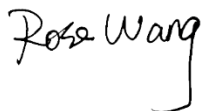


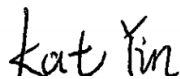
# RF Exposure Evaluation Report

APPLICANT : Assured Wireless  
EQUIPMENT : HPUE Module  
BRAND NAME : Assured Wireless  
MODEL NAME : AW12-HP  
FCC ID : 2AUZ8AW12HP  
STANDARD : 47 CFR Part 2.1091  
FCC KDB 447498 D01 v06

We, Sporton International (Kunshan) Inc., would like to declare that the device has been evaluated in accordance with 47 CFR Part 2.1091 and FCC KDB 447498 D01 v06, and pass the limit. Without written approval of Sporton International (Kunshan) Inc., the test report shall not be reproduced except in full.



Reviewed by: Rose Wang / Supervisor



Approved by: Kat Yin / Manager



**Sporton International (Kunshan) Inc.**

No. 1098, Pengxi North Road, Kunshan Economic Development Zone Jiangsu Province  
215300 People's Republic of China



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**1. Administration Data**

**1.1. Testing Laboratory**

Sporton International (Kunshan) Inc. is accredited to ISO/IEC 17025:2017 by American Association for Laboratory Accreditation with Certificate Number 5145.02.

Testing Laboratory		
Test Firm	Sporton International (Kunshan) Inc.	
Test Site Location	No. 1098, Pengxi North Road, Kunshan Economic Development Zone Jiangsu Province 215300 People's Republic of China TEL : +86-512-57900158 FAX : +86-512-57900958	
Test Site No.	FCC Designation No.	FCC Test Firm Registration No.
	CN1257	314309

Applicant	
Company Name	Assured Wireless
Address	16885 W. Bernardo Dr., Suite 300, San Diego, CA 92127

Manufacturer	
Company Name	Assured Wireless
Address	16885 W. Bernardo Dr., Suite 300, San Diego, CA 92127

## 2. Description of Equipment Under Test (EUT)

Product Feature & Specification	
EUT Type	HPUE Module
Brand Name	Assured Wireless
Model Name	AW12-HP
FCC ID	2AUZ8AW12HP
Wireless Technology and Frequency Range	WCDMA Band II: 1852.4 MHz ~ 1907.6 MHz WCDMA Band IV: 1712.4 MHz ~ 1752.6 MHz WCDMA Band V: 826.4 MHz ~ 846.6 MHz LTE Band 2: 1850.7 MHz ~ 1909.3 MHz LTE Band 4: 1710.7 MHz ~ 1754.3 MHz LTE Band 5: 824.7 MHz ~ 848.3 MHz LTE Band 12: 699.7 MHz ~ 715.3 MHz LTE Band 14: 790.5 MHz ~ 795.5 MHz LTE Band 30: 2307.5 MHz ~ 2312.5 MHz LTE Band 66: 1710.7 MHz ~ 1779.3 MHz
Mode	RMC 12.2Kbps HSDPA HSUPA DC-HSDPA HSPA+ (16QAM uplink is not supported) LTE: QPSK, 16QAM, 64QAM
HW Version	R1.0
SW Version	EM12AWPAR01A07M4G
EUT Stage	Production Unit
<b>Remark:</b> The above EUT's information was declared by manufacturer. Please refer to the specifications or user's manual for more detailed description.	

### Comments and Explanations:

The declared of product specification for EUT presented in the report are provided by the manufacturer, and the manufacturer takes all the responsibilities for the accuracy of product specification.



**3. Maximum RF average output power among production units**

**<WCDMA>**

Mode		Maximum Average power(dBm)
WCDMA	Band II	24.00
	Band IV	24.00
	Band V	24.00

**<LTE>**

Mode		Maximum Average power(dBm)
LTE	Band 2	24.00
	Band 4	24.00
	Band 5	24.00
	Band 12	24.00
	Band 14	33.00
	Band 30	24.00
	Band 66	24.00

### 4. RF Exposure Limit Introduction

According to ANSI/IEEE C95.1-1992, the criteria listed in Table 1 shall be used to evaluate the environmental impact of human exposure to radio frequency (RF) radiation as specified in §1.1310.

Frequency range (MHz)	Electric field strength (V/m)	Magnetic field strength (A/m)	Power density (mW/cm <sup>2</sup> )	Averaging time (minutes)
<b>(A) Limits for Occupational/Controlled Exposures</b>				
0.3-3.0	614	1.63	*(100)	6
3.0-30	1842/f	4.89/f	*(900/f <sup>2</sup> )	6
30-300	61.4	0.163	1.0	6
300-1500			f/300	6
1500-100,000			5	6
<b>(B) Limits for General Population/Uncontrolled Exposure</b>				
0.3-1.34	614	1.63	*(100)	30
1.34-30	824/f	2.19/f	*(180/f <sup>2</sup> )	30
30-300	27.5	0.073	0.2	30
300-1500			f/1500	30
1500-100,000			1.0	30

The MPE was calculated at 20 cm to show compliance with the power density limit.

The following formula was used to calculate the Power Density:

$$S = \frac{PG}{4\pi R^2}$$

Where:

S = Power Density

P = Output Power at Antenna Terminals

G = Gain of Transmit Antenna (linear gain)

R = Distance from Transmitting Antenna



## 5. Radio Frequency Radiation Exposure Evaluation

### 5.1. Standalone Power Density Calculation

Band	Frequency (MHz)	Antenna Gain (dBi)	Maximum Power (dBm)	Maximum EIRP (dBm)	Average EIRP (mW)	Power Density at 20cm (mW/cm <sup>2</sup> )	Limit (mW/cm <sup>2</sup> )
WCDMA Band 2	1852.4	9.00	24.00	33.00	1995.26	0.397	1.000
WCDMA Band 4	1712.4	6.00	24.00	30.00	1000.00	0.199	1.000
WCDMA Band 5	826.4	10.00	24.00	34.00	2511.89	0.500	0.551
LTE Band 2	1850.7	9.00	24.00	33.00	1995.26	0.397	1.000
LTE Band 4	1710.7	6.00	24.00	30.00	1000.00	0.199	1.000
LTE Band 5	824.7	10.00	24.00	34.00	2511.89	0.500	0.550
LTE Band 12	699.7	1.00	24.00	25.00	316.23	0.063	0.466
LTE Band 14	790.5	1.00	33.00	34.00	2511.89	0.500	0.527
LTE Band 30	2307.5	6.00	24.00	30.00	1000.00	0.199	1.000
LTE Band 66	1710.7	6.00	24.00	30.00	1000.00	0.199	1.000

**Note:** For conservativeness, the lowest frequency of each band is used to determine the MPE limit of that band.





5.2. Collocated Power Density Calculation

General Note:

- 1. This MPE analysis is applicable to any collocated transmitters with EIRP for WLAN is less than or equal to 25dBm and EIRP for Bluetooth is less than or equal to 25dBm.
- 2. A maximum antenna gain of 5dBi for WLAN/BT has been assumed for all collocated antennas.

Band	Frequency (MHz)	Antenna Gain (dBi)	Maximum Power (dBm)	Maximum EIRP (dBm)	Average EIRP (mW)	Power Density at 20cm (mW/cm <sup>2</sup> )	Limit (mW/cm <sup>2</sup> )	Power Density / Limit
WCDMA Band 2	1852.4	9.00	24.00	33.0	1995.26	0.397	1.000	0.397
WCDMA Band 4	1712.4	6.00	24.00	30.0	1000.00	0.199	1.000	0.199
WCDMA Band 5	826.4	9.50	24.00	33.5	2238.72	0.446	0.551	0.809
LTE Band 2	1850.7	9.00	24.00	33.0	1995.26	0.397	1.000	0.397
LTE Band 4	1710.7	6.00	24.00	30.0	1000.00	0.199	1.000	0.199
LTE Band 5	824.7	9.50	24.00	33.5	2238.72	0.446	0.550	0.810
LTE Band 12	699.7	0.50	24.00	24.5	281.84	0.056	0.466	0.120
LTE Band 14	790.5	0.50	33.00	33.5	2238.72	0.446	0.527	0.846
LTE Band 30	2307.5	6.00	24.00	30.0	1000.00	0.199	1.000	0.199
LTE Band 66	1710.7	6.00	24.00	30.0	1000.00	0.199	1.000	0.199
WLAN2.4GHz Band	2412.0	5.00	20.0	25.0	316.23	0.063	1.000	0.063
WLAN5GHz Band	5180.0	5.00	20.0	25.0	316.23	0.063	1.000	0.063
Bluetooth	2402.0	5.00	20.0	25.0	316.23	0.063	1.000	0.063



**<Collocated analysis>**

**General Note:**

1. For collocation analysis, LTE Band 14 is chosen for summation due to the highest (power density/limit) among all WWAN wireless modes.
2.  $\Sigma$  (Power Density / Limit): This is a summation of [(power density for each transmitter/antenna included in the simultaneous transmission)/ (corresponding MPE limit)], for WWAN + WLAN + Bluetooth
3. Considering the WWAN module collocation with the other transmitters of the EIRP performance listed in the table above, the aggregated (power density /limit) is smaller than 1, and MPE of 3 collocated transmitters is compliant.

Max WWAN Power Density / Limit	Max WLAN Power Density / Limit	Max Bluetooth Power Density / Limit	$\Sigma$ (Power Density / Limit) of WWAN + WLAN + Bluetooth
0.846	0.063	0.063	0.972



**Conclusion:**

Based on 47 CFR §2.1091 and FCC KDB 447498 D01 v06, the analysis concludes that this product when transmitting in standalone within a host device, is compliant with the FCC RF exposure requirements in mobile exposure condition, provided the conducted power and antenna gain do not exceed the limits for each given frequency band per wireless technology as follow table:

Device	Technology	Frequency (MHz)	Maximum Conducted Power (dBm)	Stanalone Maximum Antenna Gain (dBi)	Collocated Maximum Antenna Gain (dBi)
AW12-HP	WCDMA	1852.4	24.00	9.00	9.00
		1712.4	24.00	6.00	6.00
		826.4	24.00	13.00	9.50
	LTE Band 2	1850.7	24.00	9.00	9.00
	LTE Band 4	1710.7	24.00	6.00	6.00
	LTE Band 5	824.7	24.00	13.00	9.50
	LTE Band 12	699.7	24.00	1.00	0.50
	LTE Band 14	790.5	33.00	1.00	0.50
	LTE Band 30	2307.5	24.00	6.00	6.00
	LTE Band 66	1710.7	24.00	6.00	6.00
Collocated Transmitters	WLNA 2.4GHz Band	2412	20.00	/	5.00
	WLNA 5GHz Band	5180	20.00		5.00
	Bluetooth	2402	20.00		5.00