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	**Teldat S.A.**
Applicant Address	Isaac Newton, 10, Parque Tecnológico de Madrid, 28760 – Tres Cantos, Madrid, Spain
FCC ID	**YUATLDPV00A1**
Manufacturer's company	**Alpha Networks Inc.**
Manufacturer Address	No.8 Li-shing 7th Rd., Science-based Industrial Park, Hsinchu, Taiwan, R.O.C.
Manufacturer's company	**ALPHA NETWORKS (CHANGSHU) LTD.**
Manufacturer Address	369# Yintong Road, Southeast Economic Development Zone, Changshu, Jiangsu Province, PR. China

Product Name	Enterprise Router
Brand Name	Teldat, Alcatel-lucent
Model No.	TLDPV00A1, TLDPV03A1, TLDPV04A1, OA5710V, OA5710V-4A, OA5710V-4V
Test Rule Part(s)	47 CFR FCC Part 15 Subpart C § 15.247
Test Freq. Range	2400 ~ 2483.5MHz
Received Date	Mar. 18, 2013
Final Test Date	Jun. 05, 2013
Submission Type	Original Equipment

Statement

Test result included in this report is for the IEEE 802.11n and IEEE 802.11b/g part of the product.

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

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

The measurements and test results shown in this test report were made in accordance with the procedures and found in compliance with the limit given in **ANSI C63.10-2009**, **47 CFR FCC Part 15 Subpart C**, **KDB 558074 D01 v03** and **KDB 662911 D01 v01r02**.

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

Testing Laboratory
1190

Table of Contents

History of This Test Report

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FR341816AA	Rev. 01	Initial issue of report	Jul. 16, 2013
FR341816AA	Rev. 02	Add new a brand name	Aug. 16, 2013

Certificate No.: CB10206021

1. CERTIFICATE OF COMPLIANCE

Product Name	:	**Enterprise Router**
Brand Name	:	**Teldat, Alcatel-lucent**
Model No.	:	**TLDPV00A1, TLDPV03A1, TLDPV04A1, OA5710V, OA5710V-4A, OA5710V-4V**
Applicant	:	**Teldat S.A.**
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. 18, 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

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	13.03 dB
4.2	15.247(b)(3)	Maximum Conducted Output Power	Complies	7.79 dB
4.3	15.247(e)	Power Spectral Density	Complies	10.9 dB
4.4	15.247(a)(2)	6dB Spectrum Bandwidth	Complies	-
4.5	15.247(d)	Radiated Emissions	Complies	0.35 dB
4.6	15.247(d)	Band Edge Emissions	Complies	0.04 dB
4.7	15.203	Antenna Requirements	Complies	-

3. GENERAL INFORMATION

3.1. Product Details

IEEE 802.11n

Items	Description
Product Type	WLAN (2TX, 2RX)
Radio Type	Intentional Transceiver
Power Type	From Power Adapter
Modulation	see the below table for IEEE 802.11n
Data Modulation	OFDM (BPSK / QPSK / 16QAM / 64QAM)
Data Rate (Mbps)	see the below table for IEEE 802.11n
Frequency Range	2400 ~ 2483.5MHz
Channel Number	11 for 20MHz bandwidth ; 7 for 40MHz bandwidth
Channel Band Width (99%)	MCS0 (20MHz): 17.04 MHz ; MCS0 (40MHz): 36.32 MHz
Maximum Conducted Output Power	MCS0 (20MHz): 22.17 dBm ; MCS0 (40MHz): 16.56 dBm
Carrier Frequencies	Please refer to section 3.4
Antenna	Please refer to section 3.3

IEEE 802.11b/g

Items	Description
Product Type	WLAN (1TX, 2RX)
Radio Type	Intentional Transceiver
Power Type	From Power Adapter
Modulation	DSSS for IEEE 802.11b ; OFDM for IEEE 802.11g
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
Channel Number	11
Channel Band Width (99%)	11b: 10.16 MHz ; 11g: 25.52 MHz
Maximum Conducted Output Power	11b: 17.31 dBm ; 11g: 22.21 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 802.11b	V	X	X	X
IEEE 802.11g	V	X	X	X
IEEE 802.11n	X	X	V	V

IEEE 11n Spec.

Protocol	Number of Transmit Chains (NTX)	Data Rate / MCS
802.11n (HT20)	2	MCS 0-15
802.11n (HT40)	2	MCS 0-15
Note 1: IEEE Std. 802.11n modulation consists of HT20 and HT40 (HT: High Throughput). Then EUT support HT20 and HT40. Note 2: Modulation modes consist of below configuration: HT20/HT40: IEEE 802.11n		

3.2. Accessories

Power	Brand	Model No.	Rating
Adapter 1	APD	DA-36M12	Input: 100-240V~50-60Hz, 0.8A Max Output: 12V, 3.0A
Adapter 2	OEM	ADS0361-U120333	Input: 100-240V~50-60Hz, 1.0A Output: 12V, 3.33A
Other			
Power Cable*1: Non-Shielded, 2.1m			

3.3. Table for Filed Antenna

Ant.	Brand	Model No.	Antenna Type	Connector	Gain (dBi)
1	MAG.LAYERS	EDA-8709-25GR2-A9	Dipole	SMA Male RP	2
2	MAG.LAYERS	EDA-8709-25GR2-A9	Dipole	SMA Male RP	2

Note: The EUT has two antennas.

<For 2.4GHz Band:>

For IEEE 802.11b/g mode (1TX, 2RX):

Only Chain 1 can be used as transmitting, but Chain 1 and Chain 2 could receive simultaneously.

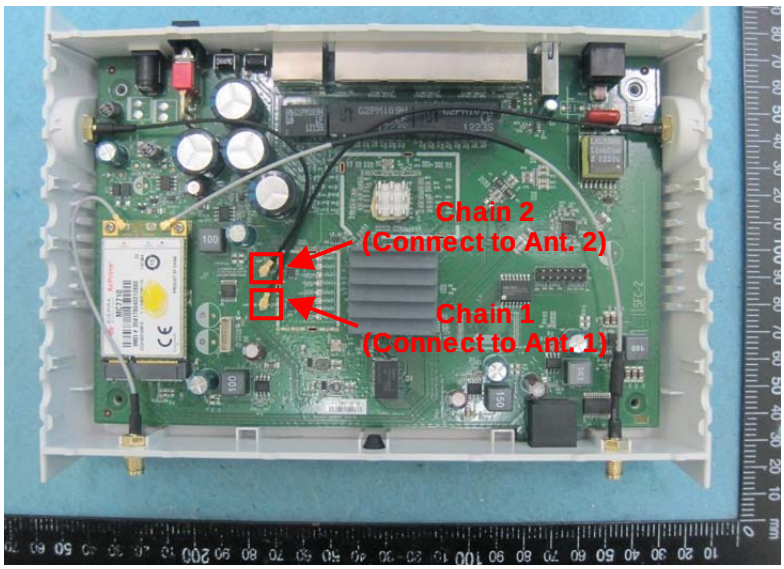
For IEEE 802.11n mode (2TX/2RX):

Chain 1 and Chain 2 could transmit/receive simultaneously.

<For 5GHz Band:>

For IEEE 802.11a/n mode (2TX/2RX):

Chain 1 and Chain 2 could transmit/receive simultaneously.



3.4. Table for Carrier Frequencies

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	-	-

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.

Test Items	Mode	Data Rate	Channel	Chain
AC Power Line Conducted Emissions	CTX	-	-	-
Maximum Conducted Output Power	11n 20MHz	MCS0	1/6/11	1+2
	11n 40MHz	MCS0	3/6/9	1+2
	11b/BPSK	1 Mbps	1/6/11	1
	11g/BPSK	6 Mbps	1/6/11	1
Power Spectral Density	11n 20MHz	MCS0	1/6/11	1, 2
	11n 40MHz	MCS0	3/6/9	1, 2
	11b/BPSK	1 Mbps	1/6/11	1
	11g/BPSK	6 Mbps	1/6/11	1
6dB Spectrum Bandwidth	11n 20MHz	MCS0	1/6/11	1+2
	11n 40MHz	MCS0	3/6/9	1+2
	11b/BPSK	1 Mbps	1/6/11	1
	11g/BPSK	6 Mbps	1/6/11	1
Radiated Emissions 9kHz~1GHz	CTX	-	-	-
Radiated Emissions 1GHz~10th Harmonic	11n 20MHz	MCS0	1/6/11	1+2
	11n 40MHz	MCS0	3/6/9	1+2
	11b/BPSK	1 Mbps	1/6/11	1
	11g/BPSK	6 Mbps	1/6/11	1

Band Edge Emissions	11n 20MHz	MCS0	1/6/11	1+2
	11n 40MHz	MCS0	3/6/9	1+2
	11b/BPSK	1 Mbps	1/6/11	1
	11g/BPSK	6 Mbps	1/6/11	1

<For MPE and Co-location Test>:

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

Please refer section 6 for Test Site Address.

3.7. Table for Multiple Listing

The model names in the following table are all refer to the identical product.

Brand name	Model	LTE module
Teldat	TLDPV00A1	X
	TLDPV03A1	E371
	TLDPV04A1	E362
Alcatel-lucent	OA5710V	X
	OA5710V-4A	E371
	OA5710V-4V	E362

EUT have two module's as below table:

Manufacturer	Model	Function	Bands	FCC ID	IC
Novatel	E362	LTE-Verizon (100M DL, 50M UL) Fallback (CDMA-EVDO)	GPRS (850, 1900) CDMA (850, 1900) WCDMA (850,1900) LTE (700→B13)	PKRNVWE362	3229B-E362
Novatel	E371	LTE-AT&T (100M DL, 50M UL) Fallback (HSPA+)	GPRS (850, 1900) WCDMA (850, 1900) LTE (700→B17)	PKRNVWE371	3229A-E371

Note: There are two module's can be used for EUT.

3.8. Table for Supporting Units

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

3.9. 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.

Power Parameters of IEEE 802.11n / Chain 1 + Chain 2

Test Software Version	Telnet 192.168.1.1		
Frequency	2412 MHz	2437 MHz	2462 MHz
MCS0 20MHz	46	72	46
Frequency	2422 MHz	2437 MHz	2452 MHz
MCS0 40MHz	36	49	37

Power Parameters of IEEE 802.11b/g / Chain 1

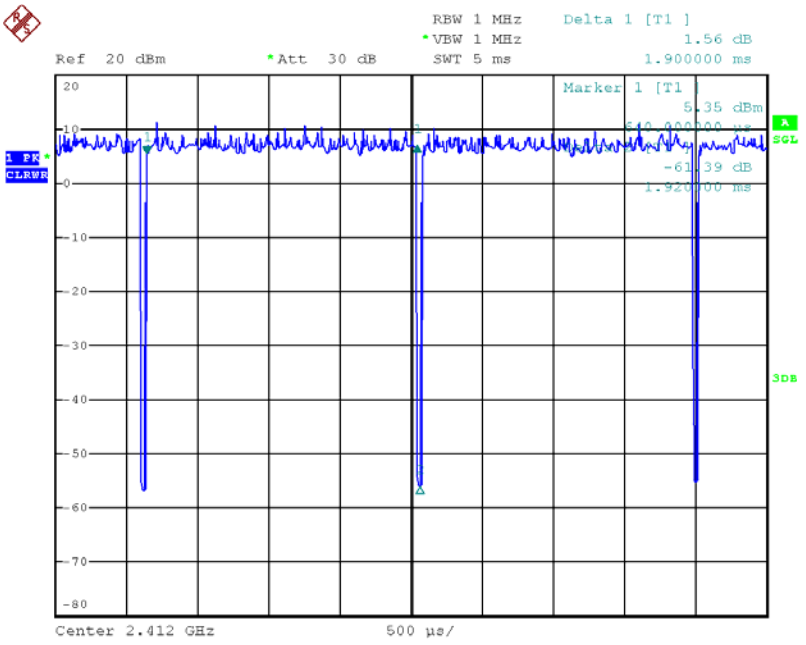
Test Software Version	Telnet 192.168.1.1		
Frequency	2412 MHz	2437 MHz	2462 MHz
IEEE 802.11b	58	58	58
IEEE 802.11g	58	79	56

3.10. EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

3.11. Duty Cycle

IEEE 802.11n MCS0 20MHz



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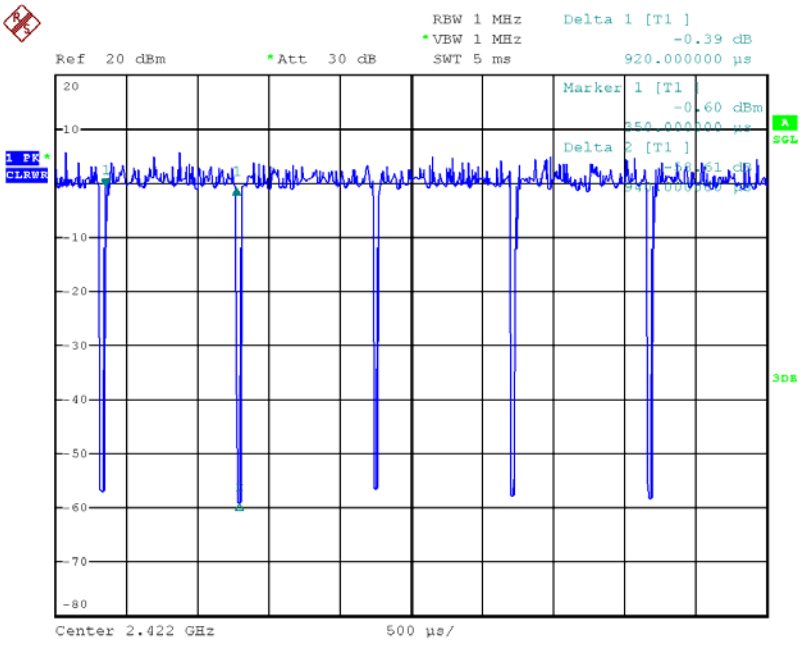
IEEE 802.11n MCS0 40MHz



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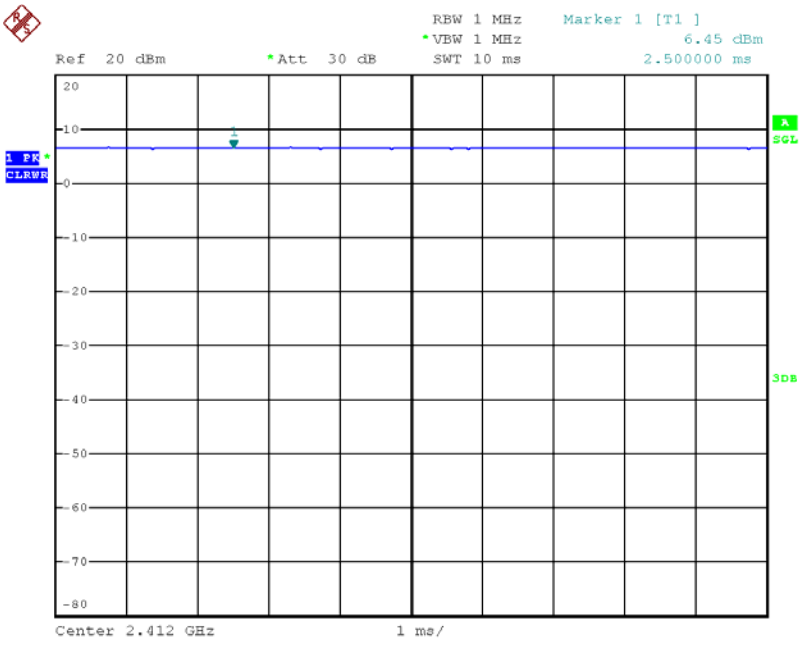
IEEE 802.11b



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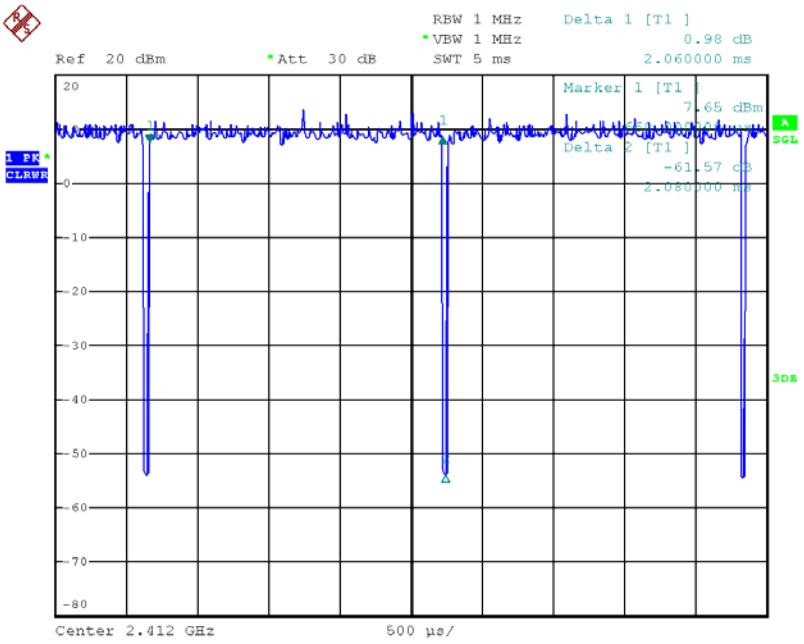
IEEE 802.11g



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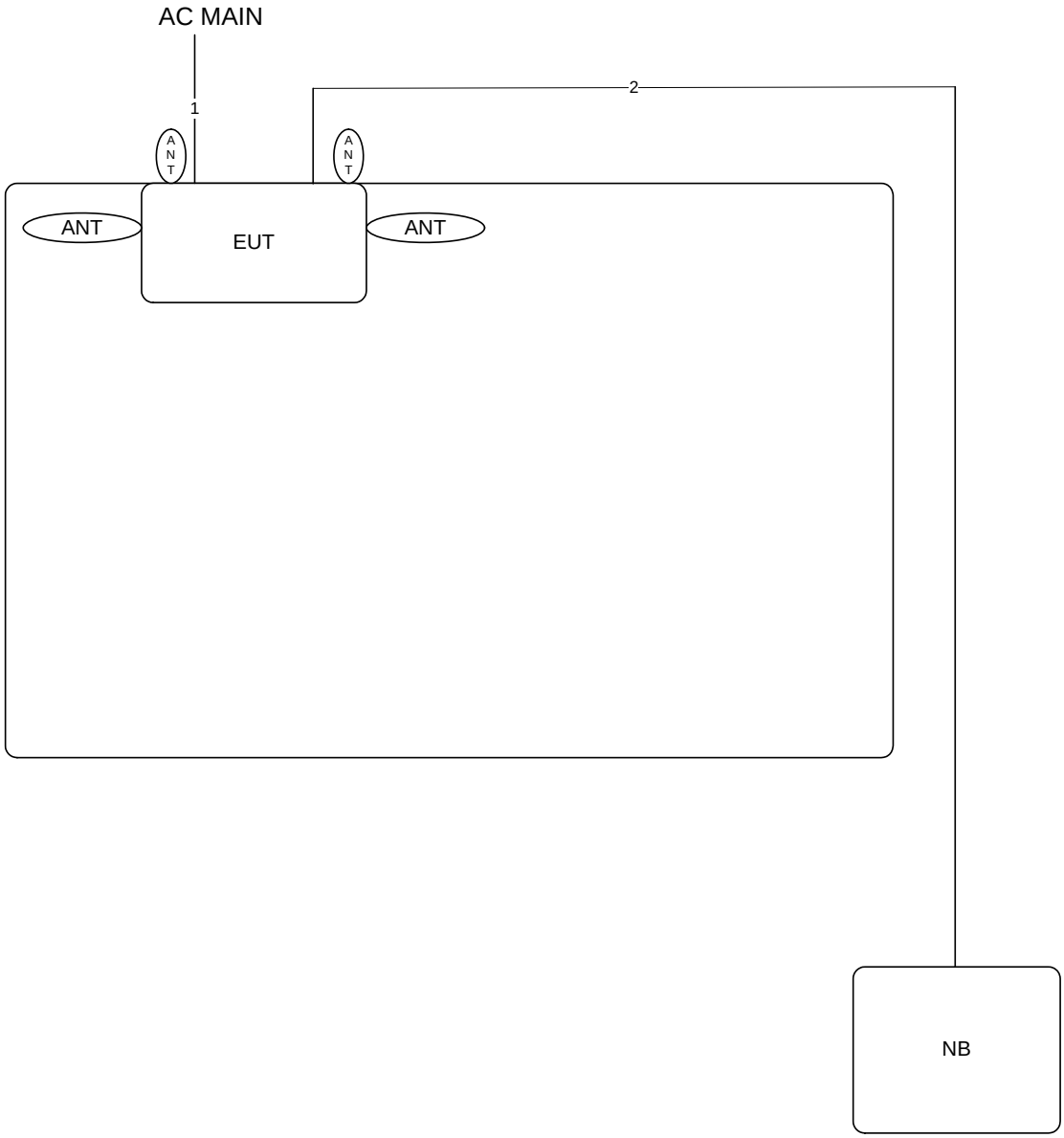
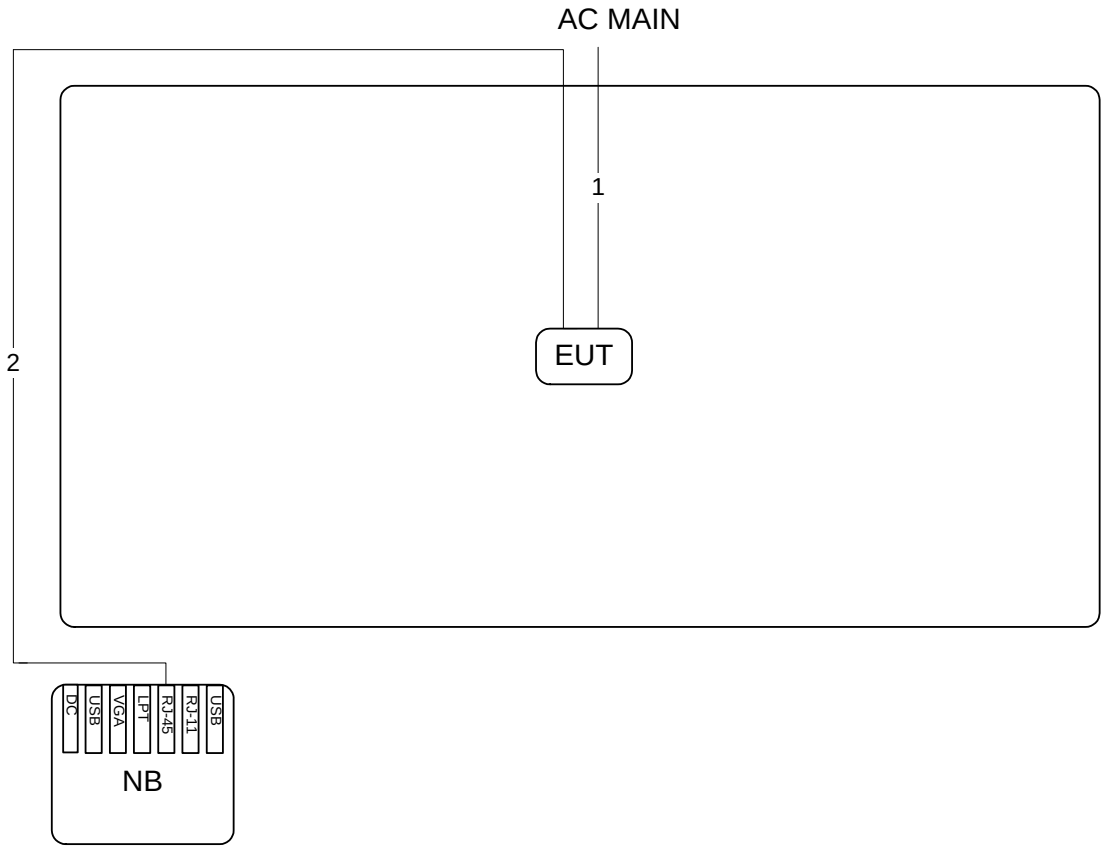
3.12. Test Configurations

3.12.1. AC Power Line Conduction Emissions Test Configuration



Item	Connection	Shield	Length
1	Power cable	No	3m
2	RJ-45 cable	No	10m

3.12.2. Radiation Emissions Test Configuration



Item	Connection	Shield	Length
1	Power cable	No	3m
2	RJ-45 cable	No	10m

4. TEST RESULT

4.1. AC Power Line Conducted Emissions Measurement

4.1.1. Limit

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

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

4.1.2. Measuring Instruments and Setting

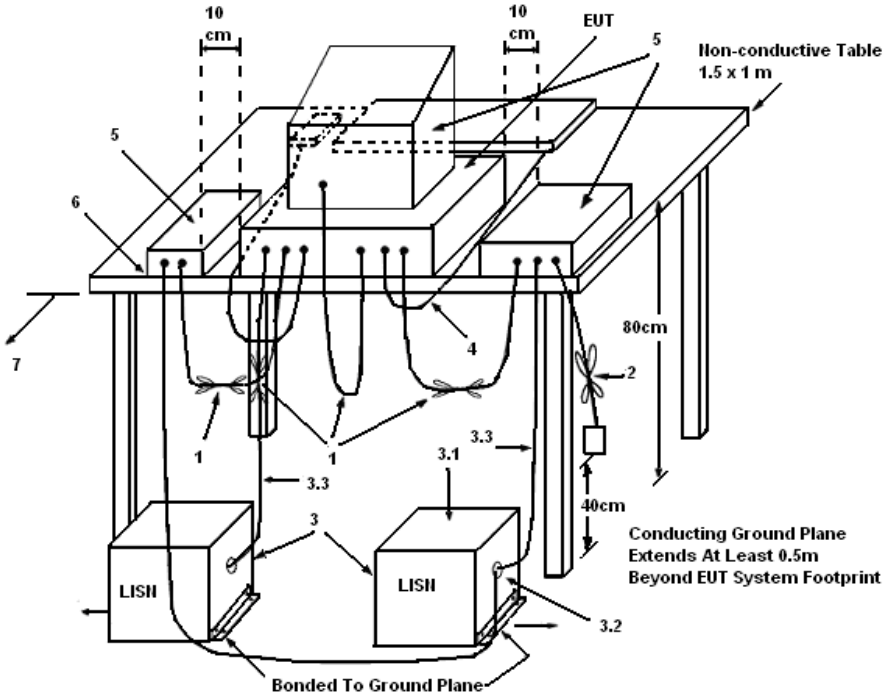
Please refer to section 5 of equipments list in this report. The following table is the setting of the receiver.

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

4.1.3. Test Procedures

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

4.1.4. Test Setup Layout



LEGEND:

(1) Interconnecting cables that hang closer than 40 cm to the ground plane shall be folded back and forth in the center forming a bundle 30 to 40 cm long.

(2) I/O cables that are not connected to a peripheral shall be bundled in the center. The end of the cable may be terminated, if required, using the correct terminating impedance. The overall length shall not exceed 1 m.

(3) EUT connected to one LISN. Unused LISN measuring port connectors shall be terminated in 50 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

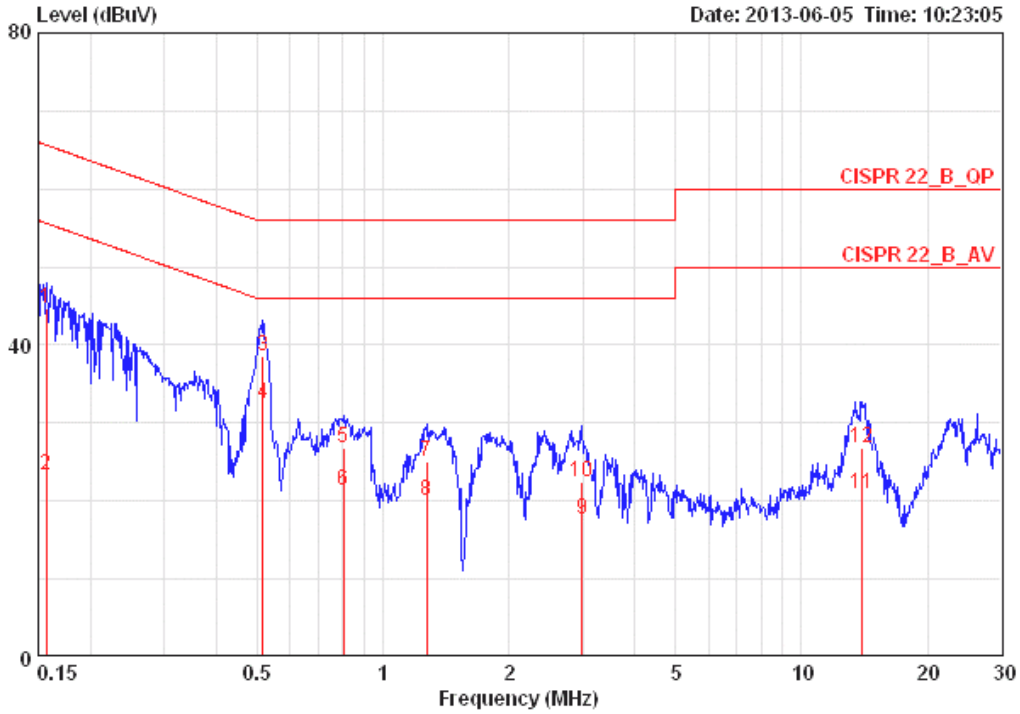
There is no deviation with the original standard.

4.1.6. EUT Operation during Test

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

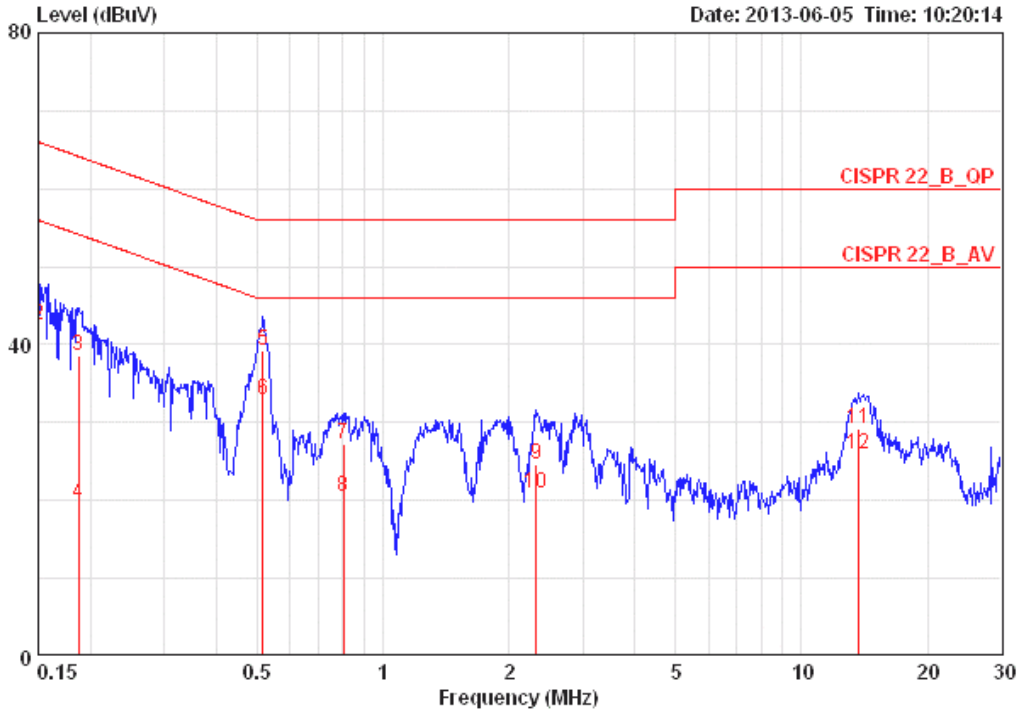
4.1.7. Results of AC Power Line Conducted Emissions Measurement

Temperature	24℃	Humidity	48%
Test Engineer	Hank Yang	Phase	Line
Configuration	CTX		



	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Pol/Phase	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB		
1	0.15650	44.66	-20.99	65.65	44.32	0.16	0.18	LINE	QP
2	0.15650	23.27	-32.38	55.65	22.93	0.16	0.18	LINE	AVERAGE
3	0.51550	38.56	-17.44	56.00	38.21	0.15	0.20	LINE	QP
4	0.51550	32.48	-13.52	46.00	32.13	0.15	0.20	LINE	AVERAGE
5	0.80449	26.86	-29.14	56.00	26.50	0.16	0.20	LINE	QP
6	0.80449	21.40	-24.60	46.00	21.04	0.16	0.20	LINE	AVERAGE
7	1.269	25.00	-31.00	56.00	24.61	0.18	0.21	LINE	QP
8	1.269	19.98	-26.02	46.00	19.59	0.18	0.21	LINE	AVERAGE
9	2.993	17.61	-28.39	46.00	17.15	0.21	0.25	LINE	AVERAGE
10	2.993	22.45	-33.55	56.00	21.99	0.21	0.25	LINE	QP
11	13.989	20.87	-29.13	50.00	20.07	0.40	0.40	LINE	AVERAGE
12	13.989	26.88	-33.12	60.00	26.08	0.40	0.40	LINE	QP

Temperature	24℃	Humidity	48%
Test Engineer	Hank Yang	Phase	Neutral
Configuration	CTX		



	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Pol/Phase	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB		
1	0.15000	25.15	-30.85	56.00	24.89	0.08	0.18	NEUTRAL	AVERAGE
2	0.15000	42.44	-23.56	66.00	42.18	0.08	0.18	NEUTRAL	QP
3	0.18739	38.54	-25.62	64.15	38.26	0.08	0.20	NEUTRAL	QP
4	0.18739	19.72	-34.44	54.15	19.44	0.08	0.20	NEUTRAL	AVERAGE
5	0.51550	39.16	-16.84	56.00	38.88	0.08	0.20	NEUTRAL	QP
6 @	0.51550	32.97	-13.03	46.00	32.69	0.08	0.20	NEUTRAL	AVERAGE
7	0.80449	27.30	-28.70	56.00	27.01	0.09	0.20	NEUTRAL	QP
8	0.80449	20.56	-25.44	46.00	20.27	0.09	0.20	NEUTRAL	AVERAGE
9	2.321	24.66	-31.34	56.00	24.31	0.11	0.24	NEUTRAL	QP
10	2.321	20.88	-25.12	46.00	20.53	0.11	0.24	NEUTRAL	AVERAGE
11	13.695	29.21	-30.79	60.00	28.51	0.30	0.40	NEUTRAL	QP
12	13.695	25.94	-24.06	50.00	25.24	0.30	0.40	NEUTRAL	AVERAGE

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.

4.2.2. Measuring Instruments and Setting

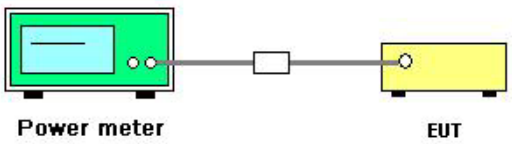
Please refer to section 5 of equipments list in this report. The following table is the setting of the power meter.

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 KDB 558074 D01 v03 section 9.2.2 Measurement using a power meter (PM).
2. This procedure provides an alternative for determining the RMS output power using a broadband RF average power meter with a thermocouple detector.

4.2.4. Test Setup Layout



4.2.5. Test Deviation

There is no deviation with the original standard.

4.2.6. EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

4.2.7. Test Result of Maximum Conducted Output Power

Temperature	25℃	Humidity	56%
Test Engineer	Benson Peng	Configurations	IEEE 802.11n
Test Date	Jun. 03, 2013		

Configuration IEEE 802.11n MCS0 20MHz / Chain 1 + Chain 2

Channel	Frequency	Conducted Power (dBm)		Total Conducted Power (dBm)	Max. Limit (dBm)	Result
		Chain 1	Chain 2			
1	2412 MHz	12.74	12.26	15.52	30.00	**Complies**
6	2437 MHz	19.03	19.29	22.17	30.00	**Complies**
11	2462 MHz	12.41	12.32	15.38	30.00	**Complies**

Configuration IEEE 802.11n MCS0 40MHz / Chain 1 + Chain 2

Channel	Frequency	Conducted Power (dBm)		Total Conducted Power (dBm)	Max. Limit (dBm)	Result
		Chain 1	Chain 2			
3	2422 MHz	10.22	10.16	13.20	30.00	**Complies**
6	2437 MHz	13.47	13.62	16.56	30.00	**Complies**
9	2452 MHz	9.98	10.51	13.26	30.00	**Complies**

Temperature	25℃	Humidity	56%
Test Engineer	Benson Peng	Configurations	IEEE 802.11b/g
Test Date	Jun. 03, 2013		

Configuration IEEE 802.11b / Chain 1

Channel	Frequency	Conducted Power (dBm)	Max. Limit (dBm)	Result
1	2412 MHz	15.98	30.00	**Complies**
6	2437 MHz	17.31	30.00	**Complies**
11	2462 MHz	16.48	30.00	**Complies**

Configuration IEEE 802.11g / Chain 1

Channel	Frequency	Conducted Power (dBm)	Max. Limit (dBm)	Result
1	2412 MHz	15.82	30.00	**Complies**
6	2437 MHz	22.21	30.00	**Complies**
11	2462 MHz	15.15	30.00	**Complies**

4.3. Power Spectral Density Measurement

4.3.1. Limit

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

4.3.2. Measuring Instruments and Setting

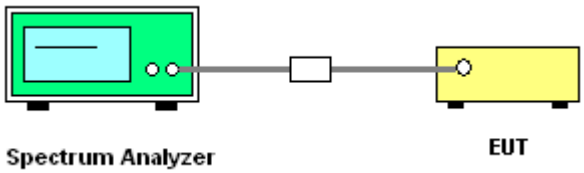
Please refer to section 5 of equipments list in this report. The following table is the setting of the spectrum analyzer.

Spectrum Parameter	Setting
Attenuation	Auto
Span Frequency	Set the span to 1.5 times the DTS channel bandwidth.
RBW	3 kHz ≤ RBW ≤ 100kHz
VBW	≥ 3 x RBW
Detector	Peak
Trace	Max Hold
Sweep Time	Auto couple

4.3.3. Test Procedures

1. Test procedures refer KDB 558074 D01 v03 section 10.2 Method PKPSD (peak PSD) & KDB 662911 D01 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 ≥ 2 x 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	25℃	Humidity	56%
Test Engineer	Benson Peng	Configurations	IEEE 802.11n

Configuration IEEE 802.11n MCS0 20MHz / Chain 1 + Chain 2

Channel	Frequency	Power Density (dBm/3kHz)		Single Port Limit (dBm/3kHz)	Result
		Chain 1	Chain 2		
1	2412 MHz	-12.78	-13.31	4.99	**Complies**
6	2437 MHz	-5.91	-6.07	4.99	**Complies**
11	2462 MHz	-12.74	-12.69	4.99	**Complies**

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

Configuration IEEE 802.11n MCS0 40MHz / Chain 1 + Chain 2

Channel	Frequency	Power Density (dBm/3kHz)		Single Port Limit (dBm/3kHz)	Result
		Chain 1	Chain 2		
3	2422 MHz	-19.06	-19.09	4.99	**Complies**
6	2437 MHz	-15.20	-15.29	4.99	**Complies**
9	2452 MHz	-18.54	-18.19	4.99	**Complies**

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

Temperature	25℃	Humidity	56%
Test Engineer	Benson Peng	Configurations	IEEE 802.11b/g

Configuration IEEE 802.11b / Chain 1

Channel	Frequency	Power Density (dBm/3kHz)	Max. Limit (dBm/3kHz)	Result
1	2412 MHz	-7.46	8.00	**Complies**
6	2437 MHz	-7.52	8.00	**Complies**
11	2462 MHz	-7.95	8.00	**Complies**

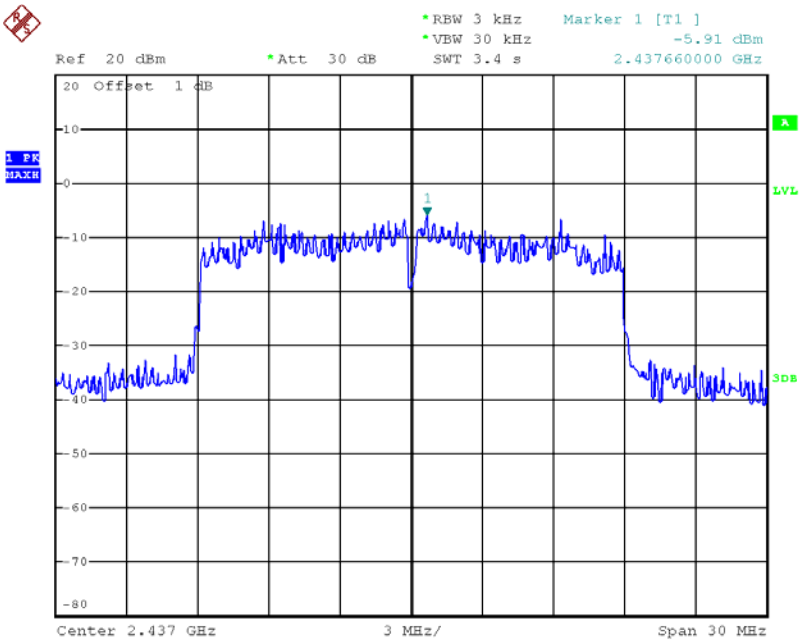
Configuration IEEE 802.11g / Chain 1

Channel	Frequency	Power Density (dBm/3kHz)	Max. Limit (dBm/3kHz)	Result
1	2412 MHz	-10.21	8.00	**Complies**
6	2437 MHz	-3.41	8.00	**Complies**
11	2462 MHz	-10.87	8.00	**Complies**

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

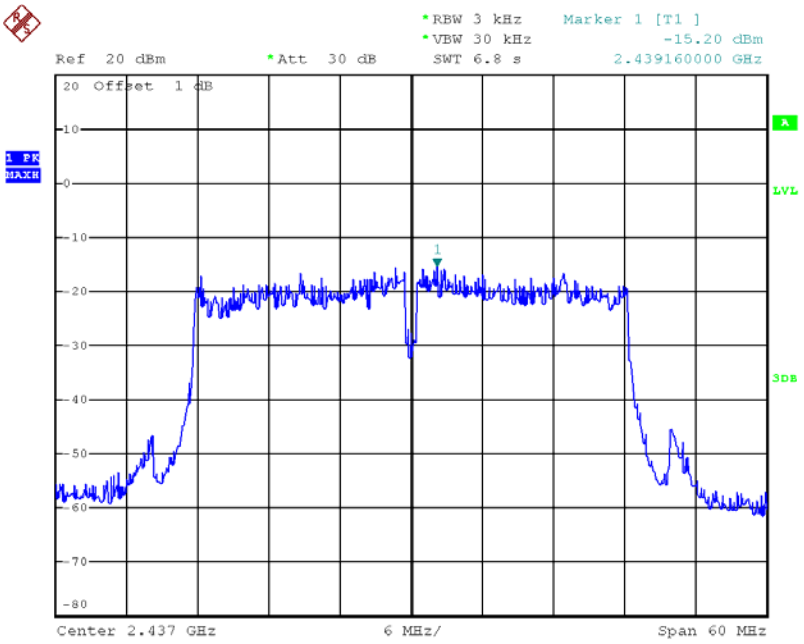
For plots, only the channel with maximum results was shown.

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



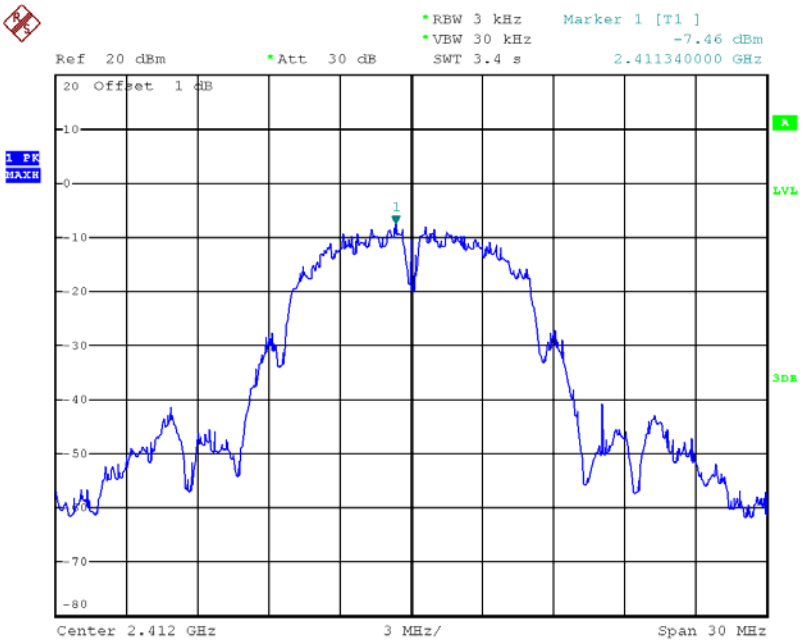
Date: 3.JUN.2013 21:45:49

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



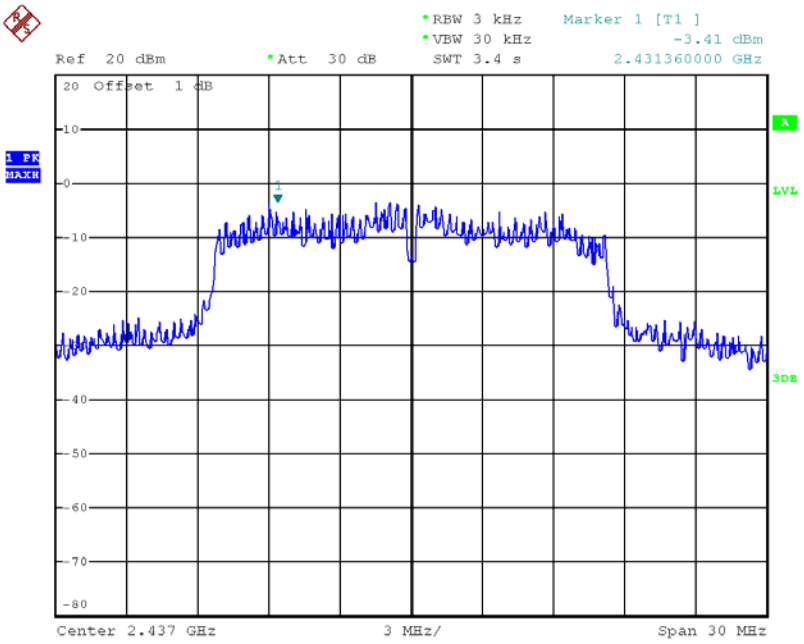
Date: 3.JUN.2013 21:49:17

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



Date: 3.JUN.2013 21:36:17

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



Date: 3.JUN.2013 21:40:22

4.4. 6dB Spectrum Bandwidth Measurement

4.4.1. Limit

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

4.4.2. Measuring Instruments and Setting

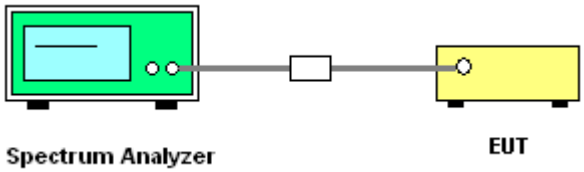
Please refer to section 5 of equipments list in this report. The following table is the setting of the Spectrum Analyzer.

Spectrum Parameters	Setting
Attenuation	Auto
Span Frequency	> 6dB Bandwidth
RBW	100kHz
VBW	≥ 3 x 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 D01 v03 for Performing Compliance Measurements on Digital Transmission Systems (DTS) Operating Under §15.247 section 8.0 DTS 6-dB signal bandwidth option 1.
3. Multiple antenna system was performed in accordance with KDB 662911 D01 v01r02 Emissions Testing of Transmitters with Multiple Outputs in the Same Band.
4. Measured the spectrum width with power higher than 6dB below carrier.

4.4.4. Test Setup Layout



4.4.5. Test Deviation

There is no deviation with the original standard.

4.4.6. EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

4.4.7. Test Result of 6dB Spectrum Bandwidth

Temperature	25℃	Humidity	56%
Test Engineer	Benson Peng	Configurations	IEEE 802.11n

Configuration IEEE 802.11n MCS0 20MHz / Chain 1 + Chain 2

Channel	Frequency	6dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)	Min. Limit (kHz)	Test Result
1	2412 MHz	15.84	16.72	500	**Complies**
6	2437 MHz	15.12	17.04	500	**Complies**
11	2462 MHz	16.08	16.72	500	**Complies**

Configuration IEEE 802.11n MCS0 40MHz / Chain 1 + Chain 2

Channel	Frequency	6dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)	Min. Limit (kHz)	Test Result
3	2422 MHz	32.80	36.32	500	**Complies**
6	2437 MHz	35.84	36.32	500	**Complies**
9	2452 MHz	35.36	36.32	500	**Complies**

Temperature	25℃	Humidity	56%
Test Engineer	Benson Peng	Configurations	IEEE 802.11b/g

Configuration IEEE 802.11b / Chain 1

Channel	Frequency	6dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)	Min. Limit (kHz)	Test Result
1	2412 MHz	8.08	10.08	500	**Complies**
6	2437 MHz	8.08	10.16	500	**Complies**
11	2462 MHz	8.08	10.16	500	**Complies**

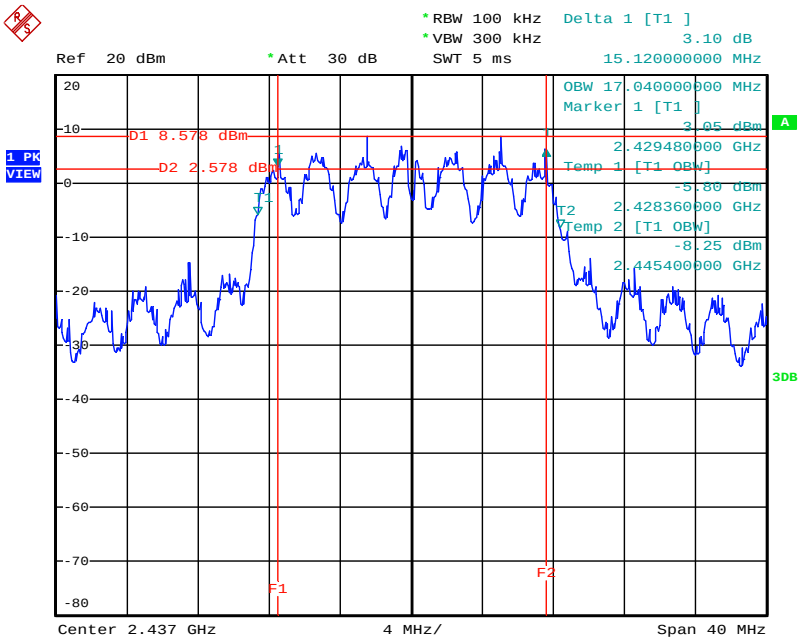
Configuration IEEE 802.11g / Chain 1

Channel	Frequency	6dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)	Min. Limit (kHz)	Test Result
1	2412 MHz	15.04	16.40	500	**Complies**
6	2437 MHz	15.92	25.52	500	**Complies**
11	2462 MHz	15.04	16.40	500	**Complies**

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

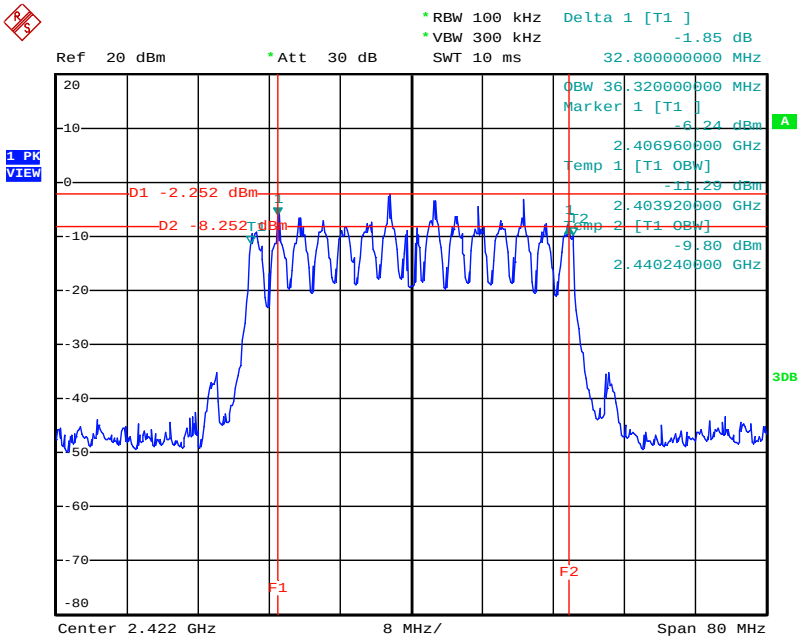
For plots, only the channel with maximum results was shown.

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



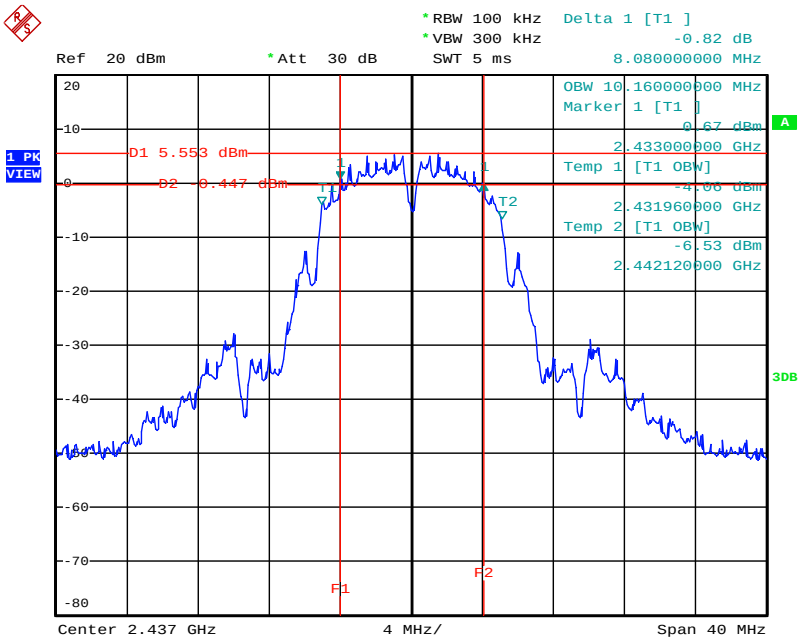
Date: 3.JUN.2013 22:11:12

6 dB Bandwidth Plot on Configuration IEEE 802.11n MCS0 40MHz / Chain 1 + Chain 2 / 2422 MHz



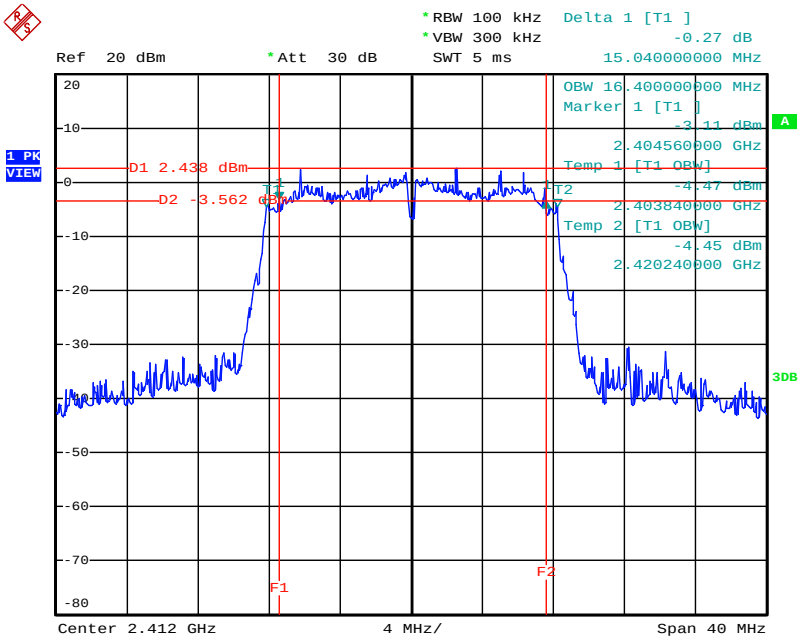
Date: 3.JUN.2013 22:12:34

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



Date: 3.JUN.2013 22:04:53

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



Date: 3.JUN.2013 22:07:43

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
RBW / VBW (Emission in restricted band)	1MHz / 3MHz for Peak, 1 MHz / 10Hz for Average
RBW / VBW (Emission in non-restricted band)	100kHz / 300kHz for peak

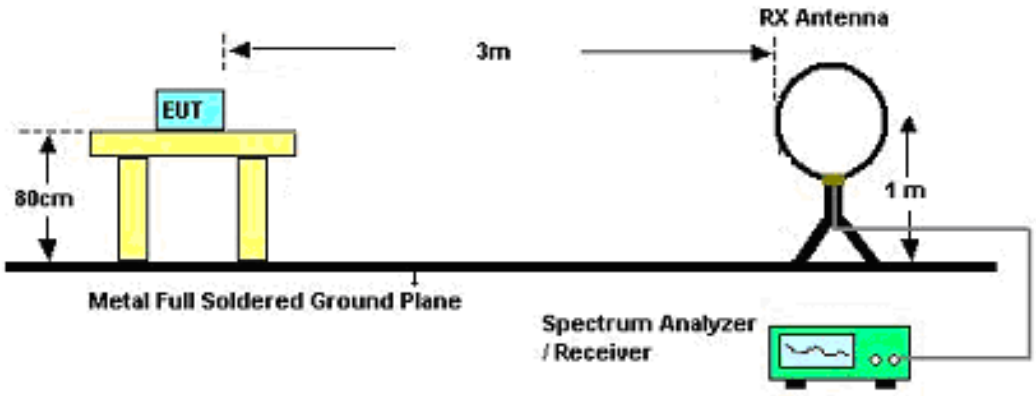
Receiver Parameter	Setting
Attenuation	Auto
Start ~ Stop Frequency	9kHz~150kHz / RBW 200Hz for QP
Start ~ Stop Frequency	150kHz~30MHz / RBW 9kHz for QP
Start ~ Stop Frequency	30MHz~1000MHz / RBW 120kHz for QP

4.5.3. Test Procedures

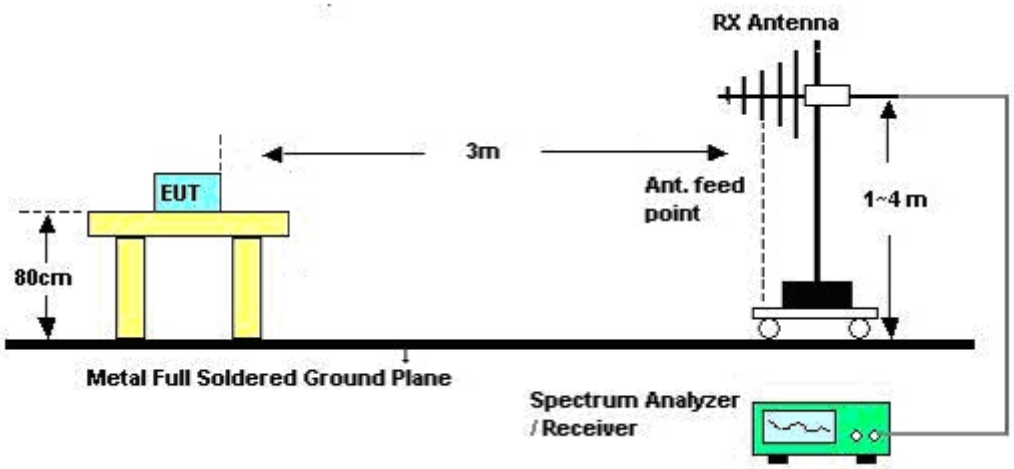
1. Configure the EUT according to ANSI C63.10. The EUT was placed on the top of the turntable 0.8 meter above ground. The phase center of the receiving antenna mounted on the top of a height-variable antenna tower was placed 3 meters far away from the turntable.
2. Power on the EUT and all the supporting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

4.5.4. Test Setup Layout

For Radiated Emissions 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℃	Humidity	60%
Test Engineer	David Tseng	Configurations	CTX
Test Date	Apr. 18, 2013		

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

Note:

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

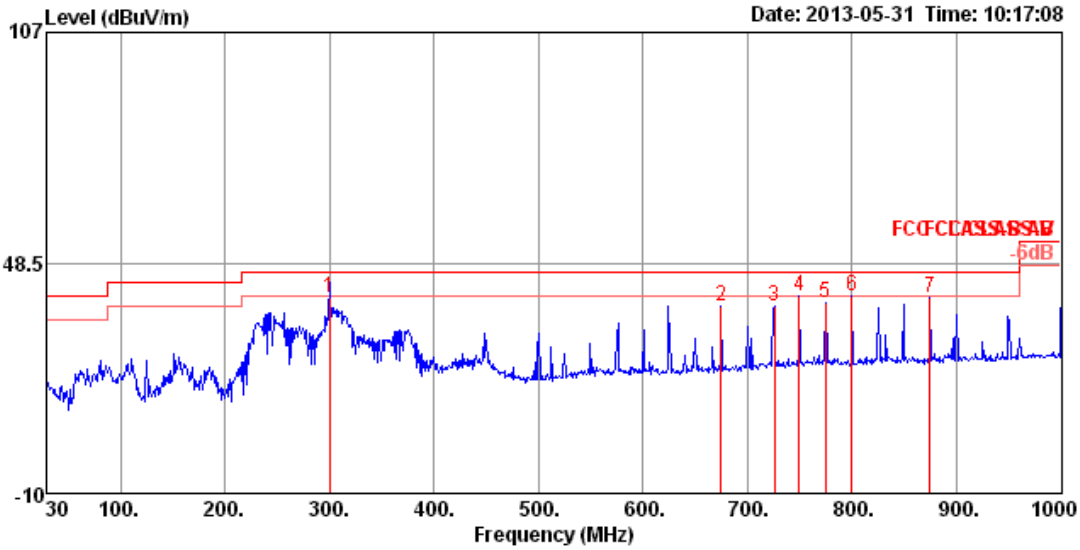
Distance extrapolation factor = 40 log (specific distance / test distance) (dB);

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

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

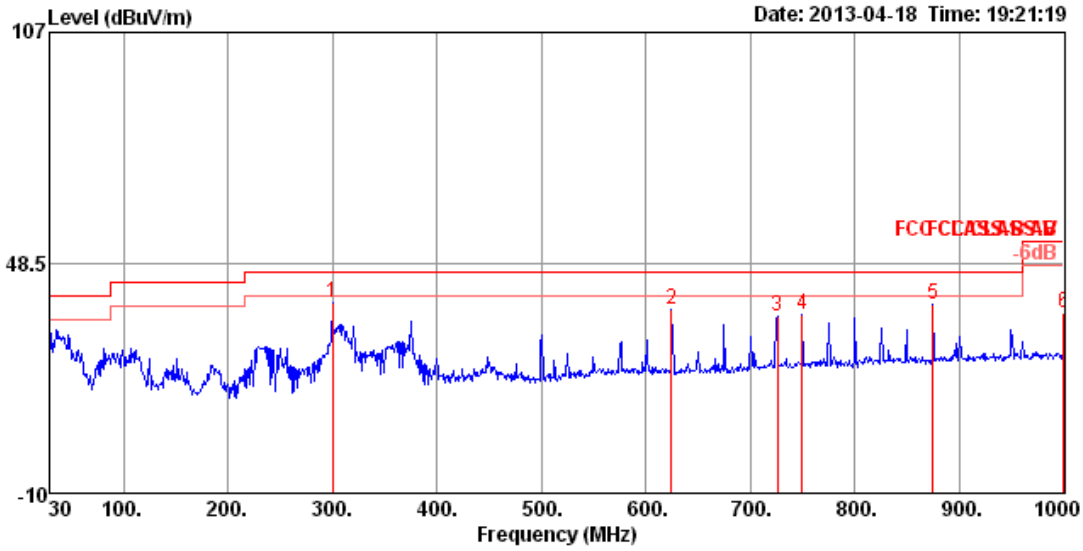
Temperature	24.5℃	Humidity	60%
Test Engineer	David Tseng	Configurations	CTX

Horizontal



	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1 qp	299.66	39.49	46.00	-6.51	55.76	2.13	13.02	31.42	100	347	HORIZONTAL	QP
2	675.05	37.70	46.00	-8.30	46.95	3.33	18.78	31.36	125	325	HORIZONTAL	Peak
3	725.49	37.68	46.00	-8.32	46.06	3.46	19.43	31.27	125	112	HORIZONTAL	Peak
4	749.74	39.87	46.00	-6.13	48.02	3.53	19.69	31.37	100	326	HORIZONTAL	Peak
5	774.96	38.54	46.00	-7.46	46.56	3.62	19.71	31.35	100	32	HORIZONTAL	Peak
6 pp	800.18	40.13	46.00	-5.87	47.97	3.67	19.76	31.27	100	280	HORIZONTAL	Peak
7	874.87	39.52	46.00	-6.48	46.54	3.89	20.24	31.15	100	155	HORIZONTAL	Peak

Vertical



	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1 pp	299.66	38.35	46.00	-7.65	54.62	2.13	13.02	31.42	150	248	VERTICAL	Peak
2	624.61	36.50	46.00	-9.50	46.11	3.18	18.61	31.40	100	166	VERTICAL	Peak
3	725.49	34.79	46.00	-11.21	43.17	3.46	19.43	31.27	100	310	VERTICAL	Peak
4	749.74	35.40	46.00	-10.60	43.55	3.53	19.69	31.37	100	322	VERTICAL	Peak
5	874.87	37.93	46.00	-8.07	44.95	3.89	20.24	31.15	125	38	VERTICAL	Peak
6	1000.00	35.61	54.00	-18.39	41.14	4.21	21.44	31.18	125	17	VERTICAL	Peak

Note:

The amplitude of spurious emissions which are attenuated by more than 20 dB 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℃	Humidity	56%
Test Engineer	Serway Li	Configurations	IEEE 802.11n MCS0 20MHz Ch 1 / Chain 1 + Chain 2
Test Date	May 21, 2013		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Preamp Factor	Antenna Factor	Remark	T/Pos	A/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m		deg	cm	
1 a	4822.80	32.46	54.00	-21.54	30.38	4.21	34.69	32.56	Average	141	123	HORIZONTAL
2 p	4827.80	47.70	74.00	-26.30	45.62	4.21	34.69	32.56	Peak	141	123	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Preamp Factor	Antenna Factor	Remark	T/Pos	A/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m		deg	cm	
1 p	4822.92	51.33	74.00	-22.67	49.25	4.21	34.69	32.56	Peak	352	115	VERTICAL
2 a	4823.16	37.02	54.00	-16.98	34.94	4.21	34.69	32.56	Average	352	115	VERTICAL

Temperature	24℃	Humidity	56%
Test Engineer	Serway Li	Configurations	IEEE 802.11n MCS0 20MHz Ch 6 / Chain 1 + Chain 2
Test Date	May 21, 2013		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Preamp Factor	Antenna Factor	Remark	T/Pos	A/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m		deg	cm	
1 p	4872.80	58.98	74.00	-15.02	56.77	4.22	34.67	32.66	Peak	143	127	HORIZONTAL
2 a	4872.80	44.34	54.00	-9.66	42.13	4.22	34.67	32.66	Average	143	127	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Preamp Factor	Antenna Factor	Remark	T/Pos	A/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m		deg	cm	
1 a	4872.68	49.15	54.00	-4.85	46.94	4.22	34.67	32.66	Average	221	102	VERTICAL
2 p	4875.28	63.80	74.00	-10.20	61.59	4.22	34.67	32.66	Peak	221	102	VERTICAL

Temperature	24℃	Humidity	56%
Test Engineer	Serway Li	Configurations	IEEE 802.11n MCS0 20MHz Ch 11 / Chain 1 + Chain 2
Test Date	May 21, 2013		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Preamp Factor	Antenna Factor	Remark	T/Pos	A/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m		deg	cm	
1 a	4925.36	34.22	54.00	-19.78	31.88	4.23	34.65	32.76	Average	5	123	HORIZONTAL
2 p	4930.40	48.19	74.00	-25.81	45.85	4.23	34.65	32.76	Peak	5	123	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Preamp Factor	Antenna Factor	Remark	T/Pos	A/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m		deg	cm	
1 a	4925.60	37.54	54.00	-16.46	35.20	4.23	34.65	32.76	Average	217	100	VERTICAL
2 p	4925.80	53.19	74.00	-20.81	50.85	4.23	34.65	32.76	Peak	217	100	VERTICAL

Temperature	24℃	Humidity	56%
Test Engineer	Serway Li	Configurations	IEEE 802.11n MCS0 40MHz Ch 3 / Chain 1 + Chain 2
Test Date	May 21, 2013		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Preamp Factor	Antenna Factor	Remark	T/Pos	A/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m		deg	cm	
1 p	4843.56	43.36	74.00	-30.64	41.24	4.21	34.68	32.59	Peak	183	100	HORIZONTAL
2 a	4843.73	29.77	54.00	-24.23	27.65	4.21	34.68	32.59	Average	183	100	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Preamp Factor	Antenna Factor	Remark	T/Pos	A/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m		deg	cm	
1 a	4843.81	30.64	54.00	-23.36	28.52	4.21	34.68	32.59	Average	92	100	VERTICAL
2 p	4843.86	43.90	74.00	-30.10	41.78	4.21	34.68	32.59	Peak	92	100	VERTICAL

Temperature	24℃	Humidity	56%
Test Engineer	Serway Li	Configurations	IEEE 802.11n MCS0 40MHz Ch 6 / Chain 1 + Chain 2
Test Date	May 21, 2013		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Preamp Factor	Antenna Factor	Remark	T/Pos	A/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m		deg	cm	
1 a	4871.16	32.44	54.00	-21.56	30.23	4.22	34.67	32.66	Average	139	100	HORIZONTAL
2 p	4871.20	44.98	74.00	-29.02	42.77	4.22	34.67	32.66	Peak	139	100	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Preamp Factor	Antenna Factor	Remark	T/Pos	A/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m		deg	cm	
1 p	4873.32	48.85	74.00	-25.15	46.64	4.22	34.67	32.66	Peak	218	101	VERTICAL
2 a	4873.64	35.65	54.00	-18.35	33.44	4.22	34.67	32.66	Average	218	101	VERTICAL

Temperature	24℃	Humidity	56%
Test Engineer	Serway Li	Configurations	IEEE 802.11n MCS0 40MHz Ch 9 / Chain 1 + Chain 2
Test Date	May 21, 2013		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Preamp Factor	Antenna Factor	Remark	T/Pos	A/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m		deg	cm	
1 p	4903.71	44.09	74.00	-29.91	41.80	4.22	34.66	32.73	Peak	312	100	HORIZONTAL
2 a	4903.96	30.35	54.00	-23.65	28.06	4.22	34.66	32.73	Average	312	100	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Preamp Factor	Antenna Factor	Remark	T/Pos	A/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m		deg	cm	
1 a	4904.01	31.57	54.00	-22.43	29.28	4.22	34.66	32.73	Average	214	100	VERTICAL
2 p	4904.33	44.93	74.00	-29.07	42.64	4.22	34.66	32.73	Peak	214	100	VERTICAL

Note:

The amplitude of spurious emissions which are attenuated by more than 20 dB 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.

Temperature	24℃	Humidity	56%
Test Engineer	Serway Li	Configurations	IEEE 802.11b CH 1 / Chain 1
Test Date	May 21, 2013		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Preamp Factor	Antenna Factor	Remark	T/Pos	A/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m		deg	cm	
1 a	4823.94	51.64	54.00	-2.36	49.56	4.21	34.69	32.56	Average	23	113	HORIZONTAL
2 p	4824.03	47.92	74.00	-26.08	45.84	4.21	34.69	32.56	Peak	23	113	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Preamp Factor	Antenna Factor	Remark	T/Pos	A/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m		deg	cm	
1 p	4824.03	55.83	74.00	-18.17	53.75	4.21	34.69	32.56	Peak	17	106	VERTICAL
2 a	4824.04	53.15	54.00	-0.85	51.07	4.21	34.69	32.56	Average	17	106	VERTICAL

Temperature	24℃	Humidity	56%
Test Engineer	Serway Li	Configurations	IEEE 802.11b CH 6 / Chain 1
Test Date	May 21, 2013		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Preamp Factor	Antenna Factor	Remark	T/Pos	A/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m		deg	cm	
1	4874.00	52.92	74.00	-21.08	50.71	4.22	34.67	32.66	Peak	28	100	HORIZONTAL
2 a	4874.05	49.53	54.00	-4.47	47.32	4.22	34.67	32.66	Average	28	100	HORIZONTAL
3	7310.34	44.94	54.00	-9.06	37.56	5.34	34.93	36.97	Average	345	106	HORIZONTAL
4 p	7311.38	53.20	74.00	-20.80	45.83	5.34	34.94	36.97	Peak	345	106	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Preamp Factor	Antenna Factor	Remark	T/Pos	A/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m		deg	cm	
1 p	4874.02	56.21	74.00	-17.79	54.00	4.22	34.67	32.66	Peak	325	100	VERTICAL
2 a	4874.06	53.65	54.00	-0.35	51.44	4.22	34.67	32.66	Average	325	100	VERTICAL
3	7311.74	41.19	54.00	-12.81	33.82	5.34	34.94	36.97	Average	5	101	VERTICAL
4	7311.87	51.53	74.00	-22.47	44.16	5.34	34.94	36.97	Peak	5	101	VERTICAL

Temperature	24℃	Humidity	56%
Test Engineer	Serway Li	Configurations	IEEE 802.11b CH 11 / Chain 1
Test Date	May 21, 2013		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Preamp Factor	Antenna Factor	Remark	T/Pos	A/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m		deg	cm	
1 p	4924.00	52.66	74.00	-21.34	50.32	4.23	34.65	32.76	Peak	295	105	HORIZONTAL
2 a	4924.02	48.90	54.00	-5.10	46.56	4.23	34.65	32.76	Average	295	105	HORIZONTAL
3	7385.33	45.72	74.00	-28.28	38.24	5.36	34.96	37.08	Peak	337	105	HORIZONTAL
4	7385.35	41.90	54.00	-12.10	34.42	5.36	34.96	37.08	Average	337	105	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Preamp Factor	Antenna Factor	Remark	T/Pos	A/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m		deg	cm	
1 p	4924.05	55.61	74.00	-18.39	53.27	4.23	34.65	32.76	Peak	22	107	VERTICAL
2 a	4924.06	52.69	54.00	-1.31	50.35	4.23	34.65	32.76	Average	22	107	VERTICAL
3	7385.87	49.90	74.00	-24.10	42.42	5.36	34.96	37.08	Peak	31	105	VERTICAL
4	7386.88	38.75	54.00	-15.25	31.27	5.36	34.96	37.08	Average	31	105	VERTICAL

Temperature	24℃	Humidity	56%
Test Engineer	Serway Li	Configurations	IEEE 802.11g CH 1 / Chain 1
Test Date	May 21, 2013		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Preamp Factor	Antenna Factor	Remark	T/Pos	A/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m		deg	cm	
1 a	4823.96	34.69	54.00	-19.31	32.61	4.21	34.69	32.56	Average	6	138	HORIZONTAL
2 p	4824.24	47.87	74.00	-26.13	45.79	4.21	34.69	32.56	Peak	6	138	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Preamp Factor	Antenna Factor	Remark	T/Pos	A/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m		deg	cm	
1 a	4823.72	37.92	54.00	-16.08	35.84	4.21	34.69	32.56	Average	352	108	VERTICAL
2 p	4823.80	55.26	74.00	-18.74	53.18	4.21	34.69	32.56	Peak	352	108	VERTICAL

Temperature	24℃	Humidity	56%
Test Engineer	Serway Li	Configurations	IEEE 802.11g CH 6 / Chain 1
Test Date	May 21, 2013		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Preamp Factor	Antenna Factor	Remark	T/Pos	A/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m		deg	cm	
1 a	4872.60	44.99	54.00	-9.01	42.78	4.22	34.67	32.66	Average	199	118	HORIZONTAL
2 p	4875.00	59.87	74.00	-14.13	57.66	4.22	34.67	32.66	Peak	199	118	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Preamp Factor	Antenna Factor	Remark	T/Pos	A/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m		deg	cm	
1 a	4873.04	48.60	54.00	-5.40	46.39	4.22	34.67	32.66	Average	222	102	VERTICAL
2 p	4875.52	63.17	74.00	-10.83	60.96	4.22	34.67	32.66	Peak	222	102	VERTICAL

Temperature	24℃	Humidity	56%
Test Engineer	Serway Li	Configurations	IEEE 802.11g CH 11 / Chain 1
Test Date	May 21, 2013		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Preamp Factor	Antenna Factor	Remark	T/Pos	A/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m		deg	cm	
1 a	4923.56	36.24	54.00	-17.76	33.90	4.23	34.65	32.76	Average	2	124	HORIZONTAL
2 p	4924.16	50.48	74.00	-23.52	48.14	4.23	34.65	32.76	Peak	2	124	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Preamp Factor	Antenna Factor	Remark	T/Pos	A/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m		deg	cm	
1 p	4921.48	53.60	74.00	-20.40	51.26	4.23	34.65	32.76	Peak	54	100	VERTICAL
2 a	4924.24	37.26	54.00	-16.74	34.92	4.23	34.65	32.76	Average	54	100	VERTICAL

Note:

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

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

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

4.6. Emissions Measurement

4.6.1. Limit

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

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

4.6.2. Measuring Instruments and Setting

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

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

4.6.3. Test Procedures

For Radiated band edges Measurement:

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

For Conducted Out of Band Emission Measurement:

1. Test was performed in accordance with KDB 558074 D01 v03 for Performing Compliance Measurements on Digital Transmission Systems (DTS) Operating Under §15.247 section 10.1 Unwanted Emissions into Non-Restricted Frequency Bands Measurement Procedure
2. The conducted emission test is performed on each TX port of operating mode without summing or adding 10log (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℃	Humidity	56%
Test Engineer	Serway Li	Configurations	IEEE 802.11n MCS0 20MHz Ch 1, 6, 11 / Chain 1 + Chain 2
Test Date	May 21, 2013		

Channel 1

		Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Preamp Factor	Antenna Factor	Remark	T/Pos	A/Pos	Pol/Phase
		MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m		deg	cm	
1	!	2389.52	72.18	74.00	-1.82	41.40	2.91	0.00	27.87	Peak	316	120	VERTICAL
2	!	2390.00	53.28	54.00	-0.72	22.50	2.91	0.00	27.87	Average	316	120	VERTICAL
3	a	2411.68	102.48	54.00			2.92	0.00	27.84	Average	316	120	VERTICAL
4	p	2411.84	112.30	74.00			2.92	0.00	27.84	Peak	316	120	VERTICAL

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

Channel 6

		Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Preamp Factor	Antenna Factor	Remark	T/Pos	A/Pos	Pol/Phase
		MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m		deg	cm	
1	!	2389.20	68.94	74.00	-5.06	38.16	2.91	0.00	27.87	Peak	192	128	VERTICAL
2	!	2389.20	52.66	54.00	-1.34	21.88	2.91	0.00	27.87	Average	192	128	VERTICAL
3	p	2436.60	117.67	74.00			2.94	0.00	27.78	Peak	192	128	VERTICAL
4	a	2436.60	108.38	54.00			2.94	0.00	27.78	Average	192	128	VERTICAL
5	!	2483.90	68.70	74.00	-5.30	38.01	2.96	0.00	27.73	Peak	192	128	VERTICAL
6	!	2483.90	53.72	54.00	-0.28	23.03	2.96	0.00	27.73	Average	192	128	VERTICAL

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

Channel 11

		Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Preamp Factor	Antenna Factor	Remark	T/Pos	A/Pos	Pol/Phase
		MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m		deg	cm	
1	p	2461.36	112.46	74.00			2.95	0.00	27.76	Peak	13	127	VERTICAL
2	a	2461.52	101.79	54.00			2.95	0.00	27.76	Average	13	127	VERTICAL
3	!	2483.82	53.61	54.00	-0.39	22.92	2.96	0.00	27.73	Average	13	127	VERTICAL
4	!	2486.55	72.93	74.00	-1.07	42.24	2.96	0.00	27.73	Peak	13	127	VERTICAL

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

Temperature	24℃	Humidity	56%
Test Engineer	Serway Li	Configurations	IEEE 802.11n MCS0 40MHz Ch 3, 6, 9 / Chain 1 + Chain 2
Test Date	May 21, 2013		

Channel 3

		Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Preamp Factor	Antenna Factor	Remark	T/Pos	A/Pos	Pol/Phase
		MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m		deg	cm	
1	!	2384.87	53.70	54.00	-0.30	22.91	2.90	0.00	27.89	Average	192	100	VERTICAL
2	!	2387.12	70.21	74.00	-3.79	39.43	2.91	0.00	27.87	Peak	192	100	VERTICAL
3	p	2424.56	106.38	74.00			2.93	0.00	27.81	Peak	192	100	VERTICAL
4	a	2424.89	95.30	54.00			2.93	0.00	27.81	Average	192	100	VERTICAL

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

Channel 6

		Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Preamp Factor	Antenna Factor	Remark	T/Pos	A/Pos	Pol/Phase
		MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m		deg	cm	
1	!	2389.60	52.44	54.00	-1.56	21.66	2.91	0.00	27.87	Average	189	100	VERTICAL
2	!	2390.00	68.83	74.00	-5.17	38.05	2.91	0.00	27.87	Peak	189	100	VERTICAL
3	p	2439.80	109.08	74.00			2.94	0.00	27.78	Peak	189	100	VERTICAL
4	a	2439.80	97.74	54.00			2.94	0.00	27.78	Average	189	100	VERTICAL
5	!	2484.70	72.83	74.00	-1.17	42.14	2.96	0.00	27.73	Peak	189	100	VERTICAL
6	!	2484.70	53.96	54.00	-0.04	23.27	2.96	0.00	27.73	Average	189	100	VERTICAL

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

Channel 9

		Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Preamp Factor	Antenna Factor	Remark	T/Pos	A/Pos	Pol/Phase
		MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m		deg	cm	
1	p	2449.60	106.04	74.00			2.94	0.00	27.78	Peak	191	125	VERTICAL
2	a	2449.60	94.20	54.00			2.94	0.00	27.78	Average	191	125	VERTICAL
3	!	2489.50	53.46	54.00	-0.54	22.79	2.97	0.00	27.70	Average	191	125	VERTICAL
4		2489.90	67.83	74.00	-6.17	37.16	2.97	0.00	27.70	Peak	191	125	VERTICAL

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

Note:

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

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

Temperature	24℃	Humidity	56%
Test Engineer	Serway Li	Configurations	IEEE 802.11b CH 1, 6, 11 / Chain 1
Test Date	May 21, 2013		

Channel 1

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Preamp Factor	Antenna Factor	Remark	T/Pos	A/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m		deg	cm	
1	2390.00	56.26	74.00	-17.74	25.48	2.91	0.00	27.87	Peak	49	123	VERTICAL
2	2390.00	45.02	54.00	-8.98	14.24	2.91	0.00	27.87	Average	49	123	VERTICAL
3 a	2411.20	105.14	54.00			2.92	0.00	27.84	Average	49	123	VERTICAL
4 p	2413.00	109.19	74.00			2.92	0.00	27.84	Peak	49	123	VERTICAL

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

Channel 6

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Preamp Factor	Antenna Factor	Remark	T/Pos	A/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m		deg	cm	
1	2387.60	56.63	74.00	-17.37	25.85	2.91	0.00	27.87	Peak	183	102	VERTICAL
2	2390.00	44.45	54.00	-9.55	13.67	2.91	0.00	27.87	Average	183	102	VERTICAL
3 p	2436.20	109.23	74.00			2.93	0.00	27.81	Peak	183	102	VERTICAL
4 a	2436.20	105.30	54.00			2.93	0.00	27.81	Average	183	102	VERTICAL
5	2485.90	55.13	74.00	-18.87	24.44	2.96	0.00	27.73	Peak	183	102	VERTICAL
6	2485.90	43.19	54.00	-10.81	12.50	2.96	0.00	27.73	Average	183	102	VERTICAL

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

Channel 11

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Preamp Factor	Antenna Factor	Remark	T/Pos	A/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m		deg	cm	
1 a	2461.20	104.69	54.00			2.95	0.00	27.76	Average	161	127	VERTICAL
2 p	2463.00	108.61	74.00			2.95	0.00	27.76	Peak	161	127	VERTICAL
3	2483.50	45.80	54.00	-8.20	15.11	2.96	0.00	27.73	Average	161	127	VERTICAL
4	2483.70	57.43	74.00	-16.57	26.74	2.96	0.00	27.73	Peak	161	127	VERTICAL

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

Temperature	24℃	Humidity	56%
Test Engineer	Serway Li	Configurations	IEEE 802.11g CH 1, 6, 11 / Chain 1
Test Date	May 21, 2013		

Channel 1

		Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Preamp Factor	Antenna Factor	Remark	T/Pos	A/Pos	Pol/Phase
		MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m		deg	cm	
1	!	2389.20	72.72	74.00	-1.28	41.94	2.91	0.00	27.87	Peak	24	132	VERTICAL
2	!	2390.00	53.63	54.00	-0.37	22.85	2.91	0.00	27.87	Average	24	132	VERTICAL
3	p	2412.16	111.76	74.00			2.92	0.00	27.84	Peak	24	132	VERTICAL
4	a	2412.80	100.41	54.00			2.92	0.00	27.84	Average	24	132	VERTICAL

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

Channel 6

		Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Preamp Factor	Antenna Factor	Remark	T/Pos	A/Pos	Pol/Phase
		MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m		deg	cm	
1	!	2388.40	70.36	74.00	-3.64	39.58	2.91	0.00	27.87	Peak	98	122	VERTICAL
2	!	2390.00	53.98	54.00	-0.02	23.20	2.91	0.00	27.87	Average	98	122	VERTICAL
3	p	2437.40	117.13	74.00			2.94	0.00	27.78	Peak	98	122	VERTICAL
4	a	2437.80	106.16	54.00			2.94	0.00	27.78	Average	98	122	VERTICAL
5	!	2483.50	53.15	54.00	-0.85	22.46	2.96	0.00	27.73	Average	98	122	VERTICAL
6	!	2488.70	72.55	74.00	-1.45	41.88	2.97	0.00	27.70	Peak	98	122	VERTICAL

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

Channel 11

		Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Preamp Factor	Antenna Factor	Remark	T/Pos	A/Pos	Pol/Phase
		MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m		deg	cm	
1	a	2461.52	100.03	54.00			2.95	0.00	27.76	Average	311	128	VERTICAL
2	p	2462.00	112.63	74.00			2.95	0.00	27.76	Peak	311	128	VERTICAL
3	!	2483.50	53.86	54.00	-0.14	23.17	2.96	0.00	27.73	Average	311	128	VERTICAL
4	!	2483.66	73.63	74.00	-0.37	42.94	2.96	0.00	27.73	Peak	311	128	VERTICAL

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

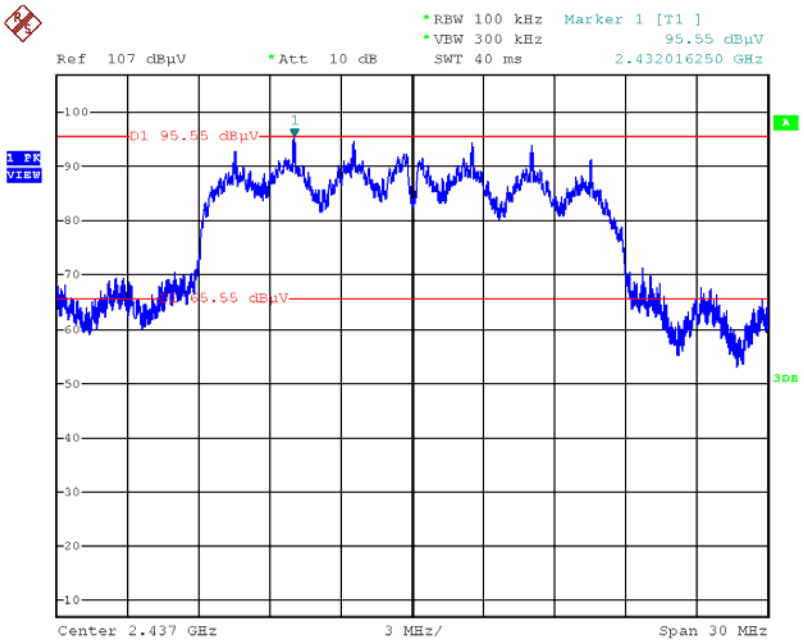
Note:

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

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

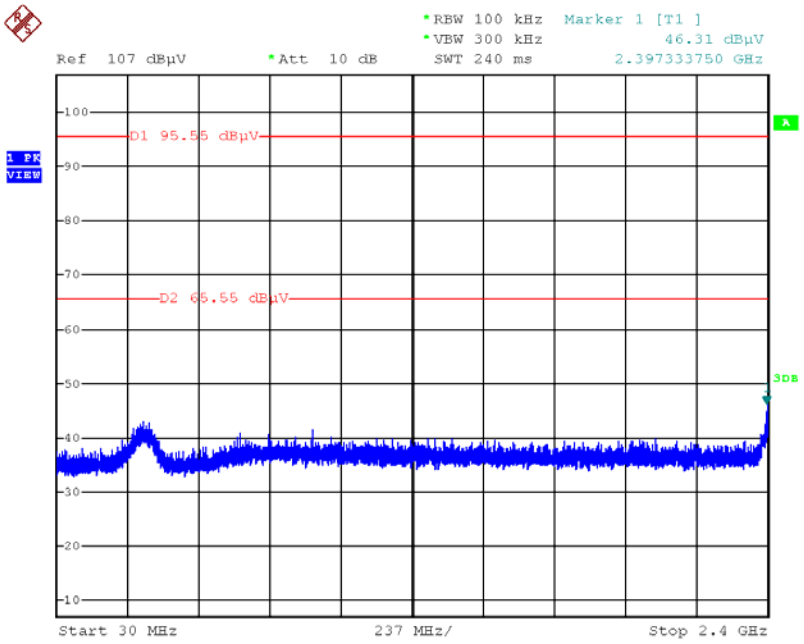
For Emission not in Restricted Band

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



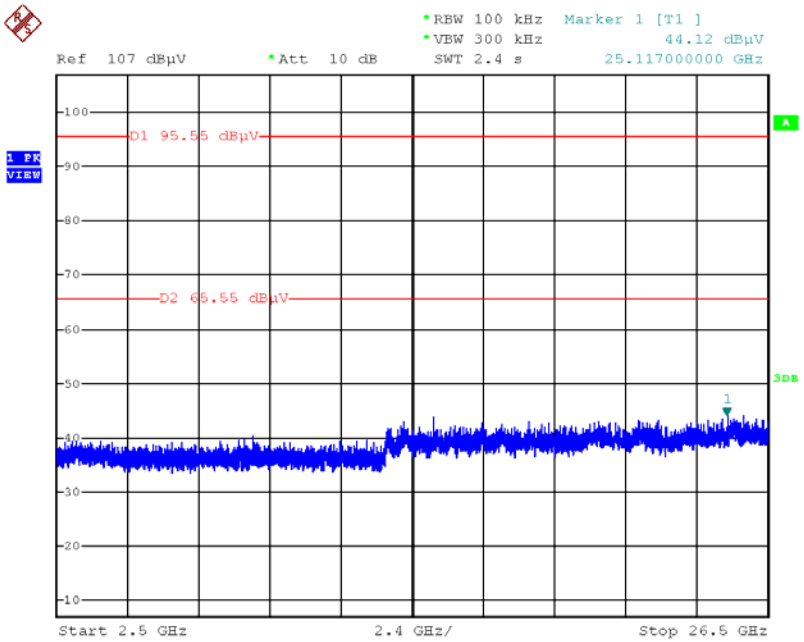
Date: 21.MAY.2013 11:17:29

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



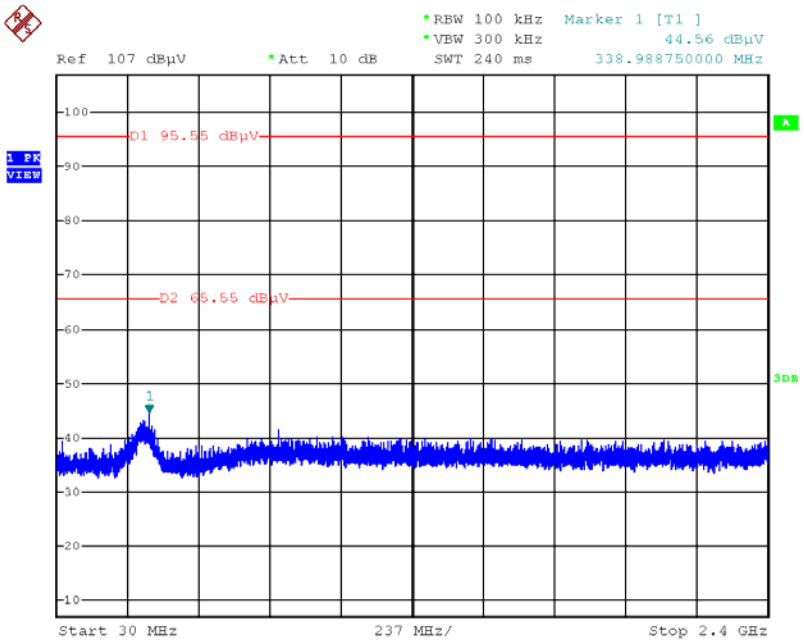
Date: 21.MAY.2013 11:18:56

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



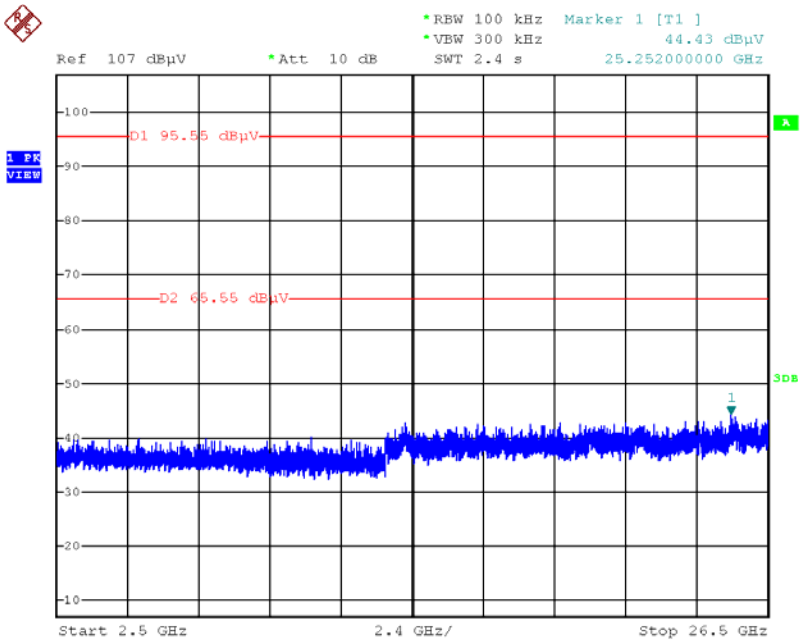
Date: 21.MAY.2013 11:19:42

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



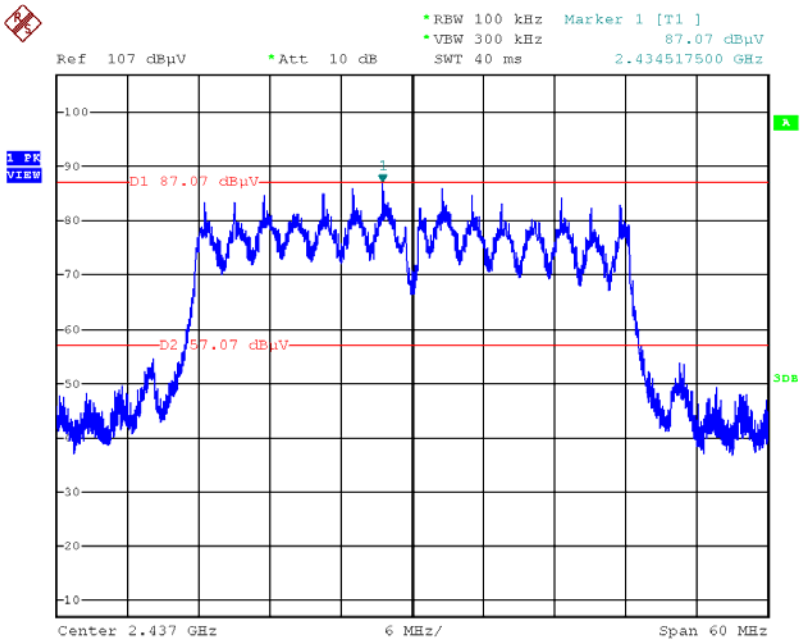
Date: 21.MAY.2013 11:21:42

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



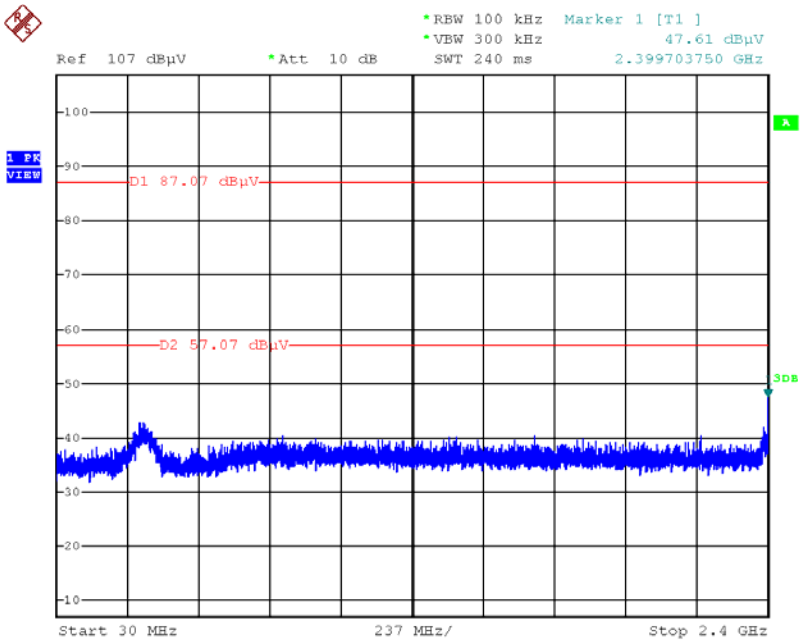
Date: 21.MAY.2013 11:20:41

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



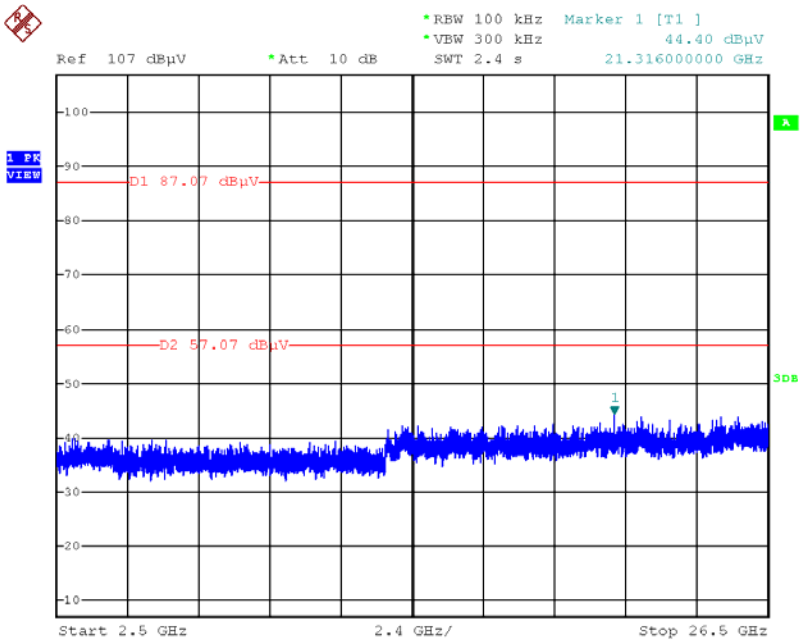
Date: 21.MAY.2013 11:25:10

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



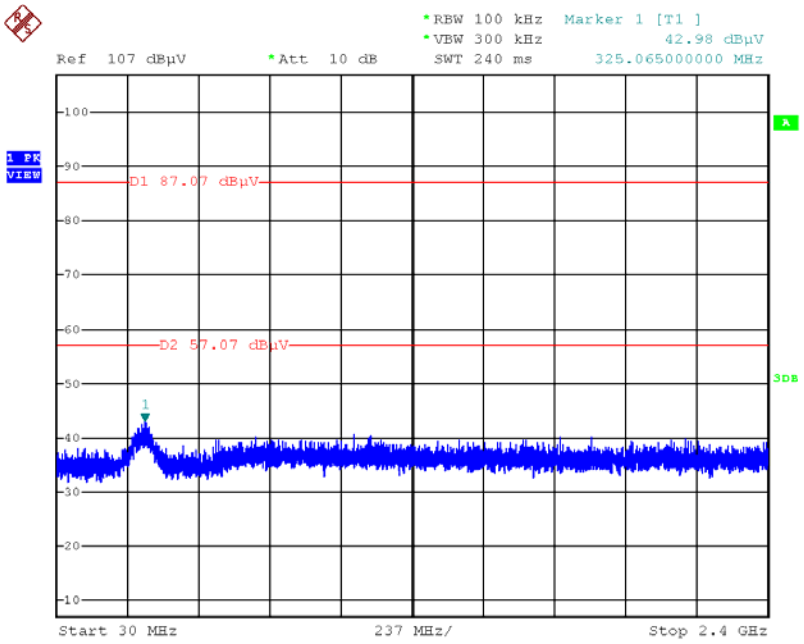
Date: 21.MAY.2013 11:26:07

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



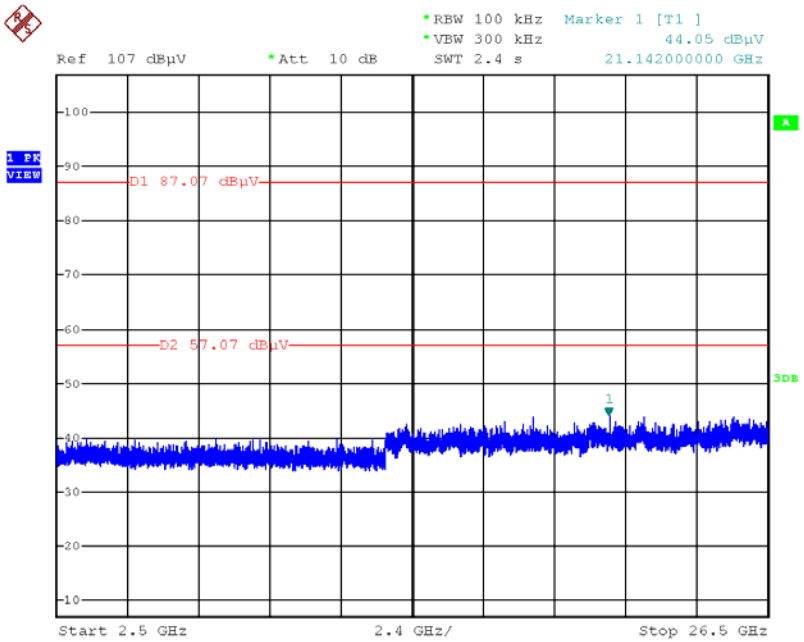
Date: 21.MAY.2013 11:26:43

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



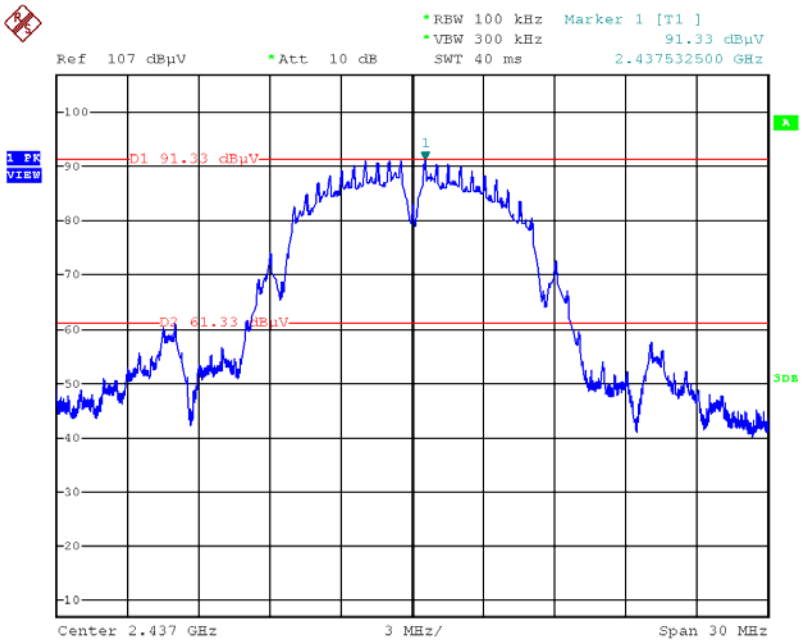
Date: 21.MAY.2013 11:28:39

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



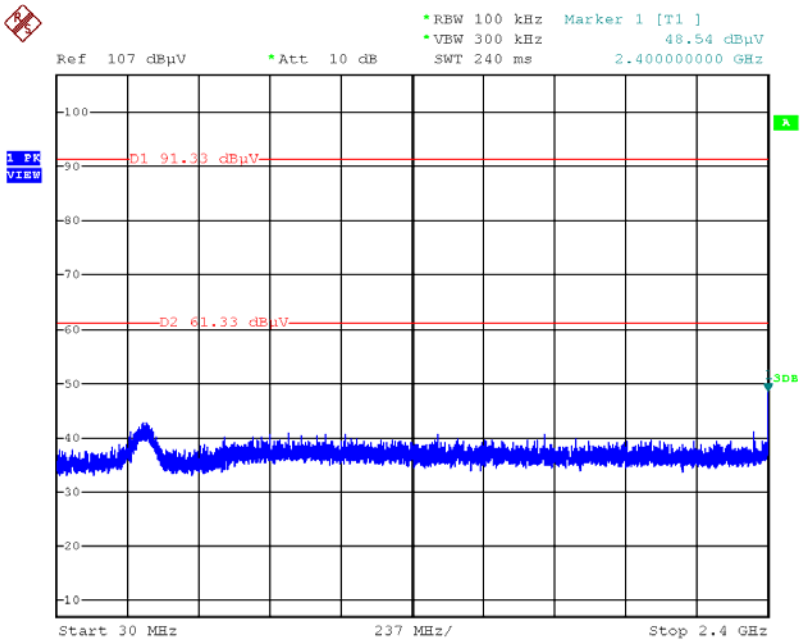
Date: 21.MAY.2013 11:28:02

Plot on Configuration IEEE 802.11b / Reference Level



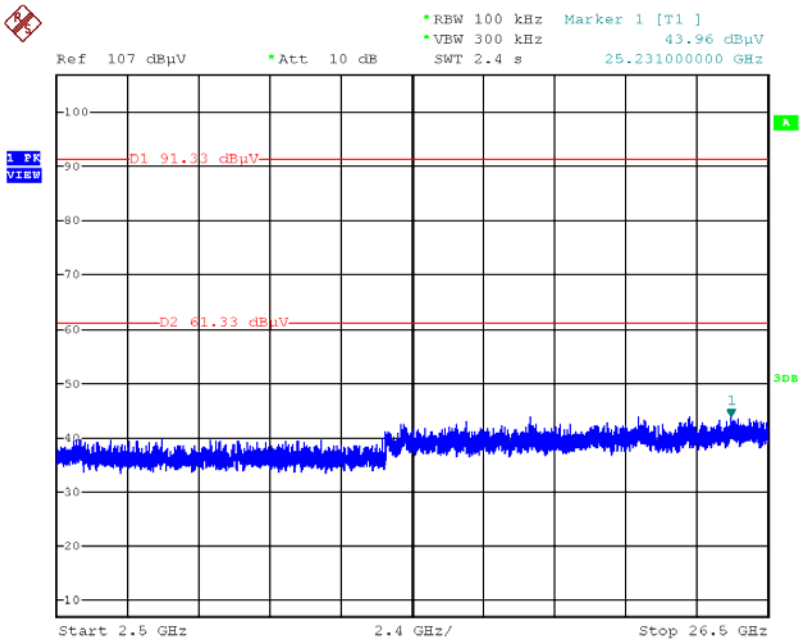
Date: 21.MAY.2013 10:02:23

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



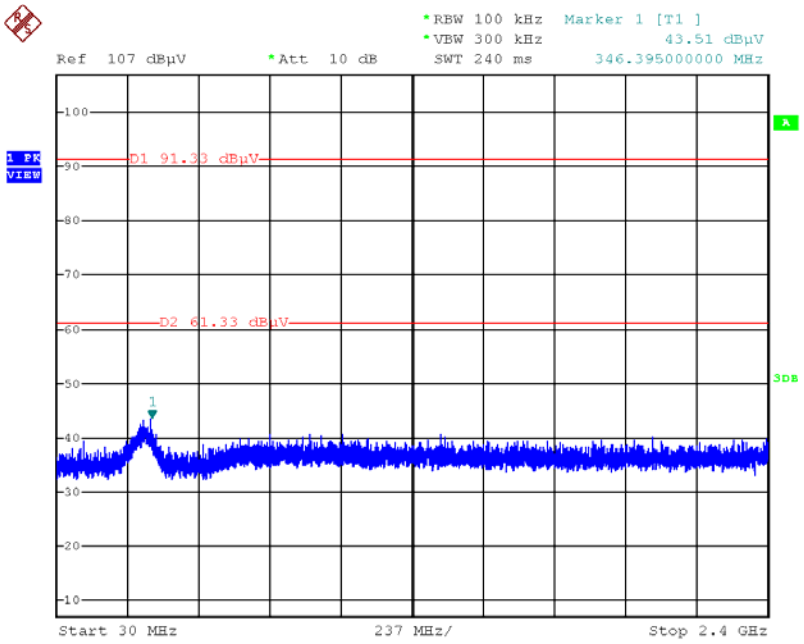
Date: 21.MAY.2013 11:06:25

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



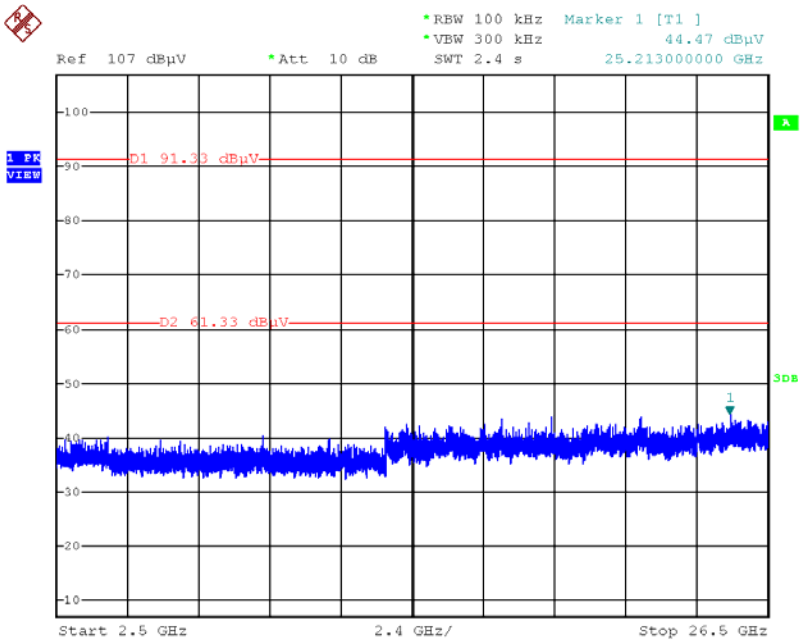
Date: 21.MAY.2013 11:07:16

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



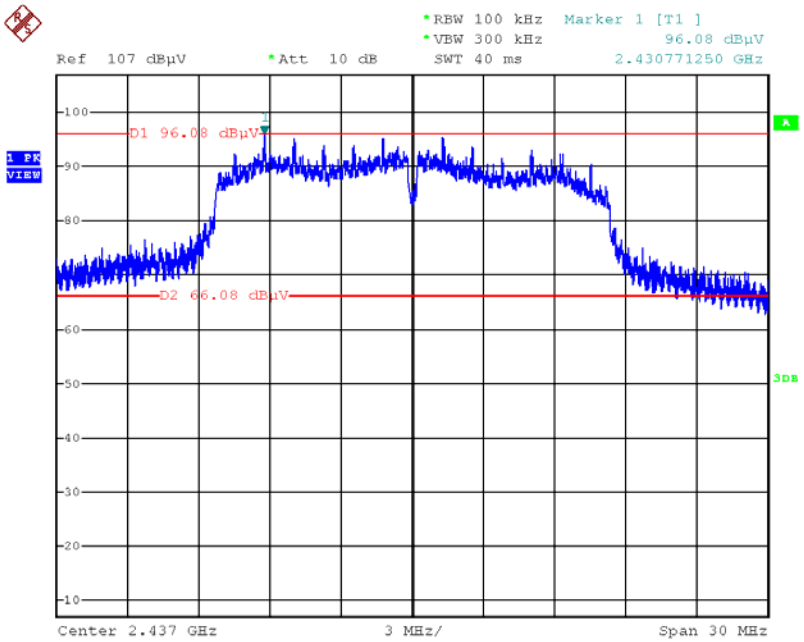
Date: 21.MAY.2013 11:08:46

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



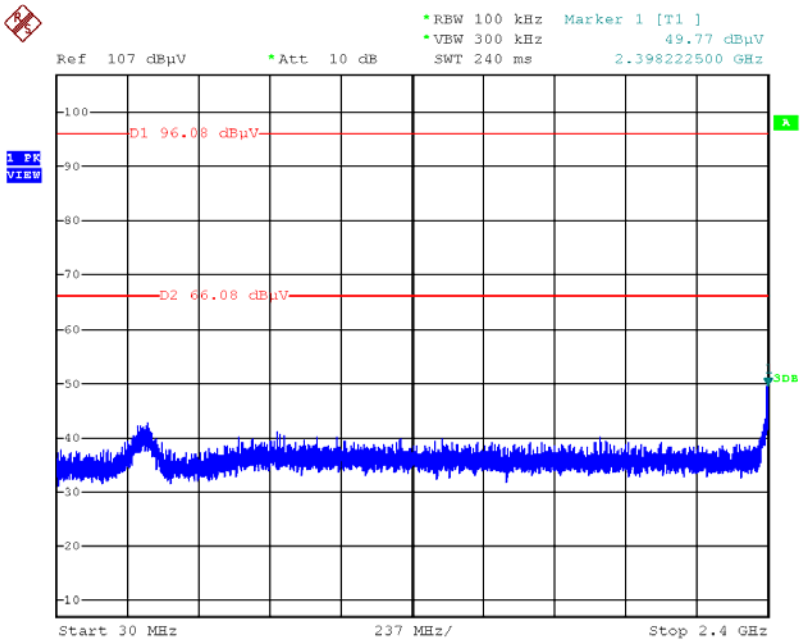
Date: 21.MAY.2013 11:08:04

Plot on Configuration IEEE 802.11g / Reference Level



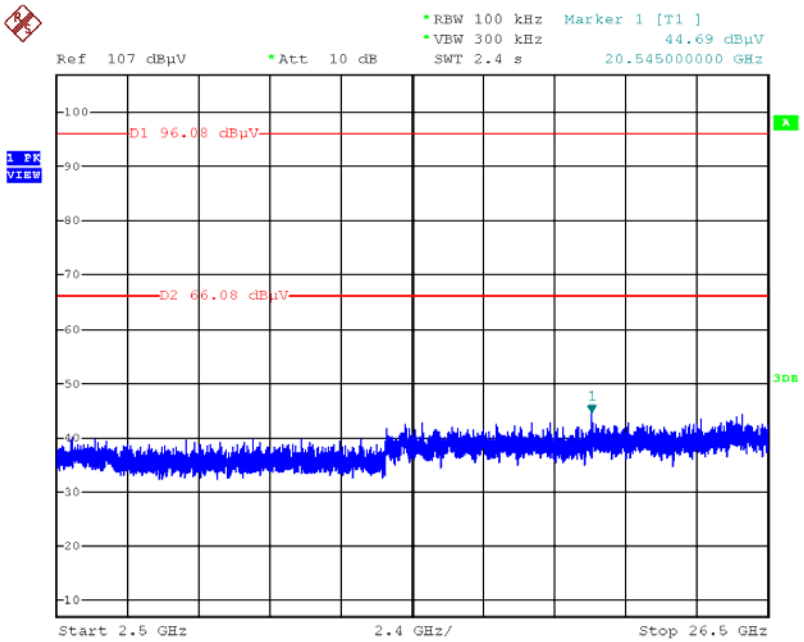
Date: 21.MAY.2013 11:10:46

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



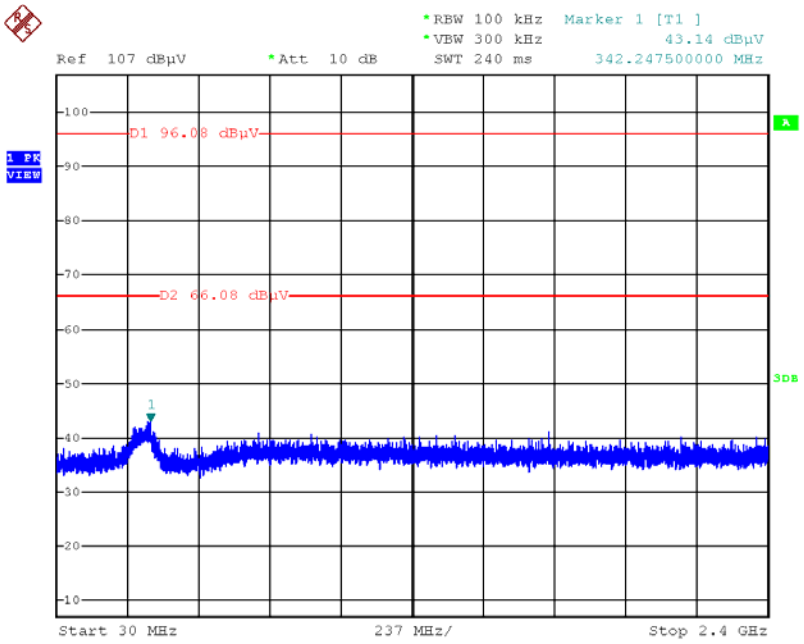
Date: 21.MAY.2013 11:11:52

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



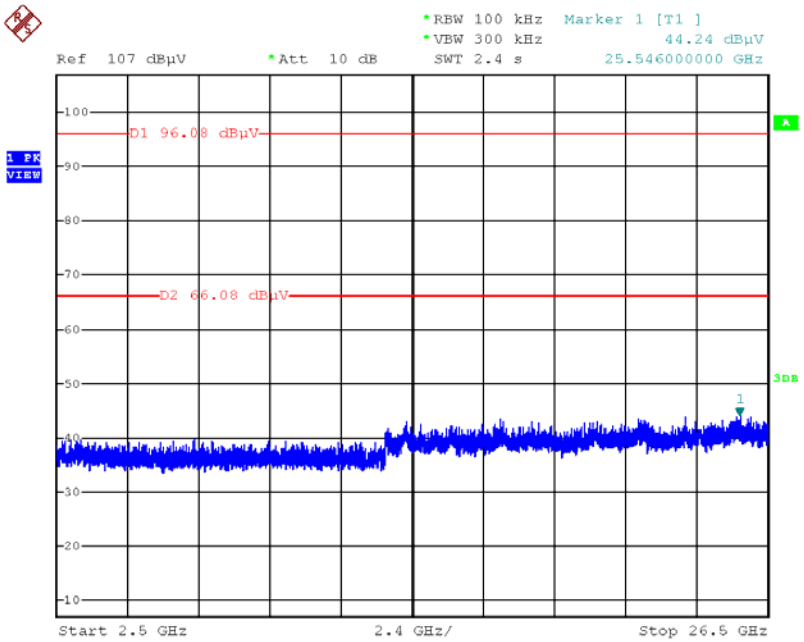
Date: 21.MAY.2013 11:12:26

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



Date: 21.MAY.2013 11:14:08

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



Date: 21.MAY.2013 11:13:26

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	Apr. 16, 2013	Radiation (03CH01-CB)
Loop Antenna	Teseq	HLA 6120	24155	9 kHz - 30 MHz	Nov. 05, 2012*	Radiation (03CH01-CB)
Horn Antenna	EMCO	3115	00075790	750MHz~18GHz	Nov. 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	Apr. 15, 2013	Radiation (03CH01-CB)
Turn Table	INN CO	CO 2000	N/A	0 ~ 360 degree	N.C.R	Radiation (03CH01-CB)
Antenna Mast	INN CO	CO2000	N/A	1 m - 4 m	N.C.R	Radiation (03CH01-CB)
RF Cable-low	Woken	Low Cable-1	N/A	30 MHz - 1 GHz	Nov. 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)
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)

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Remark
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., Neihu Chiu, Taipei, Taiwan 114, R.O.C.
	TEL	:	886-2-2631-4739
	FAX	:	886-2-2631-9740
JUNGHE	ADD	:	7Fl., No. 758, Jungjeng Rd., Junghe City, Taipei, Taiwan 235, R.O.C.
	TEL	:	886-2-8227-2020
	FAX	:	886-2-8227-2626
NEIHU	ADD	:	4Fl., No. 339, Hsin Hu 2nd Rd., Taipei 114, Taiwan, R.O.C.
	TEL	:	886-2-2794-8886
	FAX	:	886-2-2794-9777
JHUBEI	ADD	:	No.8, Lane 724, Bo-ai St., Jhubei City, HsinChu County 302, Taiwan, R.O.C.
	TEL	:	886-3-656-9065
	FAX	:	886-3-656-9085

7. MEASUREMENT UNCERTAINTY

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

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

Uncertainty of Conducted Emission Measurement

Contribution	Uncertainty of x_i			$u(x_i)$
	Value	Unit	Probability Distribution k	
Cable loss	0.038	dB	normal(k=2)	0.019
Attenuator	0.047	dB	normal(k=2)	0.024
Power Meter specification	0.300	dB	normal(k=2)	0.150
Power Sensor specification	0.300	dB	normal(k=2)	0.150
Mismatch Receiver VSWR 1= Antenna VSWR 2= Pre Amplifier VSWR 3=	-0.080	dB	U-shaped	0.060
combined standard uncertainty Ue(y)	0.403			
Measuring uncertainty for a level of confidence of 95% U=2Ue(y)	0.806			

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

Contribution	Uncertainty of x_i			$u(x_i)$
	Value	Unit	Probability Distribution k	
Receiver reading	0.1727	dB	normal(k=1)	0.1727
Cable loss	0.1736	dB	normal(k=2)	0.0868
Antenna gain	0.1687	dB	normal(k=2)	0.0843
Site imperfection	0.4898	dB	Triangular	0.2
Pre-amplifier gain	0.3661	dB	normal(k=2)	0.183
Transmitter antenna	1.7	dB	rectangular	0.9815
Signal generator	0.5	dB	rectangular	0.2887
Mismatch	0.08	dB	u-shape	0.244
Spectrum analyzer	0.5	dB	rectangular	0.2887
combined standard uncertainty Ue(y)	1.1434			
Measuring uncertainty for a level of confidence of 95% U=2Ue(y)	2.2869			

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

Contribution	Uncertainty of x_i			$u(x_i)$
	Value	Unit	Probability Distribution k	
Receiver reading	0.1908	dB	normal(k=1)	0.1908
Cable loss	0.1685	dB	normal(k=2)	0.0843
Antenna gain	0.1912	dB	normal(k=2)	0.0956
Site imperfection	1.3091	dB	Triangular	0.5344
Pre-amplifier gain	0.3043	dB	normal(k=2)	0.1521
Transmitter antenna	1.7	dB	rectangular	0.9815
Signal generator	0.5	dB	rectangular	0.2887
Mismatch	0.08	dB	u-shape	0.244
Spectrum analyzer	0.8	dB	rectangular	0.4619
combined standard uncertainty Ue(y)	1.2965			
Measuring uncertainty for a level of confidence of 95% U=2Ue(y)	2.593			

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

Contribution	Uncertainty of x_i			$u(x_i)$
	Value	Unit	Probability Distribution k	
Receiver reading	0.1864	dB	normal(k=1)	0.1864
Cable loss	0.1666	dB	normal(k=2)	0.0833
Antenna gain	0.1904	dB	normal(k=2)	0.0952
Site imperfection	0.4882	dB	Triangular	0.1993
Pre-amplifier gain	0.2688	dB	normal(k=2)	0.1344
Transmitter antenna	1.7	dB	rectangular	0.9815
Signal generator	0.5	dB	rectangular	0.2887
Mismatch	0.08	dB	u-shape	0.244
Spectrum analyzer	0.8	dB	rectangular	0.4619
combined standard uncertainty Ue(y)	1.1874			
Measuring uncertainty for a level of confidence of 95% U=2Ue(y)	2.3749			