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Maximum Permissible Exposure Evaluation

FCC ID: 2BM2K-M4

IC: 33426-M4

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
Listed Model(s):	/
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 Density(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*R^2)$
Where
Pd= Power density in mW/cm^2
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/cm^2. 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

RSS-102 Issue 6 Section 6.6

Field reference level (FRL) exposure evaluation is required if the separation distance between the user and/or bystander and the device's radiating element is greater than 20 cm (i.e. mobile devices), except when the device operates as follows:

- below 20 MHz and the source-based, time-averaged maximum EIRP of the device is equal to or less than 1 W (adjusted for tune-up tolerance)
- at or above 20 MHz and below 48 MHz and the source-based, time-averaged maximum EIRP of the device is equal to or less than 4.49/f0.5 W (adjusted for tune-up tolerance), where f is in MHz
- at or above 48 MHz and below 300 MHz and the source-based, time-averaged maximum EIRP of the device is equal to or less than 0.6 W (adjusted for tune-up tolerance)
- at or above 300 MHz and below 6 GHz and the source-based, time-averaged maximum EIRP of the device is equal to or less than $1.31 \times 10^{-2} f^{0.6834} W$ (adjusted for tune-up tolerance), where f is in MHz
- at or above 6 GHz and the source-based, time-averaged maximum EIRP of the device is equal to or less than 5 W (adjusted for tune-up tolerance)

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/cm^2)	Limit (mW/cm^2)	Verdict
LoRa	902.50	1.34	20.98	21±1	22	0.0429	0.602	PASS

IC Measurement Result

Band	Frequency (MHz)	Antenna Gain (dBi)	Maximum Power (dBm)	EIRP (dBm)	Tune up tolerance (dBm)	Max. Tune up Power (dBm)	Field reference level (W)	Limit (W)	Verdict
LoRa	902.50	1.34	20.98	22.32	22±1	23	0.1995	1.37	PASS

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

**************************THE END**************************