



**FCC Part 1 Subpart I  
FCC Part 2 Subpart J  
INDUSTRY CANADA RSS 102 ISSUE 5**

**RF EXPOSURE REPORT**

**FOR**

**WiFi Limited Module**

**MODEL NUMBER: MW300**

**FCC ID: HBW8522  
IC: 2666A-8522**

**REPORT NUMBER: 11522702B**

**ISSUE DATE: January 31, 2017**

*Prepared for*  
**CHAMBERLAIN GROUP INC.  
300 Windsor Dr.  
Oak Brook, IL 60523**

*Prepared by*  
**UL LLC  
333 Pfingsten Rd.  
Northbrook, IL 60062  
TEL: (847) 272-8800**



NVLAP Lab code: 100414-0

Revision History

Rev.	Issue Date	Revisions	Revised By
--		Initial Issue	

## TABLE OF CONTENTS

<b>1. ATTESTATION OF TEST RESULTS .....</b>	<b>4</b>
<b>2. TEST METHODOLOGY .....</b>	<b>5</b>
<b>3. REFERENCES .....</b>	<b>5</b>
<b>4. FACILITIES AND ACCREDITATION .....</b>	<b>5</b>
<b>5. MAXIMUM PERMISSIBLE RF EXPOSURE .....</b>	<b>6</b>
5.1. <i>FCC RULES</i> .....	6
5.2. <i>IC RULES</i> .....	7
5.3. <i>EQUATIONS</i> .....	8
5.4. <i>LIMITS AND IC EXEMPTION</i> .....	8
<b>6. RF EXPOSURE RESULTS .....</b>	<b>9</b>

# 1. ATTESTATION OF TEST RESULTS

**COMPANY NAME:** CHAMBERLAIN GROUP INC.  
845 N. LARCH AVE  
ELMHURST, IL 60126, USA

**EUT DESCRIPTION:** LIMITED WIFI MODULE

**MODEL:** MW300

**SERIAL NUMBER:** non-serialized

**DATE TESTED:** November 21, 2016 – December 20, 2016

APPLICABLE STANDARDS	
STANDARD	TEST RESULTS
FCC PART 1 SUBPART I & PART 2 SUBPART J	Pass
INDUSTRY CANADA RSS 102 ISSUE 5	Pass

UL LLC tested the above equipment in accordance with the requirements set forth in the above standards. All indications of Pass/Fail in this report are opinions expressed by UL LLC based on interpretations and/or observations of test results. Measurement Uncertainties were not taken into account and are published for informational purposes only. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.

**Note:** The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein. This document may not be altered or revised in any way unless done so by UL LLC and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by UL LLC will constitute fraud and shall nullify the document. This report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the U.S. Government.

Approved & Released For  
UL LLC By: Jeff Moser

Tested By: Bart Mucha



EMC ENGINEER  
UL LLC

EMC ENGINEER  
UL LLC

## 2. TEST METHODOLOGY

All calculations were made in accordance with FCC Parts 2.1091, 2.1093 and KDB 447498 D01 v06 and IC Safety Code 6, RSS 102 Issue 5.

## 3. REFERENCES

All measurements were made as documented in test report UL LLC Document 11522702A for operation in the 2.4 GHz band and UL LLC.

Output power, Duty cycle and Antenna gain data is excerpted from the applicable test report.

## 4. FACILITIES AND ACCREDITATION

The test sites and measurement facilities used to collect data are located at 333 Pfungsten Road, Northbrook, IL 60062 USA.

UL NBK is accredited by NVLAP, Laboratory Code 100414-0. The full scope of accreditation can be viewed at <http://ts.nist.gov/>

## 5. MAXIMUM PERMISSIBLE RF EXPOSURE

### 5.1. FCC RULES

§1.1310 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 §1.1307(b), except in the case of portable devices which shall be evaluated according to the provisions of §2.1093 of this chapter.

TABLE 1—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> )	Averaging time (minutes)
(A) Limits for Occupational/Controlled Exposures				
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) Limits for General Population/Uncontrolled Exposure				
0.3–1.34 .....	614	1.63	*(100)	30
1.34–30 .....	824/f	2.19/f	*(180/f <sup>2</sup> )	30

TABLE 1—LIMITS FOR MAXIMUM PERMISSIBLE EXPOSURE (MPE)—Continued

Frequency range (MHz)	Electric field strength (V/m)	Magnetic field strength (A/m)	Power density (mW/cm <sup>2</sup> )	Averaging time (minutes)
30–300 .....	27.5	0.073	0.2	30
300–1500 .....	.....	.....	f/1500	30
1500–100,000 .....	.....	.....	1.0	30

f = frequency in MHz

\* = Plane-wave equivalent power density

NOTE 1 TO TABLE 1: Occupational/controlled limits apply in situations in which persons are exposed as a consequence of their employment provided those persons are fully aware of the potential for exposure and can exercise control over their exposure. Limits for occupational/controlled exposure also apply in situations when an individual is transient through a location where occupational/controlled limits apply provided he or she is made aware of the potential for exposure.

NOTE 2 TO TABLE 1: General population/uncontrolled exposures apply in situations in which the general public may be exposed, or in which persons that are exposed as a consequence of their employment may not be fully aware of the potential for exposure or can not exercise control over their exposure.

## 5.2. IC RULES

IC Safety Code 6 (2015), Section 2.2.2: To ensure compliance with the basic restrictions outlined in Section 2.1, at frequencies between 10 MHz and 300 GHz, the reference levels for electric- and magnetic-field strength and power density must be complied with.

**TABLE 5:** Reference Levels for Electric Field Strength, Magnetic Field Strength and Power Density in Uncontrolled Environments

Frequency (MHz)	Electric Field Strength ( $E_{RL}$ ), (V/m, RMS)	Magnetic Field Strength ( $H_{RL}$ ), (A/m, RMS)	Power Density ( $S_{RL}$ ), (W/m <sup>2</sup> )	Reference Period (minutes)
10–20	27.46	0.0728	2	6
20–48	$58.07 / f^{0.25}$	$0.1540 / f^{0.25}$	$8.944 / f^{0.5}$	6
48–300	22.06	0.05852	1.291	6
300–6000	$3.142 f^{0.3417}$	$0.008335 f^{0.3417}$	$0.02619 f^{0.6834}$	6
6000–15000	61.4	0.163	10	6
15000–150000	61.4	0.163	10	$616000 / f^{1.2}$
150000–300000	$0.158 f^{0.5}$	$4.21 \times 10^{-4} f^{0.5}$	$6.67 \times 10^{-3} f$	$616000 / f^{1.2}$

Frequency,  $f$ , is in MHz.

**TABLE 6:** Reference Levels for Electric Field Strength, Magnetic Field Strength and Power Density in Controlled Environments

Frequency (MHz)	Electric Field Strength ( $E_{RL}$ ), (V/m, RMS)	Magnetic Field Strength ( $H_{RL}$ ), (A/m, RMS)	Power Density, ( $S_{RL}$ ), (W/m <sup>2</sup> )	Reference Period (minutes)
10–20	61.4	0.163	10	6
20–48	$129.8 / f^{0.25}$	$0.3444 / f^{0.25}$	$44.72 / f^{0.5}$	6
48–100	49.33	0.1309	6.455	6
100–6000	$15.60 f^{0.25}$	$0.04138 f^{0.25}$	$0.6455 f^{0.5}$	6
6000–15000	137	0.364	50	6
15000–150000	137	0.364	50	$616000 / f^{1.2}$
150000–300000	$0.354 f^{0.5}$	$9.40 \times 10^{-4} f^{0.5}$	$3.33 \times 10^{-4} f$	$616000 / f^{1.2}$

Frequency,  $f$ , is in MHz.

### NOTES FOR TABLES 5 AND 6:

- For exposures shorter than the reference period, field strengths may exceed the reference levels, provided that the time average of the squared value of the electric or magnetic field strength over any time period equal to the reference period shall not exceed  $E_{RL}^2$  or  $H_{RL}^2$ , respectively. For exposures longer than the reference period, including indefinite exposures, the time average of the squared value of the electric or magnetic field strength over any time period equal to the reference period shall not exceed  $E_{RL}^2$  or  $H_{RL}^2$ , respectively.

### **5.3. EQUATIONS**

#### **POWER DENSITY**

Power density is given by:

$$S = \text{EIRP} / (4 * \text{Pi} * \text{D}^2)$$

Where

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

EIRP = Equivalent Isotropic Radiated Power in mW

D = Separation distance in cm

Power density in units of mW/cm<sup>2</sup> is converted to units of W/m<sup>2</sup> by multiplying by 10.

### **5.4. LIMITS AND IC EXEMPTION**

#### **INDUSTRY CANADA EXEMPTION**

RSS-102 Clause 2.5.2 RF exposure evaluation is required if the separation distance between the user and the device's radiating element is greater than 20 cm, except when the device operates as follows:

At or above 300 MHz and below 6 GHz and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than  $1.31 \times 10^{-2} f^{0.6834}$  W (adjusted for tune-up tolerance), where f is in MHz.

f = 2440 MHz; Threshold = 2.7 W



## 6. RF EXPOSURE RESULTS

In the table(s) below, Power and Gain are entered in units of dBm and dBi respectively and conversions to linear forms are used for the calculations.

(Single chain transmitters, no colocation, 20 cm MPE distance)

Band	Mode	Separatio Distance (cm)	Output AVG Power (dBm)	Antenna Gain (dBi)	Duty Cycle (%)	EIRP (mW)	FCC Power Density (mW/cm <sup>2</sup> )	IC Density (W/m <sup>2</sup> )
2.4 GHz	WLAN	20	17.34	0.00	100.0	54.2	0.011	0.11
2.4 GHz	WLAN	20	18.00	0.00	100.0	63.1	0.013	0.13
<b>18dBm is the maximum rated power</b>								

Under assumption of mobile exposure conditions acc. to part 2.1091 the module is categorically excluded from routine environmental evaluation for RF exposure exemption since it's ERP is < 3W.

### Notes:

- 1) For MPE the new KDB 447498 requires the calculations to use the maximum rated power; that power should be declared by the manufacturer, and should not be lower than the measured power. If the power has a tolerance then we also need to check that the measured power is within the tolerance.

**END OF REPORT**