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FCC RADIO TEST REPORT

Applicant's company	NETGEAR, Inc.
Applicant Address	350 East Plumeria Drive, San Jose, California 95134-1911
FCC ID	PY312300207
Manufacturer's company	Ambit Microsystems (Shanghai) Ltd.
Manufacturer Address	No. 1925, Nanle Road, Songjiang Export Processing Zone, Shanghai, China

Product Name	N900 Wireless Dual Band Gigabit Router
Brand Name	NETGEAR
Model Name	WNDR4500v2
Test Rule Part(s)	47 CFR FCC Part 15 Subpart C § 15.247
Test Freq. Range	2400 ~ 2483.5MHz / 5725 ~ 5850MHz
Received Date	Sep. 04, 2012
Final Test Date	Oct. 29, 2012
Submission Type	Original Equipment

Statement

Test result included is only for the IEEE 802.11n, IEEE 802.11b/g part and IEEE 802.11a (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 and 47 CFR FCC Part 15 Subpart C and KDB558074 - 20120118 & KDB662911 D01-20121004.

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



Testing Laboratory
1190

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History of This Test Report

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FR292829AB	Rev. 01	Initial issue of report	Oct. 31, 2012



1. CERTIFICATE OF COMPLIANCE

Product Name : N900 Wireless Dual Band Gigabit Router
Brand Name : NETGEAR
Model Name : WNDR4500v2
Applicant : NETGEAR, Inc.
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 Sep. 04, 2012 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 'Jordan Hsiao'.

Jordan Hsiao

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	10.08 dB
4.2	15.247(b)(3)	Conducted Output Power Measurement	Complies	1.60 dB
4.4	15.247(e)	Power Spectral Density	Complies	13.81 dB
4.5	15.247(a)(2)	6dB Spectrum Bandwidth	Complies	-
4.6	15.247(d)	Radiated Emissions	Complies	0.52 dB
4.7	15.247(d)	Band Edge Emissions	Complies	0.25 dB
4.8	15.203	Antenna Requirements	Complies	-

Test Items	Uncertainty	Remark
AC Power Line Conducted Emissions	±2.3dB	Confidence levels of 95%
Maximum Conducted Output Power	±0.8dB	Confidence levels of 95%
Power Spectral Density	±0.5dB	Confidence levels of 95%
6dB Spectrum Bandwidth	±8.5×10 ⁻⁸	Confidence levels of 95%
Radiated Emissions (9kHz~30MHz)	±0.8dB	Confidence levels of 95%
Radiated Emissions (30MHz~1000MHz)	±1.9dB	Confidence levels of 95%
Radiated / Band Edge Emissions (1GHz~18GHz)	±1.9dB	Confidence levels of 95%
Radiated Emissions (18GHz~40GHz)	±1.9dB	Confidence levels of 95%
Temperature	±0.7°C	Confidence levels of 95%
Humidity	±3.2%	Confidence levels of 95%
DC / AC Power Source	±1.4%	Confidence levels of 95%

3. GENERAL INFORMATION

3.1. Product Details

IEEE 802.11n

Items	Description
Product Type	WLAN (3TX, 3RX)
Radio Type	Intentional Transceiver
Power Type	From power Adapter
Modulation	see the below table for IEEE 802.11n
Data Modulation	OFDM (BPSK / QPSK / 16QAM / 64QAM)
Data Rate (Mbps)	see the below table for IEEE 802.11n
Frequency Range	2400 ~ 2483.5MHz / 5725 ~ 5850MHz
Channel Number	For 2.4GHz Band: 11 for 20MHz bandwidth ; 7 for 40MHz bandwidth For 5GHz Band: 5 for 20MHz bandwidth ; 2 for 40MHz bandwidth
Channel Band Width (99%)	For 2.4GHz Band: MCS0 (20MHz): 18.00 MHz ; MCS0 (40MHz): 35.52 MHz For 5GHz Band: MCS0 (20MHz): 24.40 MHz ; MCS0 (40MHz): 47.52 MHz
Maximum Conducted Output Power	For 2.4GHz Band: MCS0 (20MHz): 28.39 dBm ; MCS0 (40MHz): 21.85 dBm For 5GHz Band: MCS0 (20MHz): 25.55 dBm ; MCS0 (40MHz): 25.85 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 (3TX, 3RX)
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: 10.08 MHz ; 11g: 19.20 MHz ; 11a: 22.72 MHz
Maximum Conducted Output Power	11b: 27.28 dBm ; 11g: 28.40 dBm ; 11a: 25.50 dBm
Carrier Frequencies	Please refer to section 3.4
Antenna	Please refer to section 3.3

Note: The test configuration, test mode and test software used in this test report are designated by the applicant.

Antenna & Band width

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

IEEE 802.11n Modulation Scheme

MCS index	Spatial streams	Modulation type	Coding rate	Data rate (Mbit/s)			
				20 MHz channel		40 MHz channel	
				800 ns GI	400 ns GI	800 ns GI	400 ns GI
0	1	BPSK	1/2	6.5	7.2	13.5	15
1	1	QPSK	1/2	13	14.4	27	30
2	1	QPSK	3/4	19.5	21.7	40.5	45
3	1	16-QAM	1/2	26	28.9	54	60
4	1	16-QAM	3/4	39	43.3	81	90
5	1	64-QAM	2/3	52	57.8	108	120
6	1	64-QAM	3/4	58.5	65	121.5	135
7	1	64-QAM	5/6	65	72.2	135	150
8	2	BPSK	1/2	13	14.4	27	30
9	2	QPSK	1/2	26	28.9	54	60
10	2	QPSK	3/4	39	43.3	81	90
11	2	16-QAM	1/2	52	57.8	108	120
12	2	16-QAM	3/4	78	86.7	162	180
13	2	64-QAM	2/3	104	115.6	216	240
14	2	64-QAM	3/4	117	130	243	270
15	2	64-QAM	5/6	130	144.4	270	300
16	3	BPSK	1/2	19.5	21.7	40.5	45
17	3	QPSK	1/2	39	43.3	81	90
18	3	QPSK	3/4	58.5	65	121.5	135
19	3	16-QAM	1/2	78	86.7	162	180
20	3	16-QAM	3/4	117	130	243	270
21	3	64-QAM	2/3	156	173.3	324	360
22	3	64-QAM	3/4	175.5	195	364.5	405
23	3	64-QAM	5/6	195	216.7	405	450

Symbol	Explanation
NSS	Number of spatial streams
R	Code rate
NBPS	Number of coded bits per single carrier
NCBPS	Number of coded bits per symbol
NDBPS	Number of data bits per symbol
GI	guard interval

3.2. Accessories

Power	Brand	Model	P/N	Rating
Adapter 1	NETGEAR	P030WF120B	332-10200-02	Input:100V-240V~50/60Hz 1.0A Output:12V – 2.5A
Adapter 2	NETGEAR	MU30-5120250-A1	332-10234-01	Input:100V-240V~50/60Hz 0.8A Output:12V – 2.5A
Others				
RJ45 Cable, Shielded, 1.4m				

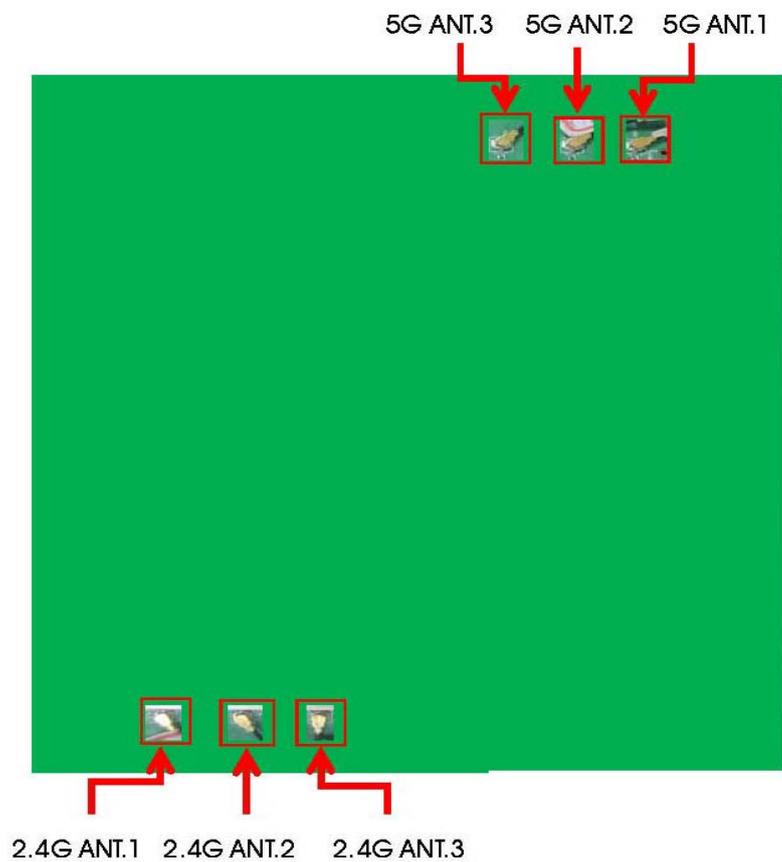
3.3. Table for Filed Antenna

Ant.	Brand	Model Name	Antenna Type	Connector	Gain (dBi)		Remark
					2.4G	5G	
1	FOXCONN	-	PCB Antenna	I-PEX	3.52	3.85	TX/RX
2	FOXCONN	-	PCB Antenna	I-PEX	3.25	3.47	TX/RX
3	FOXCONN	-	PCB Antenna	I-PEX	2.4	4.18	TX/RX

Note: 1. The EUT has three antennas. (3TX/3RX)

Ant. 1, Ant. 2, and Ant. 3 can be used as transmitting/receiving antennas.

Ant. 1, Ant. 2, and Ant. 3 could transmit/receive simultaneously.



3.4. Table for Carrier Frequencies

For 2.4GHz Band

For IEEE 802.11b/g, use Channel 1~Channel 11.

There are two bandwidth systems for IEEE 802.11n.

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

For both 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

For IEEE 802.11a, use Channel 149, 153, 157, 161, 165.

There are two bandwidth systems for IEEE 802.11n.

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

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

Frequency Band	Channel No.	Frequency	Channel No.	Frequency
5725~5850 MHz Band 4	149	5745 MHz	159	5795 MHz
	151	5755 MHz	161	5805 MHz
	153	5765 MHz	165	5825 MHz
	157	5785 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	Auto	-	-
Maximum Conducted Output Power	MCS0/20MHz	7.2 Mbps	1/6/11	1+2+3
Average Output Power	MCS0/40MHz	14.4 Mbps	3/6/9	1+2+3
Power Spectral Density	11b/CCK	1 Mbps	1/6/11	1+2+3
	11g/BPSK	6 Mbps	1/6/11	1+2+3
6dB Spectrum Bandwidth	MCS0/20MHz	7.2 Mbps	1/6/11	1+2+3
	MCS0/40MHz	14.4 Mbps	3/6/9	1+2+3
	11b/CCK	1 Mbps	1/6/11	1+2+3
	11g/BPSK	6 Mbps	1/6/11	1+2+3
Radiated Emissions Below 1GHz	Normal Link	Auto	-	-
Radiated Emissions Above 1GHz	MCS0/20MHz	7.2 Mbps	1/6/11	1+2+3
	MCS0/40MHz	14.4 Mbps	3/6/9	1+2+3
	11b/CCK	1 Mbps	1/6/11	1+2+3
	11g/BPSK	6 Mbps	1/6/11	1+2+3
Band Edge Emissions	MCS0/20MHz	7.2 Mbps	1/11	1+2+3
	MCS0/40MHz	14.4 Mbps	3/9	1+2+3
	11b/CCK	1 Mbps	1/11	1+2+3
	11g/BPSK	6 Mbps	1/11	1+2+3

For 5GHz Band

Test Items	Mode	Data Rate	Channel	Antenna
AC Power Line Conducted Emissions	Normal Link	Auto	-	-
Maximum Conducted Output Power Average Output Power Power Spectral Density	MCS0/20MHz	7.2 Mbps	149/157/165	1+2+3
	MCS0/40MHz	14.4 Mbps	151/159	1+2+3
	11a/BPSK	6 Mbps	149/157/165	1+2+3
6dB Spectrum Bandwidth	MCS0/20MHz	7.2 Mbps	149/157/165	1+2+3
	MCS0/40MHz	14.4 Mbps	151/159	1+2+3
	11a/BPSK	6 Mbps	149/157/165	1+2+3
Radiated Emissions Below 1GHz	Normal Link	Auto	-	-
Radiated Emissions Above 1GHz	MCS0/20MHz	7.2 Mbps	149/157/165	1+2+3
	MCS0/40MHz	14.4 Mbps	151/159	1+2+3
	11a/BPSK	6 Mbps	149/157/165	1+2+3
Band Edge Emissions	MCS0/20MHz	7.2 Mbps	149/157/165	1+2+3
	MCS0/40MHz	14.4 Mbps	151/159	1+2+3
	11a/BPSK	6 Mbps	149/157/165	1+2+3

The following test modes were performed for all tests:

a. The following test modes were performed for Conducted Emission test:

Mode 1: EUT Upright+Wireless Link+LAN Link+WAN link+USB Read/Write+Adapter(NETGEAR P030WF120B)

Mode 2: EUT Upright +Wireless Link+LAN Link+WAN link+USB Read/Write+Adapter(NETGEAR MU30-5120250-A1)

Due to Mode 2 generated the worst test result, so it was recorded in this report.

b. The following test modes were performed for Radiated Emission test:

Mode 1: EUT Upright+Wireless Link+LAN Link+WAN link+USB Read/Write+Adapter(NETGEAR P030WF120B)

Mode 2: EUT Upright +Wireless Link+LAN Link+WAN link+USB Read/Write+Adapter(NETGEAR MU30-5120250-A1)

Due to Mode 2 generated the worst test result, so it was recorded in this report.

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

3.6. Table for Testing Locations

Test Site No.	Site Category	Location	FCC Reg. No.	IC File No.	VCCI Reg. No
03CH01-CB	SAC	Hsin Chu	187376	IC 4086D	-
CO01-CB	Conduction	Hsin Chu	187376	IC 4086D	-
TH01-CB	OVEN Room	Hsin Chu	-	-	-

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

Please refer section 6 for Test Site Address.

3.7. Table for Supporting Units

Support Unit	Brand	Model	FCC ID
Notebook	DELL	E6220	N/A
Notebook	DELL	E6220	N/A
Mouse	Logitech	M-U0026	DoC
Flash Disk	Silicon	D33B01	DoC
Flash Disk	Silicon	D33B02	DoC
Earphone	e-bppks	N/A	N/A
Notebook	DELL	M1330	E2K4965AGNM
Notebook	DELL	M1330	E2K4965AGNM

3.8. Table for Parameters of Test Software Setting

During testing, Channel & 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

Test Software Version	Telnet 192.168.1.1		
Frequency	2412 MHz	2437 MHz	2462 MHz
MCS0 20MHz	57	91	47

Power Parameters of IEEE 802.11n

Test Software Version	Telnet 192.168.1.1		
Frequency	2422 MHz	2437 MHz	2452 MHz
MCS0 40MHz	50	63	44

Power Parameters of IEEE 802.11b/g

Test Software Version	Telnet 192.168.1.1		
Frequency	2412 MHz	2437 MHz	2462 MHz
IEEE 802.11b	74	83	78
IEEE 802.11g	64	92	56

For 5GHz Band

Power Parameters of IEEE 802.11n

Test Software Version	Telnet 192.168.1.1		
Frequency	5745 MHz	5785 MHz	5825 MHz
MCS0 20MHz	88	88	88

Power Parameters of IEEE 802.11n

Test Software Version	Telnet 192.168.1.1	
Frequency	5755 MHz	5795 MHz
MCS0 40MHz	88	88

Power Parameters of IEEE 802.11a

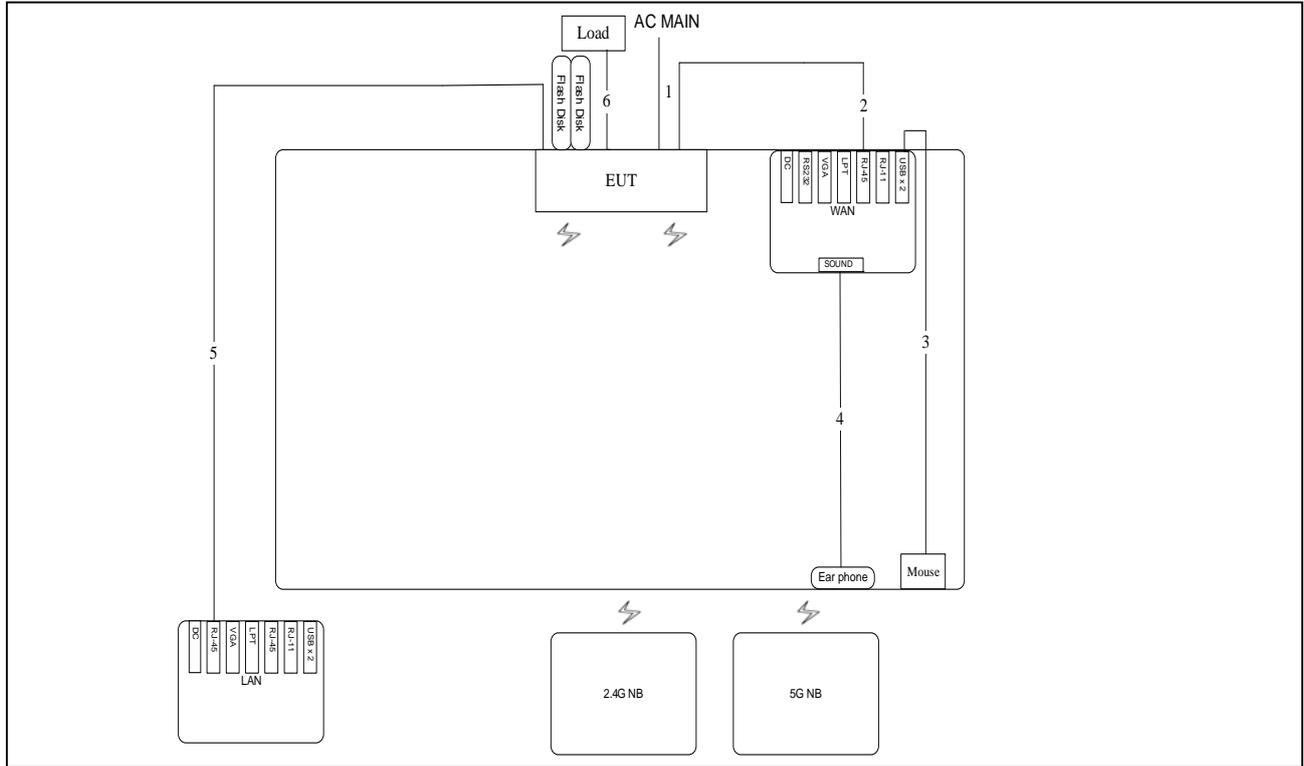
Test Software Version	Telnet 192.168.1.1		
Frequency	5745 MHz	5785 MHz	5825 MHz
IEEE 802.11a	88	88	88

During the test, "Telnet 192.168.1.1" under WIN XP was executed the test program to control the EUT continuously transmit RF signal.

3.9. Test Configurations

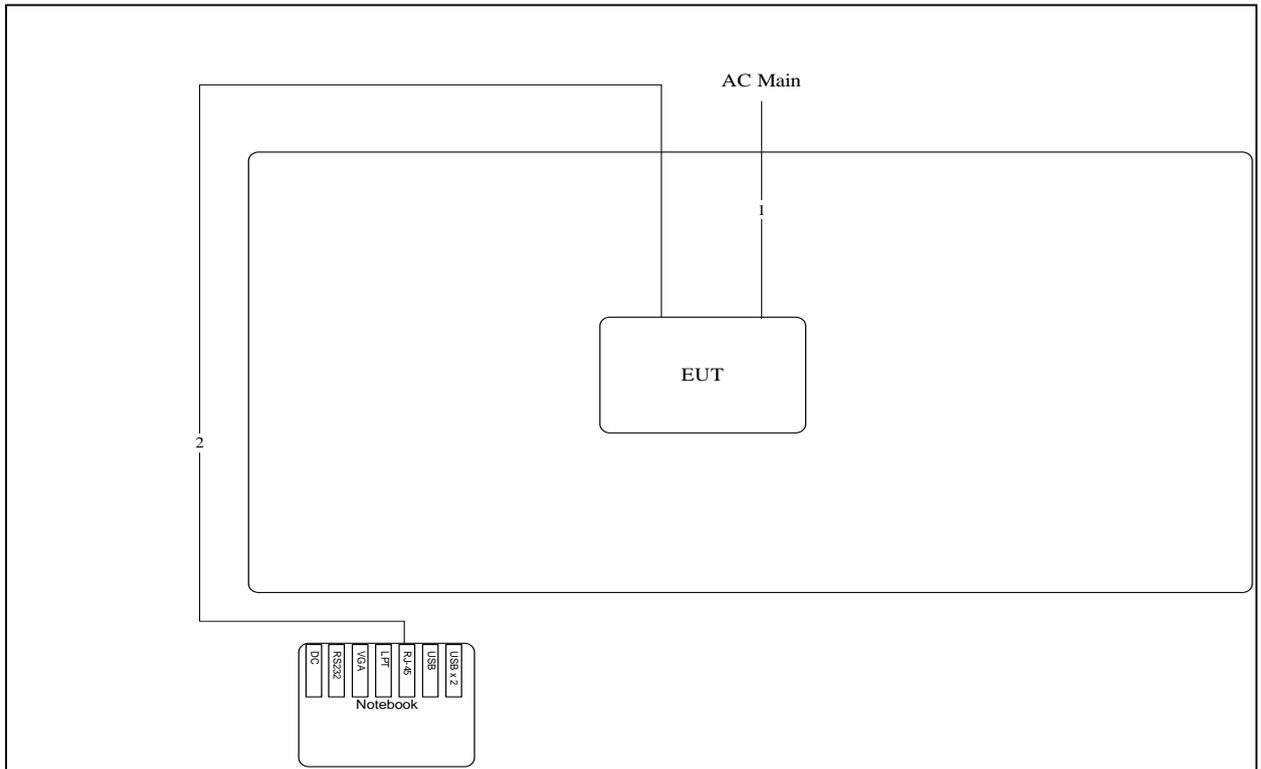
3.9.1. Radiation Emissions Test Configuration

Test Configuration: 30MHz ~1GHz



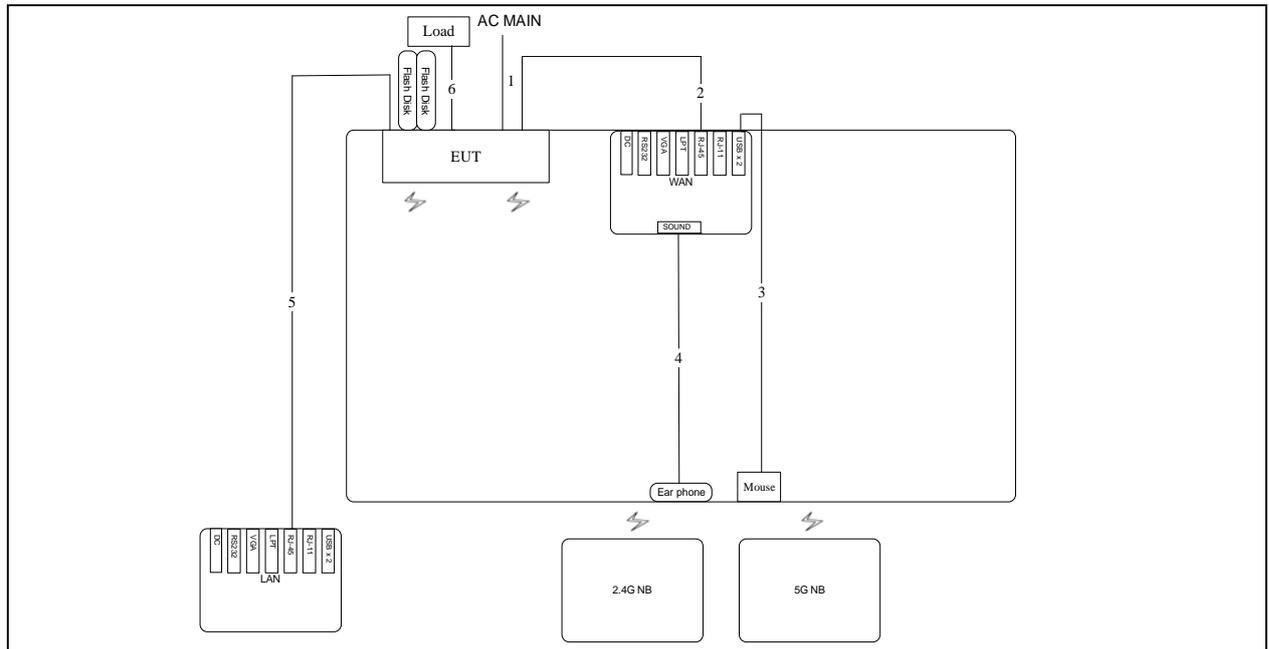
Item	Connection	Shield	Length
1	Power cable	No	1.8M
2	RJ-45 cable	Yes	1.4M
3	USB cable	No	1.8M
4	Earphone cable	No	1.1M
5	RJ-45 cable	No	10M
6	RJ-45 cable*3	No	1.5M

Test Configuration: above 1GHz



Item	Connection	Shield	Length
1	Power cable	No	1.8M
2	RJ-45 cable	No	10M

3.9.2. AC Power Line Conduction Emissions Test Configuration



Item	Connection	Shield	Length
1	Power cable	No	1.8M
2	RJ-45 cable	Yes	1.4M
3	USB cable	No	1.8M
4	Earphone cable	No	1.1M
5	RJ-45 cable	No	10M
6	RJ-45 cable*3	No	1.5M

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

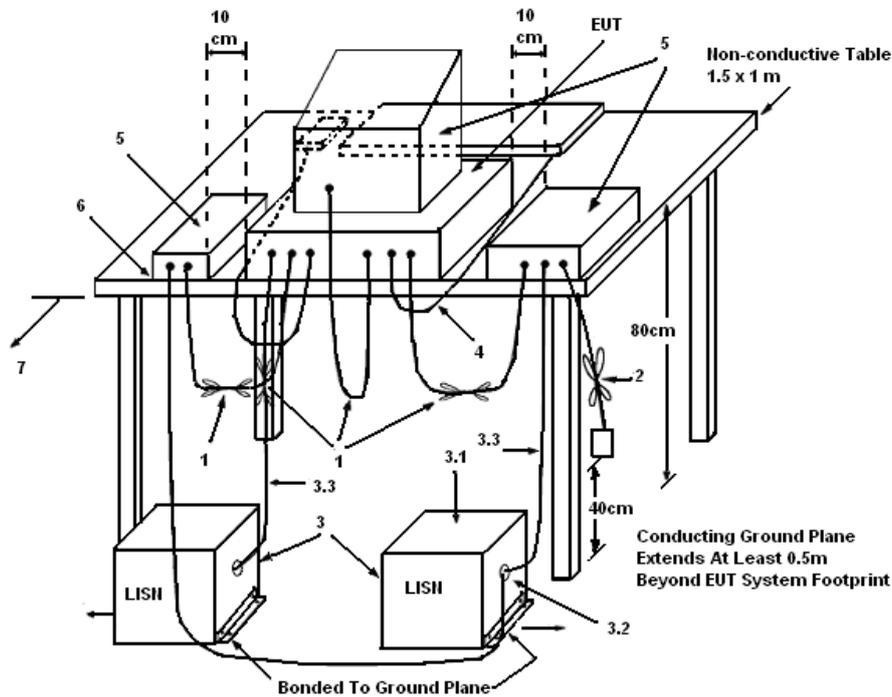
Please refer to section 5 of equipments list in this report. The following table is the setting of the receiver.

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 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

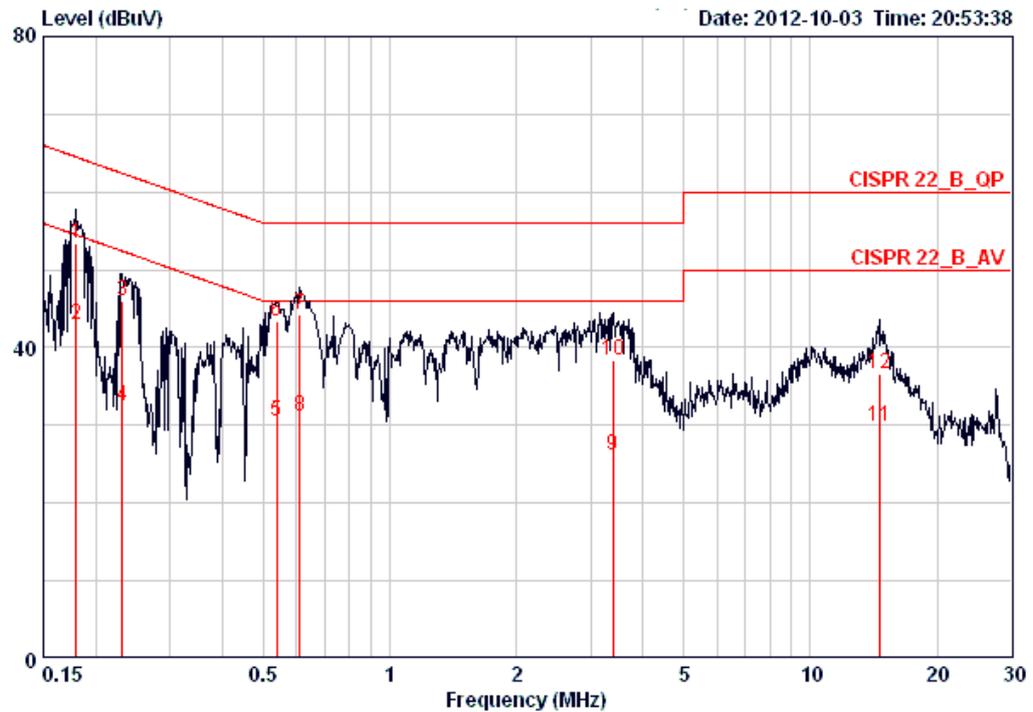
There is no deviation with the original standard.

4.1.6. EUT Operation during Test

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

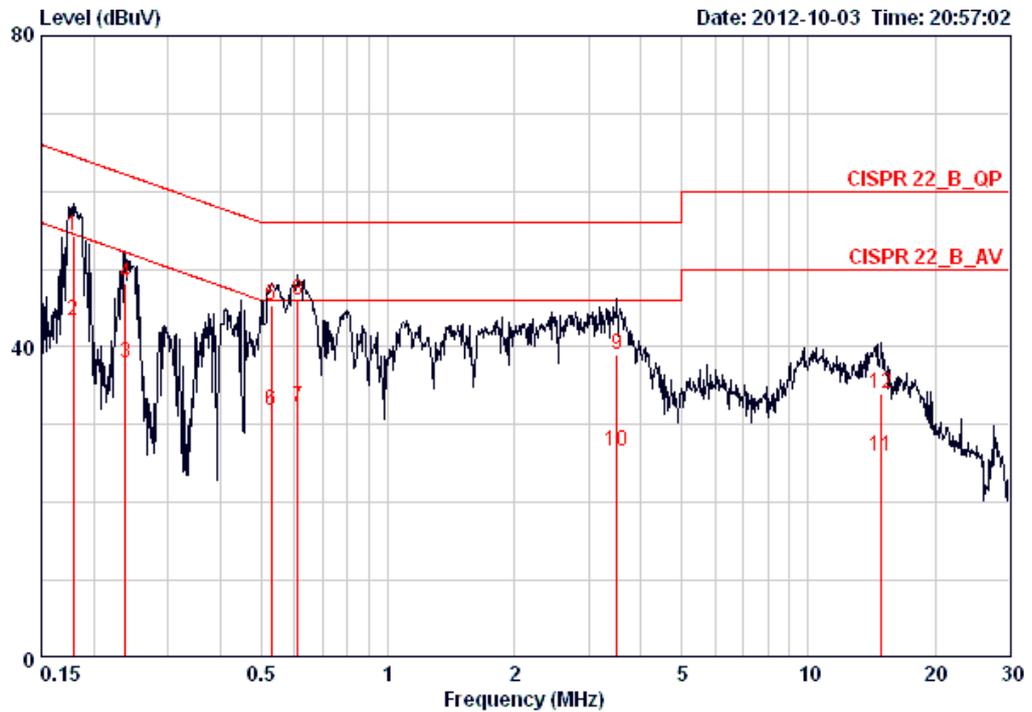
4.1.7. Results of AC Power Line Conducted Emissions Measurement

Temperature	25°C	Humidity	61%
Test Engineer	Sin Chang	Phase	Line
Configuration	Normal Link / Mode 2		



	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Pol/Phase	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB		
1	0.17961	53.34	-11.16	64.50	52.99	0.15	0.20	LINE	QP
2	0.17961	43.03	-11.47	54.50	42.68	0.15	0.20	LINE	AVERAGE
3	0.23162	46.01	-16.38	62.39	45.66	0.15	0.20	LINE	QP
4	0.23162	32.46	-19.93	52.39	32.11	0.15	0.20	LINE	AVERAGE
5	0.53782	30.46	-15.55	46.00	30.10	0.16	0.20	LINE	AVERAGE
6	0.53782	43.39	-12.62	56.00	43.03	0.16	0.20	LINE	QP
7	0.61075	44.36	-11.64	56.00	44.00	0.16	0.20	LINE	QP
8	0.61075	31.13	-14.87	46.00	30.77	0.16	0.20	LINE	AVERAGE
9	3.399	26.10	-19.90	46.00	25.61	0.21	0.28	LINE	AVERAGE
10	3.399	38.32	-17.68	56.00	37.83	0.21	0.28	LINE	QP
11	14.594	29.80	-20.20	50.00	29.00	0.40	0.40	LINE	AVERAGE
12	14.594	36.60	-23.40	60.00	35.80	0.40	0.40	LINE	QP

Temperature	21.2°C	Humidity	49.2%
Test Engineer	Sin Chang	Phase	Neutral
Configuration	Normal Link / Mode 2		



	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Pol/Phase	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB		
1	0.17866	54.21	-10.34	64.55	53.93	0.08	0.20	NEUTRAL	QP
2	0.17866	43.47	-11.08	54.55	43.19	0.08	0.20	NEUTRAL	AVERAGE
3	0.23784	37.96	-14.21	52.17	37.68	0.08	0.20	NEUTRAL	AVERAGE
4	0.23784	48.18	-13.99	62.17	47.90	0.08	0.20	NEUTRAL	QP
5	0.52934	45.33	-10.67	56.00	45.05	0.08	0.20	NEUTRAL	QP
6	0.52934	31.92	-14.08	46.00	31.64	0.08	0.20	NEUTRAL	AVERAGE
7	0.61075	32.15	-13.85	46.00	31.87	0.08	0.20	NEUTRAL	AVERAGE
8	0.61075	45.92	-10.08	56.00	45.64	0.08	0.20	NEUTRAL	QP
9	3.509	38.96	-17.04	56.00	38.54	0.13	0.30	NEUTRAL	QP
10	3.509	26.49	-19.51	46.00	26.07	0.13	0.30	NEUTRAL	AVERAGE
11	14.907	25.97	-24.03	50.00	25.26	0.31	0.40	NEUTRAL	AVERAGE
12	14.907	33.97	-26.03	60.00	33.26	0.31	0.40	NEUTRAL	QP

Note:

Level = Read Level + LISN Factor + Cable Loss.

4.2. Conducted Output Power Measurement

4.2.1. Limit

For systems using digital modulation in the 2400-2483.5MHz, the limit for peak 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 1 dB for every 3dB that the directional gain of the antenna exceeds 6dBi.

4.2.2. Measuring Instruments and Setting

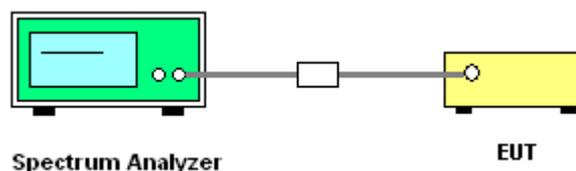
Please refer to section 5 of equipments list in this report. The following table is the setting of spectrum analyzer.

Spectrum Parameter	Setting
Attenuation	Auto
Span Frequency	Encompass the entire emissions bandwidth (EBW) of the signal
RB	1MHz
VB	3MHz
Detector	RMS
Trace	Average 100
Sweep Time	Auto

4.2.3. Test Procedures

1. The transmitter output (antenna port) was connected to the spectrum analyzer.
2. Test was performed in accordance with KDB 558074 Guidance for Performing Compliance Measurements on Digital Transmission Systems (DTS) Operating Under §15.247 section 5.2.2.2. Multiple antenna systems was performed in accordance with KDB 662911 Emissions Testing of Transmitters with Multiple Outputs in the Same Band.
3. When measuring maximum conducted output power with multiple antenna systems, add every result of the values by mathematic formula.

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	25°C	Humidity	56%
Test Engineer	Denis Su	Configurations	IEEE 802.11n
Test Date	Oct. 01, 2012		

For 2.4GHz Band

Configuration IEEE 802.11n MCS0 20MHz

Channel	Frequency	Conducted Channel power (dBm)			Total Conducted Channel power (dBm)	Max. Limit (dBm)	Result
		Ant. 1	Ant. 2	Ant. 3			
1	2412 MHz	15.26	15.75	15.80	20.38	30.00	Complies
6	2437 MHz	23.89	23.64	23.30	28.39	30.00	Complies
11	2462 MHz	12.47	12.71	12.88	17.46	30.00	Complies

Configuration IEEE 802.11n MCS0 40MHz

Channel	Frequency	Conducted Channel power (dBm)			Total Conducted Channel power (dBm)	Max. Limit (dBm)	Result
		Ant. 1	Ant. 2	Ant. 3			
3	2422 MHz	14.30	14.13	13.74	18.83	30.00	Complies
6	2437 MHz	17.36	16.97	16.88	21.85	30.00	Complies
9	2452 MHz	11.88	12.24	12.85	17.11	30.00	Complies

For 5GHz Band

Configuration IEEE 802.11n MCS0 20MHz

Channel	Frequency	Conducted Channel power (dBm)			Total Conducted Channel power (dBm)	Max. Limit (dBm)	Result
		Ant. 1	Ant. 2	Ant. 3			
149	5745 MHz	20.63	20.92	20.31	25.40	30.00	Complies
157	5785 MHz	20.85	20.91	20.58	25.55	30.00	Complies
165	5825 MHz	20.56	20.69	20.67	25.41	30.00	Complies

Configuration IEEE 802.11n MCS0 40MHz

Channel	Frequency	Conducted Channel power (dBm)			Total Conducted Channel power (dBm)	Max. Limit (dBm)	Result
		Ant. 1	Ant. 2	Ant. 3			
151	5755 MHz	20.79	21.06	20.99	25.72	30.00	Complies
159	5795 MHz	20.91	21.07	21.25	25.85	30.00	Complies

Temperature	25°C	Humidity	56%
Test Engineer	Denis Su	Configurations	IEEE 802.11a/b/g
Test Date	Oct. 01, 2012		

Configuration IEEE 802.11b

Channel	Frequency	Conducted Channel power (dBm)			Total Conducted Channel power (dBm)	Max. Limit (dBm)	Result
		Ant. 1	Ant. 2	Ant. 3			
1	2412 MHz	20.45	20.70	20.27	25.25	30.00	Complies
6	2437 MHz	22.38	22.61	22.52	27.28	30.00	Complies
11	2462 MHz	21.20	21.45	21.16	26.04	30.00	Complies

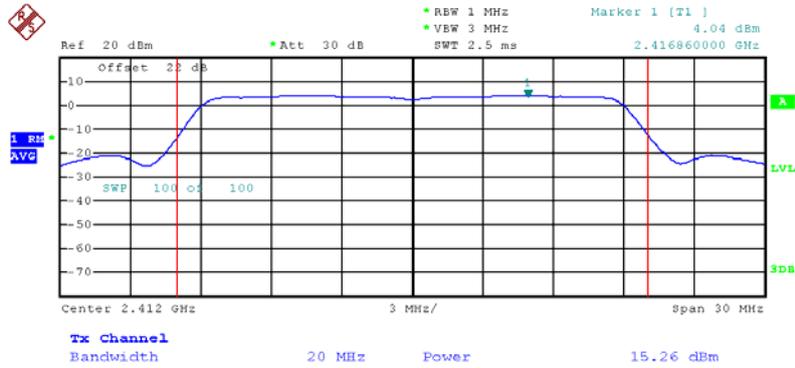
Configuration IEEE 802.11g

Channel	Frequency	Conducted Channel power (dBm)			Total Conducted Channel power (dBm)	Max. Limit (dBm)	Result
		Ant. 1	Ant. 2	Ant. 3			
1	2412 MHz	16.84	17.20	17.33	21.90	30.00	Complies
6	2437 MHz	23.88	23.51	23.47	28.40	30.00	Complies
11	2462 MHz	14.88	15.11	14.93	19.75	30.00	Complies

Configuration IEEE 802.11a

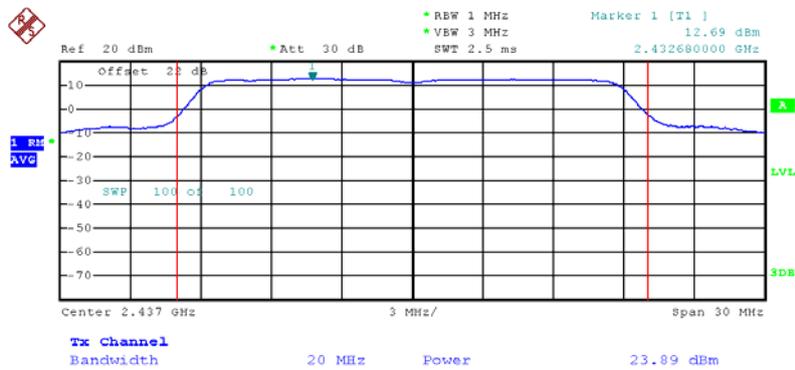
Channel	Frequency	Conducted Channel power (dBm)			Total Conducted Channel power (dBm)	Max. Limit (dBm)	Result
		Ant. 1	Ant. 2	Ant. 3			
149	5745 MHz	20.77	20.86	20.06	25.35	30.00	Complies
157	5785 MHz	20.75	20.86	20.40	25.45	30.00	Complies
165	5825 MHz	20.69	20.84	20.66	25.50	30.00	Complies

Conducted Output Power Plot on Configuration IEEE 802.11n MCS0 20MHz Ant. 1 / 2412 MHz



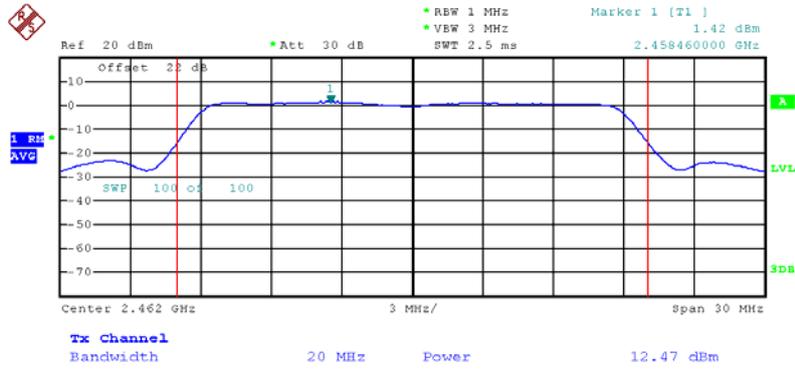
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Conducted Output Power Plot on Configuration IEEE 802.11n MCS0 20MHz Ant. 1 / 2437 MHz



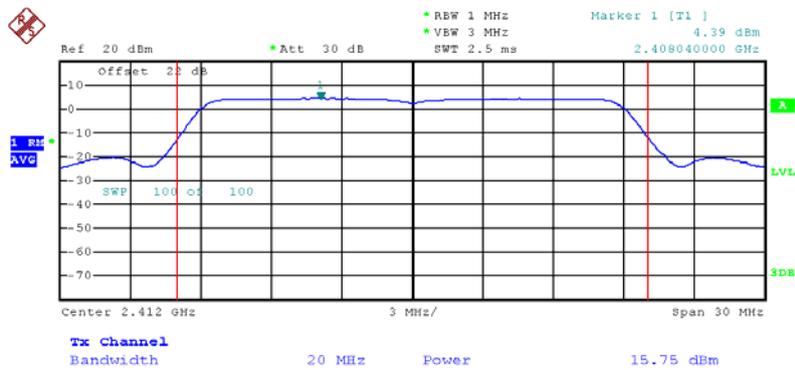
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Conducted Output Power Plot on Configuration IEEE 802.11n MCS0 20MHz Ant. 1 / 2462 MHz



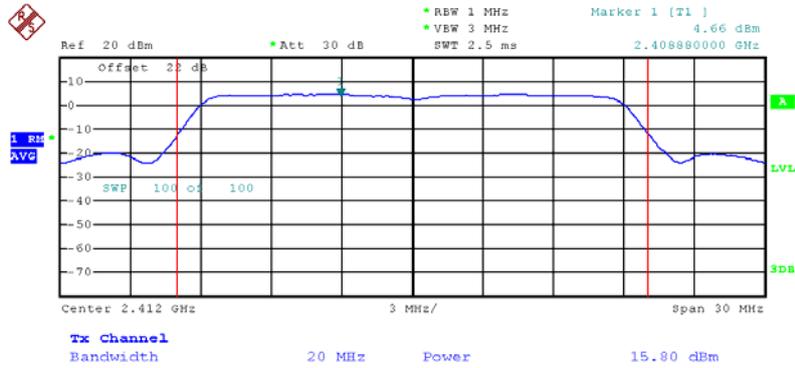
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Conducted Output Power Plot on Configuration IEEE 802.11n MCS0 20MHz Ant. 2 / 2412 MHz



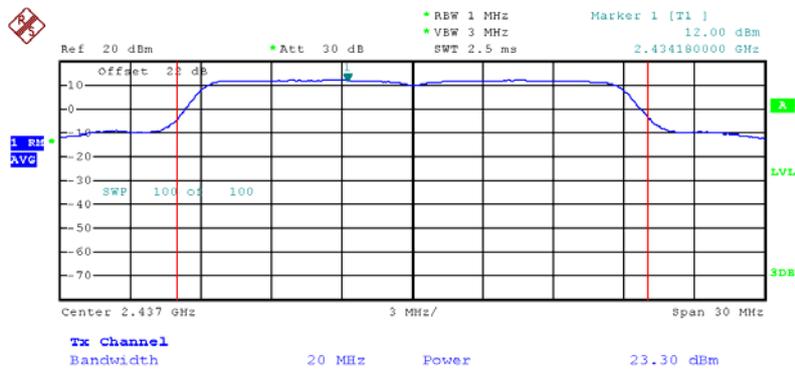
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Conducted Output Power Plot on Configuration IEEE 802.11n MCS0 20MHz Ant. 3 / 2412 MHz



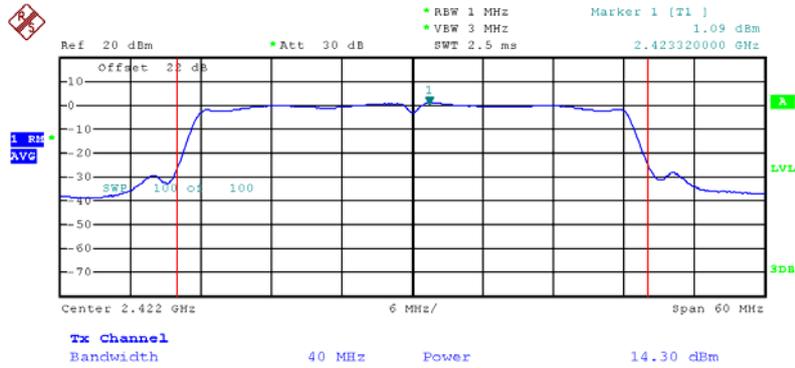
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Conducted Output Power Plot on Configuration IEEE 802.11n MCS0 20MHz Ant. 3 / 2437 MHz



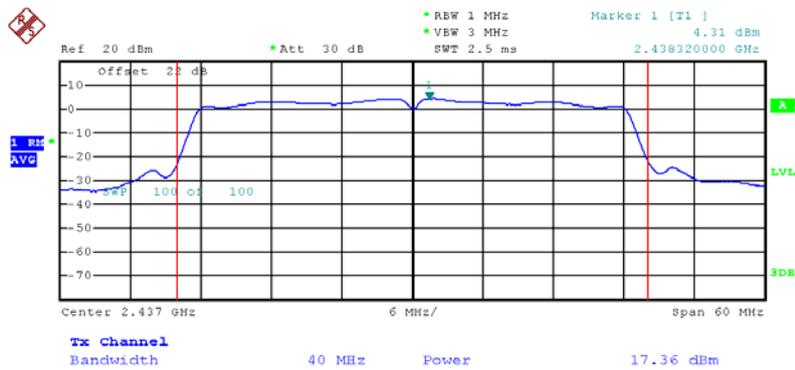
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Conducted Output Power Plot on Configuration IEEE 802.11n MCS0 40MHz Ant. 1 / 2422 MHz



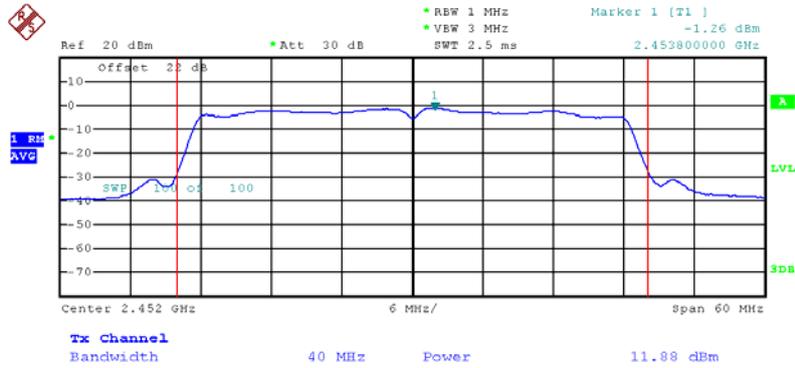
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Conducted Output Power Plot on Configuration IEEE 802.11n MCS0 40MHz Ant. 1 / 2437 MHz



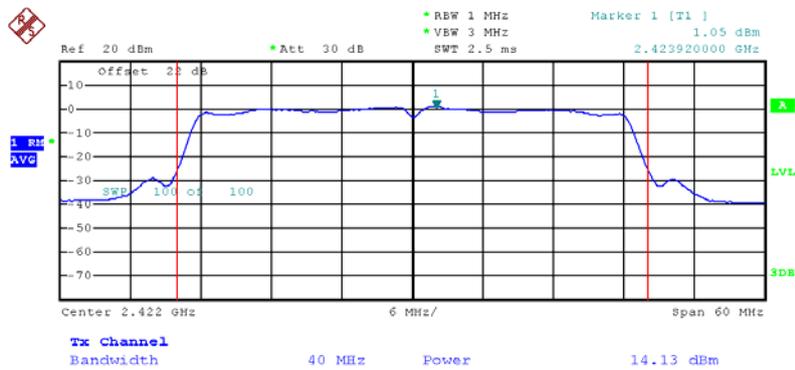
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Conducted Output Power Plot on Configuration IEEE 802.11n MCS0 40MHz Ant. 1 / 2452 MHz



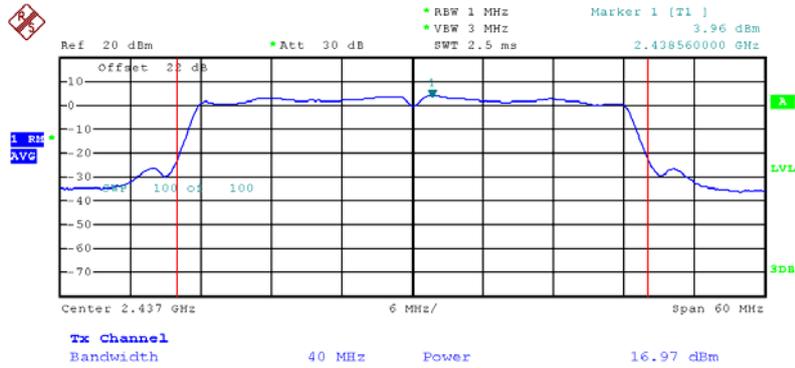
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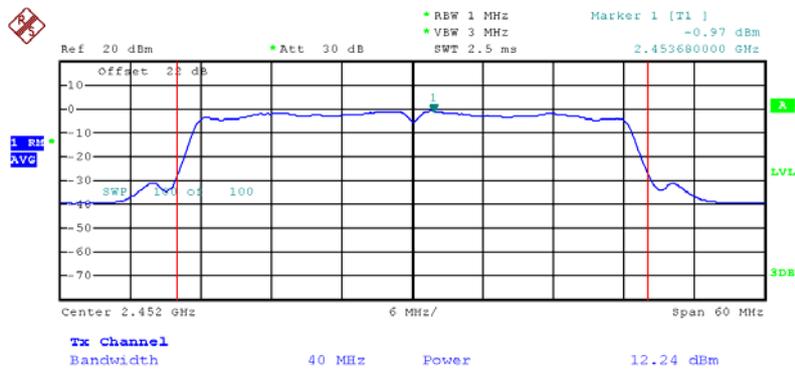
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Conducted Output Power Plot on Configuration IEEE 802.11n MCS0 40MHz Ant. 2 / 2437 MHz



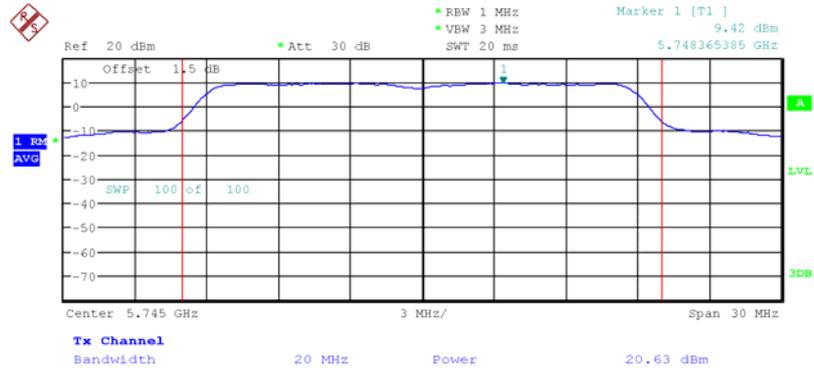
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Conducted Output Power Plot on Configuration IEEE 802.11n MCS0 40MHz Ant. 2 / 2452 MHz



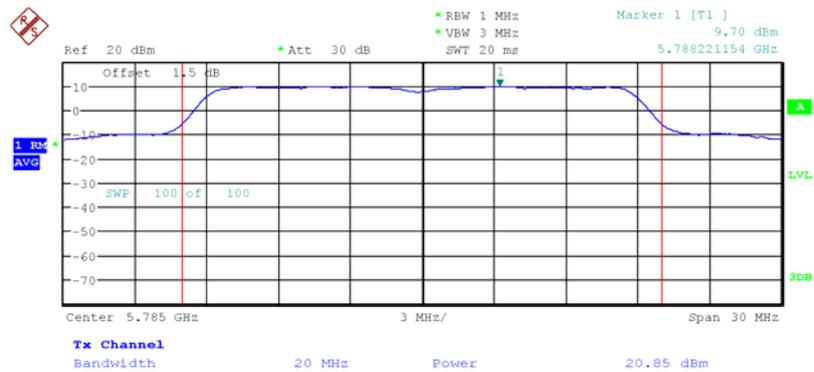
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Conducted Output Power Plot on Configuration IEEE 802.11n MCS0 20MHz Ant. 1 / 5745 MHz



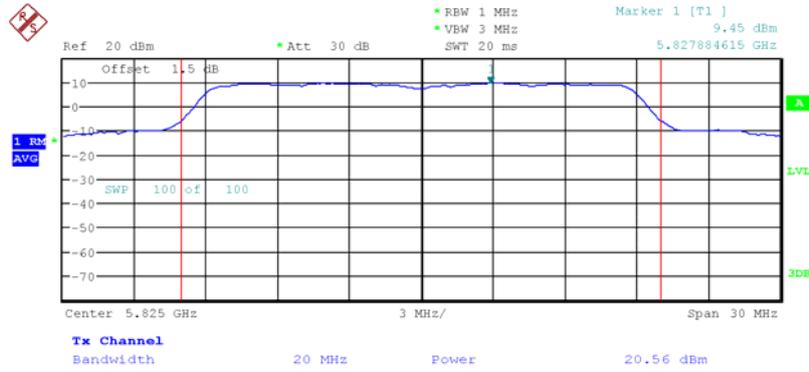
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Conducted Output Power Plot on Configuration IEEE 802.11n MCS0 20MHz Ant. 1 / 5785 MHz



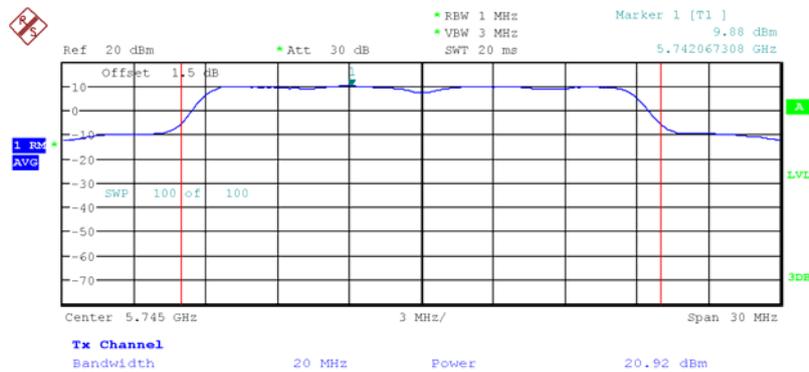
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Conducted Output Power Plot on Configuration IEEE 802.11n MCS0 20MHz Ant. 1 / 5825 MHz



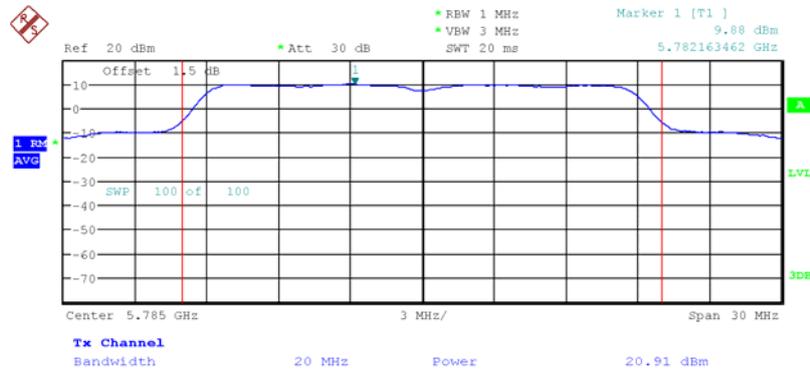
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Conducted Output Power Plot on Configuration IEEE 802.11n MCS0 20MHz Ant. 2 / 5745 MHz



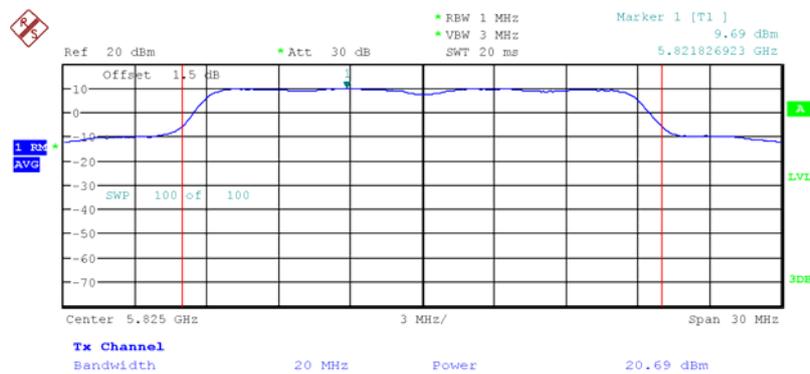
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Conducted Output Power Plot on Configuration IEEE 802.11n MCS0 20MHz Ant. 2 / 5785 MHz



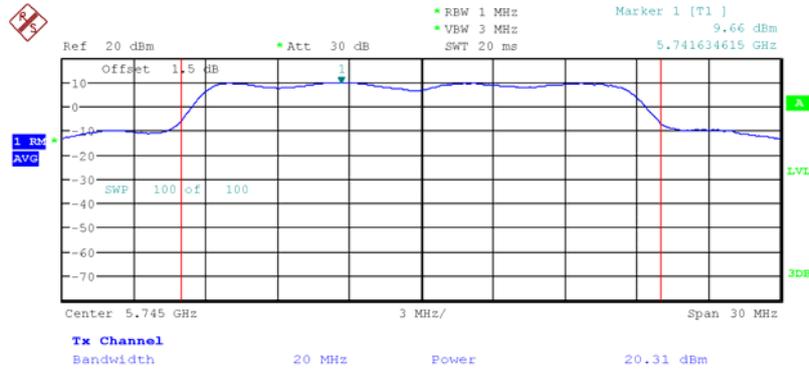
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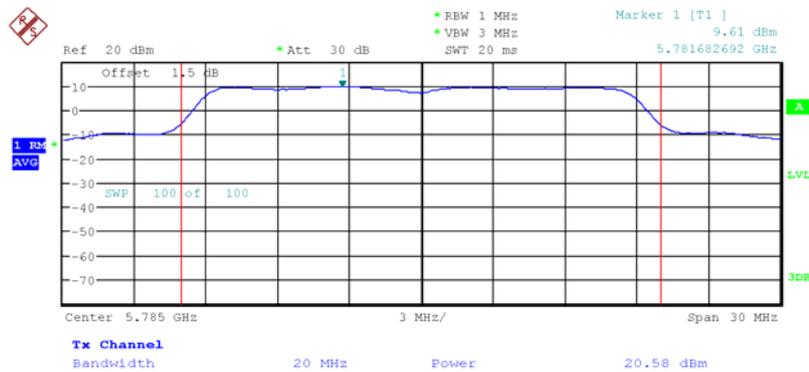
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Conducted Output Power Plot on Configuration IEEE 802.11n MCS0 20MHz Ant. 3 / 5745 MHz



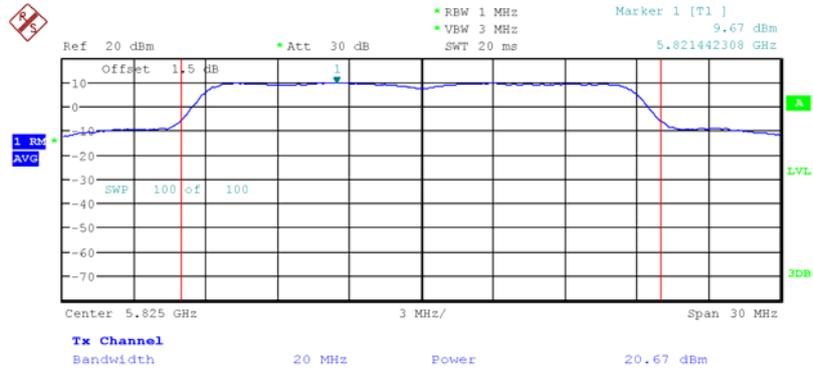
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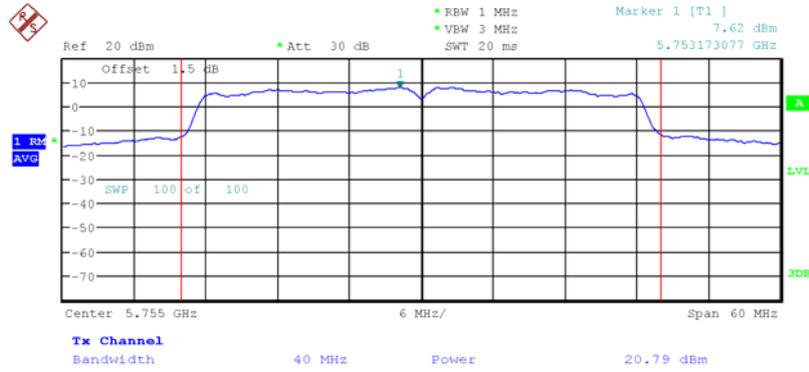
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Conducted Output Power Plot on Configuration IEEE 802.11n MCS0 20MHz Ant. 3 / 5825 MHz



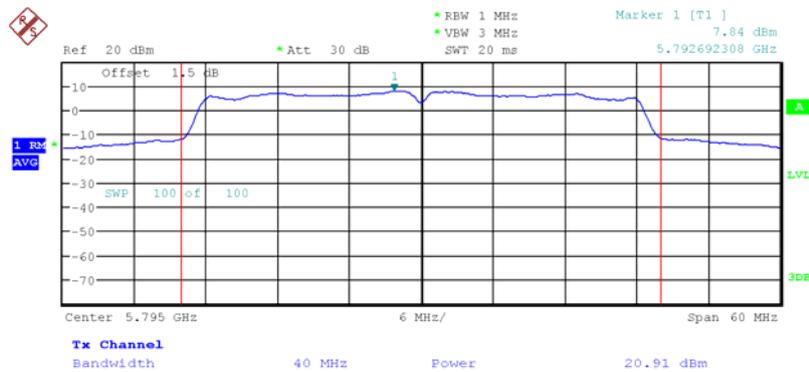
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Conducted Output Power Plot on Configuration IEEE 802.11n MCS0 40MHz Ant. 1 / 5755 MHz



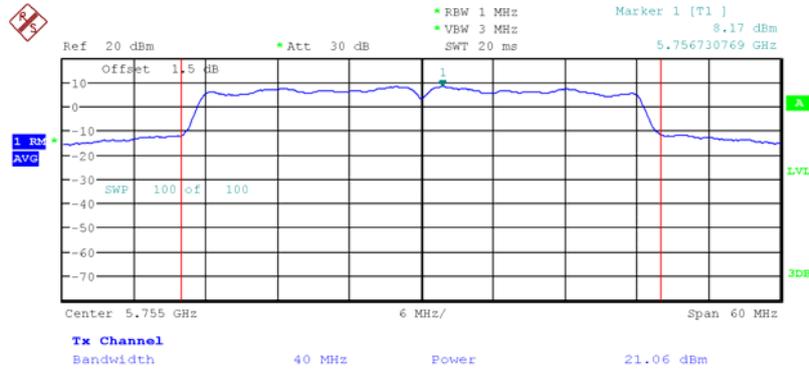
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Conducted Output Power Plot on Configuration IEEE 802.11n MCS0 40MHz Ant. 1 / 5795 MHz



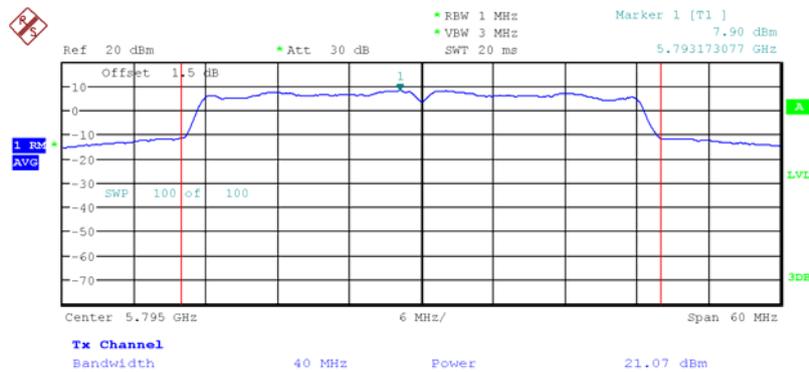
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Conducted Output Power Plot on Configuration IEEE 802.11n MCS0 40MHz Ant. 2 / 5755 MHz



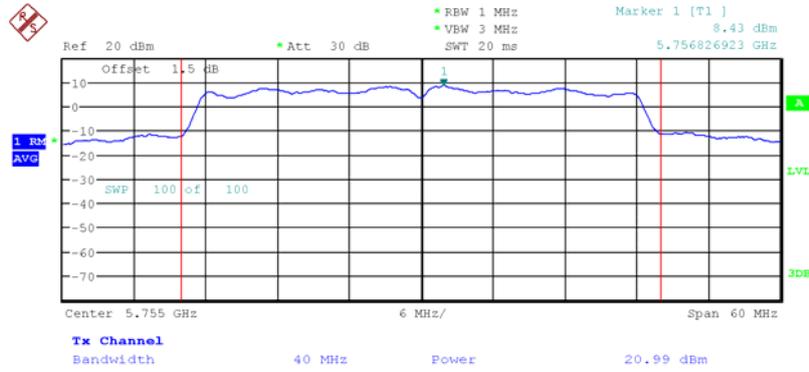
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Conducted Output Power Plot on Configuration IEEE 802.11n MCS0 40MHz Ant. 2 / 5795 MHz



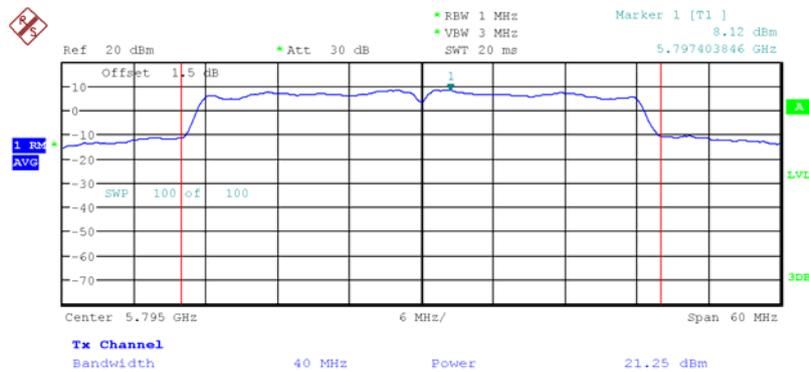
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Conducted Output Power Plot on Configuration IEEE 802.11n MCS0 40MHz Ant. 3 / 5755 MHz



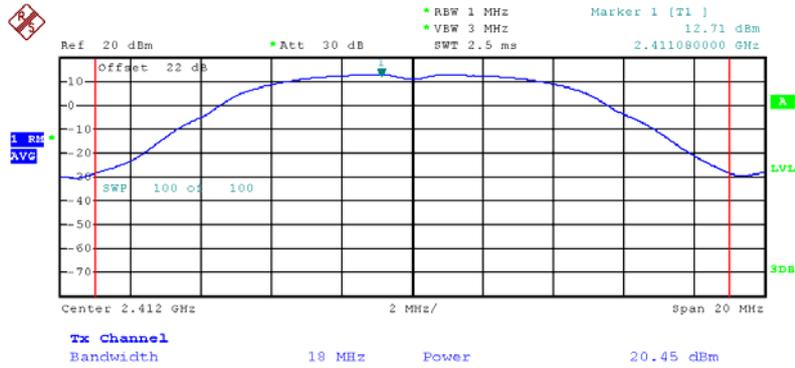
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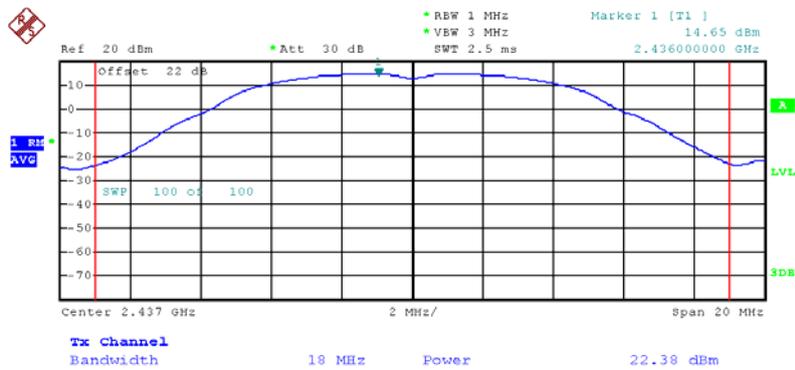
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Conducted Output Power Plot on Configuration IEEE 802.11b Ant. 1 / 2412 MHz



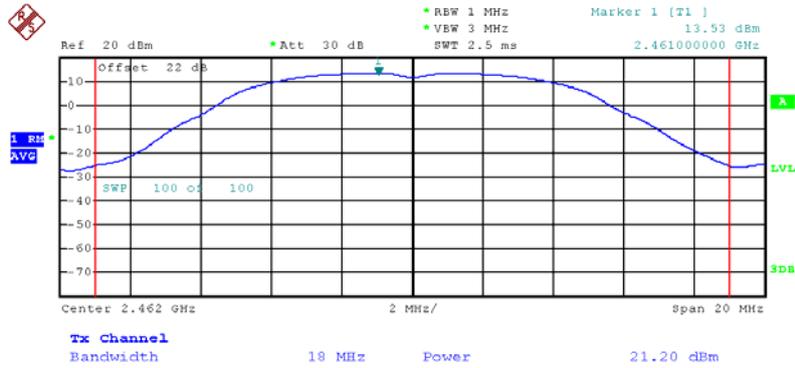
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Conducted Output Power Plot on Configuration IEEE 802.11b Ant. 1 / 2437 MHz



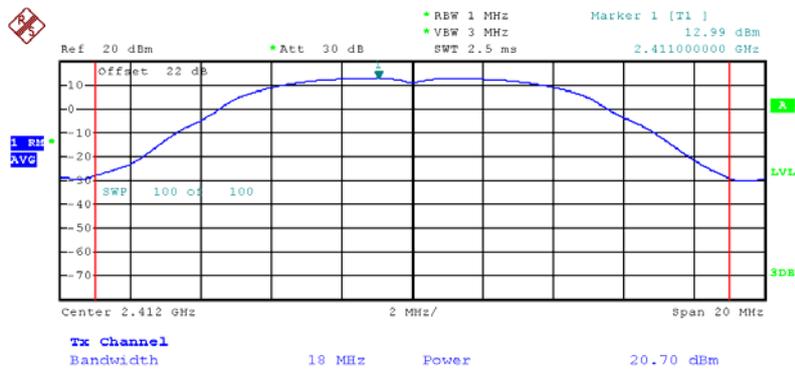
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Conducted Output Power Plot on Configuration IEEE 802.11b Ant. 1 / 2462 MHz



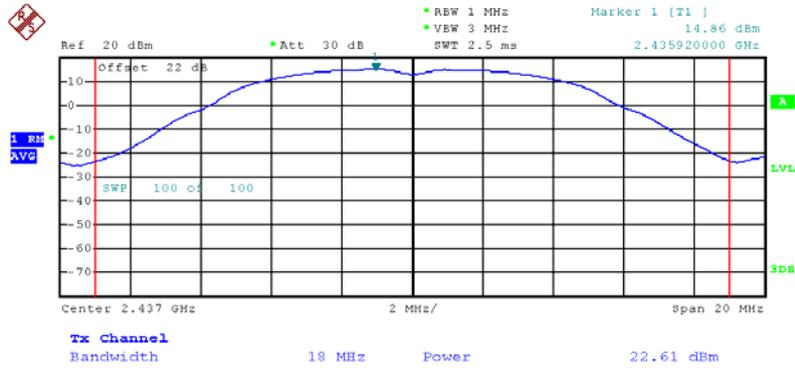
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Conducted Output Power Plot on Configuration IEEE 802.11b Ant. 2 / 2412 MHz



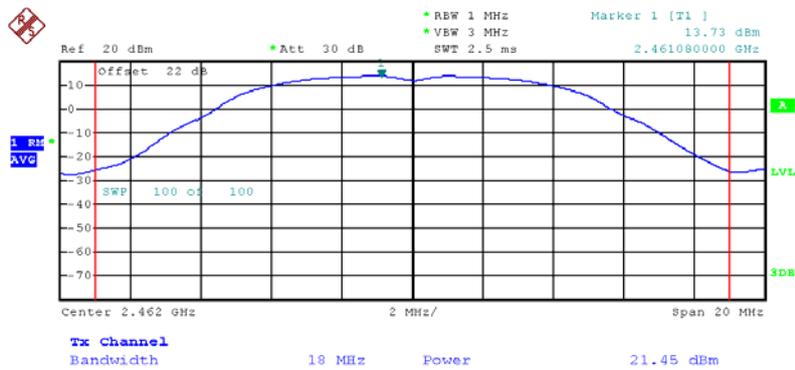
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Conducted Output Power Plot on Configuration IEEE 802.11b Ant. 2 / 2437 MHz



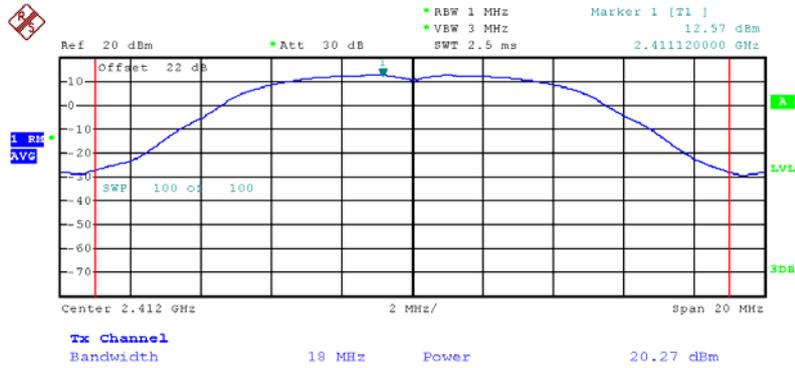
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Conducted Output Power Plot on Configuration IEEE 802.11b Ant. 2 / 2462 MHz



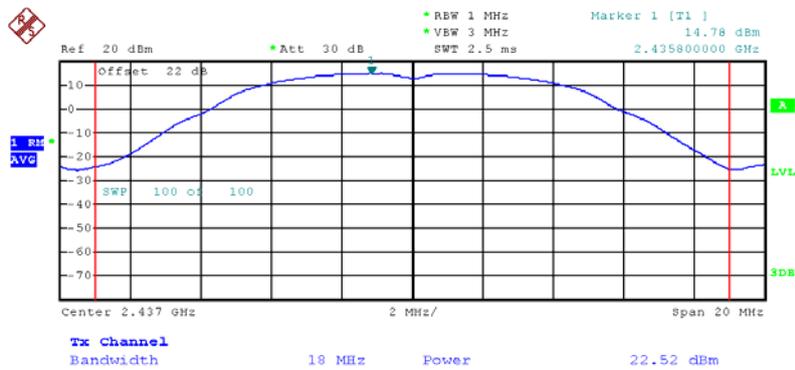
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Conducted Output Power Plot on Configuration IEEE 802.11b Ant. 3 / 2412 MHz



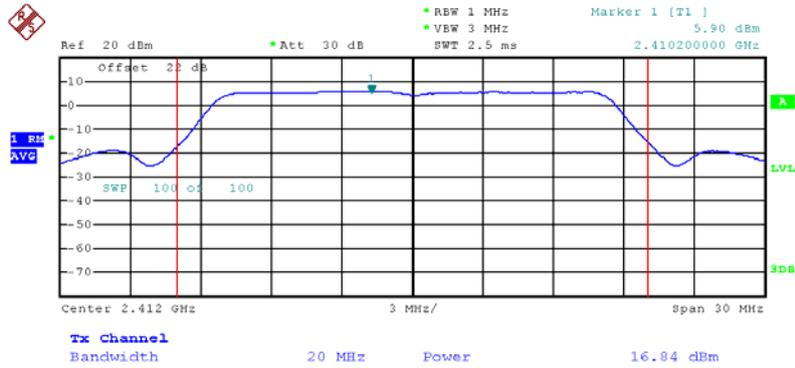
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Conducted Output Power Plot on Configuration IEEE 802.11b Ant. 3 / 2437 MHz



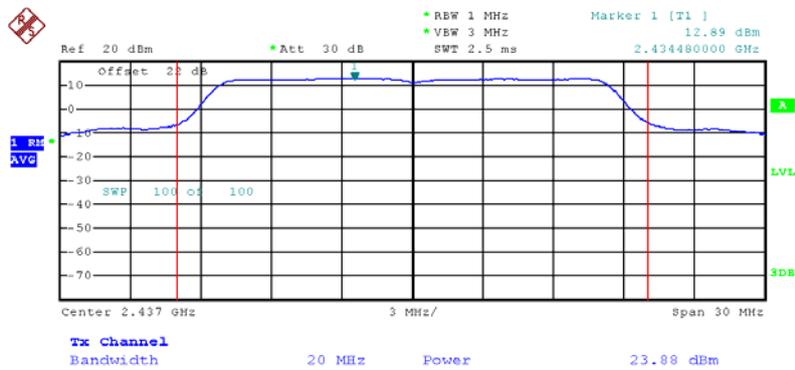
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Conducted Output Power Plot on Configuration IEEE 802.11g Ant. 1 / 2412 MHz



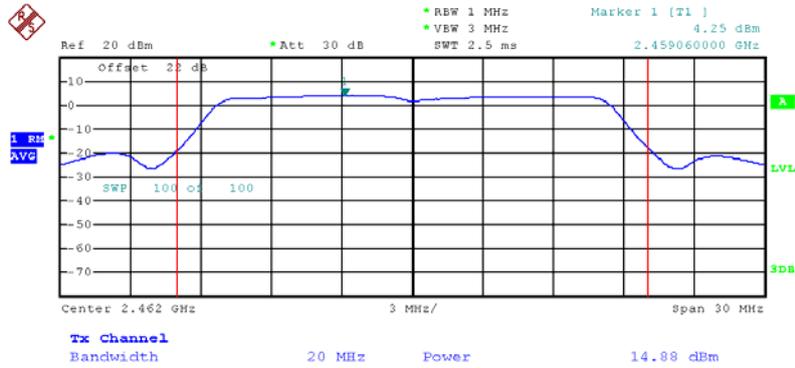
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Conducted Output Power Plot on Configuration IEEE 802.11g Ant. 1 / 2437 MHz



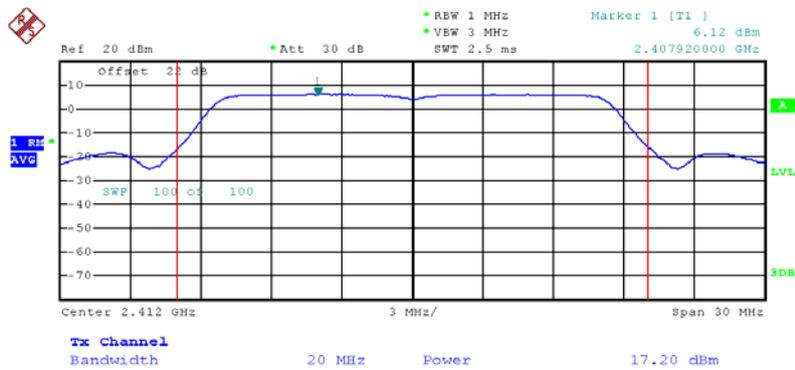
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Conducted Output Power Plot on Configuration IEEE 802.11g Ant. 1 / 2462 MHz



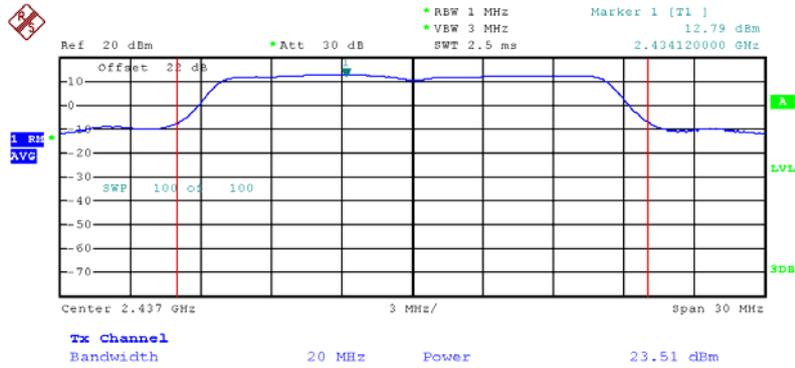
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Conducted Output Power Plot on Configuration IEEE 802.11g Ant. 2 / 2412 MHz



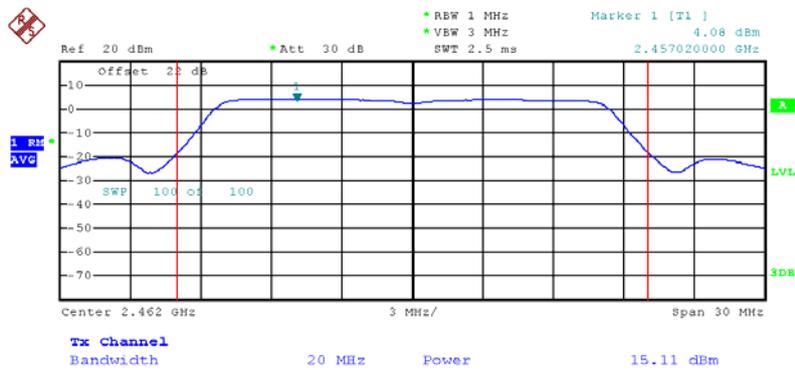
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Conducted Output Power Plot on Configuration IEEE 802.11g Ant. 2 / 2437 MHz



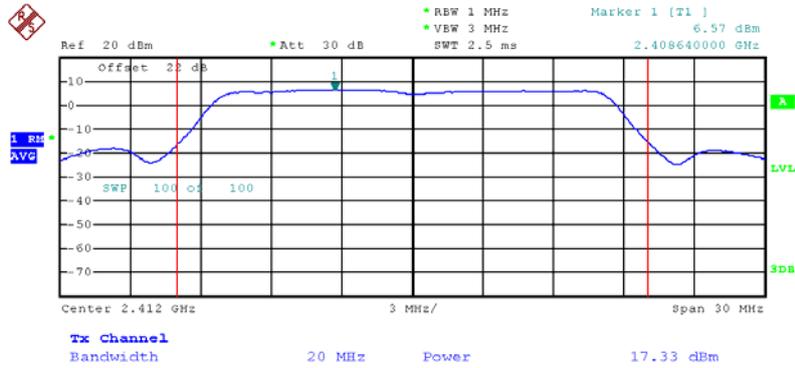
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Conducted Output Power Plot on Configuration IEEE 802.11g Ant. 2 / 2462 MHz



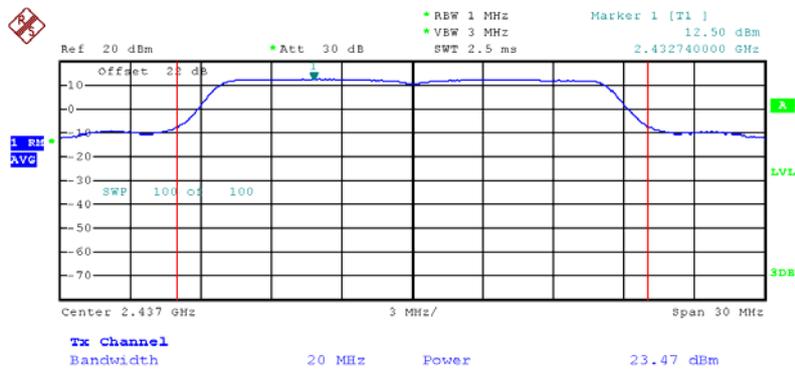
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Conducted Output Power Plot on Configuration IEEE 802.11g Ant. 3 / 2412 MHz



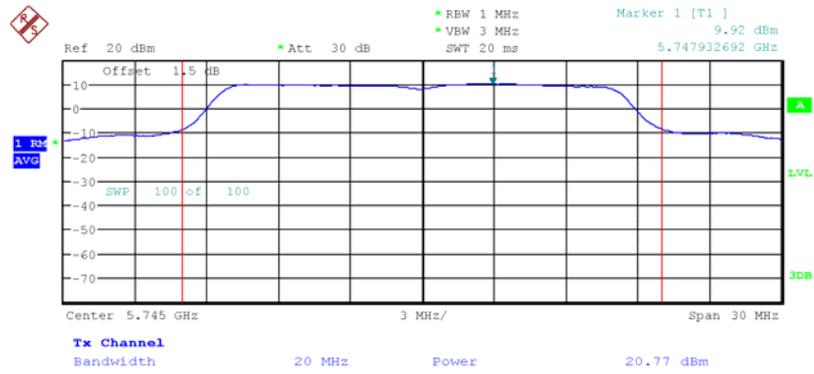
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Conducted Output Power Plot on Configuration IEEE 802.11g Ant. 3 / 2437 MHz



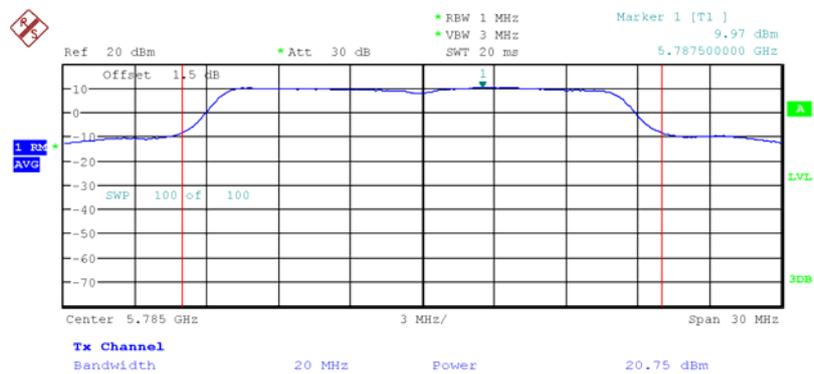
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Conducted Output Power Plot on Configuration IEEE 802.11a Ant. 1 / 5745 MHz



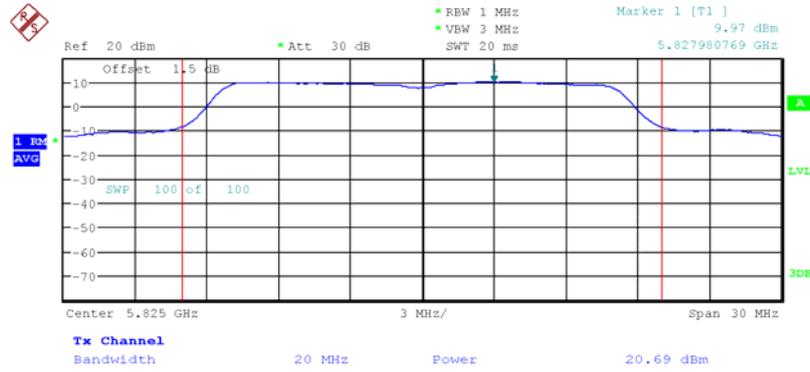
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Conducted Output Power Plot on Configuration IEEE 802.11a Ant. 1 / 5785 MHz



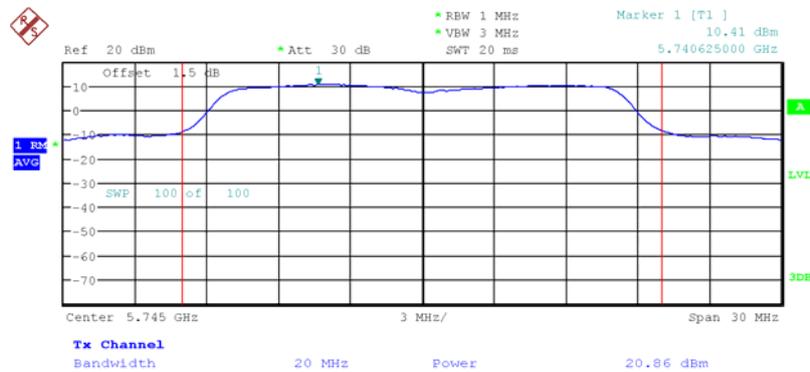
Date: 8.OCT.2012 18:00:35

Conducted Output Power Plot on Configuration IEEE 802.11a Ant. 1 / 5825 MHz



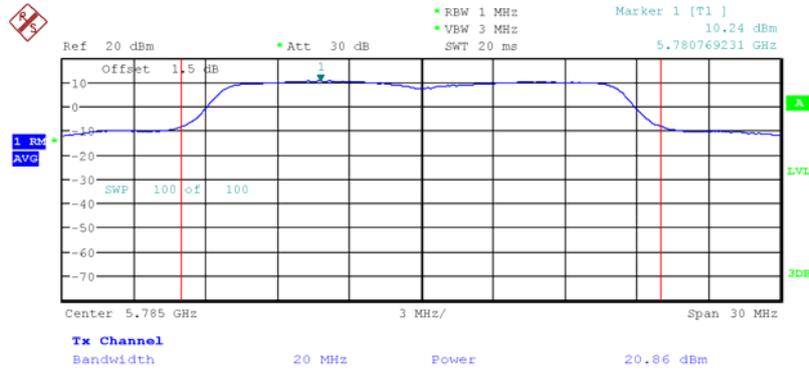
Date: 8.OCT.2012 18:01:27

Conducted Output Power Plot on Configuration IEEE 802.11a Ant. 2 / 5745 MHz



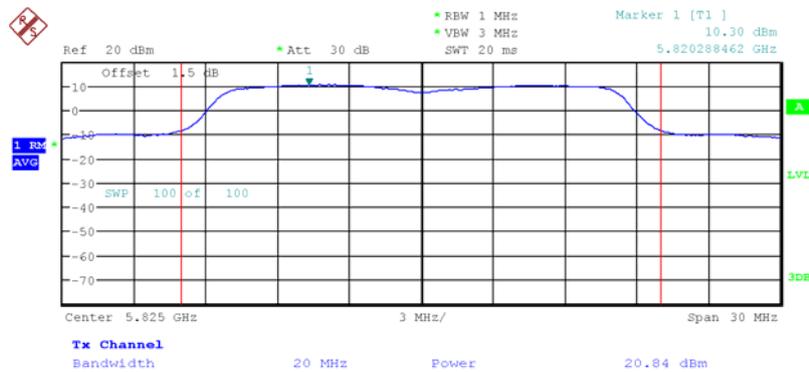
Date: 8.OCT.2012 17:55:27

Conducted Output Power Plot on Configuration IEEE 802.11a Ant. 2 / 5785 MHz



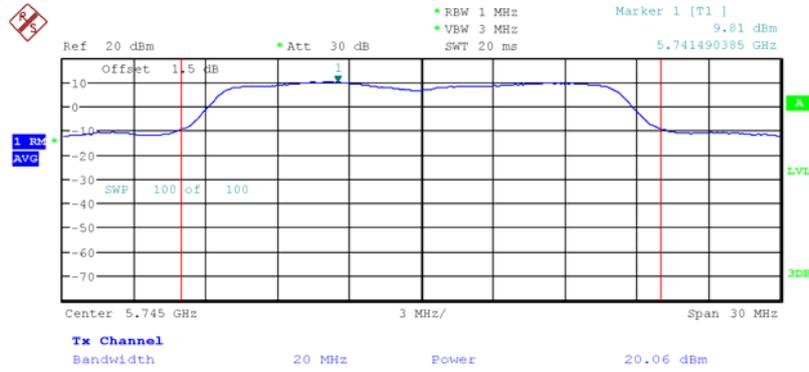
Date: 8.OCT.2012 17:59:30

Conducted Output Power Plot on Configuration IEEE 802.11a Ant. 2 / 5825 MHz



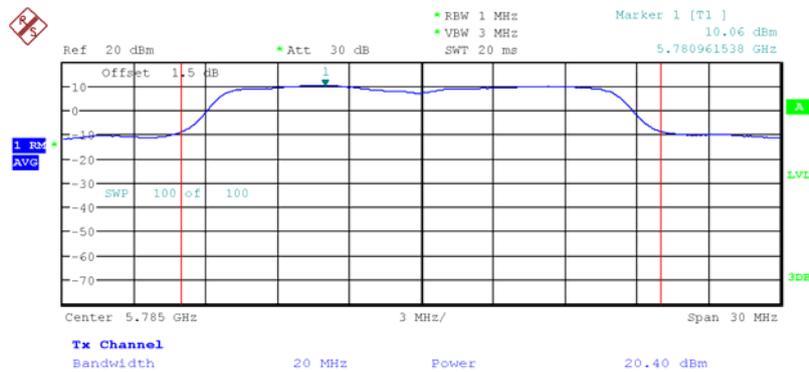
Date: 8.OCT.2012 18:02:20

Conducted Output Power Plot on Configuration IEEE 802.11a Ant. 3 / 5745 MHz



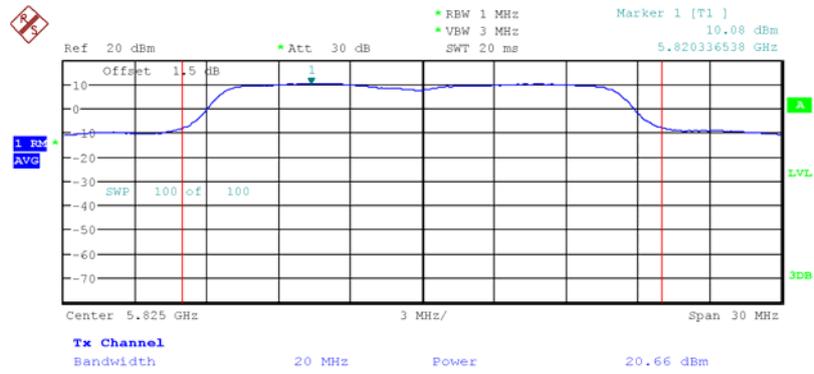
Date: 8.OCT.2012 17:57:06

Conducted Output Power Plot on Configuration IEEE 802.11a Ant. 3 / 5785 MHz



Date: 8.OCT.2012 17:58:25

Conducted Output Power Plot on Configuration IEEE 802.11a Ant. 3 / 5825 MHz



Date: 8.OCT.2012 18:03:09

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

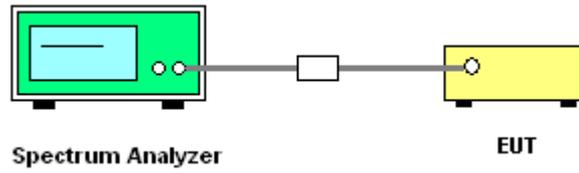
Please refer to section 5 of equipments list in this report. The following table is the setting of spectrum analyzer.

Spectrum Parameter	Setting
Attenuation	Auto
Span Frequency	Set the analyzer span to 5-30% greater than the EBW.
RB	100 kHz
VB	300 kHz
Detector	RMS
Trace	Single Sweep
Sweep Time	$\geq 10 \times (\text{number of measurement points in sweep}) \times (\text{transmission symbol period})$.

4.3.3. Test Procedures

1. Test was performed in accordance with KDB 558074 Guidance for Performing Compliance Measurements on Digital Transmission Systems (DTS) Operating Under §15.247 section 5.3.2 Multiple antenna systems was performed in accordance with KDB 662911 in-Band Power Spectral Density (PSD) Measurements(2) Measure and add $10 \log(N)$ dB (as described in the preceding section).
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 100 kHz band segment within the fundamental EBW.
5. Scale the observed power level to an equivalent level in 3 kHz by adjusting (reducing) the measured power by a bandwidth correction factor (BWCF) where: $\text{BWCF} = 10 \log(3 \text{ kHz}/100 \text{ kHz} = -15.2 \text{ dB})$.
6. 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	25°C	Humidity	56%
Test Engineer	Denis Su	Configurations	IEEE 802.11n

For 2.4GHz Band

Configuration IEEE 802.11n MCS0 20MHz

Channel	Frequency	Power Density	Power Density	Power Density	BWCF factor (100kHz to 3kHz)	Power Density	Power Density	Power Density	Single Port Limit (dBm/3kHz)	Result
		(dBm/100kHz)	(dBm/100kHz)	(dBm/100kHz)		(dBm/3kHz)	(dBm/3kHz)	(dBm/3kHz)		
		ANT-1	ANT-2	ANT-3						
1	2412 MHz	-4.21	-5.37	-4.73	-15.23	-19.44	-20.60	-19.96	3.23	Complies
6	2437 MHz	1.52	0.14	1.31	-15.23	-13.71	-15.09	-13.92	3.23	Complies
11	2462 MHz	-8.68	-10.63	-9.94	-15.23	-23.91	-25.86	-25.17	3.23	Complies

 Note: power density limit = $8 - (10 * \text{LOG}(3)) = 3.23 \text{ dBm}$

Configuration IEEE 802.11n MCS0 40MHz

Channel	Frequency	Power Density	Power Density	Power Density	BWCF factor (100kHz to 3kHz)	Power Density	Power Density	Power Density	Single Port Limit (dBm/3kHz)	Result
		(dBm/100kHz)	(dBm/100kHz)	(dBm/100kHz)		(dBm/3kHz)	(dBm/3kHz)	(dBm/3kHz)		
		ANT-1	ANT-2	ANT-3						
3	2422 MHz	-8.59	-11.00	-10.16	-15.23	-23.82	-26.23	-25.39	3.23	Complies
6	2437 MHz	-5.35	-7.90	-6.97	-15.23	-20.58	-23.13	-22.20	3.23	Complies
9	2452 MHz	-10.61	-13.14	-12.45	-15.23	-25.84	-28.37	-27.68	3.23	Complies

 Note: power density limit = $8 - (10 * \text{LOG}(3)) = 3.23 \text{ dBm}$

Temperature	25°C	Humidity	56%
Test Engineer	Denis Su	Configurations	IEEE 802.11n

For 5GHz Band

Configuration IEEE 802.11n MCS0 20MHz

Channel	Frequency	Power Density	Power Density	Power Density	BWCF factor (100kHz to 3kHz)	Power Density	Power Density	Power Density	Single Port Limit (dBm/3kHz)	Result
		(dBm/100kHz)	(dBm/100kHz)	(dBm/100kHz)		(dBm/3kHz)	(dBm/3kHz)	(dBm/3kHz)		
149	5745 MHz	-0.88	-0.56	-0.03	-15.23	-16.11	-15.79	-15.26	3.23	Complies
157	5785 MHz	-0.83	-0.61	-0.62	-15.23	-16.06	-15.84	-15.85	3.23	Complies
165	5825 MHz	-0.36	-0.04	0.01	-15.23	-15.59	-15.27	-15.22	3.23	Complies

Note: power density limit = $8 - (10 * \text{LOG}(3)) = 3.23 \text{ dBm}$

Configuration IEEE 802.11n MCS0 40MHz

Channel	Frequency	Power Density	Power Density	Power Density	BWCF factor (100kHz to 3kHz)	Power Density	Power Density	Power Density	Single Port Limit (dBm/3kHz)	Result
		(dBm/100kHz)	(dBm/100kHz)	(dBm/100kHz)		(dBm/3kHz)	(dBm/3kHz)	(dBm/3kHz)		
151	5755 MHz	-2.88	-2.46	-1.84	-15.23	-18.11	-17.69	-17.07	3.23	Complies
159	5795 MHz	-2.84	-2.20	-2.18	-15.23	-18.07	-17.43	-17.41	3.23	Complies

Note: power density limit = $8 - (10 * \text{LOG}(3)) = 3.23 \text{ dBm}$

Temperature	25°C	Humidity	56%
Test Engineer	Denis Su	Configurations	IEEE 802.11a/b/g

Configuration IEEE 802.11b

Channel	Frequency	Power Density	Power Density	Power Density	BWCF factor (100KHz to 3KHz)	Power Density	Power Density	Power Density	Single Port Limit (dBm/3kHz)	Result
		(dBm/100kHz)	(dBm/100kHz)	(dBm/100kHz)		(dBm/3kHz)	(dBm/3kHz)	(dBm/3kHz)		
1	2412 MHz	3.80	1.67	2.93	-15.23	-11.43	-13.56	-12.30	3.23	Complies
6	2437 MHz	4.65	2.51	4.20	-15.23	-10.58	-12.72	-11.03	3.23	Complies
11	2462 MHz	3.43	1.31	3.00	-15.23	-11.80	-13.92	-12.23	3.23	Complies

Note: Power density limit = $8-(10*\text{LOG}(3))=3.23\text{dBm}$

Configuration IEEE 802.11g

Channel	Frequency	Power Density	Power Density	Power Density	BWCF factor (100KHz to 3KHz)	Power Density	Power Density	Power Density	Single Port Limit (dBm/3kHz)	Result
		(dBm/100kHz)	(dBm/100kHz)	(dBm/100kHz)		(dBm/3kHz)	(dBm/3kHz)	(dBm/3kHz)		
1	2412 MHz	-3.89	-5.38	-4.45	-15.23	-19.12	-20.61	-19.68	3.23	Complies
6	2437 MHz	1.51	-0.06	1.16	-15.23	-13.72	-15.29	-14.07	3.23	Complies
11	2462 MHz	-7.57	-9.55	-8.32	-15.23	-22.80	-24.78	-23.55	3.23	Complies

Note: Power density limit = $8-(10*\text{LOG}(3))=3.23\text{dBm}$

Configuration IEEE 802.11a

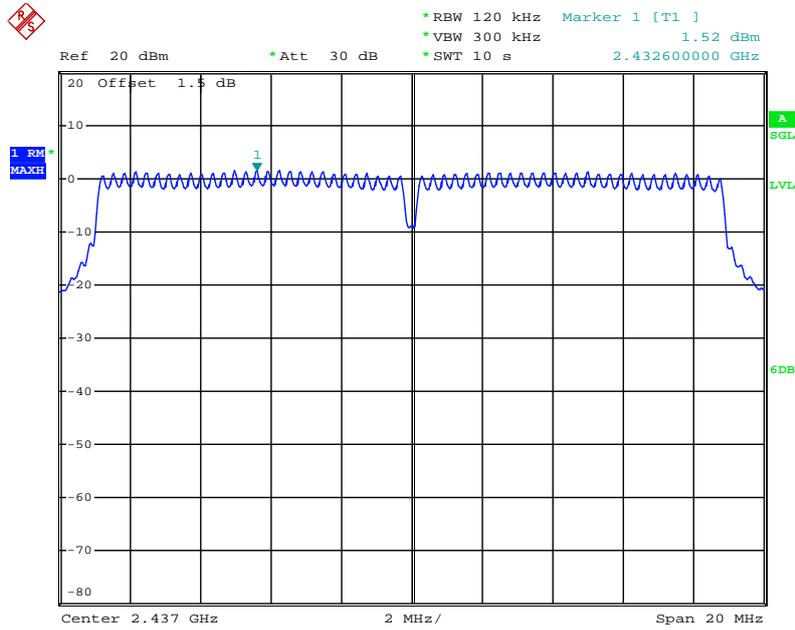
Channel	Frequency	Power Density	Power Density	Power Density	BWCF factor (100KHz to 3KHz)	Power Density	Power Density	Power Density	Single Port Limit (dBm/3kHz)	Result
		(dBm/100kHz)	(dBm/100kHz)	(dBm/100kHz)		(dBm/3kHz)	(dBm/3kHz)	(dBm/3kHz)		
149	5745 MHz	0.19	0.29	1.10	-15.23	-15.04	-14.94	-14.13	3.23	Complies
157	5785 MHz	0.10	0.38	0.95	-15.23	-15.13	-14.85	-14.28	3.23	Complies
165	5825 MHz	0.53	0.58	0.74	-15.23	-14.70	-14.65	-14.49	3.23	Complies

Note: power density limit = $8-(10*\text{LOG}(3))=3.23\text{dBm}$

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

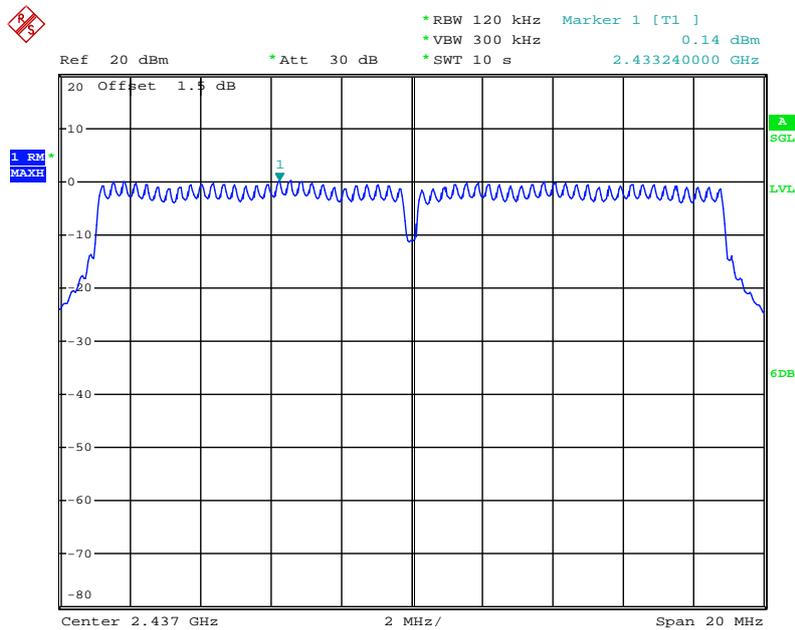
For plots, only the channel with maximum results was shown.

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



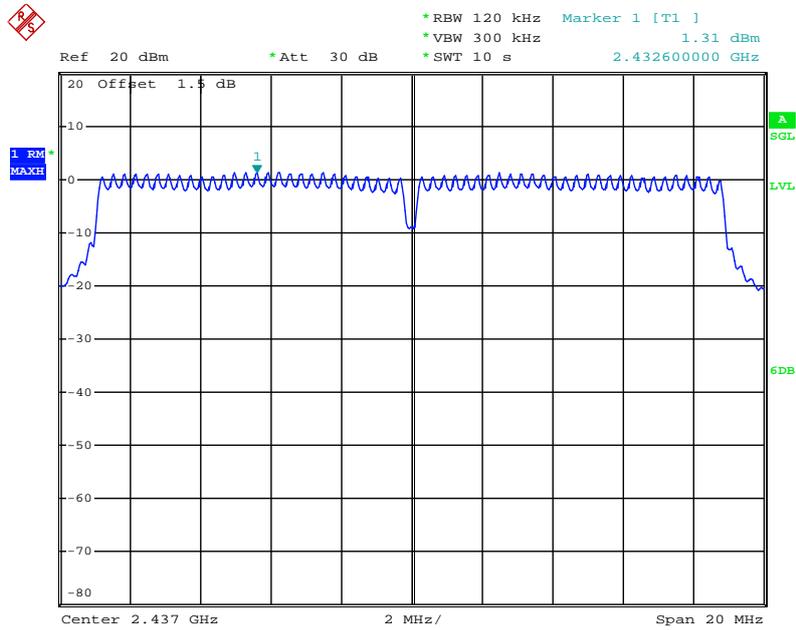
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Power Density Plot on Configuration IEEE 802.11n MCS0 20MHz / Ant. 2 / 2437 MHz



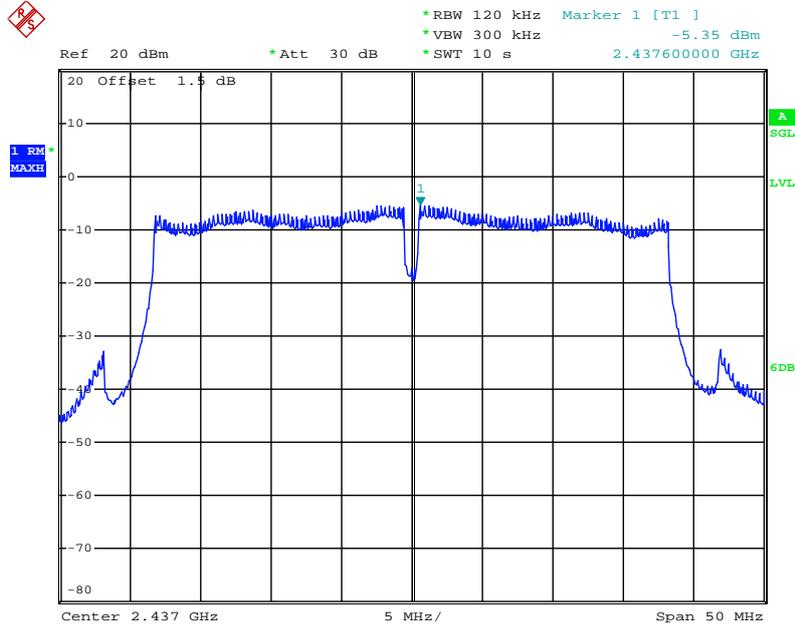
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Power Density Plot on Configuration IEEE 802.11n MCS0 20MHz / Ant. 3 / 2437 MHz



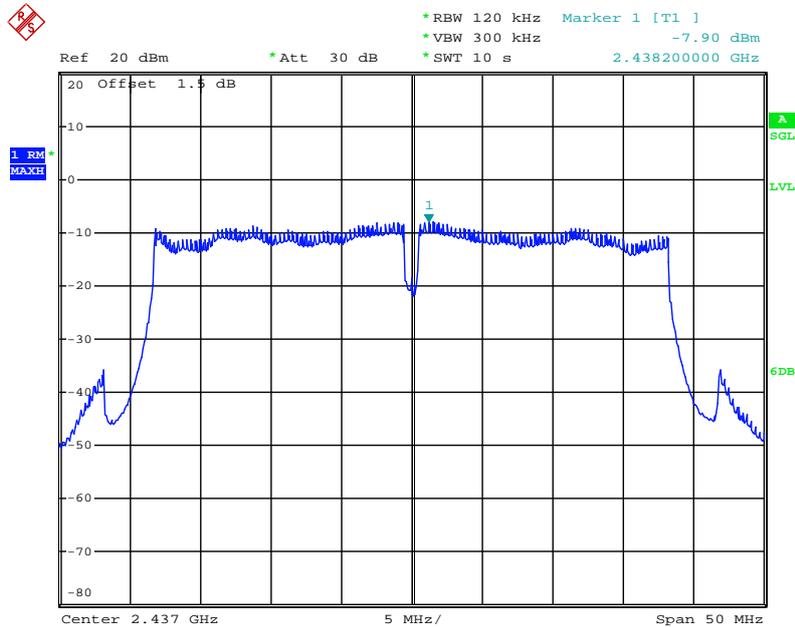
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Power Density Plot on Configuration IEEE 802.11n MCS0 40MHz / Ant. 1 / 2437 MHz



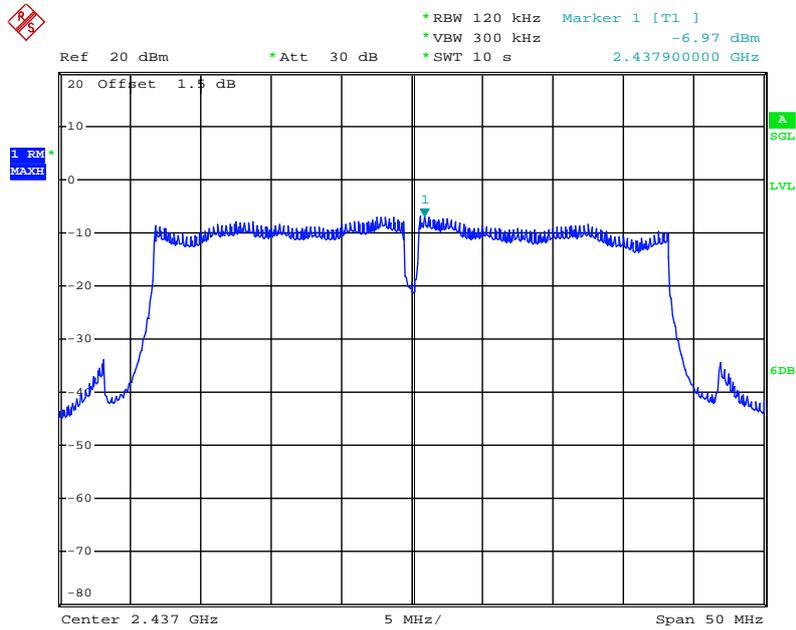
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Power Density Plot on Configuration IEEE 802.11n MCS0 40MHz / Ant. 2 / 2437 MHz



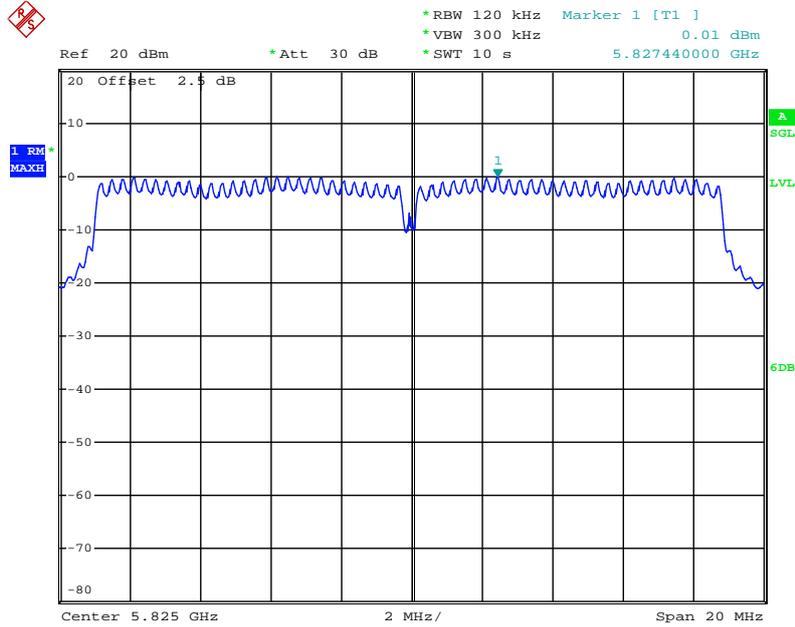
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Power Density Plot on Configuration IEEE 802.11n MCS0 40MHz / Ant. 3 / 2437 MHz



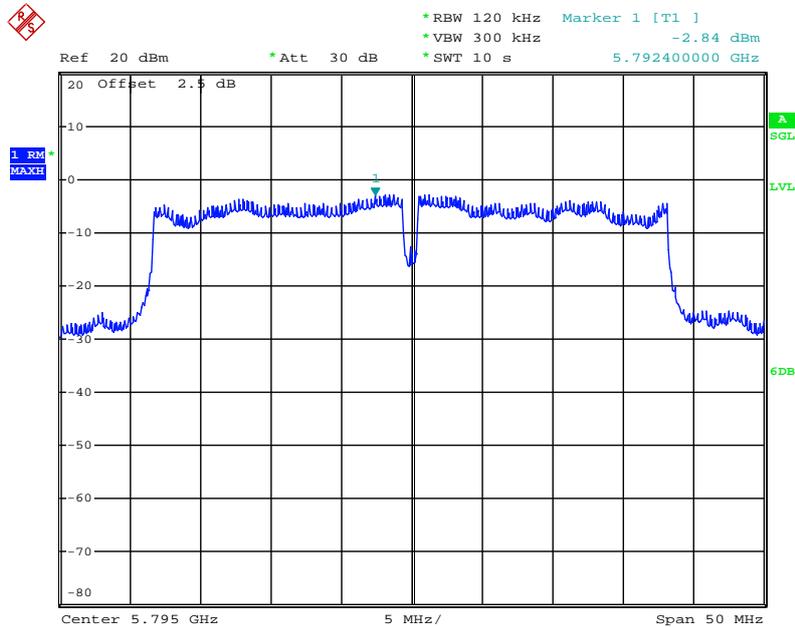
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Power Density Plot on Configuration IEEE 802.11n MCS0 20MHz / Ant. 3 / 5825 MHz



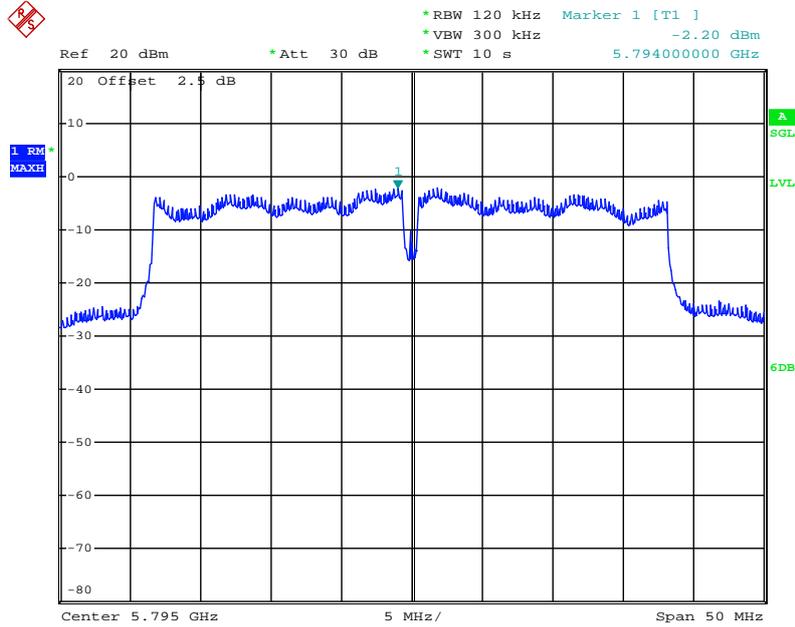
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Power Density Plot on Configuration IEEE 802.11n MCS0 40MHz / Ant. 1 / 5795 MHz



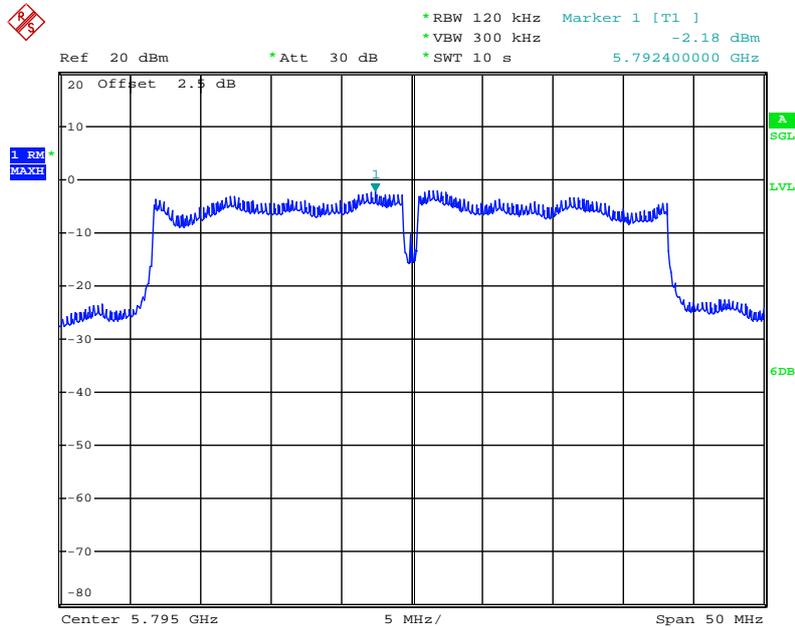
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Power Density Plot on Configuration IEEE 802.11n MCS0 40MHz / Ant. 2 / 5795 MHz



Date: 1.OCT.2012 20:39:51

Power Density Plot on Configuration IEEE 802.11n MCS0 40MHz / Ant. 3 / 5795 MHz



Date: 1.OCT.2012 20:40:29

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



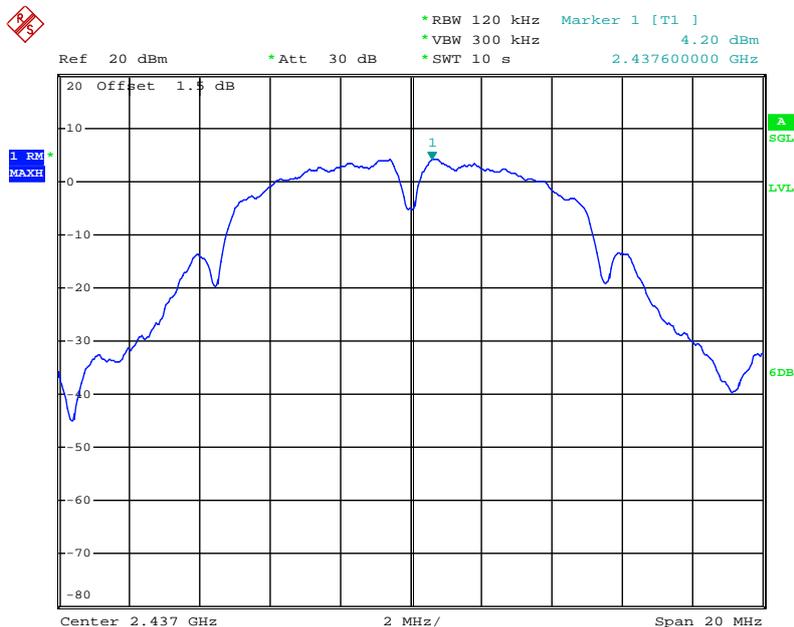
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Power Density Plot on Configuration IEEE 802.11b / Ant. 2 / 2437 MHz



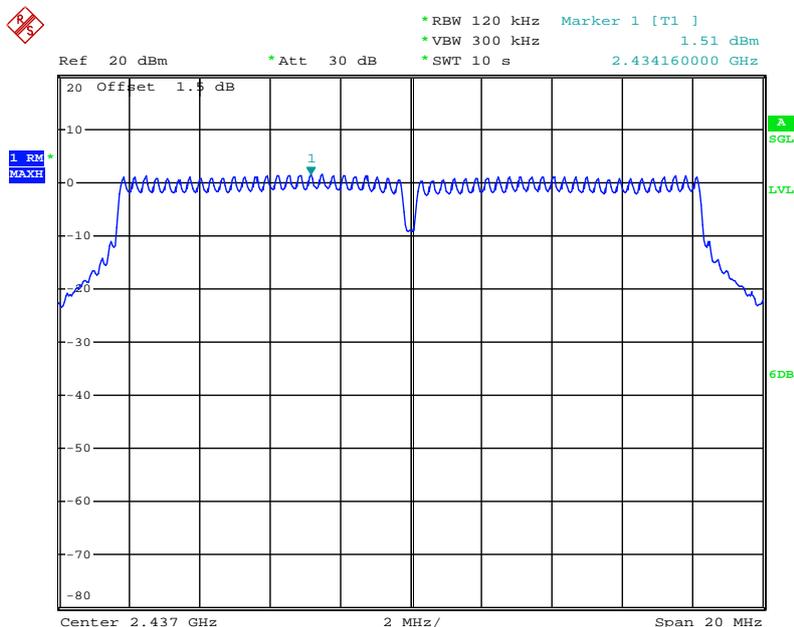
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Power Density Plot on Configuration IEEE 802.11b / Ant. 3 / 2437 MHz



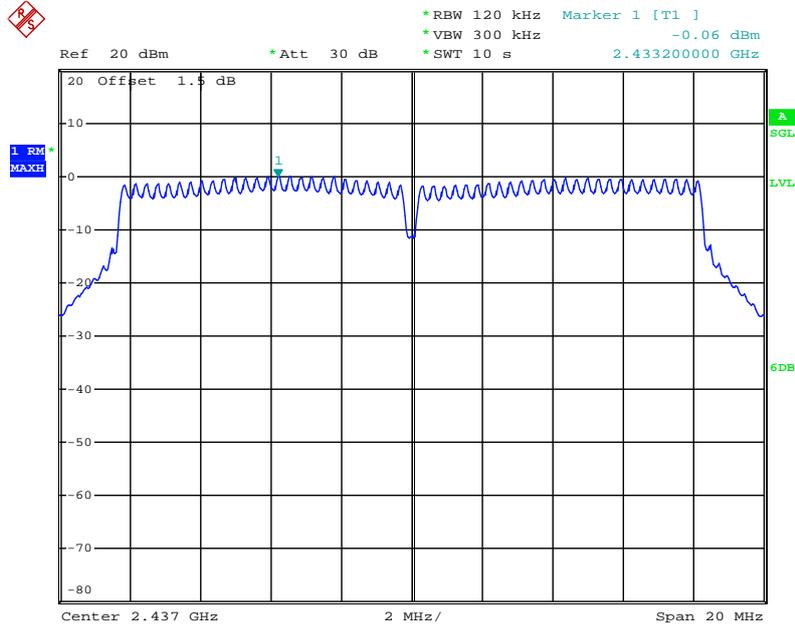
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Power Density Plot on Configuration IEEE 802.11g / Ant. 1 / 2437 MHz



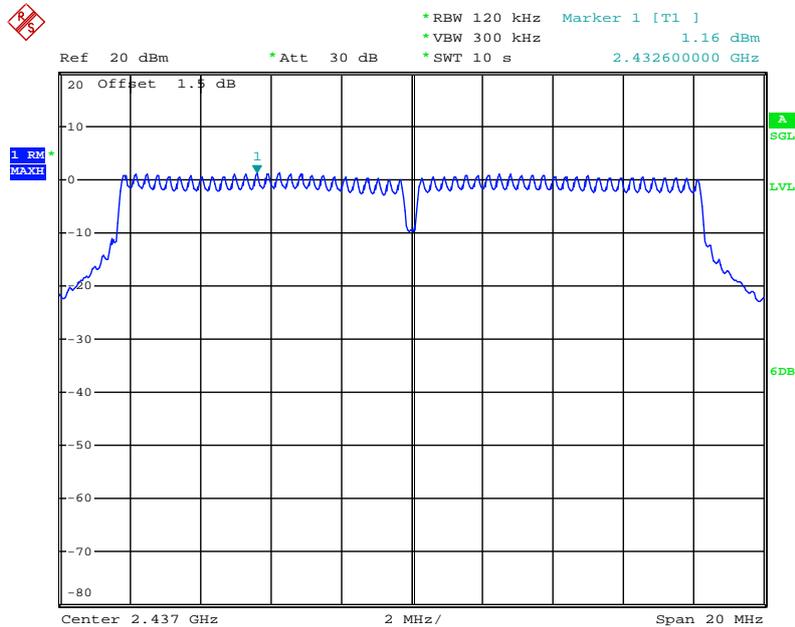
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Power Density Plot on Configuration IEEE 802.11g / Ant. 2 / 2437 MHz



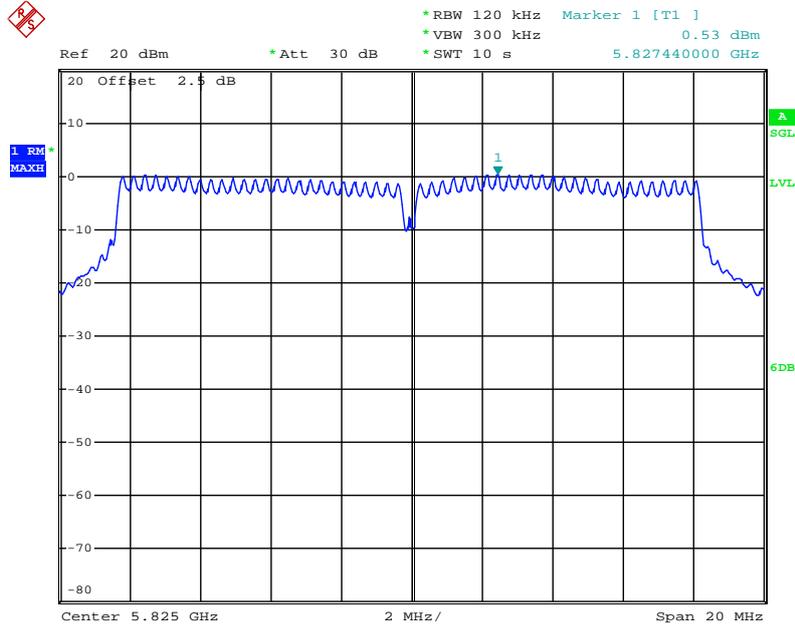
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Power Density Plot on Configuration IEEE 802.11g / Ant. 3 / 2437 MHz



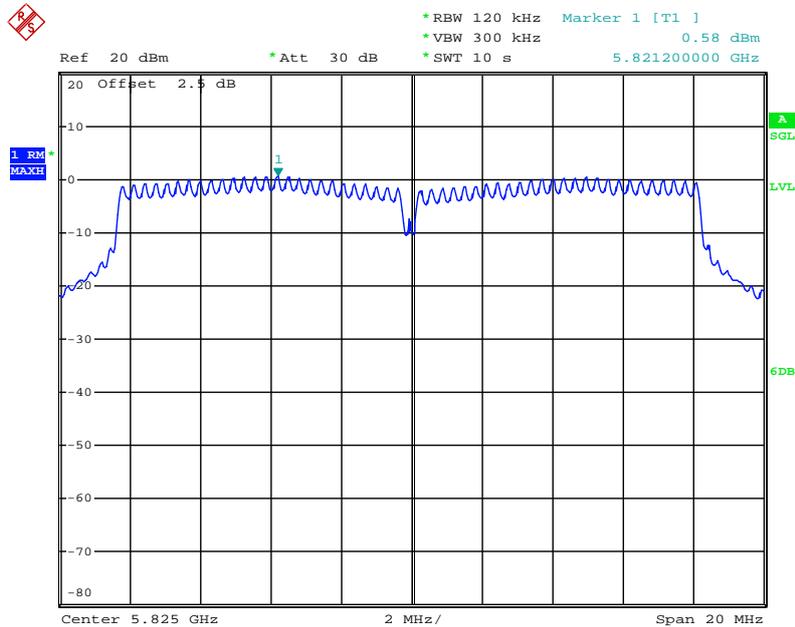
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Power Density Plot on Configuration IEEE 802.11a / Ant. 1 / 5825 MHz



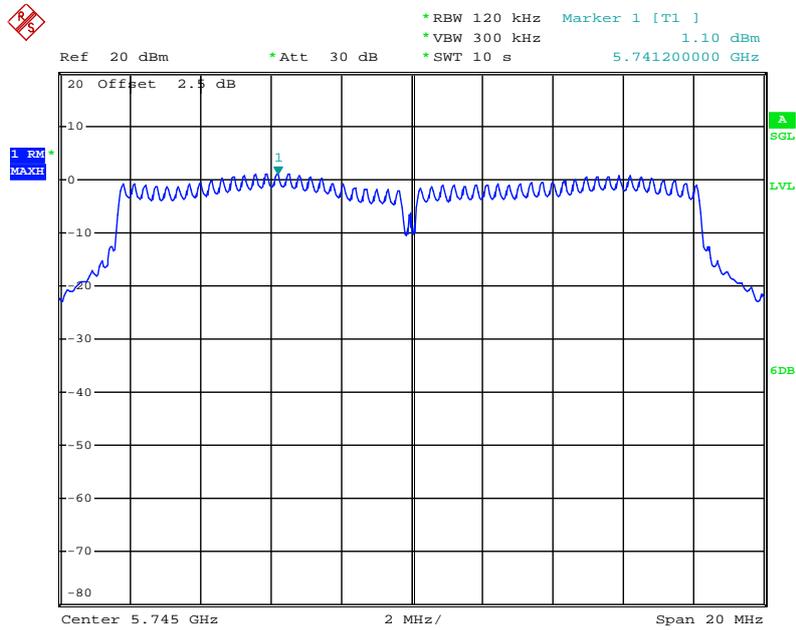
Date: 1.OCT.2012 20:22:48

Power Density Plot on Configuration IEEE 802.11a / Ant. 2 / 5825 MHz



Date: 1.OCT.2012 20:23:45

Power Density Plot on Configuration IEEE 802.11a / Ant. 3 / 5745 MHz



Date: 1.OCT.2012 20:20:15

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

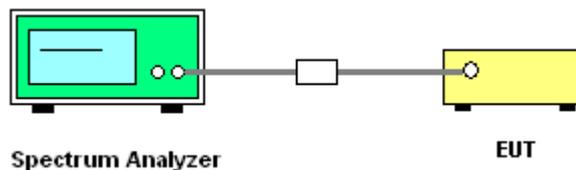
Please refer to section 5 of equipments list in this report. The following table is the setting of spectrum analyzer.

Spectrum Parameters	Setting
Attenuation	Auto
Span Frequency	> 6dB Bandwidth
RB	Set resolution bandwidth (RBW) = 1-5% or DTS BW, not to exceed 100 kHz.
VB	$\geq 3 \times \text{RBW}$
Detector	Peak
Trace	Max Hold
Sweep Time	Auto

4.4.3. Test Procedures

1. The transmitter output (antenna port) was connected to the spectrum analyzer in peak hold mode.
2. Test was performed in accordance with KDB 558074 Guidance for Performing Compliance Measurements on Digital Transmission Systems (DTS) Operating Under §15.247 section 5.1.1 EBW Measurement Procedure
3. Multiple antenna system was performed in accordance with KDB 662911 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



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	25°C	Humidity	56%
Test Engineer	Denis Su	Configurations	IEEE 802.11n

For 2.4GHz Band

Configuration IEEE 802.11n MCS0 20MHz / Ant. 1 + Ant. 2 + Ant. 3

Channel	Frequency	6dB Bandwidth (MHz)	99% Occupied BW (MHz)	Min. Limit (kHz)	Result
1	2412 MHz	15.12	17.20	500.00	Complies
6	2437 MHz	12.00	18.00	500.00	Complies
11	2462 MHz	15.44	17.28	500.00	Complies

Configuration IEEE 802.11n MCS0 40MHz / Ant. 1 + Ant. 2 + Ant. 3

Channel	Frequency	6dB Bandwidth (MHz)	99% Occupied BW (MHz)	Min. Limit (kHz)	Result
3	2422 MHz	31.20	35.40	500.00	Complies
6	2437 MHz	31.68	35.52	500.00	Complies
9	2452 MHz	31.20	35.40	500.00	Complies

For 5GHz Band

Configuration IEEE 802.11n MCS0 20MHz / Ant. 1 + Ant. 2 + Ant. 3

Channel	Frequency	6dB Bandwidth (MHz)	99% Occupied BW (MHz)	Min. Limit (kHz)	Result
149	5745 MHz	16.32	23.84	500.00	Complies
157	5785 MHz	16.32	23.76	500.00	Complies
165	5825 MHz	16.32	24.40	500.00	Complies

Configuration IEEE 802.11n MCS0 40MHz / Ant. 1 + Ant. 2 + Ant. 3

Channel	Frequency	6dB Bandwidth (MHz)	99% Occupied BW (MHz)	Min. Limit (kHz)	Result
151	5755 MHz	35.36	44.32	500.00	Complies
159	5795 MHz	36.32	47.52	500.00	Complies

Temperature	25°C	Humidity	56%
Test Engineer	Denis Su	Configurations	IEEE 802.11a/b/g

Configuration IEEE 802.11b / Ant. 1 + Ant. 2 + Ant. 3

Channel	Frequency	6dB Bandwidth (MHz)	99% Occupied BW (MHz)	Min. Limit (kHz)	Result
1	2412 MHz	8.08	10.08	500.00	Complies
6	2437 MHz	8.16	10.08	500.00	Complies
11	2462 MHz	8.08	10.08	500.00	Complies

Configuration IEEE 802.11g / Ant. 1 + Ant. 2 + Ant. 3

Channel	Frequency	6dB Bandwidth (MHz)	99% Occupied BW (MHz)	Min. Limit (kHz)	Result
1	2412 MHz	16.32	16.64	500.00	Complies
6	2437 MHz	11.28	19.20	500.00	Complies
11	2462 MHz	16.32	16.48	500.00	Complies

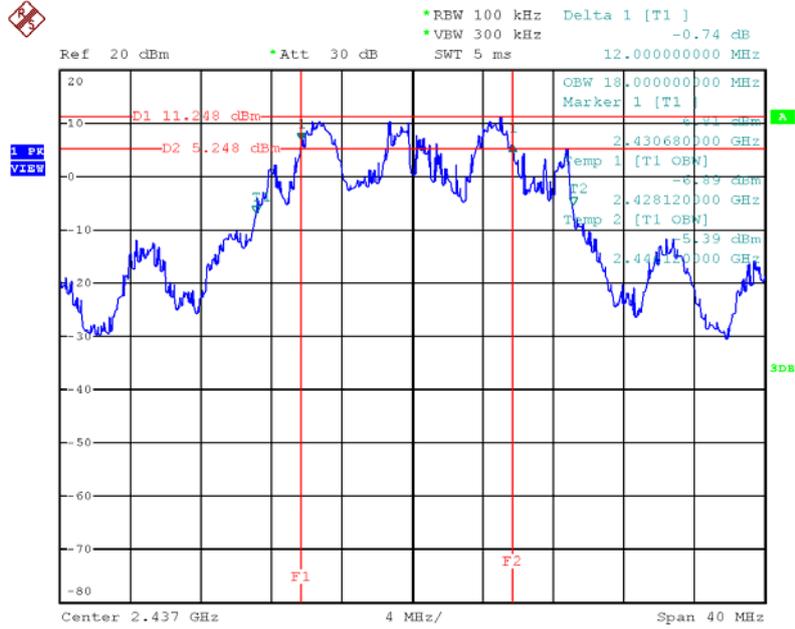
Configuration IEEE 802.11a / Ant. 1 + Ant. 2 + Ant. 3

Channel	Frequency	6dB Bandwidth (MHz)	99% Occupied BW (MHz)	Min. Limit (kHz)	Result
149	5745 MHz	14.48	22.00	500.00	Complies
157	5785 MHz	14.56	22.40	500.00	Complies
165	5825 MHz	14.48	22.72	500.00	Complies

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

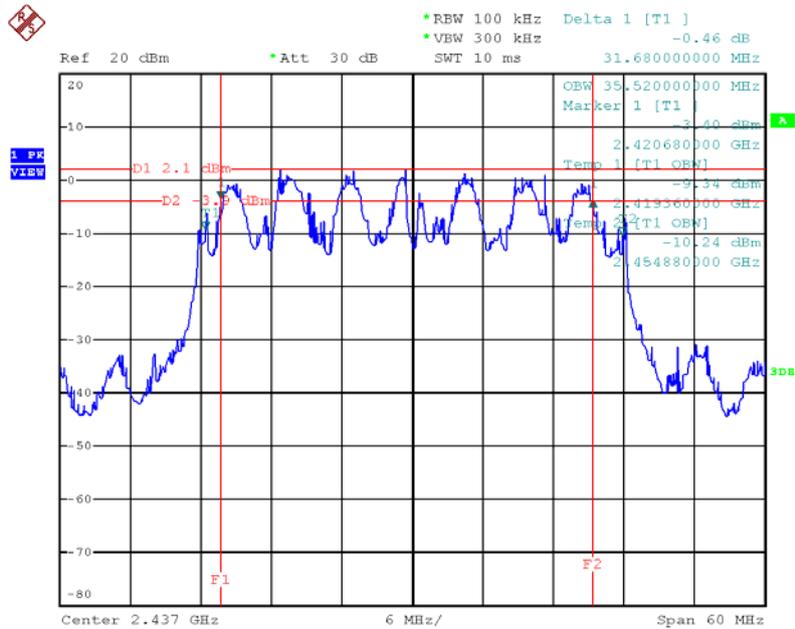
For plots, only the channel with maximum results was shown.

6 dB Bandwidth Plot on Configuration IEEE 802.11n MCS0 20MHz / Ant. 1 + Ant. 2+ Ant. 3 / 2437MHz



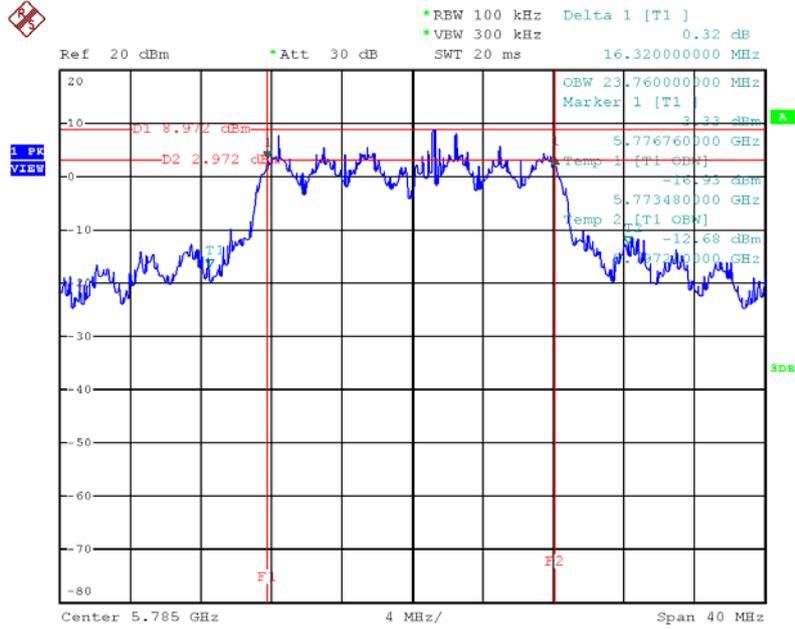
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6 dB Bandwidth Plot on Configuration IEEE 802.11n MCS0 40MHz / Ant. 1 + Ant. 2+ Ant. 3/ 2437 MHz



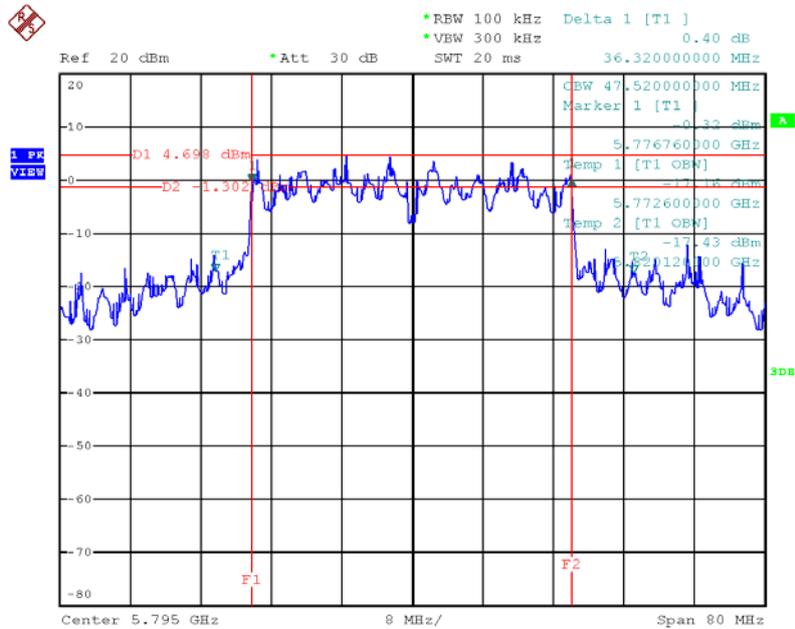
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6 dB Bandwidth Plot on Configuration IEEE 802.11n MCS0 20MHz / Ant. 1 + Ant. 2+ Ant. 3 / 5785 MHz



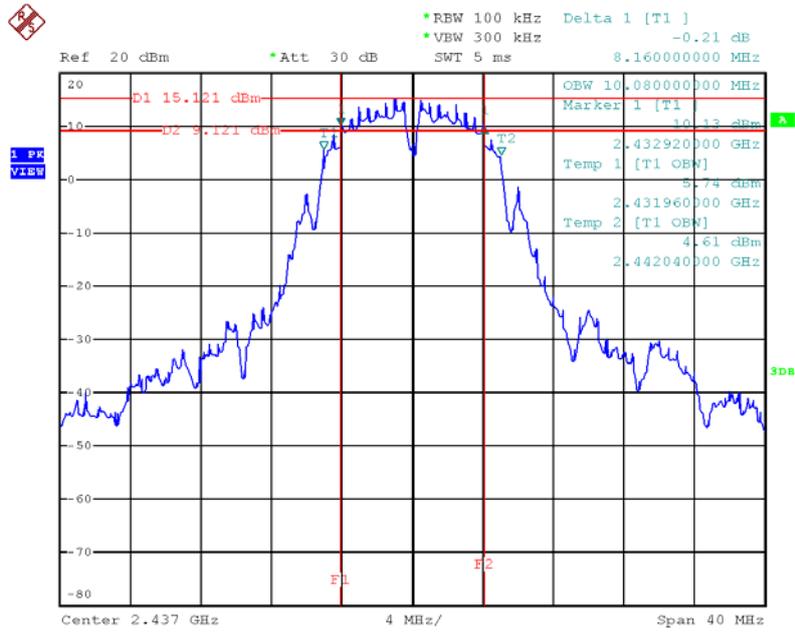
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6 dB Bandwidth Plot on Configuration IEEE 802.11n MCS0 40MHz / Ant. 1 + Ant. 2+ Ant. 3 / 5795 MHz



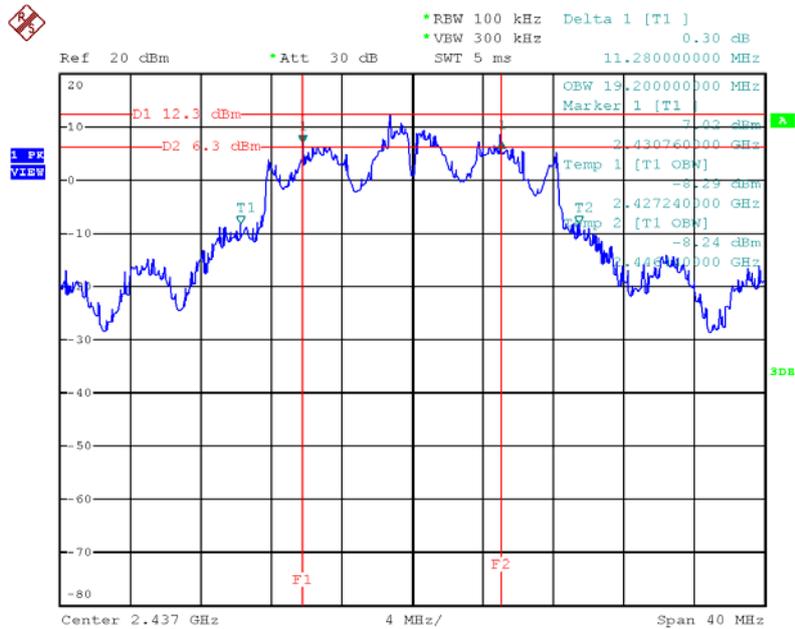
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6 dB Bandwidth Plot on Configuration IEEE 802.11b / Ant. 1 + Ant. 2 + Ant. 3 / 2437 MHz



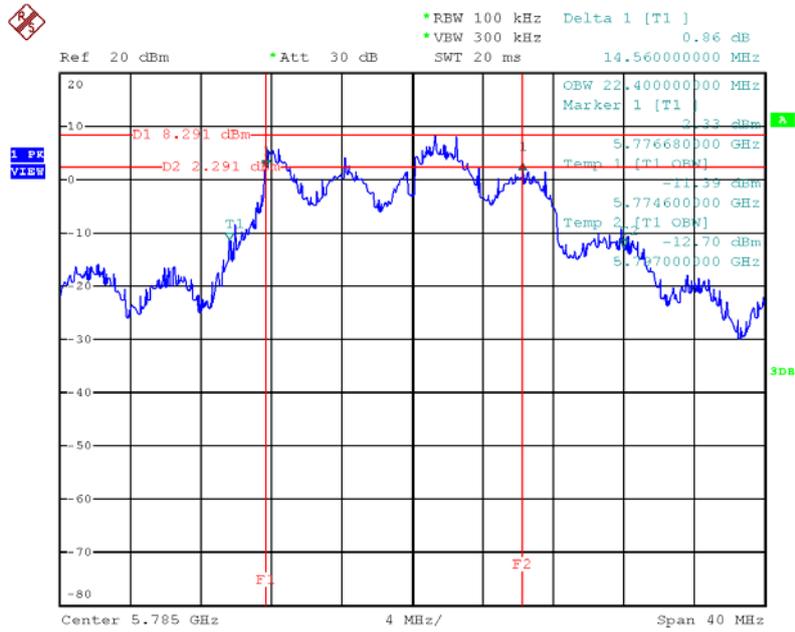
Date: 29.OCT.2012 10:51:38

6 dB Bandwidth Plot on Configuration IEEE 802.11g / Ant. 1 + Ant. 2 + Ant. 3 / 2437 MHz



Date: 29.OCT.2012 10:55:11

6 dB Bandwidth Plot on Configuration IEEE 802.11a / Ant. 1 + Ant. 2 + Ant. 3 / 5785 MHz



Date: 29.OCT.2012 10:32:53

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
RB / VB (Emission in restricted band)	1MHz / 3MHz for Peak, 1MHz / 10Hz for Average
RB / VB (Emission in non-restricted band)	1MHz / 3MHz for peak

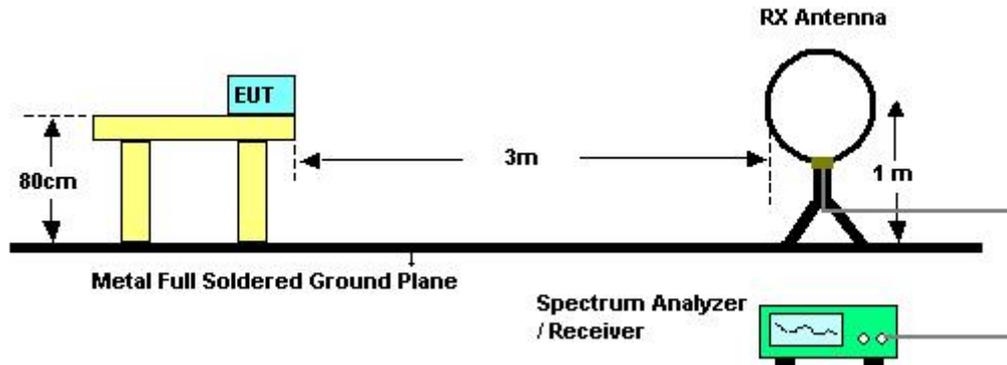
Receiver Parameter	Setting
Attenuation	Auto
Start ~ Stop Frequency	9kHz~150kHz / RB 200Hz for QP
Start ~ Stop Frequency	150kHz~30MHz / RB 9kHz for QP
Start ~ Stop Frequency	30MHz~1GHz / RB 120kHz for QP

4.5.3. Test Procedures

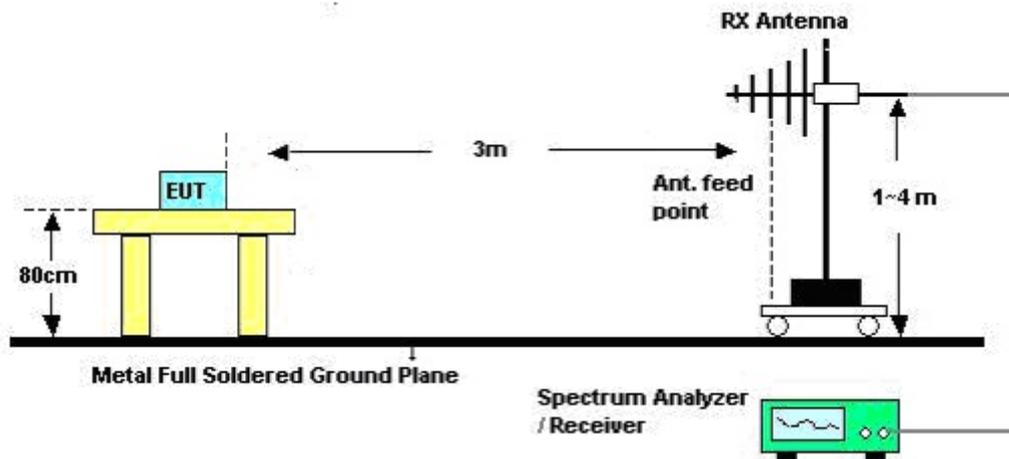
1. Configure the EUT according to ANSI C63.10. The EUT was placed on the top of the turntable 0.8 meter above ground. The phase center of the receiving antenna mounted on the top of a height-variable antenna tower was placed 3 meters far away from the turntable.
2. Power on the EUT and all the supporting 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 below 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	26°C	Humidity	60%
Test Engineer	Magic Lai	Configurations	Normal Link
Test Date	Oct. 08, 2012		

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.

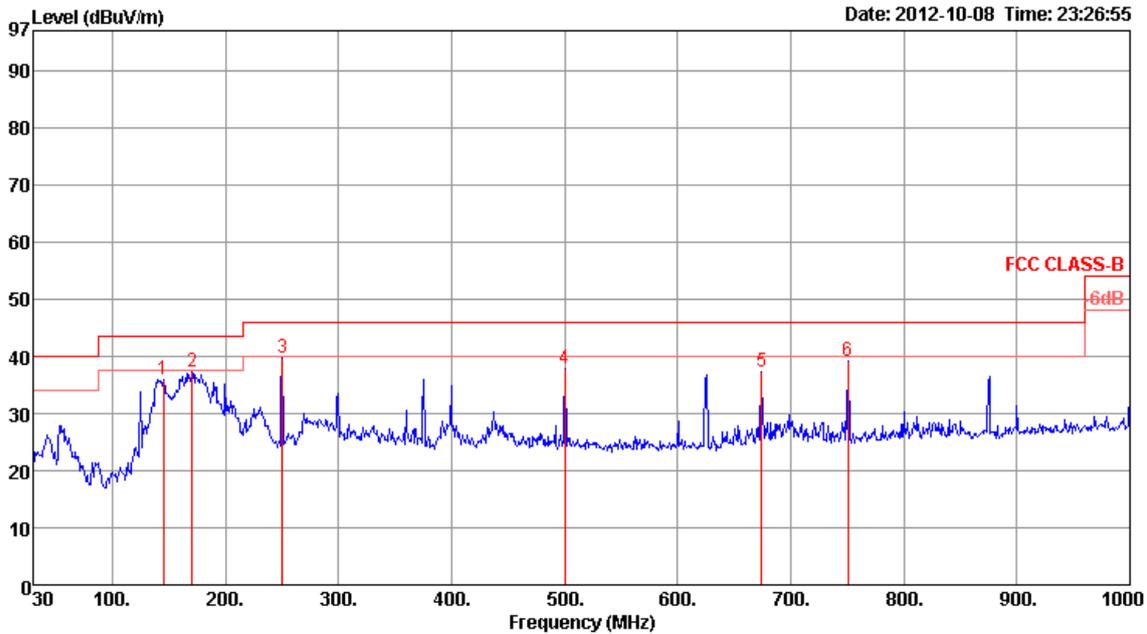
Distance extrapolation factor = $40 \log(\text{specific distance} / \text{test distance})$ (dB);

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

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

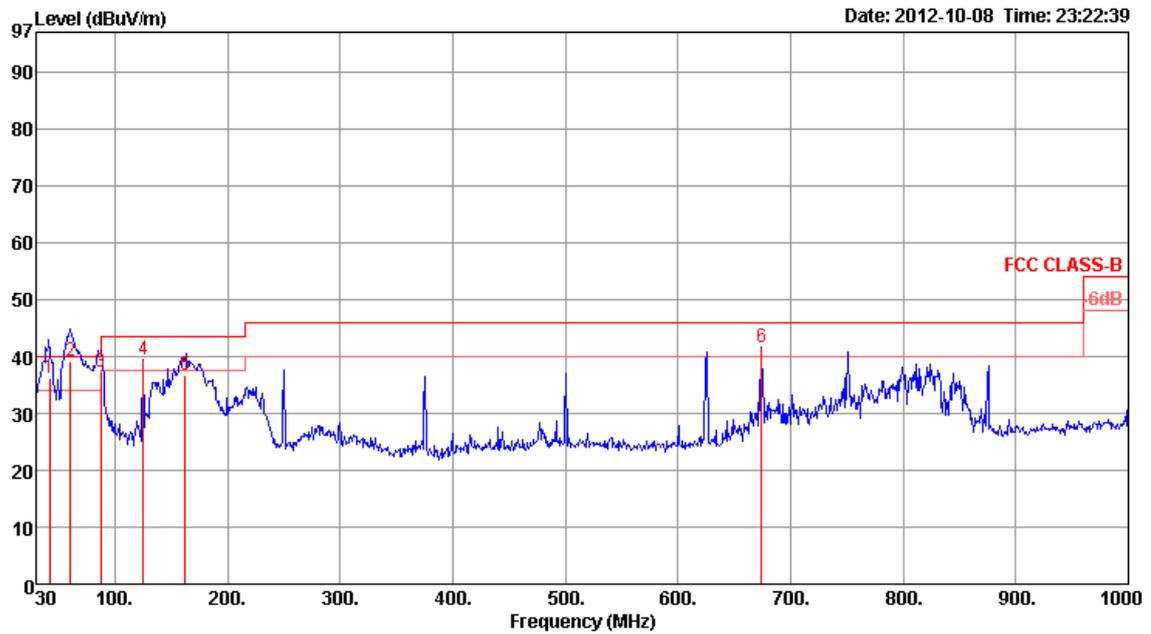
Temperature	26°C	Humidity	60%
Test Engineer	Magic Lai	Configurations	Normal Link / Mode 2

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	145.43	35.94	43.50	-7.56	49.81	1.43	12.08	27.38	Peak	100	0	HORIZONTAL
2	170.65	37.39	43.50	-6.11	50.26	1.55	12.83	27.25	Peak	100	0	HORIZONTAL
3	250.19	39.77	46.00	-6.23	52.10	1.90	12.77	27.00	Peak	100	0	HORIZONTAL
4	500.45	37.72	46.00	-8.28	45.49	2.70	17.63	28.10	Peak	100	0	HORIZONTAL
5	674.08	37.17	46.00	-8.83	42.79	3.40	19.01	28.03	Peak	100	0	HORIZONTAL
6	750.71	39.12	46.00	-6.88	43.99	3.50	19.43	27.80	Peak	100	0	HORIZONTAL

Vertical



	Freq	Level	Limit	Over	Read	CableAntenna	Preamp		A/Pos	T/Pos	Pol/Phase
	MHz	dBUV/m	dBUV/m	dB	dBuV	dB	dB/m	dB	cm	deg	
1	42.19	36.34	40.00	-3.66	52.00	0.70	11.44	27.80	100	133	VERTICAL
2	60.28	39.31	40.00	-0.69	59.50	0.80	6.77	27.76	100	151	VERTICAL
3	87.16	37.39	40.00	-2.61	55.50	1.10	8.44	27.65	140	150	VERTICAL
4	125.06	39.40	43.50	-4.10	53.42	1.25	12.21	27.48	400	0	VERTICAL
5	162.20	36.80	43.50	-6.70	50.40	1.51	12.18	27.29	100	129	VERTICAL
6	674.08	41.66	46.00	-4.34	47.28	3.40	19.01	28.03	400	0	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	25.6°C	Humidity	56%
Test Engineer	Magic Lai	Configurations	IEEE 802.11n MCS0 20MHz Ch 1 / Ant. 1 + Ant. 2 + Ant. 3
Test Date	Sep. 04, 2012		

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	4814.06	41.14	74.00	-32.86	39.85	3.31	33.02	35.04	100	247	HORIZONTAL
2	4814.31	29.42	54.00	-24.58	28.13	3.31	33.02	35.04	100	247	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	4823.60	43.15	74.00	-30.85	41.81	3.31	33.06	35.03	100	105	VERTICAL
2	4823.84	32.34	54.00	-21.66	31.00	3.31	33.06	35.03	100	105	VERTICAL

Temperature	25.6°C	Humidity	56%
Test Engineer	Magic Lai	Configurations	IEEE 802.11n MCS0 20MHz Ch 6 / Ant. 1 + Ant. 2 + Ant. 3
Test Date	Sep. 04, 2012		

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	4872.40	52.77	74.00	-21.23	51.31	3.33	33.16	35.03	Peak	155	97 HORIZONTAL
2	4872.64	39.68	54.00	-14.32	38.22	3.33	33.16	35.03	Average	155	97 HORIZONTAL
3	7311.00	37.44	54.00	-16.56	32.82	4.06	35.96	35.40	Average	124	24 HORIZONTAL
4	7311.16	49.25	74.00	-24.75	44.63	4.06	35.96	35.40	Peak	124	24 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	4873.68	37.50	54.00	-16.50	36.04	3.33	33.16	35.03	Average	149	59 VERTICAL
2	4873.81	52.38	74.00	-21.62	50.92	3.33	33.16	35.03	Peak	149	59 VERTICAL
3	7307.96	36.44	54.00	-17.56	31.82	4.06	35.96	35.40	Average	107	72 VERTICAL
4	7308.28	48.61	74.00	-25.39	43.99	4.06	35.96	35.40	Peak	107	72 VERTICAL

Temperature	25.6°C	Humidity	56%
Test Engineer	Magic Lai	Configurations	IEEE 802.11n MCS0 20MHz Ch11 / Ant. 1 + Ant. 2 + Ant. 3
Test Date	Sep. 04, 2012		

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	4922.65	29.22	54.00	-24.78	27.62	3.35	33.26	35.01	Average	100	33	HORIZONTAL
2	4922.75	40.72	74.00	-33.28	39.12	3.35	33.26	35.01	Peak	100	33	HORIZONTAL
3	7386.83	32.01	54.00	-21.99	27.26	4.06	36.09	35.40	Average	100	177	HORIZONTAL
4	7386.99	44.59	74.00	-29.41	39.84	4.06	36.09	35.40	Peak	100	177	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	4923.65	29.29	54.00	-24.71	27.69	3.35	33.26	35.01	Average	100	314	VERTICAL
2	4923.71	41.20	74.00	-32.80	39.60	3.35	33.26	35.01	Peak	100	314	VERTICAL
3	7382.92	32.32	54.00	-21.68	27.57	4.06	36.09	35.40	Average	100	194	VERTICAL
4	7383.05	44.61	74.00	-29.39	39.86	4.06	36.09	35.40	Peak	100	194	VERTICAL

Temperature	25.6°C	Humidity	56%
Test Engineer	Magic Lai	Configurations	IEEE 802.11n MCS0 40MHz Ch 3 / Ant. 1 + Ant. 2 + Ant. 3
Test Date	Sep. 04, 2012		

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	4843.52	27.57	54.00	-26.43	26.19	3.32	33.09	35.03	Average	116	247	HORIZONTAL
2	4843.57	41.50	74.00	-32.50	40.12	3.32	33.09	35.03	Peak	116	247	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	4840.80	40.40	74.00	-33.60	39.02	3.32	33.09	35.03	Peak	100	90	VERTICAL
2	4841.28	29.19	54.00	-24.81	27.81	3.32	33.09	35.03	Average	100	90	VERTICAL



Temperature	25.6°C	Humidity	56%
Test Engineer	Magic Lai	Configurations	IEEE 802.11n MCS0 40MHz Ch 6 / Ant. 1 + Ant. 2 + Ant. 3
Test Date	Sep. 04, 2012		

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	4875.19	29.56	54.00	-24.44	28.10	3.33	33.16	35.03	Average	100	87	HORIZONTAL
2	4875.27	40.63	74.00	-33.37	39.17	3.33	33.16	35.03	Peak	100	87	HORIZONTAL
3	7310.62	45.61	74.00	-28.39	40.99	4.06	35.96	35.40	Peak	100	126	HORIZONTAL
4	7310.71	30.92	54.00	-23.08	26.30	4.06	35.96	35.40	Average	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	4873.01	29.20	54.00	-24.80	27.74	3.33	33.16	35.03	Average	100	80	VERTICAL
2	4873.06	42.86	74.00	-31.14	41.40	3.33	33.16	35.03	Peak	100	80	VERTICAL
3	7310.06	46.01	74.00	-27.99	41.39	4.06	35.96	35.40	Peak	100	230	VERTICAL
4	7310.10	30.97	54.00	-23.03	26.35	4.06	35.96	35.40	Average	100	230	VERTICAL

Temperature	25.6°C	Humidity	56%
Test Engineer	Magic Lai	Configurations	IEEE 802.11n MCS0 40MHz Ch 9 / Ant. 1 + Ant. 2 + Ant. 3
Test Date	Sep. 04, 2012		

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	4916.50	29.24	54.00	-24.76	27.68	3.35	33.23	35.02	Average	100	137	HORIZONTAL
2	4916.90	40.42	74.00	-33.58	38.86	3.35	33.23	35.02	Peak	100	137	HORIZONTAL
3	7356.48	44.33	74.00	-29.67	39.65	4.06	36.02	35.40	Peak	100	67	HORIZONTAL
4	7357.12	31.44	54.00	-22.56	26.76	4.06	36.02	35.40	Average	100	67	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	4913.28	41.11	74.00	-32.89	39.56	3.34	33.23	35.02	Peak	100	76	VERTICAL
2	4913.60	28.72	54.00	-25.28	27.17	3.34	33.23	35.02	Average	100	76	VERTICAL
3	7356.69	44.05	74.00	-29.95	39.37	4.06	36.02	35.40	Peak	100	35	VERTICAL
4	7356.85	31.87	54.00	-22.13	27.19	4.06	36.02	35.40	Average	100	35	VERTICAL



Temperature	25.6°C	Humidity	56%
Test Engineer	Magic Lai	Configurations	11a IEEE 802.11n MCS0 20MHz CH 149 / Ant. 1 + Ant. 2 + Ant. 3
Test Date	Sep. 04, 2012		

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	11479.90	52.40	74.00	-21.60	43.80	5.11	38.77	35.28	Peak	100	81	HORIZONTAL
2	11490.08	42.84	54.00	-11.16	34.23	5.11	38.78	35.28	Average	100	81	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	11484.23	51.71	74.00	-22.29	43.10	5.11	38.78	35.28	Peak	100	192	VERTICAL
2	11489.52	41.92	54.00	-12.08	33.31	5.11	38.78	35.28	Average	100	192	VERTICAL

Temperature	25.6°C	Humidity	56%
Test Engineer	Magic Lai	Configurations	11a IEEE 802.11n MCS0 20MHz CH 157 / Ant. 1 + Ant. 2 + Ant. 3
Test Date	Sep. 04, 2012		

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	11567.84	51.71	74.00	-22.29	43.05	5.13	38.83	35.30	Peak	100	279	HORIZONTAL
2	11568.96	42.90	54.00	-11.10	34.24	5.13	38.83	35.30	Average	100	279	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	11564.79	51.59	74.00	-22.41	42.94	5.13	38.82	35.30	Peak	100	187	VERTICAL
2	11571.28	42.49	54.00	-11.51	33.82	5.14	38.83	35.30	Average	100	187	VERTICAL

Temperature	25.6°C	Humidity	56%
Test Engineer	Magic Lai	Configurations	11a IEEE 802.11n MCS0 20MHz CH 165 / Ant. 1 + Ant. 2 + Ant. 3
Test Date	Sep. 04, 2012		

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	11649.12	43.22	54.00	-10.78	34.50	5.16	38.86	35.30	Average	100	179	HORIZONTAL
2	11649.36	51.68	74.00	-22.32	42.96	5.16	38.86	35.30	Peak	100	179	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	11639.98	51.90	74.00	-22.10	43.18	5.16	38.86	35.30	Peak	100	46	VERTICAL
2	11649.52	46.40	54.00	-7.60	37.68	5.16	38.86	35.30	Average	100	46	VERTICAL

Temperature	25.6°C	Humidity	56%
Test Engineer	Magic Lai	Configurations	11a IEEE 802.11n MCS0 40MHz CH 151 / Ant. 1 + Ant. 2 + Ant. 3
Test Date	Sep. 04, 2012		

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	11499.50	50.54	74.00	-23.46	41.91	5.12	38.79	35.28	Peak	100	181	HORIZONTAL
2	11509.44	42.56	54.00	-11.44	33.93	5.12	38.79	35.28	Average	100	181	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	11500.30	50.99	74.00	-23.01	42.36	5.12	38.79	35.28	Peak	100	112	VERTICAL
2	11505.83	40.77	54.00	-13.23	32.14	5.12	38.79	35.28	Average	100	112	VERTICAL

Temperature	25.6°C	Humidity	56%
Test Engineer	Magic Lai	Configurations	11a IEEE 802.11n MCS0 40MHz CH 159 / Ant. 1 + Ant. 2 + Ant. 3
Test Date	Sep. 04, 2012		

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	11584.39	43.09	54.00	-10.91	34.42	5.14	38.83	35.30	Average	100	280	HORIZONTAL
2	11593.85	50.42	74.00	-23.58	41.75	5.14	38.83	35.30	Peak	100	280	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	11579.58	40.50	54.00	-13.50	31.83	5.14	38.83	35.30	Average	100	177	VERTICAL
2	11593.77	51.59	74.00	-22.41	42.92	5.14	38.83	35.30	Peak	100	177	VERTICAL

Temperature	25.6°C	Humidity	56%
Test Engineer	Magic Lai	Configurations	IEEE 802.11b CH 1 / Ant. 1 + Ant. 2 + Ant. 3
Test Date	Sep. 04, 2012		

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	4823.87	52.44	74.00	-21.56	51.10	3.31	33.06	35.03	100	154	HORIZONTAL
2	4823.97	48.66	54.00	-5.34	47.32	3.31	33.06	35.03	100	154	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	4823.94	53.43	54.00	-0.57	52.09	3.31	33.06	35.03	100	78	VERTICAL
2	4823.94	56.25	74.00	-17.75	54.91	3.31	33.06	35.03	100	78	VERTICAL

Temperature	25.6°C	Humidity	56%
Test Engineer	Magic Lai	Configurations	IEEE 802.11b CH 6 / Ant. 1 + Ant. 2 + Ant. 3
Test Date	Sep. 04, 2012		

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	4873.94	52.64	74.00	-21.36	51.18	3.33	33.16	35.03	Peak	150	332	HORIZONTAL
2	4873.97	49.48	54.00	-4.52	48.02	3.33	33.16	35.03	Average	150	332	HORIZONTAL
3	7310.02	54.80	74.00	-19.20	50.18	4.06	35.96	35.40	Peak	118	273	HORIZONTAL
4	7310.22	48.29	54.00	-5.71	43.67	4.06	35.96	35.40	Average	118	273	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	4873.94	53.48	54.00	-0.52	52.02	3.33	33.16	35.03	Average	100	76	VERTICAL
2	4873.98	56.11	74.00	-17.89	54.65	3.33	33.16	35.03	Peak	100	76	VERTICAL
3	7310.17	38.97	54.00	-15.03	34.35	4.06	35.96	35.40	Average	121	290	VERTICAL
4	7310.22	48.09	74.00	-25.91	43.47	4.06	35.96	35.40	Peak	121	290	VERTICAL



Temperature	25.6°C	Humidity	56%
Test Engineer	Magic Lai	Configurations	IEEE 802.11b CH 11 / Ant. 1 + Ant. 2 + Ant. 3
Test Date	Sep. 04, 2012		

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	4923.95	52.62	74.00	-21.38	51.02	3.35	33.26	35.01	Peak	159	72	HORIZONTAL
2	4923.95	49.43	54.00	-4.57	47.83	3.35	33.26	35.01	Average	159	72	HORIZONTAL
3	7385.10	47.19	74.00	-26.81	42.44	4.06	36.09	35.40	Peak	100	34	HORIZONTAL
4	7385.22	37.82	54.00	-16.18	33.07	4.06	36.09	35.40	Average	100	34	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	4923.97	48.45	54.00	-5.55	46.85	3.35	33.26	35.01	Average	117	51	VERTICAL
2	4923.98	51.73	74.00	-22.27	50.13	3.35	33.26	35.01	Peak	117	51	VERTICAL

Temperature	25.6°C	Humidity	56%
Test Engineer	Magic Lai	Configurations	IEEE 802.11g CH 1 / Ant. 1 + Ant. 2 + Ant. 3
Test Date	Sep. 04, 2012		

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	4823.04	43.07	74.00	-30.93	41.73	3.31	33.06	35.03	Peak	100	60	HORIZONTAL
2	4823.12	30.26	54.00	-23.74	28.92	3.31	33.06	35.03	Average	100	60	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	4822.40	47.60	74.00	-26.40	46.26	3.31	33.06	35.03	Peak	100	100	VERTICAL
2	4822.80	34.69	54.00	-19.31	33.35	3.31	33.06	35.03	Average	100	100	VERTICAL



Temperature	25.6°C	Humidity	56%
Test Engineer	Magic Lai	Configurations	IEEE 802.11g CH 6 / Ant. 1 + Ant. 2 + Ant. 3
Test Date	Sep. 04, 2012		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	PoI/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	4875.36	36.61	54.00	-17.39	35.15	3.33	33.16	35.03	Average	115	10	HORIZONTAL
2	4875.52	49.46	74.00	-24.54	48.00	3.33	33.16	35.03	Peak	115	10	HORIZONTAL
3	7311.56	38.24	54.00	-15.76	33.62	4.06	35.96	35.40	Average	133	20	HORIZONTAL
4	7311.72	50.53	74.00	-23.47	45.91	4.06	35.96	35.40	Peak	133	20	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	PoI/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	4872.48	39.15	54.00	-14.85	37.69	3.33	33.16	35.03	Average	124	102	VERTICAL
2	4872.96	52.24	74.00	-21.76	50.78	3.33	33.16	35.03	Peak	124	102	VERTICAL
3	7307.64	34.94	54.00	-19.06	30.32	4.06	35.96	35.40	Average	107	67	VERTICAL
4	7308.04	47.09	74.00	-26.91	42.47	4.06	35.96	35.40	Peak	107	67	VERTICAL

Temperature	25.6°C	Humidity	56%
Test Engineer	Magic Lai	Configurations	IEEE 802.11g CH 11 / Ant. 1 + Ant. 2 + Ant. 3
Test Date	Sep. 04, 2012		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	PoI/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	4921.81	41.24	74.00	-32.76	39.64	3.35	33.26	35.01	Peak	100	120	HORIZONTAL
2	4922.61	28.82	54.00	-25.18	27.22	3.35	33.26	35.01	Average	100	120	HORIZONTAL
3	7380.31	43.74	74.00	-30.26	38.99	4.06	36.09	35.40	Peak	100	78	HORIZONTAL
4	7380.71	32.15	54.00	-21.85	27.40	4.06	36.09	35.40	Average	100	78	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	PoI/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	4921.92	39.95	74.00	-34.05	38.35	3.35	33.26	35.01	Peak	100	198	VERTICAL
2	4922.08	28.87	54.00	-25.13	27.27	3.35	33.26	35.01	Average	100	198	VERTICAL
3	7381.32	44.76	74.00	-29.24	40.01	4.06	36.09	35.40	Peak	100	71	VERTICAL
4	7381.72	31.23	54.00	-22.77	26.48	4.06	36.09	35.40	Average	100	71	VERTICAL

Temperature	25.6°C	Humidity	56%
Test Engineer	Magic Lai	Configurations	IEEE 802.11a CH 149 / Ant. 1 + Ant. 2 + Ant. 3
Test Date	Sep. 04, 2012		

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	11488.96	44.34	54.00	-9.66	35.73	5.11	38.78	35.28	Average	102	202	HORIZONTAL
2	11492.80	55.33	74.00	-18.67	46.72	5.11	38.78	35.28	Peak	102	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	11487.36	55.91	74.00	-18.09	47.30	5.11	38.78	35.28	Peak	102	26	VERTICAL
2	11487.92	45.33	54.00	-8.67	36.72	5.11	38.78	35.28	Average	102	26	VERTICAL

Temperature	25.6°C	Humidity	56%
Test Engineer	Magic Lai	Configurations	IEEE 802.11a CH 157 / Ant. 1 + Ant. 2 + Ant. 3
Test Date	Sep. 04, 2012		

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	11572.56	39.29	54.00	-14.71	30.62	5.14	38.83	35.30	Average	102	71	HORIZONTAL
2	11573.85	51.12	74.00	-22.88	42.45	5.14	38.83	35.30	Peak	102	71	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	11569.52	45.29	54.00	-8.71	36.63	5.13	38.83	35.30	Average	102	30	VERTICAL
2	11570.24	55.83	74.00	-18.17	47.16	5.14	38.83	35.30	Peak	102	30	VERTICAL

Temperature	25.6°C	Humidity	56%
Test Engineer	Magic Lai	Configurations	IEEE 802.11a CH 165 / Ant. 1 + Ant. 2 + Ant. 3
Test Date	Sep. 04, 2012		

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	11649.68	46.02	54.00	-7.98	37.30	5.16	38.86	35.30	Average	100	313	HORIZONTAL
2	11650.72	50.08	74.00	-23.92	41.36	5.16	38.86	35.30	Peak	100	313	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	11639.82	55.21	74.00	-18.79	46.49	5.16	38.86	35.30	Peak	100	72	VERTICAL
2	11649.44	45.34	54.00	-8.66	36.62	5.16	38.86	35.30	Average	100	72	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. Band Edge 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
RB / VB (Emission in restricted band)	1 MHz / 3MHz for Peak, 1 MHz / 10Hz for Average
RB / VB (Emission in non-restricted band)	100 KHz / 300 KHz for Peak

4.6.3. Test Procedures

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

4.6.4. Test Setup Layout

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	25.6°C	Humidity	56%
Test Engineer	Magic Lai	Configurations	IEEE 802.11n MCS0 20MHz Ch 1, 6, 11 / Ant. 1 + Ant. 2 + Ant. 3
Test date	Jul. 05, 2011		

Channel 1

	Freq	Level	Limit Line	Over Limit	Read Level	CableAntenna Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	PoI/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	2390.00	53.75	54.00	-0.25	23.36	2.22	28.17	0.00	Average	122	252	VERTICAL
2	2390.00	70.44	74.00	-3.56	40.05	2.22	28.17	0.00	Peak	122	252	VERTICAL
3	2407.67	96.64				2.22	28.21	0.00	Average	122	252	VERTICAL
4	2407.83	109.21				2.22	28.21	0.00	Peak	122	252	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	PoI/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	2387.12	66.27	74.00	-7.73	35.89	2.21	28.17	0.00	Peak	136	238	VERTICAL
2	2388.08	48.30	54.00	-5.70	17.92	2.21	28.17	0.00	Average	136	238	VERTICAL
3	2432.83	105.27				2.23	28.25	0.00	Average	136	238	VERTICAL
4	2432.83	118.32				2.23	28.25	0.00	Peak	136	238	VERTICAL
5	2483.50	53.17	54.00	-0.83	22.54	2.26	28.37	0.00	Average	136	238	VERTICAL
6	2483.82	70.68	74.00	-3.32	40.05	2.26	28.37	0.00	Peak	136	238	VERTICAL

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

Channel 11

	Freq	Level	Limit Line	Over Limit	Read Level	CableAntenna Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	PoI/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	2468.25	107.08				2.26	28.37	0.00	Peak	102	257	VERTICAL
2	2468.41	93.95				2.26	28.37	0.00	Average	102	257	VERTICAL
3	2483.50	53.41	54.00	-0.59	22.78	2.26	28.37	0.00	Average	102	257	VERTICAL
4	2483.66	70.65	74.00	-3.35	40.02	2.26	28.37	0.00	Peak	102	257	VERTICAL

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

Temperature	25.6°C	Humidity	56%
Test Engineer	Magic Lai	Configurations	IEEE 802.11n MCS0 40MHz Ch 3, 6, 9 / Ant. 1 + Ant. 2 + Ant. 3
Test date	Jul. 05, 2011		

Channel 3

	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	2386.47	53.25	54.00	-0.75	22.87	2.21	28.17	0.00 Average	114	228	HORIZONTAL
2	2390.00	72.83	74.00	-1.17	42.44	2.22	28.17	0.00 Peak	114	228	HORIZONTAL
3	2420.72	109.31				2.23	28.25	0.00 Peak	114	228	HORIZONTAL
4	2421.04	92.83				2.23	28.25	0.00 Average	114	228	HORIZONTAL
5	2500.08	49.38	54.00	-4.62	18.69	2.27	28.42	0.00 Average	114	228	HORIZONTAL
6	2500.08	55.38	74.00	-18.62	24.69	2.27	28.42	0.00 Peak	114	228	HORIZONTAL

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

Channel 6

	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	2388.40	62.50	74.00	-11.50	32.12	2.21	28.17	0.00 Peak	120	250	VERTICAL
2	2390.00	47.70	54.00	-6.30	17.31	2.22	28.17	0.00 Average	120	250	VERTICAL
3	2448.54	93.86				2.24	28.29	0.00 Average	120	250	VERTICAL
4	2448.86	109.89				2.24	28.29	0.00 Peak	120	250	VERTICAL
5	2483.50	53.39	54.00	-0.61	22.76	2.26	28.37	0.00 Average	120	250	VERTICAL
6	2483.82	68.36	74.00	-5.64	37.73	2.26	28.37	0.00 Peak	120	250	VERTICAL

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

Channel 9

	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	2447.83	87.91				2.24	28.29	0.00 Average	142	267	VERTICAL
2	2453.60	105.47				2.24	28.33	0.00 Peak	142	267	VERTICAL
3	2483.50	53.49	54.00	-0.51	22.86	2.26	28.37	0.00 Average	142	267	VERTICAL
4	2488.31	71.11	74.00	-2.89	40.44	2.26	28.41	0.00 Peak	142	267	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.

Temperature	25.6°C	Humidity	56%
Test Engineer	Magic Lai	Configurations	IEEE 802.11b CH 1, 6, 11/ Ant. 1 + Ant. 2 + Ant. 3
Test Date	Sep. 04, 2012		

Channel 1

	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	2389.84	57.60	74.00	-16.40	27.21	2.22	28.17	0.00	Peak	100	136	VERTICAL
2	2390.00	50.03	54.00	-3.97	19.64	2.22	28.17	0.00	Average	100	136	VERTICAL
3	2411.04	111.88				2.22	28.21	0.00	Peak	100	136	VERTICAL
4	2411.20	107.95				2.22	28.21	0.00	Average	100	136	VERTICAL

Item 3, 4 are the fundamental frequency at 2412 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	2389.68	58.65	74.00	-15.35	28.27	2.21	28.17	0.00	Peak	107	273	HORIZONTAL
2	2390.00	46.65	54.00	-7.35	16.26	2.22	28.17	0.00	Average	107	273	HORIZONTAL
3	2436.04	117.44				2.23	28.29	0.00	Peak	107	273	HORIZONTAL
4	2436.36	113.28				2.23	28.29	0.00	Average	107	273	HORIZONTAL
5	2483.82	45.19	54.00	-8.81	14.55	2.26	28.38	0.00	Average	107	273	HORIZONTAL
6	2484.14	57.45	74.00	-16.55	26.81	2.26	28.38	0.00	Peak	107	273	HORIZONTAL

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

Channel 11

	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	2461.04	115.53				2.24	28.33	0.00	Peak	110	255	HORIZONTAL
2	2461.20	111.17				2.24	28.33	0.00	Average	110	255	HORIZONTAL
3	2483.82	53.59	54.00	-0.41	22.95	2.26	28.38	0.00	Average	110	255	HORIZONTAL
4	2483.82	63.11	74.00	-10.89	32.47	2.26	28.38	0.00	Peak	110	255	HORIZONTAL

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

Temperature	25.6°C	Humidity	56%
Test Engineer	Magic Lai	Configurations	IEEE 802.11g CH 1, 6, 11/ Ant. 1 + Ant. 2 + Ant. 3
Test Date	Sep. 04, 2012		

Channel 1

	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	2389.36	70.88	74.00	-3.12	40.50	2.21	28.17	0.00	Peak	100	25	VERTICAL
2	2390.00	53.47	54.00	-0.53	23.08	2.22	28.17	0.00	Average	100	25	VERTICAL
3	2407.83	95.42				2.22	28.21	0.00	Average	100	25	VERTICAL
4	2407.83	109.32				2.22	28.21	0.00	Peak	100	25	VERTICAL

Item 3, 4 are the fundamental frequency at 2412 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	2387.76	48.88	54.00	-5.12	18.50	2.21	28.17	0.00	Average	121	250	VERTICAL
2	2387.76	64.74	74.00	-9.26	34.36	2.21	28.17	0.00	Peak	121	250	VERTICAL
3	2432.51	119.01				2.23	28.25	0.00	Peak	121	250	VERTICAL
4	2432.83	105.39				2.23	28.25	0.00	Average	121	250	VERTICAL
5	2483.82	53.46	54.00	-0.54	22.83	2.26	28.37	0.00	Average	121	250	VERTICAL
6	2484.46	71.69	74.00	-2.31	41.06	2.26	28.37	0.00	Peak	121	250	VERTICAL

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

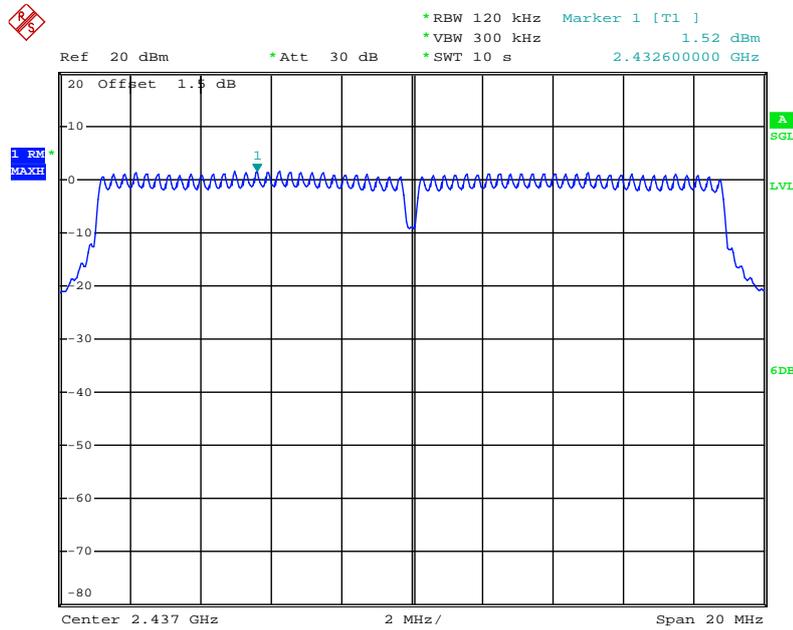
Channel 11

	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	2468.89	96.58				2.26	28.37	0.00	Average	103	277	VERTICAL
2	2469.37	109.49				2.26	28.37	0.00	Peak	103	277	VERTICAL
3	2483.50	53.50	54.00	-0.50	22.87	2.26	28.37	0.00	Average	103	277	VERTICAL
4	2483.98	68.83	74.00	-5.17	38.20	2.26	28.37	0.00	Peak	103	277	VERTICAL

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

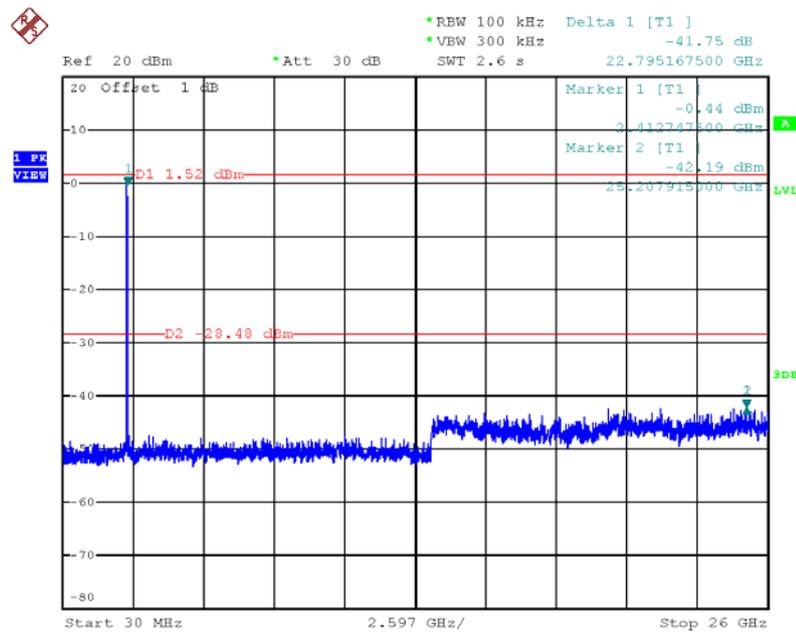
For Emission not in Restricted Band

Plot on Configuration IEEE 802.11n MCS0 20MHz / Ant. 1 / 2437 MHz (Reference Level)



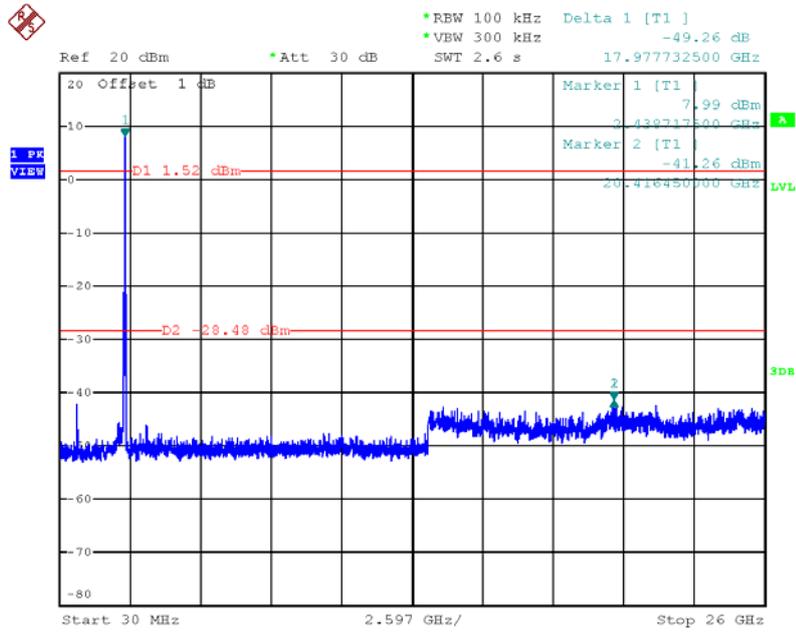
Date: 1.OCT.2012 19:51:41

Plot on Configuration IEEE 802.11n MCS0 20MHz / Ant. 1 + Ant. 2 + Ant.3 / 2412 MHz (down 30 dBc)



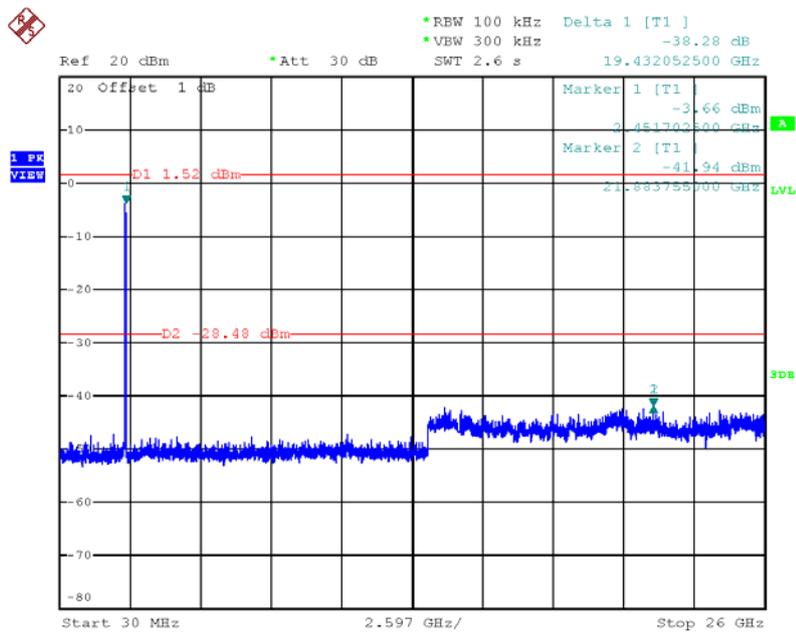
Date: 4.OCT.2012 22:04:38

Plot on Configuration IEEE 802.11n MCS0 20MHz / Ant. 1 + Ant. 2 + Ant.3 / 2437MHz (down 30 dBc)



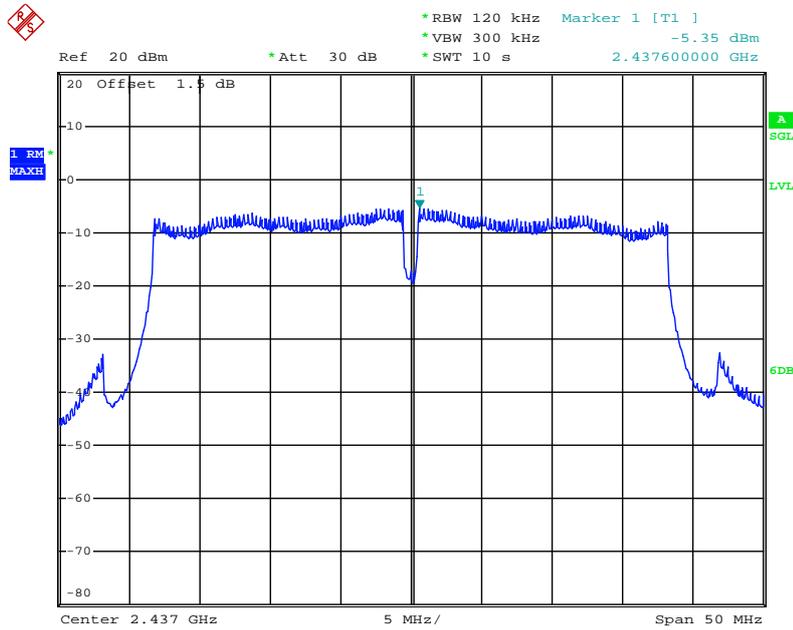
Date: 4.OCT.2012 22:03:10

Plot on Configuration IEEE 802.11n MCS0 20MHz / Ant. 1 + Ant. 2 + Ant.3 / 2462 MHz (down 30 dBc)



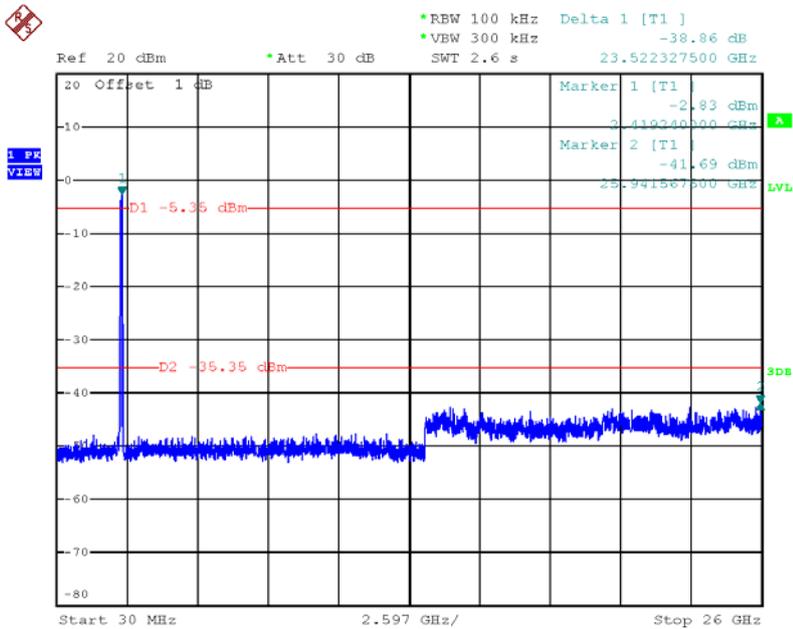
Date: 4.OCT.2012 22:01:45

Plot on Configuration IEEE 802.11n MCS0 40MHz / Ant. 1 / 2437 MHz (Reference Level)



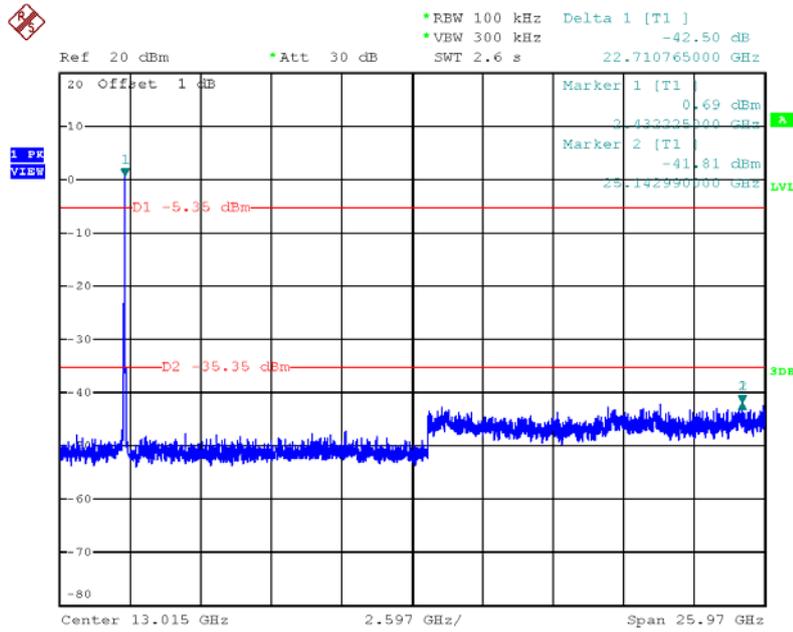
Date: 1.OCT.2012 20:00:27

Plot on Configuration IEEE 802.11n MCS0 40MHz / Ant. 1 + Ant. 2 + Ant.3 / 2422 MHz (down 30 dBc)



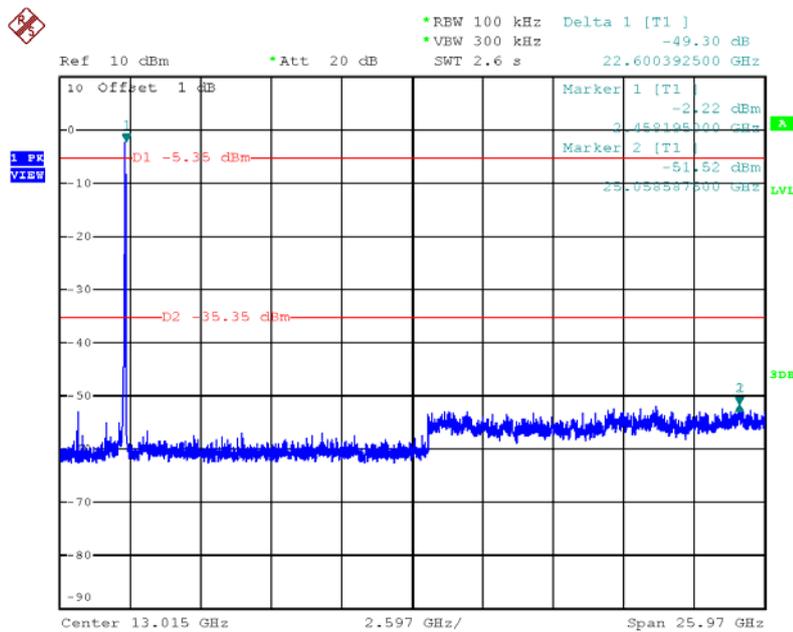
Date: 4.OCT.2012 22:11:45

Plot on Configuration IEEE 802.11n MCS0 40MHz / Ant. 1 + Ant. 2 + Ant.3 / 2437 MHz (down 30 dBc)



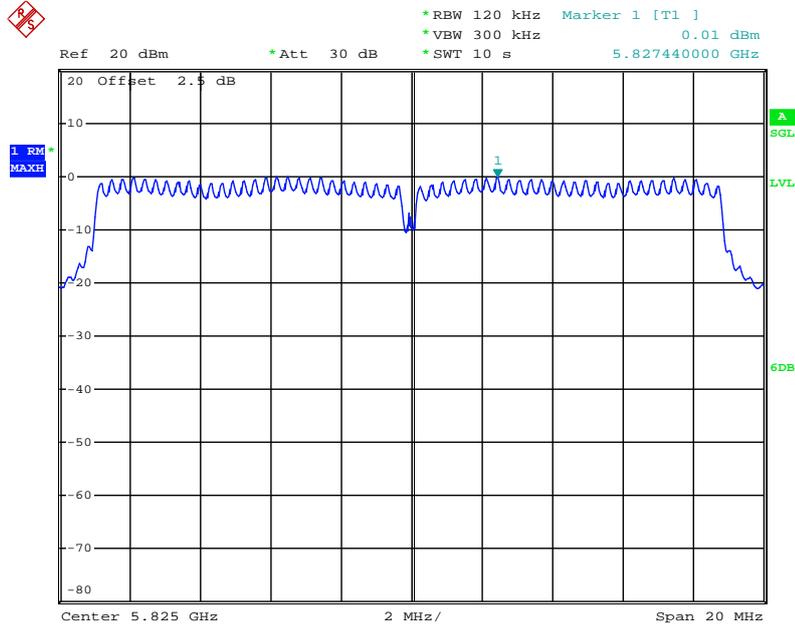
Date: 4.OCT.2012 22:09:56

Plot on Configuration IEEE 802.11n MCS0 40MHz / Ant. 1 + Ant. 2 + Ant.3 / 2452 MHz (down 30 dBc)



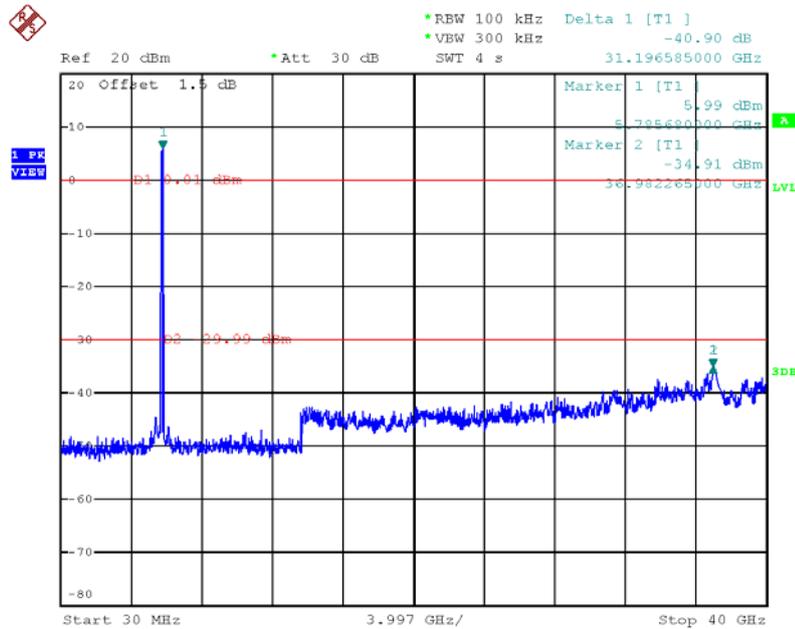
Date: 4.OCT.2012 22:07:30

Plot on Configuration IEEE 802.11n MCS0 20MHz / Ant. 3 / 5825 MHz (Reference Level)



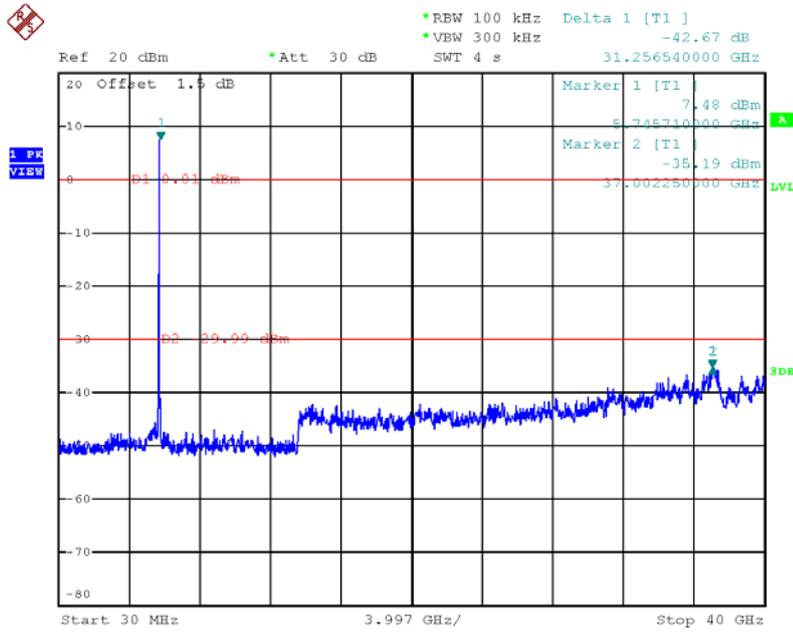
Date: 1.OCT.2012 20:25:17

Plot on Configuration IEEE 802.11n MCS0 20MHz / Ant. 1 + Ant. 2 + Ant.3 / 5745 MHz (down 30 dBc)



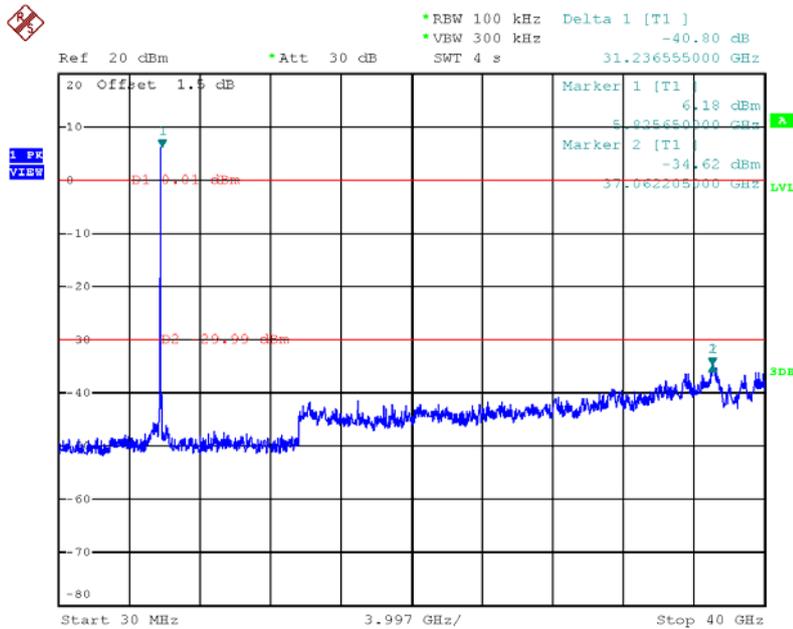
Date: 4.OCT.2012 21:35:46

Plot on Configuration IEEE 802.11n MCS0 20MHz / Ant. 1 + Ant. 2 + Ant.3 / 5785 MHz (down 30 dBc)



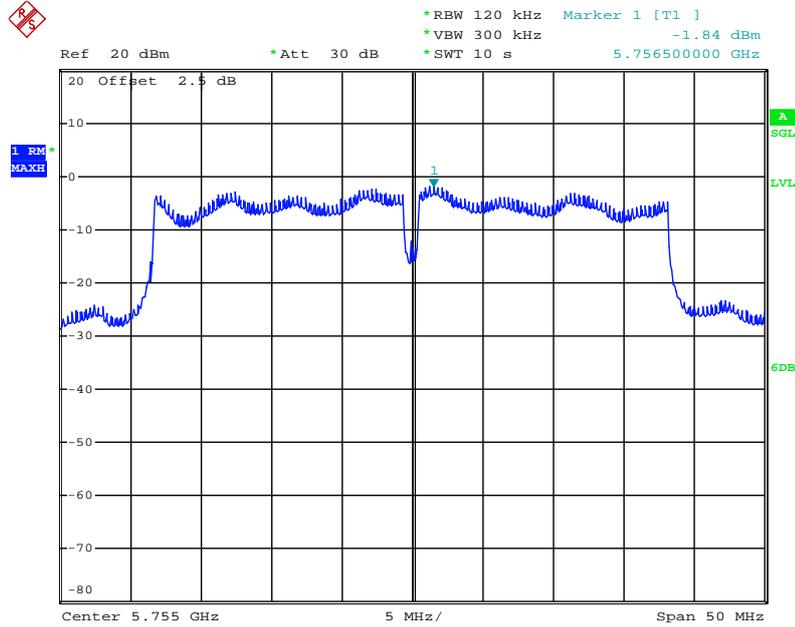
Date: 4.OCT.2012 21:36:19

Plot on Configuration IEEE 802.11n MCS0 20MHz / Ant. 1 + Ant. 2 + Ant.3 / 5825 MHz (down 30 dBc)



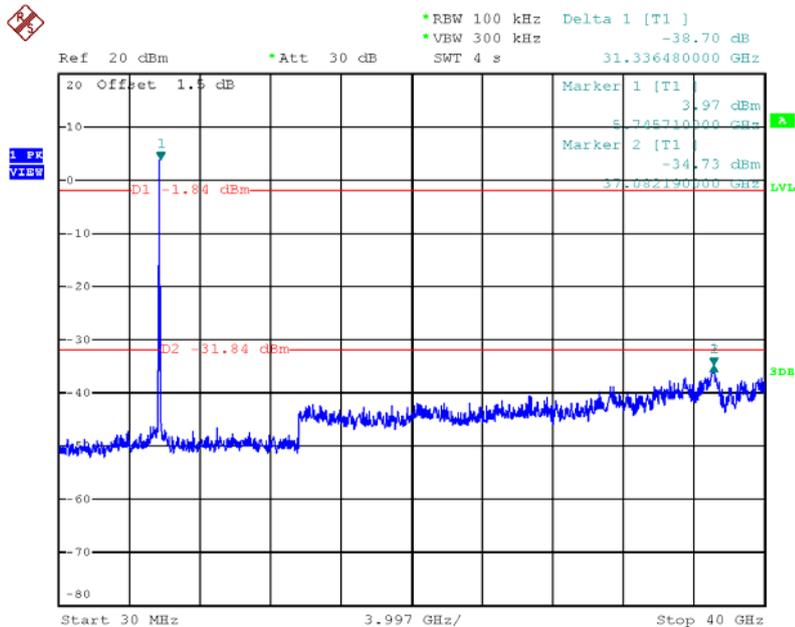
Date: 4.OCT.2012 21:35:09

Plot on Configuration IEEE 802.11n MCS0 40MHz / Ant. 3 / 5755 MHz (Reference Level)



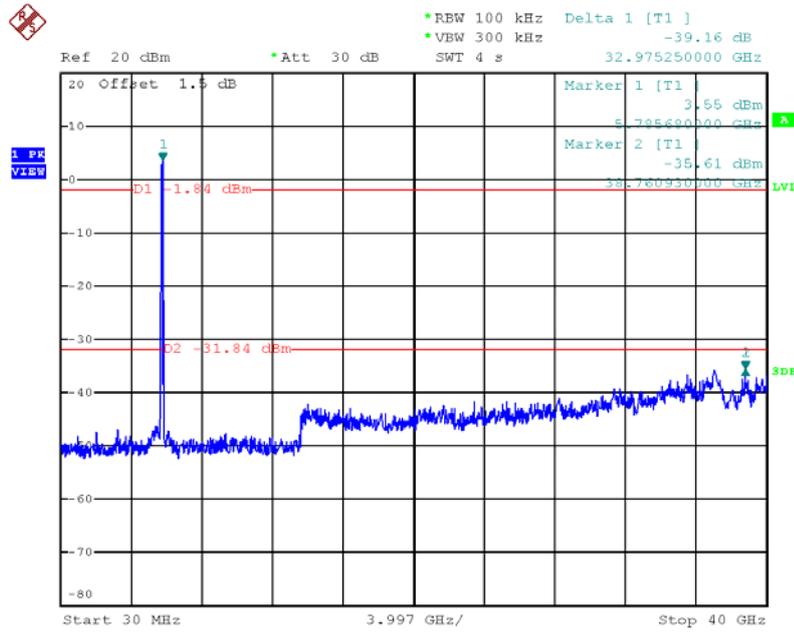
Date: 1.OCT.2012 20:37:58

Plot on Configuration IEEE 802.11n MCS0 40MHz / Ant. 1 + Ant. 2+ Ant.3 / 5755 MHz (down 30 dBc)



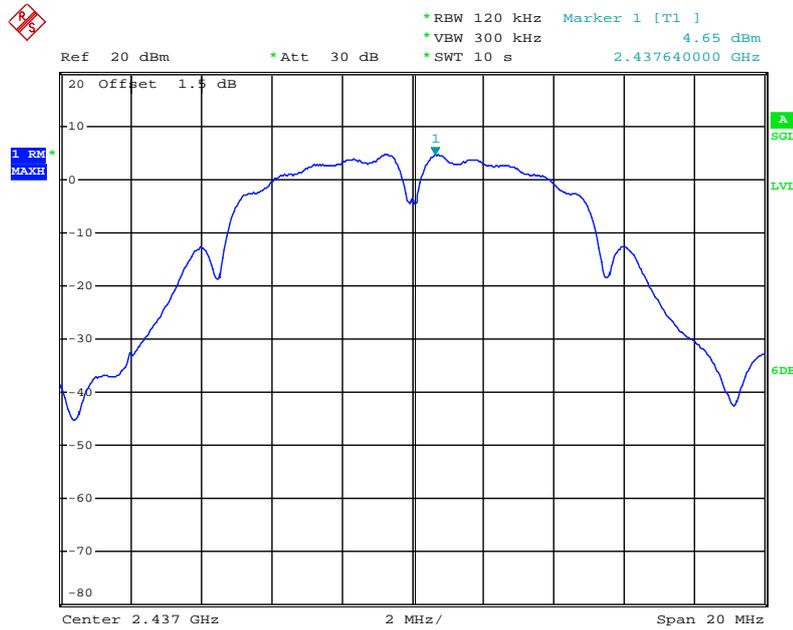
Date: 4.OCT.2012 21:38:24

Plot on Configuration IEEE 802.11n MCS0 40MHz / Ant. 1 + Ant. 2+ Ant.3 / 5795 MHz (down 30 dBc)



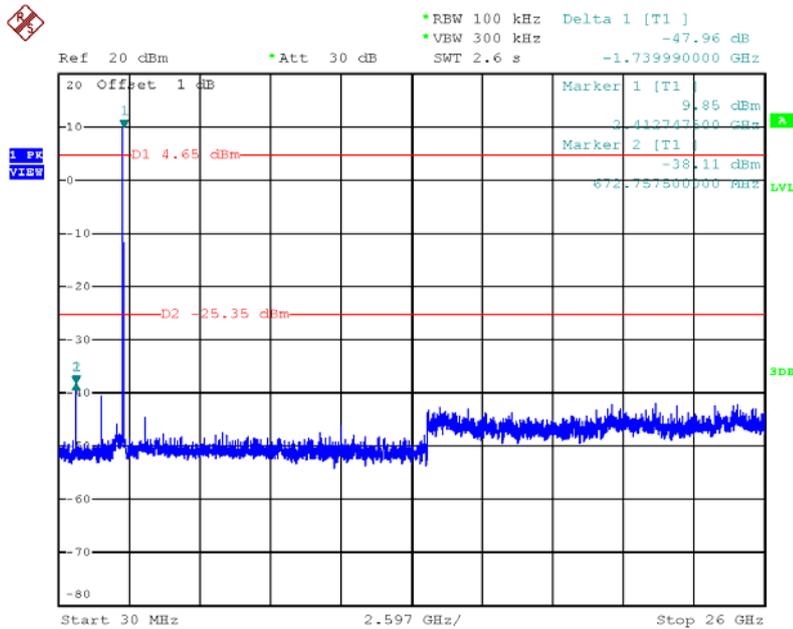
Date: 4.OCT.2012 21:38:53

Plot on Configuration IEEE 802.11b / Ant. 1 / 2437 MHz (Reference Level)



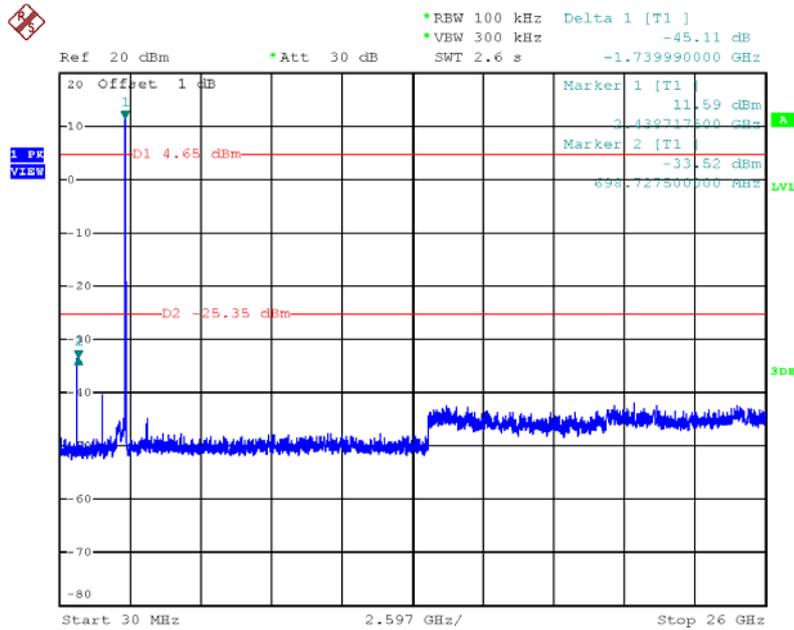
Date: 1.OCT.2012 19:37:27

Plot on Configuration IEEE 802.11b / Ant. 1 + Ant. 2 + Ant.3 / 2412 MHz (down 30 dBc)



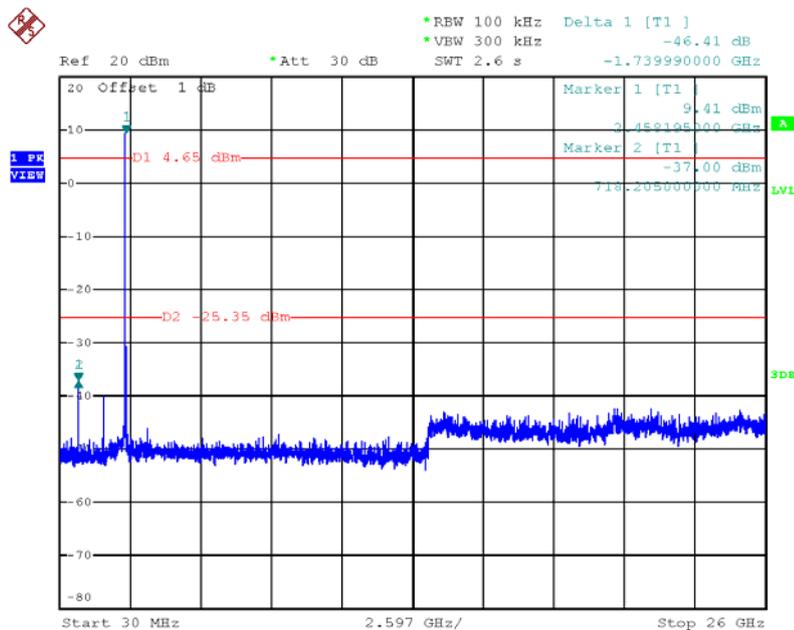
Date: 4.OCT.2012 21:43:35

Plot on Configuration IEEE 802.11b / Ant. 1 + Ant. 2+ Ant.3 / 2437 MHz (down 30 dBc)



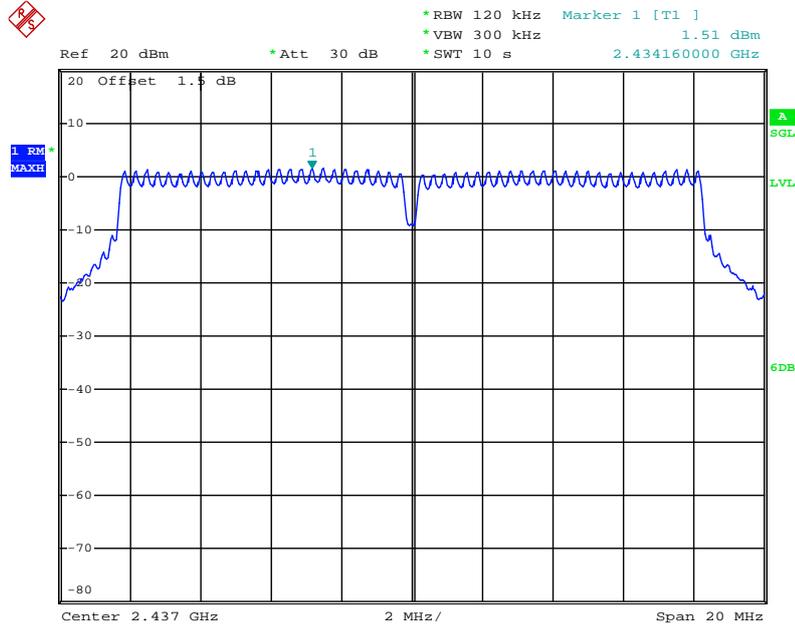
Date: 4.OCT.2012 21:44:34

Plot on Configuration IEEE 802.11b / Ant. 1 + Ant. 2+ Ant.3 / 2462 MHz (down 30 dBc)



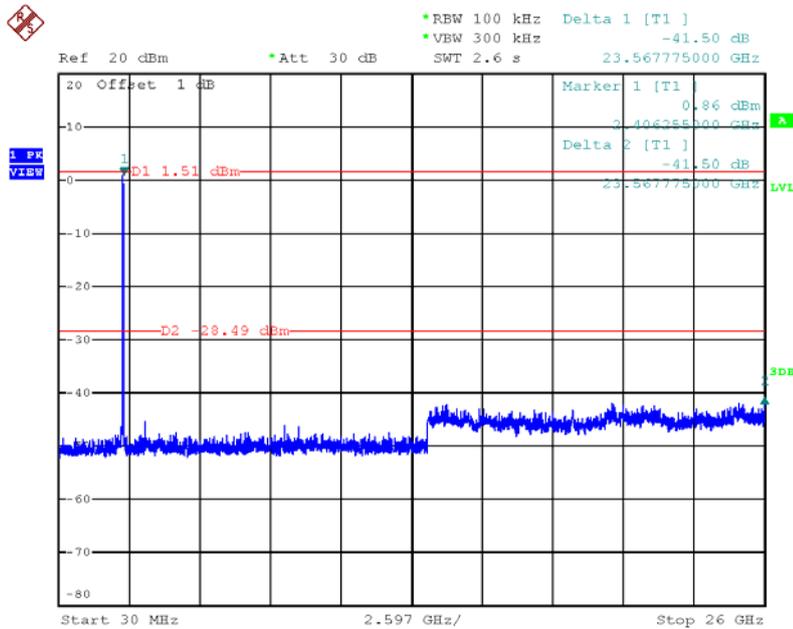
Date: 4.OCT.2012 21:46:33

Plot on Configuration IEEE 802.11g / Ant. 1 / 2437 MHz (Reference Level)



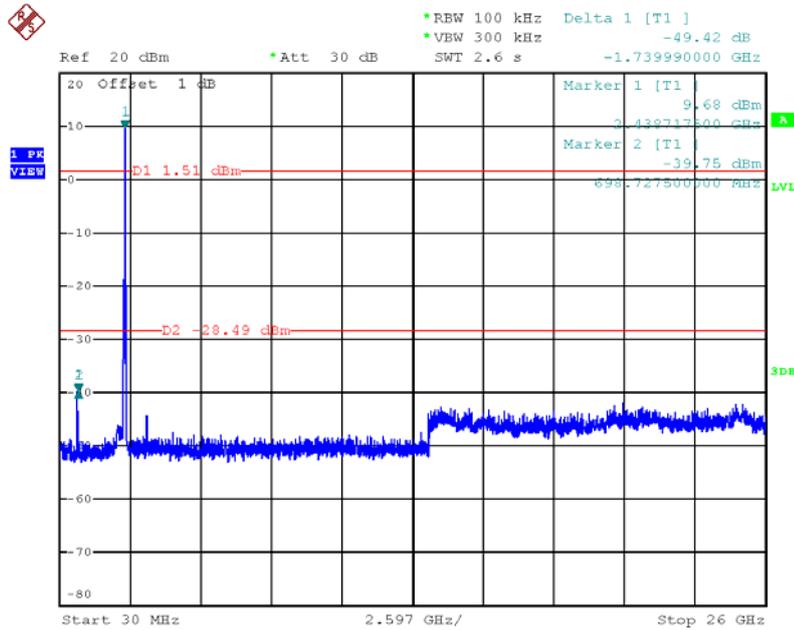
Date: 1.OCT.2012 19:44:48

Plot on Configuration IEEE 802.11g / Ant. 1 + Ant. 2 + Ant.3 / 2412 MHz (down 30 dBc)



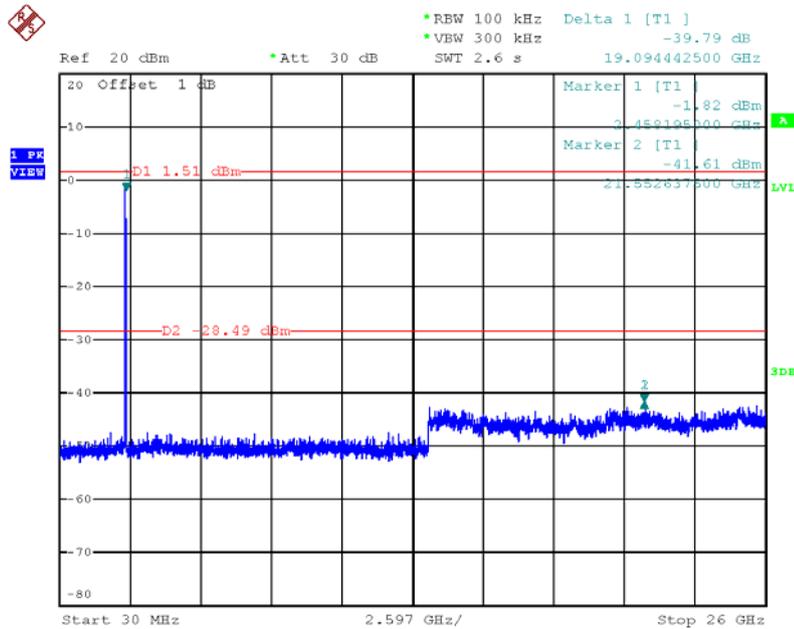
Date: 4.OCT.2012 21:51:42

Plot on Configuration IEEE 802.11b / Ant. 1 + Ant. 2+ Ant.3 / 2437 MHz (down 30 dBc)



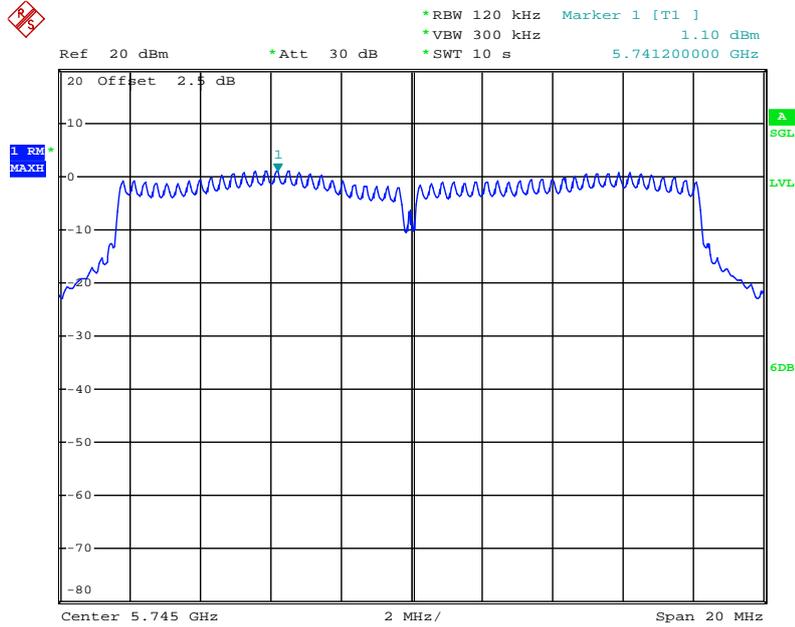
Date: 4.OCT.2012 21:53:53

Plot on Configuration IEEE 802.11g / Ant. 1 + Ant. 2+ Ant.3 / 2462 MHz (down 30 dBc)



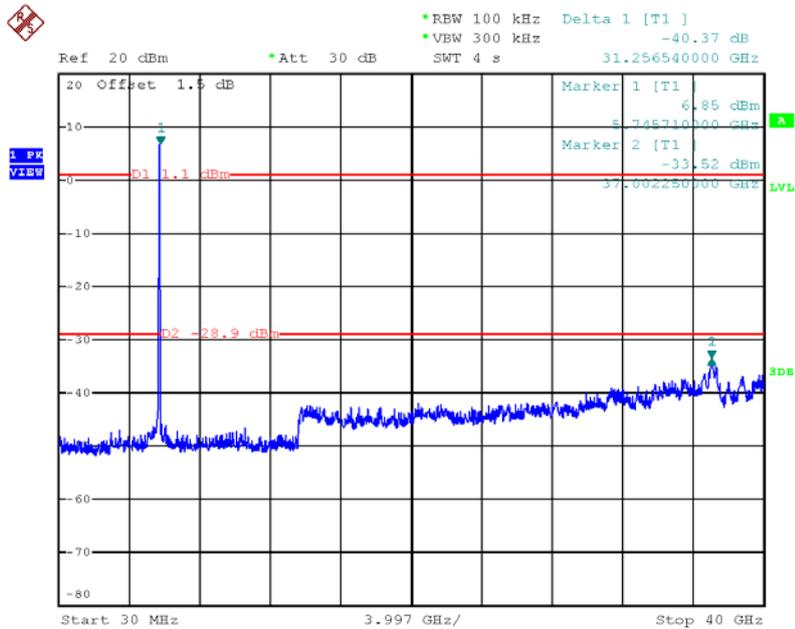
Date: 4.OCT.2012 21:59:25

Plot on Configuration IEEE 802.11a / Ant. 3 / 5745 MHz (Reference Level)



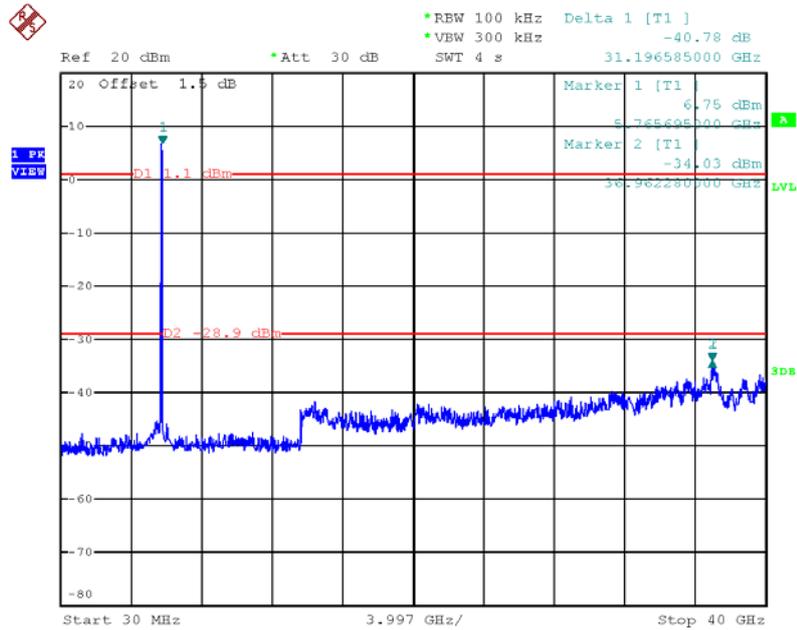
Date: 1.OCT.2012 20:20:15

Plot on Configuration IEEE 802.11a / Ant. 1 + Ant. 2+ Ant.3 / 5745 MHz (down 30 dBc)



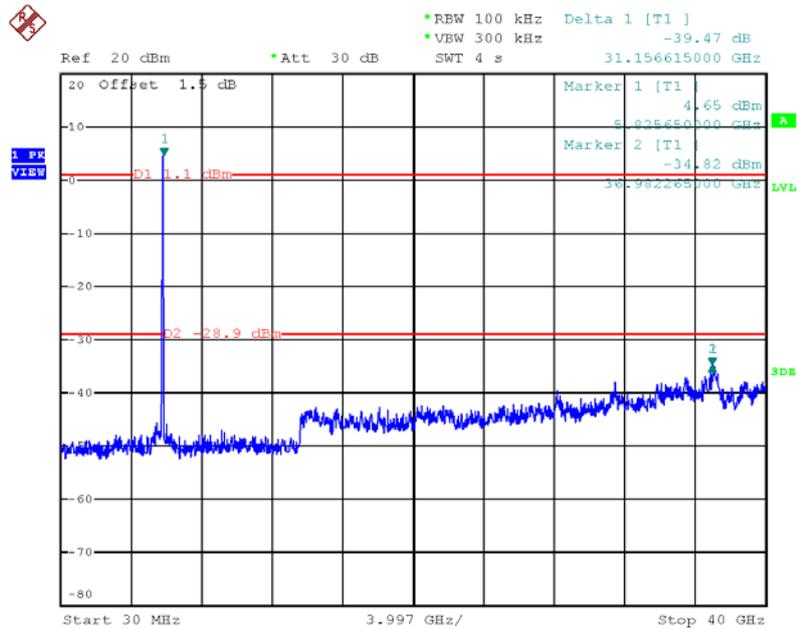
Date: 4.OCT.2012 21:32:17

Plot on Configuration IEEE 802.11a / Ant. 1 + Ant. 2 + Ant.3 / 5785 MHz (down 30 dBc)



Date: 4.OCT.2012 21:33:03

Plot on Configuration IEEE 802.11a / Ant. 1 + Ant. 2 + Ant.3 / 5825 MHz (down 30 dBc)



Date: 4.OCT.2012 21:33:33

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	100377	9kHz ~ 2.75GHz	Sep. 14, 2012	Conduction (CO01-CB)
LISN	F.C.C.	FCC-LISN-50-16-2	04083	150kHz ~ 100MHz	Nov. 14, 2011	Conduction (CO01-CB)
V- LISN	Schwarzbeck	NSLK 8127	8127-478	9K ~ 30MHz	Jun. 22, 2012	Conduction (CO01-CB)
PULSE LIMITER	R&S	ESH3-Z2	100430	9K~30MHz	Feb. 03, 2012	Conduction (CO01-CB)
COND Cable	Woken	Cable	01	0.15MHz~30MHz	Dec. 04, 2011	Conduction (CO01-CB)
BILOG ANTENNA	Schaffner	CBL6112D	22021	20MHz ~ 2GHz	Jan. 11, 2012	Radiation (O3CH01-CB)
Horn Antenna	EMCO	3115	00075790	750MHz~18GHz	Nov. 25, 2011	Radiation (O3CH01-CB)
Horn Antenna	SCHWARZBEAK	BBHA 9170	BBHA9170252	15GHz ~ 40GHz	Nov. 22, 2011	Radiation (O3CH01-CB)
Pre-Amplifier	Agilent	8447D	2944A10991	0.1MHz ~ 1.3GHz	Nov. 17, 2011	Radiation (O3CH01-CB)
Pre-Amplifier	Agilent	8449B	3008A02310	1GHz ~ 26.5GHz	Nov. 29, 2011	Radiation (O3CH01-CB)
Pre-Amplifier	WM	TF-130N-R1	923365	26.5GHz ~ 40GHz	Jul. 31, 2012	Radiation (O3CH01-CB)
Spectrum analyzer	R&S	FSP40	100056	9KHz~40GHz	Nov. 03, 2011	Radiation (O3CH01-CB)
EMI Test Receiver	R&S	ESCS 30	100355	9KHz ~ 2.75GHz	Mar. 20, 2012	Radiation (O3CH01-CB)
Loop Antenna	Teseq	HLA 6120	24155	9 kHz - 30 MHz	Sep. 09, 2012	Radiation (O3CH01-CB)
Turn Table	INN CO	CO 2000	N/A	0 ~ 360 degree	N/A	Radiation (O3CH01-CB)
Antenna Mast	INN CO	CO2000	N/A	1 m - 4 m	N/A	Radiation (O3CH01-CB)
RF Cable-low	Woken	Low Cable-1	N/A	30 MHz - 1 GHz	Nov. 17, 2011	Radiation (O3CH01-CB)
RF Cable-high	Woken	High Cable-1	N/A	1 GHz - 26.5 GHz	Nov. 17, 2011	Radiation (O3CH01-CB)
RF Cable-high	Woken	High Cable-2	N/A	1 GHz - 26.5 GHz	Nov. 17, 2011	Radiation (O3CH01-CB)
RF Cable-high	Woken	High Cable-3	N/A	1 GHz - 40 GHz	Nov. 17, 2011	Radiation (O3CH01-CB)
RF Cable-high	Woken	High Cable-4	N/A	1 GHz - 40 GHz	Nov. 17, 2011	Radiation (O3CH01-CB)
Temp. and Humidity Chamber	Ten Billion	TTH-D3SP	TBN-931011	-30~100 degree	Jun. 05, 2012	Conducted (TH01-CB)
Thermo-Hygro Meter	N/A	HC 520	#1	15~70 degree	Nov. 02, 2011	Conducted (TH01-CB)
Signal Generator	R&S	SMR40	100302	10MHz-40GHz	Nov. 22, 2011	Conducted (TH01-CB)
RF Power Divider	HP	11636A	00306	2GHz ~ 18GHz	N/A	Conducted (TH01-CB)
RF Power Splitter	Anaren	44100	1839	2GHz ~ 18GHz	N/A	Conducted (TH01-CB)
RF Power Splitter	Anaren	42100	17930	2GHz ~ 18GHz	N/A	Conducted (TH01-CB)
RF Cable-high	Woken	High Cable-7	-	1 GHz - 26.5 GHz	Nov. 17, 2011	Conducted (TH01-CB)
RF Cable-high	Woken	High Cable-8	-	1 GHz - 26.5 GHz	Nov. 17, 2011	Conducted (TH01-CB)
RF Cable-high	Woken	High Cable-9	-	1 GHz - 26.5 GHz	Nov. 17, 2011	Conducted (TH01-CB)
RF Cable-high	Woken	High Cable-10	-	1 GHz - 26.5 GHz	Nov. 17, 2011	Conducted (TH01-CB)
RF Cable-high	Woken	High Cable-11	-	1 GHz - 26.5 GHz	Nov. 17, 2011	Conducted (TH01-CB)

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Remark
RF Cable-high	Woken	High Cable-12	-	1 GHz – 26.5 GHz	Nov. 17, 2011	Conducted (TH01-CB)
RF Cable-high	Woken	High Cable-13	-	1 GHz – 26.5 GHz	Nov. 17, 2011	Conducted (TH01-CB)
Power Sensor	Anritsu	MA2411B	0917223	300MHz~40GHz	Nov. 01, 2011	Conducted (TH01-CB)
Power Meter	Anritsu	ML2495A	1035008	300MHz~40GHz	Nov. 01, 2011	Conducted (TH01-CB)

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

Note: "*" Calibration Interval of instruments listed above is two years.

6. TEST LOCATION

SHIJR	ADD : 6Fl., No. 106, Sec. 1, Shintai 5th Rd., Shijr City, Taipei, Taiwan 221, R.O.C. TEL : 886-2-2696-2468 FAX : 886-2-2696-2255
HWA YA	ADD : No. 52, Hwa Ya 1st Rd., Kwei-Shan Hsiang, Tao Yuan Hsien, Taiwan, R.O.C. TEL : 886-3-327-3456 FAX : 886-3-318-0055
LINKOU	ADD : No. 30-2, Dingfu Tsuen, Linkou Shiang, Taipei, Taiwan 244, R.O.C TEL : 886-2-2601-1640 FAX : 886-2-2601-1695
DUNGHU	ADD : No. 3, Lane 238, Kangle St., Neihu Chiu, Taipei, Taiwan 114, R.O.C. TEL : 886-2-2631-4739 FAX : 886-2-2631-9740
JUNGHE	ADD : 7Fl., No. 758, Jungjeng Rd., Junghe City, Taipei, Taiwan 235, R.O.C. TEL : 886-2-8227-2020 FAX : 886-2-8227-2626
NEIHU	ADD : 4Fl., No. 339, Hsin Hu 2 nd Rd., Taipei 114, Taiwan, R.O.C. TEL : 886-2-2794-8886 FAX : 886-2-2794-9777
JHUBEI	ADD : 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

7. TAF CERTIFICATE OF ACCREDITATION



Certificate No. : L1190-091230

財團法人全國認證基金會
Taiwan Accreditation Foundation

Certificate of Accreditation

This is to certify that

Sporton International Inc.
EMC & Wireless Communications Laboratory
No.52, Hwa Ya 1st Rd., Hwa Ya Technology Park, Kwei-Shan Hsiang, Tao Yuan Hsien,
Taiwan, R.O.C.

is accredited in respect of laboratory

Accreditation Criteria	: ISO/IEC 17025:2005
Accreditation Number	: 1190
Originally Accredited	: December 15, 2003
Effective Period	: January 10, 2010 to January 09, 2013
Accredited Scope	: Testing Field, see described in the Appendix
Specific Accreditation Program	: Accreditation Program for Designated Testing Laboratory for Commodities Inspection Accreditation Program for Telecommunication Equipment Testing Laboratory Accreditation Program for BSMI Mutual Recognition Arrangement with Foreign Authorities

Jay-san Chen

Jay-San Chen
President, Taiwan Accreditation Foundation
Date : December 30, 2009

Pl, total 22 pages

The Appendix forms an integral part of this Certificate, which shall be invalid when use without the Appendix