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Maximum Permissible Exposure Evaluation

FCC ID: 2AITMSW-1082X

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:	Smart Pass Management Module
Trade Mark:	N/A
Model/Type reference:	SW-1082X
Listed Model(s):	N/A
Frequency band (Operating)	☐ BT: 2.402GHz ~ 2.480GHz ☐ BLE: 2.402GHz ~ 2.480GHz ☒ WLAN: 2.412GHz ~ 2.462GHz ☐ RLAN: 5.180GHz ~ 5.240GHz ☐ RLAN: 5.745GHz ~ 5.825GHz ☒ NFC: 13.56MHz
Device category	☐ Portable (<5mm separation) ☐ Mobile (>20cm separation) ☒ fixed (>20cm separation) ☐ Others
Exposure classification	☐ Occupational/Controlled exposure (S=5mW/cm ²) ☒ General Population/Uncontrolled exposure (S=1mW/cm ²)
Antenna diversity	☐ Single antenna ☒ Multiple antennas ☐ Tx diversity ☐ Rx diversity ☐ Tx/Rx diversity
Antenna gain (Max)	-1dBi
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	6
1500-100000	--	--	1	30

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Friis transmission formula: $P_d = (P_{out} * G) / (4 * \pi * R^2)$

Where

P_d = Power density in mW/cm^2

P_{out} = output power to antenna in mW

G = gain of antenna in linear scale

π = 3.1416

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

P_d 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.

Measurement Result

Type	Channel frequency (MHz)	Max. Measured Power (dBm)	Tune up tolerance (dBm)	Max. Tune up Power (dBm)	Antenna Gain (dBi)	Power density at 20cm (mW/cm^2)	Power density Limits (mW/cm^2)
802.11 b	2412	18.53	18±1	19	-1	0.01255	1
	2437	18.50	18±1	19	-1	0.01255	1
	2462	18.41	18±1	19	-1	0.01255	1
802.11g	2412	21.83	21±1	22	-1	0.02505	1
	2437	21.72	21±1	22	-1	0.02505	1
	2462	21.73	21±1	22	-1	0.02505	1
802.11n(HT20)	2412	20.96	20±1	21	-1	0.01989	1
	2437	20.92	20±1	21	-1	0.01989	1
	2462	20.98	20±1	21	-1	0.01989	1

13.56MHz: 56.32BuV/m@ 3m

@20cm=@3m+40*log^(3/0.02)=143.36dBuV/m

For 13.56MHz: 143.36dBuV/m=14.72V/m< 60.77V/m.

13.56MHz and WiFi modules can simultaneous transmitting, so the maximum rate of MPE is

$14.72/60.77+0.02505/1.0=0.267 \leq 1.0$. according to the KDB447498 section 7.2 determine the device is exclusion from SAR test.

Note

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

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

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