



# SPORTON International Inc.

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## FCC RADIO TEST REPORT

Applicant's company	Alpha Networks Inc.
Applicant Address	No.8 Li-shing 7th Rd., Science-based Industrial Park, Hsinchu, 300 Taiwan
FCC ID	RRK-EA-7HW02AP1

Product Name	Wireless Access Point
Brand Name	Panasonic
Model No.	EA-7HW02AP1W, EA-7HW02AP1T, EA-7HW02AP1K
Test Rule Part(s)	47 CFR FCC Part 15 Subpart C § 15.247
Test Freq. Range	2400 ~ 2483.5MHz
Received Date	Oct. 02, 2013
Final Test Date	Feb. 02, 2015
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 C63.10-2009, 47 CFR FCC Part 15 Subpart C, KDB 558074 D01 v03r03, KDB 662911 D01 v02r01**

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

Note: Using 1.5m table as an alternative was permitted by the FCC per TCBC conference call of Dec. 2, 2014.





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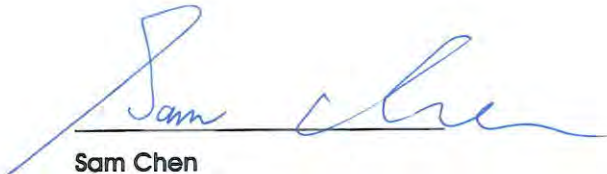
## History of This Test Report

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FR432156-06AA	Rev. 01	Initial issue of report	Dec. 29, 2015

## 1. VERIFICATION OF COMPLIANCE

Product Name : Wireless Access Point  
Brand Name : Panasonic  
Model No. : EA-7HW02AP1W, EA-7HW02AP1T, EA-7HW02AP1K  
Applicant : Alpha Networks Inc.  
Test Rule Part(s) : 47 CFR FCC Part 15 Subpart C § 15.247

Sporton International as requested by the applicant to evaluate the EMC performance of the product sample received on Oct. 02, 2013 would like to declare that the tested sample has been evaluated and found to be in compliance with the tested rule parts. The data recorded as well as the test configuration specified is true and accurate for showing the sample's EMC nature.



Sam Chen

SPORTON INTERNATIONAL INC.

## 2. SUMMARY OF THE TEST RESULT

Applied Standard: 47 CFR FCC Part 15 Subpart C				
Part	Rule Section	Description of Test	Result	Under Limit
4.1	15.207	AC Power Line Conducted Emissions	Complies	14.89 dB
4.2	15.247(b)(3)	Maximum Conducted Output Power	Complies	1.77 dB
4.3	15.247(e)	Power Spectral Density	Complies	1.49 dB
4.4	15.247(a)(2)	6dB Spectrum Bandwidth	Complies	-
4.5	15.247(d)	Radiated Emissions	Complies	0.38 dB
4.6	15.247(d)	Band Edge Emissions	Complies	0.13 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 (HT20): 18.08 MHz ; MCS0 (HT40): 36.48 MHz
Maximum Conducted Output Power	MCS0 (HT20): 27.82 dBm ; MCS0 (HT40): 21.09 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 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: 10.64 MHz ; 11g: 16.88 MHz
Maximum Conducted Output Power	11b: 28.23 dBm ; 11g: 28.15 dBm
Carrier Frequencies	Please refer to section 3.4
Antenna	Please refer to section 3.3

Items	Description	
Beamforming Function	<input type="checkbox"/> With beamforming	<input checked="" type="checkbox"/> Without beamforming

**Antenna and Band width**

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

**IEEE 11n Spec.**

Protocol	Number of Transmit Chains (NTX)	Data Rate / MCS
802.11n (HT20)	2	MCS0-15
802.11n (HT40)	2	MCS0-15

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	Panasonic	UIA336-1220	Input: 100-240Vac, 50/60Hz, 0.9A Output: 12Vdc, 2A
<b>Others</b>			
Wall-mounted rack*1			
Foot holder*1			



### 3.3. Table for Filed Antenna

Ant.	Brand	P/N	Type	Connector	Gain (dBi)		Cable loss (dBi)		True Gain (dBi)	
					2.4GHz	5GHz	2.4GHz	5GHz	2.4GHz	5GHz
1	HONGLIN	290-20113	PIFA Antenna	I-PEX	2.67	-	0.47	-	2.2	-
2	HONGLIN	290-20113	PIFA Antenna	Murata	3.88	-	-	-	3.88	-
3	HONGLIN	290-20114	PIFA Antenna	Murata	-	Note 1	-	-	-	Note 1
4	HONGLIN	290-20114	PIFA Antenna	I-PEX	-	Note 1	-	Note 1	-	Note 1

Note 1:

Ant. 3		Ant. 4			
Frequency (MHz)	Gain (dBi)	Frequency (MHz)	Gain (dBi)	Cable loss (dBi)	True Gain (dBi)
5180	3.66	5180	3.51	0.46	3.05
5190	3.66	5190	3.51	0.46	3.05
5200	3.66	5200	3.51	0.46	3.05
5210	3.66	5210	3.51	0.46	3.05
5230	3.66	5230	3.51	0.46	3.05
5240	3.66	5240	3.51	0.46	3.05
5745	4.03	5745	5.1	0.46	4.64
5755	4.03	5755	5.1	0.46	4.64
5775	4.03	5775	5.1	0.46	4.64
5785	4.03	5785	5.1	0.46	4.64
5795	4.02	5795	4.9	0.46	4.44
5825	4.02	5825	4.9	0.46	4.44

Note 2:

<2.4GHz>

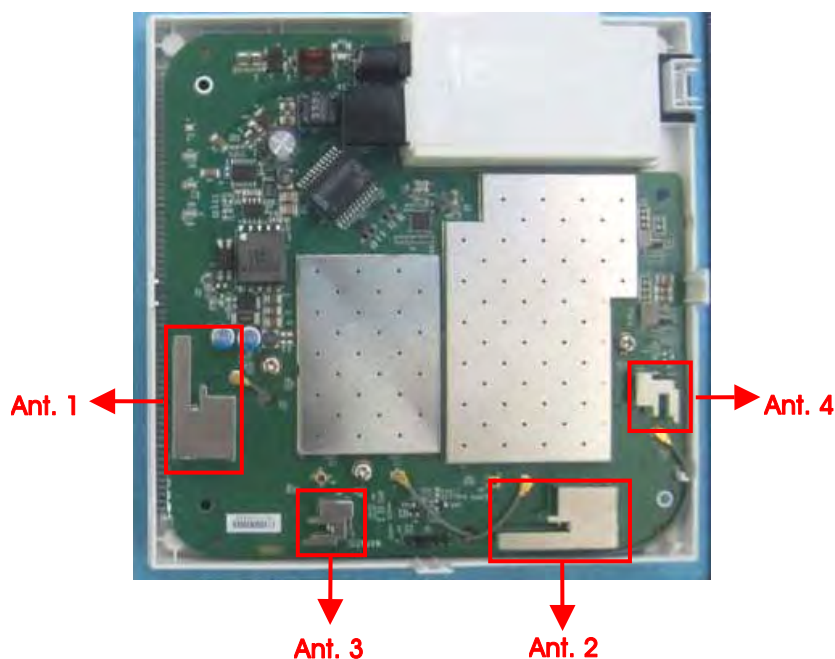
For IEEE 802.11b/g/n mode (2TX/2RX)

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

<5GHz>

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

Ant. 3 and Ant. 4 could transmit/receive simultaneously.



### 3.4. Table for Carrier Frequencies

There are two bandwidth systems.

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

For 40MHz bandwidth systems, use Channel 3~Channel 9.

Frequency Band	Channel No.	Frequency	Channel No.	Frequency
2400~2483.5MHz	1	2412 MHz	7	2442 MHz
	2	2417 MHz	8	2447 MHz
	3	2422 MHz	9	2452 MHz
	4	2427 MHz	10	2457 MHz
	5	2432 MHz	11	2462 MHz
	6	2437 MHz	-	-

### 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	11n HT20	MCS0	1/6/11	1+2
	11n HT40	MCS0	3/6/9	1+2
	11b/CCK	1 Mbps	1/6/11	1+2
	11g/BPSK	6 Mbps	1/6/11	1+2
Power Spectral Density	11n HT20	MCS0	1/6/11	1+2
	11n HT40	MCS0	3/6/9	1+2
	11b/CCK	1 Mbps	1/6/11	1+2
	11g/BPSK	6 Mbps	1/6/11	1+2
6dB Spectrum Bandwidth	11n HT20	MCS0	1/6/11	1+2
	11n HT40	MCS0	3/6/9	1+2
	11b/CCK	1 Mbps	1/6/11	1+2
	11g/BPSK	6 Mbps	1/6/11	1+2
Radiated Emissions Below 1GHz	Normal Link	-	-	-
Radiated Emissions Above 1GHz	11n HT20	MCS0	1/6/11	1+2
	11n HT40	MCS0	3/6/9	1+2
	11b/CCK	1 Mbps	1/6/11	1+2
	11g/BPSK	6 Mbps	1/6/11	1+2
Band Edge Emissions	11n HT20	MCS0	1/6/11	1+2
	11n HT40	MCS0	3/6/9	1+2
	11b/CCK	1 Mbps	1/6/11	1+2
	11g/BPSK	6 Mbps	1/6/11	1+2

The following test modes were performed for all tests:

**For AC Power Line Conducted Emissions test:**

Mode 1. EUT + Adapter

**For Radiated Emission test below 1GHz:**

Mode 1. EUT laying + Adapter

Mode 2. EUT standing + Adapter

Mode 1 generated the worst test result, so it was recorded in this report.

**For Radiated Emission test above 1GHz and Radiated Emission Co-location test:**

There are two modes of EUT, one is EUT laying, and the other is EUT standing.

After evaluating, EUT standing has been evaluated to be the worst case, thus the measurement for radiated emission above 1GHz and radiated emission co-location test will follow this same test configuration.

**For Co-location MPE and Radiated Emission Co-location test:**

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

### 3.6. Table for Testing Locations

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

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

### 3.7. Table for Multiple List

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

Model No.	Color of housing
EA-7HW02AP1W	White
EA-7HW02AP1T	Brown
EA-7HW02AP1K	Black

From the above models, model: EA-7HW02AP1W was selected as representative model for the test and its data was recorded in this report.

### 3.8. Table for Supporting Units

For Test Site No: CO01-CB

Support Unit	Brand	Model	FCC ID
NB	DELL	E6430	DoC
NB	DELL	E6430	DoC
NB	DELL	E6430	DoC

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

Support Unit	Brand	Model	FCC ID
NB	DELL	M1330	DoC
NB	DELL	E6430	DoC
NB	DELL	D420	DoC

For Test Site No: 03CH01-CB (above 1GHz) and TH01-CB

Support Unit	Brand	Model	FCC ID
NB	DELL	E6430	DoC

### 3.9. 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 MCS0 HT20

Test Software Version	DOS		
Frequency	2412 MHz	2437 MHz	2462 MHz
MCS0 HT20	16.5	24.5	16.5

#### Power Parameters of IEEE 802.11n MCS0 HT40

Test Software Version	DOS		
Frequency	2422 MHz	2437 MHz	2452 MHz
MCS0 HT40	13	17	14.5

#### Power Parameters of IEEE 802.11b/g

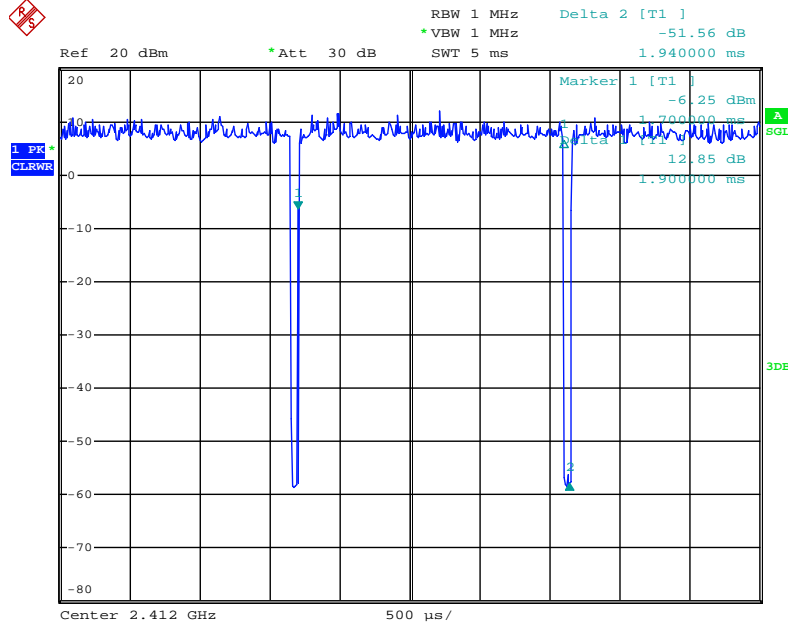
Test Software Version	DOS		
Frequency	2412 MHz	2437 MHz	2462 MHz
IEEE 802.11b	24	24.5	24
IEEE 802.11g	17	25	17

### 3.10. EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

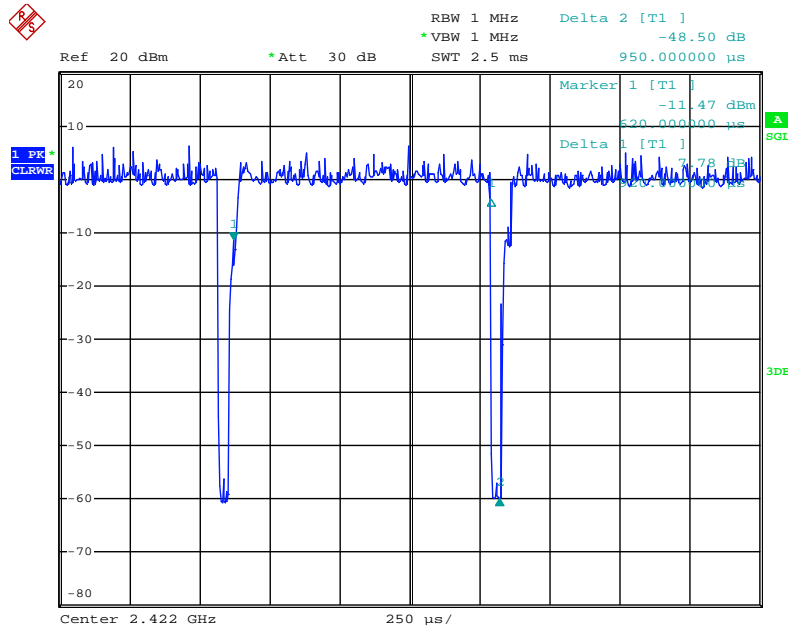
### 3.11. Duty Cycle

#### IEEE 802.11n MCS0 HT20



Date: 20.MAR.2014 17:11:55

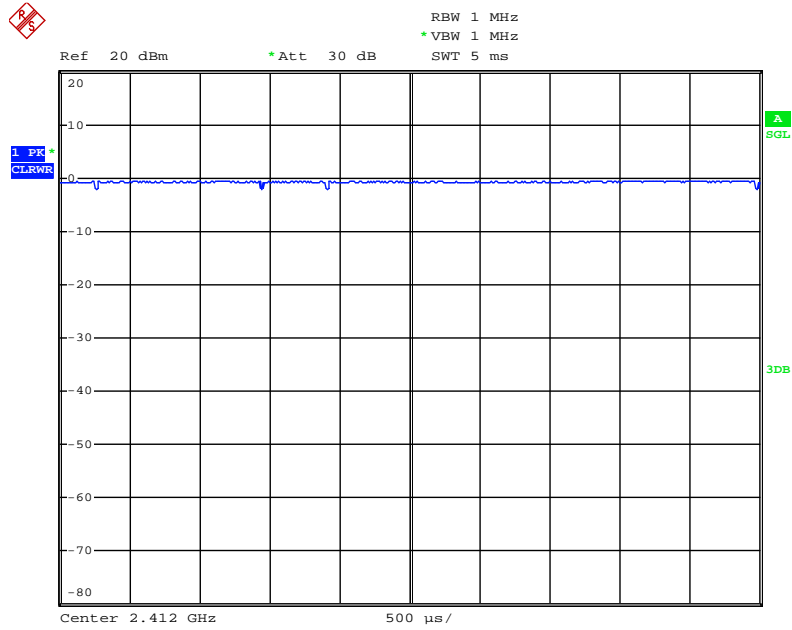
#### IEEE 802.11n MCS0 HT40



Date: 20.MAR.2014 17:10:28

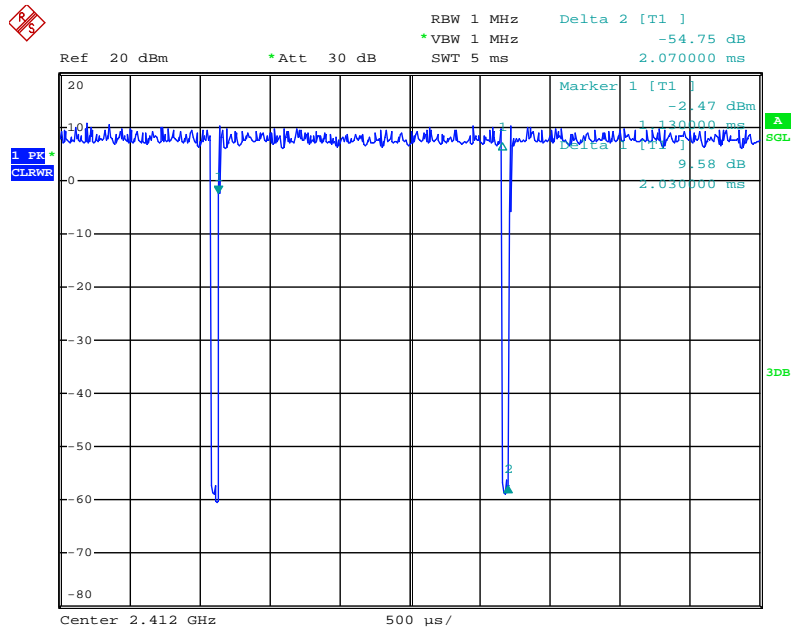


IEEE 802.11b



Date: 20.MAR.2014 17:14:25

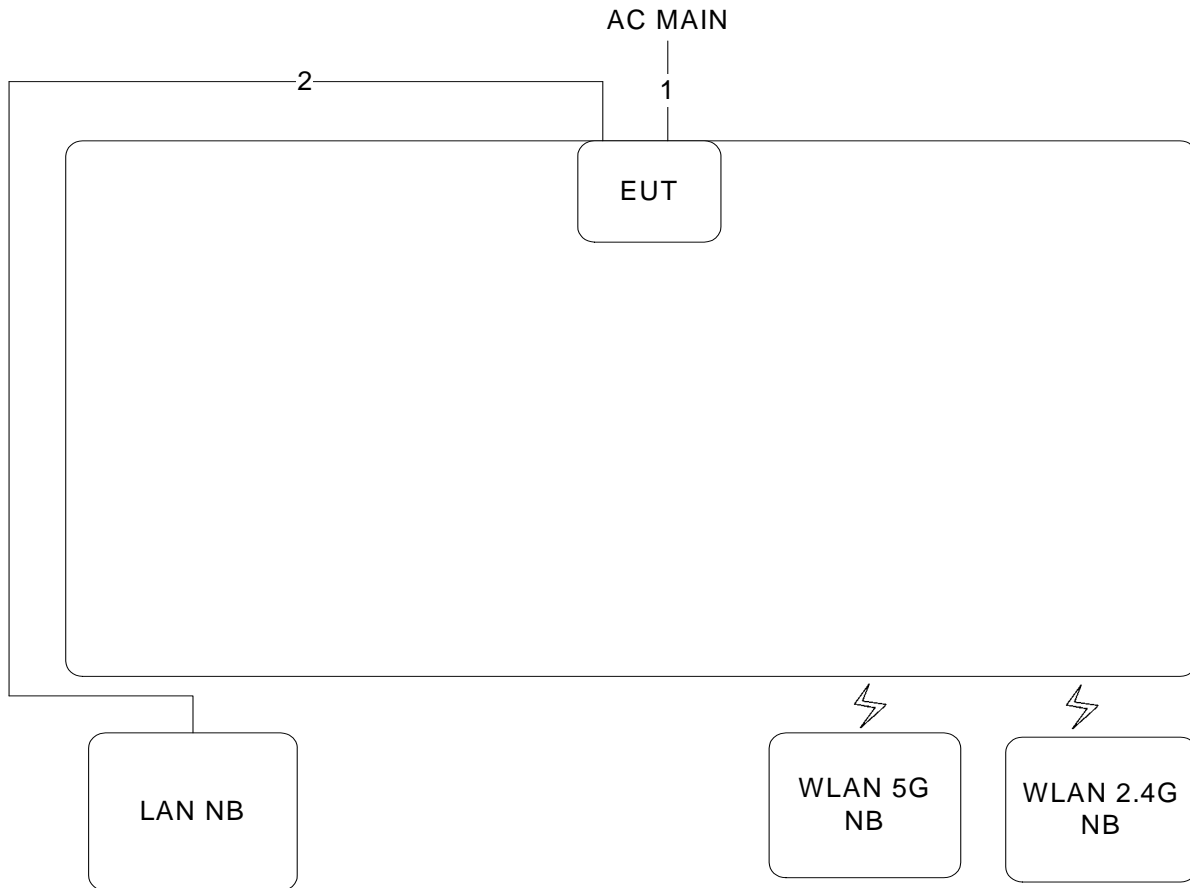
IEEE 802.11g



Date: 20.MAR.2014 17:13:20

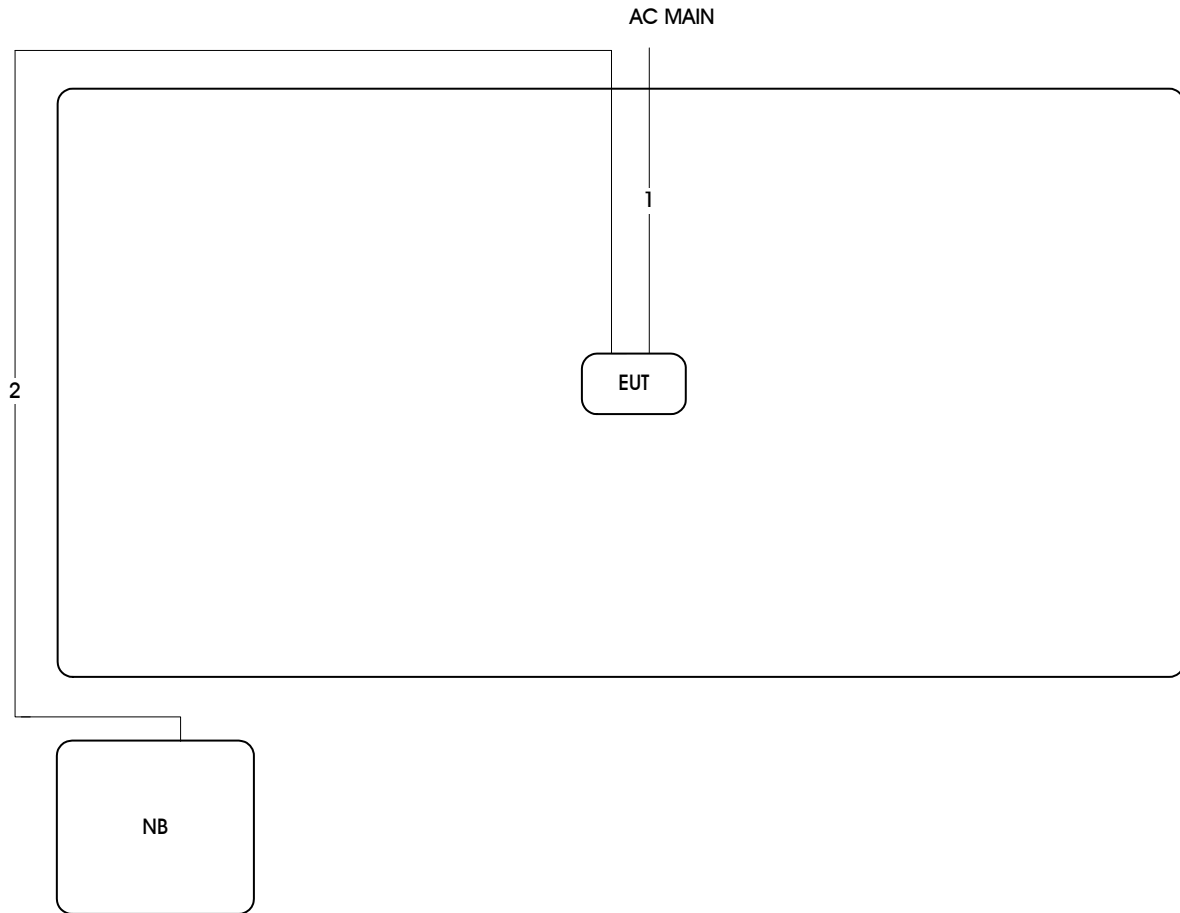
### 3.12. Test Configurations

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



Item	Connection	Shielded	Length
1	Power cable	No	2.2m
2	RJ-45 cable	No	10m

### 3.12.2. Radiation Emissions above 1GHz Test Configuration



Item	Connection	Shielded	Length
1	Power cable	No	2.2m
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

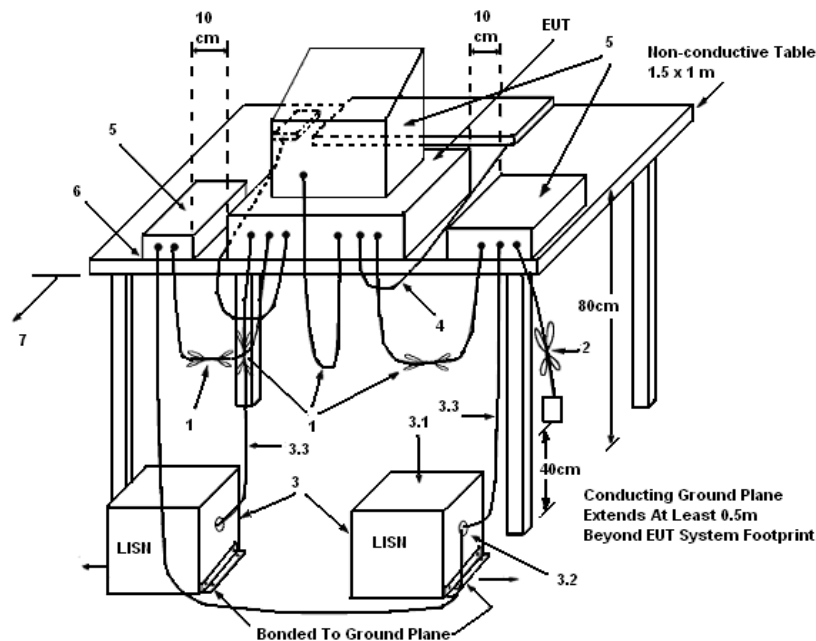
Please refer to section 5 of equipments list in this report. The following table is the setting of the receiver.

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

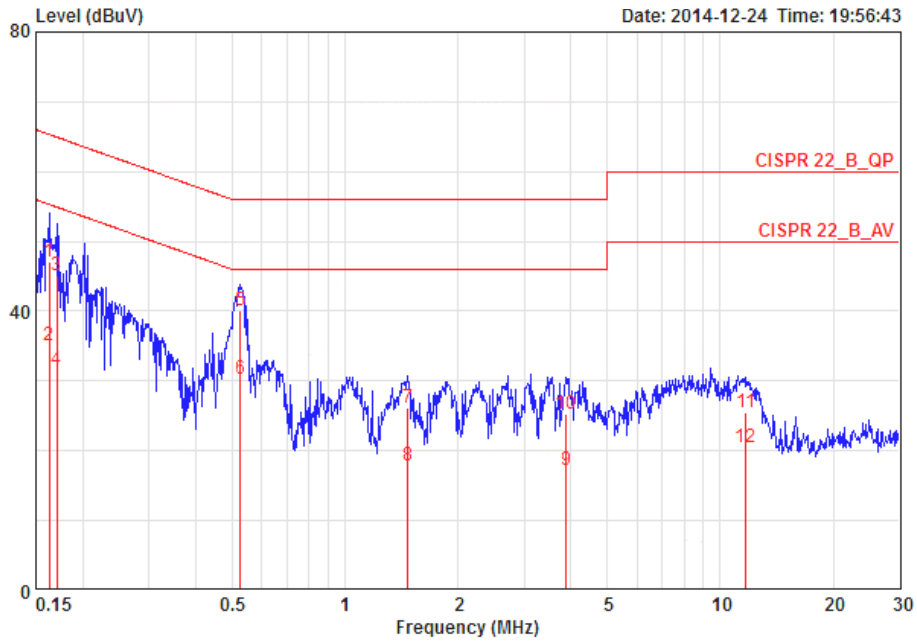
There is no deviation with the original standard.

#### 4.1.6. EUT Operation during Test

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

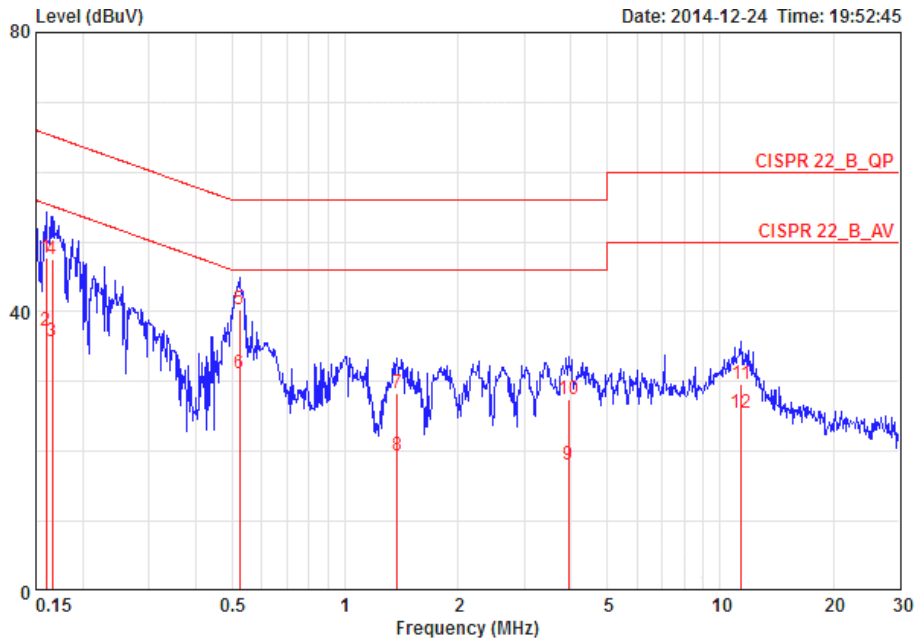
4.1.7. Results of AC Power Line Conducted Emissions Measurement

Temperature	23°C	Humidity	54%
Test Engineer	Hank Yang	Phase	Line
Configuration	Normal Link	Test Mode	Mode 1



	Freq	Level	Over	Limit	Read	LISN	Cable	Remark	Pol/Phase
	MHz	dBuV	Limit	Line	Level	Factor	Loss		
			dB	dBuV	dBuV	dB	dB		
1	0.16241	47.12	-18.22	65.34	37.19	9.77	0.16	QP	LINE
2	0.16241	35.17	-20.17	55.34	25.24	9.77	0.16	AVERAGE	LINE
3	0.17034	45.11	-19.84	64.94	35.17	9.77	0.16	QP	LINE
4	0.17034	31.56	-23.39	54.94	21.62	9.77	0.16	AVERAGE	LINE
5	0.52655	40.21	-15.79	56.00	30.25	9.77	0.19	QP	LINE
6	0.52655	30.36	-15.64	46.00	20.40	9.77	0.19	AVERAGE	LINE
7	1.472	26.10	-29.90	56.00	16.11	9.76	0.23	QP	LINE
8	1.472	17.86	-28.14	46.00	7.87	9.76	0.23	AVERAGE	LINE
9	3.881	17.16	-28.84	46.00	7.15	9.71	0.30	AVERAGE	LINE
10	3.881	25.25	-30.75	56.00	15.24	9.71	0.30	QP	LINE
11	11.683	25.55	-34.45	60.00	15.59	9.57	0.40	QP	LINE
12	11.683	20.39	-29.61	50.00	10.43	9.57	0.40	AVERAGE	LINE

Temperature	23°C	Humidity	54%
Test Engineer	Hank Yang	Phase	Neutral
Configuration	Normal Link	Test Mode	Mode 1



	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark	Pol/Phase
	MHz	dBuV	dB	dBuV	dBuV	dB	dB		
1	0.15985	47.75	-17.72	65.47	37.67	9.92	0.16	QP	NEUTRAL
2	0.15985	37.32	-18.15	55.47	27.24	9.92	0.16	AVERAGE	NEUTRAL
3	0.16589	35.77	-19.39	55.16	25.69	9.92	0.16	AVERAGE	NEUTRAL
4	0.16589	47.47	-17.69	65.16	37.39	9.92	0.16	QP	NEUTRAL
5	0.52376	40.31	-15.69	56.00	30.21	9.91	0.19	QP	NEUTRAL
6 e	0.52376	31.11	-14.89	46.00	21.01	9.91	0.19	AVERAGE	NEUTRAL
7	1.374	28.28	-27.72	56.00	18.15	9.91	0.22	QP	NEUTRAL
8	1.374	19.43	-26.57	46.00	9.30	9.91	0.22	AVERAGE	NEUTRAL
9	3.943	18.12	-27.88	46.00	7.96	9.86	0.30	AVERAGE	NEUTRAL
10	3.943	27.42	-28.58	56.00	17.26	9.86	0.30	QP	NEUTRAL
11	11.377	29.67	-30.33	60.00	19.52	9.76	0.39	QP	NEUTRAL
12	11.377	25.41	-24.59	50.00	15.26	9.76	0.39	AVERAGE	NEUTRAL

Note:

$$\text{Level} = \text{Read Level} + \text{LISN Factor} + \text{Cable Loss}$$

## 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

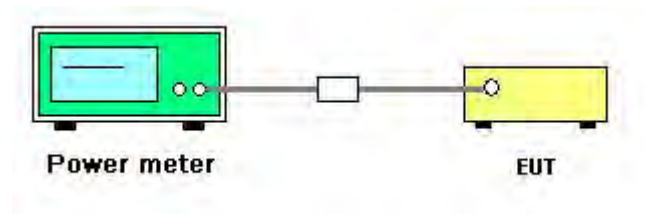
Please refer to section 5 of equipments list in this report. The following table is the setting of the power meter.

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 v03r03 section 9.2.2 Measurement using a power meter (PM).
2. This procedure provides an alternative for determining the RMS output power using a broadband RF average power meter with a thermocouple detector.

### 4.2.4. Test Setup Layout



### 4.2.5. Test Deviation

There is no deviation with the original standard.

### 4.2.6. EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.



#### 4.2.7. Test Result of Maximum Conducted Output Power

Temperature	20°C	Humidity	52%
Test Engineer	Jim Huang	Configurations	IEEE 802.11n
Test Date	Mar. 20, 2014		

##### Configuration IEEE 802.11n MCS0 HT20

Channel	Frequency	Conducted Power (dBm)			Max. Limit (dBm)	Result
		Ant. 1	Ant. 2	Total		
1	2412 MHz	17.33	17.68	20.52	30.00	Complies
6	2437 MHz	24.82	24.79	27.82	30.00	Complies
11	2462 MHz	17.48	17.45	20.48	30.00	Complies

##### Configuration IEEE 802.11n MCS0 HT40

Channel	Frequency	Conducted Power (dBm)			Max. Limit (dBm)	Result
		Ant. 1	Ant. 2	Total		
3	2422 MHz	14.72	14.57	17.66	30.00	Complies
6	2437 MHz	18.01	18.14	21.09	30.00	Complies
9	2452 MHz	15.68	15.33	18.52	30.00	Complies

<b>Temperature</b>	20°C	<b>Humidity</b>	52%
<b>Test Engineer</b>	Jim Huang	<b>Configurations</b>	IEEE 802.11b/g
<b>Test Date</b>	Mar. 20, 2014		

**Configuration IEEE 802.11b**

Channel	Frequency	Conducted Power (dBm)			Max. Limit (dBm)	Result
		Ant. 1	Ant. 2	Total		
1	2412 MHz	24.89	24.93	27.92	30.00	Complies
6	2437 MHz	25.16	25.27	28.23	30.00	Complies
11	2462 MHz	25.16	25.17	28.18	30.00	Complies

**Configuration IEEE 802.11g**

Channel	Frequency	Conducted Power (dBm)			Max. Limit (dBm)	Result
		Ant. 1	Ant. 2	Total		
1	2412 MHz	17.88	18.11	21.01	30.00	Complies
6	2437 MHz	25.16	25.11	28.15	30.00	Complies
11	2462 MHz	18.29	17.94	21.13	30.00	Complies

### 4.3. Power Spectral Density Measurement

#### 4.3.1. Limit

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

#### 4.3.2. Measuring Instruments and Setting

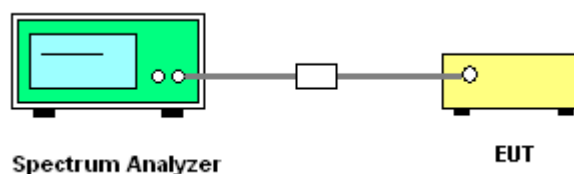
Please refer to section 5 of equipments list in this report. The following table is the setting of the spectrum analyzer.

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

#### 4.3.3. Test Procedures

1. Test procedures refer KDB 558074 D01 v03r03 section 10.2 Method PKPSD (peak PSD) and KDB 662911 D01 v02r01 section In-Band Power Spectral Density (PSD) Measurements option (b) Measure and sum spectral maximal across the outputs.
2. Use this procedure when the maximum conducted output power in the fundamental emission is used to demonstrate compliance. The EUT must be configured to transmit continuously at full power over the measurement duration.
3. Ensure that the number of measurement points in the sweep  $\geq 2 \times \text{span/RBW}$  (use of a greater number of measurement points than this minimum requirement is recommended).
4. Use the peak marker function to determine the maximum level in any 3 kHz band segment within the fundamental EBW.
5. The resulting PSD level must be  $\leq 8 \text{ dBm}$ .

#### 4.3.4. Test Setup Layout



#### 4.3.5. Test Deviation

There is no deviation with the original standard.

#### 4.3.6. EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

#### 4.3.7. Test Result of Power Spectral Density

Temperature	20°C	Humidity	52%
Test Engineer	Jim Huang	Configurations	IEEE 802.11n

##### Configuration IEEE 802.11n MCS0 HT20

Channel	Frequency	Power Density (dBm/3kHz)			Power Density Limit (dBm/3kHz)	Result
		Ant. 1	Ant. 2	Total		
1	2412 MHz	-6.91	-6.88	-3.88	8.00	Complies
6	2437 MHz	0.08	-0.60	2.76	8.00	Complies
11	2462 MHz	-7.46	-7.93	-4.68	8.00	Complies

##### Configuration IEEE 802.11n MCS0 HT40

Channel	Frequency	Power Density (dBm/3kHz)			Power Density Limit (dBm/3kHz)	Result
		Ant. 1	Ant. 2	Total		
3	2422 MHz	-14.34	-13.39	-10.83	8.00	Complies
6	2437 MHz	-7.83	-8.94	-5.34	8.00	Complies
9	2452 MHz	-12.67	-12.75	-9.70	8.00	Complies

<b>Temperature</b>	20°C	<b>Humidity</b>	52%
<b>Test Engineer</b>	Jim Huang	<b>Configurations</b>	IEEE 802.11b/g

**Configuration IEEE 802.11b**

Channel	Frequency	Power Density (dBm/3kHz)			Power Density Limit (dBm/3kHz)	Result
		Ant. 1	Ant. 2	Total		
1	2412 MHz	3.31	3.69	6.51	8.00	Complies
6	2437 MHz	3.46	3.34	6.41	8.00	Complies
11	2462 MHz	3.10	3.24	6.18	8.00	Complies

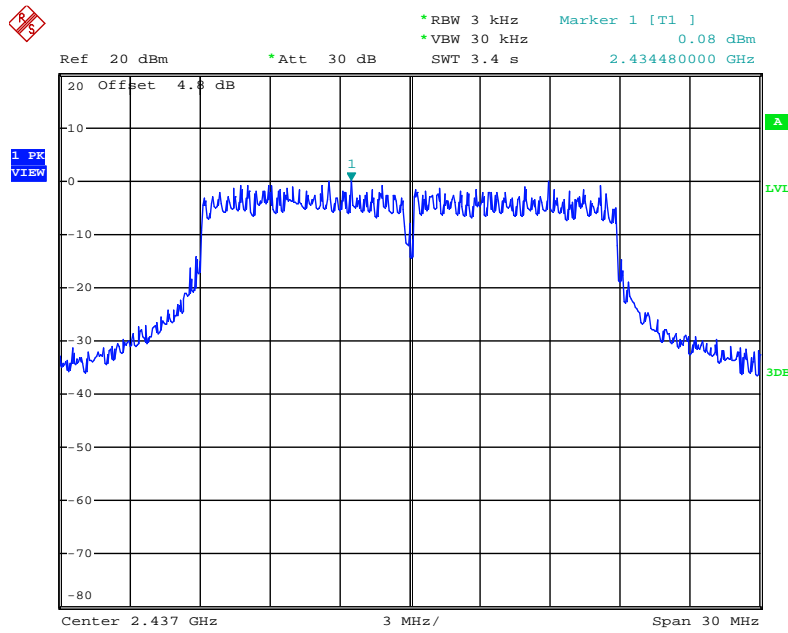
**Configuration IEEE 802.11g**

Channel	Frequency	Power Density (dBm/3kHz)			Power Density Limit (dBm/3kHz)	Result
		Ant. 1	Ant. 2	Total		
1	2412 MHz	-7.03	-6.39	-3.69	8.00	Complies
6	2437 MHz	1.74	0.11	4.01	8.00	Complies
11	2462 MHz	-6.78	-7.18	-3.97	8.00	Complies

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

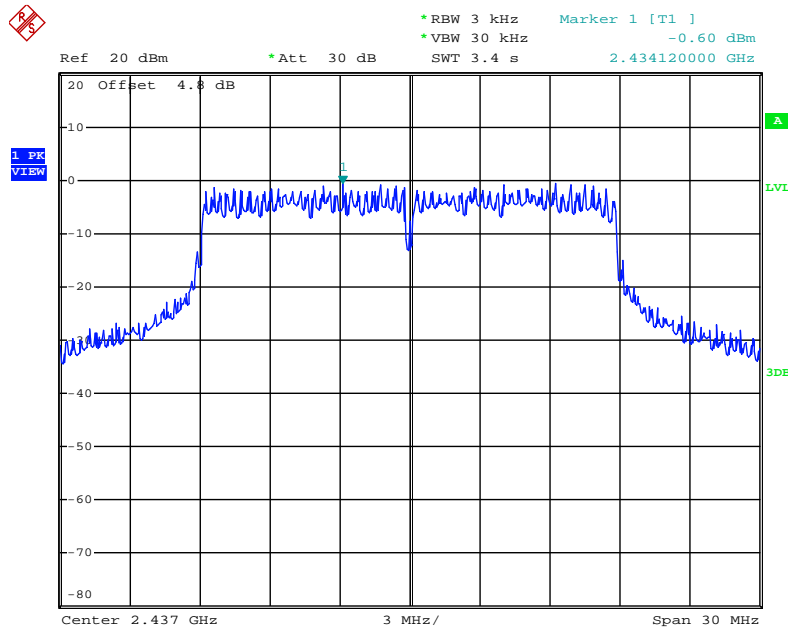
For plots, only the channel with worse result was shown.

**Power Density Plot on Configuration IEEE 802.11n MCS0 HT20 / 2437 MHz / Ant. 1**



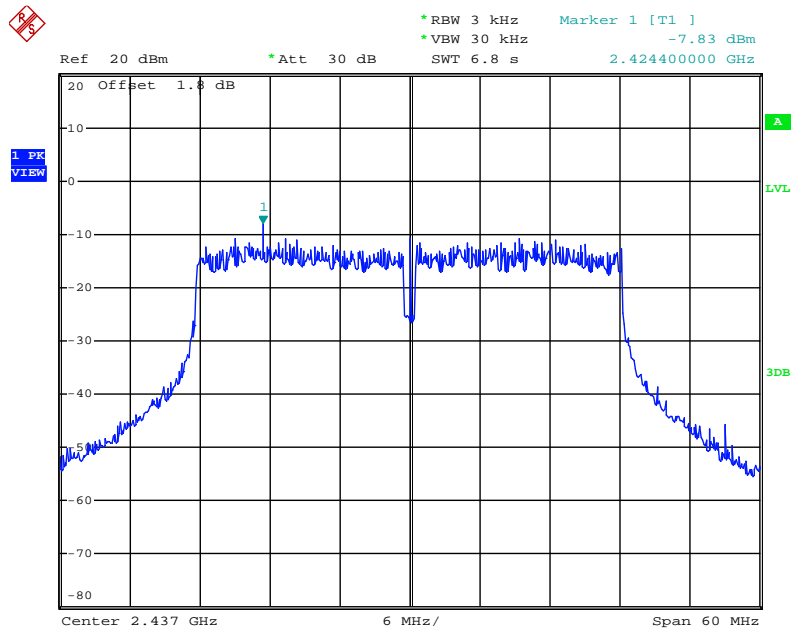
Date: 20.MAR.2014 15:36:55

**Power Density Plot on Configuration IEEE 802.11n MCS0 HT20 / 2437 MHz / Ant. 2**



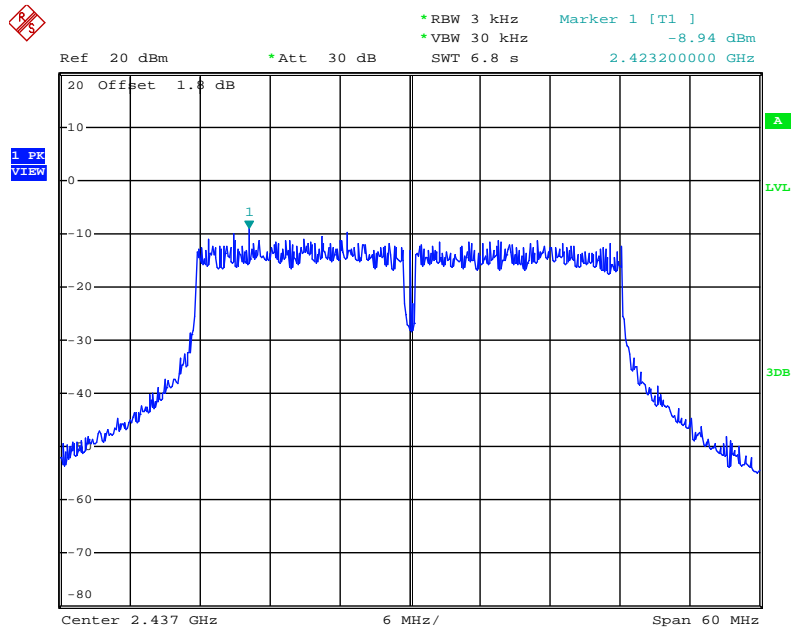
Date: 20.MAR.2014 15:35:58

**Power Density Plot on Configuration IEEE 802.11n MCS0 HT40 / 2437 MHz / Ant. 1**



Date: 20.MAR.2014 15:45:38

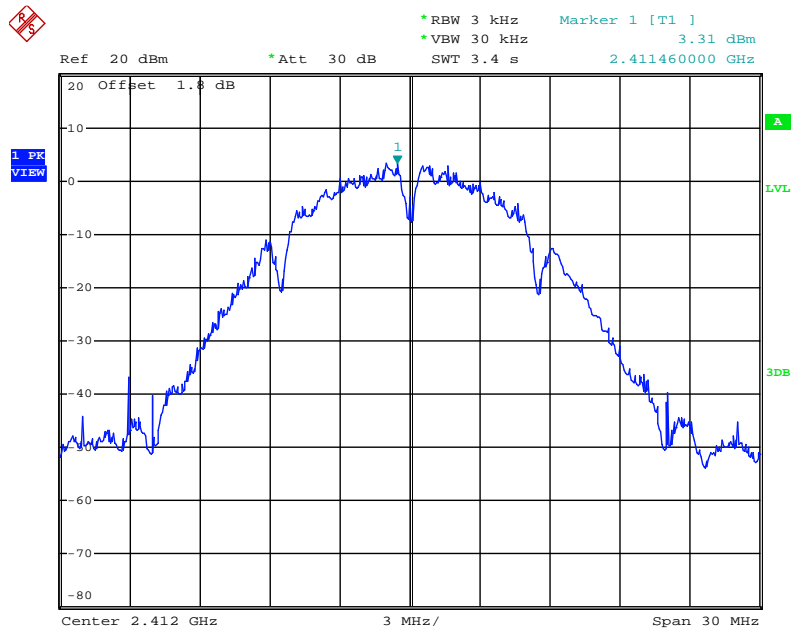
**Power Density Plot on Configuration IEEE 802.11n MCS0 HT40 / 2437 MHz / Ant. 2**



Date: 20.MAR.2014 15:46:33

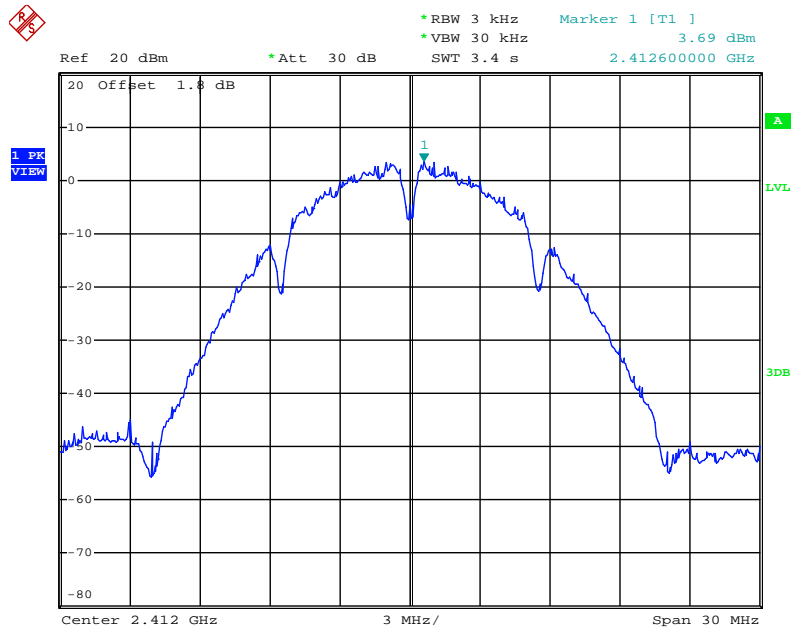


**Power Density Plot on Configuration IEEE 802.11b / 2412 MHz / Ant. 1**



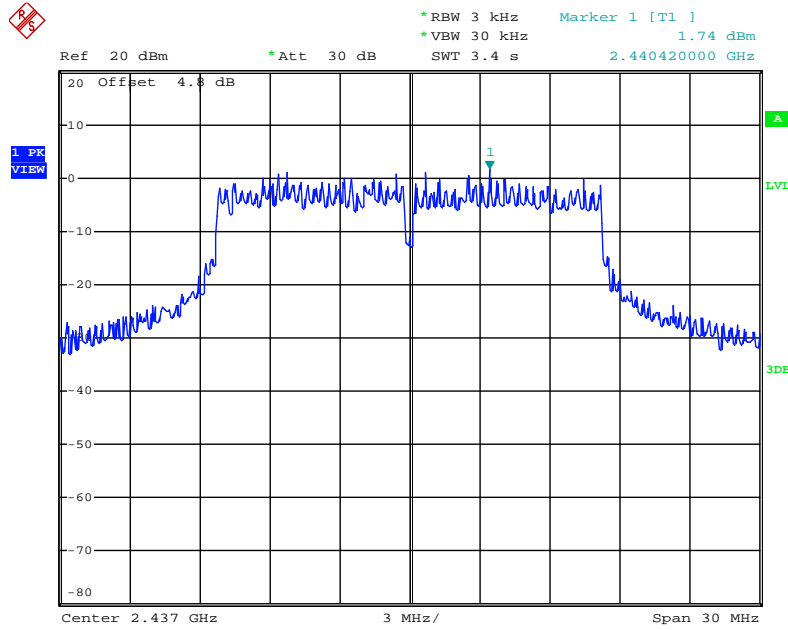
Date: 20.MAR.2014 15:06:30

**Power Density Plot on Configuration IEEE 802.11b / 2412 MHz / Ant. 2**



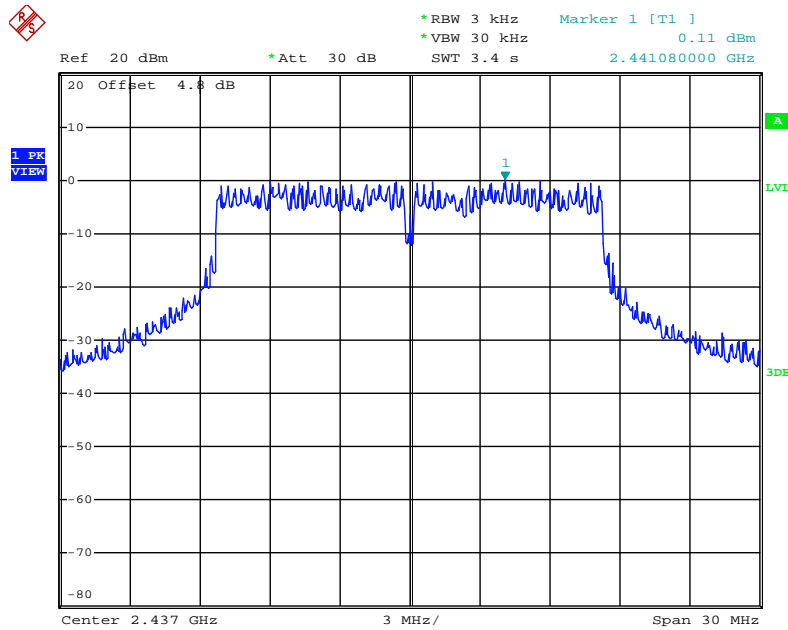
Date: 20.MAR.2014 15:04:45

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



Date: 20.MAR.2014 15:25:48

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



Date: 20.MAR.2014 15:24:14

## 4.4. 6dB Spectrum Bandwidth Measurement

### 4.4.1. Limit

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

### 4.4.2. Measuring Instruments and Setting

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

Spectrum Parameters	Setting
Attenuation	Auto
Span Frequency	> 6dB Bandwidth
RBW	100kHz
VBW	$\geq 3 \times \text{RBW}$
Detector	Peak
Trace	Max Hold
Sweep Time	Auto

### 4.4.3. Test Procedures

For Radiated 6dB Bandwidth Measurement:

1. The transmitter was radiated to the spectrum analyzer in peak hold mode.
2. Test was performed in accordance with KDB 558074 D01 v03r03 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 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

<b>Temperature</b>	20°C	<b>Humidity</b>	52%
<b>Test Engineer</b>	Jim Huang	<b>Configurations</b>	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	13.44	16.72	500	Complies
6	2437 MHz	17.60	18.08	500	Complies
11	2462 MHz	17.60	17.92	500	Complies

##### Configuration IEEE 802.11n MCS0 HT40 / Ant. 1 + Ant. 2

Channel	Frequency	6dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)	Min. Limit (kHz)	Test Result
3	2422 MHz	35.52	36.00	500	Complies
6	2437 MHz	36.48	36.48	500	Complies
9	2452 MHz	35.36	36.16	500	Complies

<b>Temperature</b>	20°C	<b>Humidity</b>	52%
<b>Test Engineer</b>	Jim Huang	<b>Configurations</b>	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	6.08	10.16	500	Complies
6	2437 MHz	6.56	10.40	500	Complies
11	2462 MHz	6.48	10.64	500	Complies

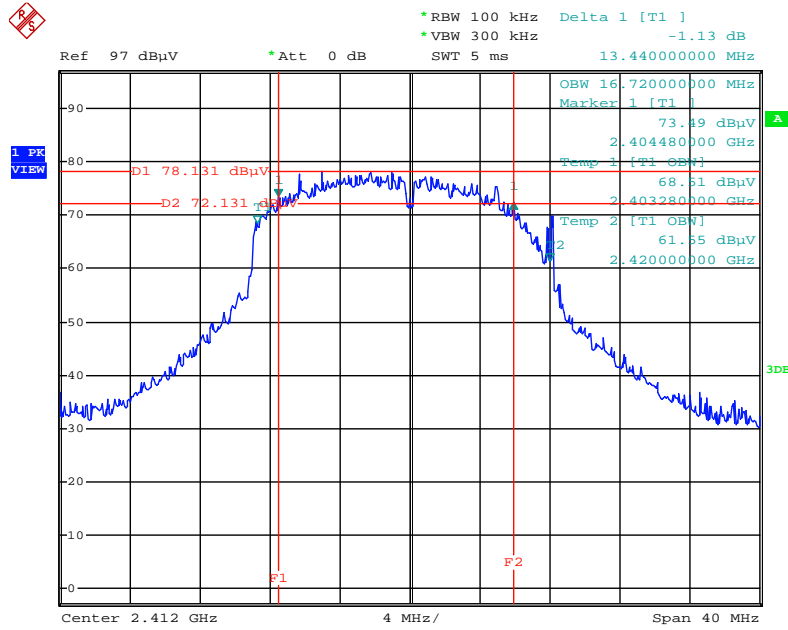
**Configuration IEEE 802.11g / Ant. 1 + Ant. 2**

Channel	Frequency	6dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)	Min. Limit (kHz)	Test Result
1	2412 MHz	16.40	16.64	500	Complies
6	2437 MHz	16.48	16.88	500	Complies
11	2462 MHz	16.40	16.64	500	Complies

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

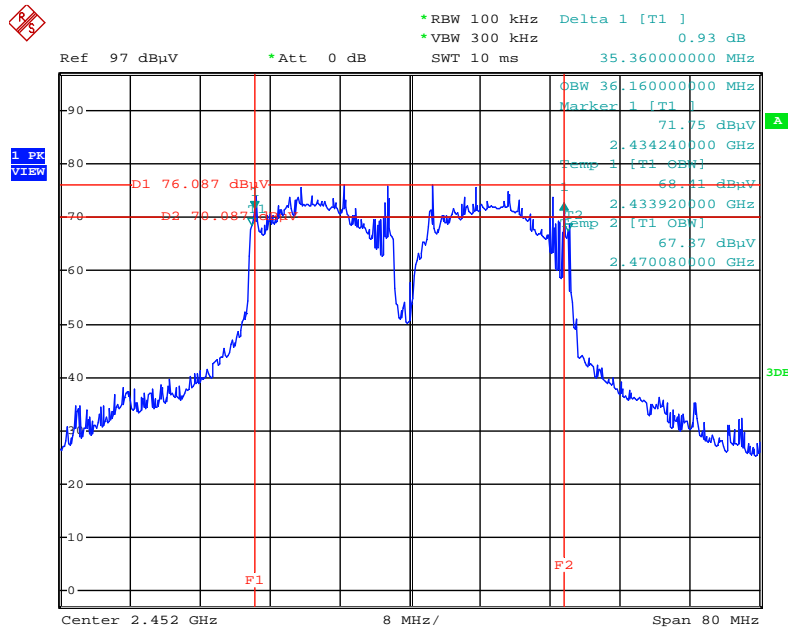
For plots, only the channel with worse result was shown.

6 dB Bandwidth Plot on Configuration IEEE 802.11n MCS0 HT20 / 2412 MHz / Ant. 1 + Ant. 2



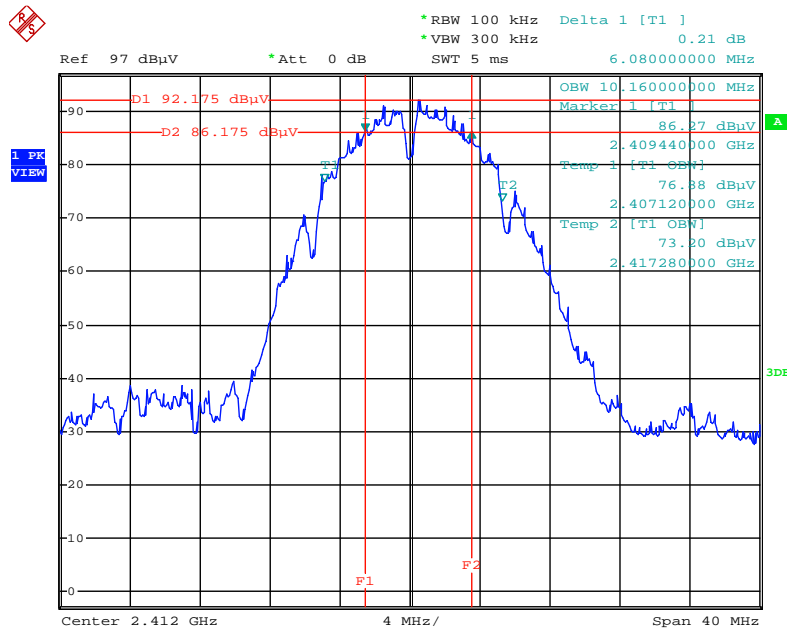
Date: 20.MAR.2014 16:53:04

6 dB Bandwidth Plot on Configuration IEEE 802.11n MCS0 HT40 / 2452 MHz / Ant. 1 + Ant. 2



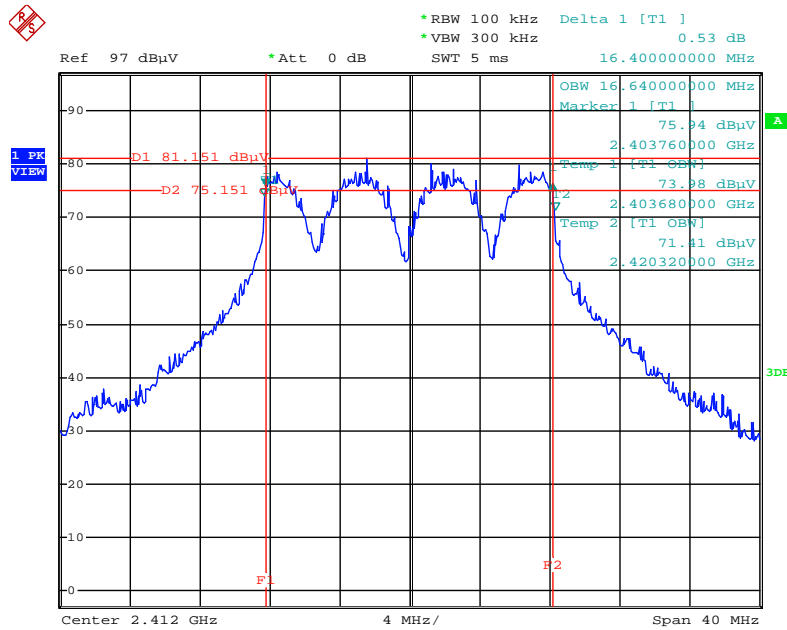
Date: 20.MAR.2014 16:57:37

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



Date: 20.MAR.2014 16:39:48

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



Date: 20.MAR.2014 16:41:26

## 4.5. Radiated Emissions Measurement

### 4.5.1. Limit

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

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

### 4.5.2. Measuring Instruments and Setting

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

Spectrum Parameter	Setting
Attenuation	Auto
Start Frequency	1GHz
Stop Frequency	10th carrier harmonic
RBW / VBW (Emission in restricted band)	1MHz / 3MHz for Peak, 1MHz / 10Hz for Average
RBW / VBW (Emission in non-restricted band)	100kHz / 300kHz for peak

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

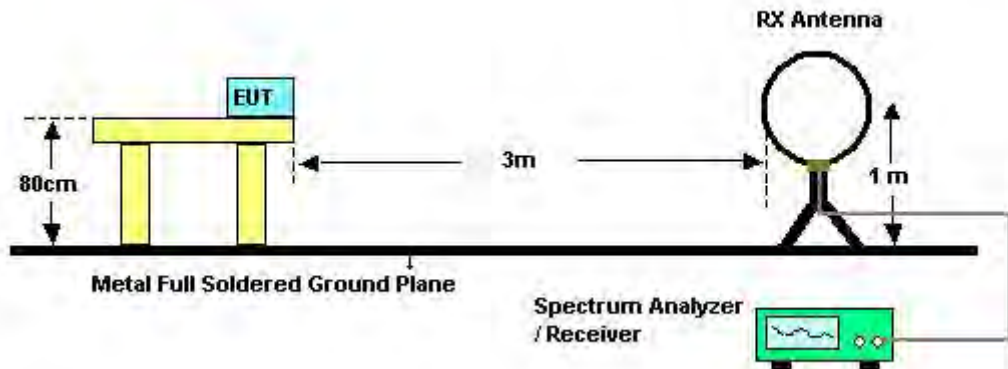


### 4.5.3. Test Procedures

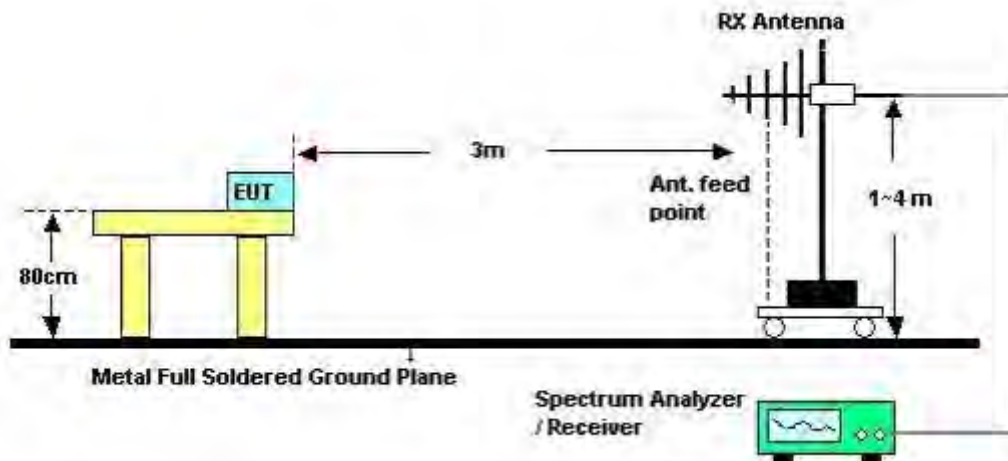
1. Configure the EUT according to ANSI C63.10. The EUT was placed on the top of the turntable 0.8 meter above ground. The phase center of the receiving antenna mounted on the top of a height-variable antenna tower was placed 3 meters far away from the turntable.
2. Power on the EUT and all the supporting 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

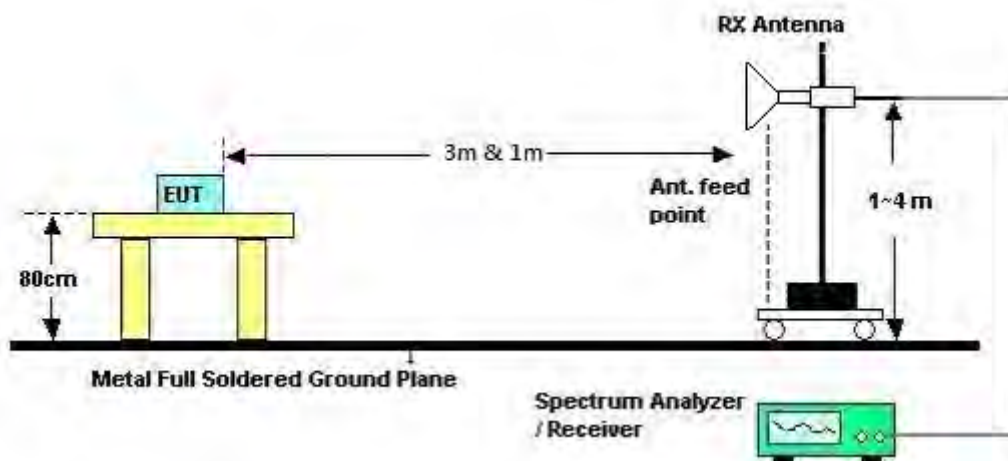
For Radiated Emissions: 9kHz ~30MHz



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)

<b>Temperature</b>	25.1°C	<b>Humidity</b>	50%
<b>Test Engineer</b>	Eason Chen	<b>Configurations</b>	Normal Link
<b>Test Date</b>	Feb. 02, 2015	<b>Test Mode</b>	Mode 1

<b>Freq. (MHz)</b>	<b>Level (dBuV)</b>	<b>Over Limit (dB)</b>	<b>Limit Line (dBuV)</b>	<b>Remark</b>
-	-	-	-	See Note

Note:

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

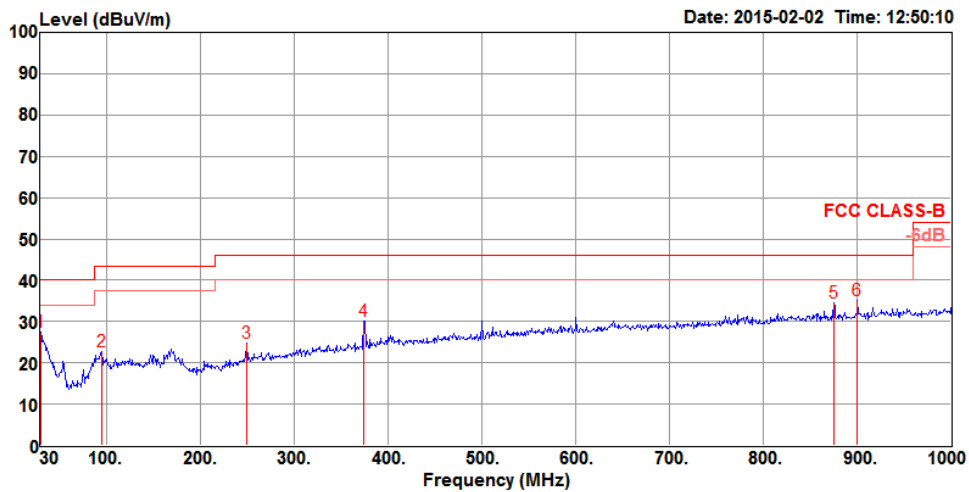
Distance extrapolation factor =  $40 \log(\text{specific distance} / \text{test distance})$  (dB);

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

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

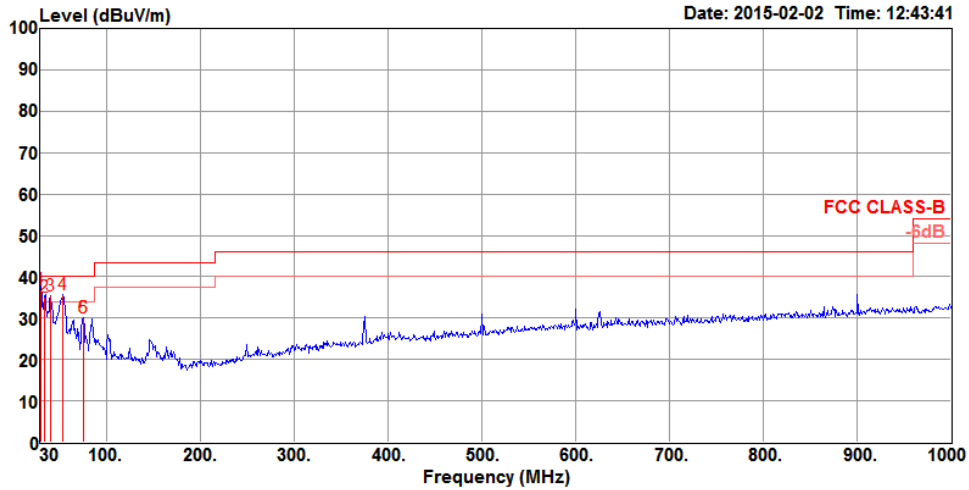
Temperature	25.1°C	Humidity	50%
Test Engineer	Eason Chen	Configurations	Normal Link
Test Mode	Mode 1		

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	30.00	27.40	40.00	-12.60	39.11	0.43	20.10	32.24	150	174	HORIZONTAL	Peak
2	94.99	22.85	43.50	-20.65	44.00	0.85	10.15	32.15	400	175	HORIZONTAL	Peak
3	250.19	24.67	46.00	-21.33	42.50	1.38	12.90	32.11	100	163	HORIZONTAL	Peak
4	374.35	30.25	46.00	-15.75	44.77	1.69	15.89	32.10	100	160	HORIZONTAL	Peak
5	874.87	34.49	46.00	-11.51	42.08	2.59	21.50	31.68	100	189	HORIZONTAL	Peak
6	900.09	34.99	46.00	-11.01	42.12	2.63	21.70	31.46	100	173	HORIZONTAL	Peak

**Vertical**



	Freq	Level	Limit	Over	Read	CableAntenna	Preamp	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg	
1	30.00	36.86	40.00	-3.14	48.57	0.43	20.10	32.24	100	185	VERTICAL Peak
2	33.88	35.16	40.00	-4.84	49.17	0.49	17.73	32.23	100	136	VERTICAL Peak
3	40.67	35.45	40.00	-4.55	53.48	0.56	13.71	32.30	100	261	VERTICAL Peak
4	54.25	35.57	40.00	-4.43	59.17	0.64	8.06	32.30	100	311	VERTICAL Peak
5	75.59	30.13	40.00	-9.87	54.29	0.75	7.26	32.17	150	147	VERTICAL Peak
6	75.59	30.13	40.00	-9.87	54.29	0.75	7.26	32.17	150	147	VERTICAL Peak

**Note:**

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

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

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

#### 4.5.9. Results for Radiated Emissions (1GHz~10<sup>th</sup> Harmonic)

<b>Temperature</b>	25.1°C	<b>Humidity</b>	50%
<b>Test Engineer</b>	YC Chen	<b>Configurations</b>	IEEE 802.11n MCS0 HT20 CH 1 / Ant. 1 + Ant. 2
<b>Test Date</b>	Mar. 03, 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	4823.54	43.64	74.00	-30.36	39.58	5.87	33.39	35.20	Peak	127	254	HORIZONTAL
2	4824.12	31.89	54.00	-22.11	27.83	5.87	33.39	35.20	Average	127	254	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	4823.88	31.36	54.00	-22.64	27.30	5.87	33.39	35.20	Average	100	109	VERTICAL
2	4824.16	43.63	74.00	-30.37	39.57	5.87	33.39	35.20	Peak	100	109	VERTICAL

<b>Temperature</b>	25.1°C	<b>Humidity</b>	50%
<b>Test Engineer</b>	YC Chen	<b>Configurations</b>	IEEE 802.11n MCS0 HT20 CH 6 / Ant. 1 + Ant. 2
<b>Test Date</b>	Mar. 03, 2014		

### Horizontal

	Freq	Level	Limit	Over	Read	Cable	Antenna	Preamp	Remark	A/Pos	T/Pos	PoI/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	Loss	Factor	Factor		cm	deg	
1	4873.67	41.85	54.00	-12.15	37.65	5.92	33.48	35.20	Average	170	307	HORIZONTAL
2	4873.81	56.16	74.00	-17.84	51.96	5.92	33.48	35.20	Peak	170	307	HORIZONTAL

### Vertical

	Freq	Level	Limit	Over	Read	Cable	Antenna	Preamp	Remark	A/Pos	T/Pos	PoI/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	Loss	Factor	Factor		cm	deg	
1	4877.68	49.81	74.00	-24.19	45.61	5.92	33.48	35.20	Peak	101	140	VERTICAL
2	4877.80	37.15	54.00	-16.85	32.95	5.92	33.48	35.20	Average	101	140	VERTICAL



<b>Temperature</b>	25.1°C	<b>Humidity</b>	50%
<b>Test Engineer</b>	YC Chen	<b>Configurations</b>	IEEE 802.11n MCS0 HT20 CH 11 / Ant. 1 + Ant. 2
<b>Test Date</b>	Mar. 03, 2014		

**Horizontal**

	Freq	Level	Limit	Over	Read	Cable	Antenna	Preamp	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	Loss	Factor	Factor		cm	deg	
1	4924.15	32.85	54.00	-21.15	28.50	5.97	33.58	35.20	Average	100	285	HORIZONTAL
2	4924.34	45.23	74.00	-28.77	40.88	5.97	33.58	35.20	Peak	100	285	HORIZONTAL

**Vertical**

	Freq	Level	Limit	Over	Read	Cable	Antenna	Preamp	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	Loss	Factor	Factor		cm	deg	
1	4924.35	32.49	54.00	-21.51	28.14	5.97	33.58	35.20	Average	100	116	VERTICAL
2	4924.43	45.33	74.00	-28.67	40.98	5.97	33.58	35.20	Peak	100	116	VERTICAL

<b>Temperature</b>	25.1°C	<b>Humidity</b>	50%
<b>Test Engineer</b>	YC Chen	<b>Configurations</b>	IEEE 802.11n MCS0 HT40 CH 3 / Ant. 1 + Ant. 2
<b>Test Date</b>	Mar. 03, 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	4843.53	44.34	74.00	-29.66	40.24	5.88	33.42	35.20	Peak	100	114	HORIZONTAL
2	4843.80	31.51	54.00	-22.49	27.41	5.88	33.42	35.20	Average	100	114	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	4843.76	31.38	54.00	-22.62	27.28	5.88	33.42	35.20	Average	100	264	VERTICAL
2	4844.21	43.90	74.00	-30.10	39.80	5.88	33.42	35.20	Peak	100	264	VERTICAL

<b>Temperature</b>	25.1°C	<b>Humidity</b>	50%
<b>Test Engineer</b>	YC Chen	<b>Configurations</b>	IEEE 802.11n MCS0 HT40 CH 6 / Ant. 1 + Ant. 2
<b>Test Date</b>	Mar. 03, 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	4874.39	45.08	74.00	-28.92	40.88	5.92	33.48	35.20	Peak	100	306	HORIZONTAL
2	4874.45	31.97	54.00	-22.03	27.77	5.92	33.48	35.20	Average	100	306	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	4873.62	44.52	74.00	-29.48	40.32	5.92	33.48	35.20	Peak	100	210	VERTICAL
2	4873.85	31.94	54.00	-22.06	27.74	5.92	33.48	35.20	Average	100	210	VERTICAL



<b>Temperature</b>	25.1°C	<b>Humidity</b>	50%
<b>Test Engineer</b>	YC Chen	<b>Configurations</b>	IEEE 802.11n MCS0 HT40 CH 9 / Ant. 1 + Ant. 2
<b>Test Date</b>	Mar. 03, 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	4903.69	44.44	74.00	-29.56	40.18	5.95	33.51	35.20	Peak	100	265	HORIZONTAL
2	4904.36	31.80	54.00	-22.20	27.54	5.95	33.51	35.20	Average	100	265	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	4904.01	45.36	74.00	-28.64	41.10	5.95	33.51	35.20	Peak	100	78	VERTICAL
2	4904.10	31.65	54.00	-22.35	27.39	5.95	33.51	35.20	Average	100	78	VERTICAL

<b>Temperature</b>	25.1°C	<b>Humidity</b>	50%
<b>Test Engineer</b>	YC Chen	<b>Configurations</b>	IEEE 802.11b CH 1 / Ant. 1 + Ant. 2
<b>Test Date</b>	Mar. 03, 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	4823.89	55.63	74.00	-18.37	51.57	5.87	33.39	35.20	Peak	160	302	HORIZONTAL
2	4824.01	52.41	54.00	-1.59	48.35	5.87	33.39	35.20	Average	160	302	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	4823.93	51.81	74.00	-22.19	47.75	5.87	33.39	35.20	Peak	115	216	VERTICAL
2	4823.99	48.15	54.00	-5.85	44.09	5.87	33.39	35.20	Average	115	216	VERTICAL

<b>Temperature</b>	25.1°C	<b>Humidity</b>	50%
<b>Test Engineer</b>	YC Chen	<b>Configurations</b>	IEEE 802.11b CH 6 / Ant. 1 + Ant. 2
<b>Test Date</b>	Mar. 13, 2014		

### 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	4872.14	51.07	74.00	-22.93	47.83	5.75	32.80	35.31	100	56	HORIZONTAL	Peak
2	4873.36	49.27	54.00	-4.73	46.03	5.75	32.80	35.31	100	56	HORIZONTAL	Average
3	7308.24	45.71	54.00	-8.29	36.90	7.05	37.12	35.36	100	141	HORIZONTAL	Average
4	7310.28	56.19	74.00	-17.81	47.37	7.06	37.12	35.36	100	141	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	4873.99	51.78	54.00	-2.22	48.54	5.75	32.80	35.31	113	319	VERTICAL	Average
2	4874.01	54.65	74.00	-19.35	51.41	5.75	32.80	35.31	113	319	VERTICAL	Peak
3	7306.67	42.51	54.00	-11.49	33.70	7.05	37.12	35.36	100	185	VERTICAL	Average
4	7314.17	55.23	74.00	-18.77	46.41	7.06	37.12	35.36	100	185	VERTICAL	Peak

<b>Temperature</b>	25.1°C	<b>Humidity</b>	50%
<b>Test Engineer</b>	YC Chen	<b>Configurations</b>	IEEE 802.11b CH 11 / Ant. 1 + Ant. 2
<b>Test Date</b>	Mar. 03, 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	4923.93	58.09	74.00	-15.91	53.74	5.97	33.58	35.20	Peak	173	288	HORIZONTAL
2	4923.97	53.62	54.00	-0.38	49.27	5.97	33.58	35.20	Average	173	288	HORIZONTAL
3	7387.24	48.92	54.00	-5.08	40.60	7.17	36.61	35.46	Average	123	65	HORIZONTAL
4	7387.40	54.79	74.00	-19.21	46.47	7.17	36.61	35.46	Peak	123	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	4923.93	52.50	74.00	-21.50	48.15	5.97	33.58	35.20	Peak	101	140	VERTICAL
2	4923.99	47.76	54.00	-6.24	43.41	5.97	33.58	35.20	Average	101	140	VERTICAL
3	7387.44	55.26	74.00	-18.74	46.94	7.17	36.61	35.46	Peak	107	9	VERTICAL
4	7387.72	48.84	54.00	-5.16	40.52	7.17	36.61	35.46	Average	107	9	VERTICAL

<b>Temperature</b>	25.1°C	<b>Humidity</b>	50%
<b>Test Engineer</b>	YC Chen	<b>Configurations</b>	IEEE 802.11g CH 1 / Ant. 1 + Ant. 2
<b>Test Date</b>	Mar. 03, 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	4823.57	44.23	74.00	-29.77	40.17	5.87	33.39	35.20	Peak	100	140	HORIZONTAL
2	4824.44	31.61	54.00	-22.39	27.55	5.87	33.39	35.20	Average	100	140	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	4823.81	31.33	54.00	-22.67	27.27	5.87	33.39	35.20	Average	100	225	VERTICAL
2	4824.02	43.89	74.00	-30.11	39.83	5.87	33.39	35.20	Peak	100	225	VERTICAL



<b>Temperature</b>	25.1°C	<b>Humidity</b>	50%
<b>Test Engineer</b>	YC Chen	<b>Configurations</b>	IEEE 802.11g CH 6 / Ant. 1 + Ant. 2
<b>Test Date</b>	Mar. 03, 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	4870.28	54.73	74.00	-19.27	50.56	5.92	33.45	35.20	Peak	170	309	HORIZONTAL
2	4873.04	40.94	54.00	-13.06	36.74	5.92	33.48	35.20	Average	170	309	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	4873.91	35.56	54.00	-18.44	31.36	5.92	33.48	35.20	Average	113	140	VERTICAL
2	4874.17	48.49	74.00	-25.51	44.29	5.92	33.48	35.20	Peak	113	140	VERTICAL

<b>Temperature</b>	25.1°C	<b>Humidity</b>	50%
<b>Test Engineer</b>	YC Chen	<b>Configurations</b>	IEEE 802.11g CH 11 / Ant. 1 + Ant. 2
<b>Test Date</b>	Mar. 03, 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	4923.87	45.01	74.00	-28.99	40.66	5.97	33.58	35.20	Peak	100	292	HORIZONTAL
2	4924.39	32.73	54.00	-21.27	28.38	5.97	33.58	35.20	Average	100	292	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	4924.14	45.15	74.00	-28.85	40.80	5.97	33.58	35.20	Peak	100	157	VERTICAL
2	4924.17	32.42	54.00	-21.58	28.07	5.97	33.58	35.20	Average	100	157	VERTICAL

#### Note:

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

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

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

## 4.6. Emissions Measurement

### 4.6.1. Limit

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

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

### 4.6.2. Measuring Instruments and Setting

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

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

### 4.6.3. Test Procedures

For Radiated band edges Measurement:

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

For Radiated Out of Band Emission Measurement:

1. Test was performed in accordance with KDB 558074 D01 v03r03 for Performing Compliance Measurements on Digital Transmission Systems (DTS) Operating Under §15.247 section 10.1 Unwanted Emissions into Non-Restricted Frequency Bands Measurement Procedure
2. The radiated emission test is performed on each TX port of operating mode without summing or adding 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 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

<b>Temperature</b>	25.1°C	<b>Humidity</b>	50%
<b>Test Engineer</b>	YC Chen	<b>Configurations</b>	IEEE 802.11n MCS0 HT20 CH 1, 6, 11 / Ant. 1 + Ant. 2
<b>Test date</b>	Mar. 03, 2014		

##### Channel 1

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	2389.60	68.11	74.00	-5.89	35.97	4.09	28.05	0.00	Peak	100	278	VERTICAL
2	2390.00	53.74	54.00	-0.26	21.60	4.09	28.05	0.00	Average	100	278	VERTICAL
3	2414.80	102.83			70.63	4.11	28.09	0.00	Average	100	278	VERTICAL
4	2414.80	114.17			81.97	4.11	28.09	0.00	Peak	100	278	VERTICAL

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

##### Channel 6

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	2386.40	66.55	74.00	-7.45	34.41	4.09	28.05	0.00	Peak	100	277	VERTICAL
2	2390.00	49.26	54.00	-4.74	17.12	4.09	28.05	0.00	Average	100	277	VERTICAL
3	2439.40	112.56			80.25	4.13	28.18	0.00	Average	100	277	VERTICAL
4	2440.20	122.05			89.74	4.13	28.18	0.00	Peak	100	277	VERTICAL
5	2483.50	53.14	54.00	-0.86	20.72	4.16	28.26	0.00	Average	100	277	VERTICAL
6	2483.50	71.83	74.00	-2.17	39.41	4.16	28.26	0.00	Peak	100	277	VERTICAL

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

##### Channel 11

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	2466.00	103.23			70.87	4.14	28.22	0.00	Average	100	278	VERTICAL
2	2466.00	114.67			82.31	4.14	28.22	0.00	Peak	100	278	VERTICAL
3	2483.50	53.82	54.00	-0.18	21.40	4.16	28.26	0.00	Average	100	278	VERTICAL
4	2483.90	68.91	74.00	-5.09	36.49	4.16	28.26	0.00	Peak	100	278	VERTICAL

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

<b>Temperature</b>	25.1°C	<b>Humidity</b>	50%
<b>Test Engineer</b>	YC Chen	<b>Configurations</b>	IEEE 802.11n MCS0 HT40 CH 3, 6, 9 / Ant. 1 + Ant. 2
<b>Test date</b>	Mar. 03, 2014		

**Channel 3**

	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	2390.00	53.05	54.00	-0.95	20.91	4.09	28.05	0.00	Average	100	278	VERTICAL
2	2390.00	71.31	74.00	-2.69	39.17	4.09	28.05	0.00	Peak	100	278	VERTICAL
3	2413.20	108.04			75.84	4.11	28.09	0.00	Peak	100	278	VERTICAL
4	2414.80	95.98			63.78	4.11	28.09	0.00	Average	100	278	VERTICAL

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

**Channel 6**

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	2389.20	67.87	74.00	-6.13	35.73	4.09	28.05	0.00	Peak	100	278	VERTICAL
2	2390.00	53.33	54.00	-0.67	21.19	4.09	28.05	0.00	Average	100	278	VERTICAL
3	2429.00	111.75			79.50	4.12	28.13	0.00	Peak	100	278	VERTICAL
4	2429.80	99.69			67.44	4.12	28.13	0.00	Average	100	278	VERTICAL
5	2483.50	49.67	54.00	-4.33	17.25	4.16	28.26	0.00	Average	100	278	VERTICAL
6	2483.50	62.65	74.00	-11.35	30.23	4.16	28.26	0.00	Peak	100	278	VERTICAL

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

**Channel 9**

	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	2442.80	109.11			76.80	4.13	28.18	0.00	Peak	100	278	VERTICAL
2	2464.80	97.08			64.72	4.14	28.22	0.00	Average	100	278	VERTICAL
3	2483.50	53.87	54.00	-0.13	21.45	4.16	28.26	0.00	Average	100	278	VERTICAL
4	2483.50	68.67	74.00	-5.33	36.25	4.16	28.26	0.00	Peak	100	278	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.

<b>Temperature</b>	25.1°C	<b>Humidity</b>	50%
<b>Test Engineer</b>	YC Chen	<b>Configurations</b>	IEEE 802.11b CH 1, 6, 11 / Ant. 1 + Ant. 2
<b>Test Date</b>	Mar. 03, 2014		

**Channel 1**

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	2331.60	65.93	74.00	-8.07	34.00	4.04	27.89	0.00	Peak	101	48	HORIZONTAL
2	2385.20	53.33	54.00	-0.67	21.20	4.08	28.05	0.00	Average	101	48	HORIZONTAL
3	2411.20	116.21			84.01	4.11	28.09	0.00	Average	101	48	HORIZONTAL
4	2411.20	119.79			87.59	4.11	28.09	0.00	Peak	101	48	HORIZONTAL

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

**Channel 6**

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	2358.00	65.63	74.00	-8.37	33.59	4.07	27.97	0.00	Peak	104	88	VERTICAL
2	2390.00	47.61	54.00	-6.39	15.47	4.09	28.05	0.00	Average	104	88	VERTICAL
3	2436.20	117.52			85.22	4.12	28.18	0.00	Average	104	88	VERTICAL
4	2436.20	121.34			89.04	4.12	28.18	0.00	Peak	104	88	VERTICAL
5	2485.10	46.52	54.00	-7.48	14.06	4.16	28.30	0.00	Average	104	88	VERTICAL
6	2498.30	59.46	74.00	-14.54	26.99	4.17	28.30	0.00	Peak	104	88	VERTICAL

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

**Channel 11**

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	2461.20	117.69			85.33	4.14	28.22	0.00	Average	100	262	VERTICAL
2	2461.20	121.33			88.97	4.14	28.22	0.00	Peak	100	262	VERTICAL
3	2484.70	53.56	54.00	-0.44	21.14	4.16	28.26	0.00	Average	100	262	VERTICAL
4	2499.10	63.15	74.00	-10.85	30.68	4.17	28.30	0.00	Peak	100	262	VERTICAL

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

<b>Temperature</b>	25.1°C	<b>Humidity</b>	50%
<b>Test Engineer</b>	YC Chen	<b>Configurations</b>	IEEE 802.11g CH 1, 6, 11 / Ant. 1 + Ant. 2
<b>Test Date</b>	Mar. 03, 2014		

**Channel 1**

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	2388.40	66.19	74.00	-7.81	34.05	4.09	28.05	0.00	Peak	101	6	HORIZONTAL
2	2390.00	53.23	54.00	-0.77	21.09	4.09	28.05	0.00	Average	101	6	HORIZONTAL
3	2418.40	103.97			71.73	4.11	28.13	0.00	Average	101	6	HORIZONTAL
4	2418.40	113.63			81.39	4.11	28.13	0.00	Peak	101	6	HORIZONTAL

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

**Channel 6**

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	2389.20	67.13	74.00	-6.87	34.99	4.09	28.05	0.00	Peak	100	358	HORIZONTAL
2	2390.00	53.24	54.00	-0.76	21.10	4.09	28.05	0.00	Average	100	358	HORIZONTAL
3	2430.20	111.71			79.46	4.12	28.13	0.00	Average	100	358	HORIZONTAL
4	2430.60	120.55			88.30	4.12	28.13	0.00	Peak	100	358	HORIZONTAL
5	2485.50	49.98	54.00	-4.02	17.52	4.16	28.30	0.00	Average	100	358	HORIZONTAL
6	2485.50	68.76	74.00	-5.24	36.30	4.16	28.30	0.00	Peak	100	358	HORIZONTAL

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

**Channel 11**

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	2454.80	103.27			70.91	4.14	28.22	0.00	Average	100	22	HORIZONTAL
2	2455.20	112.77			80.41	4.14	28.22	0.00	Peak	100	22	HORIZONTAL
3	2483.90	53.67	54.00	-0.33	21.25	4.16	28.26	0.00	Average	100	22	HORIZONTAL
4	2485.10	68.58	74.00	-5.42	36.12	4.16	28.30	0.00	Peak	100	22	HORIZONTAL

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

Note:

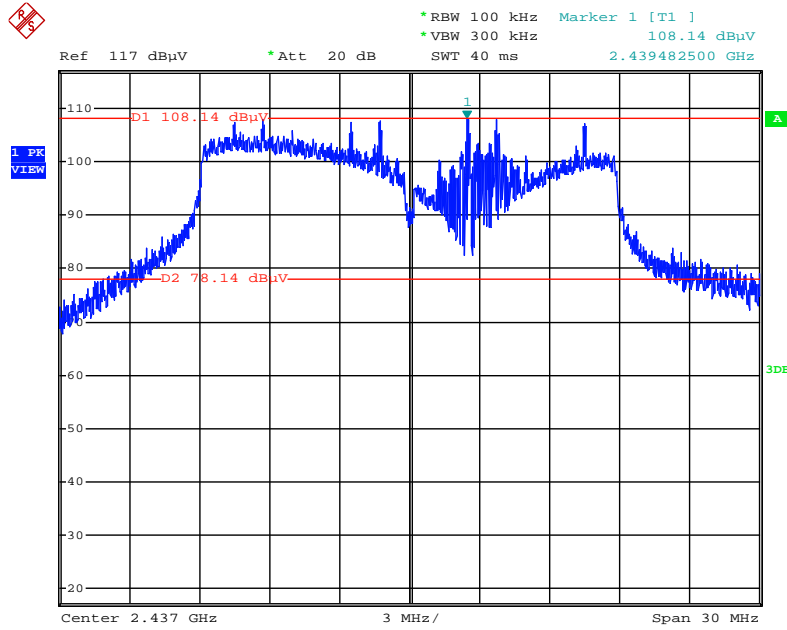
Emission level (dBuV/m) = 20 log Emission level (uV/m).

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



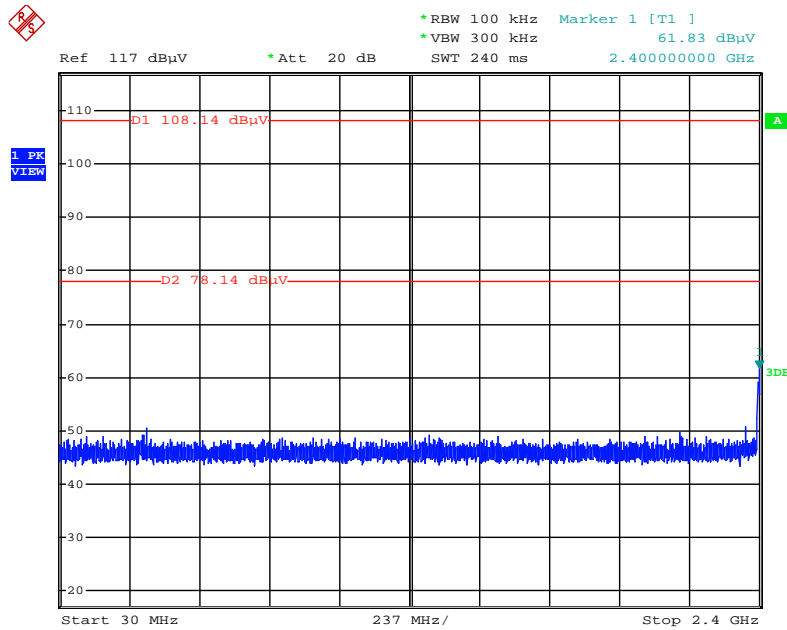
**For Emission not in Restricted Band**

**Plot on Configuration IEEE 802.11n MCS0 HT20 / Reference Level**



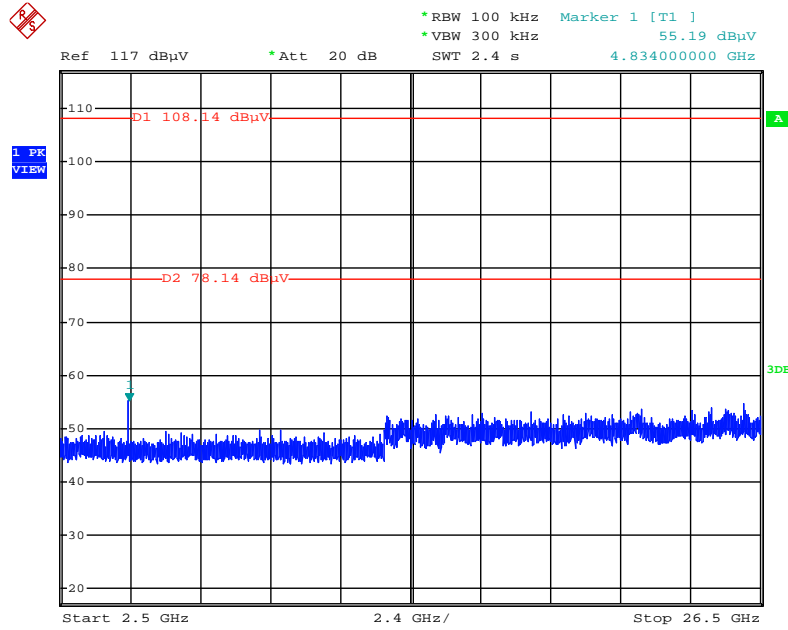
Date: 3.MAR.2014 22:32:36

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



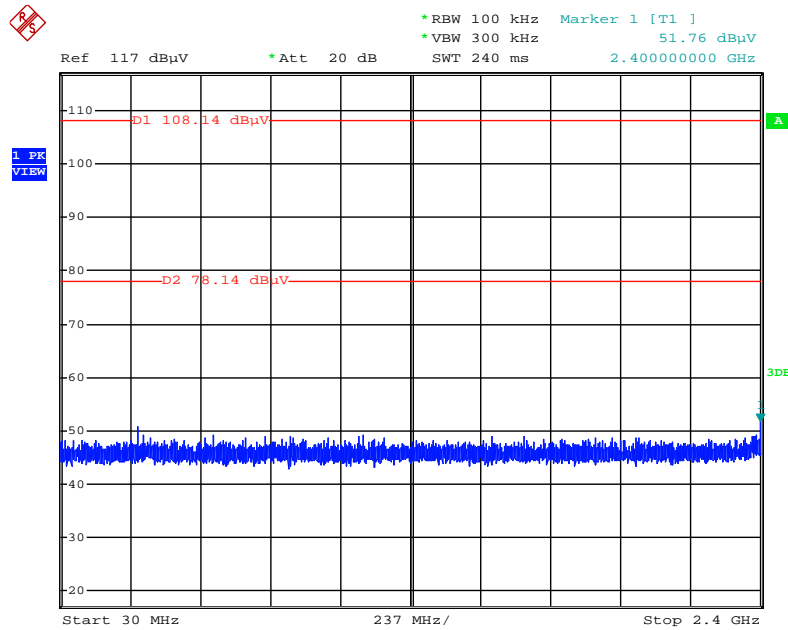
Date: 3.MAR.2014 22:34:17

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



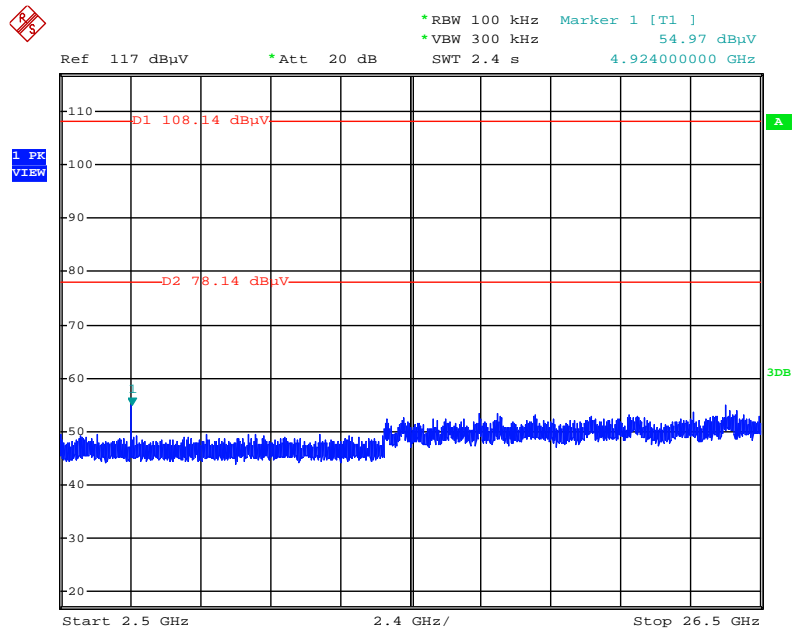
Date: 3.MAR.2014 22:35:09

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



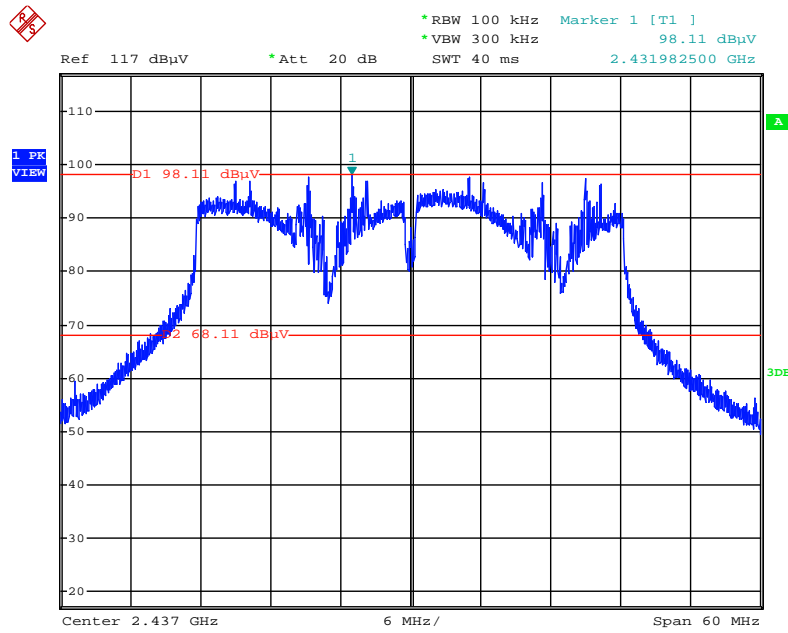
Date: 3.MAR.2014 22:37:19

Plot on Configuration IEEE 802.11n MCS0 HT20 / CH 11 / 2500MHz~26500MHz (down 30dBc)



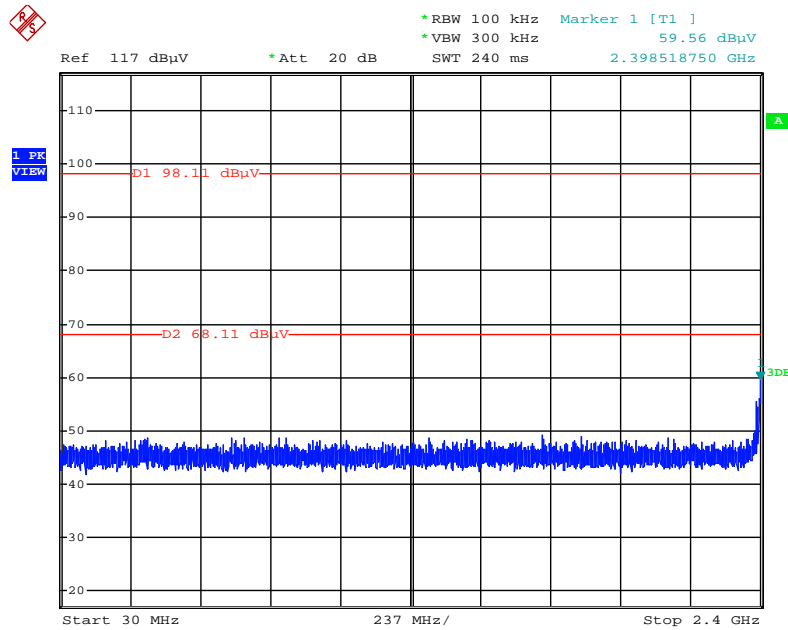
Date: 3.MAR.2014 22:36:28

Plot on Configuration IEEE 802.11n MCS0 HT40 / Reference Level



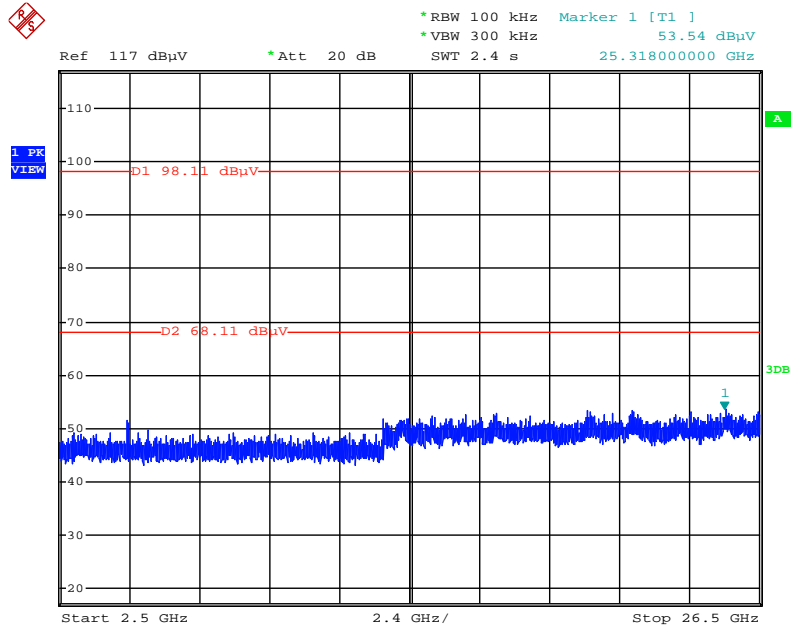
Date: 3.MAR.2014 22:41:45

Plot on Configuration IEEE 802.11n MCS0 HT40 / CH 3 / 30MHz~2400MHz (down 30dBc)



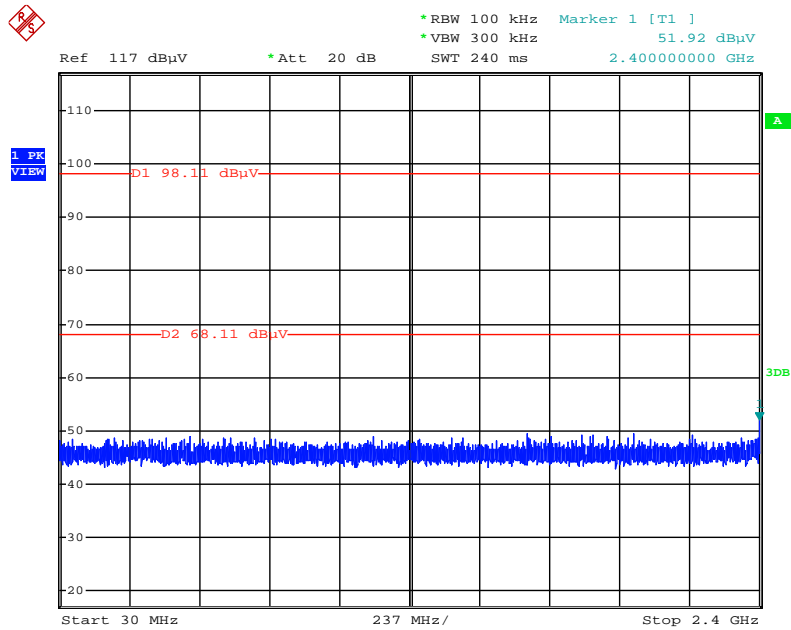
Date: 3.MAR.2014 22:42:57

Plot on Configuration IEEE 802.11n MCS0 HT40 / CH 3 / 2500MHz~26500MHz (down 30dBc)



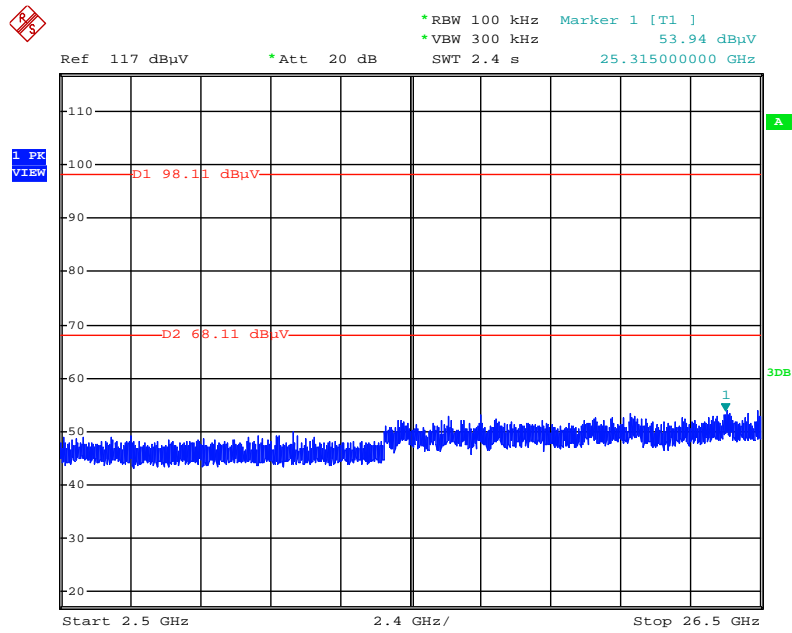
Date: 3.MAR.2014 22:43:45

Plot on Configuration IEEE 802.11n MCS0 HT40 / CH 9 / 30MHz~2400MHz (down 30dBc)



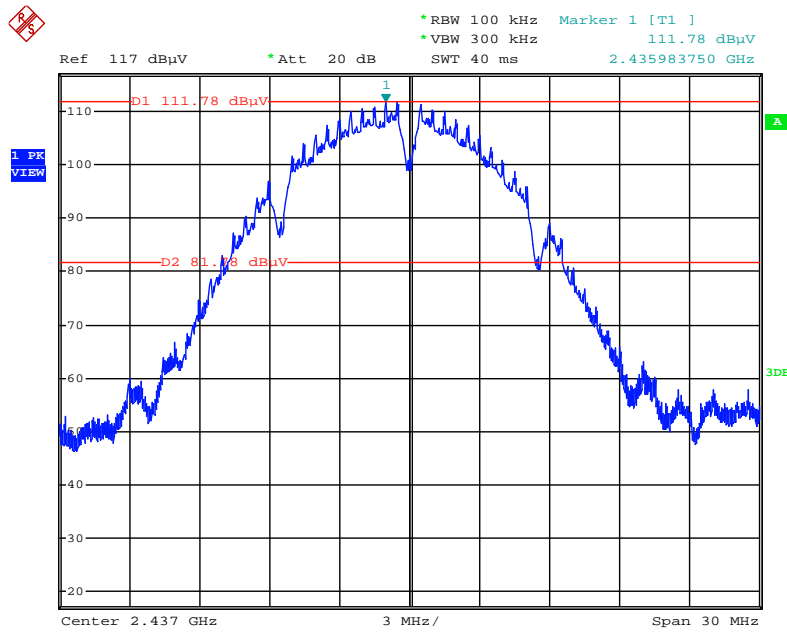
Date: 3.MAR.2014 22:45:24

Plot on Configuration IEEE 802.11n MCS0 HT40 / CH 9 / 2500MHz~26500MHz (down 30dBc)



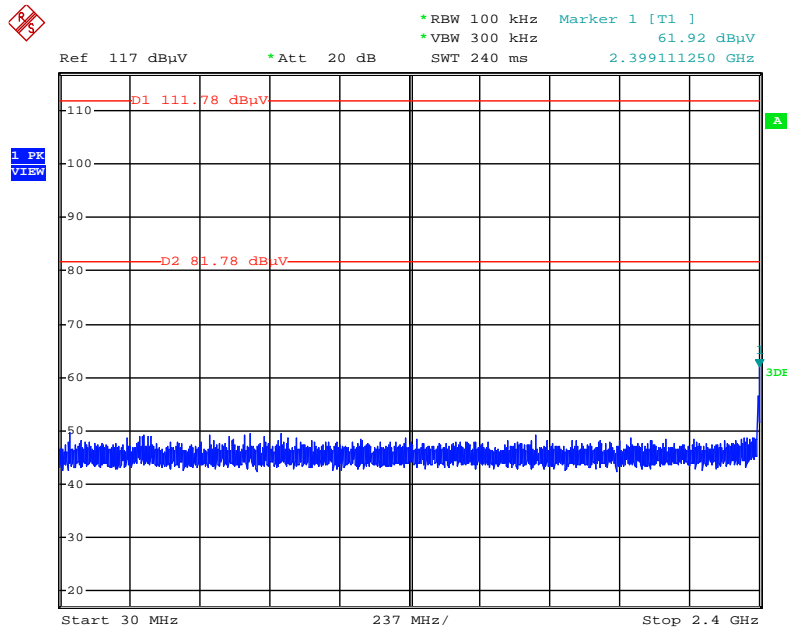
Date: 3.MAR.2014 22:46:09

Plot on Configuration IEEE 802.11b / Reference Level



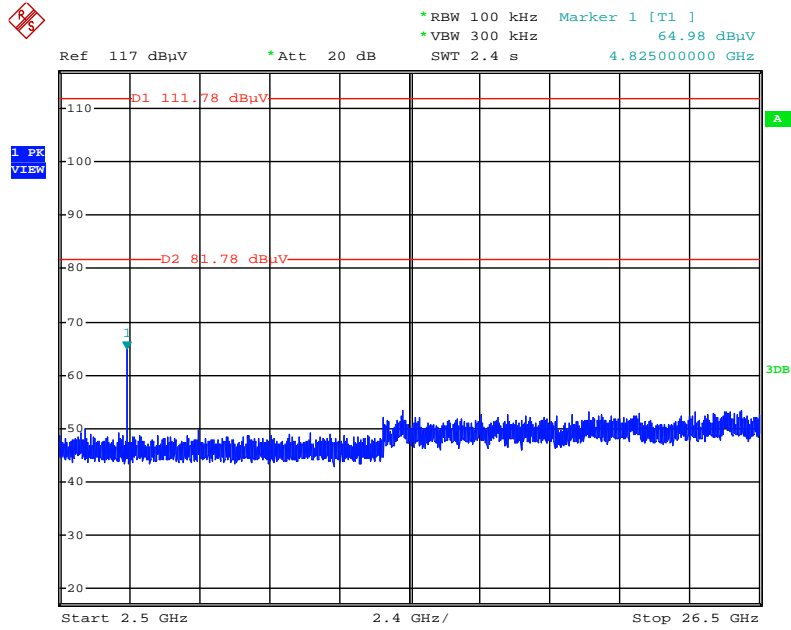
Date: 3.MAR.2014 22:12:46

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



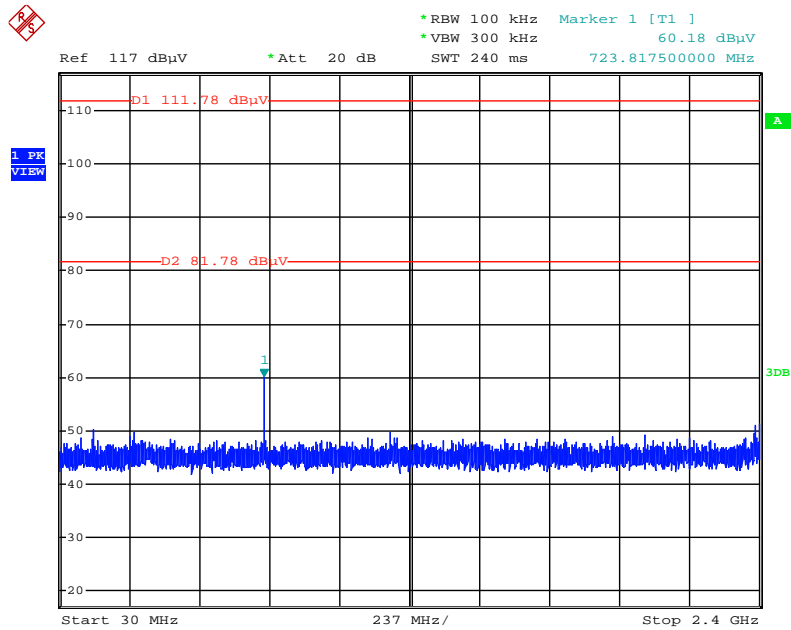
Date: 3.MAR.2014 22:14:56

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



Date: 3.MAR.2014 22:15:39

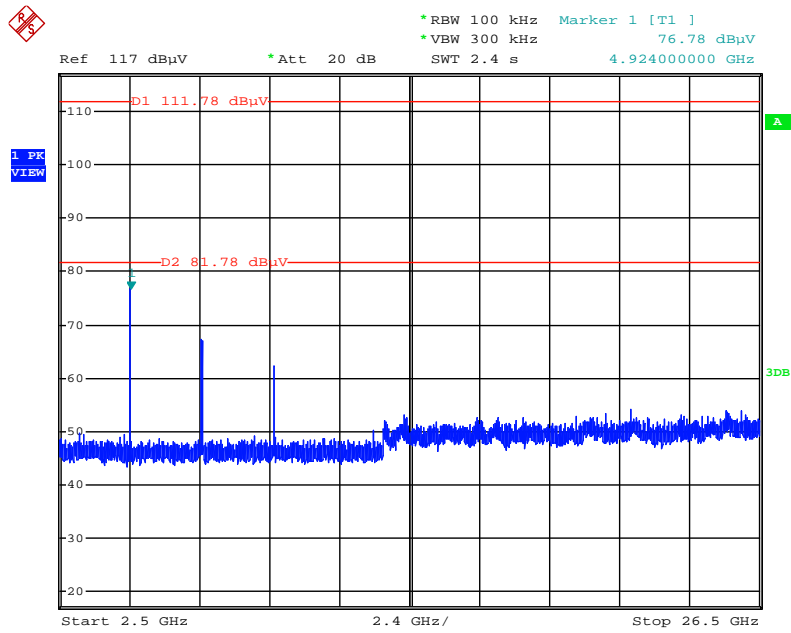
Plot on Configuration IEEE 802.11b / CH 11 / 30MHz~2400MHz (down 30dBc)



Date: 3.MAR.2014 22:17:34

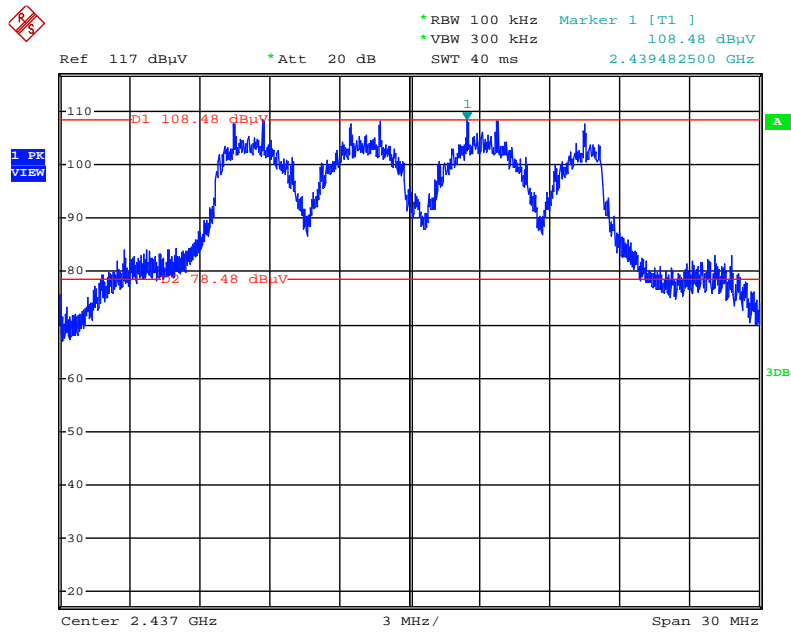


Plot on Configuration IEEE 802.11b / CH 11 / 2500MHz~26500MHz (down 30dBc)



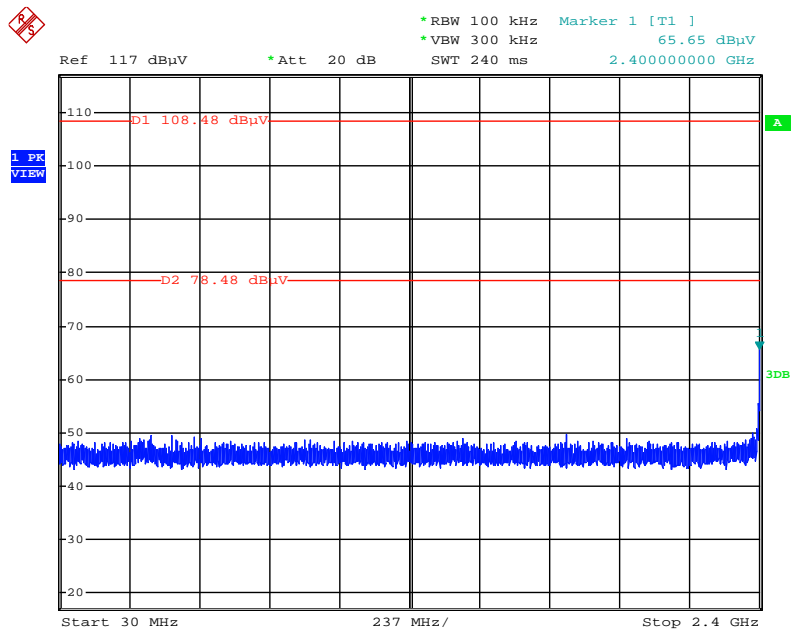
Date: 3.MAR.2014 22:18:43

Plot on Configuration IEEE 802.11g / Reference Level



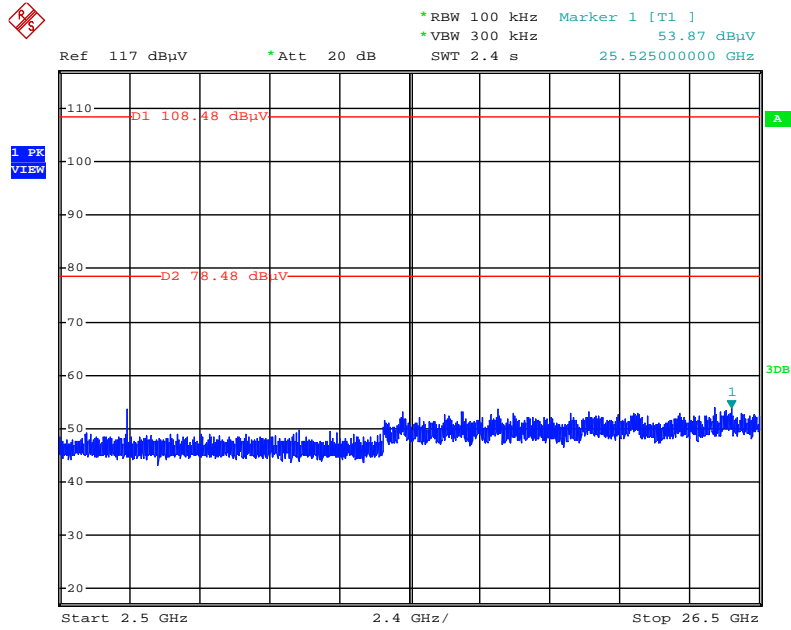
Date: 3.MAR.2014 22:24:41

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



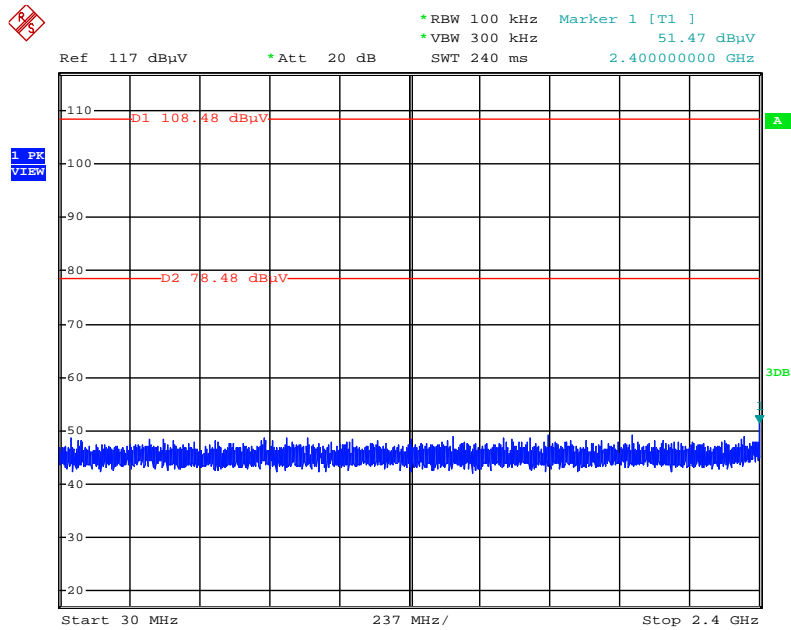
Date: 3.MAR.2014 22:26:06

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



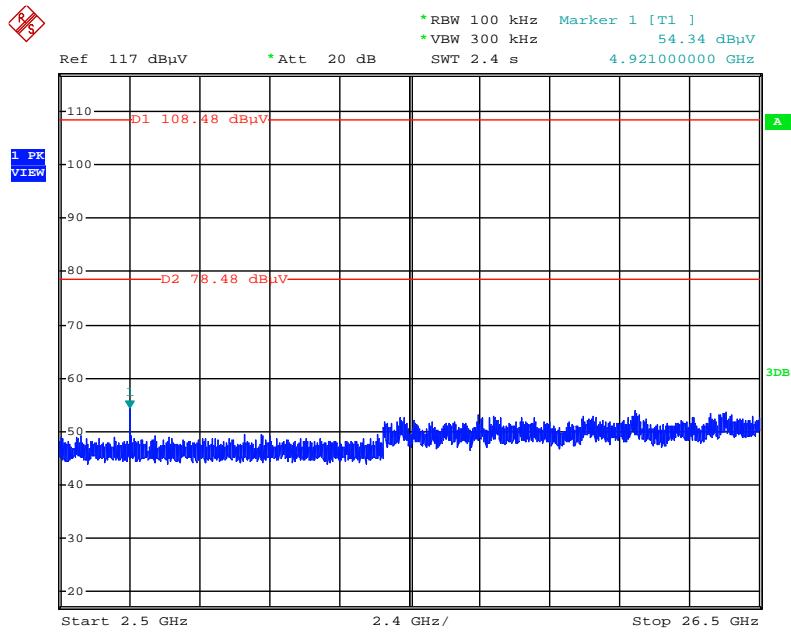
Date: 3.MAR.2014 22:27:05

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



Date: 3.MAR.2014 22:29:24

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



Date: 3.MAR.2014 22:28:43

## 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	Dec. 02, 2014	Conduction (CO01-CB)
LISN	Schwarzbeck	NSLK 8127	8127647	9kHz ~ 30MHz	Dec. 02, 2014	Conduction (CO01-CB)
COND Cable	Woken	Cable	01	150kHz ~ 30MHz	Dec. 04, 2014	Conduction (CO01-CB)
Software	Audix	E3	5.410e	-	N.C.R.	Conduction (CO01-CB)
BILOG ANTENNA	Schaffner	CBL6112D	22021	20MHz ~ 2GHz	May 26, 2014	Radiation (03CH01-CB)
Loop Antenna	Rohde & Schwarz	HFH2-Z2	100315	9 kHz~30 MHz	Jul. 28, 2014	Radiation (03CH01-CB)
Horn Antenna	EMCO	3115	00075790	750MHz~18GHz	Nov. 01, 2013	Radiation (03CH01-CB)
Horn Antenna	EMCO	3115	00075790	750MHz~18GHz	Oct. 28, 2014	Radiation (03CH01-CB)
Horn Antenna	SCHWARZBEAK	BBHA 9170	BBHA9170252	15GHz ~ 40GHz	Dec. 17, 2013	Radiation (03CH01-CB)
Pre-Amplifier	Agilent	8447D	2944A10991	0.1MHz ~ 1.3GHz	Nov. 15, 2014	Radiation (03CH01-CB)
Pre-Amplifier	Agilent	8449B	3008A02310	1GHz ~ 26.5GHz	Dec. 16, 2013	Radiation (03CH01-CB)
Pre-Amplifier	WM	TF-130N-R1	923365	26GHz ~ 40GHz	Oct. 23, 2013	Radiation (03CH01-CB)
Spectrum analyzer	R&S	FSP40	100019	9kHz~40GHz	Dec. 02, 2013	Radiation (03CH01-CB)
Spectrum Analyzer	R&S	FSP40	100080	9kHz ~ 40GHz	Oct. 15, 2014	Radiation (03CH01-CB)
EMI Test Receiver	Agilent	N9038A	MY52260123	9kHz ~ 8GHz	Dec. 12, 2013	Radiation (03CH01-CB)
EMI Test Receiver	R&S	ESR26	101289	9kHz~26GHz	Aug. 22, 2014	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-3	N/A	1GHz - 40GHz	Nov. 17, 2013	Radiation (03CH01-CB)
RF Cable-high	Woken	High Cable-4	N/A	1GHz - 40GHz	Nov. 17, 2013	Radiation (03CH01-CB)

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Remark
Signal analyzer	R&S	FSV40	100979	9kHz~40GHz	Nov. 29, 2013	Conducted (TH01-CB)
RF Power Divider	Woken	2 Way	0120A02056002D	2GHz ~ 18GHz	Nov. 17, 2013	Conducted (TH01-CB)
RF Power Divider	Woken	3 Way	MDC2366	2GHz ~ 18GHz	Nov. 17, 2013	Conducted (TH01-CB)
RF Power Divider	Woken	4 Way	0120A04056002D	2GHz ~ 18GHz	Nov. 17, 2013	Conducted (TH01-CB)
RF Cable-high	Woken	High Cable-7	-	1GHz – 26.5GHz	Nov. 17, 2013	Conducted (TH01-CB)
RF Cable-high	Woken	High Cable-8	-	1GHz – 26.5GHz	Nov. 17, 2013	Conducted (TH01-CB)
RF Cable-high	Woken	High Cable-9	-	1GHz – 26.5GHz	Nov. 17, 2013	Conducted (TH01-CB)
RF Cable-high	Woken	High Cable-10	-	1GHz – 26.5GHz	Nov. 17, 2013	Conducted (TH01-CB)
RF Cable-high	Woken	High Cable-11	-	1GHz – 26.5GHz	Nov. 17, 2013	Conducted (TH01-CB)
Power Sensor	Anritsu	MA2411B	0917223	300MHz~40GHz	Sep. 18, 2013	Conducted (TH01-CB)
Power Meter	Anritsu	ML2495A	1035008	300MHz~40GHz	Sep. 18, 2013	Conducted (TH01-CB)

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

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

## 6. MEASUREMENT UNCERTAINTY

Test Items	Uncertainty	Remark
Conducted Emission (150kHz ~ 30MHz)	3.2 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%