

RF Exposure Evaluation Declaration

Product Name : Module
Trade Name : 
Model No. : LE910C1-LA, LE910C4-LA
FCC ID. : RI7LE910CXLA

Applicant : Telit Communications S.p.A.

Address : Viale Stazione di Prosecco, 5/B, 34010 Sgonico TRIESTE – ITALY

Date of Receipt : Jul. 15, 2019
Date of Declaration : Jul. 25, 2019
Report No. : 1970268R-RF-US-Exp
Report Version : V1.0



The declaration results relate only to the samples calculated.


The declaration shall not be reproduced except in full without the written approval of DEKRA Testing and Certification Co., Ltd.

RF Exposure Evaluation Declaration

Issued Date : Jul. 25, 2019

Report No. : 1970268R-RF-US-Exp



Product Name : Module
Applicant : Telit Communications S.p.A.
Address : Viale Stazione di Prosecco, 5/B, 34010 Sgonico TRIESTE –
ITALY
Manufacturer : Telit Communications S.p.A.
Model No. : LE910C1-LA, LE910C4-LA
FCC ID : RI7LE910CXLA
Trade Name : 
Applicable Standard : FCC 47 CFR Part 2.1091 Radiofrequency radiation exposure
evaluation: mobile devices.
ISED RSS-102 Issue 5 (2015-03) – Radio Frequency Exposure
Compliance of Radiocommunication Apparatus (All Frequency
Bands)
Test Lab : Hsin Chu Laboratory
Address : No.372-2, Sec. 4, Zhongxing Rd., Zhudong Township, Hsinchu
County 310, Taiwan, R.O.C.
TEL: +886-3-582-8001 / FAX: +886-3-582-8958
Test Result : Complied

Approved By :



(Louis Hsu / Deputy Manager)

1. RF Exposure Evaluation

1.1. Limits

According to FCC 1.1310: The criteria listed in the following table shall be used to evaluate the environment impact of human exposure to radio frequency (RF) radiation as specified in 1.1307(b)

LIMITS FOR MAXIMUM PERMISSIBLE EXPOSURE (MPE)

| Frequency Range (MHz) | Electric Field Strength (V/m) | Magnetic Field Strength (A/m) | Power Density (mW/cm ²) | Average Time (Minutes) |
|---|-------------------------------|-------------------------------|-------------------------------------|------------------------|
| (A) Limits for Occupational/ Control Exposures | | | | |
| 300-1500 | -- | -- | F/300 | 6 |
| 1500-100,000 | -- | -- | 5 | 6 |
| (B) Limits for General Population/ Uncontrolled Exposures | | | | |
| 300-1500 | -- | -- | F/1500 | 6 |
| 1500-100,000 | -- | -- | 1 | 30 |

F= Frequency in MHz

According to IC RSS-102 Issue 5: For the purpose of this standard, Industry Canada has adopted the SAR and RF field strength limits established in Health Canada's RF exposure guideline.

RF Field Strength Limits for Devices Used by the General Public (Uncontrolled Environment)

| Frequency Range (MHz) | Electric Field (V/m rms) | Magnetic Field (A/m rms) | Power Density (W/m ²) | Reference Period (minutes) |
|-----------------------|--------------------------|-------------------------------|-----------------------------------|----------------------------|
| 0.003-1021 | 83 | 90 | - | Instantaneous* |
| 0.1-10 | - | $0.73/f$ | - | 6** |
| 1.1-10 | $87/f^{0.5}$ | - | - | 6** |
| 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 | $0.158 f^{0.5}$ | $4.21 \times 10^{-4} f^{0.5}$ | $6.67 \times 10^{-5} f$ | $616000/f^{1.2}$ |

Note: f is frequency in MHz.

*Based on nerve stimulation (NS). ** Based on specific absorption rate (SAR).

RF Field Strength Limits for Controlled Use Devices (Controlled Environment)

| Frequency Range (MHz) | Electric Field (V/m rms) | Magnetic Field (A/m rms) | Power Density (W/m ²) | Reference Period (minutes) |
|-----------------------|--------------------------|--------------------------------------|-----------------------------------|----------------------------|
| 0.003-1023 | 170 | 180 | - | Instantaneous* |
| 0.1-10 | - | 1.6/ <i>f</i> | - | 6** |
| 1.29-10 | 193/ <i>f</i> 0.5 | - | - | 6** |
| 10-20 | 61.4 | 0.163 | 10 | 6 |
| 20-48 | 129.8/ <i>f</i> 0.25 | 0.3444/ <i>f</i> 0.25 | 44.72/ <i>f</i> 0.5 | 6 |
| 48-100 | 49.33 | 0.1309 | 6.455 | 6 |
| 100-6000 | 15.60 <i>f</i> 0.25 | 0.04138 <i>f</i> 0.25 | 0.6455 <i>f</i> 0.5 | 6 |
| 6000-15000 | 137 | 0.364 | 50 | 6 |
| 15000-150000 | 137 | 0.364 | 50 | 616000/ <i>f</i> 1.2 |
| 150000-300000 | 0.354 <i>f</i> 0.5 | 9.40 x 10 ⁻⁴ <i>f</i> 0.5 | 3.33 x 10 ⁻⁴ <i>f</i> | 616000/ <i>f</i> 1.2 |

Note: *f* is frequency in MHz. *Based on nerve stimulation (NS). ** Based on specific absorption rate (SAR).

Friis Formula

Friis transmission formula: $P_d = (P_{out} * G) / (4 * \pi * r^2)$

Where

P_d = power density in mW/cm²

P_{out} = output power to antenna in mW

G = gain of antenna in linear scale

π = 3.1416

R = distance between observation point and center of the radiator in cm

P_d is the limit of MPE, 1 mW/cm². If we know the maximum gain of the antenna and the total power input to the antenna, through the calculation, we will know the distance r where the MPE limit is reached.

1.2. Test Procedure

Software provided by client enabled the EUT to transmit and receive data at lowest, middle and highest channel individually.

The temperature and related humidity: 18°C and 78% RH.

1.3. Test Result of RF Exposure Evaluation

| | |
|----------------|------------------------|
| Product | LE910C1-LA, LE910C4-LA |
| Test Mode | Transmit |
| Test Condition | RF Exposure Evaluation |

| GSM | Usable maximum Antenna Gain by manufacturer's declaration (dBi) | Usable maximum Antenna Gain under limit of output power (dBi) |
|---------|---|---|
| GSM 850 | 1.5 | 3.5 |
| DCS1900 | 3.5 | 9.5 |

| WCDMA | Usable maximum Antenna Gain by manufacturer's declaration (dBi) | Usable maximum Antenna Gain under limit of output power (dBi) |
|--------|---|---|
| Band 2 | 3.5 | 13.0 |
| Band 4 | 3.5 | 13.0 |
| Band 5 | 1.5 | 10.0 |

| LTE | Usable maximum Antenna Gain by manufacturer's declaration (dBi) | Usable maximum Antenna Gain under limit of output power (dBi) |
|--------|---|---|
| Band 2 | 3.5 | 13.0 |
| Band 4 | 3.5 | 13.0 |
| Band 5 | 1.5 | 10.0 |
| Band 7 | 3.0 | 13.0 |

GSM 850

Antenna Gain

Based on the Maximum Conducted Output Power, the usable maximum antenna gain by manufacturer's declaration is 1.5 dBi or 1.41 in linear scale.

Output Power into Antenna & RF Exposure Evaluation Distance:

| Channel Frequency (MHz) | Maximum Output Power by manufacturer's declaration | | Conducted Output Power by Testing | | Maximum Power Density at R = 20 cm (mW/cm ²) | FCC Limit (mW/cm ²) |
|-------------------------|--|---------|-----------------------------------|---------|--|---------------------------------|
| | (dBm) | (mW) | (dBm) | (mW) | | |
| 824.2 | 33.5 | 2238.72 | 32.81 | 1909.85 | 0.315 | 0.549 |
| 836.6 | 33.5 | 2238.72 | 32.53 | 1790.61 | 0.315 | 0.558 |
| 848.8 | 33.5 | 2238.72 | 32.58 | 1811.34 | 0.315 | 0.566 |

DCS 1900

Antenna Gain

Based on the Maximum Conducted Output Power, the usable maximum antenna gain by manufacturer's declaration is 3.5 dBi or 2.24 in linear scale.

Output Power into Antenna & RF Exposure Evaluation Distance:

| Channel Frequency (MHz) | Maximum Output Power by manufacturer's declaration | | Conducted Output Power by Testing | | Maximum Power Density at R = 20 cm (mW/cm ²) | FCC Limit (mW/cm ²) |
|-------------------------|--|---------|-----------------------------------|--------|--|---------------------------------|
| | (dBm) | (mW) | (dBm) | (mW) | | |
| 1850.2 | 30.5 | 1122.02 | 29.79 | 952.80 | 0.250 | 1.000 |
| 1880.0 | 30.5 | 1122.02 | 29.68 | 928.97 | 0.250 | 1.000 |
| 1909.8 | 30.5 | 1122.02 | 29.48 | 887.16 | 0.250 | 1.000 |

WCDMA Band 2

Antenna Gain

Based on the Maximum Conducted Output Power, the usable maximum antenna gain by manufacturer's declaration is 3.5 dBi or 2.24 in linear scale.

Output Power into Antenna & RF Exposure Evaluation Distance:

| Channel Frequency (MHz) | Maximum Output Power by manufacturer's declaration | | Conducted Output Power by Testing | | Maximum Power Density at R = 20 cm (mW/cm ²) | FCC Limit (mW/cm ²) |
|-------------------------|--|--------|-----------------------------------|--------|--|---------------------------------|
| | (dBm) | (mW) | (dBm) | (mW) | | |
| 1852.4 | 24.00 | 251.19 | 23.15 | 206.54 | 0.112 | 1.000 |
| 1880.0 | 24.00 | 251.19 | 23.01 | 199.99 | 0.112 | 1.000 |
| 1907.6 | 24.00 | 251.19 | 22.86 | 193.20 | 0.112 | 1.000 |

WCDMA Band 4

Antenna Gain

Based on the Maximum Conducted Output Power, the usable maximum antenna gain by manufacturer's declaration is 3.5 dBi or 2.24 in linear scale.

Output Power into Antenna & RF Exposure Evaluation Distance:

| Channel Frequency (MHz) | Maximum Output Power by manufacturer's declaration | | Conducted Output Power by Testing | | Maximum Power Density at R = 20 cm (mW/cm ²) | FCC Limit (mW/cm ²) |
|-------------------------|--|--------|-----------------------------------|--------|--|---------------------------------|
| | (dBm) | (mW) | (dBm) | (mW) | | |
| 1712.4 | 24.00 | 251.19 | 23.05 | 201.84 | 0.112 | 1.000 |
| 1732.6 | 24.00 | 251.19 | 21.06 | 127.64 | 0.112 | 1.000 |
| 1752.6 | 24.00 | 251.19 | 20.42 | 110.15 | 0.112 | 1.000 |

WCDMA Band 5

Antenna Gain

Based on the Maximum Conducted Output Power, the usable maximum antenna gain by manufacturer's declaration is 1.5 dBi or 1.41 in linear scale.

Output Power into Antenna & RF Exposure Evaluation Distance:

| Channel Frequency (MHz) | Maximum Output Power by manufacturer's declaration | | Conducted Output Power by Testing | | Maximum Power Density at R = 20 cm (mW/cm ²) | FCC Limit (mW/cm ²) |
|-------------------------|--|--------|-----------------------------------|--------|--|---------------------------------|
| | (dBm) | (mW) | (dBm) | (mW) | | |
| 826.4 | 24.00 | 251.19 | 23.37 | 217.27 | 0.071 | 0.551 |
| 836.6 | 24.00 | 251.19 | 21.42 | 138.68 | 0.071 | 0.558 |
| 846.6 | 24.00 | 251.19 | 21.04 | 127.06 | 0.071 | 0.558 |

LTE Band 2

Antenna Gain

Based on the Maximum Conducted Output Power, the usable maximum antenna gain by manufacturer's declaration is 3.5 dBi or 2.24 in linear scale.

Output Power into Antenna & RF Exposure Evaluation Distance:

| Channel Frequency (MHz) | Maximum Output Power by manufacturer's declaration | | Conducted Output Power by Testing | | Maximum Power Density at R = 20 cm (mW/cm ²) | FCC Limit (mW/cm ²) |
|-------------------------|--|--------|-----------------------------------|--------|--|---------------------------------|
| | (dBm) | (mW) | (dBm) | (mW) | | |
| 1850.7 | 24.00 | 251.19 | 23.40 | 218.78 | 0.112 | 1.000 |
| 1880.0 | 24.00 | 251.19 | 23.37 | 217.27 | 0.112 | 1.000 |
| 1908.5 | 24.00 | 251.19 | 23.33 | 215.28 | 0.112 | 1.000 |

LTE Band 4

Antenna Gain

Based on the Maximum Conducted Output Power, the usable maximum antenna gain by manufacturer's declaration is 3.5 dBi or 2.24 in linear scale.

Output Power into Antenna & RF Exposure Evaluation Distance:

| Channel Frequency (MHz) | Maximum Output Power by manufacturer's declaration | | Conducted Output Power by Testing | | Maximum Power Density at R = 20 cm (mW/cm ²) | FCC Limit (mW/cm ²) |
|-------------------------|--|--------|-----------------------------------|--------|--|---------------------------------|
| | (dBm) | (mW) | (dBm) | (mW) | | |
| 1711.5 | 24.00 | 251.19 | 22.99 | 199.07 | 0.112 | 1.000 |
| 1732.5 | 24.00 | 251.19 | 23.20 | 208.93 | 0.112 | 1.000 |
| 1745.0 | 24.00 | 251.19 | 23.11 | 204.64 | 0.112 | 1.000 |

LTE Band 5

Antenna Gain

Based on the Maximum Conducted Output Power, the usable maximum antenna gain by manufacturer's declaration is 1.5 dBi or 1.41 in linear scale.

Output Power into Antenna & RF Exposure Evaluation Distance:

| Channel Frequency (MHz) | Maximum Output Power by manufacturer's declaration | | Conducted Output Power by Testing | | Maximum Power Density at R = 20 cm (mW/cm ²) | FCC Limit (mW/cm ²) |
|-------------------------|--|--------|-----------------------------------|--------|--|---------------------------------|
| | (dBm) | (mW) | (dBm) | (mW) | | |
| 826.5 | 24.00 | 251.19 | 23.36 | 216.77 | 0.071 | 0.551 |
| 836.5 | 24.00 | 251.19 | 23.28 | 212.81 | 0.071 | 0.558 |
| 848.3 | 24.00 | 251.19 | 23.49 | 223.36 | 0.071 | 0.566 |

LTE Band 7

Antenna Gain

Based on the Maximum Conducted Output Power, the usable maximum antenna gain by manufacturer's declaration is 1.5 dBi or 2.0 in linear scale.

Output Power into Antenna & RF Exposure Evaluation Distance:

| Channel Frequency (MHz) | Maximum Output Power by manufacturer's declaration | | Conducted Output Power by Testing | | Maximum Power Density at R = 20 cm (mW/cm ²) | FCC Limit (mW/cm ²) |
|-------------------------|--|--------|-----------------------------------|--------|--|---------------------------------|
| | (dBm) | (mW) | (dBm) | (mW) | | |
| 2507.5 | 24.00 | 251.19 | 22.99 | 199.07 | 0.100 | 1.000 |
| 2535.0 | 24.00 | 251.19 | 23.48 | 222.84 | 0.100 | 1.000 |
| 2560.0 | 24.00 | 251.19 | 23.46 | 221.82 | 0.100 | 1.000 |