Report No: CCIS13050014801

FCC REPORT

Applicant:	Deliberant LLC
Address of Applicant:	138 Mountain Brook Dr Canton, GA 30115 United States

Equipment Under Test (EUT)

Product Name:	Broadband Digital Transmission System
Model No.:	APC Sputnik 5
FCC ID:	UB8-SPTNK5
Applicable standards:	FCC CFR Title 47 Part 15 Subpart C Section 15.247
Date of sample receipt:	23 May., 2013
Date of Test:	24 May., 2013 to 04 Jun., 2013
Date of report issued:	05 Jun., 2013
Test Result :	PASS *

* In the configuration tested, the EUT complied with the standards specified above.

Authorized Signature:

Bruce Zhang
Laboratory Manager

2 Version

Version No.	Date	Description
00	*05 Jun., 2013*	*Original*

Prepared by:  ***Date:*** *05 Jun.,2013*

Report Clerk

Reviewed by:  ***Date:*** *05 Jun.,2013*

Project Engineer

3 Contents

4 Test Summary

Test Item	Section in CFR 47	Result
Antenna requirement	15.203/15.247 (c)	Pass
AC Power Line Conducted Emission	15.207	Pass
Conducted Peak Output Power	15.247 (b)(3)	Pass
6dB Occupied Bandwidth	15.247 (a)(2)	Pass
Power Spectral Density	15.247 (e)	Pass
Band Edge	15.247(d)	Pass
Spurious Emission	15.205/15.209	Pass

Pass: The EUT complies with the essential requirements in the standard.

5 General Information

5.1 Client Information

Applicant:	Deliberant LLC
Address of Applicant:	138 Mountain Brook Dr Canton, GA 30115 United States
Manufacturer/ Factory:	Deliberant LLC
Address of Manufacturer/ Factory:	138 Mountain Brook Dr Canton, GA 30115 United States

5.2 General Description of E.U.T.

Product Name:	Broadband Digital Transmission System
Model No.:	APC Sputnik 5
Operation Frequency:	5725MHz-5850MHz
Operation mode:	Fixed point-to-point operation
Channel numbers:	802.11a/ 802.11n20:5, 802.11n40:2
Channel separation:	802.11a/802.11n20 :20MHz, 802.11n40 :40MHz
Modulation technology: (IEEE 802.11a)	BPSK,QPSK,16-QAM,64-QAM
Modulation technology: (IEEE 802.11n)	BPSK,QPSK,16-QAM,64-QAM
Data speed(IEEE 802.11a)	6MHz,9MHz,12MHz,18MHz,24MHz,36MHz,48MHz,54MHz
Data speed (IEEE 802.11n20):	MCS0: 6.5MHz,MCS1:13MHz,MCS2:19.5MHz,MCS3:26MHz, MCS4:39MHz,MCS5:52MHz,MCS6:58.5MHz,MCS7:65MHz
Data speed (IEEE 802.11n40):	MCS0:15MHz,MCS1:30MHz,MCS2:45MHz,MCS3:60MHz, MCS4:90MHz,MCS5:120MHz,MCS6:135MHz,MCS7:150MHz
Antenna Type:	ANT1:Panel, ANT2:Dish
Antenna gain:	ANT1:15 dBi, ANT2: 27 dBi
Power supply:	Model: GRT-240050 Input:100-240V AC,50/60Hz 0.5A Output:24V DC MAX0.5A

Operation Frequency each of channel

802.11a/802.11n20

Channel	Frequency
149	5745MHz
153	5765MHz
157	5785MHz
161	5805MHz
165	5825MHz

802.11n40

Channel	Frequency
151	5755MHz
159	5795MHz

Note:

In section 15.31(m), regards to the operating frequency range over 10 MHz, the Lowest frequency, the middle frequency, and the highest frequency of channel were selected to perform the test, and the selected channel see below:

802.11a/802.11n20

Channel	Frequency
The lowest channel	5745MHz
The middle channel	5785MHz
The Highest channel	5825MHz

802.11n40

Channel	Frequency
The lowest channel	5755MHz
The Highest channel	5795MHz

5.3 Test environment and mode

Operating Environment:	
Temperature:	24.0 °C
Humidity:	54 % RH
Atmospheric Pressure:	1010 mbar
Test mode:	
Continuously transmitting mode	Keep the EUT in 100% duty cycle transmitting with modulation.

We have verified the construction and function in typical operation. All the test modes were carried out with the EUT in transmitting operation, which was shown in this test report and defined as follows:

Per-scan all kind of data rate in lowest channel, and found the follow list which it was worst case.

Mode	Data rate
802.11a	6 Mbps
802.11n20	6.5 Mbps
802.11n40	13 Mbps

Final Test Mode:

According to ANSI C63.4 standards, the test results are both the “worst case” and “worst setup” 6 Mbps for 802.11a, 6.5 Mbps for 802.11n20 and 13 Mbps for 802.11n40. All test items for 802.11a and 802.11n were performed in MIMO mode and duty cycle all above 98%, meet the requirements of KDB 558074.

5.4 Laboratory Facility

The test facility is recognized, certified, or accredited by the following organizations:

- **FCC - Registration No.: 817957**

Shenzhen Zhongjian Nanfang Testing Co., Ltd. EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in out files. Registration 817957, February 27, 2012.

- **IC - Registration No.: 10106A-1**

The 3m Semi-anechoic chamber of Shenzhen Zhongjian Nanfang Testing Co., Ltd. has been Registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 10106A-1.

- **CNAS - Registration No.: CNAS L6048**

Shenzhen Zhongjian Nanfang Testing Co., Ltd. is accredited to ISO/IEC 17025:2005 General Requirements for the Competence of Testing and Calibration laboratories for the competence of testing. The Registration No. is CNAS L6048.

5.5 Laboratory Location

Shenzhen Zhongjian Nanfang Testing Co., Ltd.
Address: No.B-C, 1/F., Building 2, Laodong No.2 Industrial Park, Xixiang Road,
Bao’an District, Shenzhen, Guangdong, China
Tel: 0755-23118282
Fax: 0755-23116366

5.6 Test Instruments list

Radiated Emission:						
Item	**Test Equipment**	**Manufacturer**	**Model No.**	**Inventory No.**	**Cal. Date (mm-dd-yy)**	**Cal. Due date (mm-dd-yy)**
1	3m Semi- Anechoic Chamber	SAEMC	9(L)*6(W)* 6(H)	CCIS0001	June 09 2012	June 08 2013
2	Control Room	ZhongYu Electron	6.2(L)*2.5(W)* 2.4(H)	CCIS0002	N/A	N/A
3	BiConiLog Antenna	SCHWARZBECK MESS-ELEKTRONIK	VULB9163	CCIS0005	May 25 2013	May 24 2014
4	Double -ridged waveguide horn	SCHWARZBECK MESS-ELEKTRONIK	BBHA9120D	CCIS0006	May 25 2013	May 24 2014
5	EMI Test Software	AUDIX	E3	N/A	N/A	N/A
6	Coaxial Cable	CCIS	N/A	CCIS0016	Apr. 01 2013	Mar. 31 2014
7	Coaxial Cable	CCIS	N/A	CCIS0017	Apr. 01 2013	Mar. 31 2014
8	Coaxial cable	CCIS	N/A	CCIS0018	Apr. 01 2013	Mar. 31 2014
9	Coaxial Cable	CCIS	N/A	CCIS0019	Apr. 01 2013	Mar. 31 2014
10	Coaxial Cable	CCIS	N/A	CCIS0087	Apr. 01 2013	Mar. 31 2014
11	Amplifier(10kHz-1.3GHz)	HP	8447D	CCIS0003	Apr. 01 2013	Mar. 31 2014
12	Amplifier(1GHz-18GHz)	Compliance Direction Systems Inc.	PAP-1G18	CCIS0011	June 09 2012	June 08 2013
13	Pre-amplifier (18-40GHz)	A.H System	PAM-1840	GTS219	Apr. 01 2013	Mar. 31 2014
14	Horn Antenna	ETS-LINDGREN	3160	GTS217	Mar. 30 2013	Mar. 29 2014
15	Printer	HP	HP LaserJet P1007	N/A	N/A	N/A
16	Positioning Controller	UC	UC3000	CCIS0015	N/A	N/A
17	Spectrum analyzer 9k-30GHz	Rohde & Schwarz	FSP	CCIS0023	May. 25 2013	May. 24 2014
18	Loop antenna	Laplace instrument	RF300	EMC0701	Aug. 11 2013	Aug. 10 2014
19	EMI Test Receiver	Rohde & Schwarz	ESPI	CCIS0022	Apr 01 2013	Mar. 31 2014
20	Spectrum Analyzer	HP	8564E	CCIS0150	May 24 2013	May 23 2014

Conducted Emission:						
Item	**Test Equipment**	**Manufacturer**	**Model No.**	**Inventory No.**	**Cal. Date (mm-dd-yy)**	**Cal. Due date (mm-dd-yy)**
1	Shielding Room	ZhongShuo Electron	11.0(L)x4.0(W)x3.0(H)	CCIS0061	June 09 2012	June 08 2013
2	EMI Test Receiver	Rohde & Schwarz	ESCI	CCIS0002	May 25 2013	May 24 2014
3	LISN	CHASE	MN2050D	CCIS0074	Apr 01 2013	Mar. 31 2014
4	Coaxial Cable	CCIS	N/A	CCIS0086	Apr. 01 2013	Mar. 31 2014
5	EMI Test Software	AUDIX	E3	N/A	N/A	N/A

6 Test results and Measurement Data

6.1 Justification

According to section 5.2 of this report, the EUT have two types of antenna, so we test the maximum output power item base on the different antennas, and we selected the worst case one to perform the other conducted method test items(such as PSD, Band edge, Conducted spurious emission, etc.). The worst case for the conducted method tests is EUT with 15 dBi panel antenna (maximum conducted output power). For radiated method tests, all cases were tested.

6.2 Antenna requirement

Standard requirement:	FCC Part15 C Section 15.203 /247(c)

15.203 requirement:
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, 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.
This requirement does not apply to carrier current devices or to devices operated under the provisions of §15.211, § 15.213, § 15.217, § 15.219, or § 15.221. Further, this requirement does not apply to intentional radiators that must be professionally installed, such as perimeter protection systems and some field disturbance sensors, or to other intentional radiators which, in accordance with § 15.31(d), must be measured at the installation site. However, the installer shall be responsible for ensuring that the proper antenna is employed so that the limits in this part are not exceeded.

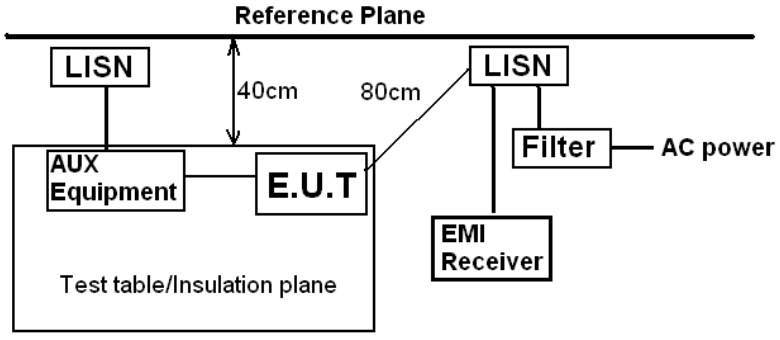
E.U.T Antenna:

The product is a professionally installed device which has two types of antenna for the application. The antenna information as below table:

Antenna No.	Antenna Type	Antenna Gain (dBi)
Antenna 1	Panel/Internal	15
Antenna 2	Dish/External	27

According to above information, the antennas meet the requirements of this section.
The details of antenna plots please refer to section 8 of this report.

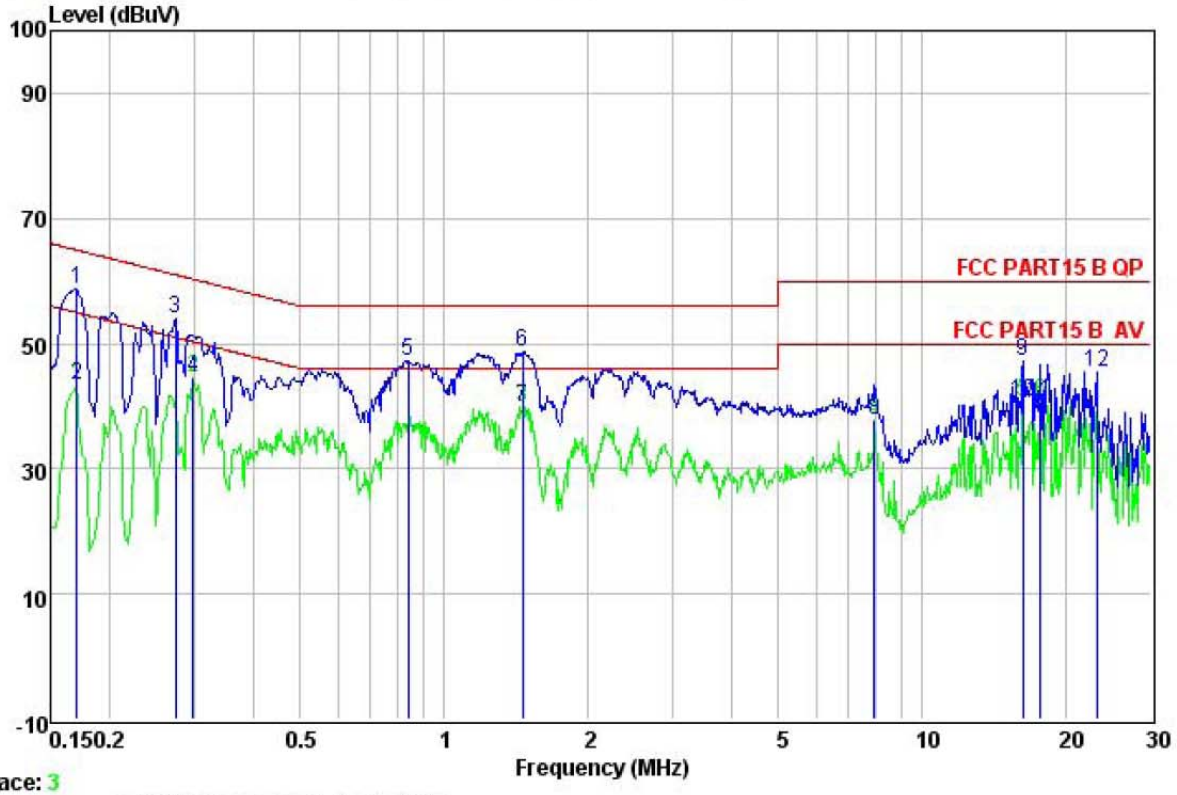
6.3 Conducted Emission

<table>
<tr><td>Test Requirement:</td><td>FCC Part15 C Section 15.207</td></tr>
<tr><td>Test Method:</td><td>ANSI C63.4: 2003</td></tr>
<tr><td>Test Frequency Range:</td><td>150 kHz to 30 MHz</td></tr>
<tr><td>Class / Severity:</td><td>Class B</td></tr>
<tr><td>Receiver setup:</td><td>RBW=9 kHz, VBW=30 kHz</td></tr>
<tr><td>Limit:</td><td>
<table>
<tr><th rowspan="2">Frequency range (MHz)</th><th colspan="2">Limit (dBuV)</th></tr>
<tr><th>Quasi-peak</th><th>Average</th></tr>
<tr><td>0.15-0.5</td><td>66 to 56*</td><td>56 to 46*</td></tr>
<tr><td>0.5-5</td><td>56</td><td>46</td></tr>
<tr><td>5-30</td><td>60</td><td>50</td></tr>
</table>
* Decreases with the logarithm of the frequency.
</td></tr>
<tr><td>Test procedure</td><td>1. The E.U.T and simulators are connected to the main power through a line impedance stabilization network (L.I.S.N.). It provides a 50ohm/50uH coupling impedance for the measuring equipment.
2. The peripheral devices are also connected to the main power through a LISN that provides a 50ohm/50uH coupling impedance with 50ohm termination. (Please refer to the block diagram of the test setup and photographs).
3. Both sides of A.C. line are checked for maximum conducted interference. In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.4: 2003 on conducted measurement.</td></tr>
<tr><td>Test setup:</td><td> 

Remark:
E.U.T: Equipment Under Test
LISN: Line Impedence Stabilization Network
Test table height=0.8m</td></tr>
<tr><td>Test Instruments:</td><td>Refer to section 5.6 for details</td></tr>
<tr><td>Test mode:</td><td>Refer to section 5.3 for details. Pre-scan EUT with two types of antenna, the test result all most same, so we just show the worst case one (EUT with 15 dBi antenna).</td></tr>
<tr><td>Test results:</td><td>Passed</td></tr>
</table>

Measurement Data

Line:

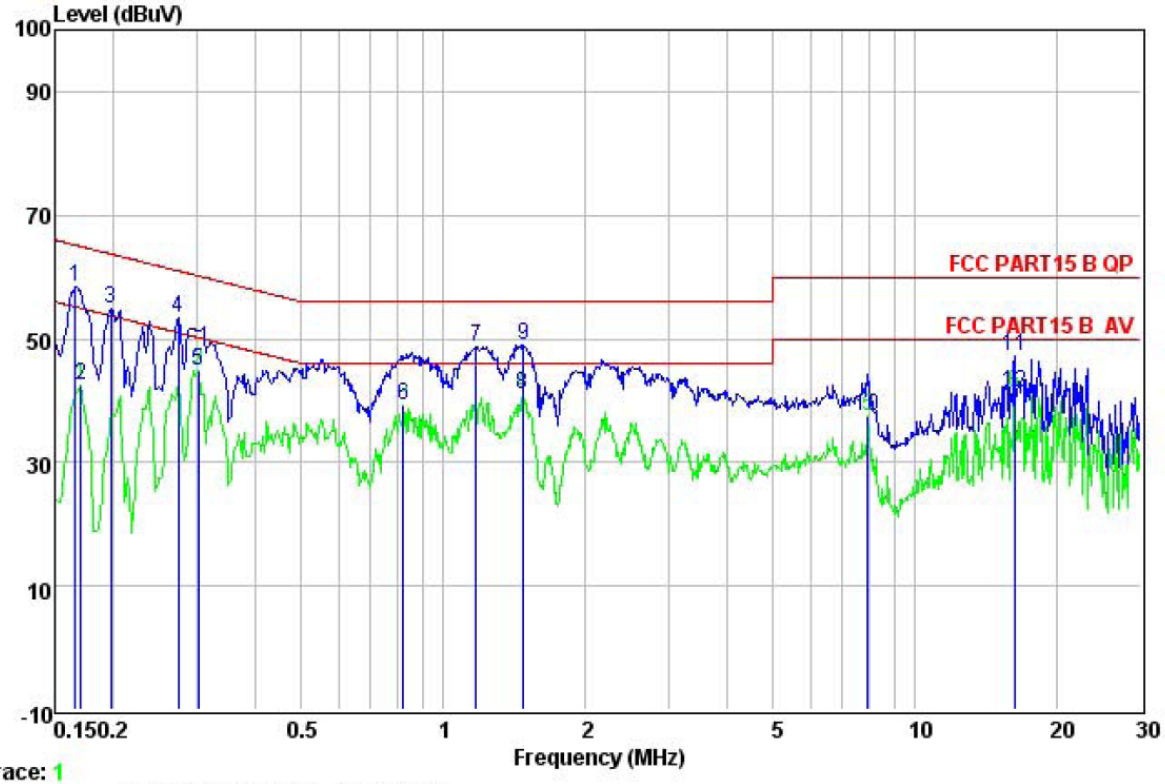


Trace: 3

Site : CCIS Conducted Test Site
Condition : FCC PART15 B QP LISN LINE
Job. no : 148RF
EUT : Broadband Digital Transmission System
Model : APC Sputnik
Test Mode : Data transmission mode
Power Rating : AC 120V/60Hz
Environment : Temp: 23 ℃ Huni:56% Atmos:101KPa
Test Engineer: Winner
Remark :

	Freq	Read Level	LISN Factor	Cable Loss	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dB	dBuV	dBuV	dB	
1	0.170	47.85	10.23	0.78	58.86	64.94	-6.08	Peak
2	0.170	32.37	10.23	0.78	43.38	54.94	-11.56	Average
3	0.274	42.88	10.25	0.74	53.87	60.98	-7.11	Peak
4	0.299	33.61	10.26	0.74	44.61	50.28	-5.67	Average
5	0.839	36.20	10.19	0.82	47.21	56.00	-8.79	Peak
6	1.456	38.00	10.25	0.37	48.62	56.00	-7.38	Peak
7	1.456	29.31	10.25	0.37	39.93	46.00	-6.07	Average
8	7.935	26.54	10.26	0.84	37.64	50.00	-12.36	Average
9	16.226	35.97	10.26	0.91	47.14	60.00	-12.86	Peak
10	16.226	29.63	10.26	0.91	40.80	50.00	-9.20	Average
11	17.661	29.64	10.29	0.92	40.85	50.00	-9.15	Average
12	23.140	34.02	10.47	0.89	45.38	60.00	-14.62	Peak

Neutral:



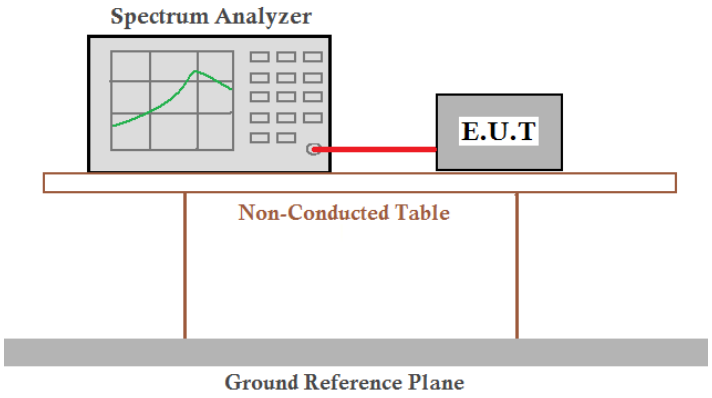
Site : CCIS Conducted Test Site
Condition : FCC PART15 B QP LISN NEUTRAL
Job. no : 148RF
EUT : Broadband Digital Transmission System
Model : APC Sputnik
Test Mode : Data transmission mode
Power Rating : AC 120V/60Hz
Environment : Temp: 23 ℃ Huni:56% Atmos:101KPa
Test Engineer: Winner
Remark :

	Freq	Read Level	LISN Factor	Cable Loss	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dB	dBuV	dBuV	dB	
1	0.166	47.45	10.26	0.78	58.49	65.16	-6.67	Peak
2	0.170	31.51	10.25	0.78	42.54	54.94	-12.40	Average
3	0.198	44.03	10.23	0.76	55.02	63.71	-8.69	Peak
4	0.274	42.35	10.24	0.74	53.33	60.98	-7.65	Peak
5	0.302	33.97	10.24	0.74	44.95	50.19	-5.24	Average
6	0.822	28.17	10.18	0.81	39.16	46.00	-6.84	Average
7	1.172	37.63	10.22	0.75	48.60	56.00	-7.40	Peak
8	1.472	30.44	10.24	0.35	41.03	46.00	-4.97	Average
9	1.480	38.33	10.24	0.33	48.90	56.00	-7.10	Peak
10	7.935	26.37	10.25	0.84	37.46	50.00	-12.54	Average
11	16.226	35.97	10.26	0.91	47.14	60.00	-12.86	Peak
12	16.226	30.24	10.26	0.91	41.41	50.00	-8.59	Average

Notes:

1. An initial pre-scan was performed on the live and neutral lines with peak detector.
2. Quasi-Peak and Average measurement were performed at the frequencies with maximized peak emission.
3. Final Level =Receiver Read level + LISN Factor + Cable Loss

6.4 Conducted Output Power

Test Requirement:	FCC Part15 C Section 15.247 (b)(3)
Test Method:	ANSI C63.4:2003 , KDB 558074 and KDB 662911
Limit:	30dBm
Test setup:	
Test Instruments:	Refer to section 5.6 for details
Test mode:	Refer to section 5.3 for details
Test results:	Passed

Measurement Data

15dBi Panel Antenna

Mode	Test CH	Ant. Port	Conducted Output power (dBm)	Total power (dBm)	Limit (dBm)	Result
802.11a	Lowest	TX0	25.21	28.14	30.00	Pass
		TX1	25.04			
	Middle	TX0	25.00	28.02	30.00	Pass
		TX1	25.02			
	Highest	TX0	24.91	27.89	30.00	Pass
		TX1	24.85			
802.11n20	Lowest	TX0	25.21	28.24	30.00	Pass
		TX1	25.24			
	Middle	TX0	25.10	28.08	30.00	Pass
		TX1	25.03			
	Highest	TX0	24.97	27.96	30.00	Pass
		TX1	24.92			
802.11n40	Lowest	TX0	25.06	28.04	30.00	Pass
		TX1	25.00			
	Highest	TX0	25.19	28.15	30.00	Pass
		TX1	25.08			

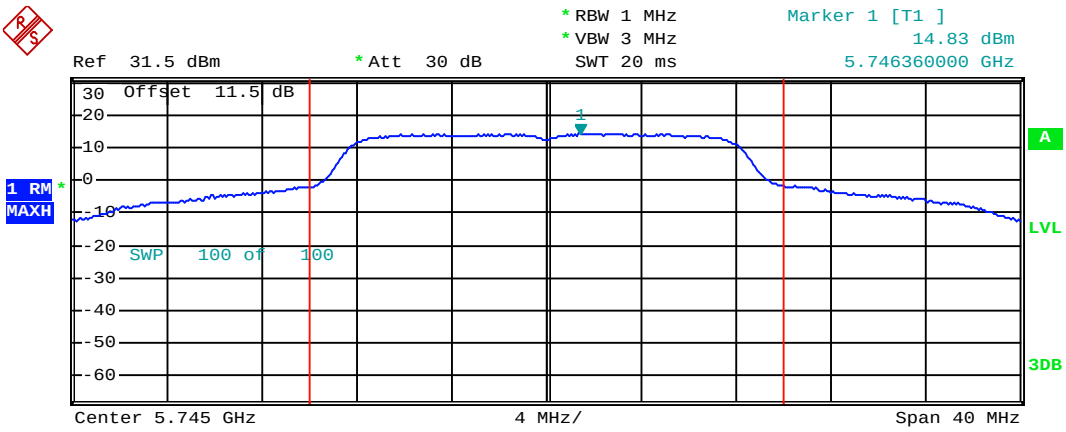
27dBi Dish Antenna

Mode	Test CH	Ant. Port	Conducted Output power (dBm)	Total power (dBm)	Limit (dBm)	Result
802.11a	Lowest	TX0	19.56	22.67	30.00	Pass
		TX1	19.76			
	Middle	TX0	19.50	22.59	30.00	Pass
		TX1	19.66			
	Highest	TX0	19.88	22.84	30.00	Pass
		TX1	19.78			
802.11n20	Lowest	TX0	19.40	22.35	30.00	Pass
		TX1	19.27			
	Middle	TX0	19.56	22.66	30.00	Pass
		TX1	19.74			
	Highest	TX0	19.45	22.65	30.00	Pass
		TX1	19.82			
802.11n40	Lowest	TX0	19.31	22.57	30.00	Pass
		TX1	19.80			
	Highest	TX0	19.37	22.62	30.00	Pass
		TX1	19.84			

Test plot as follows:

15dBi Antenna (TX0)

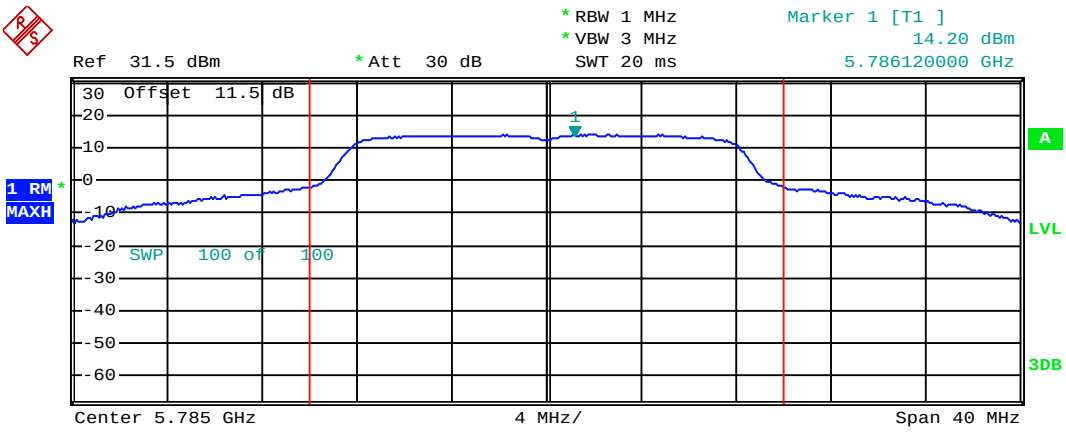
Test mode: 802.11a



Tx Channel

Bandwidth 20 MHz Power 25.21 dBm

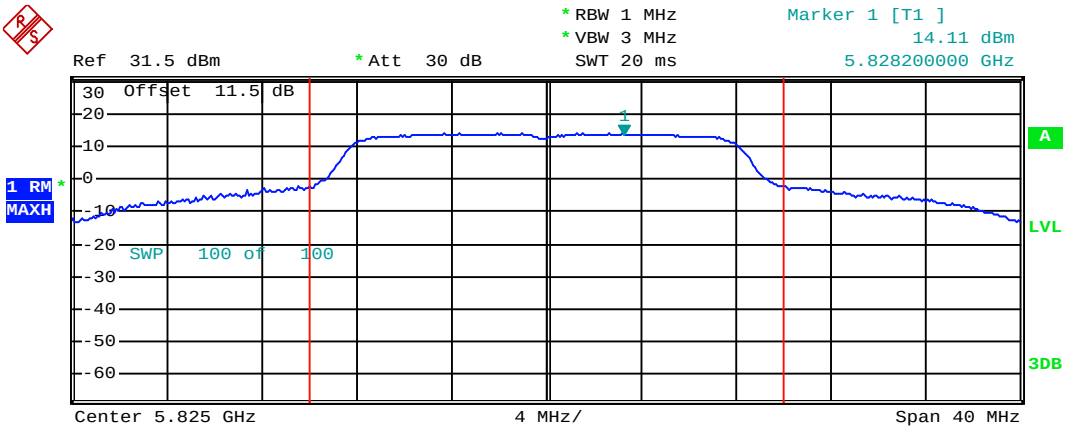
Lowest channel



Tx Channel

Bandwidth 20 MHz Power 25.00 dBm

Middle channel



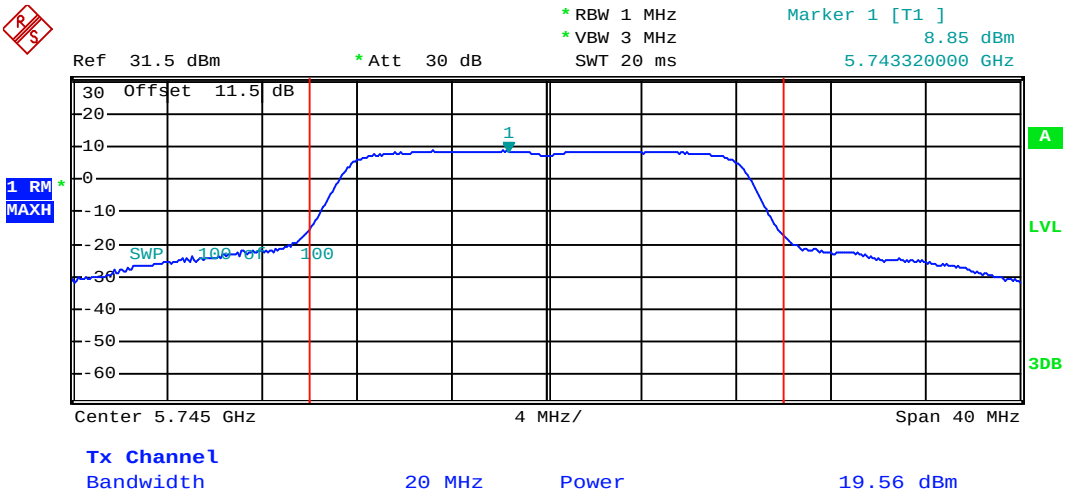
Tx Channel

Bandwidth 20 MHz Power 24.91 dBm

Highest channel

27dBi Antenna (TX0)

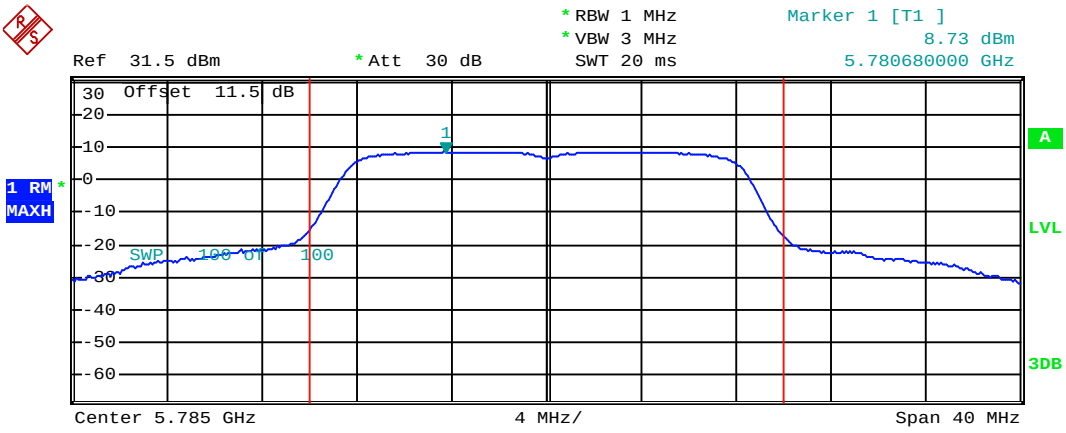
Test mode: 802.11a



Tx Channel

Bandwidth 20 MHz Power 19.56 dBm

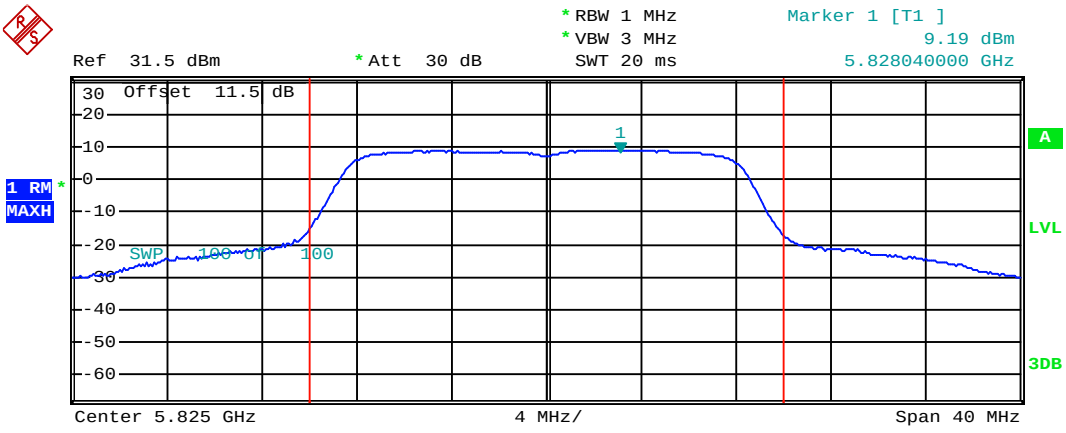
Lowest channel



Tx Channel

Bandwidth 20 MHz Power 19.50 dBm

Middle channel



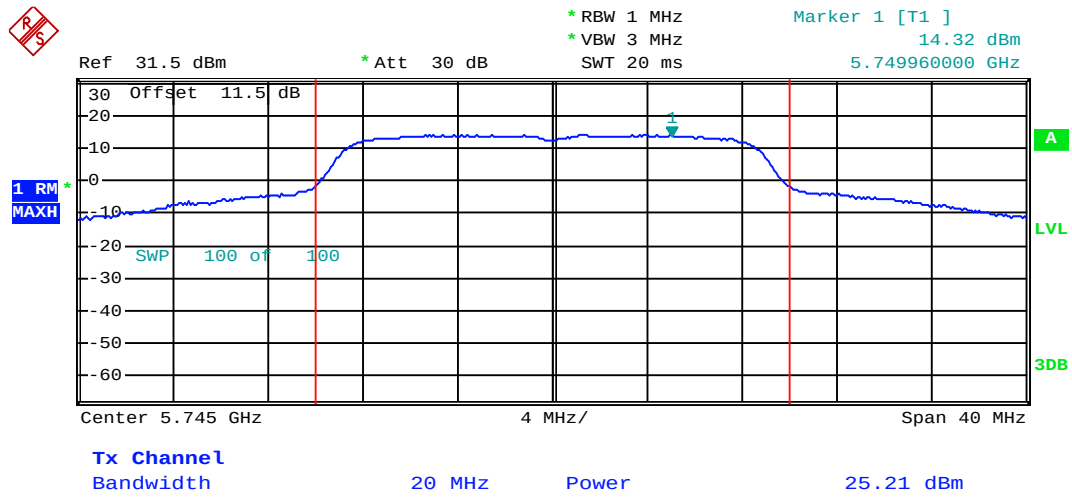
Tx Channel

Bandwidth 20 MHz Power 19.88 dBm

Highest channel

15dBi Antenna (TX0)

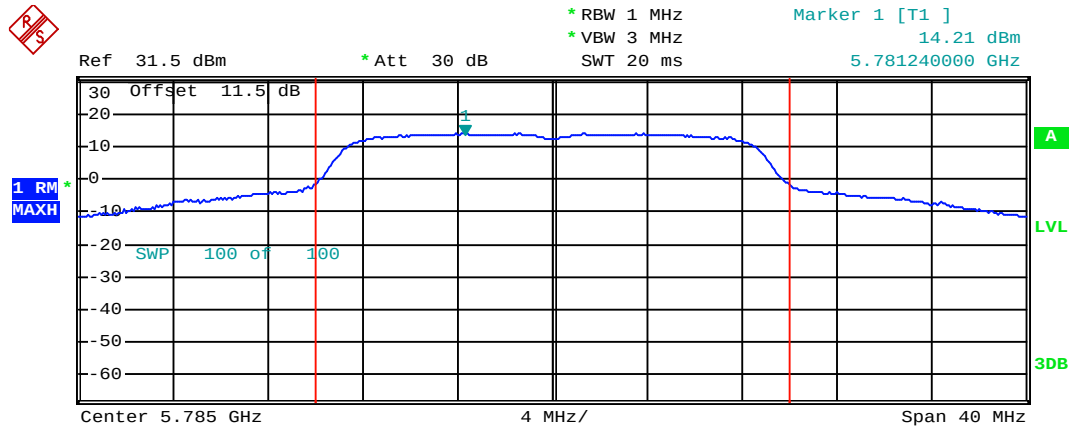
Test mode: 802.11n20



Tx Channel

Bandwidth 20 MHz Power 25.21 dBm

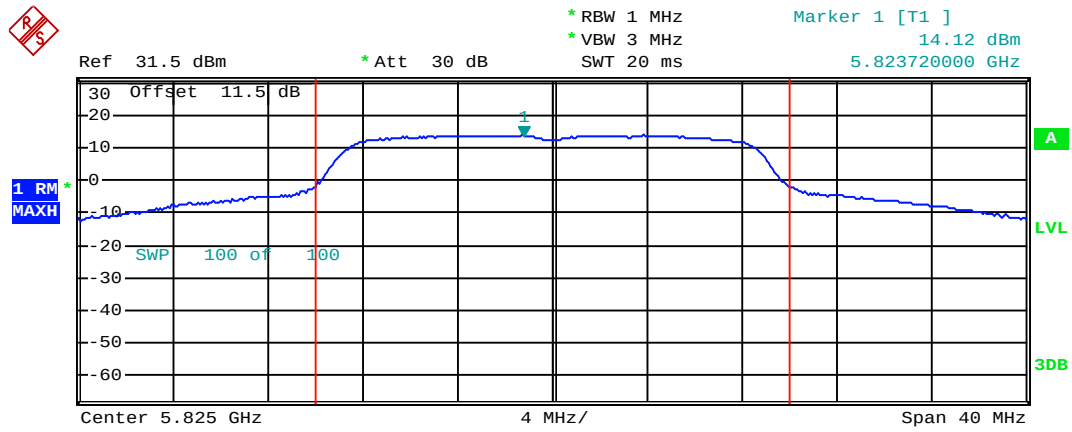
Lowest channel



Tx Channel

Bandwidth 20 MHz Power 25.10 dBm

Middle channel



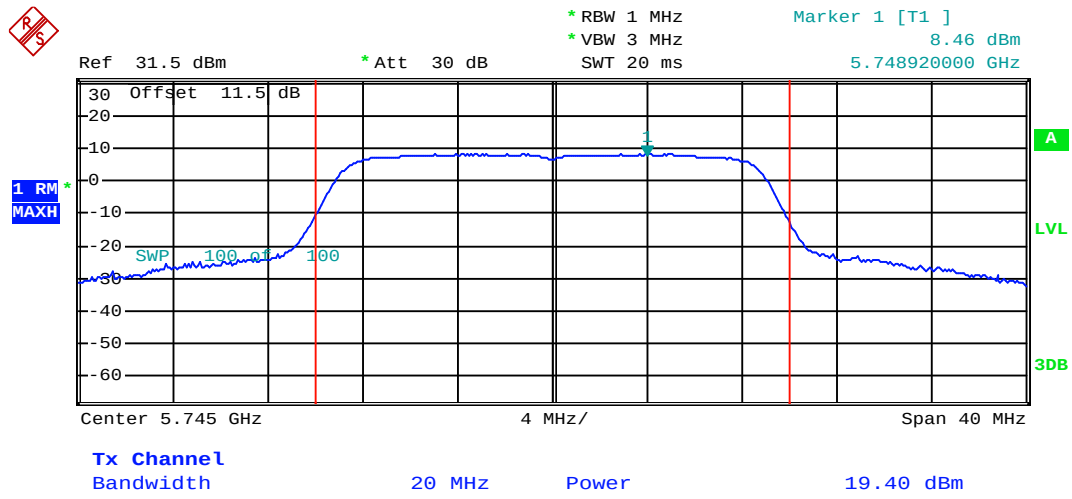
Tx Channel

Bandwidth 20 MHz Power 24.97 dBm

Highest channel

27dBi Antenna (TX0)

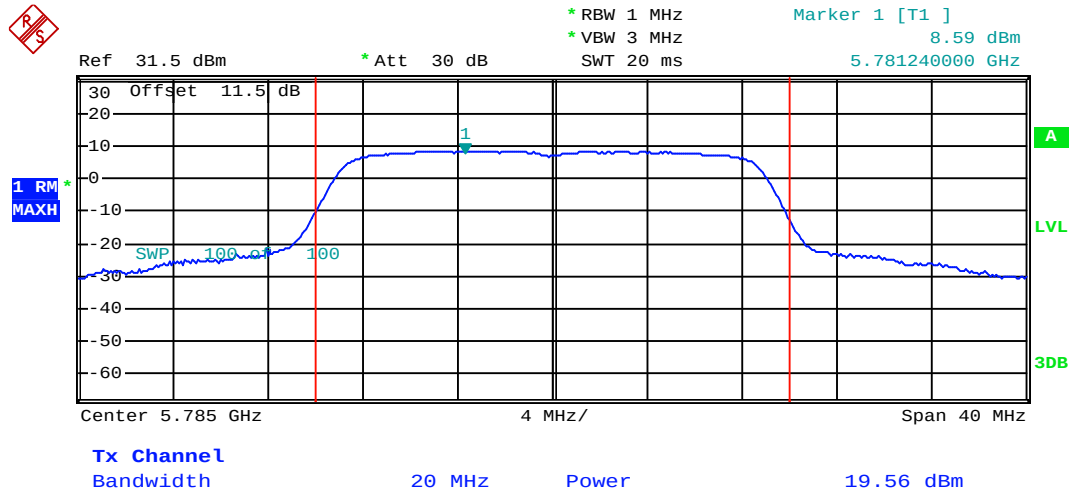
Test mode: 802.11n20



Tx Channel

Bandwidth 20 MHz Power 19.40 dBm

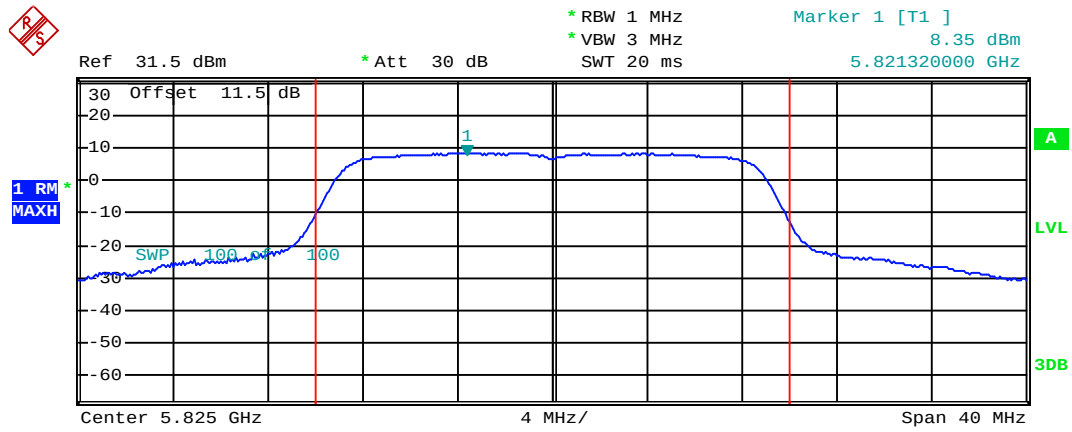
Lowest channel



Tx Channel

Bandwidth 20 MHz Power 19.56 dBm

Middle channel



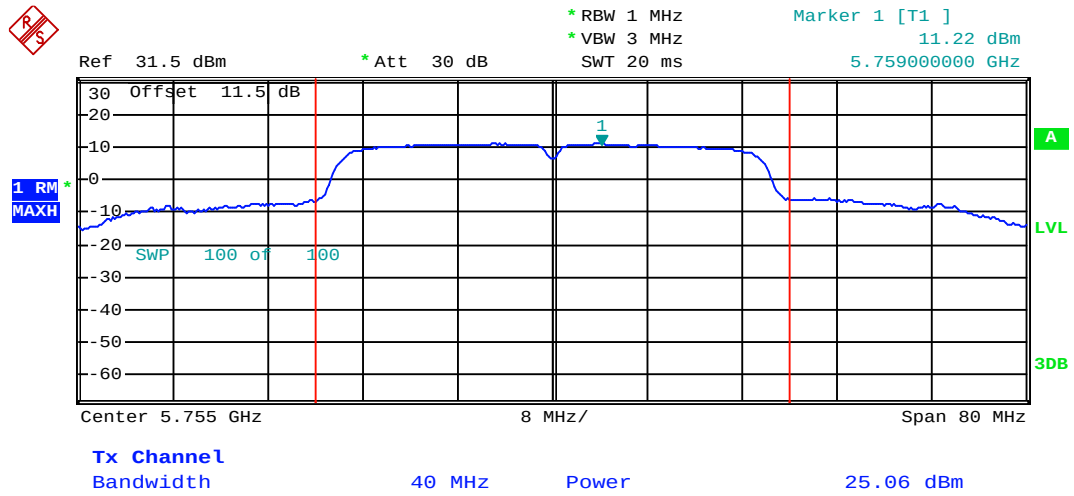
Tx Channel

Bandwidth 20 MHz Power 19.45 dBm

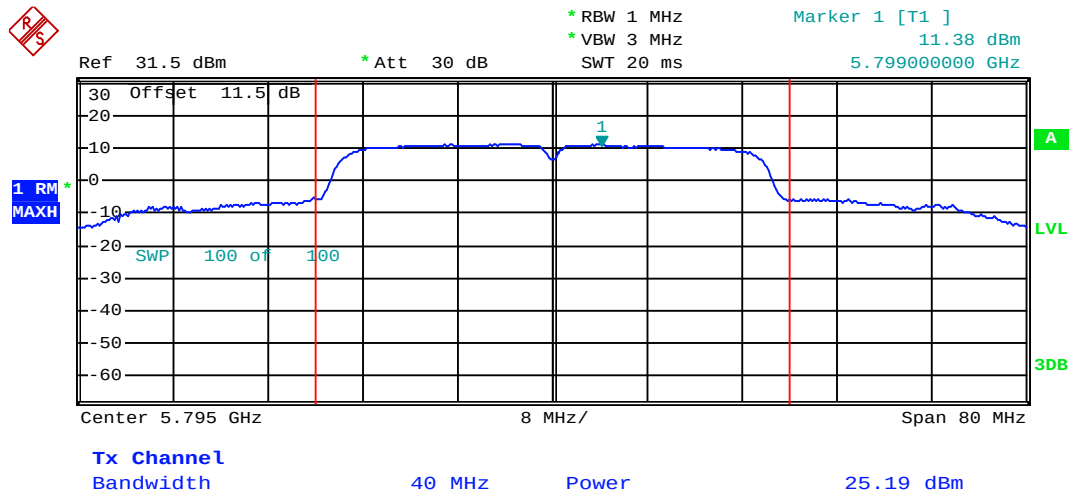
Highest channel

15dBi Antenna (TX0)

Test mode: 802.11n40



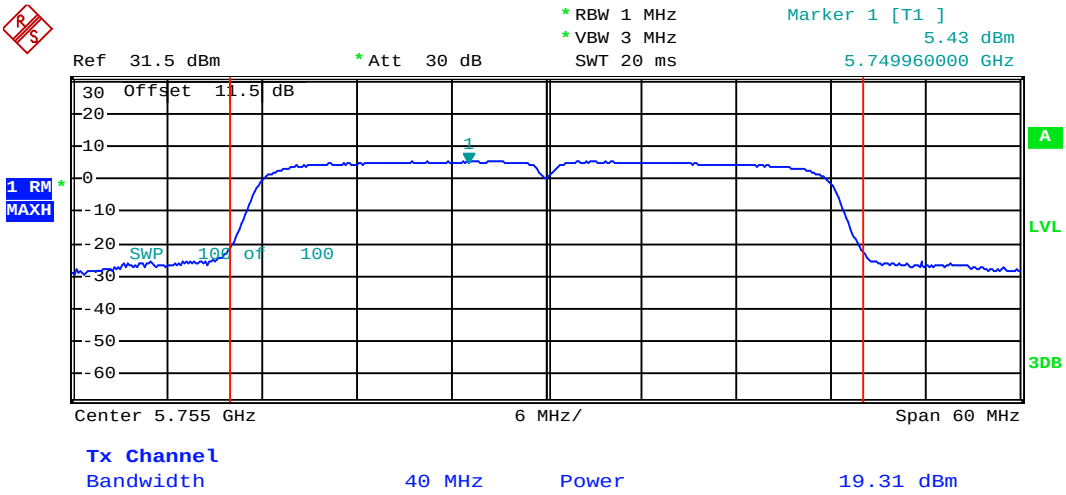
Lowest channel



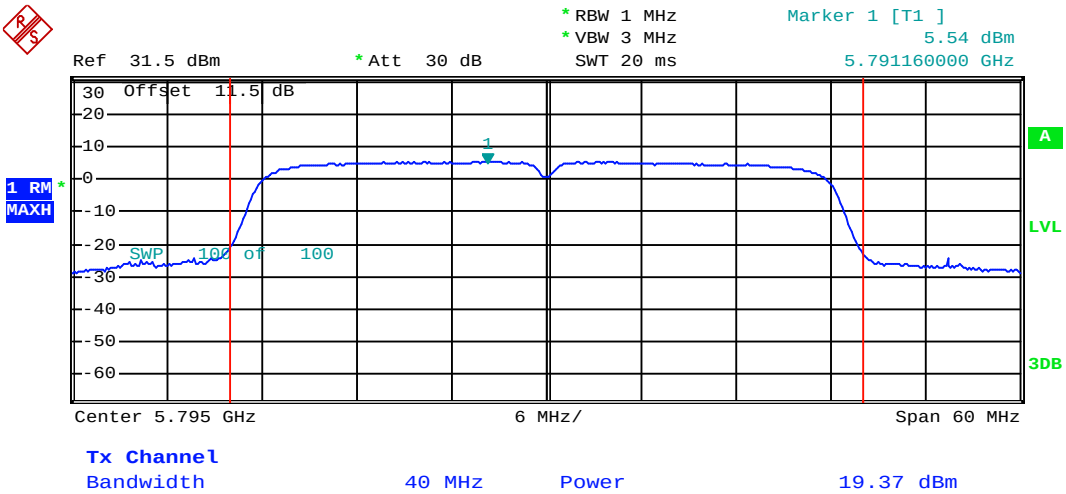
Highest channel

27dBi Antenna (TX0)

Test mode: 802.11n40



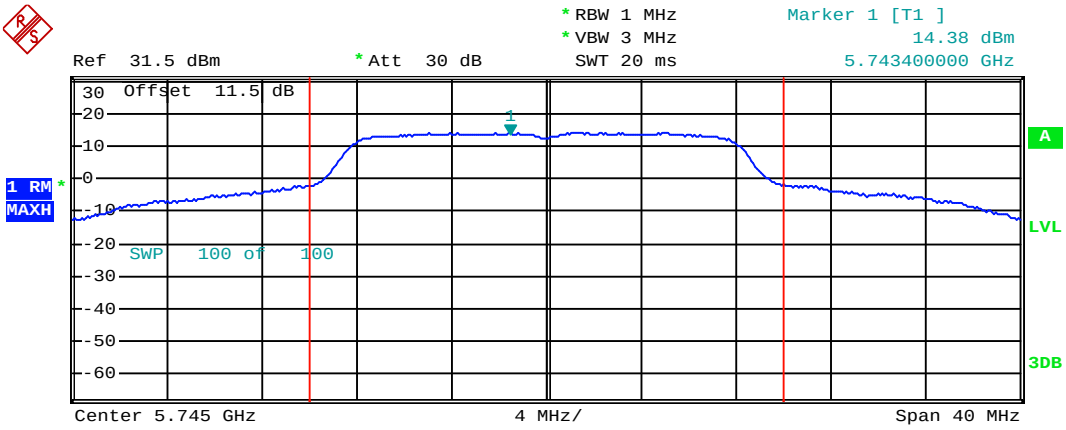
Lowest channel



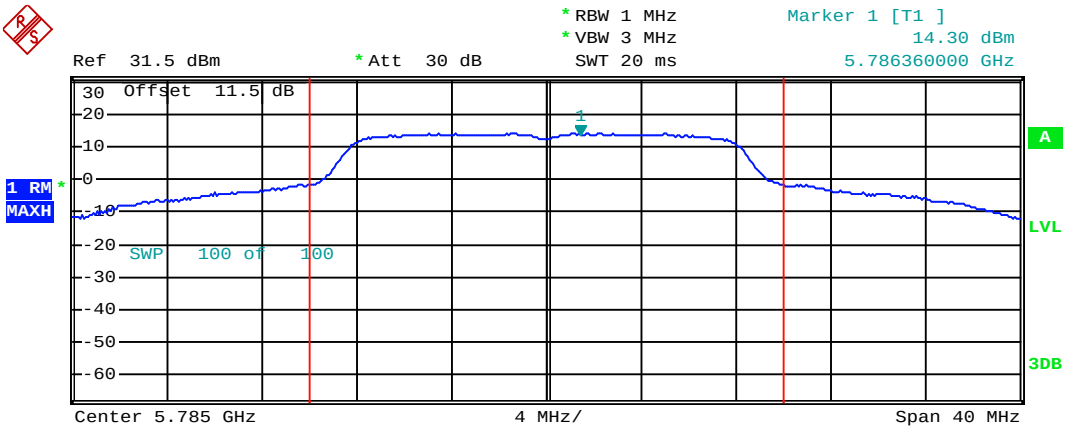
Highest channel

15dBi Antenna (TX1)

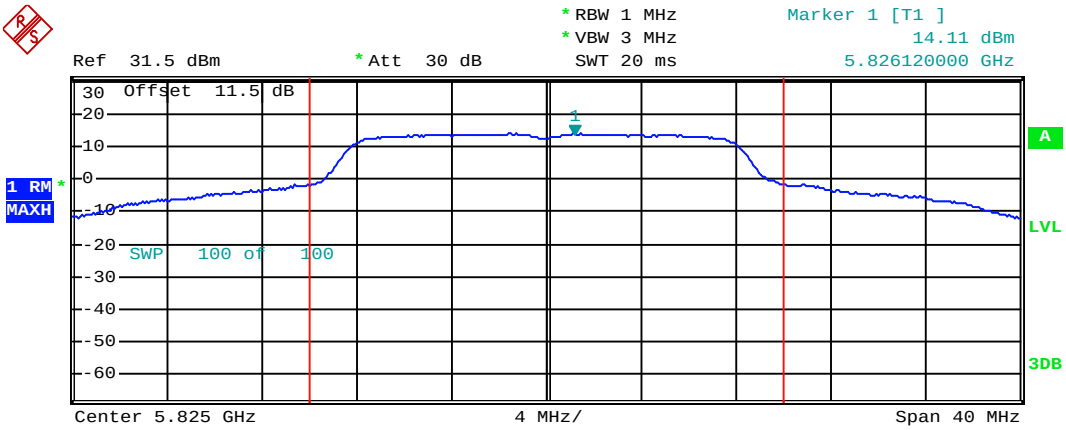
Test mode: 802.11a



Lowest channel



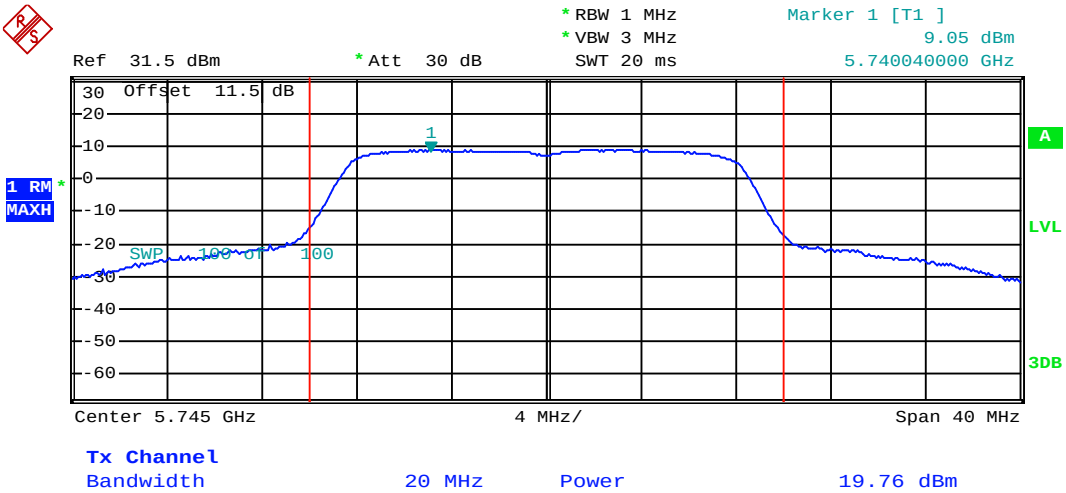
Middle channel



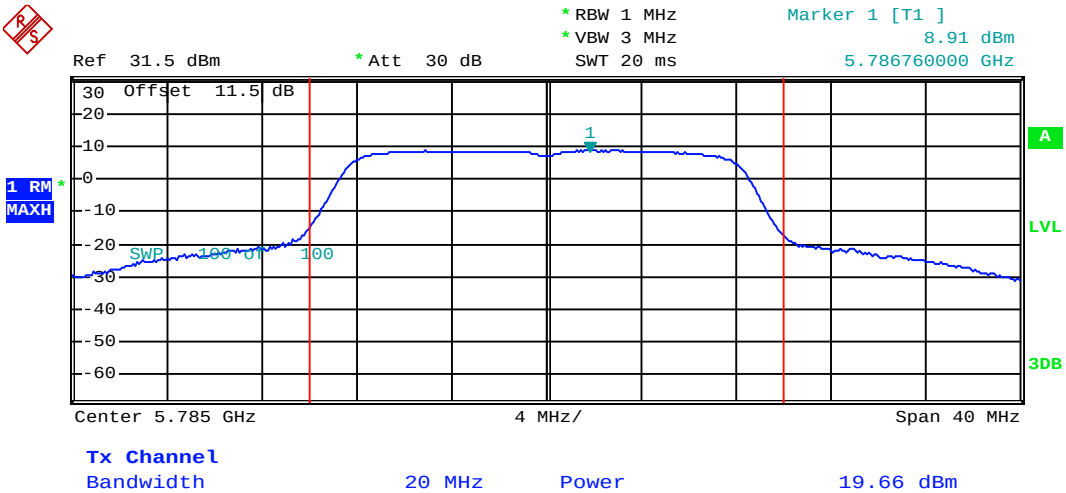
Highest channel

27dBi Antenna (TX1)

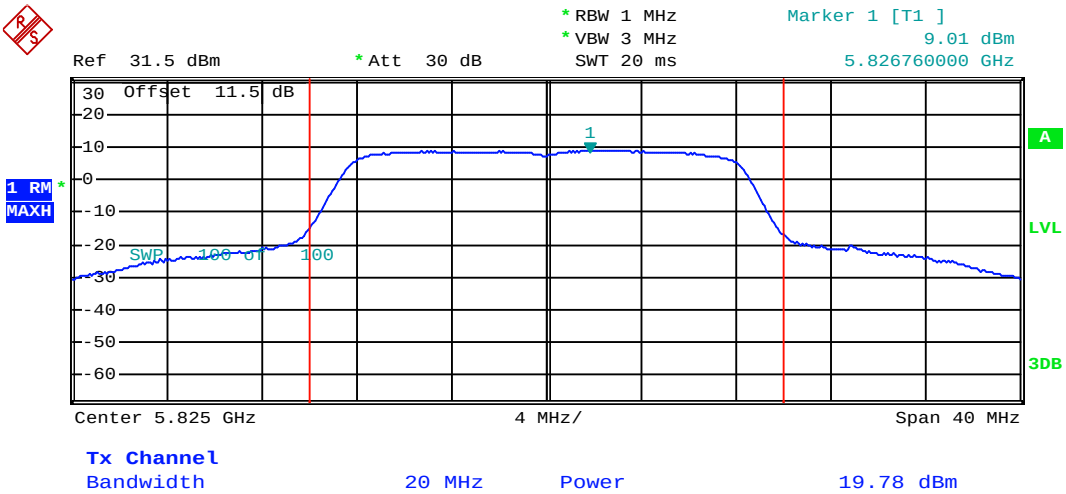
Test mode: 802.11a



Lowest channel



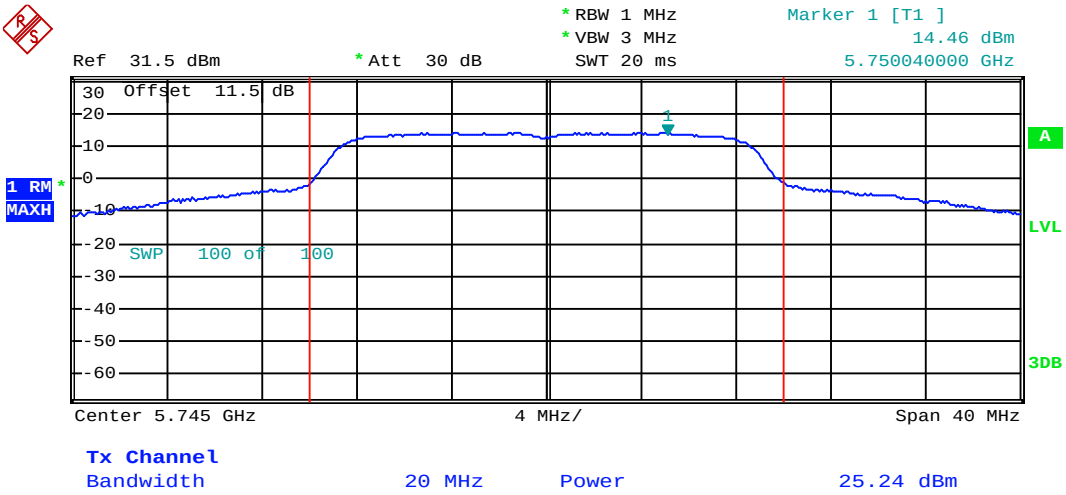
Middle channel



Highest channel

15dBi Antenna (TX1)

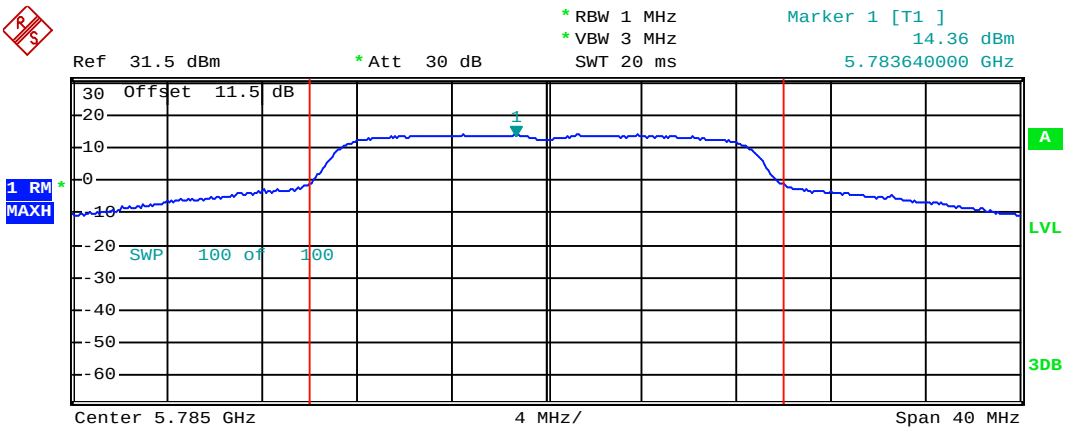
Test mode: 802.11n20



Tx Channel

Bandwidth 20 MHz Power 25.24 dBm

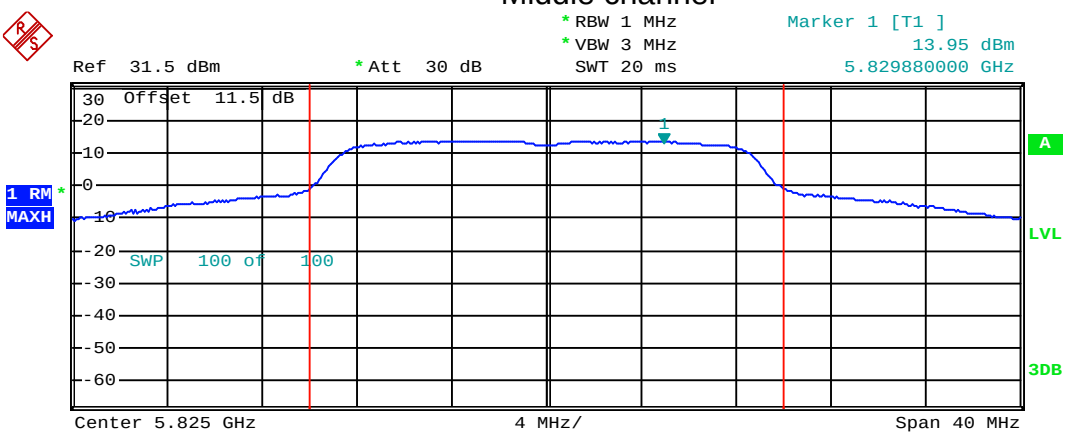
Lowest channel



Tx Channel

Bandwidth 20 MHz Power 25.03 dBm

Middle channel



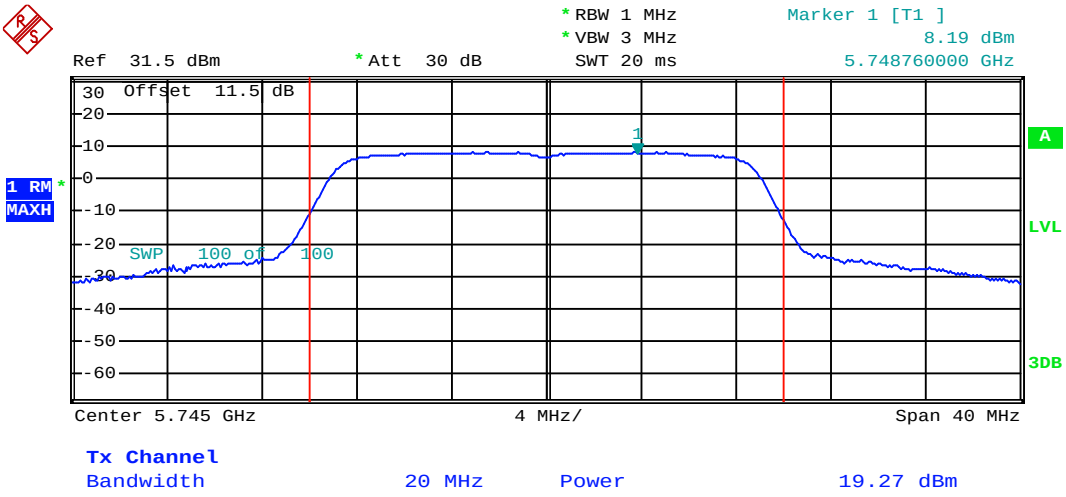
Tx Channel

Bandwidth 20 MHz Power 24.92 dBm

Highest channel

27dBi Antenna (TX1)

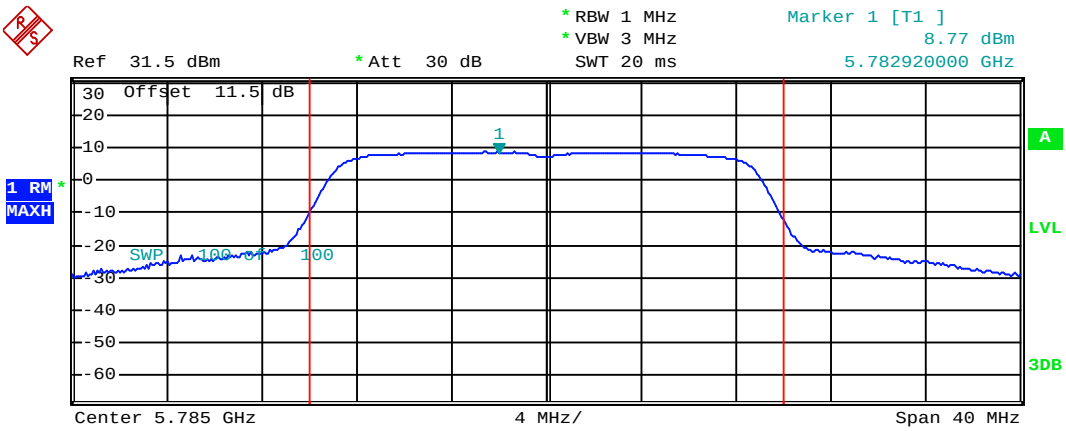
Test mode: 802.11n20



Tx Channel

Bandwidth 20 MHz Power 19.27 dBm

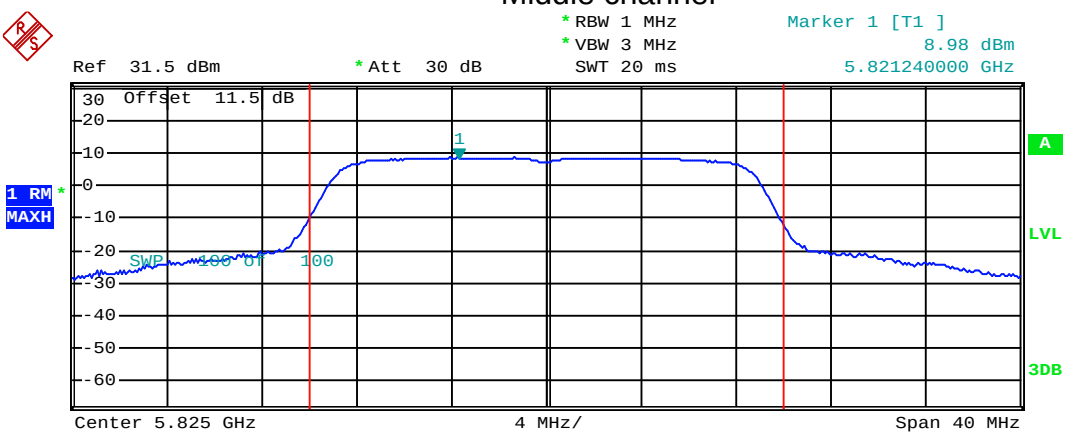
Lowest channel



Tx Channel

Bandwidth 20 MHz Power 19.74 dBm

Middle channel



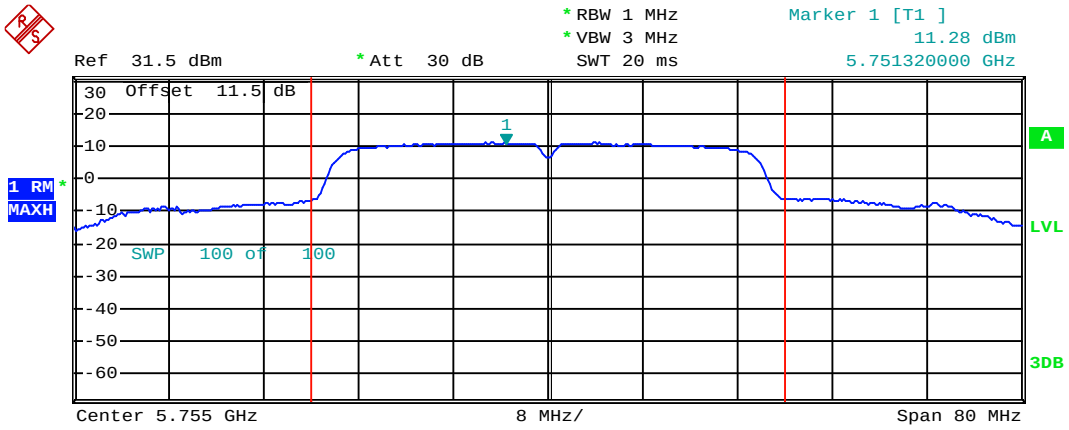
Tx Channel

Bandwidth 20 MHz Power 19.82 dBm

Highest channel

15dBi Antenna (TX1)

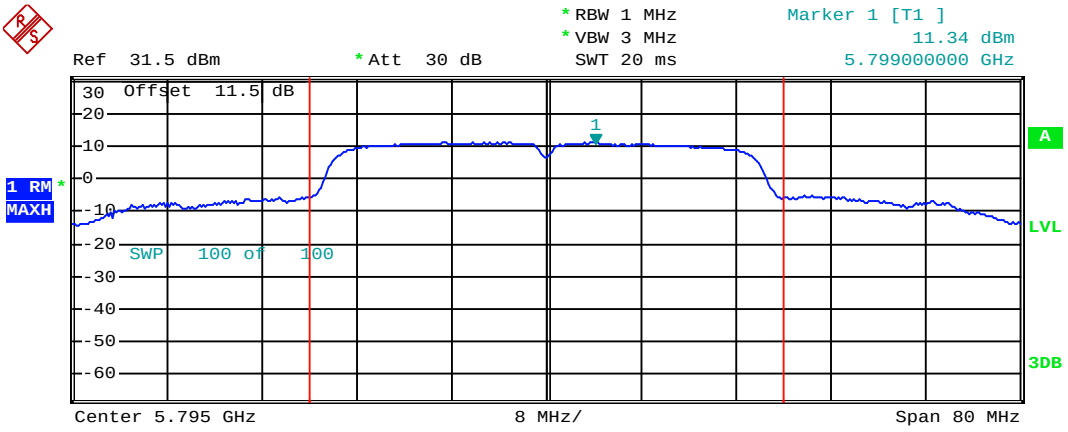
Test mode: 802.11n40



Tx Channel

Bandwidth	40 MHz	Power	25.00 dBm

Lowest channel



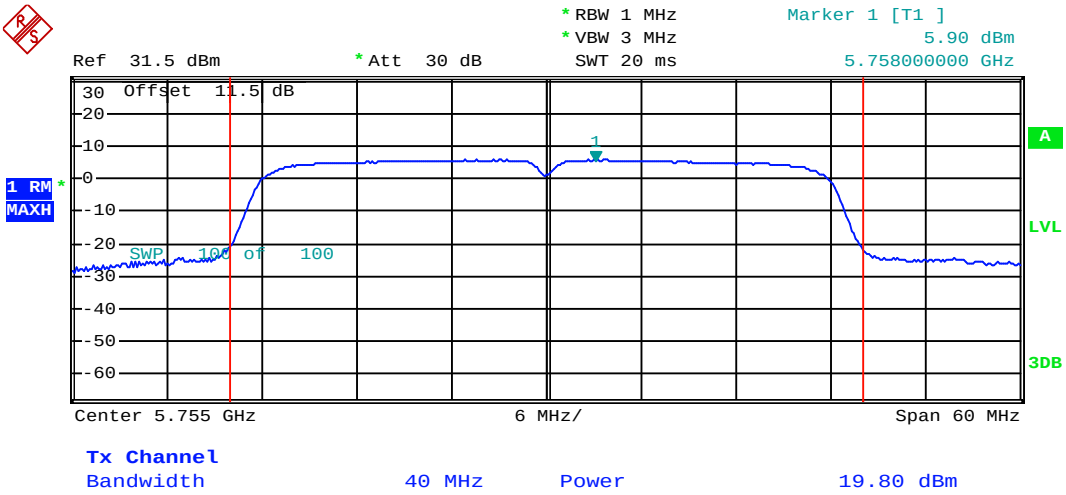
Tx Channel

Bandwidth	40 MHz	Power	25.08 dBm

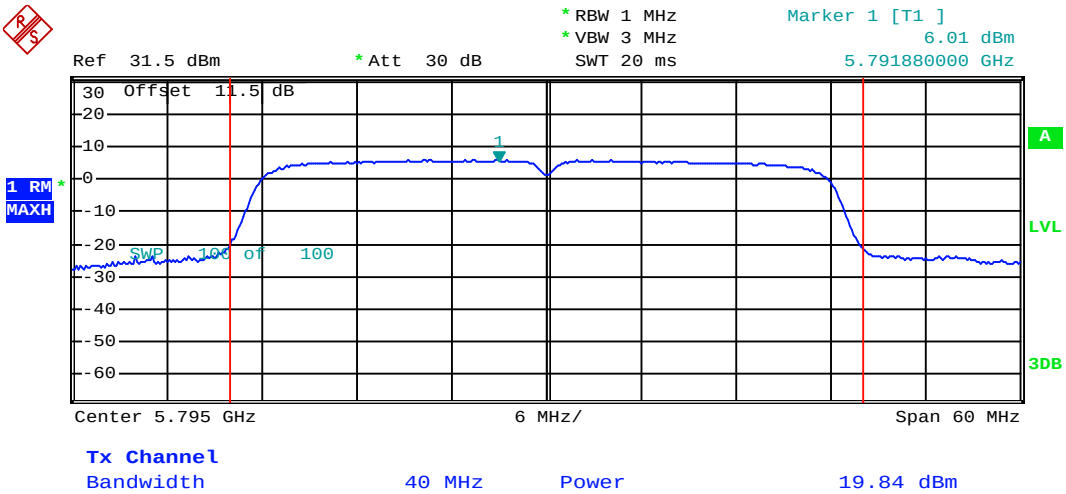
Highest channel

27dBi Antenna (TX1)

Test mode: 802.11n40

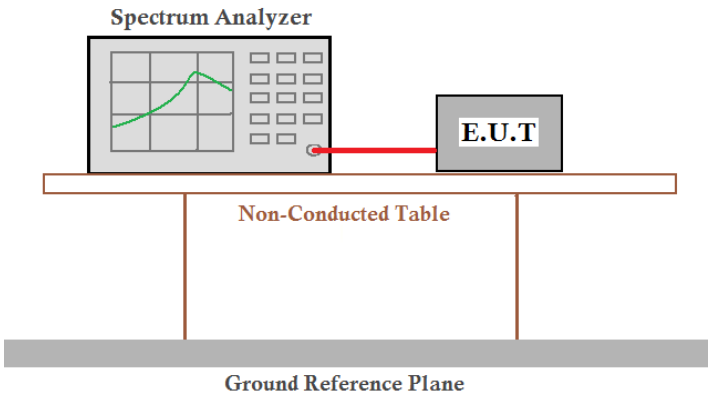


Lowest channel



Highest channel

6.5 Occupy Bandwidth

Test Requirement:	FCC Part15 C Section 15.247 (a)(2)
Test Method:	ANSI C63.4:2003 and KDB558074
Limit:	>500kHz
Test setup:	
Test Instruments:	Refer to section 5.6 for details
Test mode:	Refer to section 5.3 for details
Test results:	Passed

Measurement Data

TX0

Test CH	6dB Occupy Bandwidth (MHz)			Limit(kHz)	Result
	802.11a	802.11n20	802.11n40		
Lowest	16.16	16.24	35.52	>500	Pass
Middle	16.08	16.72	---		
Highest	16.24	16.08	35.52		

Test CH	99% Occupy Bandwidth (MHz)			Limit(kHz)	Result
	802.11a	802.11n20	802.11n40		
Lowest	17.36	17.20	35.68	N/A	N/A
Middle	17.12	17.68	---		
Highest	17.20	17.68	35.68		

TX1

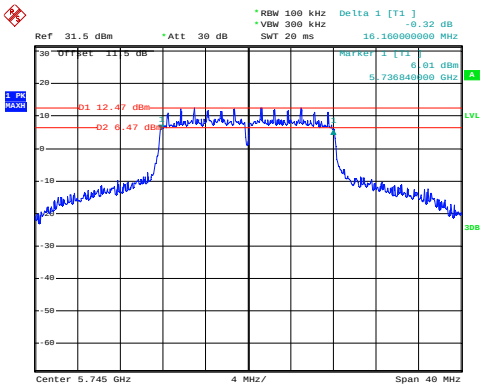
Test CH	6dB Occupy Bandwidth (MHz)			Limit(kHz)	Result
	802.11a	802.11n20	802.11n40		
Lowest	16.16	16.24	35.52	>500	Pass
Middle	16.08	16.72	---		
Highest	16.08	16.24	35.52		

Test CH	99% Occupy Bandwidth (MHz)			Limit(kHz)	Result
	802.11a	802.11n20	802.11n40		
Lowest	17.68	17.92	35.84	N/A	N/A
Middle	17.36	17.84	---		
Highest	17.52	17.68	35.68		

Test plot as follows:

TX0

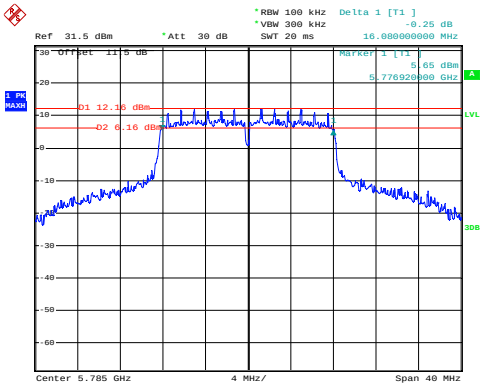
Test mode: 6dB BW 802.11a



REMOTE HIGH

Date: 31.MAY.2013 17:01:39

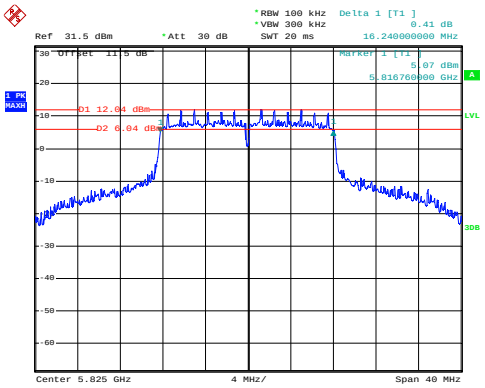
Lowest channel



REMOTE HIGH

Date: 31.MAY.2013 17:54:05

Middle channel

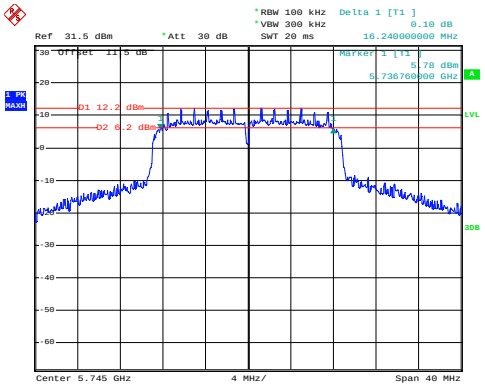


REMOTE HIGH

Date: 31.MAY.2013 18:20:44

Highest channel

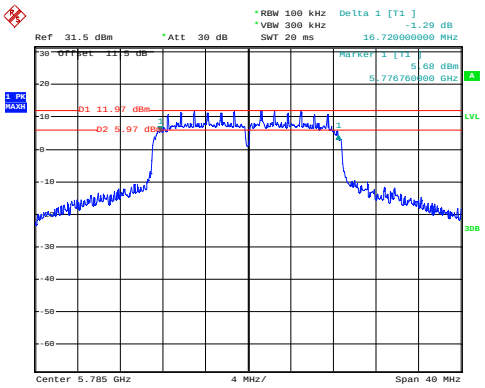
Test mode: 6dB BW 802.11n20



REMOTE HIGH

Date: 30.MAY.2013 20:54:19

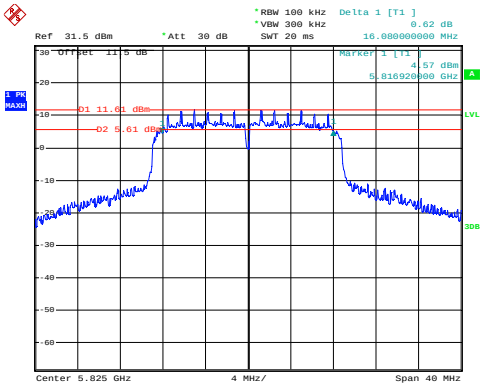
Lowest channel



REMOTE HIGH

Date: 30.MAY.2013 21:11:30

Middle channel

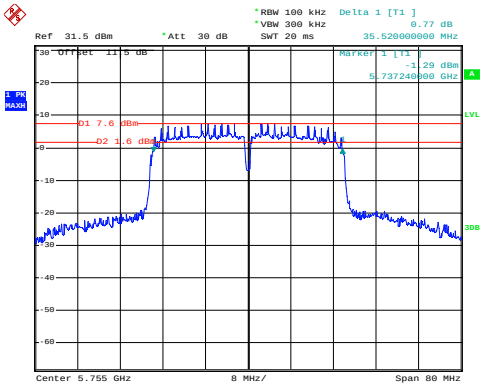


REMOTE HIGH

Date: 30.MAY.2013 21:27:52

Highest channel

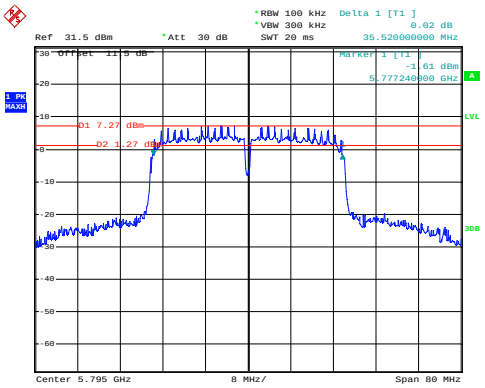
Test mode: 6dB BW 802.11n40



REMOTE HIGH

Date: 30.MAY.2013 22:53:55

Lowest channel

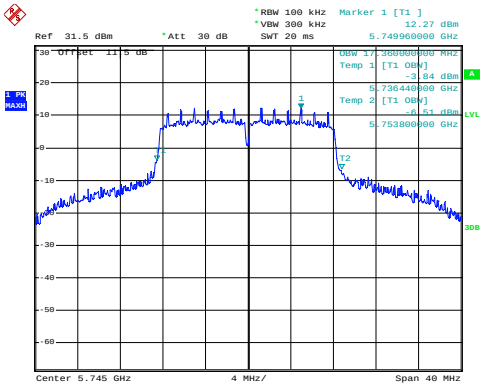


REMOTE HIGH

Date: 30.MAY.2013 23:30:17

Highest channel

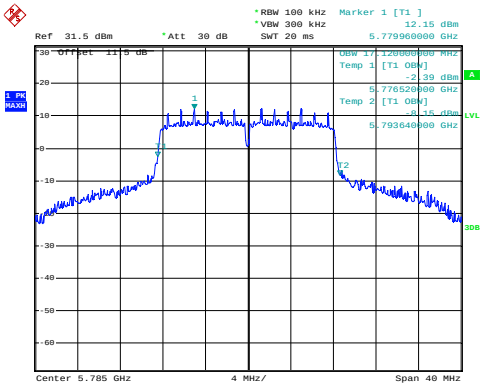
Test mode:99% BW 802.11a



REMOTE HIGH

Date: 31.MAY.2013 17:03:39

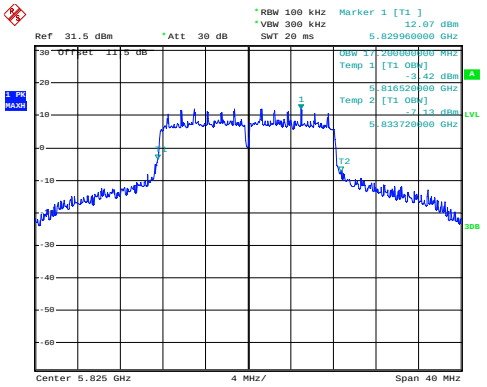
Lowest channel



REMOTE HIGH

Date: 31.MAY.2013 17:55:52

Middle channel

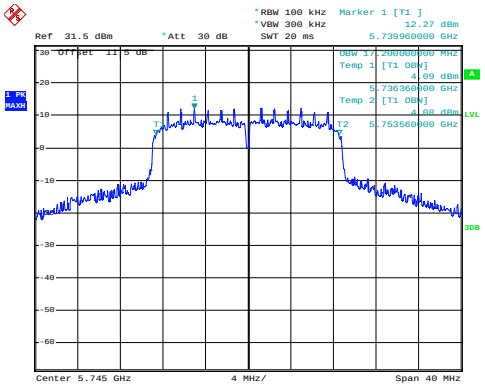


REMOTE HIGH

Date: 31.MAY.2013 18:22:18

Highest channel

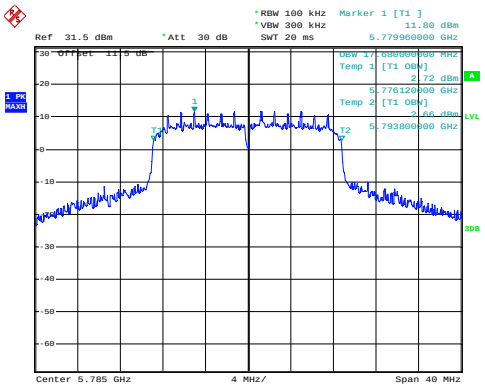
Test mode: 99% BW 802.11n20



REMOTE HIGH

Date: 30.MAY.2013 20:55:09

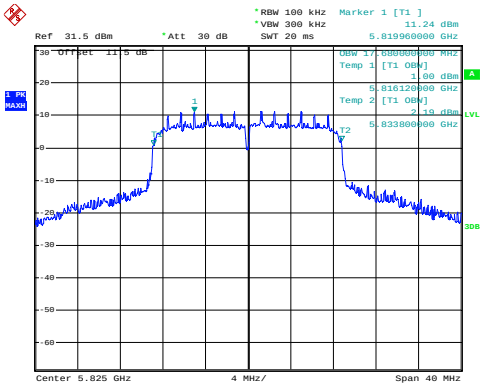
Lowest channel



REMOTE HIGH

Date: 30.MAY.2013 21:12:54

Middle channel

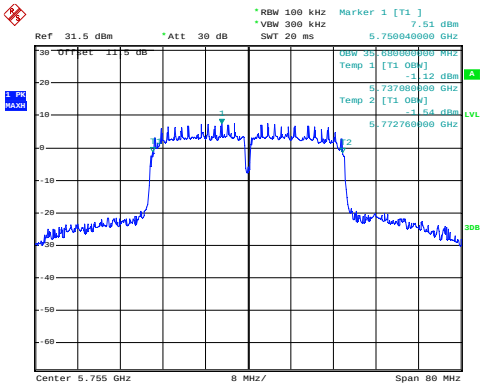


REMOTE HIGH

Date: 30.MAY.2013 21:28:54

Highest channel

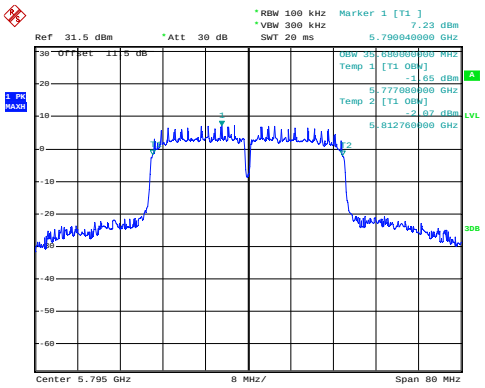
Test mode: 99% BW 802.11n40



REMOTE HIGH

Date: 30.MAY.2013 22:54:30

Lowest channel



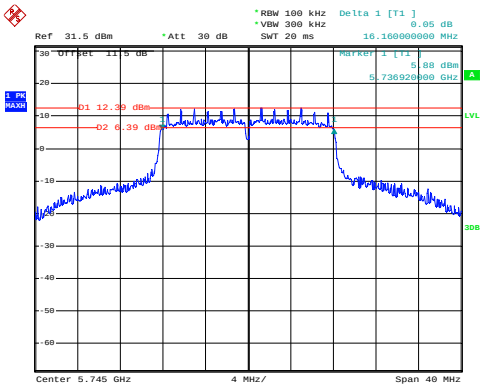
REMOTE HIGH

Date: 30.MAY.2013 23:30:58

Highest channel

TX1

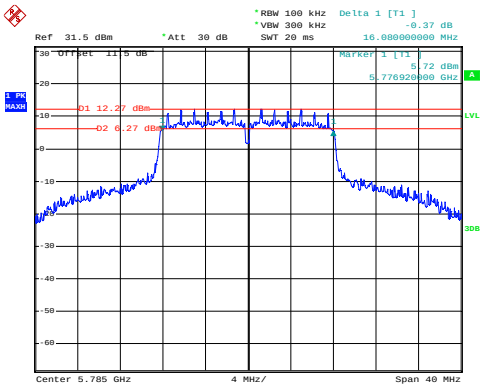
Test mode: 6dB BW 802.11a



REMOTE HIGH

Date: 31.MAY.2013 17:22:05

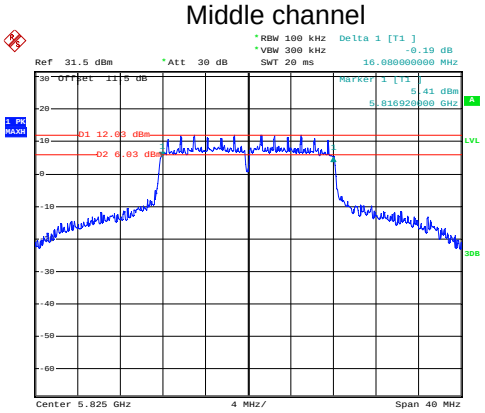
Lowest channel



REMOTE HIGH

Date: 31.MAY.2013 17:39:34

Middle channel

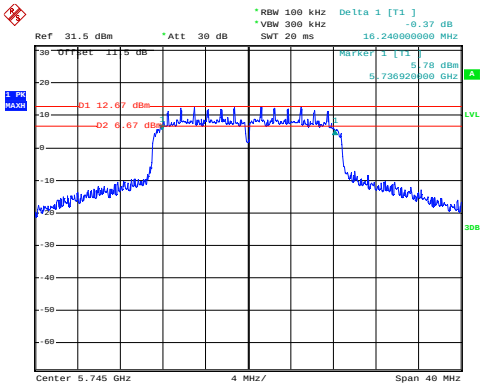


REMOTE HIGH

Date: 31.MAY.2013 18:40:37

Highest channel

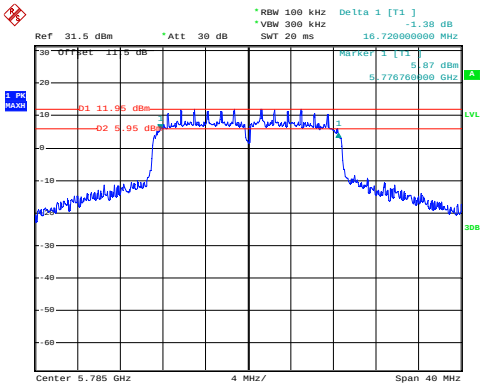
Test mode: 6dB BW 802.11n20



REMOTE HIGH

Date: 30.MAY.2013 21:50:04

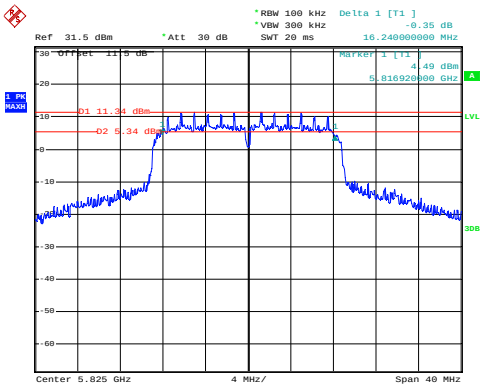
Lowest channel



REMOTE HIGH

Date: 30.MAY.2013 22:08:27

Middle channel

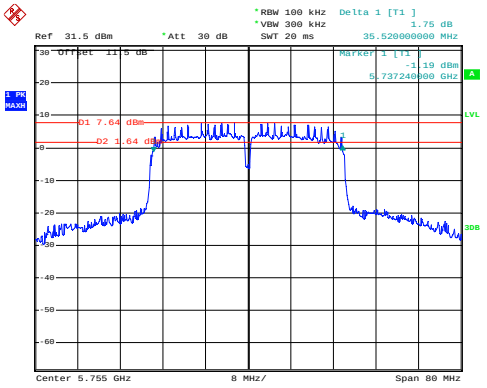


REMOTE HIGH

Date: 30.MAY.2013 22:20:51

Highest channel

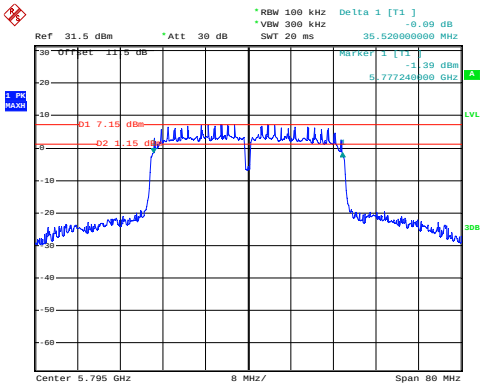
Test mode: 6dB BW 802.11n40



REMOTE HIGH

Date: 30.MAY.2013 23:05:44

Lowest channel

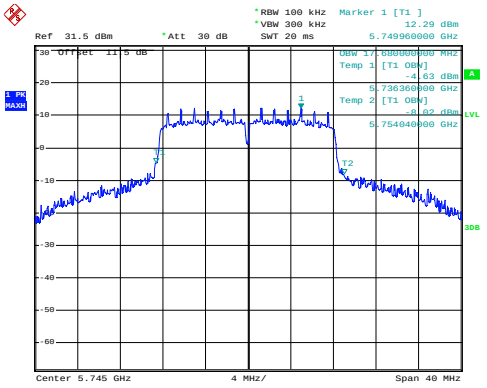


REMOTE HIGH

Date: 30.MAY.2013 23:17:58

Highest channel

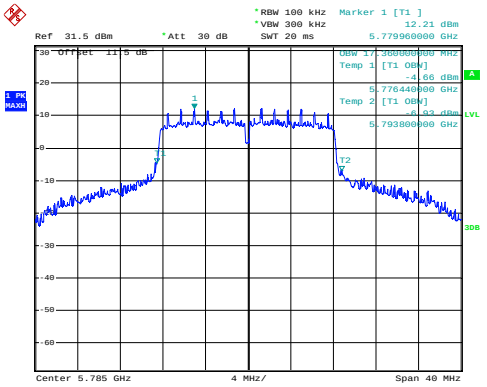
Test mode:99% BW 802.11a



REMOTE HIGH

Date: 31.MAY.2013 17:24:22

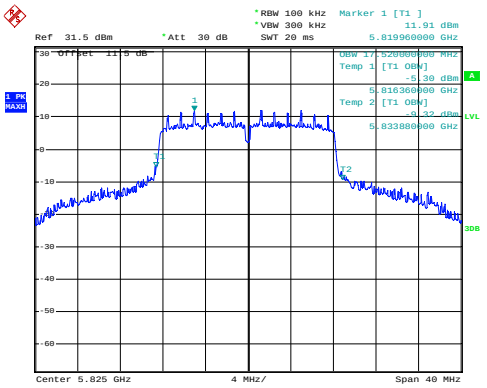
Lowest channel



REMOTE HIGH

Date: 31.MAY.2013 18:14:39

Middle channel

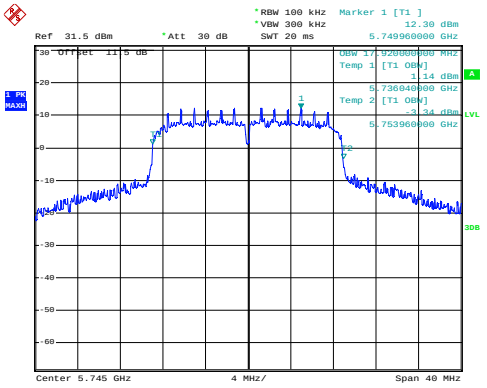


REMOTE HIGH

Date: 31.MAY.2013 18:41:58

Highest channel

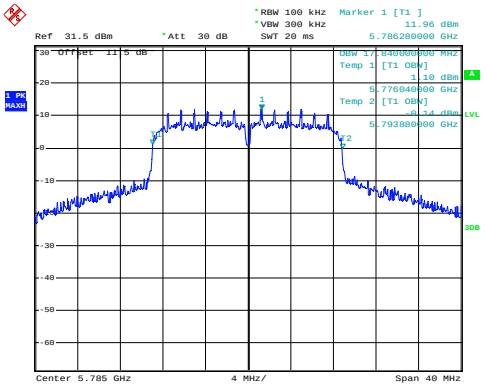
Test mode: 99% BW 802.11n20



REMOTE HIGH

Date: 30.MAY.2013 21:51:53

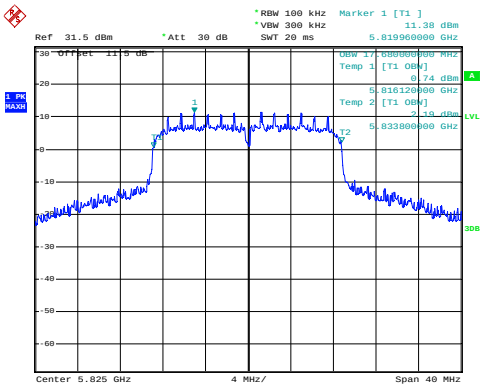
Lowest channel



REMOTE HIGH

Date: 30.MAY.2013 22:09:05

Middle channel

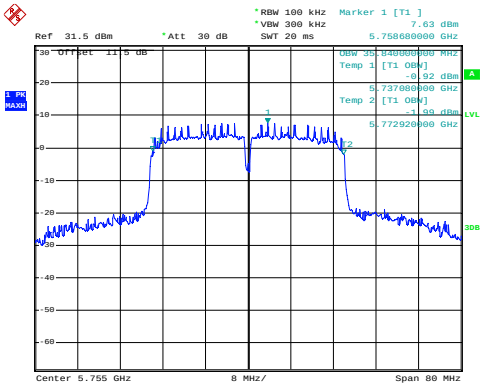


REMOTE HIGH

Date: 30.MAY.2013 22:21:37

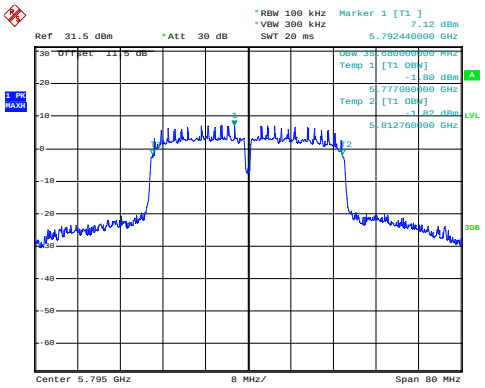
Highest channel

Test mode: 99% BW 802.11n40



REMOTE HIGH
Date: 30.MAY.2013 23:06:36

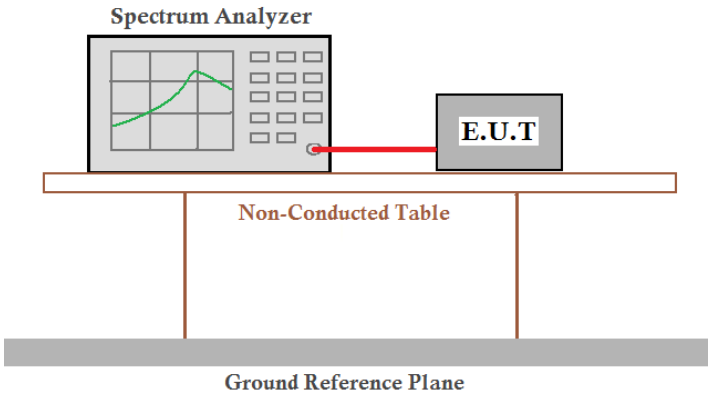
Lowest channel



REMOTE HIGH
Date: 30.MAY.2013 23:19:15

Highest channel

6.6 Power Spectral Density

Test Requirement:	FCC Part15 C Section 15.247 (e)
Test Method:	ANSI C63.4:2003 , KDB 558074 and KDB 662911
Limit:	8dBm
Test setup:	
Test Instruments:	Refer to section 5.6 for details
Test mode:	Refer to section 5.3 for details. Base on the section 6.4 conducted output power; we selected EUT with 15 dBi antenna for test.
Test results:	Passed

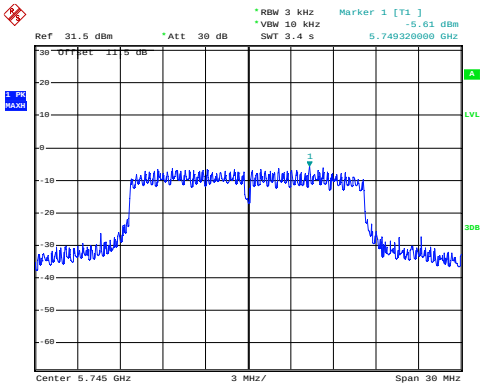
Measurement Data

Mode	Test CH	Ant. Port	PSD (dBm)	Total PSD (dBm)	Limit (dBm)	Result
802.11a	Lowest	TX0	-5.61	-2.55	8.00	Pass
		TX1	-5.51			
	Middle	TX0	-5.83	-2.57	8.00	Pass
		TX1	-5.34			
	Highest	TX0	-6.29	-3.33	8.00	Pass
		TX1	-6.40			
802.11n 20	Lowest	TX0	-5.27	-2.30	8.00	Pass
		TX1	-5.36			
	Middle	TX0	-5.30	-2.42	8.00	Pass
		TX1	-5.57			
	Highest	TX0	-5.32	-2.51	8.00	Pass
		TX1	-5.73			
802.11n 40	Lowest	TX0	-8.96	-6.44	8.00	Pass
		TX1	-10.01			
	Highest	TX0	-9.23	-6.10	8.00	Pass
		TX1	-9.06			

Test plot as follows:

TX0

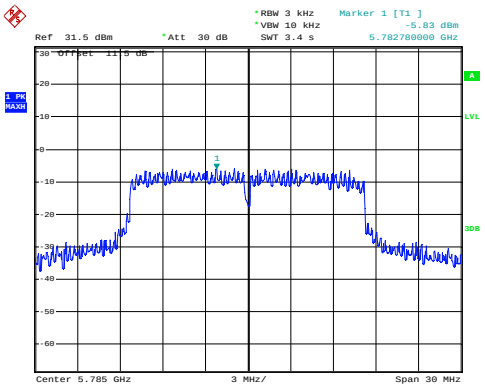
Test mode: 802.11a



REMOTE HIGH

Date: 31.MAY.2013 17:12:31

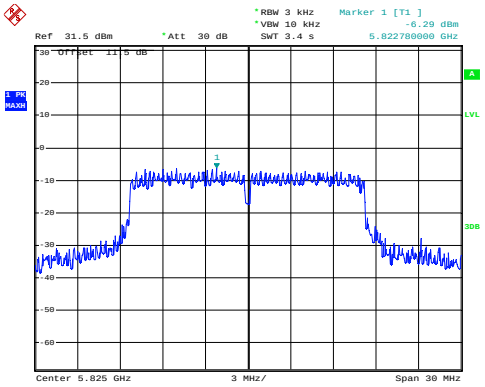
Lowest channel



REMOTE HIGH

Date: 31.MAY.2013 17:58:57

Middle channel

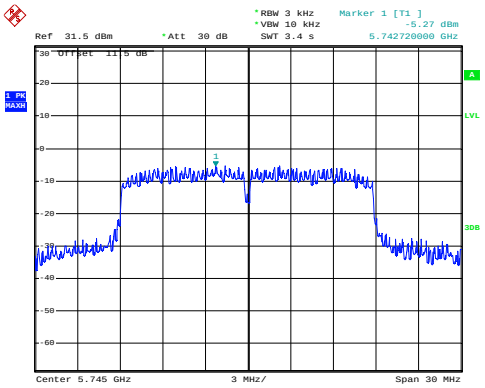


REMOTE HIGH

Date: 31.MAY.2013 18:33:15

Highest channel

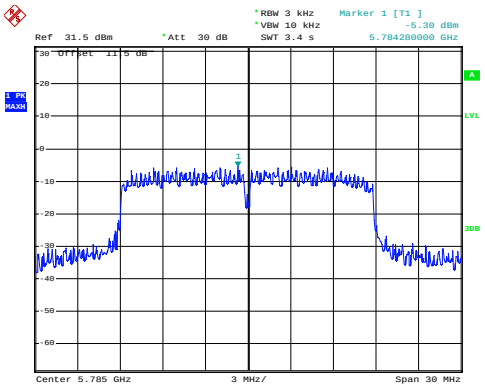
Test mode: 802.11n20



REMOTE HIGH

Date: 30.MAY.2013 21:45:04

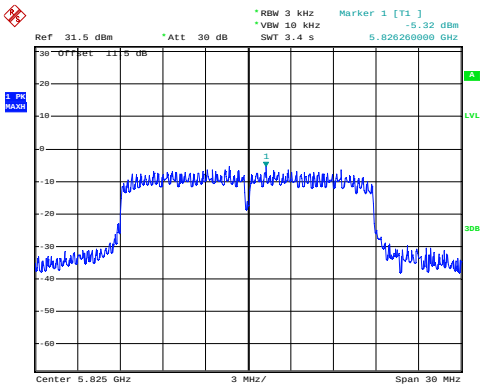
Lowest channel



REMOTE HIGH

Date: 30.MAY.2013 21:19:04

Middle channel

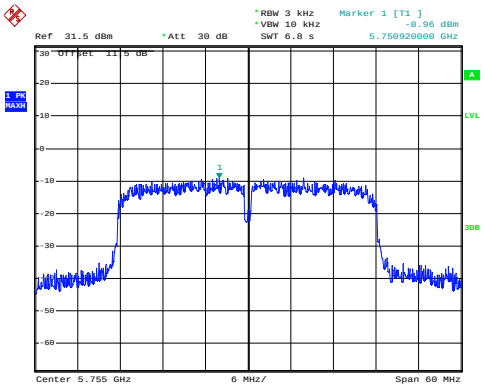


REMOTE HIGH

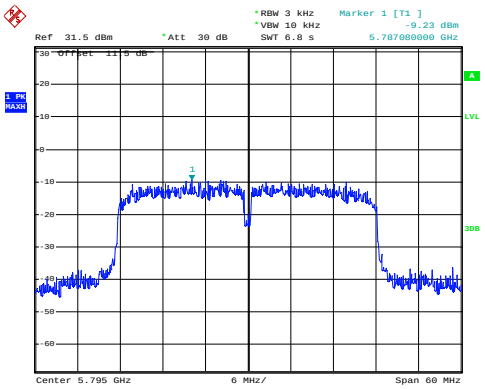
Date: 30.MAY.2013 21:36:53

Highest channel

Test mode: 802.11n40



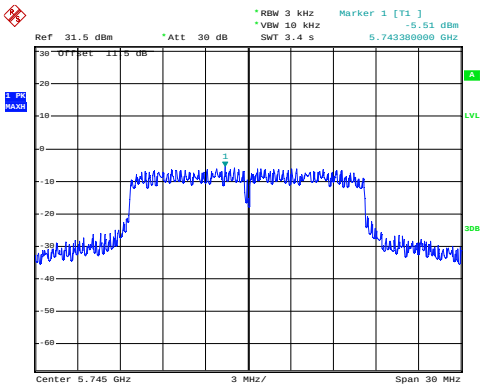
Lowest channel



Highest channel

TX1

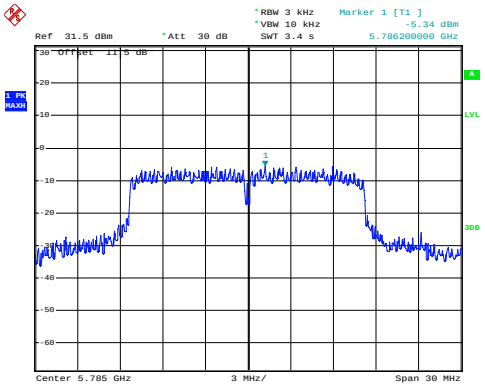
Test mode: 802.11a



REMOTE HIGH

Date: 31.MAY.2013 17:32:19

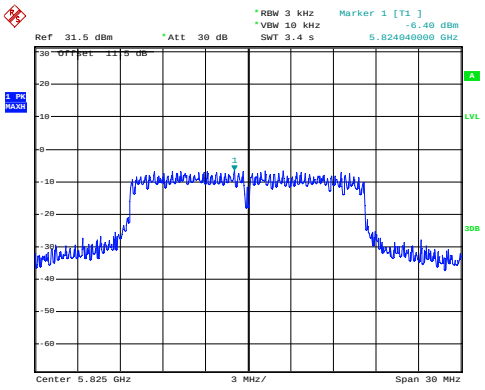
Lowest channel



REMOTE HIGH

Date: 31.MAY.2013 17:42:08

Middle channel

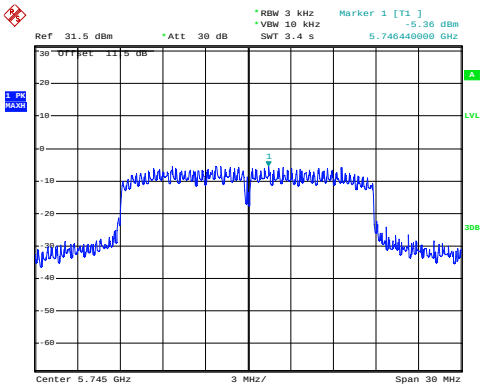


REMOTE HIGH

Date: 31.MAY.2013 18:50:53

Highest channel

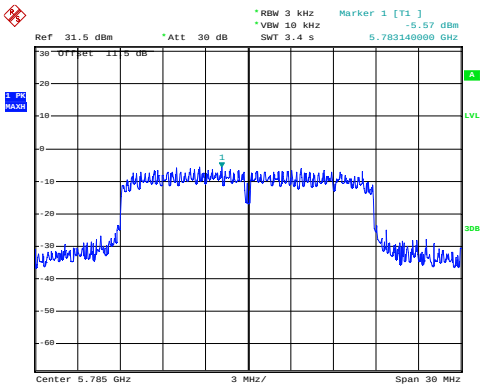
Test mode: 802.11n20



REMOTE HIGH

Date: 30.MAY.2013 22:00:01

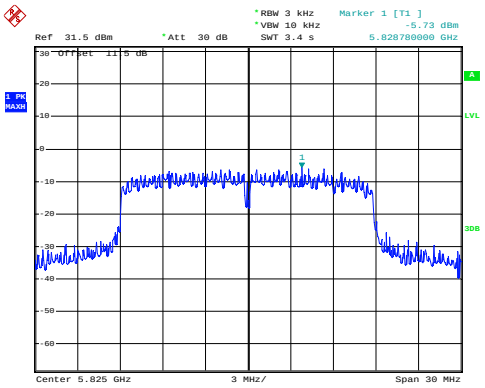
Lowest channel



REMOTE HIGH

Date: 30.MAY.2013 22:12:06

Middle channel

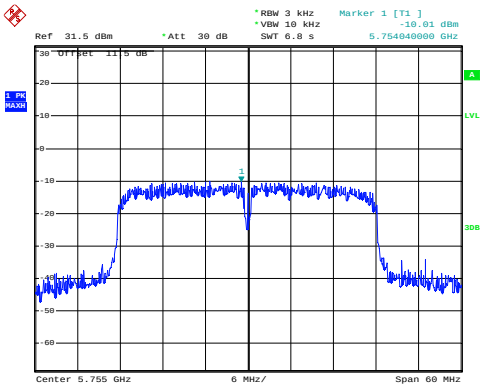


REMOTE HIGH

Date: 30.MAY.2013 22:26:17

Highest channel

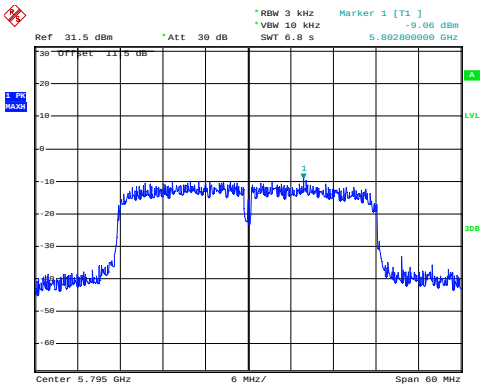
Test mode: 802.11n40



REMOTE HIGH

Date: 30.MAY.2013 23:13:02

Lowest channel



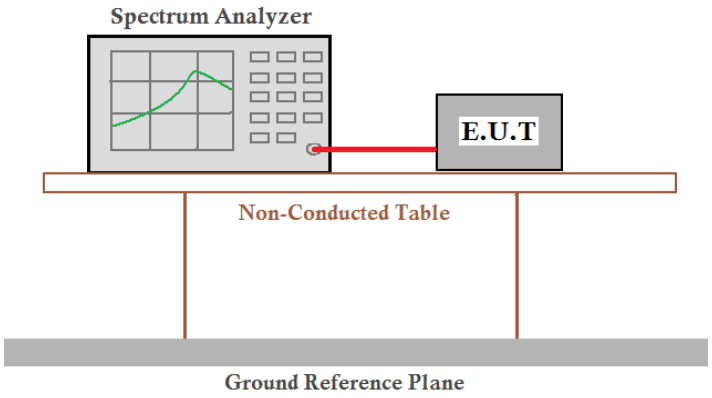
REMOTE HIGH

Date: 30.MAY.2013 23:24:25

Highest channel

6.7 Band Edge

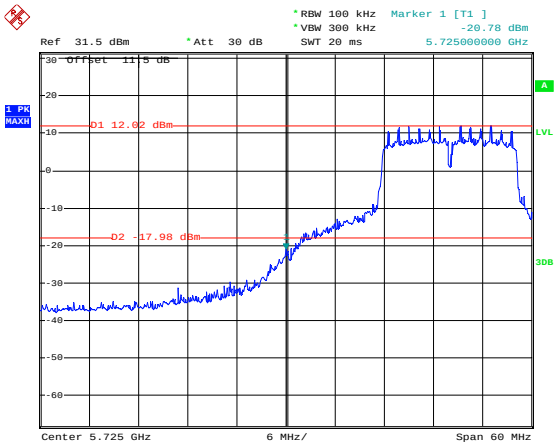
6.7.1 Conducted Emission Method

Test Requirement:	FCC Part15 C Section 15.247 (d)
Test Method:	ANSI C63.4:2003 , KDB 558074 and KDB 662911
Limit:	In any 100 kHz bandwidth outside the frequency band in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 30 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement.
Test setup:	
Test Instruments:	Refer to section 5.6 for details
Test mode:	Refer to section 5.3 for details. Base on the section 6.4 conducted output power; we selected EUT with 15 dBi antenna for test.
Test results:	Passed

Test plot as follows:

TX0

Test mode:

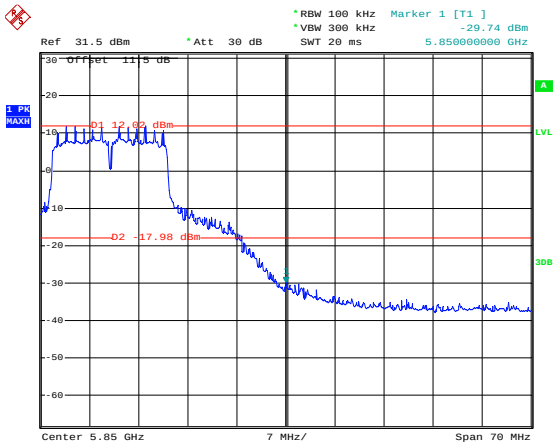


REMOTE HIGH

Date: 31.MAY.2013 17:08:05

Lowest channel

802.11a

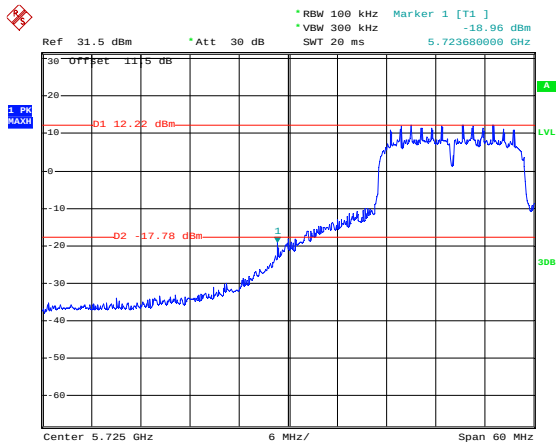


REMOTE HIGH

Date: 31.MAY.2013 18:25:48

Highest channel

Test mode:

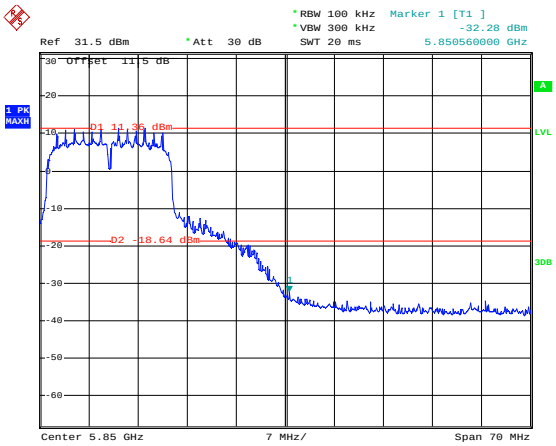


REMOTE HIGH

Date: 30.MAY.2013 21:41:39

Lowest channel

802.11n20

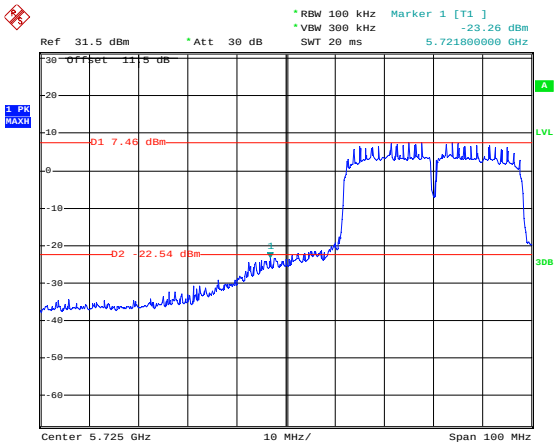


REMOTE HIGH

Date: 30.MAY.2013 21:31:42

Highest channel

Test mode:

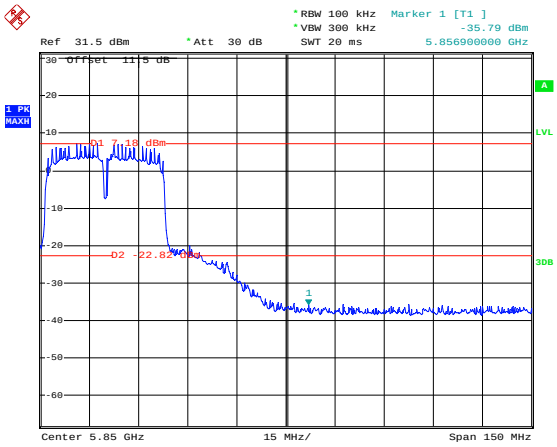


REMOTE HIGH

Date: 30.MAY.2013 22:57:22

Lowest channel

802.11n40



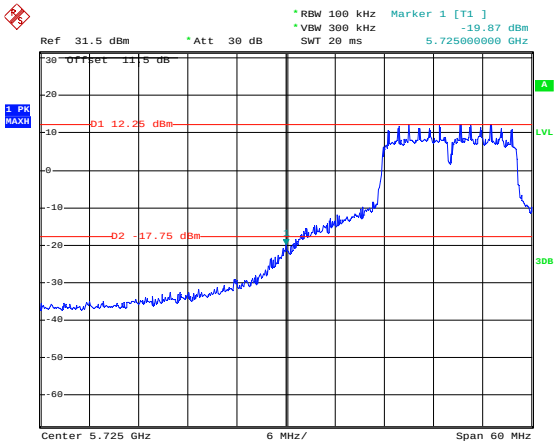
REMOTE HIGH

Date: 30.MAY.2013 23:33:01

Highest channel

TX1

Test mode:

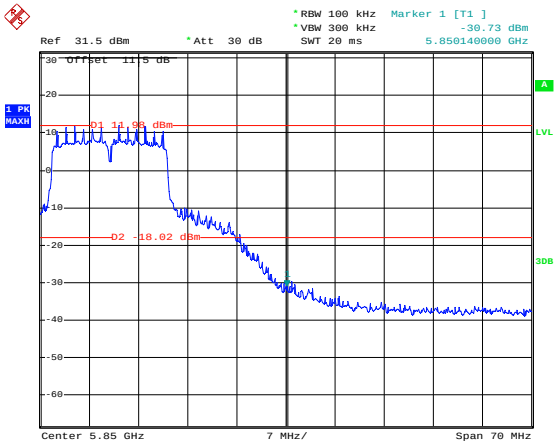


REMOTE HIGH

Date: 31.MAY.2013 17:26:39

Lowest channel

802.11a

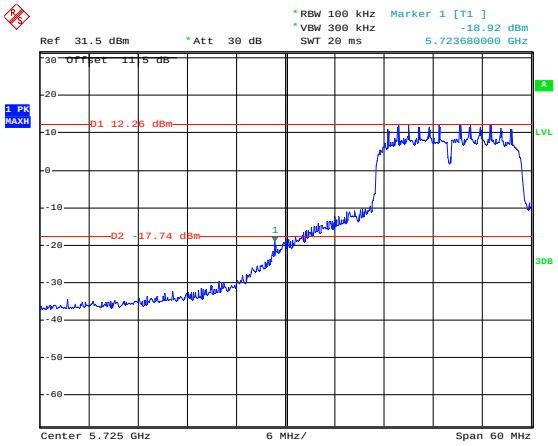


REMOTE HIGH

Date: 31.MAY.2013 18:47:31

Highest channel

Test mode:

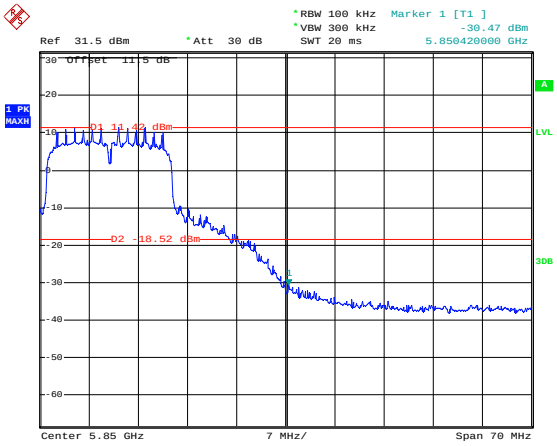


REMOTE HIGH

Date: 30.MAY.2013 21:54:27

Lowest channel

802.11n20

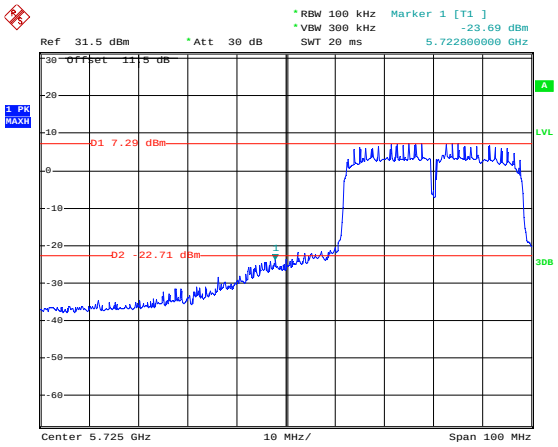


REMOTE HIGH

Date: 30.MAY.2013 22:23:11

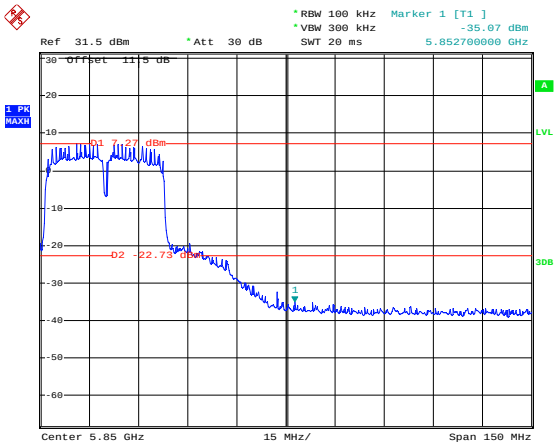
Highest channel

Test mode:



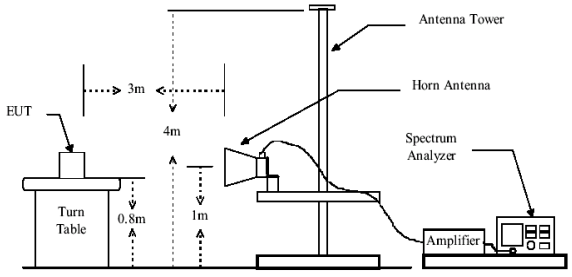
Lowest channel

802.11n40

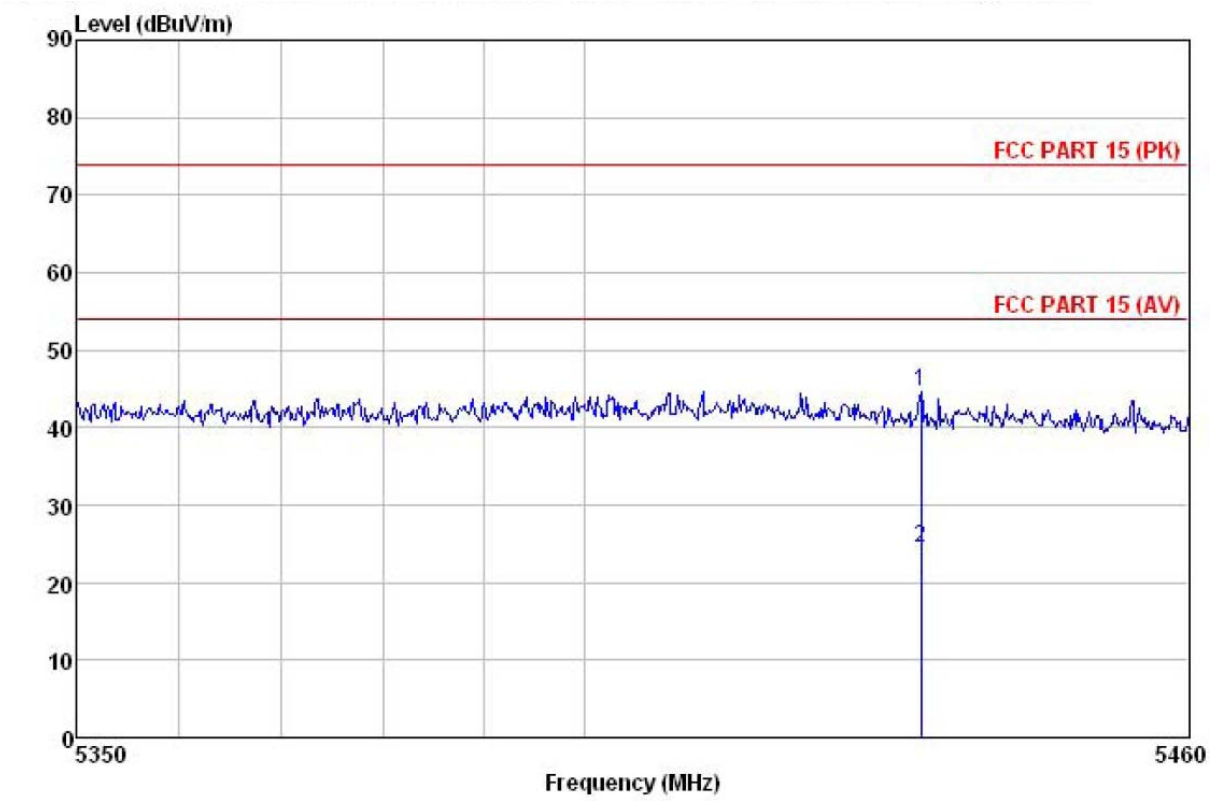


Highest channel

6.7.2 Radiated Emission Method

<table>
<tr><td>Test Requirement:</td><td>FCC Part15 C Section 15.209 and 15.205</td></tr>
<tr><td>Test Method:</td><td>ANSI C63.4: 2003</td></tr>
<tr><td>Test Frequency Range:</td><td>5.35 GHz to 5.46 GHz</td></tr>
<tr><td>Test site:</td><td>Measurement Distance: 3m</td></tr>
<tr><td>Receiver setup:</td><td>
<table>
<tr><th>Frequency</th><th>Detector</th><th>RBW</th><th>VBW</th><th>Remark</th></tr>
<tr><td rowspan="2">Above 1GHz</td><td>Peak</td><td>1MHz</td><td>3MHz</td><td>Peak Value</td></tr>
<tr><td>Peak</td><td>1MHz</td><td>10Hz</td><td>Average Value</td></tr>
</table>
</td></tr>
<tr><td>Limit:</td><td>
<table>
<tr><th>Frequency</th><th>Limit (dBuV/m @3m)</th><th>Remark</th></tr>
<tr><td rowspan="2">Above 1GHz</td><td>54.00</td><td>Average Value</td></tr>
<tr><td>74.00</td><td>Peak Value</td></tr>
</table>
</td></tr>
<tr><td>Test Procedure:</td><td>1. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter camber. The table was rotated 360 degrees to determine the position of the highest radiation.
2. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
3. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
4. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rota table was turned from 0 degrees to 360 degrees to find the maximum reading.
5. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
6. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.</td></tr>
<tr><td>Test setup:</td><td> 
</td></tr>
<tr><td>Test Instruments:</td><td>Refer to section 5.6 for details</td></tr>
<tr><td>Test mode:</td><td>Refer to section 5.3 for details</td></tr>
<tr><td>Test results:</td><td>Passed</td></tr>
</table>

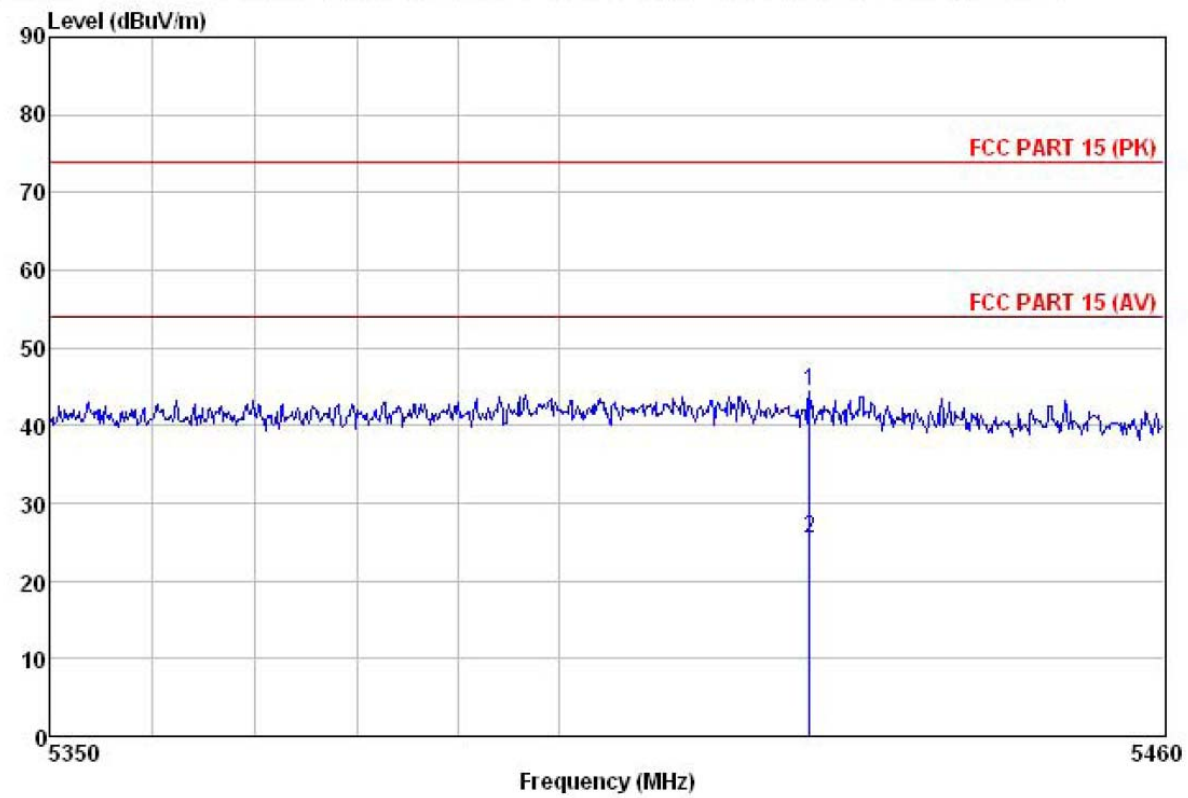
15Bi panel antenna
802.11a
Horizontal:



Site : 3m chamber
Condition : FCC PART 15 (PK) 3m BBHA9120(1G18) HORIZONTAL
Job No. : 148RF
EUT : Broadband Digital Transmission System
Model : APC Sputnik
Test mode : TX(802.11a) mode
Power Rating : AC 120V/60Hz
Environment : Temp:25℃ Huni:55% Atmos:101Kpa
Test Engineer: Winner
Remark : 15dBi ant

	Freq	ReadLevel	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	5433.285	43.70	31.95	9.15	40.22	44.58	74.00	-29.42	Peak
2	5433.285	23.70	31.95	9.15	40.22	24.58	54.00	-29.42	Average

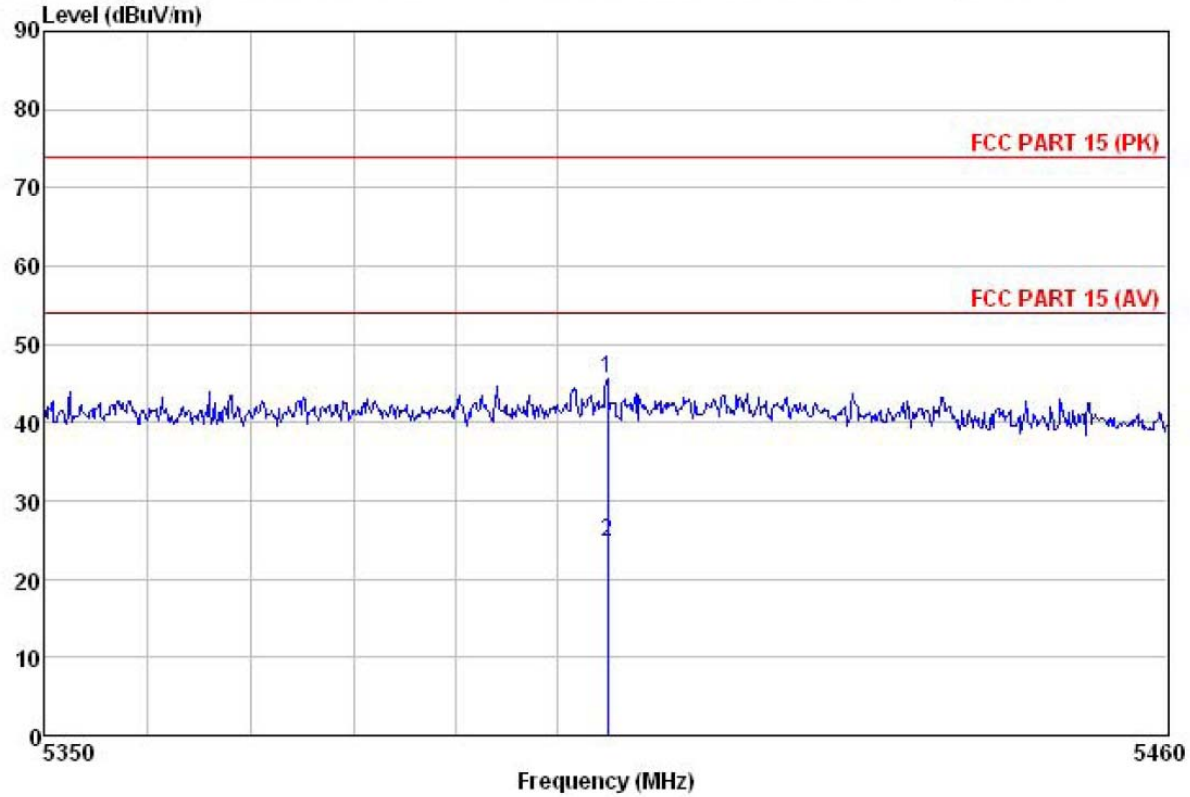
Vertical:



Site : 3m chamber
Condition : FCC PART 15 (PK) 3m BBHA9120(1G18) VERTICAL
Job No. : 148RF
EUT : Broadband Digital Transmission System
Model : APC Sputnik
Test mode : TX(802.11a) mode
Power Rating : AC 120V/60Hz
Environment : Temp:25'C Huni:55% Atmos:101Kpa
Test Engineer: Winner
Remark : 15dBi ant

	Freq	ReadAntenna Level	Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	5424.667	43.65	31.91	9.15	40.21	44.50	74.00	-29.50	Peak
2	5424.667	24.60	31.91	9.15	40.21	25.45	54.00	-28.55	Average

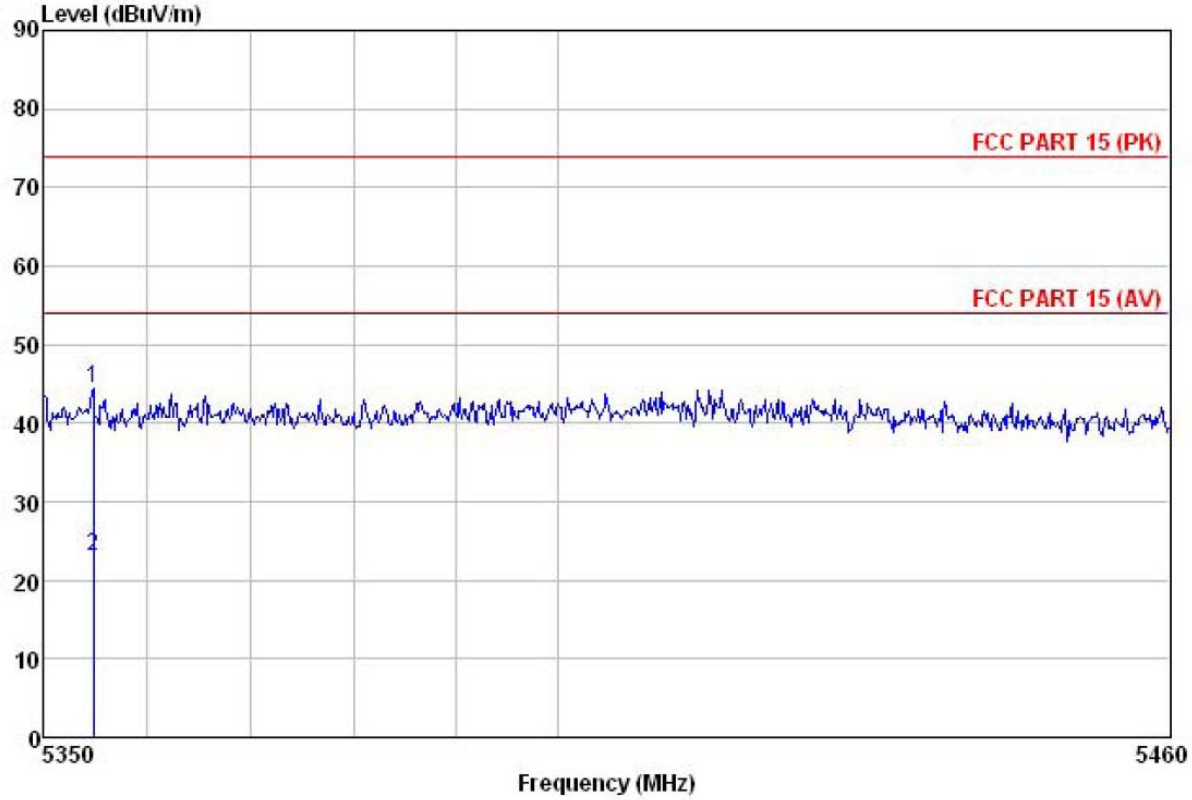
802.11n20
Horizontal:



Site : 3m chamber
Condition : FCC PART 15 (PK) 3m BBHA9120(1G18) HORIZONTAL
Job No. : 148RF
EUT : Broadband Digital Transmission System
Model : APC Sputnik
Test mode : TX(802.11n20) mode
Power Rating : AC 120V/60Hz
Environment : Temp:25'C Huni:55% Atmos:101Kpa
Test Engineer: Winner
Remark : 15dBi ant

	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	5404.830	44.76	31.87	9.15	40.20	45.58	74.00	-28.42	Peak
2	5404.830	23.90	31.87	9.15	40.20	24.72	54.00	-29.28	Average

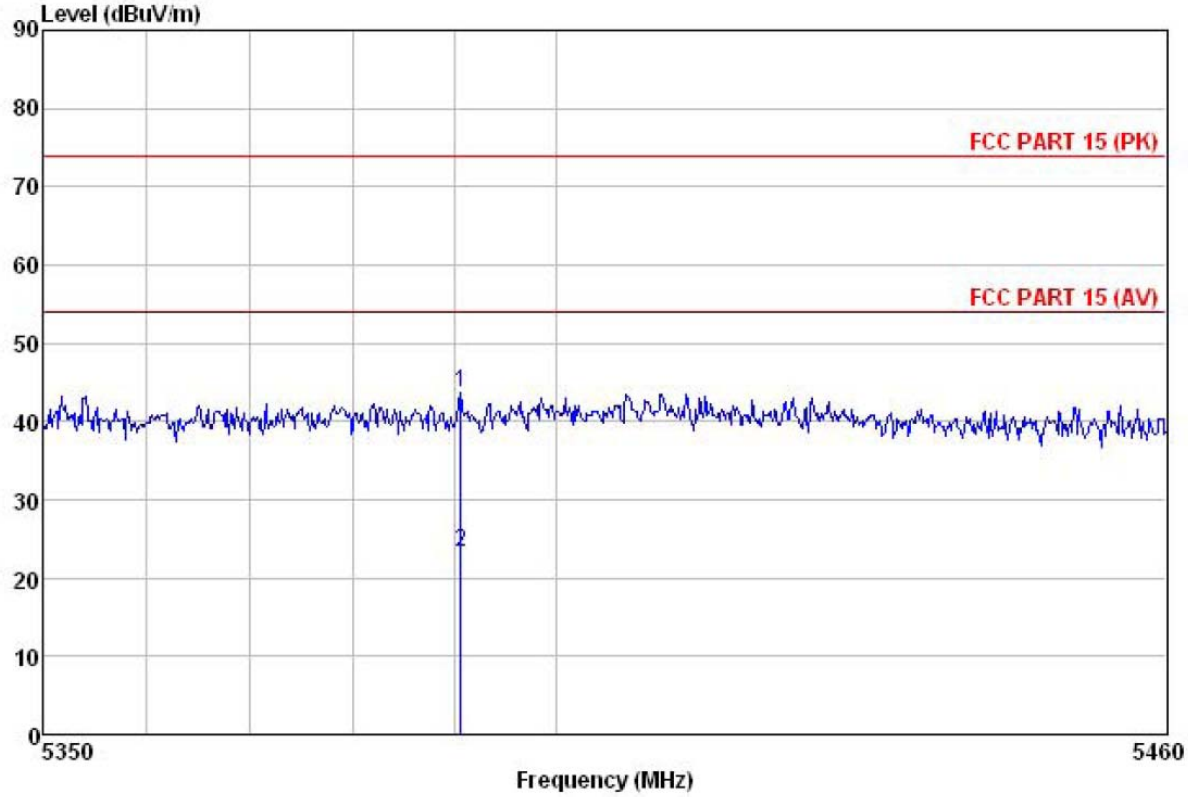
Vertical:




```
Site          : 3m chamber
Condition     : FCC PART 15 (PK) 3m BBHA9120(1G18) VERTICAL
Job No.       : 148RF
EUT           : Broadband Digital Transmission System
Model         : APC Sputnik
Test mode     : TX(802.11n20) mode
Power Rating  : AC 120V/60Hz
Environment   : Temp:25'C  Huni:55%  Atmos:101Kpa
Test Engineer: Winner
Remark        : 15dBi ant
                 ReadAntenna  Cable Preamp         Limit   Over
            Freq  Level Factor   Loss Factor  Level   Line  Limit Remark
         -------- ----- ------ ------ ------ ------ ------ ------ ----------
               MHz  dBuV   dB/m     dB     dB dBuV/m dBuV/m     dB

  1    5354.793  43.68  31.78   9.15  40.18  44.43  74.00 -29.57 Peak
  2    5354.793  22.40  31.78   9.15  40.18  23.15  54.00 -30.85 Average
```

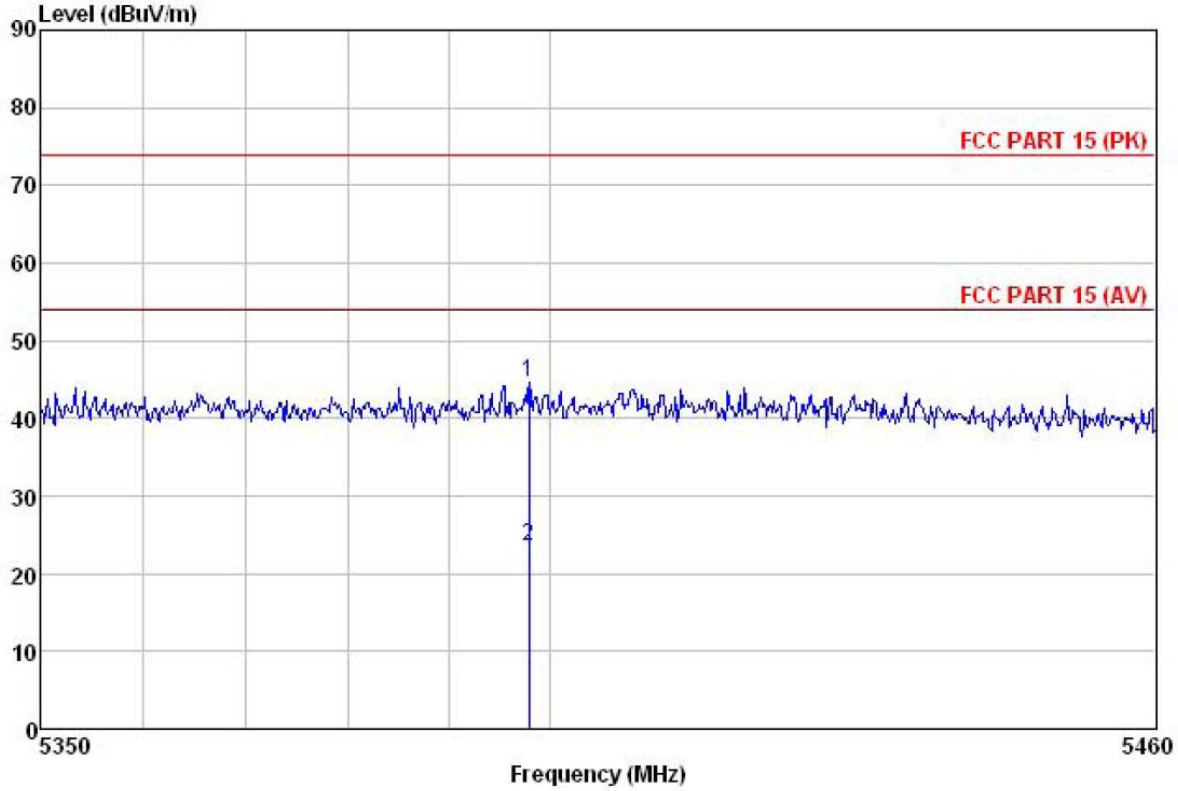
802.11n40
Horizontal:



Site : 3m chamber
Condition : FCC PART 15 (PK) 3m BBHA9120(1G18) HORIZONTAL
Job No. : 148RF
EUT : Broadband Digital Transmission System
Model : APC Sputnik
Test mode : TX(802.11n40) mode
Power Rating : AC 120V/60Hz
Environment : Temp:25'C Huni:55% Atmos:101Kpa
Test Engineer: Winner
Remark : 15dBi ant

	Freq	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	5390.549	42.77	31.84	9.15	40.19	43.57	74.00	-30.43	Peak
2	5390.549	22.50	31.84	9.15	40.19	23.30	54.00	-30.70	Average

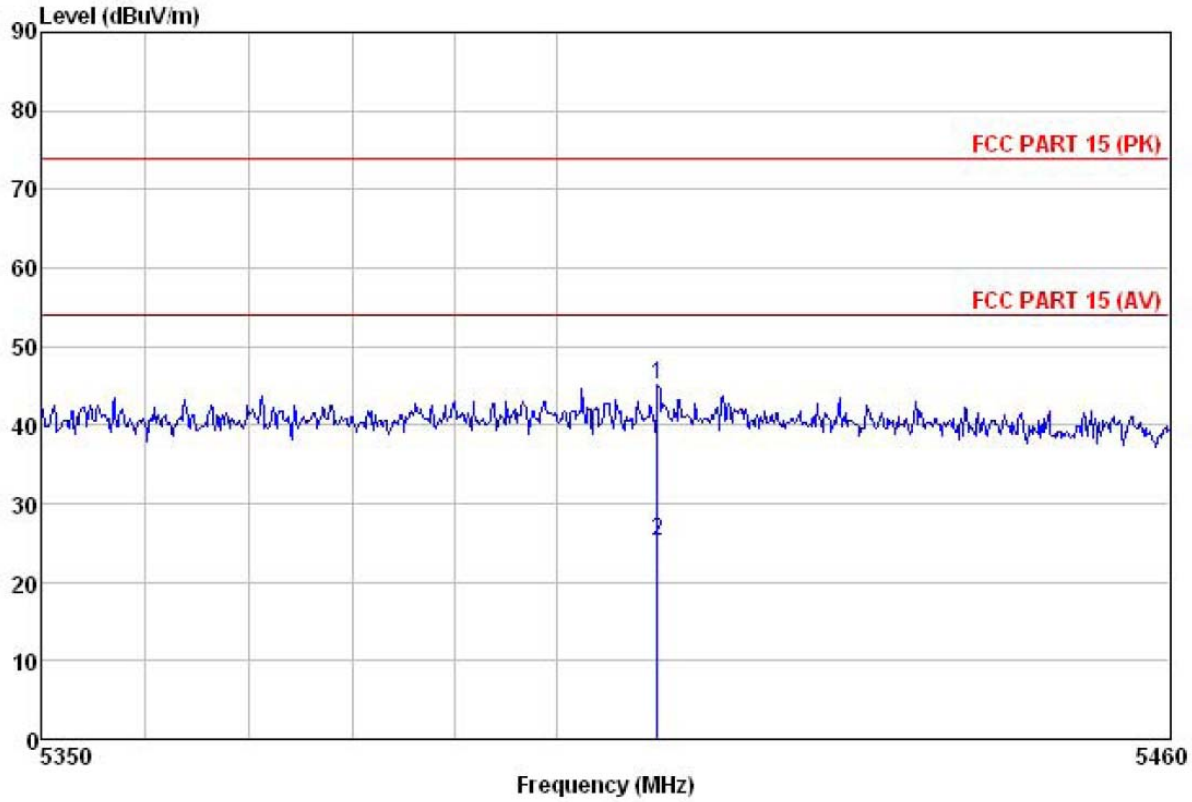
Vertical:




```
Site          : 3m chamber
Condition     : FCC PART 15 (PK) 3m BBHA9120(1G18) VERTICAL
Job No.       : 148RF
EUT           : Broadband Digital Transmission System
Model         : APC Sputnik
Test mode     : TX(802.11n40) mode
Power Rating  : AC 120V/60Hz
Environment   : Temp:25'C  Huni:55%  Atmos:101Kpa
Test Engineer: Winner
Remark        : 15dBi ant
```

	Freq	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	5397.905	43.73	31.87	9.15	40.20	44.55	74.00	-29.45	Peak
2	5397.905	22.60	31.87	9.15	40.20	23.42	54.00	-30.58	Average

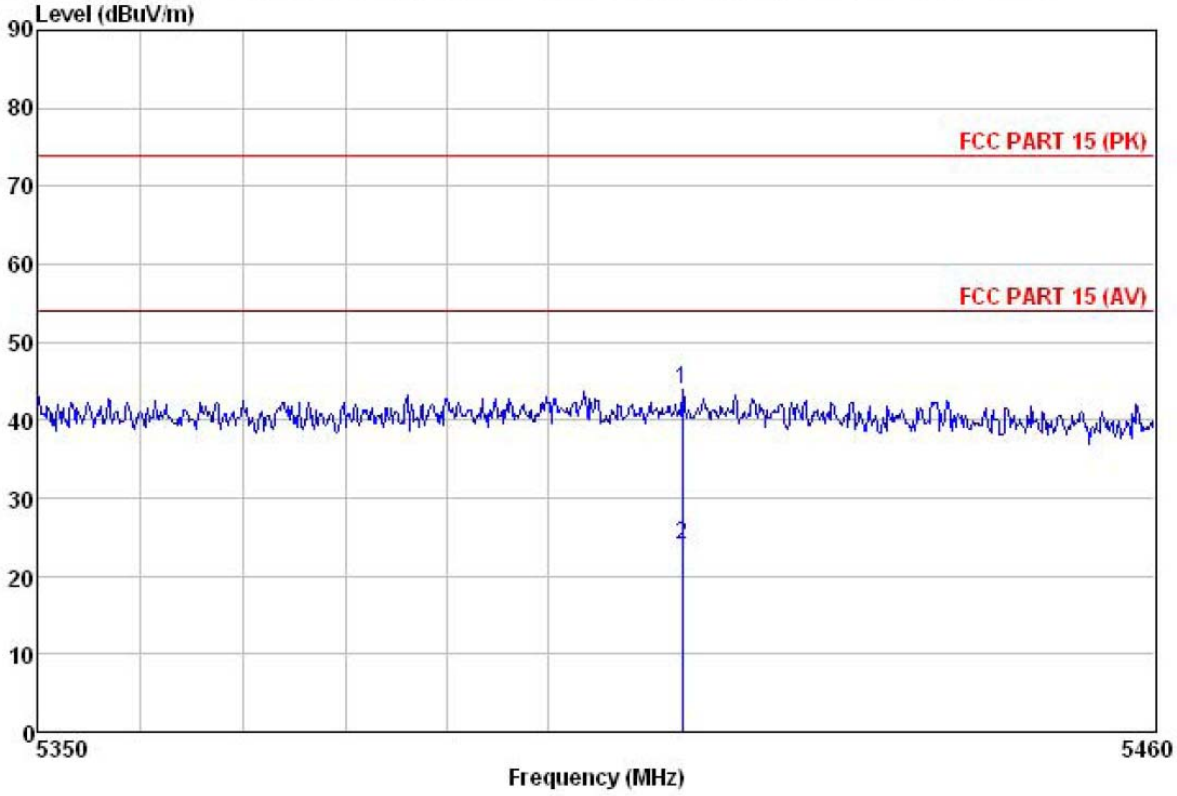
27i dish antenna
802.11a
Horizontal:



Site : 3m chamber
Condition : FCC PART 15 (PK) 3m BBHA9120(1G18) HORIZONTAL
Job No. : 148RF
EUT : Broadband Digital Transmission System
Model : APC Sputnik
Test mode : TX(802.11a) mode
Power Rating : AC 120V/60Hz
Environment : Temp:25'C Huni:55% Atmos:101Kpa
Test Engineer: Winner
Remark : 27dBi ant

	Freq	ReadLevel	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	5409.782	44.23	31.87	9.15	40.20	45.05	74.00	-28.95	Peak
2	5409.782	24.30	31.87	9.15	40.20	25.12	54.00	-28.88	Average

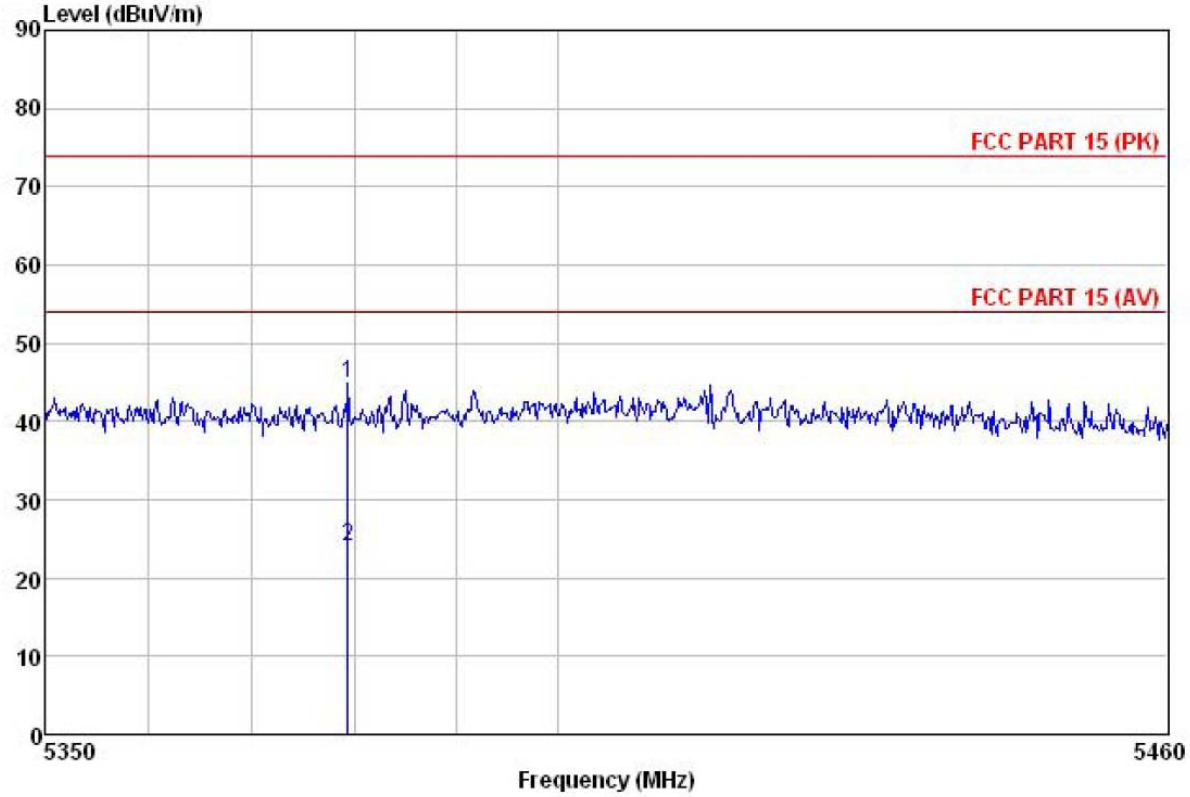
Vertical:




```
Site          : 3m chamber
Condition     : FCC PART 15 (PK) 3m BBHA9120(1G18) VERTICAL
Job No.       : 148RF
EUT           : Broadband Digital Transmission System
Model         : APC Sputnik
Test mode     : TX(802.11a) mode
Power Rating  : AC 120V/60Hz
Environment   : Temp:25'C  Huni:55%  Atmos:101Kpa
Test Engineer: Winner
Remark        : 27dBi ant
```

	Freq	ReadAntenna Level	Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	5413.197	43.15	31.91	9.15	40.21	44.00	74.00	-30.00	Peak
2	5413.197	23.10	31.91	9.15	40.21	23.95	54.00	-30.05	Average

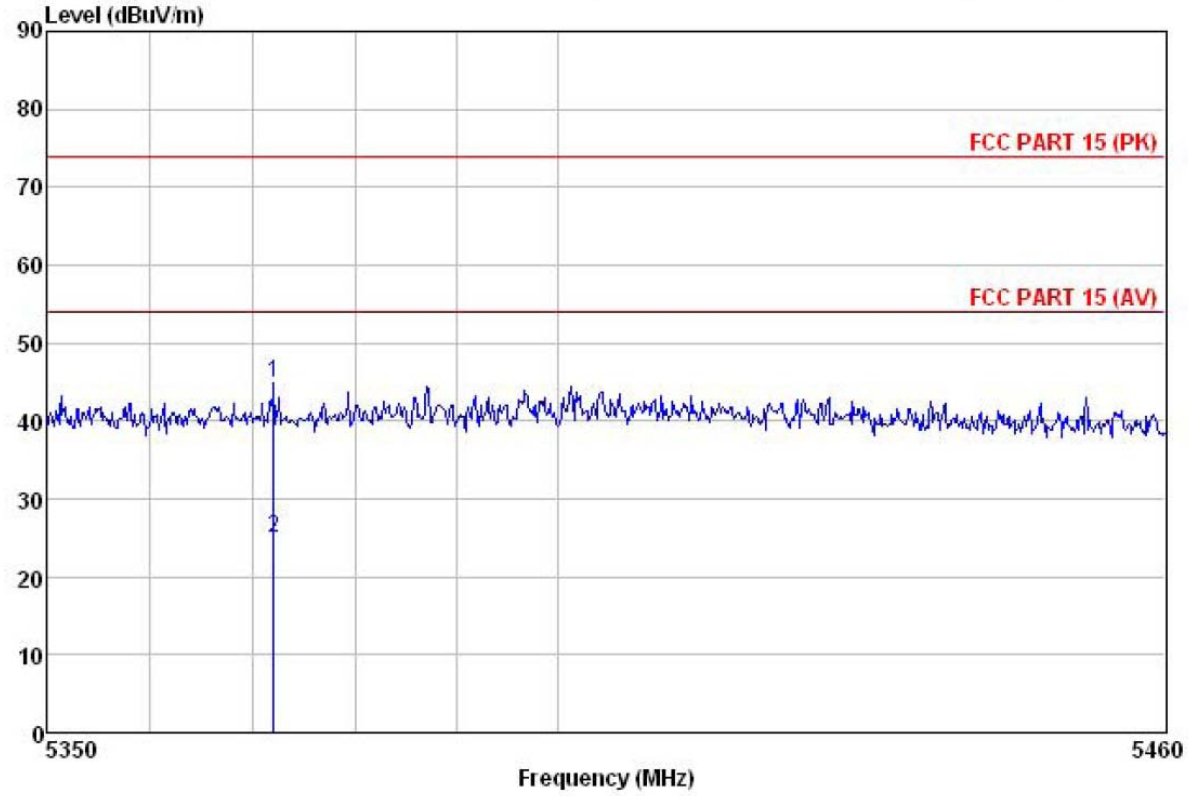
802.11n20
Horizontal:



Site : 3m chamber
Condition : FCC PART 15 (PK) 3m BBHA9120(1G18) HORIZONTAL
Job No. : 148RF
EUT : Broadband Digital Transmission System
Model : APC Sputnik
Test mode : TX(802.11n20) mode
Power Rating : AC 120V/60Hz
Environment : Temp:25℃ Huni:55% Atmos:101Kpa
Test Engineer: Winner
Remark : 27dBi ant

	Freq	ReadAntenna Level	Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	5379.370	43.99	31.84	9.15	40.19	44.79	74.00	-29.21	Peak
2	5379.370	23.10	31.84	9.15	40.19	23.90	54.00	-30.10	Average

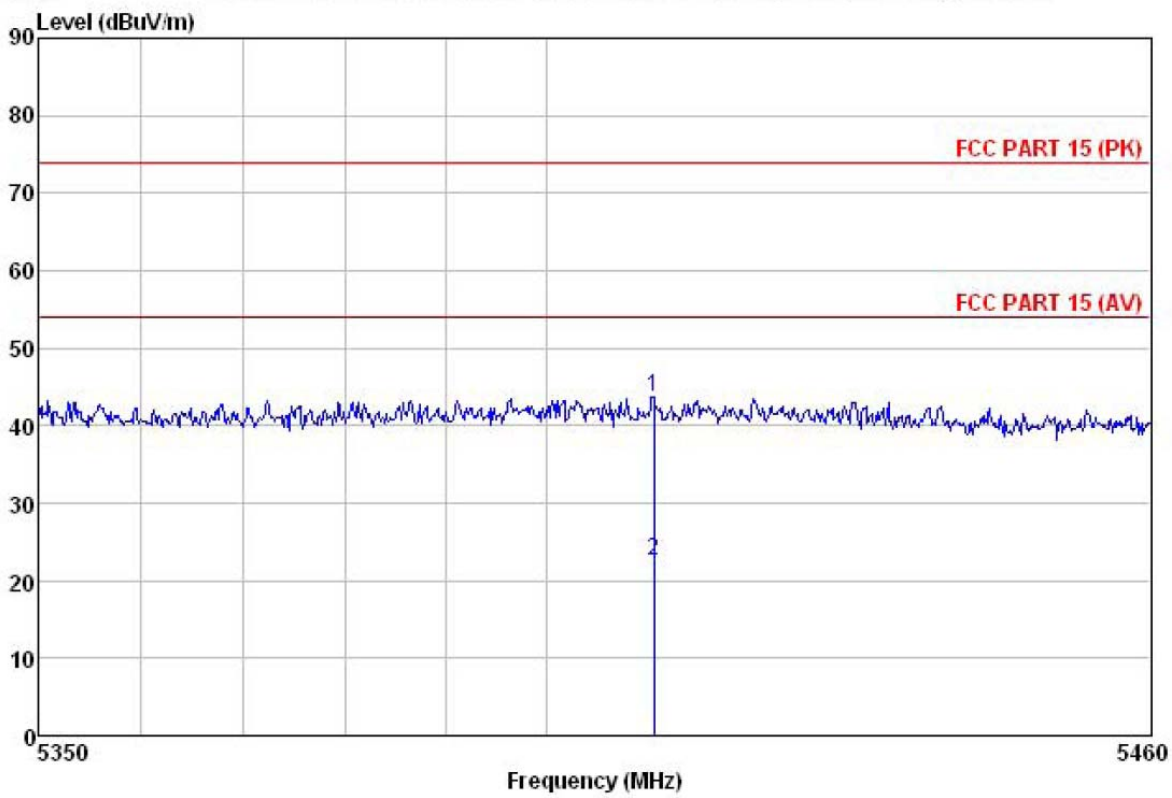
Vertical:




```
Site          : 3m chamber
Condition     : FCC PART 15 (PK) 3m BBHA9120(1G18) VERTICAL
Job No.       : 148RF
EUT           : Broadband Digital Transmission System
Model         : APC Sputnik
Test mode     : TX(802.11n20) mode
Power Rating  : AC 120V/60Hz
Environment   : Temp:25℃  Huni:55%  Atmos:101Kpa
Test Engineer: Winner
Remark        : 27dBi ant
                 ReadAntenna  Cable Preamp          Limit   Over
           Freq  Level Factor   Loss Factor  Level   Line  Limit Remark
        -------- ------ ------ ------ ------ ------ ------ ------ ----------
             MHz   dBuV   dB/m     dB     dB dBuV/m dBuV/m     dB

  1   5372.040  44.17  31.81   9.15  40.19  44.94  74.00 -29.06 Peak
  2   5372.040  24.20  31.81   9.15  40.19  24.97  54.00 -29.03 Average
```

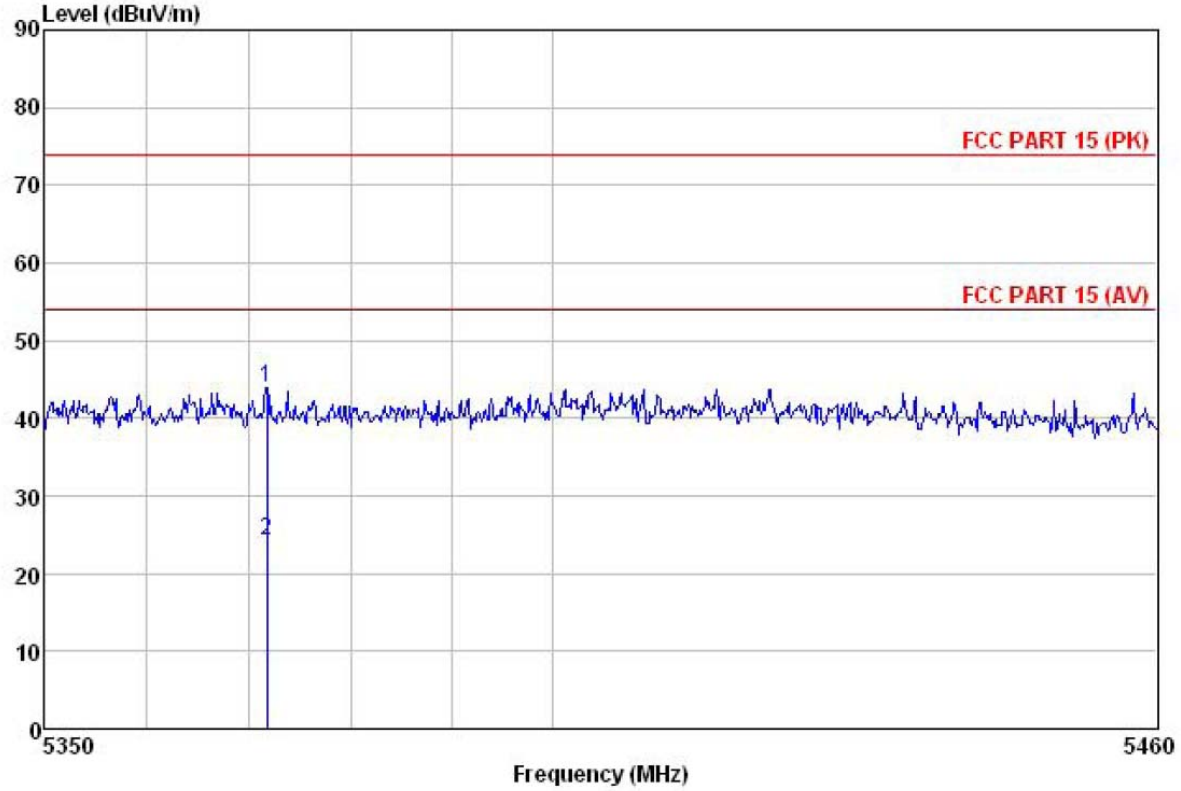
802.11n40
Horizontal:



Site : 3m chamber
Condition : FCC PART 15 (PK) 3m BBHA9120(1G18) HORIZONTAL
Job No. : 148RF
EUT : Broadband Digital Transmission System
Model : APC Sputnik
Test mode : TX(802.11n40) mode
Power Rating : AC 120V/60Hz
Environment : Temp:25°C Huni:55% Atmos:101Kpa
Test Engineer: Winner
Remark : 27dBi ant

	Freq	ReadAntenna Level	Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	5410.553	42.95	31.87	9.15	40.20	43.77	74.00	-30.23	Peak
2	5410.553	21.80	31.87	9.15	40.20	22.62	54.00	-31.38	Average

Vertical:

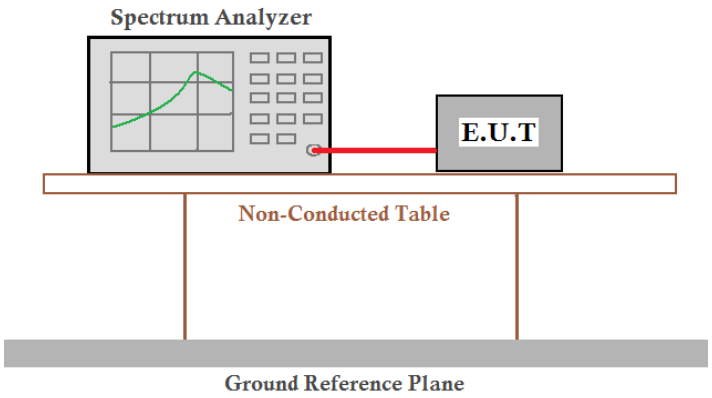



```
Site          : 3m chamber
Condition     : FCC PART 15 (PK) 3m BBHA9120(1G18) VERTICAL
Job No.       : 148RF
EUT           : Broadband Digital Transmission System
Model         : APC Sputnik
Test mode     : TX(802.11n40) mode
Power Rating  : AC 120V/60Hz
Environment   : Temp:25'C  Huni:55%  Atmos:101Kpa
Test Engineer: Winner
Remark        : 27dBi ant
```

	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	5371.821	43.11	31.81	9.15	40.19	43.88	74.00	-30.12	Peak
2	5371.821	23.50	31.81	9.15	40.19	24.27	54.00	-29.73	Average

6.8 Spurious Emission

6.8.1 Conducted Emission Method

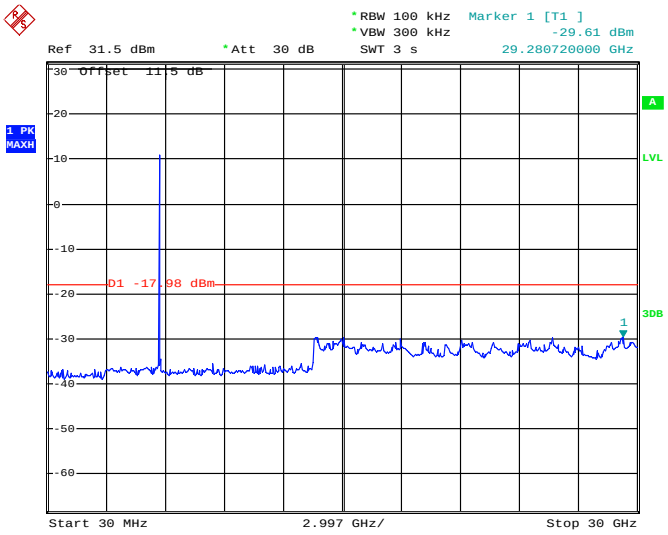
Test Requirement:	FCC Part15 C Section 15.247 (d)
Test Method:	ANSI C63.4:2003 , KDB 558074 and KDB 662911
Limit:	In any 100 kHz bandwidth outside the frequency band in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 30 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement.
Test setup:	
Test Instruments:	Refer to section 5.6 for details
Test mode:	Refer to section 5.3 for details. Base on the section 6.4 conducted output power; we selected EUT with 15 dBi antenna for test.
Test results:	Passed

Test plot as follows:

TX0

Test mode: 802.11a

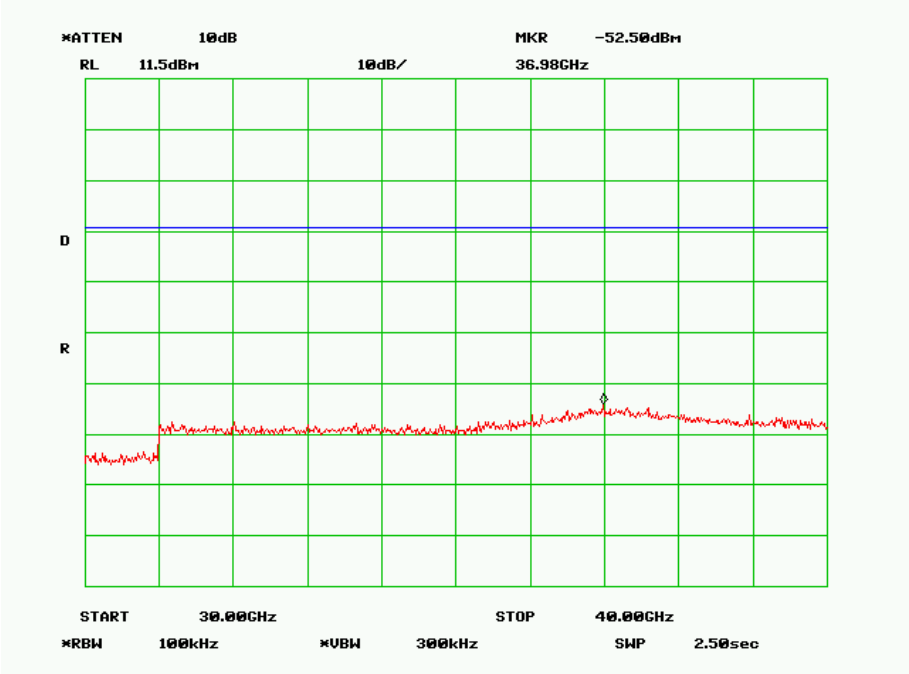
Lowest channel



REMOTE HIGH

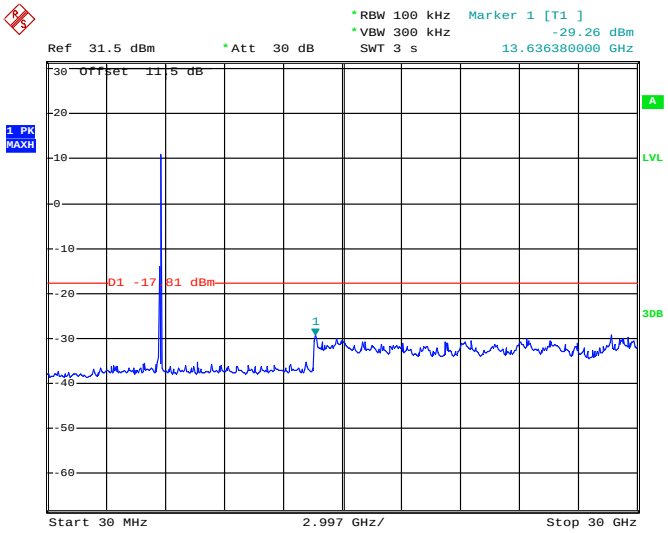
Date: 31.MAY.2013 17:11:03

30MHz~30GHz



30GHz-40GHz

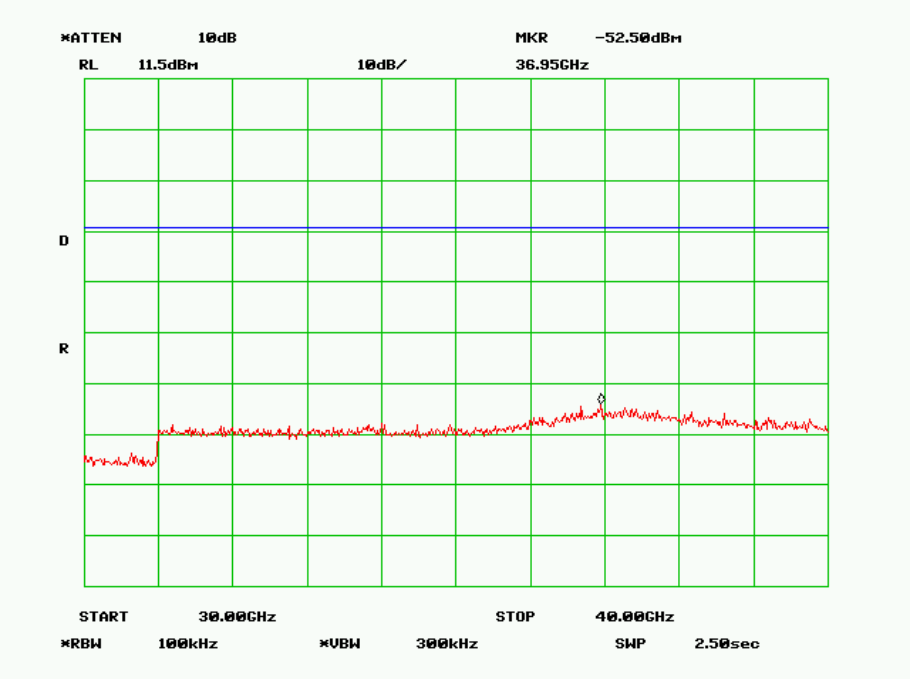
Middle channel



REMOTE HIGH

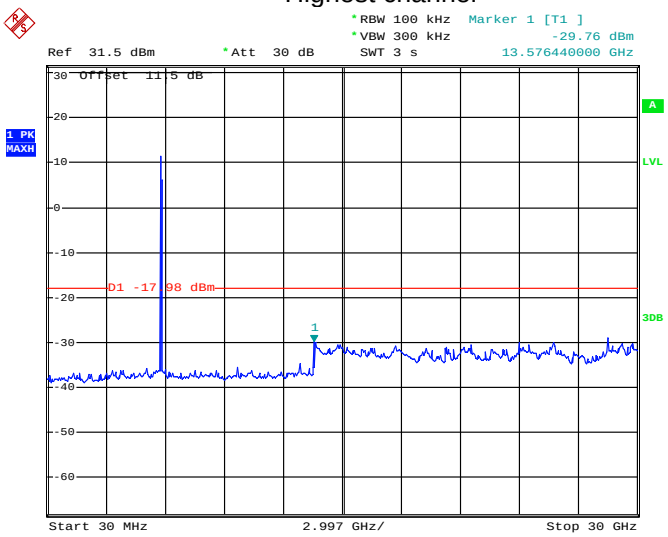
Date: 31.MAY.2013 18:03:59

30MHz~30GHz



30GHz-40GHz

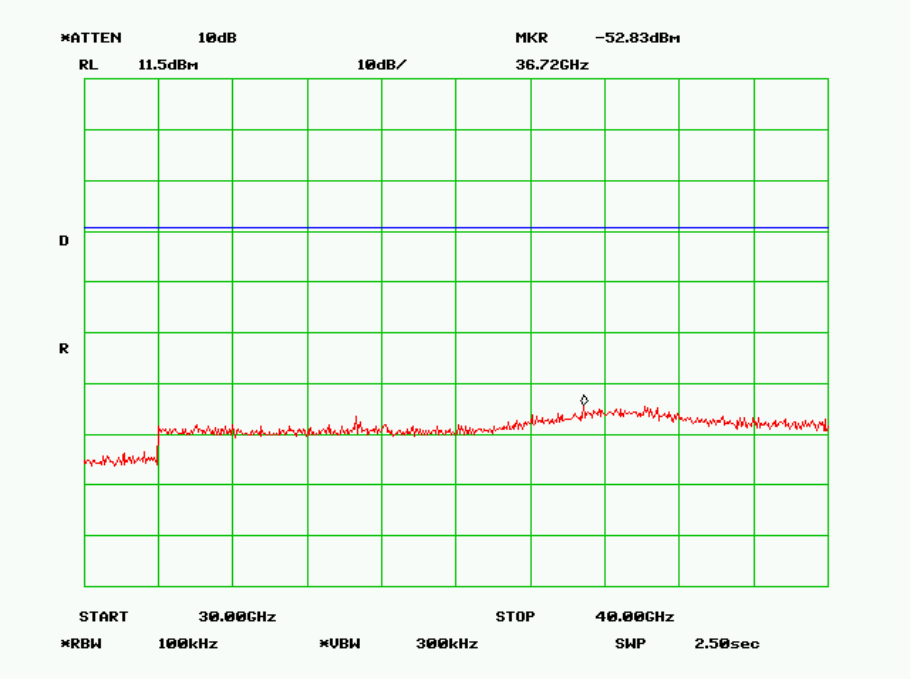
Highest channel



REMOTE HIGH

Date: 31.MAY.2013 18:32:00

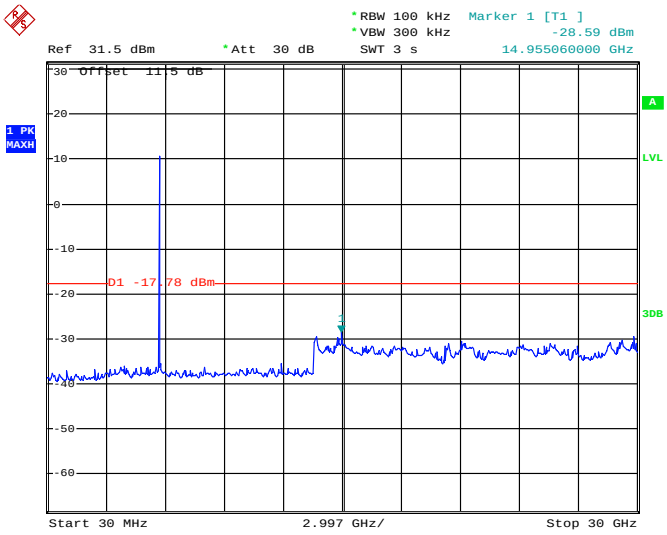
30MHz~30GHz



30GHz-40GHz

Test mode: 802.11n20

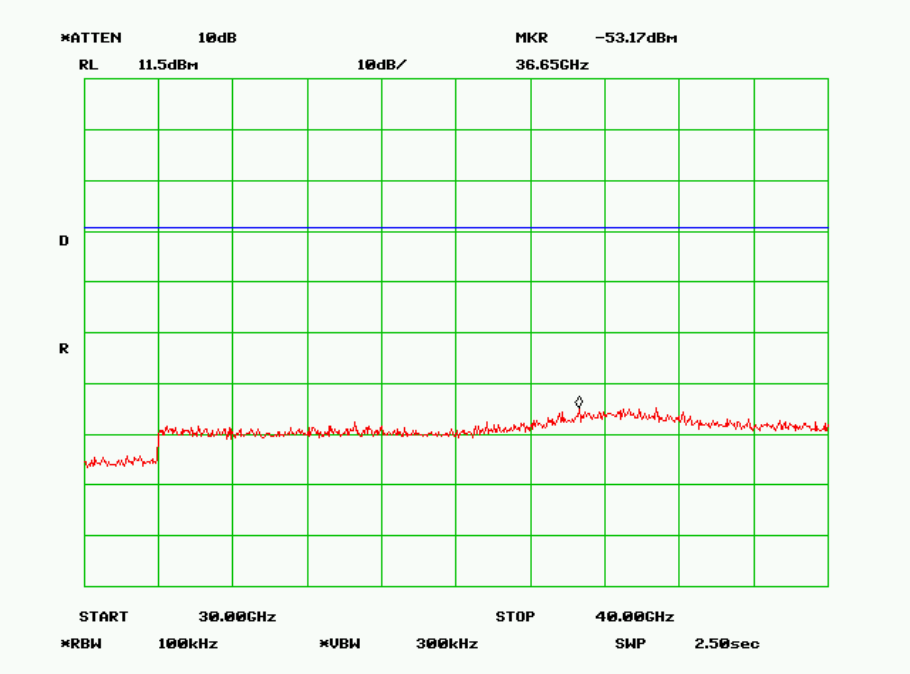
Lowest channel



REMOTE HIGH

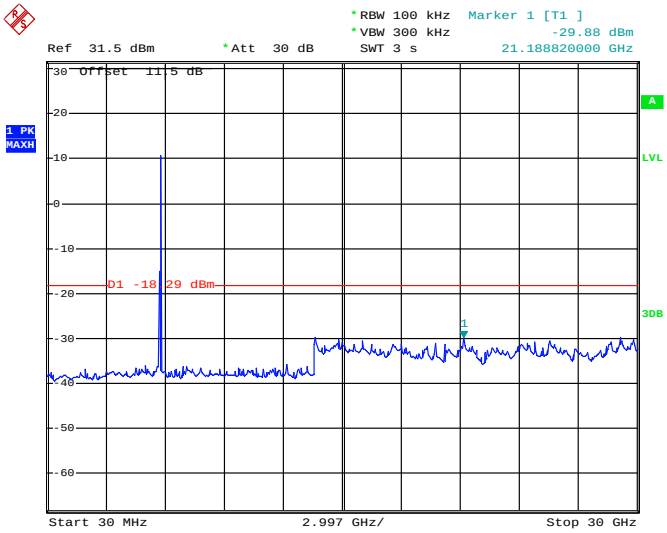
Date: 30.MAY.2013 21:43:03

30MHz~30GHz



30GHz-40GHz

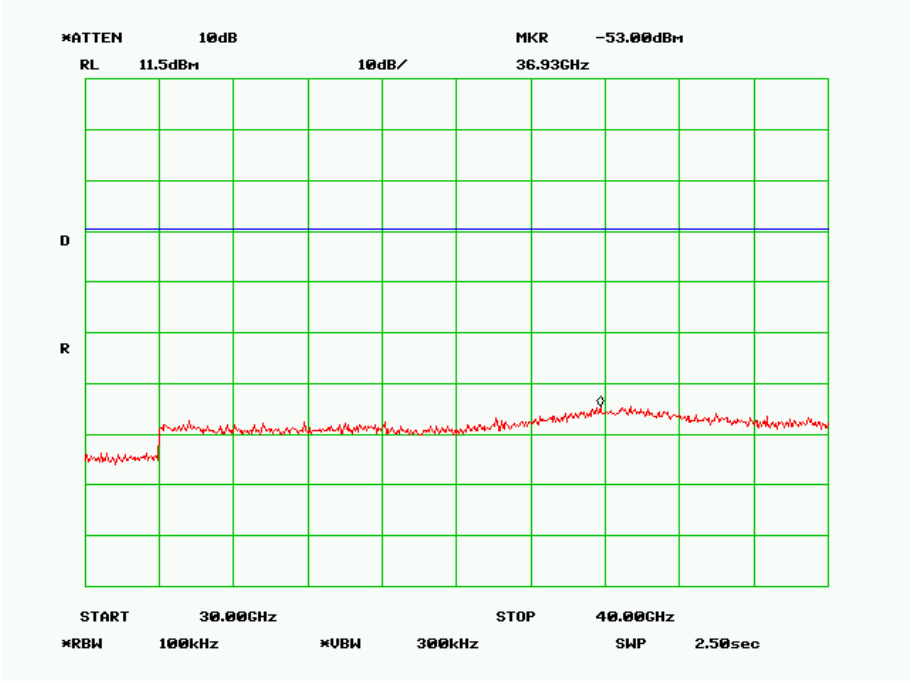
Middle channel



REMOTE HIGH

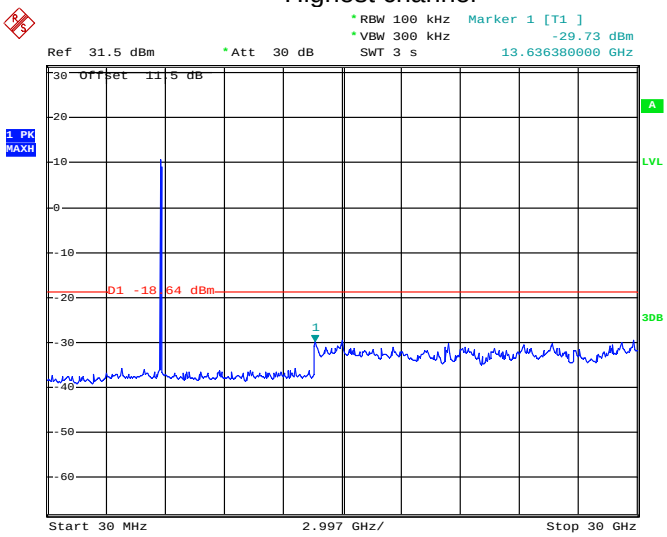
Date: 30.MAY.2013 21:20:59

30MHz~30GHz



30GHz-40GHz

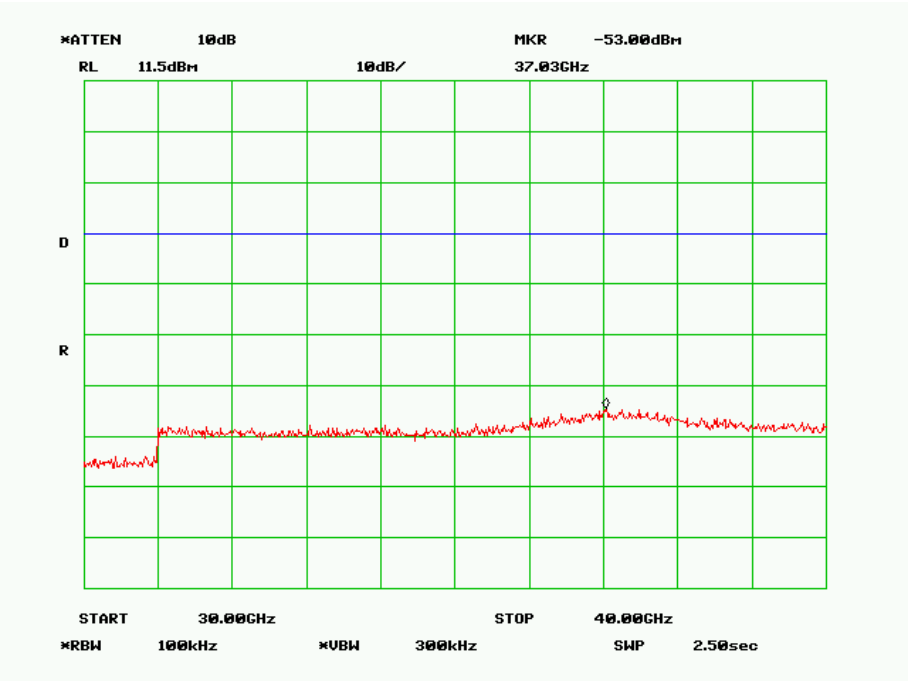
Highest channel



REMOTE HIGH

Date: 30.MAY.2013 21:36:09

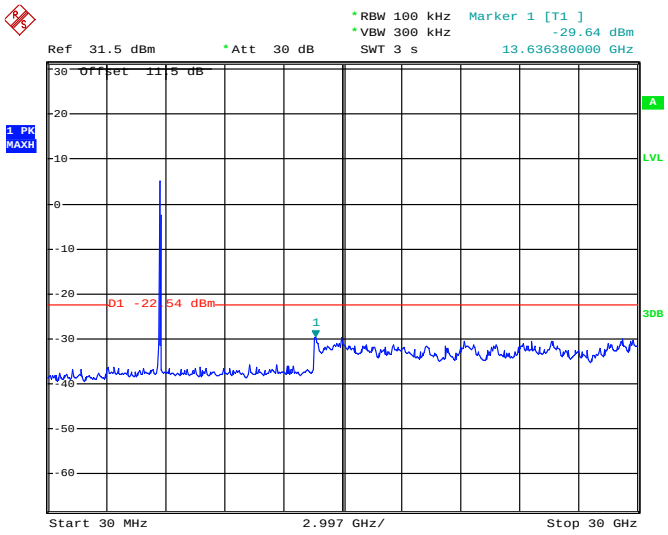
30MHz~30GHz



30GHz-40GHz

Test mode: 802.11n40

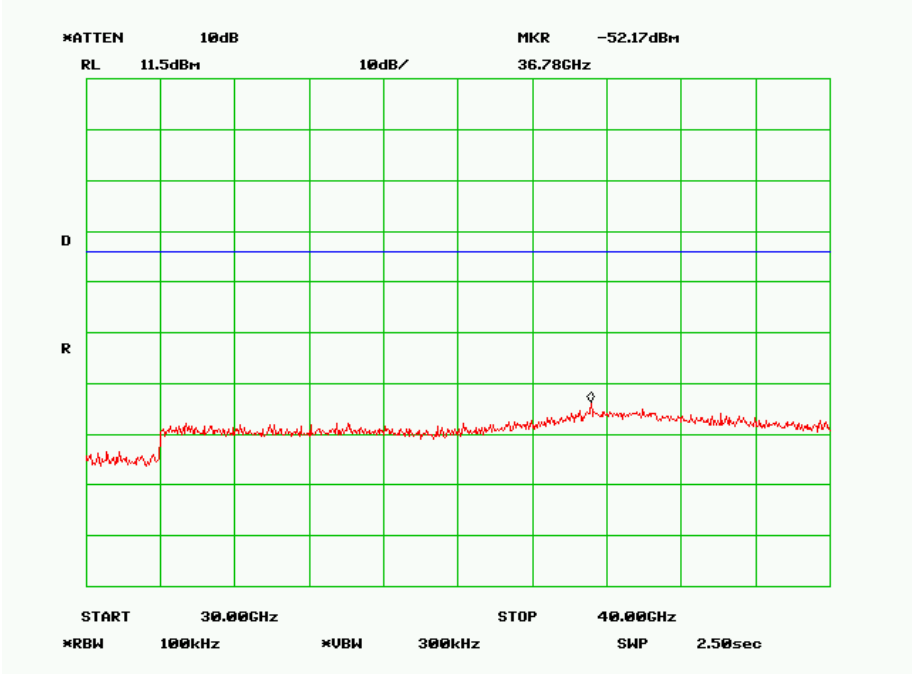
Lowest channel



REMOTE HIGH

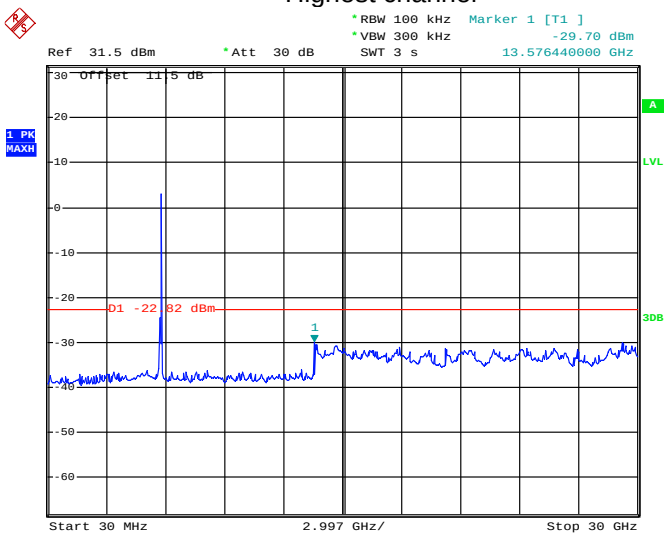
Date: 30.MAY.2013 22:59:19

30MHz~30GHz



30GHz-40GHz

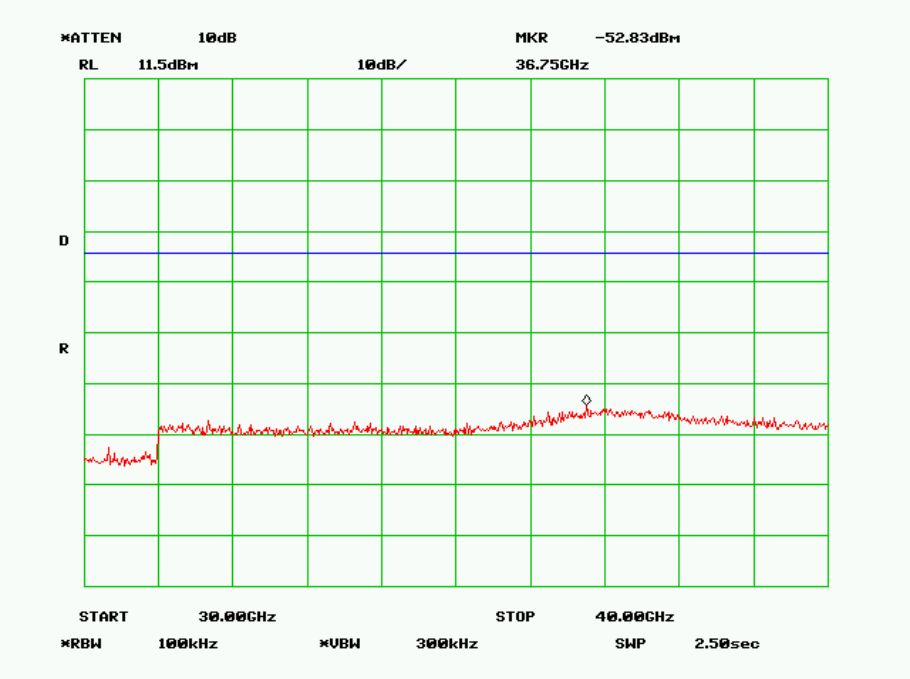
Highest channel



REMOTE HIGH

Date: 30.MAY.2013 23:34:20

30MHz~30GHz

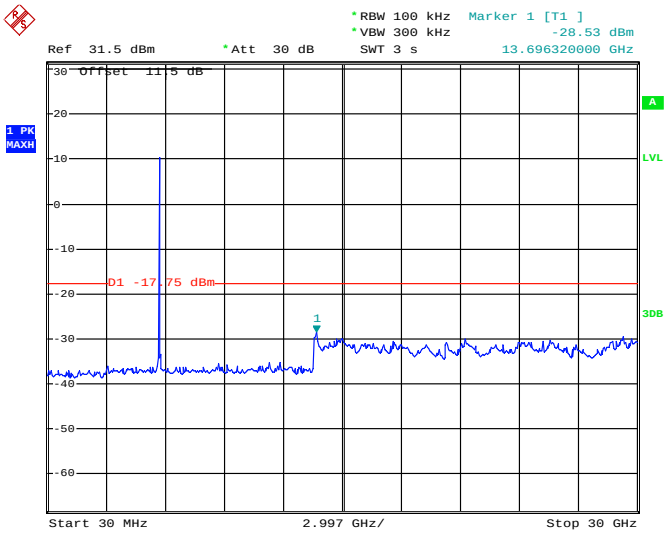


30GHz-40GHz

TX1

Test mode: 802.11a

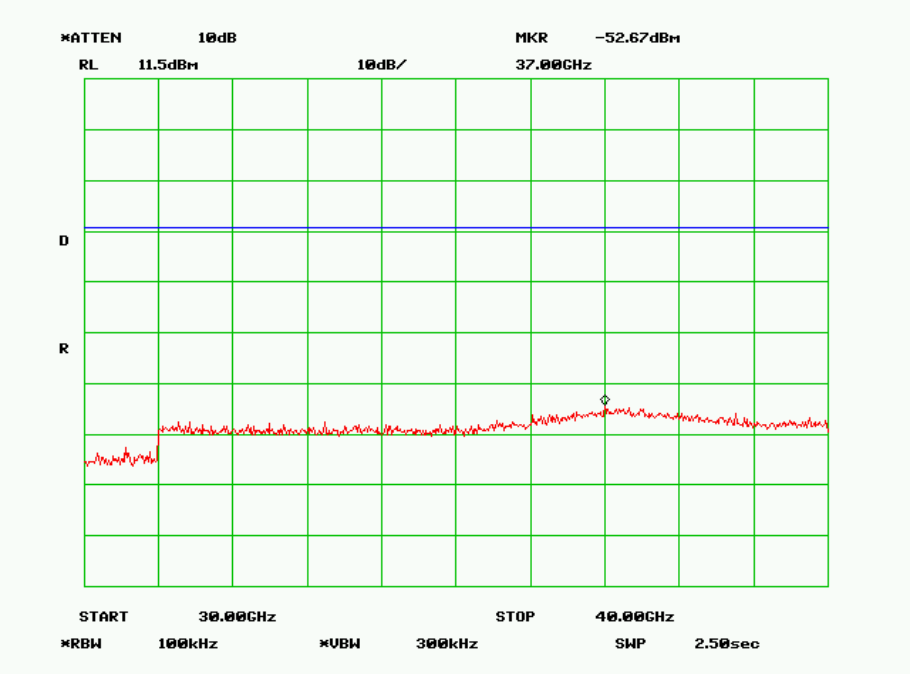
Lowest channel



REMOTE HIGH

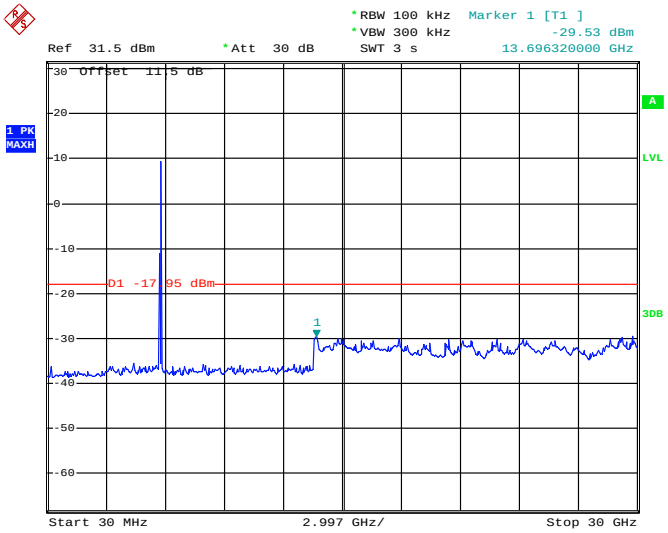
Date: 31.MAY.2013 17:30:37

30MHz~30GHz



30GHz-40GHz

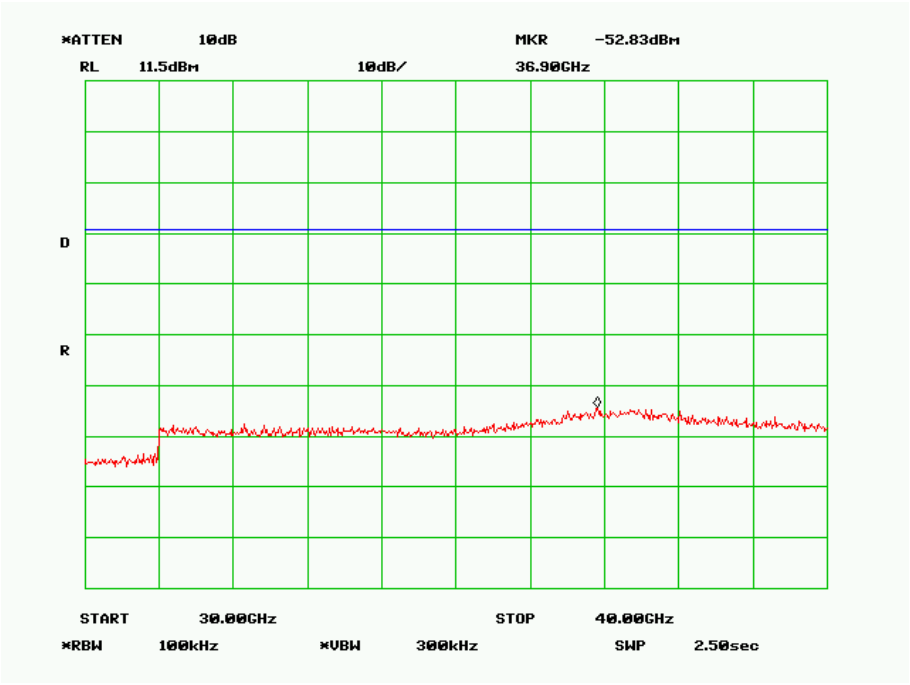
Middle channel



REMOTE HIGH

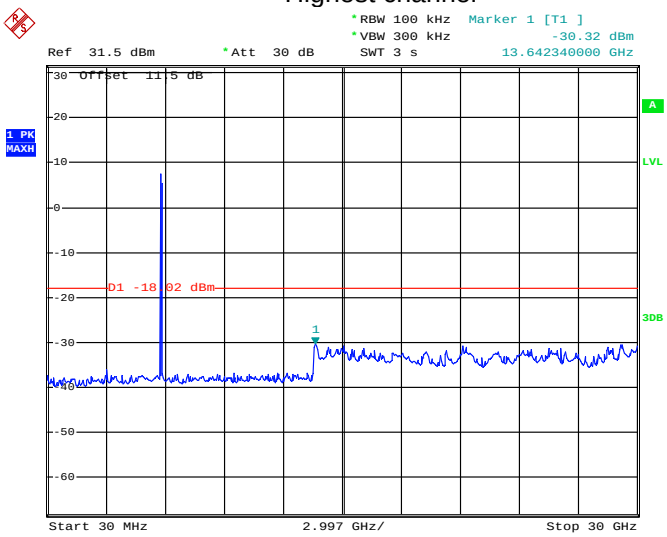
Date: 31.MAY.2013 17:46:07

30MHz~30GHz



30GHz-40GHz

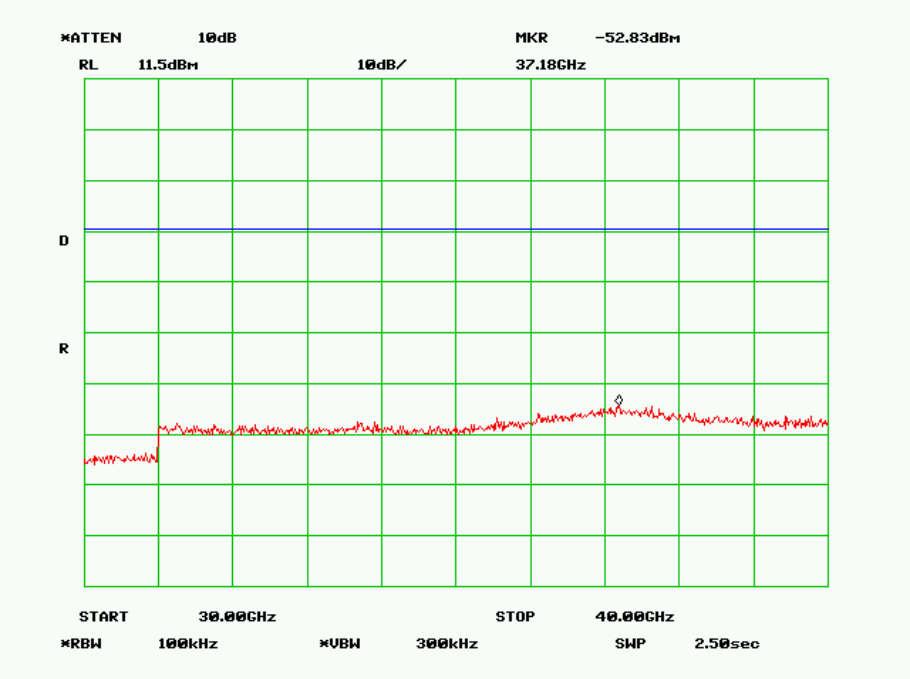
Highest channel



REMOTE HIGH

Date: 31.MAY.2013 18:49:22

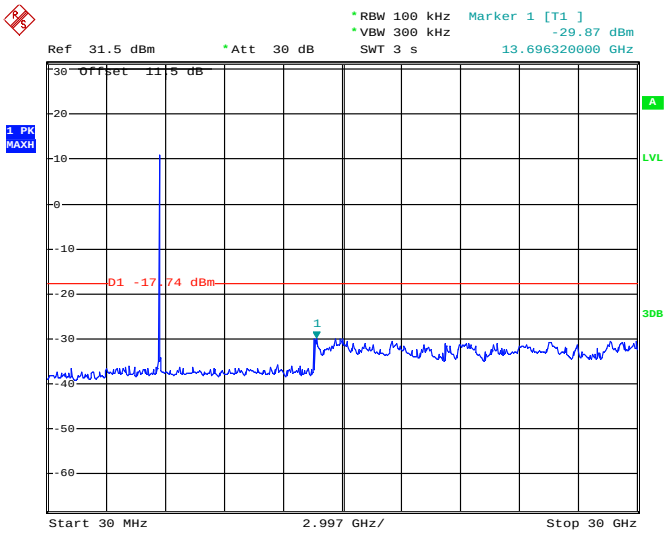
30MHz~30GHz



30GHz-40GHz

Test mode: 802.11n20

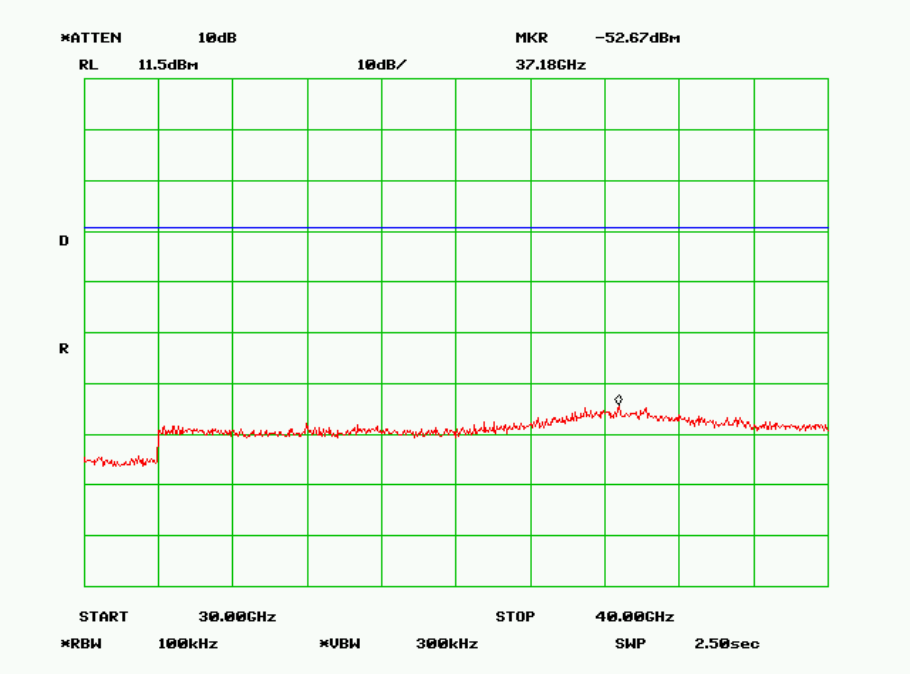
Lowest channel



REMOTE HIGH

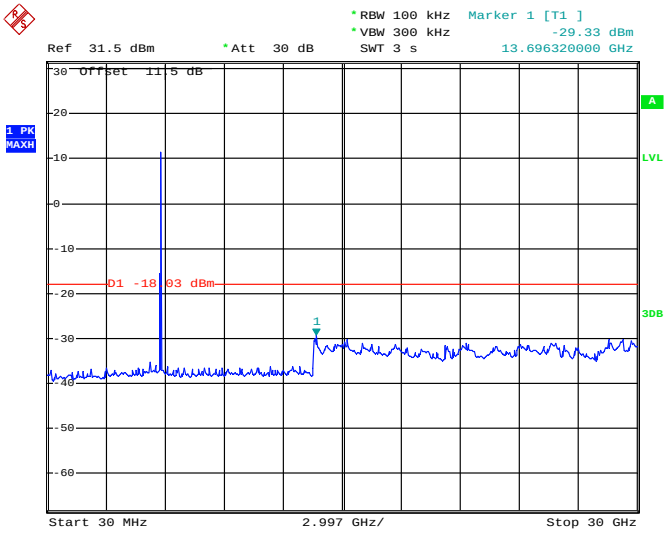
Date: 30.MAY.2013 21:58:08

30MHz~30GHz



30GHz-40GHz

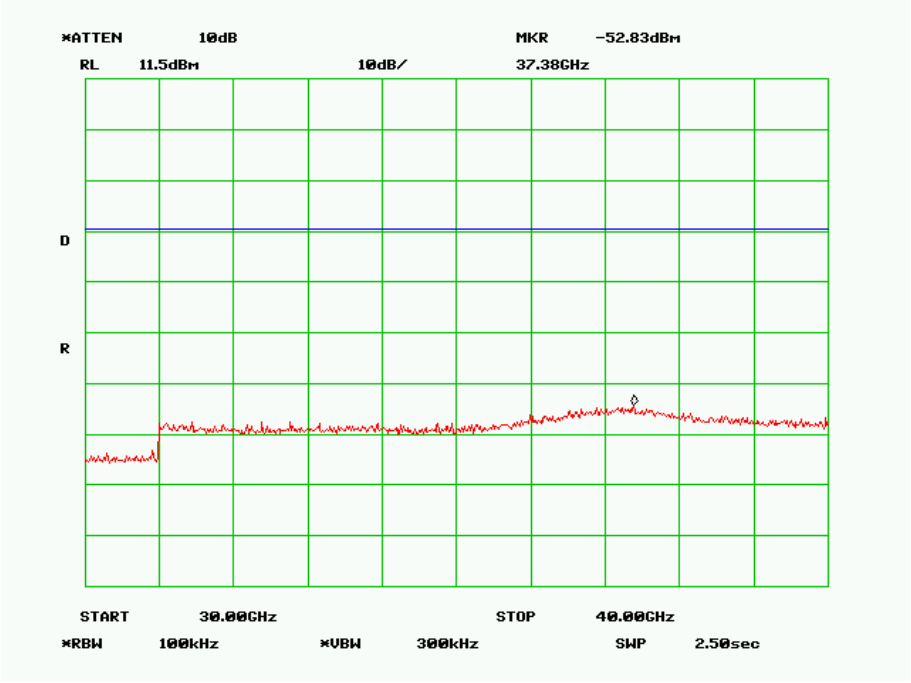
Middle channel



REMOTE HIGH

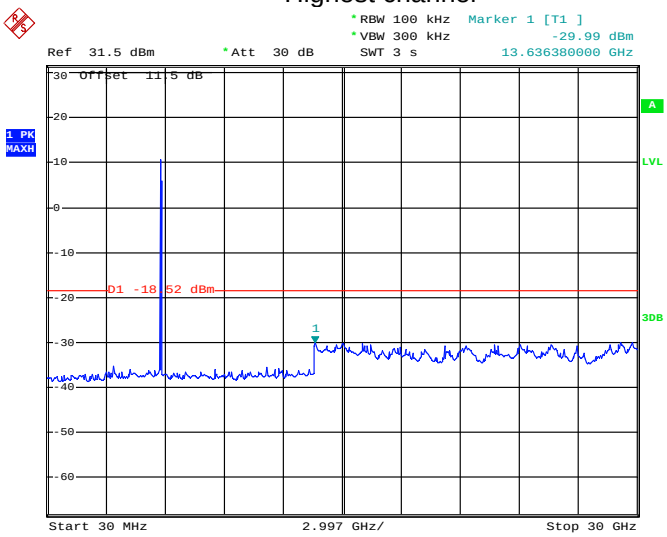
Date: 30.MAY.2013 22:14:08

30MHz~30GHz



30GHz-40GHz

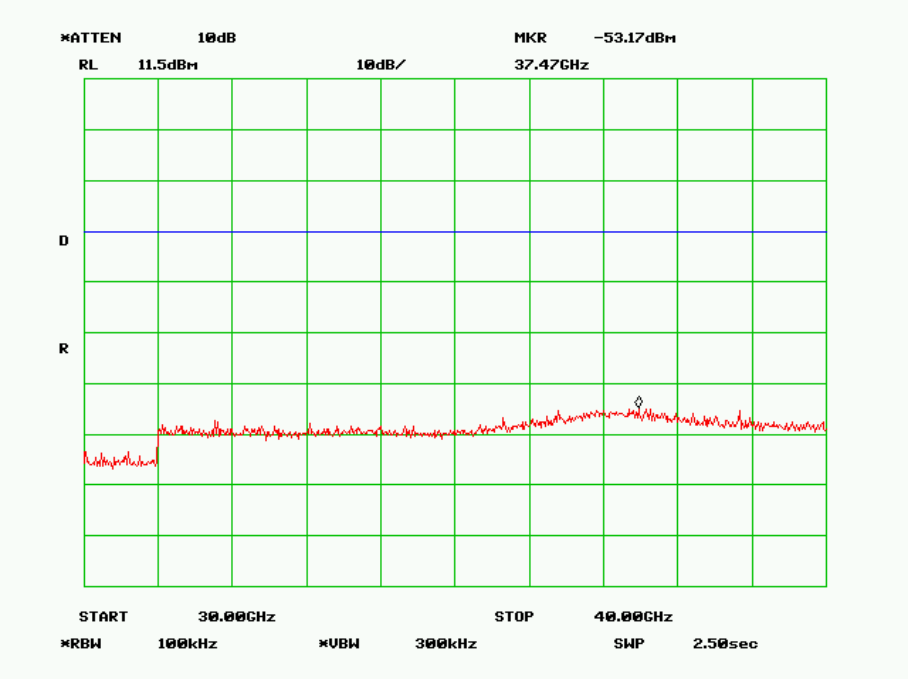
Highest channel



REMOTE HIGH

Date: 30.MAY.2013 22:25:14

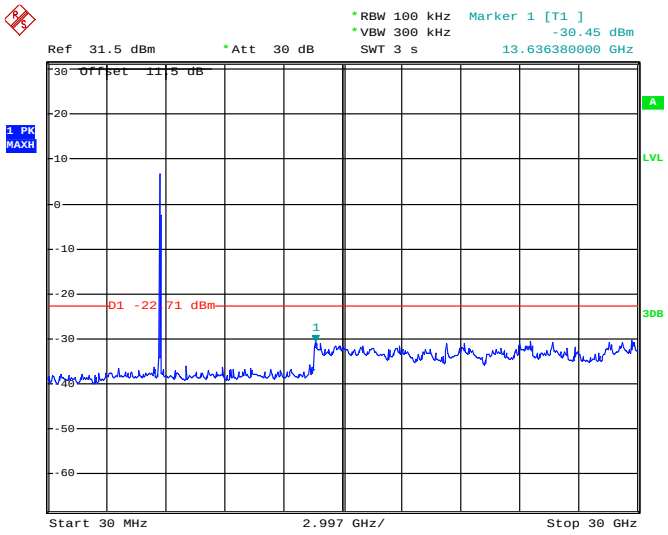
30MHz~30GHz



30GHz-40GHz

Test mode: 802.11n40

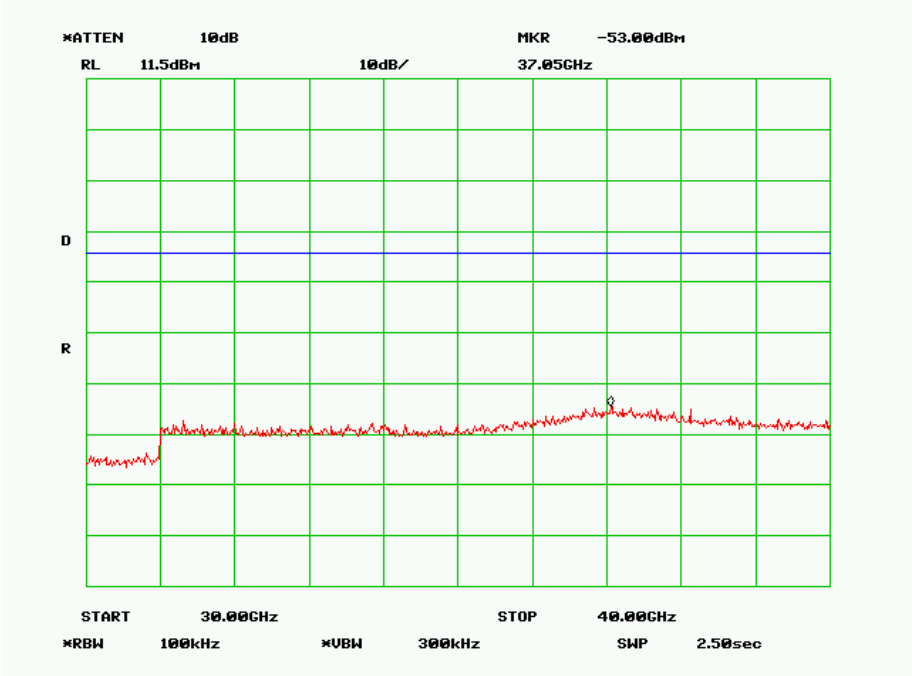
Lowest channel



REMOTE HIGH

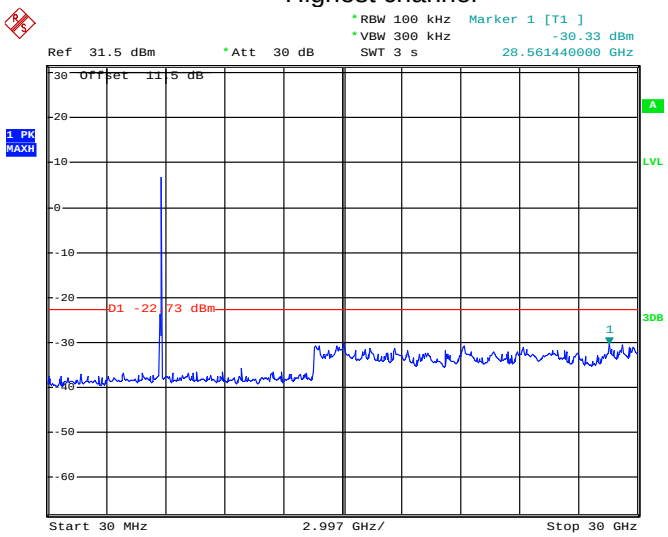
Date: 30.MAY.2013 23:11:53

30MHz~30GHz



30GHz-40GHz

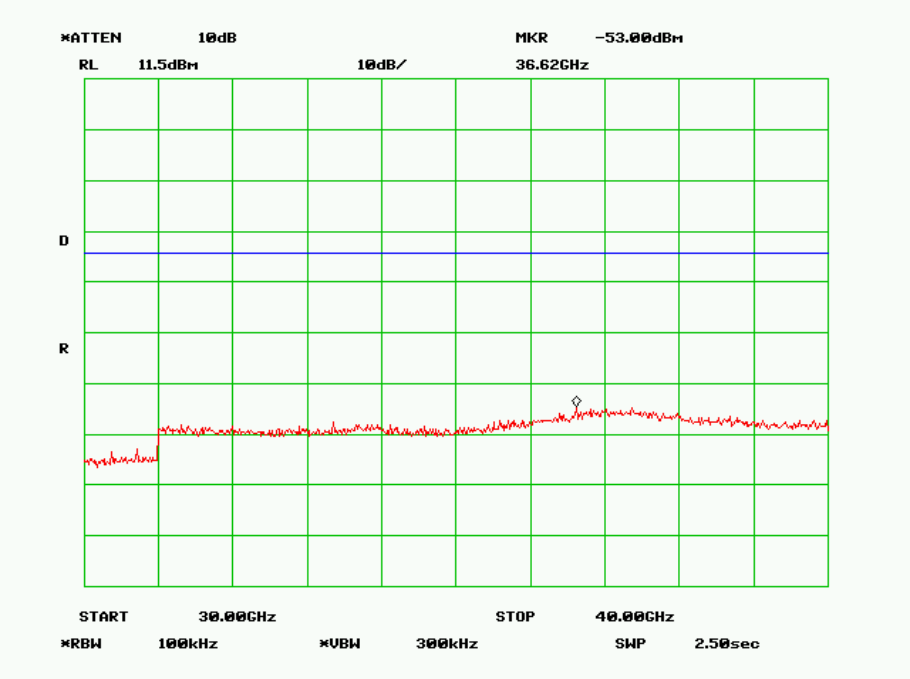
Highest channel



REMOTE HIGH

Date: 30.MAY.2013 23:22:06

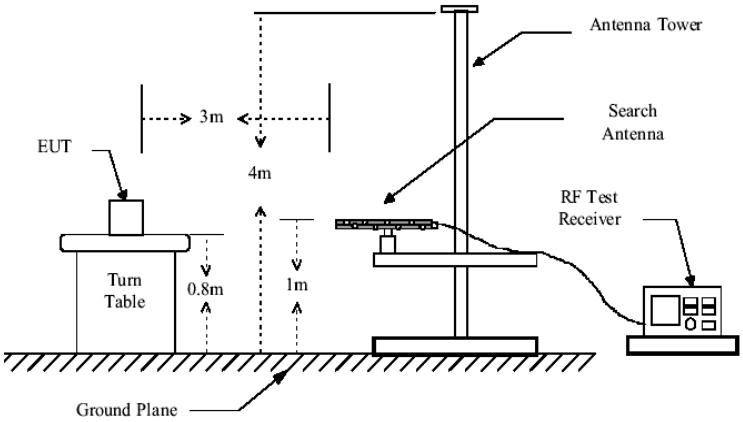
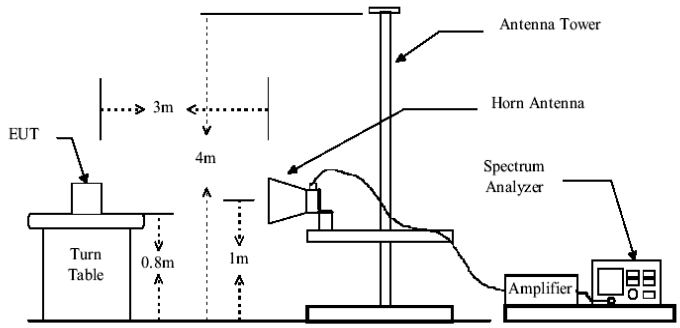
30MHz~30GHz



30GHz-40GHz

6.8.2 Radiated Emission Method

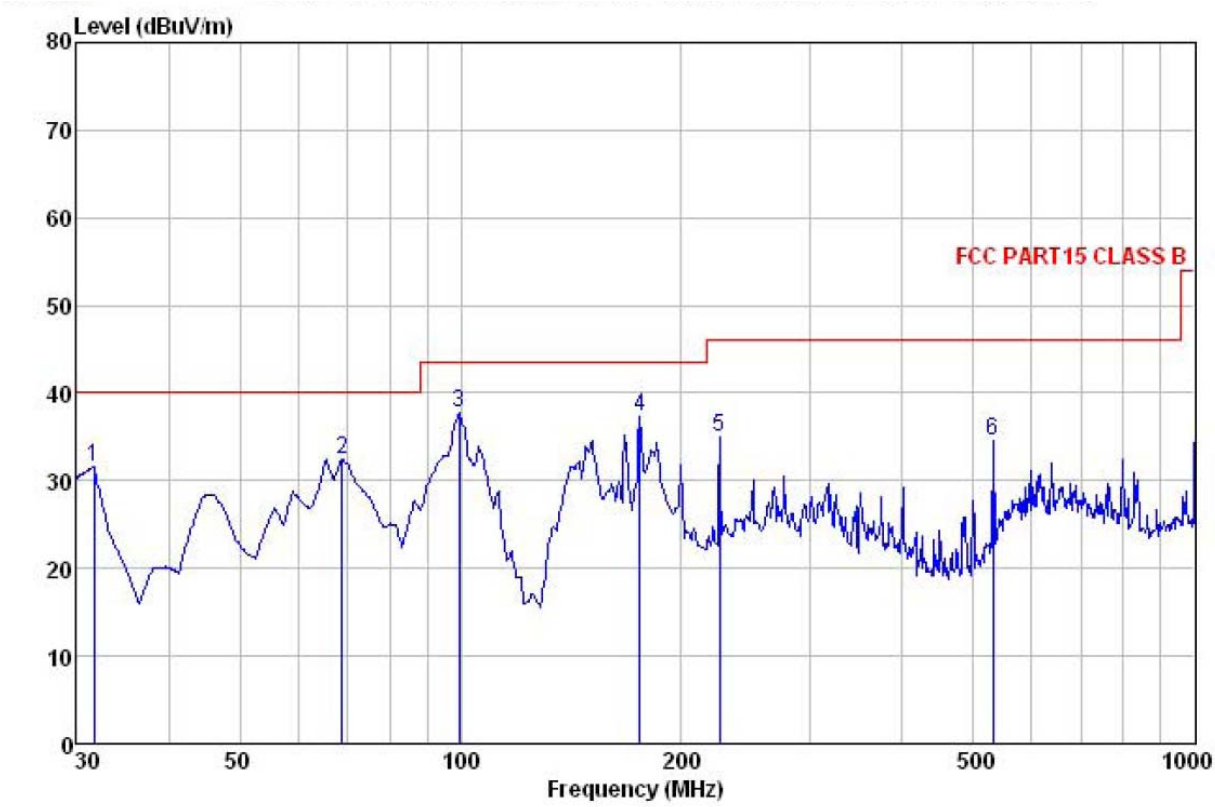
<table>
<tr><td>Test Requirement:</td><td>FCC Part15 C Section 15.209 and 15.205</td></tr>
<tr><td>Test Method:</td><td>ANSI C63.4:2003</td></tr>
<tr><td>Test Frequency Range:</td><td>30MHz to 40GHz</td></tr>
<tr><td>Test site:</td><td>Measurement Distance: 3m</td></tr>
<tr><td>Receiver setup:</td><td>
<table>
<tr><th>Frequency</th><th>Detector</th><th>RBW</th><th>VBW</th><th>Remark</th></tr>
<tr><td>30MHz-1GHz</td><td>Quasi-peak</td><td>100kHz</td><td>300kHz</td><td>Quasi-peak Value</td></tr>
<tr><td rowspan="2">Above 1GHz</td><td>Peak</td><td>1MHz</td><td>3MHz</td><td>Peak Value</td></tr>
<tr><td>Peak</td><td>1MHz</td><td>10Hz</td><td>Average Value</td></tr>
</table>
</td></tr>
<tr><td>Limit:</td><td>
<table>
<tr><th>Frequency</th><th>Limit (dBuV/m @3m)</th><th>Remark</th></tr>
<tr><td>30MHz-88MHz</td><td>40.0</td><td>Quasi-peak Value</td></tr>
<tr><td>88MHz-216MHz</td><td>43.5</td><td>Quasi-peak Value</td></tr>
<tr><td>216MHz-960MHz</td><td>46.0</td><td>Quasi-peak Value</td></tr>
<tr><td>960MHz-1GHz</td><td>54.0</td><td>Quasi-peak Value</td></tr>
<tr><td rowspan="2">Above 1GHz</td><td>54.0</td><td>Average Value</td></tr>
<tr><td>74.0</td><td>Peak Value</td></tr>
</table>
</td></tr>
<tr><td>Test Procedure:</td><td>
1. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter camber. The table was rotated 360 degrees to determine the position of the highest radiation.
2. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
3. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
4. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rota table was turned from 0 degrees to 360 degrees to find the maximum reading.
5. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
6. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.
</td></tr>
</table>

Test setup:	Below 1GHz  Above 1GHz 
Test Instruments:	Refer to section 5.6 for details
Test mode:	Refer to section 5.3 for details
Test results:	Passed

Below 1GHz

15dBi antenna

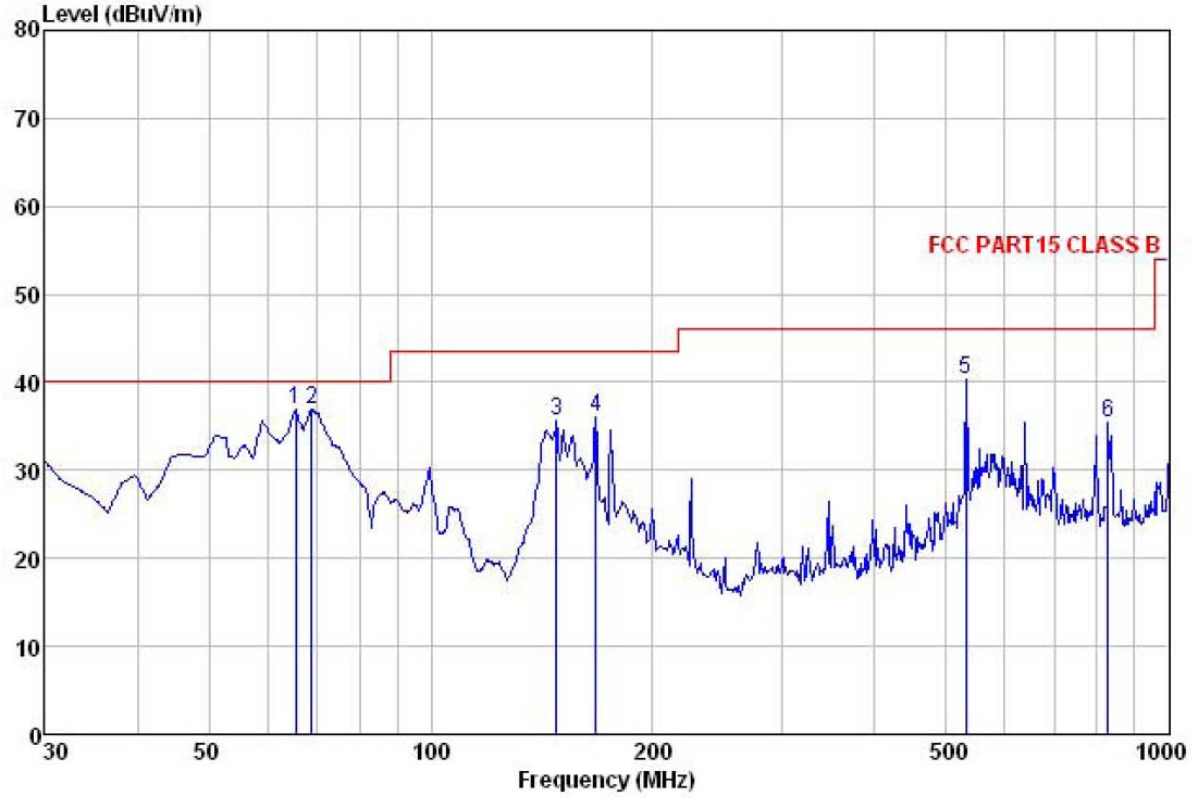
Horizontal:



Site : 3m chamber
Condition : FCC PART15 CLASS B 3m VULB9163(30M1G) HORIZONTAL
Job No. : 148RF
EUT : Broadband Digital Transmission System
Model : APC Sputnik
Test mode : TX mode
Power Rating : AC 120V/60Hz
Environment : Temp:25℃ Huni:55% Atmos:101Kpa
Test Engineer: Winner
Remark : 15dBi ant

	Freq	ReadAntenna Level	Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	31.620	44.86	12.32	0.85	26.44	31.59	40.00	-8.41	QP
2	68.872	51.94	9.06	1.49	30.04	32.45	40.00	-7.55	QP
3	99.528	52.81	13.13	1.95	30.09	37.80	43.50	-5.70	QP
4	175.652	52.76	9.36	2.70	27.57	37.25	43.50	-6.25	QP
5	225.308	50.50	11.41	2.84	29.70	35.05	46.00	-10.95	QP
6	531.964	44.14	17.20	3.79	30.53	34.60	46.00	-11.40	QP

Vertical:



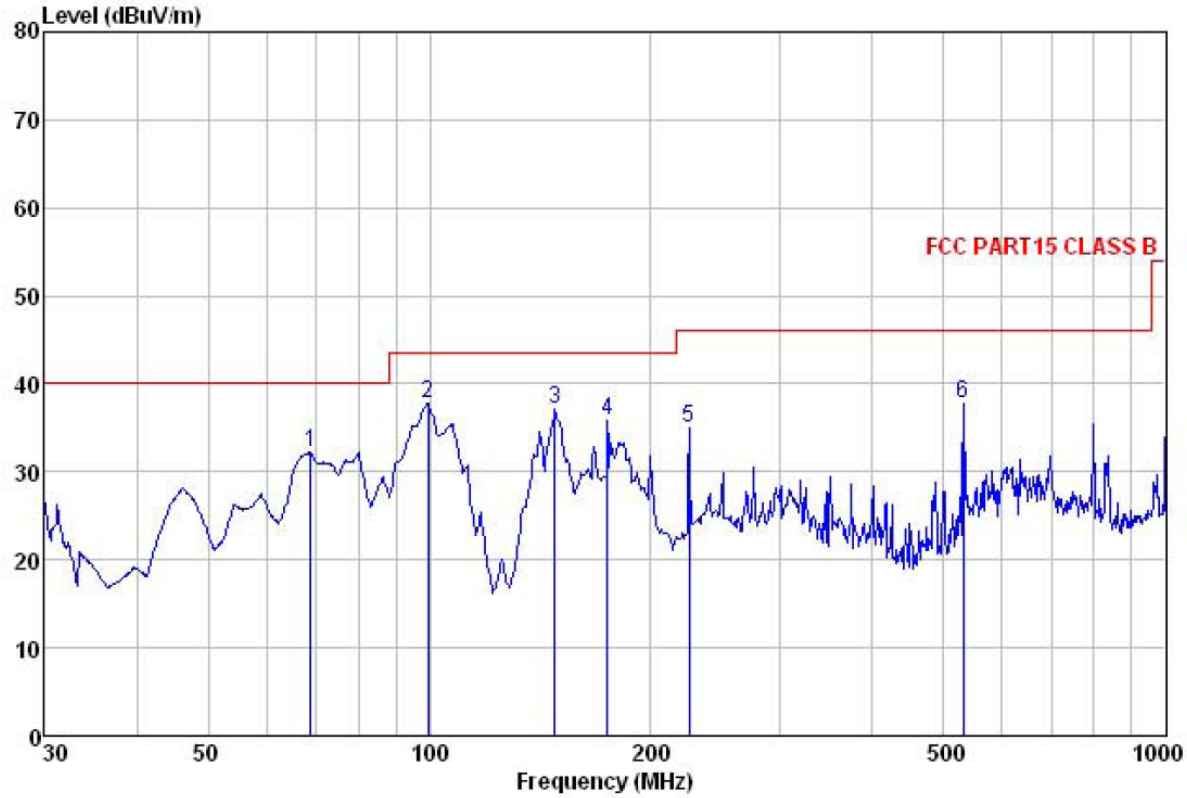
Site : 3m chamber
Condition : FCC PART15 CLASS B 3m VULB9163(30M1G) VERTICAL
Job No. : 148RF
EUT : Broadband Digital Transmission System
Model : APC Sputnik
Test mode : TX mode
Power Rating : AC 120V/60Hz
Environment : Temp:25℃ Huni:55% Atmos:101Kpa
Test Engineer: Winner
Remark : 15dBi ant

	Freq	ReadLevel	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	65.573	54.80	10.44	1.41	29.76	36.89	40.00	-3.11	QP
2	68.872	56.41	9.06	1.49	30.04	36.92	40.00	-3.08	QP
3	147.921	54.07	8.24	2.50	29.26	35.55	43.50	-7.95	QP
4	167.237	53.64	8.87	2.64	29.09	36.06	43.50	-7.44	QP
5	531.964	49.85	17.20	3.79	30.53	40.31	46.00	-5.69	QP
6	827.493	41.03	20.37	4.26	30.33	35.33	46.00	-10.67	QP

Remark: No emissions were detected when frequency above 1 GHz.

27 dBi antenna

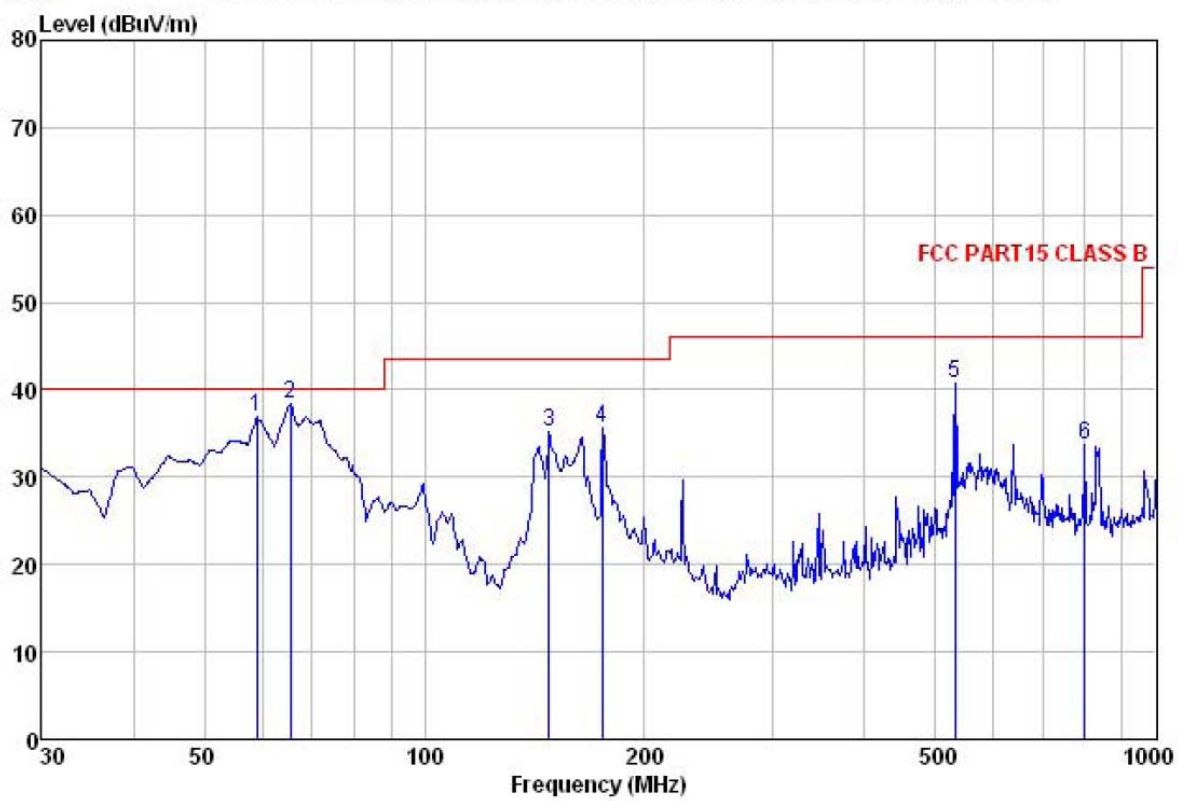
Horizontal:



Site : 3m chamber
Condition : FCC PART15 CLASS B 3m VULB9163(30M1G) HORIZONTAL
Job No. : 148RF
EUT : Broadband Digital Transmission System
Model : APC Sputnik
Test mode : TX mode
Power Rating : AC 120V/60Hz
Environment : Temp:25'C Huni:55% Atmos:101Kpa
Test Engineer: Winner
Remark : 27dBi ant

	Freq	ReadLevel	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	68.872	51.66	9.06	1.49	30.04	32.17	40.00	-7.83	QP
2	99.528	52.86	13.13	1.95	30.09	37.85	43.50	-5.65	QP
3	147.921	55.57	8.24	2.50	29.26	37.05	43.50	-6.45	QP
4	174.424	51.67	9.29	2.69	27.72	35.93	43.50	-7.57	QP
5	225.308	50.41	11.41	2.84	29.70	34.96	46.00	-11.04	QP
6	531.964	47.24	17.20	3.79	30.53	37.70	46.00	-8.30	QP

Vertical:



Site : 3m chamber
Condition : FCC PART15 CLASS B 3m VULB9163(30M1G) VERTICAL
Job No. : 148RF
EUT : Broadband Digital Transmission System
Model : APC Sputnik
Test mode : TX mode
Power Rating : AC 120V/60Hz
Environment : Temp:25°C Huni:55% Atmos:101Kpa
Test Engineer: Winner
Remark : 27dBi ant

	Freq	ReadAntenna Level	Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	59.025	51.89	12.77	1.38	29.13	36.91	40.00	-3.09	QP
2	65.573	56.34	10.44	1.41	29.76	38.43	40.00	-1.57	QP
3	147.921	53.73	8.24	2.50	29.26	35.21	43.50	-8.29	QP
4	175.037	51.25	9.29	2.69	27.57	35.66	43.50	-7.84	QP
5	531.964	50.35	17.20	3.79	30.53	40.81	46.00	-5.19	QP
6	798.980	39.70	20.06	4.35	30.41	33.70	46.00	-12.30	QP

Remark: Emissions above 1 GHz just only noise floor, so not recorded in report.