

RF EXPOSURE EVALUATION

1. PRODUCT INFORMATION

Product Description	Bluetooth FM Transmitter
Model Name	HK209, HK401, HK401H, HK402, HK402H, HK402Q, HK403, HK403H, HK405, HK406, HK407, HK408, HK501, HK502, HK503, HK504, HK505, HK506, HK507, HK508, HK509, CCC-9090-BK
FCC ID	2AR6E-HK209

2. EVALUATION METHOD

According to 447498 D01 General RF Exposure Guidance v05

The 1-g and 10-g SAR test exclusion thresholds for 100 MHz to 6 GHz at test separation distances ≤ 50 mm are determined by:

$[(\text{max. power of channel, including tune-up tolerance, mW}) / (\text{min. test separation distance, mm})] \cdot [\sqrt{f(\text{GHz})}] \leq 3.0$ for 1-g SAR and ≤ 7.5 for 10-g extremity SAR.

Where $f(\text{GHz})$ is the RF channel transmit frequency in GHz

Power and distance are rounded to the nearest mW and mm before calculation

3. CALCULATION

$$P_t = -3.535\text{dBm} = 0.44\text{mW}$$

The value of the Maximum output power P_t is referred to the test report of the CFR47 §15.247.

The result for RF exposure evaluation $\text{SAR} = (0.44\text{mW} / 5\text{mm}) \cdot [\sqrt{2.441(\text{GHz})}] = 0.14 < 3.0$ for 1-g SAR and ≤ 7.5 for 10-g extremity SAR.

$$\S 15.239$$

$$\text{FM } P_t = -48.33\text{dBm} = 0.000015\text{mW}$$

The value of the Maximum output power P_t is referred to the test report of the CFR47 For frequencies below 100 MHz and test separation distances ≤ 50 mm, the power threshold determined by the following:

$$P_{\text{max}} = 0.5 * 474 * [1 + \log(100/f)] \text{ mW, where } f \text{ is MHz}$$

$$\text{For } 88.1\text{MHz}, P_{\text{max}} = 250\text{mW}. P_t < P_{\text{max}}.$$

$$\text{For } 107.9\text{MHz}, P = 3 * 5 / 0.1079^{0.5} = 45.7 \text{ mW}$$

$$P_{\text{max}} = 45.7\text{mW}. P_t < P_{\text{max}}.$$

Simultaneous transmission between Bluetooth and FM transmitter:

$[(\text{max. power of channel, including tune-up tolerance, mW}) / (\text{min. test separation distance, mm})] \cdot [\sqrt{f(\text{GHz})/x}] \text{ W/kg, for test separation distances } \leq 50 \text{ mm};$

where $x = 7.5$ for 1-g SAR and $x = 18.75$ for 10-g SAR.

$$\text{SAR} = (0.14 + 0.000015) / 7.5 = 0.019 \text{ W/kg} < 1.6 \text{ W/kg}$$

4. CONCLUSION

The SAR evaluation is not required.

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