

RADIO TEST REPORT

Type of assessment:

MPE Calculation report

Manufacturer:

Shneider Electric

FVIN:

V1.2.3

FCC ID:

2BATG-EBIOTPGW

Contains FCC ID:

2BA24LBEE5HY1MW

XMR201903EG25G

Product Marketing Name (PMN):

EcoStruxure Building-IoT Gateway

Hardware Version Identification Number (HVIN):

EBIOTPGW

ISED certification number:

IC: 30486-EBIOTPGW

Contains ISED certification number:

IC: 12107A-LBEE5HY1MW

IC: 10224A-201903EG25G

Specification:

- ◆ FCC 47 CFR Part 1 Subpart I, §§1.1307, 1.1310
- ◆ FCC 47 CFR Part 2 Subpart J, §2.1091
- ◆ FCC KDB 447498 D01 General RF Exposure Guidance v06
- ◆ ISED Canada RSS-102 Issue 5 Amendment 1, (February 2021)

RSS-102 Annex B - Declaration of RF Exposure Compliance

ATTESTATION: I attest that the information provided in Annex A is correct; that the Technical Brief was prepared and the information contained therein is correct; that the device evaluation was performed or supervised by me; that applicable measurement methods and evaluation methodologies have been followed; and that the device meets the SAR and/or RF field strength limits of RSS-102.

Date of issue: September 12, 2023

Andrey Adelberg, Senior EMC/RF Specialist

Prepared by



Signature

Nemko Canada Inc., a testing laboratory, is accredited by ANSI National Accreditation Board (ANAB).

The tests included in this report are within the scope of this accreditation.

The ANAB symbol is an official symbol of the ANSI National Accreditation Board, used under licence.

ANAB File Number: AT-3195 (Ottawa/Almonte); AT-3193 (Pointe-Claire); AT-3194 (Cambridge)



Lab locations

| | | | | |
|----------------------|---|--|---|---|
| Company name | Nemko Canada Inc. | | | |
| Facilities | Ottawa site: 303 River Road Ottawa, Ontario Canada K1V 1H2 | Montréal site: 292 Labrosse Avenue Pointe-Claire, Québec Canada H9R 5L8 | Cambridge site: 1-130 Saltsman Drive Cambridge, Ontario Canada N3E 0B2 | Almonte site: 1500 Peter Robinson Road West Carleton, Ontario Canada K0A 1L0 |
| | Tel: +1 613 737 9680 Fax: +1 613 737 9691 | Tel: +1 514 694 2684 Fax: +1 514 694 3528 | Tel: +1 519 650 4811 | Tel: +1 613 256-9117 |
| Test site identifier | Organization FCC: ISED: | Ottawa/Almonte CA2040 2040A-4 | Montreal CA2041 2040G-5 | Cambridge CA0101 24676 |
| Website | www.nemko.com | | | |

Tested/reported at Ottawa site.

Limits of responsibility

Note that the results contained in this report relate only to the items tested and were obtained in the period between the date of initial receipt of samples and the date of issue of the report.

This test report has been completed in accordance with the requirements of ISO/IEC 17025. All results contained in this report are within Nemko Canada's ISO/IEC 17025 accreditation.

Copyright notification

Nemko Canada Inc. authorizes the applicant to reproduce this report provided it is reproduced in its entirety and for use by the company's employees only. Any use which a third party makes of this report, or any reliance on or decisions to be made based on it, are the responsibility of such third parties.

Nemko Canada Inc. accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions based on this report.

© Nemko Canada Inc.

Section 1 Evaluation summary

1.1 MPE calculation for standalone transmission

1.1.1 References, definitions and limits

FCC §2.1091(d)

(2) (2) For operations within the frequency range of 300 kHz and 6 GHz (inclusive), the limits for maximum permissible exposure (MPE), derived from whole-body SAR limits and listed in Table 1 in paragraph (e)(1) of this section, may be used instead of whole-body SAR limits as set forth in paragraphs (a) through (c) of this section to evaluate the environmental impact of human exposure to RF radiation as specified in §1.1307(b) of this part, except for portable devices as defined in §2.1093 of this chapter as these evaluations shall be performed according to the SAR provisions in §2.1093.

Table 1.1-1: Table 1 to §1.1310(e)(1)—Limits for Maximum Permissible Exposure (MPE)

| Frequency range (MHz) | Electric field strength (V/m) | Magnetic field strength (A/m) | Power density (mW/cm ²) | Averaging time (minutes) |
|---|----------------------------------|----------------------------------|--|-----------------------------|
| (i) Limits for Occupational/Controlled Exposure | | | | |
| 0.3–3.0 | 614 | 1.63 | *(100) | ≤6 |
| 3.0–30 | 1842 / f | 4.89 / f | *(900 / f ²) | <6 |
| 30–300 | 61.4 | 0.163 | 1.0 | <6 |
| 300–1500 | | | f / 300 | <6 |
| 1500–100000 | | | 5 | <6 |
| (ii) 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 ²) | <30 |
| 30–300 | 27.5 | 0.073 | 0.2 | <30 |
| 300–1500 | | | f / 1500 | <30 |
| 1500–100000 | | | 1.0 | <30 |

Notes: f = frequency in MHz. * = Plane-wave equivalent power density.

RSS-102, Section 4

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, Safety Code 6:

Table 1.1-2: Table 4 to RSS-102—RF Field Strength Limits

| Frequency range (MHz) | Electric field strength (V/m rms) | Magnetic field strength (A/m rms) | Power density (W/m ²) | Reference Period (minutes) |
|--|--------------------------------------|--------------------------------------|--------------------------------------|-------------------------------|
| Limits for Controlled Environment | | | | |
| 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 |
| Limits for Uncontrolled Environment | | | | |
| 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 |

Notes: f = frequency in MHz.

References, definitions and limits, continued

Equation from page 18 of OET Bulletin 65, Edition 97-01

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

where: S = power density (mW/cm² or W/m²)
 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)

1.1.2 EUT technical information for BLE stand alone

| | |
|--------------------------------|----------------------|
| Prediction frequency | 2.480 GHz |
| Antenna type | Flexible printed |
| Antenna gain | 3 dBi |
| Number of antennas | 1 |
| Maximum transmitter power | 7.81 dBm (conducted) |
| Prediction distance (declared) | 20 cm |

1.1.3 MPE calculation for BLE stand alone

| | | |
|---|-----------------------------------|-----------------------------------|
| Fundamental transmit (prediction) frequency: | 2480 MHz | |
| Maximum measured conducted peak output power: | 7.81 dBm | |
| Cable and/or jumper loss: | 0 dB | |
| Maximum peak power at antenna input terminal: | 7.81 dBm | |
| Duty cycle: | 100 % | |
| Maximum calculated average power at antenna input terminal: | 6.039486294 mW | |
| Single Antenna gain (typical): | 3 dBi | |
| Number of antennae: | 1 | |
| Total system gain: | 3.00 dBi | |
| | | |
| MPE limit for uncontrolled exposure at prediction frequency: | FCC limit: | ISED limit: |
| | 1.000000 mW/cm ² | 0.546895 mW/cm ² |
| | 10.000000 W/m ² | 5.468948 W/m ² |
| MPE limit for controlled exposure at prediction frequency: | 5.000000 mW/cm² | 3.214564 mW/cm² |
| | 50.000000 W/m ² | 32.145641 W/m ² |
| Minimum calculated prediction distance for compliance: | 20 cm | 20 cm |
| Typical (declared) distance: | 20 cm | 20 cm |
| Average power density at prediction frequency: | 0.002397 mW/cm² | 0.002397 mW/cm² |
| | 0.023973 W/m ² | 0.023973 W/m ² |
| Margin of Compliance for uncontrolled environment: | 26.20 dB | 23.58 dB |
| with Maximum premitted antenna gain: | 29.20 dBi | 26.58 dBi |
| Margin of Compliance for controlled environment: | 33.19 dB | 31.27 dB |
| with Maximum permitted antenna gain: | 44.00 dBi | 42.08 dBi |

1.1.4 Verdict

The calculation is below the limit; therefore, the product is passing the RF Exposure requirements for the declared distance.

1.2 MPE calculation for simultaneous transmission

1.2.1 References, definitions and limits

FCC §2.1091(d)

(2) (2) For operations within the frequency range of 300 kHz and 6 GHz (inclusive), the limits for maximum permissible exposure (MPE), derived from whole-body SAR limits and listed in Table 1 in paragraph (e)(1) of this section, may be used instead of whole-body SAR limits as set forth in paragraphs (a) through (c) of this section to evaluate the environmental impact of human exposure to RF radiation as specified in §1.1307(b) of this part, except for portable devices as defined in §2.1093 of this chapter as these evaluations shall be performed according to the SAR provisions in §2.1093.

Table 1.2-1: Table 1 to §1.1310(e)(1)—Limits for Maximum Permissible Exposure (MPE)

| Frequency range (MHz) | Electric field strength (V/m) | Magnetic field strength (A/m) | Power density (mW/cm ²) | Averaging time (minutes) |
|---|----------------------------------|----------------------------------|--|-----------------------------|
| (i) Limits for Occupational/Controlled Exposure | | | | |
| 0.3–3.0 | 614 | 1.63 | *(100) | ≤6 |
| 3.0–30 | 1842 / f | 4.89 / f | *(900 / f ²) | <6 |
| 30–300 | 61.4 | 0.163 | 1.0 | <6 |
| 300–1500 | | | f / 300 | <6 |
| 1500–100000 | | | 5 | <6 |
| (ii) 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 ²) | <30 |
| 30–300 | 27.5 | 0.073 | 0.2 | <30 |
| 300–1500 | | | f / 1500 | <30 |
| 1500–100000 | | | 1.0 | <30 |

Notes: f = frequency in MHz. * = Plane-wave equivalent power density.

RSS-102, Section 4

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, Safety Code 6:

Table 1.2-2: Table 4 to RSS-102—RF Field Strength Limits

| Frequency range (MHz) | Electric field strength (V/m rms) | Magnetic field strength (A/m rms) | Power density (W/m ²) | Reference Period (minutes) |
|--|--------------------------------------|--------------------------------------|--------------------------------------|-------------------------------|
| Limits for Controlled Environment | | | | |
| 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 |
| Limits for Uncontrolled Environment | | | | |
| 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 |

Notes: f = frequency in MHz.

References, definitions and limits, continued

Equation from page 18 of OET Bulletin 65, Edition 97-01

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

 where: S = power density (mW/cm² or W/m²)

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)

1.2.2 EUT technical information (Wi-Fi 5 GHz + Cellular + BLE)

| | Wi-Fi 5 GHz | Cellular | BLE |
|-------------------------------------|-------------|-----------|----------|
| Prediction frequency | 5250 MHz | 779.5 MHz | 2480 |
| Antenna gain | 4 dBi | 4.45 dBi | 3 dB |
| Maximum transmitter conducted power | 14.8 dBm | 25 dBm | 7.81 dBm |
| Prediction distance (declared) | 20 cm | 20 cm | 20 |

1.2.3 MPE calculation (Wi-Fi 5 GHz + Cellular + BLE)

| | Transmitter 1 | Transmitter 2 | Transmitter 3 |
|---|---|--|--|
| Fundamental transmit (prediction) frequency: | 5250 MHz | 779.5 MHz | 2480 MHz |
| Maximum measured conducted peak output power: | 14.8 dBm | 25 dBm | 7.81 dBm |
| Cable and/or jumper loss: | 0 dB | 0 dB | 0 dB |
| Maximum peak power at antenna input terminal: | 14.8 dBm | 25 dBm | 7.81 dBm |
| Duty cycle: | 100 % | 100 % | 100 % |
| Maximum calculated average power at antenna input terminal: | 30.1995 mW | 316.228 mW | 6.03949 mW |
| Single Antenna gain (typical): | 4 dBi | 4.45 dBi | 3 dBi |
| Number of antennae: | 1 | 1 | 1 |
| Total system gain: | 4.00 dBi | 4.45 dBi | 3.00 dBi |
| MPE limit for <u>uncontrolled</u> exposure at prediction frequency: | ISED limit 0.91305 mW/cm ² | FCC limit 1.00000 mW/cm ² | Transmitter 3 2480 MHz |
| Maximum measured conducted peak output power: | 9.130454 W/m ² | 10.00000 W/m ² | 7.81 dBm |
| Cable and/or jumper loss: | 4.67709 mW/cm ² | 5.00000 mW/cm ² | 0 dB |
| Maximum peak power at antenna input terminal: | 46.77092 W/m ² | 50.00000 W/m ² | 7.81 dBm |
| Duty cycle: | 20 cm | 20 cm | 100 % |
| Maximum calculated average power at antenna input terminal: | 0.015091 mW/cm ² | 0.175279 mW/cm ² | 6.03949 mW |
| Single Antenna gain (typical): | 0.150914 W/m ² | 0.150914 W/m ² | 3 dBi |
| Number of antennae: | 1 | 1 | 1 |
| Total system gain: | 0.003 | 0.097 | 3.00 dBi |
| ISED limit 0.91305 mW/cm ² | FCC limit 1.00000 mW/cm ² | Transmitter 3 2480 MHz | FCC limit 1.00000 mW/cm ² |
| 9.130454 W/m ² | 10.00000 W/m ² | 7.81 dBm | 10.00000 W/m ² |
| 4.67709 mW/cm ² | 5.00000 mW/cm ² | 0 dB | 5.00000 mW/cm ² |
| 46.77092 W/m ² | 50.00000 W/m ² | 7.81 dBm | 50.00000 W/m ² |
| 20 cm | 20 cm | 100 % | 20 cm |
| 0.015091 mW/cm ² | 0.175279 mW/cm ² | 6.03949 mW | 3 dBi |
| 0.150914 W/m ² | 0.150914 W/m ² | 3 dBi | 1.00000 mW/cm ² |
| 1 | 1 | 1 | 0 dB |
| 0.003 | 0.097 | 3.00 dBi | 0.023973 W/m ² |
| ISED limit 0.91305 mW/cm ² | FCC limit 1.00000 mW/cm ² | Transmitter 3 2480 MHz | FCC limit 1.00000 mW/cm ² |
| 9.130454 W/m ² | 10.00000 W/m ² | 7.81 dBm | 10.00000 W/m ² |
| 4.67709 mW/cm ² | 5.00000 mW/cm ² | 0 dB | 5.00000 mW/cm ² |
| 46.77092 W/m ² | 50.00000 W/m ² | 7.81 dBm | 50.00000 W/m ² |
| 20 cm | 20 cm | 100 % | 20 cm |
| 0.015091 mW/cm ² | 0.175279 mW/cm ² | 6.03949 mW | 3 dBi |
| 0.150914 W/m ² | 0.150914 W/m ² | 3 dBi | 1.00000 mW/cm ² |
| 1 | 1 | 1 | 0 dB |
| 0.003 | 0.097 | 3.00 dBi | 0.023973 W/m ² |
| ISED limit 0.91305 mW/cm ² | FCC limit 1.00000 mW/cm ² | Transmitter 3 2480 MHz | FCC limit 1.00000 mW/cm ² |
| 9.130454 W/m ² | 10.00000 W/m ² | 7.81 dBm | 10.00000 W/m ² |
| 4.67709 mW/cm ² | 5.00000 mW/cm ² | 0 dB | 5.00000 mW/cm ² |
| 46.77092 W/m ² | 50.00000 W/m ² | 7.81 dBm | 50.00000 W/m ² |
| 20 cm | 20 cm | 100 % | 20 cm |
| 0.015091 mW/cm ² | 0.175279 mW/cm ² | 6.03949 mW | 3 dBi |
| 0.150914 W/m ² | 0.150914 W/m ² | 3 dBi | 1.00000 mW/cm ² |
| 1 | 1 | 1 | 0 dB |
| 0.003 | 0.097 | 3.00 dBi | 0.023973 W/m ² |
| ISED limit 0.91305 mW/cm ² | FCC limit 1.00000 mW/cm ² | Transmitter 3 2480 MHz | FCC limit 1.00000 mW/cm ² |
| 9.130454 W/m ² | 10.00000 W/m ² | 7.81 dBm | 10.00000 W/m ² |
| 4.67709 mW/cm ² | 5.00000 mW/cm ² | 0 dB | 5.00000 mW/cm ² |
| 46.77092 W/m ² | 50.00000 W/m ² | 7.81 dBm | 50.00000 W/m ² |
| 20 cm | 20 cm | 100 % | 20 cm |
| 0.015091 mW/cm ² | 0.175279 mW/cm ² | 6.03949 mW | 3 dBi |
| 0.150914 W/m ² | 0.150914 W/m ² | 3 dBi | 1.00000 mW/cm ² |
| 1 | 1 | 1 | 0 dB |
| 0.003 | 0.097 | 3.00 dBi | 0.023973 W/m ² |
| ISED limit 0.91305 mW/cm ² | FCC limit 1.00000 mW/cm ² | Transmitter 3 2480 MHz | FCC limit 1.00000 mW/cm ² |
| 9.130454 W/m ² | 10.00000 W/m ² | 7.81 dBm | 10.00000 W/m ² |
| 4.67709 mW/cm ² | 5.00000 mW/cm ² | 0 dB | 5.00000 mW/cm ² |
| 46.77092 W/m ² | 50.00000 W/m ² | 7.81 dBm | 50.00000 W/m ² |
| 20 cm | 20 cm | 100 % | 20 cm |
| 0.015091 mW/cm ² | 0.175279 mW/cm ² | 6.03949 mW | 3 dBi |
| 0.150914 W/m ² | 0.150914 W/m ² | 3 dBi | 1.00000 mW/cm ² |
| 1 | 1 | 1 | 0 dB |
| 0.003 | 0.097 | 3.00 dBi | 0.023973 W/m ² |
| ISED limit 0.91305 mW/cm ² | FCC limit 1.00000 mW/cm ² | Transmitter 3 2480 MHz | FCC limit 1.00000 mW/cm ² |
| 9.130454 W/m ² | 10.00000 W/m ² | 7.81 dBm | 10.00000 W/m ² |
| 4.67709 mW/cm ² | 5.00000 mW/cm ² | 0 dB | 5.00000 mW/cm ² |
| 46.77092 W/m ² | 50.00000 W/m ² | 7.81 dBm | 50.00000 W/m ² |
| 20 cm | 20 cm | 100 % | 20 cm |
| 0.015091 mW/cm ² | 0.175279 mW/cm ² | 6.03949 mW | 3 dBi |
| 0.150914 W/m ² | 0.150914 W/m ² | 3 dBi | 1.00000 mW/cm ² |
| 1 | 1 | 1 | 0 dB |
| 0.003 | 0.097 | 3.00 dBi | 0.023973 W/m ² |
| ISED limit 0.91305 mW/cm ² | FCC limit 1.00000 mW/cm ² | Transmitter 3 2480 MHz | FCC limit 1.00000 mW/cm ² |
| 9.130454 W/m ² | 10.00000 W/m ² | 7.81 dBm | 10.00000 W/m ² |
| 4.67709 mW/cm ² | 5.00000 mW/cm ² | 0 dB | 5.00000 mW/cm ² |
| 46.77092 W/m ² | 50.00000 W/m ² | 7.81 dBm | 50.00000 W/m ² |
| 20 cm | 20 cm | 100 % | 20 cm |
| 0.015091 mW/cm ² | 0.175279 mW/cm ² | 6.03949 mW | 3 dBi |
| 0.150914 W/m ² | 0.150914 W/m ² | 3 dBi | 1.00000 mW/cm ² |
| 1 | 1 | 1 | 0 dB |
| 0.003 | 0.097 | 3.00 dBi | 0.023973 W/m ² |
| ISED limit 0.91305 mW/cm ² | FCC limit 1.00000 mW/cm ² | Transmitter 3 2480 MHz | FCC limit 1.00000 mW/cm ² |
| 9.130454 W/m ² | 10.00000 W/m ² | 7.81 dBm | 10.00000 W/m ² |
| 4.67709 mW/cm ² | 5.00000 mW/cm ² | 0 dB | 5.00000 mW/cm ² |
| 46.77092 W/m ² | 50.00000 W/m ² | 7.81 dBm | 50.00000 W/m ² |
| 20 cm | 20 cm | 100 % | 20 cm |
| 0.015091 mW/cm ² | 0.175279 mW/cm ² | 6.03949 mW | 3 dBi |
| 0.150914 W/m ² | 0.150914 W/m ² | 3 dBi | 1.00000 mW/cm ² |
| 1 | 1 | 1 | 0 dB |
| 0.003 | 0.097 | 3.00 dBi | 0.023973 W/m ² |
| ISED limit 0.91305 mW/cm ² | FCC limit 1.00000 mW/cm ² | Transmitter 3 2480 MHz | FCC limit 1.00000 mW/cm ² |
| 9.130454 W/m ² | 10.00000 W/m ² | 7.81 dBm | 10.00000 W/m ² |
| 4.67709 mW/cm ² | 5.00000 mW/cm ² | 0 dB | 5.00000 mW/cm ² |
| 46.77092 W/m ² | 50.00000 W/m ² | 7.81 dBm | 50.00000 W/m ² |
| 20 cm | 20 cm | 100 % | 20 cm |
| 0.015091 mW/cm ² | 0.175279 mW/cm ² | 6.03949 mW | 3 dBi |
| 0.150914 W/m ² | 0.150914 W/m ² | 3 dBi | 1.00000 mW/cm ² |
| 1 | 1 | 1 | 0 dB |
| 0.003 | 0.097 | 3.00 dBi | 0.023973 W/m ² |
| ISED limit 0.91305 mW/cm ² | FCC limit 1.00000 mW/cm ² | Transmitter 3 2480 MHz | FCC limit 1.00000 mW/cm ² |
| 9.130454 W/m ² | 10.00000 W/m ² | 7.81 dBm | 10.00000 W/m ² |
| 4.67709 mW/cm ² | 5.00000 mW/cm ² | 0 dB | 5.00000 mW/cm ² |
| 46.77092 W/m ² | 50.00000 W/m ² | 7.81 dBm | 50.00000 W/m ² |
| 20 cm | 20 cm | 100 % | 20 cm |
| 0.015091 mW/cm ² | 0.175279 mW/cm ² | 6.03949 mW | 3 dBi |
| 0.150914 W/m ² | 0.150914 W/m ² | 3 dBi | 1.00000 mW/cm ² |
| 1 | 1 | 1 | 0 dB |
| 0.003 | 0.097 | 3.00 dBi | 0.023973 W/m ² |
| ISED limit 0.91305 mW/cm ² | FCC limit 1.00000 mW/cm ² | Transmitter 3 2480 MHz | FCC limit 1.00000 mW/cm ² |
| 9.130454 W/m ² | 10.00000 W/m ² | 7.81 dBm | 10.00000 W/m ² |
| 4.67709 mW/cm ² | 5.00000 mW/cm ² | 0 dB | 5.00000 mW/cm ² |
| 46.77092 W/m ² | 50.00000 W/m ² | 7.81 dBm | 50.00000 W/m ² |
| 20 cm | 20 cm | 100 % | 20 cm |
| 0.015091 mW/cm ² | 0.175279 mW/cm ² | 6.03949 mW | 3 dBi |
| 0.150914 W/m ² | 0.150914 W/m ² | 3 dBi | 1.00000 mW/cm ² |
| 1 | 1 | 1 | 0 dB |
| 0.003 | 0.097 | 3.00 dBi | 0.023973 W/m ² |
| ISED limit 0.91305 mW/cm ² | FCC limit 1.00000 mW/cm ² | Transmitter 3 2480 MHz | FCC limit 1.00000 mW/cm ² |
| 9.130454 W/m ² | 10.00000 W/m ² | 7.81 dBm | 10.00000 W/m ² |
| 4.67709 mW/cm ² | 5.00000 mW/cm ² | 0 dB | 5.00000 mW/cm ² |
| 46.77092 W/m ² | 50.00000 W/m ² | 7.81 dBm | 50.00000 W/m ² |
| 20 cm | 20 cm | 100 % | 20 cm |
| 0.015091 mW/cm ² | 0.175279 mW/cm ² | 6.03949 mW | 3 dBi |
| 0.150914 W/m ² | 0.150914 W/m ² | 3 dBi | 1.00000 mW/cm ² |
| 1 | 1 | 1 | 0 dB |
| 0.003 | 0.097 | 3.00 dBi | 0.023973 W/m ² |
| ISED limit 0.91305 mW/cm ² | FCC limit 1.00000 mW/cm ² | Transmitter 3 2480 MHz | FCC limit 1.00000 mW/cm ² |
| 9.130454 W/m ² | 10.00000 W/m ² | 7.81 dBm | 10.00000 W/m ² |
| 4.67709 mW/cm ² | 5.00000 mW/cm ² | 0 dB | 5.00000 mW/cm ² |
| 46.77092 W/m ² | 50.00000 W/m ² | 7.81 dBm | 50.00000 W/m ² |
| 20 cm | 20 cm | 100 % | 20 cm |
| 0.015091 mW/cm ² | 0.175279 mW/cm ² | 6.03949 mW | 3 dBi |
| 0.150914 W/m ² | 0.150914 W/m ² | 3 dBi | 1.00000 mW/cm ² |
| 1 | 1 | 1 | 0 dB |
| 0.003 | 0.097 | 3.00 dBi | 0.023973 W/m ² |
| ISED limit 0.91305 mW/cm ² | FCC limit 1.00000 mW/cm ² | Transmitter 3 2480 MHz | FCC limit 1.00000 mW/cm ² |
| 9.130454 W/m ² | 10.00000 W/m ² | 7.81 dBm | 10.00000 W/m ² |
| 4.67709 mW/cm ² | 5.00000 mW/cm ² | 0 dB | 5.00000 mW/cm ² |
| 46.77092 W/m ² | 50.00000 W/m ² | 7.81 dBm | 50.00000 W/m ² |
| 20 cm | 20 cm | 100 % | 20 cm |
| 0.015091 mW/cm ² | 0.175279 mW/cm ² | 6.03949 mW | 3 dBi |

1.2.4 EUT technical information (Wi-Fi 2.4 GHz + Cellular + BLE)

| | Wi-Fi 2.4 GHz | Cellular | BLE |
|-------------------------------------|---------------|-----------|----------|
| Prediction frequency | 2412 MHz | 779.5 MHz | 2480 |
| Antenna gain | 3 dBi | 4.45 dBi | 3 dBi |
| Maximum transmitter conducted power | 23.82 dBm | 25 dBm | 7.81 dBm |
| Prediction distance (declared) | 20 cm | 20 cm | 20 |

1.2.5 MPE calculation (Wi-Fi 2.4 GHz + Cellular + BLE)

| | Transmitter 1 | Transmitter 2 | Transmitter 3 | |
|---|-----------------------------------|--|-----------------------------------|-----------------------------------|
| Fundamental transmit (prediction) frequency: | 2412 MHz | 779.5 MHz | 2480 MHz | |
| Maximum measured conducted peak output power: | 23.82 dBm | 25 dBm | 7.81 dBm | |
| Cable and/or jumper loss: | 0 dB | 0 dB | 0 dB | |
| Maximum peak power at antenna input terminal: | 23.82 dBm | 25 dBm | 7.81 dBm | |
| Duty cycle: | 100 % | 100 % | 100 % | |
| Maximum calculated average power at antenna input terminal: | 240.991 mW | 316.228 mW | 6.03949 mW | |
| Single Antenna gain (typical): | 3 dBi | 4.45 dBi | 3 dBi | |
| Number of antennae: | 1 | 1 | 1 | |
| Total system gain: | 3.00 dBi | 4.45 dBi | 3.00 dBi | |
| MPE limit for uncontrolled exposure at prediction frequency: | 0.53660 mW/cm² | 1.00000 mW/cm² | 0.54689 mW/cm² | 1.00000 mW/cm² |
| MPE limit for controlled exposure at prediction frequency: | 5.366018 W/m² | 10.00000 W/m² | 5.468948 W/m² | 10.00000 W/m² |
| Minimum calculated prediction distance for compliance: | 3.17019 mW/cm² | 5.00000 mW/cm² | 3.21456 mW/cm² | 5.00000 mW/cm² |
| Typical (declared) distance: | 20 cm | 20 cm | 20 cm | 20 cm |
| Average power density at prediction frequency: | 0.095660 mW/cm² | 0.095660 mW/cm² | 0.002397 mW/cm² | 0.002397 mW/cm² |
| MPE compliance for simultaneous operation: | 0.956599 W/m² | 0.956599 W/m² | 0.023973 W/m² | 0.023973 W/m² |
| Margin of Compliance for controlled environment: | 15.20 dB | 17.18 dB | 31.27 dB | 33.19 dB |
| with Maximum permitted antenna gain: | 18.20 dBi | 20.18 dBi | 34.27 dBi | 36.19 dBi |
| Margin of Compliance for uncontrolled environment: | 7.49 dB | 10.19 dB | 23.58 dB | 26.20 dB |
| with Maximum permitted antenna gain: | 10.49 dBi | 10.19 dBi | 26.58 dBi | 26.20 dB |
| Average power density to MPE limit ratio (uncontrolled): | 0.178 | 0.096 | 0.004 | 0.002 |
| Average power density to MPE limit ratio (controlled): | 0.030 | 0.019 | 0.001 | 0.000 |
| Total sum of ratios for FCC (uncontrolled): | 0.435 <1 | Total sum of ratios for FCC (controlled): | 0.087 <1 | Total RF value for ISED |
| Total sum of ratios for ISED (uncontrolled): | 0.890 <1 | Total sum of ratios for ISED (controlled): | 0.128 <1 | 2.7334 W/m ² |
| Maximum allowed sum of ratios: | 1 | | | |

1.2.6 Verdict

The calculation is below the limit; therefore, the product is passing the RF Exposure requirements for the declared distance.

1.2.7 RSS-102, Annex A - RF technical brief cover sheet

| | | |
|---|---|--|
| ISED certification number | 30486-EBIOTPGW | |
| Product marketing name (PMN) | EcoStruxure Building-IoT Gateway | |
| Hardware version identification number (HVIN) | EBIOTPGW | |
| Firmware version identification number (FVIN) | V1.2.3 | |
| Host marketing name (HMN) | N/A | |
| Applicant name | Schneider Electric | |
| SAR/RF exposure test laboratory | 2040A-4 (3 m semi anechoic chamber - Ottawa) | |
| Type of evaluation | <input type="checkbox"/> SAR Evaluation: Device Used in the Vicinity of the Human Head <input type="checkbox"/> SAR Evaluation: Body-Worn Device and Body-Supported Device <input type="checkbox"/> SAR Evaluation: Limb-Worn Device <input checked="" type="checkbox"/> RF Exposure Evaluation <input type="checkbox"/> Nerve Stimulation Exposure Evaluation (SPR-002) | |
| SAR evaluation | Multiple transmitters: <input type="checkbox"/> Yes <input type="checkbox"/> No Evaluated against exposure limits: <input type="checkbox"/> General Public Use <input type="checkbox"/> Controlled Use Duty cycle used in evaluation: N/A % Separation distance: N/A mm Standard used for evaluation: N/A SAR value: N/A W/kg <input type="checkbox"/> Measured <input type="checkbox"/> Computed <input type="checkbox"/> Calculated | |
| Nerve Stimulation Evaluation (SPR-002) | Evaluated against exposure limits: <input type="checkbox"/> General Public Use <input type="checkbox"/> Controlled Use Measurement distance: N/A m Field Strength: N/A <input type="checkbox"/> V/m (electric) <input type="checkbox"/> A/m (magnetic) <input type="checkbox"/> Measured <input type="checkbox"/> Computed <input type="checkbox"/> Calculated Exposure condition: <input type="checkbox"/> Whole body/Torso/Head <input type="checkbox"/> Leg <input type="checkbox"/> Arm <input type="checkbox"/> Hand/Foot | |
| RF exposure evaluation | Evaluated against exposure limits: <input checked="" type="checkbox"/> General Public Use <input type="checkbox"/> Controlled Use Duty cycle used in evaluation: 100 % Operational frequency: 2412 + 779.5 + 2480 MHz Standard used for evaluation: Safety Code 6 Measurement distance: 0.2 m RF value: 2.73 <input checked="" type="checkbox"/> W/m ² <input type="checkbox"/> V/m <input type="checkbox"/> A/m <input type="checkbox"/> Measured <input type="checkbox"/> Computed <input checked="" type="checkbox"/> Calculated | |

End of the test report