

RF Exposure Evaluation

FCC ID: Y38TE5010

The device is excluded from SAR evaluation and therefore deemed compliant with FCC RF exposure requirements as described below:

FCC KDB 447498 D01 v05r02

Section 4.3.1

“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:

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

where

- $f(\text{GHz})$ 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*
- 3.0 and 7.5 are referred to as the numeric thresholds in the step 2 below*

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 5) in section 4.1 is applied to determine SAR test exclusion.”

The device has a maximum conducted output power of 1.735 mW at 2440 MHz. The EUT has an antenna gain of 0.5 dBi for a maximum EIRP of 1.945 mW. The closest spacing of the antenna to the user's extremity is less than 5mm per the description above as the product can be hand held while transmitting.

The table below shows the results of the calculation. The value of 0.607 is well below the exclusion threshold of 3.0, therefore the unit is excluded from SAR evaluation and deemed compliant with FCC RF exposure requirements.

Output Power (mW)	Test Separation (mm)	Transmit Frequency (GHz)	Exclusion Threshold	Specification
1.945	5	2.440	0.607	≤ 3.0

Simultaneous Transmission

A FCC certified WiFi module will be installed in the device, FCC ID: YOPGS1011MEPS. It can transmit simultaneously with the device. Compliance with RF exposure requirements is demonstrated as follows: First, the standalone SAR of the device is estimated and its ratio to the limit determined. This ratio is then summed with the MPE ratio of the WiFi module. It is deemed compliant when the sum of the ratios is less than or equal to one.

Section 7.2 of KDB 447498 addresses **"Transmitters used in mobile exposure conditions for simultaneous transmission operations"**:

"When one of the following test exclusion conditions is satisfied for all combinations of simultaneous transmission configurations, further equipment approval is not required to incorporate transmitter modules in host devices that operate in the mixed mobile and portable host platform exposure conditions. The grantee is responsible for documenting this according to Class I permissive change requirements. Antennas that qualify for standalone SAR test exclusion must apply the estimated standalone SAR to determine simultaneous transmission test exclusion.

- The $\sum$ of (the highest measured or estimated SAR for each standalone antenna configuration, adjusted for maximum tune-up tolerance) / 1.6 W/kg + $\sum$ of MPE ratios] is ≤ 1.0 .*
- The SAR to peak location separation ratios of all simultaneous transmitting antenna pairs operating in portable exposure conditions are all ≤ 0.04 and the $\sum$ of MPE ratios] is ≤ 1.0 . "*

Section 4.3.2 of KDB 447498 explains **how to estimate standalone SAR**:

""When the standalone SAR test exclusion of section 4.3.1 is applied to an antenna that transmits simultaneously with other antennas, the standalone SAR must be estimated according to the following to determine simultaneous transmission SAR test exclusion:

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

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

- 0.4 W/kg for 1-g SAR and 1.0 W/kg for 10-g SAR, when the test separation distances is > 50 mm. "*

Output Power (mW)	Test Separation (mm)	Transmit Frequency (GHz)	Estimated Standalone SAR (W/kg)	Ratio to Spec
1.945	5	2.440	0.0812	0.0507

The certified WiFi module, FCC ID: YOPGS1011MEPS, has a MPE ratio of 0.0136957. Summing this with the SAR ratio for the device (0.0507) equals 0.0644. Since this is less than 1.0, the simultaneous exclusion condition is satisfied and further equipment approval is not required to incorporate the WiFi module into the device.