FCC PART 15 SUBPART E TEST REPORT

For

High Power AC1200 Plug-In Wi-Fi Range Extender

Model No.: REC22A

of

Applicant: **Amped Wireless**
Address: **13089 Peyton Dr. #C307 Chino Hills California 91709 United States**

Tested and Prepared

by

Worldwide Testing Services (Taiwan) Co., Ltd.

FCC Registration No.: 930600

Industry Canada filed test laboratory Reg. No. IC 5679A-1

A2LA Accredited No.: 2732.01

Report No.: W6M21501-14799-C-54

6F, NO. 58, LANE 188, RUEY-KUANG RD., NEIHU TAIPEI 114, TAIWAN, R.O.C.
TEL: 886-2-66068877 FAX: 886-2-66068879 E-mail: wts@wts-lab.com

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Registration number: W6M21501-14799-C-54
FCC ID: ZTT-REC22A

1 General Information

1.1 Notes

The purpose of conformity testing is to increase the probability of adherence to the essential requirements or conformity specifications, as appropriate.
The complexity of the technical specifications, however, means that full and thorough testing is impractical for both technical and economic reasons.
Furthermore, there is no guarantee that a test sample which has passed all the relevant tests conforms to a specification.
Neither is there any guarantee that such a test sample will interwork with other genuinely open systems.
The existence of the tests nevertheless provides the confidence that the test sample possesses the qualities as maintained and that is performance generally conforms to representative cases of communications equipment.

The test results of this test report relate exclusively to the item tested as specified in 1.5.
The test report may only be reproduced or published in full.
Reproduction or publication of extracts from the report requires the prior written approval of the Worldwide Testing Services(Taiwan) Co., Ltd.

Specific Conditions:
Usage of the hereunder tested device in combination with other integrated or external antennas requires at least additional output power measurements, spurious emission measurements, conducted emission measurements (AC supply lines) and radio frequency exposure evaluations for each individual configuration performed, for certification by FCC.

Tester:

March 25, 2015		Mark Cheng	Mark Cheng.
Date	WTS-Lab.	Name	Signature

Technical responsibility for area of testing:

March 25, 2015		Kevin Wang	Kevin Wang
Date	WTS	Name	Signature

Registration number: W6M21501-14799-C-54
FCC ID: ZTT-REC22A

1.2 Testing laboratory

1.2.1 Location

OATS
No.5-1, Lishui, Shuang Sing Village,
Wanli Dist., New Taipei City 207,
Taiwan (R.O.C.)
3 meter semi-anechoic chamber
No.35, Aly. 21, Ln. 228, Ankang Rd., Neihu Dist., Taipei City 114, Taiwan (R.O.C.)
TEL:886-2-6613-0228
FAX:886-2-2791-5046

Company
Worldwide Testing Services(Taiwan) Co., Ltd.
6F, NO. 58, LANE 188, RUEY-KUANG RD.
NEIHU, TAIPEI 114, TAIWAN R.O.C.
Tel : 886-2-66068877
Fax : 886-2-66068879

1.2.2 Details of accreditation status

Accredited testing laboratory
A2LA accredited number: 2732.01
FCC filed test laboratory Reg. No. 930600
Industry Canada filed test laboratory Reg. No. IC 5679A-1, IC 5107A-1

Test location, where different from Worldwide Testing Services (Taiwan) Co., Ltd. :

Name:	./.
Accredited number:	./.
Street:	./.
Town:	./.
Country:	./.
Telephone:	./.
Fax:	./.

1.3 Details of approval holder

Name:	Amped Wireless
Street:	13089 Peyton Dr. #C307
Town:	Chino Hills,California 91709
Country:	United State
Telephone:	(909) 217-3227
Fax:	(909) 580-8883

1.4 Application details

Date of receipt of test item:	February 03, 2015
Date of test:	from February 04, 2015 to March 25, 2015

1.5 General information of Test item

Type of test item:	High Power AC1200 Plug-In Wi-Fi Range Extender
Model Number:	REC22A
Brand Name:	Amped Wireless
Multi-listing model number:	./.
Photos:	see Appendix

Technical data

Frequency band:	Band 1: 5.150 GHz-5.250 GHz, Band 4: 5.725 GHz-5.850 GHz
Band 1	
802.11a:	Low Channel (CH36): 5180 MHz Middle Channel (CH40): 5200 MHz High Channel (CH48): 5240 MHz
802.11n 20MHz:	Low Channel (CH36): 5180 MHz Middle Channel (CH40): 5200 MHz High Channel (CH48): 5240 MHz
802.11n 40MHz:	Low Channel (CH38): 5190 MHz High Channel (CH46): 5230 MHz
802.11ac	CH42: 5210 MHz
Band 4	
802.11a:	Low Channel (CH149): 5745 MHz Middle Channel (CH157): 5785 MHz High Channel (CH165): 5825 MHz
802.11n 20MHz:	Low Channel (CH149): 5745 MHz Middle Channel (CH157): 5785 MHz High Channel (CH165): 5825 MHz
802.11n 40MHz:	Low Channel (CH151): 5755 MHz High Channel (CH159): 5795 MHz
802.11ac	CH155: 5775 MHz

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Band 1

Numbers of channel:	802.11a: 4 channels 802.11n 20 MHz: 4 channels 802.11n 40 MHz: 2 channels 802.11ac : 1 channel

Band 4

Numbers of channel:	802.11a: 5 channels 802.11n 20 MHz: 5 channels 802.11n 40 MHz: 2 channels 802.11ac : 1 channel

Operating modes:	Duplex
Type of modulation:	OFDM
Fixed point to point operation:	Yes / No
Antenna:	ANT1: Embedded Antenna / ANT2: Omni Antenna
Antenna gain:	ANT1: 4.13 dBi / ANT2: 3.49 dBi
Directional gain:	6.83 dBi

* According to KDB 662911, Unequal antenna gains, with equal transmit powers. For antenna gains given by G_1, G_2, …, G_N dBi. If transmit signals are correlated, then Directional gain $=10\log[(10^{G1/20}+10^{G2/20}+\ldots+10^{GN/20})^2/N]$ dBi [Note the "20"s in the denominator of each exponent and the square of the sum of terms; the object is to combine the signal levels coherently.]

Power supply:	I/P: 100-240 V~0.5 A, 50/60 Hz

Band 1

Emission designator:	802.11a: 17M1D1D 802.11n 20 MHz: 18M2D1D 802.11n 40 MHz: 36M9D1D 802.11ac: 76M6D4D

Band 4

Emission designator:	802.11a: 18M6D1D 802.11n 20 MHz: 19M2D1D 802.11n 40 MHz: 38M4D1D 802.11ac: 80M0D4D

Note: Tests were performed under worst case mode 802.11a 6 Mbps, 802.11n 20MHz(MCS0), 802.11n 40MHz(MCS0) and 802.11ac 80MHz(6Mbps).

Registration number: W6M21501-14799-C-54
FCC ID: ZTT-REC22A

Classification:

Fixed Device	☒
Mobile Device (Human Body distance ＞ 20cm)	☐
Portable Device (Human Body distance ＜ 20cm)	☐

Manufacturer: (if applicable)

Name:	EDIMAX TECHNOLOGY CO., LTD.
Street:	No.3, Wu-Chuan 3rd Road, Wu-Ku Industrial Park,
Town:	New Taipei City,
Country:	Taiwan

Transmitter **Unom**

Band 1

ANT1

Mode A (OFDM)

Power (ch 36 or A): Conducted: 24.97 dBm
Power (ch 40 or B): Conducted: 24.37 dBm
Power (ch 48 or C): Conducted: 20.00 dBm

Mode B (OFDM)

Power (ch 36 or A): Conducted: 22.04 dBm
Power (ch 40 or B): Conducted: 21.20 dBm
Power (ch 48 or C): Conducted: 21.06 dBm

Mode C (OFDM)

Power (ch 38 or A): Conducted: 20.55 dBm
Power (ch 46 or B): Conducted: 18.32 dBm

Mode D (OFDM)

Power (ch 42 or A): Conducted: 18.52 dBm

ANT2

Mode A (OFDM)

Power (ch 36 or A): Conducted: 22.67 dBm
Power (ch 40 or B): Conducted: 22.28 dBm
Power (ch 48 or C): Conducted: 22.79 dBm

Mode B (OFDM)

Power (ch 36 or A): Conducted: 19.42 dBm
Power (ch 40 or B): Conducted: 19.67 dBm
Power (ch 48 or C): Conducted: 19.14 dBm

Mode C (OFDM)

Power (ch 38 or A): Conducted: 21.08 dBm
Power (ch 46 or B): Conducted: 21.10 dBm

Mode D (OFDM)

Power (ch 42 or A): Conducted: 17.26 dBm

Band 4

ANT1

Mode A (OFDM)

Power (ch 149 or A): Conducted: 19.58 dBm
Power (ch 157 or B): Conducted: 20.15 dBm
Power (ch 165 or C): Conducted: 21.33 dBm

Mode B (OFDM)

Power (ch 149 or A): Conducted: 19.08 dBm
Power (ch 157 or B): Conducted: 19.83 dBm
Power (ch 165 or C): Conducted: 19.83 dBm

Mode C (OFDM)

Power (ch 151 or A): Conducted: 21.23 dBm
Power (ch 159 or B): Conducted: 22.03 dBm

Mode D (OFDM)

Power (ch 155 or A): Conducted: 20.98 dBm

ANT2

Mode A (OFDM)

Power (ch 149 or A): Conducted: 17.89 dBm
Power (ch 157 or B): Conducted: 17.51 dBm
Power (ch 165 or C): Conducted: 18.92 dBm

Mode B (OFDM)

Power (ch 149 or A): Conducted: 17.46 dBm
Power (ch 157 or B): Conducted: 17.56 dBm
Power (ch 165 or C): Conducted: 17.84 dBm

Mode C (OFDM)

Power (ch 151 or A): Conducted: 19.45 dBm
Power (ch 159 or B): Conducted: 19.72 dBm

Mode D (OFDM)

Power (ch 155 or A): Conducted: 19.43 dBm

Band 1

Combine	mW			dBm		
	Ch Low	Ch Mid	Ch High	Ch Low	Ch Mid	Ch High
802.11n 20MHz	247.46	224.51	209.68	23.94	23.51	23.22
802.11n 40MHz	241.73	- -	196.74	23.83	- -	22.94
802.11ac	124.33	- -	- -	20.95	- -	- -

Band 4

Combine	mW			dBm		
	Ch Low	Ch Mid	Ch High	Ch Low	Ch Mid	Ch High
802.11n 20MHz	136.63	153.18	156.97	21.36	21.85	21.96
802.11n 40MHz	220.84	- -	253.35	23.44	- -	24.04
802.11ac	213.01	- -	- -	23.28	- -	- -

1.6 Test standards

Technical standard : 47 CFR FCC Part 15 Subpart E § 15.407

2 Technical test

2.1 Summary of test results

No deviations from the technical specification(s) were ascertained in the course of the tests performed. ☒

or

The deviations as specified in 3 were ascertained in the course of the tests performed. ☐

2.2 Test environment

Temperature:	23 °C
Relative humidity content:	20 ... 75 %
Air pressure:	86 ... 103 kPa
Details of power supply:	I/P: 100-240 V~0.5 A, 50/60 Hz

2.3 Test Equipment List

No.	Test equipment	Type	Serial No.	Manufacturer	Cal. Date	Next Cal. Date
ETSTW-CE 001	EMI TEST RECEIVER	ESHS10	842121/013	R&S	2014/9/2	2015/9/1
ETSTW-CE 003	AC POWER SOURCE	APS-9102	D161137	GW	Function Test	
ETSTW-CE 008	HF-EICHLEITUNG RF STEP ATTENUATOR 139dB DPSP	334.6010.02	844581/024	R&S	Function Test	
ETSTW-CE 009	TEMP.&HUMIDITY CHAMBER	GTH-225-40-1P-U	MAA0305-009	GIANT FORCE	2014/7/8	2015/7/7
ETSTW-CE 016	TWO-LINE V-NETWORK	ENV216	100050	R&S	2014/10/13	2015/10/12
ETSTW-RE 004	EMI TEST RECEIVER	ESI 40	832427/004	R&S	2014/9/2	2015/9/1
ETSTW-RE 005	EMI TEST RECEIVER	ESVS10	843207/020	R&S	2014/9/2	2015/9/1
ETSTW-RE 012	TUNABLE BANDREJECT FILTER	D.C 0309	146	K&L	Function Test	
ETSTW-RE 013	TUNABLE BANDREJECT FILTER	D.C 0336	397	K&L	Function Test	
ETSTW-RE 018	MICROWAVE HORN ANTENNA	AT4560	27212	AR	2014/10/15	2015/10/14
ETSTW-RE 027	Passive Loop Antenna	6512	00034563	ETS-Lindgren	2014/7/01	2015/6/30
ETSTW-RE 030	Double-Ridged Guide Horn Antenna	3117	00035224	ETS-Lindgren	2015/3/2	2016/3/1
ETSTW-RE 045	ESA-E SERIES SPECTRUM ANALYZER	E4404B	MY45111242	Agilent	Pre-test Use	
ETSTW-RE 049	TRILOG Super Broadband test Antenna	VULB 9160	9160-3185	Schwarzbeck	2015/2/17	2016/2/16
ETSTW-RE 050	Attenuator 10dB	50HF-010-1	None	JFW	2015/3/2	2016/3/1
ETSTW-RE 051	Attenuator 6dB	50HF-006-1	None	JFW	2015/3/2	2016/3/1
ETSTW-RE 053	Attenuator 3dB	50HF-003-1	None	JFW	2015/3/2	2016/3/1
ETSTW-RE 055	SPECTRUM ANALYZER	FSU 26	200074	R&S	2014/6/05	2015/6/04
ETSTW-RE 060	Attenuator 30dB	5015-30	F651012z-01	ATM	2015/3/2	2016/3/1
ETSTW-RE 062	Amplifier Module	CHC 2	None	KMIC	2014/11/26	2015/11/25
ETSTW-RE 064	Bluetooth Test Set	MT8852B-042	6K00005709	Anritsu	Function Test	
ETSTW-RE 069	Double-Ridged Guide Horn Antenna	3117	00069377	ETS-Lindgren	Function Test	
ETSTW-RE 072	CELL SITE TEST SET	8921A	3339A00375	HP	2014/10/9	2015/10/8
ETSTW-RE 088	SOLID STATE AMPLIFIER	KMA180265A01	99057	KMIC	2014/9/22	2015/9/21
ETSTW-RE 099	DC Block	50DB-007-1	None	JFW	2015/3/2	2016/3/1
ETSTW-RE 106	Humidity Temperature Meter	TES-1366	091011113	TES	2014/11/7	2015/11/6
ETSTW-RE 111	TRILOG Super Broadband test Antenna	VULB 9160	9160-3309	Schwarz beck	2014/12/5	2015/12/4
ETSTW-RE 112	AC POWER SOURCE	TFC-1005	None	T-Power	Function test	
ETSTW-RE 115	2.4GHz Notch Filter	N0124411	473874	MICROWAVE CIRCUITS	2015/1/7	2016/1/6
ETSTW-RE 120	RF Player	MP9200	MP9210-111022	ADIVIC	Function test	
ETSTW-RE 122	SIGNAL GENERATOR	SMF100A	102149	R&S	2014/6/11	2015/6/10
ETSTW-RE 125	5GHz Notch filter	5NSL11-5200/E221.3-O/O	1	K&L Microwave	2014/8/12	2015/8/11

ETSTW-RE 126	5GHz Notch filter	5NSL11-5800/E221.3-O/O	1	K&L Microwave	2014/8/12	2015/8/11
ETSTW-RE 127	RF Switch Box	RFS-01	None	WTS	2015/3/2	2016/3/1
ETSTW-RE 128	5.3GHz Notch filter	N0153001	SN487233	Microwave Circits	2014/8/12	2015/8/11
ETSTW-RE 129	5.5GHz Notch filter	N0555984	SN487234	Microwave Circits	2014/8/12	2015/8/11
ETSTW-RE 130	Handheld RF Spectrum Analyzer	N9340A	CN0147000204	Agilent	Pre-test Use	
ETSTW-GSM 002	Universal Radio Communication Tester	CMU 200	109439	R&S	2014/10/20	2015/10/19
ETSTW-GSM 019	Band Reject Filter	WRCTF824/849-822/851-40 /12+9SS	3	WI	2015/1/7	2016/1/6
ETSTW-GSM 020	Band Reject Filter	WRCD1747/1748-1743/1752-32/5SS	1	WI	2015/1/7	2016/1/6
ETSTW-GSM 021	Band Reject Filter	WRCD1879.5/1880.5-1875.5/1884.5-32/5SS	3	WI	2015/1/7	2016/1/6
ETSTW-GSM 022	Band Reject Filter	WRCT901.9/903.1-904.25-50/8SS	1	WI	2015/1/7	2016/1/6
ETSTW-GSM 023	Power Divider	4901.19.A	None	SUHNER	2014/9/17	2015/9/16
ETSTW-Cable 010	BNC Cable	5 M BNC Cable	None	JYE BAO CO.,LTD.	2014/10/15	2015/10/14
ETSTW-Cable 011	BNC Cable	BNC Cable 1	None	JYE BAO CO.,LTD.	Pre-test Use NCR	
ETSTW-Cable 012	N TYPE To SMA Cable	Cable 012	None	JYE BAO CO.,LTD.	2014/10/15	2015/10/14
ETSTW-Cable 016	BNC Cable	Switch Box	B Cable 1	Schwarz beck	2015/2/25	2016/2/24
ETSTW-Cable 017	BNC Cable	X Cable	B Cable 2	Schwarz beck	2015/2/25	2016/2/24
ETSTW-Cable 018	BNC Cable	Y Cable	B Cable 3	Schwarz beck	2015/2/25	2016/2/24
ETSTW-Cable 019	BNC Cable	Z Cable	B Cable 4	Schwarz beck	2015/2/25	2016/2/24
ETSTW-Cable 022	N TYPE Cable	5006	0002	JYE BAO CO.,LTD.	2015/2/17	2016/2/16
ETSTW-Cable 026	Microwave Cable	SUCOFLEX 104	279075	HUBER+SUHNER	2015/3/2	2016/3/1
ETSTW-Cable 027	Microwave Cable	SUCOFLEX 104	279083	HUBER+SUHNER	2015/3/2	2016/3/1
ETSTW-Cable 028	Microwave Cable	FA147A0015M2020	30064-2	UTIFLEX	2015/1/16	2016/1/15
ETSTW-Cable 029	Microwave Cable	FA147A0015M2020	30064-3	UTIFLEX	2014/9/22	2015/9/21
ETSTW-Cable 030	Microwave Cable	SUCOFLEX 104（S_Cable 9）	279067	HUBER+SUHNER	2015/3/2	2016/3/1
ETSTW-Cable 031	Microwave Cable	SUCOFLEX 104（S_Cable 10）	238092	HUBER+SUHNER	2014/11/26	2015/11/25
ETSTW-Cable 043	Microwave Cable	SUCOFLEX 104	317576	HUBER+SUHNER	2014/11/26	2015/11/25
ETSTW-Cable 048	Microwave Cable	SUCOFLEX 104	325518	HUBER+SUHNER	2014/11/26	2015/11/25
ETSTW-Cable 053	N TYPE To SMA Cable	RG142	None	JYE BAO CO.,LTD.	2015/2/17	2016/2/16
ETSTW-Cable 058	Microwave Cable	SUCOFLEX 104	none	HUBER+SUHNER	2015/2/17	2016/2/16
WTSTW-SW 002	EMI TEST SOFTWARE	EZ_EMC	None	Farad	Version ETS-03A1	

2.4 Test Procedure

The test procedures are performed following the test stands ANSI STANDARD C63.4 and FCC 789033 D02 General UNII Test Procedures New Rules v01.

■ Minimum Emission Bandwidth for the band 5.150-5.250 GHz, 5.725-5.850 GHz

Section 15.407(e) specifies the minimum 6 dB emission bandwidth of at least 500 KHz for the band 5.715-5.85 GHz. The following procedure shall be used for measuring this bandwidth:

a) Set RBW = 100 kHz.
b) Set the video bandwidth (VBW) ≥ 3 × RBW.
c) Detector = Peak.
d) Trace mode = max hold.
e) Sweep = auto couple.
f) Allow the trace to stabilize.
g) 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.

Note: The automatic bandwidth measurement capability of a spectrum analyzer or EMI receiver may be employed if it implements the functionality described above.

■ 99 Percent Occupied Bandwidth

The 99-percent occupied bandwidth is the frequency bandwidth such that, below its lower and above its upper frequency limits, the mean powers are each equal to 0.5 % of the total mean power of the given emission. Measurement of the 99-percent occupied bandwidth is required only as a condition for using the optional band-edge measurement techniques described in section H)3)d). Measurements of 99-percent occupied bandwidth may also optionally be used in lieu of the 6-dB emission bandwidth to define the minimum frequency range over which the spectrum is integrated when measuring maximum conducted output power as described in section E). However, the 6-dB bandwidth must be measured to determine bandwidth dependent limits on maximum conducted output power in accordance with 15.407(a).

The following procedure shall be used for measuring (99 %) power bandwidth.

1. Set center frequency to the nominal EUT channel center frequency.
2. Set span = 1.5 times to 5.0 times the OBW.
3. Set RBW = 1 % to 5 % of the OBW
4. Set VBW ≥ 3 · RBW
5. Video averaging is not permitted. Where practical, a sample detection and single sweep mode shall be used. Otherwise, peak detection and max hold mode (until the trace stabilizes) shall be used.
6. Use the 99 % power bandwidth function of the instrument (if available).
7. If the instrument does not have a 99 % power bandwidth function, the trace data points are recovered and directly summed in power units. The recovered amplitude data points, beginning at the lowest frequency, are placed in a running sum until 0.5 % of the total is reached; that frequency is recorded as the lower frequency. The process is repeated until 99.5 % of the total is reached; that frequency is recorded as the upper frequency. The 99% occupied bandwidth is the difference between these two frequencies.

■ Maximum conducted output power

(i) Set span to encompass the entire emission bandwidth (EBW) (or, alternatively, the entire 99% occupied bandwidth) of the signal.
(ii) Set RBW = 1 MHz.
(iii) Set VBW ≥ 3 MHz.
(iv) Number of points in sweep ≥ 2 Span / RBW. (This ensures that bin-to-bin spacing is ≤ RBW/2, so that narrowband signals are not lost between frequency bins.)
(v) Sweep time = auto.
(vi) Detector = RMS (i.e., power averaging), if available. Otherwise, use sample detector mode.
(vii) If transmit duty cycle < 98 percent, use a video trigger with the trigger level set to enable triggering only on full power pulses. Transmitter must operate at maximum power control level for the entire duration of every sweep. If the EUT transmits continuously (i.e., with no off intervals) or at duty cycle ≥ 98 percent, and if each transmission is entirely at the maximum power control level, then the trigger shall be set to "free run".
(viii) Trace average at least 100 traces in power averaging (i.e., RMS) mode.
(ix) Compute power by integrating the spectrum across the EBW (or, alternatively, the entire 99% occupied bandwidth) of the signal using the instrument's band power measurement function with band limits set equal to the EBW (or occupied bandwidth) band edges. If the instrument does not have a band power function, sum the spectrum levels (in power units) at 1 MHz intervals extending across the EBW (or, alternatively, the entire 99% occupied bandwidth) of the spectrum.

■ Power Density

The rules requires "maximum power spectral density" measurements where the intent is to measure the maximum value of the time average of the power spectral density measured during a period of continuous transmission.

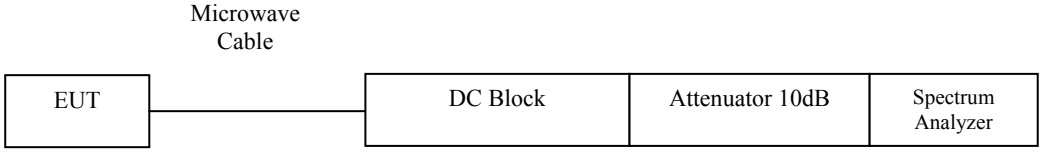
1. Create an average power spectrum for the EUT operating mode being tested by following the instructions in section II.E.2. for measuring maximum conducted output power using a spectrum analyzer or EMI receiver: select the appropriate test method (SA-1, SA-2, SA-3, or alternatives to each) and apply it up to, but not including, the step labeled, "Compute power…". (This procedure is required even if the maximum conducted output power measurement was performed using a power meter, method PM.)
2. Use the peak search function on the instrument to find the peak of the spectrum and record its value.
3. Make the following adjustments to the peak value of the spectrum, if applicable:
   a) If Method SA-2 or SA-2 Alternative was used, add 10 log(1/x), where x is the duty cycle, to the peak of the spectrum.
   b) If Method SA-3 Alternative was used and the linear mode was used in step II.E.2.g)(viii), add 1 dB to the final result to compensate for the difference between linear averaging and power averaging.
4. The result is the Maximum PSD over 1 MHz reference bandwidth.
5. For devices operating in the bands 5.15-5.25 GHz, 5.25-5.35 GHz, and 5.47-5.725 GHz, the above procedures make use of 1 MHz RBW to satisfy directly the 1 MHz reference bandwidth specified in § 15.407(a)(5). For devices operating in the band 5.725-5.85 GHz, the rules specify a measurement bandwidth of 500 kHz. Many spectrum analyzers do not have 500 kHz RBW, thus

a narrower RBW may need to be used. The rules permit the use of a RBWs less than 1 MHz, or 500 kHz, “provided that the measured power is integrated over the full reference bandwidth” to show the total power over the specified measurement bandwidth (i.e., 1 MHz, or 500 kHz). If measurements are performed using a reduced resolution bandwidth (< 1 MHz, or < 500 kHz) and integrated over 1 MHz, or 500 KHz bandwidth, the following adjustments to the procedures apply:

a) Set RBW ≥ 1/T, where T is defined in section II.B.l.a).
b) Set VBW ≥ 3 RBW.
c) If measurement bandwidth of Maximum PSD is specified in 500 kHz, add 10log(500kHz/RBW) to the measured result, whereas RBW (< 500 KHz) is the reduced resolution bandwidth of the spectrum analyzer set during measurement.
d) If measurement bandwidth of Maximum PSD is specified in 1 MHz, add 10log(1MHz/RBW) to the measured result, whereas RBW (< 1 MHz) is the reduced resolution bandwidth of spectrum analyzer set during measurement.
e) Care must be taken to ensure that the measurements are performed during a period of continuous transmission or are corrected upward for duty cycle.

Note: As a practical matter, it is recommended to use reduced RBW of 100 KHz for the sections 5.c) and 5.d) above, since RBW=100 KHZ is available on nearly all spectrum analyzers.

Conducted measurement test setup



3 Test results (enclosure)

Test case	Para. Number	Required	Test passed	Test failed
Peak Transmit Power	15.407(a)	☒	☒	☐
6-dB emission bandwidth	15.407(a)	☒	☒	☐
26-dB emission bandwidth	15.407(a)	☒	☒	☐
99 % Occupied Bandwidth	789033 D02 General UNII Test Procedures New Rules v01	☒	☒	☐
Peak Power Spectral Density	15.407(a)	☒	☒	☐
Undesirable emission limits	15.407(b)	☒	☒	☐
Radio Frequency Exposure	15.407(f)	☒	☒	☐
Radiated Emission from Receiver Part	15.109	☐	☐	☐
AC Conducted Emissions	15.207	☒	☒	☐

The following is intentionally left blank.

3.1 Peak Transmit Power, FCC 15.407 (a)

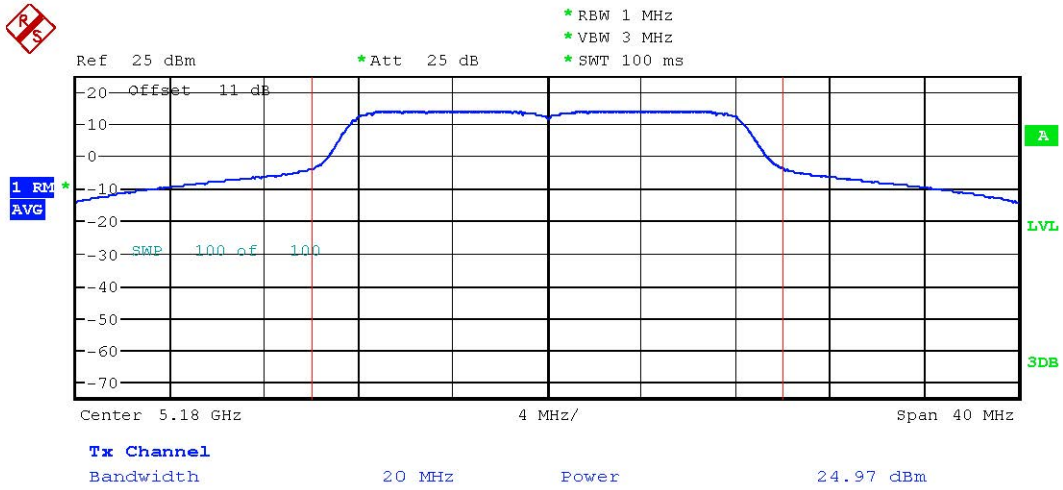
According to §15.407(a)

1. For the band 5.15-5.25 GHz, the maximum conducted power over the frequency of operation shall not exceed the lesser of 30 dBm (1 W) for master device and 24 dBm (250 mW) for mobile/portable client device.

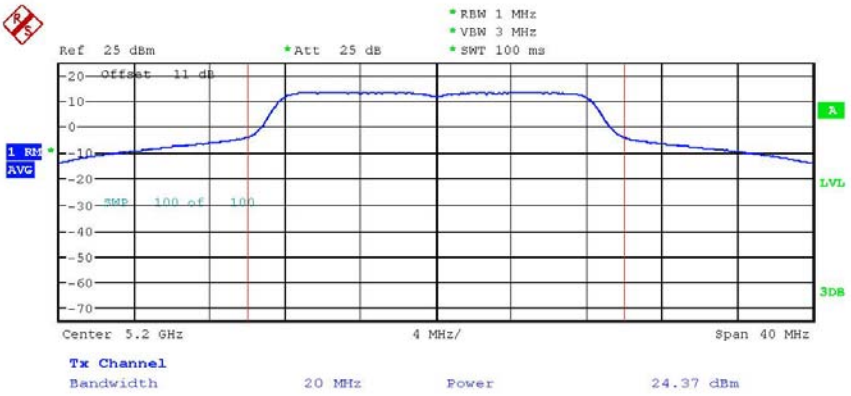
2. For the band 5.25-5.35 GHz and 5.47-5.725 GHz, the maximum conducted power over the frequency of operation shall not exceed the lesser of 24 dBm (250 mW) or 11dBm + 10 log B, whichever is lower (B= 26-dB emission BW).

3. For the band 5.725-5.850 GHz, the maximum conducted power over the frequency of operation shall not exceed the lesser of 30 dBm (1 W).

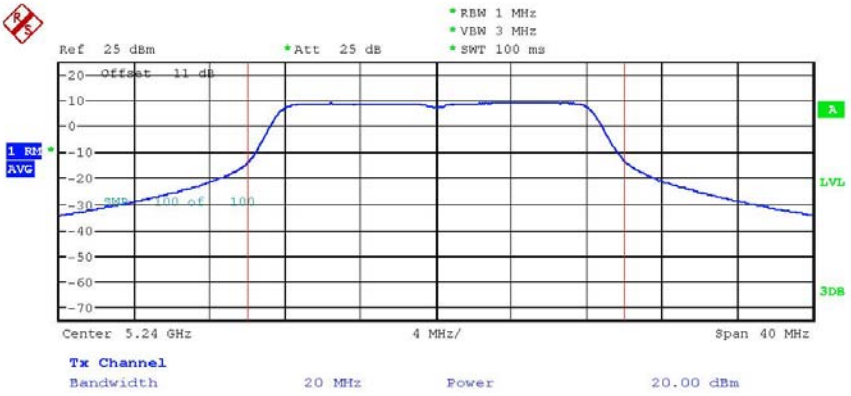
Band 1
ANT1



MAXIMUM CONDUCTED POWER ANT1_11aCH36
Date: 12.MAR.2015 15:31:00

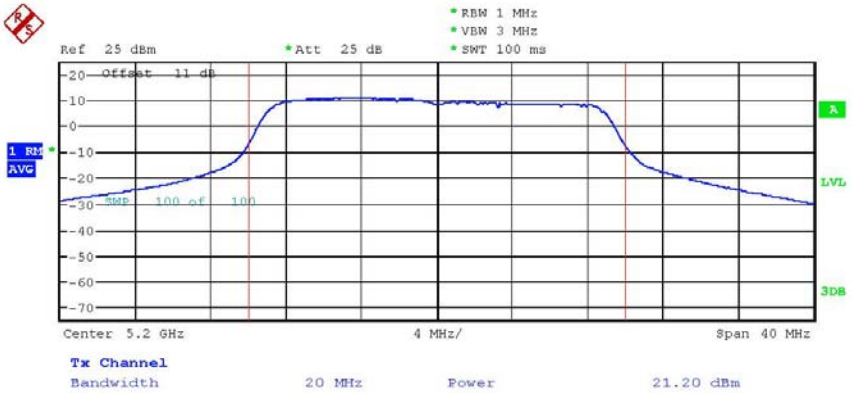


MAXIMUM CONDUCTED POWER ANT1_11aCH40
Date: 12.MAR.2015 15:31:54



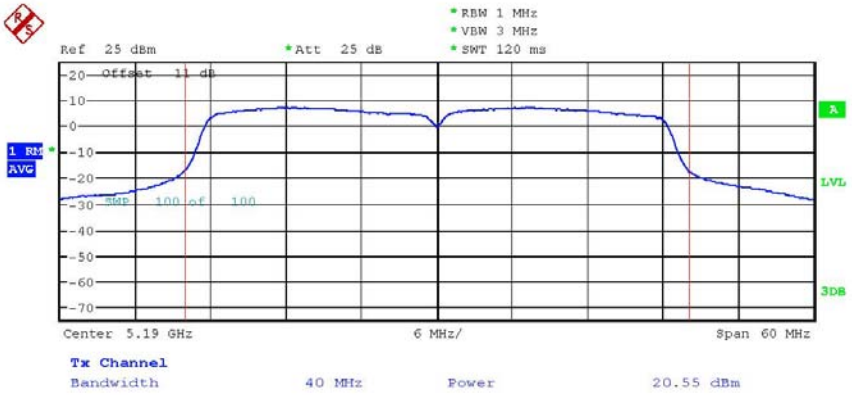
MAXIMUM CONDUCTED POWER ANT1_11aCH48
Date: 12.MAR.2015 15:32:40

MAXIMUM CONDUCTED POWER ANT1_11n20CH36
Date: 12.MAR.2015 15:37:07

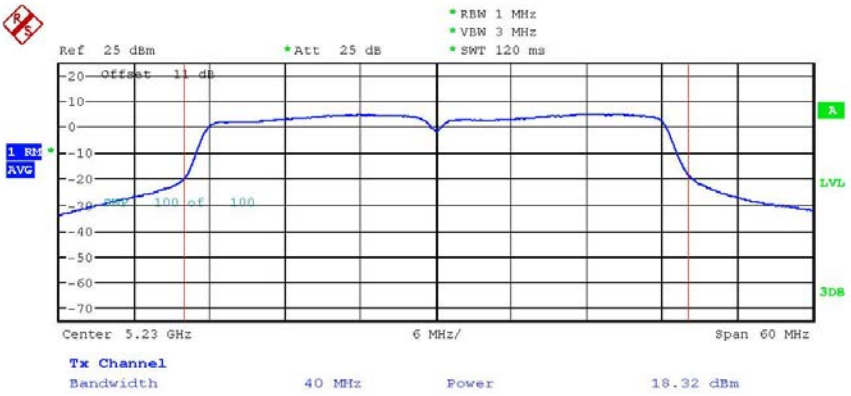


MAXIMUM CONDUCTED POWER ANT1_11n20CH40
Date: 12.MAR.2015 15:38:13

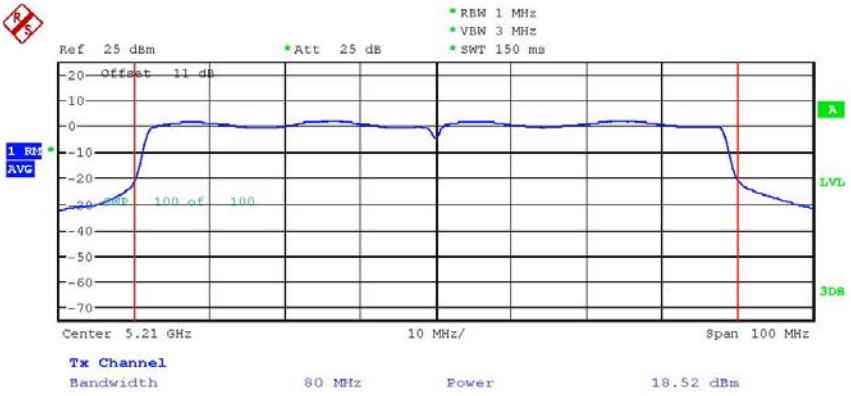
MAXIMUM CONDUCTED POWER ANT1_11n20CH48
Date: 12.MAR.2015 15:40:43



MAXIMUM CONDUCTED POWER ANT1_11n40CH38
Date: 12.MAR.2015 15:45:14



MAXIMUM CONDUCTED POWER ANT1_11n40CH46
Date: 12.MAR.2015 15:46:23

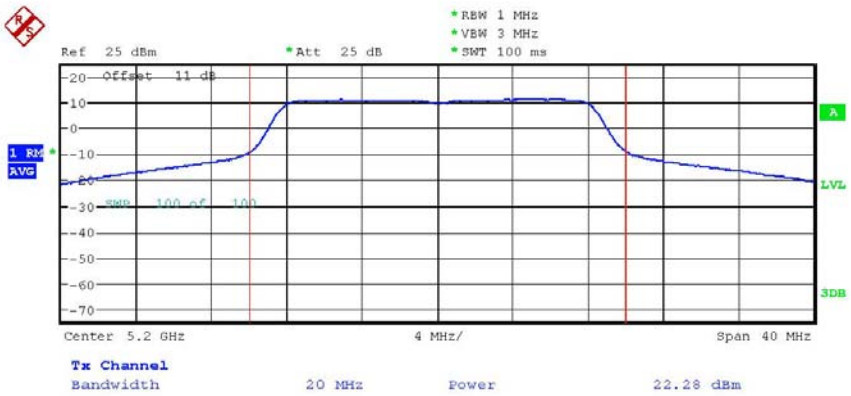


MAXIMUM CONDUCTED POWER ANT1_11ac80CH42
Date: 12.MAR.2015 15:50:36

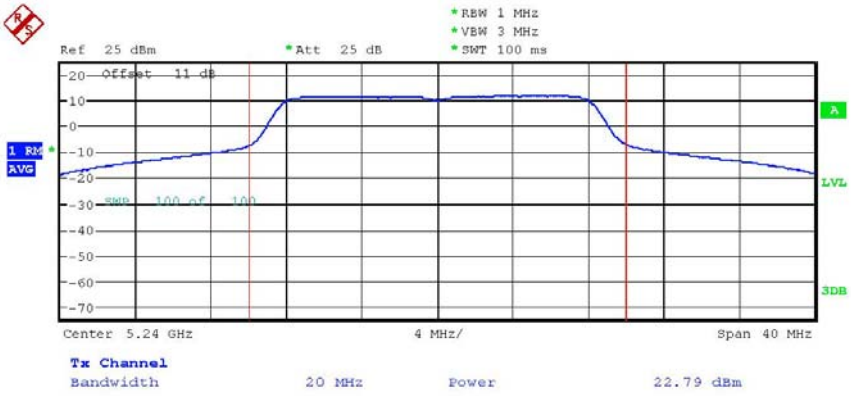
Registration number: W6M21501-14799-C-54
FCC ID: ZTT-REC22A

ANT2

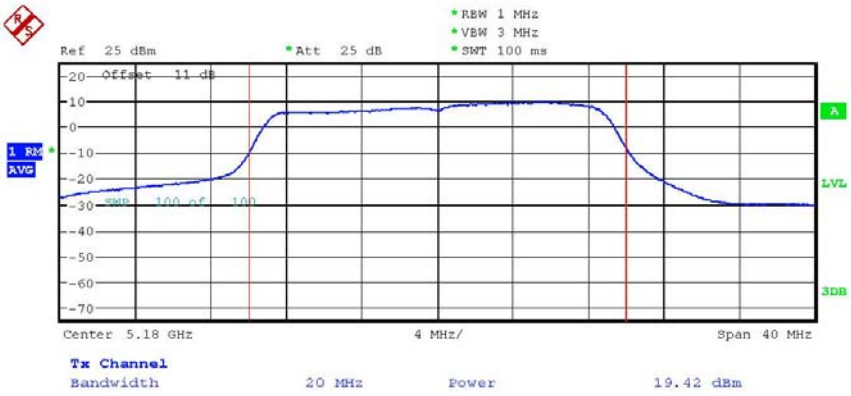
MAXIMUM CONDUCTED POWER ANT2_11aCH36
Date: 12.MAR.2015 13:41:10



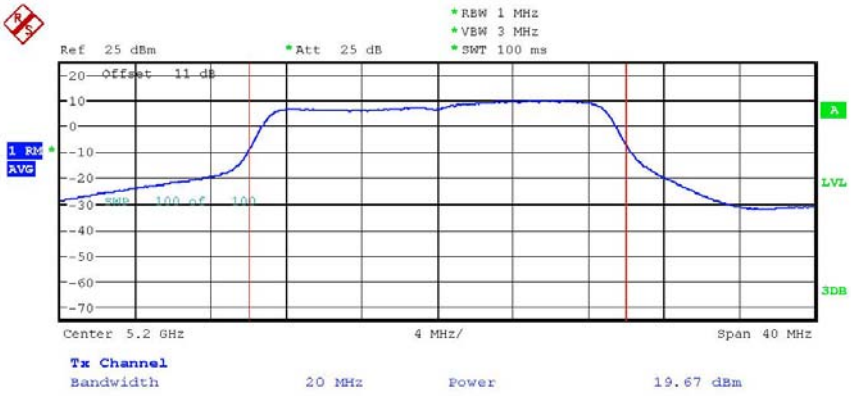
MAXIMUM CONDUCTED POWER ANT2_11aCH40
Date: 12.MAR.2015 13:42:04



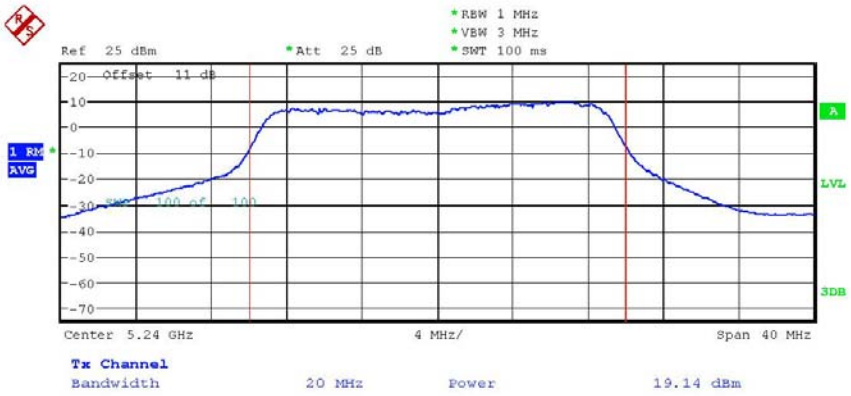
MAXIMUM CONDUCTED POWER ANT2_11aCH48
Date: 12.MAR.2015 13:42:59



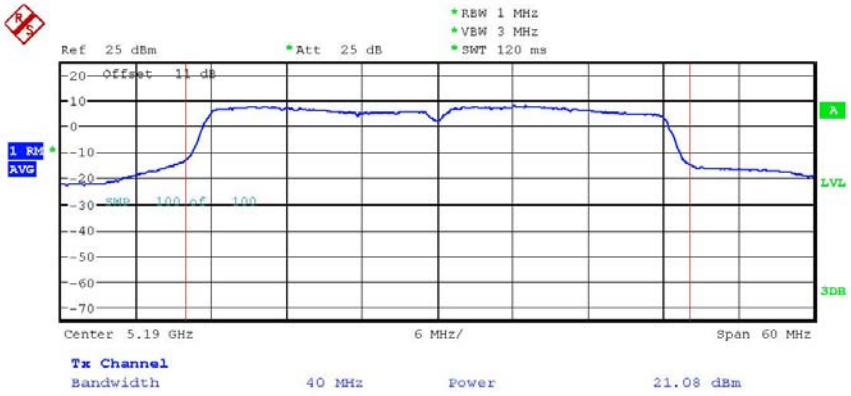
MAXIMUM CONDUCTED POWER ANT2_11n20CH36
Date: 12.MAR.2015 13:48:28



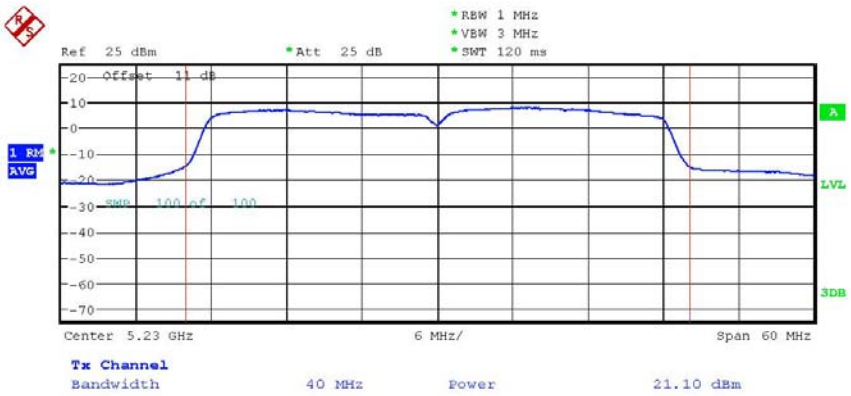
MAXIMUM CONDUCTED POWER ANT2_11n20CH40
Date: 12.MAR.2015 13:49:20



MAXIMUM CONDUCTED POWER ANT2_11n20CH48
Date: 12.MAR.2015 13:52:07

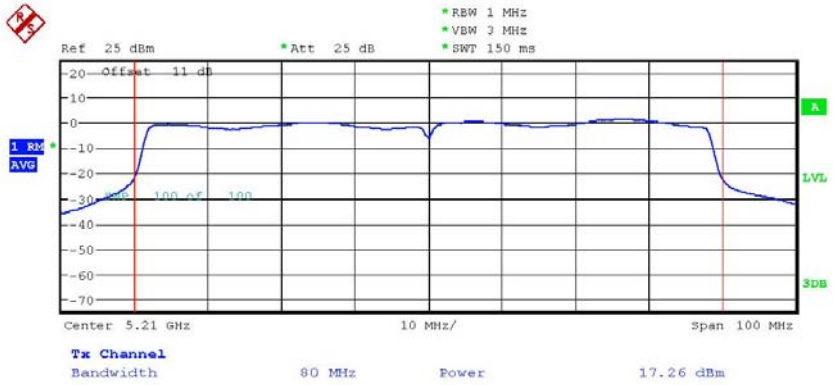


MAXIMUM CONDUCTED POWER ANT2_11n40CH38
Date: 12.MAR.2015 13:58:35



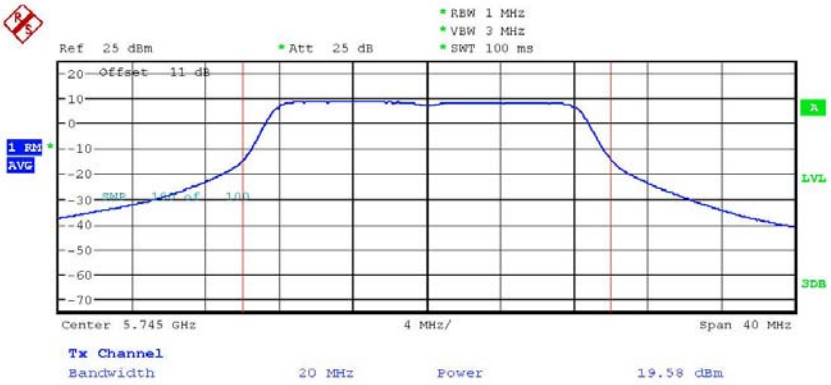
MAXIMUM CONDUCTED POWER ANT2_11n40CH46
Date: 12.MAR.2015 13:59:35

Registration number: W6M21501-14799-C-54
FCC ID: ZTT-REC22A



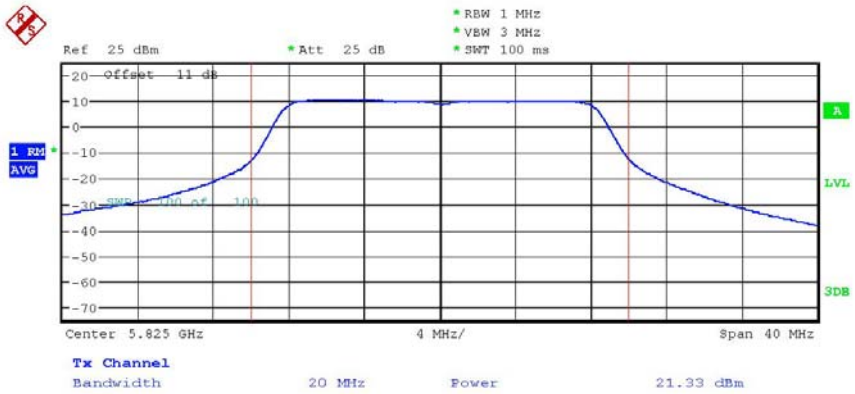
MAXIMUM CONDUCTED POWER ANT2_11ac80CH42
Date: 12.MAR.2015 14:03:55

Band 4
ANT1



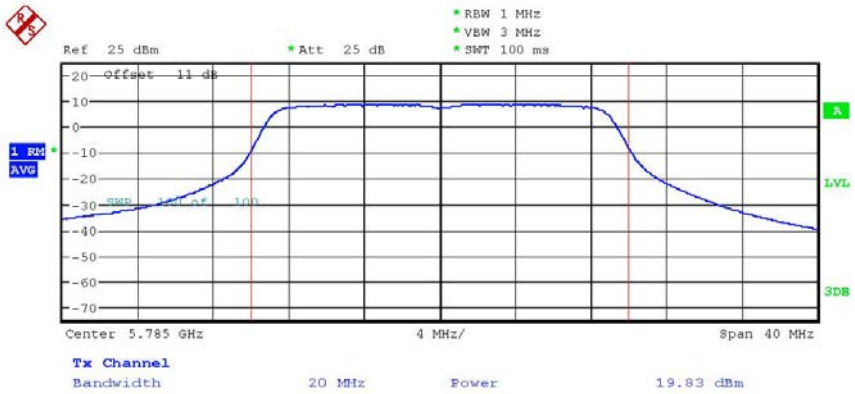
MAXIMUM CONDUCTED POWER ANT1_11aCH149
Date: 20.MAR.2015 16:53:58

MAXIMUM CONDUCTED POWER ANT1_11aCH157
Date: 20.MAR.2015 16:55:55

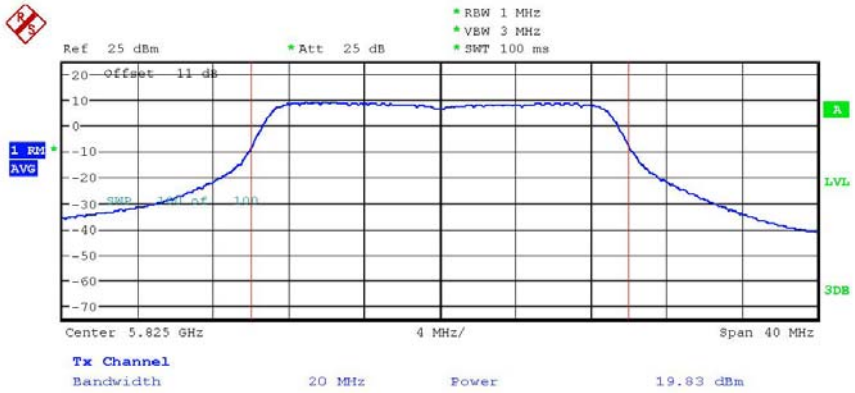


MAXIMUM CONDUCTED POWER ANT1_11aCH165
Date: 20.MAR.2015 16:56:41

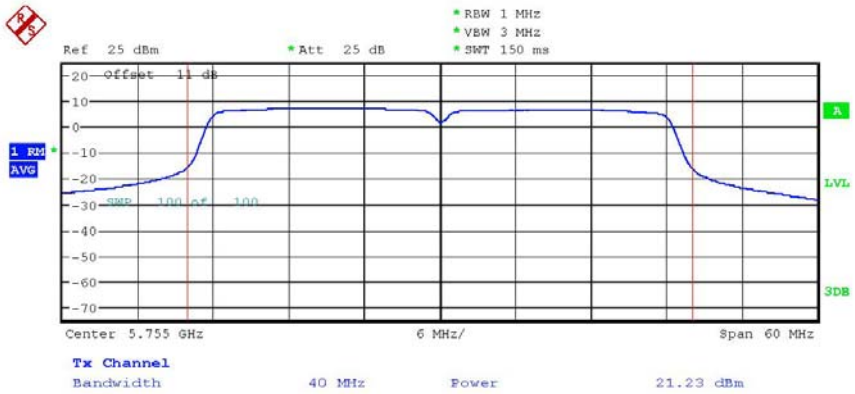
MAXIMUM CONDUCTED POWER ANT1_11n20CH149
Date: 20.MAR.2015 16:45:29



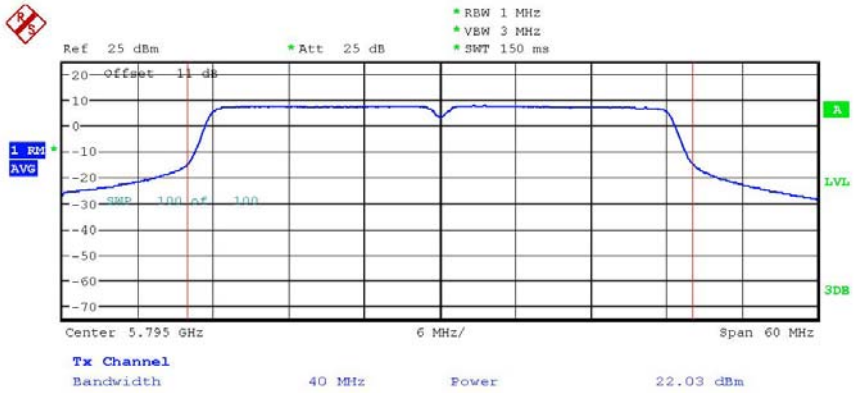
MAXIMUM CONDUCTED POWER ANT1_11n20CH157
Date: 20.MAR.2015 16:49:53



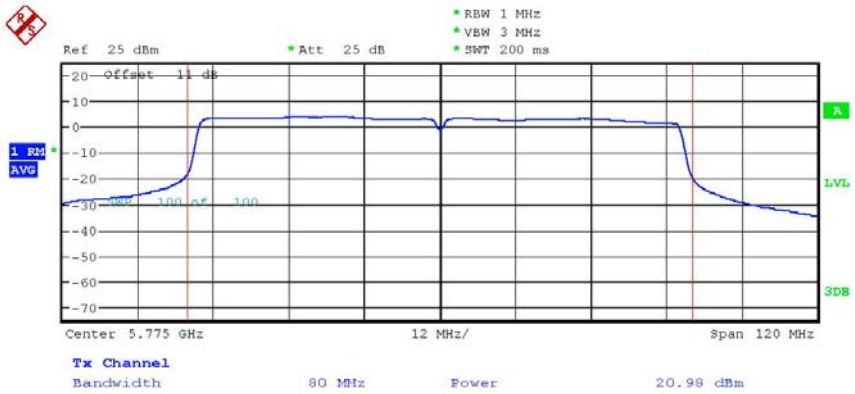
MAXIMUM CONDUCTED POWER ANT1_11n20CH165
Date: 20.MAR.2015 16:51:03



MAXIMUM CONDUCTED POWER ANT1_11n40CH151
Date: 20.MAR.2015 16:41:35



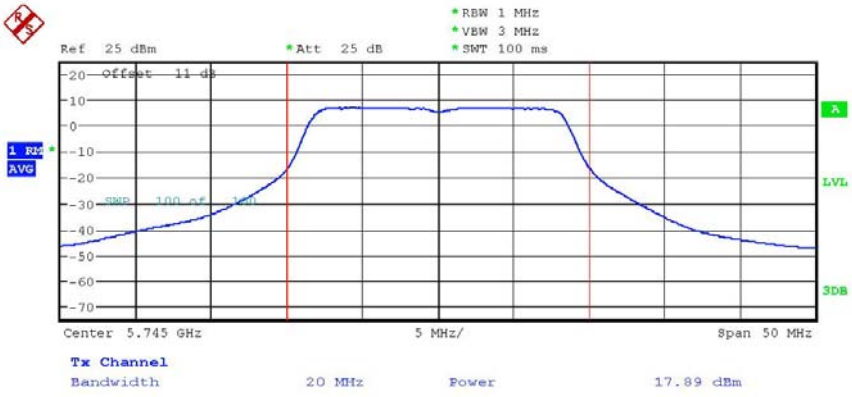
MAXIMUM CONDUCTED POWER ANT1_11n40CH159
Date: 20.MAR.2015 16:42:41



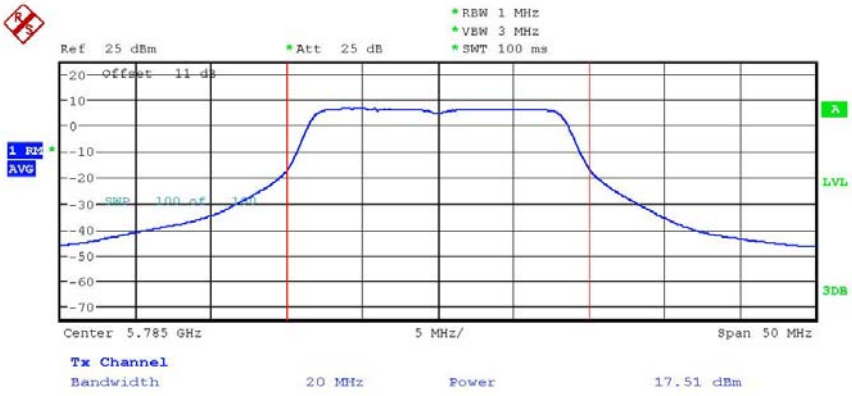
MAXIMUM CONDUCTED POWER ANT1_11ac80CH155
Date: 20.MAR.2015 16:34:28

Registration number: W6M21501-14799-C-54
FCC ID: ZTT-REC22A

ANT2



MAXIMUM CONDUCTED POWER ANT2_11aCH149
Date: 20.MAR.2015 15:08:46

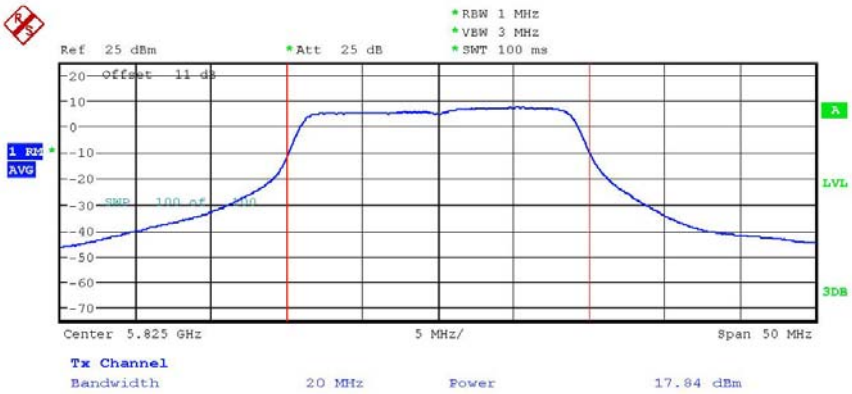


MAXIMUM CONDUCTED POWER ANT2_11aCH157
Date: 20.MAR.2015 15:10:51

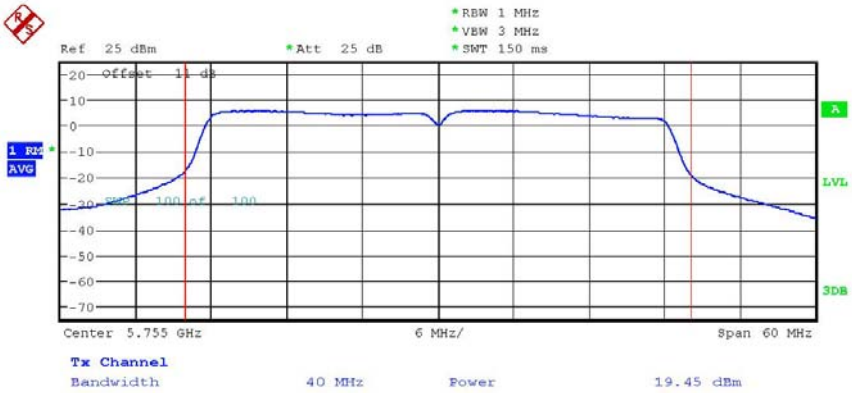
MAXIMUM CONDUCTED POWER ANT2_11aCH165
Date: 20.MAR.2015 15:12:38

MAXIMUM CONDUCTED POWER ANT2_11n20CH149
Date: 20.MAR.2015 15:15:17

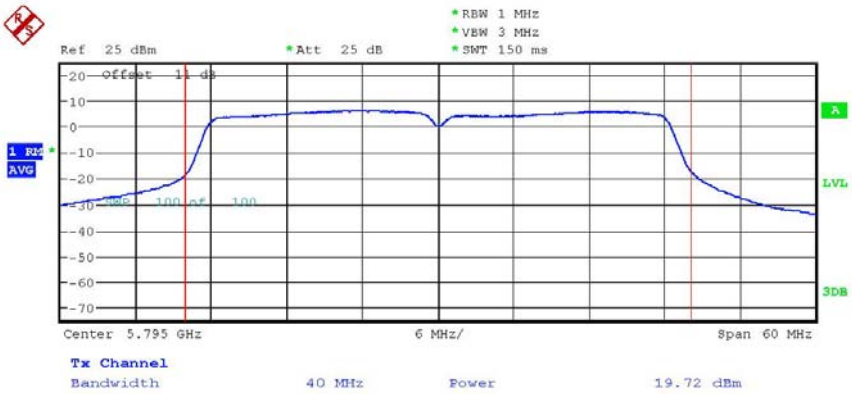
MAXIMUM CONDUCTED POWER ANT2_11n20CH157
Date: 20.MAR.2015 15:16:49



MAXIMUM CONDUCTED POWER ANT2_11n20CH165
Date: 20.MAR.2015 15:17:46

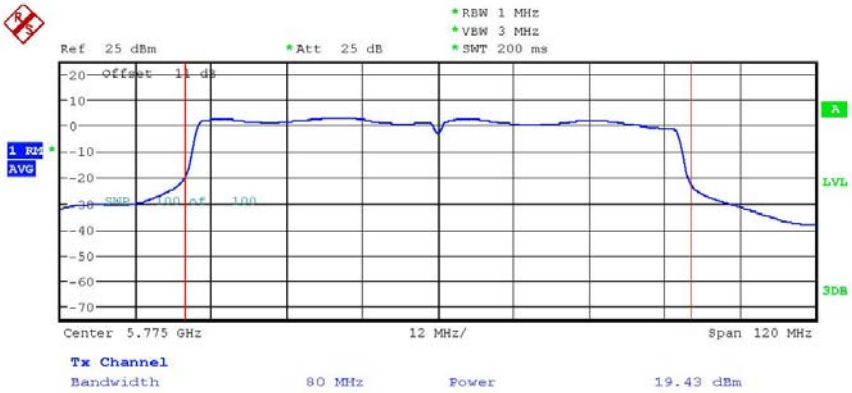


MAXIMUM CONDUCTED POWER ANT2_11n40CH151
Date: 20.MAR.2015 15:21:17



MAXIMUM CONDUCTED POWER ANT2_11n40CH159
Date: 20.MAR.2015 15:31:32

Registration number: W6M21501-14799-C-54
FCC ID: ZTT-REC22A



MAXIMUM CONDUCTED POWER ANT2_11ac80CH155
Date: 20.MAR.2015 15:37:46

Band 1

ANT1	mW			dBm		
	Ch Low	Ch Mid	Ch High	Ch Low	Ch Mid	Ch High
802.11n 20MHz	159.96	131.83	127.64	22.04	21.20	21.06
802.11n 40MHz	113.50	- -	67.92	20.55	- -	18.32
802.11ac	71.12	- -	- -	18.52	- -	- -
ANT2	mW			dBm		
	Ch Low	Ch Mid	Ch High	Ch Low	Ch Mid	Ch High
802.11n 20MHz	87.50	92.68	82.04	19.42	19.67	19.14
802.11n 40MHz	128.23	- -	128.82	21.08	- -	21.10
802.11ac	53.21	- -	- -	17.26	- -	- -
Combine	mW			dBm		
	Ch Low	Ch Mid	Ch High	Ch Low	Ch Mid	Ch High
802.11n 20MHz	247.46	224.51	209.68	23.94	23.51	23.22
802.11n 40MHz	241.73	- -	196.74	23.83	- -	22.94
802.11ac	124.33	- -	- -	20.95	- -	- -

Band 4

ANT1	mW			dBm		
	Ch Low	Ch Mid	Ch High	Ch Low	Ch Mid	Ch High
802.11n 20MHz	80.91	96.16	96.16	19.08	19.83	19.83
802.11n 40MHz	132.74	- -	159.59	21.23	- -	22.03
802.11ac	125.31	- -	- -	20.98	- -	- -
ANT2	mW			dBm		
	Ch Low	Ch Mid	Ch High	Ch Low	Ch Mid	Ch High
802.11n 20MHz	55.72	57.02	60.81	17.46	17.56	17.84
802.11n 40MHz	88.10	- -	93.76	19.45	- -	19.72
802.11ac	87.70	- -	- -	19.43	- -	- -
Combine	mW			dBm		
	Ch Low	Ch Mid	Ch High	Ch Low	Ch Mid	Ch High
802.11n 20MHz	136.63	153.18	156.97	21.36	21.85	21.96
802.11n 40MHz	220.84	- -	253.35	23.44	- -	24.04
802.11ac	213.01	- -	- -	23.28	- -	- -

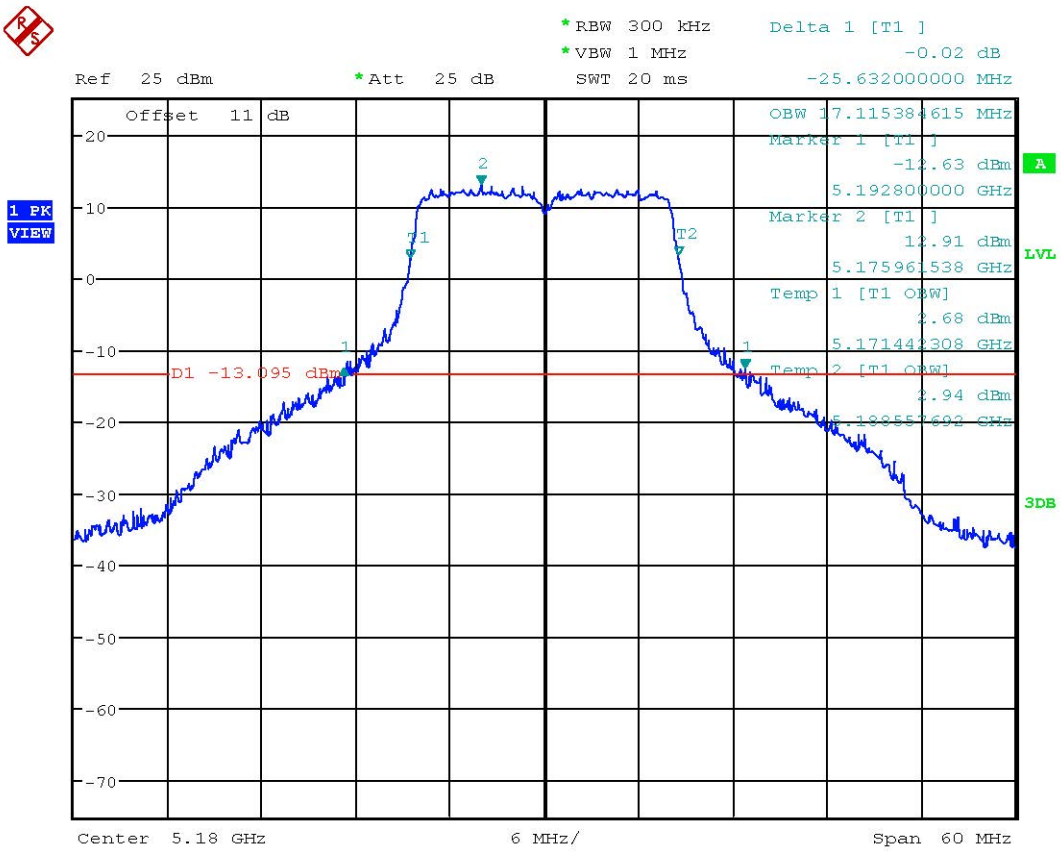
Test equipment used: ETSTW-RE 055, ETSTW-RE 050

3.2 26dB emission bandwidth, 99% Occupied Bandwidth, FCC 15.407 (a)

According to §15.407(a). No Limit required.

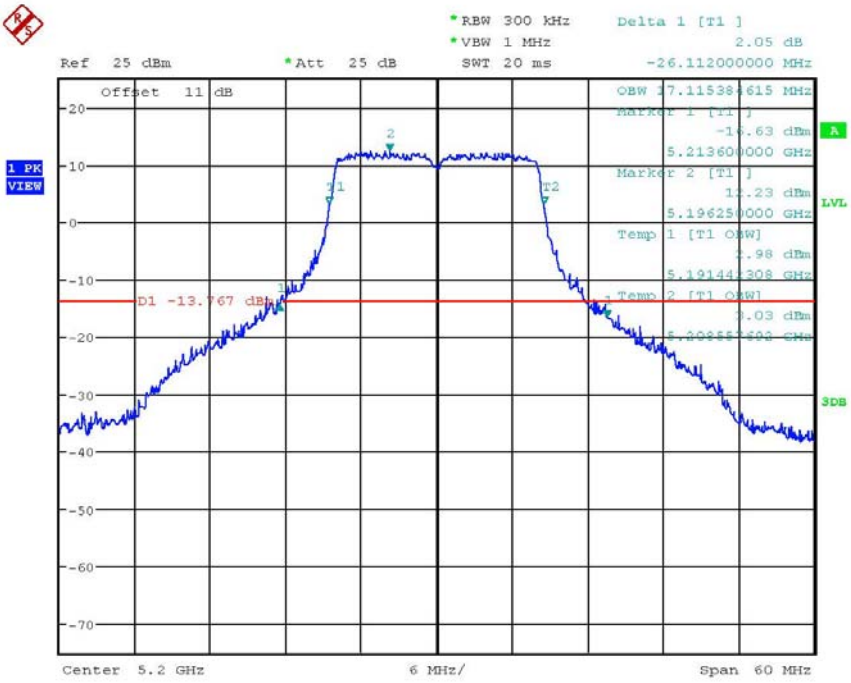
Result:

ANT1



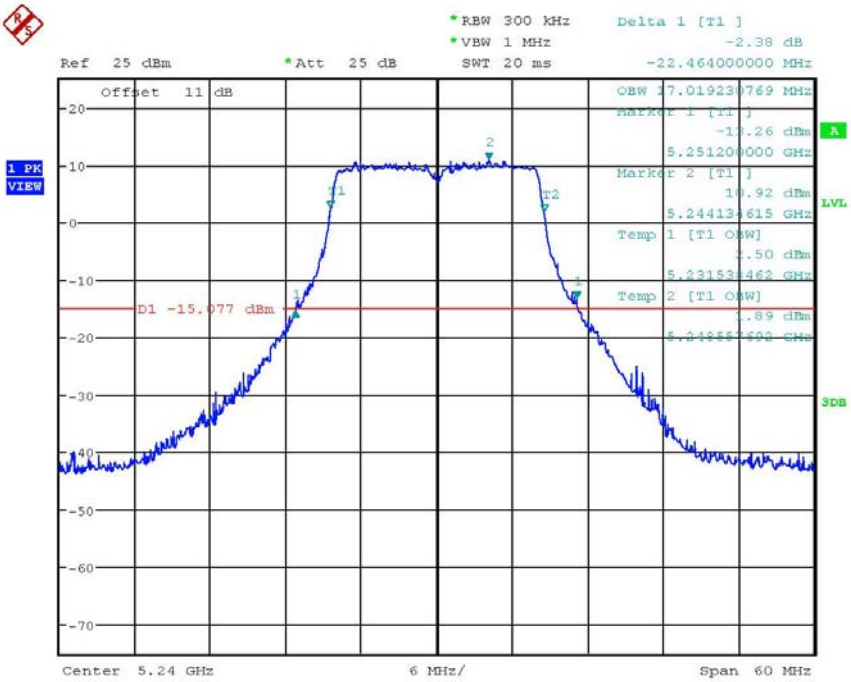
99% OBW & 26DB BANDWIDTH ANT1_11a_CH36

Date: 24.MAR.2015 13:40:21



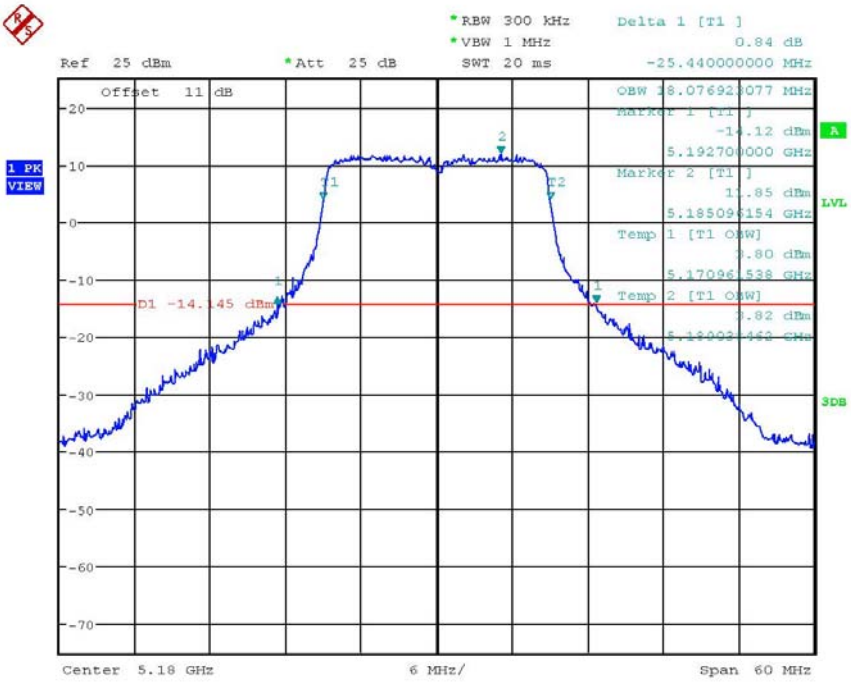
99% OBW & 26DB BANDWIDTH ANT1_11a_CH40

Date: 24.MAR.2015 13:42:44



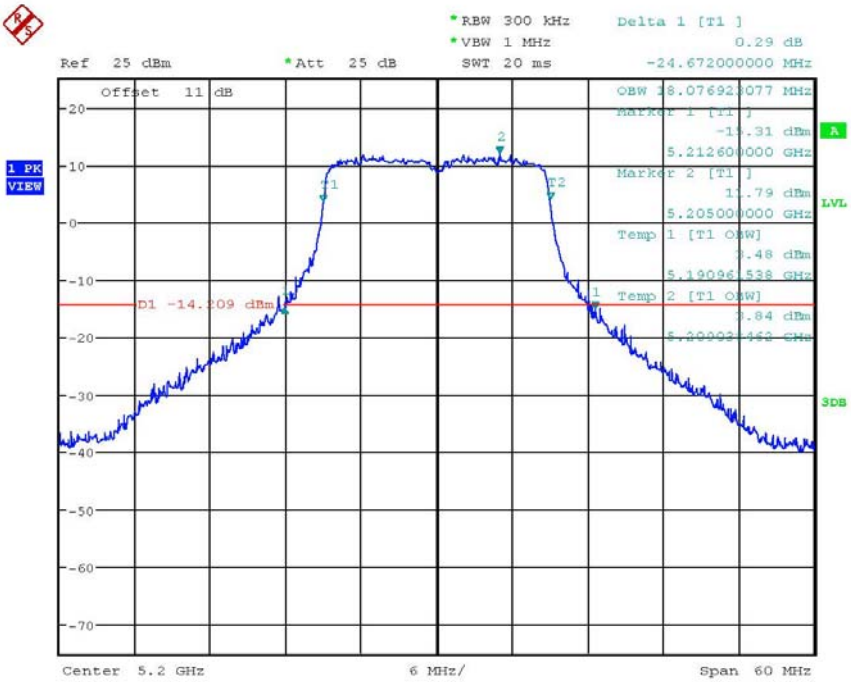
99% OBW & 26DB BANDWIDTH ANT1_11a_CH48

Date: 24.MAR.2015 13:44:56



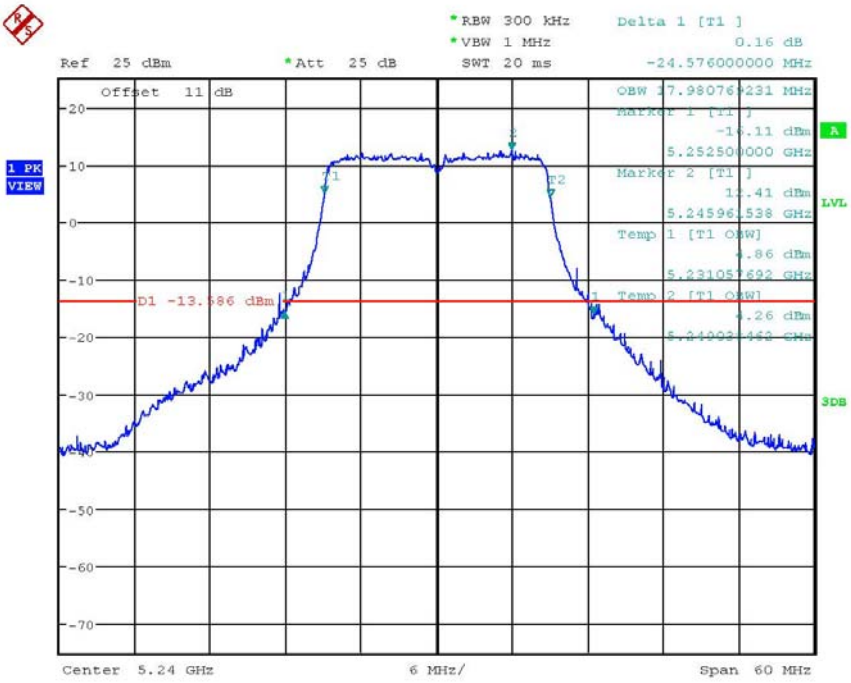
99% OBW & 26DB BANDWIDTH ANT1_11n20_CH36

Date: 24.MAR.2015 13:34:07



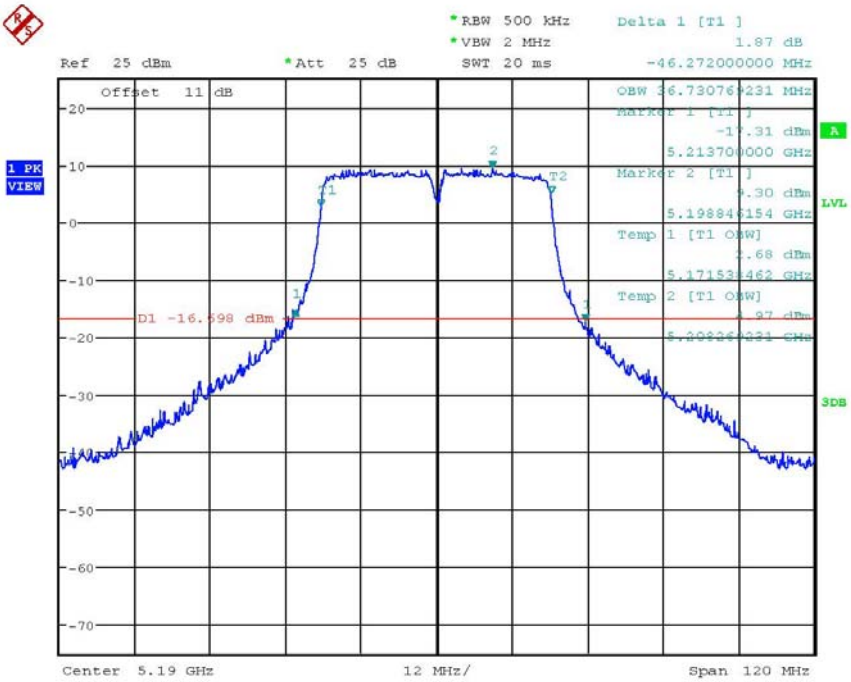
99% OBW & 26DB BANDWIDTH ANT1_11n20_CH40

Date: 24.MAR.2015 13:36:02



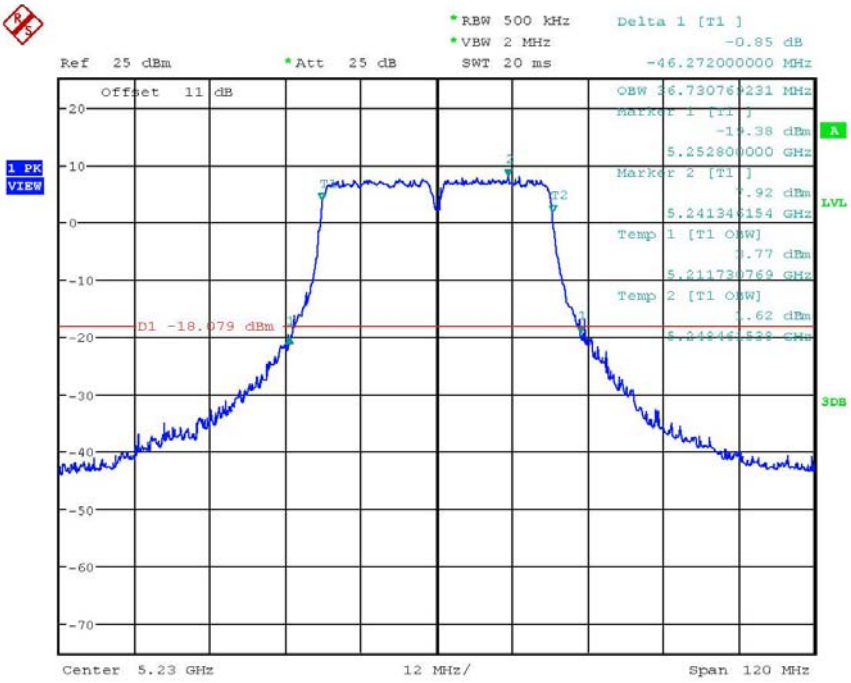
99% OBW & 26DB BANDWIDTH ANT1_11n20_CH48

Date: 24.MAR.2015 13:37:36



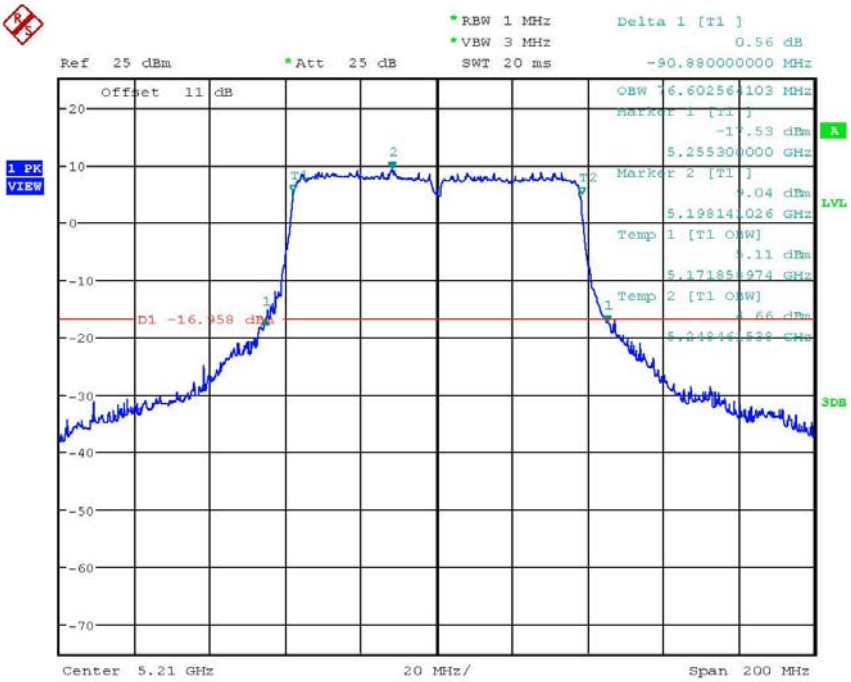
99% OBW & 26DB BANDWIDTH ANT1_11n40_CH38

Date: 24.MAR.2015 13:28:26



99% OBW & 26DB BANDWIDTH ANT1_11n40_CH46

Date: 24.MAR.2015 13:30:38

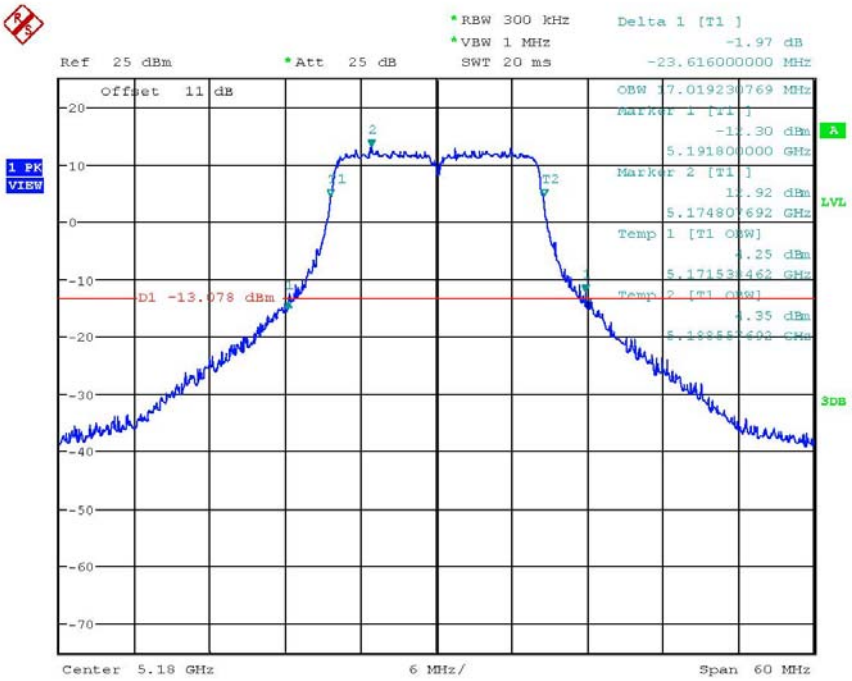


99% OBW & 26DB BANDWIDTH ANT1_11ac80_CH42

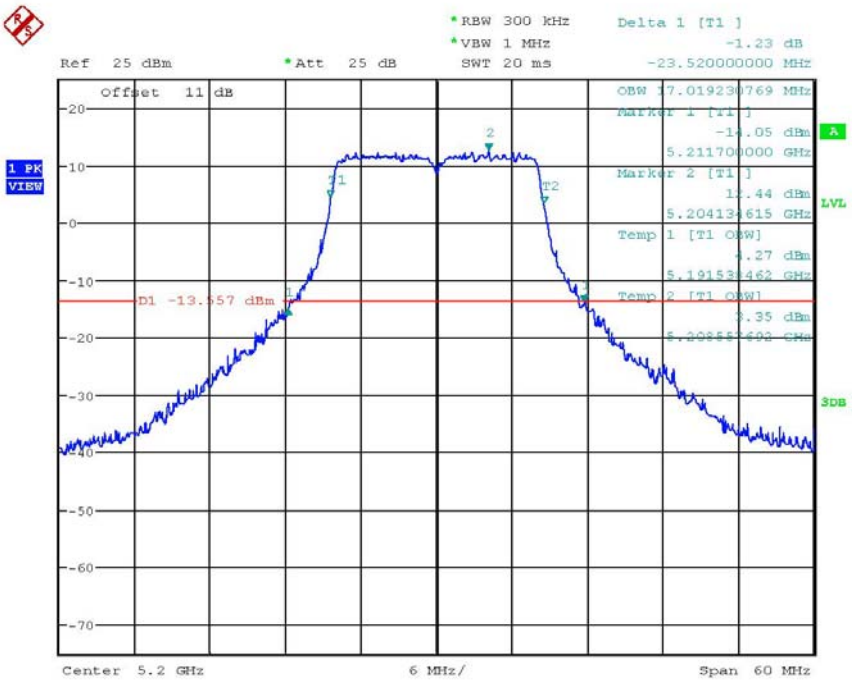
Date: 24.MAR.2015 13:24:13

Registration number: W6M21501-14799-C-54
FCC ID: ZTT-REC22A

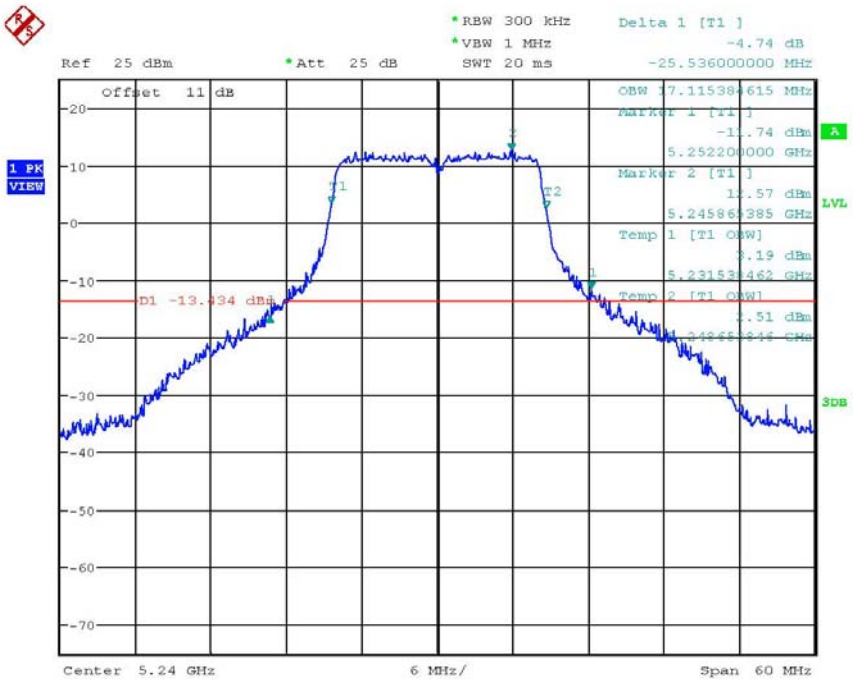
ANT2



99% OBW & 26DB BANDWIDTH ANT2_11a_CH36
Date: 24.MAR.2015 13:01:29

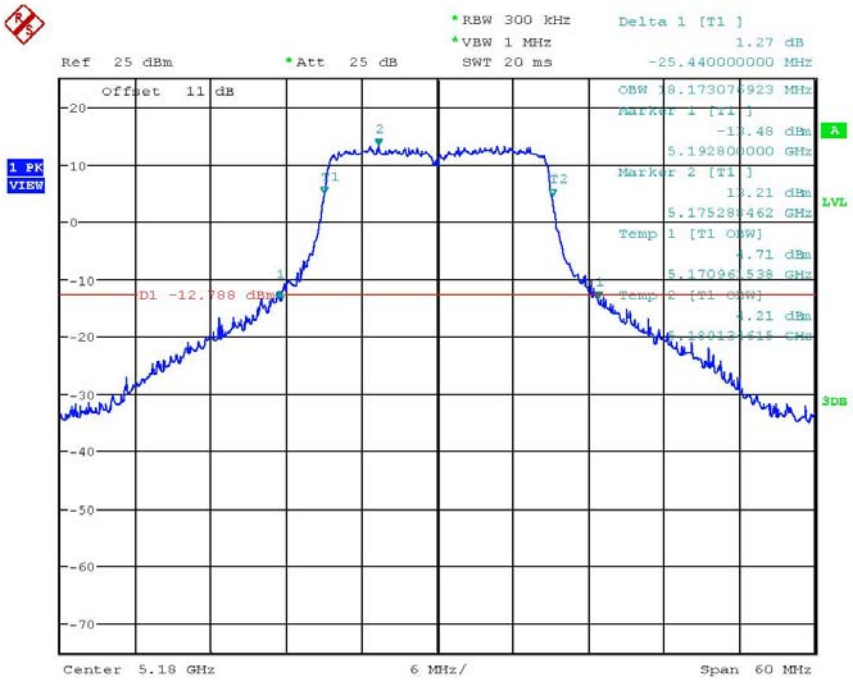


99% OBW & 26DB BANDWIDTH ANT2_11a_CH40
Date: 24.MAR.2015 13:03:52



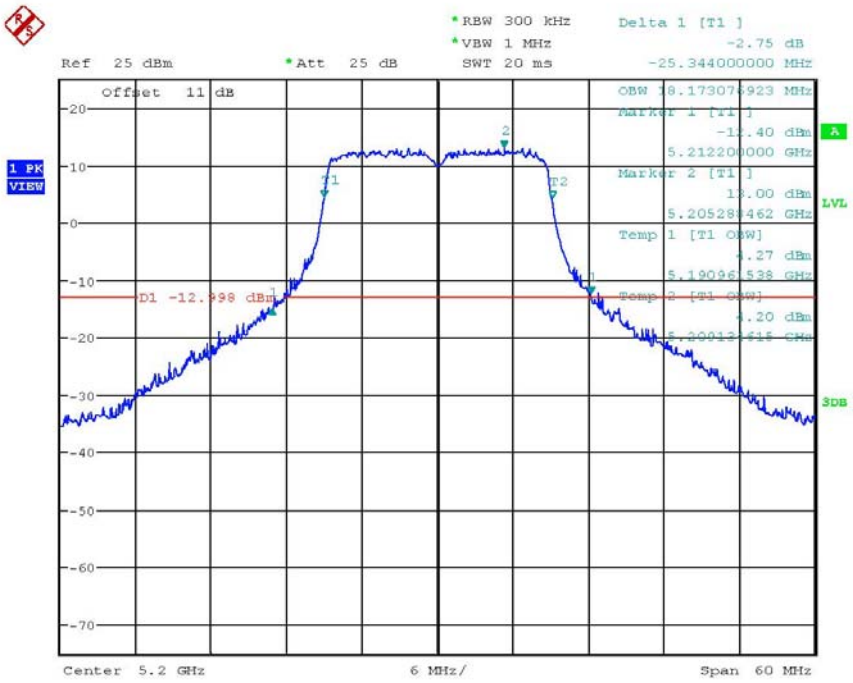
99% OBW & 26DB BANDWIDTH ANT2_11a_CH48

Date: 24.MAR.2015 13:05:48



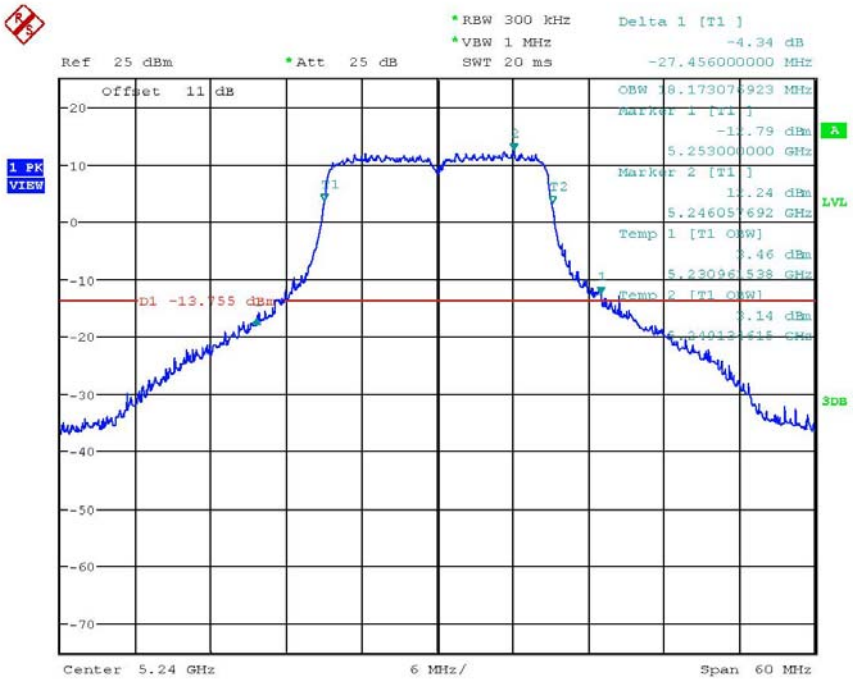
99% OBW & 26DB BANDWIDTH ANT2_11n20_CH36

Date: 24.MAR.2015 13:08:00



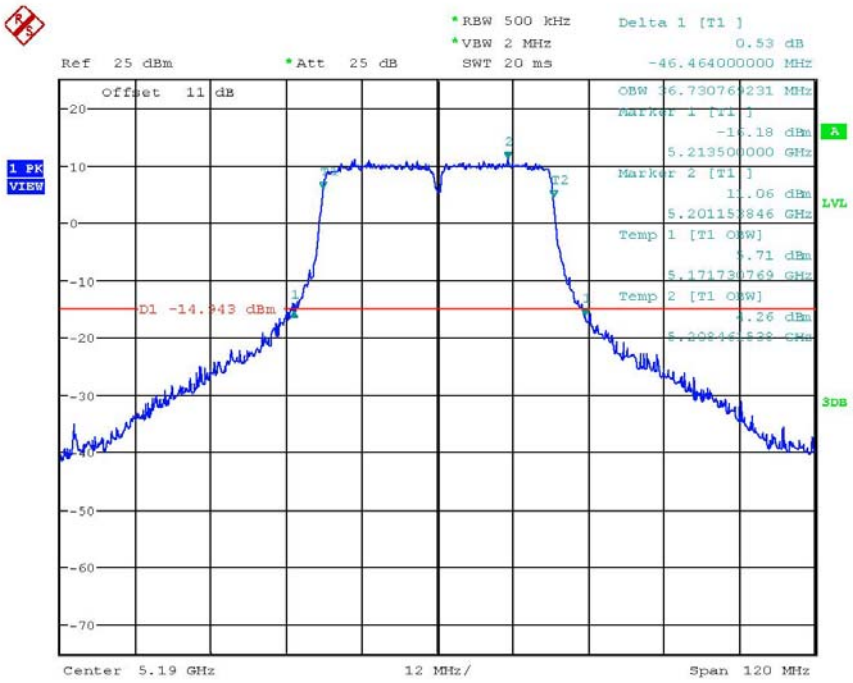
99% OBW & 26DB BANDWIDTH ANT2_11n20_CH40

Date: 24.MAR.2015 13:10:06



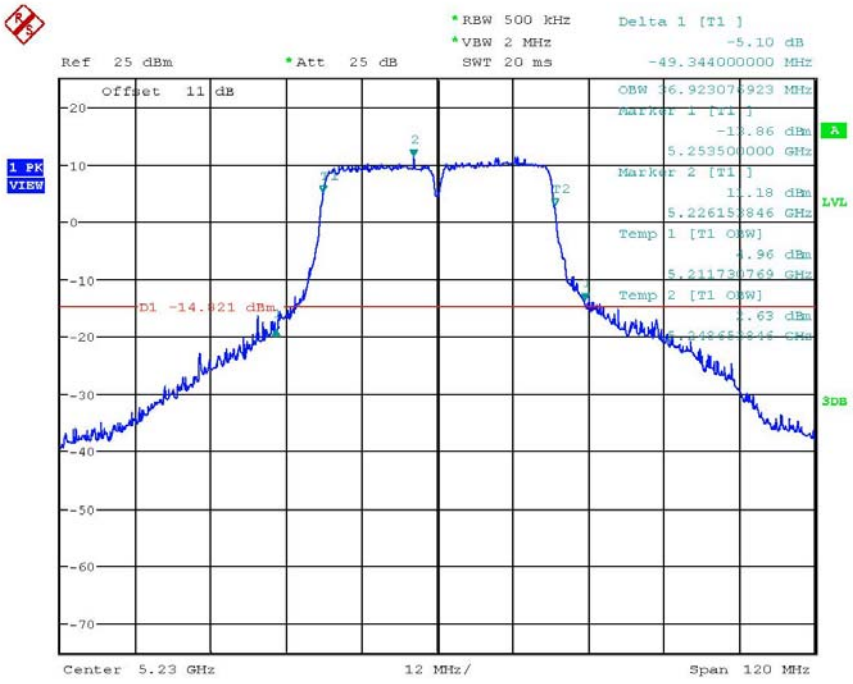
99% OBW & 26DB BANDWIDTH ANT2_11n20_CH48

Date: 24.MAR.2015 13:11:34



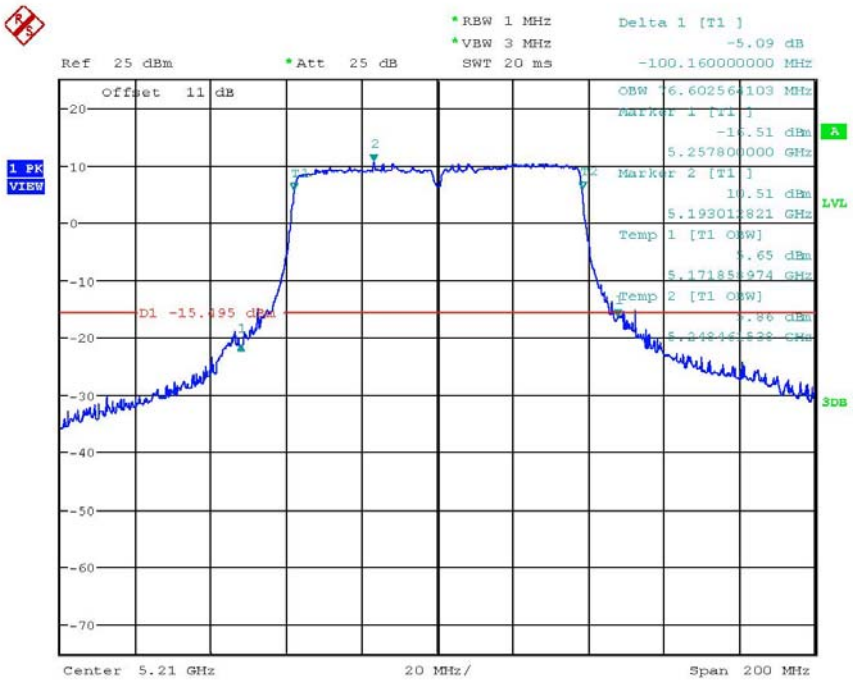
99% OBW & 26DB BANDWIDTH ANT2_11n40_CH38

Date: 24.MAR.2015 13:13:30



99% OBW & 26DB BANDWIDTH ANT2_11n40_CH46

Date: 24.MAR.2015 13:15:53



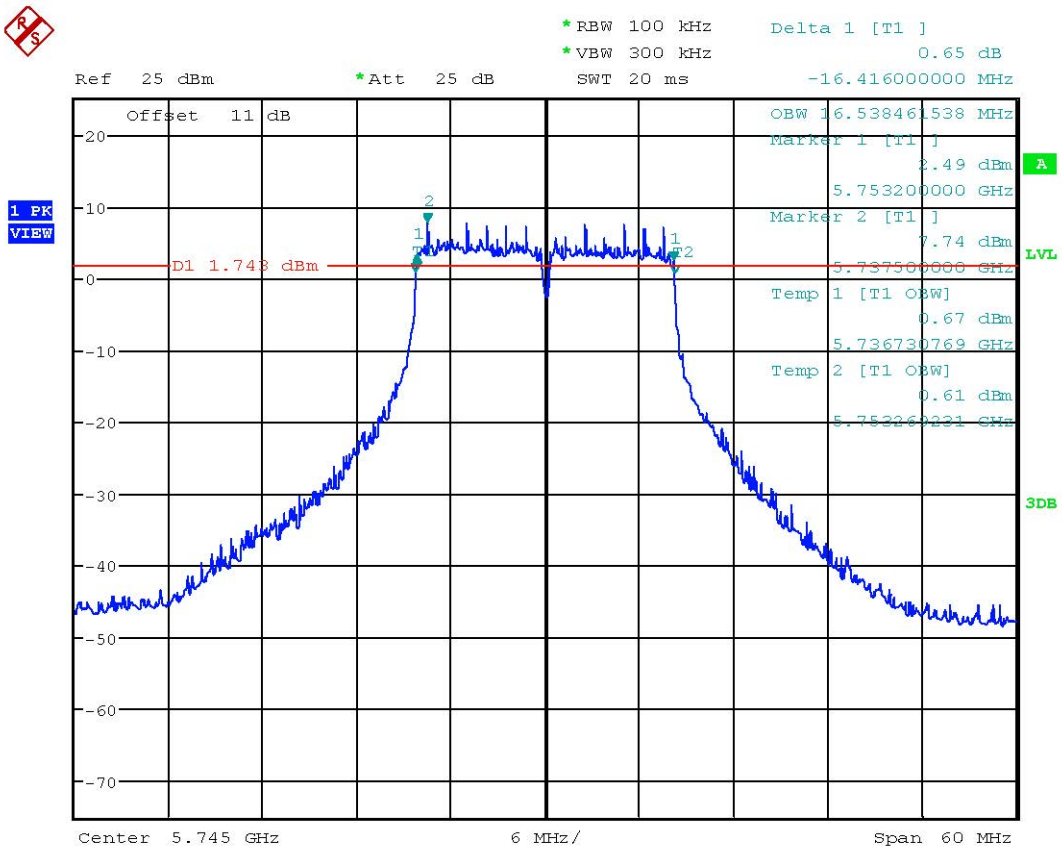
99% OBW & 26DB BANDWIDTH ANT2_11ac80_CH42
Date: 24.MAR.2015 13:18:16

3.3 6dB emission bandwidth, 99% Occupied Bandwidth, FCC 15.407 (a)

According to §15.407(a). No Limit required.

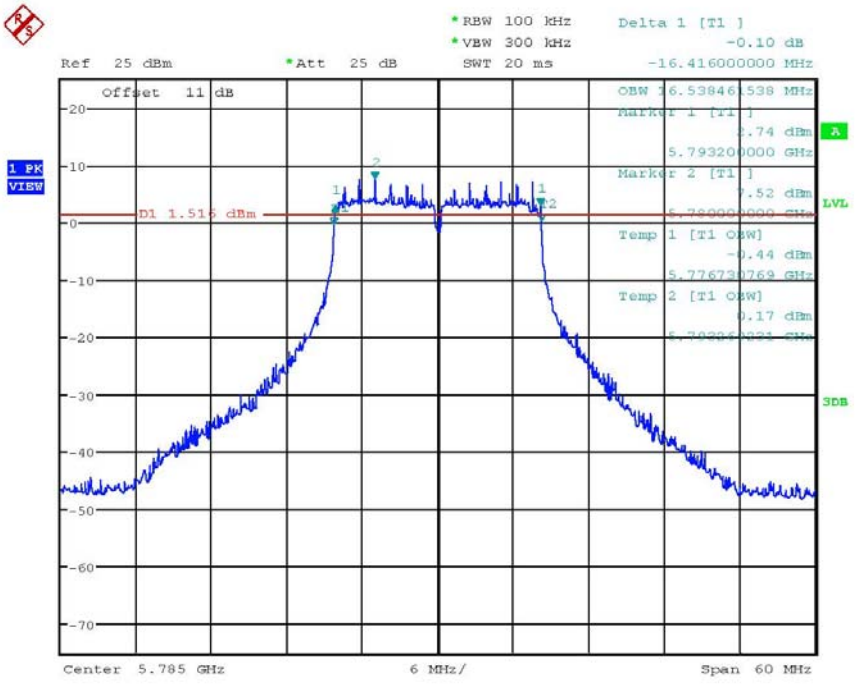
Result:

ANT1

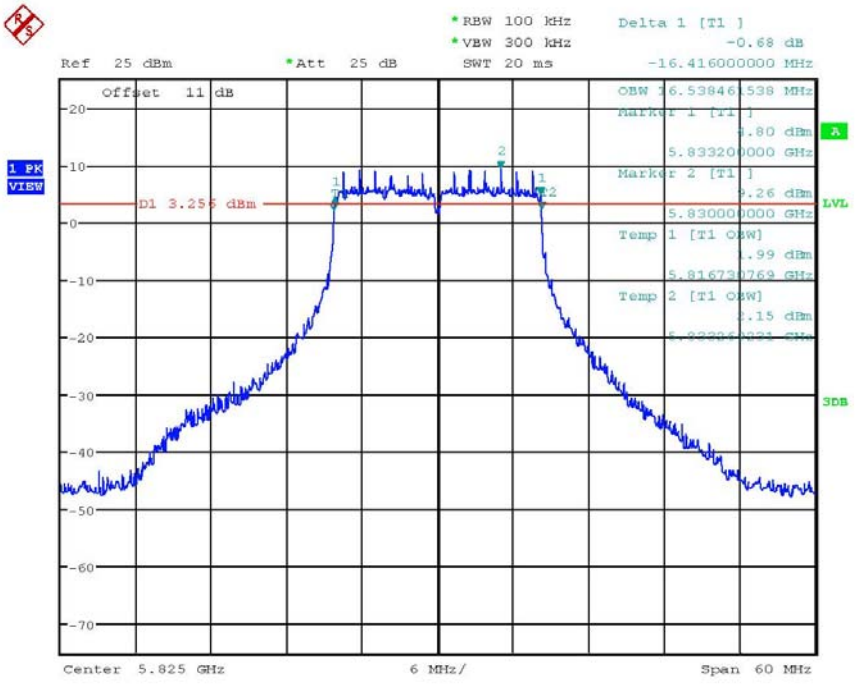


99% OBW & 6DB BANDWIDTH CDD ANT1_a Mode_CH149

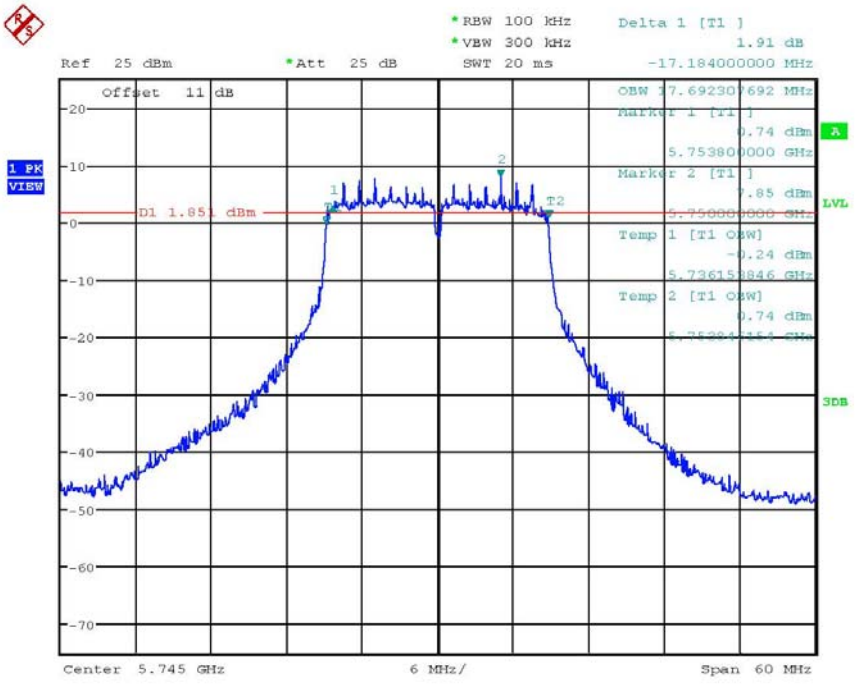
Date: 24.MAR.2015 09:22:24



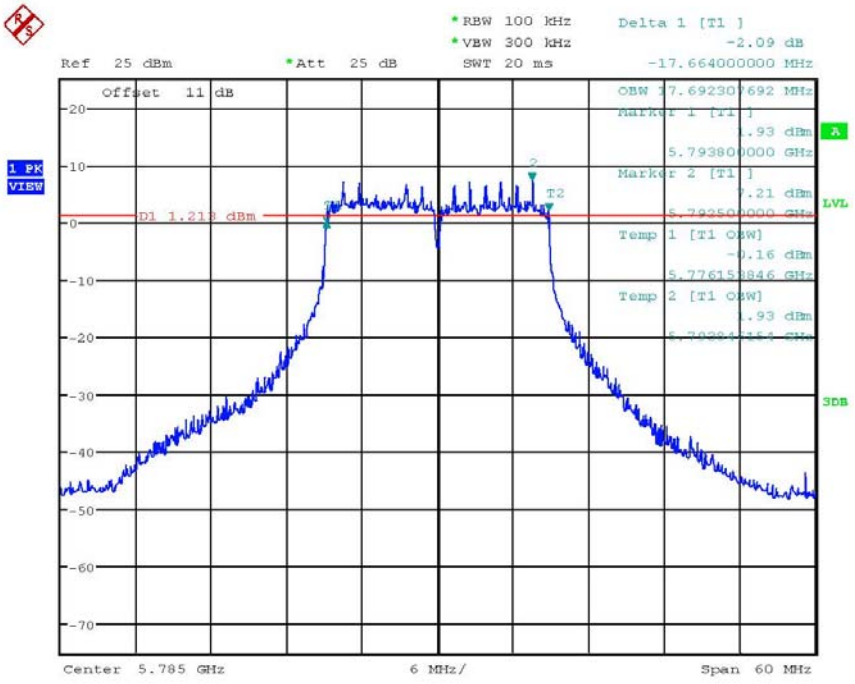
99% OBW & 6DB BANDWIDTH CDD ANT1_a Mode_CH157
Date: 24.MAR.2015 09:28:49



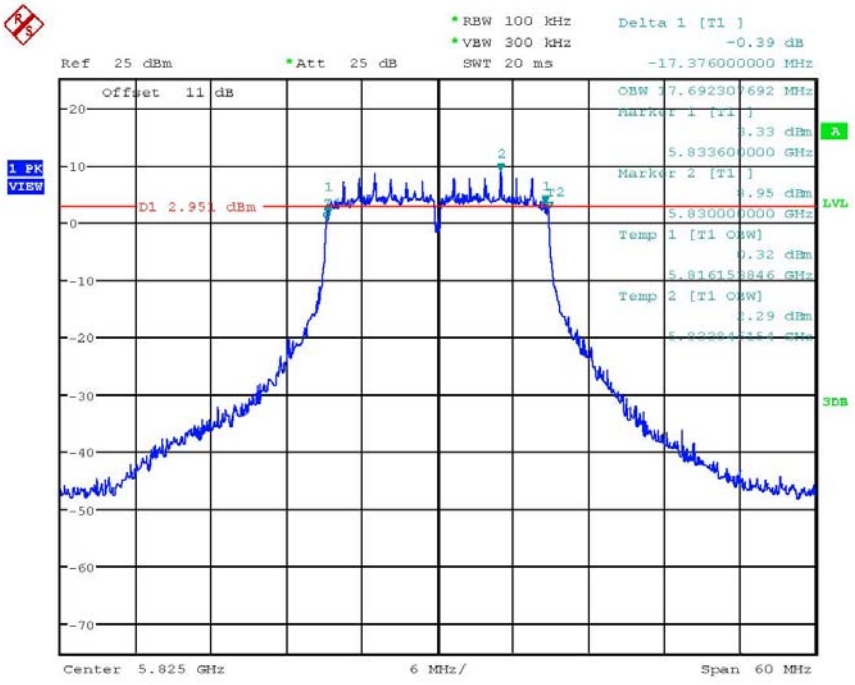
99% OBW & 6DB BANDWIDTH CDD ANT1_a Mode_CH165
Date: 24.MAR.2015 09:33:56



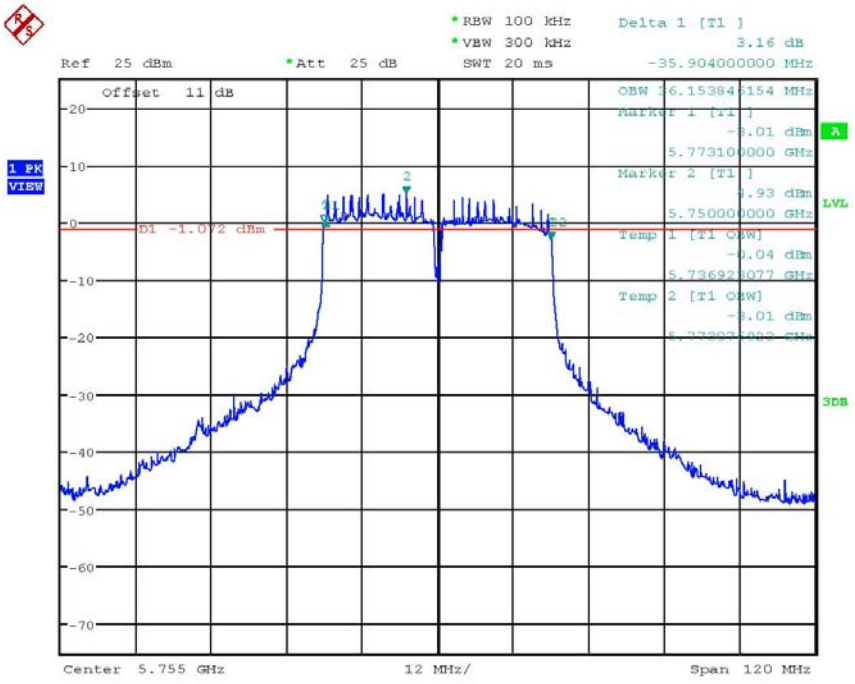
99% OBW & 6DB BANDWIDTH CDD ANT1_VHT20_CH149
Date: 24.MAR.2015 09:41:10



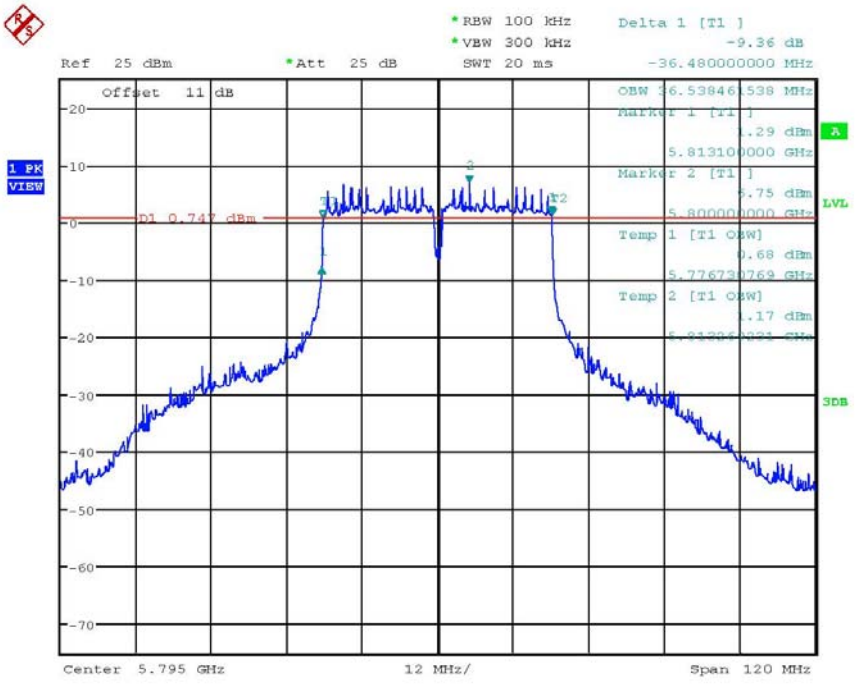
99% OBW & 6DB BANDWIDTH CDD ANT1_VHT20_CH157
Date: 24.MAR.2015 09:45:57



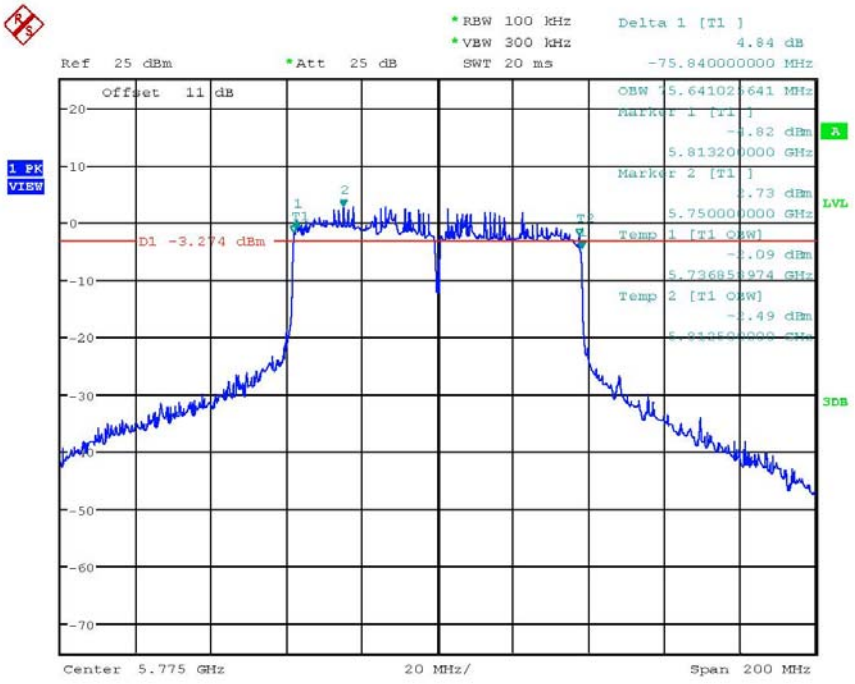
99% OBW & 6DB BANDWIDTH CDD ANT1_VHT20_CH165
Date: 24.MAR.2015 09:57:44



99% OBW & 6DB BANDWIDTH CDD ANT1_VHT40_CH151
Date: 24.MAR.2015 10:03:55



99% OBW & 6DB BANDWIDTH CDD ANT1_VHT40_CH159
Date: 24.MAR.2015 10:07:55



99% OBW & 6DB BANDWIDTH CDD ANT1_VHT80_CH155
Date: 24.MAR.2015 10:13:51