

# FCC 47 CFR PART 15 SUBPART C AND ANSI C63.10:2009 TEST REPORT

For

## **Dino-Lite CONNECT**

## Model : WF-10

### Trade Name : AnMo, Dino-Lite

**Issued for** 

## **AnMo Electronics Corporation**

5F-1, No. 76, Sec. 2, Tung-Da Road, Hsinchu 300, Taiwan

Issued by

### Compliance Certification Services Inc. Hsinchu Lab. NO. 989-1 Wen Shan Rd., Shang Shan Village, Qionglin Shiang Hsinchu County 30741, Taiwan, R.O.C TEL: +886-3-5921698 FAX: +886-3-5921108

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Issued Date: January 26, 2015



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# **Revision History**

Rev.	Issue Date	Revisions	Effect Page	Revised By
00	01/26/2015	Initial Issue	All Page 91	Dola Hsieh



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Compliance Certification Services Inc. FCC ID : 2ADVHWF10A

# **1. TEST REPORT CERTIFICATION**

Applicant	:	AnMo Electronics Corporation
Address	:	5F-1, No. 76, Sec. 2, Tung-Da Road, Hsinchu 300, Taiwan
Equipment Under Test	:	Dino-Lite CONNECT
Model	:	WF-10
Trade Name	:	AnMo, Dino-Lite
Tested Date	:	December 03, 2014 ~ January 26, 2015

APPLICABLE STANDARD		
Standard	Test Result	
FCC Part 15 Subpart C AND ANSI C63.10:2009	PASS	

WE HEREBY CERTIFY THAT: The above equipment has been tested by Compliance Certification Services Inc., and found compliance with the requirements set forth in the technical standards mentioned above. The results of testing in this report apply only to the product/system, which was tested. Other similar equipment will not necessarily produce the same results due to production tolerance and measurement uncertainties.

Approved by:

Sb. Lu Sr. Engineer

Reviewed by:

Gundam Lin Sr. Engineer



# 2. EUT DESCRIPTION

Product Name	Dino-Lite CONNECT	
Model Number	WF-10	
Identify Number	T141203D12	
Received Date	December 03, 2014	
Frequency Range	IEEE 802.11b/g, 802.11gn HT20 : 2412MHz ~ 2462MHz IEEE 802.11gn HT40 : 2422MHz ~ 2452MHz	
	IEEE 802.11b : 16.82 dBm (0.0481 W)	
Tronomit Douron	IEEE 802.11g : 22.72 dBm (0.1871 W)	
Transmit Power	IEEE 802.11gn HT20 : 22.75 dBm (0.1884 W)	
	IEEE 802.11gn HT40 : 22.43 dBm (0.1750 W)	
Channel Spacing	IEEE 802.11b/g, 802.11gn HT20/HT40 : 5MHz	
Channel Number	IEEE 802.11b/g, 802.11gn HT20 : 11 Channels	
	IEEE 802.11gn HT40 : 7 Channels	
	IEEE 802.11b : up to 11 Mbps	
	IEEE 802.11g : up to 54 Mbps	
Transmit Data Rate	IEEE 802.11gn (HT20,800ns GI) : up to 65.00 Mbps	
	IEEE 802.11gn (HT20,400ns GI) : up to 72.20 Mbps	
	IEEE 802.11gn (HT40,800ns GI) : up to 135.00 Mbps	
	IEEE 802.11gn (HT40,400ns GI) : up to 150.00 Mbps	
	IEEE 802.11b : DSSS (CCK, DQPSK, DBPSK)	
Type of Modulation	IEEE 802.11g : OFDM (64QAM, 16QAM, QPSK, BPSK)	
	IEEE 802.11gn HT20/40 : OFDM (64QAM, 16QAM, QPSK, BPSK)	
Antenna Type Flat Patch Antenna ,Antenna Gain : 4.00 dBi		
Power Rating	5Vdc(For Charging)	
	3.7Vdc, 1880mAh, 6.96Wh(For Battery)	
Test Voltage	120Vac, 60Hz	
DC Power Cable Type	Non-shielded cable, 1.8m × 1 (Non-detachable)	
I/O Port	USB Port × 1, Power Port × 1, Mini USB Port × 1	

#### **Power Adapter :**

No	Manufacturer	Model No.	Power Input	Power Output
1	UE	UE10WCP1-050200 SPA	100-240Vac, 50/60Hz, 500mA	5Vdc, 2.0A

Remark :

- 1. The sample selected for test was engineering sample that approximated to production product and was provided by manufacturer.
- 2. For more details, please refer to the User's manual of the EUT.
- 3. This submittal(s) (test report) is intended for FCC ID: 2ADVHWF10A filing to comply with Section 15.207, 15.209 and 15.247 of the FCC Part 15, Subpart C Rules.



# **3. DESCRIPTION OF TEST MODES**

The EUT is an 802.11n transceiver in Dino-Lite CONNECT form factor. For IEEE 802.11b/g, 802.11gn HT20/HT40 mode : 1TX/1RX.

### Conducted Emission / Radiated Emission Test (Below 1 GHz)

1. The following test modes were scanned during the preliminary test:

No.	Pre-Test Mode
1	TX Mode

2. After the preliminary scan, the following test mode was found to produce the highest emission level.

Final Test Mode			
Emission	Radiated Emission	TX Mode	
Emission	Conducted Emission	TX Mode	

**Remark :** Then, the above highest emission mode of the configuration of the EUT and cable was chosen for all final test items.



### Conducted / Radiated Emission Test (Above 1 GHz)

### IEEE 802.11b, 802.11g, 802.11gn HT20 mode

The EUT had been tested under operating condition.

There are three channels have been tested as following :

Channel	Frequency (MHz)
Low	2412
Middle	2437
High	2462

IEEE 802.11b mode : 1Mbps data rate (worst case) were chosen for full testing.

IEEE 802.11g mode : 6Mbps data rate (worst case) were chosen for full testing.

IEEE 802.11gn HT20 mode : 6.5Mbps data rate (worst case) were chosen for full testing.

### IEEE 802.11gn HT40 mode

The EUT had been tested under operating condition. There are three channels have been tested as following :

Channel	Frequency (MHz)
Low	2422
Middle	2437
High	2452

IEEE 802.11gn HT40 mode : 13.5Mbps data rate (worst case) were chosen for full testing. **Remark :** The field strength of spurious emission was measured in the following position: EUT stand-up position(Z axis), lie-down position(X, Y axis). The worst emission was found in lie-down position(X axis) and the worst case was recorded.



# 4. TEST METHODOLOGY

The tests documented in this report were performed in accordance with ANSI C63.10: 2009 and FCC CFR 47, 15.207, 15.209 and 15.247.

# **5. FACILITIES AND ACCREDITATION**

## **5.1 FACILITIES**

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

NO. 989-1 Wen Shan Rd., Shang Shan Village, Qionglin Shiang Hsinchu County 30741, Taiwan, R.O.C

The sites are constructed in conformance with the requirements of ANSI C63.10:2009 and CISPR 22. All receiving equipment conforms to CISPR 16-1-1, CISPR 16-1-2, CISPR 16-1-3, CISPR 16-1-4, CISPR 16-1-5.

## **5.2 ACCREDITATIONS**

Our laboratories are accredited and approved by the following approval agencies according to ISO/IEC 17025.

Taiwan TAF

The measuring facility of laboratories has been authorized or registered by the following approval agencies.

Canada	INDUSTRY CANADA
Japan	VCCI
Taiwan	BSMI
USA	FCC MRA

Copies of granted accreditation certificates are available for downloading from our web site, http:///www.ccsrf.com

Remark: FCC Designation Number TW1027.

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# 5.3 MEASUREMENT UNCERTAINTY

The following table is for the measurement uncertainty, which is calculated as per the document CISPR 16-4-2.

PARAMETER	UNCERTAINTY
Semi Anechoic Chamber (966 Chamber_B) / Radiated Emission, 30 to 1000 MHz	+/- 3.97
Semi Anechoic Chamber (966 Chamber_B) / Radiated Emission, 1 to 18GHz	+/- 3.58
Semi Anechoic Chamber (966 Chamber_B) / Radiated Emission, 18 to 26 GHz	+/- 3.59
Semi Anechoic Chamber (966 Chamber_B) / Radiated Emission, 26 to 40 GHz	+/- 3.81
Conducted Emission (Mains Terminals), 9kHz to 30MHz	+/- 2.48

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

Consistent with industry standard (e.g. CISPR 22, clause 11, Measurement Uncertainty) determining compliance with the limits shall be base on the results of the compliance measurement. Consequently the measure emissions being less than the maximum allowed emission result in this be a compliant test or passing test.

The acceptable measurement uncertainty value without requiring revision of the compliance statement is base on conducted and radiated emissions being less than  $U_{CISPR}$  which is 3.6dB and 5.2dB respectively. CCS values (called  $U_{Lab}$  in CISPR 16-4-2) is less than  $U_{CISPR}$  as shown in the table above. Therefore, MU need not be considered for compliance.



# 6. SETUP OF EQUIPMENT UNDER TEST

### SUPPORT EQUIPMENT

No.	Product	Manufacturer	Model No.	Serial No.	
1	Notebook PC	HP	ProBook 4421s	CNF03242PJ	

No.	Signal Cable Description
1	Non-shielded RJ-45 cable, 12m × 1

### SETUP DIAGRAM FOR TESTS

EUT & peripherals setup diagram is shown in appendix setup photos.

### **EUT OPERATING CONDITION**

- 1. EUT & peripherals setup diagram is shown in appendix setup photos.
- 2. Run Test software. "RT5350QA"

TX Mode:

TX Data Rate: 1Mbps Bandwidth 20 (IEEE 802.11b mode)

6Mbps Bandwidth 20 (IEEE 802.11g mode)

6.5Mbps Bandwidth 20 (IEEE 802.11gn HT20 mode)

13.5Mbps Bandwidth 40 (IEEE 802.11gn HT40 mode)

### Power control

IEEE 802.11b Channel Low (2412MHz) Power set 1B

IEEE 802.11b Channel Mid (2437MHz) Power set 1A

IEEE 802.11b Channel High (2462MHz) Power set 18

IEEE 802.11g Channel Low (2412MHz) Power set 1F

IEEE 802.11g Channel Mid (2437MHz) Power set 1F

IEEE 802.11g Channel High (2462MHz) Power set 1F

IEEE 802.11gn HT20 Channel Low (2412MHz) Power set 1F

IEEE 802.11gn HT20 Channel Mid (2437MHz) Power set 1F

IEEE 802.11gn HT20 Channel High (2462MHz) Power set 1F

IEEE 802.11gn HT40 Channel Low (2422MHz) Power set 1F

IEEE 802.11gn HT40 Channel Mid (2437MHz) Power set 1F

IEEE 802.11gn HT40 Channel High (2452MHz) Power set 1F

- 3. All of the functions are under run.
- 4. Start test.



# 7. FCC PART 15.247 REQUIREMENTS

## 7.1 6dB BANDWIDTH

### <u>LIMITS</u>

§ 15.247(a) (2) For direct sequence systems, the minimum 6dB bandwidth shall be at least 500kHz.

### TEST EQUIPMENT

Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
Spectrum Analyzer	Agilent	E4446A	MY43360132	06/10/2015
EXA Signal Analyzer	Agilent	N9010A	MY52220817	03/20/2015

**Remark:** Each piece of equipment is scheduled for calibration once a year.

### TEST SETUP



### TEST PROCEDURE

- 1. The transmitter output was connected to a spectrum analyzer.
- 2. Set RBW = 100 kHz.
- 3. Set the video bandwidth (VBW)  $\ge$  3 x RBW.
- 4. Detector = Peak.
- 5. Trace mode = max hold.
- 6. Sweep = auto couple.
- 7. Allow the trace to stabilize.
- 8. Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission.



### TEST RESULTS

#### IEEE 802.11b Mode

Channel	Channel Frequency (MHz)	6dB Bandwidth (MHz)	Minimum Limit (kHz)	Pass / Fail
Low	2412	11.995	500	PASS
Middle	2437	12.045	500	PASS
High	2462	12.050	500	PASS

### IEEE 802.11g Mode

Channel	Channel Frequency (MHz)	6dB Bandwidth (MHz)	Minimum Limit (kHz)	Pass / Fail
Low	2412	16.372	500	PASS
Middle	2437	16.375	500	PASS
High	2462	16.383	500	PASS

#### IEEE 802.11gn HT20 Mode

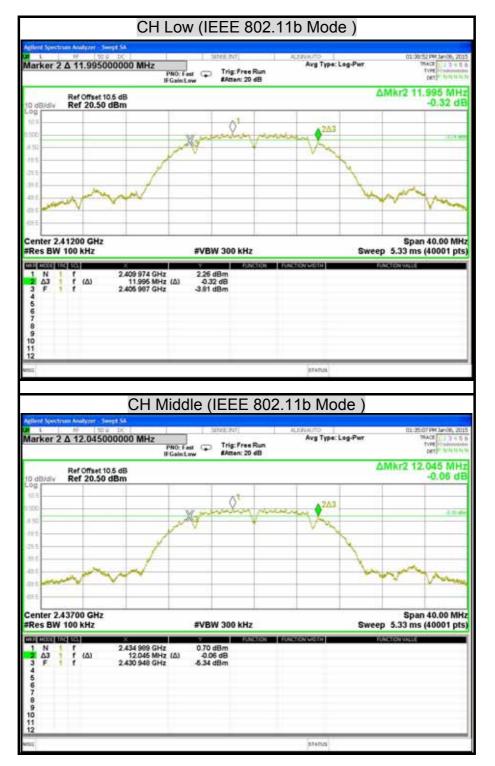
Channel	Channel Frequency (MHz)	6dB Bandwidth (MHz)	Minimum Limit (kHz)	Pass / Fail
Low	2412	17.315	500	PASS
Middle	2437	17.539	500	PASS
High	2462	17.291	500	PASS

### IEEE 802.11gn HT40 Mode

Channel	Channel Frequency (MHz)	6dB Bandwidth (MHz)	Minimum Limit (kHz)	Pass / Fail
Low	2422	35.250	500	PASS
Middle	2437	35.284	500	PASS
High	2452	35.278	500	PASS



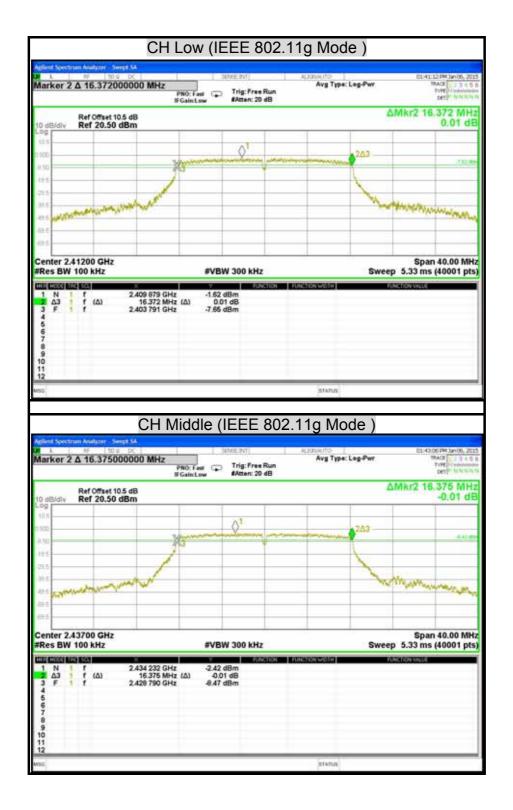
### 6dB BANDWIDTH







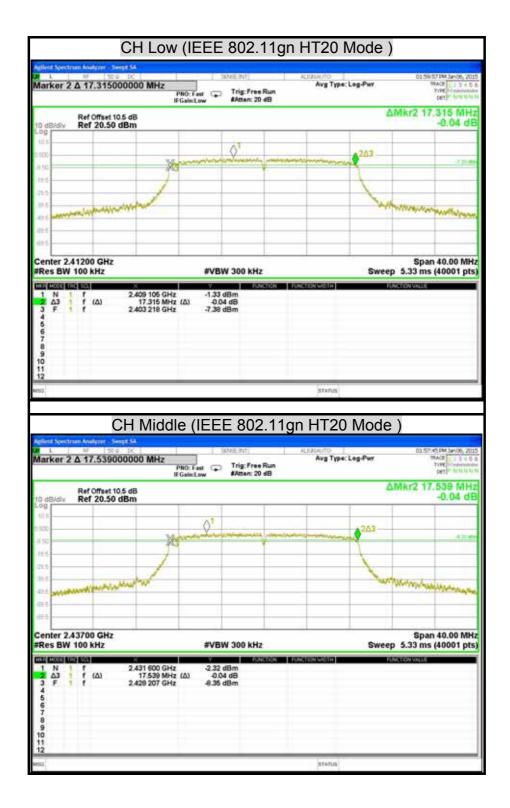




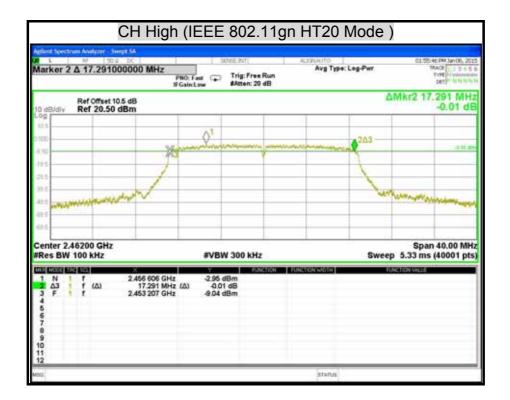




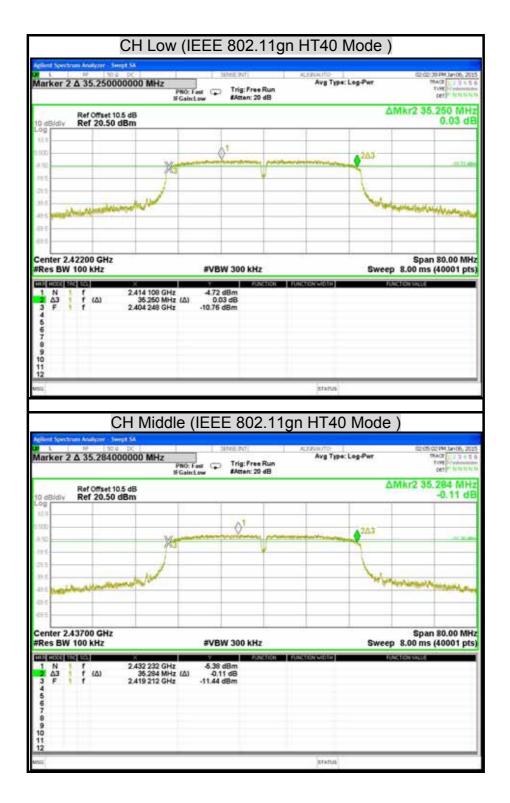




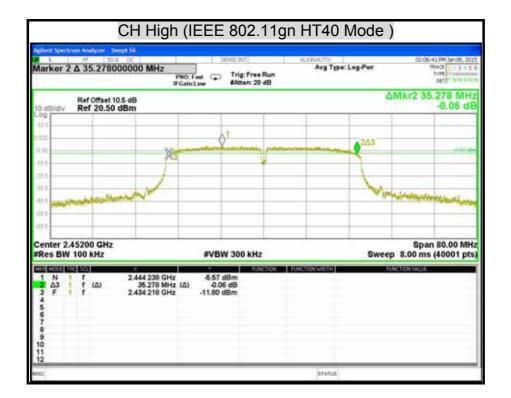














# 7.2 MAXIMUM PEAK OUTPUT POWER

### <u>LIMITS</u>

§ 15.247(b) The maximum peak output power of the intentional radiator shall not exceed the following :

§ 15.247(b) (3) For systems using digital modulation in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz bands : 1 watt.

§ 15.247(b) (4) Except as shown in paragraphs (c) of this section, if transmitting antennas of directional gain greater than 6 dBi are used the peak output power from the intentional radiator shall be reduced below the stated values in paragraphs (b)(1) or (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.

§ KDB 662911 : For power measurements on IEEE 802.11 devices

Array Gain = 0 dB (i.e., no array gain) for  $N_{ANT} \le 4$ ;

Array Gain = 0 dB (i.e., no array gain) for channel widths  $\ge$  40 MHz for any N<sub>ANT</sub>;

Array Gain = 5 log( $N_{ANT}/N_{SS}$ ) dB or 3 dB, whichever is less for 20-MHz channel widths with  $N_{ANT} \ge 5$ .

### TEST EQUIPMENT

Name of Equipment Manufacturer		Model	Serial Number	Calibration Due
Power Meter	Anritsu	ML2495A	1149001	12/11/2015
Power Sensor	Anritsu	MA2411B	1126148	12/11/2015

**Remark:** Each piece of equipment is scheduled for calibration once a year.

### TEST SETUP



### TEST PROCEDURE

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



### TEST RESULTS

#### IEEE 802.11b Mode

Channel	Channel Frequency	Peak I	Power	Peak Pov	wer Limit	Pass / Fail
Channel	(MHz)	(dBm)	(W)	(dBm)	(W)	
Low	2412	16.82	0.0481	30	1	PASS
Middle	2437	15.54	0.0358	30	1	PASS
High	2462	13.89	0.0245	30	1	PASS

#### Remark:

1. At finial test to get the worst-case emission at 1Mbps.

2. The cable assembly insertion loss of 10.5dB (including 10 dB pad and 0.5 dB cable) was Entered as an offset in the power meter to allow for direct reading of power.

#### IEEE 802.11g Mode

Channel	Channel Frequency	Peak I	Power	Peak Pov	wer Limit	Pass / Fail
Channel	(MHz)	(dBm)	(W)	(dBm)	(W)	- Fass / Faii
Low	2412	22.72	0.1871	30	1	PASS
Middle	2437	22.52	0.1786	30	1	PASS
High	2462	21.54	0.1426	30	1	PASS

Remark:

1. At finial test to get the worst-case emission at 6Mbps.

2. The cable assembly insertion loss of 10.5dB (including 10 dB pad and 0.5 dB cable) was Entered as an offset in the power meter to allow for direct reading of power.

### IEEE 802.11gn HT20 Mode

Channel	Channel	Peak	Power	Peak Pov	ver Limit	Pass / Fail
Channel	Frequency (MHz)	(dBm)	(W)	(dBm)	(W)	Fa557 Faii
Low	2412	22.75	0.1884	30	1	PASS
Middle	2437	21.68	0.1472	30	1	PASS
High	2462	21.67	0.1469	30	1	PASS

Remark:

1. At finial test to get the worst-case emission at 6.5Mbps.

2. The cable assembly insertion loss of 10.5dB (including 10 dB pad and 0.5 dB cable) was Entered as an offset in the power meter to allow for direct reading of power.

<b>IEEE 802.11</b>	gn HT40 Mode

Channel Channel Frequency		Peak	Peak Power		Peak Power Limit	
Channel	Frequency (MHz)	(dBm)	(W)	(dBm)	(W)	Pass / Fail
Low	2422	22.43	0.1750	30	1	PASS
Middle	2437	21.42	0.1387	30	1	PASS
High	2452	21.34	0.1361	30	1	PASS

Remark:

1. At finial test to get the worst-case emission at 13.5Mbps.

2. The cable assembly insertion loss of 10.5dB (including 10 dB pad and 0.5 dB cable) was Entered as an offset in the power meter to allow for direct reading of power.



## 7.3 AVERAGE POWER

### **LIMITS**

None; for reporting purposes only.

### **TEST EQUIPMENT**

Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
Power Meter	ANRITSU	ML2495A	1149001	12/11/2015
Power Sensor	ANRITSU	MA2411B	1126148	12/11/2015

Remark: Each piece of equipment is scheduled for calibration once a year.

### TEST SETUP



### TEST PROCEDURE

The transmitter output is connected to the power meter. The power meter is set to the average power detection.



### TEST RESULTS

#### IEEE 802.11b Mode

Channel	Channel Frequency (MHz)	Average Power (dBm)
Low	2412	14.29
Middle	2437	13.09
High	2462	11.19

Remark:

1. At finial test to get the worst-case emission at 1Mbps.

2. The cable assembly insertion loss of 10.5 dB (including 10 dB pad and 0.5 dB cable) was Entered as an offset in the power meter to allow for direct reading of power.

#### IEEE 802.11g Mode

Channel	Channel Frequency (MHz)	Average Power (dBm)
Low	2412	13.09
Middle	2437	12.84
High	2462	11.84

Remark:

1. At finial test to get the worst-case emission at 6Mbps.

2. The cable assembly insertion loss of 10.5 dB (including 10 dB pad and 0.5 dB cable) was Entered as an offset in the power meter to allow for direct reading of power.



### IEEE 802.11gn HT20 Mode

Channel	Channel Frequency (MHz)	Average Power (dBm)
Low	2412	13.14
Middle	2437	12.45
High	2462	11.34

Remark:

1. At finial test to get the worst-case emission at 6.5Mbps.

2. The cable assembly insertion loss of 10.5 dB (including 10 dB pad and 0.5 dB cable) was Entered as an offset in the power meter to allow for direct reading of power.

#### IEEE 802.11gn HT40 Mode

Channel	Channel Frequency (MHz)	Average Power (dBm)
Low	2422	12.99
Middle	2437	12.31
High	2452	11.87

Remark:

1. At finial test to get the worst-case emission at 13.5Mbps.

2. The cable assembly insertion loss of 10.5 dB (including 10 dB pad and 0.5 dB cable) was Entered as an offset in the power meter to allow for direct reading of power.



# 7.4 POWER SPECTRAL DENSITY

### <u>LIMITS</u>

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

### TEST EQUIPMENT

Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
Spectrum Analyzer	Agilent	E4446A	MY43360132	06/10/2015
EXA Signal Analyzer	Agilent	N9010A	MY52220817	03/20/2015

Remark: Each piece of equipment is scheduled for calibration once a year.

### TEST SETUP



### TEST PROCEDURE

- 1. The transmitter output was connected to the spectrum analyzer.
- 2. Set analyzer center frequency to DTS channel center frequency.
- 3. Set the span to 1.5 times the DTS channel bandwidth.
- 4. Set the RBW to:  $3 \text{ kHz} \leq \text{RBW} \leq 100 \text{ kHz}$ .
- 5. Set the VBW  $\geq$  3 x RBW.
- 6. Detector = peak.
- 7. Sweep time = auto couple.
- 8. Trace mode = max hold.
- 9. Allow trace to fully stabilize.
- 10. Use the peak marker function to determine the maximum amplitude level within the RBW.
- 11. If measured value exceeds limit, reduce RBW (no less than 3 kHz) and repeat.



### TEST RESULTS

#### IEEE 802.11b Mode

Channel	Channel Frequency (MHz)	Final RF Power Level in 3KHz BW (dBm)	Minimum Limit (dBm)	Pass / Fail
Low	2412	-16.790	8	PASS
Middle	2437	-18.280	8	PASS
High	2462	-19.980	8	PASS

Remark:

1. At finial test to get the worst-case emission at 1Mbps.

2. The cable assembly insertion loss of 10.5dB (including 10 dB pad and 0.5 dB cable) was Entered as an offset in the spectrum analyzer to allow for direct reading of power.

#### IEEE 802.11g Mode

Channel	Channel Frequency (MHz)	Final RF Power Level in 3KHz BW (dBm)	Minimum Limit (dBm)	Pass / Fail
Low	2412	-16.250	8	PASS
Middle	2437	-16.577	8	PASS
High	2462	-18.270	8	PASS

Remark:

1. At finial test to get the worst-case emission at 6Mbps.

2. The cable assembly insertion loss of 10.5dB (including 10 dB pad and 0.5 dB cable) was Entered as an offset in the spectrum analyzer to allow for direct reading of power.



### IEEE 802.11gn HT20 Mode

Channel	Channel Frequency (MHz)	Final RF Power Level in 3KHz BW (dBm)	Minimum Limit (dBm)	Pass / Fail
Low	2412	-15.350	8	PASS
Middle	2437	-16.451	8	PASS
High	2462	-17.609	8	PASS

#### Remark:

1. At finial test to get the worst-case emission at 6.5Mbps.

2. The cable assembly insertion loss of 10.5dB (including 10 dB pad and 0.5 dB cable) was Entered as an offset in the spectrum analyzer to allow for direct reading of power.

Channel	Channel Frequency (MHz)	Final RF Power Level in 3KHz BW (dBm)	Minimum Limit (dBm)	Pass / Fail
Low	2422	-18.093	8	PASS
Middle	2437	-17.150	8	PASS
High	2452	-18.380	8	PASS

#### IEEE 802.11gn HT40 Mode

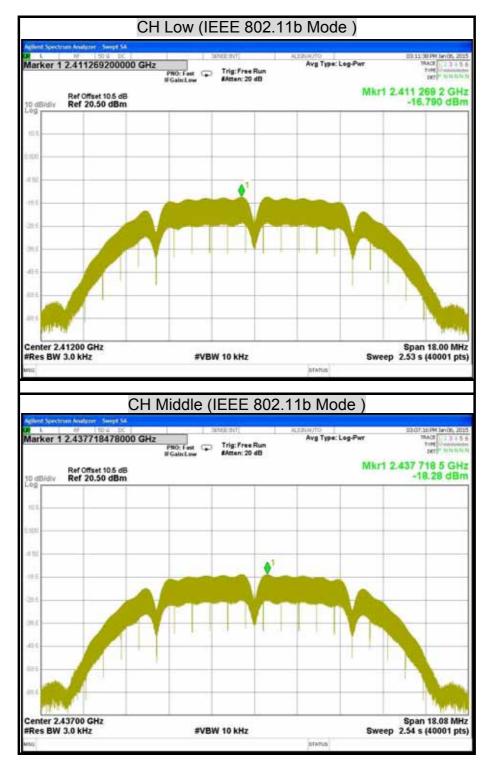
Remark:

1. At finial test to get the worst-case emission at 13.5Mbps.

2. The cable assembly insertion loss of 10.5dB (including 10 dB pad and 0.5 dB cable) was Entered as an offset in the spectrum analyzer to allow for direct reading of power.



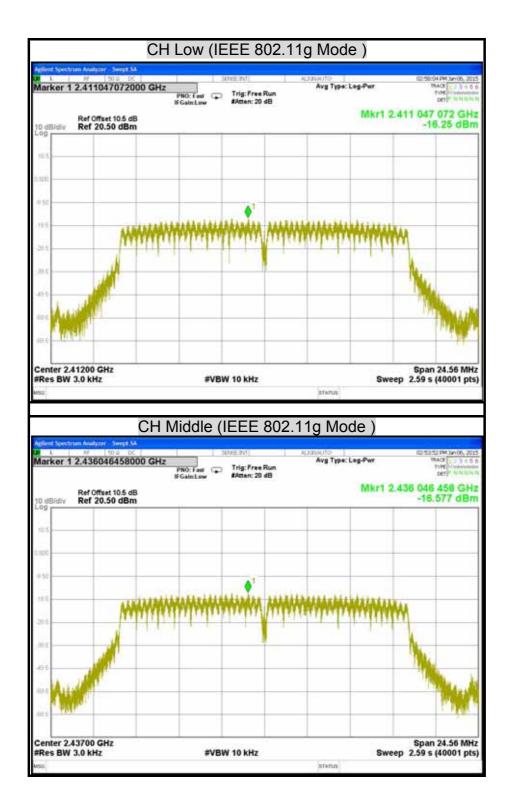
## POWER SPECTRAL DENSITY



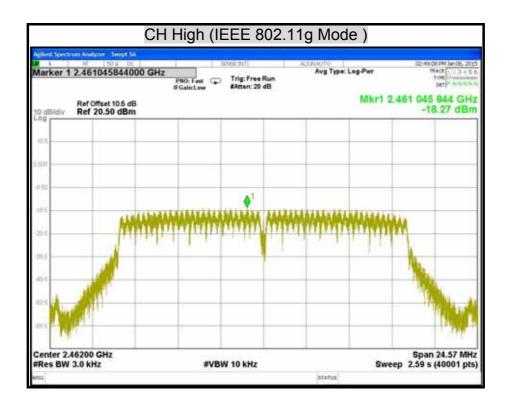




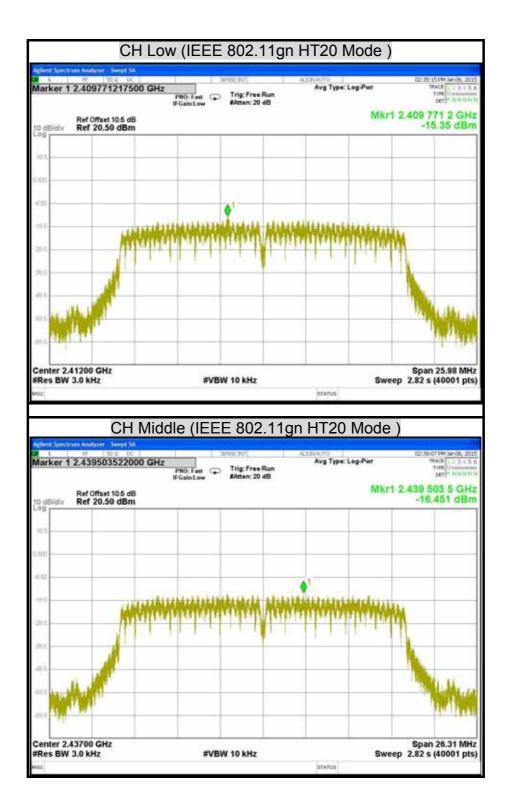




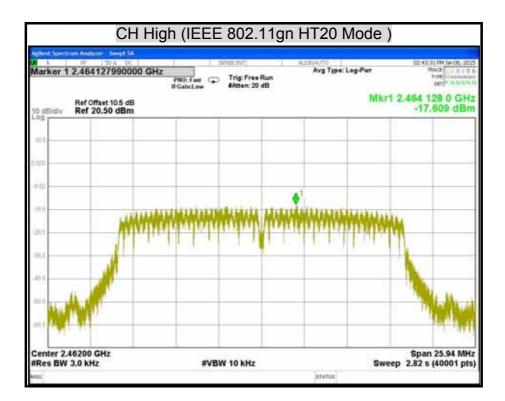




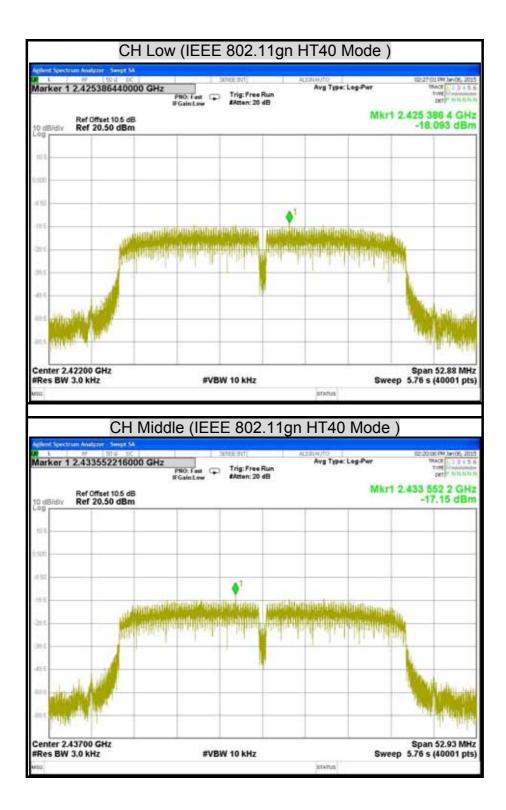




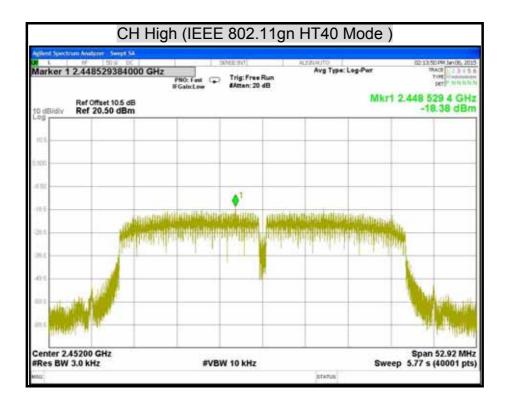














# 7.5 CONDUCTED SPURIOUS EMISSION

## <u>LIMITS</u>

§ 15.247(d) In any 100 kHz bandwidth outside the frequency band in which the spread spectrum intentional radiator is 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 and that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement. Attenuation below the general limits specified in § 15.209(a) is not required. 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 § 15.205(c)).

## TEST EQUIPMENT

Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
Spectrum Analyzer	Agilent	E4446A	MY43360132	06/10/2015
EXA Signal Analyzer	Agilent	N9010A	MY52220817	03/20/2015

**Remark:** Each piece of equipment is scheduled for calibration once a year.

## TEST SETUP



## TEST PROCEDURE

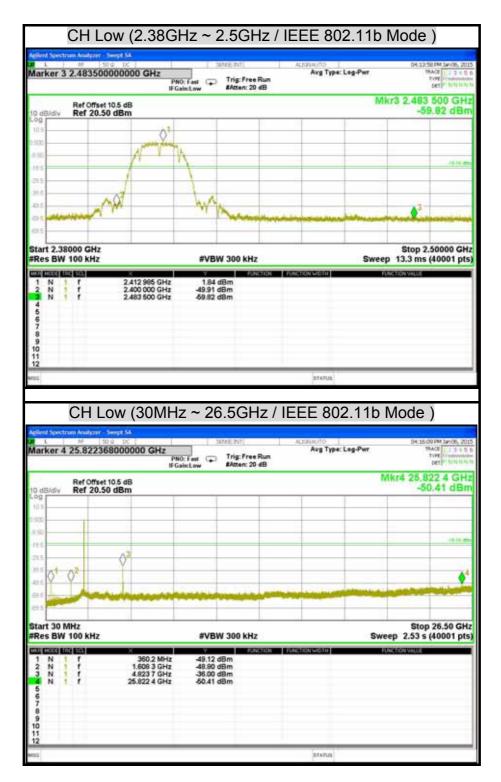
The transmitter output is connected to a spectrum analyzer. The resolution bandwidth is set to 100 kHz. The video bandwidth is set to 300 kHz.

The spectrum from 30 MHz to 26.5 GHz is investigated with the transmitter set to the lowest, middle, and highest channels in the 2.4 GHz band.

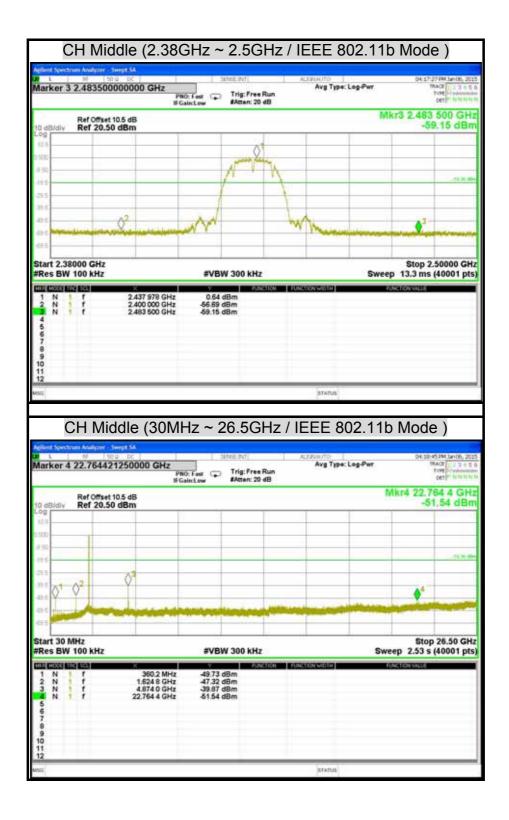


## TEST RESULTS

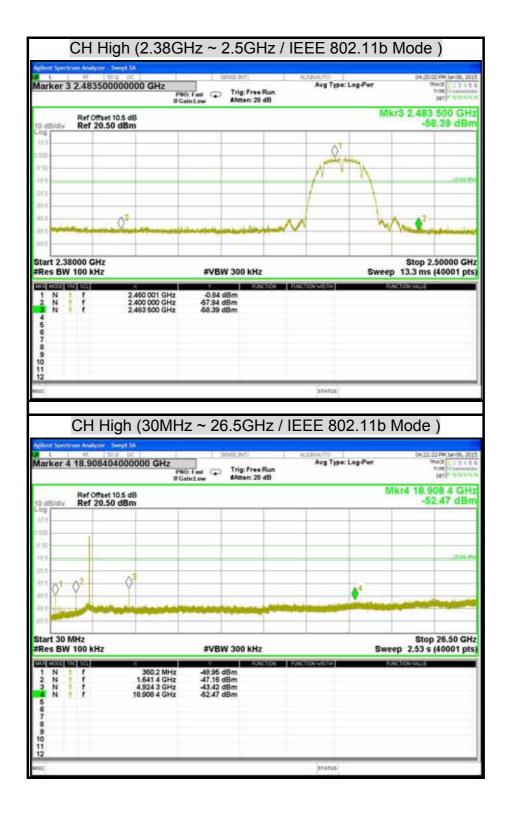
## **OUT-OF-BAND SPURIOUS EMISSIONS-CONDUCTED MEASUREMENT**



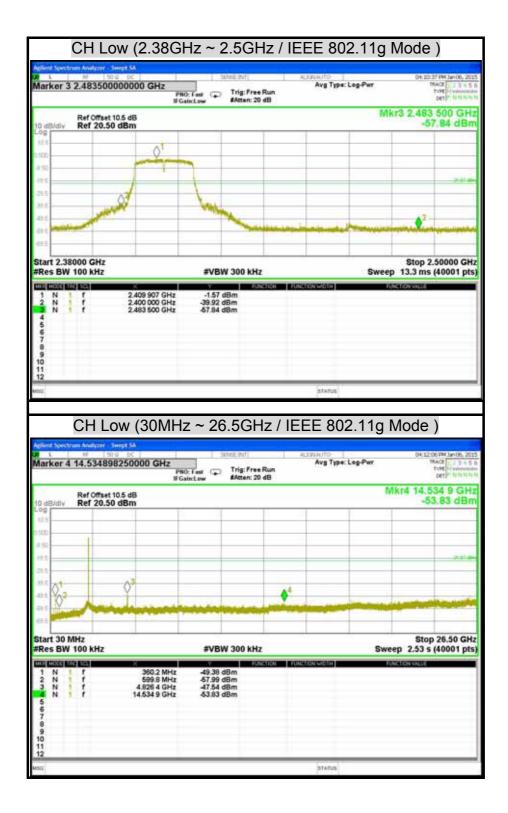




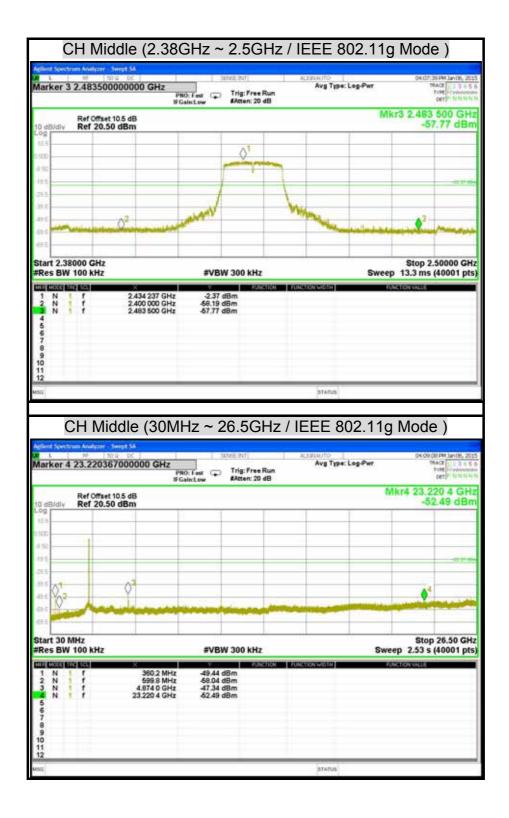




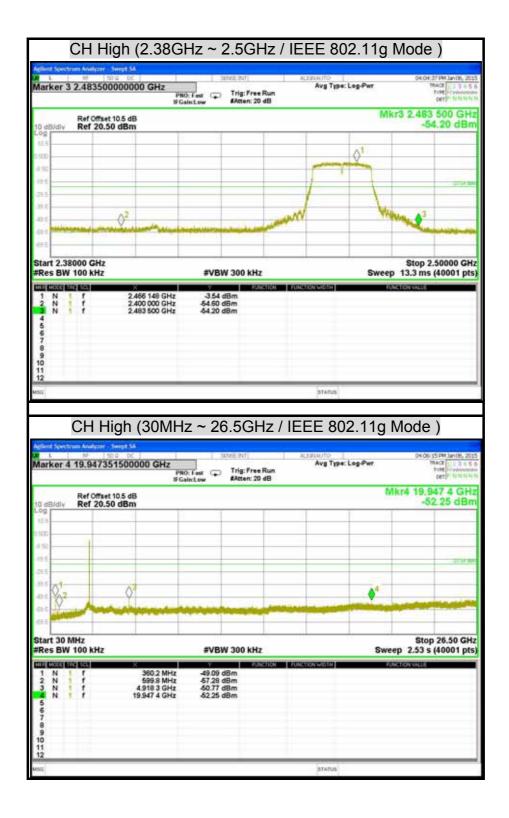




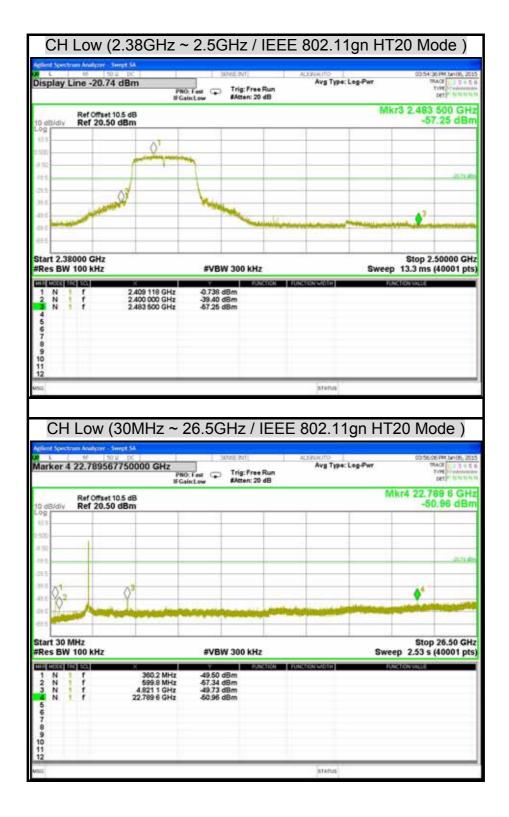




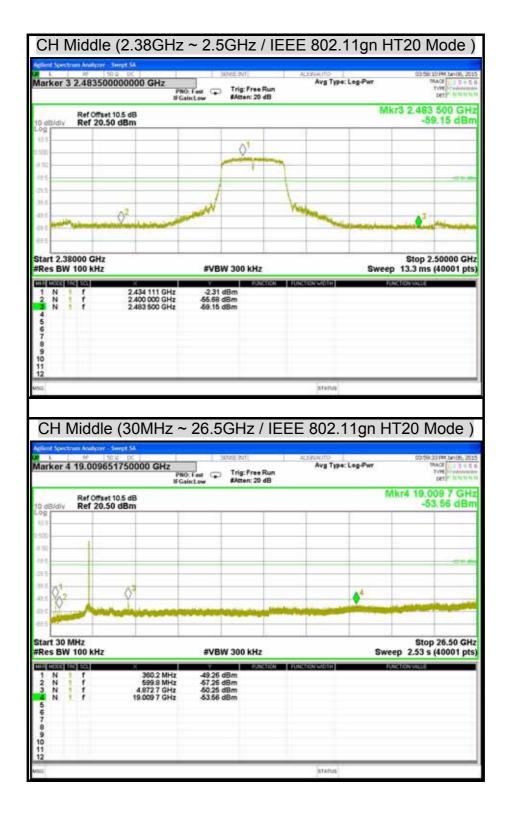




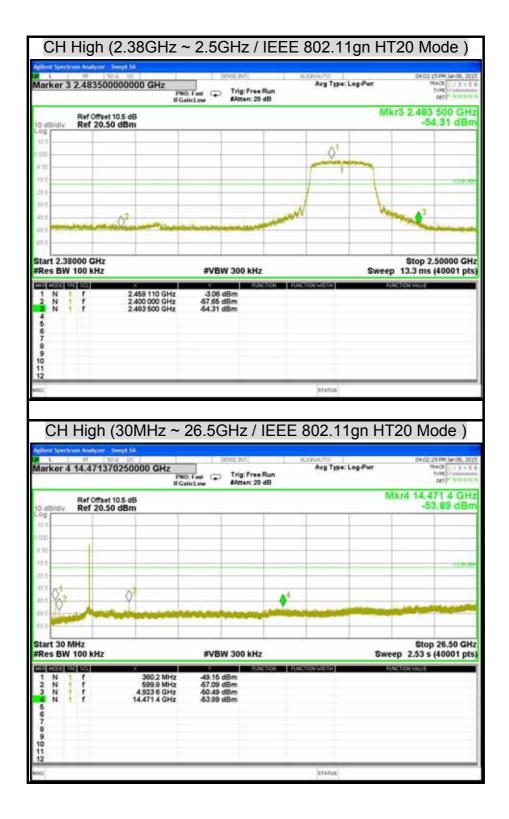




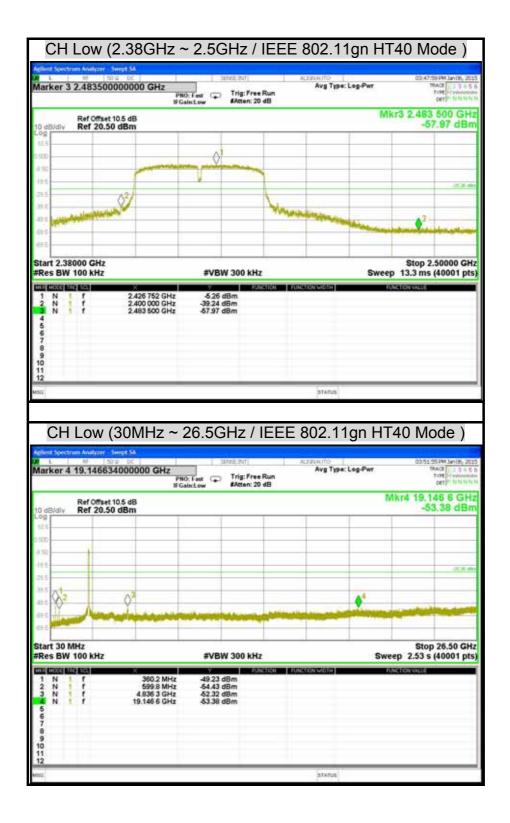




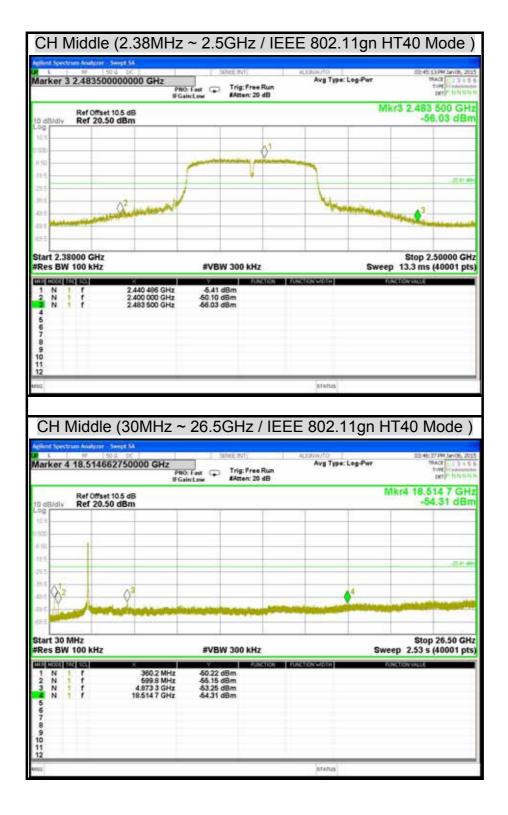




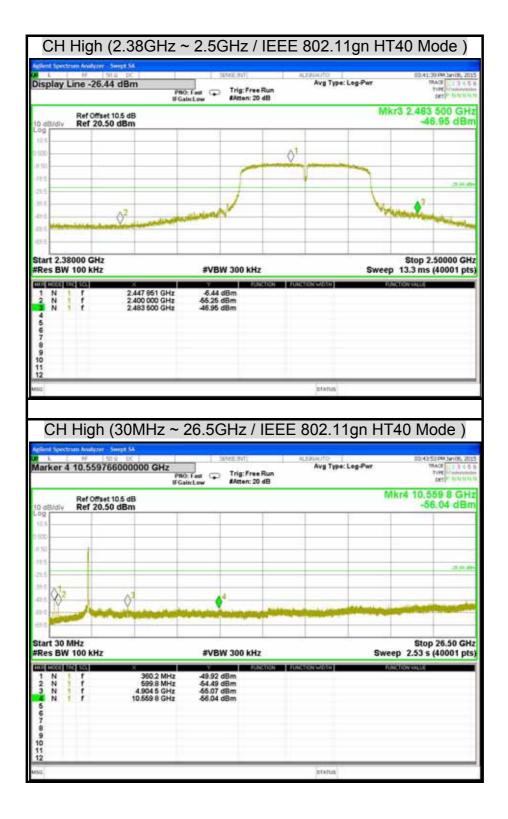














# 7.6 RADIATED EMISSION

## LIMITS

(1) According to § 15.205 (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
<sup>1</sup> 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 - 156.52525	2483.5 - 2500	17.7 - 21.4
8.37625 - 8.38675	156.7 - 156.9	2655 - 2900	22.01 - 23.12
8.41425 - 8.41475	162.0125 - 167.17	3260 - 3267	23.6 - 24.0
12.29 - 12.293	167.72 - 173.2	3332 - 3339	31.2 - 31.8
12.51975 - 12.52025	240 - 285	3345.8 - 3338	36.43 - 36.5
12.57675 - 12.57725	322 -335.4	3600 - 4400	( <sup>2</sup> )
13.36 - 13.41			

#### Remark:

1.<sup>1</sup> Until February 1, 1999, this restricted band shall be 0.490-0.510 MHz.

2.<sup>2</sup> Above 38.6

(2) According to § 15.205 (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 is 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.

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(3) 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 (microvolts/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

**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.

(4) According to § 15.209 (b) In the emission table above, the tighter limit applies at the band edges.

### TEST EQUIPMENT

### Radiated Emission / 966Chamber\_B

Name of Equipment	Manufacture	Model	Serial Number	Calibration Due
Spectrum Analyzer	Agilent	E4446A	MY46180323	04/15/2015
EMI Test Receiver	ROHDE & SCHWARZ	ESCS 30	835418/008	10/14/2015
Bi-log Antenna	SCHWARZBECK	VULB 9168	9168-250	08/21/2015
Broad-Band Horn Antenna	SCHWARZBECK	BBHA 9120 D	9120D-778	08/19/2015
Double-Ridged Waveguide Horn	ETS-LINDGREN	3117	00078733	12/02/2015
Horn Antenna	COM-POWER	AH-840	03077	12/17/2015
Pre-Amplifier	Agilent	8447D	2944A10052	07/15/2015
Pre-Amplifier	Agilent	8449B	3008A01916	07/15/2015
LOOP Antenna	EMCO	6502	8905-2356	09/23/2015
Notch Filters Band Reject	Micro-Tronics	BRM05702-01	026	N.C.R

**Remark:** 1. Each piece of equipment is scheduled for calibration once a year.

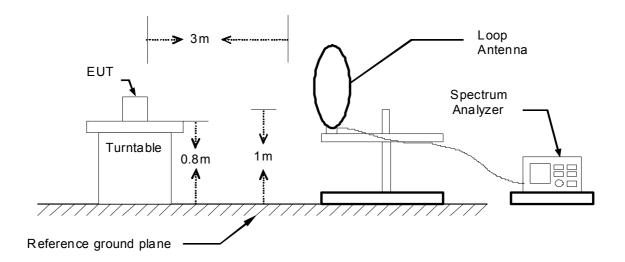
2. N.C.R = No Calibration Request.

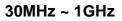


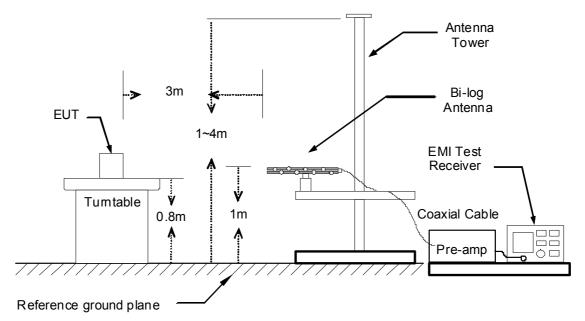
## TEST SETUP

The diagram below shows the test setup that is utilized to make the measurements for emission below 1GHz.

## 9kHz ~ 30MHz

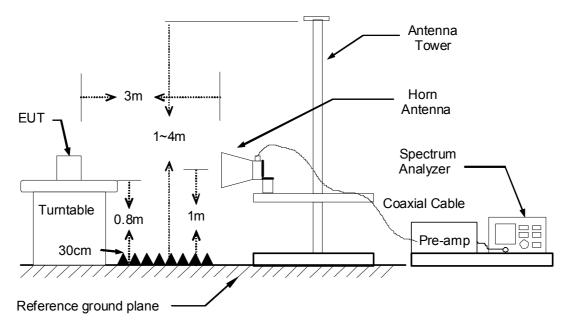








The diagram below shows the test setup that is utilized to make the measurements for emission above 1GHz.



## TEST PROCEDURE

- 1. The EUT was placed on the top of a rotating table 0.8 meters above the ground. The table was rotated 360 degrees to determine the position of the highest radiation.
- 2. While measuring the radiated emission below 1GHz, the EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower. While measuring the radiated emission above 1GHz, the EUT was set 3 meters away from the interference-receiving antenna.
- 3. The antenna is a broadband antenna, and its height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarization of the antenna are set to make the measurement.
- 4. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the table was turned from 0 degrees to 360 degrees to find the maximum reading.
- 5. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
- 6. If the emission level of the EUT in peak mode was 10 dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10 dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.

### Remark :

- 1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120 KHz for Peak detection (PK) and Quasi-peak detection (QP) at frequency below 1GHz.
- 2. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 1 MHz for Peak detection and frequency above 1GHz.
- 3. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 10 Hz for Average detection (AV) at frequency above 1GHz.



## TEST RESULTS

## Below 1 GHz (9kHz ~ 30MHz)

No emission found between lowest internal used/generated frequency to 30MHz.

### Below 1 GHz (30MHz ~ 1GHz)

Product Name	Dino-Lite CONNECT	Test By	Rex Chiu
Test Model	WF-10	Test Date	2014/12/29
Test Mode	TX Mode	Temp. & Humidity	19°C, 56%

	966 Chamber_B at 3Meter / Horizontal											
Frequency (MHz) Reading (dBµV)		Correction Factor (dB/m)	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Remark						
37.76	41.93	-14.81	27.12	40.00	-12.88	Peak						
88.20	51.31	-19.68	31.63	43.50	-11.87	Peak						
114.39	47.48	-16.79	30.69	43.50	-12.81	Peak						
328.76	37.69	-11.36	26.33	46.00	-19.67	Peak						
495.60	34.45	-8.44	26.00	46.00	-20.00	Peak						
943.74	38.64	-0.83	37.81	46.00	-8.19	Peak						

### 966 Chamber\_B at 3Meter / Vertical

			—			
Frequency (MHz)	Reading (dBµV)	Correction Factor (dB/m)	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Remark
37.76	54.60	-14.81	39.79	40.00	-0.21	QP
86.26	47.91	-19.43	28.49	40.00	-11.51	Peak
127.00	43.90	-15.35	28.55	43.50	-14.95	Peak
492.69	43.39	-8.48	34.91	46.00	-11.09	Peak
515.00	43.86	-8.17	35.69	46.00	-10.31	Peak
943.74	43.09	-0.83	42.26	46.00	-3.74	Peak

Remark:

1. Quasi-peak test would be performed if the peak result were greater than the quasi-peak limit.

2. 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.

3. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Loss (dB) – PreAmp.Gain (dB)

4. Result (dBuV/m) = Reading (dBuV) + Correction Factor (dB/m)

5. Margin (dB) = Remark result (dBuV/m) - Quasi-peak limit (dBuV/m).

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### Above 1 GHz

Product Name	Product Name Dino-Lite CONNECT		Rex Chiu
Test Model	WF-10	Test Date	2014/12/27
Test Mode	IEEE 802.11b TX / CH Low	Temp. & Humidity	18 <sup>°</sup> C, 56%

	966 Chamber_B at 3Meter / Horizontal												
Frequency (MHz)	Reading- PK (dBuV)	Reading- AV (dBuV)	Correction Factor (dB/m)	Result-PK (dBuV/m)			Limit-AV (dBuV/m)	Margin (dB)	Remark				
1080.00	57.63	56.45	-3.31	54.32	53.14	74.00	54.00	-0.86	AVG				
1320.00	49.10		-3.05	46.05		74.00	54.00	-7.95	Peak				
2646.00	44.10		3.31	47.40		74.00	54.00	-6.60	Peak				
3345.00	43.12		4.72	47.84		74.00	54.00	-6.16	Peak				
4830.00	45.27		8.00	53.27		74.00	54.00	-0.73	Peak				
6195.00	39.71		11.59	51.30		74.00	54.00	-2.70	Peak				

	966 Chamber_B at 3Meter / Vertical												
Frequency (MHz)	Reading- PK (dBuV)	Reading- AV (dBuV)	Correction Factor (dB/m)	Result-PK (dBuV/m)			Limit-AV (dBuV/m)	Margin (dB)	Remark				
1080.00	51.02		-3.31	47.71		74.00	54.00	-6.29	Peak				
2290.00	43.47		2.49	45.96		74.00	54.00	-8.04	Peak				
2578.00	43.73		3.17	46.90		74.00	54.00	-7.10	Peak				
3840.00	41.79		5.67	47.46		74.00	54.00	-6.54	Peak				
4830.00	48.20	45.26	8.00	56.20	53.26	74.00	54.00	-0.74	AVG				
6945.00	39.39		12.24	51.63		74.00	54.00	-2.37	Peak				

#### Remark:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.

2. Average test would be performed if the peak result were greater than the average limit.

3. 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.

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.



Product Name	Dino-Lite CONNECT	Test By	Rex Chiu
Test Model	WF-10	Test Date	2014/12/27
Test Mode	IEEE 802.11b TX / CH Middle	Temp. & Humidity	18 <sup>°</sup> C, 56%

	966 Chamber_B at 3Meter / Horizontal												
Frequency (MHz)	Reading- PK (dBuV)	Reading- AV (dBuV)	Correction Factor (dB/m)	Result-PK (dBuV/m)		Limit-PK (dBuV/m)	Limit-AV (dBuV/m)	Margin (dB)	Remark				
1080.00	57.79	56.60	-3.31	54.48	53.29	74.00	54.00	-0.71	AVG				
1320.00	48.27		-3.05	45.22		74.00	54.00	-8.78	Peak				
2504.00	44.06		3.02	47.08		74.00	54.00	-6.92	Peak				
4155.00	42.03		6.52	48.55		74.00	54.00	-5.45	Peak				
4875.00	43.38		8.04	51.42		74.00	54.00	-2.58	Peak				
7065.00	40.22		12.16	52.38		74.00	54.00	-1.62	Peak				

				—					
Frequency (MHz)	Reading- PK (dBuV)	Reading- AV (dBuV)	Correction Factor (dB/m)	Result-PK (dBuV/m)	Result-AV (dBuV/m)	Limit-PK (dBuV/m)	Limit-AV (dBuV/m)	Margin (dB)	Remark
1080.00	51.56		-3.31	48.26		74.00	54.00	-5.74	Peak
2156.00	44.31		2.16	46.47		74.00	54.00	-7.53	Peak
2636.00	43.20		3.29	46.48		74.00	54.00	-7.52	Peak
3735.00	41.78		5.47	47.25		74.00	54.00	-6.75	Peak
4875.00	48.32	45.82	8.04	56.36	53.86	74.00	54.00	-0.14	AVG
6840.00	39.58		12.10	51.68		74.00	54.00	-2.32	Peak

#### Remark:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.

2. Average test would be performed if the peak result were greater than the average limit.

3. 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.

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.



Product Name	Dino-Lite CONNECT	Test By	Rex Chiu
Test Model	WF-10	Test Date	2014/12/27
Test Mode	IEEE 802.11b TX / CH High	Temp. & Humidity	18 <sup>°</sup> C, 56%

	966 Chamber_B at 3Meter / Horizontal												
Frequency (MHz)	Reading- PK (dBuV)	Reading- AV (dBuV)	Correction Factor (dB/m)	Result-PK (dBuV/m)	Result-AV (dBuV/m)	Limit-PK (dBuV/m)	Limit-AV (dBuV/m)	Margin (dB)	Remark				
1080.00	57.99	56.65	-3.31	54.69	53.34	74.00	54.00	-0.66	AVG				
2378.00	43.45		2.71	46.16		74.00	54.00	-7.84	Peak				
2656.00	43.75		3.33	47.08		74.00	54.00	-6.92	Peak				
3270.00	42.47		4.57	47.04		74.00	54.00	-6.96	Peak				
4920.00	44.17		8.08	52.25		74.00	54.00	-1.75	Peak				
5595.00	40.00		10.37	50.36		74.00	54.00	-3.64	Peak				

Frequency (MHz)	Reading- PK (dBuV)	Reading- AV (dBuV)	Correction Factor (dB/m)	Result-PK (dBuV/m)		Limit-PK (dBuV/m)	Limit-AV (dBuV/m)	Margin (dB)	Remark
1080.00	52.01		-3.31	48.70		74.00	54.00	-5.30	Peak
2300.00	43.84		2.52	46.36		74.00	54.00	-7.64	Peak
2714.00	42.83		3.45	46.28		74.00	54.00	-7.72	Peak
3210.00	42.27		4.45	46.72		74.00	54.00	-7.28	Peak
4920.00	48.16	45.74	8.08	56.24	53.82	74.00	54.00	-0.18	AVG
5535.00	40.92		10.19	51.11		74.00	54.00	-2.89	Peak

#### Remark:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.

2. Average test would be performed if the peak result were greater than the average limit.

3. 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.

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.



Product Name	Dino-Lite CONNECT	Test By	Rex Chiu
Test Model	WF-10	Test Date	2014/12/27
Test Mode	IEEE 802.11g TX / CH Low	Temp. & Humidity	18 <sup>°</sup> C, 56%

	966 Chamber_B at 3Meter / Horizontal												
Frequency (MHz)	Reading- PK (dBuV)	Reading- AV (dBuV)	Correction Factor (dB/m)	Result-PK (dBuV/m)	Result-AV (dBuV/m)	Limit-PK (dBuV/m)	Limit-AV (dBuV/m)	Margin (dB)	Remark				
1080.00	57.63	56.58	-3.31	54.33	53.27	74.00	54.00	-0.73	AVG				
2282.00	43.86		2.47	46.34		74.00	54.00	-7.66	Peak				
2632.00	43.55		3.28	46.83		74.00	54.00	-7.17	Peak				
3735.00	42.11		5.47	47.58		74.00	54.00	-6.42	Peak				
4815.00	45.96	37.33	7.99	53.95	45.32	74.00	54.00	-8.68	AVG				
7185.00	39.77		11.88	51.66		74.00	54.00	-2.34	Peak				

Frequency (MHz)	Reading- PK (dBuV)	Reading- AV (dBuV)	Correction Factor (dB/m)	Result-PK (dBuV/m)	Result-AV (dBuV/m)	Limit-PK (dBuV/m)	Limit-AV (dBuV/m)	Margin (dB)	Remark
1080.00	51.19		-3.31	47.89		74.00	54.00	-6.11	Peak
2024.00	44.19		1.84	46.03		74.00	54.00	-7.97	Peak
2528.00	42.93		3.07	45.99		74.00	54.00	-8.01	Peak
4830.00	47.32	35.97	8.00	55.32	43.97	74.00	54.00	-10.03	AVG
5715.00	39.59		10.72	50.31		74.00	54.00	-3.69	Peak
7125.00	40.24		12.02	52.26		74.00	54.00	-1.74	Peak

#### Remark:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.

2. Average test would be performed if the peak result were greater than the average limit.

3. 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.

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.



Product Name	Dino-Lite CONNECT	Test By	Rex Chiu
Test Model	WF-10	Test Date	2014/12/27
Test Mode	IEEE 802.11g TX / CH Middle	Temp. & Humidity	18 <sup>°</sup> C, 56%

	966 Chamber_B at 3Meter / Horizontal												
Frequency (MHz)	Reading- PK (dBuV)	Reading- AV (dBuV)	Correction Factor (dB/m)	Result-PK (dBuV/m)	Result-AV (dBuV/m)		Limit-AV (dBuV/m)	Margin (dB)	Remark				
1024.00	50.72		-3.36	47.36		74.00	54.00	-6.64	Peak				
1080.00	57.71	56.62	-3.31	54.41	53.31	74.00	54.00	-0.69	AVG				
1260.00	49.76		-3.11	46.65		74.00	54.00	-7.35	Peak				
4620.00	41.42		7.84	49.25		74.00	54.00	-4.75	Peak				
4860.00	48.69	36.11	8.03	56.72	44.14	74.00	54.00	-9.86	AVG				
7305.00	41.25		11.61	52.86		74.00	54.00	-1.14	Peak				

Frequency (MHz)	Reading- PK (dBuV)	Reading- AV (dBuV)	Correction Factor (dB/m)	Result-PK (dBuV/m)	Result-AV (dBuV/m)	Limit-PK (dBuV/m)	Limit-AV (dBuV/m)	Margin (dB)	Remark
1080.00	51.72		-3.31	48.41		74.00	54.00	-5.59	Peak
2158.00	44.42		2.17	46.59		74.00	54.00	-7.41	Peak
2708.00	44.88		3.43	48.32		74.00	54.00	-5.68	Peak
4170.00	41.68		6.57	48.25		74.00	54.00	-5.75	Peak
4860.00	48.52	35.16	8.03	56.55	43.19	74.00	54.00	-10.81	AVG
6195.00	39.37		11.59	50.96		74.00	54.00	-3.04	Peak

#### Remark:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.

2. Average test would be performed if the peak result were greater than the average limit.

3. 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.

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.



Product Name	Dino-Lite CONNECT	Test By	Rex Chiu
Test Model	WF-10	Test Date	2014/12/27
Test Mode	IEEE 802.11g TX / CH High	Temp. & Humidity	18 <sup>°</sup> C, 56%

	966 Chamber_B at 3Meter / Horizontal											
Frequency (MHz)	Reading- PK (dBuV)	Reading- AV (dBuV)	Correction Factor (dB/m)	Result-PK (dBuV/m)	Result-AV (dBuV/m)	Limit-PK (dBuV/m)	Limit-AV (dBuV/m)	Margin (dB)	Remark			
1080.00	57.54	56.41	-3.31	54.24	53.10	74.00	54.00	-0.90	AVG			
1320.00	47.97		-3.05	44.92		74.00	54.00	-9.08	Peak			
2634.00	43.13		3.28	46.41		74.00	54.00	-7.59	Peak			
4920.00	44.83		8.08	52.91		74.00	54.00	-1.09	Peak			
6000.00	39.57		11.55	51.12		74.00	54.00	-2.88	Peak			
7380.00	41.42		11.44	52.85		74.00	54.00	-1.15	Peak			

Frequency (MHz)	Reading- PK (dBuV)	Reading- AV (dBuV)	Correction Factor (dB/m)	Result-PK (dBuV/m)	Result-AV (dBuV/m)	Limit-PK (dBuV/m)	Limit-AV (dBuV/m)	Margin (dB)	Remark
1080.00	51.71		-3.31	48.41		74.00	54.00	-5.59	Peak
2190.00	43.60		2.25	45.85		74.00	54.00	-8.15	Peak
2644.00	43.37		3.30	46.68		74.00	54.00	-7.32	Peak
3690.00	42.11		5.39	47.50		74.00	54.00	-6.50	Peak
4920.00	48.77	35.53	8.08	56.85	43.61	74.00	54.00	-10.39	AVG
7890.00	39.50		12.16	51.66		74.00	54.00	-2.34	Peak

#### Remark:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.

2. Average test would be performed if the peak result were greater than the average limit.

3. 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.

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.



Product Name	Dino-Lite CONNECT	Test By	Rex Chiu
Test Model	WF-10	Test Date	2014/12/27
Test Mode	IEEE 802.11gn HT20 TX / CH Low	Temp. & Humidity	18 <sup>°</sup> C, 56%

	966 Chamber_B at 3Meter / Horizontal									
Frequency (MHz)	Reading- PK (dBuV)	Reading- AV (dBuV)	Correction Factor (dB/m)	Result-PK (dBuV/m)	Result-AV (dBuV/m)	Limit-PK (dBuV/m)	Limit-AV (dBuV/m)	Margin (dB)	Remark	
1080.00	57.46	56.49	-3.31	54.16	53.18	74.00	54.00	-0.82	AVG	
1320.00	47.77		-3.05	44.72		74.00	54.00	-9.28	Peak	
2502.00	43.26		3.01	46.28		74.00	54.00	-7.72	Peak	
3270.00	42.10		4.57	46.67		74.00	54.00	-7.33	Peak	
4830.00	53.18	36.03	8.00	61.18	44.03	74.00	54.00	-9.97	AVG	
6975.00	39.70		12.28	51.98		74.00	54.00	-2.02	Peak	

	-								
Frequency (MHz)	Reading- PK (dBuV)	Reading- AV (dBuV)	Correction Factor (dB/m)	Result-PK (dBuV/m)		Limit-PK (dBuV/m)	Limit-AV (dBuV/m)	Margin (dB)	Remark
1080.00	52.73		-3.31	49.42		74.00	54.00	-4.58	Peak
2156.00	43.89		2.16	46.05		74.00	54.00	-7.95	Peak
2560.00	43.32		3.13	46.45		74.00	54.00	-7.55	Peak
3225.00	42.51		4.48	46.99		74.00	54.00	-7.01	Peak
4830.00	51.66	35.87	8.00	59.66	43.87	74.00	54.00	-10.13	AVG
7230.00	43.63	26.03	11.78	55.41	37.81	74.00	54.00	-16.19	AVG

#### Remark:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.

 Average test would be performed if the peak result were greater than the average limit.
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.

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.



Product Name	Dino-Lite CONNECT	Test By	Rex Chiu
Test Model	WF-10	Test Date	2014/12/27
Test Mode	IEEE 802.11gn HT20 TX / CH Middle	Temp. & Humidity	18 <sup>°</sup> C, 56%

	966 Chamber_B at 3Meter / Horizontal									
Frequency (MHz)	Reading- PK (dBuV)	Reading- AV (dBuV)	Correction Factor (dB/m)	Result-PK			Limit-AV (dBuV/m)	Margin (dB)	Remark	
1080.00	57.57	56.45	-3.31	54.27	53.14	74.00	54.00	-0.86	AVG	
2390.00	44.24		2.74	46.98		74.00	54.00	-7.02	Peak	
2536.00	43.95		3.08	47.04		74.00	54.00	-6.96	Peak	
3165.00	42.42		4.36	46.78		74.00	54.00	-7.22	Peak	
4875.00	48.54	33.27	8.04	56.58	41.31	74.00	54.00	-12.69	AVG	
6720.00	40.21		11.94	52.15		74.00	54.00	-1.85	Peak	

966 Chamber	_B at 3Meter	/ Vertical
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Frequency (MHz)	Reading- PK (dBuV)	Reading- AV (dBuV)	Correction Factor (dB/m)	Result-PK (dBuV/m)	Result-AV (dBuV/m)	Limit-PK (dBuV/m)	Limit-AV (dBuV/m)	Margin (dB)	Remark
1080.00	52.41		-3.31	49.10		74.00	54.00	-4.90	Peak
2156.00	44.23		2.16	46.39		74.00	54.00	-7.61	Peak
2686.00	43.04		3.39	46.43		74.00	54.00	-7.57	Peak
3240.00	42.27		4.51	46.78		74.00	54.00	-7.22	Peak
4875.00	50.74	35.52	8.04	58.78	43.56	74.00	54.00	-10.44	AVG
7305.00	40.56		11.61	52.17		74.00	54.00	-1.83	Peak

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.

2. Average test would be performed if the peak result were greater than the average limit.

3. 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.

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.



Product Name	Dino-Lite CONNECT	Test By	Rex Chiu
Test Model	WF-10	Test Date	2014/12/27
Test Mode	IEEE 802.11gn HT20 TX / CH High	Temp. & Humidity	18 <sup>°</sup> C, 56%

	966 Chamber_B at 3Meter / Horizontal									
Frequency (MHz)	Reading- PK (dBuV)	Reading- AV (dBuV)	Correction Factor (dB/m)	Result-PK (dBuV/m)			Limit-AV (dBuV/m)	Margin (dB)	Remark	
1080.00	57.61	56.55	-3.31	54.31	53.24	74.00	54.00	-0.76	AVG	
2232.00	42.91		2.35	45.26		74.00	54.00	-8.74	Peak	
2508.00	46.05		3.03	49.08		74.00	54.00	-4.92	Peak	
3465.00	42.08		4.96	47.04		74.00	54.00	-6.96	Peak	
4920.00	48.21	32.54	8.08	56.29	40.62	74.00	54.00	-13.38	AVG	
6855.00	40.05		12.12	52.17		74.00	54.00	-1.83	Peak	

	966 Chamber_B at 3Meter / Vertical									
Frequency (MHz)	Reading- PK (dBuV)	Reading- AV (dBuV)	Correction Factor (dB/m)	Result-PK (dBuV/m)		Limit-PK (dBuV/m)	Limit-AV (dBuV/m)	Margin (dB)	Remark	
1080.00	51.58		-3.31	48.27		74.00	54.00	-5.73	Peak	
2330.00	43.06		2.59	45.65		74.00	54.00	-8.35	Peak	
2612.00	43.43		3.24	46.67		74.00	54.00	-7.33	Peak	
3810.00	42.26		5.61	47.88		74.00	54.00	-6.12	Peak	
4920.00	46.35	31.62	8.08	54.43	39.70	74.00	54.00	-14.30	AVG	
7155.00	39.69		11.95	51.64		74.00	54.00	-2.36	Peak	

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.

2. Average test would be performed if the peak result were greater than the average limit.

3. 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.

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.



Product Name	Dino-Lite CONNECT	Test By	Rex Chiu
Test Model	WF-10	Test Date	2014/12/27
Test Mode	IEEE 802.11gn HT40 TX / CH Low	Temp. & Humidity	18 <sup>°</sup> C, 56%

	966 Chamber_B at 3Meter / Horizontal												
Frequency (MHz)	Reading- PK (dBuV)	Reading- AV (dBuV)	Correction Factor (dB/m)	Result-PK (dBuV/m)	Result-AV (dBuV/m)		Limit-AV (dBuV/m)	Margin (dB)	Remark				
1080.00	52.66		-3.31	49.36		74.00	54.00	-4.64	Peak				
1200.00	50.84		-3.18	47.66		74.00	54.00	-6.34	Peak				
1320.00	51.42		-3.05	48.36		74.00	54.00	-5.64	Peak				
3195.00	42.76		4.42	47.18		74.00	54.00	-6.82	Peak				
4830.00	44.24		8.00	52.24		74.00	54.00	-1.76	Peak				
7155.00	39.35		11.95	51.30		74.00	54.00	-2.70	Peak				

Frequency (MHz)	Reading- PK (dBuV)	Reading- AV (dBuV)	Correction Factor (dB/m)	Result-PK (dBuV/m)	Limit-PK (dBuV/m)	Limit-AV (dBuV/m)	Margin (dB)	Remark
1080.00	48.90		-3.31	45.60	 74.00	54.00	-8.40	Peak
2214.00	44.08		2.31	46.38	 74.00	54.00	-7.62	Peak
2526.00	43.87		3.06	46.93	 74.00	54.00	-7.07	Peak
3195.00	42.72		4.42	47.14	 74.00	54.00	-6.86	Peak
4845.00	43.07		8.02	51.08	 74.00	54.00	-2.92	Peak
7020.00	39.04		12.26	51.30	 74.00	54.00	-2.70	Peak

#### Remark:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.

 Average test would be performed if the peak result were greater than the average limit.
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.

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.



Product Name	Dino-Lite CONNECT	Test By	Rex Chiu
Test Model	WF-10	Test Date	2014/12/27
Test Mode	IEEE 802.11gn HT40 TX / CH Middle	Temp. & Humidity	18 <sup>°</sup> C, 56%

	966 Chamber_B at 3Meter / Horizontal												
Frequency (MHz)	Reading- PK (dBuV)	Reading- AV (dBuV)	Correction Factor (dB/m)	Result-PK			Limit-AV (dBuV/m)	Margin (dB)	Remark				
1020.00	53.45		-3.37	50.08		74.00	54.00	-3.92	Peak				
1080.00	57.39	56.15	-3.31	54.08	52.84	74.00	54.00	-1.16	AVG				
2484.00	50.28	35.79	2.97	53.25	38.76	74.00	54.00	-15.24	AVG				
3255.00	42.53		4.54	47.07		74.00	54.00	-6.93	Peak				
4890.00	44.14		8.05	52.20		74.00	54.00	-1.80	Peak				
7065.00	39.49		12.16	51.65		74.00	54.00	-2.35	Peak				

966 Chamber	B	at 3Meter	/ Vertical
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Frequency (MHz)	Reading- PK (dBuV)	Reading- AV (dBuV)	Correction Factor (dB/m)	Result-PK (dBuV/m)	Result-AV (dBuV/m)	Limit-PK (dBuV/m)	Limit-AV (dBuV/m)	Margin (dB)	Remark	
1080.00	52.07		-3.31	48.76		74.00	54.00	-5.24	Peak	
2184.00	44.54		2.23	46.77		74.00	54.00	-7.23	Peak	
2484.00	49.18		2.97	52.15		74.00	54.00	-1.85	Peak	
3255.00	42.54		4.54	47.08		74.00	54.00	-6.92	Peak	
4875.00	44.54		8.04	52.58		74.00	54.00	-1.42	Peak	
7005.00	40.08		12.30	52.38		74.00	54.00	-1.62	Peak	

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.

2. Average test would be performed if the peak result were greater than the average limit.

3. 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.

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.



Product Name	Dino-Lite CONNECT	Test By	Rex Chiu
Test Model	WF-10	Test Date	2014/12/27
Test Mode	IEEE 802.11gn HT40 TX / CH High	Temp. & Humidity	18 <sup>°</sup> C, 56%

	966 Chamber_B at 3Meter / Horizontal												
Frequency (MHz)	Reading- PK (dBuV)	Reading- AV (dBuV)	Correction Factor (dB/m)	Result-PK (dBuV/m)			Limit-AV (dBuV/m)	Margin (dB)	Remark				
1080.00	57.38	56.49	-3.31	54.07	53.18	74.00	54.00	-0.82	AVG				
1320.00	48.66		-3.05	45.60		74.00	54.00	-8.40	Peak				
2502.00	48.26		3.01	51.28		74.00	54.00	-2.72	Peak				
3195.00	42.26		4.42	46.68		74.00	54.00	-7.32	Peak				
4905.00	42.77		8.06	50.83		74.00	54.00	-3.17	Peak				
6930.00	40.00		12.22	52.22		74.00	54.00	-1.78	Peak				

				—					
Frequency (MHz)	Reading- PK (dBuV)	Reading- AV (dBuV)	Correction Factor (dB/m)	Result-PK (dBuV/m)	Result-AV (dBuV/m)	Limit-PK (dBuV/m)	Limit-AV (dBuV/m)	Margin (dB)	Remark
1080.00	51.06		-3.31	47.76		74.00	54.00	-6.24	Peak
2296.00	43.46		2.51	45.97		74.00	54.00	-8.03	Peak
2502.00	46.05		3.01	49.06		74.00	54.00	-4.94	Peak
3195.00	42.82		4.42	47.24		74.00	54.00	-6.76	Peak
4905.00	46.55	31.98	8.06	54.62	40.04	74.00	54.00	-13.96	AVG
7005.00	39.74		12.30	52.04		74.00	54.00	-1.96	Peak

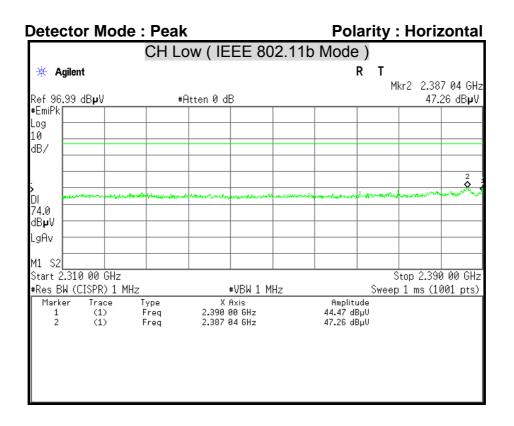
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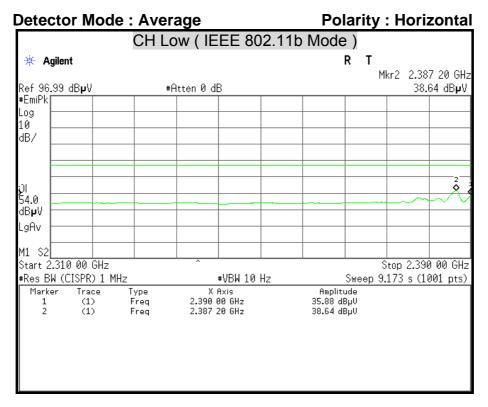
2. Average test would be performed if the peak result were greater than the average limit.

3. 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.

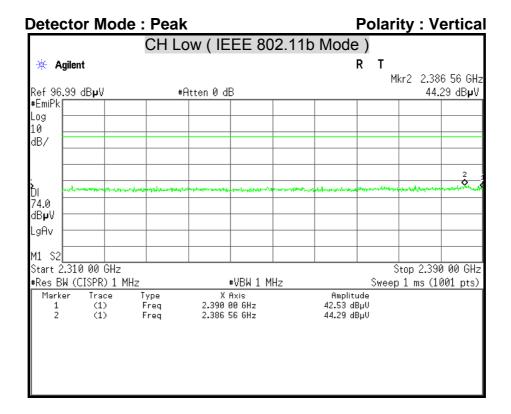
4. Measurements above show only up to 6 maximum emissions noted, or would be lesser, with "N/A" remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.

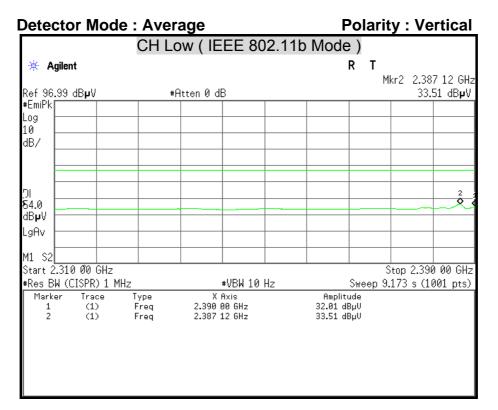
## **Restricted Band Edges**



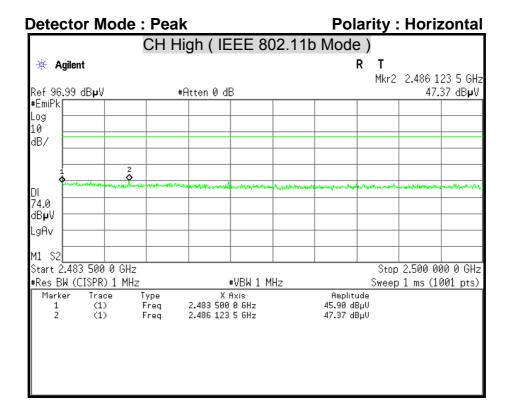


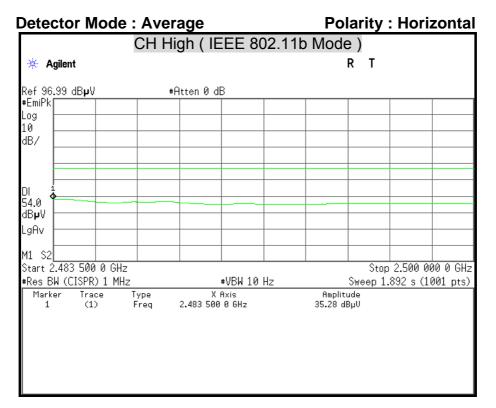




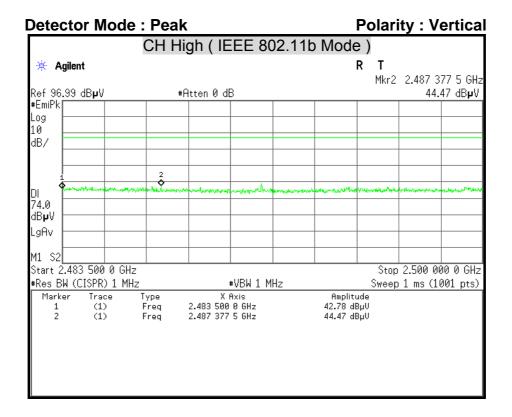


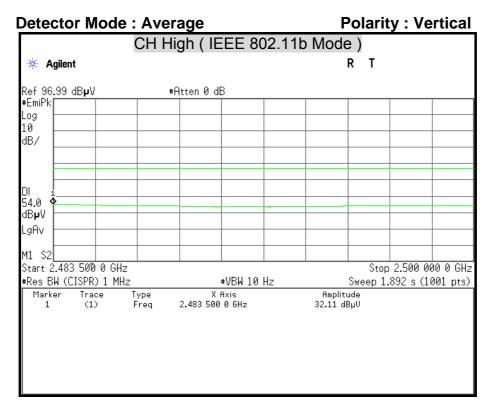




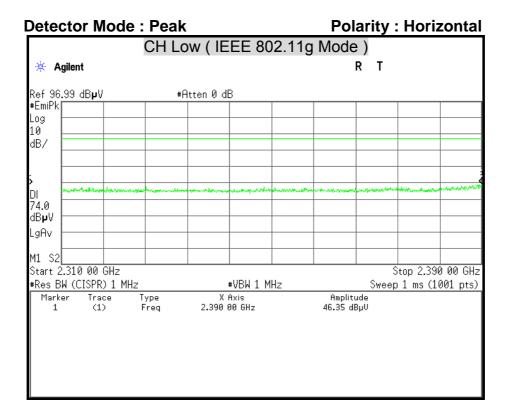


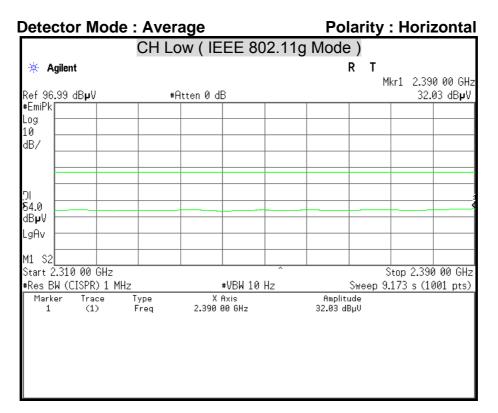




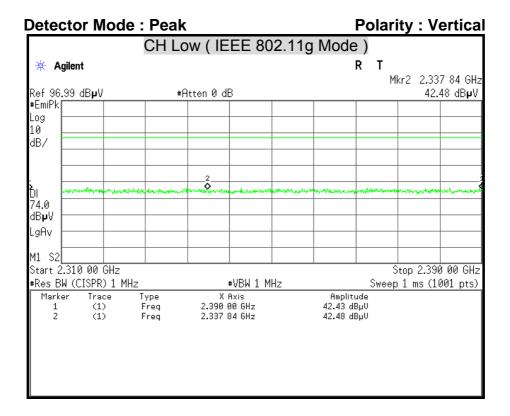


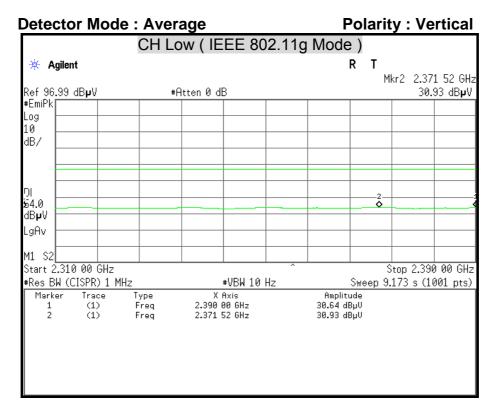




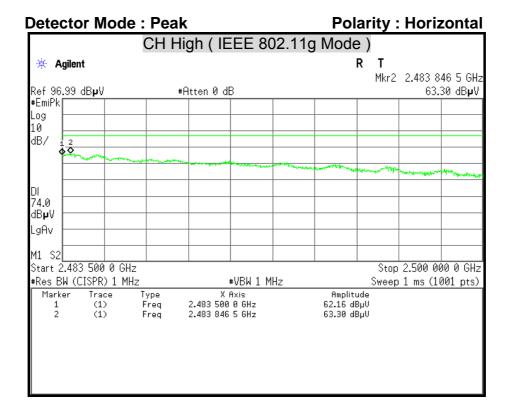


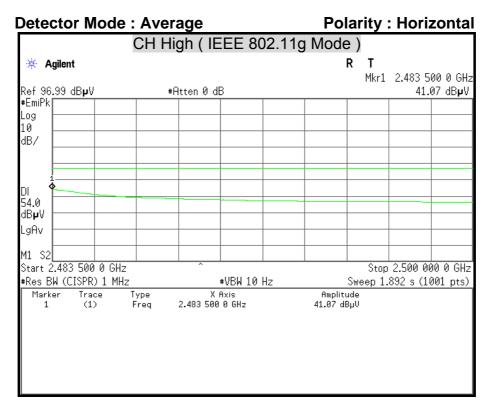




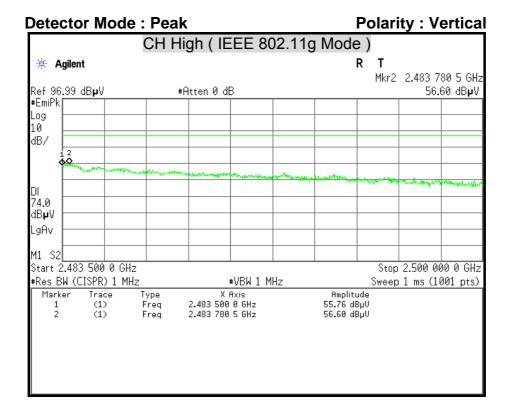


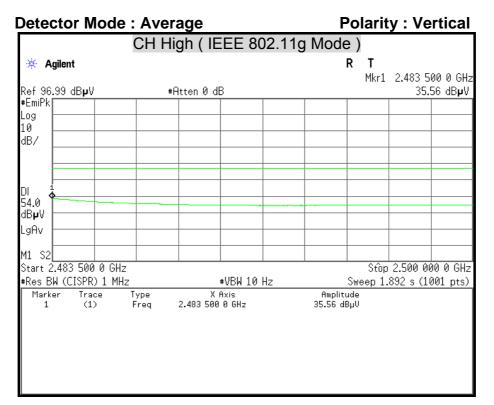




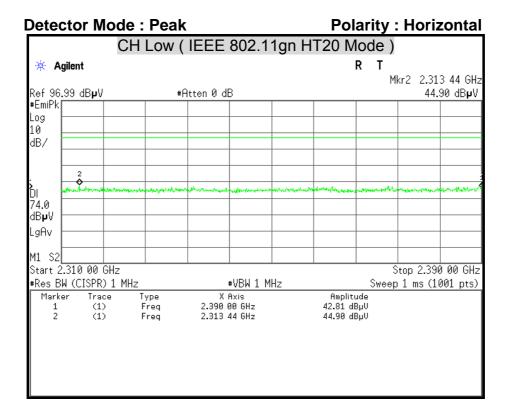


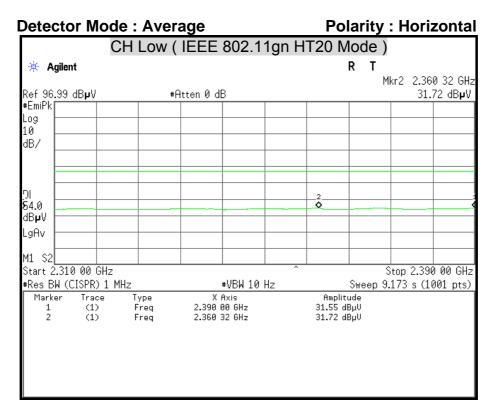




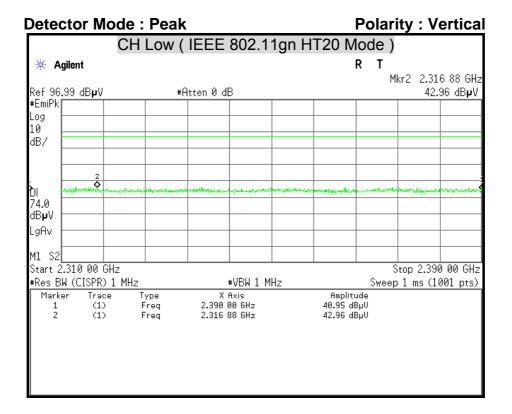


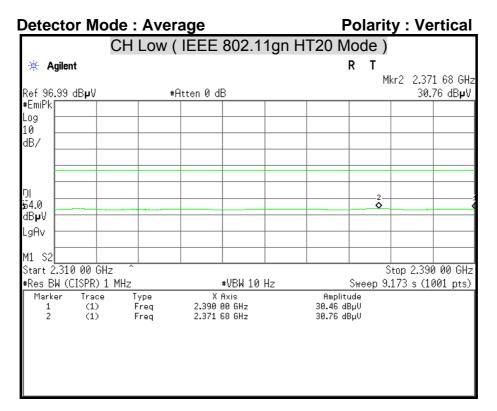




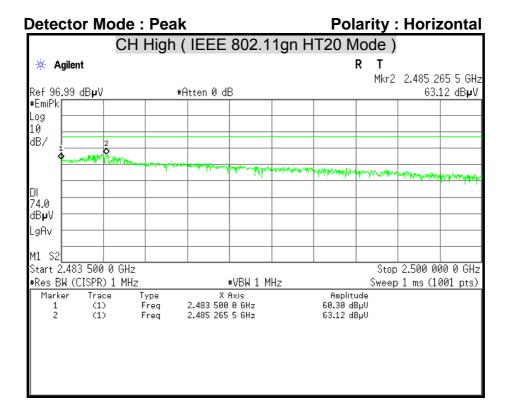


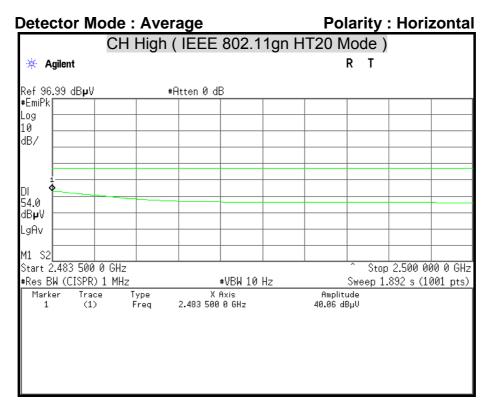




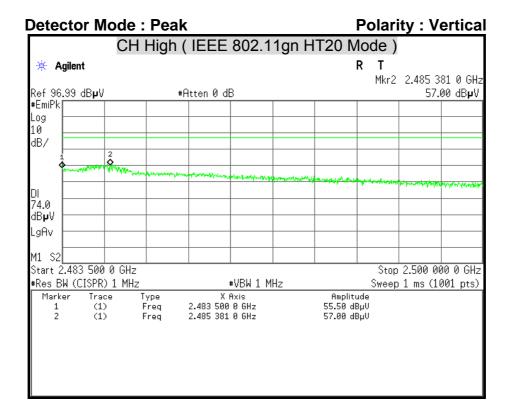


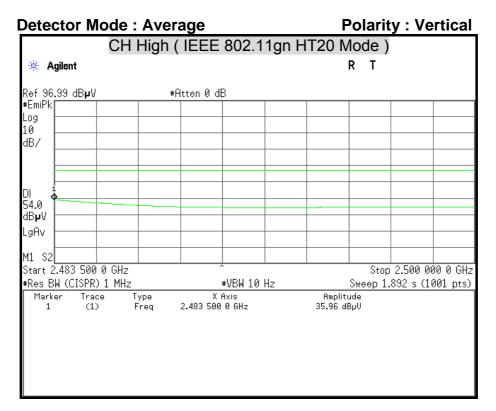




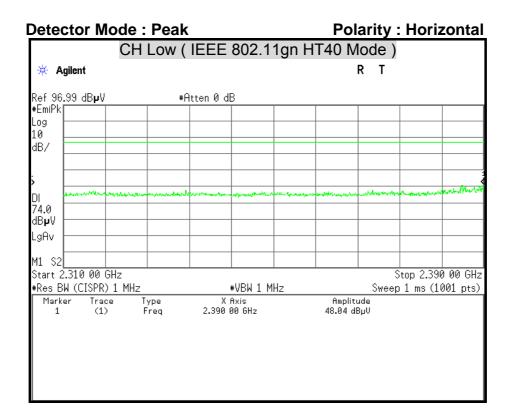


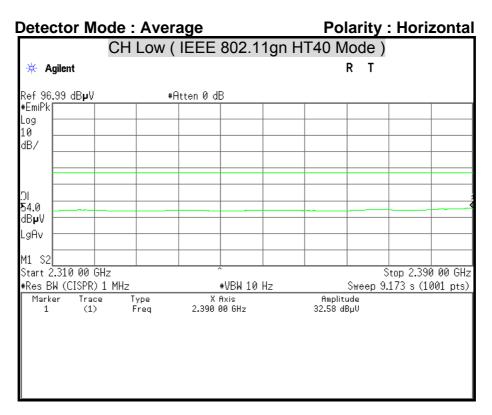




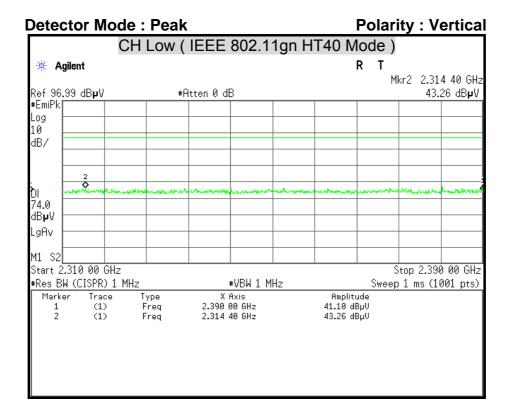


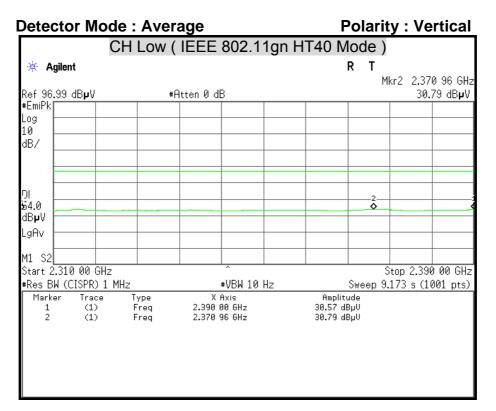




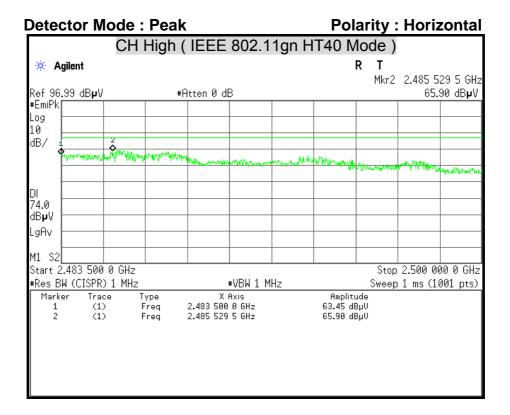


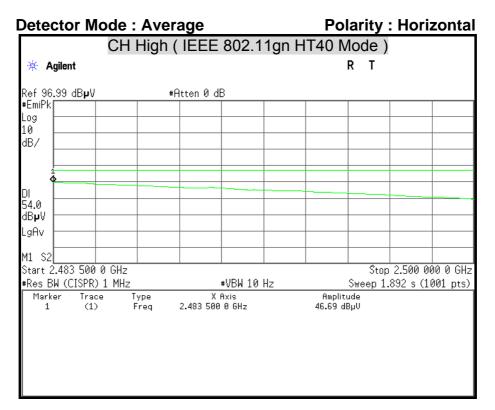




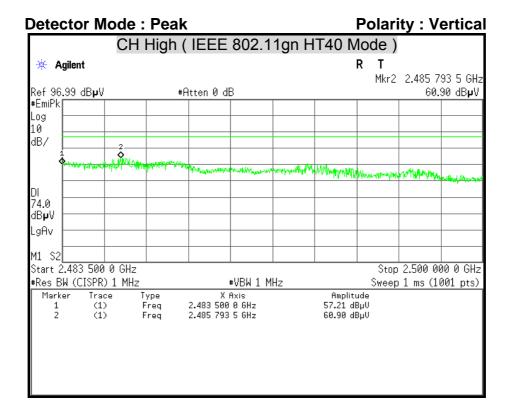


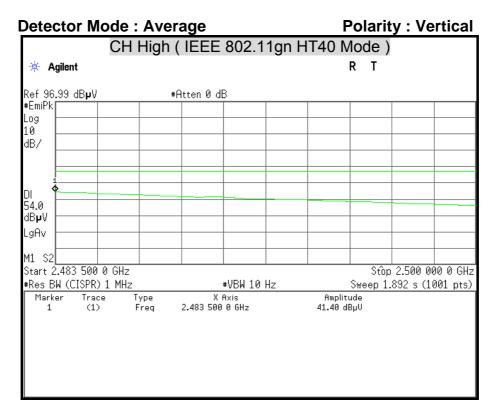














# 7.7 CONDUCTED EMISSION

## <u>LIMITS</u>

§ 15.207 (a) Except as shown in paragraph (b) and (c) 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  $\mu$ H/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	Conducted Limit (dBµv)		
(MHz)	Quasi-peak	Average	
0.15 - 0.50	66 to 56	56 to 46	
0.50 - 5.00	56	46	
5.00 - 30.0	60	50	

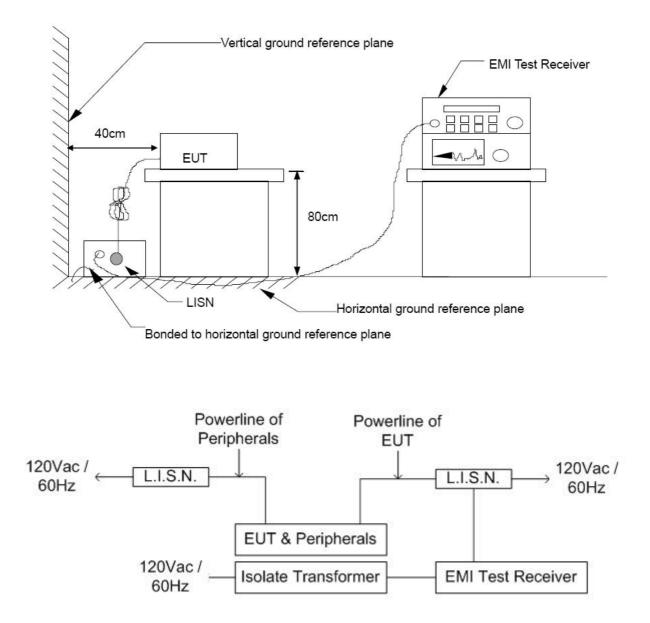
### TEST EQUIPMENT

Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
L.I.S.N	SCHWARZBECK	NSLK 8127	8127-465	08/06/2015
L.I.S.N	SCHWARZBECK	NSLK 8127	8127-473	03/10/2015
EMI Receiver	ROHDE & SCHWARZ	ESHS 30	838550/003	11/02/2015
Pulse Limiter	ROHDE & SCHWARZ	ESH3-Z2	100111	06/30/2015

Remark: Each piece of equipment is scheduled for calibration once a year.



# TEST SETUP





FCC ID : 2ADVHWF10A

# TEST PROCEDURE

The basic test procedure was in accordance with ANSI C63.10:2009.

The test procedure is performed in a  $4m \times 3m \times 2.4m$  (L×W×H) shielded room.

The EUT along with its peripherals were placed on a 1.0m (W) × 1.5m (L) and 0.8m in height wooden table and the EUT was adjusted to maintain a 0.4 meter space from a vertical reference plane.

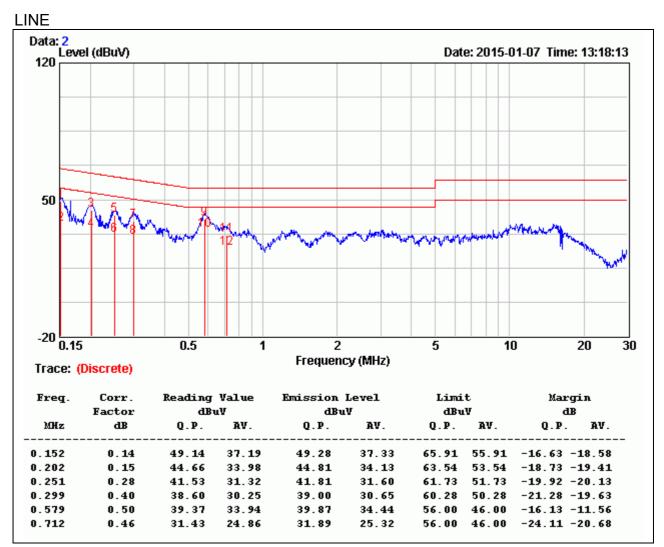
The EUT was connected to power mains through a line impedance stabilization network (LISN) which provides 50 ohm coupling impedance for measuring instrument and the chassis ground was bounded to the horizontal ground plane of shielded room. All peripherals were connected to the second LISN and the chassis ground also bounded to the horizontal ground plane of shielded room.

The EUT was located so that the distance between the boundary of the EUT and the closest surface of the LISN is 0.8 m. Where a mains flexible cord was provided by the manufacturer shall be 1 m long, or if in excess of 1 m, the excess cable was folded back and forth as far as possible so as to form a bundle not exceeding 0.4 m in length.



#### TEST RESULTS

Product Name Dino-Lite CONNECT		Test By	Jey Li
Test Model	WF-10	Test Date	2015/01/07
Test Mode	TX Mode	Temp. & Humidity	21°C, 45%



Remark:

1. Correction Factor = Insertion loss + Cable loss

2. Emission level = Reading Value + Correction factor

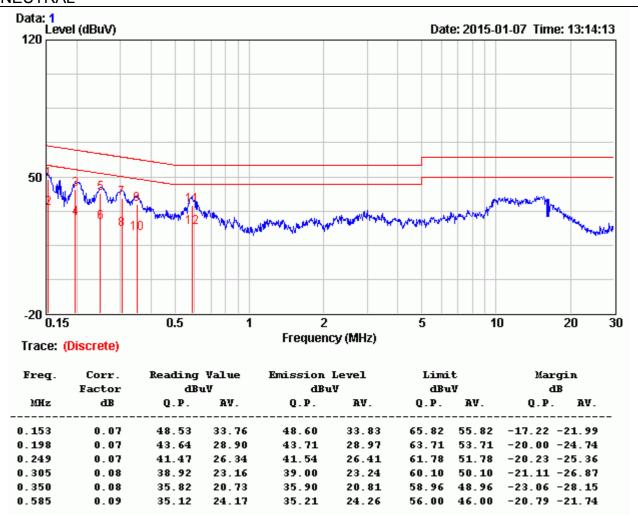
3. Margin value = Emission level - Limit value

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Product Name	Dino-Lite CONNECT	Test By	Jey Li
Test Model	WF-10	Test Date	2015/01/07
Test Mode	TX Mode	Temp. & Humidity	21°C, 45%





#### Remark:

- 1. Correction Factor = Insertion loss + Cable loss
- 2. Emission level = Reading Value + Correction factor
- 3. Margin value = Emission level Limit value

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