FCC PART 15.407

TEST REPORT

For

UTStarcom Inc.

1732 North 1st St Suite 220, San Jose, CA

FCC ID: 2ACKN-UOA5280

Report Type:	**Product Name:**
Original Report	Dual-Band 802.11ac Outdoor Access Point

Test Engineer:	Kevin Tao
Report Number:	RSC150615002
Report Date:	2015-07-02
Reviewed By:	Harry Wu Technical Leader
Test Laboratory:	Bay Area Compliance Laboratories Corp. (Chengdu) 5040, HuiLongWan Plaza, No. 1, ShaWan Road, JinNiu District, ChengDu, China Tel: 028-65523123, Fax: 028-65525125 www.baclcorp.com

TABLE OF CONTENTS

GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

The *UTStarcom Inc.*'s product, model number: *UOA5280 (FCC ID: 2ACKN-UOA5280) or* ("EUT") in this report was the *Dual-Band 802.11ac Outdoor Access Point,* which was measured approximately: 260mm (W) x 210mm (D) x 80mm (H). The operating frequency were 5150~5250MHz, 5725~5850MHz.

POE:
Input: AC 100 - 240V, 50/60Hz
Output: DC 48 - 56V

**All measurement and test data in this report were gathered from final production sample, serial number: 4062013062800001 (provided by the Applicant). It may have deviation from any other sample. The EUT supplied by the applicant was received on 2015-06-15, and EUT complied with test requirement.*

Objective

This type approval report is prepared on behalf of *UTStarcom Inc.* in accordance with Part 2-Subpart J, Part 15-Subparts A, B ,C and E of the Federal Communications Commission rules.

The tests were performed in order to determine compliance with FCC Part 15, section subpart C, 15.203, 15.205, 15.207, 15.209 and Subpart E, 15.407 rules.

Related Submittal(s)/Grant(s)

FCC Part 15.247 submissions with FCC ID: 2ACKN-UOA5280.

Test Methodology

All measurements contained in this report were conducted with ANSI C63.4-2003, 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. (Chengdu).

Test Facility

The test site used by BACL to collect test data is located in the 5040, HuiLongWan Plaza, No. 1, ShaWan Road, JinNiu District, ChengDu, China

Test site at BACL 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 July 31, 2009. 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.: 560332. 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.

The operating frequency range is 5150~5250 MHz and 5725~5850 MHz, the frequencies are 5180 MHz, 5210 MHz, 5220 MHz, 5240 MHz, 5190 MHz, 5230 MHz for 5150~5250 MHz band. 5745 MHz, 5785 MHz, 5825 MHz, 5775MHz, 5755 MHz, 5795 MHz for 5725~5850 MHz band, which was provided by the manufacturer.

EUT Exercise Software

The software “art2_ver_4_9_93_RC_Bin, SecureCRT 7.1 & tftpd32” was used for testing, which was provided by manufacturer.

For 5150~5250 MHz

Test Mode	Test Software Version	art2_ver_4_9_93_RC_Bin, SecureCRT 7.1 & tftpd32		
802.11a	Test Frequency	5180MHz	5220MHz	5240MHz
	Data Rate	OFDM 6Mbps	OFDM 6Mbps	OFDM 6Mbps
	Power Level Setting Antenna 0	12	12	12
	Power Level Setting Antenna 1	13	13	13
	Power Level Setting Antenna 2	14	12	11
802.11ac VHT20	Test Frequency	5180MHz	5220MHz	5240MHz
	Data Rate	1SSO 6.5Mbps	1SSO 6.5Mbps	1SSO 6.5Mbps
	Power Level Setting Antenna 0	11	11	11
	Power Level Setting Antenna 1	13	13	13
	Power Level Setting Antenna 2	14	12	11
802.11ac VHT40	Test Frequency	5190MHz	5230MHz	
	Data Rate	1SSO 13.5Mbps	1SSO 13.5Mbps	
	Power Level Setting Antenna 0	11	11	
	Power Level Setting Antenna 1	13	13	
	Power Level Setting Antenna 2	14	12	
802.11ac VHT80	Test Frequency	5210MHz		
	Data Rate	1SSO 29.3Mbps		
	Power Level Setting Antenna 0	11		
	Power Level Setting Antenna 1	13		
	Power Level Setting Antenna 2	13		
802.11n HT20	Test Frequency	5180MHz	5220MHz	5240MHz
	Data Rate	MCSO 6.5Mbps	MCSO 6.5Mbps	MCSO 6.5Mbps
	Power Level Setting Antenna 0	12	12	12
	Power Level Setting Antenna 1	13	13	13
	Power Level Setting Antenna 2	14	12	11
802.11n HT40	Test Frequency	5190MHz	5230MHz	
	Data Rate	MCSO 13.5Mbps	MCSO 13.5Mbps	
	Power Level Setting Antenna 0	12	12	
	Power Level Setting Antenna 1	13	13	
	Power Level Setting Antenna 2	14	12	

For 5725~5850 MHz

Test Mode	Test Software Version	art2_ver_4_9_93_RC_Bin, SecureCRT 7.1 & tftpd32		
802.11a	Test Frequency	5745MHz	5785MHz	5825MHz
	Data Rate	OFDM 6Mbps	OFDM 6Mbps	OFDM 6Mbps
	Power Level Setting Antenna 0	14	14	14
	Power Level Setting Antenna 1	18	18	18
	Power Level Setting Antenna 2	13	13	13
802.11ac VHT20	Test Frequency	5745MHz	5785MHz	5825MHz
	Data Rate	1SSO 6.5Mbps	1SSO 6.5Mbps	1SSO 6.5Mbps
	Power Level Setting Antenna 0	14	14	14
	Power Level Setting Antenna 1	18	18	18
	Power Level Setting Antenna 2	12	12	12
802.11ac VHT40	Test Frequency	5755MHz	5795MHz	
	Data Rate	1SSO 13.5Mbps	1SSO 13.5Mbps	
	Power Level Setting Antenna 0	14	14	
	Power Level Setting Antenna 1	18	18	
	Power Level Setting Antenna 2	12	12	
802.11ac VHT80	Test Frequency	5775MHz		
	Data Rate	1SSO 29.3Mbps		
	Power Level Setting Antenna 0	14		
	Power Level Setting Antenna 1	18		
	Power Level Setting Antenna 2	12		
802.11n HT20	Test Frequency	5745MHz	5785MHz	5825MHz
	Data Rate	MCSO 6.5Mbps	MCSO 6.5Mbps	MCSO 6.5Mbps
	Power Level Setting Antenna 0	14	14	14
	Power Level Setting Antenna 1	18	18	18
	Power Level Setting Antenna 2	12	12	12
802.11n HT40	Test Frequency	5755MHz	5795MHz	
	Data Rate	MCSO 13.5Mbps	MCSO 13.5Mbps	
	Power Level Setting Antenna 0	14	14	
	Power Level Setting Antenna 1	18	18	
	Power Level Setting Antenna 2	12	12	

Note1: The device supports SISO and MIMO mode, 100% duty cycle was configured. Power and PSD test results were the same as MIMO and SISO mode. So only the SISO mode was tested for these items, and used to evaluate MIMO mode compliance.
Note2: All test modes (a/ac/n20/n40) support SISO and MIMO mode.

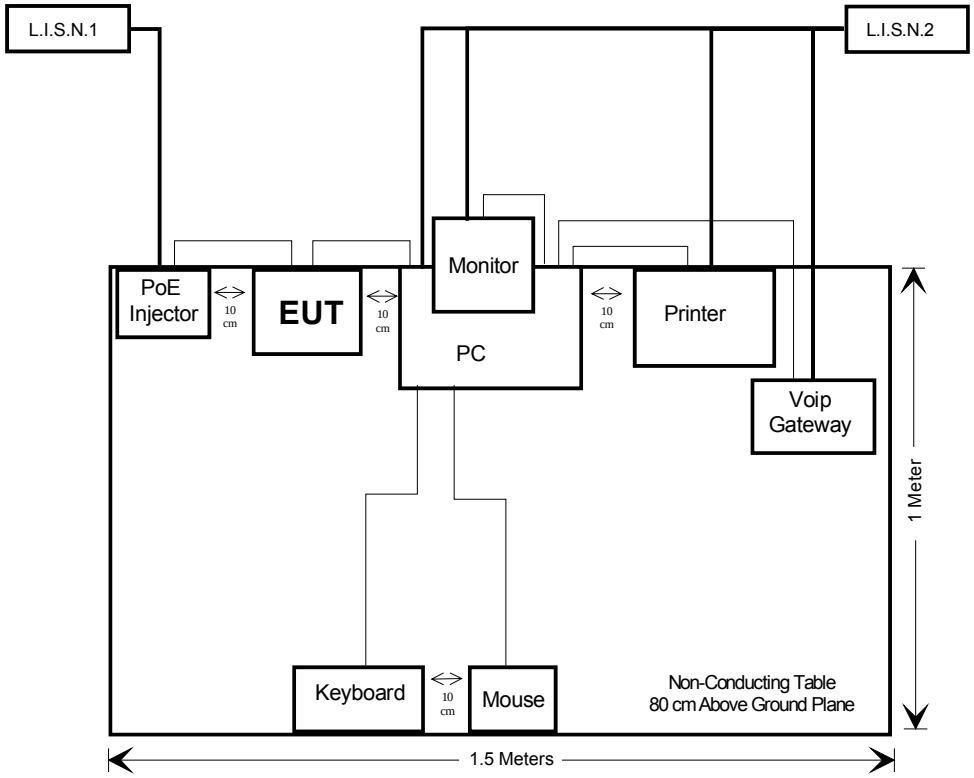
Support Equipment List and Details

Manufacturer	Description	Model	Serial Number
IBM	PC	8176	99Y7315
DELL	Monitor	SK-8815	9161649
IBM	Keyboard	KM-110X	XBK133000993
Logitech	Mouse	M-U0004	810-001808
Antek	Voip Gateway	EGW802	050830054-1B
EPSON	Printer	B261A	GXSK285854
GIGADIT	PoE Injector	NONE	NONE

External I/O Cable

Cable Description	Length (m)	From	To
Unshielded LAN	1.0	PoE Injector	EUT
Shielded VGA cable	1.5	PC	Monitor
Unshielded LAN cable	1.0	PC	EUT
Shielded Mouse cable	1.5	PC	Mouse
Shielded Keyboard cable	1.5	PC	Keyboard
Shielded LPT Cable	1.5	PC	Printer
Shielded RS232 Cable	0.5	PC	Voip Gateway

Block Diagram of Test Setup



SUMMARY OF TEST RESULTS

FCC Rules	Description of Test	Result
FCC §15.407 (f) & §1.1310 & §2.1091	Maximum Permissible Exposure	Compliance
§15.203	Antenna Requirement	Compliance
§15.407(b)(6)& §15.207(a)	Conducted Emissions	Compliance
§15.205& §15.209 &§15.407(b) (1),(4),(6),(7)	Undesirable Emission& Restricted Bands	Compliance
§15.407(b) (1),(2), (3),(4)	Band Edge	Compliance
§15.407(a) (1),(3) & (e)	26dB & 6dB Bandwidth	Compliance
§15.407(a)(1),(3)	Conducted Transmitter Output Power	Compliance
§15.407 (a)(1),(3),(5)	Power Spectral Density	Compliance

FCC §15.407(f) & §1.1310 & §2.1091- MAXIMUM PERMISSIBLE EXPOSURE (MPE)

Applicable Standard

According to subpart 15.407(f)and subpart §1.1310, systems operating under the provisions of this section shall be operated in a manner that ensures that the public is not exposed to radio frequency energy level in excess of the Commission's guidelines.

Limits for Maximum Permissible Exposure (MPE) (§1.1310, §2.1091)

(B) Limits for General Population/Uncontrolled Exposure				
Frequency Range (MHz)	**Electric Field Strength (V/m)**	**Magnetic Field Strength (A/m)**	**Power Density (mW/cm^2)**	**Averaging Time (minutes)**
0.3–1.34	614	1.63	*(100)	30
1.34–30	824/f	2.19/f	*($180/f^2$)	30
30–300	27.5	0.073	0.2	30
300–1500	/	/	f/1500	30
1500–100,000	/	/	1.0	30

f = frequency in MHz; * = Plane-wave equivalent power density;

According to §1.1310 and §2.1091 RF exposure is calculated.

Per 447498 D01 General RF Exposure Guidance v05r02**,** simultaneous transmission MPE test exclusion applies when the sum of the MPE for all simultaneous transmitting antennas incorporated in a host device, based on the calculated/estimated, numerically modeled or measured field strengths or power density, is $\leqslant$ 1.0.

Calculated Formulary:

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, the power gain factor, is normally numeric gain;
R = distance to the center of radiation of the antenna (appropriate units, e.g., cm);

Calculated Data:

DTS Band：

Mode	Frequency (MHz)	Antenna Gain		Conducted Power		Evaluation Distance (cm)	Power Density (mW/cm^2)	MPE Limit (mW/cm^2)
		(dBi)	(numeric)	(dBm)	(mW)			
802.11b	2412	9	7.94	26.94	494.31	25	0.500	1.0
802.11g	2462	9	7.94	26.96	496.59	25	0.502	1.0
802.11n HT20	2437	9	7.94	26.73	470.98	25	0.477	1.0
802.11n HT40	2452	9	7.94	26.99	500.03	25	**0.506**	1.0

UNII Band：

5150-5250 MHz

Mode	Frequency (MHz)	Antenna Gain		Conducted Power		Evaluation Distance (cm)	Power Density (mW/cm^2)	MPE Limit (mW/cm^2)
		(dBi)	(numeric)	(dBm)	(mW)			
802.11a	5240	9	7.94	19.88	97.27	25	0.098	1.0
802.11ac VHT20	5180	9	7.94	19.86	96.83	25	0.098	1.0
802.11ac VHT40	5230	9	7.94	19.53	89.74	25	0.091	1.0
802.11ac VHT80	5210	9	7.94	19.48	88.72	25	0.090	1.0
802.11n HT20	5240	9	7.94	19.24	83.95	25	0.085	1.0
802.11n HT40	5230	9	7.94	19.38	86.70	25	0.088	1.0

5725-5850 MHz

Mode	Frequency (MHz)	Antenna Gain		Conducted Power		Evaluation Distance (cm)	Power Density (mW/cm^2)	MPE Limit (mW/cm^2)
		(dBi)	(numeric)	(dBm)	(mW)			
802.11a	5745	9	7.94	25.16	328.10	25	**0.332**	1.0
802.11ac VHT20	5745	9	7.94	25.05	319.89	25	0.324	1.0
802.11ac VHT40	5795	9	7.94	24.48	280.54	25	0.284	1.0
802.11ac VHT80	5775	9	7.94	24.71	295.80	25	0.299	1.0
802.11n HT20	5745	9	7.94	25.00	316.23	25	0.320	1.0
802.11n HT40	5755	9	7.94	24.70	295.12	25	0.299	1.0

Note:
For WIFI module, 2.4GHz and 5GHz can transmit simultaneously, the worst case for MPE was chosen to be added up. Total sum of MPE is 0.838 (0.506+0.332=0.838).

Result: 0.838<1.0, the device meet FCC MPE at 25 cm distance.

FCC §15.203 – ANTENNA REQUIREMENT

Applicable Standard

According to § 15.203, An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.
And according to FCC 47 CFR section 15.407 (a)(1),if transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the peak power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

Antenna Connector Construction

The EUT has six PCB antennas (three antennas for 2.4GHz & three antennas for 5GHz) which were permanently attached to the EUT, and complied with 15.203, the maximum gain is 9.0 dBi. Please refer to the EUT internal photos.

Result: Compliance.

FCC §15.407 (b) (6) §15.207 (a) – CONDUCTED EMISSIONS

Applicable Standard

FCC §15.207, §15.407(b) (6)

Measurement Uncertainty

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

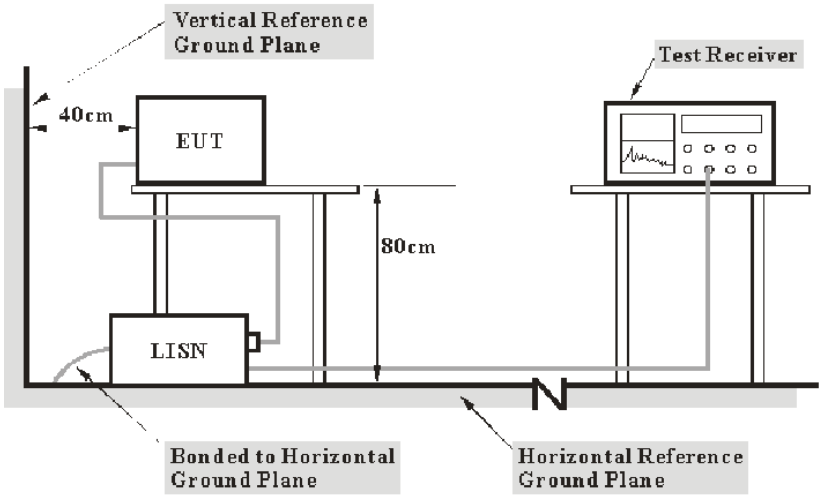
If U_{lab} is less than or equal to U_{cispr} of Table 1, then:
–compliance is deemed to occur if no measured disturbance level exceeds the disturbance limit;
–non - compliance is deemed to occur if any measured disturbance level exceeds the disturbance limit.
If U_{lab} is greater than U_{cispr} of 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. (Chengdu) is 3.17 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 C63.4-2003 measurement procedure. The specification used was with the FCC Part 15.207 limits.

The spacing between the peripherals was 10 cm.

DC 48V was used by the EUT through POE injector.

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

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
Rohde & Schwarz	EMI Test Receiver	ESCS 30	836858/0016	2015-06-23	2016-06-22
Rohde & Schwarz	L.I.S.N.	ENV216	3560.6550.06	2015-06-23	2016-06-22
Rohde & Schwarz	Pluse Limter	ESH3Z2	357.8810.52	2015-02-08	2016-02-07
Rohde & Schwarz	L.I.S.N.	ENV216	3560.6550.12	2015-02-08	2016-02-07

*** Statement of Traceability:** BACL (Chengdu) attested that all calibrations have been performed, traceable to National Primary Standards and International System of Units (SI).

Test Procedure

During the conducted emission test, the adapter was connected to the LISN and the other support equipments were connected to the outlet of the second 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 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:

1.3 dB at **2.840386 MHz** in the **Line** conducted mode

Test Data

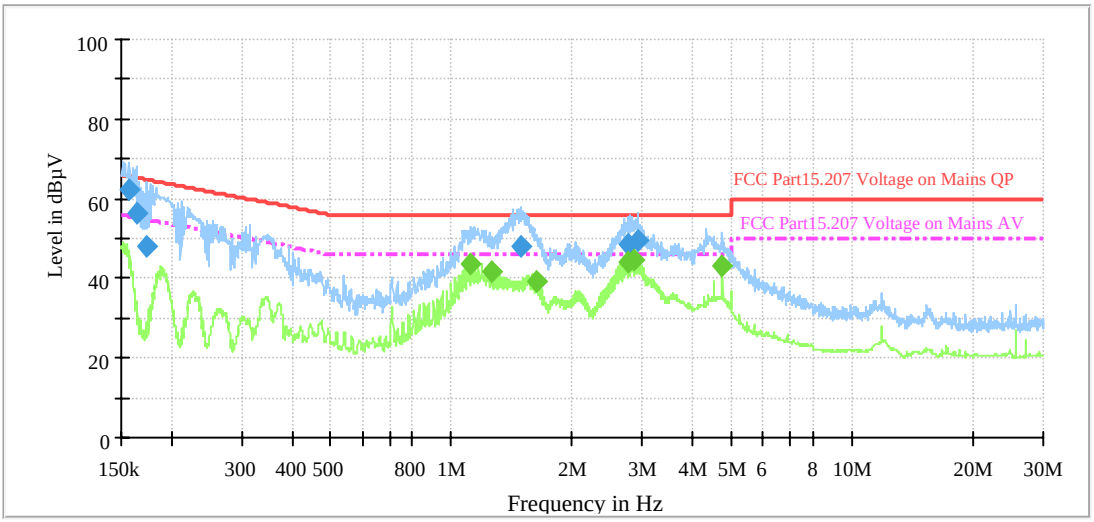
Environmental Conditions

Temperature:	26 °C
Relative Humidity:	57 %
ATM Pressure:	97.1 kPa

The testing was performed by Kevin Tao on 2015-06-29.

Test Mode: Transmitting

Line

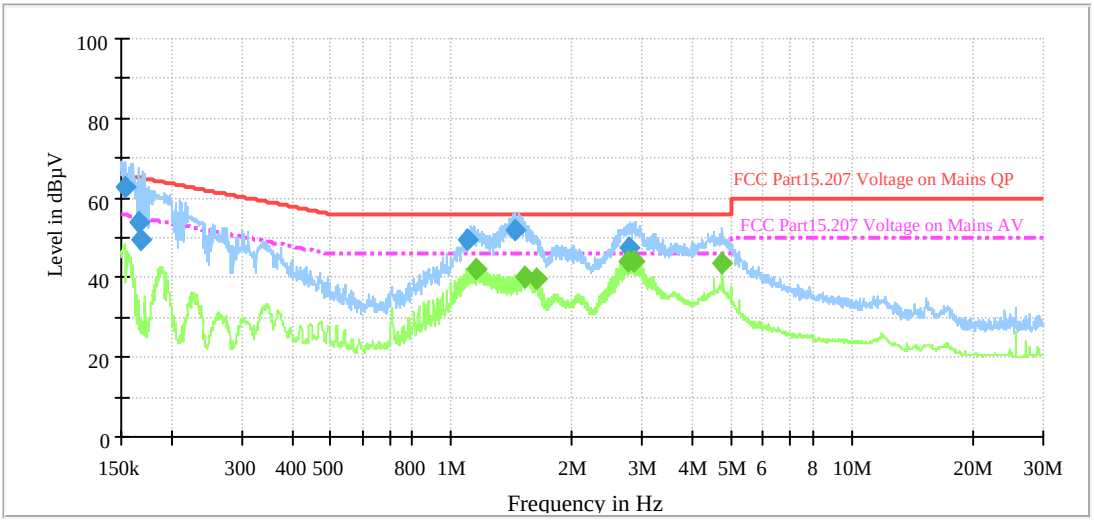


Frequency (MHz)	QuasiPeak (dBuV)	Bandwidth (kHz)	Neutral	Corr. (dB)	Margin (dB)	Limit (dBuV)
0.156115	62.5	9.000	L1	18.8	3.2	65.7
0.163457	56.5	9.000	L1	18.9	8.7	65.3
0.173901	48.3	9.000	L1	19.0	16.5	64.8
1.489715	47.9	9.000	L1	20.2	8.1	56.0
2.756522	48.4	9.000	L1	20.4	7.6	56.0
2.920959	49.4	9.000	L1	20.4	6.6	56.0

Frequency (MHz)	Average (dBuV)	Bandwidth (kHz)	Neutral	Corr. (dB)	Margin (dB)	Limit (dBuV)
1.119487	43.6	9.000	L1	20.2	*2.4	46.0
1.264591	41.6	9.000	L1	20.2	4.4	46.0
1.636388	39.1	9.000	L1	20.3	6.9	46.0
2.745529	44.1	9.000	L1	20.4	*1.9	46.0
2.840386	44.7	9.000	L1	20.4	*1.3	46.0
4.746591	43.4	9.000	L1	20.5	*2.6	46.0

**Within measurement uncertainty!*

Neutral



Frequency (MHz)	QuasiPeak (dBuV)	Bandwidth (kHz)	Neutral	Corr. (dB)	Margin (dB)	Limit (dBuV)
0.152722	63.0	9.000	N	18.8	*2.9	65.9
0.165098	54.1	9.000	N	18.9	11.1	65.2
0.167758	49.3	9.000	N	18.9	15.7	65.1
1.058560	49.3	9.000	N	20.2	6.7	56.0
1.445731	52.1	9.000	N	20.2	3.9	56.0
2.745690	48.3	9.000	N	20.4	7.7	56.0

Frequency (MHz)	Average (dBuV)	Bandwidth (kHz)	Neutral	Corr. (dB)	Margin (dB)	Limit (dBuV)
1.155853	42.1	9.000	N	20.2	3.9	46.0
1.528916	40.2	9.000	N	20.3	5.8	46.0
1.636388	39.5	9.000	N	20.3	6.5	46.0
2.745529	44.0	9.000	N	20.4	*2.0	46.0
2.840386	44.2	9.000	N	20.4	*1.8	46.0
4.746591	43.5	9.000	N	20.4	*2.5	46.0

**Within measurement uncertainty!*

Note: EUT transmitting simultaneously with 2.4G and 5G radio frequency and supports intelligent radio frequency management functionalities.

FCC §15.209, §15.205 & §15.407(b) (1) (2) (3) (4) (6) (7) – UNDESIRABLE EMISSION, RESTRICTED BANDS & BAND EDGE

Applicable Standard

FCC §15.407 (b) (1), (2), (3), (4), (6), (7); §15.209; §15.205;

For transmitters operating in the 5.15-5.25 GHz band: All emissions outside of the 5.15-5.35 GHz band shall not exceed an e.i.r.p. of −27 dBm/MHz.

For transmitters operating in the 5.25-5.35 GHz band: All emissions outside of the 5.15-5.35 GHz band shall not exceed an e.i.r.p. of −27 dBm/MHz.

For transmitters operating in the 5.47-5.725 GHz band: All emissions outside of the 5.47-5.725 GHz band shall not exceed an e.i.r.p. of −27 dBm/MHz.

For transmitters operating in the 5.725-5.85 GHz band: All emissions within the frequency range from the band edge to 10 MHz above or below the band edge shall not exceed an e.i.r.p. of −17 dBm/MHz; for frequencies 10 MHz or greater above or below the band edge, emissions shall not exceed an e.i.r.p. of −27 dBm/MHz.

Unwanted emissions below 1 GHz must comply with the general field strength limits set forth in §15.209.

According to KDB 789033 D02 General UNII Test Procedures v01, emission shall be computed as:
E[dBuV/m] = EIRP[dBm] + 95.2, for d = 3 meters.

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.

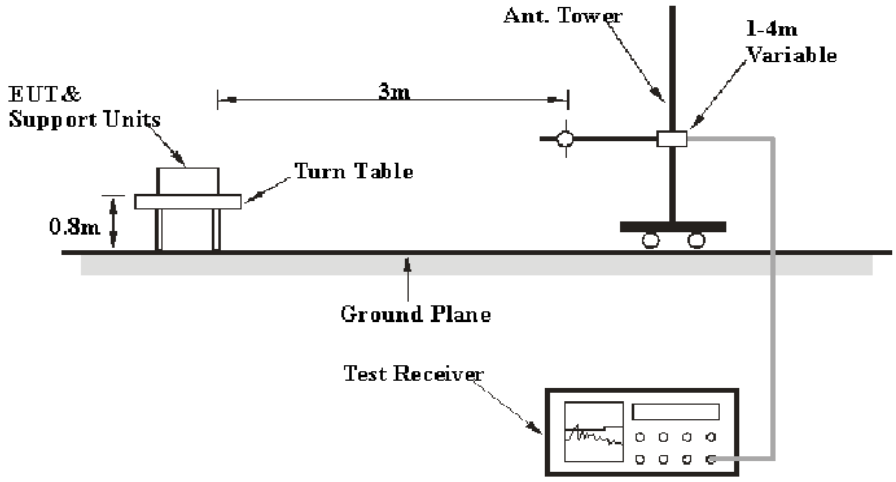
Based on CISPR 16-4-2: 2011, measurement uncertainty of radiated emission at a distance of 3m at Bay Area Compliance Laboratories Corp. (Chengdu) is:
30M~200MHz: ±4.7 dB ;
200M~1GHz: ±6.0 dB ;
1G-6GHz: ±5.13dB;
6G~40GHz: ±5.47 dB;

Table 1 – Values of U_{cispr}

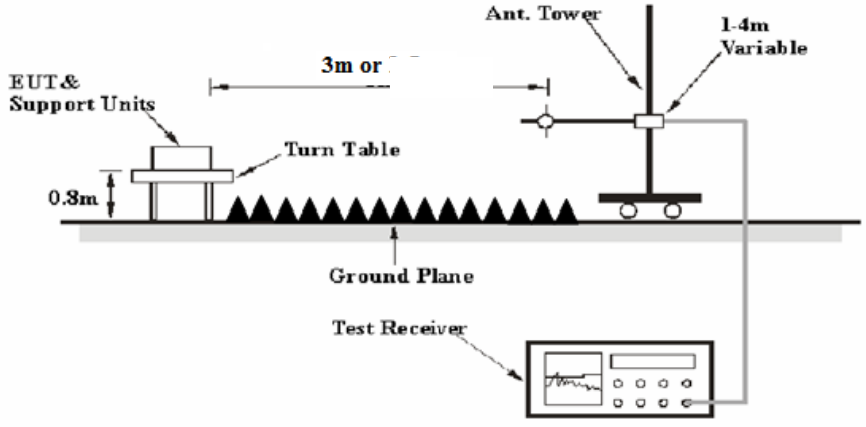
Measurement	U_{cispr}
Radiated disturbance (electric field strength at an OATS or in a SAC) (30 MHz to 1000 MHz)	6.3 dB
Radiated disturbance (electric field strength in a FAR) (1 GHz to 6 GHz)	5.2 dB
Radiated disturbance (electric field strength in a FAR) (6 GHz to 18 GHz)	5.5 dB

EUT Setup

Below 1 GHz:



Above 1 GHz:



The radiated emission tests were performed in the 3 meters semi-anechoic chamber, using the setup accordance with the ANSI C63.4-2003. The specification used was the FCC 15.209 and FCC 15.407 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.

DC 48V was used by the EUT through POE injector.

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
30 MHz – 1000 MHz	120 kHz	300 kHz	120 kHz	QP
Above 1 GHz	1 MHz	3 MHz	/	PK
	1 MHz	10 Hz	/	Ave.

Test Procedure

During the radiated emission test, the adapter was connected to the first AC floor outlet and the other support equipments were connected to the second 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-1GHz, peak and Average detection modes for frequencies above 1 GHz.

Test Equipment List and Details

Manufacturer	Description	Model Number	Serial Number	Calibration Date	Calibration Due Date
Agilent	Amplifier	8447D	2944A10442	2015-06-23	2016-06-22
Rohde & Schwarz	EMI Test Receiver	ESCI	100028	2015-06-23	2016-06-22
Sunol Sciences	Broadband Antenna	JB3	A101808	2013-04-10	2016-04-09
Rohde & Schwarz	Spectrum Analyzer	FSL18	100180	2015-06-23	2016-06-22
Rohde & Schwarz	Spectrum Analyzer	FSEM30	100018	2014-10-17	2015-10-16
Rohde & Schwarz	Spectrum Analyzer	FSP 38	100478	2014-10-17	2015-10-16
EM TEST	Horn Antenna	3115	003-6076	2015-04-09	2016-04-08
WEINSCHEL ENGINEERING	Attenuator	1A 10dB	AB1165	2014-10-31	2015-10-30
Mini-circuits	Filter	VHF-3100+	31306	2014-07-15	2015-07-14
Mini-circuits	Filter	VHF-6010+	31336	2014-07-15	2015-07-14
Mini-circuits	Amplifier	ZVA-183-S+	771001215	2014-11-18	2015-11-17
EMCT	Semi-Anechoic Chamber	966	N/A	2015-04-24	2018-04-23

*** Statement of Traceability:** BACL (Chengdu) attested that all calibrations have been performed, traceable to National Primary Standards and International System of Units (SI).

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 = Receiver Reading + Cable loss + Antenna Factor – 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 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 and 15.209, Subpart E, Section 15.407, with the worst margin reading of:

3.50 dB at **5350.05 MHz** in the **Vertical** polarization for 802.11ac VHT20 mode **(5150-5250MHz)**

Test Data

Environmental Conditions

Temperature:	25 °C & 26 °C
Relative Humidity:	51 % & 42 %
ATM Pressure:	97.1 kPa & 97.5 kPa

The testing was performed by Kevin Tao on 2015-06-25 & 2015-06-26.

Test mode: transmitting

5150-5250 MHz:

For 802.11a mode

Frequency	Receiver		Rx Antenna		Cable loss (dB)	Amplifier Gain (dB)	Corrected Amplitude (dBμV/m)	Limit (dBμV/m)	Margin (dB)
(MHz)	Reading (dBμV)	Detector (PK/QP/AV)	Polar (H/V)	Factor (dB)					
5180 MHz									
5180	80.31	PK	H	31.70	4.15	0.00	116.16	N/A	N/A
5180	66.45	AV	H	31.70	4.15	0.00	102.30	N/A	N/A
5180	80.87	PK	V	31.70	4.15	0.00	116.72	N/A	N/A
5180	67.95	AV	V	31.70	4.15	0.00	103.80	N/A	N/A
5149.95	53.41	PK	V	31.70	4.10	26.55	62.66	68.20	5.54
5149.95	36.37	AV	V	31.70	4.10	26.55	45.62	54.00	8.38
5350.05	51.31	PK	V	31.70	4.20	26.55	60.66	68.20	7.54
5350.05	33.12	AV	V	31.70	4.20	26.55	42.47	54.00	11.53
10360	31.86	PK	V	37.40	6.34	23.80	51.80	68.20	16.40
10360	17.97	AV	V	37.40	6.34	23.80	37.91	54.00	16.09
15540	31.56	PK	V	39.40	6.45	22.40	55.01	68.20	13.19
15540	18.32	AV	V	39.40	6.45	22.40	41.77	54.00	12.23
35.94	46.7	QP	V	13.37	0.26	26.20	34.13	40.00	5.87

For 802.11a mode

Frequency	Receiver		Rx Antenna		Cable loss (dB)	Amplifier Gain (dB)	Corrected Amplitude (dBμV/m)	Limit (dBμV/m)	Margin (dB)
(MHz)	Reading (dBμV)	Detector (PK/QP/AV)	Polar (H/V)	Factor (dB)					
5220 MHz									
5220	79.38	PK	H	31.70	4.15	0.00	115.23	N/A	N/A
5220	67.41	AV	H	31.70	4.15	0.00	103.26	N/A	N/A
5220	80.27	PK	V	31.70	4.15	0.00	116.12	N/A	N/A
5220	68.66	AV	V	31.70	4.15	0.00	104.51	N/A	N/A
5149.95	51.32	PK	V	31.70	4.10	26.55	60.57	68.20	7.63
5149.95	31.56	AV	V	31.70	4.10	26.55	40.81	54.00	13.19
5350.05	52.16	PK	V	31.70	4.20	26.55	61.51	68.20	6.69
5350.05	32.59	AV	V	31.70	4.20	26.55	41.94	54.00	12.06
10440	31.67	PK	V	37.40	6.34	23.80	51.61	68.20	16.59
10440	18.84	AV	V	37.40	6.34	23.80	38.78	54.00	15.22
15660	30.59	PK	V	39.40	6.45	22.40	54.04	68.20	14.16
15660	17.68	AV	V	39.40	6.45	22.40	41.13	54.00	12.87
35.94	46.8	QP	V	13.37	0.26	26.20	34.23	40.00	5.77
5240 MHz									
5240	79.48	PK	H	31.70	4.15	0.00	115.33	N/A	N/A
5240	66.75	AV	H	31.70	4.15	0.00	102.60	N/A	N/A
5240	81.74	PK	V	31.70	4.15	0.00	117.59	N/A	N/A
5240	68.83	AV	V	31.70	4.15	0.00	104.68	N/A	N/A
5149.95	52.14	PK	V	31.70	4.10	26.55	61.39	68.20	6.81
5149.95	31.95	AV	V	31.70	4.10	26.55	41.20	54.00	12.80
5350.05	55.12	PK	V	31.70	4.20	26.55	64.47	68.20	*3.73
5350.05	32.79	AV	V	31.70	4.20	26.55	42.14	54.00	11.86
10480	32.69	PK	V	37.40	6.34	23.80	52.63	68.20	15.57
10480	19.16	AV	V	37.40	6.34	23.80	39.10	54.00	14.90
15720	31.58	PK	V	39.40	6.45	22.40	55.03	68.20	13.17
15720	18.23	AV	V	39.40	6.45	22.40	41.68	54.00	12.32
35.94	46.5	QP	V	13.37	0.26	26.20	33.93	40.00	6.07

**Within measurement uncertainty!*

For 802.11ac VHT20 mode

Frequency	Receiver		Rx Antenna		Cable loss (dB)	Amplifier Gain (dB)	Corrected Amplitude (dBμV/m)	Limit (dBμV/m)	Margin (dB)
(MHz)	Reading (dBμV)	Detector (PK/QP/AV)	Polar (H/V)	Factor (dB)					
5180 MHz									
5180	77.78	PK	H	31.70	4.15	0.00	113.63	N/A	N/A
5180	64.98	AV	H	31.70	4.15	0.00	100.83	N/A	N/A
5180	79.28	PK	V	31.70	4.15	0.00	115.13	N/A	N/A
5180	64.76	AV	V	31.70	4.15	0.00	100.61	N/A	N/A
5149.95	54.21	PK	V	31.70	4.10	26.55	63.46	68.20	*4.74
5149.95	32.64	AV	V	31.70	4.10	26.55	41.89	54.00	12.11
5350.05	50.98	PK	V	31.70	4.20	26.55	60.33	68.20	7.87
5350.05	30.19	AV	V	31.70	4.20	26.55	39.54	54.00	14.46
10360	33.12	PK	V	37.40	6.34	23.80	53.06	68.20	15.14
10360	20.56	AV	V	37.40	6.34	23.80	40.50	54.00	13.50
15540	31.59	PK	V	39.40	6.45	22.40	55.04	68.20	13.16
15540	18.64	AV	V	39.40	6.45	22.40	42.09	54.00	11.91
35.94	46.3	QP	V	13.37	0.26	26.20	33.73	40.00	6.27
5220 MHz									
5220	78.34	PK	H	31.70	4.15	0.00	114.19	N/A	N/A
5220	65.01	AV	H	31.70	4.15	0.00	100.86	N/A	N/A
5220	80.28	PK	V	31.70	4.15	0.00	116.13	N/A	N/A
5220	65.49	AV	V	31.70	4.15	0.00	101.34	N/A	N/A
5149.95	51.61	PK	V	31.70	4.10	26.55	60.86	68.20	7.34
5149.95	31.08	AV	V	31.70	4.10	26.55	40.33	54.00	13.67
5350.05	52.16	PK	V	31.70	4.20	26.55	61.51	68.20	6.69
5350.05	31.24	AV	V	31.70	4.20	26.55	40.59	54.00	13.41
10440	34.21	PK	V	37.40	6.34	23.80	54.15	68.20	14.05
10440	21.56	AV	V	37.40	6.34	23.80	41.50	54.00	12.50
15660	30.89	PK	V	39.40	6.45	22.40	54.34	68.20	13.86
15660	18.55	AV	V	39.40	6.45	22.40	42.00	54.00	12.00
35.94	46.4	QP	V	13.37	0.26	26.20	33.83	40.00	6.17

For 802.11ac VHT20 mode

Frequency	Receiver		Rx Antenna		Cable loss (dB)	Amplifier Gain (dB)	Corrected Amplitude (dBμV/m)	Limit (dBμV/m)	Margin (dB)
(MHz)	Reading (dBμV)	Detector (PK/QP/AV)	Polar (H/V)	Factor (dB)					
5240 MHz									
5240	78.97	PK	H	31.70	4.15	0.00	114.82	N/A	N/A
5240	65.28	AV	H	31.70	4.15	0.00	103.13	N/A	N/A
5240	80.04	PK	V	31.70	4.15	0.00	115.89	N/A	N/A
5240	66.25	AV	V	31.70	4.15	0.00	102.10	N/A	N/A
5149.95	51.56	PK	V	31.70	4.10	26.55	60.81	68.20	7.39
5149.95	30.85	AV	V	31.70	4.10	26.55	40.10	54.00	13.90
5350.05	55.35	PK	V	31.70	4.20	26.55	64.70	68.20	*3.50
5350.05	34.52	AV	V	31.70	4.20	26.55	43.87	54.00	10.13
10480	32.48	PK	V	37.40	6.34	23.80	52.42	68.20	15.78
10480	21.09	AV	V	37.40	6.34	23.80	41.03	54.00	12.97
15720	31.26	PK	V	39.40	6.45	22.40	54.71	68.20	13.49
15720	19.68	AV	V	39.40	6.45	22.40	43.13	54.00	10.87
35.94	46.5	QP	V	13.37	0.26	26.20	33.93	40.00	6.07

**Within measurement uncertainty!*

For 802.11ac VHT40 mode

Frequency	Receiver		Rx Antenna		Cable loss (dB)	Amplifier Gain (dB)	Corrected Amplitude (dBμV/m)	Limit (dBμV/m)	Margin (dB)
(MHz)	Reading (dBμV)	Detector (PK/QP/AV)	Polar (H/V)	Factor (dB)					
5190 MHz									
5190	73.61	PK	H	31.70	4.15	0.00	109.46	N/A	N/A
5190	60.33	AV	H	31.70	4.15	0.00	96.18	N/A	N/A
5190	75.99	PK	V	31.70	4.15	0.00	111.84	N/A	N/A
5190	61.54	AV	V	31.70	4.15	0.00	97.39	N/A	N/A
5149.95	55.29	PK	V	31.70	4.10	26.55	64.54	68.20	*3.66
5149.95	33.98	AV	V	31.70	4.10	26.55	43.23	54.00	10.77
5350.05	50.68	PK	V	31.70	4.20	26.55	60.03	68.20	8.17
5350.05	30.23	AV	V	31.70	4.20	26.55	39.58	54.00	14.42
10380	32.68	PK	V	37.40	6.34	23.80	52.62	68.20	15.58
10380	22.16	AV	V	37.40	6.34	23.80	42.10	54.00	11.90
15570	32.19	PK	V	39.40	6.45	22.40	55.64	68.20	12.56
15570	19.32	AV	V	39.40	6.45	22.40	42.77	54.00	11.23
35.94	46.2	QP	V	13.37	0.26	26.20	33.63	40.00	6.37
5230 MHz									
5230	74.94	PK	H	31.70	4.15	0.00	109.79	N/A	N/A
5230	61.22	AV	H	31.70	4.15	0.00	97.07	N/A	N/A
5230	76.36	PK	V	31.70	4.15	0.00	112.21	N/A	N/A
5230	62.94	AV	V	31.70	4.15	0.00	98.79	N/A	N/A
5149.95	52.49	PK	V	31.70	4.10	26.55	61.74	68.20	6.46
5149.95	31.74	AV	V	31.70	4.10	26.55	40.99	54.00	13.01
5350.05	55.02	PK	V	31.70	4.20	26.55	65.37	68.20	*3.83
5350.05	34.67	AV	V	31.70	4.20	26.55	44.02	54.00	9.98
10460	33.52	PK	V	37.40	6.34	23.80	53.46	68.20	14.74
10460	23.64	AV	V	37.40	6.34	23.80	43.58	54.00	10.42
15690	31.96	PK	V	39.40	6.45	22.40	55.41	68.20	12.79
15690	19.68	AV	V	39.40	6.45	22.40	43.13	54.00	10.87
35.94	46.8	QP	V	13.37	0.26	26.20	34.23	40.00	5.77

**Within measurement uncertainty!*

For 802.11ac VHT80 mode

Frequency	Receiver		Rx Antenna		Cable loss (dB)	Amplifier Gain (dB)	Corrected Amplitude (dBμV/m)	Limit (dBμV/m)	Margin (dB)
(MHz)	Reading (dBμV)	Detector (PK/QP/AV)	Polar (H/V)	Factor (dB)					
5210 MHz									
5210	74.59	PK	H	31.70	4.15	0.00	110.44	N/A	N/A
5210	57.81	AV	H	31.70	4.15	0.00	93.66	N/A	N/A
5210	77.33	PK	V	31.70	4.15	0.00	113.18	N/A	N/A
5210	59.49	AV	V	31.70	4.15	0.00	95.34	N/A	N/A
5149.95	54.91	PK	V	31.70	4.10	26.55	64.16	68.20	*4.04
5149.95	34.56	AV	V	31.70	4.10	26.55	43.81	54.00	10.19
5350.05	55.09	PK	V	31.70	4.20	26.55	64.44	68.20	*3.76
5350.05	33.97	AV	V	31.70	4.20	26.55	43.32	54.00	10.68
10420	34.35	PK	V	37.40	6.34	23.80	54.29	68.20	13.91
10420	22.48	AV	V	37.40	6.34	23.80	42.42	54.00	11.58
15630	32.43	PK	V	39.40	6.45	22.40	55.88	68.20	12.32
15630	20.58	AV	V	39.40	6.45	22.40	44.03	54.00	9.97
35.94	46.7	QP	V	13.37	0.26	26.20	34.13	40.00	5.87

**Within measurement uncertainty!*

For 802.11n HT20 mode

Frequency	Receiver		Rx Antenna		Cable loss (dB)	Amplifier Gain (dB)	Corrected Amplitude (dBμV/m)	Limit (dBμV/m)	Margin (dB)
(MHz)	Reading (dBμV)	Detector (PK/QP/AV)	Polar (H/V)	Factor (dB)					
5180 MHz									
5180	78.7	PK	H	31.70	4.15	0.00	114.55	N/A	N/A
5180	63.68	AV	H	31.70	4.15	0.00	99.53	N/A	N/A
5180	80.22	PK	V	31.70	4.15	0.00	116.07	N/A	N/A
5180	66.64	AV	V	31.70	4.15	0.00	102.49	N/A	N/A
5149.95	55.23	PK	V	31.70	4.10	26.55	64.48	68.20	*3.72
5149.95	31.49	AV	V	31.70	4.10	26.55	40.74	54.00	13.26
5350.05	50.51	PK	V	31.70	4.20	26.55	59.86	68.20	8.34
5350.05	30.76	AV	V	31.70	4.20	26.55	40.11	54.00	13.89
10360	32.5	PK	V	37.40	6.34	23.80	52.44	68.20	15.76
10360	19.57	AV	V	37.40	6.34	23.80	39.51	54.00	14.49
15540	31.25	PK	V	39.40	6.45	22.40	54.70	68.20	13.50
15540	20.03	AV	V	39.40	6.45	22.40	43.48	54.00	10.52
35.94	46.7	QP	V	13.37	0.26	26.20	34.13	40.00	5.87

**Within measurement uncertainty!*

For 802.11n HT20 mode

Frequency	Receiver		Rx Antenna		Cable loss (dB)	Amplifier Gain (dB)	Corrected Amplitude (dBμV/m)	Limit (dBμV/m)	Margin (dB)
(MHz)	Reading (dBμV)	Detector (PK/QP/AV)	Polar (H/V)	Factor (dB)					
5220 MHz									
5220	80.65	PK	H	31.70	4.15	0.00	116.50	N/A	N/A
5220	67.23	AV	H	31.70	4.15	0.00	103.08	N/A	N/A
5220	76.21	PK	V	31.70	4.15	0.00	112.06	N/A	N/A
5220	62.32	AV	V	31.70	4.15	0.00	98.17	N/A	N/A
5149.95	52.15	PK	V	31.70	4.10	26.55	61.40	68.20	6.80
5149.95	30.91	AV	V	31.70	4.10	26.55	40.16	54.00	13.84
5350.05	52.49	PK	V	31.70	4.20	26.55	61.84	68.20	6.36
5350.05	30.34	AV	V	31.70	4.20	26.55	39.69	54.00	14.31
10440	32.74	PK	V	37.40	6.34	23.80	52.68	68.20	15.52
10440	19.03	AV	V	37.40	6.34	23.80	38.97	54.00	15.03
15660	32.18	PK	V	39.40	6.45	22.40	55.63	68.20	12.57
15660	20.45	AV	V	39.40	6.45	22.40	43.90	54.00	10.10
35.94	46.2	QP	V	13.37	0.26	26.20	33.63	40.00	6.37
5240 MHz									
5240	79.95	PK	H	31.70	4.15	0.00	115.80	N/A	N/A
5240	65.15	AV	H	31.70	4.15	0.00	101.00	N/A	N/A
5240	81.02	PK	V	31.70	4.15	0.00	116.87	N/A	N/A
5240	67.09	AV	V	31.70	4.15	0.00	102.94	N/A	N/A
5149.95	52.16	PK	V	31.70	4.10	26.55	61.41	68.20	6.79
5149.95	31.87	AV	V	31.70	4.10	26.55	41.12	54.00	12.88
5350.05	54.93	PK	V	31.70	4.20	26.55	64.28	68.20	*3.92
5350.05	33.63	AV	V	31.70	4.20	26.55	42.98	54.00	11.02
10480	33.69	PK	V	37.40	6.34	23.80	53.63	68.20	14.57
10480	21.01	AV	V	37.40	6.34	23.80	40.95	54.00	13.05
15720	31.69	PK	V	39.40	6.45	22.40	55.14	68.20	13.06
15720	19.79	AV	V	39.40	6.45	22.40	43.24	54.00	10.76
35.94	46.1	QP	V	13.37	0.26	26.20	33.53	40.00	6.47

**Within measurement uncertainty!*

For 802.11n HT40 mode

Frequency	Receiver		Rx Antenna		Cable loss (dB)	Amplifier Gain (dB)	Corrected Amplitude (dBμV/m)	Limit (dBμV/m)	Margin (dB)
(MHz)	Reading (dBμV)	Detector (PK/QP/AV)	Polar (H/V)	Factor (dB)					
5190 MHz									
5190	75.35	PK	H	31.70	4.15	0.00	112.20	N/A	N/A
5190	60.56	AV	H	31.70	4.15	0.00	96.41	N/A	N/A
5190	77.82	PK	V	31.70	4.15	0.00	113.67	N/A	N/A
5190	62.54	AV	V	31.70	4.15	0.00	98.39	N/A	N/A
5149.95	54.95	PK	V	31.70	4.10	26.55	64.20	68.20	*4.00
5149.95	32.06	AV	V	31.70	4.10	26.55	41.31	54.00	12.69
5350.05	50.66	PK	V	31.70	4.20	26.55	60.01	68.20	8.19
5350.05	30.31	AV	V	31.70	4.20	26.55	39.66	54.00	14.34
10380	31.37	PK	V	37.40	6.34	23.80	51.31	68.20	16.89
10380	19.74	AV	V	37.40	6.34	23.80	39.68	54.00	14.32
15570	30.59	PK	V	39.40	6.45	22.40	54.04	68.20	14.16
15570	19.33	AV	V	39.40	6.45	22.40	42.78	54.00	11.22
35.94	46.2	QP	V	13.37	0.26	26.20	33.63	40.00	6.37
5230 MHz									
5230	75.25	PK	H	31.70	4.15	0.00	111.10	N/A	N/A
5230	59.7	AV	H	31.70	4.15	0.00	95.55	N/A	N/A
5230	78.46	PK	V	31.70	4.15	0.00	114.31	N/A	N/A
5230	62.43	AV	V	31.70	4.15	0.00	98.28	N/A	N/A
5149.95	50.19	PK	V	31.70	4.10	26.55	59.44	68.20	8.76
5149.95	30.55	AV	V	31.70	4.10	26.55	39.80	54.00	14.20
5350.05	54.98	PK	V	31.70	4.20	26.55	64.33	68.20	*3.87
5350.05	33.86	AV	V	31.70	4.20	26.55	43.21	54.00	10.79
10460	31.98	PK	V	37.40	6.34	23.80	51.92	68.20	16.28
10460	21.13	AV	V	37.40	6.34	23.80	41.07	54.00	12.93
15690	31.25	PK	V	39.40	6.45	22.40	54.70	68.20	13.50
15690	19.61	AV	V	39.40	6.45	22.40	43.06	54.00	10.94
35.94	46.5	QP	V	13.37	0.26	26.20	33.93	40.00	6.07

**Within measurement uncertainty!*

5725-5850 MHz

For 802.11a mode

Frequency	Receiver		Rx Antenna		Cable loss (dB)	Amplifier Gain (dB)	Corrected Amplitude (dBμV/m)	Limit (dBμV/m)	Margin (dB)
(MHz)	Reading (dBμV)	Detector (PK/QP/AV)	Polar (H/V)	Factor (dB)					
5745 MHz									
5745	80.72	PK	H	32.50	4.15	0.00	117.37	N/A	N/A
5745	68.73	AV	H	32.50	4.15	0.00	105.38	N/A	N/A
5745	80.34	PK	V	32.50	4.15	0.00	116.99	N/A	N/A
5745	65.8	AV	V	32.50	4.15	0.00	102.45	N/A	N/A
5724.95	56.82	PK	V	32.50	4.10	26.55	66.87	78.20	11.33
5724.95	38.54	AV	V	32.50	4.10	26.55	48.59	54.00	5.41
5850.05	50.02	PK	V	32.50	4.20	26.55	60.17	78.20	18.03
5850.05	32.14	AV	V	32.50	4.20	26.55	42.29	54.00	11.71
11490	32.07	PK	V	38.00	6.34	23.80	52.61	68.20	15.59
11490	18.74	AV	V	38.00	6.34	23.80	39.28	54.00	14.72
17235	31.02	PK	V	43.00	6.45	22.40	58.07	68.20	10.13
17235	17.11	AV	V	43.00	6.45	22.40	44.16	54.00	9.84
35.94	45.8	QP	V	13.37	0.26	26.20	33.23	40.00	6.77
5785 MHz									
5785	79.78	PK	H	32.50	4.15	0.00	116.43	N/A	N/A
5785	65.04	AV	H	32.50	4.15	0.00	101.69	N/A	N/A
5785	79.58	PK	V	32.50	4.15	0.00	116.23	N/A	N/A
5785	65.51	AV	V	32.50	4.15	0.00	102.16	N/A	N/A
5724.7	50.16	PK	V	32.50	4.10	26.55	60.21	78.20	17.99
5724.7	34.18	AV	V	32.50	4.10	26.55	44.23	54.00	9.77
5856.45	50.32	PK	V	32.50	4.20	26.55	60.47	78.20	17.73
5856.45	35.01	AV	V	32.50	4.20	26.55	45.16	54.00	8.84
11570	36.12	PK	V	38.00	6.34	23.80	56.66	68.20	11.54
11570	20.64	AV	V	38.00	6.34	23.80	41.18	54.00	12.82
17355	30.35	PK	V	43.00	6.45	22.40	57.40	68.20	10.80
17355	16.99	AV	V	43.00	6.45	22.40	44.04	54.00	9.96
35.94	45.3	QP	V	13.37	0.26	26.20	32.73	40.00	7.27

For 802.11a mode

Frequency	Receiver		Rx Antenna		Cable loss (dB)	Amplifier Gain (dB)	Corrected Amplitude (dBμV/m)	Limit (dBμV/m)	Margin (dB)
(MHz)	Reading (dBμV)	Detector (PK/QP/AV)	Polar (H/V)	Factor (dB)					
5825 MHz									
5825	78.29	PK	H	32.50	4.15	0.00	114.94	N/A	N/A
5825	64.07	AV	H	32.50	4.15	0.00	100.72	N/A	N/A
5825	79.26	PK	V	32.50	4.15	0.00	115.91	N/A	N/A
5825	64.95	AV	V	32.50	4.15	0.00	101.60	N/A	N/A
5724.8	50.19	PK	V	32.50	4.10	26.55	60.24	78.20	17.96
5724.8	34.92	AV	V	32.50	4.10	26.55	44.97	54.00	9.03
5850.1	56.46	PK	V	32.50	4.20	26.55	66.61	78.20	11.59
5850.1	37.84	AV	V	32.50	4.20	26.55	47.99	54.00	6.01
11650	31.74	PK	V	38.00	6.34	23.80	52.28	68.20	15.92
11650	18.08	AV	V	38.00	6.34	23.80	38.62	54.00	15.38
17475	30.11	PK	V	43.00	6.45	22.40	57.16	68.20	11.04
17475	16.35	AV	V	43.00	6.45	22.40	43.40	54.00	10.60
35.94	45.6	QP	V	13.37	0.26	26.20	33.03	40.00	6.97

For 802.11ac VHT20 mode

Frequency	Receiver		Rx Antenna		Cable loss (dB)	Amplifier Gain (dB)	Corrected Amplitude (dBμV/m)	Limit (dBμV/m)	Margin (dB)
(MHz)	Reading (dBμV)	Detector (PK/QP/AV)	Polar (H/V)	Factor (dB)					
5745 MHz									
5745	80.59	PK	H	32.50	4.15	0.00	117.24	N/A	N/A
5745	67.33	AV	H	32.50	4.15	0.00	103.98	N/A	N/A
5745	79.87	PK	V	32.50	4.15	0.00	116.52	N/A	N/A
5745	65.21	AV	V	32.50	4.15	0.00	101.86	N/A	N/A
5724.95	55.54	PK	V	32.50	4.10	26.55	65.59	78.20	12.61
5724.95	35.62	AV	V	32.50	4.10	26.55	45.67	54.00	8.33
5850.05	52.14	PK	V	32.50	4.20	26.55	62.29	78.20	15.91
5850.05	34.04	AV	V	32.50	4.20	26.55	44.19	54.00	9.81
11490	36.85	PK	V	38.00	6.34	23.80	57.39	68.20	10.81
11490	22.62	AV	V	38.00	6.34	23.80	43.16	54.00	10.84
17235	34.6	PK	V	43.00	6.45	22.40	61.65	68.20	6.55
17235	20.43	AV	V	43.00	6.45	22.40	47.48	54.00	6.52
35.94	45.6	QP	V	13.37	0.26	26.20	33.03	40.00	6.97

For 802.11ac VHT20 mode

Frequency	Receiver		Rx Antenna		Cable loss (dB)	Amplifier Gain (dB)	Corrected Amplitude (dBμV/m)	Limit (dBμV/m)	Margin (dB)
(MHz)	Reading (dBμV)	Detector (PK/QP/AV)	Polar (H/V)	Factor (dB)					
5785 MHz									
5785	79.31	PK	H	32.50	4.15	0.00	115.96	N/A	N/A
5785	65.43	AV	H	32.50	4.15	0.00	102.08	N/A	N/A
5785	78.44	PK	V	32.50	4.15	0.00	115.09	N/A	N/A
5785	64.66	AV	V	32.50	4.15	0.00	101.31	N/A	N/A
5724.95	50.57	PK	V	32.50	4.10	26.55	60.62	78.20	17.58
5724.95	33.15	AV	V	32.50	4.10	26.55	43.20	54.00	10.80
5850.05	50.95	PK	V	32.50	4.20	26.55	61.10	78.20	17.10
5850.05	34.17	AV	V	32.50	4.20	26.55	44.32	54.00	9.68
11570	36.77	PK	V	38.00	6.34	23.80	57.31	68.20	10.89
11570	22.67	AV	V	38.00	6.34	23.80	43.21	54.00	10.79
17355	30.36	PK	V	43.00	6.45	22.40	57.41	68.20	10.79
17355	16.98	AV	V	43.00	6.45	22.40	44.03	54.00	9.97
35.94	45.7	QP	V	13.37	0.26	26.20	33.13	40.00	6.87
5825 MHz									
5825	77.84	PK	H	32.50	4.15	0.00	114.49	N/A	N/A
5825	64.23	AV	H	32.50	4.15	0.00	100.88	N/A	N/A
5825	78.51	PK	V	32.50	4.15	0.00	115.16	N/A	N/A
5825	63.96	AV	V	32.50	4.15	0.00	100.61	N/A	N/A
5724.8	49.95	PK	V	32.50	4.10	26.55	60.00	78.20	18.20
5724.8	37.47	AV	V	32.50	4.10	26.55	47.52	54.00	6.48
5850.75	53.02	PK	V	32.50	4.20	26.55	63.17	78.20	15.03
5850.75	37.86	AV	V	32.50	4.20	26.55	48.01	54.00	5.99
11650	34.56	PK	V	38.00	6.34	23.80	55.10	68.20	13.10
11650	19.91	AV	V	38.00	6.34	23.80	40.45	54.00	13.55
17475	32.23	PK	V	43.00	6.45	22.40	59.28	68.20	8.92
17475	17.54	AV	V	43.00	6.45	22.40	44.59	54.00	9.41
35.94	46.1	QP	V	13.37	0.26	26.20	33.53	40.00	6.47

For 802.11ac VHT40 mode

Frequency	Receiver		Rx Antenna		Cable loss (dB)	Amplifier Gain (dB)	Corrected Amplitude (dBμV/m)	Limit (dBμV/m)	Margin (dB)
(MHz)	Reading (dBμV)	Detector (PK/QP/AV)	Polar (H/V)	Factor (dB)					
5755 MHz									
5755	75.64	PK	H	32.50	4.15	0.00	112.29	N/A	N/A
5755	60.66	AV	H	32.50	4.15	0.00	97.31	N/A	N/A
5755	76.37	PK	V	32.50	4.15	0.00	113.02	N/A	N/A
5755	61.09	AV	V	32.50	4.15	0.00	97.74	N/A	N/A
5724.95	55.63	PK	V	32.50	4.10	26.55	65.68	78.20	12.52
5724.95	38.91	AV	V	32.50	4.10	26.55	48.96	54.00	*5.04
5850.05	50.82	PK	V	32.50	4.20	26.55	60.97	78.20	17.23
5850.05	34.06	AV	V	32.50	4.20	26.55	44.21	54.00	9.79
11510	34.66	PK	V	38.00	6.34	23.80	55.20	68.20	13.00
11510	21.13	AV	V	38.00	6.34	23.80	41.67	54.00	12.33
17265	31.72	PK	V	43.00	6.45	22.40	58.77	68.20	9.43
17265	18.11	AV	V	43.00	6.45	22.40	45.16	54.00	8.84
35.94	45.5	QP	V	13.37	0.26	26.20	32.93	40.00	7.07
5795 MHz									
5795	74.51	PK	H	32.50	4.15	0.00	111.16	N/A	N/A
5795	59.91	AV	H	32.50	4.15	0.00	96.56	N/A	N/A
5795	76.46	PK	V	32.50	4.15	0.00	113.11	N/A	N/A
5795	60.28	AV	V	32.50	4.15	0.00	96.93	N/A	N/A
5724.95	50.76	PK	V	32.50	4.10	26.55	60.81	78.20	17.39
5724.95	32.85	AV	V	32.50	4.10	26.55	42.90	54.00	11.10
5850.05	55.48	PK	V	32.50	4.20	26.55	65.63	78.20	12.57
5850.05	36.13	AV	V	32.50	4.20	26.55	46.28	54.00	7.72
11590	34.21	PK	V	38.00	6.34	23.80	54.75	68.20	13.45
11590	20.28	AV	V	38.00	6.34	23.80	40.82	54.00	13.18
17385	30.57	PK	V	43.00	6.45	22.40	57.62	68.20	10.58
17385	17.65	AV	V	43.00	6.45	22.40	44.70	54.00	9.30
35.94	45.4	QP	V	13.37	0.26	26.20	32.83	40.00	7.17

**Within measurement uncertainty!*

For 802.11ac VHT80 mode

Frequency	Receiver		Rx Antenna		Cable loss (dB)	Amplifier Gain (dB)	Corrected Amplitude (dBμV/m)	Limit (dBμV/m)	Margin (dB)
(MHz)	Reading (dBμV)	Detector (PK/QP/AV)	Polar (H/V)	Factor (dB)					
5775 MHz									
5775	74.49	PK	H	32.50	4.15	0.00	111.14	N/A	N/A
5775	54.42	AV	H	32.50	4.15	0.00	91.07	N/A	N/A
5775	74.87	PK	V	32.50	4.15	0.00	111.52	N/A	N/A
5775	54.71	AV	V	32.50	4.15	0.00	91.36	N/A	N/A
5724.95	51.93	PK	V	32.50	4.10	26.55	61.98	78.20	16.22
5724.95	35.41	AV	V	32.50	4.10	26.55	45.46	54.00	8.54
5850.05	52.36	PK	V	32.50	4.20	26.55	62.51	78.20	15.69
5850.05	36.54	AV	V	32.50	4.20	26.55	46.69	54.00	7.31
11550	33.51	PK	V	38.00	6.34	23.80	54.05	68.20	14.15
11550	19.67	AV	V	38.00	6.34	23.80	40.21	54.00	13.79
17325	31.04	PK	V	43.00	6.45	22.40	58.09	68.20	10.11
17325	16.54	AV	V	43.00	6.45	22.40	43.59	54.00	10.41
35.94	45.6	QP	V	13.37	0.26	26.20	33.03	40.00	6.97

For 802.11n HT20 mode

Frequency	Receiver		Rx Antenna		Cable loss (dB)	Amplifier Gain (dB)	Corrected Amplitude (dBμV/m)	Limit (dBμV/m)	Margin (dB)
(MHz)	Reading (dBμV)	Detector (PK/QP/AV)	Polar (H/V)	Factor (dB)					
5745 MHz									
5745	76.34	PK	H	32.50	4.15	0.00	112.99	N/A	N/A
5745	63.34	AV	H	32.50	4.15	0.00	99.99	N/A	N/A
5745	79.72	PK	V	32.50	4.15	0.00	116.37	N/A	N/A
5745	64.61	AV	V	32.50	4.15	0.00	101.26	N/A	N/A
5724.95	52.85	PK	V	32.50	4.10	26.55	62.90	78.20	15.30
5724.95	35.14	AV	V	32.50	4.10	26.55	45.19	54.00	8.81
5850.05	50.03	PK	V	32.50	4.20	26.55	60.18	78.20	18.02
5850.05	34.12	AV	V	32.50	4.20	26.55	44.27	54.00	9.73
11490	39.31	PK	V	38.00	6.34	23.80	59.85	68.20	8.35
11490	24.21	AV	V	38.00	6.34	23.80	44.75	54.00	9.25
17235	32.22	PK	V	43.00	6.45	22.40	59.27	68.20	8.93
17235	18.97	AV	V	43.00	6.45	22.40	46.02	54.00	7.98
35.94	46.3	QP	V	13.37	0.26	26.20	33.73	40.00	6.27
5785 MHz									
5785	80.2	PK	H	32.50	4.15	0.00	116.85	N/A	N/A
5785	65.82	AV	H	32.50	4.15	0.00	102.47	N/A	N/A
5785	79.91	PK	V	32.50	4.15	0.00	116.56	N/A	N/A
5785	65.18	AV	V	32.50	4.15	0.00	101.83	N/A	N/A
5724.95	49.12	PK	V	32.50	4.10	26.55	59.17	78.20	19.03
5724.95	34.16	AV	V	32.50	4.10	26.55	44.21	54.00	9.79
5850.05	50.15	PK	V	32.50	4.20	26.55	60.30	78.20	17.90
5850.05	33.98	AV	V	32.50	4.20	26.55	44.13	54.00	9.87
11570	36.88	PK	V	38.00	6.34	23.80	57.42	68.20	10.78
11570	22.54	AV	V	38.00	6.34	23.80	43.08	54.00	10.92
17355	30.56	PK	V	43.00	6.45	22.40	57.61	68.20	10.59
17355	16.93	AV	V	43.00	6.45	22.40	43.98	54.00	10.02
35.94	45.9	QP	V	13.37	0.26	26.20	33.33	40.00	6.67

For 802.11n HT20 mode

Frequency	Receiver		Rx Antenna		Cable loss (dB)	Amplifier Gain (dB)	Corrected Amplitude (dBμV/m)	Limit (dBμV/m)	Margin (dB)
(MHz)	Reading (dBμV)	Detector (PK/QP/AV)	Polar (H/V)	Factor (dB)					
5825 MHz									
5825	77.63	PK	H	32.50	4.15	0.00	114.28	N/A	N/A
5825	64.13	AV	H	32.50	4.15	0.00	100.78	N/A	N/A
5825	78.12	PK	V	32.50	4.15	0.00	114.77	N/A	N/A
5825	64.32	AV	V	32.50	4.15	0.00	100.97	N/A	N/A
5724.8	50.32	PK	V	32.50	4.10	26.55	60.37	78.20	17.83
5724.8	34.17	AV	V	32.50	4.10	26.55	44.22	54.00	9.78
5850.75	49.99	PK	V	32.50	4.20	26.55	60.14	78.20	18.06
5850.75	33.87	AV	V	32.50	4.20	26.55	44.02	54.00	9.98
11650	36.05	PK	V	38.00	6.34	23.80	56.59	68.20	11.61
11650	20.61	AV	V	38.00	6.34	23.80	41.15	54.00	12.85
17475	31.22	PK	V	43.00	6.45	22.40	58.27	68.20	9.93
17475	17.65	AV	V	43.00	6.45	22.40	44.70	54.00	9.30
35.94	45.4	QP	V	13.37	0.26	26.20	33.83	40.00	6.17

For 802.11n HT40 mode

Frequency	Receiver		Rx Antenna		Cable loss (dB)	Amplifier Gain (dB)	Corrected Amplitude (dBμV/m)	Limit (dBμV/m)	Margin (dB)
(MHz)	Reading (dBμV)	Detector (PK/QP/AV)	Polar (H/V)	Factor (dB)					
5755 MHz									
5755	78.18	PK	H	32.50	4.15	0.00	114.83	N/A	N/A
5755	63.01	AV	H	32.50	4.15	0.00	99.66	N/A	N/A
5755	76.16	PK	V	32.50	4.15	0.00	112.81	N/A	N/A
5755	60.32	AV	V	32.50	4.15	0.00	96.97	N/A	N/A
5724.95	54.71	PK	V	32.50	4.10	26.55	64.76	78.20	13.44
5724.95	37.65	AV	V	32.50	4.10	26.55	47.70	54.00	6.30
5850.05	50.22	PK	V	32.50	4.20	26.55	60.37	78.20	17.83
5850.05	34.02	AV	V	32.50	4.20	26.55	44.17	54.00	9.83
11510	35.23	PK	V	38.00	6.34	23.80	55.77	68.20	12.43
11510	21.65	AV	V	38.00	6.34	23.80	42.19	54.00	11.81
17265	32.28	PK	V	43.00	6.45	22.40	59.33	68.20	8.87
17265	18.71	AV	V	43.00	6.45	22.40	45.76	54.00	8.24
35.94	45.3	QP	V	13.37	0.26	26.20	32.73	40.00	7.27
5795 MHz									
5795	77.64	PK	H	32.50	4.15	0.00	114.29	N/A	N/A
5795	62.72	AV	H	32.50	4.15	0.00	99.37	N/A	N/A
5795	75.64	PK	V	32.50	4.15	0.00	112.29	N/A	N/A
5795	60.29	AV	V	32.50	4.15	0.00	96.94	N/A	N/A
5724.95	50.42	PK	V	32.50	4.10	26.55	60.47	78.20	17.73
5724.95	33.25	AV	V	32.50	4.10	26.55	43.30	54.00	10.70
5850.05	54.15	PK	V	32.50	4.20	26.55	64.30	78.20	13.90
5850.05	37.62	AV	V	32.50	4.20	26.55	47.77	54.00	6.23
11590	34.26	PK	V	38.00	6.34	23.80	54.80	68.20	13.40
11590	20.49	AV	V	38.00	6.34	23.80	41.03	54.00	12.97
17385	30.97	PK	V	43.00	6.45	22.40	58.02	68.20	10.18
17385	17.56	AV	V	43.00	6.45	22.40	44.61	54.00	9.39
35.94	45.2	QP	V	13.37	0.26	26.20	32.63	40.00	7.37

Note:
Corrected Amplitude = Receiver Reading + Cable loss + Antenna Factor – Amplifier Gain
Margin = Limit-Corrected Amplitude

FCC §15.407(a) (1) (3) & (e) – 26dB & 6dB BANDWIDTH

Applicable Standard

For an outdoor access point operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 17 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. The maximum e.i.r.p. at any elevation angle above 30 degrees as measured from the horizon must not exceed 125 mW (21 dBm).

For the band 5.725-5.85 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W. In addition, the maximum power spectral density shall not exceed 30 dBm in any 500-kHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. However, fixed point-to-point U-NII devices operating in this band may employ transmitting antennas with directional gain greater than 6 dBi without any corresponding reduction in transmitter conducted power. Fixed, point-to-point operations exclude the use of point-to-multipoint systems, omnidirectional applications, and multiple collocated transmitters transmitting the same information. The operator of the U-NII device, or if the equipment is professionally installed, the installer, is responsible for ensuring that systems employing high gain directional antennas are used exclusively for fixed, point-to-point operations.

Within the 5.725-5.85 GHz band, the minimum 6 dB bandwidth of U-NII devices shall be at least 500 kHz.

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	Spectrum Analyzer	FSEM30	100018	2014-10-17	2015-10-16

*** Statement of Traceability:** BACL (Chengdu) attested that all calibrations have been performed, traceable to National Primary Standards and International System of Units (SI).

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.

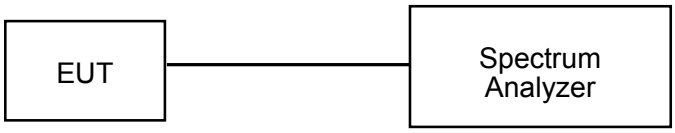
(A) 26dB Bandwidth

Set RBW = approximately 1% of the emission bandwidth.
Set the VBW > RBW.Detector= Peak. Trace mode = max hold. Measure the maximum width of the emission that is 26 dB down from the maximum of the emission. Compare this with the RBW setting of the analyzer. Readjust RBW and repeat measurement as needed until the RBW/EBW ratio is approximately 1%.

(B) 6dB Bandwidth

Set RBW = 100 kHz. Set the video bandwidth (VBW) ≥ 3 × RBW.
Detector = Peak.Tracemode = max hold. Sweep = auto couple. Allow the trace to stabilize. Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission.

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



Test Data

Environmental Conditions

Temperature:	25°C & 23 °C
Relative Humidity:	54%, 48% & 58 %
ATM Pressure:	97.1 kPa ,97.5 kPa & 96.2 kPa

The testing was performed by Kevin Tao on 2015-06-17, 2015-06-18 & 2015-06-19.

Test Result: Pass.

Please refer to the following tables and plots.

Test mode: Transmitting

5150-5250 MHz:

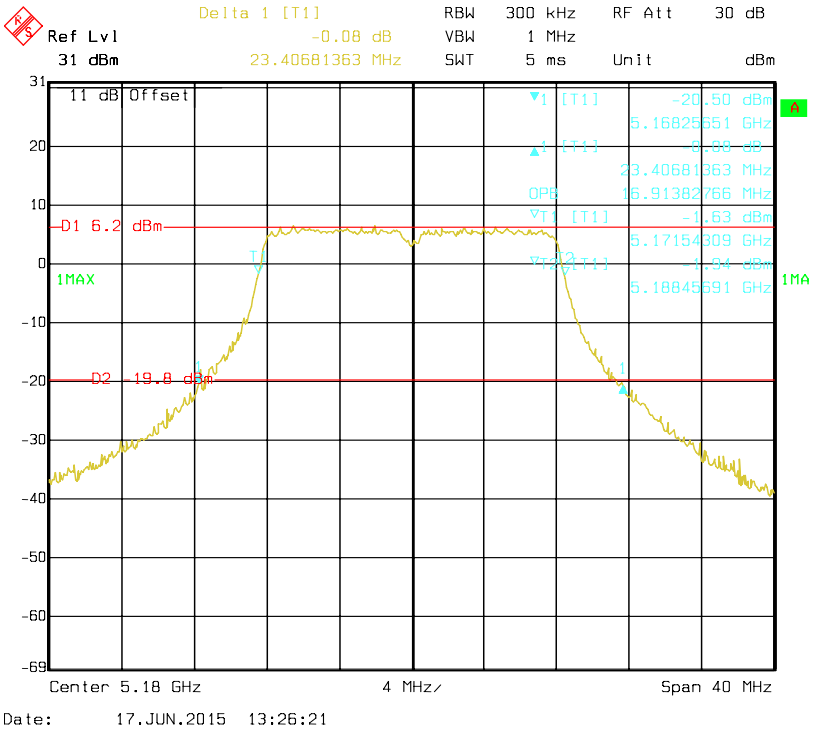
Mode	Channel	Frequency (MHz)	26dB Bandwidth (MHz)			Limit (kHz)
			Antenna 0	Antenna 1	Antenna 2	
802.11a	Low	5180	23.40	23.48	23.48	-
	Middle	5220	23.48	23.48	23.48	-
	High	5240	23.48	23.48	23.40	-
802.11ac VHT20	Low	5180	24.52	24.12	24.12	-
	Middle	5220	24.12	24.12	24.12	-
	High	5240	24.60	24.12	24.12	-
802.11ac VHT40	Low	5190	47.49	46.41	46.05	-
	High	5230	46.53	46.41	46.05	-
802.11ac VHT80	Low	5210	88.73	88.49	89.21	-
802.11n HT20	Low	5180	24.68	23.48	24.12	-
	Middle	5220	24.12	23.48	24.12	-
	High	5240	24.04	23.80	24.12	-
802.11n HT40	Low	5190	47.37	46.65	46.05	-
	High	5230	46.53	46.65	46.05	-

5725-5850 MHz:

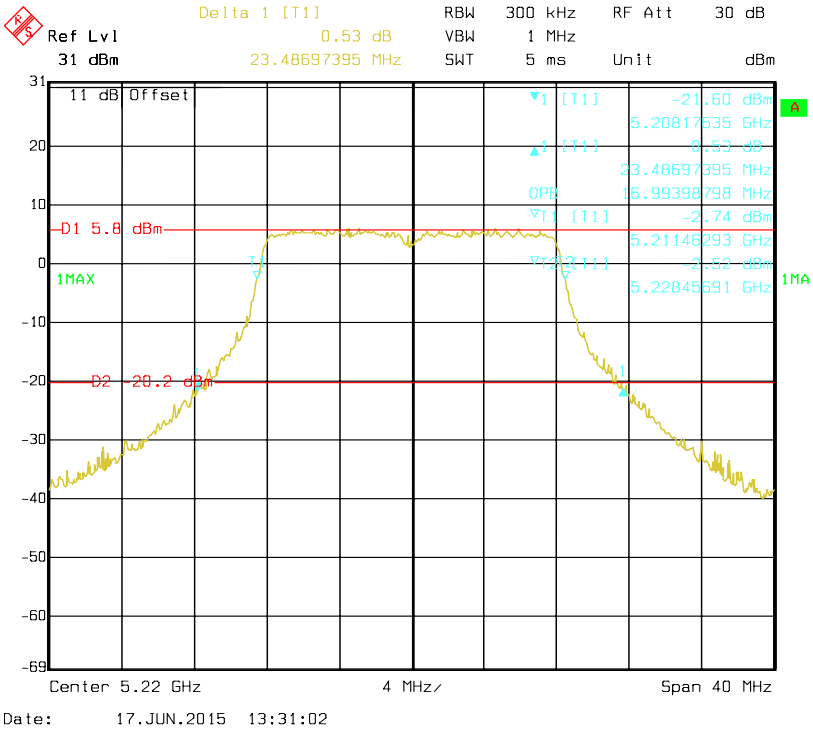
Mode	Channel	Frequency (MHz)	6dB Bandwidth (MHz)			Limit (kHz)
			Antenna 0	Antenna 1	Antenna 2	
802.11a	Low	5745	16.59	16.59	16.59	>500
	Middle	5785	16.59	16.59	16.59	>500
	High	5825	16.59	16.59	16.59	>500
802.11ac VHT20	Low	5745	17.79	17.79	17.79	>500
	Middle	5785	17.79	17.79	17.79	>500
	High	5825	17.79	17.79	17.79	>500
802.11ac VHT40	Low	5755	36.67	36.67	36.67	>500
	High	5795	36.67	36.67	36.67	>500
802.11ac VHT80	Low	5775	76.47	76.71	76.71	>500
802.11n HT20	Low	5745	17.79	17.79	17.79	>500
	Middle	5785	17.79	17.79	17.79	>500
	High	5825	17.79	17.79	17.79	>500
802.11n HT40	Low	5755	36.67	36.79	36.67	>500
	High	5795	36.67	36.67	36.67	>500

5150-5250 MHz:

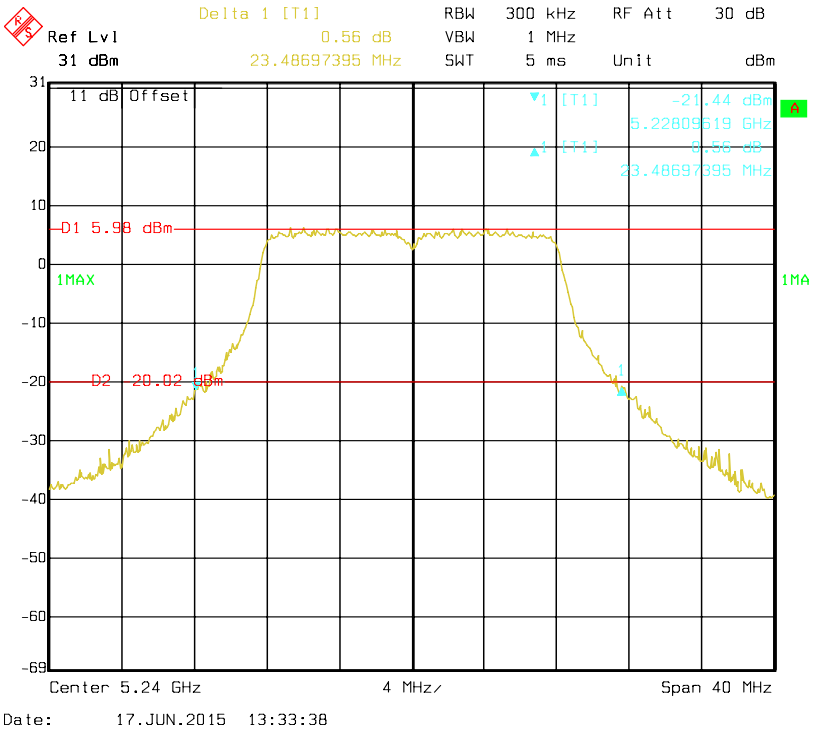
802.11a mode, Antenna 0: 26 dB Bandwidth-5180 MHz



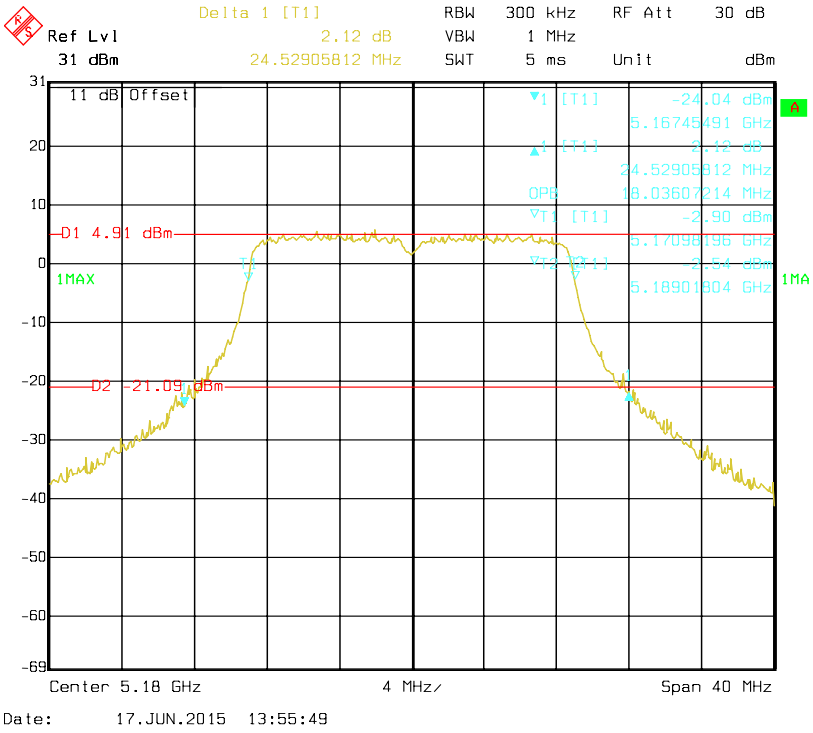
802.11a mode, Antenna 0: 26 dB Bandwidth -5220 MHz



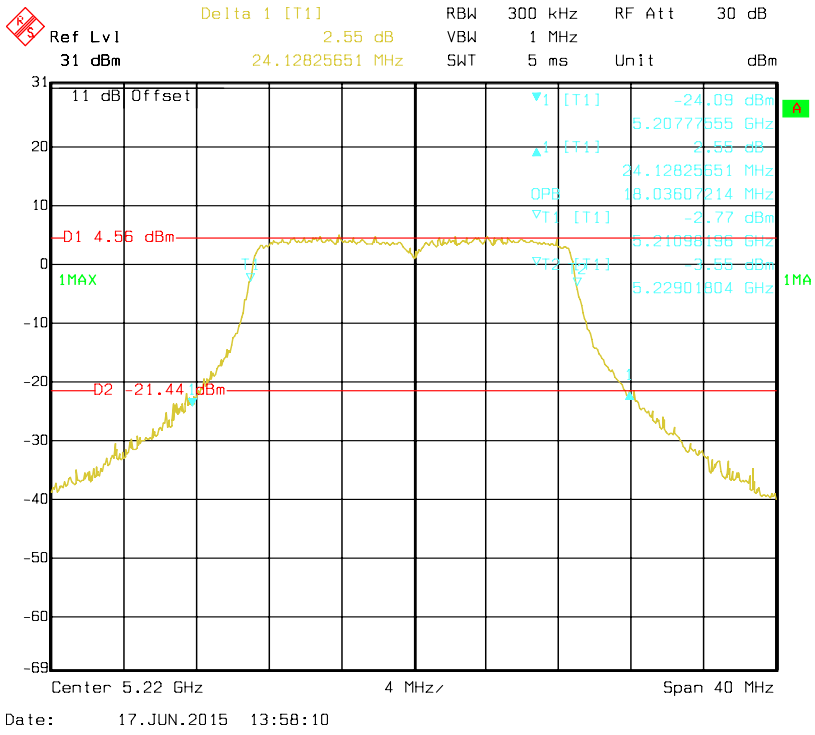
802.11a mode, Antenna 0: 26 dB Bandwidth-5240 MHz



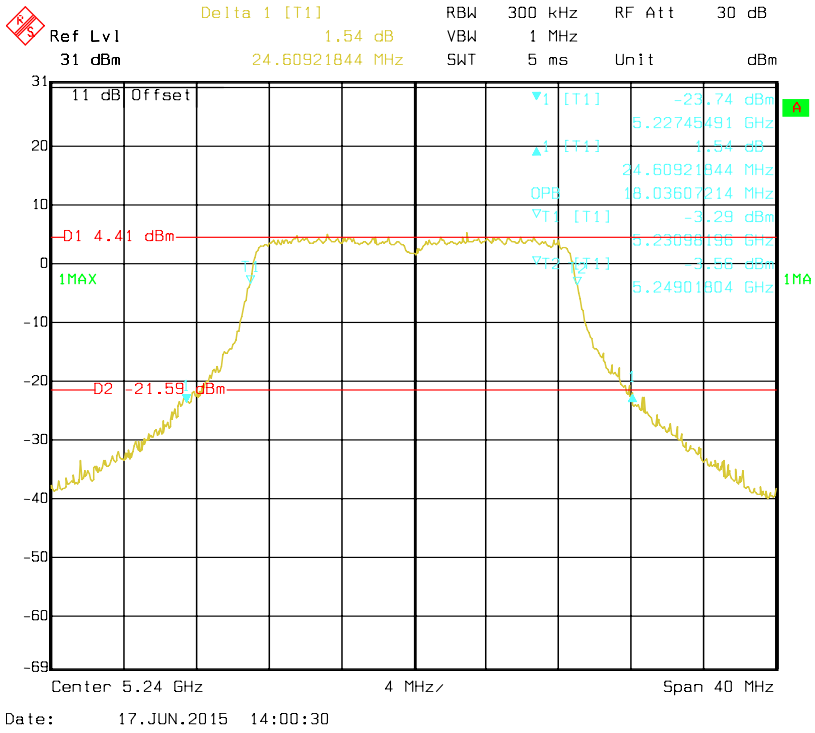
802.11ac VHT20 mode, Antenna 0: 26 dB Bandwidth-5180 MHz



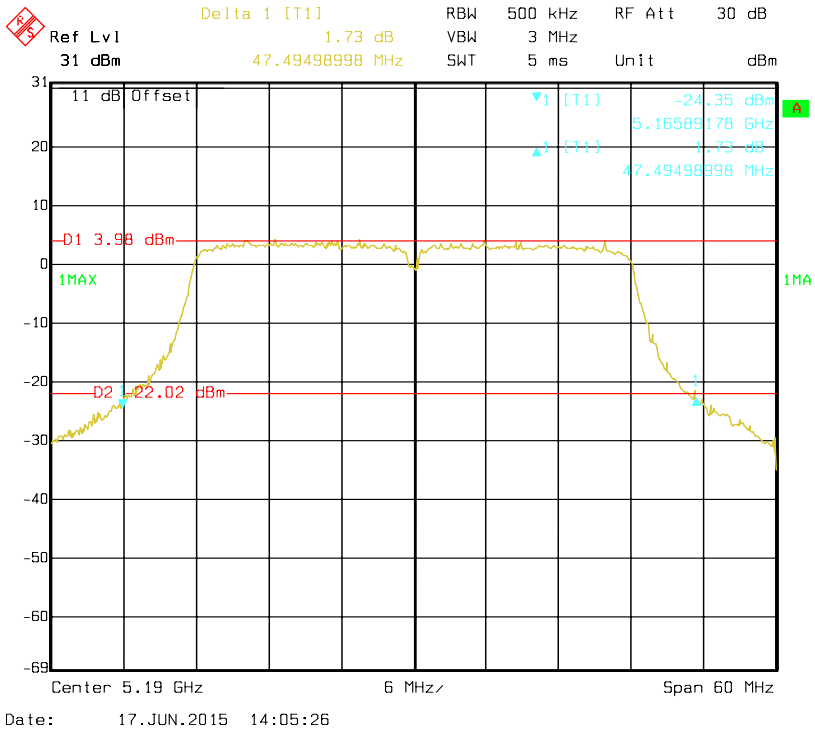
802.11ac VHT20 mode, Antenna 0: 26 dB Bandwidth-5220 MHz



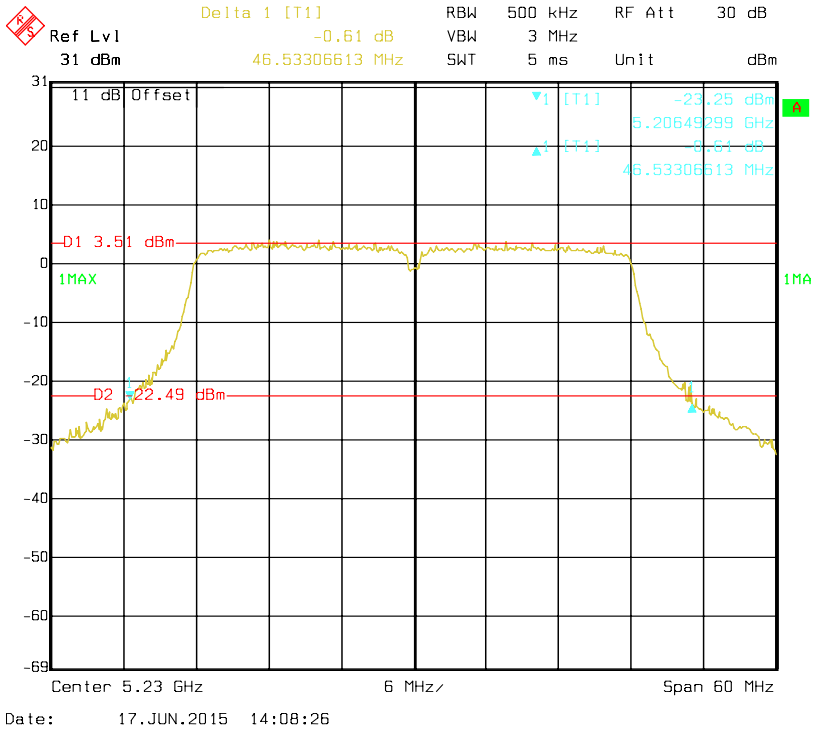
802.11ac VHT20 mode, Antenna 0: 26 dB Bandwidth-5240 MHz



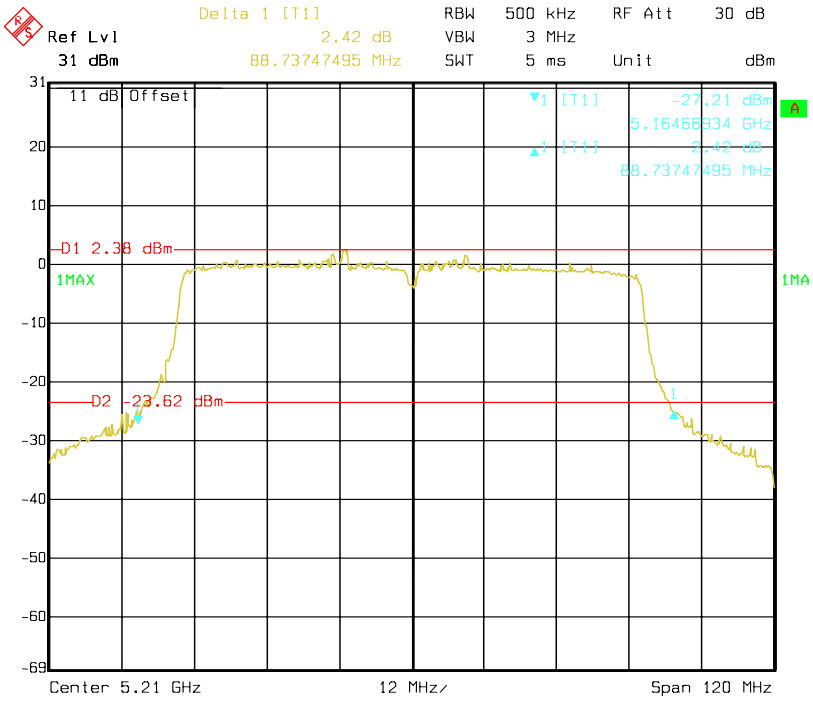
802.11ac VHT40 mode, Antenna 0: 26 dB Bandwidth-5190 MHz



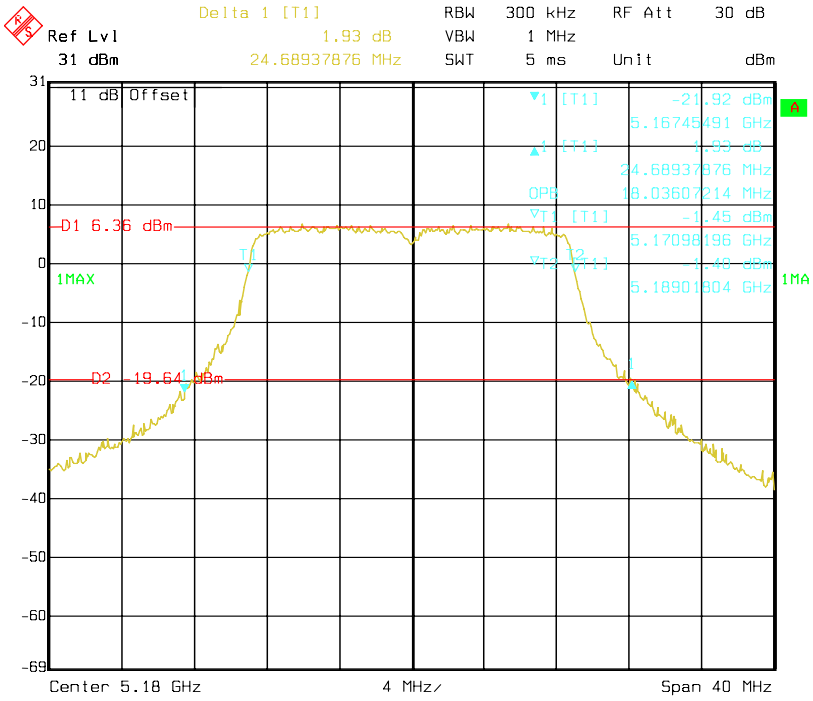
802.11ac VHT40 mode, Antenna 0: 26 dB Bandwidth-5230 MHz



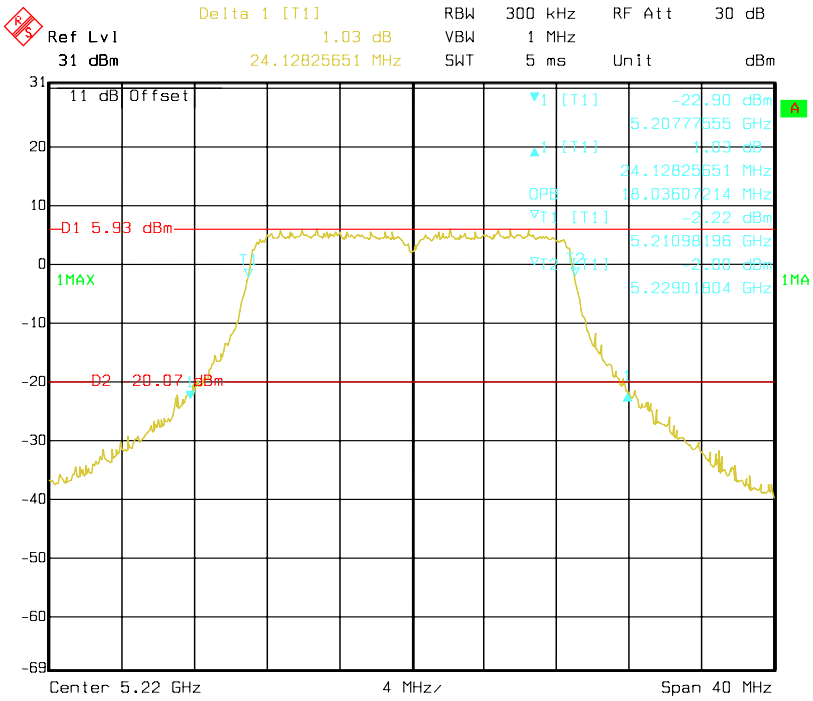
802.11ac VHT80 mode, Antenna 0: 26 dB Bandwidth-5210 MHz



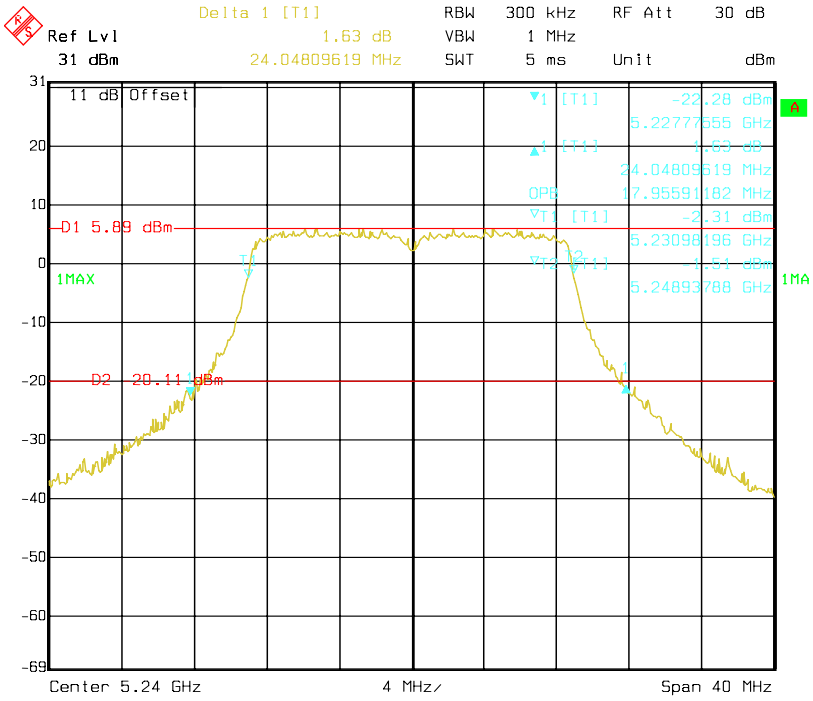
802.11n HT20 mode, Antenna 0: 26 dB Bandwidth-5180 MHz



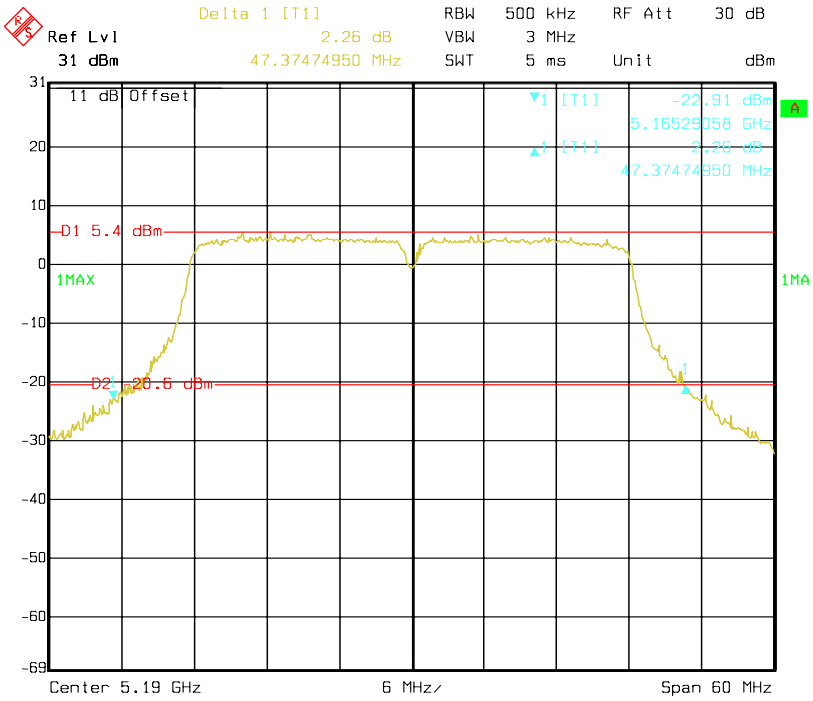
802.11n HT20 mode, Antenna 0: 26 dB Bandwidth-5220 MHz



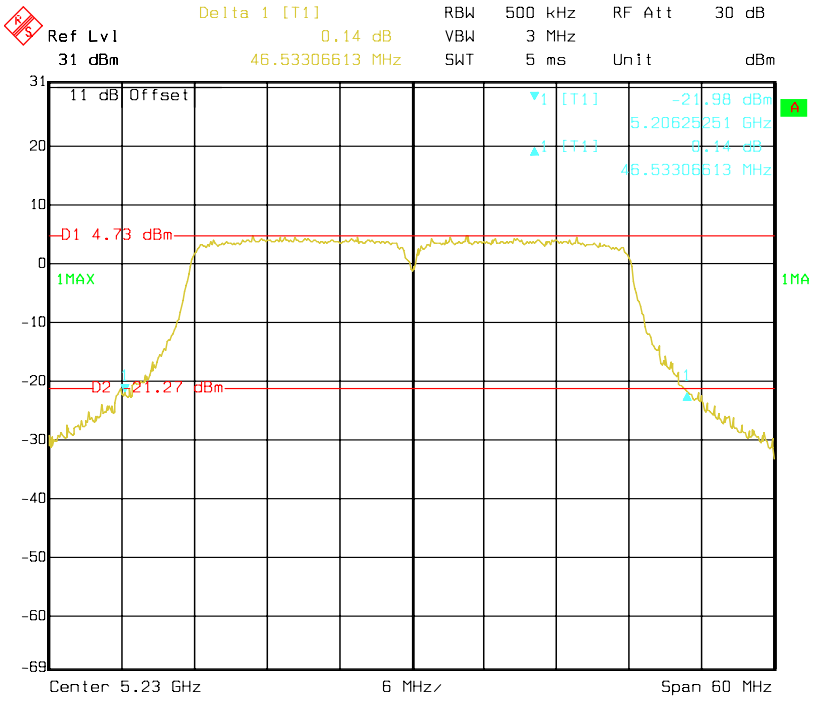
802.11n HT20 mode, Antenna 0: 26 dB Bandwidth-5240 MHz



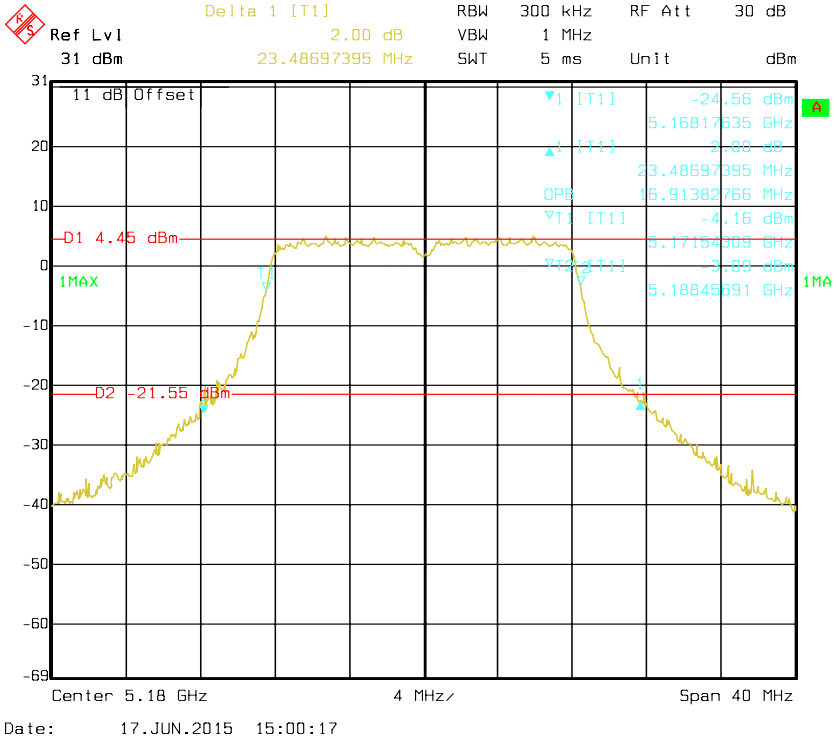
802.11n HT40 mode, Antenna 0: 26 dB Bandwidth-5190 MHz



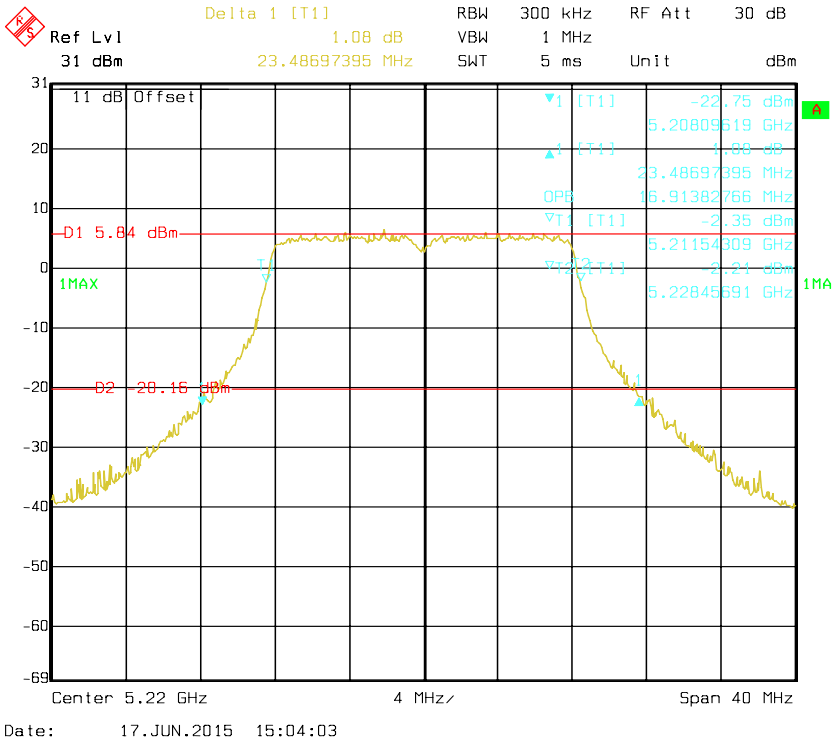
802.11n HT40 mode, Antenna 0: 26 dB Bandwidth-5230 MHz



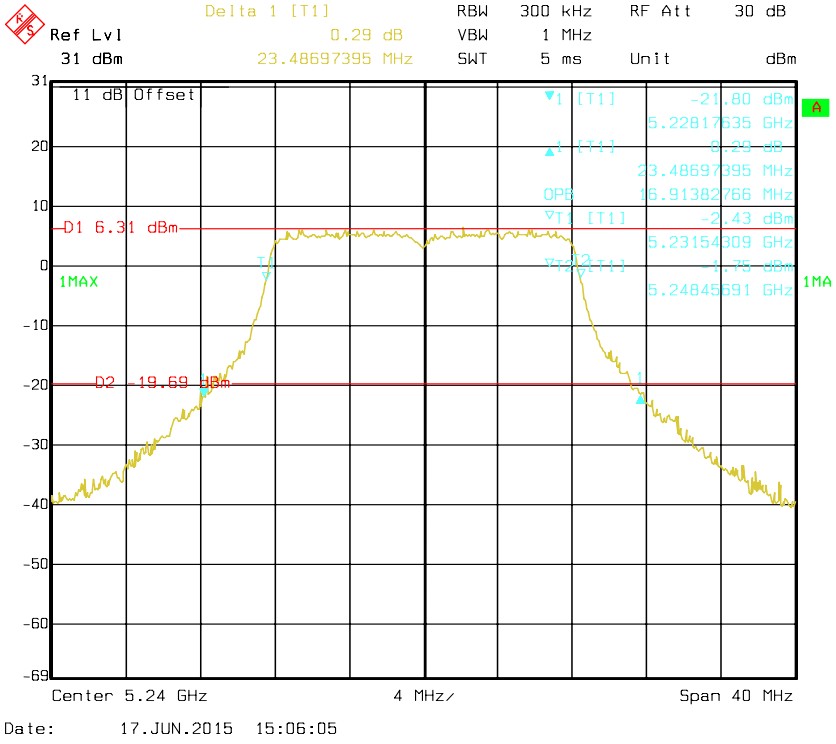
802.11a mode, Antenna 1: 26 dB Bandwidth-5180 MHz



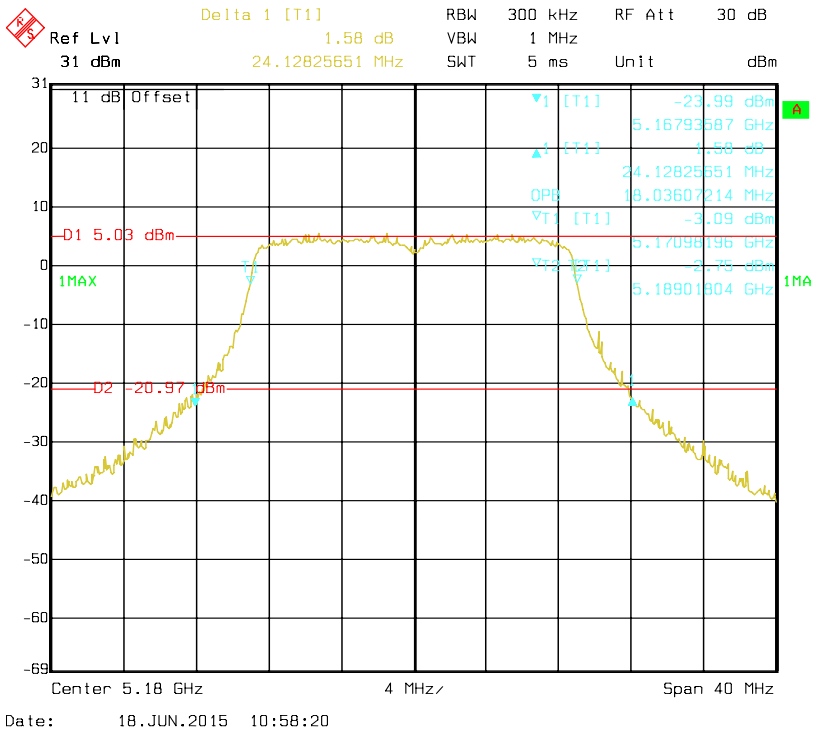
802.11a mode, Antenna 1: 26 dB Bandwidth-5220 MHz



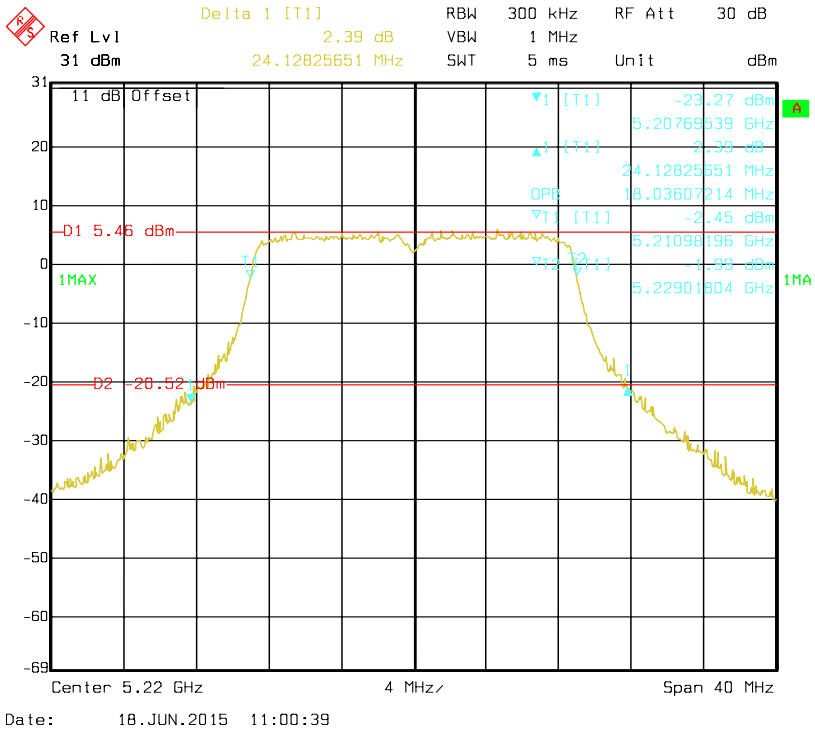
802.11a mode, Antenna 1: 26 dB Bandwidth-5240 MHz



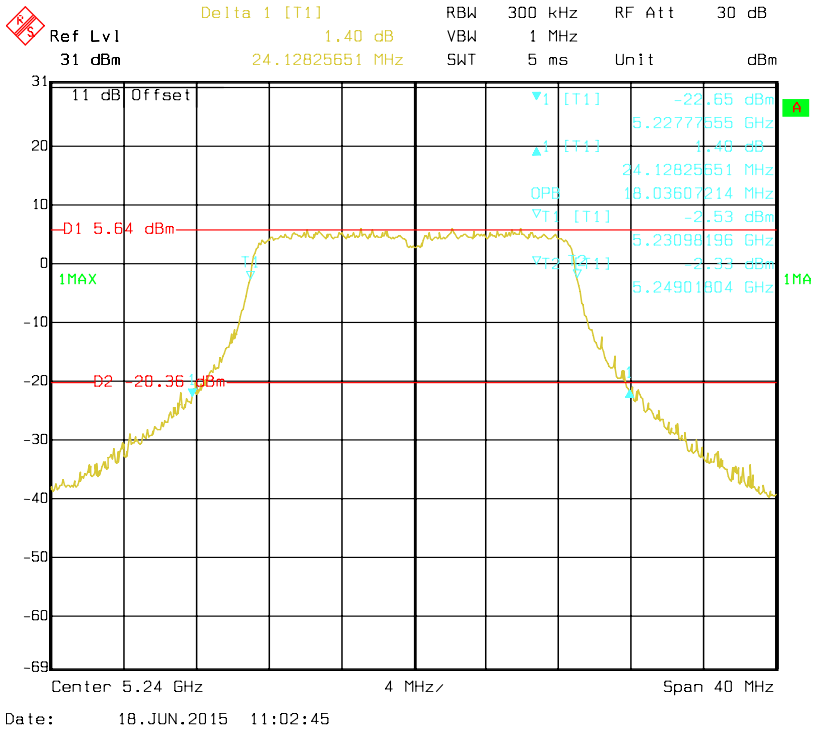
802.11ac VHT20 mode, Antenna 1: 26 dB Bandwidth-5180 MHz



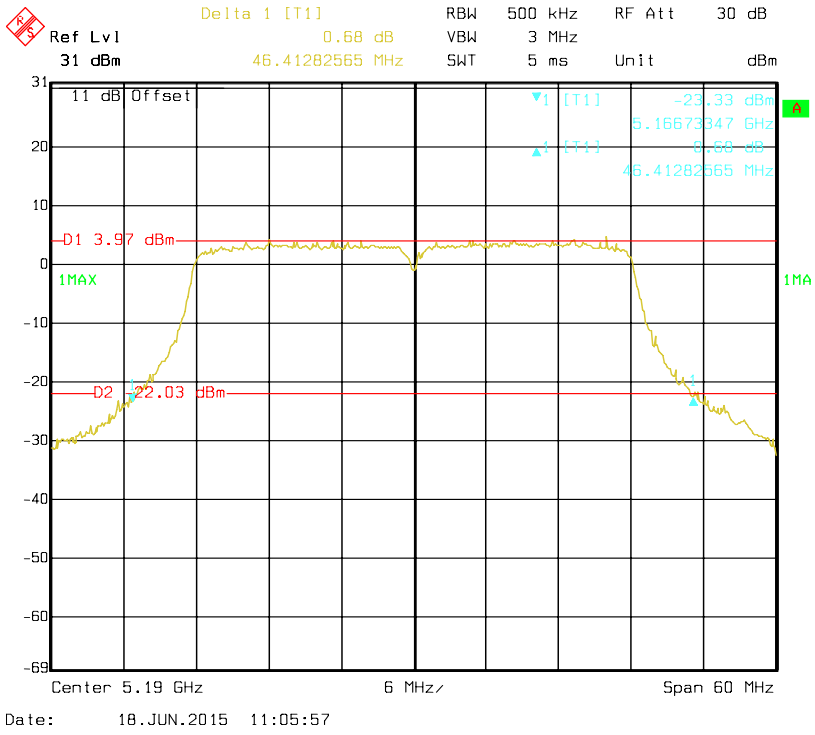
802.11ac VHT20 mode, Antenna 1: 26 dB Bandwidth-5220 MHz



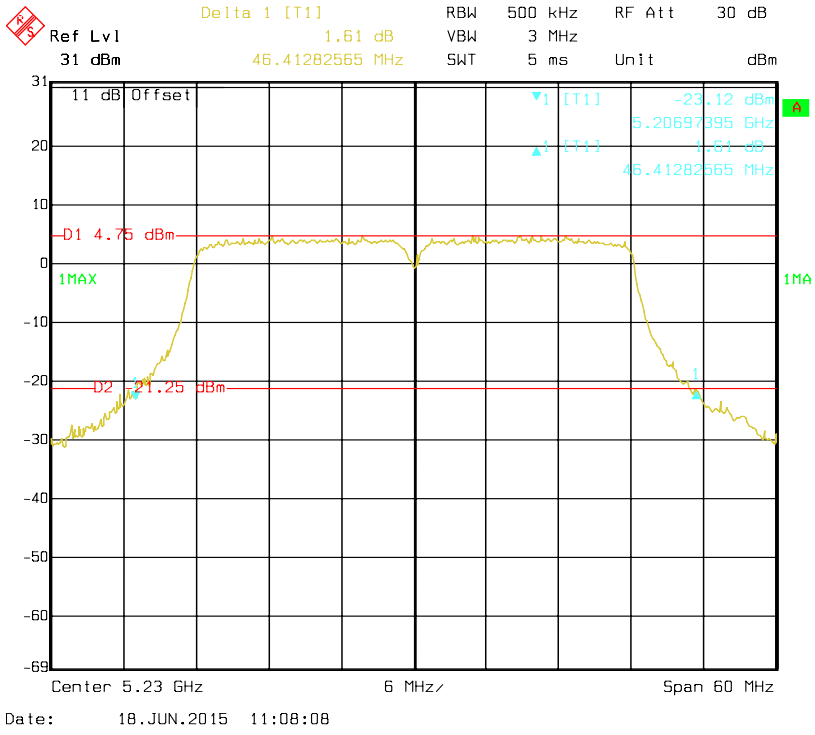
802.11ac VHT20 mode, Antenna 1: 26 dB Bandwidth-5240 MHz



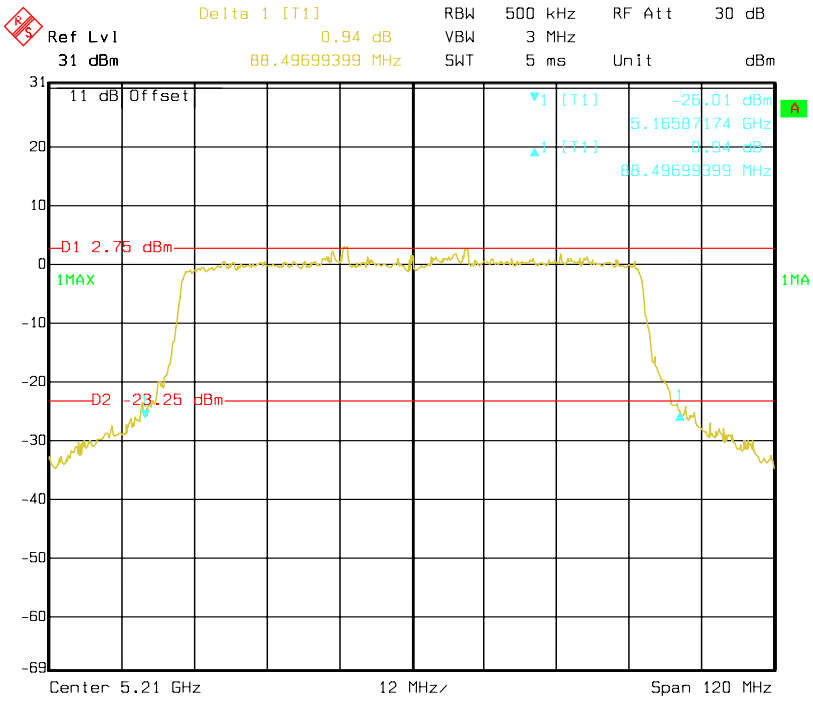
802.11ac VHT40 mode, Antenna 1: 26 dB Bandwidth-5190 MHz



802.11ac VHT40 mode, Antenna 1: 26 dB Bandwidth-5230 MHz

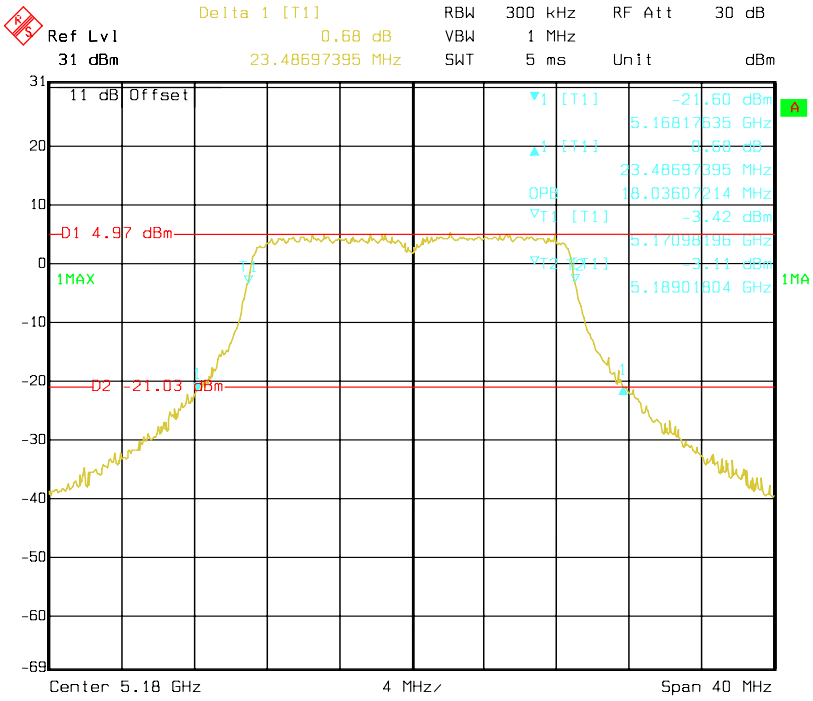


802.11ac VHT80 mode, Antenna 1: 26 dB Bandwidth-5210 MHz



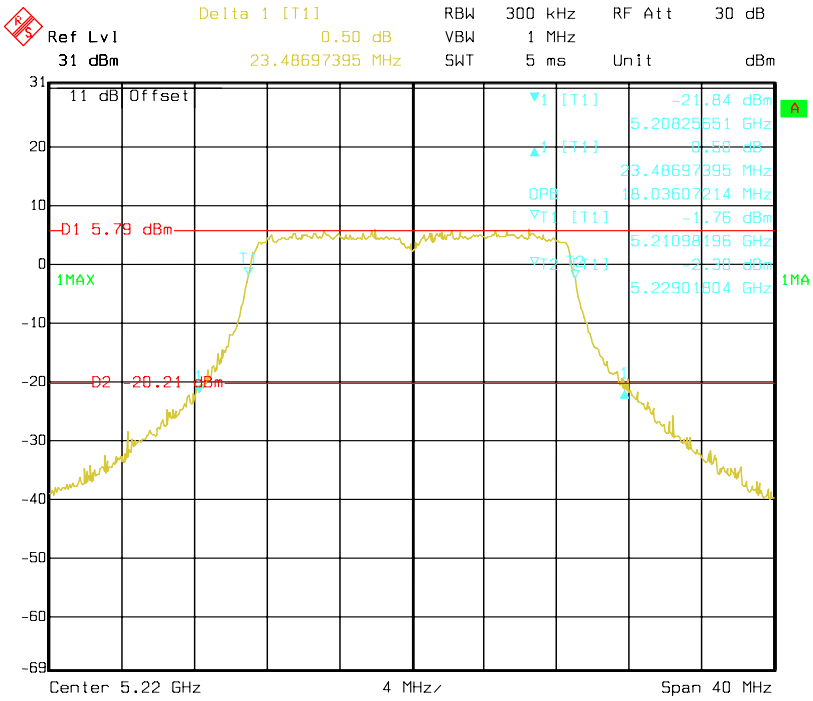
Date: 18.JUN.2015 11:10:40

802.11n HT20 mode, Antenna 1: 26 dB Bandwidth-5180 MHz

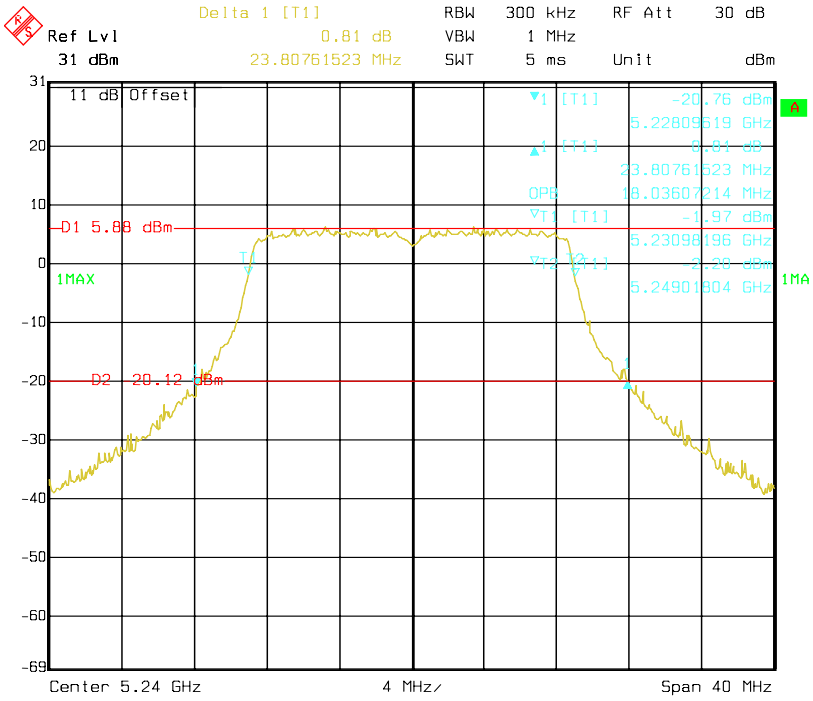


Date: 17.JUN.2015 15:09:14

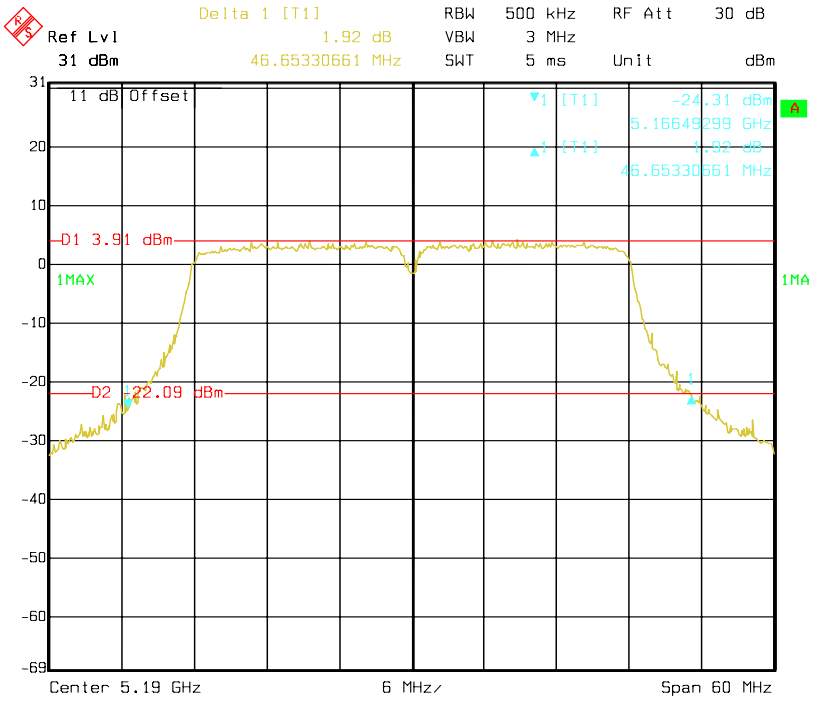
802.11n HT20 mode, Antenna 1: 26 dB Bandwidth-5220 MHz



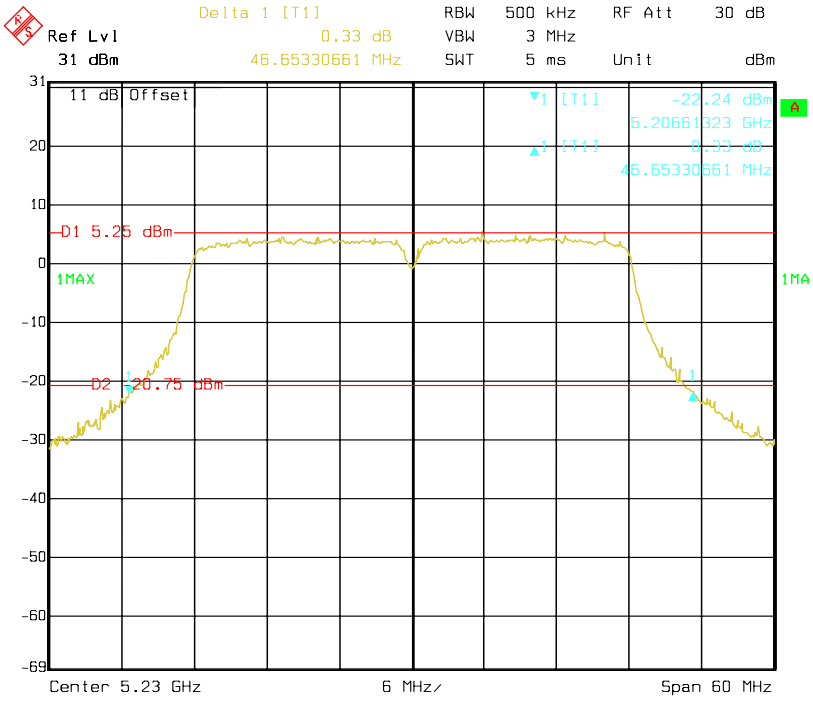
802.11n HT20 mode, Antenna 1: 26 dB Bandwidth-5240 MHz



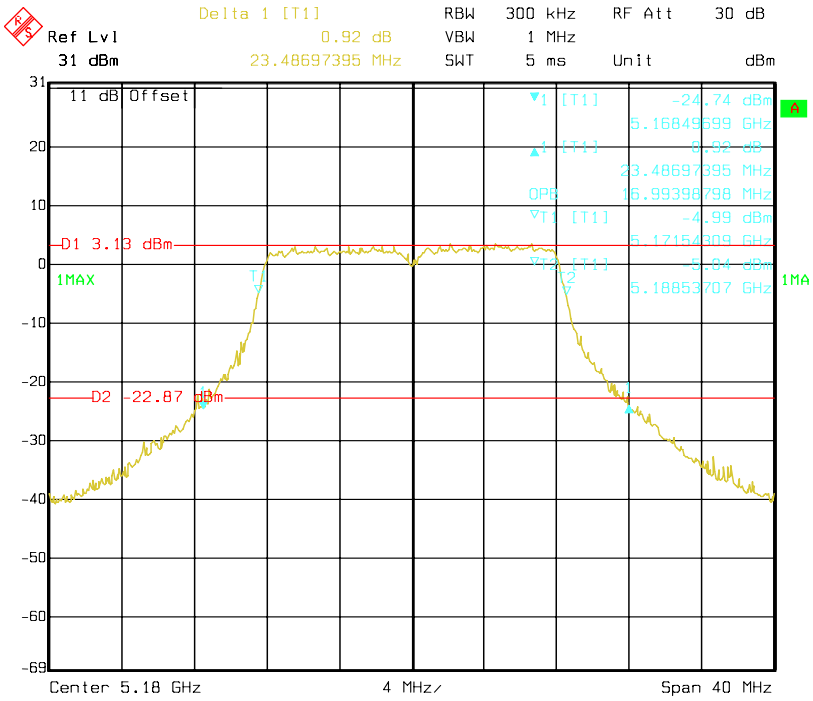
802.11n HT40 mode, Antenna 1: 26 dB Bandwidth-5190 MHz



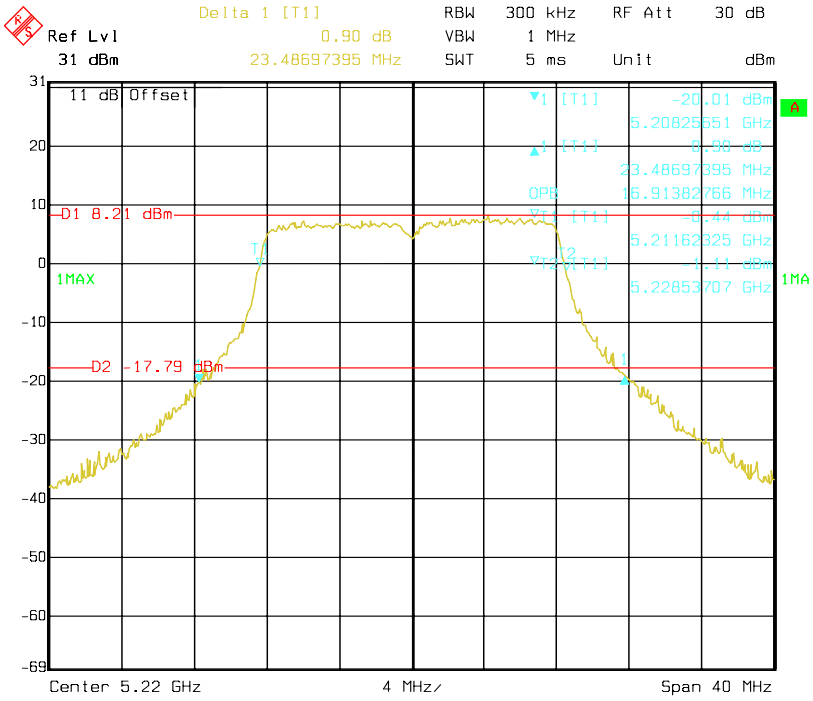
802.11n HT40 mode, Antenna 1: 26 dB Bandwidth-5230 MHz



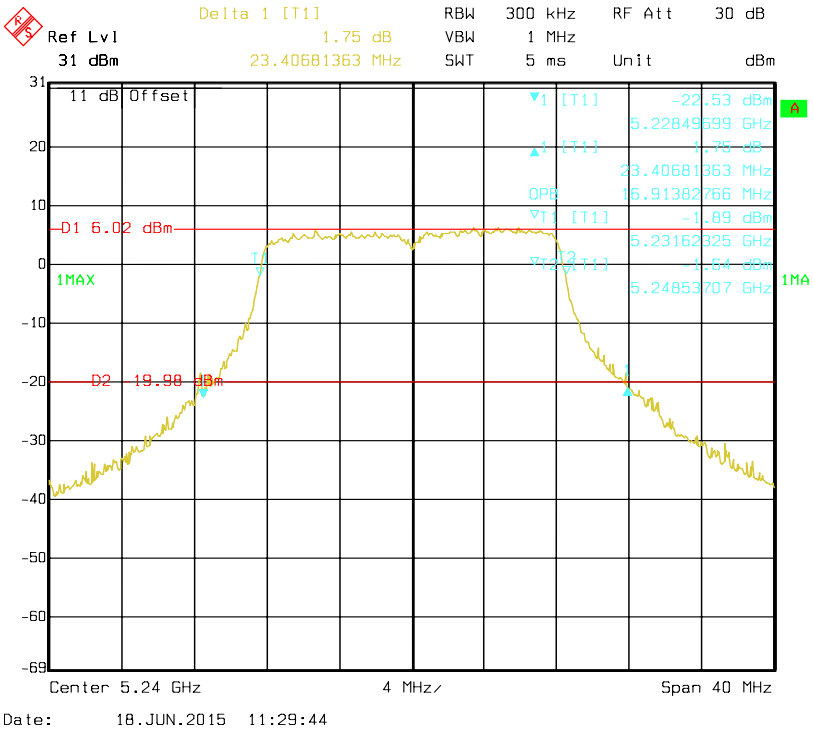
802.11a mode, Antenna 2: 26 dB Bandwidth-5180 MHz



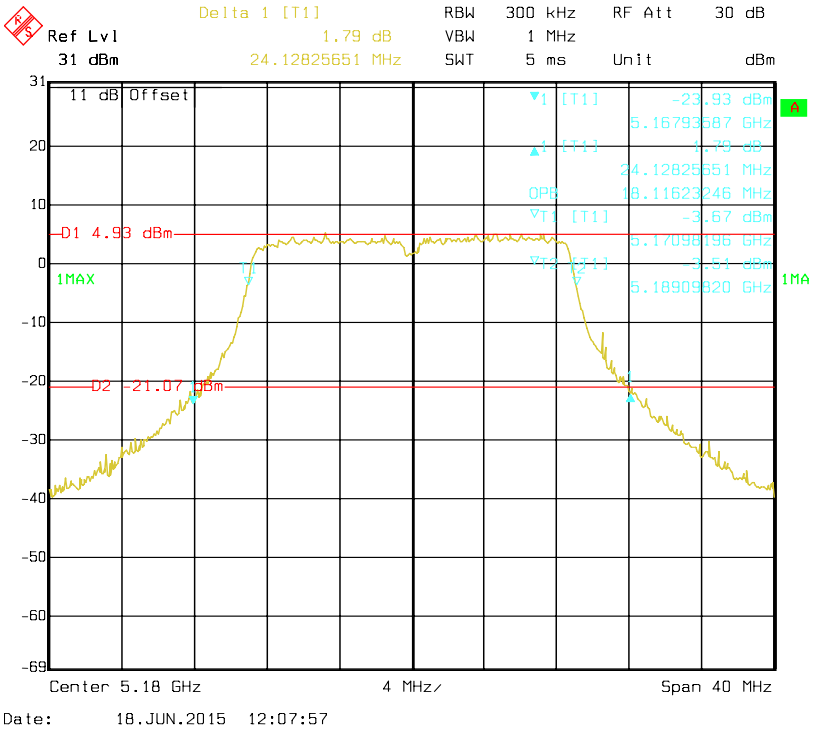
802.11a mode, Antenna 2: 26 dB Bandwidth-5220 MHz



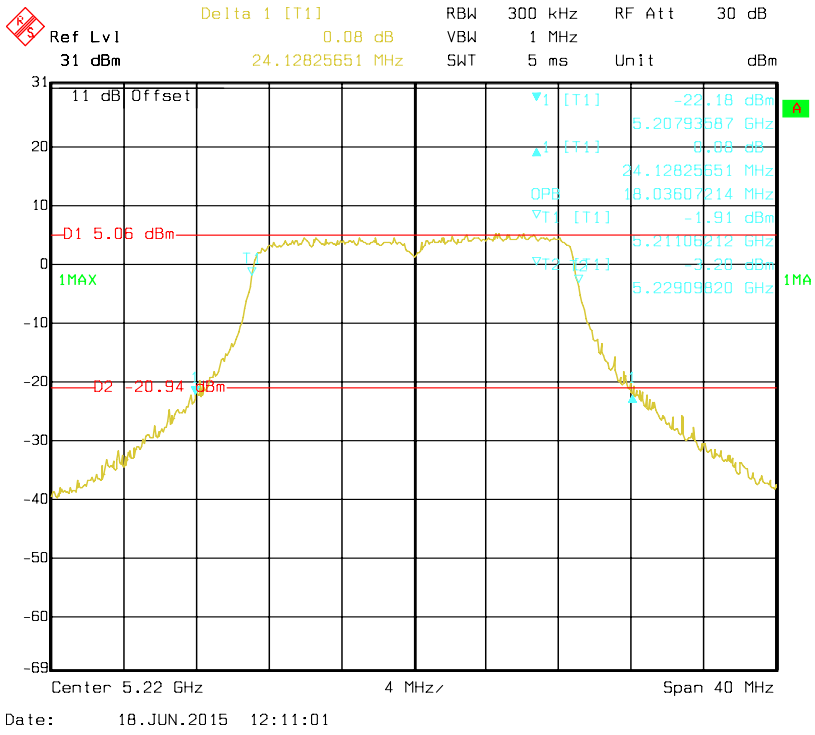
802.11a mode, Antenna 2: 26 dB Bandwidth-5240 MHz



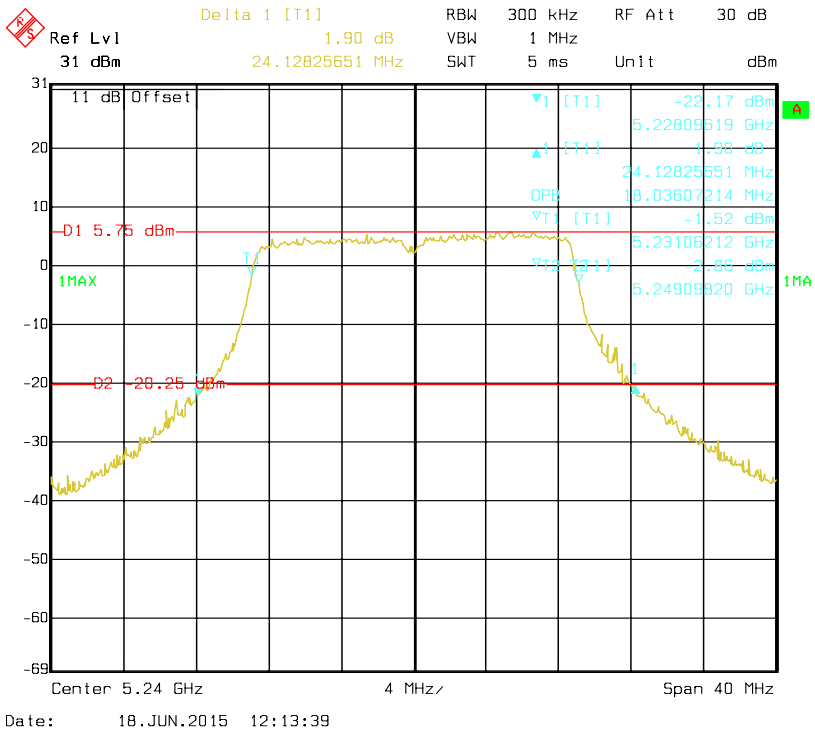
802.11ac VHT20 mode, Antenna 2: 26 dB Bandwidth-5180 MHz



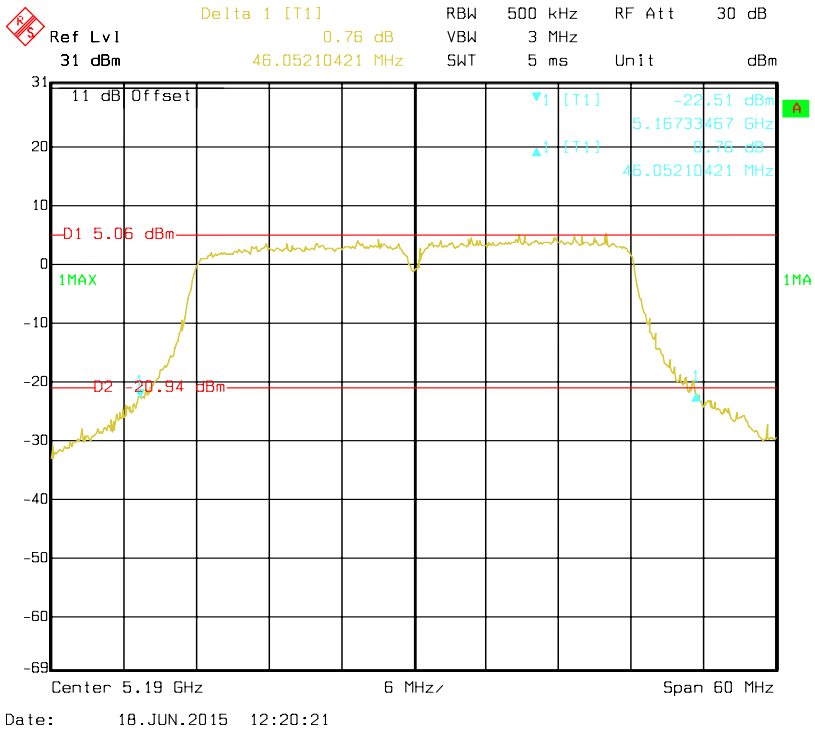
802.11ac VHT20 mode, Antenna 2: 26 dB Bandwidth-5220 MHz



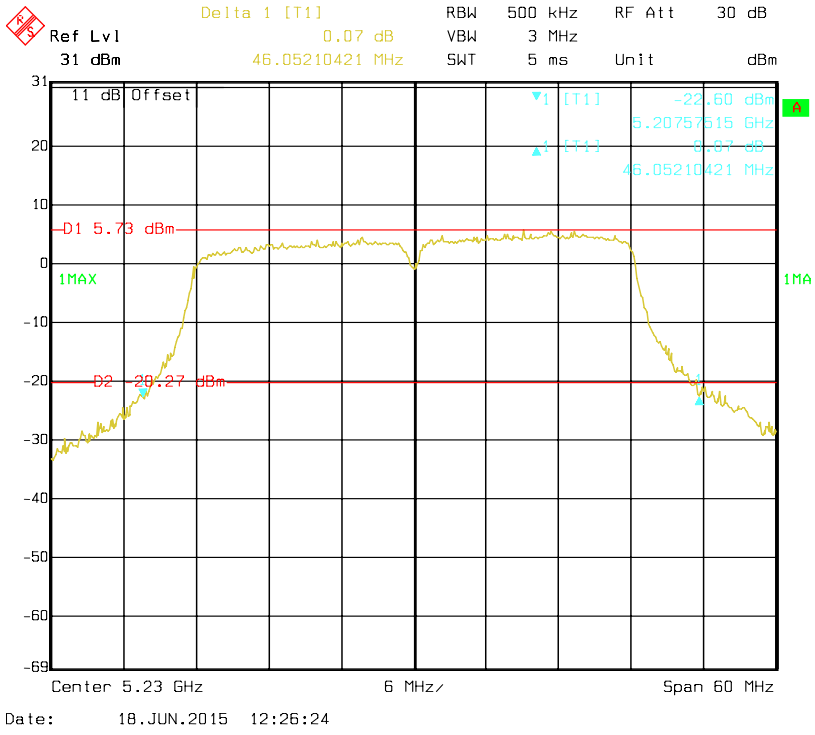
802.11ac VHT20 mode, Antenna 2: 26 dB Bandwidth-5240 MHz



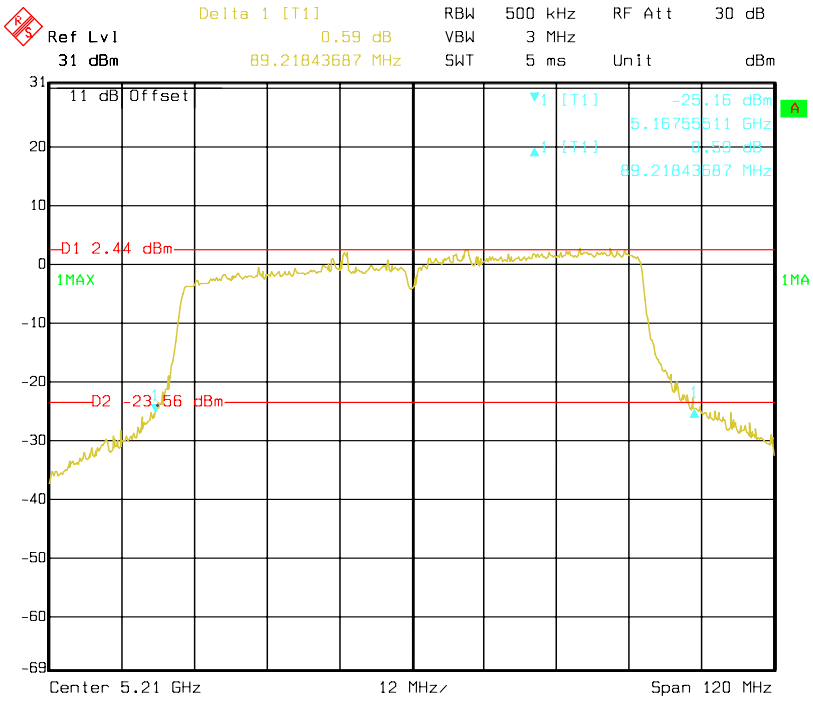
802.11ac VHT40 mode, Antenna 2: 26 dB Bandwidth-5190 MHz



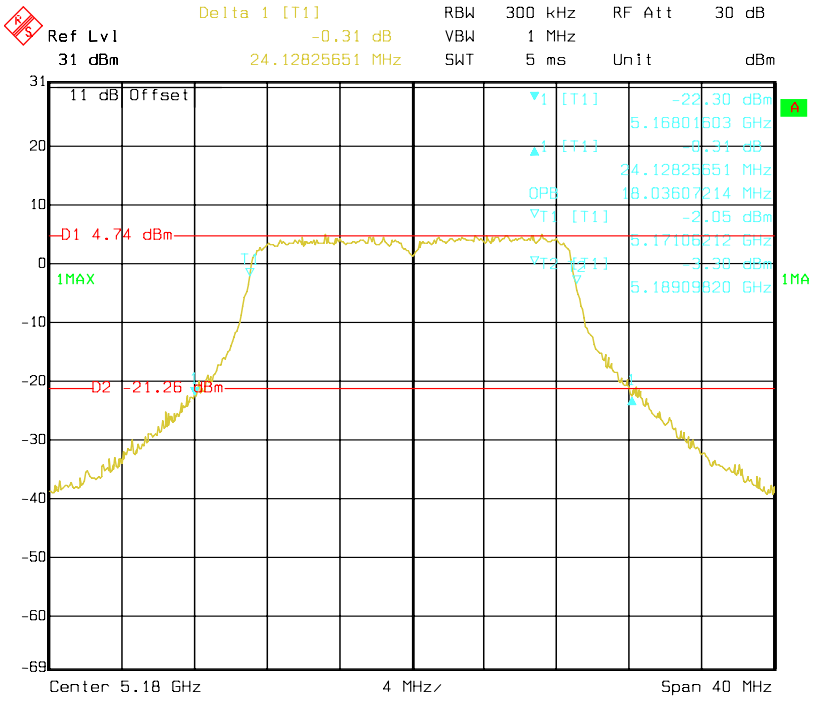
802.11ac VHT40 mode, Antenna 2: 26 dB Bandwidth-5230 MHz



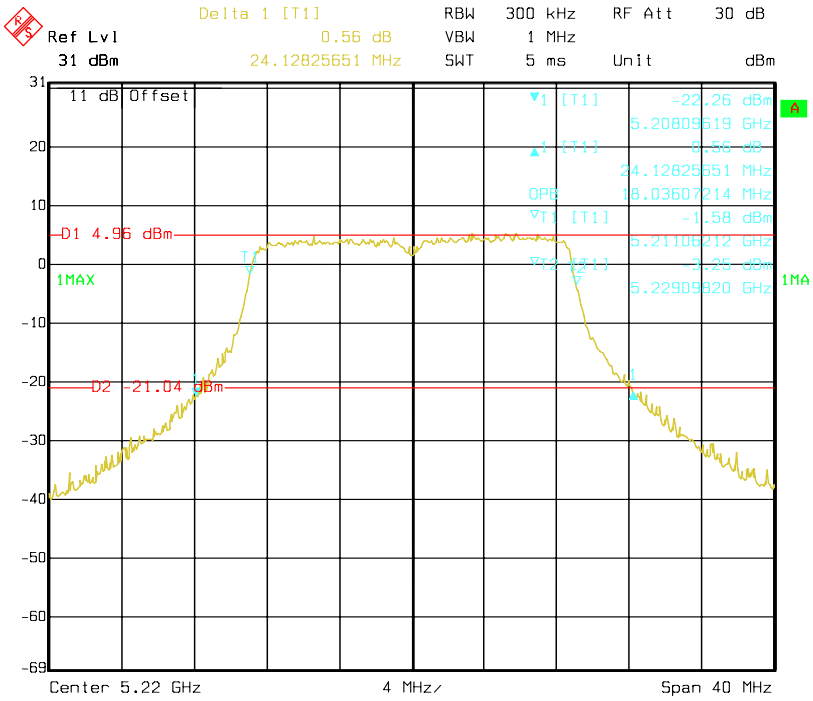
802.11ac VHT80 mode, Antenna 2: 26 dB Bandwidth-5210 MHz



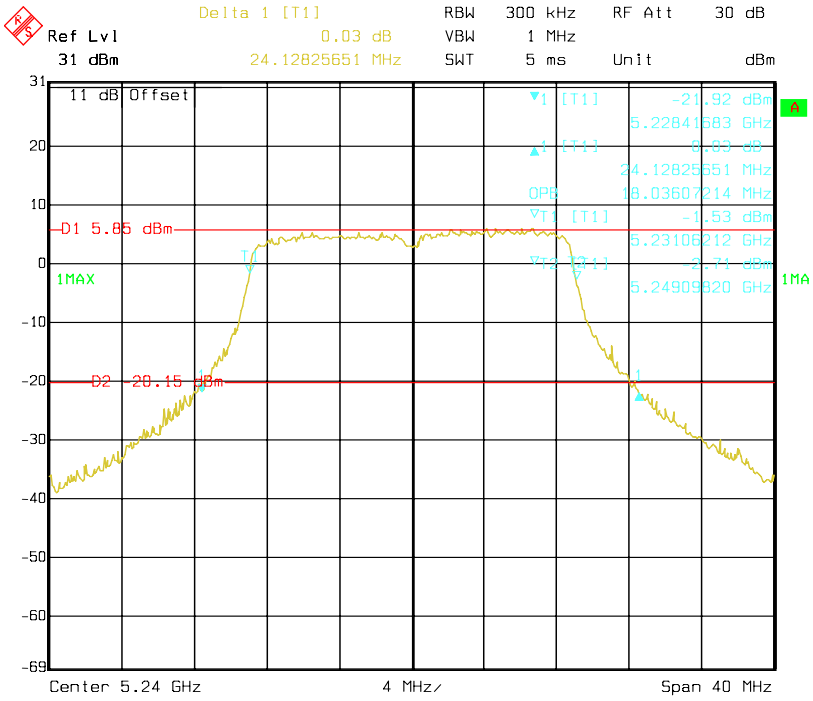
802.11n HT20 mode, Antenna 2: 26 dB Bandwidth-5180 MHz



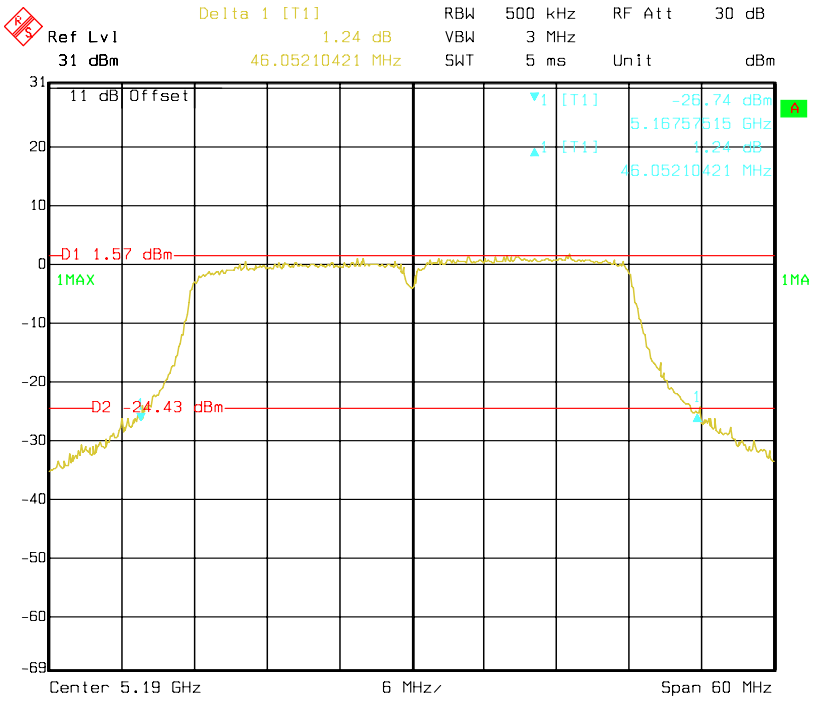
802.11n HT20 mode, Antenna 2: 26 dB Bandwidth-5220 MHz



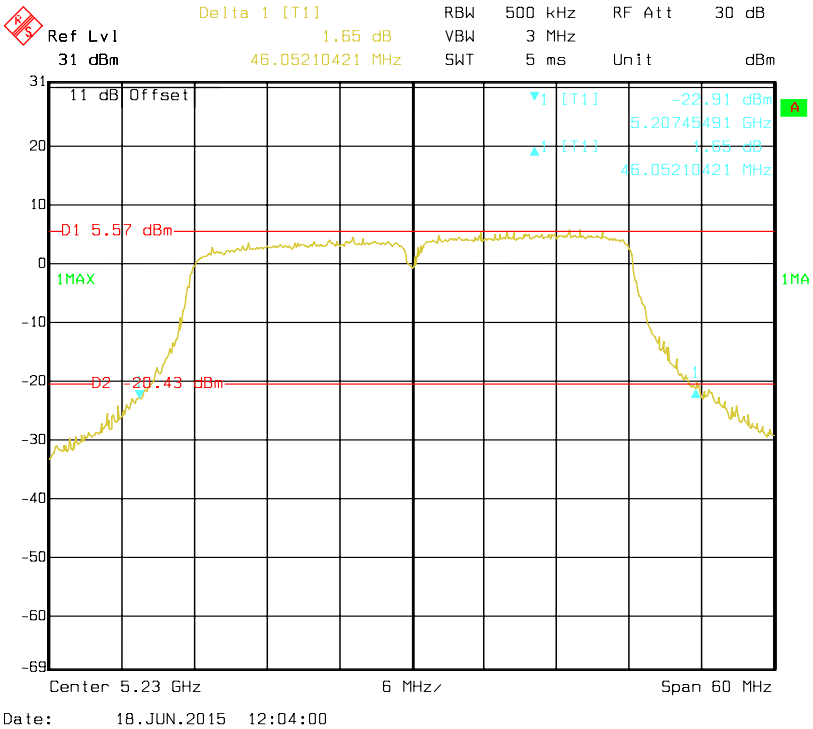
802.11n HT20 mode, Antenna 2: 26 dB Bandwidth-5240 MHz



802.11n HT40 mode, Antenna 2: 26 dB Bandwidth-5190 MHz

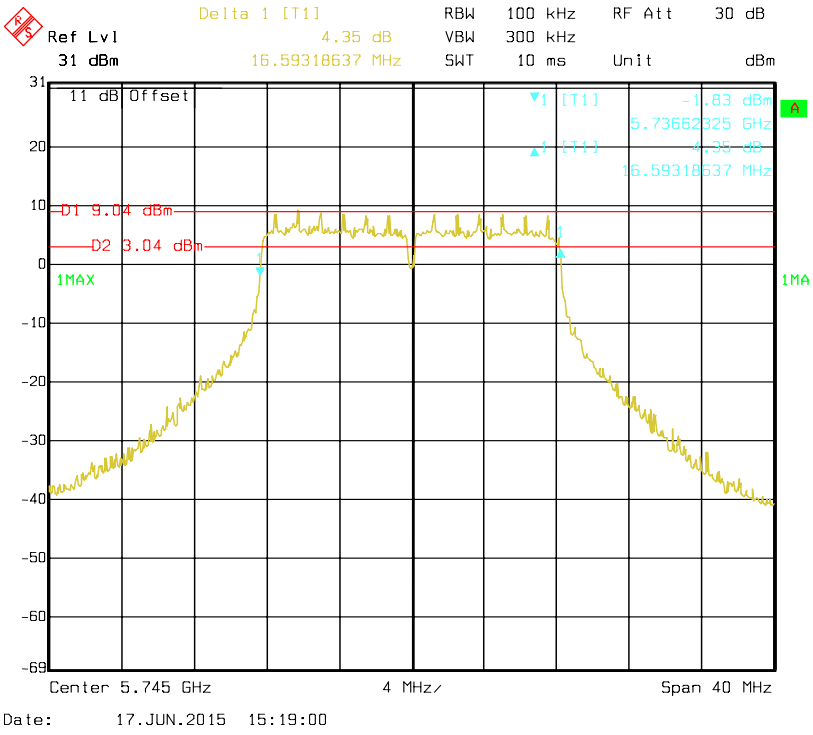


802.11n HT40 mode, Antenna 2: 26 dB Bandwidth-5230 MHz

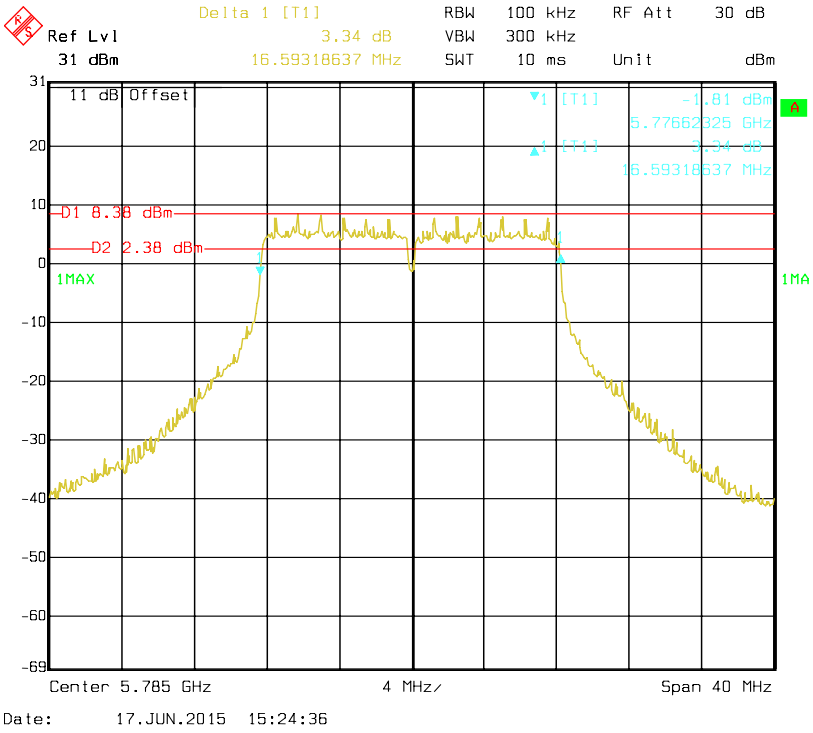


5725-5850 MHz:

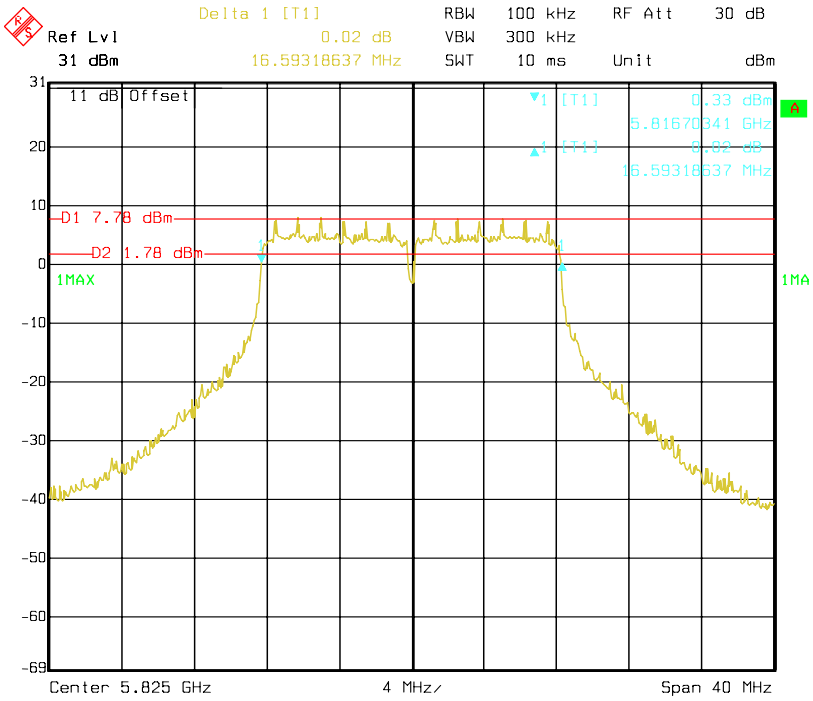
802.11a mode, Antenna 0: 6 dB Bandwidth-5745 MHz



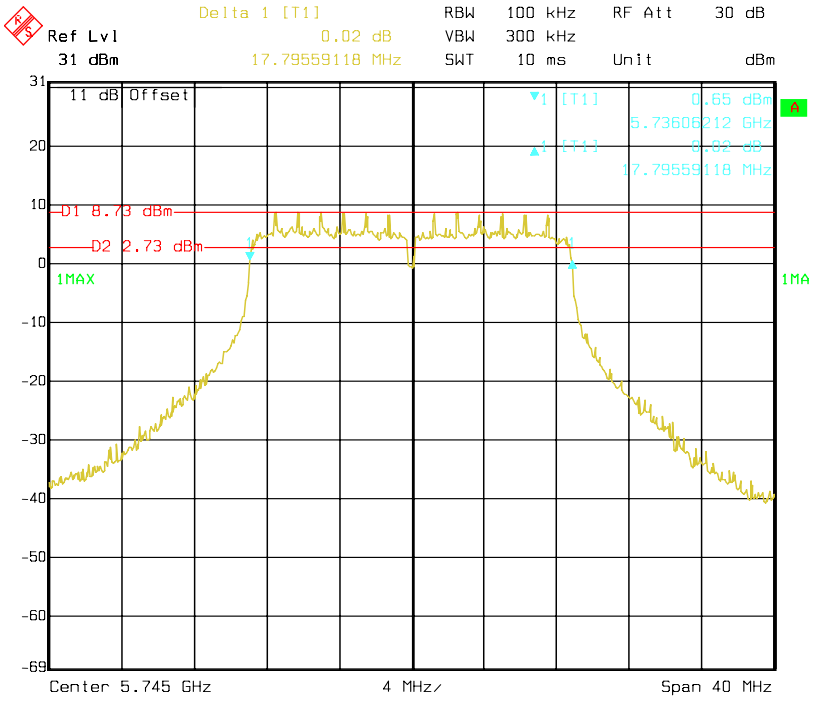
802.11a mode, Antenna 0: 6 dB Bandwidth-5785 MHz



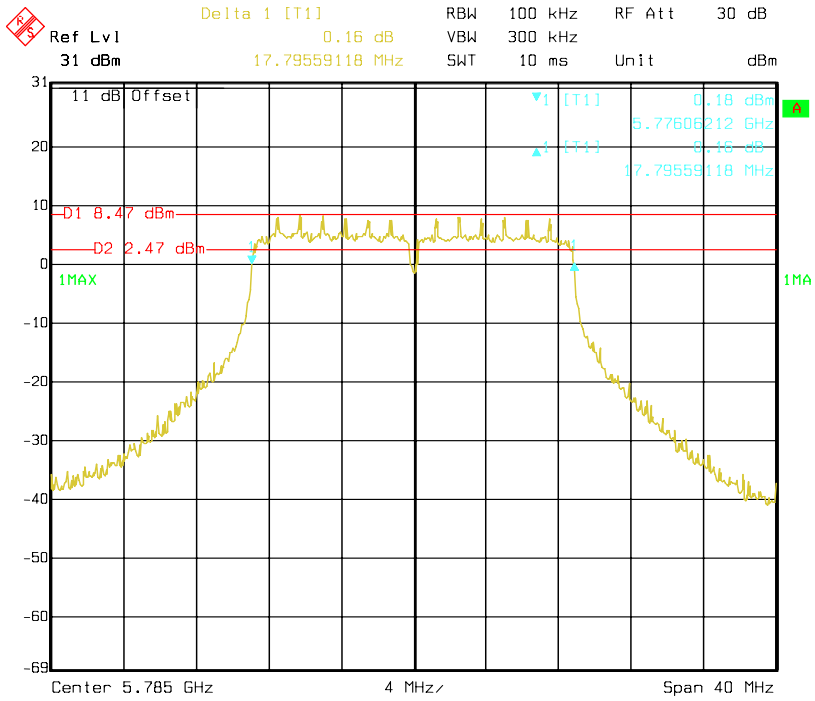
802.11a mode, Antenna 0: 6 dB Bandwidth-5825 MHz



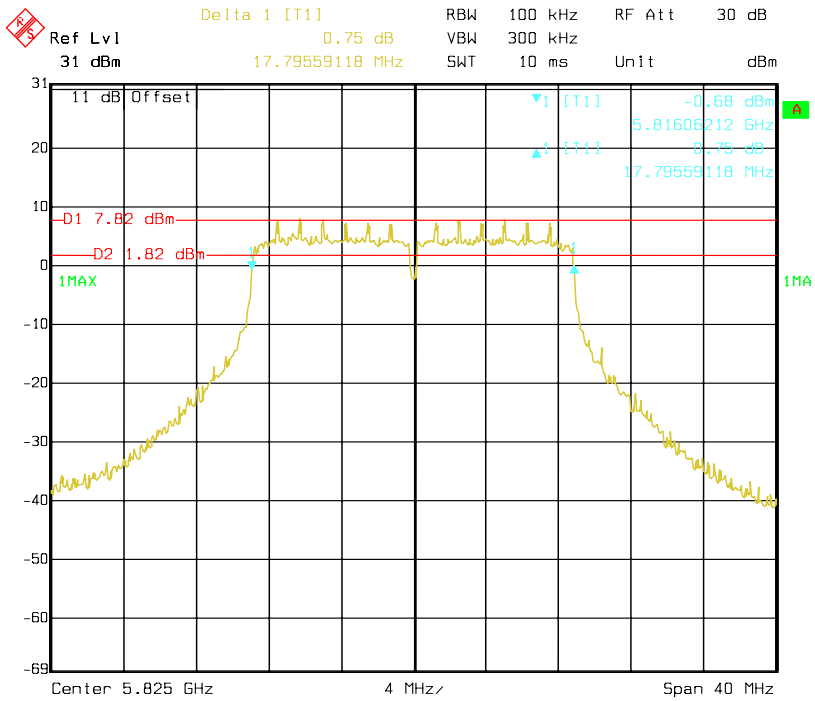
802.11ac VHT20 mode, Antenna 0: 6 dB Bandwidth-5745 MHz



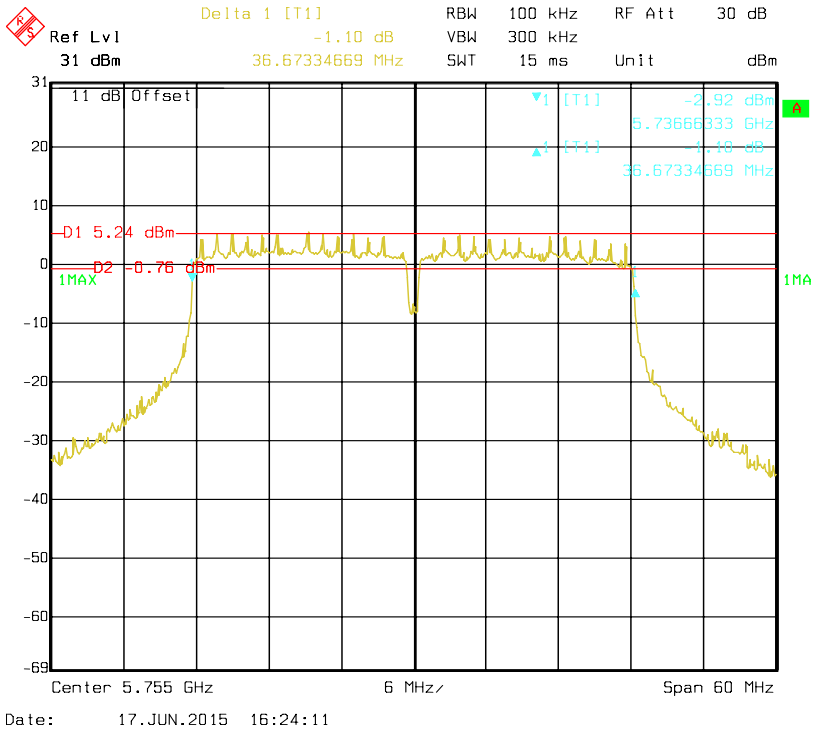
802.11ac VHT20 mode, Antenna 0: 6 dB Bandwidth-5785 MHz



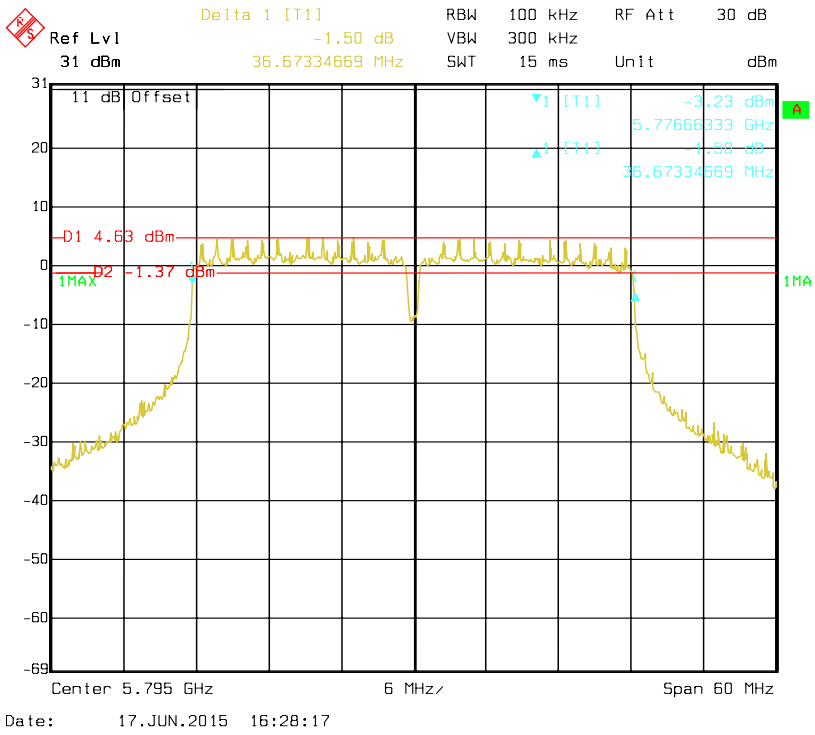
802.11ac VHT20 mode, Antenna 0: 6 dB Bandwidth-5825 MHz



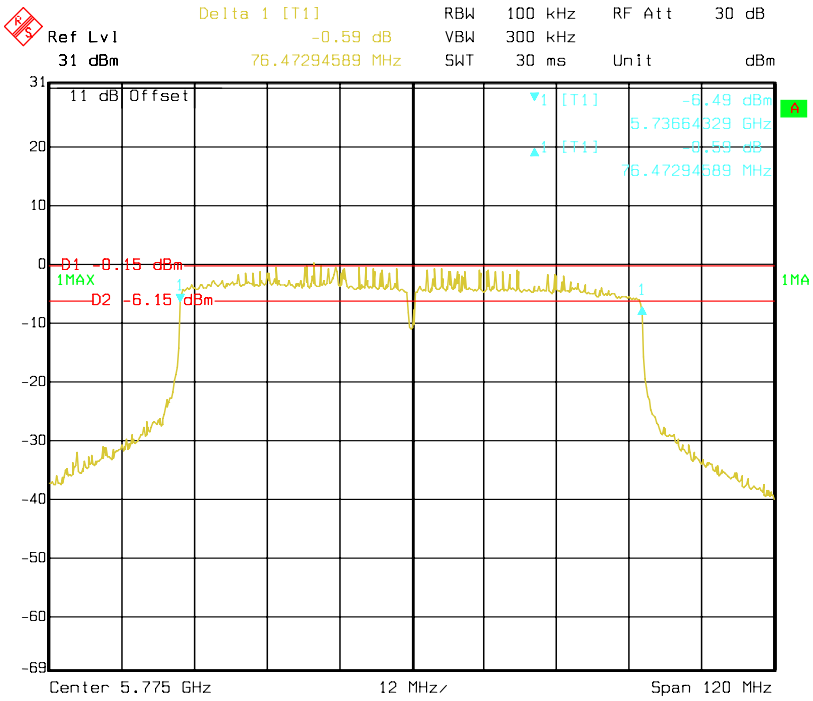
802.11ac VHT40 mode, Antenna 0: 6 dB Bandwidth-5755 MHz



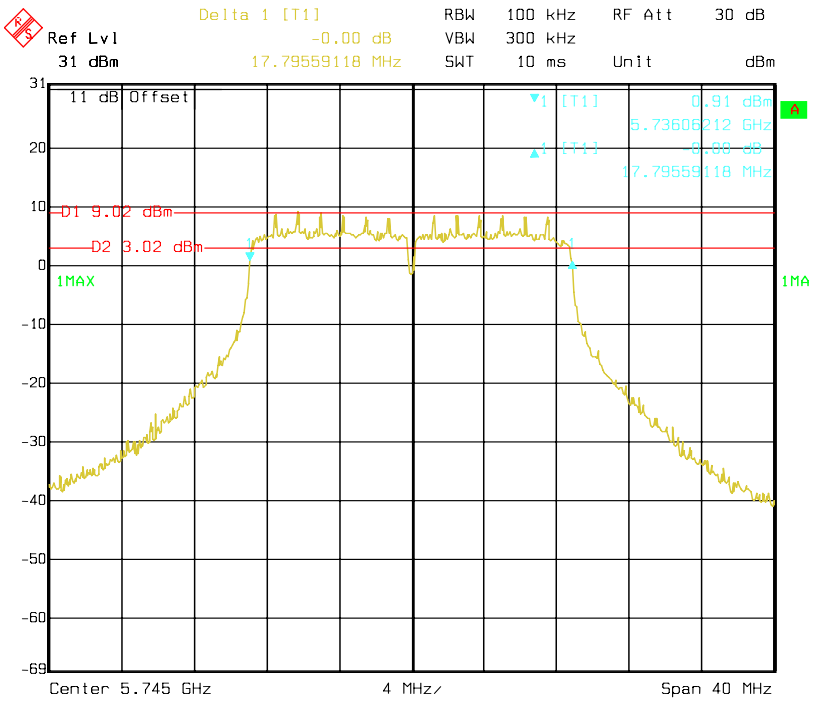
802.11ac VHT40 mode, Antenna 0: 6 dB Bandwidth-5795 MHz



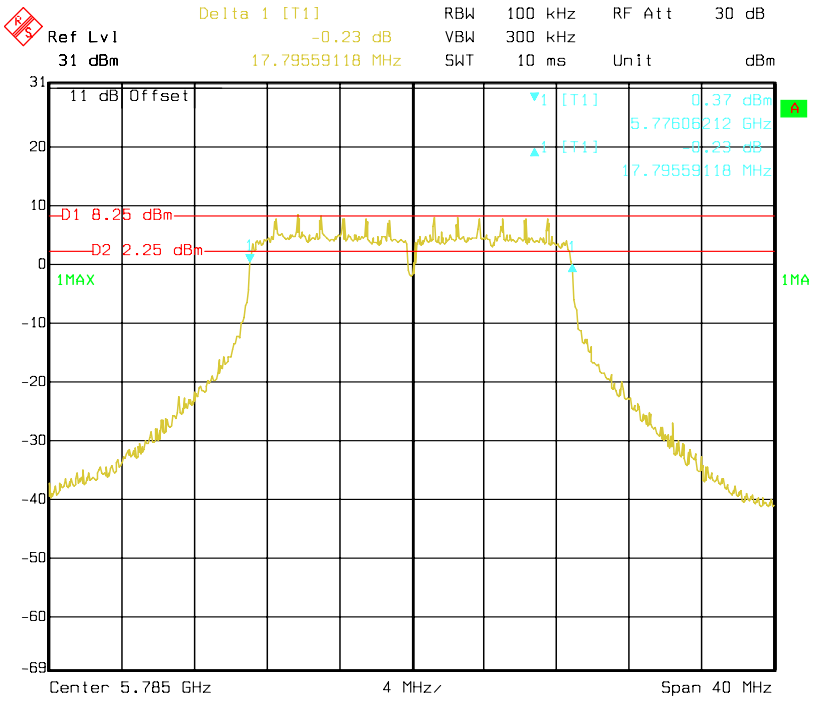
802.11ac VHT80 mode, Antenna 0: 6 dB Bandwidth-5775 MHz



802.11n HT20 mode, Antenna 0: 6 dB Bandwidth-5745 MHz

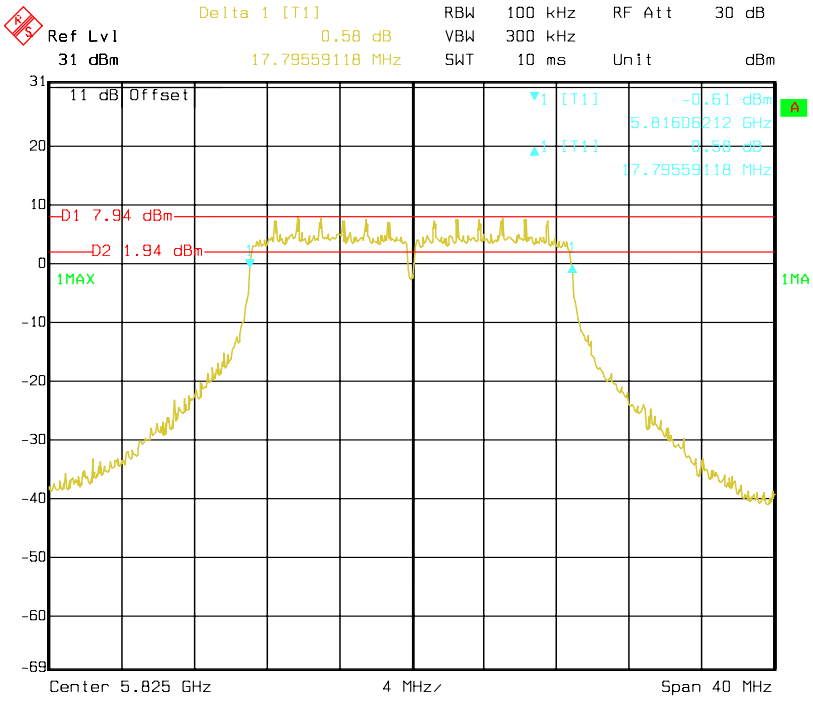


802.11n HT20 mode, Antenna 0: 6 dB Bandwidth-5785 MHz



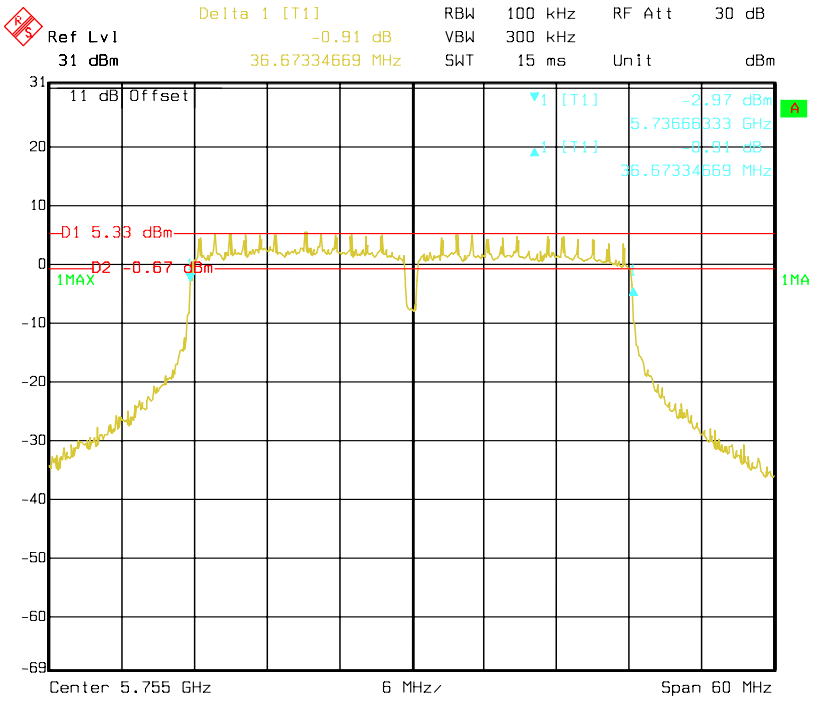
Date: 17.JUN.2015 15:41:41

802.11n HT20 mode, Antenna 0: 6 dB Bandwidth-5825 MHz

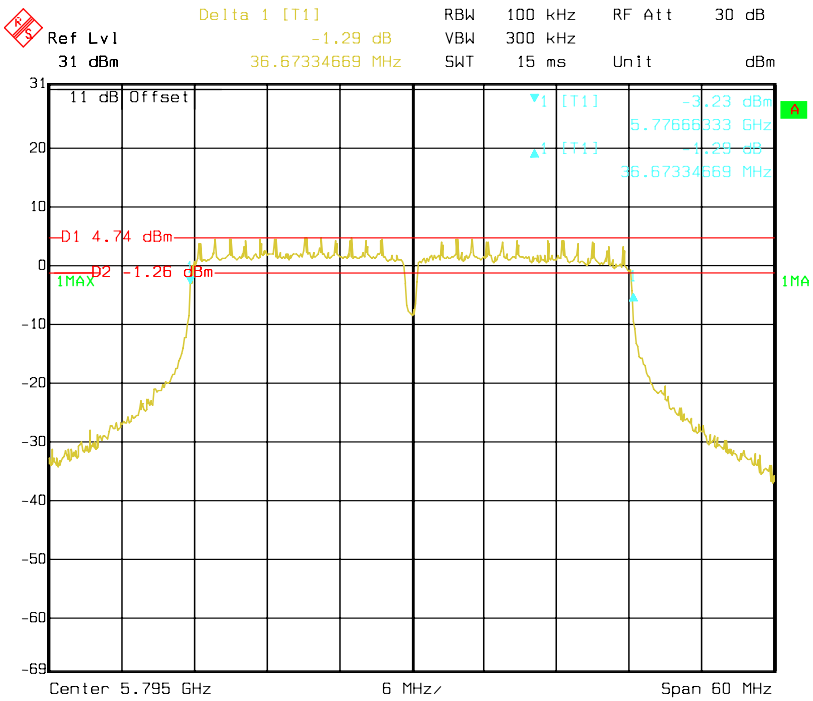


Date: 17.JUN.2015 15:45:45

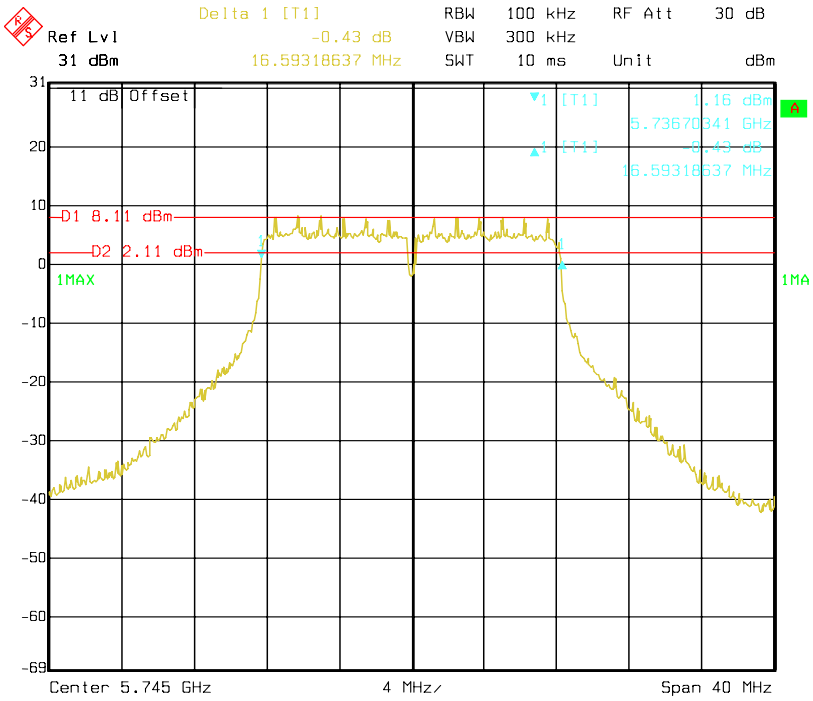
802.11n HT40 mode, Antenna 0: 6 dB Bandwidth-5755 MHz



802.11n HT40 mode, Antenna 0: 6 dB Bandwidth-5795 MHz

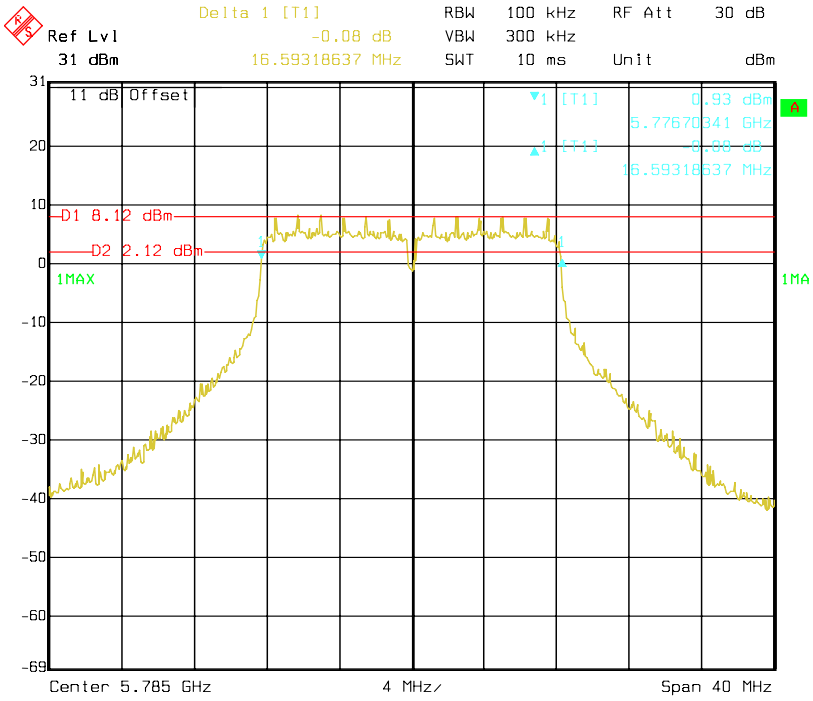


802.11a mode, Antenna 1: 6 dB Bandwidth-5745 MHz



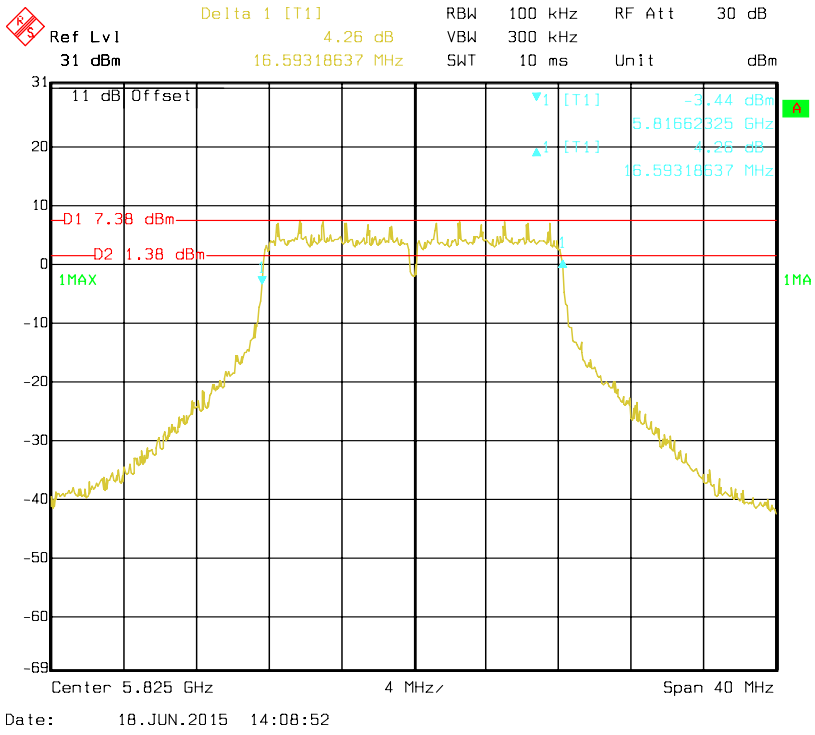
Date: 18.JUN.2015 13:59:30

802.11a mode, Antenna 1: 6 dB Bandwidth-5785 MHz

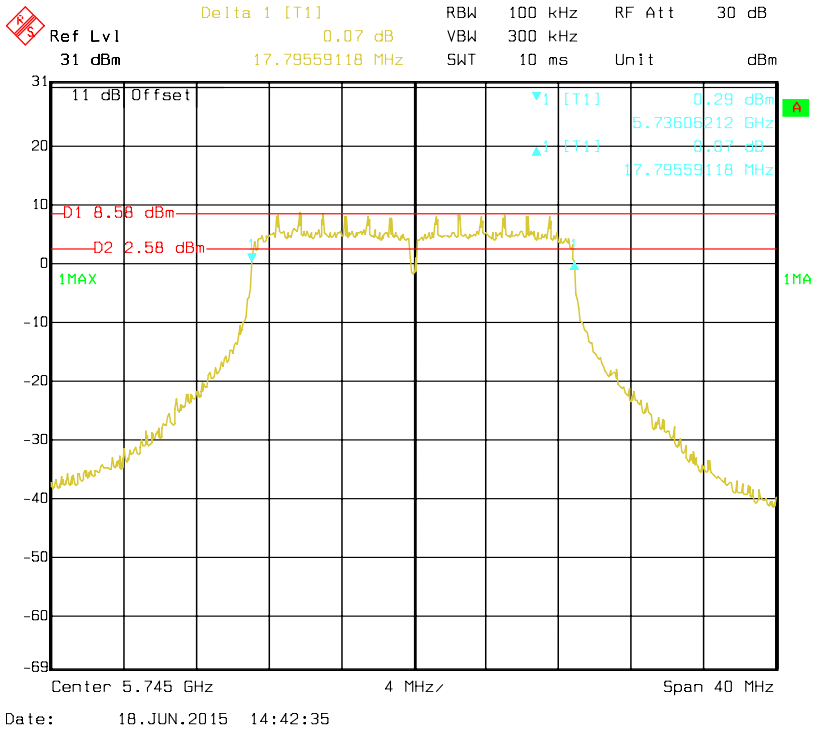


Date: 18.JUN.2015 14:05:02

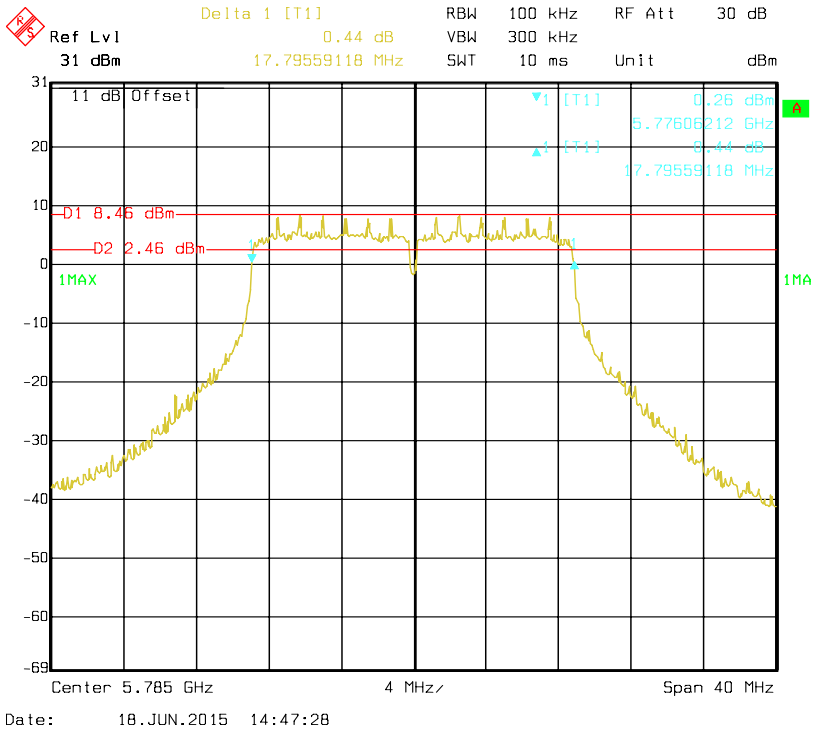
802.11a mode, Antenna 1: 6 dB Bandwidth-5825 MHz



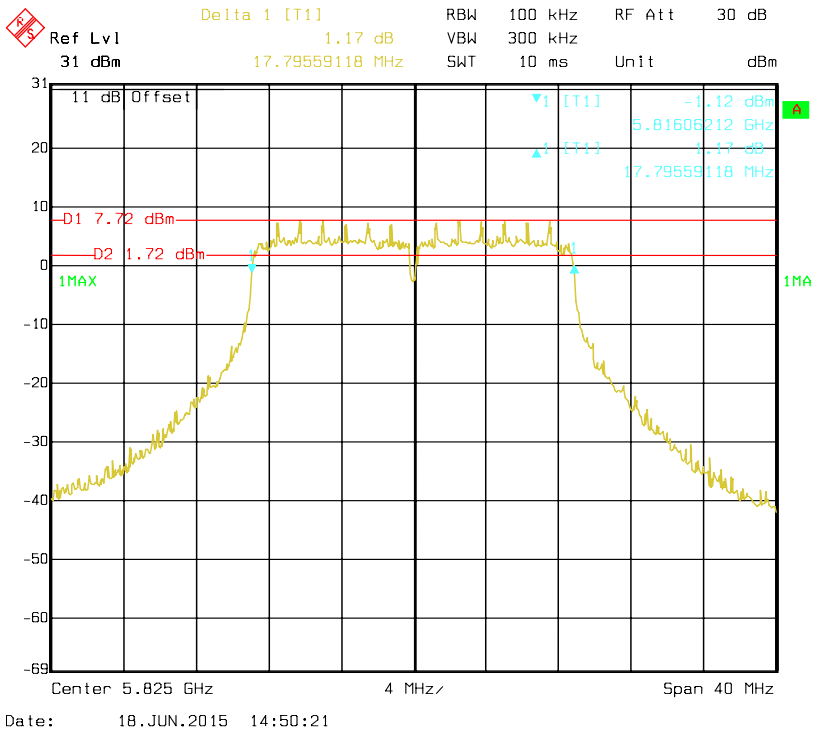
802.11ac VHT20 mode, Antenna 1: 6 dB Bandwidth-5745 MHz



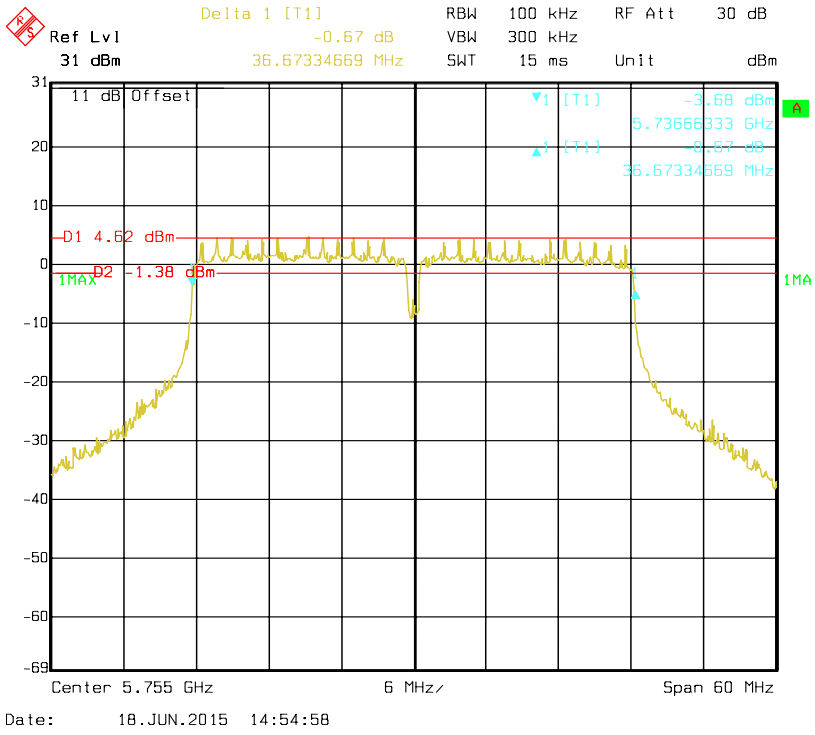
802.11ac VHT20 mode, Antenna 1: 6 dB Bandwidth-5785 MHz



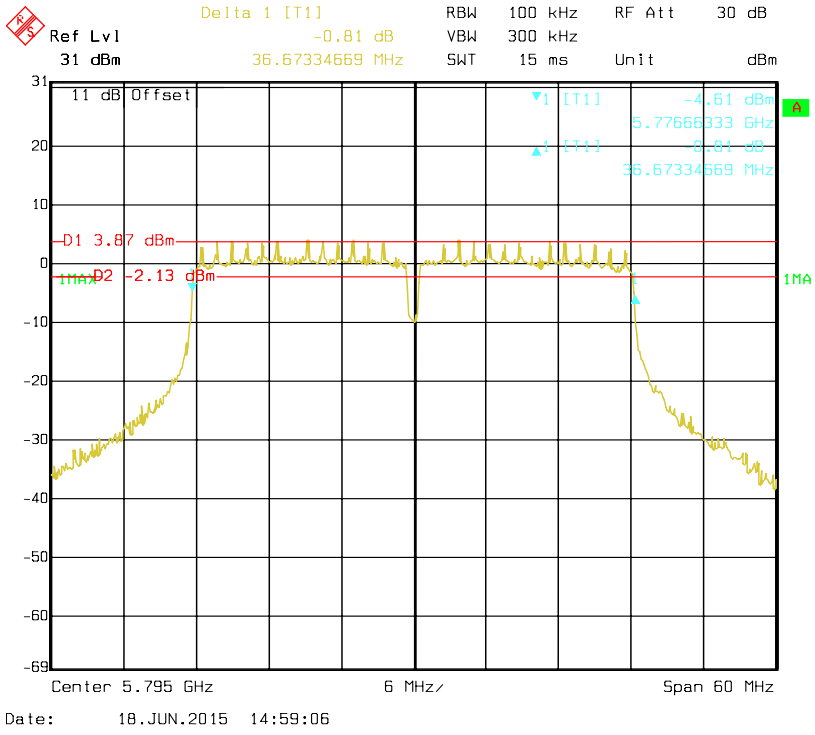
802.11ac VHT20 mode, Antenna 1: 6 dB Bandwidth-5825 MHz



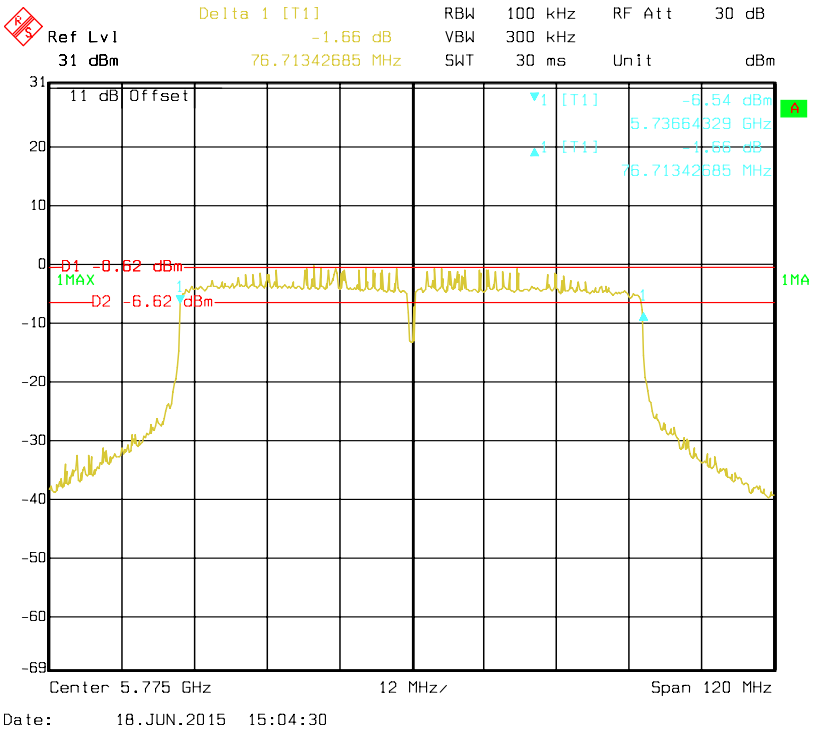
802.11ac VHT40 mode, Antenna 1: 6 dB Bandwidth-5755 MHz



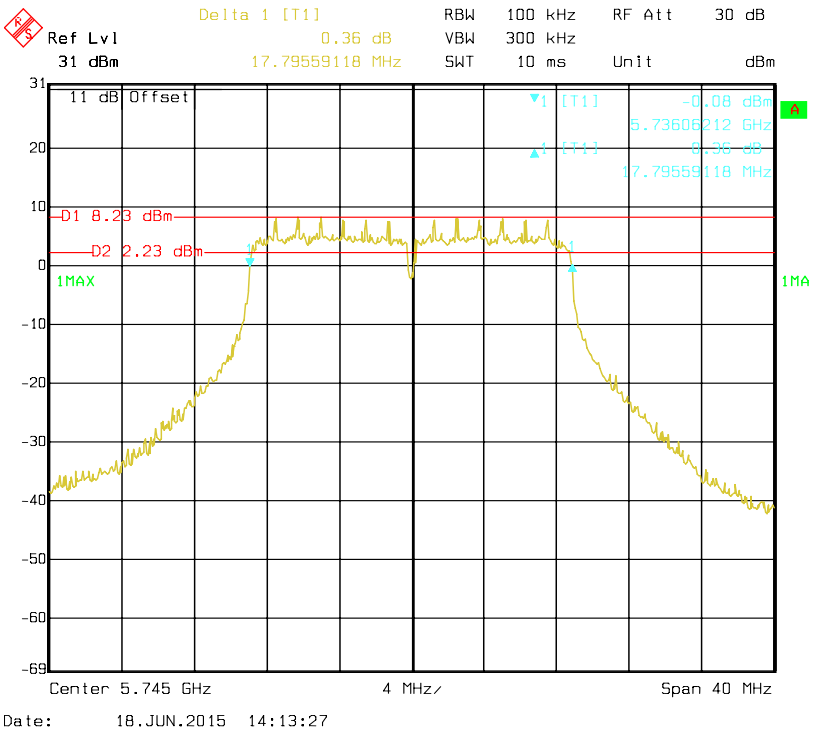
802.11ac VHT40 mode, Antenna 1: 6 dB Bandwidth-5795 MHz



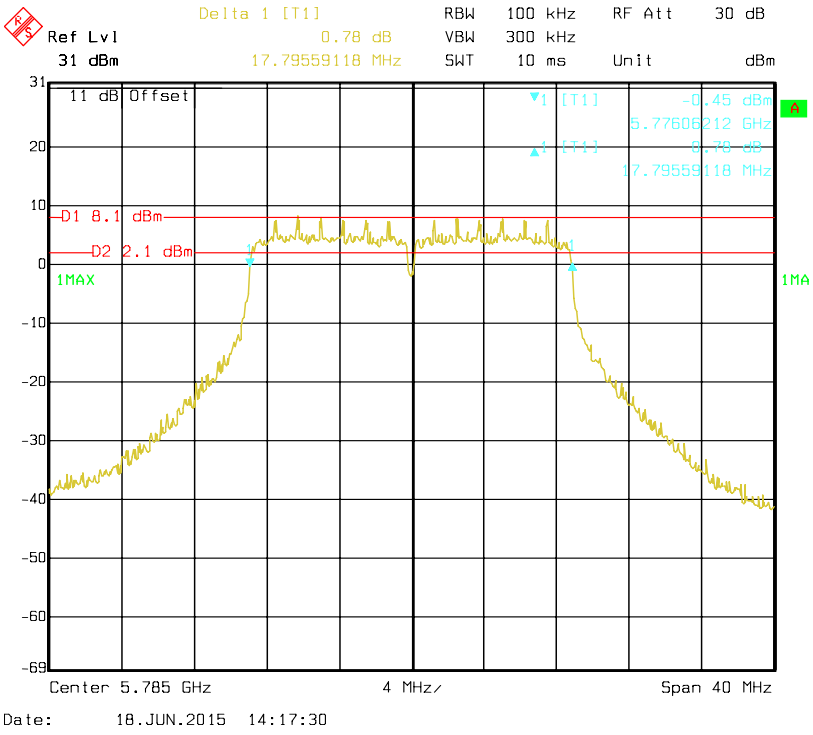
802.11ac VHT80 mode, Antenna 1: 6 dB Bandwidth-5775 MHz



802.11n HT20 mode, Antenna 1: 6 dB Bandwidth-5745 MHz

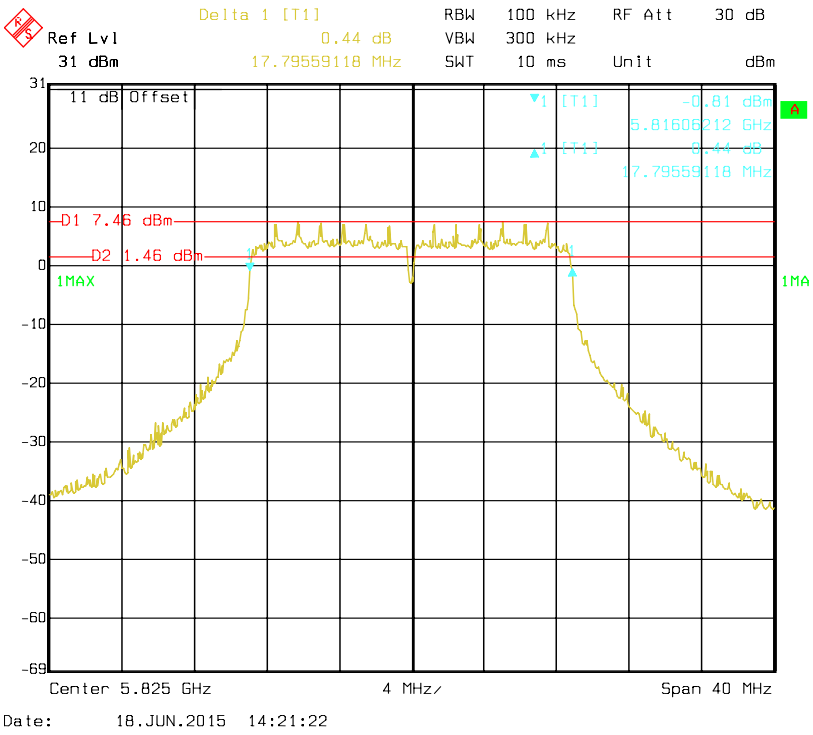


802.11n HT20 mode, Antenna 1: 6 dB Bandwidth-5785 MHz



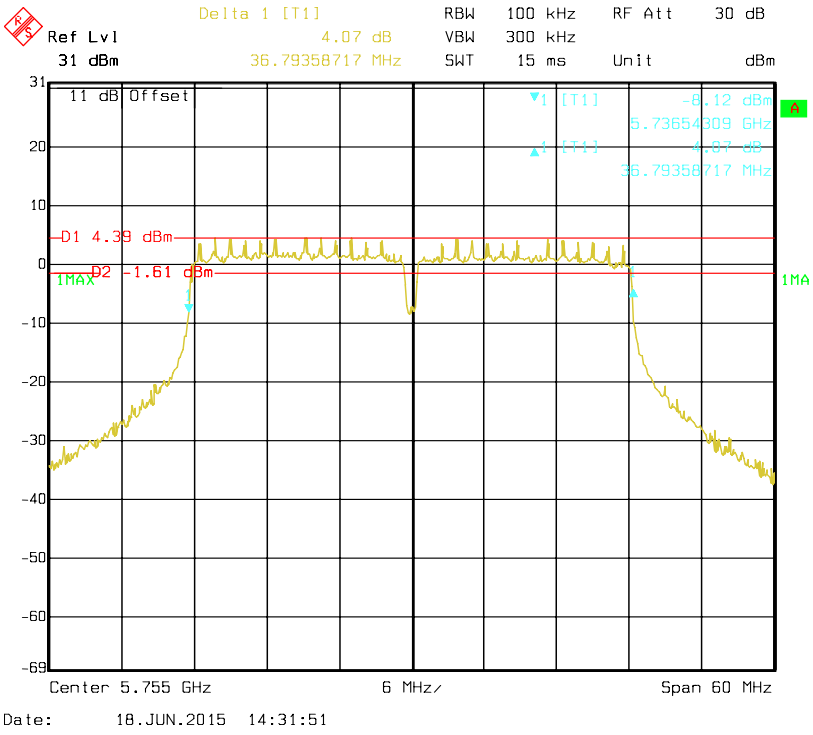
Date: 18.JUN.2015 14:17:30

802.11n HT20 mode, Antenna 1: 6 dB Bandwidth-5825 MHz

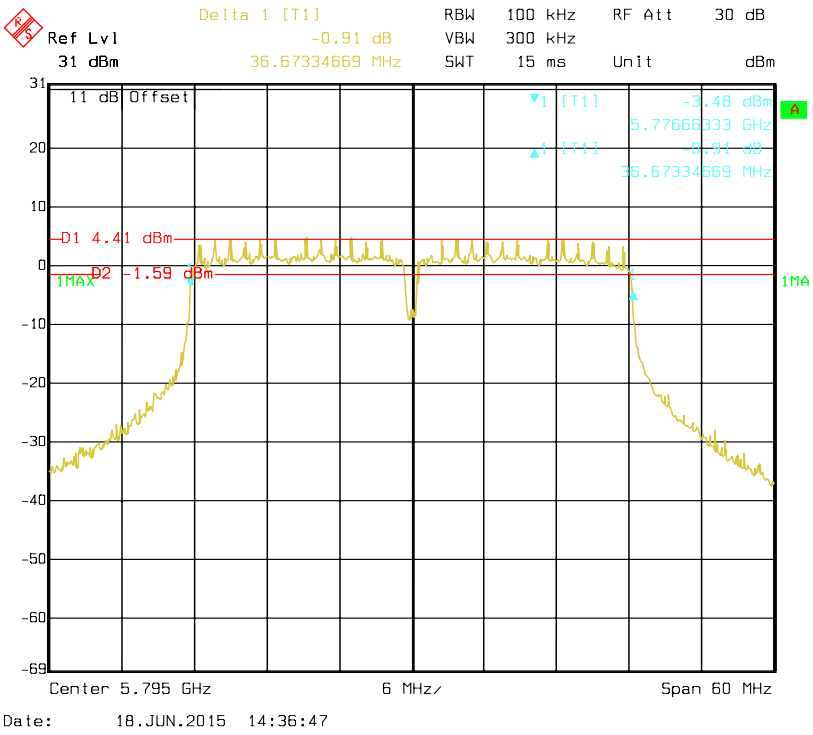


Date: 18.JUN.2015 14:21:22

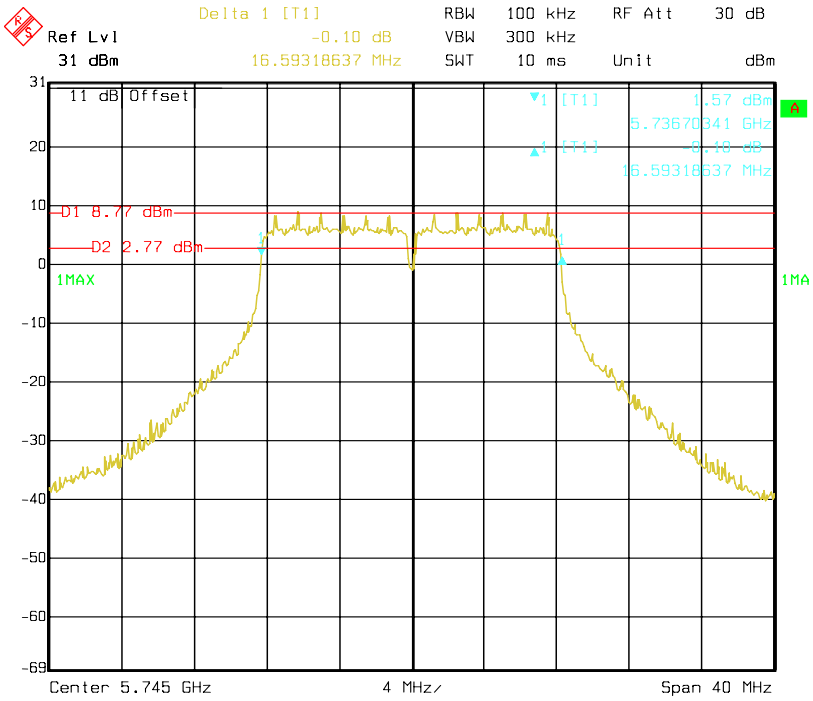
802.11n HT40 mode, Antenna 1: 6 dB Bandwidth-5755 MHz



802.11n HT40 mode, Antenna 1: 6 dB Bandwidth-5795 MHz

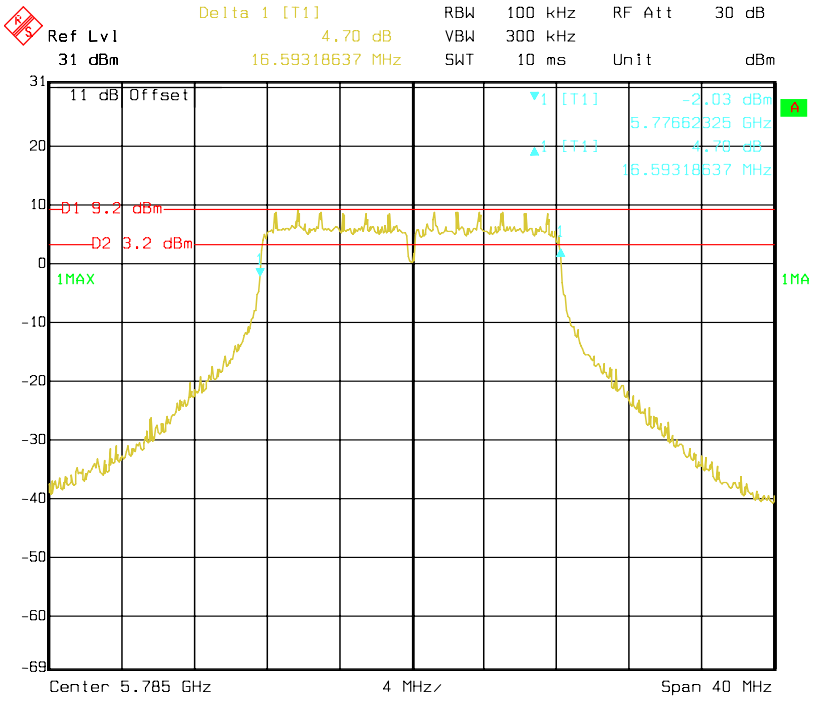


802.11a mode, Antenna 2: 6 dB Bandwidth-5745 MHz



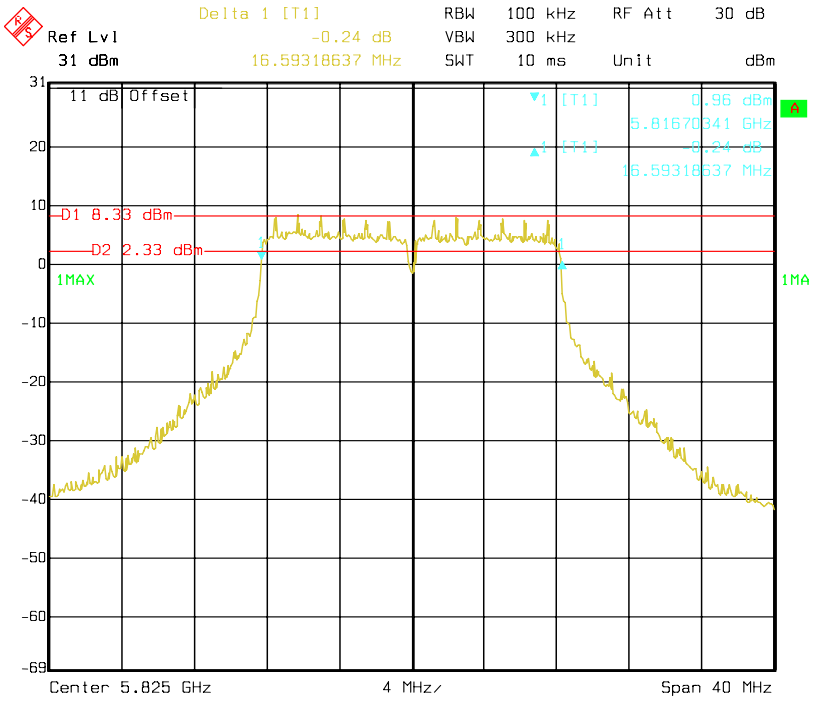
Date: 18.JUN.2015 17:16:23

802.11a mode, Antenna 2: 6 dB Bandwidth-5785 MHz

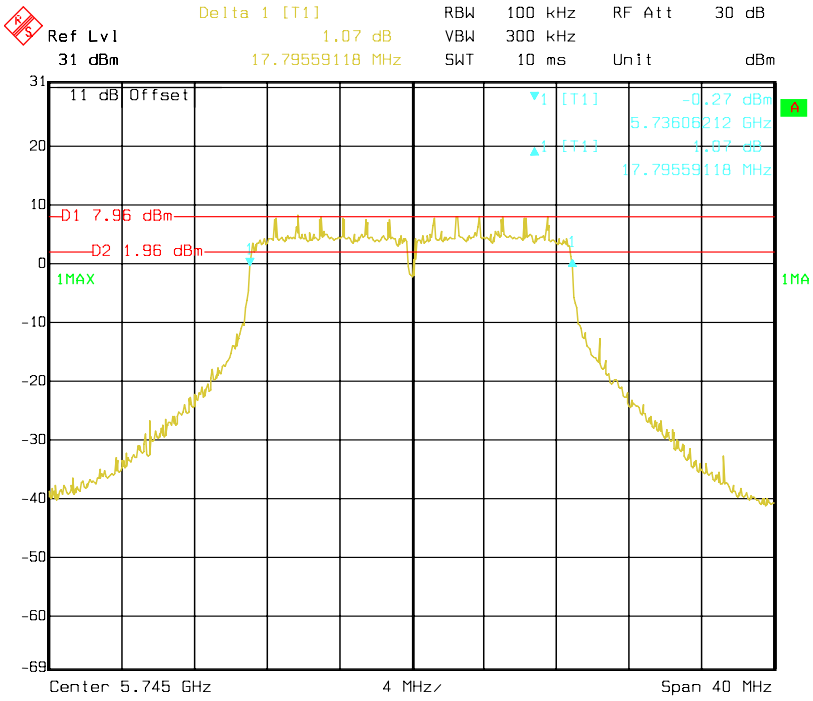


Date: 18.JUN.2015 17:21:09

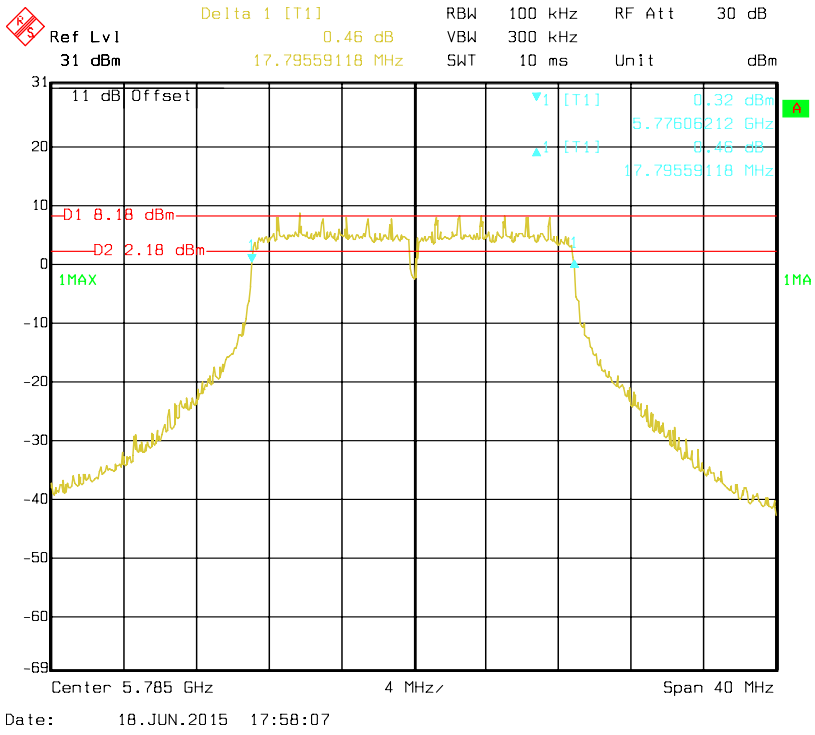
802.11a mode, Antenna 2: 6 dB Bandwidth-5825 MHz



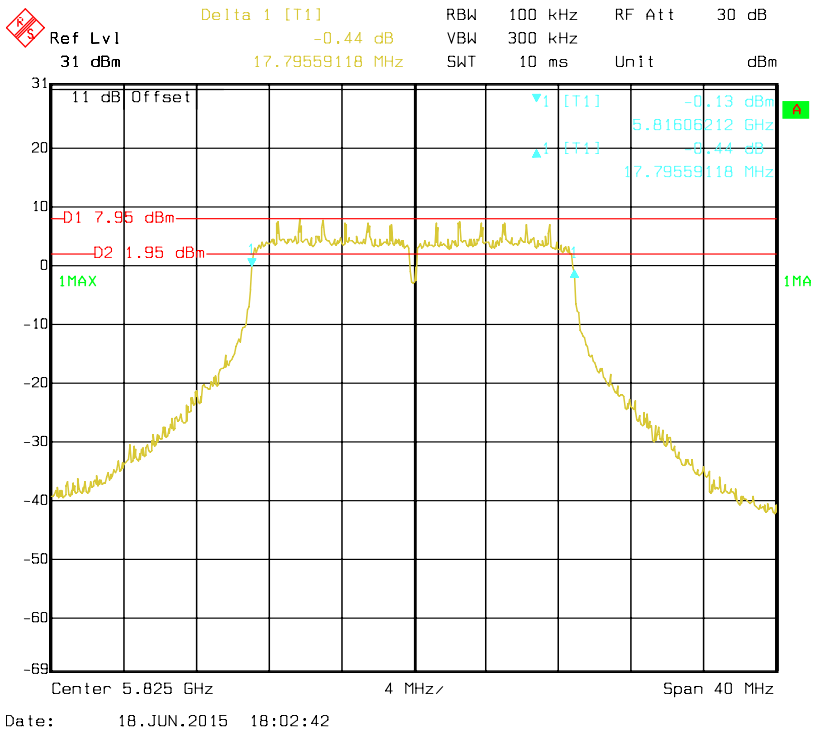
802.11ac VHT20 mode, Antenna 2: 6 dB Bandwidth-5745 MHz



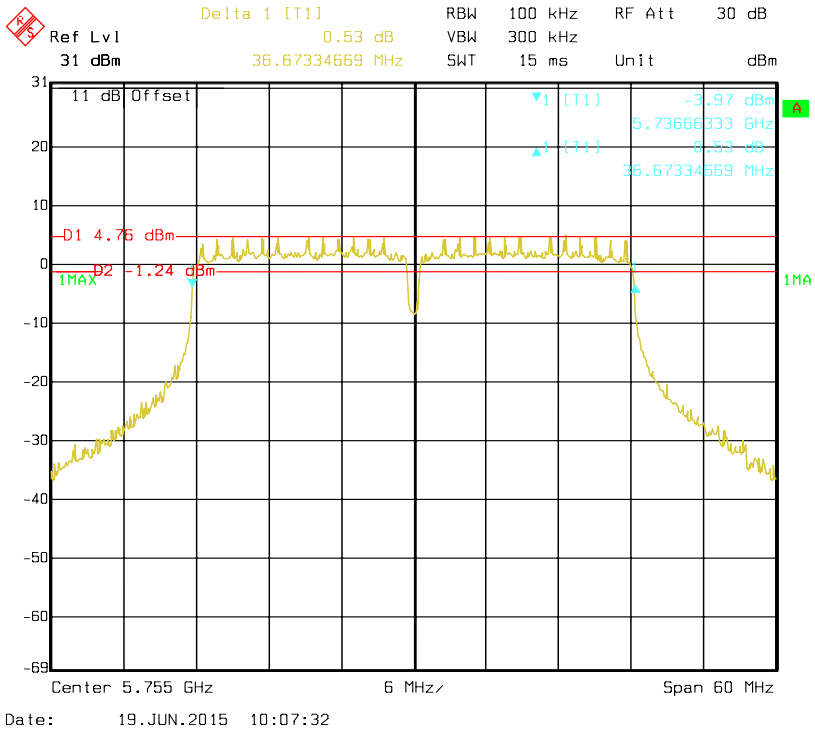
802.11ac VHT20 mode, Antenna 2: 6 dB Bandwidth-5785 MHz



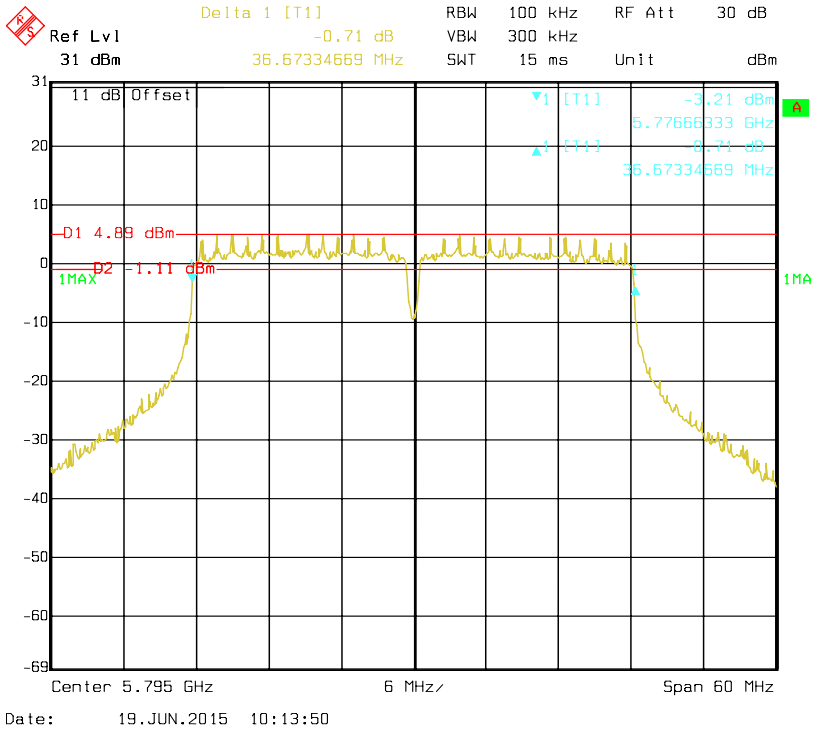
802.11ac VHT20 mode, Antenna 2: 6 dB Bandwidth-5825 MHz



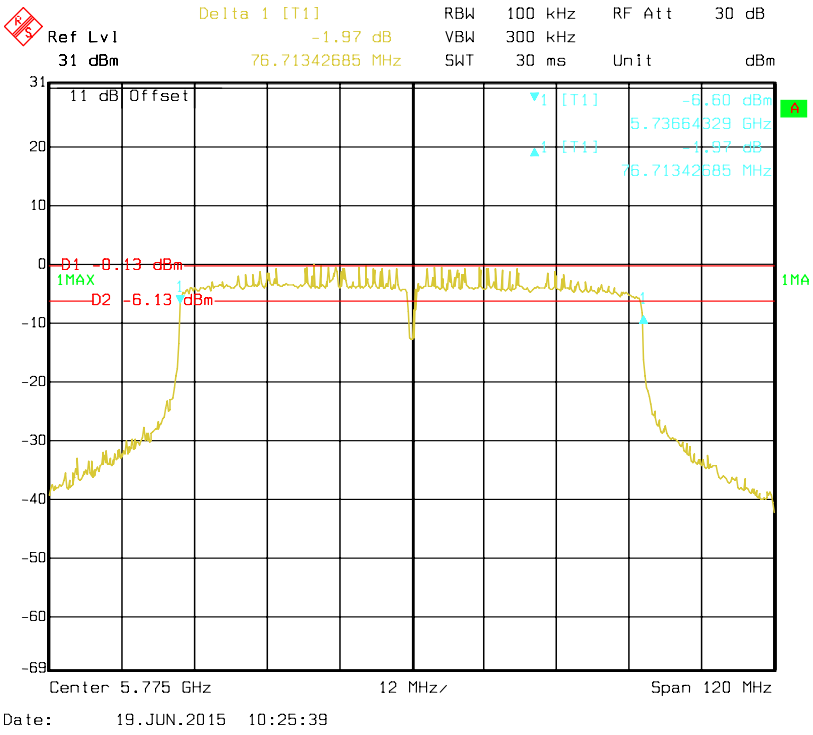
802.11ac VHT40 mode, Antenna 2: 6 dB Bandwidth-5755 MHz



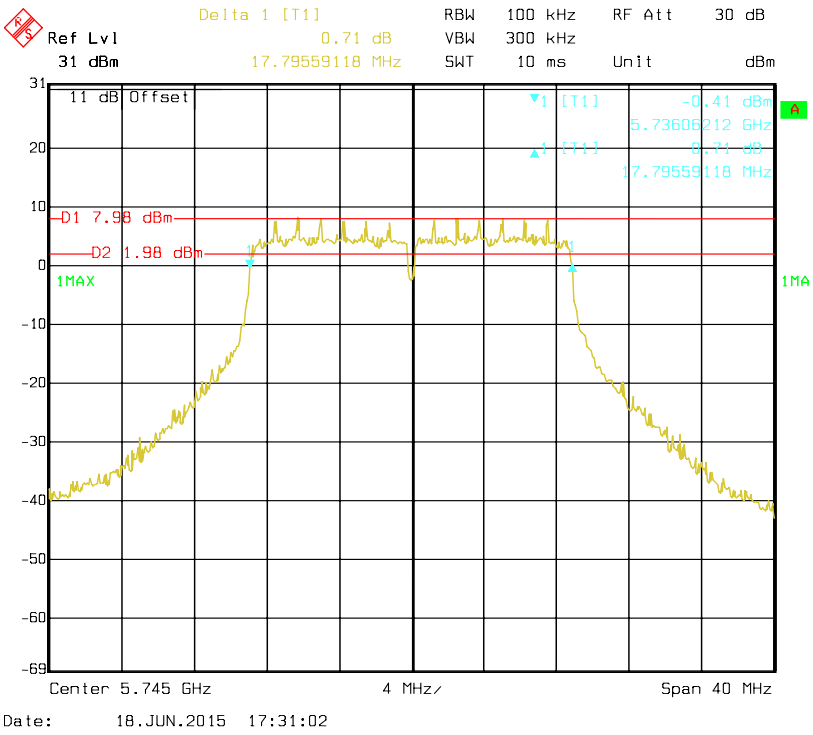
802.11ac VHT40 mode, Antenna 2: 6 dB Bandwidth-5795 MHz



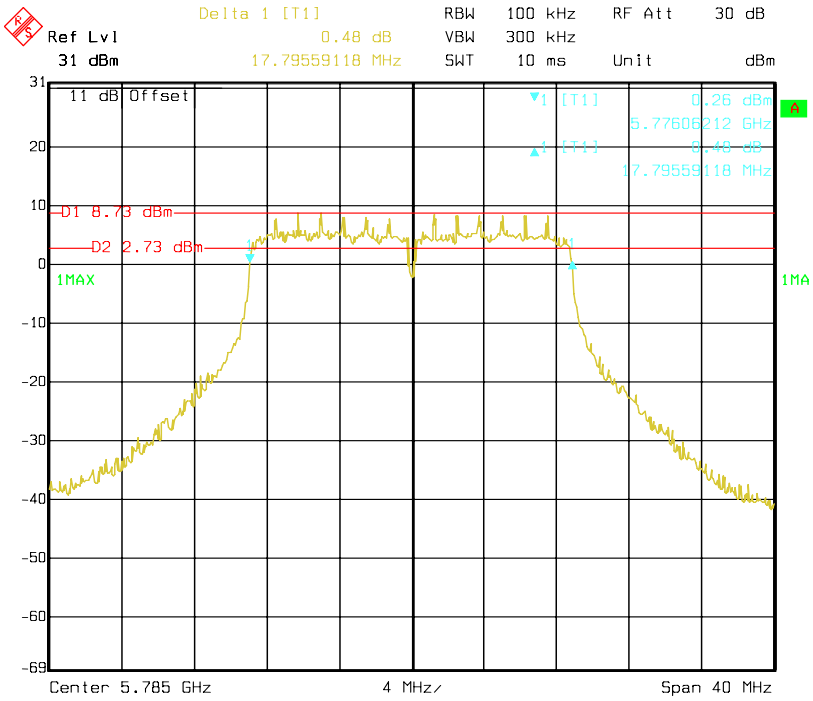
802.11ac VHT80 mode, Antenna 2: 6 dB Bandwidth-5775 MHz



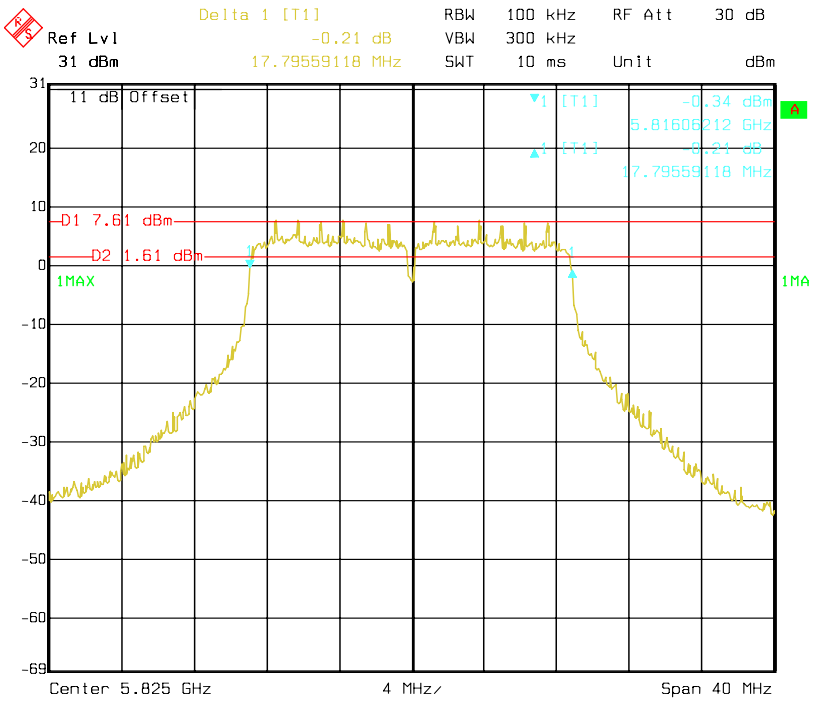
802.11n HT20 mode, Antenna 2: 6 dB Bandwidth-5745 MHz



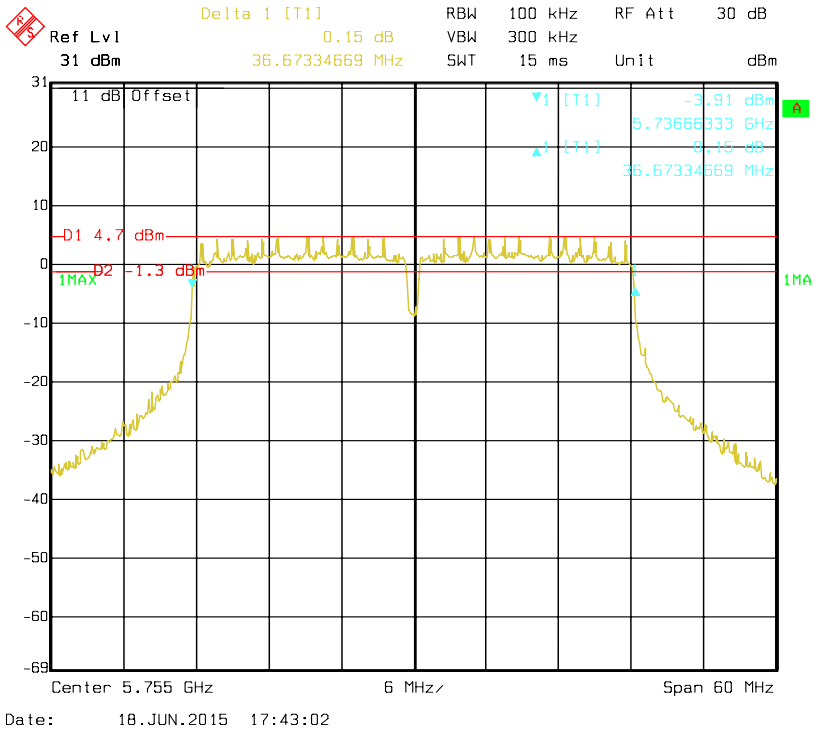
802.11n HT20 mode, Antenna 2: 6 dB Bandwidth-5785 MHz



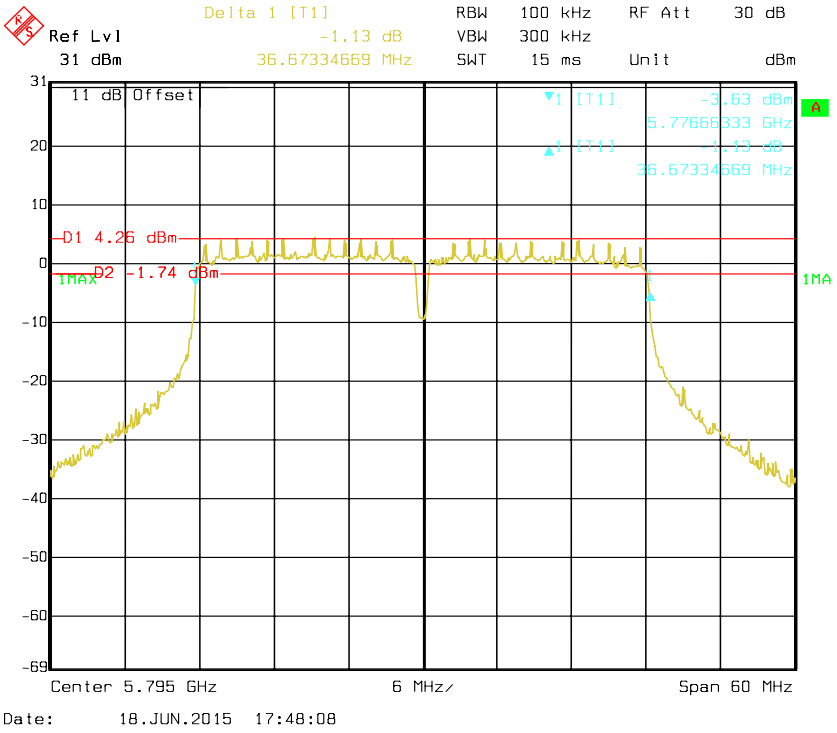
802.11n HT20 mode, Antenna 2: 6 dB Bandwidth-5825 MHz



802.11n HT40 mode, Antenna 2: 6 dB Bandwidth-5755 MHz



802.11n HT40 mode, Antenna 2: 6 dB Bandwidth-5795 MHz



FCC §15.407(a) (1) (3)– CONDUCTED TRANSMITTER OUTPUT POWER

Applicable Standard

For an outdoor access point operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 17 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. The maximum e.i.r.p. at any elevation angle above 30 degrees as measured from the horizon must not exceed 125 mW (21 dBm).

For the band 5.725-5.85 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W. In addition, the maximum power spectral density shall not exceed 30 dBm in any 500-kHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. However, fixed point-to-point U-NII devices operating in this band may employ transmitting antennas with directional gain greater than 6 dBi without any corresponding reduction in transmitter conducted power. Fixed, point-to-point operations exclude the use of point-to-multipoint systems, omnidirectional applications, and multiple collocated transmitters transmitting the same information. The operator of the U-NII device, or if the equipment is professionally installed, the installer, is responsible for ensuring that systems employing high gain directional antennas are used exclusively for fixed, point-to-point operations.

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	Spectrum Analyzer	FSEM30	100018	2014-10-17	2015-10-16

*** Statement of Traceability:** BACL (Chengdu) attested that all calibrations have been performed, traceable to National Primary Standards and International System of Units (SI).

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. Set span to encompass the entire emission bandwidth (EBW) of the signal. Set RBW = 1 MHz. Set VBW ≥ 3 MHz. Use sample detector mode Use a video trigger with the trigger level set to enable triggering only on full power pulses. Transmitter must operate at full control power for entire sweep of every sweep. If the device transmits continuously, with no off intervals or reduced power intervals, the trigger may be set to “free run”. Trace average 100 traces in power averaging mode. Compute power by integrating the spectrum across the 26 dB EBW of the signal. The integration can be performed using the spectrum analyzer’s band power measurement function with band limits set equal to the EBW band edges or by summing power levels in each 1 MHz band in linear power terms. The 1 MHz band power levels to be summed can be obtained by averaging, in linear power terms, power levels in each frequency bin across the 1 MHz.
4. Repeat above procedures until all frequencies measured were complete.

Test Data

Environmental Conditions

Temperature:	25°C & 23 °C
Relative Humidity:	54%, 48% & 58 %
ATM Pressure:	97.1 kPa ,97.5 kPa & 96.2 kPa

The testing was performed by Kevin Tao on 2015-06-17, 2015-06-18 & 2015-06-19.

Test Mode: Transmitting

5150-5250 MHz:

Mode	Channel	Frequency (MHz)	Output Power (dBm)				Limit (dBm)
			Antenna 0	Antenna 1	Antenna 2	Antenna 0 + Antenna 1 + Antenna 2	
802.11a	Low	5180	15.41	14.54	14.7	19.67	27
	Middle	5220	15.16	15.06	14.93	19.82	27
	High	5240	15.16	15.19	14.97	19.88	27
802.11ac VHT20	Low	5180	15.39	14.48	14.33	19.53	27
	Middle	5220	15.12	14.94	14.48	19.63	27
	High	5240	15.20	15.12	14.95	19.86	27
802.11ac VHT40	Low	5190	14.92	14.29	14.46	19.34	27
	High	5230	14.61	14.85	14.81	19.53	27
802.11ac VHT80	Low	5210	14.61	14.61	14.33	19.29	27
802.11n HT20	Low	5180	14.47	14.89	14.37	19.35	27
	Middle	5220	14.33	15.07	14.68	19.48	27
	High	5240	14.17	14.35	14.23	19.02	27
802.11n HT40	Low	5190	14.06	14.74	14.58	19.24	27
	High	5230	14.38	14.59	14.83	19.38	27

※The device has three PCB antennas, antenna gain is 9dBi, and employed Cyclic Delay Devisity (CCD) for 802.11 MIMO transmitting, per KDB662911 D01 Multiple Transmitter Output v02r01, for power measurements on IEEE 802.11 devices:

Array Gain = 0 dB (i.e., no array gain) for NANT $\leqslant$ 4:

So:

Directional gain = GANT + Array Gain =9dBi;

Limit =30 –（9-6）=27dBm.

5725-5850 MHz:

mode	Channel	Frequency (MHz)	Output Power (dBm)				Limit (dBm)
			Antenna 0	Antenna 1	Antenna 2	Antenna 0 + Antenna 1 + Antenna 2	
802.11a	Low	5745	20.51	20.11	20.54	25.16	27
	Middle	5785	20.10	19.94	20.66	25.02	27
	High	5825	19.86	19.43	20.24	24.63	27
802.11ac VHT20	Low	5745	20.55	20.18	20.09	25.05	27
	Middle	5785	20.29	20.09	20.31	25.00	27
	High	5825	19.79	19.75	19.62	24.49	27
802.11ac VHT40	Low	5755	20.13	19.91	19.91	24.76	27
	High	5795	19.79	19.38	19.94	24.48	27
802.11ac VHT80	Low	5775	20.01	19.54	20.23	24.71	27
802.11n HT20	Low	5745	20.56	20.06	20.03	25.00	27
	Middle	5785	20.13	19.84	20.29	24.86	27
	High	5825	19.90	19.39	19.78	24.47	27
802.11n HT40	Low	5755	20.10	19.79	19.88	24.70	27
	High	5795	19.80	19.68	19.90	24.57	27

※The device has three PCB antennas, antenna gain is 9dBi, and employed Cyclic Delay Devisity (CCD) for 802.11 MIMO transmitting, per KDB662911 D01 Multiple Transmitter Output v02r01, for power measurements on IEEE 802.11 devices:

Array Gain = 0 dB (i.e., no array gain) for NANT $\leqslant$ 4:

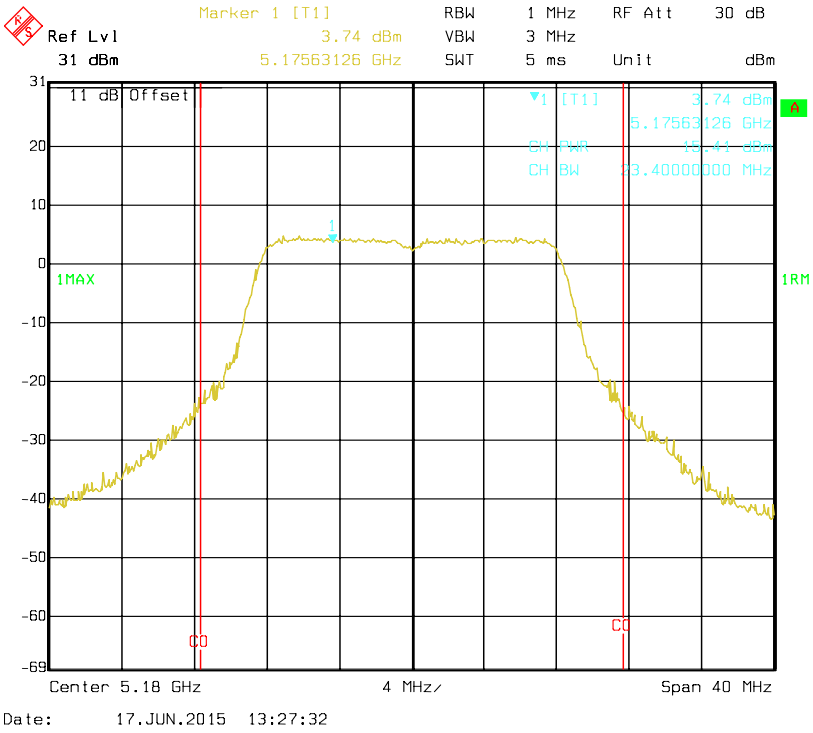
So:

Directional gain = GANT + Array Gain =9dBi;

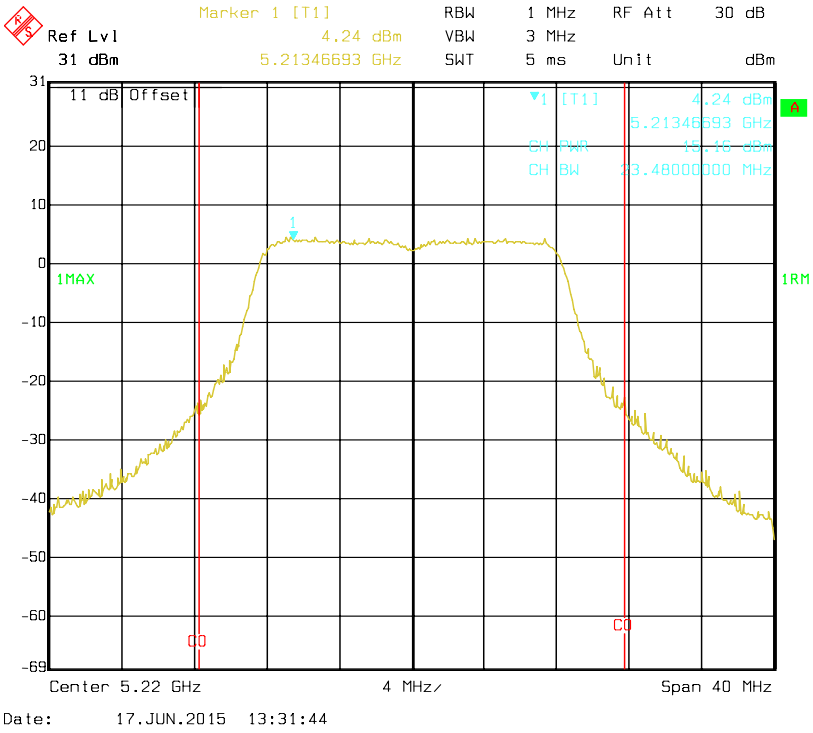
Limit =30 –（9-6）=27dBm.

5150-5250 MHz:

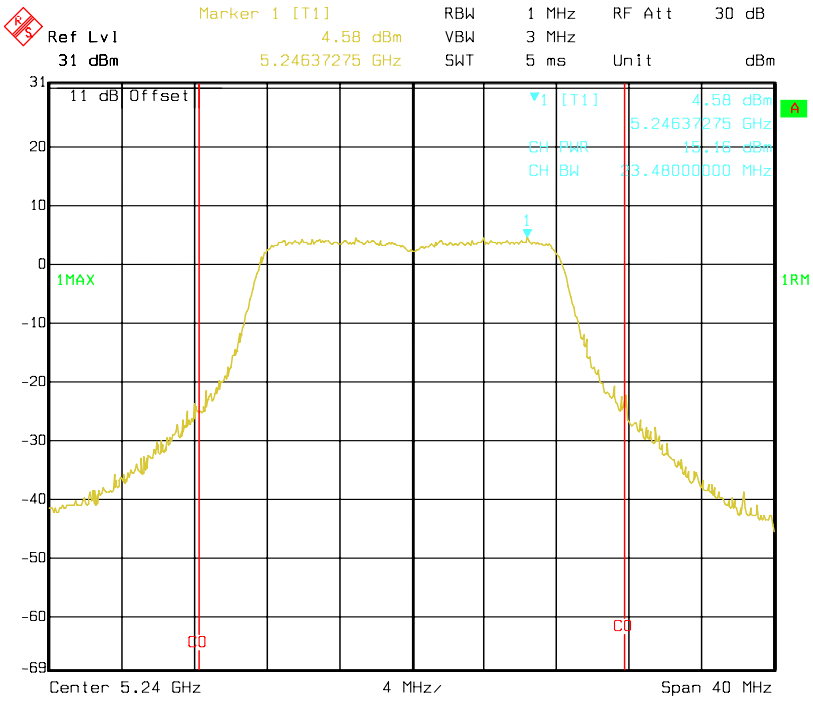
802.11a, Antenna 0: RF Output Power-5180 MHz



802.11a, Antenna 0: RF Output Power-5220 MHz

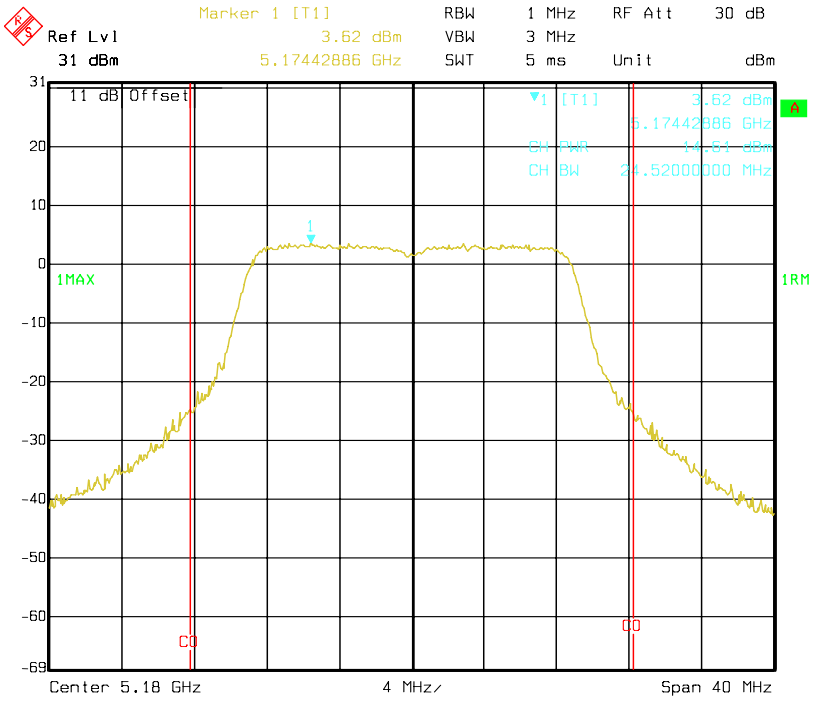


802.11a, Antenna 0: RF Output Power-5240 MHz



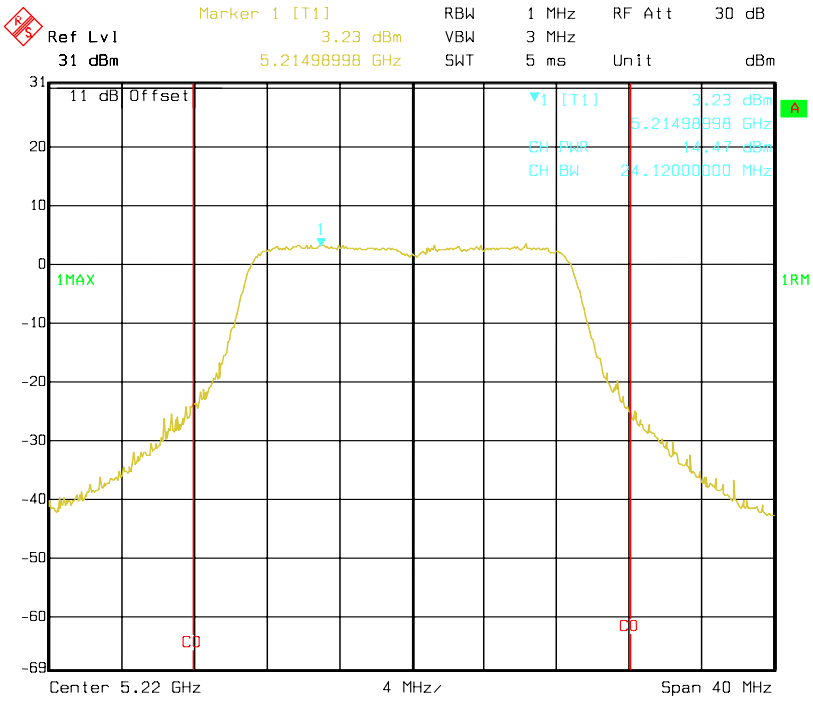
Date: 17.JUN.2015 13:34:15

802.11ac VHT20, Antenna 0: RF Output Power-5180 MHz

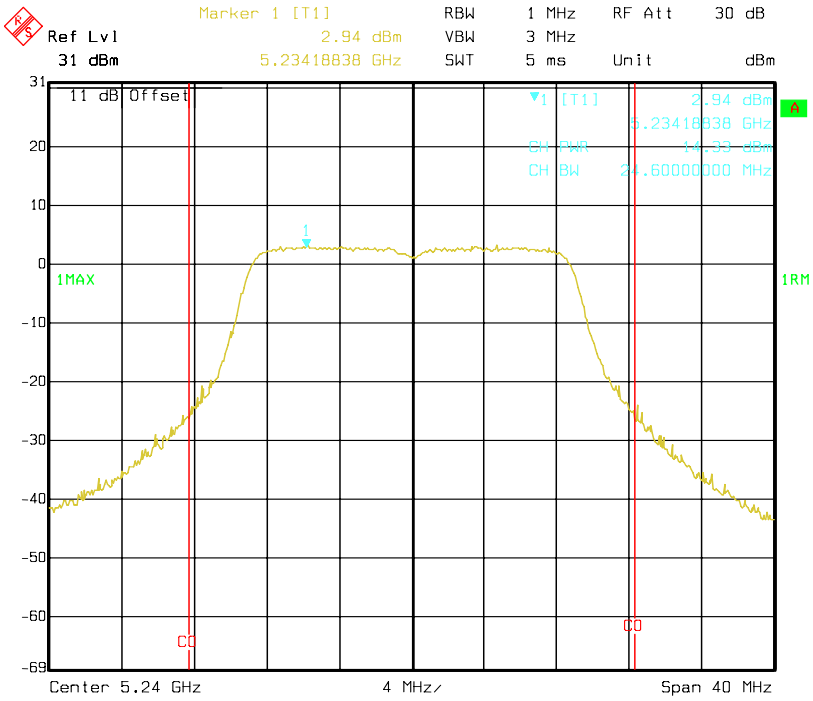


Date: 17.JUN.2015 13:56:31

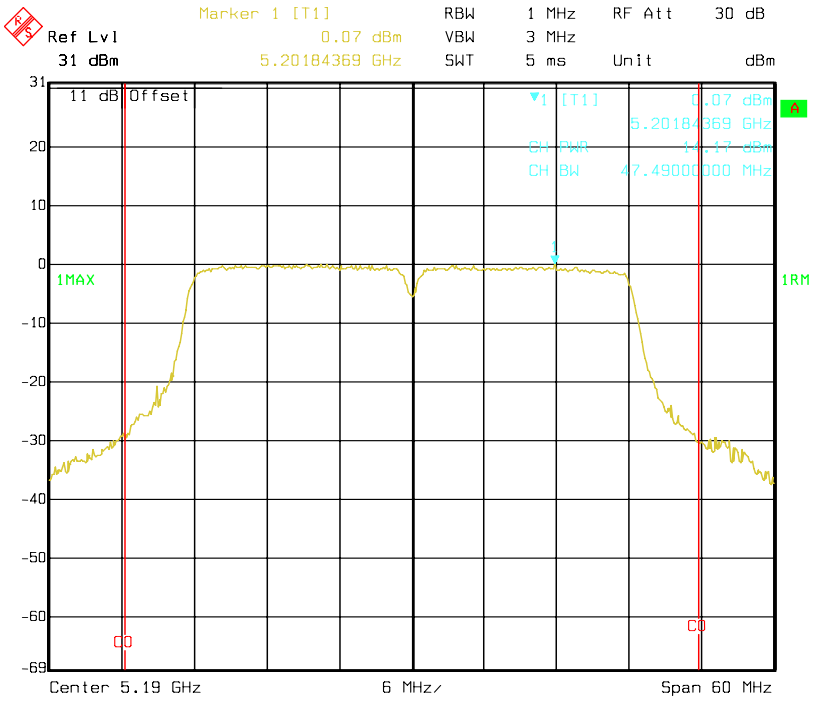
802.11ac VHT20, Antenna 0: RF Output Power-5220 MHz



802.11ac VHT20, Antenna 0: RF Output Power-5240 MHz

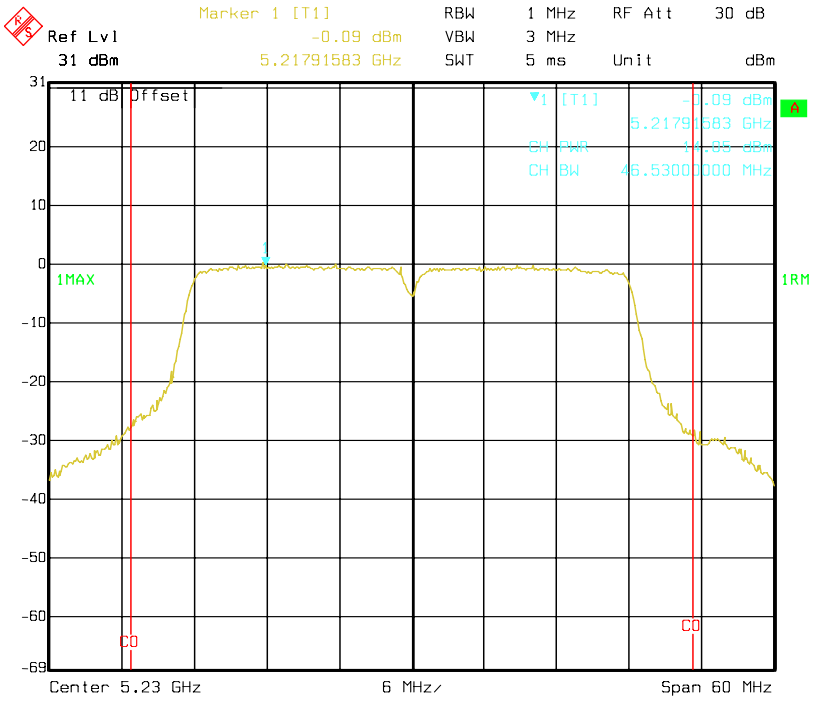


802.11ac VHT40, Antenna 0: RF Output Power-5190 MHz



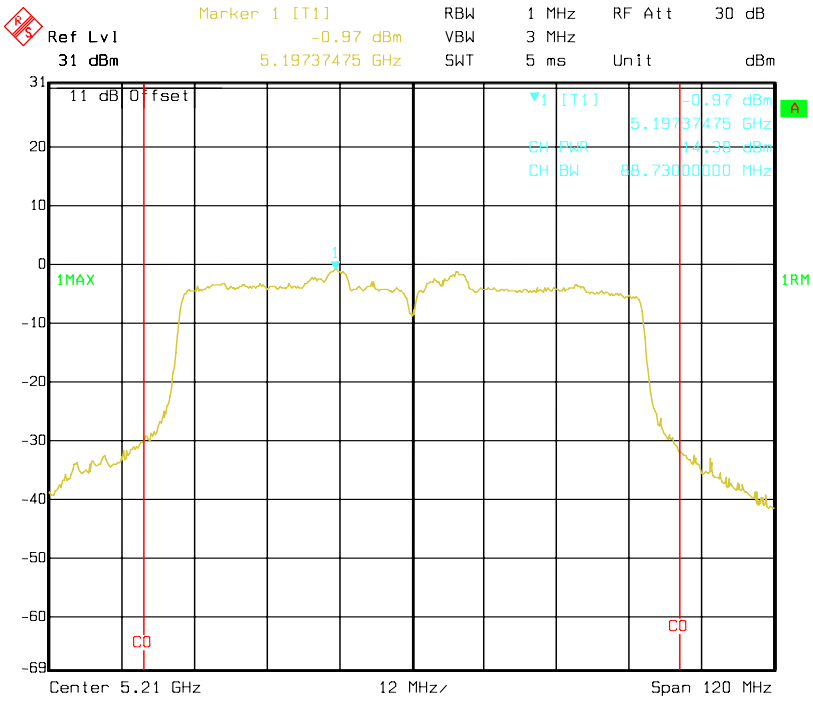
Date: 17.JUN.2015 14:06:30

802.11ac VHT40, Antenna 0: RF Output Power-5230 MHz

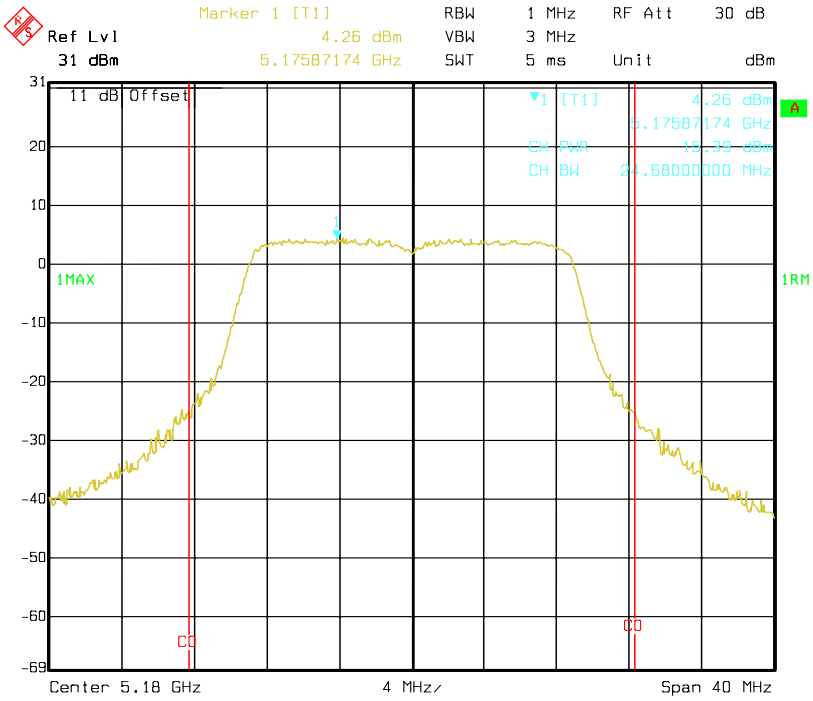


Date: 17.JUN.2015 14:09:54

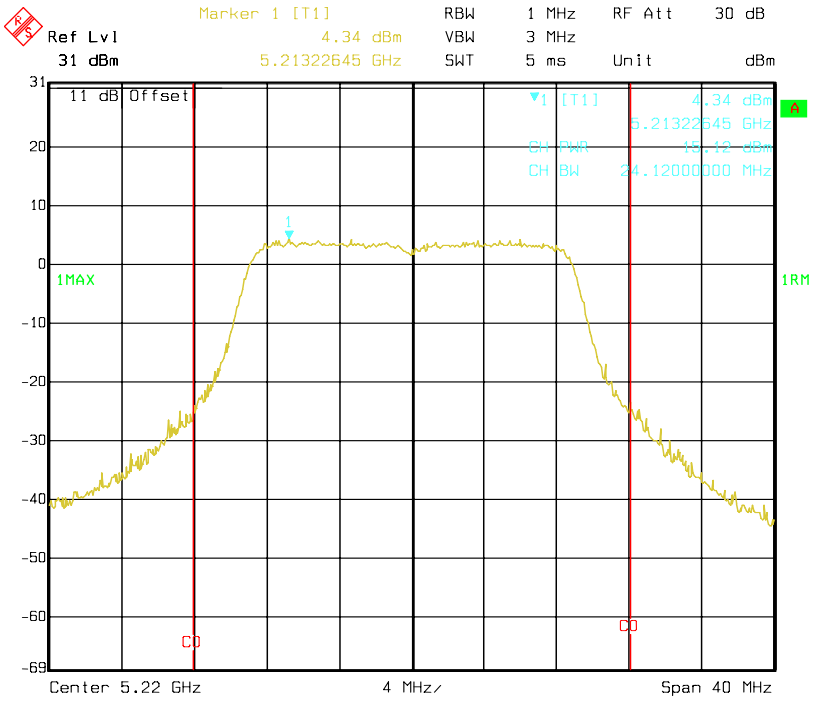
802.11ac VHT80, Antenna 0: RF Output Power-5210 MHz



802.11n HT20 mode, Antenna 0: RF Output Power-5180 MHz

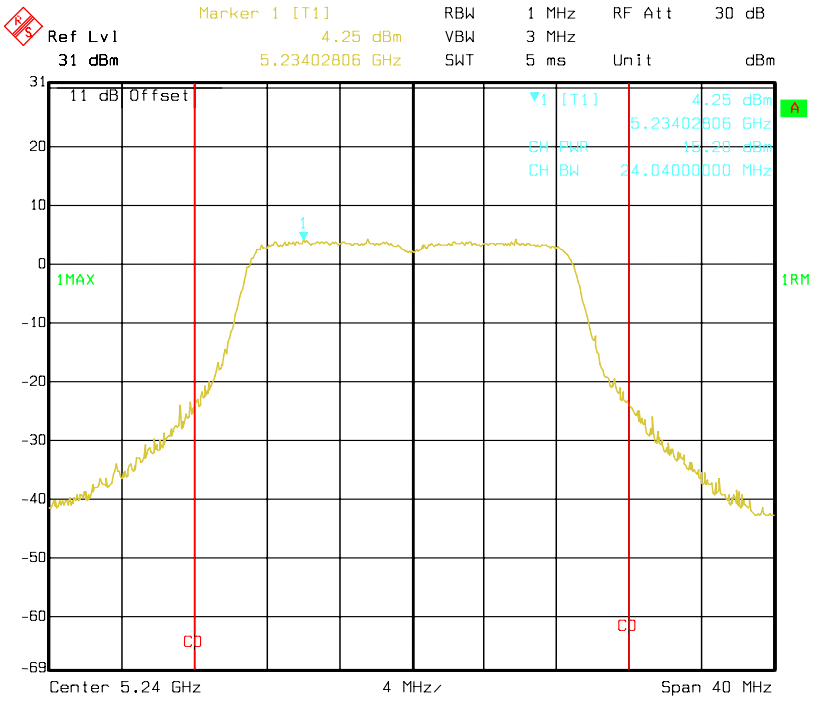


802.11n HT20 mode, Antenna 0: RF Output Power-5220 MHz



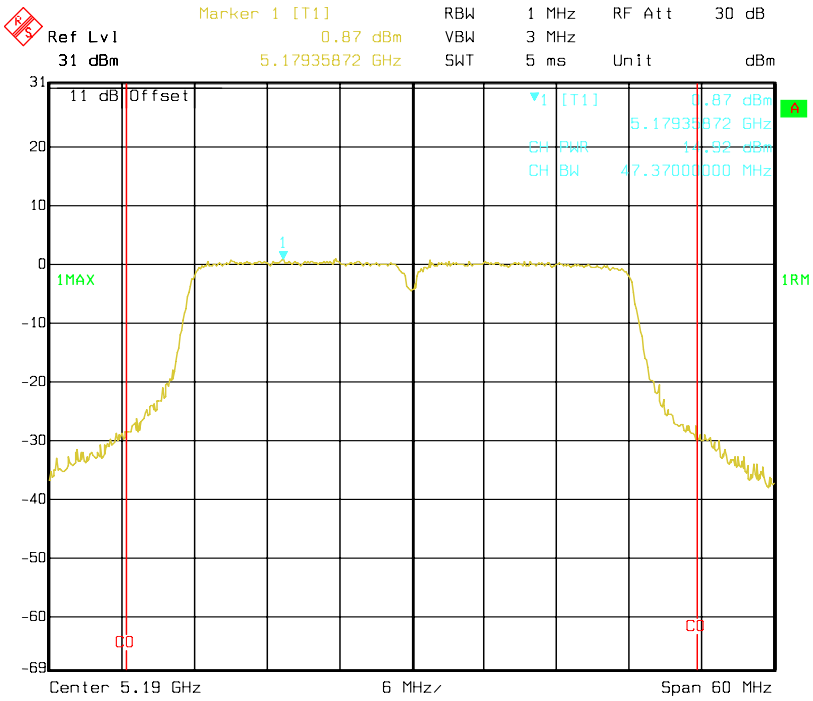
Date: 17.JUN.2015 13:43:40

802.11n HT20 mode, Antenna 0: RF Output Power-5240 MHz

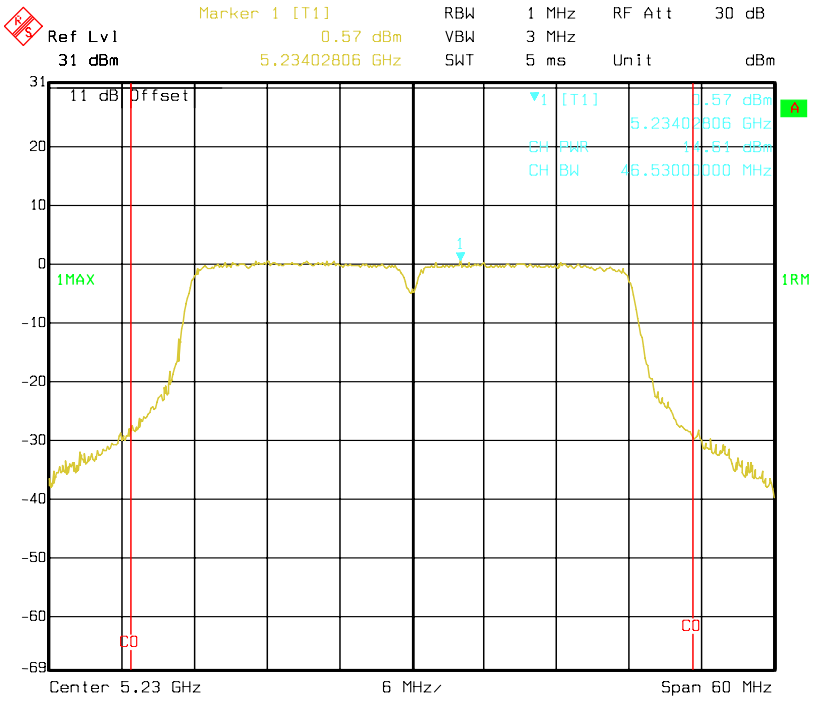


Date: 17.JUN.2015 13:45:44

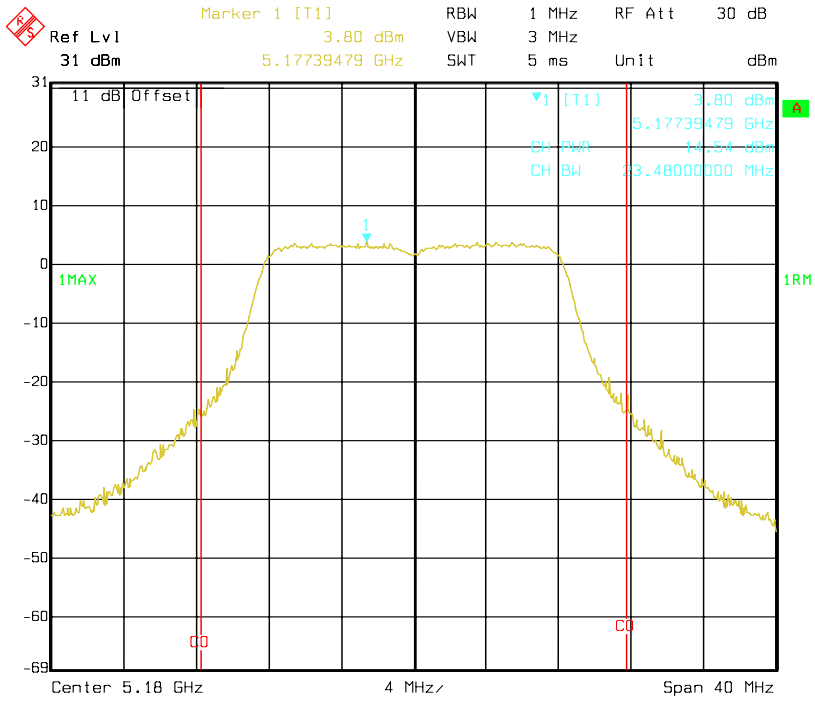
802.11n HT40 mode, Antenna 0: RF Output Power-5190 MHz



802.11n HT40 mode, Antenna 0: RF Output Power-5230 MHz

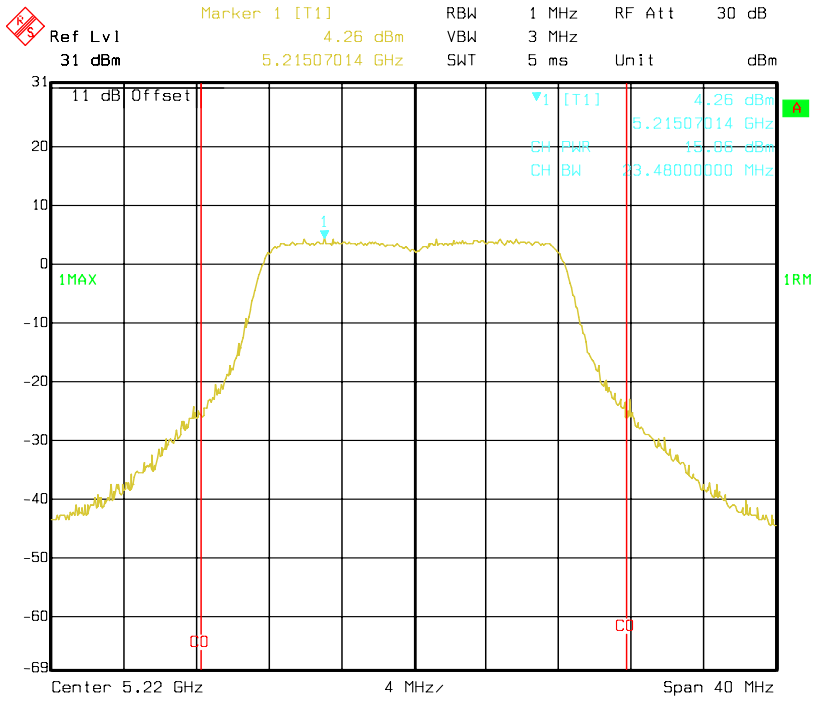


802.11a, Antenna 1: RF Output Power-5180 MHz



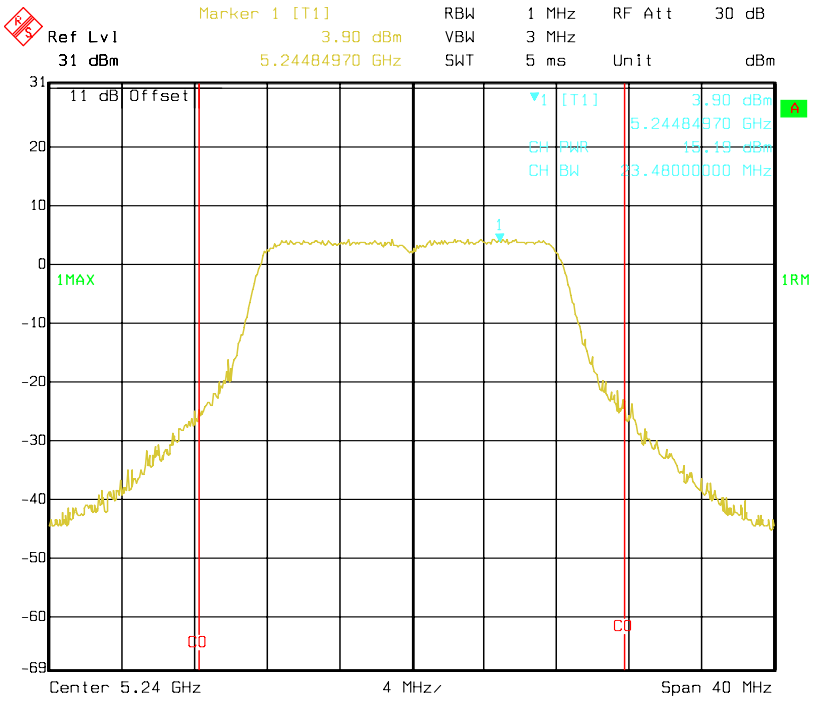
Date: 17.JUN.2015 15:01:07

802.11a, Antenna 1: RF Output Power-5220 MHz



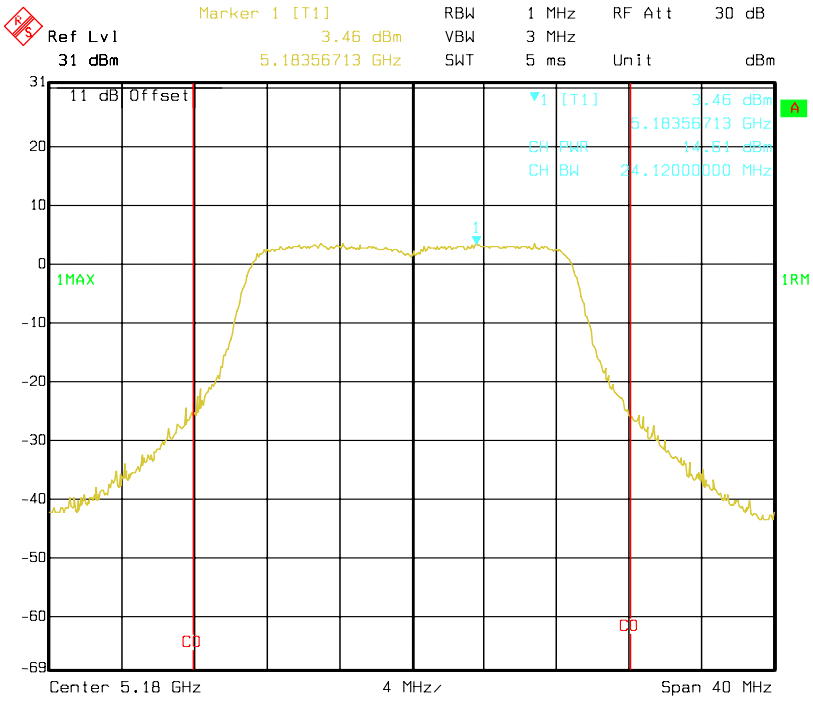
Date: 17.JUN.2015 15:04:30

802.11a, Antenna 1: RF Output Power-5240 MHz



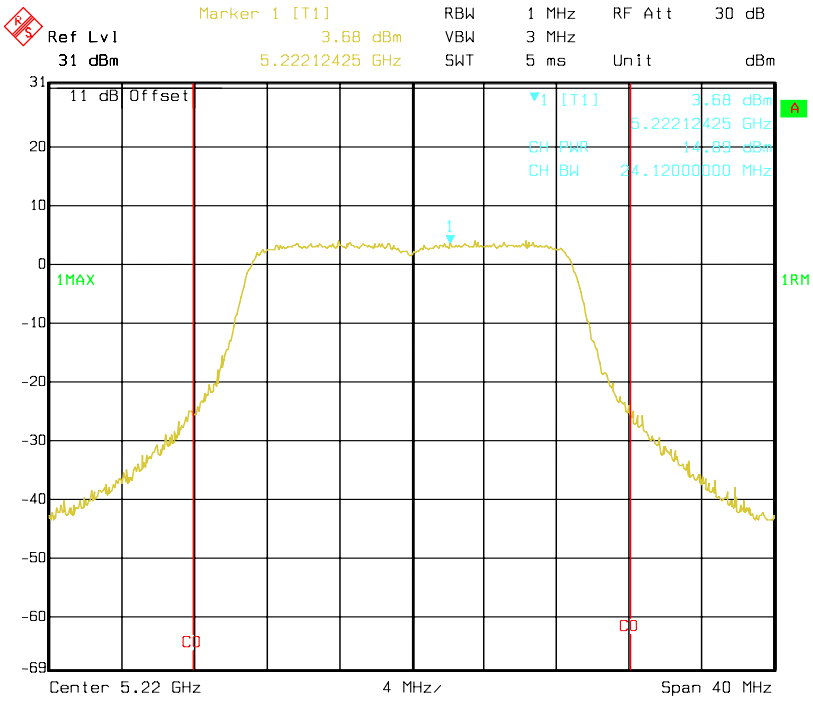
Date: 17.JUN.2015 15:06:37

802.11ac VHT20, Antenna 1: RF Output Power-5180 MHz



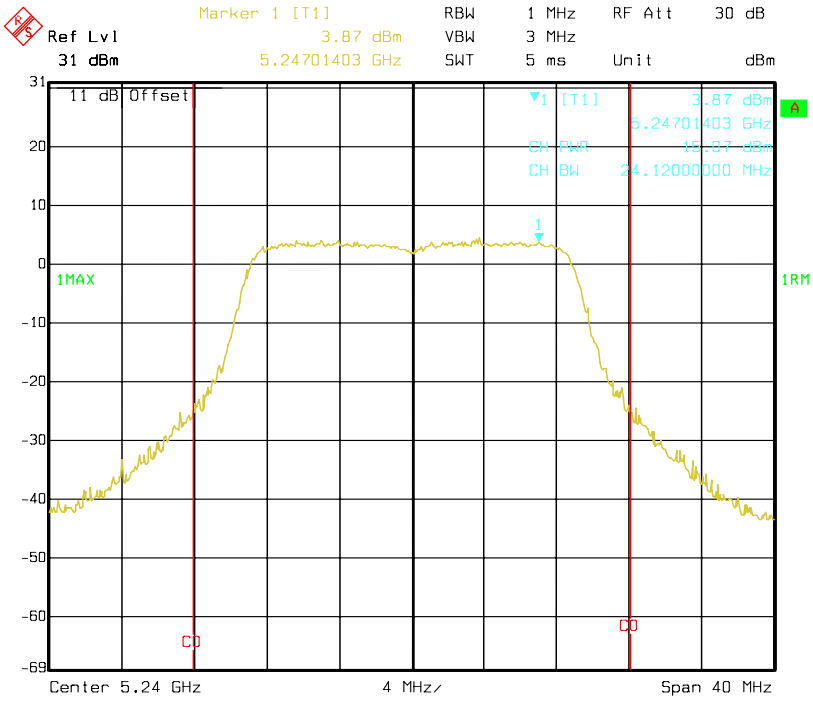
Date: 18.JUN.2015 10:58:55

802.11ac VHT20, Antenna 1: RF Output Power-5220 MHz



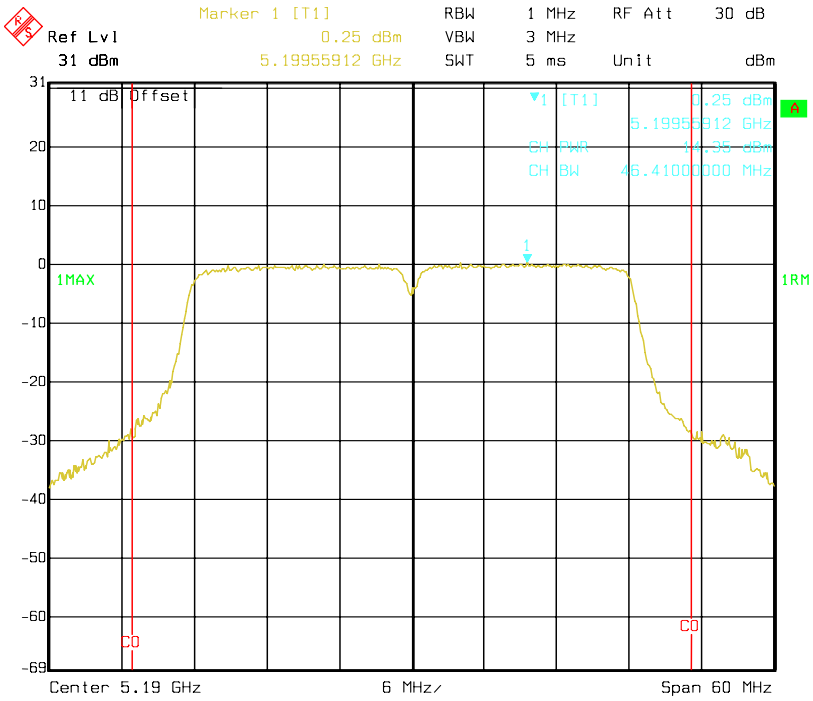
Date: 18.JUN.2015 11:01:03

802.11ac VHT20, Antenna 1: RF Output Power-5240 MHz



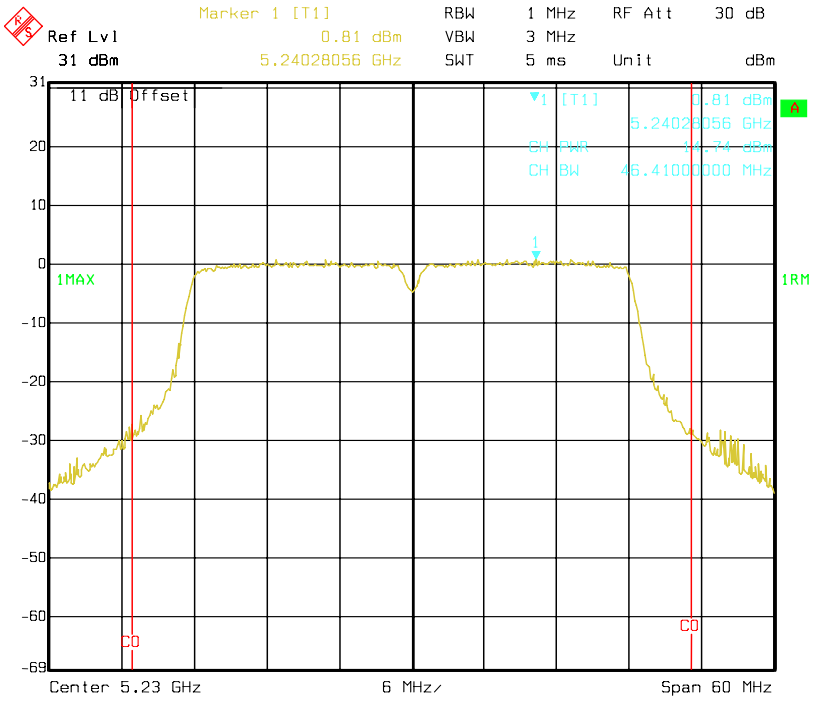
Date: 18.JUN.2015 11:03:13

802.11VHT40, Antenna 1: RF Output Power-5190 MHz



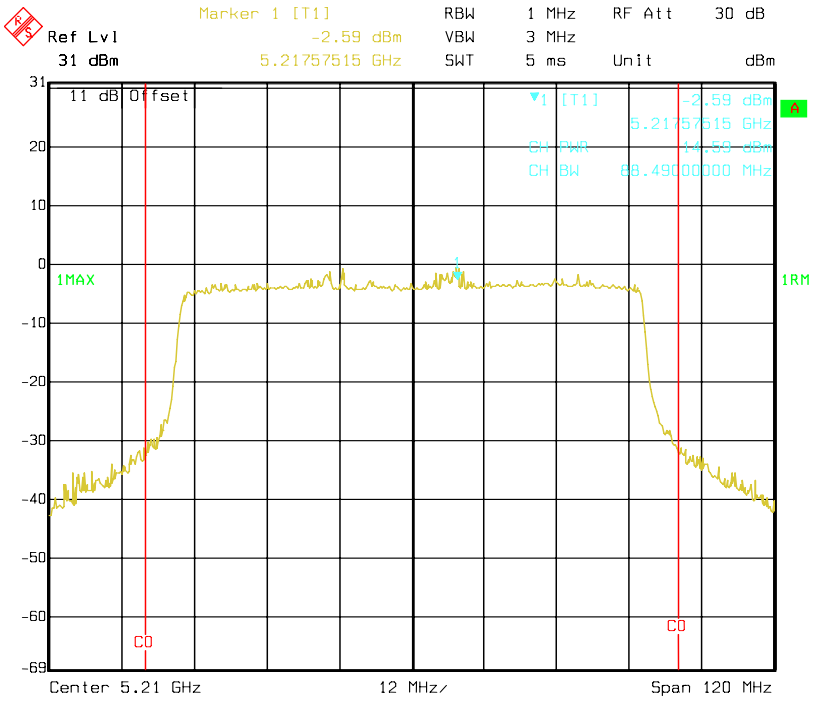
Date: 18.JUN.2015 11:06:43

802.11VHT40, Antenna 1: RF Output Power-5230 MHz



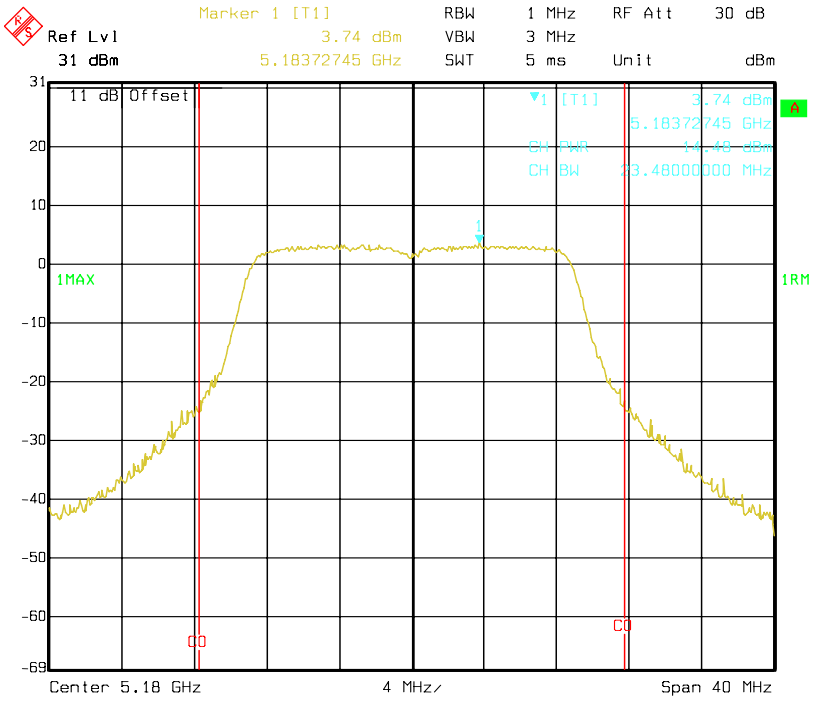
Date: 18.JUN.2015 11:08:30

802.11VHT80, Antenna 1: RF Output Power-5210 MHz



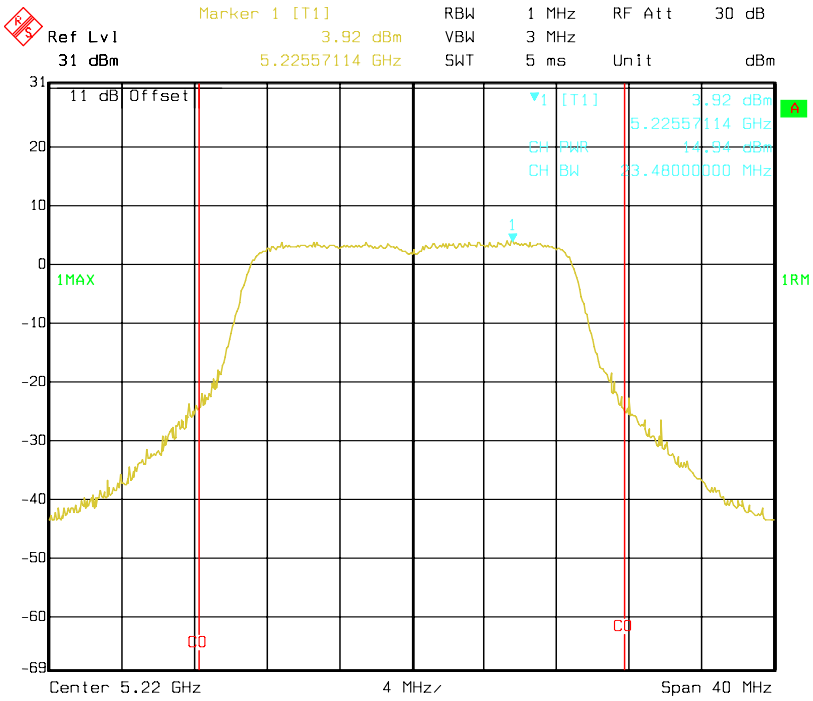
Date: 18.JUN.2015 11:11:15

802.11n HT20 mode, Antenna 1: RF Output Power-5180 MHz



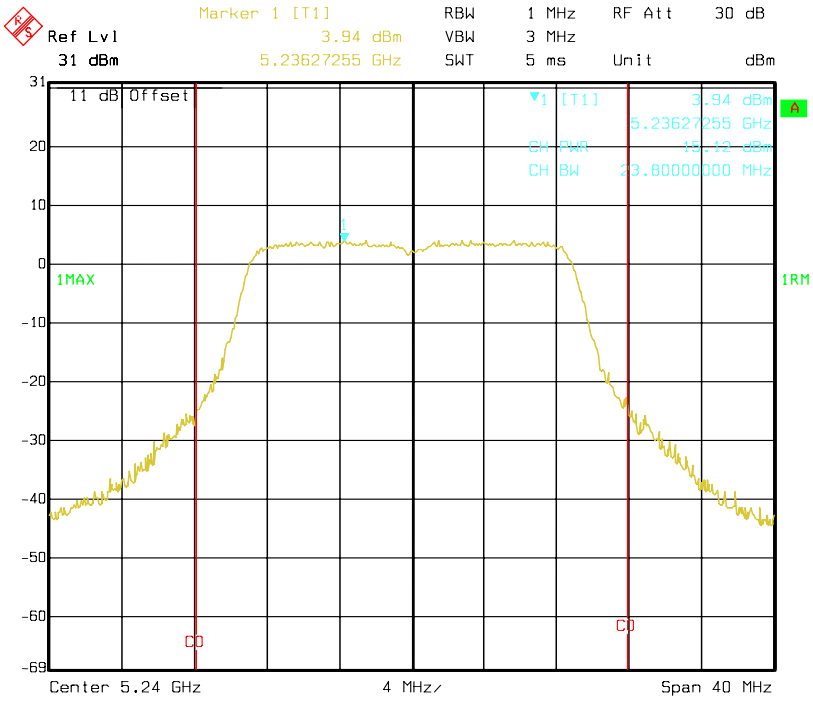
Date: 17.JUN.2015 15:09:51

802.11n HT20 mode, Antenna 1: RF Output Power-5220 MHz



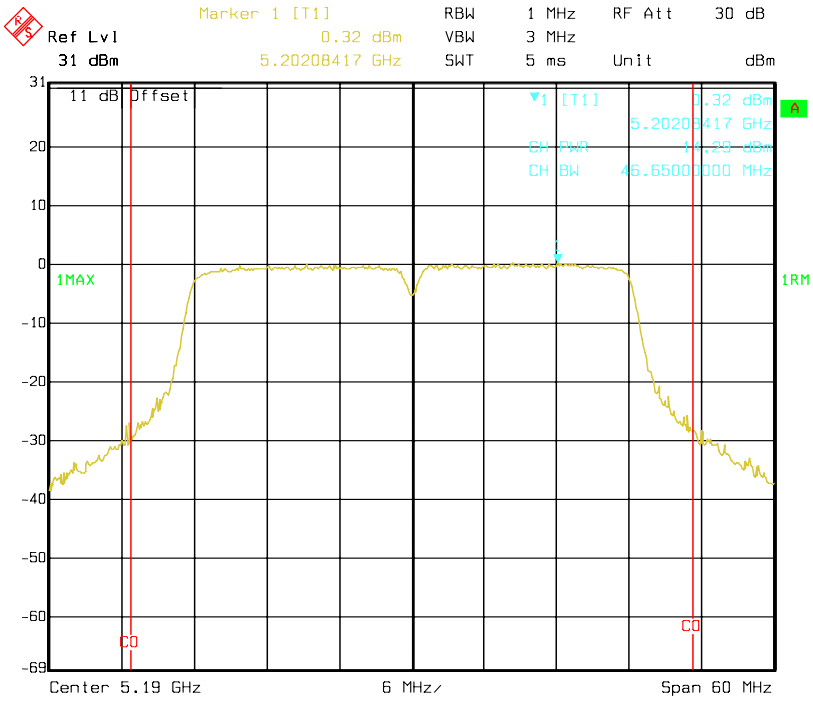
Date: 17.JUN.2015 15:12:25

802.11n HT20 mode, Antenna 1: RF Output Power-5240 MHz



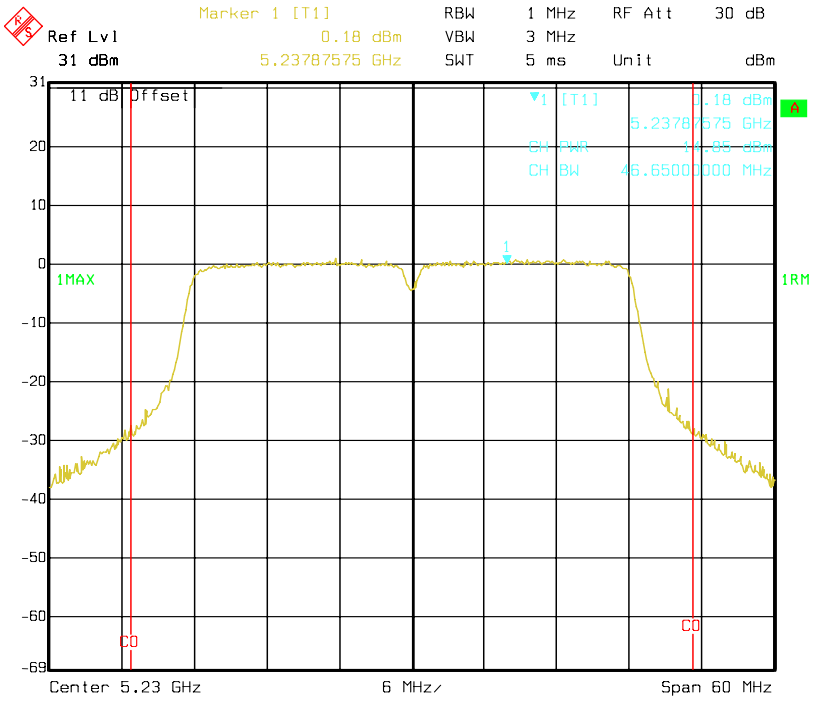
Date: 17.JUN.2015 15:15:13

802.11n HT40 mode, Antenna 1: RF Output Power-5190 MHz



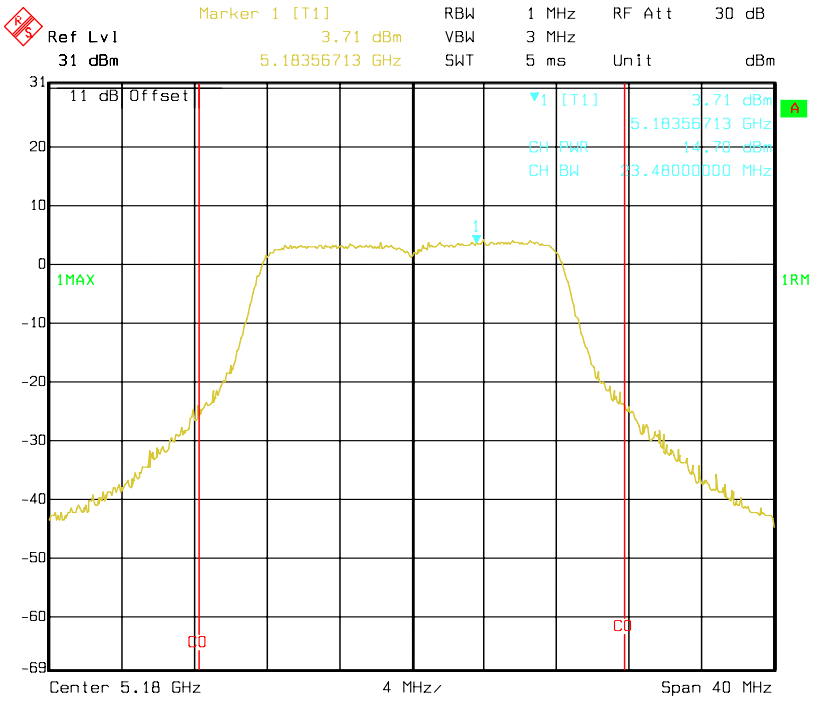
Date: 17.JUN.2015 15:17:56

802.11n HT40 mode, Antenna 1: RF Output Power-5230 MHz



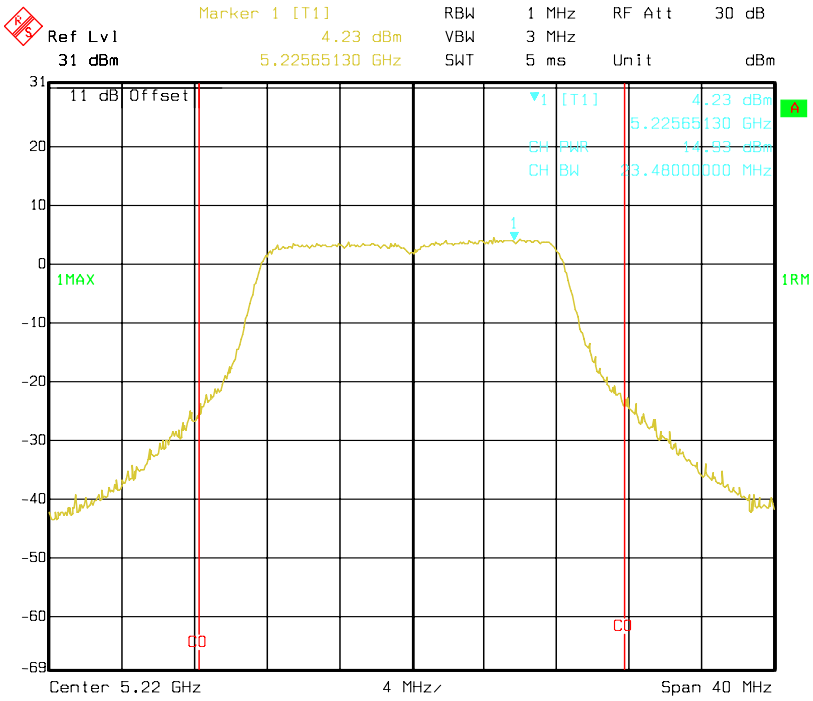
Date: 17.JUN.2015 15:20:27

802.11a, Antenna 2: RF Output Power-5180 MHz



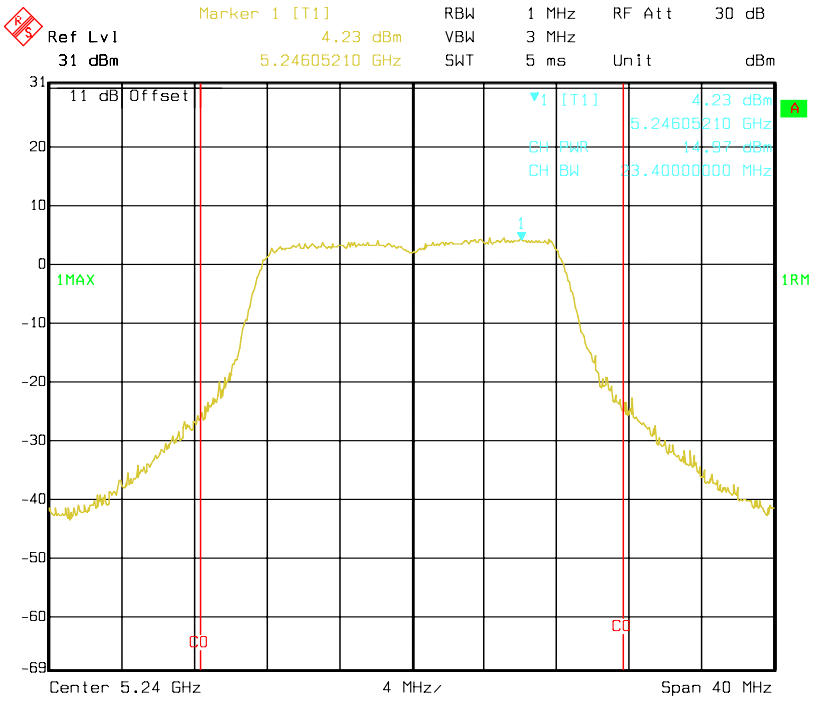
Date: 18.JUN.2015 11:22:50

802.11a, Antenna 2: RF Output Power-5220 MHz



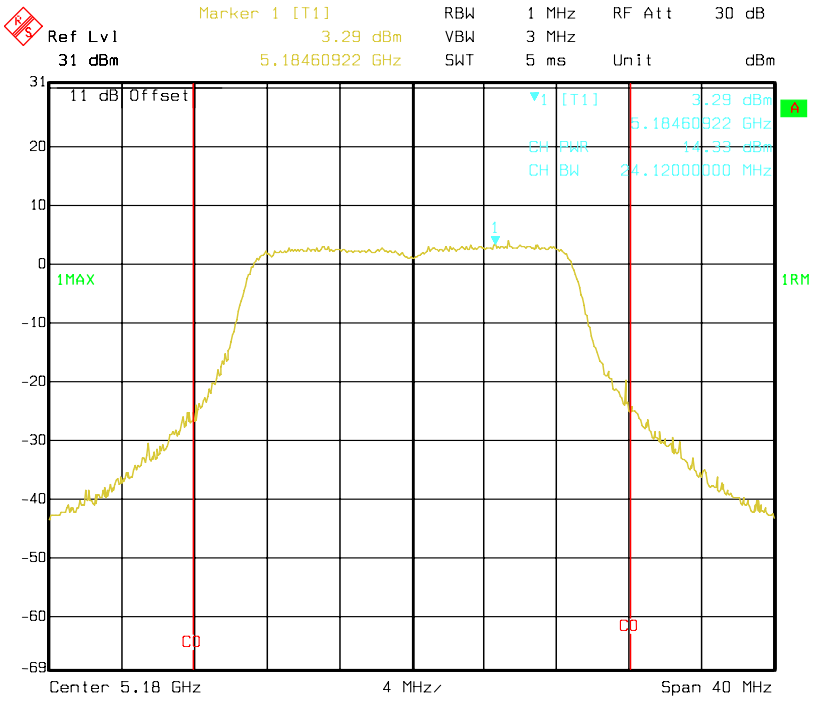
Date: 18.JUN.2015 11:26:53

802.11a, Antenna 2: RF Output Power-5240 MHz



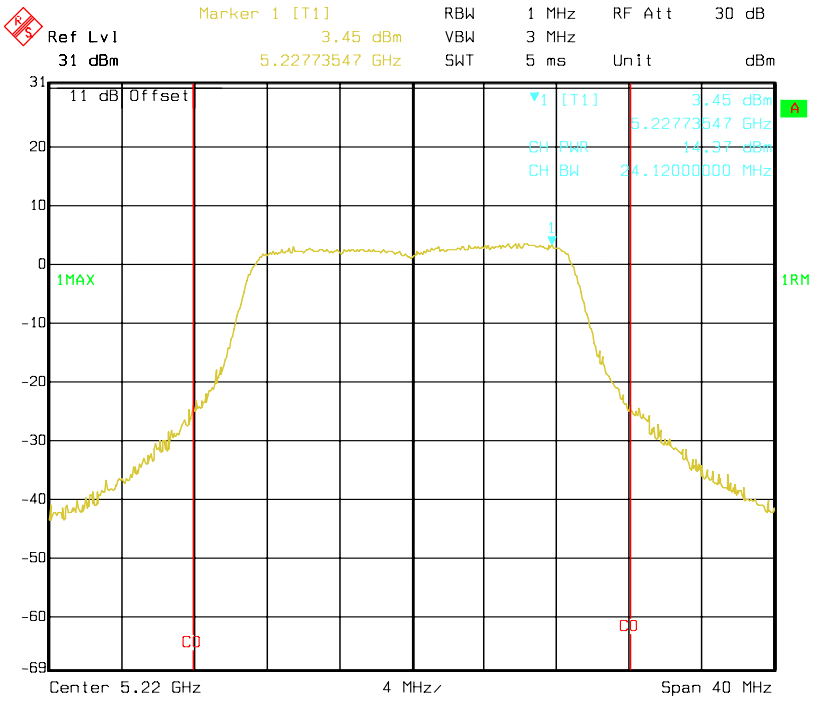
Date: 18.JUN.2015 11:30:18

802.11ac VHT20, Antenna 2: RF Output Power-5180 MHz



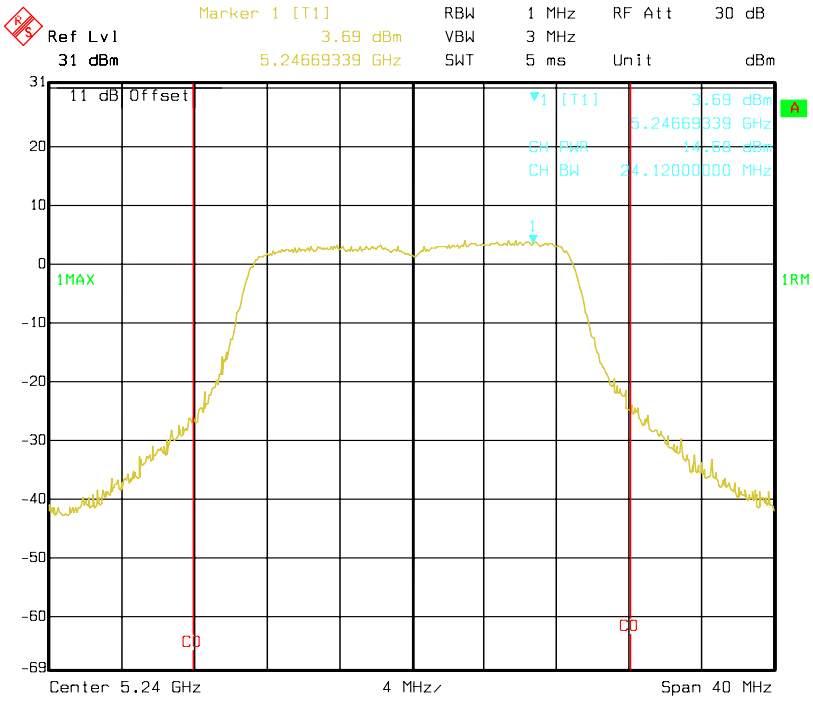
Date: 18.JUN.2015 12:08:35

802.11ac VHT20, Antenna 2: RF Output Power-5220 MHz



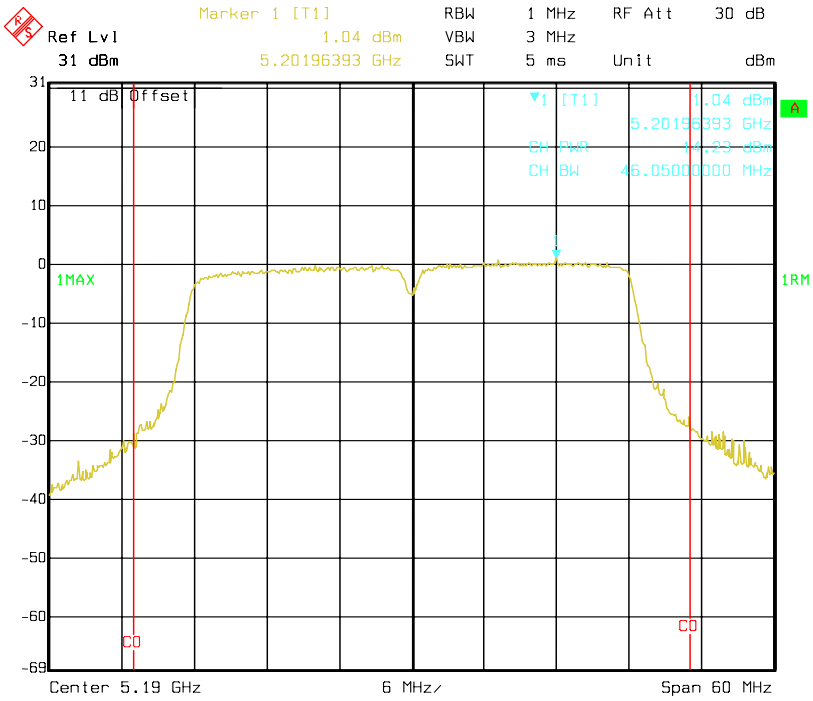
Date: 18.JUN.2015 12:11:31

802.11ac VHT20, Antenna 2: RF Output Power-5240 MHz



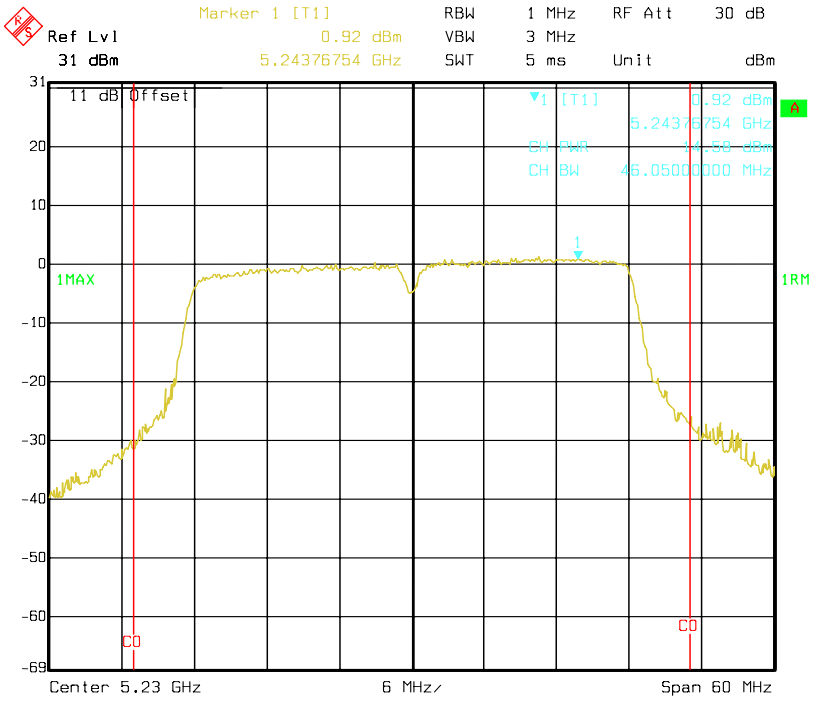
Date: 18.JUN.2015 12:14:01

802.11ac VHT40, Antenna 2: RF Output Power-5190 MHz



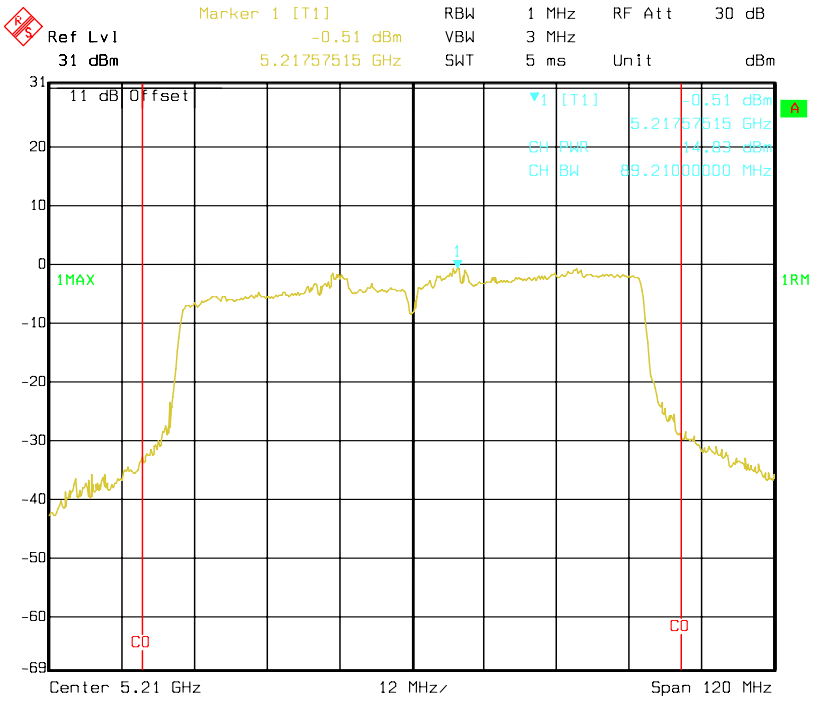
Date: 18.JUN.2015 12:20:57

802.11ac VHT40, Antenna 2: RF Output Power-5230 MHz



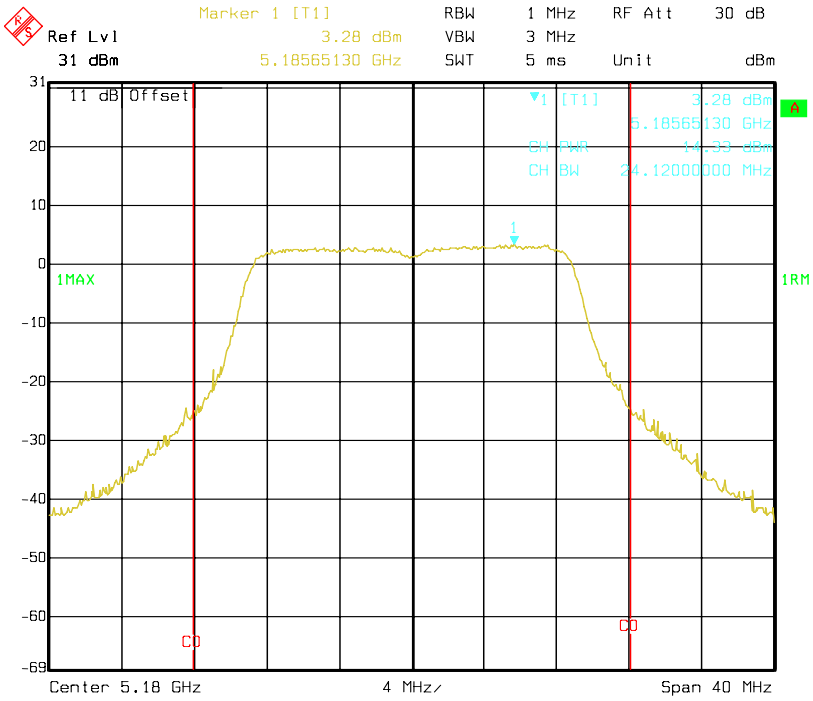
Date: 18.JUN.2015 12:26:47

802.11ac VHT80, Antenna 2: RF Output Power-5210 MHz



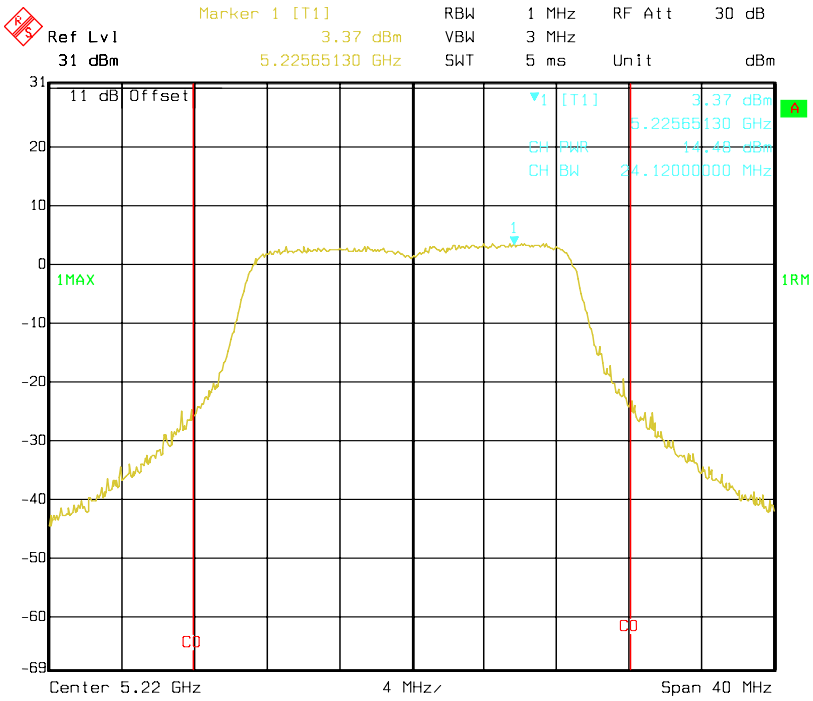
Date: 18.JUN.2015 12:29:14

802.11n HT20 mode, Antenna 2: RF Output Power-5180 MHz



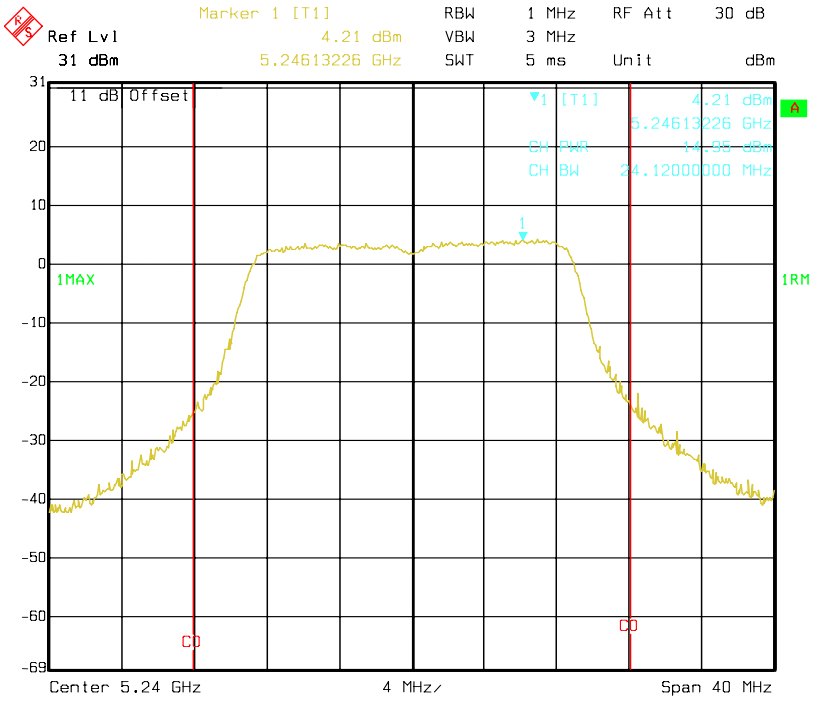
Date: 18.JUN.2015 11:38:45

802.11n HT20 mode, Antenna 2: RF Output Power-5220 MHz



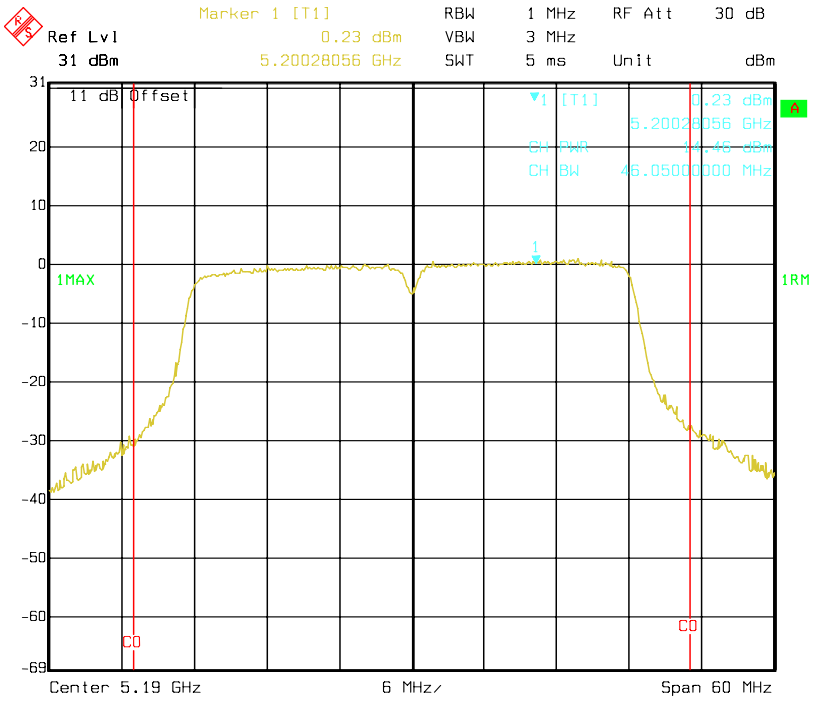
Date: 18.JUN.2015 11:41:43

802.11n HT20 mode, Antenna 2: RF Output Power-5240 MHz



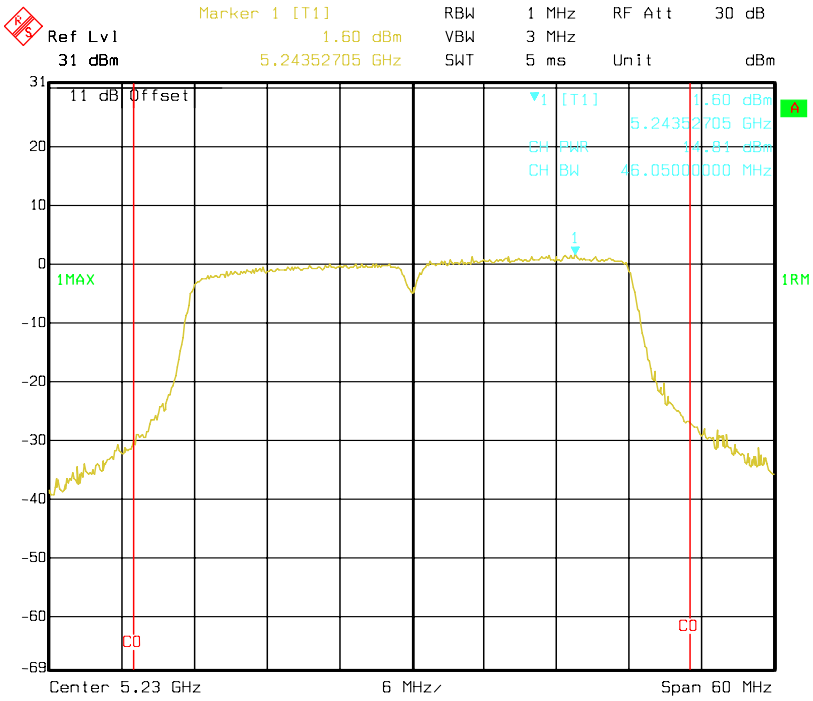
Date: 18.JUN.2015 11:44:38

802.11n HT40 mode, Antenna 2: RF Output Power-5190 MHz



Date: 18.JUN.2015 12:01:41

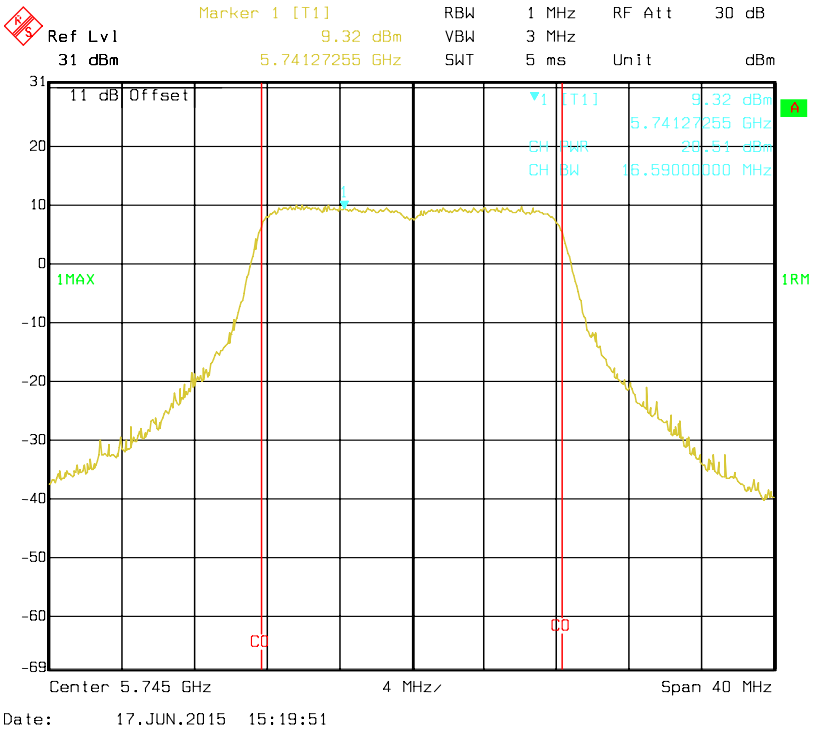
802.11n HT40 mode, Antenna 2: RF Output Power-5230 MHz



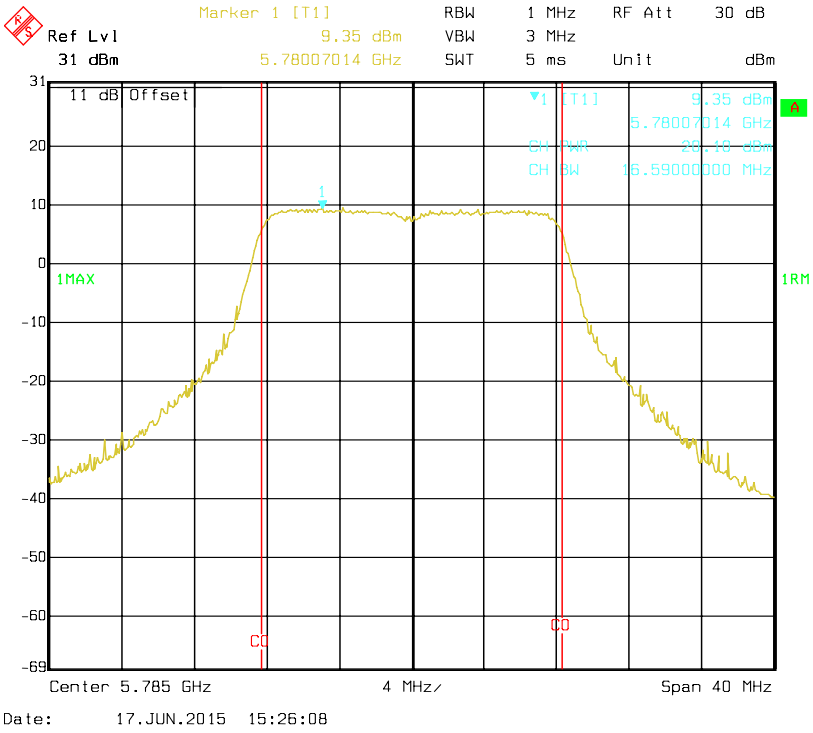
Date: 18.JUN.2015 12:04:26

5725-5850 MHz:

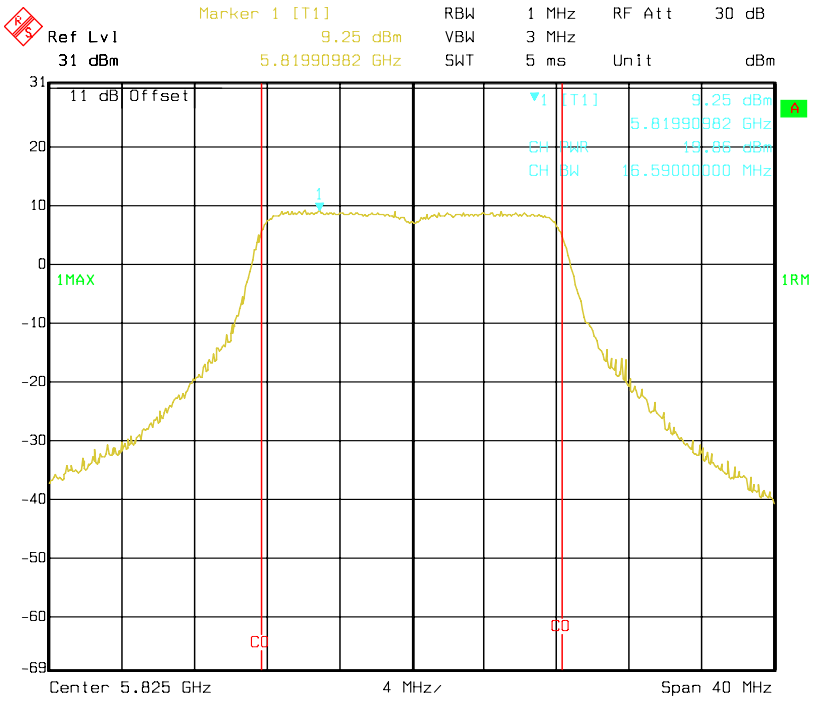
802.11a, Antenna 0: RF Output Power-5745 MHz



802.11a, Antenna 0: RF Output Power-5785 MHz

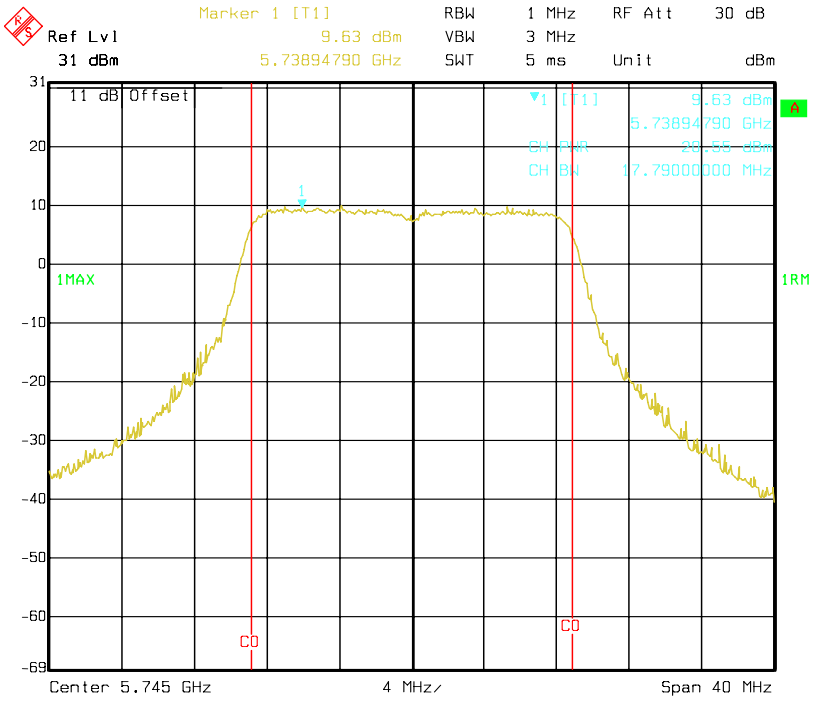


802.11a, Antenna 0: RF Output Power-5825 MHz



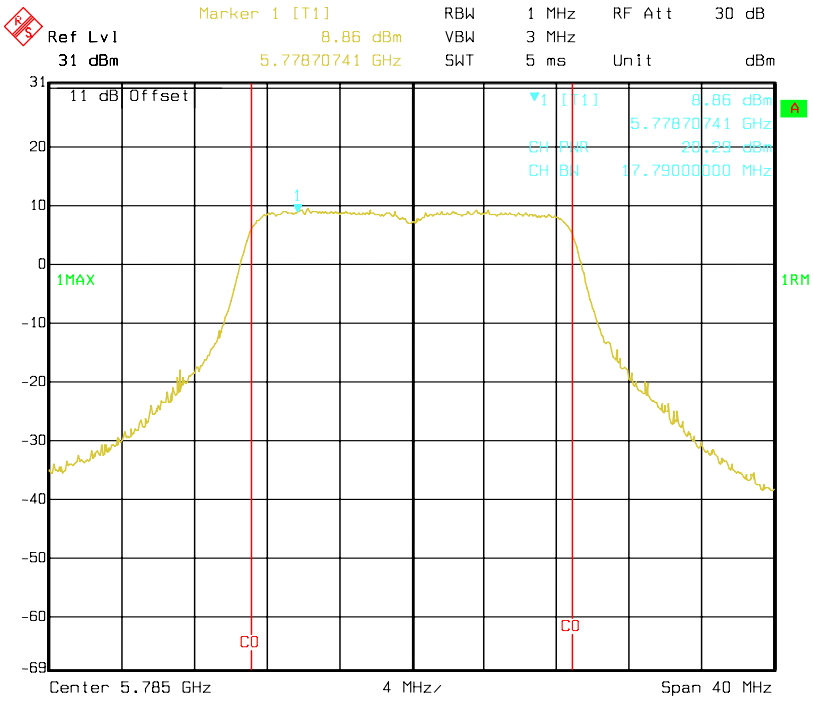
Date: 17.JUN.2015 15:30:58

802.11ac VHT20, Antenna 0: RF Output Power-5745 MHz



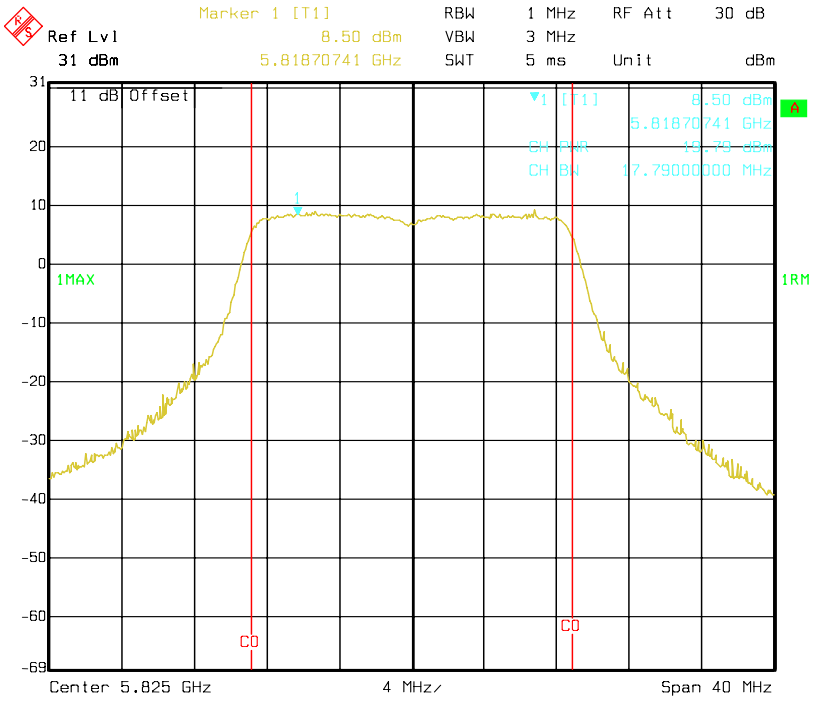
Date: 17.JUN.2015 16:09:46

802.11ac VHT20, Antenna 0: RF Output Power-5785 MHz



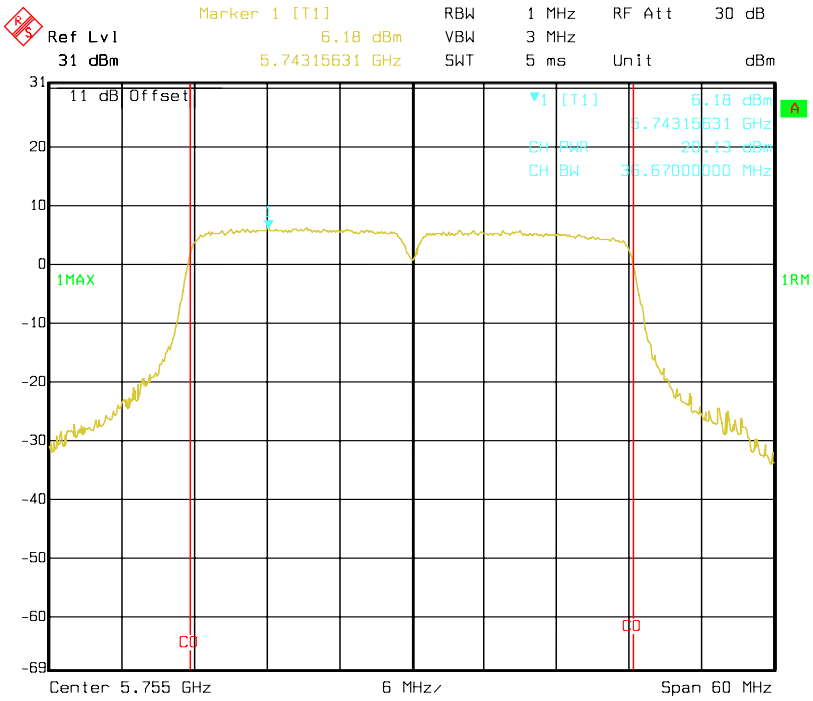
Date: 17.JUN.2015 16:15:52

802.11ac VHT20, Antenna 0: RF Output Power-5825 MHz



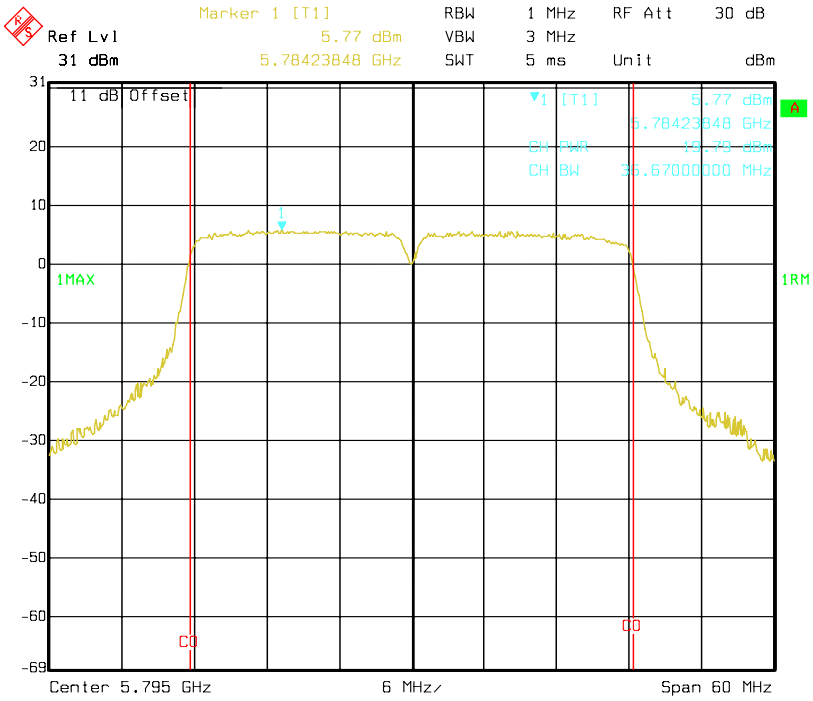
Date: 17.JUN.2015 16:19:47

802.11ac VHT40, Antenna 0: RF Output Power-5755 MHz



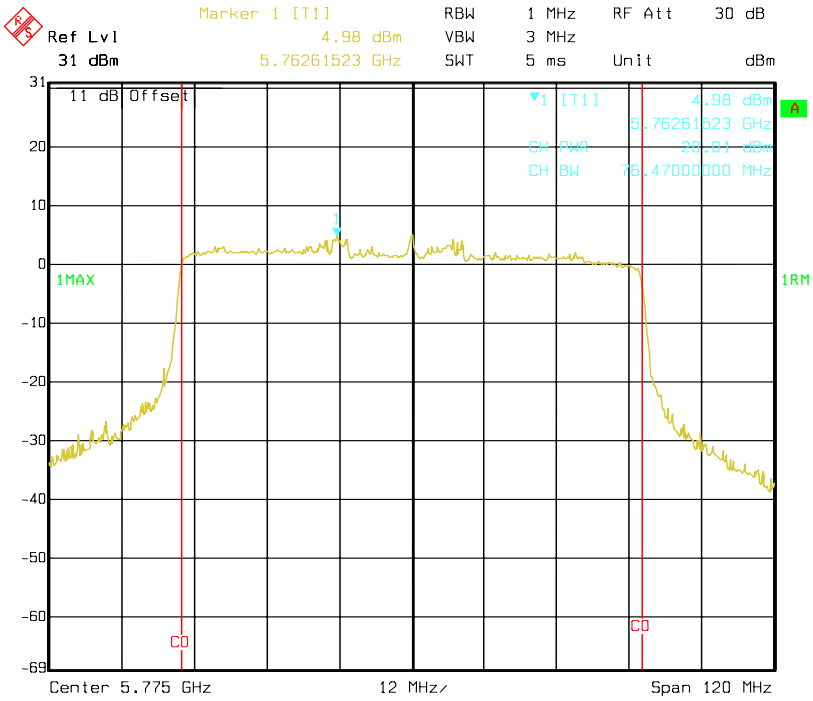
Date: 17.JUN.2015 16:25:07

802.11ac VHT40, Antenna 0: RF Output Power-5795 MHz



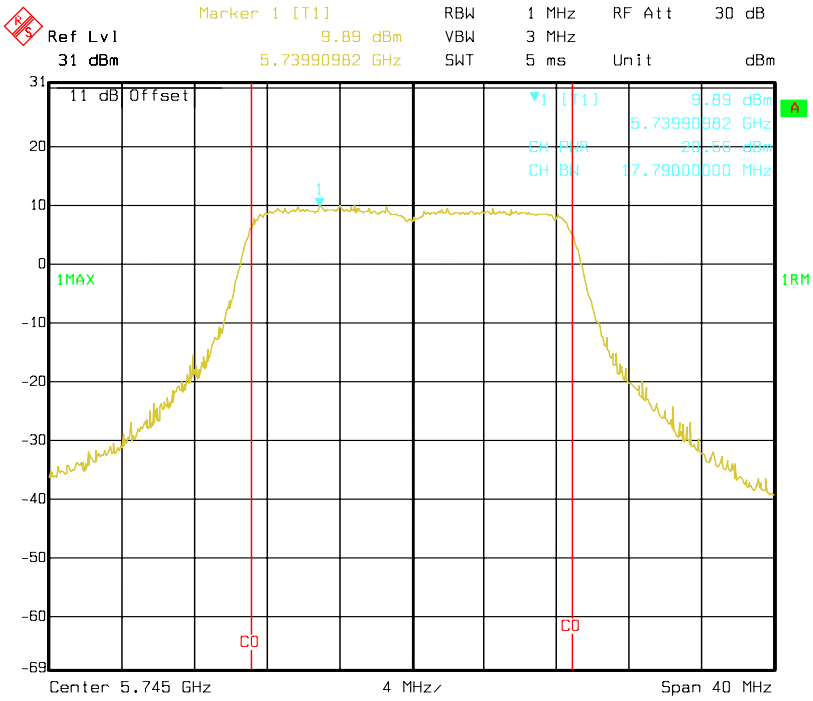
Date: 17.JUN.2015 16:29:10

802.11ac VHT80, Antenna 0: RF Output Power-5775 MHz



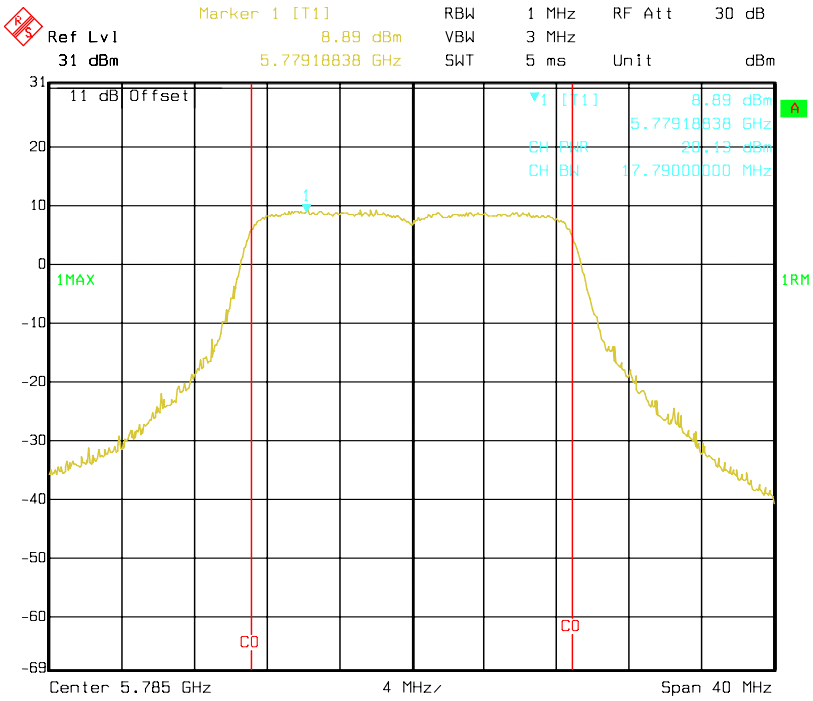
Date: 17.JUN.2015 16:33:55

802.11n HT20 mode, Antenna 0: RF Output Power-5745 MHz



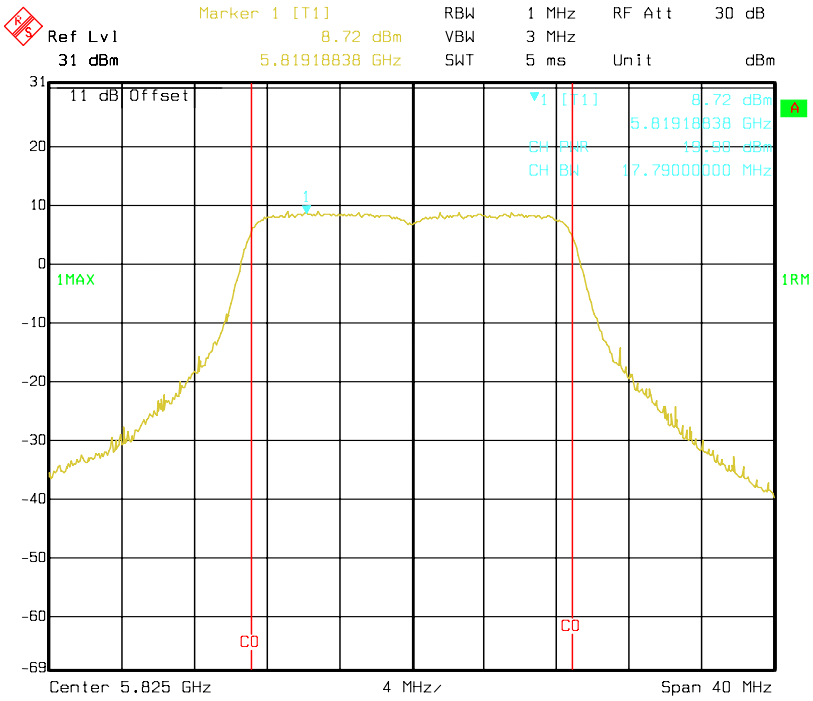
Date: 17.JUN.2015 15:38:31

802.11n HT20 mode, Antenna 0: RF Output Power-5785 MHz



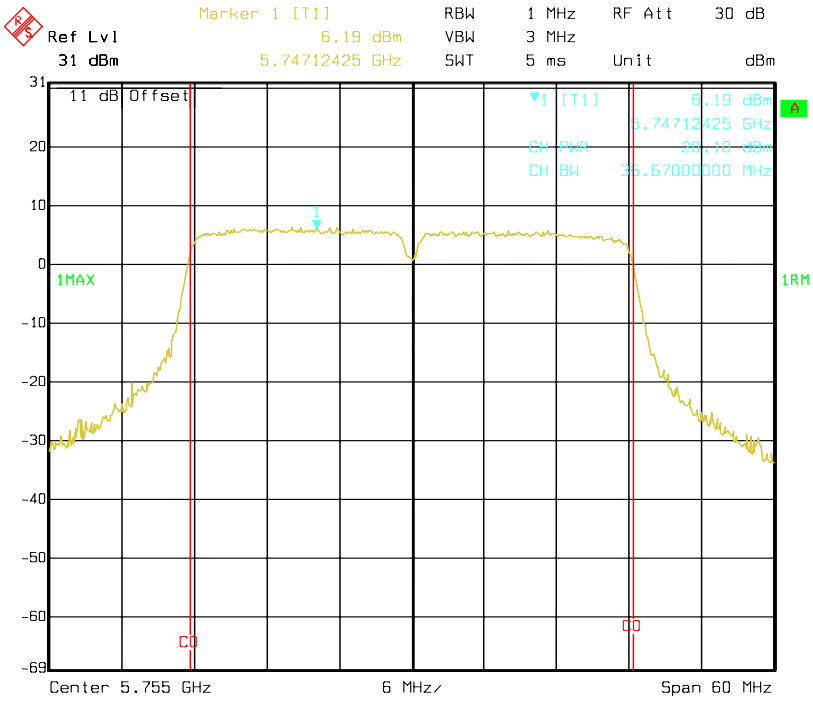
Date: 17.JUN.2015 15:42:36

802.11n HT20 mode, Antenna 0: RF Output Power-5825 MHz

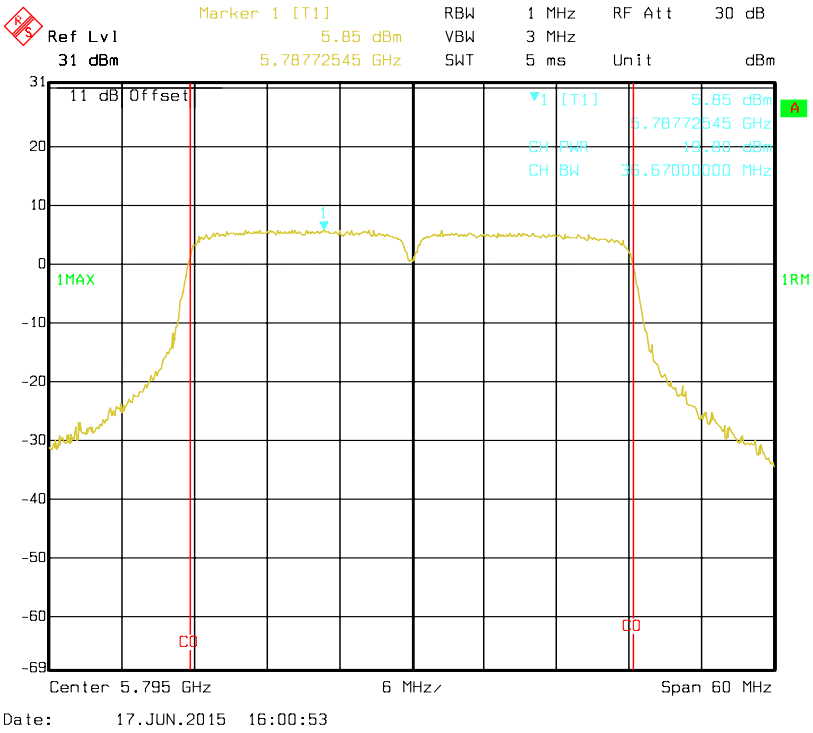


Date: 17.JUN.2015 15:47:02

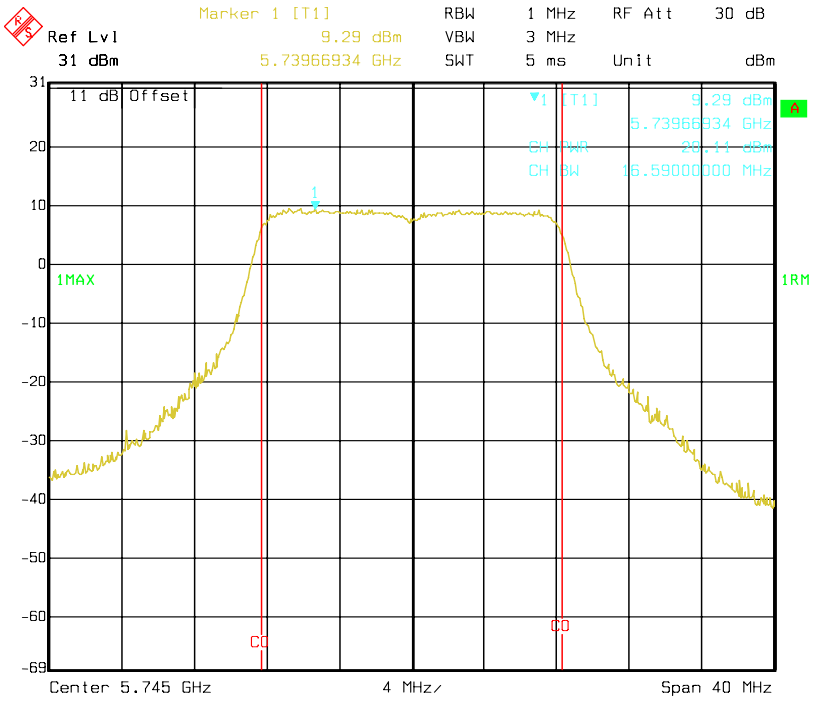
802.11n HT40 mode, Antenna 0: RF Output Power-5755 MHz



802.11n HT40 mode, Antenna 0: RF Output Power-5795 MHz

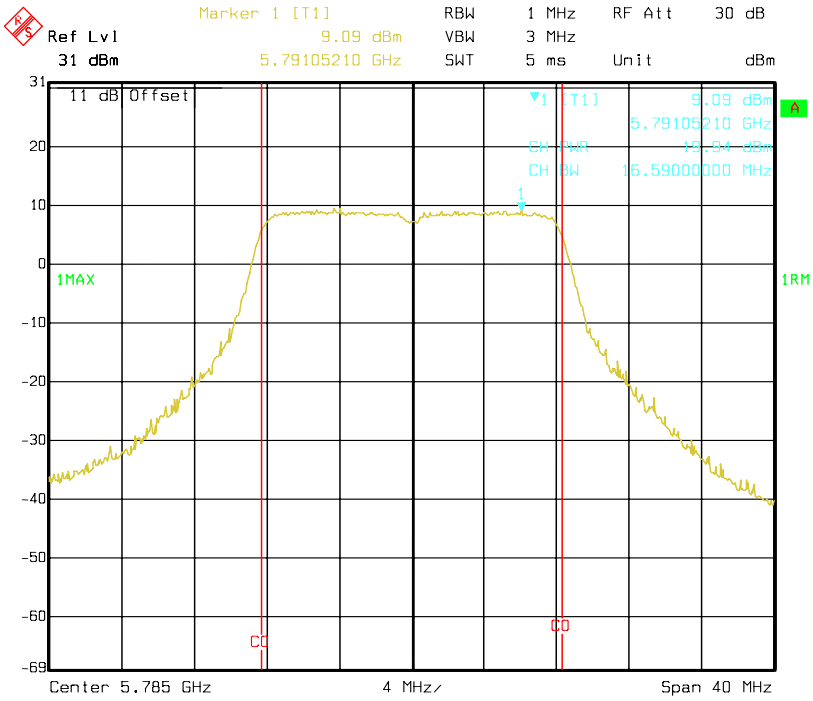


802.11a, Antenna 1: RF Output Power-5745 MHz



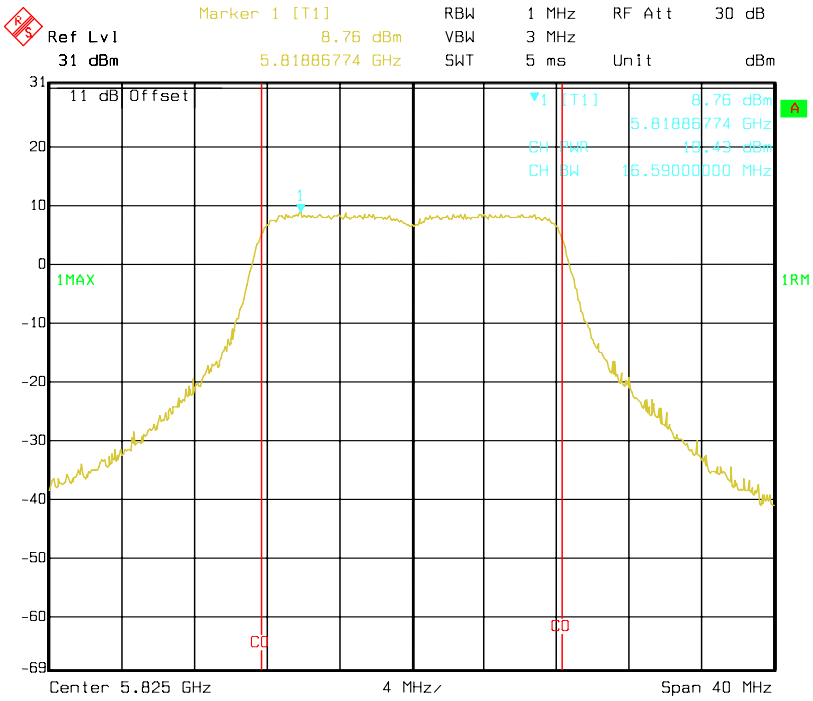
Date: 18.JUN.2015 14:00:18

802.11a, Antenna 1: RF Output Power-5785 MHz



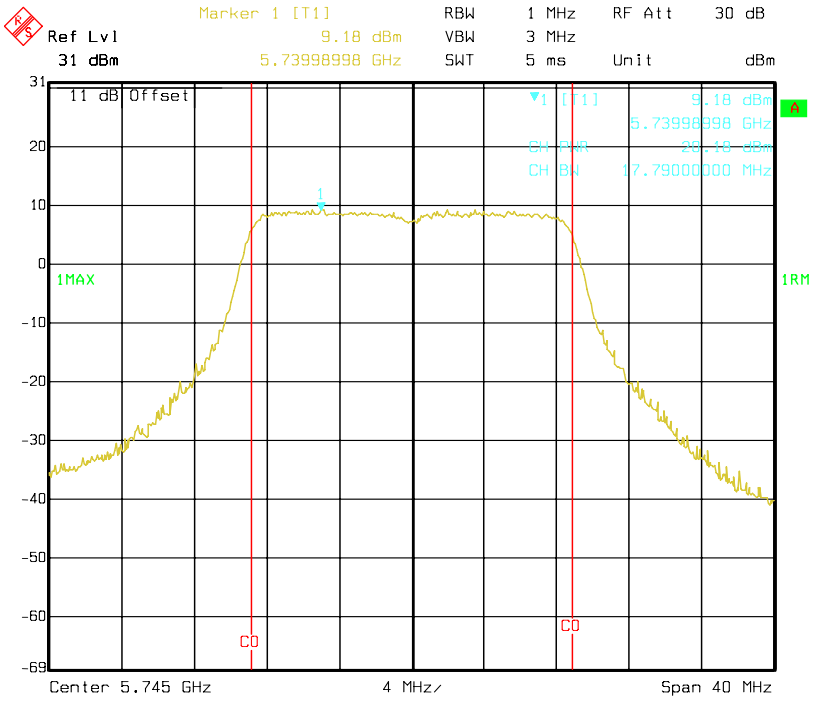
Date: 18.JUN.2015 14:05:54

802.11a, Antenna 1: RF Output Power-5825 MHz



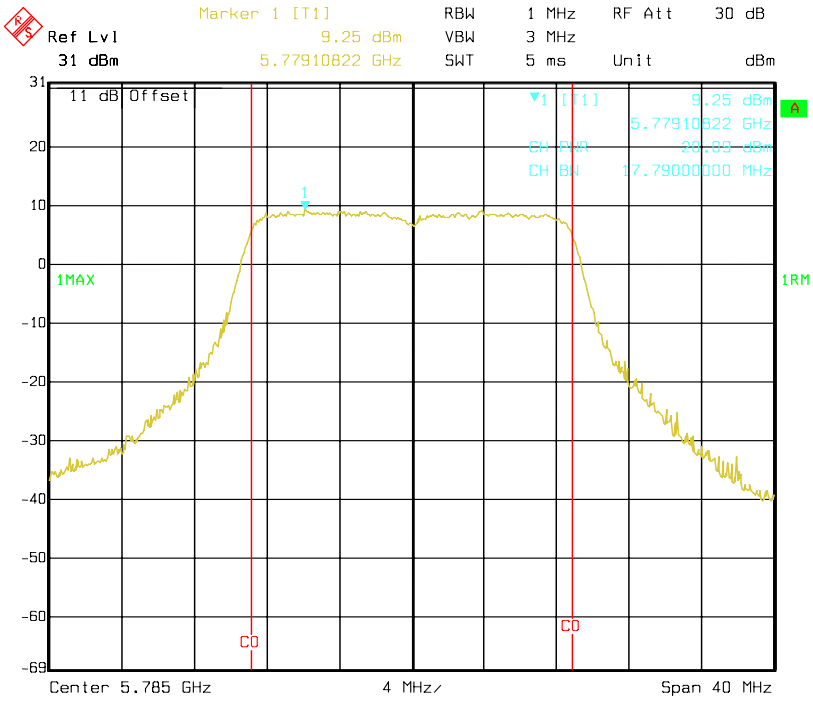
Date: 18.JUN.2015 14:09:45

802.11ac VHT20, Antenna 1: RF Output Power-5745 MHz



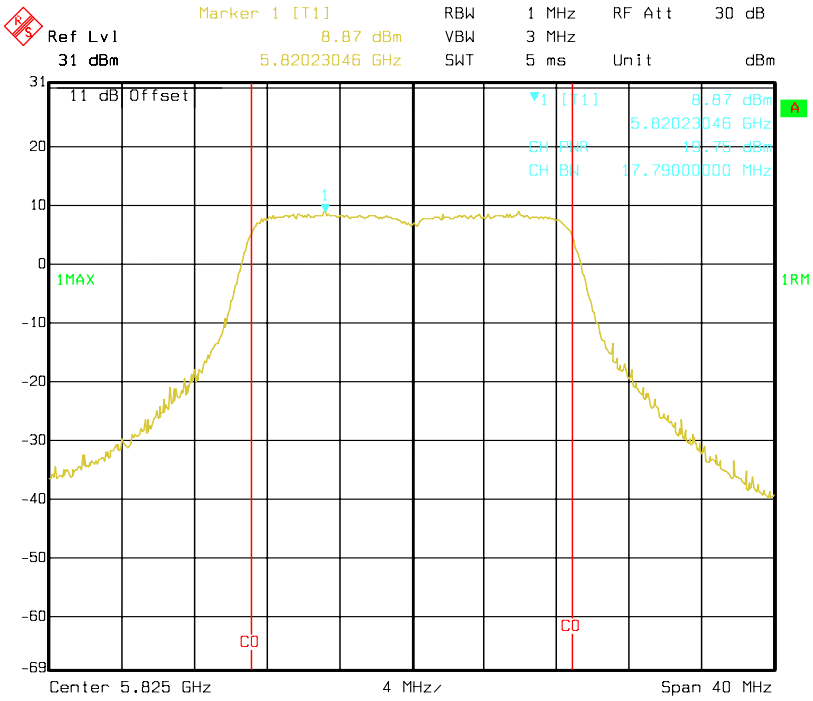
Date: 18.JUN.2015 14:43:37

802.11ac VHT20, Antenna 1: RF Output Power-5785 MHz



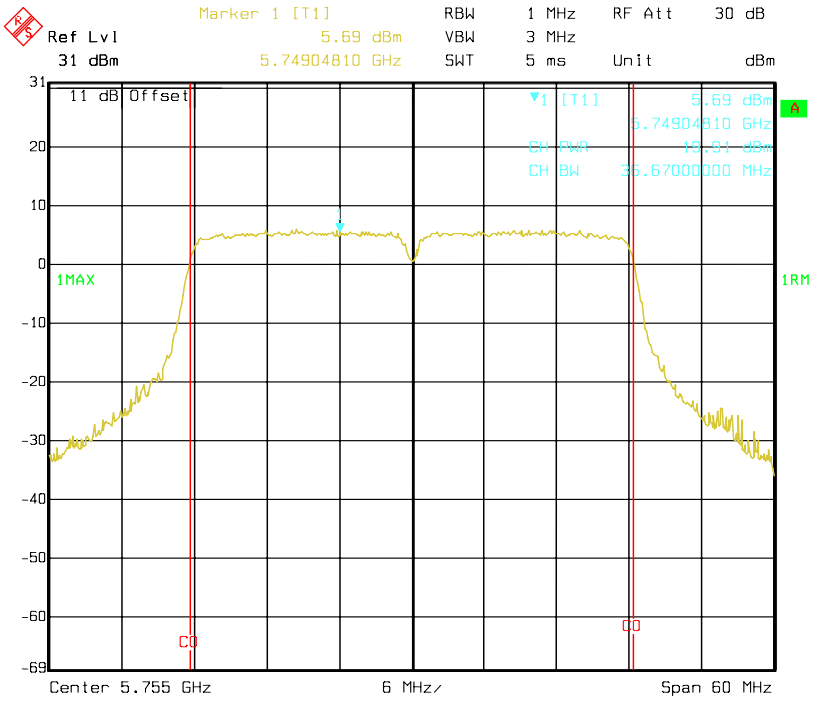
Date: 18.JUN.2015 14:48:08

802.11ac VHT20, Antenna 1: RF Output Power-5825 MHz



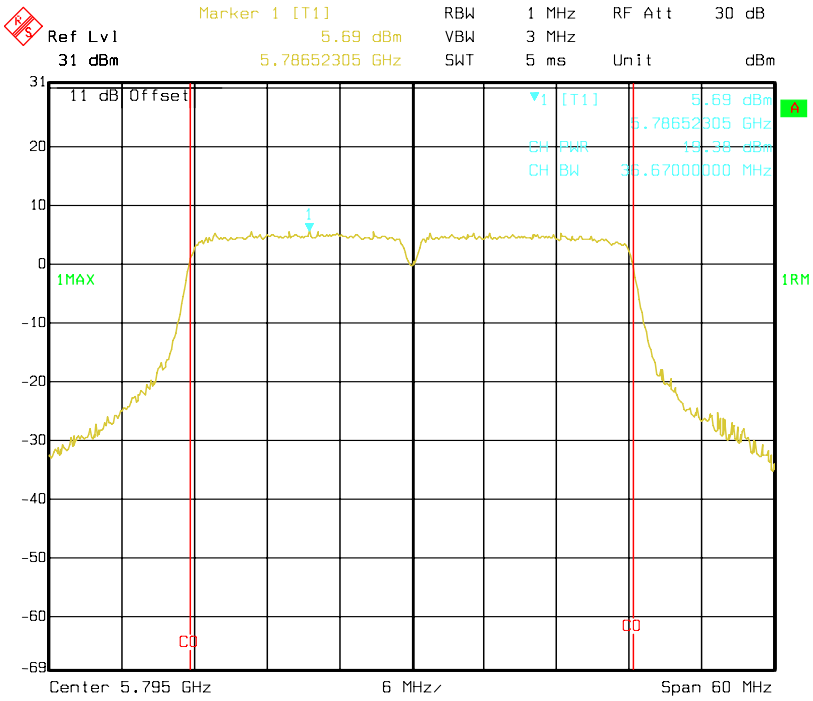
Date: 18.JUN.2015 14:51:12

802.11ac VHT40, Antenna 1: RF Output Power-5755 MHz



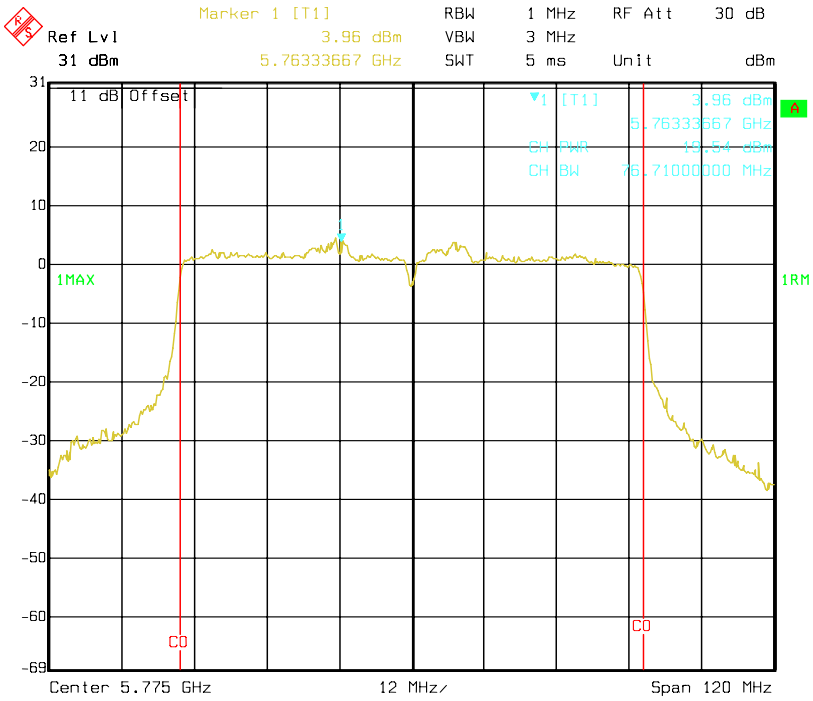
Date: 19.JUN.2015 10:08:48

802.11ac VHT40, Antenna 1: RF Output Power-5795 MHz

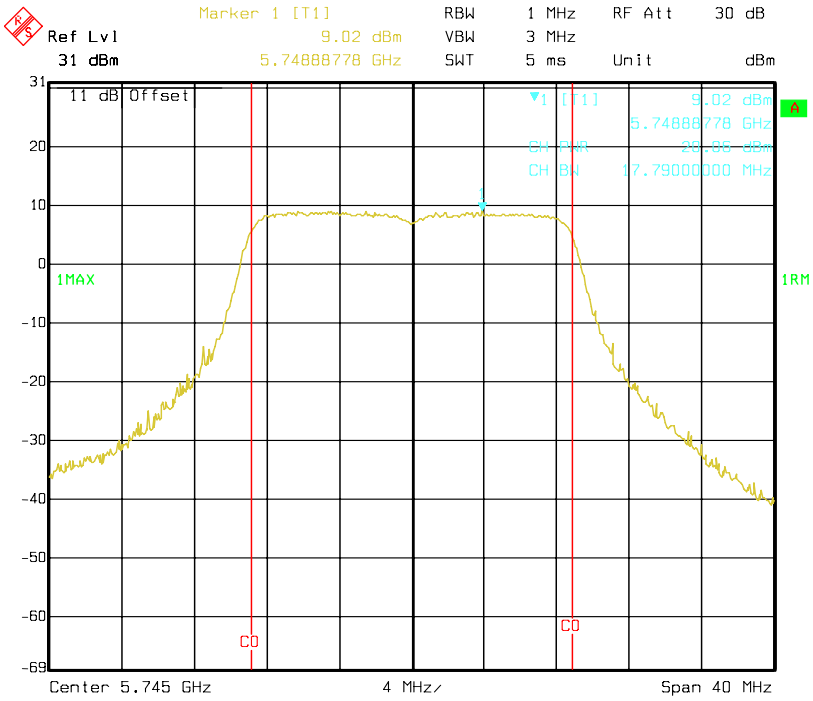


Date: 18.JUN.2015 14:59:57

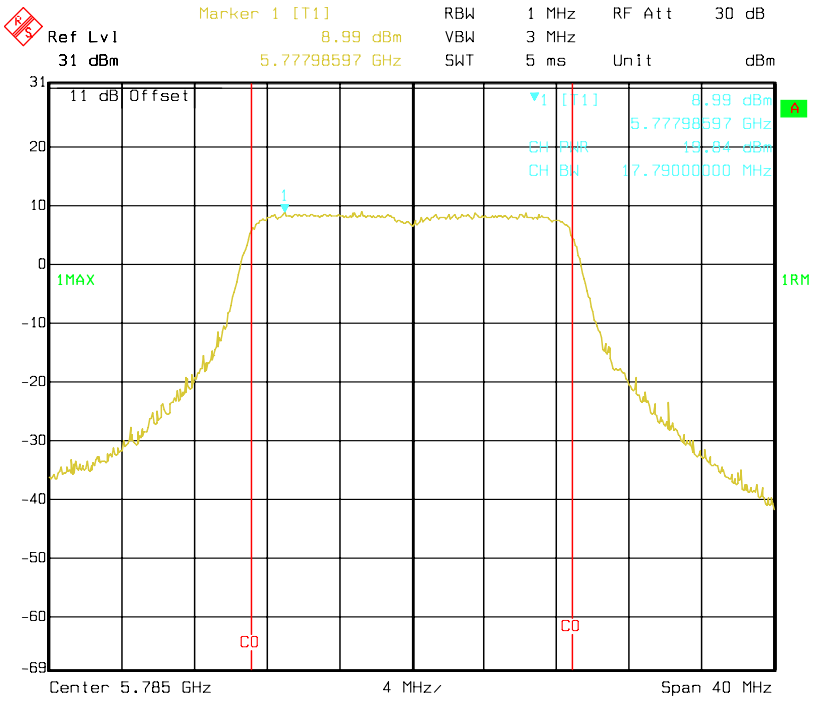
802.11ac VHT80, Antenna 1: RF Output Power-5775 MHz



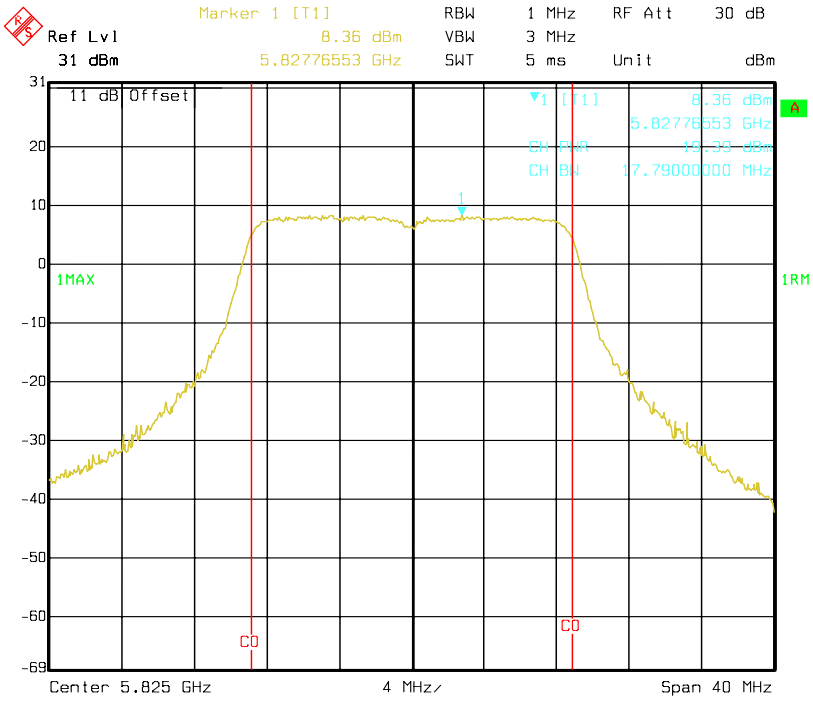
802.11n HT20 mode, Antenna 1: RF Output Power-5745 MHz



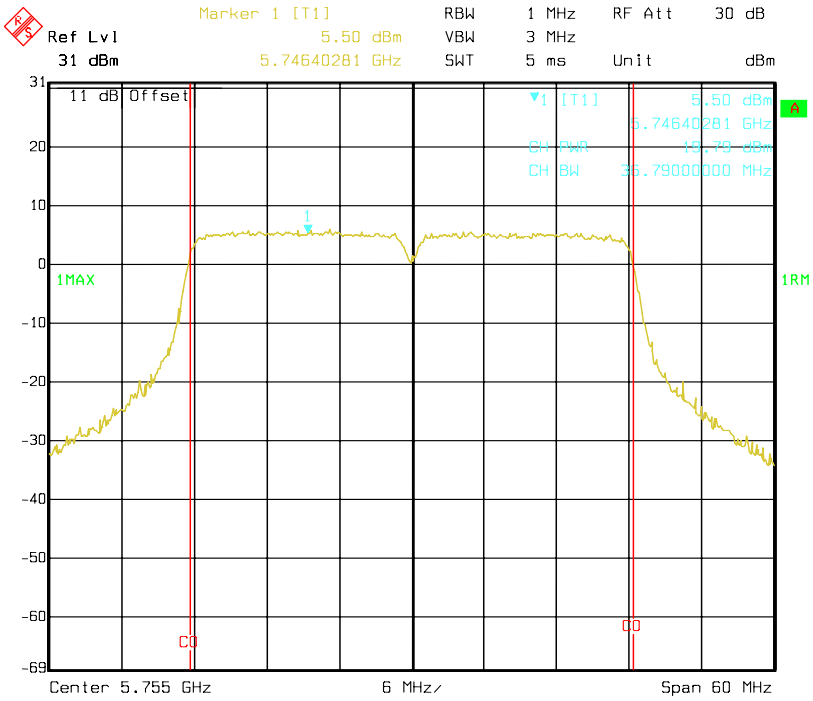
802.11n HT20 mode, Antenna 1: RF Output Power-5785 MHz



802.11n HT20 mode, Antenna 1: RF Output Power-5825 MHz

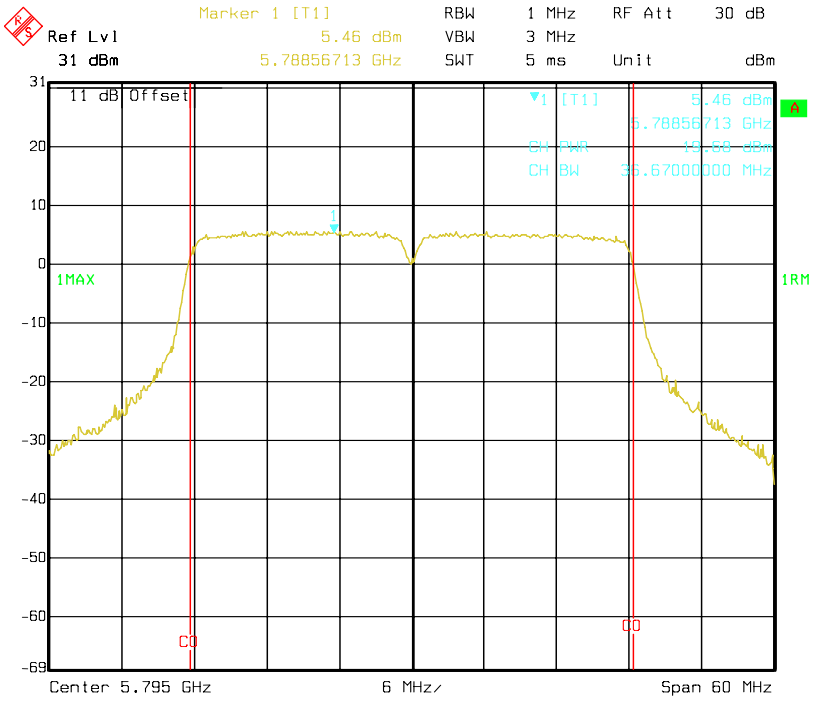


802.11n HT40 mode, Antenna 1: RF Output Power-5755 MHz



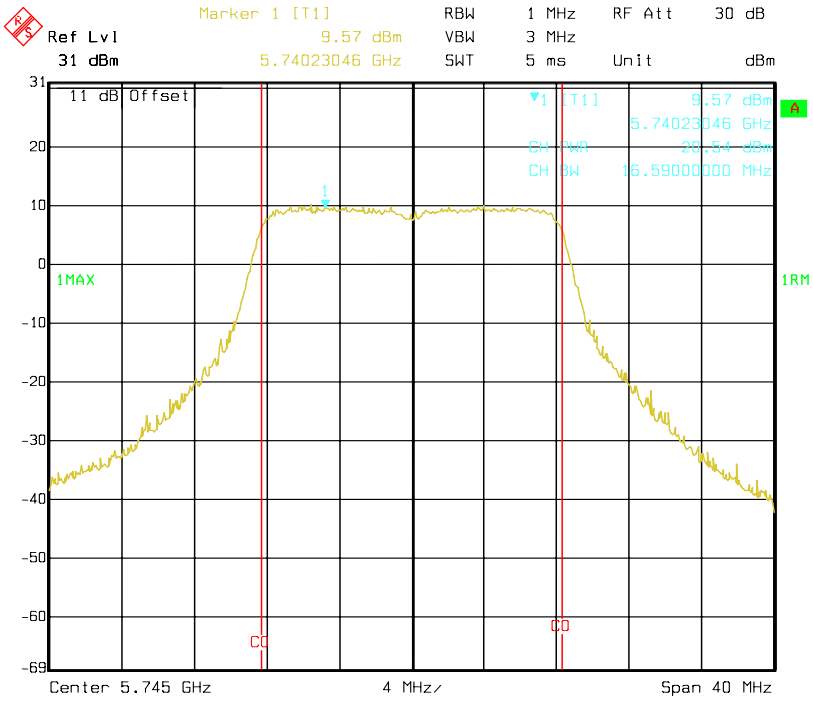
Date: 18.JUN.2015 14:32:57

802.11n HT40 mode, Antenna 1: RF Output Power-5795 MHz



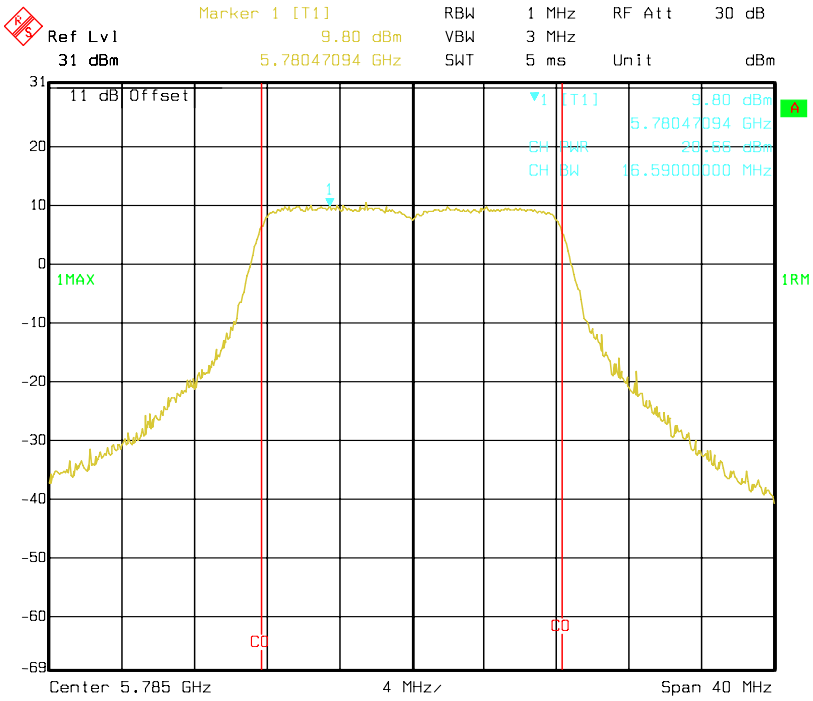
Date: 18.JUN.2015 14:37:49

802.11a, Antenna 2: RF Output Power-5745 MHz



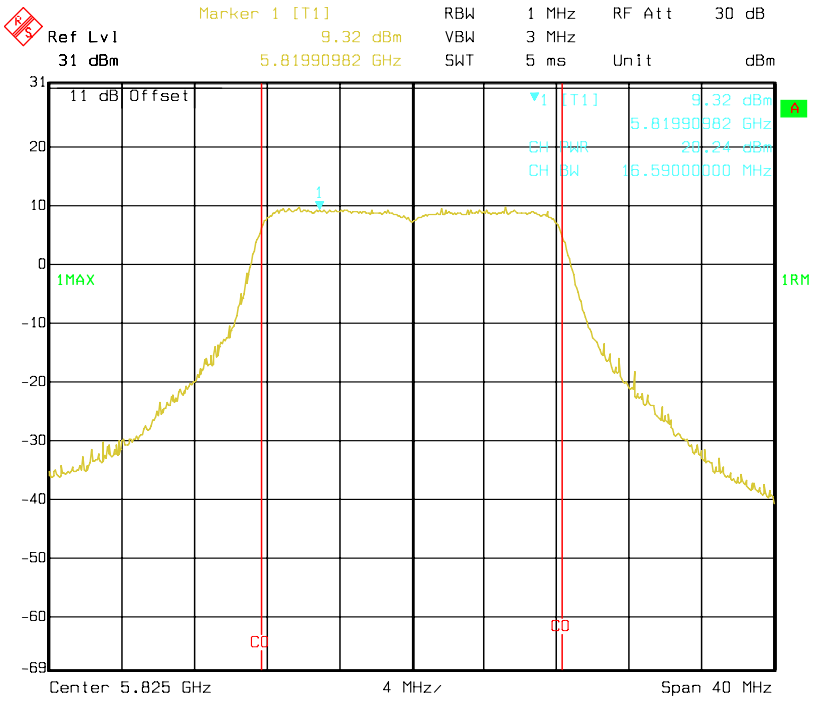
Date: 18.JUN.2015 17:17:22

802.11a, Antenna 2: RF Output Power-5785 MHz



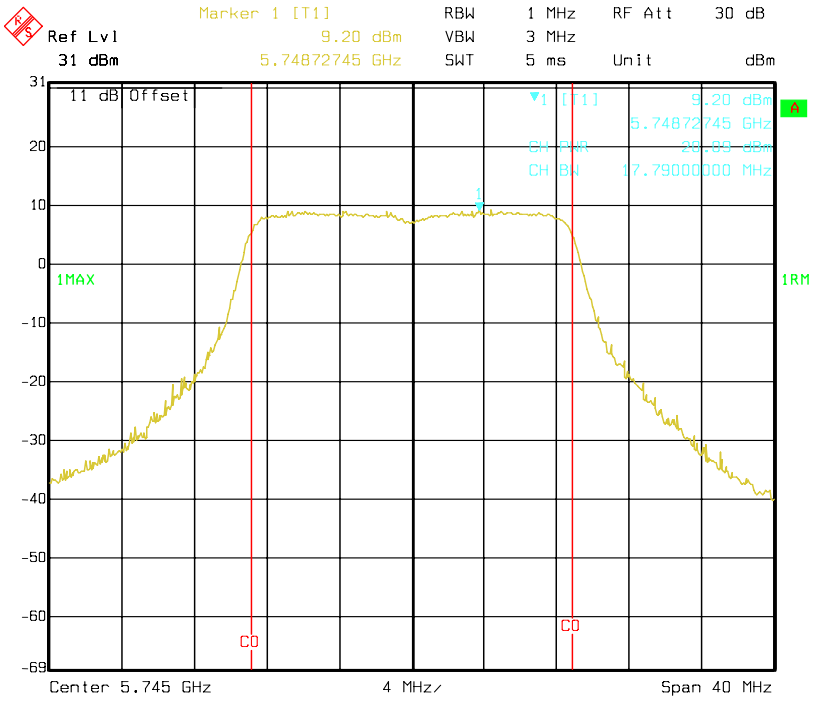
Date: 18.JUN.2015 17:21:59

802.11a, Antenna 2: RF Output Power-5825 MHz



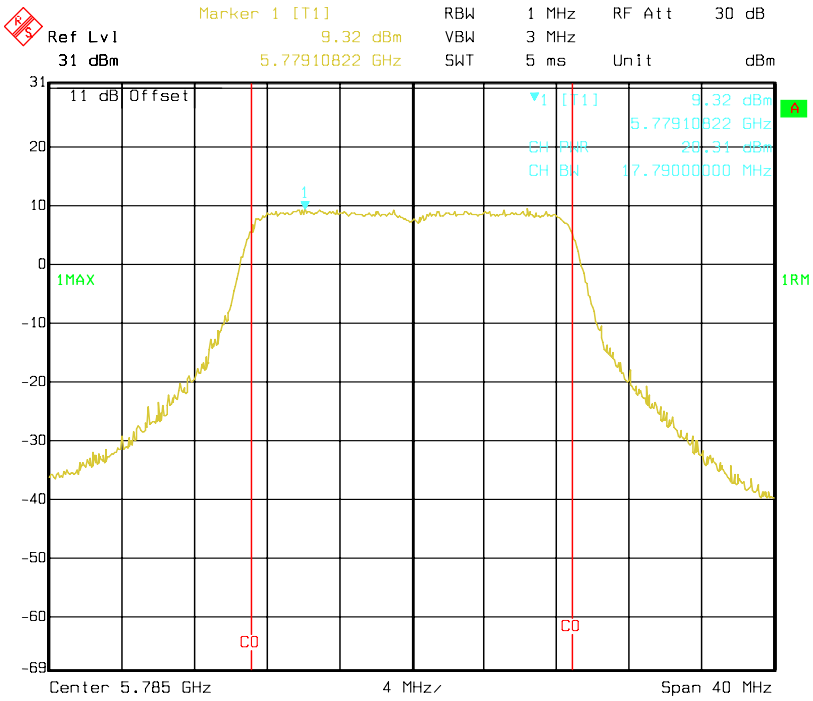
Date: 18.JUN.2015 17:25:16

802.11ac VHT20, Antenna 2: RF Output Power-5745 MHz



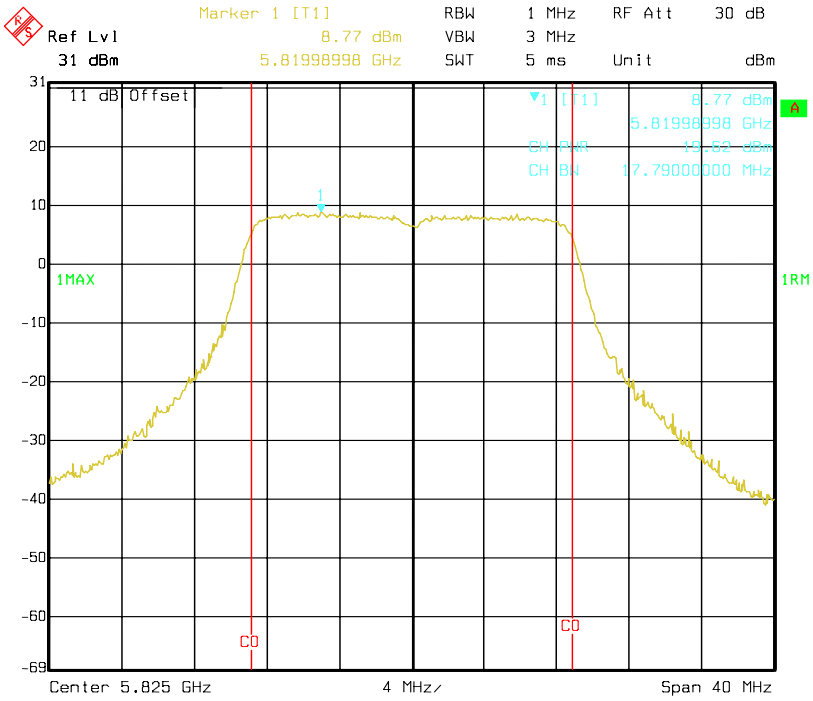
Date: 18.JUN.2015 17:53:42

802.11ac VHT20, Antenna 2: RF Output Power-5785 MHz



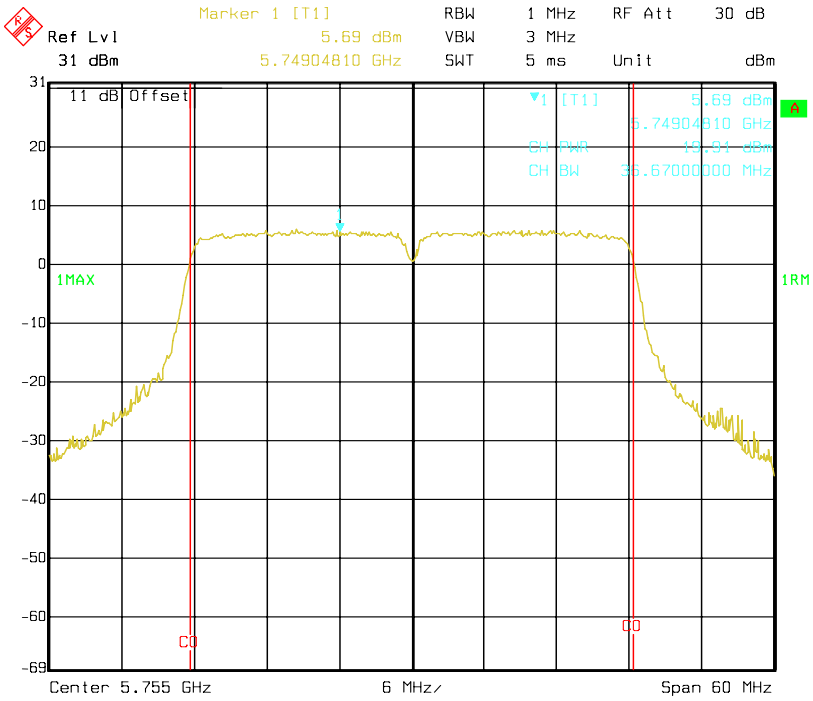
Date: 18.JUN.2015 17:59:38

802.11ac VHT20, Antenna 2: RF Output Power-5825 MHz



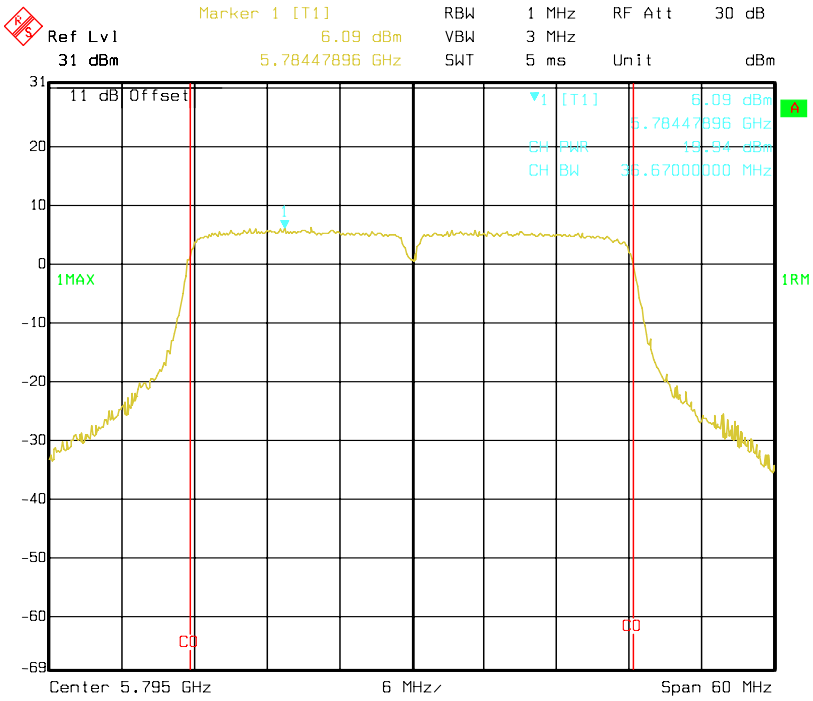
Date: 18.JUN.2015 18:03:23

802.11ac VHT40, Antenna 2: RF Output Power-5755 MHz



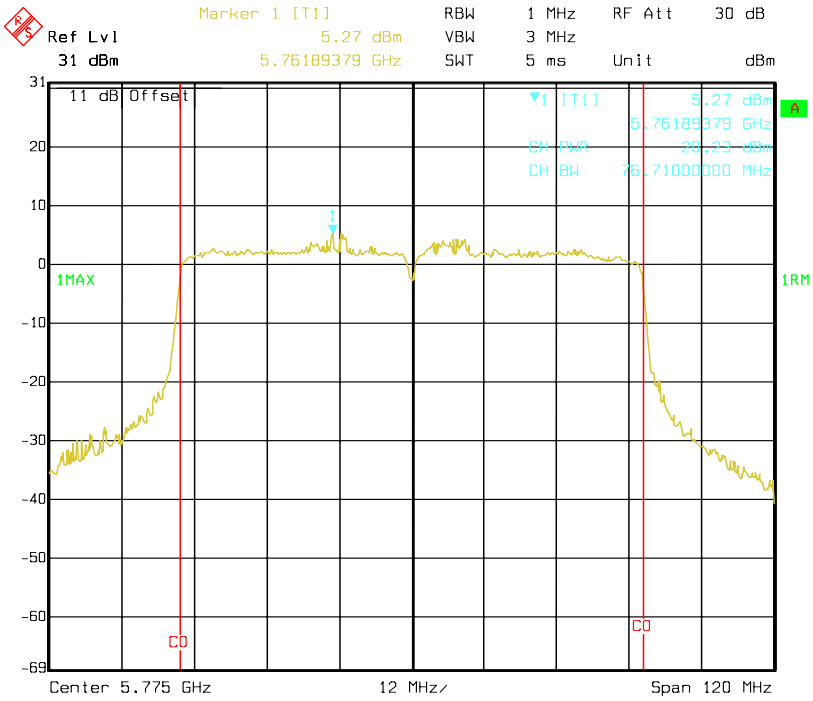
Date: 19.JUN.2015 10:08:48

802.11ac VHT40, Antenna 2: RF Output Power-5795 MH

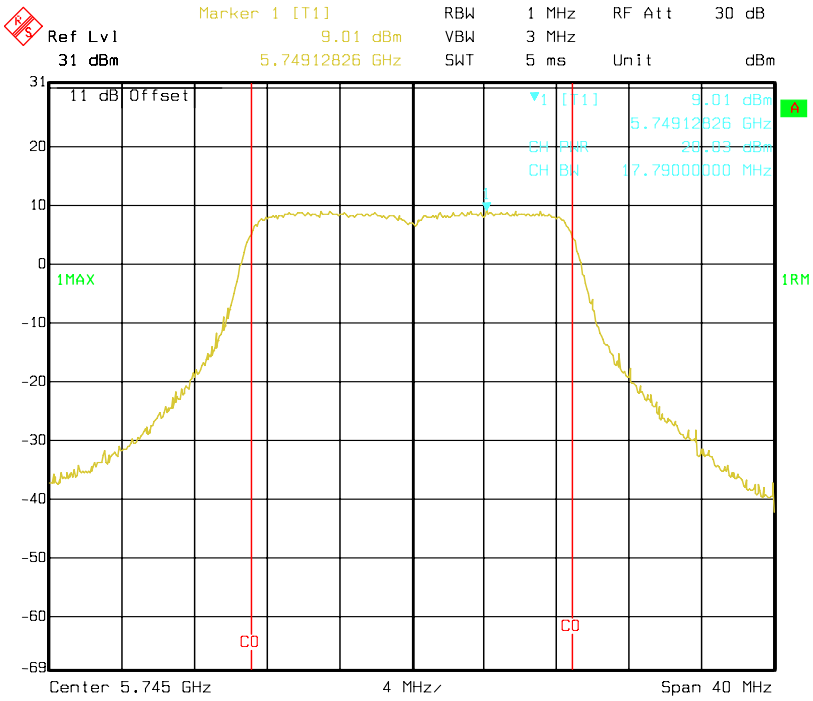


Date: 19.JUN.2015 10:14:38

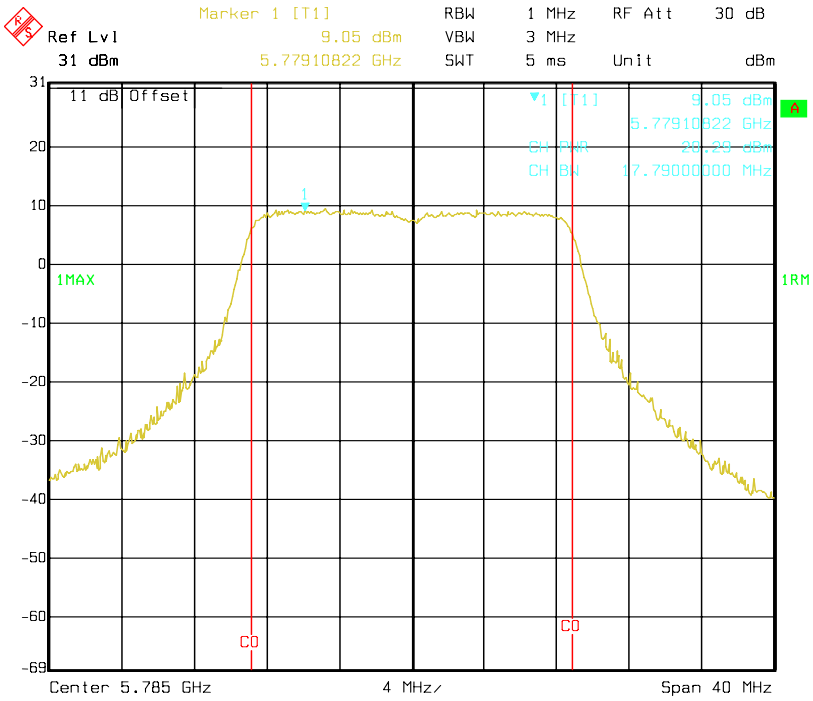
802.11ac VHT80, Antenna 2: RF Output Power-5775 MHz



802.11n HT20 mode, Antenna 2: RF Output Power-5745 MHz

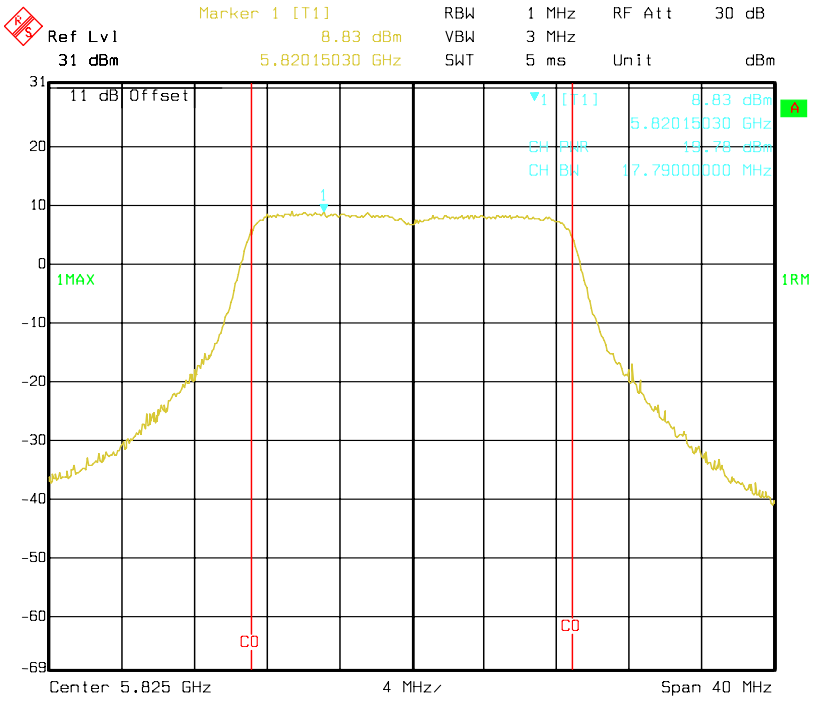


802.11n HT20 mode, Antenna 2: RF Output Power-5785 MHz



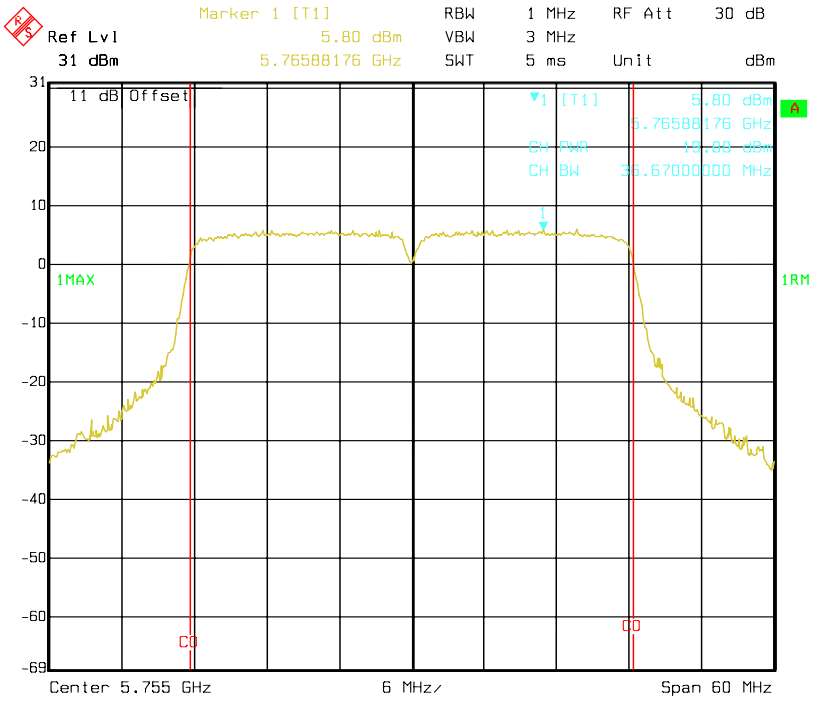
Date: 18.JUN.2015 17:35:00

802.11n HT20 mode, Antenna 2: RF Output Power-5825 MHz



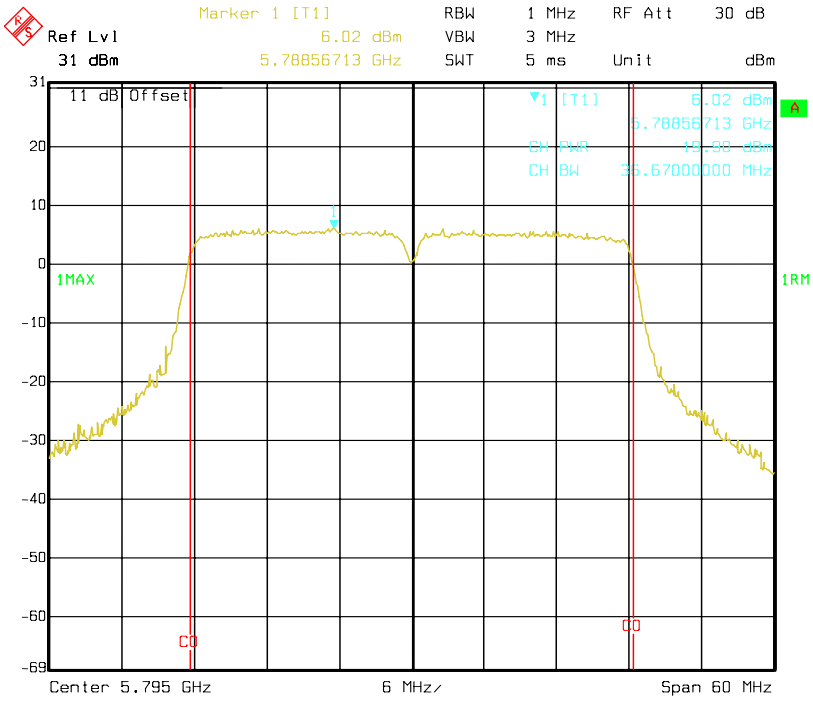
Date: 18.JUN.2015 17:38:16

802.11n HT40 mode, Antenna 2: RF Output Power-5755 MHz



Date: 18.JUN.2015 17:43:44

802.11n HT40 mode, Antenna 2: RF Output Power-5795 MHz



Date: 18.JUN.2015 17:48:31

FCC §15.407(a) (1) (3) (5) - POWER SPECTRAL DENSITY

Applicable Standard

For an outdoor access point operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 17 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. The maximum e.i.r.p. at any elevation angle above 30 degrees as measured from the horizon must not exceed 125 mW (21 dBm).

For the band 5.725-5.85 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W. In addition, the maximum power spectral density shall not exceed 30 dBm in any 500-kHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. However, fixed point-to-point U-NII devices operating in this band may employ transmitting antennas with directional gain greater than 6 dBi without any corresponding reduction in transmitter conducted power. Fixed, point-to-point operations exclude the use of point-to-multipoint systems, omnidirectional applications, and multiple collocated transmitters transmitting the same information. The operator of the U-NII device, or if the equipment is professionally installed, the installer, is responsible for ensuring that systems employing high gain directional antennas are used exclusively for fixed, point-to-point operations.

The maximum power spectral density is measured as a conducted emission by direct connection of a calibrated test instrument to the equipment under test. If the device cannot be connected directly, alternative techniques acceptable to the Commission may be used. Measurements in the 5.725-5.85 GHz band are made over a reference bandwidth of 500 kHz or the 26 dB emission bandwidth of the device, whichever is less. Measurements in the 5.15-5.25 GHz, 5.25-5.35 GHz, and the 5.47-5.725 GHz bands are made over a bandwidth of 1 MHz or the 26 dB emission bandwidth of the device, whichever is less. A narrower resolution bandwidth can be used, provided that the measured power is integrated over the full reference bandwidth.

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. Use sample detector and power averaging (not video averaging) mode. Set RBW= 1 MHz, VBW > 1 MHz. The PPSD is the highest level found across the emission in any 1-MHz band after 100 sweeps of averaging. This method is permitted only if the transmission pulse or sequence of pulses remains at maximum transmits power throughout each of the 100 sweeps of averaging and that the interval between pulses is not included in any of the sweeps.
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	FSEM30	100018	2014-10-17	2015-10-16

*** Statement of Traceability:** BACL (Chengdu) attested that all calibrations have been performed, traceable to National Primary Standards and International System of Units (SI).

Test Data

Environmental Conditions

Temperature:	25°C & 23 °C
Relative Humidity:	54%, 48% & 58 %
ATM Pressure:	97.1 kPa ,97.5 kPa & 96.2 kPa

The testing was performed by Kevin Tao on 2015-06-17, 2015-06-18 & 2015-06-19.

Test Mode: Transmitting

Test Result: Pass

5150-5250 MHz:

Mode	Channel	Frequency (MHz)	Power Spectral Density (dBm/MHz)				Limit (dBm/MHz)	Result
			Antenna 0	Antenna 1	Antenna 2	Antenna 0 + Antenna 1 + Antenna 2		
802.11a	Low	5180	4.52	3.50	3.69	8.70	9.23	PASS
	Middle	5220	4.02	4.02	3.92	8.76	9.23	PASS
	High	5240	4.33	4.11	4.05	8.94	9.23	PASS
802.11ac VHT20	Low	5180	3.53	3.50	3.64	8.33	9.23	PASS
	Middle	5220	3.03	3.81	3.17	8.12	9.23	PASS
	High	5240	2.79	3.78	3.93	8.30	9.23	PASS
802.11ac VHT40	Low	5190	-0.04	0.45	0.52	5.09	9.23	PASS
	High	5230	-0.28	0.61	1.17	5.31	9.23	PASS
802.11ac VHT80	Low	5210	-1.20	-0.68	-0.54	3.97	9.23	PASS
802.11n HT20	Low	5180	4.23	3.18	3.10	8.31	9.23	PASS
	Middle	5220	4.27	4.02	3.61	8.75	9.23	PASS
	High	5240	3.66	4.21	4.13	8.78	9.23	PASS
802.11n HT40	Low	5190	0.88	0.16	0.85	5.41	9.23	PASS
	High	5230	0.37	0.84	1.25	5.61	9.23	PASS

Note : The device has three PCB antennas, antenna gain is 9dBi, and employed Cyclic Delay Devisity (CCD) for 802.11 MIMO transmitting, per KDB662911 D01 Multiple Transmitter Output v02r01.

For power spectral density (PSD) measurements on the devices：

Array Gain = 10 log(NANT/NSS) dB

So:

Directional gain = GANT + Array Gain=9+10* log(3)=9+4.77=13.77dBi.

The Power Spectral Density Limits were reduced 7.77dB. （13.77-6=7.77）

5725-5850 MHz:

Mode	Channel	Frequency (MHz)	Power Spectral Density (dBm/500kHz)				Limit (dBm/500kHz)	Result
			Antenna 0	Antenna 1	Antenna 2	Antenna 0 + Antenna 1 + Antenna 2		
802.11a	Low	5745	8.29	7.97	8.92	13.18	22.23	PASS
	Middle	5785	7.52	7.66	8.35	12.63	22.23	PASS
	High	5825	7.19	7.63	8.38	12.53	22.23	PASS
802.11ac VHT20	Low	5745	8.53	7.30	7.76	12.66	22.23	PASS
	Middle	5785	8.39	8.27	8.02	13.00	22.23	PASS
	High	5825	7.16	7.32	6.50	11.78	22.23	PASS
802.11ac VHT40	Low	5755	4.46	3.59	4.65	9.03	22.23	PASS
	High	5795	4.94	3.85	3.92	9.04	22.23	PASS
802.11ac VHT80	Low	5775	5.31	3.91	5.01	9.56	22.23	PASS
802.11n HT20	Low	5725	8.95	8.20	7.05	12.91	22.23	PASS
	Middle	5785	7.68	7.66	8.42	12.71	22.23	PASS
	High	5825	7.54	7.00	7.08	11.98	22.23	PASS
802.11n HT40	Low	5755	5.21	4.56	3.78	9.33	22.23	PASS
	High	5795	4.64	4.66	4.02	9.22	22.23	PASS

Note : The device has three PCB antennas, antenna gain is 9dBi, and employed Cyclic Delay Devisity (CCD) for 802.11 MIMO transmitting, per KDB662911 D01 Multiple Transmitter Output v02r01.

For power spectral density (PSD) measurements on the devices：

Array Gain = 10 log(NANT/NSS) dB

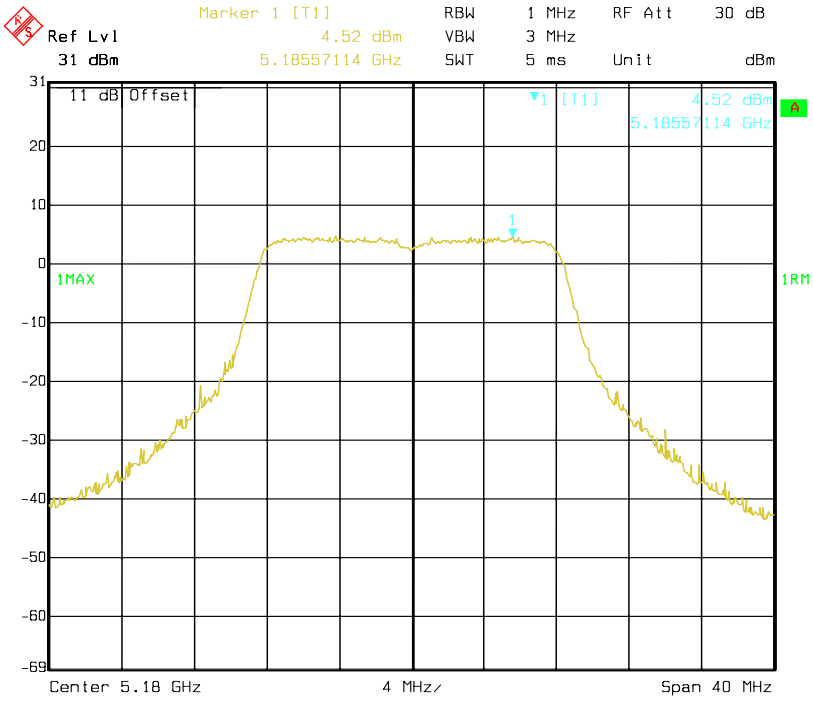
So:

Directional gain = GANT + Array Gain=9+10* log(3)=9+4.77=13.77dBi.

The Power Spectral Density Limits were reduced 7.77dB. （13.77-6=7.77）

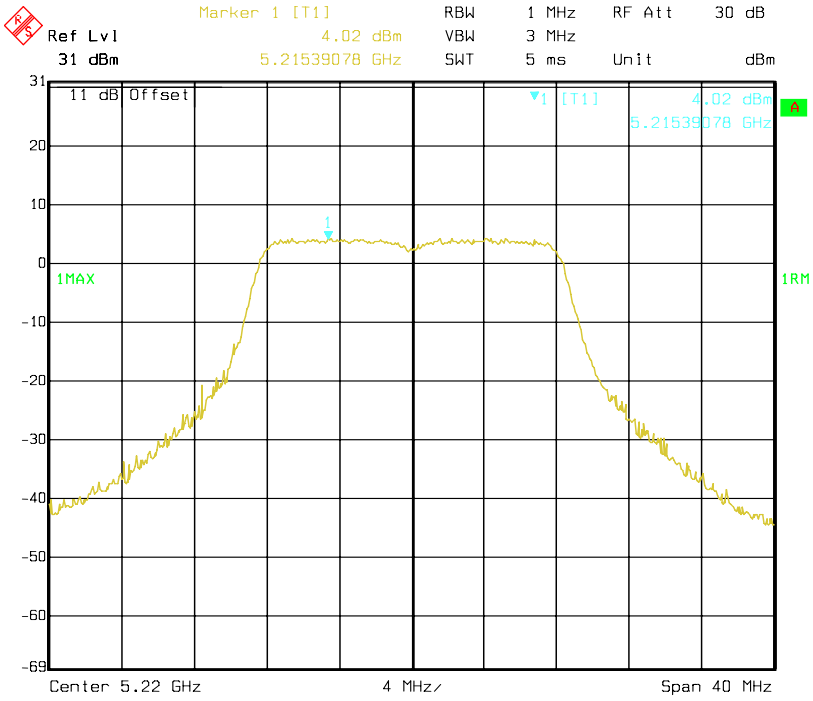
5150-5250 MHz:

802.11a mode, Antenna 0: Power Spectral Density-5180 MHz



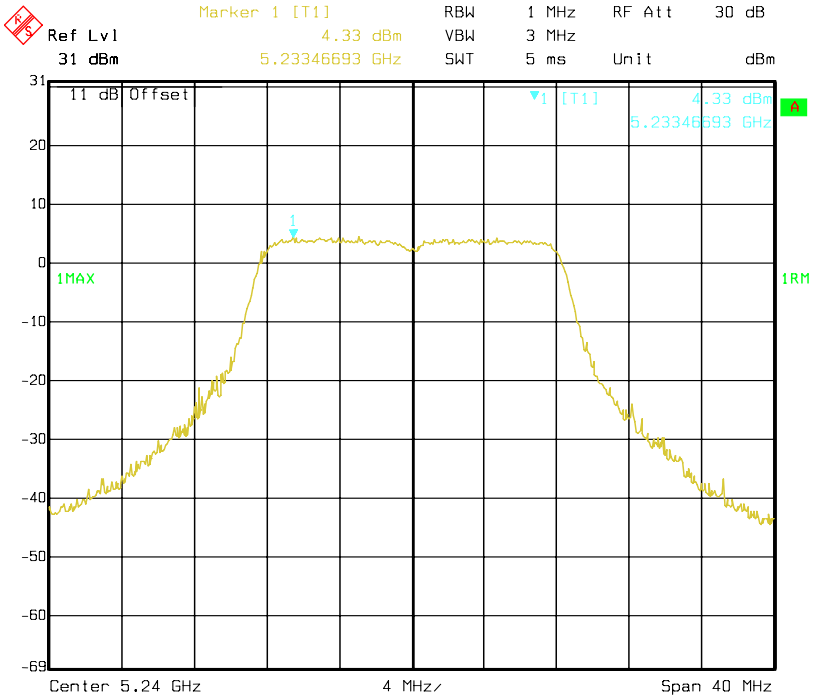
Date: 17.JUN.2015 13:27:54

802.11a mode, Antenna 0: Power Spectral Density-5220 MHz

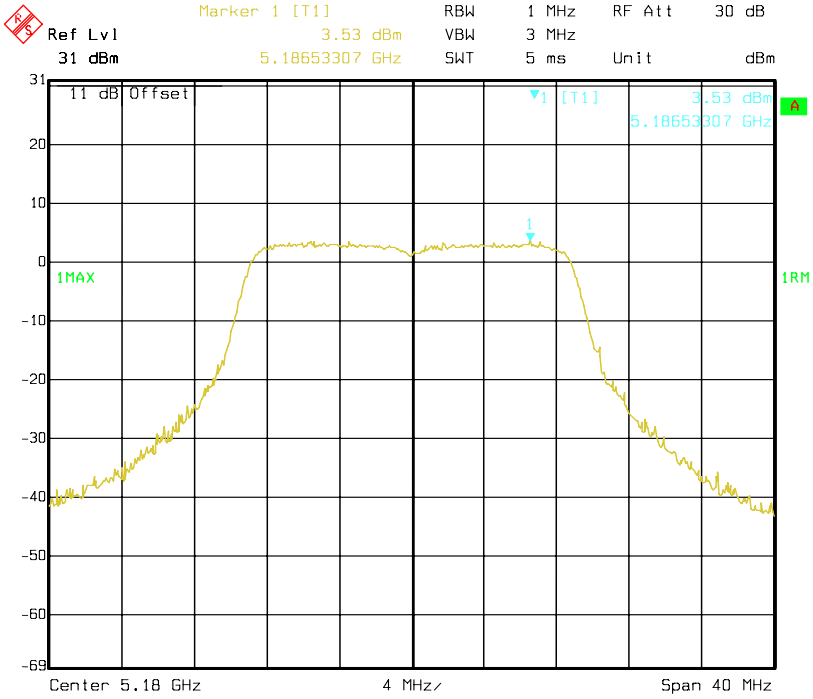


Date: 17.JUN.2015 13:32:01

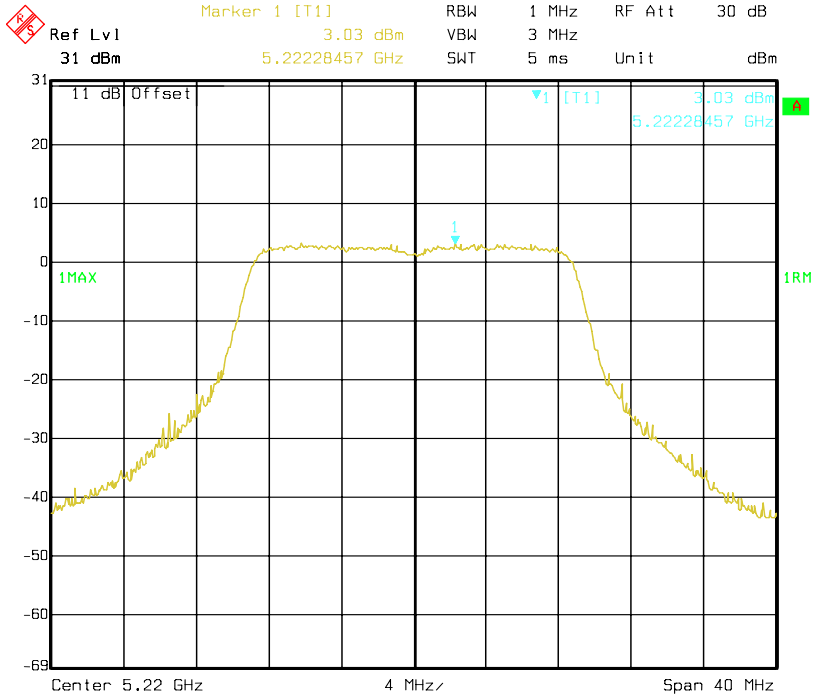
802.11a mode, Antenna 0: Power Spectral Density-5240 MHz



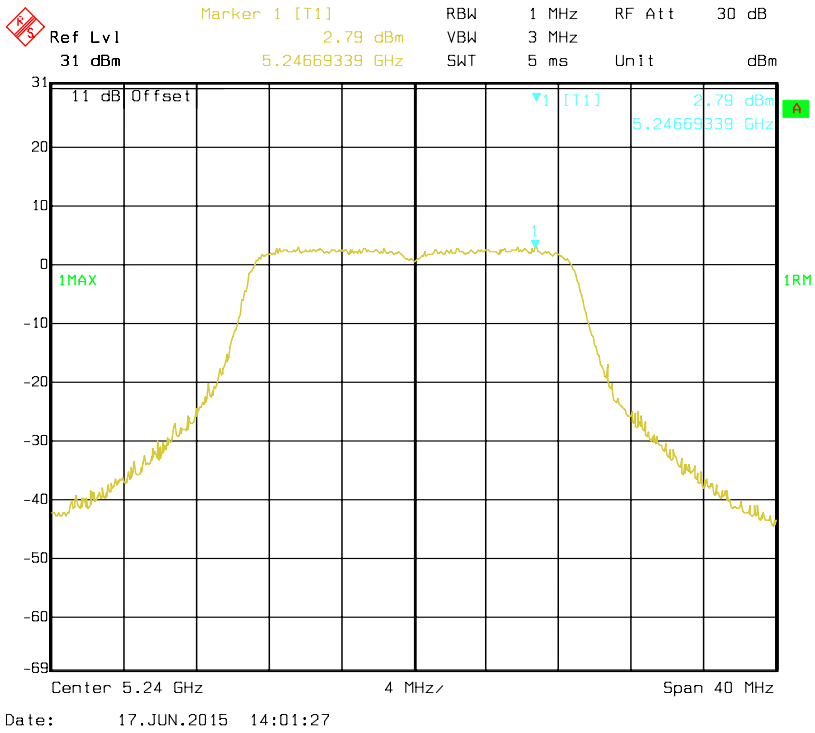
802.11ac VHT20 mode, Antenna 0: Power Spectral Density-5180 MHz



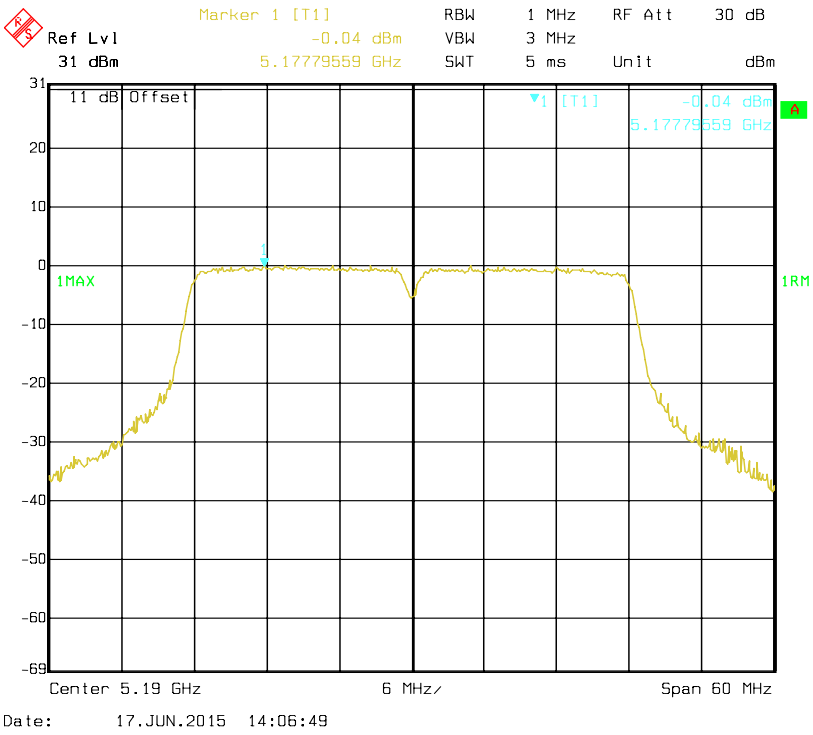
802.11ac VHT20 mode, Antenna 0: Power Spectral Density-5220 MHz



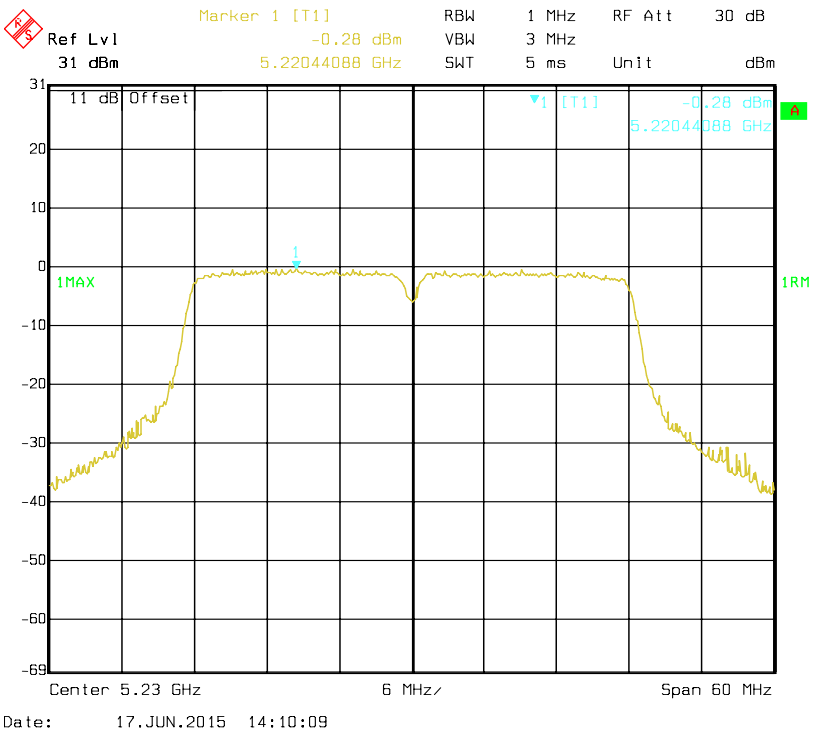
802.11ac VHT20 mode, Antenna 0: Power Spectral Density-5240 MHz



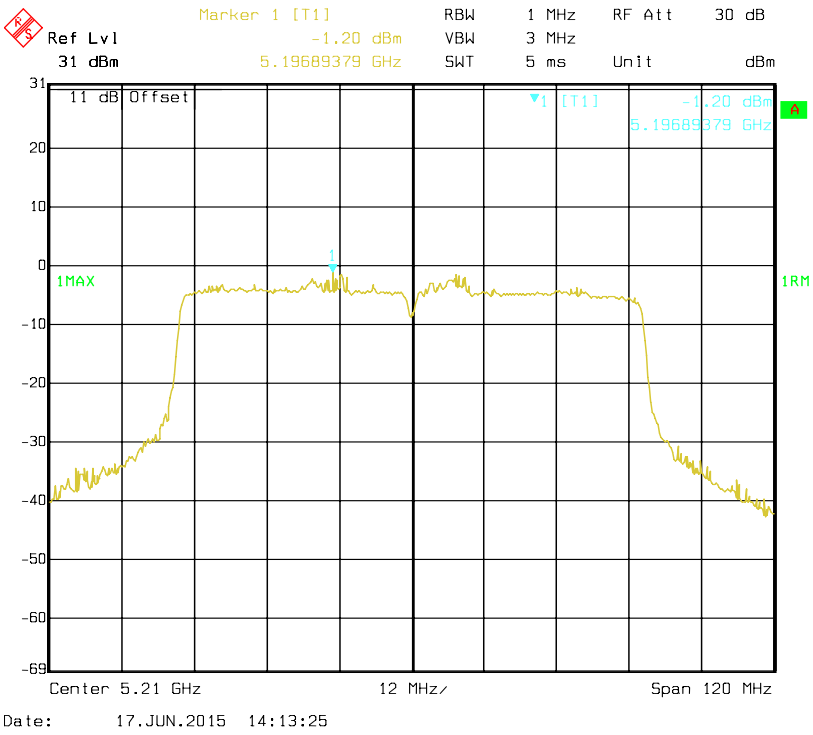
802.11ac VHT40 mode, Antenna 0: Power Spectral Density-5190 MHz



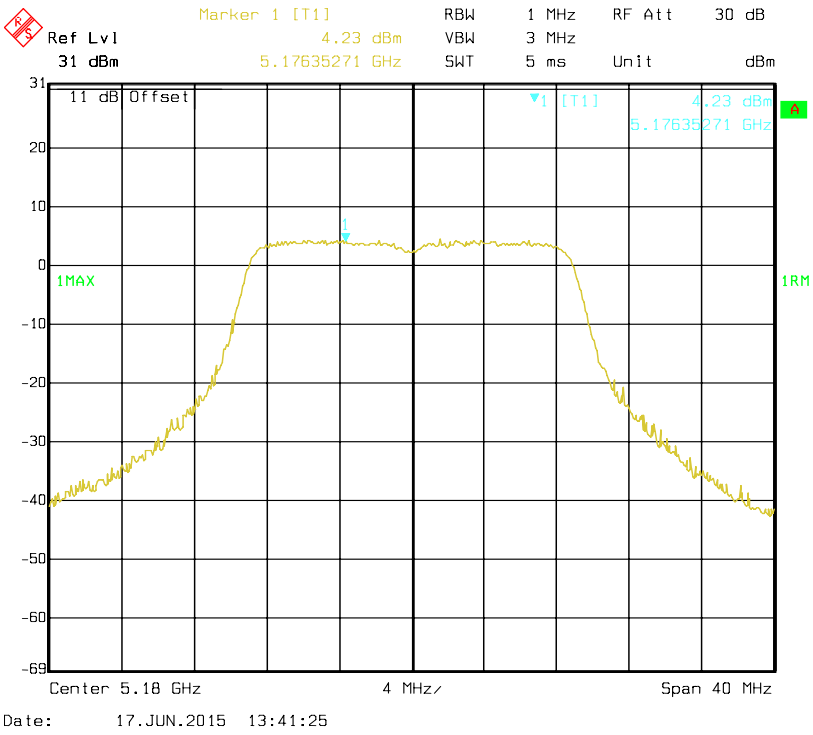
802.11ac VHT40 mode, Antenna 0: Power Spectral Density-5230 MHz



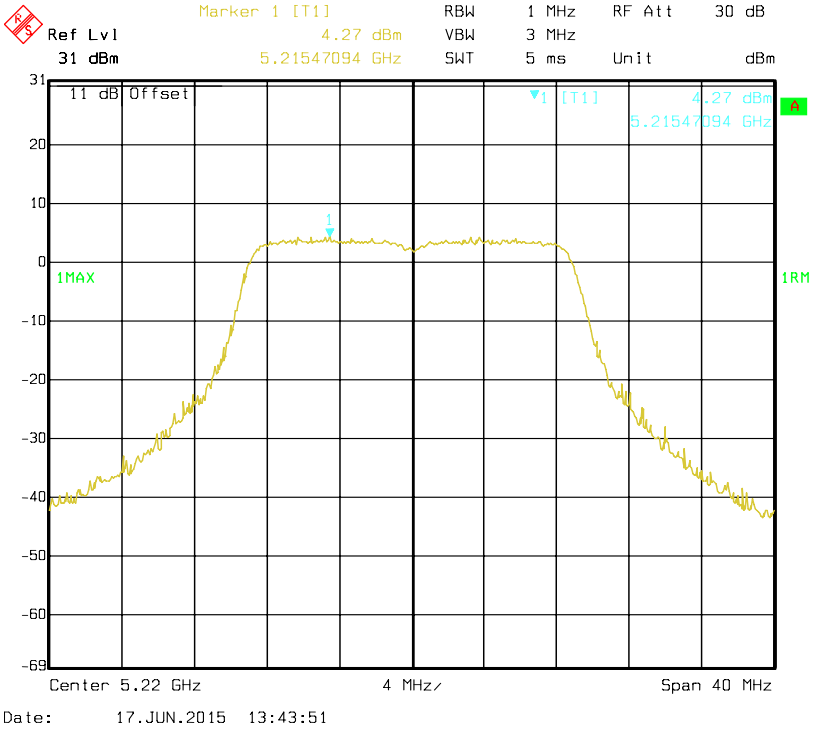
802.11ac VHT80 mode, Antenna 0: Power Spectral Density-5210 MHz



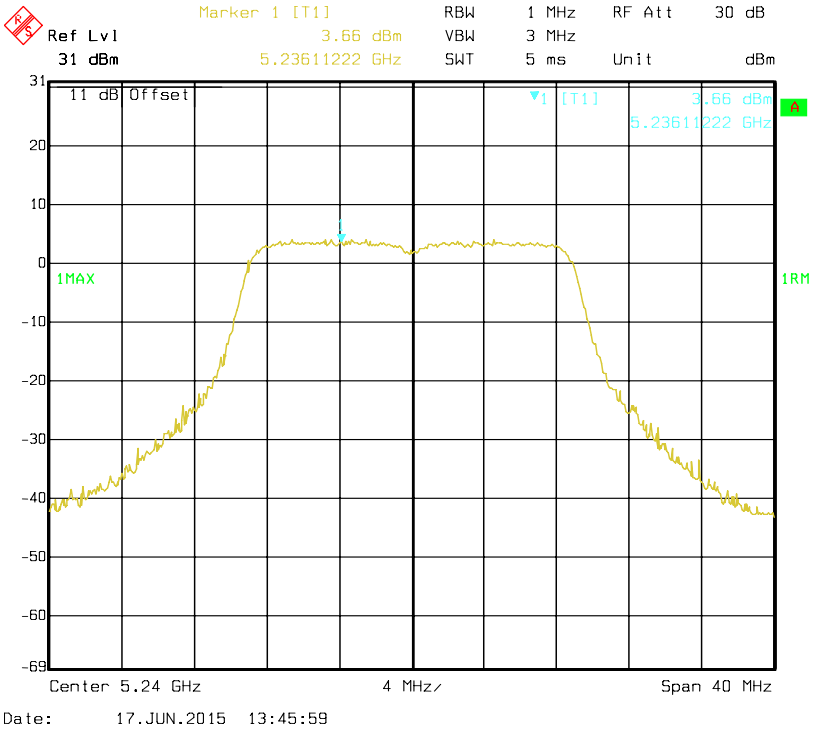
802.11n HT20 mode, Antenna 0: Power Spectral Density-5180 MHz



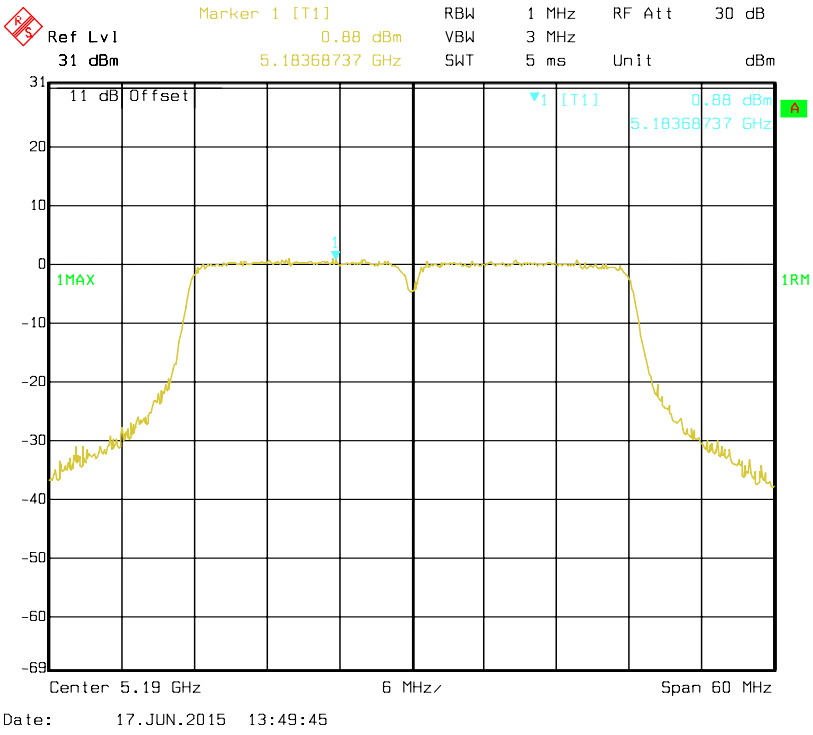
802.11n HT20 mode, Antenna 0: Power Spectral Density-5220 MHz



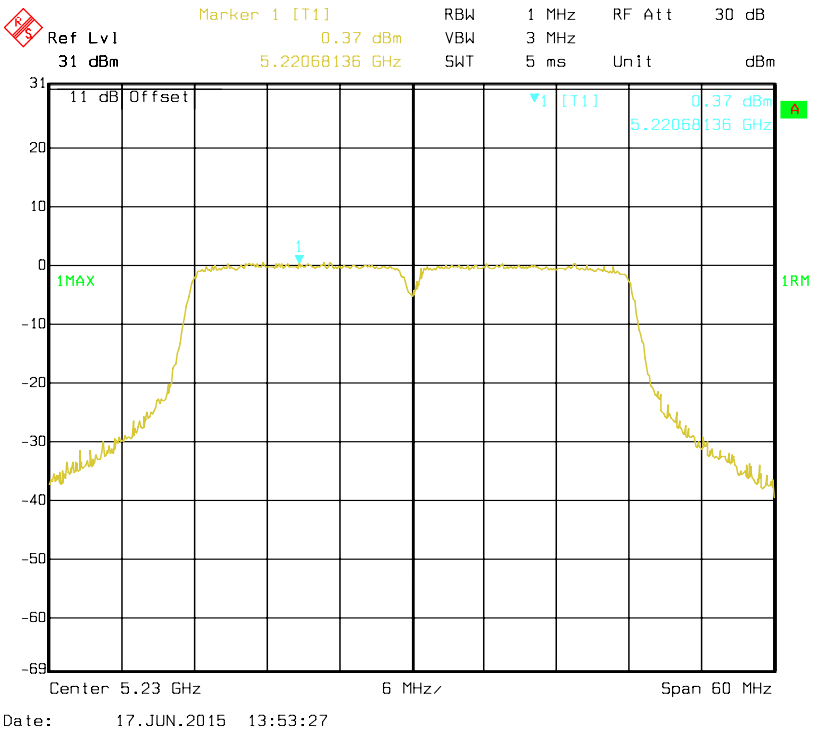
802.11n HT20 mode, Antenna 0: Power Spectral Density-5240 MHz



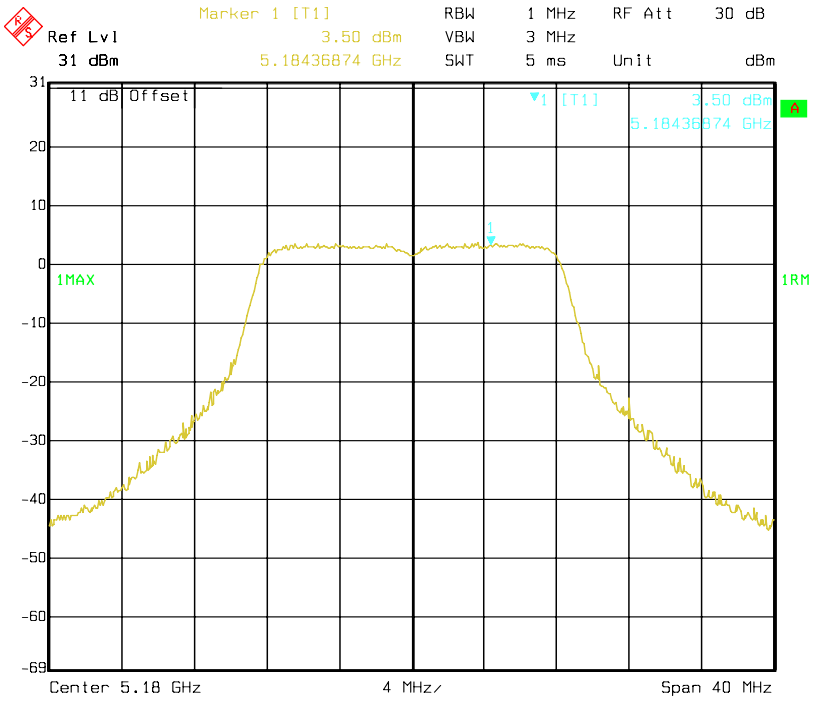
802.11n HT40 mode, Antenna 0: Power Spectral Density-5190 MHz



802.11n HT40 mode, Antenna 0: Power Spectral Density-5230 MHz

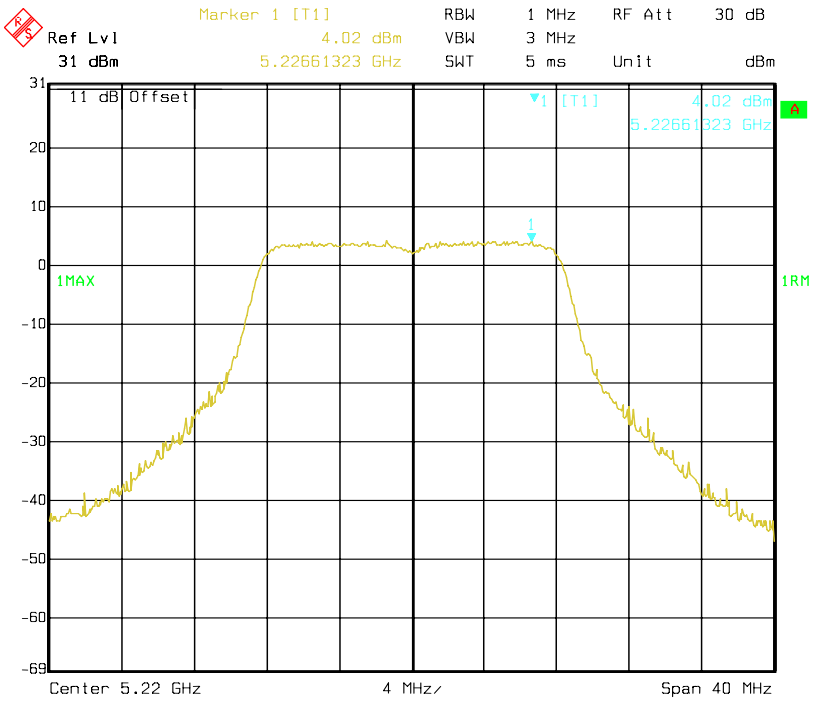


802.11a mode, Antenna 1: Power Spectral Density-5180 MHz



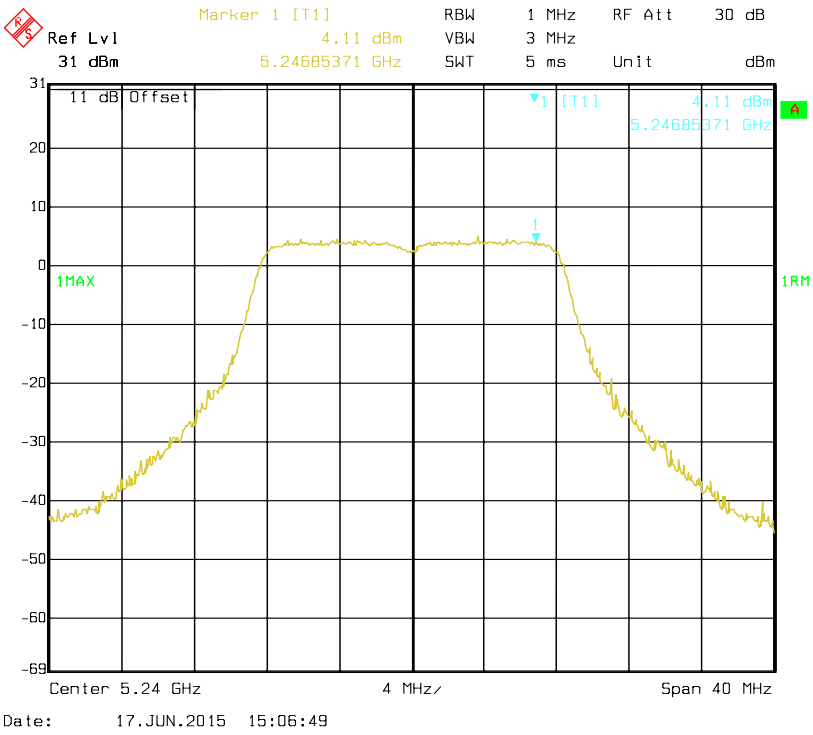
Date: 17.JUN.2015 15:02:23

802.11a mode, Antenna 1: Power Spectral Density-5220 MHz

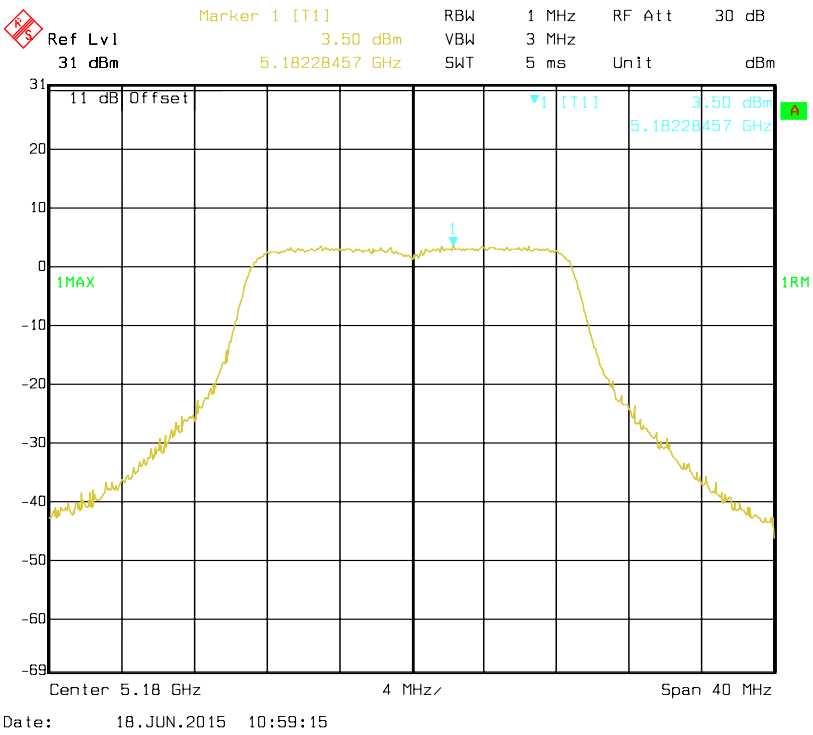


Date: 17.JUN.2015 15:04:44

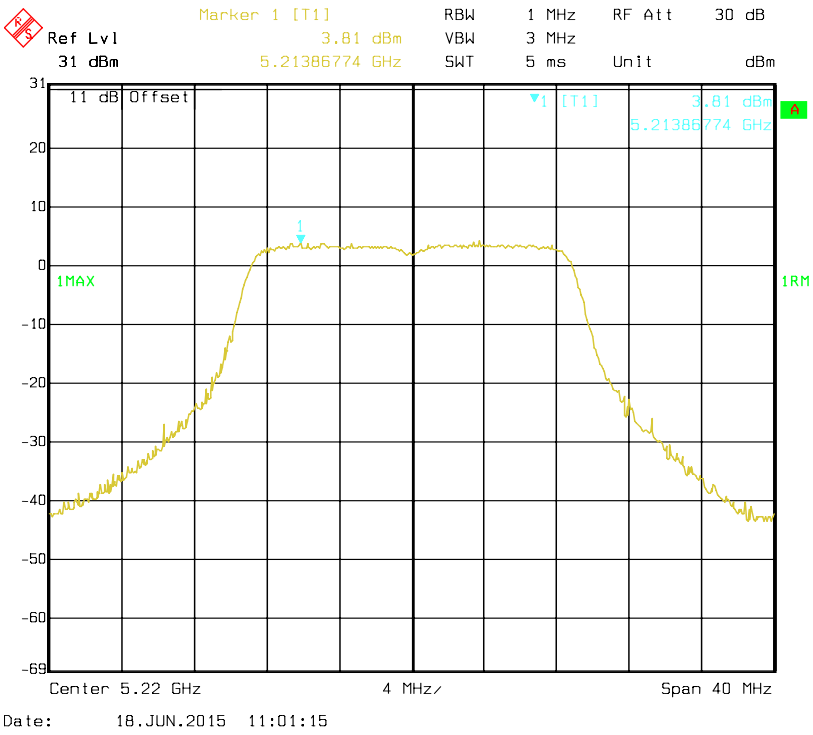
802.11a mode, Antenna 1: Power Spectral Density-5240 MHz



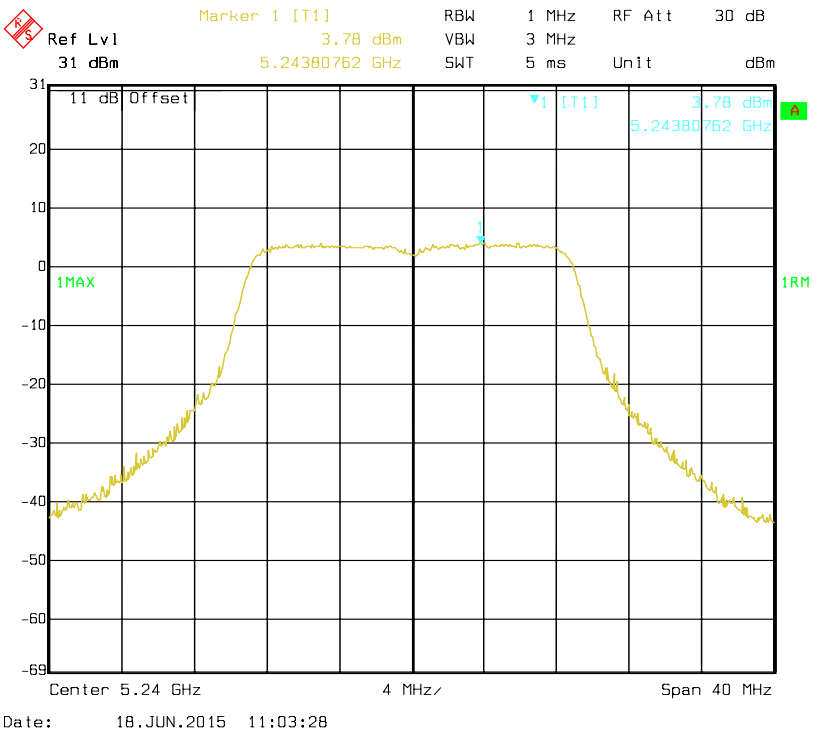
802.11ac VHT20 mode, Antenna 1: Power Spectral Density-5180 MHz



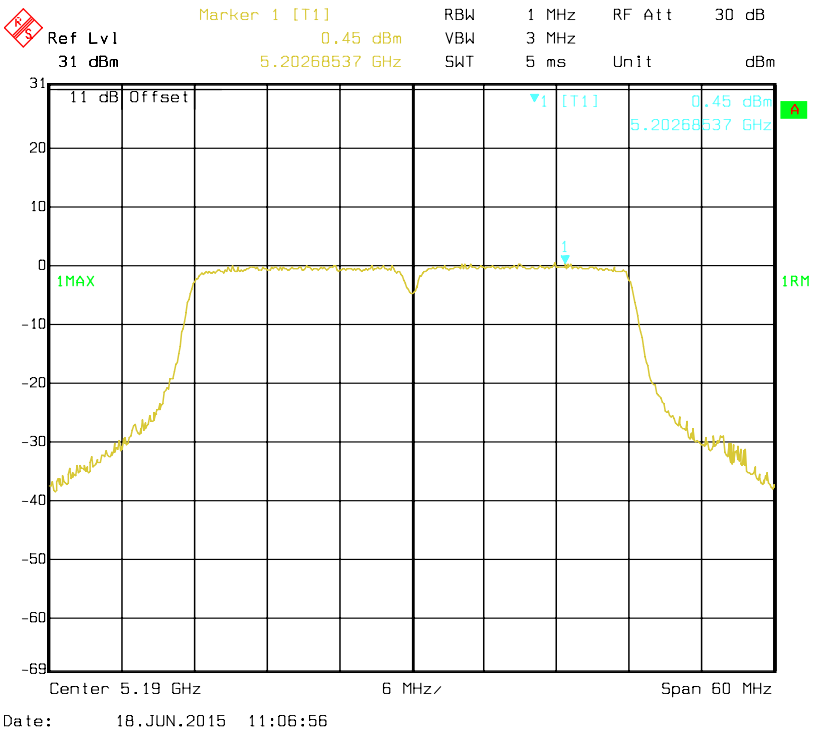
802.11ac VHT20 mode, Antenna 1: Power Spectral Density-5220 MHz



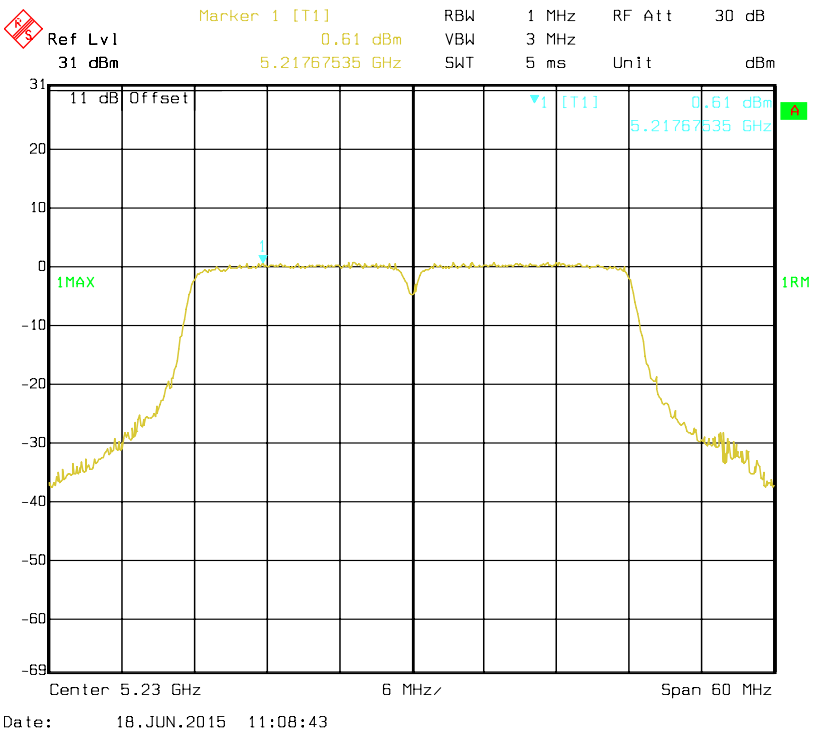
802.11ac VHT20 mode, Antenna 1: Power Spectral Density-5240 MHz



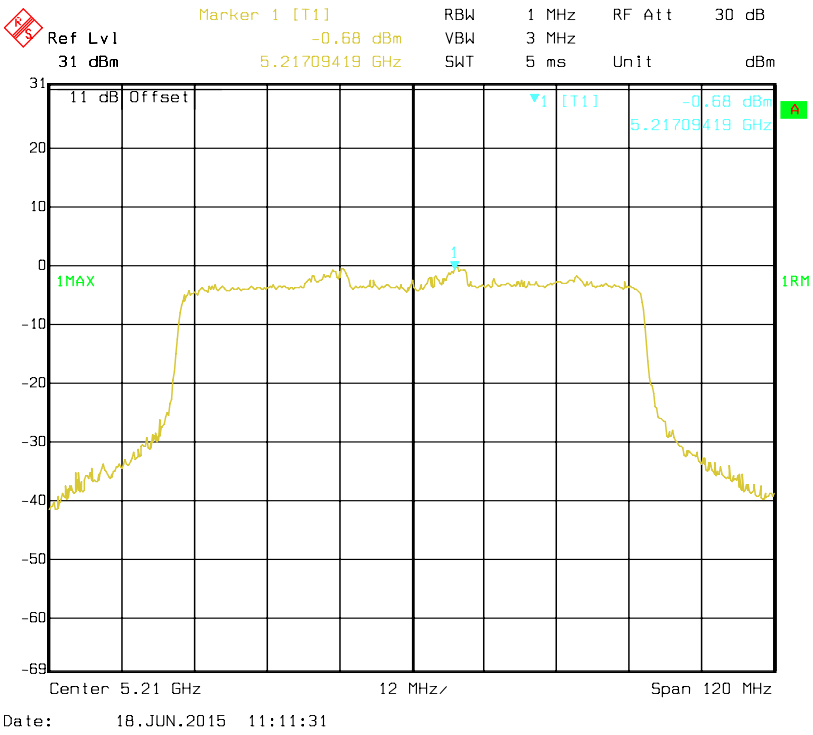
802.11ac VHT40 mode, Antenna 1: Power Spectral Density-5190 MHz



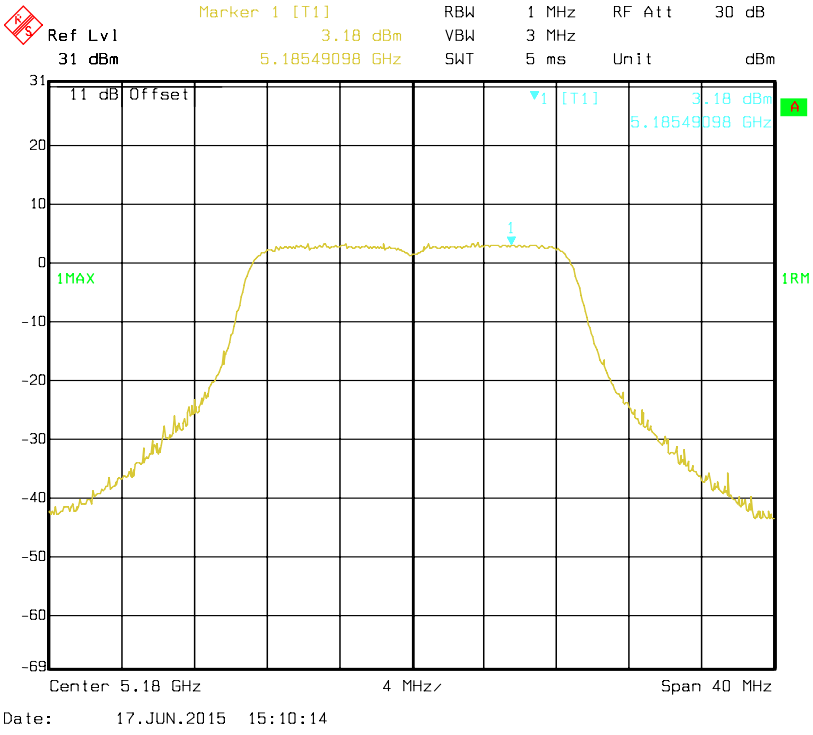
802.11ac VHT40 mode, Antenna 1: Power Spectral Density-5230 MHz



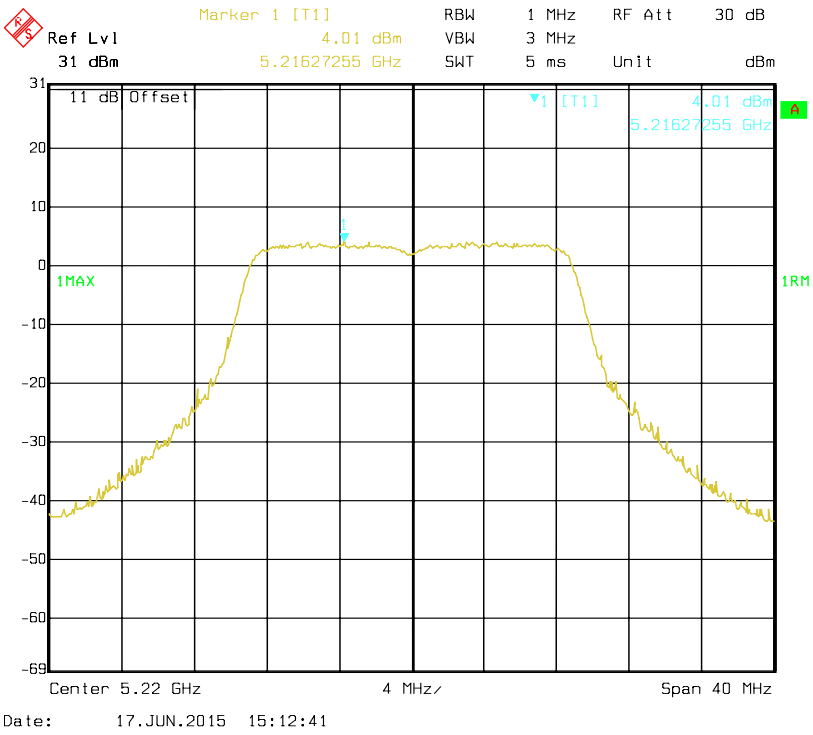
802.11ac VHT80 mode, Antenna 1: Power Spectral Density-5210 MHz



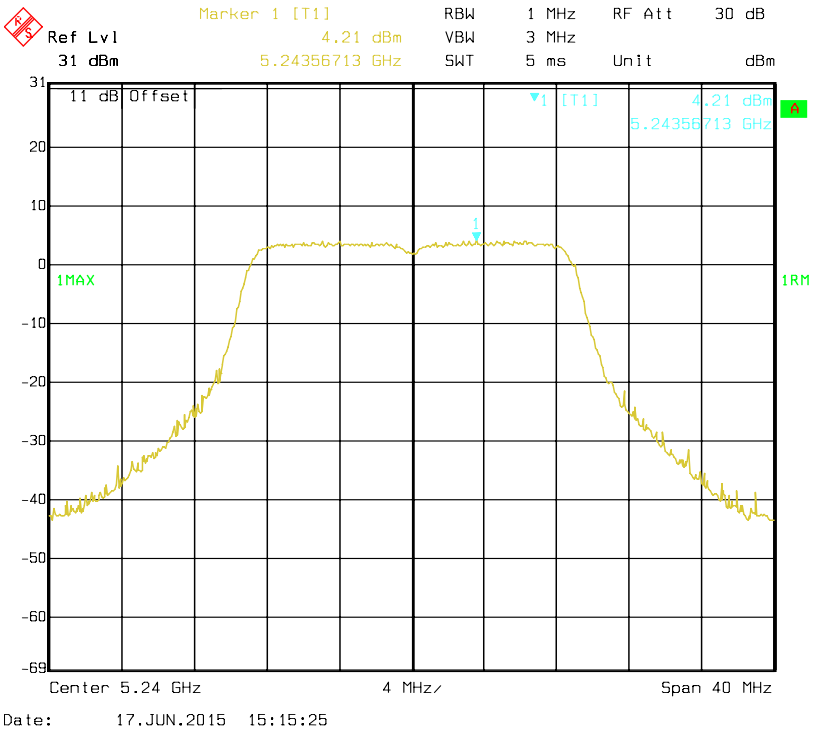
802.11n HT20 mode, Antenna 1: Power Spectral Density-5180 MHz



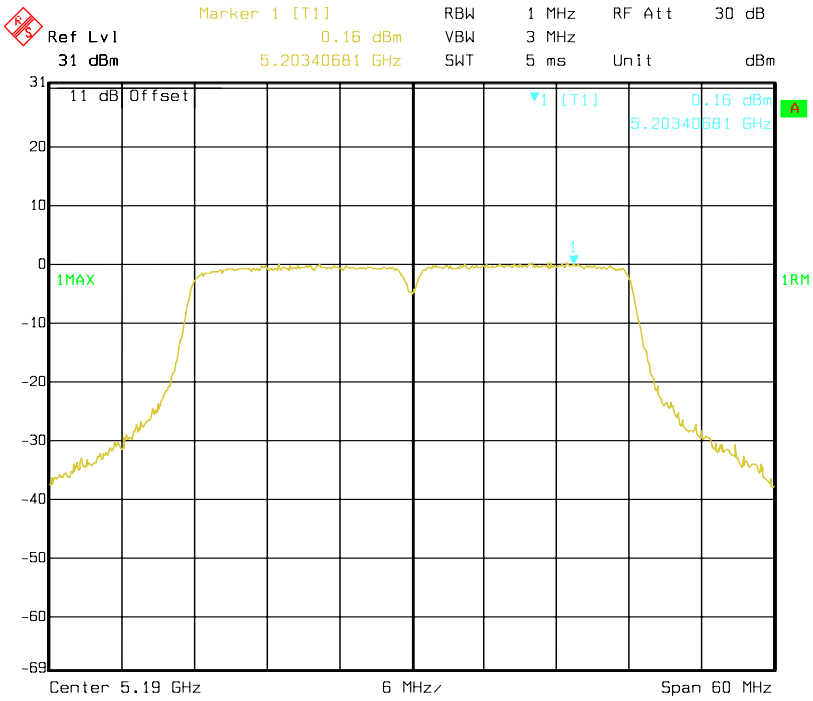
802.11n HT20 mode, Antenna 1: Power Spectral Density-5220 MHz



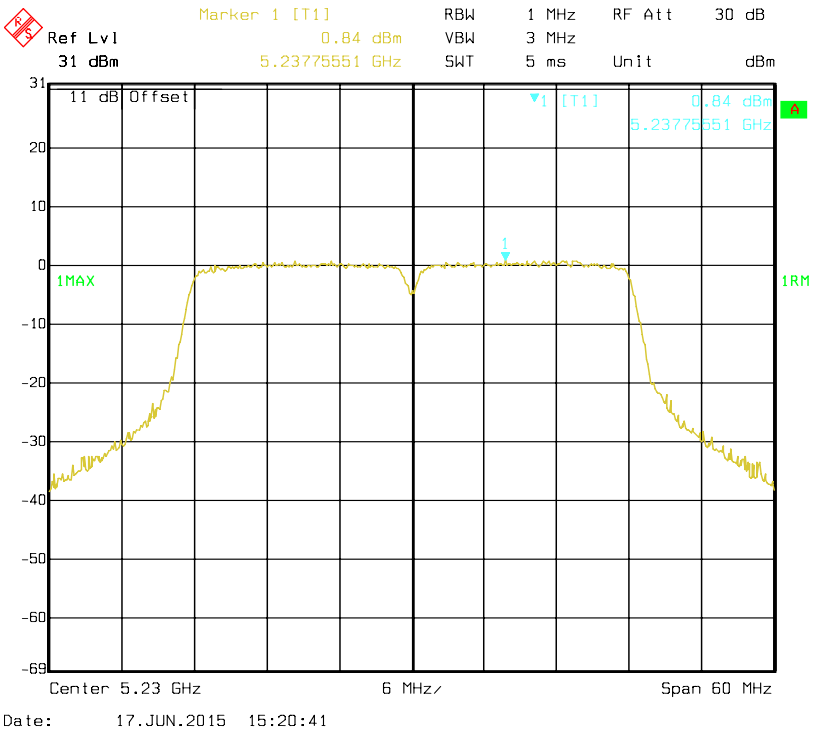
802.11n HT20 mode, Antenna 1: Power Spectral Density-5240 MHz



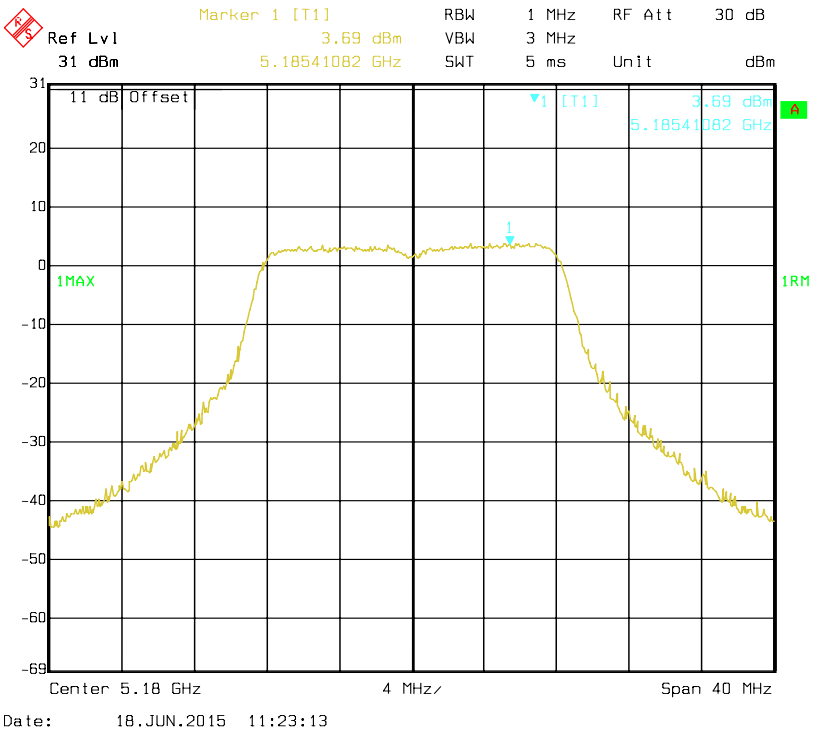
802.11n HT40 mode, Antenna 1: Power Spectral Density-5190 MHz



802.11n HT40 mode, Antenna 1: Power Spectral Density-5230 MHz

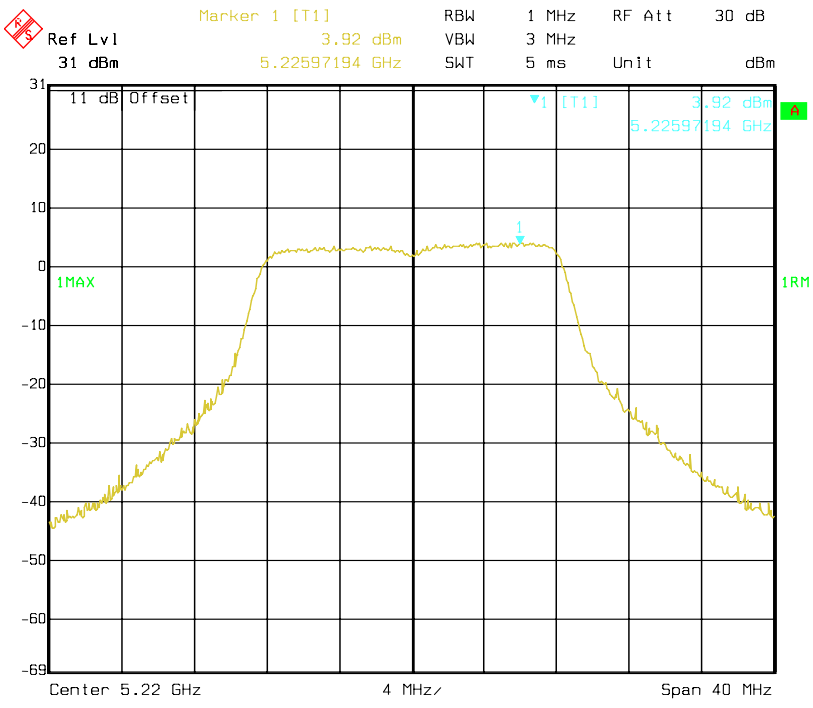


802.11a mode, Antenna 2: Power Spectral Density-5180 MHz



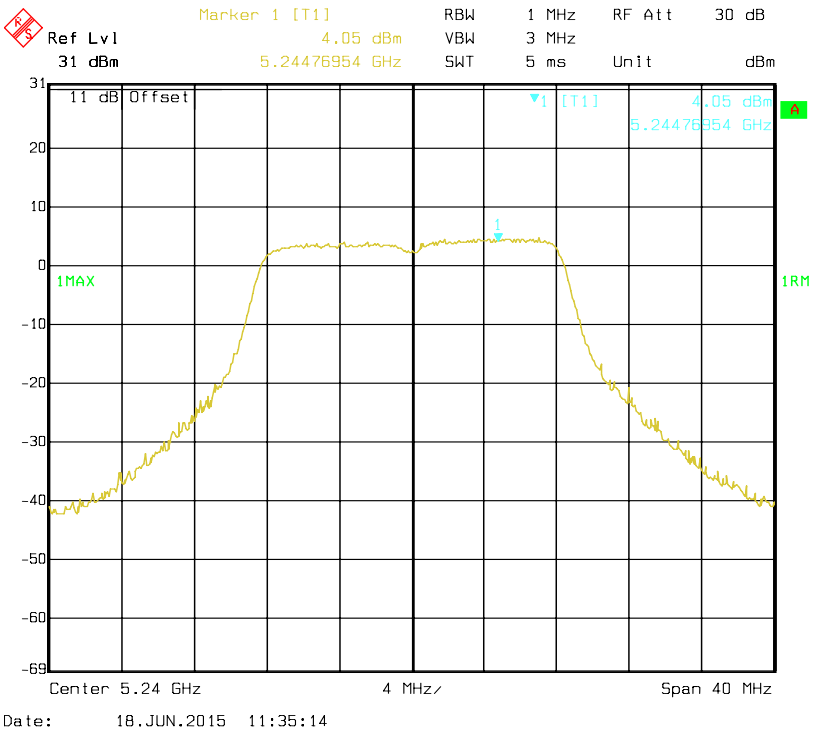
Date: 18.JUN.2015 11:23:13

802.11a mode, Antenna 2: Power Spectral Density-5220 MHz

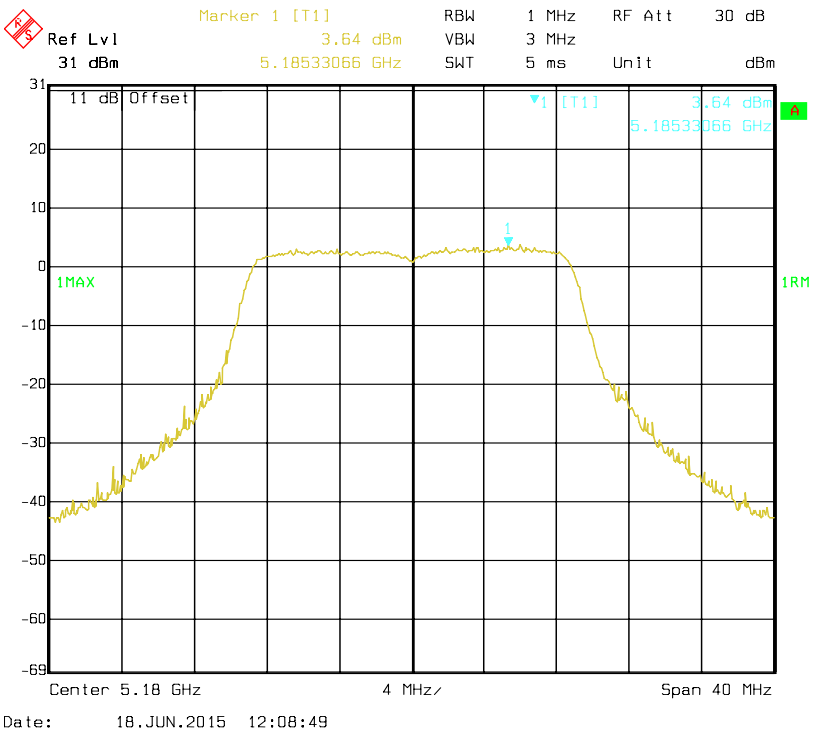


Date: 18.JUN.2015 11:27:07

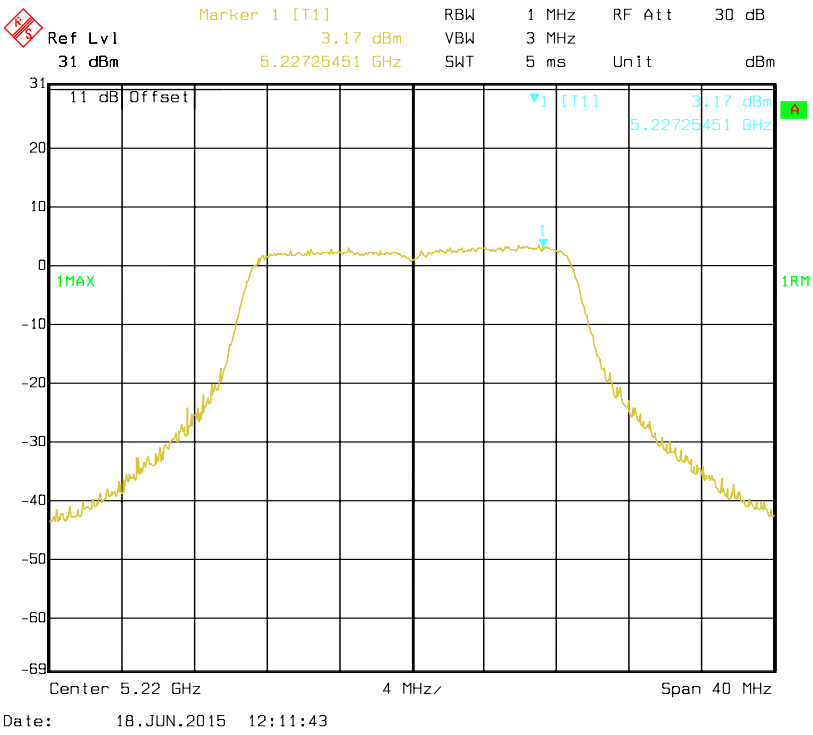
802.11a mode, Antenna 2: Power Spectral Density-5240 MHz



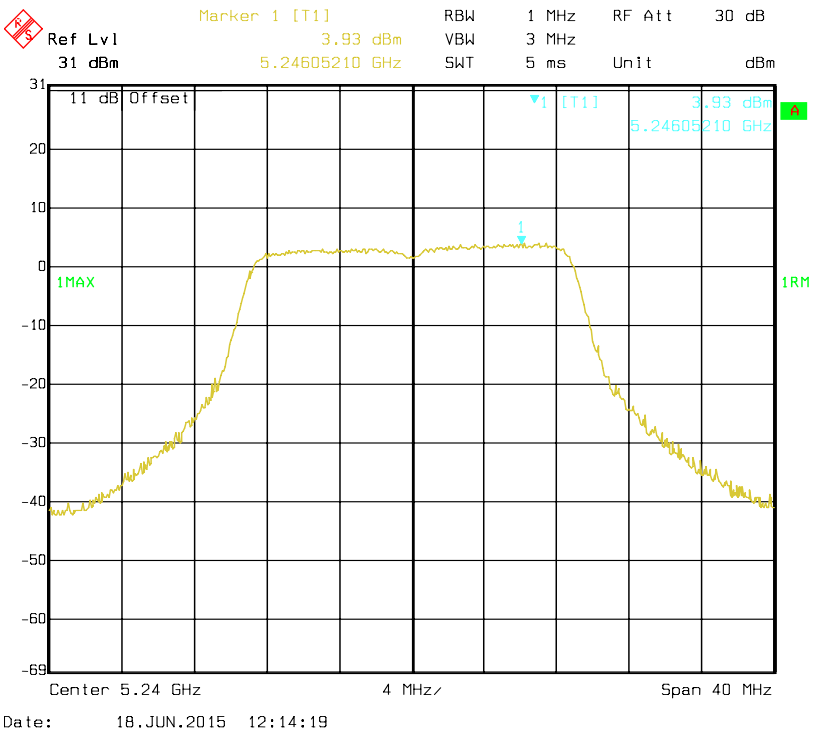
802.11ac VHT20 mode, Antenna 2: Power Spectral Density-5180 MHz



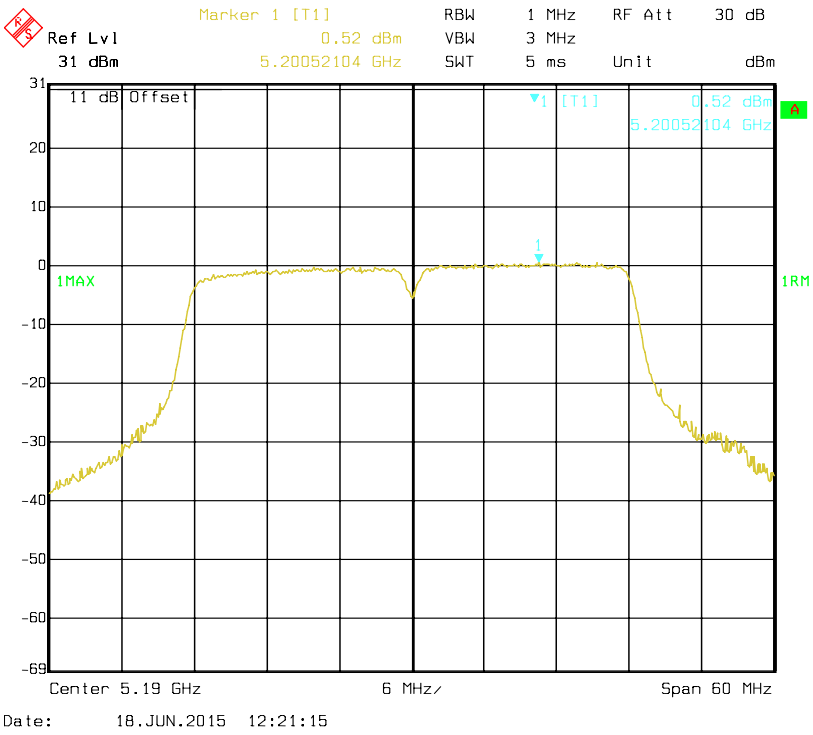
802.11ac VHT20 mode, Antenna 2: Power Spectral Density-5220 MHz



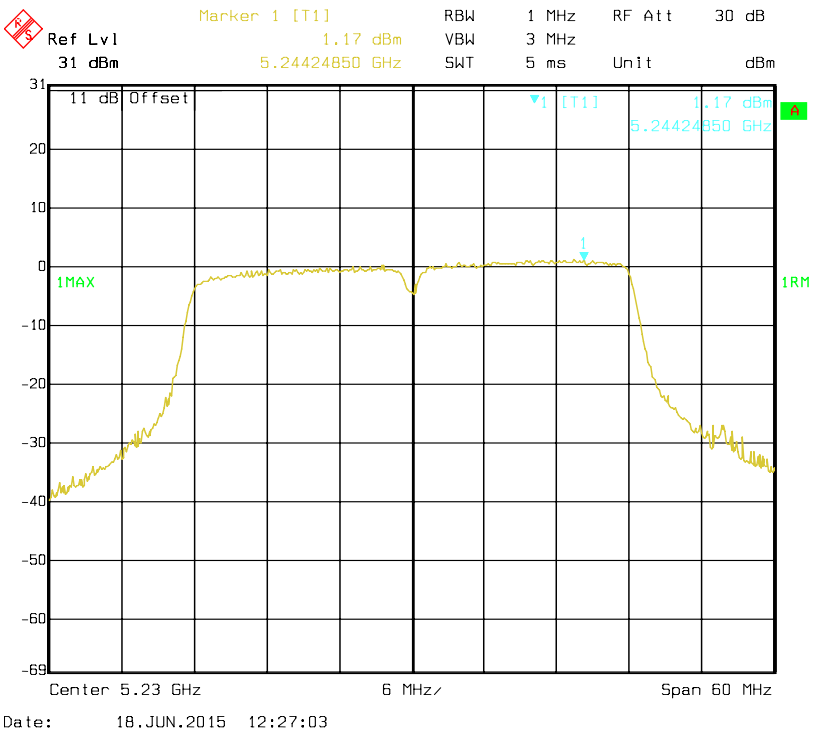
802.11ac VHT20 mode, Antenna 2: Power Spectral Density-5240 MHz



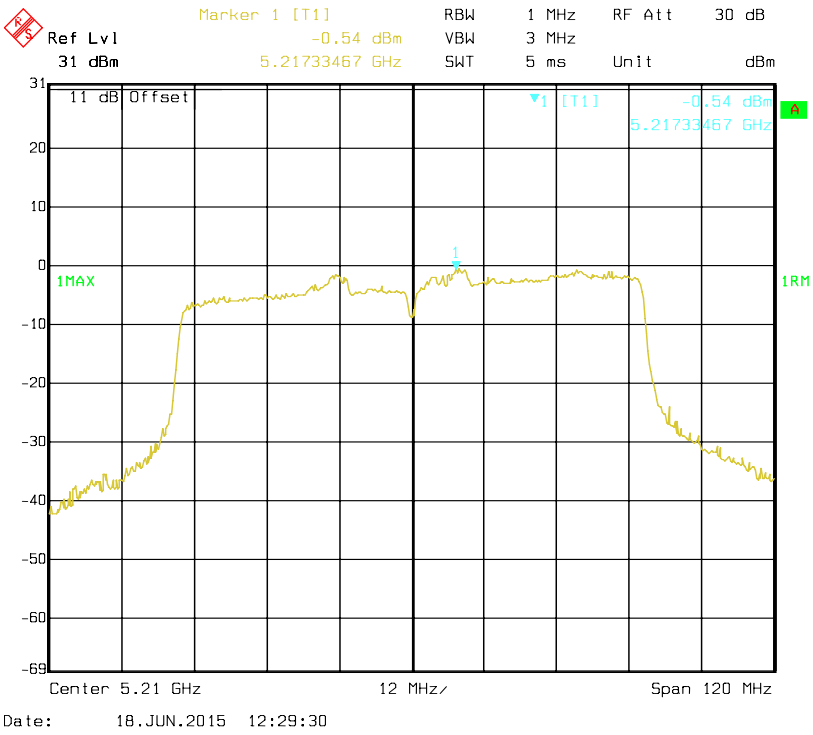
802.11ac VHT40 mode, Antenna 2: Power Spectral Density-5190 MHz



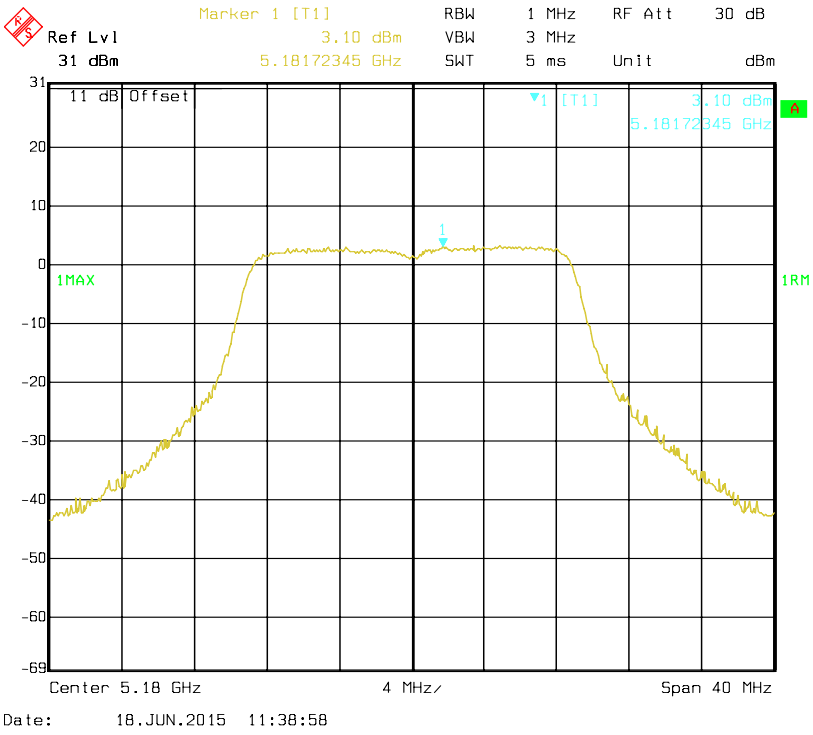
802.11ac VHT40 mode, Antenna 2: Power Spectral Density-5230 MHz



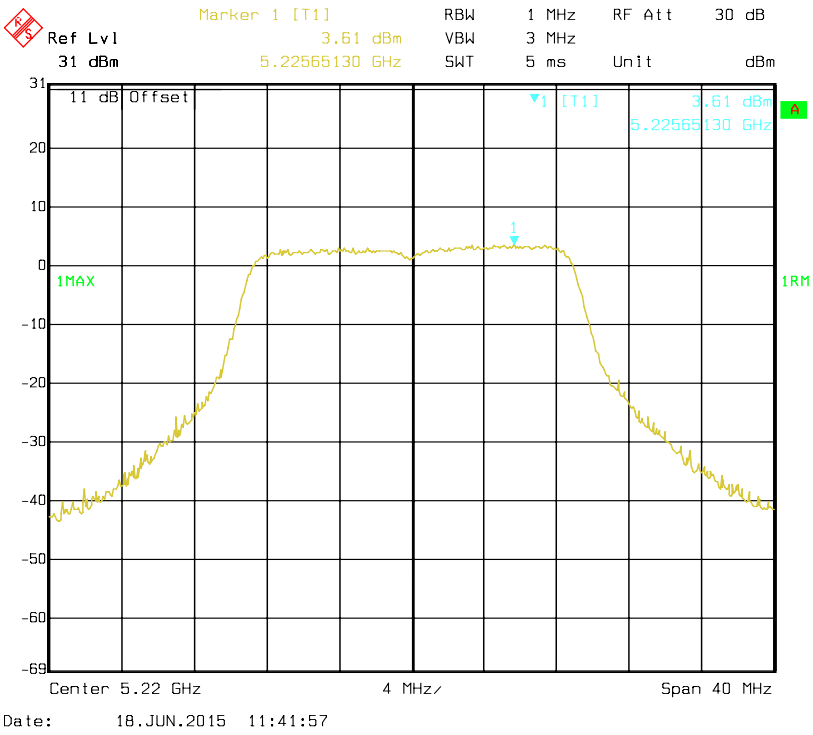
802.11ac VHT80 mode, Antenna 2: Power Spectral Density-5210 MHz



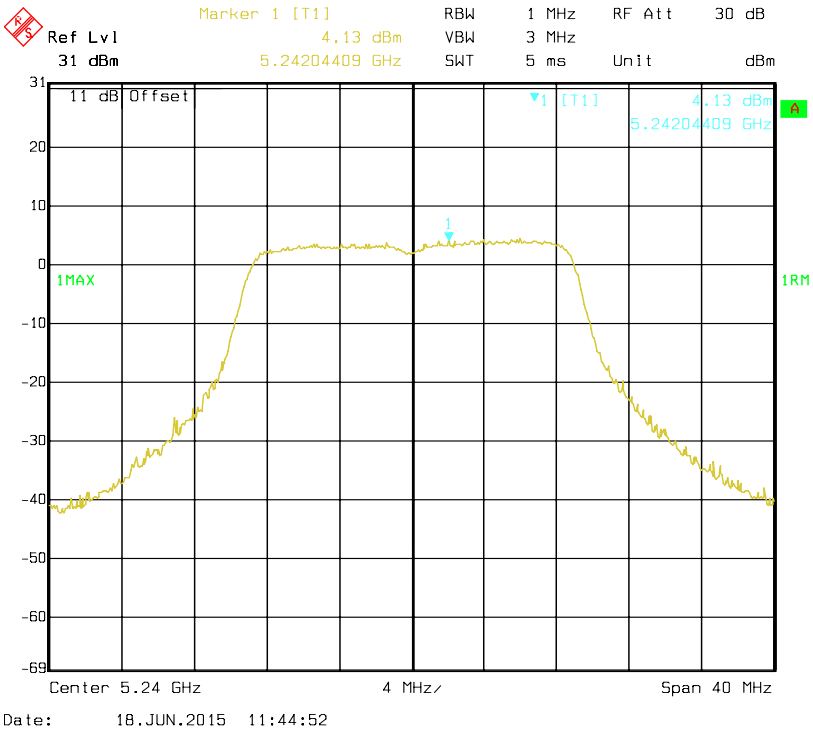
802.11n HT20 mode, Antenna 2: Power Spectral Density-5180 MHz



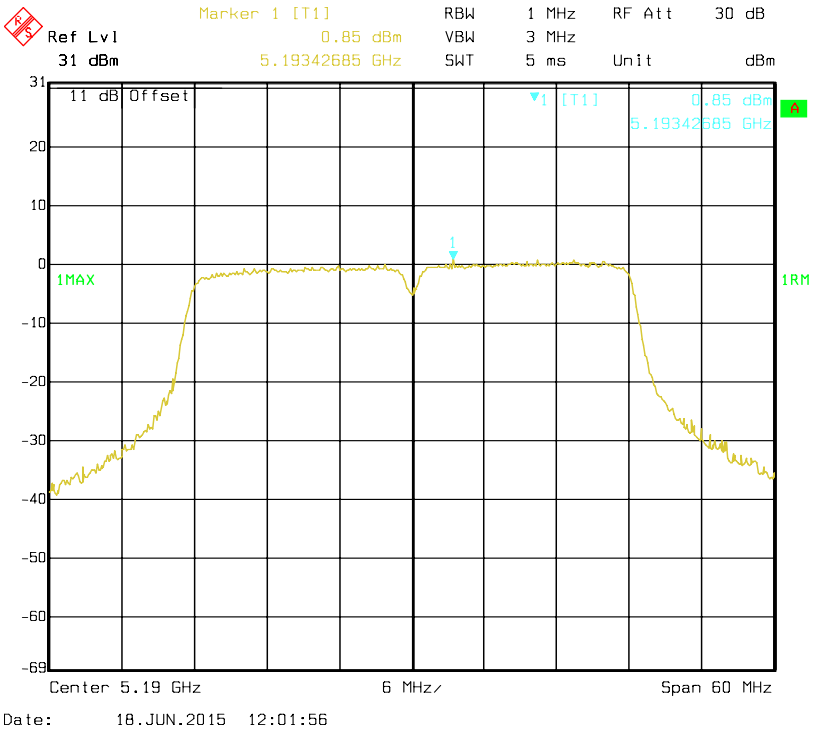
802.11n HT20 mode, Antenna 2: Power Spectral Density-5220 MHz



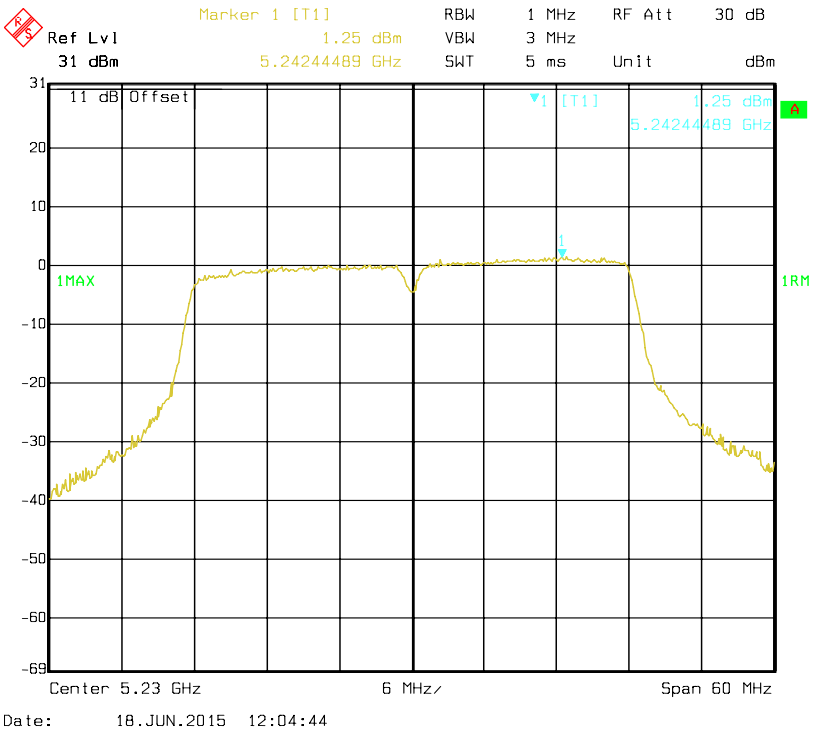
802.11n HT20 mode, Antenna 2: Power Spectral Density-5240 MHz



802.11n HT40 mode, Antenna 2: Power Spectral Density-5190 MHz

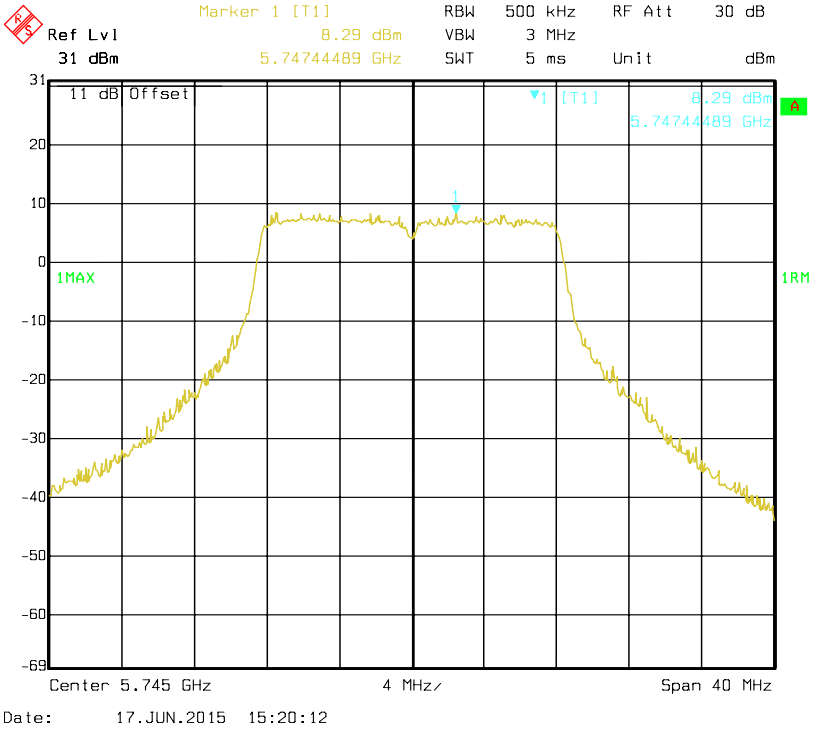


802.11n HT40 mode, Antenna 2: Power Spectral Density-5230 MHz



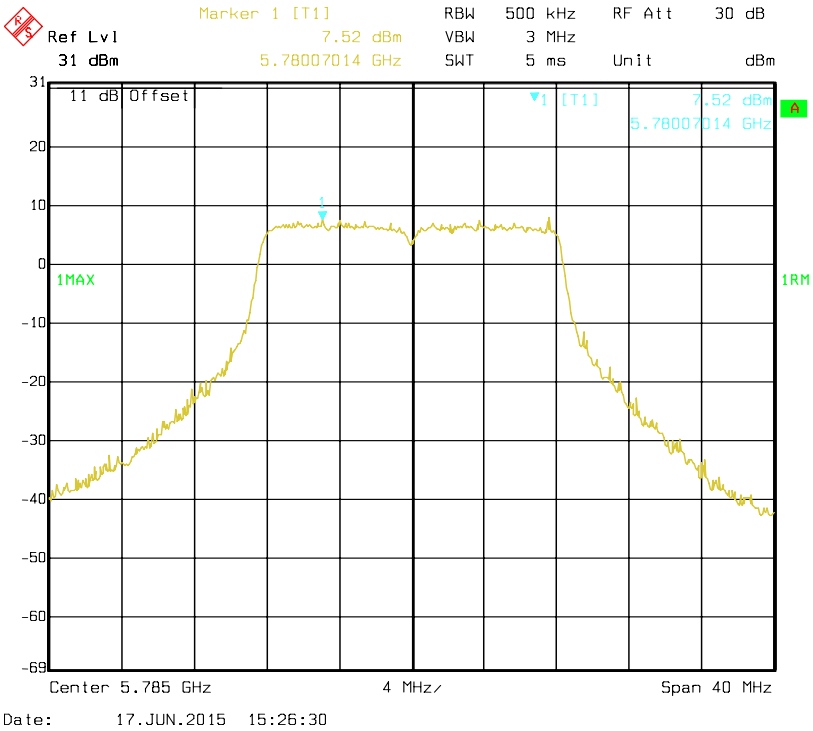
5725-5850 MHz:

802.11a mode, Antenna 0: Power Spectral Density-5745 MHz



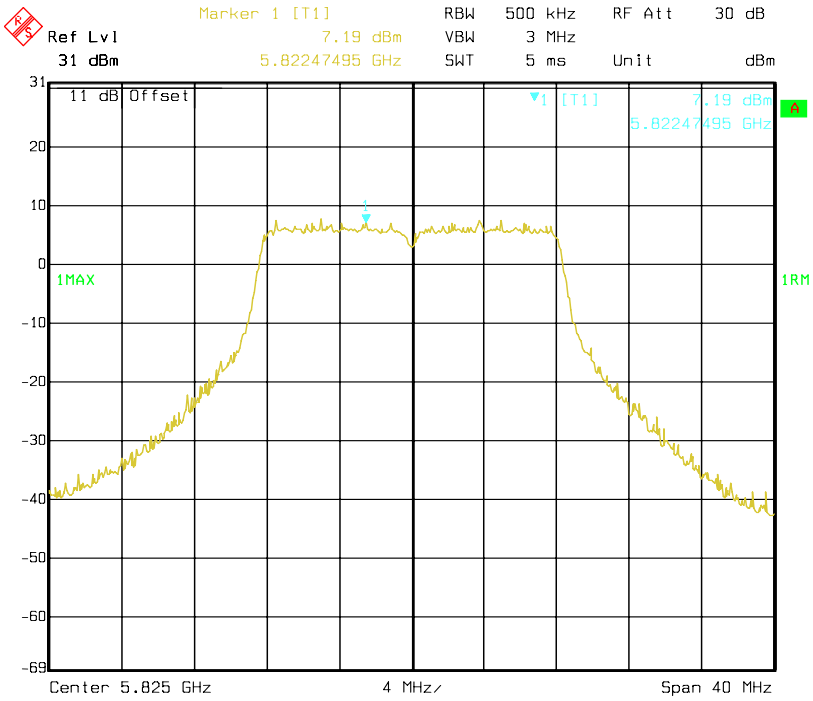
Date: 17.JUN.2015 15:20:12

802.11a mode, Antenna 0: Power Spectral Density-5785 MHz



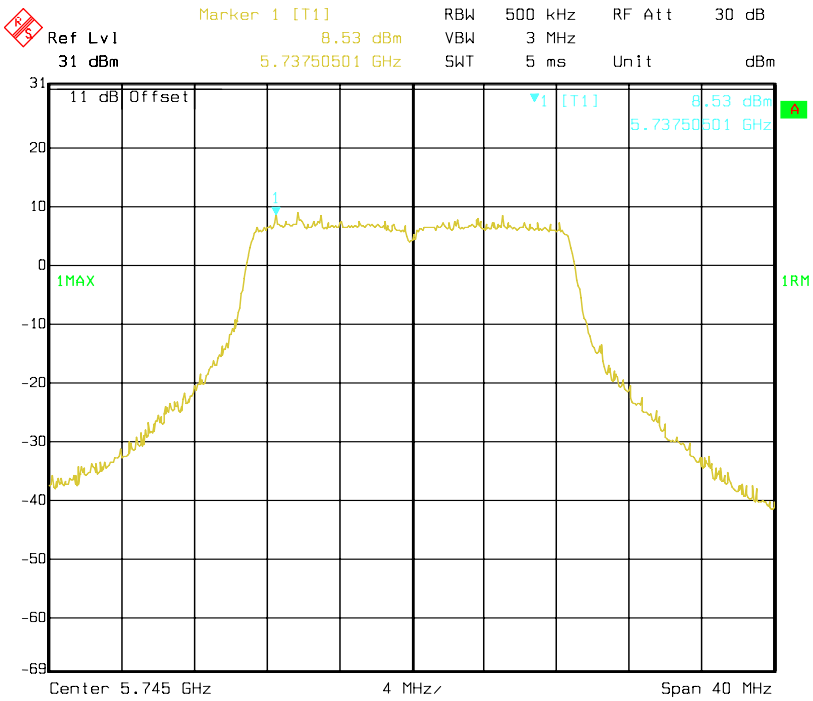
Date: 17.JUN.2015 15:26:30

802.11a mode, Antenna 0: Power Spectral Density-5825 MHz



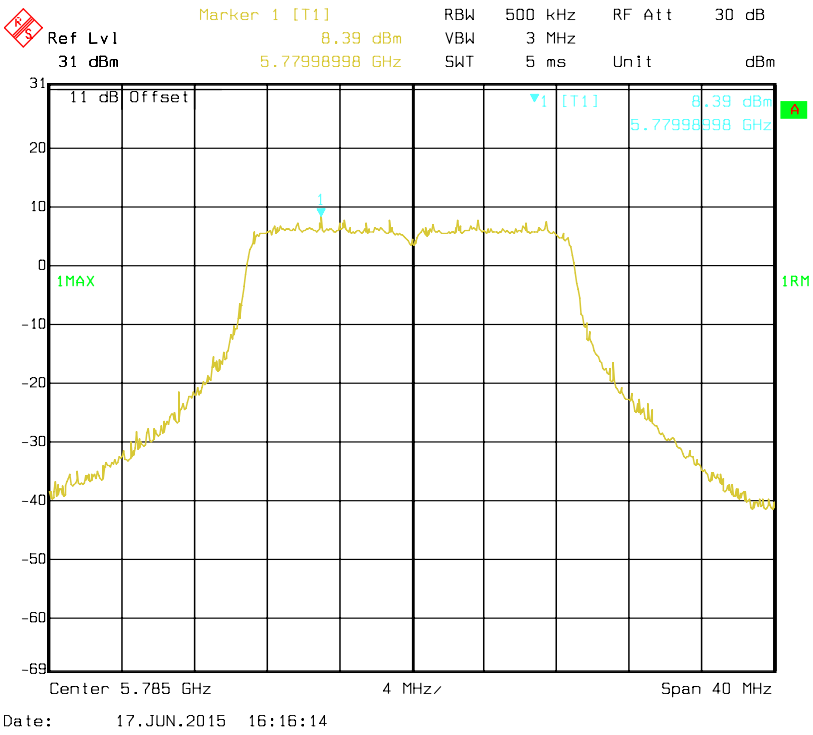
Date: 17.JUN.2015 15:31:18

802.11ac VHT20 mode, Antenna 0: Power Spectral Density-5745 MHz

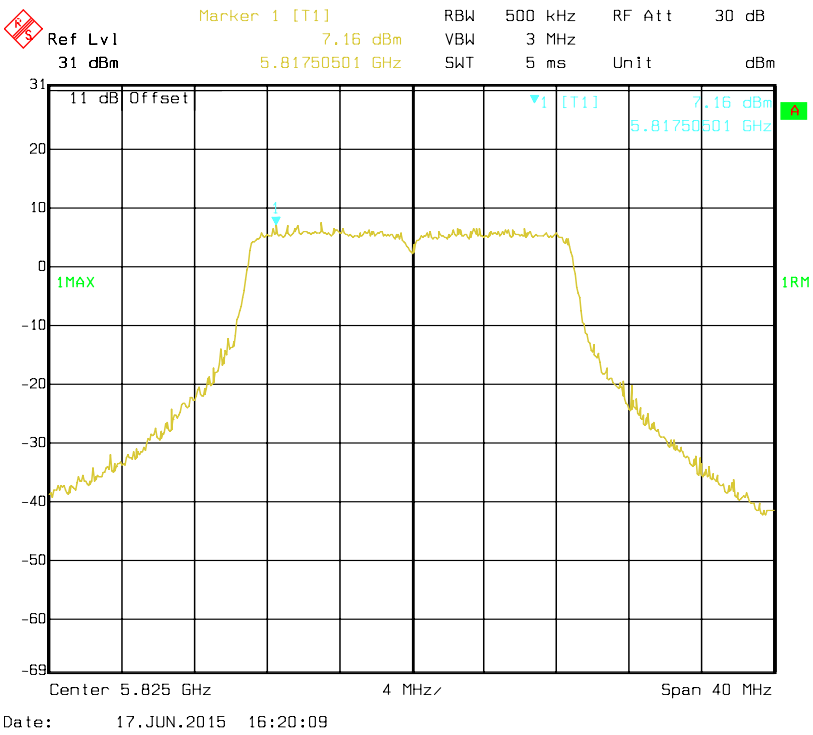


Date: 17.JUN.2015 16:10:18

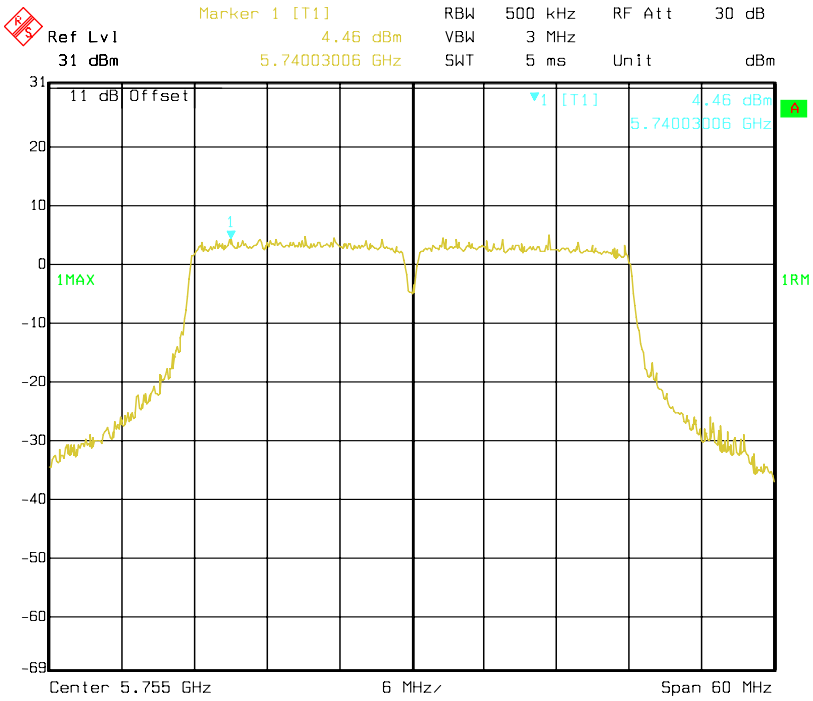
802.11ac VHT20 mode, Antenna 0: Power Spectral Density-5785 MHz



802.11ac VHT20 mode, Antenna 0: Power Spectral Density-5825 MHz

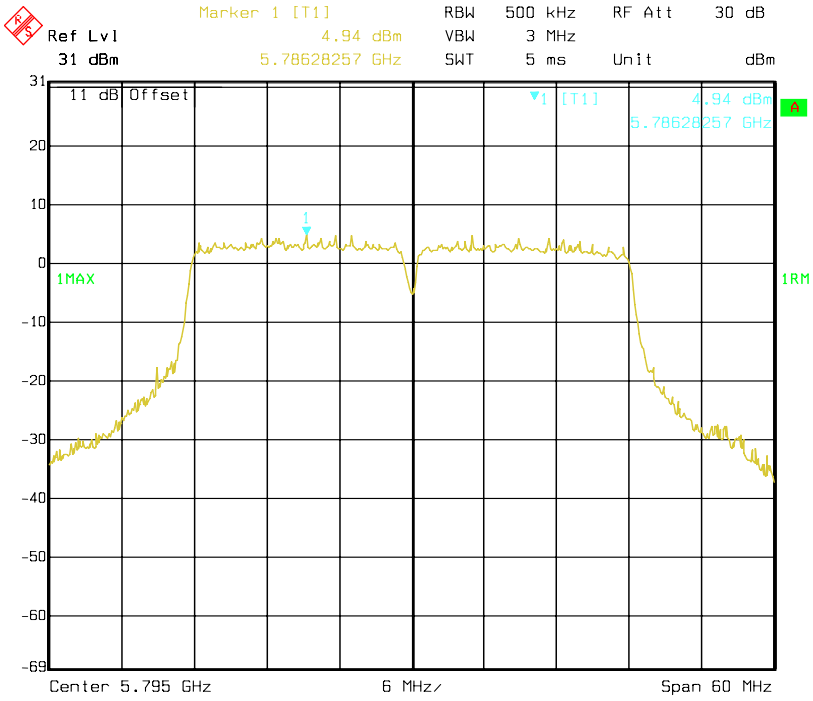


802.11ac VHT40 mode, Antenna 0: Power Spectral Density-5755 MHz



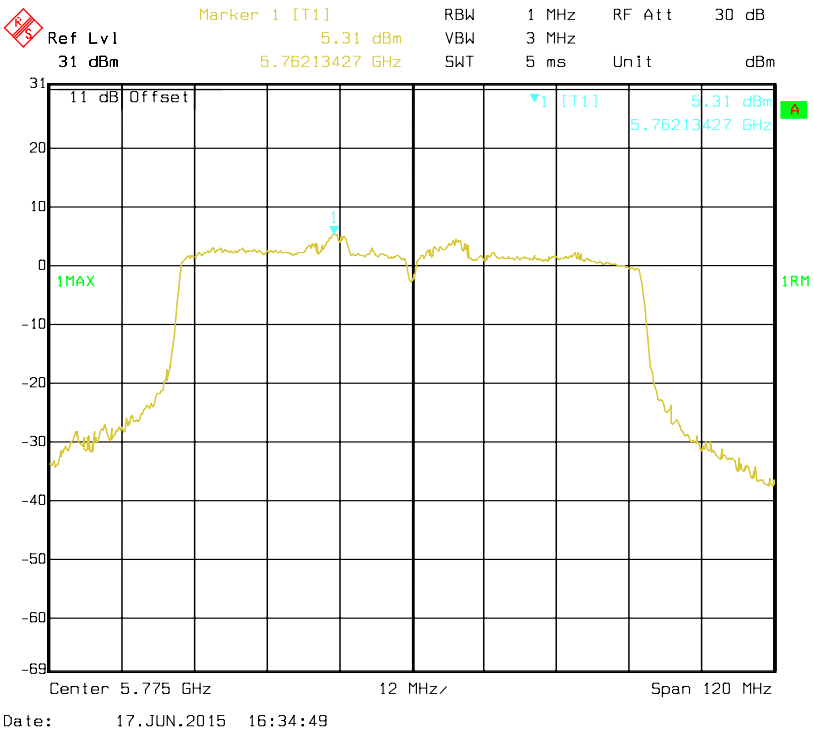
Date: 17.JUN.2015 16:25:29

802.11ac VHT40 mode, Antenna 0: Power Spectral Density-5795 MHz

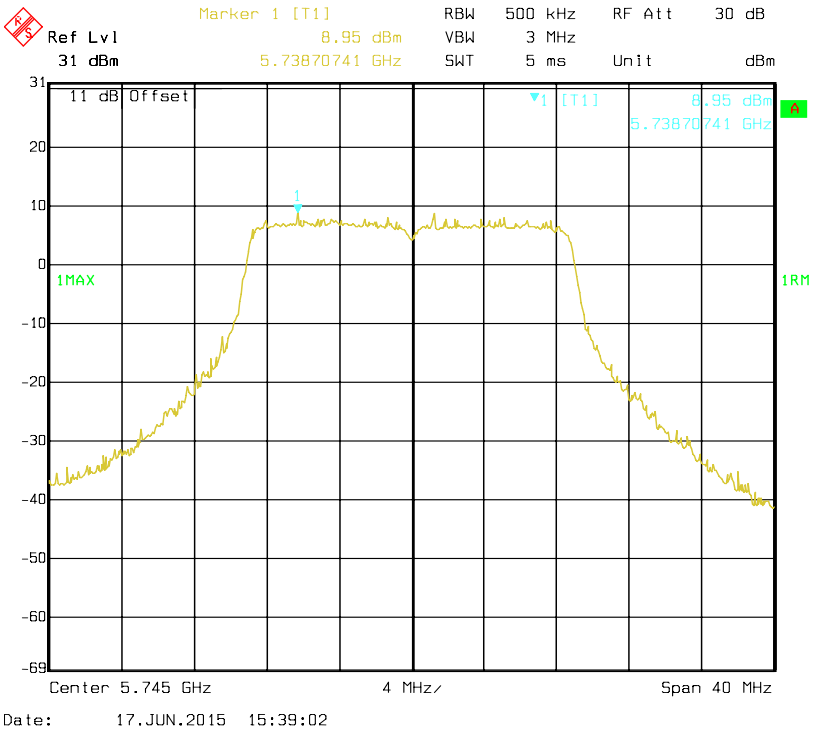


Date: 17.JUN.2015 16:29:40

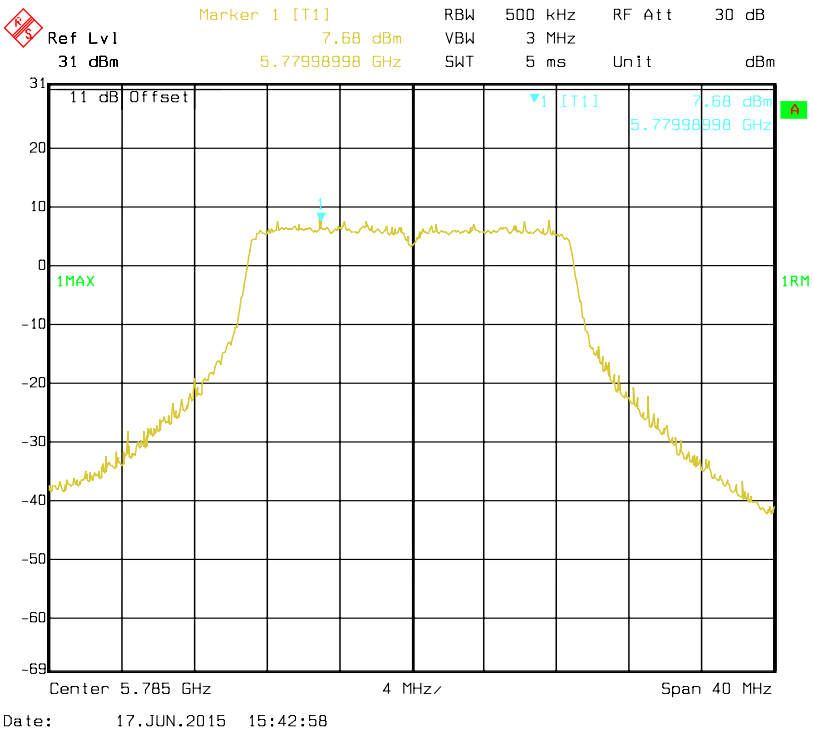
802.11ac VHT80 mode, Antenna 0: Power Spectral Density-5775 MHz



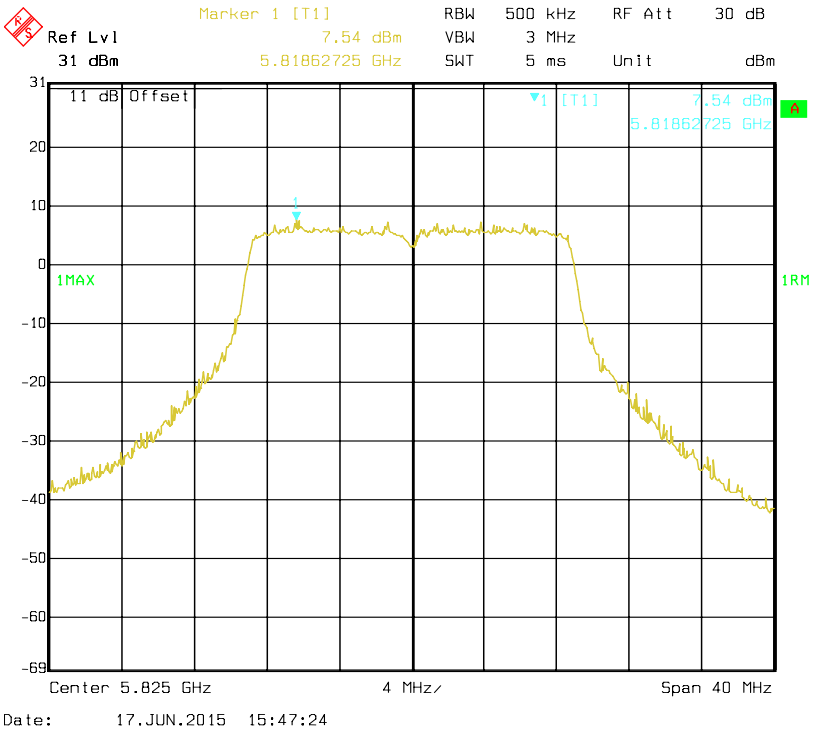
802.11n HT20 mode, Antenna 0: Power Spectral Density-5745 MHz



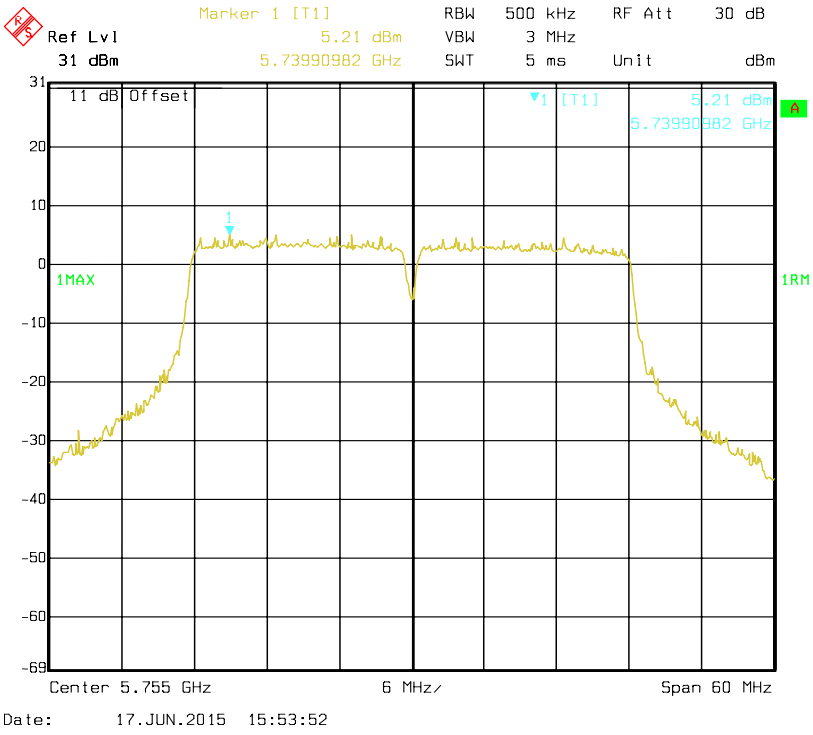
802.11n HT20 mode, Antenna 0: Power Spectral Density-5785 MHz



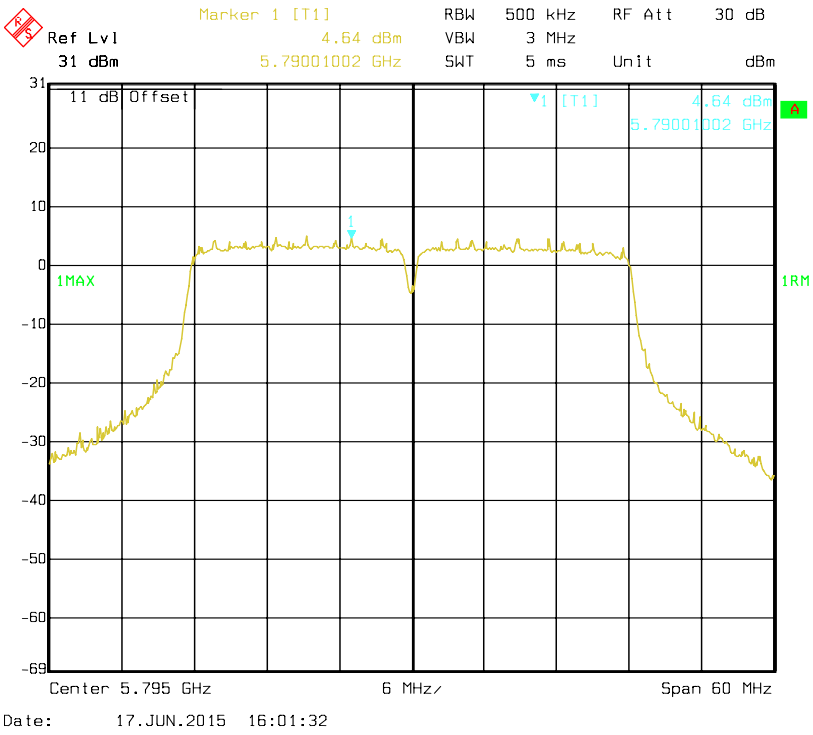
802.11n HT20 mode, Antenna 0: Power Spectral Density-5825 MHz



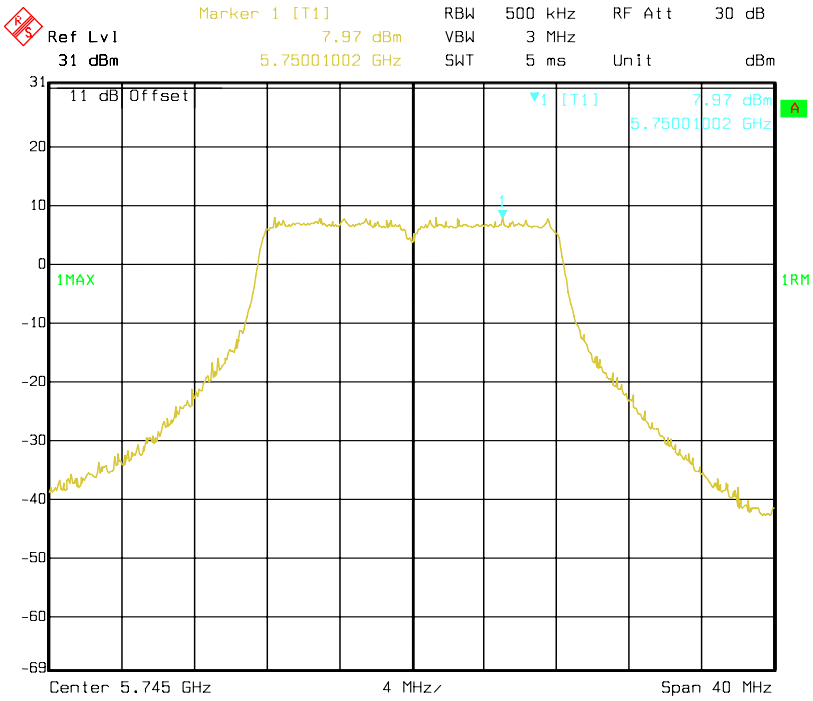
802.11n HT40 mode, Antenna 0: Power Spectral Density-5755 MHz



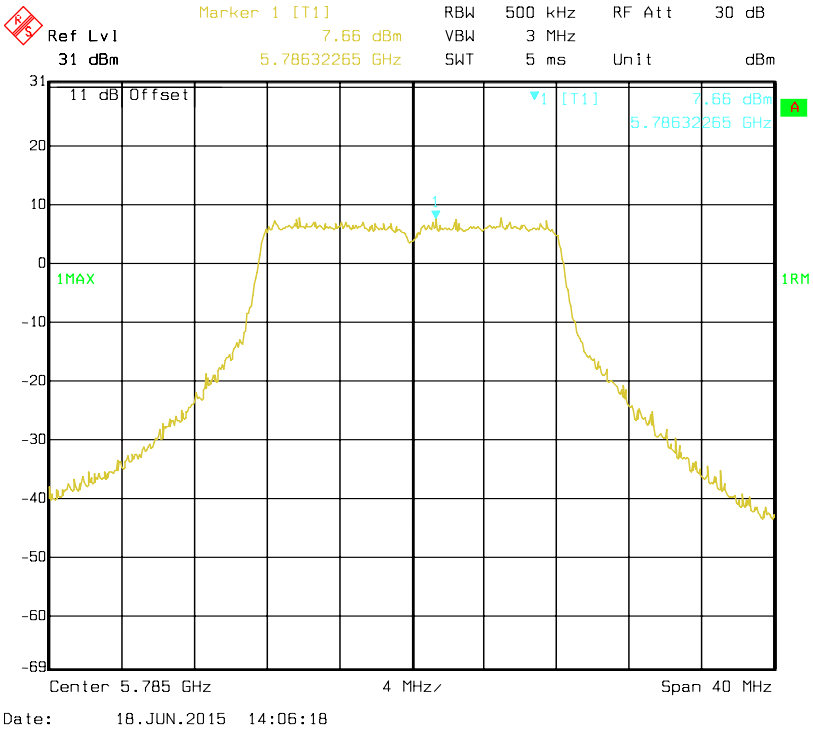
802.11n HT40 mode, Antenna 0: Power Spectral Density-5795 MHz



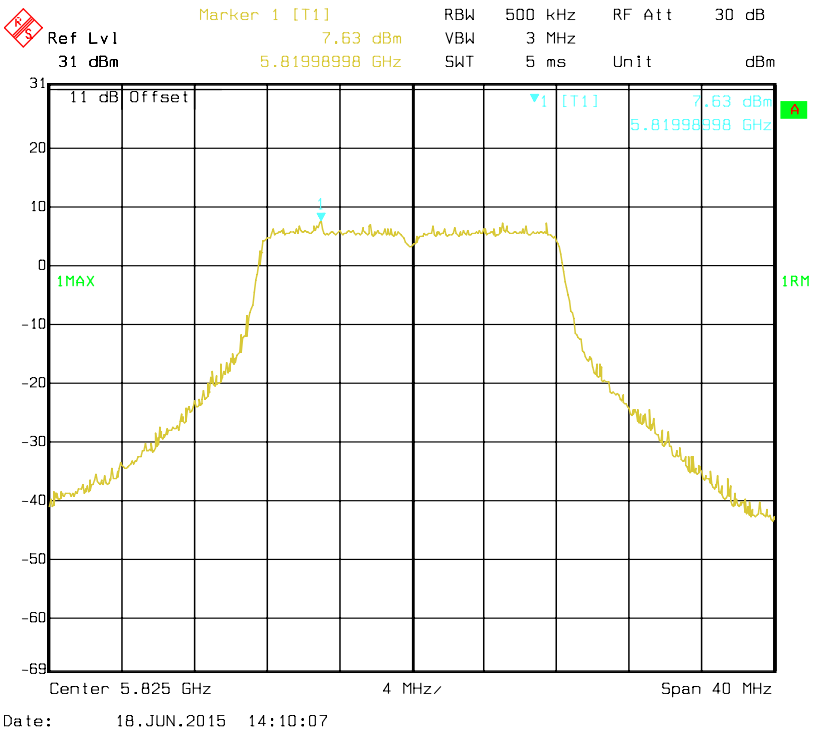
802.11a mode, Antenna 1: Power Spectral Density-5745 MHz



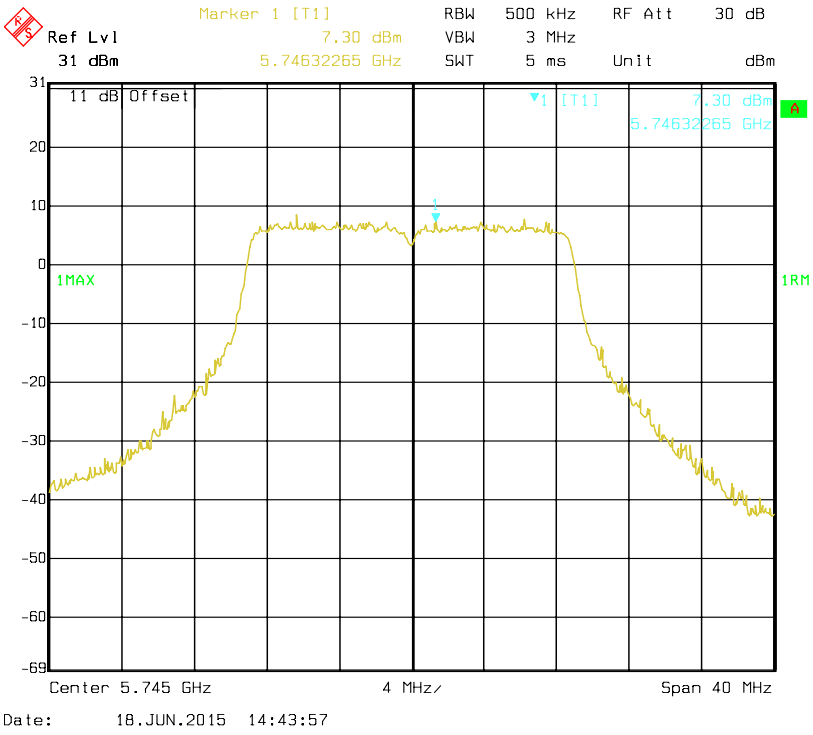
802.11a mode, Antenna 1: Power Spectral Density-5785 MHz



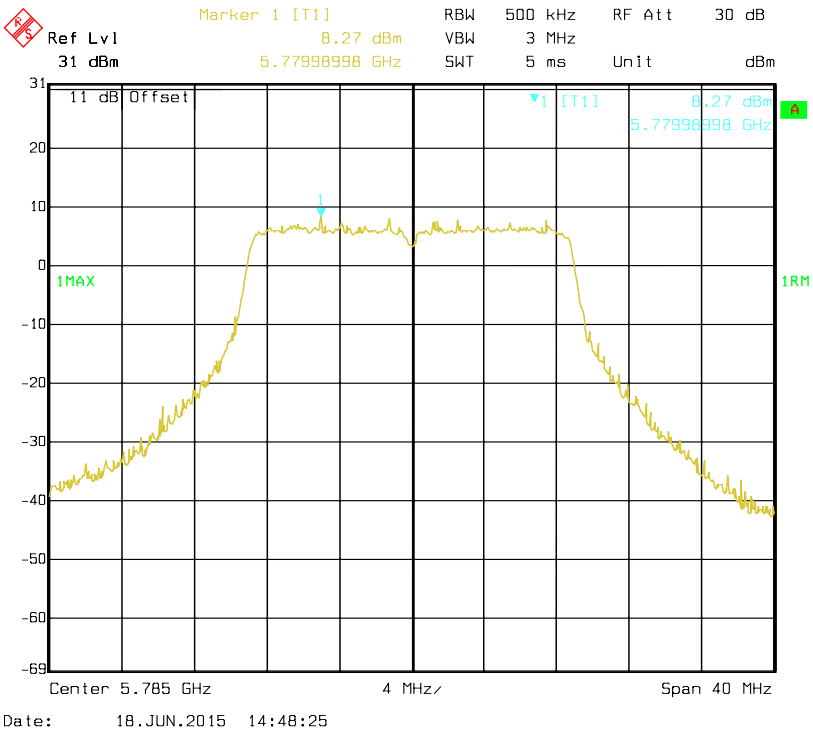
802.11a mode, Antenna 1: Power Spectral Density-5825 MHz



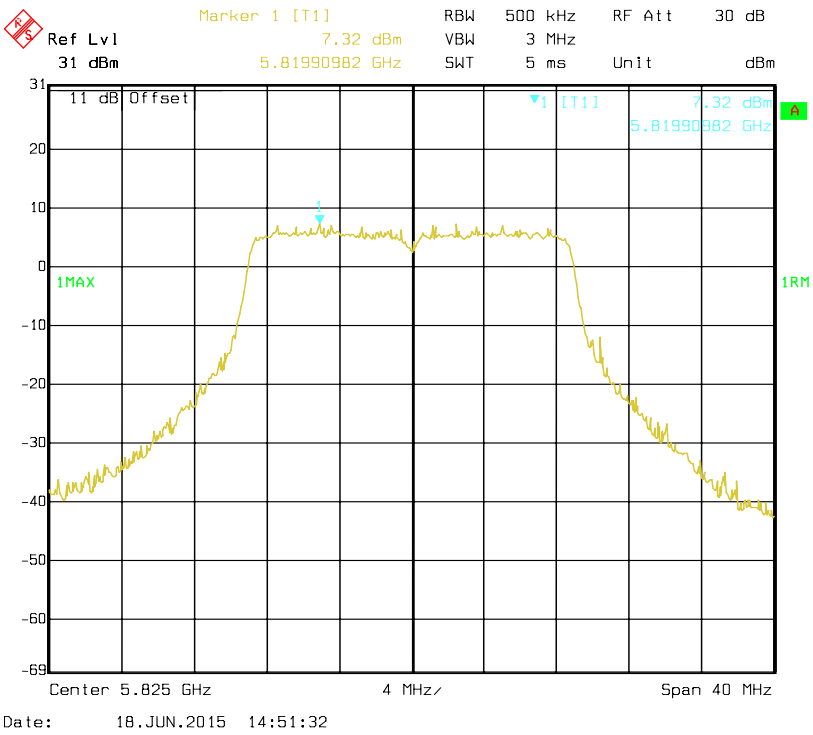
802.11ac VHT20 mode, Antenna 1: Power Spectral Density-5745 MHz



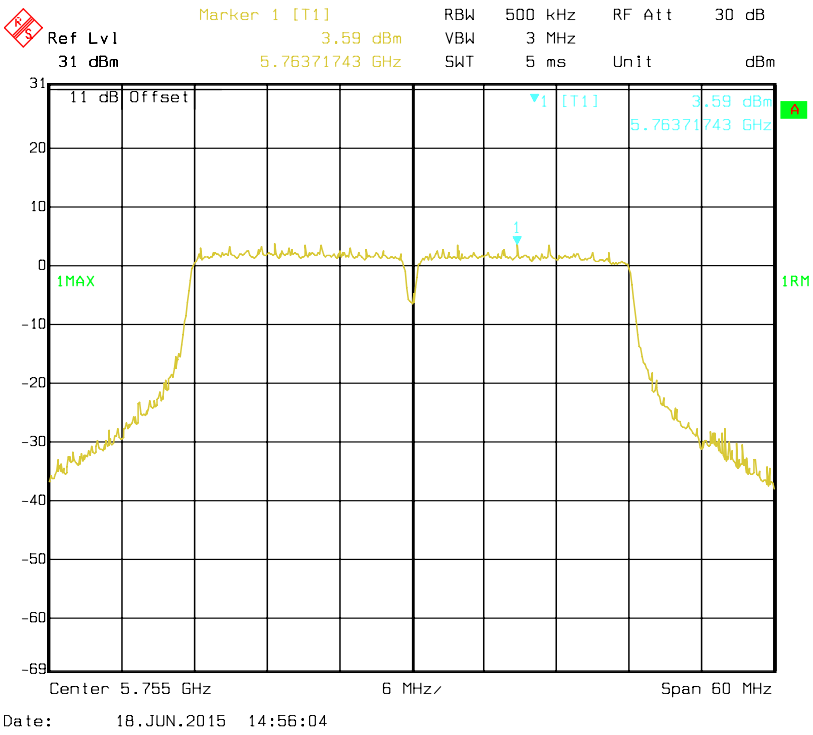
802.11ac VHT20 mode, Antenna 1: Power Spectral Density-5785 MHz



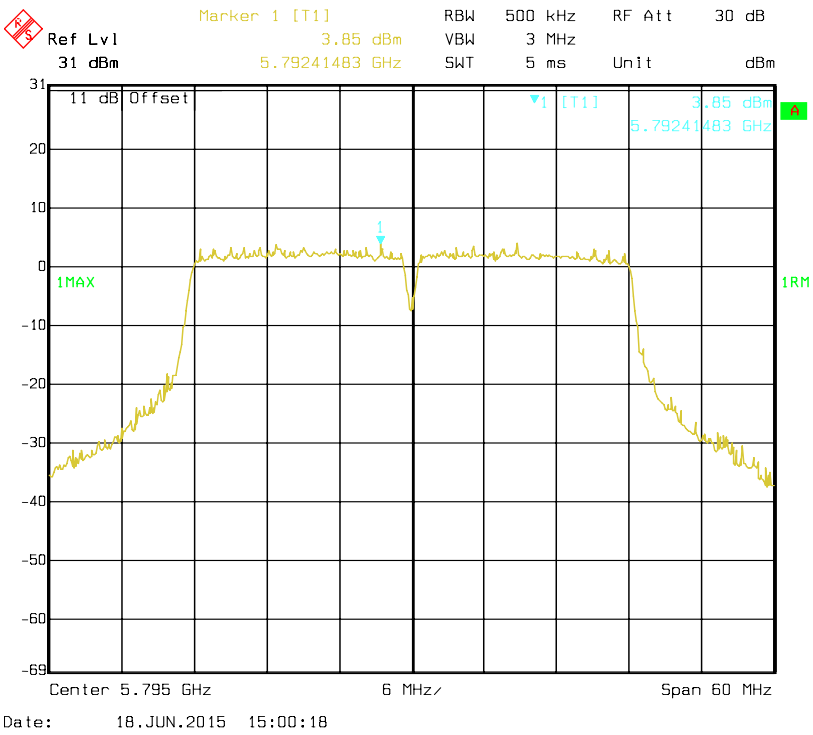
802.11ac VHT20 mode, Antenna 1: Power Spectral Density-5825 MHz



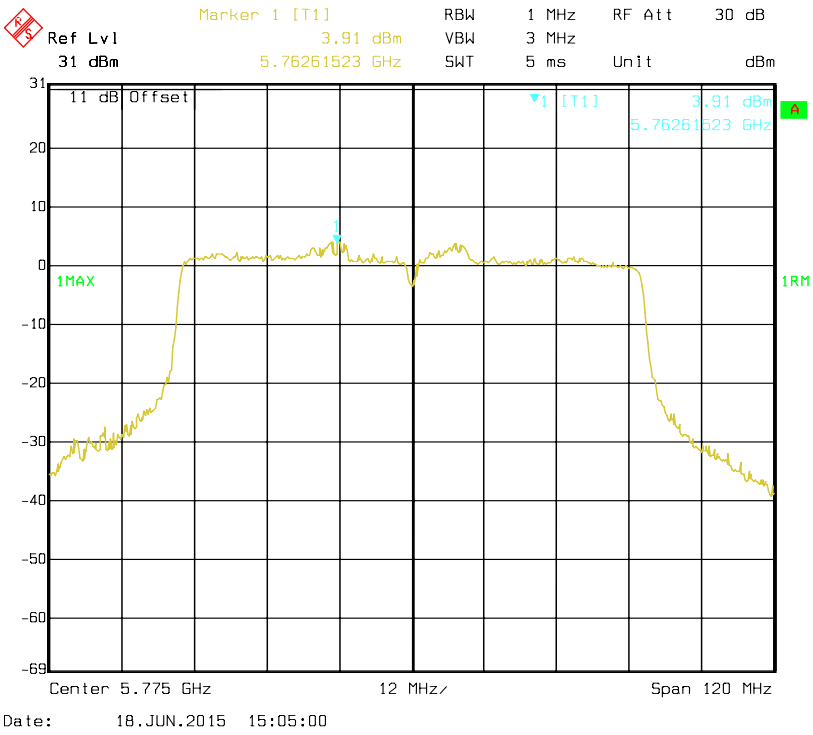
802.11ac VHT40 mode, Antenna 1: Power Spectral Density-5755 MHz



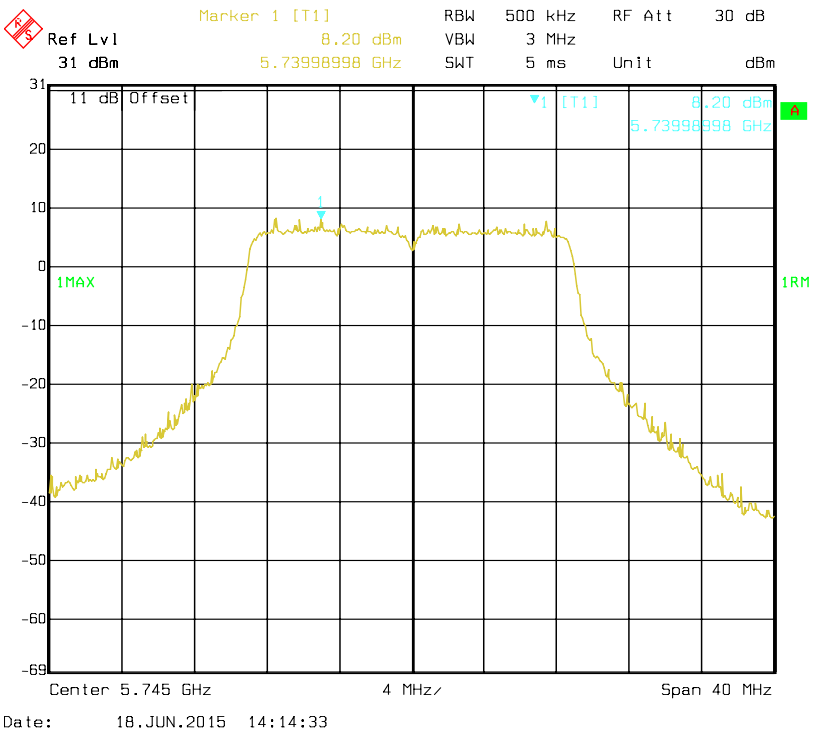
802.11ac VHT40 mode, Antenna 1: Power Spectral Density-5795 MHz



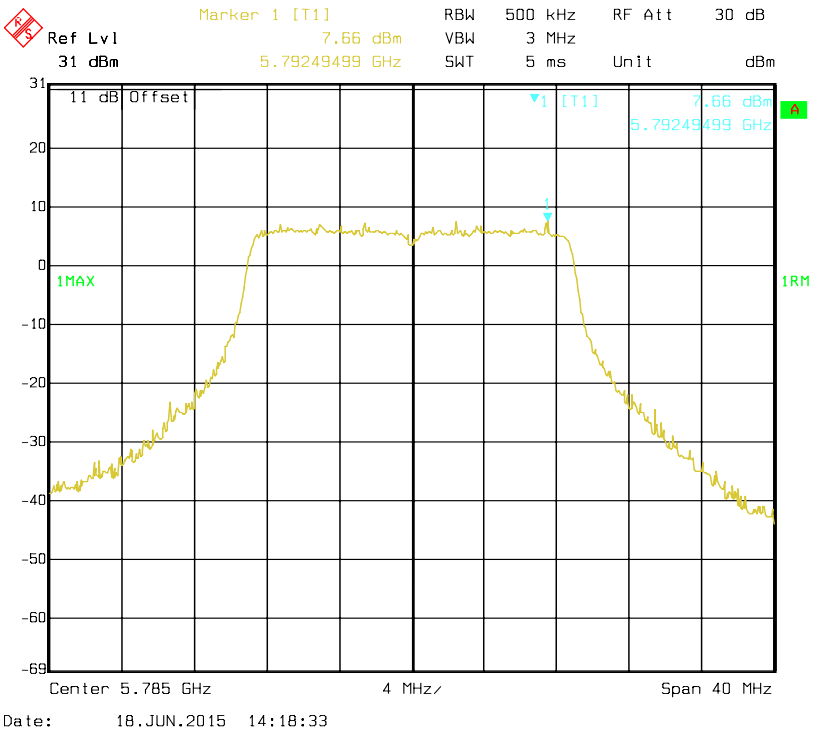
802.11ac VHT80 mode, Antenna 1: Power Spectral Density-5775 MHz



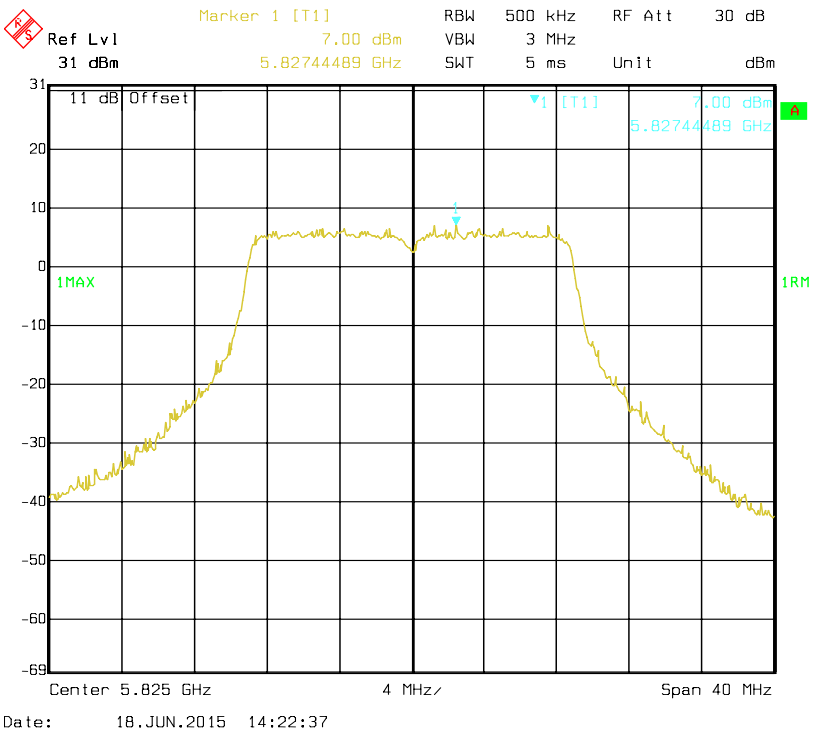
802.11n HT20 mode, Antenna 1: Power Spectral Density-5745 MHz



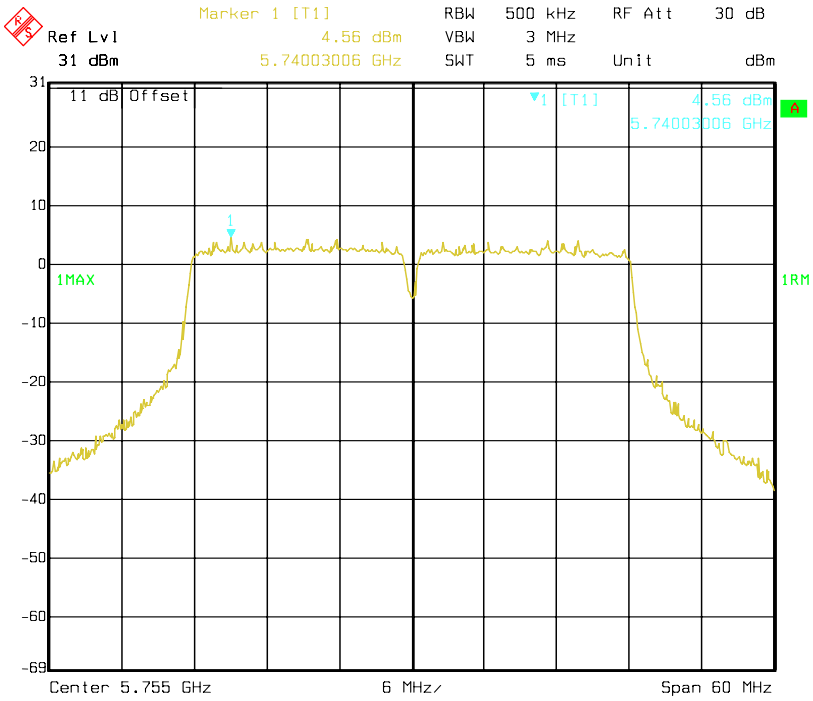
802.11n HT20 mode, Antenna 1: Power Spectral Density-5785 MHz



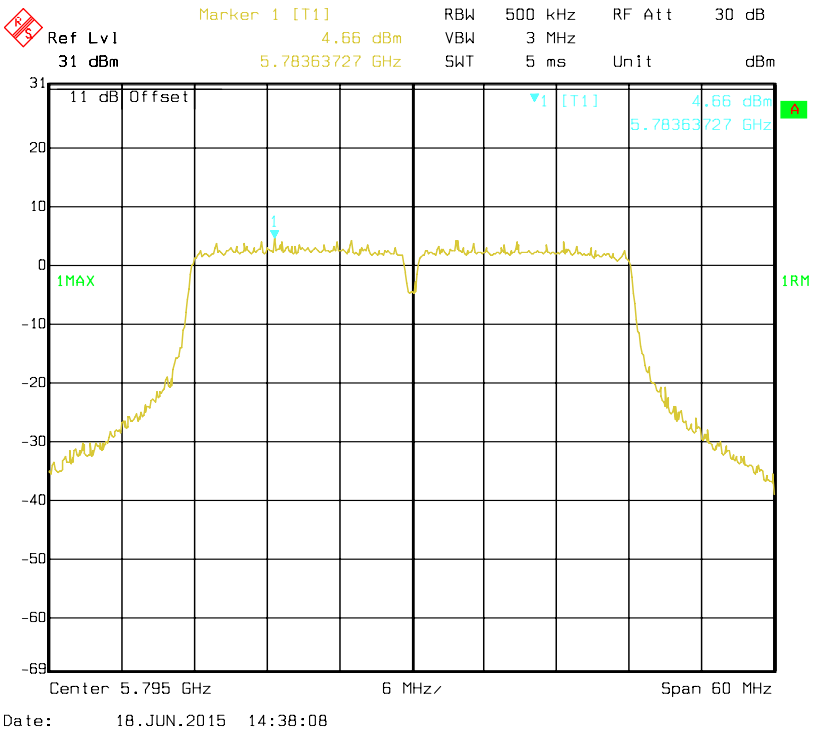
802.11n HT20 mode, Antenna 1: Power Spectral Density-5825 MHz



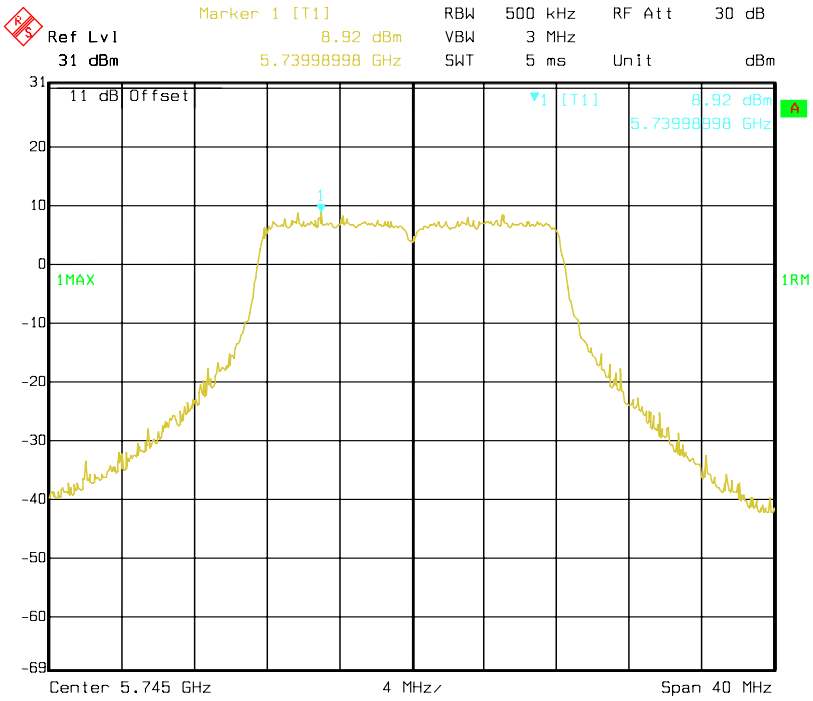
802.11n HT40 mode, Antenna 1: Power Spectral Density-5755 MHz



802.11n HT40 mode, Antenna 1: Power Spectral Density-5795 MHz

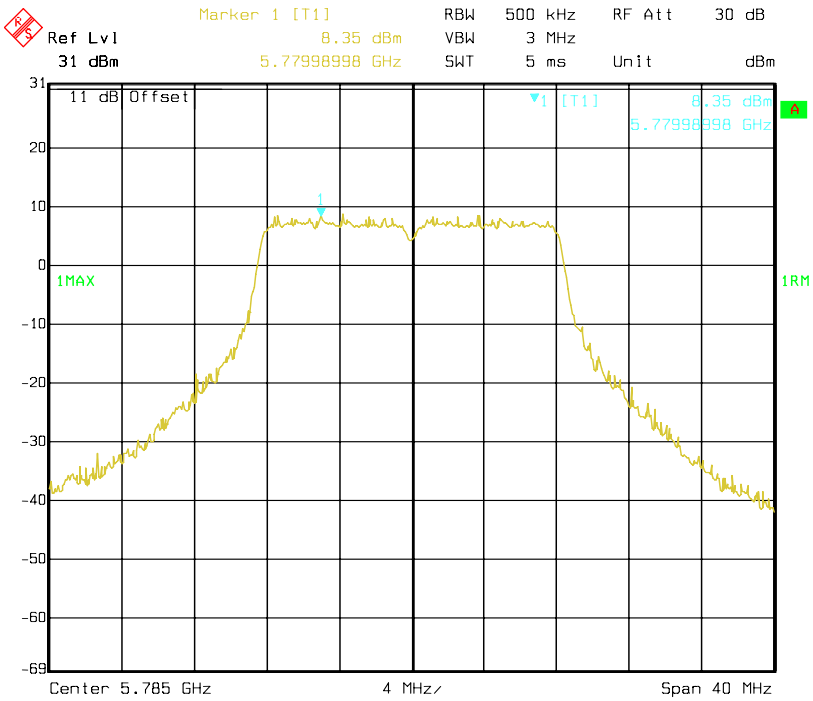


802.11a mode, Antenna 2: Power Spectral Density-5745 MHz



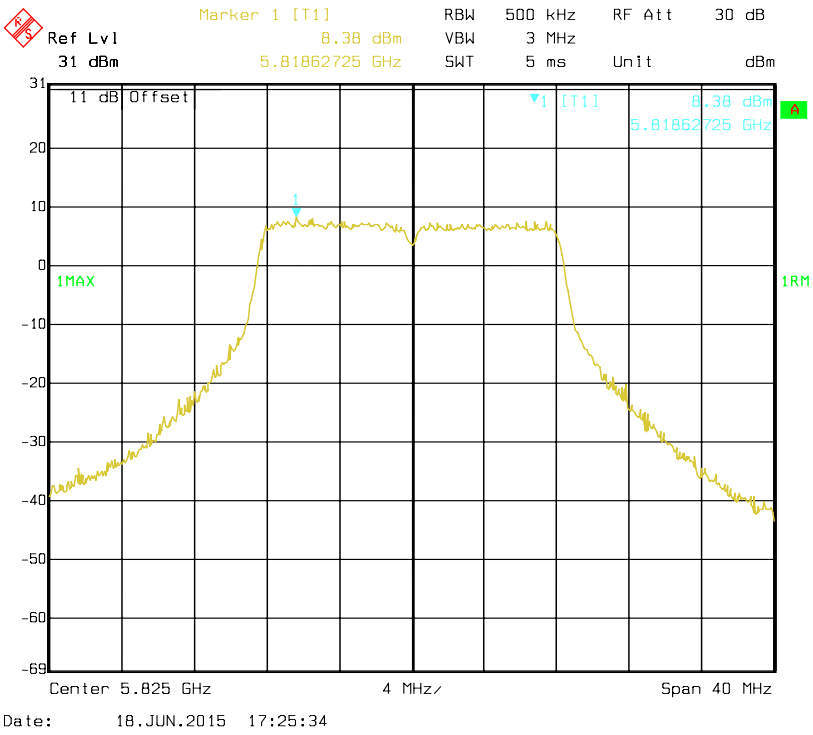
Date: 18.JUN.2015 17:17:44

802.11a mode, Antenna 2: Power Spectral Density-5785 MHz

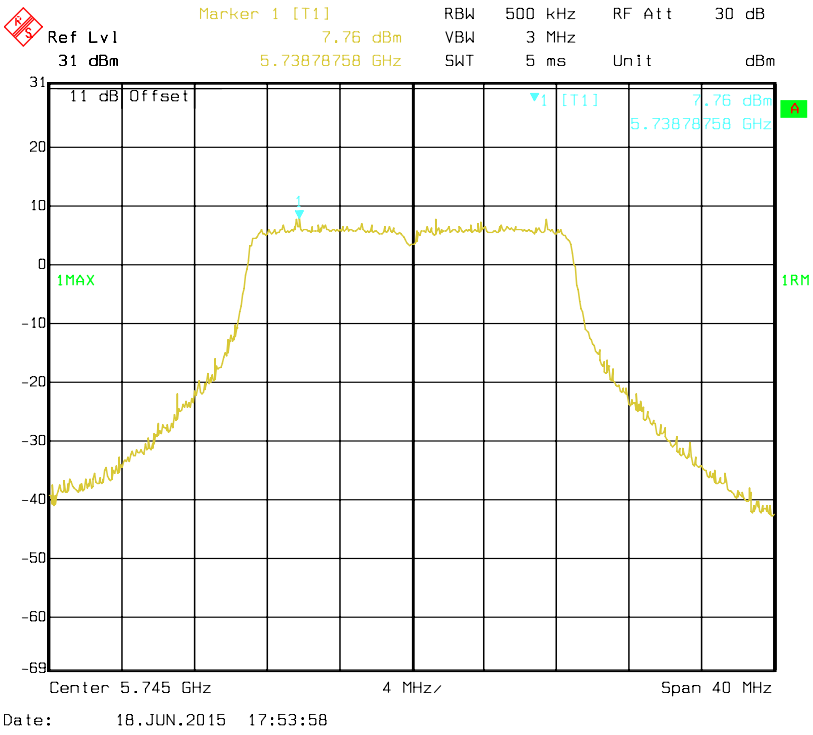


Date: 18.JUN.2015 17:22:18

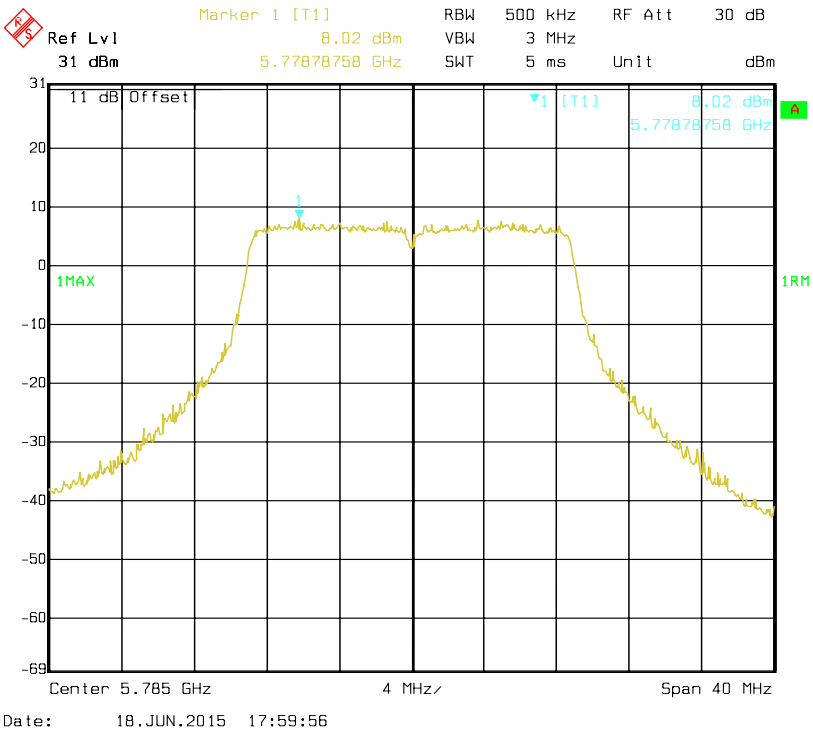
802.11a mode, Antenna 2: Power Spectral Density-5825 MHz



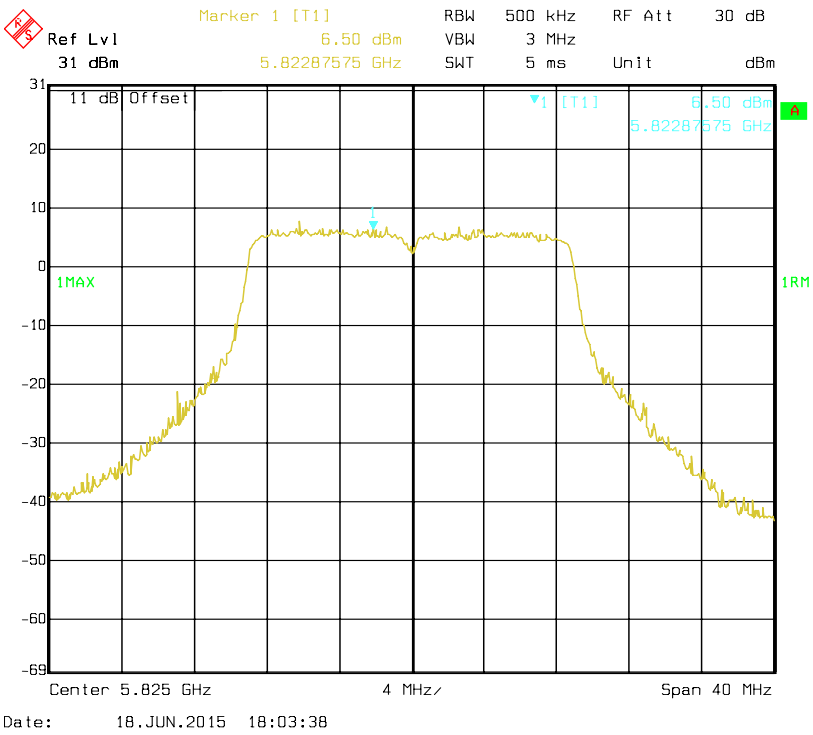
802.11ac VHT20 mode, Antenna 2: Power Spectral Density-5745 MHz



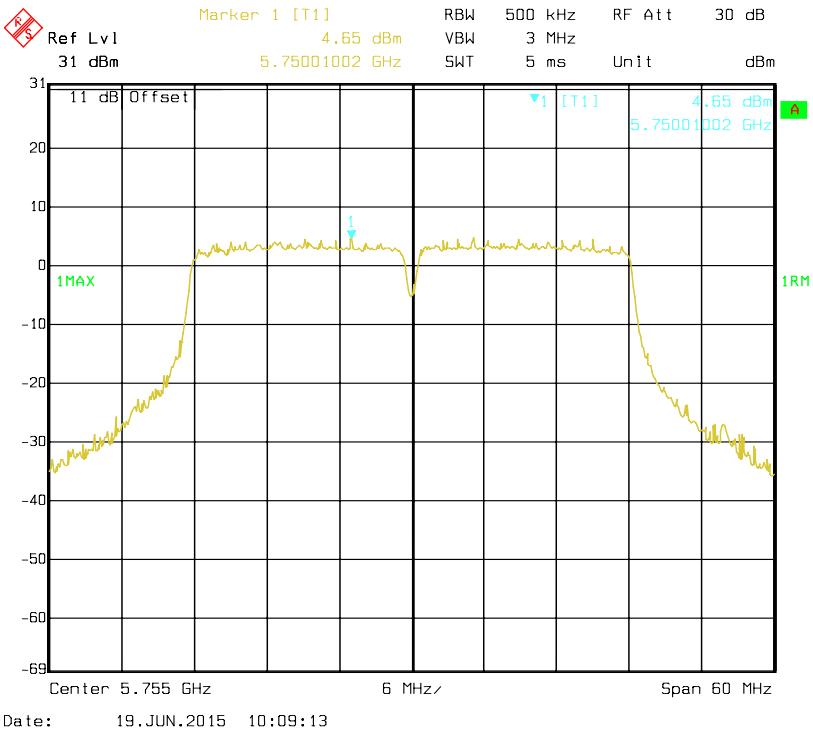
802.11ac VHT20 mode, Antenna 2: Power Spectral Density-5785 MHz



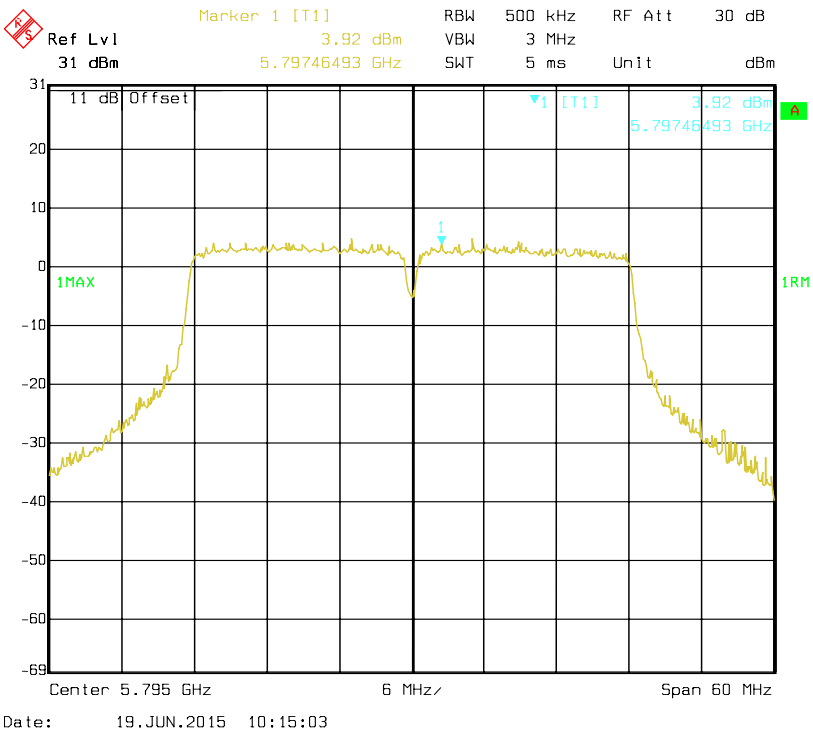
802.11ac VHT20 mode, Antenna 2: Power Spectral Density-5825 MHz



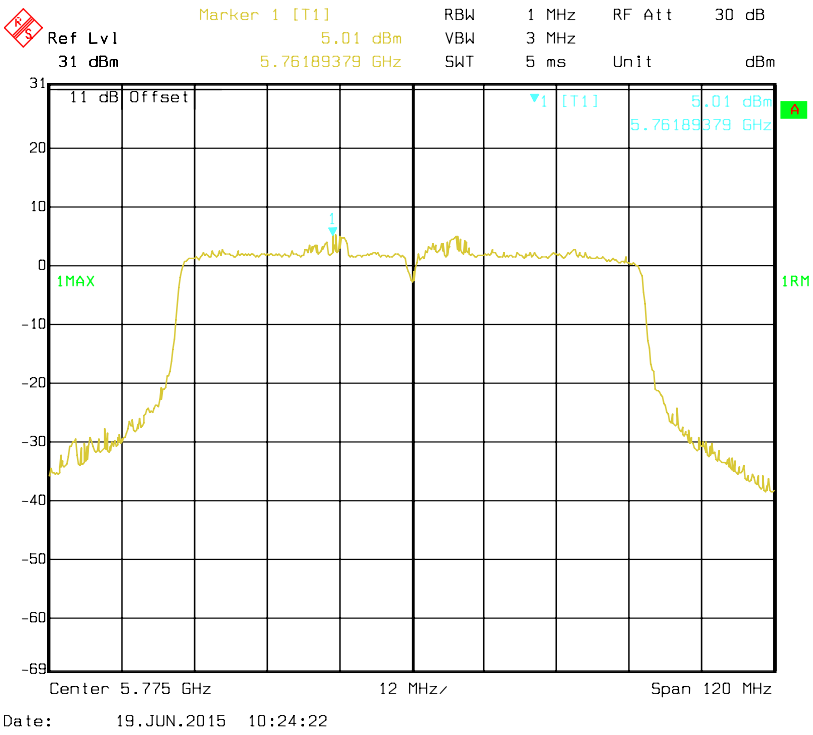
802.11ac VHT40 mode, Antenna 2: Power Spectral Density-5755 MHz



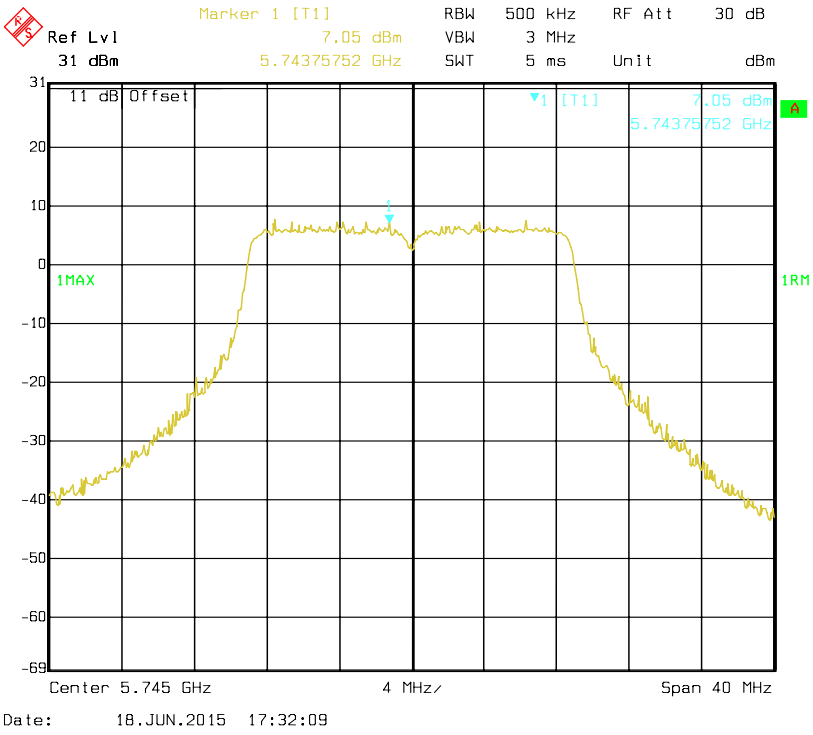
802.11ac VHT40 mode, Antenna 2: Power Spectral Density-5795 MHz



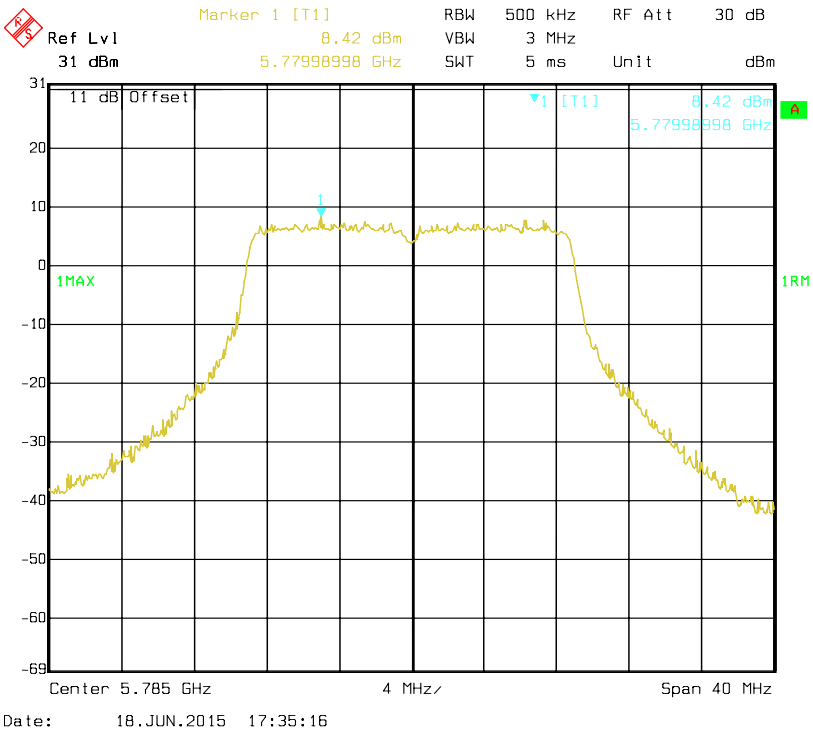
802.11ac VHT80 mode, Antenna 2: Power Spectral Density-5775 MHz



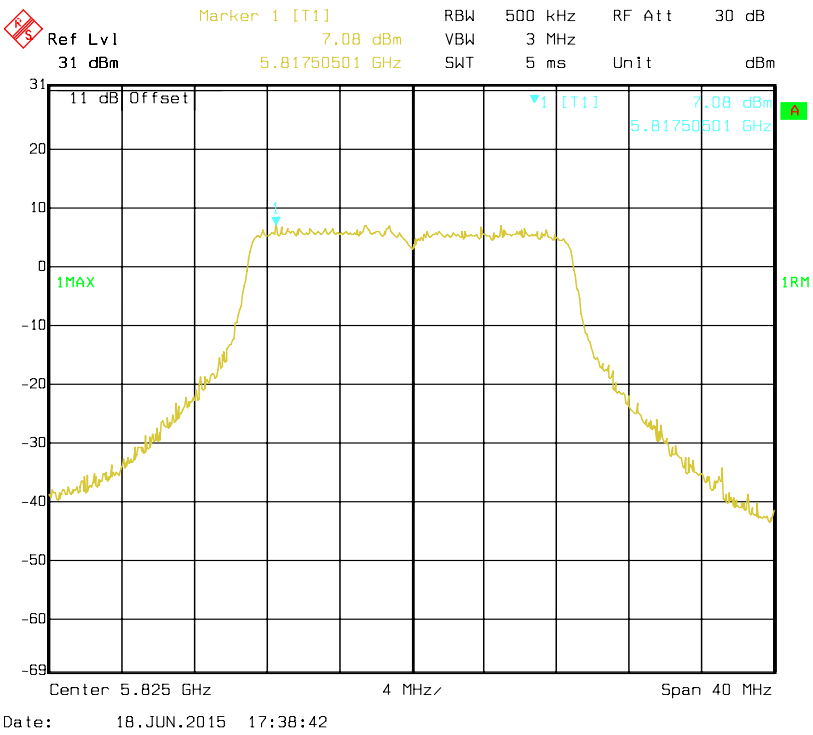
802.11n HT20 mode, Antenna 2: Power Spectral Density-5745 MHz



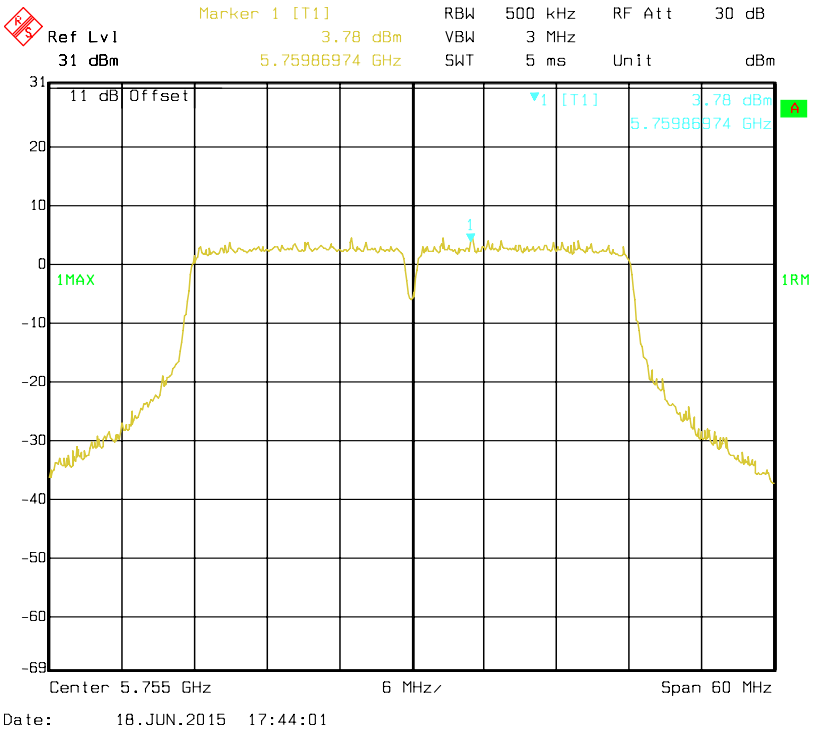
802.11n HT20 mode, Antenna 2: Power Spectral Density-5785 MHz



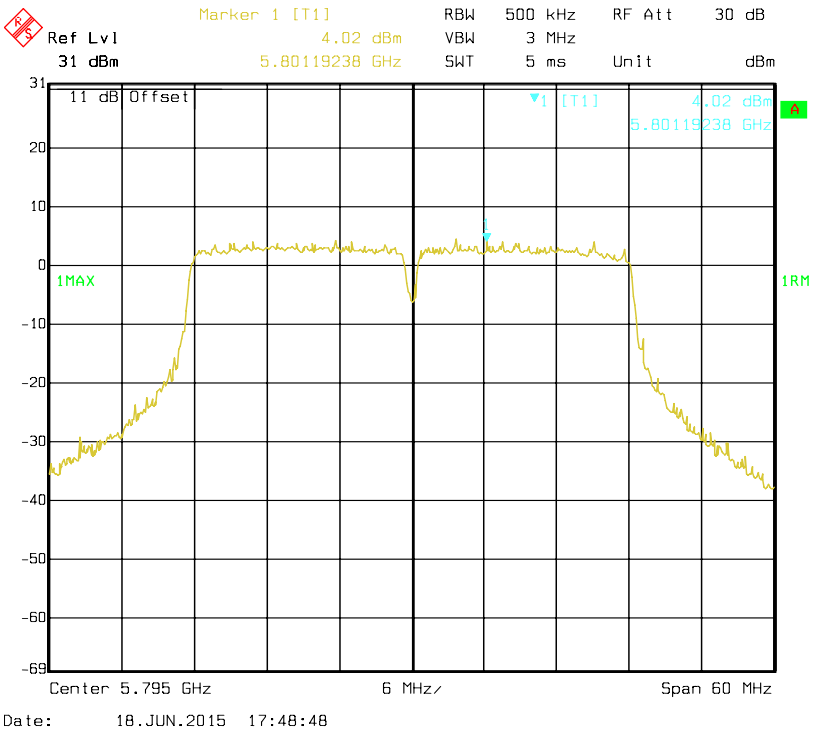
802.11n HT20 mode, Antenna 2: Power Spectral Density-5825 MHz



802.11n HT40 mode, Antenna 2: Power Spectral Density-5755 MHz



802.11n HT40 mode, Antenna 2: Power Spectral Density-5795 MHz



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