SPORTON International Inc.
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FCC RADIO TEST REPORT

Applicant's company	**Linksys LLC**
Applicant Address	121 Theory Drive, Irvine, CA 92617, USA
FCC ID	**Q87-RE3000WV2**

Product Name	Linksys Wi-Fi Single-Band Wireless-N Range Extender
Brand Name	LINKSYS
Model No.	RE3000W V2
Test Rule	47 CFR FCC Part 15 Subpart C § 15.247
Test Freq. Range	2400 ~ 2483.5MHz
Received Date	Nov. 21, 2014
Final Test Date	Dec. 02, 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.

Testing Laboratory
1190

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History of This Test Report

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FR4N2146	Rev. 01	Initial issue of report	Jan. 13, 2015

Certificate No.: CB10312171

1. CERTIFICATE OF COMPLIANCE

Product Name	:	Linksys Wi-Fi Single-Band Wireless-N Range Extender
Brand Name	:	LINKSYS
Model No.	:	RE3000W V2
Applicant	:	Linksys LLC
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 Nov. 21, 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	7.64 dB
4.2	15.247(b)(3)	Maximum Conducted Output Power	Complies	5.75 dB
4.3	15.247(e)	Power Spectral Density	Complies	0.19 dB
4.4	15.247(a)(2)	6dB Spectrum Bandwidth	Complies	-
4.5	15.247(d)	Radiated Emissions	Complies	3.36 dB
4.6	15.247(d)	Band Edge Emissions	Complies	1.09 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 Internal Power Supply
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): 23.68 MHz ; MCS0 (HT40): 35.89 MHz
Maximum Conducted Output Power	MCS0 (HT20): 24.18 dBm ; MCS0 (HT40): 18.58 dBm
Carrier Frequencies	Please refer to section 3.4
Antenna	Please refer to section 3.3

IEEE 802.11b/g

Items	Description
Product Type	802.11b: WLAN (1TX, 1RX) 802.11g: WLAN (2TX, 2RX)
Radio Type	Intentional Transceiver
Power Type	From Internal Power Supply
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: 14.59 MHz ; 11g: 21.53 MHz
Maximum Conducted Output Power	11b: 18.63 dBm ; 11g: 24.25 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	Single (TX)		Two (TX)	
Band width Mode	20 MHz	40 MHz	20 MHz	40 MHz
IEEE 802.11b	V	X	X	X
IEEE 802.11g	X	X	V	X
IEEE 802.11n	X	X	V	V

IEEE 11n Spec.

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

3.2. Accessories

N/A

3.3. Table for Filed Antenna

Ant.	Brand	Model Name	Antenna Type	Connector	Gain (dBi)
1	Galtronics	02036140-05830-2	PCB Antenna	N/A	1
2	Galtronics	02036140-05830-2	PCB Antenna	N/A	1

Note: The EUT has two antennas.

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

The EUT supports the antenna with TX and RX diversity functions.

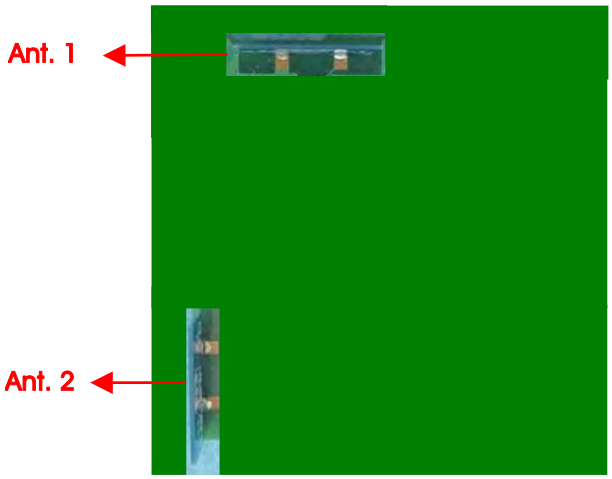
Both Ant. 1 and Ant. 2 support transmit and receive functions, but only one of them will be used at one time.

The Ant. 1 generated the worst case, so it was selected to test and record in the report.

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

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

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



3.4. Table for Carrier Frequencies

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	802.11n HT20	MCS0	1/6/11	1+2
	802.11n HT40	MCS0	3/6/9	1+2
	11b/BPSK	1 Mbps	1/6/11	1
	11g/BPSK	6 Mbps	1/6/11	1+2
Power Spectral Density	802.11n HT20	MCS0	1/6/11	1+2
	802.11n HT40	MCS0	3/6/9	1+2
	11b/BPSK	1 Mbps	1/6/11	1
	11g/BPSK	6 Mbps	1/6/11	1+2
6dB Spectrum Bandwidth	802.11n HT20	MCS0	1/6/11	1+2
	802.11n HT40	MCS0	3/6/9	1+2
	11b/BPSK	1 Mbps	1/6/11	1
	11g/BPSK	6 Mbps	1/6/11	1+2
Radiated Emissions 9kHz~1GHz	Normal Link	-	-	-
Radiated Emissions 1GHz~10th Harmonic	802.11n HT20	MCS0	1/6/11	1+2
	802.11n HT40	MCS0	3/6/9	1+2
	11b/BPSK	1 Mbps	1/6/11	1
	11g/BPSK	6 Mbps	1/6/11	1+2

Band Edge Emissions	802.11n HT20	MCS0	1/6/11	1+2
	802.11n HT40	MCS0	3/6/9	1+2
	11b/BPSK	1 Mbps	1/6/11	1
	11g/BPSK	6 Mbps	1/6/11	1+2

Note 1:

For Radiated Emission test below 1GHz:

EUT	Laying	Standing
Orthogonal Planes of EUT		

For Radiated Emission test above 1GHz:

EUT	X Axis	Y Axis	Z Axis
Orthogonal Planes of EUT			

Note 2:

The following test modes were performed for all tests:

For Conducted Emission test:

Mode 1. Normal Link - EUT 1

Mode 2. Normal Link - EUT 2

Mode 1 is the worst case, so it was selected to record in this test report.

For Radiated Emission test below 1GHz:

Mode 1. EUT 1 laying

Mode 2. EUT 1 standing

Mode 2 has been evaluated to be the worst case among Mode 1~2, thus measurement for Mode 3 will follow this same test mode.

Mode 3. EUT 2 standing

Mode 2 is the worst case, so it was selected to record in this test report.

For Radiated Emission test above 1GHz:

It were performed at its 3-axis and the worst-case was found at Z-axis.

Mode 1. Place EUT in Z axis

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 Explanation

EUT	HON-KWANG	KUANTECH INCORPORATED COMPANY
1	V	-
2	-	V

Brand	Difference: Power source board
HON-KWANG	Please refer to Photographs of EUT at page 13
KUANTECH INCORPORATED COMPANY	Please refer to Photographs of EUT at page 26

Note:

For Radiated Emission test above 1GHz:

The above difference does not affect the test result of RF tests, so only EUT 1 was tested and recorded in this report.

3.8. Table for Supporting Units

For Test Site No: 03CH01-CB – for Radiated Emission test below 1GHz

Support Unit	Brand	Model	FCC ID
Notebook	DELL	M1330	DoC
Notebook	DELL	M1340	DoC

For Test Site No: 03CH01-CB – for Radiated Emission test above 1GHz

Support Unit	Brand	Model	FCC ID
Notebook	DELL	M1330	DoC

For Test Site No: CO01-CB

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

For Test Site No: TH01-CB

Support Unit	Brand	Model	FCC ID
Notebook	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

Test Software Version	MT7603 QA V0.0.0.41		
Frequency	2412 MHz	2437 MHz	2462 MHz
MCS0 HT20	21	28	20
Frequency	2422 MHz	2437 MHz	2452 MHz
MCS0 HT40	1B	1C	16

Power Parameters of IEEE 802.11b/g

Test Software Version	MT7603 QA V0.0.0.41		
Frequency	2412 MHz	2437 MHz	2462 MHz
IEEE 802.11b	23	1B	23
IEEE 802.11g	20	28	21

3.10. EUT Operation during Test

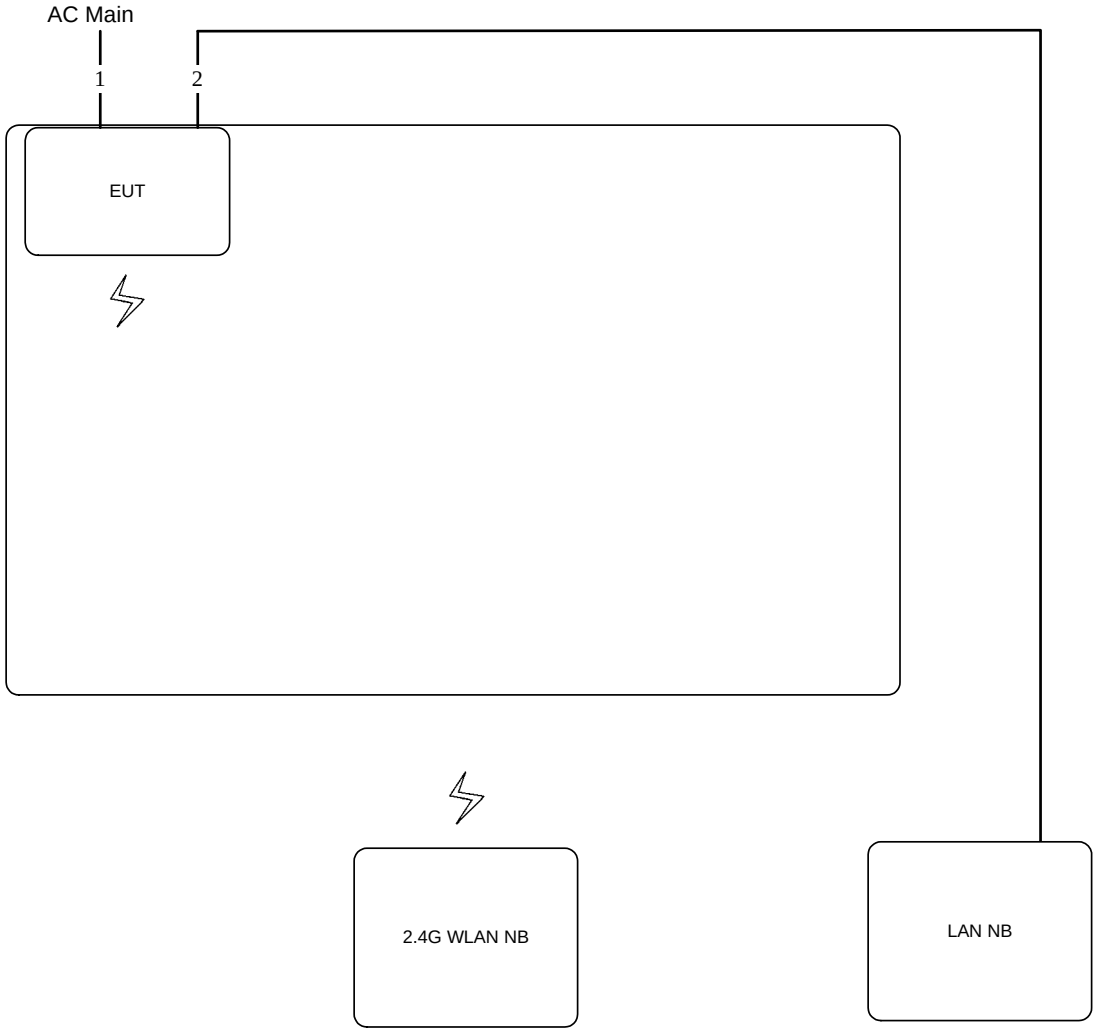
The EUT was programmed to be in continuously transmitting mode.

3.11. Duty Cycle

Mode	On Time (ms)	On+Off Time (ms)	Duty Cycle (%)	Duty Factor (dB)	1/T Minimum VBW (kHz)
802.11n MCS0 HT20	1.296	1.473	87.98	0.56	0.77
802.11n MCS0 HT40	0.618	0.805	76.77	1.15	1.62
802.11b	8.438	8.554	98.65	0.06	0.01
802.11g	1.384	1.587	87.21	0.59	0.72

3.12. Test Configurations

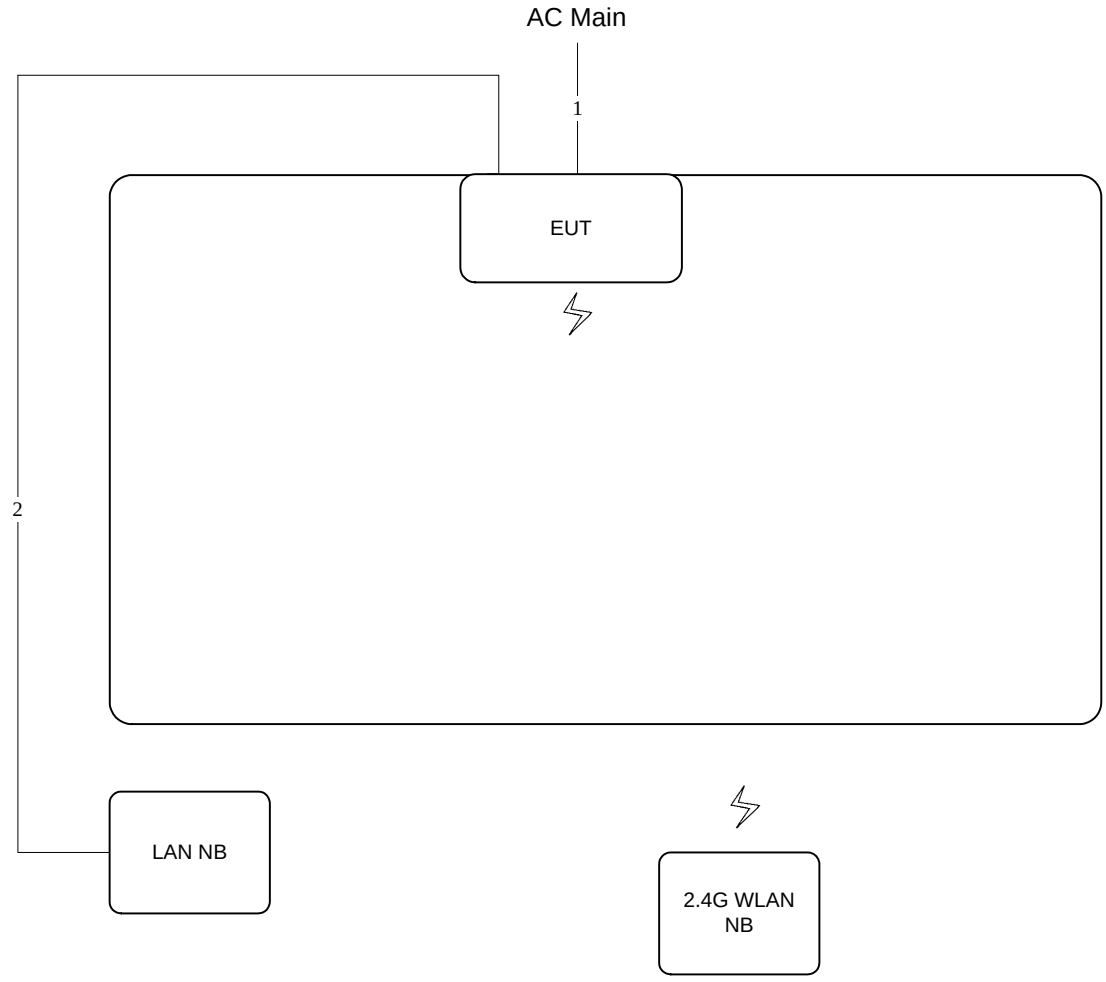
3.12.1. AC Power Line Conduction Emissions Test Configuration



Item	Connection	Shielded	Length
1	Power cable	No	1.8m
2	RJ-45 cable	No	10m

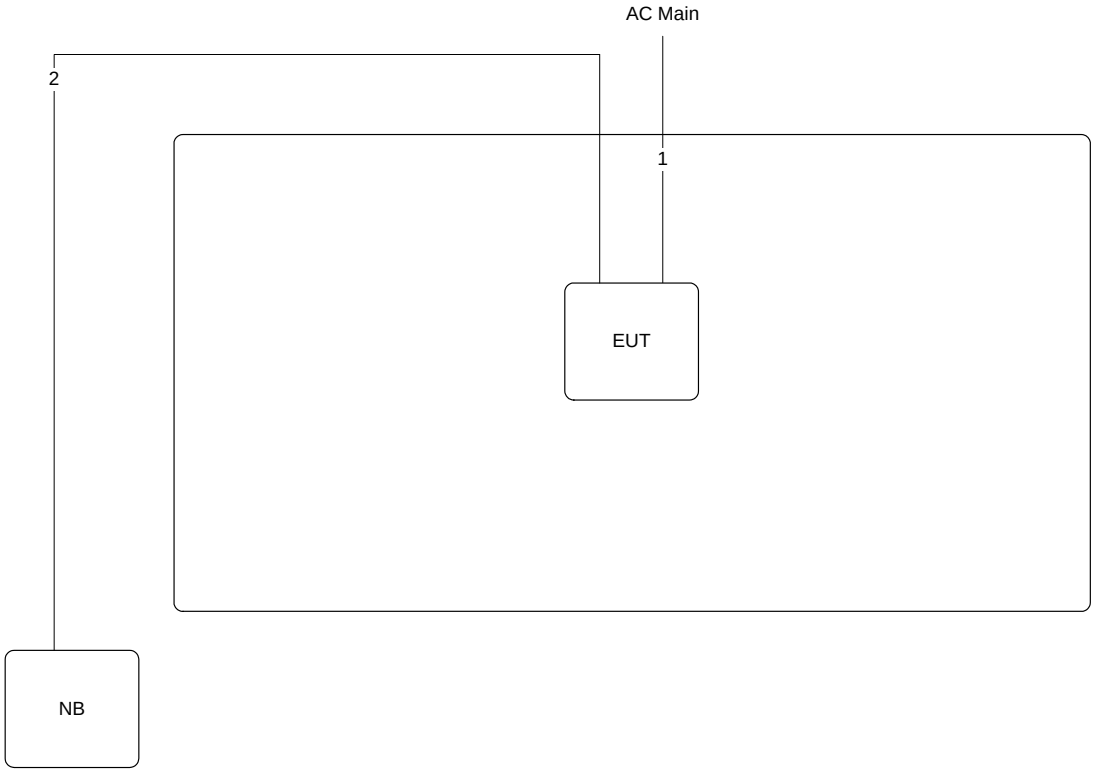
3.12.2. Radiation Emissions Test Configuration

Test Configuration: 30MHz~1GHz



Item	Connection	Shielded	Length
1	Power cable	No	1.8m
2	RJ-45 cable	No	10m

Test Configuration: above 1GHz



Item	Connection	Shielded	Length
1	Power cable	No	1.8m
2	RJ-45 cable	No	10m

4. TEST RESULT

4.1. AC Power Line Conducted Emissions Measurement

4.1.1. Limit

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

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

4.1.2. Measuring Instruments and Setting

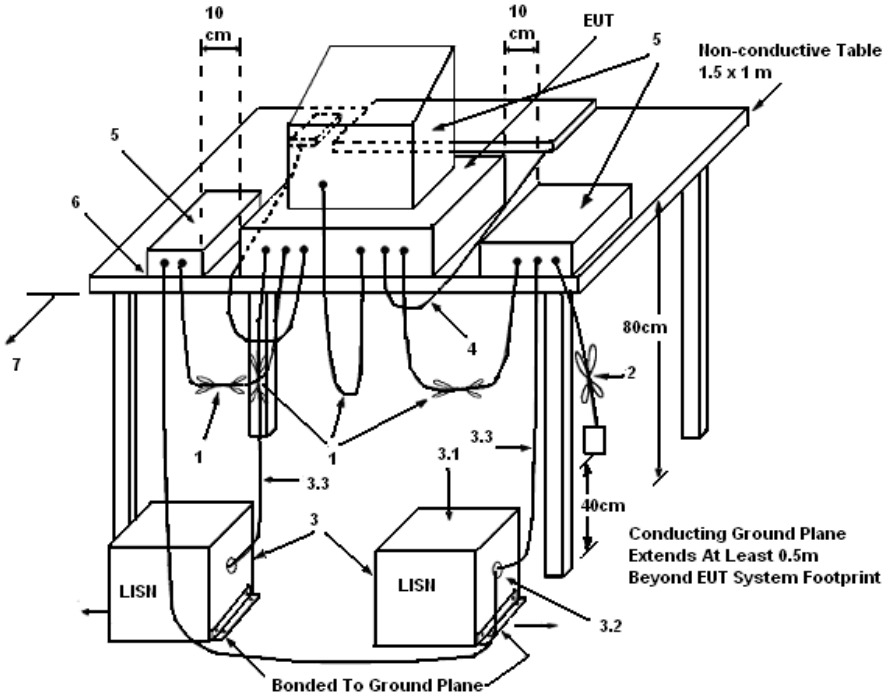
Please refer to section 5 of equipments list in this report. The following table is the setting of the receiver.

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

4.1.3. Test Procedures

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

4.1.4. Test Setup Layout



LEGEND:

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

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

(3) EUT connected to one LISN. Unused LISN measuring port connectors shall be terminated in 50 Ω. LISN can be placed on top of, or immediately beneath, reference ground plane.

(3.1) All other equipment powered from additional LISN(s).

(3.2) Multiple outlet strip can be used for multiple power cords of non-EUT equipment.

(3.3) LISN at least 80 cm from nearest part of EUT chassis.

(4) Cables of hand-operated devices, such as keyboards, mice, etc., shall be placed as for normal use.

(5) Non-EUT components of EUT system being tested.

(6) Rear of EUT, including peripherals, shall all be aligned and flush with rear of tabletop.

(7) Rear of tabletop shall be 40 cm removed from a vertical conducting plane that is bonded to the ground plane.

4.1.5. Test Deviation

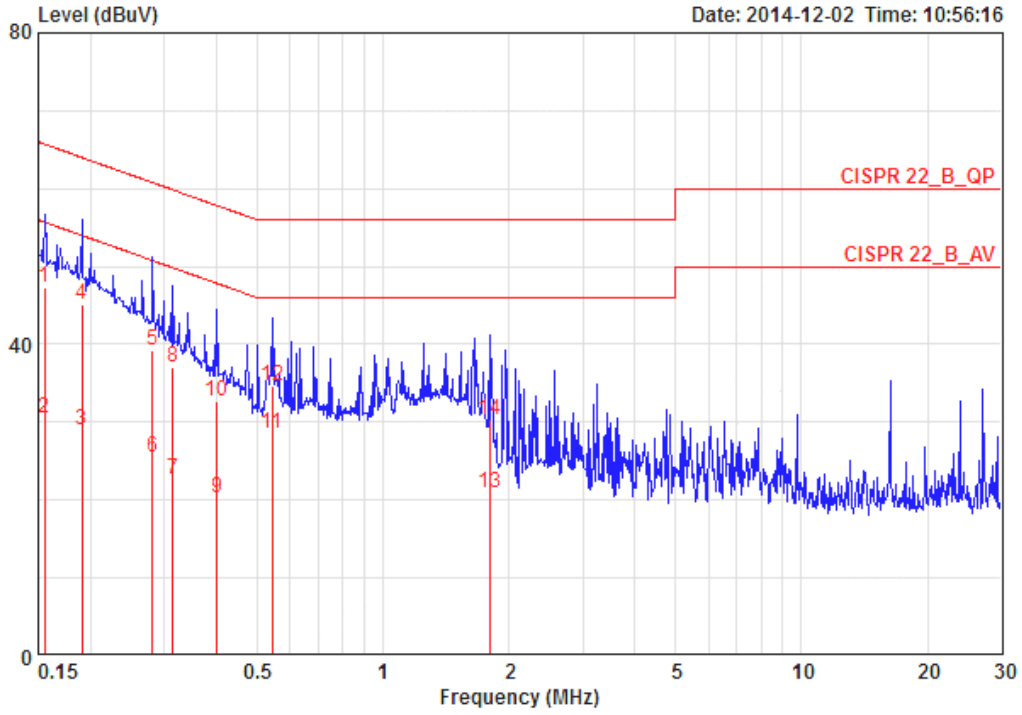
There is no deviation with the original standard.

4.1.6. EUT Operation during Test

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

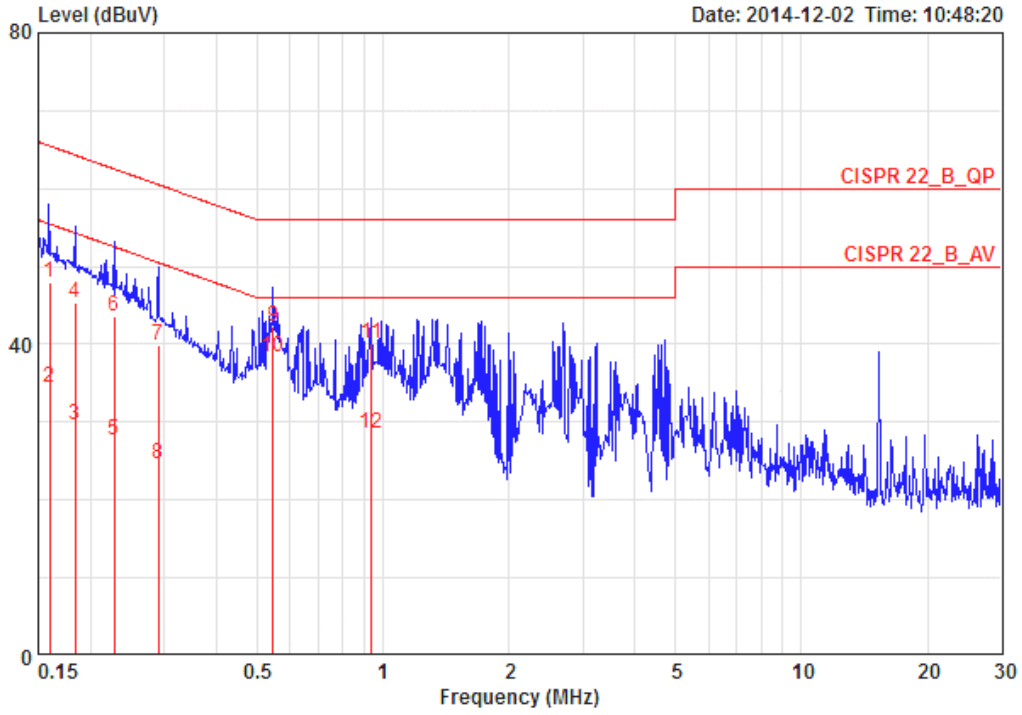
4.1.7. Results of AC Power Line Conducted Emissions Measurement

Temperature	24°C	Humidity	56%
Test Engineer	Edison Lin	Phase	Line
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	0.15567	47.22	-18.48	65.69	37.09	9.97	0.16	QP	LINE
2	0.15567	30.54	-25.16	55.69	20.41	9.97	0.16	AVERAGE	LINE
3	0.19039	28.92	-25.10	54.02	18.79	9.96	0.16	AVERAGE	LINE
4	0.19039	45.07	-18.95	64.02	34.94	9.96	0.16	QP	LINE
5	0.28178	39.27	-21.50	60.76	29.13	9.96	0.17	QP	LINE
6	0.28178	25.43	-25.34	50.76	15.29	9.96	0.17	AVERAGE	LINE
7	0.31495	22.76	-27.08	49.84	12.62	9.97	0.17	AVERAGE	LINE
8	0.31495	37.05	-22.79	59.84	26.91	9.97	0.17	QP	LINE
9	0.40187	20.24	-27.57	47.81	10.09	9.97	0.18	AVERAGE	LINE
10	0.40187	32.72	-25.09	57.81	22.57	9.97	0.18	QP	LINE
11	0.54355	28.66	-17.34	46.00	18.51	9.96	0.19	AVERAGE	LINE
12	0.54355	34.56	-21.44	56.00	24.41	9.96	0.19	QP	LINE
13	1.800	21.01	-24.99	46.00	10.81	9.96	0.24	AVERAGE	LINE
14	1.800	30.24	-25.76	56.00	20.04	9.96	0.24	QP	LINE

Temperature	24°C	Humidity	56%
Test Engineer	Edison Lin	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	0.15980	48.03	-17.45	65.47	37.90	9.97	0.16	QP	NEUTRAL
2	0.15980	34.42	-21.06	55.47	24.29	9.97	0.16	AVERAGE	NEUTRAL
3	0.18346	29.67	-24.66	54.33	19.54	9.96	0.16	AVERAGE	NEUTRAL
4	0.18346	45.30	-19.03	64.33	35.17	9.96	0.16	QP	NEUTRAL
5	0.22797	27.60	-24.92	52.52	17.47	9.96	0.17	AVERAGE	NEUTRAL
6	0.22797	43.70	-18.82	62.52	33.57	9.96	0.17	QP	NEUTRAL
7	0.29088	39.88	-20.62	60.50	29.74	9.97	0.17	QP	NEUTRAL
8	0.29088	24.70	-25.80	50.50	14.56	9.97	0.17	AVERAGE	NEUTRAL
9	0.54644	42.30	-13.70	56.00	32.15	9.96	0.19	QP	NEUTRAL
10 @	0.54644	38.36	-7.64	46.00	28.21	9.96	0.19	AVERAGE	NEUTRAL
11	0.93810	40.12	-15.88	56.00	29.97	9.95	0.20	QP	NEUTRAL
12	0.93810	28.56	-17.44	46.00	18.41	9.95	0.20	AVERAGE	NEUTRAL

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

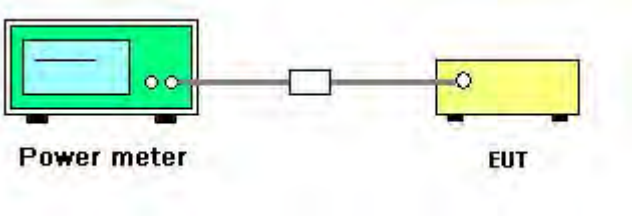
Please refer to section 5 of equipments list in this report. The following table is the setting of the power meter.

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	25°C	Humidity	60%
Test Engineer	Lucas Huang	Configurations	IEEE 802.11n
Test Date	Nov. 28, 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	15.10	15.33	18.23	30.00	Complies
6	2437 MHz	21.77	20.48	24.18	30.00	Complies
11	2462 MHz	14.78	14.90	17.85	30.00	Complies

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

Channel	Frequency	Conducted Power (dBm)			Max. Limit (dBm)	Result
		Ant. 1	Ant. 2	Total		
3	2422 MHz	11.22	11.31	14.28	30.00	Complies
6	2437 MHz	15.58	15.55	18.58	30.00	Complies
9	2452 MHz	12.62	12.64	15.64	30.00	Complies

Temperature	25°C	Humidity	60%
Test Engineer	Lucas Huang	Configurations	IEEE 802.11b/g
Test Date	Nov. 28, 2014		

Configuration IEEE 802.11b / Ant. 1

Channel	Frequency	Conducted Power (dBm)	Max. Limit (dBm)	Result
1	2412 MHz	18.12	30.00	Complies
6	2437 MHz	18.05	30.00	Complies
11	2462 MHz	18.63	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	15.04	15.01	18.04	30.00	Complies
6	2437 MHz	21.88	20.49	24.25	30.00	Complies
11	2462 MHz	15.40	15.42	18.42	30.00	Complies

4.3. Power Spectral Density Measurement

4.3.1. Limit

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

4.3.2. Measuring Instruments and Setting

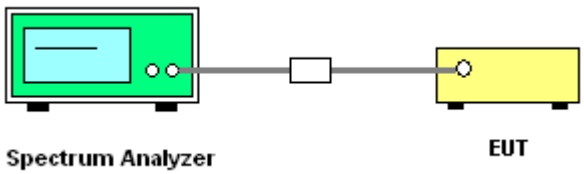
Please refer to section 5 of equipments list in this report. The following table is the setting of the spectrum analyzer.

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

4.3.3. Test Procedures

1. Test 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 ≥ 2 x span/RBW (use of a greater number of measurement points than this minimum requirement is recommended).
4. Use the peak marker function to determine the maximum level in any 3 kHz band segment within the fundamental EBW.
5. The resulting PSD level must be ≤ 8 dBm.

4.3.4. Test Setup Layout



4.3.5. Test Deviation

There is no deviation with the original standard.

4.3.6. EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

4.3.7. Test Result of Power Spectral Density

Temperature	25°C	Humidity	60%
Test Engineer	Lucas Huang	Configurations	IEEE 802.11n
Test Date	Nov. 28, 2014		

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	-8.71	-9.64	-6.14	8.00	Complies
6	2437 MHz	-3.27	-4.28	-0.74	8.00	Complies
11	2462 MHz	-10.28	-9.92	-7.09	8.00	Complies

Note: Directional gain= $DirectionalGain = 10 \cdot \log\left[\frac{\sum_{j=1}^{N_{SS}}\left\{\sum_{k=1}^{N_{ANT}} g_{j,k}\right\}^2}{N_{ANT}}\right]$ =4.01dBi <6dBi, so the limit doesn't reduce.

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

Channel	Frequency	Power Density (dBm/3kHz)			Power Density Limit (dBm/3kHz)	Result
		Ant. 1	Ant. 2	Total		
3	2422 MHz	-16.34	-16.58	-13.45	8.00	Complies
6	2437 MHz	-10.03	-12.79	-8.18	8.00	Complies
9	2452 MHz	-15.14	-14.86	-11.99	8.00	Complies

Note: Directional gain= $DirectionalGain = 10 \cdot \log\left[\frac{\sum_{j=1}^{N_{SS}}\left\{\sum_{k=1}^{N_{ANT}} g_{j,k}\right\}^2}{N_{ANT}}\right]$ =4.01dBi <6dBi, so the limit doesn't reduce.

Temperature	25°C	Humidity	60%
Test Engineer	Lucas Huang	Configurations	IEEE 802.11b/g
Test Date	Nov. 28, 2014		

Configuration IEEE 802.11b / Ant. 1

Channel	Frequency	Power Density (dBm/3kHz)	Power Density Limit (dBm/3kHz)	Result
1	2412 MHz	7.81	8.00	Complies
6	2437 MHz	7.30	8.00	Complies
11	2462 MHz	7.76	8.00	Complies

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

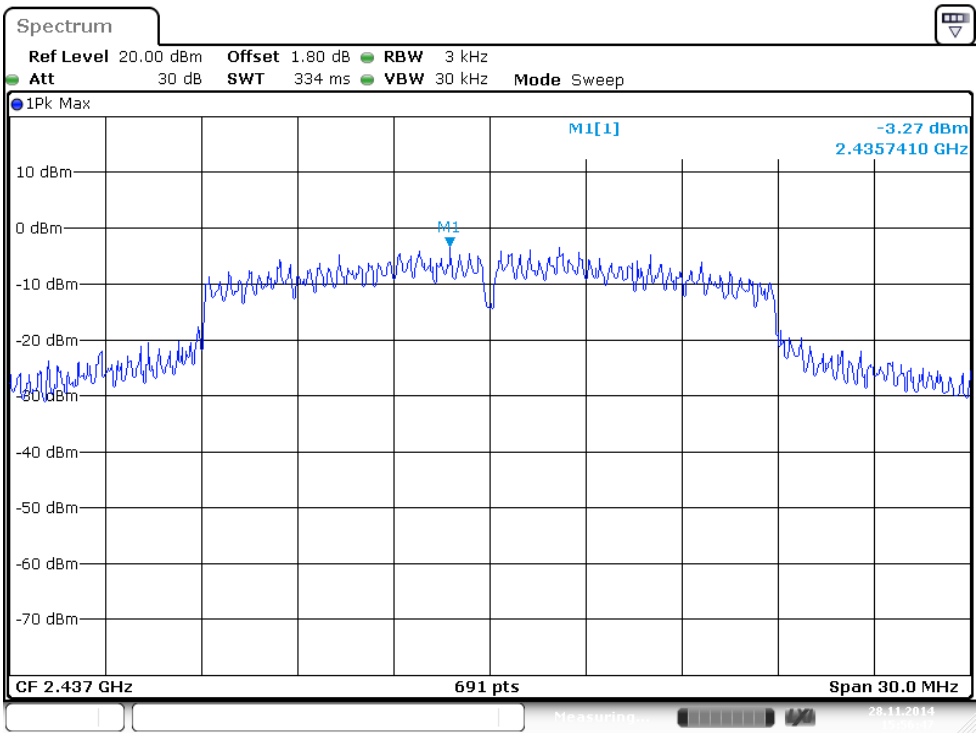
Channel	Frequency	Power Density (dBm/3kHz)			Power Density Limit (dBm/3kHz)	Result
		Ant. 1	Ant. 2	Total		
1	2412 MHz	-10.77	-10.57	-7.66	8.00	Complies
6	2437 MHz	-3.16	-5.62	-1.21	8.00	Complies
11	2462 MHz	-9.02	-10.75	-6.79	8.00	Complies

Note: Directional gain= $DirectionalGain = 10 \cdot \log\left[\frac{\sum_{j=1}^{N_{BS}}\left\{\sum_{k=1}^{N_{BST}} g_{j,k}\right\}^2}{N_{ANT}}\right]$ =4.01dBi <6dBi, so the limit doesn't reduce.

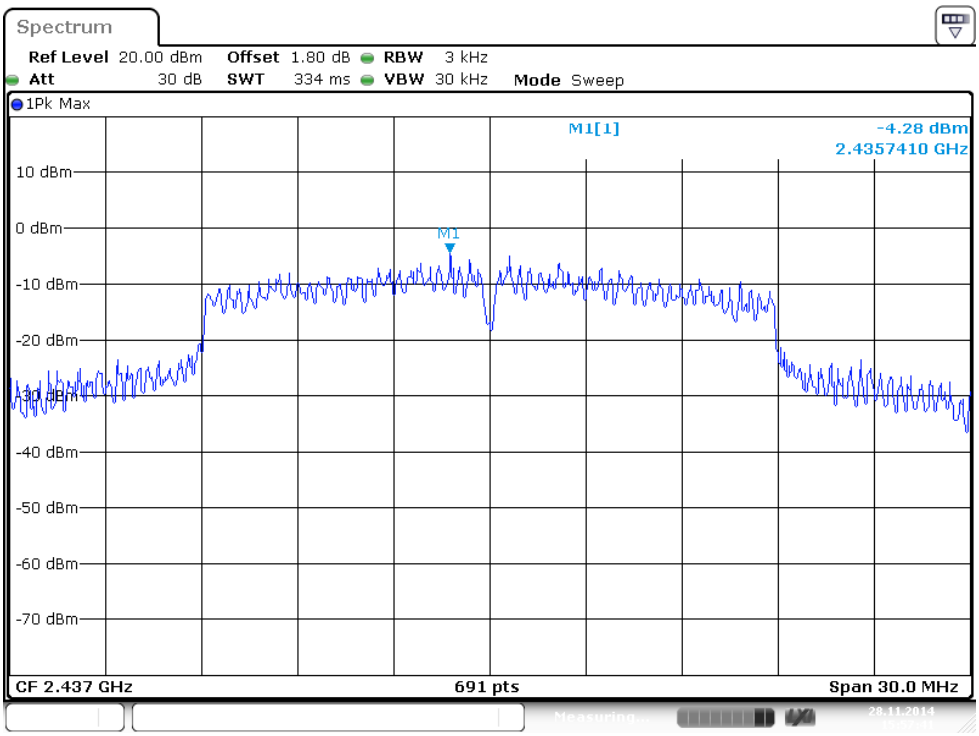
Note: All the test values were listed in the report.

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

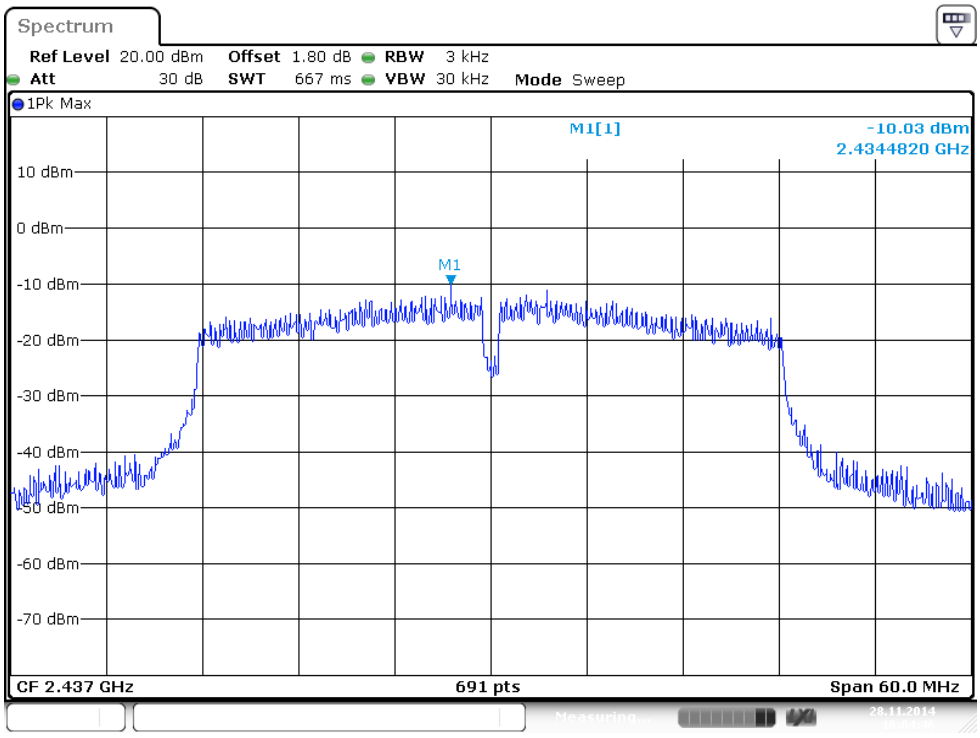
Power Density Plot on Configuration IEEE 802.11n MCS0 HT20 / 2437 MHz / Ant. 1



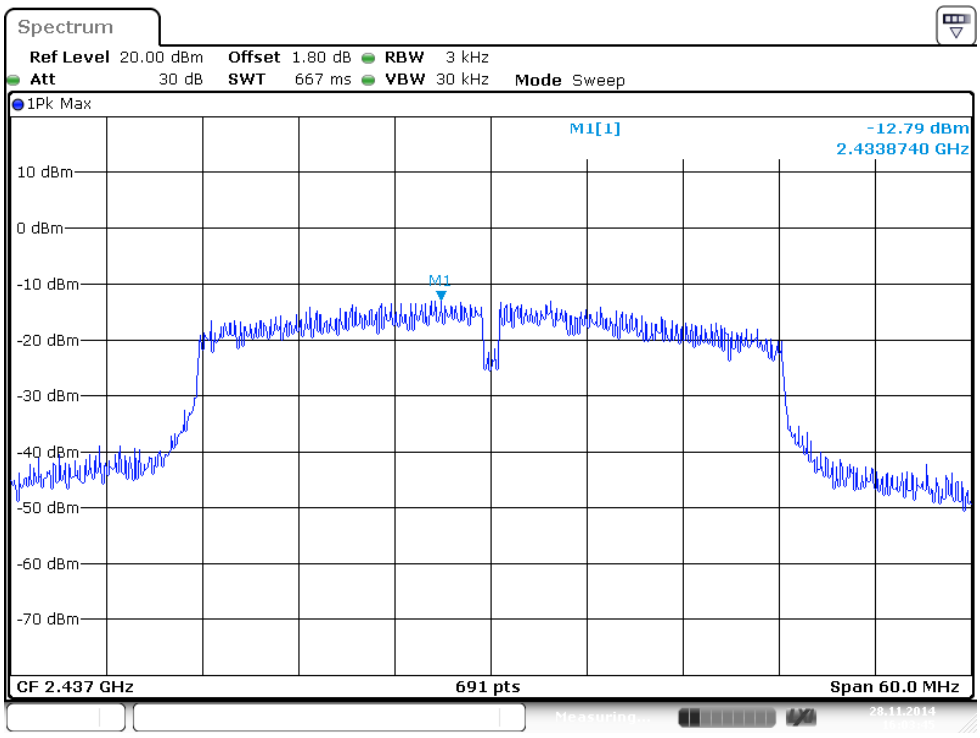
Power Density Plot on Configuration IEEE 802.11n MCS0 HT20 / 2437 MHz / Ant. 2



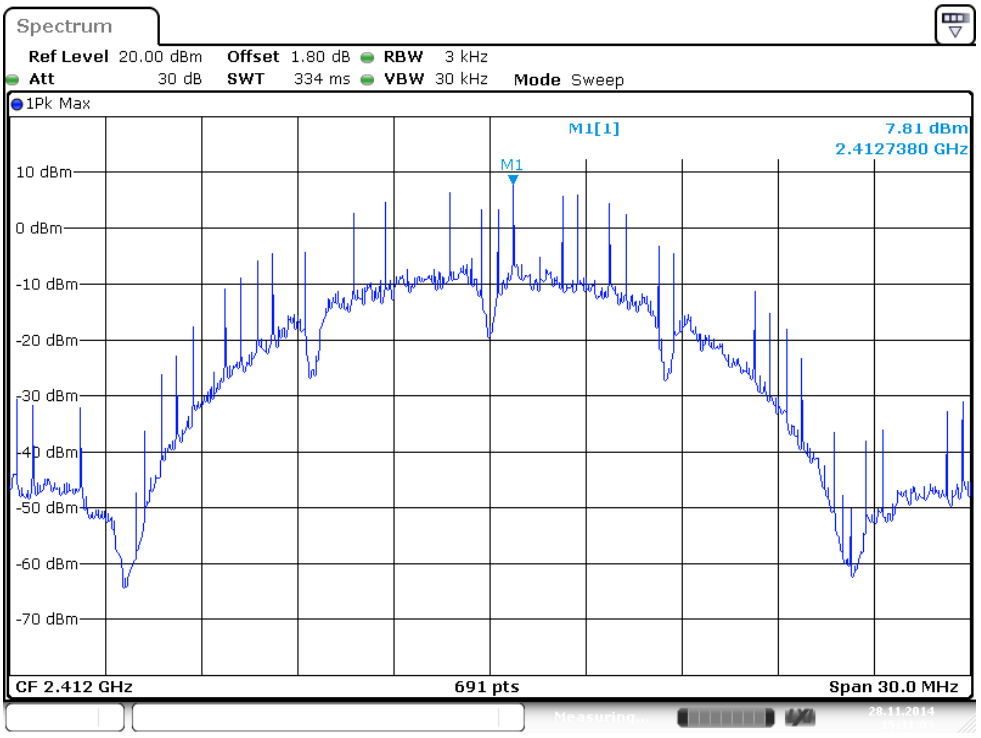
Power Density Plot on Configuration IEEE 802.11n MCS0 HT40 / 2437 MHz / Ant. 1



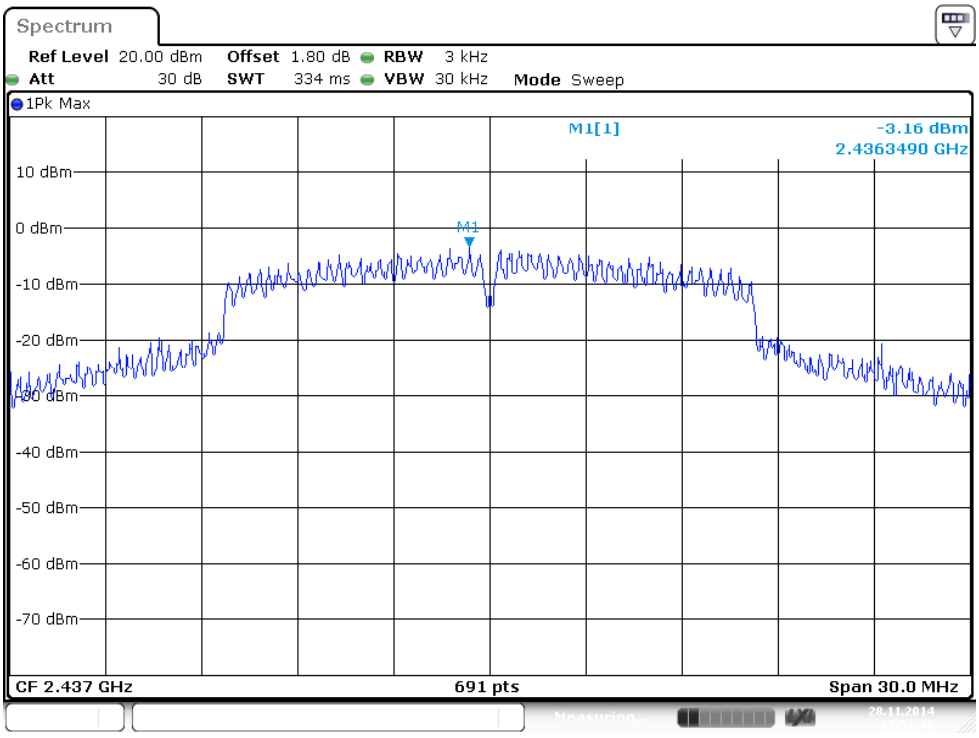
Power Density Plot on Configuration IEEE 802.11n MCS0 HT40 / 2437 MHz / Ant. 2



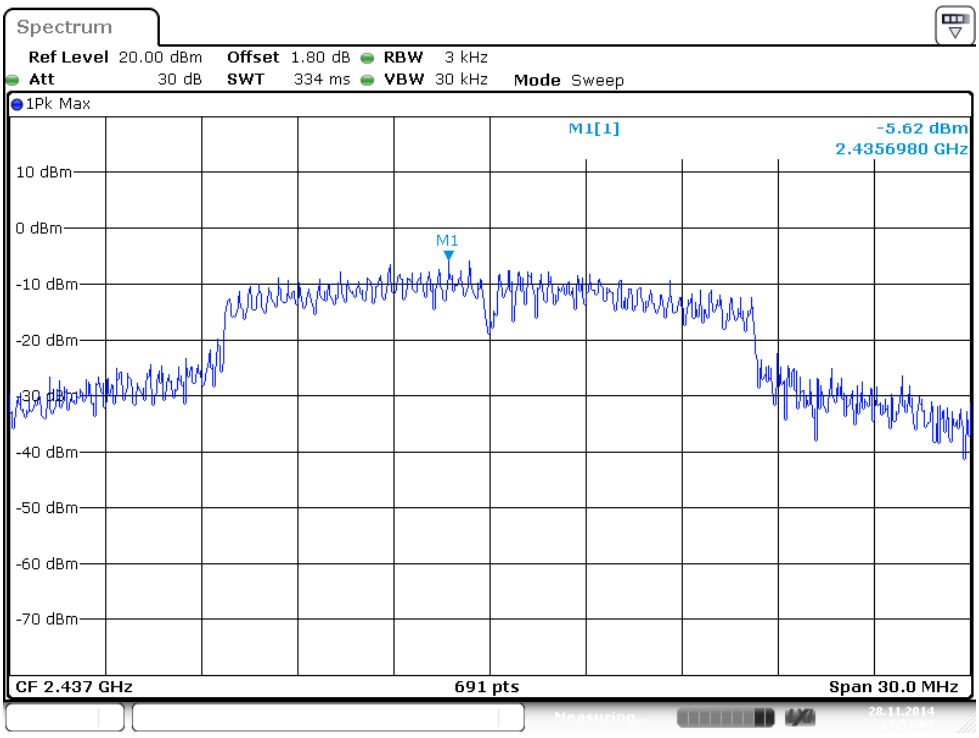
Power Density Plot on Configuration IEEE 802.11b / 2412 MHz / Ant. 1



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



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



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.

6dB Spectrum Bandwidth	
Spectrum Parameters	**Setting**
Attenuation	Auto
Span Frequency	> 6dB Bandwidth
RBW	100kHz
VBW	≥ 3 x RBW
Detector	Peak
Trace	Max Hold
Sweep Time	Auto
99% Occupied Bandwidth	
Spectrum Parameters	**Setting**
Span	1.5 times to 5.0 times the OBW
RBW	1 % to 5 % of the OBW
VBW	≥ 3 x RBW
Detector	Peak
Trace	Max Hold

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	25°C	Humidity	60%
Test Engineer	Lucas Huang	Configurations	IEEE 802.11n
Test Date	Nov. 28, 2014		

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	15.65	17.48	500	Complies
6	2437 MHz	13.16	23.68	500	Complies
11	2462 MHz	10.72	17.54	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	30.15	35.66	500	Complies
6	2437 MHz	31.30	35.89	500	Complies
9	2452 MHz	30.15	35.77	500	Complies

Temperature	25°C	Humidity	60%
Test Engineer	Lucas Huang	Configurations	IEEE 802.11 b/g
Test Date	Nov. 28, 2014		

Configuration IEEE 802.11b / Ant. 1

Channel	Frequency	6dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)	Min. Limit (kHz)	Test Result
1	2412 MHz	10.03	14.59	500	Complies
6	2437 MHz	10.03	14.59	500	Complies
11	2462 MHz	10.03	14.47	500	Complies

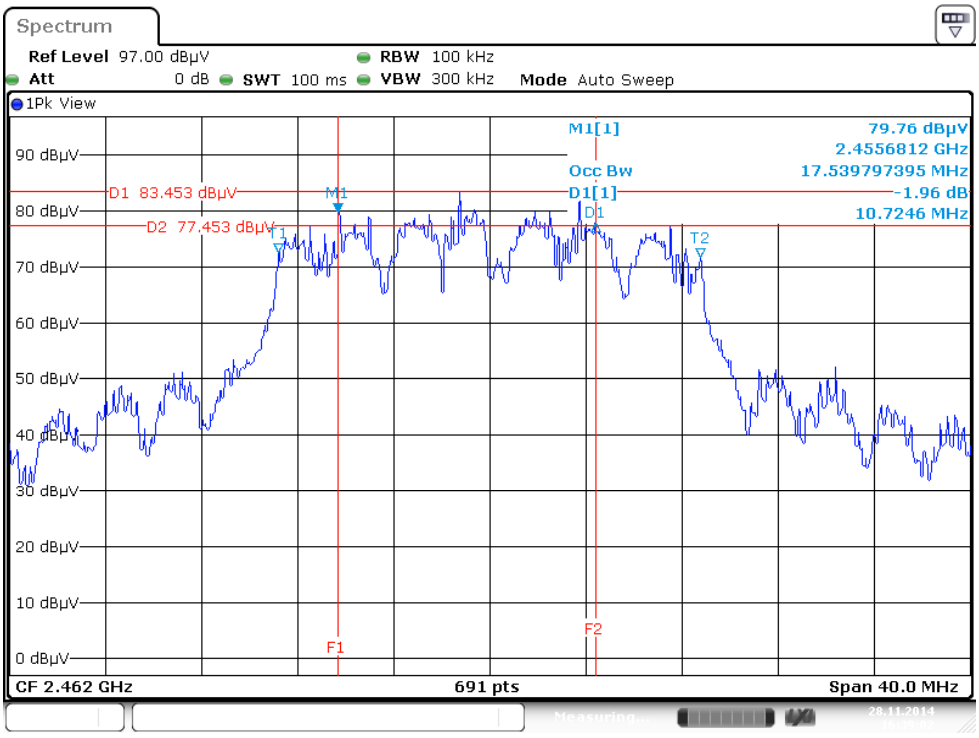
Configuration IEEE 802.11g / Ant. 1 + Ant. 2

Channel	Frequency	6dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)	Min. Limit (kHz)	Test Result
1	2412 MHz	11.48	16.09	500	Complies
6	2437 MHz	11.36	21.53	500	Complies
11	2462 MHz	13.80	16.27	500	Complies

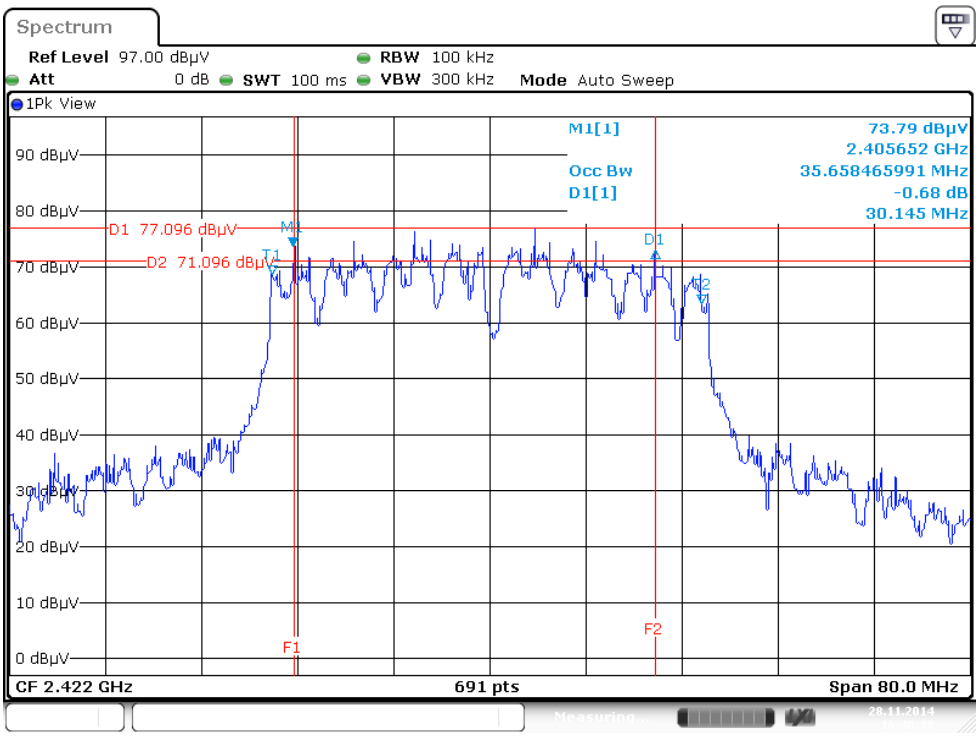
Note: All the test values were listed in the report.

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

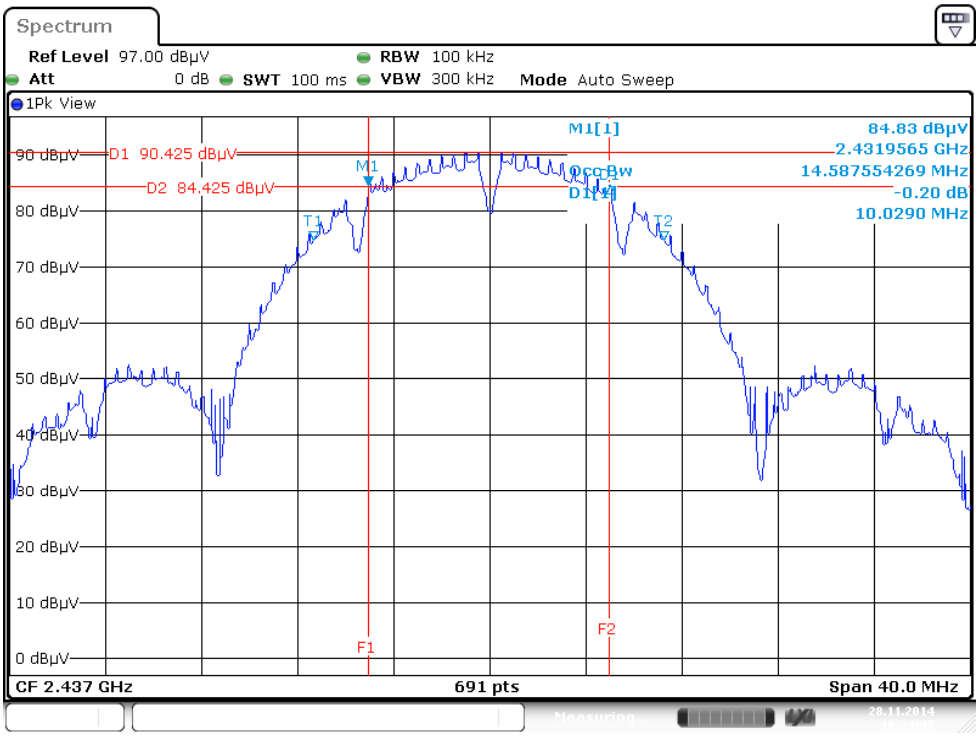
6 dB Bandwidth Plot on Configuration IEEE 802.11n MCS0 HT20 / 2462 MHz / Ant. 1 + Ant. 2



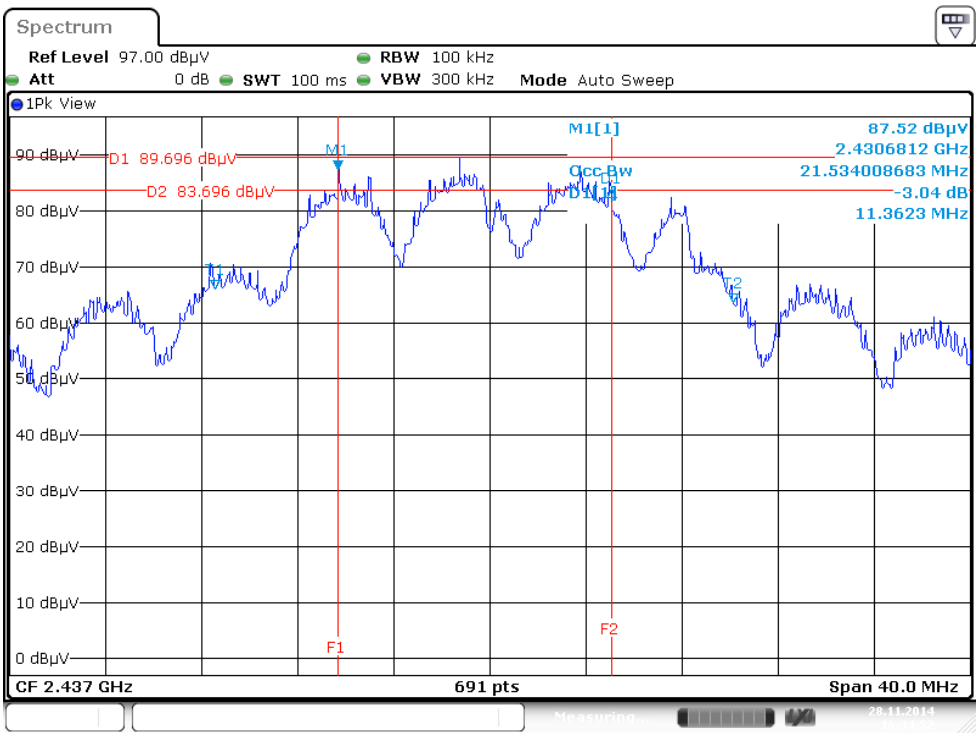
6 dB Bandwidth Plot on Configuration IEEE 802.11n MCS0 HT40 / 2422 MHz / Ant. 1 + Ant. 2



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



99% Occupied Bandwidth Plot on Configuration IEEE 802.11g / 2437 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 (micorvolts/meter)	Measurement Distance (meters)
0.009~0.490	2400/F(kHz)	300
0.490~1.705	24000/F(kHz)	30
1.705~30.0	30	30
30~88	100	3
88~216	150	3
216~960	200	3
Above 960	500	3

4.5.2. Measuring Instruments and Setting

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

Spectrum Parameter	Setting
Attenuation	Auto
Start Frequency	1000 MHz
Stop Frequency	10th carrier harmonic
RBW / VBW (Emission in restricted band)	1MHz / 3MHz for Peak, 1MHz / 1/T for Average
RBW / VBW (Emission in non-restricted band)	100kHz / 300kHz for peak

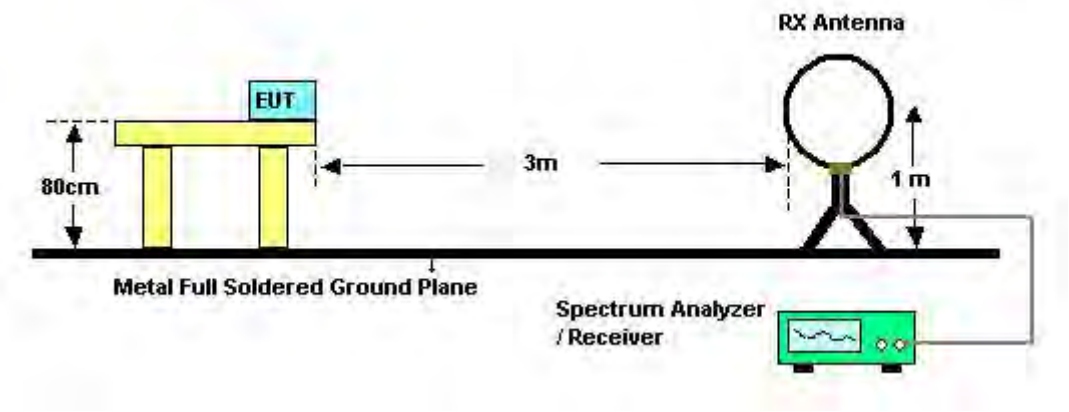
Receiver Parameter	Setting
Attenuation	Auto
Start ~ Stop Frequency	9kHz~150kHz / RBW 200Hz for QP
Start ~ Stop Frequency	150kHz~30MHz / RBW 9kHz for QP
Start ~ Stop Frequency	30MHz~1000MHz / RBW 120kHz for QP

4.5.3. Test Procedures

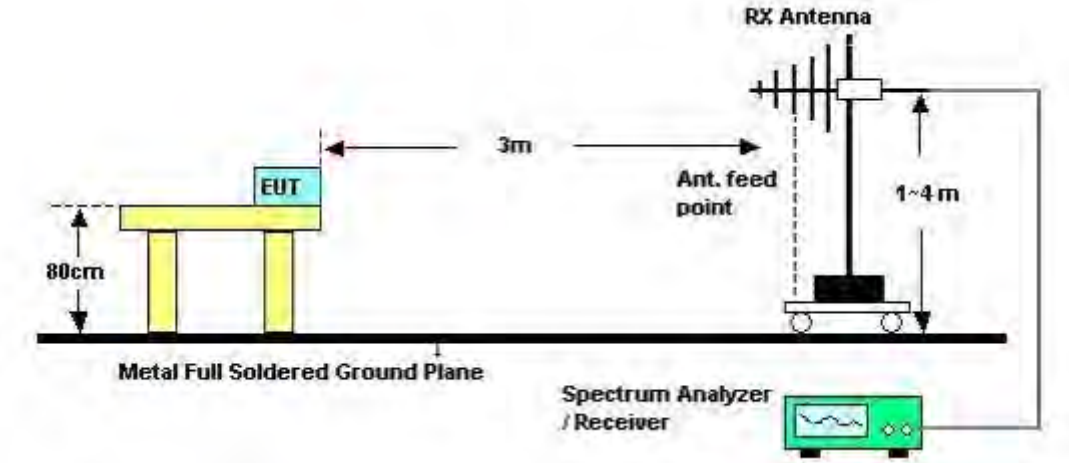
1. Configure the EUT according to ANSI C63.10. The EUT was placed on the top of the turntable 1.5 meter above ground. The phase center of the receiving antenna mounted on the top of a height-variable antenna tower was placed 3 meters far away from the turntable.
2. Power on the EUT and all the supporting 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

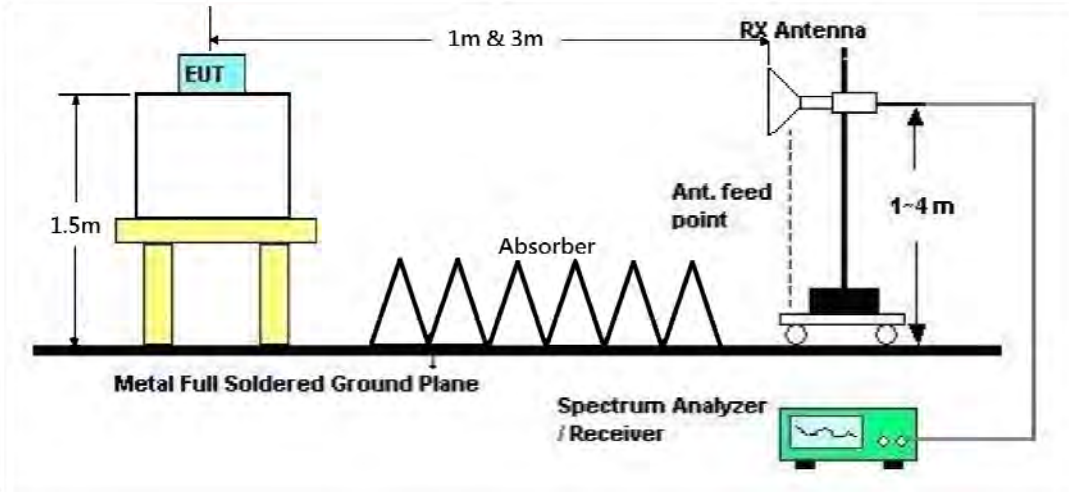
For Radiated Emissions: 9kHz ~30MHz



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	58%
Test Engineer	Mars Lin	Configurations	Normal Link
Test Date	Nov. 24, 2014	Test Mode	Mode 2

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

Note:

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

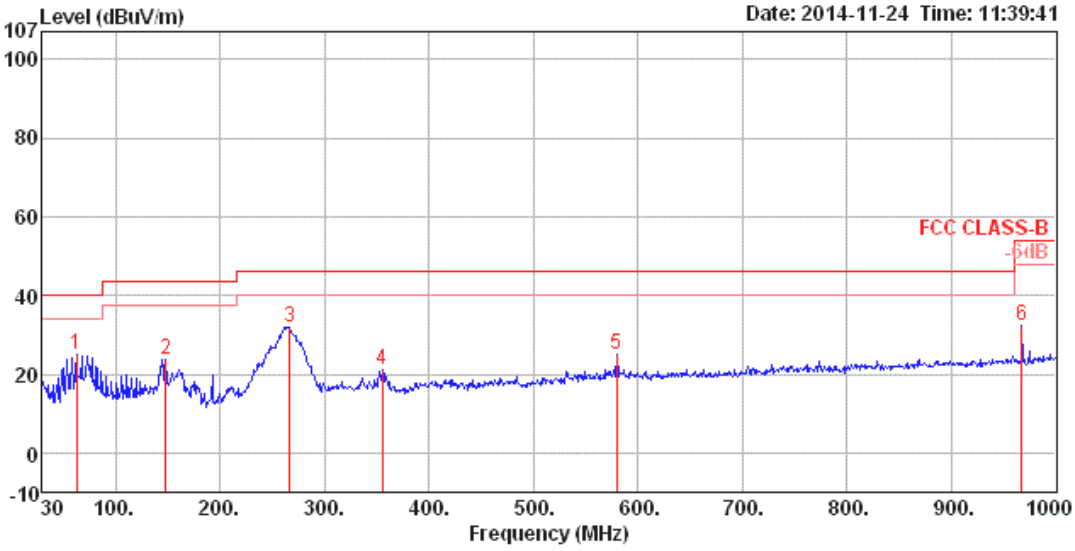
Distance extrapolation factor = 40 log (specific distance / test distance) (dB);

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

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

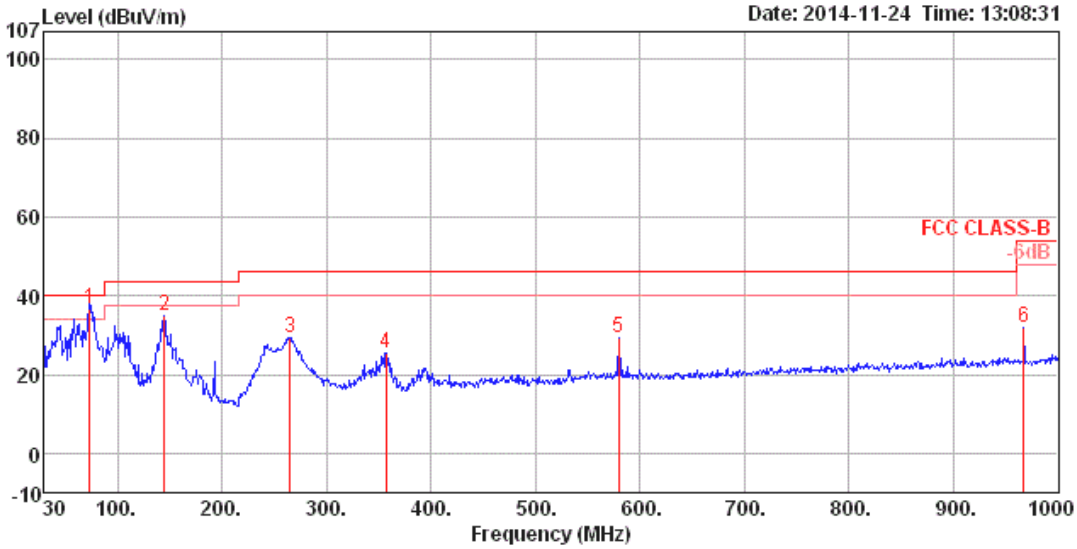
Temperature	25℃	Humidity	58%
Test Engineer	Mars Lin	Configurations	Normal Link
Test Mode	Mode 2		

Horizontal



	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Preamp Factor	Antenna Factor	Pol/Phase	T/Pos	A/Pos	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m		deg	cm	
1	62.98	24.78	40.00	-15.22	50.85	0.92	31.81	4.82	HORIZONTAL	254	300	Peak
2	148.34	23.64	43.50	-19.86	43.59	1.46	31.55	10.14	HORIZONTAL	150	200	Peak
3	266.68	31.99	46.00	-14.01	49.04	1.97	31.55	12.53	HORIZONTAL	307	400	Peak
4	354.95	20.94	46.00	-25.06	35.46	2.33	31.34	14.49	HORIZONTAL	320	100	Peak
5	579.99	25.17	46.00	-20.83	34.89	3.06	31.18	18.40	HORIZONTAL	189	150	Peak
6	967.02	32.25	54.00	-21.75	38.13	4.11	31.09	21.10	HORIZONTAL	286	125	Peak

Vertical



	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Preamp Factor	Antenna Factor	Pol/Phase	T/Pos	A/Pos	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m		deg	cm	
1	73.65	36.64	40.00	-3.36	61.52	1.02	31.70	5.80	VERTICAL	243	155	QP
2	144.46	34.78	43.50	-8.72	54.38	1.43	31.54	10.51	VERTICAL	210	100	Peak
3	264.74	29.19	46.00	-16.81	46.12	1.96	31.54	12.65	VERTICAL	352	400	Peak
4	356.89	25.47	46.00	-20.53	39.90	2.34	31.33	14.56	VERTICAL	165	125	Peak
5	579.99	29.49	46.00	-16.51	39.21	3.06	31.18	18.40	VERTICAL	1	150	Peak
6	967.02	31.72	54.00	-22.28	37.60	4.11	31.09	21.10	VERTICAL	340	100	Peak

Note:

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

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

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

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

Temperature	25℃	Humidity	58%
Test Engineer	Mars Lin	Configurations	IEEE 802.11n MCS0 HT20 CH 1 / Ant. 1 + Ant. 2
Test Date	Nov. 22, 2014	Test Mode	Mode 1

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	T/Pos	A/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		deg	cm	
1	4822.55	32.14	54.00	-21.86	30.06	4.10	32.56	34.58	Average	256	243	HORIZONTAL
2	4822.58	45.41	74.00	-28.59	43.33	4.10	32.56	34.58	Peak	256	243	HORIZONTAL
3	7228.27	49.39	74.00	-24.61	42.16	5.07	36.97	34.81	Peak	84	112	HORIZONTAL
4	7230.24	36.32	54.00	-17.68	29.09	5.07	36.97	34.81	Average	84	112	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	T/Pos	A/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		deg	cm	
1	4820.67	31.94	54.00	-22.06	29.86	4.10	32.56	34.58	Average	335	135	VERTICAL
2	4824.46	44.67	74.00	-29.33	42.59	4.10	32.56	34.58	Peak	335	135	VERTICAL
3	7229.72	36.23	54.00	-17.77	29.00	5.07	36.97	34.81	Average	71	148	VERTICAL
4	7231.66	49.35	74.00	-24.65	42.09	5.08	36.99	34.81	Peak	71	148	VERTICAL

Temperature	25°C	Humidity	58%
Test Engineer	Mars Lin	Configurations	IEEE 802.11n MCS0 HT20 CH 6 / Ant. 1 + Ant. 2
Test Date	Nov. 22, 2014	Test Mode	Mode 1

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	T/Pos	A/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		deg	cm	
1	4869.96	48.83	74.00	-25.17	46.61	4.13	32.66	34.57	Peak	163	208	HORIZONTAL
2	4870.05	36.17	54.00	-17.83	33.95	4.13	32.66	34.57	Average	163	208	HORIZONTAL
3	7309.65	56.66	74.00	-17.34	49.32	5.09	37.07	34.82	Peak	158	114	HORIZONTAL
4	7311.96	42.61	54.00	-11.39	35.28	5.09	37.07	34.83	Average	158	114	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	T/Pos	A/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		deg	cm	
1	4873.02	35.14	54.00	-18.86	32.92	4.13	32.66	34.57	Average	19	120	VERTICAL
2	4877.88	46.95	74.00	-27.05	44.73	4.13	32.66	34.57	Peak	19	120	VERTICAL
3	7307.22	58.25	74.00	-15.75	50.91	5.09	37.07	34.82	Peak	238	102	VERTICAL
4	7311.96	43.40	54.00	-10.60	36.07	5.09	37.07	34.83	Average	238	102	VERTICAL

Temperature	25℃	Humidity	58%
Test Engineer	Mars Lin	Configurations	IEEE 802.11n MCS0 HT20 CH 11 / Ant. 1 + Ant. 2
Test Date	Nov. 22, 2014	Test Mode	Mode 1

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	T/Pos	A/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		deg	cm	
1	4922.22	34.07	54.00	-19.93	31.71	4.15	32.76	34.55	Average	182	208	HORIZONTAL
2	4927.08	47.53	74.00	-26.47	45.17	4.15	32.76	34.55	Peak	182	208	HORIZONTAL
3	7386.74	36.99	54.00	-17.01	29.53	5.12	37.18	34.84	Average	146	124	HORIZONTAL
4	7389.60	50.06	74.00	-23.94	42.60	5.12	37.18	34.84	Peak	146	124	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	T/Pos	A/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		deg	cm	
1	4916.88	45.24	74.00	-28.76	42.92	4.14	32.73	34.55	Peak	346	105	VERTICAL
2	4922.70	32.27	54.00	-21.73	29.91	4.15	32.76	34.55	Average	346	104	VERTICAL
3	7396.77	49.77	74.00	-24.23	42.31	5.12	37.18	34.84	Peak	75	144	VERTICAL
4	7400.89	36.71	54.00	-17.29	29.23	5.12	37.20	34.84	Average	75	144	VERTICAL

Temperature	25℃	Humidity	58%
Test Engineer	Mars Lin	Configurations	IEEE 802.11n MCS0 HT40 CH 3 / Ant. 1 + Ant. 2
Test Date	Nov. 22, 2014	Test Mode	Mode 1

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	T/Pos	A/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		deg	cm	
1	4855.64	44.63	74.00	-29.37	42.47	4.12	32.62	34.58	Peak	58	148	HORIZONTAL
2	4857.37	31.65	54.00	-22.35	29.49	4.12	32.62	34.58	Average	58	148	HORIZONTAL
3	7253.84	48.82	74.00	-25.18	41.55	5.08	37.01	34.82	Peak	133	141	HORIZONTAL
4	7257.06	36.09	54.00	-17.91	28.82	5.08	37.01	34.82	Average	133	141	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	T/Pos	A/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		deg	cm	
1	4830.89	44.30	74.00	-29.70	42.22	4.10	32.56	34.58	Peak	75	126	VERTICAL
2	4858.94	31.22	54.00	-22.78	29.06	4.12	32.62	34.58	Average	75	126	VERTICAL
3	7252.89	36.31	54.00	-17.69	29.04	5.08	37.01	34.82	Average	249	105	VERTICAL
4	7279.16	49.39	74.00	-24.61	42.10	5.08	37.03	34.82	Peak	254	105	VERTICAL

Temperature	25℃	Humidity	58%
Test Engineer	Mars Lin	Configurations	IEEE 802.11n MCS0 HT40 CH 6 / Ant. 1 + Ant. 2
Test Date	Nov. 22, 2014	Test Mode	Mode 1

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	T/Pos	A/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		deg	cm	
1	4859.28	45.67	74.00	-28.33	43.51	4.12	32.62	34.58	Peak	298	110	HORIZONTAL
2	4867.62	32.96	54.00	-21.04	30.74	4.13	32.66	34.57	Average	298	110	HORIZONTAL
3	7299.32	37.42	54.00	-16.58	30.08	5.09	37.07	34.82	Average	203	148	HORIZONTAL
4	7306.22	50.32	74.00	-23.68	42.98	5.09	37.07	34.82	Peak	203	148	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	T/Pos	A/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		deg	cm	
1	4865.66	32.99	54.00	-21.01	30.82	4.12	32.62	34.57	Average	253	114	VERTICAL
2	4875.52	45.01	74.00	-28.99	42.79	4.13	32.66	34.57	Peak	253	114	VERTICAL
3	7314.73	37.47	54.00	-16.53	30.14	5.09	37.07	34.83	Average	333	168	VERTICAL
4	7320.68	49.66	74.00	-24.34	42.30	5.10	37.09	34.83	Peak	333	168	VERTICAL

Temperature	25℃	Humidity	58%
Test Engineer	Mars Lin	Configurations	IEEE 802.11n MCS0 HT40 CH 9 / Ant. 1 + Ant. 2
Test Date	Nov. 22, 2014	Test Mode	Mode 1

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	T/Pos	A/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		deg	cm	
1	4904.74	32.56	54.00	-21.44	30.25	4.14	32.73	34.56	Average	58	179	HORIZONTAL
2	4905.39	46.09	74.00	-27.91	43.78	4.14	32.73	34.56	Peak	58	179	HORIZONTAL
3	7356.91	37.48	54.00	-16.52	30.07	5.11	37.13	34.83	Average	152	109	HORIZONTAL
4	7362.04	49.97	74.00	-24.03	42.56	5.11	37.13	34.83	Peak	152	109	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	T/Pos	A/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		deg	cm	
1	4902.48	33.03	54.00	-20.97	30.72	4.14	32.73	34.56	Average	332	112	VERTICAL
2	4917.76	46.51	74.00	-27.49	44.19	4.14	32.73	34.55	Peak	332	112	VERTICAL
3	7365.60	50.52	74.00	-23.48	43.12	5.11	37.13	34.84	Peak	256	134	VERTICAL
4	7366.07	36.95	54.00	-17.05	29.55	5.11	37.13	34.84	Average	256	134	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℃	Humidity	58%
Test Engineer	Mars Lin	Configurations	IEEE 802.11b CH 1 / Ant. 1
Test Date	Nov. 22, 2014	Test Mode	Mode 1

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	T/Pos	A/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		deg	cm	
1	4824.02	47.66	54.00	-6.34	45.58	4.10	32.56	34.58	Average	165	209	HORIZONTAL
2	4824.04	51.58	74.00	-22.42	49.50	4.10	32.56	34.58	Peak	165	209	HORIZONTAL
3	7236.17	44.41	54.00	-9.59	37.16	5.08	36.99	34.82	Average	176	201	HORIZONTAL
4	7236.28	52.58	74.00	-21.42	45.33	5.08	36.99	34.82	Peak	176	201	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	T/Pos	A/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		deg	cm	
1	4823.96	44.63	54.00	-9.37	42.55	4.10	32.56	34.58	Average	25	100	VERTICAL
2	4824.09	49.75	74.00	-24.25	47.67	4.10	32.56	34.58	Peak	25	100	VERTICAL
3	7236.15	51.93	74.00	-22.07	44.68	5.08	36.99	34.82	Peak	284	100	VERTICAL
4	7236.72	43.17	54.00	-10.83	35.92	5.08	36.99	34.82	Average	284	100	VERTICAL

Temperature	25℃	Humidity	58%
Test Engineer	Mars Lin	Configurations	IEEE 802.11b CH 6 / Ant. 1
Test Date	Nov. 22, 2014	Test Mode	Mode 1

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	T/Pos	A/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		deg	cm	
1	4874.00	49.16	54.00	-4.84	46.94	4.13	32.66	34.57	Average	162	164	HORIZONTAL
2	4874.04	52.68	74.00	-21.32	50.46	4.13	32.66	34.57	Peak	162	164	HORIZONTAL
3	7311.35	55.62	74.00	-18.38	48.29	5.09	37.07	34.83	Peak	152	198	HORIZONTAL
4	7311.70	49.03	54.00	-4.97	41.70	5.09	37.07	34.83	Average	152	198	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	T/Pos	A/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		deg	cm	
1	4873.99	50.22	74.00	-23.78	48.00	4.13	32.66	34.57	Peak	14	135	VERTICAL
2	4874.00	45.85	54.00	-8.15	43.63	4.13	32.66	34.57	Average	14	135	VERTICAL
3	7309.32	55.58	74.00	-18.42	48.24	5.09	37.07	34.82	Peak	229	116	VERTICAL
4	7310.22	49.00	54.00	-5.00	41.66	5.09	37.07	34.82	Average	229	116	VERTICAL

Temperature	25℃	Humidity	58%
Test Engineer	Mars Lin	Configurations	IEEE 802.11b CH 11 / Ant. 1
Test Date	Nov. 22, 2014	Test Mode	Mode 1

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	T/Pos	A/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		deg	cm	
1	4923.96	48.02	54.00	-5.98	45.66	4.15	32.76	34.55	Average	190	237	HORIZONTAL
2	4924.01	52.07	74.00	-21.93	49.71	4.15	32.76	34.55	Peak	190	237	HORIZONTAL
3	7386.78	46.98	54.00	-7.02	39.52	5.12	37.18	34.84	Average	155	194	HORIZONTAL
4	7386.90	54.16	74.00	-19.84	46.70	5.12	37.18	34.84	Peak	155	194	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	T/Pos	A/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		deg	cm	
1	4923.96	41.70	54.00	-12.30	39.34	4.15	32.76	34.55	Average	323	250	VERTICAL
2	4924.03	48.35	74.00	-25.65	45.99	4.15	32.76	34.55	Peak	323	250	VERTICAL
3	7384.64	54.27	74.00	-19.73	46.81	5.12	37.18	34.84	Peak	231	100	VERTICAL
4	7385.19	45.46	54.00	-8.54	38.00	5.12	37.18	34.84	Average	231	100	VERTICAL

Temperature	25℃	Humidity	58%
Test Engineer	Mars Lin	Configurations	IEEE 802.11g CH 1 / Ant. 1 + Ant. 2
Test Date	Nov. 22, 2014	Test Mode	Mode 1

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	T/Pos	A/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		deg	cm	
1	4820.41	48.00	74.00	-26.00	45.92	4.10	32.56	34.58	Peak	161	213	HORIZONTAL
2	4825.74	34.37	54.00	-19.63	32.29	4.10	32.56	34.58	Average	161	213	HORIZONTAL
3	7237.48	37.31	54.00	-16.69	30.06	5.08	36.99	34.82	Average	219	153	HORIZONTAL
4	7243.47	50.09	74.00	-23.91	42.84	5.08	36.99	34.82	Peak	219	153	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	T/Pos	A/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		deg	cm	
1	4821.60	47.69	74.00	-26.31	45.61	4.10	32.56	34.58	Peak	20	213	VERTICAL
2	4821.95	34.46	54.00	-19.54	32.38	4.10	32.56	34.58	Average	20	213	VERTICAL
3	7234.12	51.46	74.00	-22.54	44.20	5.08	36.99	34.81	Peak	284	124	VERTICAL
4	7238.11	38.17	54.00	-15.83	30.92	5.08	36.99	34.82	Average	284	124	VERTICAL

Temperature	25℃	Humidity	58%
Test Engineer	Mars Lin	Configurations	IEEE 802.11g CH 6 / Ant. 1 + Ant. 2
Test Date	Nov. 22, 2014	Test Mode	Mode 1

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	T/Pos	A/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		deg	cm	
1	4871.31	36.85	54.00	-17.15	34.63	4.13	32.66	34.57	Average	161	100	HORIZONTAL
2	4876.14	49.56	74.00	-24.44	47.34	4.13	32.66	34.57	Peak	161	100	HORIZONTAL
3	7308.14	43.91	54.00	-10.09	36.57	5.09	37.07	34.82	Average	160	106	HORIZONTAL
4	7313.13	56.62	74.00	-17.38	49.29	5.09	37.07	34.83	Peak	160	106	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	T/Pos	A/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		deg	cm	
1	4872.74	36.87	54.00	-17.13	34.65	4.13	32.66	34.57	Average	13	212	VERTICAL
2	4873.00	49.89	74.00	-24.11	47.67	4.13	32.66	34.57	Peak	13	212	VERTICAL
3	7308.53	58.47	74.00	-15.53	51.13	5.09	37.07	34.82	Peak	240	100	VERTICAL
4	7313.17	45.20	54.00	-8.80	37.87	5.09	37.07	34.83	Average	240	100	VERTICAL

Temperature	25℃	Humidity	58%
Test Engineer	Mars Lin	Configurations	IEEE 802.11g CH 11 / Ant. 1 + Ant. 2
Test Date	Nov. 22, 2014	Test Mode	Mode 1

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	T/Pos	A/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		deg	cm	
1	4925.51	34.31	54.00	-19.69	31.95	4.15	32.76	34.55	Average	94	119	HORIZONTAL
2	4925.77	47.40	74.00	-26.60	45.04	4.15	32.76	34.55	Peak	94	119	HORIZONTAL
3	7387.01	52.30	74.00	-21.70	44.84	5.12	37.18	34.84	Peak	155	174	HORIZONTAL
4	7387.56	38.82	54.00	-15.18	31.36	5.12	37.18	34.84	Average	155	174	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	T/Pos	A/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		deg	cm	
1	4922.06	33.81	54.00	-20.19	31.45	4.15	32.76	34.55	Average	21	199	VERTICAL
2	4926.08	46.24	74.00	-27.76	43.88	4.15	32.76	34.55	Peak	21	199	VERTICAL
3	7387.48	38.67	54.00	-15.33	31.21	5.12	37.18	34.84	Average	316	112	VERTICAL
4	7388.58	52.07	74.00	-21.93	44.61	5.12	37.18	34.84	Peak	316	112	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:

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

For Radiated Out of Band Emission Measurement:

1. 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	58%
Test Engineer	Mars Lin	Configurations	IEEE 802.11n MCS0 HT20 CH 1, 6, 11 / Ant. 1 + Ant. 2
Test Date	Nov. 22, 2014	Test Mode	Mode 1

Channel 1

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	T/Pos	A/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		deg	cm	
1	2389.86	52.88	54.00	-1.12	22.10	2.86	27.92	0.00	Average	173	172	HORIZONTAL
2	2390.00	68.20	74.00	-5.80	37.42	2.86	27.92	0.00	Peak	173	172	HORIZONTAL
3	2414.32	98.96			68.19	2.87	27.90	0.00	Average	173	172	HORIZONTAL
4	2414.60	109.66			78.89	2.87	27.90	0.00	Peak	173	172	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	T/Pos	A/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		deg	cm	
1	2390.00	62.98	74.00	-11.02	32.20	2.86	27.92	0.00	Peak	173	222	HORIZONTAL
2	2390.00	48.33	54.00	-5.67	17.55	2.86	27.92	0.00	Average	173	222	HORIZONTAL
3	2434.68	105.37			74.61	2.88	27.88	0.00	Average	173	222	HORIZONTAL
4	2434.97	114.78			84.02	2.88	27.88	0.00	Peak	173	222	HORIZONTAL
5	2483.50	59.22	74.00	-14.78	28.49	2.91	27.82	0.00	Peak	173	222	HORIZONTAL
6	2483.50	46.41	54.00	-7.59	15.68	2.91	27.82	0.00	Average	173	222	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	T/Pos	A/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		deg	cm	
1	2463.30	111.63			80.89	2.90	27.84	0.00	Peak	300	128	VERTICAL
2	2463.45	100.74			70.00	2.90	27.84	0.00	Average	300	128	VERTICAL
3	2483.50	69.55	74.00	-4.45	38.82	2.91	27.82	0.00	Peak	300	128	VERTICAL
4	2483.50	52.78	54.00	-1.22	22.05	2.91	27.82	0.00	Average	300	128	VERTICAL

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

Temperature	25°C	Humidity	58%
Test Engineer	Mars Lin	Configurations	IEEE 802.11n MCS0 HT40 CH 3, 6, 9 / Ant. 1 + Ant. 2
Test Date	Nov. 22, 2014	Test Mode	Mode 1

Channel 3

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	T/Pos	A/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		deg	cm	
1	2388.84	52.83	54.00	-1.17	22.05	2.86	27.92	0.00	Average	272	130	VERTICAL
2	2390.00	69.05	74.00	-4.95	38.27	2.86	27.92	0.00	Peak	272	130	VERTICAL
3	2419.68	105.03			74.27	2.88	27.88	0.00	Peak	272	130	VERTICAL
4	2420.84	96.33			65.57	2.88	27.88	0.00	Average	272	130	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	T/Pos	A/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		deg	cm	
1	2388.55	67.60	74.00	-6.40	36.82	2.86	27.92	0.00	Peak	266	144	VERTICAL
2	2388.84	52.58	54.00	-1.42	21.80	2.86	27.92	0.00	Average	266	144	VERTICAL
3	2434.68	108.19			77.43	2.88	27.88	0.00	Peak	266	144	VERTICAL
4	2435.84	99.85			69.09	2.88	27.88	0.00	Average	266	144	VERTICAL
5	2483.50	62.84	74.00	-11.16	32.11	2.91	27.82	0.00	Peak	266	144	VERTICAL
6	2483.50	49.09	54.00	-4.91	18.36	2.91	27.82	0.00	Average	266	144	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	T/Pos	A/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		deg	cm	
1	2449.68	106.77			76.02	2.89	27.86	0.00	Peak	257	162	VERTICAL
2	2453.45	98.24			67.49	2.89	27.86	0.00	Average	257	162	VERTICAL
3	2483.50	52.89	54.00	-1.11	22.16	2.91	27.82	0.00	Average	257	162	VERTICAL
4	2484.08	67.36	74.00	-6.64	36.63	2.91	27.82	0.00	Peak	257	162	VERTICAL

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

Note:

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

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

Temperature	25°C	Humidity	58%
Test Engineer	Mars Lin	Configurations	IEEE 802.11b CH 1, 6, 11 / Ant. 1
Test Date	Nov. 22, 2014	Test Mode	Mode 1

Channel 1

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	T/Pos	A/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		deg	cm	
1	2383.63	59.44	74.00	-14.56	28.65	2.85	27.94	0.00	Peak	330	134	VERTICAL
2	2383.63	52.91	54.00	-1.09	22.12	2.85	27.94	0.00	Average	330	134	VERTICAL
3	2411.13	105.91			75.14	2.87	27.90	0.00	Average	330	134	VERTICAL
4	2411.42	108.76			77.99	2.87	27.90	0.00	Peak	330	134	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	T/Pos	A/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		deg	cm	
1	2389.13	60.27	74.00	-13.73	29.49	2.86	27.92	0.00	Peak	334	131	VERTICAL
2	2389.13	52.28	54.00	-1.72	21.50	2.86	27.92	0.00	Average	334	131	VERTICAL
3	2436.13	107.10			76.34	2.88	27.88	0.00	Average	334	131	VERTICAL
4	2436.57	110.00			79.25	2.89	27.86	0.00	Peak	334	131	VERTICAL
5	2484.80	58.34	74.00	-15.66	27.61	2.91	27.82	0.00	Peak	334	131	VERTICAL
6	2484.80	48.56	54.00	-5.44	17.83	2.91	27.82	0.00	Average	334	131	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	T/Pos	A/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		deg	cm	
1	2463.16	107.35			76.61	2.90	27.84	0.00	Peak	187	143	HORIZONTAL
2	2463.16	104.34			73.60	2.90	27.84	0.00	Average	187	143	HORIZONTAL
3	2488.71	60.63	74.00	-13.37	29.91	2.92	27.80	0.00	Peak	187	143	HORIZONTAL
4	2488.71	52.70	54.00	-1.30	21.98	2.92	27.80	0.00	Average	187	143	HORIZONTAL

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

Temperature	25°C	Humidity	58%
Test Engineer	Mars Lin	Configurations	IEEE 802.11g CH 1, 6, 11 / Ant. 1 + Ant. 2
Test Date	Nov. 22, 2014	Test Mode	Mode 1

Channel 1

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	T/Pos	A/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		deg	cm	
1	2389.42	67.41	74.00	-6.59	36.63	2.86	27.92	0.00	Peak	275	158	VERTICAL
2	2390.00	52.17	54.00	-1.83	21.39	2.86	27.92	0.00	Average	275	158	VERTICAL
3	2410.12	111.63			80.86	2.87	27.90	0.00	Peak	275	158	VERTICAL
4	2410.26	102.31			71.54	2.87	27.90	0.00	Average	275	158	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	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm		
1	2389.42	62.93	74.00	-11.07	30.07	4.37	28.49	0.00	313	213	Peak	VERTICAL
2	2390.00	49.60	54.00	-4.40	16.70	4.41	28.49	0.00	313	213	Average	VERTICAL
3	2439.60	108.63			75.59	4.44	28.60	0.00	313	213	Average	VERTICAL
4	2440.18	119.01			85.97	4.44	28.60	0.00	313	213	Peak	VERTICAL
5	2483.79	62.06	74.00	-11.94	28.88	4.51	28.67	0.00	313	213	Peak	VERTICAL
6	2484.08	48.99	54.00	-5.01	15.81	4.51	28.67	0.00	313	213	Average	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	T/Pos	A/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		deg	cm	
1	2459.83	112.53			81.79	2.90	27.84	0.00	Peak	299	126	VERTICAL
2	2464.17	102.91			72.17	2.90	27.84	0.00	Average	299	126	VERTICAL
3	2483.50	52.23	54.00	-1.77	21.50	2.91	27.82	0.00	Average	299	126	VERTICAL
4	2484.22	69.38	74.00	-4.62	38.65	2.91	27.82	0.00	Peak	299	126	VERTICAL

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

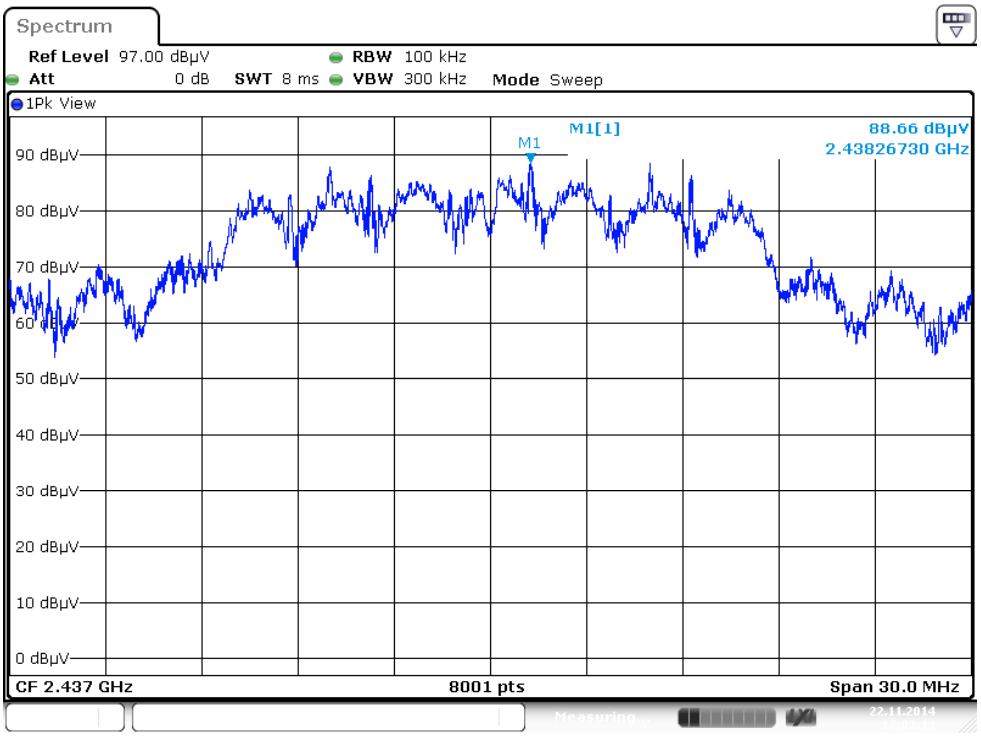
Note:

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

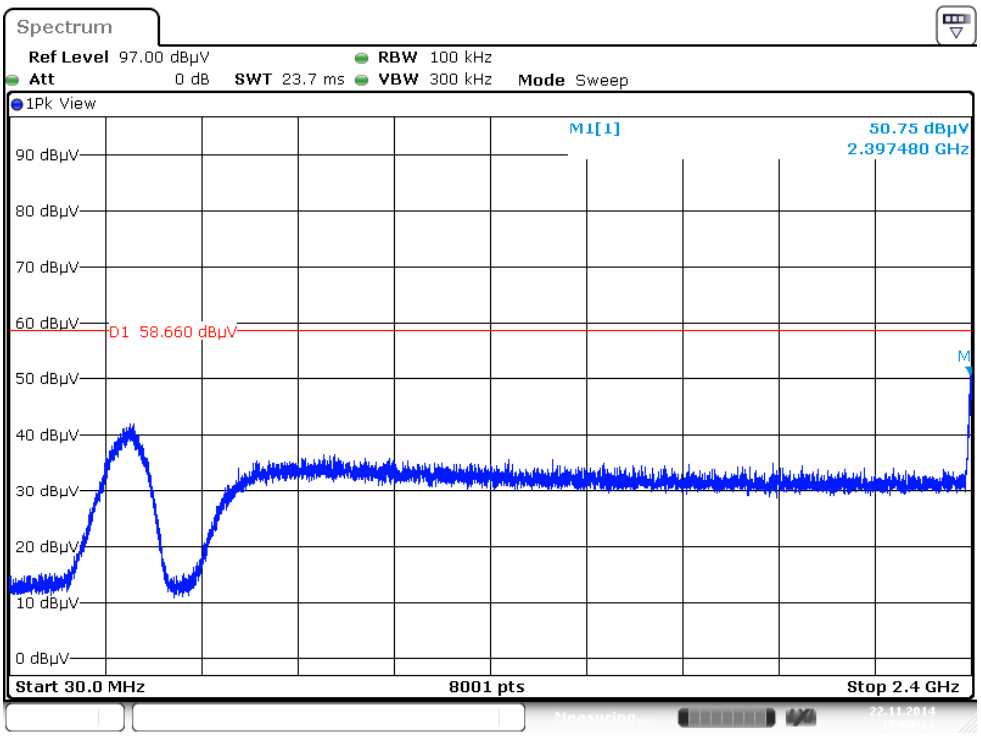
Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level.

For Emission not in Restricted Band

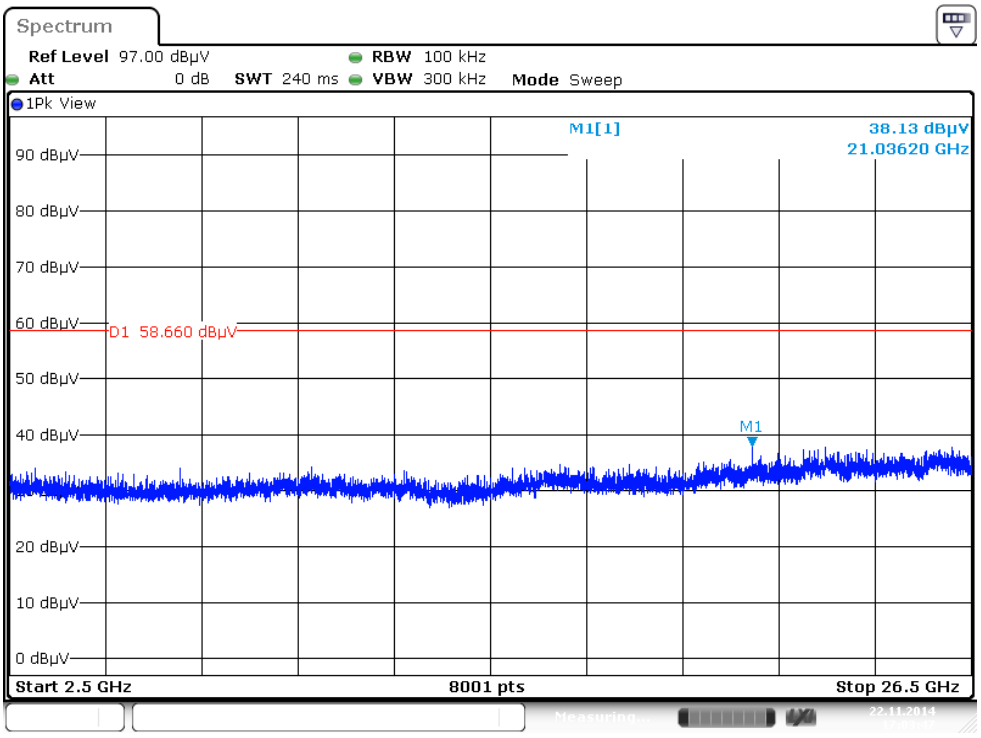
Plot on Configuration IEEE 802.11n MCS0 HT20 / Reference Level



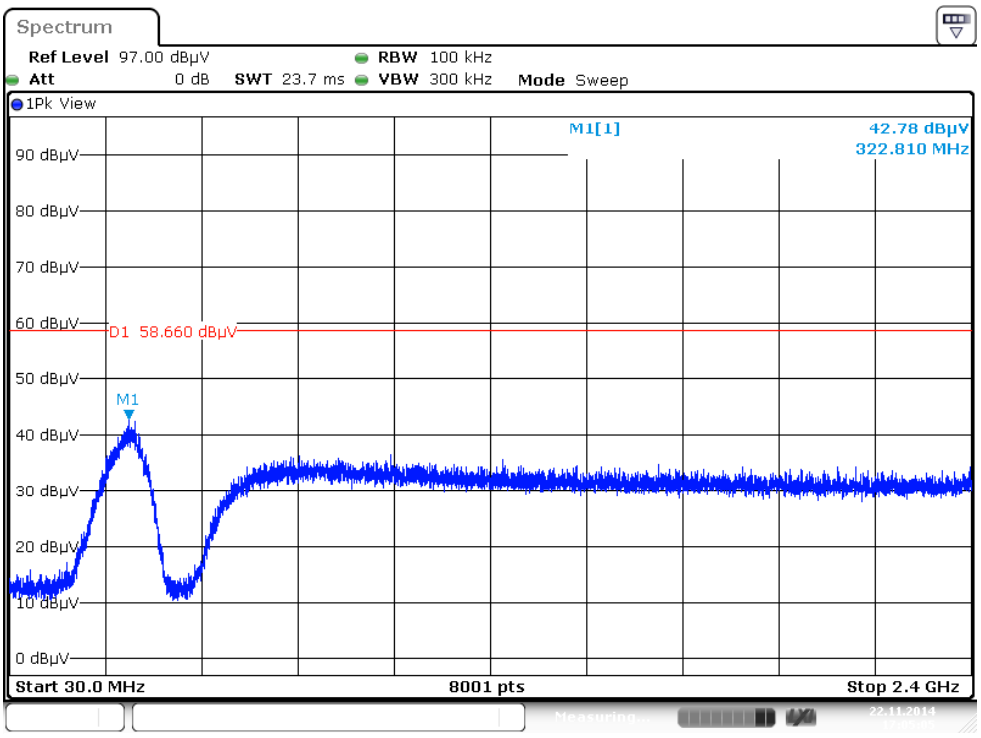
Plot on Configuration IEEE 802.11n MCS0 HT20 / CH 1 / 30MHz~2400MHz (down 30dBc)



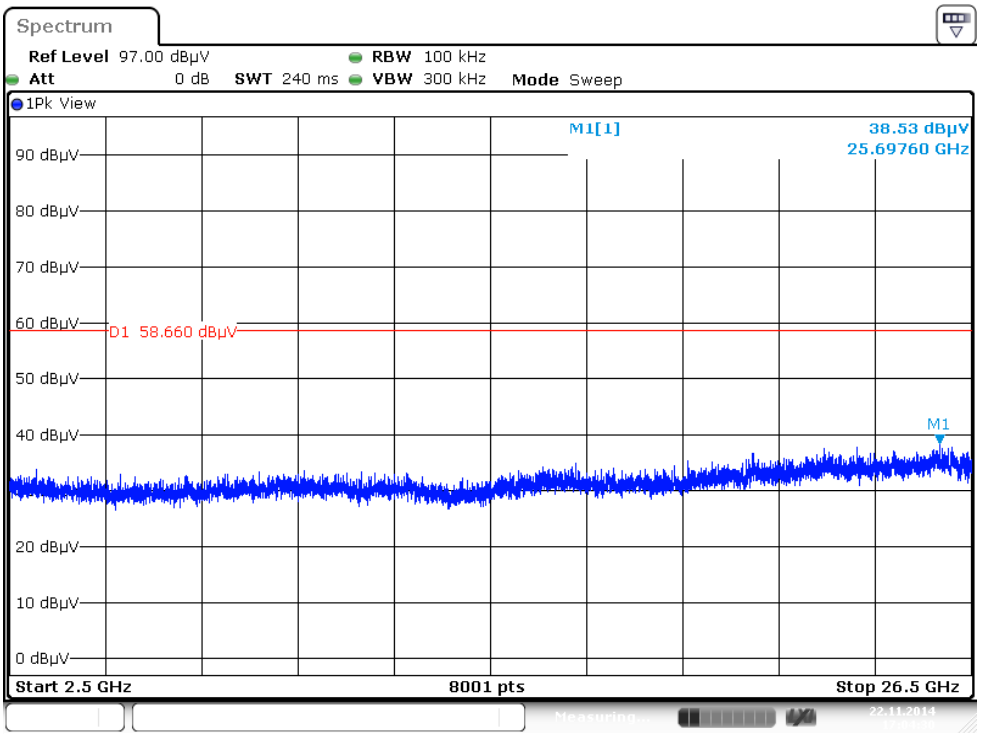
Plot on Configuration IEEE 802.11n MCS0 HT20 / CH 1 / 2500MHz~26500MHz (down 30dBc)



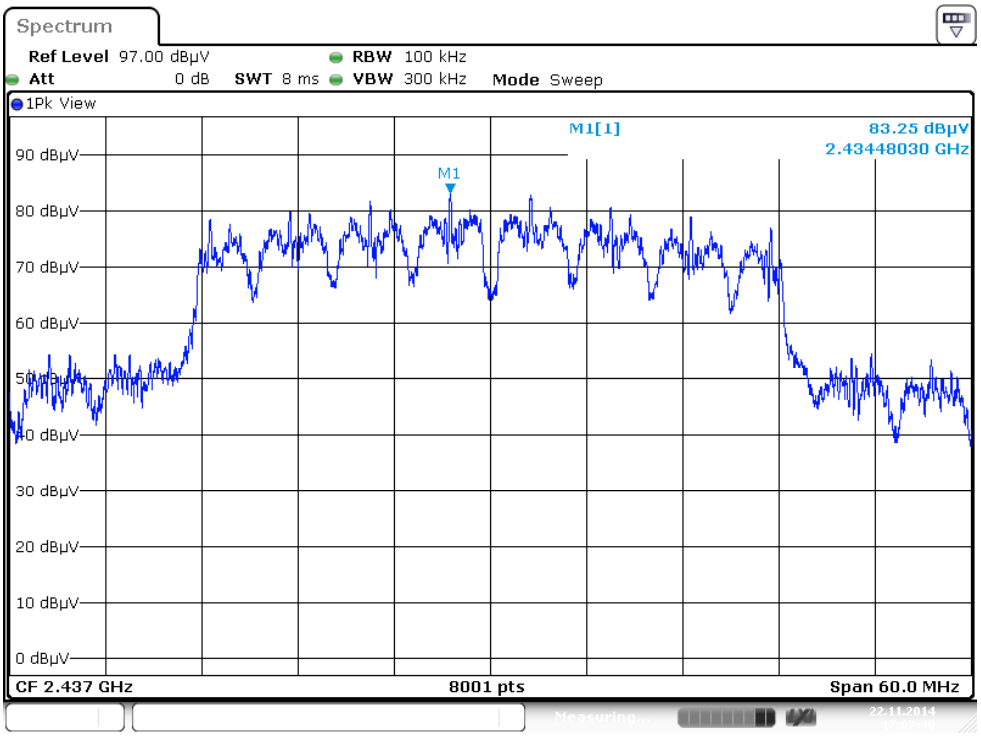
Plot on Configuration IEEE 802.11n MCS0 HT20 / CH 11 / 30MHz~2400MHz (down 30dBc)



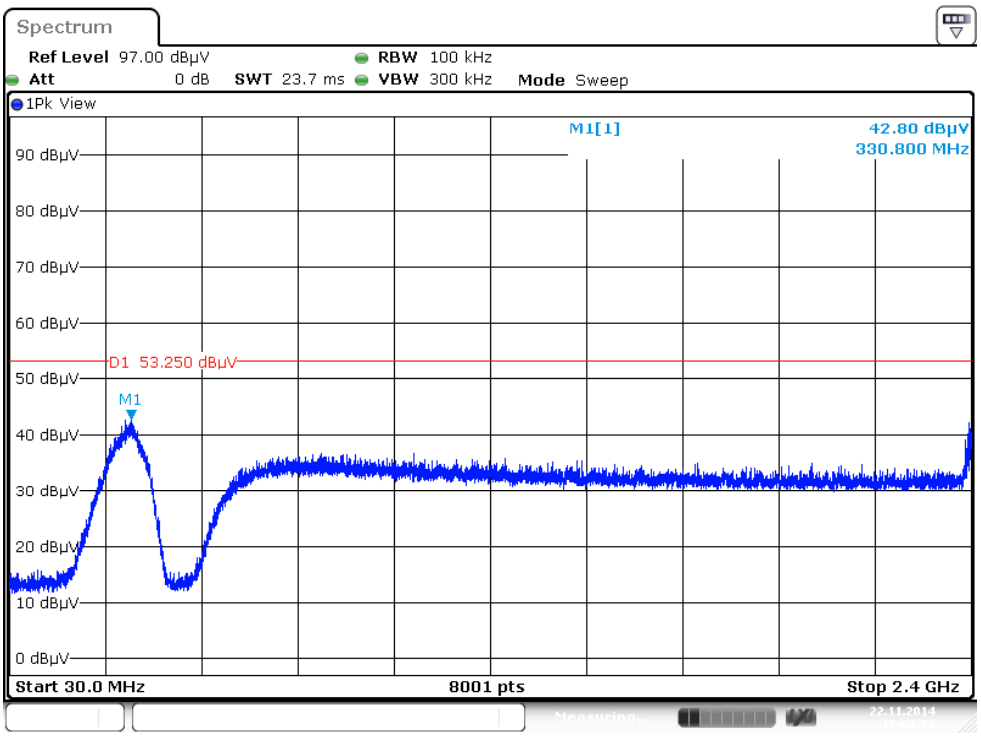
Plot on Configuration IEEE 802.11n MCS0 HT20 / CH 11 / 2500MHz~26500MHz (down 30dBc)



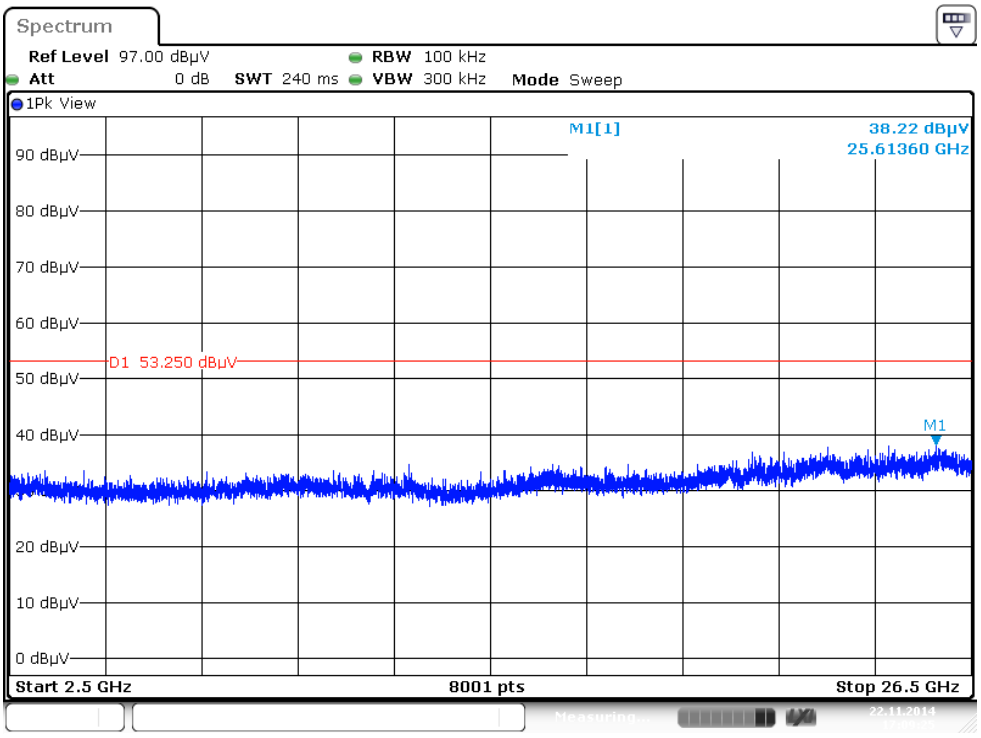
Plot on Configuration IEEE 802.11n MCS0 HT40 / Reference Level



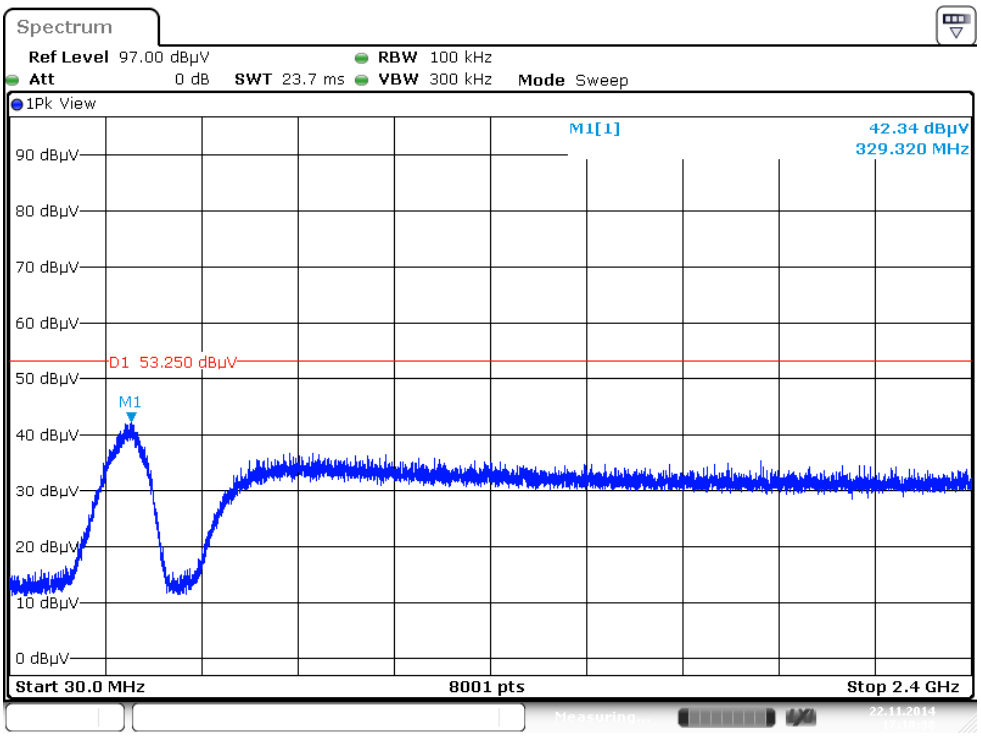
Plot on Configuration IEEE 802.11n MCS0 HT40 / CH 3 / 30MHz~2400MHz (down 30dBc)



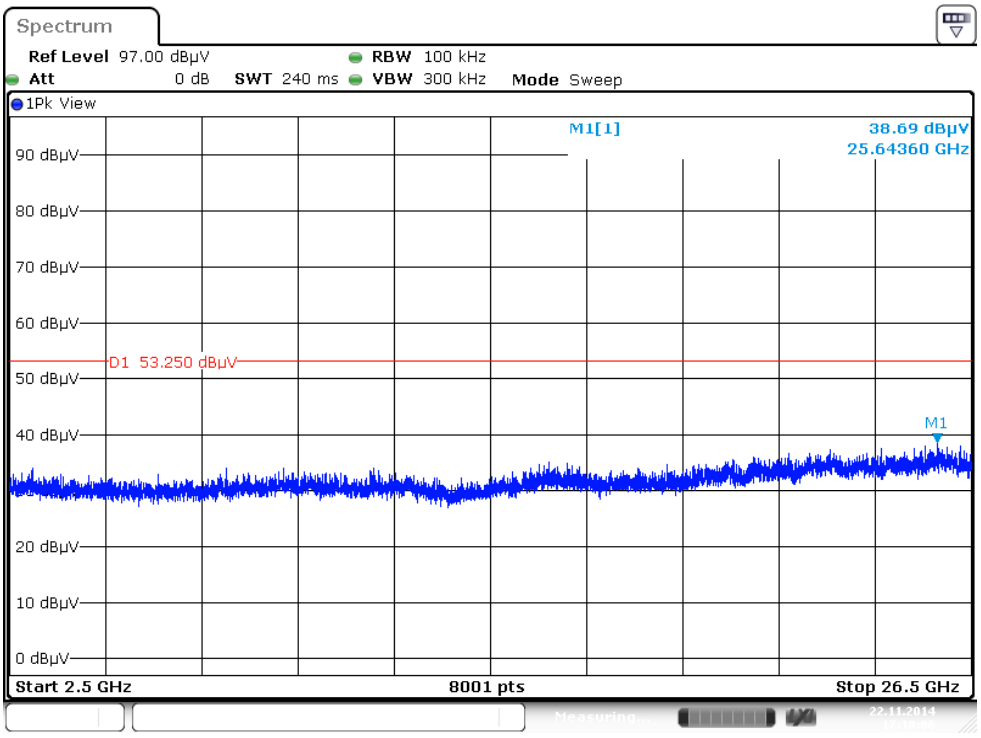
Plot on Configuration IEEE 802.11n MCS0 HT40 / CH 3 / 2500MHz~26500MHz (down 30dBc)



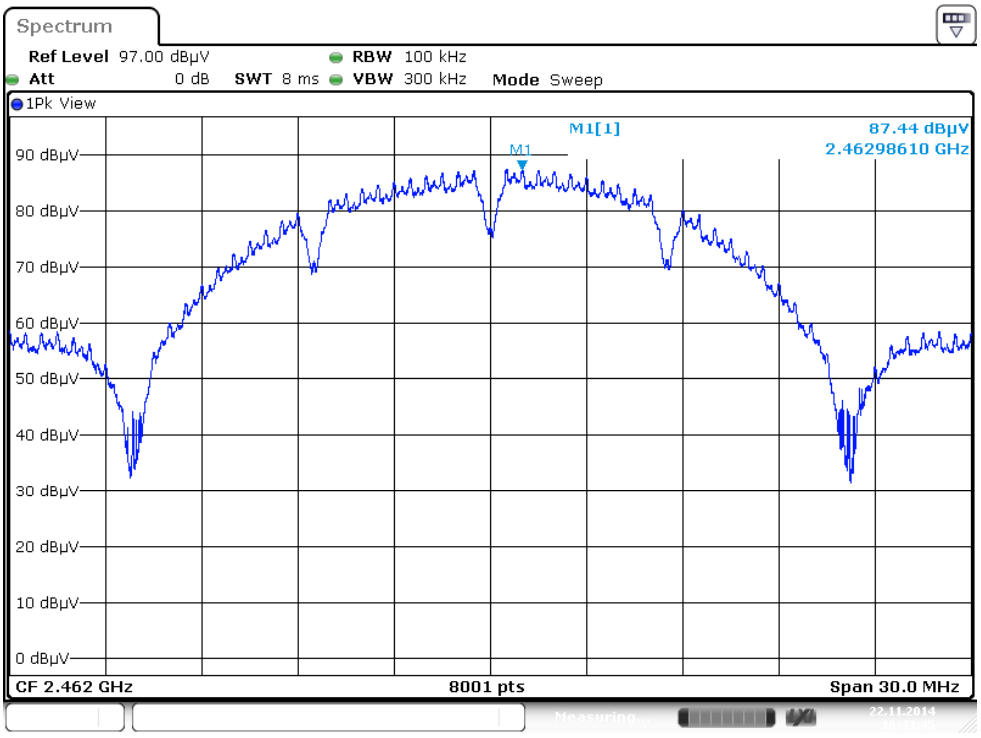
Plot on Configuration IEEE 802.11n MCS0 HT40 / CH 9 / 30MHz~2400MHz (down 30dBc)



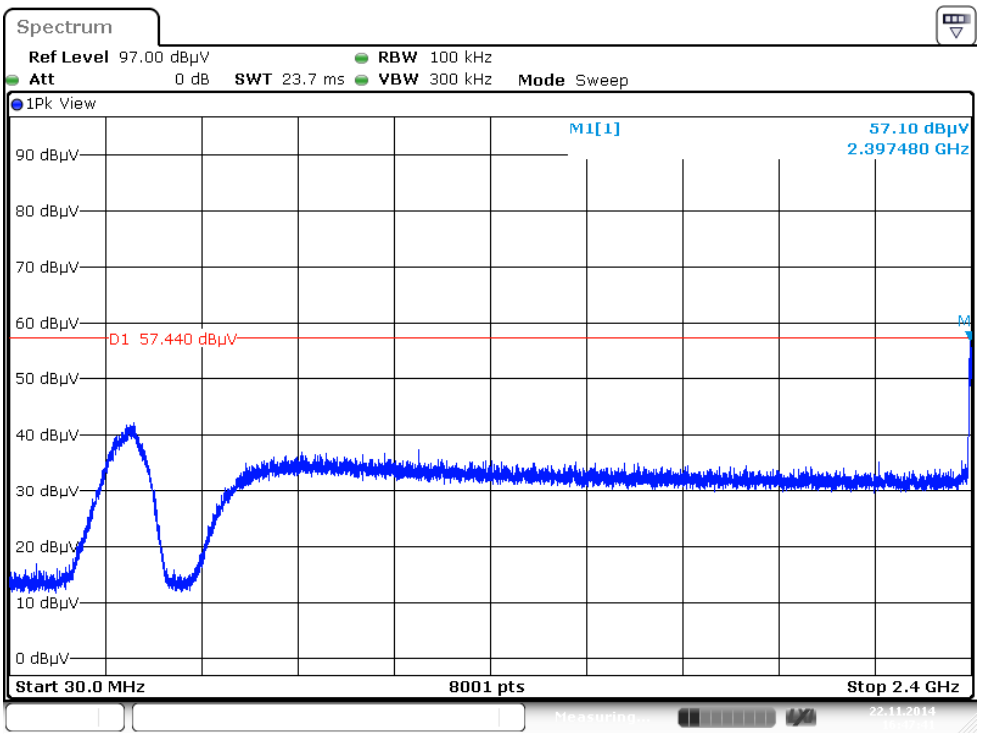
Plot on Configuration IEEE 802.11n MCS0 HT40 / CH 9 / 2500MHz~26500MHz (down 30dBc)



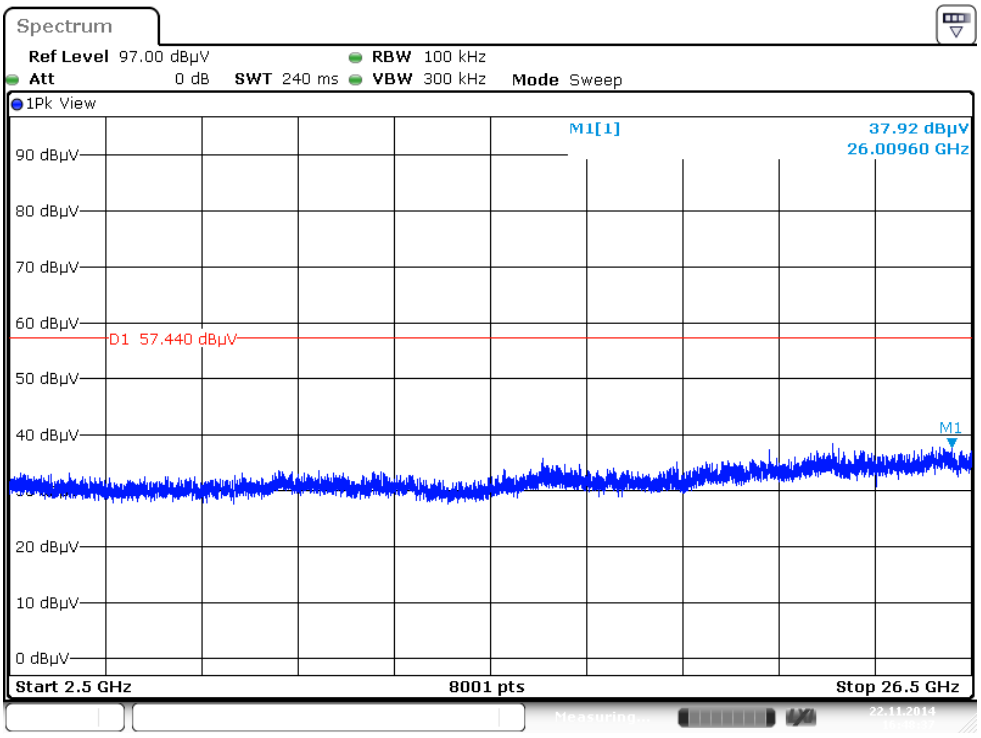
Plot on Configuration IEEE 802.11b / Reference Level



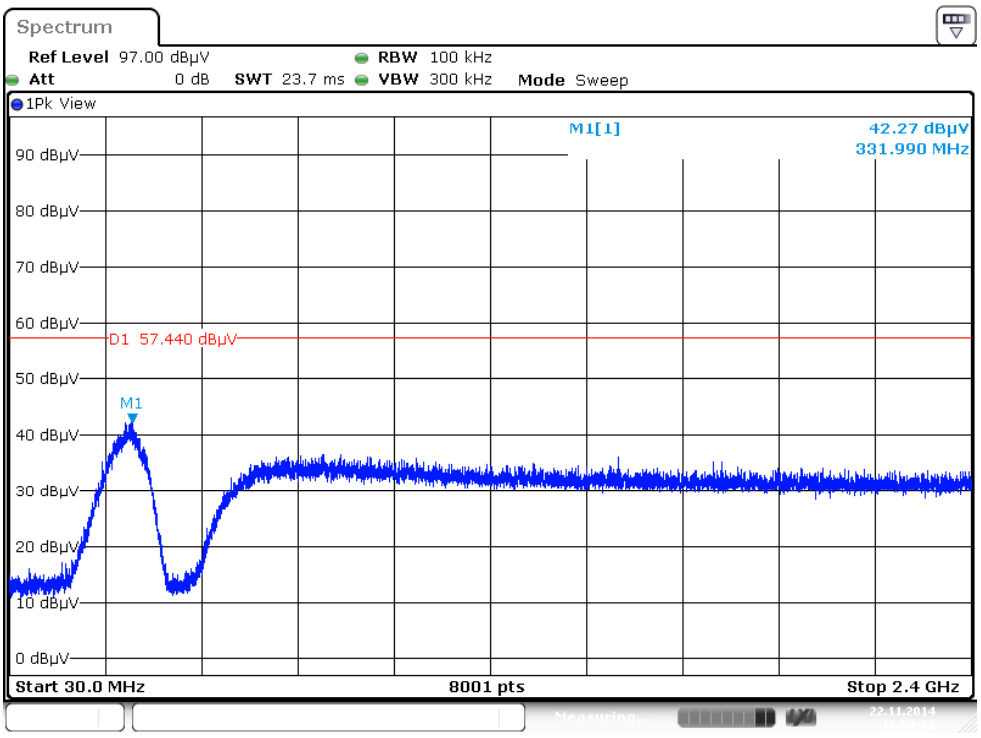
Plot on Configuration IEEE 802.11b / CH 1 / 30MHz~2400MHz (down 30dBc)



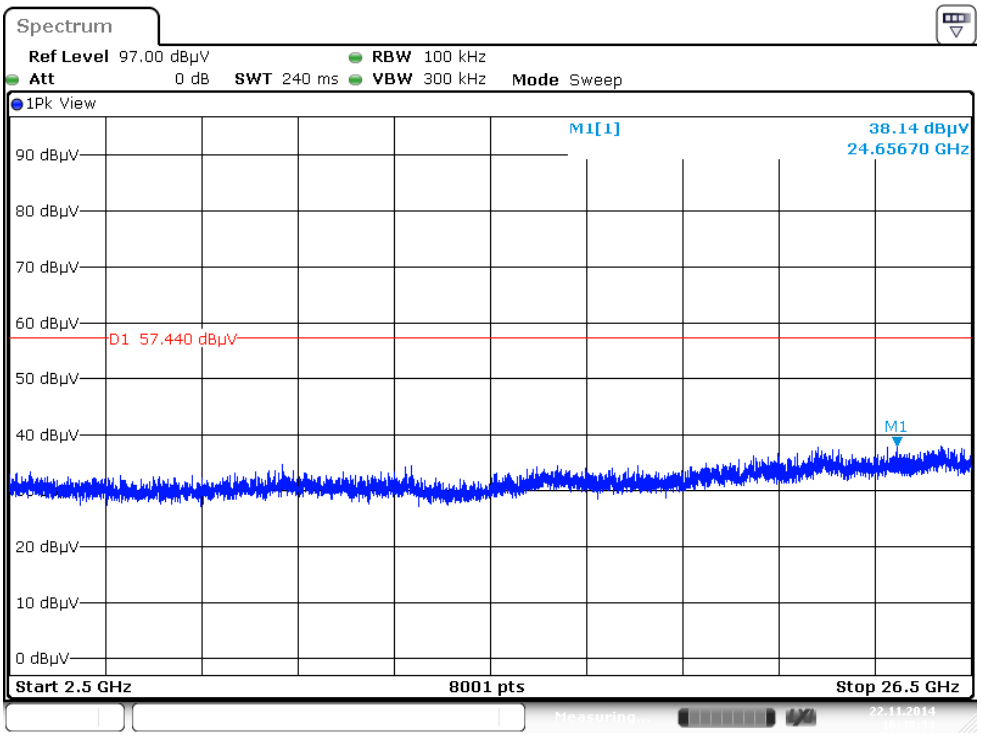
Plot on Configuration IEEE 802.11b / CH 1 / 2500MHz~26500MHz (down 30dBc)



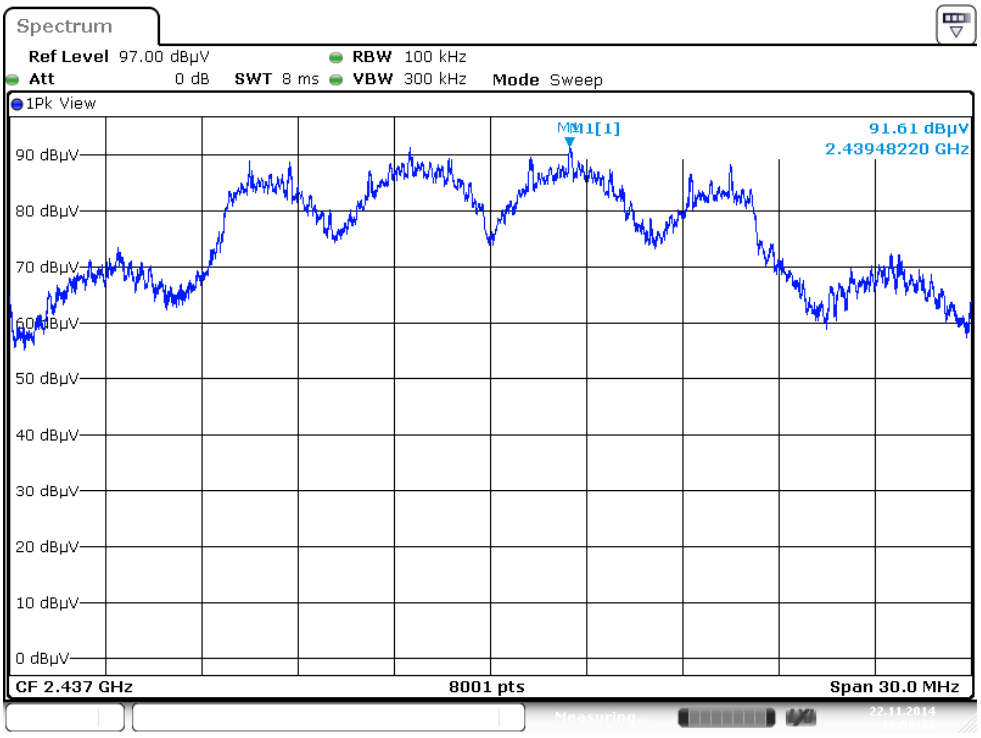
Plot on Configuration IEEE 802.11b / CH 11 / 30MHz~2400MHz (down 30dBc)



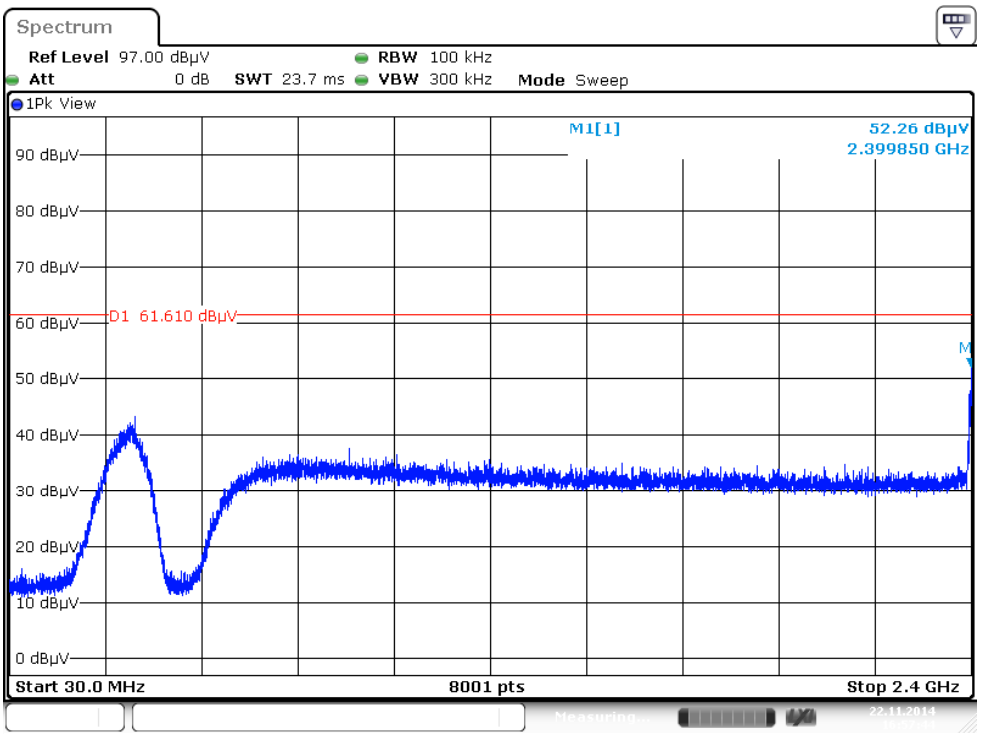
Plot on Configuration IEEE 802.11b / CH 11 / 2500MHz~26500MHz (down 30dBc)



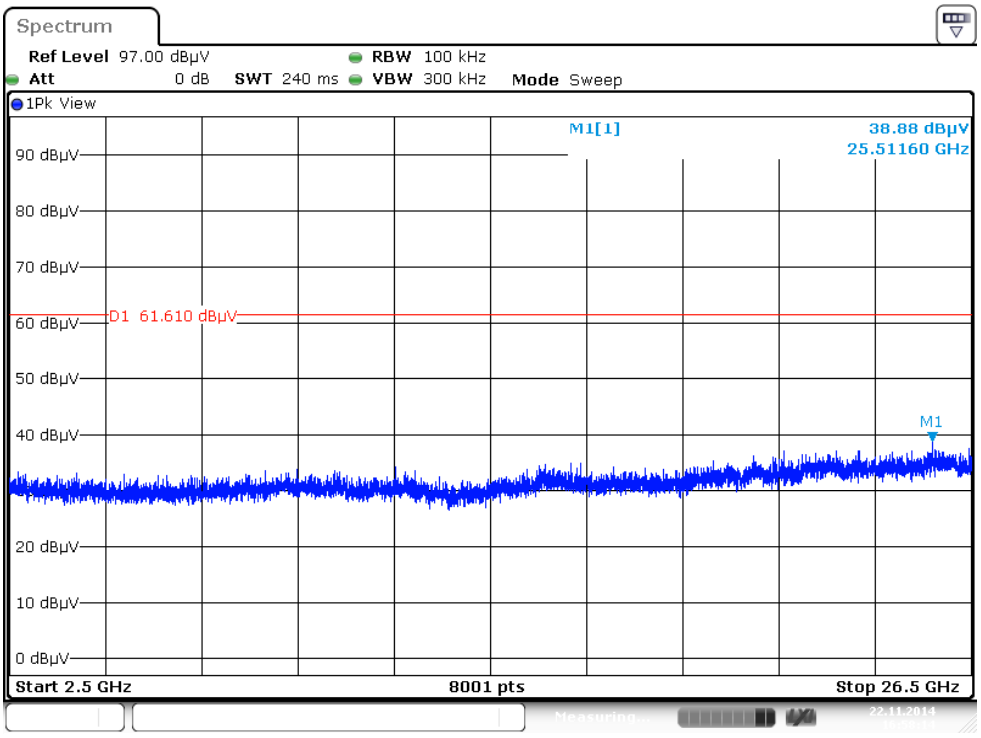
Plot on Configuration IEEE 802.11g / Reference Level



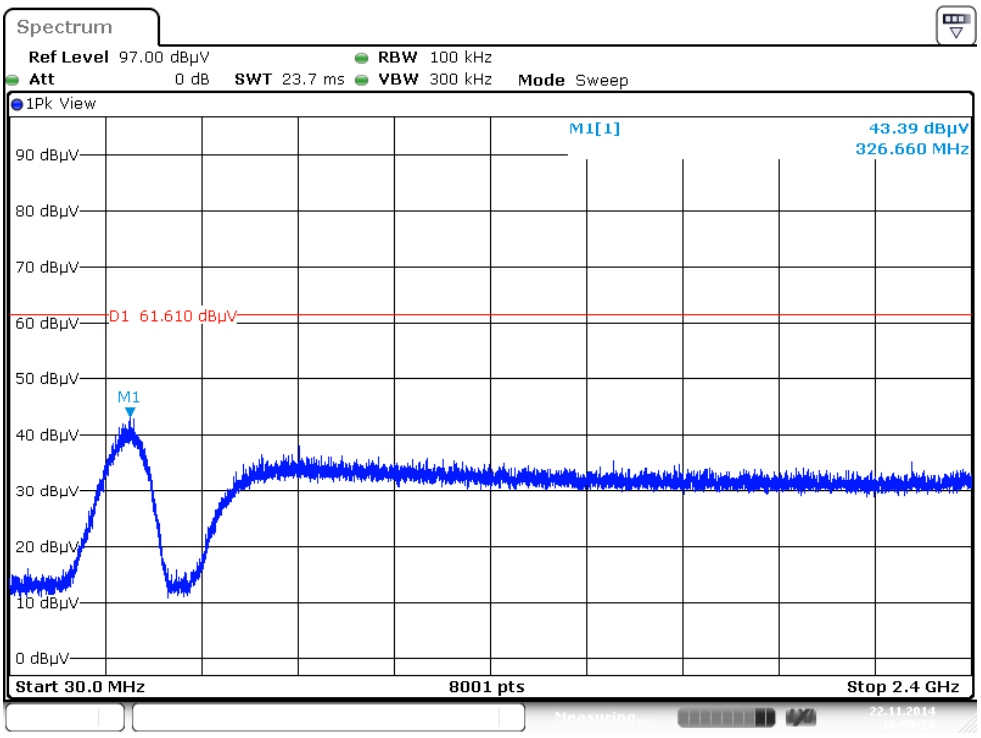
Plot on Configuration IEEE 802.11g / CH 1 / 30MHz~2400MHz (down 30dBc)



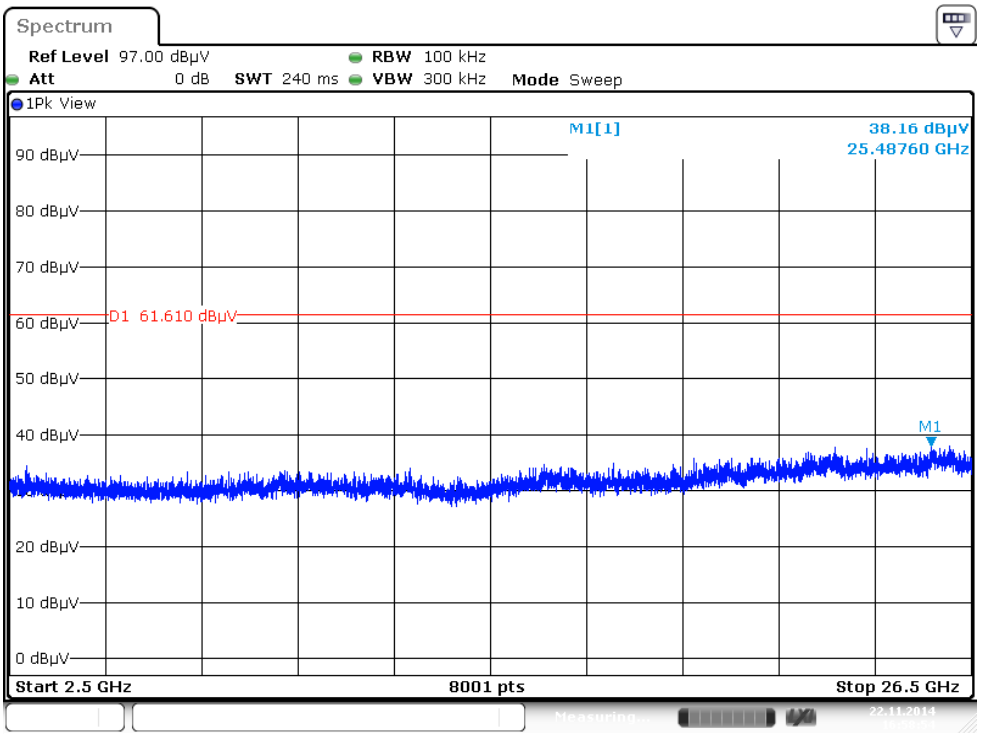
Plot on Configuration IEEE 802.11g / CH 1 / 2500MHz~26500MHz (down 30dBc)



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



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



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	Schwarzbeck	NSLK 8127	8127650	9kHz ~ 30MHz	Nov. 17, 2014	Conduction (CO01-CB)
LISN	Schwarzbeck	NSLK 8127	8127478	9kHz ~ 30MHz	Nov. 17, 2014	Conduction (CO01-CB)
COND Cable	Woken	Cable	01	150kHz ~ 30MHz	Dec. 04, 2013	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	Oct. 28, 2014	Radiation (03CH01-CB)
Horn Antenna	Schwarzbeck	BBHA 9170	BBHA9170252	15GHz ~ 40GHz	Aug. 22, 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	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-1	N/A	1 GHz – 26.5 GHz	Nov. 15, 2014	Radiation (03CH01-CB)
RF Cable-high	Woken	High Cable-2	N/A	1 GHz – 26.5 GHz	Nov. 15, 2014	Radiation (03CH01-CB)
Signal analyzer	R&S	FSV40	100979	9kHz~40GHz	Dec.12, 2014	Conducted (TH01-CB)
Temp. and Humidity Chamber	Ten Billion	TTH-D3SP	TBN-931011	-30~100 degree	Jun. 03, 2014	Conducted (TH01-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. 15, 2014	Conducted (TH01-CB)
RF Cable-high	Woken	High Cable-8	-	1 GHz – 26.5 GHz	Nov. 15, 2014	Conducted (TH01-CB)
RF Cable-high	Woken	High Cable-9	-	1 GHz – 26.5 GHz	Nov. 15, 2014	Conducted (TH01-CB)
RF Cable-high	Woken	High Cable-10	-	1 GHz – 26.5 GHz	Nov. 15, 2014	Conducted (TH01-CB)

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Remark
RF Cable-high	Woken	High Cable-11	-	1 GHz – 26.5 GHz	Nov. 15, 2014	Conducted (TH01-CB)
Power Sensor	Agilent	U2021XA	MY53410001	50MHz~18GHz	Nov. 03, 2014	Conducted (TH01-CB)
Power Sensor	Agilent	U2021XA	MY53410002	50MHz~18GHz	Nov. 03, 2014	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)	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%