

FCC REPORT

Applicant: Eltop

Address of Applicant: 9F.,No.21,Ln221,Gangqian Rd.,Neuhu Districk,Taipei,Taiwan

Equipment Under Test (EUT)

Product Name: Broadband Digital Transmission System

Model No.: JetPalm 5M-15

FCC ID: 2AA3R-JPM5M15

Applicable standards: FCC CFR Title 47 Part 15 Subpart C Section 15.247

Date of sample receipt: 19 Jun., 2013

Date of Test: 20 Jun., 2013 to 11 Oct., 2013

Date of report issued: 12 Oct., 2013

Test Result : PASS *

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

Authorized Signature:



Bruce Zhang
Laboratory Manager

This report details the results of the testing carried out on one sample. The results contained in this test report do not relate to other samples of the same product and does not permit the use of the CCIS product certification mark. The manufacturer should ensure that all products in series production are in conformity with the product sample detailed in this report.

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2 Version

Version No.	Date	Description
00	12 Oct., 2013	Original

Prepared by:

Sera

Date:

12 Oct., 2013

Report Clerk

Reviewed by:

Joe. Zhou

Date:

12 Oct., 2013

Project Engineer

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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:	Eltop
Address of Applicant:	9F.,No.21,Ln221,Gangqian Rd.,Neuhu Districk,Taipei,Taiwan
Manufacturer/ Factory:	Eltop
Address of Manufacturer/ Factory:	9F.,No.21,Ln221,Gangqian Rd.,Neuhu Districk,Taipei,Taiwan

5.2 General Description of E.U.T.

Product Name:	Broadband Digital Transmission System
Model No.:	JetPalm 5M-15
Operation Frequency:	5745MHz-5825MHz
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:	Panel
Antenna gain:	15 dBi
Power supply:	Adapter1: Model: GRT-240050 Input:100-240V AC,50/60Hz 0.5A Output:24V DC MAX0.5A Adapter2: Model: AY012E-ZF243 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 in MIMO mode.

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 our 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 2013	June 08 2014
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 2013	June 08 2014
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

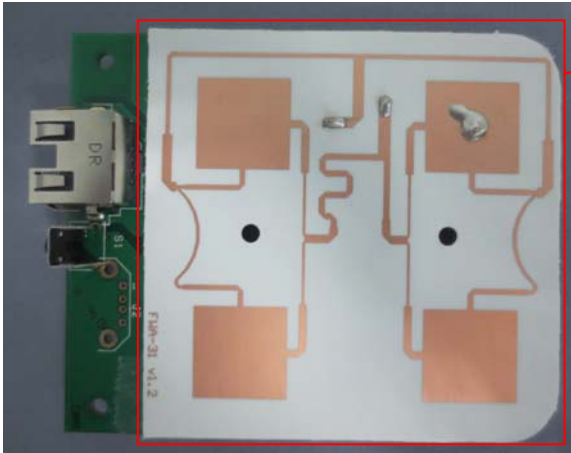
Conducted Emission:						
Item	Test Equipment	Manufacturer	Model No.	Inventory No.	Cal. Date (mm-dd-yy)	Cal. Due date (mm-dd-yy)
1	Shielding Room	ZhongShuo Electron	11.0(L)x4.0(W)x3.0(H)	CCIS0061	June 09 2013	June 08 2014
2	EMI Test Receiver	Rohde & Schwarz	ESCI	CCIS0002	May 25 2013	May 24 2014
3	LISN	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)
<p>15.203 requirement:</p> <p><i>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.</i></p> <p><i>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.</i></p>	
E.U.T Antenna:	
<p>The details of antenna plots as below:</p> <div></div>	

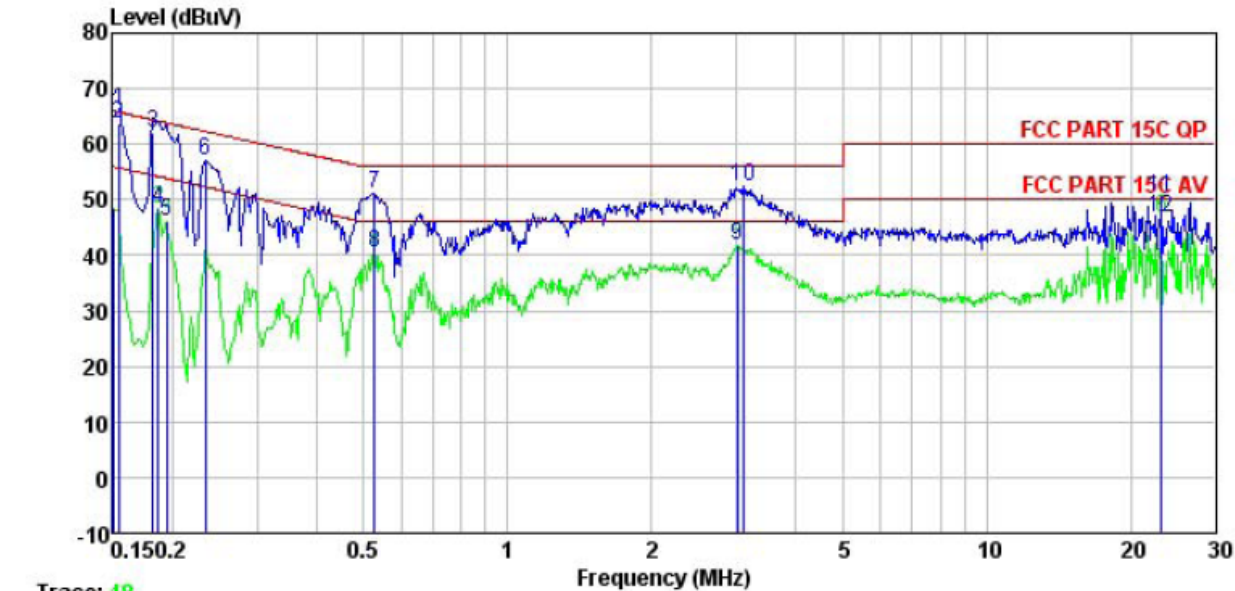
6.3 Conducted Emission

Test Requirement:	FCC Part15 C Section 15.207			
Test Method:	ANSI C63.4: 2003			
Test Frequency Range:	150 kHz to 30 MHz			
Class / Severity:	Class B			
Receiver setup:	RBW=9 kHz, VBW=30 kHz			
Limit:	Frequency range (MHz)	Limit (dBuV)		
		Quasi-peak	Average	
		0.15-0.5	66 to 56*	56 to 46*
		0.5-5	56	46
		5-30	60	50
* Decreases with the logarithm of the frequency.				
Test procedure	<div>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.</div> <div>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).</div> <div>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.</div>			
Test setup:	<div><div><div>Reference Plane</div><div><div><div>LISN</div><div>AUX Equipment</div><div>E.U.T</div></div><div>40cm</div><div>80cm</div><div><div>LISN</div><div>Filter</div><div>AC power</div></div><div>EMI Receiver</div></div><div>Test table/Insulation plane</div></div><div><div>Remark</div><div>E.U.T: Equipment Under Test</div><div>LISN: Line Impedance Stabilization Network</div><div>Test table height=0.8m</div></div></div>			
Test Instruments:	Refer to section 5.6 for details			
Test mode:	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).			
Test results:	Passed			

Measurement Data

Model: GRT-240050

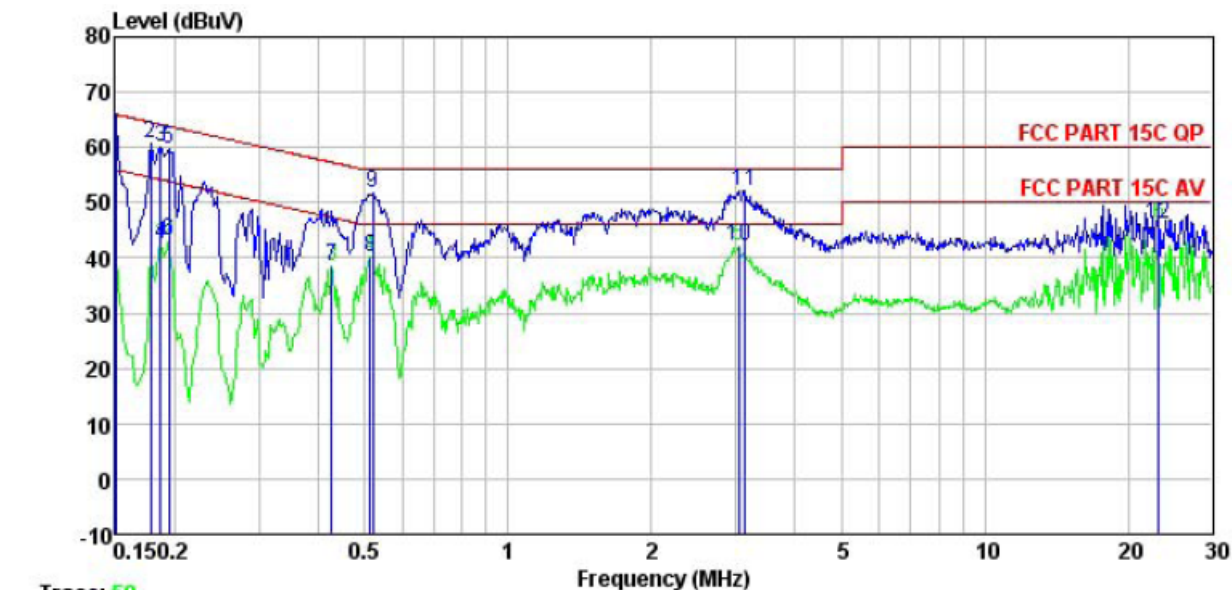
Line:



Trace: 48
Site : CCIS Conducted test Site
Condition : FCC PART 15C QP LISN LINE
Job NO. : 176RF
Test Mode : TX mode
Power Rating : AC 120V/60Hz
Environment : Temp: 23 °C Humi:56% Atmos:101KPa
Test Engineer: Joe

	Freq	Read Level	LISN Factor	Cable Loss	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dB	dBuV	dBuV	dB	
1	0.150	37.28	10.25	0.79	48.32	56.00	-7.68	Average
2	0.154	52.81	10.25	0.79	63.85	65.78	-1.93	QP
3	0.182	51.07	10.22	0.77	62.06	64.42	-2.36	QP
4	0.186	37.51	10.22	0.77	48.50	54.20	-5.70	Average
5	0.194	35.23	10.21	0.76	46.20	53.84	-7.64	Average
6	0.234	46.17	10.23	0.75	57.15	62.30	-5.15	QP
7	0.527	40.09	10.26	0.76	51.11	56.00	-4.89	QP
8	0.527	29.52	10.26	0.76	40.54	46.00	-5.46	Average
9	3.025	30.68	10.29	0.92	41.89	46.00	-4.11	Average
10	3.107	41.37	10.29	0.92	52.58	56.00	-3.42	QP
11	23.140	38.96	10.47	0.89	50.32	60.00	-9.68	QP
12	23.140	35.36	10.47	0.89	46.72	50.00	-3.28	Average

Neutral:



Site : CCIS Conducted test Site
Condition : FCC PART 15C QP LISN NEUTRAL
Job NO. : 176RF
Test Mode : TX mode
Power Rating : AC 120V/60Hz
Environment : Temp: 23 °C Humi:56% Atmos:101KPa
Test Engineer: Joe

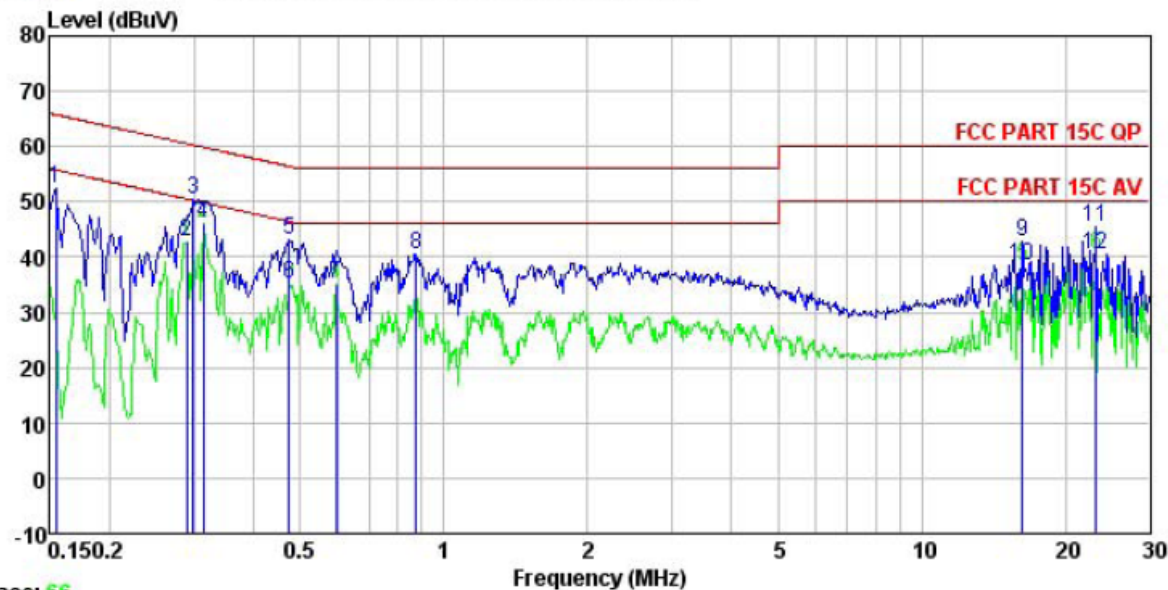
	Read	LISN	Cable	Limit	Over	
Freq	Level	Factor	Loss	Line	Limit	Remark
MHz	dBuV	dB	dB	dBuV	dBuV	dB
1	0.150	52.88	10.27	0.79	63.94	66.00 -2.06 QP
2	0.178	49.85	10.25	0.77	60.87	64.59 -3.72 QP
3	0.186	49.22	10.24	0.77	60.23	64.20 -3.97 QP
4	0.186	31.47	10.24	0.77	42.48	54.20 -11.72 Average
5	0.194	48.74	10.23	0.76	59.73	63.84 -4.11 QP
6	0.194	32.18	10.23	0.76	43.17	53.84 -10.67 Average
7	0.426	27.54	10.27	0.73	38.54	47.33 -8.79 Average
8	0.513	29.20	10.27	0.76	40.23	46.00 -5.77 Average
9	0.521	40.80	10.27	0.76	51.83	56.00 -4.17 QP
10	3.041	30.79	10.28	0.92	41.99	46.00 -4.01 Average
11	3.123	41.05	10.28	0.92	52.25	56.00 -3.75 QP
12	23.140	34.71	10.48	0.89	46.08	50.00 -3.92 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

Model: AY012E-ZF243

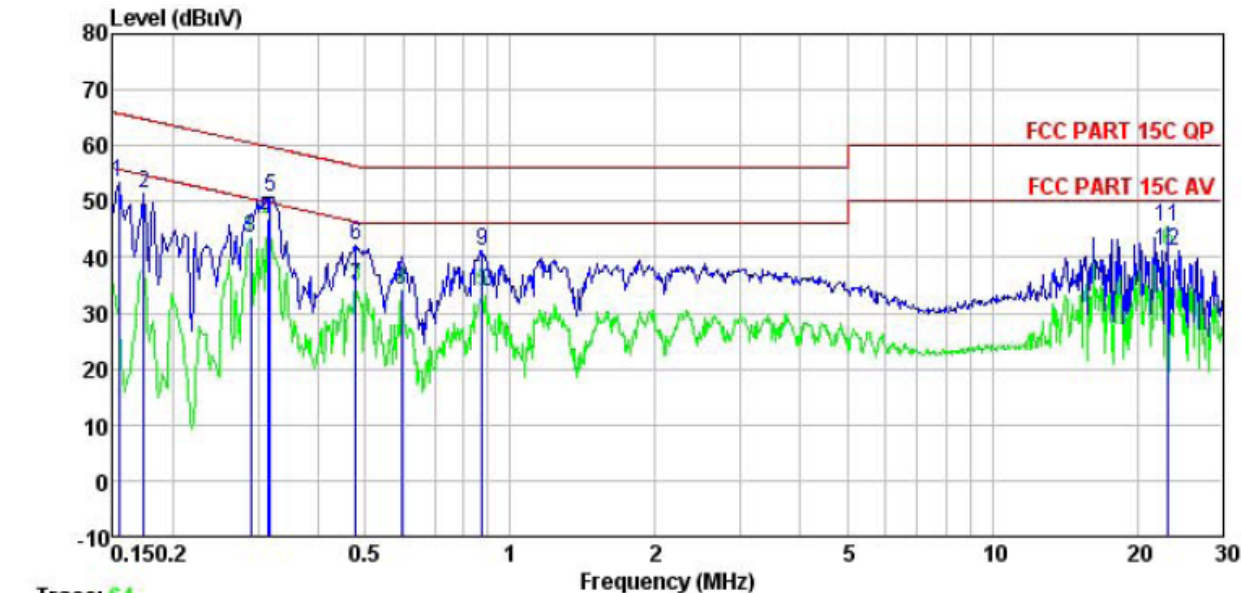
Line:



Trace: 66
Site : CCIS Conducted test Site
Condition : FCC PART 15C QP LISN LINE
Job NO. : 176RF
Test Mode : TX mode
Power Rating : AC 120V/60Hz
Environment : Temp: 23 °C Humi:56% Atmos:101KPa
Test Engineer: Joe

	Freq	Read Level	LISN Factor	Cable Loss	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dB	dBuV	dBuV	dB	
1	0.154	41.31	10.25	0.79	52.35	65.78	-13.43	QP
2	0.289	31.64	10.26	0.74	42.64	50.54	-7.90	Average
3	0.299	39.51	10.26	0.74	50.51	60.28	-9.77	QP
4	0.313	35.12	10.26	0.74	46.12	49.88	-3.76	Average
5	0.474	32.06	10.27	0.75	43.08	56.45	-13.37	QP
6	0.474	24.01	10.27	0.75	35.03	46.45	-11.42	Average
7	0.595	24.06	10.22	0.77	35.05	46.00	-10.95	Average
8	0.876	29.55	10.20	0.83	40.58	56.00	-15.42	QP
9	16.226	31.52	10.26	0.91	42.69	60.00	-17.31	QP
10	16.226	27.32	10.26	0.91	38.49	50.00	-11.51	Average
11	23.140	33.98	10.47	0.89	45.34	60.00	-14.66	QP
12	23.140	28.99	10.47	0.89	40.35	50.00	-9.65	Average

Neutral:



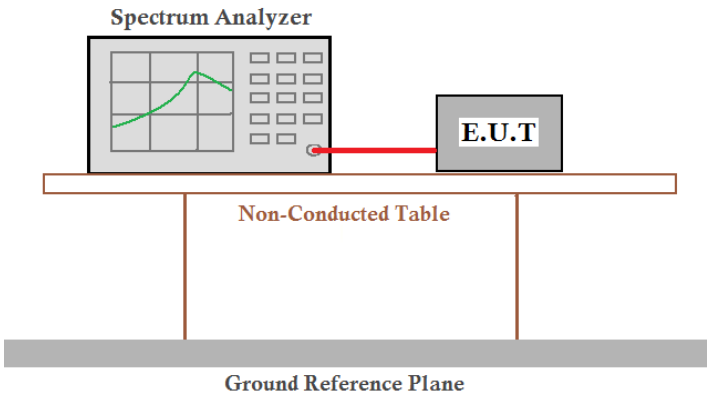
Trace: 64
Site : CCIS Conducted test Site
Condition : FCC PART 15C QP LISN NEUTRAL
Job NO. : 176RF
Test Mode : TX mode
Power Rating : AC 120V/60Hz
Environment : Temp: 23 °C Humi:56% Atmos:101KPa
Test Engineer: Joe

	Freq	Read	LISN	Cable	Level	Limit	Over	
	MHz	Level	Factor	Loss	Level	Line	Limit	Remark
	MHz	dBuV	dB	dB	dBuV	dBuV	dB	
1	0.154	42.36	10.27	0.79	53.42	65.78	-12.36	QP
2	0.174	40.54	10.25	0.77	51.56	64.77	-13.21	QP
3	0.289	32.35	10.24	0.74	43.33	50.54	-7.21	Average
4	0.313	35.94	10.24	0.74	46.92	49.88	-2.96	Average
5	0.318	39.87	10.24	0.74	50.85	59.75	-8.90	QP
6	0.479	31.18	10.28	0.75	42.21	56.36	-14.15	QP
7	0.479	23.71	10.28	0.75	34.74	46.36	-11.62	Average
8	0.595	23.23	10.22	0.77	34.22	46.00	-11.78	Average
9	0.876	30.20	10.18	0.83	41.21	56.00	-14.79	QP
10	0.876	22.77	10.18	0.83	33.78	46.00	-12.22	Average
11	23.140	34.14	10.48	0.89	45.51	60.00	-14.49	QP
12	23.140	29.71	10.48	0.89	41.08	50.00	-8.92	Average

Notes:

- An initial pre-scan was performed on the live and neutral lines with peak detector.
- Quasi-Peak and Average measurement were performed at the frequencies with maximized peak emission.
- 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

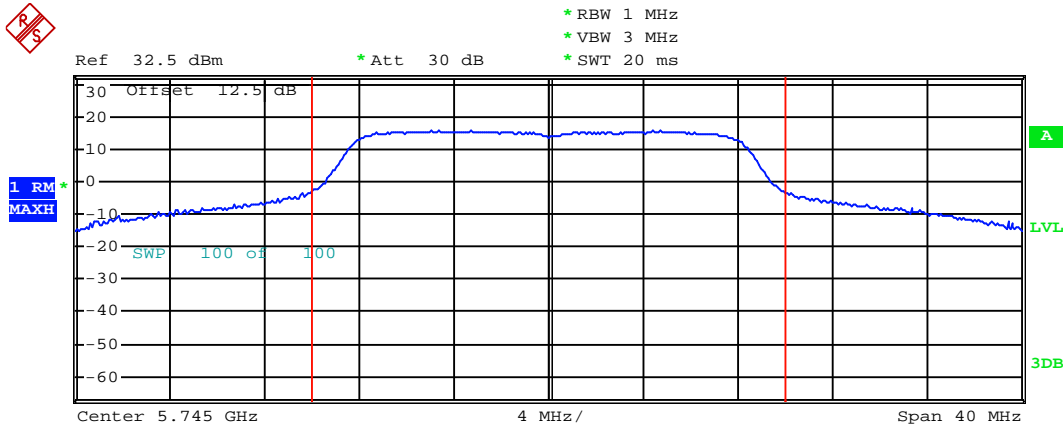
Mode	Test CH	Ant. Port	Conducted Output power (dBm)	Total power (dBm)	Limit (dBm)	Result
802.11a	Lowest	TX0	26.42	29.42	30.00	Pass
		TX1	26.40			
	Middle	TX0	26.54	29.53	30.00	Pass
		TX1	26.49			
	Highest	TX0	26.45	29.44	30.00	Pass
		TX1	26.40			
802.11n20	Lowest	TX0	26.37	29.41	30.00	Pass
		TX1	26.42			
	Middle	TX0	26.49	29.50	30.00	Pass
		TX1	26.48			
	Highest	TX0	26.47	29.48	30.00	Pass
		TX1	26.47			
802.11n40	Lowest	TX0	26.51	29.50	30.00	Pass
		TX1	26.46			
	Highest	TX0	26.51	29.65	30.00	Pass
		TX1	26.77			

Test plot as follows:

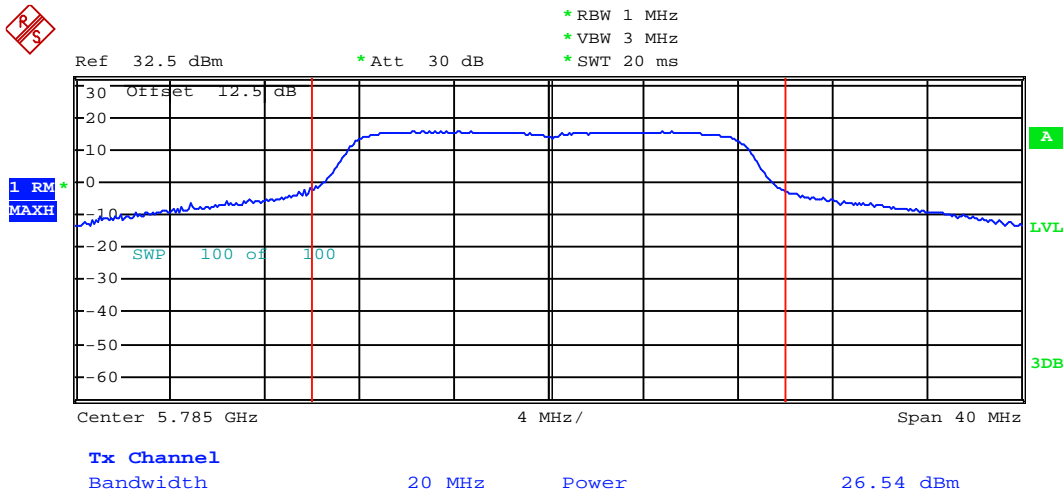
TX0

Test mode:

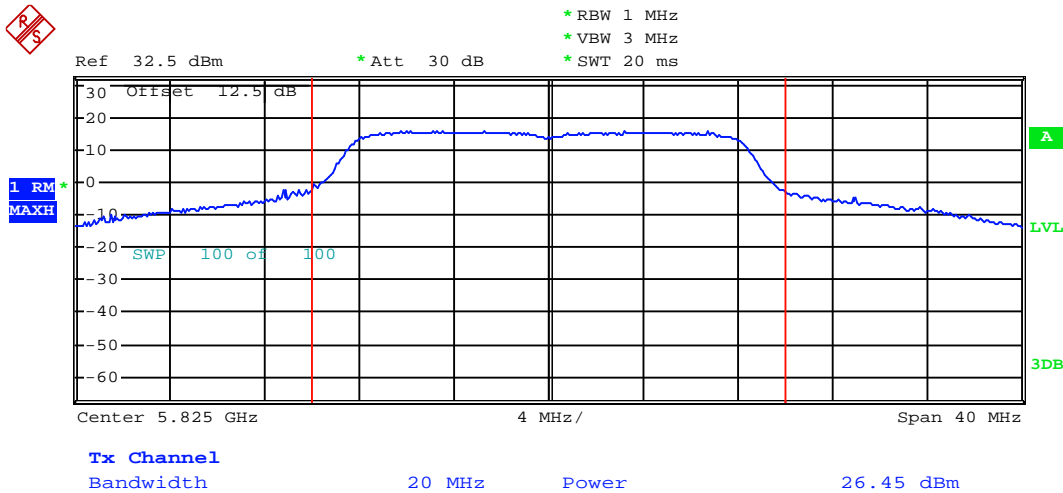
802.11a



Lowest channel



Middle channel

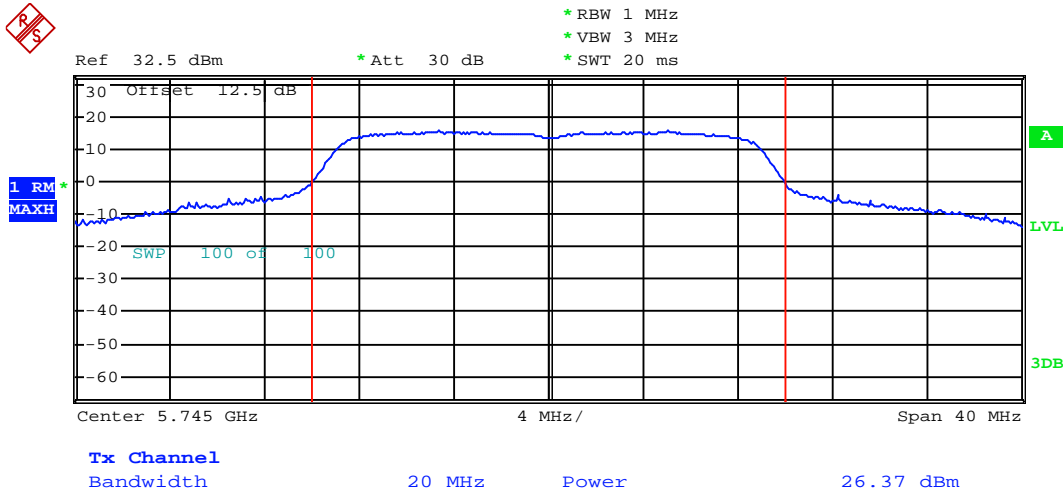


Highest channel

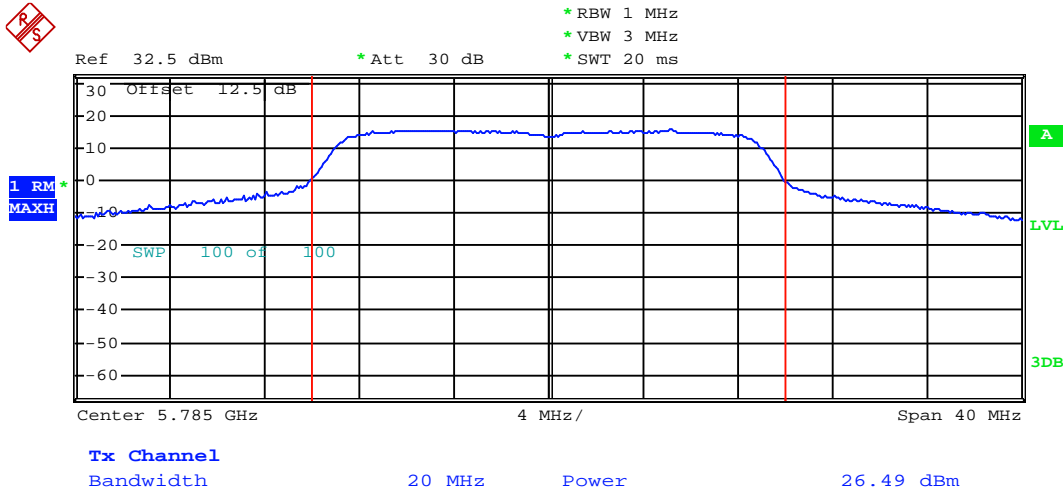
TX0

Test mode:

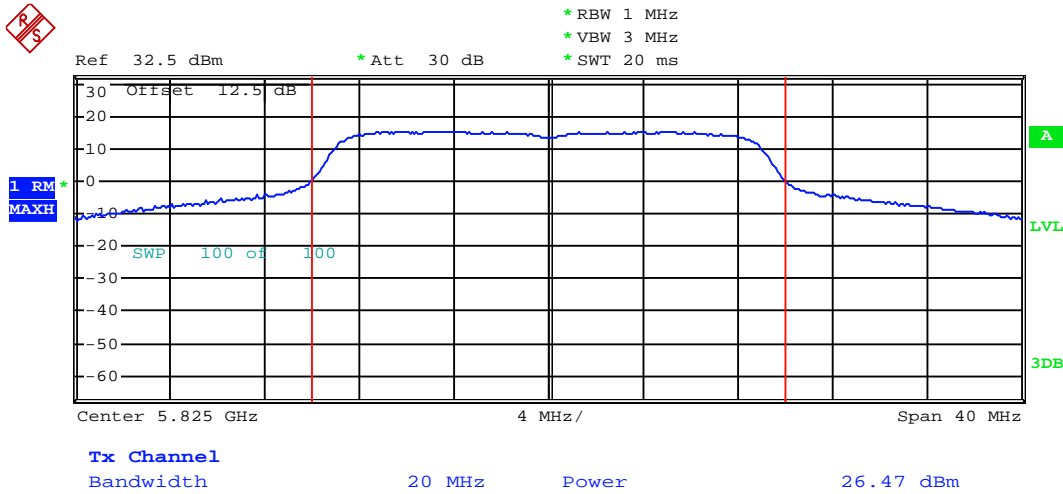
802.11n20



Lowest channel



Middle channel

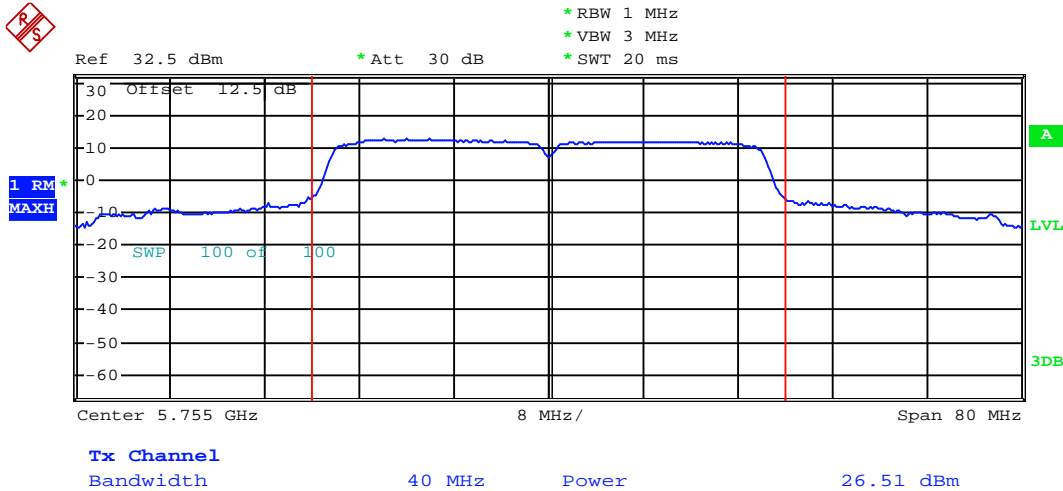


Highest channel

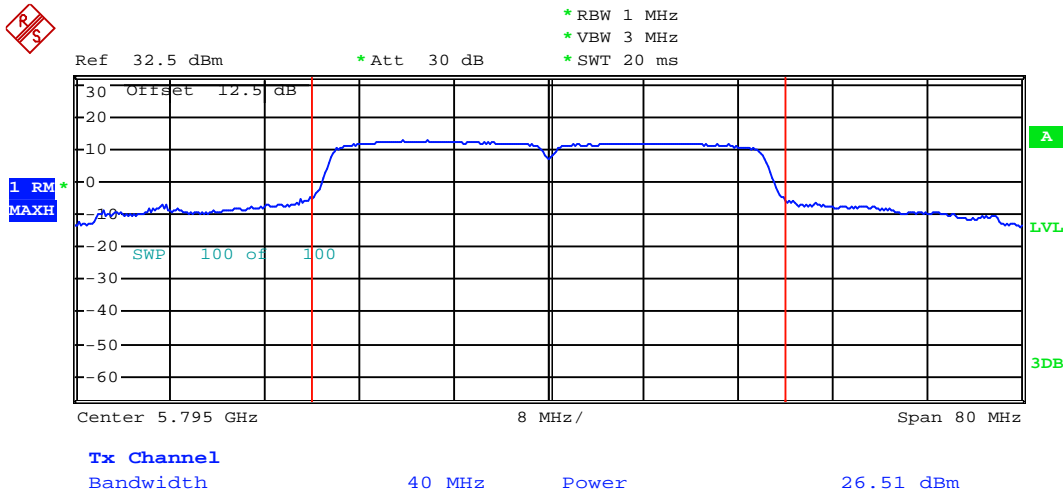
TX0

Test mode:

802.11n40



Lowest channel

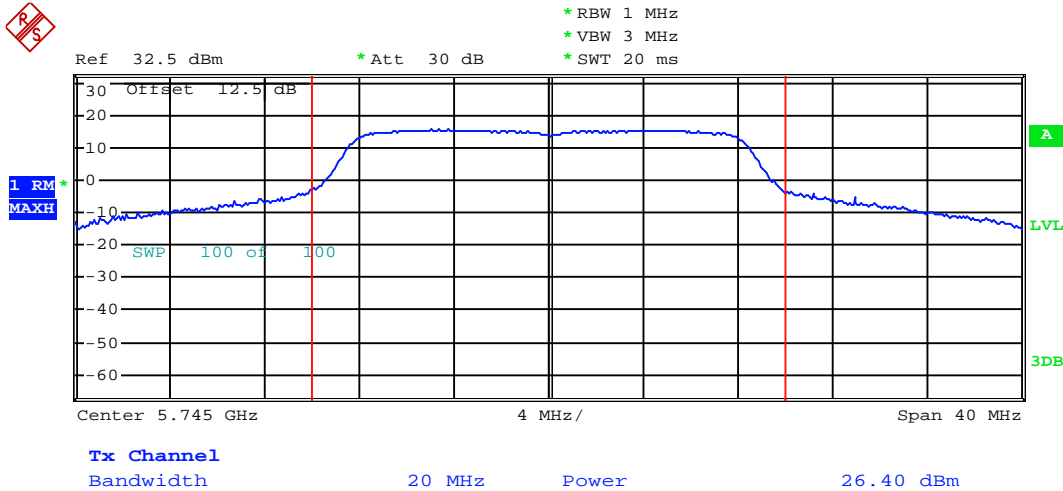


Highest channel

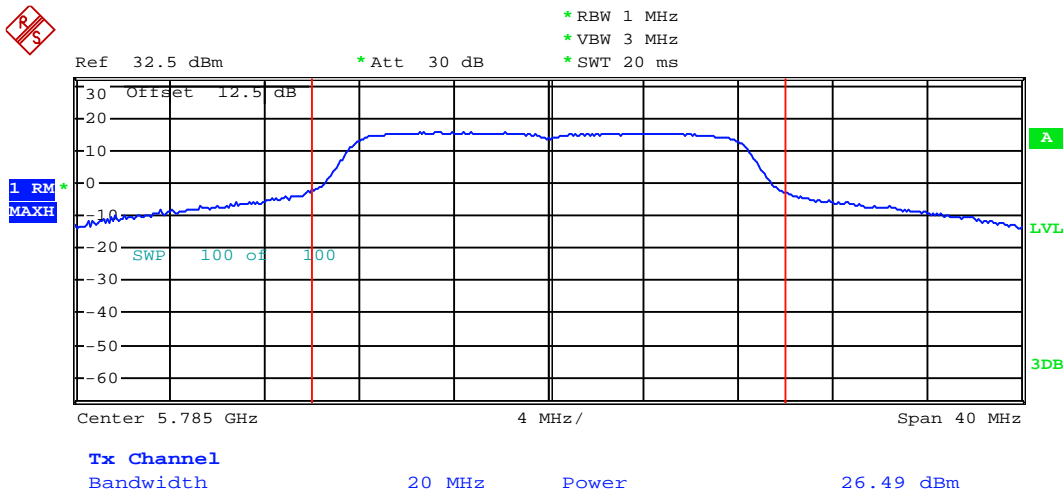
TX1

Test mode:

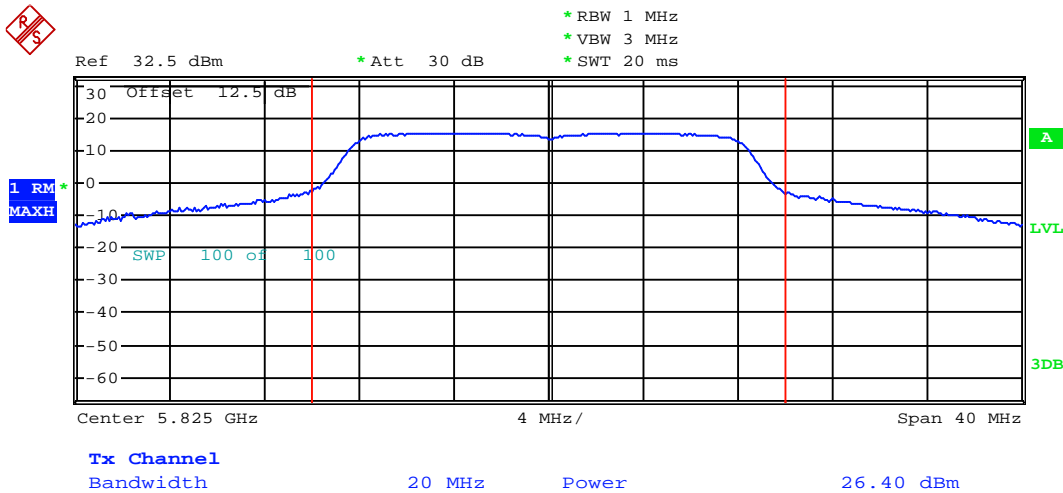
802.11a



Lowest channel



Middle channel

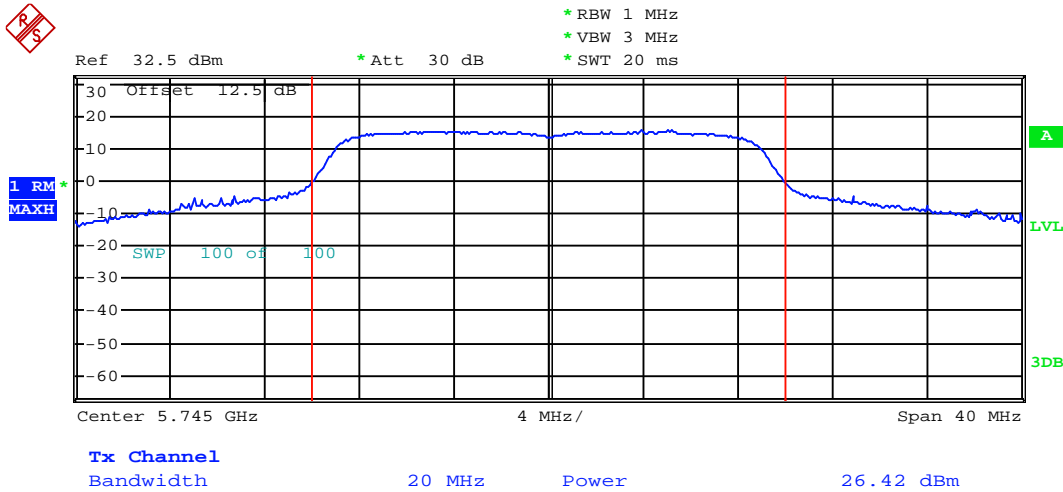


Highest channel

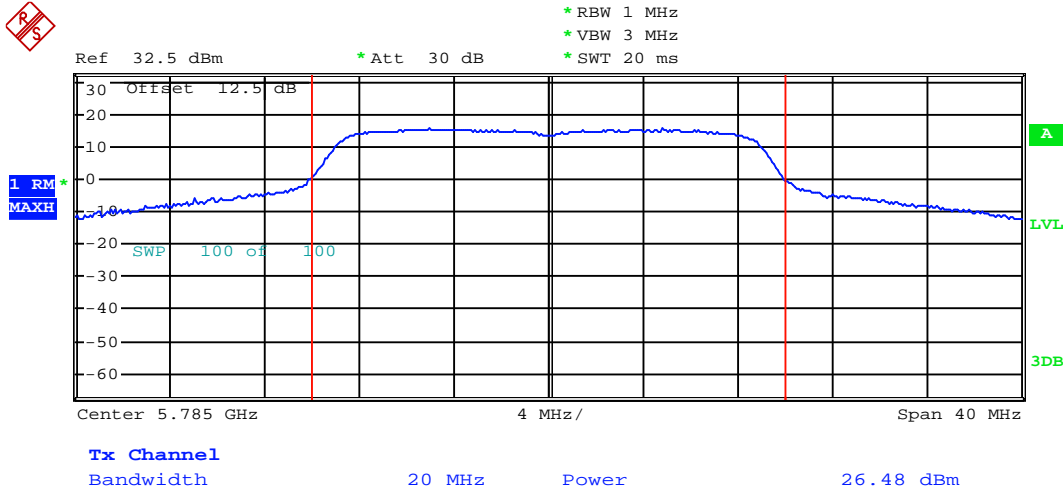
TX1

Test mode:

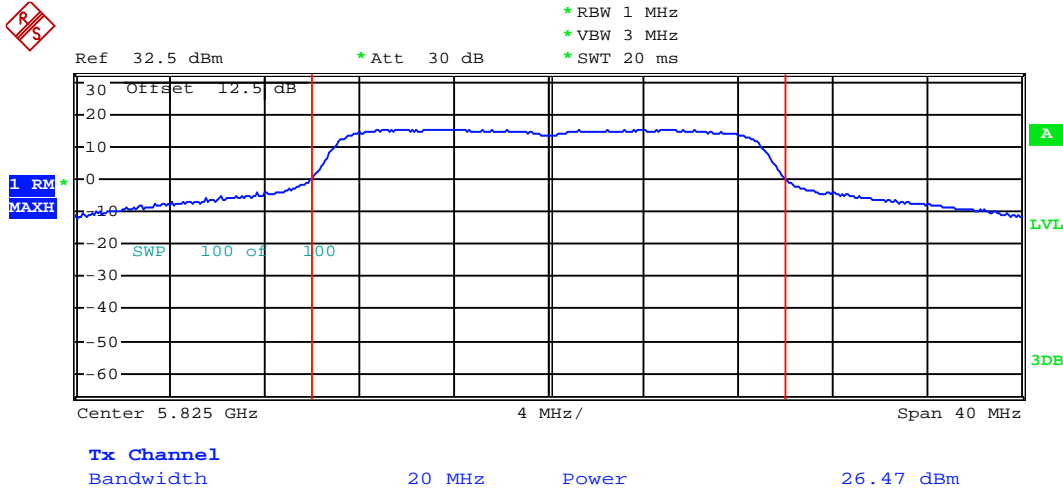
802.11n20



Lowest channel



Middle channel

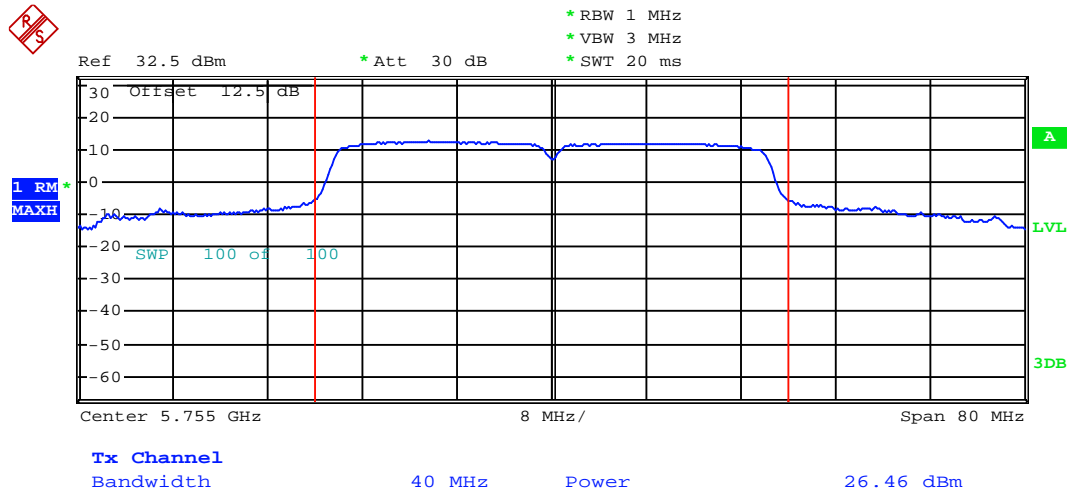


Highest channel

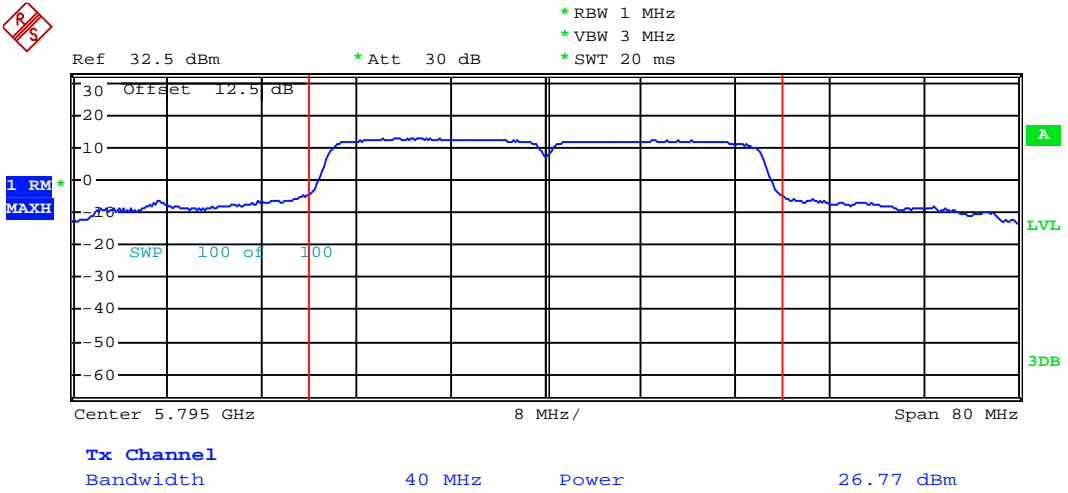
TX1

Test mode:

802.11n40

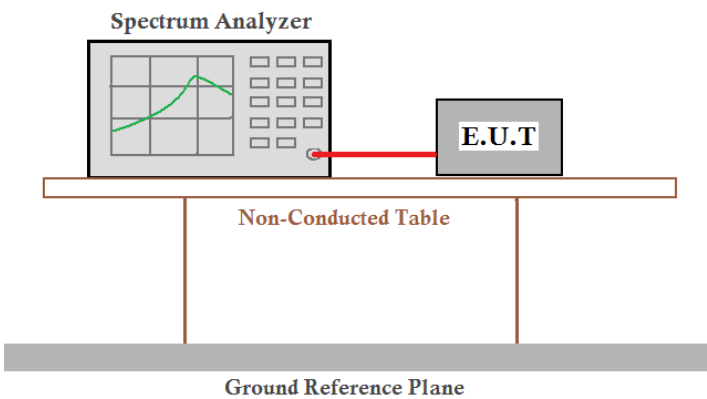


Lowest channel



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	14.40	13.80	26.56	>500	Pass
Middle	13.20	13.60	---		
Highest	13.20	13.60	26.88		

Test CH	99% Occupy Bandwidth (MHz)			Limit(kHz)	Result
	802.11a	802.11n20	802.11n40		
Lowest	17.70	18.20	36.48	N/A	N/A
Middle	18.90	18.70	---		
Highest	18.40	18.50	38.08		

TX1

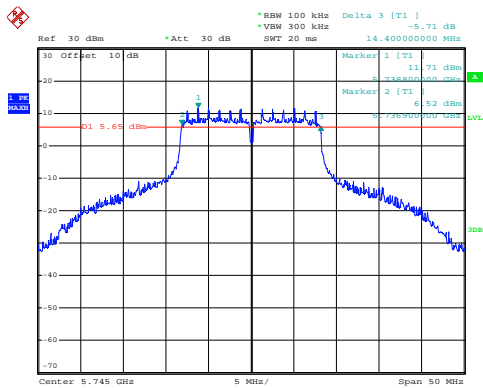
Test CH	6dB Occupy Bandwidth (MHz)			Limit(kHz)	Result
	802.11a	802.11n20	802.11n40		
Lowest	14.40	13.60	26.56	>500	Pass
Middle	13.20	13.80	---		
Highest	13.20	13.60	26.72		

Test CH	99% Occupy Bandwidth (MHz)			Limit(kHz)	Result
	802.11a	802.11n20	802.11n40		
Lowest	17.60	18.50	36.48	N/A	N/A
Middle	18.40	19.00	---		
Highest	18.20	19.10	38.40		

Test plot as follows:

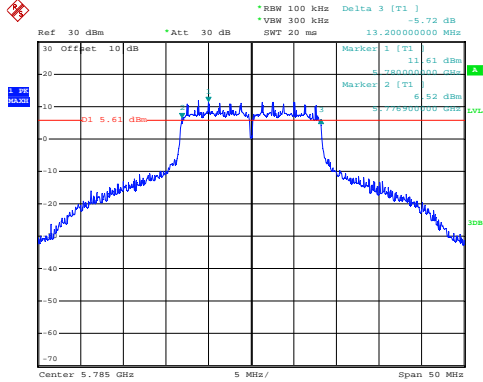
TX0
Test mode: 6dB BW

802.11a



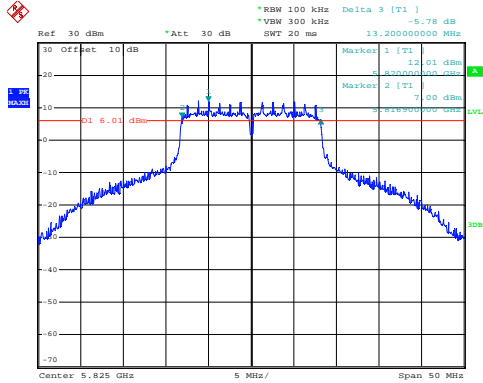
Date: 22.SEP.2013 14:48:58

Lowest channel



Date: 22.SEP.2013 14:45:49

Middle channel

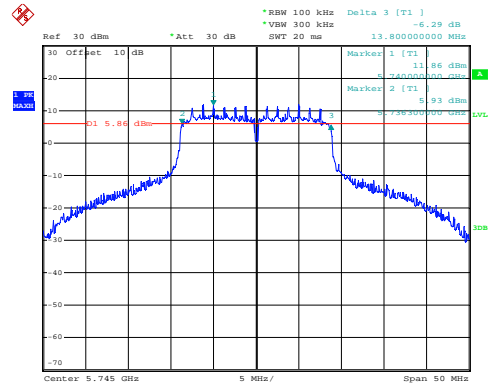


Date: 22.SEP.2013 14:54:37

Highest channel

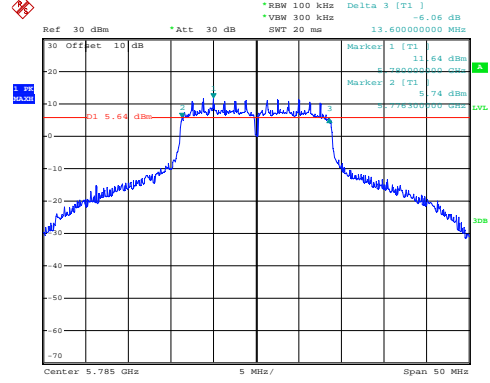
Test mode: 6dB BW

802.11n20



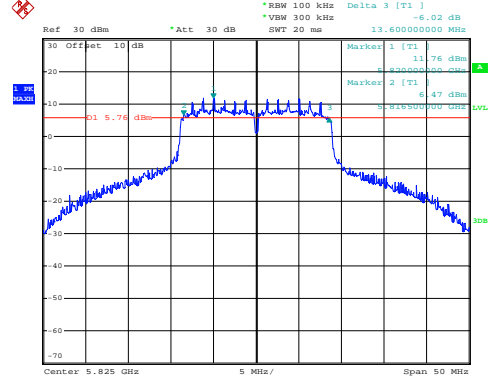
Date: 22.SEP.2013 10:15:36

Lowest channel



Date: 22.SEP.2013 10:20:11

Middle channel

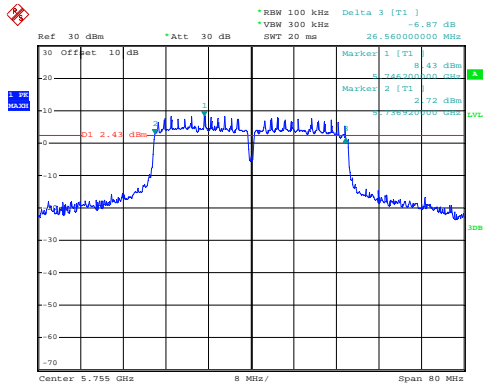


Date: 22.SEP.2013 10:22:57

Highest channel

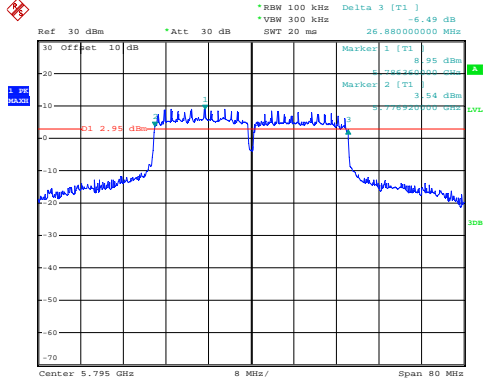
Test mode: 6dB BW

802.11n40



Date: 22.SEP.2013 11:19:36

Lowest channel

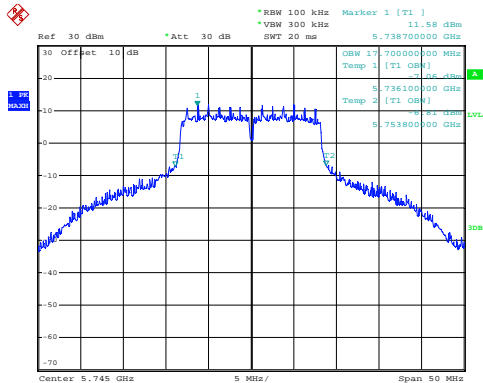


Date: 22.SEP.2013 11:24:07

Highest channel

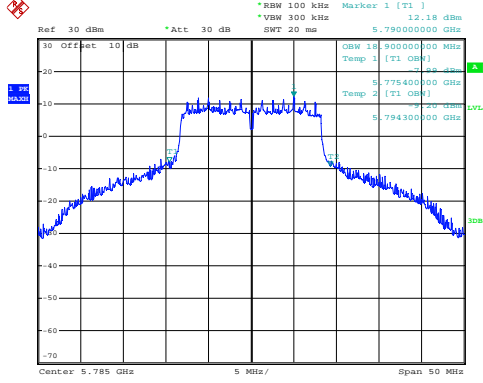
Test mode:99% BW

802.11a



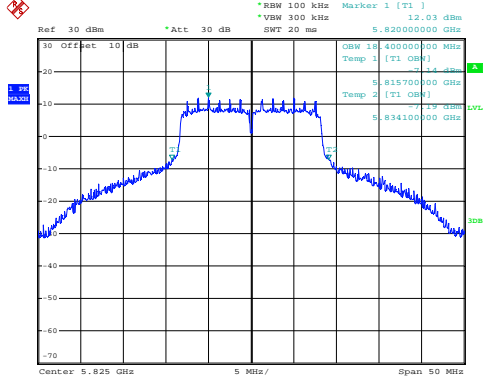
Date: 22.SEP.2013 14:36:22

Lowest channel



Date: 22.SEP.2013 14:39:25

Middle channel

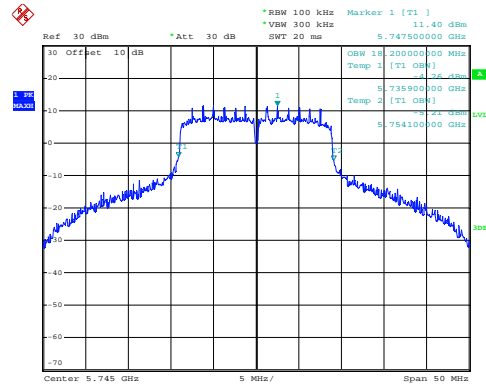


Date: 22.SEP.2013 14:35:03

Highest channel

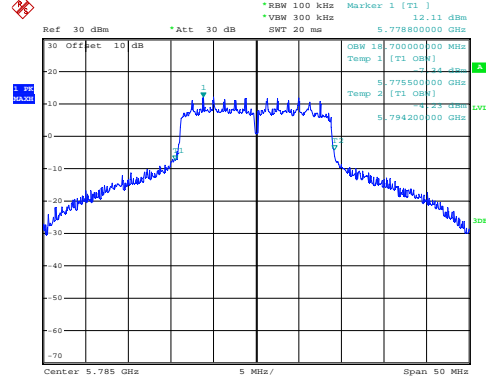
Test mode: 99% BW

802.11n20



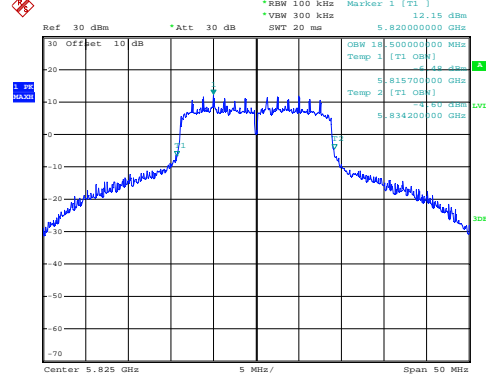
Date: 22.SEP.2013 10:14:08

Lowest channel



Date: 22.SEP.2013 10:12:56

Middle channel

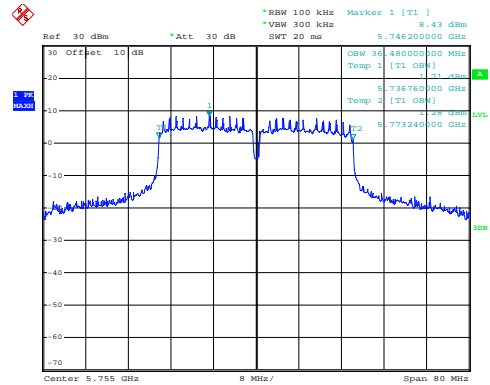


Date: 22.SEP.2013 10:09:58

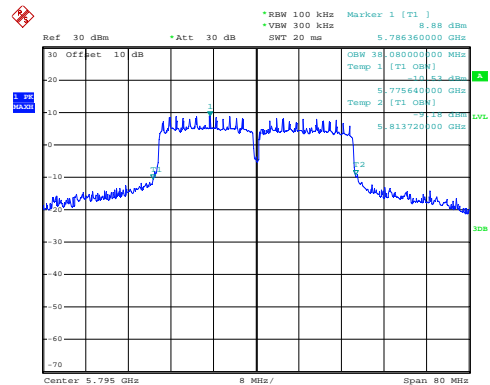
Highest channel

Test mode: 99% BW

802.11n40



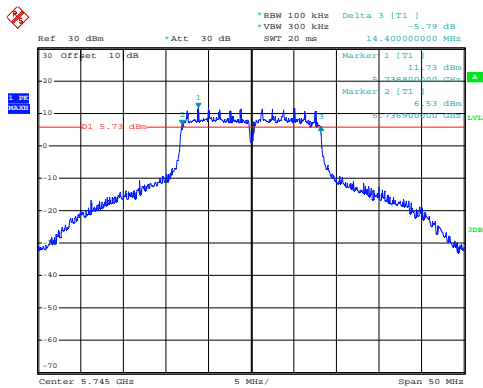
Lowest channel



Highest channel

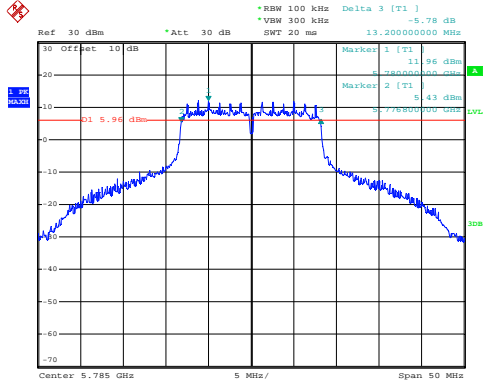
TX1
Test mode: 6dB BW

802.11a



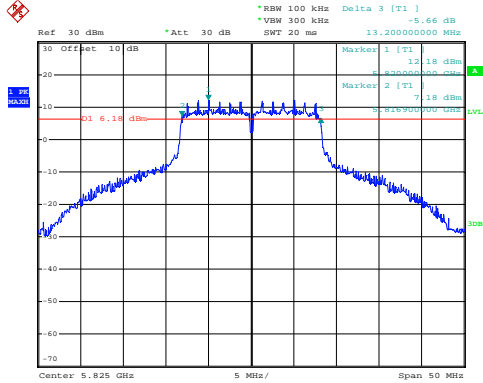
Date: 22.SEP.2013 14:49:49

Lowest channel



Date: 22.SEP.2013 14:43:04

Middle channel

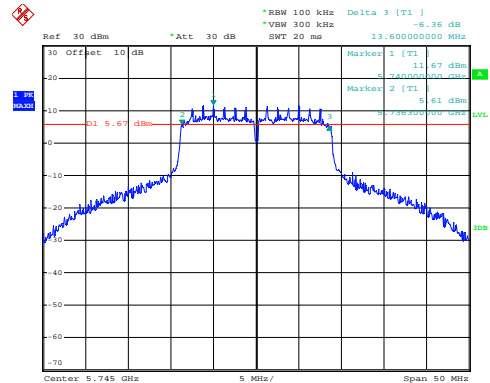


Date: 22.SEP.2013 14:53:39

Highest channel

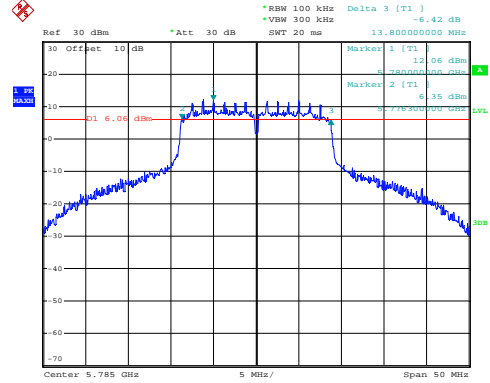
Test mode: 6dB BW

802.11n20



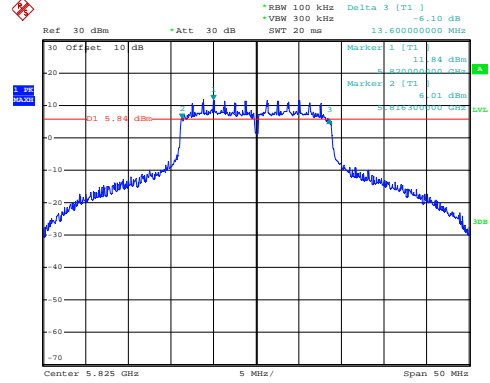
Date: 22.SEP.2013 10:16:34

Lowest channel



Date: 22.SEP.2013 10:19:29

Middle channel

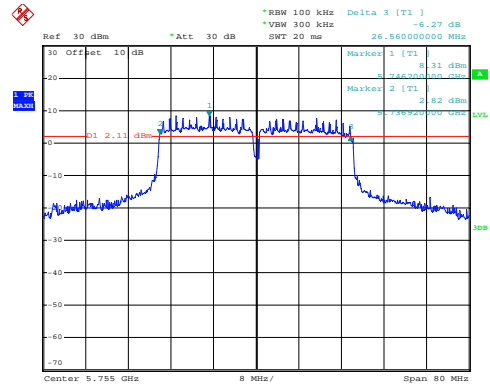


Date: 22.SEP.2013 10:22:03

Highest channel

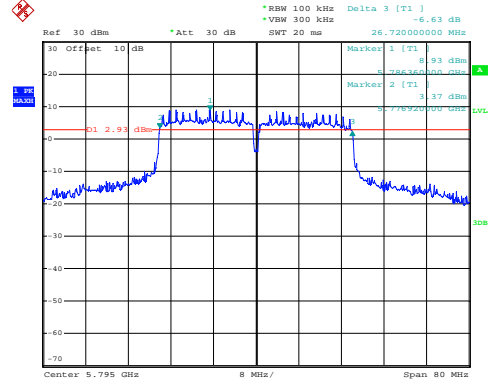
Test mode: 6dB BW

802.11n40



Date: 22.SEP.2013 11:20:25

Lowest channel

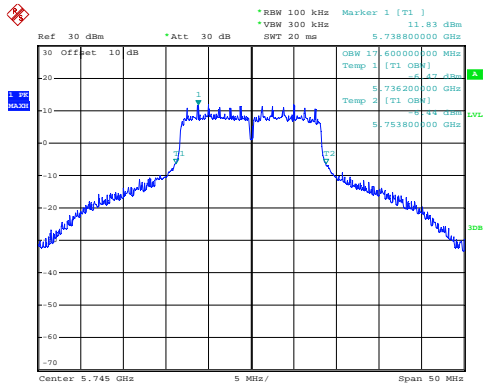


Date: 22.SEP.2013 11:25:27

Highest channel

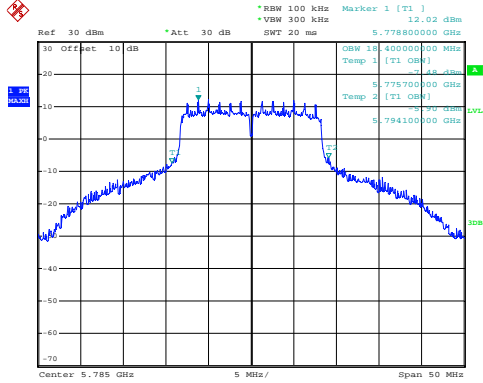
Test mode:99% BW

802.11a



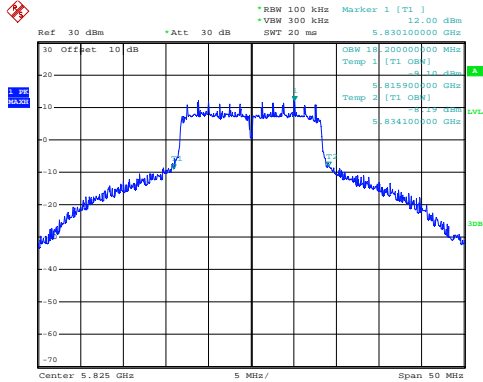
Date: 22.SEP.2013 14:37:05

Lowest channel



Date: 22.SEP.2013 14:38:21

Middle channel

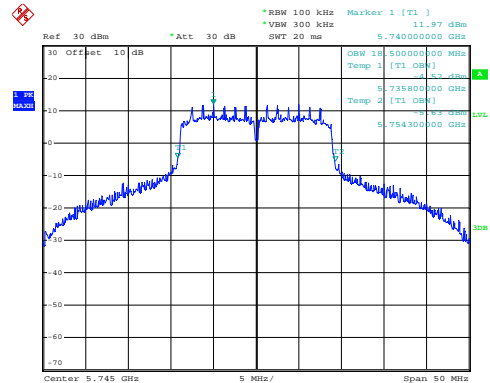


Date: 22.SEP.2013 14:35:29

Highest channel

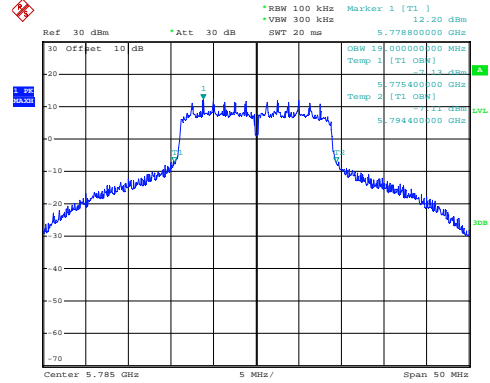
Test mode: 99% BW

802.11n20



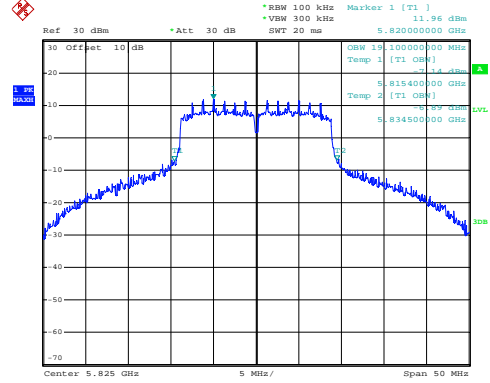
Date: 22.SEP.2013 10:14:30

Lowest channel



Date: 22.SEP.2013 10:13:25

Middle channel

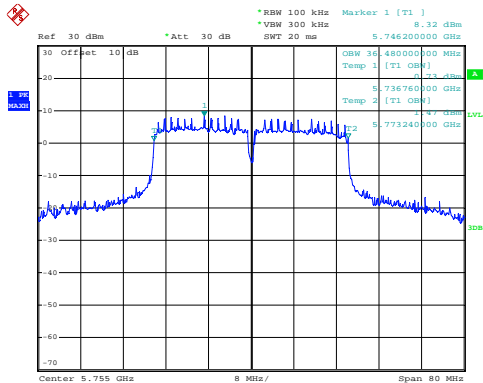


Date: 22.SEP.2013 10:10:51

Highest channel

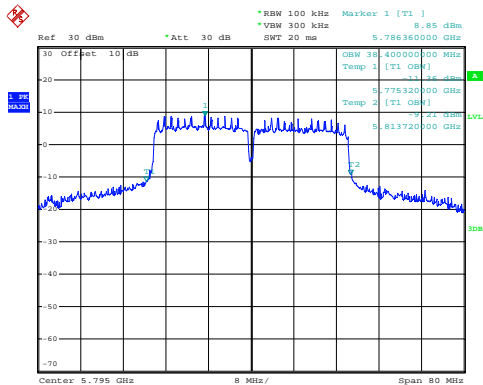
Test mode: 99% BW

802.11n40



Date: 22.SEP.2013 11:16:57

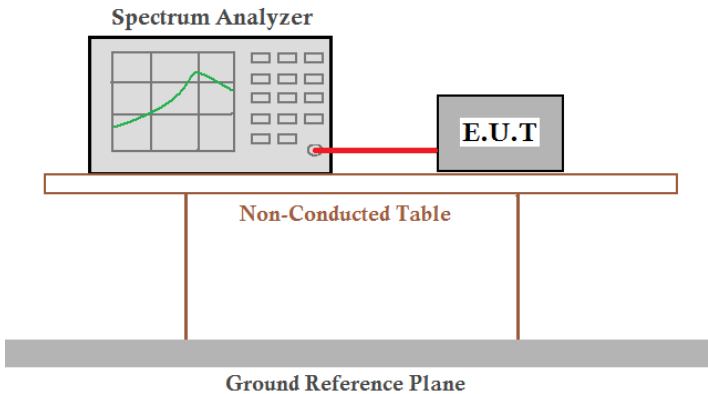
Lowest channel



Date: 22.SEP.2013 11:14:15

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:	 <p>The diagram illustrates the test setup. A Spectrum Analyzer, shown with a grid and a green curve on its screen, is connected to an E.U.T. (Equipment Under Test) by a red cable. Both the Spectrum Analyzer and the E.U.T. are positioned on a Non-Conducted Table, which is supported by two vertical legs. Below the table, a Ground Reference Plane is indicated by a thick grey bar.</p>
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

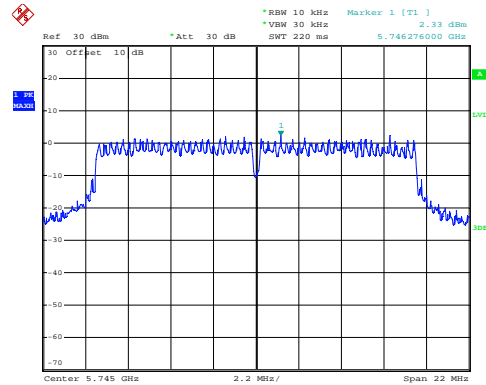
Measurement Data

Mode	Test CH	Ant. Port	PSD (dBm)	Total PSD (dBm)	Limit (dBm)	Result
802.11a	Lowest	TX0	2.33	5.71	8.00	Pass
		TX1	3.04			
	Middle	TX0	2.14	5.51	8.00	Pass
		TX1	2.84			
	Highest	TX0	2.11	6.08	8.00	Pass
		TX1	3.85			
802.11n 20	Lowest	TX0	3.33	5.97	8.00	Pass
		TX1	2.55			
	Middle	TX0	3.83	6.16	8.00	Pass
		TX1	2.35			
	Highest	TX0	2.59	5.61	8.00	Pass
		TX1	2.61			
802.11n 40	Lowest	TX0	-0.41	2.96	8.00	Pass
		TX1	0.29			
	Highest	TX0	0.44	3.54	8.00	Pass
		TX1	0.62			

Test plot as follows:

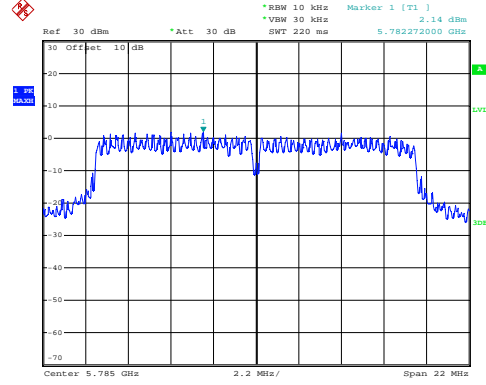
TX0
Test mode:

802.11a



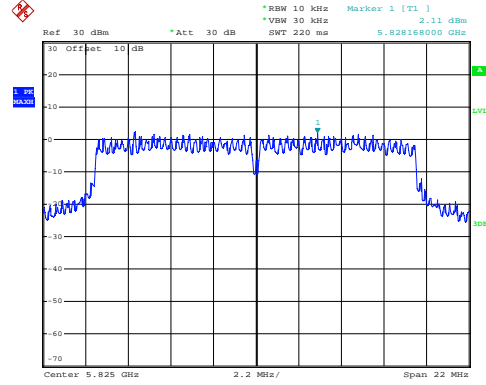
Date: 22.SEP.2013 15:14:40

Lowest channel



Date: 22.SEP.2013 15:12:51

Middle channel

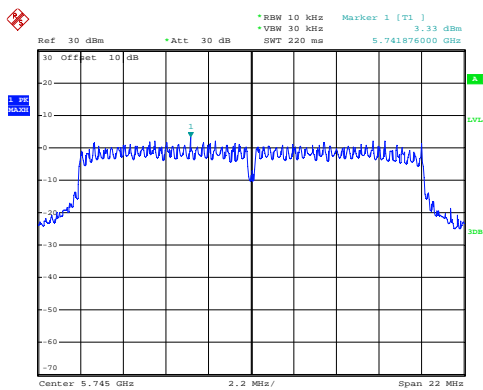


Date: 22.SEP.2013 15:11:07

Highest channel

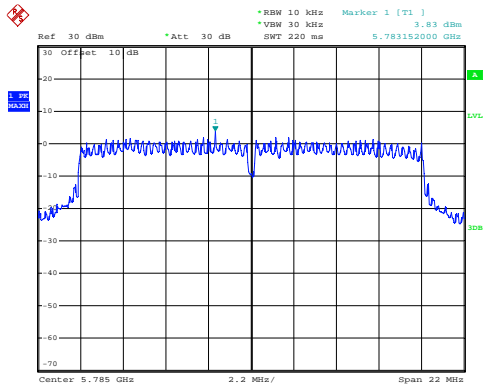
Test mode:

802.11n20



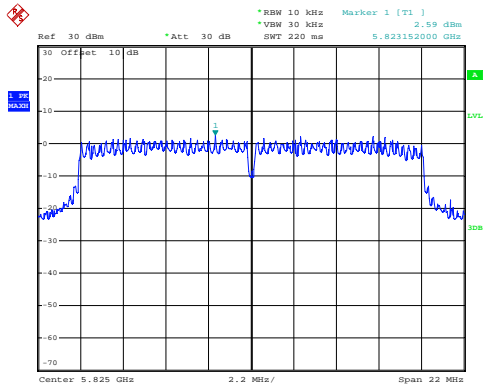
Date: 22.SEP.2013 10:31:23

Lowest channel



Date: 22.SEP.2013 10:33:25

Middle channel

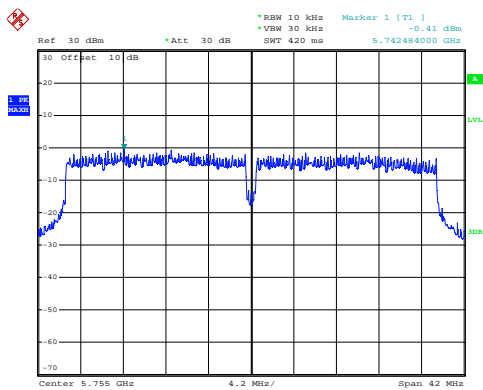


Date: 22.SEP.2013 10:29:40

Highest channel

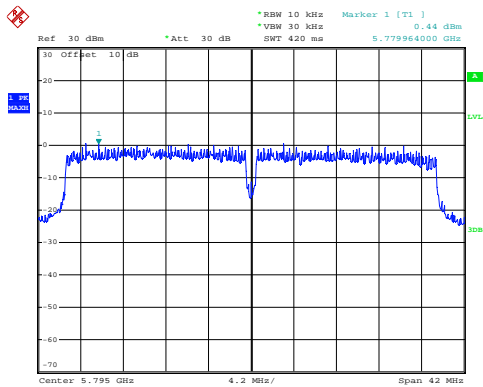
Test mode:

802.11n40



Date: 22.SEP.2013 11:35:32

Lowest channel

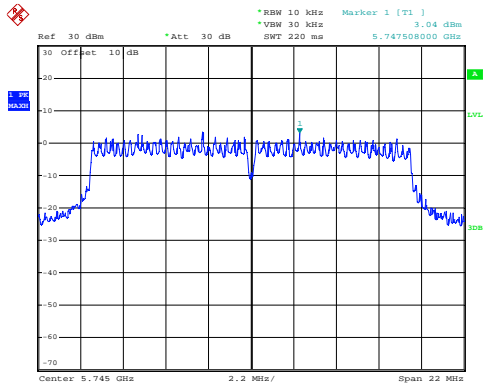


Date: 22.SEP.2013 11:30:28

Highest channel

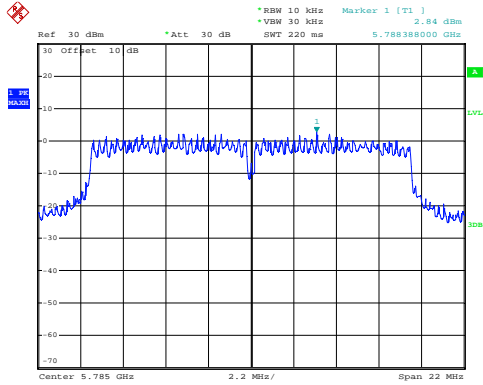
TX1
Test mode:

802.11a



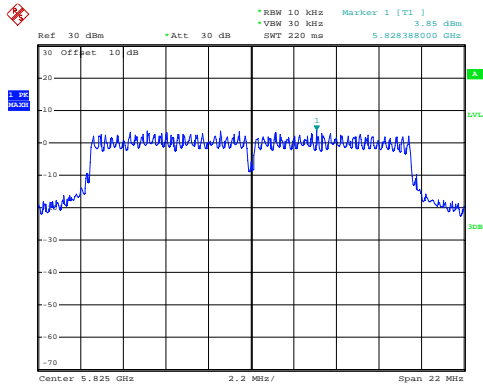
Date: 22.SEP.2013 15:14:16

Lowest channel



Date: 22.SEP.2013 15:12:33

Middle channel

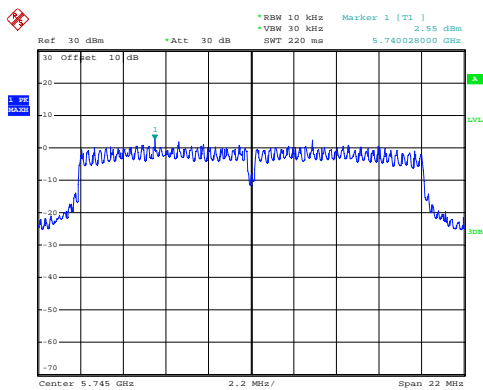


Date: 22.SEP.2013 15:09:24

Highest channel

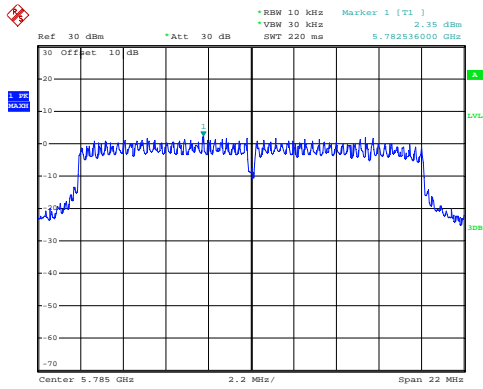
Test mode:

802.11n20



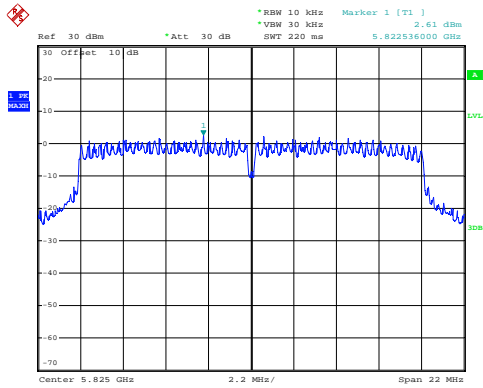
Date: 22.SEP.2013 10:31:50

Lowest channel



Date: 22.SEP.2013 10:32:47

Middle channel

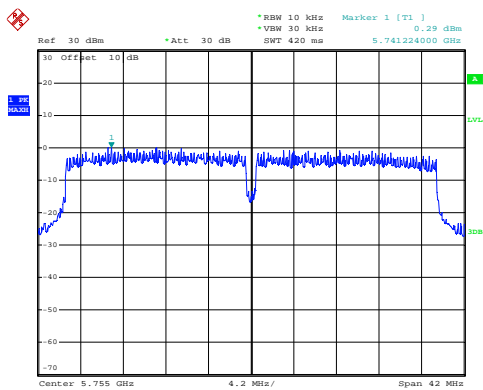


Date: 22.SEP.2013 10:30:11

Highest channel

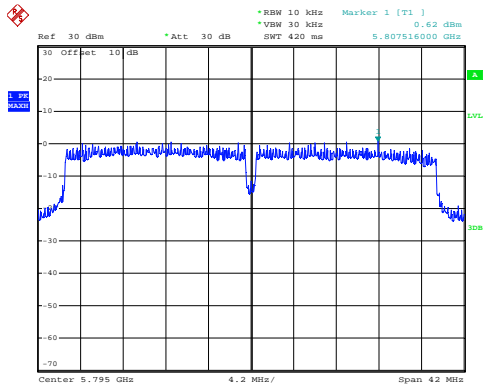
Test mode:

802.11n40



Date: 22.SEP.2013 11:34:42

Lowest channel

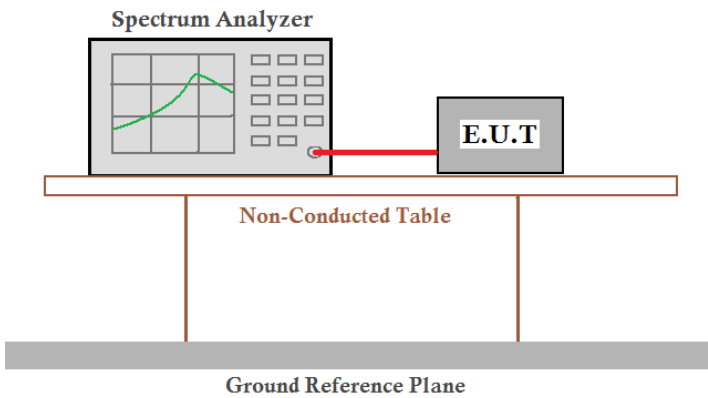


Date: 24.SEP.2013 15:27:14

Highest channel

6.7 Band Edge

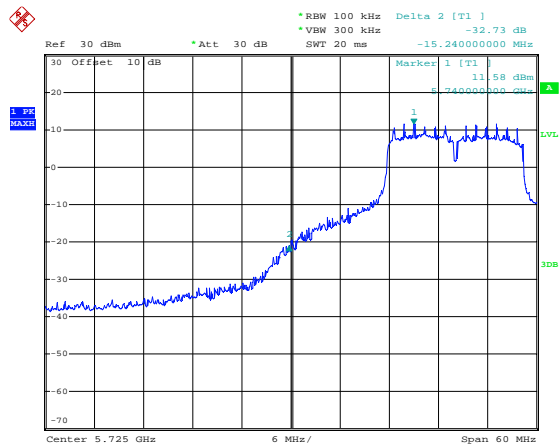
6.7.1 Conducted Emission Method

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:	 <p>The diagram illustrates the test setup. A Spectrum Analyzer is connected to an E.U.T (Equipment Under Test) via a red cable. Both the Spectrum Analyzer and the E.U.T are placed on a Non-Conducted Table. The table is supported by a Ground Reference Plane.</p>
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:

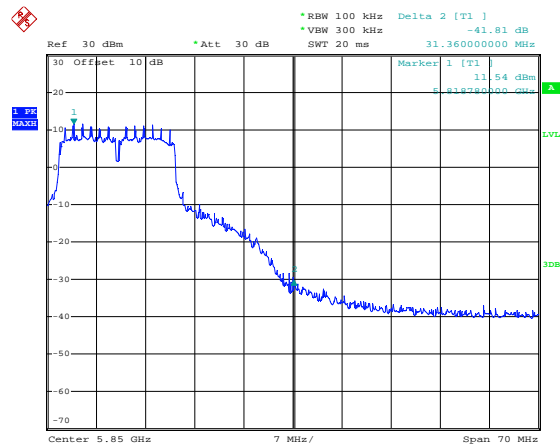
TX0

Test mode:



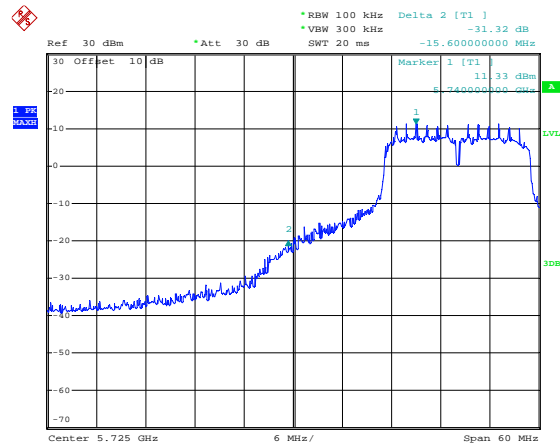
Lowest channel

802.11a



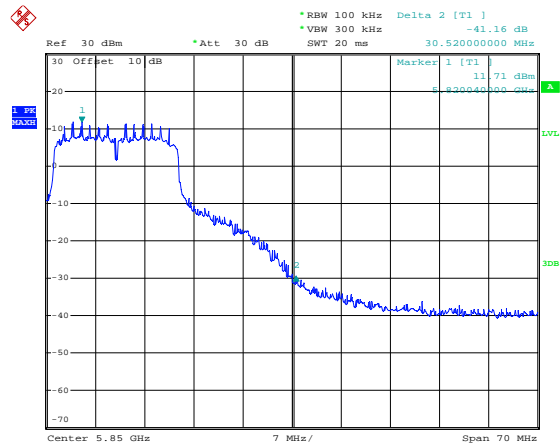
Highest channel

Test mode:



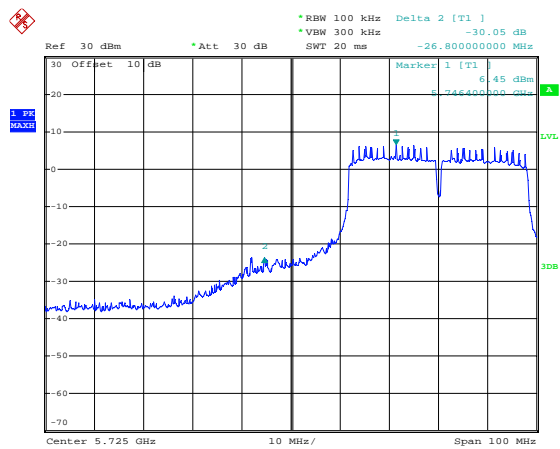
Lowest channel

802.11n20



Highest channel

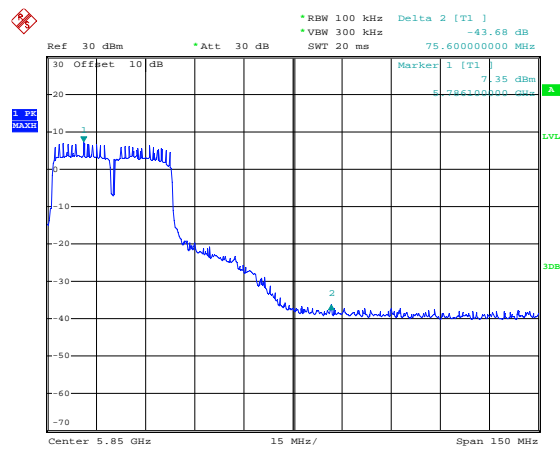
Test mode:



Date: 22.SEP.2013 11:48:17

Lowest channel

802.11n40

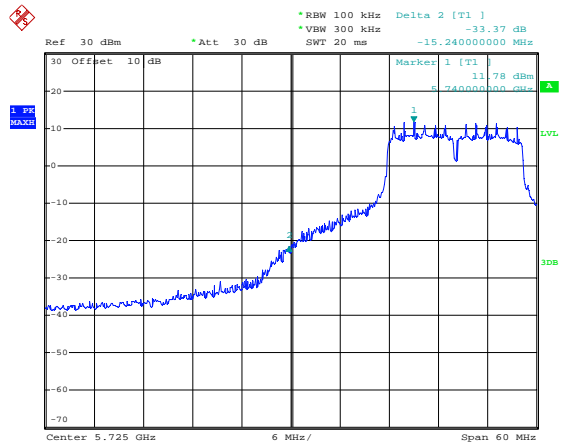


Date: 22.SEP.2013 11:53:05

Highest channel

TX1

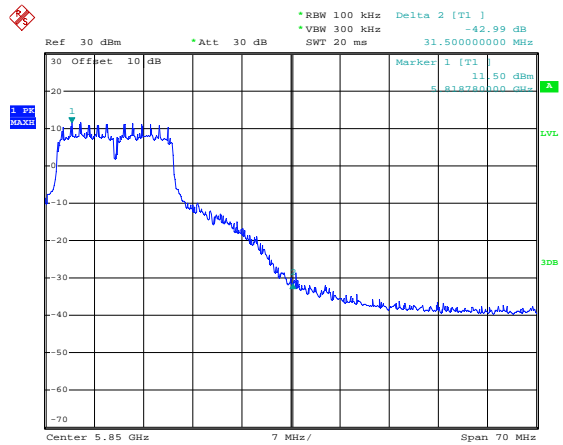
Test mode:



Date: 22.SEP.2013 15:17:00

Lowest channel

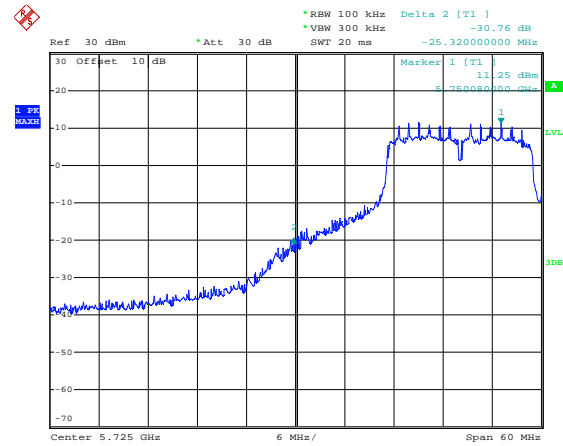
802.11a



Date: 22.SEP.2013 15:20:02

Highest channel

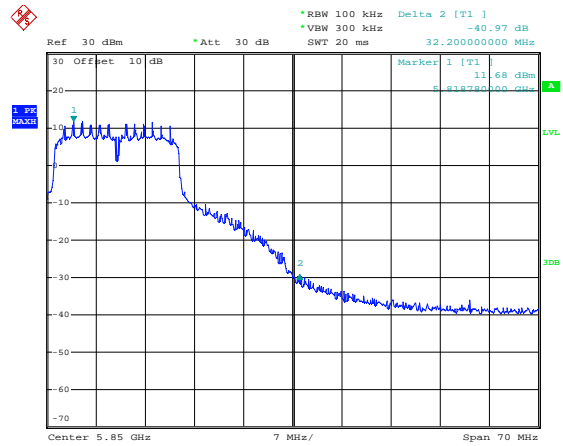
Test mode:



Date: 22.SEP.2013 10:34:37

Lowest channel

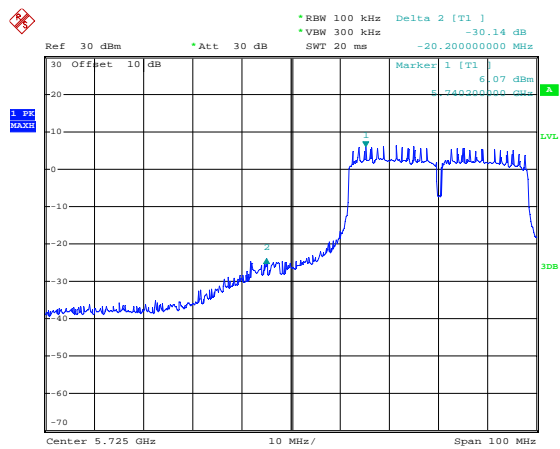
802.11n20



Date: 22.SEP.2013 10:37:00

Highest channel

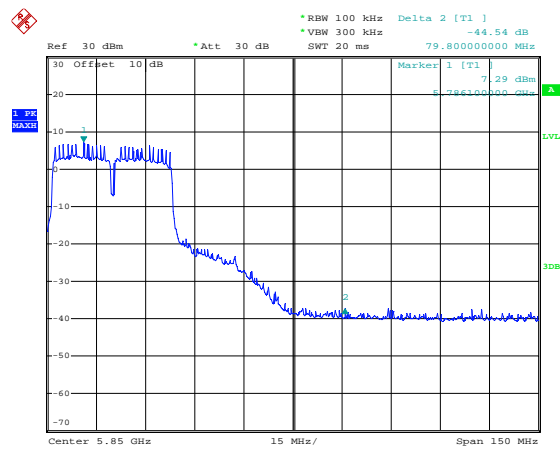
Test mode:



Date: 22.SEP.2013 11:46:07

Lowest channel

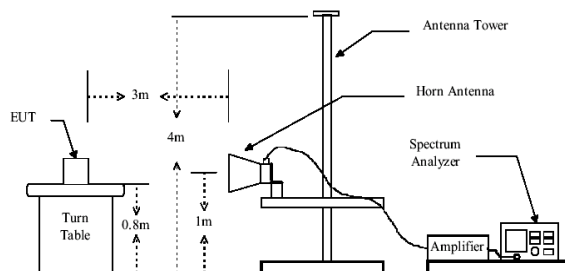
802.11n40



Date: 22.SEP.2013 11:51:51

Highest channel

6.7.2 Radiated Emission Method

Test Requirement:	FCC Part15 C Section 15.209 and 15.205																		
Test Method:	ANSI C63.4: 2003																		
Test Frequency Range:	5.35 GHz to 5.46 GHz																		
Test site:	Measurement Distance: 3m																		
Receiver setup:	<table><tr><td>Frequency</td><td>Detector</td><td>RBW</td><td>VBW</td><td>Remark</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>					Frequency	Detector	RBW	VBW	Remark	Above 1GHz	Peak	1MHz	3MHz	Peak Value	Peak	1MHz	10Hz	Average Value
Frequency	Detector	RBW	VBW	Remark															
Above 1GHz	Peak	1MHz	3MHz	Peak Value															
	Peak	1MHz	10Hz	Average Value															
Limit:	<table><tr><td>Frequency</td><td>Limit (dBuV/m @3m)</td><td>Remark</td></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>					Frequency	Limit (dBuV/m @3m)	Remark	Above 1GHz	54.00	Average Value	74.00	Peak Value						
Frequency	Limit (dBuV/m @3m)	Remark																	
Above 1GHz	54.00	Average Value																	
	74.00	Peak Value																	
Test Procedure:	<div>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.</div> <div>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.</div> <div>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.</div> <div>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.</div> <div>5. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.</div> <div>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.</div>																		
Test setup:																			
Test Instruments:	Refer to section 5.6 for details																		
Test mode:	Refer to section 5.3 for details																		
Test results:	Passed																		

Test mode: 802.11a	Test channel:Lowest	Level:	Peak
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Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
5350.00	46.35	31.78	9.15	40.18	47.10	74.00	-26.90	Horizontal
5460.00	48.03	31.99	9.16	40.23	48.95	74.00	-25.05	Horizontal
5350.00	47.25	31.78	9.15	40.18	48.00	74.00	-26.00	Vertical
5460.00	49.39	31.99	9.16	40.23	50.31	74.00	-23.70	Vertical

Test mode: 802.11a	Test channel:Lowest	Level:	Average
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Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
5350.00	38.30	31.78	9.15	40.18	39.05	54.00	-14.95	Horizontal
5460.00	34.27	31.99	9.16	40.23	35.19	54.00	-18.82	Horizontal
5350.00	35.34	31.78	9.15	40.18	36.09	54.00	-17.91	Vertical
5460.00	39.24	31.99	9.16	40.23	40.16	54.00	-13.84	Vertical

Remark:

1. *Final Level = Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor*
2. *“*”*, means average level is not recorded when its peak level is less than average limit.
3. *The emission levels of other frequencies are very lower than the limit and not show in test report.*

Test mode: 802.11n-HT20	Test channel:Lowest	Level:	Peak
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Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
5350.00	45.33	31.78	9.15	40.18	46.08	74.00	-27.92	Horizontal
5460.00	49.31	31.99	9.16	40.23	50.23	74.00	-23.77	Horizontal
5350.00	48.25	31.78	9.15	40.18	49.00	74.00	-25.00	Vertical
5460.00	47.02	31.99	9.16	40.23	47.94	74.00	-26.06	Vertical

Test mode: 802.11 n-HT20	Test channel:Lowest	Level:	Average
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Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
5350.00	35.35	31.78	9.15	40.18	36.10	54.00	-17.90	Horizontal
5460.00	36.28	31.99	9.16	40.23	37.20	54.00	-16.80	Horizontal
5350.00	37.05	31.78	9.15	40.18	37.80	54.00	-16.20	Vertical
5460.00	39.14	31.99	9.16	40.23	40.06	54.00	-13.94	Vertical

Remark:

4. *Final Level = Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor*
5. *“*”*, means average level is not recorded when its peak level is less than average limit.
6. *The emission levels of other frequencies are very lower than the limit and not show in test report.*

Test mode: 802.11n-HT40	Test channel:Lowest	Level:	Peak
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Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
5350.00	48.24	31.78	9.15	40.18	48.99	74.00	-25.01	Horizontal
5460.00	46.39	31.99	9.16	40.23	47.31	74.00	-26.70	Horizontal
5350.00	45.38	31.78	9.15	40.18	46.13	74.00	-27.87	Vertical
5460.00	47.53	31.99	9.16	40.23	48.45	74.00	-25.55	Vertical

Test mode: 802.11 n-HT40	Test channel:Lowest	Level:	Average
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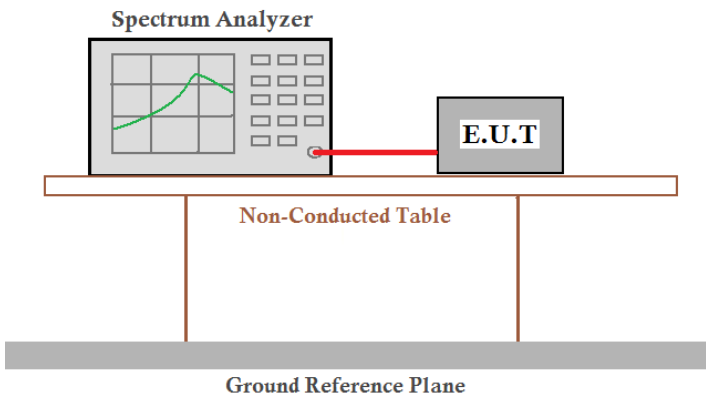
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
5350.00	35.28	31.78	9.15	40.18	36.03	54.00	-17.97	Horizontal
5460.00	34.39	31.99	9.16	40.23	35.31	54.00	-18.70	Horizontal
5350.00	38.65	31.78	9.15	40.18	39.40	54.00	-14.60	Vertical
5460.00	34.38	31.99	9.16	40.23	35.30	54.00	-18.70	Vertical

Remark:

7. Final Level = Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor
8. “*”, means average level is not recorded when its peak level is less than average limit.
9. The emission levels of other frequencies are very lower than the limit and not show in test report.

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:	 <p>The diagram illustrates the test setup. A 'Spectrum Analyzer' is connected to an 'E.U.T.' (Equipment Under Test) by a red cable. Both the Spectrum Analyzer and the E.U.T. are positioned on a 'Non-Conducted Table'. This table is supported by two vertical legs and rests on a 'Ground Reference Plane', which is represented by a thick grey horizontal bar at the bottom of the diagram.</p>
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

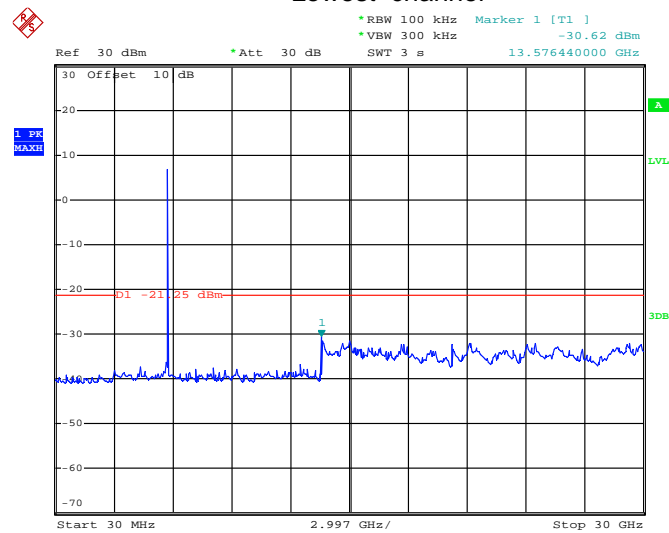
Test plot as follows:

TX0

Test mode:

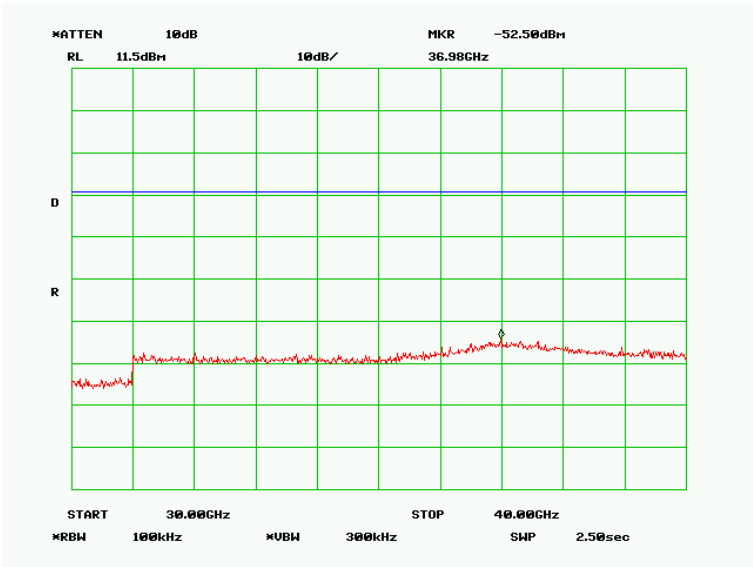
802.11a

Lowest channel

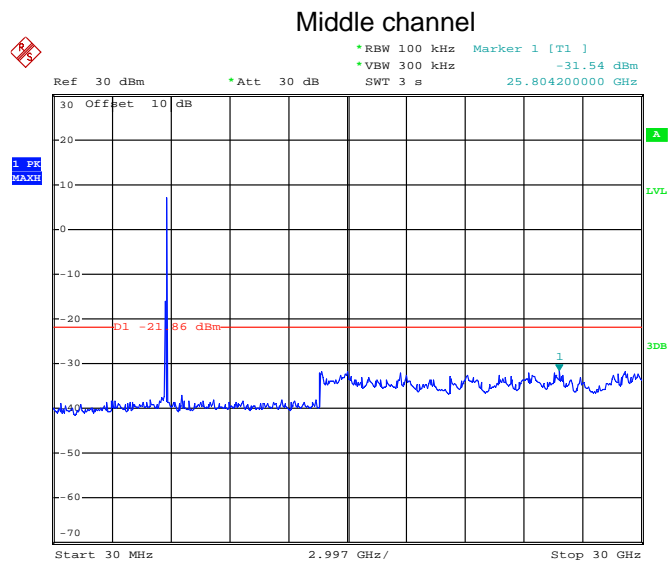


Date: 22.SEP.2013 15:25:07

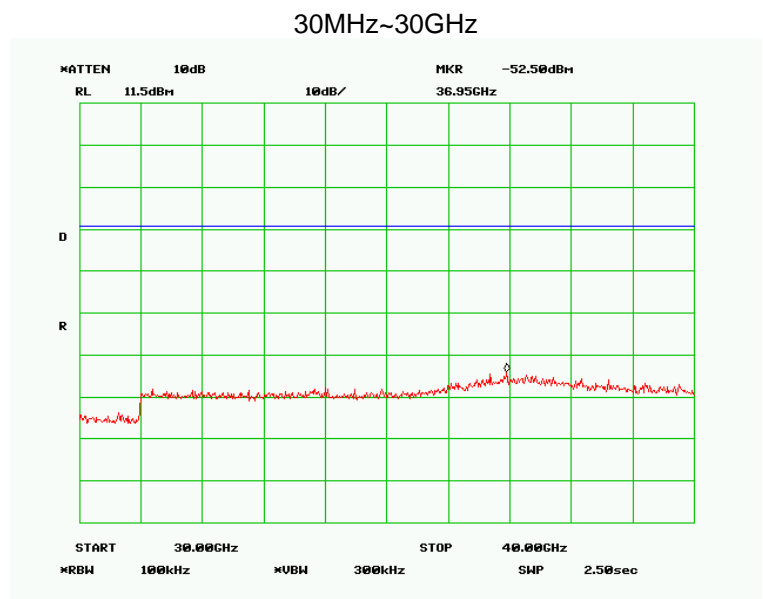
30MHz~30GHz



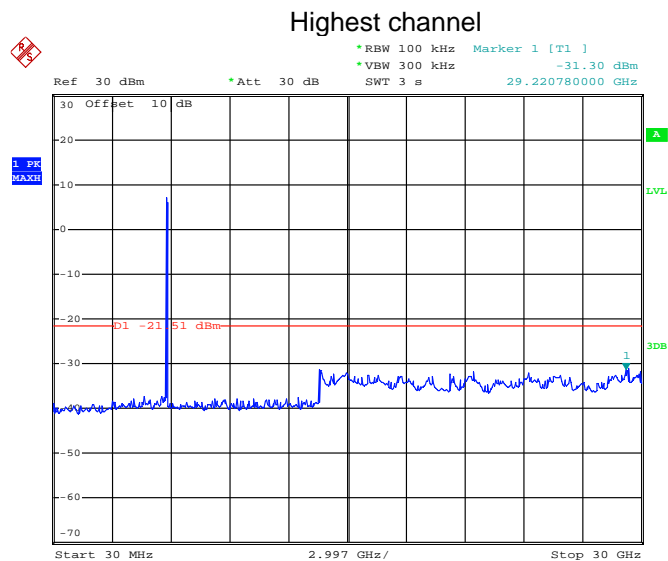
30GHz-40GHz



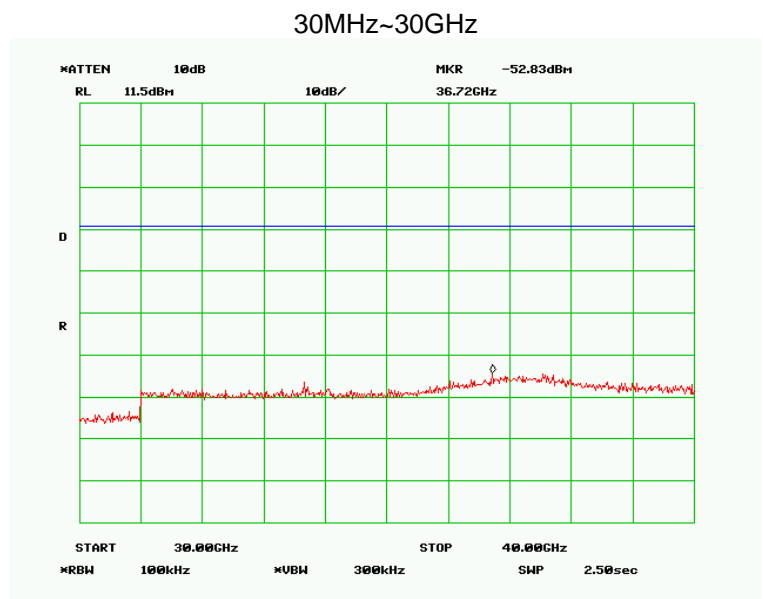
Date: 22.SEP.2013 15:23:55



30GHz~40GHz



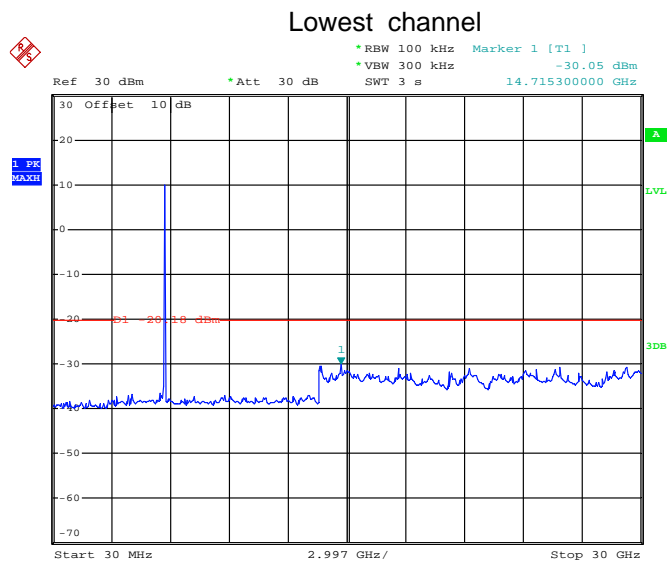
Date: 22.SEP.2013 15:22:31



30GHz~40GHz

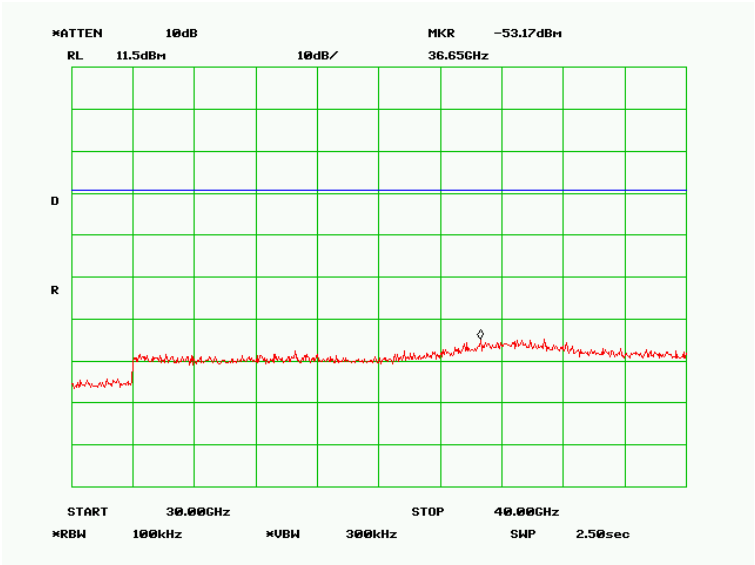
Test mode:

802.11n20

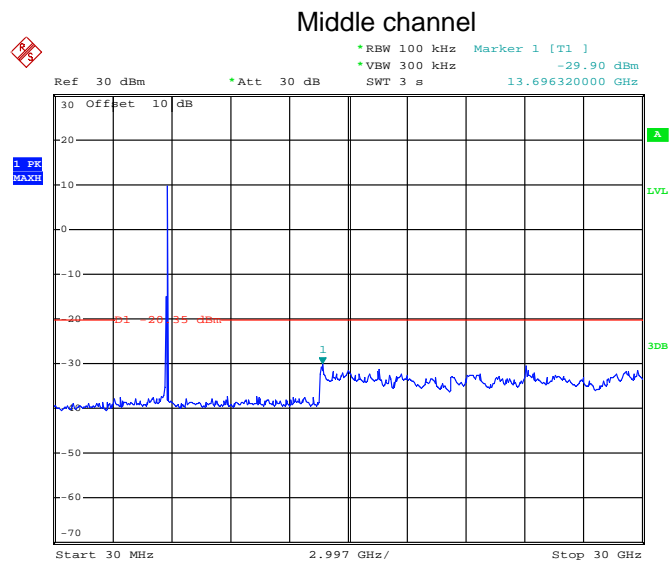


Date: 22.SEP.2013 10:49:14

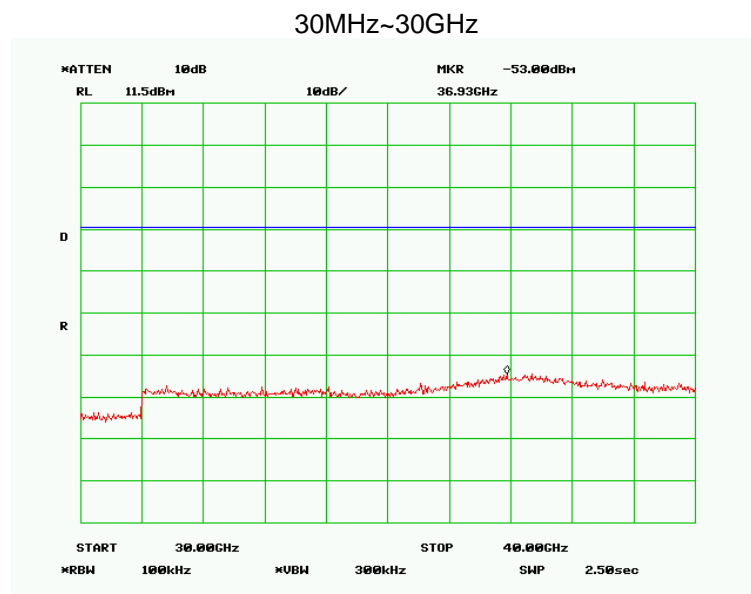
30MHz~30GHz



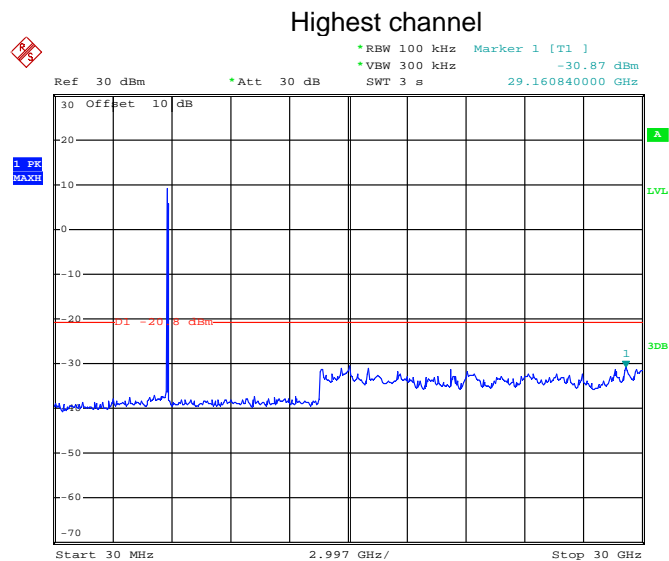
30GHz-40GHz



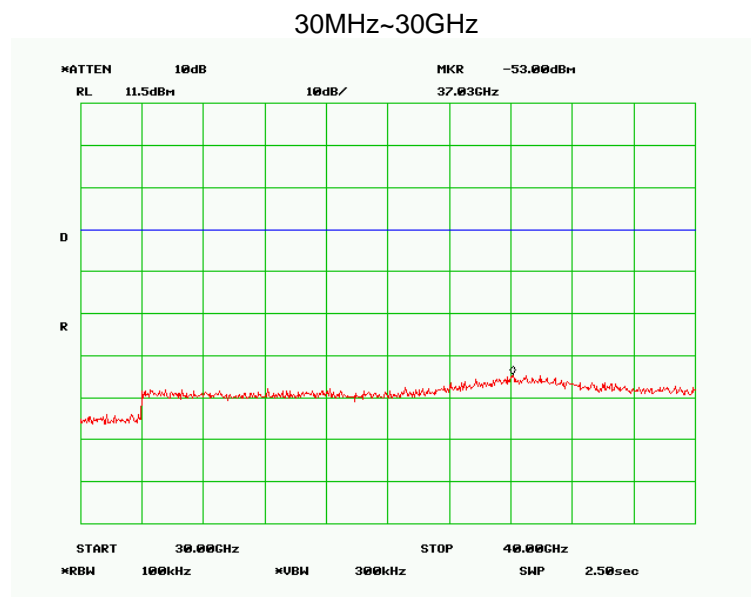
Date: 22.SEP.2013 10:53:26



30GHz~40GHz



Date: 22.SEP.2013 10:56:54

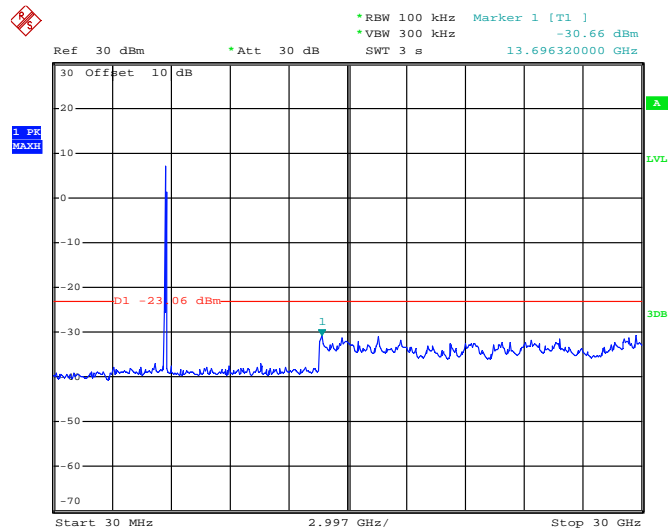


30GHz~40GHz

Test mode:

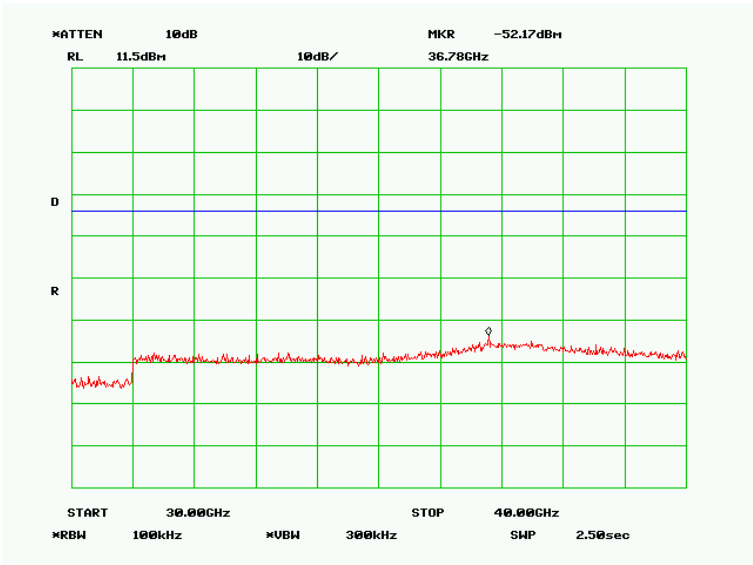
802.11n40

Lowest channel

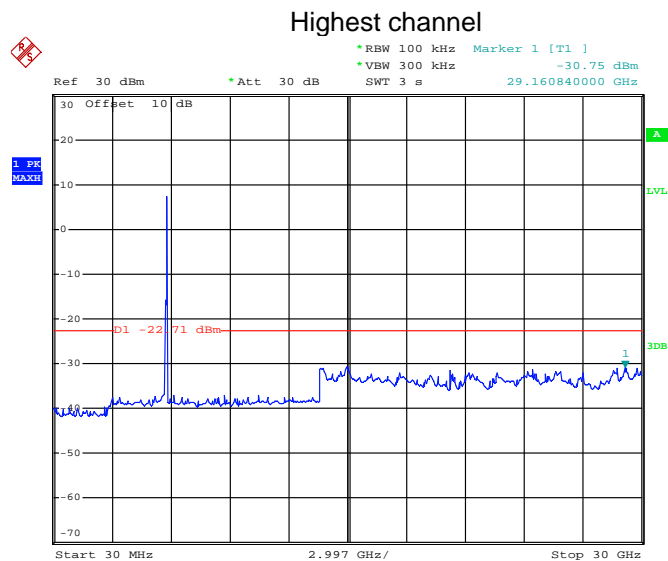


Date: 22.SEP.2013 12:01:08

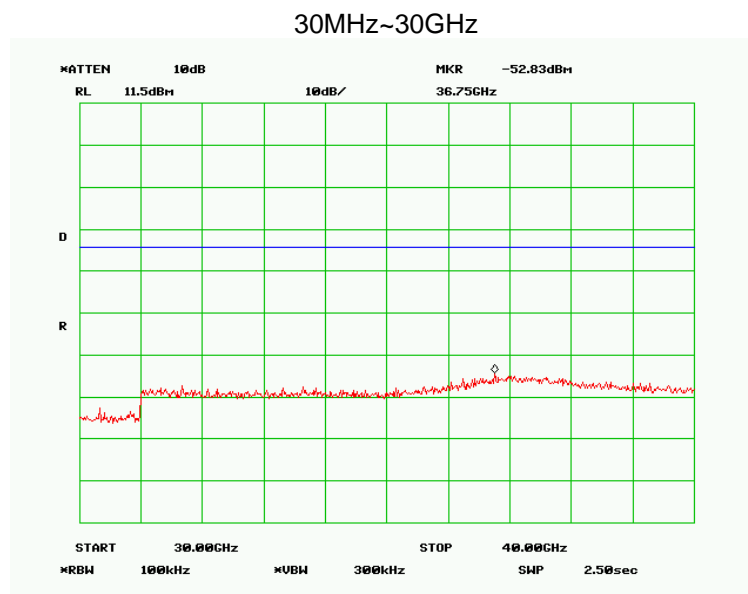
30MHz~30GHz



30GHz-40GHz



Date: 22.SEP.2013 11:56:04



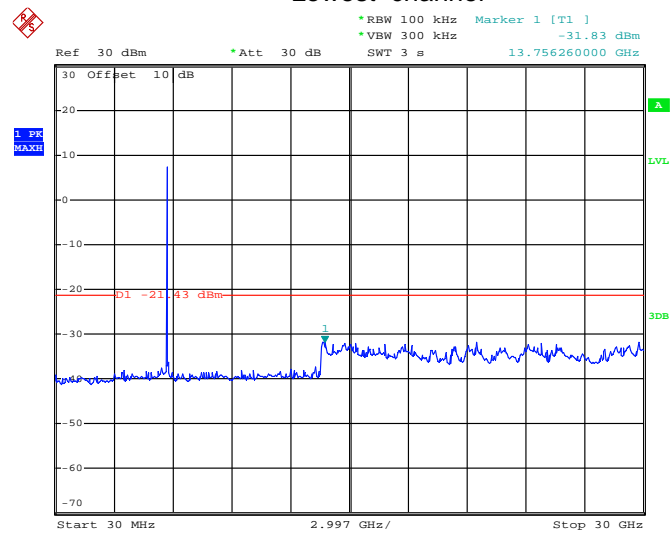
30GHz~40GHz

TX1

Test mode:

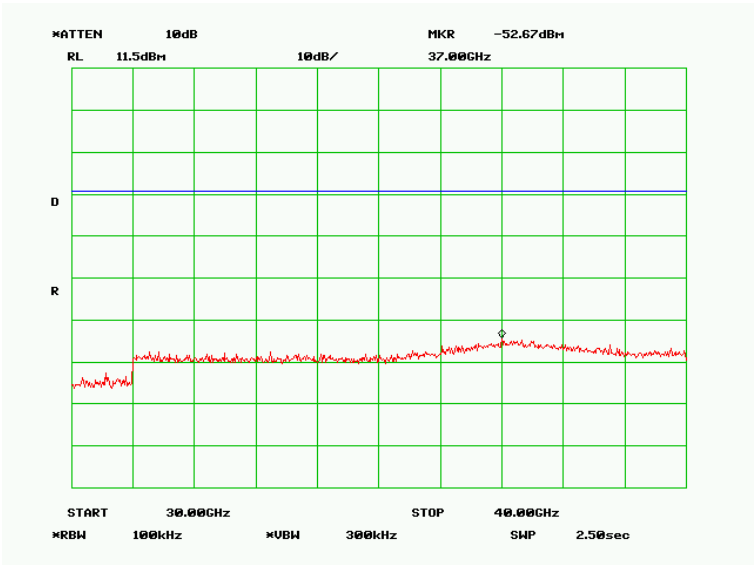
802.11a

Lowest channel

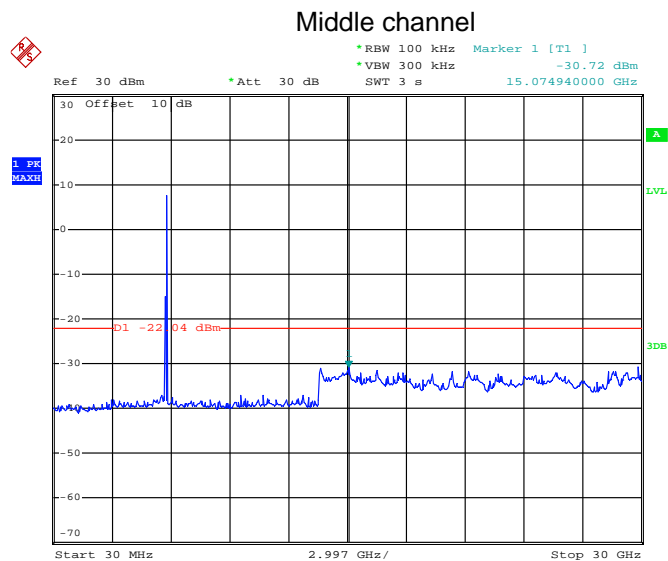


Date: 22.SEP.2013 15:24:38

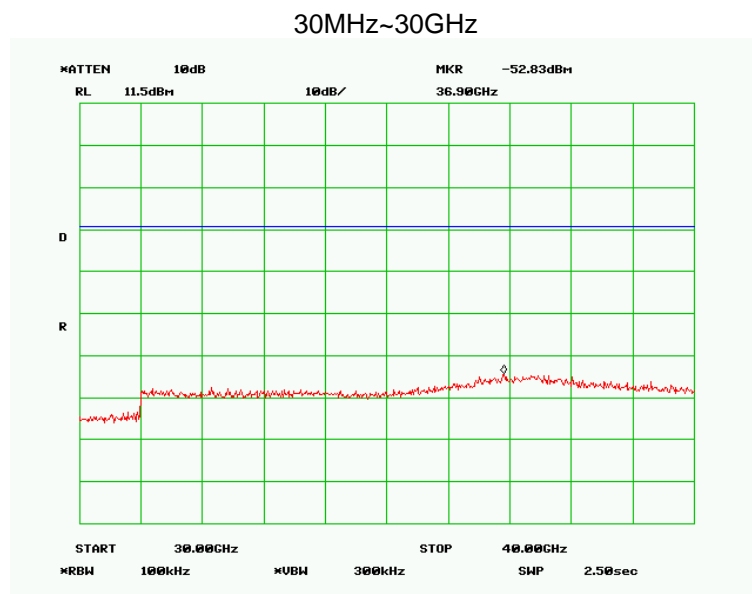
30MHz~30GHz



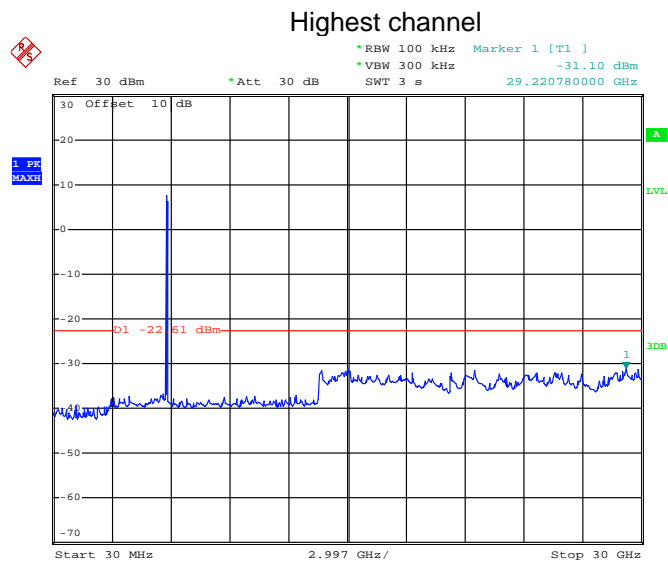
30GHz-40GHz



Date: 22.SEP.2013 15:23:28

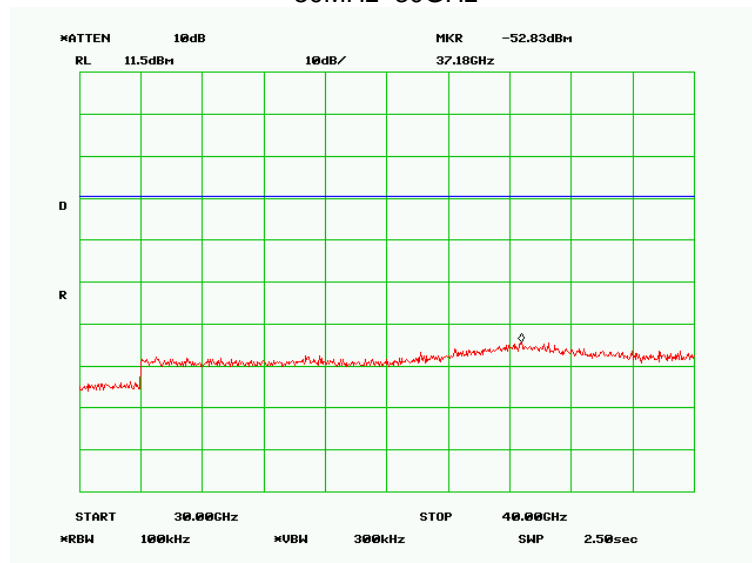


30GHz~40GHz



Date: 22.SEP.2013 15:21:48

30MHz~30GHz

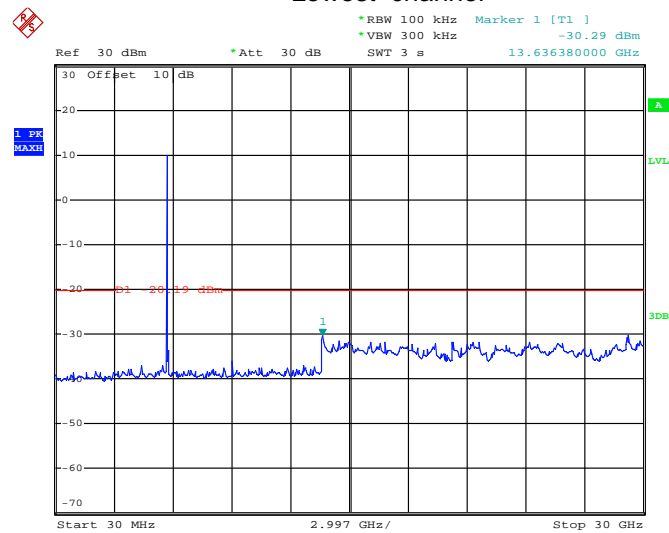


30GHz~40GHz

Test mode:

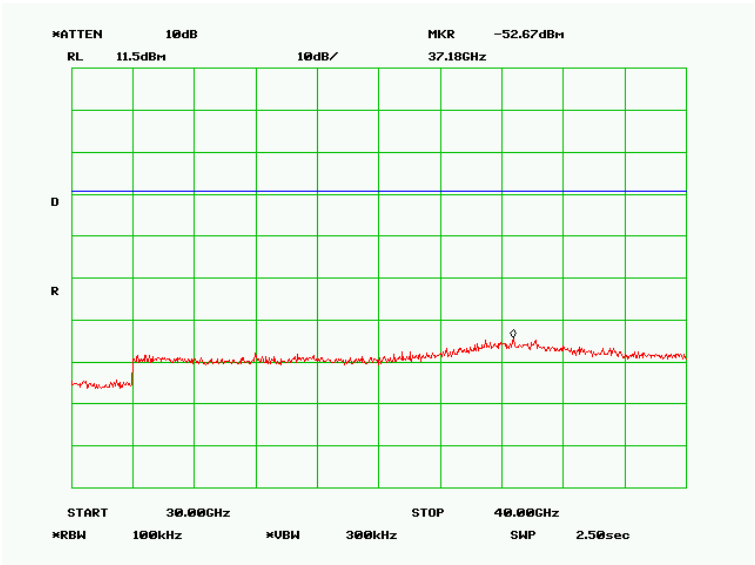
802.11n20

Lowest channel

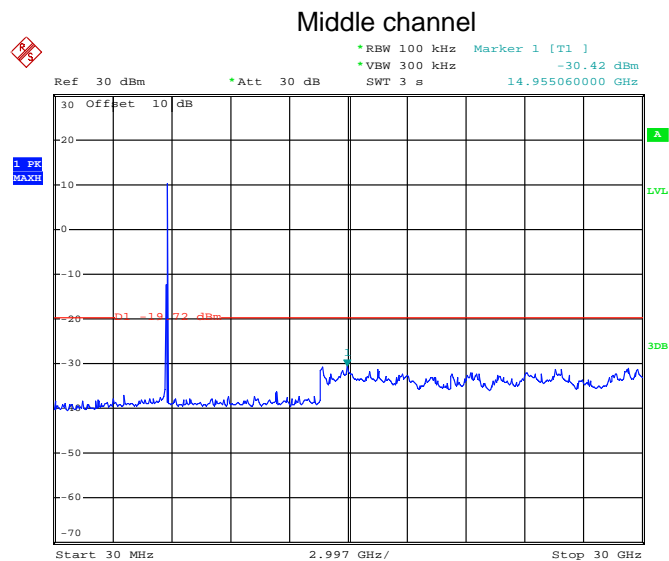


Date: 22.SEP.2013 10:45:56

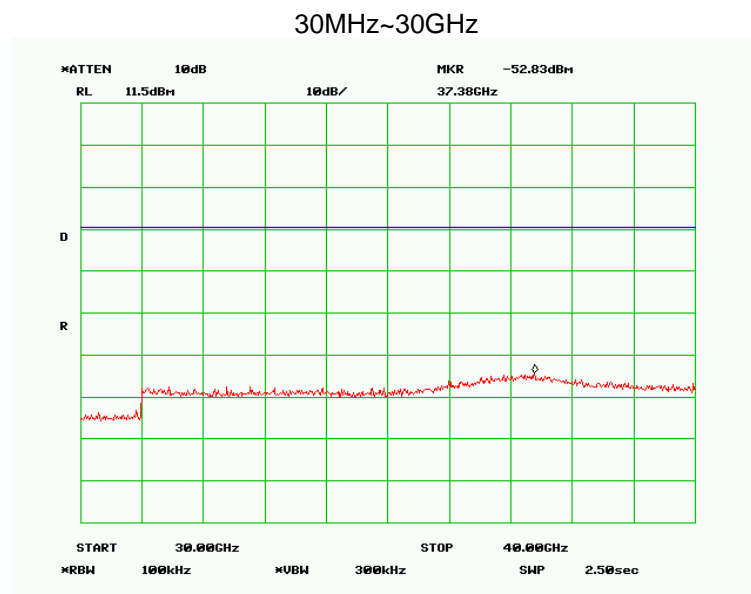
30MHz~30GHz



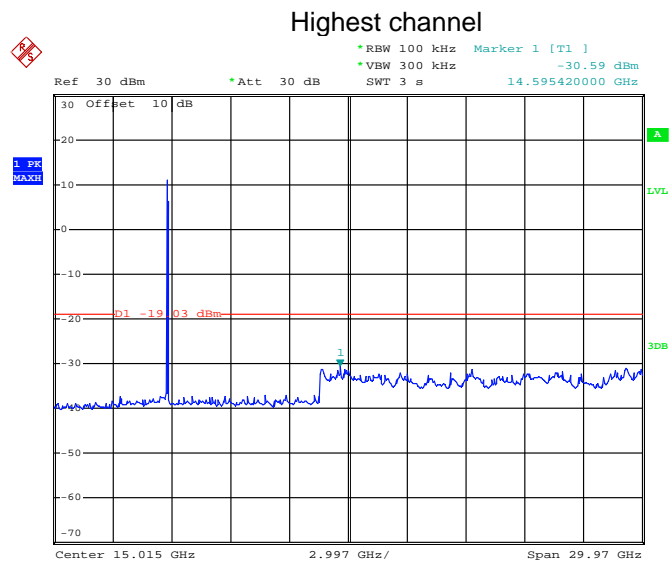
30GHz-40GHz



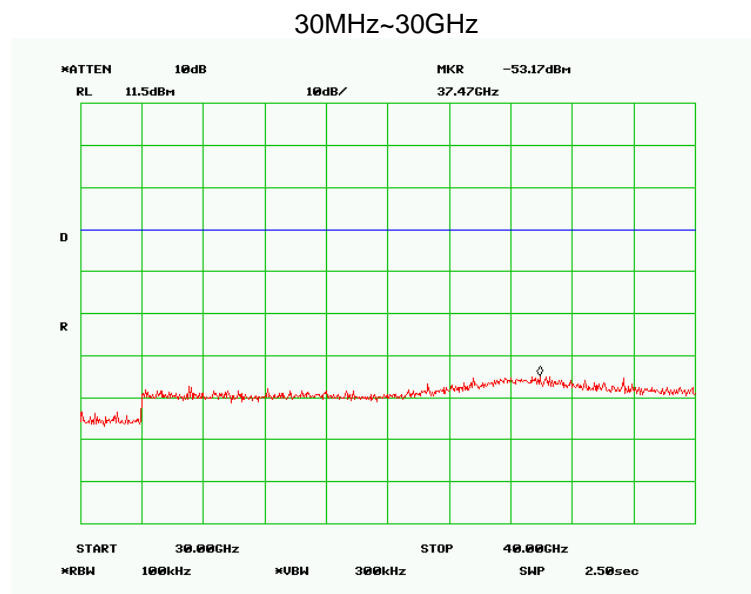
Date: 22.SEP.2013 10:51:44



30GHz~40GHz



Date: 22.SEP.2013 10:55:29

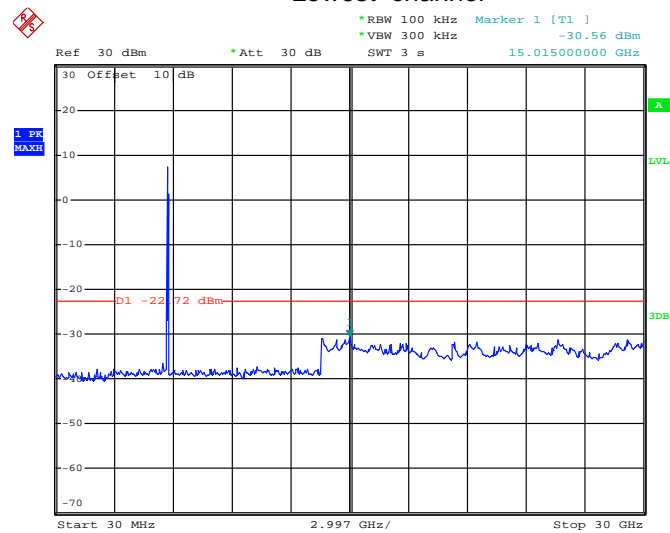


30GHz~40GHz

Test mode:

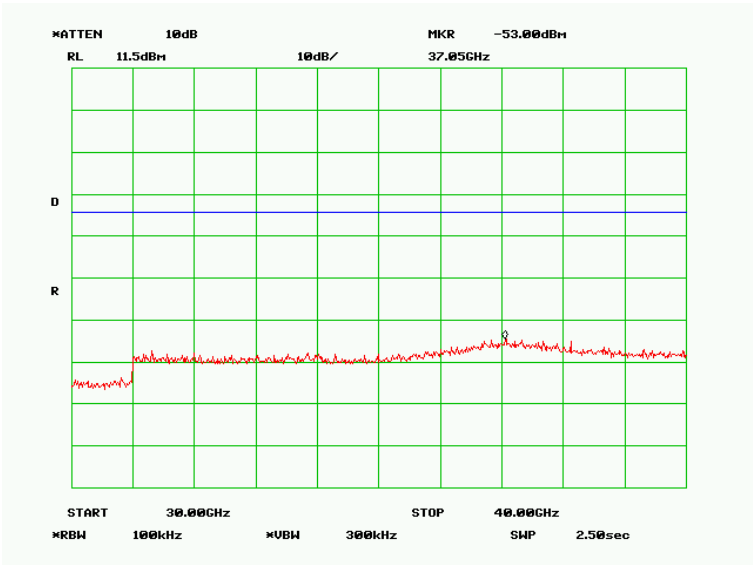
802.11n40

Lowest channel

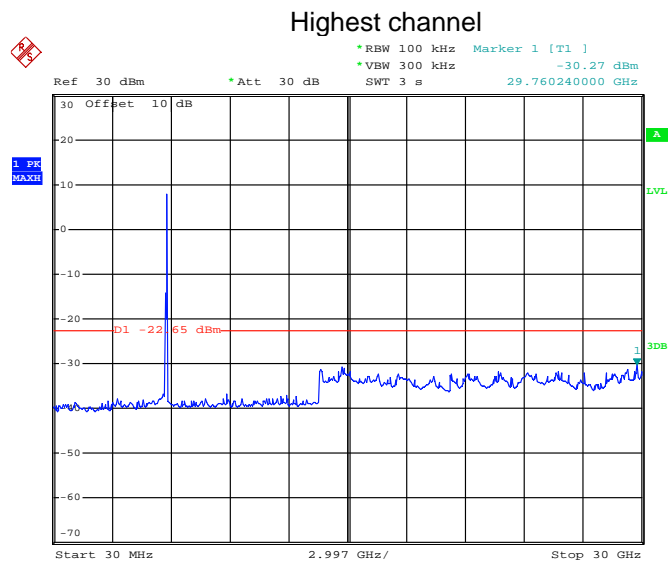


Date: 22.SEP.2013 11:59:55

30MHz~30GHz



30GHz-40GHz



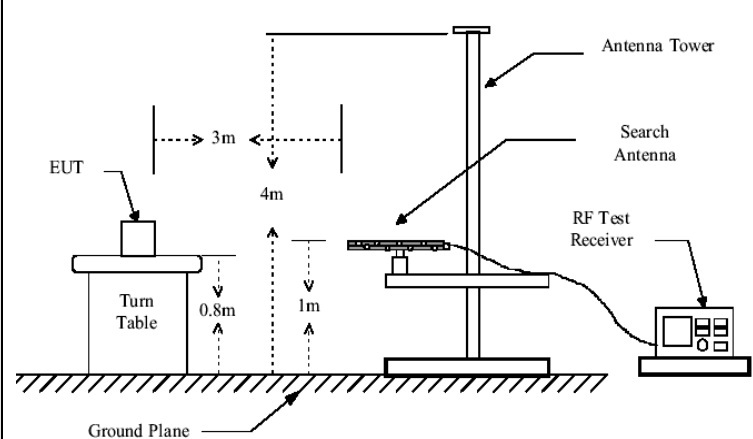
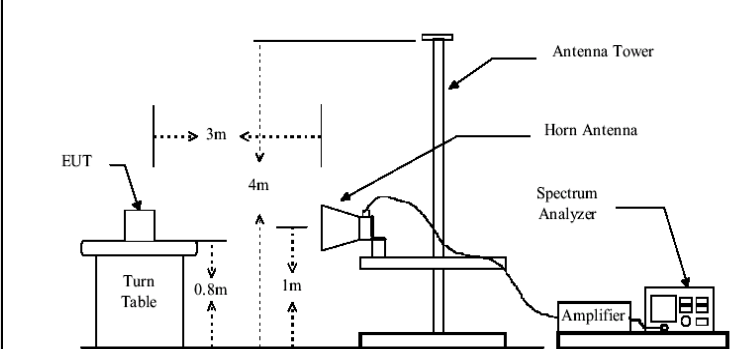
Date: 22.SEP.2013 11:57:37



30GHz~40GHz

6.8.2 Radiated Emission Method

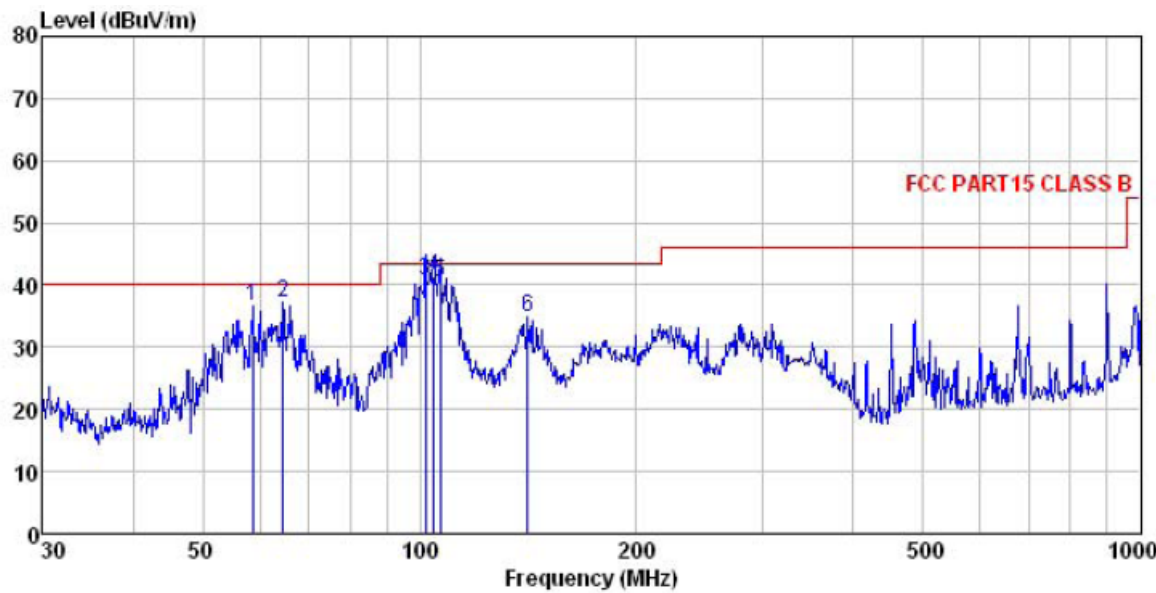
Test Requirement:	FCC Part15 C Section 15.209 and 15.205				
Test Method:	ANSI C63.4:2003				
Test Frequency Range:	30MHz to 40GHz				
Test site:	Measurement Distance: 3m				
Receiver setup:					
	Frequency	Detector	RBW	VBW	Remark
	30MHz-1GHz	Quasi-peak	100kHz	300kHz	Quasi-peak Value
	Above 1GHz	Peak	1MHz	3MHz	Peak Value
Peak		1MHz	10Hz	Average Value	
Limit:					
	Frequency		Limit (dBuV/m @3m)		Remark
	30MHz-88MHz		40.0		Quasi-peak Value
	88MHz-216MHz		43.5		Quasi-peak Value
	216MHz-960MHz		46.0		Quasi-peak Value
	960MHz-1GHz		54.0		Quasi-peak Value
	Above 1GHz	54.0		Average Value	
74.0		Peak Value			
Test Procedure:	<div>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.</div> <div>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.</div> <div>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.</div> <div>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.</div> <div>5. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.</div> <div>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.</div>				

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

Below 1GHz

Model:GRT-240050

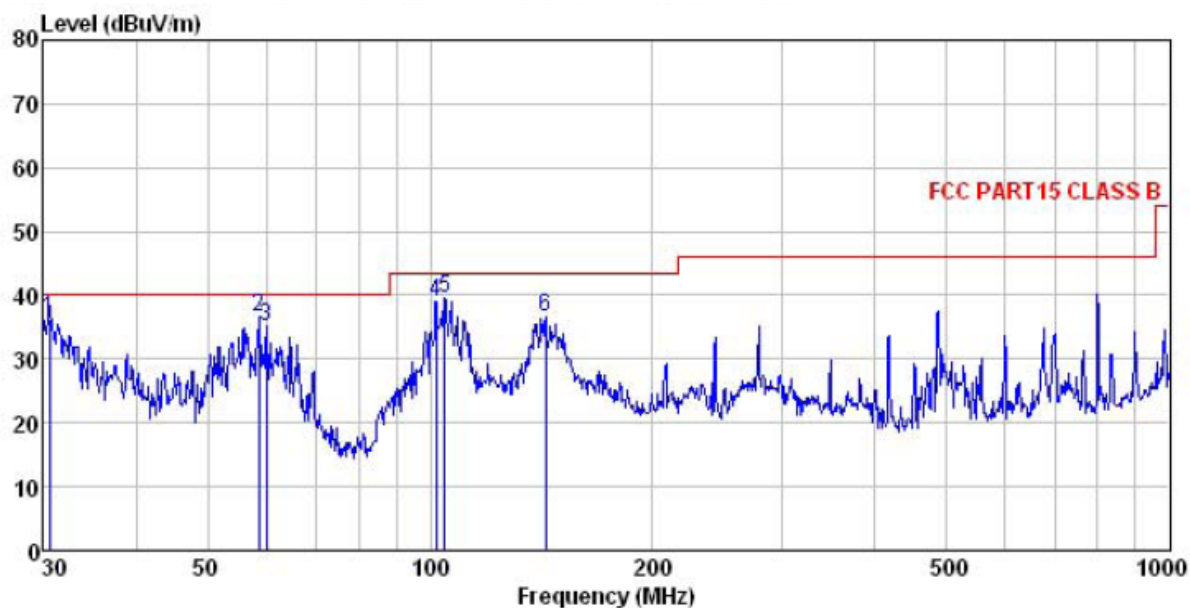
Horizontal:



Site : 3m chamber
Condition : FCC PART15 CLASS B 3m VULB9163(30M1G) HORIZONTAL
Job NO. : 176RF
Test mode : TX mode
Power Rating : AC 120V/60Hz
Environment : Temp:25.5°C Humi:55%
Test Engineer: Joe

	Freq	ReadAntenna	Cable Preamp		Limit	Over	
	Level	Factor	Loss Factor	Level	Line	Limit	Remark
	MHz	dBuV	dB/m	dB	dBuV/m	dBuV/m	dB
1	58.613	51.44	12.79	1.37	29.09	36.51	40.00 -3.49 QP
2	64.659	54.61	10.84	1.38	29.66	37.17	40.00 -2.83 QP
3	102.001	55.94	12.97	1.96	30.05	40.82	43.50 -2.68 QP
4	104.536	56.70	12.73	1.99	29.99	41.43	43.50 -2.07 QP
5	106.759	55.76	12.54	2.02	29.95	40.37	43.50 -3.13 QP
6	141.330	53.52	8.20	2.42	29.35	34.79	43.50 -8.71 QP

Vertical:

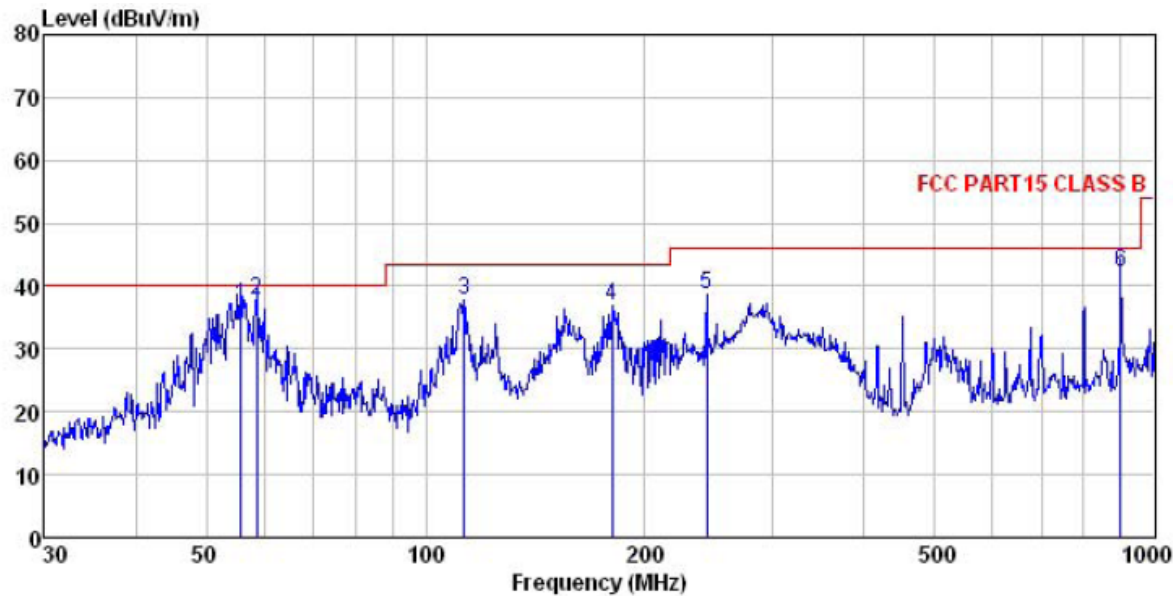


Site : 3m chamber
Condition : FCC PART15 CLASS B 3m VULB9163(30M1G) VERTICAL
Job NO. : 176RF
Test mode : TX mode
Power Rating : AC 120V/60Hz
Environment : Temp:25.5°C Humi:55%
Test Engineer: Joe

	Freq	ReadAntenna	Cable Preamp		Limit	Over	
	Level	Factor	Loss Factor	Level	Line	Limit	Remark
	MHz	dBuV	dB/m	dB	dBuV/m	dBuV/m	dB
1	30.531	49.52	12.33	0.78	26.32	36.31	40.00 -3.69 QP
2	58.613	51.51	12.79	1.37	29.09	36.58	40.00 -3.42 QP
3	60.069	50.37	12.69	1.38	29.21	35.23	40.00 -4.77 QP
4	102.001	54.19	12.97	1.96	30.05	39.07	43.50 -4.43 QP
5	104.536	54.86	12.73	1.99	29.99	39.59	43.50 -3.91 QP
6	143.326	55.32	8.22	2.44	29.33	36.65	43.50 -6.85 QP

Model:AY012E-ZF243

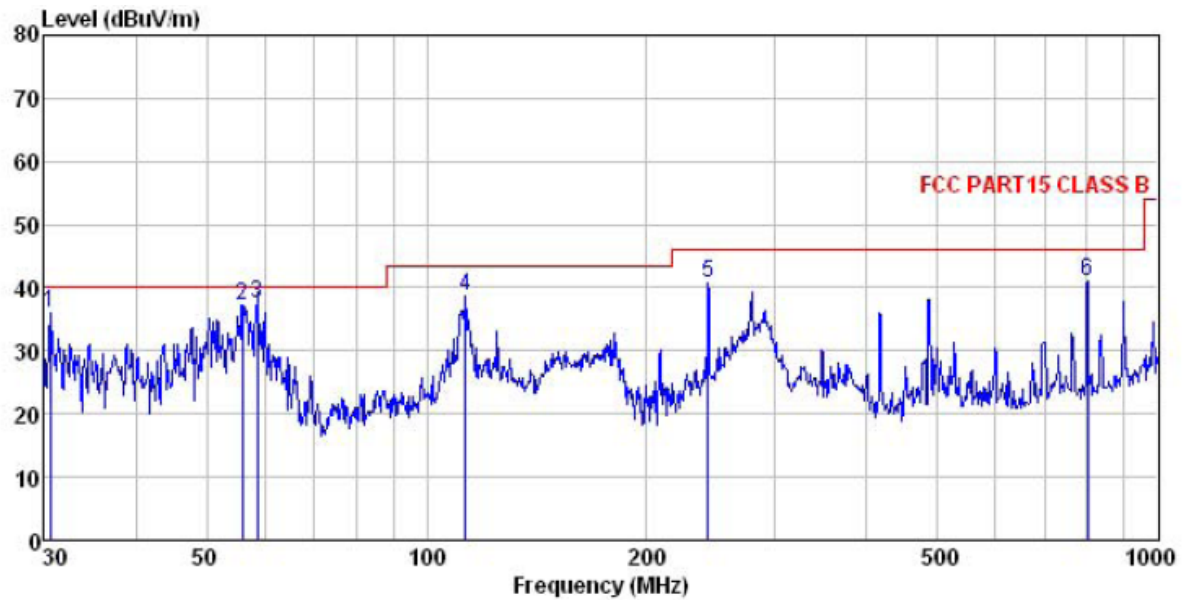
Horizontal:



Site : 3m chamber
Condition : FCC PART15 CLASS B 3m VULB9163(30M1G) HORIZONTAL
Job NO. : 176RF
Test mode : TX mode
Power Rating : AC 120V/60Hz
Environment : Temp:25.5℃ Humi:55%
Test Engineer: Joe

	Freq	ReadAntenna	Cable Preamp		Limit	Over	
		Level Factor	Loss Factor	Level	Line	Limit	Remark
	MHz	dBuV	dB/m	dB	dBuV/m	dBuV/m	dB
1	55.805	51.53	12.99	1.36	28.83	37.05	40.00
2	58.613	52.82	12.79	1.37	29.09	37.89	40.00
3	112.920	53.81	11.73	2.09	29.83	37.80	43.50
4	180.017	51.12	9.68	2.73	26.51	37.02	43.50
5	243.377	53.38	12.08	2.82	29.63	38.65	46.00
6	900.147	47.48	21.09	3.71	30.14	42.14	46.00

Vertical:



Site : 3m chamber
Condition : FCC PART15 CLASS B 3m VULB9163(30M1G) VERTICAL
Job NO. : 176RF
Test mode : TX mode
Power Rating : AC 120V/60Hz
Environment : Temp:25.5°C Humi:55%
Test Engineer: Joe

	Freq	ReadAntenna	Cable	Preamp	Limit	Over	
	Level	Factor	Loss	Factor	Line	Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m
1	30.531	49.35	12.33	0.78	26.32	36.14	40.00
2	56.001	51.83	12.97	1.36	28.85	37.31	40.00
3	58.613	52.30	12.79	1.37	29.09	37.37	40.00
4	112.920	54.69	11.73	2.09	29.83	38.68	43.50
5	242.525	55.38	12.08	2.82	29.63	40.65	46.00
6	801.786	46.91	20.06	4.34	30.40	40.91	46.00

Above 1GHz

Test mode: 802.11a	Test channel:Lowest	Level:	Peak
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Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
11490.00	42.32	40.23	13.81	40.73	55.63	74.00	-18.37	Vertical
17235.00	38.35	41.43	16.12	37.83	58.07	74.00	-15.93	Vertical
11490.00	46.32	40.23	13.81	40.73	59.63	74.00	-14.37	Horizontal
17235.00	35.39	41.43	16.12	37.83	55.11	74.00	-18.89	Horizontal

Test mode: 802.11a	Test channel:Lowest	Level:	Average
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Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
11490.00	36.35	40.23	13.81	40.73	49.66	54.00	-4.34	Vertical
17235.00	29.34	41.43	16.12	37.83	49.06	54.00	-4.94	Vertical
11490.00	31.35	40.23	13.81	40.73	44.66	54.00	-9.34	Horizontal
17235.00	24.32	41.43	16.12	37.83	44.04	54.00	-9.96	Horizontal

Remark:

10. *Final Level = Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor*

11. *“**”, means average level is not recorded when its peak level is less than average limit.*

12. *The emission levels of other frequencies are very lower than the limit and not show in test report.*

Test mode: 802.11a	Test channel:Middle	Level:	Peak
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Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
11570.00	42.32	40.17	13.78	40.91	55.36	74.00	-18.64	Vertical
17355.00	35.35	42.22	16.37	37.63	56.31	74.00	-17.69	Vertical
11570.00	46.32	40.17	13.78	40.91	59.36	74.00	-14.64	Horizontal
17355.00	39.53	42.22	16.37	37.63	60.49	74.00	-13.51	Horizontal

Test mode: 802.11a	Test channel:Middle	Level:	Average
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Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
11570.00	35.35	40.17	13.78	40.91	48.39	54.00	-5.61	Vertical
17355.00	26.35	42.22	16.37	37.63	47.31	54.00	-6.69	Vertical
11570.00	32.35	40.17	13.78	40.91	45.39	54.00	-8.61	Horizontal
17355.00	25.35	42.22	16.37	37.63	46.31	54.00	-7.69	Horizontal

Remark:

1. Final Level = Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor
2. “*”, means average level is not recorded when its peak level is less than average limit.
3. The emission levels of other frequencies are very lower than the limit and not show in test report.

Test mode: 802.11a	Test channel: Highest	Level:	Peak
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Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
11650.00	42.35	39.75	13.71	41.13	54.68	74.00	-19.32	Vertical
17475.00	35.25	43.33	16.65	37.48	57.75	74.00	-16.25	Vertical
11650.00	43.31	39.75	13.71	41.13	55.64	74.00	-18.36	Horizontal
17475.00	31.29	43.33	16.65	37.48	53.79	74.00	-20.21	Horizontal

Test mode: 802.11a	Test channel: Highest	Level:	Average
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Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
11650.00	32.20	39.75	13.71	41.13	44.53	54.00	-9.47	Vertical
17475.00	26.35	43.33	16.65	37.48	48.85	54.00	-5.15	Vertical
11650.00	35.27	39.75	13.71	41.13	47.60	54.00	-6.40	Horizontal
17475.00	21.29	43.33	16.65	37.48	43.79	54.00	-10.22	Horizontal

Remark:

1. Final Level = Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor
2. “*”, means average level is not recorded when its peak level is less than average limit.
3. The emission levels of other frequencies are very lower than the limit and not show in test report.

Test mode: 802.11n-HT20	Test channel:Lowest	Level:	Peak
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Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
11490.00	42.23	40.23	13.81	40.73	55.54	74.00	-18.46	Vertical
17235.00	35.20	41.43	16.12	37.83	54.92	74.00	-19.08	Vertical
11490.00	41.28	40.23	13.81	40.73	54.59	74.00	-19.41	Horizontal
17235.00	33.64	41.43	16.12	37.83	53.36	74.00	-20.64	Horizontal

Test mode: 802.11n-HT20	Test channel:Lowest	Level:	Average
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Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
11490.00	32.96	40.23	13.81	40.73	46.27	54.00	-7.73	Vertical
17235.00	25.42	41.43	16.12	37.83	45.14	54.00	-8.86	Vertical
11490.00	33.40	40.23	13.81	40.73	46.71	54.00	-7.29	Horizontal
17235.00	25.30	41.43	16.12	37.83	45.02	54.00	-8.98	Horizontal

Remark:

13. Final Level = Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor

14. “*”, means average level is not recorded when its peak level is less than average limit.

15. The emission levels of other frequencies are very lower than the limit and not show in test report.

Test mode: 802.11n-HT20	Test channel:Middle	Level:	Peak
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Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
11570.00	42.35	40.17	13.78	40.91	55.39	74.00	-18.61	Vertical
17355.00	36.21	42.22	16.37	37.63	57.17	74.00	-16.83	Vertical
11570.00	42.15	40.17	13.78	40.91	55.19	74.00	-18.81	Horizontal
17355.00	34.28	42.22	16.37	37.63	55.24	74.00	-18.76	Horizontal

Test mode: 802.11n-HT20	Test channel:Middle	Level:	Average
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Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
11570.00	32.51	40.17	13.78	40.91	45.55	54.00	-8.45	Vertical
17355.00	24.05	42.22	16.37	37.63	45.01	54.00	-8.99	Vertical
11570.00	33.10	40.17	13.78	40.91	46.14	54.00	-7.86	Horizontal
17355.00	24.10	42.22	16.37	37.63	45.06	54.00	-8.94	Horizontal

Remark:

4. *Final Level = Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor*
5. *“*”*, means average level is not recorded when its peak level is less than average limit.
6. *The emission levels of other frequencies are very lower than the limit and not show in test report.*

Test mode: 802.11n-HT20	Test channel: Highest	Level:	Peak
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Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
11650.00	42.31	39.75	13.71	41.13	54.64	74.00	-19.36	Vertical
17475.00	32.34	43.33	16.65	37.48	54.84	74.00	-19.16	Vertical
11650.00	42.33	39.75	13.71	41.13	54.66	74.00	-19.34	Horizontal
17475.00	30.27	43.33	16.65	37.48	52.77	74.00	-21.23	Horizontal

Test mode: 802.11n-HT20	Test channel: Highest	Level:	Average
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Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
11650.00	32.51	39.75	13.71	41.13	44.84	54.00	-9.16	Vertical
17475.00	25.34	43.33	16.65	37.48	47.84	54.00	-6.16	Vertical
11650.00	32.10	39.75	13.71	41.13	44.43	54.00	-9.57	Horizontal
17475.00	22.38	43.33	16.65	37.48	44.88	54.00	-9.12	Horizontal

Remark:

4. *Final Level = Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor*
5. *“**”, means average level is not recorded when its peak level is less than average limit.*
6. *The emission levels of other frequencies are very lower than the limit and not show in test report.*

Test mode: 802.11n-HT40	Test channel:Lowest	Level:	Peak
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Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
11510.00	41.35	40.25	13.82	40.75	54.67	74.00	-19.33	Vertical
17265.00	32.55	41.58	16.18	37.79	52.52	74.00	-21.48	Vertical
11510.00	43.52	40.25	13.82	40.75	56.84	74.00	-17.16	Horizontal
17265.00	32.71	41.58	16.18	37.79	52.68	74.00	-21.32	Horizontal

Test mode: 802.11n-HT40	Test channel:Lowest	Level:	Average
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Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
11510.00	32.81	40.25	13.82	40.75	46.13	54.00	-7.87	Vertical
17265.00	25.35	41.58	16.18	37.79	45.32	54.00	-8.68	Vertical
11510.00	32.00	40.25	13.82	40.75	45.32	54.00	-8.68	Horizontal
17265.00	26.35	41.58	16.18	37.79	46.32	54.00	-7.68	Horizontal

Remark:

16. Final Level = Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor

17. “*”, means average level is not recorded when its peak level is less than average limit.

18. The emission levels of other frequencies are very lower than the limit and not show in test report.

Test mode: 802.11n-HT40	Test channel: Highest	Level:	Peak
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Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
11590.00	42.35	40.17	13.78	40.91	55.39	74.00	-18.61	Vertical
17385.00	35.38	42.22	16.37	37.63	56.34	74.00	-17.66	Vertical
11590.00	41.06	40.17	13.78	40.91	54.10	74.00	-19.90	Horizontal
17385.00	34.35	42.22	16.37	37.63	55.31	74.00	-18.69	Horizontal

Test mode: 802.11n-HT40	Test channel: Highest	Level:	Average
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Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
11590.00	32.62	40.17	13.78	40.91	45.66	54.00	-8.34	Vertical
17385.00	28.35	42.22	16.37	37.63	49.31	54.00	-4.69	Vertical
11590.00	35.25	40.17	13.78	40.91	48.29	54.00	-5.71	Horizontal
17385.00	26.38	42.22	16.37	37.63	47.34	54.00	-6.66	Horizontal

Remark:

7. Final Level = Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor
8. “*”, means average level is not recorded when its peak level is less than average limit.
9. The emission levels of other frequencies are very lower than the limit and not show in test report.