MPE Calculation / RF Exposure

Product: UWB Tag
Applicant: Geoplan Co., Ltd.
Model: TR100
Address: 622, Geumjeong SKV1, 142, LS-ro, Dongan-gu, Anyang-si, Gyeonggi-do, South Korea
FCC ID: 2ASPN-TR100

� BLE

Per KDB 447498 D01 General RF Exposure Guidance v06 (10/23/2015) section 4.3.1 (a)

Standalone SAR test exclusion threshold is applied;

a) For 100 MHz to 6 GHz and test separation distances ≤ 50 mm, the 1-g and 10-g SAR test exclusion thresholds are determined by the following:

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

- where f(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 values 3.0 and 7.5 are referred to as numeric thresholds in step b) below

Freq: BLE / 2 402 MHz

Tune-up max. power : -7.31 dBm (0.186 mW)

Min. Test separation distance : 5 mm

SAR exclusion threshold: [0.186/5] x [$\sqrt{2.402}$] = 0.058 (=0.1, is rouned to one decimal place)

* Tune-up tolerance : -7 dBm +/- 1.0 dB

Therefore, the EUT was not evaluated as the value of SAR exclusion threshold was less than 3 per KDB 447498 D01 v06 section 4.3.1(a)

◼ UWB

RF Exposure for devices that operate above 6 GHz (1.1310):

2.1093 (d): Portable devices that transmit at frequencies above 6 GHz are to be evaluated in terms of the MPE limits specified 47 CFR 1.1310. Measurements and calculations to demonstrate compliance with MPE Field strength or power density limits for device operating above 6 GHz should be made at a minimum distance of 5 cm from the radiating source.

Limits for General Population/Uncontrolled Exposure

Frequency Range (MHz)	Electric Field Strength (V/m)	Magnetic Field Strength (A/m)	Power Density (mW/cm^2)	Averaging Time (minutes)
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
1500-100,000	/	/	1.0	30

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

Result

Calculated Formulary:

Predication of MPE limit at a given distance

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

S = power density (in appropriate units, e.g. mW/cm^2)
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)

Frequency (GHz)	Tune up EIRP		Evaluation Distance (cm)	Power Density (mW/cm^2)	MPE Limit (mW/cm^2)
	(dBm)	(mW)			
7.800	-16.0	0.025	5	0.000 08	1

Results: Compliant

UWB and BLE radios do not operate simultaneously.