

RF EXPOSURE EVALUATION

1. PRODUCT INFORMATION

Product Description	SW6+
Model Name	SW6+, SW620, SW621
FCC ID	WBQSW6PLUS

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

According to the follow transmitter output power (P_t) formula:

$$P_t = (E \times d)^2 / (30 \times g_t)$$

P_t =transmitter output power in watts

g_t =numeric gain of the transmitting antenna (unitless)

E =electric field strength in V/m

d =measurement distance in meters (m)

For BT

According to the formula described above:

$$E_{\text{max}} = \underline{94.75} \text{ dBuV/m} = \underline{0.055} \text{ V/m}, d = 3\text{m}, g_t = 1.58$$

$$P_t = (E \times d)^2 / (30 \times g_t) = (0.055 \times 3)^2 / (30 \times 1.58) = 0.00057436 \text{ W} = 0.57 \text{ mW}$$

The result is rounded to one decimal place for comparison

Worse case is as below: [2402MHz -0.57mW output power]

$$(0.57 \text{ mW} / 5\text{mm}) \cdot [\sqrt{2.402(\text{GHz})}] = \underline{0.18} < 3.0 \text{ for 1-g SAR}$$

For 433.4MHz

$$P_t = -23.61 \text{ dBm} = 0.0044 \text{ mW}$$

The result for RF exposure evaluation

$$\text{SAR} = (0.0044 \text{ mW} / 5\text{mm}) \cdot [\sqrt{0.4334(\text{GHz})}] = 0.00058 < 3.0 \text{ for 1-g SAR}$$

Simultaneous transmission between Bluetooth and 433MHz transmitter
[(max. power of channel, including tune-up tolerance, mW) / (min. test separation distance, mm)] • [√ f(GHz)/x] W/kg, for test separation distances ≤ 50 mm;
where x = 7.5 for 1-g SAR and x = 18.75 for 10-g SAR.

$$\text{SAR}=(0.18+0.00058)/7.5=0.024\text{W/kg}<1.6\text{W/kg}$$

4. CONCLUSION

The SAR evaluation is not required.