RF EXPOSURE EVALUATION

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)

Limits for Maximum Permissible Exposure (MPE)

Frequency range (MHz)	Electric field strength (V/m)	Magnetic field strength (A/m)	Power density (mW/cm^2)	Averaging time (minutes)
(A) Limits for Occupational/Controlled Exposure				
0.3-3.0	614	1.63	*100	6
3.0-30	1842/f	4.89/f	$*900/f^2$	6
30-300	61.4	0.163	1.0	6
300-1,500			f/300	6
1,500-100,000			5	6
(B) Limits for General Population/Uncontrolled Exposure				
0.3-1.34	614	1.63	*100	30
1.34-30	824/f	2.19/f	$*180/f^2$	30
30-300	27.5	0.073	0.2	30
300-1,500			f/1500	30
1,500-100,000			1.0	30

f = frequency in MHz * = Plane-wave equivalent power density

MPE Calculation Method

E (V/m) = $\frac{\sqrt{30 * P * G}}{d}$ Power Density: *Pd* (W/m²) = $\frac{E^2}{377}$

E = Electric field (V/m)

P = Average RF output power (W)

G = EUT Antenna numeric gain (numeric)

d = Separation distance between radiator and human body (m)

The formula can be changed to

$Pd = \frac{30 * P * G}{377 * D^2}$

From the EUT RF output power, the minimum mobile separation distance, d=0.2m, as well as the gain of the used antenna, the RF power density can be obtained.

MAX OUTPUT POWER

DTS

Test Channel	Frequency (MHz)	Power Setting	Average Output Power (dBm)	LIMIT (dBm)	Verdict
64	903.0	Default	13.868	30	PASS
72	923.3	Default	13.297	30	PASS
79	927.5	Default	13.211	30	PASS

DSS

Test Channel	Frequency (MHz)	Power Setting	Peak Output Power (dBm)	LIMIT (dBm)	Verdict
1Mbps					
0	902.3	Default	20.87	30	PASS
31	908.5	Default	21.04	30	PASS
63	914.9	Default	20.97	30	PASS

Measurement Result

Operation Frequency: DTS: 903.0MHz~927.5MHz
DSS: 902.3 MHz~914.9MHz

Antenna Type	ANT1:Reverse SMA interface Rubber Bar antenna ANT2:Spring antenna

Power density limited: 0.602mW/ cm^2
Antenna gain: 2.15 dBi,
R=20cm

LORA:
DTS

Channel Freq. (MHz)	modulation	conducted power (dBm)	Tune-up power (dBm)	Max tune-up power (dBm)	Max tune-up power (mW)	Antenna Gain (dBi)	Antenna Gain Numeric	Evaluation result (mW/cm2)	Power density Limits (mW/cm2)
903.0	LORA）	13.868	13±1	14	25.119	2.15	1.64	0.0082	0.602
923.3		13.297	13±1	14	25.119	2.15	1.64	0.0082	0.616
927.5		13.211	13±1	14	25.119	2.15	1.64	0.0082	0.618

DSS

Channel Freq. (MHz)	modulation	conducted power (dBm)	Tune-up power (dBm)	Max tune-up power (dBm)	Max tune-up power (mW)	Antenna Gain (dBi)	Antenna Gain Numeric	Evaluation result (mW/cm2)	Power density Limits (mW/cm2)
902.3	LORA）	20.87	21±1	22	158.489	2.15	1.64	0.0517	0.602
908.5		21.04	21±1	22	158.489	2.15	1.64	0.0517	0.606
914.9		20.97	21±1	22	158.489	2.15	1.64	0.0517	0.610

Conclusion:
For the max result : 0.0517≤ 0.602 for Max Power Density, compliance RF exposure..

Signature: **Date:** 2019/9/30

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