Chain 1:802.11ac80 Low Channel



Date: 16.FEB.2013 17:39:46

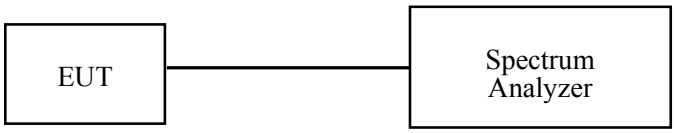
FCC §15.247(b) (3) - MAXIMUM PEAK OUTPUT POWER

Applicable Standard

According to FCC §15.247(b) (3), for systems using digital modulation in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz bands: 1 Watt. As an alternative to a peak power measurement, compliance with the one Watt limit can be based on a measurement of the maximum conducted output power. Maximum Conducted Output Power is defined as the total transmit power delivered to all antennas and antenna elements averaged across all symbols in the signaling alphabet when the transmitter is operating at its maximum power control level. Power must be summed across all antennas and antenna elements. The average must not include any time intervals during which the transmitter is off or is transmitting at a reduced power level. If multiple modes of operation are possible (e.g., alternative modulation methods), the maximum conducted output power is the highest total transmit power occurring in any mode.

Test Procedure

1. Place the EUT on a bench and set it in transmitting mode.
2. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to an EMI Test Receiver.
3. Add a correction factor to the display.



Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	Spectrum Analyzer	FSP38	100478	2012-5-14	2013-5-13

Test Data

Environmental Conditions

Temperature:	28.1 ° C
Relative Humidity:	47%
ATM Pressure:	101.4kPa

The testing was performed by Leon Chen on 2013-03-14.

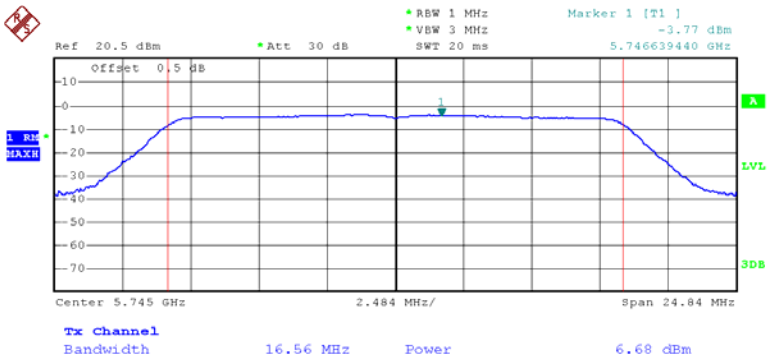
Test Mode: Transmitting

Channel	Frequency (MHz)	Conducted Output Power (dBm)	Limit (dBm)	Result
802.11a mode				
Low	5745	6.68	30	PASS
Middle	5785	6.71	30	PASS
High	5825	6.76	30	PASS
chain 0:802.11n20 mode				
Low	5745	4.03	30	PASS
Middle	5785	4.04	30	PASS
High	5825	4.06	30	PASS
chain 1:802.11n20 mode				
Low	5745	4.09	30	PASS
Middle	5785	3.99	30	PASS
High	5825	4.11	30	PASS
chain 0:802.11n40 mode				
Low	5755	4.21	30	PASS
High	5795	4.07	30	PASS
chain 1:802.11n40 mode				
Low	5755	4.11	30	PASS
High	5795	4.01	30	PASS
chain 0:802.11ac20 mode				
Low	5745	4.02	30	PASS
Middle	5785	4.21	30	PASS
High	5825	4.04	30	PASS
chain 1:802.11ac20 mode				
Low	5745	4.09	30	PASS
Middle	5785	4.08	30	PASS
High	5825	4.09	30	PASS
chain 0:802.11ac40 mode				
Low	5755	4.15	30	PASS
High	5795	4.11	30	PASS
chain 1:802.11ac40 mode				
Low	5755	4.05	30	PASS
High	5795	3.99	30	PASS
chain 0:802.11ac80 mode				
Low	5775	4.06	30	PASS
chain 1:802.11ac80 mode				
Low	5775	4.16	30	PASS

Total power: chain 0+ chain 1

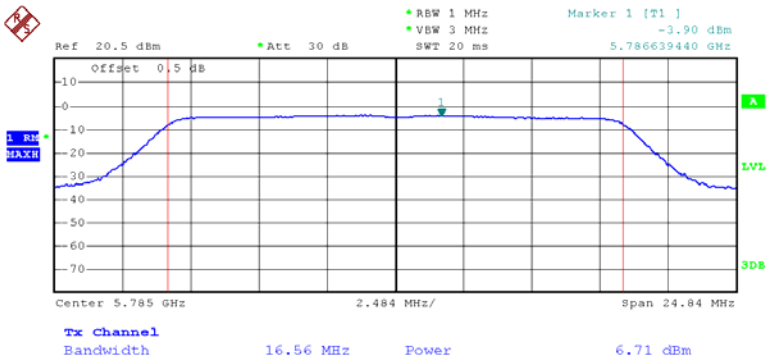
Channel	Frequency	Conducted Output Power	Limit	Result
	(MHz)	(dBm)	(dBm)	
Total:802.11n20 mode				
Low	5745	7.07	30	PASS
Middle	5785	7.03	30	PASS
High	5825	7.10	30	PASS
Total:802.11n40 mode				
Low	5755	7.17	30	PASS
High	5795	7.05	30	PASS
Total:802.11ac20 mode				
Low	5745	7.07	30	PASS
Middle	5785	7.16	30	PASS
High	5825	7.08	30	PASS
Total:802.11ac40 mode				
Low	5755	7.11	30	PASS
High	5795	7.06	30	PASS
Total:802.11ac80 mode				
Low	5775	7.12	30	PASS

802.11a RF Output Power, Low Channel



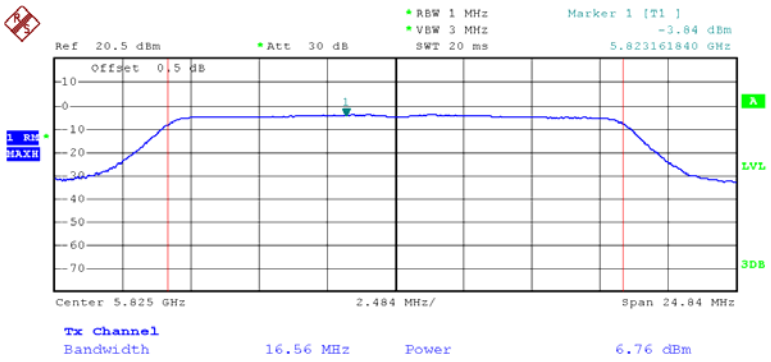
Date: 14.MAR.2013 10:15:17

802.11a RF Output Power, Middle Channel



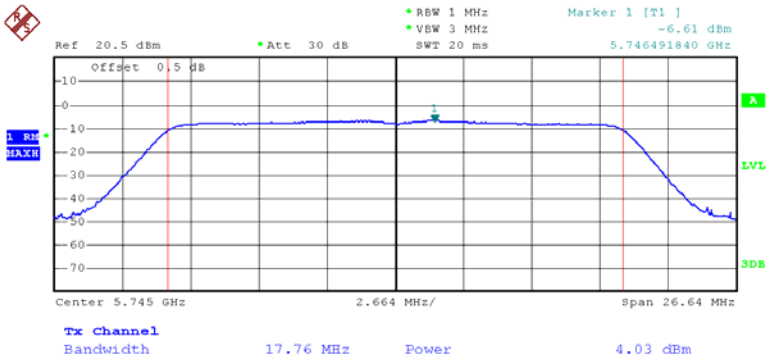
Date: 14.MAR.2013 10:14:52

802.11a RF Output Power, High Channel



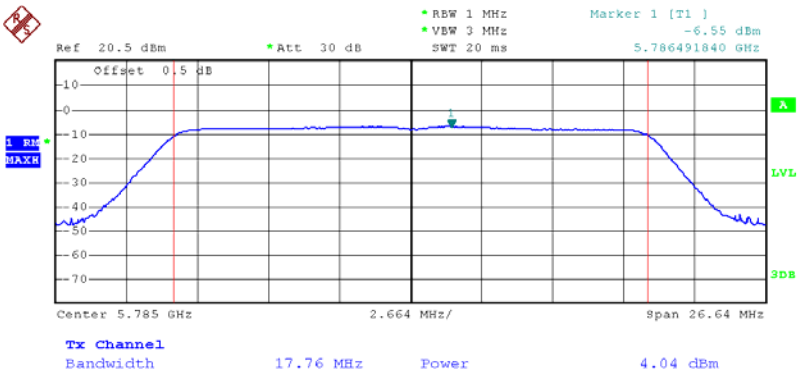
Date: 14.MAR.2013 10:14:30

Chain 0:802.11n20 RF Output Power, Low Channel



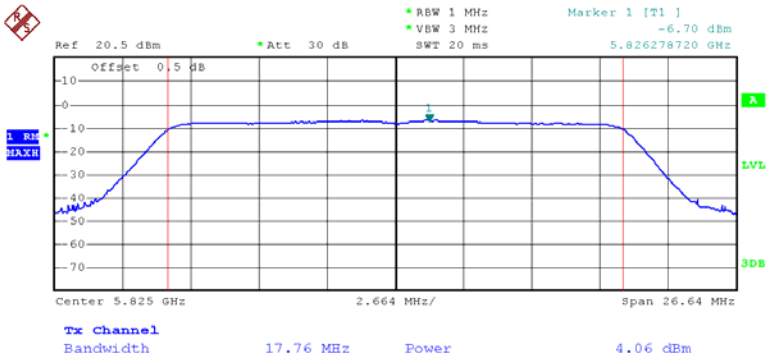
Date: 14.MAR.2013 10:17:41

Chain 0:802.11n20 RF Output Power, Middle Channel



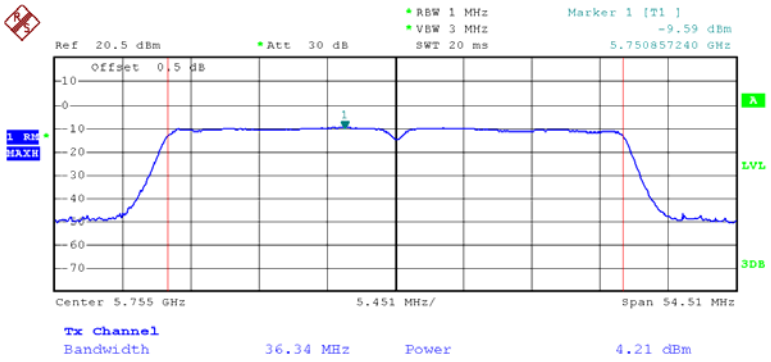
Date: 14.MAR.2013 10:18:39

Chain 0:802.11n20 RF Output Power, High Channel



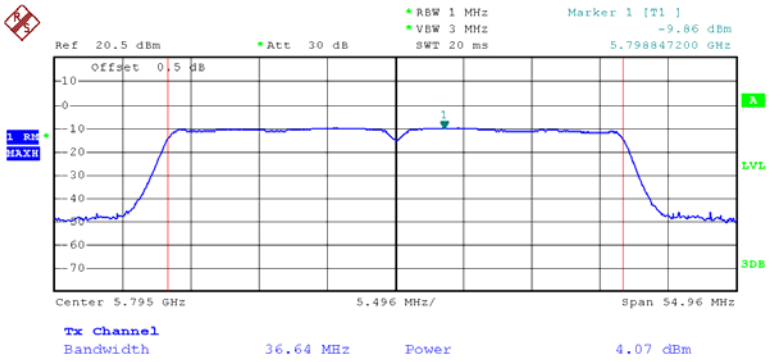
Date: 14.MAR.2013 10:19:14

Chain 0:802.11n40 RF Output Power, Low Channel



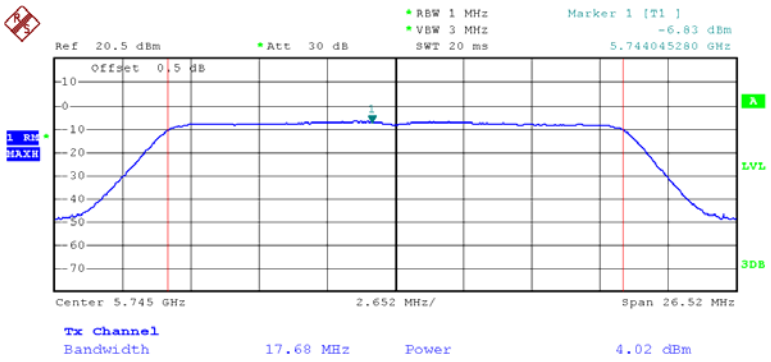
Date: 14.MAR.2013 10:24:26

Chain 0:802.11n40 RF Output Power, High Channel



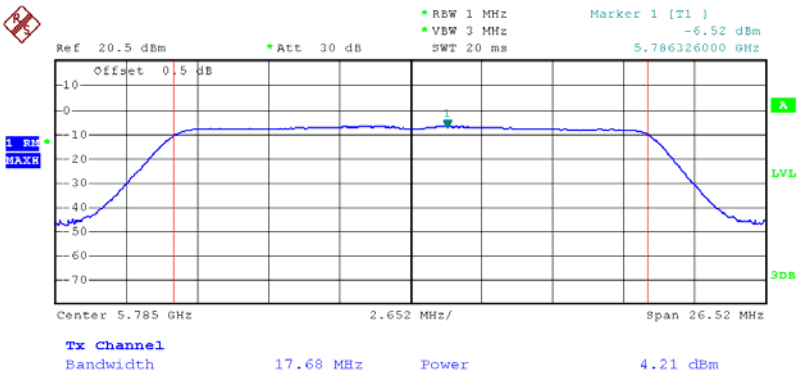
Date: 14.MAR.2013 10:25:48

Chain 0:802.11ac20 RF Output Power, Low Channel



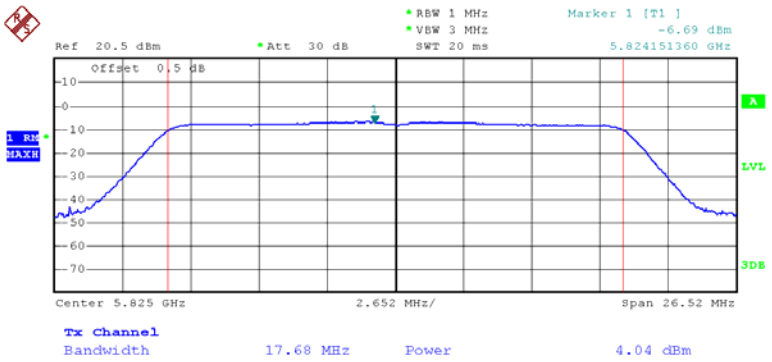
Date: 14.MAR.2013 11:01:43

Chain 0:802.11ac20 RF Output Power, Middle Channel



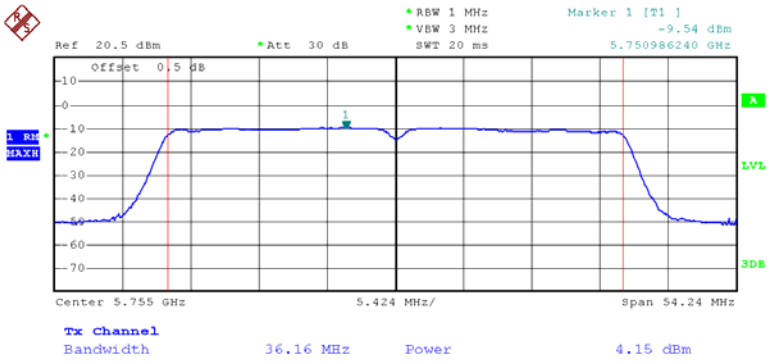
Date: 14.MAR.2013 11:23:19

Chain 0:802.11ac20 RF Output Power, High Channel



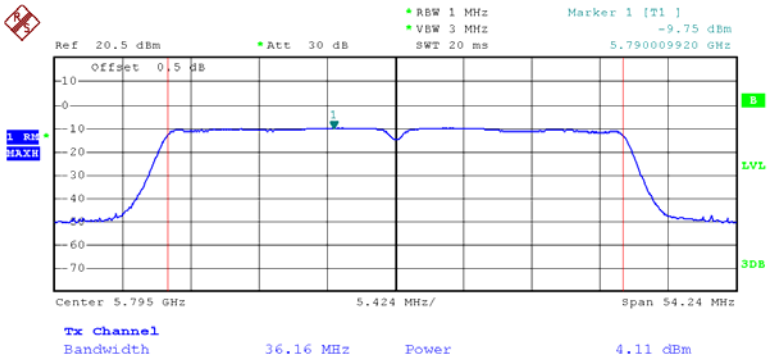
Date: 14.MAR.2013 11:29:58

Chain 0:802.11ac40 RF Output Power, Low Channel



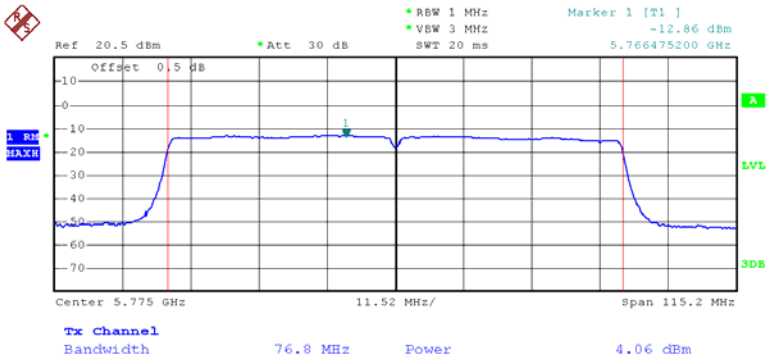
Date: 14.MAR.2013 11:48:07

Chain 0:802.11ac40 RF Output Power, High Channel



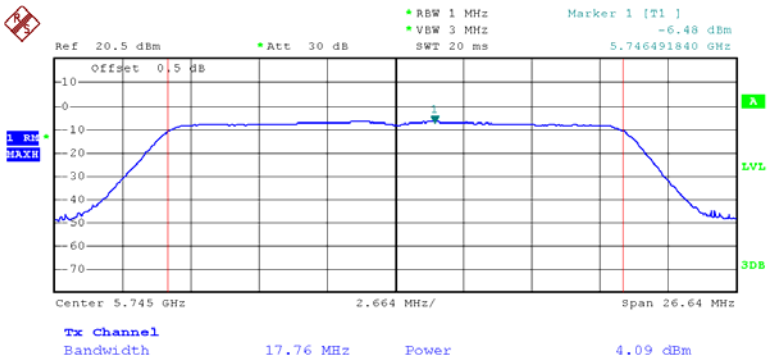
Date: 14.MAR.2013 13:36:37

Chain 0:802.11ac80 RF Output Power, Low Channel



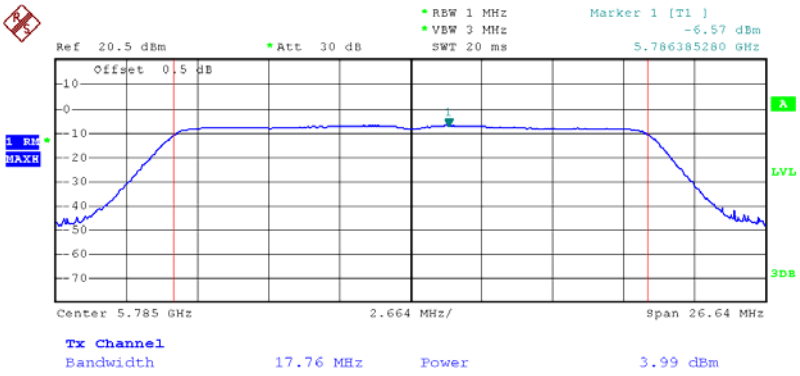
Date: 14.MAR.2013 10:29:55

Chain 1:802.11n20 RF Output Power, Low Channel



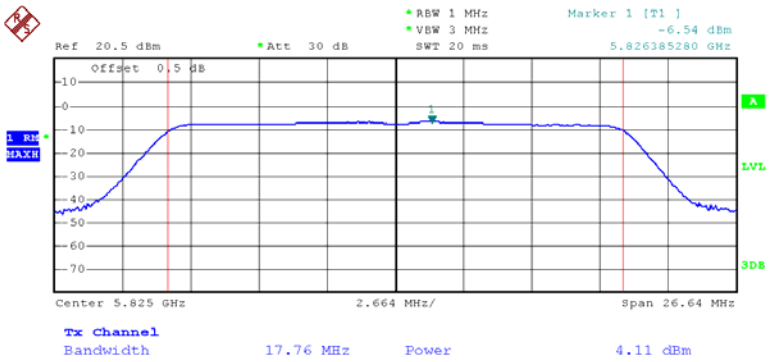
Date: 14.MAR.2013 10:22:36

Chain 1:802.11n20 RF Output Power, Middle Channel



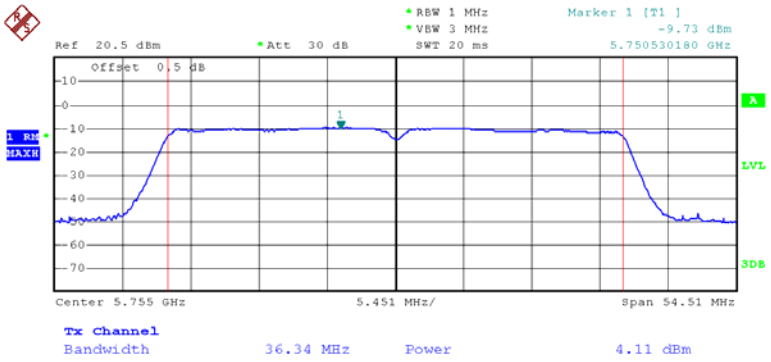
Date: 14.MAR.2013 10:21:46

Chain 1:802.11n20 RF Output Power, High Channel



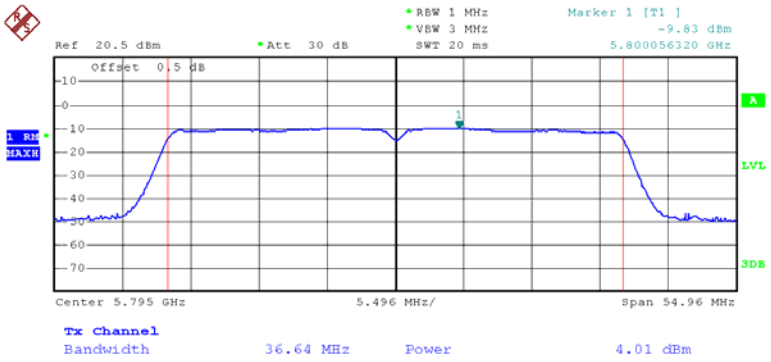
Date: 14.MAR.2013 10:21:13

Chain 1:802.11n40 RF Output Power, Low Channel



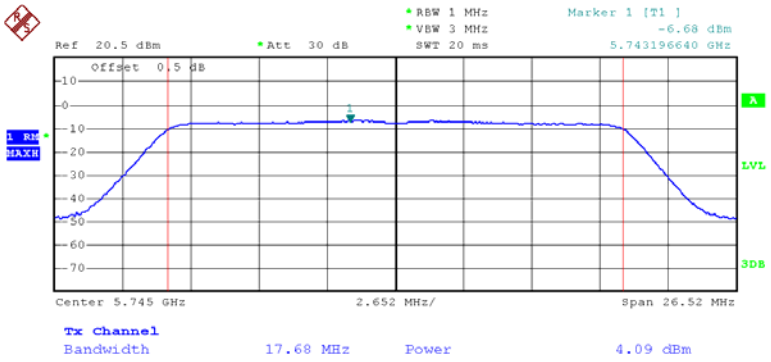
Date: 14.MAR.2013 10:27:37

Chain 1:802.11n40 RF Output Power, High Channel



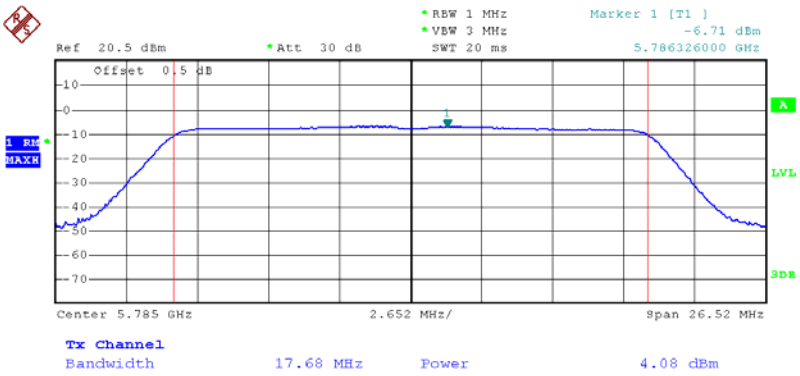
Date: 14.MAR.2013 10:26:37

Chain 1:802.11ac20 RF Output Power, Low Channel



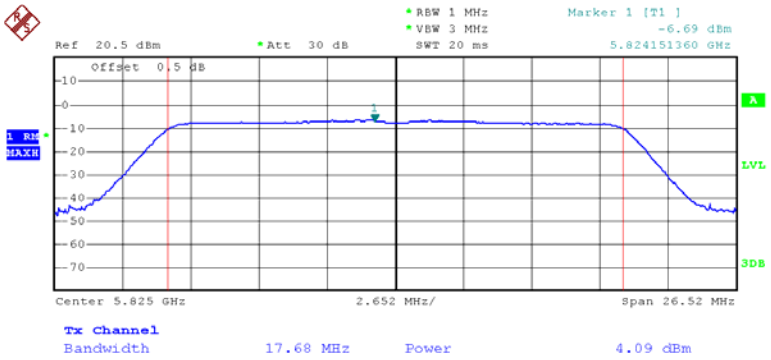
Date: 14.MAR.2013 11:01:51

Chain 1:802.11ac20 RF Output Power, Middle Channel



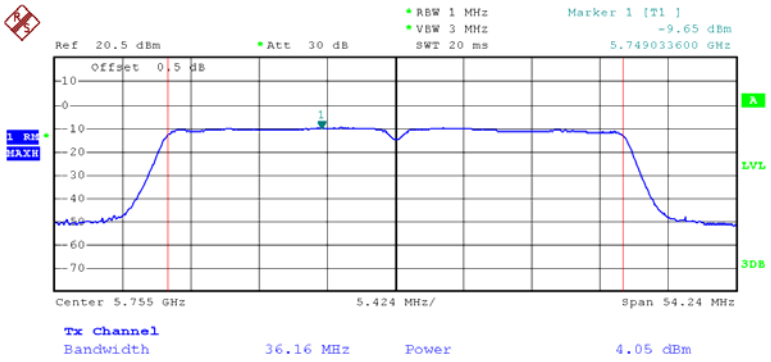
Date: 14.MAR.2013 11:23:27

Chain 1:802.11ac20 RF Output Power, High Channel



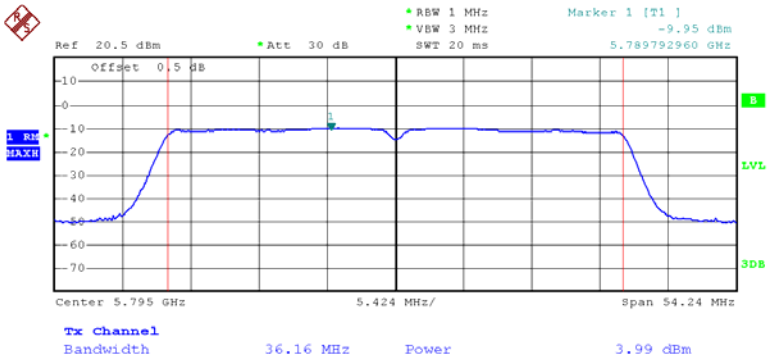
Date: 14.MAR.2013 11:30:05

Chain 1:802.11ac40 RF Output Power, Low Channel



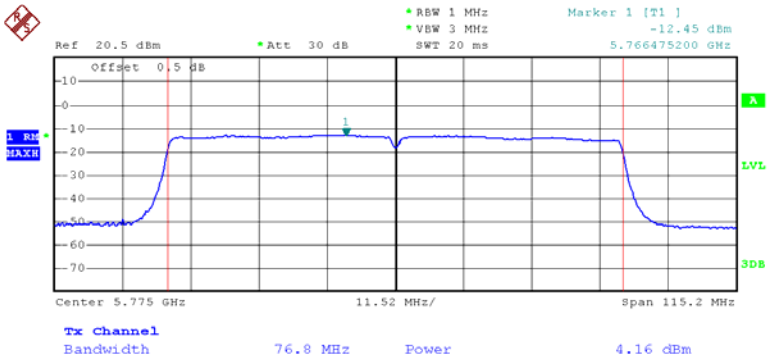
Date: 14.MAR.2013 11:48:34

Chain 1:802.11ac40 RF Output Power, High Channel



Date: 14.MAR.2013 13:36:59

Chain 1:802.11ac80 RF Output Power, Low Channel



Date: 14.MAR.2013 10:30:12

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

Applicable Standard

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

Test Procedure

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

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	Spectrum Analyzer	FSP38	100478	2012-5-14	2013-5-13

Test Data

Environmental Conditions

Temperature:	22.6~28.1 ° C
Relative Humidity:	29~65 %
ATM Pressure:	100.8~101.9kPa

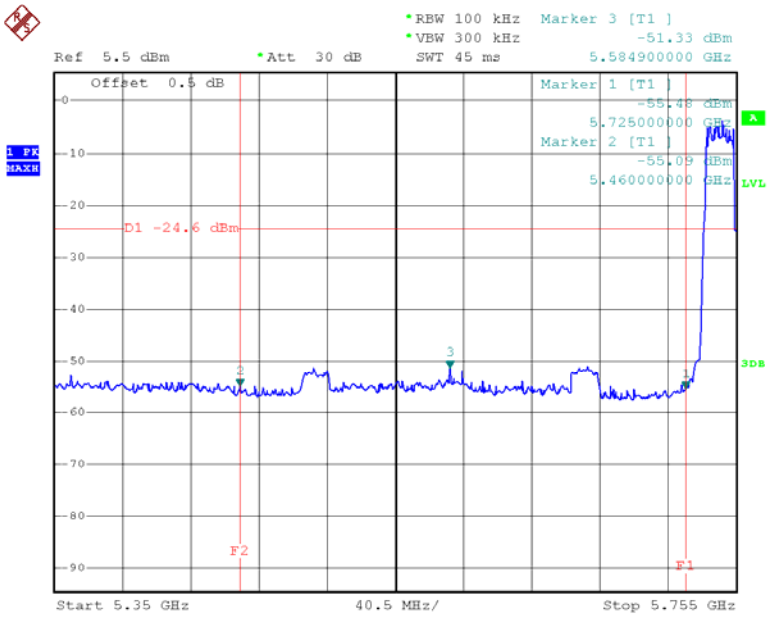
The testing was performed by Leon Chen from 2013-02-07 to 2013-03-14.

Test Result: *Compliance*

Test mode: Transmitting

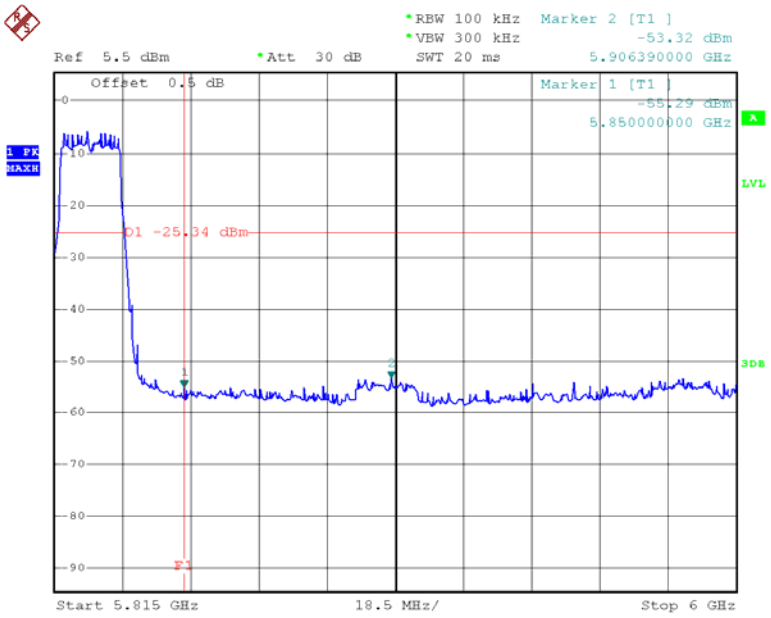
Band edge	Delta Peak to Band Emission (dBc)	Limit (dBc)	Result
802.11a			
Left	46.73	20	PASS
Right	47.98	20	PASS
802.11n20 Chain 0			
Left	43.90	20	PASS
Right	44.39	20	PASS
802.11n20 Chain 1			
Left	44.28	20	PASS
Right	46.54	20	PASS
802.11n40 Chain 0			
Left	49.07	20	PASS
Right	44.52	20	PASS
802.11n40 Chain 1			
Left	40.79	20	PASS
Right	40.66	20	PASS
802.11ac20 Chain 0			
Left	43.67	20	PASS
Right	45.16	20	PASS
802.11ac20 Chain 1			
Left	40.54	20	PASS
Right	41.64	20	PASS
802.11ac40 Chain 0			
Left	44.34	20	PASS
Right	44.72	20	PASS
802.11ac40 Chain 1			
Left	42.24	20	PASS
Right	42.64	20	PASS
802.11ac80 Chain 0			
Left	48.26	20	PASS
Right	41.01	20	PASS
802.11ac80 Chain 1			
Left	39.45	20	PASS
Right	40.64	20	PASS

Left Band Edge (802.11a mode)



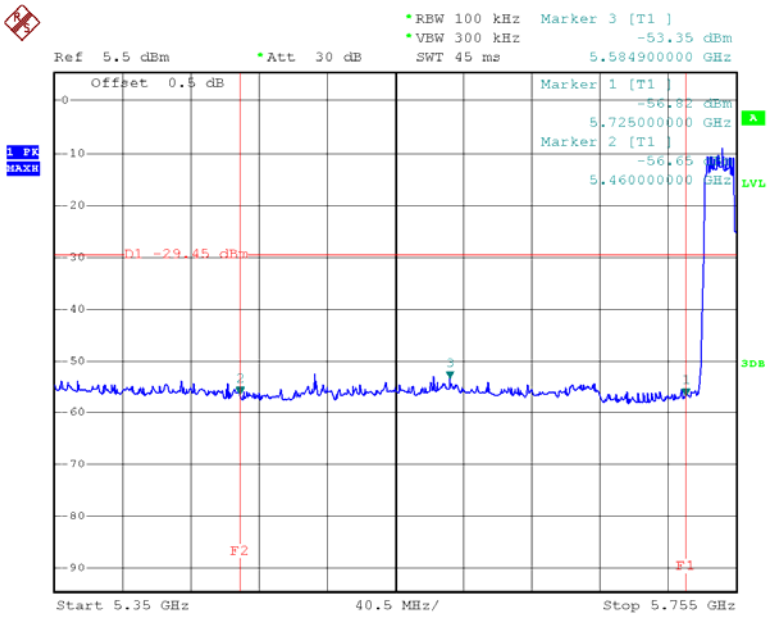
Date: 7.FEB.2013 12:53:46

Right Band Edge (802.11a mode)



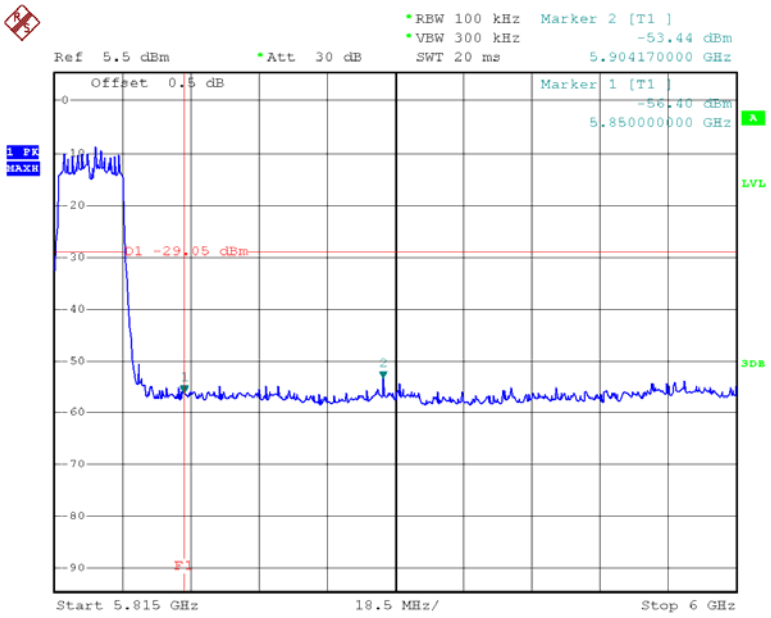
Date: 7.FEB.2013 13:17:32

Chain 0:Left Band Edge (802.11n20 mode)



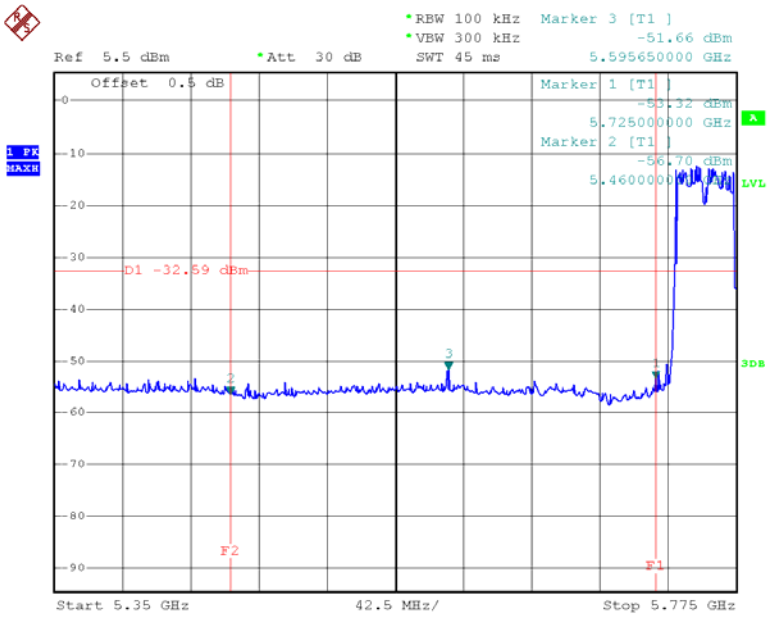
Date: 7.FEB.2013 13:32:09

Chain 0:Right Band Edge (802.11n20 mode)



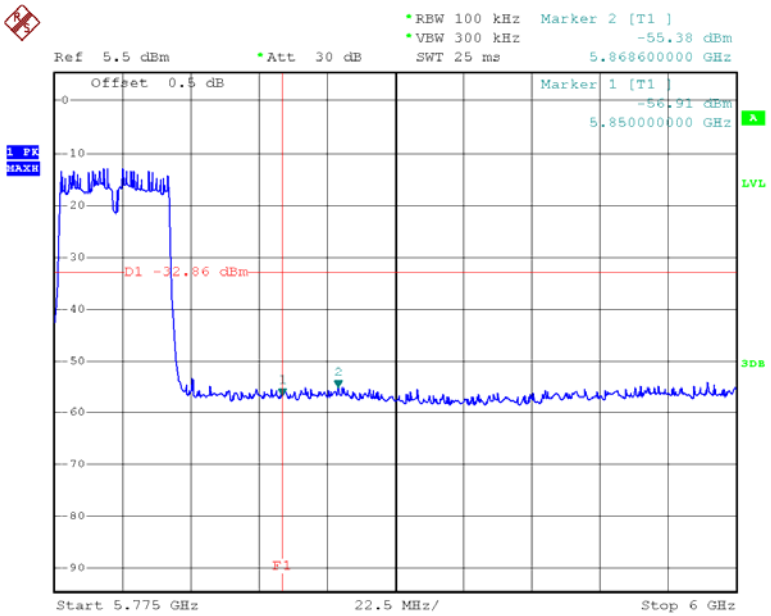
Date: 7.FEB.2013 13:58:30

Chain 0:Left Band Edge (802.11n40 mode)



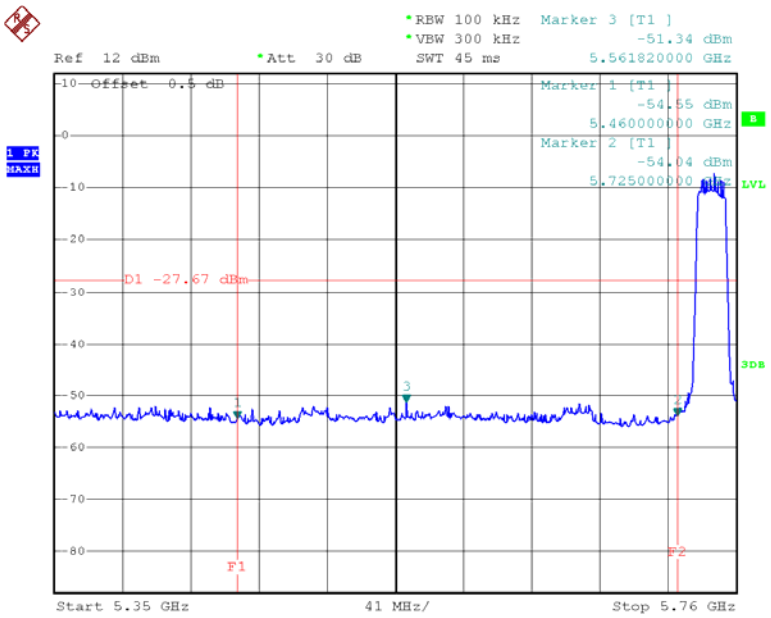
Date: 16.FEB.2013 17:05:16

Chain 0:Right Band Edge (802.11n40 mode)



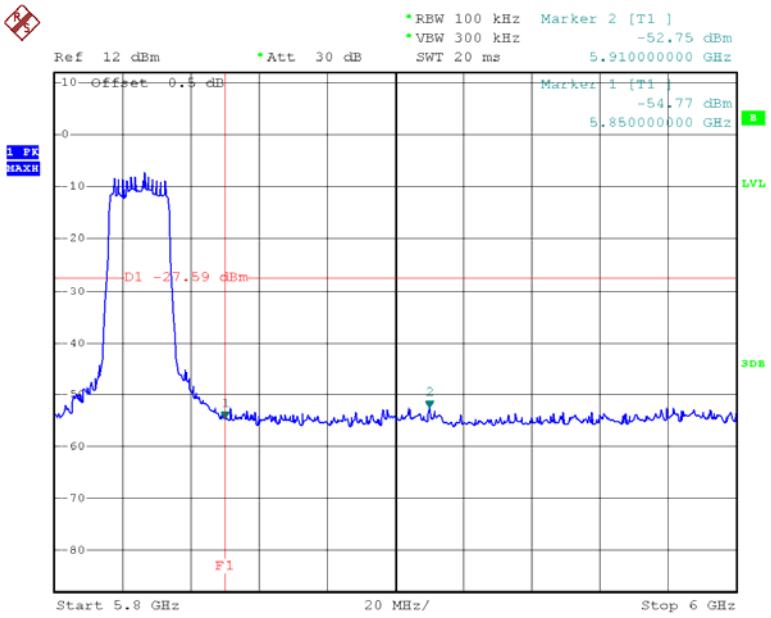
Date: 16.FEB.2013 17:18:50

Chain 0:Left Band Edge (802.11ac20 mode)



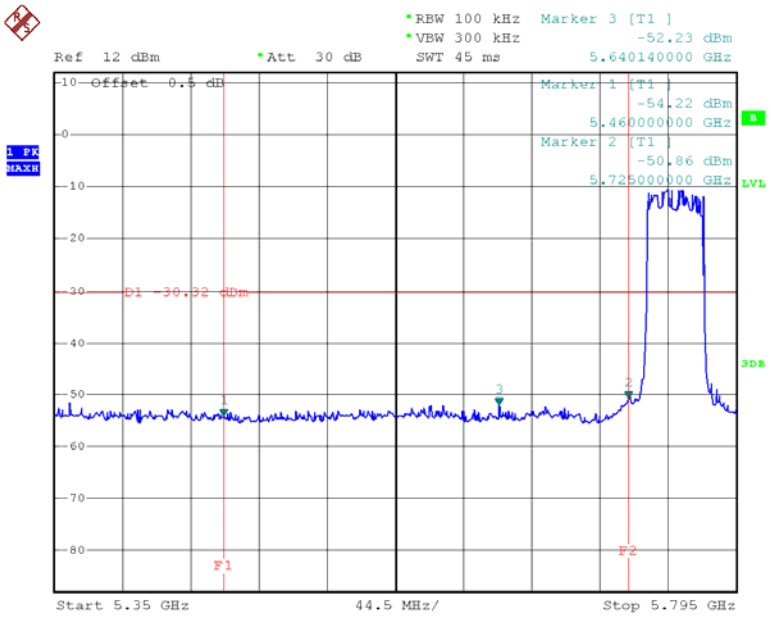
Date: 14.MAR.2013 11:16:40

Chain 0:Right Band Edge (802.11ac20 mode)



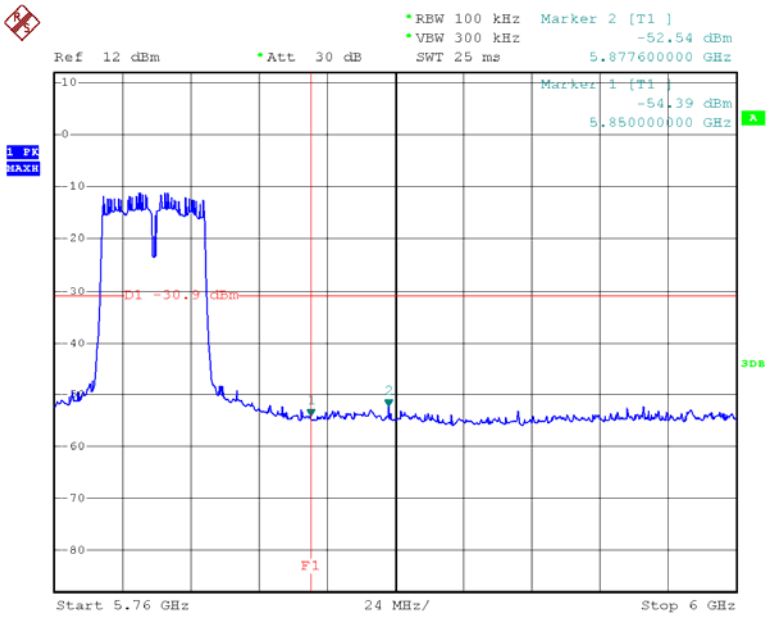
Date: 14.MAR.2013 11:33:52

Chain 0:Left Band Edge (802.11ac40 mode)



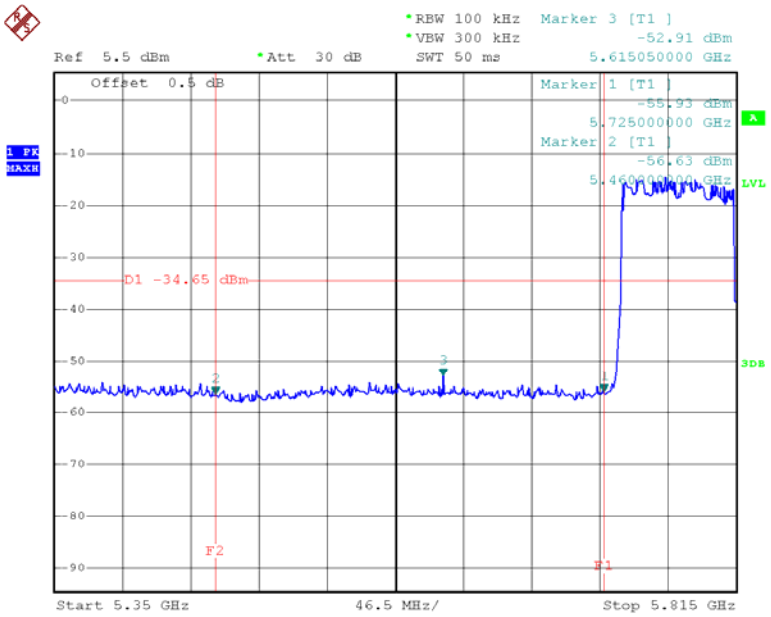
Date: 14.MAR.2013 11:52:14

Chain 0:Right Band Edge (802.11ac40 mode)



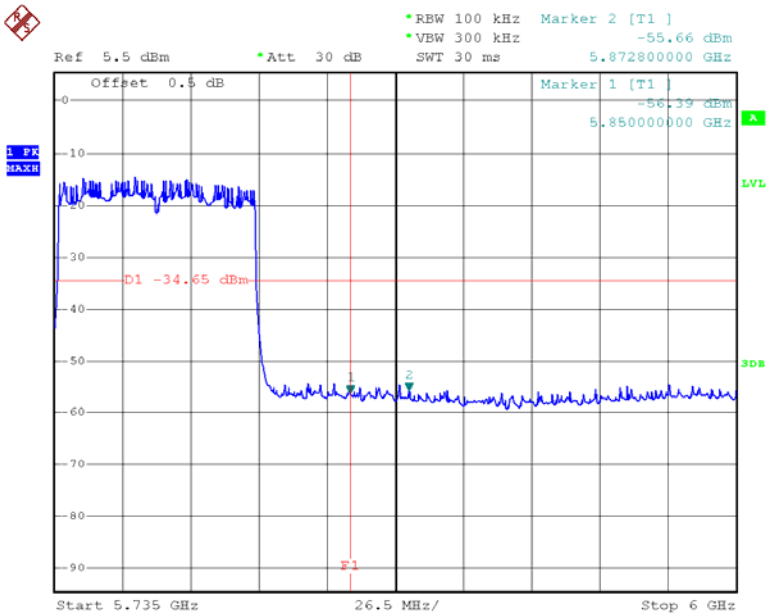
Date: 14.MAR.2013 13:46:46

Chain 0:Left Band Edge (802.11ac80 mode)



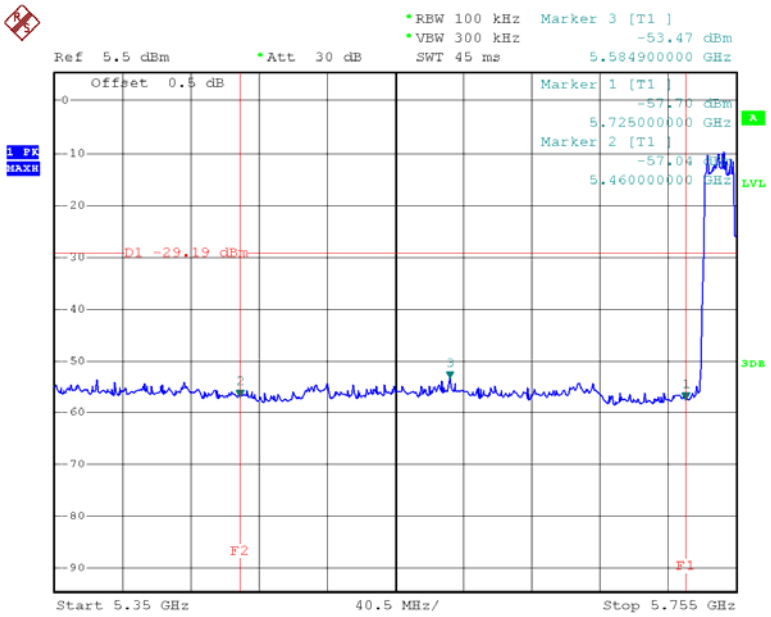
Date: 16.FEB.2013 17:35:52

Chain 0:Right Band Edge (802.11ac80 mode)



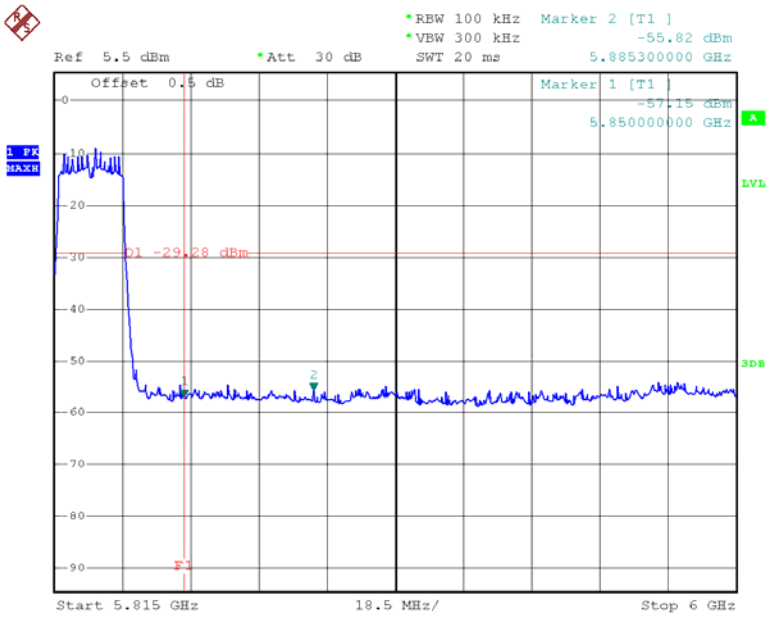
Date: 16.FEB.2013 17:36:43

Chain 1:Left Band Edge (802.11n20 mode)



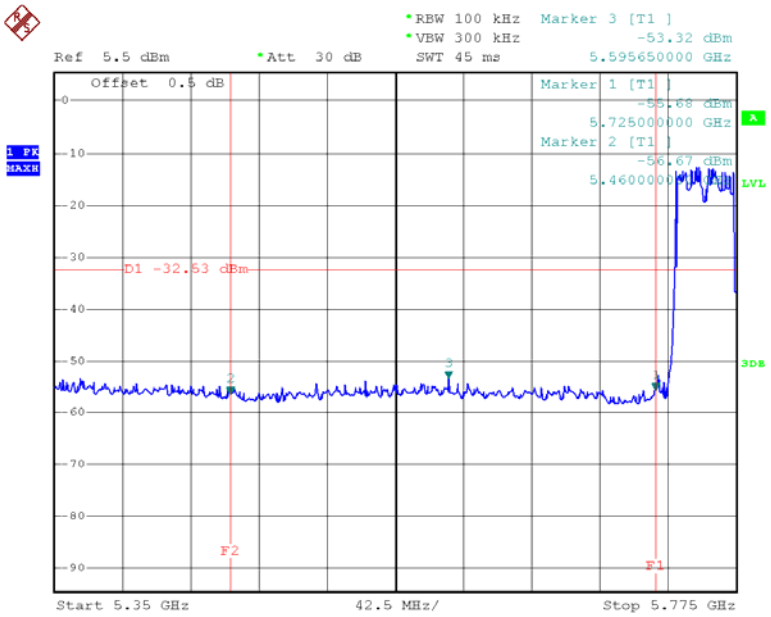
Date: 7.FEB.2013 13:38:16

Chain 1:Right Band Edge (802.11n20 mode)



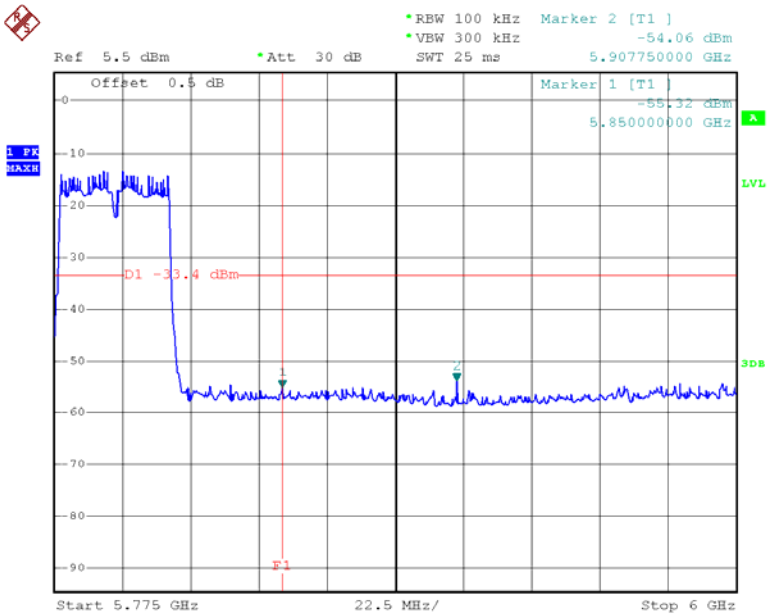
Date: 7.FEB.2013 14:03:47

Chain 1:Left Band Edge (802.11n40 mode)



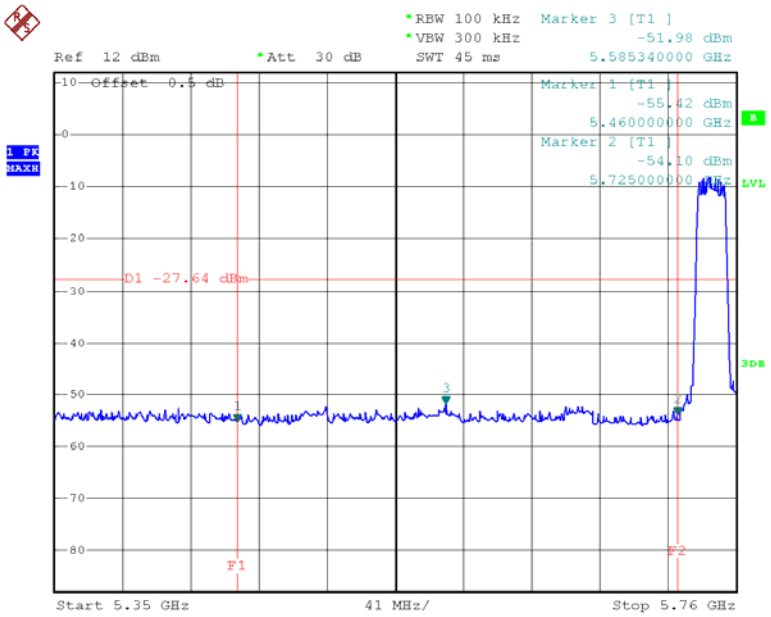
Date: 16.FEB.2013 17:11:51

Chain 1:Right Band Edge (802.11n40 mode)



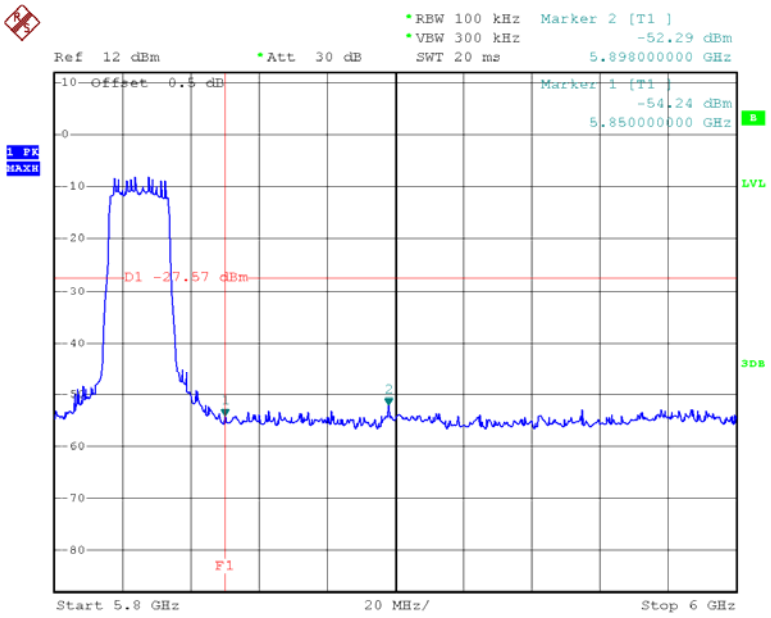
Date: 16.FEB.2013 17:26:17

Chain 1:Left Band Edge (802.11ac20 mode)



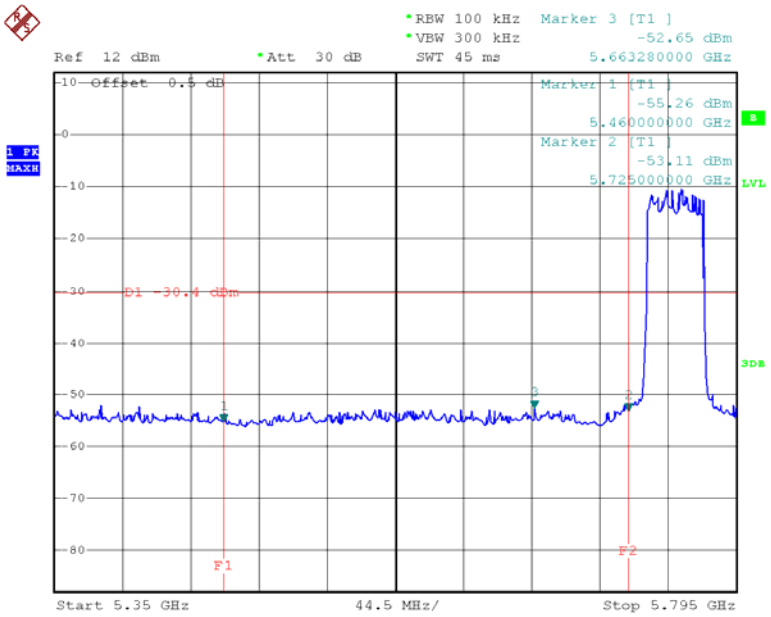
Date: 14.MAR.2013 11:17:19

Chain 1:Right Band Edge (802.11ac20 mode)



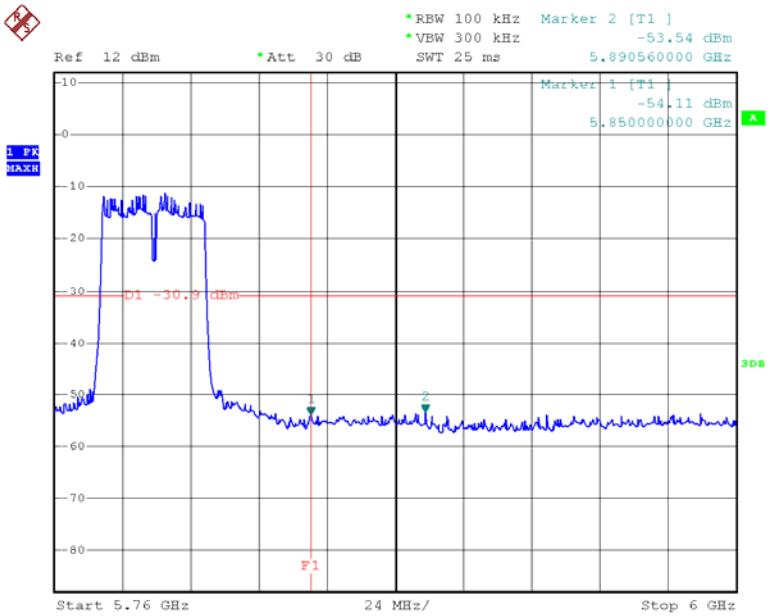
Date: 14.MAR.2013 11:36:40

Chain 1:Left Band Edge (802.11ac40 mode)



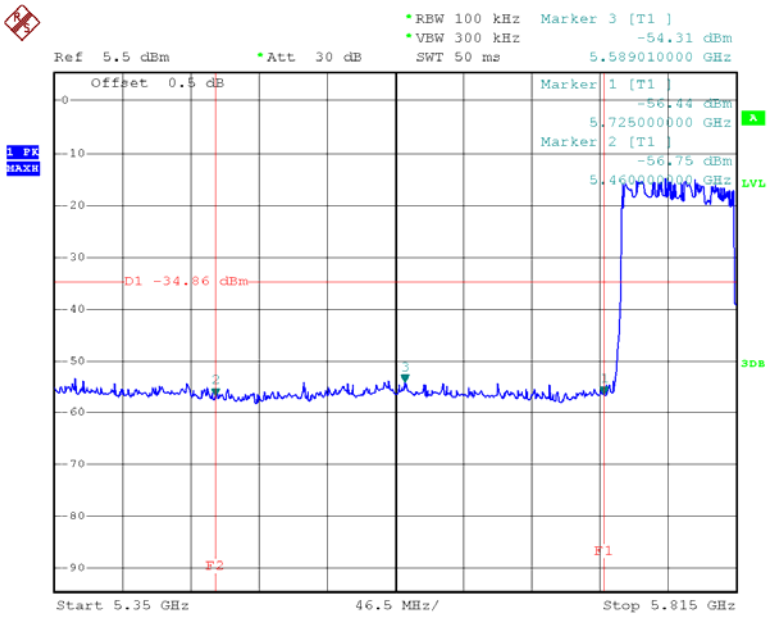
Date: 14.MAR.2013 11:52:45

Chain 1:Right Band Edge (802.11ac40 mode)



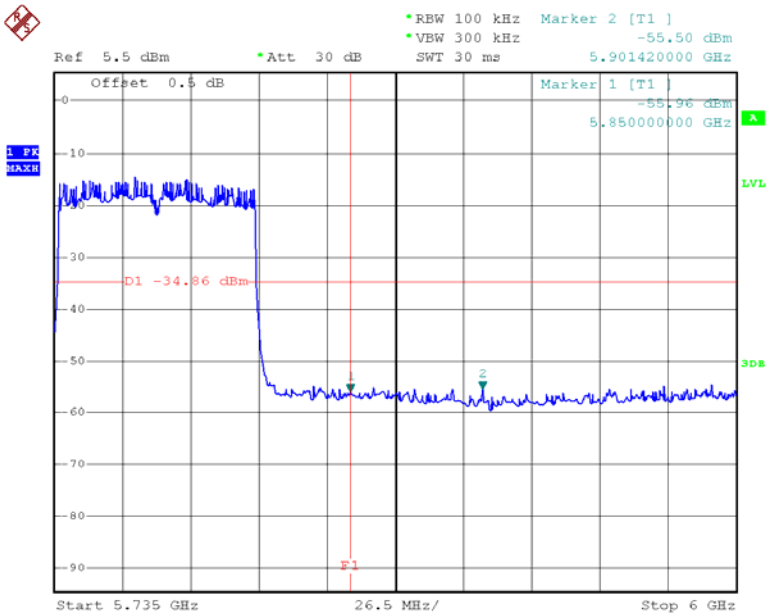
Date: 14.MAR.2013 13:47:07

Chain 1:Left Band Edge (802.11ac80 mode)



Date: 16.FEB.2013 17:43:26

Chain 1:Right Band Edge (802.11ac80 mode)



Date: 16.FEB.2013 17:44:05

FCC §15.247(e) - POWER SPECTRAL DENSITY

Applicable Standard

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

Test Procedure

1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. Position the EUT was set without connection to measurement instrument. Turn on the EUT and connect its antenna terminal to measurement instrument via a low loss cable. Then set it to any one measured frequency within its operating range, and make sure the instrument is operated in its linear range.
3. According to KDB 558074 D01 DTS Meas Guidance v02, set the RBW = 3 kHz, VBW = 30 kHz, Set the span to 1.5 times the DTS channel bandwidth.
4. Use the peak marker function to determine the maximum power level in any 3 kHz band segment within the fundamental EBW.

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	Spectrum Analyzer	FSP38	100478	2012-5-14	2013-5-13

Test Data

Environmental Conditions

Temperature:	23.4~28.1 ° C
Relative Humidity:	29~63%
ATM Pressure:	100.8~101.9kPa

The testing was performed by Leon Chen from 2013-02-21 to 2013-03-14.

Test Mode: Transmitting

Test Result: Pass

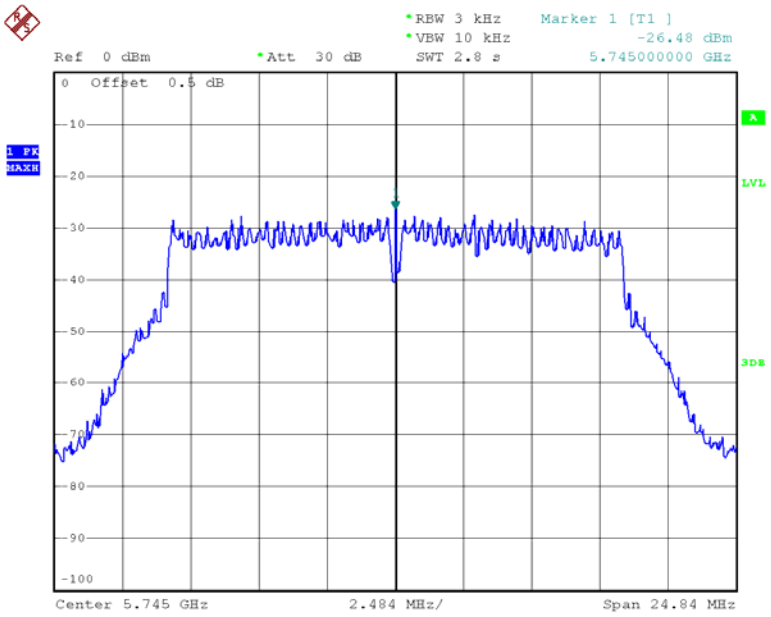
Test mode: Transmitting

Channel	PSD (dBm/3kHz)	Limit (dBm/3kHz)	Result
802.11a mode			
Low	-26.48	8	PASS
Middle	-26.34	8	PASS
High	-26.47	8	PASS
Chain 0:802.11n20 mode			
Low	-29.68	8	PASS
Middle	-29.50	8	PASS
High	-29.35	8	PASS
Chain 1:802.11n20 mode			
Low	-29.98	8	PASS
Middle	-29.66	8	PASS
High	-29.01	8	PASS
Chain 0:802.11n40 mode			
Low	-31.74	8	PASS
High	-32.77	8	PASS
Chain 1:802.11n40 mode			
Low	-32.61	8	PASS
High	-32.85	8	PASS
Chain 0:802.11ac20 mode			
Low	-29.68	8	PASS
Middle	-29.50	8	PASS
High	-29.35	8	PASS
Chain 1:802.11ac20 mode			
Low	-29.98	8	PASS
Middle	-29.66	8	PASS
High	-29.01	8	PASS
Chain 0:802.11ac40 mode			
Low	-31.74	8	PASS
High	-32.77	8	PASS
Chain 1:802.11ac40 mode			
Low	-32.61	8	PASS
High	-32.85	8	PASS
Chain 0:802.11ac80 mode			
Low	-36.66	8	PASS
Chain 1:802.11ac80 mode			
Low	-35.65	8	PASS

Total power: chain 0+ chain 1

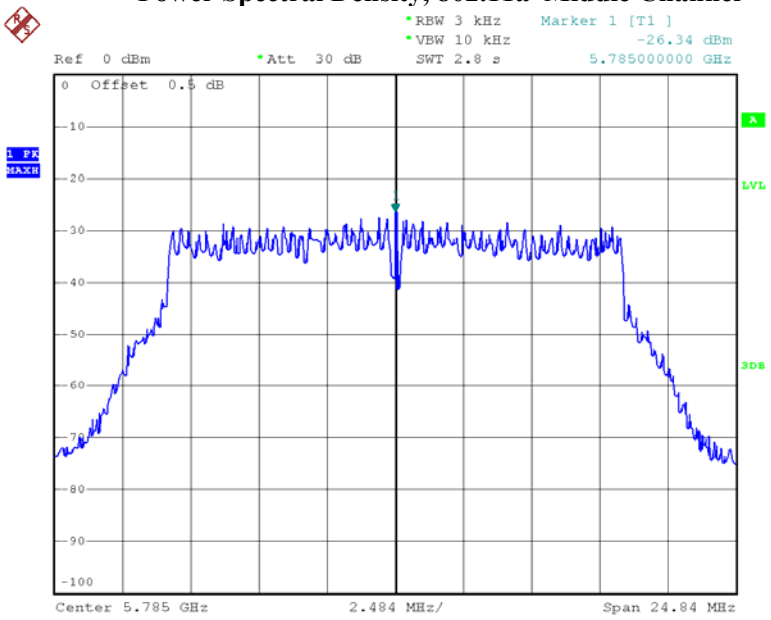
Channel	PSD (dBm/3kHz)	Limit (dBm/3kHz)	Result
	PSD	Limit	
Total:802.11n20 mode			
Low	-26.82	8	PASS
Middle	-26.57	8	PASS
High	-26.17	8	PASS
Total:802.11n40 mode			
Low	-29.14	8	PASS
High	-29.80	8	PASS
Total:802.11ac20 mode			
Low	-26.82	8	PASS
Middle	-26.57	8	PASS
High	-26.17	8	PASS
Total:802.11ac40 mode			
Low	-29.14	8	PASS
High	-29.80	8	PASS
Total:802.11ac80 mode			
Low	-33.12	8	PASS

Power Spectral Density, 802.11a Low Channel



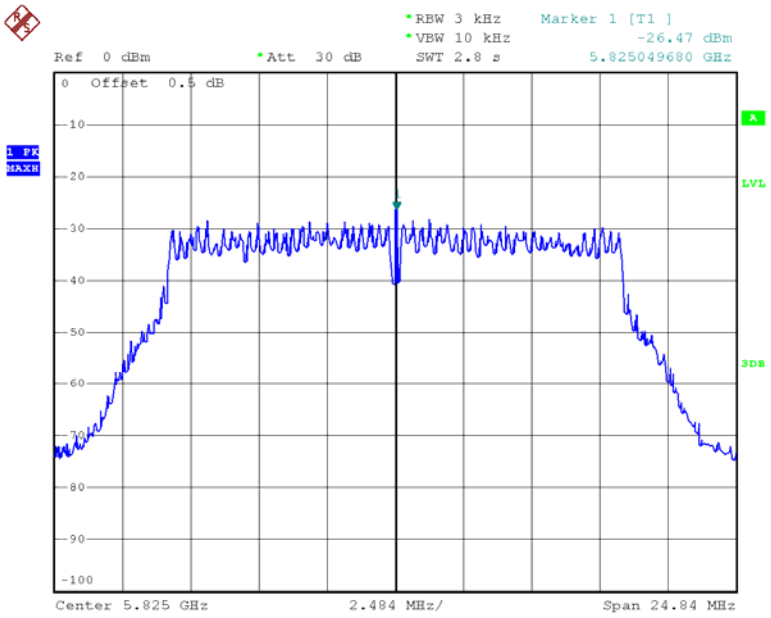
Date: 21.FEB.2013 10:14:33

Power Spectral Density, 802.11a Middle Channel



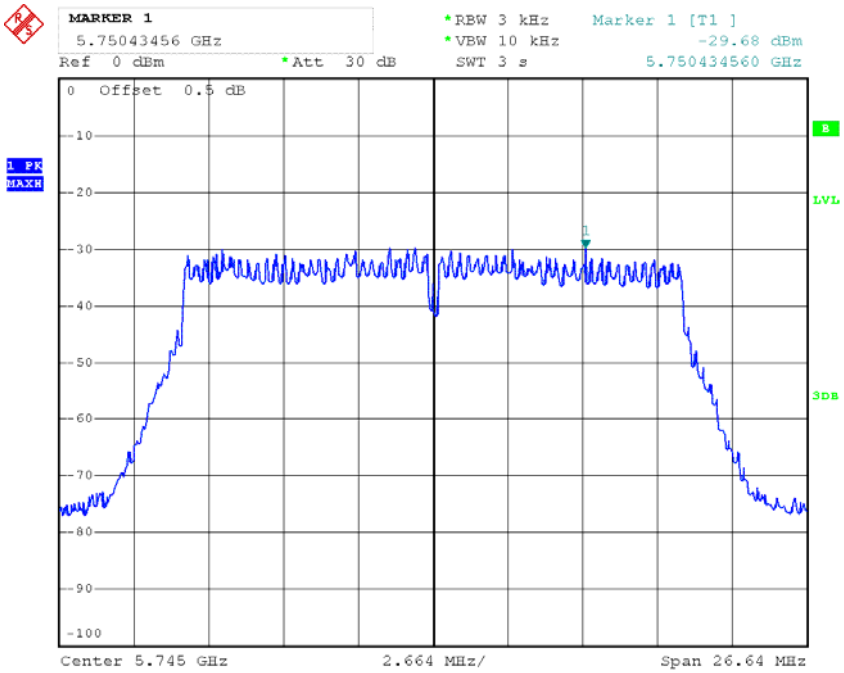
Date: 21.FEB.2013 10:13:23

Power Spectral Density, 802.11a High Channel



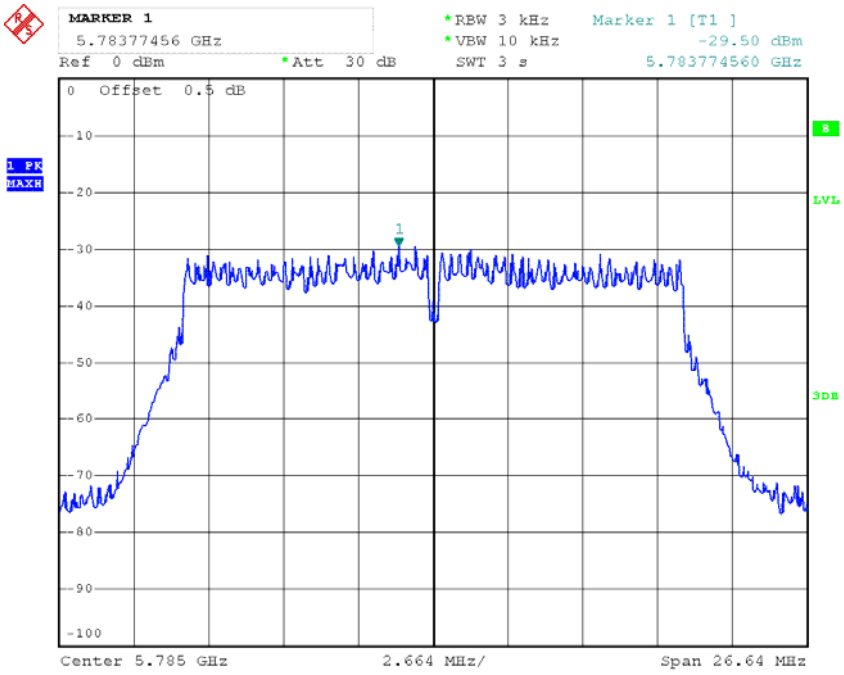
Date: 21.FEB.2013 10:12:42

Chain 0:Power Spectral Density, 802.11 n20 Low Channel

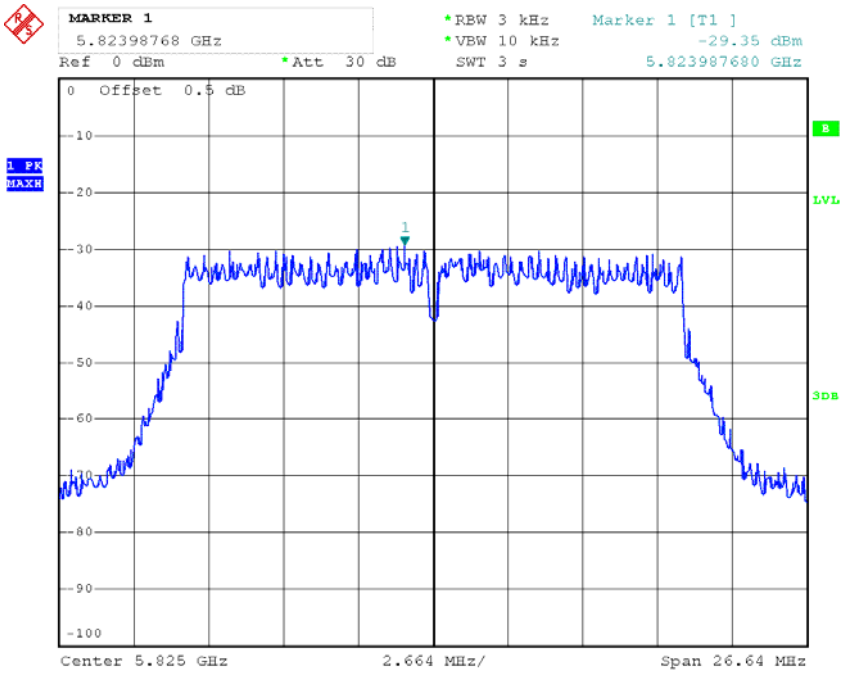


Date: 25.FEB.2013 10:30:27

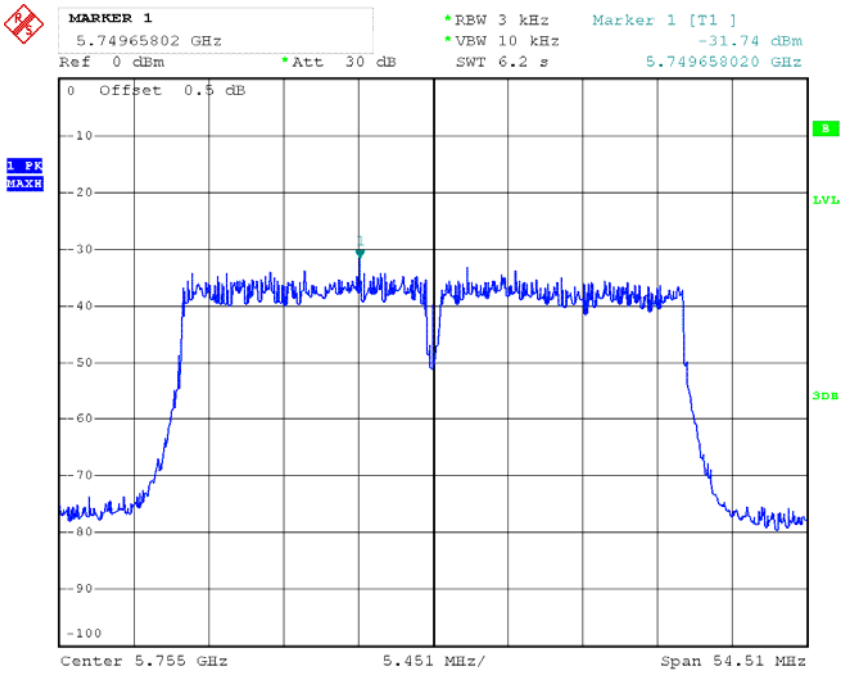
Chain 0:Power Spectral Density, 802.11n20 Middle Channel



Chain 0:Power Spectral Density, 802.11n20 High Channel

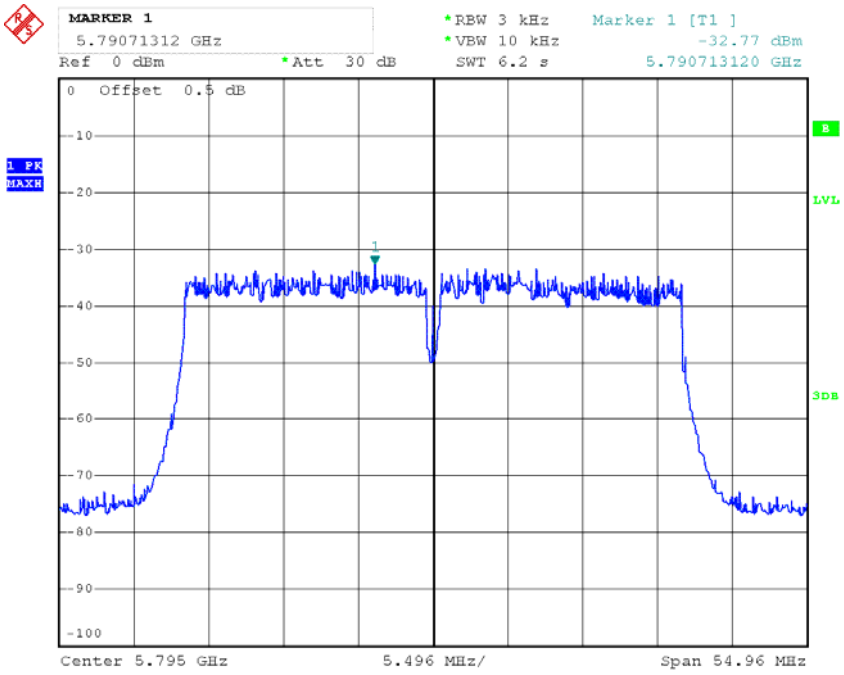


Chain 0:Power Spectral Density, 802.11n40 Low Channel



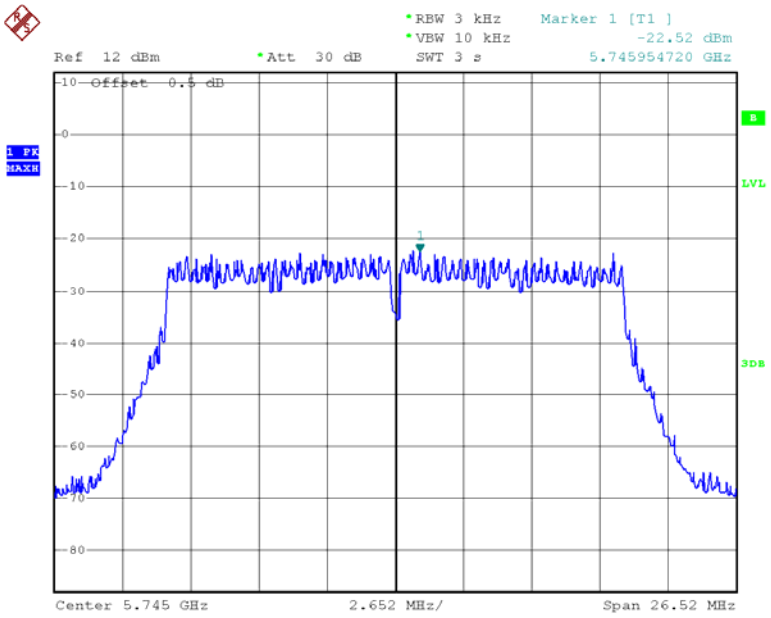
Date: 25.FEB.2013 10:40:18

Chain 0:Power Spectral Density, 802.11n40 High Channel



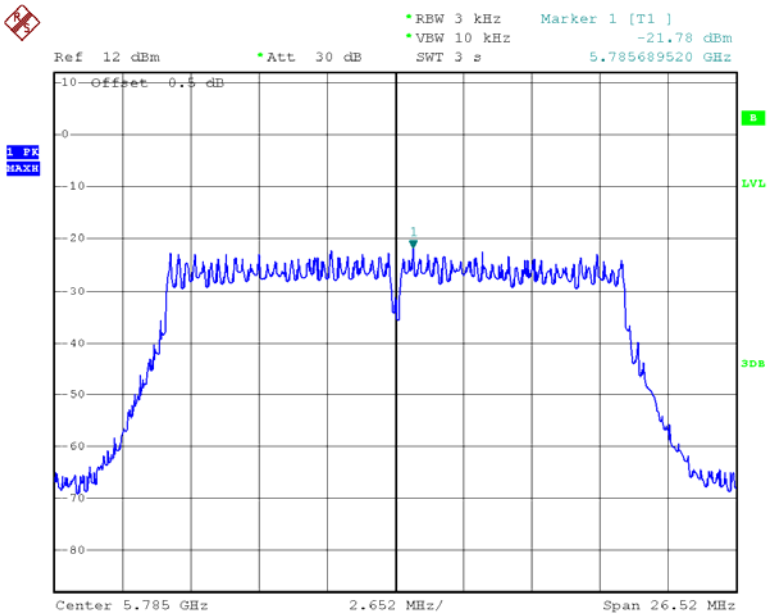
Date: 25.FEB.2013 10:42:15

Chain 0:Power Spectral Density, 802.11 ac20 Low Channel



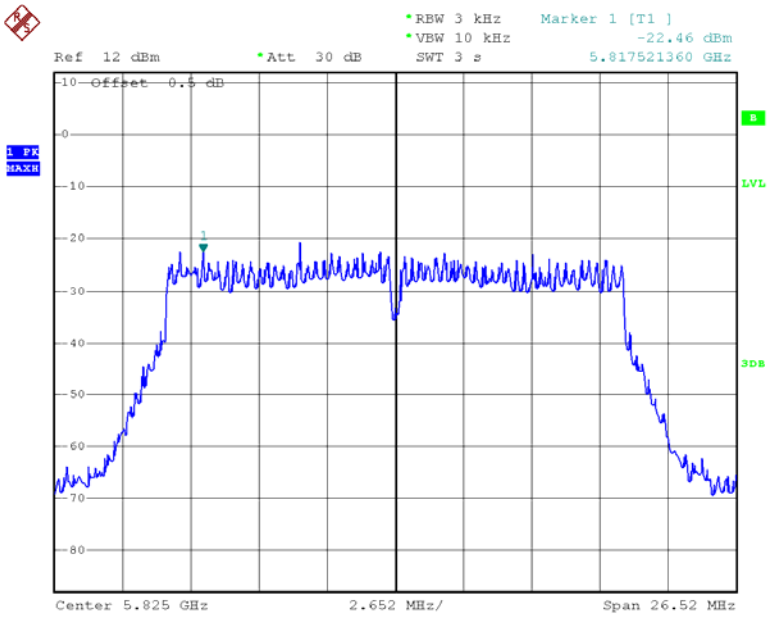
Date: 14.MAR.2013 11:05:43

Chain 0:Power Spectral Density, 802.11ac20 Middle Channel



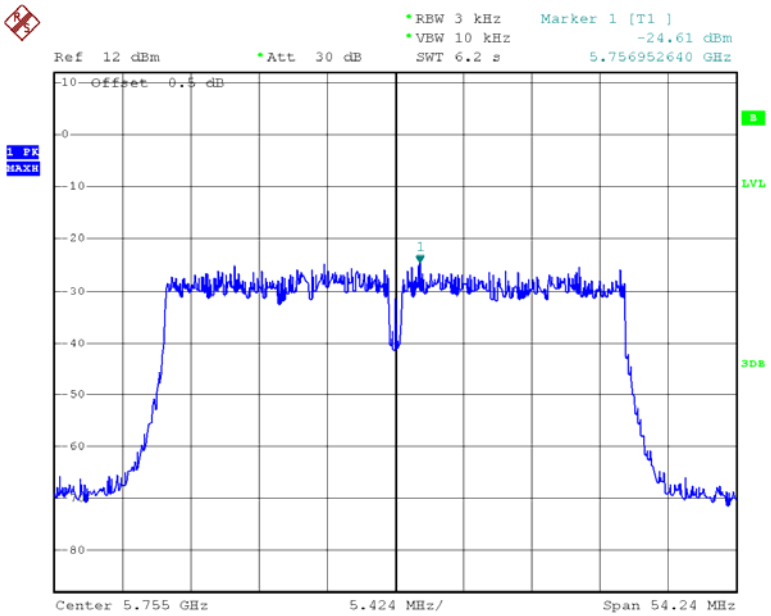
Date: 14.MAR.2013 11:26:28

Chain 0:Power Spectral Density, 802.11ac20 High Channel



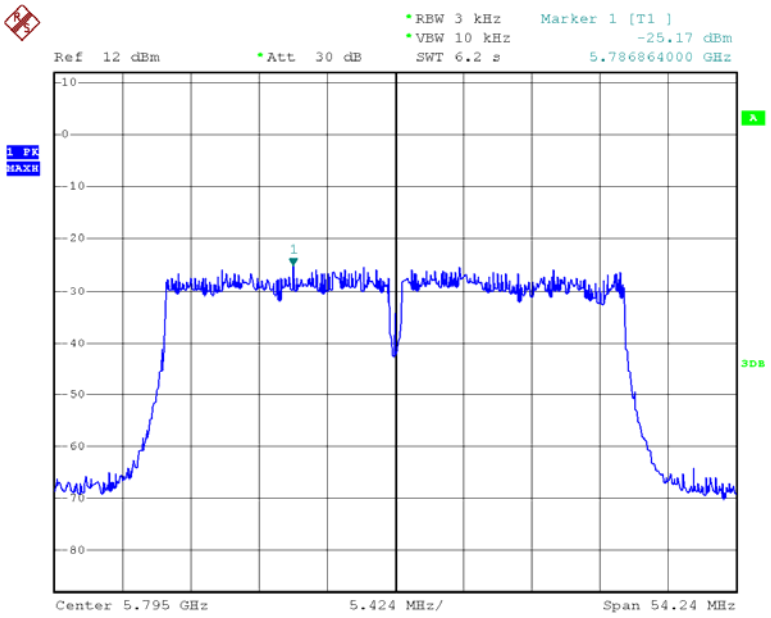
Date: 14.MAR.2013 11:32:14

Chain 0:Power Spectral Density, 802.11ac40 Low Channel



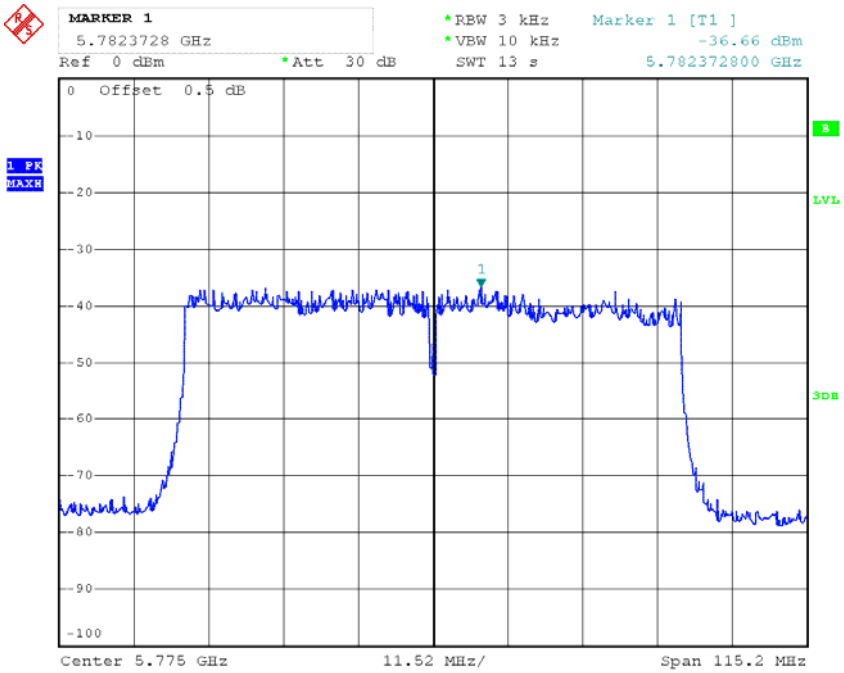
Date: 14.MAR.2013 11:50:44

Chain 0:Power Spectral Density, 802.11ac40 High Channel



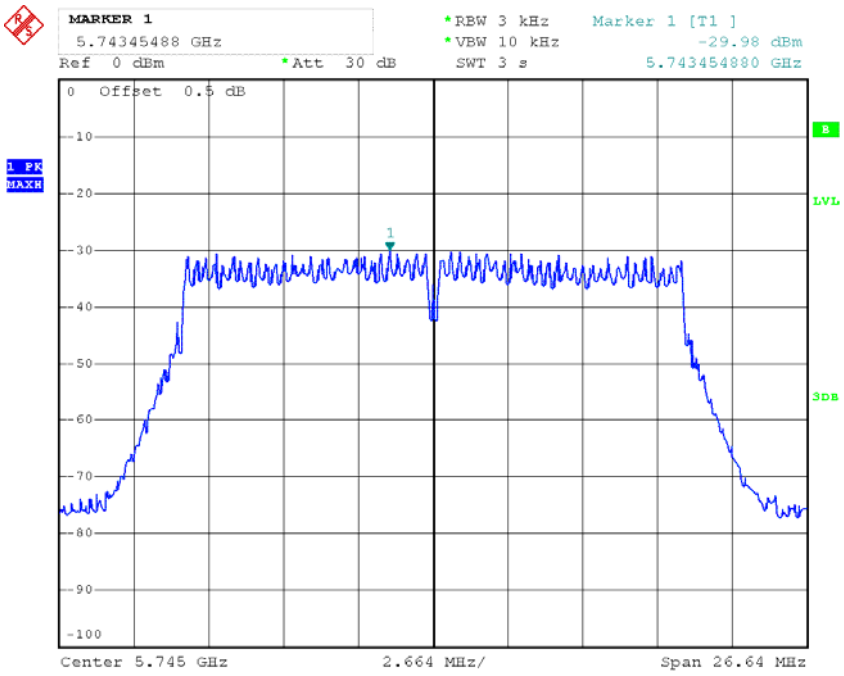
Date: 14.MAR.2013 13:42:35

Chain 0:Power Spectral Density, 802.11ac80 Low Channel



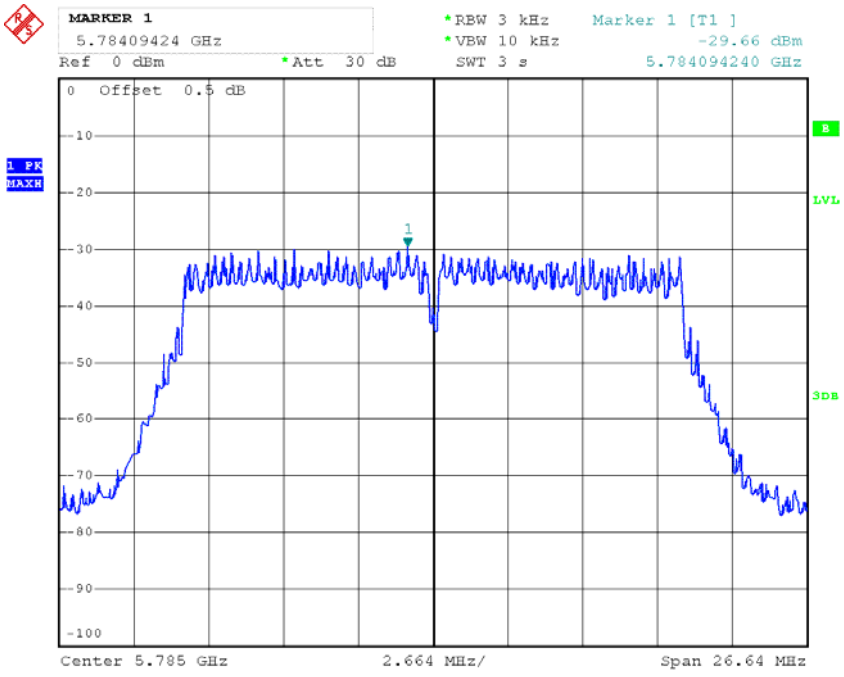
Date: 25.FEB.2013 10:47:02

Chain 1:Power Spectral Density, 802.11 n20 Low Channel



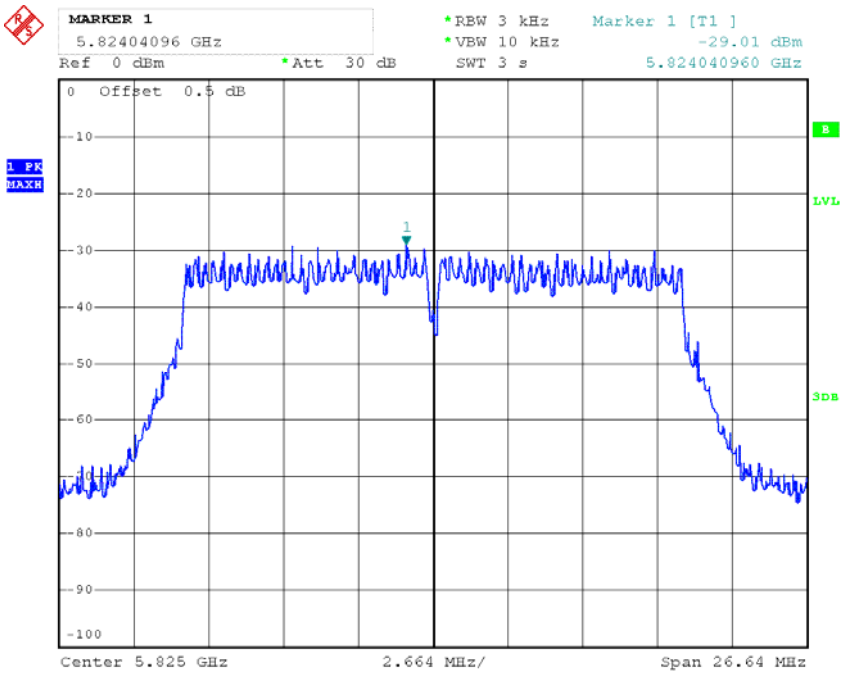
Date: 25.FEB.2013 10:37:50

Chain 1:Power Spectral Density, 802.11n20 Middle Channel



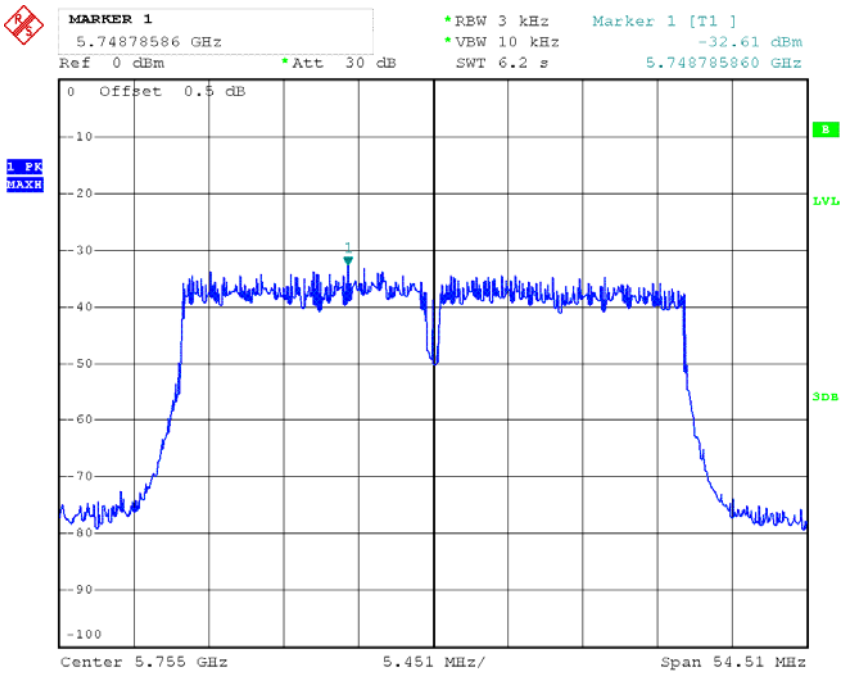
Date: 25.FEB.2013 10:36:15

Chain 1:Power Spectral Density, 802.11n20 High Channel



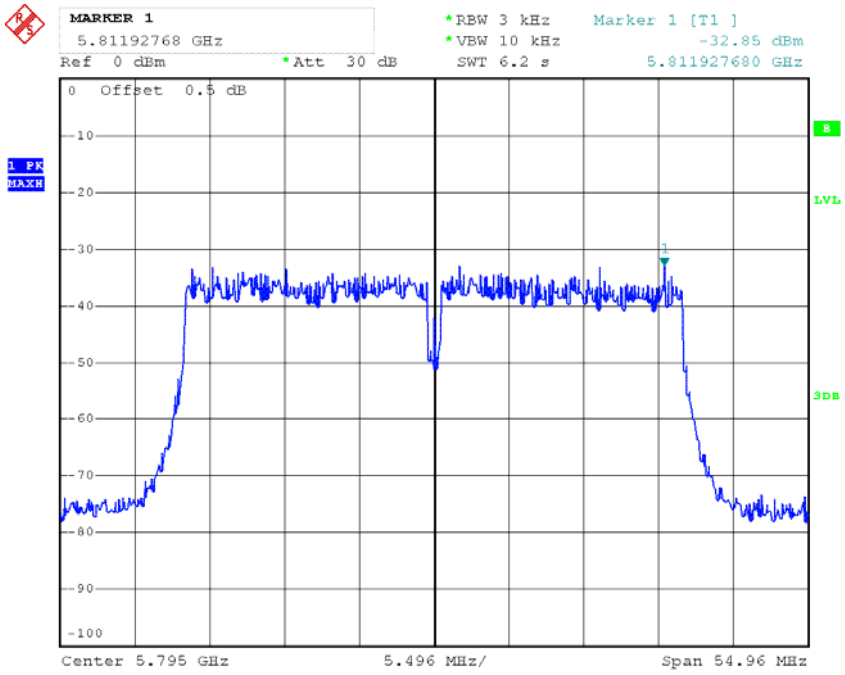
Date: 25.FEB.2013 10:35:14

Chain 1:Power Spectral Density, 802.11n40 Low Channel



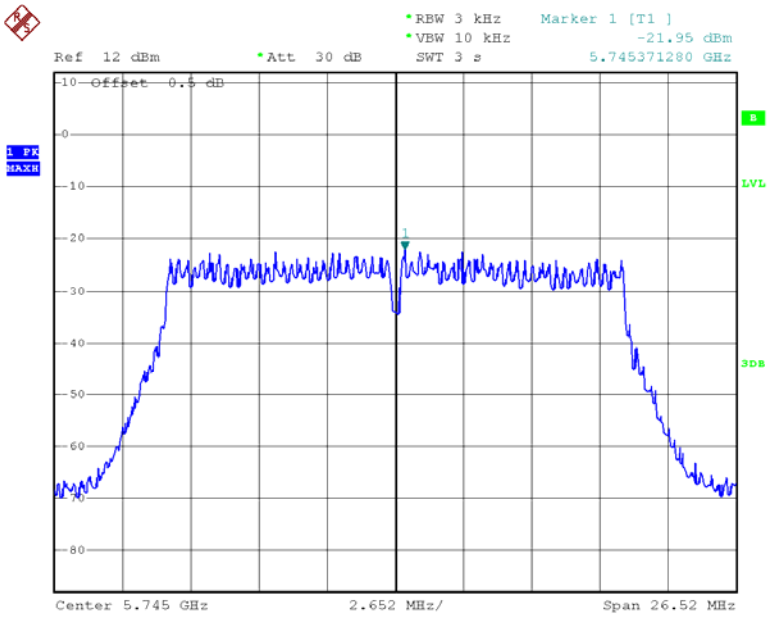
Date: 25.FEB.2013 10:44:44

Chain 1:Power Spectral Density, 802.11n40 High Channel



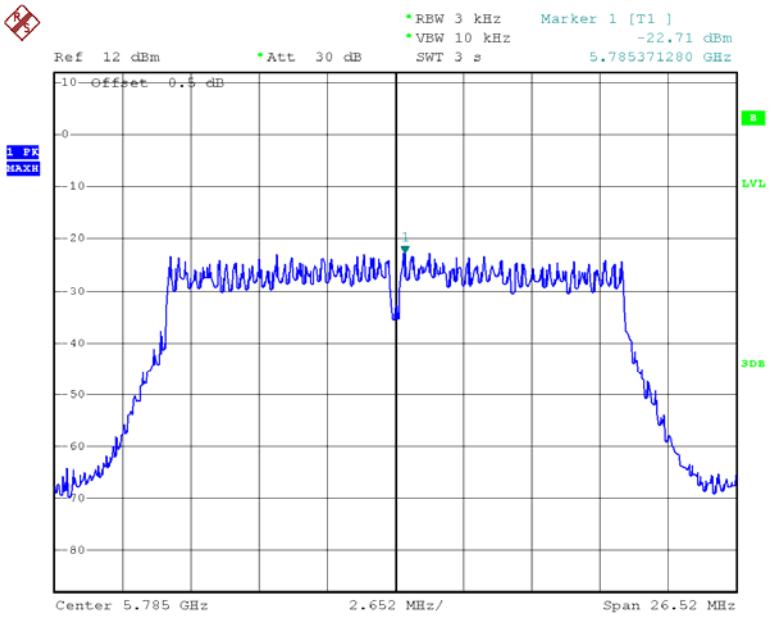
Date: 25.FEB.2013 10:42:55

Chain 1:Power Spectral Density, 802.11 ac20 Low Channel



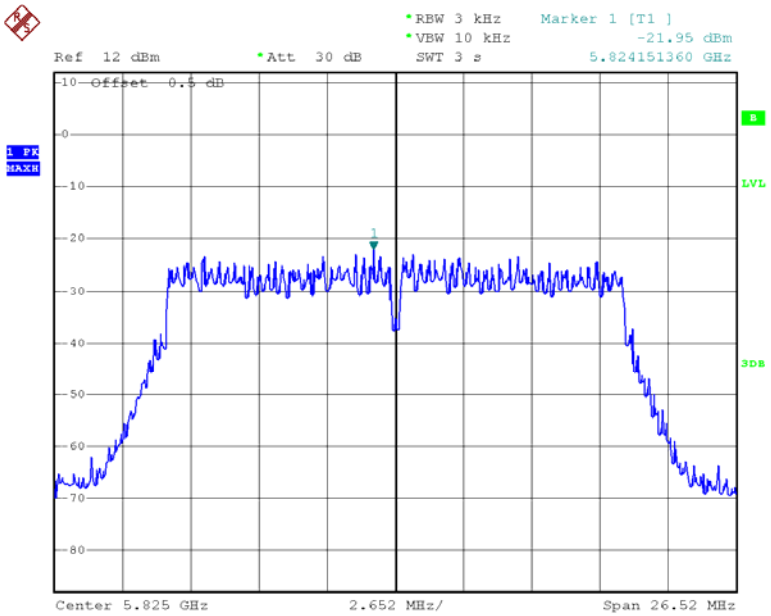
Date: 14.MAR.2013 11:05:59

Chain 1:Power Spectral Density, 802.11ac20 Middle Channel



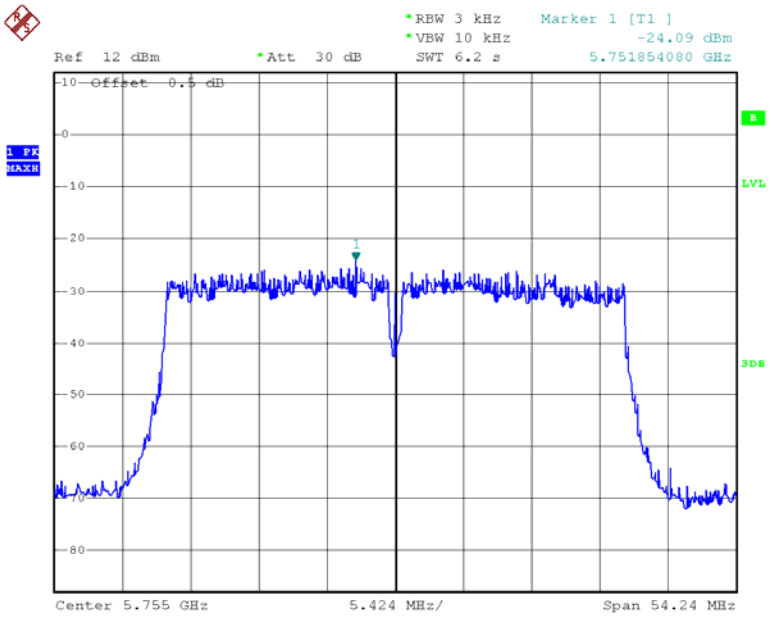
Date: 14.MAR.2013 11:26:45

Chain 1:Power Spectral Density, 802.11ac20 High Channel



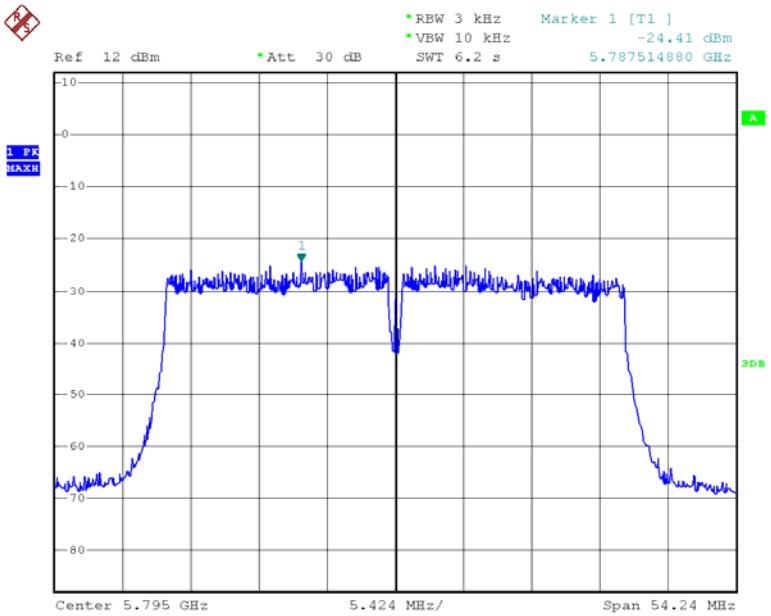
Date: 14.MAR.2013 11:32:20

Chain 1:Power Spectral Density, 802.11ac40 Low Channel



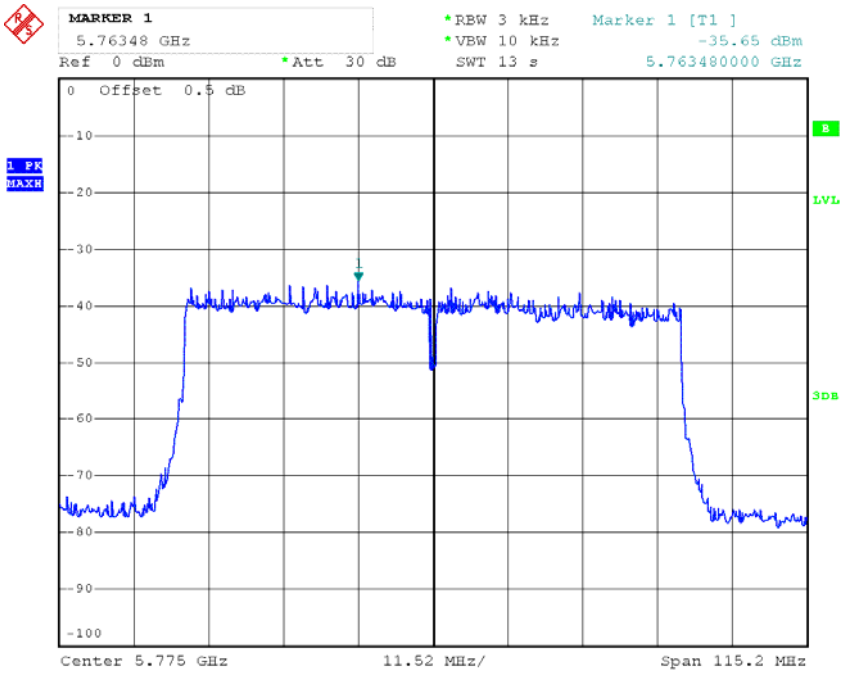
Date: 14.MAR.2013 11:50:58

Chain 1:Power Spectral Density, 802.11ac40 High Channel



Date: 14.MAR.2013 13:44:11

Chain 1:Power Spectral Density, 802.11ac80 Low Channel



Date: 25.FEB.2013 10:47:56

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