



SPORTON International Inc.

No. 52, Hwa Ya 1st Rd., Kwei-Shan Hsiang, TaoYuan Hsien, Taiwan, R.O.C.
Ph: 886-3-327-3456 / FAX: 886-3-327-0973 / www.sporton.com.tw

FCC RADIO TEST REPORT

Applicant's company	Broadcom Corporation
Applicant Address	190 Mathilda Place Sunnyvale CA 94086 U.S.A.
FCC ID	QDS-BRCM1073
Manufacturer's company	Broadcom Corporation
Manufacturer Address	190 Mathilda Place Sunnyvale CA 94086 U.S.A.

Product Name	802.11a/b/g/n WLAN + Bluetooth Card
Brand Name	Broadcom
Model Name	BCM943241NG1630
Test Rule Part(s)	47 CFR FCC Part 15 Subpart C § 15.247
Test Freq. Range	2400 ~ 2483.5MHz / 5725 ~ 5850MHz
Received Date	Mar. 04, 2013
Final Test Date	Apr. 04, 2013
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 C63.4-2003, 47 CFR FCC Part 15 Subpart C, KDB 558074 D01 v02 and KDB 662911 D01 v01r02.

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



Table of Contents

1. CERTIFICATE OF COMPLIANCE	1
2. SUMMARY OF THE TEST RESULT	2
3. GENERAL INFORMATION	3
3.1. Product Details.....	3
3.2. Accessories.....	5
3.3. Table for Filed Antenna.....	6
3.4. Table for Carrier Frequencies	7
3.5. Table for Test Modes	8
3.6. Table for Testing Locations.....	10
3.7. Table for Supporting Units	10
3.8. Table for Parameters of Test Software Setting	11
3.9. Test Configurations	13
4. TEST RESULT	15
4.1. AC Power Line Conducted Emissions Measurement.....	15
4.2. Maximum Conducted Output Power Measurement.....	19
4.3. Power Spectral Density Measurement	23
4.4. 6dB Spectrum Bandwidth Measurement	33
4.5. Radiated Emissions Measurement	42
4.6. Emissions Measurement	73
4.7. Antenna Requirements	114
5. LIST OF MEASURING EQUIPMENTS	115
6. TEST LOCATION.....	117
APPENDIX A. TEST PHOTOS	A1 ~ A7
APPENDIX B. CO-LOCATION REPORT	B1 ~ B5

History of This Test Report

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FR330410AB	Rev. 01	Initial issue of report	Apr. 04, 2013

1. CERTIFICATE OF COMPLIANCE

Product Name : 802.11a/b/g/n WLAN + Bluetooth Card
Brand Name : Broadcom
Model Name : BCM943241NG1630
Applicant : Broadcom Corporation
Test Rule Part(s) : 47 CFR FCC Part 15 Subpart C § 15.247

Sporton International as requested by the applicant to evaluate the EMC performance of the product sample received on Mar. 04, 2013 would like to declare that the tested sample has been evaluated and found to be in compliance with the tested rule parts. The data recorded as well as the test configuration specified is true and accurate for showing the sample's EMC nature.



Sam Chen
SPORTON INTERNATIONAL INC.

2. SUMMARY OF THE TEST RESULT

Applied Standard: 47 CFR FCC Part 15 Subpart C				
Part	Rule Section	Description of Test	Result	Under Limit
4.1	15.207	AC Power Line Conducted Emissions	Complies	11.88 dB
4.2	15.247(b)(3)	Maximum Conducted Output Power	Complies	7.85 dB
4.3	15.247(e)	Power Spectral Density	Complies	2.64 dB
4.4	15.247(a)(2)	6dB Spectrum Bandwidth	Complies	-
4.5	15.247(d)	Radiated Emissions	Complies	0.27 dB
4.6	15.247(d)	Band Edge Emissions	Complies	0.04 dB
4.7	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 (1TX/2TX, 1RX/2RX)
Radio Type	Intentional Transceiver
Power Type	From Host System
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): 16.96 MHz For 1TX:MCS0 (40MHz): 36.48 MHz For 2TX:MCS0 (40MHz): 36.32 MHz For 5GHz Band: MCS0 (20MHz): 26.48 MHz For 1TX:MCS0 (40MHz): 62.08 MHz For 2TX:MCS0 (40MHz): 65.44 MHz
Maximum Conducted Output Power	For 2.4GHz Band: MCS0 (20MHz): 19.22 dBm For 1TX:MCS0 (40MHz): 14.65 dBm For 2TX:MCS0 (40MHz): 16.77 dBm For 5GHz Band: MCS0 (20MHz): 22.15 dBm For 1TX:MCS0 (40MHz): 20.25 dBm For 2TX:MCS0 (40MHz): 22.08 dBm
Carrier Frequencies	Please refer to section 3.4
Antenna	Please refer to section 3.3

802.11a/b/g

Items	Description
Product Type	802.11b: WLAN (1TX, 1RX) 802.11g: WLAN (1TX, 1RX) 802.11a: WLAN (1TX, 1RX)
Radio Type	Intentional Transceiver
Power Type	From Host System
Modulation	DSSS for IEEE 802.11b ; OFDM for IEEE 802.11a/g
Data Modulation	DSSS (BPSK / QPSK / CCK) ; OFDM (BPSK / QPSK / 16QAM / 64QAM)
Data Rate (Mbps)	DSSS (1/ 2/ 5.5/11) ; OFDM (6/9/12/18/24/36/48/54)
Frequency Range	2400 ~ 2483.5MHz / 5725 ~ 5850MHz
Channel Number	11b/g: 11 ; 11a: 5
Channel Band Width (99%)	11b: 10.16 MHz ; 11g: 16.56 MHz ; 11a: 27.68 MHz
Maximum Conducted Output Power	11b: 17.49 dBm ; 11g: 18.84 dBm ; 11a: 20.48 dBm
Carrier Frequencies	Please refer to section 3.4
Antenna	Please refer to section 3.3

Antenna & Band width

Antenna	Single (TX)		Two (TX)	
Band width Mode	20 MHz	40 MHz	20 MHz	40 MHz
IEEE 802.11a	V	X	X	X
IEEE 802.11b	V	X	X	X
IEEE 802.11g	V	X	X	X
IEEE 802.11n	V	V	V	V
IEEE 802.11an	V	V	V	V

IEEE 802.11n spec

MCS Index	Nss	Modulation	R	NBPSC	NCBPS		NDBPS		Datarate(Mbps)			
									800nsGI		400nsGI	
					20MHz	40MHz	20MHz	40MHz	20MHz	40MHz	20MHz	40MHz
0	1	BPSK	1/2	1	52	108	26	54	6.5	13.5	7.200	15
1	1	QPSK	1/2	2	104	216	52	108	13.0	27.0	14.400	30
2	1	QPSK	3/4	2	104	216	78	162	19.5	40.5	21.700	45
3	1	16-QAM	1/2	4	208	432	104	216	26.0	54.0	28.900	60
4	1	16-QAM	3/4	4	208	432	156	324	39.0	81.0	43.300	90
5	1	64-QAM	2/3	6	312	648	208	432	52.0	108.0	57.800	120
6	1	64-QAM	3/4	6	312	648	234	486	58.5	121.5	65.000	135
7	1	64-QAM	5/6	6	312	648	260	540	65.0	135.0	72.200	150
8	2	BPSK	1/2	1	104	216	52	108	13.0	27.0	14.444	30
9	2	QPSK	1/2	2	208	432	104	216	26.0	54.0	28.889	60
10	2	QPSK	3/4	2	208	432	156	324	39.0	81.0	43.333	90
11	2	16-QAM	1/2	4	416	864	208	432	52.0	108.0	57.778	120
12	2	16-QAM	3/4	4	416	864	312	648	78.0	162.0	86.667	180
13	2	64-QAM	2/3	6	624	1296	416	864	104.0	216.0	115.556	240
14	2	64-QAM	3/4	6	624	1296	468	972	117.0	243.0	130.000	270
15	2	64-QAM	5/6	6	624	1296	520	1080	130.0	270.0	144.444	300

Symbol	Explanation
NSS	Number of spatial streams
R	Code rate
NBPSC	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

N/A

3.3. Table for Filed Antenna

Ant.	Brand	Model Name	Antenna Type	Connector	Gain (dBi)		Remark
1	Hitachi Cable, Ltd	HMT05/HFT17-DL07	PIFA Antenna	I-PEX	2.4GHz	3.9	ANT0 of board
					5GHz-B4	5.8	
2	Hitachi Cable, Ltd	HMT05/HFT17-DL07	PIFA Antenna	I-PEX	2.4GHz	3.9	ANT1 of board
					5GHz-B4	5.8	

Note:

For IEEE 802.11b mode (1TX/1RX):

Only Ant. 1 can be use as transmit and receive antenna.

For IEEE 802.11g mode (1TX/1RX):

Only Ant. 1 can be use as transmit and receive antenna.

For IEEE 802.11a mode (1TX/1RX):

Only Ant. 1 can be use as transmit and receive antenna.

For IEEE 802.11n mode (1TX2TX/1RX2RX):

The EUT can support both 1TX and 2TX functions.

For 1TX

Only Ant. 1 can be use as transmit and receive antenna.

For 2TX

Both Ant. 1 and Ant. 2 can be used as transmitting/receiving antenna.

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

For IEEE 802.11an mode (1TX2TX/1RX2RX):

The EUT can support both 1TX and 2TX functions.

For 1TX

Only Ant. 1 can be use as transmit and receive antenna.

For 2TX

Both Ant. 1 and Ant. 2 can be used as transmitting/receiving antenna.

Ant. 1 and Ant. 2 could both 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	CTX	-	-	-
Maximum Conducted Output Power	MCS0/20MHz	7.2 Mbps	1/6/11	1+2
	MCS0/40MHz	15 Mbps	3/6/9	1
	MCS0/40MHz	15 Mbps	3/6/9	1+2
	11b/CCK	1 Mbps	1/6/11	1
	11g/BPSK	6 Mbps	1/6/11	1
Power Spectral Density	MCS0/20MHz	7.2 Mbps	1/6/11	1&2
	MCS0/40MHz	15 Mbps	3/6/9	1
	MCS0/40MHz	15 Mbps	3/6/9	1&2
	11b/CCK	1 Mbps	1/6/11	1
	11g/BPSK	6 Mbps	1/6/11	1
6dB Spectrum Bandwidth	MCS0/20MHz	7.2 Mbps	1/6/11	1+2
	MCS0/40MHz	15 Mbps	3/6/9	1
	MCS0/40MHz	15 Mbps	3/6/9	1+2
	11b/CCK	1 Mbps	1/6/11	1
	11g/BPSK	6 Mbps	1/6/11	1
Radiated Emissions Below 1GHz	CTX	-	-	-
Radiated Emissions Above 1GHz	MCS0/20MHz	7.2 Mbps	1/6/11	1+2
	MCS0/40MHz	15 Mbps	3/6/9	1
	MCS0/40MHz	15 Mbps	3/6/9	1+2
	11b/CCK	1 Mbps	1/6/11	1
	11g/BPSK	6 Mbps	1/6/11	1
Band Edge Emissions	MCS0/20MHz	7.2 Mbps	1/6/11	1+2
	MCS0/40MHz	15 Mbps	3/6/9	1
	MCS0/40MHz	15 Mbps	3/6/9	1+2
	11b/CCK	1 Mbps	1/6/11	1
	11g/BPSK	6 Mbps	1/6/11	1

Note: The 1TX of 11g power could cover 1TX of 11n 20.

For 5GHz Band

Test Items	Mode	Data Rate	Channel	Antenna
AC Power Line Conducted Emissions	CTX	-	-	-
Maximum Conducted Output Power	MCS0/20MHz	7.2 Mbps	149/157/165	1+2
	MCS0/40MHz	15 Mbps	151/159	1
	MCS0/40MHz	15 Mbps	151/159	1+2
	11a/BPSK	6 Mbps	149/157/165	1
Power Spectral Density	MCS0/20MHz	7.2 Mbps	149/157/165	1&2
	MCS0/40MHz	15 Mbps	151/159	1
	MCS0/40MHz	15 Mbps	151/159	1&2
	11a/BPSK	6 Mbps	149/157/165	1
6dB Spectrum Bandwidth	MCS0/20MHz	7.2 Mbps	149/157/165	1+2
	MCS0/40MHz	15 Mbps	151/159	1
	MCS0/40MHz	15 Mbps	151/159	1+2
	11a/BPSK	6 Mbps	149/157/165	1
Radiated Emissions Below 1GHz	CTX	-	-	-
Radiated Emissions Above 1GHz	MCS0/20MHz	7.2 Mbps	149/157/165	1+2
	MCS0/40MHz	15 Mbps	151/159	1
	MCS0/40MHz	15 Mbps	151/159	1+2
	11a/BPSK	6 Mbps	149/157/165	1
Band Edge Emissions	MCS0/20MHz	7.2 Mbps	149/157/165	1+2
	MCS0/40MHz	15 Mbps	151/159	1
	MCS0/40MHz	15 Mbps	151/159	1+2
	11a/BPSK	6 Mbps	149/157/165	1

Note: The 1TX of 11a power could cover 1TX of 11an20.

<For MPE and Co-location Test>:

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

3.6. Table for Testing Locations

Test Site No.	Site Category	Location	FCC Reg. No.	IC File No.
03CH01-CB	SAC	Hsin Chu	262045	IC 4086D
CO01-CB	Conduction	Hsin Chu	262045	IC 4086D
TH01-CB	OVEN Room	Hsin Chu	-	-

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

Please refer section 6 for Test Site Address.

3.7. Table for Supporting Units

Test Site No: CO01-CB

Support Unit	Brand	Model	FCC ID
Notebook	DELL	E6430	QDS-BRCM1049LE

Test Site No: 03CH01-CB

Support Unit	Brand	Model	FCC ID
Notebook	DELL	E6430	QDS-BRCM1049LE

Test Site No: TH01-CB

Support Unit	Brand	Model	FCC ID
Notebook	DELL	E4300	E2K512ANHWW

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 MCS0 20MHz

Test Software Version	Manual Tool Version : 2.0.0.7		
Frequency	2412 MHz	2437 MHz	2462 MHz
MCS0 20MHz	45	64	52

For 1TX

Power Parameters of IEEE 802.11n MCS0 40MHz

Test Software Version	Manual Tool Version : 2.0.0.7		
Frequency	2422 MHz	2437 MHz	2452 MHz
MCS0 40MHz	46	56	50

For 2TX

Power Parameters of IEEE 802.11n MCS0 40MHz

Test Software Version	Manual Tool Version : 2.0.0.7		
Frequency	2422 MHz	2437 MHz	2452 MHz
MCS0 40MHz	39	52	47

Power Parameters of IEEE 802.11b/g

Test Software Version	Manual Tool Version : 2.0.0.7		
Frequency	2412 MHz	2437 MHz	2462 MHz
IEEE 802.11b	68	68	68
IEEE 802.11g	61	75	57

For 5GHz Band

Power Parameters of IEEE 802.11n MCS0 20MHz

Test Software Version	Manual Tool Version : 2.0.0.7		
Frequency	5745 MHz	5785 MHz	5825 MHz
MCS0 20MHz	86	86	86

For 1TX

Power Parameters of IEEE 802.11n MCS0 40MHz

Test Software Version	Manual Tool Version : 2.0.0.7	
Frequency	5755 MHz	5795 MHz
MCS0 40MHz	86	86

For 2TX

Power Parameters of IEEE 802.11n MCS0 40MHz

Test Software Version	Manual Tool Version : 2.0.0.7	
Frequency	5755 MHz	5795 MHz
MCS0 40MHz	86	86

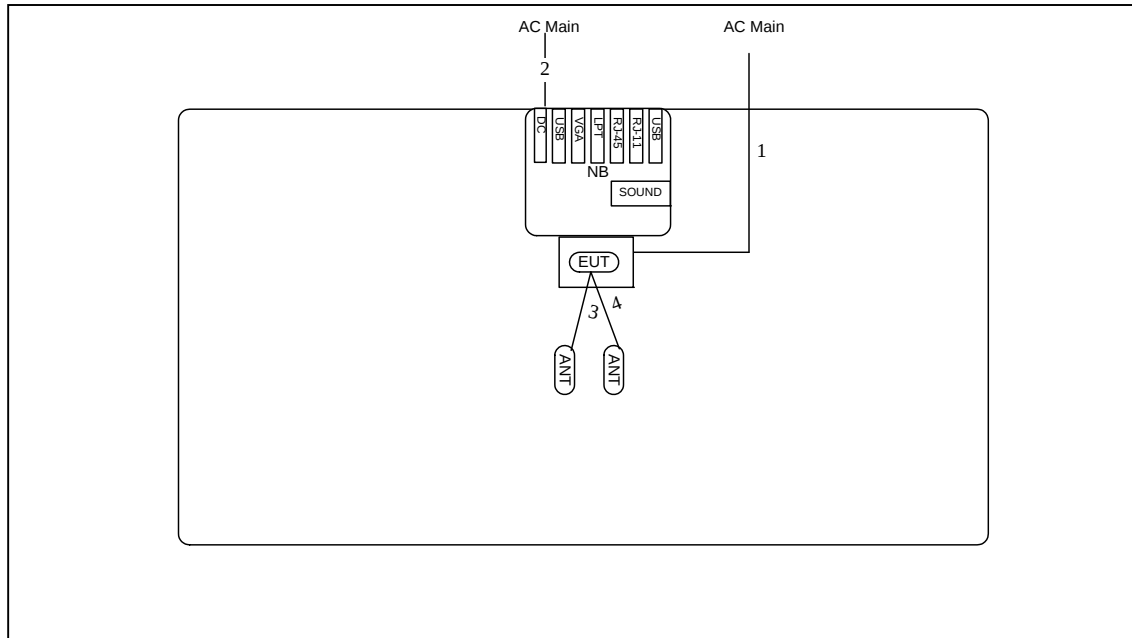
Power Parameters of IEEE 802.11a

Test Software Version	Manual Tool Version : 2.0.0.7		
Frequency	5745 MHz	5785 MHz	5825 MHz
IEEE 802.11a	86	86	86

During the test, "Manual Tool Version : 2.0.0.7" under WIN XP was executed the test program to control the EUT continuously transmit RF signal.

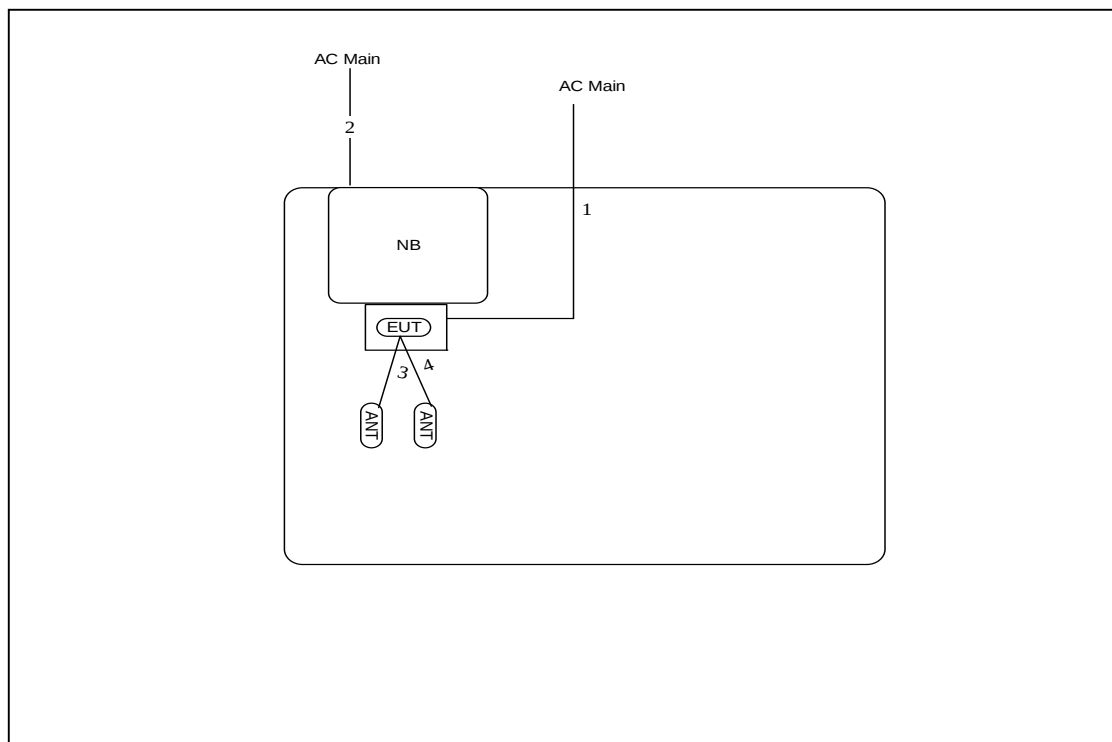
3.9. Test Configurations

3.9.1. Radiation Emissions Test Configuration



Item	Connection	Shield	Length
1	AC power cable	No	1.8m
2	AC power cable	No	0.75m
3	Antenna cable	No	0.2m
4	Antenna cable	No	0.2m

3.9.2. AC Power Line Conduction Emissions Test Configuration



Item	Connection	Shield	Length
1	AC power cable	No	1.8m
2	AC power cable	No	0.75m
3	Antenna cable	No	0.2m
4	Antenna cable	No	0.2m

4. TEST RESULT

4.1. AC Power Line Conducted Emissions Measurement

4.1.1. Limit

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

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

4.1.2. Measuring Instruments and Setting

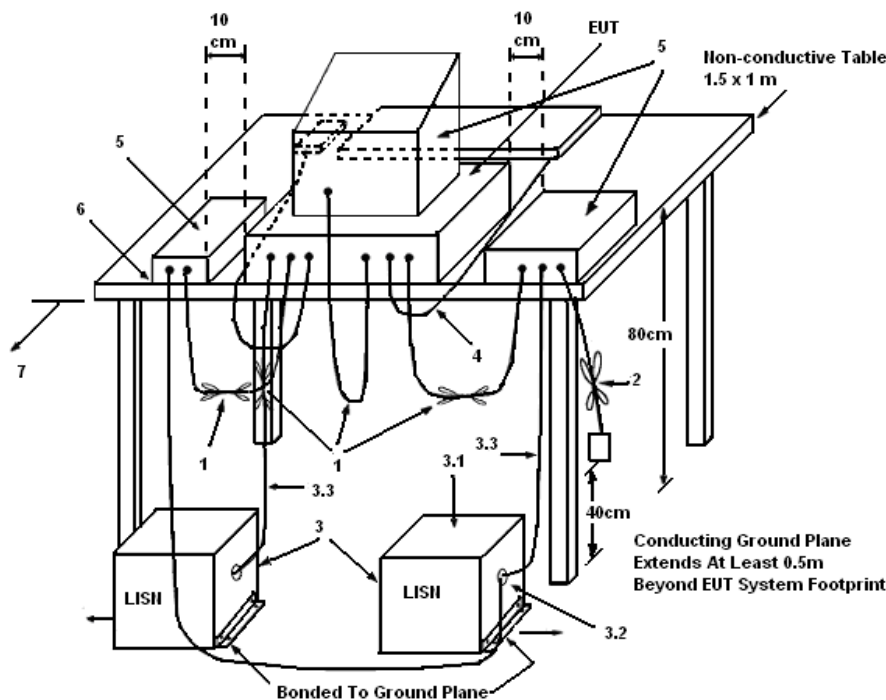
Please refer to section 5 of equipments list in this report. The following table is the setting of the receiver.

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

4.1.3. Test Procedures

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

4.1.4. Test Setup Layout



LEGEND:

- (1) Interconnecting cables that hang closer than 40 cm to the ground plane shall be folded back and forth in the center forming a bundle 30 to 40 cm long.
- (2) I/O cables that are not connected to a peripheral shall be bundled in the center. The end of the cable may be terminated, if required, using the correct terminating impedance. The overall length shall not exceed 1 m.
- (3) EUT connected to one LISN. Unused LISN measuring port connectors shall be terminated in 50 Ω . LISN can be placed on top of, or immediately beneath, reference ground plane.
- (3.1) All other equipment powered from additional LISN(s).
- (3.2) Multiple outlet strip can be used for multiple power cords of non-EUT equipment.
- (3.3) LISN at least 80 cm from nearest part of EUT chassis.
- (4) Cables of hand-operated devices, such as keyboards, mice, etc., shall be placed as for normal use.
- (5) Non-EUT components of EUT system being tested.
- (6) Rear of EUT, including peripherals, shall all be aligned and flush with rear of tabletop.
- (7) Rear of tabletop shall be 40 cm removed from a vertical conducting plane that is bonded to the ground plane.

4.1.5. Test Deviation

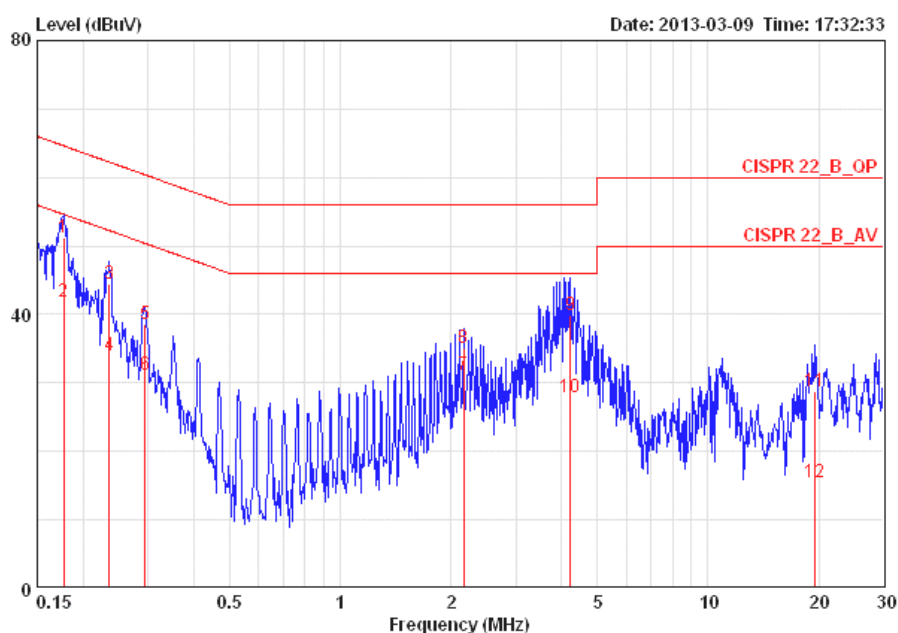
There is no deviation with the original standard.

4.1.6. EUT Operation during Test

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

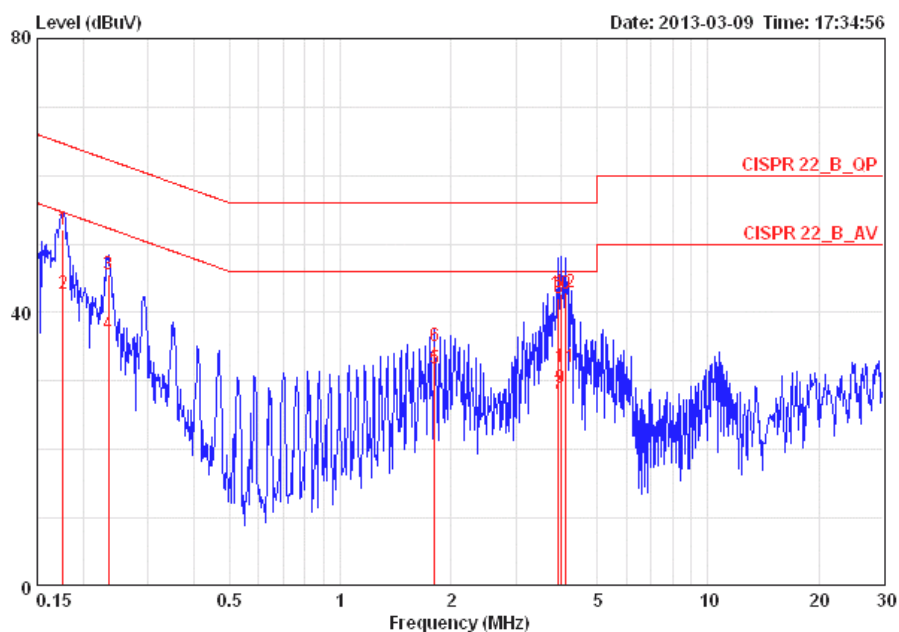
4.1.7. Results of AC Power Line Conducted Emissions Measurement

Temperature	25°C	Humidity	52%
Test Engineer	Kane Liu	Phase	Line
Configuration	CTX		



	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.17678	51.27	-13.36	64.64	50.93	0.15	0.19	QP
2	0.17678	41.94	-12.69	54.64	41.60	0.15	0.19	AVERAGE
3	0.23533	44.44	-17.82	62.26	44.09	0.15	0.20	QP
4	0.23533	33.92	-18.34	52.26	33.57	0.15	0.20	AVERAGE
5	0.29398	38.54	-21.87	60.41	38.19	0.15	0.20	QP
6	0.29398	31.16	-19.25	50.41	30.81	0.15	0.20	AVERAGE
7	2.167	31.27	-14.73	46.00	30.84	0.19	0.23	AVERAGE
8	2.167	35.00	-21.00	56.00	34.57	0.19	0.23	QP
9	4.224	39.93	-16.07	56.00	39.40	0.22	0.30	QP
10	4.224	27.98	-18.02	46.00	27.45	0.22	0.30	AVERAGE
11	19.428	28.76	-31.24	60.00	27.79	0.47	0.50	QP
12	19.428	15.37	-34.63	50.00	14.40	0.47	0.50	AVERAGE

Temperature	25°C	Humidity	52%
Test Engineer	Kane Liu	Phase	Neutral
Configuration	CTX		



	Freq	Level	Over	Limit	Read	LISN	Cable	
	MHz	dBuV	Limit	Line	Level	Factor	Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.17584	52.09	-12.59	64.68	51.82	0.08	0.19	QP
2	0.17584	42.80	-11.88	54.68	42.53	0.08	0.19	AVERAGE
3	0.23409	45.62	-16.68	62.30	45.34	0.08	0.20	QP
4	0.23409	36.85	-15.45	52.30	36.57	0.08	0.20	AVERAGE
5	1.810	31.88	-14.12	46.00	31.55	0.11	0.23	AVERAGE
6	1.810	35.20	-20.80	56.00	34.87	0.11	0.23	QP
7	3.922	28.06	-17.94	46.00	27.63	0.13	0.30	AVERAGE
8	3.922	41.97	-14.03	56.00	41.54	0.13	0.30	QP
9	3.985	29.09	-16.91	46.00	28.66	0.13	0.30	AVERAGE
10	3.985	42.65	-13.35	56.00	42.22	0.13	0.30	QP
11	4.092	32.00	-14.00	46.00	31.57	0.13	0.30	AVERAGE
12	4.092	42.90	-13.10	56.00	42.47	0.13	0.30	QP

Note:

Level = Read Level + LISN Factor + Cable Loss

4.2. Maximum Conducted Output Power Measurement

4.2.1. Limit

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

4.2.2. Measuring Instruments and Setting

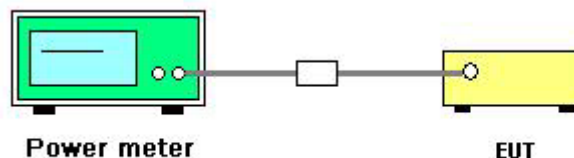
Please refer to section 5 of equipments list in this report. The following table is the setting of the power meter.

Power Meter Parameter	Setting
Bandwidth	50MHz bandwidth is greater than the EUT emission bandwidth
Detector	Average

4.2.3. Test Procedures

1. Test procedures refer KDB558074 v01 r02 section 8.2.3 option 3.
2. This procedure provides an alternative for determining the RMS output power using a broadband RF average power meter with a thermocouple detector.

4.2.4. Test Setup Layout



4.2.5. Test Deviation

There is no deviation with the original standard.

4.2.6. EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

4.2.7. Test Result of Maximum Conducted Output Power

Temperature	23°C	Humidity	63%
Test Engineer	Benson Peng	Configurations	IEEE 802.11n
Test Date	Mar. 10, 2013		

For 2.4GHz Band

Configuration IEEE 802.11n MCS0 20MHz

Channel	Frequency	Conducted Power (dBm)		Total Conducted Power (dBm)	Max. Limit (dBm)	Result
		Ant. 1	Ant. 2			
1	2412 MHz	11.42	11.80	14.62	30.00	Complies
6	2437 MHz	16.25	16.16	19.22	30.00	Complies
11	2462 MHz	13.78	13.81	16.81	30.00	Complies

For 1TX

Configuration IEEE 802.11n MCS0 40MHz / Ant. 1

Channel	Frequency	Conducted Power (dBm)	Max. Limit (dBm)	Result
3	2422 MHz	12.07	30.00	Complies
6	2437 MHz	14.65	30.00	Complies
9	2452 MHz	13.31	30.00	Complies

For 2TX

Configuration IEEE 802.11n MCS0 40MHz

Channel	Frequency	Conducted Power (dBm)		Total Conducted Power (dBm)	Max. Limit (dBm)	Result
		Ant. 1	Ant. 2			
3	2422 MHz	10.18	10.26	13.23	30.00	Complies
6	2437 MHz	13.76	13.75	16.77	30.00	Complies
9	2452 MHz	12.63	12.68	15.67	30.00	Complies

For 5GHz Band

Configuration IEEE 802.11n MCS0 20MHz

Channel	Frequency	Conducted Power (dBm)		Total Conducted Power (dBm)	Max. Limit (dBm)	Result
		Ant. 1	Ant. 2			
149	5745 MHz	19.12	19.15	22.15	30.00	Complies
157	5785 MHz	19.08	19.05	22.08	30.00	Complies
165	5825 MHz	18.84	18.89	21.88	30.00	Complies

For 1TX

Configuration IEEE 802.11n MCS0 40MHz / Ant. 1

Channel	Frequency	Conducted Power (dBm)	Max. Limit (dBm)	Result
151	5755 MHz	20.25	30.00	Complies
159	5795 MHz	20.05	30.00	Complies

For 2TX

Configuration IEEE 802.11n MCS0 40MHz

Channel	Frequency	Conducted Power (dBm)		Total Conducted Power (dBm)	Max. Limit (dBm)	Result
		Ant. 1	Ant. 2			
151	5755 MHz	18.99	19.15	22.08	30.00	Complies
159	5795 MHz	18.92	19.00	21.97	30.00	Complies

Temperature	23°C	Humidity	63%
Test Engineer	Benson Peng	Configurations	IEEE 802.11a/b/g
Test Date	Mar. 10, 2013		

Configuration IEEE 802.11b / Ant. 1

Channel	Frequency	Conducted Power (dBm)	Max. Limit (dBm)	Result
1	2412 MHz	16.62	30.00	Complies
6	2437 MHz	17.16	30.00	Complies
11	2462 MHz	17.49	30.00	Complies

Configuration IEEE 802.11g / Ant. 1

Channel	Frequency	Conducted Power (dBm)	Max. Limit (dBm)	Result
1	2412 MHz	14.93	30.00	Complies
6	2437 MHz	18.84	30.00	Complies
11	2462 MHz	14.77	30.00	Complies

Configuration IEEE 802.11a / Ant. 1

Channel	Frequency	Conducted Power (dBm)	Max. Limit (dBm)	Result
149	5745 MHz	20.48	30.00	Complies
157	5785 MHz	20.07	30.00	Complies
165	5825 MHz	19.93	30.00	Complies

4.3. Power Spectral Density Measurement

4.3.1. Limit

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

4.3.2. Measuring Instruments and Setting

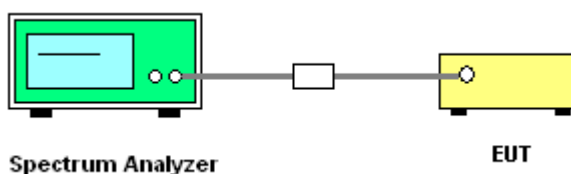
Please refer to section 5 of equipments list in this report. The following table is the setting of the spectrum analyzer.

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

4.3.3. Test Procedures

1. Test procedures refer KDB 558074 v01 r02 section 9.1 option 1 & KDB662911 D01 Multiple Transmitter Output v01r02 section In-Band Power Spectral Density (PSD) Measurements option (2) Measure and add 10 log(NANT) dB.
2. Use this procedure when the maximum conducted output power in the fundamental emission is used to demonstrate compliance. The EUT must be configured to transmit continuously at full power over the measurement duration.
3. Ensure that the number of measurement points in the sweep $\geq 2 \times \text{span/RBW}$ (use of a greater number of measurement points than this minimum requirement is recommended).
4. Use the peak marker function to determine the maximum level in any 3 kHz band segment within the fundamental EBW.
5. The resulting PSD level must be ≤ 8 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	23°C	Humidity	63%
Test Engineer	Benson Peng	Configurations	IEEE 802.11n

For 2.4GHz Band

Configuration IEEE 802.11n MCS0 20MHz

Channel	Frequency	Power Density (dBm/10kHz)		Single Port Limit (dBm/3kHz)	Result
		Ant. 1	Ant. 2		
1	2412 MHz	-8.02	-7.90	4.99	Complies
6	2437 MHz	-3.17	-3.02	4.99	Complies
11	2462 MHz	-4.93	-5.75	4.99	Complies

Note: PSD Limit = (8dBm/3kHz - (10log(2))) = 4.99dBm/3kHz

For 1TX

Configuration IEEE 802.11n MCS0 40MHz / Ant. 1

Channel	Frequency	Power Density (dBm/10kHz)	Max. Limit (dBm/3kHz)	Result
3	2422 MHz	-10.71	8.00	Complies
6	2437 MHz	-7.80	8.00	Complies
9	2452 MHz	-9.46	8.00	Complies

Note: PSD Limit = (8dBm/3kHz - (10log(1))) = 8dBm/3kHz

For 2TX

Configuration IEEE 802.11n MCS0 40MHz

Channel	Frequency	Power Density (dBm/10kHz)		Single Port Limit (dBm/3kHz)	Result
		Ant. 1	Ant. 2		
3	2422 MHz	-12.41	-12.13	4.99	Complies
6	2437 MHz	-8.92	-7.71	4.99	Complies
9	2452 MHz	-10.62	-9.22	4.99	Complies

Note: PSD Limit = (8dBm/3kHz - (10log(2))) = 4.99dBm/3kHz

For 5GHz Band

Configuration IEEE 802.11n MCS0 20MHz

Channel	Frequency	Power Density (dBm/10kHz)		Single Port Limit (dBm/3kHz)	Result
		Ant. 1	Ant. 2		
149	5745 MHz	1.52	0.75	4.99	Complies
157	5785 MHz	2.35	0.05	4.99	Complies
165	5825 MHz	0.13	0.11	4.99	Complies

Note: PSD Limit = (8dBm/3kHz - (10log(2))) = 4.99dBm/3kHz

For 1TX

Configuration IEEE 802.11n MCS0 40MHz / Ant. 1

Channel	Frequency	Power Density (dBm/10kHz)	Max. Limit (dBm/3kHz)	Result
151	5755 MHz	-1.58	8.00	Complies
159	5795 MHz	-1.95	8.00	Complies

Note: PSD Limit = (8dBm/3kHz - (10log(1))) = 8dBm/3kHz

For 2TX

Configuration IEEE 802.11n MCS0 40MHz

Channel	Frequency	Power Density (dBm/10kHz)		Single Port Limit (dBm/3kHz)	Result
		Ant. 1	Ant. 2		
151	5755 MHz	-3.67	-2.38	4.99	Complies
159	5795 MHz	-3.99	-3.60	4.99	Complies

Note: PSD Limit = (8dBm/3kHz - (10log(2))) = 4.99dBm/3kHz

Temperature	23°C	Humidity	63%
Test Engineer	Benson Peng	Configurations	IEEE 802.11a/b/g

Configuration IEEE 802.11b / Ant. 1

Channel	Frequency	Power Density (dBm/10kHz)	Max. Limit (dBm/3kHz)	Result
1	2412 MHz	0.26	8.00	Complies
6	2437 MHz	0.53	8.00	Complies
11	2462 MHz	0.49	8.00	Complies

Note: PSD Limit = (8dBm/3kHz - (10log(1))) = 8dBm/3kHz

Configuration IEEE 802.11g / Ant. 1

Channel	Frequency	Power Density (dBm/10kHz)	Max. Limit (dBm/3kHz)	Result
1	2412 MHz	-3.43	8.00	Complies
6	2437 MHz	-0.95	8.00	Complies
11	2462 MHz	-3.74	8.00	Complies

Note: PSD Limit = (8dBm/3kHz - (10log(1))) = 8dBm/3kHz

Configuration IEEE 802.11a / Ant. 1

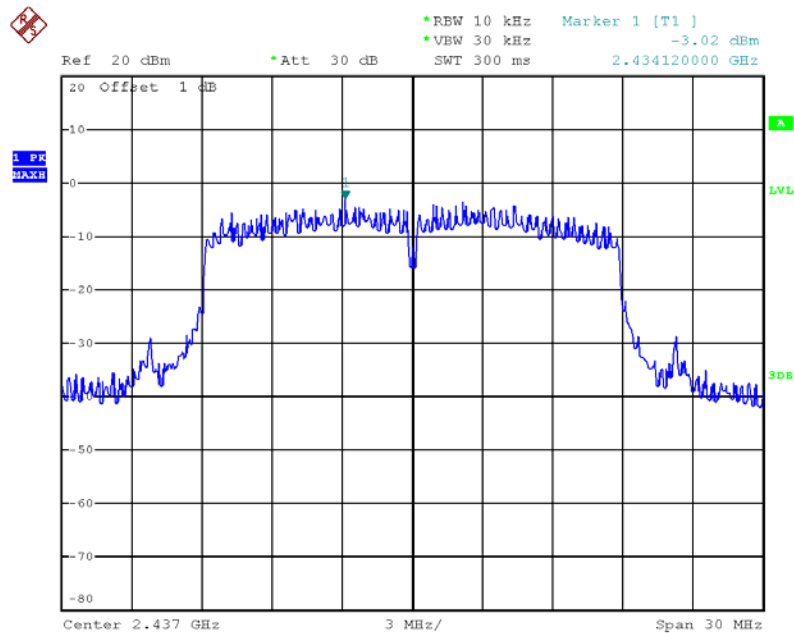
Channel	Frequency	Power Density (dBm/10kHz)	Max. Limit (dBm/3kHz)	Result
149	5745 MHz	1.08	8.00	Complies
157	5785 MHz	0.67	8.00	Complies
165	5825 MHz	0.95	8.00	Complies

Note: PSD Limit = (8dBm/3kHz - (10log(1))) = 8dBm/3kHz

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

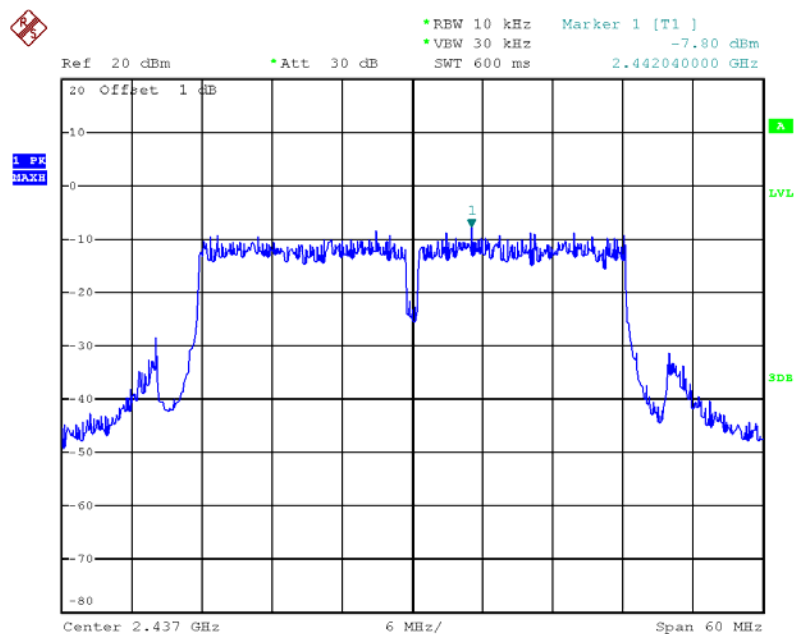
For plots, only the channel with maximum results was shown.

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



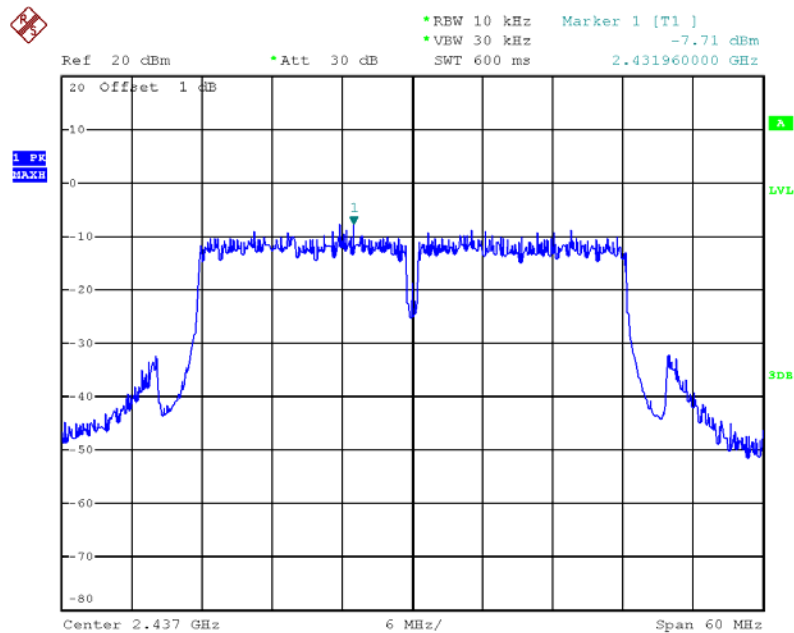
Date: 10.MAR.2013 12:22:38

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



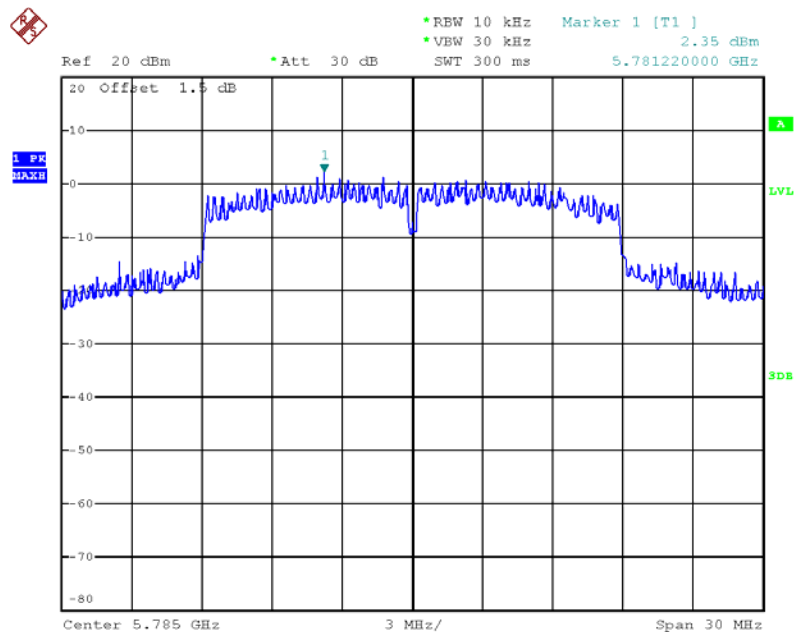
Date: 10.MAR.2013 11:46:41

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



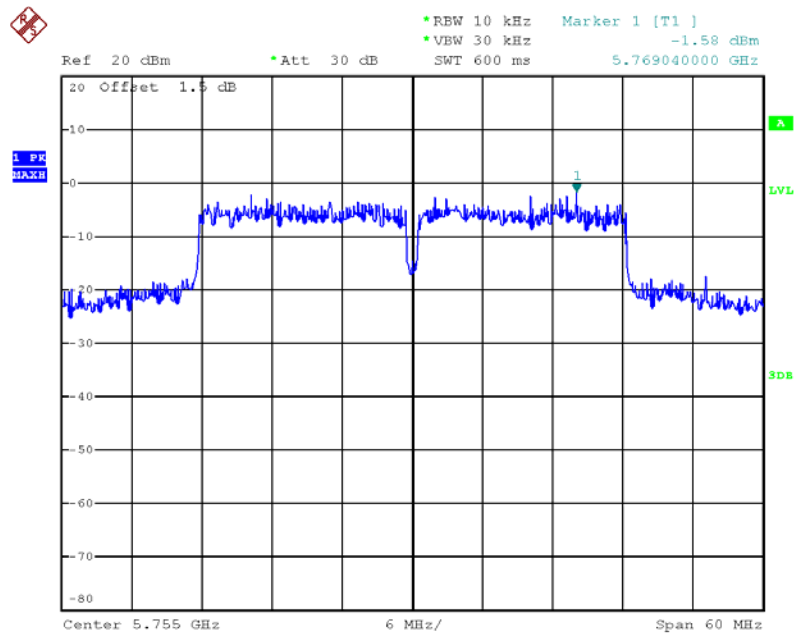
Date: 10.MAR.2013 12:15:10

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



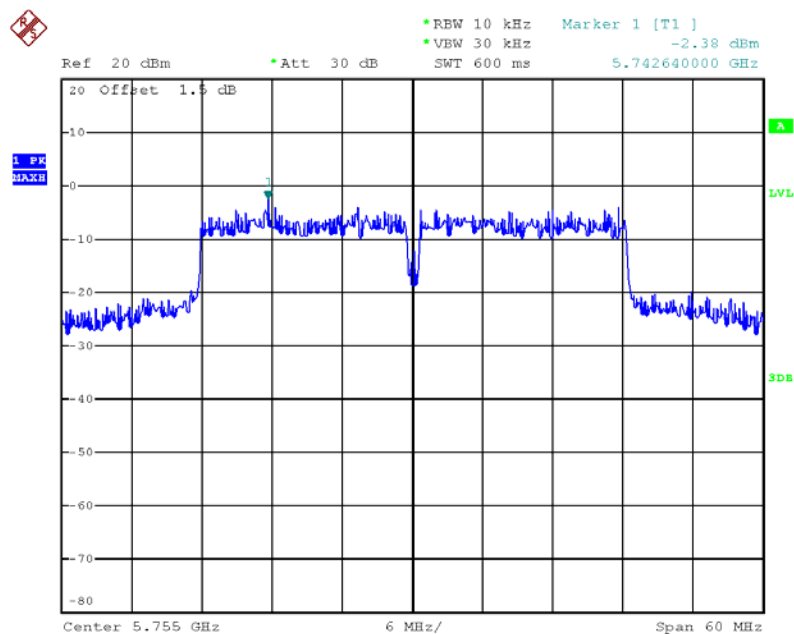
Date: 10.MAR.2013 11:17:49

Power Density Plot on Configuration IEEE 802.11n MCS0 40MHz / Ant. 1 / 5755 MHz / For 1TX



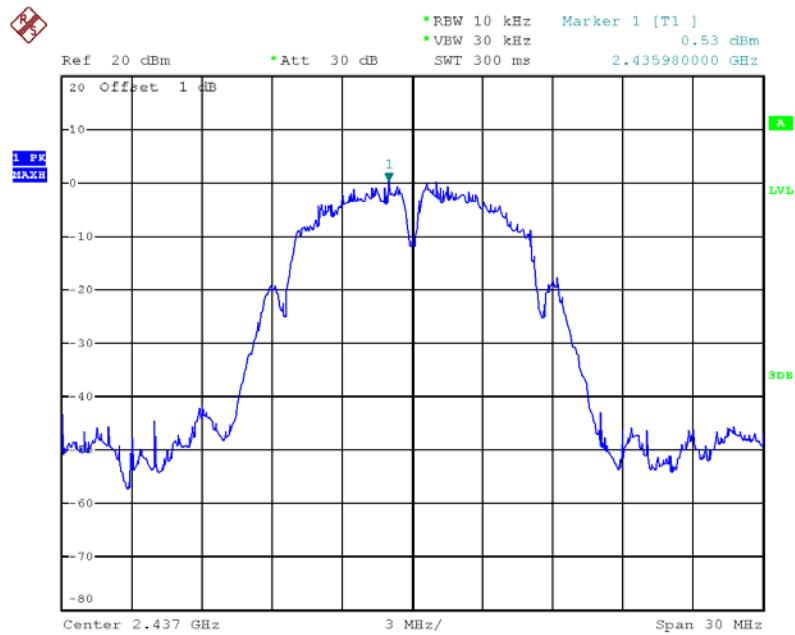
Date: 10.MAR.2013 11:31:24

Power Density Plot on Configuration IEEE 802.11n MCS0 40MHz / Ant. 2 / 5755 MHz / For 2TX



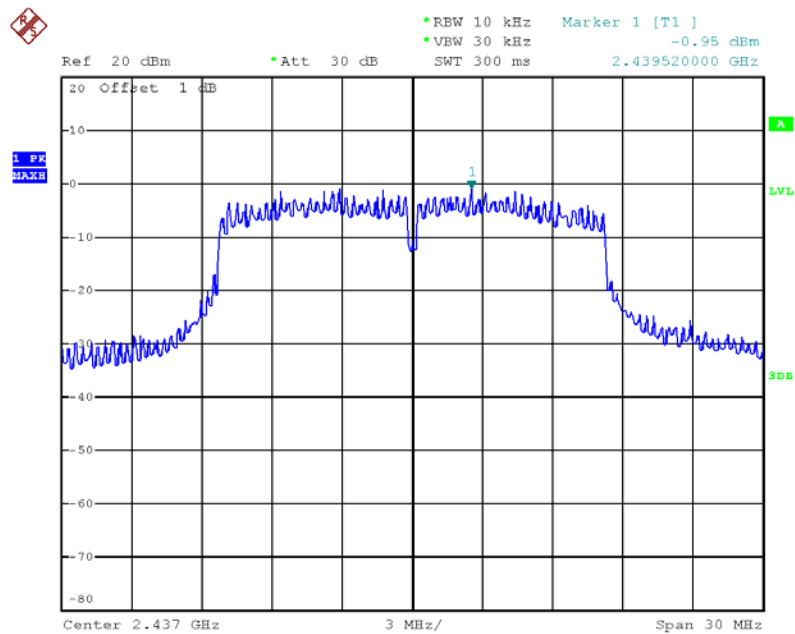
Date: 10.MAR.2013 12:30:41

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



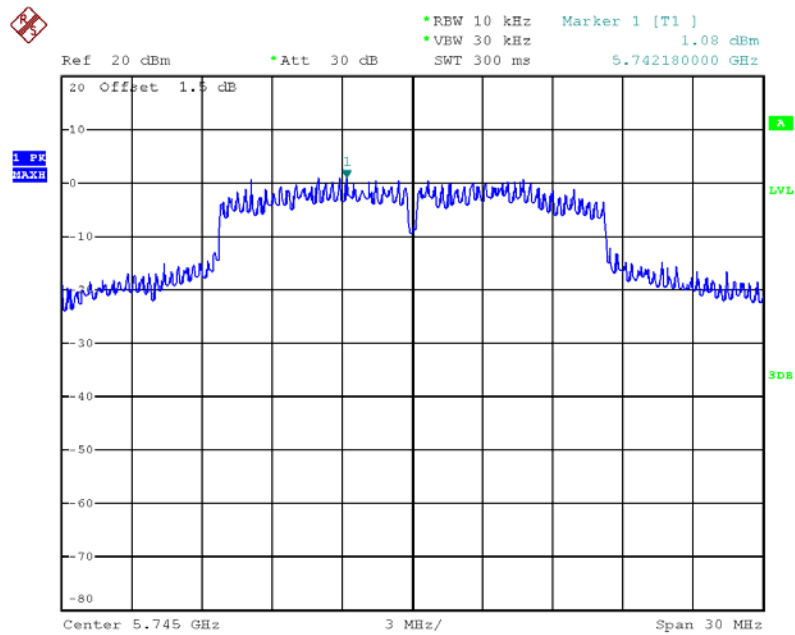
Date: 10.MAR.2013 11:36:52

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



Date: 10.MAR.2013 11:41:32

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



Date: 10.MAR.2013 11:55:50

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

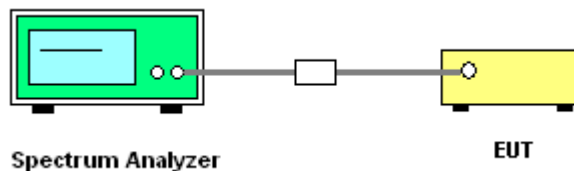
Please refer to section 5 of equipments list in this report. The following table is the setting of the spectrum analyzer.

Spectrum Parameters	Setting
Attenuation	Auto
Span Frequency	> 6dB Bandwidth
RB	1-5 % or DTS BW, not exceed 100KHz
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	23°C	Humidity	63%
Test Engineer	Benson Peng	Configurations	IEEE 802.11n

For 2.4GHz Band

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

Channel	Frequency	6dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)	Min. Limit (kHz)	Test Result
1	2412 MHz	15.12	16.80	500	Complies
6	2437 MHz	15.68	16.96	500	Complies
11	2462 MHz	15.76	16.80	500	Complies

For 1TX

Configuration IEEE 802.11n MCS0 40MHz / Ant. 1

Channel	Frequency	6dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)	Min. Limit (kHz)	Test Result
3	2422 MHz	36.32	36.32	500	Complies
6	2437 MHz	36.48	36.48	500	Complies
9	2452 MHz	36.32	36.32	500	Complies

For 2TX

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

Channel	Frequency	6dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)	Min. Limit (kHz)	Test Result
3	2422 MHz	35.68	36.32	500	Complies
6	2437 MHz	35.84	36.16	500	Complies
9	2452 MHz	35.68	36.16	500	Complies

For 5GHz Band

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

Channel	Frequency	6dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)	Min. Limit (kHz)	Test Result
149	5745 MHz	15.04	26.48	500	Complies
157	5785 MHz	15.68	24.80	500	Complies
165	5825 MHz	15.04	24.32	500	Complies

For 1TX

Configuration IEEE 802.11n MCS0 40MHz / Ant. 1

Channel	Frequency	6dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)	Min. Limit (kHz)	Test Result
151	5755 MHz	36.32	62.08	500	Complies
159	5795 MHz	36.16	58.56	500	Complies

For 2TX

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

Channel	Frequency	6dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)	Min. Limit (kHz)	Test Result
151	5755 MHz	35.52	61.92	500	Complies
159	5795 MHz	35.84	65.44	500	Complies

Temperature	23°C	Humidity	63%
Test Engineer	Benson Peng	Configurations	IEEE 802.11a/b/g

Configuration IEEE 802.11b / Ant. 1

Channel	Frequency	6dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)	Min. Limit (kHz)	Test Result
1	2412 MHz	7.60	10.16	500	Complies
6	2437 MHz	8.00	10.08	500	Complies
11	2462 MHz	7.76	10.16	500	Complies

Configuration IEEE 802.11g / Ant. 1

Channel	Frequency	6dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)	Min. Limit (kHz)	Test Result
1	2412 MHz	15.28	16.40	500	Complies
6	2437 MHz	15.44	16.56	500	Complies
11	2462 MHz	15.36	16.40	500	Complies

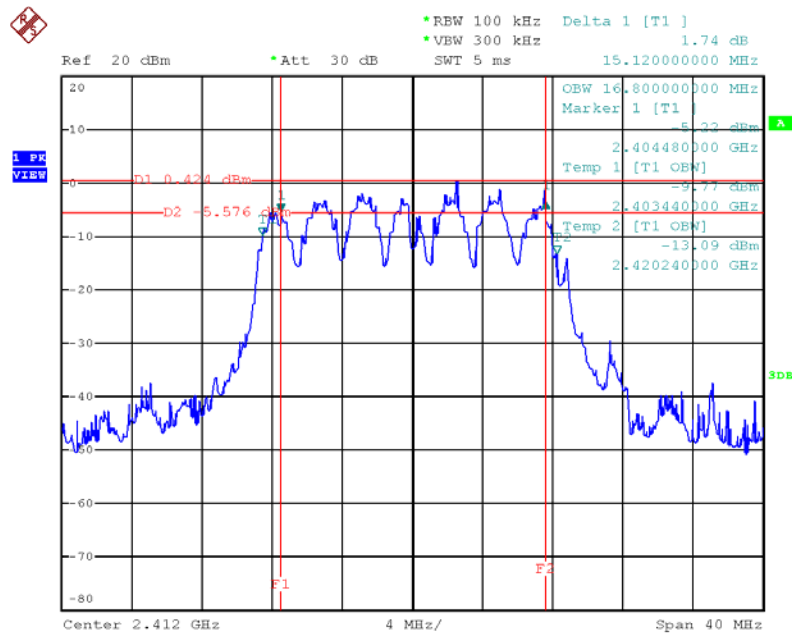
Configuration IEEE 802.11a / Ant. 1

Channel	Frequency	6dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)	Min. Limit (kHz)	Test Result
149	5745 MHz	15.60	27.68	500	Complies
157	5785 MHz	15.76	25.76	500	Complies
165	5825 MHz	16.00	24.72	500	Complies

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

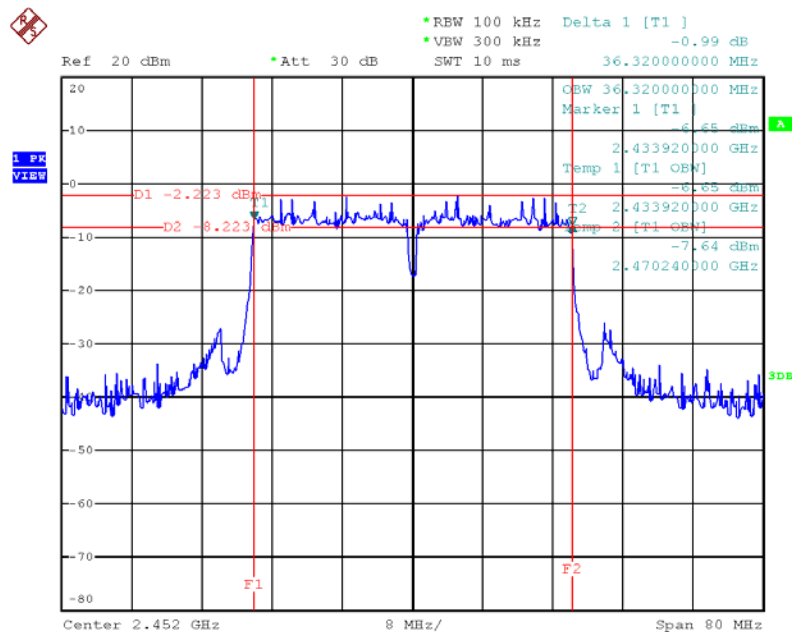
For plots, only the channel with maximum results was shown.

6 dB Bandwidth Plot on Configuration IEEE 802.11n MCS0 20MHz / Ant. 1 + Ant. 2 / 2412 MHz



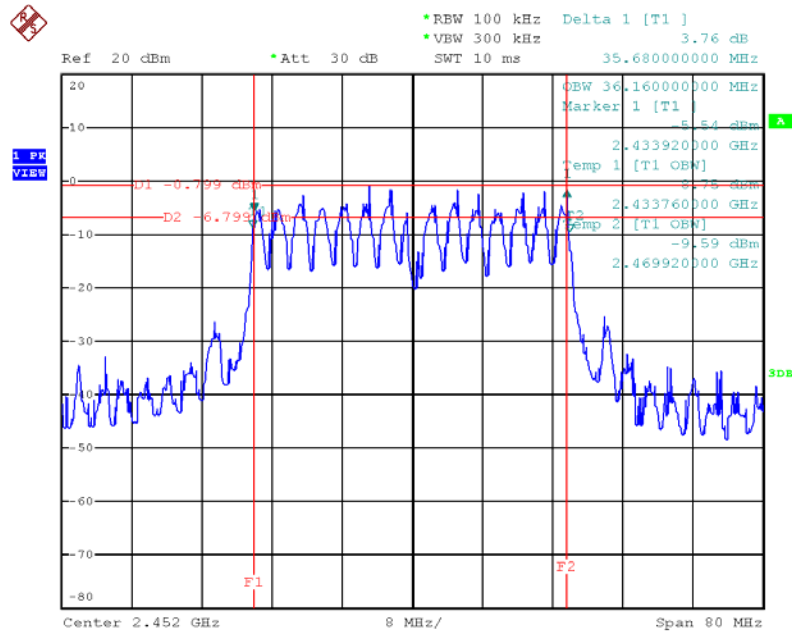
Date: 10.MAR.2013 14:18:09

6 dB Bandwidth Plot on Configuration IEEE 802.11n MCS0 40MHz / Ant. 1 / 2452 MHz / For 1TX



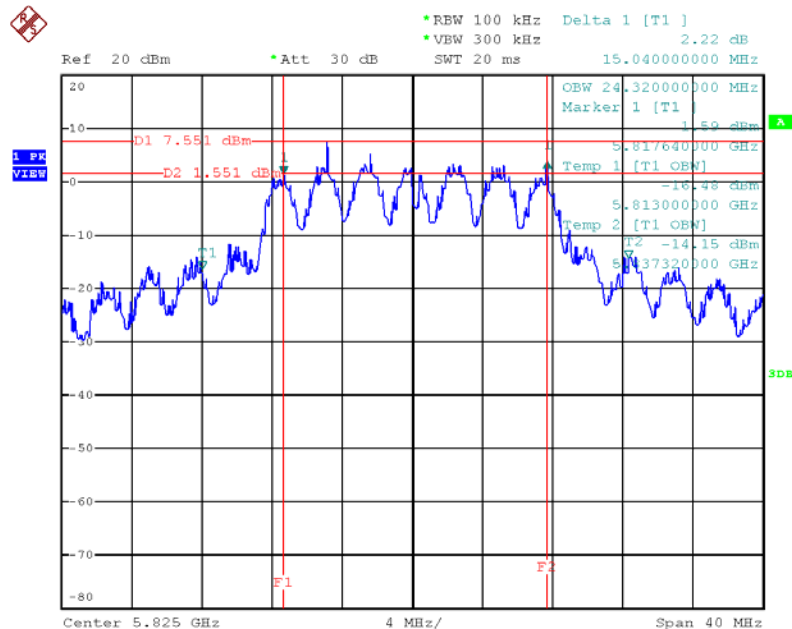
Date: 10.MAR.2013 13:41:42

6 dB Bandwidth Plot on Configuration IEEE 802.11n MCS0 40MHz / Ant. 1 + Ant. 2 / 2452 MHz / For 2TX



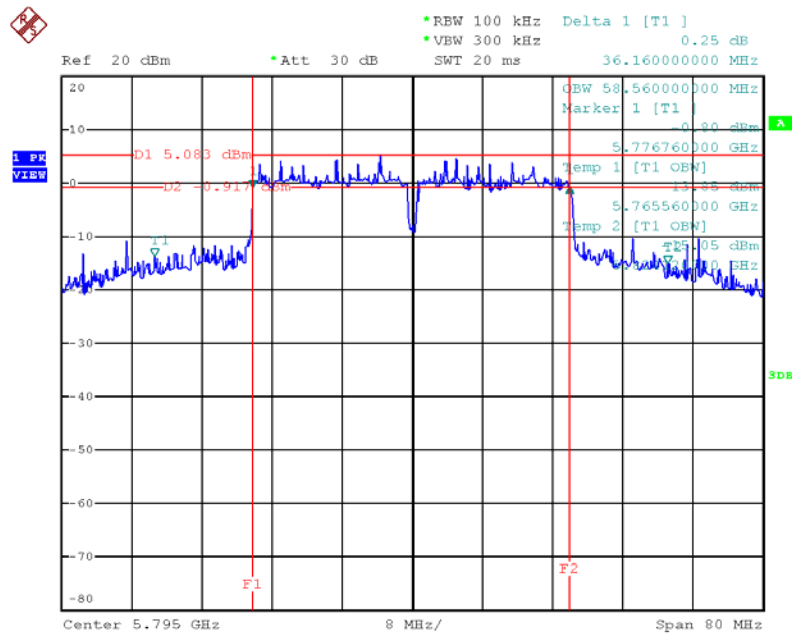
Date: 10.MAR.2013 14:27:05

6 dB Bandwidth Plot on Configuration IEEE 802.11n MCS0 20MHz / Ant. 1 + Ant. 2 / 5825 MHz



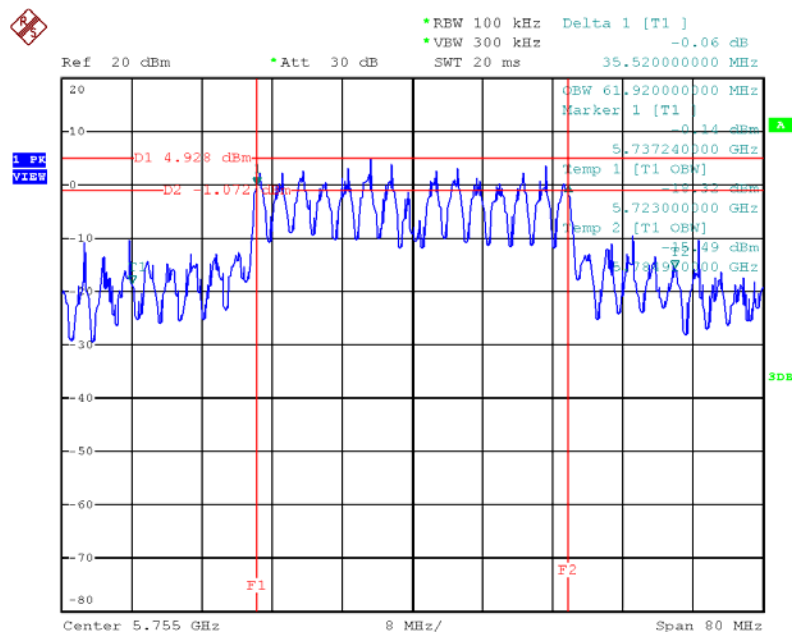
Date: 10.MAR.2013 14:12:49

6 dB Bandwidth Plot on Configuration IEEE 802.11n MCS0 40MHz / Ant. 1 / 5795 MHz / For 1TX



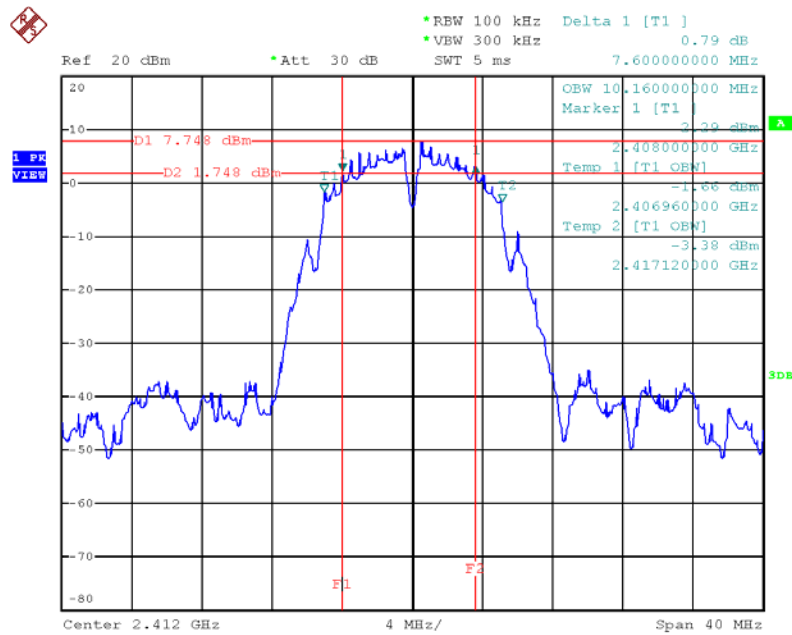
Date: 10.MAR.2013 13:56:41

6 dB Bandwidth Plot on Configuration IEEE 802.11n MCS0 40MHz / Ant. 1 + Ant. 2 / 5755 MHz / For 2TX



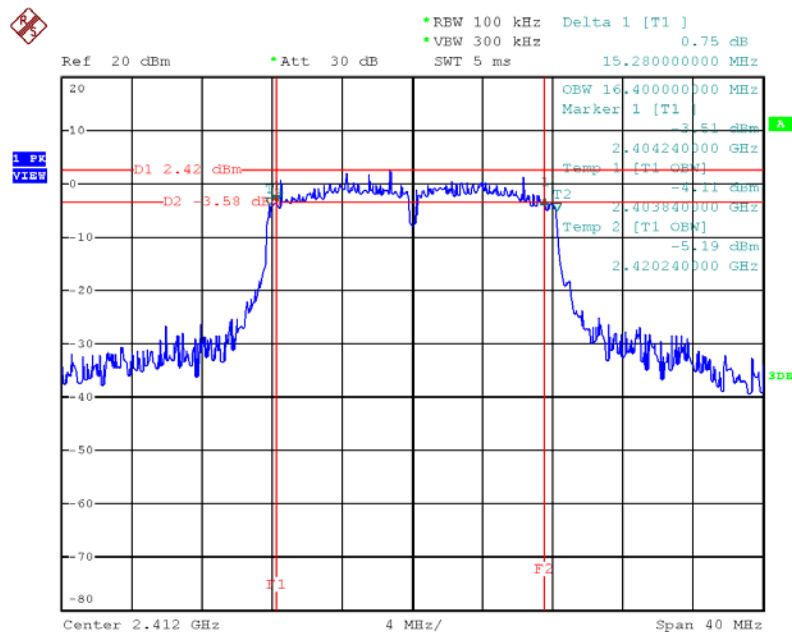
Date: 10.MAR.2013 14:04:36

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



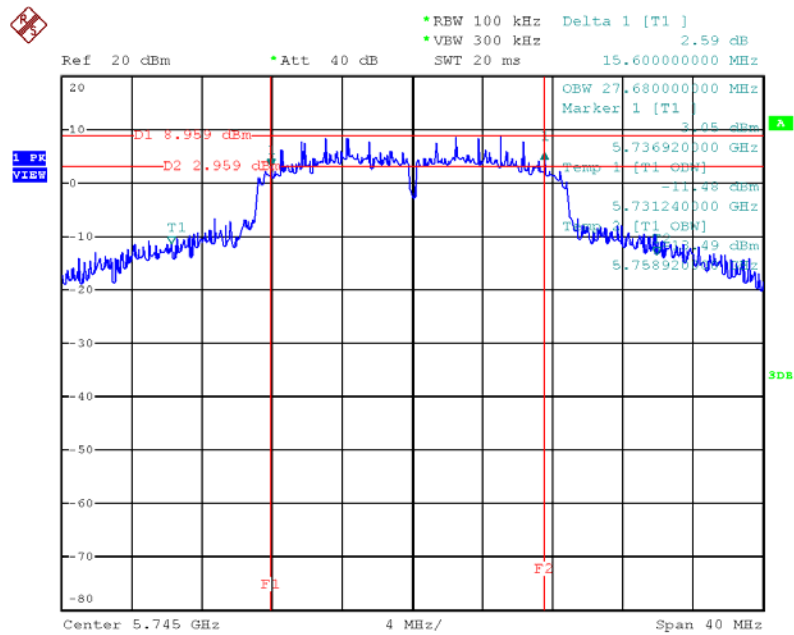
Date: 10.MAR.2013 13:25:52

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



Date: 10.MAR.2013 13:33:25

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



Date: 10.MAR.2013 13:46:45

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	1000 MHz
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)	100kHz / 300kHz for peak

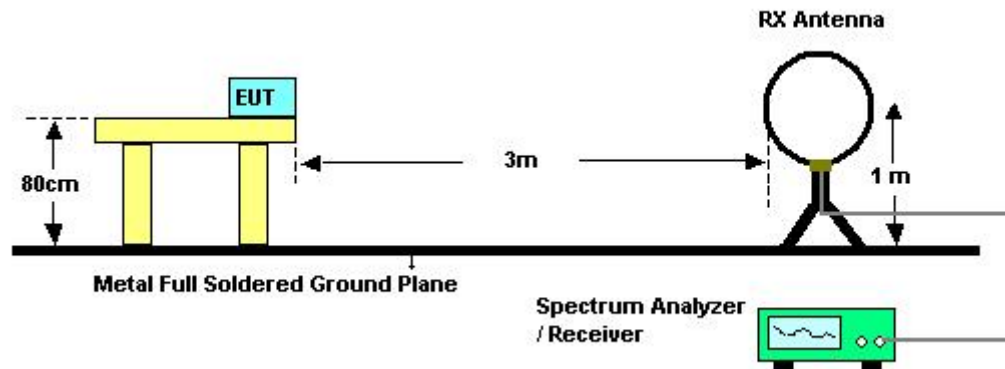
Receiver Parameter	Setting
Attenuation	Auto
Start ~ Stop Frequency	9kHz~150kHz / RB 200Hz for QP
Start ~ Stop Frequency	150kHz~30MHz / RB 9kHz for QP
Start ~ Stop Frequency	30MHz~1000MHz / RB 120kHz for QP

4.5.3. Test Procedures

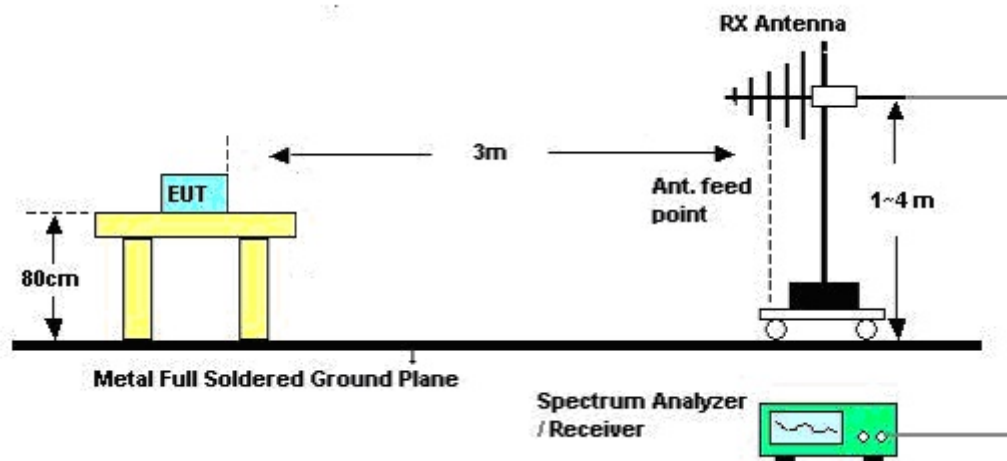
1. Configure the EUT according to ANSI C63.4. The EUT was placed on the top of the turntable 0.8 meter above ground. The phase center of the receiving antenna mounted on the top of a height-variable antenna tower was placed 3 meters far away from the turntable.
2. Power on the EUT and all the supporting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

4.5.4. Test Setup Layout

For radiated emissions 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	24.5°C	Humidity	57%
Test Engineer	David Tesng	Configurations	CTX
Test Date	Mar. 19, 2013		

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.

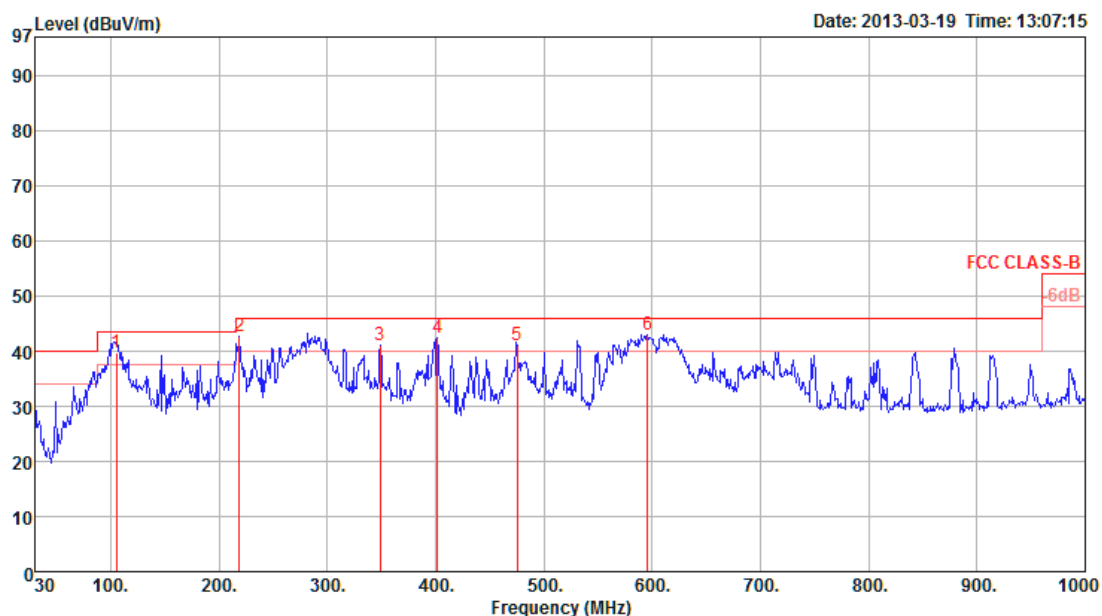
Distance extrapolation factor = $40 \log (\text{specific distance} / \text{test distance})$ (dB);

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

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

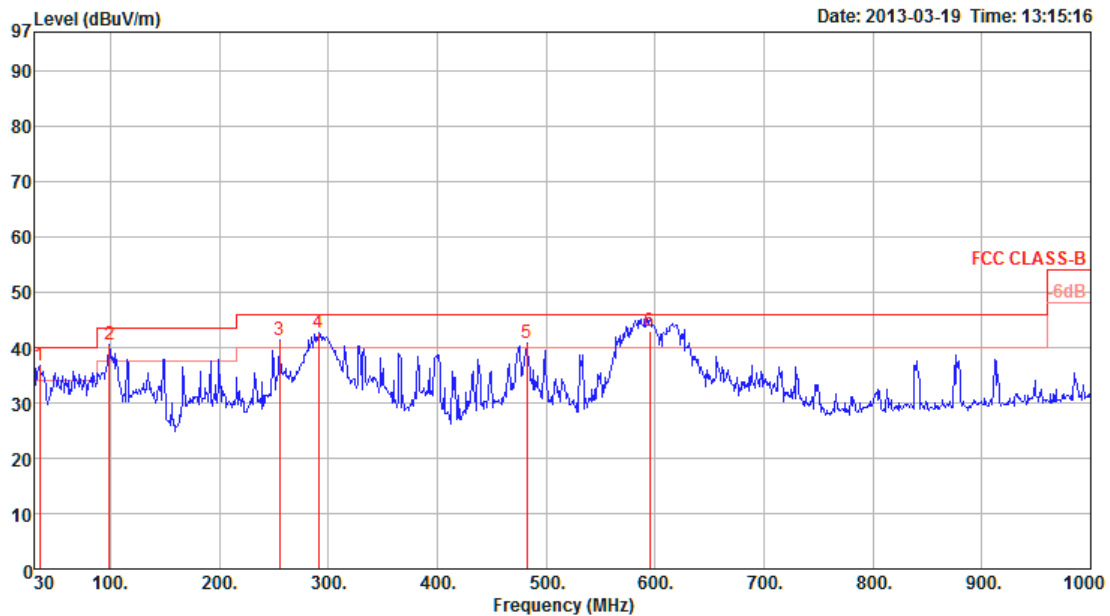
Temperature	24.5°C	Humidity	57%
Test Engineer	David Tesng	Configurations	CTX

Horizontal



	Freq	Level	Limit	Over	Read	Cable	Preamp	Antenna		T/Pos	A/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m	Remark	deg	cm	
1 q	105.00	39.76	43.50	-3.74	54.00	1.53	27.77	12.00	QP	115	100	HORIZONTAL
2 !	219.15	42.69	46.00	-3.31	56.96	2.25	27.12	10.60	Peak	0	100	HORIZONTAL
3 !	349.13	40.96	46.00	-5.04	49.97	2.79	27.07	15.27	Peak	0	100	HORIZONTAL
4 !	401.51	42.41	46.00	-3.59	50.38	2.99	27.48	16.52	Peak	0	100	HORIZONTAL
5 !	475.23	41.19	46.00	-4.81	48.37	3.31	27.89	17.40	Peak	0	100	HORIZONTAL
6 p	595.51	42.96	46.00	-3.04	47.63	3.71	27.63	19.25	Peak	0	100	HORIZONTAL

Vertical



	Freq	Level	Limit	Over	Read	Cable	Preamp	Antenna		T/Pos	A/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m	Remark	deg	cm	
1	34.85	36.63	40.00	-3.37	46.81	0.92	28.00	16.90	Peak	0	400	VERTICAL
2	98.87	40.49	43.50	-3.01	55.63	1.49	27.82	11.19	Peak	0	400	VERTICAL
3	255.04	41.42	46.00	-4.58	52.70	2.41	26.94	13.25	Peak	0	400	VERTICAL
4	290.93	42.70	46.00	-3.30	53.23	2.52	26.85	13.80	Peak	0	400	VERTICAL
5	482.02	40.73	46.00	-5.27	47.79	3.33	27.90	17.51	Peak	0	400	VERTICAL
6	595.00	42.94	46.00	-3.06	47.62	3.71	27.63	19.24	QP	143	100	VERTICAL

Note:

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

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

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

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

Temperature	24.5°C	Humidity	57%
Test Engineer	David Tesng	Configurations	IEEE 802.11n MCS0 20MHz Ch 1 / Ant. 1 + Ant. 2
Test Date	Mar. 09, 2013		

Horizontal

	Freq	Level	Limit	Over	Read	Cable	Antenna	Preamp		A/Pos	T/Pos	
	MHz	dBuV/m	dBuV/m	Limit	Level	Loss	Factor	Factor	Remark	cm	deg	Pol/Phase
				dB	dBuV	dB	dB/m	dB				
1	4820.64	48.31	74.00	-25.69	44.35	5.77	33.39	35.20	Peak	100	224	HORIZONTAL
2	4820.90	35.52	54.00	-18.48	31.56	5.77	33.39	35.20	Average	100	224	HORIZONTAL

Vertical

	Freq	Level	Limit	Over	Read	Cable	Antenna	Preamp		A/Pos	T/Pos	
	MHz	dBuV/m	dBuV/m	Limit	Level	Loss	Factor	Factor	Remark	cm	deg	Pol/Phase
				dB	dBuV	dB	dB/m	dB				
1	4822.08	51.79	74.00	-22.21	47.83	5.77	33.39	35.20	Peak	100	82	VERTICAL
2	4824.72	39.13	54.00	-14.87	35.17	5.77	33.39	35.20	Average	100	82	VERTICAL

Temperature	24.5°C	Humidity	57%
Test Engineer	David Tesng	Configurations	IEEE 802.11n MCS0 20MHz Ch 6 / Ant. 1 + Ant. 2
Test Date	Mar. 09, 2013		

Horizontal

	Freq	Level	Limit	Over	Read	Cable	Antenna	Preamp		A/Pos	T/Pos	
	MHz	dBuV/m	Line	Limit	Level	Loss	Factor	Factor	Remark	cm	deg	Pol/Phase
1	4871.18	56.45	74.00	-17.55	54.99	3.33	33.16	35.03	Peak	111	299	HORIZONTAL
2	4873.49	41.15	54.00	-12.85	39.69	3.33	33.16	35.03	Average	111	299	HORIZONTAL

Vertical

	Freq	Level	Limit	Over	Read	Cable	Antenna	Preamp		A/Pos	T/Pos	
	MHz	dBuV/m	Line	Limit	Level	Loss	Factor	Factor	Remark	cm	deg	Pol/Phase
1	4873.52	39.71	54.00	-14.29	38.25	3.33	33.16	35.03	Average	100	98	VERTICAL
2	4873.84	53.11	74.00	-20.89	51.65	3.33	33.16	35.03	Peak	100	98	VERTICAL

Temperature	24.5°C	Humidity	57%
Test Engineer	David Tesng	Configurations	IEEE 802.11n MCS0 20MHz Ch11 / Ant. 1 + Ant. 2
Test Date	Mar. 09, 2013		

Horizontal

	Freq	Level	Limit	Over	Read	CableAntenna	Preamp		A/Pos	T/Pos	
	MHz	dBuV/m	Line	Limit	Level	Loss	Factor	Factor	Remark	cm	deg
			dBuV/m	dB	dBuV	dB	dB/m	dB			Pol/Phase
1	4922.22	34.34	54.00	-19.66	30.14	5.82	33.58	35.20	Average	100	138 HORIZONTAL
2	4926.60	46.85	74.00	-27.15	42.65	5.82	33.58	35.20	Peak	100	138 HORIZONTAL
3	7381.18	51.73	74.00	-22.27	41.85	8.72	36.61	35.45	Peak	100	75 HORIZONTAL
4	7381.76	38.55	54.00	-15.45	28.67	8.72	36.61	35.45	Average	100	75 HORIZONTAL

Vertical

	Freq	Level	Limit	Over	Read	CableAntenna	Preamp		A/Pos	T/Pos	
	MHz	dBuV/m	Line	Limit	Level	Loss	Factor	Factor	Remark	cm	deg
			dBuV/m	dB	dBuV	dB	dB/m	dB			Pol/Phase
1	4922.10	45.78	74.00	-28.22	41.58	5.82	33.58	35.20	Peak	100	118 VERTICAL
2	4923.22	34.11	54.00	-19.89	29.91	5.82	33.58	35.20	Average	100	118 VERTICAL
3	7384.02	38.36	54.00	-15.64	28.46	8.75	36.61	35.46	Average	100	217 VERTICAL
4	7386.42	51.23	74.00	-22.77	41.33	8.75	36.61	35.46	Peak	100	217 VERTICAL

For 1TX

Temperature	24.5°C	Humidity	57%
Test Engineer	David Tesng	Configurations	IEEE 802.11n MCS0 40MHz Ch 3 / Ant. 1
Test Date	Mar. 09, 2013		

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	4836.12	47.75	74.00	-26.25	46.41	3.31	33.06	35.03	Peak	100	308	HORIZONTAL
2	4844.55	34.19	54.00	-19.81	32.81	3.32	33.09	35.03	Average	100	308	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	4851.85	33.07	54.00	-20.93	31.69	3.32	33.09	35.03	Average	100	100	VERTICAL
2	4851.85	47.17	74.00	-26.83	45.79	3.32	33.09	35.03	Peak	100	100	VERTICAL

Temperature	24.5°C	Humidity	57%
Test Engineer	David Tesng	Configurations	IEEE 802.11n MCS0 40MHz Ch 6 / Ant. 1
Test Date	Mar. 09, 2013		

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	4873.44	49.09	74.00	-24.91	47.63	3.33	33.16	35.03	110	304	HORIZONTAL
2	4873.76	36.10	54.00	-17.90	34.64	3.33	33.16	35.03	110	304	HORIZONTAL
3	7323.34	33.24	54.00	-20.76	28.62	4.06	35.96	35.40	100	0	HORIZONTAL
4	7336.16	45.62	74.00	-28.38	40.97	4.06	35.99	35.40	100	0	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	4869.99	35.08	54.00	-18.92	33.66	3.33	33.12	35.03	101	98	VERTICAL
2	4870.80	49.17	74.00	-24.83	47.71	3.33	33.16	35.03	101	98	VERTICAL
3	7304.59	45.50	74.00	-28.50	40.92	4.06	35.92	35.40	100	308	VERTICAL
4	7321.74	33.17	54.00	-20.83	28.55	4.06	35.96	35.40	100	308	VERTICAL

Temperature	24.5°C	Humidity	57%
Test Engineer	David Tesng	Configurations	IEEE 802.11n MCS0 40MHz Ch 9 / Ant. 1
Test Date	Mar. 09, 2013		

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	4905.28	32.86	54.00	-21.14	31.31	3.34	33.23	35.02	100	315	HORIZONTAL
2	4907.53	45.26	74.00	-28.74	43.71	3.34	33.23	35.02	100	315	HORIZONTAL
3	7345.58	33.22	54.00	-20.78	28.54	4.06	36.02	35.40	100	68	HORIZONTAL
4	7357.57	45.96	74.00	-28.04	41.28	4.06	36.02	35.40	100	68	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	4904.08	32.21	54.00	-21.79	30.70	3.34	33.19	35.02	100	99	VERTICAL
2	4911.77	46.08	74.00	-27.92	44.53	3.34	33.23	35.02	100	99	VERTICAL
3	7346.83	33.07	54.00	-20.93	28.39	4.06	36.02	35.40	100	204	VERTICAL
4	7351.51	46.10	74.00	-27.90	41.42	4.06	36.02	35.40	100	204	VERTICAL

For 2TX

Temperature	24.5°C	Humidity	57%
Test Engineer	David Tesng	Configurations	IEEE 802.11n MCS0 40MHz Ch 3 / Ant. 1 + Ant. 2
Test Date	Mar. 09, 2013		

Horizontal

	Freq	Level	Limit	Over	Read	CableAntenna	Preamp		A/Pos	T/Pos	
	MHz	dBuV/m	dBuV/m	dB	dBuV	Loss	Factor	Factor	Remark	cm	deg
1	4821.60	32.92	54.00	-21.08	28.96	5.77	33.39	35.20	Average	100	53 HORIZONTAL
2	4861.90	46.17	74.00	-27.83	42.14	5.78	33.45	35.20	Peak	100	53 HORIZONTAL
3	7264.50	51.49	74.00	-22.51	41.91	8.56	36.43	35.41	Peak	100	110 HORIZONTAL
4	7265.00	38.51	54.00	-15.49	28.91	8.58	36.43	35.41	Average	100	110 HORIZONTAL

Vertical

	Freq	Level	Limit	Over	Read	CableAntenna	Preamp		A/Pos	T/Pos	
	MHz	dBuV/m	dBuV/m	dB	dBuV	Loss	Factor	Factor	Remark	cm	deg
1	4822.80	32.66	54.00	-21.34	28.70	5.77	33.39	35.20	Average	100	222 VERTICAL
2	4831.40	44.79	74.00	-29.21	40.83	5.77	33.39	35.20	Peak	100	222 VERTICAL
3	7267.10	38.34	54.00	-15.66	28.74	8.58	36.43	35.41	Average	100	162 VERTICAL
4	7272.00	51.24	74.00	-22.76	41.64	8.58	36.43	35.41	Peak	100	162 VERTICAL

Temperature	24.5°C	Humidity	57%
Test Engineer	David Tesng	Configurations	IEEE 802.11n MCS0 40MHz Ch 6 / Ant. 1 + Ant. 2
Test Date	Mar. 09, 2013		

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	4871.02	39.95	54.00	-14.05	38.49	3.33	33.16	35.03	108	300	HORIZONTAL
2	4873.58	53.47	74.00	-20.53	52.01	3.33	33.16	35.03	108	300	HORIZONTAL
3	7313.89	46.32	74.00	-27.68	41.70	4.06	35.96	35.40	100	187	HORIZONTAL
4	7316.93	33.47	54.00	-20.53	28.85	4.06	35.96	35.40	100	187	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	4871.44	36.40	54.00	-17.60	34.94	3.33	33.16	35.03	100	298	VERTICAL
2	4871.47	49.26	74.00	-24.74	47.80	3.33	33.16	35.03	100	298	VERTICAL
3	7321.58	33.16	54.00	-20.84	28.54	4.06	35.96	35.40	100	217	VERTICAL
4	7324.62	46.12	74.00	-27.88	41.47	4.06	35.99	35.40	100	217	VERTICAL

Temperature	24.5°C	Humidity	57%
Test Engineer	David Tesng	Configurations	IEEE 802.11n MCS0 40MHz Ch 9 / Ant. 1 + Ant. 2
Test Date	Mar. 09, 2013		

Horizontal

	Freq	Level	Limit	Over	Read	CableAntenna	Preamp		A/Pos	T/Pos	
	MHz	dBuV/m	Line	Limit	Level	Loss	Factor	Factor	Remark	cm	deg
			dBuV/m	dB	dBuV	dB	dB/m	dB			Pol/Phase
1	4890.70	47.57	74.00	-26.43	43.46	5.80	33.51	35.20	Peak	100	256 HORIZONTAL
2	4902.80	35.15	54.00	-18.85	31.03	5.81	33.51	35.20	Average	100	256 HORIZONTAL
3	7352.10	38.63	54.00	-15.37	28.81	8.70	36.56	35.44	Average	100	175 HORIZONTAL
4	7375.70	51.47	74.00	-22.53	41.59	8.72	36.61	35.45	Peak	100	175 HORIZONTAL

Vertical

	Freq	Level	Limit	Over	Read	CableAntenna	Preamp		A/Pos	T/Pos	
	MHz	dBuV/m	Line	Limit	Level	Loss	Factor	Factor	Remark	cm	deg
			dBuV/m	dB	dBuV	dB	dB/m	dB			Pol/Phase
1	4905.60	36.03	54.00	-17.97	31.88	5.81	33.54	35.20	Average	113	88 VERTICAL
2	4907.50	48.24	74.00	-25.76	44.09	5.81	33.54	35.20	Peak	113	88 VERTICAL
3	7343.00	38.51	54.00	-15.49	28.71	8.68	36.56	35.44	Average	100	112 VERTICAL
4	7365.60	51.50	74.00	-22.50	41.66	8.70	36.59	35.45	Peak	100	112 VERTICAL

Temperature	24.5°C	Humidity	57%
Test Engineer	David Tesng	Configurations	IEEE 802.11n MCS0 20MHz CH 149 / Ant. 1 + Ant. 2
Test Date	Mar. 09, 2013		

Horizontal

	Freq	Level	Limit	Over	Read	CableAntenna	Preamp		A/Pos	T/Pos	
	MHz	dBuV/m	Line	Limit	Level	Loss Factor	Factor	Remark	cm	deg	Pol/Phase
1	11488.29	53.13	74.00	-20.87	44.52	5.11	38.78	35.28	100	251	HORIZONTAL
2	11491.15	40.05	54.00	-13.95	31.44	5.11	38.78	35.28	100	251	HORIZONTAL

Vertical

	Freq	Level	Limit	Over	Read	CableAntenna	Preamp		A/Pos	T/Pos	
	MHz	dBuV/m	Line	Limit	Level	Loss Factor	Factor	Remark	cm	deg	Pol/Phase
1	11488.78	41.17	54.00	-12.83	32.56	5.11	38.78	35.28	100	219	VERTICAL
2	11491.78	55.78	74.00	-18.22	47.17	5.11	38.78	35.28	100	219	VERTICAL

Temperature	24.5°C	Humidity	57%
Test Engineer	David Tesng	Configurations	IEEE 802.11n MCS0 20MHz CH 157 / Ant. 1 + Ant. 2
Test Date	Mar. 09, 2013		

Horizontal

	Freq	Level	Limit	Over	Read	CableAntenna	Preamp		A/Pos	T/Pos	
	MHz	dBuV/m	Line	Limit	Level	Loss	Factor	Factor	Remark	cm	deg
			dBuV/m	dB	dBuV	dB	dB/m	dB			Pol/Phase
1	11567.20	51.55	74.00	-22.45	42.90	5.13	38.82	35.30	Peak	100	251 HORIZONTAL
2	11570.71	39.03	54.00	-14.97	30.36	5.14	38.83	35.30	Average	100	251 HORIZONTAL

Vertical

	Freq	Level	Limit	Over	Read	CableAntenna	Preamp		A/Pos	T/Pos	
	MHz	dBuV/m	Line	Limit	Level	Loss	Factor	Factor	Remark	cm	deg
			dBuV/m	dB	dBuV	dB	dB/m	dB			Pol/Phase
1	11569.52	54.42	74.00	-19.58	45.76	5.13	38.83	35.30	Peak	100	226 VERTICAL
2	11569.84	40.65	54.00	-13.35	31.98	5.14	38.83	35.30	Average	100	226 VERTICAL

Temperature	24.5°C	Humidity	57%
Test Engineer	David Tesng	Configurations	IEEE 802.11n MCS0 20MHz CH 165 / Ant. 1 + Ant. 2
Test Date	Mar. 09, 2013		

Horizontal

	Freq	Level	Limit	Over	Read	CableAntenna	Preamp		A/Pos	T/Pos	
	MHz	dBuV/m	Line	Limit	Level	Loss	Factor	Factor	Remark	cm	deg
			dBuV/m	dB	dBuV	dB	dB/m	dB			Pol/Phase
1	11649.91	50.37	74.00	-23.63	41.65	5.16	38.86	35.30	Peak	100	58 HORIZONTAL
2	11650.01	38.10	54.00	-15.90	29.38	5.16	38.86	35.30	Average	100	58 HORIZONTAL

Vertical

	Freq	Level	Limit	Over	Read	CableAntenna	Preamp		A/Pos	T/Pos	
	MHz	dBuV/m	Line	Limit	Level	Loss	Factor	Factor	Remark	cm	deg
			dBuV/m	dB	dBuV	dB	dB/m	dB			Pol/Phase
1	11649.94	50.87	74.00	-23.13	42.15	5.16	38.86	35.30	Peak	100	344 VERTICAL
2	11650.02	40.77	54.00	-13.23	32.05	5.16	38.86	35.30	Average	100	344 VERTICAL

For 1TX

Temperature	24.5°C	Humidity	57%
Test Engineer	David Tesng	Configurations	IEEE 802.11n MCS0 40MHz CH 151 / Ant. 1
Test Date	Mar. 09, 2013		

Horizontal

	Freq	Level	Limit	Over	Read	CableAntenna	Preamp		A/Pos	T/Pos	
	MHz	dBuV/m	dBuV/m	dB	dBuV	Loss Factor	Factor	Remark	cm	deg	Pol/Phase
1	11505.61	51.82	74.00	-22.18	43.19	5.12	38.79	35.28 Peak	100	347	HORIZONTAL
2	11509.57	38.09	54.00	-15.91	29.46	5.12	38.79	35.28 Average	100	347	HORIZONTAL

Vertical

	Freq	Level	Limit	Over	Read	CableAntenna	Preamp		A/Pos	T/Pos	
	MHz	dBuV/m	dBuV/m	dB	dBuV	Loss Factor	Factor	Remark	cm	deg	Pol/Phase
1	11510.27	52.58	74.00	-21.42	43.95	5.12	38.79	35.28 Peak	100	22	VERTICAL
2	11510.37	39.48	54.00	-14.52	30.85	5.12	38.79	35.28 Average	100	22	VERTICAL

Temperature	24.5°C	Humidity	57%
Test Engineer	David Tesng	Configurations	IEEE 802.11n MCS0 40MHz CH 159 / Ant. 1
Test Date	Mar. 09, 2013		

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	11589.79	37.07	54.00	-16.93	28.40	5.14	38.83	35.30	Average	100	340	HORIZONTAL
2	11589.95	47.72	74.00	-26.28	39.05	5.14	38.83	35.30	Peak	100	340	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	11589.76	39.74	54.00	-14.26	31.07	5.14	38.83	35.30	Average	100	11	VERTICAL
2	11589.90	50.34	74.00	-23.66	41.67	5.14	38.83	35.30	Peak	100	11	VERTICAL

For 2TX

Temperature	24.5°C	Humidity	57%
Test Engineer	David Tesng	Configurations	IEEE 802.11n MCS0 40MHz CH 151 / Ant. 1 + Ant. 2
Test Date	Mar. 09, 2013		

Horizontal

	Freq	Level	Limit	Over	Read	Cable	Antenna	Preamp		A/Pos	T/Pos	
	MHz	dBuV/m	Line	Limit	Level	Loss	Factor	Factor	Remark	cm	deg	Pol/Phase
1	11509.39	52.61	74.00	-21.39	43.98	5.12	38.79	35.28	Peak	100	227	HORIZONTAL
2	11511.55	39.20	54.00	-14.80	30.57	5.12	38.79	35.28	Average	100	227	HORIZONTAL

Vertical

	Freq	Level	Limit	Over	Read	Cable	Antenna	Preamp		A/Pos	T/Pos	
	MHz	dBuV/m	Line	Limit	Level	Loss	Factor	Factor	Remark	cm	deg	Pol/Phase
1	11511.59	40.68	54.00	-13.32	32.05	5.12	38.79	35.28	Average	100	19	VERTICAL
2	11511.88	53.14	74.00	-20.86	44.51	5.12	38.79	35.28	Peak	100	19	VERTICAL

Temperature	24.5°C	Humidity	57%
Test Engineer	David Tesng	Configurations	IEEE 802.11n MCS0 40MHz CH 159 / Ant. 1 + Ant. 2
Test Date	Mar. 09, 2013		

Horizontal

	Freq	Level	Limit	Over	Read	Cable	Antenna	Preamp		A/Pos	T/Pos	
	MHz	dBuV/m	Line	Limit	Level	Loss	Factor	Factor	Remark	cm	deg	Pol/Phase
1	11574.94	38.30	54.00	-15.70	29.63	5.14	38.83	35.30	Average	100	202	HORIZONTAL
2	11584.01	50.43	74.00	-23.57	41.76	5.14	38.83	35.30	Peak	100	202	HORIZONTAL

Vertical

	Freq	Level	Limit	Over	Read	Cable	Antenna	Preamp		A/Pos	T/Pos	
	MHz	dBuV/m	Line	Limit	Level	Loss	Factor	Factor	Remark	cm	deg	Pol/Phase
1	11581.11	51.82	74.00	-22.18	43.15	5.14	38.83	35.30	Peak	100	309	VERTICAL
2	11588.72	40.44	54.00	-13.56	31.77	5.14	38.83	35.30	Average	100	309	VERTICAL

Temperature	24.5°C	Humidity	57%
Test Engineer	David Tesng	Configurations	IEEE 802.11b CH 1 / Ant. 1
Test Date	Mar. 09, 2013		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamplifier Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	4823.97	50.90	54.00	-3.10	46.94	5.77	33.39	35.20	Average	101	311	HORIZONTAL
2	4824.04	54.79	74.00	-19.21	50.83	5.77	33.39	35.20	Peak	101	311	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamplifier Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	4824.00	52.85	54.00	-1.15	48.89	5.77	33.39	35.20	Average	8960	90	VERTICAL
2	4824.02	56.00	74.00	-18.00	52.04	5.77	33.39	35.20	Peak	103	90	VERTICAL

Temperature	24.5°C	Humidity	57%
Test Engineer	David Tesng	Configurations	IEEE 802.11b CH 6 / Ant. 1
Test Date	Mar. 09, 2013		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamplifier Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	4873.99	53.44	54.00	-0.56	51.98	3.33	33.16	35.03	Average	100	308	HORIZONTAL
2	4874.02	55.83	74.00	-18.17	54.37	3.33	33.16	35.03	Peak	100	308	HORIZONTAL
3	7310.23	40.34	54.00	-13.66	35.72	4.06	35.96	35.40	Average	142	267	HORIZONTAL
4	7311.81	49.63	74.00	-24.37	45.01	4.06	35.96	35.40	Peak	142	267	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamplifier Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	4873.95	55.92	74.00	-18.08	54.46	3.33	33.16	35.03	Peak	101	99	VERTICAL
2	4873.99	53.73	54.00	-0.27	52.27	3.33	33.16	35.03	Average	101	99	VERTICAL
3	7310.02	48.37	74.00	-25.63	43.75	4.06	35.96	35.40	Peak	106	353	VERTICAL
4	7311.78	37.08	54.00	-16.92	32.46	4.06	35.96	35.40	Average	106	353	VERTICAL

Temperature	24.5°C	Humidity	57%
Test Engineer	David Tesng	Configurations	IEEE 802.11b CH 11 / Ant. 1
Test Date	Mar. 09, 2013		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	CableAntenna Loss Factor	Preamplifier Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg	
1	4923.99	51.20	54.00	-2.80	47.00	5.82	33.58	35.20	Average	101	313 HORIZONTAL
2	4924.06	54.57	74.00	-19.43	50.37	5.82	33.58	35.20	Peak	101	313 HORIZONTAL
3	7385.00	53.87	74.00	-20.13	43.97	8.75	36.61	35.46	Peak	100	88 HORIZONTAL
4	7385.30	42.72	54.00	-11.28	32.82	8.75	36.61	35.46	Average	100	88 HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	CableAntenna Loss Factor	Preamplifier Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg	
1	4923.98	55.21	74.00	-18.79	51.01	5.82	33.58	35.20	Peak	100	82 VERTICAL
2	4924.00	51.88	54.00	-2.12	47.68	5.82	33.58	35.20	Average	100	82 VERTICAL
3	7386.76	41.52	54.00	-12.48	31.62	8.75	36.61	35.46	Average	100	276 VERTICAL
4	7388.98	52.84	74.00	-21.16	42.94	8.75	36.61	35.46	Peak	100	276 VERTICAL

Temperature	24.5°C	Humidity	57%
Test Engineer	David Tesng	Configurations	IEEE 802.11g CH 1 / Ant. 1
Test Date	Mar. 09, 2013		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamplifier Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	4799.00	45.27	74.00	-28.73	41.39	5.75	33.33	35.20	Peak	100	177	HORIZONTAL
2	4826.50	34.63	54.00	-19.37	30.67	5.77	33.39	35.20	Average	100	177	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamplifier Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	4822.90	37.75	54.00	-16.25	33.79	5.77	33.39	35.20	Average	100	83	VERTICAL
2	4830.90	49.91	74.00	-24.09	45.95	5.77	33.39	35.20	Peak	100	83	VERTICAL

Temperature	24.5°C	Humidity	57%
Test Engineer	David Tesng	Configurations	IEEE 802.11g CH 6 / Ant. 1
Test Date	Mar. 09, 2013		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamplifier Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	4871.53	52.42	74.00	-21.58	50.96	3.33	33.16	35.03	Peak	108	308	HORIZONTAL
2	4872.94	39.02	54.00	-14.98	37.56	3.33	33.16	35.03	Average	108	308	HORIZONTAL
3	7313.97	35.84	54.00	-18.16	31.22	4.06	35.96	35.40	Average	145	267	HORIZONTAL
4	7315.01	49.73	74.00	-24.27	45.11	4.06	35.96	35.40	Peak	145	267	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamplifier Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	4874.87	38.71	54.00	-15.29	37.25	3.33	33.16	35.03	Average	102	100	VERTICAL
2	4875.31	52.14	74.00	-21.86	50.68	3.33	33.16	35.03	Peak	102	100	VERTICAL
3	7305.26	46.33	74.00	-27.67	41.75	4.06	35.92	35.40	Peak	100	92	VERTICAL
4	7305.46	34.38	54.00	-19.62	29.80	4.06	35.92	35.40	Average	100	92	VERTICAL

Temperature	24.5°C	Humidity	57%
Test Engineer	David Tesng	Configurations	IEEE 802.11g CH 11 / Ant. 1
Test Date	Mar. 09, 2013		

Horizontal

	Freq	Level	Limit	Over	Read	CableAntenna	Preamp		A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	Loss	Factor	Factor	Remark	cm	deg
1	4912.40	46.09	74.00	-27.91	41.94	5.81	33.54	35.20	Peak	100	210 HORIZONTAL
2	4922.40	34.66	54.00	-19.34	30.46	5.82	33.58	35.20	Average	100	210 HORIZONTAL
3	7395.50	38.81	54.00	-15.19	28.88	8.75	36.64	35.46	Average	100	144 HORIZONTAL
4	7405.50	51.26	74.00	-22.74	41.31	8.77	36.64	35.46	Peak	100	144 HORIZONTAL

Vertical

	Freq	Level	Limit	Over	Read	CableAntenna	Preamp		A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	Loss	Factor	Factor	Remark	cm	deg
1	4923.20	50.89	74.00	-23.11	46.69	5.82	33.58	35.20	Peak	100	92 VERTICAL
2	4923.60	38.51	54.00	-15.49	34.31	5.82	33.58	35.20	Average	100	92 VERTICAL
3	7386.60	51.35	74.00	-22.65	41.45	8.75	36.61	35.46	Peak	100	70 VERTICAL
4	7396.20	39.19	54.00	-14.81	29.26	8.75	36.64	35.46	Average	100	70 VERTICAL

Temperature	24.5°C	Humidity	57%
Test Engineer	David Tesng	Configurations	IEEE 802.11a CH 149 / Ant. 1
Test Date	Mar. 09, 2013		

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	11490.75	39.28	54.00	-14.72	30.67	5.11	38.78	35.28	Average	100	250	HORIZONTAL
2	11493.00	53.83	74.00	-20.17	45.22	5.11	38.78	35.28	Peak	100	250	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	11489.07	41.85	54.00	-12.15	33.24	5.11	38.78	35.28	Average	100	217	VERTICAL
2	11491.44	54.17	74.00	-19.83	45.56	5.11	38.78	35.28	Peak	100	217	VERTICAL

Temperature	24.5°C	Humidity	57%
Test Engineer	David Tesng	Configurations	IEEE 802.11a CH 157 / Ant. 1
Test Date	Mar. 09, 2013		

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	11568.73	38.52	54.00	-15.48	29.86	5.13	38.83	35.30	Average	100	253	HORIZONTAL
2	11574.74	51.44	74.00	-22.56	42.77	5.14	38.83	35.30	Peak	100	253	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	11570.10	41.60	54.00	-12.40	32.93	5.14	38.83	35.30	Average	100	230	VERTICAL
2	11571.60	55.92	74.00	-18.08	47.25	5.14	38.83	35.30	Peak	100	230	VERTICAL

Temperature	24.5°C	Humidity	57%
Test Engineer	David Tesng	Configurations	IEEE 802.11a CH 165 / Ant. 1
Test Date	Mar. 09, 2013		

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	11646.31	49.43	74.00	-24.57	40.71	5.16	38.86	35.30	Peak	100	204	HORIZONTAL
2	11653.53	38.02	54.00	-15.98	29.30	5.16	38.86	35.30	Average	100	204	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	11649.90	41.71	54.00	-12.29	32.99	5.16	38.86	35.30	Average	100	215	VERTICAL
2	11649.94	54.34	74.00	-19.66	45.62	5.16	38.86	35.30	Peak	100	215	VERTICAL

Note:

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

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

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

4.6. Emissions Measurement

4.6.1. Limit

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

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

4.6.2. Measuring Instruments and Setting

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

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

4.6.3. Test Procedures

For Radiated band edges Measurement:

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

For Conducted Out of Band Emission Measurement:

- Test was performed in accordance with KDB 558074 v02 Guidance for Performing Compliance Measurements on Digital Transmission Systems (DTS) Operating Under §15.247 section 10.1 Unwanted Emissions into Non-Restricted Frequency Bands Measurement Procedure
- The conducted emission test is performed on each TX port of operating mode without summing or adding $10\log(N)$ since the limit is relative emission limit.
Only worst data of each operating mode is presented.

4.6.4. Test Setup Layout

For Radiated band edges Measurement:

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

For Conducted Out of Band Emission Measurement:

This test setup layout is the same as that shown in section 4.4.4.

4.6.5. Test Deviation

There is no deviation with the original standard.

4.6.6. EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

4.6.7. Test Result of Band Edge and Fundamental Emissions

Temperature	24.5°C	Humidity	57%
Test Engineer	David Tesng	Configurations	IEEE 802.11n MCS0 20MHz Ch 1, 6, 11 / Ant. 1 + Ant. 2
Test date	Mar. 09, 2013		

Channel 1

	Freq	Level	Limit	Over	Read	CableAntenna	Preamp		A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	Loss	Factor	Factor	Remark	cm	deg
1	2388.20	71.52	74.00	-2.48	39.50	3.97	28.05	0.00	Peak	147	156 HORIZONTAL
2	2390.00	53.78	54.00	-0.22	21.76	3.97	28.05	0.00	Average	147	156 HORIZONTAL
3	2407.80	110.10			78.02	3.99	28.09	0.00	Peak	147	156 HORIZONTAL
4	2415.40	98.94			66.86	3.99	28.09	0.00	Average	147	156 HORIZONTAL

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

Channel 6

	Freq	Level	Limit	Over	Read	CableAntenna	Preamp		A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	Loss	Factor	Factor	Remark	cm	deg
1	2385.83	72.39	74.00	-1.61	42.01	2.21	28.17	0.00	Peak	144	22 HORIZONTAL
2	2390.00	53.63	54.00	-0.37	23.24	2.22	28.17	0.00	Average	144	22 HORIZONTAL
3	2435.40	103.17			72.65	2.23	28.29	0.00	Average	144	22 HORIZONTAL
4	2435.40	113.23			82.71	2.23	28.29	0.00	Peak	144	22 HORIZONTAL
5	2483.50	50.68	54.00	-3.32	20.04	2.26	28.38	0.00	Average	144	22 HORIZONTAL
6	2483.82	71.38	74.00	-2.62	40.74	2.26	28.38	0.00	Peak	144	22 HORIZONTAL

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

Channel 11

	Freq	Level	Limit	Over	Read	CableAntenna	Preamp		A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	Loss	Factor	Factor	Remark	cm	deg
1	2459.80	101.40			69.15	4.03	28.22	0.00	Average	143	143 HORIZONTAL
2	2465.20	112.34			80.09	4.03	28.22	0.00	Peak	143	143 HORIZONTAL
3	2484.90	53.77	54.00	-0.23	21.46	4.05	28.26	0.00	Average	143	143 HORIZONTAL
4	2484.90	73.73	74.00	-0.27	41.42	4.05	28.26	0.00	Peak	143	143 HORIZONTAL

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

For 1TX

Temperature	24.5°C	Humidity	57%
Test Engineer	David Tesng	Configurations	IEEE 802.11n MCS0 40MHz Ch 3, 6, 9 Ant. 1
Test date	Mar. 09, 2013		

Channel 3

	Freq	Level	Limit	Over	Read	Cable	Antenna	Preamp		A/Pos	T/Pos	
	MHz	dBuV/m	Line	Limit	Level	Loss	Factor	Factor	Remark	cm	deg	Pol/Phase
1	2382.95	73.96	74.00	-0.04	43.58	2.21	28.17	0.00	Peak	152	138	HORIZONTAL
2	2387.76	49.19	54.00	-4.81	18.81	2.21	28.17	0.00	Average	152	138	HORIZONTAL
3	2426.49	102.26			71.78	2.23	28.25	0.00	Peak	152	138	HORIZONTAL
4	2427.13	90.81			60.33	2.23	28.25	0.00	Average	152	138	HORIZONTAL

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

Channel 6

	Freq	Level	Limit	Over	Read	Cable	Antenna	Preamp		A/Pos	T/Pos	
	MHz	dBuV/m	Line	Limit	Level	Loss	Factor	Factor	Remark	cm	deg	Pol/Phase
1	2389.04	71.43	74.00	-2.57	41.05	2.21	28.17	0.00	Peak	180	136	HORIZONTAL
2	2390.00	50.68	54.00	-3.32	20.29	2.22	28.17	0.00	Average	180	136	HORIZONTAL
3	2449.50	103.24			72.71	2.24	28.29	0.00	Peak	180	136	HORIZONTAL
4	2450.46	92.87			62.34	2.24	28.29	0.00	Average	180	136	HORIZONTAL
5	2483.50	53.93	54.00	-0.07	23.29	2.26	28.38	0.00	Average	180	136	HORIZONTAL
6	2484.46	72.58	74.00	-1.42	41.94	2.26	28.38	0.00	Peak	180	136	HORIZONTAL

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

Channel 9

	Freq	Level	Limit	Over	Read	Cable	Antenna	Preamp		A/Pos	T/Pos	
	MHz	dBuV/m	Line	Limit	Level	Loss	Factor	Factor	Remark	cm	deg	Pol/Phase
1	2446.87	101.33			70.80	2.24	28.29	0.00	Peak	139	87	VERTICAL
2	2464.82	89.98			59.41	2.24	28.33	0.00	Average	139	87	VERTICAL
3	2483.50	51.81	54.00	-2.19	21.18	2.26	28.37	0.00	Average	139	87	VERTICAL
4	2488.95	73.41	74.00	-0.59	42.74	2.26	28.41	0.00	Peak	139	87	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.

For 2TX

Temperature	24.5°C	Humidity	57%
Test Engineer	David Tesng	Configurations	IEEE 802.11n MCS0 40MHz Ch 3, 6, 9 Ant. 1 + Ant. 2
Test date	Mar. 09, 2013		

Channel 3

	Freq	Level	Limit Line	Over Limit	Read Level	CableAntenna Loss Factor	Preamplifier Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg	
1	2388.00	73.32	74.00	-0.68	41.30	3.97	28.05	0.00 Peak	144	158	HORIZONTAL
2	2390.00	53.48	54.00	-0.52	21.46	3.97	28.05	0.00 Average	144	158	HORIZONTAL
3	2425.40	94.83			62.70	4.00	28.13	0.00 Average	144	158	HORIZONTAL
4	2427.60	105.77			73.64	4.00	28.13	0.00 Peak	144	158	HORIZONTAL

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

Channel 6

	Freq	Level	Limit Line	Over Limit	Read Level	CableAntenna Loss Factor	Preamplifier Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg	
1	2388.72	73.64	74.00	-0.36	43.26	2.21	28.17	0.00 Peak	176	147	HORIZONTAL
2	2389.36	52.93	54.00	-1.07	22.55	2.21	28.17	0.00 Average	176	147	HORIZONTAL
3	2431.23	93.89			63.41	2.23	28.25	0.00 Average	176	147	HORIZONTAL
4	2431.55	105.73			75.25	2.23	28.25	0.00 Peak	176	147	HORIZONTAL
5	2484.14	51.82	54.00	-2.18	21.18	2.26	28.38	0.00 Average	176	147	HORIZONTAL
6	2484.14	71.12	74.00	-2.88	40.48	2.26	28.38	0.00 Peak	176	147	HORIZONTAL

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

Channel 9

	Freq	Level	Limit Line	Over Limit	Read Level	CableAntenna Loss Factor	Preamplifier Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg	
1	2445.40	107.21			75.01	4.02	28.18	0.00 Peak	122	161	HORIZONTAL
2	2445.60	94.99			62.79	4.02	28.18	0.00 Average	122	161	HORIZONTAL
3	2483.50	52.36	54.00	-1.64	20.05	4.05	28.26	0.00 Average	122	161	HORIZONTAL
4	2484.90	73.04	74.00	-0.96	40.73	4.05	28.26	0.00 Peak	122	161	HORIZONTAL

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

Note:

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

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

Temperature	24.5°C	Humidity	57%
Test Engineer	David Tesng	Configurations	IEEE 802.11b CH 1, 6, 11 / Ant. 1
Test Date	Mar. 09, 2013		

Channel 1

	Freq	Level	Limit	Over	Read	CableAntenna	Preamp		A/Pos	T/Pos	
	MHz	dBuV/m	Line	Limit	Level	Loss	Factor	Factor	Remark	cm	deg
			dBuV/m	dB	dBuV	dB	dB/m	dB			Pol/Phase
1	2383.20	51.70	54.00	-2.30	19.69	3.96	28.05	0.00	Average	138	155 HORIZONTAL
2	2388.60	60.88	74.00	-13.12	28.86	3.97	28.05	0.00	Peak	138	155 HORIZONTAL
3	2411.00	111.04			78.96	3.99	28.09	0.00	Peak	138	155 HORIZONTAL
4	2411.20	107.28			75.20	3.99	28.09	0.00	Average	138	155 HORIZONTAL

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

Channel 6

	Freq	Level	Limit	Over	Read	CableAntenna	Preamp		A/Pos	T/Pos	
	MHz	dBuV/m	Line	Limit	Level	Loss	Factor	Factor	Remark	cm	deg
			dBuV/m	dB	dBuV	dB	dB/m	dB			Pol/Phase
1	2388.40	50.03	54.00	-3.97	19.65	2.21	28.17	0.00	Average	141	51 HORIZONTAL
2	2388.88	61.01	74.00	-12.99	30.63	2.21	28.17	0.00	Peak	141	51 HORIZONTAL
3	2436.04	111.55			81.03	2.23	28.29	0.00	Peak	141	51 HORIZONTAL
4	2436.20	107.75			77.23	2.23	28.29	0.00	Average	141	51 HORIZONTAL
5	2483.50	50.50	54.00	-3.50	19.86	2.26	28.38	0.00	Average	141	51 HORIZONTAL
6	2485.58	61.87	74.00	-12.13	31.19	2.26	28.42	0.00	Peak	141	51 HORIZONTAL

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

Channel 11

	Freq	Level	Limit	Over	Read	CableAntenna	Preamp		A/Pos	T/Pos	
	MHz	dBuV/m	Line	Limit	Level	Loss	Factor	Factor	Remark	cm	deg
			dBuV/m	dB	dBuV	dB	dB/m	dB			Pol/Phase
1	2461.20	107.38			75.13	4.03	28.22	0.00	Average	143	151 HORIZONTAL
2	2461.20	110.81			78.56	4.03	28.22	0.00	Peak	143	151 HORIZONTAL
3	2483.90	53.00	54.00	-1.00	20.69	4.05	28.26	0.00	Average	143	151 HORIZONTAL
4	2484.10	62.09	74.00	-11.91	29.78	4.05	28.26	0.00	Peak	143	151 HORIZONTAL

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

Temperature	24.5°C	Humidity	57%
Test Engineer	David Tesng	Configurations	IEEE 802.11g CH 1, 6, 11 / Ant. 1
Test Date	Mar. 09, 2013		

Channel 1

	Freq	Level	Limit	Over	Read	CableAntenna	Preamp		A/Pos	T/Pos	
	MHz	dBuV/m	Line	Limit	Level	Loss	Factor	Factor	Remark	cm	deg
			dBuV/m	dB	dBuV	dB	dB/m	dB			Pol/Phase
1	2388.60	71.93	74.00	-2.07	39.91	3.97	28.05	0.00	Peak	137	158 HORIZONTAL
2	2390.00	53.81	54.00	-0.19	21.79	3.97	28.05	0.00	Average	137	158 HORIZONTAL
3	2409.40	99.38			67.30	3.99	28.09	0.00	Average	137	158 HORIZONTAL
4	2412.00	110.22			78.14	3.99	28.09	0.00	Peak	137	158 HORIZONTAL

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

Channel 6

	Freq	Level	Limit	Over	Read	CableAntenna	Preamp		A/Pos	T/Pos	
	MHz	dBuV/m	Line	Limit	Level	Loss	Factor	Factor	Remark	cm	deg
			dBuV/m	dB	dBuV	dB	dB/m	dB			Pol/Phase
1	2389.04	71.48	74.00	-2.52	41.10	2.21	28.17	0.00	Peak	180	141 HORIZONTAL
2	2390.00	53.86	54.00	-0.14	23.47	2.22	28.17	0.00	Average	180	141 HORIZONTAL
3	2440.53	99.59			69.07	2.23	28.29	0.00	Average	180	141 HORIZONTAL
4	2440.76	113.81			83.28	2.24	28.29	0.00	Peak	180	141 HORIZONTAL
5	2483.50	53.08	54.00	-0.92	22.44	2.26	28.38	0.00	Average	180	141 HORIZONTAL
6	2485.10	71.60	74.00	-2.40	40.92	2.26	28.42	0.00	Peak	180	141 HORIZONTAL

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

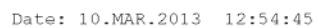
Channel 11

	Freq	Level	Limit	Over	Read	CableAntenna	Preamp		A/Pos	T/Pos	
	MHz	dBuV/m	Line	Limit	Level	Loss	Factor	Factor	Remark	cm	deg
			dBuV/m	dB	dBuV	dB	dB/m	dB			Pol/Phase
1	2464.60	98.73			66.48	4.03	28.22	0.00	Average	134	154 HORIZONTAL
2	2465.00	109.69			77.44	4.03	28.22	0.00	Peak	134	154 HORIZONTAL
3	2483.70	53.80	54.00	-0.20	21.49	4.05	28.26	0.00	Average	134	154 HORIZONTAL
4	2483.70	73.83	74.00	-0.17	41.52	4.05	28.26	0.00	Peak	134	154 HORIZONTAL

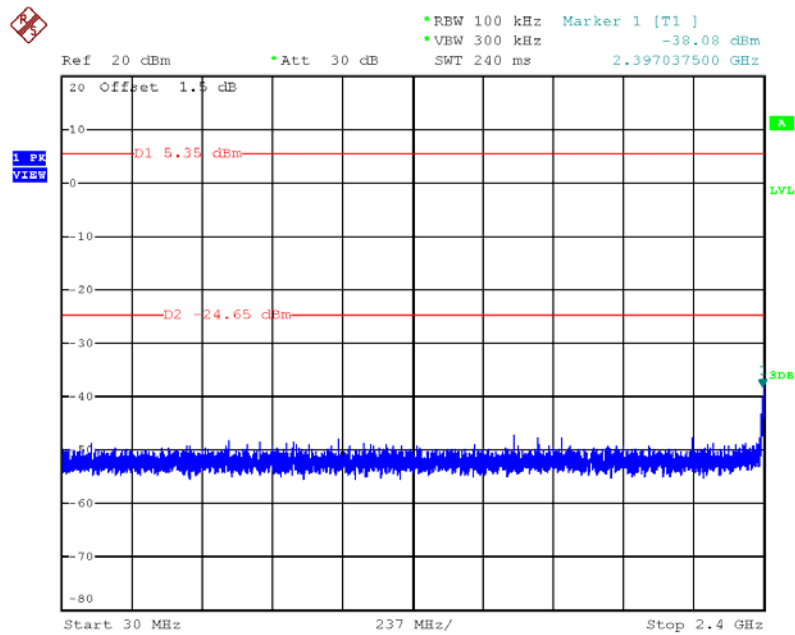
Item 1, 2 are the fundamental frequency at 2462 MHz.



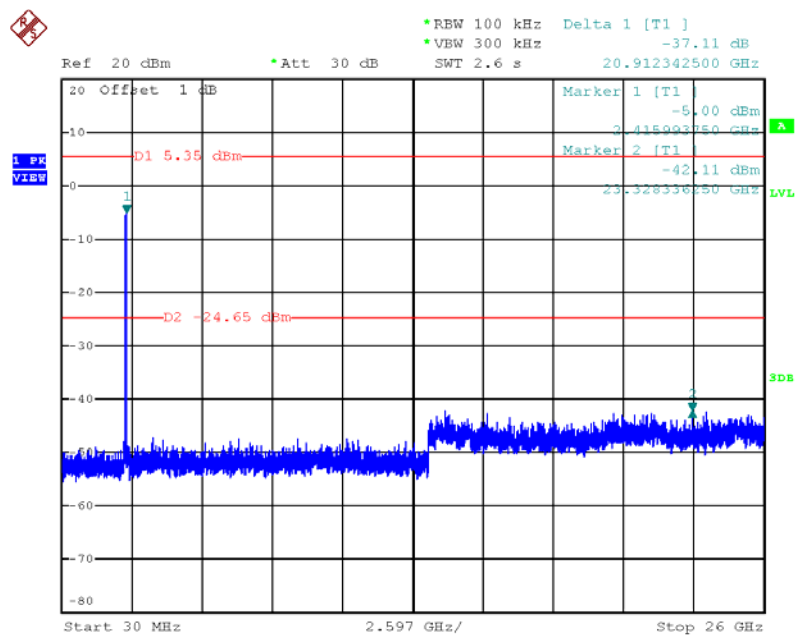
Plot on Configuration IEEE 802.11n MCS0 20MHz / Reference Level



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

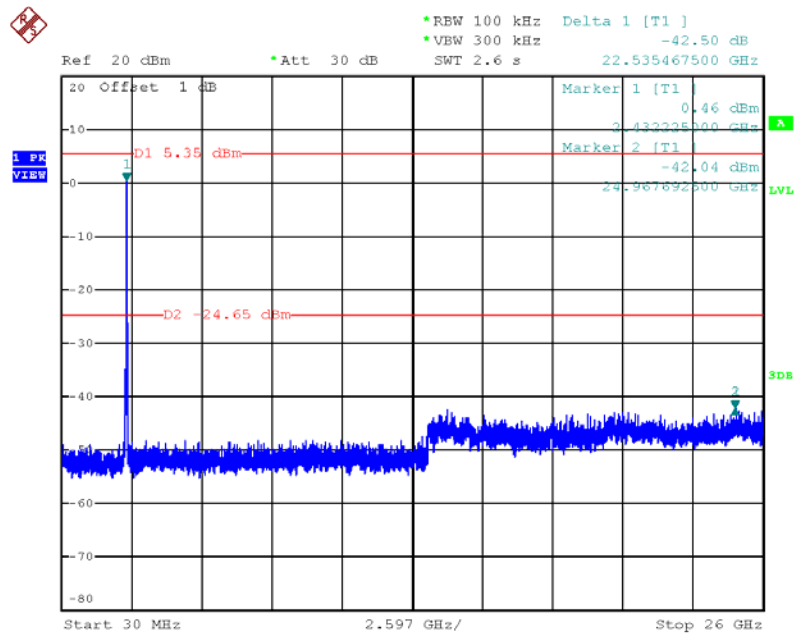


Date: 3.APR.2013 23:44:19



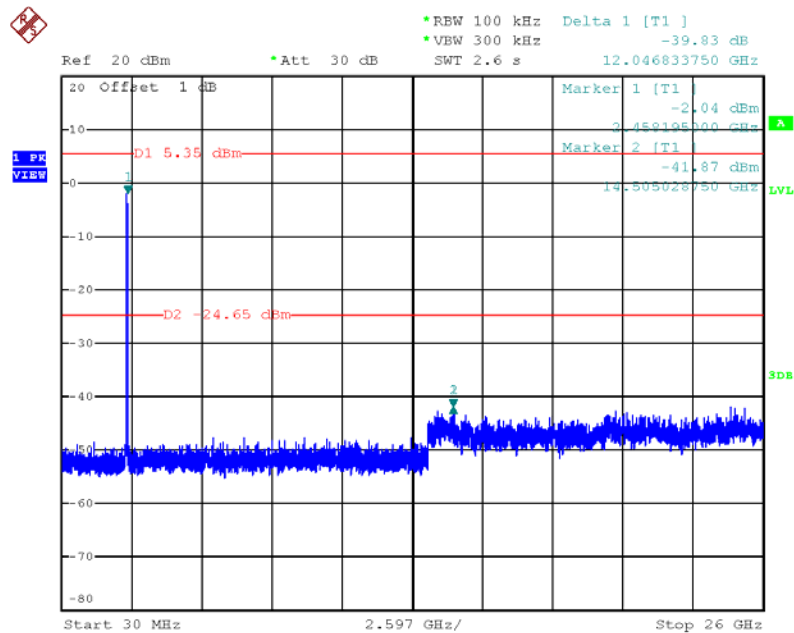
Date: 11.MAR.2013 07:30:40

Plot on Configuration IEEE 802.11n MCS0 20MHz / CH 6 (down 30dBc)

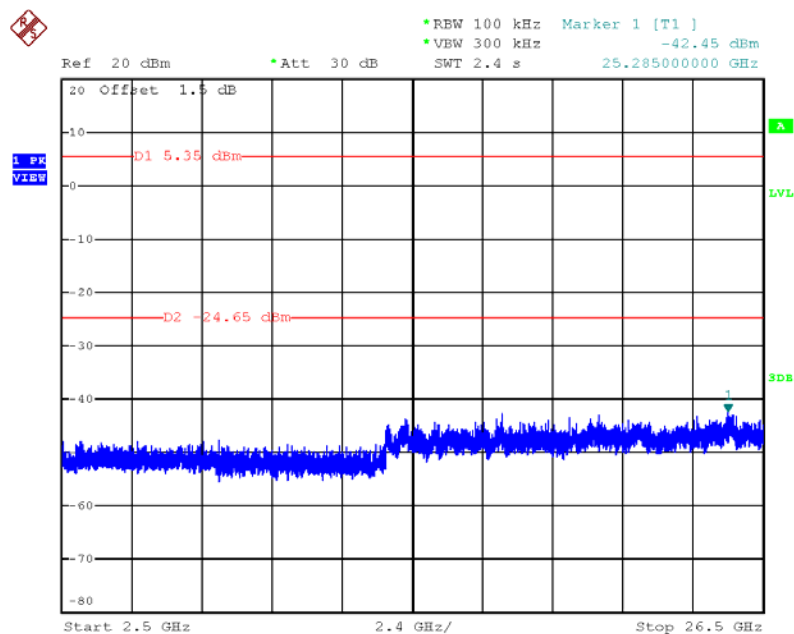


Date: 11.MAR.2013 07:31:04

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



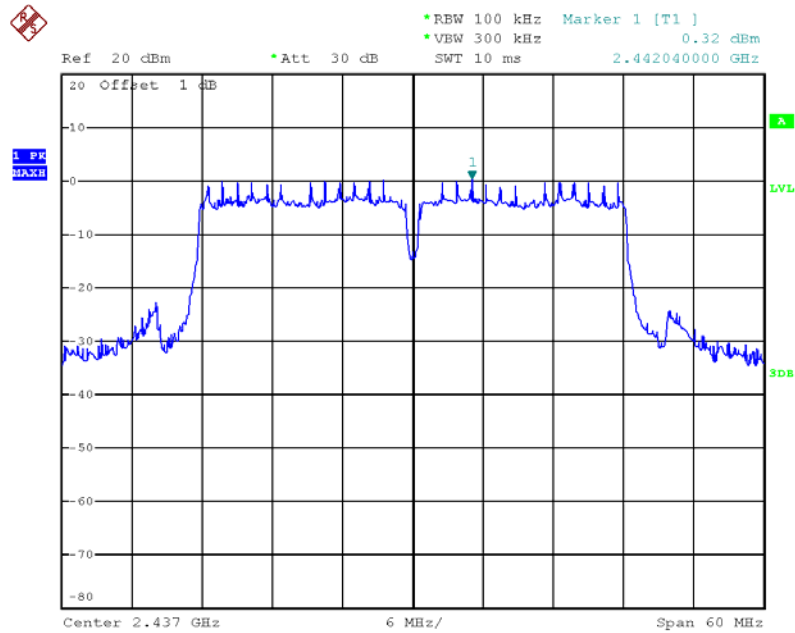
Date: 11.MAR.2013 07:31:32



Date: 3.APR.2013 23:45:45

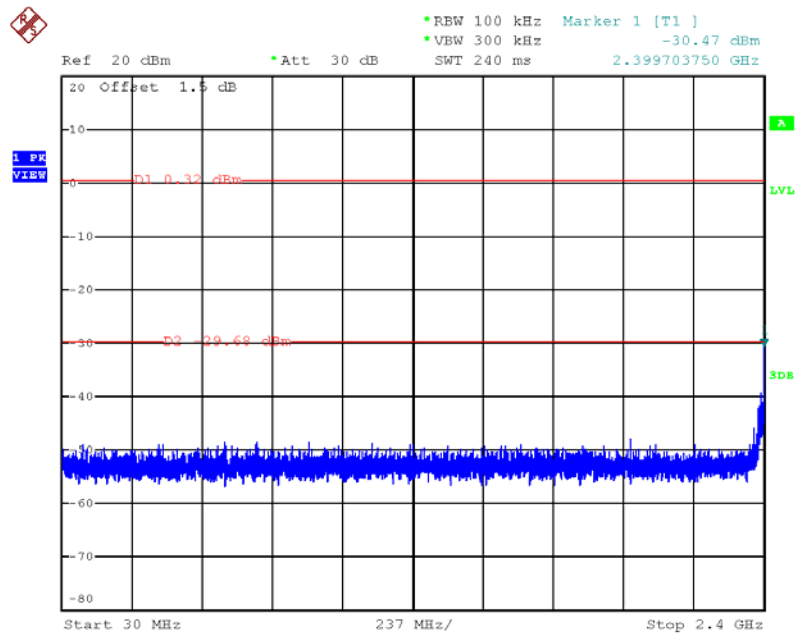
For 1TX

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

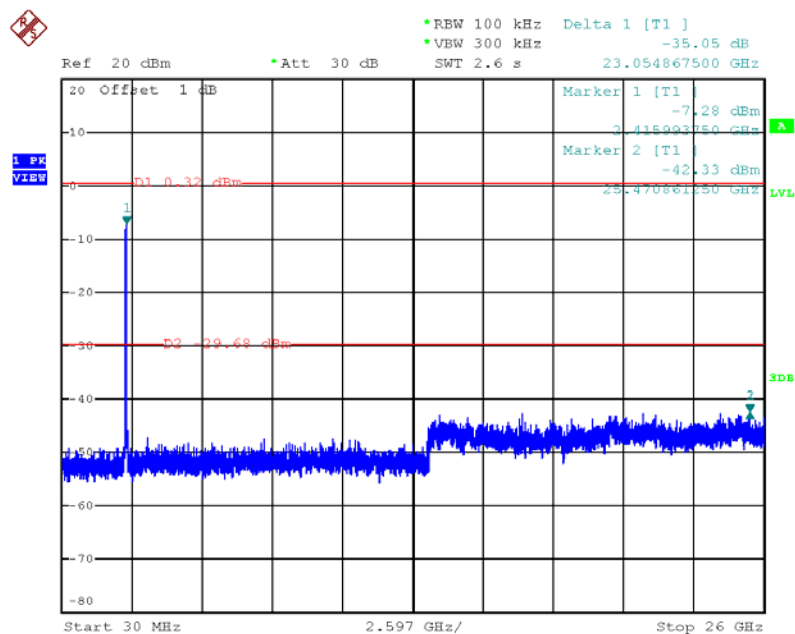


Date: 10.MAR.2013 12:59:13

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

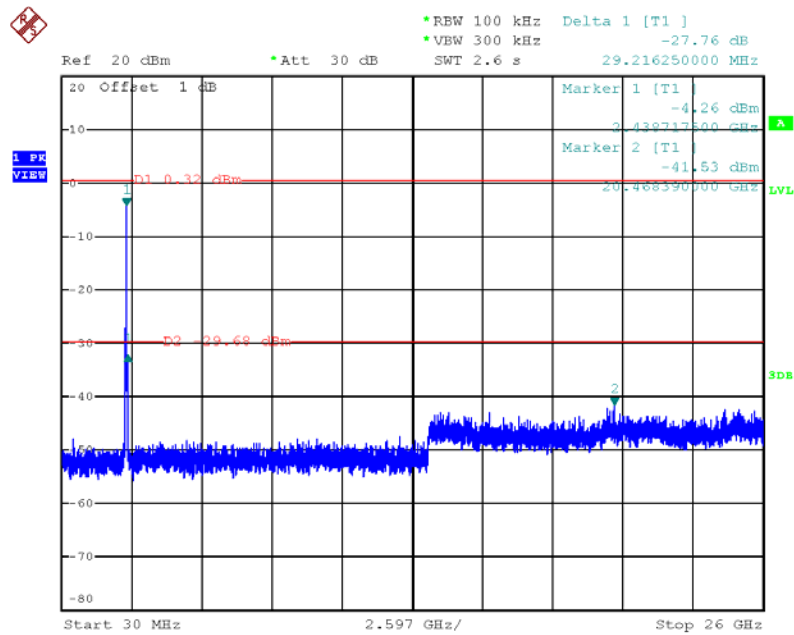


Date: 3.APR.2013 23:48:00



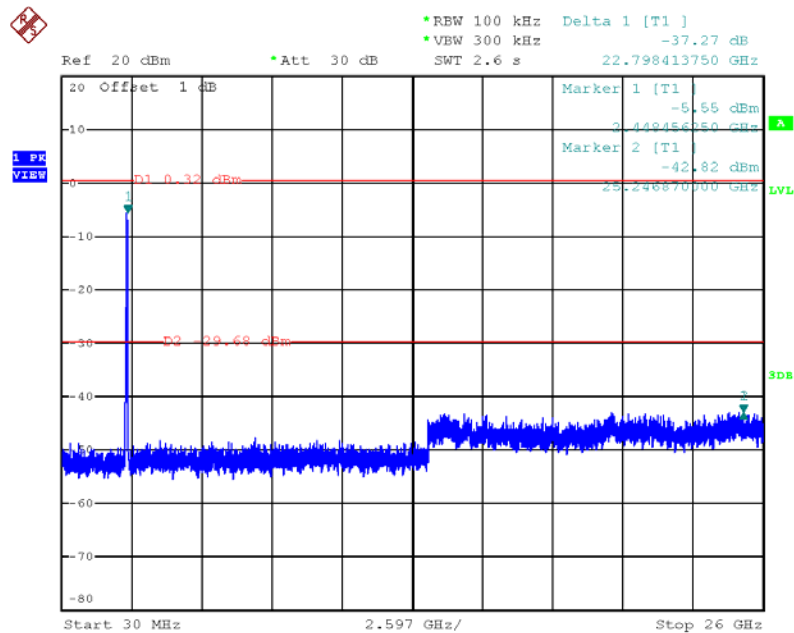
Date: 11.MAR.2013 07:35:59

Plot on Configuration IEEE 802.11n MCS0 40MHz / CH 6 (down 30dBc)

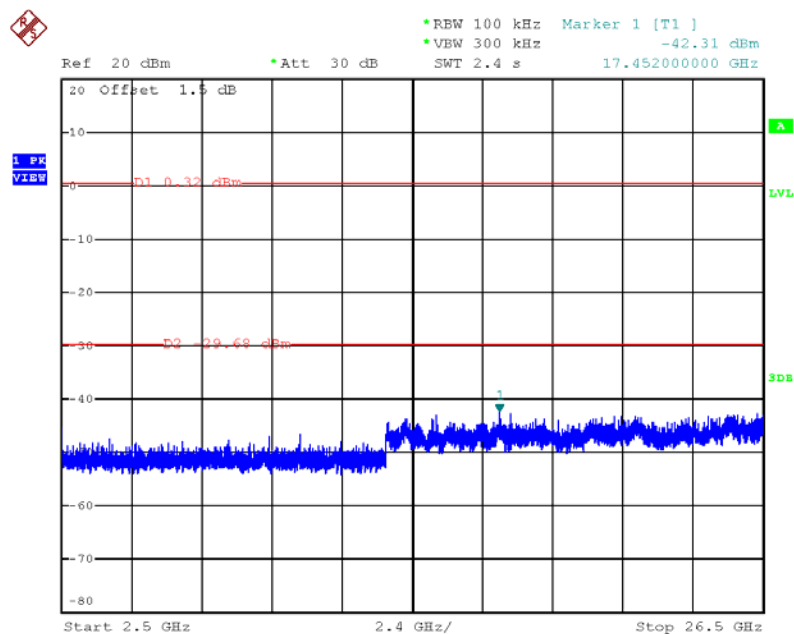


Date: 11.MAR.2013 07:36:35

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



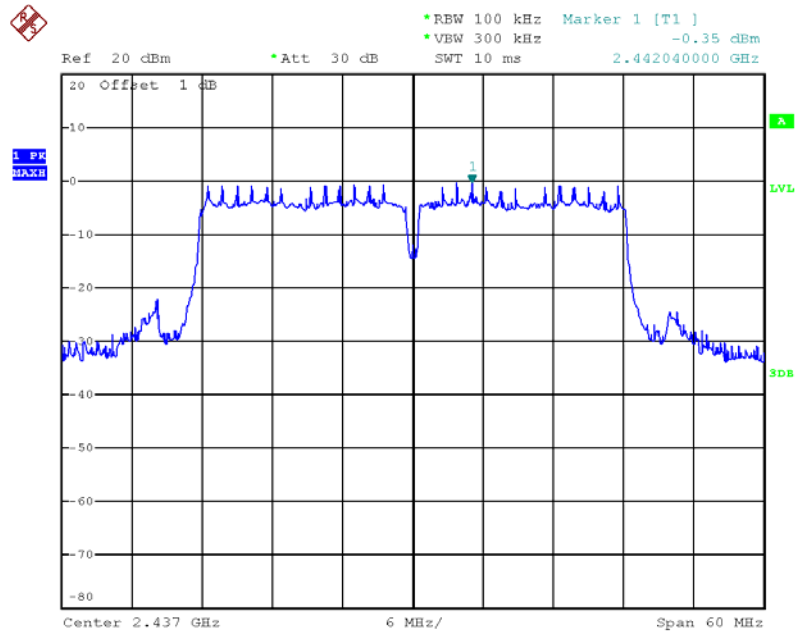
Date: 11.MAR.2013 07:36:59



Date: 3.APR.2013 23:49:42

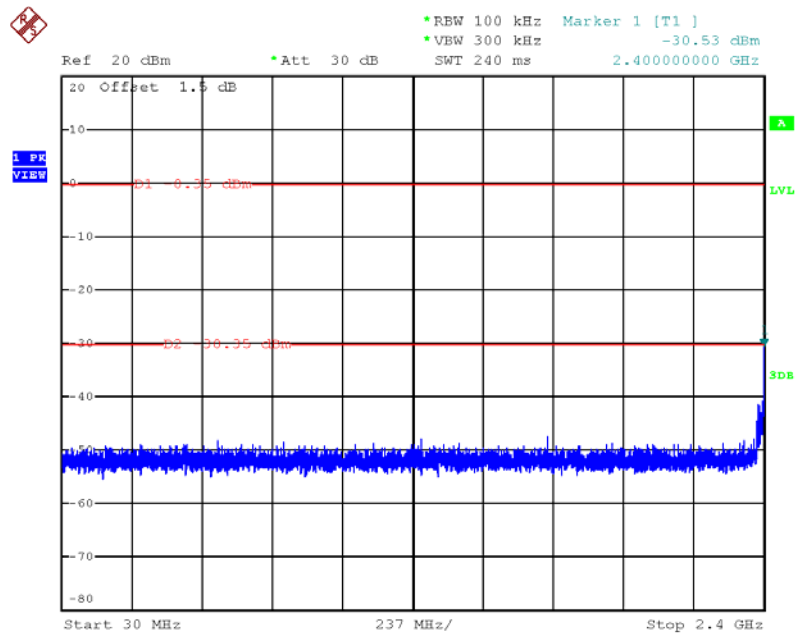
For 2TX

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

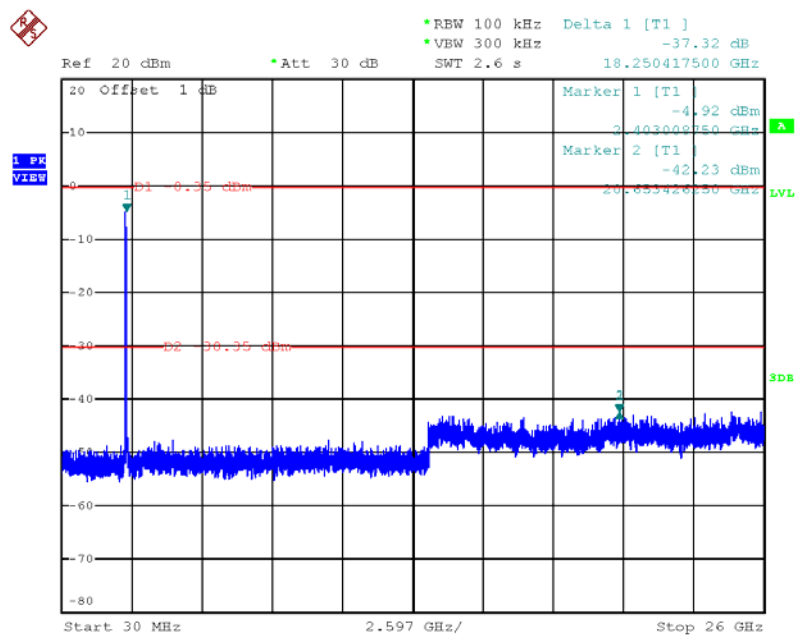


Date: 10.MAR.2013 12:57:53

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

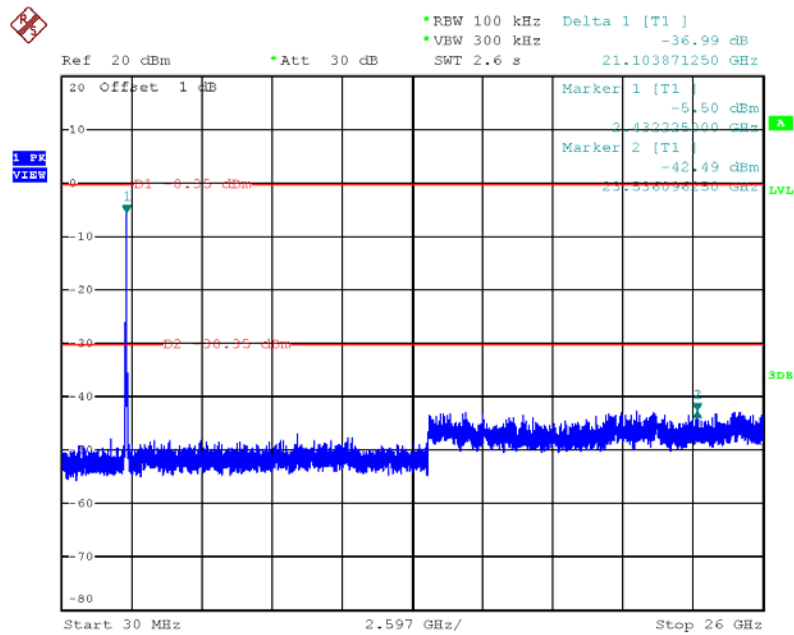


Date: 4.APR.2013 00:12:21



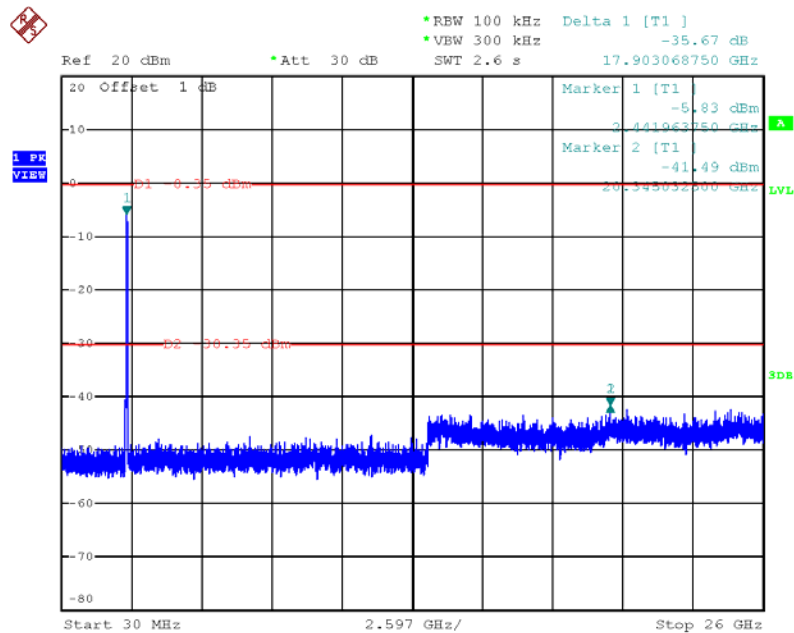
Date: 11.MAR.2013 07:33:38

Plot on Configuration IEEE 802.11n MCS0 40MHz / CH 6 (down 30dBc)

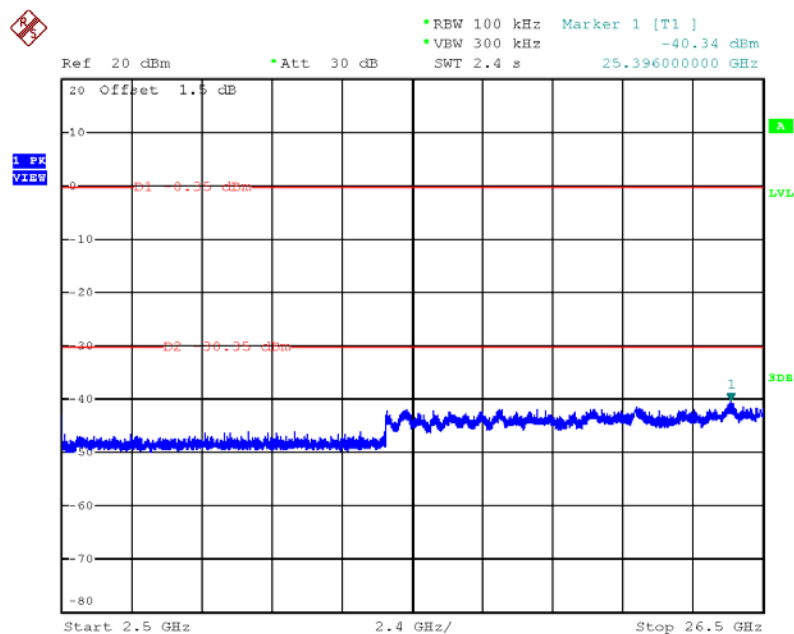


Date: 11.MAR.2013 07:34:12

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

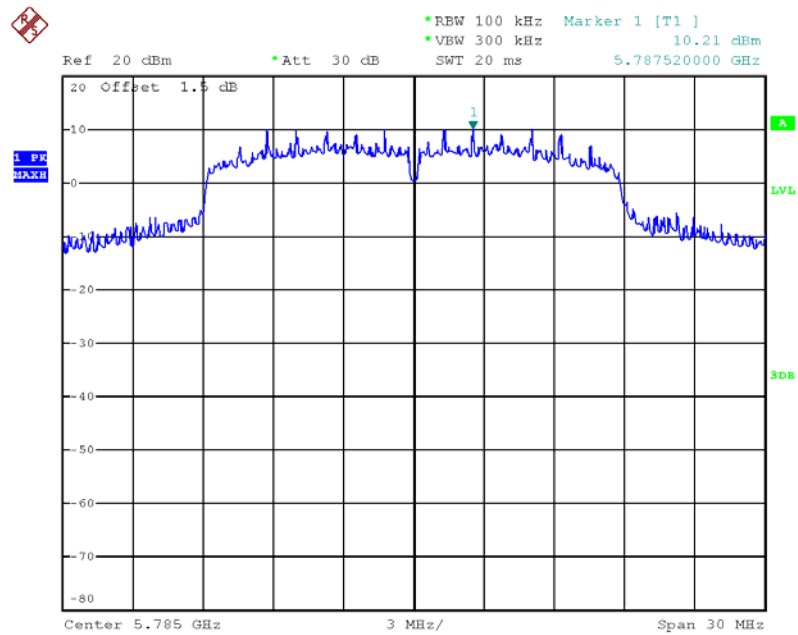


Date: 11.MAR.2013 07:34:36



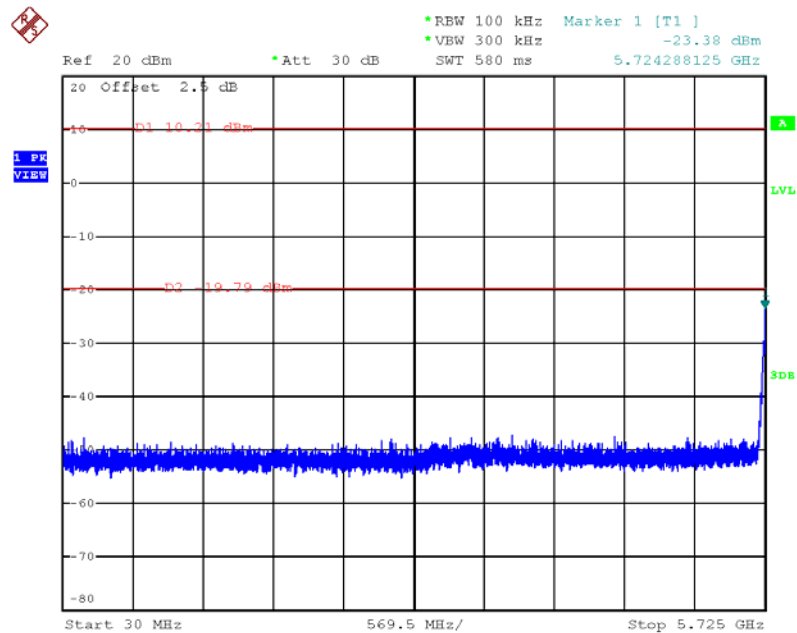
Date: 4.APR.2013 00:11:11

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

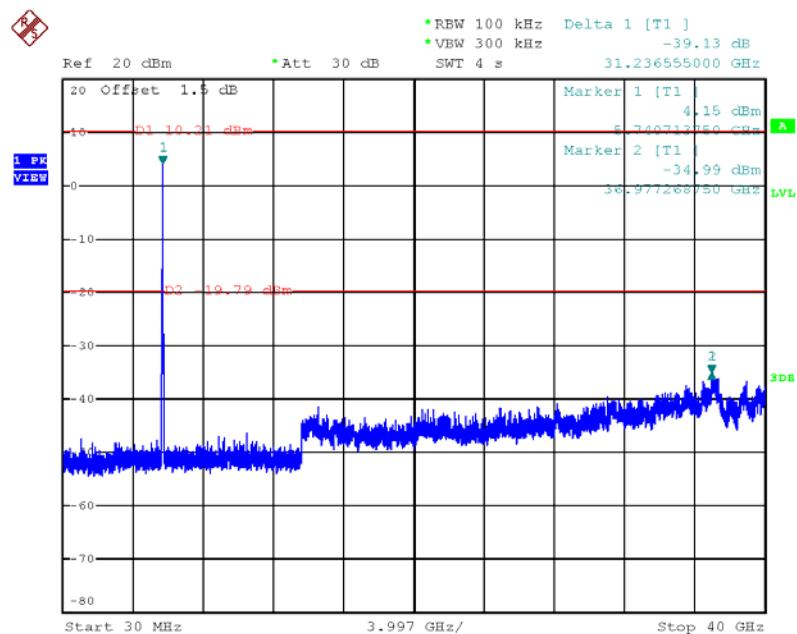


Date: 10.MAR.2013 13:13:25

Plot on Configuration IEEE 802.11n MCS0 20MHz / CH 149 (down 30dBc)

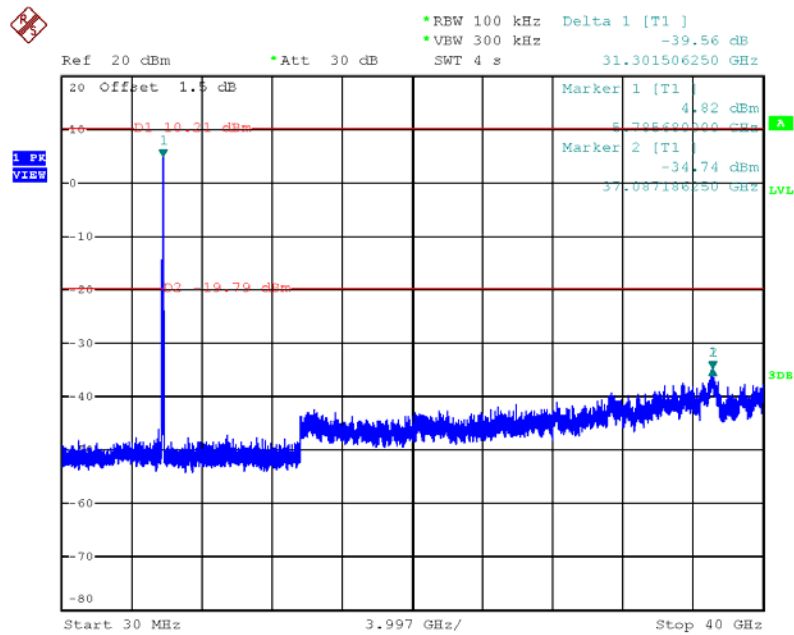


Date: 4.APR.2013 00:20:32



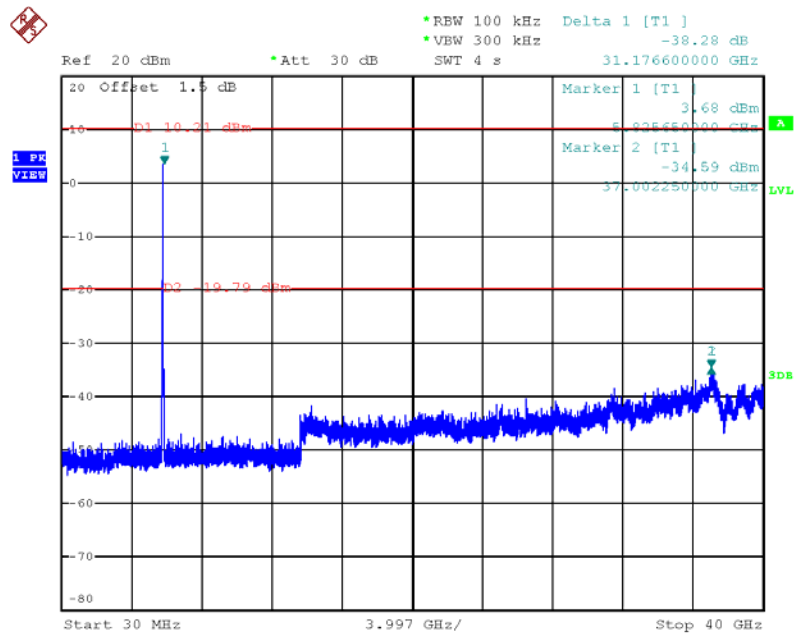
Date: 11.MAR.2013 07:46:41

Plot on Configuration IEEE 802.11n MCS0 20MHz / CH 157 (down 30dBc)

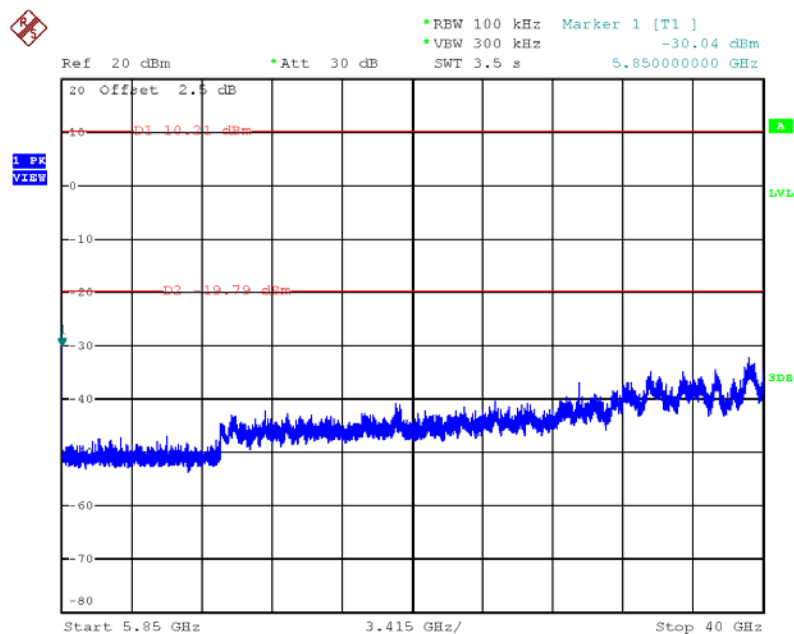


Date: 11.MAR.2013 07:47:11

Plot on Configuration IEEE 802.11n MCS0 20MHz / CH 165 (down 30dBc)



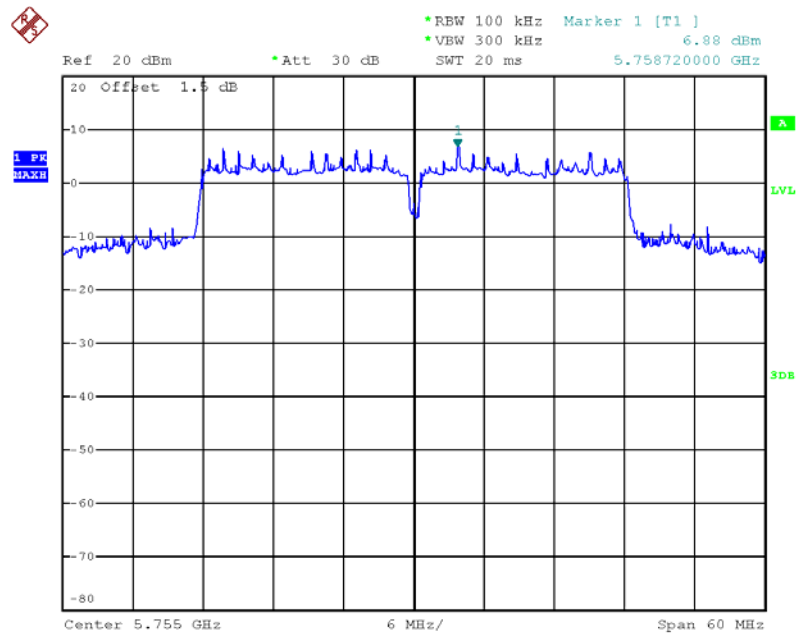
Date: 11.MAR.2013 07:47:36



Date: 4.APR.2013 00:19:37

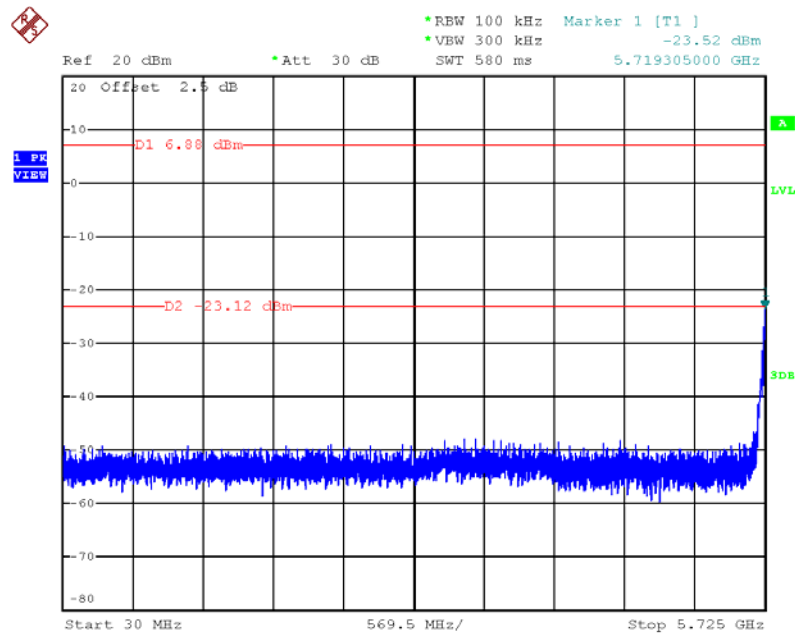
For 1TX

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

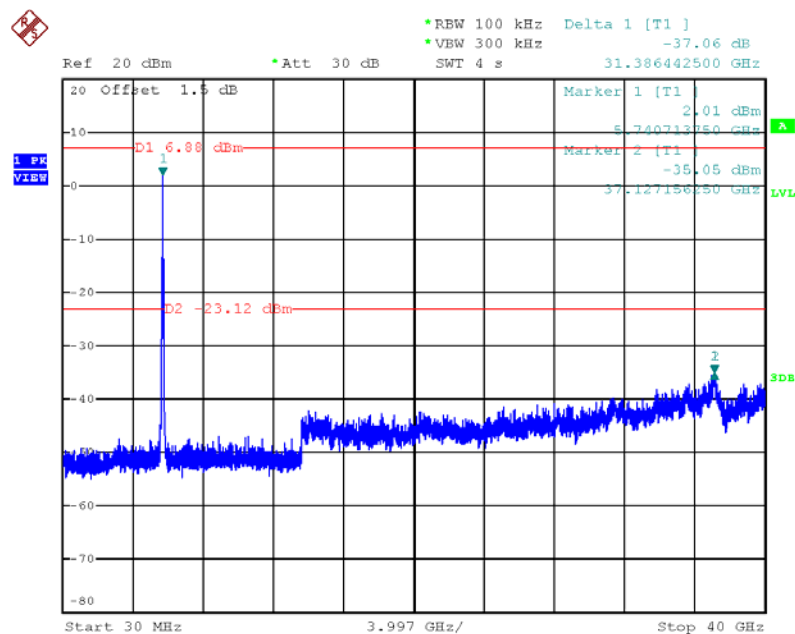


Date: 10.MAR.2013 13:17:11

Plot on Configuration IEEE 802.11n MCS0 40MHz / CH 151 (down 30dBc)

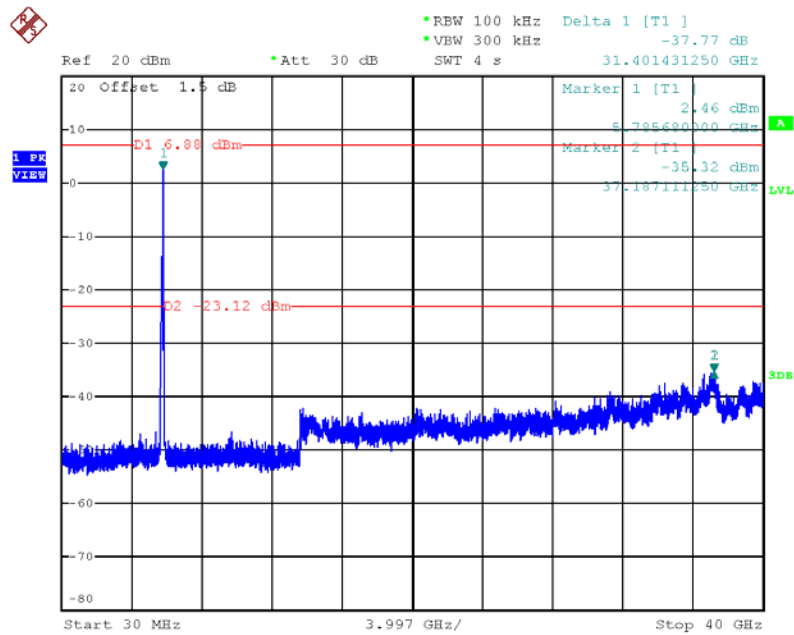


Date: 4.APR.2013 00:41:49

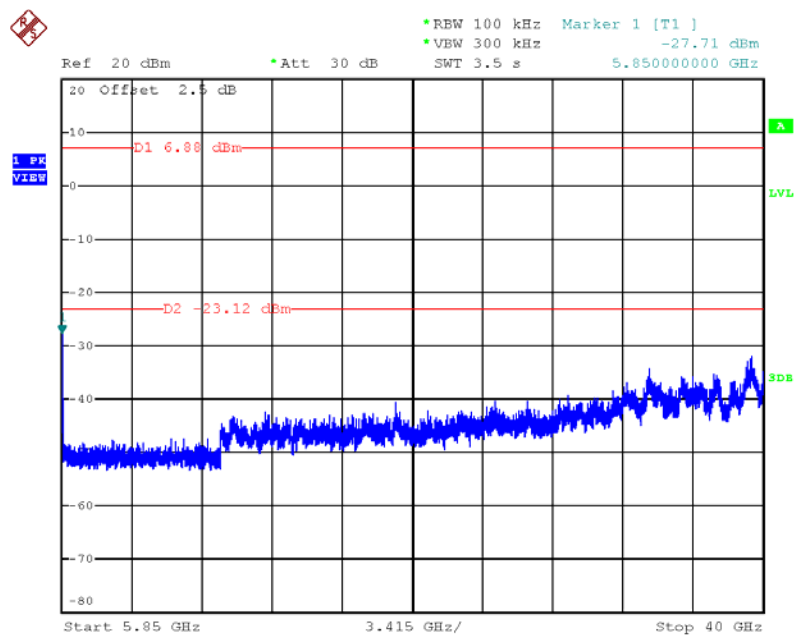


Date: 11.MAR.2013 07:50:24

Plot on Configuration IEEE 802.11n MCS0 40MHz / CH 159 (down 30dBc)



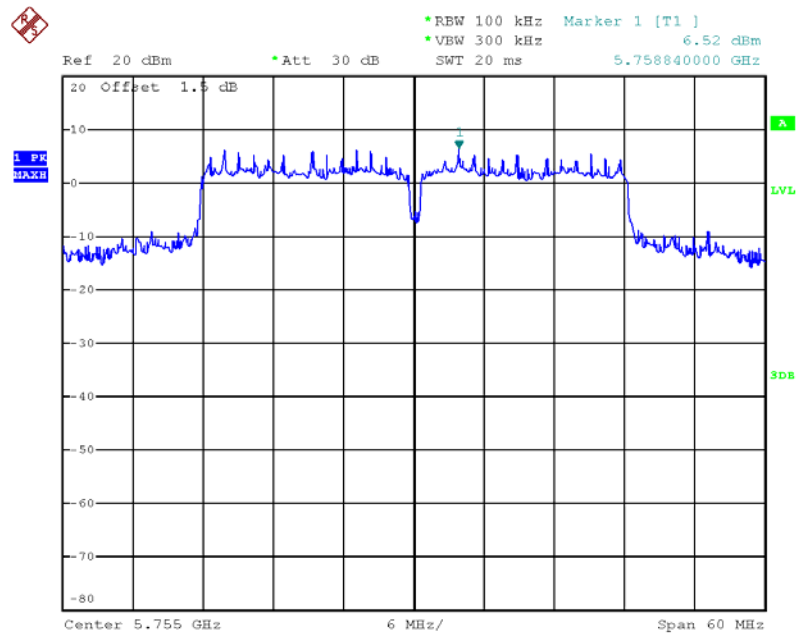
Date: 11.MAR.2013 07:50:47



Date: 4.APR.2013 00:43:39

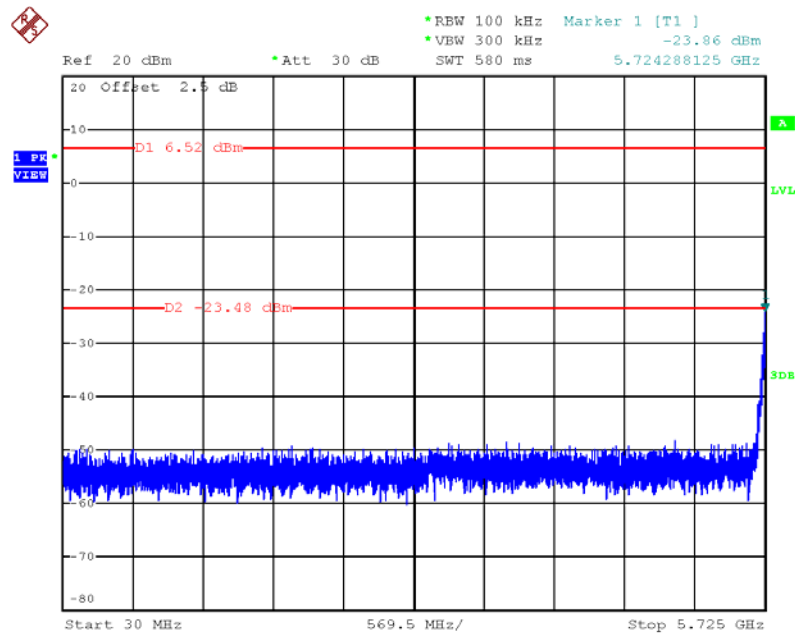
For 2TX

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

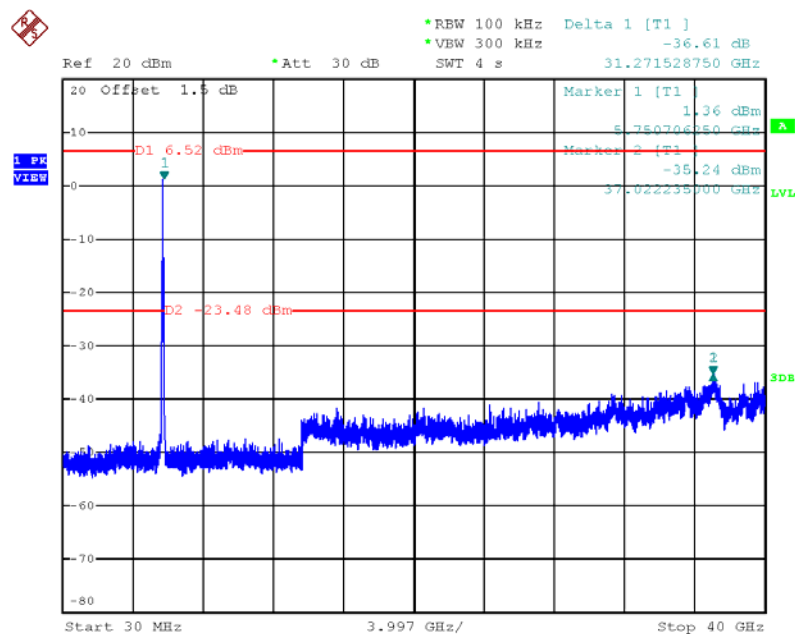


Date: 10.MAR.2013 13:18:19

Plot on Configuration IEEE 802.11n MCS0 40MHz / CH 151 (down 30dBc)

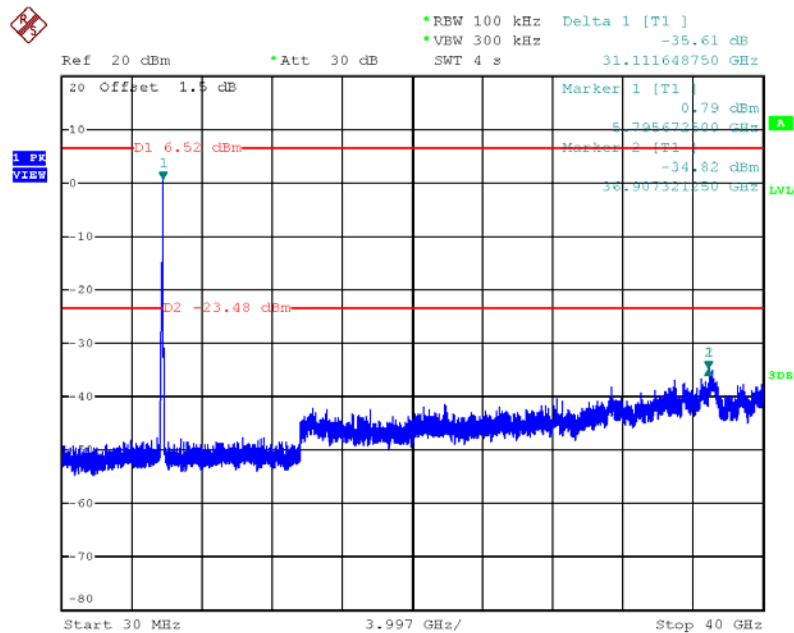


Date: 4.APR.2013 00:48:37

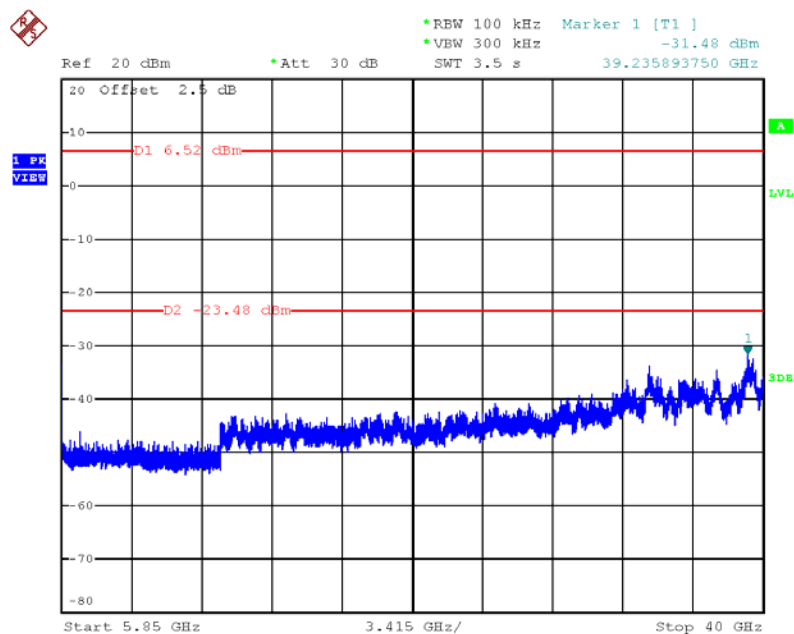


Date: 11.MAR.2013 07:48:44

Plot on Configuration IEEE 802.11n MCS0 40MHz / CH 159 (down 30dBc)

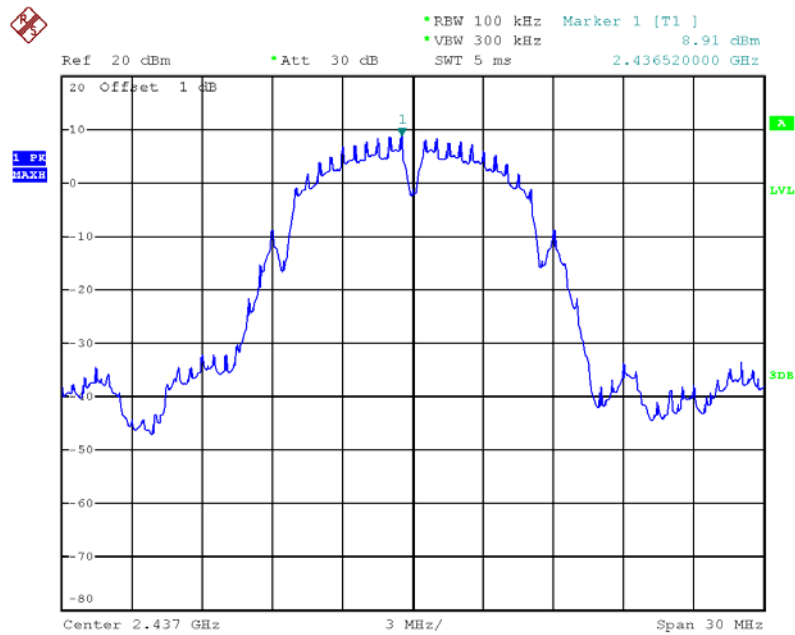


Date: 11.MAR.2013 07:49:08



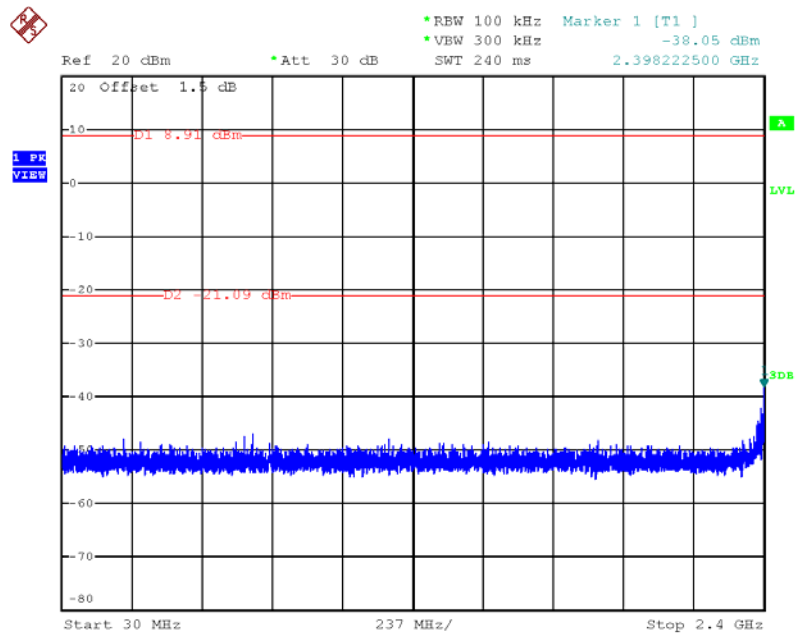
Date: 4.APR.2013 00:46:28

Plot on Configuration IEEE 802.11b / Reference Level

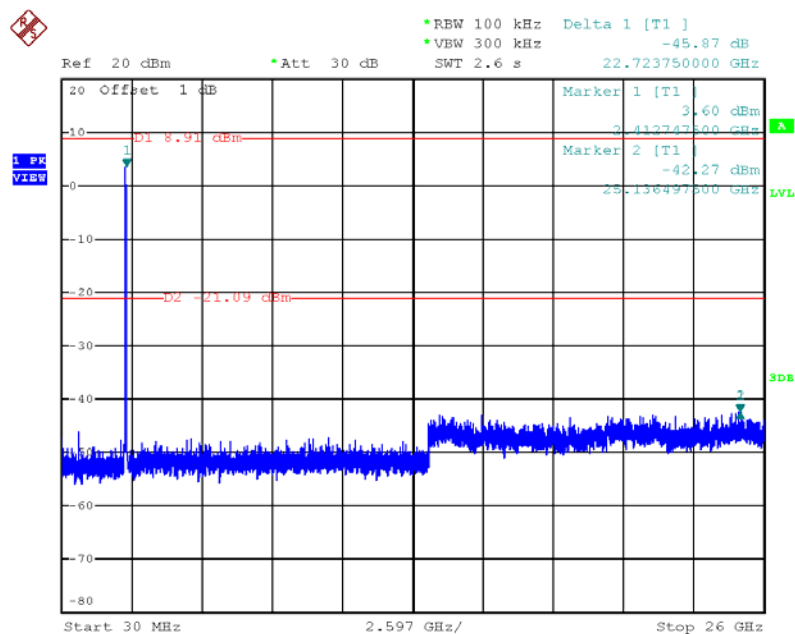


Date: 11.MAR.2013 07:19:02

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

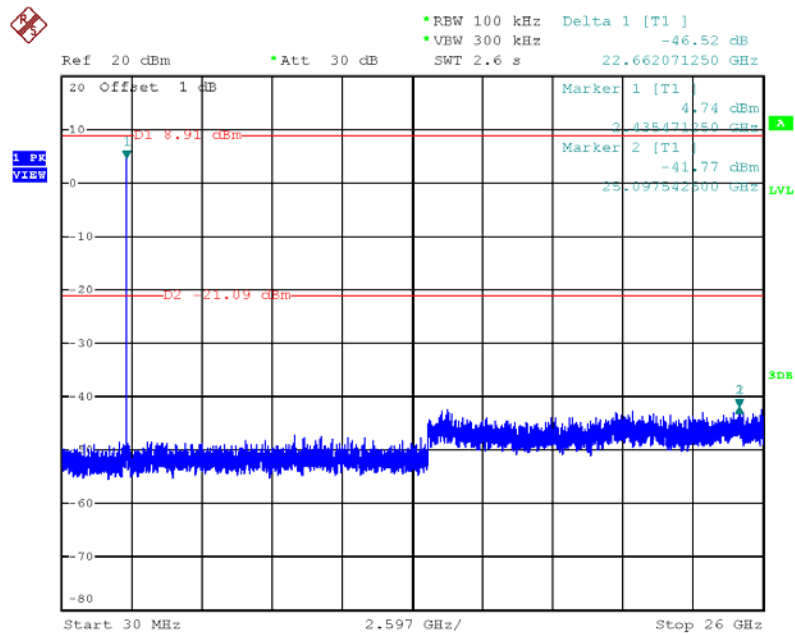


Date: 3.APR.2013 23:34:33



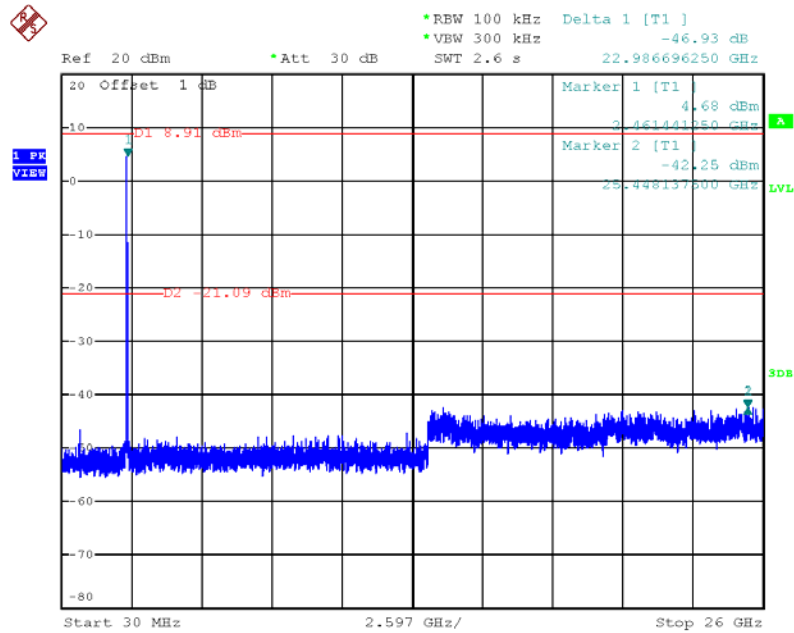
Date: 11.MAR.2013 07:24:56

Plot on Configuration IEEE 802.11b / CH 6 (down 30dBc)

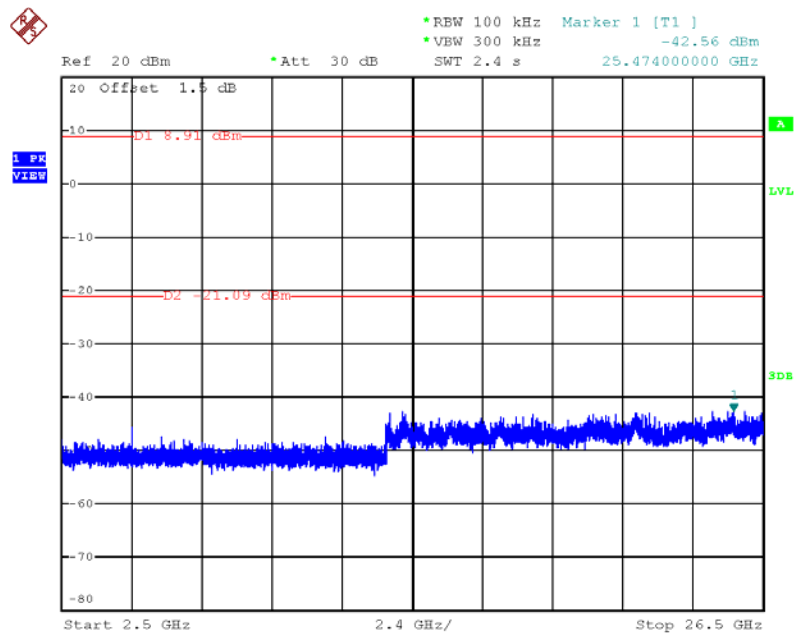


Date: 11.MAR.2013 07:24:25

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



Date: 11.MAR.2013 07:24:07



Date: 3.APR.2013 23:37:03



Ref 20 dBm *Att 30 dB RBW 100 kHz Marker 1 [T1] 7.77 dBm
*VBW 300 kHz SWT 5 ms 2.439520000 GHz

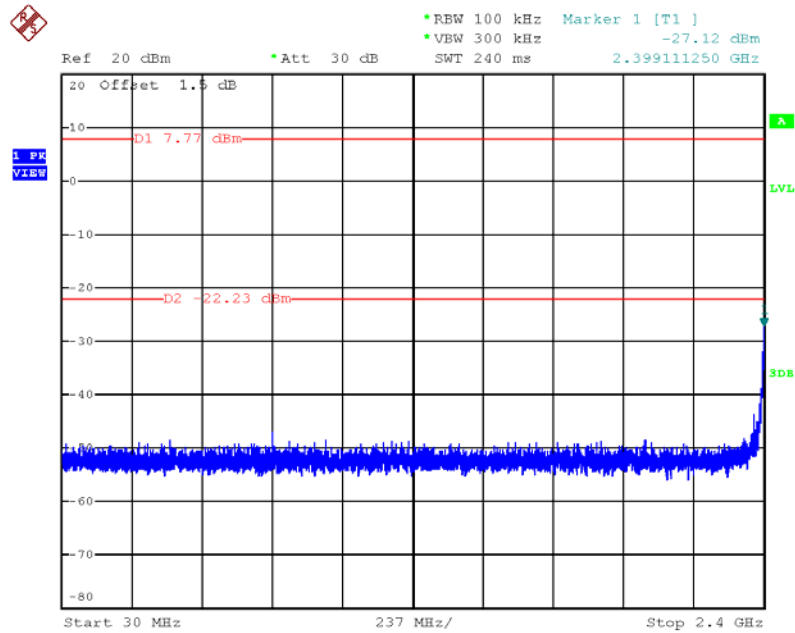
20 Offset 1 dB

1 PF
MAX

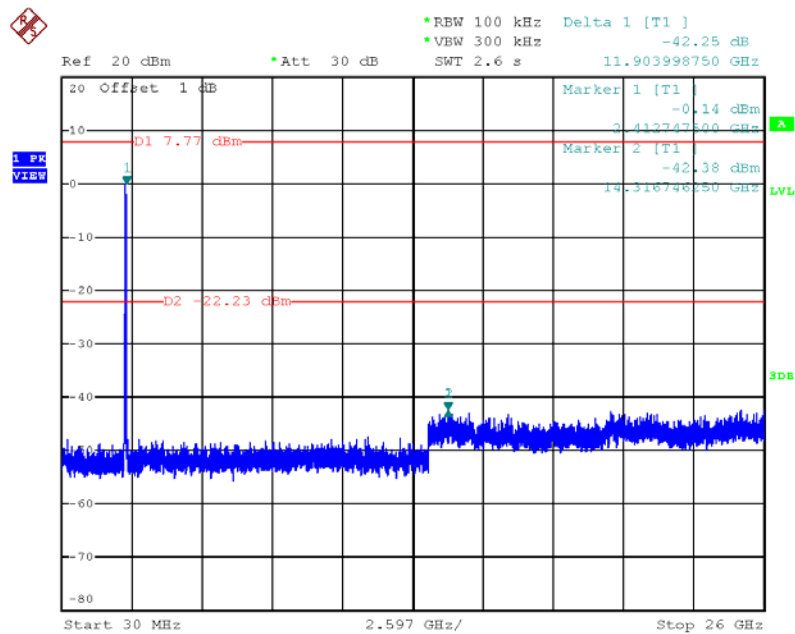
Center 2.437 GHz 3 MHz/ Span 30 MHz

Page No. : 106 of 117
Issued Date : Apr. 04, 2013

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

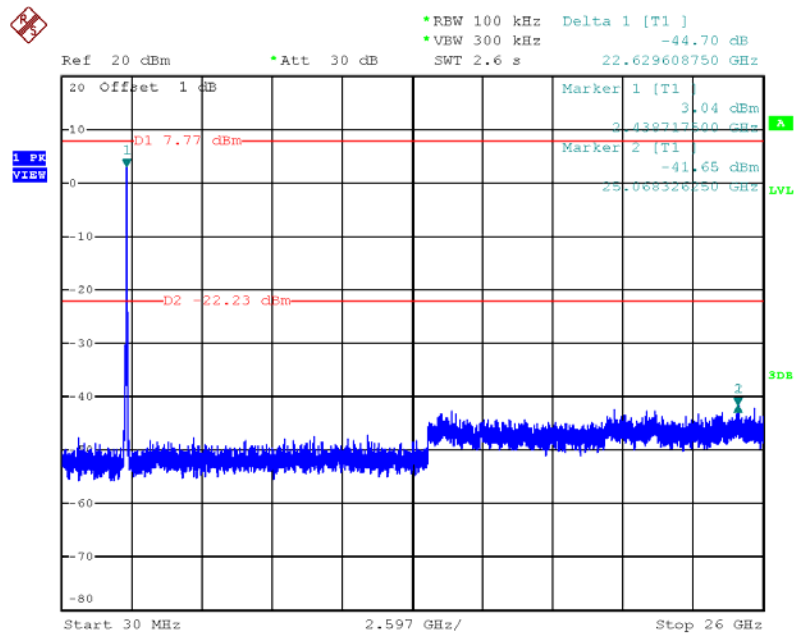


Date: 3.APR.2013 23:42:20



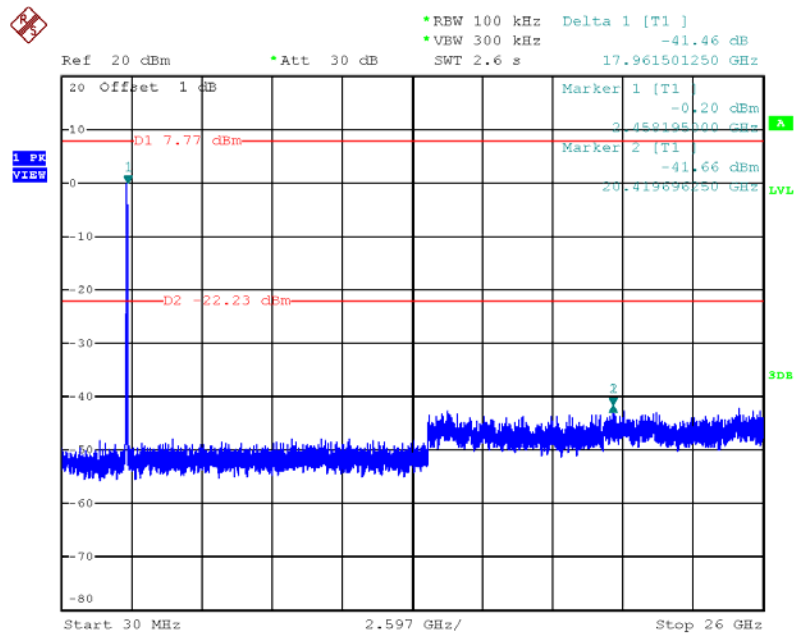
Date: 11.MAR.2013 07:27:21

Plot on Configuration IEEE 802.11g / CH 6 (down 30dBc)

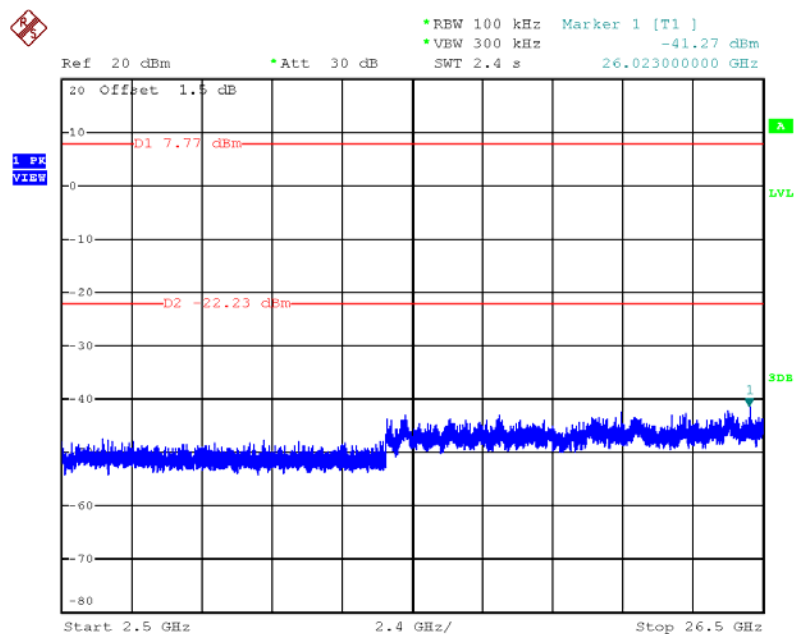


Date: 11.MAR.2013 07:27:45

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

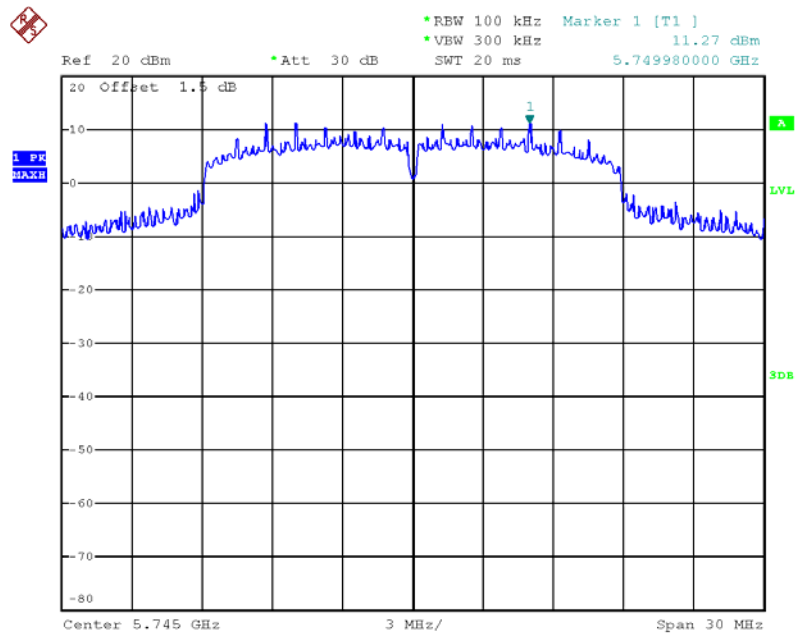


Date: 11.MAR.2013 07:28:09



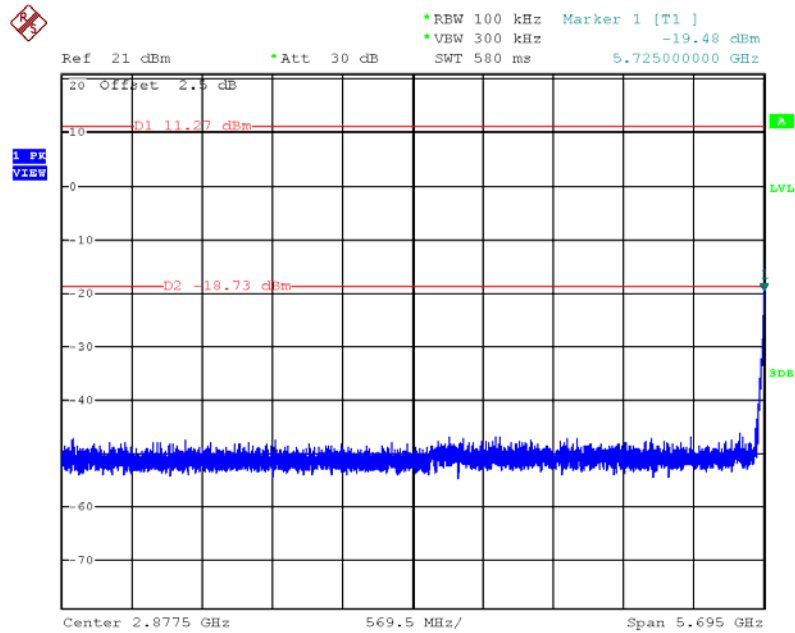
Date: 3.APR.2013 23:40:53

Plot on Configuration IEEE 802.11a / Reference Level

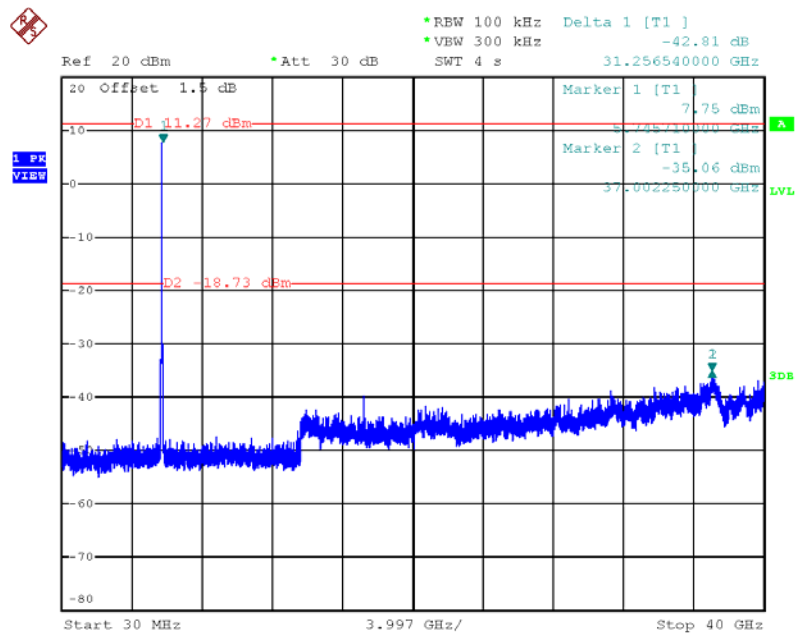


Date: 10.MAR.2013 13:11:02

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

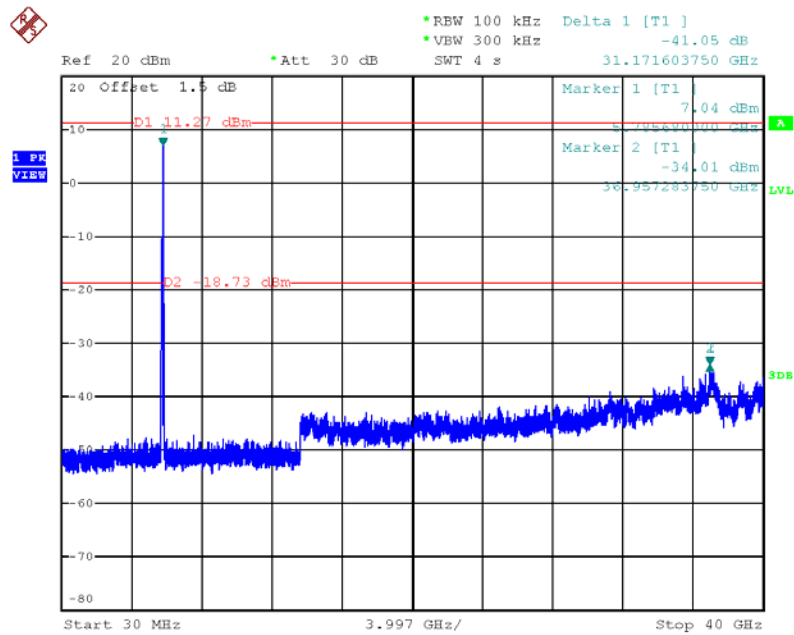


Date: 4.APR.2013 00:15:01



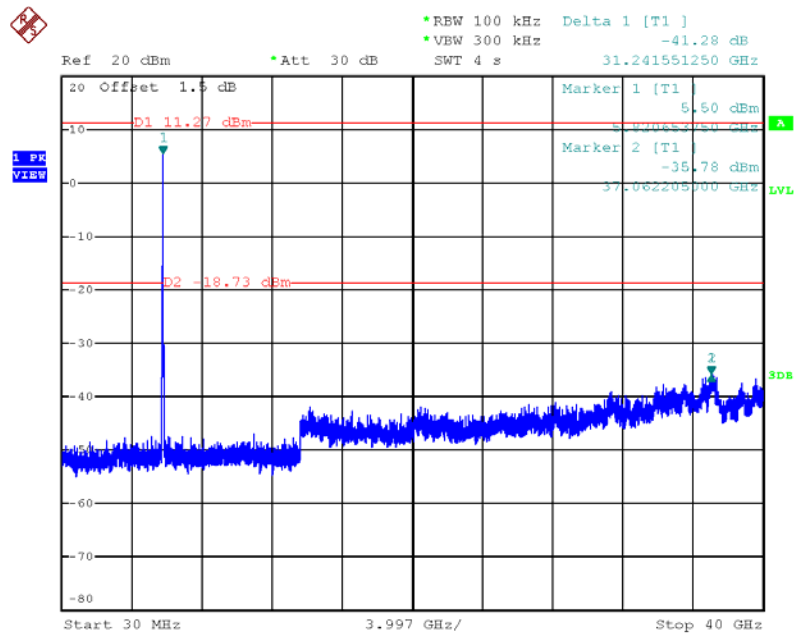
Date: 11.MAR.2013 07:39:43

Plot on Configuration IEEE 802.11a / CH 157 (down 30dBc)

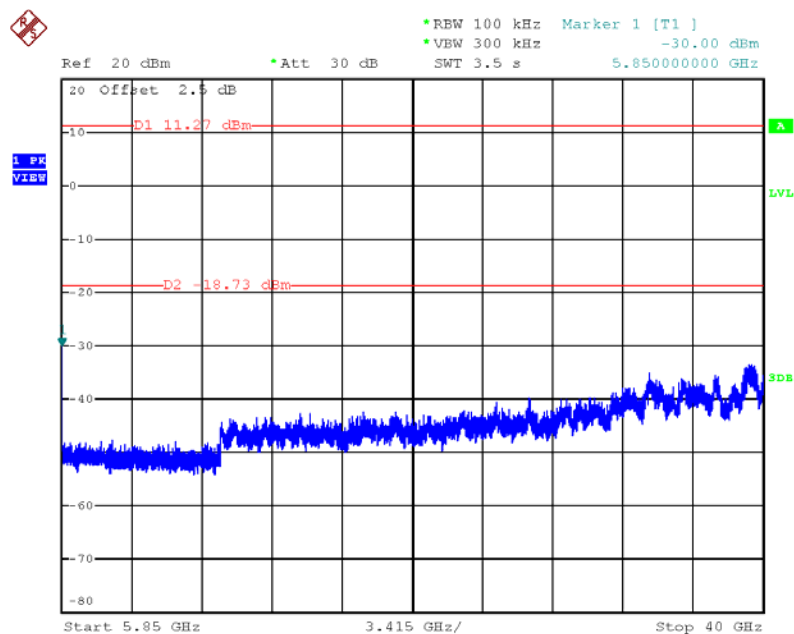


Date: 11.MAR.2013 07:40:05

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



Date: 11.MAR.2013 07:40:31



Date: 4.APR.2013 00:17:11

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	Oct. 23, 2012	Conduction (CO01-CB)
LISN	F.C.C.	FCC-LISN-50-16-2	04083	150kHz ~ 100MHz	Nov. 26, 2012	Conduction (CO01-CB)
V- LISN	Schwarzbeck	NSLK 8127	8127-478	9kHz ~ 30MHz	Jun. 22, 2012	Conduction (CO01-CB)
Impulsbegrenzer Pulse Limiter	Rohde&Schwarz	ESH3-Z2	100430	9kHz~30MHz	Feb. 21, 2013	Conduction (CO01-CB)
COND Cable	Woken	Cable	01	0.15MHz~30MHz	Dec. 04, 2012	Conduction (CO01-CB)
Software	Audix	E3	5.410e	-	-	Conduction (CO01-CB)
BILOG ANTENNA	Schaffner	CBL6112D	22021	20MHz ~ 2GHz	Jan. 11, 2013	Radiation (03CH01-CB)
Loop Antenna	Teseq	HLA 6120	24155	9 kHz - 30 MHz	Nov. 05, 2012*	Radiation (03CH01-CB)
Horn Antenna	EMCO	3115	00075790	750MHz~18GHz	Nov. 27, 2012	Radiation (03CH01-CB)
Horn Antenna	SCHWARZBEAK	BBHA 9170	BBHA9170252	15GHz ~ 40GHz	Nov. 23, 2012	Radiation (03CH01-CB)
Pre-Amplifier	Agilent	8447D	2944A10991	0.1MHz ~ 1.3GHz	Nov. 27, 2012	Radiation (03CH01-CB)
Pre-Amplifier	Agilent	8449B	3008A02310	1GHz ~ 26.5GHz	Nov. 23, 2012	Radiation (03CH01-CB)
Pre-Amplifier	WM	TF-130N-R1	923365	26.5GHz ~ 40GHz	Jul. 31, 2012	Radiation (03CH01-CB)
Spectrum analyzer	R&S	FSP40	100056	9KHz~40GHz	Nov. 16, 2012	Radiation (03CH01-CB)
EMI Test Receiver	R&S	ESCS 30	100355	9KHz ~ 2.75GHz	Mar. 20, 2012	Radiation (03CH01-CB)
Turn Table	INN CO	CO 2000	N/A	0 ~ 360 degree	N.C.R	Radiation (03CH01-CB)
Antenna Mast	INN CO	CO2000	N/A	1 m - 4 m	N.C.R	Radiation (03CH01-CB)
RF Cable-low	Woken	Low Cable-1	N/A	30 MHz - 1 GHz	Nov. 18, 2012	Radiation (03CH01-CB)
RF Cable-high	Woken	High Cable-1	N/A	1 GHz – 26.5 GHz	Nov. 18, 2012	Radiation (03CH01-CB)
RF Cable-high	Woken	High Cable-2	N/A	1 GHz – 26.5 GHz	Nov. 18, 2012	Radiation (03CH01-CB)
RF Cable-high	Woken	High Cable-3	N/A	1 GHz - 40 GHz	Nov. 18, 2012	Radiation (03CH01-CB)
RF Cable-high	Woken	High Cable-4	N/A	1 GHz - 40 GHz	Nov. 18, 2012	Radiation (03CH01-CB)
Signal analyzer	R&S	FSV40	100979	9KHz~40GHz	Oct. 08, 2012	Conducted (TH01-CB)
Temp. and Humidity Chamber	Ten Billion	TTH-D3SP	TBN-931011	-30~100 degree	Jun. 05, 2012	Conducted (TH01-CB)
RF Power Divider	Woken	2 Way	0120A02056002D	2GHz ~ 18GHz	Nov. 18, 2012	Conducted (TH01-CB)

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Remark
RF Power Divider	Woken	3 Way	MDC2366	2GHz ~ 18GHz	Nov. 18, 2012	Conducted (TH01-CB)
RF Power Divider	Woken	4 Way	0120A04056002D	2GHz ~ 18GHz	Nov. 18, 2012	Conducted (TH01-CB)
RF Cable-high	Woken	High Cable-7	-	1 GHz – 26.5 GHz	Nov. 19, 2012	Conducted (TH01-CB)
RF Cable-high	Woken	High Cable-8	-	1 GHz – 26.5 GHz	Nov. 19, 2012	Conducted (TH01-CB)
RF Cable-high	Woken	High Cable-9	-	1 GHz – 26.5 GHz	Nov. 19, 2012	Conducted (TH01-CB)
RF Cable-high	Woken	High Cable-10	-	1 GHz – 26.5 GHz	Nov. 19, 2012	Conducted (TH01-CB)
RF Cable-high	Woken	High Cable-11	-	1 GHz – 26.5 GHz	Nov. 19, 2012	Conducted (TH01-CB)
Power Sensor	Anritsu	MA2411B	0917223	300MHz~40GHz	Nov. 28, 2012	Conducted (TH01-CB)
Power Meter	Anritsu	ML2495A	1035008	300MHz~40GHz	Nov. 27, 2012	Conducted (TH01-CB)

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

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

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

6. 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., Neihsu 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