



**FCC 47 CFR PART 15 SUBPART C AND ANSI C63.4:2003  
TEST REPORT**

**For**

**CONTROLLER**

**Model : 510-2017-0001**

**Trade Name : OnLive**

**Issued for**

**OnLive, Inc.**

**181 Lytton Avenue Palo Alto, CA 94301**

**Issued by**

**Compliance Certification Services Inc.  
Hsinchu Lab.**

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## Revision History

Rev.	Issue Date	Revisions	Effect Page	Revised By
00	10/18/2010	Initial Issue	All Page 60	Winnie Chen
01	10/25/2010	Add Channel List and Assessment of X, Y, Z Axis Description.	Page 5, 6	Winnie Chen



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## 1. TEST REPORT CERTIFICATION

**Applicant** : OnLive, Inc.  
**Address** : 181 Lytton Avenue Palo Alto, CA 94301  
**Equipment Under Test** : CONTROLLER  
**Model** : 510-2017-0001  
**Trade Name** : OnLive  
**Tested Date** : October 08 ~ 18, 2010

APPLICABLE STANDARD	
Standard	Test Result
FCC Part 15 Subpart C AND ANSI C63.4:2003	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:**

**Reviewed by:**

Alex Chiu  
Director

Gundam Lin  
Team Leader



## 2. EUT DESCRIPTION

### 2.1 DESCRIPTION OF EUT & POWER

<b>Product Name</b>	CONTROLLER
<b>Model Number</b>	510-2017-0001
<b>Received Date</b>	October 08, 2010
<b>Frequency Range</b>	2405MHz ~ 2480MHz
<b>Transmit Power</b>	4.46dBm (0.0028W)
<b>Channel Spacing</b>	5MHz
<b>Channel Number</b>	16 Channels
<b>Transmit Data Rate</b>	250kbps, 500kbps, 1Mbps, 2Mbps
<b>Type of Modulation</b>	OQPSK
<b>Antenna Type</b>	Chip Antenna × 2 Antenna 1 Gain 0.89dBi Antenna 2 Gain -0.92dBi
<b>Power Source</b>	Normal Mode: 3VDC (Rechargeable Battery Powered / AA battery) Charging Mode: 5.0VDC (From Notebook PC, Powered From Host Device)
<b>I/O Port</b>	Micro USB port × 1

**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: YUZ-510-2017-0001 filing to comply with Section 15.207, 15.209 and 15.247 of the FCC Part 15, Subpart C Rules.

**Operation Frequency :**

Channel	MHz	Channel	MHz
11	2405	19	2445
12	2410	20	2450
13	2415	21	2455
14	2420	22	2460
15	2425	23	2465
16	2430	24	2470
17	2435	25	2475
18	2440	26	2480



### 3. DESCRIPTION OF TEST MODES

The EUT had been tested under operating condition.

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

<b>Radiation Test Mode</b>	Rechargeable battery (normal link)
	AA battery (normal link)
	Rechargeable battery (charge)
<b>Conduction Test Mode</b>	Rechargeable battery (charge)

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

There are three channels have been tested as following :

<b>Channel</b>	<b>Frequency (MHz)</b>
Low	2405
Middle	2440
High	2480

2Mbps data rate (worst case) were chosen for full testing.

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 C63.4: 2003 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 C63.4:2003 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.

**Taiwan** BSMI  
**USA** FCC MRA

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

## 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
Open Area Test Site (OATS No.3) / Radiated Emission, 30 to 200 MHz	+/- 3.9267
Open Area Test Site (OATS No.3) / Radiated Emission, 200 to 1000 MHz	+/- 3.6899
Semi Anechoic Chamber (966 Chamber) / Radiated Emission, 30 to 200 MHz	+/- 3.6878
Semi Anechoic Chamber (966 Chamber) / Radiated Emission, 200 to 1000 MHz	+/- 3.0885
Semi Anechoic Chamber (966 Chamber) / Radiated Emission, 1 to 26.5GHz	+/- 3.2000
Conducted Emission, 9kHz to 30MHz	+/- 1.7468

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: 2006, 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.	FCC ID
1	Notebook PC	HP	ProBook 4421s	CNF03242PJ	DoC
2	MICROCONSOLE™ TV ADAPTER	OnLive, Inc.	510-2016-0001	-----	FCC ID: YUZ-510-2016-0001

### SETUP DIAGRAM FOR TESTS

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

### EUT OPERATING CONDITION

#### **RF Mode**

1. Set up all computers like the setup diagram.
2. Power on all equipments.

TX Mode:

⇒ Tx Data Rate: 2Mbps

⇒ Select channel:

Channel Low (2405MHz)

Channel Mid (2440MHz)

Channel High (2480MHz)

3. All of the function are under run.
4. Start test.

#### **Normal Mode**

1. Setup whole system for test as shown on diagram.
2. Power on all equipments.
3. All of the function are under run.
4. Start test.





## 7. FCC PART 15.247 REQUIREMENTS

### 7.1 6dB BANDWIDTH

#### LIMITS

§ 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	06/20/2011
Spectrum Analyzer	AGILENT	E4446A	MY46180323	05/02/2011

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

#### TEST SETUP



#### TEST PROCEDURE

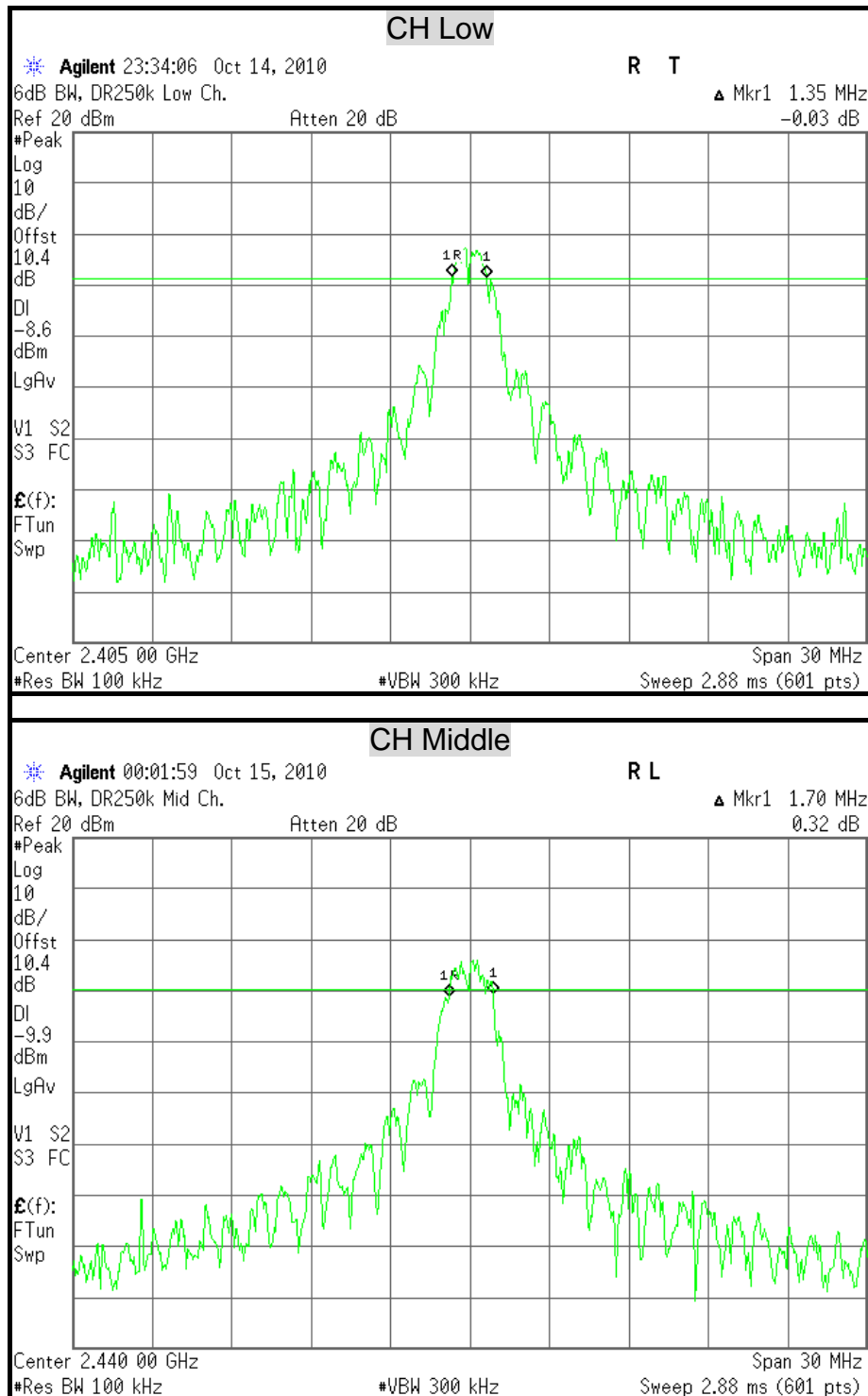
The transmitter output was connected to a spectrum analyzer. The bandwidth of the fundamental frequency was measured by spectrum analyzer with 100 KHz RBW and 300 KHz VBW. The 6dB bandwidth is defined as the total spectrum the power of which is higher than peak power minus 6dB.

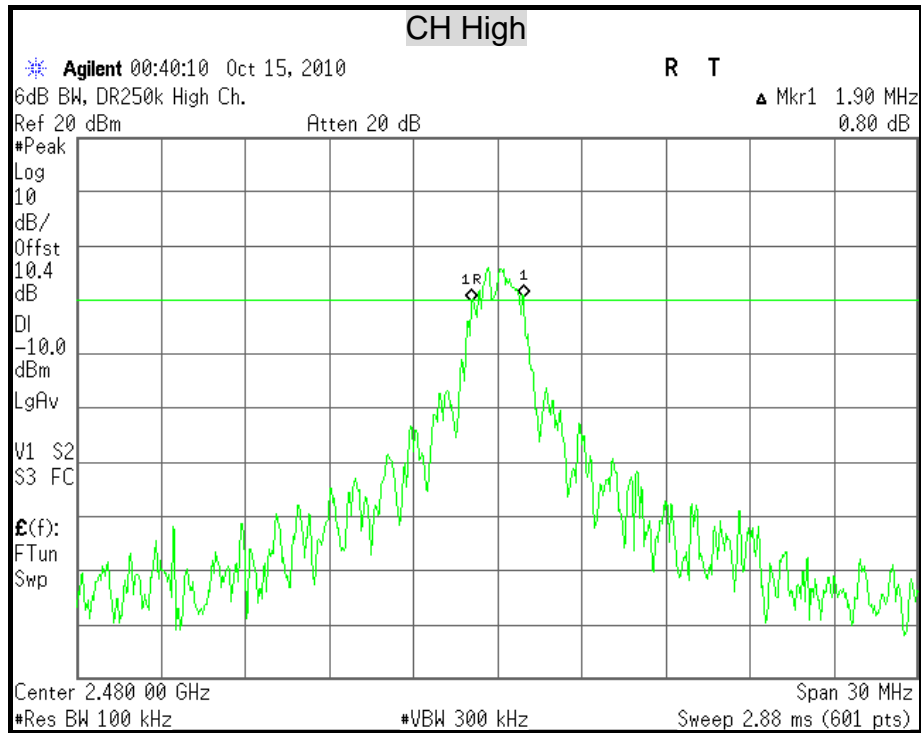
**TEST RESULTS**

Channel	Channel Frequency (MHz)	6dB Bandwidth (MHz)	Minimum Limit (kHz)	Pass / Fail
Low	2405	1.35	500	PASS
Middle	2440	1.70	500	PASS
High	2480	1.90	500	PASS



## 6dB BANDWIDTH







## 7.2 MAXIMUM PEAK OUTPUT POWER

### LIMITS

§ 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.

### TEST EQUIPMENT

Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
Spectrum Analyzer	AGILENT	E4446A	MY43360132	06/20/2011
Spectrum Analyzer	AGILENT	E4446A	MY46180323	05/02/2011

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

### TEST SETUP



### TEST PROCEDURE

1. The spectrum shall be set as follows :  
Span : 1.5 times channel integration bandwidth.  
RBW : 1MHz  
VBW : 3MHz  
Detector : Peak  
Sweep : Single trace
2. Compute the combined power of all signal responses contained in the trace by covering all the data points.
3. The peak output power is the channel power integrated over 26dB bandwidth.

**TEST RESULTS**

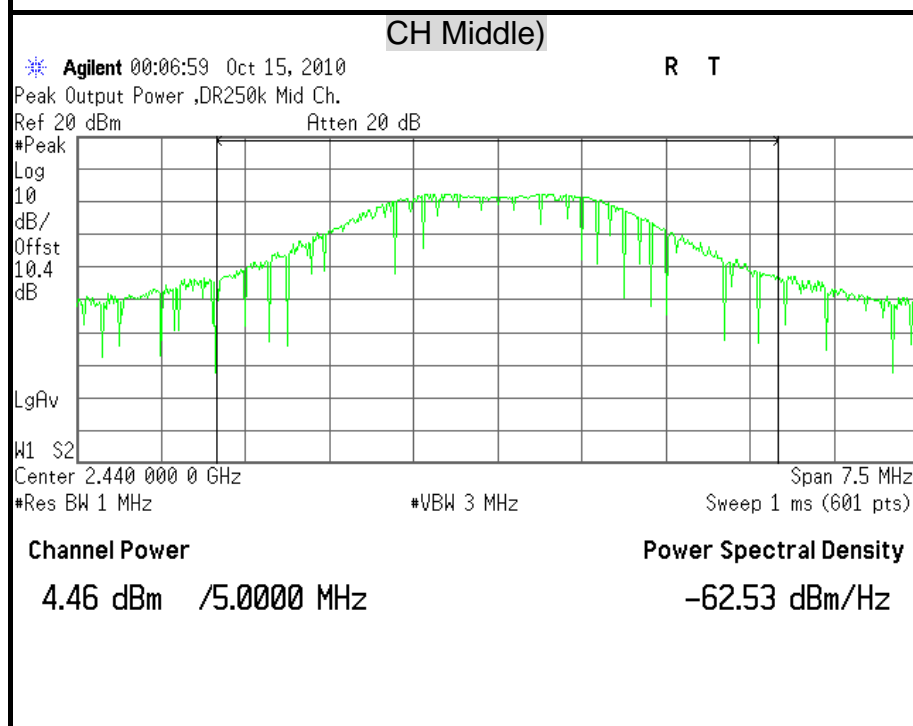
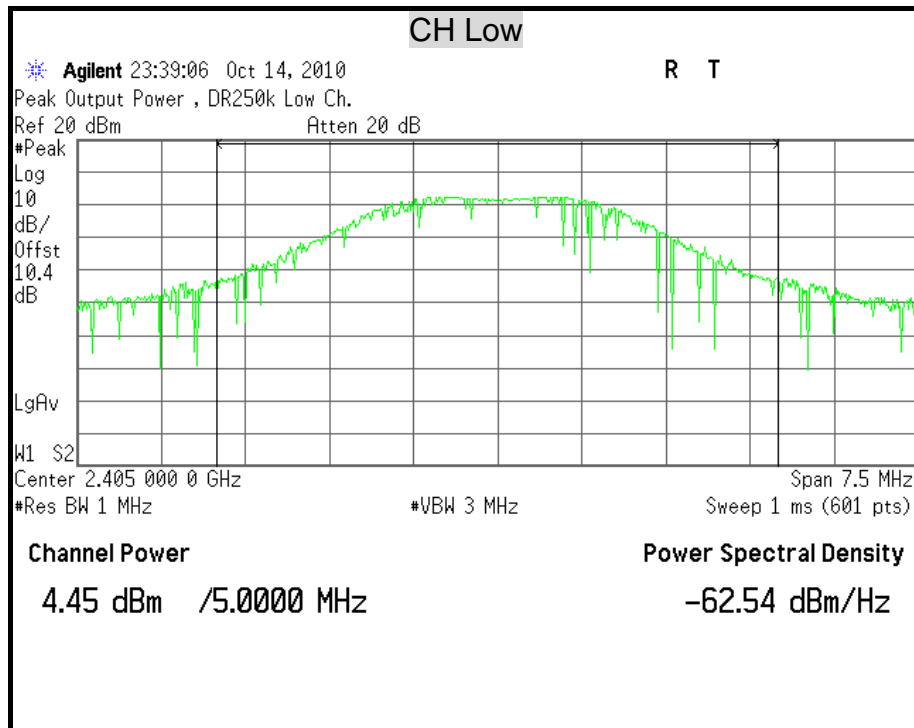
Channel	Channel Frequency (MHz)	Peak Power		Peak Power Limit		Pass / Fail
		(dBm)	(W)	(dBm)	(W)	
Low	2405	4.45	0.0028	30	1	PASS
Middle	2440	4.46	0.0028	30	1	PASS
High	2480	4.31	0.0027	30	1	PASS

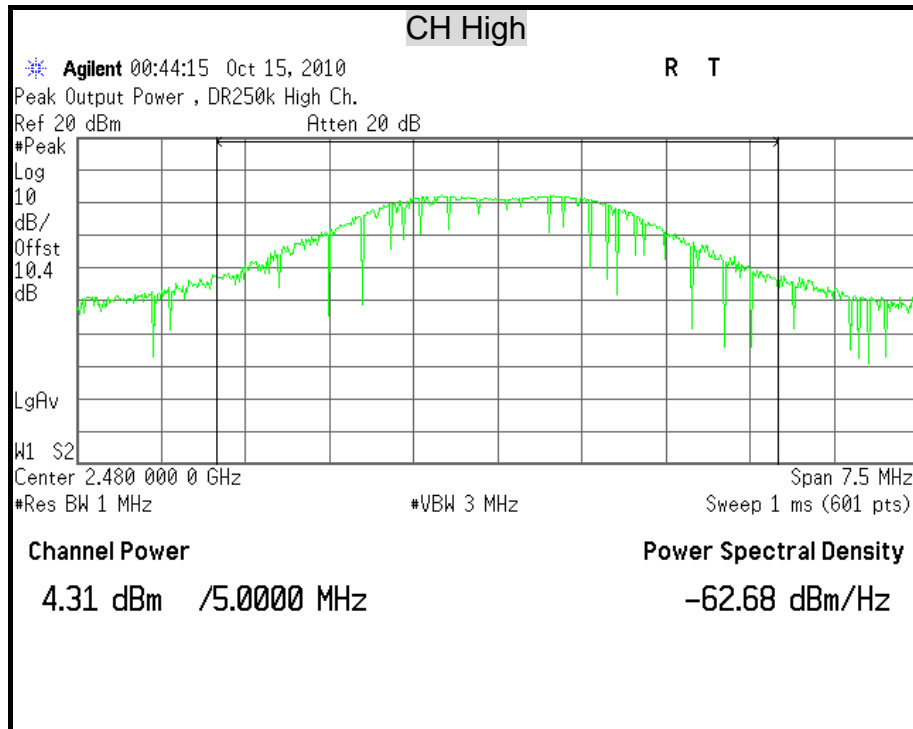
**Remark:**

1. At final test to get the worst-case emission at 2Mbps.
2. The cable assembly insertion loss of 10.4dB (including 10 dB pad and 0.4 dB cable) was Entered as an offset in the spectrum analyzer to allow for direct reading of power.



## MAXIMUM PEAK OUTPUT POWER









## 7.3 AVERAGE POWER

### LIMITS

None; for reporting purposes only.

### TEST EQUIPMENT

Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
Spectrum Analyzer	AGILENT	E4446A	MY43360132	06/20/2011
Spectrum Analyzer	AGILENT	E4446A	MY46180323	05/02/2011

**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.

### TEST RESULTS

Channel	Channel Frequency (MHz)	Average Power Output (dBm)
Low	2405	2.46
Middle	2440	2.48
High	2480	2.16

**Remark:**

1. At final test to get the worst-case emission at 2Mbps.
2. The cable assembly insertion loss of 10.4dB (including 10 dB pad and 0.4 dB cable) was Entered as an offset in the spectrum analyzer to allow for direct reading of power.



## 7.4 POWER SPECTRAL DENSITY

### LIMITS

§ 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	06/20/2011
Spectrum Analyzer	AGILENT	E4446A	MY46180323	05/02/2011

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

### TEST SETUP



### TEST PROCEDURE

The transmitter output was connected to the spectrum analyzer, the bandwidth of the fundamental frequency was measured with the spectrum analyzer using RBW = 3KHz and VBW = RBW, set sweep time = span / 3KHz.

The power spectral density was measured and recorded.

The sweep time is allowed to be longer than span / 3KHz for a full response of the mixer in the spectrum analyzer.

**TEST RESULTS**

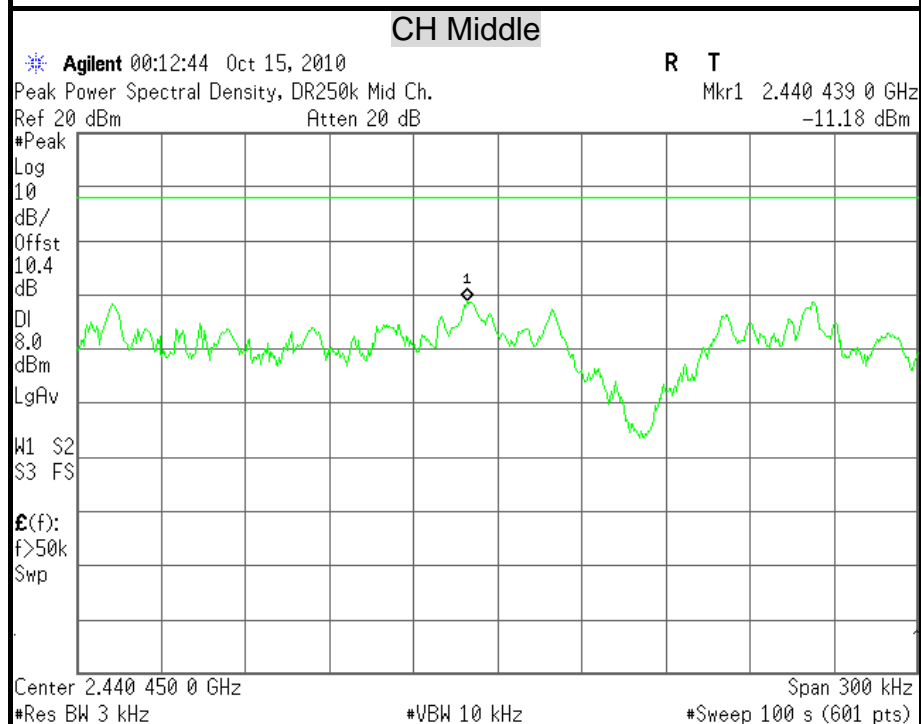
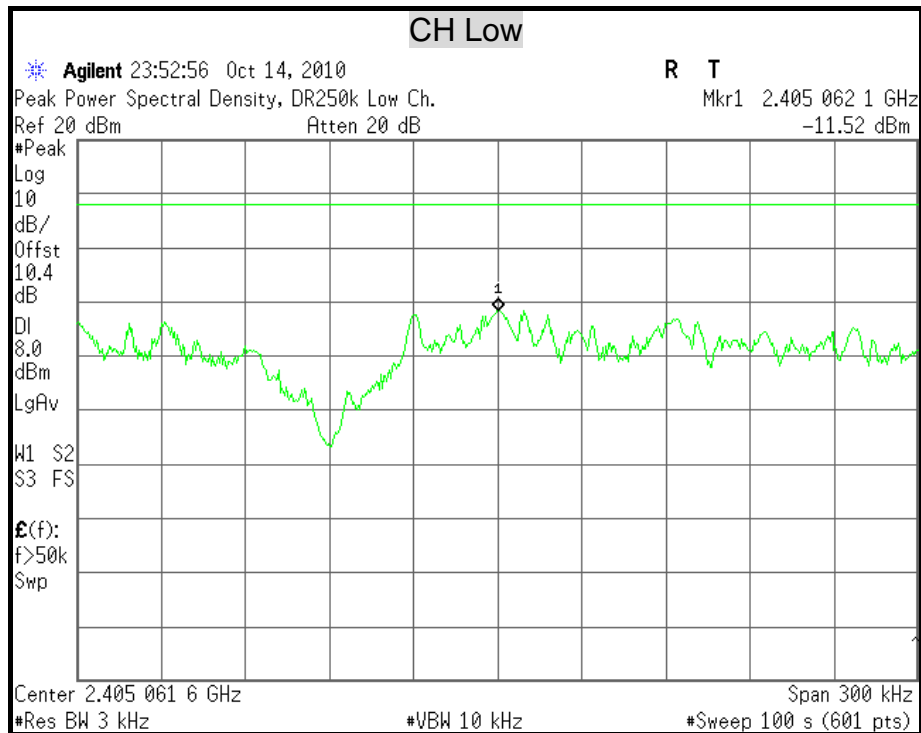
Channel	Channel Frequency (MHz)	Final RF Power Level in 3KHz BW (dBm)	Minimum Limit (dBm)	Pass / Fail
Low	2405	-11.52	8	PASS
Middle	2440	-11.18	8	PASS
High	2480	-11.60	8	PASS

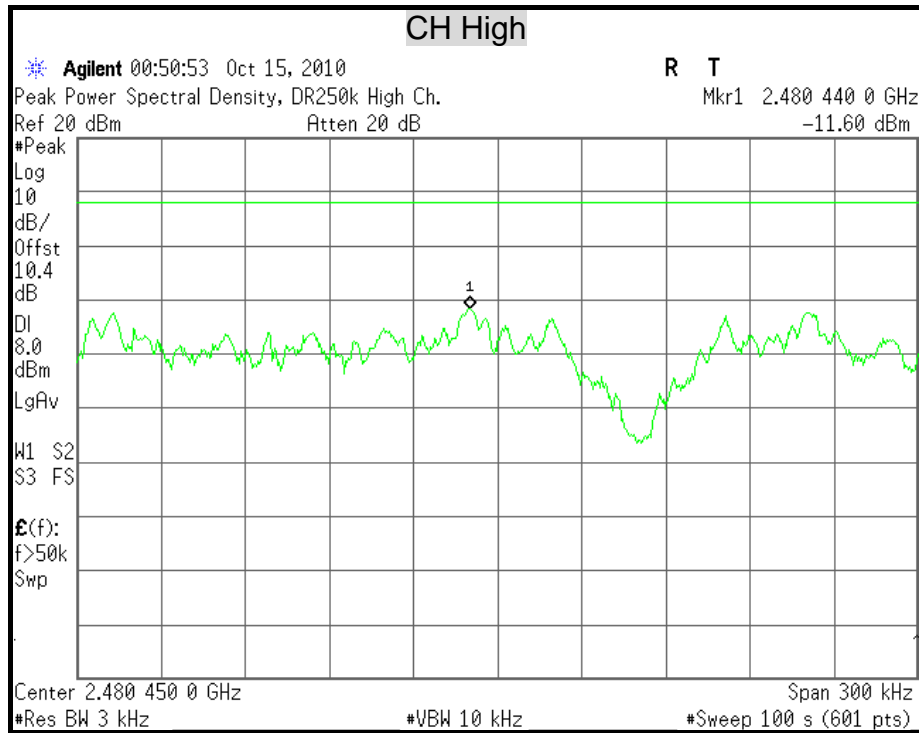
**Remark:**

1. At final test to get the worst-case emission at 2Mbps.
2. The cable assembly insertion loss of 10.4dB (including 10 dB pad and 0.4 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

### LIMITS

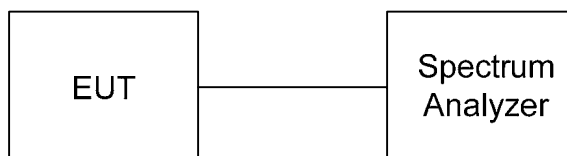
§ 15.247(d) In any 100 kHz bandwidth outside the frequency band in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest 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	06/20/2011
Spectrum Analyzer	AGILENT	E4446A	MY46180323	05/02/2011

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

### TEST SETUP



### TEST PROCEDURE

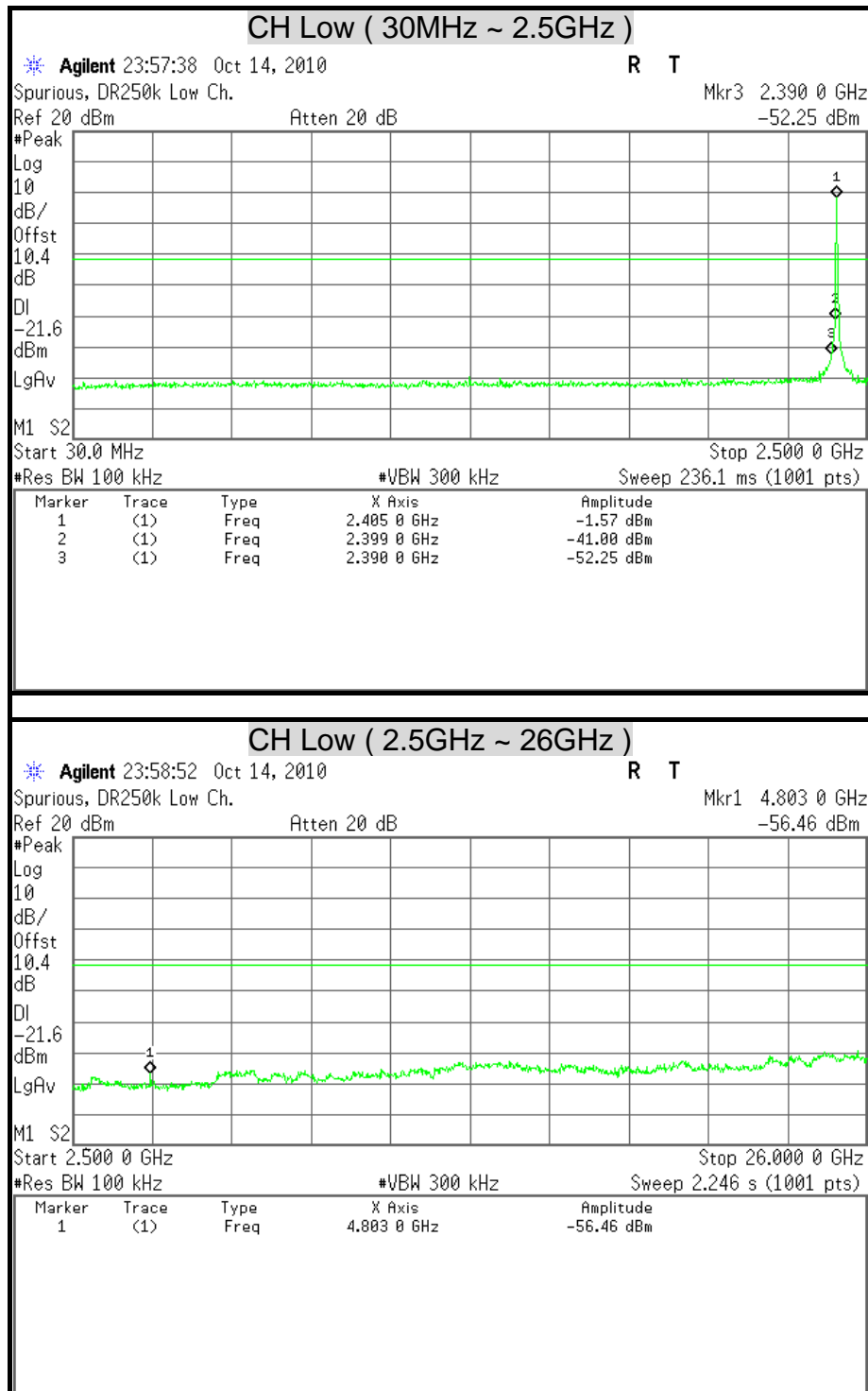
The transmitter output is connected to a spectrum analyzer. The resolution bandwidth is set to 100 kHz. The video bandwidth is set to 300 kHz.

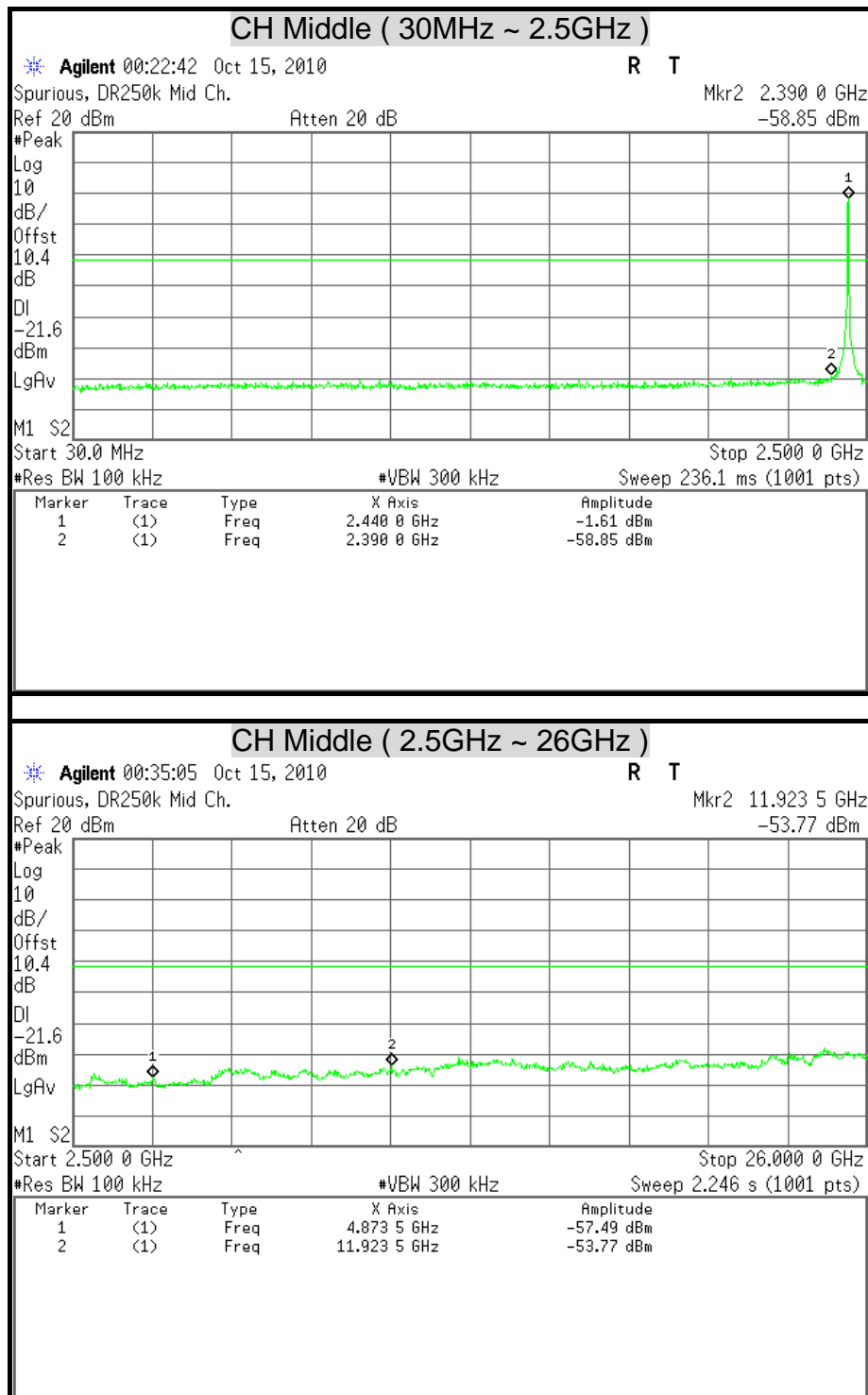
The spectrum from 30 MHz to 26 GHz is investigated with the transmitter set to the lowest, middle, and highest channels in the 2.4 GHz band.



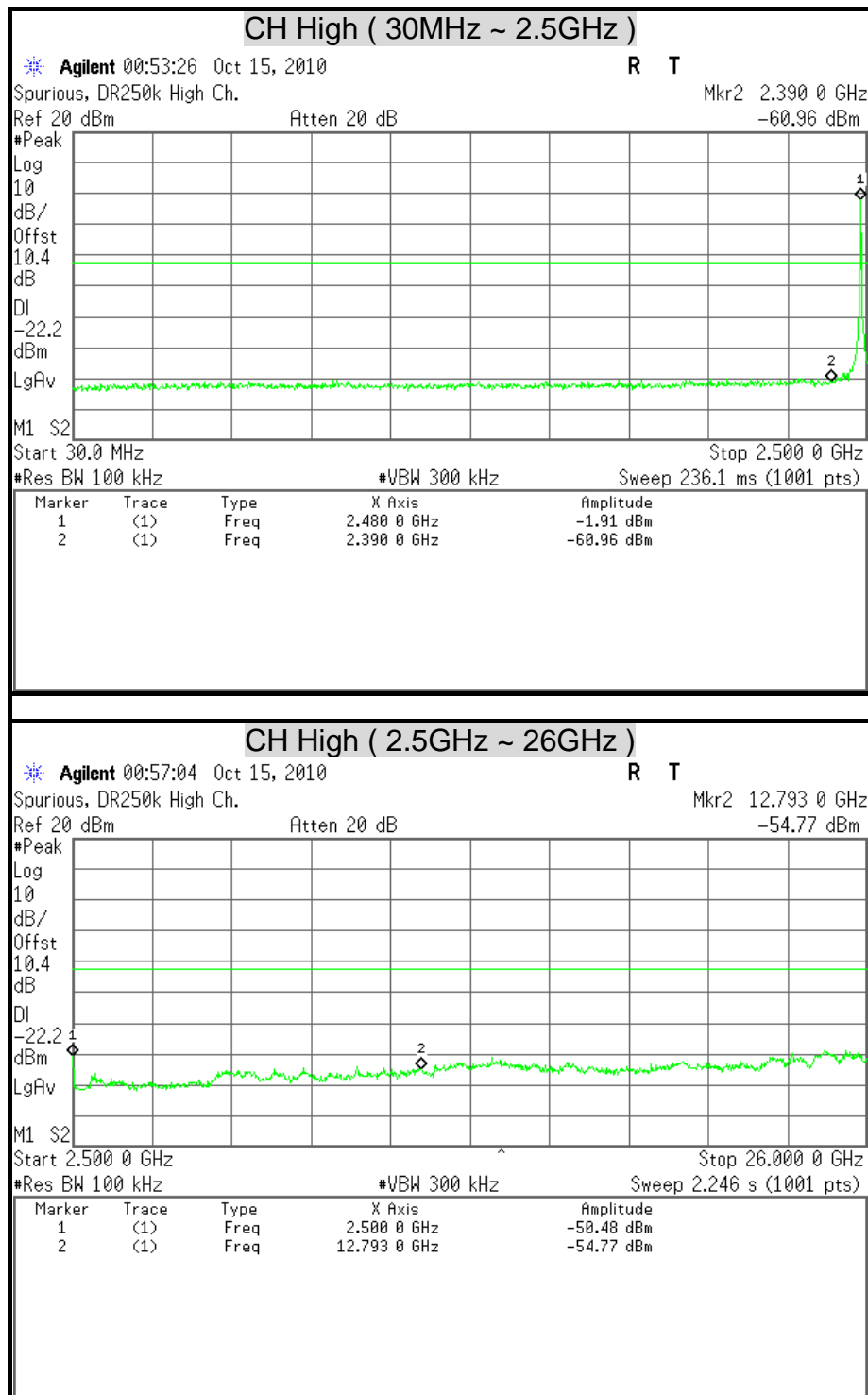
## TEST RESULTS

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











## 7.6 RADIATED EMISSION

### LIMITS

- (1) § 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) § 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 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) 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

### 966Chamber\_A

Name of Equipment	Manufacture	Model	Serial Number	Calibration Due
Spectrum Analyzer	Agilent	E4446A	MY43360132	06/20/2011
EMI Test Receiver	ROHDE & SCHWARZ	ESCI	100221	05/03/2011
Bilog Antenna	SCHWARZBECK	VULB	9168-249	10/04/2011
Double-Ridged Waveguide Horn	ETS LINDGREN	3117	00078732	07/05/2011
Pre-Amplifier	Agilent	8449B	3008A01471	08/02/2011
Pre-Amplifier	HP	8447F	2944A03748	09/23/2011
RF Coaxial Cable	HUBER-SUHNER	SUCOFLEX 104PEA	SN31347	07/21/2011
RF Coaxial Cable	HUBER-SUHNER	SUCOFLEX 104PEA	SN31350	07/21/2011
RF Coaxial Cable	HUBER-SUHNER	SUCOFLEX 104PEA	SN31355	07/21/2011
LOOP Antenna	EMCO	6502	8905-2356	06/09/2011
Notch Filters Band Reject	Micro-Tronics	BRM05702-01	009	N.C.R

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

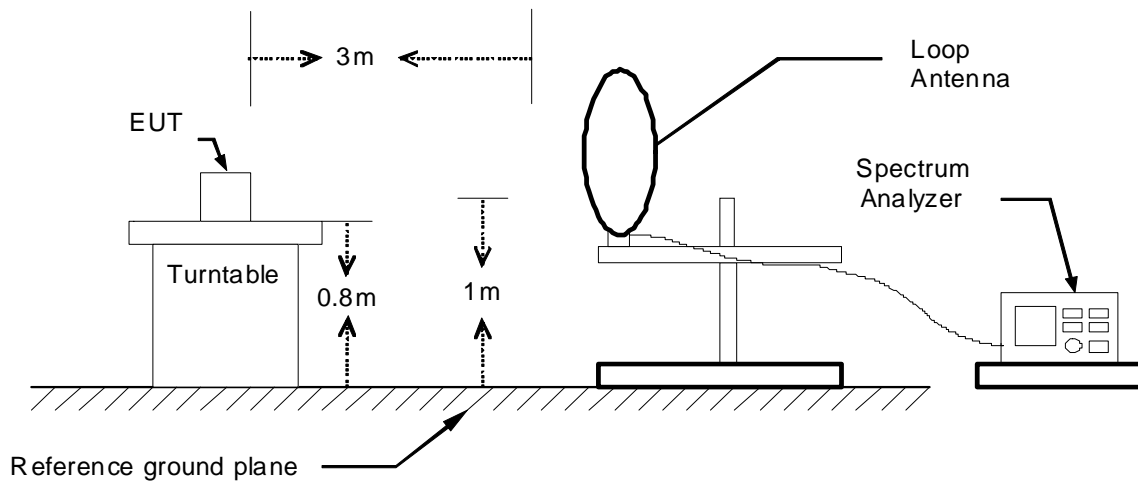
2. N.C.R = No Calibration Request.



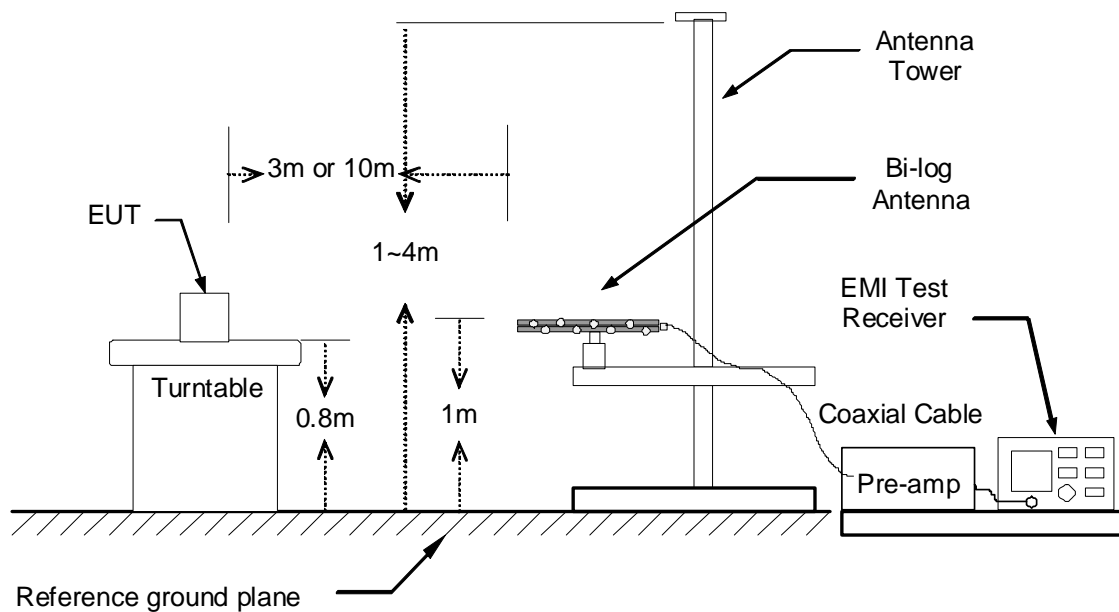
## TEST SETUP

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

### 9kHz ~ 30MHz

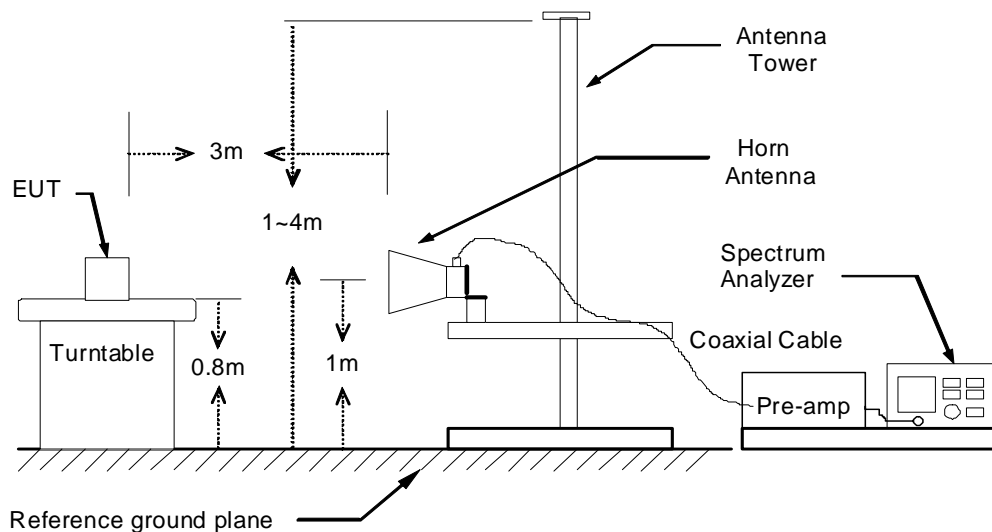


### 30MHz ~ 1GHz





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 at a 10 meter open area test site. 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)**

<b>Product Name</b>	CONTROLLER	<b>Test By</b>	Waternil Guan
<b>Model</b>	510-2017-0001	<b>Test Date</b>	2010/10/15
<b>Test Mode</b>	Rechargeable battery (normal link)	<b>TEMP &amp; Humidity</b>	24°C, 54%

966 Chamber_A at 3Meter / Horizontal						
Frequency (MHz)	Reading (dBμV)	Correction Factor (dB/m)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Remark
107.60	48.26	-14.15	34.11	43.50	-9.39	Peak
120.21	49.90	-12.76	37.14	43.50	-6.36	QP
131.85	48.02	-11.72	36.30	43.50	-7.20	Peak
216.24	48.59	-13.33	35.26	46.00	-10.74	Peak
227.88	43.60	-12.69	30.91	46.00	-15.09	QP
239.52	47.65	-11.86	35.79	46.00	-10.21	Peak
495.60	35.35	-4.47	30.88	46.00	-15.12	Peak
864.20	33.83	2.38	36.21	46.00	-9.79	Peak
966 Chamber_A at 3Meter / Vertical						
Frequency (MHz)	Reading (dBμV)	Correction Factor (dB/m)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Remark
107.60	45.51	-14.15	31.36	43.50	-12.14	Peak
120.21	50.26	-12.76	37.50	43.50	-6.00	Peak
131.85	47.08	-11.72	35.36	43.50	-8.14	Peak
216.24	46.55	-13.33	33.22	46.00	-12.78	Peak
227.88	45.73	-12.69	33.04	46.00	-12.96	Peak
527.61	33.76	-3.91	29.85	46.00	-16.15	Peak
640.13	30.95	-1.36	29.59	46.00	-16.41	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 (dBμV/m) = Reading (dBμV) + Correction Factor (dB/m)
5. Margin (dB) = Remark result (dBμV/m) - Quasi-peak limit (dBμV/m).



<b>Product Name</b>	CONTROLLER	<b>Test By</b>	Waternil Guan
<b>Model</b>	510-2017-0001	<b>Test Date</b>	2010/10/15
<b>Test Mode</b>	AA battery (normal link)	<b>TEMP &amp; Humidity</b>	24°C, 54%

966 Chamber_A at 3Meter / Horizontal						
Frequency (MHz)	Reading (dBμV)	Correction Factor (dB/m)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Remark
95.96	52.06	-15.51	36.55	43.50	-6.95	Peak
107.60	47.90	-14.15	33.75	43.50	-9.75	QP
120.21	47.00	-12.76	34.24	43.50	-9.26	QP
131.85	50.23	-11.72	38.51	43.50	-4.99	Peak
216.24	50.96	-13.33	37.63	46.00	-8.37	Peak
227.88	46.70	-12.69	34.01	46.00	-11.99	QP
864.20	32.73	2.38	35.11	46.00	-10.89	Peak
896.21	32.09	2.95	35.04	46.00	-10.96	Peak
966 Chamber_A at 3Meter / Vertical						
Frequency (MHz)	Reading (dBμV)	Correction Factor (dB/m)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Remark
107.60	45.76	-14.15	31.61	43.50	-11.89	Peak
120.21	48.24	-12.76	35.48	43.50	-8.02	Peak
131.85	44.68	-11.72	32.96	43.50	-10.54	Peak
216.24	46.60	-13.33	33.27	46.00	-12.73	Peak
227.88	46.25	-12.69	33.56	46.00	-12.44	Peak
527.61	37.57	-3.91	33.66	46.00	-12.34	Peak
559.62	36.28	-3.23	33.05	46.00	-12.95	Peak
928.22	31.98	3.32	35.30	46.00	-10.70	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).



<b>Product Name</b>	CONTROLLER	<b>Test By</b>	Waternil Guan
<b>Model</b>	510-2017-0001	<b>Test Date</b>	2010/10/15
<b>Test Mode</b>	Rechargeable battery (charge)	<b>TEMP &amp; Humidity</b>	24°C, 54%

966 Chamber_A at 3Meter / Horizontal						
Frequency (MHz)	Reading (dBμV)	Correction Factor (dB/m)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Remark
95.96	53.14	-15.51	37.63	43.50	-5.87	Peak
107.60	48.90	-14.15	34.75	43.50	-8.75	QP
120.21	48.80	-12.76	36.04	43.50	-7.46	QP
227.88	50.70	-12.69	38.01	46.00	-7.99	Peak
239.52	48.90	-11.86	37.04	46.00	-8.96	Peak
532.46	38.55	-3.82	34.73	46.00	-11.27	Peak
559.62	38.63	-3.23	35.40	46.00	-10.60	Peak
641.10	35.02	-1.34	33.68	46.00	-12.32	Peak
966 Chamber_A at 3Meter / Vertical						
Frequency (MHz)	Reading (dBμV)	Correction Factor (dB/m)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Remark
95.96	48.02	-15.51	32.51	43.50	-10.99	Peak
107.60	46.86	-14.15	32.71	43.50	-10.79	Peak
120.21	48.51	-12.76	35.75	43.50	-7.75	Peak
216.24	46.44	-13.33	33.11	46.00	-12.89	Peak
227.88	44.38	-12.69	31.69	46.00	-14.31	Peak
263.77	42.68	-10.91	31.77	46.00	-14.23	Peak
608.12	32.87	-1.90	30.97	46.00	-15.03	Peak
864.20	29.75	2.38	32.13	46.00	-13.87	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).





## Above 1 GHz

<b>Product Name</b>	CONTROLLER	<b>Test By</b>	Waternil Guan
<b>Model</b>	510-2017-0001	<b>Test Date</b>	2010/10/14
<b>Test Mode</b>	Antenna (1) TX / CH Low	<b>TEMP &amp; Humidity</b>	24°C, 48%

966 Chamber_A 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
1174.00	54.52	---	-3.98	50.54	---	74.00	54.00	-23.46	Peak
1292.00	54.21	---	-3.50	50.71	---	74.00	54.00	-23.29	Peak
1526.00	54.14	---	-2.44	51.70	---	74.00	54.00	-22.30	Peak
2405.00	96.69	75.89	2.36	99.05	78.25	---	---	---	Carrier
3510.00	42.01	---	3.84	45.85	---	74.00	54.00	-28.15	Peak
4215.00	41.69	---	5.82	47.51	---	74.00	54.00	-26.49	Peak
4837.50	41.07	---	6.05	47.12	---	74.00	54.00	-26.88	Peak
966 Chamber_A at 3Meter / Vertical									
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
1138.00	54.44	---	-4.13	50.31	---	74.00	54.00	-23.69	Peak
1274.00	53.78	---	-3.58	50.20	---	74.00	54.00	-23.80	Peak
1416.00	53.06	---	-3.00	50.06	---	74.00	54.00	-23.94	Peak
2405.00	92.68	73.34	2.36	95.04	75.70	---	---	---	Carrier
3360.00	42.54	---	3.74	46.28	---	74.00	54.00	-27.72	Peak
3735.00	42.48	---	4.45	46.93	---	74.00	54.00	-27.07	Peak
4807.50	40.90	---	6.10	47.00	---	74.00	54.00	-27.00	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.
5. In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated 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 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. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB.
6. Result = Reading + Correction Factor  
 Margin = Result - Limit  
 Remark Peak = Result(PK) - Limit(PK)  
 Remark AVG = Result(AV) - Limit(AV)



<b>Product Name</b>	CONTROLLER	<b>Test By</b>	Waternil Guan
<b>Model</b>	510-2017-0001	<b>Test Date</b>	2010/10/14
<b>Test Mode</b>	Antenna (1) TX / CH Middle	<b>TEMP &amp; Humidity</b>	24°C, 48%

966 Chamber_A 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
1152.00	54.42	---	-4.07	50.35	---	74.00	54.00	-23.65	Peak
1350.00	53.73	---	-3.27	50.46	---	74.00	54.00	-23.54	Peak
1558.00	53.77	---	-2.18	51.59	---	74.00	54.00	-22.41	Peak
2440.00	97.26	74.28	2.44	99.70	76.72	---	---	---	Carrier
3217.50	42.75	---	3.67	46.42	---	74.00	54.00	-27.58	Peak
4657.50	41.73	---	6.38	48.11	---	74.00	54.00	-25.89	Peak
6195.00	40.35	---	9.02	49.37	---	74.00	54.00	-24.63	Peak
966 Chamber_A at 3Meter / Vertical									
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
1168.00	53.91	---	-4.01	49.90	---	74.00	54.00	-24.10	Peak
1438.00	54.27	---	-2.91	51.36	---	74.00	54.00	-22.64	Peak
1586.00	53.13	---	-1.94	51.19	---	74.00	54.00	-22.81	Peak
2440.00	94.28	72.41	2.44	96.72	74.85	---	---	---	Carrier
3817.50	41.25	---	4.67	45.92	---	74.00	54.00	-28.08	Peak
4425.00	40.72	---	6.45	47.17	---	74.00	54.00	-26.83	Peak
5775.00	39.94	---	8.01	47.95	---	74.00	54.00	-26.05	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.
5. In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated 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 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. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB.
6. Result = Reading + Correction Factor  
 Margin = Result – Limit  
 Remark Peak = Result(PK) – Limit(PK)  
 Remark AVG = Result(AV) – Limit(AV)



<b>Product Name</b>	CONTROLLER	<b>Test By</b>	Waternil Guan
<b>Model</b>	510-2017-0001	<b>Test Date</b>	2010/10/14
<b>Test Mode</b>	Antenna (1) TX / CH High	<b>TEMP &amp; Humidity</b>	24°C, 48%

966 Chamber_A 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
1246.00	54.01	---	-3.69	50.32	---	74.00	54.00	-23.68	Peak
1400.00	53.51	---	-3.07	50.44	---	74.00	54.00	-23.56	Peak
1520.00	53.61	---	-2.49	51.12	---	74.00	54.00	-22.88	Peak
2480.00	95.03	74.61	2.52	97.55	77.13	---	---	---	Carrier
3795.00	41.51	---	4.61	46.12	---	74.00	54.00	-27.88	Peak
4800.00	41.26	---	6.12	47.38	---	74.00	54.00	-26.62	Peak
5332.50	40.39	---	6.57	46.96	---	74.00	54.00	-27.04	Peak
966 Chamber_A at 3Meter / Vertical									
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
1084.00	54.83	---	-4.35	50.48	---	74.00	54.00	-23.52	Peak
1312.00	54.12	---	-3.42	50.70	---	74.00	54.00	-23.30	Peak
1506.00	53.55	---	-2.61	50.94	---	74.00	54.00	-23.06	Peak
2480.00	93.72	73.76	2.52	96.24	76.28	---	---	---	Carrier
3502.50	41.98	---	3.82	45.80	---	74.00	54.00	-28.20	Peak
4642.50	40.27	---	6.41	46.68	---	74.00	54.00	-27.32	Peak
6030.00	40.35	---	8.87	49.22	---	74.00	54.00	-24.78	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.
5. In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated 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 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. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB.
6. Result = Reading + Correction Factor  
 Margin = Result – Limit  
 Remark Peak = Result(PK) – Limit(PK)  
 Remark AVG = Result(AV) – Limit(AV)



<b>Product Name</b>	CONTROLLER	<b>Test By</b>	Waternil Guan
<b>Model</b>	510-2017-0001	<b>Test Date</b>	2010/10/14
<b>Test Mode</b>	Antenna (2) TX / CH Low	<b>TEMP &amp; Humidity</b>	24°C, 48%

966 Chamber_A 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
1174.50	54.63	---	-3.98	50.65	---	74.00	54.00	-23.35	Peak
1291.00	54.37	---	-3.50	50.87	---	74.00	54.00	-23.13	Peak
1527.00	54.54	---	-2.44	52.10	---	74.00	54.00	-21.90	Peak
2405.00	96.19	74.89	2.36	98.55	77.25	---	---	---	Carrier
3511.00	42.56	---	3.84	46.40	---	74.00	54.00	-27.60	Peak
4213.00	41.43	---	5.82	47.25	---	74.00	54.00	-26.75	Peak
4837.50	41.67	---	6.05	47.72	---	74.00	54.00	-26.28	Peak
966 Chamber_A at 3Meter / Vertical									
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
1139.00	54.41	---	-4.13	50.28	---	74.00	54.00	-23.72	Peak
1273.00	53.65	---	-3.58	50.07	---	74.00	54.00	-23.93	Peak
1417.00	53.11	---	-3.00	50.11	---	74.00	54.00	-23.89	Peak
2405.00	90.83	72.89	2.36	93.19	75.25	---	---	---	Carrier
3361.00	42.14	---	3.74	45.88	---	74.00	54.00	-28.12	Peak
3736.00	42.52	---	4.45	46.97	---	74.00	54.00	-27.03	Peak
4807.00	40.67	---	6.10	46.77	---	74.00	54.00	-27.23	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.
5. In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated 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 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. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB.
6. Result = Reading + Correction Factor  
 Margin = Result – Limit  
 Remark Peak = Result(PK) – Limit(PK)  
 Remark AVG = Result(AV) – Limit(AV)



<b>Product Name</b>	CONTROLLER	<b>Test By</b>	Waternil Guan
<b>Model</b>	510-2017-0001	<b>Test Date</b>	2010/10/14
<b>Test Mode</b>	Antenna (2) TX / CH Middle	<b>TEMP &amp; Humidity</b>	24°C, 48%

966 Chamber_A 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
1151.50	54.72	---	-4.07	50.65	---	74.00	54.00	-23.35	Peak
1351.00	53.39	---	-3.27	50.12	---	74.00	54.00	-23.88	Peak
1559.00	53.55	---	-2.18	51.37	---	74.00	54.00	-22.63	Peak
2440.00	96.09	72.92	2.44	98.53	75.36	---	---	---	Carrier
3216.50	42.55	---	3.67	46.22	---	74.00	54.00	-27.78	Peak
4658.50	41.67	---	6.38	48.05	---	74.00	54.00	-25.95	Peak
6195.00	40.39	---	9.02	49.41	---	74.00	54.00	-24.59	Peak
966 Chamber_A at 3Meter / Vertical									
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
1166.00	53.51	---	-4.01	49.50	---	74.00	54.00	-24.50	Peak
1440.00	54.72	---	-2.91	51.81	---	74.00	54.00	-22.19	Peak
1587.00	53.31	---	-1.94	51.37	---	74.00	54.00	-22.63	Peak
2440.00	93.44	71.53	2.44	95.88	73.97	---	---	---	Carrier
3818.50	41.56	---	4.67	46.23	---	74.00	54.00	-27.77	Peak
4426.00	40.83	---	6.45	47.28	---	74.00	54.00	-26.72	Peak
5775.00	39.36	---	8.01	47.37	---	74.00	54.00	-26.63	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.
5. In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated 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 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. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB.
6. Result = Reading + Correction Factor  
 Margin = Result – Limit  
 Remark Peak = Result(PK) – Limit(PK)  
 Remark AVG = Result(AV) – Limit(AV)





<b>Product Name</b>	CONTROLLER	<b>Test By</b>	Waternil Guan
<b>Model</b>	510-2017-0001	<b>Test Date</b>	2010/10/14
<b>Test Mode</b>	Antenna (2) TX / CH High	<b>TEMP &amp; Humidity</b>	24°C, 48%

966 Chamber_A 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
1247.00	54.09	---	-3.69	50.40	---	74.00	54.00	-23.60	Peak
1401.00	53.41	---	-3.07	50.34	---	74.00	54.00	-23.66	Peak
1521.00	53.38	---	-2.49	50.89	---	74.00	54.00	-23.11	Peak
2480.00	93.76	73.21	2.52	96.28	75.73	---	---	---	Carrier
3794.00	41.61	---	4.61	46.22	---	74.00	54.00	-27.78	Peak
4801.00	41.56	---	6.12	47.68	---	74.00	54.00	-26.32	Peak
5332.00	40.48	---	6.57	47.05	---	74.00	54.00	-26.95	Peak
966 Chamber_A at 3Meter / Vertical									
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
1085.00	54.53	---	-4.35	50.18	---	74.00	54.00	-23.82	Peak
1311.00	54.32	---	-3.42	50.90	---	74.00	54.00	-23.10	Peak
1507.00	53.59	---	-2.61	50.98	---	74.00	54.00	-23.02	Peak
2480.00	93.04	73.02	2.52	95.56	75.54	---	---	---	Carrier
3501.00	41.68	---	3.82	45.50	---	74.00	54.00	-28.50	Peak
4643.00	40.72	---	6.41	47.13	---	74.00	54.00	-26.87	Peak
6032.00	40.59	---	8.87	49.46	---	74.00	54.00	-24.54	Peak

**Remark:**

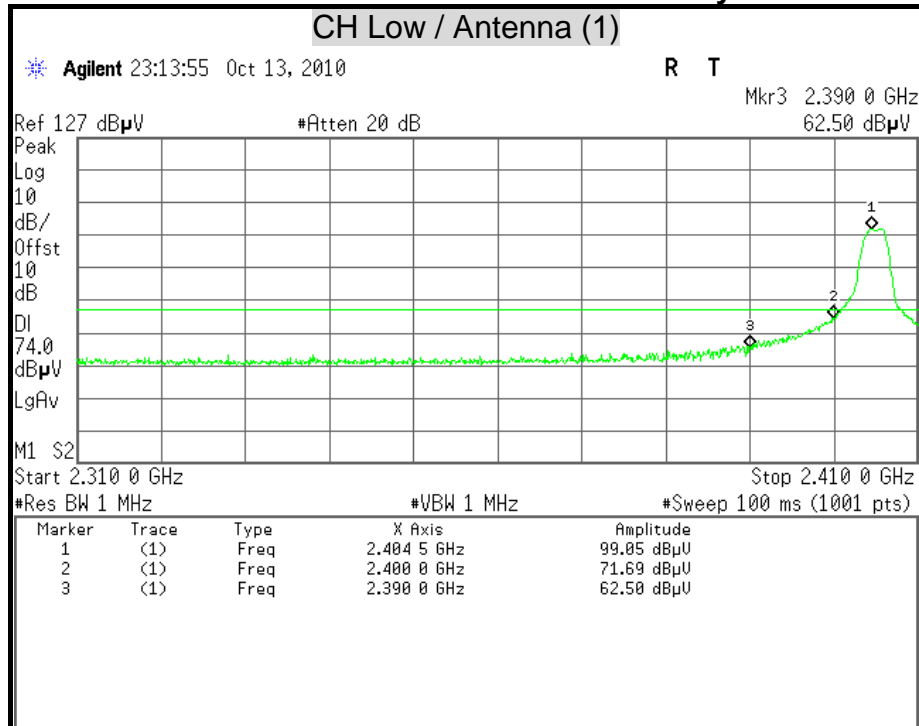
1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Average test would be performed if the peak result were greater than the average limit.
3. Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are 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.
5. In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated 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 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. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB.
6. Result = Reading + Correction Factor  
 Margin = Result – Limit  
 Remark Peak = Result(PK) – Limit(PK)  
 Remark AVG = Result(AV) – Limit(AV)



## Restricted Band Edges

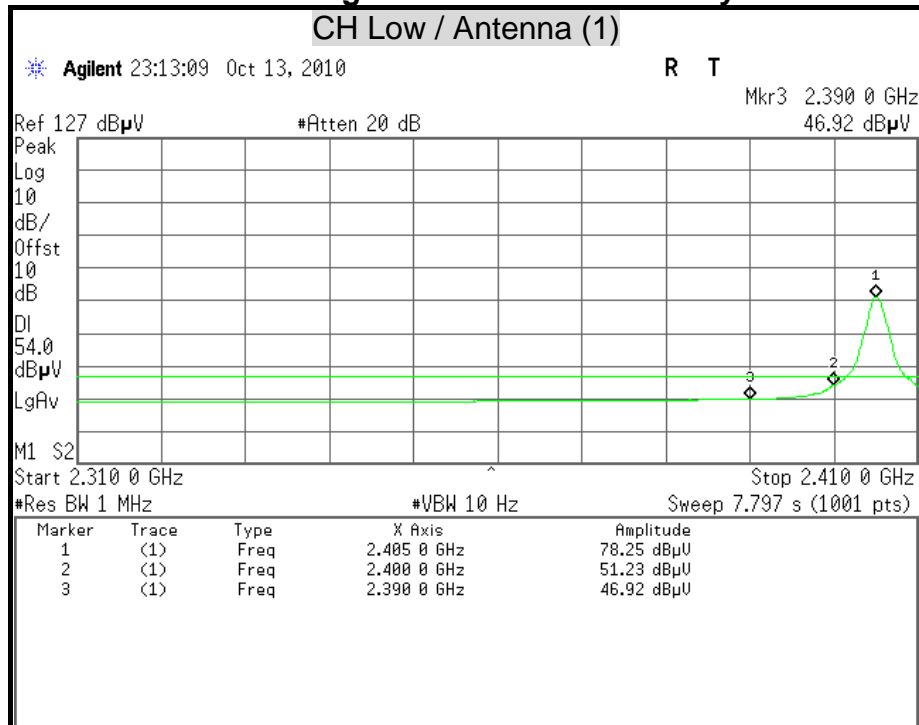
**Detector Mode : Peak**

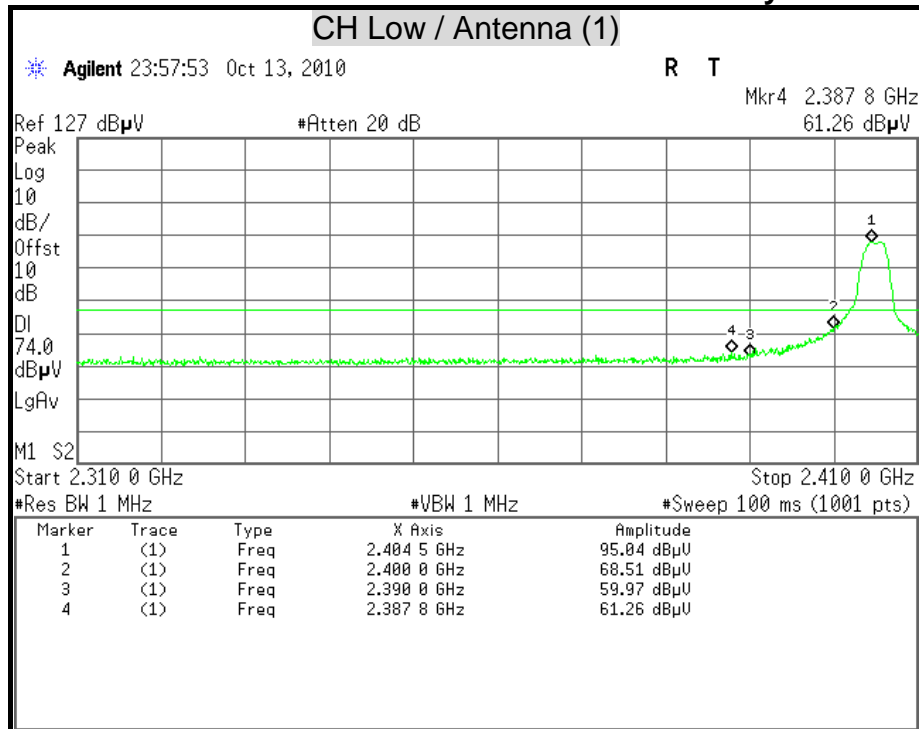
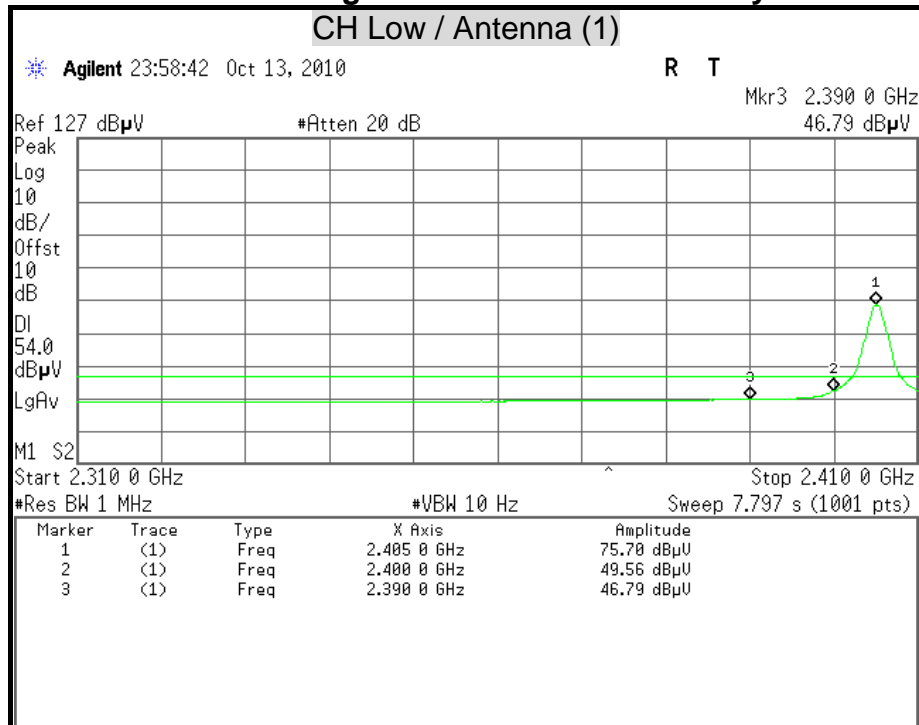
**Polarity : Horizontal**



**Detector Mode : Average**

**Polarity : Horizontal**



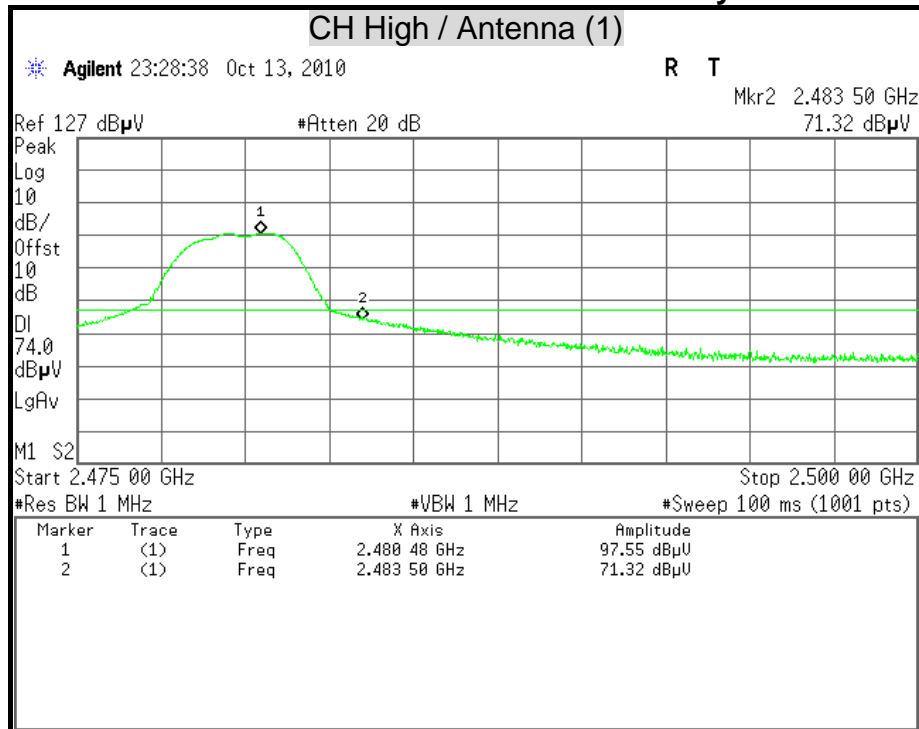
**Detector Mode : Peak****Polarity : Vertical****Detector Mode : Average****Polarity : Vertical**





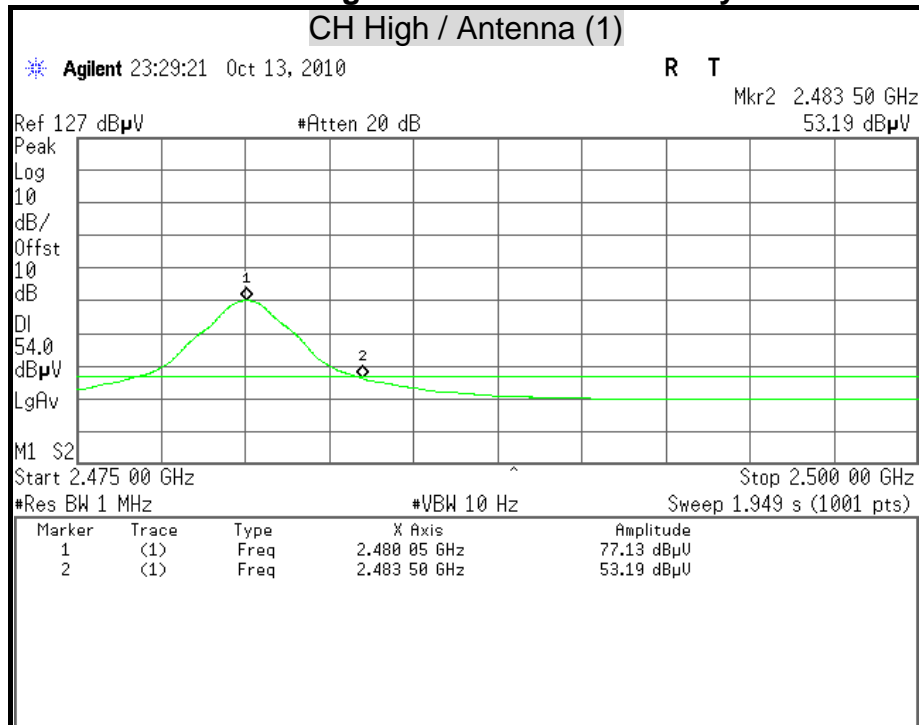
**Detector Mode : Peak**

**Polarity : Horizontal**



**Detector Mode : Average**

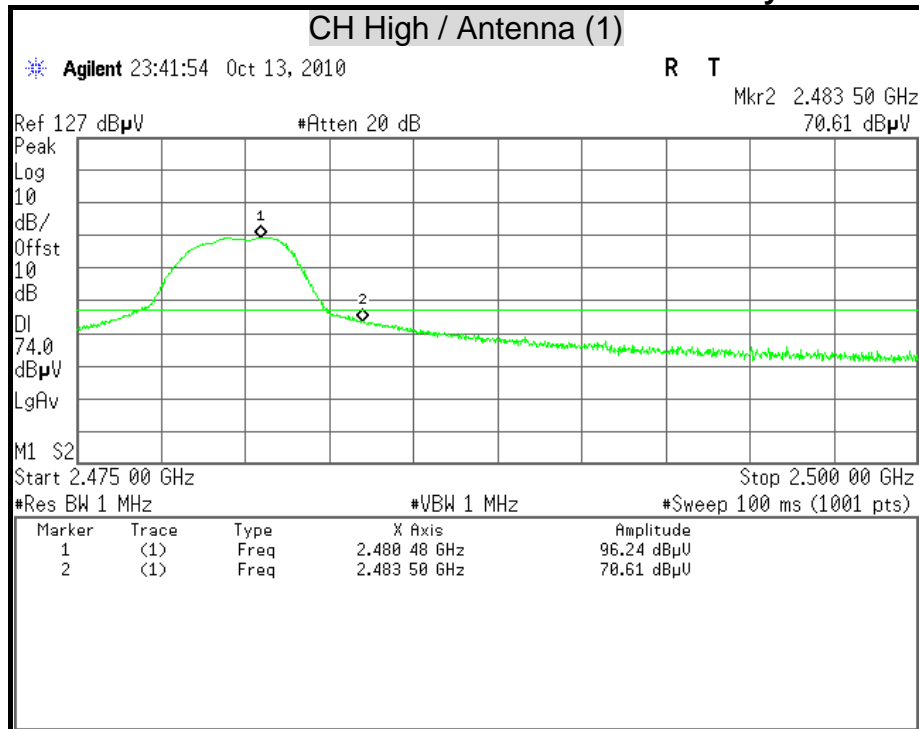
**Polarity : Horizontal**





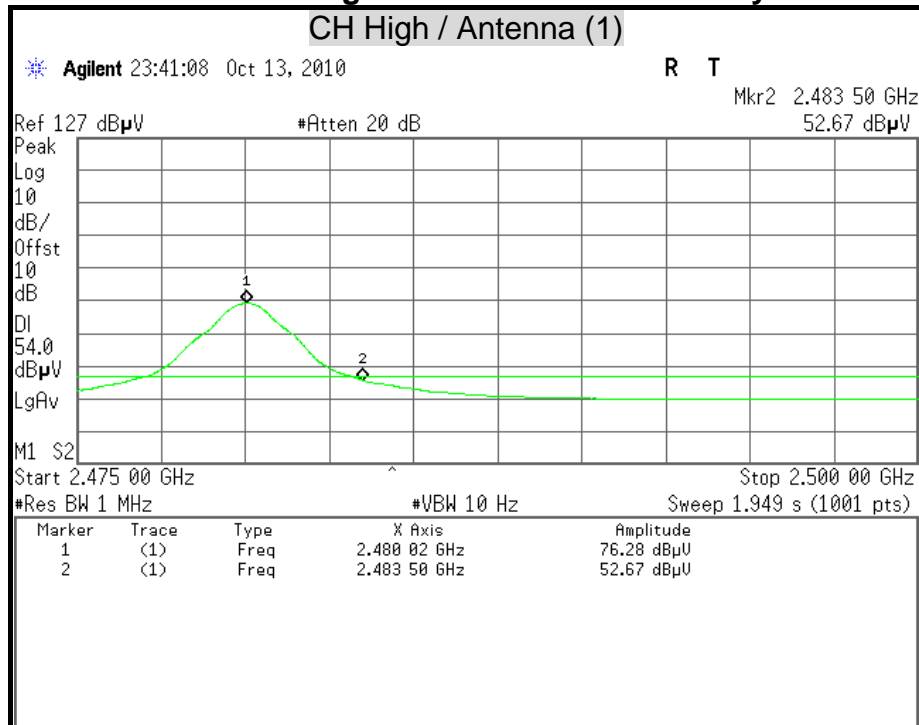
**Detector Mode : Peak**

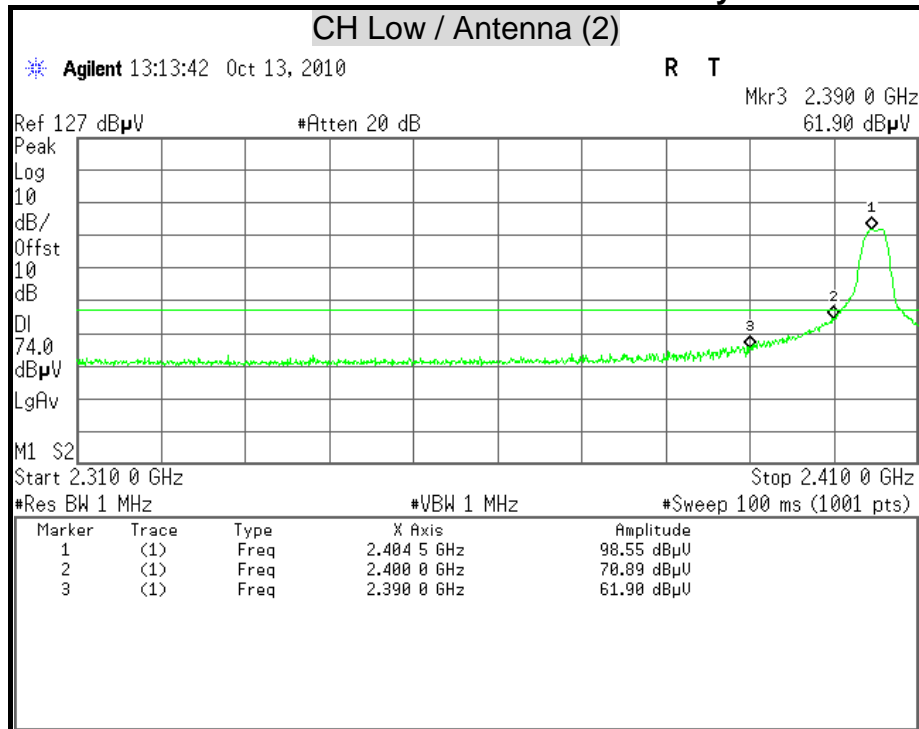
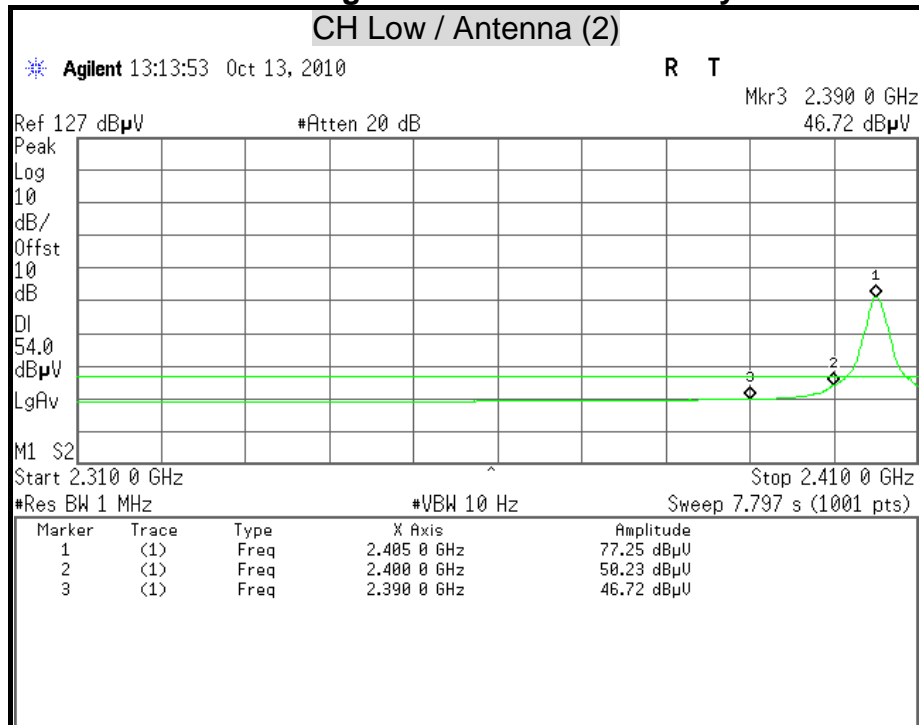
**Polarity : Vertical**



**Detector Mode : Average**

**Polarity : Vertical**

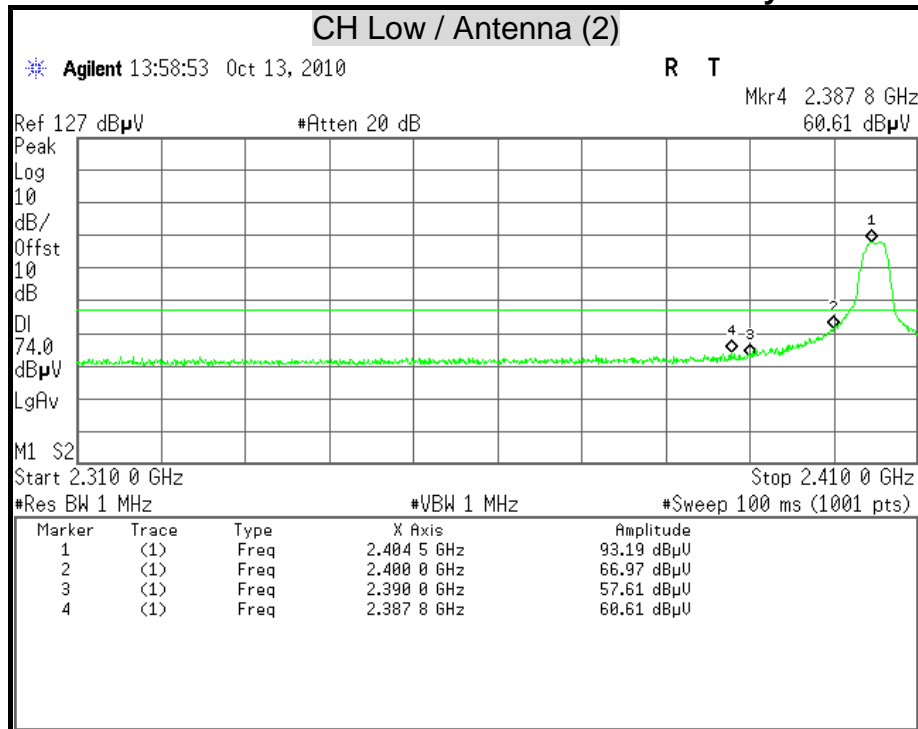


**Detector Mode : Peak****Polarity : Horizontal****Detector Mode : Average****Polarity : Horizontal**



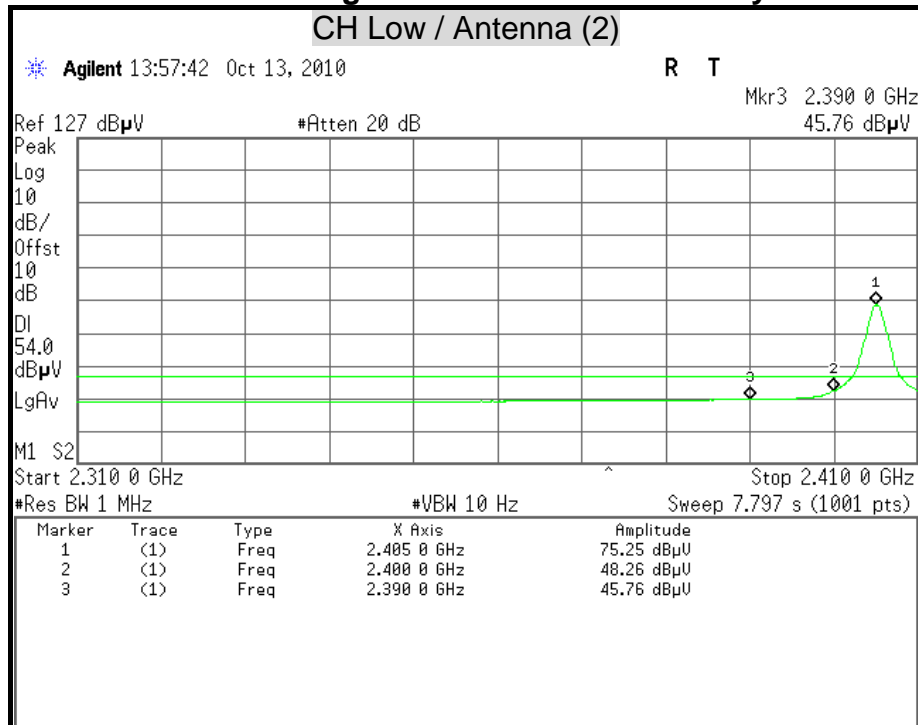
**Detector Mode : Peak**

**Polarity : Vertical**



**Detector Mode : Average**

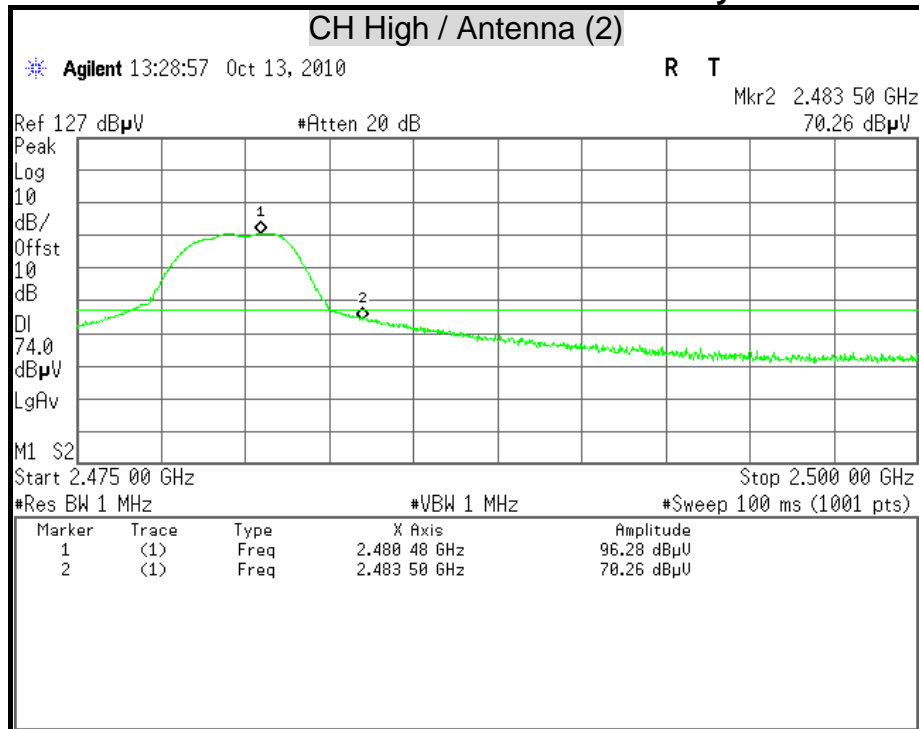
**Polarity : Vertical**





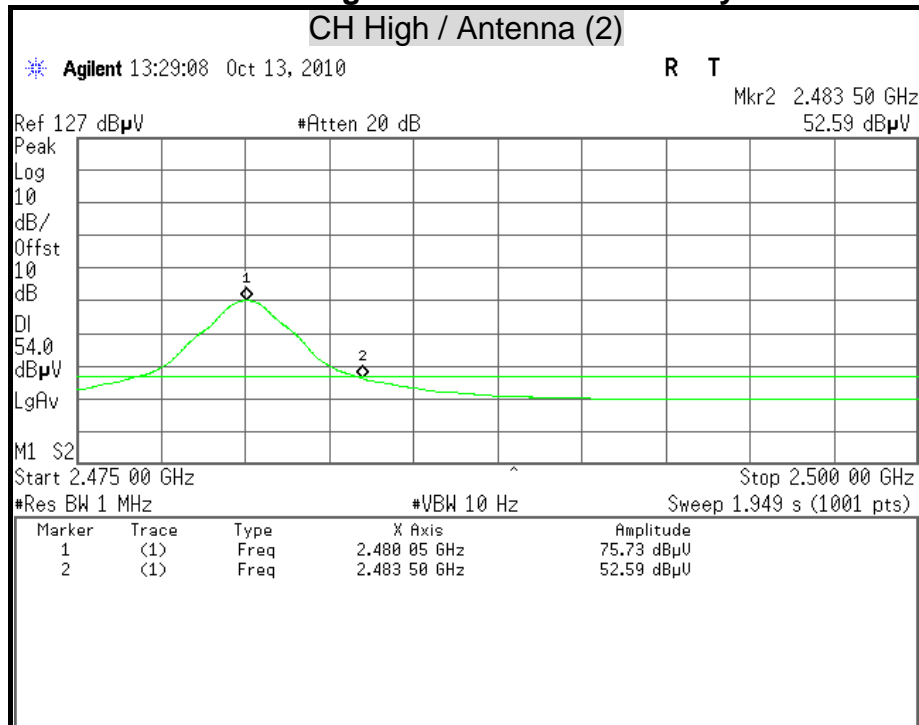
**Detector Mode : Peak**

**Polarity : Horizontal**



**Detector Mode : Average**

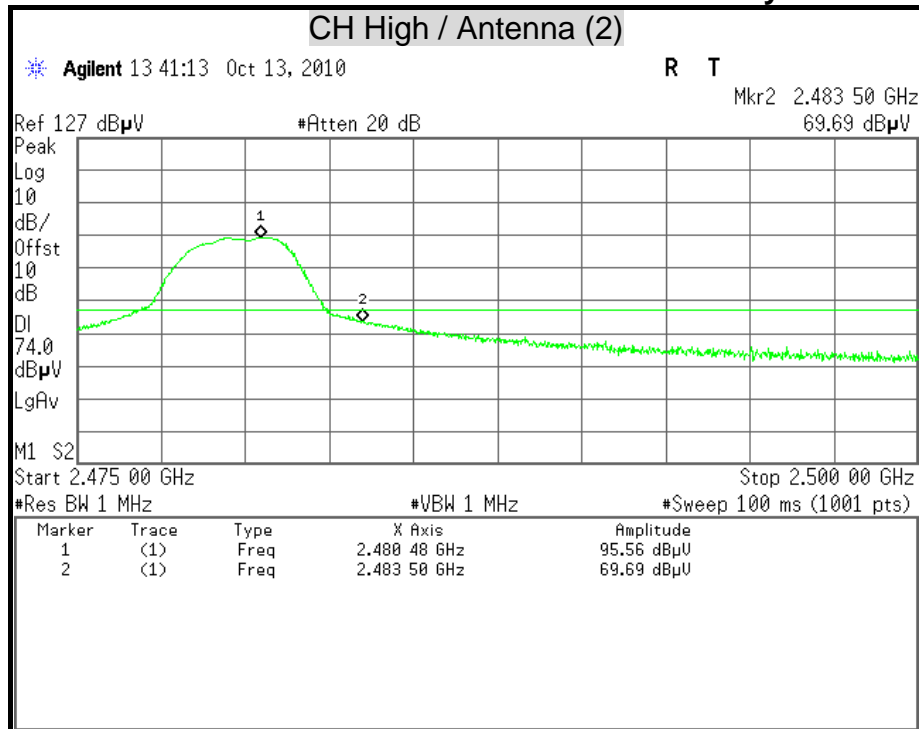
**Polarity : Horizontal**





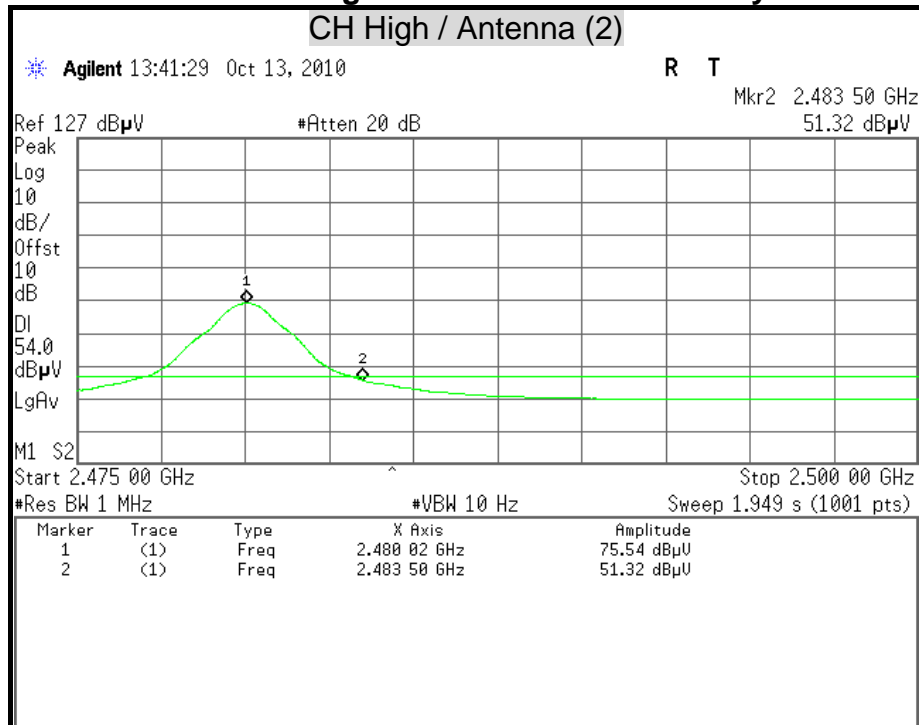
**Detector Mode : Peak**

**Polarity : Vertical**



**Detector Mode : Average**

**Polarity : Vertical**





## 7.7 CONDUCTED EMISSION

### LIMITS

§ 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 (MHz)	Conducted Limit (dB $\mu$ v)	
	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

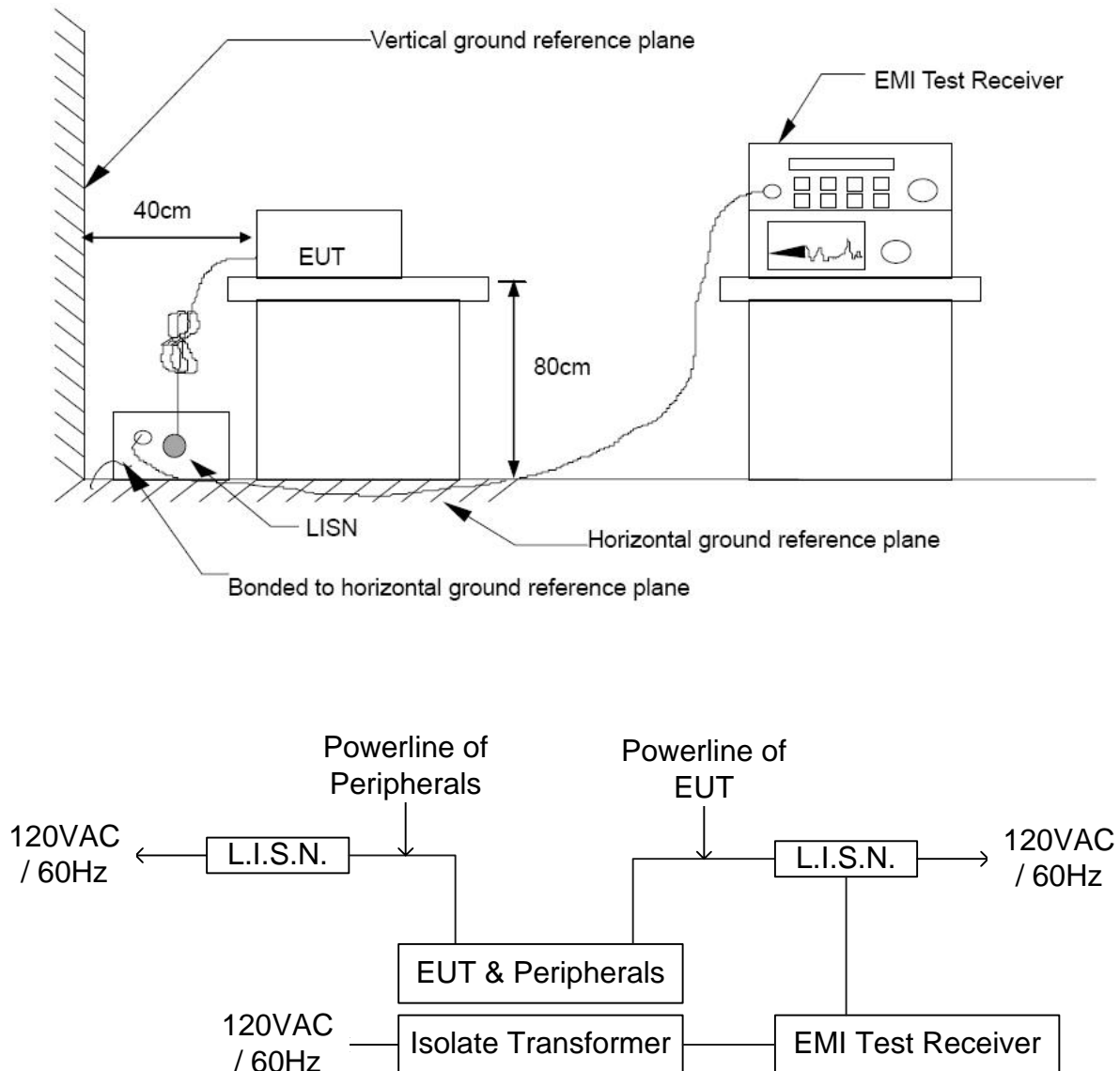
### TEST EQUIPMENT

Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
L.I.S.N	SCHWARZBECK	NSLK 8127	8127-465	08/08/2011
L.I.S.N	SCHWARZBECK	NSLK 8127	8127-473	03/22/2011
EMI Test Receiver	ROHDE & SCHWARZ	ESCS 30	835418/008	10/27/2010
Pulse Limit	ROHDE & SCHWARZ	ESH3-Z2	100117	09/17/2011
N Type Coaxial Cable	BELDEN	8268 M17/164	003	07/09/2011

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



## TEST SETUP







## **TEST PROCEDURE**

The basic test procedure was in accordance with ANSI C63.4:2003.

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

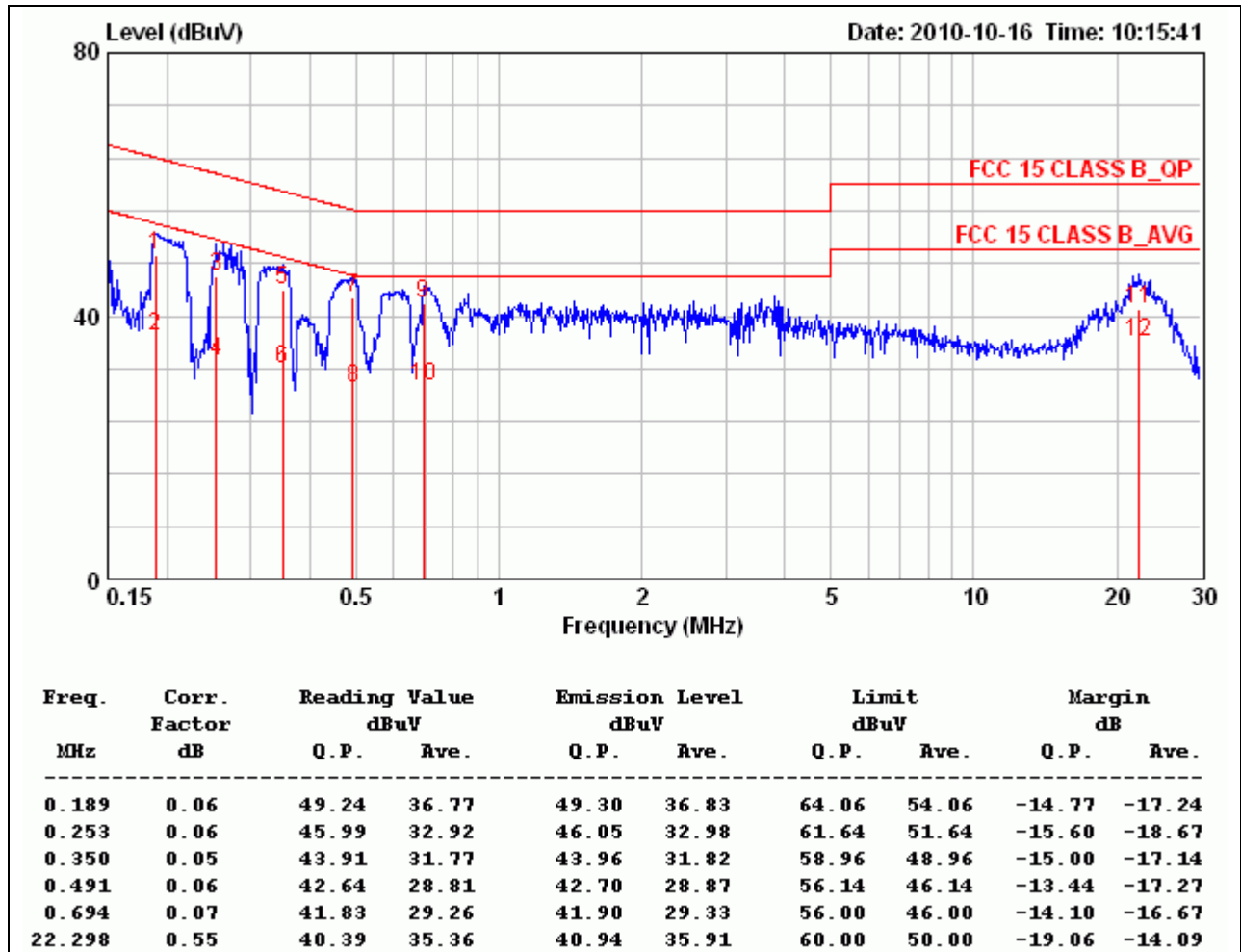
The EUT along with its peripherals were placed on a 1.0m (W) × 1.5m (L) and 0.8m in height wooden table and the EUT was adjusted to maintain a 0.4 meter space from a vertical reference plane.

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**

<b>Product Name</b>	CONTROLLER	<b>Test By</b>	Albert Lai
<b>Model</b>	510-2017-0001	<b>Test Date</b>	2010/10/16
<b>Test Mode</b>	Rechargeable battery (charge)	<b>TEMP &amp; Humidity</b>	28°C, 57%

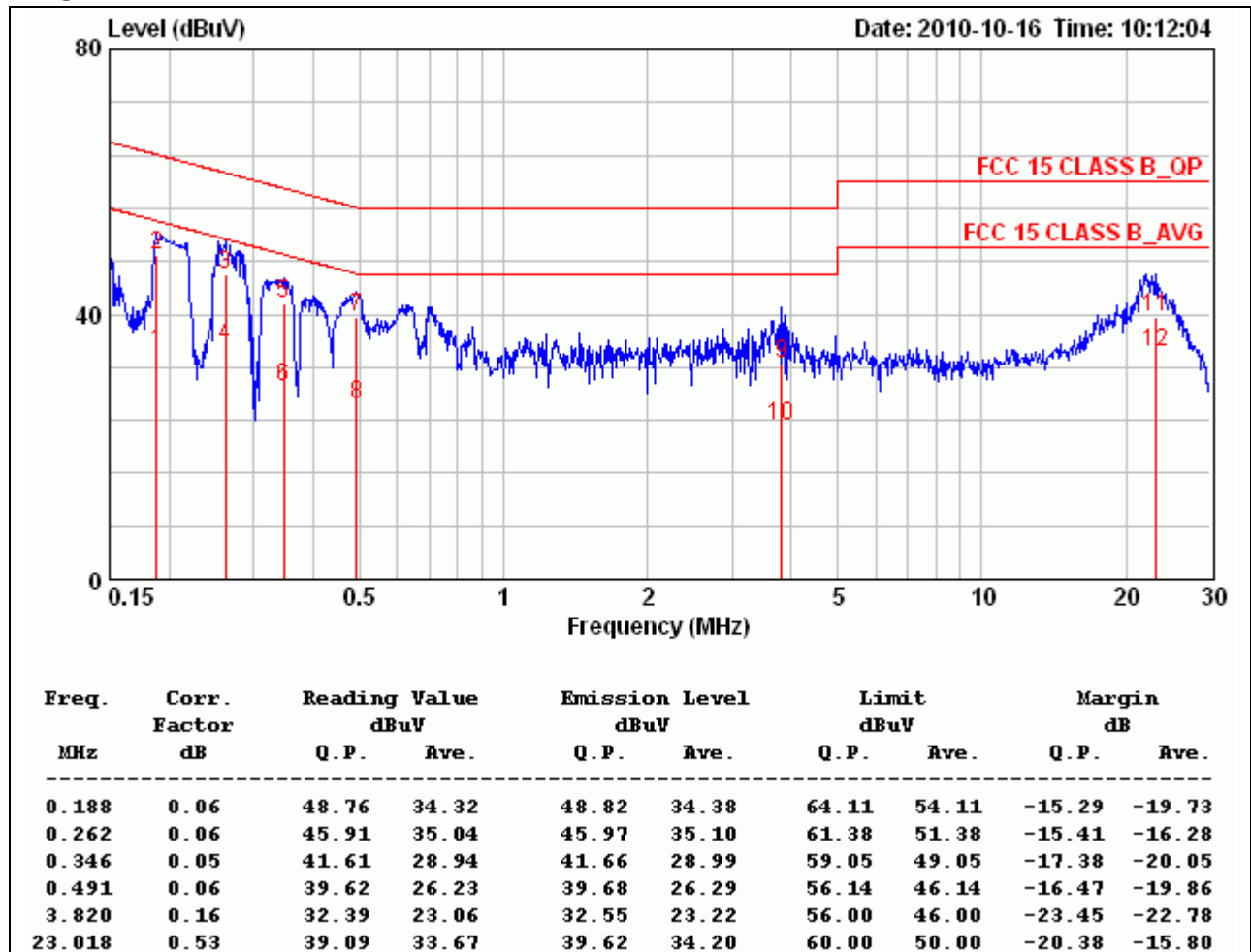
**LINE****Remark:**

1. Correction Factor = Insertion loss + cable loss
2. Margin value = Emission level – Limit value



Product Name	CONTROLLER	Test By	Albert Lai
Model	510-2017-0001	Test Date	2010/10/16
Test Mode	Rechargeable battery (charge)	TEMP & Humidity	28°C, 57%

## NEUTRAL



### Remark:

1. Correction Factor = Insertion loss + cable loss
2. Margin value = Emission level – Limit value



## APPENDIX I MAXIMUM PERMISSIBLE EXPOSURE

According to FCC 1.1310 : The criteria listed in the following table shall be used to evaluate the environment impact of human exposure to radio frequency (RF) radiation as specified in 1.1307(b) LIMITS FOR MAXIMUM PERMISSIBLE EXPOSURE (MPE)

Frequency Range (MHz)	Electric Field Strength (V/m)	Magnetic Field Strength (A/m)	Power Density (mW/cm <sup>2</sup> )	Average Time
(A) Limits for Occupational / Control Exposures				
300-1,500	--	--	F/300	6
1,500-100,000	--	--	5	6
(B) Limits for General Population / Uncontrol Exposures				
300-1,500	--	--	F/1500	6
1,500-100,000	--	--	1	30

### CALCULATIONS

Given  $E = \frac{\sqrt{30 \times P \times G}}{d}$  &  $S = \frac{E^2}{3770}$

Where  $E$  = Field strength in Volts / meter

$P$  = Power in Watts

$G$  = Numeric antenna gain

$d$  = Distance in meters

$S$  = Power density in milliwatts / square centimeter

Combining equations and re-arranging the terms to express the distance as a function of the remaining variables yields:

$$S = \frac{30 \times P \times G}{3770 d^2}$$

Changing to units of mW and cm, using:

$$P \text{ (mW)} = P \text{ (W)} / 1000 \text{ and}$$

$$d \text{ (cm)} = d \text{ (m)} / 100$$

Yields

$$S = \frac{30 \times (P/1000) \times G}{3770 \times (d/100)^2} = 0.0796 \times \frac{P \times G}{d^2}$$

Where  $d$  = Distance in cm

$P$  = Power in mW

$G$  = Numeric antenna gain

$S$  = Power density in mW / cm<sup>2</sup>

**LIMIT**

Power Density Limit,  $S=1.0\text{mW/cm}^2$

**TEST RESULTS**

Antenna Gain (dBi)	Minimum separation distance (cm)	Output Power (dBm)	Numeric antenna gain (mW)	Power Density Limit ( $\text{mW/cm}^2$ )	Power Density at 20cm ( $\text{mW/cm}^2$ )
0.89	20.0	4.46	1.23	1.00	0.000682

**Remark:** For mobile or fixed location transmitters, the maximum power density is  $1.0\text{ mW/cm}^2$  even if the calculation indicates that the power density would be larger.