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FCC RADIO TEST REPORT

Applicant's company	SEIKO EPSON CORPORATION
Applicant Address	3-3-5 Owa Suwa-shi Nagano-Ken 392-8502, Japan
FCC ID	BKMAE-7522
Manufacturer's company	Arcadyan Technology Corporation
Manufacturer Address	4F, No. 9, Park Ave II -Science Based Ind. Park Hsinchu Taiwan

Product Name	ELPAP10
Brand Name	EPSON
Model No.	WN7522BEP
Test Rule	47 CFR FCC Part 15 Subpart C § 15.247
Test Freq. Range	2400 ~ 2483.5MHz
Received Date	Oct. 20, 2014
Final Test Date	Nov. 24, 2014
Submission Type	Original Equipment

Statement

Test result included in this report is for the IEEE 802.11n and IEEE 802.11b/g 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 C63.10-2013, 47 CFR FCC Part 15 Subpart C, KDB 558074 D01 v03r02 and KDB 662911 D01 v02r01.

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



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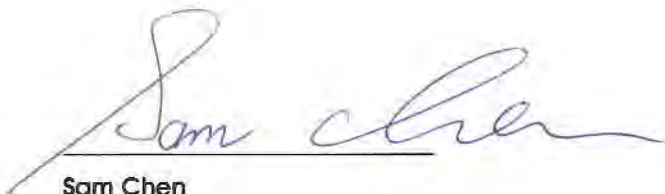
History of This Test Report

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FR4O2011	Rev. 01	Initial issue of report	Dec. 03, 2014

1. CERTIFICATE OF COMPLIANCE

Product Name : ELPAP10
Brand Name : EPSON
Model No. : WN7522BEP
Applicant : SEIKO EPSON 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 Oct. 20, 2014 would like to declare that the tested sample has been evaluated and found to be in compliance with the tested rule parts. The data recorded as well as the test configuration specified is true and accurate for showing the sample's EMC nature.



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	15.11 dB
4.2	15.247(b)(3)	Maximum Conducted Output Power	Complies	11.02 dB
4.3	15.247(e)	Power Spectral Density	Complies	0.209 dB
4.4	15.247(a)(2)	6dB Spectrum Bandwidth	Complies	-
4.5	15.247(d)	Radiated Emissions	Complies	3.35 dB
4.6	15.247(d)	Band Edge Emissions	Complies	0.03 dB
4.7	15.203	Antenna Requirements	Complies	-

Note 1: The EUT can only operate with EPSON Projector.

Note 2: The EUT only supports 20MHz.

3. GENERAL INFORMATION

3.1. Product Details

IEEE 802.11n

Items	Description
Product Type	WLAN (2TX, 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
Channel Number	13 for 20MHz bandwidth
Channel Band Width (99%)	MCS0 (HT20): 17.80 MHz
Maximum Conducted Output Power	MCS0 (HT20): 18.98 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 (2TX, 2RX)
Radio Type	Intentional Transceiver
Power Type	From host system
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	13
Channel Band Width (99%)	11b: 14.37 MHz ; 11g: 16.98 MHz
Maximum Conducted Output Power	11b: 18.84 dBm ; 11g: 18.97 dBm
Carrier Frequencies	Please refer to section 3.4
Antenna	Please refer to section 3.3

Items	Description	
Beamforming Function	☐ With beamforming	☒ Without beamforming

Antenna and Band width

Antenna	Two (TX)
Band width Mode	20 MHz
IEEE 802.11b	V
IEEE 802.11g	V
IEEE 802.11n	V

Note: The EUT only supports 20MHz.

IEEE 11n Spec.

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

3.2. Accessories

N/A

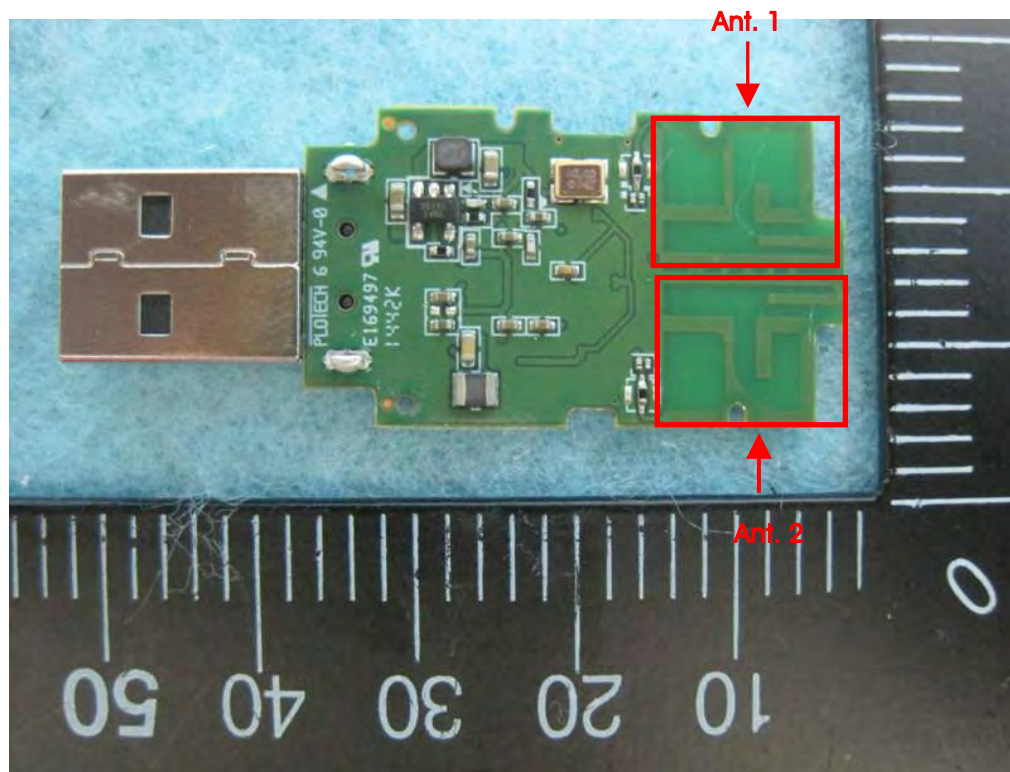
3.3. Table for Filed Antenna

Ant.	Brand	Model Name	Antenna Type	Connector	Gain (dBi)
1	Arcadyan	WN7522B-LF-PE R0A	Printed Antenna	N/A	-1.36
2	Arcadyan	WN7522B-LF-PE R0A	Printed Antenna	N/A	-1.13

Note:

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

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



3.4. Table for Carrier Frequencies

There is one bandwidth system.

For 20MHz bandwidth systems, use Channel 1~Channel 13.

Frequency Band	Channel No.	Frequency	Channel No.	Frequency
2400~2483.5MHz	1	2412 MHz	8	2447 MHz
	2	2417 MHz	9	2452 MHz
	3	2422 MHz	10	2457 MHz
	4	2427 MHz	11	2462 MHz
	5	2432 MHz	12	2467 MHz
	6	2437 MHz	13	2472 MHz
	7	2442 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	Antenna
AC Power Line Conducted Emissions	Normal Link	-	-	-
Maximum Conducted Output Power	802.11n HT20	MCS0	1/6/11/12/13	1+2
	11b/BPSK	1 Mbps	1/6/11/12/13	1+2
	11g/BPSK	6 Mbps	1/6/11/12/13	1+2
Power Spectral Density	802.11n HT20	MCS0	1/6/11/12/13	1+2
	11b/BPSK	1 Mbps	1/6/11/12/13	1+2
	11g/BPSK	6 Mbps	1/6/11/12/13	1+2
6dB Spectrum Bandwidth	802.11n HT20	MCS0	1/6/11/12/13	1+2
	11b/BPSK	1 Mbps	1/6/11/12/13	1+2
	11g/BPSK	6 Mbps	1/6/11/12/13	1+2
Radiated Emissions 9kHz~1GHz	Normal Link	-	-	-
Radiated Emissions 1GHz~10 th Harmonic	802.11n HT20	MCS0	1/6/11/12/13	1+2
	11b/BPSK	1 Mbps	1/6/11/12/13	1+2
	11g/BPSK	6 Mbps	1/6/11/12/13	1+2
Band Edge Emissions	802.11n HT20	MCS0	1/6/11/12/13	1+2
	11b/BPSK	1 Mbps	1/6/11/12/13	1+2
	11g/BPSK	6 Mbps	1/6/11/12/13	1+2

The following test modes were performed for all tests:

For Conducted Emission and Radiated Emission <below 1GHz>test:

Mode 1. Normal Link

For Radiated Emission <above 1GHz>test:

Mode 1. Place EUT in X axis

Mode 2. Place EUT in Y axis

Mode 3. Place EUT in Z axis

Mode 3 is the worst case, so it was selected to record in this test report.

3.6. Table for Testing Locations

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

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

3.7. Table for Supporting Units

For Test Site No: 03CH01-CB <below 1GHz>

Support Unit	Brand	Model	FCC ID
NB	HP	ProBook 4420s	QDS-BRCM1043
Mouse	ASUS	M-U0005	DoC
Earphone	E-BOOKI	E-EPC040	DoC
Wireless AP	BELKIN	WG7117F22	DoC
NB	DELL	E6430	DoC

For Test Site No: 03CH01-CB <above 1GHz>

Support Unit	Brand	Model	FCC ID
NB	HP	ProBook 4420s	QDS-BRCM1043

For Test Site No: CO01-CB

Support Unit	Brand	Model	FCC ID
AP Router	Planex	GW-AP54SGX	KA220030603014-1
NB	DELL	E6430	DoC
Mouse	HP	FM100	DoC
Earphone	SHYARO CHI	MIC-04	N/A
NB	HP	4420S	DoC

For Test Site No: TH01-CB

Support Unit	Brand	Model	FCC ID
NB	DELL	E6220	DoC

3.8. Table for Parameters of Test Software Setting

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

Power Parameters of IEEE 802.11n

Test Software Version	QA Tool				
Frequency	2412 MHz	2437 MHz	2462 MHz	2467 MHz	2472 MHz
MCS0 HT20	1F	1F	1F	19	14

Power Parameters of IEEE 802.11b/g

Test Software Version	QA Tool				
Frequency	2412 MHz	2437 MHz	2462 MHz	2467 MHz	2472 MHz
IEEE 802.11b	1D	1D	1D	1D	14
IEEE 802.11g	1F	1F	1F	19	15

3.9. EUT Operation during Test

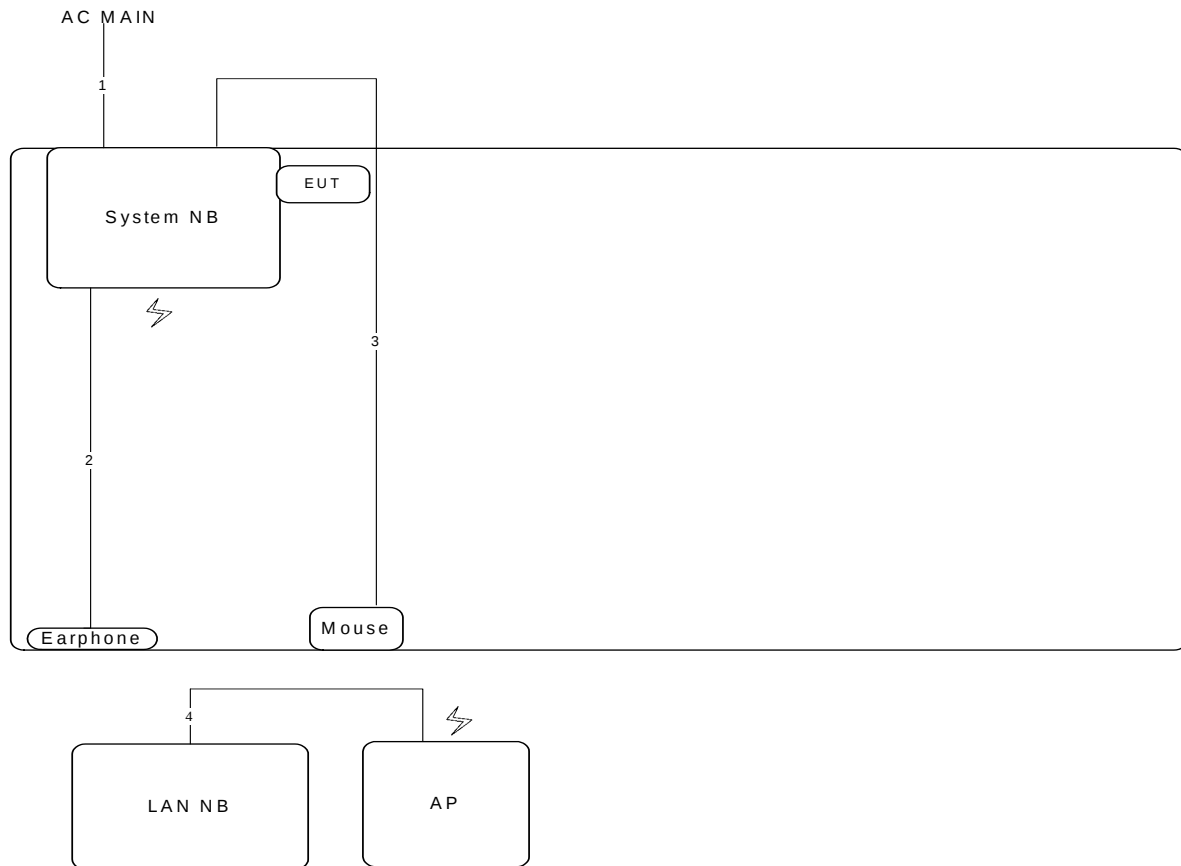
The EUT was programmed to be in continuously transmitting mode.

3.10. Duty Cycle

Mode	On Time (ms)	On+Off Time (ms)	Duty Cycle (%)	Duty Factor (dB)	1/T Minimum VBW (kHz)
802.11n MCS0 HT20	1.297	1.457	89.05%	0.50	0.77
802.11b	8.435	8.580	98.31%	0.07	0.01
802.11g	1.384	1.543	89.67%	0.47	0.72

3.11. Test Configurations

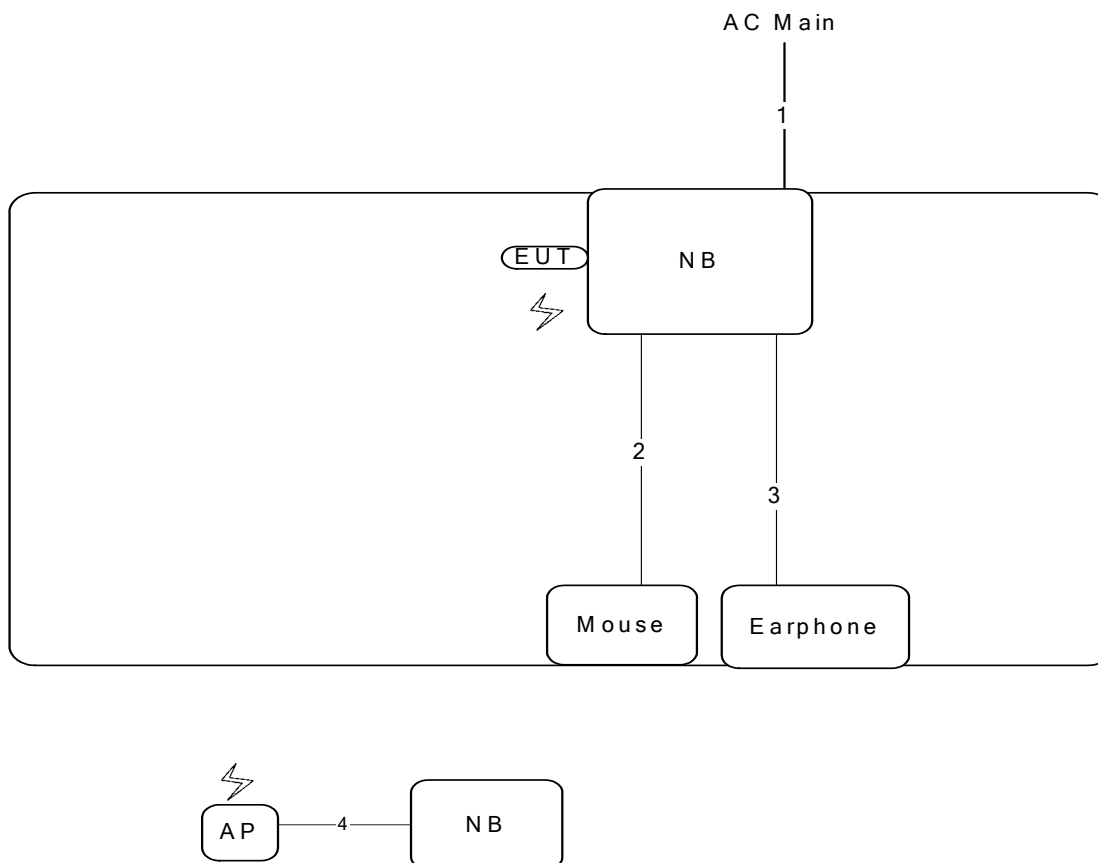
3.11.1. AC Power Line Conduction Emissions Test Configuration



Item	Connection	Shielded	Length
1	Power cable	No	2.6m
2	Audio cable	No	1.1m
3	USB cable	Yes	1.8m
4	RJ-45 cable	No	1.5m

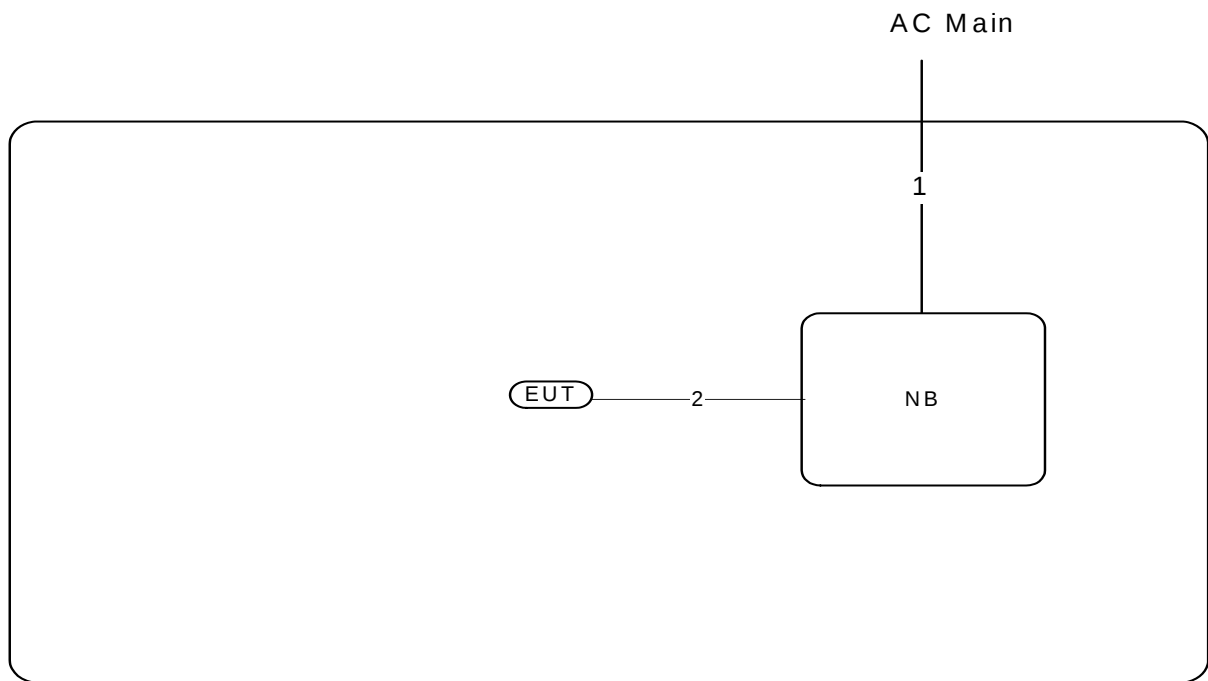
3.11.2. Radiation Emissions Test Configuration

Test Configuration: 30MHz~1GHz



Item	Connection	Shielded	Length
1	AC power cable	No	2.6m
2	USB Cable	Yes	1.8m
3	Audio Cable	No	1.5m
4	RJ-45 Cable	No	1.5m

Test Configuration: above 1GHz



Item	Connection	Shielded	Length
1	Power cable	No	2.6m
2	USB Cable	Yes	1.5m

4. TEST RESULT

4.1. AC Power Line Conducted Emissions Measurement

4.1.1. Limit

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

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

4.1.2. Measuring Instruments and Setting

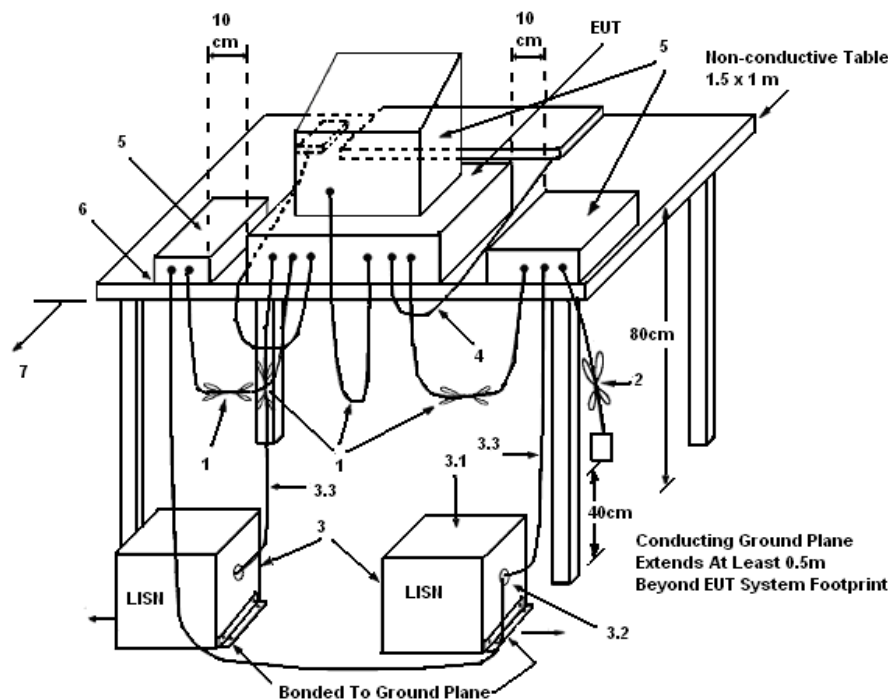
Please refer to section 5 of equipments list in this report. The following table is the setting of the receiver.

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

4.1.3. Test Procedures

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

4.1.4. Test Setup Layout



LEGEND:

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

4.1.5. Test Deviation

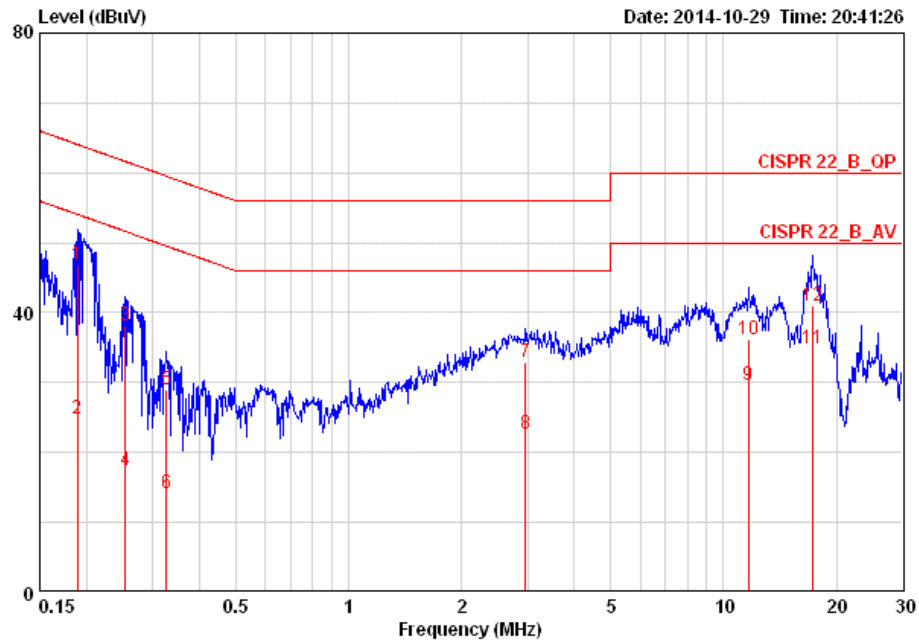
There is no deviation with the original standard.

4.1.6. EUT Operation during Test

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

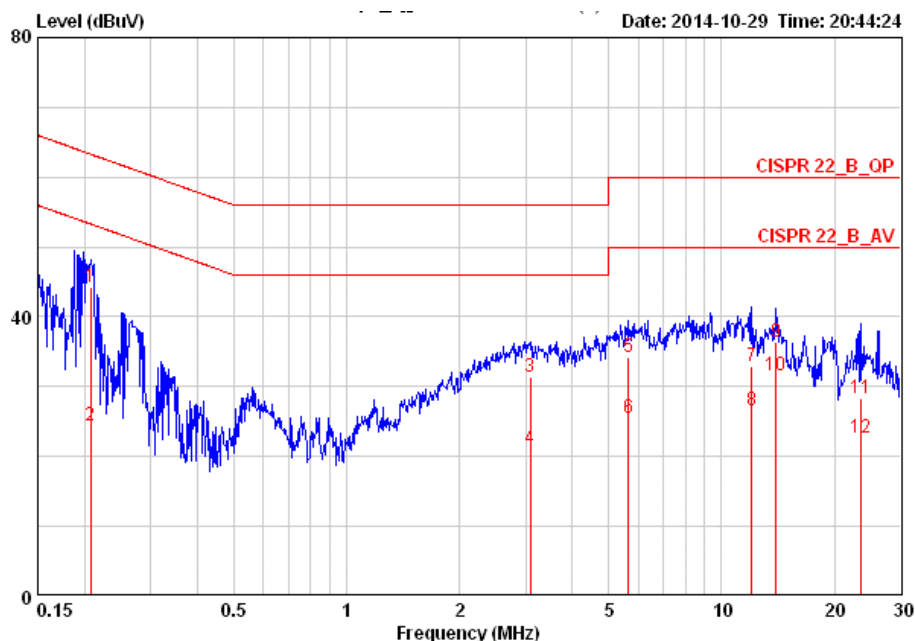
4.1.7. Results of AC Power Line Conducted Emissions Measurement

Temperature	25°C	Humidity	55%
Test Engineer	Hank Huang	Phase	Line
Configuration	Normal Link		



	Freq	Level	Over	Limit	LISN	Read	Cable	Pol/Phase	Remark
	MHz	dBuV	Limit	Line	Factor	Level	Loss		
			dB	dBuV	dB	dBuV	dB		
1	0.18938	46.85	-17.21	64.06	9.96	36.73	0.16	LINE	QP
2	0.18938	24.89	-29.17	54.06	9.96	14.77	0.16	LINE	AVERAGE
3	0.25345	38.06	-23.59	61.64	9.96	27.93	0.17	LINE	QP
4	0.25345	17.37	-34.28	51.64	9.96	7.24	0.17	LINE	AVERAGE
5	0.32685	28.96	-30.57	59.53	9.95	18.83	0.18	LINE	QP
6	0.32685	14.19	-35.34	49.53	9.95	4.06	0.18	LINE	AVERAGE
7	2.962	32.82	-23.18	56.00	10.05	22.49	0.28	LINE	QP
8	2.962	22.76	-23.24	46.00	10.05	12.43	0.28	LINE	AVERAGE
9	11.621	29.71	-20.29	50.00	10.26	19.05	0.40	LINE	AVERAGE
10	11.621	36.19	-23.81	60.00	10.26	25.53	0.40	LINE	QP
11	17.291	34.89	-15.11	50.00	10.38	24.03	0.48	LINE	AVERAGE
12	17.291	41.08	-18.92	60.00	10.38	30.22	0.48	LINE	QP

Temperature	25°C	Humidity	55%
Test Engineer	Hank Huang	Phase	Neutral
Configuration	Normal Link		



	Freq	Level	Over Limit	Limit Line	LISN Factor	Read Level	Cable Loss	Pol/Phase	Remark
	MHz	dBuV	dB	dBuV	dB	dBuV	dB		
1	0.20723	44.23	-19.09	63.32	9.95	34.11	0.17	NEUTRAL	QP
2	0.20723	24.45	-28.87	53.32	9.95	14.33	0.17	NEUTRAL	AVERAGE
3	3.090	31.38	-24.62	56.00	10.04	21.06	0.28	NEUTRAL	QP
4	3.090	21.15	-24.85	46.00	10.04	10.83	0.28	NEUTRAL	AVERAGE
5	5.653	34.15	-25.85	60.00	10.11	23.71	0.33	NEUTRAL	QP
6	5.653	25.54	-24.46	50.00	10.11	15.10	0.33	NEUTRAL	AVERAGE
7	12.060	32.97	-27.03	60.00	10.25	22.32	0.40	NEUTRAL	QP
8	12.060	26.50	-23.50	50.00	10.25	15.85	0.40	NEUTRAL	AVERAGE
9	13.989	36.35	-23.65	60.00	10.29	25.63	0.43	NEUTRAL	QP
10	13.989	31.60	-18.40	50.00	10.29	20.88	0.43	NEUTRAL	AVERAGE
11	23.511	28.29	-31.71	60.00	10.43	17.31	0.56	NEUTRAL	QP
12	23.511	22.68	-27.32	50.00	10.43	11.70	0.56	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

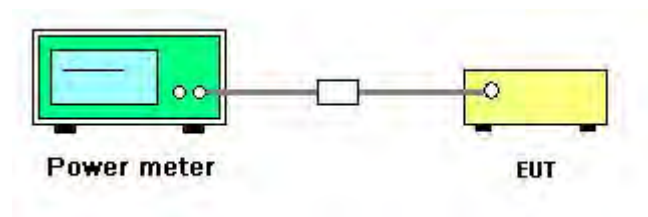
Please refer to section 5 of equipments list in this report. The following table is the setting of the power meter.

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 v03r02 section 9.2.3.2 Measurement using a power meter (PM).
2. Multiple antenna systems was performed in accordance with KDB 662911 D01 v02r01 Emissions Testing of Transmitters with Multiple Outputs in the Same Band.
3. 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	26°C	Humidity	63%
Test Engineer	Nick Peng	Configurations	IEEE 802.11n
Test Date	Nov. 12, 2014		

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

Channel	Frequency	Conducted Power (dBm)			Max. Limit (dBm)	Result
		Ant. 1	Ant. 2	Total		
1	2412 MHz	15.43	16.36	18.93	30.00	Complies
6	2437 MHz	15.46	16.42	18.98	30.00	Complies
11	2462 MHz	15.38	16.30	18.87	30.00	Complies
12	2467 MHz	12.61	14.09	16.42	30.00	Complies
13	2472 MHz	10.02	11.78	14.00	30.00	Complies

Temperature	26°C	Humidity	63%
Test Engineer	Nick Peng	Configurations	IEEE 802.11b/g
Test Date	Nov. 12, 2014		

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

Channel	Frequency	Conducted Power (dBm)			Max. Limit (dBm)	Result
		Ant. 1	Ant. 2	Total		
1	2412 MHz	15.24	16.34	18.84	30.00	Complies
6	2437 MHz	15.29	16.21	18.78	30.00	Complies
11	2462 MHz	15.23	16.22	18.76	30.00	Complies
12	2467 MHz	15.34	16.25	18.83	30.00	Complies
13	2472 MHz	10.72	13.25	15.18	30.00	Complies

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

Channel	Frequency	Conducted Power (dBm)			Max. Limit (dBm)	Result
		Ant. 1	Ant. 2	Total		
1	2412 MHz	15.39	16.42	18.95	30.00	Complies
6	2437 MHz	15.43	16.43	18.97	30.00	Complies
11	2462 MHz	15.33	16.39	18.90	30.00	Complies
12	2467 MHz	12.77	14.12	16.51	30.00	Complies
13	2472 MHz	10.75	12.16	14.52	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

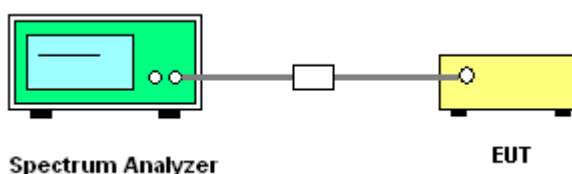
Please refer to section 5 of equipments list in this report. The following table is the setting of the spectrum analyzer.

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

4.3.3. Test Procedures

1. Test was performed in accordance with KDB 558074 D01 v03r02 for Performing Compliance Measurements on Digital Transmission Systems (DTS) - section 10.2 Method PKPSD (peak PSD) and KDB 662911 D01 v02r01 section In-Band Power Spectral Density (PSD) Measurements option (b) Measure and sum spectral maximal across the outputs.
2. Use this procedure when the maximum conducted output power in the fundamental emission is used to demonstrate compliance. The EUT must be configured to transmit continuously at full power over the measurement duration.
3. Ensure that the number of measurement points in the sweep $\geq 2 \times \text{span/RBW}$ (use of a greater number of measurement points than this minimum requirement is recommended).
4. Use the peak marker function to determine the maximum level in any 3 kHz band segment within the fundamental EBW.
5. The resulting PSD level must be $\leq 8 \text{ dBm}$.

4.3.4. Test Setup Layout



4.3.5. Test Deviation

There is no deviation with the original standard.

4.3.6. EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

4.3.7. Test Result of Power Spectral Density

Temperature	26°C	Humidity	63%
Test Engineer	Nick Peng	Configurations	IEEE 802.11n

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

Channel	Frequency	Power Density (dBm/3kHz)			Power Density Limit (dBm/3kHz)	Result
		Ant. 1	Ant. 2	Total		
1	2412 MHz	-10.40	-9.54	-6.94	8.00	Complies
6	2437 MHz	-11.12	-9.23	-7.06	8.00	Complies
11	2462 MHz	-10.93	-8.55	-6.57	8.00	Complies
12	2467 MHz	-14.88	-12.43	-10.47	8.00	Complies
13	2472 MHz	-16.36	-15.45	-12.87	8.00	Complies

Temperature	26°C	Humidity	63%
Test Engineer	Nick Peng	Configurations	IEEE 802.11b/g

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

Channel	Frequency	Power Density (dBm/3kHz)			Power Density Limit (dBm/3kHz)	Result
		Ant. 1	Ant. 2	Total		
1	2412 MHz	4.40	5.13	7.79	8.00	Complies
6	2437 MHz	4.35	4.38	7.38	8.00	Complies
11	2462 MHz	3.99	4.44	7.23	8.00	Complies
12	2467 MHz	4.19	2.99	6.64	8.00	Complies
13	2472 MHz	-1.52	-1.35	1.58	8.00	Complies

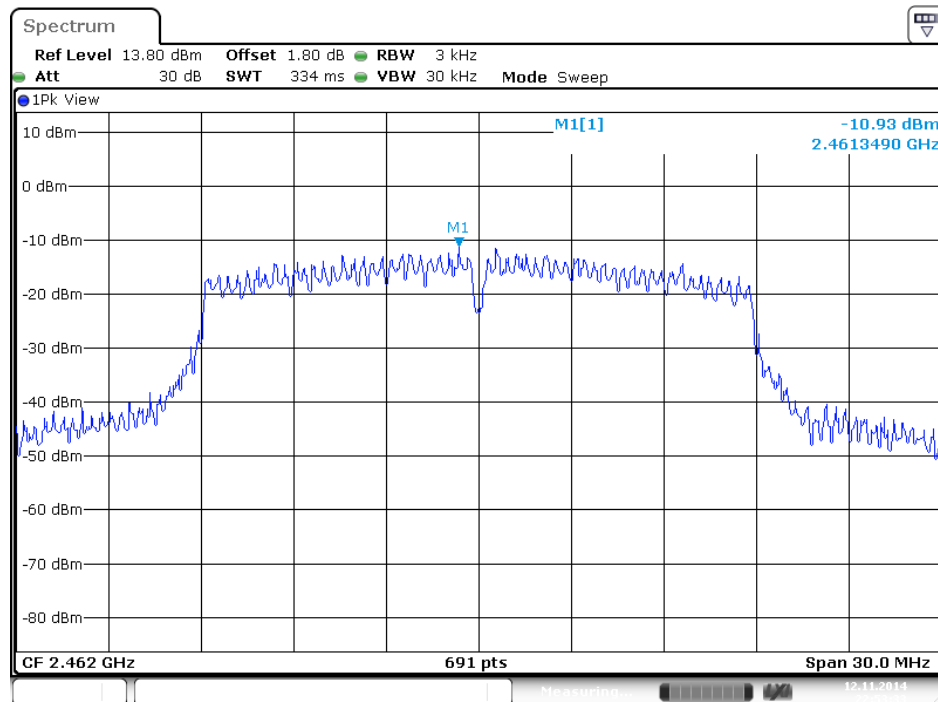
Configuration IEEE 802.11g / Ant. 1 + Ant. 2

Channel	Frequency	Power Density (dBm/3kHz)			Power Density Limit (dBm/3kHz)	Result
		Ant. 1	Ant. 2	Total		
1	2412 MHz	-11.13	-10.44	-7.76	8.00	Complies
6	2437 MHz	-9.81	-9.93	-6.86	8.00	Complies
11	2462 MHz	-8.40	-9.04	-5.74	8.00	Complies
12	2467 MHz	-13.68	-12.85	-10.23	8.00	Complies
13	2472 MHz	-16.43	-15.26	-12.80	8.00	Complies

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

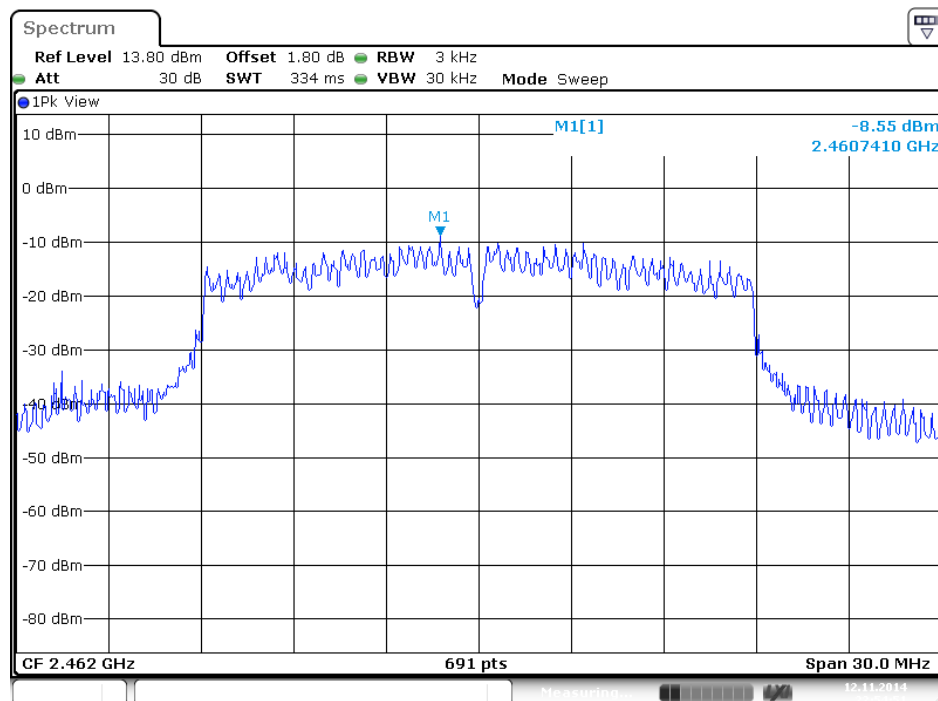
For plots, only the channel with worse result was shown.

Power Density Plot on Configuration IEEE 802.11n MCS0 HT20 / 2462 MHz / Ant. 1



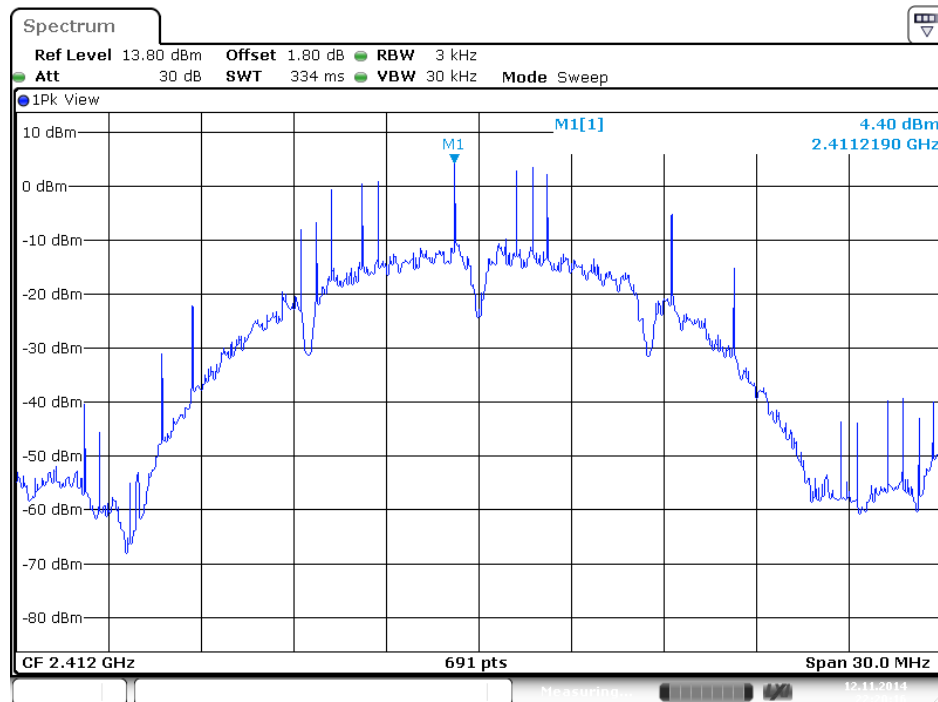
Date: 12.NOV.2014 22:53:33

Power Density Plot on Configuration IEEE 802.11n MCS0 HT20 / 2462MHz / Ant. 2



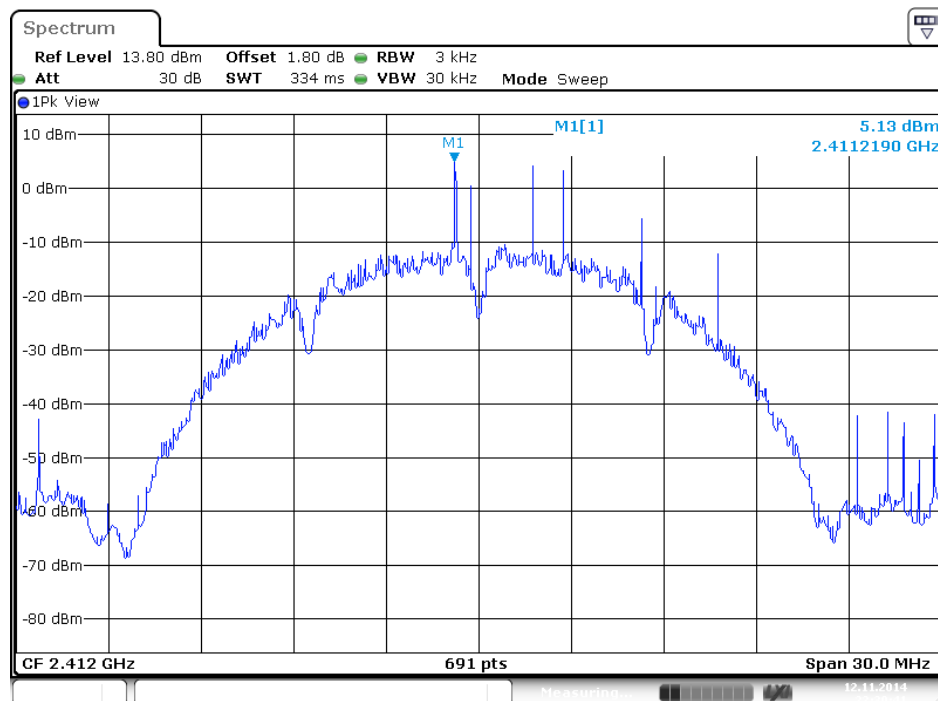
Date: 12.NOV.2014 22:54:51

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



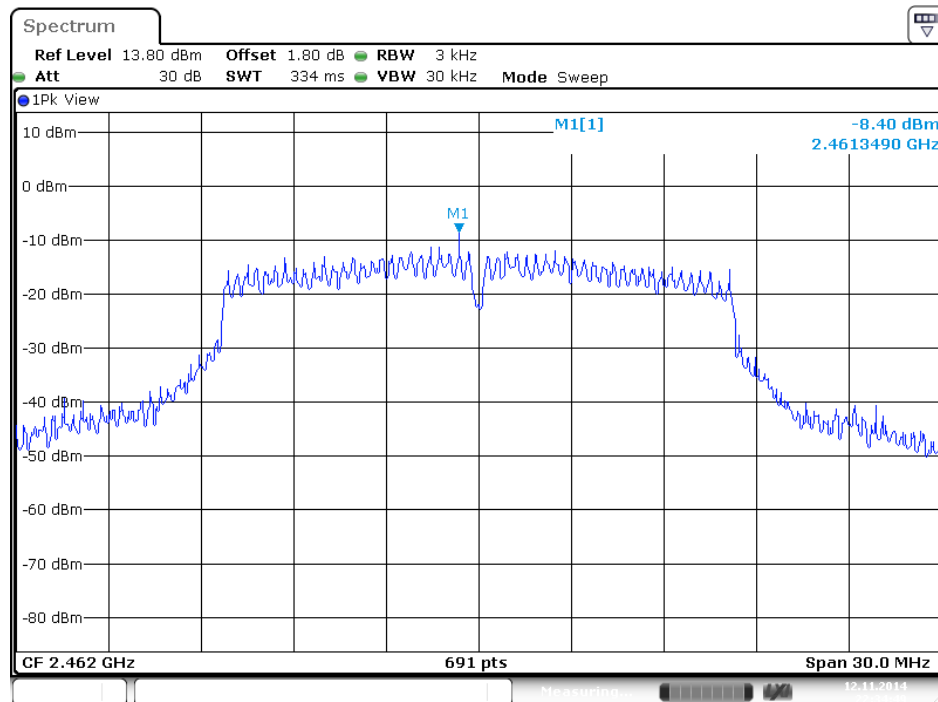
Date: 12.NOV.2014 22:20:16

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



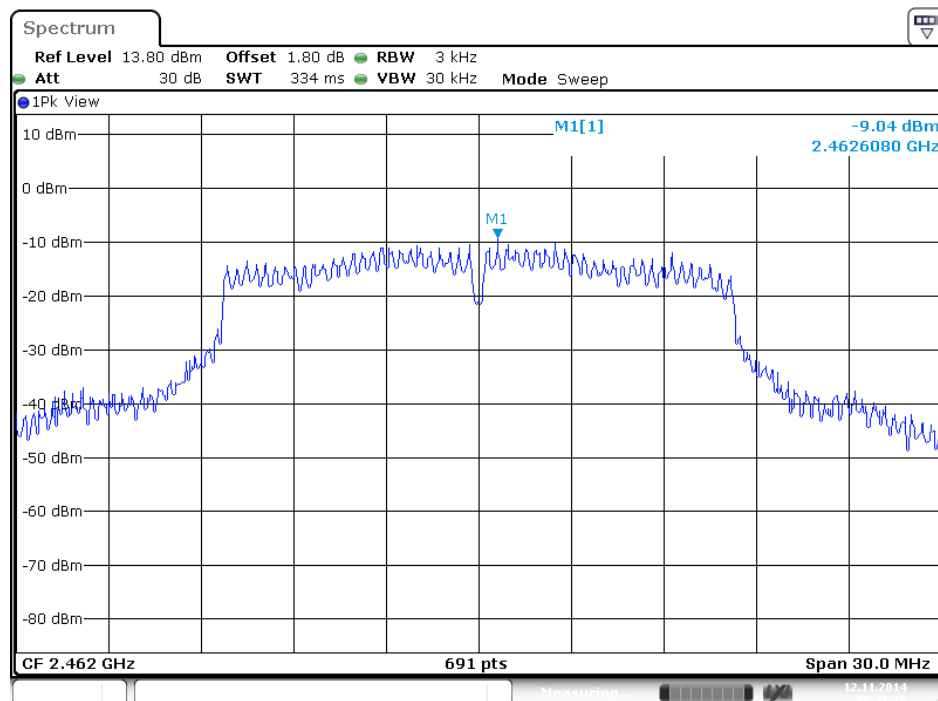
Date: 12.NOV.2014 22:30:41

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



Date: 12.NOV.2014 22:34:49

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



Date: 12.NOV.2014 22:41:16

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	$\geq 3 \times \text{RBW}$
Detector	Peak
Trace	Max Hold
Sweep Time	Auto

4.4.3. Test Procedures

For Radiated 6dB Bandwidth Measurement:

1. The transmitter was radiated to the spectrum analyzer in peak hold mode.
2. Test was performed in accordance with KDB 558074 D01 v03r02 for Performing Compliance Measurements on Digital Transmission Systems (DTS) - section 8.0 DTS bandwidth=> 8.1 Option 1.
3. Multiple antenna system was performed in accordance with KDB 662911 D01 v02r01 Emissions Testing of Transmitters with Multiple Outputs in the Same Band.
4. Measured the spectrum width with power higher than 6dB below carrier.

4.4.4. Test Setup Layout

For Radiated 6dB Bandwidth Measurement:

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

4.4.5. Test Deviation

There is no deviation with the original standard.

4.4.6. EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

4.4.7. Test Result of 6dB Spectrum Bandwidth

Temperature	26°C	Humidity	63%
Test Engineer	Nick Peng	Configurations	IEEE 802.11n

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

Channel	Frequency	6dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)	Min. Limit (kHz)	Test Result
1	2412 MHz	15.13	17.76	500	Complies
6	2437 MHz	15.01	17.80	500	Complies
11	2462 MHz	15.13	17.76	500	Complies
12	2467 MHz	15.07	17.67	500	Complies
13	2472 MHz	15.07	17.67	500	Complies

Temperature	26°C	Humidity	63%
Test Engineer	Nick Peng	Configurations	IEEE 802.11b/g

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

Channel	Frequency	6dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)	Min. Limit (kHz)	Test Result
1	2412 MHz	9.57	14.37	500	Complies
6	2437 MHz	9.57	14.37	500	Complies
11	2462 MHz	10.03	14.33	500	Complies
12	2467 MHz	9.57	14.20	500	Complies
13	2472 MHz	9.57	14.24	500	Complies

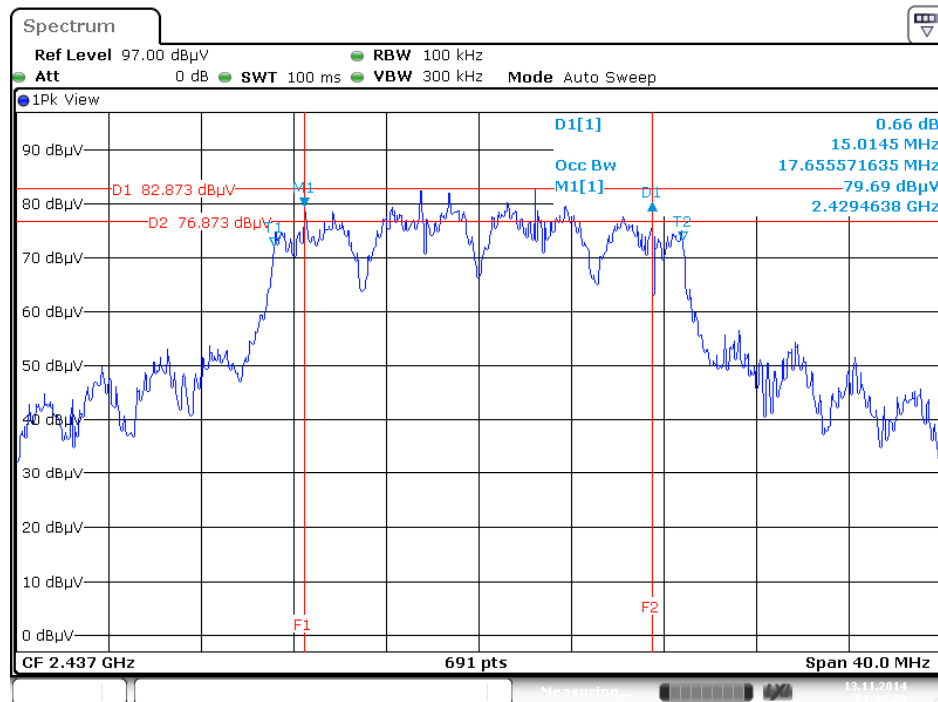
Configuration IEEE 802.11g / Ant. 1 + Ant. 2

Channel	Frequency	6dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)	Min. Limit (kHz)	Test Result
1	2412 MHz	15.07	16.93	500	Complies
6	2437 MHz	15.13	16.93	500	Complies
11	2462 MHz	15.07	16.93	500	Complies
12	2467 MHz	15.01	16.93	500	Complies
13	2472 MHz	15.07	16.98	500	Complies

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

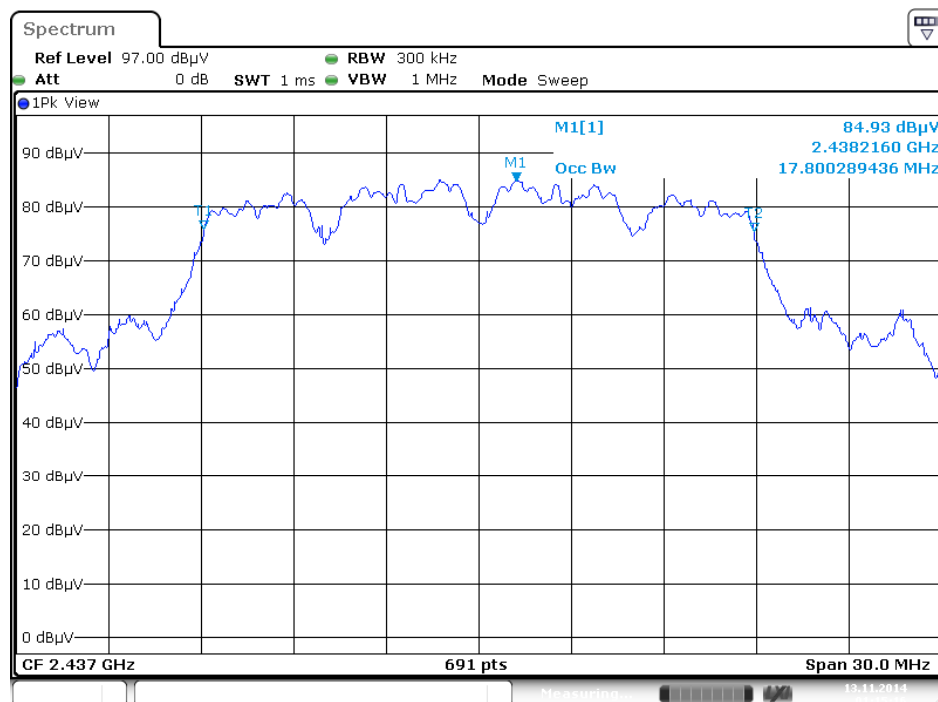
For plots, only the channel with worse result was shown.

6 dB Bandwidth Plot on Configuration IEEE 802.11n MCS0 HT20 / 2437 MHz / Ant. 1 + Ant. 2



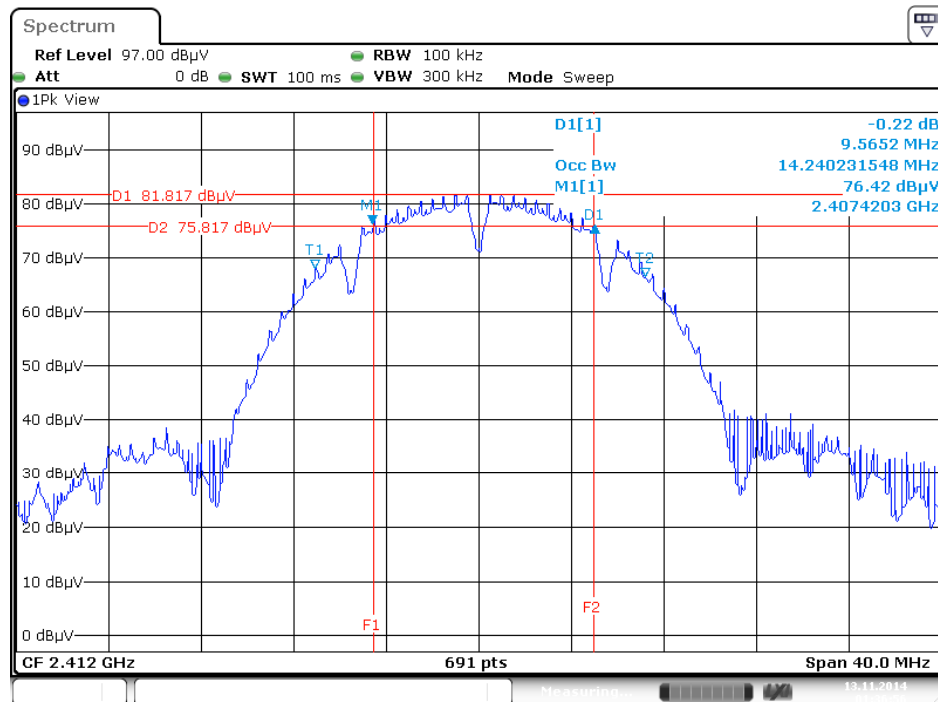
Date: 13.NOV.2014 01:02:23

99% Occupied Bandwidth Plot on Configuration IEEE 802.11n MCS0 HT20 / 2437 MHz / Ant. 1 + Ant. 2

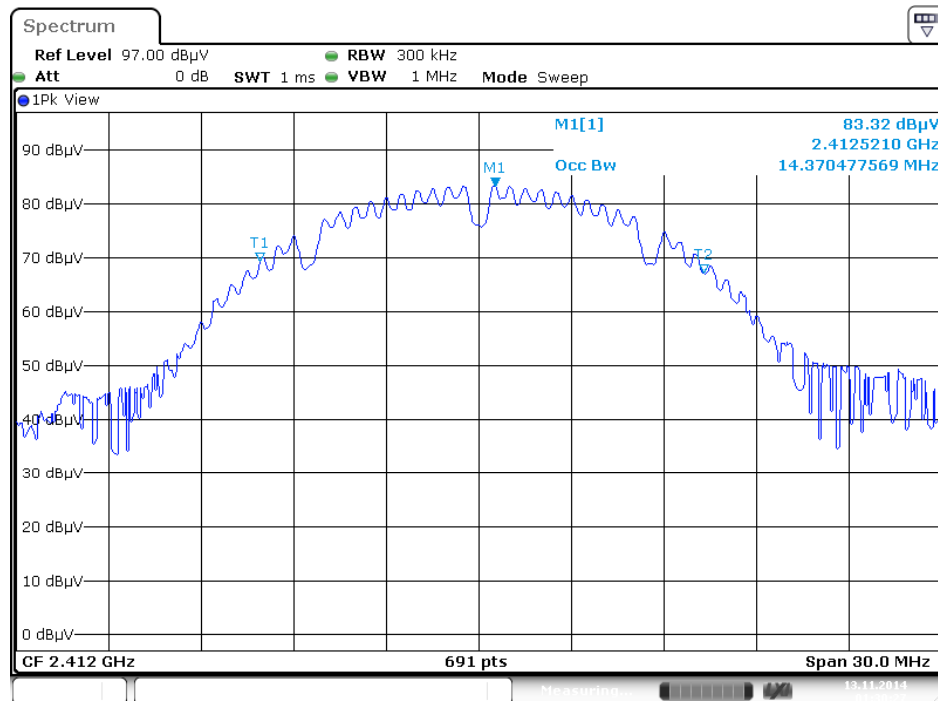


Date: 13.NOV.2014 01:15:16

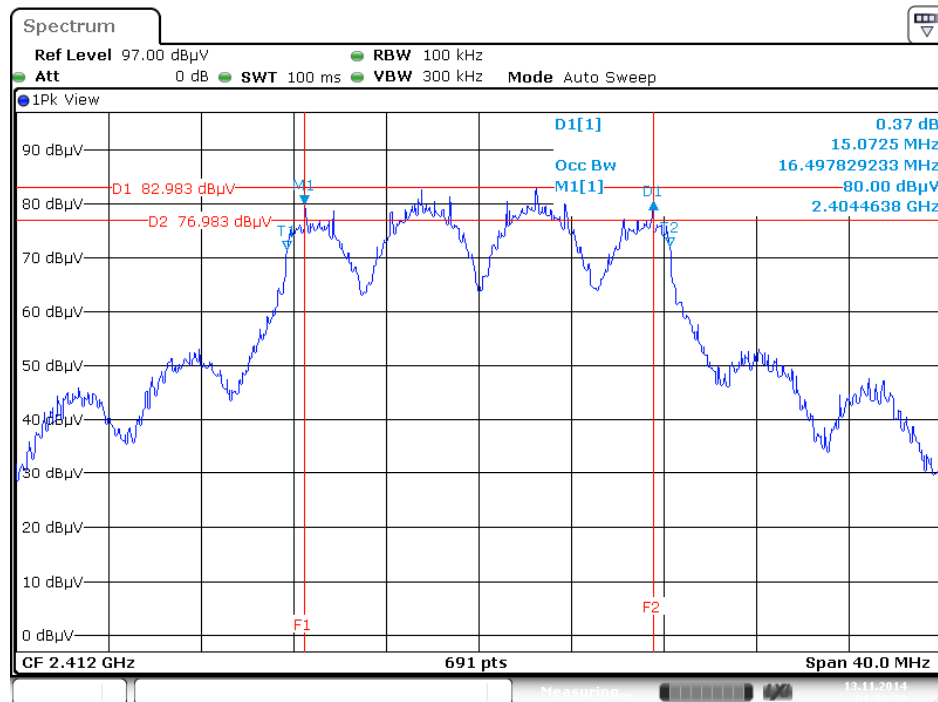
6 dB Bandwidth Plot on Configuration IEEE 802.11b / 2412 MHz / Ant. 1 + Ant. 2



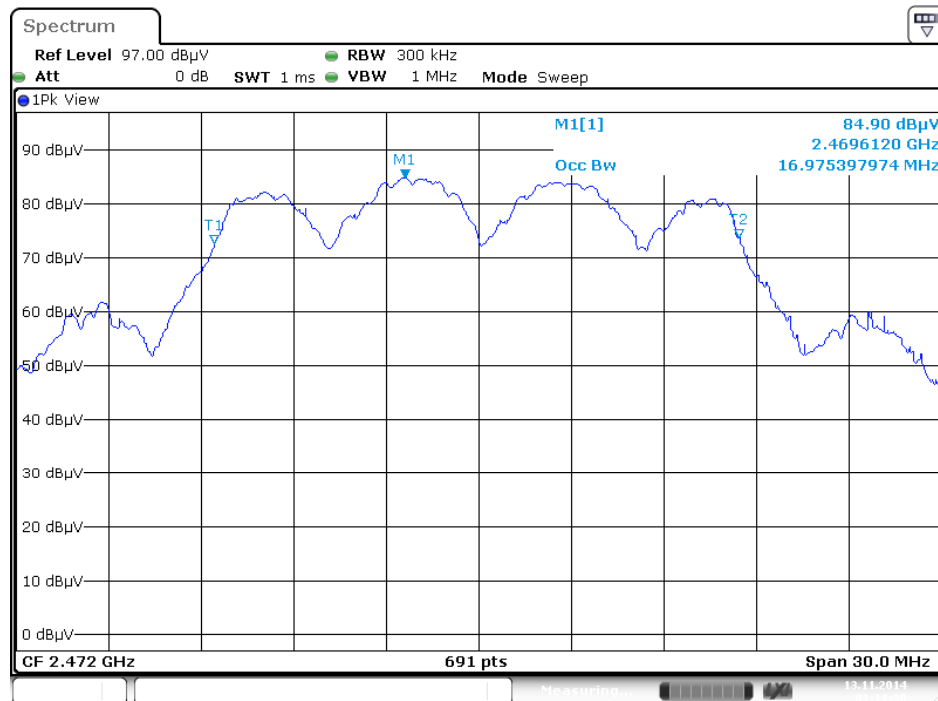
99% Occupied Bandwidth Plot on Configuration IEEE 802.11b / 2412 MHz / Ant. 1 + Ant. 2



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



99% Occupied Bandwidth Plot on Configuration IEEE 802.11g / 2472 MHz / Ant. 1 + Ant. 2



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 (microvolt/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, 1MHz / 1/T for Average
RBW / VBW (Emission in non-restricted band)	100kHz / 300kHz for peak

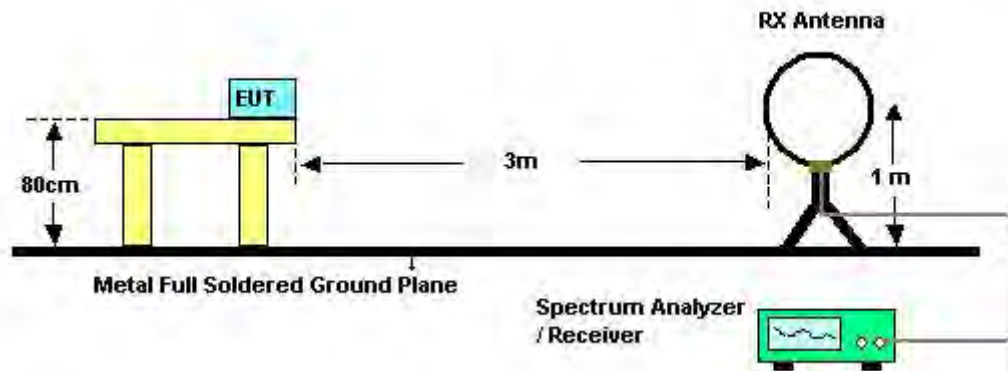
Receiver Parameter	Setting
Attenuation	Auto
Start ~ Stop Frequency	9kHz~150kHz / RBW 200Hz for QP
Start ~ Stop Frequency	150kHz~30MHz / RBW 9kHz for QP
Start ~ Stop Frequency	30MHz~1000MHz / RBW 120kHz for QP

4.5.3. Test Procedures

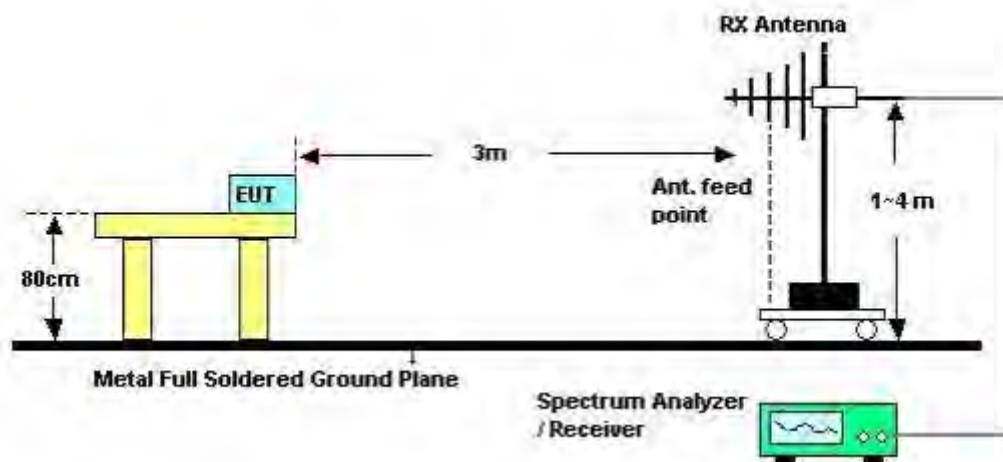
1. Configure the EUT according to ANSI C63.10. The EUT was placed on the top of the turntable 1.5 meter above ground. The phase center of the receiving antenna mounted on the top of a height-variable antenna tower was placed 3 meters far away from the turntable.
2. Power on the EUT and all the supporting 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 1/T VBW for average reading in spectrum analyzer.
7. 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.
8. 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.
9. In case the emission is lower than 30MHz, loop antenna has to be used for measurement and the recorded data should be QP measured by receiver. High – Low scan is not required in this case.

4.5.4. Test Setup Layout

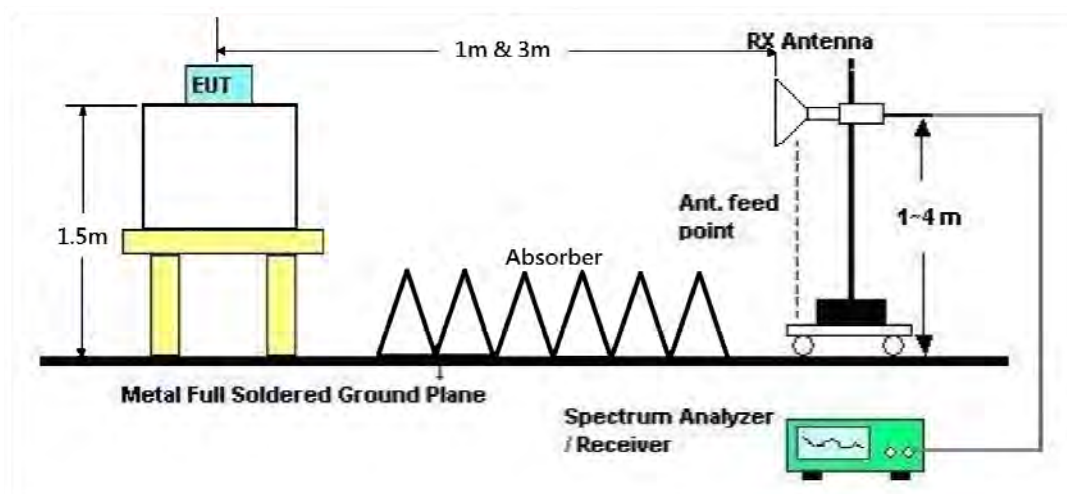
For Radiated Emissions: 9kHz ~30MHz



For Radiated Emissions: 30MHz~1GHz



For Radiated Emissions: Above 1GHz



4.5.5. Test Deviation

There is no deviation with the original standard.

4.5.6. EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

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

Temperature	25°C	Humidity	40%
Test Engineer	Lucas Huang	Configurations	Normal Link
Test Date	Nov. 24, 2014		

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.

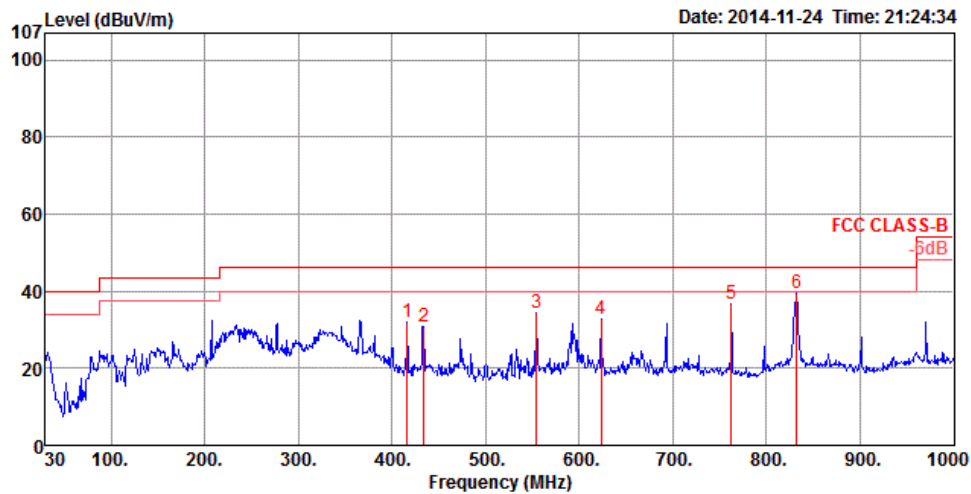
Distance extrapolation factor = $40 \log (\text{specific distance} / \text{test distance})$ (dB);

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

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

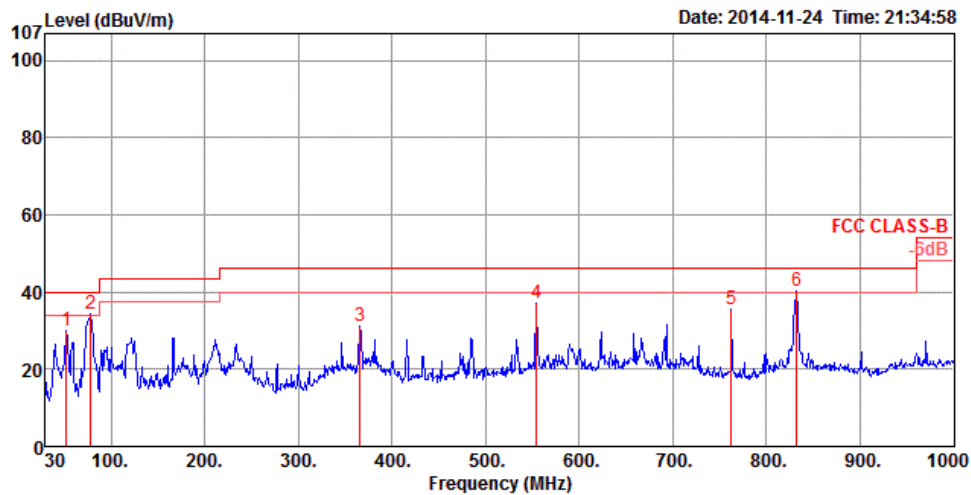
Temperature	25°C	Humidity	40%
Test Engineer	Lucas Huang	Configurations	Normal Link

Horizontal



	Freq	Level	Limit	Over	Read	Cable	Preamp	Antenna		T/Pos	A/Pos
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m	Pol/Phase	deg	cm
1	416.06	31.99	46.00	-14.01	46.22	1.45	32.38	16.70	HORIZONTAL	359	100
2	434.49	30.92	46.00	-15.08	44.89	1.49	32.38	16.92	HORIZONTAL	192	100
3	554.77	34.39	46.00	-11.61	46.44	1.69	32.38	18.64	HORIZONTAL	144	150
4	623.64	32.81	46.00	-13.19	44.32	1.80	32.55	19.24	HORIZONTAL	220	150
5	762.35	36.83	46.00	-9.17	46.98	1.99	32.44	20.30	HORIZONTAL	148	100
6	832.19	39.60	46.00	-6.40	48.69	2.07	32.09	20.93	HORIZONTAL	38	125

Vertical



	Freq	Level	Limit	Over	Read	Cable	Preamp	Antenna		T/Pos	A/Pos
	MHz	dBuV/m	dBuV/m	Limit	Level	Loss	Factor	Factor	Pol/Phase	deg	cm
1	52.31	29.88	40.00	-10.12	53.33	0.51	32.52	8.56	VERTICAL	207	100
2	78.50	34.28	40.00	-5.72	58.55	0.64	32.36	7.45	VERTICAL	339	125
3	365.62	31.04	46.00	-14.96	46.37	1.37	32.38	15.68	VERTICAL	185	125
4	554.77	36.99	46.00	-9.01	49.04	1.69	32.38	18.64	VERTICAL	26	125
5	762.35	35.44	46.00	-10.56	45.59	1.99	32.44	20.30	VERTICAL	46	100
6	832.19	40.30	46.00	-5.70	49.40	2.07	32.09	20.92	VERTICAL	20	100

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	25°C	Humidity	40%
Test Engineer	Lucas Huang	Configurations	IEEE 802.11n MCS0 HT20 CH 1 / Ant. 1 + Ant. 2
Test Date	Oct. 30, 2014		

Horizontal

	Freq	Level	Limit	Over	Read	CableAntenna	Preamp		A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	Line	Limit	Level	Loss	Factor	Factor	Remark	cm	deg
			dBuV/m	dB	dBuV	dB	dB/m	dB			
1	4824.28	39.08	54.00	-14.92	35.02	5.87	33.39	35.20	Average	100	66 HORIZONTAL
2	4824.44	53.74	74.00	-20.26	49.68	5.87	33.39	35.20	Peak	100	66 HORIZONTAL

Vertical

	Freq	Level	Limit	Over	Read	CableAntenna	Preamp		A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	Line	Limit	Level	Loss	Factor	Factor	Remark	cm	deg
			dBuV/m	dB	dBuV	dB	dB/m	dB			
1	4823.28	47.48	74.00	-26.52	43.42	5.87	33.39	35.20	Peak	100	71 VERTICAL
2	4825.68	35.14	54.00	-18.86	31.08	5.87	33.39	35.20	Average	100	71 VERTICAL

Temperature	25°C	Humidity	40%
Test Engineer	Lucas Huang	Configurations	IEEE 802.11n MCS0 HT20 CH 6 / Ant. 1 + Ant. 2
Test Date	Oct. 30, 2014		

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	4874.36	55.19	74.00	-18.81	50.99	5.92	33.48	35.20	Peak	100	98 HORIZONTAL
2	4876.84	40.63	54.00	-13.37	36.43	5.92	33.48	35.20	Average	100	98 HORIZONTAL
3	7310.20	37.40	54.00	-16.60	29.19	7.13	36.51	35.43	Average	100	89 HORIZONTAL
4	7310.52	51.23	74.00	-22.77	43.02	7.13	36.51	35.43	Peak	100	89 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	4873.20	48.74	74.00	-25.26	44.54	5.92	33.48	35.20	Peak	100	73 VERTICAL
2	4877.76	36.37	54.00	-17.63	32.17	5.92	33.48	35.20	Average	100	73 VERTICAL
3	7309.04	37.33	54.00	-16.67	29.12	7.13	36.51	35.43	Average	100	157 VERTICAL
4	7310.96	49.88	74.00	-24.12	41.67	7.13	36.51	35.43	Peak	100	157 VERTICAL

Temperature	25°C	Humidity	40%
Test Engineer	Lucas Huang	Configurations	IEEE 802.11n MCS0 HT20 CH 11 / Ant. 1 + Ant. 2
Test Date	Oct. 30, 2014		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	4924.60	54.55	74.00	-19.45	50.20	5.97	33.58	35.20	Peak	100	83	HORIZONTAL
2	4926.76	40.44	54.00	-13.56	36.09	5.97	33.58	35.20	Average	100	83	HORIZONTAL
3	7379.36	50.65	74.00	-23.35	42.33	7.16	36.61	35.45	Peak	100	67	HORIZONTAL
4	7388.72	37.60	54.00	-16.40	29.28	7.17	36.61	35.46	Average	100	67	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	4927.60	50.15	74.00	-23.85	45.80	5.97	33.58	35.20	Peak	100	88	VERTICAL
2	4927.88	36.39	54.00	-17.61	32.04	5.97	33.58	35.20	Average	100	88	VERTICAL
3	7383.72	37.55	54.00	-16.45	29.23	7.17	36.61	35.46	Average	100	230	VERTICAL
4	7386.24	50.54	74.00	-23.46	42.22	7.17	36.61	35.46	Peak	100	230	VERTICAL

Temperature	25°C	Humidity	40%
Test Engineer	Lucas Huang	Configurations	IEEE 802.11n MCS0 HT20 CH 12 / Ant. 1 + Ant. 2
Test Date	Oct. 30, 2014		

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	4934.20	36.91	54.00	-17.09	32.56	5.97	33.58	35.20	Average	100	66	HORIZONTAL
2	4934.44	51.35	74.00	-22.65	47.00	5.97	33.58	35.20	Peak	100	66	HORIZONTAL
3	7399.40	49.48	74.00	-24.52	41.13	7.17	36.64	35.46	Peak	100	164	HORIZONTAL
4	7407.88	37.17	54.00	-16.83	28.81	7.18	36.64	35.46	Average	100	164	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	4932.68	34.74	54.00	-19.26	30.39	5.97	33.58	35.20	Average	100	103	VERTICAL
2	4935.56	47.86	74.00	-26.14	43.50	5.98	33.58	35.20	Peak	100	103	VERTICAL
3	7391.68	50.22	74.00	-23.78	41.90	7.17	36.61	35.46	Peak	100	73	VERTICAL
4	7407.96	36.98	54.00	-17.02	28.62	7.18	36.64	35.46	Average	100	73	VERTICAL

Temperature	25°C	Humidity	40%
Test Engineer	Lucas Huang	Configurations	IEEE 802.11n MCS0 HT20 CH 13 / Ant. 1 + Ant. 2
Test Date	Oct. 30, 2014		

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	4944.56	47.88	74.00	-26.12	43.49	5.98	33.61	35.20	Peak	100	106	HORIZONTAL
2	4946.96	34.82	54.00	-19.18	30.43	5.98	33.61	35.20	Average	100	106	HORIZONTAL
3	7416.40	37.17	54.00	-16.83	28.79	7.18	36.67	35.47	Average	100	148	HORIZONTAL
4	7425.76	49.95	74.00	-24.05	41.56	7.19	36.67	35.47	Peak	100	148	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	4946.28	46.82	74.00	-27.18	42.43	5.98	33.61	35.20	Peak	100	44	VERTICAL
2	4947.04	34.17	54.00	-19.83	29.78	5.98	33.61	35.20	Average	100	44	VERTICAL
3	7411.08	49.94	74.00	-24.06	41.56	7.18	36.67	35.47	Peak	100	272	VERTICAL
4	7413.64	37.27	54.00	-16.73	28.89	7.18	36.67	35.47	Average	100	272	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	25°C	Humidity	40%
Test Engineer	Lucas Huang	Configurations	IEEE 802.11b CH 1 / Ant. 1 + Ant. 2
Test Date	Oct. 30, 2014		

Horizontal

	Freq	Level	Limit	Over	Read	Cable	Antenna	Preamp		T/Pos	A/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	Loss	Factor	Factor	Remark	deg	cm	
1	4823.95	51.97	74.00	-22.03	49.78	4.21	32.56	34.58	Peak	182	121	HORIZONTAL
2	4824.02	47.57	54.00	-6.43	45.38	4.21	32.56	34.58	Average	182	121	HORIZONTAL

Vertical

	Freq	Level	Limit	Over	Read	Cable	Antenna	Preamp		T/Pos	A/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	Loss	Factor	Factor	Remark	deg	cm	
1	4823.95	51.97	74.00	-22.03	49.78	4.21	32.56	34.58	Peak	182	121	HORIZONTAL
2	4824.02	47.57	54.00	-6.43	45.38	4.21	32.56	34.58	Average	182	121	HORIZONTAL

Temperature	25°C	Humidity	62%
Test Engineer	Lucas Huang	Configurations	IEEE 802.11b CH 6 / Ant. 1 + Ant. 2
Test Date	Oct. 30, 2014		

Horizontal

	Freq	Level	Limit	Over	Read	CableAntenna	Preamp		T/Pos	A/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	Loss	Factor	Factor	Remark	deg	cm
1	4874.00	49.62	54.00	-4.38	47.31	4.22	32.66	34.57	Average	193	121 HORIZONTAL
2	4874.19	53.06	74.00	-20.94	50.75	4.22	32.66	34.57	Peak	193	121 HORIZONTAL
3	7311.70	38.57	54.00	-15.43	30.99	5.34	37.07	34.83	Average	260	100 HORIZONTAL
4	7312.32	51.51	74.00	-22.49	43.93	5.34	37.07	34.83	Peak	260	100 HORIZONTAL

Vertical

	Freq	Level	Limit	Over	Read	CableAntenna	Preamp		T/Pos	A/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	Loss	Factor	Factor	Remark	deg	cm
1	4873.93	49.57	74.00	-24.43	47.26	4.22	32.66	34.57	Peak	184	100 VERTICAL
2	4874.00	41.67	54.00	-12.33	39.36	4.22	32.66	34.57	Average	184	100 VERTICAL
3	7310.34	51.34	74.00	-22.66	43.75	5.34	37.07	34.82	Peak	242	100 VERTICAL
4	7312.96	38.95	54.00	-15.05	31.37	5.34	37.07	34.83	Average	242	100 VERTICAL

Temperature	25°C	Humidity	40%
Test Engineer	Lucas Huang	Configurations	IEEE 802.11b CH 11 / Ant. 1 + Ant. 2
Test Date	Oct. 30, 2014		

Horizontal

	Freq	Level	Limit	Over	Read	Cable	Antenna	Preamp		T/Pos	A/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	Loss	Factor	Factor	Remark	deg	cm	
1	4923.81	51.43	74.00	-22.57	48.99	4.23	32.76	34.55	Peak	219	126	HORIZONTAL
2	4924.02	46.58	54.00	-7.42	44.14	4.23	32.76	34.55	Average	219	126	HORIZONTAL
3	7383.83	39.51	54.00	-14.49	31.81	5.36	37.18	34.84	Average	298	100	HORIZONTAL
4	7388.23	52.01	74.00	-21.99	44.31	5.36	37.18	34.84	Peak	298	100	HORIZONTAL

Vertical

	Freq	Level	Limit	Over	Read	Cable	Antenna	Preamp		T/Pos	A/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	Loss	Factor	Factor	Remark	deg	cm	
1	4924.00	47.04	74.00	-26.96	44.60	4.23	32.76	34.55	Peak	67	100	VERTICAL
2	4924.00	39.30	54.00	-14.70	36.86	4.23	32.76	34.55	Average	67	100	VERTICAL
3	7384.99	51.95	74.00	-22.05	44.25	5.36	37.18	34.84	Peak	323	100	VERTICAL
4	7387.56	39.02	54.00	-14.98	31.32	5.36	37.18	34.84	Average	323	100	VERTICAL

Temperature	25°C	Humidity	40%
Test Engineer	Lucas Huang	Configurations	IEEE 802.11b CH 12 / Ant. 1 + Ant. 2
Test Date	Oct. 30, 2014		

Horizontal

	Freq	Level	Limit	Over	Read	Cable	Antenna	Preamp		A/Pos	T/Pos	
	MHz	dBuV/m	dBuV/m	dB	dBuV	Loss	Factor	Factor	Remark	cm	deg	Pol/Phase
1	4933.96	54.53	74.00	-19.47	50.18	5.97	33.58	35.20	Peak	100	84	HORIZONTAL
2	4934.01	50.65	54.00	-3.35	46.30	5.97	33.58	35.20	Average	100	84	HORIZONTAL
3	7398.70	50.06	74.00	-23.94	41.71	7.17	36.64	35.46	Peak	100	90	HORIZONTAL
4	7400.33	37.20	54.00	-16.80	28.85	7.17	36.64	35.46	Average	100	90	HORIZONTAL

Vertical

	Freq	Level	Limit	Over	Read	Cable	Antenna	Preamp		A/Pos	T/Pos	
	MHz	dBuV/m	dBuV/m	dB	dBuV	Loss	Factor	Factor	Remark	cm	deg	Pol/Phase
1	4934.00	44.80	54.00	-9.20	40.45	5.97	33.58	35.20	Average	129	152	VERTICAL
2	4934.01	51.19	74.00	-22.81	46.84	5.97	33.58	35.20	Peak	129	152	VERTICAL
3	7401.21	49.88	74.00	-24.12	41.52	7.18	36.64	35.46	Peak	100	181	VERTICAL
4	7401.74	36.56	54.00	-17.44	28.20	7.18	36.64	35.46	Average	100	181	VERTICAL

Temperature	25°C	Humidity	40%
Test Engineer	Lucas Huang	Configurations	IEEE 802.11b CH 13 / Ant. 1 + Ant. 2
Test Date	Oct. 30, 2014		

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	4943.97	41.22	54.00	-12.78	36.83	5.98	33.61	35.20	Average	118	65	HORIZONTAL
2	4944.05	49.17	74.00	-24.83	44.78	5.98	33.61	35.20	Peak	118	65	HORIZONTAL
3	7416.35	49.50	74.00	-24.50	41.12	7.18	36.67	35.47	Peak	100	178	HORIZONTAL
4	7419.46	35.27	54.00	-18.73	26.88	7.19	36.67	35.47	Average	116	178	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	4943.94	36.06	54.00	-17.94	31.67	5.98	33.61	35.20	Average	112	113	VERTICAL
2	4944.00	47.66	74.00	-26.34	43.27	5.98	33.61	35.20	Peak	112	113	VERTICAL
3	7418.10	49.57	74.00	-24.43	41.18	7.19	36.67	35.47	Peak	100	81	VERTICAL
4	7419.18	35.29	54.00	-18.71	26.90	7.19	36.67	35.47	Average	100	81	VERTICAL

Temperature	25°C	Humidity	40%
Test Engineer	Lucas Huang	Configurations	IEEE 802.11g CH 1 / Ant. 1 + Ant. 2
Test Date	Oct. 30, 2014		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	4820.48	53.70	74.00	-20.30	49.64	5.87	33.39	35.20	Peak	100	65	HORIZONTAL
2	4824.60	39.59	54.00	-14.41	35.53	5.87	33.39	35.20	Average	100	65	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	4822.04	48.48	74.00	-25.52	44.42	5.87	33.39	35.20	Peak	112	87	VERTICAL
2	4826.76	35.21	54.00	-18.79	31.15	5.87	33.39	35.20	Average	112	87	VERTICAL

Temperature	25°C	Humidity	40%
Test Engineer	Lucas Huang	Configurations	IEEE 802.11g CH 6 / Ant. 1 + Ant. 2
Test Date	Oct. 30, 2014		

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	4874.08	54.24	74.00	-19.76	50.04	5.92	33.48	35.20	Peak	100	84	HORIZONTAL
2	4874.84	40.51	54.00	-13.49	36.31	5.92	33.48	35.20	Average	100	84	HORIZONTAL
3	7309.88	50.74	74.00	-23.26	42.53	7.13	36.51	35.43	Peak	105	88	HORIZONTAL
4	7310.22	37.12	54.00	-16.88	28.91	7.13	36.51	35.43	Average	105	88	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	4875.92	49.84	74.00	-24.16	45.64	5.92	33.48	35.20	Peak	121	88	VERTICAL
2	4876.40	36.52	54.00	-17.48	32.32	5.92	33.48	35.20	Average	121	88	VERTICAL
3	7305.84	50.21	74.00	-23.79	42.02	7.13	36.48	35.42	Peak	100	181	VERTICAL
4	7312.00	36.97	54.00	-17.03	28.76	7.13	36.51	35.43	Average	100	181	VERTICAL

Temperature	25°C	Humidity	62%
Test Engineer	Lucas Huang	Configurations	IEEE 802.11g CH 11 / Ant. 1 + Ant. 2
Test Date	Oct. 30, 2014		

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	4924.04	54.15	74.00	-19.85	49.80	5.97	33.58	35.20	Peak	100	73	HORIZONTAL
2	4925.00	40.01	54.00	-13.99	35.66	5.97	33.58	35.20	Average	100	73	HORIZONTAL
3	7383.72	50.80	74.00	-23.20	42.48	7.17	36.61	35.46	Peak	100	87	HORIZONTAL
4	7390.40	37.71	54.00	-16.29	29.39	7.17	36.61	35.46	Average	100	87	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	4921.08	49.37	74.00	-24.63	45.06	5.97	33.54	35.20	Peak	100	87	VERTICAL
2	4926.24	36.35	54.00	-17.65	32.00	5.97	33.58	35.20	Average	100	87	VERTICAL
3	7376.20	49.96	74.00	-24.04	41.64	7.16	36.61	35.45	Peak	100	48	VERTICAL
4	7382.12	37.60	54.00	-16.40	29.28	7.16	36.61	35.45	Average	100	48	VERTICAL

Temperature	25°C	Humidity	62%
Test Engineer	Lucas Huang	Configurations	IEEE 802.11g CH 12 / Ant. 1 + Ant. 2
Test Date	Oct. 30, 2014		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	4934.44	37.07	54.00	-16.93	32.72	5.97	33.58	35.20	Average	100	66	HORIZONTAL
2	4939.80	50.99	74.00	-23.01	46.60	5.98	33.61	35.20	Peak	100	66	HORIZONTAL
3	7398.44	49.62	74.00	-24.38	41.27	7.17	36.64	35.46	Peak	100	124	HORIZONTAL
4	7405.44	37.03	54.00	-16.97	28.67	7.18	36.64	35.46	Average	100	124	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	4932.40	48.17	74.00	-25.83	43.82	5.97	33.58	35.20	Peak	100	101	VERTICAL
2	4932.44	35.01	54.00	-18.99	30.66	5.97	33.58	35.20	Average	100	101	VERTICAL
3	7395.44	50.19	74.00	-23.81	41.84	7.17	36.64	35.46	Peak	100	28	VERTICAL
4	7402.84	37.11	54.00	-16.89	28.75	7.18	36.64	35.46	Average	100	28	VERTICAL

Temperature	25°C	Humidity	62%
Test Engineer	Lucas Huang	Configurations	IEEE 802.11g CH 13 / Ant. 1 + Ant. 2
Test Date	Oct. 30, 2014		

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	4939.32	47.95	74.00	-26.05	43.56	5.98	33.61	35.20	Peak	100	94	HORIZONTAL
2	4944.88	35.38	54.00	-18.62	30.99	5.98	33.61	35.20	Average	100	94	HORIZONTAL
3	7416.04	50.23	74.00	-23.77	41.85	7.18	36.67	35.47	Peak	100	70	HORIZONTAL
4	7418.84	37.22	54.00	-16.78	28.83	7.19	36.67	35.47	Average	100	70	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	4945.96	47.28	74.00	-26.72	42.89	5.98	33.61	35.20	Peak	100	63	VERTICAL
2	4951.96	34.32	54.00	-19.68	29.93	5.98	33.61	35.20	Average	100	63	VERTICAL
3	7415.28	37.16	54.00	-16.84	28.78	7.18	36.67	35.47	Average	100	114	VERTICAL
4	7418.96	49.69	74.00	-24.31	41.30	7.19	36.67	35.47	Peak	100	114	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, 1MHz / 1/T for Average
RBW / VBW (30dBc in any 100 kHz bandwidth emission)	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 Radiated Out of Band Emission Measurement:

- Test was performed in accordance with KDB 558074 D01 v03r02 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.

4.6.4. Test Setup Layout

For Radiated band edges Measurement:

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

For Radiated Out of Band Emission Measurement:

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

4.6.5. Test Deviation

There is no deviation with the original standard.

4.6.6. EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

4.6.7. Test Result of Band Edge and Fundamental Emissions

Temperature	25°C	Humidity	40%
Test Engineer	Lucas Huang	Configurations	IEEE 802.11n MCS0 HT20 CH 1, 6, 11 / Ant. 1 + Ant. 2
Test Date	Oct. 30, 2014		

Channel 1

	Freq	Level	Limit Line	Over Limit	Read Level	CableAntenna Loss Factor	Preamp Factor	Remark	T/Pos	A/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm	
1	2389.13	72.77	74.00	-1.23	41.94	2.91	27.92	0.00 Peak	92	100	VERTICAL
2	2389.28	52.66	54.00	-1.34	21.83	2.91	27.92	0.00 Average	92	100	VERTICAL
3	2414.46	97.01			66.19	2.92	27.90	0.00 Average	92	100	VERTICAL
4	2414.60	108.89			78.07	2.92	27.90	0.00 Peak	92	100	VERTICAL

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

Channel 6

	Freq	Level	Limit Line	Over Limit	Read Level	CableAntenna Loss Factor	Preamp Factor	Remark	T/Pos	A/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm	
1	2387.97	59.27	74.00	-14.73	28.44	2.91	27.92	0.00 Peak	88	141	VERTICAL
2	2390.00	46.48	54.00	-7.52	15.65	2.91	27.92	0.00 Average	88	141	VERTICAL
3	2439.32	108.37			77.57	2.94	27.86	0.00 Peak	88	141	VERTICAL
4	2439.32	99.24			68.44	2.94	27.86	0.00 Average	88	141	VERTICAL
5	2483.50	47.40	54.00	-6.60	16.62	2.96	27.82	0.00 Average	88	141	VERTICAL
6	2484.08	59.94	74.00	-14.06	29.16	2.96	27.82	0.00 Peak	88	141	VERTICAL

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

Channel 11

	Freq	Level	Limit Line	Over Limit	Read Level	CableAntenna Loss Factor	Preamp Factor	Remark	T/Pos	A/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm	
1	2461.42	104.27			73.48	2.95	27.84	0.00 Peak	56	100	HORIZONTAL
2	2463.45	90.58			59.79	2.95	27.84	0.00 Average	56	100	HORIZONTAL
3	2483.50	72.56	74.00	-1.44	41.78	2.96	27.82	0.00 Peak	56	100	HORIZONTAL
4	2483.50	52.95	54.00	-1.05	22.17	2.96	27.82	0.00 Average	56	100	HORIZONTAL

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

Temperature	25°C	Humidity	40%
Test Engineer	Lucas Huang	Configurations	IEEE 802.11n MCS0 HT20 CH 12, 13 / Ant. 1 + Ant. 2
Test Date	Oct. 30, 2014		

Channel 12

	Freq	Level	Limit	Over	Read	CableAntenna	Preamp		A/Pos	T/Pos	
	MHz	dBuV/m	Line	Limit	Level	Loss	Factor	Factor	Remark	cm	deg
1	2466.40	94.62			62.26	4.14	28.22	0.00	Average	173	220 VERTICAL
2	2466.40	104.90			72.54	4.14	28.22	0.00	Peak	173	220 VERTICAL
3	2483.50	53.97	54.00	-0.03	21.55	4.16	28.26	0.00	Average	173	220 VERTICAL
4	2483.50	71.40	74.00	-2.60	38.98	4.16	28.26	0.00	Peak	173	220 VERTICAL

Item 1, 2 are the fundamental frequency at 2467 MHz.

Channel 13

	Freq	Level	Limit	Over	Read	CableAntenna	Preamp		A/Pos	T/Pos	
	MHz	dBuV/m	Line	Limit	Level	Loss	Factor	Factor	Remark	cm	deg
1	2474.00	92.52			60.10	4.16	28.26	0.00	Average	147	136 VERTICAL
2	2474.00	104.11			71.69	4.16	28.26	0.00	Peak	147	136 VERTICAL
3	2483.50	53.96	54.00	-0.04	21.54	4.16	28.26	0.00	Average	147	136 VERTICAL
4	2484.70	69.16	74.00	-4.84	36.74	4.16	28.26	0.00	Peak	147	136 VERTICAL

Item 1, 2 are the fundamental frequency at 2472 MHz.

Temperature	25°C	Humidity	40%
Test Engineer	Lucas Huang	Configurations	IEEE 802.11b CH 1, 6, 11/ Ant. 1 + Ant. 2
Test Date	Oct. 30, 2014		

Channel 1

	Freq	Level	Limit Line	Over Limit	Read Level	CableAntenna Loss Factor	Preamp Factor	Remark	T/Pos	A/Pos	Pol/Phase	
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm		
1	2374.80	45.80	54.00	-8.20	14.96	2.90	27.94	0.00	Average	84	140	VERTICAL
2	2388.12	64.20	74.00	-9.80	33.37	2.91	27.92	0.00	Peak	84	140	VERTICAL
3	2411.28	108.93			78.11	2.92	27.90	0.00	Peak	84	140	VERTICAL
4	2411.28	106.15			75.33	2.92	27.90	0.00	Average	84	140	VERTICAL

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

Channel 6

	Freq	Level	Limit Line	Over Limit	Read Level	CableAntenna Loss	Factor	Preamp Factor	Remark	T/Pos	A/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		deg	cm	
1	2379.00	57.59	74.00	-16.41	26.75	2.90	27.94	0.00	Peak	258	100	VERTICAL
2	2390.00	44.90	54.00	-9.10	14.07	2.91	27.92	0.00	Average	258	100	VERTICAL
3	2436.13	105.11			74.30	2.93	27.88	0.00	Average	258	100	VERTICAL
4	2436.42	107.84			77.03	2.93	27.88	0.00	Peak	258	100	VERTICAL
5	2483.50	45.02	54.00	-8.98	14.24	2.96	27.82	0.00	Average	258	100	VERTICAL
6	2484.08	57.77	74.00	-16.23	26.99	2.96	27.82	0.00	Peak	258	100	VERTICAL

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

Channel 11

	Freq	Level	Limit Line	Over Limit	Read Level	CableAntenna Loss Factor	Preamp Factor	Remark	T/Pos	A/Pos	Pol/Phase	
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm		
1	2461.13	107.82			77.03	2.95	27.84	0.00	Peak	75	100	VERTICAL
2	2461.28	105.07			74.28	2.95	27.84	0.00	Average	75	100	VERTICAL
3	2483.93	65.86	74.00	-8.14	35.08	2.96	27.82	0.00	Peak	75	100	VERTICAL
4	2488.71	45.32	54.00	-8.68	14.55	2.97	27.80	0.00	Average	75	100	VERTICAL

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

Temperature	25°C	Humidity	40%
Test Engineer	Lucas Huang	Configurations	IEEE 802.11b CH 12, 13 / Ant. 1 + Ant. 2
Test Date	Oct. 30, 2014		

Channel 12

	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	2467.80	103.16			70.80	4.14	28.22	0.00	Average	161	198	VERTICAL
2	2468.00	107.75			75.39	4.14	28.22	0.00	Peak	161	198	VERTICAL
3	2483.70	71.18	74.00	-2.82	38.76	4.16	28.26	0.00	Peak	161	198	VERTICAL
4	2484.10	53.85	54.00	-0.15	21.43	4.16	28.26	0.00	Average	161	198	VERTICAL

Item 1, 2 are the fundamental frequency at 2467 MHz.

Channel 13

	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	2471.20	99.19			66.77	4.16	28.26	0.00	Average	146	206	VERTICAL
2	2473.00	103.48			71.06	4.16	28.26	0.00	Peak	146	206	VERTICAL
3	2483.70	73.93	74.00	-0.07	41.51	4.16	28.26	0.00	Peak	146	206	VERTICAL
4	2487.10	51.30	54.00	-2.70	18.84	4.16	28.30	0.00	Average	146	206	VERTICAL

Item 1, 2 are the fundamental frequency at 2472 MHz.

Temperature	25°C	Humidity	40%
Test Engineer	Lucas Huang	Configurations	IEEE 802.11g CH 1, 6, 11 / Ant. 1 + Ant. 2
Test Date	Oct. 30, 2014		

Channel 1

	Freq	Level	Limit Line	Over Limit	Read Level	CableAntenna Loss Factor	Preamp Factor	Remark	T/Pos	A/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm	
1	2386.09	65.09	74.00	-8.91	34.26	2.91	27.92	0.00 Peak	81	142	VERTICAL
2	2390.00	51.62	54.00	-2.38	20.79	2.91	27.92	0.00 Average	81	142	VERTICAL
3	2411.42	111.79			80.97	2.92	27.90	0.00 Peak	81	142	VERTICAL
4	2411.57	101.86			71.04	2.92	27.90	0.00 Average	81	142	VERTICAL

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

Channel 6

	Freq	Level	Limit Line	Over Limit	Read Level	CableAntenna Loss Factor	Preamp Factor	Remark	T/Pos	A/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm	
1	2387.97	59.48	74.00	-14.52	28.65	2.91	27.92	0.00 Peak	256	100	VERTICAL
2	2390.00	46.36	54.00	-7.64	15.53	2.91	27.92	0.00 Average	256	100	VERTICAL
3	2436.42	109.30			78.49	2.93	27.88	0.00 Peak	256	100	VERTICAL
4	2436.42	99.55			68.74	2.93	27.88	0.00 Average	256	100	VERTICAL
5	2483.50	46.41	54.00	-7.59	15.63	2.96	27.82	0.00 Average	256	100	VERTICAL
6	2486.10	58.41	74.00	-15.59	27.63	2.96	27.82	0.00 Peak	256	100	VERTICAL

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

Channel 11

	Freq	Level	Limit Line	Over Limit	Read Level	CableAntenna Loss Factor	Preamp Factor	Remark	T/Pos	A/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm	
1	2459.83	104.81			74.02	2.95	27.84	0.00 Peak	58	100	HORIZONTAL
2	2459.97	91.52			60.73	2.95	27.84	0.00 Average	58	100	HORIZONTAL
3	2483.50	52.55	54.00	-1.45	21.77	2.96	27.82	0.00 Average	58	100	HORIZONTAL
4	2484.37	72.31	74.00	-1.69	41.53	2.96	27.82	0.00 Peak	58	100	HORIZONTAL

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

Temperature	25°C	Humidity	40%
Test Engineer	Lucas Huang	Configurations	IEEE 802.11g CH 12, 13 / Ant. 1 + Ant. 2
Test Date	Oct. 30, 2014		

Channel 12

	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	2466.00	105.48			73.12	4.14	28.22	0.00	Peak	171	219	VERTICAL
2	2466.20	95.33			62.97	4.14	28.22	0.00	Average	171	219	VERTICAL
3	2483.90	70.70	74.00	-3.30	38.28	4.16	28.26	0.00	Peak	171	219	VERTICAL
4	2484.30	53.53	54.00	-0.47	21.11	4.16	28.26	0.00	Average	171	219	VERTICAL

Item 1, 2 are the fundamental frequency at 2467 MHz.

Channel 13

	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	2475.60	94.13			61.71	4.16	28.26	0.00	Average	171	219	VERTICAL
2	2475.80	104.83			72.41	4.16	28.26	0.00	Peak	171	219	VERTICAL
3	2484.70	69.17	74.00	-4.83	36.75	4.16	28.26	0.00	Peak	171	219	VERTICAL
4	2484.90	53.87	54.00	-0.13	21.45	4.16	28.26	0.00	Average	171	219	VERTICAL

Item 1, 2 are the fundamental frequency at 2472 MHz.

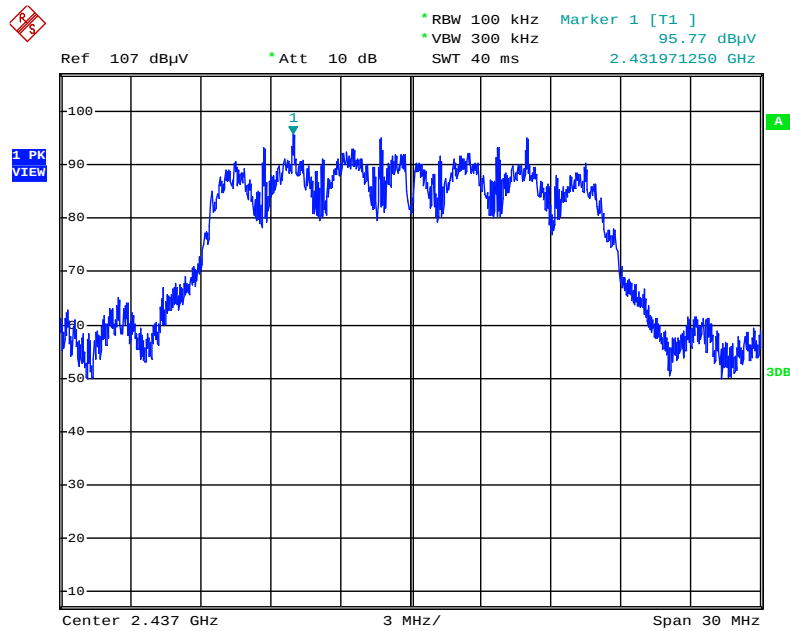
Note:

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

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

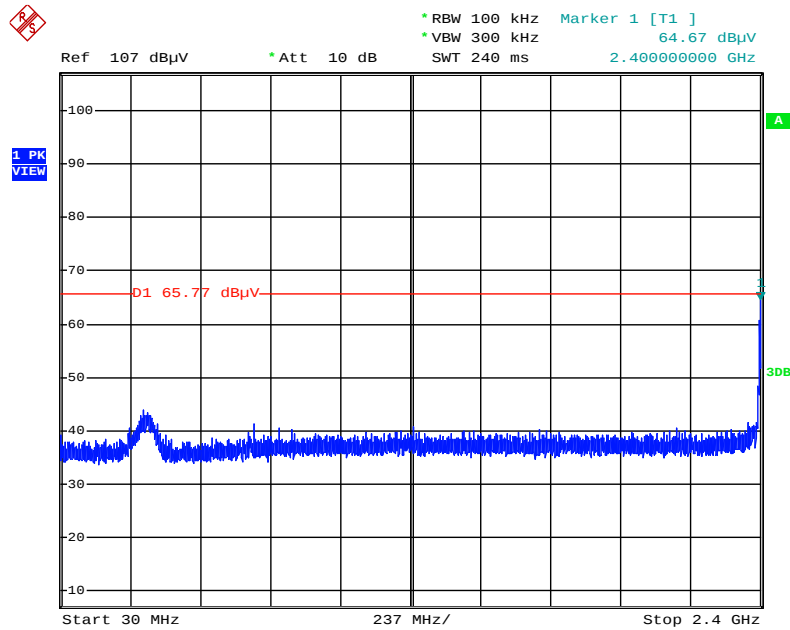
For Emission not in Restricted Band

Plot on Configuration IEEE 802.11n MCS0 HT20 / Reference Level



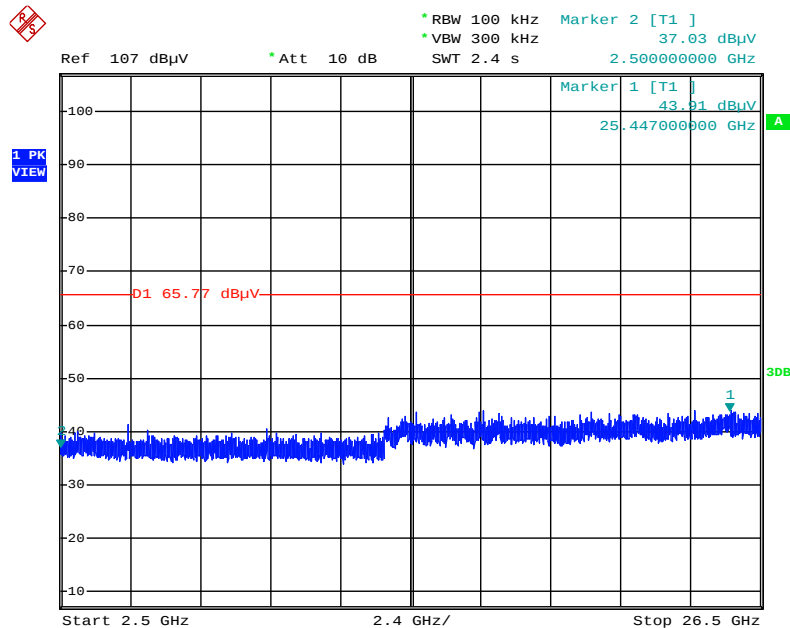
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Plot on Configuration IEEE 802.11n MCS0 HT20 / CH 1 / 30MHz~2400MHz (down 30dBc)



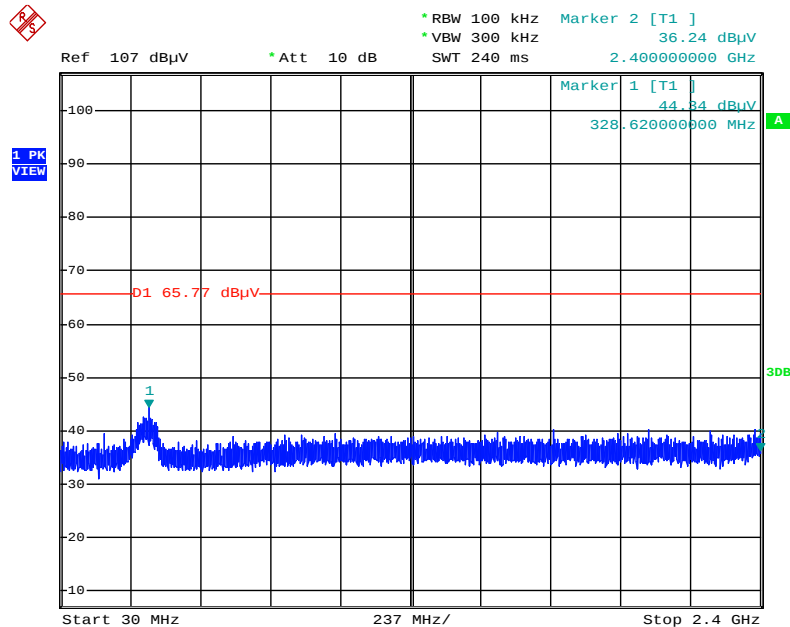
Date: 30.OCT.2014 23:47:50

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

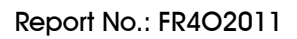


Date: 30.OCT.2014 23:48:11

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



Date: 30.OCT.2014 23:50:21



Ref 107 dBμV

* Att 10 dB

* RBW 100 kHz

* VBW 300 kHz

SWT 2.4 s

Marker 2 [T1]

40.36 dBμV

2.500000000 GHz

Marker 1 [T1]

45.26 dBμV

26.389000000 GHz

1 PK VIEW

D1 65.77 dBμV

Start 2.5 GHz

2.4 GHz/

Stop 26.5 GHz

Ref 107 dBμV

* Att 10 dB

* RBW 100 kHz

* VBW 300 kHz

SWT 240 ms

Marker 2 [T1]

36.53 dBμV

2.400000000 GHz

Marker 1 [T1]

44.20 dBμV

309.363750000 MHz

1 PK VIEW

01 65.77 dBμV

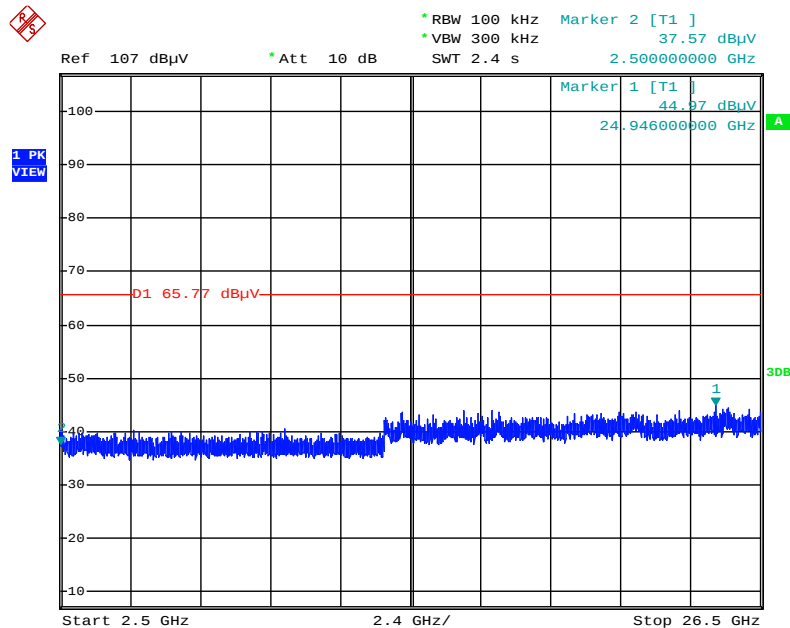
Start 30 MHz

237 MHz/

Stop 2.4 GHz

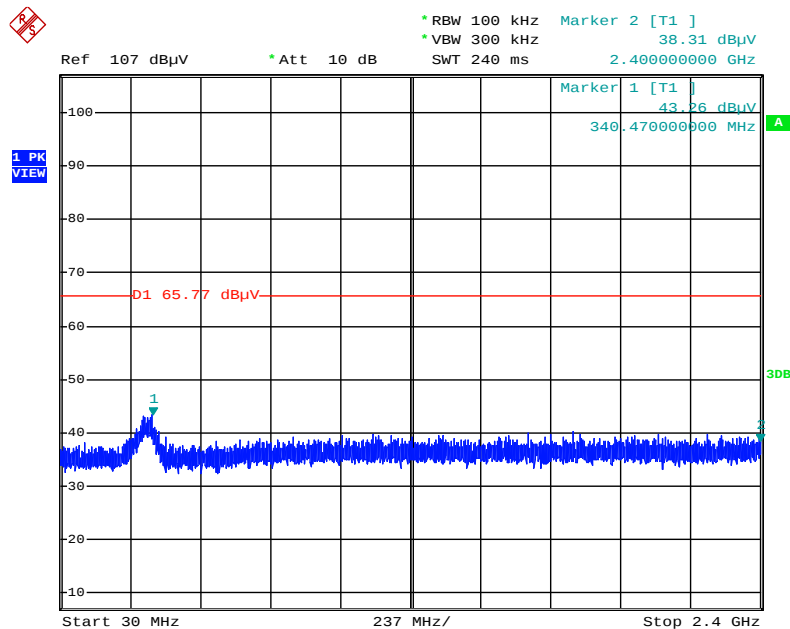
Date: 30.OCT.2014 23:51:40

Plot on Configuration IEEE 802.11n MCS0 HT20 / CH 12 / 2500MHz~26500MHz (down 30dBc)



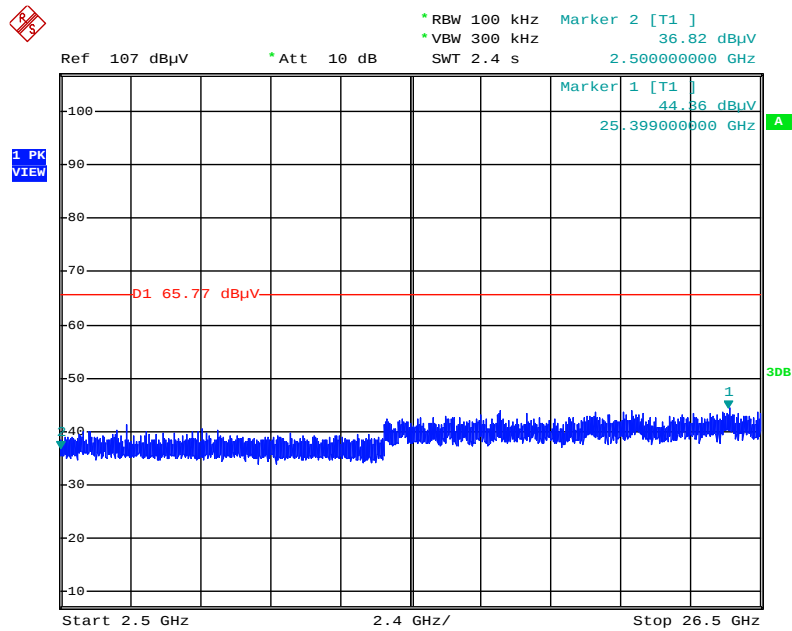
Date: 30.OCT.2014 23:52:12

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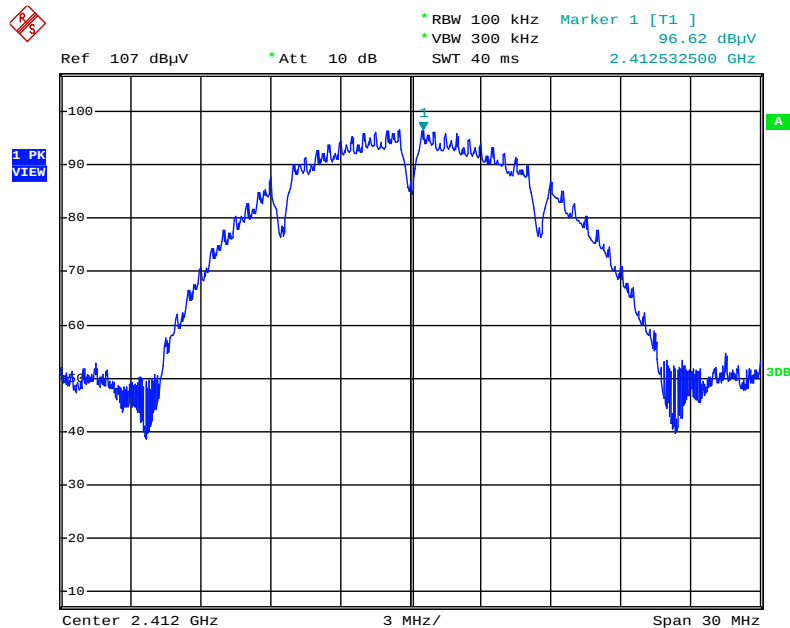
Date: 30.OCT.2014 23:53:01

Plot on Configuration IEEE 802.11n MCS0 HT20 / CH 13 / 2500MHz~26500MHz (down 30dBc)



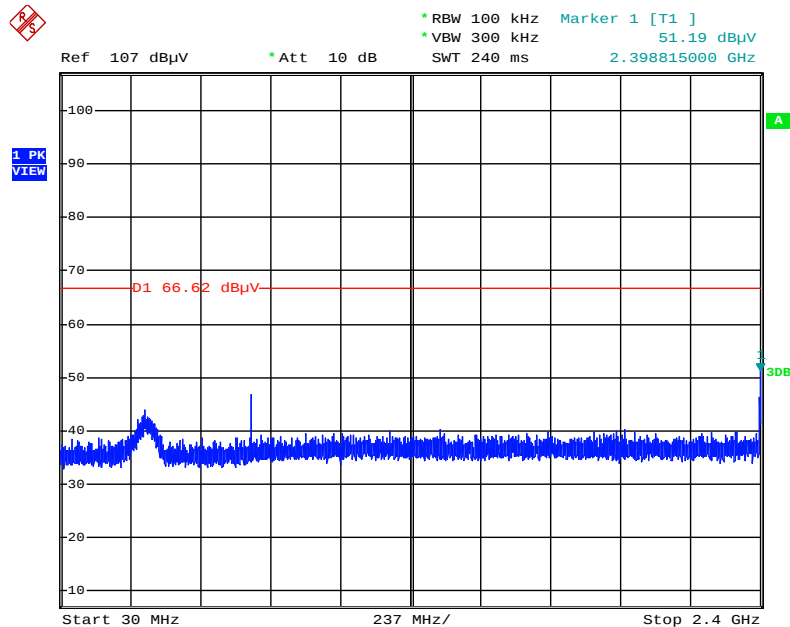
Date: 30.OCT.2014 23:53:22

Plot on Configuration IEEE 802.11b / Reference Level



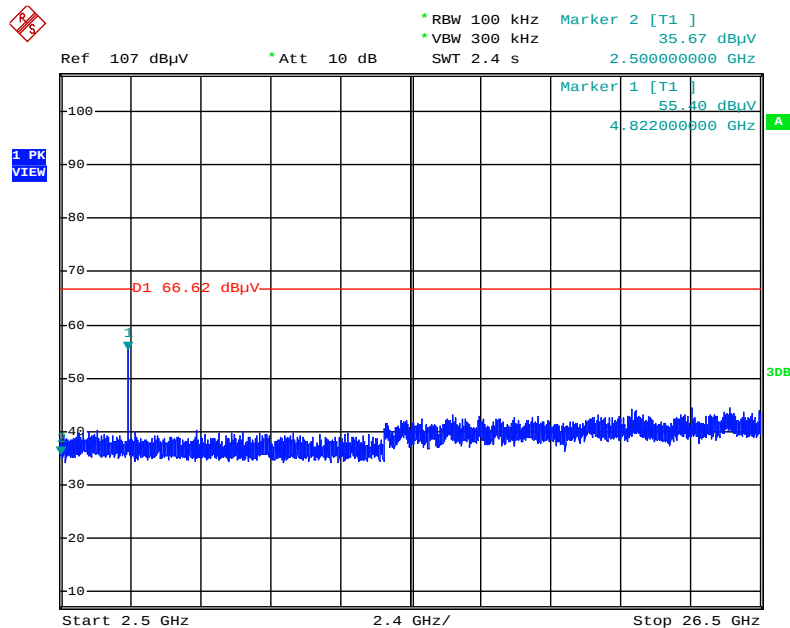
Date: 30.OCT.2014 23:20:21

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



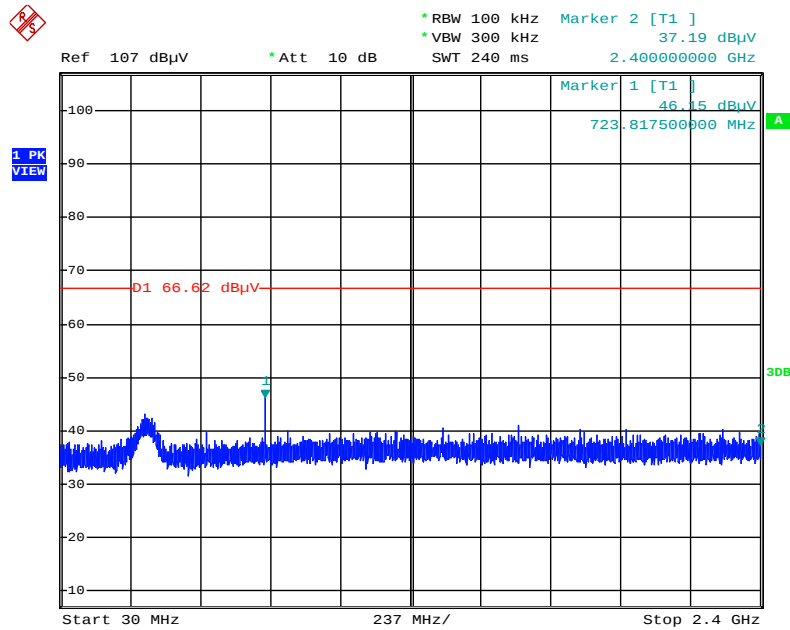
Date: 30.OCT.2014 23:21:03

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



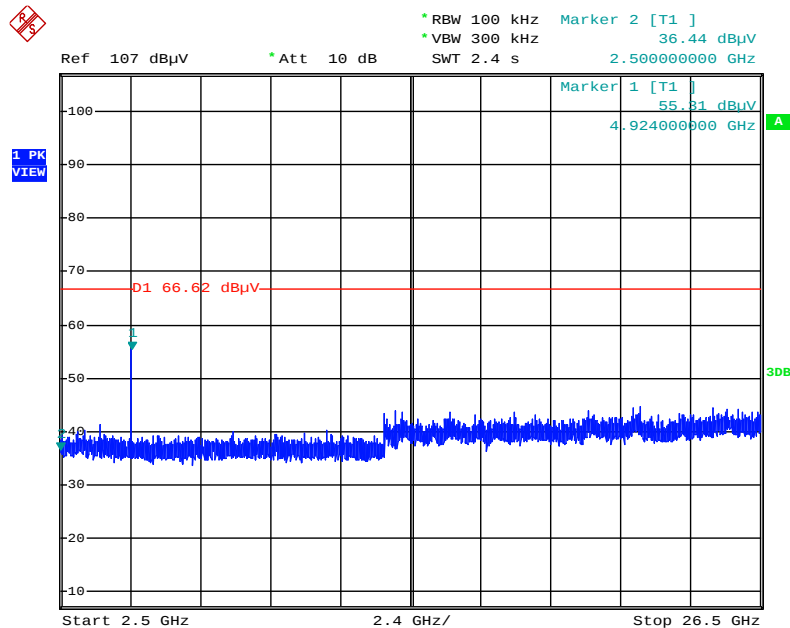
Date: 30.OCT.2014 23:21:23

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



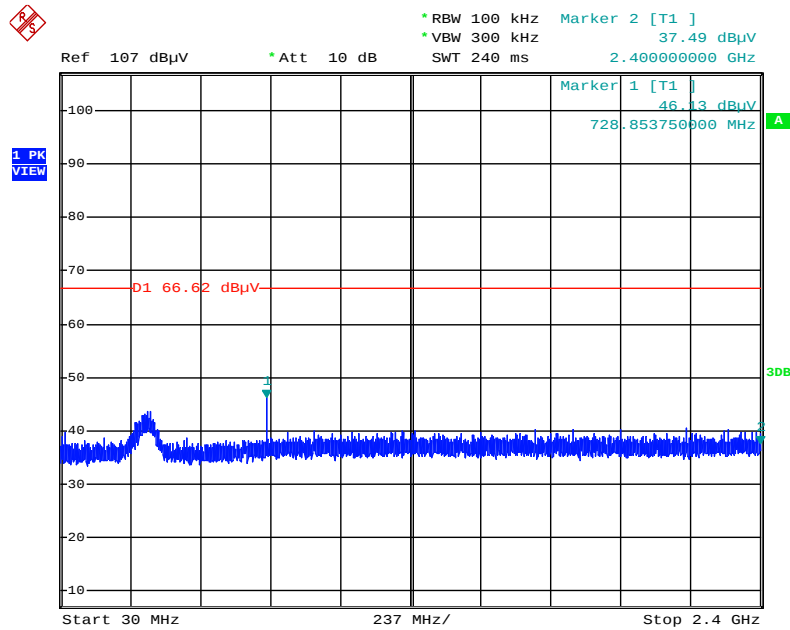
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Plot on Configuration IEEE 802.11b / CH 11 / 2500MHz~26500MHz (down 30dBc)



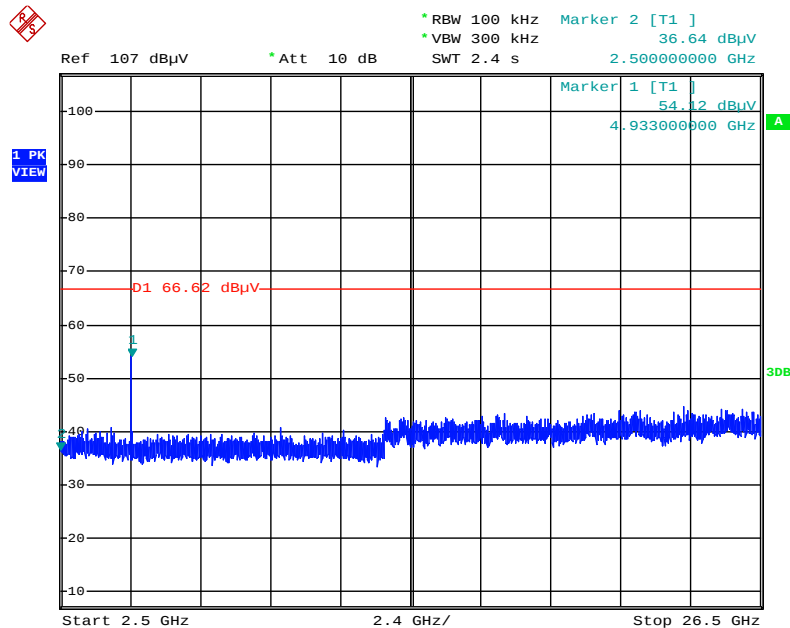
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Plot on Configuration IEEE 802.11b / CH 12 / 30MHz~2400MHz (down 30dBc)



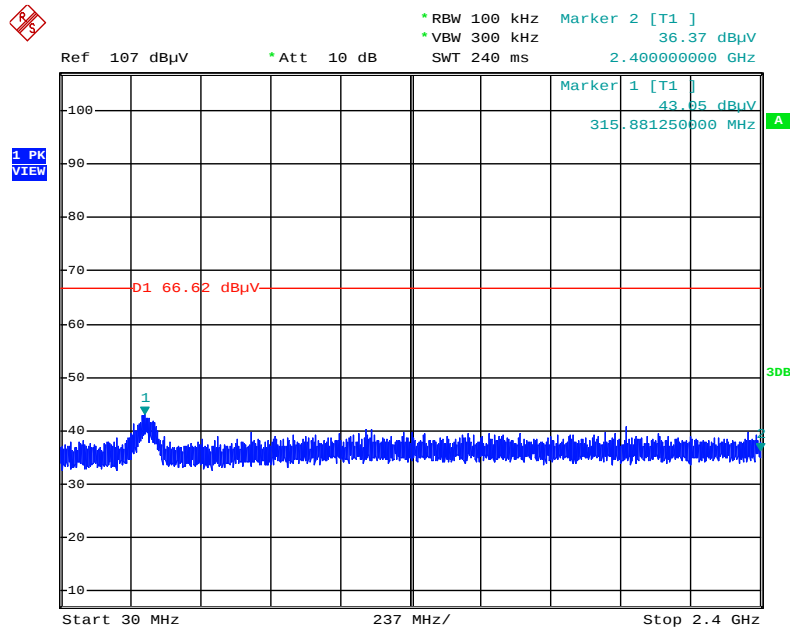
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Plot on Configuration IEEE 802.11b / CH 12 / 2500MHz~26500MHz (down 30dBc)



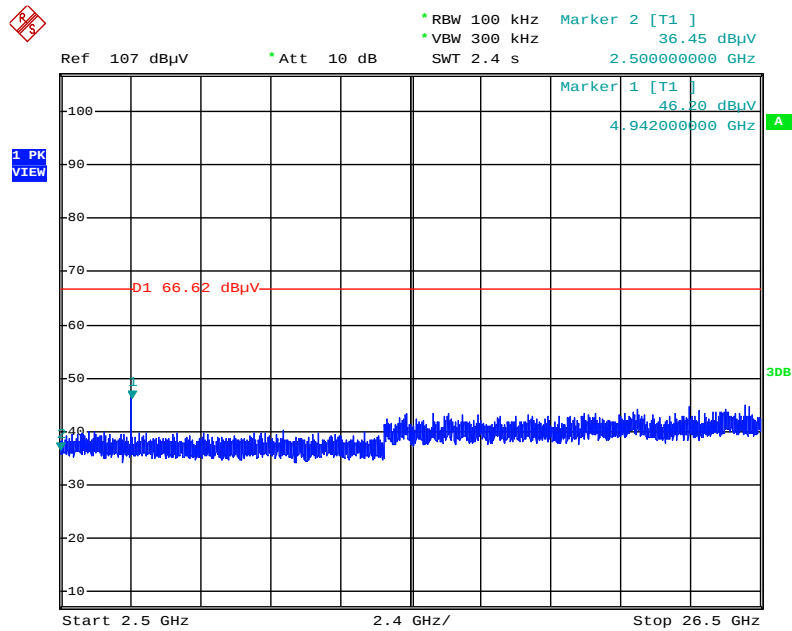
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Plot on Configuration IEEE 802.11b / CH 13 / 30MHz~2400MHz (down 30dBc)



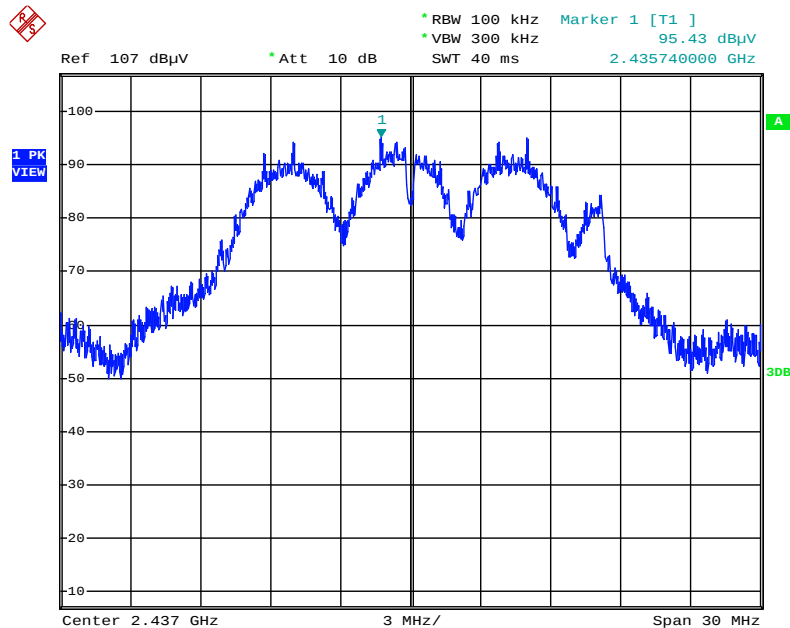
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Plot on Configuration IEEE 802.11b / CH 13 / 2500MHz~26500MHz (down 30dBc)



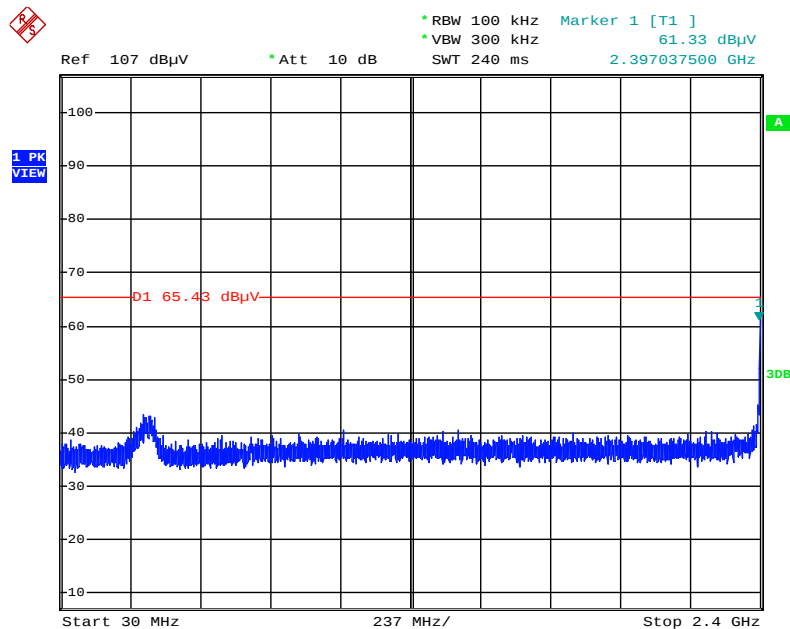
Date: 30.OCT.2014 23:30:50

Plot on Configuration IEEE 802.11g / Reference Level



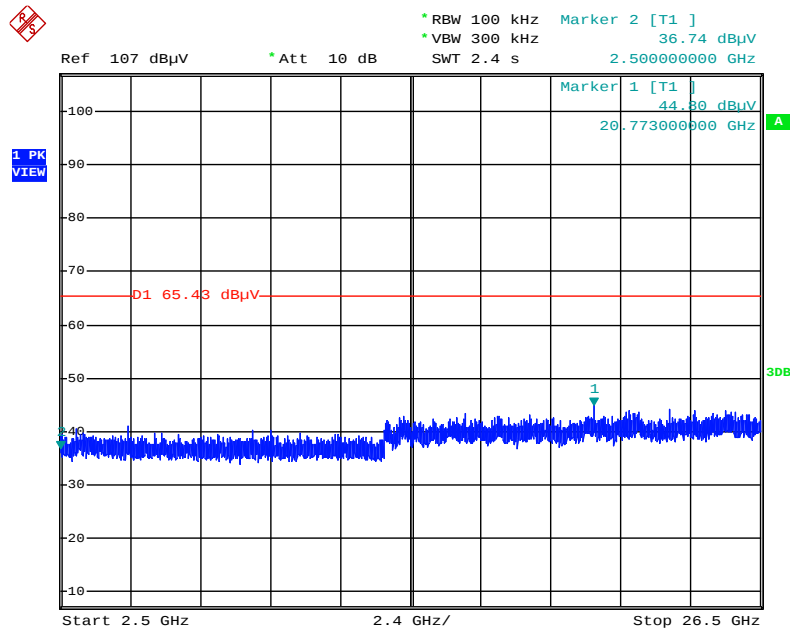
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Plot on Configuration IEEE 802.11g / CH 1 / 30MHz~2400MHz (down 30dBc)



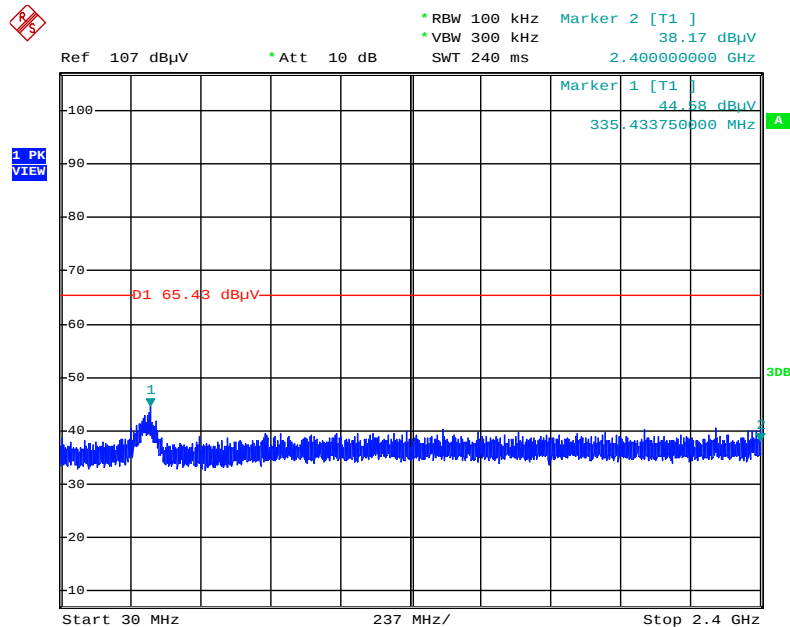
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Plot on Configuration IEEE 802.11g / CH 1 / 2500MHz~26500MHz (down 30dBc)



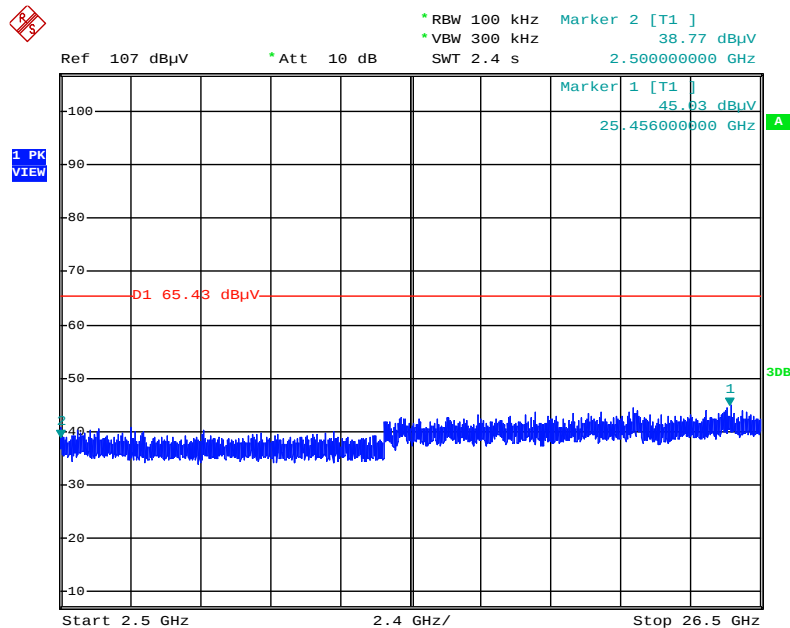
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Plot on Configuration IEEE 802.11g / CH 11 / 30MHz~2400MHz (down 30dBc)



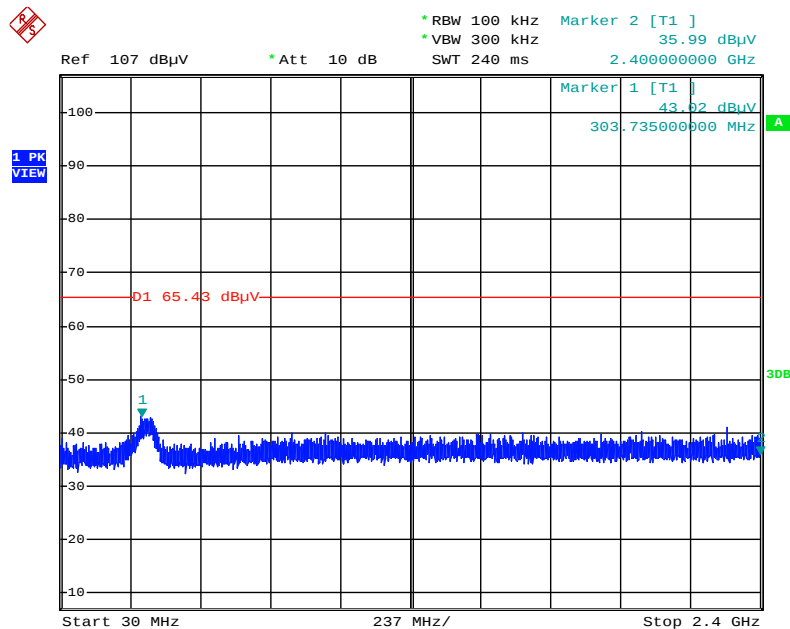
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Plot on Configuration IEEE 802.11g / CH 11 / 2500MHz~26500MHz (down 30dBc)



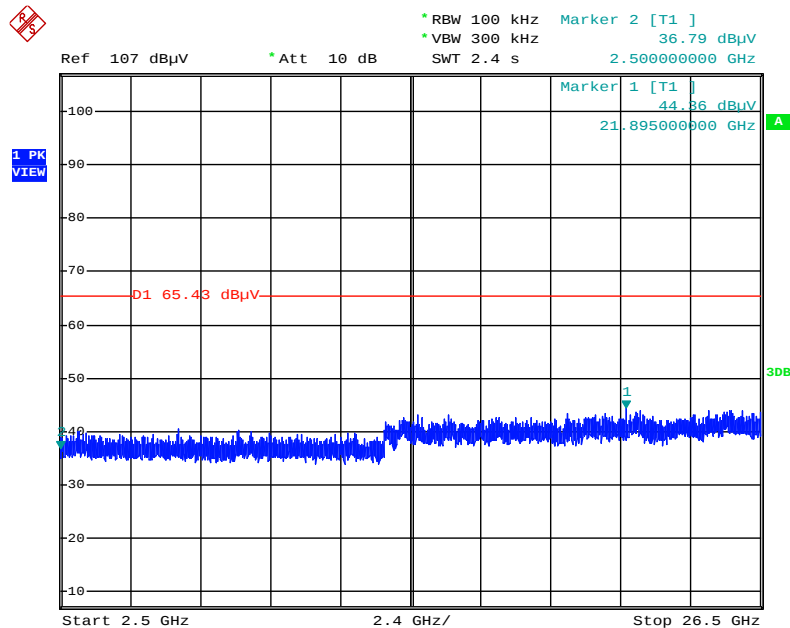
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Plot on Configuration IEEE 802.11g / CH 12 / 30MHz~2400MHz (down 30dBc)



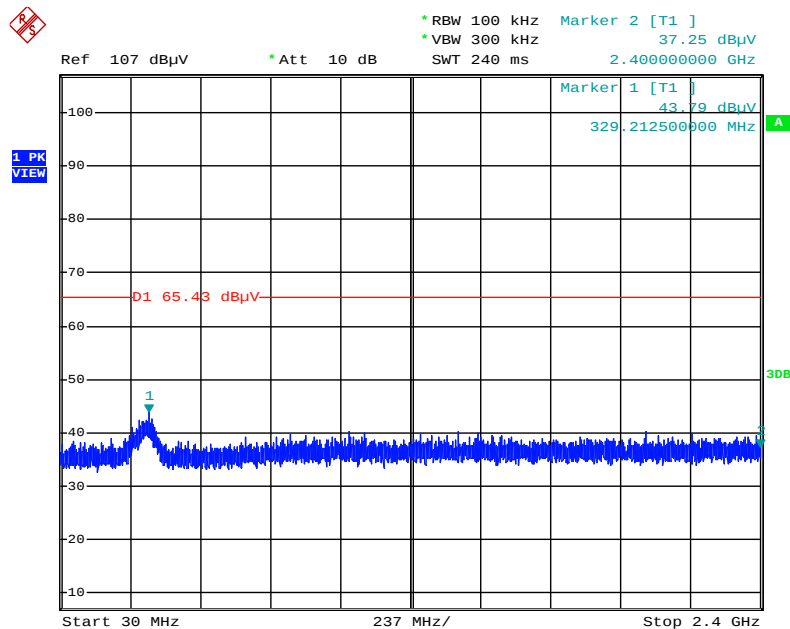
Date: 30.OCT.2014 23:40:51

Plot on Configuration IEEE 802.11g / CH 12 / 2500MHz~26500MHz (down 30dBc)



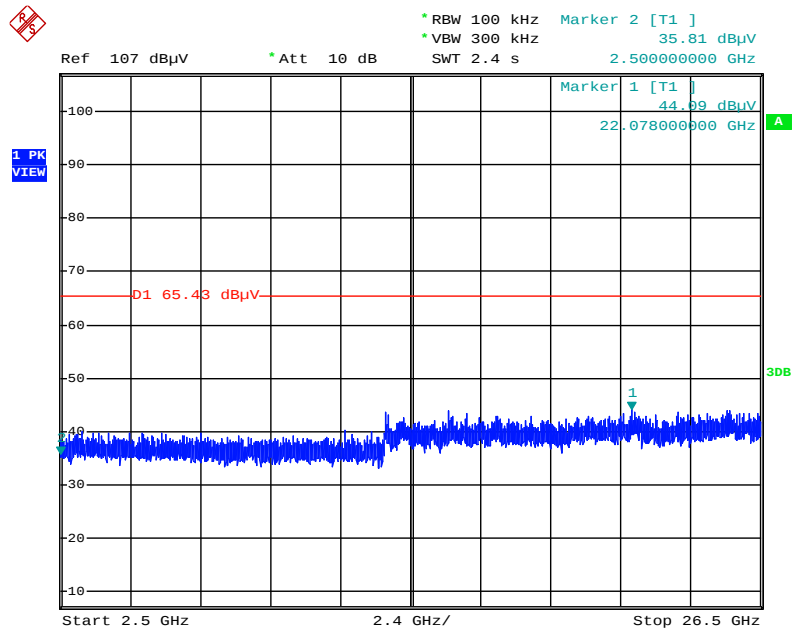
Date: 30.OCT.2014 23:41:11

Plot on Configuration IEEE 802.11g / CH 13 / 30MHz~2400MHz (down 30dBc)



Date: 30.OCT.2014 23:41:53

Plot on Configuration IEEE 802.11g / CH 13 / 2500MHz~26500MHz (down 30dBc)



Date: 30.OCT.2014 23:42:11

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	100355	9kHz ~ 2.75GHz	Apr. 23, 2014	Conduction (CO01-CB)
LISN	F.C.C.	FCC-LISN-50-16-2	04083	150kHz ~ 100MHz	Nov. 23, 2013	Conduction (CO01-CB)
LISN	Schwarzbeck	NSLK 8127	8127647	9kHz ~ 30MHz	Nov. 23, 2013	Conduction (CO01-CB)
COND Cable	Woken	Cable	01	150kHz ~ 30MHz	Dec. 04, 2013	Conduction (CO01-CB)
BILOG ANTENNA	Schaffner	CBL6112D	22021	20MHz ~ 2GHz	May 26, 2014	Radiation (03CH01-CB)
Horn Antenna	EMCO	3115	00075790	750MHz~18GHz	Oct. 28, 2014	Radiation (03CH01-CB)
Pre-Amplifier	Agilent	8447D	2944A10991	0.1MHz ~ 1.3GHz	Nov. 15, 2014	Radiation (03CH01-CB)
Pre-Amplifier	Agilent	8449B	3008A02310	1GHz ~ 26.5GHz	Dec. 16, 2013	Radiation (03CH01-CB)
Spectrum analyzer	R&S	FSP40	100019	9kHz~40GHz	Dec. 02, 2013	Radiation (03CH01-CB)
EMI Test Receiver	Agilent	N9038A	MY52260123	9kHz ~ 8GHz	Dec. 12, 2013	Radiation (03CH01-CB)
Turn Table	INN CO	CO 2000	N/A	0 ~ 360 degree	N.C.R.	Radiation (03CH01-CB)
Antenna Mast	INN CO	CO 2000	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. 15, 2014	Radiation (03CH01-CB)
RF Cable-high	Woken	High Cable-1	N/A	1 GHz - 26.5 GHz	Nov. 15, 2014	Radiation (03CH01-CB)
Signal analyzer	R&S	FSV40	100979	9kHz~40GHz	Nov. 29, 2013	Conducted (TH01-CB)
RF Cable-high	Woken	High Cable-7	-	1 GHz - 26.5 GHz	Nov. 17, 2013	Conducted (TH01-CB)
RF Cable-high	Woken	High Cable-8	-	1 GHz - 26.5 GHz	Nov. 17, 2013	Conducted (TH01-CB)
RF Cable-high	Woken	High Cable-9	-	1 GHz - 26.5 GHz	Nov. 17, 2013	Conducted (TH01-CB)
RF Cable-high	Woken	High Cable-10	-	1 GHz - 26.5 GHz	Nov. 17, 2013	Conducted (TH01-CB)
RF Cable-high	Woken	High Cable-11	-	1 GHz - 26.5 GHz	Nov. 17, 2013	Conducted (TH01-CB)
Power Sensor	Anritsu	MA2411B	1126203	300MHz~40GHz	Oct. 06, 2014	Conducted (TH01-CB)
Power Meter	Anritsu	ML2495A	1210004	300MHz~40GHz	Oct. 06, 2014	Conducted (TH01-CB)

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

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

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

6. MEASUREMENT UNCERTAINTY

Test Items	Uncertainty	Remark
Conducted Emission (150kHz ~ 30MHz)	2.4 dB	Confidence levels of 95%
Radiated Emission (30MHz ~ 1,000MHz)	3.6 dB	Confidence levels of 95%
Radiated Emission (1GHz ~ 18GHz)	3.7 dB	Confidence levels of 95%
Radiated Emission (18GHz ~ 40GHz)	3.5 dB	Confidence levels of 95%
Conducted Emission	1.7 dB	Confidence levels of 95%