



4.8	RF Exposure Evaluation	
Reference Standard(s):	☐ KDB 447498 RF Exposure Guidance v06 ☒ KDB 447498 Interim RF Exposure Guidance v01 ☒ RSS 102, Issue 6	☒ MPE ☐ SAR Evaluation ☒ SAR Test Exclusion
Frequency Range(s):	☒ 2402-2480.0MHz (DTS) ☒ 6489.6 MHz (UWB)	
Antenna Separation Distance:	>40mm	
RF Exposure Conditions:	Portable (Body-worn)	
BFE and IPT Antennas Gain:	4.0dBi	
PASS Alarm BLE output power:	99.3mW(19.97dBm)* 0.094 (worst case duty cycle) = 9.3mW(9.7dBm)	
PASS Alarm BLE EIRP/ERP output power:	EIRP=9.7dBm + 4dBi=13.7dBm, ERP=13.7dBm - 2.15dB=11.55dBm(14.3mW)	
AoA Beacon BLE the source-based conducted output power:	104.7mW(20.2dBm)*0.1(worst case duty cycle) =10.5mW(10.2dBm)	
AoA Beacon BLE EIRP/ERP output power:	EIRP=10.2dBm + 4.0dBi=14.2dBm, ERP=14.2dBm - 2.15dB= 12.05dBm(16mW)	
The estimated 1-g SAR Value of AoA Beacon BLE transmitter:	[(max. power of channel, including tune-up tolerance, mW) / (min. test separation distance, mm)]:[√f(GHz)/x] W/kg, for test separation distances ≤ 50 mm; where x = 7.5 for 1-g SAR (16mW/40mm)*(√2.4/7.5) = (0.4)*(1.55/7.5) = 0.08W/Kg	
NDT BLE the source-based conducted output power:	4.2mW(6.2dBm)*0.8(worst case duty cycle) =3.4mW(5.3dBm)	
NDT BLE EIRP/ERP output power:	EIRP=5.3dBm + 4.0dBi=9.3dBm, ERP=9.3dBm - 2.15dB=7.15dBm(5.2mW)	
Body-Are-Network BLE the source-based conducted output power:	1.3mW(1.1dBm)*0.8(worst case duty cycle) =1.04mW(0.17dBm)	
Body-Are-Network BLE EIRP/ERP output power:	EIRP=0.17dBm + 4.0dBi=4.17dBm, ERP=4.17dBm - 2.15dB= 2.02dBm(1.6mW)	
UWB EIPR power:	48dBuV(-49.4 dBm/MHz) = 0.00002(mW/MHz). 99% OBW = 533MHz 0.00002(mW/MHz) x 533MHz = 0.01mW <1mW (meets 1mW test exemption)	
The estimated 1-g SAR Value of UWB transmitter:	(0.01mW/40mm)*(√6.5/7.5) =0.00008W/Kg	
The sum of ratios (1-g SAR value) for all simultaneously transmitting AoA BLE and UWB antennas incorporated in a radio:	(SAR value of AoA Transmitter/SAR limit) + (SAR value of UWB Transmitter/SAR limit) = (0.08/1.6) + (0.00008/1.6) = (0.05+0.00005)=0.05< 1	
The SAR Exclusion Threshold Level		
FCC Part 2.1093	143mW<40mm @2.45GHz	
FCC Part 1.1307	UWB Exempt from RF exposure SAR evaluation as its output power meets the 1mW test exemption threshold stated in Section 1.1307(b)(3)(i)(A).	
RSS 102, Issue 6	170mW<40mm @2.45GHz	
RSS 102, Issue 6	UWB Exempt from RF exposure SAR evaluation according to Section 6.5 if power is less than or equal to 1mW from 6GHz to 30GHz.	
Note:	Each BLE transmitter is connected to exactly one antenna at any given time. Any of four BLE transmitters cannot be connected to the same antenna at the same time or transmit simultaneously. The worst-case scenario UWB and AoA Beacon BLE transmission.	