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FCC RADIO TEST REPORT

Applicant's company	**Xirrus, Inc.**
Applicant Address	2101 Corporate Center Drive, Thousand Oaks, CA 91320 USA
FCC ID	**SK6-XDR130**
Manufacturer's company	**Lite-On Network Communication (Dongguan) Limited**
Manufacturer Address	30#Keji Rd.,Yin Hu Industrial Area,Qingxi Town,DongGuan City,Guangdong,China

Product Name	Wireless Access Point Radio module
Brand Name	XIRRUS
Model No.	XDR130
Test Rule Part(s)	47 CFR FCC Part 15 Subpart C § 15.247
Test Freq. Range	2400 ~ 2483.5MHz
Received Date	Apr. 10, 2015
Final Test Date	May 14, 2015
Submission Type	Original Equipment
Operating Mode	Master / Bridge (Client without radar detection)

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 v03r02**, **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.

Testing Laboratory
1190

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History of This Test Report

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FR541029AA	Rev. 01	Initial issue of report	May 27, 2015

1. VERIFICATION OF COMPLIANCE

Product Name	:	Wireless Access Point Radio module
Brand Name	:	XIRRUS
Model No.	:	XDR130
Applicant	:	Xirrus, 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 Apr. 10, 2015 would like to declare that the tested sample has been evaluated and found to be in compliance with the tested rule parts. The data recorded as well as the test configuration specified is true and accurate for showing the sample's EMC nature.

Sam Chen

SPORTON INTERNATIONAL INC.

2. SUMMARY OF THE TEST RESULT

Applied Standard: 47 CFR FCC Part 15 Subpart C				
Part	**Rule Section**	**Description of Test**	**Result**	**Under Limit**
4.1	15.207	AC Power Line Conducted Emissions	Complies	11.17 dB
4.2	15.247(b)(3)	Maximum Conducted Output Power	Complies	4.08 dB
4.3	15.247(e)	Power Spectral Density	Complies	4.66 dB
4.4	15.247(a)(2)	6dB Spectrum Bandwidth	Complies	-
4.5	15.247(d)	Radiated Emissions	Complies	3.35 dB
4.6	15.247(d)	Band Edge Emissions	Complies	0.26 dB
4.7	15.203	Antenna Requirements	Complies	-

Note: 1. The EUT is a limited module which only limited to the Wireless Access Point (brand: XIRRUS / model: XD4130).

2. The EUT was installed to the Wireless Access Point (brand: XIRRUS / model: XD4130) to perform all the tests.

3. GENERAL INFORMATION

3.1. Product Details

Items	Description
Product Type	WLAN (3TX, 3RX)
Radio Type	Intentional Transceiver
Power Type	From host system
Modulation	IEEE 802.11b: DSSS IEEE 802.11g: OFDM IEEE 802.11n: see the below table
Data Modulation	IEEE 802.11b: DSSS (BPSK / QPSK / CCK) IEEE 802.11g/n: OFDM (BPSK / QPSK / 16QAM / 64QAM)
Data Rate (Mbps)	IEEE 802.11b: DSSS (1/ 2/ 5.5/11) IEEE 802.11g: OFDM (6/9/12/18/24/36/48/54) IEEE 802.11n: see the below table
Frequency Range	2400 ~ 2483.5MHz
Channel Number	11 for 20MHz bandwidth ; 7 for 40MHz bandwidth
Channel Band Width (99%)	IEEE 802.11b: 17.97 MHz IEEE 802.11g: 35.94 MHz IEEE 802.11n MCS0 (HT20): 34.65 MHz IEEE 802.11n MCS0 (HT40): 37.63 MHz
Maximum Conducted Output Power	IEEE 802.11b: 25.85 dBm IEEE 802.11g: 25.92 dBm IEEE 802.11n MCS0 (HT20): 25.22 dBm IEEE 802.11n MCS0 (HT40): 19.52 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	Three (TX)	
Band width Mode	20 MHz	40 MHz
IEEE 802.11b	V	X
IEEE 802.11g	V	X
IEEE 802.11n	V	V

IEEE 802.11n Spec.

Protocol	Number of Transmit Chains (NTX)	Data Rate / MCS
802.11n (HT20)	3	MCS0-23
802.11n (HT40)	3	MCS0-23
Note 1: IEEE Std. 802.11n modulation consists of HT20 and HT40 (HT: High Throughput). Then EUT supports 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 No.	Type	Connector	Gain (dBi)	
					2.4GHz	5GHz
1	Walsin	RFMTA241700NNLB004	Directional	I-PEX	2.3	10.5
2	Walsin	RFMTA241700NNLB004	Directional	I-PEX	2.3	10.5
3	Walsin	RFMTA241700NNLB004	Directional	I-PEX	2.3	10.5

Note: 1. The EUT has three antennas.

2. Chain 1: Connect to Ant. 1, Chain 2: Connect to Ant. 2, Chain 3: Connect to Ant. 3.

3. Chain 1, Chain 2 and Chain 3 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.

For RF transceiver sources (QCA9890):

Test Items	Mode	Data Rate	Channel	Chain
AC Power Line Conducted Emissions	CTX	-	-	-
Maximum Conducted Output Power	11b/CCK	1 Mbps	1/6/11	1+2+3
	11g/BPSK	6 Mbps	1/6/11	1+2+3
	11n HT20	MCS0	1/6/11	1+2+3
	11n HT40	MCS0	3/6/9	1+2+3
Power Spectral Density	11b/CCK	1 Mbps	1/6/11	1+2+3
	11g/BPSK	6 Mbps	1/6/11	1+2+3
	11n HT20	MCS0	1/6/11	1+2+3
	11n HT40	MCS0	3/6/9	1+2+3
6dB Spectrum Bandwidth	11b/CCK	1 Mbps	1/6/11	1+2+3
	11g/BPSK	6 Mbps	1/6/11	1+2+3
	11n HT20	MCS0	1/6/11	1+2+3
	11n HT40	MCS0	3/6/9	1+2+3
Radiated Emissions Below 1GHz	CTX	-	-	-
Radiated Emissions Above 1GHz	11b/CCK	1 Mbps	1/6/11	1+2+3
	11g/BPSK	6 Mbps	1/6/11	1+2+3
	11n HT20	MCS0	1/6/11	1+2+3
	11n HT40	MCS0	3/6/9	1+2+3
Band Edge Emissions	11b/CCK	1 Mbps	1/6/11	1+2+3
	11g/BPSK	6 Mbps	1/6/11	1+2+3
	11n HT20	MCS0	1/6/11	1+2+3
	11n HT40	MCS0	3/6/9	1+2+3

For RF transceiver sources (QCA9880):

Test Items	Mode	Data Rate	Channel	Chain
Radiated Emissions Above 1GHz	11g/BPSK	6 Mbps	1/6/11	1+2+3
Band Edge Emissions	11g/BPSK	6 Mbps	1/6/11	1+2+3

Note: The PoE is for measurement only, would not be marketed, its information as below:

Power	Brand	Model No.	FCC ID
PoE 1	PowerDsine	PD-3501G/AC	DoC
PoE 2	PowerDsine	PwerDsine7001G	DoC

The following test modes were performed for all tests:

For Radiated Emissions Above 1GHz and Radiated Emission Co-location test:

Mode 1. Place EUT in X axis (Panel upward)

Mode 2. Place EUT in X axis (Panel down)

Mode 3. Place EUT in Y axis (LAN port down)

Mode 3 has been evaluated to be the worst case after evaluating. Consequently, measurement will follow this same test mode.

For Radiated Emissions Below 1GHz test:

Place EUT in Y axis (LAN port down) generated the worst test result for Radiated emission Above 1GHz test, thus the measurement for Radiated emission Below 1GHz test will follow this same test configuration.

Mode 1. Place EUT in Y axis (LAN port down) - 2.4GHz WLAN function

Mode 2. Place EUT in Y axis (LAN port down) - 5GHz WLAN function

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

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 Sporton test report: FA541029.) and Radiated Emission Co-location (please refer to Appendix B) tests are added for simultaneously transmit between 2.4GHz WLAN function and 5GHz WLAN function.

Note: The Wireless Access Point (brand: XIRRUS / model: XD4130) will install four radio modules (brand: XIRRUS / model: XDR130 / FCC ID: SK6-XDR130). These four radio modules will be operated in different bands. If they are used in the same band, the output power of each radio module will be reduced to make sure that total power is equal to max output power of single radio module.

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. Multiple Listing

There are two RF transceiver sources (QCA9890 & QCA 9880). They are pin to pin compatible. These two RF chipset are electrically identical.

The deviation is F/W and communications protocol so just selects QCA9890 as worse case and recorded in the report.

The QCA9880 was verified spurious emission above 1G, band-edge for 802.11g CH6 and recorded in the report.

3.8. Table for Supporting Units

For Test Site No: TH01-CB and 03CH01-CB

Support Unit	Brand	Model	FCC ID
Notebook	DELL	E6430	DoC
Wireless Access Point	XIRRUS	XD4130	SK6-XDR130
PoE 2	PowerDsine	PwerDsine7001G	N/A

For Test Site No: CO01-CB

Support Unit	Brand	Model	FCC ID
NB	DELL	E4300	DoC
Wireless Access Point	XIRRUS	XD4130	SK6-XDR130
PoE 1	PowerDsine	PD-3501G/AC	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.

Test Software Version	ART-xircon V1.0.2.25					
Mode	Test Frequency (MHz)					
	NCB: 20MHz			NCB: 40MHz		
	2412 MHz	2437 MHz	2462 MHz	2422 MHz	2437 MHz	2452 MHz
802.11b	19.5	25	19	-	-	-
802.11g	15	23	13.5	-	-	-
802.11n MCS0 HT20	14	22	13	-	-	-
802.11n MCS0 HT40	-	-	-	12	14	12

3.10. EUT Operation during Test

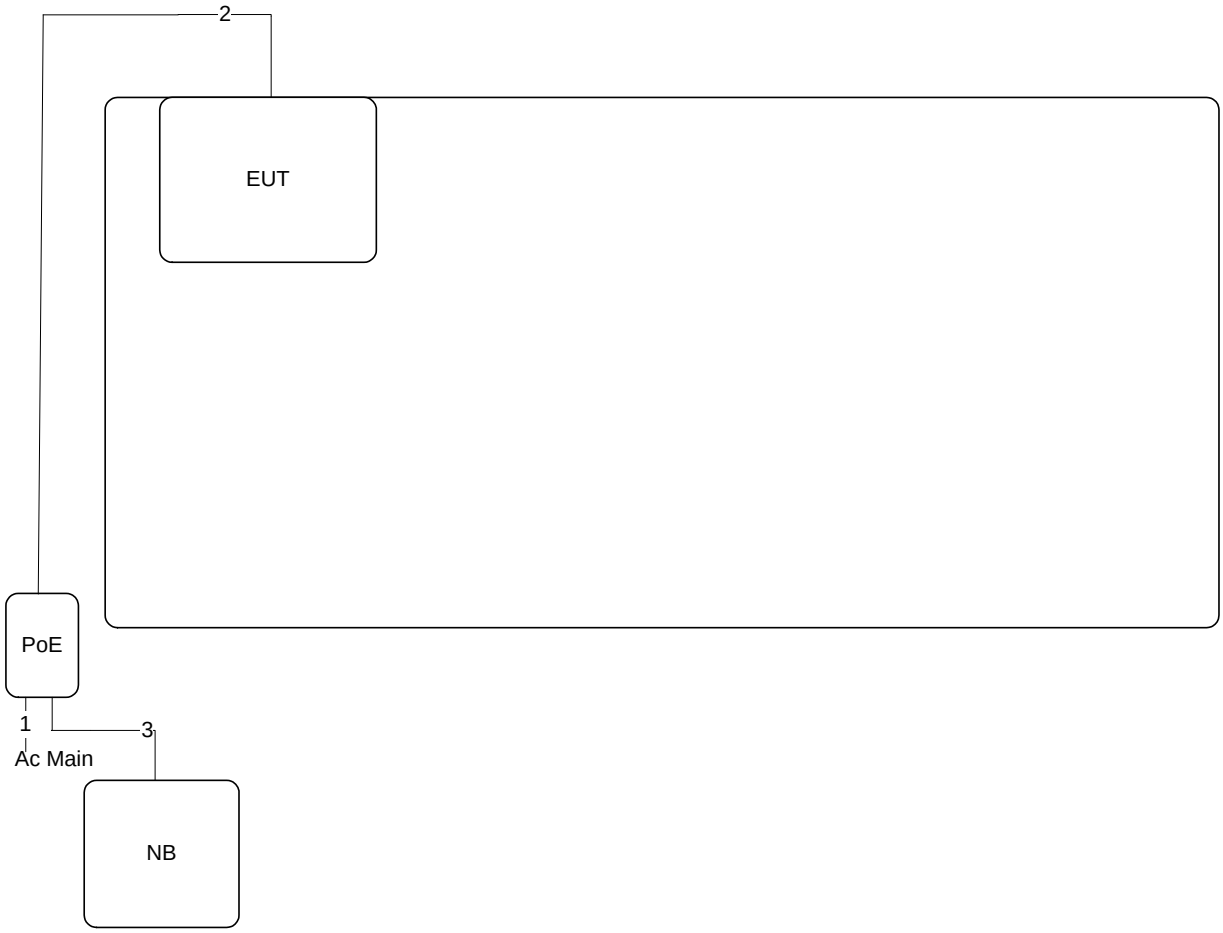
The EUT was programmed to be in continuously transmitting mode.

3.11. Duty Cycle

Mode	On Time (ms)	On+Off Time (ms)	Duty Cycle (%)	Duty Factor (dB)	1/T Minimum VBW (kHz)
802.11b	1.000	1.000	100.00	0.00	0.01
802.11g	1.000	1.000	100.00	0.00	0.01
802.11n MCS0 HT20	1.000	1.000	100.00	0.00	0.01
802.11n MCS0 HT40	1.000	1.000	100.00	0.00	0.01

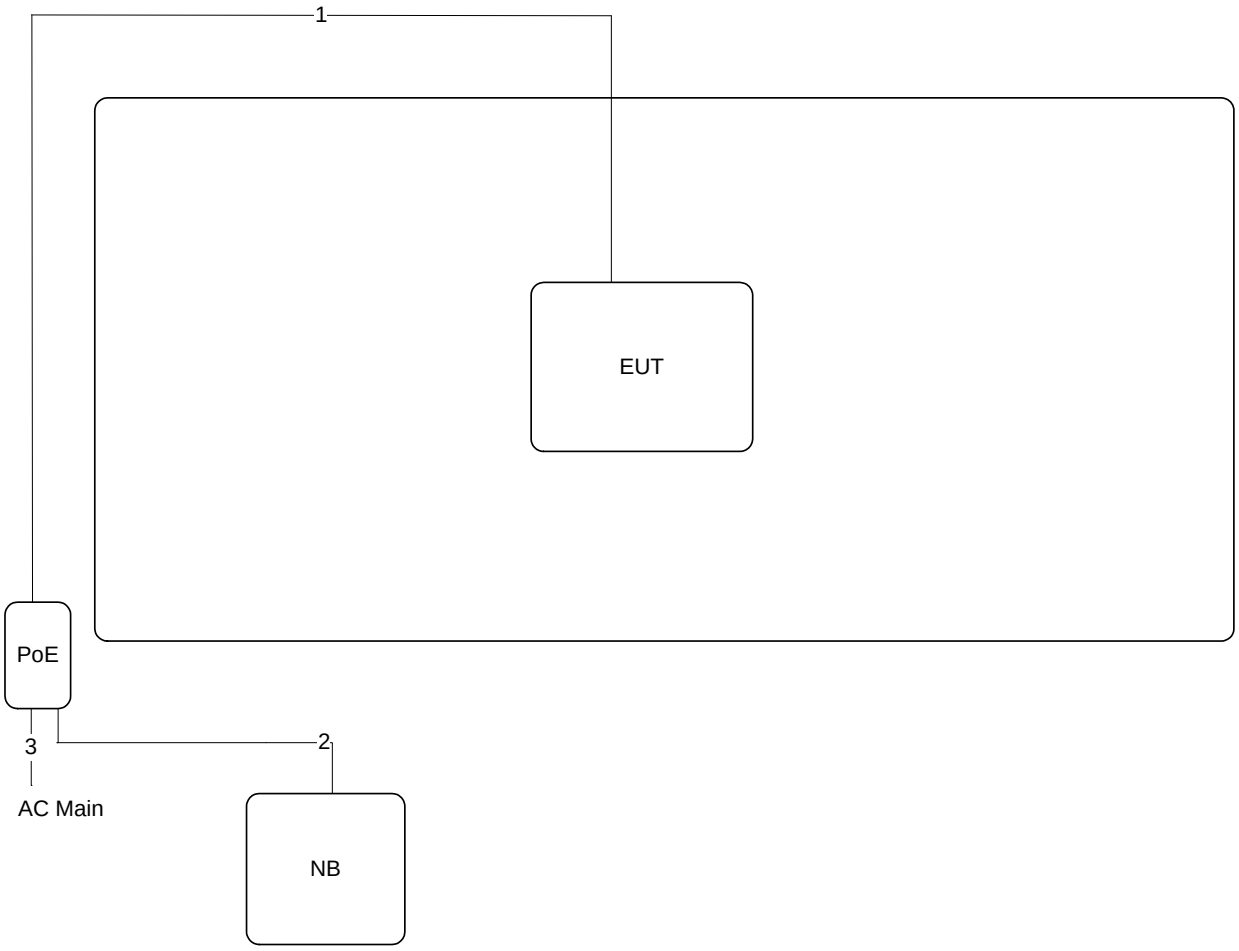
3.12. Test Configurations

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	RJ-45 cable	No	1.5m

3.12.2. Radiation Emissions Test Configuration



Item	Connection	Shielded	Length
1	RJ-45 cable	No	10m
2	RJ-45 cable	No	1.5m
3	Power cable	No	2m

4. TEST RESULT

4.1. AC Power Line Conducted Emissions Measurement

4.1.1. Limit

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

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

4.1.2. Measuring Instruments and Setting

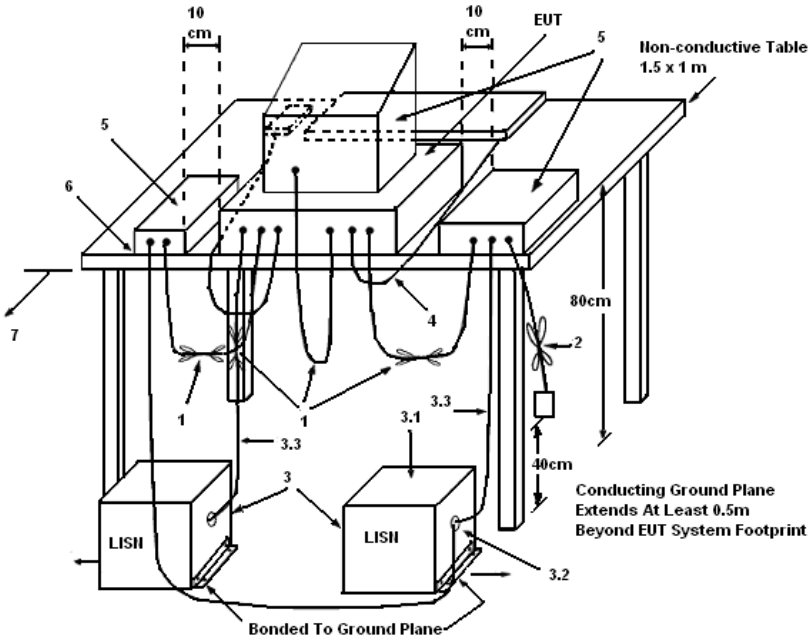
Please refer to section 5 of equipments list in this report. The following table is the setting of the receiver.

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

4.1.3. Test Procedures

1. Configure the EUT according to ANSI C63.10. 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

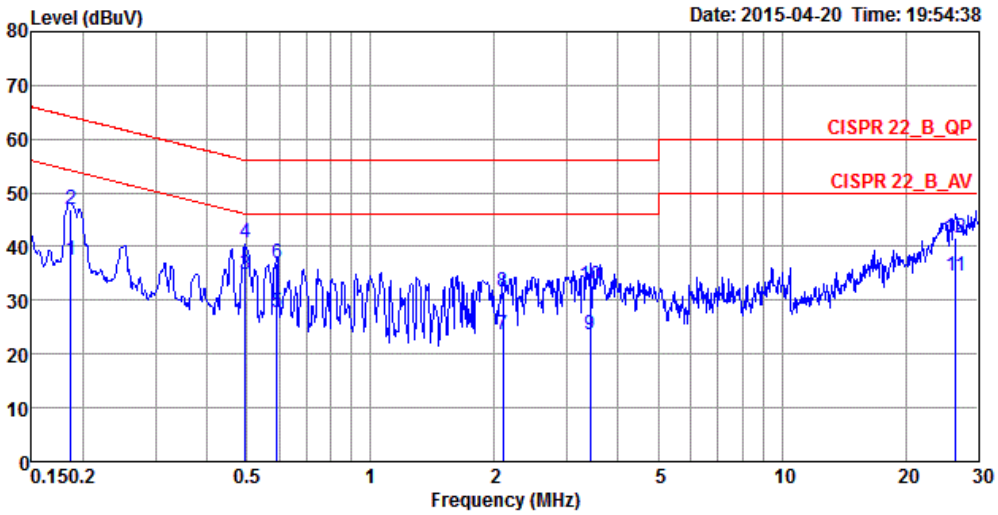
There is no deviation with the original standard.

4.1.6. EUT Operation during Test

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

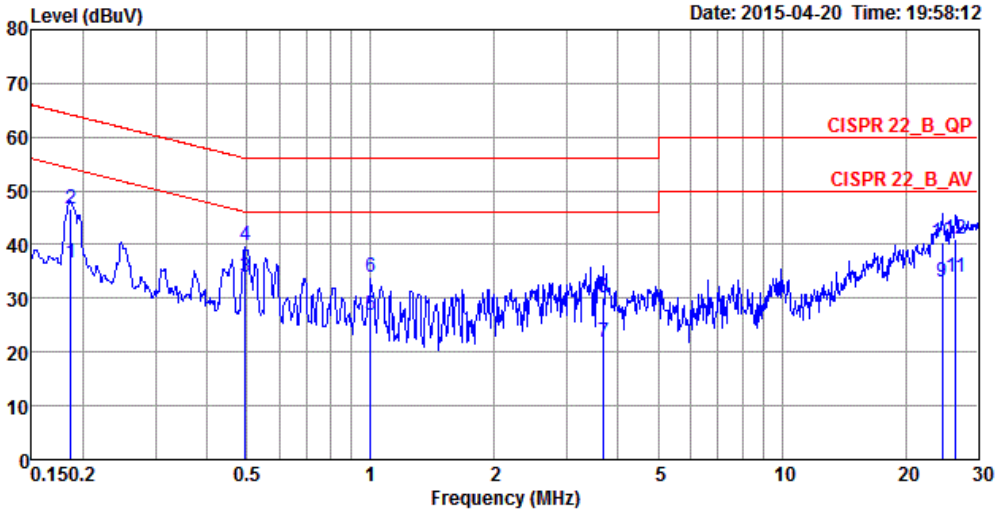
4.1.7. Results of AC Power Line Conducted Emissions Measurement

Temperature	24°C	Humidity	56%
Test Engineer	Hank Yang	Phase	Line
Configuration	CTX		



	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Pol/Phase	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB		
1	0.19	37.42	-16.78	54.20	27.37	10.03	0.02	LINE	Average
2	0.19	47.08	-17.12	64.20	37.03	10.03	0.02	LINE	QP
3	0.50	34.88	-11.17	46.05	24.81	10.03	0.04	LINE	Average
4	0.50	40.80	-15.25	56.05	30.73	10.03	0.04	LINE	QP
5	0.59	27.86	-18.14	46.00	17.80	10.02	0.04	LINE	Average
6	0.59	36.99	-19.01	56.00	26.93	10.02	0.04	LINE	QP
7	2.10	23.66	-22.34	46.00	13.57	10.03	0.06	LINE	Average
8	2.10	31.70	-24.30	56.00	21.61	10.03	0.06	LINE	QP
9	3.42	23.56	-22.44	46.00	13.47	10.03	0.06	LINE	Average
10	3.42	32.66	-23.34	56.00	22.57	10.03	0.06	LINE	QP
11	26.42	34.58	-15.42	50.00	23.79	10.51	0.28	LINE	Average
12	26.42	41.58	-18.42	60.00	30.79	10.51	0.28	LINE	QP

Temperature	24°C	Humidity	56%
Test Engineer	Hank Yang	Phase	Neutral
Configuration	CTX		



	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Pol/Phase	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB		
1	0.19	36.49	-17.71	54.20	26.50	9.97	0.02	NEUTRAL	Average
2	0.19	46.68	-17.52	64.20	36.69	9.97	0.02	NEUTRAL	QP
3	0.50	33.82	-12.23	46.05	23.90	9.88	0.04	NEUTRAL	Average
4	0.50	39.98	-16.07	56.05	30.06	9.88	0.04	NEUTRAL	QP
5	1.00	26.92	-19.08	46.00	16.98	9.89	0.05	NEUTRAL	Average
6	1.00	33.91	-22.09	56.00	23.97	9.89	0.05	NEUTRAL	QP
7	3.68	21.87	-24.13	46.00	11.92	9.89	0.06	NEUTRAL	Average
8	3.68	30.24	-25.76	56.00	20.29	9.89	0.06	NEUTRAL	QP
9	24.53	32.94	-17.06	50.00	22.48	10.18	0.28	NEUTRAL	Average
10	24.53	40.34	-19.66	60.00	29.88	10.18	0.28	NEUTRAL	QP
11	26.42	33.92	-16.08	50.00	23.41	10.23	0.28	NEUTRAL	Average
12	26.42	41.12	-18.88	60.00	30.61	10.23	0.28	NEUTRAL	QP

Note:

Level = Read Level + LISN Factor + Cable Loss

4.2. Maximum Conducted Output Power Measurement

4.2.1. Limit

For systems using digital modulation in the 2400-2483.5MHz, the limit for output power is 30dBm. The limited has to be reduced by the amount in dB that the gain of the antenna exceed 6dBi. In case of point-to-point operation, the limit has to be reduced by 1dB for every 3dB that the directional gain of the antenna exceeds 6dBi.

4.2.2. Measuring Instruments and Setting

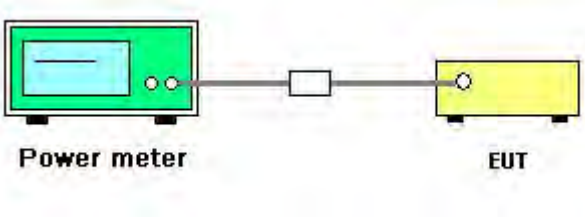
Please refer to section 5 of equipments list in this report. The following table is the setting of the power meter.

Power Meter Parameter	Setting
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 system was performed in accordance with KDB 662911 D01 v02r01 Emissions Testing of Transmitters with Multiple Outputs in the Same Band.
3. This procedure provides an alternative for determining the RMS output power using a broadband RF average power meter with a thermocouple detector.

4.2.4. Test Setup Layout



4.2.5. Test Deviation

There is no deviation with the original standard.

4.2.6. EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

4.2.7. Test Result of Maximum Conducted Output Power

Temperature	26°C	Humidity	63%
Test Engineer	Lucas Huang	Test Date	Apr. 28, 2015

Mode	Frequency	Conducted Power (dBm)				Max. Limit (dBm)	Result
		Chain 1	Chain 2	Chain 3	Total		
802.11b	2412 MHz	19.53	19.85	19.48	24.39	30.00	Complies
	2437 MHz	21.04	21.19	21.00	25.85	30.00	Complies
	2462 MHz	19.45	19.62	19.30	24.23	30.00	Complies
802.11g	2412 MHz	16.02	15.91	15.78	20.68	30.00	Complies
	2437 MHz	20.77	21.00	21.62	25.92	30.00	Complies
	2462 MHz	15.02	14.84	14.86	19.68	30.00	Complies
802.11n MCS0 HT20	2412 MHz	14.92	14.91	14.06	19.42	30.00	Complies
	2437 MHz	20.37	20.66	20.31	25.22	30.00	Complies
	2462 MHz	14.39	14.43	13.23	18.82	30.00	Complies
802.11n MCS0 HT40	2422 MHz	12.67	12.89	12.21	17.37	30.00	Complies
	2437 MHz	15.10	14.98	14.10	19.52	30.00	Complies
	2452 MHz	13.29	13.28	12.58	17.83	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

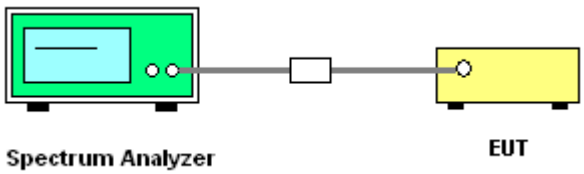
Please refer to section 5 of equipments list in this report. The following table is the setting of the spectrum analyzer.

Spectrum Parameter	Setting
Attenuation	Auto
Span Frequency	Set the span to 1.5 times the DTS channel bandwidth.
RBW	3 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	26°C	Humidity	63%
Test Engineer	Lucas Huang	Test Date	Apr. 28, 2015

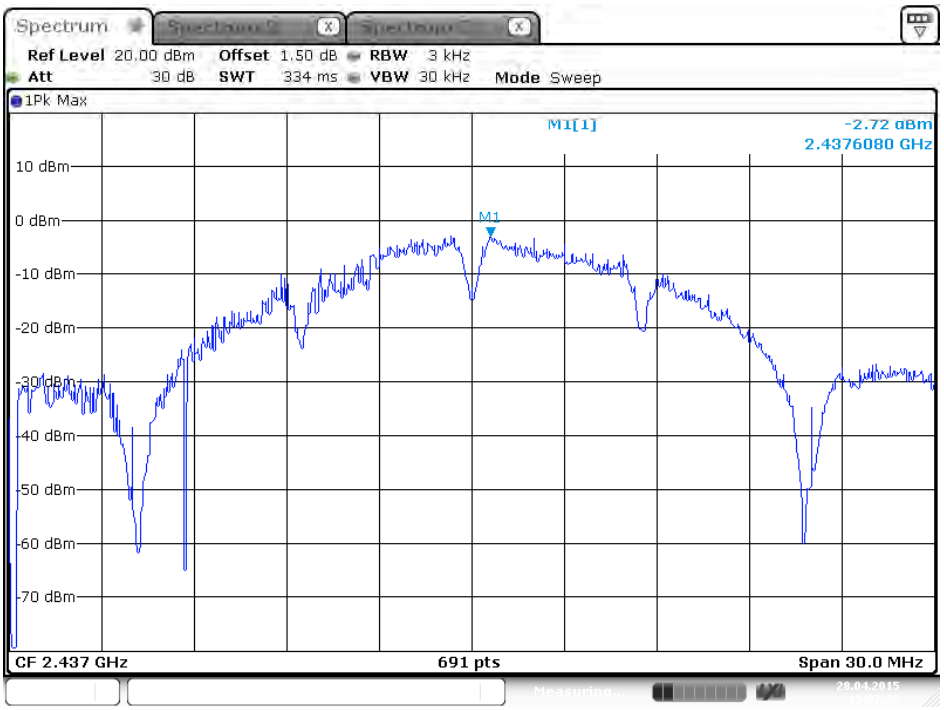
Mode	Frequency	Power Density (dBm/3kHz)				Power Density Limit (dBm/3kHz)	Result
		Chain 1	Chain 2	Chain 3	Total		
802.11b	2412 MHz	-3.07	-2.77	-2.16	2.12	6.93	Complies
	2437 MHz	-2.72	-1.93	-2.91	2.27	6.93	Complies
	2462 MHz	-1.98	-3.09	-2.94	2.13	6.93	Complies
802.11g	2412 MHz	-8.83	-7.32	-10.40	-3.90	6.93	Complies
	2437 MHz	-5.96	-5.32	-2.42	0.49	6.93	Complies
	2462 MHz	-8.84	-10.75	-10.79	-5.26	6.93	Complies
802.11n MCS0 HT20	2412 MHz	-10.58	-11.00	-11.40	-6.21	6.93	Complies
	2437 MHz	-6.76	-4.83	-4.02	-0.29	6.93	Complies
	2462 MHz	-10.90	-10.97	-10.60	-6.05	6.93	Complies
802.11n MCS0 HT40	2422 MHz	-15.44	-16.18	-16.32	-11.19	6.93	Complies
	2437 MHz	-13.21	-11.92	-12.78	-7.83	6.93	Complies
	2452 MHz	-15.18	-15.34	-15.18	-10.46	6.93	Complies

Note: $Directional\,Gain = 10\log\left[\frac{\sum_{j=1}^{Nss}\left\{\sum_{K=1}^{N_{ANT}} g_{j,k}\right\}^2}{N_{ANT}}\right]$ =7.07dBi >6dBi, so limit=8 – (7.07 – 6)=6.93dBm/3kHz.

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

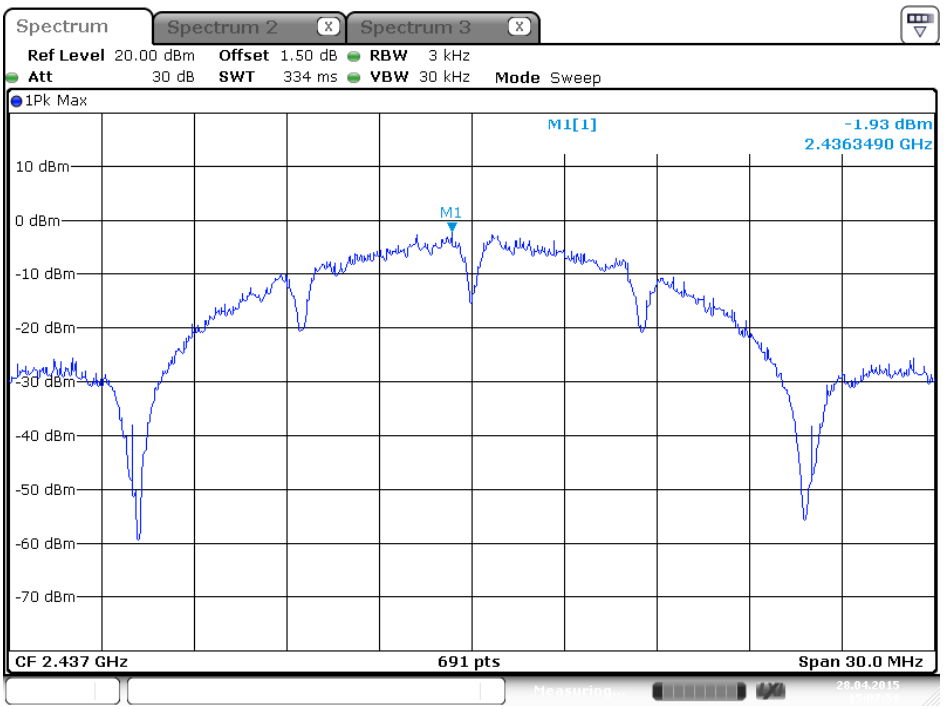
For plots, only the channel with worse result was shown.

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



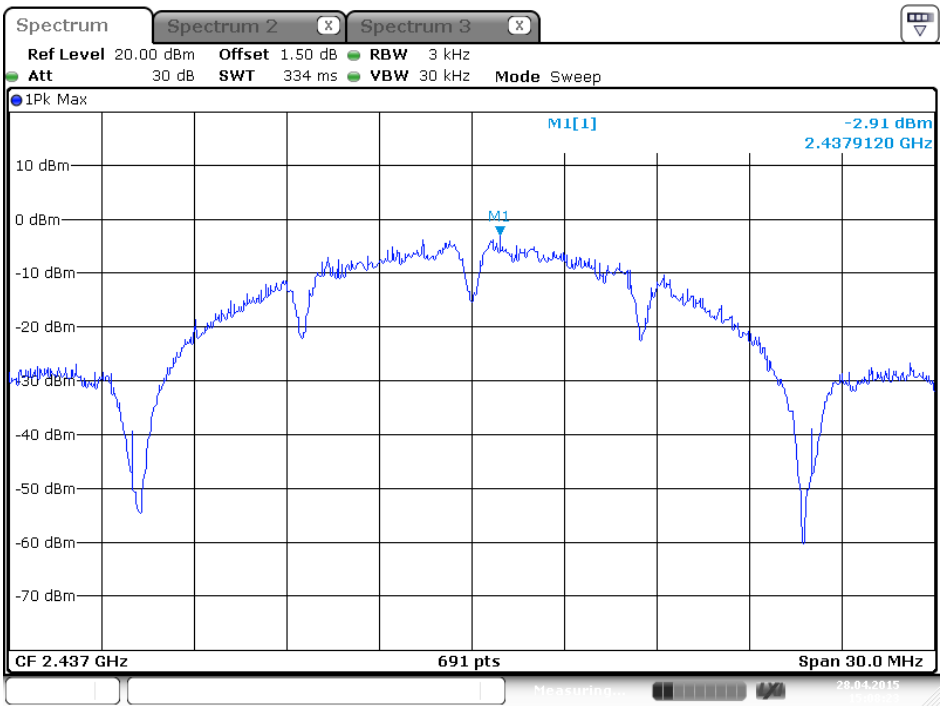
Date: 28.APR.2015 15:07:23

Power Density Plot on Configuration IEEE 802.11b / 2437 MHz / Chain 2



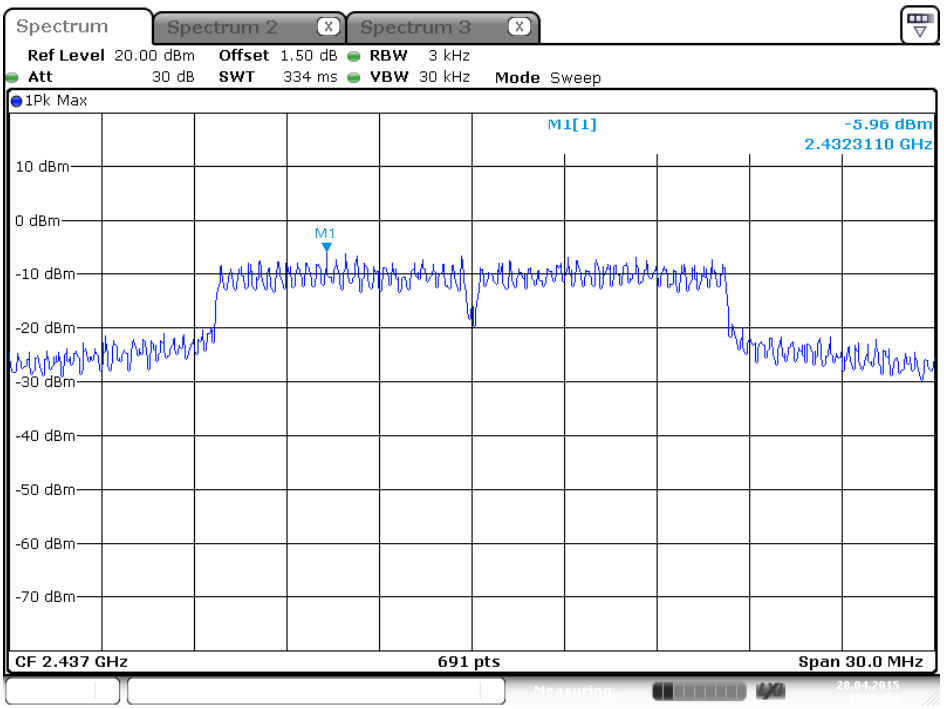
Date: 28.APR.2015 15:07:59

Power Density Plot on Configuration IEEE 802.11b / 2437 MHz / Chain 3



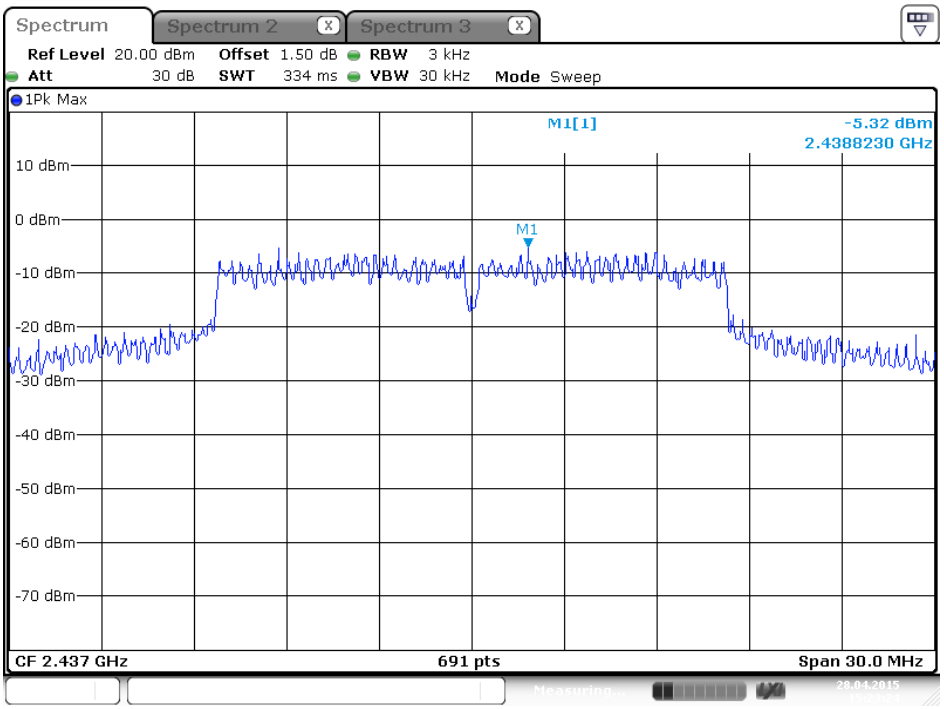
Date: 28.APR.2015 15:08:23

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



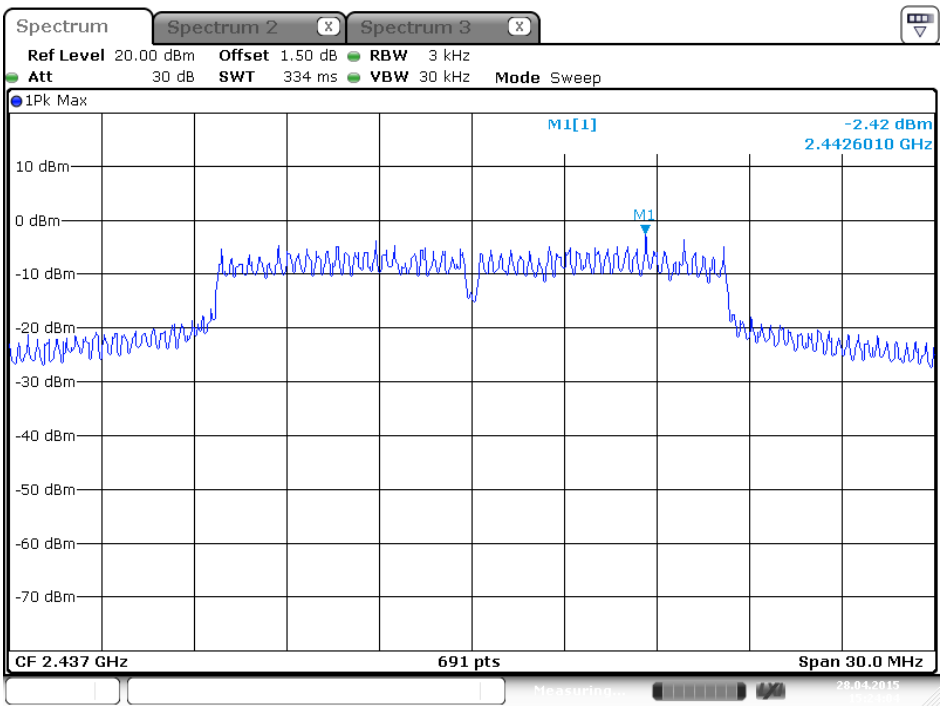
Date: 28.APR.2015 15:22:58

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



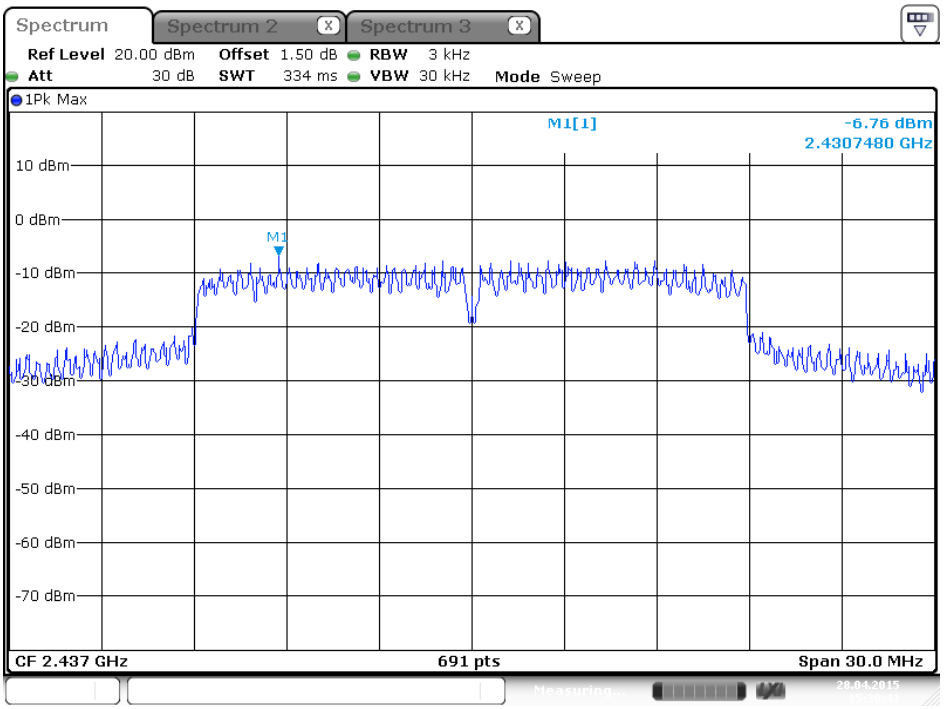
Date: 28.APR.2015 15:23:25

Power Density Plot on Configuration IEEE 802.11g / 2437 MHz / Chain 3



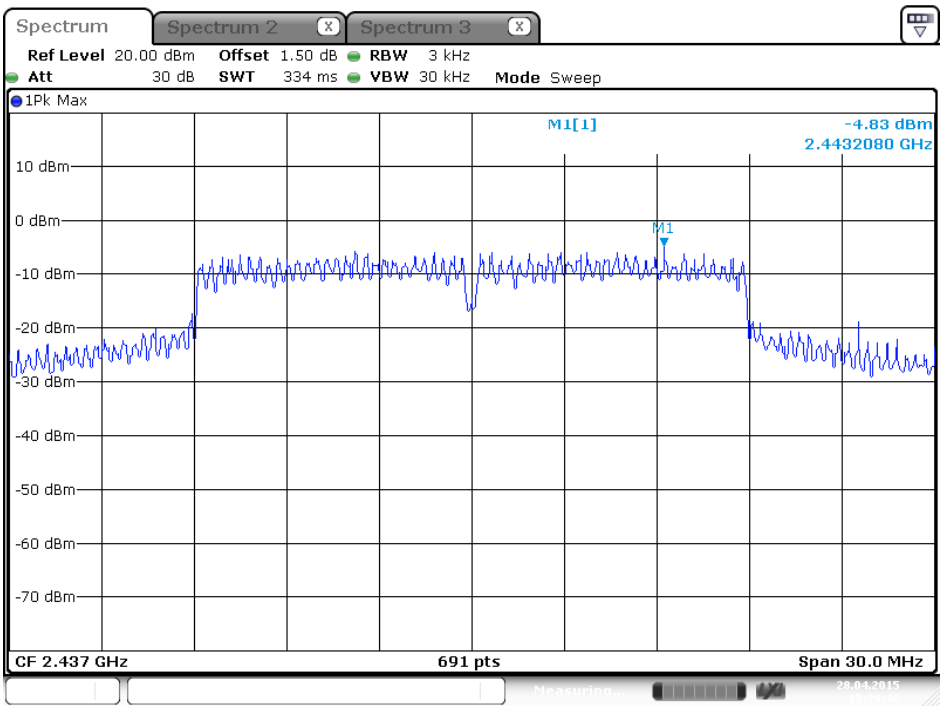
Date: 28.APR.2015 15:24:04

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



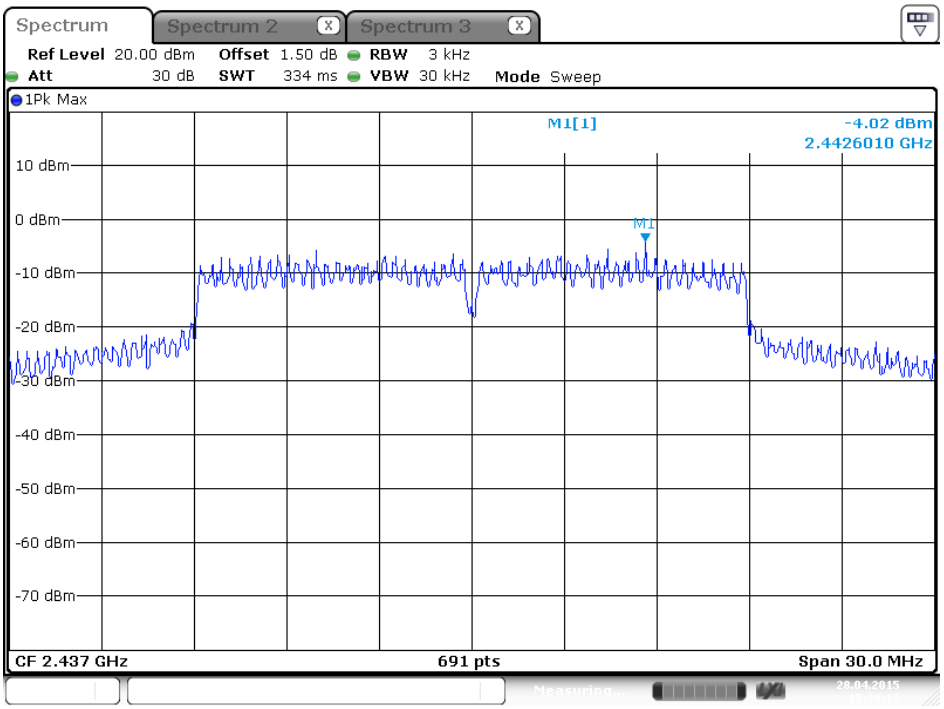
Date: 28.APR.2015 15:30:40

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



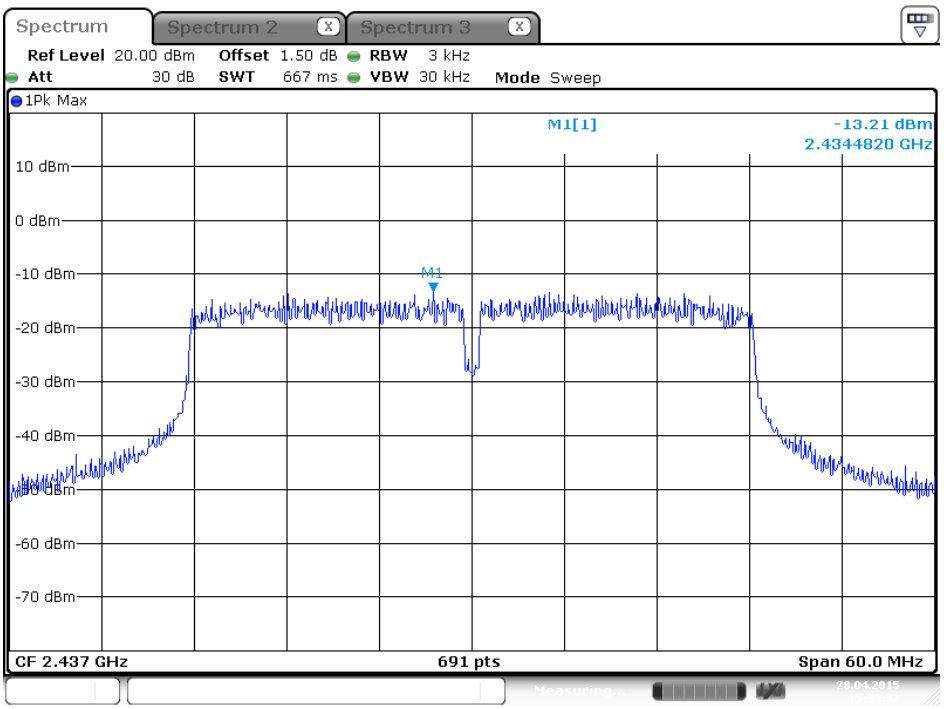
Date: 28.APR.2015 15:29:40

Power Density Plot on Configuration IEEE 802.11n MCS0 HT20 / 2437 MHz / Chain 3



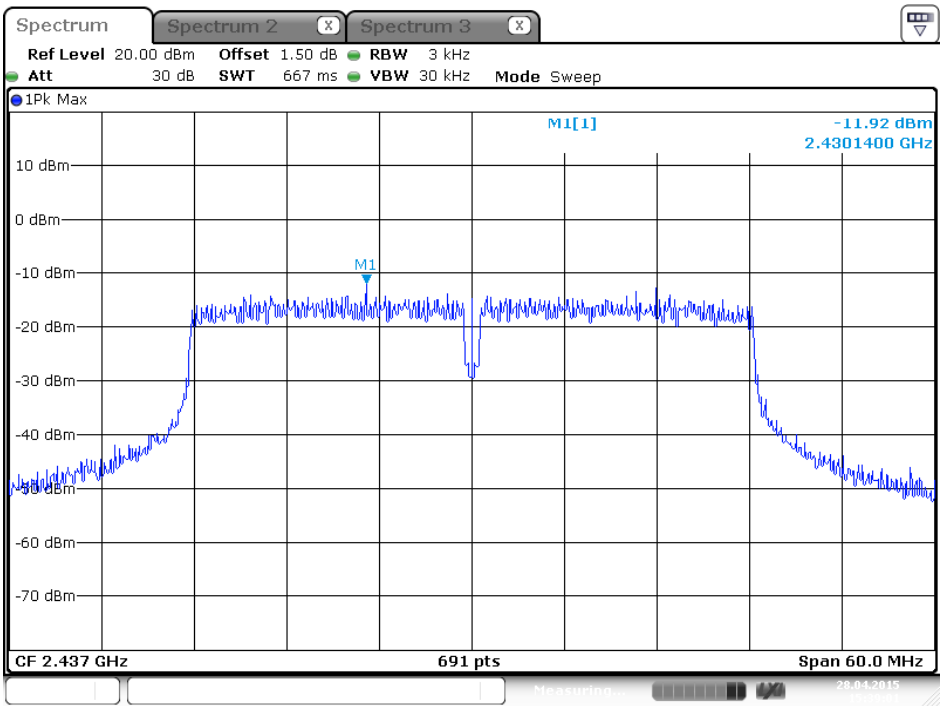
Date: 28.APR.2015 15:30:12

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



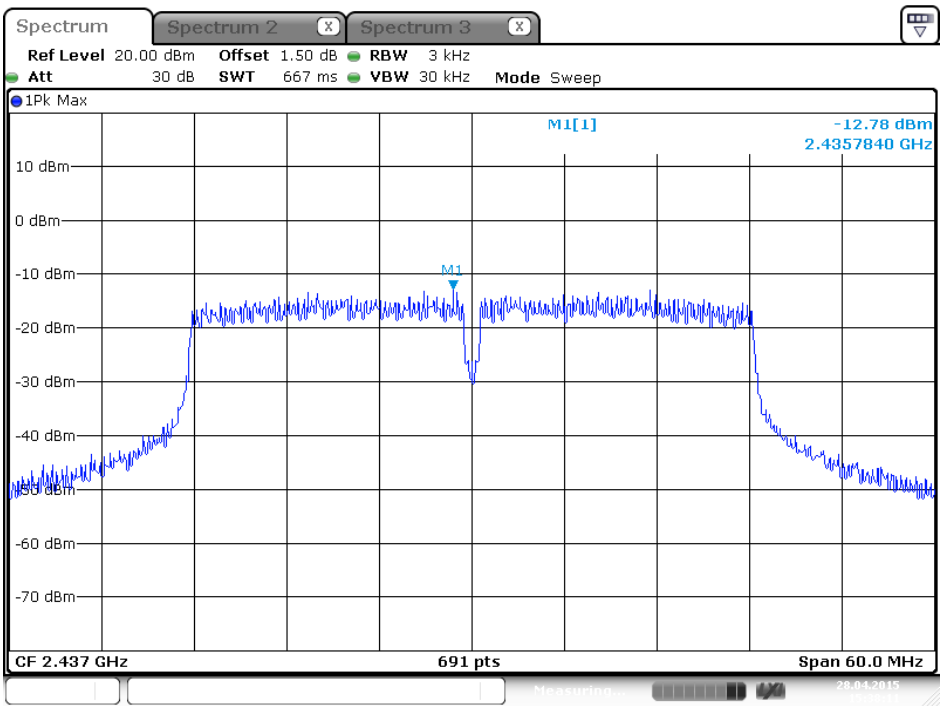
Date: 28.APR.2015 15:39:32

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



Date: 28.APR.2015 15:39:02

Power Density Plot on Configuration IEEE 802.11n MCS0 HT40 / 2437 MHz / Chain 3



Date: 28.APR.2015 15:38:11

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.

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

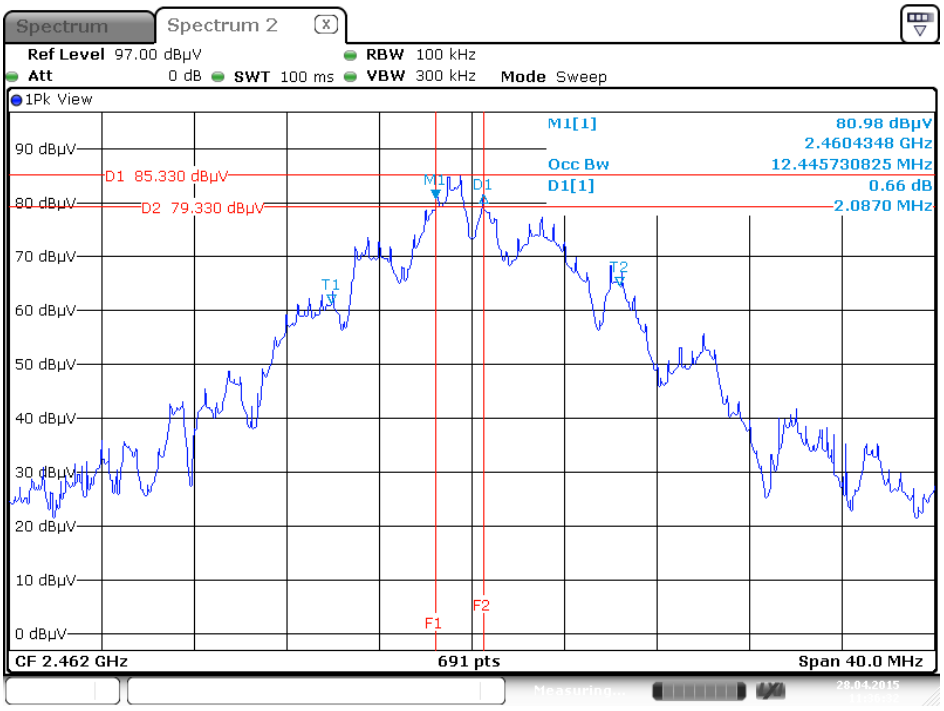
Temperature	26°C	Humidity	63%
Test Engineer	Lucas Huang		

Mode	Frequency	6dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)	Min. Limit (kHz)	Test Result
802.11b	2412 MHz	5.50	14.67	500	Complies
	2437 MHz	12.58	17.97	500	Complies
	2462 MHz	2.09	14.67	500	Complies
802.11g	2412 MHz	13.22	23.87	500	Complies
	2437 MHz	16.17	35.94	500	Complies
	2462 MHz	16.23	16.75	500	Complies
802.11n MCS0 HT20	2412 MHz	15.36	17.45	500	Complies
	2437 MHz	15.30	34.65	500	Complies
	2462 MHz	16.23	17.80	500	Complies
802.11n MCS0 HT40	2422 MHz	34.20	36.90	500	Complies
	2437 MHz	34.20	37.05	500	Complies
	2452 MHz	29.80	37.63	500	Complies

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

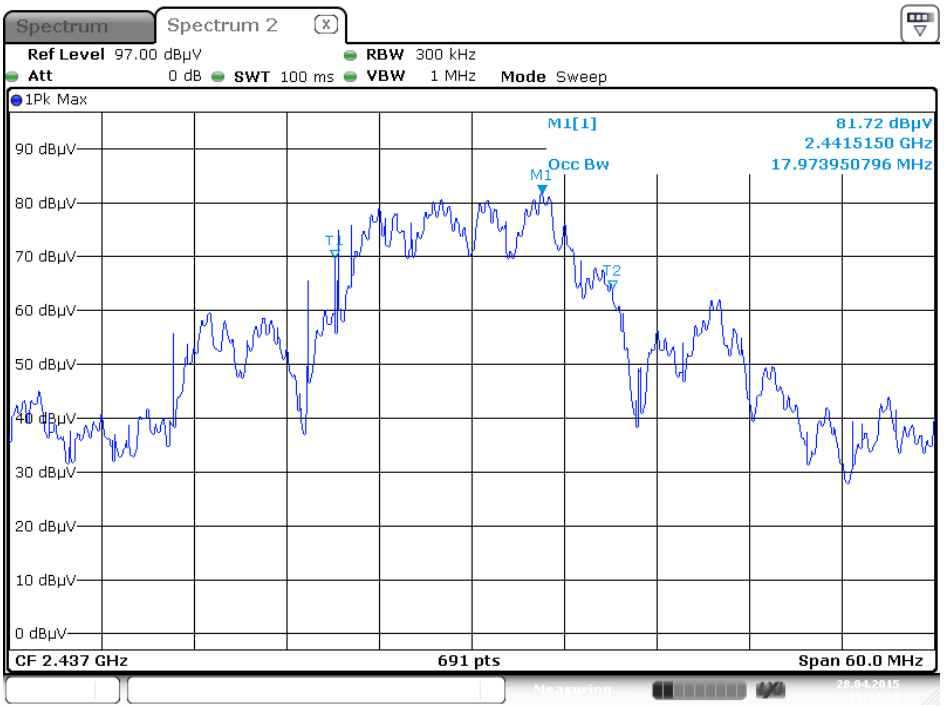
For plots, only the channel with worse result was shown.

6 dB Bandwidth Plot on Configuration IEEE 802.11b / 2462 MHz / Chain 1 + Chain 2 + Chain 3



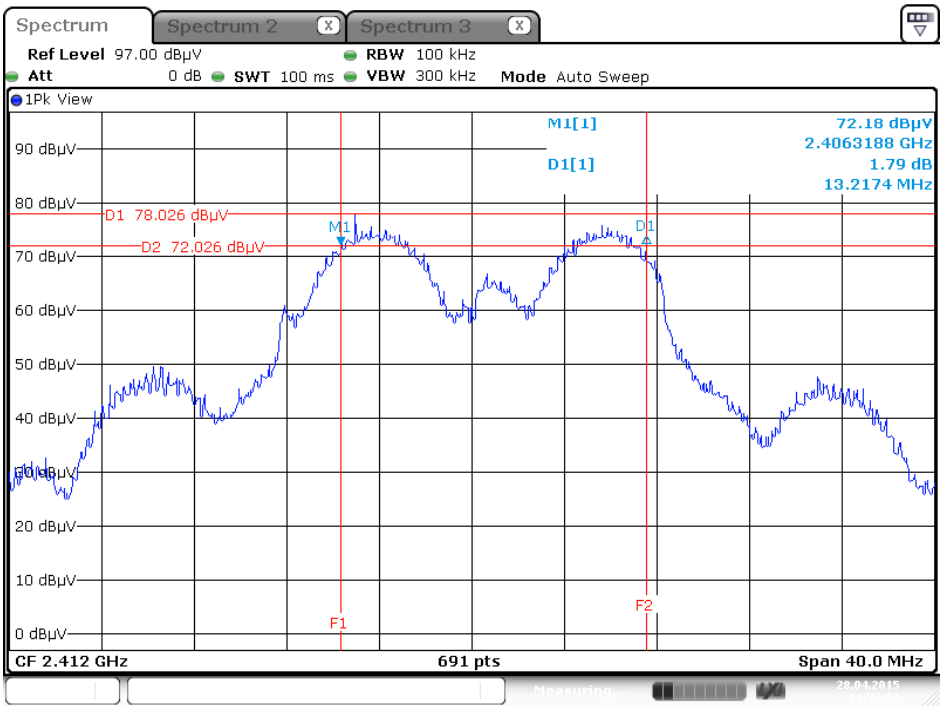
Date: 28.APR.2015 11:36:33

99% Occupied Bandwidth Plot on Configuration IEEE 802.11b / 2437 MHz / Chain 1 + Chain 2 + Chain 3



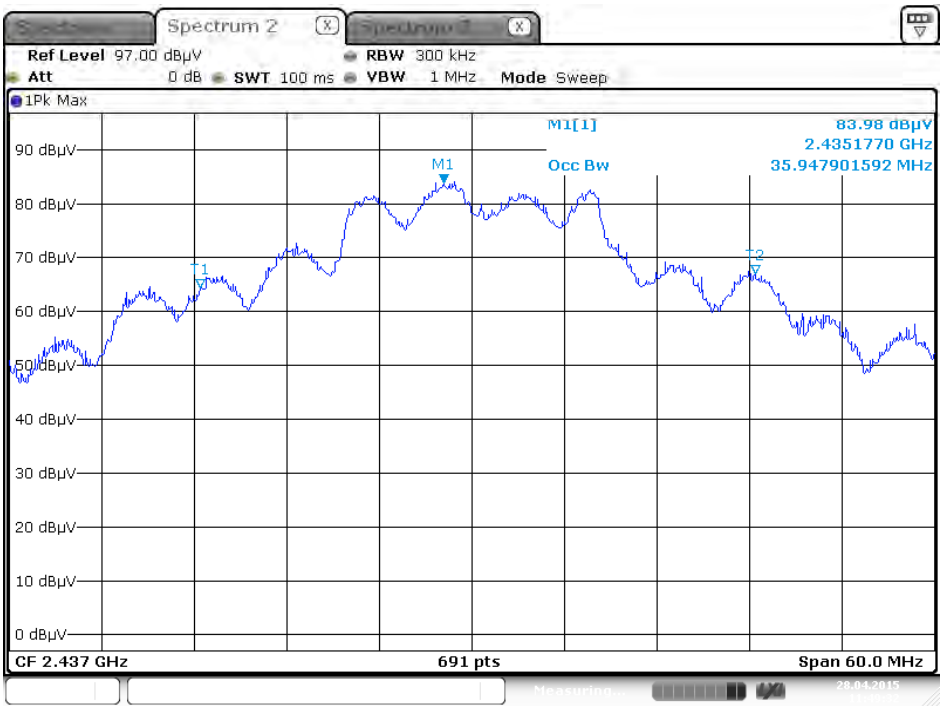
Date: 28.APR.2015 11:34:19

6 dB Bandwidth Plot on Configuration IEEE 802.11g / 2412 MHz / Chain 1 + Chain 2 + Chain 3



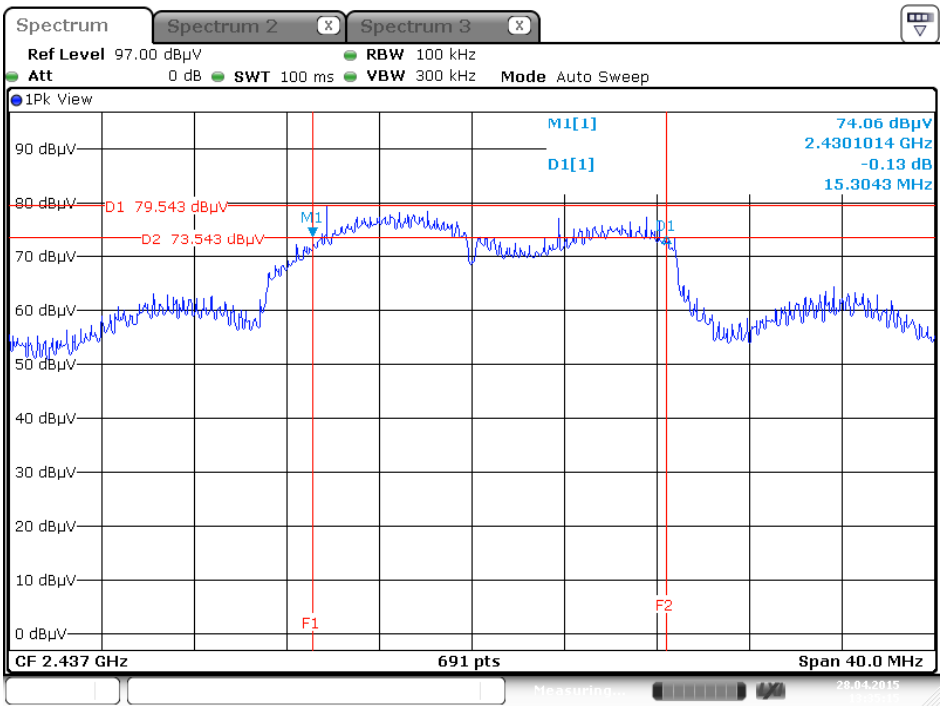
Date: 28.APR.2015 11:52:03

99% Occupied Bandwidth Plot on Configuration IEEE 802.11g / 2437 MHz / Chain 1 + Chain 2 + Chain 3



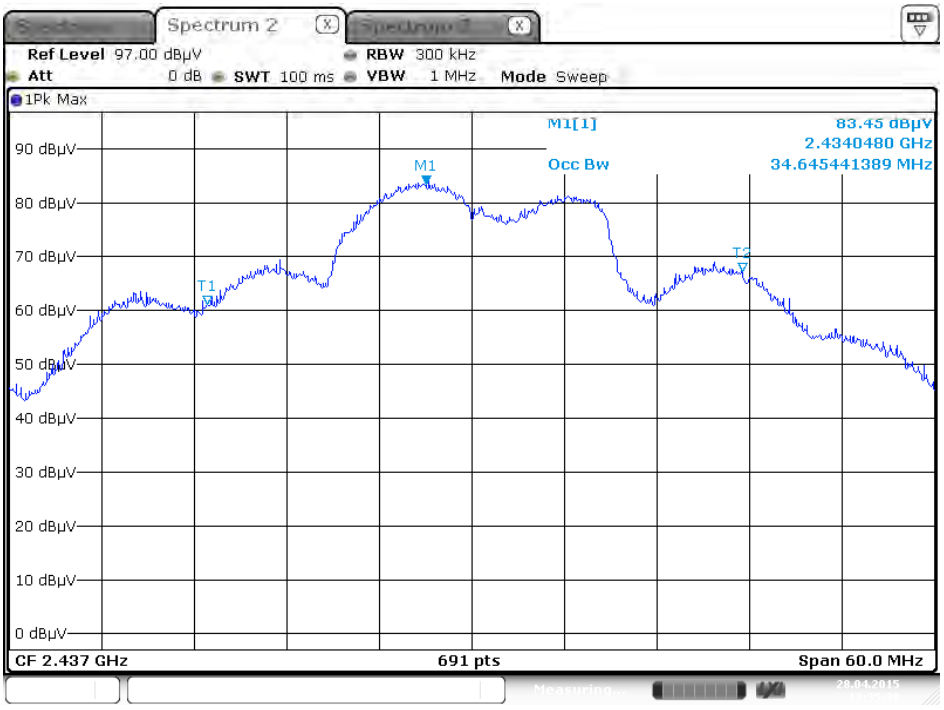
Date: 28.APR.2015 11:49:33

6 dB Bandwidth Plot on Configuration IEEE 802.11n MCS0 HT20 / 2437 MHz / Chain 1 + Chain 2 + Chain 3



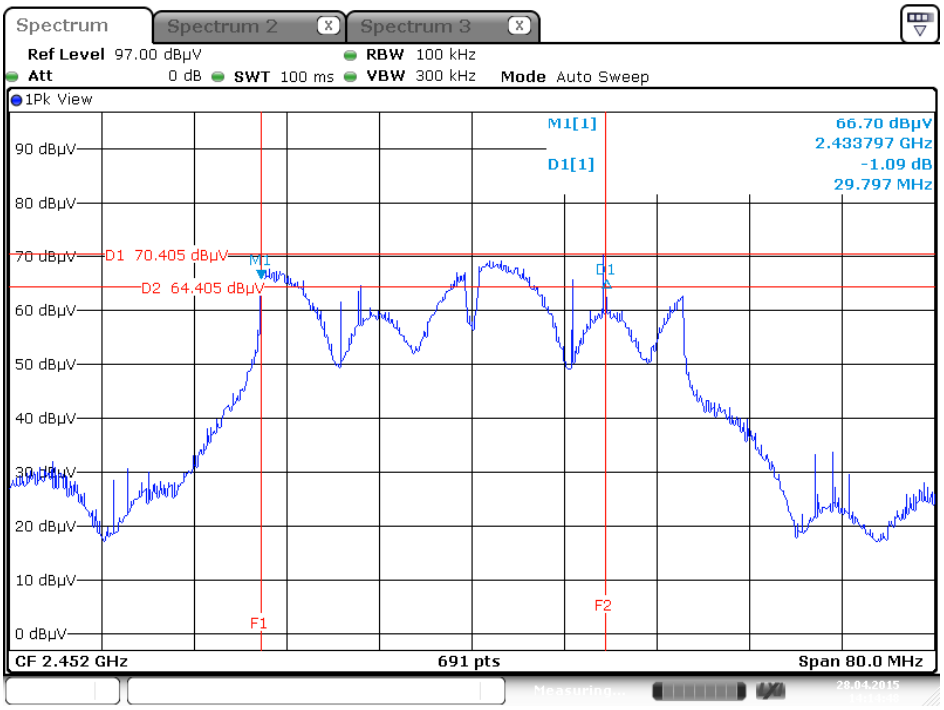
Date: 28.APR.2015 13:35:15

99% Occupied Bandwidth Plot on Configuration IEEE 802.11n MCS0 HT20 / 2437 MHz / Chain 1 + Chain 2 + Chain 3



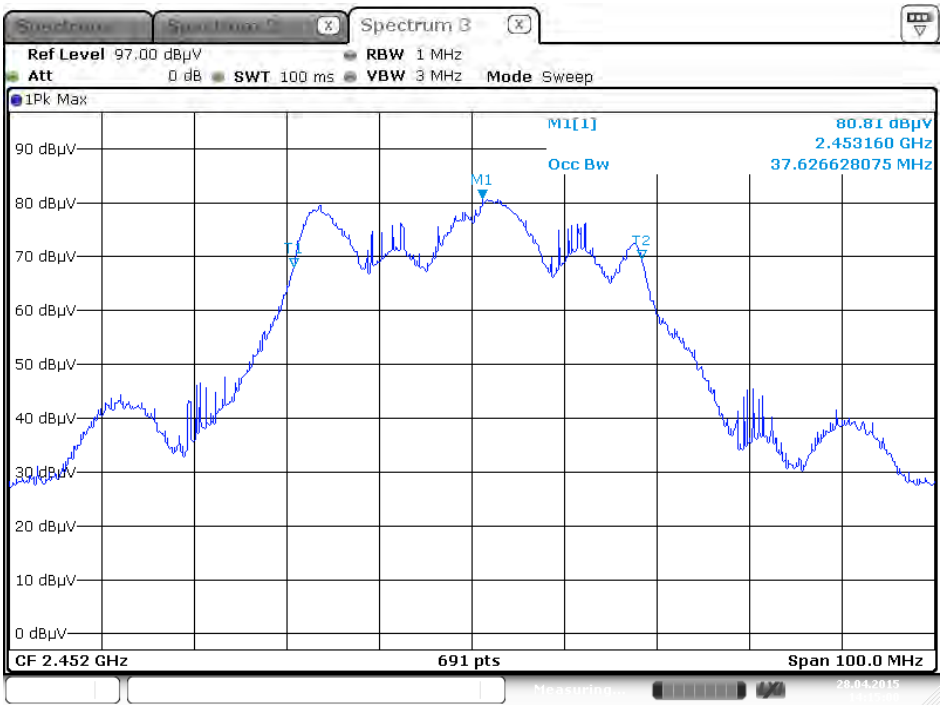
Date: 28.APR.2015 13:35:38

6 dB Bandwidth Plot on Configuration IEEE 802.11n MCS0 HT40 / 2452 MHz / Chain 1 + Chain 2 + Chain 3



Date: 28.APR.2015 14:14:47

99% Occupied Bandwidth Plot on Configuration IEEE 802.11n MCS0 HT40 / 2452 MHz / Chain 1 + Chain 2 + Chain 3



Date: 28.APR.2015 14:15:00

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

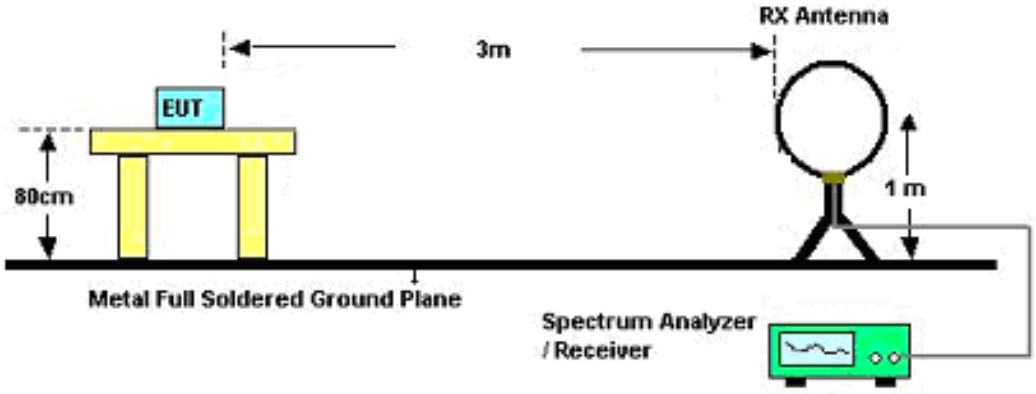
Receiver Parameter	Setting
Attenuation	Auto
Start ~ Stop Frequency	9kHz~150kHz / RBW 200Hz for QP
Start ~ Stop Frequency	150kHz~30MHz / RBW 9kHz for QP
Start ~ Stop Frequency	30MHz~1GHz / RBW 120kHz for QP

4.5.3. Test Procedures

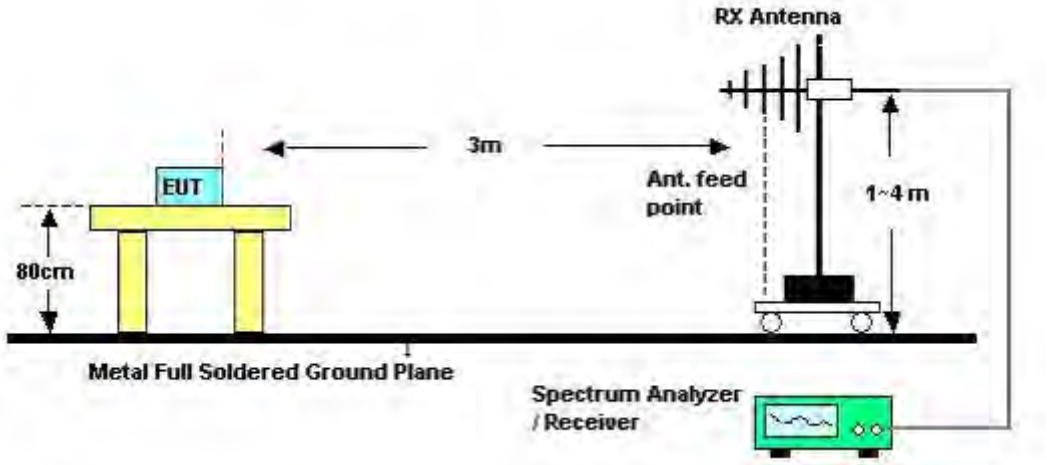
1. Configure the EUT according to ANSI C63.10. The EUT was placed on the top of the turntable 1.5 meter above ground. The phase center of the receiving antenna mounted on the top of a height-variable antenna tower was placed 1m & 3m far away from the turntable.
2. Power on the EUT and all the supporting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

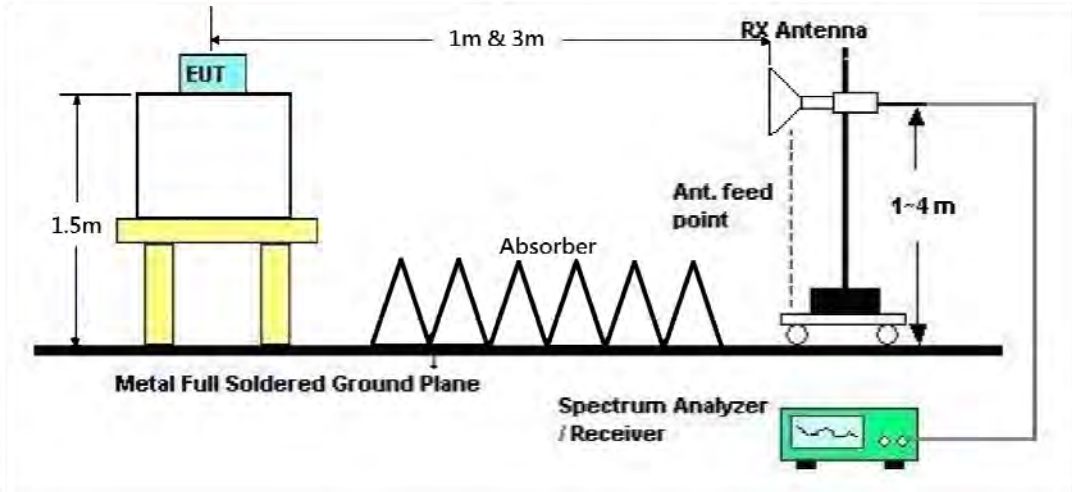
For Radiated Emissions: 9kHz ~30MHz



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	26°C	Humidity	68%
Test Engineer	Gino Huang	Configurations	CTX
Test Date	May 04, 2015	Test Mode	Mode 1

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

Note:

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

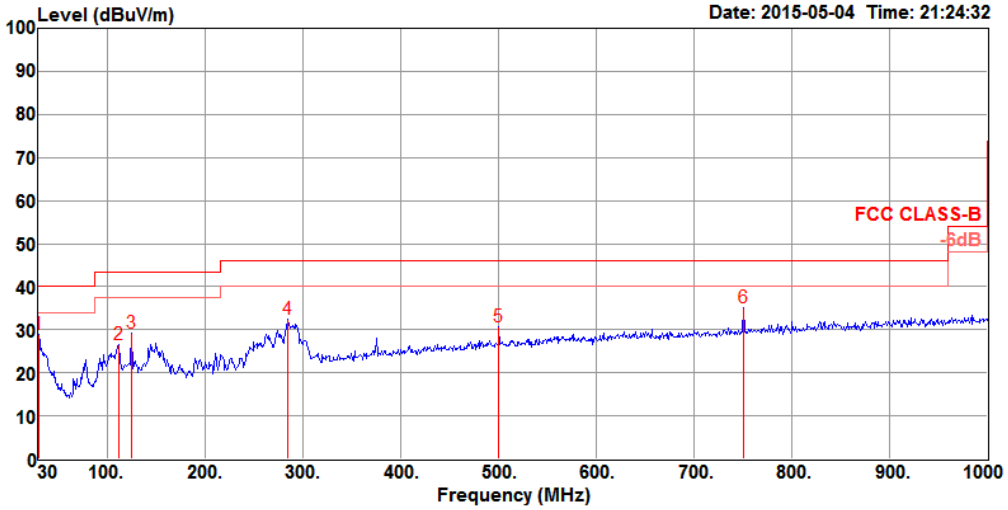
Distance extrapolation factor = 40 log (specific distance / test distance) (dB);

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

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

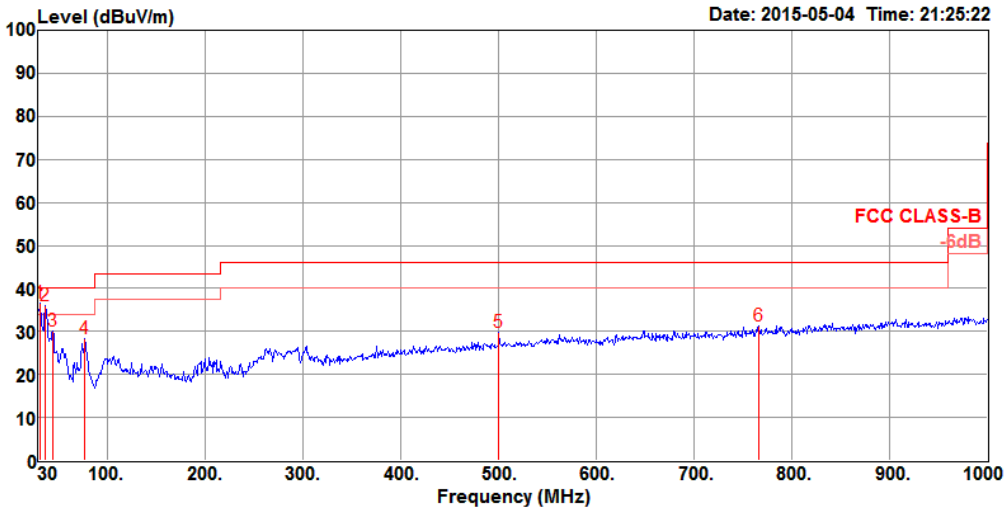
Temperature	26°C	Humidity	68%
Test Engineer	Gino Huang	Configurations	CTX
Test Mode	Mode 1		

Horizontal



	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	30.00	28.80	40.00	-11.20	40.30	0.64	20.10	32.24	300	342	Peak	HORIZONTAL
2	111.48	26.43	43.50	-17.07	45.32	0.99	12.39	32.27	300	64	Peak	HORIZONTAL
3	125.06	29.21	43.50	-14.29	47.68	1.04	12.75	32.26	300	99	Peak	HORIZONTAL
4	284.14	32.33	46.00	-13.67	49.43	1.46	13.58	32.14	100	113	Peak	HORIZONTAL
5	500.45	30.57	46.00	-15.43	43.02	1.90	17.80	32.15	150	233	Peak	HORIZONTAL
6	750.71	35.02	46.00	-10.98	44.46	2.22	20.41	32.07	100	214	Peak	HORIZONTAL

Vertical



	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	31.94	36.65	40.00	-3.35	49.37	0.64	18.88	32.24	125	260	Peak	VERTICAL
2	36.79	35.97	40.00	-4.03	51.60	0.65	15.98	32.26	100	143	Peak	VERTICAL
3	44.55	30.05	40.00	-9.95	50.07	0.68	11.54	32.24	200	152	Peak	VERTICAL
4	77.53	28.23	40.00	-11.77	52.15	0.84	7.41	32.17	125	163	Peak	VERTICAL
5	500.45	29.75	46.00	-16.25	42.19	1.90	17.81	32.15	100	188	Peak	VERTICAL
6	766.23	31.37	46.00	-14.63	40.68	2.25	20.53	32.09	150	295	Peak	VERTICAL

Note:

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

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

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

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

For RF transceiver sources (QCA9890):

Temperature	26°C	Humidity	68%
Test Engineer	Gino Huang	Configurations	IEEE 802.11b CH 1 / Chain 1 + Chain 2 + Chain 3
Test Date	Apr. 24, 2015		

Horizontal

	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	4823.92	36.61	54.00	-17.39	34.53	4.10	32.56	34.58	85	133	Average	HORIZONTAL
2	4824.08	45.22	74.00	-28.78	43.14	4.10	32.56	34.58	85	133	Peak	HORIZONTAL

Vertical

	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	4823.94	32.04	54.00	-21.96	29.96	4.10	32.56	34.58	185	141	Average	VERTICAL
2	4824.20	44.12	74.00	-29.88	42.04	4.10	32.56	34.58	185	141	Peak	VERTICAL

Temperature	26℃	Humidity	68%
Test Engineer	Gino Huang	Configurations	IEEE 802.11b CH 6 / Chain 1 + Chain 2 + Chain 3
Test Date	Apr. 24, 2015		

Horizontal

	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	4874.00	41.86	54.00	-12.14	39.64	4.13	32.66	34.57	81	117	Average	HORIZONTAL
2	4874.07	48.22	74.00	-25.78	46.00	4.13	32.66	34.57	81	117	Peak	HORIZONTAL
3	7309.83	49.76	74.00	-24.24	42.42	5.09	37.07	34.82	114	186	Peak	HORIZONTAL
4	7309.92	38.73	54.00	-15.27	31.39	5.09	37.07	34.82	114	186	Average	HORIZONTAL
5	12179.06	40.12	54.00	-13.88	29.65	6.65	38.58	34.76	97	127	Average	HORIZONTAL
6	12180.32	53.52	74.00	-20.48	43.05	6.65	38.58	34.76	97	127	Peak	HORIZONTAL

Vertical

	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	4873.96	48.12	74.00	-25.88	45.90	4.13	32.66	34.57	184	169	Peak	VERTICAL
2	4874.03	41.05	54.00	-12.95	38.83	4.13	32.66	34.57	184	169	Average	VERTICAL
3	7311.76	50.79	74.00	-23.21	43.46	5.09	37.07	34.83	10	167	Peak	VERTICAL
4	7311.92	40.15	54.00	-13.85	32.82	5.09	37.07	34.83	10	167	Average	VERTICAL
5	12182.78	53.47	74.00	-20.53	42.98	6.65	38.58	34.74	23	121	Peak	VERTICAL
6	12184.12	41.06	54.00	-12.94	30.57	6.65	38.58	34.74	23	121	Average	VERTICAL

Temperature	26℃	Humidity	68%
Test Engineer	Gino Huang	Configurations	IEEE 802.11b CH 11 / Chain 1 + Chain 2 + Chain 3
Test Date	Apr. 24, 2015		

Horizontal

	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	4924.00	45.55	74.00	-28.45	43.19	4.15	32.76	34.55	198	150	Peak	HORIZONTAL
2	4924.00	35.35	54.00	-18.65	32.99	4.15	32.76	34.55	198	150	Average	HORIZONTAL

Vertical

	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	4924.00	36.91	54.00	-17.09	34.55	4.15	32.76	34.55	331	166	Average	VERTICAL
2	4924.06	45.78	74.00	-28.22	43.42	4.15	32.76	34.55	331	166	Peak	VERTICAL

Temperature	26℃	Humidity	68%
Test Engineer	Gino Huang	Configurations	IEEE 802.11g CH 1 / Chain 1 + Chain 2 + Chain 3
Test Date	Apr. 18, 2015		

Horizontal

	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	4819.80	52.71	74.00	-21.29	50.63	4.10	32.56	34.58	152	156	Peak	HORIZONTAL
2	4821.00	35.81	54.00	-18.19	33.73	4.10	32.56	34.58	152	156	Average	HORIZONTAL

Vertical

	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	4819.00	35.09	54.00	-18.91	33.01	4.10	32.56	34.58	288	151	Average	VERTICAL
2	4819.70	52.89	74.00	-21.11	50.81	4.10	32.56	34.58	288	151	Peak	VERTICAL

Temperature	26℃	Humidity	68%
Test Engineer	Gino Huang	Configurations	IEEE 802.11g CH 6 / Chain 1 + Chain 2 + Chain 3
Test Date	Apr. 24, 2015		

Horizontal

	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	4874.06	36.01	54.00	-17.99	33.79	4.13	32.66	34.57	92	143	Average	HORIZONTAL
2	4874.20	47.94	74.00	-26.06	45.72	4.13	32.66	34.57	92	143	Peak	HORIZONTAL

Vertical

	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	4869.34	31.20	54.00	-22.80	28.98	4.13	32.66	34.57	94	117	Average	VERTICAL
2	4878.46	44.61	74.00	-29.39	42.39	4.13	32.66	34.57	94	118	Peak	VERTICAL

Temperature	26℃	Humidity	68%
Test Engineer	Gino Huang	Configurations	IEEE 802.11g CH 11 / Chain 1 + Chain 2 + Chain 3
Test Date	Apr. 18, 2015		

Horizontal

	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	4909.90	44.09	74.00	-29.91	41.78	4.14	32.73	34.56	263	159	Peak	HORIZONTAL
2	4940.30	30.79	54.00	-23.21	28.37	4.16	32.80	34.54	263	159	Average	HORIZONTAL

Vertical

	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	4938.40	30.79	54.00	-23.21	28.38	4.16	32.80	34.55	191	184	Average	VERTICAL
2	4948.50	43.48	74.00	-30.52	41.06	4.16	32.80	34.54	191	184	Peak	VERTICAL

Temperature	26℃	Humidity	68%
Test Engineer	Gino Huang	Configurations	IEEE 802.11n MCS0 HT20 CH 1 / Chain 1 + Chain 2 + Chain 3
Test Date	Apr. 18, 2015		

Horizontal

	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	4829.30	34.15	54.00	-19.85	32.07	4.10	32.56	34.58	291	150	Average	HORIZONTAL
2	4837.60	46.74	74.00	-27.26	44.62	4.11	32.59	34.58	291	150	Peak	HORIZONTAL

Vertical

	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	4799.70	44.67	74.00	-29.33	42.65	4.09	32.52	34.59	186	150	Peak	VERTICAL
2	4831.10	32.48	54.00	-21.52	30.40	4.10	32.56	34.58	186	150	Average	VERTICAL

Temperature	26℃	Humidity	68%
Test Engineer	Gino Huang	Configurations	IEEE 802.11n MCS0 HT20 CH 6 / Chain 1 + Chain 2 + Chain 3
Test Date	Apr. 24, 2015		

Horizontal

	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	4873.36	43.84	74.00	-30.16	41.62	4.13	32.66	34.57	144	114	Peak	HORIZONTAL
2	4875.02	31.18	54.00	-22.82	28.96	4.13	32.66	34.57	144	114	Average	HORIZONTAL

Vertical

	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	4871.42	43.83	74.00	-30.17	41.61	4.13	32.66	34.57	174	128	Peak	VERTICAL
2	4876.48	31.28	54.00	-22.72	29.06	4.13	32.66	34.57	172	128	Average	VERTICAL

Temperature	26℃	Humidity	68%
Test Engineer	Gino Huang	Configurations	IEEE 802.11n MCS0 HT20 CH 11 / Chain 1 + Chain 2 + Chain 3
Test Date	Apr. 18, 2015		

Horizontal

	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	4916.10	43.09	74.00	-30.91	40.77	4.14	32.73	34.55	61	183	Peak	HORIZONTAL
2	4936.00	30.76	54.00	-23.24	28.35	4.16	32.80	34.55	61	183	Average	HORIZONTAL

Vertical

	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	4934.10	30.65	54.00	-23.35	28.29	4.15	32.76	34.55	125	153	Average	VERTICAL
2	4940.50	44.41	74.00	-29.59	41.99	4.16	32.80	34.54	125	153	Peak	VERTICAL

Temperature	26℃	Humidity	68%
Test Engineer	Gino Huang	Configurations	IEEE 802.11n MCS0 HT40 CH 3 / Chain 1 + Chain 2 + Chain 3
Test Date	Apr. 18, 2015		

Horizontal

	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	4803.40	44.34	74.00	-29.66	42.32	4.09	32.52	34.59	93	162	Peak	HORIZONTAL
2	4841.10	30.29	54.00	-23.71	28.17	4.11	32.59	34.58	93	162	Average	HORIZONTAL

Vertical

	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	4801.50	43.37	74.00	-30.63	41.35	4.09	32.52	34.59	131	145	Peak	VERTICAL
2	4806.50	30.25	54.00	-23.75	28.23	4.09	32.52	34.59	131	145	Average	VERTICAL

Temperature	26℃	Humidity	68%
Test Engineer	Gino Huang	Configurations	IEEE 802.11n MCS0 HT40 CH 6 / Chain 1 + Chain 2 + Chain 3
Test Date	Apr. 18, 2015		

Horizontal

	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	4871.20	43.61	74.00	-30.39	41.39	4.13	32.66	34.57	146	121	Peak	HORIZONTAL
2	4874.00	30.35	54.00	-23.65	28.13	4.13	32.66	34.57	146	121	Average	HORIZONTAL

Vertical

	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	4866.00	30.26	54.00	-23.74	28.09	4.12	32.62	34.57	36	146	Average	VERTICAL
2	4866.12	42.48	74.00	-31.52	40.31	4.12	32.62	34.57	36	146	Peak	VERTICAL

Temperature	26℃	Humidity	68%
Test Engineer	Gino Huang	Configurations	IEEE 802.11n MCS0 HT40 CH 9 / Chain 1 + Chain 2 + Chain 3
Test Date	Apr. 18, 2015		

Horizontal

	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	4897.44	30.17	54.00	-23.83	27.91	4.13	32.69	34.56	66	163	Average	HORIZONTAL
2	4910.64	43.26	74.00	-30.74	40.95	4.14	32.73	34.56	66	163	Peak	HORIZONTAL

Vertical

	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	4907.12	30.12	54.00	-23.88	27.81	4.14	32.73	34.56	106	148	Average	VERTICAL
2	4913.32	43.57	74.00	-30.43	41.26	4.14	32.73	34.56	106	148	Peak	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.

For RF transceiver sources (QCA9880):

Temperature	26°C	Humidity	68%
Test Engineer	Gino Huang	Configurations	IEEE 802.11g CH 6 / Chain 1 + Chain 2 + Chain 3
Test Date	May 14, 2015		

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	4863.10	49.72	74.00	-24.28	46.84	5.40	32.79	35.31	169	123	HORIZONTAL	Peak
2	4872.96	38.00	54.00	-16.00	35.11	5.40	32.80	35.31	169	123	HORIZONTAL	Average
3	7304.59	60.89	74.00	-13.11	52.10	7.03	37.12	35.36	164	333	HORIZONTAL	Peak
4	7314.05	48.45	54.00	-5.55	39.64	7.05	37.12	35.36	164	333	HORIZONTAL	Average

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	4872.00	34.91	54.00	-19.09	32.02	5.40	32.80	35.31	220	311	VERTICAL	Average
2	4873.12	46.54	74.00	-27.46	43.65	5.40	32.80	35.31	220	311	VERTICAL	Peak
3	7306.99	43.82	54.00	-10.18	35.01	7.05	37.12	35.36	234	22	VERTICAL	Average
4	7307.23	56.41	74.00	-17.59	47.60	7.05	37.12	35.36	234	22	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.

4.6. 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 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 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

For RF transceiver sources (QCA9890):

Temperature	26°C	Humidity	68%
Test Engineer	Gino Huang	Configurations	IEEE 802.11b CH 1, 6, 11 / Chain 1 + Chain 2 + Chain 3
Test Date	Apr. 24, 2015		

Channel 1

	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	2386.80	60.19	74.00	-13.81	29.41	2.86	27.92	0.00	71	123	Peak	HORIZONTAL
2	2387.60	53.25	54.00	-0.75	22.47	2.86	27.92	0.00	71	123	Average	HORIZONTAL
3	2411.20	109.34			78.57	2.87	27.90	0.00	71	123	Peak	HORIZONTAL
4	2411.20	105.69			74.92	2.87	27.90	0.00	71	123	Average	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	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm		
1	2388.40	60.84	74.00	-13.16	30.06	2.86	27.92	0.00	92	123	Peak	HORIZONTAL
2	2388.40	53.53	54.00	-0.47	22.75	2.86	27.92	0.00	92	123	Average	HORIZONTAL
3	2436.40	112.08			81.32	2.88	27.88	0.00	92	123	Peak	HORIZONTAL
4	2436.40	108.45			77.69	2.88	27.88	0.00	92	123	Average	HORIZONTAL
5	2483.50	49.99	54.00	-4.01	19.26	2.91	27.82	0.00	92	123	Average	HORIZONTAL
6	2487.40	57.23	74.00	-16.77	26.50	2.91	27.82	0.00	92	123	Peak	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	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm		
1	2461.20	110.54			79.80	2.90	27.84	0.00	74	122	Peak	HORIZONTAL
2	2461.20	106.60			75.86	2.90	27.84	0.00	74	122	Average	HORIZONTAL
3	2483.50	59.49	74.00	-14.51	28.76	2.91	27.82	0.00	74	122	Peak	HORIZONTAL
4	2483.50	52.44	54.00	-1.56	21.71	2.91	27.82	0.00	74	122	Average	HORIZONTAL

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

Temperature	26℃	Humidity	68%
Test Engineer	Gino Huang	Configurations	IEEE 802.11g CH 1, 6, 11 / Chain 1 + Chain 2 + Chain 3
Test Date	Apr. 17, 2015 / Apr. 24, 2015		

Channel 1

	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	2390.00	71.14	74.00	-2.86	40.36	2.86	27.92	0.00	113	123	Peak	HORIZONTAL
2	2390.00	53.54	54.00	-0.46	22.76	2.86	27.92	0.00	113	123	Average	HORIZONTAL
3	2418.60	109.69			78.92	2.87	27.90	0.00	113	123	Peak	HORIZONTAL
4	2419.20	99.20			68.43	2.87	27.90	0.00	113	123	Average	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	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm		
1	2388.00	53.62	54.00	-0.38	22.84	2.86	27.92	0.00	73	129	Average	HORIZONTAL
2	2390.00	69.01	74.00	-4.99	38.23	2.86	27.92	0.00	73	129	Peak	HORIZONTAL
3	2438.60	113.67			82.92	2.89	27.86	0.00	73	129	Peak	HORIZONTAL
4	2439.00	102.26			71.51	2.89	27.86	0.00	73	129	Average	HORIZONTAL
5	2485.50	70.63	74.00	-3.37	39.90	2.91	27.82	0.00	73	129	Peak	HORIZONTAL
6	2486.30	53.03	54.00	-0.97	22.30	2.91	27.82	0.00	73	129	Average	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	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm		
1	2464.60	111.50			80.76	2.90	27.84	0.00	95	125	Peak	HORIZONTAL
2	2465.00	100.56			69.82	2.90	27.84	0.00	95	125	Average	HORIZONTAL
3	2483.50	70.26	74.00	-3.74	39.53	2.91	27.82	0.00	95	125	Peak	HORIZONTAL
4	2484.00	53.42	54.00	-0.58	22.69	2.91	27.82	0.00	95	125	Average	HORIZONTAL

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

Temperature	26℃	Humidity	68%
Test Engineer	Gino Huang	Configurations	IEEE 802.11n MCS0 HT20 CH 1, 6, 11 / Chain 1 + Chain 2 + Chain 3
Test Date	Apr. 17, 2015 / Apr. 24, 2015		

Channel 1

	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	2389.60	67.78	74.00	-6.22	37.00	2.86	27.92	0.00	100	118	Peak	HORIZONTAL
2	2390.00	53.65	54.00	-0.35	22.87	2.86	27.92	0.00	100	118	Average	HORIZONTAL
3	2407.20	107.73			76.96	2.87	27.90	0.00	100	118	Peak	HORIZONTAL
4	2408.00	98.15			67.38	2.87	27.90	0.00	100	118	Average	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	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm		
1	2388.80	65.86	74.00	-8.14	35.08	2.86	27.92	0.00	73	126	Peak	HORIZONTAL
2	2389.20	52.52	54.00	-1.48	21.74	2.86	27.92	0.00	73	126	Average	HORIZONTAL
3	2431.80	100.85			70.09	2.88	27.88	0.00	73	126	Average	HORIZONTAL
4	2433.80	111.67			80.91	2.88	27.88	0.00	73	126	Peak	HORIZONTAL
5	2485.10	69.74	74.00	-4.26	39.01	2.91	27.82	0.00	73	126	Peak	HORIZONTAL
6	2485.10	52.80	54.00	-1.20	22.07	2.91	27.82	0.00	73	126	Average	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	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm		
1	2455.00	96.93			66.19	2.90	27.84	0.00	89	126	Average	HORIZONTAL
2	2455.60	106.97			76.23	2.90	27.84	0.00	89	126	Peak	HORIZONTAL
3	2483.50	53.66	54.00	-0.34	22.93	2.91	27.82	0.00	89	126	Average	HORIZONTAL
4	2484.20	70.35	74.00	-3.65	39.62	2.91	27.82	0.00	89	126	Peak	HORIZONTAL

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

Temperature	26℃	Humidity	68%
Test Engineer	Gino Huang	Configurations	IEEE 802.11n MCS0 HT40 CH 3, 6, 9 / Chain 1 + Chain 2 + Chain 3
Test Date	Apr. 17, 2015		

Channel 3

	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	2388.80	53.36	54.00	-0.64	22.58	2.86	27.92	0.00	88	161	Average	HORIZONTAL
2	2390.00	66.05	74.00	-7.95	35.27	2.86	27.92	0.00	88	161	Peak	HORIZONTAL
3	2428.00	103.57			72.81	2.88	27.88	0.00	88	161	Peak	HORIZONTAL
4	2428.00	93.61			62.85	2.88	27.88	0.00	88	161	Average	HORIZONTAL

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	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm		
1	2387.00	60.79	74.00	-13.21	30.01	2.86	27.92	0.00	90	127	Peak	HORIZONTAL
2	2388.20	45.89	54.00	-8.11	15.11	2.86	27.92	0.00	90	127	Average	HORIZONTAL
3	2442.20	108.06			77.31	2.89	27.86	0.00	90	127	Peak	HORIZONTAL
4	2443.40	96.95			66.20	2.89	27.86	0.00	90	127	Average	HORIZONTAL
5	2483.50	68.36	74.00	-5.64	37.63	2.91	27.82	0.00	90	127	Peak	HORIZONTAL
6	2483.50	53.40	54.00	-0.60	22.67	2.91	27.82	0.00	90	127	Average	HORIZONTAL

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	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm		
1	2448.00	94.91			64.16	2.89	27.86	0.00	88	161	Average	HORIZONTAL
2	2448.40	104.57			73.82	2.89	27.86	0.00	88	161	Peak	HORIZONTAL
3	2487.60	53.72	54.00	-0.28	23.00	2.92	27.80	0.00	88	161	Average	HORIZONTAL
4	2489.20	68.56	74.00	-5.44	37.84	2.92	27.80	0.00	88	161	Peak	HORIZONTAL

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

Note:

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

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

For RF transceiver sources (QCA9880):

Temperature	26°C	Humidity	68%
Test Engineer	Gino Huang	Configurations	IEEE 802.11g CH 6 / Chain 1 + Chain 2 + Chain 3
Test Date	May 14, 2015		

Channel 6

	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	2387.00	65.05	74.00	-8.95	33.43	3.72	27.90	0.00	122	86	HORIZONTAL	Peak
2	2390.00	50.19	54.00	-3.81	18.57	3.72	27.90	0.00	122	86	HORIZONTAL	Average
3	2442.45	102.53			70.86	3.77	27.90	0.00	122	86	HORIZONTAL	Average
4	2443.09	113.17			81.48	3.79	27.90	0.00	122	86	HORIZONTAL	Peak
5	2486.36	53.74	54.00	-0.26	22.03	3.81	27.90	0.00	122	86	HORIZONTAL	Average
6	2487.32	68.46	74.00	-5.54	36.75	3.81	27.90	0.00	122	86	HORIZONTAL	Peak

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

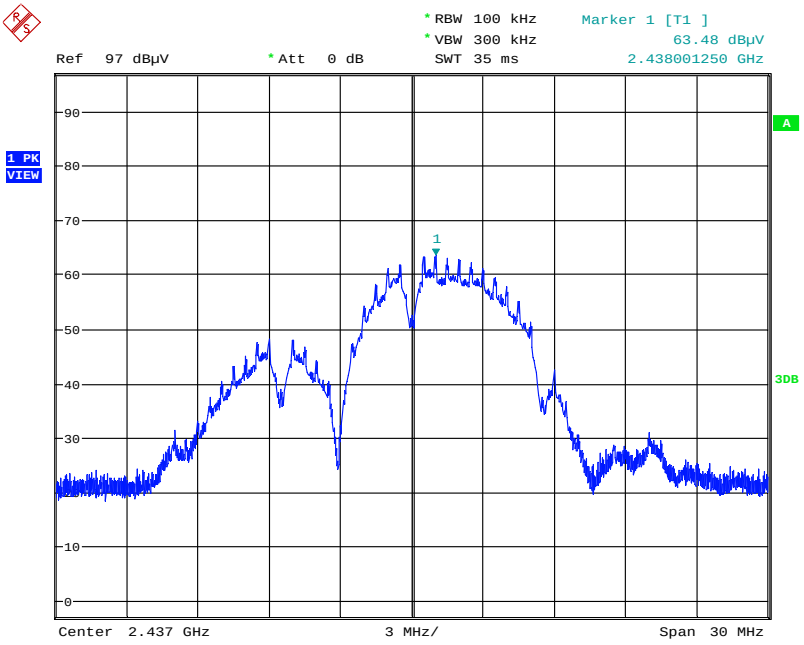
Note:

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

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

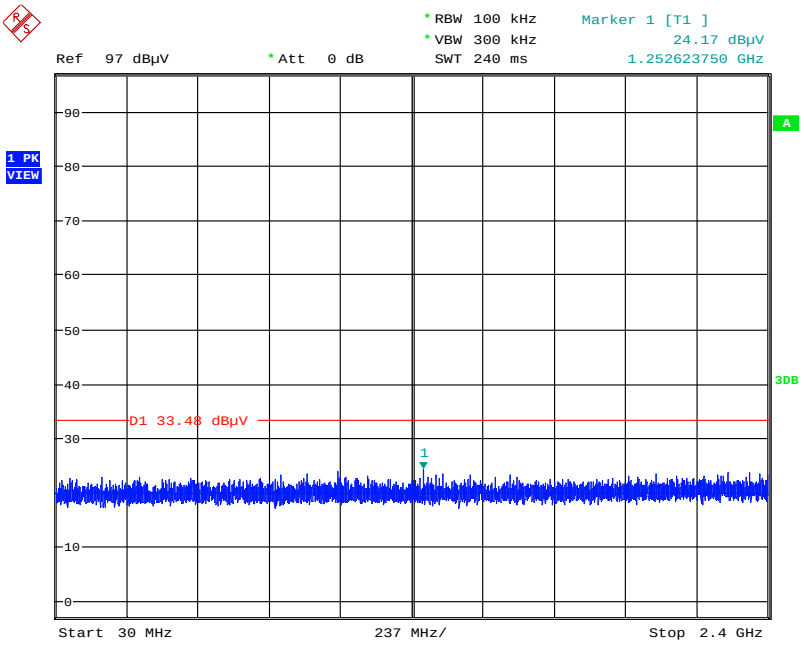
For Emission not in Restricted Band

Plot on Configuration IEEE 802.11b / Reference Level



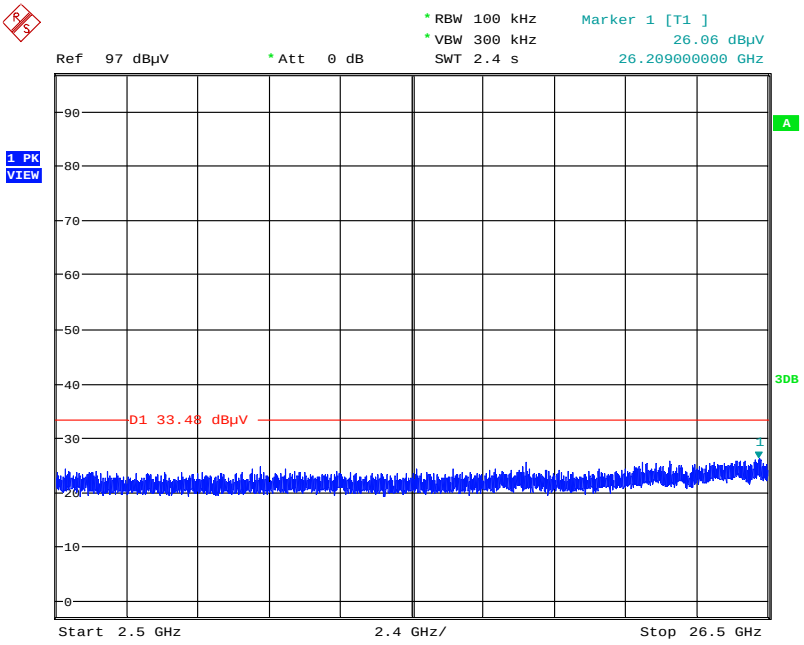
Date: 20.APR.2015 12:00:21

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



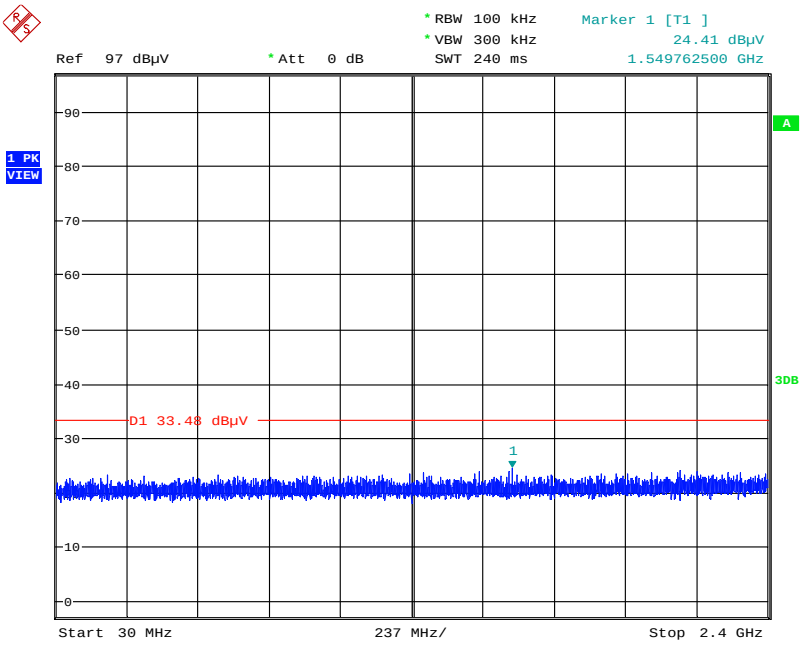
Date: 20.APR.2015 12:02:07

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



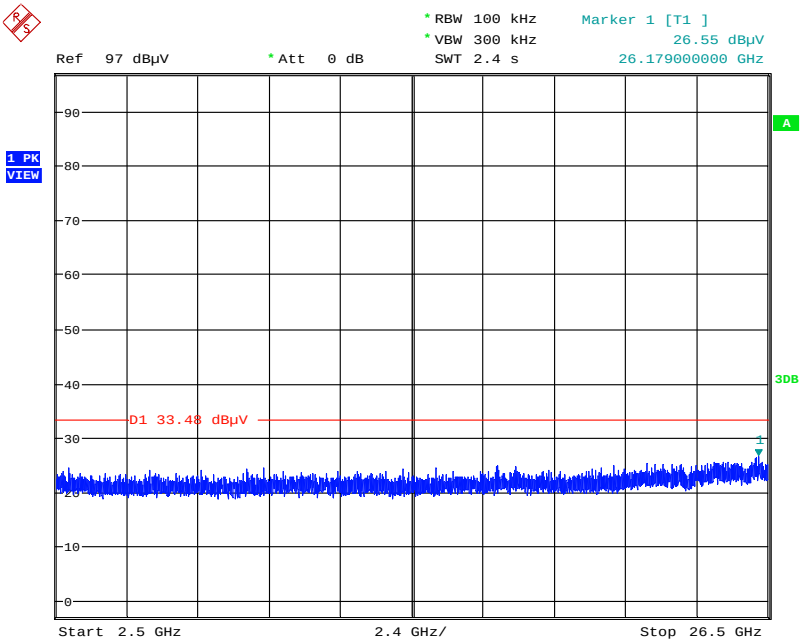
Date: 20.APR.2015 12:04:11

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



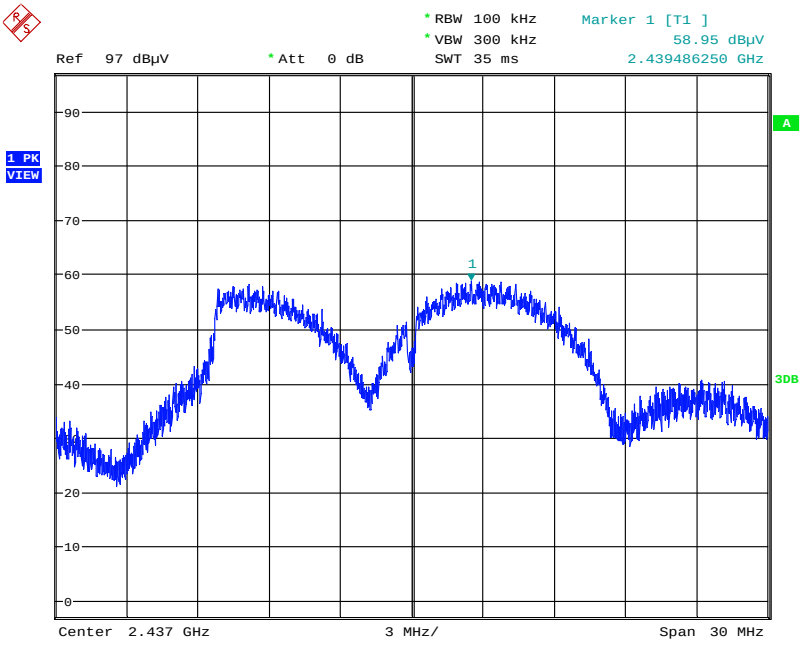
Date: 20.APR.2015 12:06:20

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



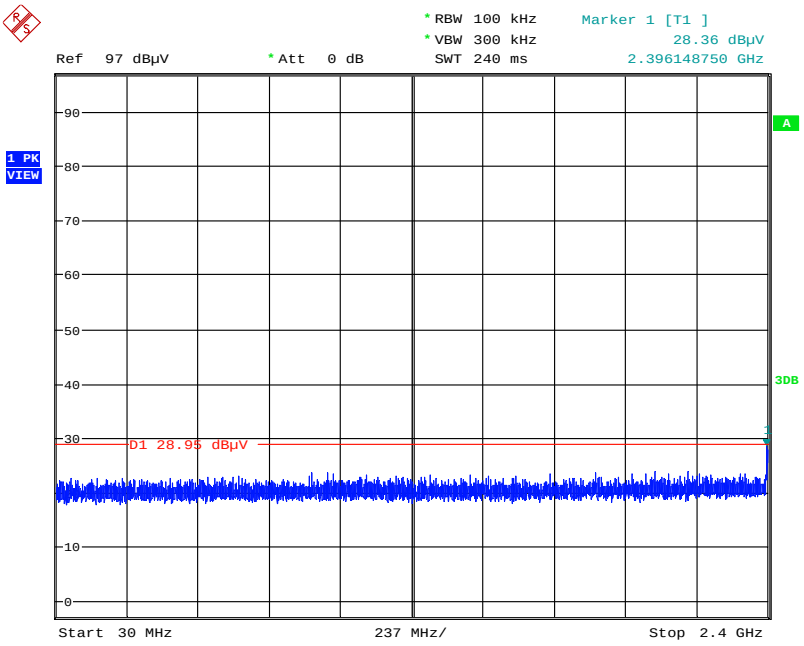
Date: 20.APR.2015 12:07:15

Plot on Configuration IEEE 802.11g / Reference Level



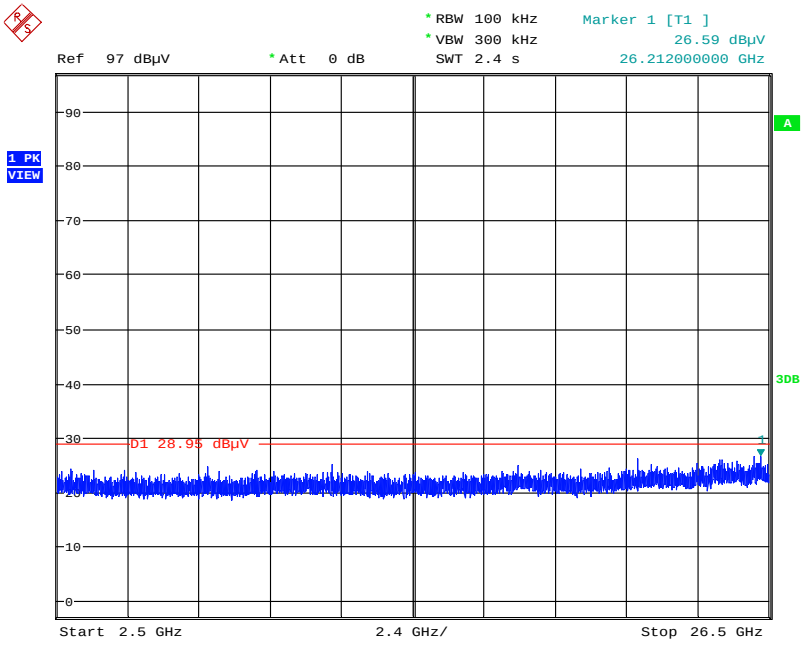
Date: 20.APR.2015 12:10:44

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



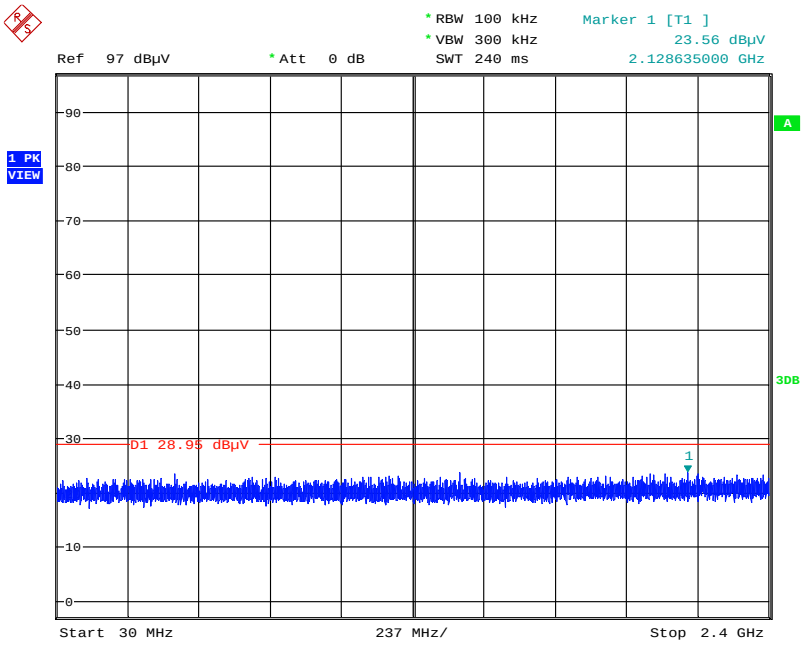
Date: 20.APR.2015 12:12:42

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



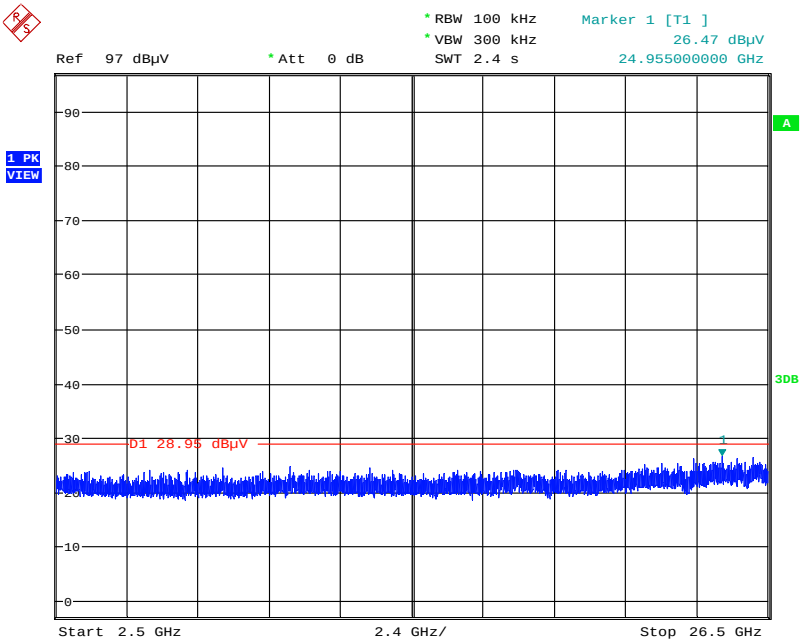
Date: 20.APR.2015 12:13:37

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



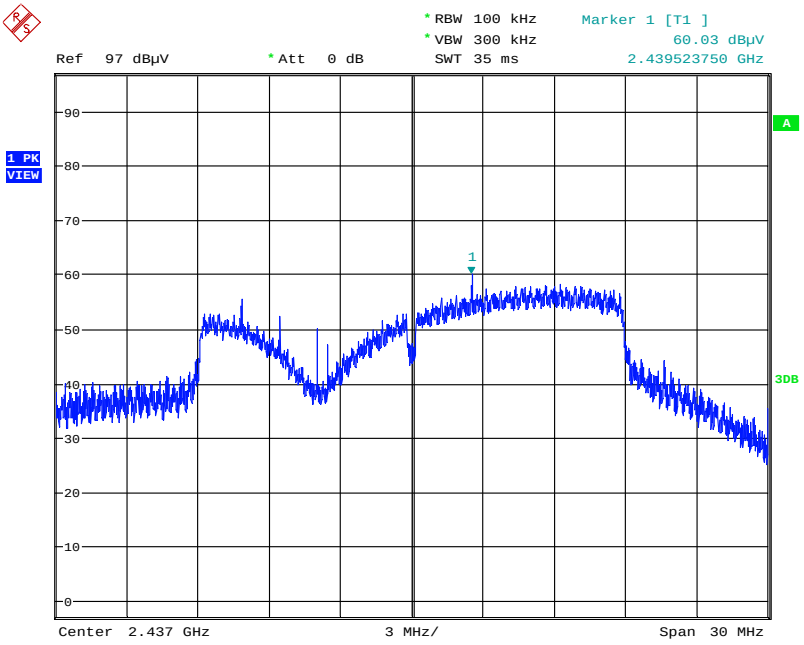
Date: 20.APR.2015 12:14:28

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



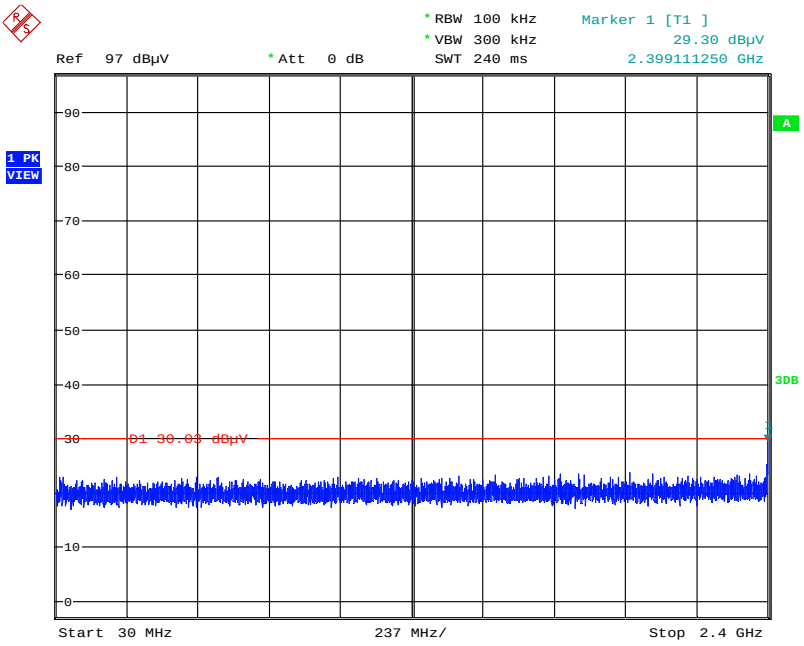
Date: 20.APR.2015 12:15:05

Plot on Configuration IEEE 802.11n MCS0 HT20 / Reference Level



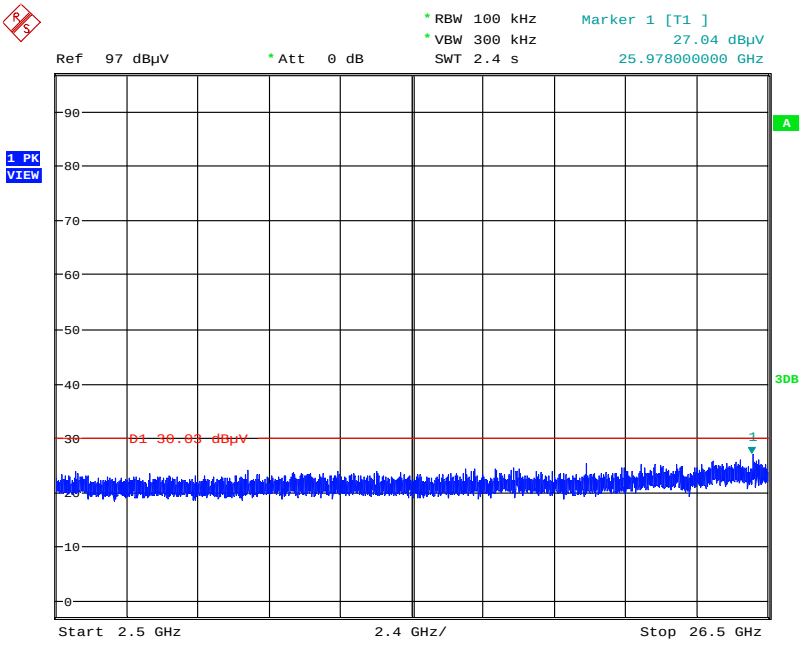
Date: 20.APR.2015 12:18:52

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



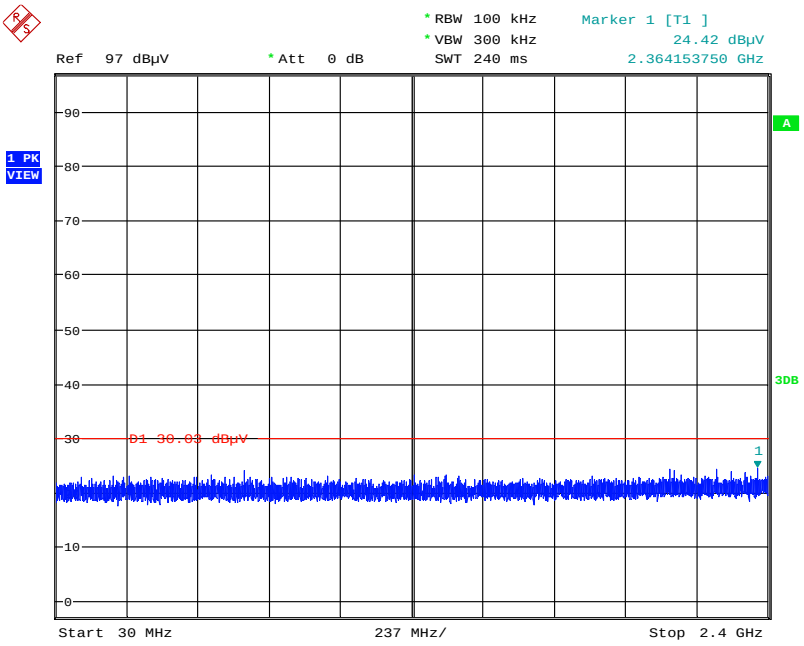
Date: 20.APR.2015 12:20:06

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



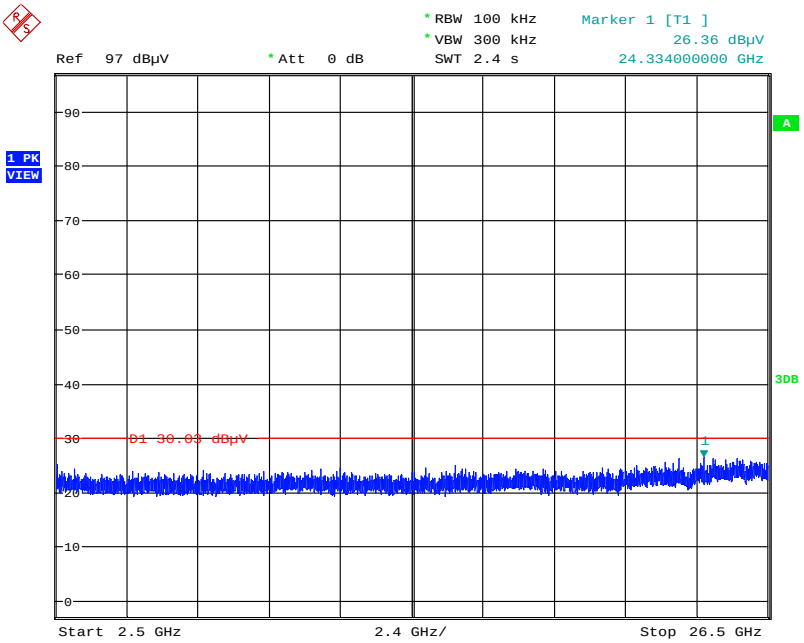
Date: 20.APR.2015 12:20:40

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



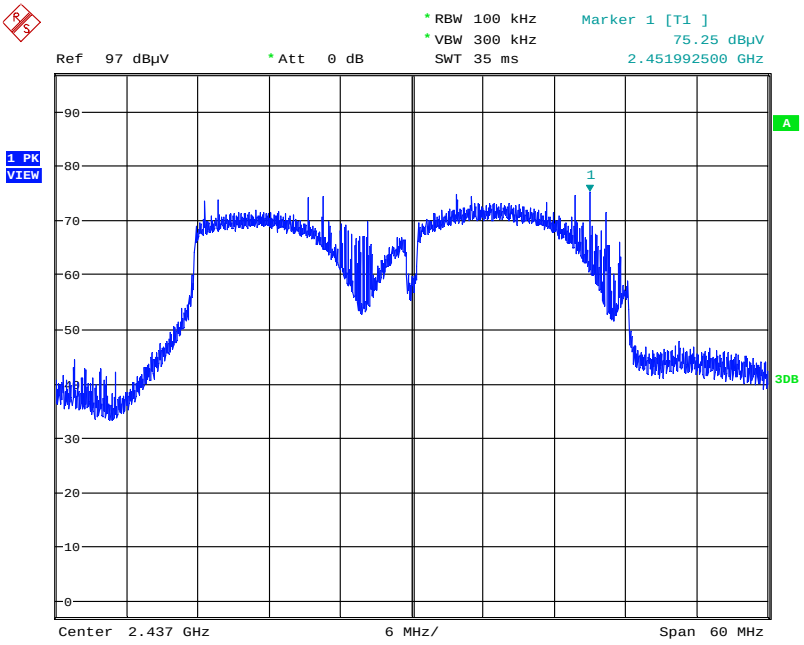
Date: 20.APR.2015 12:21:26

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



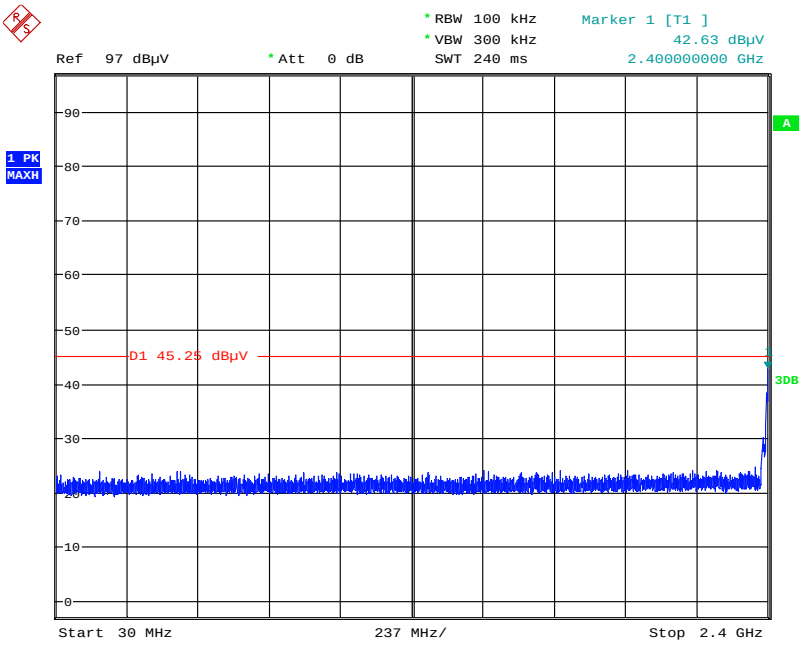
Date: 20.APR.2015 12:22:08

Plot on Configuration IEEE 802.11n MCS0 HT40 / Reference Level



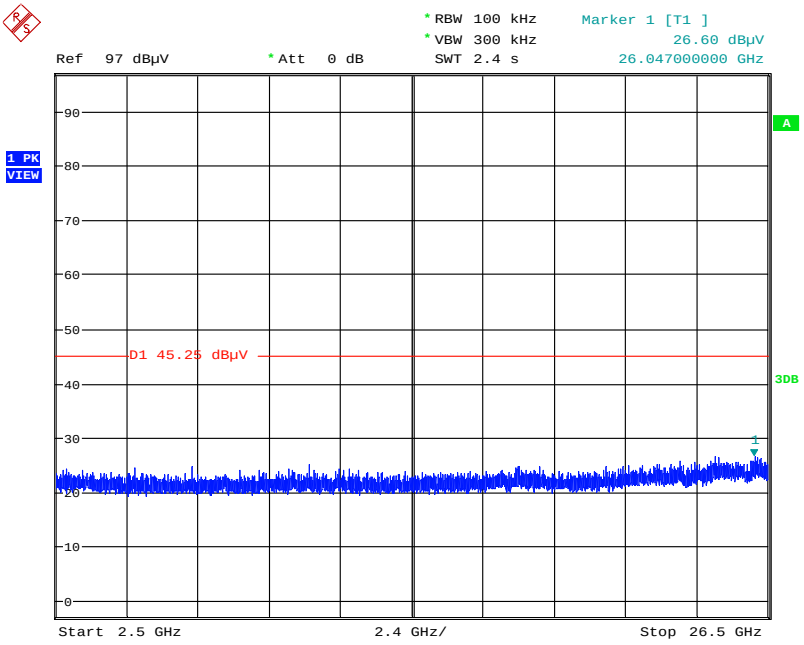
Date: 20.APR.2015 12:41:39

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



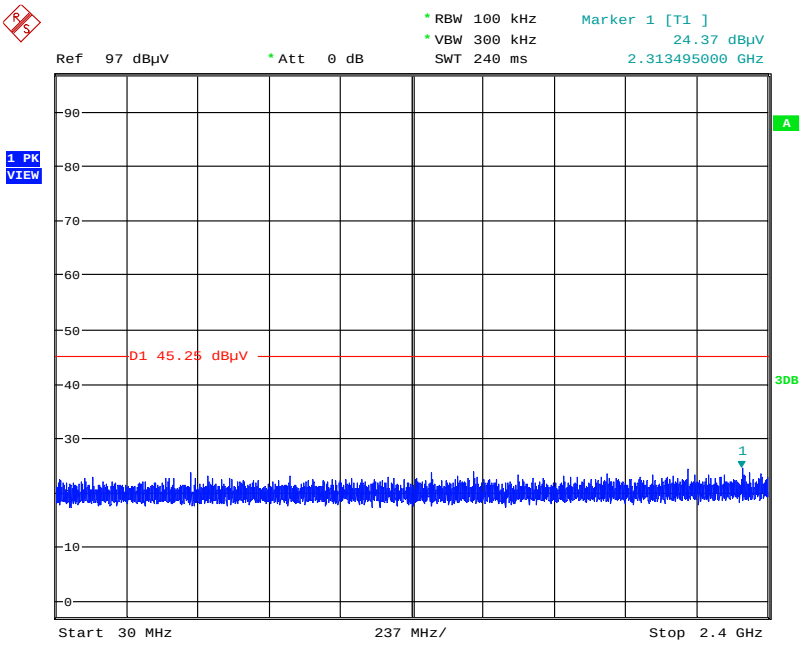
Date: 20.APR.2015 12:44:08

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



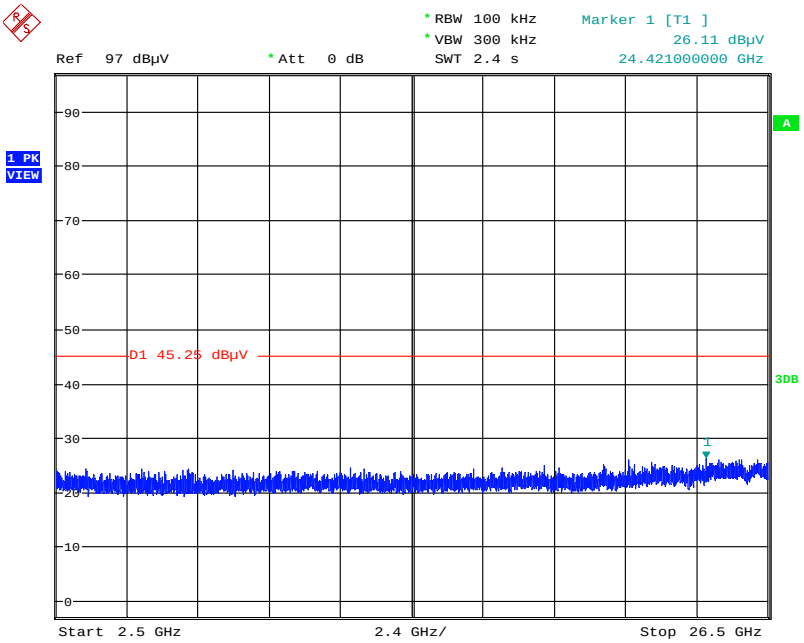
Date: 20.APR.2015 12:45:24

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



Date: 20.APR.2015 12:46:43

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



Date: 20.APR.2015 12:47:36

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. 03, 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	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	Feb. 24, 2015	Radiation (03CH01-CB)
Pre-Amplifier	Agilent	8449B	3008A02310	1GHz ~ 26.5GHz	Jan. 12, 2015	Radiation (03CH01-CB)
Pre-Amplifier	WM	TF-130N-R1	923365	26GHz ~ 40GHz	Nov. 25, 2014	Radiation (03CH01-CB)
Spectrum Analyzer	R&S	FSP40	100056	9kHz ~ 40GHz	Nov. 06, 2014	Radiation (03CH01-CB)
EMI Test Receiver	Agilent	N9038A	MY52260123	9kHz ~ 8GHz	Jan. 21, 2015	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-16	N/A	1 GHz ~ 18 GHz	Nov. 15, 2014	Radiation (03CH01-CB)
RF Cable-high	Woken	High Cable-17	N/A	1 GHz ~ 18 GHz	Nov. 15, 2014	Radiation (03CH01-CB)
RF Cable-high	Woken	High Cable-40G-1	N/A	1 GHz ~ 40 GHz	Nov. 15, 2014	Radiation (03CH01-CB)
RF Cable-high	Woken	High Cable-40G-2	N/A	1 GHz ~ 40 GHz	Nov. 15, 2014	Radiation (03CH01-CB)
Thermometer	HTC-1	HTC-1	TP-1	-50℃~70℃	Mar. 11, 2015	Radiation (03CH01-CB)
Spectrum analyzer	R&S	FSV40	100979	9kHz~40GHz	Dec. 12, 2014	Conducted (TH01-CB)
RF Power Divider	Woken	2 Way	TH01-DV-02	1GHz ~ 6GHz	Jan. 10, 2015	Conducted (TH01-CB)
RF Power Divider	Woken	4 Way	TH01-DV-01	1GHz ~ 6GHz	Jan. 10, 2015	Conducted (TH01-CB)
RF Cable-high	Woken	RG402	High Cable-7	1 GHz – 26.5 GHz	Nov. 15, 2014	Conducted (TH01-CB)
RF Cable-high	Woken	RG402	High Cable-8	1 GHz – 26.5 GHz	Nov. 15, 2014	Conducted (TH01-CB)
RF Cable-high	Woken	RG402	High Cable-9	1 GHz – 26.5 GHz	Nov. 15, 2014	Conducted (TH01-CB)
RF Cable-high	Woken	RG402	High Cable-10	1 GHz – 26.5 GHz	Nov. 15, 2014	Conducted (TH01-CB)
RF Cable-high	Woken	RG402	High Cable-6	1 GHz – 26.5 GHz	Nov. 15, 2014	Conducted (TH01-CB)
Power Sensor	Agilent	U2021XA	MY53410001	50MHz~18GHz	Nov. 03, 2014	Conducted (TH01-CB)

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Remark
Thermometer	HTC-1	HTC-1	TP-8	-50℃~70℃	Mar. 05, 2015	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%