

RF Exposure evaluation

FCC ID: 2AANZVRBT

1. Reference

According to 447498 D01 General RF Exposure Guidance v06

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:

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

Where:

- f (GHz) is the RF channel transmit frequency in GHz
- Power and distance are rounded to the nearest mW and mm before calculation
- The result is rounded to one decimal place for comparison

and

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

Where:

p_t = transmitter output power in watts,

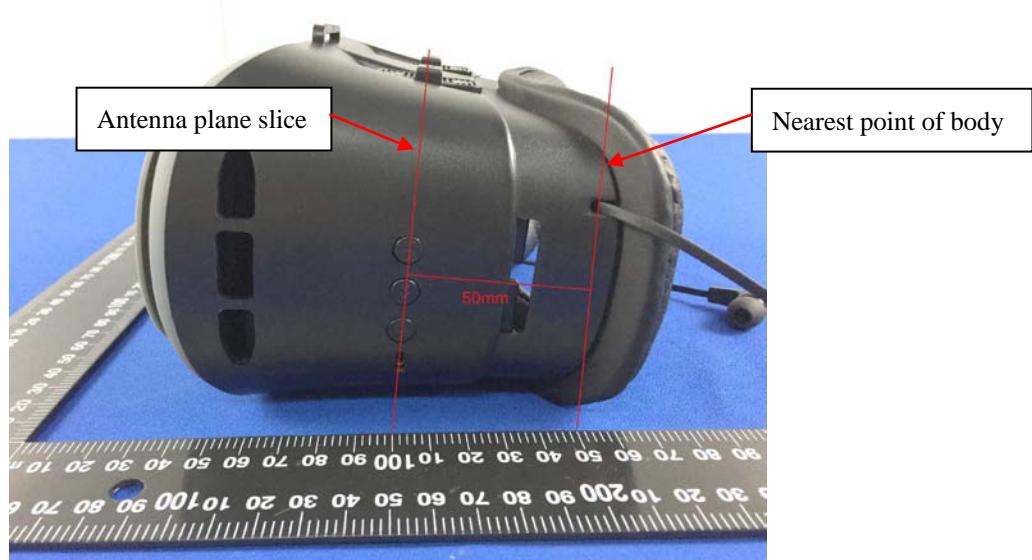
g_t = numeric gain of the transmitting antenna (unitless),

E = electric field strength in V/m, --- $10^{(\text{dBuV/m}/20)/10^6}$

d = measurement distance in meters (m) ---3m

2. Test distance

As the plot exhibit below, the distance of body to the Antenna plane is 50mm.



3. Result

As the antenna EUT used was 0dBi and the Max field strength level measured with duty cycle $\geq 98\%$ in EMI test report, the sar exclusion value can obtained.

According to the formula described above:

$$E_{max}=97.39 \text{ dBuV/m} = 0.0740 \text{ V/m}, d=3 \text{ m}, g_t=1$$

$$P_t = (E \times d)^2 / (30 \times g_t) = (0.0740 \times 3)^2 / (30 \times 1) = 0.001645 = 1.64 \text{ mW}$$

The value is within the tune up $2 \pm 1 \text{ dBm}$ stated by the manufacturer

Worse case is as below:

Frequency (MHz)	Field strength dBuV/m	TX Power (mw)	TX Power with tune-up (mw)	Separation Distance (mm)	calculated value	exclusion thresholds
2402	97.39	1.64	2.00	50	0.1	3

4. Conclusion

The SAR evaluation is not required.