



# RF EXPOSURE REPORT

For

## Waylens Inc.

2711 Centerville Road - Suite 400, Wilmington, Delaware, United States 19808

**FCC ID: 2AKAF-MDM01**

<b>Report Type:</b> Original Report	<b>Product Name:</b> LTE CAT.1 Module
<b>Report Number:</b>	RSHA240408005-00B
<b>Report Date:</b>	2024-05-30
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Note: This test report is prepared for the customer shown above and for the device described herein. It may not be duplicated or used in part without prior written consent from Bay Area Compliance Laboratories Corp. (Kunshan). This report must not be used by the customer to claim product certification, approval, or endorsement by NVLAP, or any agency of the U.S.Government.

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## REPORT REVISION HISTORY

Number of Revisions	Report No.	Version	Issue Date	Description
0	RSHA240408005-00B	R1V1	2024-05-30	Initial Release

## GENERAL INFORMATION

### Product Description for Equipment under Test (EUT)

Applicant:	Waylens Inc.
Tested Model:	MDM01
Product Name:	LTE CAT.1 Module
Power Supply:	DC 3.8V
Maximum Conducted Output Power:	Band 2: 24.04 dBm; Band 4: 24.82 dBm; Band 5: 24.66; Band 12: 24.78 dBm; Band 17: 23.93 dBm; Band 66: 22.86 dBm
RF Function:	LTE
Operating Band/Frequency:	LTE Band 2: 1850-1910 MHz(TX), 1930-1990 MHz(RX) LTE Band 4: 1710-1755 MHz(TX), 2110-2155 MHz(RX) LTE Band 5: 824-849 MHz(TX), 869-894 MHz(RX) LTE Band 12: 699-716 MHz(TX), 729-746 MHz(RX) LTE Band 17: 704-716 MHz(TX), 734-746 MHz(RX) LTE Band 66: 1710-1780 MHz(TX), 2110-2200 MHz(RX)
Modulation Type:	QPSK, 16QAM
Antenna Type:	Rod Antenna
★Maximum Antenna Gain:	Band 2: 2.06 dBi; Band 4: 1.75 dBi; Band 5: -0.22 dBi; Band 12: -0.14 dBi; Band 17: -0.14 dBi; Band 66: 1.75 dBi
★Maximum Cable Loss:	0.2dB(Below 1GHz), 0.4dB(Above 1GHz)

*Note: The maximum antenna gain is provided by the applicant.*

*All measurement and test data in this report was gathered from production sample serial number: RSHA240408005-1 (Assigned by the BACL (Kunshan). The EUT supplied by the applicant was received on 2024-04-08.)*

**FCC §1.1310 & §2.1091 –MAXIMUM PERMISSIBLE EXPOSURE (MPE)**

**Applicable Standard**

According to subpart §2.1091 and subpart §1.1310, systems operating under the provisions of this section shall be operated in a manner that ensures that the public is not exposed to radio frequency energy level in excess of the Commission’s guidelines.

Limits for Maximum Permissible Exposure (MPE) (§1.1310, §2.1091)

<b>(B) Limits for General Population/Uncontrolled Exposure</b>				
<b>Frequency Range (MHz)</b>	<b>Electric Field Strength (V/m)</b>	<b>Magnetic Field Strength (A/m)</b>	<b>Power Density (mW/cm<sup>2</sup>)</b>	<b>Averaging Time (minutes)</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

f = frequency in MHz; \* = Plane-wave equivalent power density;

According to §1.1310 and §2.1091 RF exposure is calculated.

**Calculated Formulary**

Predication of MPE limit at a given distance

S = PG/4 π R<sup>2</sup> = power density (in appropriate units, e.g. mW/cm<sup>2</sup>);

P = power input to the antenna (in appropriate units, e.g., mW);

G = power gain of the antenna in the direction of interest relative to an isotropic radiator, the power gain factor, is normally numeric gain;

R = distance to the center of radiation of the antenna (appropriate units, e.g., cm);

**Calculated Data:**

Mode	Frequency (MHz)	Antenna Gain with cable loss		★Tune-up Output Power		Evaluation Distance (cm)	Power Density (mW/cm <sup>2</sup> )	MPE Limit (mW/cm <sup>2</sup> )
		(dBi)	(numeric)	(dBm)	(mW)			
LTE Band 2	1850-1910	1.66	1.47	25.0	316.23	20	0.0922	1.0
LTE Band 4	1710-1755	1.35	1.36	25.0	316.23	20	0.0858	1.0
LTE Band 5	824-849	-0.42	0.91	25.0	316.23	20	0.0571	0.5493
LTE Band 12	699-716	-0.34	0.92	25.0	316.23	20	0.0582	0.466
LTE Band 17	704-716	-0.34	0.92	25.0	316.23	20	0.0582	0.4693
LTE Band 66	1710-1780	1.35	1.36	25.0	316.23	20	0.0858	1.0

Calculation of maximum antenna gain based on ERP/EIRP

Mode	Max Tune-up Power (dBm)	ERP/EIRP Limit (dBm)	Max Antenna Gain (dBi)
FDD (Band 2)	25.0	33.00	8.00
FDD (Band 4)	25.0	30.00	5.00
FDD (Band 5)	25.0	38.45	15.60
FDD (Band 12)	25.0	34.77	11.92
FDD (Band 17)	25.0	34.77	11.92
FDD (Band 66)	25.0	30.00	5.00

## Calculation of maximum antenna gain based on MPE Ratio

Mode	Frequency Range	Tune-up Conducted Power		Power Density Limit	Maximum Power Density	Evaluation Distance	Maximun Antenna Gain Allowed based on MPE	
	(MHz)	(dBm)	(mW)	(mW/cm <sup>2</sup> )	(mW/cm <sup>2</sup> )		(cm)	(numeric)
FDD (Band 2)	1850-1910	25.0	316.23	1.0	0.9970	20	15.85	12.0
FDD (Band 4)	1710-1755	25.0	316.23	1.0	0.997	20	15.85	12.0
FDD (Band 5)	824-849	25.0	316.23	0.5493	0.5491	20	8.73	9.41
FDD (Band 12)	699-716	25.0	316.23	0.466	0.465	20	7.40	8.69
FDD (Band 17)	704-716	25.0	316.23	0.4693	0.4663	20	7.41	8.7
FDD (Band 66)	1710-1780	25.0	316.23	1.0	0.997	20	15.85	12.0

**Note:**

1. For the above tune up power were declared by the manufacturer.

**Result:** The device meet FCC MPE at 20 cm distance.

To meet RF exposure & ERP/ERIP, the maximum net gains of antennas allowed are 8.0 dBi @ FDD (Band 2), 5.0 dBi @ FDD (Band 4), 9.41 dBi @ FDD (Band 5), 8.69 dBi @ FDD (Band 12), 8.7 dBi @ FDD (Band 17), 5 dBi @ FDD (Band 66). The antenna(s) used for this transmitter must be installed to provide a separation distance of at least 20 cm from all persons and must not be co-located or operating in conjunction with any other antenna or transmitter.

## **EUT PHOTOGRAPHS**

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Please refer to the attachment EXHIBIT A - EUT EXTERNAL PHOTOGRAPHS and EXHIBIT B - EUT INTERNAL PHOTOGRAPHS.



### **Declarations**

1. The laboratory is not responsible for the authenticity of any information provided by the applicant. Information from the applicant that may affect test results is marked with “★”.
2. The test data was only valid for the test sample(s).
3. This report is valid only with a valid digital signature. The digital signature may be available only under the Adobe software above version 7.0.
4. Otherwise required by the applicant or Product Regulations, Decision Rule in this report did not consider the uncertainty.
5. The extended uncertainty given in this report is obtained by combining the standard uncertainty times the coverage factor  $k=2$  with the 95.45% confidence interval.

**\*\*\*\*\* END OF REPORT \*\*\*\*\***