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Maximum Permissible Exposure Evaluation

FCC ID: 2AK29-DS2012

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	Remote Smart Dimmer
Trade Mark	/
Model/Type reference	DS2012
Listed Model(s)	/
Model Difference	/
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
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 antenna ☐ Tx diversity ☐ Rx diversity ☐ Tx/Rx diversity
Antenna gain (Max)	2dBi
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: $P_d = (P_{out} \cdot G) / (4 \cdot \pi \cdot R^2)$

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

BLE							
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)
GFSK	2402	7.20	7±1	8	2	0.001655	1
	2440	7.29	7±1	8	2	0.001689	1
	2480	7.39	7±1	8	2	0.001729	1

BR/ EDR							
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)
GFSK	2402	7.45	7±1	8	2	0.001753	1
	2441	7.59	7±1	8	2	0.001810	1
	2480	7.65	7±1	8	2	0.001835	1
π /4-DQPSK	2402	6.04	6±1	7	2	0.001267	1
	2441	6.23	6±1	7	2	0.001324	1
	2480	6.42	6±1	7	2	0.001383	1
8-DPSK	2402	6.64	6±1	7	2	0.001455	1
	2441	6.62	6±1	7	2	0.001448	1
	2480	6.83	6±1	7	2	0.001520	1



WLAN							
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)
802.11b	2412	17.66	17±1	18	2	0.018397	1
	2437	17.43	17±1	18	2	0.017448	1
	2462	17.52	17±1	18	2	0.017813	1
802.11g	2412	18.54	18±1	19	2	0.022529	1
	2437	18.53	18±1	19	2	0.022477	1
	2462	19.43	19±1	20	2	0.027653	1
802.11n (HT20)	2412	18.03	18±1	19	2	0.020033	1
	2437	18.04	18±1	19	2	0.020079	1
	2462	18.80	18±1	19	2	0.023919	1
802.11n (HT40)	2422	17.30	17±1	18	2	0.016933	1
	2437	16.86	16±1	17	2	0.015302	1
	2452	17.03	17±1	18	2	0.015913	1

The WLAN or Bluetooth can transmit simultaneously.

WLAN Power density at 20cm (mW/cm ²)	Bluetooth Power density at 20cm (mW/cm ²)	Total Power density at 20cm (mW/cm ²)	Power density Limits (mW/cm ²)
0.027653	0.001835	0.029488	1

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

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