

RF EXPOSURE EVALUATION

EUT Specification

EUT	Color Changing Bluetooth Alarm Clock Speaker with Qi Wireless Charging and USB Charging
Model Number	iBTW281v2, iBTW281v2B, iBTW281v2X(X could be single or multiple digits by any alphabets denote different cabinet color)
FCC ID	EMOIBTW281V2C
Antenna gain (Max)	0 dBi
Operation Frequency	2402MHz-2480MHz
Input Rating	AC 120V/60Hz
Classification Per Stipulated Test Standard	§ 15.247(i), § 2.1091
Modulation	GFSK, pi/4-DQPSK , 8-DPSK
Max. output power	2.62 dBm(0.00183W)
Evaluation applied	☒ MPE Evaluation ☐ SAR Evaluation

Test Requirement:

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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)	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

1 Friis transmission formula: $P_d = \frac{P_{out} \cdot G}{4 \cdot \pi \cdot R^2}$

Where

P_d = Power density in mW/cm²

P_{out} = output power to antenna in mW

G = Numeric gain of the antenna relative to isotropic antenna

π = 3.1416

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

P_d 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.

2 Measurement Result

Antenna gain: 0 dBi

Mode	Frequency (MHz)	Output Power (dBm)	Target Power W/tolerance (dBm)	Max tune up power tolerance (dBm)	Max tune up power tolerance (mW)	Power Density at R=20cm (mW/cm ²)	Limit (mW/cm ²)	Verdict
GFSK	2402	-0.78	0±1	1	1.259	0.000250	1.0	PASS
	2441	-0.18	0±1	1	1.259	0.000250	1.0	PASS
	2480	0.11	0±1	1	1.259	0.000250	1.0	PASS
pi/4-DQPSK	2402	1.30	2±1	3	1.995	0.000397	1.0	PASS
	2441	1.86	2±1	3	1.995	0.000397	1.0	PASS
	2480	2.18	2±1	3	1.995	0.000397	1.0	PASS
8-DPSK	2402	1.73	2±1	3	1.995	0.000397	1.0	PASS
	2441	2.34	2±1	3	1.995	0.000397	1.0	PASS
	2480	2.62	2±1	3	1.995	0.000397	1.0	PASS

Signature:

A handwritten signature in black ink is positioned to the left of a circular purple stamp. The stamp features a stylized 'M' in the center, with the text 'EMTEK (HONGGUAN) CO., LTD.' around the top inner edge and 'TESTING' around the bottom inner edge. Two small asterisks are located on the left and right sides of the stamp.

Sam Lv

Date: 2021-08-20