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Maximum Permissible Exposure Evaluation

FCC ID: 2AY37-S-13

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:	Car Bluetooth Player
Model/Type reference:	S-13
Listed Model(s):	S-09, S-09A, S-13, S-13A, S-16, S-16A
Frequency band (Operating)	☒BT: 2.402GHz ~ 2.480GHz ☒BLE: 2.402GHz ~ 2.480GHz ☐WLAN: 2.412GHz ~ 2.462GHz ☐RLAN: 5.150GHz ~ 5.250GHz ☐RLAN: 5.250GHz ~ 5.350GHz ☐RLAN: 5.470GHz ~ 5.725GHz ☐RLAN: 5.725GHz ~ 5.850GHz ☒FM: 88.1MHz ~ 107.9MHz ☐Others ___
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 antenna ☐Tx diversity ☐Rx diversity ☐Tx/Rx diversity
Antenna gain (Max)	BT: -0.58dBi FMT: 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

Friis transmission formula: $Pd=(Pout*G)\backslash(4*pi*R^2)$
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.

Measurement Result

BLE - Worst case						
Type	Channel Frequency (MHz)	Max. Measured Power (dBm)	Max. Tune up Power (dBm)	Antenna Gain (dBi)	Power density at 20cm (mW/cm^2)	Power density Limits (mW/cm^2)
GFSK	2402	2.10	2.50	-0.58	0.000310	1

EDR - Worst case						
Type	Channel Frequency (MHz)	Max. Measured Power (dBm)	Max. Tune up Power (dBm)	Antenna Gain (dBi)	Power density at 20cm (mW/cm^2)	Power density Limits (mW/cm^2)
π/4-DQPSK	2402	4.75	5.50	-0.58	0.000618	1

FMT - Worst case						
Type	Channel Frequency (MHz)	Max. Measured Power (dBm)	Max. Tune up Power (dBm)	Antenna Gain (dBi)	Power density at 20cm (mW/cm^2)	Power density Limits (mW/cm^2)
ASK	107.9	0.00	0.50	2	0.000354	1

The BT and FMT can transmit simultaneously.

Worst case					
Type	Frequency (MHz)	Antenna Gain (dBi)	Power density at 20cm (mW/cm^2)	BT+FMT Power density at 20cm (mW/cm^2)	Power density Limits (mW/cm^2)
π/4-DQPSK	2402	-0.58	0.000618	0.000972	1
ASK	107.9	2	0.000354		

Note:

1. Calculate by Worst-case mode.
2. Max. Tune Up Power by Manufacturer's Declaration, and Max. Tune Up Power is used to calculate.
3. For a more detailed features description, please refer to the RF Test Report.

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