

Report No.: STUGZEMO110813334TX

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# FCC ID TEST REPORT

**Application No.:** 

STUGZEMO110813334TX

Applicant:

**BELLMATE HOLDINGS LTD** 

Address

UNIT206, STERLING CENTRE, 11 CHEUNG YUE STREET,

CHEUNG SHA WAN, KOWLOON, HONG KONG

**Equipment Under Test (EUT):** 

**EUT Name:** 

Wireless Controller

Trade Mark:

PRO 1

Model No.:

W150W

Serial No.:

Not supplied by client

FCC ID:

**UX2W150W** 

Standards:

FCC PART 15.249

Date of Receipt:

14 Sep 2011

Date of Test:

15 Sep 2011

Test Result:

PASS\*

Tested By: Jackson Zhang / Engineer.

Reviewed By: Jimmy Yao / EMC Manager.



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#### 1. SUMMARY OF TEST RESULTS

Test procedures according to the technical standards:

FCC Part15, Subpart C (15.249)					
Standard Section	Test Item	Judgment	Remark		
15.207	Conducted Emission	Pass	/		
15.203	Antenna Requirement	Pass	/		
15.249	Radiated Spurious Emission	Pass	/		
15.249	Occupied Bandwidth	Pass	/		

## We hereby certify that:

The above equipment was tested by Guangdong Electronic & Electrical Products Inspection and Supervision Institute (CGEL) .The data evaluation, test procedures, and equipment configurations shown in this report were made in accordance with the procedures given in **ANSI C 63.4:2003**. The sample tested as described in this report is in compliance with the FCC Rules Part 15.

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#### 1.1 TEST FACILITY

Guangdong Electronic & Electrical Products Inspection and Supervision Institute (CGEL) 45 South Street Shayongnan village Sanyuanli Guangzhou

FCC Registration No.: 597719.

Industry Canada (IC) Assigned No.: 6664A.

#### 1.2 MEASUREMENT UNCERTAINTY

The reported uncertainty of measurement  $\mathbf{y} \pm \mathbf{U}$ , where expended uncertainty  $\mathbf{U}$  is based on a standard uncertainty multiplied by a coverage factor of  $\mathbf{k=2}$ , providing a level of confidence of approximately 95 %  $^{\circ}$ 

No.	Item	Uncertainty
1	Conducted Emission Test	±1.38dB
2	Radiated Emission Test	±3.17dB
3	RF power,conducted	±0.16dB
4	Spurious emissions,conducted	±0.21dB
5	All emissions,radiated(<1G)	±4.68dB
6	All emissions,radiated(>1G)	±4.89dB

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### 2. GENERAL INFORMATION

#### 2.1 GENERAL DESCRIPTION OF EUT

Equipment	Wireless Controller			
Trade Name	PRO 1			
Model Name	W150W			
OEM Brand/Model Name	N/A			
Model Difference	N/A			
Applicant:	BELLMATE HOLDINGS LTD			
Address	UNIT206, STERLING CENTRE, 1 CHEUNG SHA WAN,KOWLOON,			
Manufacture	BELLMATE HOLDINGS LTD			
Address	UNIT206, STERLING CENTRE, 11 CHEUNG YUE STREET, CHEUNG SHA WAN,KOWLOON, HONG KONG			
	The EUT is a Wireless Controller			
	Operation Frequency:	916 MHz		
	Modulation Type:	ASK		
Product Description	Antenna Designation:	Integral ANT		
·	Antenna Gain(Peak)	2.0 dBi		
	Output Power:	91.13dBuV/m @3m(PK) 86.49dBuV/m@3m(AV)		
Power Source	AC24 Voltage supplied from adapter			
Connecting I/O Port(s)	Please refer to the User's Manual			
Products Covered	N/A			
EUT Modification(s)	N/A			

#### Note:

1. For a more detailed features description, please refer to the manufacturer's specifications or the User's Manual.



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Table for Filed Antenna

Ant	Brand	Model Name	Antenna Type	Connector	Gain (dBi)	NOTE
1	N/A	N/A	Integral Antenna	NA	2.0	Antenna



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#### 2.2 DESCRIPTION OF TEST MODES

To investigate the maximum EMI emission characteristics generates from EUT, the test system was pre-scanning tested base on the consideration of following EUT operation mode or test configuration mode which possible have effect on EMI emission level. Each of these EUT operation mode(s) or test configuration mode(s) mentioned above was evaluated respectively.

Pretest Mode	Description
Mode 1	TX

For Conducted Emission			
Final Test Mode Description			
-	"N/A" denotes test is not applicable in this Test Report		

For Radiated Emission			
Final Test Mode	Description		
Mode 1	TX		

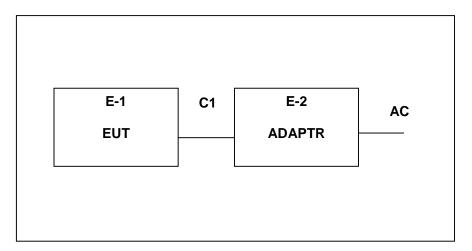
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### 2.3 BLOCK DIGRAM SHOWING THE CONFIGURATION OF SYSTEM TESTED





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## 2.4 DESCRIPTION OF SUPPORT UNITS(CONDUCTED MODE)

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

Item	Equipment	Mfr/Brand	Model/Type No.	Series No.	Note
E-1	Wireless Controller	PRO 1	W150W	N/A	EUT
E-2	ADAPER	/	W150W	N/A	

Item	Shielded Type	Ferrite Core	Length	Note
C1	NO	NO	1.5m	

#### Note:

- (1) The support equipment was authorized by Declaration of Confirmation.
- (2) For detachable type I/O cable should be specified the length in cm in Length column.



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#### 2.5 EQUIPMENTS LIST FOR ALL TEST ITEMS

**Radiation Test equipment** 

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Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Spectrum Analyzer	Agilent	E4407B	160400005	Jul. 06. 2012
2	Test Receiver	R&S	ESPI	101318	Jul. 06. 2012
3	Bilog Antenna	TESEQ	CBL6111D	31216	Jul. 06. 2012
4	50Ω Coaxial Switch	Anritsu	MP59B	6200264416	Jul. 06. 2012
5	Spectrum Analyzer	ADVANTEST	R3132	150900201	Jul. 06. 2012
6	Horn Antenna	EM	EM-AH-10180	2011071402	Jul. 06. 2012
7	Horn Ant	Schwarzbeck	BBHA 9170	9170-181	Jul. 06. 2012
8	Amplifier	EM	EM-30180	060538	Jul. 06. 2012
9	Loop Antenna	ARA	PLA-1030/B	1029	Jul. 06. 2012
10	Power Meter	R&S	NRVS	100696	Jul. 06. 2012

**Conduction Test equipment** 

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Test Receiver	R&S	ESCI	101160	Jul. 06. 2012
2	LISN	R&S	ENV216	101313	Jul. 06. 2012
3	LISN	EMCO	3816/2	00042990	Jul. 06. 2012
4	50Ω Coaxial Switch	Anritsu	MP59B	6200264417	Jul. 06. 2012
5	Passive Voltage Probe	R&S	ESH2-Z3	100196	Jul. 06. 2012
6	Absorbing clamp	R&S	MOS-21	100423	Jul. 06. 2012



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#### 3. TEST RESULT

#### **3.1 ANTENNA REQUIREMENT**

### 3.1.1 STANDARD REQUIREMENT

15.203 requirement: For intentional device, according to 15.203: an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device.

#### 3.1.2 EUT ANTENNA

The EUT antenna is integral Antenna. It comply with the standard requirement.



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#### 3.2 CONDUCTED EMISSION MEASUREMENT

### 3.2.1 POWER LINE CONDUCTED EMISSION Limits (Frequency Range 150KHz-30MHz)

FREQUENCY (MHz)	Class A (dBuV)		Class B (dBuV)		Standard	
FREQUENCT (MITZ)	Quasi-peak	Average	Quasi-peak	Average	Stariuaru	
0.15 -0.5			66 - 56 *	56 - 46 *	CISPR	
0.50 -5.0			56.00	46.00	CISPR	
5.0 -30.0			60.00	50.00	CISPR	

0.15 -0.5		66 - 56 *	56 - 46 *	LP002.
0.50 -5.0		56.00	46.00	LP002.
5.0 -30.0		60.00	50.00	LP002.

#### Note:

- (1) The tighter limit applies at the band edges.
- (2) The limit of " \* " marked band means the limitation decreases linearly with the logarithm of the frequency in the range.

### The following table is the setting of the receiver

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



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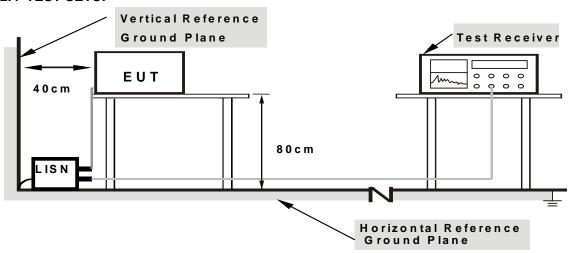
#### 3.2.2 TEST PROCEDURE

- a. The EUT was placed 0.4 meters from the horizontal ground plane with EUT being connected to the power mains through a line impedance stabilization network (LISN). All other support equipments powered from additional LISN(s). The LISN provide 50 Ohm/ 50uH of coupling impedance for the measuring instrument.
- b. Interconnecting cables that hang closer than 40 cm to the ground plane shall be folded back and forth in the center forming a bundle 30 to 40 cm long.
- c. I/O cables that are not connected to a peripheral shall be bundled in the center. The end of the cable may be terminated, if required, using the correct terminating impedance. The overall length shall not exceed 1 m.
- d. LISN at least 80 cm from nearest part of EUT chassis.
- e. For the actual test configuration, please refer to the related Item –EUT Test Photos.

#### 3.2.3 DEVIATION FROM TEST STANDARD

No deviation

#### 3.2.4 TEST SETUP



Note: 1.Support units were connected to second LISN.

2.Both of LISNs (AMN) are 80 cm from EUT and at least 80 from other units and other metal planes

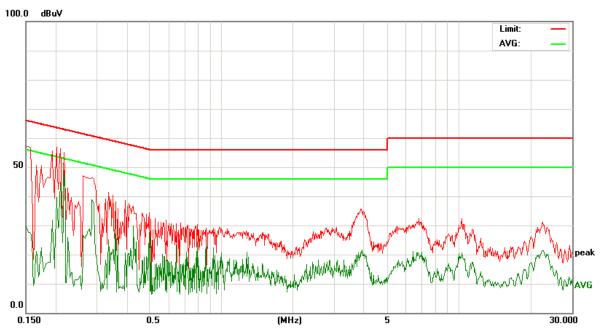


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### 3.2.5 TEST RESULT

EUT:	Wireless Controller	Model Name :	W150W
Temperature:	26 ℃	Relative Humidity:	54%
Pressure :	1010hPa	Test Date :	2011-9-15
Test Mode:	Running	Phase :	L
Test Voltage :	AC 24V from adapter		



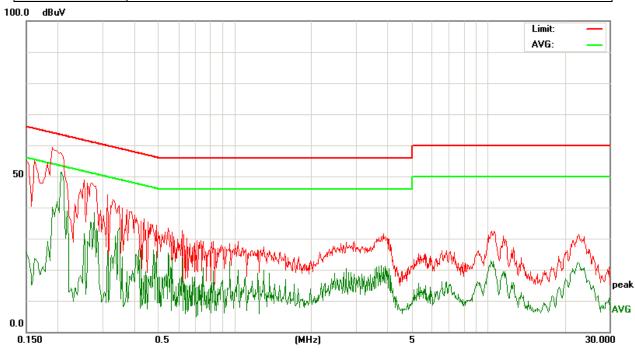
Frequency	Factor	Meter Read	ling (dBµV)	Emission Le	evel (dBµV)	Limits (	dBµV)	Margir	n (dB)
(MHz)	(dB)	Quasi-Peak	Average	Quasi-Peak	Average	Quasi-Peak	Average	Quasi-Peak	Average
0.206	11.09	46.54	40.3	57.63	51.39	63.36	53.36	-5.73	-1.97
0.2779	10.8	36.03	27.51	46.83	38.31	60.88	50.88	-14.05	-12.57
0.546	10.32	22.96	15.01	33.28	25.33	56	46	-22.72	-20.67
3.778	10.17	19.77	11.28	29.94	21.45	56	46	-26.06	-24.55
10.2459	10.29	21.6	12.61	31.89	22.9	60	50	-28.11	-27.1
22.578	10.52	20.22	11.77	30.74	22.29	60	50	-29.26	-27.71



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EUT:	Wireless Controller	Model Name :	W150W
Temperature:	<b>26</b> ℃	Relative Humidity:	54%
Pressure :	1010hPa	Test Date :	2011-9-15
Test Mode:	Running	Phase :	N
Test Voltage :	AC 24V from adapter		



Frequency	Factor	Meter Read	ling (dBµV)	Emission Le	vel (dBµV)	Limits (d	dBµV)	Margin	(dB)
(MHz)	(dB)	Quasi-Peak	Average	Quasi-Peak	Average	Quasi-Peak	Average	Quasi-Peak	Average
0.206	11.09	46.54	38	57.63	49.09	63.36	53.36	-5.73	-4.27
0.2779	10.8	36.03	28.01	46.83	38.81	60.88	50.88	-14.05	-12.07
0.546	10.32	22.96	17.15	33.28	27.47	56	46	-22.72	-18.53
3.778	10.17	19.77	11.52	29.94	21.69	56	46	-26.06	-24.31
10.2459	10.29	21.6	10.27	31.89	20.56	60	50	-28.11	-29.44
22.578	10.52	20.22	10.94	30.74	21.46	60	50	-29.26	-28.54



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#### 3.3 RADIATED EMISSION MEASUREMENT

### **3.3.1 Radiated Emission Limits** (FCC 15.209)

Frequencies (MHz)	Field Strength (micorvolts/meter)	Measurement Distance (meters)
0.009~0.490	2400/F(KHz)	300
0.490~1.705	24000/F(KHz)	30
1.705~30.0	30	30
30~88	100	3
88~216	150	3
216~960	200	3
Above 960	500	3

#### Note:

- (1) The tighter limit applies at the band edges.
- (2) Emission level (dBuV/m)=20log Emission level (uV/m).

### LIMITS OF RADIATED EMISSION MEASUREMENT (FCC 15.249)

Frequency of Emission (MHz)	Field Strength of fundamental ((millivolts /meter)	Field Strength of Harmonics (microvolts/meter)
2400 - 2483.5	50	500

#### Note:

(1) Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in Section 15.209, whichever is the lesser attenuation.



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Spectrum Parameter	Setting
Attenuation	Auto
Start Frequency	1000 MHz
Stop Frequency	10th carrier harmonic
RB / VB (emission in restricted band)	1MHz / 1MHz for Peak

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

#### 3.3.2 TEST PROCEDURE

- a. The measuring distance of at 3 m shall be used for measurements at frequency up to 1GHz. For frequencies above 1GHz, any suitable measuring distance may be used.
- b. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3m meter open area test site. The table was rotated 360 degrees to determine the position of the highest radiation.
- c. The height of the equipment or of the substitution antenna shall be 0.8 m; the height of the test antenna shall vary between 1 m to 4 m.
- d. The initial step in collecting conducted emission data is a spectrum analyzer peak detector mode pre-scanning the measurement frequency range. Significant peaks are then marked and then Quasi Peak detector mode re-measured.
- e. If the Peak Mode measured value compliance with and lower than Quasi Peak Mode Limit, the EUT shall be deemed to meet QP Limits and then no additional QP Mode measurement performed.
- f. For the actual test configuration, please refer to the related Item –EUT Test Photos.

#### Note:

Both horizontal and vertical antenna polarities were tested and performed pretest to three orthogonal axis. The worst case emissions were reported

#### 3.3.3 DEVIATION FROM TEST STANDARD

No deviation

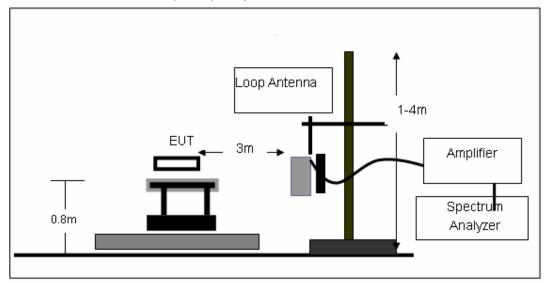


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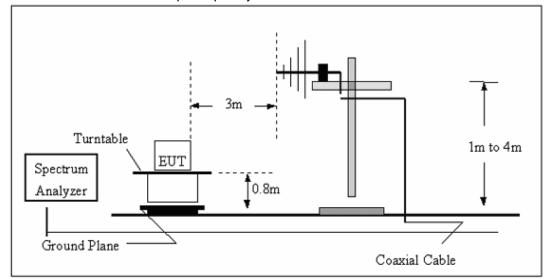
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#### 3.3.4 TEST SETUP

### (A) Radiated Emission Test-Up Frequency Below 30MHz



### (B) Radiated Emission Test-Up Frequency 30MHz~1GHz

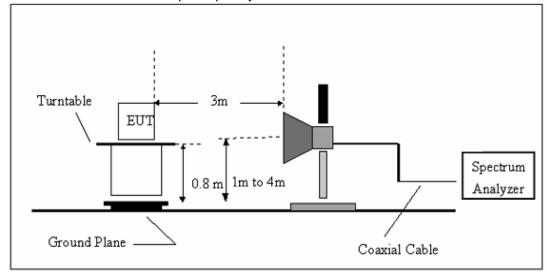




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## (C) Radiated Emission Test-Up Frequency Above 1GHz





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## 3.3.5 TEST RESULTS (BLOW 30MHz)

EUT:	Wireless Controller	Model Name. :	W150W
Temperature :	1:2() ( '	Relative HuMaylong Mobility Tabletity:	48%
Pressure:	1010 hPa	Test Voltage :	AC 24V
Test Mode :	TX	Polarization:	

Freq.	Reading	Limit	Margin	State
(MHz)	(dBuV/m)	(dBuV/m)	(dB)	P/F
				PASS
				PASS

#### NOTE:

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

Distance extrapolation factor =20 log (specific distance/test distance)(dB); Limit line = specific limits(dBuv) + distance extrapolation factor.



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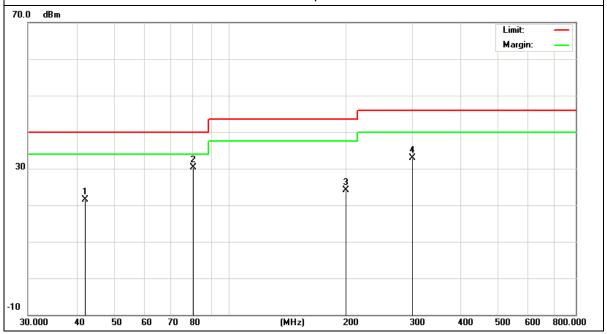
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## 3.3.6 TEST RESULTS (BETWEEN 30 – 800 MHZ,800MHZ-1000MHZ)

EUT:	Wireless Controller	Model Name :	W150W
Temperature:	<b>24</b> ℃	Relative Humidity:	54%
Pressure:	1010 hPa	Test Date :	2011-9-15
Test Mode :	RX	Polarization:	Horizontal
Test Power :	AC 24V		

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	
(MHz)	(dBµV)	(dB)	(dBµV/m)	(dBµV/m)	(dB)	Detector Type
42.31	9.46	12.05	21.51	40	-18.49	Quasi-Peak
80.59	22.46	7.86	30.32	40	-9.68	Quasi-Peak
200.59	15.46	8.73	24.19	43.5	-19.31	Quasi-Peak
299.23	18.46	14.54	33	46	-13	Quasi-Peak

### Remark:





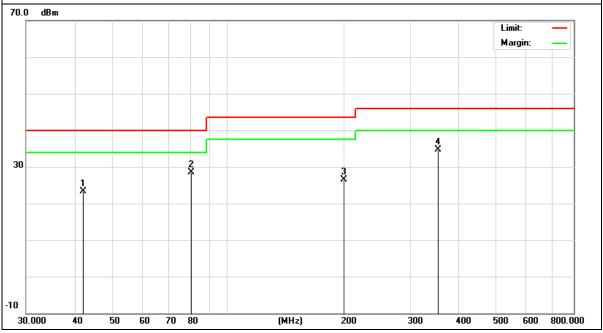
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EUT:	Wireless Controller	Model Name :	W150W
Temperature:	<b>24</b> ℃	Relative Humidity:	54%
Pressure :	1010 hPa	Test Date :	2011-9-15
Test Mode :	RX	Polarization:	Vertical
Test Power :	AC 24V		

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Data eter Tuna
(MHz)	(dBµV)	(dB)	(dBµV/m)	(dBµV/m)	(dB)	Detector Type
42.31	11.24	12.05	23.29	40	-16.71	Quasi-Peak
80.59	20.55	7.86	28.41	40	-11.59	Quasi-Peak
200.59	17.87	8.73	26.6	43.5	-16.9	Quasi-Peak
354.23	19.22	15.44	34.66	46	-11.34	Quasi-Peak

### Remark:





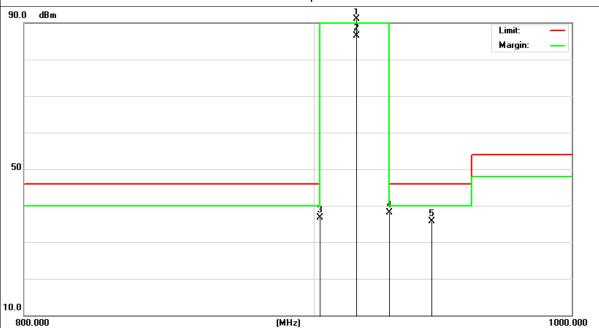
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EUT:	Wireless Controller	Model Name :	W150W
Temperature:	<b>24</b> ℃	Relative Humidity:	54%
Pressure :	1010 hPa	Test Date :	2011-9-15
Test Mode :	TX	Polarization:	Horizontal
Test Power :	AC 24V		

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Dotostor Typo
(MHz)	(dBµV)	(dB)	(dBµV/m)	(dBµV/m)	(dB)	Detector Type
916.01	65.12	26.01	91.13	114	-22.87	PK
916.01	60.48	26.01	86.49	94	-7.51	AV
902.00	10.99	25.75	36.74	46	-9.26	QP
928.00	11.48	26.57	38.05	46	-7.95	QP
944.34	8.46	27.26	35.72	46	-10.28	QP

#### Remark:





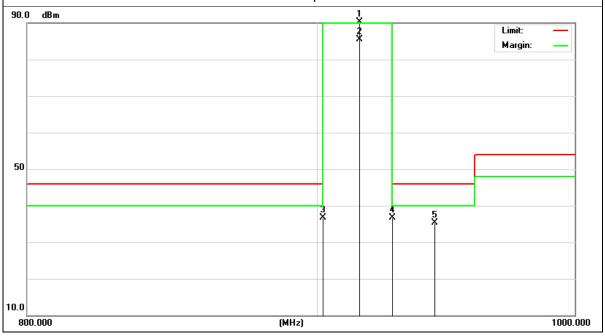
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EUT:	Wireless Controller	Model Name :	W150W
Temperature:	<b>24</b> ℃	Relative Humidity:	54%
Pressure:	1010 hPa	Test Date :	2011-9-15
Test Mode :	TX	Polarization :	Vertical
Test Power :	AC 24V		

	1		1			1
Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBµV)	(dB)	(dBµV/m)	(dBµV/m)	(dB)	Detector Type
916.01	64.21	26.01	90.22	114	-23.78	PK
916.01	59.48	26.01	85.49	94	-8.51	AV
902.00	10.87	25.75	36.62	46	-9.38	QP
928.00	10.21	26.57	36.78	46	-9.22	QP
944.34	8.09	27.26	35.35	46	-10.65	QP

### Remark:





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## 3.3.7 TEST RESULTS (ABOVE 1000 MHZ)

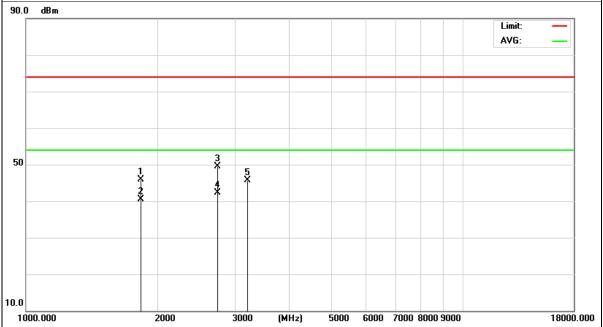
EUT:	Wireless Controller	Model Name :	W150W
Temperature :	<b>24</b> ℃	Relative Humidity:	54%
Pressure :	1010 hPa	Test Date :	2011-9-15
Test Mode :	TX	Polarization :	Horizontal
Test Power :	AC 24V		

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBµV)	(dB)	(dBµV/m)	(dBµV/m)	(dB)	Detector Type
1832.01	27.46	18.36	45.82	74	-28.18	peak
1832.01	22.21	18.36	40.57	54	-13.43	AVG
2748.00	24.21	25.25	49.46	74	-24.54	peak
2748.00	17.08	25.25	42.33	54	-11.67	AVG
3211.80	18.29	27.47	45.76	74	-28.24	peak

#### Remark:

1. Factor = Antenna Factor + Cable Loss – Pre-amplifier.

2. No emission detected above 18GHz.





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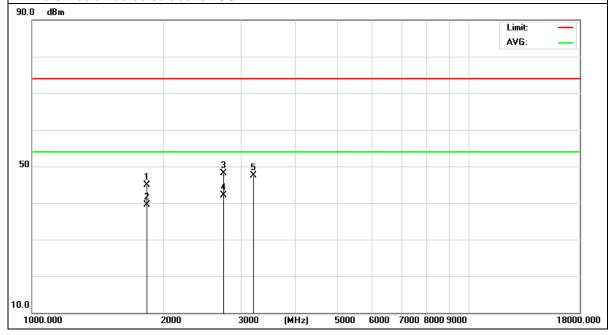
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EUT:	Wireless Controller	Model Name :	W150W
Temperature:	<b>24</b> ℃	Relative Humidity:	54%
Pressure :	1010 hPa	Test Date :	2011-9-15
Test Mode :	TX	Polarization:	Vertical
Test Power :	AC 24V		

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Dotootor Typo
(MHz)	(dBµV)	(dB)	(dBµV/m)	(dBµV/m)	(dB)	Detector Type
1832.01	26.51	18.36	44.87	74	-29.13	peak
1832.01	21.09	18.36	39.45	54	-14.55	AVG
2748.00	22.88	25.25	48.13	74	-25.87	peak
2748.00	16.84	25.25	42.09	54	-11.91	AVG
3211.80	20.11	27.47	47.58	74	-26.42	peak

#### Remark:

- 1. Factor = Antenna Factor + Cable Loss Pre-amplifier.
- 2. No emission detected above 18GHz.





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#### 4. BANDWIDTH TEST

### **4.1 TEST PROCEDURE**

- a. The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram below,
- b. Spectrum Setting : RBW= 100KHz, VBW ≧ RBW, Sweep time = Auto.

#### **4.2 DEVIATION FROM STANDARD**

No deviation.

#### **4.3 TEST SETUP**

EUT	SPECTRUM
	ANALYZER

#### **4.4 TEST RESULTS**

EUT:	Wireless Controller	Model Name :	W150W
Temperature:	<b>26</b> ℃	Relative Humidity:	53%
Pressure :	1020 hPa	Test Power :	AC 24V
Test Mode :	TX		

Frequency	20 dBc Bandwidth	
(MHz)	(MHz)	
916	0.976	



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