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|-----------------------------------|--|
| Project Num | 21E9185-3b |
| Quotation | Q21-1401-1 |
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| Test Lab Address | Clonross Lane, Derrockstown, Dunshaughlin, Co. Meath, Ireland |
| Tested By | Michael Kirby |
| Test Report By | Michael Kirby |
| FCC Test Firm Registration | 409640 |
| ISED CAB identifier: | IE0001 |
| Date | 6 th Sept 2021 |
| EUT Description | Asset Tracker |
| FCC ID | 2AT4VSKALLI1RM |
| IC ID | 26629-SKALLI1RM |
| Authorised by | Paul Reilly |
| Authorised Signature: |  |

RF Exposure Exhibit– Technical Report

1.0 Overview

Fixed / Mobile Application

MPE for bystanders which are considered to be ≥ 20 cm away from the front of the transmit antenna

2. Maximum Permissible Exposure FCC

2.1 Limits /guidelines

47 CFR Sections 1.1307, 1.1310, 2.1091

447498 D01 General RF Exposure Guidance v06

2.2 Results

where:

S = power density

P = power input to the antenna

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

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

Note the Radiated field strength was measured at 3 metres and the conversion formula below was used to determine the EIRP in dBm

$$EIRP (dBm) = E_{3m} (dBuV/m) - 95.2$$

2.2.1 Sigfox transmitter

| | | |
|---|---------|--------------------|
| Conducted Output Power | 21.17 | dBm |
| Antenna Gain | 3.86 | dBi |
| | | |
| Time Averaging Factor | 0 | dB |
| Tune up factor | 0 | dB |
| EIRP Peak | 25.03 | dBm |
| EIRP Peak | 318 | mW |
| | | |
| Prediction distance: | 20 | cm |
| Prediction frequency: | 903.388 | MHz |
| Power density at prediction frequency: | 0.063 | mW/cm ² |
| Power density at prediction frequency: | 0.633 | W/m ² |
| | | |
| MPE limit for Uncontrolled/General Population exposure at prediction frequency: | 0.600 | mW/cm ² |
| | | |
| Fraction of the limit (0.063/0.6) | 10.6 | % |
| Result => Exempt from RF Exposure evaluation | | |

2.2.2 BLE transmitter

| | | |
|---|-------|--------------------|
| Conducted Output Power | 6.38 | dBm |
| Antenna Gain | 0.9 | dBi |
| | | |
| Time Averaging Factor | 0 | dB |
| Tune up factor | 0 | dB |
| EIRP Peak | 7.28 | dBm |
| EIRP Peak | 5 | mW |
| | | |
| Prediction distance: | 20 | cm |
| Prediction frequency: | 2480 | MHz |
| Power density at prediction frequency: | 0.001 | mW/cm ² |
| Power density at prediction frequency: | 0.011 | W/m ² |
| | | |
| MPE limit for Uncontrolled/General Population exposure at prediction frequency: | 1.000 | mW/cm ² |
| | | |
| Fraction of the limit (0.001/1) | 0.1 | % |
| Result => Exempt from RF Exposure evaluation | | |

2.2.3 BLE and Sigfox co-locating

Combining the Sigfox and BLE results above

10.6% + 0.1% = 10.7%
Result less than limit of 100%

Result => Exempt from RF Exposure Evaluation

The tables and co-locating results above show that for a prediction distance of 20cm, RF exposure evaluation is not required.

3.0 Maximum Permissible Exposure IC

3.1 Limits /guidelines

Limits for Routine Evaluation — RF Exposure Evaluation
Limits as per RSS 102 Issue 5 Section 2.5.2

3.2 Results

where:

S = power density

P = power input to the antenna

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

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

Note the Radiated field strength was measured at 3 metres and
the conversion formula below was used to determine the EIRP in dBm

$$EIRP (dBm) = E_{3m} (dB\mu V/m) - 95.2$$

3.2.1 Sigfox transmitter

| | | |
|---|---------|-----|
| Prediction frequency: | 903.388 | MHz |
| Conducted power at the antenna port | 21.17 | dBm |
| Antenna Gain | 3.86 | dBi |
| EIRP Peak | 25.03 | dBm |
| Time Averaging Factor | 0.00 | dB |
| Tune up factor | 0 | dB |
| | | |
| EIRP Peak | 25.030 | dBm |
| EIRP Peak | 318.42 | mW |
| | | |
| MPE limit for Uncontrolled/General Population exposure at prediction frequency: | 1371.88 | mW |
| Prediction distance: | 20 | cm |
| | | |
| Fraction of the limit (318.42/1371.88) | 23.21 | % |
| Result => Exempt from RF Exposure Evaluation | | |

3.2.2 BLE transmitter

| | | |
|---|---------|-----|
| Prediction frequency: | 2480 | MHz |
| Conducted power at the antenna port | 6.38 | dBm |
| Antenna Gain | 0.9 | dBi |
| EIRP Peak | 7.28 | dBm |
| Time Averaging Factor | 0.00 | dB |
| Tune up factor | 0 | dB |
| | | |
| EIRP Peak | 7.280 | dBm |
| EIRP Peak | 5.35 | mW |
| | | |
| MPE limit for Uncontrolled/General Population exposure at prediction frequency: | 2735.52 | mW |
| Prediction distance: | 20 | cm |
| | | |
| Fraction of the limit (5.35/2735.52) | 0.2 | % |
| Result => Exempt from RF Exposure Evaluation | | |

3.2.3 BLE and Sigfox co-locating

Combining the Sigfox and BLE results above

$$23.21\% + 0.2\% = 23.41\%$$

Result less than limit of 100%

Result => Exempt from RF Exposure Evaluation

Note the tables and co-locating results above show that for a prediction distance of 20cm, RF exposure evaluation is not required.

End of Report