



# SPORTON International Inc.

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## FCC RADIO TEST REPORT

Applicant's company	Linksys LLC
Applicant Address	131 Theory Drive, Irvine, CA 92617, USA
FCC ID	Q87-RE6500

Product Name	Linksys AC1200 MAX Wi-Fi Range Extender
Brand Name	Linksys
Model No.	RE6500
Test Rule Part(s)	47 CFR FCC Part 15 Subpart C § 15.247
Test Freq. Range	2400 ~ 2483.5MHz / 5725 ~ 5850MHz
Received Date	Feb. 18, 2014
Final Test Date	Apr. 10, 2014
Submission Type	Original Equipment

### Statement

**Test result included is only for the IEEE 802.11n, IEEE 802.11b/g part and IEEE 802.11a/ac (5725 ~ 5850MHz) of the product.**

The test result in this report refers exclusively to the presented test model / sample.

Without written approval of SPORTON International Inc., the test report shall not be reproduced except in full.

The measurements and test results shown in this test report were made in accordance with the procedures and found in compliance with the limit given in **ANSI C63.10-2009, 47 CFR FCC Part 15 Subpart C, KDB 558074 D01 v03r01, KDB 662911 D01 v02r01, KDB644545 D01v01r02.**

The test equipment used to perform the test is calibrated and traceable to NML/ROC.



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## 1. CERTIFICATE OF COMPLIANCE

Product Name : Linksys AC1200 MAX Wi-Fi Range Extender  
Brand Name : Linksys  
Model No. : RE6500  
Applicant : Linksys LLC  
Test Rule Part(s) : 47 CFR FCC Part 15 Subpart C § 15.247

Sporton International as requested by the applicant to evaluate the EMC performance of the product sample received on Feb. 18, 2014 would like to declare that the tested sample has been evaluated and found to be in compliance with the tested rule parts. The data recorded as well as the test configuration specified is true and accurate for showing the sample's EMC nature.

A handwritten signature in blue ink that reads 'Sam Chen'. The signature is written in a cursive style and is positioned above a horizontal line.

Sam Chen

SPORTON INTERNATIONAL INC.

## 2. SUMMARY OF THE TEST RESULT

Applied Standard: 47 CFR FCC Part 15 Subpart C				
Part	Rule Section	Description of Test	Result	Under Limit
4.1	15.207	AC Power Line Conducted Emissions	Complies	12.52 dB
4.2	15.247(b)(3)	Maximum Conducted Output Power	Complies	6.85 dB
4.3	15.247(e)	Power Spectral Density	Complies	12.02 dB
4.4	15.247(a)(2)	6dB Spectrum Bandwidth	Complies	-
4.5	15.247(d)	Radiated Emissions	Complies	4.55 dB
4.6	15.247(d)	Band Edge Emissions	Complies	1.09 dB
4.7	15.203	Antenna Requirements	Complies	-

### 3. GENERAL INFORMATION

#### 3.1. Product Details

##### IEEE 802.11n/ac

Items	Description
Product Type	WLAN (2TX, 2RX)
Radio Type	Intentional Transceiver
Power Type	From power adapter
Modulation	see the below table for IEEE 802.11n/ac
Data Modulation	For 802.11n: OFDM (BPSK / QPSK / 16QAM / 64QAM) For 802.11ac: OFDM (BPSK / QPSK / 16QAM / 64QAM / 256QAM)
Data Rate (Mbps)	see the below table for IEEE 802.11n/ac
Frequency Range	2400 ~ 2483.5MHz / 5725 ~ 5850MHz
Channel Number	<u>For 2.4GHz Band:</u> 11 for 20MHz bandwidth ; 7 for 40MHz bandwidth <u>For 5GHz Band:</u> 5 for 20MHz bandwidth ; 2 for 40MHz bandwidth ; 1 for 80MHz bandwidth
Channel Band Width (99%)	<u>For 2.4GHz Band:</u> MCS0 (HT20): 17.77 MHz ; MCS0 (HT40): 36.12 MHz <u>For 5GHz Band:</u> 802.11ac MCS0, Nss1 (VHT20): 30.62 MHz ; 802.11ac MCS0, Nss1 (VHT40): 63.10 MHz ; 802.11ac MCS0, Nss1 (VHT80): 75.02 MHz
Maximum Conducted Output Power	<u>For 2.4GHz Band:</u> MCS0 (HT20): 18.84 dBm ; MCS0 (HT40): 16.40 dBm <u>For 5GHz Band:</u> 802.11ac MCS0, Nss1 (VHT20): 23.08 dBm ; 802.11ac MCS0, Nss1 (VHT40): 22.92 dBm ; 802.11ac MCS0, Nss1 (VHT80): 16.58 dBm
Carrier Frequencies	Please refer to section 3.4
Antenna	Please refer to section 3.3

**IEEE 802.11a/b/g**

Items	Description
Product Type	WLAN (2TX, 2RX)
Radio Type	Intentional Transceiver
Power Type	From power adapter
Modulation	DSSS for IEEE 802.11b ; OFDM for IEEE 802.11a/g
Data Modulation	DSSS (BPSK / QPSK / CCK) ; OFDM (BPSK / QPSK / 16QAM / 64QAM)
Data Rate (Mbps)	DSSS (1/ 2/ 5.5/11) ; OFDM (6/9/12/18/24/36/48/54)
Frequency Range	2400 ~ 2483.5MHz / 5725 ~ 5850MHz
Channel Number	11b/g: 11 ; 11a: 5
Channel Band Width (99%)	11b: 12.33 MHz ; 11g: 17.37 MHz ; 11a: 29.75 MHz
Maximum Conducted Output Power	11b: 19.31 dBm ; 11g: 19.42 dBm ; 11a: 23.15 dBm
Carrier Frequencies	Please refer to section 3.4
Antenna	Please refer to section 3.3

Items	Description	
Beamforming Function	<input type="checkbox"/> With beamforming	<input checked="" type="checkbox"/> Without beamforming

**Antenna and Bandwidth**

Antenna	Two (TX)		
	20 MHz	40 MHz	80 MHz
IEEE 802.11a	V	X	X
IEEE 802.11b	V	X	X
IEEE 802.11g	V	X	X
IEEE 802.11n	V	V	X
IEEE 802.11ac	V	V	V

**IEEE 11n/ac Spec.**

Protocol	Number of Transmit Chains (NTX)	Data Rate / MCS
802.11n (HT20)	2	MCS 0-15
802.11n (HT40)	2	MCS 0-15
802.11ac (VHT20)	2	MCS 0-9, Nss1-2
802.11ac (VHT40)	2	MCS 0-9, Nss1-2
802.11ac (VHT80)	2	MCS 0-9, Nss1-2

Note 1: IEEE Std. 802.11n modulation consists of HT20 and HT40 (HT: High Throughput).  
Then EUT support HT20 and HT40.

Note 2: IEEE Std. 802.11ac modulation consists of VHT20, VHT40, VHT80 and VHT160 (VHT: Very High Throughput). Then EUT support VHT20, VHT40 and VHT80.

Note 3: Modulation modes consist of below configuration:  
HT20/HT40: IEEE 802.11n, VHT20/VHT40/VHT80: IEEE 802.11ac

**3.2. Accessories**

Power	Brand	Model No.	Rating
Adapter 1 (Fixed plug)	Ktec	KSAS0121200100VU	INPUT: 100-240Vac, 50/60Hz, 0.4A OUTPUT: 12Vdc, 1.0A
Adapter 2 (Removable plug)	Ktec	KSAS0121200100D5	INPUT: 100-240Vac, 50/60Hz, 0.4A OUTPUT: 12Vdc, 1.0A
<b>Others</b>			
Plug*1 (Only for Adapter 2 use)			
RJ-45 cable*1: Non-shielded, 1.5m			

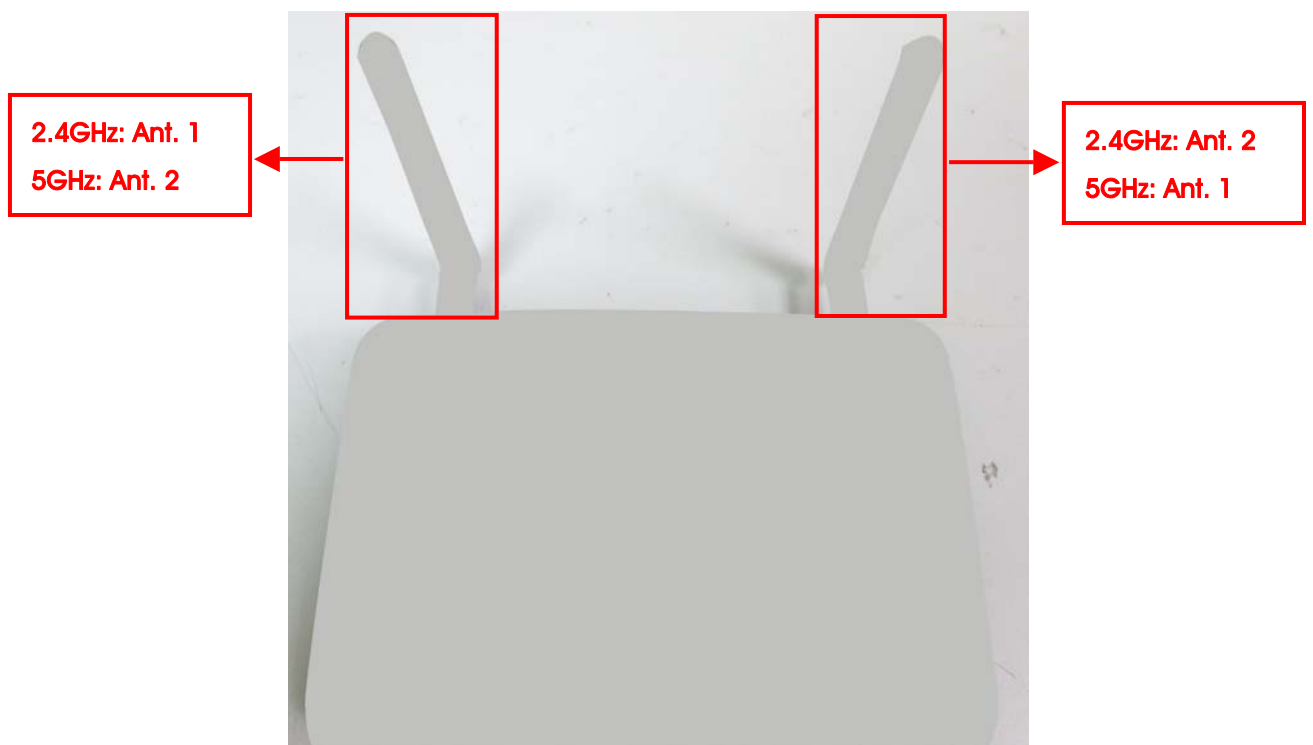


### 3.3. Table for Filed Antenna

Ant.	Brand	Model No.	Antenna Type	Connector	Gain (dBi)		Cable Loss (dB)		True Gain (dBi)	
					2.4GHz	5GHz	2.4GHz	5GHz	2.4GHz	5GHz
1	INVAX	AN2450	Dipole Antenna	RP SMA	3.5	3.5	1.0	2.8	2.5	0.7
2	INVAX	AN2450	Dipole Antenna	RP SMA	3.5	3.5	2.8	1.0	0.7	2.5

Note: The EUT has two antennas.

Ant. 1 and Ant. 2 could transmit/receive simultaneously.



### 3.4. Table for Carrier Frequencies

#### For 2.4GHz Band:

There are two bandwidth systems.

For 20MHz bandwidth systems, use Channel 1~Channel 11.

For 40MHz bandwidth systems, use Channel 3~Channel 9.

Frequency Band	Channel No.	Frequency	Channel No.	Frequency
2400~2483.5MHz	1	2412 MHz	7	2442 MHz
	2	2417 MHz	8	2447 MHz
	3	2422 MHz	9	2452 MHz
	4	2427 MHz	10	2457 MHz
	5	2432 MHz	11	2462 MHz
	6	2437 MHz	-	-

#### For 5GHz Band:

There are three bandwidth systems.

For 20MHz bandwidth systems, use Channel 149, 153, 157, 161, 165.

For 40MHz bandwidth systems, use Channel 151, 159.

For 80MHz bandwidth systems, use Channel 155.

Frequency Band	Channel No.	Frequency	Channel No.	Frequency
5725~5850 MHz Band 4	149	5745 MHz	157	5785 MHz
	151	5755 MHz	159	5795 MHz
	153	5765 MHz	161	5805 MHz
	155	5775 MHz	165	5825 MHz

### 3.5. Table for Test Modes

Preliminary tests were performed in different data rate to find the worst radiated emission. The data rate shown in the table below is the worst-case rate with respect to the specific test item. Investigation has been done on all the possible configurations for searching the worst cases. The following table is a list of the test modes shown in this test report.

#### For 2.4GHz Band:

Test Items	Mode	Data Rate	Channel	Antenna
AC Power Line Conducted Emissions	Normal Link	-	-	-
Maximum Conducted Output Power	11n HT20	MCS0	1/6/11	1+2
	11n HT40	MCS0	3/6/9	1+2
	11b/CCK	1 Mbps	1/6/11	1+2
	11g/BPSK	6 Mbps	1/6/11	1+2
Power Spectral Density	11n HT20	MCS0	1/6/11	1+2
	11n HT40	MCS0	3/6/9	1+2
	11b/CCK	1 Mbps	1/6/11	1+2
	11g/BPSK	6 Mbps	1/6/11	1+2
6dB Spectrum Bandwidth	11n HT20	MCS0	1/6/11	1+2
	11n HT40	MCS0	3/6/9	1+2
	11b/CCK	1 Mbps	1/6/11	1+2
	11g/BPSK	6 Mbps	1/6/11	1+2
Radiated Emissions Below 1GHz	Normal Link	-	-	-
Radiated Emissions Above 1GHz	11n HT20	MCS0	1/6/11	1+2
	11n HT40	MCS0	3/6/9	1+2
	11b/CCK	1 Mbps	1/6/11	1+2
	11g/BPSK	6 Mbps	1/6/11	1+2
Band Edge Emissions	11n HT20	MCS0	1/6/11	1+2
	11n HT40	MCS0	3/6/9	1+2
	11b/CCK	1 Mbps	1/6/11	1+2
	11g/BPSK	6 Mbps	1/6/11	1+2

**For 5GHz Band:**

Test Items	Mode	Data Rate	Channel	Antenna
AC Power Line Conducted Emissions	Normal Link	-	-	-
Maximum Conducted Output Power	11ac VHT20	MCS0, Nss1	149/157/165	1+2
	11ac VHT40	MCS0, Nss1	151/159	1+2
	11ac VHT80	MCS0, Nss1	155	1+2
	11a/BPSK	6 Mbps	149/157/165	1+2
Power Spectral Density	11ac VHT20	MCS0, Nss1	149/157/165	1+2
	11ac VHT40	MCS0, Nss1	151/159	1+2
	11ac VHT80	MCS0, Nss1	155	1+2
	11a/BPSK	6 Mbps	149/157/165	1+2
6dB Spectrum Bandwidth	11ac VHT20	MCS0, Nss1	149/157/165	1+2
	11ac VHT40	MCS0, Nss1	151/159	1+2
	11ac VHT80	MCS0, Nss1	155	1+2
	11a/BPSK	6 Mbps	149/157/165	1+2
Radiated Emissions Below 1GHz	Normal Link	-	-	-
Radiated Emissions Above 1GHz	11ac VHT20	MCS0, Nss1	149/157/165	1+2
	11ac VHT40	MCS0, Nss1	151/159	1+2
	11ac VHT80	MCS0, Nss1	155	1+2
	11a/BPSK	6 Mbps	149/157/165	1+2
Band Edge Emissions	11ac VHT20	MCS0, Nss1	149/157/165	1+2
	11ac VHT40	MCS0, Nss1	151/159	1+2
	11ac VHT80	MCS0, Nss1	155	1+2
	11a/BPSK	6 Mbps	149/157/165	1+2

Note: VHT20/VHT40 covers HT20/HT40, due to same modulation.

The following test modes were performed for all tests:

**For AC Power Line Conducted Emissions test:**

Mode 1. EUT + Adapter 1

Mode 2. EUT + Adapter 2

Mode 1 generated the worst test result, so it was recorded in this report.

**For Radiated Emissions Below 1GHz test:**

Mode 1. Laying of EUT + Adapter 1

Mode 2. Stand of EUT + Adapter 1

Mode 1 has been evaluated to be the worst case among Mode 1~2, thus measurement for Mode 3 will follow this same test mode.

Mode 3. Laying of EUT + Adapter 1

Mode 1 generated the worst test result, so it was recorded in this report.

### For Radiated Emissions Above 1GHz, Band Edge Emissions and Radiated Emission Co-location tests:

The mode "Laying of EUT + Adapter" has been evaluated to be the worst case for Radiated Emissions Below 1GHz test.

Consequently, measurement for Radiated Emissions Above 1GHz, Band Edge Emissions and Radiated Emission Co-location tests will follow this same test mode.

The EUT could be applied with 2.4GHz WLAN function and 5GHz WLAN function; therefore Co-location Maximum Permissible Exposure (please refer to Appendix B) and Radiated Emission Co-location (please refer to Appendix C) tests are added for simultaneously transmit between 2.4GHz WLAN function and 5GHz WLAN function.

### 3.6. Table for Testing Locations

Test Site Location				
Address:	No.8, Lane 724, Bo-ai St., Jhubei City, Hsinchu County 302, Taiwan, R.O.C.			
TEL:	886-3-656-9065			
FAX:	886-3-656-9085			
Test Site No.	Site Category	Location	FCC Reg. No.	IC File No.
03CH01-CB	SAC	Hsin Chu	262045	IC 4086D
CO01-CB	Conduction	Hsin Chu	262045	IC 4086D
TH01-CB	OVEN Room	Hsin Chu	-	-

Open Area Test Site (OATS); Semi Anechoic Chamber (SAC).

### 3.7. Table for Supporting Units

**For AC Power Line Conducted Emissions test:**

Support Unit	Brand	Model	FCC ID
NB	DELL	E6430	DoC
NB	DELL	E6430	DoC
NB	DELL	E6430	DoC
AP Router	Planex	GW-AP54SGX	KA220030603014-1
Earphone	e-Power	S90W	N/A

**For Radiated Emissions Below 1GHz test:**

Support Unit	Brand	Model	FCC ID
NB	DELL	M1340	E2K4965AGNM
NB	DELL	E6430	DoC
NB	DELL	D420	E2KWM3945ABG
AP Router	Planex	GW-AP54SGX	KA220030603014-1
Earphone	E-BOOKI	E-EPC040	N/A

**For Others test:**

Support Unit	Brand	Model	FCC ID
NB	DELL	M1340	E2K4965AGNM

### 3.8. Table for Parameters of Test Software Setting

During testing, Channel and Power Controlling Software provided by the customer was used to control the operating channel as well as the output power level. The RF output power selection is for the setting of RF output power expected by the customer and is going to be fixed on the firmware of the final end product.

#### For 2.4GHz Band

##### Power Parameters of IEEE 802.11n MCS0 HT20

Test Software Version	MT 7662 QA V 0.0.2.3		
Frequency	2412 MHz	2437 MHz	2462 MHz
MCS0 HT20	1E/26	27/2F	1B/23

##### Power Parameters of IEEE 802.11n MCS0 HT40

Test Software Version	MT 7662 QA V 0.0.2.3		
Frequency	2422 MHz	2437 MHz	2452 MHz
MCS0 HT40	18/20	20/28	19/21

##### Power Parameters of IEEE 802.11b/g

Test Software Version	MT 7662 QA V 0.0.2.3		
Frequency	2412 MHz	2437 MHz	2462 MHz
IEEE 802.11b	23/2B	27/2F	23/2B
IEEE 802.11g	1E/26	27/2F	1C/24

#### For 5GHz Band

##### Power Parameters of IEEE 802.11ac MCS0, Nss1 VHT20

Test Software Version	MT 7662 QA V 0.0.2.3		
Frequency	5745 MHz	5785 MHz	5825 MHz
MCS0, Nss1 VHT20	3F/36	3F/38	3F/38

##### Power Parameters of IEEE 802.11ac MCS0, Nss1 VHT40

Test Software Version	MT 7662 QA V 0.0.2.3		
Frequency	5755 MHz		5795 MHz
MCS0, Nss1 VHT40	3F/34		3F/36

##### Power Parameters of IEEE 802.11ac MCS0, Nss1 VHT80

Test Software Version	MT 7662 QA V 0.0.2.3		
Frequency	5775 MHz		
MCS0, Nss1 VHT80	1A/0F		

##### Power Parameters of IEEE 802.11a

Test Software Version	MT 7662 QA V 0.0.2.3		
Frequency	5745 MHz	5785 MHz	5825 MHz
IEEE 802.11a	3F/36	3F/36	3F/38

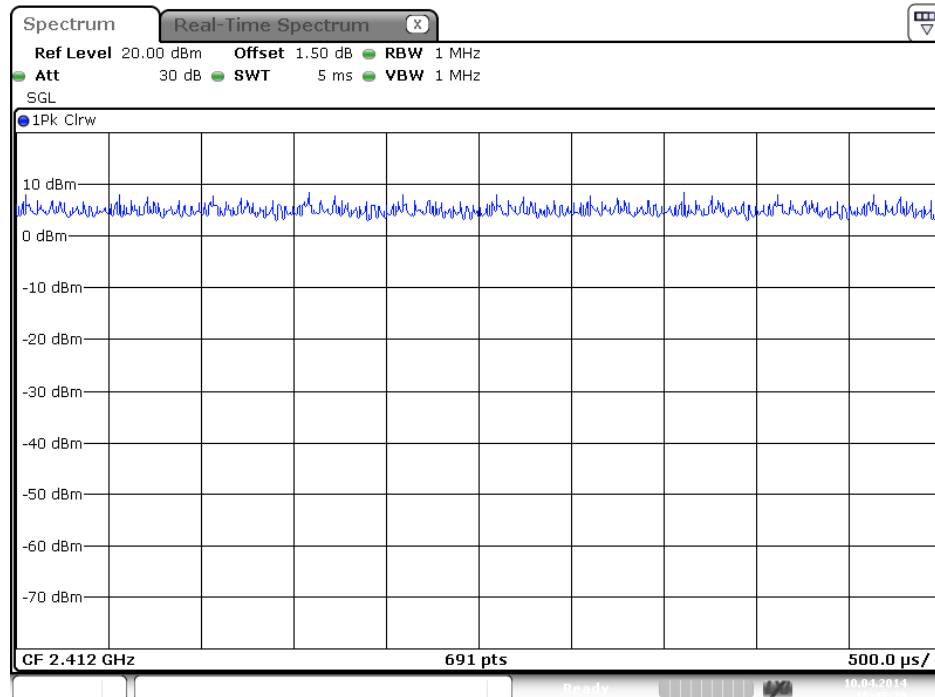
### 3.9. EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

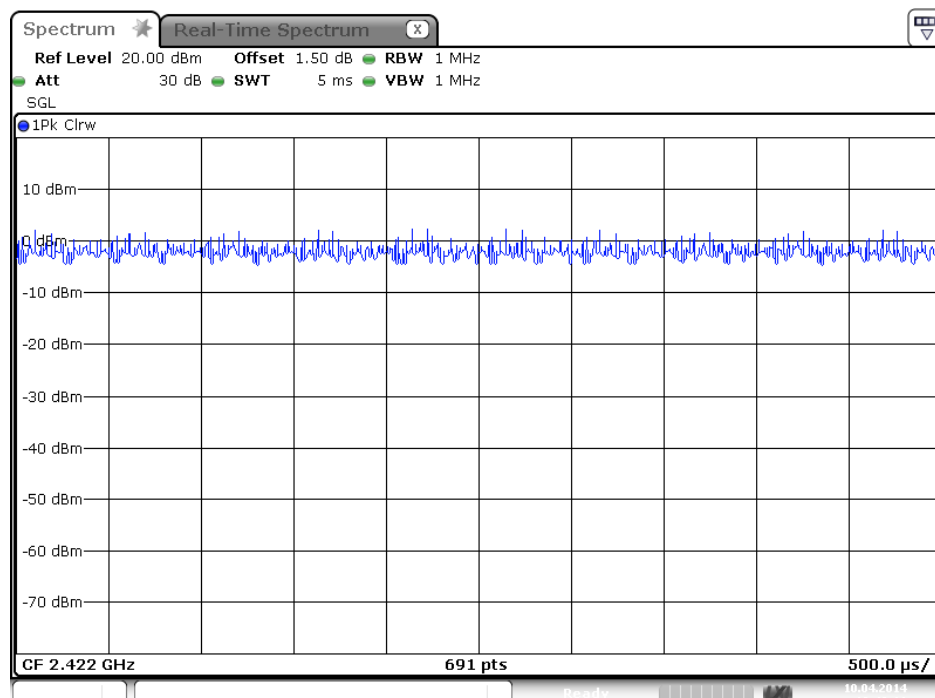
### 3.10. Duty Cycle

For 2.4GHz Band:

IEEE 802.11n MCS0 HT20

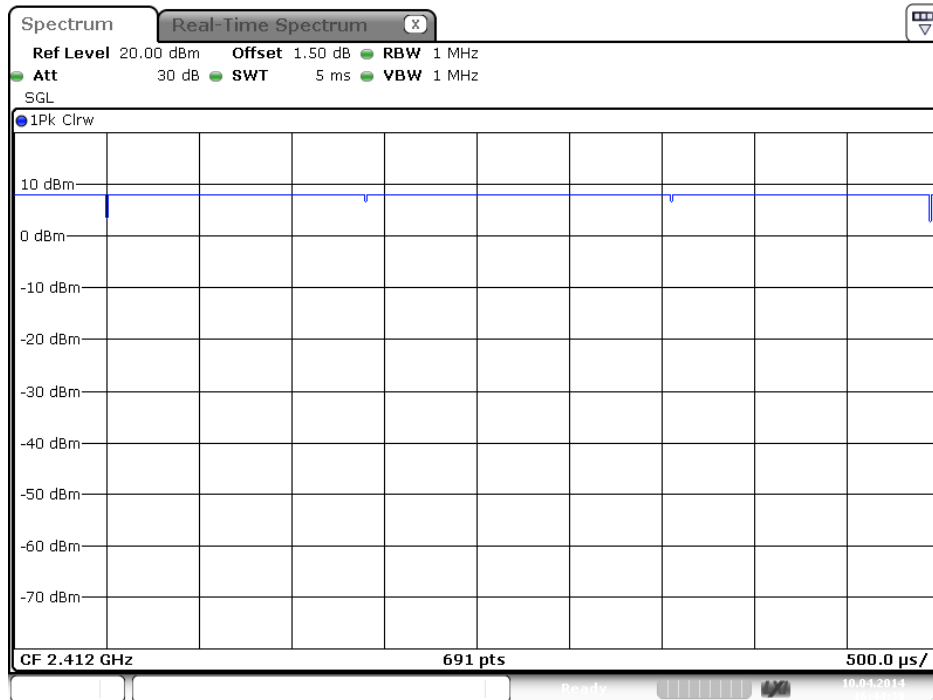


IEEE 802.11n MCS0 HT40



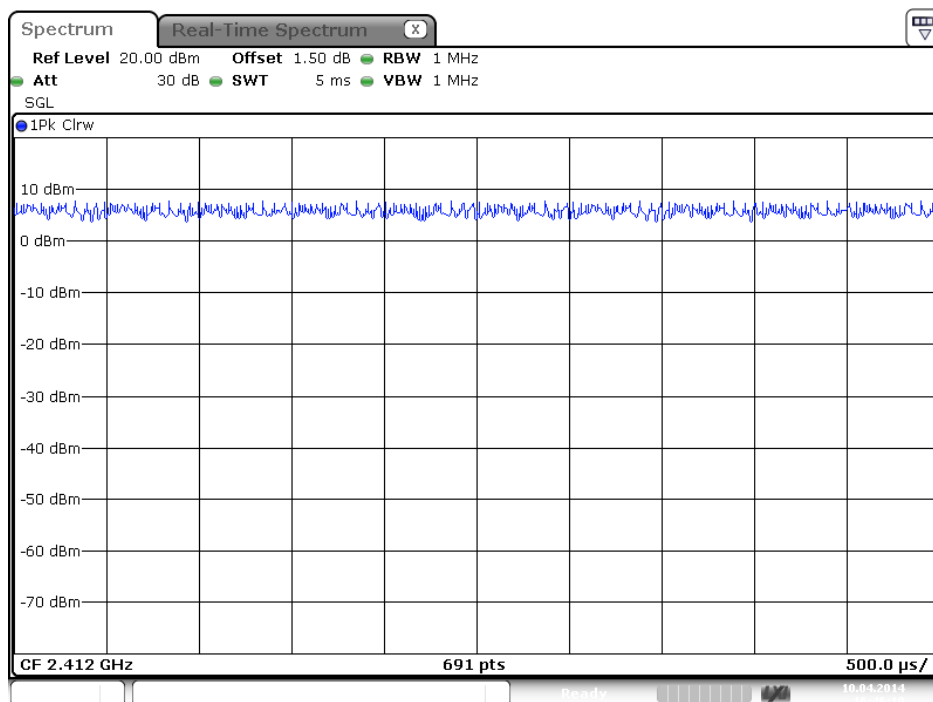


IEEE 802.11b



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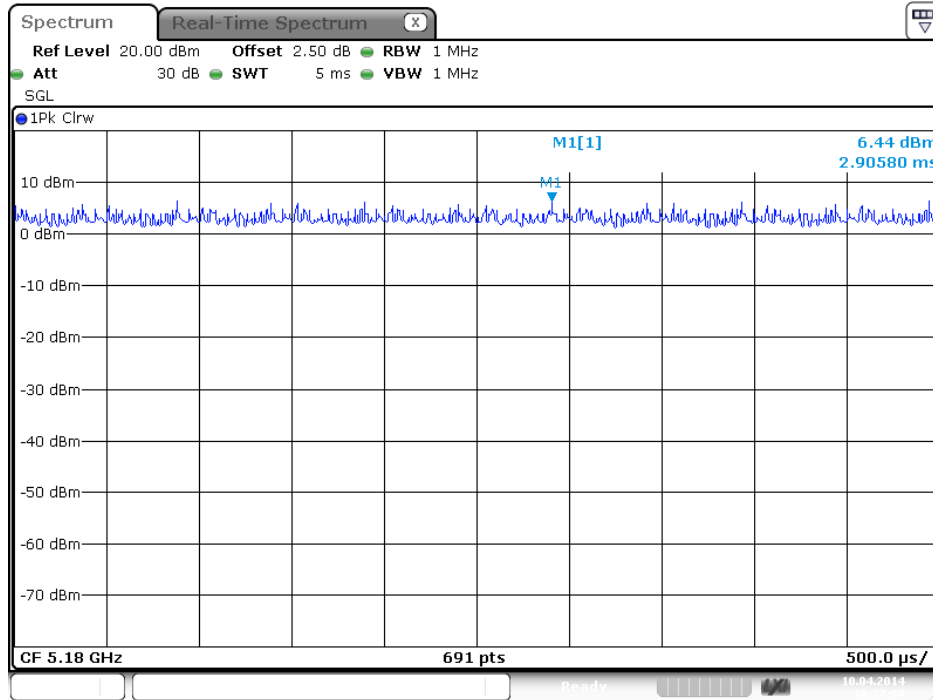
IEEE 802.11g



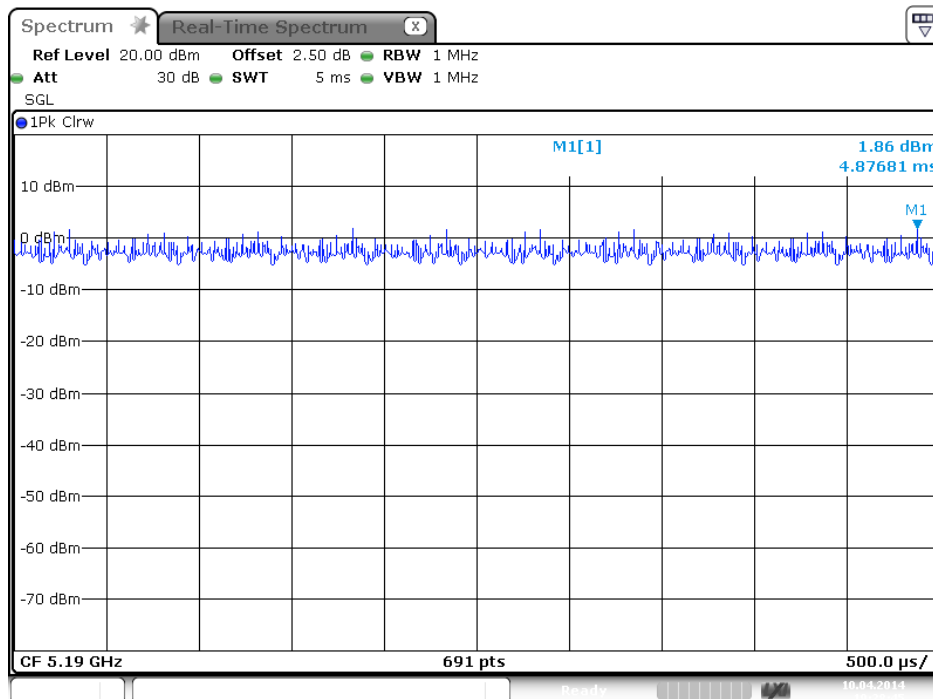
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For 5GHz Band:

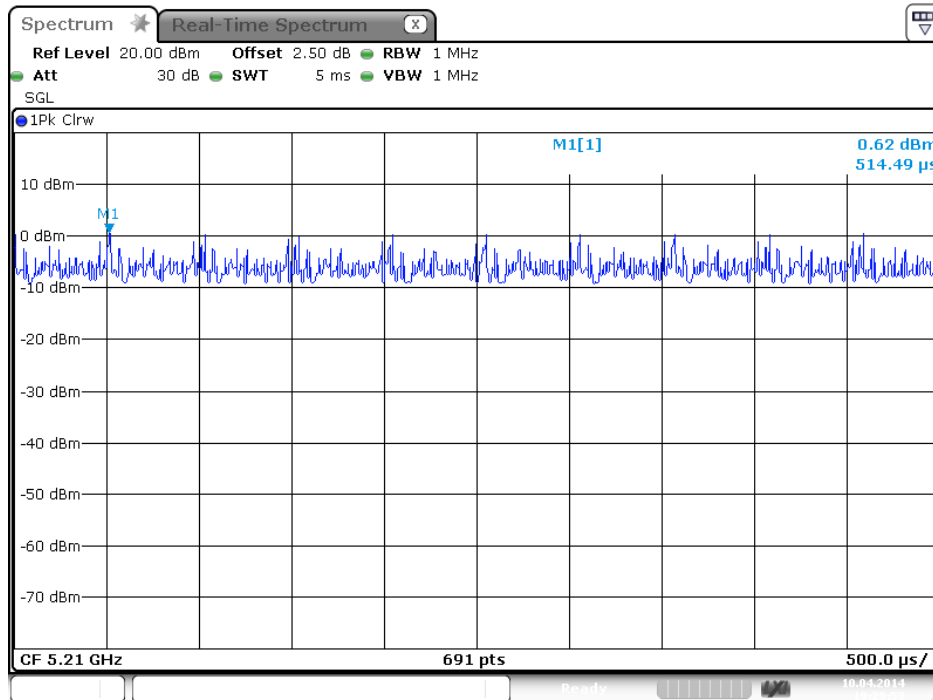
IEEE 802.11ac MCS0, Nss1 VHT20



IEEE 802.11ac MCS0, Nss1 VHT40

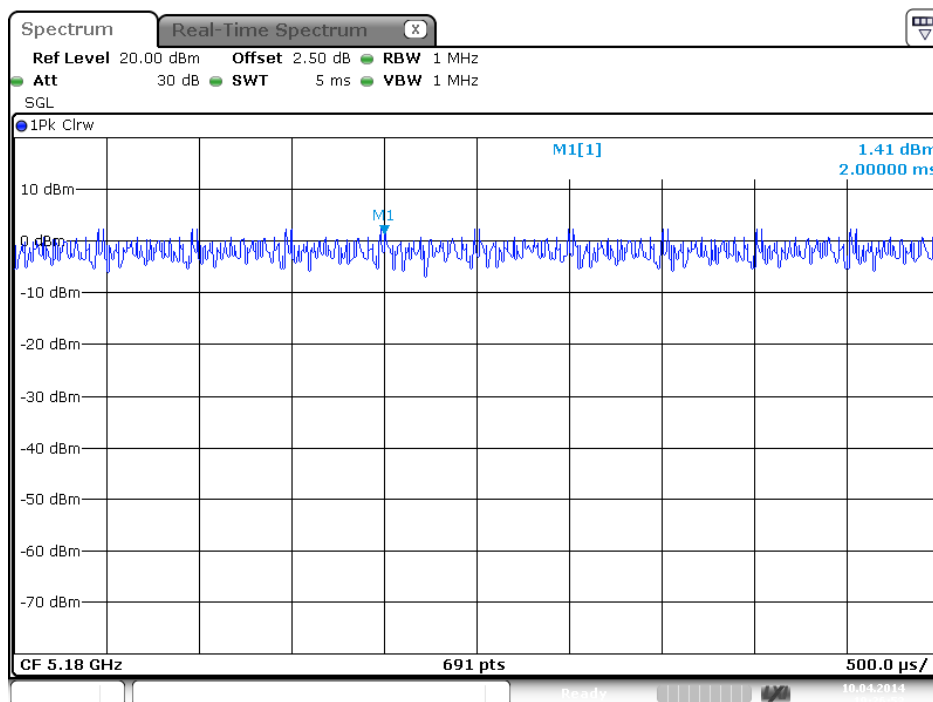


IEEE 802.11ac MCS0, Nss1 VHT80



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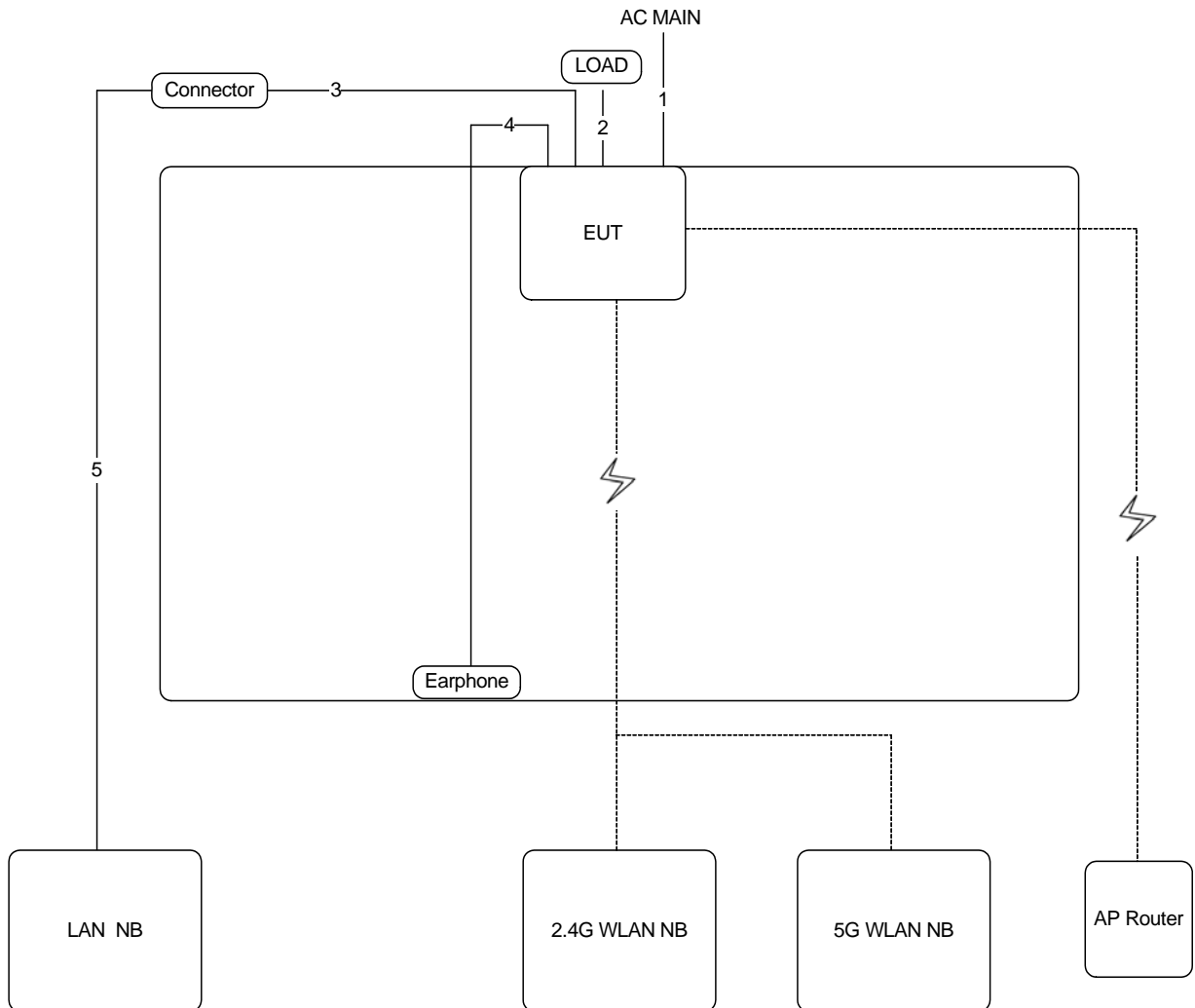
IEEE 802.11a



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### 3.11. Test Configurations

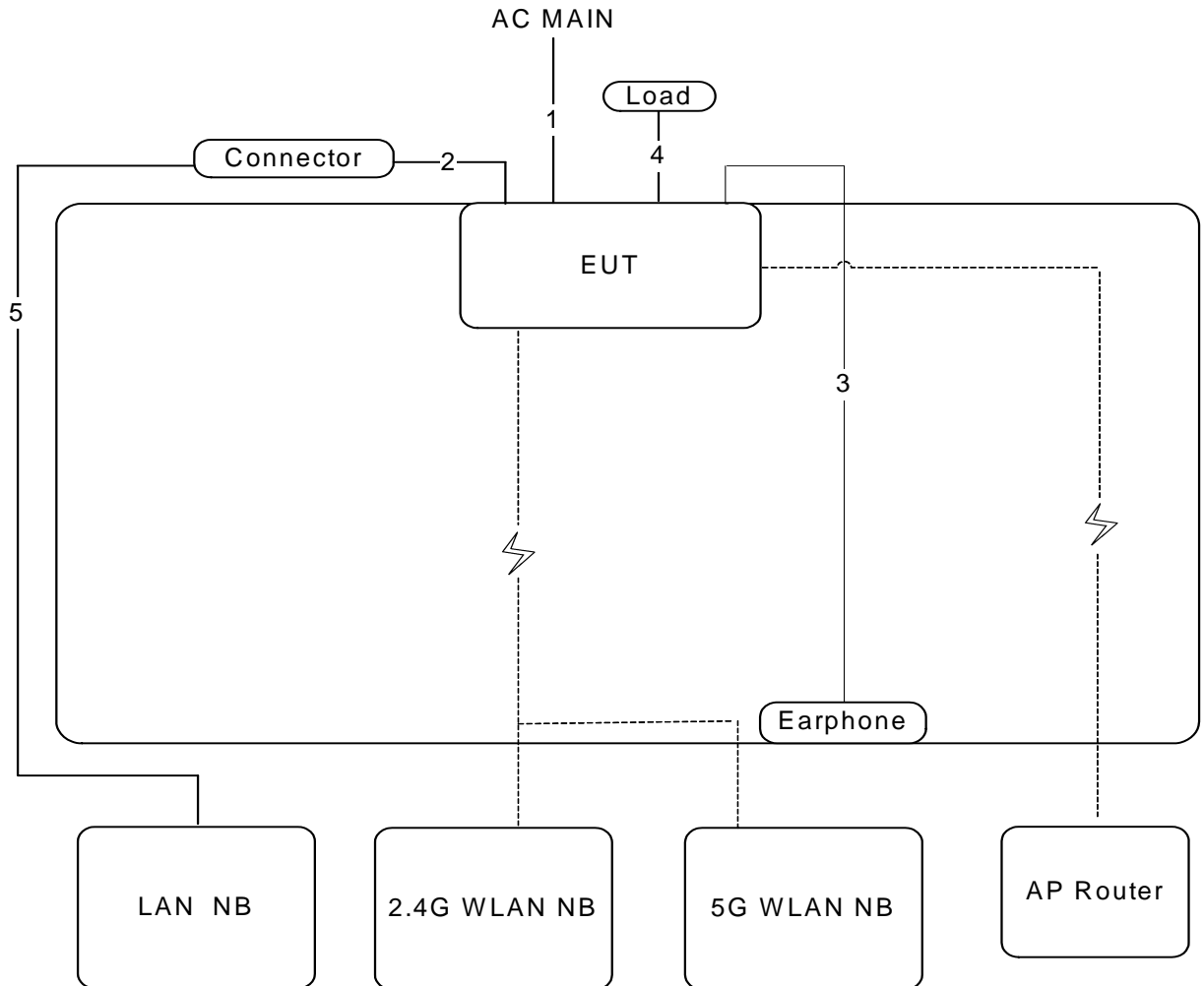
#### 3.11.1. AC Power Line Conduction Emissions Test Configuration



Item	Connection	Shielded	Length
1	Power cable	No	1.5m
2	RJ-45 cable*3	No	3m
3	RJ-45 cable	No	1.5m
4	Audio cable	No	1.1m
5	RJ-45 cable	No	10m

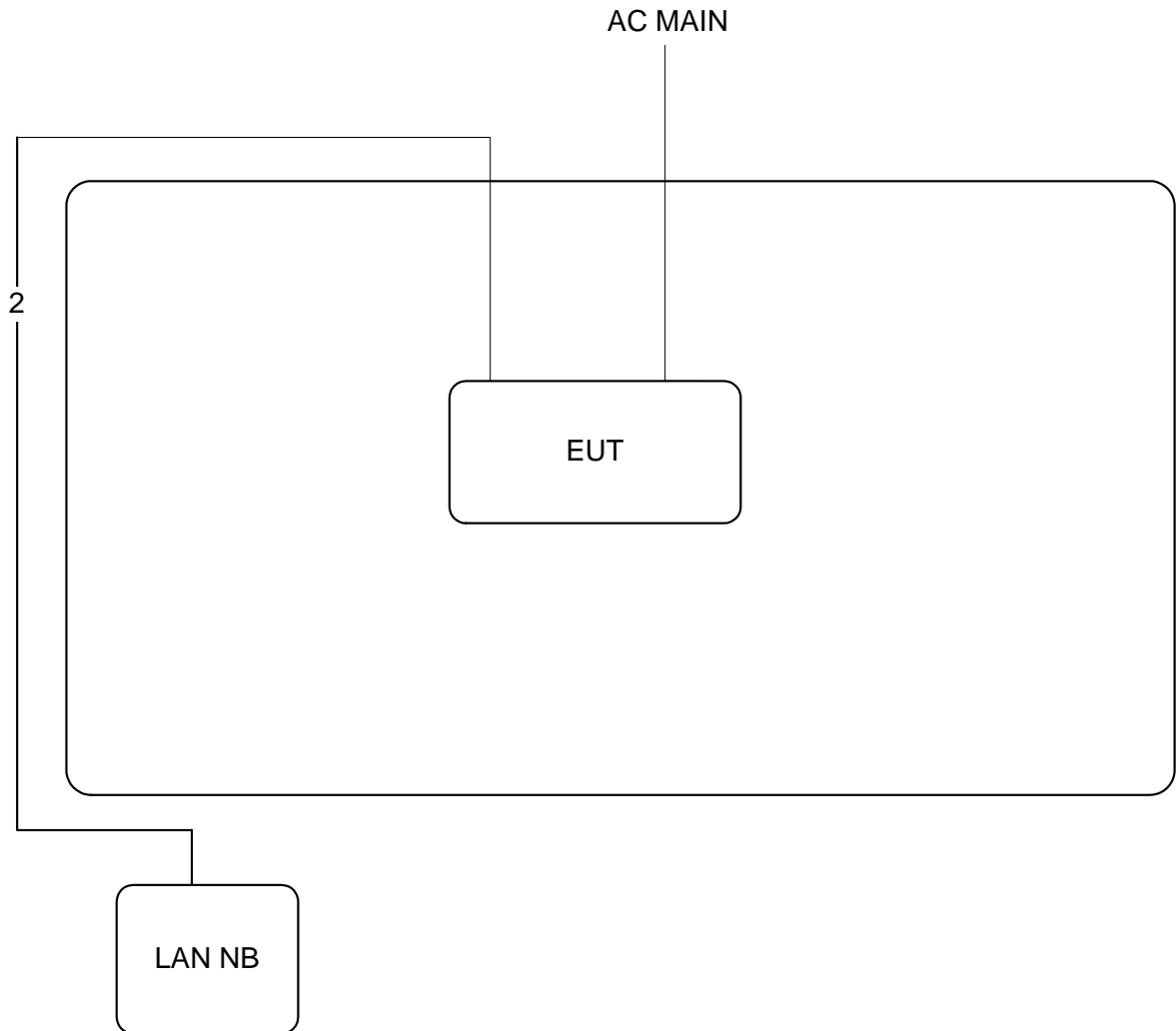
### 3.11.2. Radiation Emissions Test Configuration

Test Configuration: below 1GHz



Item	Connection	Shielded	Length
1	Power cable	No	1.5m
2	RJ-45 cable	No	1.5m
3	Audio cable	No	1.1m
4	RJ-45 cable*3	No	0.4m
5	RJ-45 cable	No	10m

Test Configuration: above 1GHz



Item	Connection	Shielded	Length
1	Power cable	No	1.5m
2	RJ-45 cable	No	10m

## 4. TEST RESULT

### 4.1. AC Power Line Conducted Emissions Measurement

#### 4.1.1. Limit

For this product which is designed to be connected to the AC power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed below limits table.

Frequency (MHz)	QP Limit (dBuV)	AV Limit (dBuV)
0.15~0.5	66~56	56~46
0.5~5	56	46
5~30	60	50

#### 4.1.2. Measuring Instruments and Setting

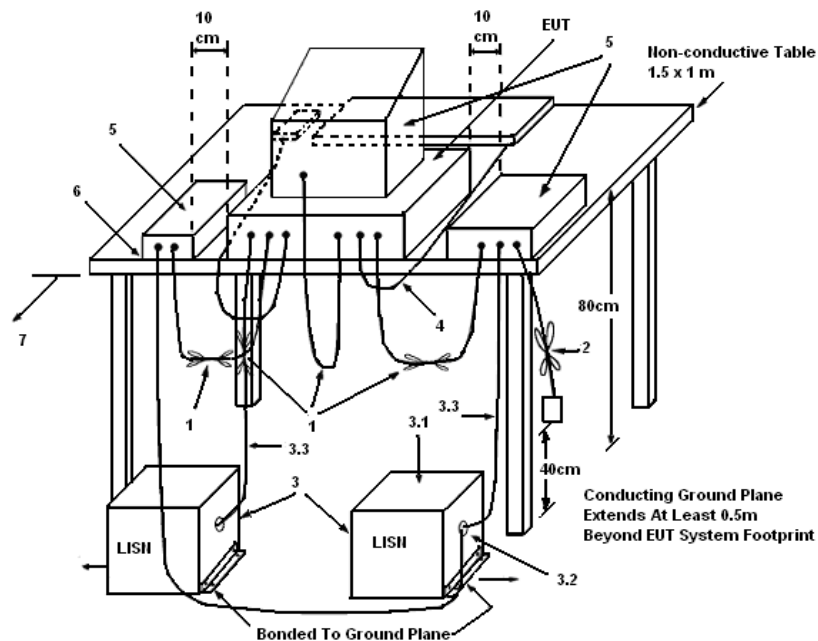
Please refer to section 5 of equipments list in this report. The following table is the setting of the receiver.

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

#### 4.1.3. Test Procedures

1. Configure the EUT according to ANSI C63.10. The EUT or host of EUT has to be placed 0.4 meter far from the conducting wall of the shielding room and at least 80 centimeters from any other grounded conducting surface.
2. Connect EUT or host of EUT to the power mains through a line impedance stabilization network (LISN).
3. All the support units are connected to the other LISNs. The LISN should provide 50uH/50ohms coupling impedance.
4. The frequency range from 150 kHz to 30 MHz was searched.
5. Set the test-receiver system to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
6. The measurement has to be done between each power line and ground at the power terminal.

#### 4.1.4. Test Setup Layout



#### LEGEND:

- (1) 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.
- (2) 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.
- (3) EUT connected to one LISN. Unused LISN measuring port connectors shall be terminated in 50  $\Omega$ . LISN can be placed on top of, or immediately beneath, reference ground plane.
  - (3.1) All other equipment powered from additional LISN(s).
  - (3.2) Multiple outlet strip can be used for multiple power cords of non-EUT equipment.
  - (3.3) LISN at least 80 cm from nearest part of EUT chassis.
- (4) Cables of hand-operated devices, such as keyboards, mice, etc., shall be placed as for normal use.
- (5) Non-EUT components of EUT system being tested.
- (6) Rear of EUT, including peripherals, shall all be aligned and flush with rear of tabletop.
- (7) Rear of tabletop shall be 40 cm removed from a vertical conducting plane that is bonded to the ground plane.

#### 4.1.5. Test Deviation

There is no deviation with the original standard.

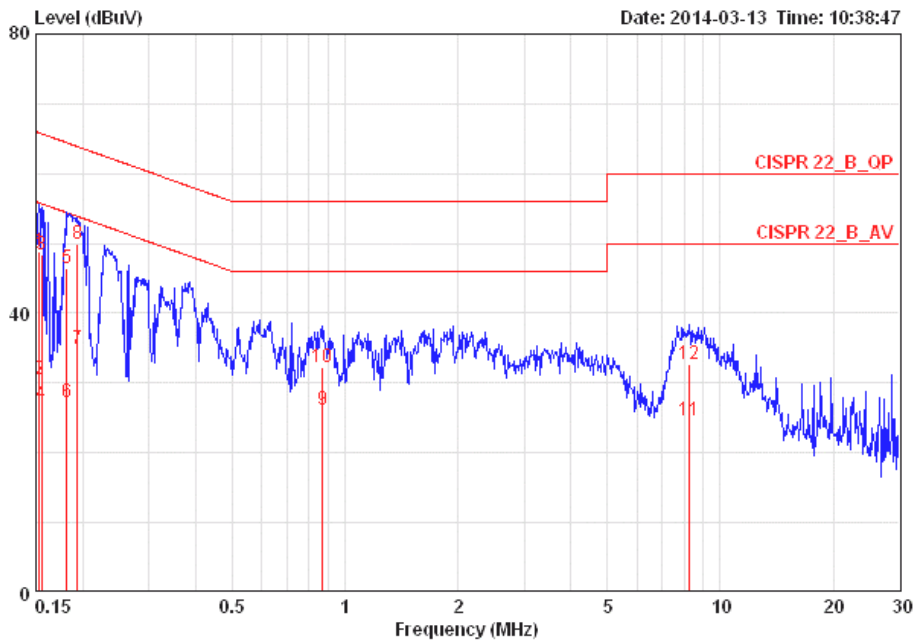
#### 4.1.6. EUT Operation during Test

The EUT was placed on the test table and programmed in normal function.



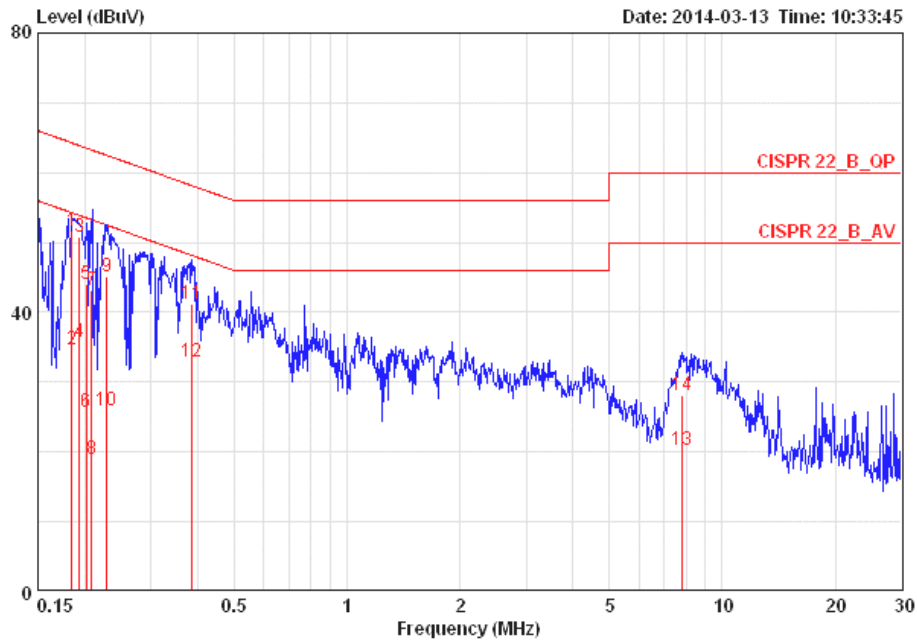
4.1.7. Results of AC Power Line Conducted Emissions Measurement

Temperature	22°C	Humidity	52%
Test Engineer	Sollo Luo	Phase	Line
Configuration	Normal Link	Test Mode	Mode 1



	Freq	Level	Over Limit	Limit Line	LISN Factor	Read Level	Cable Loss	Pol/Phase	Remark
	MHz	dBµV	dB	dBµV	dB	dBµV	dB		
1	0.15321	48.89	-16.93	65.82	0.15	48.58	0.16	LINE	QP
2	0.15321	30.51	-25.31	55.82	0.15	30.20	0.16	LINE	AVERAGE
3	0.15567	48.39	-17.30	65.69	0.15	48.08	0.16	LINE	QP
4	0.15567	27.08	-28.61	55.69	0.15	26.77	0.16	LINE	AVERAGE
5	0.18152	46.37	-18.04	64.42	0.15	46.06	0.16	LINE	QP
6	0.18152	27.27	-27.14	54.42	0.15	26.96	0.16	LINE	AVERAGE
7	0.19344	34.82	-19.06	53.89	0.15	34.51	0.16	LINE	AVERAGE
8	0.19344	50.02	-13.86	63.89	0.15	49.71	0.16	LINE	QP
9	0.87103	26.25	-19.75	46.00	0.16	25.89	0.20	LINE	AVERAGE
10	0.87103	32.31	-23.69	56.00	0.16	31.95	0.20	LINE	QP
11	8.279	24.58	-25.42	50.00	0.34	23.87	0.37	LINE	AVERAGE
12	8.279	32.59	-27.41	60.00	0.34	31.88	0.37	LINE	QP

Temperature	22°C	Humidity	52%
Test Engineer	Sollo Luo	Phase	Neutral
Configuration	Normal Link	Test Mode	Mode 1



	Freq	Level	Over Limit	Limit	LISN	Read	Cable	Pol/Phase	Remark
	MHz	dBuV	dB	dBuV	dB	dBuV	dB		
1	0.18443	51.76	-12.52	64.28	0.07	51.53	0.16	NEUTRAL	QP
2	0.18443	34.57	-19.71	54.28	0.07	34.34	0.16	NEUTRAL	AVERAGE
3	0.19344	50.82	-13.06	63.89	0.07	50.59	0.16	NEUTRAL	QP
4	0.19344	35.76	-18.12	53.89	0.07	35.53	0.16	NEUTRAL	AVERAGE
5	0.20181	44.14	-19.40	63.54	0.07	43.90	0.17	NEUTRAL	QP
6	0.20181	25.83	-27.71	53.54	0.07	25.59	0.17	NEUTRAL	AVERAGE
7	0.20833	43.09	-20.19	63.27	0.07	42.85	0.17	NEUTRAL	QP
8	0.20833	18.96	-34.32	53.27	0.07	18.72	0.17	NEUTRAL	AVERAGE
9	0.22918	45.20	-17.28	62.48	0.07	44.96	0.17	NEUTRAL	QP
10	0.22918	25.99	-26.49	52.48	0.07	25.75	0.17	NEUTRAL	AVERAGE
11	0.38724	41.16	-16.96	58.12	0.07	40.91	0.18	NEUTRAL	QP
12	0.38724	32.86	-15.26	48.12	0.07	32.61	0.18	NEUTRAL	AVERAGE
13	7.810	20.20	-29.80	50.00	0.22	19.62	0.36	NEUTRAL	AVERAGE
14	7.810	28.15	-31.85	60.00	0.22	27.57	0.36	NEUTRAL	QP

Note:

$$\text{Level} = \text{Read Level} + \text{LISN Factor} + \text{Cable Loss}$$

## 4.2. Maximum Conducted Output Power Measurement

### 4.2.1. Limit

For systems using digital modulation in the 2400-2483.5MHz, the limit for output power is 30dBm. The limited has to be reduced by the amount in dB that the gain of the antenna exceed 6dBi. In case of point-to-point operation, the limit has to be reduced by 1dB for every 3dB that the directional gain of the antenna exceeds 6dBi. Systems operating in the 5725-5850 MHz band that are used exclusively for fixed, point-to-point operations may employ transmitting antennas with directional gain greater than 6 dBi without any corresponding reduction in transmitter output power.

### 4.2.2. Measuring Instruments and Setting

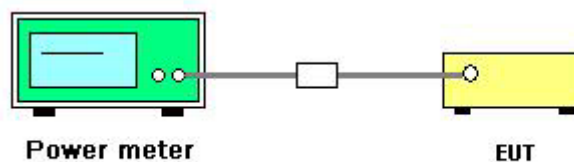
Please refer to section 5 of equipments list in this report. The following table is the setting of the power meter.

Power Meter Parameter	Setting
Detector	Average

### 4.2.3. Test Procedures

1. Test procedures refer KDB 558074 D01 v03r01 section 9.2.2 Measurement using a power meter (PM).
2. This procedure provides an alternative for determining the RMS output power using a broadband RF average power meter with a thermocouple detector.

### 4.2.4. Test Setup Layout



### 4.2.5. Test Deviation

There is no deviation with the original standard.

### 4.2.6. EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

#### 4.2.7. Test Result of Maximum Conducted Output Power

Temperature	20°C	Humidity	55%
Test Engineer	David Tseng	Configurations	IEEE 802.11n/ac
Test Date	Apr. 10, 2014		

##### For 2.4GHz Band

##### Configuration IEEE 802.11n MCS0 HT20

Channel	Frequency	Conducted Power (dBm)			Max. Limit (dBm)	Result
		Ant. 1	Ant. 2	Total		
1	2412 MHz	12.35	12.16	15.27	30.00	Complies
6	2437 MHz	15.97	15.68	18.84	30.00	Complies
11	2462 MHz	11.63	11.71	14.68	30.00	Complies

##### Configuration IEEE 802.11n MCS0 HT40

Channel	Frequency	Conducted Power (dBm)			Max. Limit (dBm)	Result
		Ant. 1	Ant. 2	Total		
3	2422 MHz	9.71	9.76	12.75	30.00	Complies
6	2437 MHz	13.48	13.29	16.40	30.00	Complies
9	2452 MHz	10.19	9.86	13.04	30.00	Complies

##### For 5GHz Band

##### Configuration IEEE 802.11ac MCS0, Nss1 VHT20

Channel	Frequency	Conducted Power (dBm)			Max. Limit (dBm)	Result
		Ant. 1	Ant. 2	Total		
149	5745 MHz	20.25	19.81	23.05	30.00	Complies
157	5785 MHz	20.19	19.75	22.99	30.00	Complies
165	5825 MHz	20.11	20.03	23.08	30.00	Complies

##### Configuration IEEE 802.11ac MCS0, Nss1 VHT40

Channel	Frequency	Conducted Power (dBm)			Max. Limit (dBm)	Result
		Ant. 1	Ant. 2	Total		
151	5755 MHz	20.29	19.49	22.92	30.00	Complies
159	5795 MHz	20.05	19.68	22.88	30.00	Complies

##### Configuration IEEE 802.11ac MCS0, Nss1 VHT80

Channel	Frequency	Conducted Power (dBm)			Max. Limit (dBm)	Result
		Ant. 1	Ant. 2	Total		
155	5775 MHz	13.91	13.20	16.58	30.00	Complies

<b>Temperature</b>	20°C	<b>Humidity</b>	55%
<b>Test Engineer</b>	David Tseng	<b>Configurations</b>	IEEE 802.11a/b/g
<b>Test Date</b>	Apr. 10, 2014		

**Configuration IEEE 802.11b**

Channel	Frequency	Conducted Power (dBm)			Max. Limit (dBm)	Result
		Ant. 1	Ant. 2	Total		
1	2412 MHz	15.18	15.01	18.11	30.00	Complies
6	2437 MHz	16.48	16.12	19.31	30.00	Complies
11	2462 MHz	15.32	15.19	18.27	30.00	Complies

**Configuration IEEE 802.11g**

Channel	Frequency	Conducted Power (dBm)			Max. Limit (dBm)	Result
		Ant. 1	Ant. 2	Total		
1	2412 MHz	12.96	12.94	15.96	30.00	Complies
6	2437 MHz	16.56	16.26	19.42	30.00	Complies
11	2462 MHz	12.37	12.66	15.53	30.00	Complies

**Configuration IEEE 802.11a**

Channel	Frequency	Conducted Power (dBm)			Max. Limit (dBm)	Result
		Ant. 1	Ant. 2	Total		
149	5745 MHz	20.21	19.71	22.98	30.00	Complies
157	5785 MHz	20.18	19.85	23.03	30.00	Complies
165	5825 MHz	20.06	20.21	23.15	30.00	Complies

### 4.3. Power Spectral Density Measurement

#### 4.3.1. Limit

For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8dBm in any 3 kHz band during any time interval of continuous transmission.

#### 4.3.2. Measuring Instruments and Setting

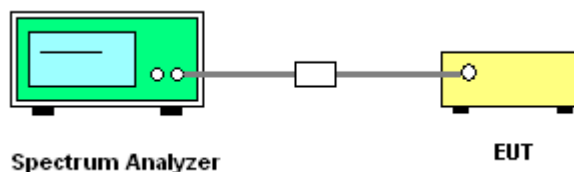
Please refer to section 5 of equipments list in this report. The following table is the setting of the spectrum analyzer.

Spectrum Parameter	Setting
Attenuation	Auto
Span Frequency	Set the span to 1.5 times the DTS channel bandwidth.
RBW	$3 \text{ kHz} \leq \text{RBW} \leq 100\text{kHz}$
VBW	$\geq 3 \times \text{RBW}$
Detector	Peak
Trace	Max Hold
Sweep Time	Auto couple

#### 4.3.3. Test Procedures

1. Test procedures refer KDB 558074 D01 v03r01 section 10.2 Method PKPSD (peak PSD) and KDB 662911 D01 v02r01 section In-Band Power Spectral Density (PSD) Measurements option (b) Measure and sum spectral maximal across the outputs.
2. Use this procedure when the maximum conducted output power in the fundamental emission is used to demonstrate compliance. The EUT must be configured to transmit continuously at full power over the measurement duration.
3. Ensure that the number of measurement points in the sweep  $\geq 2 \times \text{span}/\text{RBW}$  (use of a greater number of measurement points than this minimum requirement is recommended).
4. Use the peak marker function to determine the maximum level in any 3 kHz band segment within the fundamental EBW.
5. The resulting PSD level must be  $\leq 8 \text{ dBm}$ .

#### 4.3.4. Test Setup Layout



#### 4.3.5. Test Deviation

There is no deviation with the original standard.

#### 4.3.6. EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

#### 4.3.7. Test Result of Power Spectral Density

Temperature	20°C	Humidity	55%
Test Engineer	David Tseng	Configurations	IEEE 802.11n/ac

##### For 2.4GHz Band

##### Configuration IEEE 802.11n MCS0 HT20

Channel	Frequency	Power Density (dBm/3kHz)			Power Density Limit (dBm/3kHz)	Result
		Ant. 1	Ant. 2	Total		
1	2412 MHz	-14.61	-14.88	-11.73	8.00	Complies
6	2437 MHz	-10.65	-11.56	-8.07	8.00	Complies
11	2462 MHz	-15.06	-14.30	-11.65	8.00	Complies

##### Configuration IEEE 802.11n MCS0 HT40

Channel	Frequency	Power Density (dBm/3kHz)			Power Density Limit (dBm/3kHz)	Result
		Ant. 1	Ant. 2	Total		
3	2422 MHz	-19.58	-20.08	-16.81	8.00	Complies
6	2437 MHz	-15.50	-14.92	-12.19	8.00	Complies
9	2452 MHz	-18.02	-16.86	-14.39	8.00	Complies

##### For 5GHz Band

##### Configuration IEEE 802.11ac MCS0, Nss1 VHT20

Channel	Frequency	Power Density (dBm/3kHz)			Power Density Limit (dBm/3kHz)	Result
		Ant. 1	Ant. 2	Total		
149	5745 MHz	-7.43	-7.19	-4.30	8.00	Complies
157	5785 MHz	-7.44	-6.65	-4.02	8.00	Complies
165	5825 MHz	-7.58	-6.87	-4.20	8.00	Complies

##### Configuration IEEE 802.11ac MCS0, Nss1 VHT40

Channel	Frequency	Power Density (dBm/3kHz)			Power Density Limit (dBm/3kHz)	Result
		Ant. 1	Ant. 2	Total		
151	5755 MHz	-9.97	-8.99	-6.44	8.00	Complies
159	5795 MHz	-9.15	-8.15	-5.61	8.00	Complies

##### Configuration IEEE 802.11ac MCS0, Nss1 VHT80

Channel	Frequency	Power Density (dBm/3kHz)			Power Density Limit (dBm/3kHz)	Result
		Ant. 1	Ant. 2	Total		
155	5775 MHz	-18.38	-18.33	-15.34	8.00	Complies



Temperature	20°C	Humidity	55%
Test Engineer	David Tseng	Configurations	IEEE 802.11a/b/g

**Configuration IEEE 802.11b**

Channel	Frequency	Power Density (dBm/3kHz)			Power Density Limit (dBm/3kHz)	Result
		Ant. 1	Ant. 2	Total		
1	2412 MHz	-14.17	-14.63	-11.38	8.00	Complies
6	2437 MHz	-12.30	-12.56	-9.42	8.00	Complies
11	2462 MHz	-14.02	-12.83	-10.37	8.00	Complies

**Configuration IEEE 802.11g**

Channel	Frequency	Power Density (dBm/3kHz)			Power Density Limit (dBm/3kHz)	Result
		Ant. 1	Ant. 2	Total		
1	2412 MHz	-14.94	-15.50	-12.20	8.00	Complies
6	2437 MHz	-11.28	-11.46	-8.36	8.00	Complies
11	2462 MHz	-15.74	-14.21	-11.90	8.00	Complies

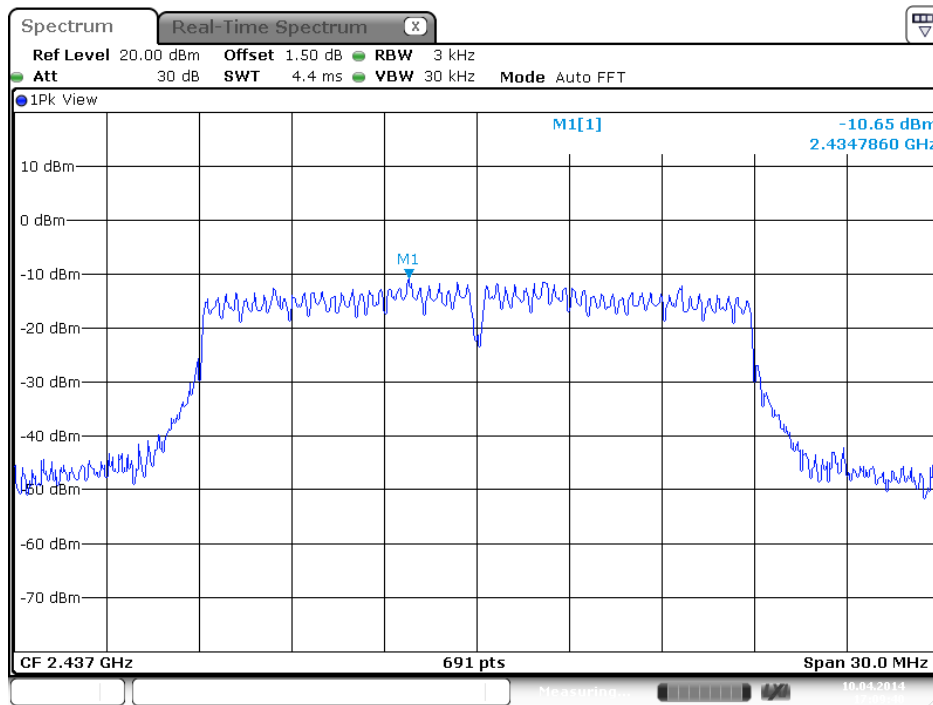
**Configuration IEEE 802.11a**

Channel	Frequency	Power Density (dBm/3kHz)			Power Density Limit (dBm/3kHz)	Result
		Ant. 1	Ant. 2	Total		
149	5745 MHz	-8.33	-7.66	-4.97	8.00	Complies
157	5785 MHz	-7.61	-7.39	-4.49	8.00	Complies
165	5825 MHz	-8.64	-7.36	-4.94	8.00	Complies

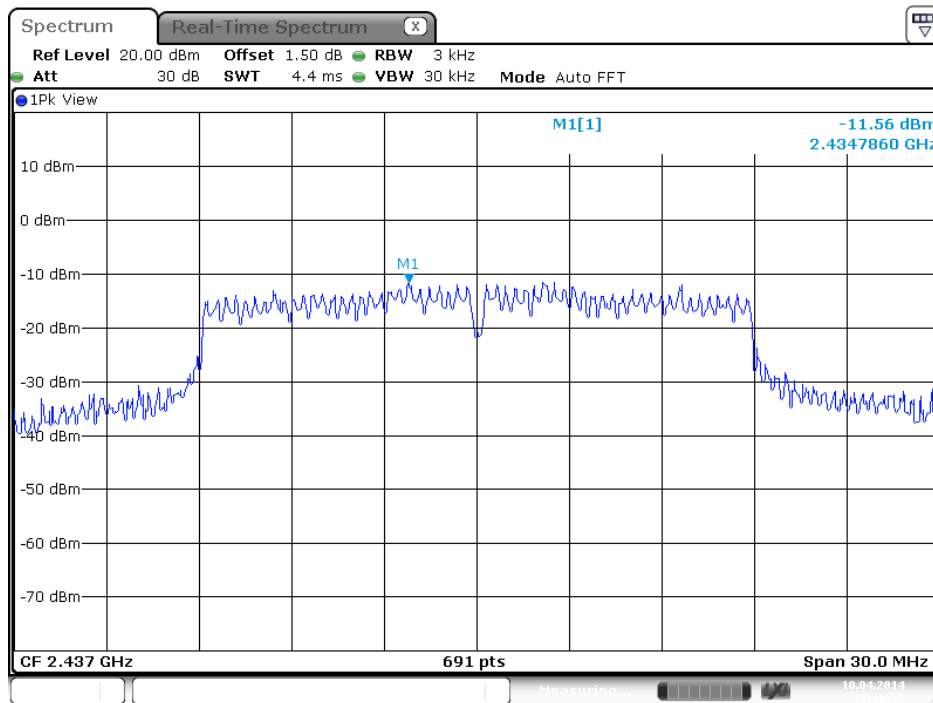
Note: All the test values were listed in the report.

For plots, only the channel with worse result was shown.

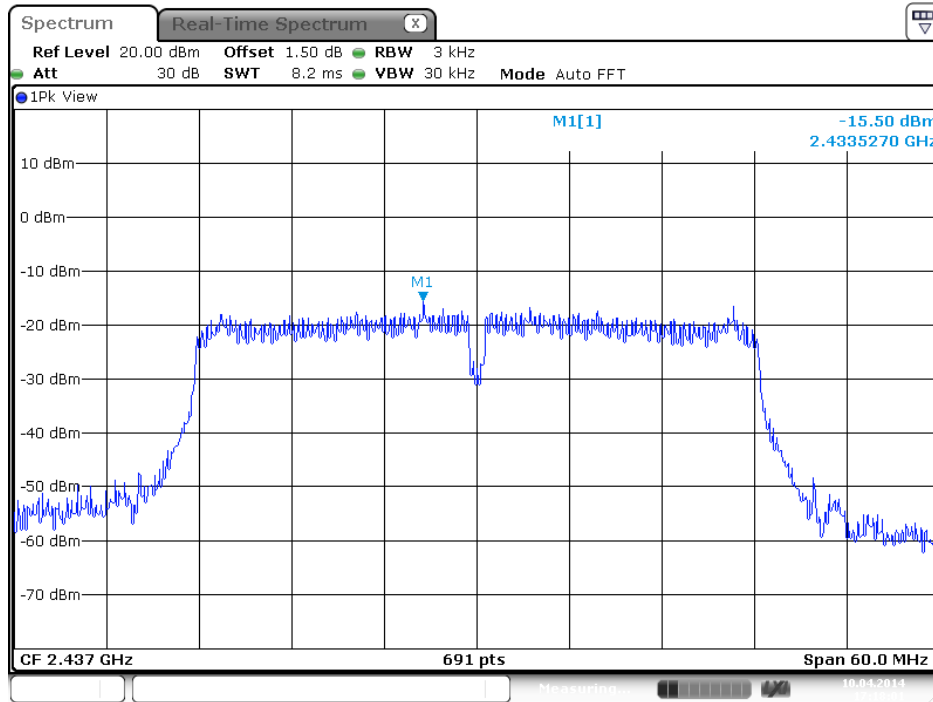
**Power Density Plot on Configuration IEEE 802.11n MCS0 HT20 / 2437 MHz / Ant. 1**



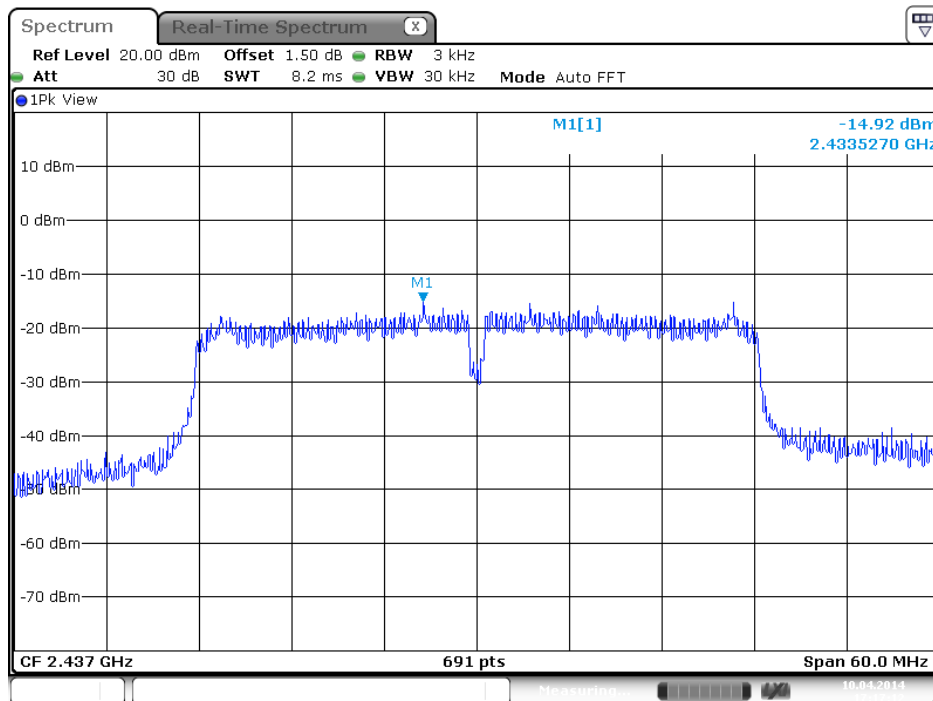
**Power Density Plot on Configuration IEEE 802.11n MCS0 HT20 / 2437 MHz / Ant. 2**



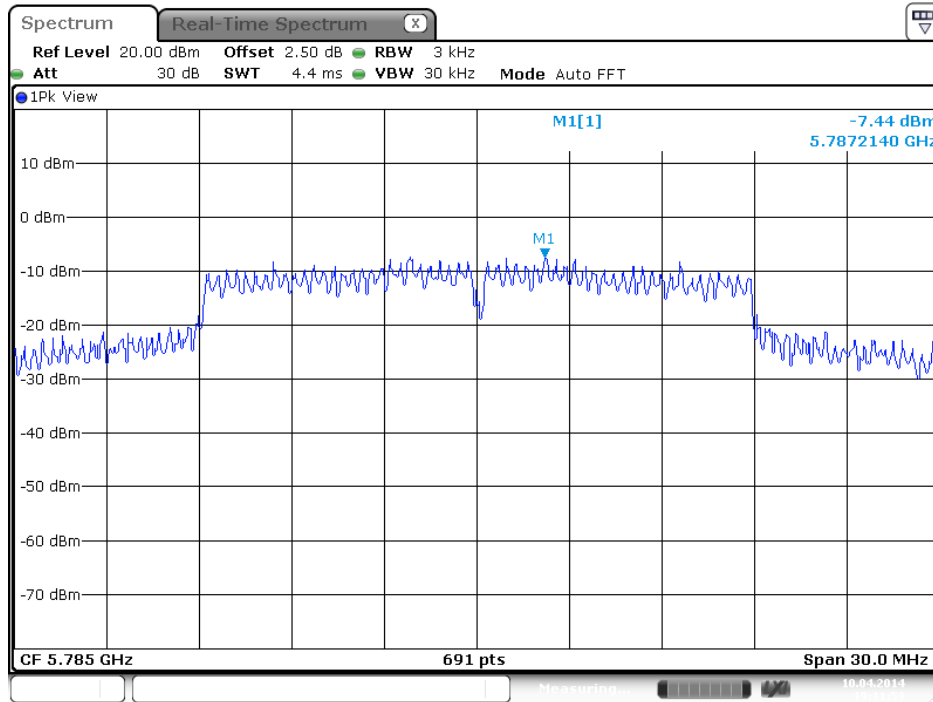
**Power Density Plot on Configuration IEEE 802.11n MCS0 HT40 / 2437 MHz / Ant. 1**



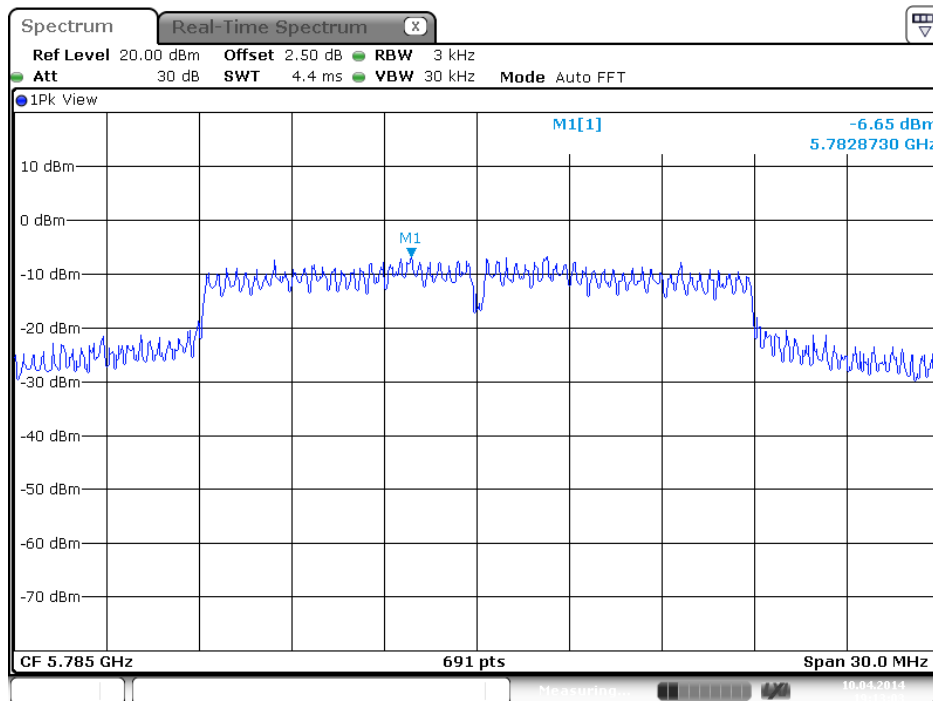
**Power Density Plot on Configuration IEEE 802.11n MCS0 HT40 / 2437 MHz / Ant. 2**



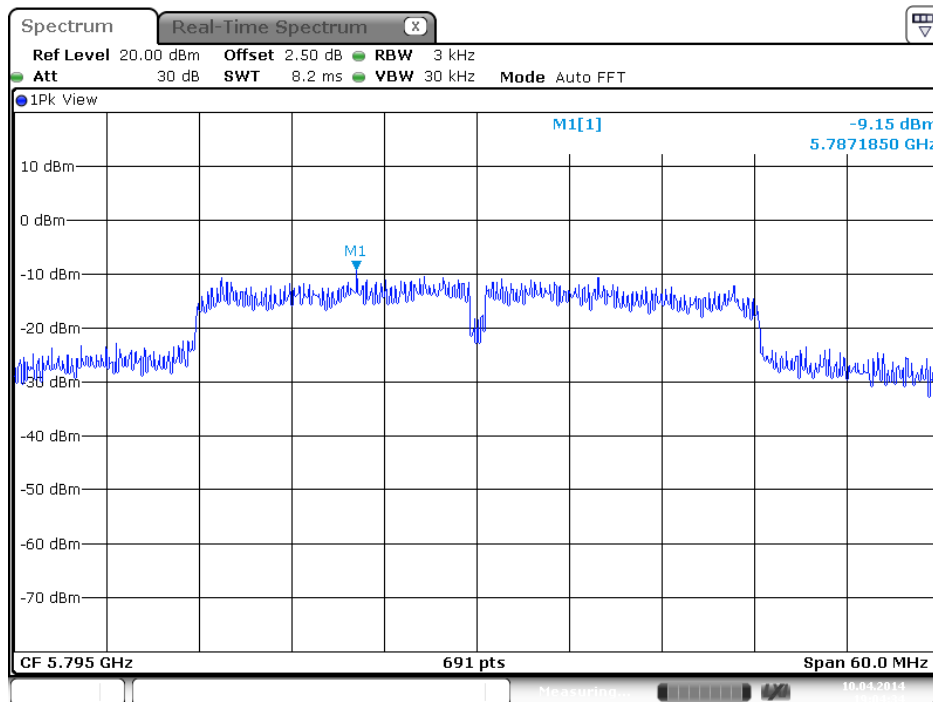
**Power Density Plot on Configuration IEEE 802.11ac MCS0, Nss1 VHT20 / 5785 MHz / Ant. 1**



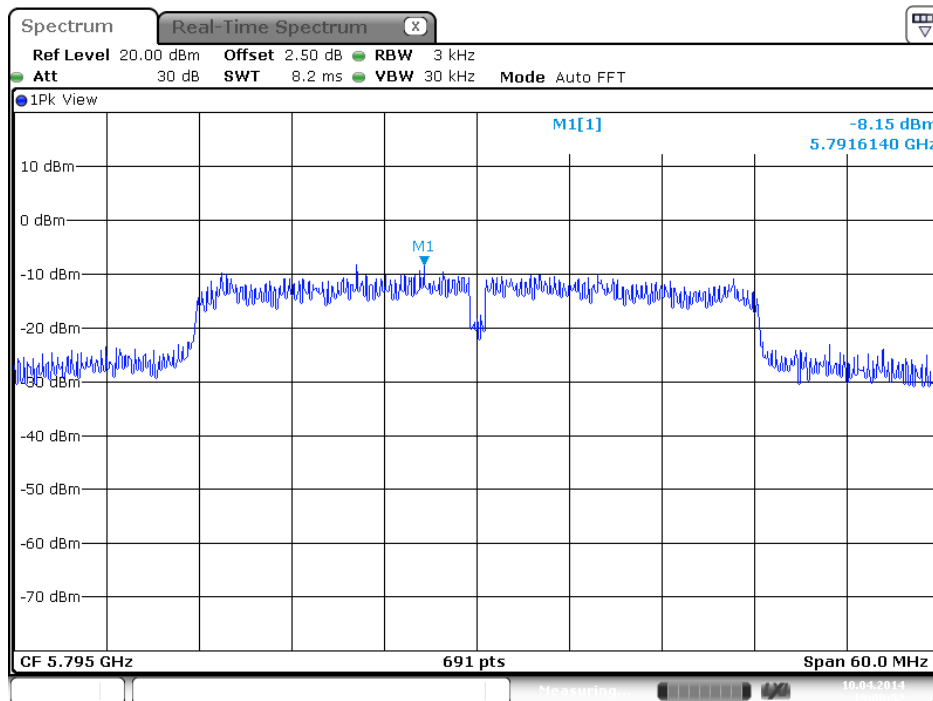
**Power Density Plot on Configuration IEEE 802.11ac MCS0, Nss1 VHT20 / 5785 MHz / Ant. 2**



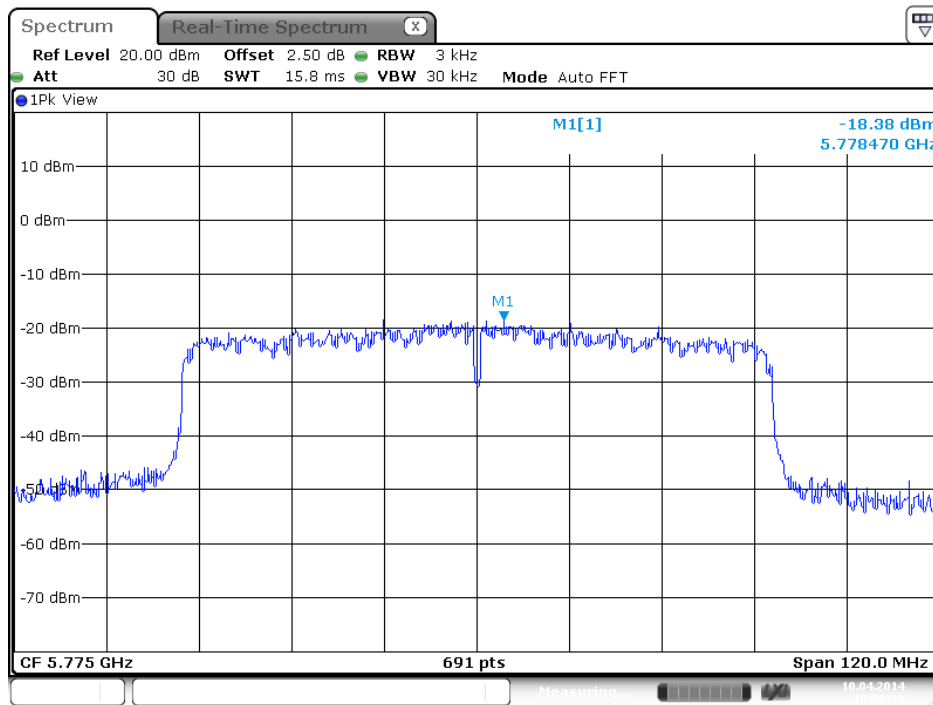
**Power Density Plot on Configuration IEEE 802.11ac MCS0, Nss1 VHT40 / 5795 MHz / Ant. 1**



**Power Density Plot on Configuration IEEE 802.11ac MCS0, Nss1 VHT40 / 5795 MHz / Ant. 2**

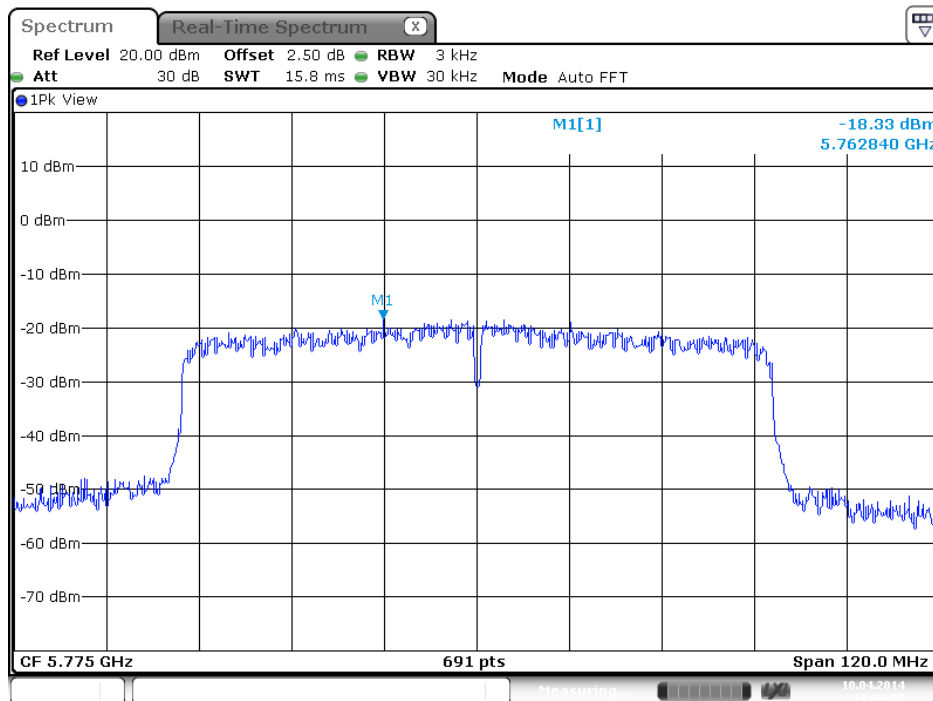


**Power Density Plot on Configuration IEEE 802.11ac MCS0, Nss1 VHT80 / 5775 MHz / Ant. 1**



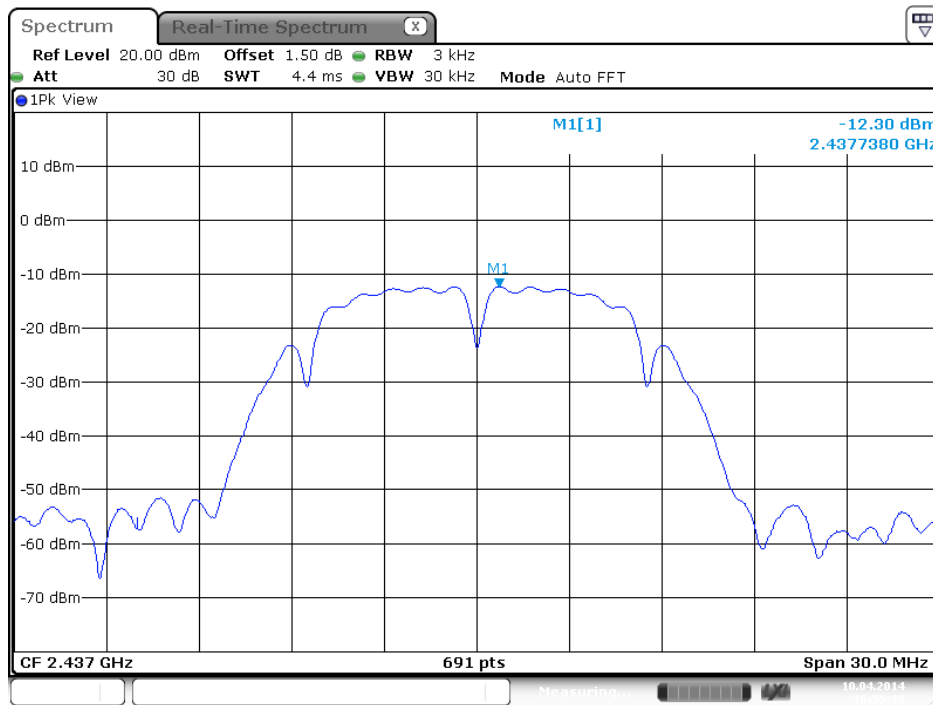
Date: 10. APR. 2014 18:59:11

**Power Density Plot on Configuration IEEE 802.11ac MCS0, Nss1 VHT80 / 5775 MHz / Ant. 2**



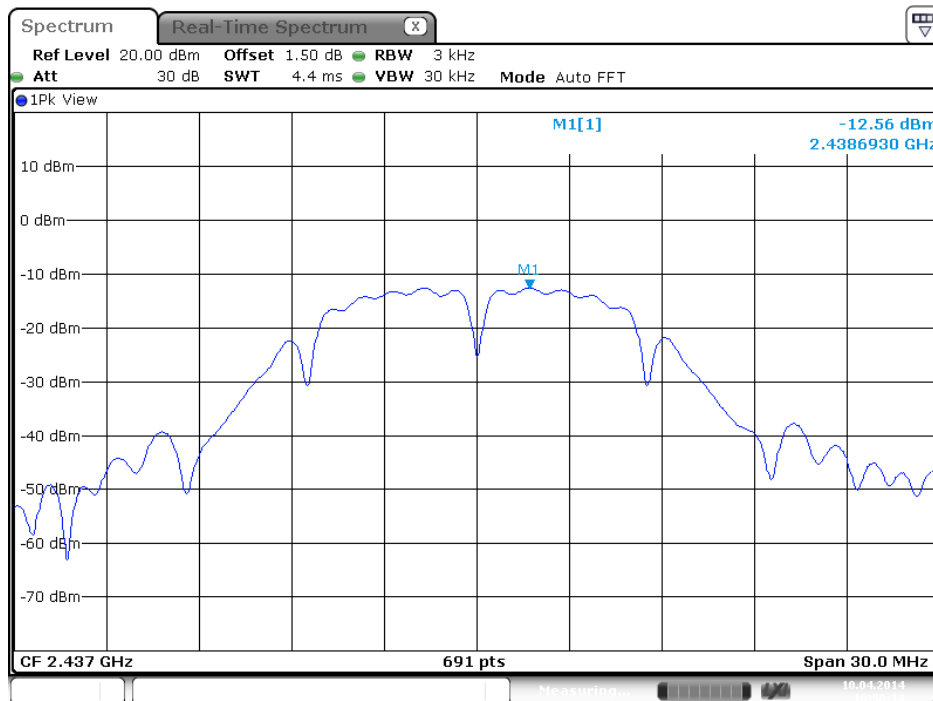
Date: 10. APR. 2014 19:00:27

**Power Density Plot on Configuration IEEE 802.11b / 2437 MHz / Ant. 1**



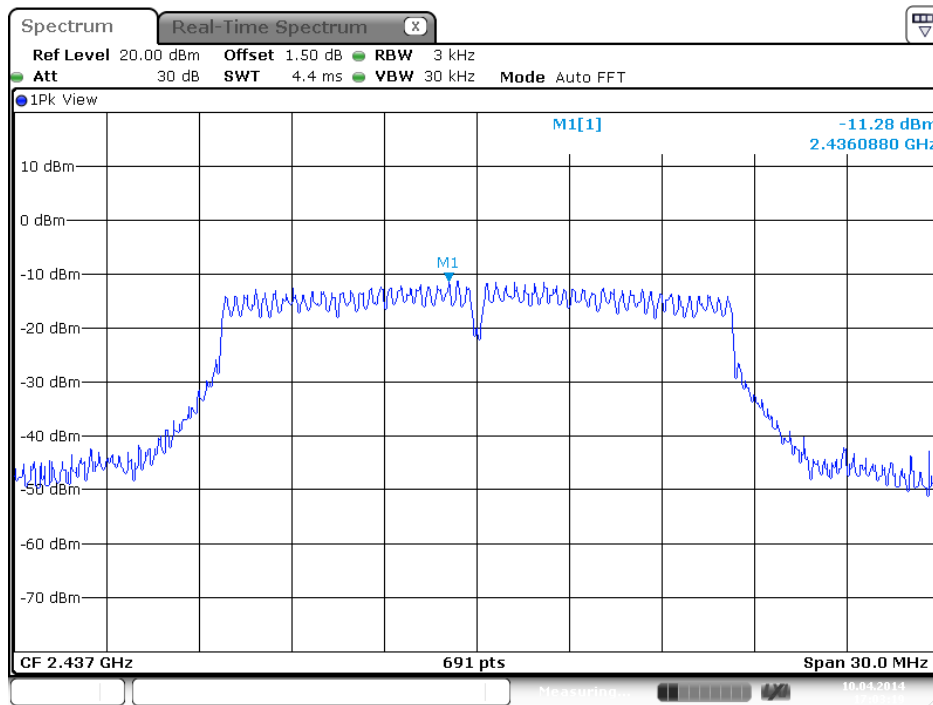
Date: 10. APR. 2014 16:55:13

**Power Density Plot on Configuration IEEE 802.11b / 2437 MHz / Ant. 2**

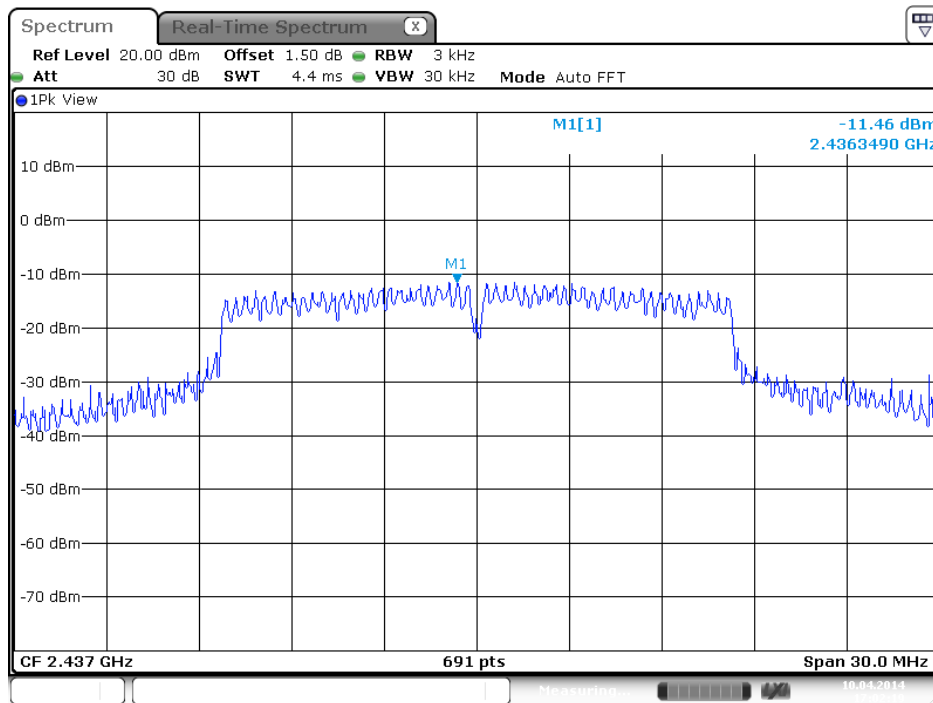


Date: 10. APR. 2014 16:56:14

**Power Density Plot on Configuration IEEE 802.11g / 2437 MHz / Ant. 1**

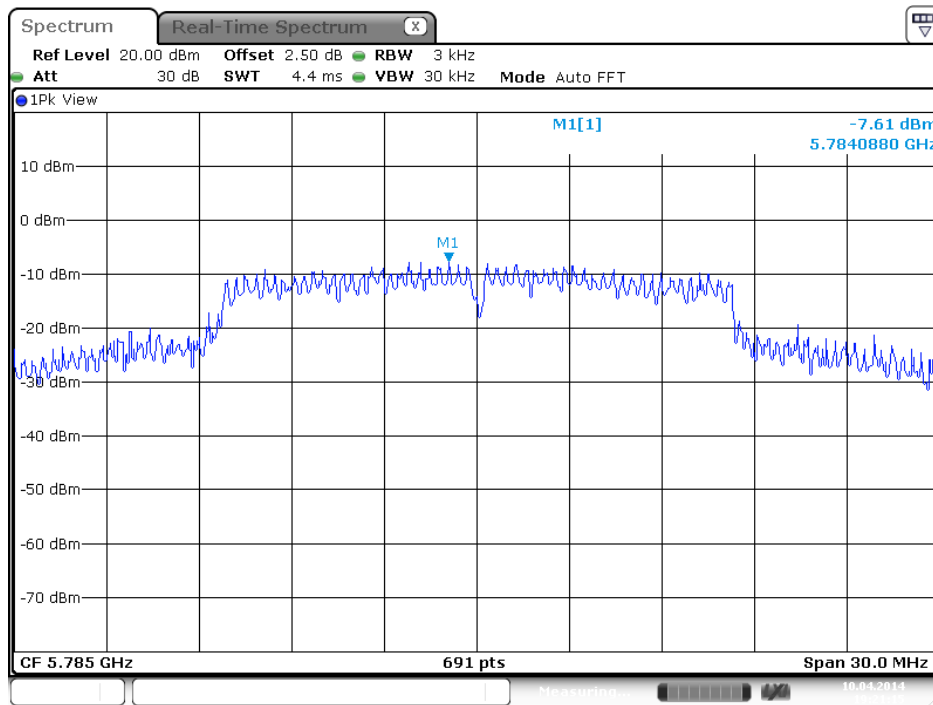


**Power Density Plot on Configuration IEEE 802.11g / 2437 MHz / Ant. 2**

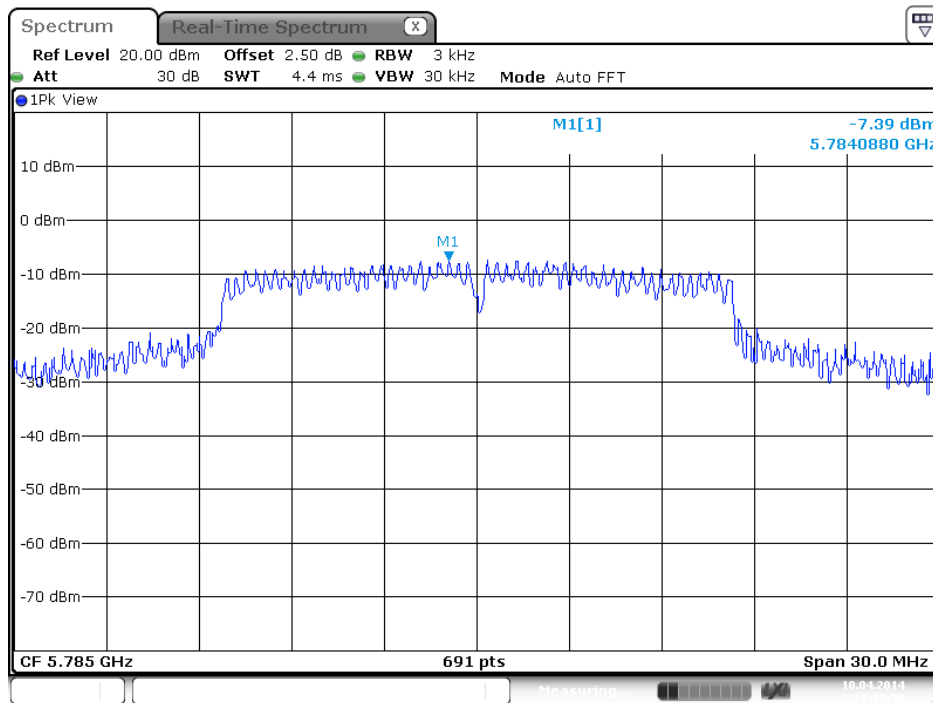




**Power Density Plot on Configuration IEEE 802.11a / 5785 MHz / Ant. 1**



**Power Density Plot on Configuration IEEE 802.11a / 5785 MHz / Ant. 2**



## 4.4. 6dB Spectrum Bandwidth Measurement

### 4.4.1. Limit

For digital modulation systems, the minimum 6dB bandwidth shall be at least 500 kHz.

### 4.4.2. Measuring Instruments and Setting

Please refer to section 5 of equipments list in this report. The following table is the setting of spectrum analyzer.

Spectrum Parameters	Setting
Attenuation	Auto
Span Frequency	> 6dB Bandwidth
RBW	100kHz
VBW	$\geq 3 \times \text{RBW}$
Detector	Peak
Trace	Max Hold
Sweep Time	Auto

### 4.4.3. Test Procedures

For Radiated 6dB Bandwidth Measurement:

1. The transmitter was radiated to the spectrum analyzer in peak hold mode.
2. Test was performed in accordance with KDB 558074 D01 v03r01 for Performing Compliance Measurements on Digital Transmission Systems (DTS) Operating Under §15.247 section 8.0 DTS 6-dB signal bandwidth option 1.
3. Multiple antenna system was performed in accordance with KDB 662911 D01 v02r01 Emissions Testing of Transmitters with Multiple Outputs in the Same Band.
4. Measured the spectrum width with power higher than 6dB below carrier.

### 4.4.4. Test Setup Layout

For Radiated 6dB Bandwidth Measurement:

This test setup layout is the same as that shown in section 4.5.4.

### 4.4.5. Test Deviation

There is no deviation with the original standard.

### 4.4.6. EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

#### 4.4.7. Test Result of 6dB Spectrum Bandwidth

Temperature	20°C	Humidity	55%
Test Engineer	David Tseng	Configurations	IEEE 802.11n/ac

For 2.4GHz Band

Configuration IEEE 802.11n MCS0 HT20 / Ant. 1 + Ant. 2

Channel	Frequency	6dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)	Min. Limit (kHz)	Test Result
1	2412 MHz	17.66	17.60	500	Complies
6	2437 MHz	17.60	17.77	500	Complies
11	2462 MHz	17.54	17.66	500	Complies

Configuration IEEE 802.11n MCS0 HT40 / Ant. 1 + Ant. 2

Channel	Frequency	6dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)	Min. Limit (kHz)	Test Result
3	2422 MHz	36.35	36.01	500	Complies
6	2437 MHz	36.35	36.12	500	Complies
9	2452 MHz	36.24	36.01	500	Complies

**For 5GHz Band**
**Configuration IEEE 802.11ac MCS0, Nss1 VHT20 / Ant. 1 + Ant. 2**

Channel	Frequency	6dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)	Min. Limit (kHz)	Test Result
149	5745 MHz	17.71	30.56	500	Complies
157	5785 MHz	17.71	30.33	500	Complies
165	5825 MHz	17.66	30.62	500	Complies

**Configuration IEEE 802.11ac MCS0, Nss1 VHT40 / Ant. 1 + Ant. 2**

Channel	Frequency	6dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)	Min. Limit (kHz)	Test Result
151	5755 MHz	36.01	63.10	500	Complies
159	5795 MHz	35.89	62.29	500	Complies

**Configuration IEEE 802.11ac MCS0, Nss1 VHT80 / Ant. 1 + Ant. 2**

Channel	Frequency	6dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)	Min. Limit (kHz)	Test Result
155	5775 MHz	75.46	75.02	500	Complies

<b>Temperature</b>	20°C	<b>Humidity</b>	55%
<b>Test Engineer</b>	David Tseng	<b>Configurations</b>	IEEE 802.11a/b/g

**Configuration IEEE 802.11b / Ant. 1 + Ant. 2**

Channel	Frequency	6dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)	Min. Limit (kHz)	Test Result
1	2412 MHz	10.01	12.27	500	Complies
6	2437 MHz	10.07	12.33	500	Complies
11	2462 MHz	10.07	12.27	500	Complies

**Configuration IEEE 802.11g / Ant. 1 + Ant. 2**

Channel	Frequency	6dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)	Min. Limit (kHz)	Test Result
1	2412 MHz	16.56	16.44	500	Complies
6	2437 MHz	16.44	17.37	500	Complies
11	2462 MHz	16.44	16.50	500	Complies

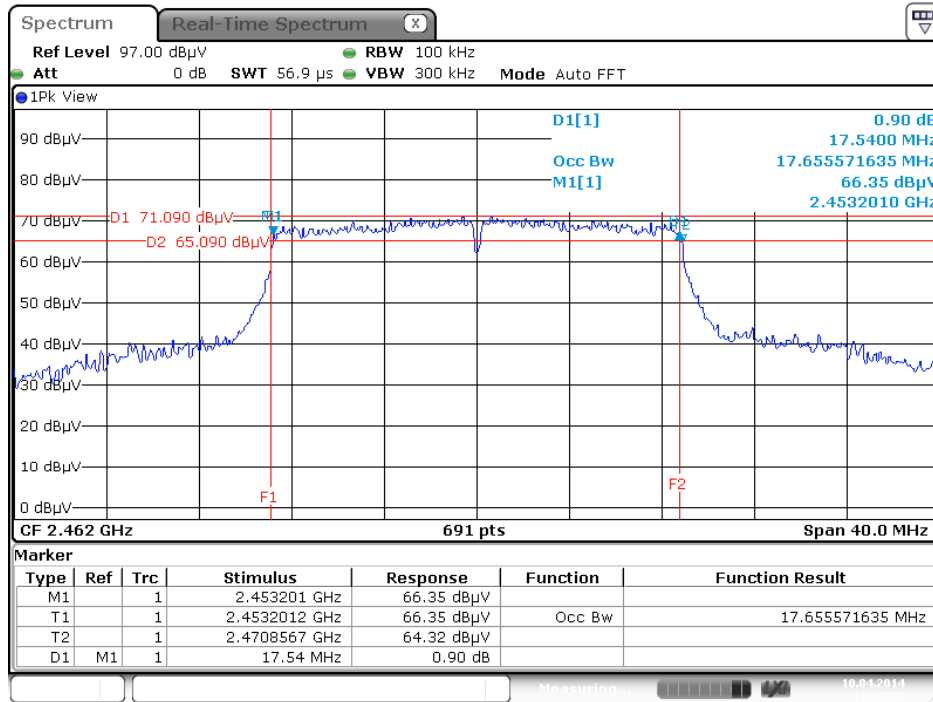
**Configuration IEEE 802.11a / Ant. 1 + Ant. 2**

Channel	Frequency	6dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)	Min. Limit (kHz)	Test Result
149	5745 MHz	16.44	29.75	500	Complies
157	5785 MHz	16.44	29.00	500	Complies
165	5825 MHz	16.38	29.55	500	Complies

Note: All the test values were listed in the report.

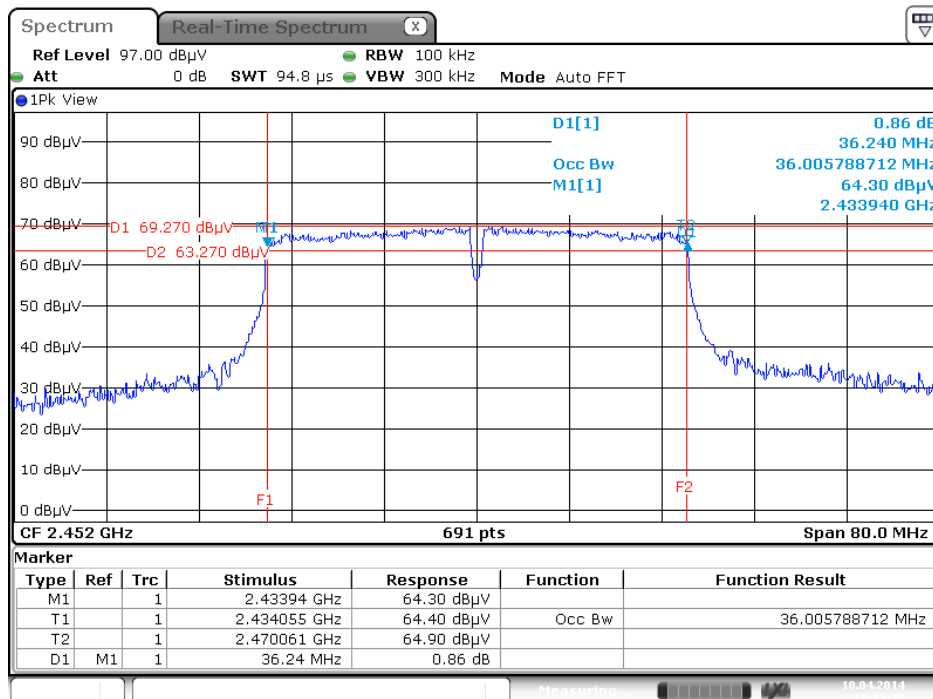
For plots, only the channel with worse result was shown.

6 dB Bandwidth Plot on Configuration IEEE 802.11n MCS0 HT20 / 2462 MHz / Ant. 1 + Ant. 2



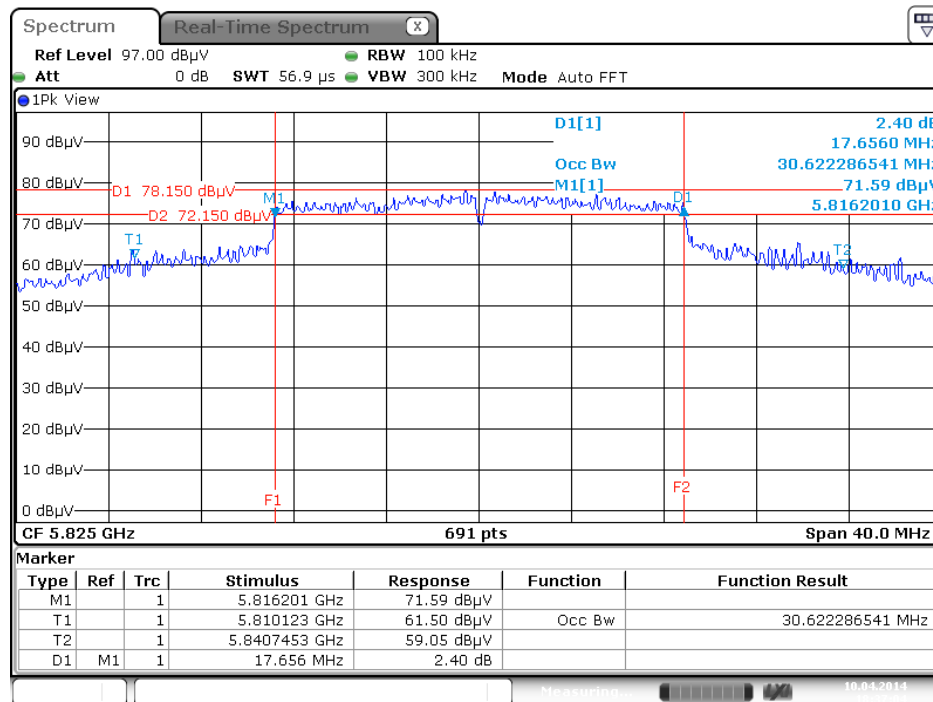
Date: 10. APR. 2014 18:07:59

6 dB Bandwidth Plot on Configuration IEEE 802.11n MCS0 HT40 / 2452 MHz / Ant. 1 + Ant. 2



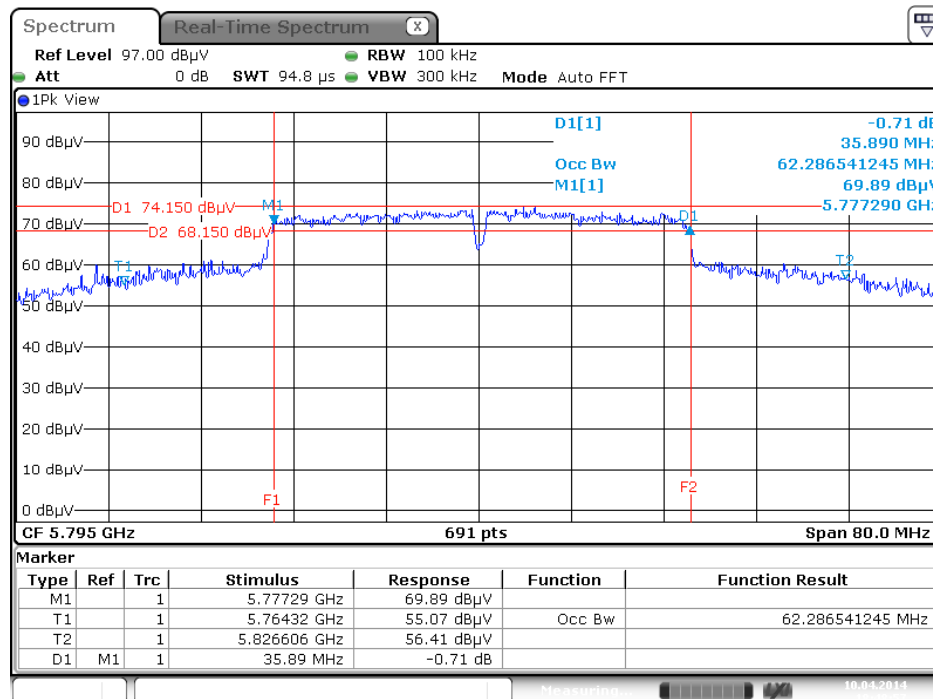
Date: 10. APR. 2014 18:15:25

6 dB Bandwidth Plot on Configuration IEEE 802.11ac MCS0, Nss1 VHT20 / 5825 MHz / Ant. 1 + Ant. 2



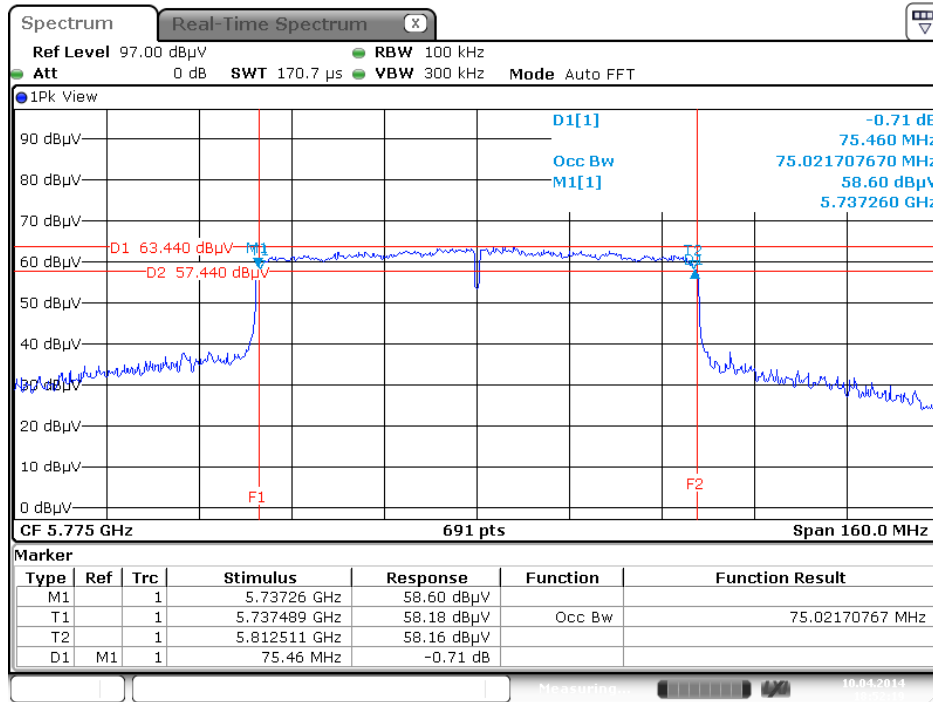
Date: 10. APR. 2014 18:37:04

6 dB Bandwidth Plot on Configuration IEEE 802.11ac MCS0, Nss1 VHT40 / 5795MHz / Ant. 1 + Ant. 2



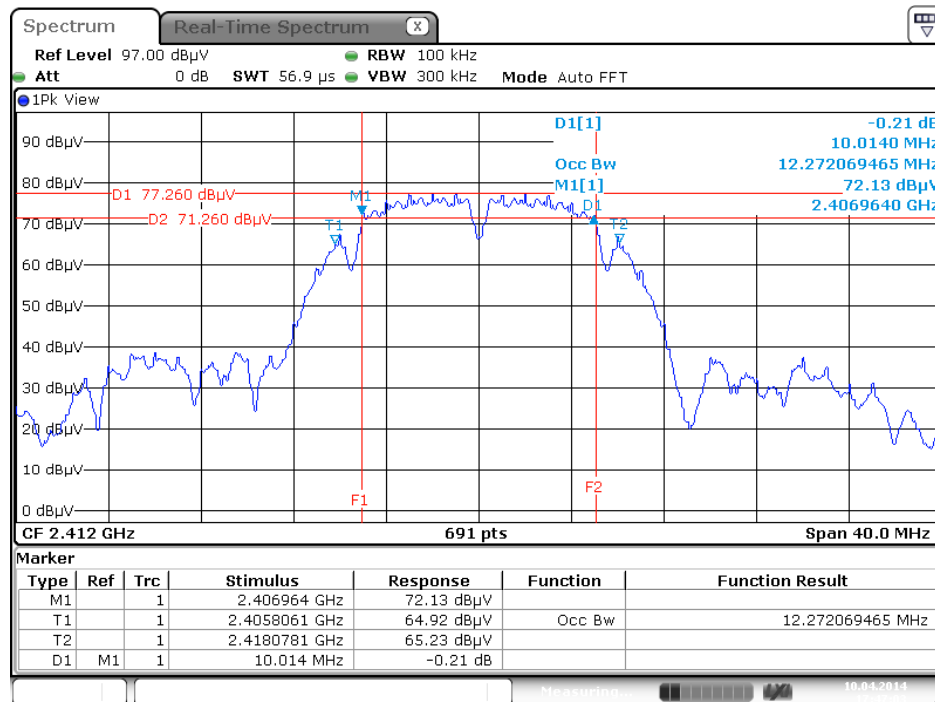
Date: 10. APR. 2014 18:48:57

6 dB Bandwidth Plot on Configuration IEEE 802.11ac MCS0, Nss1 VHT80 / 5775 MHz / Ant. 1 + Ant. 2



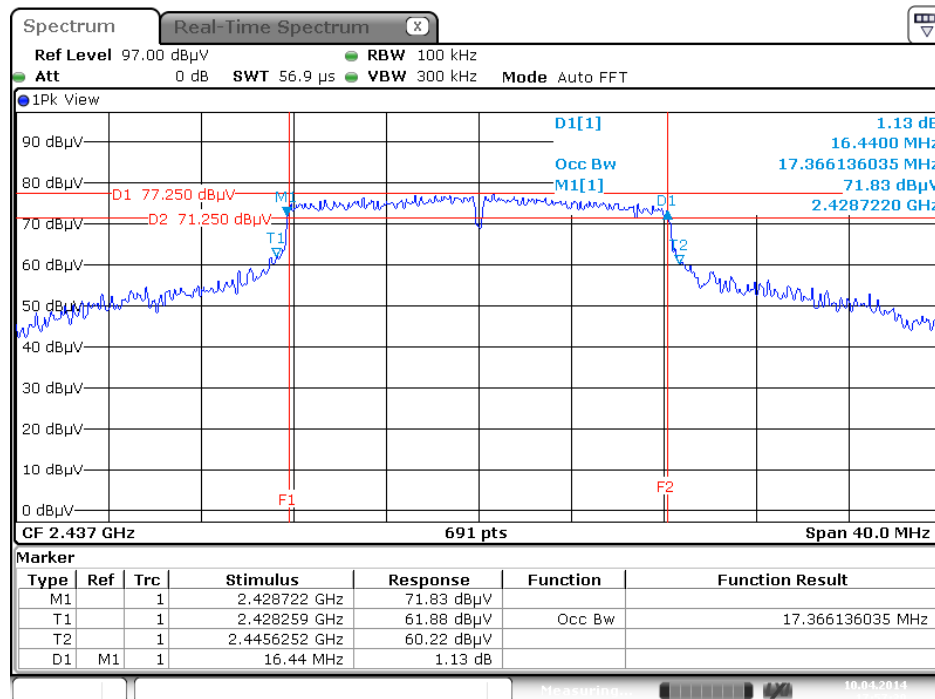


6 dB Bandwidth Plot on Configuration IEEE 802.11b / 2412 MHz / Ant. 1 + Ant. 2



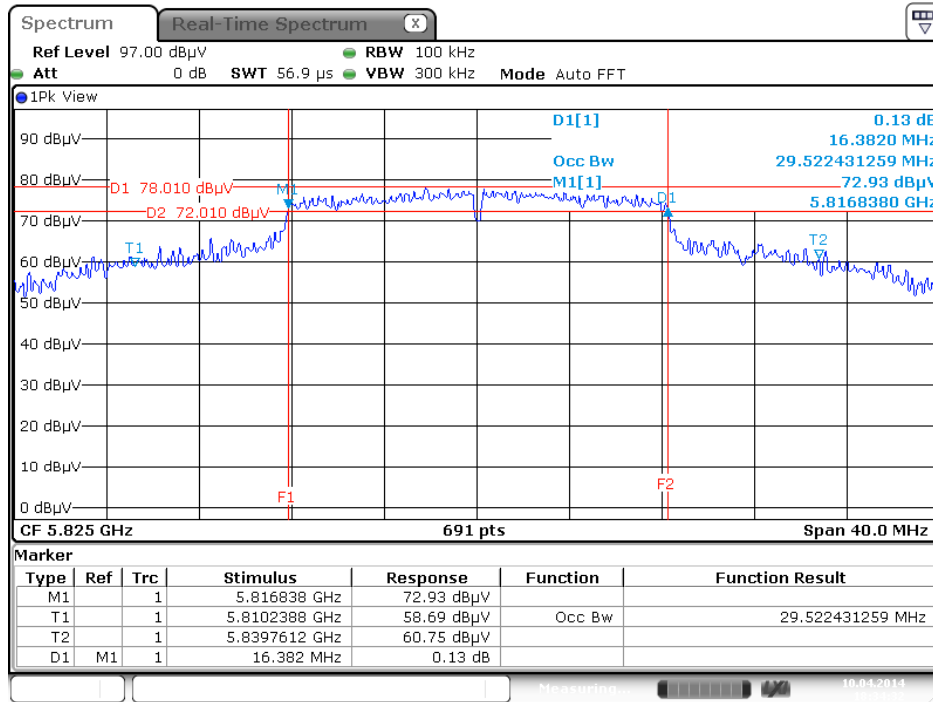
Date: 10. APR. 2014 17:47:03

6 dB Bandwidth Plot on Configuration IEEE 802.11g / 2437 MHz / Ant. 1 + Ant. 2



Date: 10. APR. 2014 17:57:39

6 dB Bandwidth Plot on Configuration IEEE 802.11a / 5825 MHz / Ant. 1 + Ant. 2



Date: 10. APR. 2014 18:34:32

## 4.5. Radiated Emissions Measurement

### 4.5.1. Limit

30dBc in any 100 kHz bandwidth outside the operating frequency band. In case the emission fall within the restricted band specified on 15.205(a), then the 15.209(a) limit in the table below has to be followed.

Frequencies (MHz)	Field Strength (micorvolts/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

### 4.5.2. Measuring Instruments and Setting

Please refer to section 5 of equipments list in this report. The following table is the setting of spectrum analyzer and receiver.

Spectrum Parameter	Setting
Attenuation	Auto
Start Frequency	1GHz
Stop Frequency	10th carrier harmonic
RBW / VBW (Emission in restricted band)	1MHz / 3MHz for Peak, 1MHz / 10Hz for Average
RBW / VBW (Emission in non-restricted band)	100kHz / 300kHz for peak

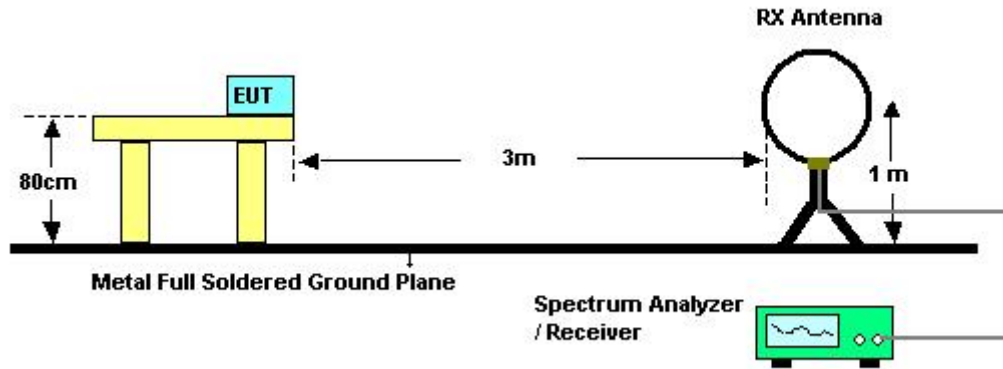
Receiver Parameter	Setting
Attenuation	Auto
Start ~ Stop Frequency	9kHz~150kHz / RBW 200Hz for QP
Start ~ Stop Frequency	150kHz~30MHz / RBW 9kHz for QP
Start ~ Stop Frequency	30MHz~1GHz / RBW 120kHz for QP

### 4.5.3. Test Procedures

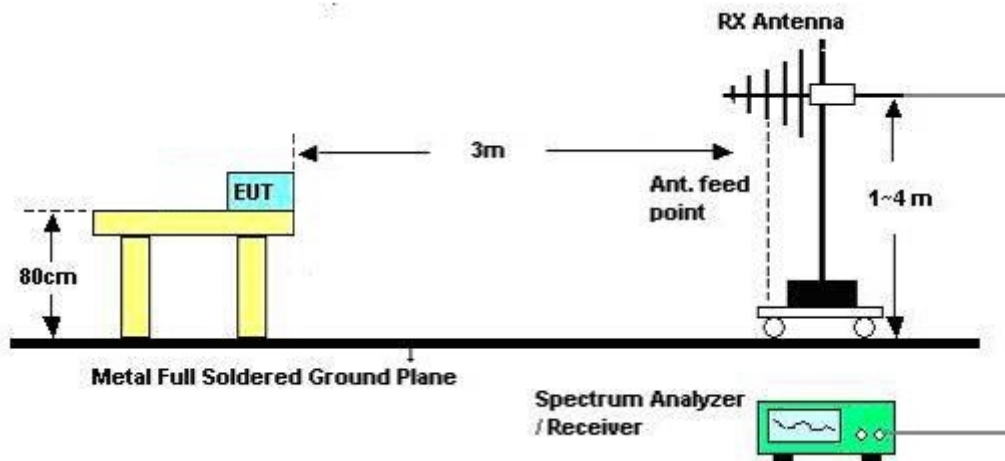
1. Configure the EUT according to ANSI C63.10. The EUT was placed on the top of the turntable 0.8 meter above ground. The phase center of the receiving antenna mounted on the top of a height-variable antenna tower was placed 3 meters far away from the turntable.
2. Power on the EUT and all the supporting units. The turntable was rotated by 360 degrees to determine the position of the highest radiation.
3. The height of the broadband receiving antenna was varied between one meter and four meters above ground to find the maximum emissions field strength of both horizontal and vertical polarization.
4. For each suspected emissions, the antenna tower was scan (from 1 M to 4 M) and then the turntable was rotated (from 0 degree to 360 degrees) to find the maximum reading.
5. Set the test-receiver system to Peak or CISPR quasi-peak Detect Function with specified bandwidth under Maximum Hold Mode.
6. For emissions above 1GHz, use 1MHz VBW and 3MHz RBW for peak reading. Then 1MHz RBW and 10Hz VBW for average reading in spectrum analyzer.
7. When the radiated emissions limits are expressed in terms of the average value of the emissions, and pulsed operation is employed, the measurement field strength shall be determined by averaging over one complete pulse train, including blanking intervals, as long as the pulse train does not exceed 0.1 seconds. As an alternative (provided the transmitter operates for longer than 0.1 seconds) or in cases where the pulse train exceeds 0.1 seconds, the measured field strength shall be determined from the average absolute voltage during a 0.1 second interval during which the field strength is at its maximum value.
8. If the emissions level of the EUT in peak mode was 3 dB lower than the average limit specified, then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions which do not have 3 dB margin will be repeated one by one using the quasi-peak method for below 1GHz.
9. For testing above 1GHz, the emissions level of the EUT in peak mode was lower than average limit (that means the emissions level in peak mode also complies with the limit in average mode), then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions will be measured in average mode again and reported.
10. In case the emission is lower than 30MHz, loop antenna has to be used for measurement and the recorded data should be QP measured by receiver. High – Low scan is not required in this case.

#### 4.5.4. Test Setup Layout

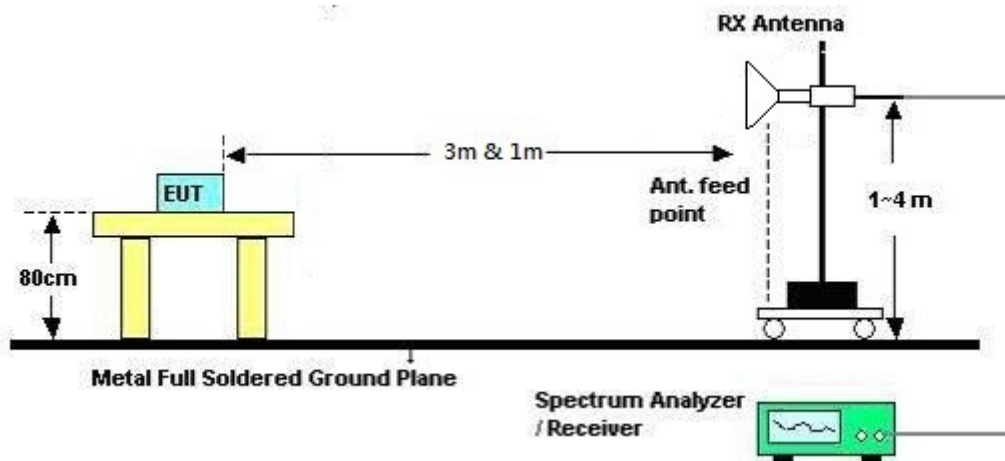
For Radiated Emissions: 9kHz ~30MHz



For Radiated Emissions: 30MHz~1GHz



For Radiated Emissions: Above 1GHz



#### 4.5.5. Test Deviation

There is no deviation with the original standard.

#### 4.5.6. EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

#### 4.5.7. Results of Radiated Emissions (9kHz~30MHz)

<b>Temperature</b>	24°C	<b>Humidity</b>	55%
<b>Test Engineer</b>	David Tseng	<b>Configurations</b>	Normal Link
<b>Test Date</b>	Mar. 18, 2014	<b>Test Mode</b>	Mode 1

<b>Freq. (MHz)</b>	<b>Level (dBuV)</b>	<b>Over Limit (dB)</b>	<b>Limit Line (dBuV)</b>	<b>Remark</b>
-	-	-	-	See Note

Note:

The amplitude of spurious emissions that are attenuated by more than 20 dB below the permissible value has no need to be reported.

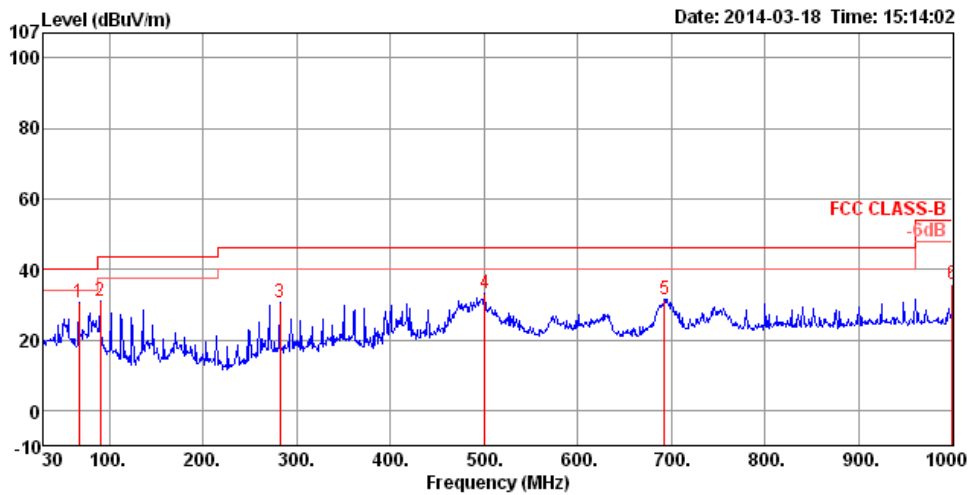
Distance extrapolation factor =  $40 \log(\text{specific distance} / \text{test distance})$  (dB);

Limit line = specific limits (dBuV) + distance extrapolation factor.

#### 4.5.8. Results of Radiated Emissions (30MHz~1GHz)

Temperature	24°C	Humidity	55%
Test Engineer	David Tseng	Configurations	Normal Link
Test Mode	Mode 1		

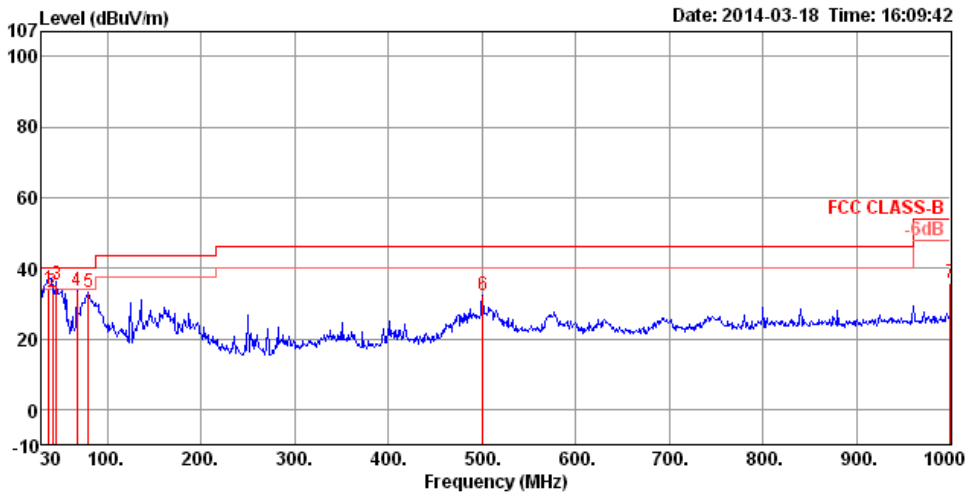
##### Horizontal



	Freq	Level	Limit	Over	Read	CableAntenna	Preamp	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg	
1	67.83	30.75	40.00	-9.25	56.50	0.98	5.08	31.81	300	281	HORIZONTAL Peak
2	90.14	30.93	43.50	-12.57	52.65	1.13	8.74	31.59	200	98	HORIZONTAL Peak
3	282.20	30.37	46.00	-15.63	47.32	2.03	12.57	31.55	125	29	HORIZONTAL Peak
4	500.45	33.25	46.00	-12.75	44.92	2.82	16.92	31.41	100	233	HORIZONTAL Peak
5	692.51	31.60	46.00	-14.40	40.73	3.40	18.79	31.32	125	324	HORIZONTAL Peak
6	1000.00	35.74	54.00	-18.26	41.27	4.21	21.44	31.18	150	169	HORIZONTAL Peak



**Vertical**



	Freq	Level	Limit	Over	Read	CableAntenna	Preamp	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg	
1	37.76	33.92	40.00	-6.08	51.30	0.72	13.78	31.88	100	70 VERTICAL	QP
2	41.64	33.06	40.00	-6.94	52.89	0.76	11.27	31.86	100	1 VERTICAL	QP
3	45.52	35.45	40.00	-4.55	57.25	0.80	9.23	31.83	100	46 VERTICAL	QP
4	67.83	33.72	40.00	-6.28	59.47	0.98	5.08	31.81	200	352 VERTICAL	Peak
5	79.47	33.32	40.00	-6.68	57.26	1.04	6.73	31.71	100	255 VERTICAL	Peak
6	500.45	32.44	46.00	-13.56	44.11	2.82	16.92	31.41	100	212 VERTICAL	Peak
7	1000.00	35.67	54.00	-18.33	41.20	4.21	21.44	31.18	125	129 VERTICAL	Peak

**Note:**

The amplitude of spurious emissions that are attenuated by more than 20dB below the permissible value has no need to be reported.

Emission level (dBuV/m) = 20 log Emission level (uV/m).

Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level.

#### 4.5.9. Results for Radiated Emissions (1GHz~10<sup>th</sup> Harmonic)

<b>Temperature</b>	24°C	<b>Humidity</b>	55%
<b>Test Engineer</b>	David Tseng	<b>Configurations</b>	IEEE 802.11n MCS0 HT20 CH 1 / Ant. 1 + Ant. 2
<b>Test Date</b>	Feb. 25, 2014		

##### Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	CableAntenna Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	4817.96	33.94	54.00	-20.06	29.91	5.87	33.36	35.20	Average	100	313	HORIZONTAL
2	4820.40	47.42	74.00	-26.58	43.36	5.87	33.39	35.20	Peak	100	313	HORIZONTAL

##### Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	CableAntenna Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	4816.36	48.49	74.00	-25.51	44.48	5.85	33.36	35.20	Peak	100	261	VERTICAL
2	4823.88	35.57	54.00	-18.43	31.51	5.87	33.39	35.20	Average	100	261	VERTICAL

<b>Temperature</b>	24°C	<b>Humidity</b>	55%
<b>Test Engineer</b>	David Tseng	<b>Configurations</b>	IEEE 802.11n MCS0 HT20 CH 6 / Ant. 1 + Ant. 2
<b>Test Date</b>	Feb. 25, 2014		

### Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	CableAntenna Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	4868.56	32.55	54.00	-21.45	28.38	5.92	33.45	35.20	Average	100	277	HORIZONTAL
2	4875.36	44.84	74.00	-29.16	40.64	5.92	33.48	35.20	Peak	100	277	HORIZONTAL
3	7304.28	36.38	54.00	-17.62	28.19	7.13	36.48	35.42	Average	100	108	HORIZONTAL
4	7309.92	50.25	74.00	-23.75	42.04	7.13	36.51	35.43	Peak	100	108	HORIZONTAL

### Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	CableAntenna Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	4872.08	53.18	74.00	-20.82	48.98	5.92	33.48	35.20	Peak	100	252	VERTICAL
2	4873.68	38.97	54.00	-15.03	34.77	5.92	33.48	35.20	Average	100	252	VERTICAL
3	7302.00	36.52	54.00	-17.48	28.33	7.13	36.48	35.42	Average	100	202	VERTICAL
4	7319.04	49.51	74.00	-24.49	41.29	7.14	36.51	35.43	Peak	100	202	VERTICAL

<b>Temperature</b>	24°C	<b>Humidity</b>	55%
<b>Test Engineer</b>	David Tseng	<b>Configurations</b>	IEEE 802.11n MCS0 HT20 CH 11 / Ant. 1 + Ant. 2
<b>Test Date</b>	Feb. 25, 2014		

**Horizontal**

	Freq	Level	Limit	Over	Read	Cable	Antenna	Preamp	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	4920.64	44.96	74.00	-29.04	40.65	5.97	33.54	35.20	Peak	100	269	HORIZONTAL
2	4927.96	32.31	54.00	-21.69	27.96	5.97	33.58	35.20	Average	100	269	HORIZONTAL
3	7376.28	36.73	54.00	-17.27	28.41	7.16	36.61	35.45	Average	100	126	HORIZONTAL
4	7376.52	50.60	74.00	-23.40	42.28	7.16	36.61	35.45	Peak	100	126	HORIZONTAL

**Vertical**

	Freq	Level	Limit	Over	Read	Cable	Antenna	Preamp	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	4918.48	48.73	74.00	-25.27	44.44	5.95	33.54	35.20	Peak	100	250	VERTICAL
2	4922.80	35.25	54.00	-18.75	30.90	5.97	33.58	35.20	Average	100	250	VERTICAL
3	7383.04	36.58	54.00	-17.42	28.26	7.16	36.61	35.45	Average	100	215	VERTICAL
4	7385.48	49.75	74.00	-24.25	41.43	7.17	36.61	35.46	Peak	100	215	VERTICAL

<b>Temperature</b>	24°C	<b>Humidity</b>	55%
<b>Test Engineer</b>	David Tseng	<b>Configurations</b>	IEEE 802.11n MCS0 HT40 CH 3 / Ant. 1 + Ant. 2
<b>Test Date</b>	Feb. 25, 2014		

### Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	CableAntenna Loss Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase	
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	4834.28	45.82	74.00	-28.18	41.75	5.88	33.39	35.20	Peak	100	275	HORIZONTAL
2	4850.48	32.31	54.00	-21.69	28.21	5.88	33.42	35.20	Average	100	275	HORIZONTAL
3	7272.24	49.48	74.00	-24.52	41.35	7.11	36.43	35.41	Peak	100	154	HORIZONTAL
4	7274.24	36.61	54.00	-17.39	28.46	7.11	36.45	35.41	Average	100	154	HORIZONTAL

### Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	CableAntenna Loss Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase	
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	4840.12	32.82	54.00	-21.18	28.72	5.88	33.42	35.20	Average	100	315	VERTICAL
2	4842.48	45.03	74.00	-28.97	40.93	5.88	33.42	35.20	Peak	100	315	VERTICAL
3	7265.04	49.06	74.00	-24.94	40.93	7.11	36.43	35.41	Peak	100	213	VERTICAL
4	7275.36	36.58	54.00	-17.42	28.43	7.11	36.45	35.41	Average	100	213	VERTICAL

<b>Temperature</b>	24°C	<b>Humidity</b>	55%
<b>Test Engineer</b>	David Tseng	<b>Configurations</b>	IEEE 802.11n MCS0 HT40 CH 6 / Ant. 1 + Ant. 2
<b>Test Date</b>	Feb. 25, 2014		

### Horizontal

	Freq	Level	Limit	Over	Read	CableAntenna	Preamp	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg	
1	4868.20	32.46	54.00	-21.54	28.29	5.92	33.45	35.20	Average	100	246 HORIZONTAL
2	4868.52	45.55	74.00	-28.45	41.38	5.92	33.45	35.20	Peak	100	246 HORIZONTAL
3	7301.64	36.80	54.00	-17.20	28.61	7.13	36.48	35.42	Average	100	165 HORIZONTAL
4	7303.96	49.93	74.00	-24.07	41.74	7.13	36.48	35.42	Peak	100	165 HORIZONTAL

### Vertical

	Freq	Level	Limit	Over	Read	CableAntenna	Preamp	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg	
1	4869.64	32.46	54.00	-21.54	28.29	5.92	33.45	35.20	Average	100	237 VERTICAL
2	4870.40	45.49	74.00	-28.51	41.32	5.92	33.45	35.20	Peak	100	237 VERTICAL
3	7302.64	36.72	54.00	-17.28	28.53	7.13	36.48	35.42	Average	100	102 VERTICAL
4	7311.92	49.38	74.00	-24.62	41.17	7.13	36.51	35.43	Peak	100	102 VERTICAL

<b>Temperature</b>	24°C	<b>Humidity</b>	55%
<b>Test Engineer</b>	David Tseng	<b>Configurations</b>	IEEE 802.11n MCS0 HT40 CH 9 / Ant. 1 + Ant. 2
<b>Test Date</b>	Feb. 25, 2014		

### Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	CableAntenna Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	4908.36	32.82	54.00	-21.18	28.53	5.95	33.54	35.20	Average	100	100	HORIZONTAL
2	4912.08	46.05	74.00	-27.95	41.76	5.95	33.54	35.20	Peak	100	100	HORIZONTAL
3	7355.16	37.36	54.00	-16.64	29.08	7.16	36.56	35.44	Average	100	184	HORIZONTAL
4	7360.76	50.48	74.00	-23.52	42.18	7.16	36.59	35.45	Peak	100	184	HORIZONTAL

### Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	CableAntenna Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	4909.88	33.33	54.00	-20.67	29.04	5.95	33.54	35.20	Average	100	300	VERTICAL
2	4911.68	45.80	74.00	-28.20	41.51	5.95	33.54	35.20	Peak	100	300	VERTICAL
3	7359.00	50.39	74.00	-23.61	42.09	7.16	36.59	35.45	Peak	100	203	VERTICAL
4	7360.28	37.42	54.00	-16.58	29.12	7.16	36.59	35.45	Average	100	203	VERTICAL

<b>Temperature</b>	24°C	<b>Humidity</b>	55%
<b>Test Engineer</b>	David Tseng	<b>Configurations</b>	IEEE 802.11ac MCS0, Nss1 VHT20 CH 149 / Ant. 1 + Ant. 2
<b>Test Date</b>	Feb. 26, 2014		

### Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	CableAntenna Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	11489.32	43.34	54.00	-10.66	29.68	9.24	39.50	35.08	Average	150	240	HORIZONTAL
2	11499.44	55.85	74.00	-18.15	42.20	9.25	39.50	35.10	Peak	150	240	HORIZONTAL

### Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	CableAntenna Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	11488.76	59.71	74.00	-14.29	46.05	9.24	39.50	35.08	Peak	150	13	VERTICAL
2	11489.96	46.21	54.00	-7.79	32.55	9.24	39.50	35.08	Average	150	13	VERTICAL



<b>Temperature</b>	24°C	<b>Humidity</b>	55%
<b>Test Engineer</b>	David Tseng	<b>Configurations</b>	IEEE 802.11ac MCS0, Nss1 VHT20 CH 157 / Ant. 1 + Ant. 2
<b>Test Date</b>	Feb. 26, 2014		

**Horizontal**

	Freq	Level	Limit	Over	Read	Cable	Antenna	Preamp	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	Loss	Factor	Factor		cm	deg	
1	11566.08	43.18	54.00	-10.82	29.53	9.26	39.48	35.09	Average	100	225	HORIZONTAL
2	11576.24	55.17	74.00	-18.83	41.52	9.26	39.47	35.08	Peak	100	225	HORIZONTAL

**Vertical**

	Freq	Level	Limit	Over	Read	Cable	Antenna	Preamp	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	Loss	Factor	Factor		cm	deg	
1	11570.36	45.70	54.00	-8.30	32.06	9.26	39.47	35.09	Average	141	6	VERTICAL
2	11576.36	57.63	74.00	-16.37	43.98	9.26	39.47	35.08	Peak	141	6	VERTICAL

<b>Temperature</b>	24°C	<b>Humidity</b>	55%
<b>Test Engineer</b>	David Tseng	<b>Configurations</b>	IEEE 802.11ac MCS0, Nss1 VHT20 CH 165 / Ant. 1 + Ant. 2
<b>Test Date</b>	Feb. 26, 2014		

**Horizontal**

	Freq	Level	Limit	Over	Read	Cable	Antenna	Preamp	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	Loss	Factor	Factor		cm	deg	
1	11649.36	43.16	54.00	-10.84	29.51	9.28	39.44	35.07	Average	100	185	HORIZONTAL
2	11657.68	55.68	74.00	-18.32	42.03	9.28	39.44	35.07	Peak	100	185	HORIZONTAL

**Vertical**

	Freq	Level	Limit	Over	Read	Cable	Antenna	Preamp	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	Loss	Factor	Factor		cm	deg	
1	11648.84	46.59	54.00	-7.41	32.94	9.28	39.44	35.07	Average	154	3	VERTICAL
2	11656.04	57.24	74.00	-16.76	43.59	9.28	39.44	35.07	Peak	154	3	VERTICAL

<b>Temperature</b>	24°C	<b>Humidity</b>	55%
<b>Test Engineer</b>	David Tseng	<b>Configurations</b>	IEEE 802.11ac MCS0, Nss1 VHT40 CH 151 / Ant. 1 + Ant. 2
<b>Test Date</b>	Feb. 26, 2014		

**Horizontal**

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	11504.00	55.11	74.00	-18.89	41.46	9.25	39.50	35.10	Peak	100	202	HORIZONTAL
2	11504.40	42.65	54.00	-11.35	29.00	9.25	39.50	35.10	Average	100	202	HORIZONTAL

**Vertical**

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	11500.36	44.45	54.00	-9.55	30.80	9.25	39.50	35.10	Average	117	36	VERTICAL
2	11515.00	56.05	74.00	-17.95	42.40	9.25	39.50	35.10	Peak	117	36	VERTICAL

<b>Temperature</b>	24°C	<b>Humidity</b>	55%
<b>Test Engineer</b>	David Tseng	<b>Configurations</b>	IEEE 802.11ac MCS0, Nss1 VHT40 CH 159 / Ant. 1 + Ant. 2
<b>Test Date</b>	Feb. 26, 2014		

### Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	CableAntenna Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	11583.48	56.01	74.00	-17.99	42.35	9.27	39.47	35.08	Peak	100	262	HORIZONTAL
2	11584.24	42.59	54.00	-11.41	28.93	9.27	39.47	35.08	Average	100	262	HORIZONTAL

### Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	CableAntenna Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	11585.88	56.01	74.00	-17.99	42.35	9.27	39.47	35.08	Peak	137	1	VERTICAL
2	11595.00	44.78	54.00	-9.22	31.12	9.27	39.47	35.08	Average	137	1	VERTICAL

<b>Temperature</b>	24°C	<b>Humidity</b>	55%
<b>Test Engineer</b>	David Tseng	<b>Configurations</b>	IEEE 802.11ac MCS0, Nss1 VHT80 CH 155 / Ant. 1 + Ant. 2
<b>Test Date</b>	Feb. 26, 2014		

**Horizontal**

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	11552.12	55.79	74.00	-18.21	42.14	9.26	39.48	35.09	Peak	100	211	HORIZONTAL
2	11557.28	42.62	54.00	-11.38	28.97	9.26	39.48	35.09	Average	100	211	HORIZONTAL

**Vertical**

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	11553.28	55.42	74.00	-18.58	41.77	9.26	39.48	35.09	Peak	143	16	VERTICAL
2	11557.04	43.86	54.00	-10.14	30.21	9.26	39.48	35.09	Average	143	16	VERTICAL

<b>Temperature</b>	24°C	<b>Humidity</b>	55%
<b>Test Engineer</b>	David Tseng	<b>Configurations</b>	IEEE 802.11b CH 1 / Ant. 1 + Ant. 2
<b>Test Date</b>	Feb. 25, 2014		

### Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	4824.03	46.06	74.00	-27.94	42.00	5.87	33.39	35.20	Peak	101	262	HORIZONTAL
2	4824.09	37.08	54.00	-16.92	33.02	5.87	33.39	35.20	Average	101	262	HORIZONTAL

### Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	4824.02	42.58	54.00	-11.42	38.52	5.87	33.39	35.20	Average	100	262	VERTICAL
2	4824.11	49.22	74.00	-24.78	45.16	5.87	33.39	35.20	Peak	100	262	VERTICAL

<b>Temperature</b>	24°C	<b>Humidity</b>	55%
<b>Test Engineer</b>	David Tseng	<b>Configurations</b>	IEEE 802.11b CH 6 / Ant. 1 + Ant. 2
<b>Test Date</b>	Feb. 25, 2014		

### Horizontal

	Freq	Level	Limit	Over	Read	Cable	Antenna	Preamp	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	Loss	Factor	Factor		cm	deg	
1	4873.82	47.30	74.00	-26.70	43.10	5.92	33.48	35.20	Peak	100	162	HORIZONTAL
2	4873.98	37.88	54.00	-16.12	33.68	5.92	33.48	35.20	Average	100	162	HORIZONTAL
3	7310.34	36.18	54.00	-17.82	27.97	7.13	36.51	35.43	Average	100	241	HORIZONTAL
4	7311.89	49.60	74.00	-24.40	41.39	7.13	36.51	35.43	Peak	100	241	HORIZONTAL

### Vertical

	Freq	Level	Limit	Over	Read	Cable	Antenna	Preamp	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	Loss	Factor	Factor		cm	deg	
1	4874.02	53.78	54.00	-0.22	49.58	5.92	33.48	35.20	Average	102	13	VERTICAL
2	4874.03	56.13	74.00	-17.87	51.93	5.92	33.48	35.20	Peak	102	13	VERTICAL
3	7310.18	49.34	74.00	-24.66	41.13	7.13	36.51	35.43	Peak	100	225	VERTICAL
4	7311.52	36.45	54.00	-17.55	28.24	7.13	36.51	35.43	Average	100	225	VERTICAL

<b>Temperature</b>	24°C	<b>Humidity</b>	55%
<b>Test Engineer</b>	David Tseng	<b>Configurations</b>	IEEE 802.11b CH 11 / Ant. 1 + Ant. 2
<b>Test Date</b>	Feb. 25, 2014		

### Horizontal

	Freq	Level	Limit	Over	Read	Cable	Antenna	Preamp	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	Loss	Factor	Factor		cm	deg	
1	4923.97	47.23	74.00	-26.77	42.88	5.97	33.58	35.20	Peak	170	317	HORIZONTAL
2	4924.01	38.45	54.00	-15.55	34.10	5.97	33.58	35.20	Average	170	317	HORIZONTAL
3	7386.48	49.57	74.00	-24.43	41.25	7.17	36.61	35.46	Peak	100	210	HORIZONTAL
4	7386.66	36.45	54.00	-17.55	28.13	7.17	36.61	35.46	Average	100	210	HORIZONTAL

### Vertical

	Freq	Level	Limit	Over	Read	Cable	Antenna	Preamp	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	Loss	Factor	Factor		cm	deg	
1	4923.93	50.69	74.00	-23.31	46.34	5.97	33.58	35.20	Peak	102	15	VERTICAL
2	4923.99	45.76	54.00	-8.24	41.41	5.97	33.58	35.20	Average	102	15	VERTICAL
3	7385.56	36.43	54.00	-17.57	28.11	7.17	36.61	35.46	Average	100	154	VERTICAL
4	7386.88	51.02	74.00	-22.98	42.70	7.17	36.61	35.46	Peak	100	154	VERTICAL



<b>Temperature</b>	24°C	<b>Humidity</b>	55%
<b>Test Engineer</b>	David Tseng	<b>Configurations</b>	IEEE 802.11g CH 1 / Ant. 1 + Ant. 2
<b>Test Date</b>	Feb. 25, 2014		

### Horizontal

	Freq	Level	Limit	Over	Read	Cable	Antenna	Preamp	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	4817.72	33.16	54.00	-20.84	29.13	5.87	33.36	35.20	Average	100	289	HORIZONTAL
2	4819.32	45.07	74.00	-28.93	41.04	5.87	33.36	35.20	Peak	100	289	HORIZONTAL

### Vertical

	Freq	Level	Limit	Over	Read	Cable	Antenna	Preamp	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	4818.28	49.80	74.00	-24.20	45.77	5.87	33.36	35.20	Peak	100	248	VERTICAL
2	4822.72	37.77	54.00	-16.23	33.71	5.87	33.39	35.20	Average	100	248	VERTICAL

<b>Temperature</b>	24°C	<b>Humidity</b>	55%
<b>Test Engineer</b>	David Tseng	<b>Configurations</b>	IEEE 802.11g CH 6 / Ant. 1 + Ant. 2
<b>Test Date</b>	Feb. 25, 2014		

**Horizontal**

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	4866.96	45.40	74.00	-28.60	41.25	5.90	33.45	35.20	Peak	100	250	HORIZONTAL
2	4876.76	32.13	54.00	-21.87	27.93	5.92	33.48	35.20	Average	100	250	HORIZONTAL
3	7301.76	36.34	54.00	-17.66	28.15	7.13	36.48	35.42	Average	100	128	HORIZONTAL
4	7319.20	49.04	74.00	-24.96	40.82	7.14	36.51	35.43	Peak	100	128	HORIZONTAL

**Vertical**

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	4874.28	38.54	54.00	-15.46	34.34	5.92	33.48	35.20	Average	100	262	VERTICAL
2	4876.80	51.14	74.00	-22.86	46.94	5.92	33.48	35.20	Peak	100	262	VERTICAL
3	7304.88	49.25	74.00	-24.75	41.06	7.13	36.48	35.42	Peak	100	216	VERTICAL
4	7309.24	36.18	54.00	-17.82	27.97	7.13	36.51	35.43	Average	100	216	VERTICAL

<b>Temperature</b>	24°C	<b>Humidity</b>	55%
<b>Test Engineer</b>	David Tseng	<b>Configurations</b>	IEEE 802.11g CH 11 / Ant. 1 + Ant. 2
<b>Test Date</b>	Feb. 25, 2014		

### Horizontal

	Freq	Level	Limit	Over	Read	Cable	Antenna	Preamp	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	Loss	Factor	Factor		cm	deg	
1	4919.26	32.69	54.00	-21.31	28.38	5.97	33.54	35.20	Average	100	170	HORIZONTAL
2	4919.46	45.10	74.00	-28.90	40.79	5.97	33.54	35.20	Peak	100	170	HORIZONTAL
3	7383.02	49.60	74.00	-24.40	41.28	7.16	36.61	35.45	Peak	100	250	HORIZONTAL
4	7390.06	36.69	54.00	-17.31	28.37	7.17	36.61	35.46	Average	100	250	HORIZONTAL

### Vertical

	Freq	Level	Limit	Over	Read	Cable	Antenna	Preamp	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	Loss	Factor	Factor		cm	deg	
1	4922.00	37.76	54.00	-16.24	33.41	5.97	33.58	35.20	Average	100	253	VERTICAL
2	4924.58	50.25	74.00	-23.75	45.90	5.97	33.58	35.20	Peak	100	253	VERTICAL
3	7386.52	36.62	54.00	-17.38	28.30	7.17	36.61	35.46	Average	100	168	VERTICAL
4	7388.38	49.71	74.00	-24.29	41.39	7.17	36.61	35.46	Peak	100	168	VERTICAL

<b>Temperature</b>	24°C	<b>Humidity</b>	55%
<b>Test Engineer</b>	David Tseng	<b>Configurations</b>	IEEE 802.11a CH 149 / Ant. 1 + Ant. 2
<b>Test Date</b>	Feb. 26, 2014		

### Horizontal

	Freq	Level	Limit	Over	Read	CableAntenna	Preamp	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	Loss	Factor	Factor	cm	deg	
1	11486.72	55.87	74.00	-18.13	42.21	9.24	39.50	35.08	100	236	HORIZONTAL
2	11488.72	42.51	54.00	-11.49	28.85	9.24	39.50	35.08	100	236	HORIZONTAL

### Vertical

	Freq	Level	Limit	Over	Read	CableAntenna	Preamp	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	Loss	Factor	Factor	cm	deg	
1	11487.84	46.96	54.00	-7.04	33.30	9.24	39.50	35.08	145	2	VERTICAL
2	11493.04	58.92	74.00	-15.08	45.26	9.24	39.50	35.08	145	2	VERTICAL

<b>Temperature</b>	24°C	<b>Humidity</b>	55%
<b>Test Engineer</b>	David Tseng	<b>Configurations</b>	IEEE 802.11a CH 157 / Ant. 1 + Ant. 2
<b>Test Date</b>	Feb. 26, 2014		

**Horizontal**

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	11574.84	42.61	54.00	-11.39	28.96	9.26	39.47	35.08	Average	100	203	HORIZONTAL
2	11575.32	55.55	74.00	-18.45	41.90	9.26	39.47	35.08	Peak	100	203	HORIZONTAL

**Vertical**

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	11570.44	58.01	74.00	-15.99	44.37	9.26	39.47	35.09	Peak	137	29	VERTICAL
2	11571.64	46.01	54.00	-7.99	32.37	9.26	39.47	35.09	Average	137	29	VERTICAL

<b>Temperature</b>	24°C	<b>Humidity</b>	55%
<b>Test Engineer</b>	David Tseng	<b>Configurations</b>	IEEE 802.11a CH 165 / Ant. 1 + Ant. 2
<b>Test Date</b>	Feb. 26, 2014		

### Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	11641.20	55.60	74.00	-18.40	41.95	9.28	39.44	35.07	Peak	100	246	HORIZONTAL
2	11655.84	42.97	54.00	-11.03	29.32	9.28	39.44	35.07	Average	100	246	HORIZONTAL

### Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	11646.28	58.09	74.00	-15.91	44.44	9.28	39.44	35.07	Peak	147	4	VERTICAL
2	11652.36	46.51	54.00	-7.49	32.86	9.28	39.44	35.07	Average	147	4	VERTICAL

### Note:

The amplitude of spurious emissions that are attenuated by more than 20dB below the permissible value has no need to be reported.

Emission level (dBuV/m) = 20 log Emission level (uV/m).

Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level.

## 4.6. Emissions Measurement

### 4.6.1. Limit

30dBc in any 100 kHz bandwidth outside the operating frequency band. In case the emission fall within the restricted band specified on 15.205(a), then the 15.209(a) limit in the table below has to be followed.

Frequencies (MHz)	Field Strength (micorvolts/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

### 4.6.2. Measuring Instruments and Setting

Please refer to section 5 of equipments list in this report. The following table is the setting of the spectrum analyzer.

Spectrum Parameter	Setting
Attenuation	Auto
Span Frequency	100 MHz
RBW / VBW (Emission in restricted band)	1MHz / 3MHz for Peak, 1 MHz / 10Hz for Average
RBW / VBW (Emission in non-restricted band)	100 kHz / 300 kHz for Peak

### 4.6.3. Test Procedures

For Radiated band edges Measurement:

1. The test procedure is the same as section 4.5.3, only the frequency range investigated is limited to 100MHz around band edges.

For Radiated Out of Band Emission Measurement:

1. Test was performed in accordance with KDB 558074 D01 v03r01 for Performing Compliance Measurements on Digital Transmission Systems (DTS) Operating Under §15.247 section 10.1 Unwanted Emissions into Non-Restricted Frequency Bands Measurement Procedure
2. The radiated emission test is performed on each TX port of operating mode without summing or adding  $10\log(N)$  since the limit is relative emission limit.  
Only worst data of each operating mode is presented.

#### **4.6.4. Test Setup Layout**

For Radiated band edges Measurement:

This test setup layout is the same as that shown in section 4.5.4.

For Radiated Out of Band Emission Measurement:

This test setup layout is the same as that shown in section 4.5.4.

#### **4.6.5. Test Deviation**

There is no deviation with the original standard.

#### **4.6.6. EUT Operation during Test**

The EUT was programmed to be in continuously transmitting mode.



#### 4.6.7. Test Result of Band Edge and Fundamental Emissions

Temperature	24°C	Humidity	55%
Test Engineer	David Tseng	Configurations	IEEE 802.11n MCS0 HT20 CH 1, 6, 11 / Ant. 1 + Ant. 2
Test Date	Feb. 25, 2014		

##### Channel 1

	Freq	Level	Limit Line	Over Limit	Read Level	CableAntenna Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	2390.00	52.79	54.00	-1.21	20.65	4.09	28.05	0.00	Average	100	211	VERTICAL
2	2390.00	70.66	74.00	-3.34	38.52	4.09	28.05	0.00	Peak	100	211	VERTICAL
3	2412.40	98.32			66.12	4.11	28.09	0.00	Average	100	211	VERTICAL
4	2413.60	108.91			76.71	4.11	28.09	0.00	Peak	100	211	VERTICAL

Item 3, 4 are the fundamental frequency at 2412 MHz.

##### Channel 6

	Freq	Level	Limit Line	Over Limit	Read Level	CableAntenna Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	2387.60	54.35	74.00	-19.65	22.21	4.09	28.05	0.00	Peak	100	260	VERTICAL
2	2390.00	45.05	54.00	-8.95	12.91	4.09	28.05	0.00	Average	100	260	VERTICAL
3	2437.60	102.03			69.72	4.13	28.18	0.00	Average	100	260	VERTICAL
4	2438.00	110.84			78.53	4.13	28.18	0.00	Peak	100	260	VERTICAL
5	2483.50	46.21	54.00	-7.79	13.79	4.16	28.26	0.00	Average	100	260	VERTICAL
6	2485.10	56.27	74.00	-17.73	23.81	4.16	28.30	0.00	Peak	100	260	VERTICAL

Item 3, 4 are the fundamental frequency at 2437 MHz.

##### Channel 11

	Freq	Level	Limit Line	Over Limit	Read Level	CableAntenna Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	2464.00	107.90			75.54	4.14	28.22	0.00	Peak	100	279	VERTICAL
2	2465.00	98.43			66.07	4.14	28.22	0.00	Average	100	279	VERTICAL
3	2483.50	52.50	54.00	-1.50	20.08	4.16	28.26	0.00	Average	100	279	VERTICAL
4	2484.50	70.24	74.00	-3.76	37.82	4.16	28.26	0.00	Peak	100	279	VERTICAL

Item 1, 2 are the fundamental frequency at 2462 MHz.

<b>Temperature</b>	24°C	<b>Humidity</b>	55%
<b>Test Engineer</b>	David Tseng	<b>Configurations</b>	IEEE 802.11n MCS0 HT40 CH 3, 6, 9 / Ant. 1 + Ant. 2
<b>Test Date</b>	Feb. 25, 2014		

**Channel 3**

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	2388.80	65.15	74.00	-8.85	33.01	4.09	28.05	0.00	Peak	105	214	VERTICAL
2	2390.00	52.91	54.00	-1.09	20.77	4.09	28.05	0.00	Average	105	214	VERTICAL
3	2420.80	100.78			68.53	4.12	28.13	0.00	Peak	105	214	VERTICAL
4	2423.60	91.52			59.27	4.12	28.13	0.00	Average	105	214	VERTICAL

Item 3, 4 are the fundamental frequency at 2422 MHz.

**Channel 6**

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	2389.20	64.91	74.00	-9.09	32.77	4.09	28.05	0.00	Peak	100	211	VERTICAL
2	2390.00	52.34	54.00	-1.66	20.20	4.09	28.05	0.00	Average	100	211	VERTICAL
3	2434.60	106.79			74.49	4.12	28.18	0.00	Peak	100	211	VERTICAL
4	2438.60	96.42			64.11	4.13	28.18	0.00	Average	100	211	VERTICAL
5	2483.50	52.55	54.00	-1.45	20.13	4.16	28.26	0.00	Average	100	211	VERTICAL
6	2483.50	67.65	74.00	-6.35	35.23	4.16	28.26	0.00	Peak	100	211	VERTICAL

Item 3, 4 are the fundamental frequency at 2437 MHz.

**Channel 9**

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	2453.60	95.38			63.02	4.14	28.22	0.00	Average	100	206	VERTICAL
2	2455.60	104.63			72.27	4.14	28.22	0.00	Peak	100	206	VERTICAL
3	2483.50	52.55	54.00	-1.45	20.13	4.16	28.26	0.00	Average	100	206	VERTICAL
4	2483.90	67.68	74.00	-6.32	35.26	4.16	28.26	0.00	Peak	100	206	VERTICAL

Item 1, 2 are the fundamental frequency at 2452 MHz.

Note:

Emission level (dBuV/m) = 20 log Emission level (uV/m).

Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level.

<b>Temperature</b>	24°C	<b>Humidity</b>	55%
<b>Test Engineer</b>	David Tseng	<b>Configurations</b>	IEEE 802.11b CH 1, 6, 11 / Ant. 1 + Ant. 2
<b>Test Date</b>	Feb. 25, 2014		

**Channel 1**

	Freq	Level	Limit Line	Over Limit	Read Level	CableAntenna Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	2387.00	61.06	74.00	-12.94	28.92	4.09	28.05	0.00	Peak	100	202	VERTICAL
2	2387.20	52.66	54.00	-1.34	20.52	4.09	28.05	0.00	Average	100	202	VERTICAL
3	2413.80	107.89			75.69	4.11	28.09	0.00	Average	100	202	VERTICAL
4	2414.60	111.40			79.20	4.11	28.09	0.00	Peak	100	202	VERTICAL

Item 3, 4 are the fundamental frequency at 2412 MHz.

**Channel 6**

	Freq	Level	Limit Line	Over Limit	Read Level	CableAntenna Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	2386.80	44.66	54.00	-9.34	12.52	4.09	28.05	0.00	Average	100	80	VERTICAL
2	2386.80	56.47	74.00	-17.53	24.33	4.09	28.05	0.00	Peak	100	80	VERTICAL
3	2438.20	112.35			80.04	4.13	28.18	0.00	Peak	100	80	VERTICAL
4	2438.60	107.87			75.56	4.13	28.18	0.00	Average	100	80	VERTICAL
5	2486.30	45.01	54.00	-8.99	12.55	4.16	28.30	0.00	Average	100	80	VERTICAL
6	2487.10	57.41	74.00	-16.59	24.95	4.16	28.30	0.00	Peak	100	80	VERTICAL

Item 3, 4 are the fundamental frequency at 2437 MHz.

**Channel 11**

	Freq	Level	Limit Line	Over Limit	Read Level	CableAntenna Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	2463.80	106.81			74.45	4.14	28.22	0.00	Average	100	279	VERTICAL
2	2464.60	110.35			77.99	4.14	28.22	0.00	Peak	100	279	VERTICAL
3	2483.50	52.83	54.00	-1.17	20.41	4.16	28.26	0.00	Average	100	279	VERTICAL
4	2483.50	61.32	74.00	-12.68	28.90	4.16	28.26	0.00	Peak	100	279	VERTICAL

Item 1, 2 are the fundamental frequency at 2462 MHz.

Temperature	24°C	Humidity	55%
Test Engineer	David Tseng	Configurations	IEEE 802.11g CH 1, 6, 11 / Ant. 1 + Ant. 2
Test Date	Feb. 25, 2014		

**Channel 1**

	Freq	Level	Limit Line	Over Limit	Read Level	CableAntenna Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	2389.80	69.32	74.00	-4.68	37.18	4.09	28.05	0.00	Peak	100	80	VERTICAL
2	2390.00	52.88	54.00	-1.12	20.74	4.09	28.05	0.00	Average	100	80	VERTICAL
3	2404.40	96.05			63.85	4.11	28.09	0.00	Average	100	80	VERTICAL
4	2405.40	106.85			74.65	4.11	28.09	0.00	Peak	100	80	VERTICAL

Item 3, 4 are the fundamental frequency at 2412 MHz.

**Channel 6**

	Freq	Level	Limit Line	Over Limit	Read Level	CableAntenna Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	2390.00	44.91	54.00	-9.09	12.77	4.09	28.05	0.00	Average	100	260	VERTICAL
2	2390.00	57.34	74.00	-16.66	25.20	4.09	28.05	0.00	Peak	100	260	VERTICAL
3	2438.20	104.55			72.24	4.13	28.18	0.00	Average	100	260	VERTICAL
4	2439.80	113.61			81.30	4.13	28.18	0.00	Peak	100	260	VERTICAL
5	2483.50	46.50	54.00	-7.50	14.08	4.16	28.26	0.00	Average	100	260	VERTICAL
6	2483.90	59.09	74.00	-14.91	26.67	4.16	28.26	0.00	Peak	100	260	VERTICAL

Item 3, 4 are the fundamental frequency at 2437 MHz.

**Channel 11**

	Freq	Level	Limit Line	Over Limit	Read Level	CableAntenna Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	2463.80	100.72			68.36	4.14	28.22	0.00	Average	100	205	VERTICAL
2	2464.80	109.68			77.32	4.14	28.22	0.00	Peak	100	205	VERTICAL
3	2483.50	52.47	54.00	-1.53	20.05	4.16	28.26	0.00	Average	100	205	VERTICAL
4	2483.70	69.37	74.00	-4.63	36.95	4.16	28.26	0.00	Peak	100	205	VERTICAL

Item 1, 2 are the fundamental frequency at 2462 MHz.

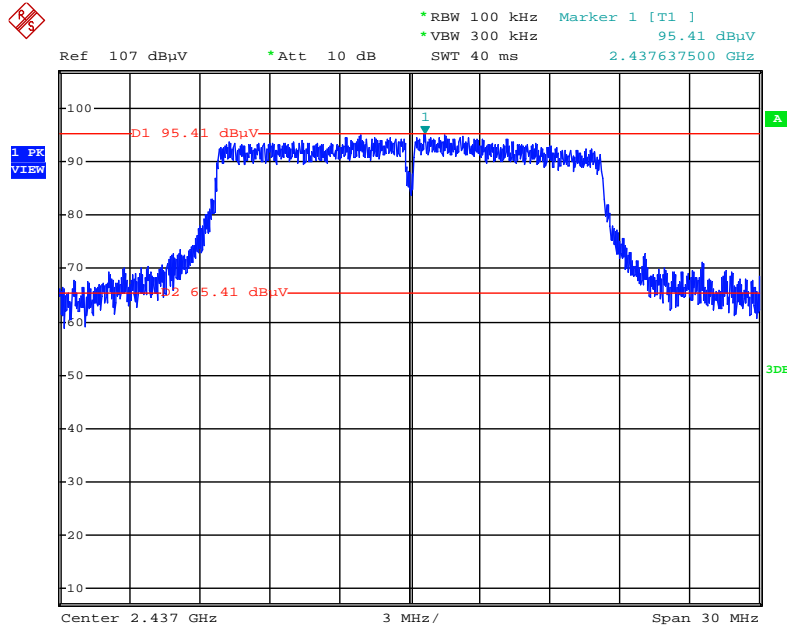
Note:

Emission level (dBuV/m) = 20 log Emission level (uV/m).

Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level.

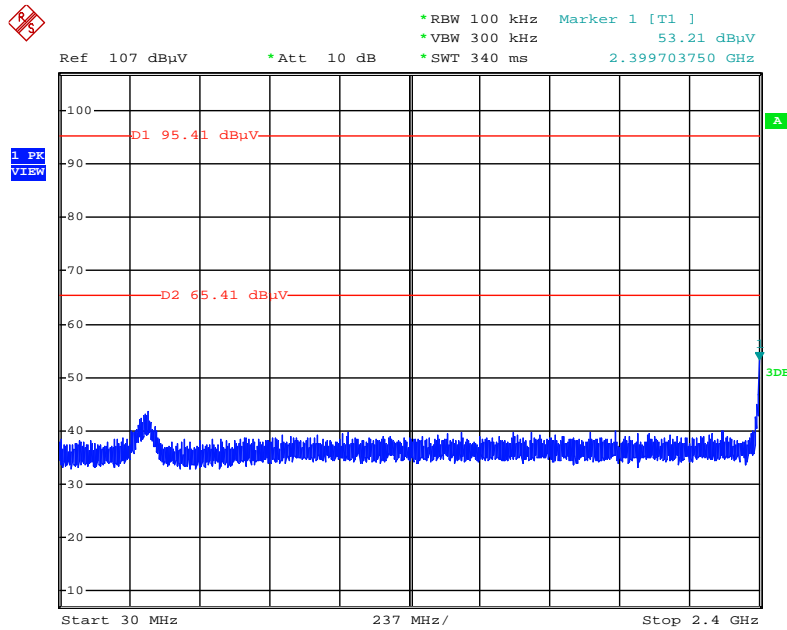
**For Emission not in Restricted Band**

**Plot on Configuration IEEE 802.11n MCS0 HT20 / Reference Level**



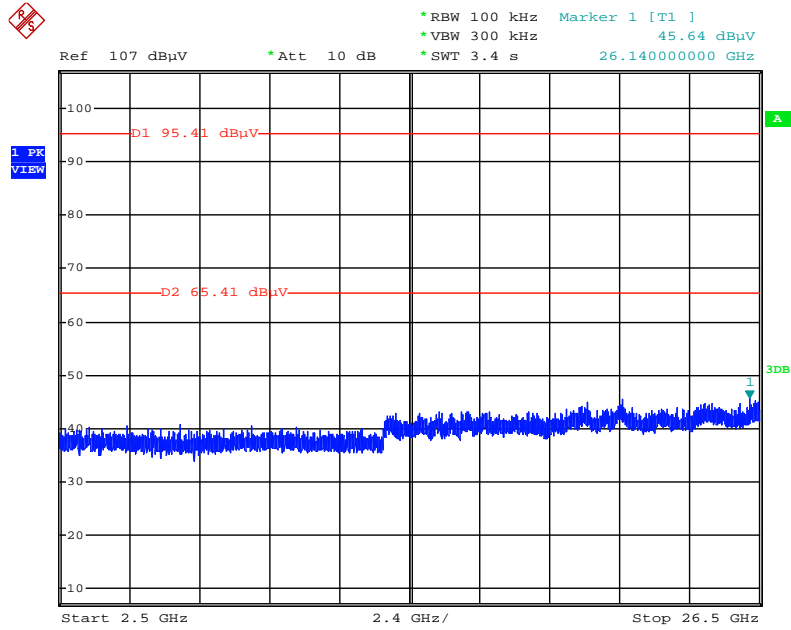
Date: 25.FEB.2014 23:15:00

**Plot on Configuration IEEE 802.11n MCS0 HT20 / CH 1 / 30MHz~2400MHz (down 30dBc)**



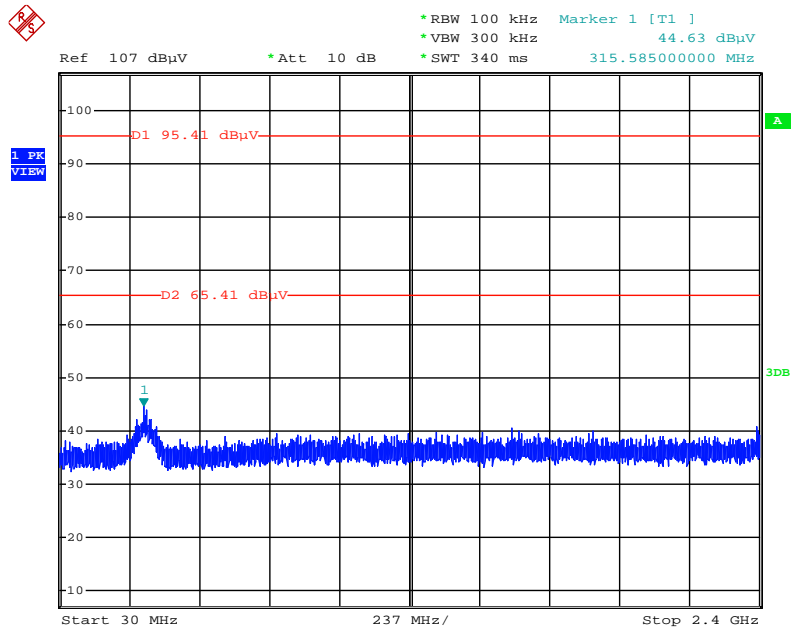
Date: 25.FEB.2014 23:15:56

Plot on Configuration IEEE 802.11n MCS0 HT20 / CH 1 / 2500MHz~26500MHz (down 30dBc)



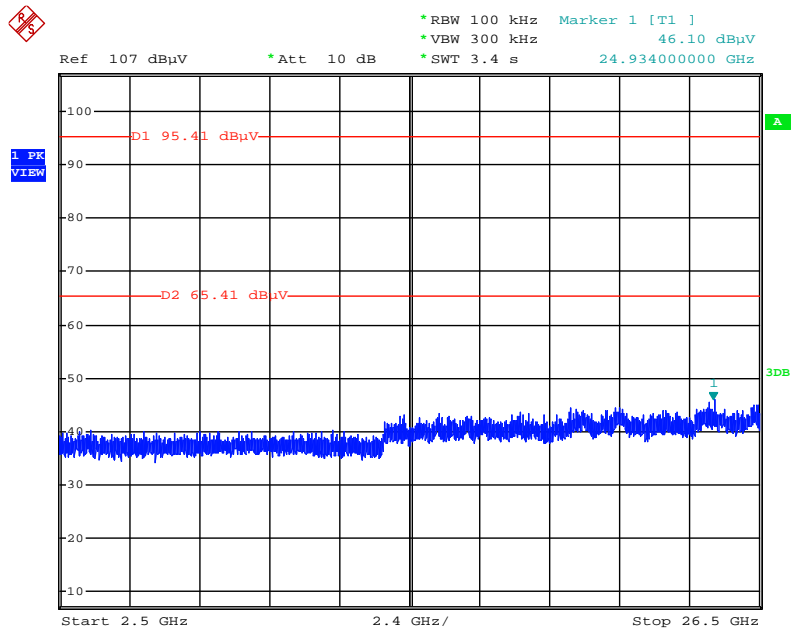
Date: 25.FEB.2014 23:16:58

Plot on Configuration IEEE 802.11n MCS0 HT20 / CH 11 / 30MHz~2400MHz (down 30dBc)



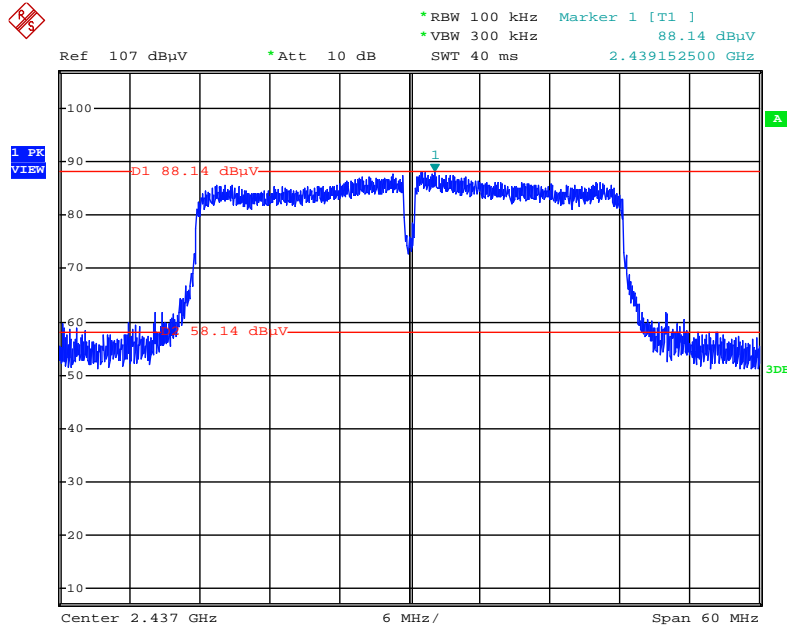
Date: 25.FEB.2014 23:18:33

Plot on Configuration IEEE 802.11n MCS0 HT20 / CH 11 / 2500MHz~26500MHz (down 30dBc)



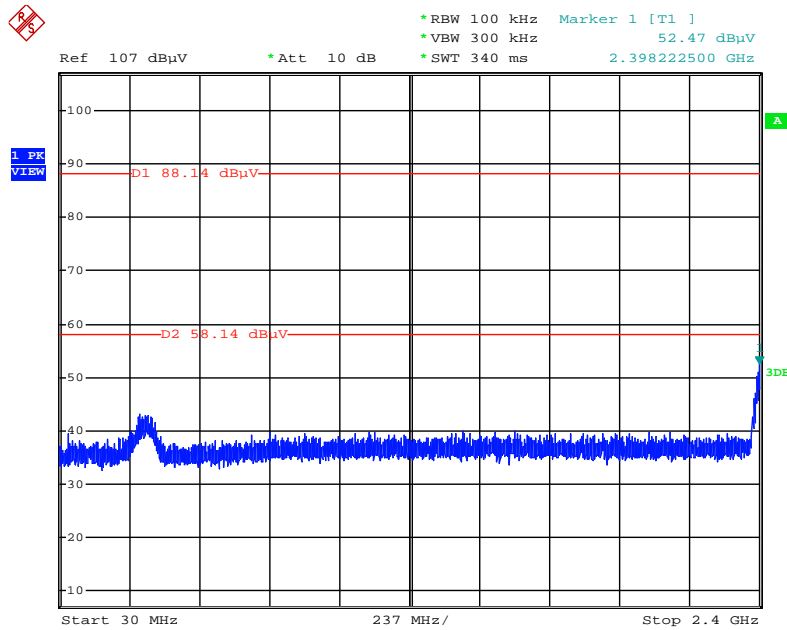
Date: 25.FEB.2014 23:17:53

Plot on Configuration IEEE 802.11n MCS0 HT40 / Reference Level



Date: 25.FEB.2014 23:27:24

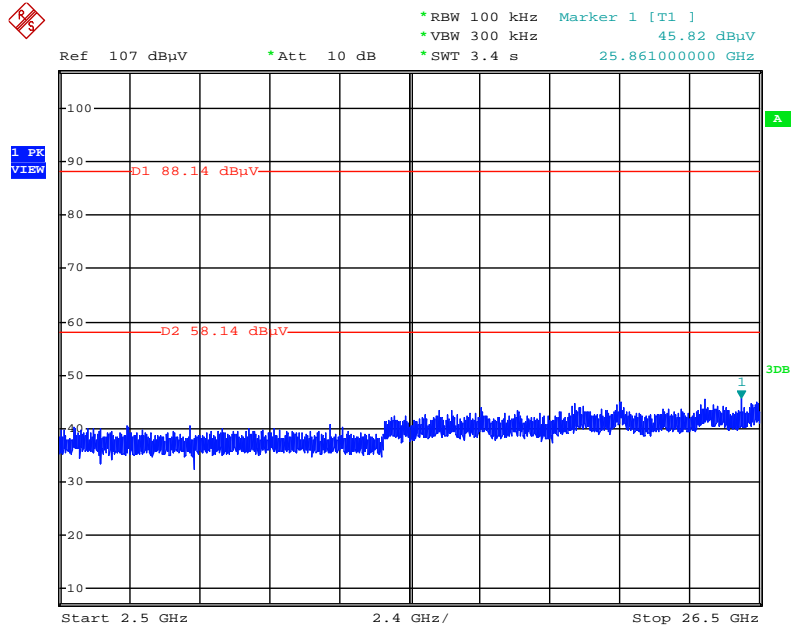
Plot on Configuration IEEE 802.11n MCS0 HT40 / CH 3 / 30MHz~2400MHz (down 30dBc)



Date: 25.FEB.2014 23:28:25

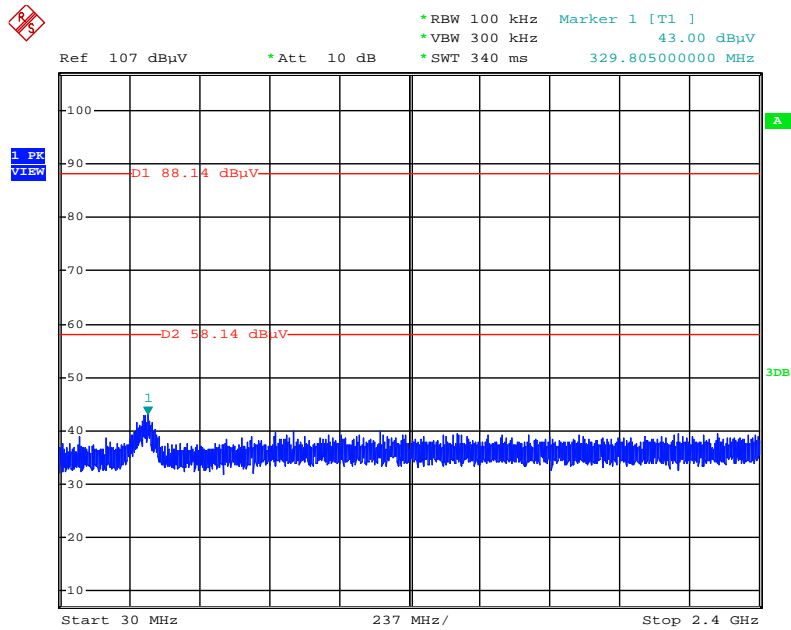


Plot on Configuration IEEE 802.11n MCS0 HT40 / CH 3 / 2500MHz~26500MHz (down 30dBc)



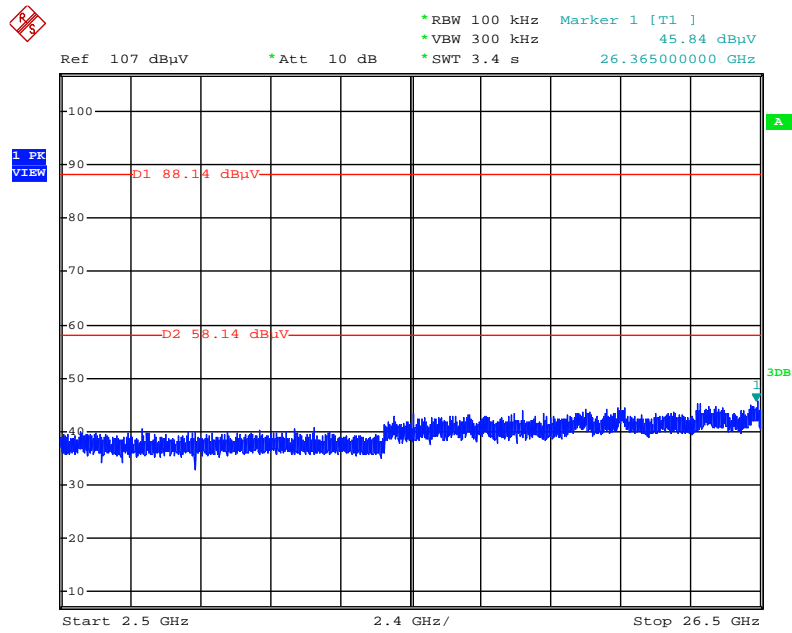
Date: 25.FEB.2014 23:29:04

Plot on Configuration IEEE 802.11n MCS0 HT40 / CH 9 / 30MHz~2400MHz (down 30dBc)



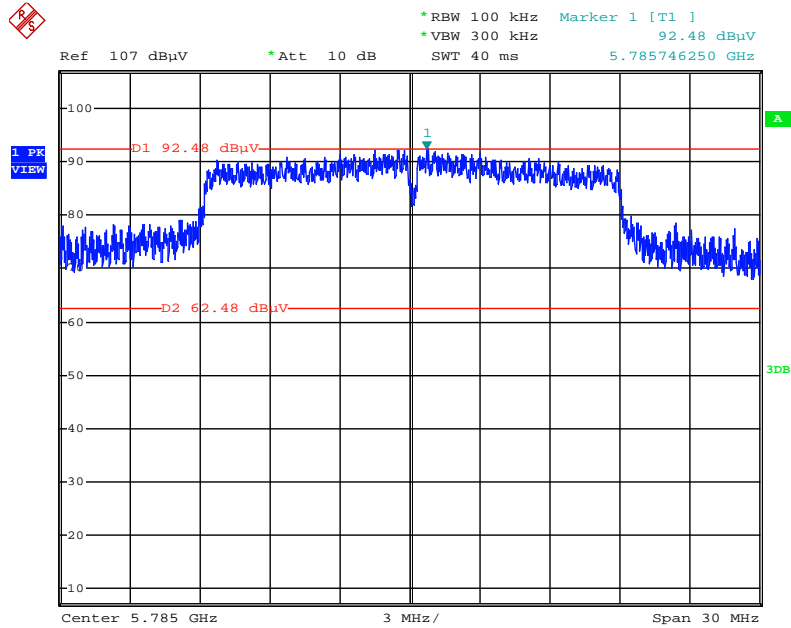
Date: 25.FEB.2014 23:30:23

Plot on Configuration IEEE 802.11n MCS0 HT40 / CH 9 / 2500MHz~26500MHz (down 30dBc)



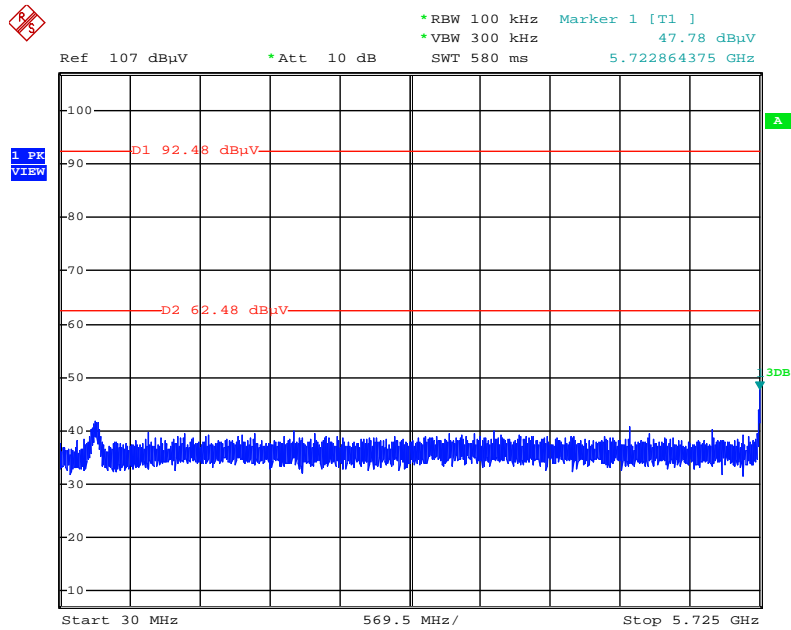
Date: 25.FEB.2014 23:29:59

Plot on Configuration IEEE 802.11ac MCS0, Nss1 VHT20 / Reference Level



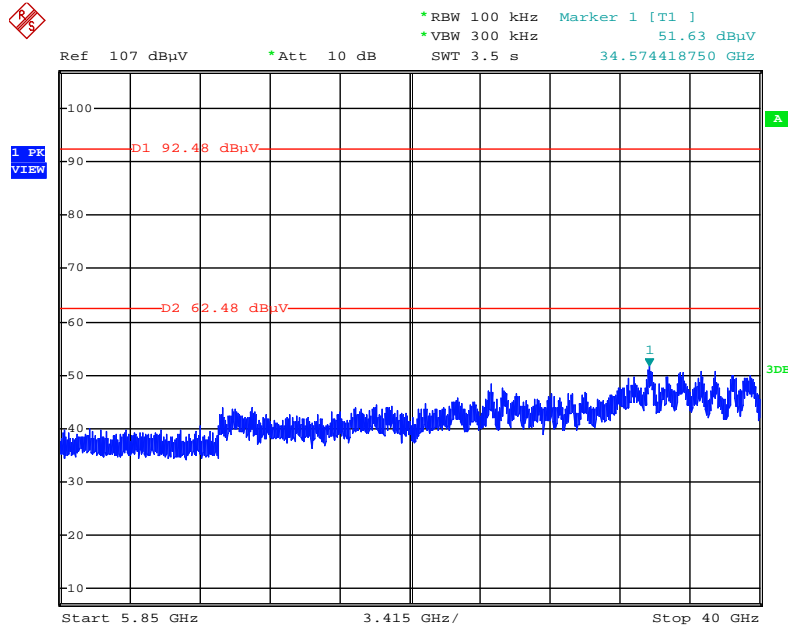
Date: 26.FEB.2014 05:01:20

Plot on Configuration IEEE 802.11ac MCS0, Nss1 VHT20 / CH 149 / 30MHz~5725MHz (down 30dBc)



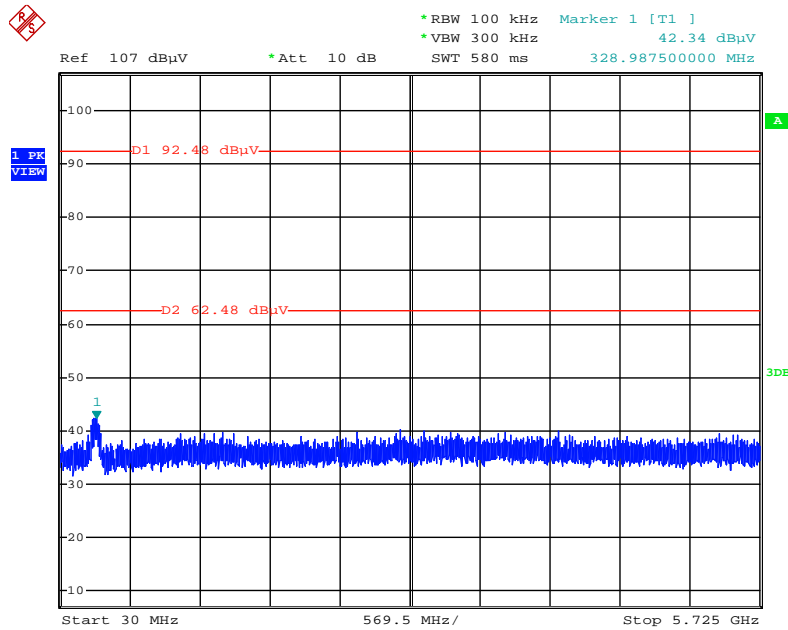
Date: 26.FEB.2014 05:03:10

Plot on Configuration IEEE 802.11ac MCS0, Nss1 VHT20 / CH 149 / 5850MHz~40000MHz (down 30dBc)



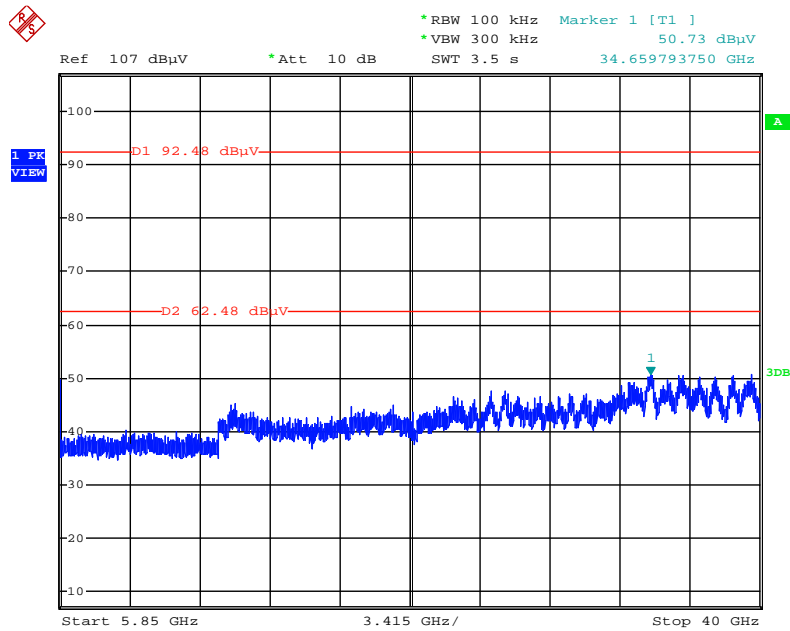
Date: 26.FEB.2014 05:05:12

Plot on Configuration IEEE 802.11ac MCS0, Nss1 VHT20 / CH 165 / 30MHz~5725MHz (down 30dBc)



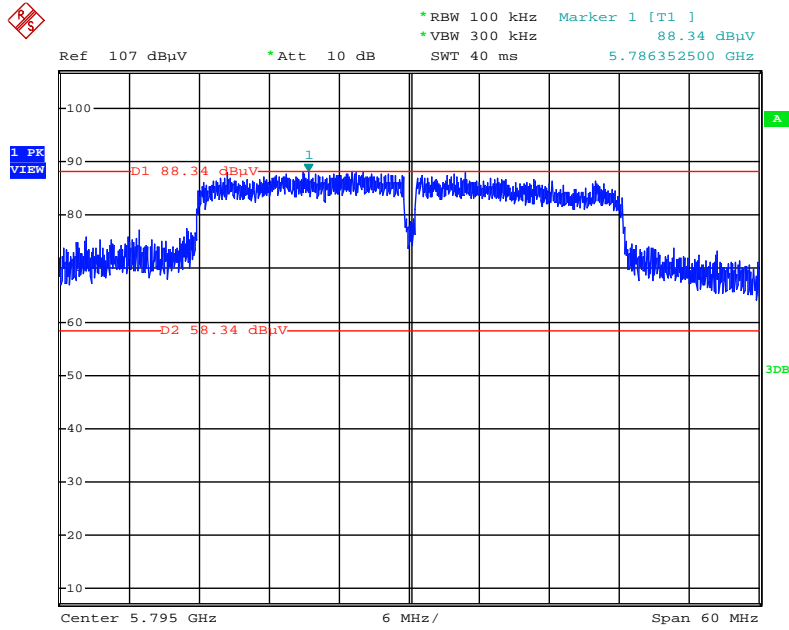
Date: 26.FEB.2014 05:05:45

Plot on Configuration IEEE 802.11ac MCS0, Nss1 VHT20 / CH 165 / 5850MHz~40000MHz (down 30dBc)



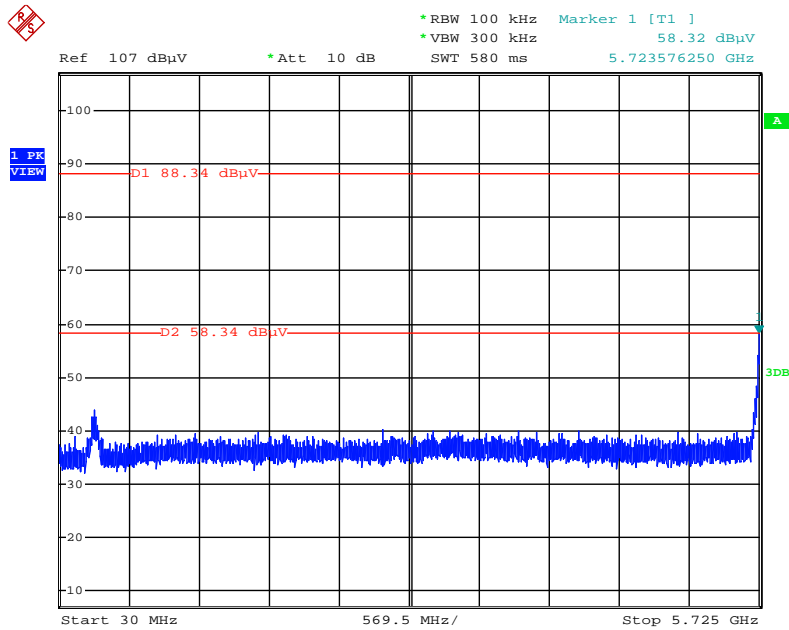
Date: 26.FEB.2014 05:04:44

Plot on Configuration IEEE 802.11ac MCS0, Nss1 VHT40 / Reference Level



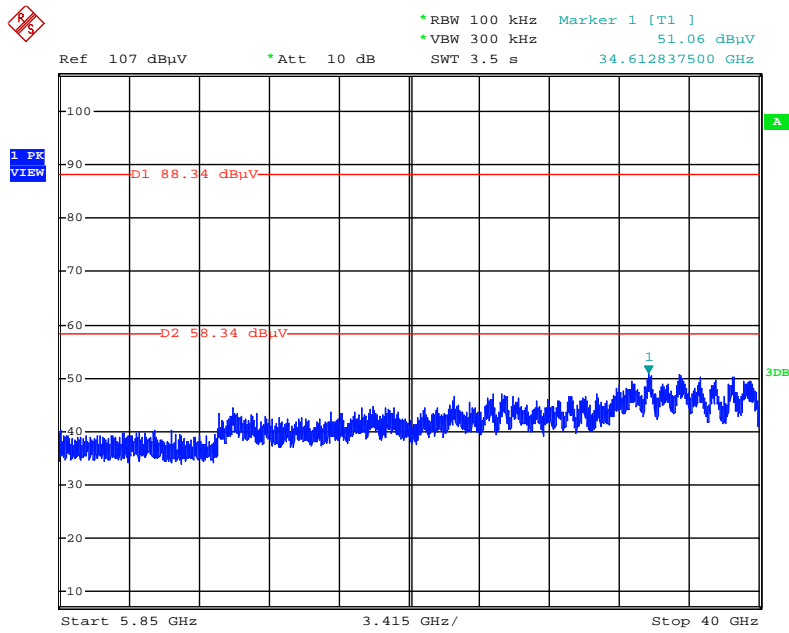
Date: 26.FEB.2014 05:08:15

Plot on Configuration IEEE 802.11ac MCS0, Nss1 VHT40 / CH 151 / 30MHz~5725MHz (down 30dBc)



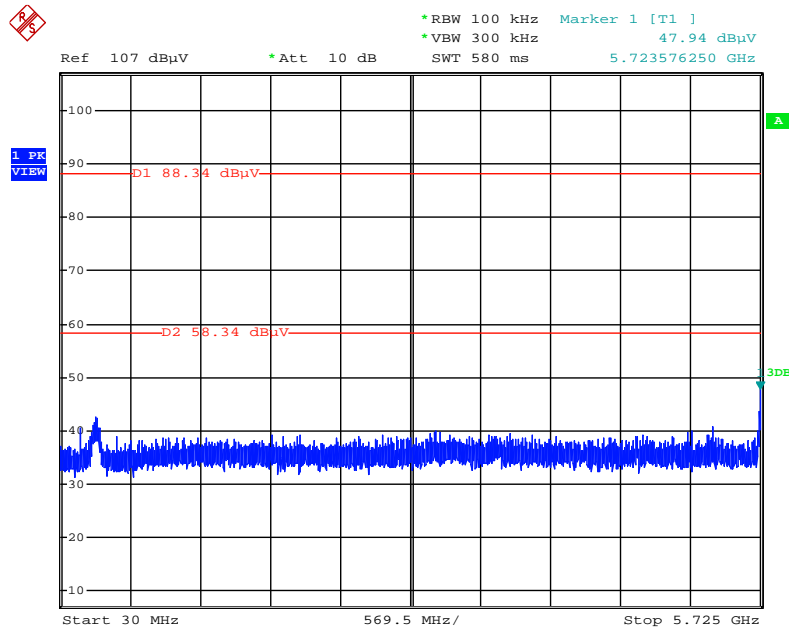
Date: 26.FEB.2014 05:10:01

Plot on Configuration IEEE 802.11ac MCS0, Nss1 VHT40 / CH 151 / 5850MHz~40000MHz (down 30dBc)



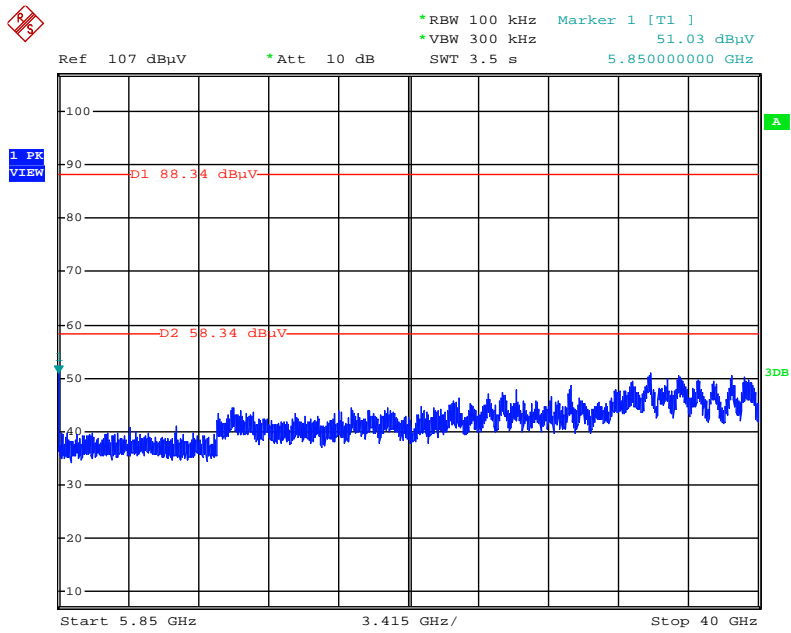
Date: 26.FEB.2014 05:10:34

Plot on Configuration IEEE 802.11ac MCS0, Nss1 VHT40 / CH 159 / 30MHz~5725MHz (down 30dBc)



Date: 26.FEB.2014 05:09:17

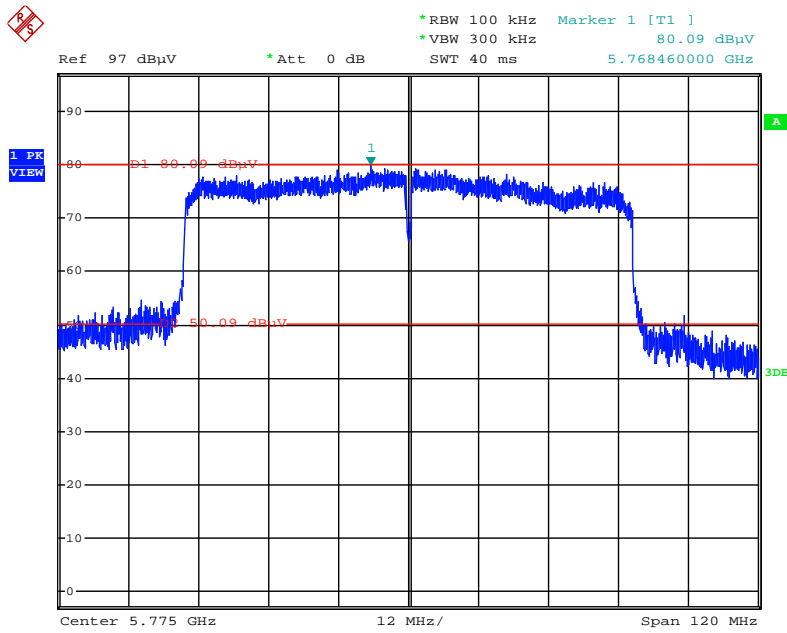
Plot on Configuration IEEE 802.11ac MCS0, Nss1 VHT40 / CH 159 / 5850MHz~40000MHz (down 30dBc)



Date: 26.FEB.2014 05:08:53

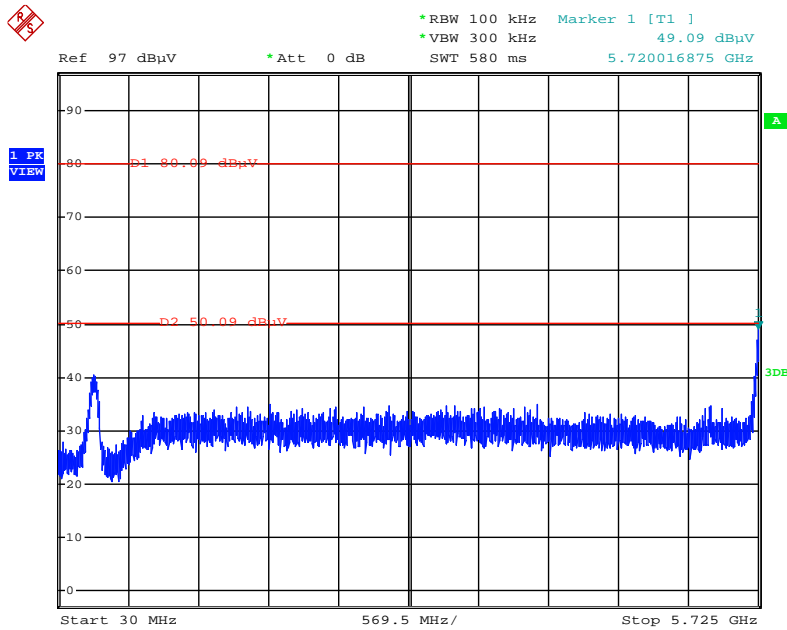


Plot on Configuration IEEE 802.11ac MCS0, Nss1 VHT80 / Reference Level



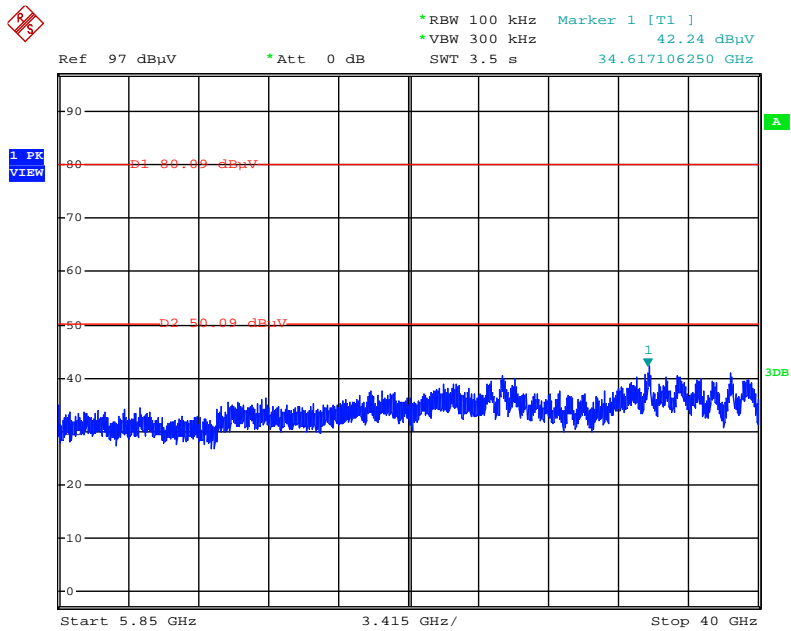
Date: 26.FEB.2014 04:40:27

Plot on Configuration IEEE 802.11ac MCS0, Nss1 VHT80 / CH 155 / 30MHz~5725MHz (down 30dBc)



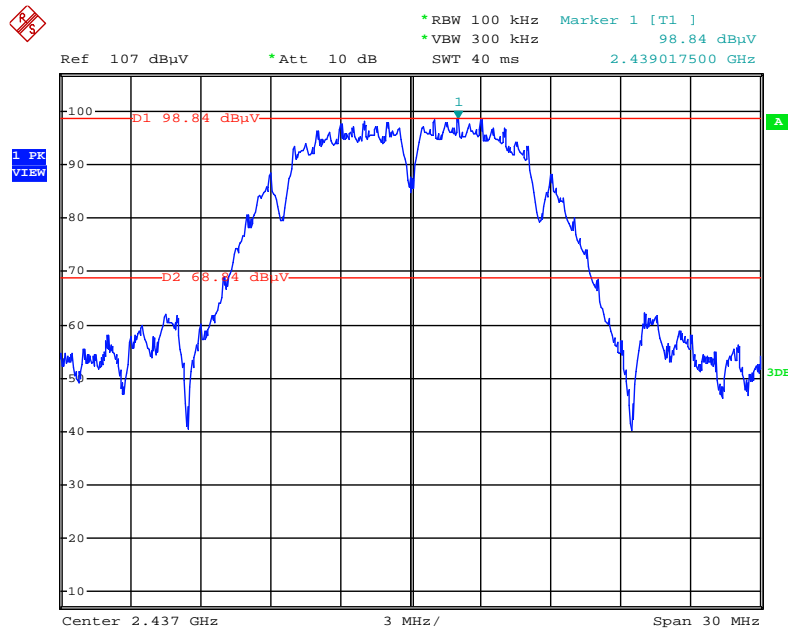
Date: 26.FEB.2014 04:42:39

Plot on Configuration IEEE 802.11ac MCS0, Nss1 VHT80 / CH 155 / 5850MHz~40000MHz (down 30dBc)



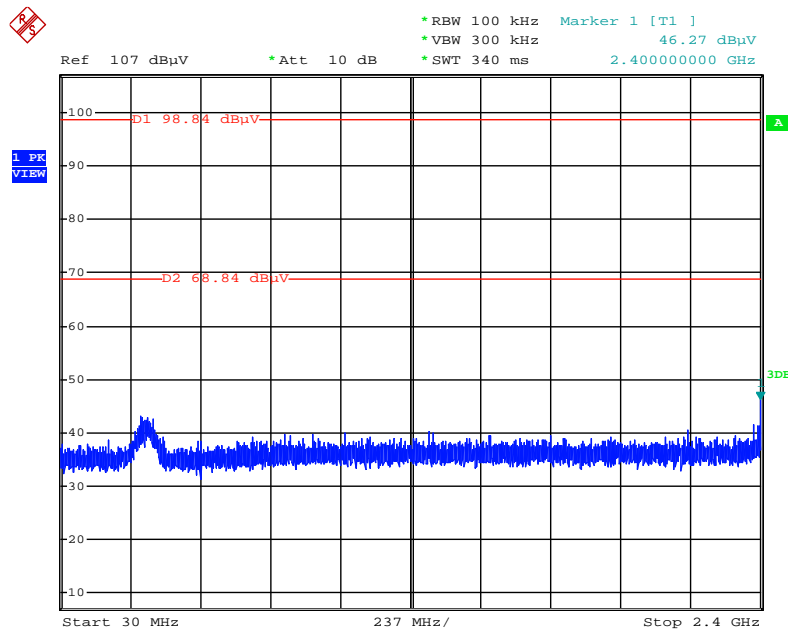
Date: 26.FEB.2014 04:43:40

Plot on Configuration IEEE 802.11b / Reference Level



Date: 25.FEB.2014 23:09:19

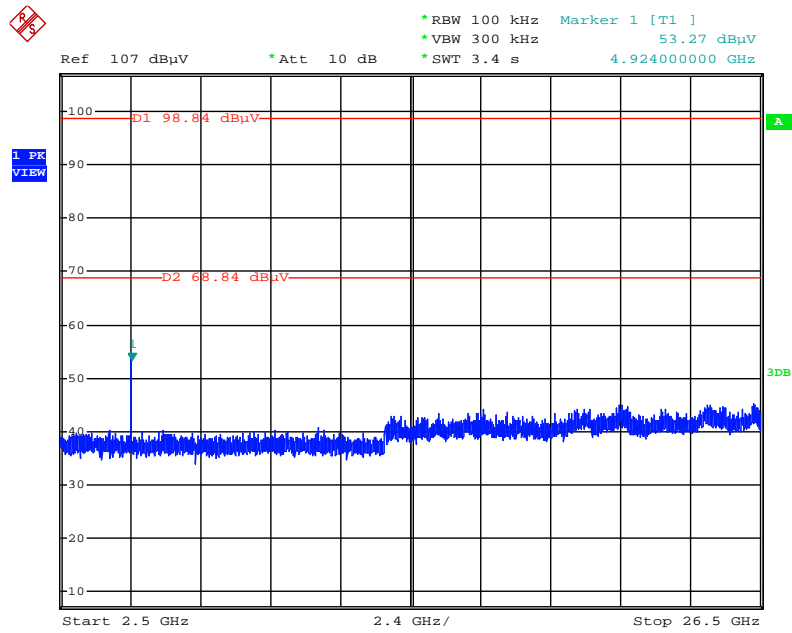
Plot on Configuration IEEE 802.11b / CH 1 / 30MHz~2400MHz (down 30dBc)



Date: 25.FEB.2014 23:10:46

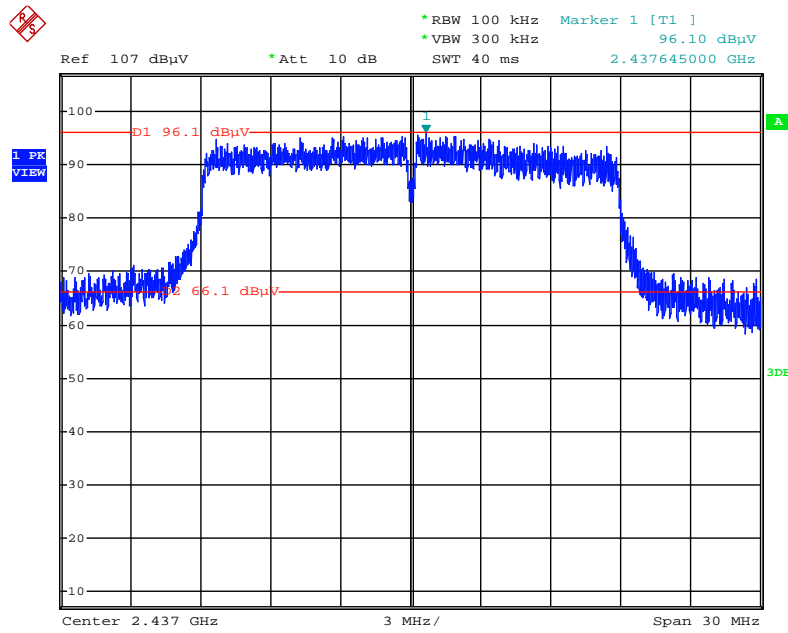


Plot on Configuration IEEE 802.11b / CH 11 / 2500MHz~26500MHz (down 30dBc)



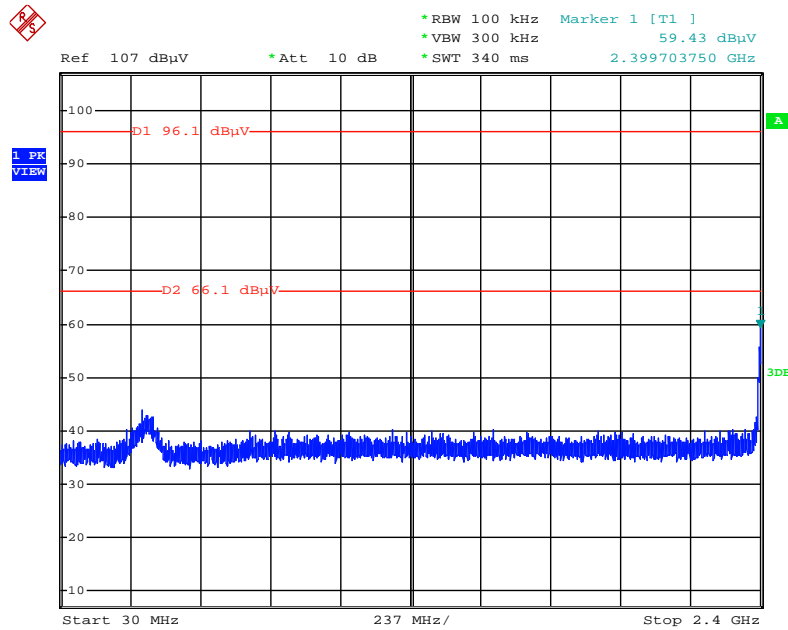
Date: 25.FEB.2014 23:12:37

Plot on Configuration IEEE 802.11g / Reference Level



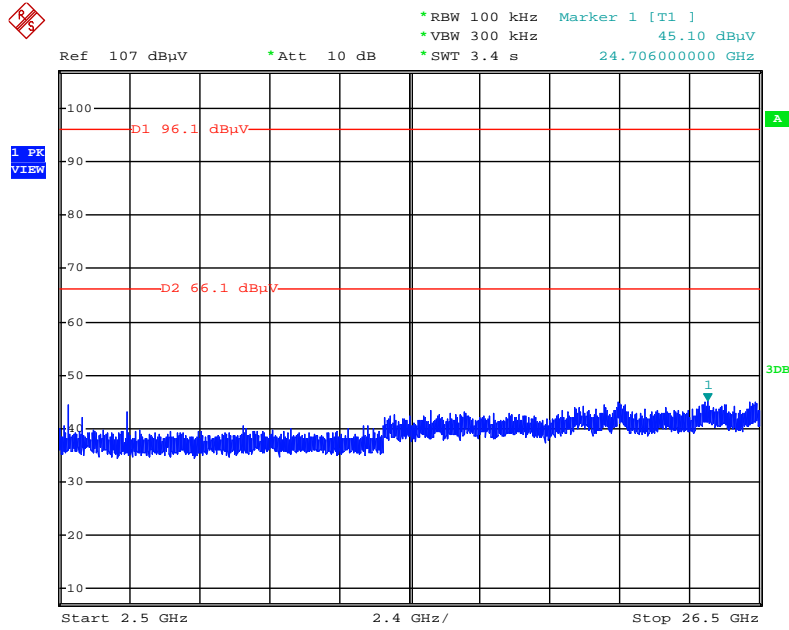
Date: 25.FEB.2014 23:20:17

Plot on Configuration IEEE 802.11g / CH 1 / 30MHz~2400MHz (down 30dBc)



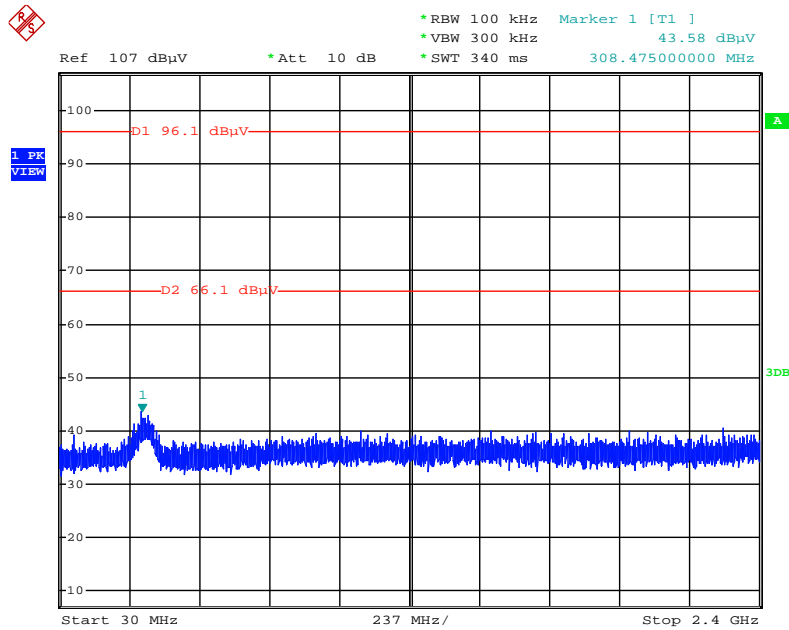
Date: 25.FEB.2014 23:21:22

Plot on Configuration IEEE 802.11g / CH 1 / 2500MHz~26500MHz (down 30dBc)



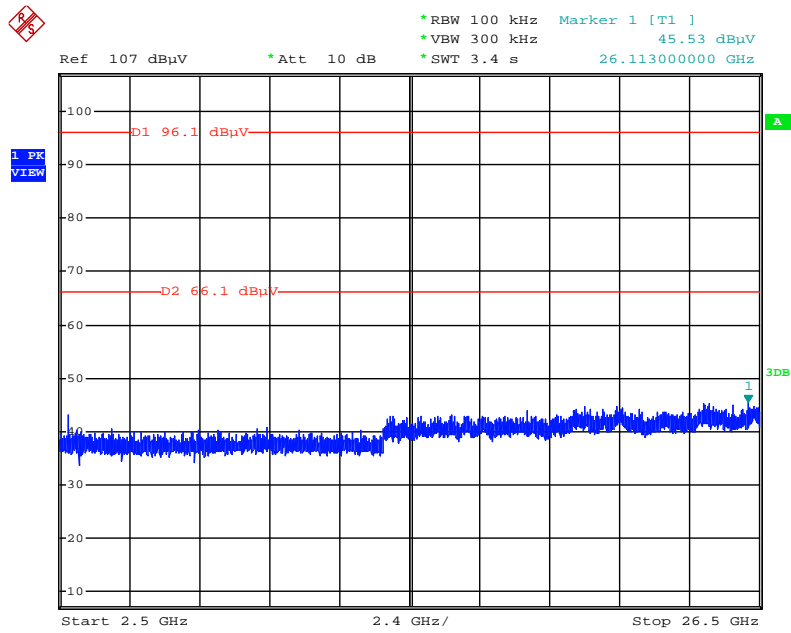
Date: 25.FEB.2014 23:22:18

Plot on Configuration IEEE 802.11g / CH 11 / 30MHz~2400MHz (down 30dBc)



Date: 25.FEB.2014 23:23:43

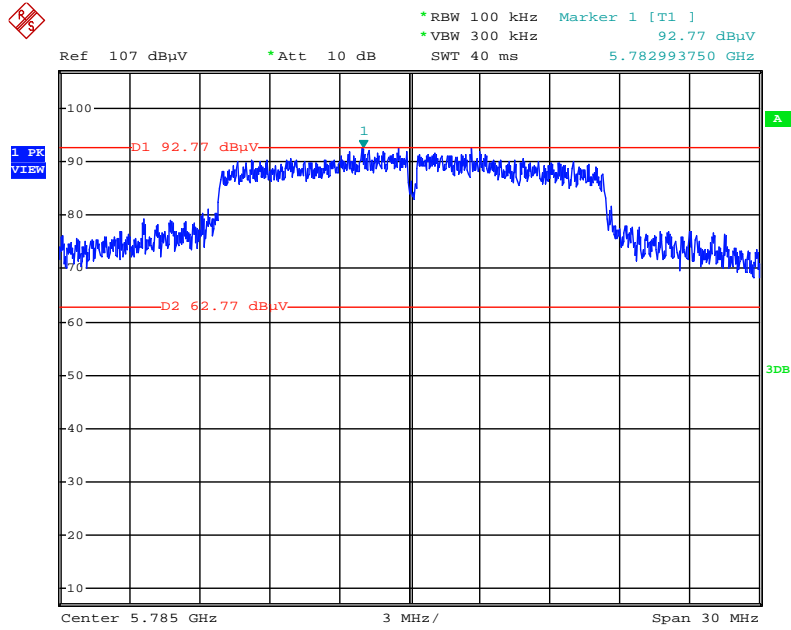
Plot on Configuration IEEE 802.11g / CH 11 / 2500MHz~26500MHz (down 30dBc)



Date: 25.FEB.2014 23:23:16

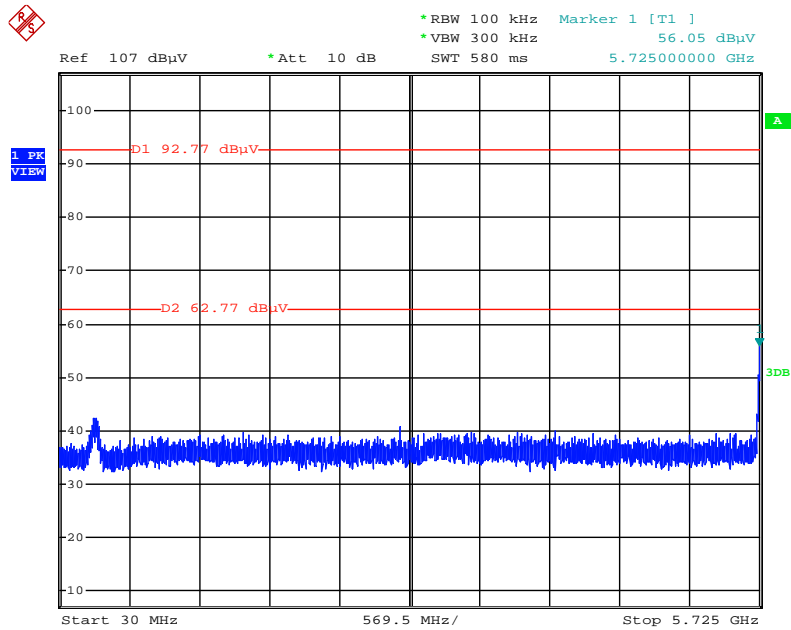


Plot on Configuration IEEE 802.11a / Reference Level



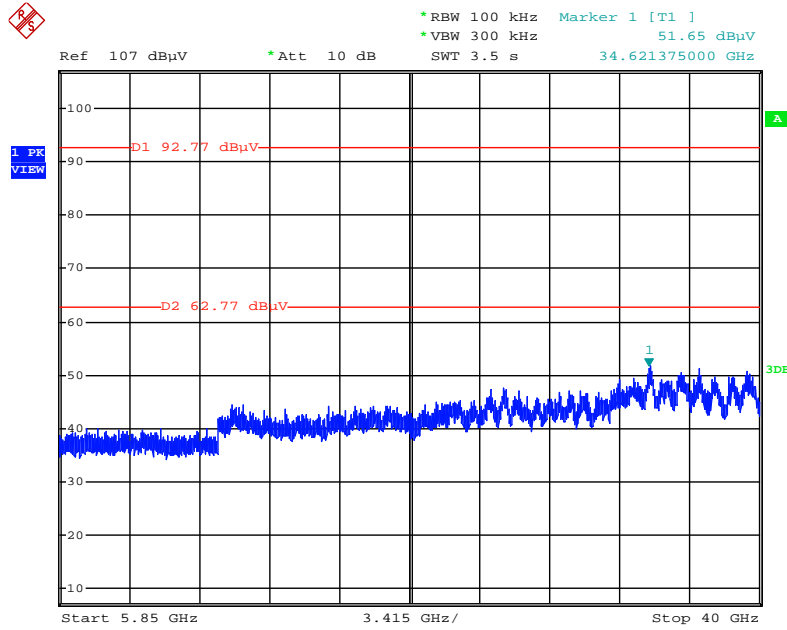
Date: 26.FEB.2014 04:46:43

Plot on Configuration IEEE 802.11a / CH 149 / 30MHz~5725MHz (down 30dBc)



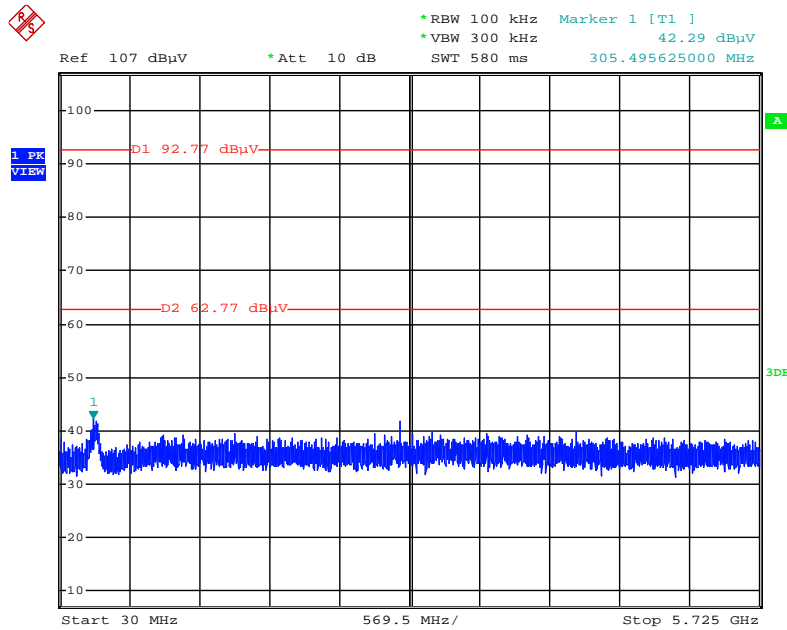
Date: 26.FEB.2014 04:53:07

Plot on Configuration IEEE 802.11a / CH 149 / 5850MHz~40000MHz (down 30dBc)



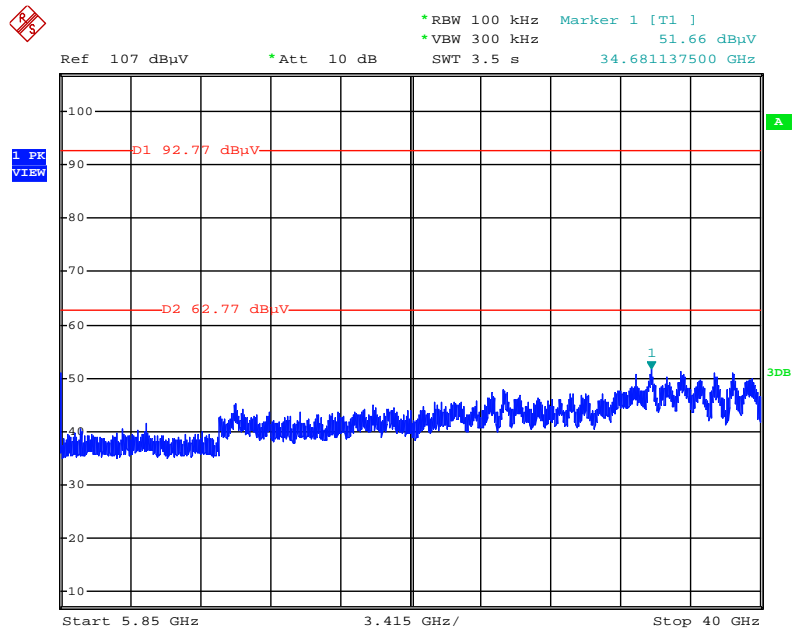
Date: 26.FEB.2014 04:53:43

Plot on Configuration IEEE 802.11a / CH 165 / 30MHz~5725MHz (down 30dBc)



Date: 26.FEB.2014 04:55:05

Plot on Configuration IEEE 802.11a / CH 165 / 5850MHz~4000MHz (down 30dBc)



Date: 26.FEB.2014 04:54:41

## 4.7. Antenna Requirements

### 4.7.1. Limit

Except for special regulations, the Low-power Radio-frequency Devices must not be equipped with any jacket for installing an antenna with extension cable. 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 the user can replace a broken antenna, but the use of a standard antenna jack or electrical connector is prohibited. Further, this requirement does not apply to intentional radiators that must be professionally installed.

### 4.7.2. Antenna Connector Construction

Please refer to section 3.3 in this test report; antenna connector complied with the requirements.

## 5. LIST OF MEASURING EQUIPMENTS

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Remark
EMI Test Receiver	R&S	ESCS 30	100355	9 kHz ~ 2.75 GHz	Apr. 12, 2013	Conduction (CO01-CB)
LISN	F.C.C.	FCC-LISN-50-16-2	04083	150 kHz ~ 100 MHz	Nov. 23, 2013	Conduction (CO01-CB)
LISN	Schwarzbeck	NSLK 8127	8127647	9kHz ~ 30MHz	Nov. 23, 2013	Conduction (CO01-CB)
COND Cable	Woken	Cable	01	150 kHz ~ 30 MHz	Dec. 04, 2013	Conduction (CO01-CB)
Software	Audix	E3	5.410e	-	N.C.R.	Conduction (CO01-CB)
BILOG ANTENNA	Schaffner	CBL6112D	22021	20MHz ~ 2GHz	Apr. 16, 2013	Radiation (03CH01-CB)
Loop Antenna	Teseq	HLA 6120	24155	9 kHz - 30 MHz	Nov. 05, 2012*	Radiation (03CH01-CB)
Horn Antenna	EMCO	3115	00075790	750MHz~18GHz	Nov. 01, 2013	Radiation (03CH01-CB)
Horn Antenna	SCHWARZBEAK	BBHA 9170	BBHA9170252	15GHz ~ 40GHz	Dec. 17, 2013	Radiation (03CH01-CB)
Pre-Amplifier	Agilent	8447D	2944A10991	0.1MHz ~ 1.3GHz	Nov. 12, 2013	Radiation (03CH01-CB)
Pre-Amplifier	Agilent	8449B	3008A02310	1GHz ~ 26.5GHz	Dec. 16, 2013	Radiation (03CH01-CB)
Pre-Amplifier	WM	TF-130N-R1	923365	26GHz ~ 40GHz	Oct. 23, 2013	Radiation (03CH01-CB)
Spectrum analyzer	R&S	FSP40	100019	9kHz~40GHz	Dec. 02, 2013	Radiation (03CH01-CB)
EMI Test Receiver	Agilent	N9038A	MY52260123	9kHz ~ 8GHz	Dec. 12, 2013	Radiation (03CH01-CB)
Turn Table	INN CO	CO 2000	N/A	0 ~ 360 degree	N.C.R.	Radiation (03CH01-CB)
Antenna Mast	INN CO	CO2000	N/A	1 m - 4 m	N.C.R.	Radiation (03CH01-CB)
RF Cable-low	Woken	Low Cable-1	N/A	30 MHz - 1 GHz	Nov. 17, 2013	Radiation (03CH01-CB)
RF Cable-high	Woken	High Cable-1	N/A	1 GHz - 26.5 GHz	Nov. 17, 2013	Radiation (03CH01-CB)
RF Cable-high	Woken	High Cable-2	N/A	1 GHz - 26.5 GHz	Nov. 17, 2013	Radiation (03CH01-CB)
RF Cable-high	Woken	High Cable-3	N/A	1 GHz - 40 GHz	Nov. 17, 2013	Radiation (03CH01-CB)
RF Cable-high	Woken	High Cable-4	N/A	1 GHz - 40 GHz	Nov. 17, 2013	Radiation (03CH01-CB)
Signal analyzer	R&S	FSV40	100979	9kHz~40GHz	Nov. 29, 2013	Conducted (TH01-CB)
RF Power Divider	Woken	3 Way	MDC2366	2GHz ~ 18GHz	Nov. 17, 2013	Conducted (TH01-CB)
RF Cable-high	Woken	High Cable-7	-	1 GHz - 26.5 GHz	Nov. 17, 2013	Conducted (TH01-CB)
RF Cable-high	Woken	High Cable-8	-	1 GHz - 26.5 GHz	Nov. 17, 2013	Conducted (TH01-CB)
RF Cable-high	Woken	High Cable-9	-	1 GHz - 26.5 GHz	Nov. 17, 2013	Conducted (TH01-CB)



Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Remark
RF Cable-high	Woken	High Cable-10	-	1 GHz – 26.5 GHz	Nov. 17, 2013	Conducted (TH01-CB)
RF Cable-high	Woken	High Cable-11	-	1 GHz – 26.5 GHz	Nov. 17, 2013	Conducted (TH01-CB)
Power Sensor	Anritsu	MA2411B	0917223	300MHz~40GHz	Sep. 18, 2013	Conducted (TH01-CB)
Power Meter	Anritsu	ML2495A	1035008	300MHz~40GHz	Sep. 18, 2013	Conducted (TH01-CB)

Note: Calibration Interval of instruments listed above is one year.

“\*” Calibration Interval of instruments listed above is two years.

N.C.R. means Non-Calibration required.

## 6. MEASUREMENT UNCERTAINTY

### Uncertainty of Conducted Emission Measurement (150kHz ~ 30MHz)

Contribution	Uncertainty of $x_i$			$u(x_i)$
	Value	Unit	Probability Distribution k	
Receiver reading	0.026	dB	normal(k=2)	0.013
Cable loss	0.002	dB	normal(k=2)	0.001
AMN/LISN specification	1.200	dB	normal(k=2)	0.600
Mismatch Receiver VSWR 1= AMN/LISN VSWR 2=	-0.080	dB	U-shaped	0.060
Combined standard uncertainty $U_c(y)$				1.2
Measuring uncertainty for a level of confidence of 95% $U=2U_c(y)$				2.4

### Uncertainty of Radiated Emission Measurement (30MHz ~ 1,000MHz)

Contribution	Uncertainty of $x_i$			$u(x_i)$
	Value	Unit	Probability Distribution k	
Receiver reading	$\pm 0.173$	dB	K=1	0.086
Cable loss	$\pm 0.174$	dB	K=2	0.087
Antenna gain	$\pm 0.169$	dB	K=2	0.084
Site imperfection	$\pm 0.433$	dB	Triangular	0.214
Pre-amplifier gain	$\pm 0.366$	dB	K=2	0.183
Transmitter antenna	$\pm 1.200$	dB	Rectangular	0.600
Signal generator	$\pm 0.461$	dB	Rectangular	0.231
Mismatch	$\pm 0.080$	dB	U-shape	0.040
Spectrum analyzer	$\pm 0.500$	dB	Rectangular	0.250
Combined standard uncertainty $U_c(y)$				1.778
Measuring uncertainty for a level of confidence of 95% $U=2U_c(y)$				3.555

**Uncertainty of Radiated Emission Measurement (1GHz ~ 18GHz)**

Contribution	Uncertainty of $x_i$			$u(x_i)$
	Value	Unit	Probability Distribution k	
Receiver reading	±0.191	dB	K=1	0.095
Cable loss	±0.169	dB	K=2	0.084
Antenna gain	±0.191	dB	K=2	0.096
Site imperfection	±0.582	dB	Triangular	0.291
Pre-amplifier gain	±0.304	dB	K=2	0.152
Transmitter antenna	±1.200	dB	Rectangular	0.600
Signal generator	±0.461	dB	Rectangular	0.231
Mismatch	±0.080	dB	U-shape	0.040
Spectrum analyzer	±0.500	dB	Rectangular	0.250
Combined standard uncertainty $U_c(y)$				1.839
Measuring uncertainty for a level of confidence of 95% $U=2U_c(y)$				3.678

**Uncertainty of Radiated Emission Measurement (18GHz ~ 40GHz)**

Contribution	Uncertainty of $x_i$			$u(x_i)$
	Value	Unit	Probability Distribution k	
Receiver reading	±0.186	dB	K=1	0.093
Cable loss	±0.167	dB	K=2	0.083
Antenna gain	±0.190	dB	K=2	0.095
Site imperfection	±0.488	dB	Triangular	0.244
Pre-amplifier gain	±0.269	dB	K=2	0.134
Transmitter antenna	±1.200	dB	Rectangular	0.600
Signal generator	±0.461	dB	Rectangular	0.231
Mismatch	±0.080	dB	U-shape	0.040
Spectrum analyzer	±0.500	dB	Rectangular	0.250
Combined standard uncertainty $U_c(y)$				1.771
Measuring uncertainty for a level of confidence of 95% $U=2U_c(y)$				3.541



### Uncertainty of Conducted Emission Measurement

Contribution	Uncertainty of $x_i$			$u(x_i)$
	Value	Unit	Probability Distribution k	
Cable loss	±0.038	dB	K=2	0.019
Attenuator	±0.047	dB	K=2	0.024
Power Meter specification	±0.300	dB	Triangular	0.150
Power Sensor specification	±0.300	dB	Rectangular	0.150
Signal generator	±0.461	dB	Rectangular	0.231
Mismatch	±0.080	dB	U-shape	0.040
Spectrum analyzer	±0.500	dB	Rectangular	0.250
Combined standard uncertainty $U_c(y)$				0.863
Measuring uncertainty for a level of confidence of 95% $U=2U_c(y)$				1.726