

Maximum permissible emission (MPE) ver.1.0

As PTT Voice Responder has one *Bluetooth* Class 2 devices with maximum EIRP transmit power +4dBm (2.51mW), conducted maximum RF power +3.5dBm (2.24mW) due to antenna peak gain 0.5dBi.

1. European standard EN 50663 defines maximum power levels called P_{MAX} exclusion levels. The standard EN 50663 has defined a maximum low-power exclusion level to be 20 mW over the 10 MHz to 300 GHz frequency range for the general public exposure.

Thus, if a device has lower or equal power levels as exclusion level (20 mW), the device is considered as a low power equipment and deemed to comply with the basic restrictions.

$P_{MAX} = 2.51mW \leq 20mW$ limit, **Conclusion: No SAR test required**

2. Calculation from FCC document "RF Exposure Procedures and Equipment Authorization Policies For Mobile and Portable Devices" attached.

4.3. General SAR test reduction and exclusion guidance

4.3.1. Standalone SAR test exclusion considerations

- a) For 100 MHz to 6 GHz and test separation distances ≤ 50 mm, the 1-g and 10-g SAR test exclusion thresholds are determined by the following:

$[(\text{max. power of channel, including tune-up tolerance, mW})/(\text{min. test separation distance, mm})] \cdot [\sqrt{f(\text{GHz})}] \leq 3.0$ 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
- The result is rounded to one decimal place for comparison

The test exclusions are applicable only when the minimum *test separation distance* is ≤ 50 mm and for transmission frequencies between 100 MHz and 6 GHz. When the minimum *test separation distance* is < 5 mm, a distance of 5 mm according to 4.1 f) is applied to determine SAR test exclusion.

Calculation:

$[(\text{max. power of channel, including tune-up tolerance, mW})/(\text{min. test separation distance, mm})] \cdot [\sqrt{f(\text{GHz})}]$

Power = 2.51mW => rounded to 3mW

Distance = (if distance <5mm, use value 5mm) = 5mm

Frequency = 2.45GHz

$[(3\text{mW})/(5\text{mm})] \cdot [\sqrt{2.45\text{GHz}}] = 0.94 \leq 3.0$ (1g SAR limit) => **SAR test excluded for 1g SAR tests.**

$[(3\text{mW})/(5\text{mm})] \cdot [\sqrt{2.45\text{GHz}}] = 0.94 \leq 7.5$ (10g SAR limit) => **SAR test excluded for 10g SAR tests.**

3. Canada RSS-102

Table 1: SAR evaluation — Exemption limits for routine evaluation based on frequency and separation distance ^{4,5}					
Frequency (MHz)	Exemption Limits (mW)				
	At separation distance of ≤5 mm	At separation distance of 10 mm	At separation distance of 15 mm	At separation distance of 20 mm	At separation distance of 25 mm
≤300	71 mW	101 mW	132 mW	162 mW	193 mW
450	52 mW	70 mW	88 mW	106 mW	123 mW
835	17 mW	30 mW	42 mW	55 mW	67 mW
1900	7 mW	10 mW	18 mW	34 mW	60 mW
2450	4 mW	7 mW	15 mW	30 mW	52 mW
3500	2 mW	6 mW	16 mW	32 mW	55 mW
5800	1 mW	6 mW	15 mW	27 mW	41 mW

$P_{\text{MAX}} = 2.51\text{mW} \leq 4\text{mW}$ limit,

Conclusion: No SAR test required