RF EXPOSURE EVALUATION

EUT Specification

EUT	Bluetooth-LoRaWAN Gateway
Model Number	LW003-B
FCC ID	2AO94- LW003
Antenna gain (Max)	4.51dBi
Operation Frequency	2402-2480MHz, 915MHz
Input Rating	DC 3.7V
Standard	47 CFR Part 1.1307 47 CFR Part 1.1310 KDB447498D01 General RF Exposure Guidance v06
Modulation	BLE, LoRa

Limits

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: [(max. power of channel, including tune-up tolerance, mW)/(min. test separation distance, mm)] • [√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 calculation17 • 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 is applied to determine SAR test exclusion

According to KDB447498D01 General RF Exposure Guidance v06
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 Exclusion Threshold condition, listed below, is satisfied.

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Calculated Result and Limit

Operation Mode: GFSK, 8DPSK						
Channel	Maximum Peak Conducted Output Power (dBm)	Tune up tolerance (dBm)	Maximum tune-up Power		Calculated value	Exclusion threshold
			(dBm)	(mW)		
GFSK -Lowest (2402MHz)	4.01	4±1	5	3.16	0.98	3.0
GFSK -Middle (2440MHz)	3.77	3±1	4	2.51	0.78	
GFSK -Highest (2480MHz)	2.90	3±1	4	2.51	0.79	
Conclusion: the calculated value ≤3.0, SAR is exempted.						

The Maxinum power is less than the limit, complies with the exemption requirements, SAR is exempted.

For 915MHz SRD
Ant gain=2.0dBi
Ant numeric gain= 1.58
Field strength = 80.22dBuV/m@3m

$P = \{[10^{\left(\frac{80.22}{20}\right)}/10^6 * 3]^2/(30 * 1.58\} * 1000\text{mw} = 0.0199\text{mW}$

Pd= (30*0.003*1.58) / (377*20^2)=0.000000942<1

Remark: The Max Conducted Peak Output Power data refer to report Report No.:
90174-23-72-23-PP001 , 90174-23-72-23-PP002
BLE and LoRa can be launched simultaneously. Simultaneous evaluation of compliant RF exposur：0.98/3+0.000000942/1=0.327000942<1