



# Radio Frequency Exposure Evaluation Report

FOR:

Luminate Wireless

Model Name:

LWAP-0001

Product Description:

4G LTE Access Point

FCC ID: 2AJLI-LWAP-0002

Applied Rules and Standards:

CFR Part 1 (1.1307 & 1.1310), Part 2 (2.1091),  
FCC KDB 447498 D01 General RF Exposure Guidance v06

Report number: EMC\_LUMIN-001-16001\_FCC\_MPE\_Rev1

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## **1. Assessment**

This RF Exposure evaluation report provides information about compliance of the below identified device with the RF Exposure limits for mobile devices as defined in FCC CFR Part 1 (1.1307 &1.1310), Part 2 (2.1091). In addition, maximum antenna gain or minimum distance towards the human body is calculated, respectively, where relevant.

The device meets the limits as stipulated by the above given FCC rule parts based on available specifications.

<b>Company</b>	<b>Description</b>	<b>Model #</b>
Luminate Wireless	4G LTE Access Point	LWAP-0001

### **Responsible for Testing Laboratory:**

2016-11-29	Compliance	Franz Engert (Compliance Manager)
<b>Date</b>	<b>Section</b>	<b>Name</b>

### **Responsible for the Report:**

2016-11-29	Compliance	Kris Lazarov (EMC Engineer)
<b>Date</b>	<b>Section</b>	<b>Name</b>

The test results of this test report relate exclusively to the test item specified in Section3.  
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## **2. Administrative Data**

### **2.1. Identification of the Testing Laboratory Issuing the Test Report**

<b>Company Name:</b>	CETECOM Inc.
<b>Department:</b>	Compliance
<b>Street Address:</b>	411 Dixon Landing Road
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<b>Compliance Manager:</b>	Franz Engert
<b>Responsible Project Leader:</b>	Kris Lazarov

### **2.2. Identification of the Client / Manufacturer**

<b>Client Firm/Name:</b>	Luminate Wireless Inc.
<b>Street Address:</b>	20883 Stevens Creek Blvd. S-100
<b>City/Zip Code</b>	Cupertino, CA 95014
<b>Country</b>	USA
<b>Contact Person:</b>	Jerry Martinson
<b>Phone No.</b>	650-600-3899
<b>e-mail:</b>	jerrym@luminatewireless.com

### **3. Equipment under Assessment**

<b>Model No</b>	LWAP-0001
<b>HW Version</b>	0T
<b>SW Version</b>	DV5.2.3
<b>FCC-ID</b>	2AJLI-LWAP-0002
<b>Product Description</b>	4G LTE Access Point
<b>Transceiver Technology / Type(s) of Modulation</b>	LTE / QPSK / 16-QAM / 64-QAM
<b>Frequency Range</b>	LTE Band 2: Uplink: 1850 – 1910 MHz / Downlink: 1930 – 1990 MHz LTE Band 4: Uplink: 1710 – 1755 MHz / Downlink: 2110 – 2155 MHz
<b>Max. declared antenna gain</b>	3dBi
<b>Co-located Transmitters/ Antennas?</b>	Yes, the 2 LTE radio modules operate independently and may transmit simultaneously
<b>Power Supply/ Rated Operating Voltage Range</b>	44 V (min) / 48 V (nom) / 57 V (max)
<b>Operating Temperature Range</b>	Tmin: 0 °C / Tmax 50 °C
<b>Sample Revision</b>	<input type="checkbox"/> Prototype <input checked="" type="checkbox"/> Production <input type="checkbox"/> Pre-Production
<b>Device Category</b>	<input checked="" type="checkbox"/> Fixed Installation <input type="checkbox"/> Mobile <input type="checkbox"/> Portable
<b>Exposure Category</b>	<input type="checkbox"/> Occupational/ Controlled <input checked="" type="checkbox"/> General Population/ Uncontrolled

#### **4. RF Exposure Limits and FCC**

For the specific described radio apparatus the following basic limits and rules apply

##### **4.1. Power Density Limits acc. to FCC 1.1310(e)**

Frequency Range (MHz)	Power density (mW/cm <sup>2</sup> )	Averaging time (minutes)
300 – 1500	f (MHz) /1500	30
1500 – 100.000	1.0	30

##### **4.2. Routine Environmental Evaluation Categorical Exclusion Limits acc. to FCC 2.1091(c)**

Mobile devices that operate in the Commercial Mobile Radio Services pursuant to part 20 of this chapter; the Cellular Radiotelephone Service pursuant to part 22 of this chapter; the Personal Communications Services pursuant to part 24 of this chapter; the Satellite Communications Services pursuant to part 25 of this chapter; the Miscellaneous Wireless Communications Services pursuant to part 27 of this chapter; the Maritime Services (ship earth station devices only) pursuant to part 80 of this chapter; the Specialized Mobile Radio Service, and the 3650 MHz Wireless Broadband Service pursuant to part 90 of this chapter; and the Citizens Broadband Radio Service pursuant to part 96 of this chapter are subject to routine environmental evaluation for RF exposure prior to equipment authorization or use if:

- (i) They operate at frequencies of 1.5 GHz or below and their effective radiated power (ERP) is 1.5 watts or more, or
- (ii) They operate at frequencies above 1.5 GHz and their ERP is 3 watts or more.

##### **4.3. RF Exposure Estimation (MPE Estimation)**

Having available the source based average output power and peak antenna gain or the ERP/EIRP of the specified device and for a known minimum distance of its radiating structures from the body of persons according to its use cases (at least 20cm) the power density at that distance can be estimated by the following formula for plane-wave equivalent conditions (far-field conditions), when ground reflection is neglected.

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

Where: S = power density (mW/cm<sup>2</sup> or W/m<sup>2</sup>)

P = power input to the antenna (mW or W)

G = power gain of the antenna in the direction of interest relative to an isotropic radiator

R = distance to the center of radiation of the antenna (cm or m)

## 5. Evaluations

### 5.1. Routine Environmental Evaluation Applicability Stand Alone transmission

Transmission Mode	EIRP (dBm)	Duty Cycle (%)	Limits for Routine Environmental Evaluation Applicability, EIRP (dBm)	Exempt from Routine evaluation (Yes/No)
LTE Band 2	24	100	< 33.59	Yes
LTE Band 4	24	100	< 33.59	Yes

Note: EIRP power calculation is based on the Stated RF output power and tune-up tolerance and antenna gain provided by the manufacturer

**Conclusion:**

- Since the EIRP is less than the FCC limit, this device is exempt from Routine evaluation.

### 5.2. Compliance with MPE (Power Density) limits

Power Density Calculation						
Band of Operation MHz	EIRP dBm	Maximum Duty Cycle %	Distance cm	Power Density mW/cm²	Limit mW/cm²	Verdict
LTE Band 2	24	100	20	0.050	< 1.000	Pass
LTE Band 4	24	100	20	0.050	< 1.000	Pass

**Conclusion:**

- The equipment fulfills the MPE limits for the minimum 20cm distance between the antenna and the human body

## 6. Routine Environmental Evaluation Applicability Simultaneous Transmission

- Possible simultaneous transmissions: According to the manufacturer the two identical cellular radio modules incorporated within the device operate independently from each other. Theoretically the worst case of simultaneous transmission is with the two transmitters operating at the highest output power mode, within the same band (2 x GSM 850MHz).

Transmission Mode	Ratio of Power Density to Applicable limit for Stand Alone Operation	Sum of the Ratios for the Highest Possible Simultaneous Operation	Limits for the Highest Combined Ratio	Exempt from Routine evaluation
LTE Band 2 and 4	0.050	2 x 0.050 = 0.1	< 1	Yes

Note: Power Density to Applicable limit for Stand Alone Operation are derived from table in section 5.2

**Conclusion:**

- The equipment is excluded from simultaneous transmission MPE test.

## 7. Revision History

Date	Report Name	Changes to report	Report prepared by
2016-09-08	EMC_LUMIN-001-16001_FCC_MPE	Initial Version	Kris Lazarov
2016-11-29	EMC_LUMIN-001-16001_FCC_MPE_Rev1	Updated the FCC ID to 2AJLI-LWAP-0002; Fixed EUT frequency range in section 3.	Kris Lazarov