

## FCC RF Exposure

EUT Description: Car MP3 FM Transmitter

Model Name: E01

Series Model: W1, W2, W3, W5, W6, W7, W8, W9, W10, W11, W12, W13, W15, W16, W17, W18, W19, W20, E02, E03, E05, E06, E07, E08, E09, E10, E11, E12, E13, E15, E16, E17, E18, E19, E20, E21, E22, E23, E25, E26, E27, E28, E29, E30, E31, E32

FCC ID: 2BDHR-SMR01

Equipment type: Stationary equipment

Test procedures according to the technical standards: KDB 447498 D01 V06 and FCC 2.1091.

### 1. Limits

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<br>(MHz)                                | Electric field<br>strength<br>(V/m) | Magnetic field strength<br>(A/m) | Power density<br>(mW/cm <sup>2</sup> ) | Averaging time<br>(minutes) |
|---------------------------------------------------------|-------------------------------------|----------------------------------|----------------------------------------|-----------------------------|
| (A) Limits for Occupational/Controlled Exposures        |                                     |                                  |                                        |                             |
| 0.3–3.0                                                 | 614                                 | 1.63                             | *(100)                                 | 6                           |
| 3.0–30                                                  | 1842/f                              | 4.89/f                           | *(900/f <sup>2</sup> )                 | 6                           |
| 30–300                                                  | 61.4                                | 0.163                            | 1.0                                    | 6                           |
| 300–1500                                                |                                     |                                  | f/300                                  | 6                           |
| 1500–100,000                                            |                                     |                                  | 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 <sup>2</sup> )                 | 30                          |
| 30–300                                                  | 27.5                                | 0.073                            | 0.2                                    | 30                          |
| 300–1500                                                |                                     |                                  | f/1500                                 | 30                          |
| 1500–100,000                                            |                                     |                                  | 1.0                                    | 30                          |

F = frequency in MHz

Formula:  $P_d = (P_{out} \cdot G) / (4 \cdot \pi \cdot r^2)$

Where :

$P_d$  = power density in mW/cm<sup>2</sup>,

$P_{out}$  = output power to antenna in mW;

G = gain of antenna in linear scale,

$\pi$  = 3.14;

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

$P_d$  is the limit of MPE, 1 mW/cm<sup>2</sup>. If we know the maximum gain of the antenna and the total power input to the antenna, through the calculation, we will know the distance r where the MPE

limit is reached.

## 2. Test Procedure

Software provided by client enabled the EUT to transmit and receive data at lowest, middle and highest channel individually.

## 3. Test Result of RF Exposure Evaluation

### BT

| Modulation | Channel Freq. (MHz) | Conduct ed power (dBm) | Max tune-up power (mW) | Antenna Gain (dBi) | Antenna gain numeric | Evaluation result (mW/cm <sup>2</sup> ) | Power density Limits (mW/cm <sup>2</sup> ) |
|------------|---------------------|------------------------|------------------------|--------------------|----------------------|-----------------------------------------|--------------------------------------------|
| GFSK       | 2402                | 4.25                   | 2.66                   | -0.68              | 0.855                | 0.000452687                             | 1                                          |
|            | 2441                | 4.38                   | 2.74                   | -0.68              | 0.855                | 0.000466359                             | 1                                          |
|            | 2480                | 4.12                   | 2.58                   | -0.68              | 0.855                | 0.000439072                             | 1                                          |

### FM

|        | Output power (dBm/ mW) | Antenna Gain(dBi) | Power Density at R=20cm (mW/cm <sup>2</sup> ) | Limit (mW/cm <sup>2</sup> ) | Result |
|--------|------------------------|-------------------|-----------------------------------------------|-----------------------------|--------|
|        | 54.91                  |                   |                                               |                             |        |
| 108MHz | -43.26/0.00004         | -0.68             | 0.000000008                                   | 0.2                         | Pass   |

Note:(1)  $EIRP = E_{Meas} + 20\log(d_{meas}) - 104.7$

$EIRP$  is the equivalent isotropically radiated power,

$E_{Meas}$  in dBm is the field strength of the emission at the measurement distance, in dB u V/m

$d_{Meas}$  is the measurement distance, in m

(2)  $Limit = \frac{180}{f^2}$

$$FM = 0.000000008 / 0.2 = 0.00000004$$

$$BT + FM(0.000466359 + 0.00000004) = 0.000466399$$

Conclusion: the max result :  $0.000466399 \leq 0.2$  compliance with FCC's RF Exposure.