



Copied from Test Report, 2019-108

10.0 MAXIMUM PERMISSIBLE EXPOSURE

10.1 Applicable Standards

FCC Part 2.1091, KDB 447498 D01 General RF Exposure Guidance v06
ISED RSS-102, Issue 5, Section 2.5

An intentional radiator shall be evaluated for radiofrequency radiation exposure to persons. This EUT is considered a mobile device in that it is intended to be used in other than fixed locations and to generally be used in such a way that a separation distance of at least 20 centimeters is normally maintained between the transmitter's radiating structure and the body of the user or nearby persons.

10.2 MPE Calculations

General SAR test exclusion guidance is given in KDB 447498 D01 General RF Exposure Guidance v06. It states that 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:

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

≤ 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 values 3.0 and 7.5 are referred to as numeric thresholds in step b) 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 4.1 f) is applied to determine SAR test exclusion.

Using this equation for determining the 1-g and 10-g SAR and using the worst-case peak power measurements of all the operating modes tested and the worst-case separation distance of 5.0 mm, the following was determined:



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10.2 MPE Calculations (continued)

FCC Part 2.1091, KDB 447498 D01 General RF Exposure Guidance v06

Operating Mode	Channel	Frequency (MHz)	EIRP (mW)	EIRP (dBm)	*Minimum Test Separation Distance (mm)	SAR Test Exclusion Calculation (mW)	1-g SAR Exclusion if ≤ 3.0	10-g SAR Exclusion if ≤ 7.5
WiFi b	Low, 1	2402.000	7.364127	8.67	5.00	2.17	EXCLUDED	EXCLUDED
WiFi g	Low, 1	2440.000	1.172523	0.69	5.00	0.31	EXCLUDED	EXCLUDED
WiFi n 20M	Low, 1	2480.000	1.324711	1.22	5.00	0.31	EXCLUDED	EXCLUDED
WiFi n 40M	Low, 3	2480.000	0.771119	-1.13	5.00	0.31	EXCLUDED	EXCLUDED
BLE	Low	2480.000	1.482932	1.71	5.00	0.31	EXCLUDED	EXCLUDED
WiFi b	Mid, 6	2437.000	5.849534	7.67	5.00	1.87	EXCLUDED	EXCLUDED
WiFi g	Mid, 6	2437.000	4.437325	6.47	5.00	1.25	EXCLUDED	EXCLUDED
WiFi n 20M	Mid, 6	2437.000	3.444461	5.37	5.00	0.94	EXCLUDED	EXCLUDED
WiFi n 40M	Mid, 6	2437.000	0.726309	-1.39	5.00	0.31	EXCLUDED	EXCLUDED
BLE	Mid	2440.000	0.869203	-0.61	5.00	0.31	EXCLUDED	EXCLUDED
WiFi b	High, 11	2462.000	5.213402	7.17	5.00	1.57	EXCLUDED	EXCLUDED
WiFi g	High, 11	2462.000	1.482932	1.71	5.00	0.31	EXCLUDED	EXCLUDED
WiFi n 20M	High, 11	2462.000	2.524185	4.02	5.00	0.94	EXCLUDED	EXCLUDED
WiFi n 40M	High, 9	2452.000	0.807460	-0.93	5.00	0.31	EXCLUDED	EXCLUDED
BLE	High	2480.000	0.711412	-1.48	5.00	0.31	EXCLUDED	EXCLUDED

*Used worst case separation distance of 5mm.

RSS-102, Issue 5, section 2.5

Operating Mode	Channel	Frequency (MHz)	EIRP (mW)	EIRP (dBm)	*Minimum Test Separation Distance (mm)	RSS-102, 2.5.1 Limit (mW)	RSS-102, 2.5.2 Calculation (W)	RSS-102, 2.5.1 Exclusion	RSS-102, 2.5.2 Exclusion	Excluded if 2.5.1 or 2.5.2 shows Exclusion
WiFi b	Low, 1	2402.000	7.364127	8.67	5.00	4.26	2.68	SAR REQUIRED	EXCLUDED	EXCLUDED
WiFi g	Low, 1	2440.000	1.172523	0.69	5.00	4.05	2.71	EXCLUDED	EXCLUDED	EXCLUDED
WiFi n 20M	Low, 1	2480.000	1.324711	1.22	5.00	3.94	2.74	EXCLUDED	EXCLUDED	EXCLUDED
WiFi n 40M	Low, 3	2480.000	0.771119	-1.13	5.00	3.94	2.74	EXCLUDED	EXCLUDED	EXCLUDED
BLE	Low	2480.000	1.482932	1.71	5.00	3.94	2.74	EXCLUDED	EXCLUDED	EXCLUDED
WiFi b	Mid, 6	2437.000	5.849534	7.67	5.00	4.07	2.70	SAR REQUIRED	EXCLUDED	EXCLUDED
WiFi g	Mid, 6	2437.000	4.437325	6.47	5.00	4.07	2.70	SAR REQUIRED	EXCLUDED	EXCLUDED
WiFi n 20M	Mid, 6	2437.000	3.444461	5.37	5.00	4.07	2.70	EXCLUDED	EXCLUDED	EXCLUDED
WiFi n 40M	Mid, 6	2437.000	0.726309	-1.39	5.00	4.07	2.70	EXCLUDED	EXCLUDED	EXCLUDED
BLE	Mid	2440.000	0.869203	-0.61	5.00	4.05	2.71	EXCLUDED	EXCLUDED	EXCLUDED
WiFi b	High, 11	2462.000	5.213402	7.17	5.00	3.98	2.72	SAR REQUIRED	EXCLUDED	EXCLUDED
WiFi g	High, 11	2462.000	1.482932	1.71	5.00	3.98	2.72	EXCLUDED	EXCLUDED	EXCLUDED
WiFi n 20M	High, 11	2462.000	2.524185	4.02	5.00	3.98	2.72	EXCLUDED	EXCLUDED	EXCLUDED
WiFi n 40M	High, 9	2452.000	0.807460	-0.93	5.00	4.00	2.71	EXCLUDED	EXCLUDED	EXCLUDED
BLE	High	2480.000	0.711412	-1.48	5.00	3.94	2.74	EXCLUDED	EXCLUDED	EXCLUDED

*Used worst case separation distance of 5mm.

10.3 MPE Conclusion

Since the worst-case peak power is below the SAR test exclusion power thresholds, the EUT is excluded from the SAR evaluation. All operating modes were checked, and all modes are excluded.