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Maximum Permissible Exposure Evaluation

FCC ID: 2BM2K-M4P

IC: 33426-M4P

According to FCC 1.1310: The criteria listed in the following table shall be used to evaluate the environment impact of human exposure to radio frequency (RF) Radiation as specified in §1.1307(b)

EUT Specification

Product Name:	Wireless date transceiver				
Trade Mark:	/				
Model/Type reference:	M4 P				
Listed Model(s):	1				
Frequency Operating band:	LoRa: 902.50MHz~927.49MHz				
Device category:	 Portable (<5mm separation) Mobile (>20cm separation) Fixed (>20cm separation) Others 				
Exposure classification:	☐Occupational/Controlled exposure (S=5mW/cm2) ⊠General Population/Uncontrolled exposure (S=1mW/cm2)				
Antenna diversity:	Single antenna Multiple antennas □Tx diversity □Rx diversity □Tx/Rx diversity				
Antenna gain:	1.34dBi Max				
Evaluation applied:	⊠MPE Evaluation □SAR Evaluation				

Limits for Maximum Permissible Exposure (MPE)

Frequency Range (MHz)	Electric Field Strength(V/m)	Magnetic Field Strength(A/m)	Power Densitv(mW/cm ²)	Average Time					
(A) Limits for Occupational/Control Exposures									
300-1500			F/300	6					
1500-100000			5	6					
(B) Limits for General Population/Uncontrol Exposures									
300-1500			F/1500	30					
1500-100000			1	30					

F = frequency in MHz

Friis transmission formula: Pd=(Pout*G)\(4*Pi*R²) Where Pd= Power density in mW/cm² Pout= output power to antenna in mW G= gain of antenna in linear scale



Pi= 3.1416

R= distance between observation point and center of the radiator in cm

Pd the limit of MPE 1mW/cm². If we know the maximum gain of the antenna and total power input to the antenna, through the calculation, We will know the distance where the MPE limit is reached.

RF exposure evaluation Limits for IC

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Table 7: RF field strength and power density limits for devices used by the general public (uncontrolled environment)

Frequency range (MHz)	Electric field (V _{RMS} /m)	Magnetic field (A _{RMS} /m)	Power density (W/m²)	Reference period (minutes)
10-20	27.46	0.0728	2	6
20-48	58.07 / f ^{0.25}	0.1540 / f ^{0.25}	8.944 / f ^{0.5}	6
48-300	22.06	0.05852	1.291	6
300-6000	$3.142 f^{0.3417}$	$0.008335 f^{0.3417}$	$0.02619 f^{0.6834}$	6
6000-15000	61.4	0.163	10	6
15000-150000	61.4	0.163	10	$616000/f^{1.2}$
150000-300000	0.158 f ^{0.5}	$4.21 \times 10^{-4} f^{0.5}$	$6.67 \times 10^{-5} f$	616000/f ^{1.2}

Note: f is frequency in MHz.

FCC Measurement Result

Band	Frequency (MHz)	Antenna Gain (dBi)	Maximum Power (dBm)	Tune up tolerance (dBm)	Max. Tune up Power (dBm)	Power Density at 20cm (mW/cm²)	Limit (mW/cm²)	Verdict
LoRa	927.49	1.34	29.572	29±1	30	0.271	0.618	PASS

IC Measurement Result

Band	Frequency (MHz)	Antenna Gain (dBi)	Maximum Power (dBm)	Tune up tolerance (dBm)	Max. Tune up Power (dBm)	Power Density at 20cm (mW/cm²)	Limit (mW/cm²)	Limit (W/m²)	Verdict
LoRa	927.49	1.34	29.572	29±1	30	0.271	0.2793	2.793	PASS

Note:

For a more detailed features description, Please refer to the RF Test Report.

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