RF Exposure – FCC

The device is intended for use on extremities (wrists) and the minimum separation distance from the radiating structure to any part of the body or extremity of a user is 7mm as stated by the manufacturer during normal operation.

General SAR test exclusion guidance:

As per FCC KDB 447498 Section 4.3.1 1), the 10-g extremity SAR Test Exclusion Threshold for 100 MHz to 6 GHz at test separation distances ≤ 50 mm is determined by:

[(max. power of channel, including tune-up tolerance, mW)/(min. test separation distance, mm)] [$\sqrt{f_{(GHz)}}$] ≤ 7.5

Where:
$f_{(GHz)}$ is the RF channel transmit frequency in GHz = 2.480GHz
(max. power of channel, including tune-up tolerance, mW) = 0.476 mW
(min. test separation distance, mm) = 7 mm

Peak conducted power was measured to be 0.476mW. Therefore,

[0.476 mW / 7 mm]*[$\sqrt{2.480}$ GHz] = 0.11 ≤ 7.5

SAR Exclusion Threshold condition is met with peak conducted power.

Radiofrequency Radiation Exposure Evaluation: Portable Devices

Portable devices shall be evaluated for RF radiation exposure according to the provisions of FCC §2.1093 and the MPE guidelines identified in FCC §1.1310.

As per FCC §1.1310 Table 1(B), the limit for Maximum Permissible Exposure (MPE) to radiofrequency electromagnetic fields in the frequency range of 1.5GHz to 100GHz for General Population/Uncontrolled Exposure is 1.0 mW/cm^2.

The power density formula is given by:
$P_d = EIRP / (4*pi*R^2)$

Where,
EIRP = Equivalent Isotropic Radiated Power in mW
Pi = 3.1416
R = Separation distance in cm = 0.7cm

EIRP = Highest received peak signal measured under the Radiated Emission results (94.8dB(uV/m)) – Free Space Impedance at 3m, 95.2.
Since the 99% bandwidth is greater than the measurement bandwidth, an adjustment factor of 20log(99% BW/Measurement BW) was used.

EIRP = 94.8 – 95.2 + 20log(1.1/1) = 0.4dBm or 1.096mW.
$P_d = (1.096mW) / (4 * 3.1416 * (0.7cm)^2)$
$P_d = 1.096mW / 6.158\ cm^2$
$P_d = 0.178\ mW/cm^2$

The device passes the requirement. The calculated power density is $0.178mW/cm^2$ and this is below the 1.0 mW/cm^2 limit.