



FCC Radio Test Report

FCC ID: 2ACSY-AX821

FCC 47 CFR Part 15 Subpart C

Product : Hy-Fi Powerline Adapter

Trade Name : Neurona

Model Number : AX821

Issued for

Neurona LLC

300 International Drive, Suite 100, Amherst, NY 14221

Issued by

Shenzhen STONE Testing Technology Co., Ltd.

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The test results in the report only apply to the tested sample.*

**TEST RESULT CERTIFICATION**

Product : Hy-Fi Powerline Adapter
Applicant..... : Neurona LLC
Address : 300 International Drive, Suite 100, Amherst, NY 14221
Manufacturer..... : Neurona LLC
Address : 300 International Drive, Suite 100, Amherst, NY 14221
Model No. : AX821
Standards : FCC Part 15 Subpart C (15.407)
Test Method..... : ANSI C63.4: 2003
KDB 789033 D01 v01r04 and KDB 662911 D01v01r01

The above equipment has been tested by Shenzhen STONE Testing Technology Co., Ltd. and found compliance with the requirements set forth in the technical standards mentioned above. The results of testing in this report apply only to the product/system, which was tested. Other similar equipment will not necessarily produce the same results due to production tolerance and measurement uncertainties.

Test..... :

Date of receipt of test item 2014-07-10

Date(s) of performance of test 2014-07-10 to 2014-07-28

Test Result..... : Pass

Testing by	:	<u>Linna Liu</u>	Date	:	<u>2014-07-27</u>
		(Linna Liu)			
Check by	:	<u>Andy Huang</u>	Date	:	<u>2014-07-30</u>
		(Andy Huang)			
Approved by	:	<u>Ethan Chen</u>	Date	:	<u>2014-08-04</u>
		(Ethan Chen)			



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1. TEST SUMMARY

Test procedures according to the technical standards:

FCC Part 15 Subpart C (15.407)			
Standard Section	Test Item	Judgment	Remark
15.207	AC Power Conducted Emission	PASS	
15.407(b)	Transmitter Radiated Emissions	PASS	
15.407(b)	Band Edge Measurement	PASS	
15.407(a)	26 dB Spectrum Bandwidth and 99% Occupied Bandwidth	PASS	
15.407(a)	Peak Excursion	PASS	
15.407(a)	Power Spectral Density	PASS	
15.407(g)	Frequency Stability	PASS	
15.203	Antenna Requirement	PASS	

NOTE:

(1) "N/A" denotes test is not applicable in this Test Report

(2) The test results of this report relate only to the tested sample(s) identified in this report.



1.1 TEST FACILITY

Shenzhen STONE Testing Technology Co., Ltd.

Add. : F/6, Bldg.12, Zhongxing Industrial City, Chuangye Rd., Nanshan District, Shenzhen, Guangdong, China

Our laboratories are accredited and approved by the following approval agencies according to ISO/IEC 17025.

IC Registration No.:

FCC Registration No.: 323508

IC Registration No.: 11043A

1.2 MEASUREMENT UNCERTAINTY

The reported uncertainty of measurement $y \pm U$, where expanded uncertainty U is based on a standard uncertainty multiplied by a coverage factor of $k=2$, providing a level of confidence of approximately **95** %.

A. Conducted Emission :

The measurement uncertainty is evaluated as ± 3.2 dB.

B. Radiated Measurement :

The measurement uncertainty is evaluated as ± 3.7 dB.



2. GENERAL INFORMATION

2.1 GENERAL DESCRIPTION OF EUT

Equipment	Hy-Fi Powerline Adapter
Model Name	AX821
Additional Model Number(s)	N/A
Model Difference	N/A
Frequency Range	5150 ~5250 MHz
Modulation Type	802.11a: OFDM
Data Rate	802.11a: 6/9/12/18/24/36/48/54 Mbps 802.11n: 450 Mbps
RF Output Power	802.11a: 14.71 dBm 802.11n(HT20): 14.62 dBm 802.11n(HT40): 14.01 dBm
Antenna Type	PIFA Antenna (Max. Gain: 4 dBi)
Power Source	AC power by AC system.
Power Rating	Input: AC 120~240V 50/60 Hz 12A
Remark	More details EUT technical specifications, please refer to the User's Manual.

Note:

- (1) This Test Report is FCC Part 15 Subpart C, 15.407 for IEEE 802.11an. And the Test procedure follows the FCC KDB 789033 D01 General UNII Test Procedures v01r04.
- (2) Transmitting mode with antennas

Mode	TX Antenna (s)	Mode	TX Antenna (s)
802.11b	1	802.11a	1
802.11g	1	802.11a (HT20)	2
802.11n(HT20)	2	802.11a (HT40)	2
802.11n(HT40)	2		



(3) Channel List.

5 GHz Band				
Frequency Band	Channel No.	Frequency	Channel No.	Frequency
5150~5250 MHz Band 1	36	5180 MHz	44	5220 MHz
	38	5190 MHz	46	5230 MHz
	40	5200 MHz	48	5240 MHz
	42	5210 MHz		
For 20 MHz Bandwidth, use channel 36, 40, 44, 48.				
For 40 MHz Bandwidth, use channel 38, 46.				



2.2 DESCRIPTION OF TEST MODES

To investigate the maximum EMI emission characteristics generated from EUT, the test system was pre-scanning tested based on the consideration of following EUT operation mode or test configuration mode which possibly have effect on EMI emission level. Each of these EUT operation mode(s) or test configuration mode(s) mentioned above was evaluated respectively.

Pretest Mode	Description
Mode 1	WIFI TX 802.11a Mode
Mode 2	WIFI TX 802.11a(HT20) Mode
Mode 3	WIFI TX 802.11a(HT40) Mode

For Conducted Test	
Final Test Mode	Description
Mode 1	WIFI TX 802.11a Mode

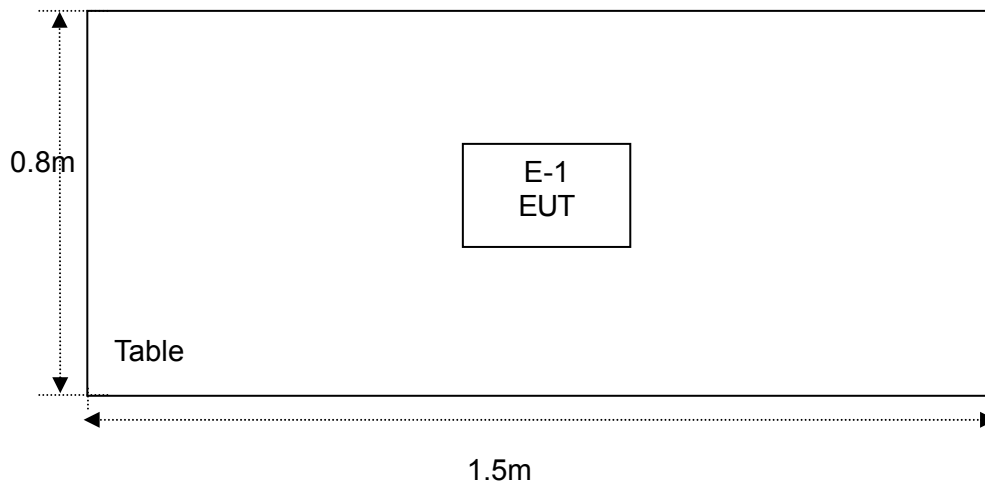
For Radiated Test	
Final Test Mode	Description
Mode 1	WIFI TX 802.11a Mode
Mode 2	WIFI TX 802.11a(HT20) Mode
Mode 3	WIFI TX 802.11a(HT40) Mode

Note:

- (1) Software used to control the EUT for staying in continuous transmitting mode was programmed. After verification, all tests were carried out with the worst case test modes as shown below.
- (2) IEEE 802.11a(HT20) Mode:
Channel (5180/5200/5240 MHz) with BPSK data rate were chosen for full testing.
- (3) IEEE 802.11a(HT40) Mode:
Channel (5190/5230 MHz) with MCS 0 data rate were chosen for full testing.
- (4) By preliminary testing and verifying three axis (X, Y and Z) position of EUT transmitted status, it was found that "X axis" position was the worst, then the final test was executed the worst condition and test data were recorded in this report.

2.3 DESCRIPTION OF TEST SETUP

Radiated Emission





2.4 DESCRIPTION TEST PERIPHERAL AND EUT PERIPHERAL

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

Item	Equipment	Mfr/Brand	Model/Type No.	Series No.	Note
E-1	Hy-Fi Powerline Adapter	Neurona LLC	AX821	N/A	EUT

Item	Shielded Type	Ferrite Core	Length	Note

Note:

- (1) The support equipment was authorized by Declaration of Confirmation.
- (2) For detachable type I/O cable should be specified the length in cm in 『Length』 column.
- (3) “YES” means “shielded” “with core”; “NO” means “unshielded” “without core”.

2.5 EUT Exercise Software

Power Parameters for Testing			
Test Software Version	Atheros Radio Test 2 (ART2-GUI).exe		
Mode	Frequency/ Parameters		
802.11a	5180 MHz	5200 MHz	5240 MHz
	17	17	17
802.11n(HT20)	5180 MHz	5200 MHz	5240 MHz
	17	17	17
802.11n(HT40)	5190 MHz	5230 MHz	
	17	17	



3. CONDUCTED EMISSION TEST

3.1 CONDUCTED EMISSION MEASUREMENT (Frequency Range 150KHz-30MHz)

FREQUENCY (MHz)	Quasi-peak	Average
	dBuV	dBuV
0.15 -0.5	66 - 56 *	56 - 46 *
0.50 -5.0	56.00	46.00
5.0 -30.0	60.00	50.00

Note:

- (1) The tighter limit applies at the band edges.
- (2) The limit of " * " marked band means the limitation decreases linearly with the logarithm of the frequency in the range.

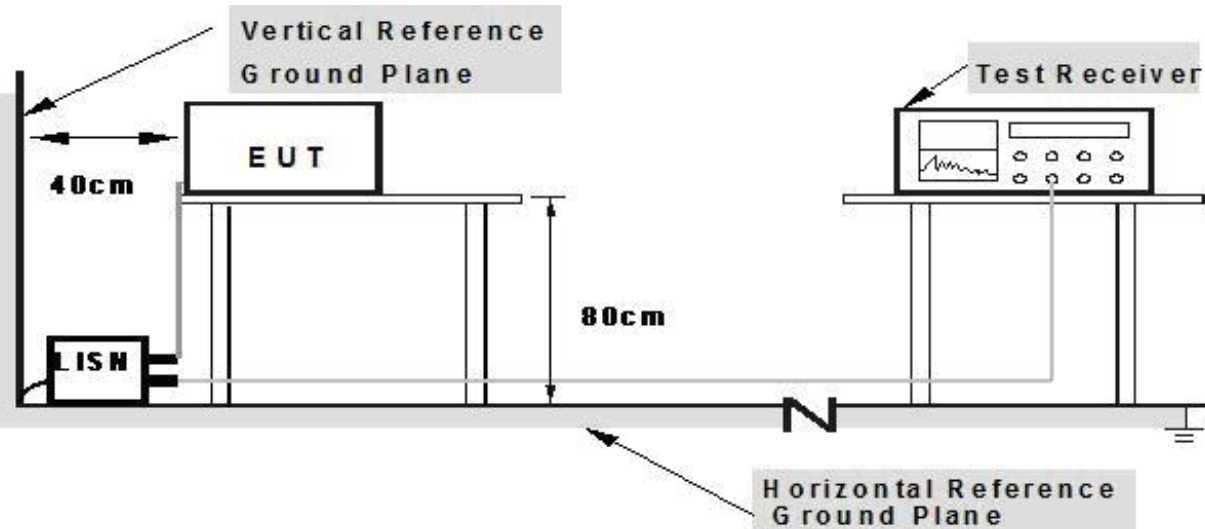
The following table is the setting of the receiver

Receiver Parameters	Setting
Attenuation	10 dB
Start Frequency	0.15 MHz
Stop Frequency	30 MHz
IF Bandwidth	9 kHz

3.2 TEST PROCEDURE

- a. The EUT was placed 0.8 meters from the horizontal ground plane with EUT being connected to the power mains through a line impedance stabilization network (LISN). All other support equipments powered from additional LISN(s). The LISN provide 50 Ohm/ 50uH of coupling impedance for the measuring instrument.
- b. Interconnecting cables that hang closer than 40 cm to the ground plane shall be folded back and forth in the center forming a bundle 30 to 40 cm long.
- c. I/O cables that are not connected to a peripheral shall be bundled in the center. The end of the cable may be terminated, if required, using the correct terminating impedance. The overall length shall not exceed 1 m.
- d. LISN at least 80 cm from nearest part of EUT chassis.
- e. For the actual test configuration, please refer to the related Item –EUT Test Photos.

3.3 TEST SETUP



Note: 1.Support units were connected to second LISN.

2.Both of LISNs (AMN) are 80 cm from EUT and at least 80 from other units and other metal planes

3.4 TEST INSTRUMENTS

Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until	Calibration period
LISN	R&S	NSLK81	8126466	Jul. 06, 2014	Jul. 05. 2015	1 year
LISN	R&S	NSLK81	8126487	Dec. 25, 2013	Dec. 24, 2014	1 year
50Ω Switch	ANRITSU CORP	MP59B	6200983704	Jul. 06, 2014	Jul. 05. 2015	1 year
Test Cable	N/A	C01	N/A	Jul. 06, 2014	Jul. 05. 2015	1 year
Test Cable	N/A	C02	N/A	Jul. 06, 2014	Jul. 05. 2015	1 year
Test Cable	N/A	C03	N/A	Jul. 06, 2014	Jul. 05. 2015	1 year
EMI Test Receiver	R&S	ESCI	1166.595	Jul. 06, 2014	Jul. 05. 2015	1 year
Passive Voltage Probe	ESH2-Z3	R&S	100196	Jul. 06, 2014	Jul. 05. 2015	1 year

3.5 EUT OPERATING CONDITIONS

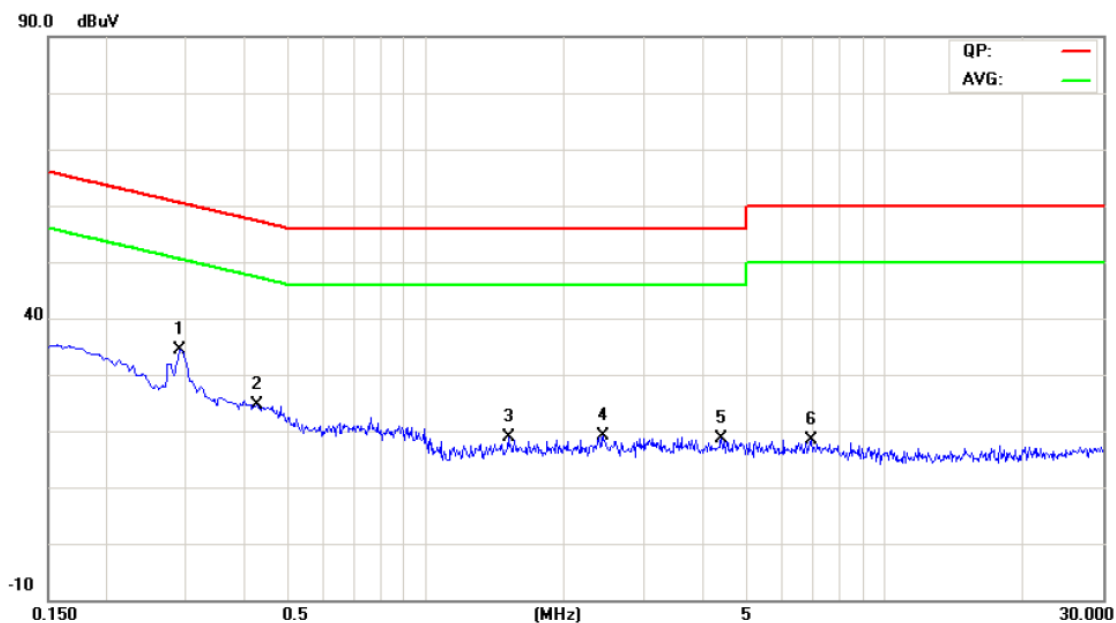
The EUT tested system was configured as the statements of 2.3 Unless otherwise a special operating condition is specified in the follows during the testing.



3.6 TEST RESULTS

EUT :	Hy-Fi Powerline Adapter	Model Name. :	AX821
Temperature :	26 °C	Relative Humidity :	56%
Pressure :	1010hPa	Test Date :	2014-07-22
Test Mode :	Mode 1	Phase :	Line
Test Voltage :	120V/ 60Hz		

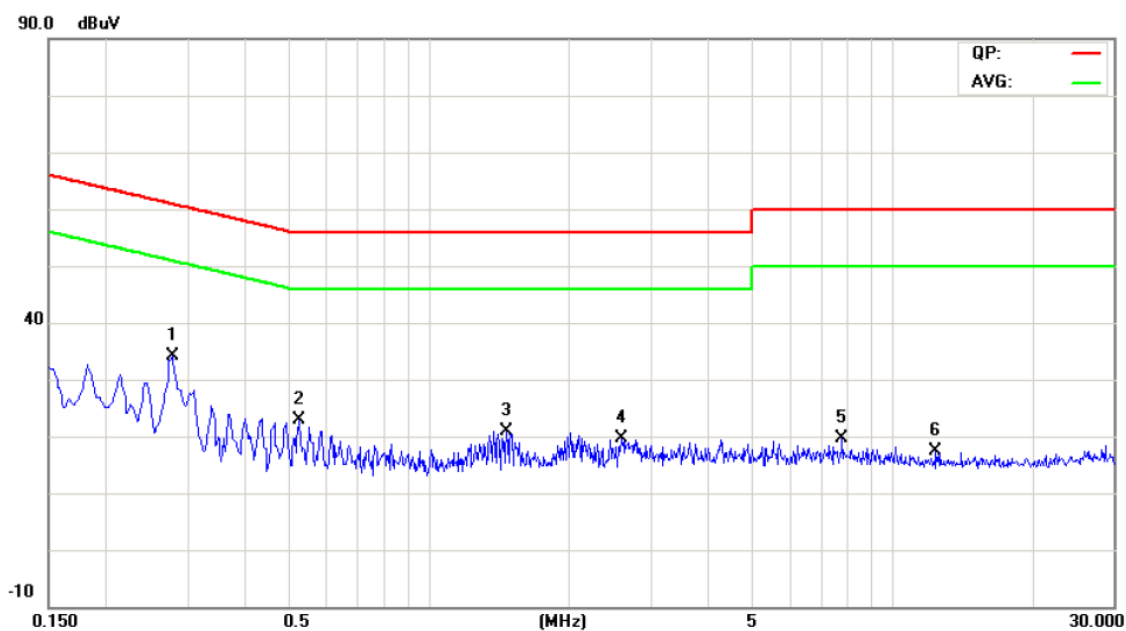
No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	Detector	Comment
		MHz	dBuV	dB	dBuV	dBuV	dB		
1	*	0.2900	24.42	10.02	34.44	60.52	-26.08	peak	
2		0.4300	14.49	10.02	24.51	57.25	-32.74	peak	
3		1.5140	8.80	10.06	18.86	56.00	-37.14	peak	
4		2.4460	9.13	10.05	19.18	56.00	-36.82	peak	
5		4.4140	8.55	9.98	18.53	56.00	-37.47	peak	
6		6.9220	8.43	10.06	18.49	60.00	-41.51	peak	





EUT :	Hy-Fi Powerline Adapter	Model Name. :	AX821
Temperature :	26 °C	Relative Humidity :	56%
Pressure :	1010hPa	Test Date :	2014-07-22
Test Mode :	Mode 1	Phase :	Neutral
Test Voltage :	120V/ 60Hz		

No.	Mk.	Freq.	Reading	Correct	Measure-	Limit	Over		
		MHz	Level	Factor	ment			Detector	Comment
			dBuV	dB	dBuV	dBuV	dB		
1	*	0.2779	23.93	10.09	34.02	60.88	-26.86	peak	
2		0.5220	12.78	10.02	22.80	56.00	-33.20	peak	
3		1.4660	10.87	10.11	20.98	56.00	-35.02	peak	
4		2.5980	9.50	10.06	19.56	56.00	-36.44	peak	
5		7.8100	9.49	10.09	19.58	60.00	-40.42	peak	
6		12.4020	7.32	10.11	17.43	60.00	-42.57	peak	





4. RADIATED EMISSION MEASUREMENT

4.1 RADIATED EMISSION LIMIT

20 dBc in any 100 kHz bandwidth outside the operating frequency band. In case the emission fall within the restricted band specified on 15.205(a) and RSS-210 Section 2.2&A8.5, then the 15.209(a) and RSS-General limit in the table below has to be followed.

FREQUENCY (MHz)	Field Strength (uV/m at meter)	Measurement Distance (meters)
0.009 -0.490	2400/F(KHz)	300
0.490 -1.705	24000/F(KHz)	30
1.705 -30.0	30	30
30 -88	100	3
88 -216	150	3
216~960	200	3
Above 960	500	3

RADIATED EMISSION LIMITS (Above 1000MHz)

FREQUENCY (MHz)	Class A (dBuV/m)(at 3 M)		Class B (dBuV/m)(at 3 M)	
	Peak	Average		Peak
Above 1000	80	60	74	54

Note:

- (1) The limit for radiated test was performed according to FCC PART 15C.
- (2) The tighter limit applies at the band edges.
- (2) Emission Level(dBuV/m)=20log Emission Level(uV/m)

Limits of unwanted emission out of the restricted bands

Frequency (MHz)	EIRP Limits (dBm)	Equivalent Field Strength at 3m (dBuV/m)
5150~5250	-27	68.3
5250~5350	-27	68.3
5470~5725	-27	68.3
5725~5825	-27	68.3
	-17	78.3

NOTE: The following formula is used to convert the equipment isotropic radiated power (eirp) to field strength:

$$E = \frac{1000000\sqrt{30P}}{3} \text{ uV/m, where P is the eirp (Watts)}$$

The following table is the setting of the receiver

Receiver Parameter	Setting
Attenuation	Auto
Start Frequency~ Stop Frequency	9kHz~150kHz/ RB 200Hz for QP



Start Frequency~ Stop Frequency	150kHz~30MHz/ RB 9kHz for QP
Start Frequency~ Stop Frequency	30MHz~1000MHz/ RB120kHz for QP

The following table is the setting of the spectrum

Spectrum Parameter	Setting
Attenuation	Auto
Start Frequency	1000 MHz
Stop Frequency	10 th carrier harmonic
RB/ VB (emission in restricted band)	1MHz/ 3 MHz for Peak, 1MHz/ 10Hz for Average

4.2 TEST PROCEDURE

- The measuring distance of at 3 m shall be used for measurements at frequency up to 1GHz. For frequencies above 1GHz, any suitable measuring distance may be used.
- The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter open area test site. The table was rotated 360 degrees to determine the position of the highest radiation.
- The height of the equipment or of the substitution antenna shall be 0.8 m; the height of the test antenna shall vary between 1 m to 4 m. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- The initial step in collecting conducted emission data is a spectrum analyzer peak detector mode pre-scanning the measurement frequency range. Significant peaks are then marked and then Quasi Peak detector mode re-measured, above 1G Average detector mode will be instead.
- If the Peak Mode measured value compliance with and lower than Quasi Peak Mode Limit, the EUT shall be deemed to meet QP Limits and then no additional QP Mode measurement performed.
- For the actual test configuration, please refer to the related Item –EUT Test Photos.

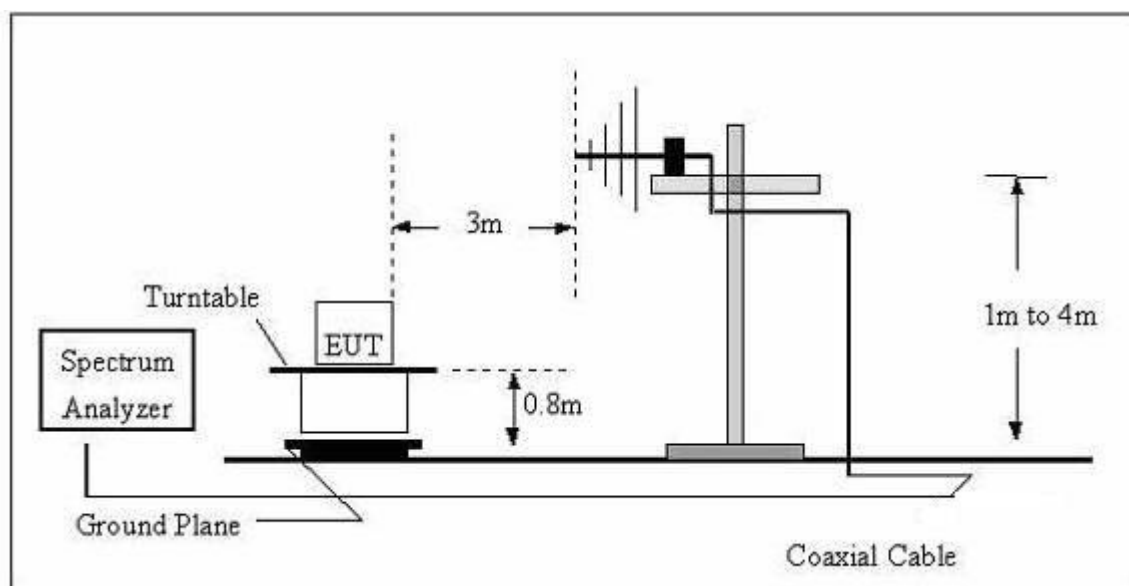
Note:

Both horizontal and vertical antenna polarities were tested.

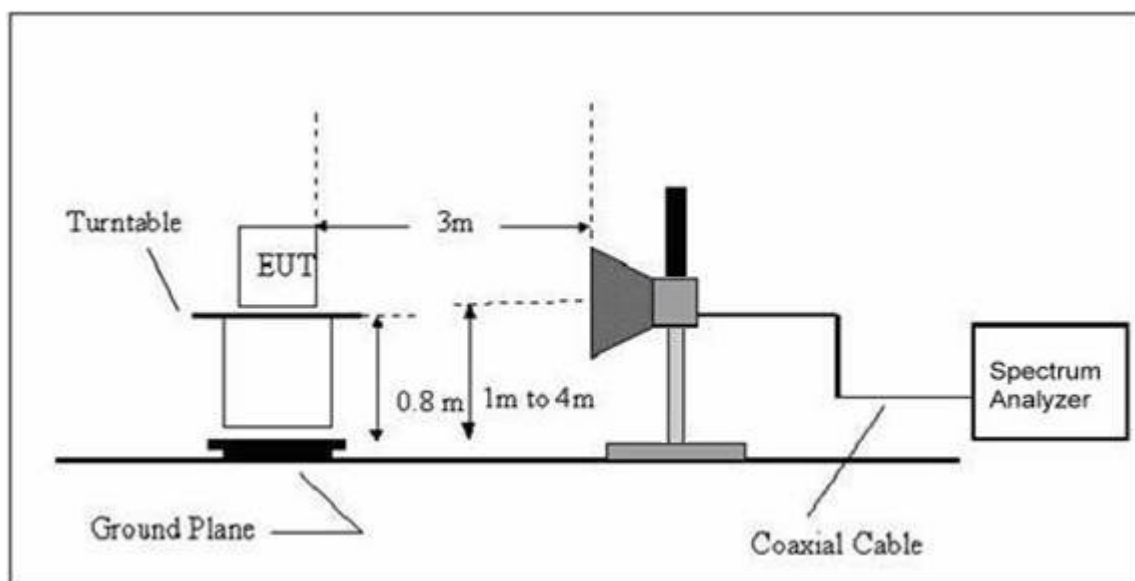
And performed pretest to three orthogonal axis. The worst case emissions were reported.

4.3 TEST SETUP

(A) Radiated Emission Test Set-Up Frequency Below 1 GHz



(B) Radiated Emission Test Set-Up Frequency Above 1GHz



4.4 TEST INSTRUMENTS

Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until	Calibration period
Broadband Antenna	R&S	VULB 9168	VULB 9168-456	Jul. 06, 2014	Jul. 05. 2015	1 year
Test Cable	N/A	R-01	N/A	Dec. 25, 2013	Dec. 24, 2014	1 year
Test Cable	N/A	R-02	N/A	Dec. 25, 2013	Dec. 24, 2014	1 year
EMI Test Receiver	R&S	ESCI	101324	Jul. 06, 2014	Jul. 05. 2015	1 year



Antenna Mast	EM	SC100_1	N/A	N/A	N/A	N/A
Turn Table	EM	SC100	060531	N/A	N/A	N/A
50Ω Switch	Anritsu Corp	MP59B	6200983705	Jul. 06, 2014	Jul. 05. 2015	1 year
Spectrum Analyzer	R&S	FSP40	100154	Jul. 06, 2014	Jul. 05. 2015	1 year
Horn Antenna	R&S	HF906	10029	Jul. 06, 2014	Jul. 05. 2015	1 year
Horn Antenna	Schwarzbek	BBHA9170	0258475	Dec. 25, 2013	Dec. 24, 2014	1 year
Amplifier	EM	EM-30180	060538	Jul. 06, 2014	Jul. 05. 2015	1 year

4.5 EUT OPERATING CONDITIONS

The EUT tested system was configured as the statements of **2.3** Unless otherwise a special operating condition is specified in the follows during the testing.



4.6 TEST RESULTS

4.6.1 TEST RESULTS (Bellow 1GHz)

EUT :	Hy-Fi Powerline Adapter	Model Name. :	AX821
Temperature :	26 °C	Relative Humidity :	56%
Pressure :	1010hPa	Test Date :	2014-07-15
Test Mode :	TX 802.11a 5180MHz	Polarization :	Horizontal
Test Power :	AC 120V/60 Hz		

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		35.8746	41.84	-13.07	28.77	40.00	-11.23	peak	
2		51.6612	48.04	-13.08	34.96	40.00	-5.04	peak	
3		79.5214	47.19	-17.78	29.41	40.00	-10.59	peak	
4		326.7460	46.90	-11.02	35.88	46.00	-10.12	peak	
5		400.4320	51.63	-9.36	42.27	46.00	-3.73	peak	
6	*	556.7741	50.91	-7.09	43.82	46.00	-2.18	peak	

Remark:

Factor = Antenna Factor + Cable Loss.



EUT :	Hy-Fi Powerline Adapter	Model Name. :	AX821
Temperature :	26 °C	Relative Humidity :	56%
Pressure :	1010hPa	Test Date :	2014-07-15
Test Mode :	TX 802.11a 5180MHz	Polarization :	Vertical
Test Power :	AC 120V/60 Hz		

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		35.8746	41.86	-13.07	28.79	40.00	-11.21	peak	
2		79.5207	46.19	-17.78	28.41	40.00	-11.59	peak	
3		162.0453	47.94	-16.89	31.05	43.50	-12.45	peak	
4		372.0045	43.89	-9.97	33.92	46.00	-12.08	peak	
5		556.7744	45.60	-7.09	38.51	46.00	-7.49	peak	
6	*	744.8661	44.14	-4.09	40.05	46.00	-5.95	peak	

Remark:

Factor = Antenna Factor + Cable Loss.



4.6.2 TEST RESULTS (Above 1GHz)

EUT :	Hy-Fi Powerline Adapter	Model Name. :	AX821
Temperature :	26 °C	Relative Humidity :	56%
Pressure :	1010hPa	Test Date :	2014-07-15
Test Mode :	TX 802.11a 5180MHz	Polarization :	Horizontal
Test Power :	AC 120V/60 Hz		

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		5150.000	46.06	8.69	54.75	68.30	-13.55	peak	
2		5150.000	34.45	8.69	43.14	54.00	-10.86	AVG	
3	X	5174.800	96.02	8.76	104.78	68.30	36.48	peak	Fudamental Frequency
4	*	5175.400	85.08	8.76	93.84	54.00	39.84	AVG	Fudamental Frequency

EUT :	Hy-Fi Powerline Adapter	Model Name. :	AX821
Temperature :	26 °C	Relative Humidity :	56%
Pressure :	1010hPa	Test Date :	2014-07-15
Test Mode :	TX 802.11a 5180MHz	Polarization :	Vertical
Test Power :	AC 120V/60 Hz		

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		5150.000	45.87	8.69	54.56	68.30	-13.74	peak	
2		5150.000	33.72	8.69	42.41	54.00	-11.59	AVG	
3	X	5185.650	93.33	8.79	102.12	68.30	33.82	peak	Fudamental Frequency
4	*	5186.050	82.85	8.79	91.64	54.00	37.64	AVG	Fudamental Frequency



EUT :	Hy-Fi Powerline Adapter	Model Name. :	AX821
Temperature :	26 °C	Relative Humidity :	56%
Pressure :	1010hPa	Test Date :	2014-07-15
Test Mode :	TX 802.11a 5180MHz	Polarization :	Horizontal
Test Power :	AC 120V/60 Hz		

No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		10362.50	41.25	8.86	50.11	68.30	-18.19	peak	
2	*	10362.50	34.76	8.86	43.62	54.00	-10.38	AVG	

EUT :	Hy-Fi Powerline Adapter	Model Name. :	AX821
Temperature :	26 °C	Relative Humidity :	56%
Pressure :	1010hPa	Test Date :	2014-07-15
Test Mode :	TX 802.11a 5180MHz	Polarization :	Vertical
Test Power :	AC 120V/60 Hz		

No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		10362.10	41.10	11.25	52.35	68.30	-15.95	peak	
2	*	10362.10	34.22	11.25	45.47	54.00	-8.53	AVG	



EUT :	Hy-Fi Powerline Adapter	Model Name. :	AX821
Temperature :	26 °C	Relative Humidity :	56%
Pressure :	1010hPa	Test Date :	2014-07-15
Test Mode :	TX 802.11a 5200MHz	Polarization :	Horizontal
Test Power :	AC 120V/60 Hz		

No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1	*	5195.800	84.92	8.82	93.74	54.00	39.74	AVG	Fudamental Frequency
2	X	5196.400	93.94	8.82	102.76	68.30	34.46	peak	Fudamental Frequency

EUT :	Hy-Fi Powerline Adapter	Model Name. :	AX821
Temperature :	26 °C	Relative Humidity :	56%
Pressure :	1010hPa	Test Date :	2014-07-15
Test Mode :	TX 802.11a 5200MHz	Polarization :	Vertical
Test Power :	AC 120V/60 Hz		

No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1	X	5203.700	93.67	8.84	102.51	68.30	34.21	peak	Fudamental Frequency
2	*	5204.000	82.95	8.84	91.79	54.00	37.79	AVG	Fudamental Frequency



EUT :	Hy-Fi Powerline Adapter	Model Name. :	AX821
Temperature :	26 °C	Relative Humidity :	56%
Pressure :	1010hPa	Test Date :	2014-07-15
Test Mode :	TX 802.11a 5200MHz	Polarization :	Horizontal
Test Power :	AC 120V/60 Hz		

No. Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
	MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1	10405.20	41.34	8.87	50.21	68.30	-18.09	peak	
2 *	10405.20	34.61	8.87	43.48	54.00	-10.52	AVG	

EUT :	Hy-Fi Powerline Adapter	Model Name. :	AX821
Temperature :	26 °C	Relative Humidity :	56%
Pressure :	1010hPa	Test Date :	2014-07-15
Test Mode :	TX 802.11a 5200MHz	Polarization :	Vertical
Test Power :	AC 120V/60 Hz		

No. Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
	MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1	10405.20	41.17	11.27	52.44	68.30	-15.86	peak	
2 *	10405.20	34.46	11.27	45.73	54.00	-8.27	AVG	



EUT :	Hy-Fi Powerline Adapter	Model Name. :	AX821
Temperature :	26 °C	Relative Humidity :	56%
Pressure :	1010hPa	Test Date :	2014-07-15
Test Mode :	TX 802.11a 5240MHz	Polarization :	Horizontal
Test Power :	AC 120V/60 Hz		

No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1	*	5245.100	84.59	8.96	93.55	54.00	39.55	AVG	Fudamental Frequency
2	X	5245.850	94.18	8.96	103.14	68.30	34.84	peak	Fudamental Frequency
3		5350.000	45.64	9.08	54.72	68.30	-13.58	peak	
4		5350.000	34.37	9.08	43.45	54.00	-10.55	AVG	

EUT :	Hy-Fi Powerline Adapter	Model Name. :	AX821
Temperature :	26 °C	Relative Humidity :	56%
Pressure :	1010hPa	Test Date :	2014-07-15
Test Mode :	TX 802.11a 5240MHz	Polarization :	Vertical
Test Power :	AC 120V/60 Hz		

No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1	*	5245.100	85.09	8.96	94.05	54.00	40.05	AVG	Fudamental Frequency
2	X	5245.850	94.59	8.96	103.55	68.30	35.25	peak	Fudamental Frequency
3		5350.000	45.96	9.08	55.04	68.30	-13.26	peak	
4		5350.000	34.46	9.08	43.54	54.00	-10.46	AVG	



EUT :	Hy-Fi Powerline Adapter	Model Name. :	AX821
Temperature :	26 °C	Relative Humidity :	56%
Pressure :	1010hPa	Test Date :	2014-07-15
Test Mode :	TX 802.11a 5240MHz	Polarization :	Horizontal
Test Power :	AC 120V/60 Hz		

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		10483.10	44.16	8.89	53.05	68.30	-15.25	peak	
2	*	10483.10	36.90	8.89	45.79	54.00	-8.21	AVG	

EUT :	Hy-Fi Powerline Adapter	Model Name. :	AX821
Temperature :	26 °C	Relative Humidity :	56%
Pressure :	1010hPa	Test Date :	2014-07-15
Test Mode :	TX 802.11a 5240MHz	Polarization :	Vertical
Test Power :	AC 120V/60 Hz		

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		10483.10	38.88	11.31	50.19	68.30	-18.11	peak	
2	*	10483.10	32.20	11.31	43.51	54.00	-10.49	AVG	



EUT :	Hy-Fi Powerline Adapter	Model Name. :	AX821
Temperature :	26 °C	Relative Humidity :	56%
Pressure :	1010hPa	Test Date :	2014-07-15
Test Mode :	TX 802.11n(HT20) 5180MHz	Polarization :	Horizontal
Test Power :	AC 120V/60 Hz		

No. Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over		
	MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1	5150.000	46.14	8.69	54.83	68.30	-13.47	peak	
2	5150.000	34.53	8.69	43.22	54.00	-10.78	AVG	
3 X	5174.800	96.32	8.76	105.08	68.30	36.78	peak	Fudamental Frequency
4 *	5175.400	85.58	8.76	94.34	54.00	40.34	AVG	Fudamental Frequency

EUT :	Hy-Fi Powerline Adapter	Model Name. :	AX821
Temperature :	26 °C	Relative Humidity :	56%
Pressure :	1010hPa	Test Date :	2014-07-15
Test Mode :	TX 802.11n(HT20) 5180MHz	Polarization :	Vertical
Test Power :	AC 120V/60 Hz		

No. Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over		
	MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1	5150.000	46.43	8.69	55.12	68.30	-13.18	peak	
2	5150.000	34.20	8.69	42.89	54.00	-11.11	AVG	
3 X	5185.650	94.00	8.79	102.79	68.30	34.49	peak	Fudamental Frequency
4 *	5186.050	83.35	8.79	92.14	54.00	38.14	AVG	Fudamental Frequency



EUT :	Hy-Fi Powerline Adapter	Model Name. :	AX821
Temperature :	26 °C	Relative Humidity :	56%
Pressure :	1010hPa	Test Date :	2014-07-15
Test Mode :	TX 802.11n(HT20) 5180MHz	Polarization :	Horizontal
Test Power :	AC 120V/60 Hz		

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		10365.00	39.74	8.86	48.60	68.30	-19.70	peak	
2	*	10365.00	33.03	8.86	41.89	54.00	-12.11	AVG	

EUT :	Hy-Fi Powerline Adapter	Model Name. :	AX821
Temperature :	26 °C	Relative Humidity :	56%
Pressure :	1010hPa	Test Date :	2014-07-15
Test Mode :	TX 802.11n(HT20) 5180MHz	Polarization :	Vertical
Test Power :	AC 120V/60 Hz		

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		10365.10	38.97	11.25	50.22	68.30	-18.08	peak	
2	*	10365.10	32.43	11.25	43.68	54.00	-10.32	AVG	



EUT :	Hy-Fi Powerline Adapter	Model Name. :	AX821
Temperature :	26 °C	Relative Humidity :	56%
Pressure :	1010hPa	Test Date :	2014-07-15
Test Mode :	TX 802.11n(HT20) 5200MHz	Polarization :	Horizontal
Test Power :	AC 120V/60 Hz		

No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1	*	5195.800	85.42	8.82	94.24	54.00	40.24	AVG	Fudamental Frequency
2	X	5196.400	94.80	8.82	103.62	68.30	35.32	peak	Fudamental Frequency

EUT :	Hy-Fi Powerline Adapter	Model Name. :	AX821
Temperature :	26 °C	Relative Humidity :	56%
Pressure :	1010hPa	Test Date :	2014-07-15
Test Mode :	TX 802.11n(HT20) 5200MHz	Polarization :	Vertical
Test Power :	AC 120V/60 Hz		

No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1	X	5203.700	94.78	8.84	103.62	68.30	35.32	peak	Fudamental Frequency
2	*	5204.000	83.95	8.84	92.79	54.00	38.79	AVG	Fudamental Frequency



EUT :	Hy-Fi Powerline Adapter	Model Name. :	AX821
Temperature :	26 °C	Relative Humidity :	56%
Pressure :	1010hPa	Test Date :	2014-07-15
Test Mode :	TX 802.11n(HT20) 5200MHz	Polarization :	Horizontal
Test Power :	AC 120V/60 Hz		

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		10403.40	39.87	8.87	48.74	68.30	-19.56	peak	
2	*	10403.40	32.19	8.87	41.06	54.00	-12.94	AVG	

EUT :	Hy-Fi Powerline Adapter	Model Name. :	AX821
Temperature :	26 °C	Relative Humidity :	56%
Pressure :	1010hPa	Test Date :	2014-07-15
Test Mode :	TX 802.11n(HT20) 5200MHz	Polarization :	Vertical
Test Power :	AC 120V/60 Hz		

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		10403.40	38.92	11.27	50.19	68.30	-18.11	peak	
2	*	10403.40	32.18	11.27	43.45	54.00	-10.55	AVG	



EUT :	Hy-Fi Powerline Adapter	Model Name. :	AX821
Temperature :	26 °C	Relative Humidity :	56%
Pressure :	1010hPa	Test Date :	2014-07-15
Test Mode :	TX 802.11n(HT20) 5240MHz	Polarization :	Horizontal
Test Power :	AC 120V/60 Hz		

No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1	*	5245.100	85.59	8.96	94.55	54.00	40.55	AVG	Fudamental Frequency
2	X	5245.850	96.45	8.96	105.41	68.30	37.11	peak	Fudamental Frequency
3		5350.000	46.45	9.08	55.53	68.30	-12.77	peak	
4		5350.000	34.73	9.08	43.81	54.00	-10.19	AVG	

EUT :	Hy-Fi Powerline Adapter	Model Name. :	AX821
Temperature :	26 °C	Relative Humidity :	56%
Pressure :	1010hPa	Test Date :	2014-07-15
Test Mode :	TX 802.11n(HT20) 5240MHz	Polarization :	Vertical
Test Power :	AC 120V/60 Hz		

No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1	*	5234.900	83.45	8.93	92.38	54.00	38.38	AVG	Fudamental Frequency
2	X	5235.650	94.32	8.93	103.25	68.30	34.95	peak	Fudamental Frequency
3		5350.000	46.31	9.08	55.39	68.30	-12.91	peak	
4		5350.000	34.62	9.08	43.70	54.00	-10.30	AVG	



EUT :	Hy-Fi Powerline Adapter	Model Name. :	AX821
Temperature :	26 °C	Relative Humidity :	56%
Pressure :	1010hPa	Test Date :	2014-07-15
Test Mode :	TX 802.11n(HT20) 5240MHz	Polarization :	Horizontal
Test Power :	AC 120V/60 Hz		

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		10485.20	39.65	8.90	48.55	68.30	-19.75	peak	
2	*	10485.20	32.03	8.90	40.93	54.00	-13.07	AVG	

EUT :	Hy-Fi Powerline Adapter	Model Name. :	AX821
Temperature :	26 °C	Relative Humidity :	56%
Pressure :	1010hPa	Test Date :	2014-07-15
Test Mode :	TX 802.11n(HT20) 5240MHz	Polarization :	Vertical
Test Power :	AC 120V/60 Hz		

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		10485.20	39.05	11.31	50.36	68.30	-17.94	peak	
2	*	10485.20	32.70	11.31	44.01	54.00	-9.99	AVG	



EUT :	Hy-Fi Powerline Adapter	Model Name. :	AX821
Temperature :	26 °C	Relative Humidity :	56%
Pressure :	1010hPa	Test Date :	2014-07-15
Test Mode :	TX 802.11n(HT40) 5190MHz	Polarization :	Horizontal
Test Power :	AC 120V/60 Hz		

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		5150.000	51.86	8.69	60.55	68.30	-7.75	peak	
2		5150.000	38.31	8.69	47.00	54.00	-7.00	AVG	
3	*	5197.000	83.47	8.83	92.30	54.00	38.30	AVG	Fudamental Frequency
4	X	5197.400	94.16	8.83	102.99	68.30	34.69	peak	Fudamental Frequency

EUT :	Hy-Fi Powerline Adapter	Model Name. :	AX821
Temperature :	26 °C	Relative Humidity :	56%
Pressure :	1010hPa	Test Date :	2014-07-15
Test Mode :	TX 802.11n(HT40) 5190MHz	Polarization :	Vertical
Test Power :	AC 120V/60 Hz		

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		5150.000	53.61	8.69	62.30	68.30	-6.00	peak	
2		5150.000	38.10	8.69	46.79	54.00	-7.21	AVG	
3	*	5186.400	81.16	8.80	89.96	54.00	35.96	AVG	Fudamental Frequency
4	X	5202.800	91.84	8.84	100.68	68.30	32.38	peak	Fudamental Frequency



EUT :	Hy-Fi Powerline Adapter	Model Name. :	AX821
Temperature :	26 °C	Relative Humidity :	56%
Pressure :	1010hPa	Test Date :	2014-07-15
Test Mode :	TX 802.11n(HT40) 5190MHz	Polarization :	Horizontal
Test Power :	AC 120V/60 Hz		

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		10382.10	37.44	8.86	46.30	68.30	-22.00	peak	
2	*	10382.10	30.01	8.86	38.87	54.00	-15.13	AVG	

EUT :	Hy-Fi Powerline Adapter	Model Name. :	AX821
Temperature :	26 °C	Relative Humidity :	56%
Pressure :	1010hPa	Test Date :	2014-07-15
Test Mode :	TX 802.11n(HT40) 5190MHz	Polarization :	Vertical
Test Power :	AC 120V/60 Hz		

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		10382.10	36.56	11.26	47.82	68.30	-20.48	peak	
2	*	10382.10	28.90	11.26	40.16	54.00	-13.84	AVG	



EUT :	Hy-Fi Powerline Adapter	Model Name. :	AX821
Temperature :	26 °C	Relative Humidity :	56%
Pressure :	1010hPa	Test Date :	2014-07-15
Test Mode :	TX 802.11n(HT40) 5230MHz	Polarization :	Horizontal
Test Power :	AC 120V/60 Hz		

No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1	*	5235.400	82.17	8.93	91.10	54.00	37.10	AVG	Fudamental Frequency
2	X	5237.000	93.00	8.93	101.93	68.30	33.63	peak	Fudamental Frequency
3		5350.000	46.73	9.08	55.81	68.30	-12.49	peak	
4		5350.000	34.76	9.08	43.84	54.00	-10.16	AVG	

EUT :	Hy-Fi Powerline Adapter	Model Name. :	AX821
Temperature :	26 °C	Relative Humidity :	56%
Pressure :	1010hPa	Test Date :	2014-07-15
Test Mode :	TX 802.11n(HT40) 5230MHz	Polarization :	Vertical
Test Power :	AC 120V/60 Hz		

No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1	X	5225.000	90.97	8.90	99.87	68.30	31.57	peak	Fudamental Frequency
2	*	5226.600	80.21	8.90	89.11	54.00	35.11	AVG	Fudamental Frequency
3		5350.000	46.94	9.08	56.02	68.30	-12.28	peak	
4		5350.000	34.62	9.08	43.70	54.00	-10.30	AVG	



EUT :	Hy-Fi Powerline Adapter	Model Name. :	AX821
Temperature :	26 °C	Relative Humidity :	56%
Pressure :	1010hPa	Test Date :	2014-07-15
Test Mode :	TX 802.11n(HT40) 5230MHz	Polarization :	Horizontal
Test Power :	AC 120V/60 Hz		

No. Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
	MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1	10465.30	37.49	8.89	46.38	68.30	-21.92	peak	
2 *	10465.30	29.90	8.89	38.79	54.00	-15.21	AVG	

EUT :	Hy-Fi Powerline Adapter	Model Name. :	AX821
Temperature :	26 °C	Relative Humidity :	56%
Pressure :	1010hPa	Test Date :	2014-07-15
Test Mode :	TX 802.11n(HT40) 5230MHz	Polarization :	Vertical
Test Power :	AC 120V/60 Hz		

No. Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
	MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1	10465.10	36.37	11.30	47.67	68.30	-20.63	peak	
2 *	10465.30	28.85	11.30	40.15	54.00	-13.85	AVG	



5. 26 DB BANDWIDTH AND 99% OCCUPIED BANDWIDTH MEASUREMENT

5.1 LIMITS

FCC Part 15, Subpart E	
26dB Bandwidth	N/A
99% Occupied Bandwidth	N/A

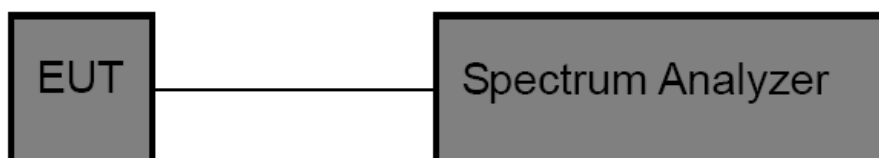
5.2 TEST PROCEDURE

The EUT was directly connected to the power meter and antenna output port as show in the block diagram as bellow.

Testing as below setting:

26dB Bandwidth Test	
Spectrum Parameters	Setting
Attenuation	Auto
Span	>26 dB Bandwidth
RBW	Approximately 1% of the emission bandwidth
VBW	VBW>RBW
Detector	Peak
Trace	Max Hold
Sweep Time	Auto
99% Occupied Bandwidth Test	
Spectrum Parameters	Setting
Attenuation	Auto
RBW	1% to 5% of the OBW
VBW	$\geq 3\text{RBW}$
Detector	Peak
Trace	Max Hold

5.3 TEST SETUP



5.4 TEST INSTRUMENTS

Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until	Calibration period
Spectrum Analyzer	R&S	FSP40	100154	Jul. 06, 2014	Jul. 05. 2015	1 year



5.5 EUT OPERATING CONDITIONS

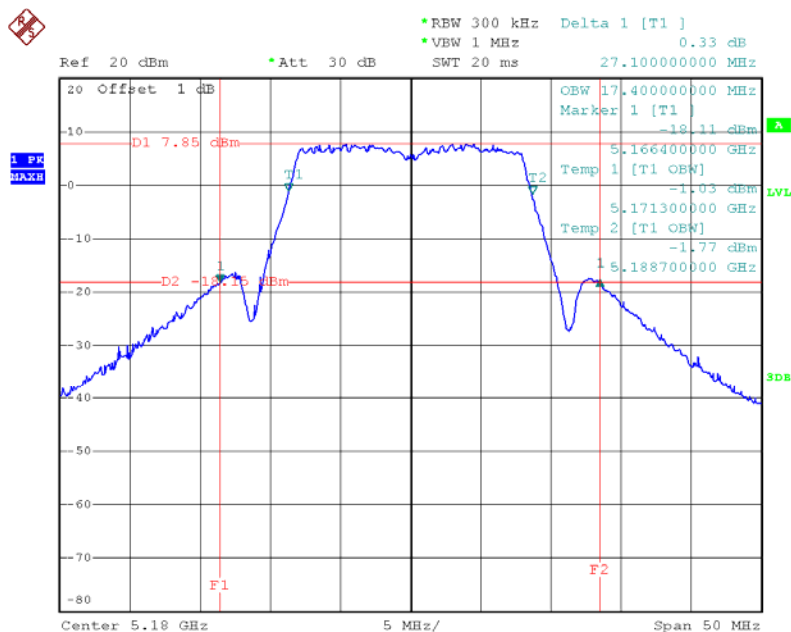
The EUT was set to continuously transmitting in the maximum power during the test.

5.6 TEST RESULTS



802.11a Mode			
Channel	Frequency	26 dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)
36	5180 MHz	27.10	17.40
40	5200 MHz	27.70	17.40
48	5240 MHz	27.40	17.40

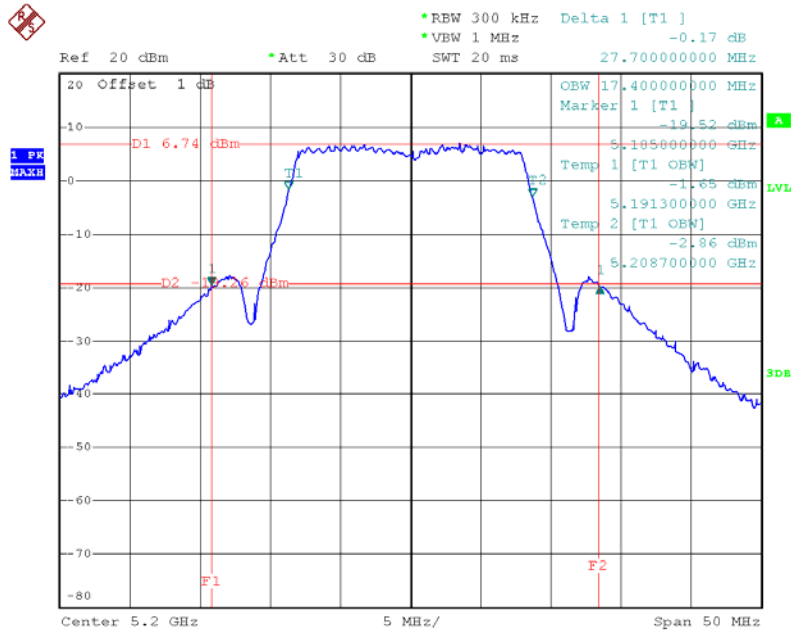
Note: The worst mode is the TX AN0, only showed the worst mode plots.

CH 36 5180MHz

Date: 26.JUL.2014 11:20:56

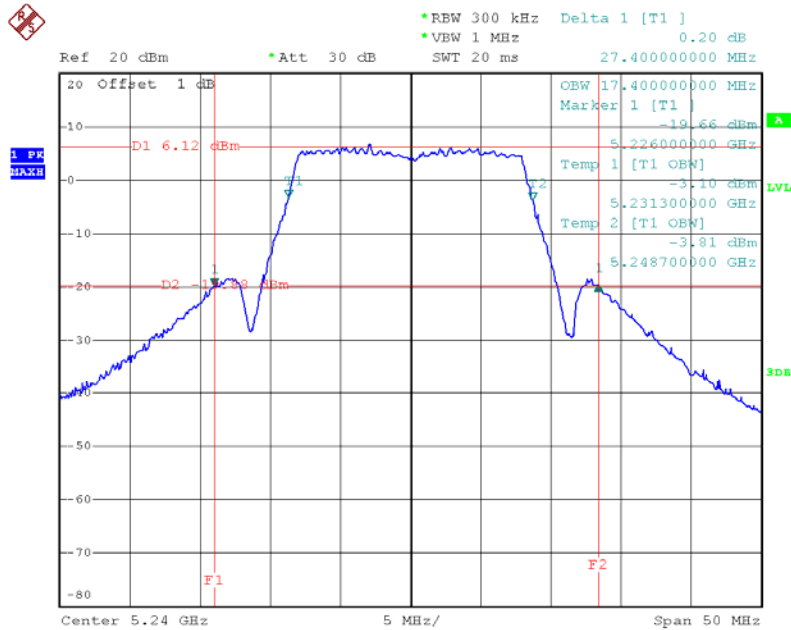


CH 40 5200MHz



Date: 26.JUL.2014 11:24:13

CH 48 5240MHz

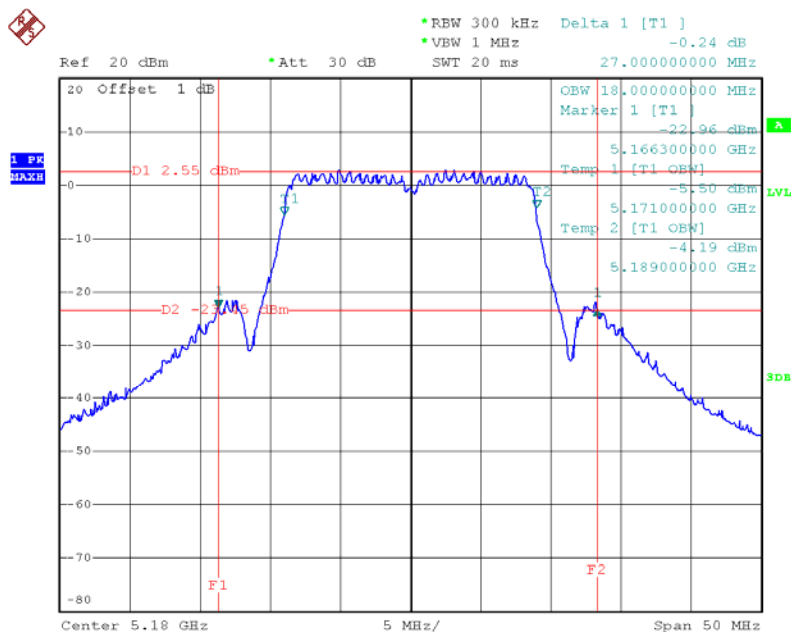


Date: 26.JUL.2014 11:24:59



802.11n(HT20) Mode			
Channel	Frequency	26 dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)
36	5180 MHz	27.00	18.00
40	5200 MHz	27.00	18.00
48	5240 MHz	26.70	18.10

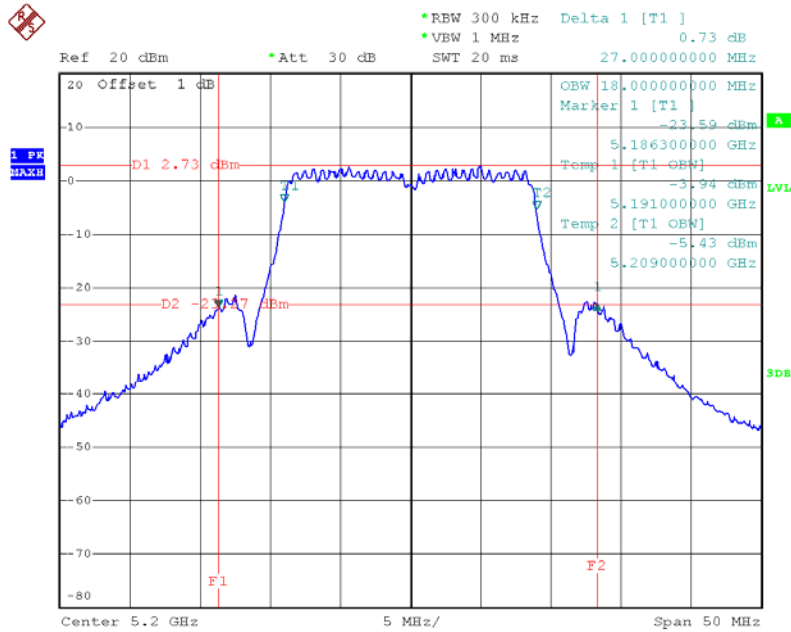
Note: The worst mode is the TX AN0, only showed the worst mode plots.

CH 36 5180MHz

Date: 26.JUL.2014 11:52:22

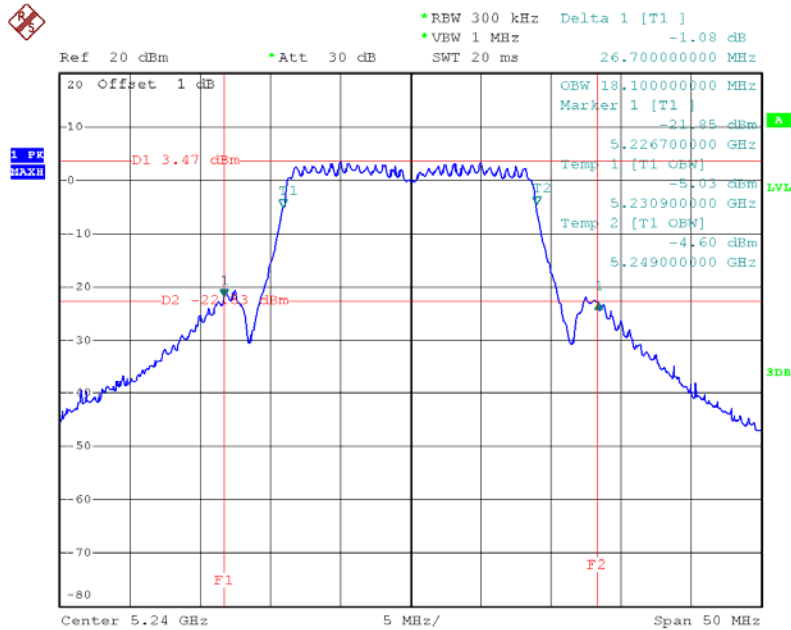


CH 40 5200MHz



Date: 26.JUL.2014 11:46:28

CH 48 5240MHz



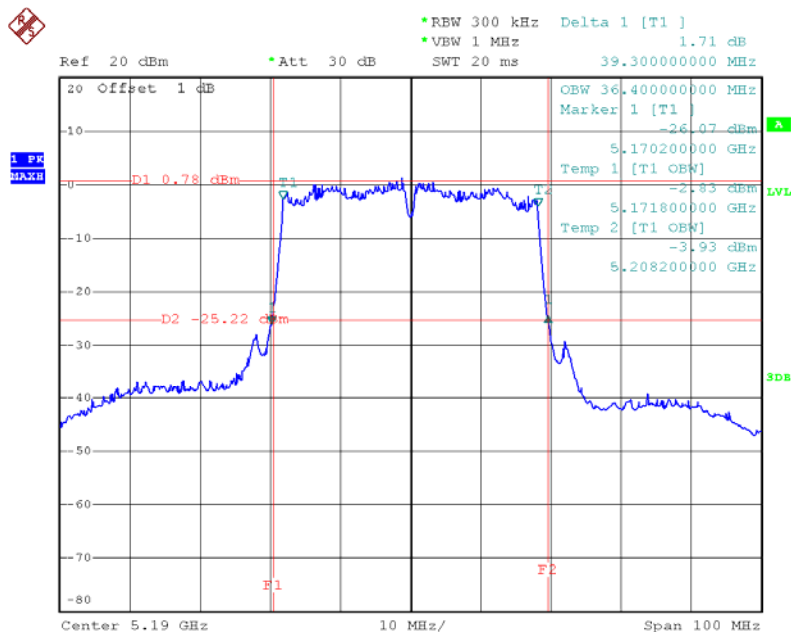
Date: 26.JUL.2014 11:40:32



802.11n(HT40) Mode			
Channel	Frequency	26 dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)
38	5190 MHz	39.30	36.40
46	5230 MHz	39.10	36.40

Note: The worst mode is the TX AN0, only showed the worst mode plots.

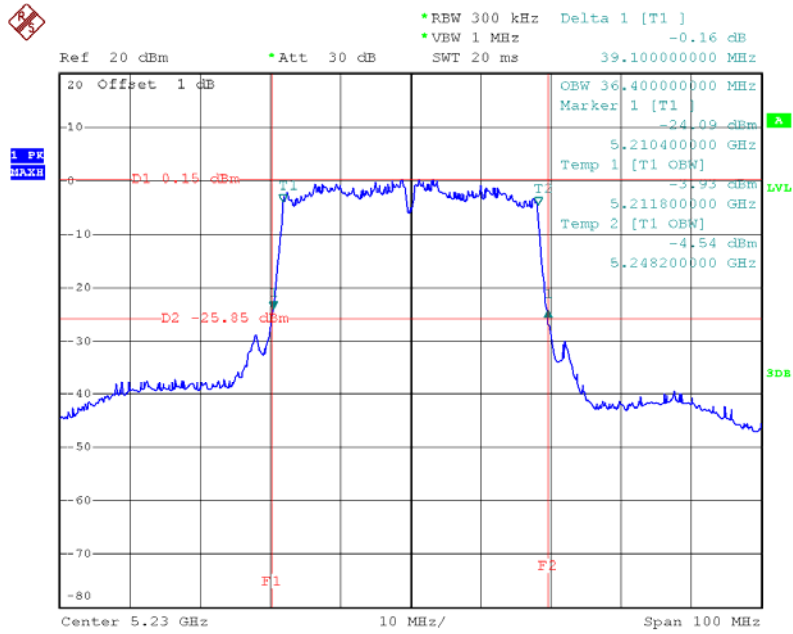
CH 38 5190MHz



Date: 26.JUL.2014 12:01:29



CH 46 5230MHz



Date: 26.JUL.2014 12:03:33



6. MAXIMUM CONDUCTED OUTPUT POWER MEASUREMENT

6.1 LIMITS

FCC Part 15, Subpart E	
Peak Output Power	For the band 5.15~5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed the lesser of 50 mW (17dBm) or 4 dBm+ 10logB, where B is the 26 dB Emissions bandwidth in MHz. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the peak power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

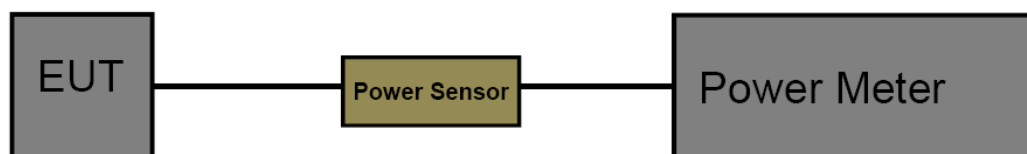
6.2 TEST PROCEDURE

The measurement is according to section 9.1.2 of KDB 789033 D01 v01r04 for Compliance Testing of Unlicensed National Information Infrastructure (U-NII) Devices.

Spectrum Parameters	Setting
Attenuation	Auto
Span	Encompass the entire emissions bandwidth (EBW) of the signal
RBW	=1 MHz
VBW	≥3 MHz
Detector	RMS
Trace	Max Hold
Sweep Time	Auto

The EUT was directly connected to the power meter and antenna output port as show in the block diagram as below.

6.3 TEST SETUP



6.4 TEST INSTRUMENTS

Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until	Calibration period
Power Meter	Anritsu	ML2495A	0917201	Jul. 06, 2014	Jul. 05. 2015	1 year
Power Sensor	Anritsu	MA2411B	1035004	Jul. 06, 2014	Jul. 05. 2015	1 year



6.5 EUT OPERATING CONDITIONS

The EUT was set to continuously transmitting in the maximum power during the test.

6.6 TEST RESULTS

Band 1 Conducted Power					
802.11a Power					
Channel	Frequency	Conducted Power (dBm)			Max. Limit (dBm)
		Ant. 0	Ant. 1	Total	
36	5180 MHz	14.56			17
40	5200 MHz	14.62			
48	5240 MHz	14.71			
802.11n (HT20) Power					
Channel	Frequency	Conducted Power (dBm)			Max. Limit (dBm)
		Ant. 0	Ant. 1	Total	
36	5180 MHz	11.62	11.21	14.43	17
40	5200 MHz	11.71	11.36	14.55	
48	5240 MHz	11.75	11.47	14.62	
802.11n (HT40) Power					
Channel	Frequency	Conducted Power (dBm)			Max. Limit (dBm)
		Ant. 0	Ant. 1	Total	
38	5190 MHz	11.12	10.24	13.71	17
46	5230 MHz	11.52	10.40	14.01	



7. POWER DENSITY

7.1 LIMITS

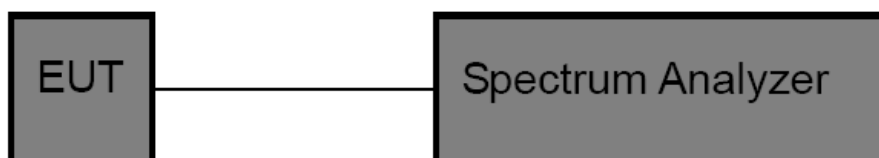
FCC Part 15, Subpart E	
Frequency Range (MHz)	5150~5250
Limit	4 dBm

7.2 TEST PROCEDURE

The EUT was directly connected to the power meter and antenna output port as show in the block diagram as bellow.

Spectrum Parameters	Setting
Attenuation	Auto
Span	Encompass the entire emissions bandwidth (EBW) of the signal
RBW	=1 MHz
VBW	≥3 MHz
Detector	RMS
Trace	Max Hold
Sweep Time	Auto

7.3 TEST SETUP



7.4 TEST INSTRUMENTS

Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until	Calibration period
Spectrum Analyzer	R&S	FSP40	100154	Jul. 06, 2014	Jul. 05. 2015	1 year

7.5 EUT OPERATING CONDITIONS

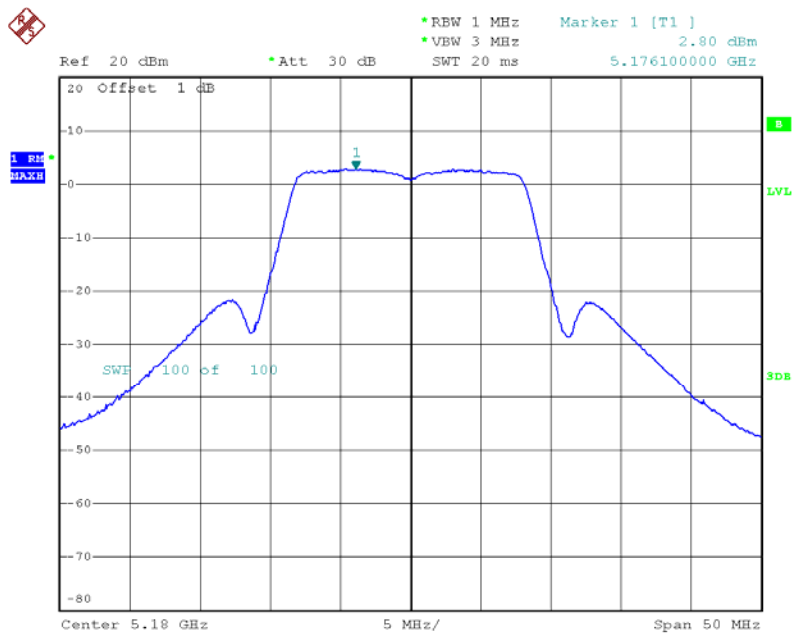
The EUT was set to continuously transmitting in the maximum power during the test.

7.6 TEST RESULTS



802.11a Power Density					
Channel	Frequency	Conducted Power (dBm)			Max. Limit (dBm)
		Ant. 0	Ant. 1	Total	
36	5180 MHz	2.80			4.0
40	5200 MHz	2.87			
48	5240 MHz	2.14			

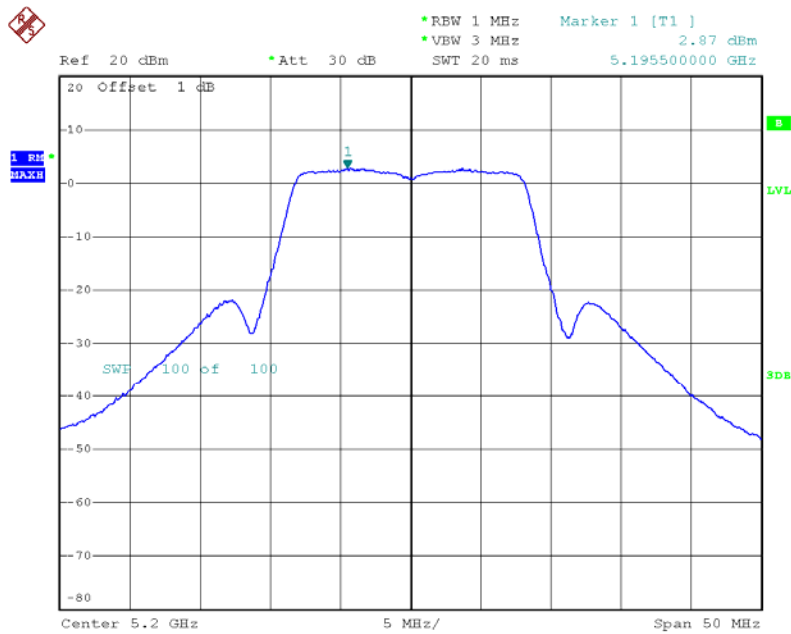
CH 36 5180 MHz



Date: 26.JUL.2014 11:59:01

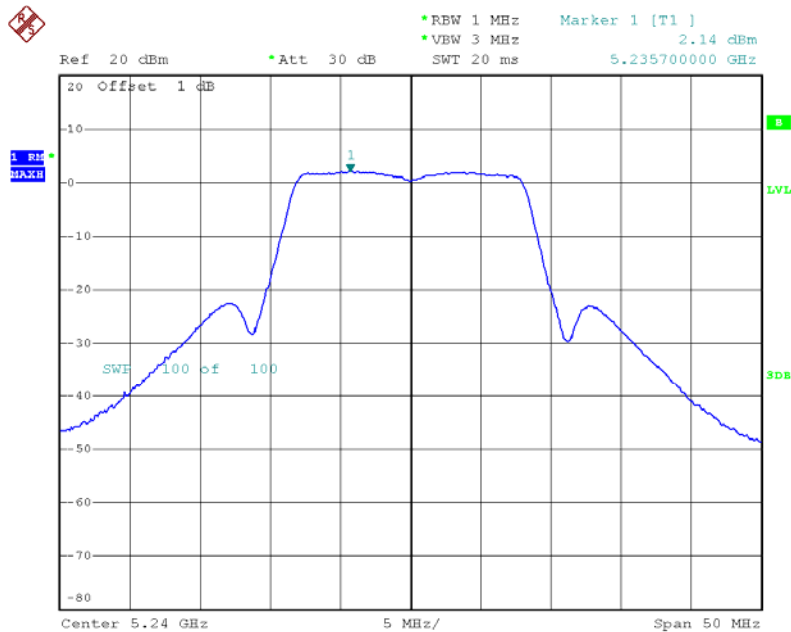


CH 40 5200 MHz



Date: 26.JUL.2014 11:58:45

CH 48 5240 MHz

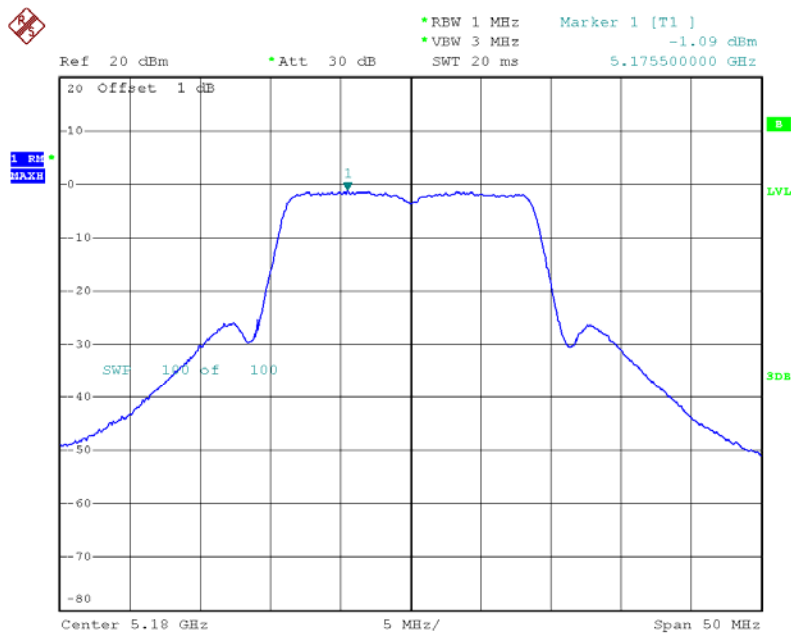


Date: 26.JUL.2014 11:58:31

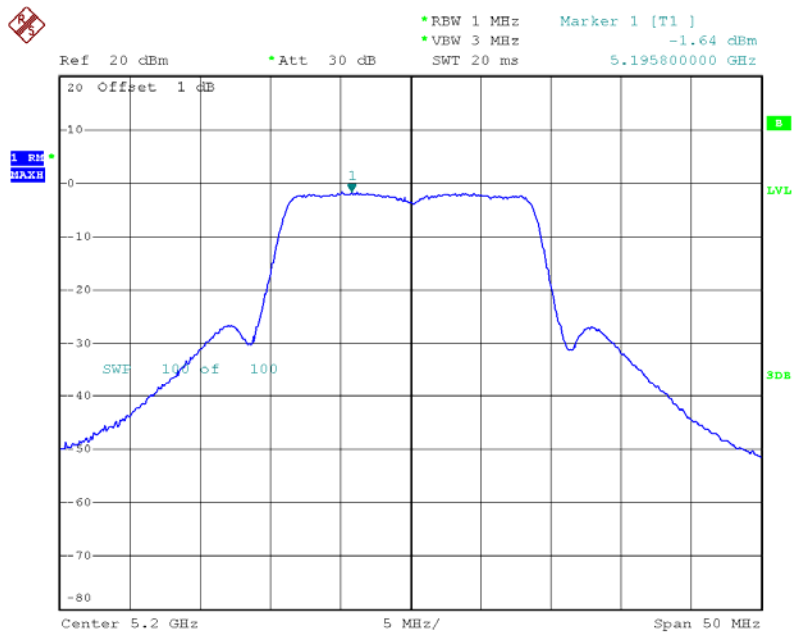


802.11n(HT20) Power Density					
Channel	Frequency	Conducted Power (dBm)			Max. Limit (dBm)
		Ant. 0	Ant. 1	Total	
36	5180 MHz	-1.09	-1.40	1.77	4.0
40	5200 MHz	-1.64	-1.74	1.32	
48	5240 MHz	-1.41	-1.43	1.59	

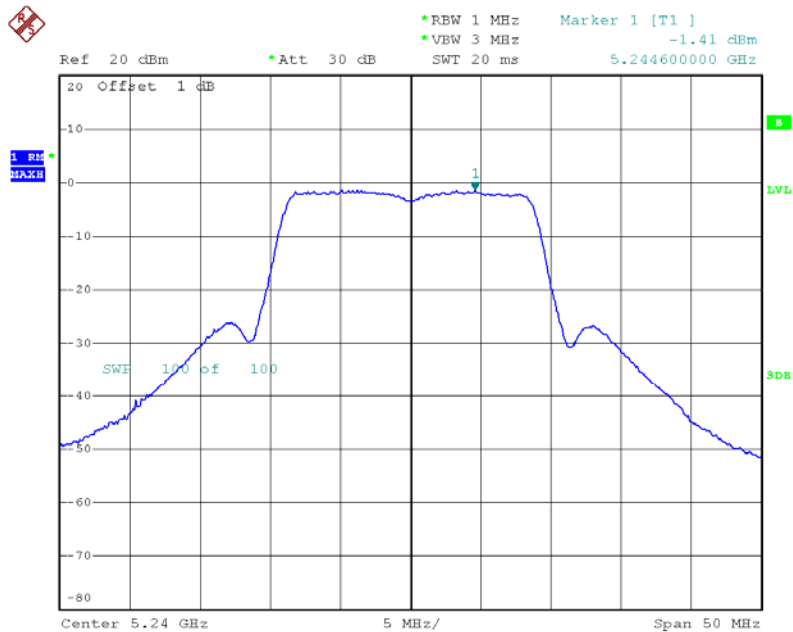
CH 36 5180 MHz-ANT 0



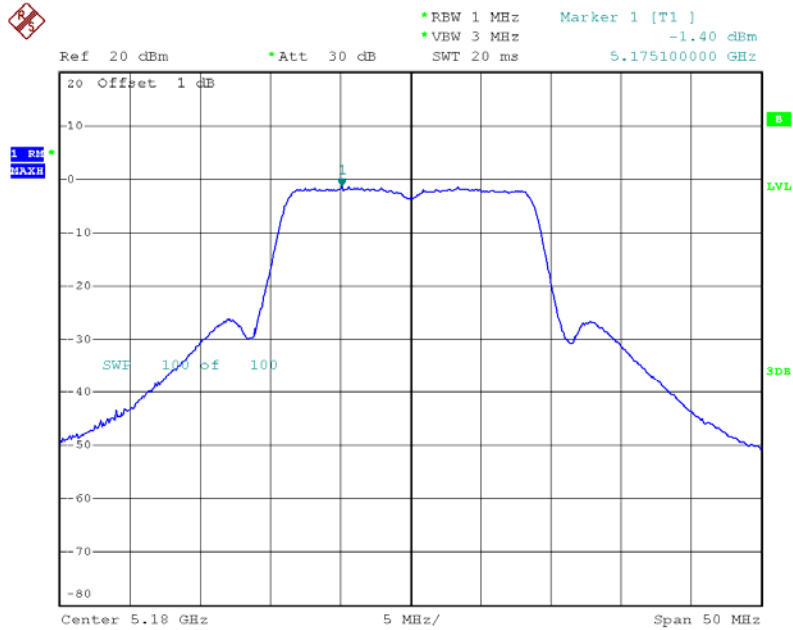
Date: 26.JUL.2014 11:50:59

**CH 40 5200 MHz-ANT 0**

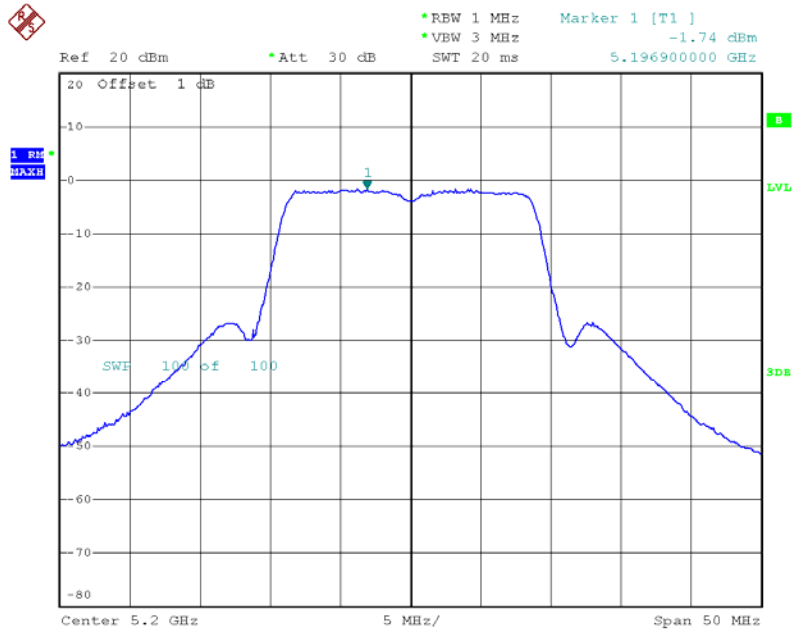
Date: 26.JUL.2014 11:48:13

CH 48 5240 MHz-ANT 0

Date: 26.JUL.2014 11:49:25

**CH 36 5180 MHz-ANT 1**

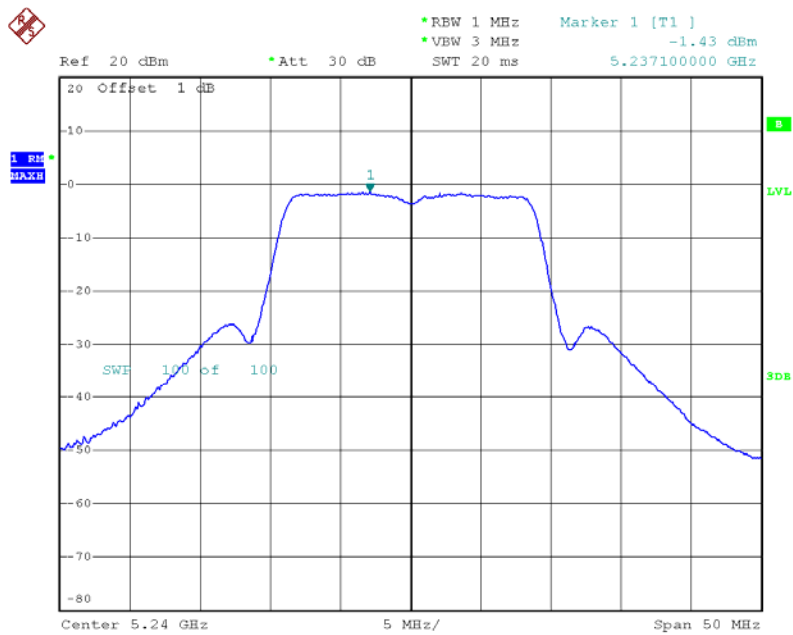
Date: 26.JUL.2014 11:50:52

CH 40 5200 MHz-ANT 1

Date: 26.JUL.2014 11:48:20



CH 48 5240 MHz-ANT 1

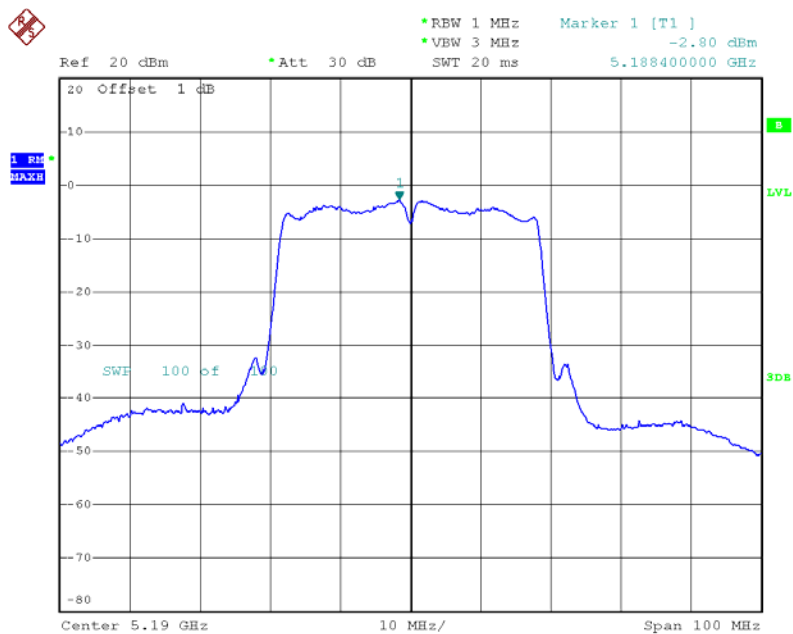


Date: 26.JUL.2014 11:49:17

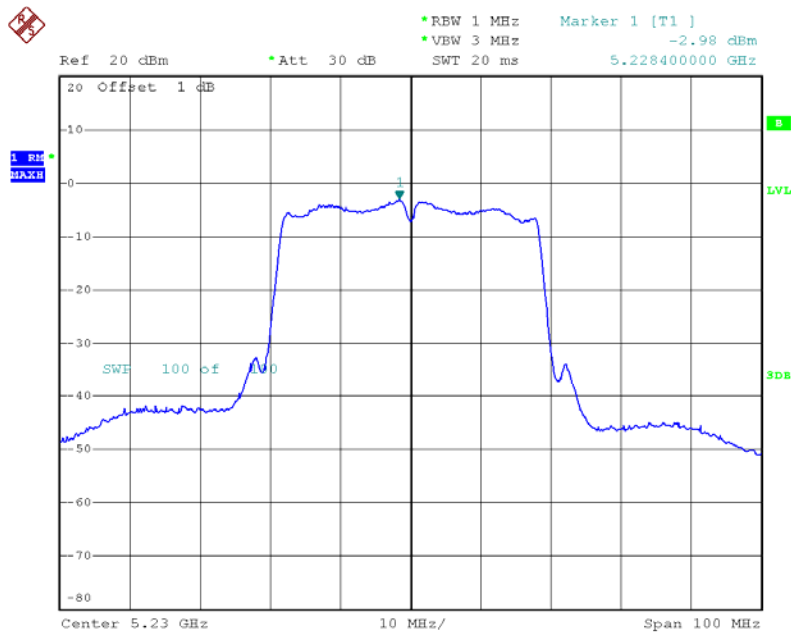


802.11n(HT40) Power Density					
Channel	Frequency	Conducted Power (dBm)			Max. Limit (dBm)
		Ant. 0	Ant. 1	Total	
38	5190 MHz	-2.80	-2.95	0.14	4.0
46	5230 MHz	-2.98	-3.25	-0.11	

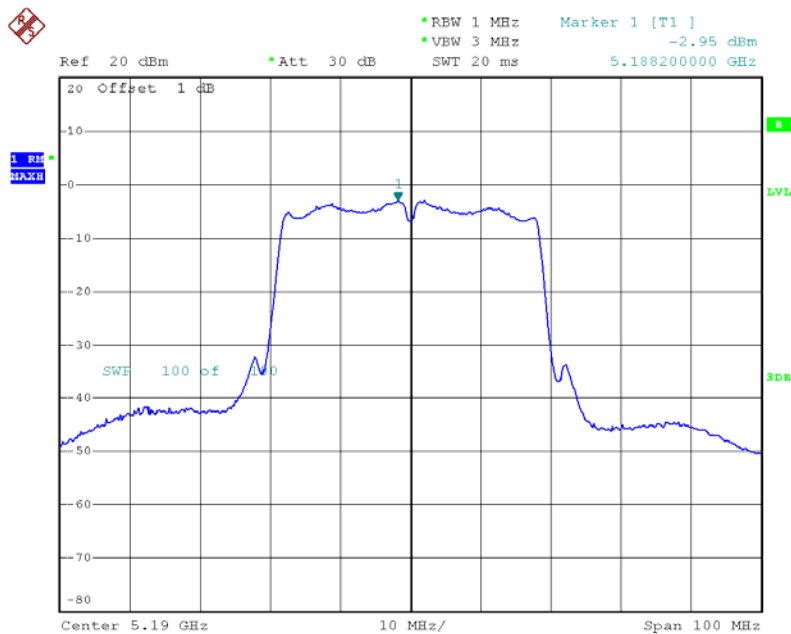
CH 38 5190 MHz-ANT 0



Date: 26.JUL.2014 12:00:24

**CH 46 5230 MHz-ANT 0**

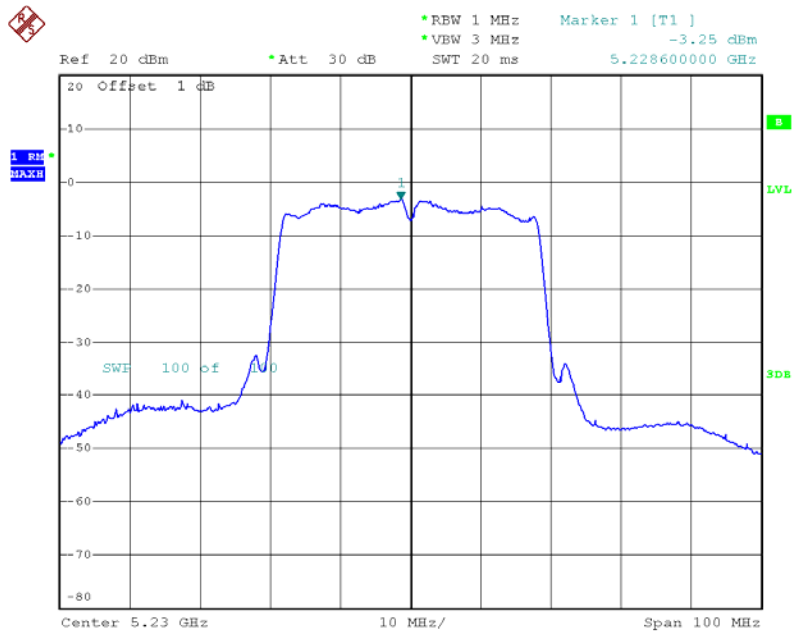
Date: 26.JUL.2014 12:04:53

CH 38 5190 MHz-ANT 1

Date: 26.JUL.2014 12:00:33



CH 46 5230 MHz-ANT 1



Date: 26.JUL.2014 12:04:46



8. ANTENNA CONDUCTED SPURIOUS EMISSION

8.1 LIMITS

FCC Part 15, Subpart E	
Frequency Range (MHz)	5150~5250
Limit	-27 dBm/1MHz

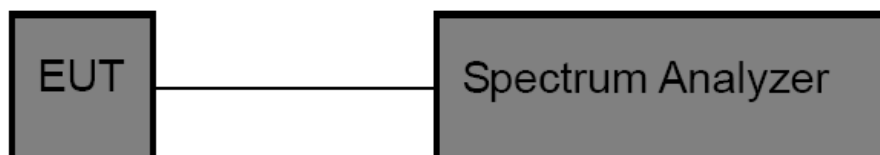
8.2 TEST PROCEDURE

The EUT was directly connected to the power meter and antenna output port as show in the block diagram as below.

Spectrum Parameters	Setting
Attenuation	Auto
RBW	=1 MHz
VBW	=1 MHz
Trace	Max Hold
Sweep Time	Auto

8.3 TEST SETUP

Conducted Emission Test Setup



8.4 TEST INSTRUMENTS

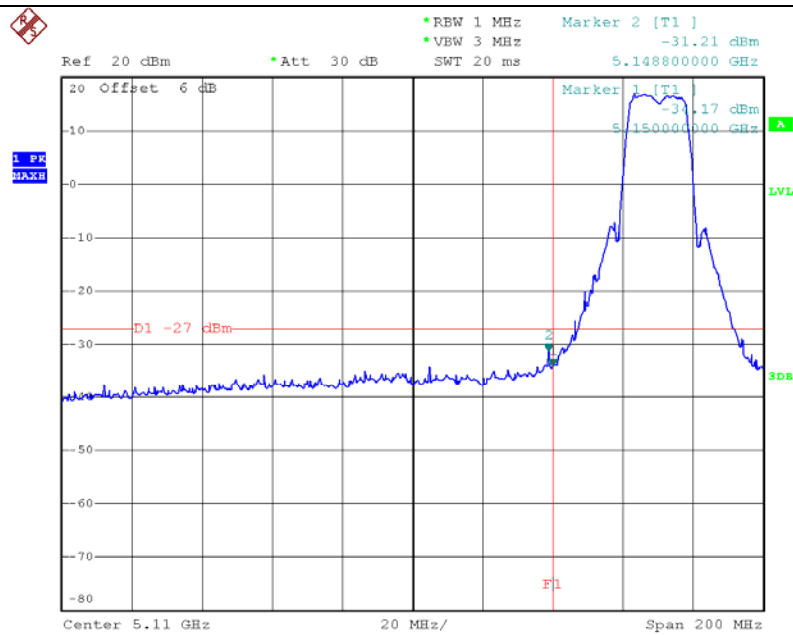
Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until	Calibration period
Spectrum Analyzer	R&S	FSP40	100154	Jul. 06, 2014	Jul. 05. 2015	1 year

8.5 EUT OPERATING CONDITIONS

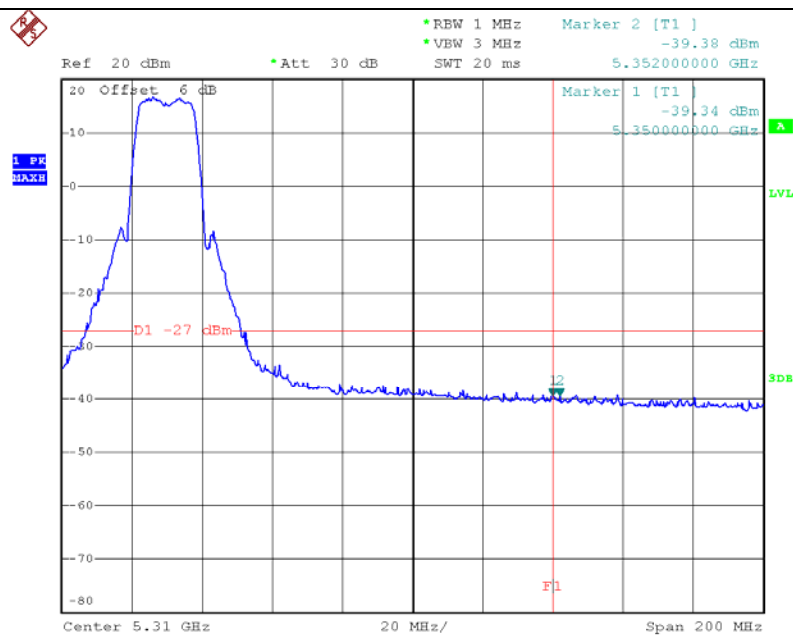
The EUT was set to continuously transmitting in the maximum power during the test.

8.6 TEST RESULTS

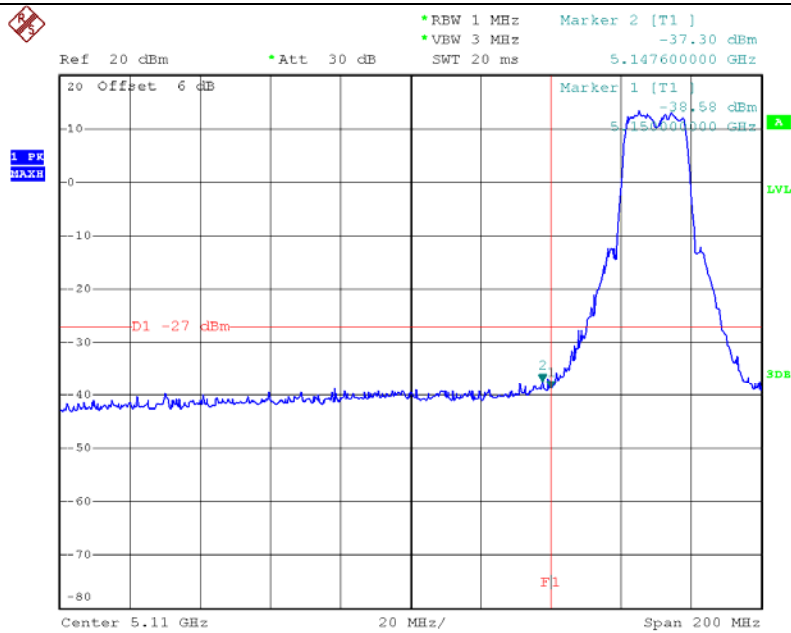
Only showed the worst mode of ANT 0 transmitting.

**A Mode CH 36**

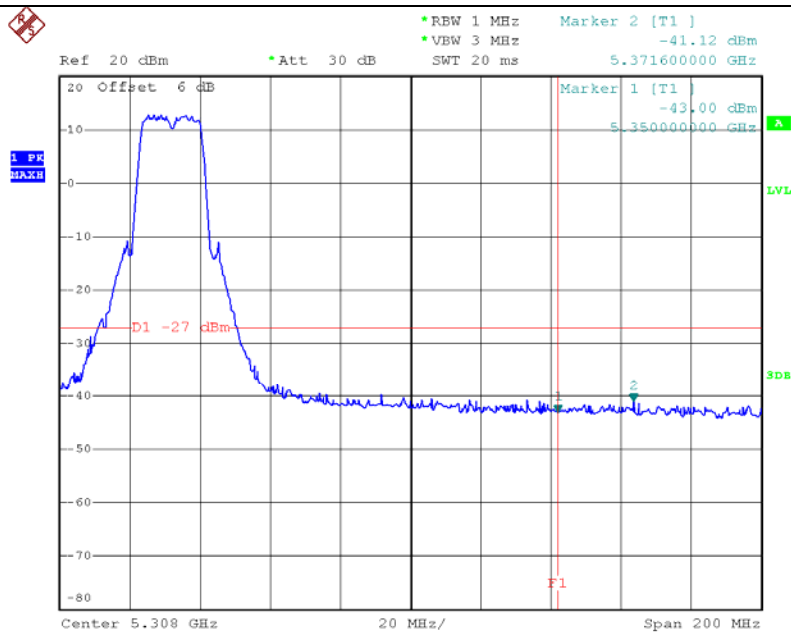
Date: 26.JUL.2014 11:35:29

A Mode CH 48

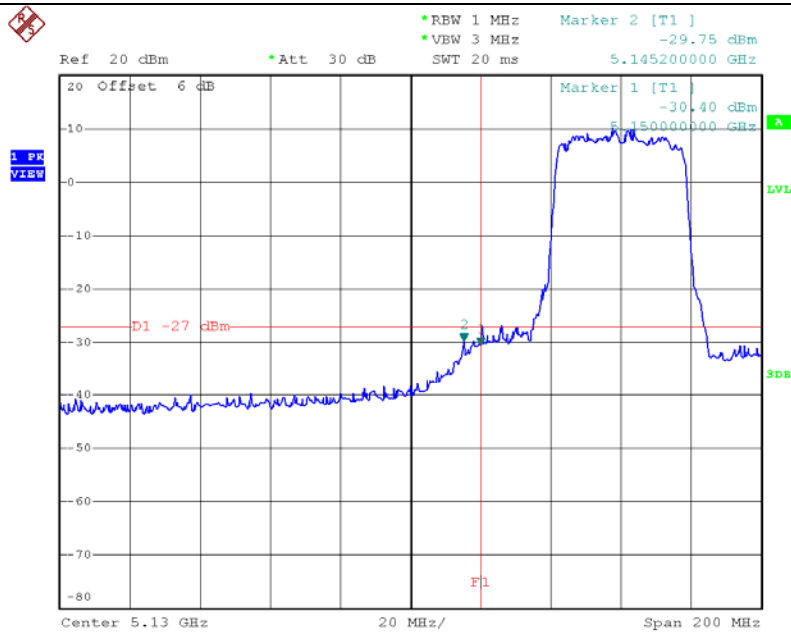
Date: 26.JUL.2014 11:34:15

**N(20) Mode CH 36**

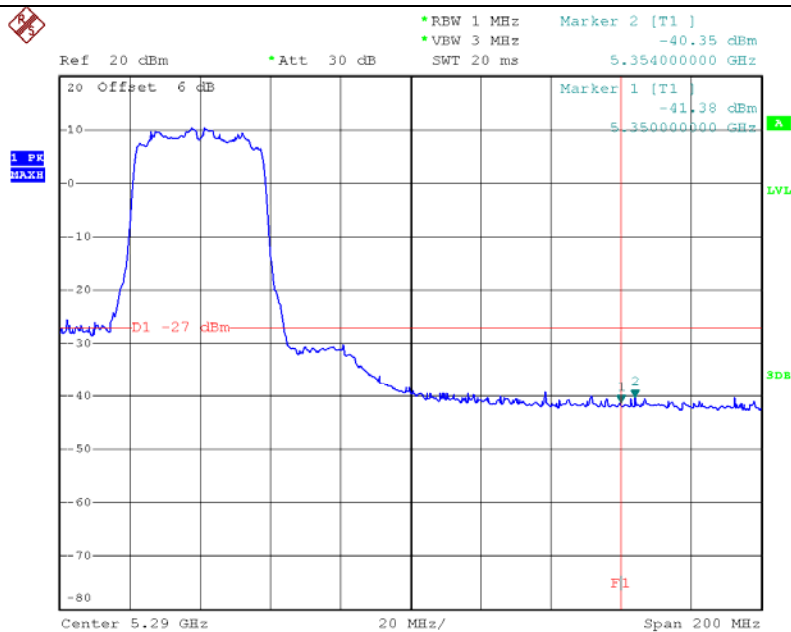
Date: 26.JUL.2014 11:36:42

N(20) Mode CH 48

Date: 26.JUL.2014 11:38:33

**N(40) Mode CH 38**

Date: 26.JUL.2014 12:17:52

N(20) Mode CH 46

Date: 26.JUL.2014 12:16:51



9. PEAK EXCURSION MEASUREMENT

9.1 LIMITS

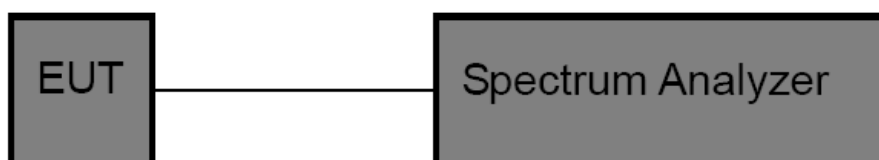
FCC Part 15, Subpart E	
Frequency Range (MHz)	5150~5250
Limits	13 dB

9.2 TEST PROCEDURE

The EUT was directly connected to the power meter and antenna output port as show in the block diagram as bellow.

Spectrum Parameters	Setting
Attenuation	Auto
Span	Encompass the entire emissions bandwidth (EBW) of the signal
RBW	1MHz (Peak Trace)/ 1MHz (Average Trace)
VBW	3MHz (Peak Trace)/ 3MHz (Average Trace)
Trace	Max Hold
Sweep Time	60s
Note: Peak Trace: Set RBW=1 MHz, VBW=3MHz with peak detector and maxhold settings. Average Trace: Set RBW= 1 MHz, VBW= 3 MHz with RMS detector and trace average across 100 traces in power averaging mode.	

9.3 TEST SETUP



9.4 TEST INSTRUMENTS

Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until	Calibration period
Spectrum Analyzer	R&S	FSP40	100154	Jul. 06, 2014	Jul. 05. 2015	1 year

9.5 EUT OPERATING CONDITIONS

The EUT was set to continuously transmitting in the maximum power during the test.

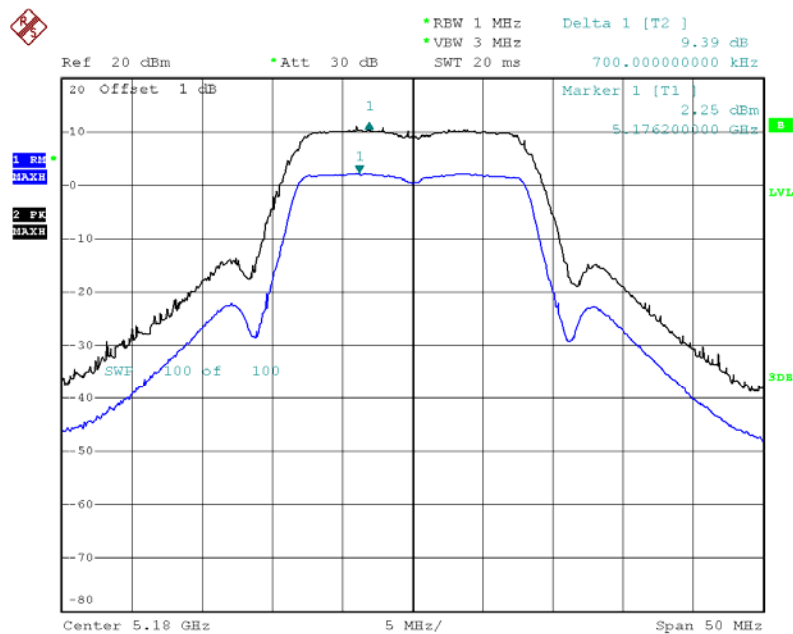
9.6 TEST RESULTS

Only showed the worst mode data of Ant 0 transmitting.



801.11a Mode			
Channel	Frequency (MHz)	Peak Exclusion (dB)	Limit (dB)
36	5180	9.39	13
40	5200	8.52	
48	5240	8.55	
Note: The worst mode is ANT 0			

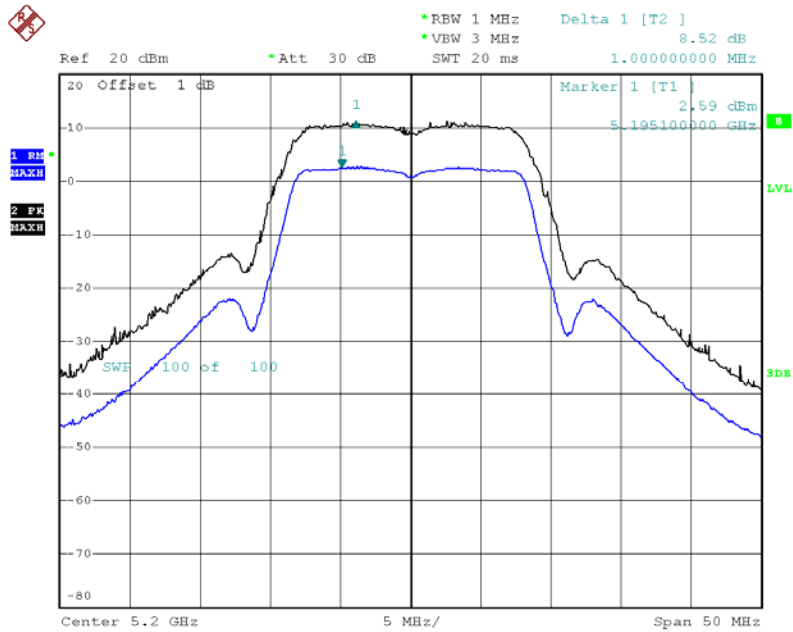
CH 36 5180



Date: 26.JUL.2014 11:57:42

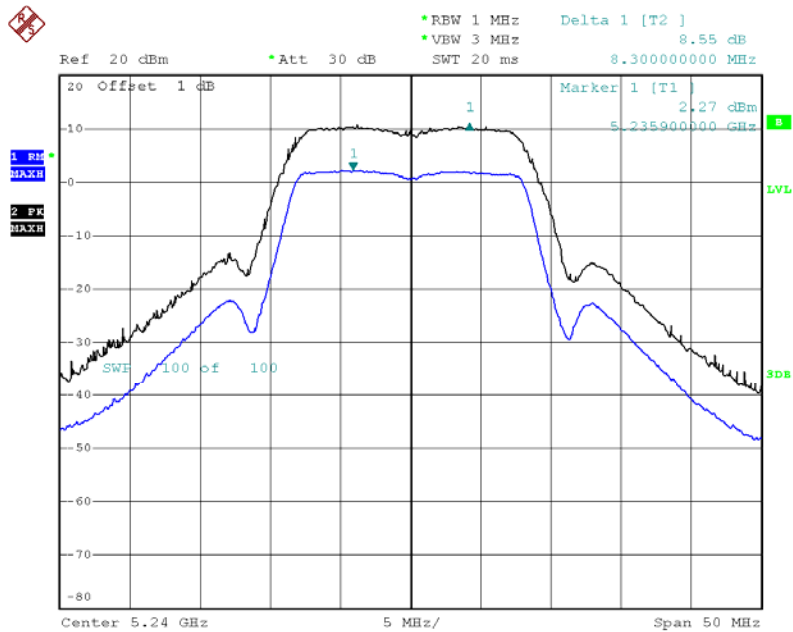


CH 40 5200



Date: 26.JUL.2014 11:58:04

CH 48 5240

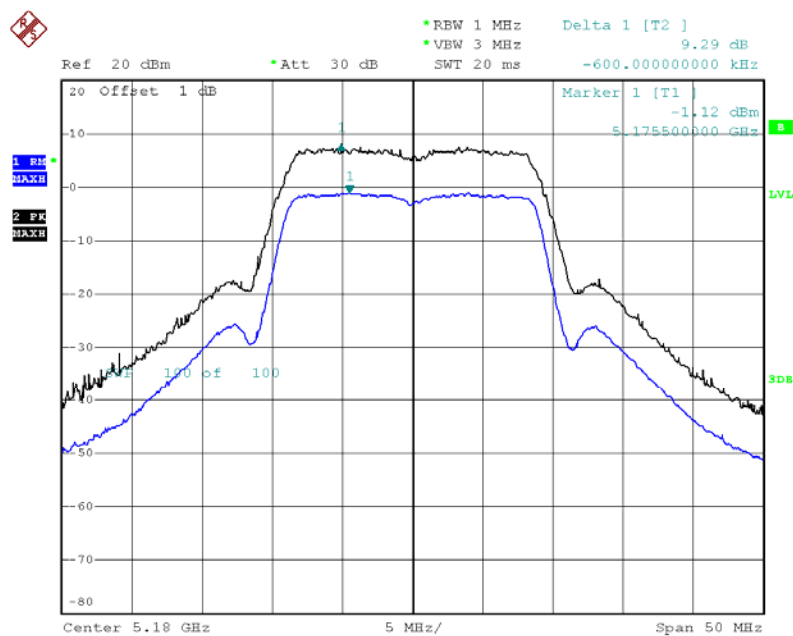


Date: 26.JUL.2014 11:58:19

801.11n(HT20) Mode			
Channel	Frequency (MHz)	Peak Exclusion (dB)	Limit (dB)
36	5180	9.29	13
40	5200	8.89	
48	5240	9.11	

Note: The worst mode is ANT 0

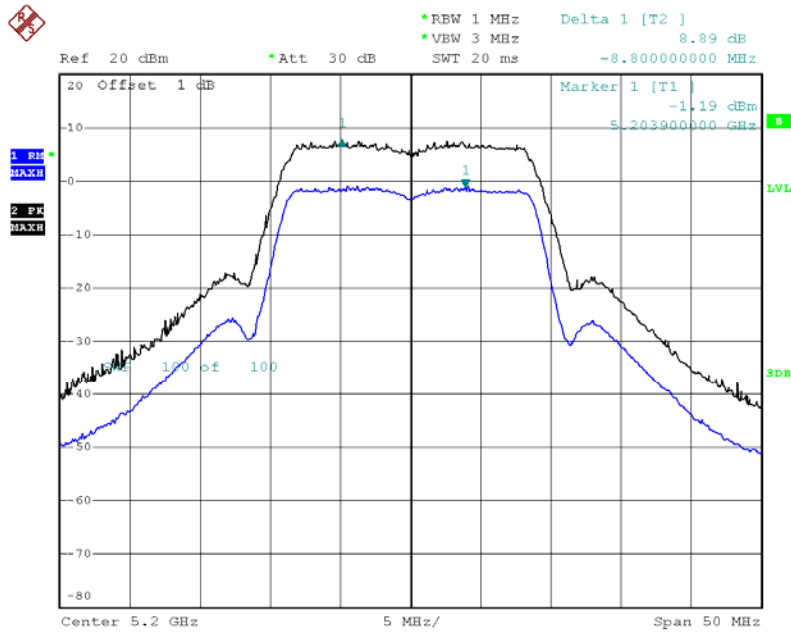
CH 36 5180



Date: 26.JUL.2014 11:53:11

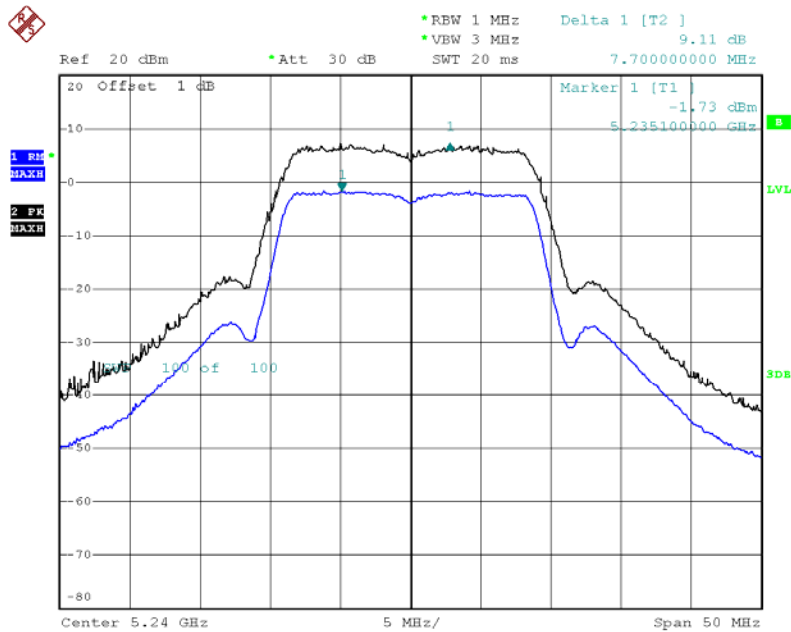


CH 40 5200



Date: 26.JUL.2014 11:53:43

CH 48 5240

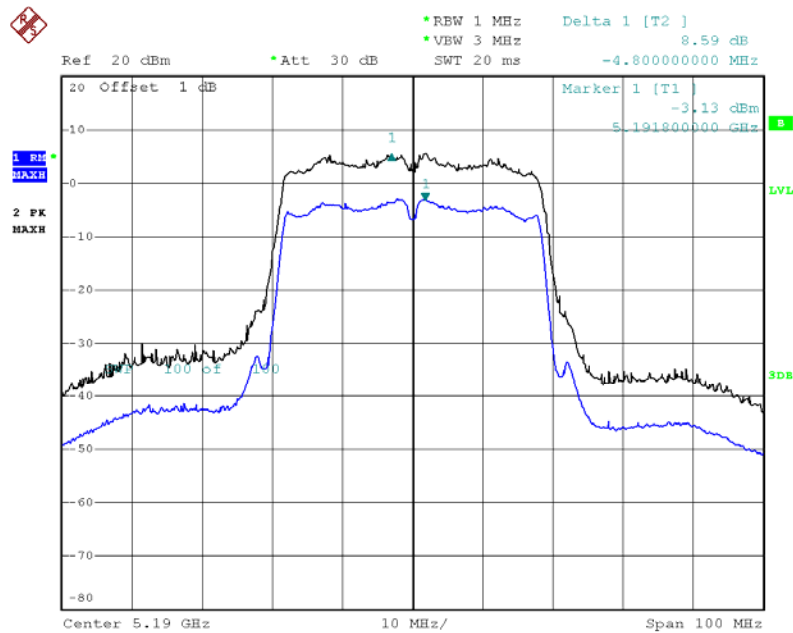


Date: 26.JUL.2014 11:54:27



801.11n(HT40) Mode			
Channel	Frequency (MHz)	Peak Exclusion (dB)	Limit (dB)
38	5190	8.59	13
46	5230	8.42	
Note: The worst mode is ANT 0			

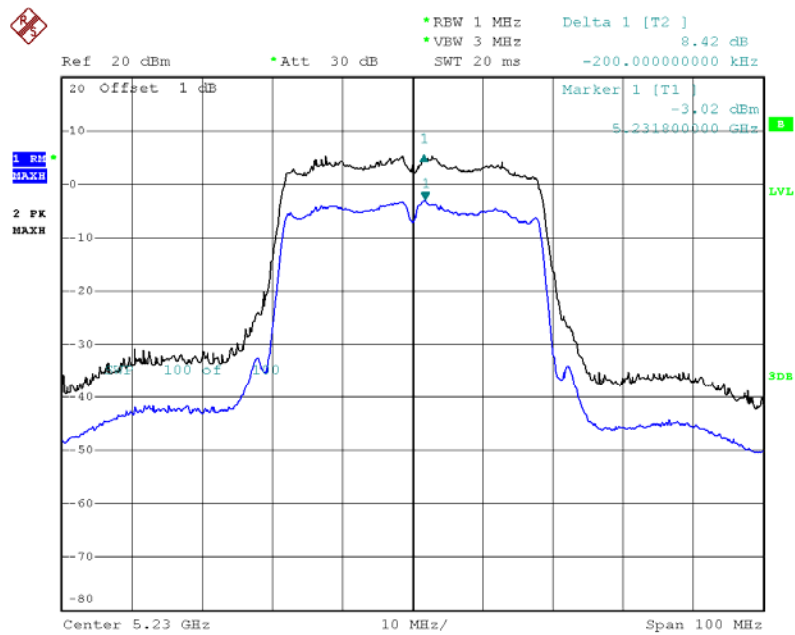
CH 36 5190



Date: 26.JUL.2014 12:18:29



CH 40 5230



Date: 26.JUL.2014 12:15:05



10. FREQUENCY STABILITY MEASUREMENT

10.1 LIMITS

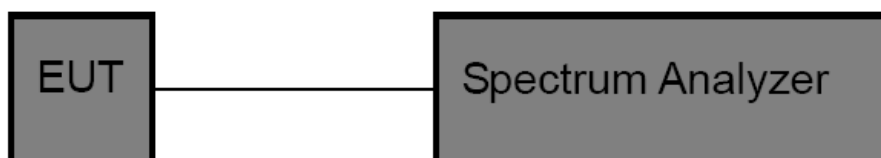
FCC Part 15, Subpart E	
Frequency Range (MHz)	5150~5250
Limits	Specified in the user's manual The transmitter center frequency tolerance shall be ± 20 ppm maximum for the 5 GHz band (IEEE 802.11n specification)

10.2 TEST PROCEDURE

The EUT was directly connected to the power meter and antenna output port as show in the block diagram as bellow.

Spectrum Parameters	Setting
Attenuation	Auto
Span	Encompass the entire emissions bandwidth (EBW) of the signal
RBW	10 kHz
VBW	10 kHz
Trace	Max Hold
Sweep Time	Auto
Note:	
(1) The test extreme voltage is to change the primary supply voltage from 85 to 115 percent of the nominal value.	
(2) Extreme temperature is 0°C~50°C	

10.3 TEST SETUP



10.4 TEST INSTRUMENTS

Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until	Calibration period
Spectrum Analyzer	R&S	FSP40	100154	Jul. 06, 2014	Jul. 05. 2015	1 year
Temp. & Humidity Chamber	ZHONG ZHI	CZ-A-225D	HW08053	Jul. 06, 2014	Jul. 05. 2015	1 year

10.5 EUT OPERATING CONDITIONS

The EUT was set to continuously transmitting in the maximum power during the test.

10.6 TEST RESULTS



801.11a Band 1: 5200 MHz	
Voltage vs. Frequency Stability	
Voltage (V)	Measurement Frequency (MHz)
132	5199.9941
120	5199.9962
118	5199.9978
Max. Deviation (MHz)	0.0059
Max. Deviation (ppm)	1.13
Temperature vs. Frequency Stability	
Temperature (°C)	Measurement Frequency (MHz)
0	5199.9947
10	5199.9961
20	5199.9964
30	5199.9975
40	5199.9979
50	5199.9981
Max. Deviation (MHz)	0.0053
Max. Deviation (ppm)	1.01



11. ANTENNA REQUIREMENT

11.1 REQUIREMENT

Antenna Requirement (15.203)	An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this Section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.
---------------------------------	---

11.2 ANTENNA CONNECTOR CONSTRUCTION

The EUT antenna is a PIFA Antenna. And the maximum gain of this antenna is 4 dBi.
It complies with the standard requirement.