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FCC RADIO TEST REPORT

Applicant's company	Broadcom Corporation
Applicant Address	190 Mathilda Place Sunnyvale CA 94086 U.S.A.
FCC ID	QDS-BRCM1075
Manufacturer's company	Broadcom Corporation
Manufacturer Address	190 Mathilda Place Sunnyvale CA 94086 U.S.A.

Product Name	Broadcom 802.11a/b/g/n/ac WLAN + Bluetooth 4.0 NGFF2230 Mini Card
Brand Name	Broadcom
Model No.	BCM943162ZP
Test Rule Part(s)	47 CFR FCC Part 15 Subpart C § 15.247
Test Freq. Range	2400 ~ 2483.5MHz / 5725 ~ 5850MHz
Received Date	Dec. 25, 2013
Final Test Date	Feb. 13, 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 C63.4-2003, 47 CFR FCC Part 15 Subpart C, KDB 558074 D01 v03r01 and KDB 662911 D01 v02r01.**

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



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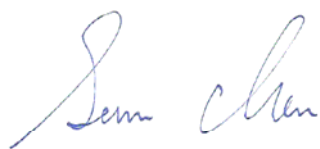
History of This Test Report

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FR3D2546AA	Rev. 01	Initial issue of report	Jan. 31, 2014
FR3D2546AA	Rev. 02	Adding Duty Cycle value	Feb. 12, 2014
FR3D2546AA	Rev. 03	- Adding duty factor value. - Re-measured radiated emission and band-edge with VB set to 3kHz due to duty cycle < 98% for worst case mode.	Feb. 14, 2014

1. CERTIFICATE OF COMPLIANCE

Product Name : Broadcom 802.11a/b/g/n/ac WLAN + Bluetooth 4.0 NGFF2230 Mini Card
Brand Name : Broadcom
Model No. : BCM943162ZP
Applicant : Broadcom Corporation
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 Dec. 25, 2013 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.



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	14.30 dB
4.2	15.247(b)(3)	Maximum Conducted Output Power	Complies	8.58 dB
4.3	15.247(e)	Power Spectral Density	Complies	11.99 dB
4.4	15.247(a)(2)	6dB Spectrum Bandwidth	Complies	-
4.5	15.247(d)	Radiated Emissions	Complies	0.01 dB
4.6	15.247(d)	Band Edge Emissions	Complies	0.03 dB
4.7	15.203	Antenna Requirements	Complies	-

3. GENERAL INFORMATION

3.1. Product Details

IEEE 802.11n/ac

Items	Description
Product Type	WLAN (1TX, 1RX)
Radio Type	Intentional Transceiver
Power Type	From host system
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 (20MHz): 17.92 MHz ; MCS0 (40MHz): 36.48 MHz <u>For 5GHz Band:</u> 802.11ac MCS0/Nss1 (20MHz): 23.36 MHz ; 802.11ac MCS0/Nss1 (40MHz): 52.48 MHz ; 802.11ac MCS0/Nss1 (80MHz): 76.16 MHz
Maximum Conducted Output Power	<u>For 2.4GHz Band:</u> MCS0 (20MHz): 20.95 dBm ; MCS0 (40MHz): 17.23 dBm <u>For 5GHz Band:</u> 802.11ac MCS0/Nss1 (20MHz): 20.46 dBm ; 802.11ac MCS0/Nss1 (40MHz): 20.5 dBm ; 802.11ac MCS0/Nss1 (80MHz): 16.45 dBm
Carrier Frequencies	Please refer to section 3.4
Antenna	Please refer to section 3.3

802.11a/b/g

Items	Description
Product Type	WLAN (1TX, 1RX)
Radio Type	Intentional Transceiver
Power Type	From host system
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: 10.48 MHz ; 11g: 17.12 MHz ; 11a: 23.76 MHz
Maximum Conducted Output Power	11b: 17.10 dBm ; 11g: 21.42 dBm ; 11a: 20.38 dBm
Carrier Frequencies	Please refer to section 3.4
Antenna	Please refer to section 3.3

Antenna and Band width

Antenna	Single (TX)		
Band width Mode	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)	1	MCS0-7
802.11n (HT40)	1	MCS0-7
802.11ac (VHT20)	1	MCS 0-9/Nss1
802.11ac (VHT40)	1	MCS 0-9/Nss1
802.11ac (VHT80)	1	MCS 0-9/Nss1

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:

11a: IEEE 802.11a, HT20/HT40: IEEE 802.11n, VHT20/VHT40/VHT80: IEEE 802.11ac

3.2. Accessories

N/A

3.3. Table for Filed Antenna

Set	Ant.	Brand	Model Name	Antenna Type	Connector	Gain (dBi)				
						2.4GHz	5GHz B1	5GHz B2	5GHz B3	5GHz B4
1	1	Hitachi	HMT05/HFT17-DL07	WLAN/BT antenna	Micro Coaxial	3.9	3.9	5.6	5.8	5.8
	2	Hitachi	HMT05/HFT17-DL07	WLAN/BT antenna	Micro Coaxial	3.9	3.9	5.6	5.8	5.8

Note: The EUT has one set of antenna and each set has two antennas.

For 2.4GHz:

For IEEE 802.11b/g/n mode (1TX/1RX)

The EUT supports the antenna with TX/RX diversity function.

Both Chain 1 and Chain 2 can be used as transmitting/receiving antenna, but only one antenna can be used as transmitting/receiving antenna at the same time.

Chain 1 generated the worst case than Chain 2, so it tested and recorded in the report.

For 5GHz:

For IEEE 802.11a/n/ac mode (1TX/1RX)

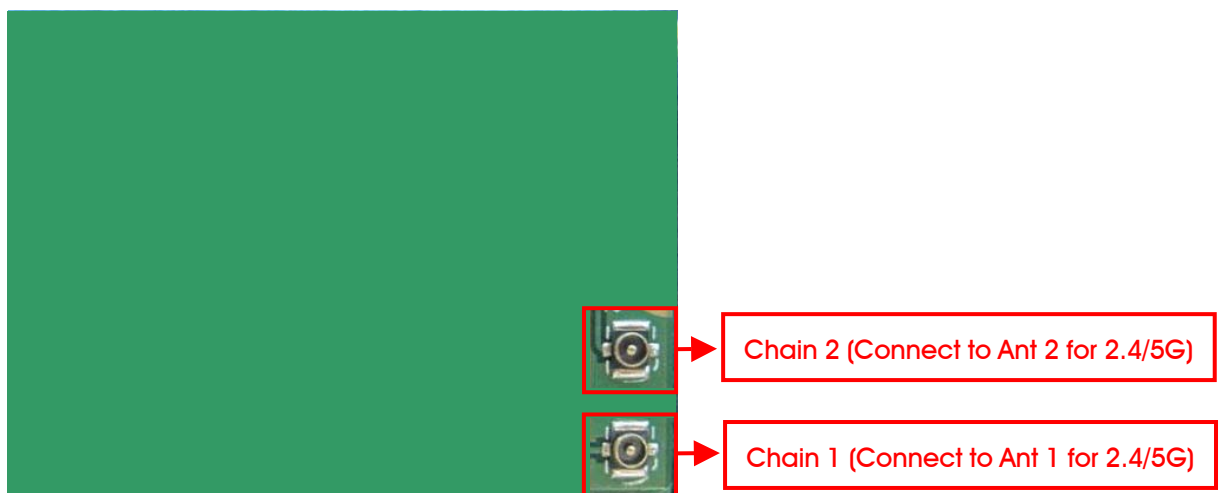
The EUT supports the antenna with TX/RX diversity function.

Both Chain 1 and Chain 2 can be used as transmitting/receiving antenna, but only one antenna can be used as transmitting/receiving antenna at the same time.

Chain 1 generated the worst case than Chain 2, so it tested and recorded in the report.

For Bluetooth mode (1TX/1RX)

Only Chain 1 can be used as transmitting/receiving antenna.



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	Chain
AC Power Line Conducted Emissions	Normal Link	-	-	-
Maximum Conducted Output Power	11n 20MHz	MCS0	1/6/11	1
	11n 40MHz	MCS0	3/6/9/	1
	11b/CCK	1 Mbps	1/6/11	1
	11g/BPSK	6 Mbps	1/6/11	1
Power Spectral Density	11n 20MHz	MCS0	1/6/11	1
	11n 40MHz	MCS0	3/6/9	1
	11b/CCK	1 Mbps	1/6/11	1
	11g/BPSK	6 Mbps	1/6/11	1
6dB Spectrum Bandwidth	11n 20MHz	MCS0	1/6/11	1
	11n 40MHz	MCS0	3/6/9	1
	11b/CCK	1 Mbps	1/6/11	1
	11g/BPSK	6 Mbps	1/6/11	1
Radiated Emissions Below 1GHz	Normal Link	-	-	-
Radiated Emissions Above 1GHz	11n 20MHz	MCS0	1/6/11	1
	11n 40MHz	MCS0	3/6/9	1
	11b/CCK	1 Mbps	1/6/11	1
	11g/BPSK	6 Mbps	1/6/11	1
Band Edge Emissions	11n 20MHz	MCS0	1/6/11	1
	11n 40MHz	MCS0	3/6/9	1
	11b/CCK	1 Mbps	1/6/11	1
	11g/BPSK	6 Mbps	1/6/11	1

For 5GHz Band:

Test Items	Mode	Data Rate	Channel	Chain
AC Power Line Conducted Emissions	Normal Link	-	-	-
Maximum Conducted Output Power	11ac 20MHz	MCS0/Nss1	149/157/165	1
	11ac 40MHz	MCS0/Nss1	151/159	1
	11ac 80MHz	MCS0/Nss1	155	1
	11a/BPSK	6 Mbps	149/157/165	1
Power Spectral Density	11ac 20MHz	MCS0/Nss1	149/157/165	1
	11ac 40MHz	MCS0/Nss1	151/159	1
	11ac 80MHz	MCS0/Nss1	155	1
	11a/BPSK	6 Mbps	149/157/165	1
6dB Spectrum Bandwidth	11ac 20MHz	MCS0/Nss1	149/157/165	1
	11ac 40MHz	MCS0/Nss1	151/159	1
	11ac 80MHz	MCS0/Nss1	155	1
	11a/BPSK	6 Mbps	149/157/165	1
Radiated Emissions Below 1GHz	Normal Link	-	-	-
Radiated Emissions Above 1GHz	11ac 20MHz	MCS0/Nss1	149/157/165	1
	11ac 40MHz	MCS0/Nss1	151/159	1
	11ac 80MHz	MCS0/Nss1	155	1
	11a/BPSK	6 Mbps	149/157/165	1
Band Edge Emissions	11ac 20MHz	MCS0/Nss1	149/157/165	1
	11ac 40MHz	MCS0/Nss1	151/159	1
	11ac 80MHz	MCS0/Nss1	155	1
	11a/BPSK	6 Mbps	149/157/165	1

The following test modes were performed for all tests:

For Conducted Emission test:

Mode 1. Normal Link -2.4GHz WLAN function + Bluetooth function

Mode 2. Normal Link -5GHz WLAN function + Bluetooth function

Mode 1 is the worst case, so it was selected to record in this test report.

For Radiated Emission Below 1GHz test:

Mode 1. Normal Link -2.4GHz WLAN function + Bluetooth function

Mode 2. Normal Link -5GHz WLAN function + Bluetooth function

Mode 1 is the worst case, so it was selected to record in this test report.

For Radiated Emission Above 1GHz test:

Mode 1. CTX-EUT

For Co-location test:

Mode 1. 2.4GHz WLAN function + Bluetooth function

Mode 2. 5GHz WLAN function + Bluetooth function

For MPE and Co-location Test:

The EUT could be applied 2.4GHz / 5GHz with WLAN function and Bluetooth function; therefore Maximum Permissible Exposure (please refer to Appendix C) and Co-location (please refer to Appendix B) tests are added for simultaneously transmit between 2.4GHz / 5GHz WLAN function and Bluetooth 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 Test Site No: CO01-CB and 03CH01-CB (Below 1GHz)

Support Unit	Brand	Model	FCC ID
Wireless AP	Planex	GW-AP54SGX	N/A
NB	DELL	E6220	DoC
NB	DELL	E6430	DoC
Mouse	Logitech	M-U0026	DoC
Earphone	SHYARO CHI	MIC-04	N/A
Test fixture*2	Broadcom	BCM9NGFF2EC_1	N/A
Broadcom 802.11a/b/g/n/ac WLAN + Bluetooth 4.0 NGFF2230 Mini Card (Device)	Broadcom	BCM943162ZP	QDS-BRCM1075

For Test Site No: 03CH01-CB (Above 1GHz)

Support Unit	Brand	Model	FCC ID
NB	DELL	E6220	DoC
Test fixture	Broadcom	BCM9NGFF2EC_1	N/A

For Test Site No: TH01-CB

Support Unit	Brand	Model	FCC ID
NB	DELL	E6510	N/A
Test fixture	Broadcom	BCM9NGFF2EC_1	N/A

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 20MHz

Test Software Version	Mtool 2.0.1.5		
Frequency	2412 MHz	2437 MHz	2462 MHz
MCS0 20MHz	74	85	69

Power Parameters of IEEE 802.11n MCS0 40MHz

Test Software Version	Mtool 2.0.1.5		
Frequency	2422 MHz	2437 MHz	2452 MHz
MCS0 40MHz	57	68	60

Power Parameters of IEEE 802.11b/g

Test Software Version	Mtool 2.0.1.5		
Frequency	2412 MHz	2437 MHz	2462 MHz
IEEE 802.11b	64	64	67
IEEE 802.11g	75	86	72

For 5GHz Band

Power Parameters of IEEE 802.11ac MCS0/Nss1 20MHz

Test Software Version	Mtool 2.0.1.5		
Frequency	5745 MHz	5785 MHz	5825 MHz
MCS0/Nss1 20MHz	82	86	86

Power Parameters of IEEE 802.11ac MCS0/Nss1 40MHz

Test Software Version	Mtool 2.0.1.5	
Frequency	5755 MHz	5795 MHz
MCS0/Nss1 40MHz	73	86

Power Parameters of IEEE 802.11ac MCS0/Nss1 80MHz

Test Software Version	Mtool 2.0.1.5
Frequency	5775 MHz
MCS0/Nss1 80MHz	70

Power Parameters of IEEE 802.11a

Test Software Version	Mtool 2.0.1.5		
Frequency	5745 MHz	5785 MHz	5825 MHz
IEEE 802.11a	82	86	86

3.9. EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

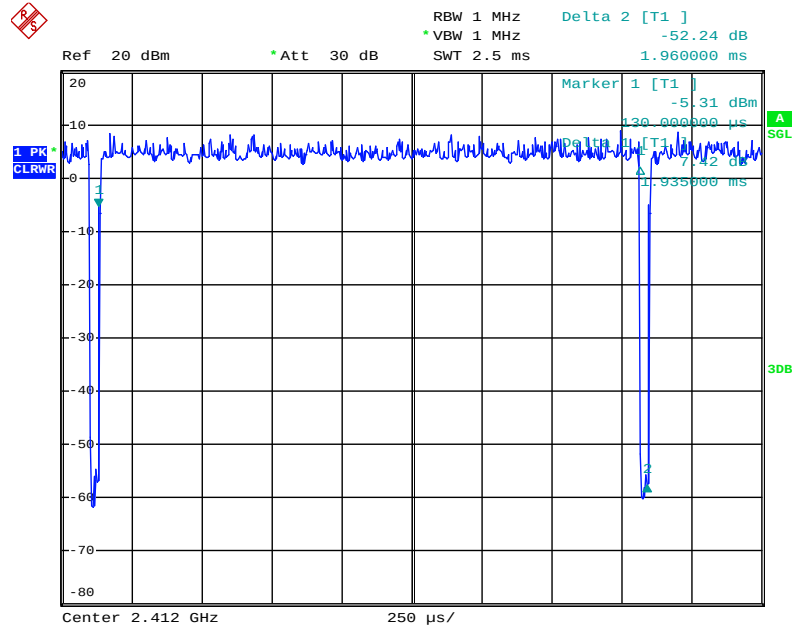
3.10. Test Signal Duty Cycle

Band	Mode	TX-on (ms)	TX-on+TX-off (ms)	TX-on/(TX-on+TX-off)x100= Duty cycle (%)
2.4G	802.11n MCS0 20MHz	1.935	1.96	98.72
	802.11n MCS0 40MHz	0.95	0.975	97.44
	802.11b	10	10	100
	802.11g	2.08	2.103	98.91
5G	802.11ac MCS0/Nss1 20MHz	1.94	1.965	98.73
	802.11ac MCS0/Nss1 40MHz	0.96	0.985	97.46
	802.11ac MCS0/Nss1 80MHz	0.46	0.485	94.85
	802.11a	2.075	2.1	98.81

3.11. Plots of Duty Cycle

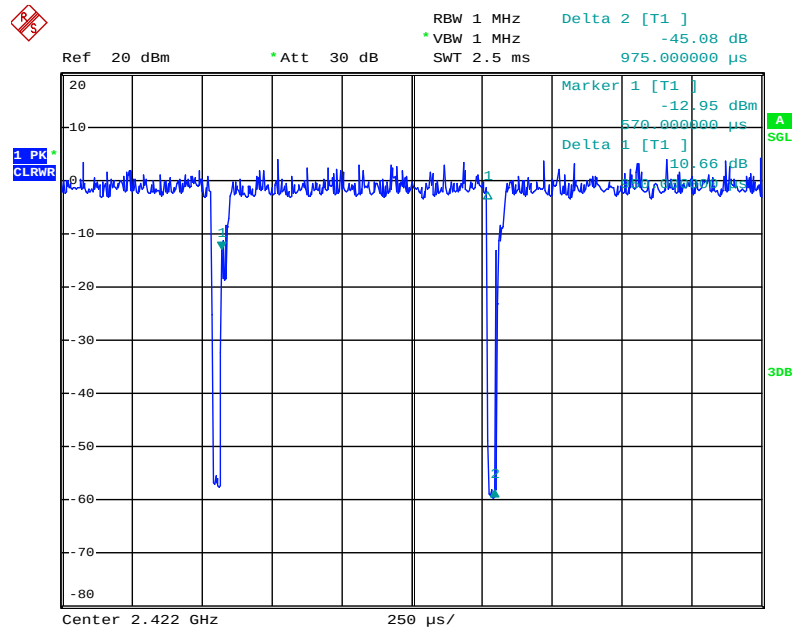
For 2.4GHz Band:

IEEE 802.11n MCS0 20MHz



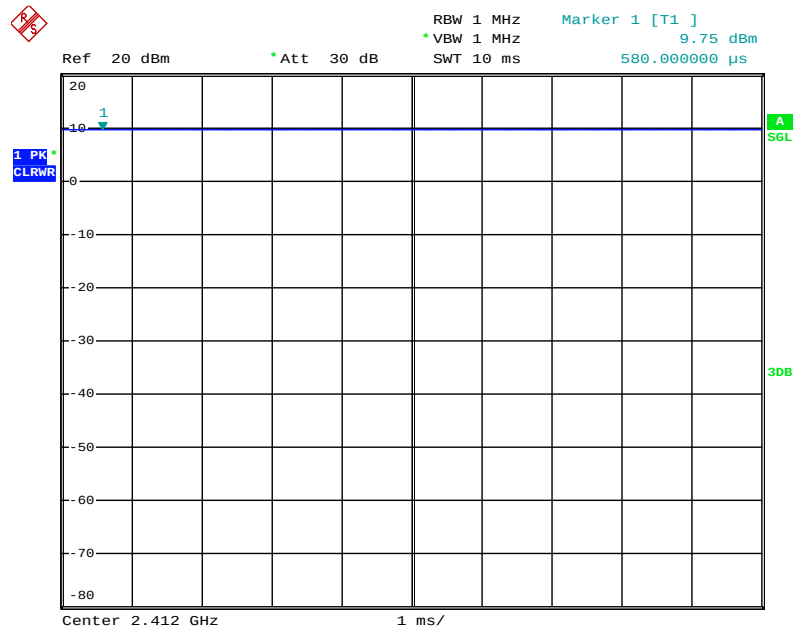
Date: 22.JAN.2014 21:17:22

IEEE 802.11n MCS0 40MHz



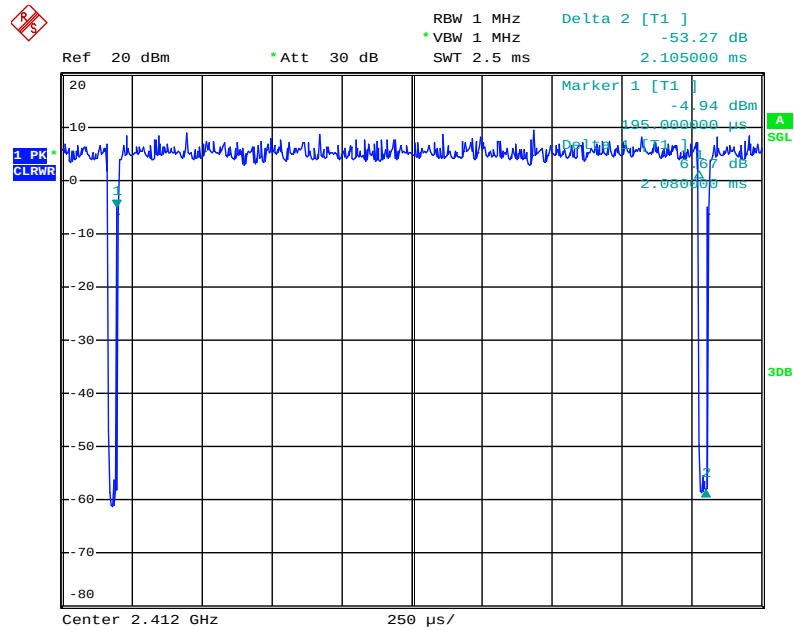
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IEEE 802.11b



Date: 22.JAN.2014 21:15:25

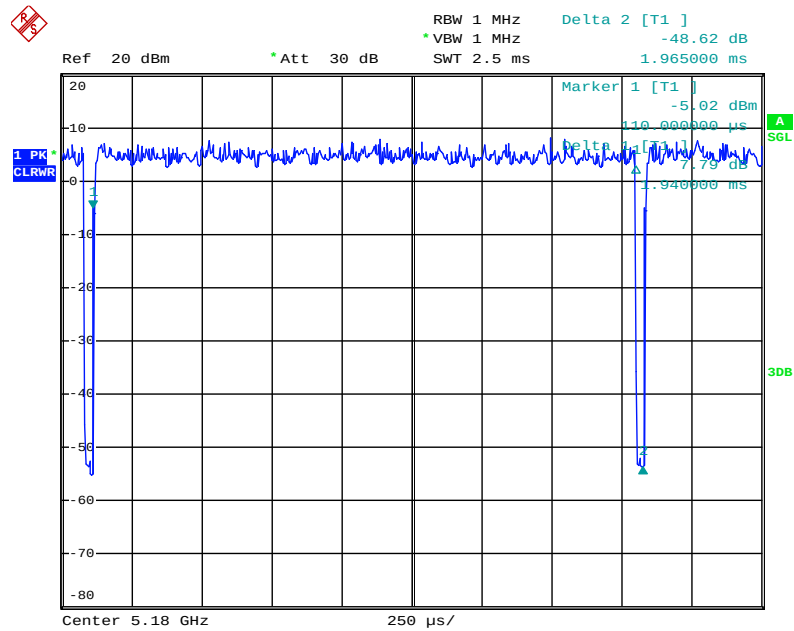
IEEE 802.11g



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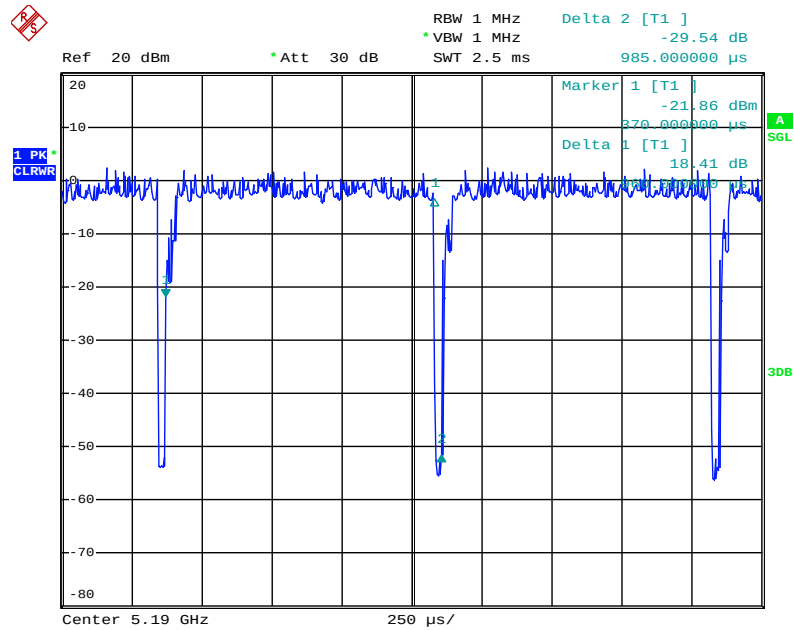
For 5GHz Band:

IEEE 802.11ac MCS0/Nss1 20MHz



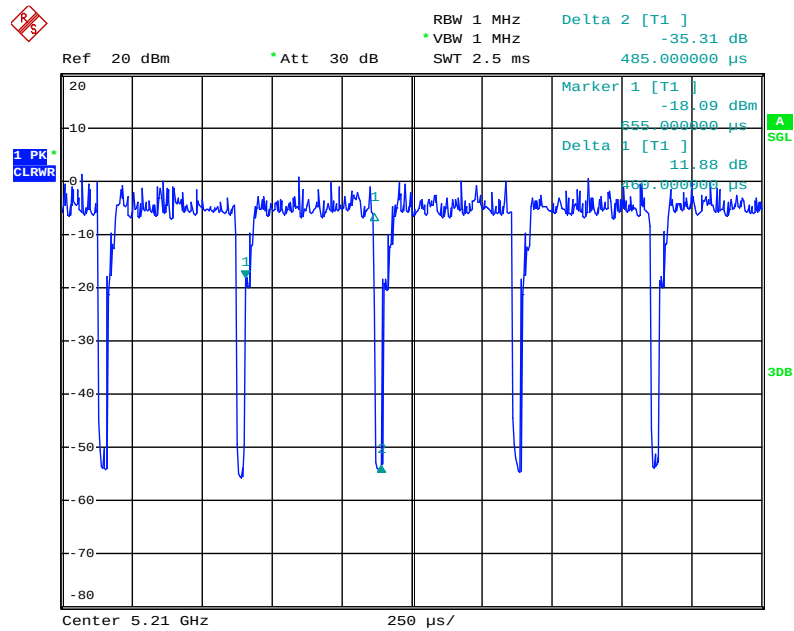
Date: 22.JAN.2014 23:39:56

IEEE 802.11ac MCS0/Nss1 40MHz



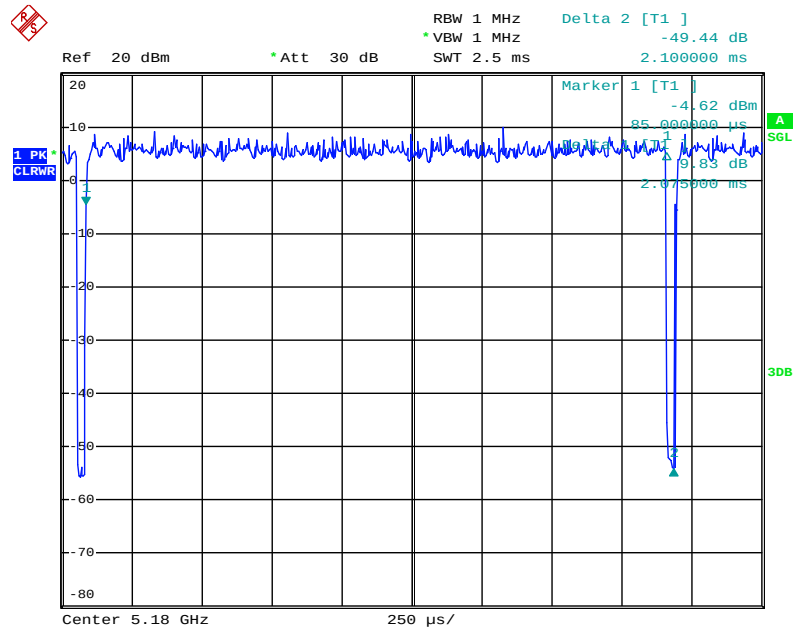
Date: 22.JAN.2014 23:41:24

IEEE 802.11ac MCS0/Nss1 80MHz



Date: 22.JAN.2014 23:45:34

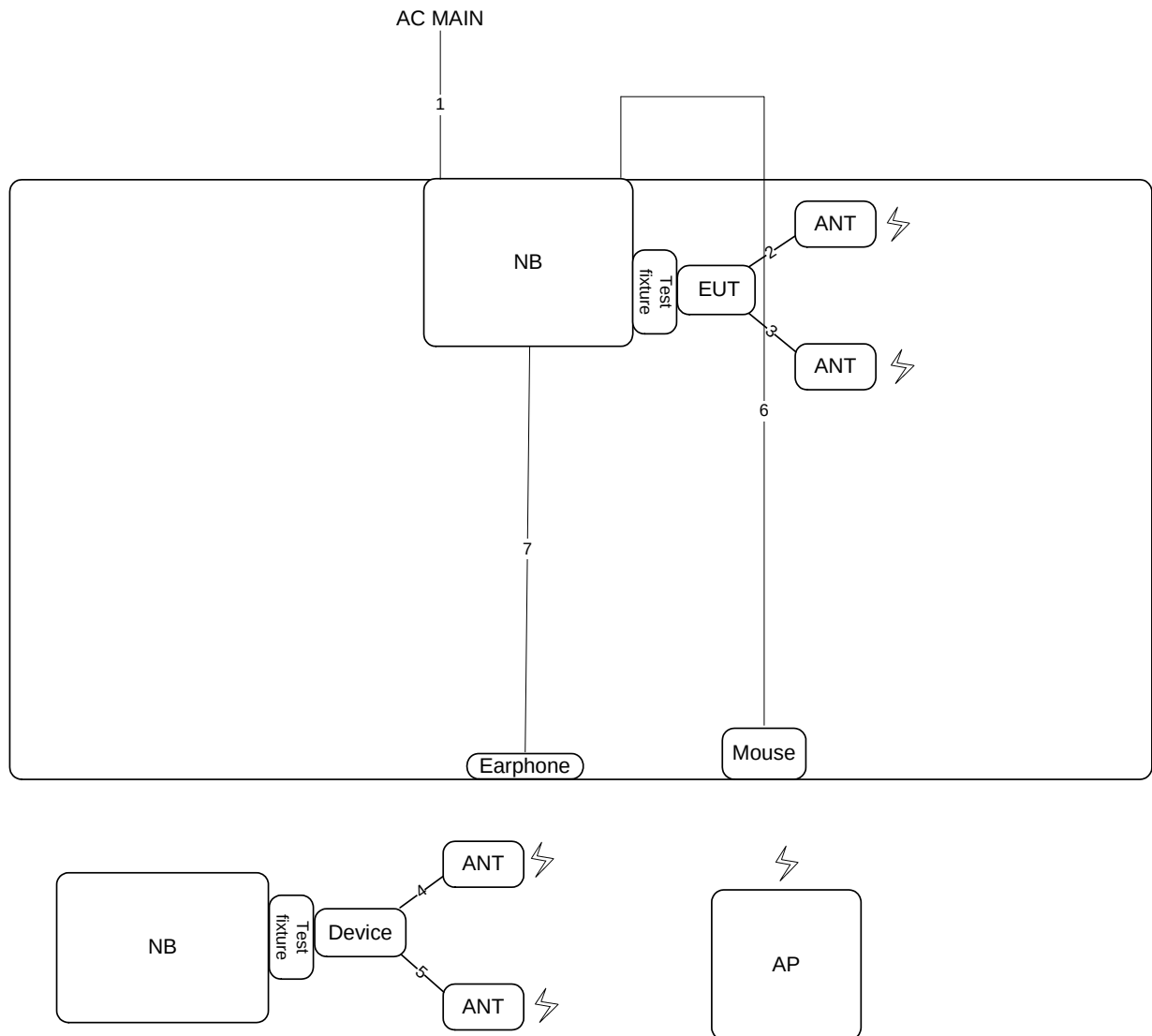
IEEE 802.11a



Date: 22.JAN.2014 23:37:24

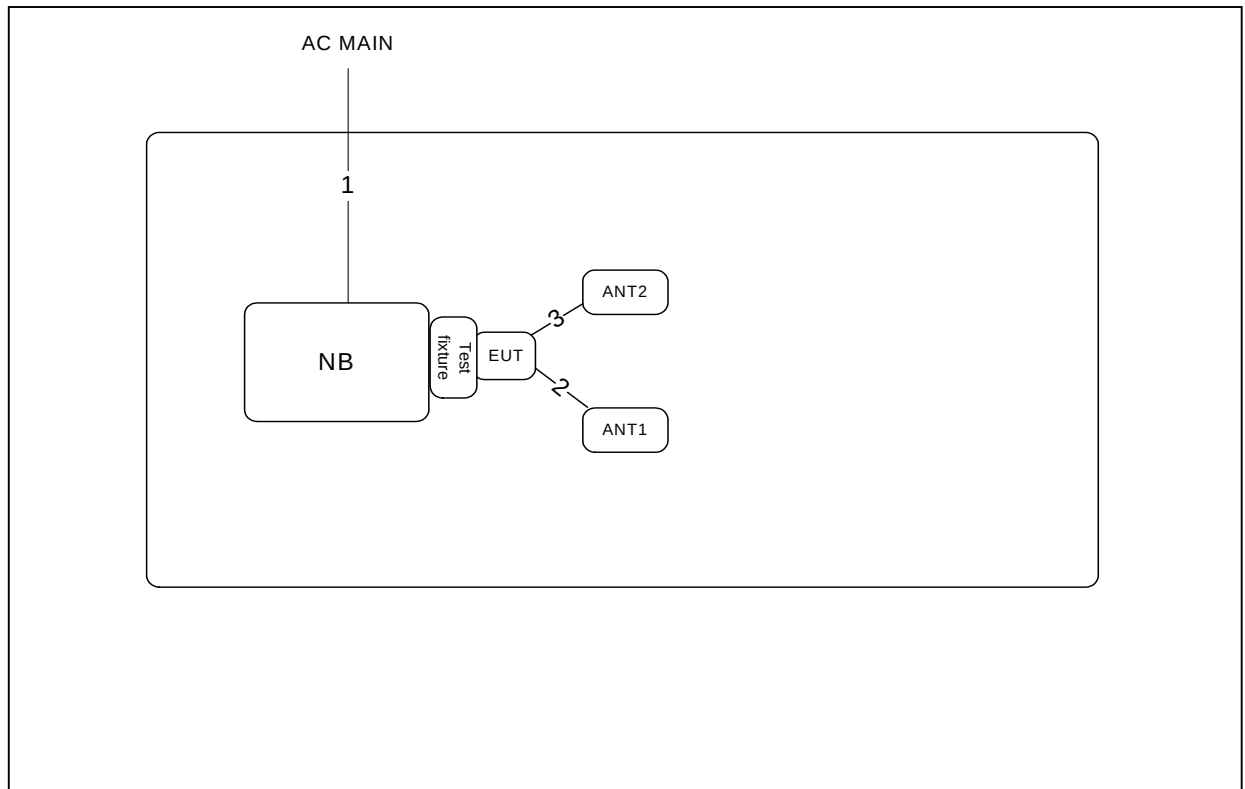
3.12. Test Configurations

3.12.1. AC Power Line Conduction and Radiation Emissions Below 1GHz Test Configuration



Item	Connection	Shielded	Length
1	Power cable	No	2.6m
2	ANT cable	Yes	0.2m
3	ANT cable	Yes	0.2m
4	ANT cable	Yes	0.2m
5	ANT cable	Yes	0.2m
6	USB cable	Yes	1.8m
7	Audio cable	No	1.1m

3.12.2. Radiation Emissions Above 1GHz Test Configuration



Item	Connection	Shielded	Length
1	Power Cable	No	2.6m
2	ANT cable	Yes	0.2m
3	ANT cable	Yes	0.2m

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

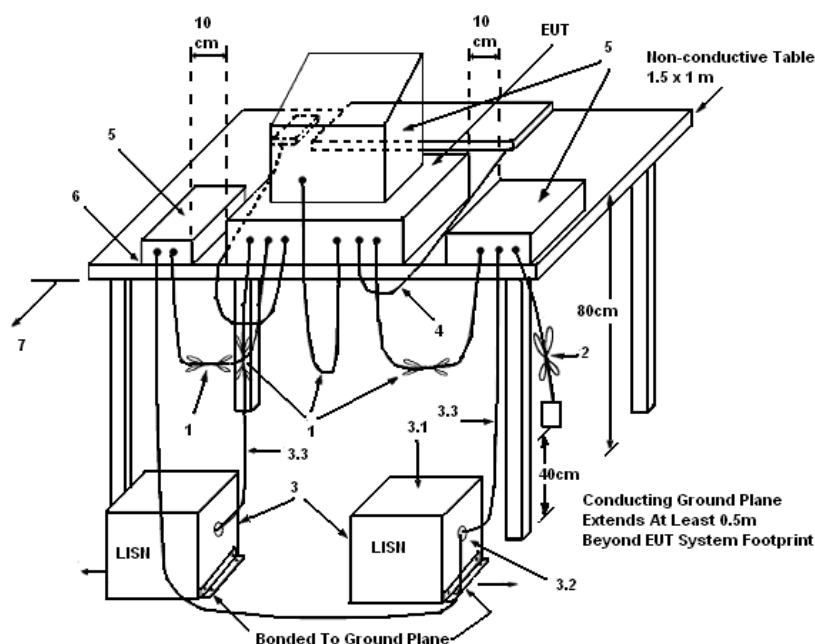
Please refer to section 5 of equipments list in this report. The following table is the setting of the receiver.

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 C63.4. 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 Ω . 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

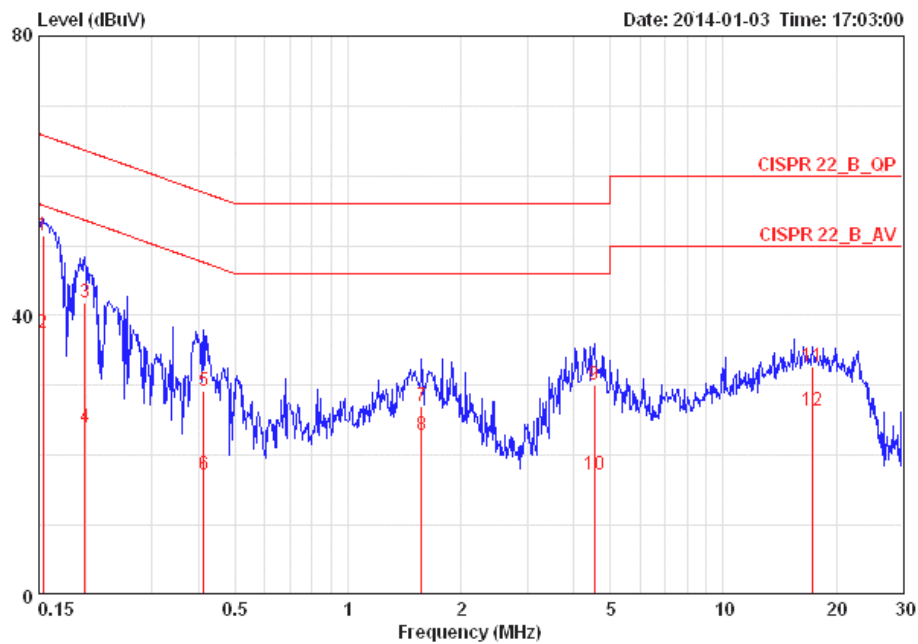
There is no deviation with the original standard.

4.1.6. EUT Operation during Test

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

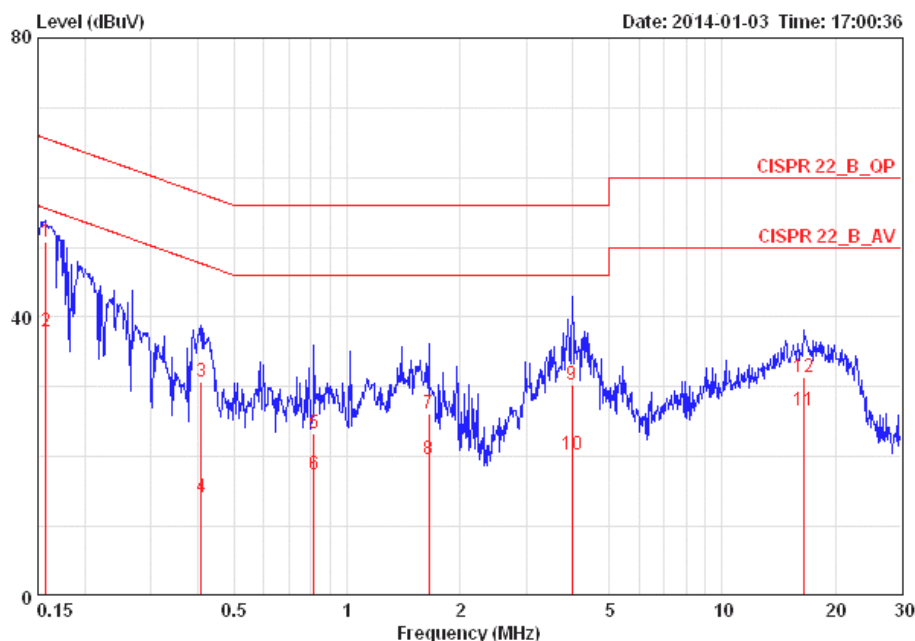
4.1.7. Results of AC Power Line Conducted Emissions Measurement

Temperature	25°C	Humidity	52%
Test Engineer	Justin Chiu	Phase	Line
Configuration	Normal Link	Test Mode	Mode 1



	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark	Pol/Phase
	MHz	dBuV	dB	dBuV	dBuV	dB	dB		
1	0.15403	51.48	-14.30	65.78	51.17	0.15	0.16	QP	LINE
2	0.15403	37.53	-18.25	55.78	37.22	0.15	0.16	AVERAGE	LINE
3	0.19863	41.83	-21.83	63.67	41.52	0.15	0.16	QP	LINE
4	0.19863	24.04	-29.62	53.67	23.73	0.15	0.16	AVERAGE	LINE
5	0.41266	29.25	-28.34	57.59	28.92	0.15	0.18	QP	LINE
6	0.41266	17.23	-30.36	47.59	16.90	0.15	0.18	AVERAGE	LINE
7	1.568	27.12	-28.88	56.00	26.71	0.18	0.23	QP	LINE
8	1.568	22.83	-23.17	46.00	22.42	0.18	0.23	AVERAGE	LINE
9	4.525	30.12	-25.88	56.00	29.52	0.29	0.31	QP	LINE
10	4.525	17.19	-28.81	46.00	16.59	0.29	0.31	AVERAGE	LINE
11	17.291	32.62	-27.38	60.00	31.60	0.54	0.48	QP	LINE
12	17.291	26.45	-23.55	50.00	25.43	0.54	0.48	AVERAGE	LINE

Temperature	25°C	Humidity	52%
Test Engineer	Justin Chiu	Phase	Neutral
Configuration	Normal Link	Test Mode	Mode 1



	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark	Pol/Phase
	MHz	dBuV	dB	dBuV	dBuV	dB	dB		
1 @	0.15733	50.75	-14.85	65.60	50.52	0.07	0.16	QP	NEUTRAL
2 @	0.15733	37.89	-17.71	55.60	37.66	0.07	0.16	AVERAGE	NEUTRAL
3	0.40831	30.65	-27.03	57.68	30.40	0.07	0.18	QP	NEUTRAL
4	0.40831	14.26	-33.42	47.68	14.01	0.07	0.18	AVERAGE	NEUTRAL
5	0.81737	23.29	-32.71	56.00	23.02	0.08	0.20	QP	NEUTRAL
6	0.81737	17.42	-28.58	46.00	17.15	0.08	0.20	AVERAGE	NEUTRAL
7	1.654	26.16	-29.84	56.00	25.82	0.10	0.24	QP	NEUTRAL
8	1.654	19.56	-26.44	46.00	19.22	0.10	0.24	AVERAGE	NEUTRAL
9	3.985	30.40	-25.60	56.00	29.97	0.13	0.30	QP	NEUTRAL
10	3.985	20.33	-25.67	46.00	19.90	0.13	0.30	AVERAGE	NEUTRAL
11	16.486	26.51	-23.49	50.00	25.66	0.39	0.47	AVERAGE	NEUTRAL
12	16.486	31.45	-28.55	60.00	30.60	0.39	0.47	QP	NEUTRAL

Note:

Level = Read Level + LISN Factor + 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

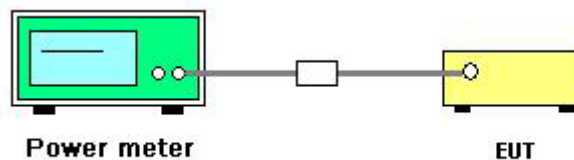
Please refer to section 5 of equipments list in this report. The following table is the setting of the power meter.

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	53%
Test Engineer	Wen Chao	Configurations	IEEE 802.11n/ac
Test Date	Jan. 22, 2014		

For 2.4GHz Band

Configuration IEEE 802.11n MCS0 20MHz / Chain 1

Channel	Frequency	Duty Factor (dB)	Conducted Power (dBm)	Max. Limit (dBm)	Result
1	2412 MHz	0.06	17.82	30.00	Complies
6	2437 MHz		20.95	30.00	Complies
11	2462 MHz		16.81	30.00	Complies

Configuration IEEE 802.11n MCS0 40MHz / Chain 1

Channel	Frequency	Duty Factor (dB)	Conducted Power (dBm)	Max. Limit (dBm)	Result
3	2422 MHz	0.11	14.5	30.00	Complies
6	2437 MHz		17.23	30.00	Complies
9	2452 MHz		15.35	30.00	Complies

For 5GHz Band

Configuration IEEE 802.11ac MCS0/Nss1 20MHz / Chain 1

Channel	Frequency	Duty Factor (dB)	Conducted Power (dBm)	Max. Limit (dBm)	Result
149	5745 MHz	0.06	19.28	30.00	Complies
157	5785 MHz		20.38	30.00	Complies
165	5825 MHz		20.46	30.00	Complies

Configuration IEEE 802.11ac MCS0/Nss1 40MHz / Chain 1

Channel	Frequency	Duty Factor (dB)	Conducted Power (dBm)	Max. Limit (dBm)	Result
151	5755 MHz	0.11	17.36	30.00	Complies
159	5795 MHz		20.5	30.00	Complies

Configuration IEEE 802.11ac MCS0/Nss1 80MHz / Chain 1

Channel	Frequency	Duty Factor (dB)	Conducted Power (dBm)	Max. Limit (dBm)	Result
155	5775 MHz	0.23	16.45	30.00	Complies

Temperature	20°C	Humidity	53%
Test Engineer	Wen Chao	Configurations	IEEE 802.11a/b/g
Test Date	Jan. 22, 2014		

Configuration IEEE 802.11b / Chain 1

Channel	Frequency	Duty Factor (dB)	Conducted Power (dBm)	Max. Limit (dBm)	Result
1	2412 MHz	0	16.31	30.00	Complies
6	2437 MHz		16.42	30.00	Complies
11	2462 MHz		17.1	30.00	Complies

Configuration IEEE 802.11g / Chain 1

Channel	Frequency	Duty Factor (dB)	Conducted Power (dBm)	Max. Limit (dBm)	Result
1	2412 MHz	0.05	18.07	30.00	Complies
6	2437 MHz		21.42	30.00	Complies
11	2462 MHz		17.44	30.00	Complies

Configuration IEEE 802.11a / Chain 1

Channel	Frequency	Duty Factor (dB)	Conducted Power (dBm)	Max. Limit (dBm)	Result
149	5745 MHz	0.05	19.24	30.00	Complies
157	5785 MHz		20.38	30.00	Complies
165	5825 MHz		20.36	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

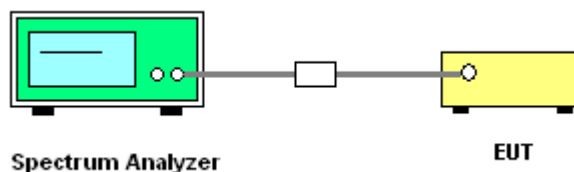
Please refer to section 5 of equipments list in this report. The following table is the setting of the spectrum analyzer.

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 $\geq 2 \times \text{span/RBW}$ (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	53%
Test Engineer	Wen Chao	Configurations	IEEE 802.11n/ac

For 2.4GHz Band

Configuration IEEE 802.11n MCS0 20MHz / Chain 1

Channel	Frequency	Power Density (dBm/3kHz)	Power Density Limit (dBm/3kHz)	Result
1	2412 MHz	-8.79	8.00	Complies
6	2437 MHz	-4.25	8.00	Complies
11	2462 MHz	-9.04	8.00	Complies

Configuration IEEE 802.11n MCS0 40MHz / Chain 1

Channel	Frequency	Power Density (dBm/3kHz)	Power Density Limit (dBm/3kHz)	Result
3	2422 MHz	-13.68	8.00	Complies
6	2437 MHz	-11.30	8.00	Complies
9	2452 MHz	-13.31	8.00	Complies

For 5GHz Band

Configuration IEEE 802.11ac MCS0/Nss1 20MHz / Chain 1

Channel	Frequency	Power Density (dBm/3kHz)	Power Density Limit (dBm/3kHz)	Result
149	5745 MHz	-6.39	8.00	Complies
157	5785 MHz	-6.45	8.00	Complies
165	5825 MHz	-6.61	8.00	Complies

Configuration IEEE 802.11ac MCS0/Nss1 40MHz / Chain 1

Channel	Frequency	Power Density (dBm/3kHz)	Power Density Limit (dBm/3kHz)	Result
151	5755 MHz	-10.59	8.00	Complies
159	5795 MHz	-7.71	8.00	Complies

Configuration IEEE 802.11ac MCS0/Nss1 80MHz / Chain 1

Channel	Frequency	Power Density (dBm/3kHz)	Power Density Limit (dBm/3kHz)	Result
155	5775 MHz	-14.97	8.00	Complies

Temperature	20°C	Humidity	53%
Test Engineer	Wen Chao	Configurations	IEEE 802.11a/b/g

Configuration IEEE 802.11b / Chain 1

Channel	Frequency	Power Density (dBm/3kHz)	Power Density Limit (dBm/3kHz)	Result
1	2412 MHz	-5.12	8.00	Complies
6	2437 MHz	-6.01	8.00	Complies
11	2462 MHz	-5.32	8.00	Complies

Configuration IEEE 802.11g / Chain 1

Channel	Frequency	Power Density (dBm/3kHz)	Power Density Limit (dBm/3kHz)	Result
1	2412 MHz	-7.42	8.00	Complies
6	2437 MHz	-3.99	8.00	Complies
11	2462 MHz	-7.24	8.00	Complies

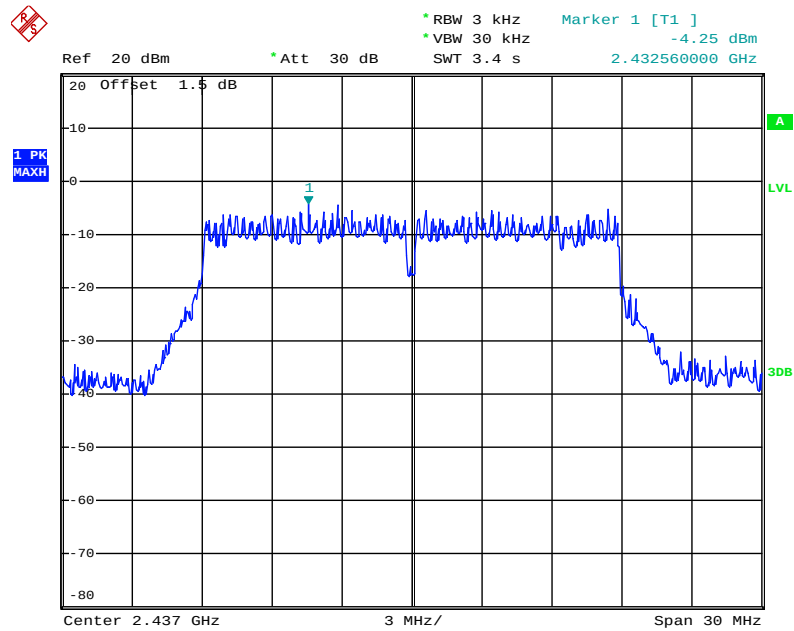
Configuration IEEE 802.11a / Chain 1

Channel	Frequency	Power Density (dBm/3kHz)	Power Density Limit (dBm/3kHz)	Result
149	5745 MHz	-5.34	8.00	Complies
157	5785 MHz	-6.01	8.00	Complies
165	5825 MHz	-5.98	8.00	Complies

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

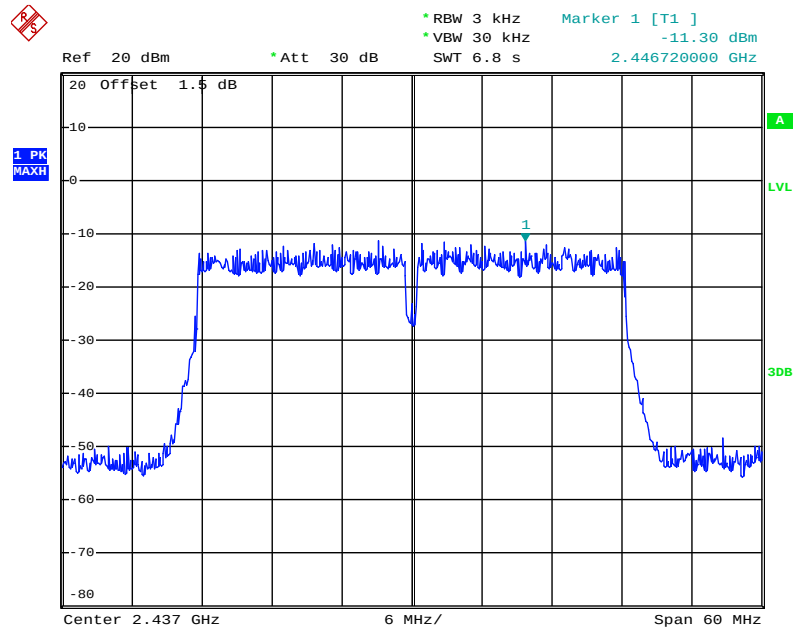
For plots, only the channel with worse result was shown.

Power Density Plot on Configuration IEEE 802.11n MCS0 20MHz / 2437 MHz / Chain 1



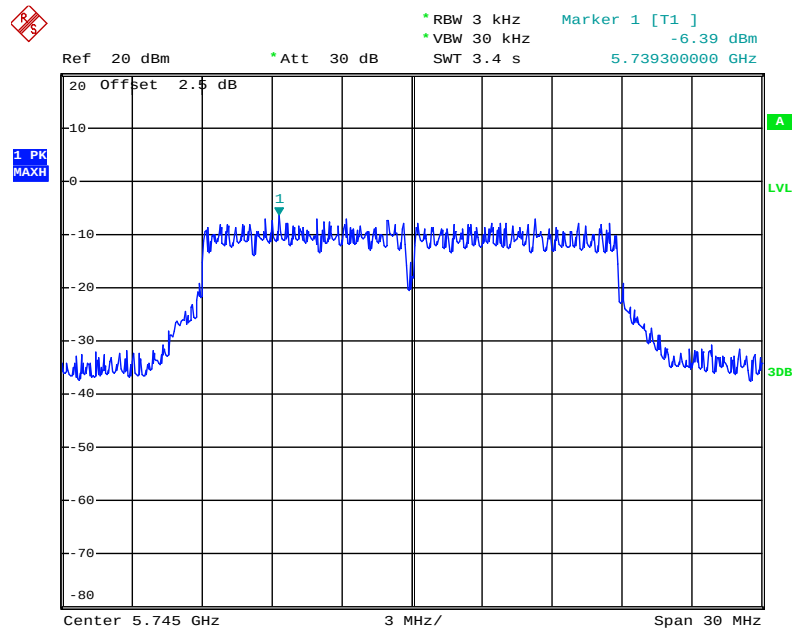
Date: 22.JAN.2014 21:30:51

Power Density Plot on Configuration IEEE 802.11n MCS0 40MHz / 2437 MHz / Chain 1



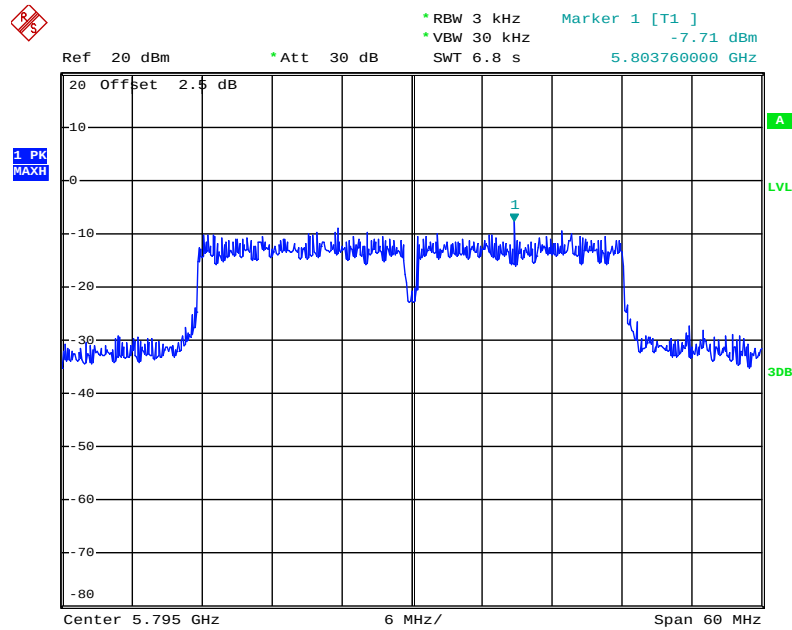
Date: 22.JAN.2014 21:35:26

Power Density Plot on Configuration IEEE 802.11ac MCS0/Nss1 20MHz / 5745 MHz / Chain 1



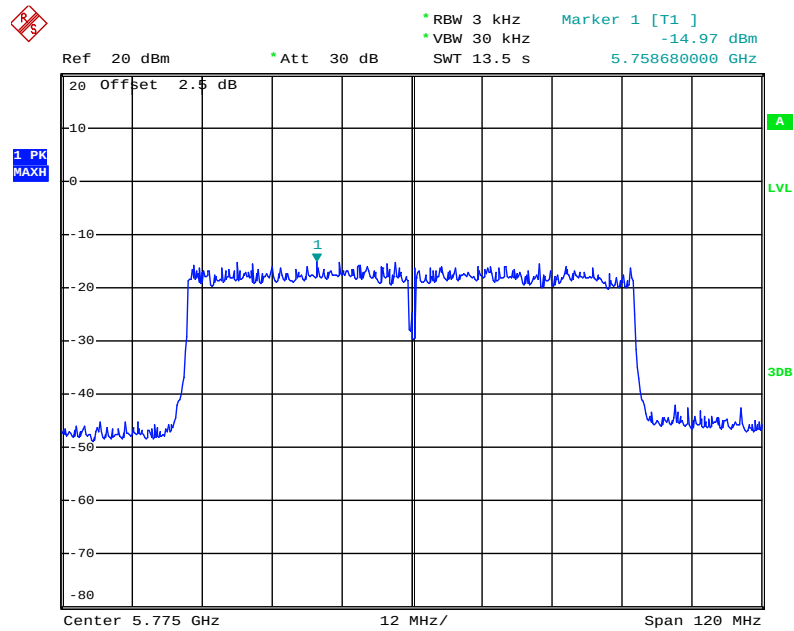
Date: 22.JAN.2014 21:40:45

Power Density Plot on Configuration IEEE 802.11ac MCS0/Nss1 40MHz / 5795 MHz / Chain 1



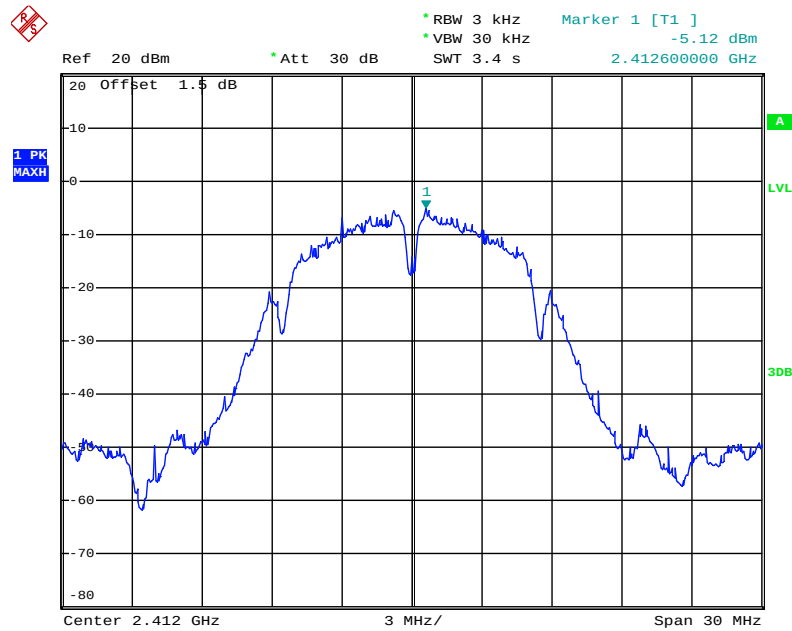
Date: 22.JAN.2014 21:43:49

Power Density Plot on Configuration IEEE 802.11ac MCS0/Nss1 80MHz / 5775 MHz / Chain 1



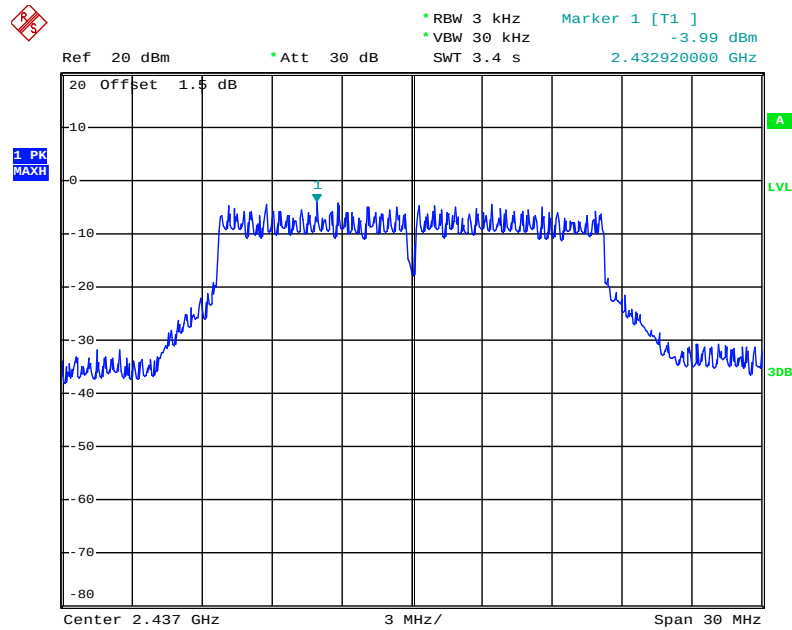
Date: 22.JAN.2014 21:46:51

Power Density Plot on Configuration IEEE 802.11b / 2412 MHz / Chain 1



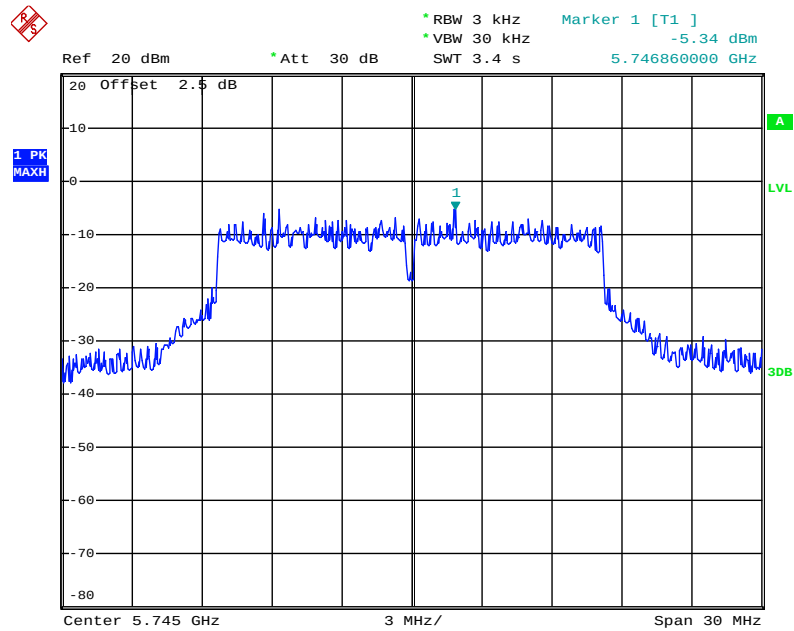
Date: 22.JAN.2014 21:21:13

Power Density Plot on Configuration IEEE 802.11g / 2437 MHz / Chain 1



Date: 22.JAN.2014 21:24:37

Power Density Plot on Configuration IEEE 802.11a / 5745 MHz / Chain 1



Date: 22.JAN.2014 21:38:35

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:

7. The transmitter was radiated to the spectrum analyzer in peak hold mode.
8. 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.
9. Multiple antenna system was performed in accordance with KDB 662911 D01 v02r01 Emissions Testing of Transmitters with Multiple Outputs in the Same Band.
10. 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	53%
Test Engineer	Wen Chao	Configurations	IEEE 802.11n/ac

For 2.4GHz Band

Configuration IEEE 802.11n MCS0 20MHz / Chain 1

Channel	Frequency	6dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)	Min. Limit (kHz)	Test Result
1	2412 MHz	17.60	17.84	500	Complies
6	2437 MHz	17.60	17.92	500	Complies
11	2462 MHz	17.60	17.76	500	Complies

Configuration IEEE 802.11n MCS0 40MHz / Chain 1

Channel	Frequency	6dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)	Min. Limit (kHz)	Test Result
3	2422 MHz	36.48	36.48	500	Complies
6	2437 MHz	36.48	36.48	500	Complies
9	2452 MHz	36.48	36.48	500	Complies

For 5GHz Band

Configuration IEEE 802.11ac MCS0/Nss1 20MHz / Chain 1

Channel	Frequency	6dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)	Min. Limit (kHz)	Test Result
149	5745 MHz	17.52	18.64	500	Complies
157	5785 MHz	17.60	23.36	500	Complies
165	5825 MHz	17.52	21.76	500	Complies

Configuration IEEE 802.11ac MCS0/Nss1 40MHz / Chain 1

Channel	Frequency	6dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)	Min. Limit (kHz)	Test Result
151	5755 MHz	36.48	36.48	500	Complies
159	5795 MHz	36.32	52.48	500	Complies

Configuration IEEE 802.11ac MCS0/Nss1 80MHz / Chain 1

Channel	Frequency	6dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)	Min. Limit (kHz)	Test Result
155	5775 MHz	75.52	76.16	500	Complies

Temperature	20°C	Humidity	53%
Test Engineer	Wen Chao	Configurations	IEEE 802.11a/b/g

Configuration IEEE 802.11b / Chain 1

Channel	Frequency	6dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)	Min. Limit (kHz)	Test Result
1	2412 MHz	7.04	10.48	500	Complies
6	2437 MHz	6.08	10.40	500	Complies
11	2462 MHz	7.52	10.48	500	Complies

Configuration IEEE 802.11g / Chain 1

Channel	Frequency	6dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)	Min. Limit (kHz)	Test Result
1	2412 MHz	16.32	16.64	500	Complies
6	2437 MHz	16.32	17.12	500	Complies
11	2462 MHz	16.32	16.64	500	Complies

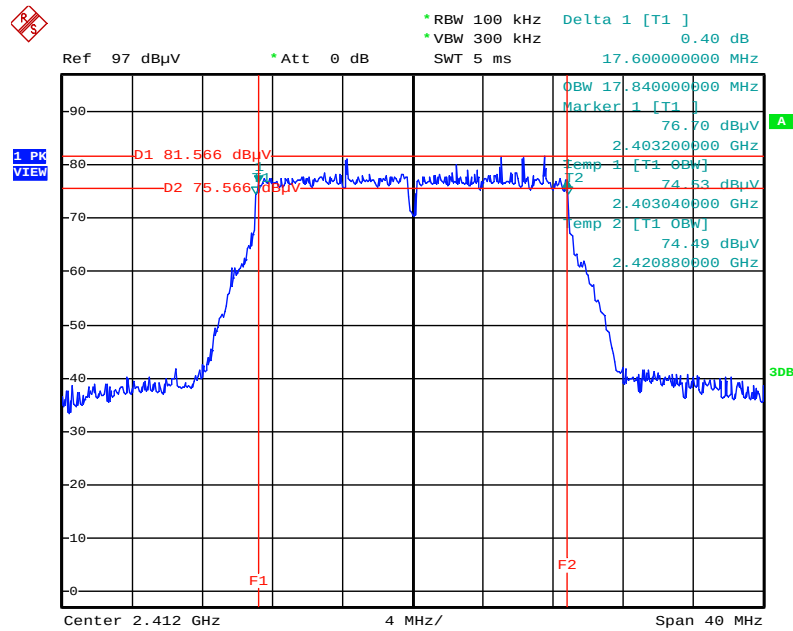
Configuration IEEE 802.11a / Chain 1

Channel	Frequency	6dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)	Min. Limit (kHz)	Test Result
149	5745 MHz	16.32	18.00	500	Complies
157	5785 MHz	16.40	23.76	500	Complies
165	5825 MHz	16.32	21.04	500	Complies

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

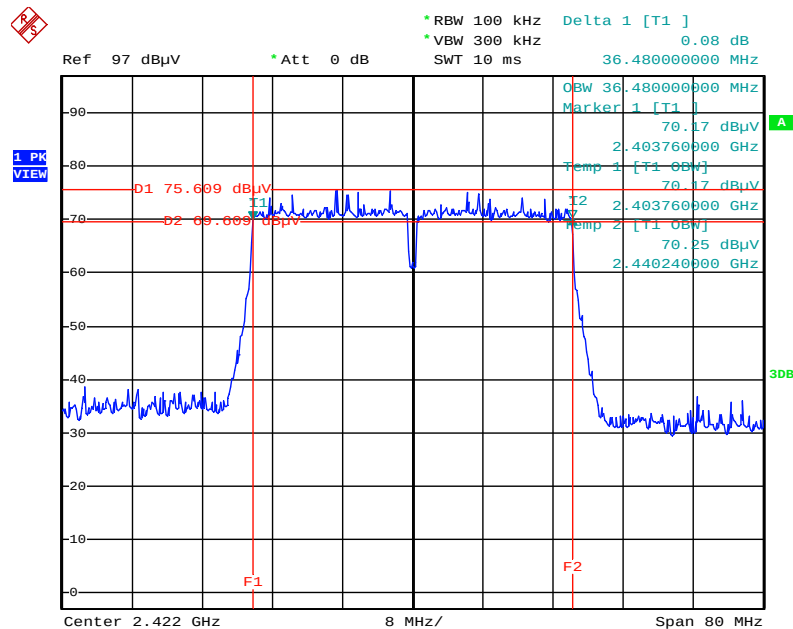
For plots, only the channel with worse result was shown.

6 dB Bandwidth Plot on Configuration IEEE 802.11n MCS0 20MHz / 2412 MHz / Chain 1



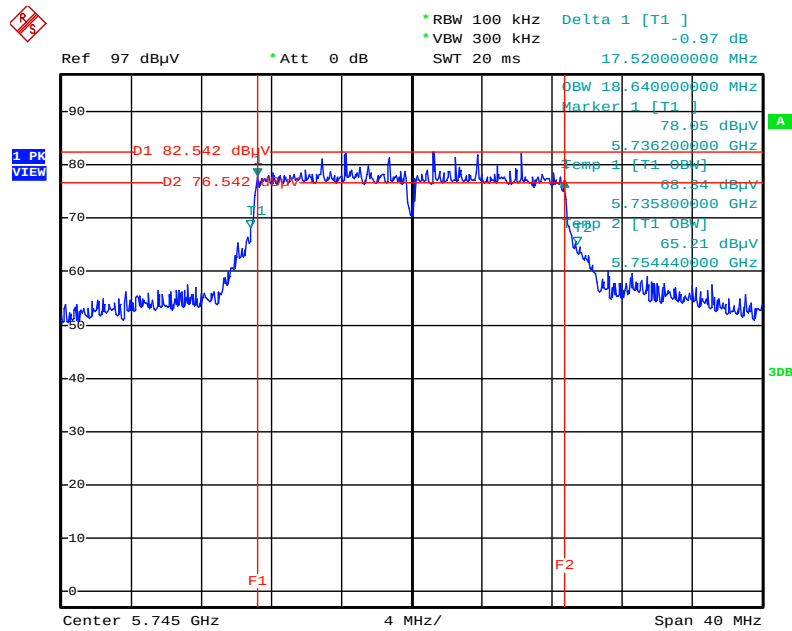
Date: 22.JAN.2014 22:12:01

6 dB Bandwidth Plot on Configuration IEEE 802.11n MCS0 40MHz / 2422 MHz / Chain 1



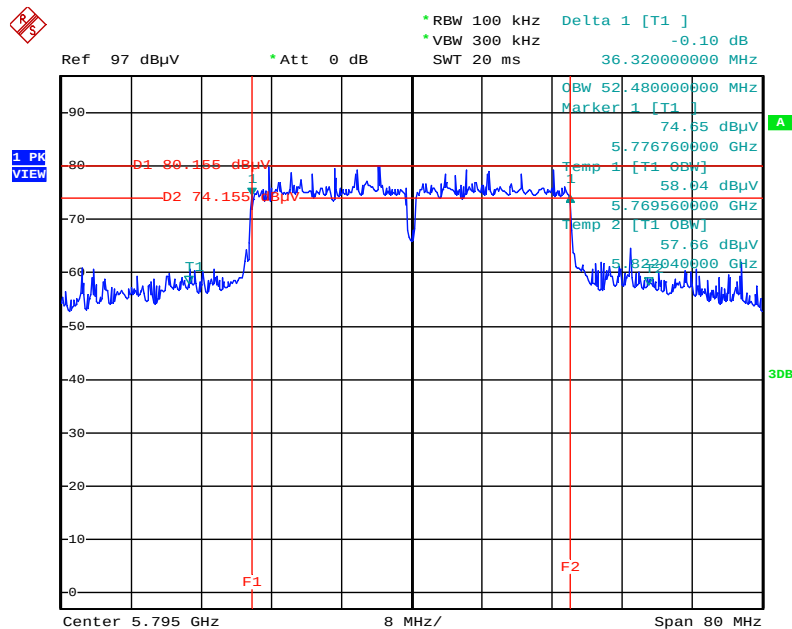
Date: 22.JAN.2014 22:15:43

6 dB Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 20MHz / 5745 MHz / Chain 1



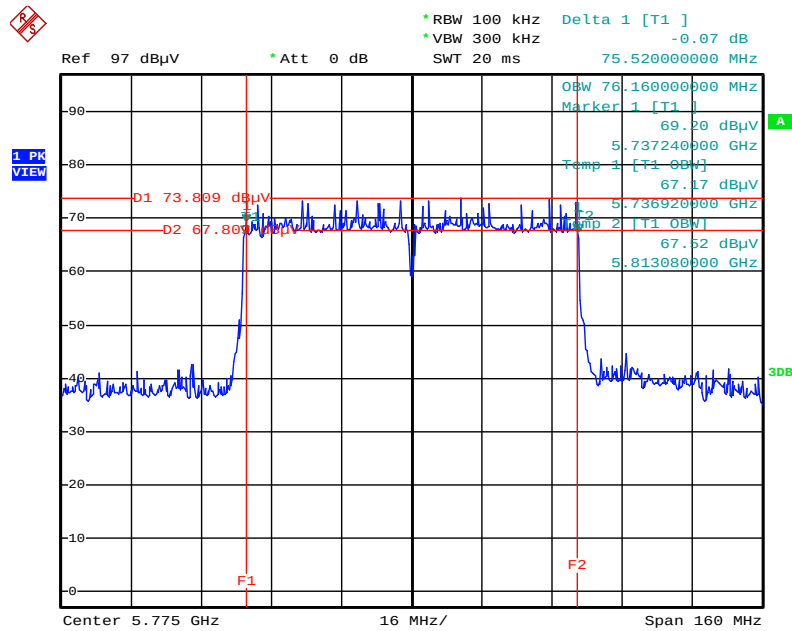
Date: 22.JAN.2014 22:32:17

6 dB Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 40MHz / 5795MHz / Chain 1



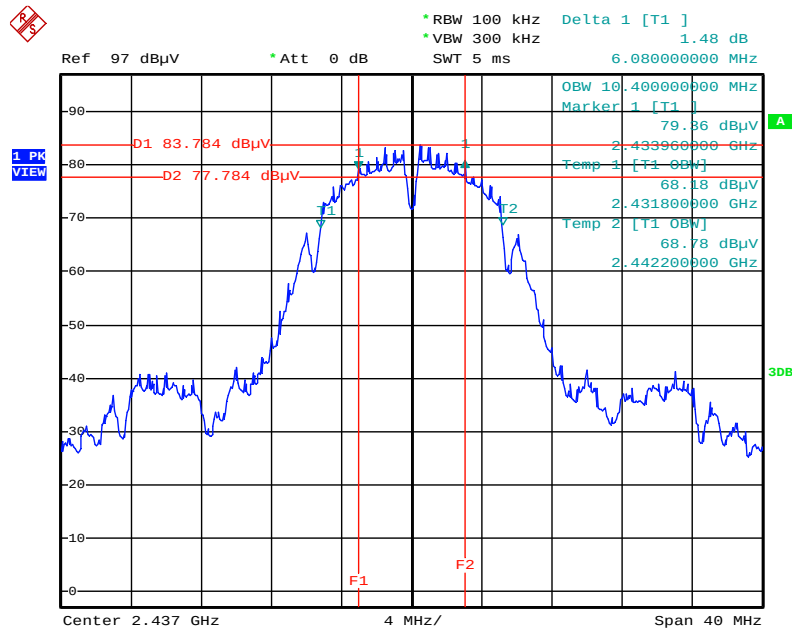
Date: 22.JAN.2014 22:33:36

6 dB Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 80MHz / 5775 MHz / Chain 1



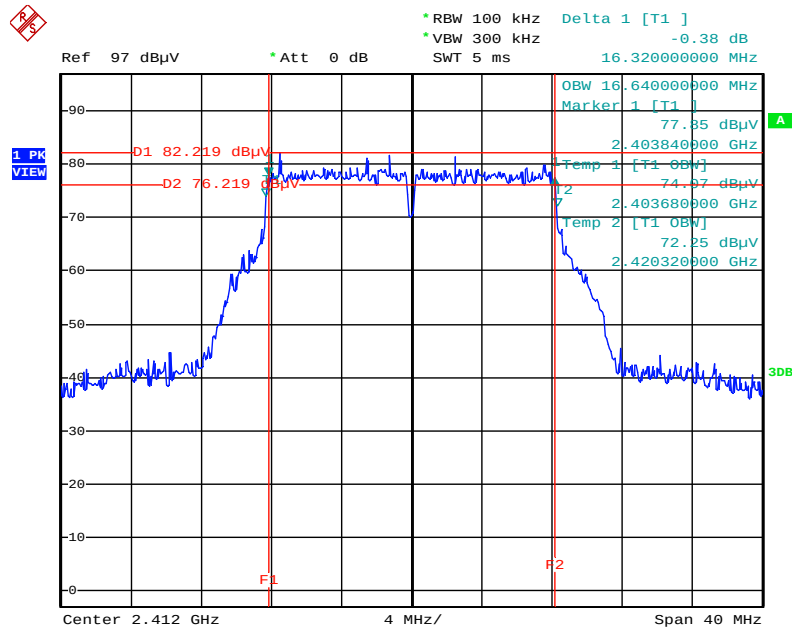
Date: 22.JAN.2014 22:34:19

6 dB Bandwidth Plot on Configuration IEEE 802.11b / 2437 MHz / Chain 1



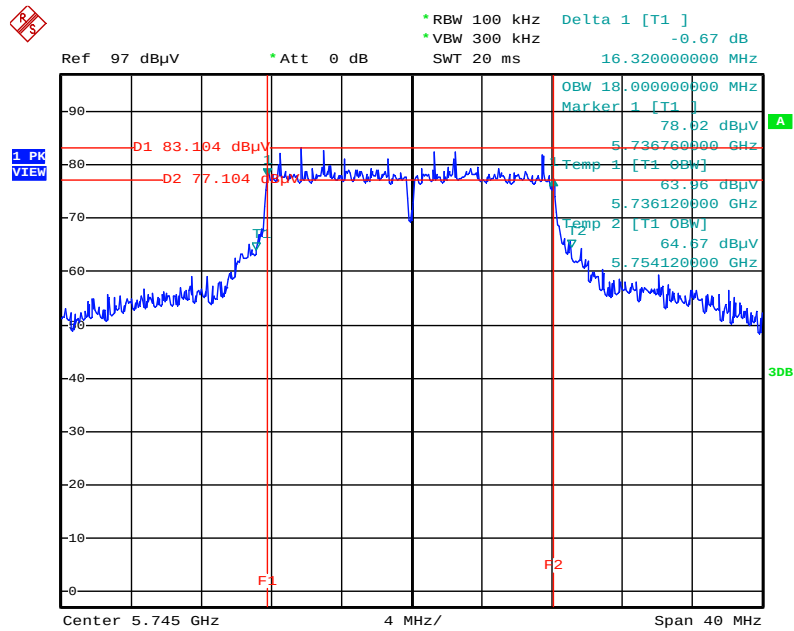
Date: 22.JAN.2014 22:02:27

6 dB Bandwidth Plot on Configuration IEEE 802.11g / 2412 MHz / Chain 1



Date: 22.JAN.2014 22:06:13

6 dB Bandwidth Plot on Configuration IEEE 802.11a / 5745 MHz / Chain 1



Date: 22.JAN.2014 22:29:33

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	1 GHz
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

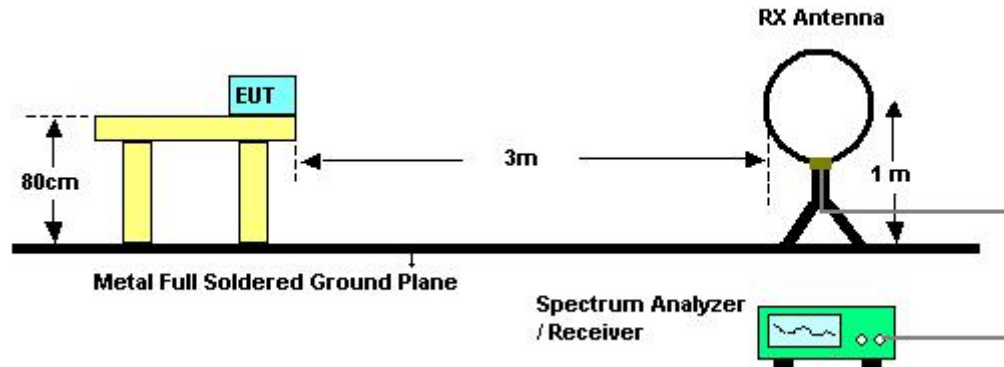
Receiver Parameter	Setting
Attenuation	Auto
Start ~ Stop Frequency	9kHz~150kHz / RBW 200Hz for QP
Start ~ Stop Frequency	150kHz~30MHz / RBW 9kHz for QP
Start ~ Stop Frequency	30MHz~1GHz / RBW 120kHz for QP

4.5.3. Test Procedures

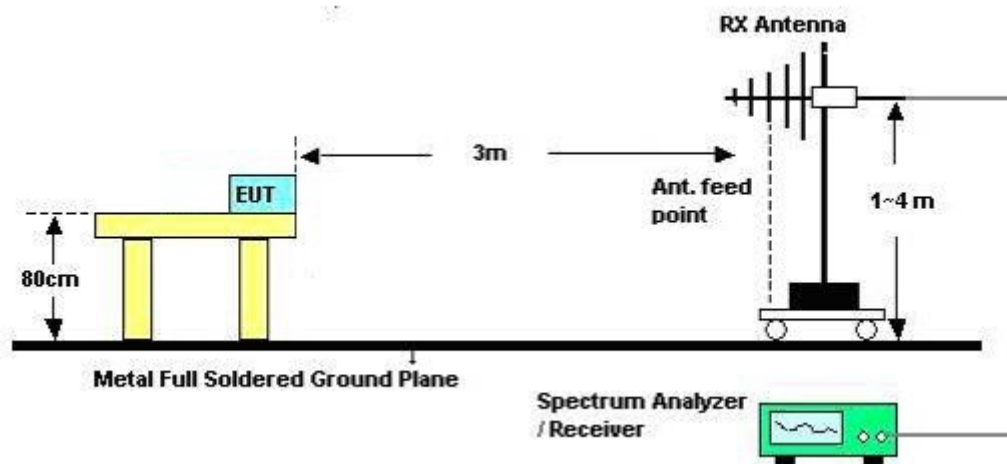
1. Configure the EUT according to ANSI C63.4. The EUT was placed on the top of the turntable 0.8 meter above ground. The phase center of the receiving antenna mounted on the top of a height-variable antenna tower was placed 3 meters far away from the turntable.
2. Power on the EUT and all the supporting 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

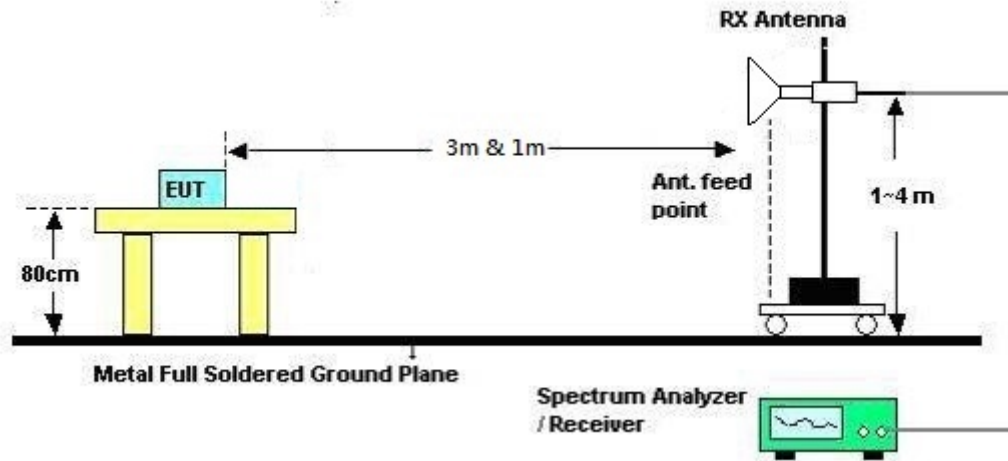
For Radiated Emissions: 9kHz ~30MHz



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)

Temperature	20°C	Humidity	55%
Test Engineer	David Tseng	Configurations	Normal Link
Test Date	Jan. 08, 2014	Test Mode	Mode 1

Freq. (MHz)	Level (dBuV)	Over Limit (dB)	Limit Line (dBuV)	Remark
-	-	-	-	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.

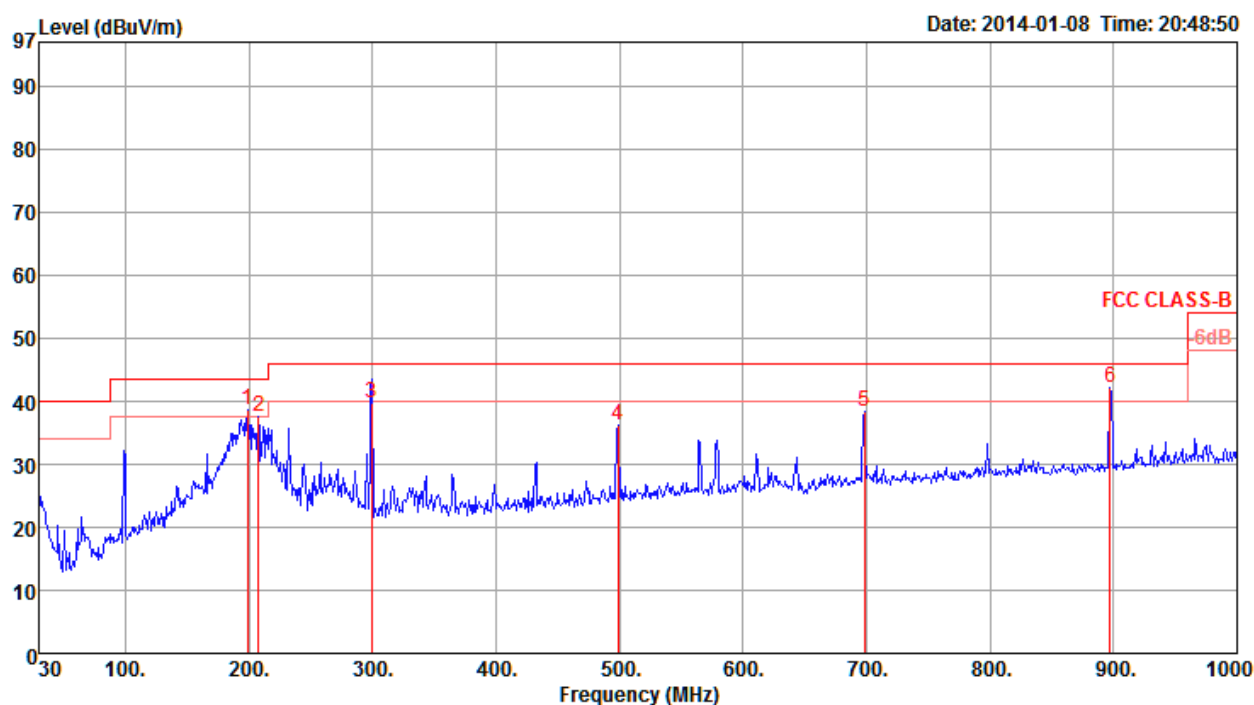
Distance extrapolation factor = $40 \log (\text{specific distance} / \text{test distance})$ (dB);

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

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

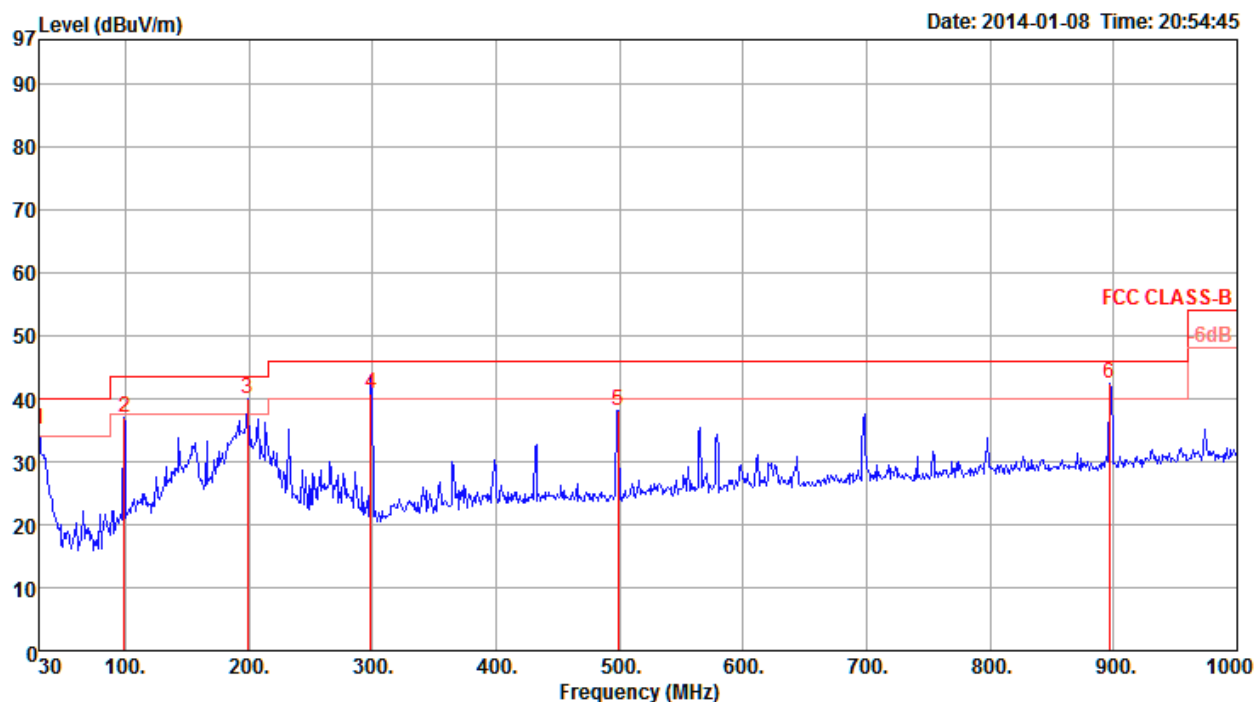
Temperature	20°C	Humidity	55%
Test Engineer	David Tseng	Configurations	Normal Link
Test Mode	Mode 1		

Horizontal



	Freq	Level	Limit	Over	Read	Cable	Preamp			T/Pos	A/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m	Remark	deg	cm	
1	198.78	38.73	43.50	-4.77	53.56	2.09	27.26	-14.83	Peak	0	400	HORIZONTAL
2	207.51	37.62	43.50	-5.88	52.11	2.15	27.19	-14.49	Peak	0	400	HORIZONTAL
3	299.66	39.82	46.00	-6.18	50.34	2.51	26.83	-10.52	QP	349	106	HORIZONTAL
4	498.51	36.29	46.00	-9.71	43.07	3.38	27.93	-6.78	Peak	0	400	HORIZONTAL
5	698.33	38.35	46.00	-7.65	41.32	4.15	27.10	-2.97	Peak	0	400	HORIZONTAL
6	897.18	42.27	46.00	-3.73	43.04	4.58	26.83	-0.77	Peak	0	400	HORIZONTAL

Vertical



	Freq	Level	Limit	Over	Read	Cable	Preamp			T/Pos	A/Pos	
	MHz	dBuV/m	dBuV/m	Limit	Level	Loss	Factor	Factor	Remark	deg	cm	Pol/Phase
1	30.00	35.16	40.00	-4.84	42.40	0.83	27.97	-7.24	Peak	0	100	VERTICAL
2	98.87	36.98	43.50	-6.52	52.12	1.49	27.82	-15.14	Peak	0	100	VERTICAL
3	198.78	40.03	43.50	-3.47	54.86	2.09	27.26	-14.83	Peak	0	100	VERTICAL
4	298.69	40.78	46.00	-5.22	51.30	2.51	26.83	-10.52	QP	166	100	VERTICAL
5	498.51	38.14	46.00	-7.86	44.92	3.38	27.93	-6.78	Peak	0	100	VERTICAL
6	896.21	42.29	46.00	-3.71	43.07	4.58	26.84	-0.78	Peak	0	100	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.

4.5.9. Results for Radiated Emissions (1GHz~10th Harmonic)

Temperature	20°C	Humidity	55%
Test Engineer	David Tseng	Configurations	IEEE 802.11n MCS0 20MHz CH 1 / Chain 1
Test Date	Jan. 01, 2014		

Horizontal

	Freq	Level	Limit	Over	Read	Cable	Preamp			T/Pos	A/Pos	
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m	Remark	deg	cm	Pol/Phase
1	4819.03	52.84	74.00	-21.16	50.76	4.21	34.69	2.08	Peak	307	121	HORIZONTAL
2	4823.76	38.77	54.00	-15.23	36.69	4.21	34.69	2.08	Average	307	121	HORIZONTAL

Vertical

	Freq	Level	Limit	Over	Read	Cable	Preamp			T/Pos	A/Pos	
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m	Remark	deg	cm	Pol/Phase
1	4823.12	53.16	74.00	-20.84	51.08	4.21	34.69	2.08	Peak	82	100	VERTICAL
2	4823.76	39.31	54.00	-14.69	37.23	4.21	34.69	2.08	Average	82	100	VERTICAL

Temperature	20°C	Humidity	55%
Test Engineer	David Tseng	Configurations	IEEE 802.11n MCS0 20MHz CH 6 / Chain 1
Test Date	Jan. 01, 2014		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Preamp Factor	Factor	Remark	T/Pos	A/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m		deg	cm	
1	4874.77	41.87	54.00	-12.13	39.66	4.22	34.67	2.21	Average	308	100	HORIZONTAL
2	4878.26	55.97	74.00	-18.03	53.76	4.22	34.67	2.21	Peak	308	100	HORIZONTAL
3	7311.51	41.01	54.00	-12.99	33.64	5.34	34.94	7.37	Average	226	100	HORIZONTAL
4	7312.19	49.56	74.00	-24.44	42.19	5.34	34.94	7.37	Peak	225	100	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Preamp Factor	Factor	Remark	T/Pos	A/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m		deg	cm	
1	4874.56	41.12	54.00	-12.88	38.91	4.22	34.67	2.21	Average	88	100	VERTICAL
2	4876.32	48.98	74.00	-25.02	46.77	4.22	34.67	2.21	Peak	88	100	VERTICAL
3	7307.39	53.29	74.00	-20.71	45.91	5.34	34.93	7.38	Peak	71	100	VERTICAL
4	7309.08	39.82	54.00	-14.18	32.44	5.34	34.93	7.38	Average	71	100	VERTICAL

Temperature	20°C	Humidity	55%
Test Engineer	David Tseng	Configurations	IEEE 802.11n MCS0 20MHz CH 11 / Chain 1
Test Date	Jan. 01, 2014		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Preamp Factor	Factor	Remark	T/Pos	A/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m		deg	cm	
1	4920.35	51.24	74.00	-22.76	48.90	4.23	34.65	2.34	Peak	307	100	HORIZONTAL
2	4925.38	37.35	54.00	-16.65	35.01	4.23	34.65	2.34	Average	307	100	HORIZONTAL
3	7381.48	36.69	54.00	-17.31	29.23	5.36	34.96	7.46	Average	103	100	HORIZONTAL
4	7390.90	48.89	74.00	-25.11	41.41	5.36	34.96	7.48	Peak	103	100	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Preamp Factor	Factor	Remark	T/Pos	A/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m		deg	cm	
1	4925.54	52.23	74.00	-21.77	49.89	4.23	34.65	2.34	Peak	83	113	VERTICAL
2	4925.57	37.87	54.00	-16.13	35.53	4.23	34.65	2.34	Average	83	113	VERTICAL
3	7388.53	34.77	54.00	-19.23	27.29	5.36	34.96	7.48	Average	329	100	VERTICAL
4	7389.30	48.81	74.00	-25.19	41.33	5.36	34.96	7.48	Peak	329	100	VERTICAL

Temperature	20°C	Humidity	55%
Test Engineer	David Tseng	Configurations	IEEE 802.11n MCS0 40MHz CH 3 / Chain 1
Test Date	Jan. 01, 2014		

Horizontal

	Freq	Level	Limit	Over	Read	Cable	Preamp			T/Pos	A/Pos	
	MHz	dBuV/m	dBuV/m	Limit	Level	Loss	Factor	Factor	Remark	deg	cm	Pol/Phase
1	4836.92	47.37	74.00	-26.63	45.26	4.21	34.69	2.11	Peak	306	100	HORIZONTAL
2	4842.43	33.03	54.00	-20.97	30.91	4.21	34.68	2.12	Average	306	100	HORIZONTAL

Vertical

	Freq	Level	Limit	Over	Read	Cable	Preamp			T/Pos	A/Pos	
	MHz	dBuV/m	dBuV/m	Limit	Level	Loss	Factor	Factor	Remark	deg	cm	Pol/Phase
1	4838.58	33.35	54.00	-20.65	31.23	4.21	34.68	2.12	Average	88	100	VERTICAL
2	4843.97	47.94	74.00	-26.06	45.82	4.21	34.68	2.12	Peak	88	100	VERTICAL

Temperature	20°C	Humidity	55%
Test Engineer	David Tseng	Configurations	IEEE 802.11n MCS0 40MHz CH 6 / Chain 1
Test Date	Jan. 01, 2014		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Preamp Factor	Factor	Remark	T/Pos	A/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m		deg	cm	
1	4872.69	34.99	54.00	-19.01	32.78	4.22	34.67	2.21	Average	313	125	HORIZONTAL
2	4872.75	49.80	74.00	-24.20	47.59	4.22	34.67	2.21	Peak	313	125	HORIZONTAL
3	7314.65	49.01	74.00	-24.99	41.64	5.34	34.94	7.37	Peak	63	100	HORIZONTAL
4	7316.45	34.71	54.00	-19.29	27.31	5.35	34.94	7.40	Average	63	100	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Preamp Factor	Factor	Remark	T/Pos	A/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m		deg	cm	
1	4880.09	50.04	74.00	-23.96	47.83	4.22	34.67	2.21	Peak	87	117	VERTICAL
2	4880.19	35.93	54.00	-18.07	33.72	4.22	34.67	2.21	Average	87	117	VERTICAL
3	7305.36	34.55	54.00	-19.45	27.17	5.34	34.93	7.38	Average	299	100	VERTICAL
4	7312.51	48.36	74.00	-25.64	40.99	5.34	34.94	7.37	Peak	296	100	VERTICAL

Temperature	20°C	Humidity	55%
Test Engineer	David Tseng	Configurations	IEEE 802.11n MCS0 40MHz CH 9 / Chain 1
Test Date	Jan. 01, 2014		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Preamp Factor	Factor	Remark	T/Pos	A/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m		deg	cm	
1	4895.15	33.26	54.00	-20.74	31.01	4.22	34.66	2.25	Average	303	119	HORIZONTAL
2	4899.00	47.51	74.00	-26.49	45.26	4.22	34.66	2.25	Peak	303	119	HORIZONTAL
3	7346.10	34.95	54.00	-19.05	27.54	5.35	34.95	7.41	Average	8	100	HORIZONTAL
4	7352.22	48.56	74.00	-25.44	41.13	5.35	34.95	7.43	Peak	8	100	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Preamp Factor	Factor	Remark	T/Pos	A/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m		deg	cm	
1	4898.87	43.27	74.00	-30.73	41.02	4.22	34.66	2.25	Peak	149	100	VERTICAL
2	4903.62	32.37	54.00	-21.63	30.08	4.22	34.66	2.29	Average	149	100	VERTICAL
3	7346.93	35.03	54.00	-18.97	27.62	5.35	34.95	7.41	Average	328	100	VERTICAL
4	7360.07	48.97	74.00	-25.03	41.54	5.35	34.95	7.43	Peak	328	100	VERTICAL

Temperature	20°C	Humidity	55%
Test Engineer	David Tseng	Configurations	IEEE 802.11ac MCS0/Nss1 20MHz CH 149 / Chain 1
Test Date	Jan. 04, 2014		

Horizontal

	Freq	Level	Limit	Over	Read	Cable	Preamp			T/Pos	A/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m	Remark	deg	cm	
1	11487.44	68.39	74.00	-5.61	57.97	6.74	34.82	10.42	Peak	268	152	HORIZONTAL
2	11489.04	53.87	54.00	-0.13	43.45	6.74	34.82	10.42	Average	268	152	HORIZONTAL

Vertical

	Freq	Level	Limit	Over	Read	Cable	Preamp			T/Pos	A/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m	Remark	deg	cm	
1	11489.08	53.19	54.00	-0.81	42.77	6.74	34.82	10.42	Average	343	119	VERTICAL
2	11489.64	67.64	74.00	-6.36	57.22	6.74	34.82	10.42	Peak	343	119	VERTICAL

Temperature	20°C	Humidity	55%
Test Engineer	David Tseng	Configurations	IEEE 802.11ac MCS0/Nss1 20MHz CH 157 / Chain 1
Test Date	Jan. 04, 2014		

Horizontal

	Freq	Level	Limit	Over	Read	Cable	Preamp			T/Pos	A/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m	Remark	deg	cm	
1	11571.24	53.99	54.00	-0.01	43.57	6.77	34.85	10.42	Average	266	155	HORIZONTAL
2	11573.68	68.36	74.00	-5.64	57.94	6.77	34.85	10.42	Peak	266	155	HORIZONTAL

Vertical

	Freq	Level	Limit	Over	Read	Cable	Preamp			T/Pos	A/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m	Remark	deg	cm	
1	11569.92	67.79	74.00	-6.21	57.37	6.77	34.85	10.42	Peak	344	166	VERTICAL
2	11570.88	52.97	54.00	-1.03	42.55	6.77	34.85	10.42	Average	344	166	VERTICAL

Temperature	20°C	Humidity	55%
Test Engineer	David Tseng	Configurations	IEEE 802.11ac MCS0/Nss1 20MHz CH 165 / Chain 1
Test Date	Jan. 04, 2014		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Preamp Factor	Factor	Remark	T/Pos	A/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m		deg	cm	
1	11648.60	52.32	54.00	-1.68	41.89	6.80	34.87	10.43	Average	355	160	HORIZONTAL
2	11651.48	67.16	74.00	-6.84	56.73	6.80	34.87	10.43	Peak	355	160	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Preamp Factor	Factor	Remark	T/Pos	A/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m		deg	cm	
1	11649.36	64.89	74.00	-9.11	54.46	6.80	34.87	10.43	Peak	58	100	VERTICAL
2	11652.48	50.21	54.00	-3.79	39.78	6.80	34.87	10.43	Average	58	100	VERTICAL

Temperature	20°C	Humidity	55%
Test Engineer	David Tseng	Configurations	IEEE 802.11ac MCS0/Nss1 40MHz CH 151 / Chain 1
Test Date	Jan. 04, 2014 & Feb. 13, 2014		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Preamp Factor	Factor	Remark	T/Pos	A/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m		deg	cm	
1	11509.00	51.04	54.00	-2.96	40.61	6.75	34.82	10.43	Average	267	154	HORIZONTAL
2	11512.10	65.17	74.00	-8.83	54.74	6.75	34.82	10.43	Peak	267	154	HORIZONTAL

Note: Re-measured with VB set to 3kHz due to duty cycle < 98% and measured value was 52.10 dBuV/m.

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Preamp Factor	Factor	Remark	T/Pos	A/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m		deg	cm	
1	11508.80	49.07	54.00	-4.93	38.64	6.75	34.82	10.43	Average	345	166	VERTICAL
2	11514.90	62.82	74.00	-11.18	52.38	6.76	34.82	10.44	Peak	345	166	VERTICAL

Temperature	20°C	Humidity	55%
Test Engineer	David Tseng	Configurations	IEEE 802.11ac MCS0/Nss1 40MHz CH 159 / Chain 1
Test Date	Jan. 04, 2014		

Horizontal

	Freq	Level	Limit	Over	Read	Cable	Preamp			T/Pos	A/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m	Remark	deg	cm	
1	11584.80	50.03	54.00	-3.97	39.60	6.78	34.85	10.43	Average	265	155	HORIZONTAL
2	11590.00	64.21	74.00	-9.79	53.78	6.78	34.85	10.43	Peak	265	155	HORIZONTAL

Vertical

	Freq	Level	Limit	Over	Read	Cable	Preamp			T/Pos	A/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m	Remark	deg	cm	
1	11586.60	60.83	74.00	-13.17	50.40	6.78	34.85	10.43	Peak	58	100	VERTICAL
2	11587.60	47.15	54.00	-6.85	36.72	6.78	34.85	10.43	Average	58	100	VERTICAL

Temperature	20°C	Humidity	55%
Test Engineer	David Tseng	Configurations	IEEE 802.11ac MCS0/Nss1 80MHz CH 155 / Chain 1
Test Date	Jan. 04, 2014 & Feb. 13, 2014		

Horizontal

	Freq	Level	Limit	Over	Read	Cable	Preamp			T/Pos	A/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m	Remark	deg	cm	
1	11550.50	62.21	74.00	-11.79	51.78	6.77	34.84	10.43	Peak	267	154	HORIZONTAL
2	11556.10	46.87	54.00	-7.13	36.44	6.77	34.84	10.43	Average	267	154	HORIZONTAL

Note: Re-measured with VB set to 3kHz due to duty cycle < 98% and measured value was 50.60 dBuV/m.

Vertical

	Freq	Level	Limit	Over	Read	Cable	Preamp			T/Pos	A/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m	Remark	deg	cm	
1	11557.20	44.91	54.00	-9.09	34.48	6.77	34.84	10.43	Average	195	123	VERTICAL
2	11571.30	59.04	74.00	-14.96	48.62	6.77	34.85	10.42	Peak	195	123	VERTICAL

Temperature	20°C	Humidity	55%
Test Engineer	David Tseng	Configurations	IEEE 802.11b CH 1 / Chain 1
Test Date	Dec. 31, 2013		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Preamplifier	Factor	Factor	Remark	T/Pos	A/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m			deg	cm	
1	4823.91	56.29	74.00	-17.71	54.21	4.21	34.69	2.08	Peak		306	180	HORIZONTAL
2	4823.97	53.61	54.00	-0.39	51.53	4.21	34.69	2.08	Average		306	180	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Preamplifier	Factor	Factor	Remark	T/Pos	A/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m			deg	cm	
1	4823.88	54.90	74.00	-19.10	52.82	4.21	34.69	2.08	Peak		83	116	VERTICAL
2	4823.95	52.42	54.00	-1.58	50.34	4.21	34.69	2.08	Average		83	116	VERTICAL

Temperature	20°C	Humidity	55%
Test Engineer	David Tseng	Configurations	IEEE 802.11b CH 6 / Chain 1
Test Date	Dec. 31, 2013		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Preamplifier Factor	Factor	Remark	T/Pos	A/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m		deg	cm	
1	4873.93	53.64	54.00	-0.36	51.43	4.22	34.67	2.21	Average	302	185	HORIZONTAL
2	4873.94	56.32	74.00	-17.68	54.11	4.22	34.67	2.21	Peak	302	185	HORIZONTAL
3	7310.15	51.92	74.00	-22.08	44.54	5.34	34.93	7.38	Peak	254	102	HORIZONTAL
4	7310.28	40.06	54.00	-13.94	32.68	5.34	34.93	7.38	Average	254	102	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Preamplifier Factor	Factor	Remark	T/Pos	A/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m		deg	cm	
1	4873.94	52.73	54.00	-1.27	50.52	4.22	34.67	2.21	Average	89	119	VERTICAL
2	4873.95	55.53	74.00	-18.47	53.32	4.22	34.67	2.21	Peak	89	119	VERTICAL
3	7309.99	50.62	74.00	-23.38	43.24	5.34	34.93	7.38	Peak	136	112	VERTICAL
4	7310.16	39.48	74.00	-34.52	32.10	5.34	34.93	7.38	Peak	136	112	VERTICAL

Temperature	20°C	Humidity	55%
Test Engineer	David Tseng	Configurations	IEEE 802.11b CH 11 / Chain 1
Test Date	Dec. 31, 2013		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Preamplifier Factor	Factor	Remark	T/Pos	A/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m		deg	cm	
1	4923.90	56.36	74.00	-17.64	54.02	4.23	34.65	2.34	Peak	304	186	HORIZONTAL
2	4923.94	53.72	54.00	-0.28	51.38	4.23	34.65	2.34	Average	304	186	HORIZONTAL
3	7385.22	41.01	54.00	-12.99	33.53	5.36	34.96	7.48	Average	253	102	HORIZONTAL
4	7385.80	52.54	74.00	-21.46	45.06	5.36	34.96	7.48	Peak	253	102	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Preamplifier Factor	Factor	Remark	T/Pos	A/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m		deg	cm	
1	4923.91	56.10	74.00	-17.90	53.76	4.23	34.65	2.34	Peak	89	116	VERTICAL
2	4923.96	52.35	54.00	-1.65	50.01	4.23	34.65	2.34	Average	89	116	VERTICAL
3	7382.52	52.61	74.00	-21.39	45.15	5.36	34.96	7.46	Peak	211	100	VERTICAL
4	7386.72	40.24	54.00	-13.76	32.76	5.36	34.96	7.48	Average	211	102	VERTICAL

Temperature	20°C	Humidity	55%
Test Engineer	David Tseng	Configurations	IEEE 802.11g CH 1 / Chain 1
Test Date	Jan. 01, 2014		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Preamp Factor	Factor	Remark	T/Pos	A/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m		deg	cm	
1	4820.06	40.38	54.00	-13.62	38.30	4.21	34.69	2.08	Average	306	105	HORIZONTAL
2	4822.91	54.32	74.00	-19.68	52.24	4.21	34.69	2.08	Peak	306	105	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Preamp Factor	Factor	Remark	T/Pos	A/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m		deg	cm	
1	4823.49	39.68	54.00	-14.32	37.60	4.21	34.69	2.08	Average	82	100	VERTICAL
2	4824.29	53.81	74.00	-20.19	51.73	4.21	34.69	2.08	Peak	82	100	VERTICAL

Temperature	20°C	Humidity	55%
Test Engineer	David Tseng	Configurations	IEEE 802.11g CH 6 / Chain 1
Test Date	Jan. 01, 2014		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Preamplifier Factor	Factor	Remark	T/Pos	A/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m		deg	cm	
1	4873.36	58.03	74.00	-15.97	55.82	4.22	34.67	2.21	Peak	307	128	HORIZONTAL
2	4874.42	43.46	54.00	-10.54	41.25	4.22	34.67	2.21	Average	307	128	HORIZONTAL
3	7308.12	42.19	54.00	-11.81	34.81	5.34	34.93	7.38	Average	259	148	HORIZONTAL
4	7314.37	57.17	74.00	-16.83	49.80	5.34	34.94	7.37	Peak	259	148	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Preamplifier Factor	Factor	Remark	T/Pos	A/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m		deg	cm	
1	4873.33	57.66	74.00	-16.34	55.45	4.22	34.67	2.21	Peak	82	100	VERTICAL
2	4876.21	42.82	54.00	-11.18	40.61	4.22	34.67	2.21	Average	82	100	VERTICAL
3	7308.24	40.58	54.00	-13.42	33.20	5.34	34.93	7.38	Average	71	100	VERTICAL
4	7314.11	55.32	74.00	-18.68	47.95	5.34	34.94	7.37	Peak	71	100	VERTICAL

Temperature	20°C	Humidity	55%
Test Engineer	David Tseng	Configurations	IEEE 802.11g CH 11 / Chain 1
Test Date	Jan. 01, 2014		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Preampl Factor	Factor	Remark	T/Pos	A/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m		deg	cm	
1	4925.86	38.04	54.00	-15.96	35.70	4.23	34.65	2.34	Average	313	125	HORIZONTAL
2	4929.74	53.42	74.00	-20.58	51.08	4.23	34.65	2.34	Peak	314	125	HORIZONTAL
3	7383.40	36.33	54.00	-17.67	28.87	5.36	34.96	7.46	Average	254	100	HORIZONTAL
4	7389.81	50.32	74.00	-23.68	42.84	5.36	34.96	7.48	Peak	254	100	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Preampl Factor	Factor	Remark	T/Pos	A/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m		deg	cm	
1	4925.76	37.46	54.00	-16.54	35.12	4.23	34.65	2.34	Average	78	100	VERTICAL
2	4929.58	52.19	74.00	-21.81	49.85	4.23	34.65	2.34	Peak	78	100	VERTICAL
3	7379.01	48.29	74.00	-25.71	40.83	5.36	34.96	7.46	Peak	113	100	VERTICAL
4	7383.60	34.26	54.00	-19.74	26.78	5.36	34.96	7.48	Average	113	100	VERTICAL

Temperature	20°C	Humidity	55%
Test Engineer	David Tseng	Configurations	IEEE 802.11a CH 149 / Chain 1
Test Date	Jan. 04, 2014		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Preamplifier Factor	Factor	Remark	T/Pos	A/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m		deg	cm	
1	11490.24	68.03	74.00	-5.97	57.61	6.74	34.82	10.42	Peak	265	153	HORIZONTAL
2	11491.92	53.59	54.00	-0.41	43.17	6.74	34.82	10.42	Average	265	153	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Preamplifier Factor	Factor	Remark	T/Pos	A/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m		deg	cm	
1	11486.04	52.64	54.00	-1.36	42.22	6.74	34.82	10.42	Average	344	119	VERTICAL
2	11490.24	67.63	74.00	-6.37	57.21	6.74	34.82	10.42	Peak	344	119	VERTICAL

Temperature	20°C	Humidity	55%
Test Engineer	David Tseng	Configurations	IEEE 802.11a CH 157 / Chain 1
Test Date	Jan. 04, 2014		

Horizontal

	Freq	Level	Limit	Over	Read	Cable	Preamp			T/Pos	A/Pos	
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m	Remark	deg	cm	Pol/Phase
1	11570.48	68.41	74.00	-5.59	57.99	6.77	34.85	10.42	Peak	269	155	HORIZONTAL
2	11571.24	53.96	54.00	-0.04	43.54	6.77	34.85	10.42	Average	269	155	HORIZONTAL

Vertical

	Freq	Level	Limit	Over	Read	Cable	Preamp			T/Pos	A/Pos	
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m	Remark	deg	cm	Pol/Phase
1	11570.24	64.04	74.00	-9.96	53.62	6.77	34.85	10.42	Peak	59	100	VERTICAL
2	11571.24	50.00	54.00	-4.00	39.58	6.77	34.85	10.42	Average	59	100	VERTICAL

Temperature	20°C	Humidity	55%
Test Engineer	David Tseng	Configurations	IEEE 802.11a CH 165 / Chain 1
Test Date	Jan. 04, 2014		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Preamp Factor	Factor	Remark	T/Pos	A/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m		deg	cm	
1	11649.80	52.22	54.00	-1.78	41.79	6.80	34.87	10.43	Average	356	160	HORIZONTAL
2	11650.36	66.98	74.00	-7.02	56.55	6.80	34.87	10.43	Peak	356	160	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Preamp Factor	Factor	Remark	T/Pos	A/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m		deg	cm	
1	11650.48	64.53	74.00	-9.47	54.10	6.80	34.87	10.43	Peak	58	100	VERTICAL
2	11651.68	50.59	54.00	-3.41	40.16	6.80	34.87	10.43	Average	58	100	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	20°C	Humidity	55%
Test Engineer	David Tseng	Configurations	IEEE 802.11n MCS0 20MHz CH 1, 6, 11 / Chain 1
Test date	Jan. 01, 2014		

Channel 1

	Freq	Level	Limit	Over	Read	Cable	Preamp			T/Pos	A/Pos	
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m	Remark	deg	cm	Pol/Phase
1	2389.80	69.68	74.00	-4.32	38.90	2.91	0.00	30.78	Peak	18	124	HORIZONTAL
2	2390.00	53.56	54.00	-0.44	22.78	2.91	0.00	30.78	Average	18	124	HORIZONTAL
3	2415.40	99.63			68.87	2.92	0.00	30.76	Average	18	124	HORIZONTAL
4	2416.20	112.09			81.33	2.92	0.00	30.76	Peak	18	124	HORIZONTAL

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

Channel 6

	Freq	Level	Limit	Over	Read	Cable	Preamp			T/Pos	A/Pos	
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m	Remark	deg	cm	Pol/Phase
1	2389.60	67.37	74.00	-6.63	36.59	2.91	0.00	30.78	Peak	20	127	HORIZONTAL
2	2390.00	53.44	54.00	-0.56	22.66	2.91	0.00	30.78	Average	20	127	HORIZONTAL
3	2430.60	114.62			83.88	2.93	0.00	30.74	Peak	20	127	HORIZONTAL
4	2438.20	103.52			72.80	2.94	0.00	30.72	Average	20	127	HORIZONTAL
5	2483.50	51.55	54.00	-2.45	20.86	2.96	0.00	30.69	Average	20	127	HORIZONTAL
6	2485.90	68.52	74.00	-5.48	37.83	2.96	0.00	30.69	Peak	20	127	HORIZONTAL

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

Channel 11

	Freq	Level	Limit	Over	Read	Cable	Preamp			T/Pos	A/Pos	
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m	Remark	deg	cm	Pol/Phase
1	2454.60	98.73			68.02	2.95	0.00	30.71	Average	16	125	HORIZONTAL
2	2457.60	110.39			79.68	2.95	0.00	30.71	Peak	16	125	HORIZONTAL
3	2483.50	53.82	54.00	-0.18	23.13	2.96	0.00	30.69	Average	16	125	HORIZONTAL
4	2484.30	69.74	74.00	-4.26	39.05	2.96	0.00	30.69	Peak	16	125	HORIZONTAL

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

Temperature	20°C	Humidity	55%
Test Engineer	David Tseng	Configurations	IEEE 802.11n MCS0 40MHz CH 3, 6, 9 / Chain 1
Test date	Jan. 01, 2014 & Feb. 13, 2014		

Channel 3

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Preamp Factor	Factor	Remark	T/Pos	A/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m		deg	cm	
1	2387.76	67.84	74.00	-6.16	37.06	2.91	0.00	30.78	Peak	13	126	HORIZONTAL
2	2389.68	53.66	54.00	-0.34	22.88	2.91	0.00	30.78	Average	13	126	HORIZONTAL
3	2424.89	93.34			62.60	2.93	0.00	30.74	Average	13	126	HORIZONTAL
4	2428.41	105.49			74.75	2.93	0.00	30.74	Peak	13	126	HORIZONTAL

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

Re-measured with VB set to 3kHz due to duty cycle < 98% and measured value was 53.72 dBuV/m

Channel 6

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Preamp Factor	Factor	Remark	T/Pos	A/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m		deg	cm	
1	2386.80	68.03	74.00	-5.97	37.25	2.91	0.00	30.78	Peak	17	124	HORIZONTAL
2	2390.00	52.15	54.00	-1.85	21.37	2.91	0.00	30.78	Average	17	124	HORIZONTAL
3	2440.21	106.96			76.24	2.94	0.00	30.72	Peak	17	124	HORIZONTAL
4	2450.78	94.92			64.20	2.94	0.00	30.72	Average	17	124	HORIZONTAL
5	2483.50	53.50	54.00	-0.50	22.81	2.96	0.00	30.69	Average	17	124	HORIZONTAL
6	2486.06	70.63	74.00	-3.37	39.94	2.96	0.00	30.69	Peak	17	124	HORIZONTAL

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

Channel 9

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Preamp Factor	Factor	Remark	T/Pos	A/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m		deg	cm	
1	2453.60	104.79			74.08	2.95	0.00	30.71	Peak	26	145	HORIZONTAL
2	2454.56	93.09			62.38	2.95	0.00	30.71	Average	26	145	HORIZONTAL
3	2483.50	53.44	54.00	-0.56	22.75	2.96	0.00	30.69	Average	26	145	HORIZONTAL
4	2486.06	68.55	74.00	-5.45	37.86	2.96	0.00	30.69	Peak	26	145	HORIZONTAL

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.

Temperature	20°C	Humidity	55%
Test Engineer	David Tseng	Configurations	IEEE 802.11b CH 1, 6, 11 / Chain 1
Test Date	Dec. 31, 2013		

Channel 1

	Freq	Level	Limit	Over	Read	Cable	Preamp			T/Pos	A/Pos	
	MHz	dBuV/m	dBuV/m	dB	dBuV	Loss	Factor	Factor	Remark	deg	cm	Pol/Phase
1	2388.20	59.02	74.00	-14.98	28.24	2.91	0.00	30.78	Peak	21	132	HORIZONTAL
2	2390.00	47.05	54.00	-6.95	16.27	2.91	0.00	30.78	Average	21	132	HORIZONTAL
3	2411.00	109.89			79.13	2.92	0.00	30.76	Peak	21	132	HORIZONTAL
4	2411.20	105.75			74.99	2.92	0.00	30.76	Average	21	132	HORIZONTAL

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

Channel 6

	Freq	Level	Limit	Over	Read	Cable	Preamp			T/Pos	A/Pos	
	MHz	dBuV/m	dBuV/m	dB	dBuV	Loss	Factor	Factor	Remark	deg	cm	Pol/Phase
1	2388.80	53.57	74.00	-20.43	22.79	2.91	0.00	30.78	Peak	18	149	HORIZONTAL
2	2390.00	41.74	54.00	-12.26	10.96	2.91	0.00	30.78	Average	18	149	HORIZONTAL
3	2436.20	109.63			78.89	2.93	0.00	30.74	Peak	18	149	HORIZONTAL
4	2436.20	105.75			75.01	2.93	0.00	30.74	Average	18	149	HORIZONTAL
5	2484.70	54.51	74.00	-19.49	23.82	2.96	0.00	30.69	Peak	18	149	HORIZONTAL
6	2489.90	42.07	54.00	-11.93	11.40	2.97	0.00	30.67	Average	18	149	HORIZONTAL

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

Channel 11

	Freq	Level	Limit	Over	Read	Cable	Preamp			T/Pos	A/Pos	
	MHz	dBuV/m	dBuV/m	dB	dBuV	Loss	Factor	Factor	Remark	deg	cm	Pol/Phase
1	2461.20	105.43			74.72	2.95	0.00	30.71	Average	24	151	HORIZONTAL
2	2463.00	109.61			78.90	2.95	0.00	30.71	Peak	24	151	HORIZONTAL
3	2483.50	58.87	74.00	-15.13	28.18	2.96	0.00	30.69	Peak	24	151	HORIZONTAL
4	2483.50	50.90	54.00	-3.10	20.21	2.96	0.00	30.69	Average	24	151	HORIZONTAL

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

Temperature	20°C	Humidity	55%
Test Engineer	David Tseng	Configurations	IEEE 802.11g CH 1, 6, 11 / Chain 1
Test Date	Jan. 01, 2014		

Channel 1

	Freq	Level	Limit	Over	Read	Cable	Preamp			T/Pos	A/Pos	
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m	Remark	deg	cm	Pol/Phase
1	2390.00	69.59	74.00	-4.41	38.81	2.91	0.00	30.78	Peak	20	125	HORIZONTAL
2	2390.00	53.97	54.00	-0.03	23.19	2.91	0.00	30.78	Average	20	125	HORIZONTAL
3	2410.20	111.13			80.37	2.92	0.00	30.76	Peak	20	125	HORIZONTAL
4	2415.20	100.70			69.94	2.92	0.00	30.76	Average	20	125	HORIZONTAL

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

Channel 6

	Freq	Level	Limit	Over	Read	Cable	Preamp			T/Pos	A/Pos	
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m	Remark	deg	cm	Pol/Phase
1	2387.20	66.34	74.00	-7.66	35.56	2.91	0.00	30.78	Peak	17	100	HORIZONTAL
2	2390.00	52.36	54.00	-1.64	21.58	2.91	0.00	30.78	Average	17	100	HORIZONTAL
3	2433.00	114.48			83.74	2.93	0.00	30.74	Peak	17	100	HORIZONTAL
4	2434.20	103.65			72.91	2.93	0.00	30.74	Average	17	100	HORIZONTAL
5	2483.50	49.08	54.00	-4.92	18.39	2.96	0.00	30.69	Average	17	100	HORIZONTAL
6	2483.90	63.19	74.00	-10.81	32.50	2.96	0.00	30.69	Peak	17	100	HORIZONTAL

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

Channel 11

	Freq	Level	Limit	Over	Read	Cable	Preamp			T/Pos	A/Pos	
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m	Remark	deg	cm	Pol/Phase
1	2457.60	110.22			79.51	2.95	0.00	30.71	Peak	26	143	HORIZONTAL
2	2458.40	99.49			68.78	2.95	0.00	30.71	Average	26	143	HORIZONTAL
3	2483.50	53.48	54.00	-0.52	22.79	2.96	0.00	30.69	Average	26	143	HORIZONTAL
4	2484.70	69.96	74.00	-4.04	39.27	2.96	0.00	30.69	Peak	26	143	HORIZONTAL

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

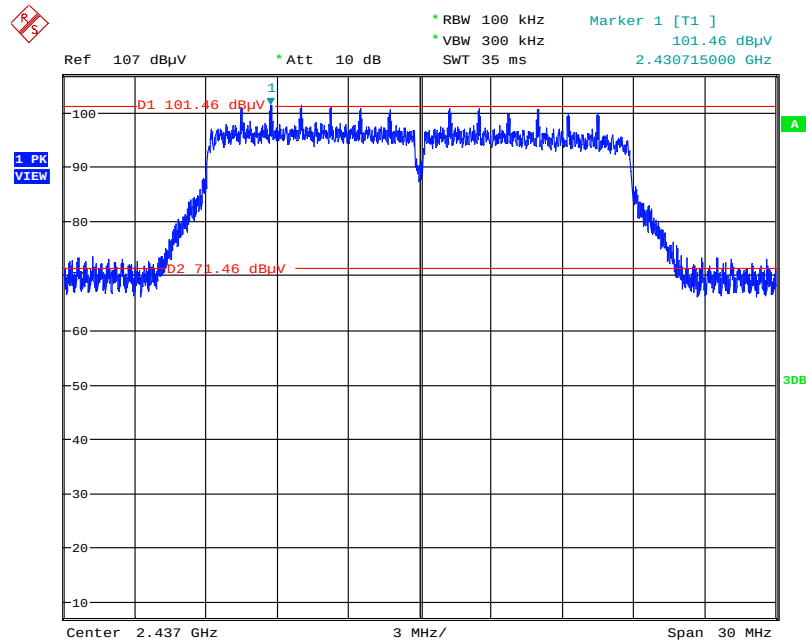
Note:

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

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

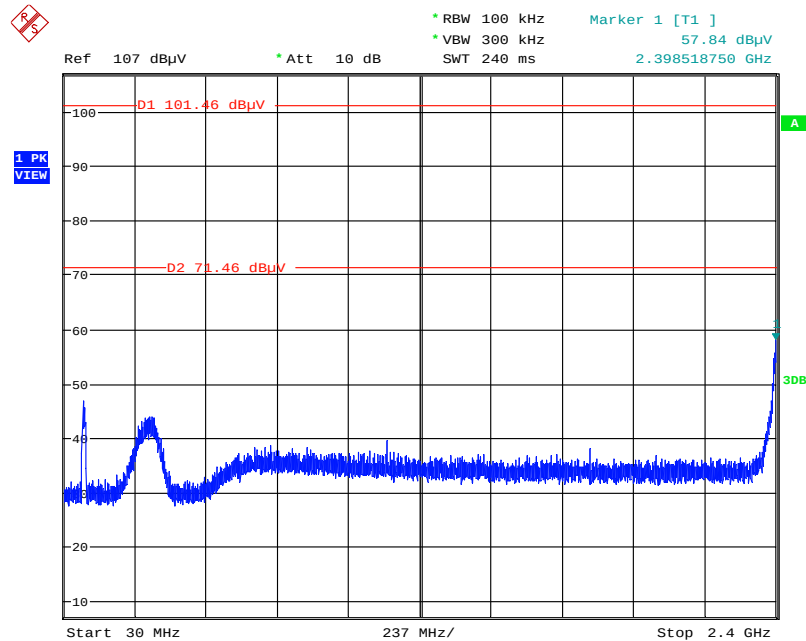
For Emission not in Restricted Band

Plot on Configuration IEEE 802.11n MCS0 20MHz / Reference Level



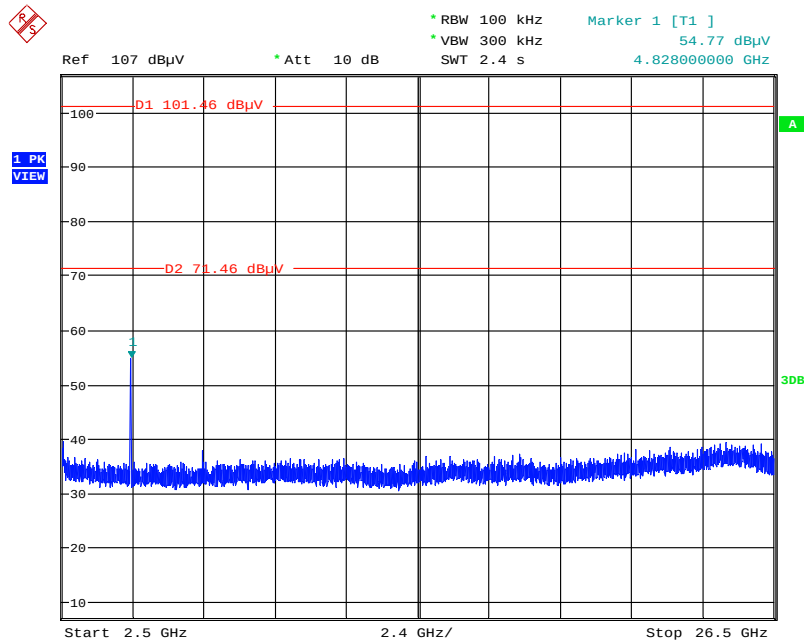
Date: 27.JAN.2014 17:08:54

Plot on Configuration IEEE 802.11n MCS0 20MHz / CH 1 / 30MHz~2400MHz (down 30dBc)



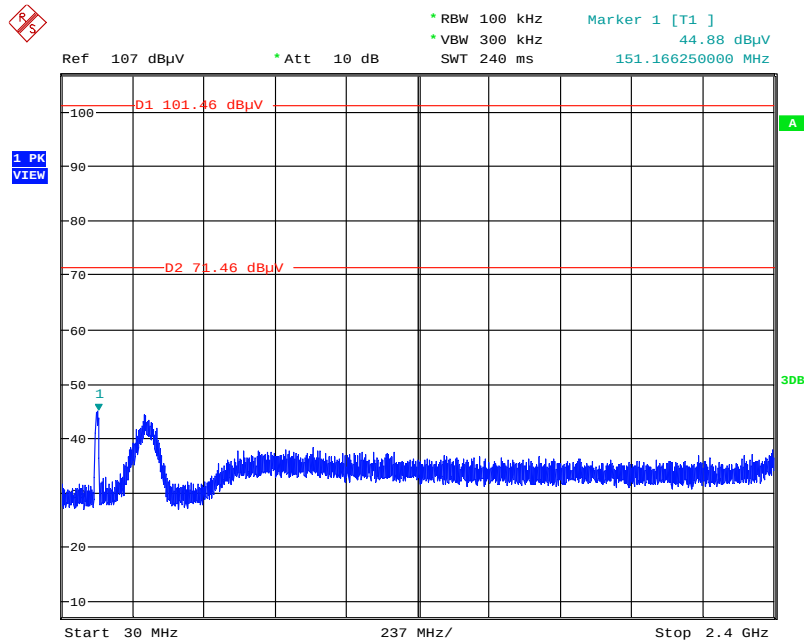
Date: 27.JAN.2014 17:09:40

Plot on Configuration IEEE 802.11n MCS0 20MHz / CH 1 / 2500MHz~26500MHz (down 30dBc)



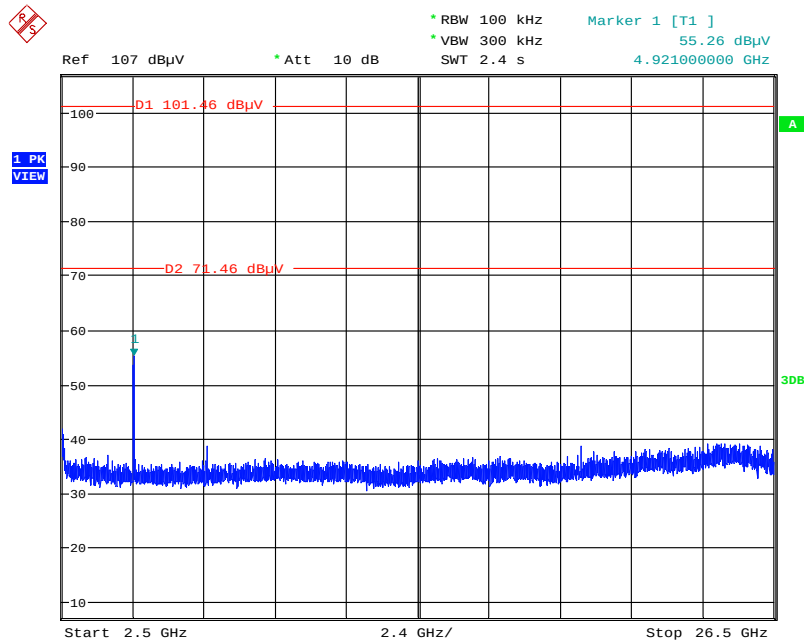
Date: 27. JAN. 2014 17:10:00

Plot on Configuration IEEE 802.11n MCS0 20MHz / CH 11 / 30MHz~2400MHz (down 30dBc)



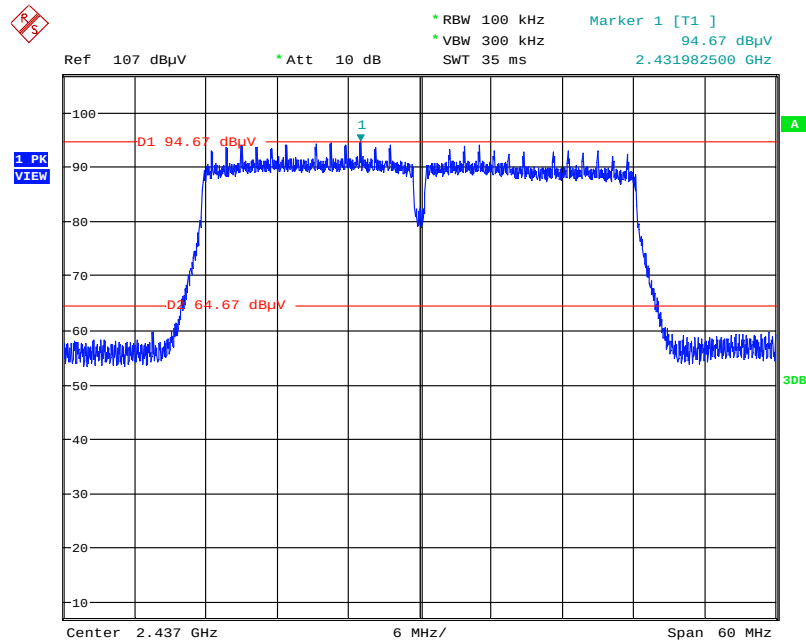
Date: 27. JAN. 2014 17:10:56

Plot on Configuration IEEE 802.11n MCS0 20MHz / CH 11 / 2500MHz~26500MHz (down 30dBc)



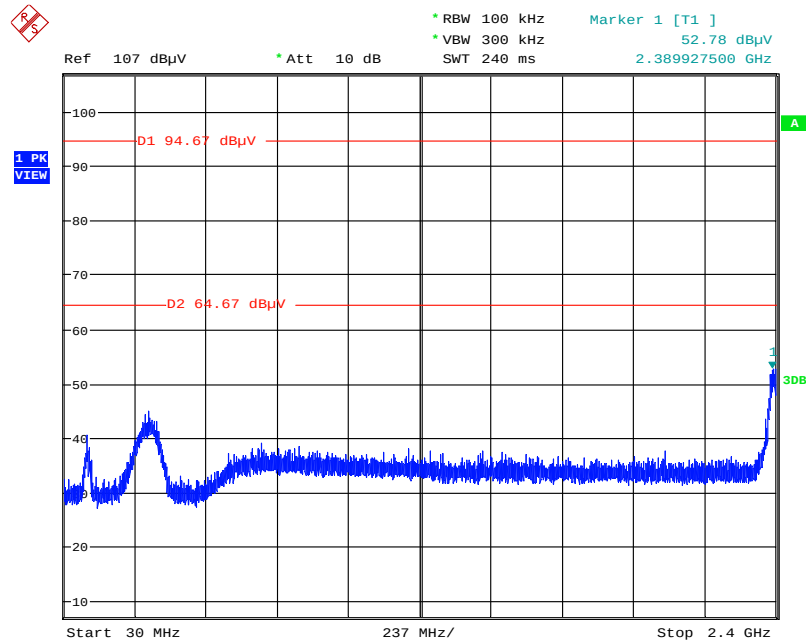
Date: 27.JAN.2014 17:10:36

Plot on Configuration IEEE 802.11n MCS0 40MHz / Reference Level



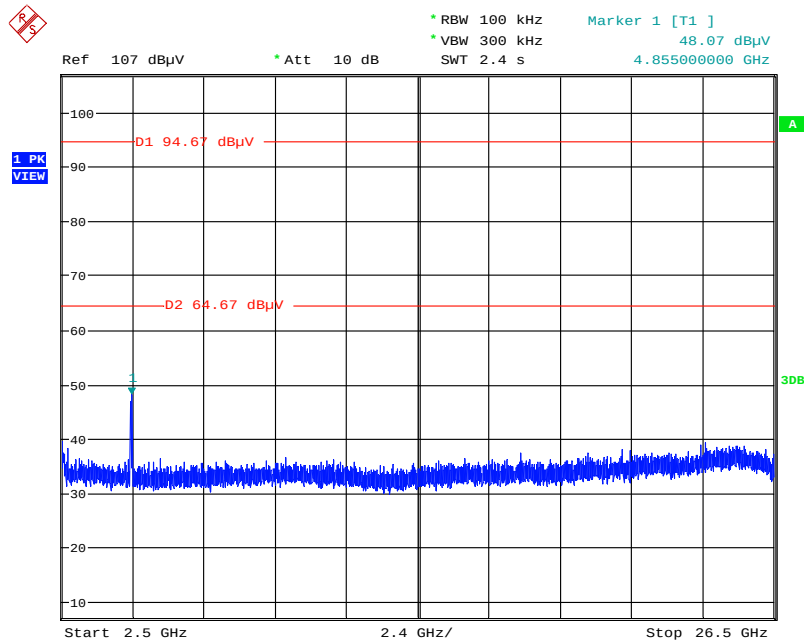
Date: 27. JAN. 2014 17:35:32

Plot on Configuration IEEE 802.11n MCS0 40MHz / CH 3 / 30MHz~2400MHz (down 30dBc)



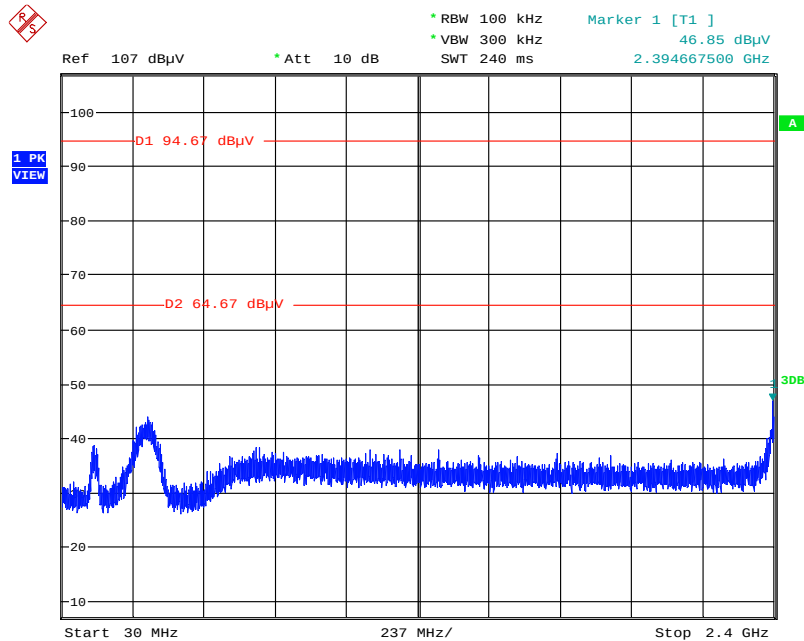
Date: 27. JAN. 2014 17:36:05

Plot on Configuration IEEE 802.11n MCS0 40MHz / CH 3 / 2500MHz~26500MHz (down 30dBc)



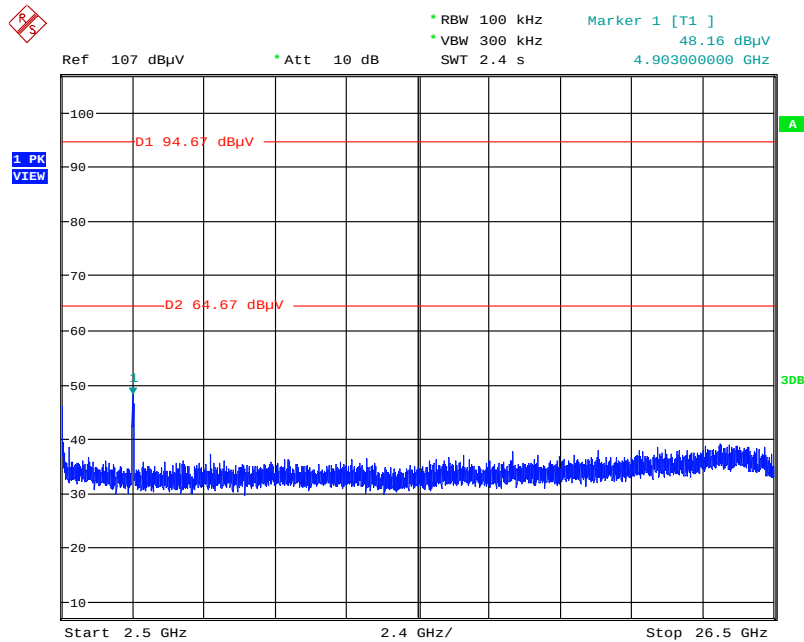
Date: 27. JAN. 2014 17:36:32

Plot on Configuration IEEE 802.11n MCS0 40MHz / CH 9 / 30MHz~2400MHz (down 30dBc)



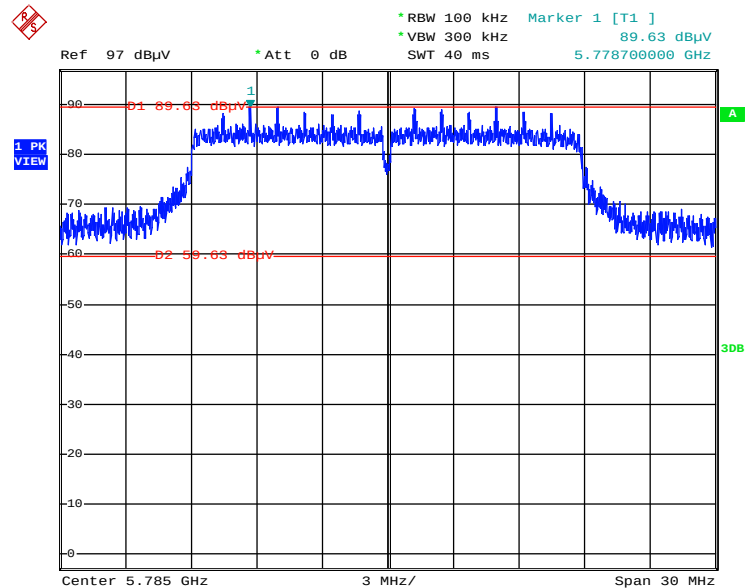
Date: 27. JAN. 2014 17:37:12

Plot on Configuration IEEE 802.11n MCS0 40MHz / CH 9 / 2500MHz~26500MHz (down 30dBc)



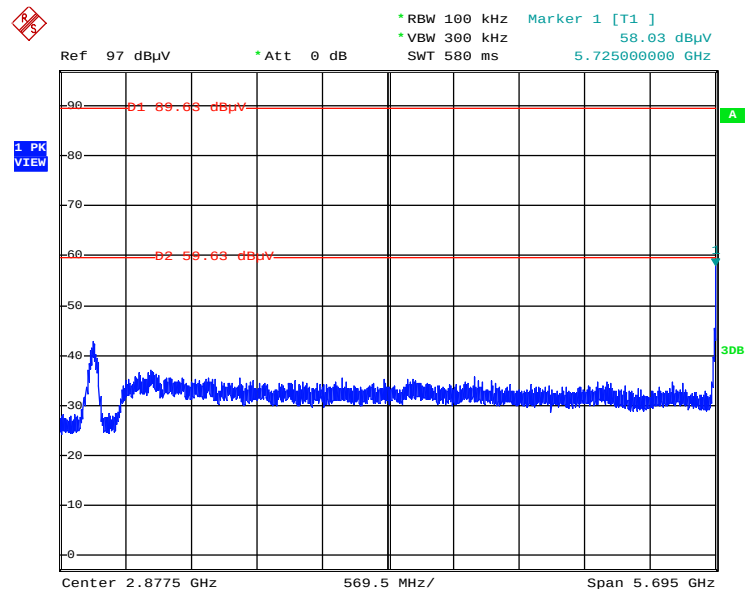
Date: 27.JAN.2014 17:37:00

Plot on Configuration IEEE 802.11ac MCS0/Nss1 20MHz / Reference Level



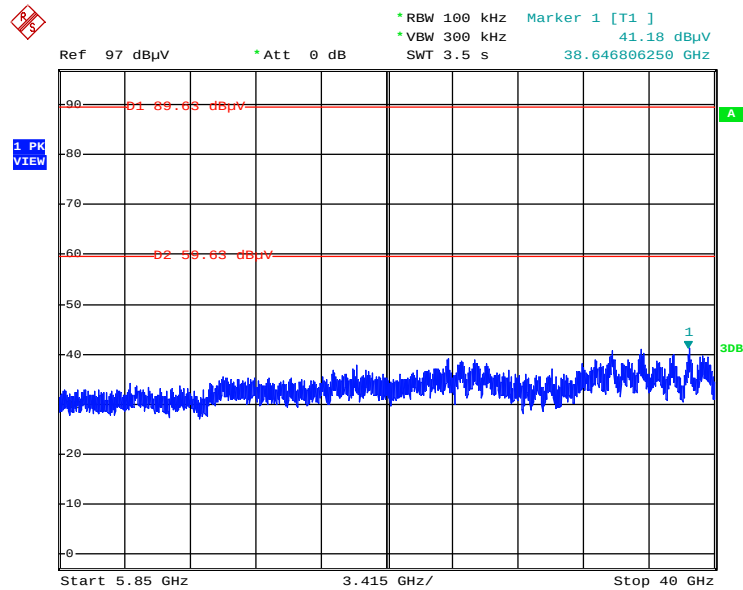
Date: 4.JAN.2014 04:20:38

Plot on Configuration IEEE 802.11ac MCS0/Nss1 20MHz / CH 149 / 30MHz~5725MHz (down 30dBc)



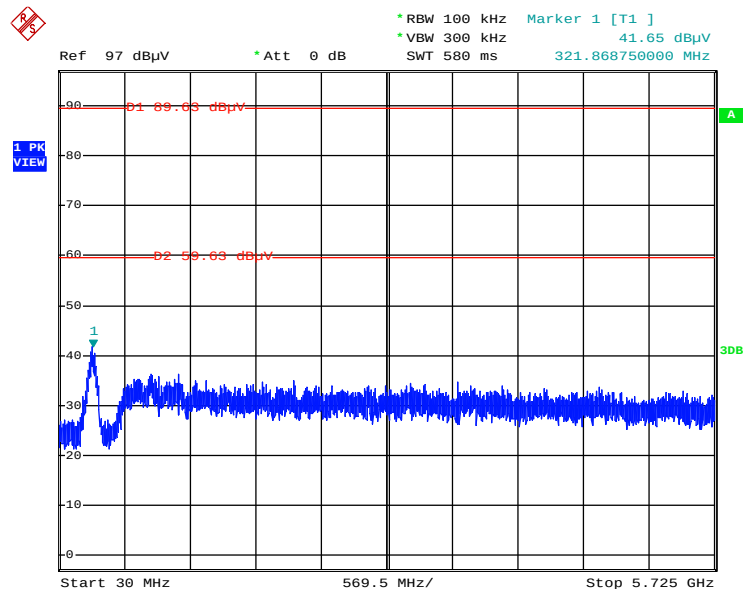
Date: 4.JAN.2014 04:25:25

Plot on Configuration IEEE 802.11ac MCS0/Nss1 20MHz / CH 149 / 5850MHz~40000MHz (down 30dBc)



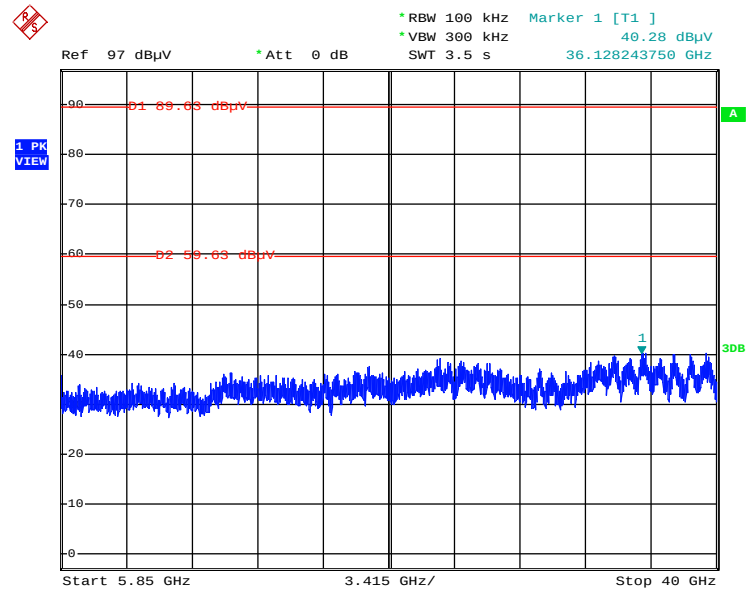
Date: 4.JAN.2014 04:25:59

Plot on Configuration IEEE 802.11ac MCS0/Nss1 20MHz / CH 165 / 30MHz~5725MHz (down 30dBc)



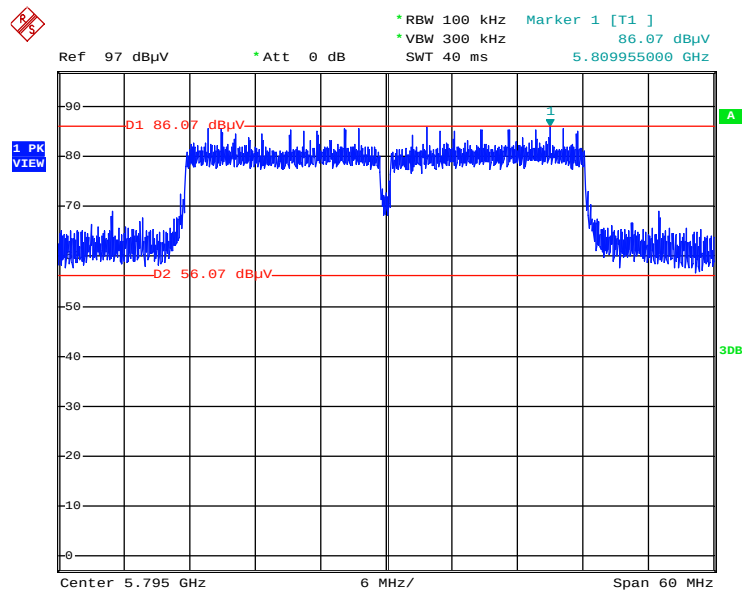
Date: 4.JAN.2014 04:27:05

Plot on Configuration IEEE 802.11ac MCS0/Nss1 20MHz / CH 165 / 5850MHz~40000MHz (down 30dBc)



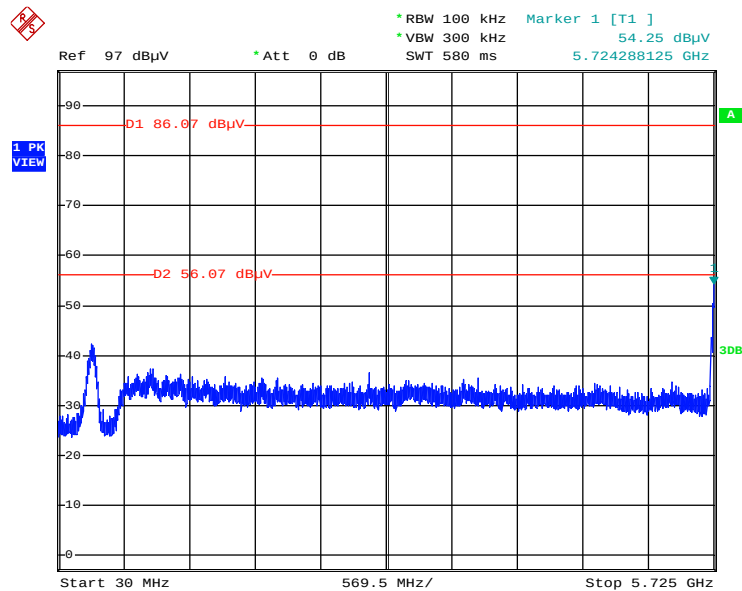
Date: 4.JAN.2014 04:26:33

Plot on Configuration IEEE 802.11ac MCS0/Nss1 40MHz / Reference Level



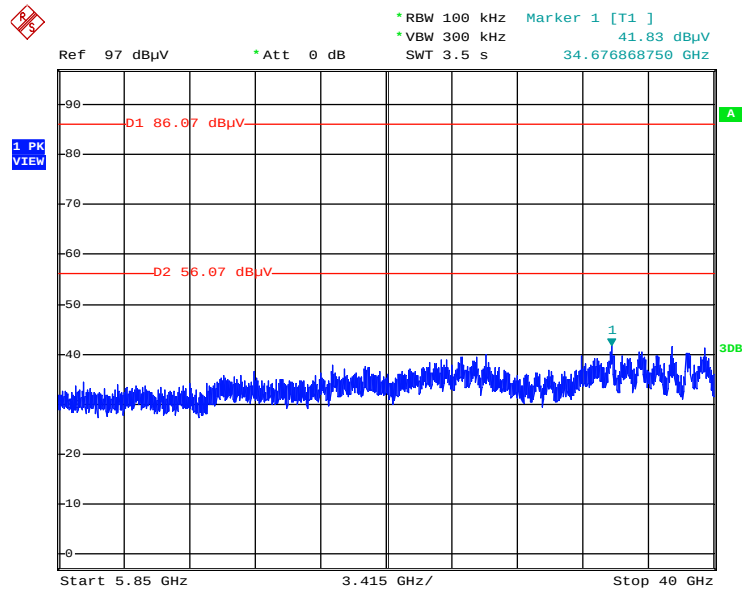
Date: 4.JAN.2014 04:30:16

Plot on Configuration IEEE 802.11ac MCS0/Nss1 40MHz / CH 151 / 30MHz~5725MHz (down 30dBc)



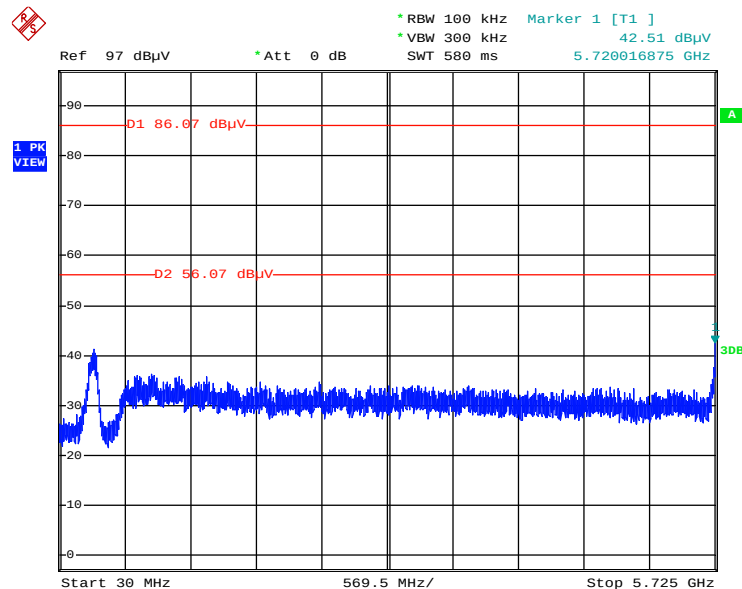
Date: 4.JAN.2014 04:35:05

Plot on Configuration IEEE 802.11ac MCS0/Nss1 40MHz / CH 151 / 5850MHz~40000MHz (down 30dBc)



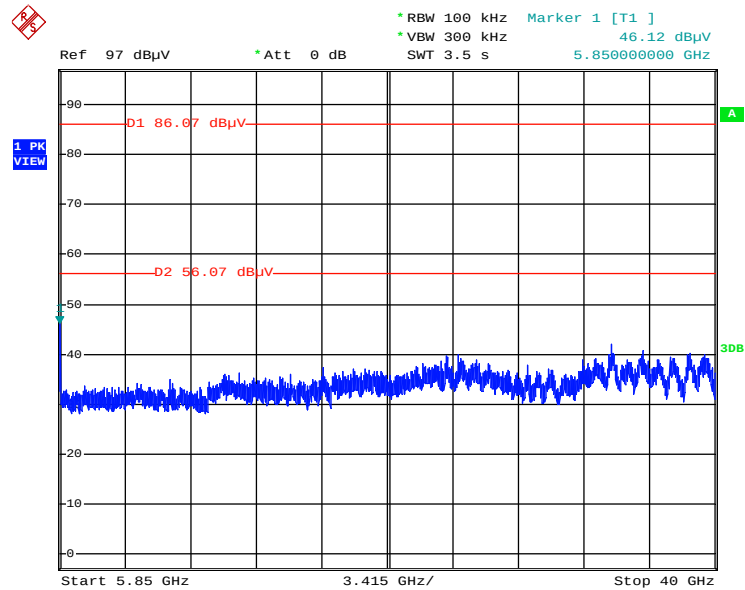
Date: 4.JAN.2014 04:35:41

Plot on Configuration IEEE 802.11ac MCS0/Nss1 40MHz / CH 159 / 30MHz~5725MHz (down 30dBc)



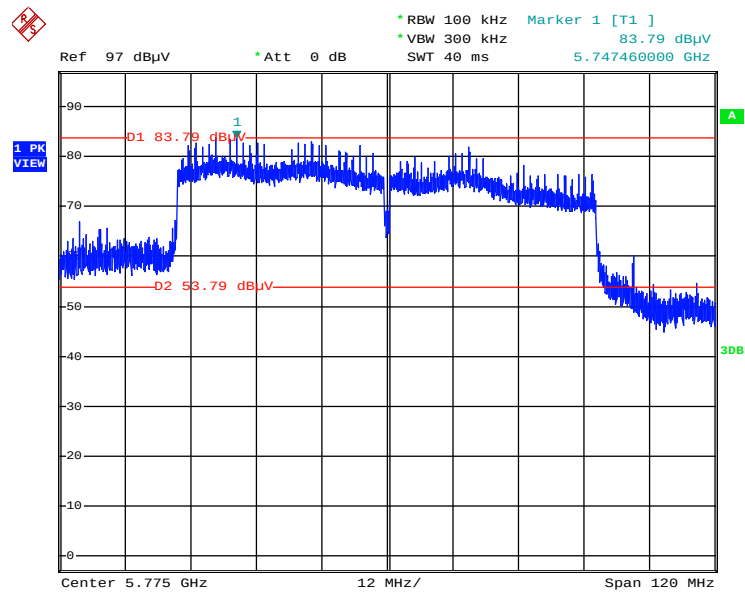
Date: 4.JAN.2014 04:30:46

Plot on Configuration IEEE 802.11ac MCS0/Nss1 40MHz / CH 159 / 5850MHz~40000MHz (down 30dBc)



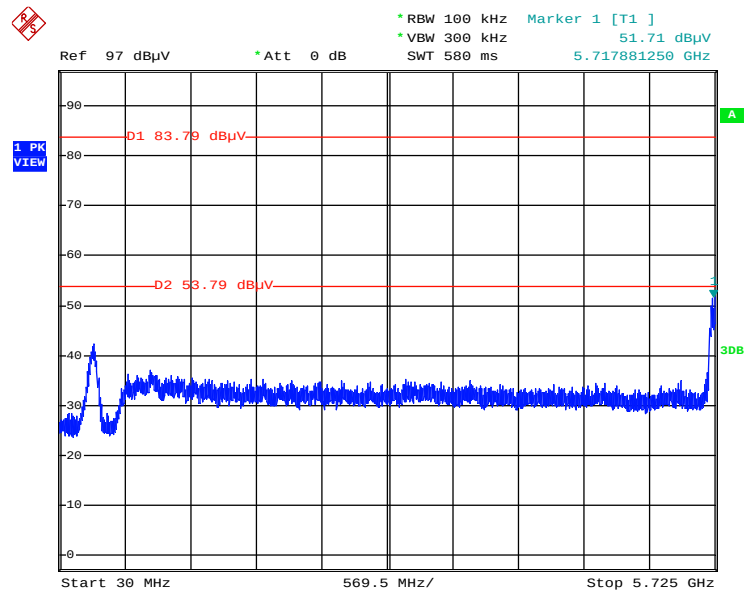
Date: 4.JAN.2014 04:31:22

Plot on Configuration IEEE 802.11ac MCS0/Nss1 80MHz / Reference Level



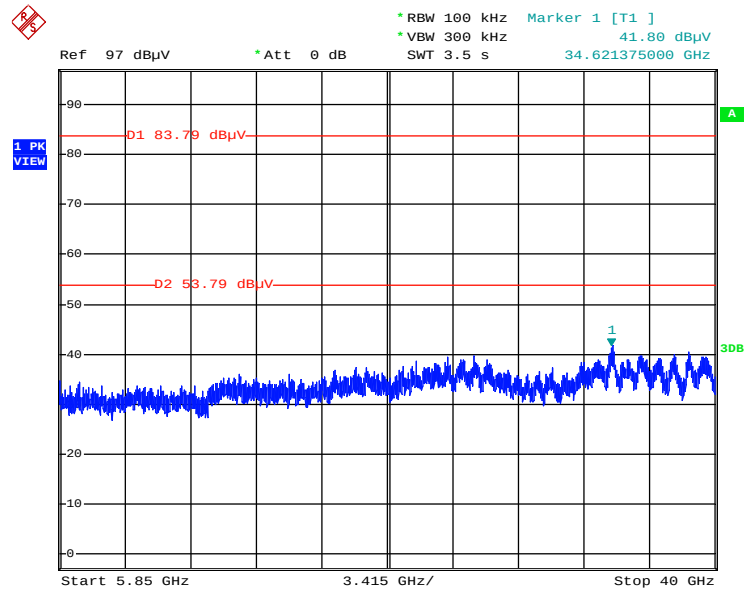
Date: 4.JAN.2014 04:39:56

Plot on Configuration IEEE 802.11ac MCS0/Nss1 80MHz / CH 155 / 30MHz~5725MHz (down 30dBc)



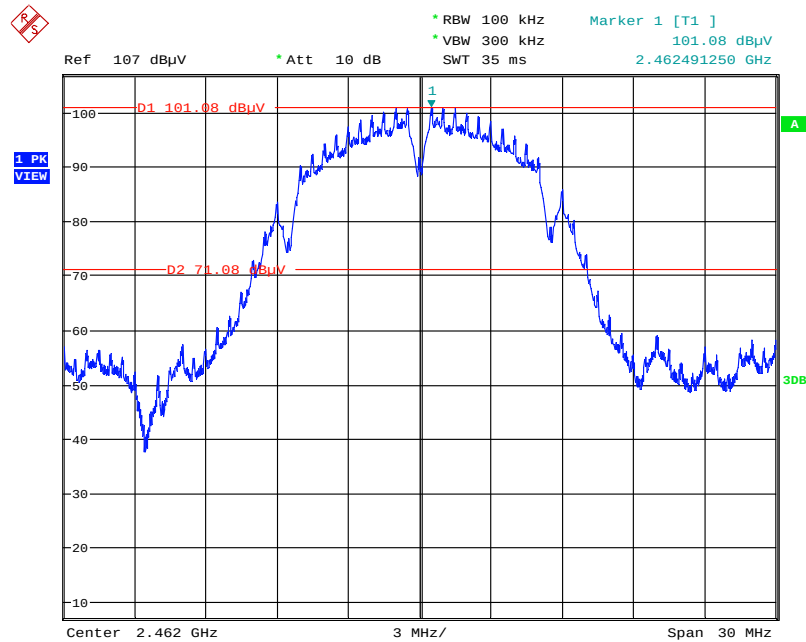
Date: 4.JAN.2014 04:42:10

Plot on Configuration IEEE 802.11ac MCS0/Nss1 80MHz / CH 155 / 5850MHz~40000MHz (down 30dBc)



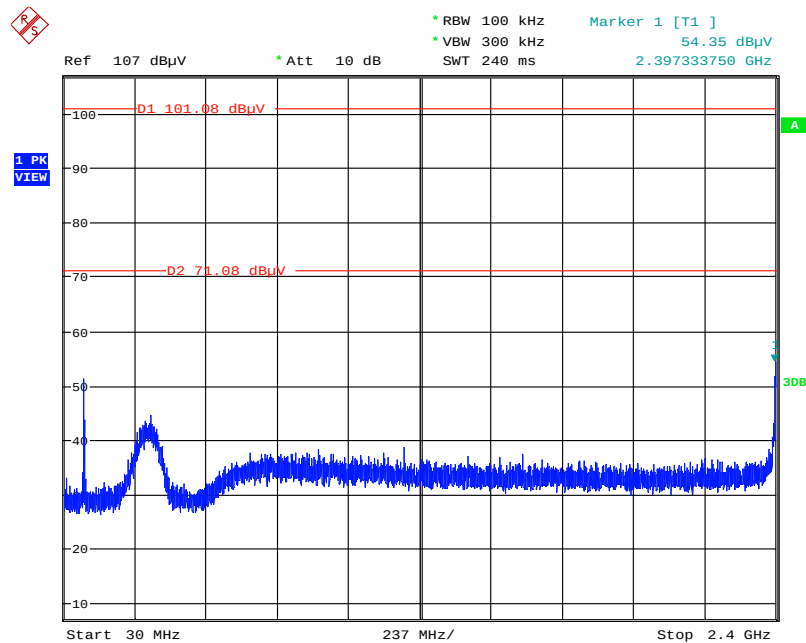
Date: 4.JAN.2014 04:42:47

Plot on Configuration IEEE 802.11b / Reference Level



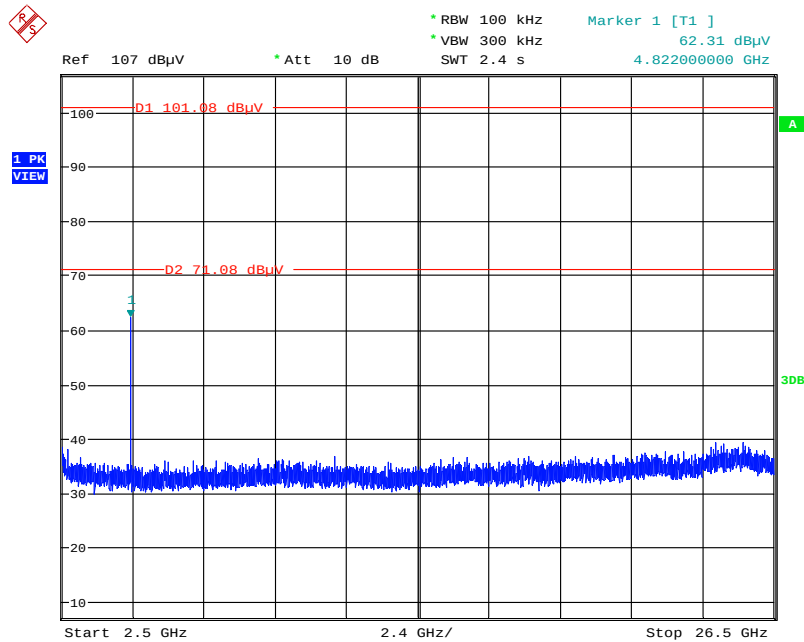
Date: 27.JAN.2014 16:51:24

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



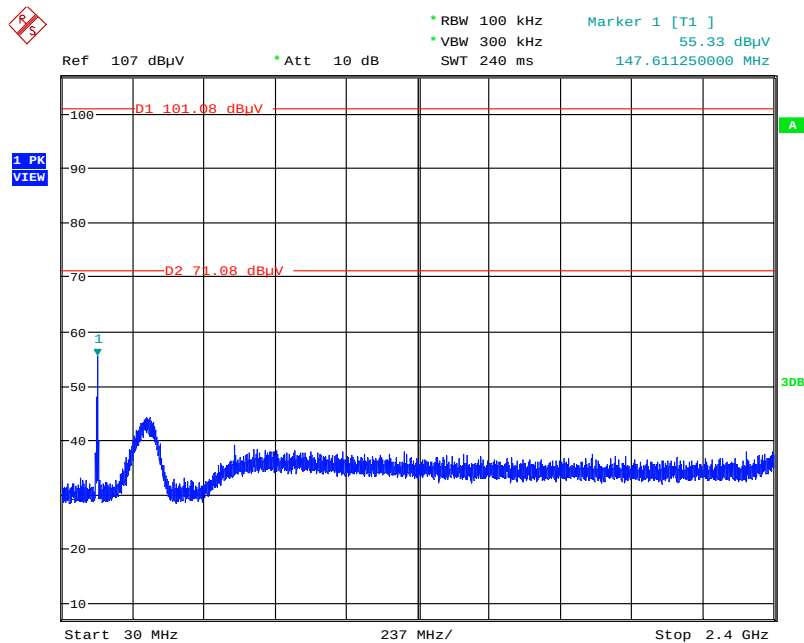
Date: 27.JAN.2014 16:53:31

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



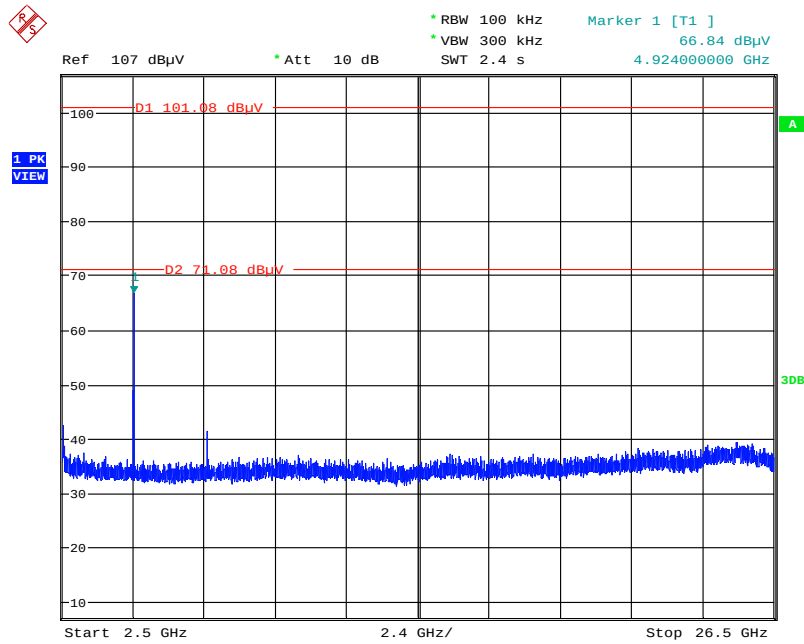
Date: 27. JAN. 2014 16:53:16

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



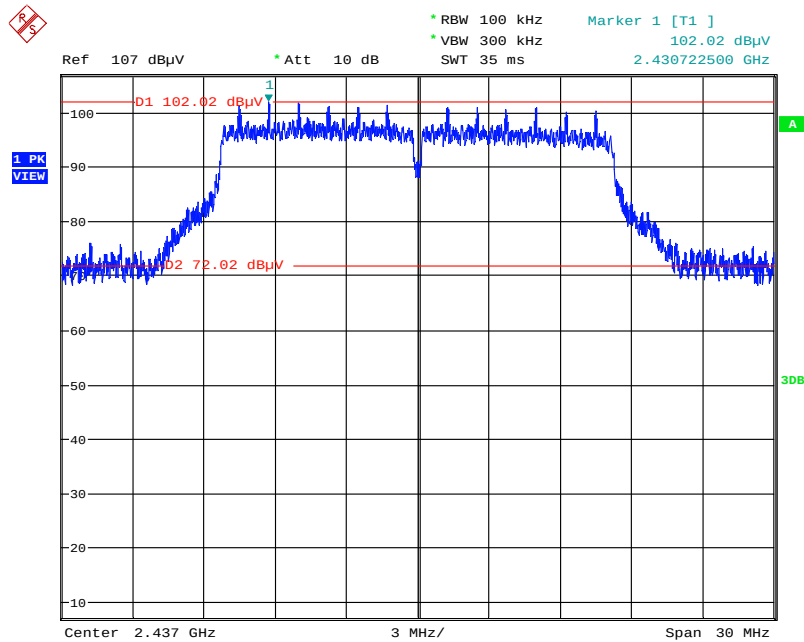
Date: 27. JAN. 2014 16:52:05

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



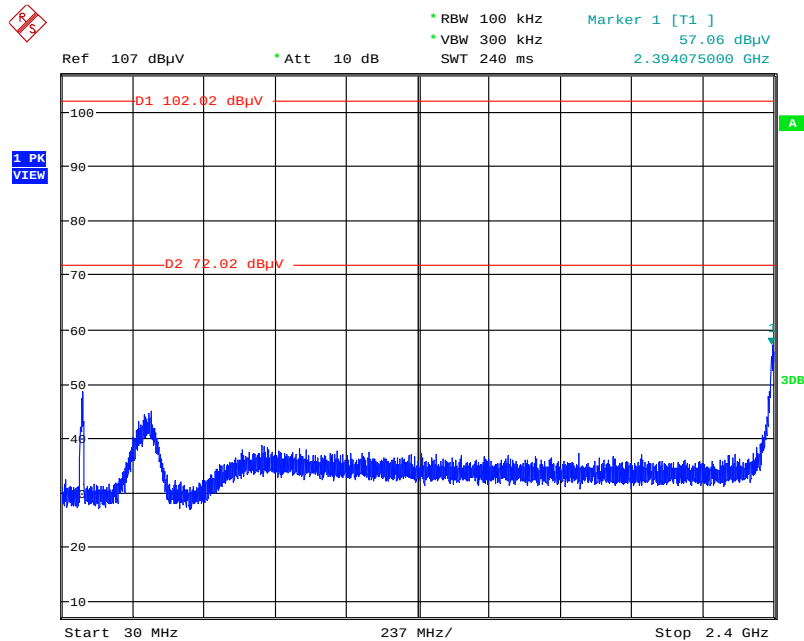
Date: 27.JAN.2014 16:52:40

Plot on Configuration IEEE 802.11g / Reference Level



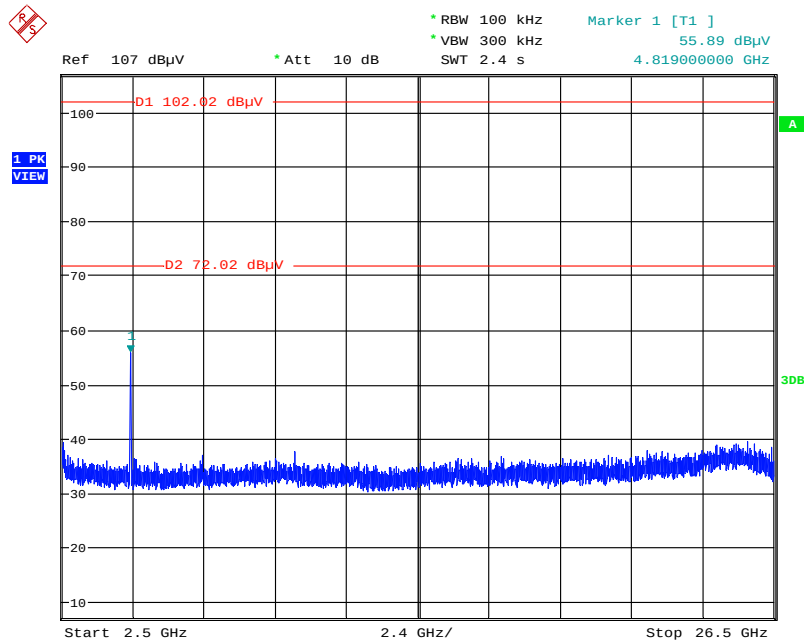
Date: 27.JAN.2014 17:02:48

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



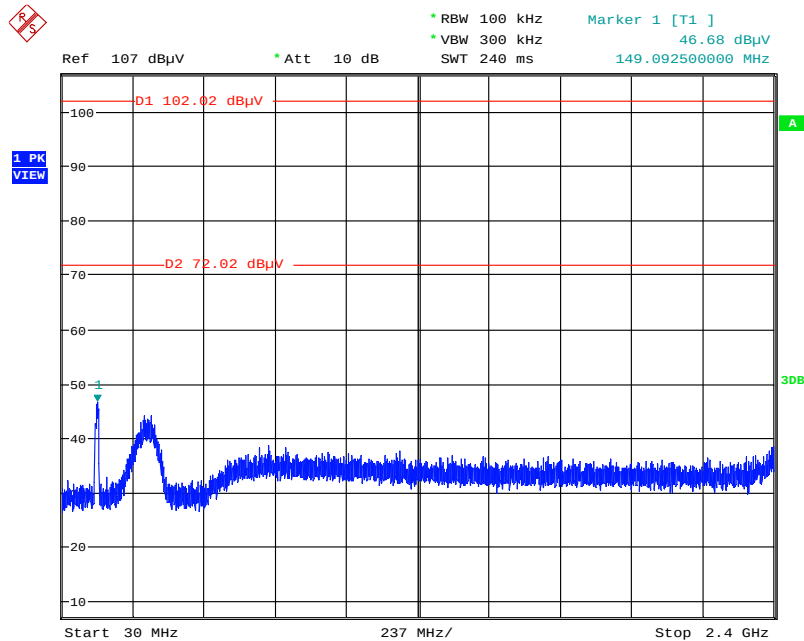
Date: 27.JAN.2014 17:04:01

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



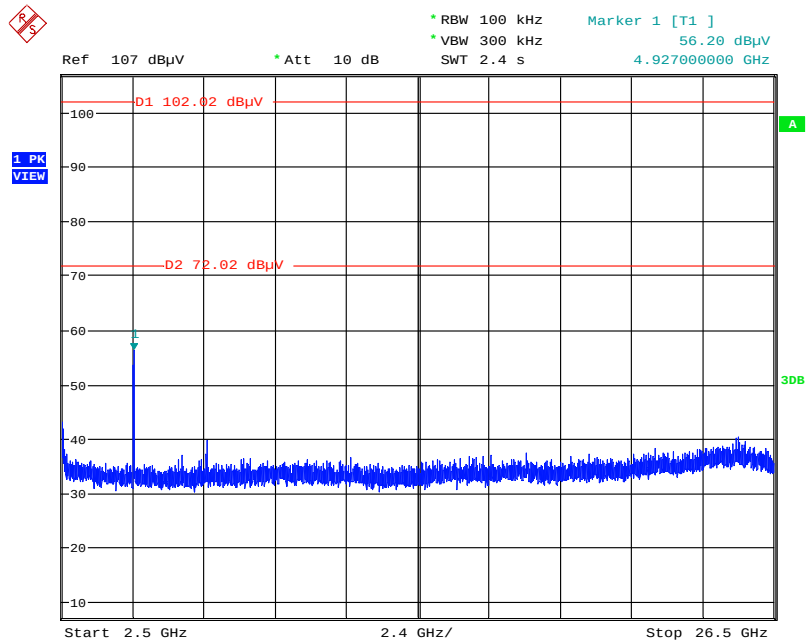
Date: 27. JAN. 2014 17:04:29

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



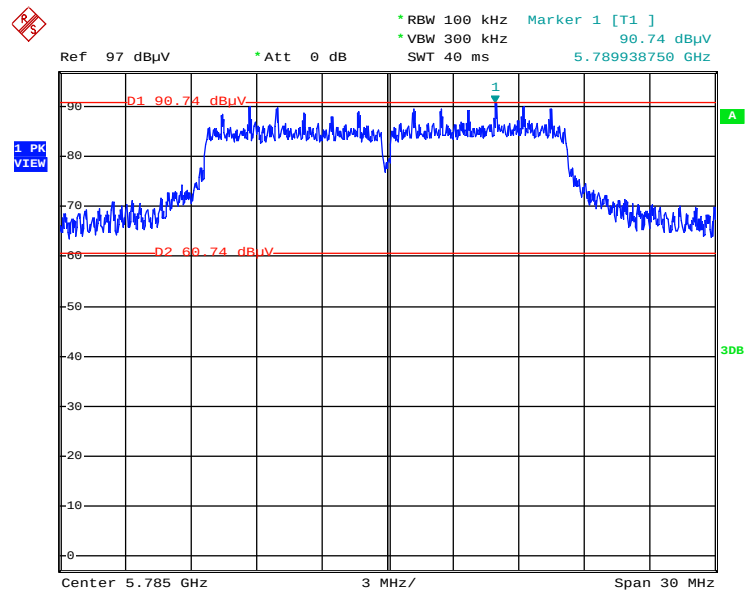
Date: 27. JAN. 2014 17:05:25

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



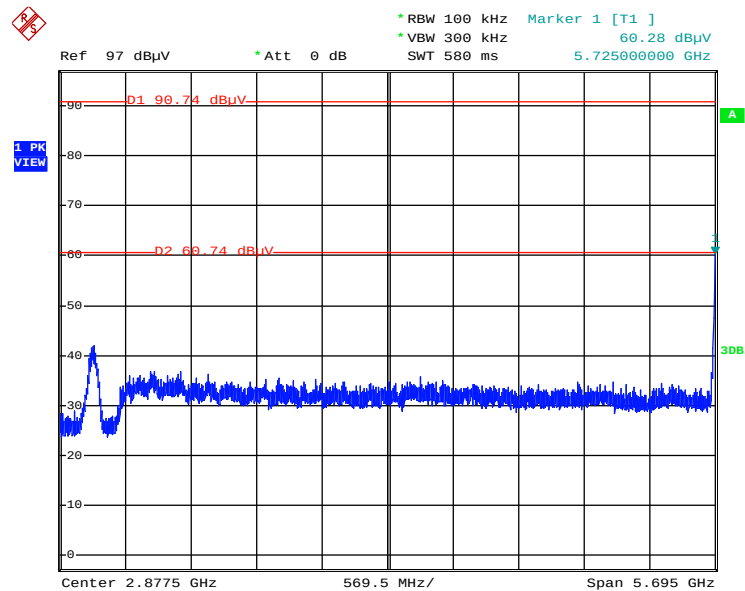
Date: 27.JAN.2014 17:05:05

Plot on Configuration IEEE 802.11a / Reference Level



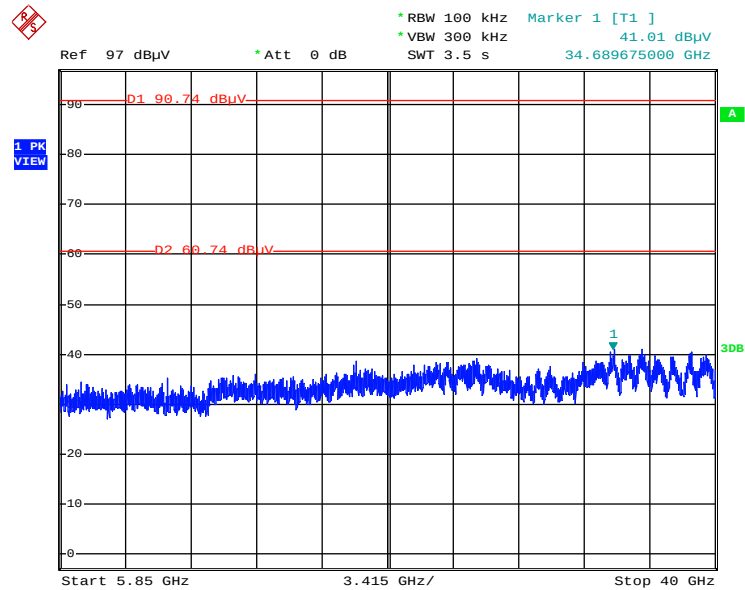
Date: 4.JAN.2014 03:48:48

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



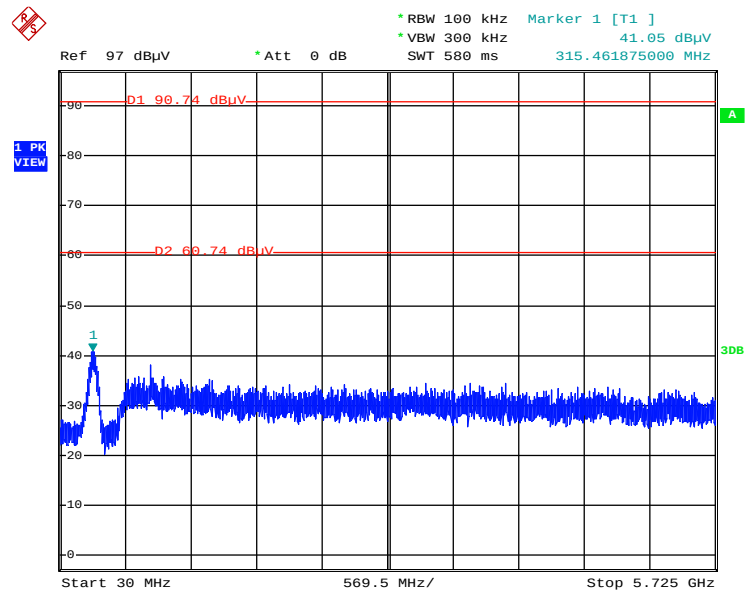
Date: 4.JAN.2014 03:54:29

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



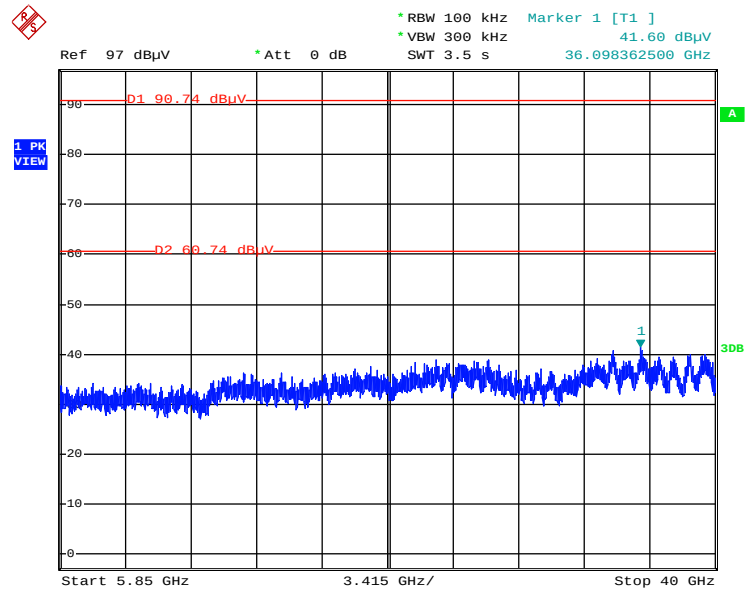
Date: 4.JAN.2014 03:55:02

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



Date: 4.JAN.2014 03:56:10

Plot on Configuration IEEE 802.11a / CH 165 / 5850MHz~40000MHz (down 30dBc)



Date: 4.JAN.2014 03:55:45

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)
Artificial Mains Network	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	-	-	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 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)
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	± 0.173	dB	K=1	0.086
Cable loss	± 0.174	dB	K=2	0.087
Antenna gain	± 0.169	dB	K=2	0.084
Site imperfection	± 0.433	dB	Triangular	0.214
Pre-amplifier gain	± 0.366	dB	K=2	0.183
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 $U_c(y)$				1.778
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