

RF Exposure

TAGBS0203

FCC ID: 2ACLYTAGBS0203



TSB Real Time Location Systems S.L.

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1. Summary

This document describes the RF Exposure Analysis for the TAGBS0203, FCC ID: 2ACLYTAGBS0203.

2. Analysis for FCC standalone SAR evaluation

2.1. Standard applicable

In order to determine whether a SAR evaluation shall be addressed, the output power is compared to FCC SAR evaluation exemption level, according to KDB 447498 D01 General RF Exposure Guidance v05r02, section 4.3.1.

4.3.1. Standalone SAR test exclusion considerations

Unless specifically required by the published RF exposure KDB procedures, standalone 1-g head or body and 10-g extremity SAR evaluation for general population exposure conditions, by measurement or numerical simulation, is not required when the corresponding SAR Test Exclusion Threshold condition, listed below, is satisfied. These test exclusion conditions are based on source-based time-averaged maximum conducted output power of the RF channel requiring evaluation, adjusted for tune-up tolerance, and the minimum test separation distance required for the exposure conditions.²³ The minimum test separation distance is determined by the smallest distance from the antenna and radiating structures or outer surface of the device, according to the host form factor, exposure conditions and platform requirements, to any part of the body or extremity of a user or bystander (see 5) of section 4.1). To qualify for SAR test exclusion, the test separation distances applied must be fully explained and justified by the operating configurations and exposure conditions of the transmitter and applicable host platform requirements, typically in the SAR measurement or SAR analysis report, according to the required published RF exposure KDB procedures. When no other RF exposure testing or reporting is required, a statement of justification and compliance must be included in the equipment approval, in lieu of the SAR report, to qualify for the SAR test exclusion. When required, the device specific conditions described in the other published RF exposure KDB procedures must be satisfied before applying these SAR test exclusion provisions; for example, handheld PTT two-way radios, handsets, laptops & tablets etc.²⁴

- 1) The 1-g and 10-g SAR test exclusion thresholds for 100 MHz to 6 GHz at test separation distances ≤ 50 mm are determined by:

$$[(\text{max. power of channel, including tune-up tolerance, mW}) / (\text{min. test separation distance, mm})] \cdot [1/f(\text{GHz})] \leq 3.0 \text{ for 1-g SAR and } \leq 7.5 \text{ for 10-g extremity SAR, where}$$

- $f(\text{GHz})$ is the RF channel transmit frequency in GHz
- Power and distance are rounded to the nearest mW and mm before calculation
- The result is rounded to one decimal place for comparison

The test exclusions are applicable only when the minimum test separation distance is ≤ 50 mm and for transmission frequencies between 100 MHz and 6 GHz. When the minimum test separation distance is < 5 mm, a distance of 5 mm according to 5) in section 4.1 is applied to determine SAR test exclusion.

- 2) At 100 MHz to 6 GHz and for test separation distances > 50 mm, the SAR test exclusion threshold is determined according to the following, and as illustrated in Appendix B:

[(Power allowed at numeric threshold for 50 mm in step 1) + (test separation distance - 50 mm) \cdot 10] mW at > 1500 MHz and ≤ 6 GHz

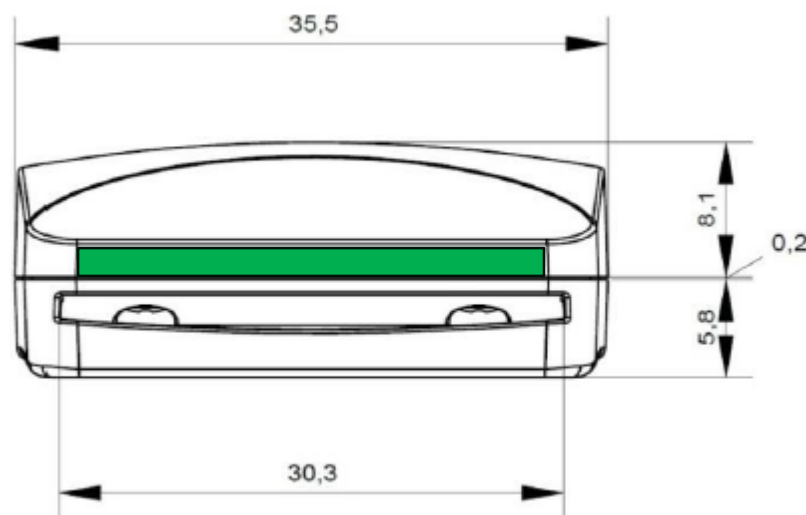
2.2. Calculations

The TAGBS0203 is a portable device designed to be wrist worn by a person, but it can also be attached to a necklace and wear it over the chest. Therefore, the SAR exposure limit to apply is 3.0 at 1-g SAR, which is more restrictive than the limit at 10-g extremity SAR. It works with Bluetooth Low Energy technology in the 2.4 GHz band. The theoretical (worst case) maximum conducted power is 0dBm + 1dB tune-up tolerance corresponding to 1.3 mW. Inside the case, the PCB antenna is located as shown in the figure below (the green rectangle corresponds to the PCB). The distance from the antenna to the user body is 5 mm. The formula is as follows:

$$\frac{\text{Conducted Power (mW)} * \sqrt{f(\text{GHz})}}{\text{distance (mm)}}$$

Applying the above data to the formula, the following result for assessment against the 5mm minimum distance is achieved:

Result rounded to 0.4 for comparison.



2.3. Conclusion

The resultant value of 0.4 is < 3.0 limit 1-g SAR meaning that RF exposure exemption is applicable in the use of this product.