FCC 47 CFR PART 15 SUBPART C

PERMISSIVE CLASS II TEST REPORT

For

HD Wirless N 360° Home Network Camera

Model: DCS-6010L

Trade Name: D-Link

Issued to

D Link Corporation
17595 Mt. Herrmann, Fountain Valley, California 92708, United States

Issued by

Compliance Certification Services Inc.
No.81-1, Lane 210, Bade 2nd Rd., Lujhu Township,
Taoyuan County 33841, Taiwan, R.O.C.
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Testing Laboratory
1309

Revision History

Rev.		Issue Date		Revisions	Effect Page	Revised By
00		July 10, 2012		Initial Issue	All	Jill Shiau
01		October 31, 2014		See following note Rev.(01)	All	Landy Huang

Note:
Rev.(01)：

1. Applicant adds keypart (Antenna) to re-test.
(Please refer to have ** mark items on this report)
2. Other information, please refer to the T120601J01 and this test report.

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1 TEST RESULT CERTIFICATION

Applicant:	**D Link Corporation** 17595 Mt. Herrmann, Fountain Valley, California 92708, United States
Manufacturer:	**Appro Technology Inc.** 13F, No. 66, Zhongzheng Rd., Xinzhuang District, New Taipei City, Taiwan, R.O.C.
Equipment Under Test:	HD Wirless N 360° Home Network Camera
Trade Name:	D-Link
Model:	DCS-6010L
Date of Test:	July 22 ~ October 24, 2014

APPLICABLE STANDARDS	
STANDARD	**TEST RESULT**
FCC 47 CFR Part 15 Subpart C	No non-compliance noted

We hereby certify that:

Compliance Certification Services Inc. tested the above equipment in accordance with the requirements set forth in the above standards. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.

The test results of this report relate only to the tested sample identified in this report.

Approved by:

Stan Lin
Section Manager

Reviewed by:

Angel Hu
Section Manager

2 EUT DESCRIPTION

Product	HD Wirless N 360° Home Network Camera		
Trade Name	D-Link		
Model Number	DCS-6010L		
Model Discrepancy	N/A		
EUT Power Rating	5VDC, 1.2A		
Power Adapter	D-Link	**Model**	AMS1-0501200FU
RF Module Manufacturer	Realtek	**Model**	RTL8188CUS
Operating Frequency Range	IEEE 802.11 b/g/HT 20MHz: 2412 ~ 2462 MHz IEEE 802.11 HT 40MHz: 2422 ~ 2452 MHz		
Transmit Power	IEEE 802.11b mode: 13.72 dBm (0.0236W) IEEE 802.11g mode: 19.96 dBm (0.0991W) IEEE 802.11n HT20 mode: 20.21 dBm (0.1050W) IEEE 802.11n HT40 mode: 19.56 dBm (0.0904W)		
Modulation Technique	IEEE 802.11b mode: DSSS (1, 2, 5.5 and 11 Mpbs) IEEE 802.11g mode: OFDM (6, 9, 12, 18, 24, 36, 48 and 54 Mpbs) IEEE 802.11n HT20 mode: OFDM (6.5, 7.2, 13, 14.4, 14.44, 19.5, 21.7, 26, 28.89, 28.9, 39, 43.3, 43.33 52, 57.78, 57.8, 58.5, 65.0, 72.2, 78, 86.67, 104, 115.56, 117, 130, 144.44 Mbps) IEEE 802.11n HT40 mode: OFDM (13.5, 15, 27, 30, 40.5, 45, 54, 60, 81, 90, 108, 120, 121.5, 135, 150, 162, 180, 216, 240, 243, 270, 300 Mbps)		
Number of Channels	IEEE 802.11b/g mode: 11 Channels IEEE 802.11n HT20 mode: 11 Channels IEEE 802.11n HT40 mode: 7 Channels		
Antenna Specification	Multilayer Chip Antenna / Gain: 0.5dBi		
**	Dipole antenna / Gain: 2.4dBi		

Remark:

1. The sample selected for test was production product and was provided by manufacturer.

*2. This submittal(s) (test report) is intended for FCC ID: **KA2CS6010LA1** filing to comply with Section 15.207, 15.209 and 15.247 of the FCC Part 15, Subpart C Rules.*

3 TEST METHODOLOGY

The tests documented in this report were performed in accordance with ANSI C63.4: 2009 and FCC CFR 47 Part 15.207, 15.209, 15.247.

3.1 EUT CONFIGURATION

The EUT configuration for testing is installed on RF field strength measurement to meet the Commissions requirement and operating in a manner that intends to maximize its emission characteristics in a continuous normal application.

3.2 EUT EXERCISE

The EUT was operated in the engineering mode to fix the TX frequency that was for the purpose of the measurements.

According to its specifications, the EUT must comply with the requirements of the Section 15.207, 15.209 and 15.247 under the FCC Rules Part 15 Subpart C.

3.3 GENERAL TEST PROCEDURES

Conducted Emissions

The EUT is placed on the turntable, which is 0.8 m above ground plane. According to the requirements in Section 13.1.4.1 of ANSI C63.4 Conducted emissions from the EUT measured in the frequency range between 0.15 MHz and 30MHz using CISPR Quasi-peak and average detector modes.

Radiated Emissions

The EUT is placed on a turn table, which is 0.8 m above ground plane. The turntable shall rotate 360 degrees to determine the position of maximum emission level. EUT is set 3m away from the receiving antenna, which varied from 1m to 4m to find out the highest emission. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical. In order to find out the maximum emissions, exploratory radiated emission measurements were made according to the requirements in Section 13.1.4.1 of ANSI C63.4.

3.4 FCC PART 15.205 RESTRICTED BANDS OF OPERATIONS

(a) Except as shown in paragraph (d) of this section, only spurious emissions are permitted in any of the frequency bands listed below:

MHz	MHz	MHz	GHz
0.090 - 0.110	16.42 - 16.423	399.9 - 410	4.5 - 5.15
[1]0.495 - 0.505	16.69475 - 16.69525	608 - 614	5.35 - 5.46
2.1735 - 2.1905	16.80425 - 16.80475	960 - 1240	7.25 - 7.75
4.125 - 4.128	25.5 - 25.67	1300 - 1427	8.025 - 8.5
4.17725 - 4.17775	37.5 - 38.25	1435 - 1626.5	9.0 - 9.2
4.20725 - 4.20775	73 - 74.6	1645.5 - 1646.5	9.3 - 9.5
6.215 - 6.218	74.8 - 75.2	1660 - 1710	10.6 - 12.7
6.26775 - 6.26825	108 - 121.94	1718.8 - 1722.2	13.25 - 13.4
6.31175 - 6.31225	123 - 138	2200 - 2300	14.47 - 14.5
8.291 - 8.294	149.9 - 150.05	2310 - 2390	15.35 - 16.2
8.362 - 8.366	156.52475 -	2483.5 - 2500	17.7 - 21.4
8.37625 - 8.38675	156.52525	2655 - 2900	22.01 - 23.12
8.41425 - 8.41475	156.7 - 156.9	3260 - 3267	23.6 - 24.0
12.29 - 12.293	162.0125 - 167.17	3332 - 3339	31.2 - 31.8
12.51975 - 12.52025	167.72 - 173.2	3345.8 - 3358	36.43 - 36.5
12.57675 - 12.57725	240 - 285	3600 - 4400	([2])
13.36 - 13.41	322 - 335.4		

[1] Until February 1, 1999, this restricted band shall be 0.490-0.510 MHz.

[2] Above 38.6

(b) Except as provided in paragraphs (d) and (e), the field strength of emissions appearing within these frequency bands shall not exceed the limits shown in Section 15.209. At frequencies equal to or less than 1000 MHz, compliance with the limits in Section 15.209 shall be demonstrated using measurement instrumentation employing a CISPR quasi-peak detector. Above 1000 MHz, compliance with the emission limits in Section 15.209 shall be demonstrated based on the average value of the measured emissions. The provisions in Section 15.35 apply to these measurements.

3.5 DESCRIPTION OF TEST MODES

Software used to control the EUT for staying in continuous transmitting mode was programmed.

The worst case data rate is determined as the data rate with highest output power.
After verification, all tests were carried out with the worst case test modes as shown below except radiated spurious emission below 1GHz, which worst case was in normal link mode only.

IEEE 802.11b mode:

Channel Low (2412MHz), Channel Mid (2437MHz) and Channel High (2462MHz) with 1Mbps data rate was chosen for full testing.

IEEE 802.11g mode:

Channel Low (2412MHz), Channel Mid (2437MHz) and Channel High (2462MHz) with 6Mbps data rate was chosen for full testing.

IEEE 802.11n HT20 mode:

Channel Low (2412MHz), Channel Mid (2437MHz) and Channel High (2462MHz) with 13.5Mbps data rate were chosen for full testing.

IEEE 802.11n HT40 mode:

Channel Low (2422MHz), Channel Mid (2437MHz) and Channel High (2452MHz) with 13.5Mbps data rate were chosen for full testing.

4 INSTRUMENT CALIBRATION

4.1 MEASURING INSTRUMENT CALIBRATION

The measuring equipment, which was utilized in performing the tests documented herein, has been calibrated in accordance with the manufacturer's recommendations for utilizing calibration equipment, which is traceable to recognized national standards.

4.2 MEASUREMENT EQUIPMENT USED

Equipment Used for Emissions Measurement

Conducted Emissions Test Site				
Name of Equipment	**Manufacturer**	**Model**	**Serial Number**	**Calibration Due**
Spectrum Analyzer	Agilent	E4446A	MY48250064	01/01/2015
Spectrum Analyzer	Agilent	N9010A	MY52220817	03/20/2015
Spectrum Analyzer	R&S	FSL	100837	11/11/2014
Power meter	Anritsu	ML2495A	1033009	09/25/2015
Power Sensor	Anritsu	MA2411B	0917221	09/28/2015

3M Semi Anechoic Chamber				
Name of Equipment	**Manufacturer**	**Model**	**Serial Number**	**Calibration Due**
Spectrum Analyzer	Agilent	E4446A	MY48250064	01/01/2015
Spectrum Analyzer	R&S	FSL	100837	11/11/2014
Pre-Amplifier	HP	8447D	2944A06530	05/02/2015
Pre-Amplifier	EMEC	EM01M26G	060570	07/28/2015
Pre-Amplifier	MITEQ	AMF-6F-260400-40-8P	985646	06/12/2015
Pre-Amplifier	Agilent	8449B	3008A01738	08/11/2015
EMI Test Receiver	SCHAFFNER	SCR 3501	430	03/30/2015
Loop Antenna	EMCO	6502	8905-2356	09/23/2015
Bilog Antenna	TESEQ	CBL 6112D	35378	08/21/2015
Horn Antenna	EMCO	3115	00022250	08/05/2015
Horn Antenna	EMCO	3116	00026370	12/29/2014
Antenna Tower	CCS	CC-A-1F	N/A	N.C.R
Turn Table	CCS	CC-T-1F	N/A	N.C.R
Turn Table	CCS			

NOTE: *1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.*
2. N.C.R = No Calibration Request.

Powerline Conducted Emissions Test Site #4				
Name of Equipment	**Manufacturer**	**Model**	**Serial Number**	**Calibration Due**
EMI Test Receiver	R&S	ESCI	101300	08/31/2015
LISN	R&S	ENV216	100069	06/09/2015
LISN	FCC	FCC-LISN-50/250-16-2-07	06013	11/20/2014
ISN	TESEQ	ISN-T8	30842	07/30/2015
Current Probe	FCC	F-35	506	07/13/2015
ISN	FCC	FCC-TLISN-T2-02	20587	07/28/2015
Test S/W	EZ-EMC			

NOTE: *1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.*
2. N.C.R = No Calibration Request.

4.3 MEASUREMENT UNCERTAINTY

Parameter	Uncertainty
Powerline Conducted Emission #3	±2.1876
3M Semi Anechoic Chamber / 30MHz ~ 200MHz	±3.5921
3M Semi Anechoic Chamber / 200MHz ~ 1GHz	±3.5657
3M Semi Anechoic Chamber / 1 ~ 8GHz	±2.5873
3M Semi Anechoic Chamber / 8 ~ 18GHz	±2.6646
3M Semi Anechoic Chamber / 18 ~ 26GHz	±2.9617
3M Semi Anechoic Chamber / 26 ~ 40GHz	±3.4250

Remark*: This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.*

5 FACILITIES AND ACCREDITATIONS

5.1 FACILITIES

All measurement facilities used to collect the measurement data are located at

☐ No. 163-1, Jhongsheng Rd., Sindien District, Taipei City 23151, Taiwan
Tel: 886-2-2217-0894 / Fax: 886-2-2217-1029

☐ No 11, Wugong 6th Rd, Wugu District, New Taipei City 24891, Taiwan (R.O.C)
Tel: 886-2-2299-9720 / Fax: 886-2-2298-4045

☒ No.81-1, Lane 210, Bade 2nd Rd., Lujhu Township, Taoyuan County 33841, Taiwan
Tel: 886-3-324-0332 / Fax: 886-3-324-5235

The sites are constructed in conformance with the requirements of ANSI C63.7, ANSI C63.4 and CISPR Publication 22.

All receiving equipment conforms to CISPR Publication 16-1, “Radio Interference Measuring Apparatus and Measurement Methods.”

5.2 LABORATORY ACCREDITATIONS AND LISTING

The test facilities used to perform radiated and conducted emissions tests are accredited by American Association for Laboratory Accreditation Program for the specific scope accreditation under Lab Code: 0824-01 to perform Electromagnetic Interference tests according to FCC Part 15 and CISPR 22 requirements. In addition, the test facilities are listed with Industry Canada, Certification and Engineering Bureau, IC 2324G-1 for 3M Semi Anechoic Chamber A, IC 2324G-2 for 3M Semi Anechoic Chamber B.

5.3 TABLE OF ACCREDITATIONS AND LISTINGS

Country	Agency	Scope of Accreditation	Logo
USA	A2LA	CFR 47, FCC Part15/18, CISPR 22, EN 55022, ICES-003, AS/NZS CISPR 22, VCCI V-3, EN 55011, CISPR 11, IEC/EN 61000-4-2/3/4/5/6/8/11, EN 61000-6-1/2/3/4, EN 55024, CISPR 24, AS/NZS CISPR 24, AS/NZS 61000.6.2, EN 55014-1/-2, ETSI EN 300 386 v1.3.2/v1.3.3, IEC/EN 61000-3-2, AS/NZS 61000.3.2, IEC/EN 61000-3-3, AS/NZS 61000.3.3	ACCREDITED TESTING CERT #0824.01
USA	FCC MRA	3 meter Open Area Test Sites to perform FCC Part 15/18 measurements	TW1026
Japan	VCCI	3/10 meter Open Area Test Sites and conducted test sites to perform radiated/conducted measurements	VCCI R-2882/2541/2798/725/1868 C-402/747/912 T-1930/1646
Taiwan	TAF	EN 55014-1, CISPR 14, CNS 13781-1, EN 55013, CISPR 13, CNS 13439, EN 55011, CISPR 11, CNS 13803, PLMN09, IS2045-0, LP0002 FCC Part 27/90, Part 15B/C/D/E, RSS-192/193/210/310 ETSI EN 300 328/ 300 220-1/ 300 220-2/ 301 893/ 301 489-01/ 301 489-03/ 301 489-07 / 301 489-17/ 300 440-1/ 300 440-2 AS/NZS 4268, AS/NZS 4771 CISPR 22, EN 55022, CNS 13438, AS/NZS CISPR 22, VCCI, IEC/EN 61000-4-2/3/4/5/6/8/11, CNS 14676-2/3/4/5/6/8, CNS 14934-2/3, CNS 13783-1, CNS 13439, CNS 13803	ilac-MRA TAF Testing Laboratory 0363
Taiwan	BSMI	CNS 13438, CNS 13783-1, CNS 13439, CNS 14115	SL2-IS-E-0014 / IN-E-0014 /A1-E-0014 /R1-E-0014 /R2-E-0014 /L1-E-0014
Canada	Industry Canada	RSS-Gen Issue 3	Canada IC 2324C-5

** No part of this report may be used to claim or imply product endorsement by A2LA or any agency of the US Government.*

6 SETUP OF EQUIPMENT UNDER TEST

6.1 SETUP CONFIGURATION OF EUT

See test photographs attached in Appendix II for the actual connections between EUT and support equipment.

6.2 SUPPORT EQUIPMENT

For Powerline Conducted Emission and Radiated Emissions(Below 1GHz)							
No.	**Device Type**	**Model**	**Series No.**	**FCC ID**	**Brand**	**Data Cable**	**Power Cord**
1	AP (Remote)	LM-RT210 W	12442028770	H8N-RT210W	LEMEL	N/A	Unshielded, 1.8m
2	Notebook PC (Remote)	ThinkPad T430u	PB-VZLGG 12/09	FCC DOC	LENOVO	LAN Cable: Unshielded, 3.0m	AC I/P: Unshielded, 1.8m DC O/P: Unshielded, 1.8m with a core

For Conducted Emission and Radiated Emissions(Above 1GHz)							
No.	**Device Type**	**Model**	**Series No.**	**FCC ID**	**Brand**	**Data Cable**	**Power Cord**
1	Notebook PC (Remote)	ThinkPad T430u	PB-VZLGG 12/09	FCC DOC	LENOVO	LAN Cable: Unshielded, 3.0m	AC I/P: Unshielded, 1.8m DC O/P: Unshielded, 1.8m with a core

Remark: *Grounding was established in accordance with the manufacturer's requirements and conditions for the intended use.*

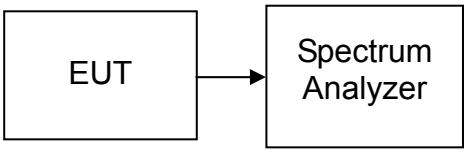
7 FCC PART 15 REQUIREMENTS

7.1 6DB BANDWIDTH

LIMIT

According to §15.247(a)(2), systems using digital modulation techniques may operate in the 902 - 928 MHz, 2400 - 2483.5 MHz, and 5725 - 5850 MHz bands. The minimum 6dB bandwidth shall be at least 500 kHz.

Test Configuration



TEST PROCEDURE

1. Place the EUT on the table and set it in the transmitting mode.
2. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.
3. Set the spectrum analyzer as RBW = 100kHz, VBW = 300kHz, Sweep = auto, Span = 30MHz (IEEE 802.11b, IEEE 802.11g, IEEE 802.11n HT20) or Span = 60MHz (IEEE 802.11n HT40).
4. Mark the peak frequency and –6dB (upper and lower) frequency.
5. Repeat until all the rest channels are investigated.

TEST RESULTS

Not applicable, it is unnecessary to final tested after the evaluation.

7.2 PEAK POWER

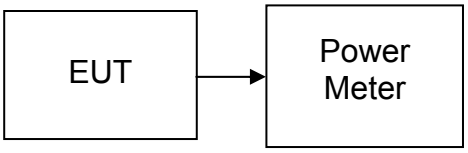
LIMIT

The maximum peak output power of the intentional radiator shall not exceed the following:

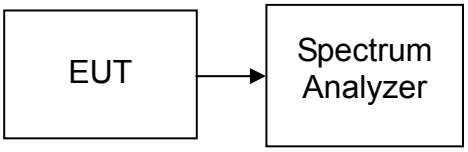
1. According to §15.247(b)(3), for systems using digital modulation in the bands of 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz: 1 Watt.
2. According to §15.247(b)(4), the conducted output power limit specified in paragraph (b) of this section is based on the use of antennas with directional gains that do not exceed 6 dBi. Except as shown in paragraph (c) of this section, if transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced below the stated values in paragraphs (b)(1), (b)(2), and (b)(3) of this section, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

TEST CONFIGURATION

For IEEE 802.11b mode



For IEEE 802.11g mode, IEEE 802.11n HT20 mode, IEEE 802.11n HT40 mode



TEST PROCEDURE

For IEEE 802.11b mode:

Per KDB 558074 v03r02

The transmitter output is connected to the Power Meter. The Power Meter is set to the peak power detection.

For IEEE 802.11g mode, IEEE 802.11n HT20 mode, IEEE 802.11n HT40 mode

Per KDB 558074 5.2.1.2/ or 5.2.2.1.

The transmitter output is connected to the spectrum analyzer. Set the RBW = 1MHz, VBW = 3MHz, Detector = Peak, Trace mode = max hold, Sweep = auto couple. Record the max reading.

Repeat the above procedure until the measurements for all frequencies are completed.

TEST RESULTS

After evaluation, the power of IEEE 802.11b mode is changed and retested as below. IEEE 802.11g mode, IEEE 802.11n HT20 mode, IEEE 802.11n HT40 mode is conformed as original result at T120601J01.

Test Data

Test mode: IEEE 802.11b mode

Channel	Frequency (MHz)	Output Power (dBm)	Output Power (W)	Limit (W)	Test Result
Low	2412	13.62	0.0230	1	PASS
Mid	2437	13.72	0.0236		PASS
High	2462	13.48	0.0223		PASS

Test mode: IEEE 802.11g mode

Channel	Frequency (MHz)	Output Power (dBm)	Output Power (W)	Limit (W)	Test Result
Low	2412	19.64	0.0920	1	PASS
Mid	2437	19.64	0.0920		PASS
High	2462	19.96	0.0991		PASS

Test mode: IEEE 802.11n HT20 mode

Channel	Frequency (MHz)	Output Power (dBm)	Output Power (W)	Limit (W)	Test Result
Low	2412	19.3	0.0851	1	PASS
Mid	2437	20.21	0.1050		PASS
High	2462	20.21	0.1050		PASS

Test mode: IEEE 802.11n HT40 mode

Channel	Frequency (MHz)	Output Power (dBm)	Output Power (W)	Limit (W)	Test Result
Low	2422	19.01	0.0796	1	PASS
Mid	2437	19.56	0.0904		PASS
High	2452	19.31	0.0853		PASS

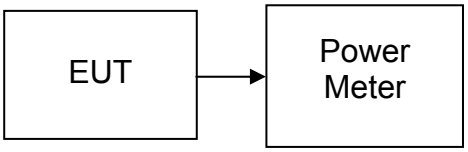
7.3 AVERAGE POWER

LIMIT

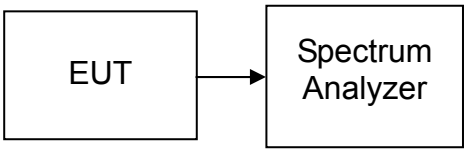
None; for reporting purposes only.

TEST CONFIGURATION

For IEEE 802.11b mode



For IEEE 802.11g mode, IEEE 802.11n HT20 mode, IEEE 802.11n HT40 mode



TEST PROCEDURE

For IEEE 802.11b mode:

Per KDB 558074 v03r02

The transmitter output is connected to the Power Meter. The Power Meter is set to the peak power detection.

For IEEE 802.11g mode, IEEE 802.11n HT20 mode, IEEE 802.11n HT40 mode

Per KDB 558074 5.2.1.2/ or 5.2.2.1.

The transmitter output is connected to the spectrum analyzer. Set the RBW = 1MHz, VBW = 3MHz, Detector = Peak, Trace mode = max hold, Sweep = auto couple. Record the max reading.

Repeat the above procedure until the measurements for all frequencies are completed.

TEST RESULTS

After evaluation, the power of IEEE 802.11b mode is changed and retested as below. IEEE 802.11g mode, IEEE 802.11n HT20 mode, IEEE 802.11n HT40 mode is conformed as original result at T120601J01.

Test Data

Test mode: IEEE 802.11b mode

Channel	Frequency (MHz)	Output Power (dBm)	Output Power (W)
Low	2412	11.41	0.0138
Mid	2437	11.49	0.0141
High	2462	11.22	0.0132

Test mode: IEEE 802.11g mode

Channel	Frequency (MHz)	Output Power (dBm)	Output Power (W)
Low	2412	12.19	0.0166
Mid	2437	12.64	0.0184
High	2462	12.78	0.0190

Test mode: IEEE 802.11n HT20 mode

Channel	Frequency (MHz)	Output Power (dBm)	Output Power (W)
Low	2412	12.13	0.0163
Mid	2437	12.25	0.0168
High	2462	12.68	0.0185

Test mode: IEEE 802.11n HT40 mode

Channel	Frequency (MHz)	Output Power (dBm)	Output Power (W)
Low	2422	11.82	0.0152
Mid	2437	11.8	0.0151
High	2452	11.62	0.0145

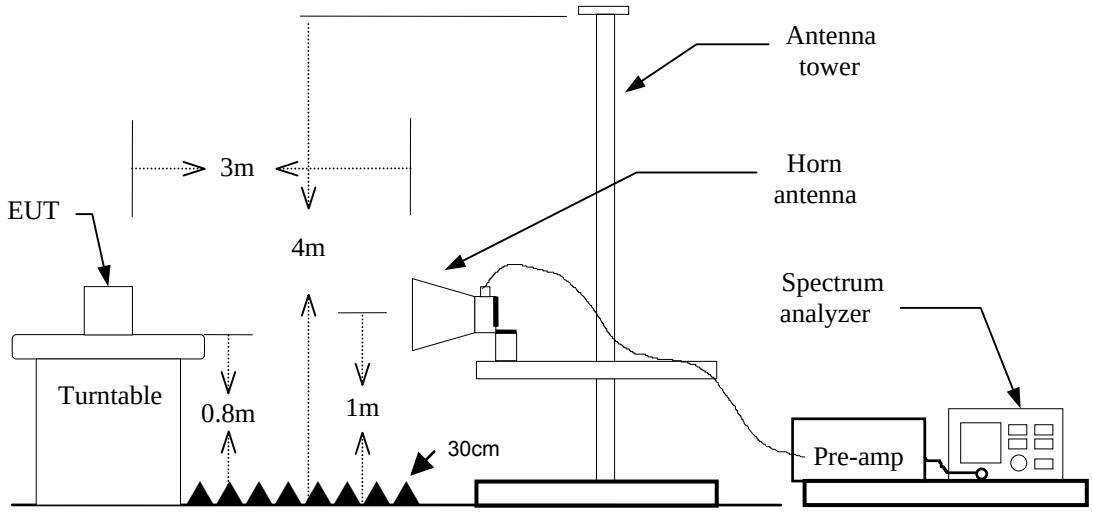
7.4 BAND EDGES MEASUREMENT

LIMIT

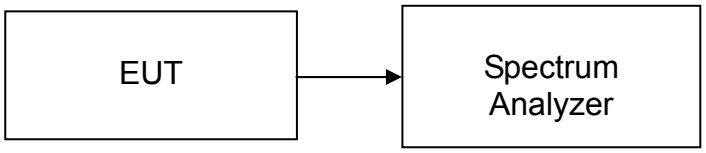
According to §15.247(d), in any 100 kHz bandwidth outside the frequency bands in which the spread spectrum intentional radiator in operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in 15.209(a) (see Section 15.205(c)).

Test Configuration

For Radiated



For Conducted



TEST PROCEDURE

For Radiated

1. The EUT is placed on a turntable, which is 0.8m above the ground plane.
2. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
3. EUT is set 3m away from the receiving antenna, which is varied from 1m to 4m to find out the highest emission.
4. Set the spectrum analyzer in the following setting in order to capture the lower and upper band-edges of the emission:
   (a) PEAK: RBW=1MHz / VBW=3MHz / Sweep=AUTO
   (b) AVERAGE: RBW=1MHz / VBW=300Hz / Sweep=AUTO
   (c) Duty Cycle: RBW=1MHz / VBW=1MHz
5. Repeat the procedures until all the PEAK and AVERAGE versus POLARIZATION are measured.

For Conducted

Conducted RF measurements of the transmitter output were made to confirm that the EUT antenna port conducted emissions meet the specified limit and to identify any spurious signals that require further investigation or measurements on the radiated emissions site.

The transmitter output is connected to the spectrum analyzer. The resolution bandwidth is set to 100 kHz. The video bandwidth is set to 100 kHz.

TEST RESULTS

For Radiated

Refer to attach spectrum analyzer data chart.

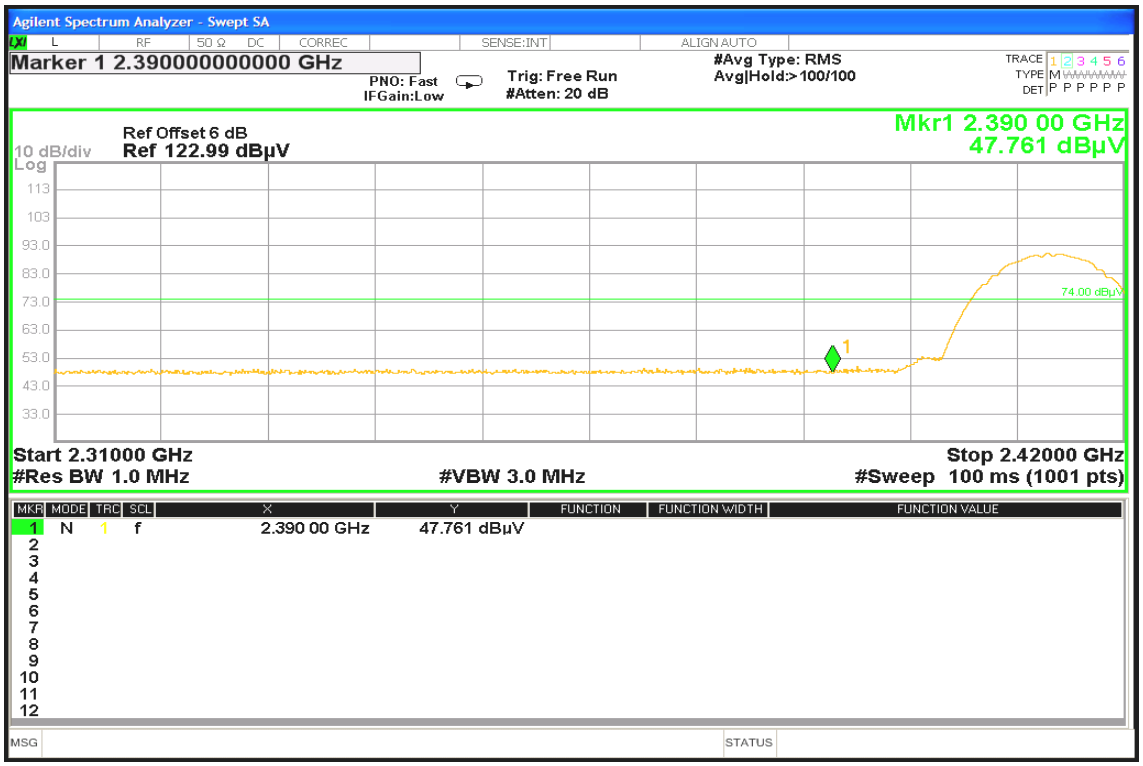
For Conducted

Not applicable, it is unnecessary to final tested after the evaluation.

TEST DATA

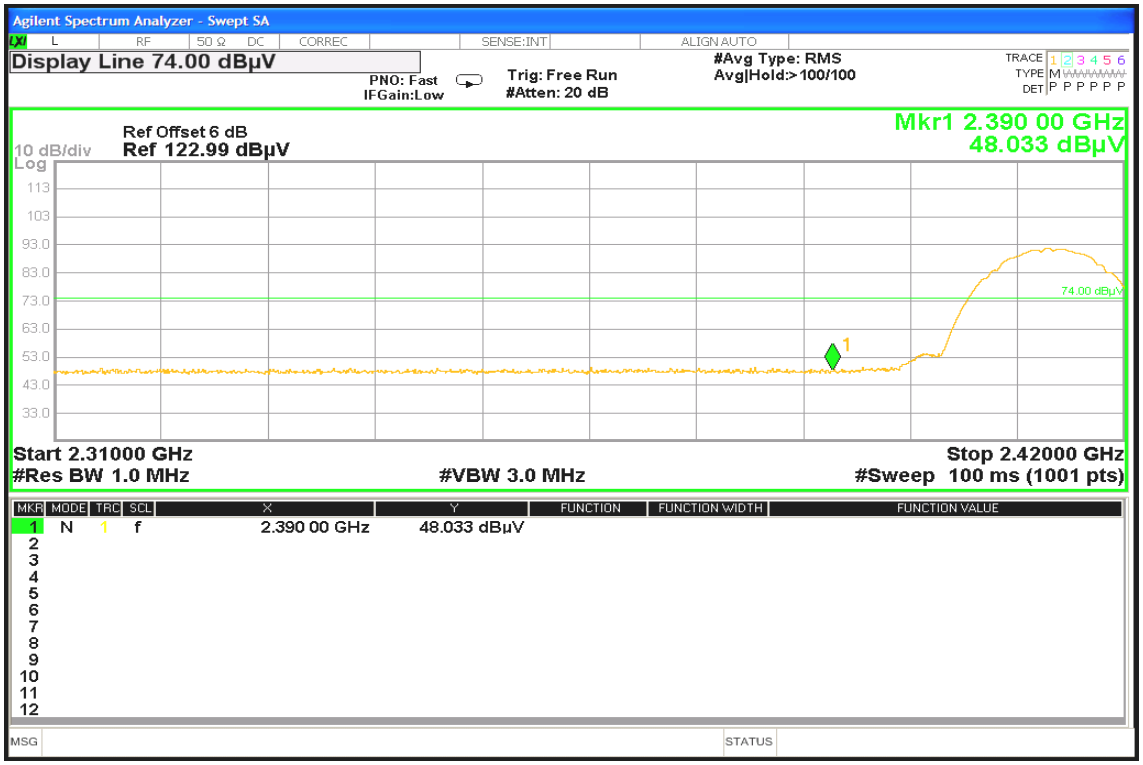
Band Edges (IEEE 802.11b mode / CH Low)

Detector mode: Peak Polarity: Vertical



Detector mode: Average Polarity: Vertical

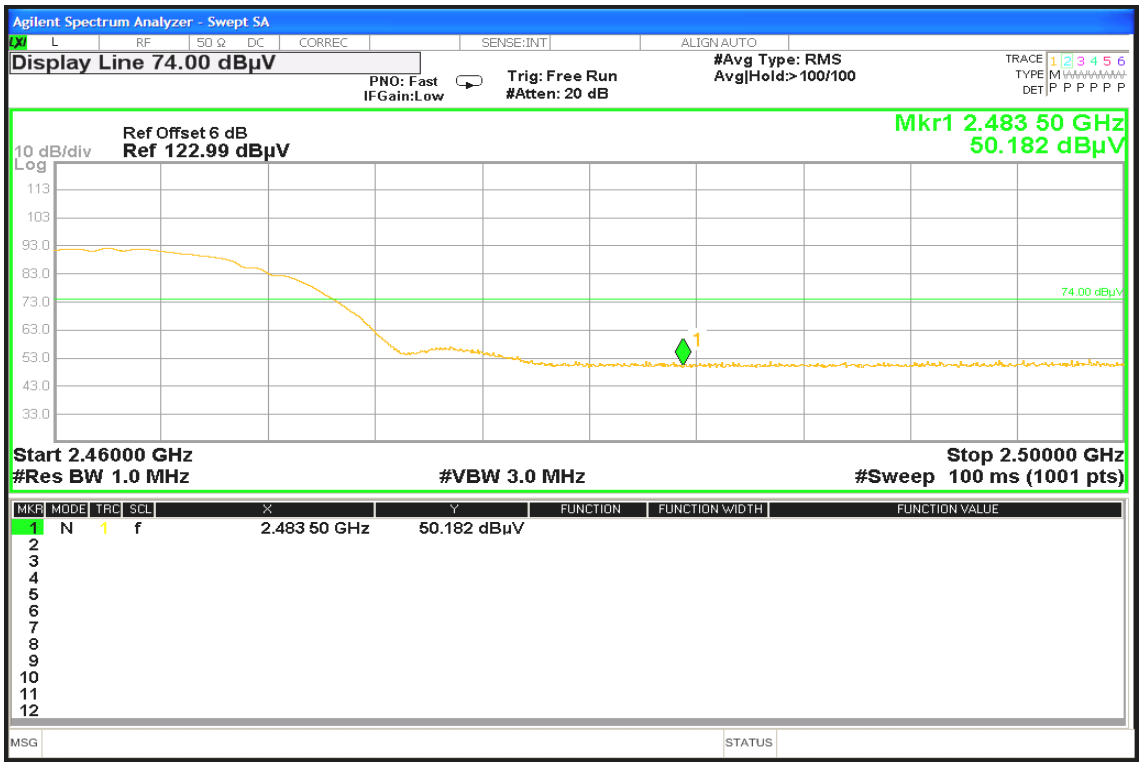
Detector mode: Peak Polarity: Horizontal



Detector mode: Average Polarity: Horizontal

Band Edges (IEEE 802.11b mode / CH High)

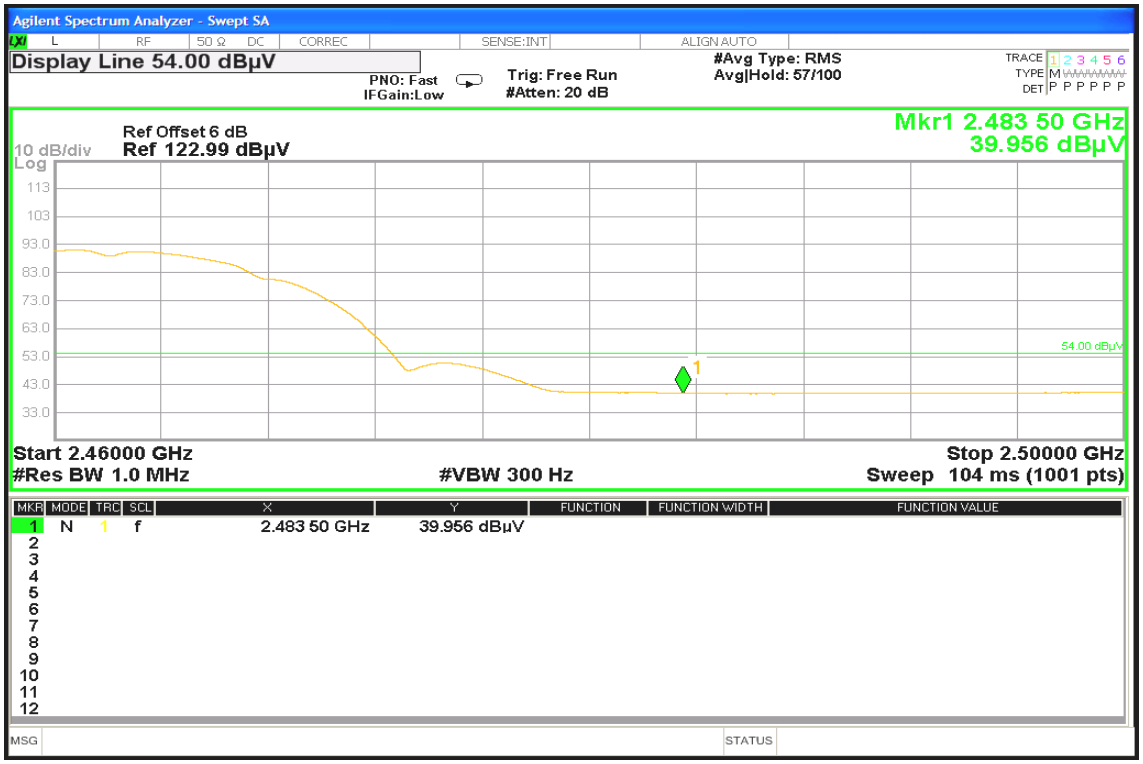
Detector mode: Peak Polarity: Vertical



Detector mode: Average Polarity: Vertical

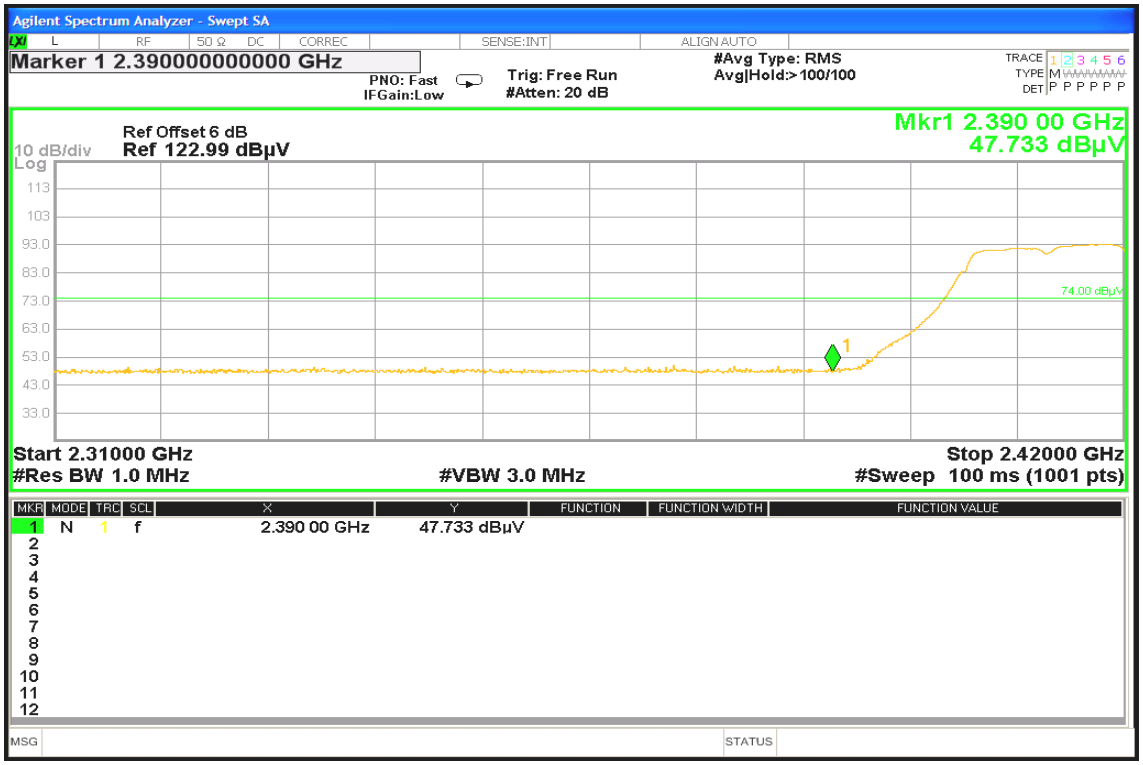
Detector mode: Peak Polarity: Horizontal

Detector mode: Average Polarity: Horizontal

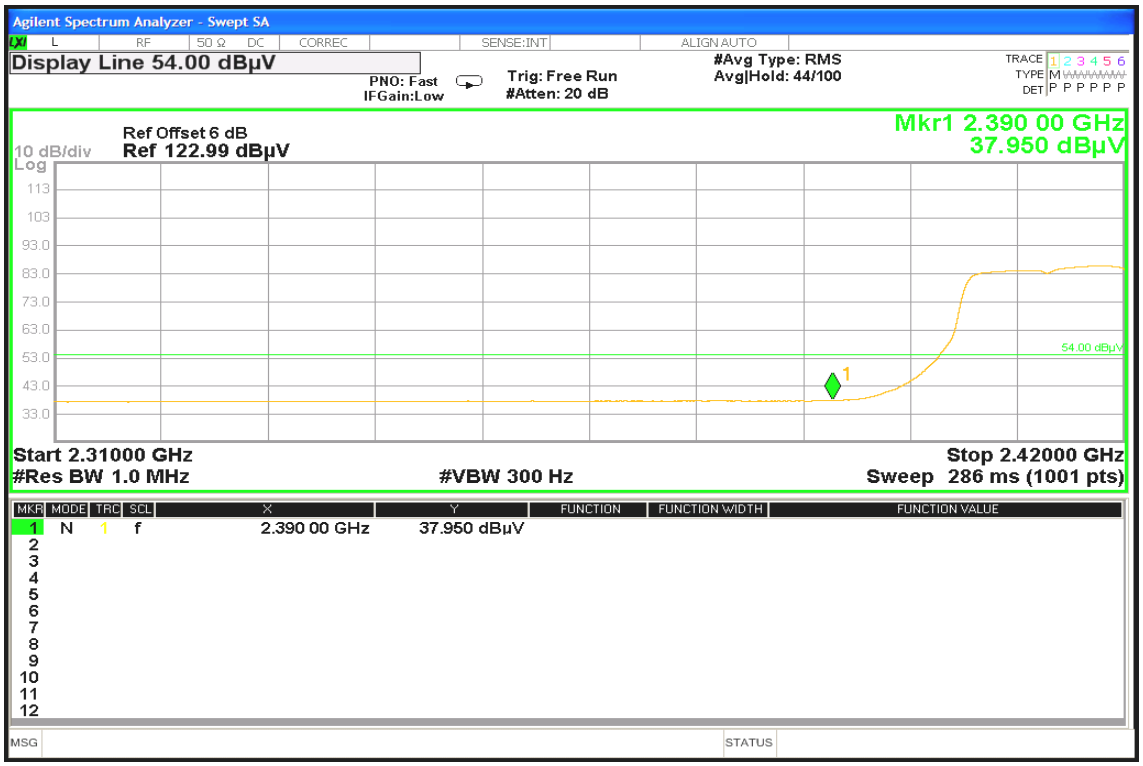


Band Edges (IEEE 802.11g mode / CH Low)

Detector mode: Peak Polarity: Vertical

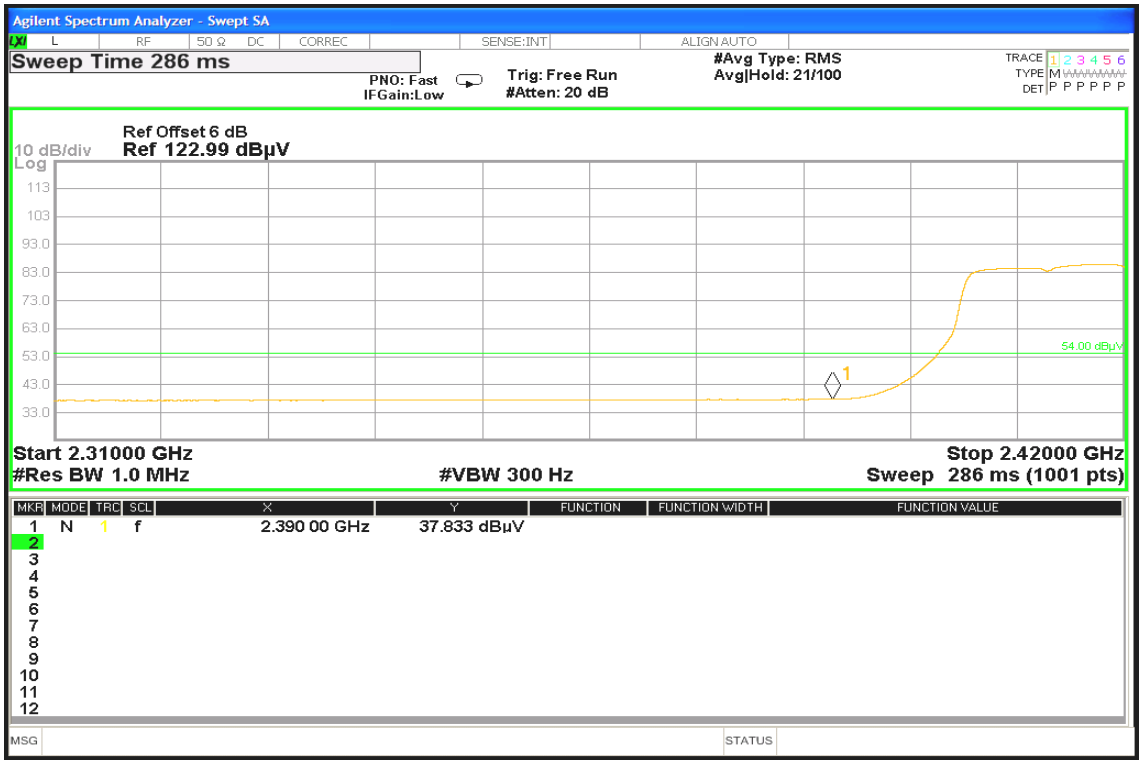


Detector mode: Average Polarity: Vertical



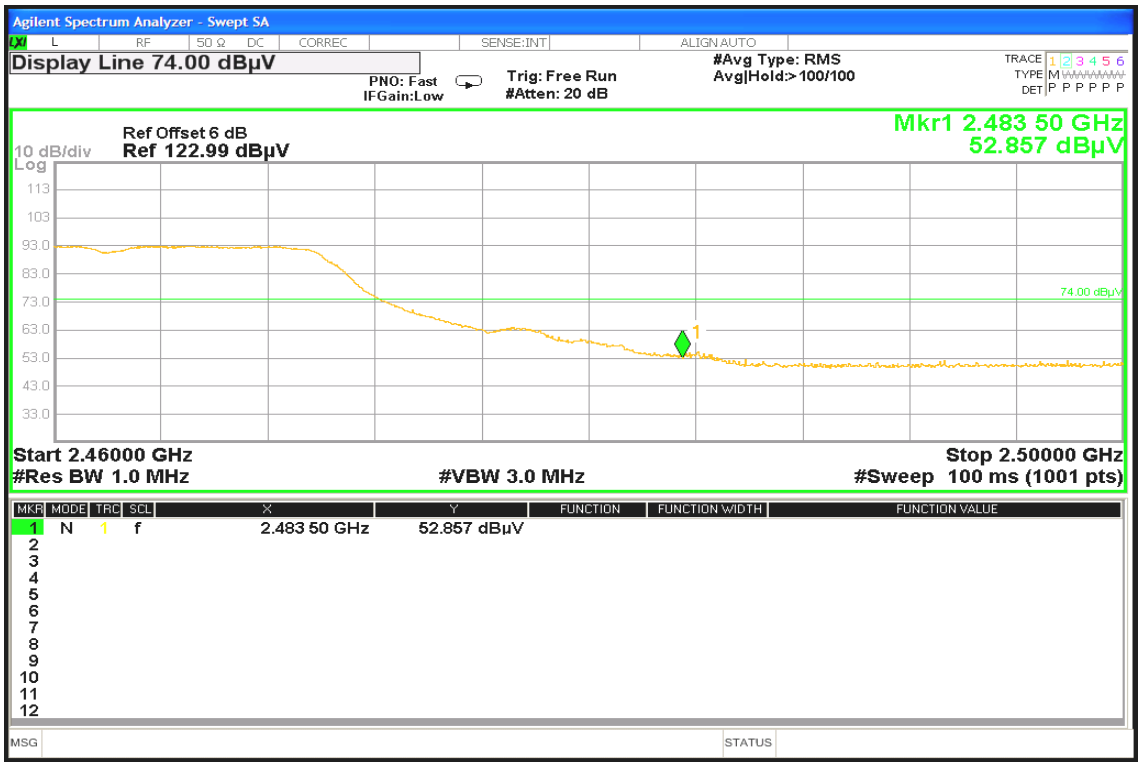
Detector mode: Peak Polarity: Horizontal

Detector mode: Average Polarity: Horizontal



Band Edges (IEEE 802.11g mode / CH High)

Detector mode: Peak Polarity: Vertical



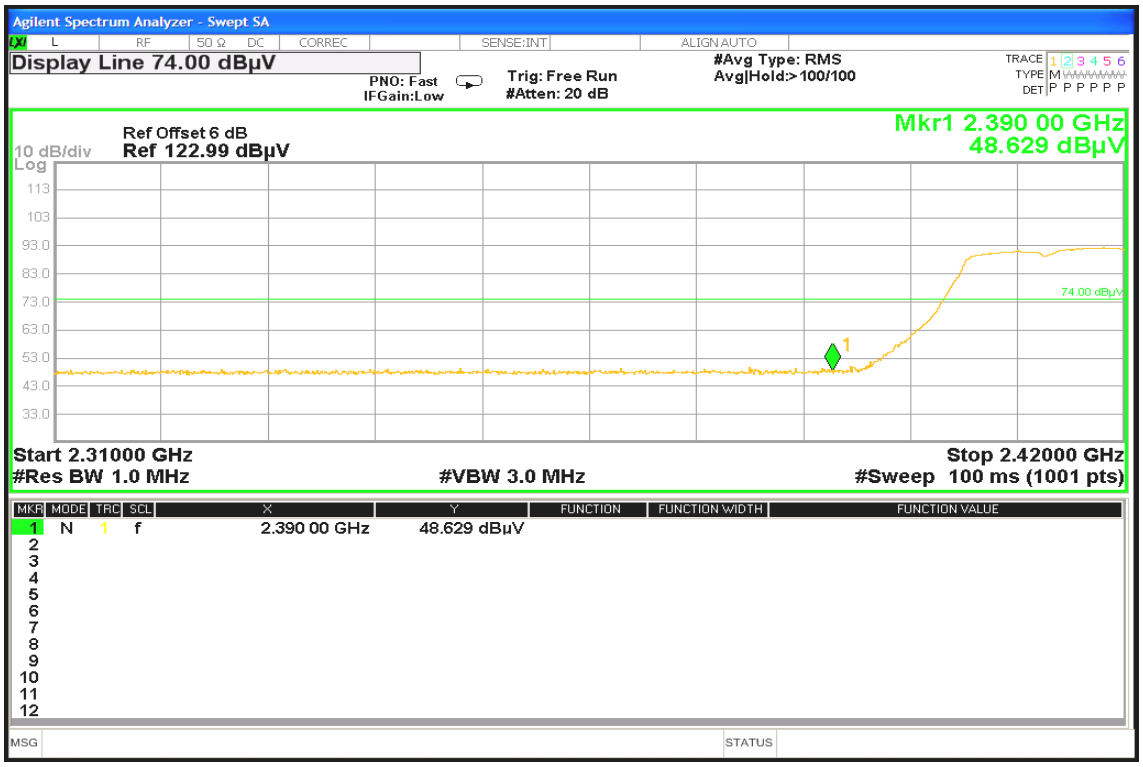
Detector mode: Average Polarity: Vertical

Detector mode: Peak Polarity: Horizontal

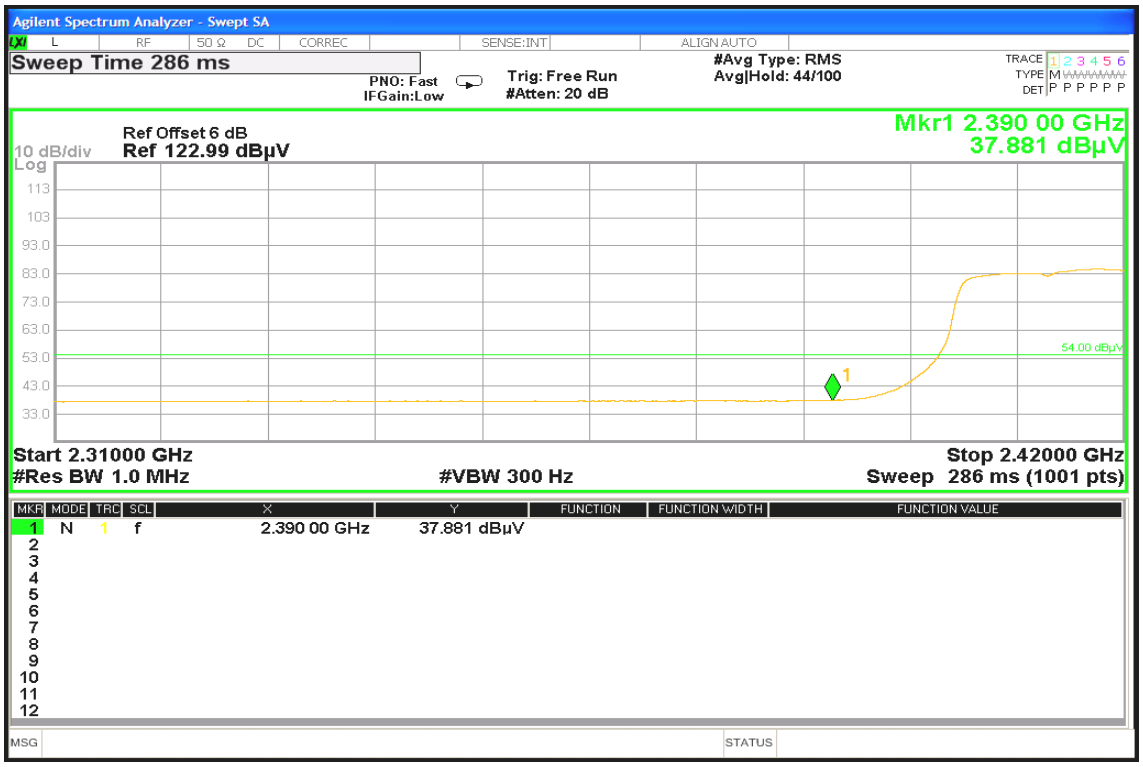
Detector mode: Average Polarity: Horizontal

Band Edges (IEEE 802.11n HT20 mode / CH Low)

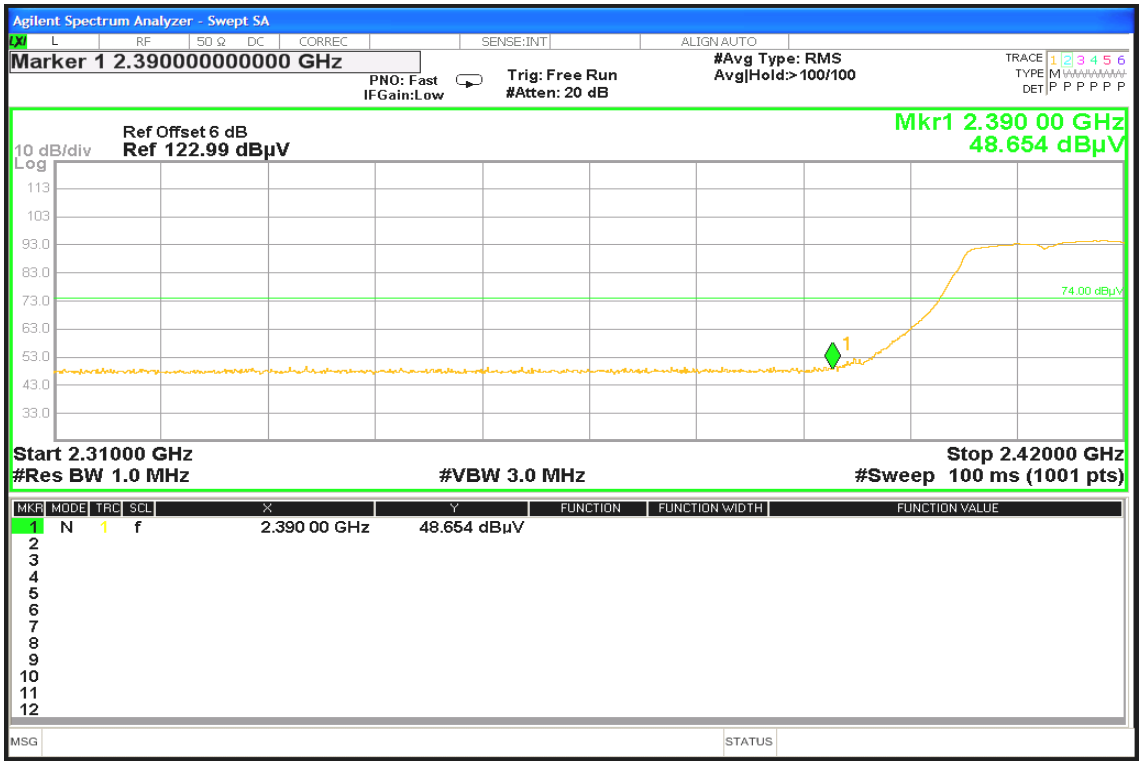
Detector mode: Peak Polarity: Vertical



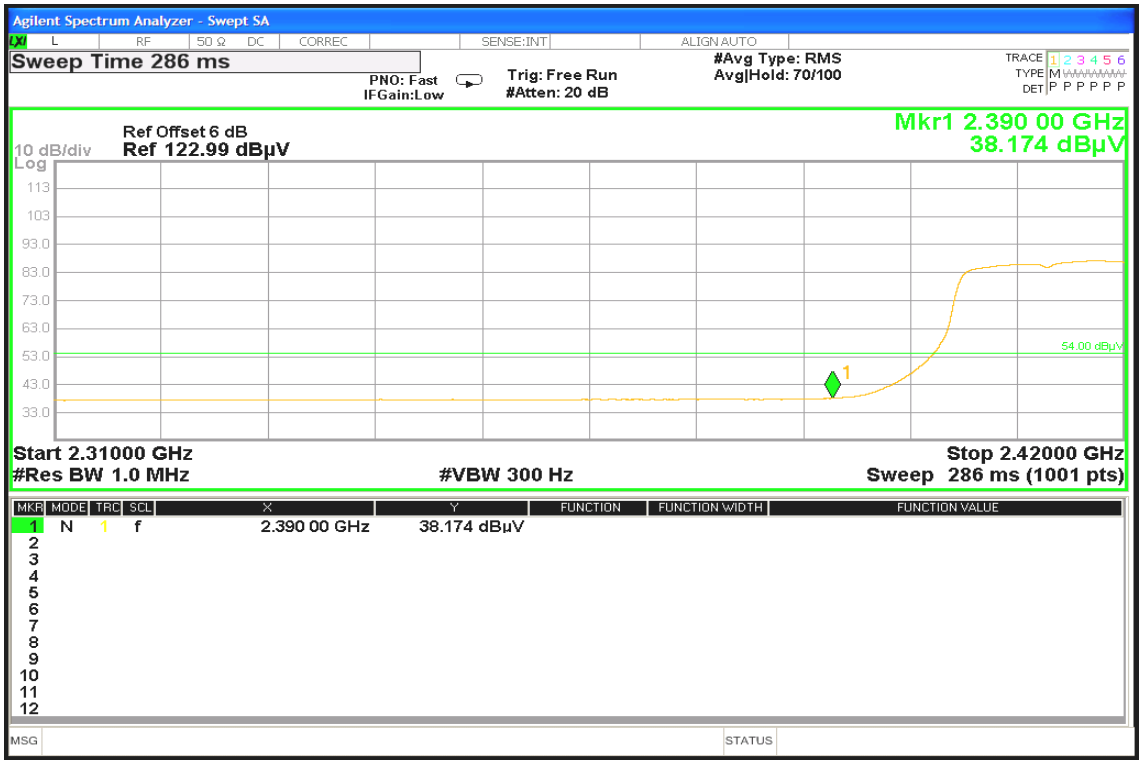
Detector mode: Average Polarity: Vertical



Detector mode: Peak Polarity: Horizontal



Detector mode: Average Polarity: Horizontal



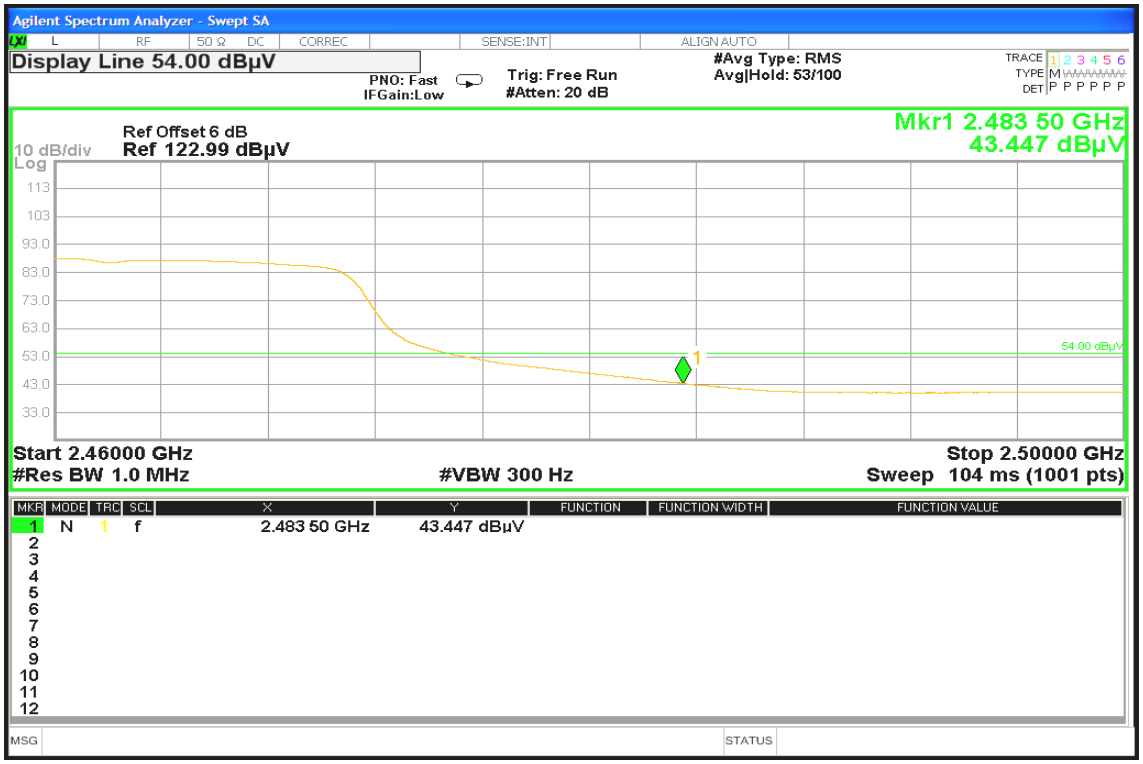
Band Edges (IEEE 802.11n HT20 mode / CH High)

Detector mode: Peak Polarity: Vertical

Detector mode: Average Polarity: Vertical

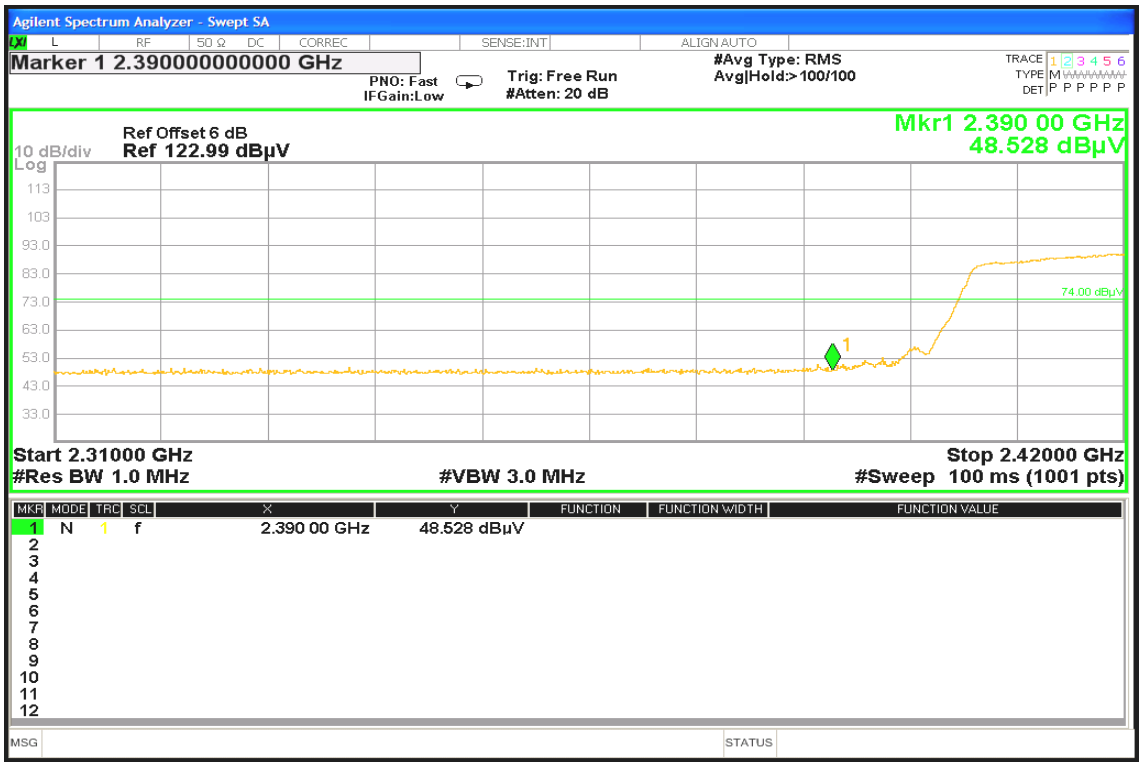
Detector mode: Peak Polarity: Horizontal

Detector mode: Average Polarity: Horizontal



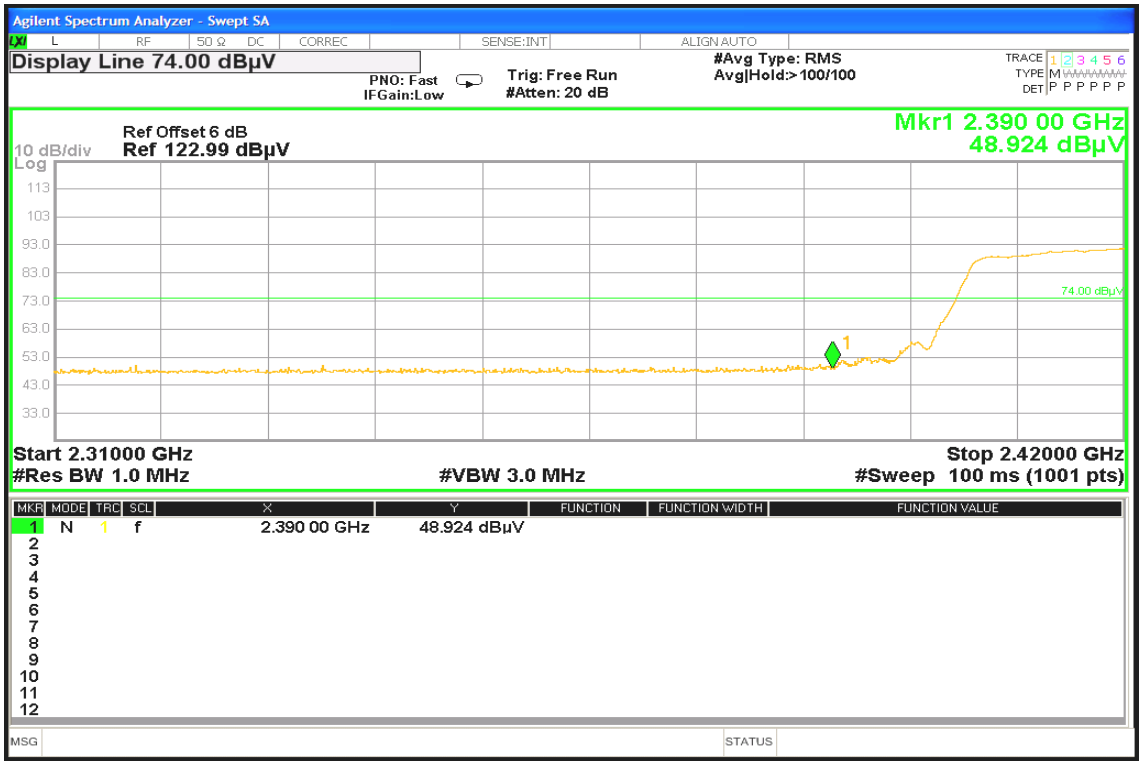
Band Edges (IEEE 802.11n HT40 mode / CH Low)

Detector mode: Peak Polarity: Vertical

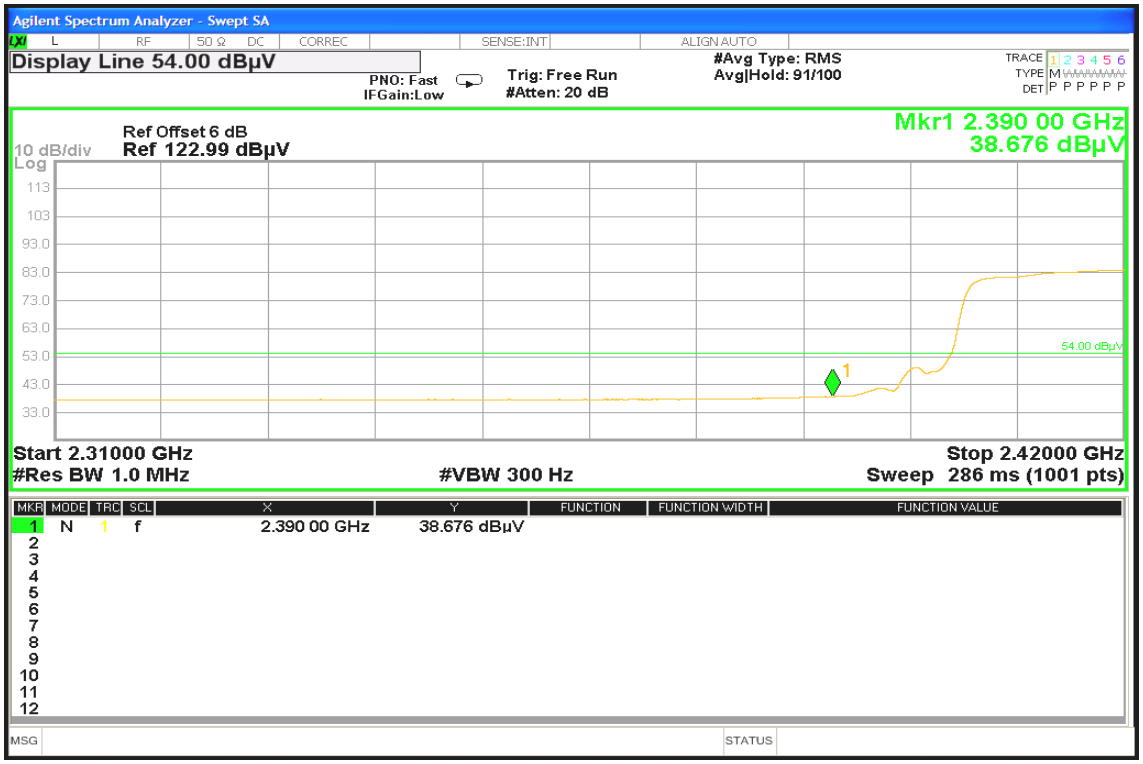


Detector mode: Average Polarity: Vertical

Detector mode: Peak Polarity: Horizontal



Detector mode: Average Polarity: Horizontal



Band Edges (IEEE 802.11n HT40 mode / CH High)

Detector mode: Peak Polarity: Vertical

Detector mode: Average Polarity: Vertical

Detector mode: Peak Polarity: Horizontal

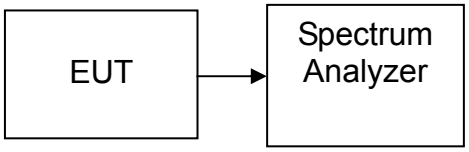
Detector mode: Average Polarity: Horizontal

7.5 PEAK POWER SPECTRAL DENSITY

LIMIT

1. According to §15.247(e), 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.
2. According to §15.247(f), the digital modulation operation of the hybrid system, with the frequency hopping turned off, shall comply with the power density requirements of paragraph (d) of this section.

Test Configuration



TEST PROCEDURE

Per KDB 558074 v03r02

This procedure must be used if maximum peak conducted output power was used to demonstrate compliance to the fundamental output power limit, and is optional if the maximum (average) conducted output power was used to demonstrate compliance.

1. Set analyzer center frequency to DTS channel center frequency.
2. Set the span to 1.5 times the DTS channel bandwidth.
3. Set the RBW ≥ 3 kHz.
4. Set the VBW ≥ 3 x RBW.
5. Detector = peak.
6. Sweep time = auto couple.
7. Trace mode = max hold.
8. Allow trace to fully stabilize.

Use the peak marker function to determine the maximum amplitude level.
If measured value exceeds limit, reduce RBW (no less than 3 kHz) and repeat

TEST RESULTS

Not applicable, it is unnecessary to final tested after the evaluation.

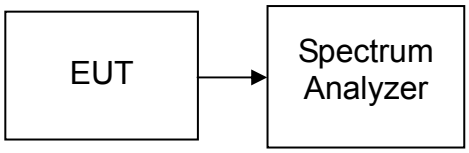
7.6 SPURIOUS EMISSIONS

7.6.1 Conducted Measurement

LIMIT

According to §15.247(d), in any 100 kHz bandwidth outside the frequency bands in which the spread spectrum intentional radiator in operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in 15.209(a) (see Section 15.205(c)).

Test Configuration



TEST PROCEDURE

Conducted RF measurements of the transmitter output were made to confirm that the EUT antenna port conducted emissions meet the specified limit and to identify any spurious signals that require further investigation or measurements on the radiated emissions site.

The transmitter output is connected to the spectrum analyzer. The resolution bandwidth is set to 100 kHz. The video bandwidth is set to 100 kHz.

Measurements are made over the 30MHz to 26GHz range for IEEE 802.11b/g, 30MHz to 40GHz range for IEEE 802.11a with the transmitter set to the lowest, middle, and highest channels.

TEST RESULTS

Not applicable, it is unnecessary to final tested after the evaluation.

7.6.2 Radiated Emissions

LIMIT

1. According to §15.209(a), except as provided elsewhere in this Subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:

Frequency (MHz)	Field Strength (μV/m)	Measurement Distance (m)
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

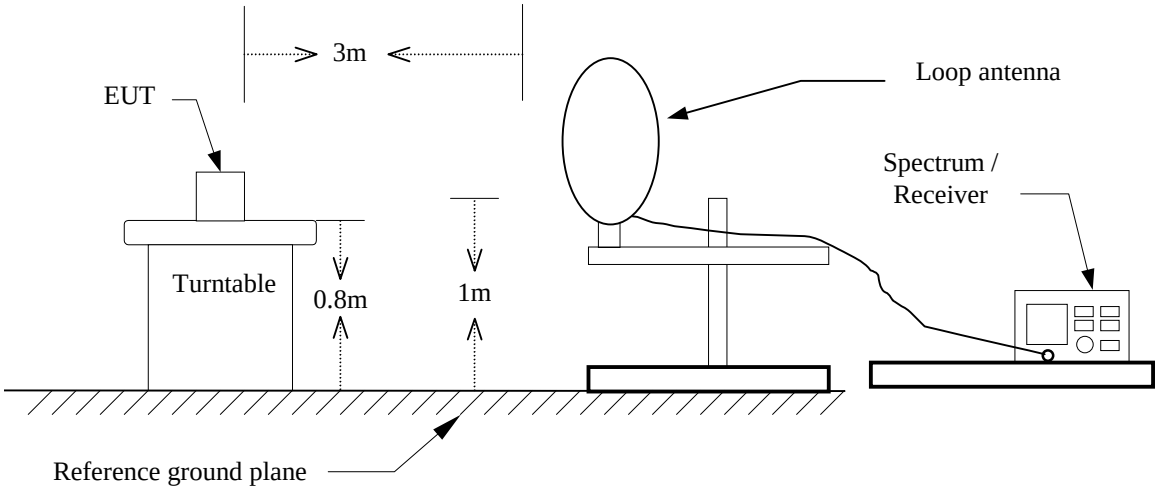
Remark: *Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this Section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections of this Part, e.g., Sections 15.231 and 15.241.*

2. In the above emission table, the tighter limit applies at the band edges.

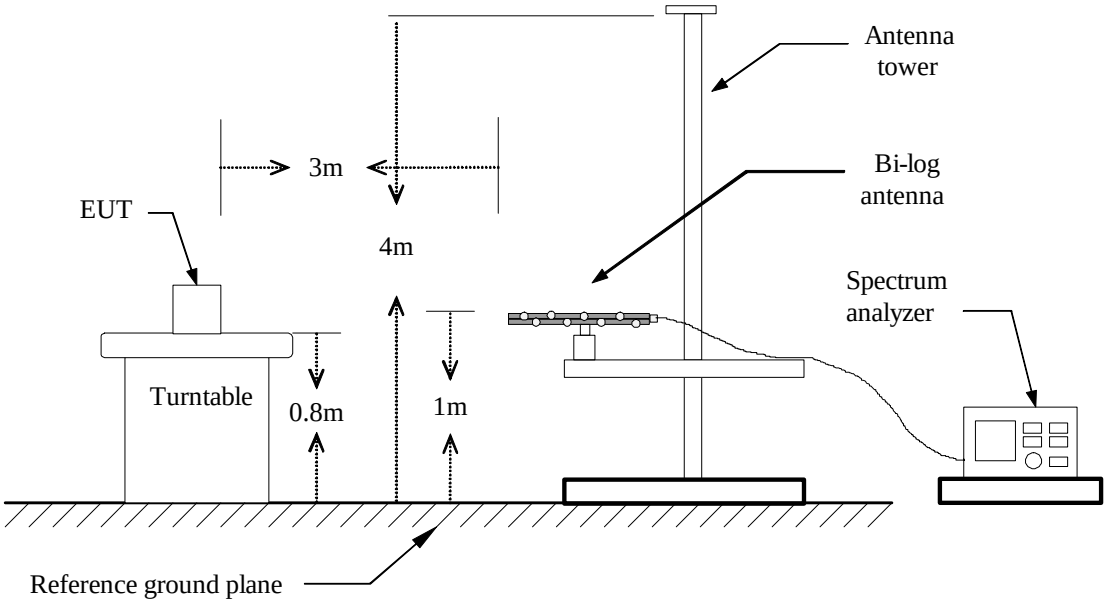
Frequency (MHz)	Field Strength (μV/m at 3-meter)	Field Strength (dBμV/m at 3-meter)
0.009 - 0.490	2400/F(kHz) +80	20LOG((2400/F(kHz))+80)
0.490 - 1.705	24000/F(kHz) +40	20LOG((24000/F(kHz))+40)
1.705 – 30.0	30	69.54
30-88	100	40
88-216	150	43.5
216-960	200	46
Above 960	500	54

Test Configuration

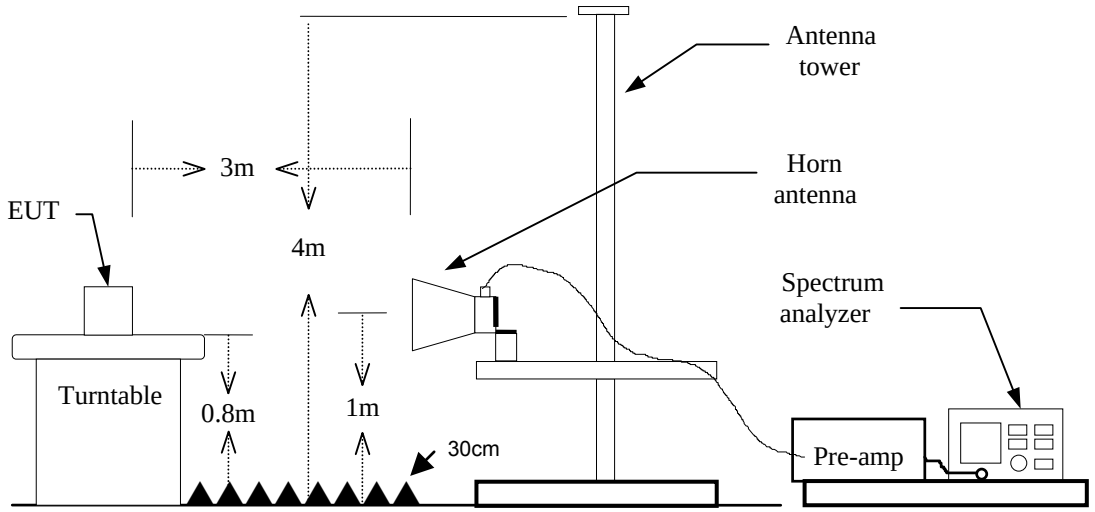
9kHz ~ 30MHz



30MHz ~ 1GHz



Above 1 GHz



TEST PROCEDURE

1. The EUT is placed on a turntable, which is 0.8m above ground plane.
2. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
3. EUT is set 3m away from the receiving antenna, which is varied from 1m to 4m to find out the highest emissions.
4. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
5. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
6. Set the spectrum analyzer in the following setting as:

   Below 30MHz

   RBW=10kHz / VBW=30kHz / Sweep=AUTO

   30 ~ 1000MHz:

   RBW=100kHz / VBW=300KHz / Sweep=AUTO

   Above 1GHz:

   a) PEAK: RBW=1MHz / VBW=3MHz / Sweep=AUTO

   b) AVERAGE: RBW=1MHz / VBW=300Hz / Sweep=AUTO
7. Repeat above procedures until the measurements for all frequencies are complete.

DATA SAMPLE

Below 1 GHz

Frequency (MHz)	Reading (dBuV)	Correction Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Ant. Pol. (H/V)	Remark
x.xx	43.20	-20.71	22.49	40.00	-17.51	V	QP

Frequency (MHz) = Emission frequency in MHz
Reading (dBuV) = Uncorrected Analyzer / Receiver reading
Correction Factor (dB/m) = Antenna factor – Amplifier gain + Cable loss
Result (dBuV/m) = Reading (dBuV) + Corr. Factor (dB/m)
Limit (dBuV/m) = Limit stated in standard
Margin (dB) = Result (dBuV/m) – Limit (dBuV/m)
Q.P. = Quasi-Peak

Above 1 GHz

Freq. (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Ant. Pol H/V	Remark
x.xx	45.25	6.91	52.16	74.00	-21.84	H	peak
x.xx	32.33	6.91	39.24	54.00	-14.76	H	AVG

Frequency (MHz) = Emission frequency in MHz
Reading (dBuV) = Uncorrected Analyzer / Receiver reading
Correction Factor (dB/m) = Antenna factor + Cable loss – Amplifier gain
Result (dBuV/m) = Reading (dBuV) + Corr. Factor (dB/m)
Limit (dBuV/m) = Limit stated in standard
Margin (dB) = Result (dBuV/m) – Limit (dBuV/m)

Below 1 GHz

Operation Mode:	Normal Link	**Test Date:**	2014/7/27
Temperature:	26°C	**Tested by:**	Eric Liao
Humidity:	56% RH	**Polarity:**	Ver. / Hor.

Frequency (MHz)	Reading (dBuV)	Correction Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Ant. Pol. (H/V)	Remark
94.0100	32.40	1.71	34.11	43.50	-9.39	V	QP
169.6799	42.99	-4.05	38.94	43.50	-4.56	V	QP
340.3999	47.67	-10.81	36.86	46.00	-9.14	V	QP
408.3000	49.58	-12.20	37.38	46.00	-8.62	V	QP
549.9199	44.51	-8.11	36.40	46.00	-9.60	V	QP
624.6100	46.82	-8.34	38.48	46.00	-7.52	V	QP
1000.0000	46.51	-6.16	40.35	54.00	-13.65	V	QP
167.7400	38.03	0.35	38.38	43.50	-5.12	H	QP
250.1900	51.62	-12.17	39.45	46.00	-6.55	H	QP
409.2700	46.23	-12.00	34.23	46.00	-11.77	H	QP
500.4500	43.87	-9.39	34.48	46.00	-11.52	H	QP
624.6100	45.92	-7.77	38.15	46.00	-7.85	H	QP
774.9600	45.56	-11.65	33.91	46.00	-12.09	H	QP
903.0000	45.74	-9.98	35.76	46.00	-10.24	H	QP
1000.0000	48.44	-8.58	39.86	54.00	-14.14	H	QP

Remark:

1. *No emission found between lowest internal used/generated frequency to 30MHz (9kHz~30MHz).*
2. *Radiated emissions measured in frequency range from 30 MHz to 1000MHz were made with an instrument using peak/quasi-peak detector mode.*
3. *Quasi-peak test would be performed if the peak result were greater than the quasi-peak limit or as required by the applicant.*
4. *Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.*
5. *Margin (dB) = Remark result (dBuV/m) – Quasi-peak limit (dBuV/m).*

Above 1 GHz

Operation Mode: TX / IEEE 802.11b mode / CH Low **Test Date:** 2014/7/22~23

Temperature: 26℃ **Tested by:** Eric Liao

Humidity: 56%RH **Polarity:** Ver. / Hor.

Freq. (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Ant. Pol H/V	Remark
1350.000	53.22	-7.62	45.60	74.00	-28.40	V	peak
2684.000	50.13	-1.58	48.55	74.00	-25.45	V	peak
4050.000	43.85	3.31	47.16	74.00	-26.84	V	peak
4825.000	49.80	2.68	52.48	74.00	-21.52	V	peak
4825.000	47.57	2.68	50.25	54.00	-3.75	V	AVG
5395.000	40.35	6.33	46.68	74.00	-27.32	V	peak
7420.000	38.97	11.35	50.32	74.00	-23.68	V	peak
1126.000	55.10	-10.42	44.68	74.00	-29.32	H	peak
1890.000	52.45	-5.90	46.55	74.00	-27.45	H	peak
2280.000	52.51	-5.79	46.72	74.00	-27.28	H	peak
4290.000	38.97	7.49	46.46	74.00	-27.54	H	peak
4825.000	47.90	5.88	53.78	74.00	-20.22	H	peak
4825.000	46.11	5.88	51.99	54.00	-2.01	H	AVG
6355.000	39.47	7.85	47.32	74.00	-26.68	H	peak

Remark:

1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*
2. *Radiated emissions measured in frequency above 1000MHz were made with an instrument using peak/average detector mode.*
3. *Average test would be performed if the peak result were greater than the average limit.*
4. *Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.*
5. *Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.*
6. *Margin (dB) = Remark result (dBuV/m) – Average limit (dBuV/m).*

Operation Mode: TX / IEEE 802.11b mode / CH Mid **Test Date:** 2014/7/23

Temperature: 26℃ **Tested by:** Eric Liao

Humidity: 56%RH **Polarity:** Ver. / Hor.

Freq. (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Ant. Pol H/V	Remark
1592.000	51.74	-4.83	46.91	74.00	-27.09	V	peak
2016.000	50.39	-1.66	48.73	74.00	-25.27	V	peak
2896.000	49.04	-0.72	48.32	74.00	-25.68	V	peak
3510.000	42.60	2.30	44.90	74.00	-29.10	V	peak
4875.000	48.41	3.81	52.22	74.00	-21.78	V	peak
4875.000	46.25	3.81	50.06	54.00	-3.94	V	AVG
7310.000	40.76	10.56	51.32	74.00	-22.68	V	peak
1350.000	52.16	-8.19	43.97	74.00	-30.03	H	peak
1894.000	50.74	-5.87	44.87	74.00	-29.13	H	peak
4875.000	47.03	6.73	53.76	74.00	-20.24	H	peak
4875.000	45.76	6.73	52.49	54.00	-1.51	H	AVG
5595.000	38.69	9.18	47.87	74.00	-26.13	H	peak
N/A							

Remark:

1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*
2. *Radiated emissions measured in frequency above 1000MHz were made with an instrument using peak/average detector mode.*
3. *Average test would be performed if the peak result were greater than the average limit.*
4. *Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.*
5. *Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.*
6. *Margin (dB) = Remark result (dBuV/m) – Average limit (dBuV/m).*

Operation Mode: TX / IEEE 802.11b mode / CH High **Test Date:** 2014/7/23
Temperature: 26℃ **Tested by:** Eric Liao
Humidity: 56%RH **Polarity:** Ver. / Hor.

Freq. (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Ant. Pol H/V	Remark
1350.000	52.57	-7.62	44.95	74.00	-29.05	V	peak
1890.000	51.96	-3.11	48.85	74.00	-25.15	V	peak
4050.000	43.58	3.31	46.89	74.00	-27.11	V	peak
4925.000	47.84	4.61	52.45	74.00	-21.55	V	peak
4925.000	46.24	4.61	50.85	54.00	-3.15	V	AVG
5890.000	39.19	6.15	45.34	74.00	-28.66	V	peak
1126.000	55.54	-10.42	45.12	74.00	-28.88	H	peak
2868.000	49.83	-1.97	47.86	74.00	-26.14	H	peak
4925.000	48.64	7.26	55.90	74.00	-18.10	H	peak
4925.000	44.82	7.26	52.08	54.00	-1.92	H	AVG
5900.000	39.51	9.22	48.73	74.00	-25.27	H	peak
6720.000	39.63	8.78	48.41	74.00	-25.59	H	peak

Remark:

1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*
2. *Radiated emissions measured in frequency above 1000MHz were made with an instrument using peak/average detector mode.*
3. *Average test would be performed if the peak result were greater than the average limit.*
4. *Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.*
5. *Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.*
6. *Margin (dB) = Remark result (dBuV/m) – Average limit (dBuV/m).*

Operation Mode: TX / IEEE 802.11g mode / CH Low **Test Date:** 2014/7/22~23
Temperature: 26℃ **Tested by:** Eric Liao
Humidity: 56%RH **Polarity:** Ver. / Hor.

Freq. (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Ant. Pol H/V	Remark
1618.000	52.54	-4.94	47.60	74.00	-26.40	V	peak
1888.000	50.97	-3.16	47.81	74.00	-26.19	V	peak
2906.000	49.73	-0.70	49.03	74.00	-24.97	V	peak
4050.000	42.45	3.31	45.76	74.00	-28.24	V	peak
4825.000	49.17	2.68	51.85	74.00	-22.15	V	peak
5900.000	40.90	6.26	47.16	74.00	-26.84	V	peak
1126.000	55.97	-10.42	45.55	74.00	-28.45	H	peak
1376.000	52.95	-7.52	45.43	74.00	-28.57	H	peak
2158.000	50.29	-3.65	46.64	74.00	-27.36	H	peak
4820.000	45.09	5.79	50.88	74.00	-23.12	H	peak
5900.000	39.78	9.22	49.00	74.00	-25.00	H	peak
7410.000	39.11	11.27	50.38	74.00	-23.62	H	peak

Remark:

1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*
2. *Radiated emissions measured in frequency above 1000MHz were made with an instrument using peak/average detector mode.*
3. *Average test would be performed if the peak result were greater than the average limit.*
4. *Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.*
5. *Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.*
6. *Margin (dB) = Remark result (dBuV/m) – Average limit (dBuV/m).*

Operation Mode: TX / IEEE 802.11g mode / CH Mid **Test Date:** 2014/7/23
Temperature: 26℃ **Tested by:** Eric Liao
Humidity: 56%RH **Polarity:** Ver. / Hor.

Freq. (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Ant. Pol H/V	Remark
1998.000	49.72	-1.33	48.39	74.00	-25.61	V	peak
2594.000	50.30	-2.10	48.20	74.00	-25.80	V	peak
4875.000	50.54	3.81	54.35	74.00	-19.65	V	peak
4875.000	37.97	3.81	41.78	54.00	-12.22	V	AVG
7315.000	44.52	10.60	55.12	74.00	-18.88	V	peak
7315.000	31.09	10.60	41.69	54.00	-12.31	V	AVG
1126.000	54.93	-10.42	44.51	74.00	-29.49	H	peak
2582.000	51.15	-3.44	47.71	74.00	-26.29	H	peak
3910.000	41.70	5.18	46.88	74.00	-27.12	H	peak
4875.000	48.52	6.73	55.25	74.00	-18.75	H	peak
4875.000	37.25	6.73	43.98	54.00	-10.02	H	AVG
7310.000	42.08	11.77	53.85	74.00	-20.15	H	peak
7310.000	33.51	11.77	45.28	54.00	-8.72	H	AVG

Remark:

1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*
2. *Radiated emissions measured in frequency above 1000MHz were made with an instrument using peak/average detector mode.*
3. *Average test would be performed if the peak result were greater than the average limit.*
4. *Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.*
5. *Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.*
6. *Margin (dB) = Remark result (dBuV/m) – Average limit (dBuV/m).*

Operation Mode: TX / IEEE 802.11g mode / CH High **Test Date:** 2014/7/23

Temperature: 26℃ **Tested by:** Eric Liao

Humidity: 56%RH **Polarity:** Ver. / Hor.

Freq. (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Ant. Pol H/V	Remark
1998.000	49.59	-1.33	48.26	74.00	-25.74	V	peak
2958.000	49.84	-1.03	48.81	74.00	-25.19	V	peak
4055.000	41.41	3.29	44.70	74.00	-29.30	V	peak
4915.000	47.42	4.51	51.93	74.00	-22.07	V	peak
4915.000	37.62	4.51	42.13	54.00	-11.87	V	AVG
7385.000	43.58	11.18	54.76	74.00	-19.24	V	peak
7385.000	30.52	11.18	41.70	54.00	-12.30	V	AVG
2144.000	51.05	-3.68	47.37	74.00	-26.63	H	peak
2594.000	51.14	-3.39	47.75	74.00	-26.25	H	peak
4930.000	47.14	7.28	54.42	74.00	-19.58	H	peak
4930.000	36.21	7.28	43.49	54.00	-10.51	H	AVG
5595.000	39.42	9.18	48.60	74.00	-25.40	H	peak
N/A							

Remark:

1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*
2. *Radiated emissions measured in frequency above 1000MHz were made with an instrument using peak/average detector mode.*
3. *Average test would be performed if the peak result were greater than the average limit.*
4. *Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.*
5. *Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.*
6. *Margin (dB) = Remark result (dBuV/m) – Average limit (dBuV/m).*

Operation Mode: TX / IEEE 802.11n HT20 mode / CH Low **Test Date:** 2014/7/22~23

Temperature: 26℃ **Tested by:** Eric Liao

Humidity: 56%RH **Polarity:** Ver. / Hor.

Freq. (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Ant. Pol H/V	Remark
1912.000	50.33	-2.69	47.64	74.00	-26.36	V	peak
2524.000	50.76	-1.23	49.53	74.00	-24.47	V	peak
4050.000	42.09	3.31	45.40	74.00	-28.60	V	peak
4825.000	52.68	2.68	55.36	74.00	-18.64	V	peak
4825.000	38.70	2.68	41.38	54.00	-12.62	V	AVG
5660.000	40.53	5.93	46.46	74.00	-27.54	V	peak
1126.000	55.08	-10.42	44.66	74.00	-29.34	H	peak
1890.000	51.03	-5.90	45.13	74.00	-28.87	H	peak
2792.000	49.24	-2.55	46.69	74.00	-27.31	H	peak
4825.000	46.90	5.88	52.78	74.00	-21.22	H	peak
4825.000	33.52	5.88	39.40	54.00	-14.60	H	AVG
5905.000	38.97	9.20	48.17	74.00	-25.83	H	peak
7295.000	39.69	11.75	51.44	74.00	-22.56	H	peak

Remark:

1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*
2. *Radiated emissions measured in frequency above 1000MHz were made with an instrument using peak/average detector mode.*
3. *Average test would be performed if the peak result were greater than the average limit.*
4. *Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.*
5. *Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.*
6. *Margin (dB) = Remark result (dBuV/m) – Average limit (dBuV/m).*

Operation Mode:	TX / IEEE 802.11n HT20 mode / CH Mid	**Test Date:**	2014/7/23
Temperature:	26℃	**Tested by:**	Eric Liao
Humidity:	56%RH	**Polarity:**	Ver. / Hor.

Freq. (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Ant. Pol H/V	Remark
2298.000	50.46	-1.55	48.91	74.00	-25.09	V	peak
2946.000	49.59	-0.95	48.64	74.00	-25.36	V	peak
3515.000	42.51	2.33	44.84	74.00	-29.16	V	peak
4045.000	41.58	3.32	44.90	74.00	-29.10	V	peak
4870.000	46.90	3.70	50.60	74.00	-23.40	V	peak
N/A							
1126.000	55.38	-10.42	44.96	74.00	-29.04	H	peak
2122.000	51.06	-3.73	47.33	74.00	-26.67	H	peak
2974.000	49.33	-0.94	48.39	74.00	-25.61	H	peak
4400.000	40.28	6.92	47.20	74.00	-26.80	H	peak
4880.000	43.21	6.81	50.02	74.00	-23.98	H	peak
5940.000	39.71	9.06	48.77	74.00	-25.23	H	peak

Remark:

1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*
2. *Radiated emissions measured in frequency above 1000MHz were made with an instrument using peak/average detector mode.*
3. *Average test would be performed if the peak result were greater than the average limit.*
4. *Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.*
5. *Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.*
6. *Margin (dB) = Remark result (dBuV/m) – Average limit (dBuV/m).*

Operation Mode:	TX / IEEE 802.11n HT20 mode / CH High	**Test Date:**	2014/7/23
Temperature:	26℃	**Tested by:**	Eric Liao
Humidity:	56%RH	**Polarity:**	Ver. / Hor.

Freq. (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Ant. Pol H/V	Remark
1350.000	52.67	-7.62	45.05	74.00	-28.95	V	peak
2970.000	49.42	-1.10	48.32	74.00	-25.68	V	peak
3515.000	43.08	2.33	45.41	74.00	-28.59	V	peak
4050.000	41.31	3.31	44.62	74.00	-29.38	V	peak
4925.000	44.49	4.61	49.10	74.00	-24.90	V	peak
N/A							
1126.000	54.52	-10.42	44.10	74.00	-29.90	H	peak
1890.000	51.70	-5.90	45.80	74.00	-28.20	H	peak
2966.000	49.18	-1.02	48.16	74.00	-25.84	H	peak
4330.000	40.05	7.44	47.49	74.00	-26.51	H	peak
4920.000	43.75	7.24	50.99	74.00	-23.01	H	peak
5915.000	39.78	9.16	48.94	74.00	-25.06	H	peak

Remark:

1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*
2. *Radiated emissions measured in frequency above 1000MHz were made with an instrument using peak/average detector mode.*
3. *Average test would be performed if the peak result were greater than the average limit.*
4. *Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.*
5. *Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.*
6. *Margin (dB) = Remark result (dBuV/m) – Average limit (dBuV/m).*

Operation Mode: TX / IEEE 802.11n HT40 mode / CH Low **Test Date:** 2014/7/22~23

Temperature: 26℃ **Tested by:** Eric Liao

Humidity: 56%RH **Polarity:** Ver. / Hor.

Freq. (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Ant. Pol H/V	Remark
1350.000	52.58	-7.62	44.96	74.00	-29.04	V	peak
2908.000	49.67	-0.71	48.96	74.00	-25.04	V	peak
4045.000	40.94	3.32	44.26	74.00	-29.74	V	peak
4845.000	47.10	3.13	50.23	74.00	-23.77	V	peak
5840.000	40.66	5.58	46.24	74.00	-27.76	V	peak
N/A							
1126.000	54.71	-10.42	44.29	74.00	-29.71	H	peak
1890.000	51.52	-5.90	45.62	74.00	-28.38	H	peak
2884.000	49.48	-1.85	47.63	74.00	-26.37	H	peak
4295.000	39.96	7.58	47.54	74.00	-26.46	H	peak
4850.000	42.50	6.30	48.80	74.00	-25.20	H	peak
5910.000	40.11	9.18	49.29	74.00	-24.71	H	peak

Remark:

1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*
2. *Radiated emissions measured in frequency above 1000MHz were made with an instrument using peak/average detector mode.*
3. *Average test would be performed if the peak result were greater than the average limit.*
4. *Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.*
5. *Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.*
6. *Margin (dB) = Remark result (dBuV/m) – Average limit (dBuV/m).*

Operation Mode: TX / IEEE 802.11n HT40 mode / CH Mid **Test Date:** 2014/7/22~23

Temperature: 26℃ **Tested by:** Eric Liao

Humidity: 56%RH **Polarity:** Ver. / Hor.

Freq. (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Ant. Pol H/V	Remark
1352.000	52.30	-7.59	44.71	74.00	-29.29	V	peak
1614.000	51.62	-4.91	46.71	74.00	-27.29	V	peak
2908.000	49.53	-0.71	48.82	74.00	-25.18	V	peak
4050.000	42.89	3.31	46.20	74.00	-27.80	V	peak
4880.000	46.02	3.92	49.94	74.00	-24.06	V	peak
7320.000	39.66	10.64	50.30	74.00	-23.70	V	peak
1126.000	56.06	-10.42	45.64	74.00	-28.36	H	peak
1350.000	53.95	-8.19	45.76	74.00	-28.24	H	peak
1892.000	50.47	-5.88	44.59	74.00	-29.41	H	peak
4320.000	39.06	7.51	46.57	74.00	-27.43	H	peak
4870.000	43.16	6.64	49.80	74.00	-24.20	H	peak
5950.000	38.80	9.03	47.83	74.00	-26.17	H	peak

Remark:

1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*
2. *Radiated emissions measured in frequency above 1000MHz were made with an instrument using peak/average detector mode.*
3. *Average test would be performed if the peak result were greater than the average limit.*
4. *Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.*
5. *Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.*
6. *Margin (dB) = Remark result (dBuV/m) – Average limit (dBuV/m).*

Operation Mode: TX / IEEE 802.11n HT40 mode / CH High **Test Date:** 2014/7/22~23

Temperature: 26℃ **Tested by:** Eric Liao

Humidity: 56%RH **Polarity:** Ver. / Hor.

Freq. (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Ant. Pol H/V	Remark
2000.000	50.12	-1.30	48.82	74.00	-25.18	V	peak
2854.000	49.60	-1.32	48.28	74.00	-25.72	V	peak
4050.000	42.64	3.31	45.95	74.00	-28.05	V	peak
4905.000	44.27	4.42	48.69	74.00	-25.31	V	peak
5915.000	38.90	6.10	45.00	74.00	-29.00	V	peak
N/A							
1126.000	55.22	-10.42	44.80	74.00	-29.20	H	peak
1350.000	53.04	-8.19	44.85	74.00	-29.15	H	peak
1890.000	52.21	-5.90	46.31	74.00	-27.69	H	peak
4905.000	43.20	7.17	50.37	74.00	-23.63	H	peak
5615.000	39.45	9.03	48.48	74.00	-25.52	H	peak
7350.000	39.32	11.57	50.89	74.00	-23.11	H	peak

Remark:

1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*
2. *Radiated emissions measured in frequency above 1000MHz were made with an instrument using peak/average detector mode.*
3. *Average test would be performed if the peak result were greater than the average limit.*
4. *Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.*
5. *Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.*
6. *Margin (dB) = Remark result (dBuV/m) – Average limit (dBuV/m).*

7.7 POWERLINE CONDUCTED EMISSIONS

LIMIT

According to §15.207(a), except as shown in paragraphs (b) and (c) of this section, for an intentional radiator that is designed to be connected to the public utility (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 the limits in the following table, as measured using a 50 μH/50 ohms line impedance stabilization network (LISN). Compliance with the provisions of this paragraph shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminal. The lower limit applies at the boundary between the frequency ranges.

Frequency Range (MHz)	Limits (dBμV)	
	Quasi-peak	Average
0.15 to 0.50	66 to 56*	56 to 46*
0.50 to 5	56	46
5 to 30	60	50

***** *Decreases with the logarithm of the frequency.*

Test Configuration

See test photographs attached in Appendix 1 for the actual connections between EUT and support equipment.

TEST PROCEDURE

1. The EUT was placed on a table, which is 0.8m above ground plane.
2. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
3. Repeat above procedures until all frequency measured were complete.

TEST RESULTS

The initial step in collecting conducted data is a spectrum analyzer peak scan of the measurement range. Significant peaks are then marked as shown on the following data page, and these signals are then quasi-peaked.

Test Data

Operation Mode:	Normal Link	**Test Date:**	2014/7/26
Temperature:	25℃	**Tested by:**	Eric Liao
Humidity:	57% RH		

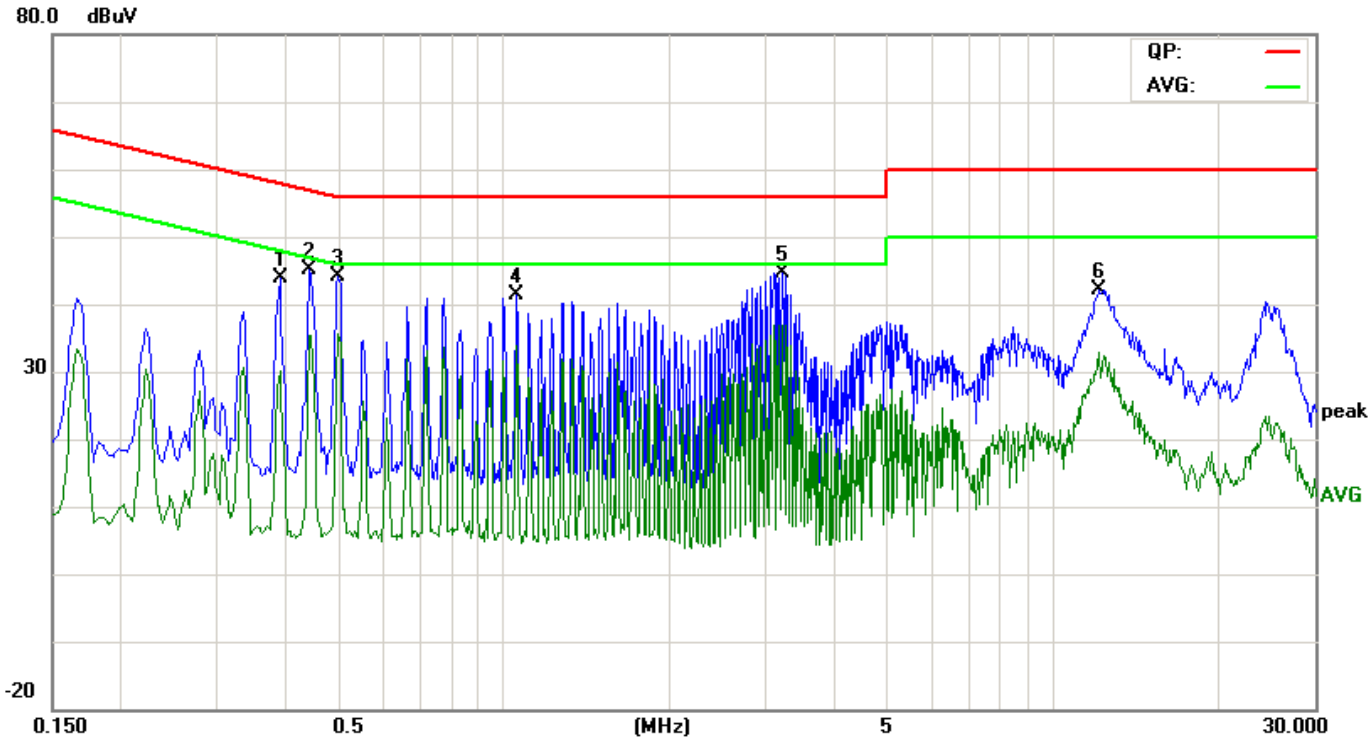
Freq. (MHz)	QP Reading	AV Reading	Corr. factor	QP Result	AV Result	QP Limit	AV Limit	QP Margin	AV Margin	Note
0.3900	34.03	20.30	9.75	43.78	30.05	58.06	48.06	-14.28	-18.01	L1
0.4420	35.32	25.73	9.75	45.07	35.48	57.02	47.02	-11.95	-11.54	L1
0.4980	34.35	25.91	9.75	44.10	35.66	56.03	46.03	-11.93	-10.37	L1
1.0540	31.73	24.27	9.72	41.45	33.99	56.00	46.00	-14.55	-12.01	L1
3.2180	34.74	27.12	9.83	44.57	36.95	56.00	46.00	-11.43	-9.05	L1
12.1500	32.12	22.31	10.00	42.12	32.31	60.00	50.00	-17.88	-17.69	L1
0.4420	28.61	16.39	9.73	38.34	26.12	57.02	47.02	-18.68	-20.90	L2
0.4980	27.37	16.83	9.73	37.10	26.56	56.03	46.03	-18.93	-19.47	L2
1.7220	26.84	11.43	9.75	36.59	21.18	56.00	46.00	-19.41	-24.82	L2
3.1100	29.55	15.73	9.81	39.36	25.54	56.00	46.00	-16.64	-20.46	L2
12.4300	29.28	17.21	10.02	39.30	27.23	60.00	50.00	-20.70	-22.77	L2
25.1340	31.46	9.77	10.20	41.66	19.97	60.00	50.00	-18.34	-30.03	L2

Remark:

1. *Measuring frequencies from 0.15 MHz to 30MHz.*
2. *The emissions measured in frequency range from 0.15 MHz to 30MHz were made with an instrument using Quasi-peak detector and average detector.*
3. *The IF bandwidth of SPA between 0.15MHz to 30MHz was 10kHz; the IF bandwidth of Test Receiver between 0.15MHz to 30MHz was 9kHz;*
4. *L1 = Line One (Live Line) / L2 = Line Two (Neutral Line)*

Test Plots

Conducted emissions (Line 1)



Conducted emissions (Line 2)