



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):	☒ 902.58 - 927.42MHz ☒ 2402-2480.0MHz ☒ 13.56MHz	
Antenna Separation Distance LoRa/BT/RFID:	>100mm/40mm/40mm	
RF Exposure Conditions:	Portable (Body-worn)	
BT 2.4GHz Antenna Gain:	4.3dBi	
LoRa 900MHz Antenna Gain:	3.0dBi	
LoRa source-based output power:	41.7mW(16.2dBm)*0.85(worst case duty cycle)= 35.4mW(15.5dBm)	
LoRa EIRP/ERP output power:	EIRP=15.5dBm + 3.0dBi=18.5dBm, ERP=18.5dBm - 2.15dB=16.35dBm(43.2mW)	
The estimated 1-g SAR Value of LoRa transmitter:	[(max. power of channel, including tune-up tolerance, mW) / (min. test separation distance, mm)] * [sqrt(f(GHz)/x)] W/kg, for test separation distances ≤ 50 mm; where x = 7.5 for 1-g SAR (43.2mW/100mm)*(sqrt(0.92/7.5))=(0.43)*(0.96/7.5)=0.06W/Kg	
BLE the source-based output power:	0.6mW(-2.24dBm)*0.85(worst case duty cycle)=0.5mW(-3.0dBm)	
BLE EIRP/ERP output power:	EIRP=-3.0dBm + 4.3dBi=1.3dBm, ERP=1.3dBm - 2.15dB= -0.85dBm(0.82mW)	
The estimated 1-g SAR Value of the BLE transmitter:	[(max. power of channel, including tune-up tolerance, mW) / (min. test separation distance, mm)] * [sqrt(f(GHz)/x)] W/kg, for test separation distances ≤ 50 mm; where x = 7.5 for 1-g SAR (0.82mW/40mm)*(sqrt(2.45/7.5))=(0.02)*(1.57/7.5)<0.01 W/Kg	
RFID Maximum Output Power:	60dBuV(from the field strength)	
The estimated 1-g SAR Value of the RFID transmitter:	(0.00018mW/40mm)*(sqrt(0.01356/7.5)) <0.01W/Kg	
The sum of ratios (1-g SAR value) for all simultaneously transmitting BT and ISRD antennas incorporated in a radio:	(SAR value of BT EDR Transmitter/SAR limit) + (SAR value of ISRD Transmitter/SAR limit) + (SAR value of BT EDR Transmitter/SAR limit) = (0.06/1.6) + (0.01/1.6) + (0.01/1.6) = 0.06 < 1	
The SAR Exclusion Threshold Level		
FCC Part 2.1093	143mW/40mm @2.45GHz	
FCC Part 2.1093	666mW/100mm @900MHz	
RSS 102, Issue 6	170mW/40mm @2.45GHz	
RSS 102, Issue 6	>300mW/100mm @900MHz	

Note:

The device has three simultaneously transmitting antennas for LoRa, BLE and RFID.