



Maximum Permissible Exposure

FCC Part 2 Sections §2.1091 and §2.1093

Test Requirement(s): §15.407(f): U-NII devices are subject to the radio frequency radiation exposure requirements specified in §1.1307(b), §2.1091 and §2.1093 of this chapter, as appropriate. All equipment shall be considered to operate in a “general population/uncontrolled” environment.

RF Exposure Requirements: §1.1307(b)(1) and §1.1307(b)(2): Systems operating under the provisions of this section shall be operated in a manner that ensures that the public is not exposed to radio frequency energy levels in excess of the Commission’s guidelines.

RF Radiation Exposure Limit: §1.1310: As specified in this section, the Maximum Permissible Exposure (MPE) Limit shall be used to evaluate the environmental impact of human exposure to radiofrequency (RF) radiation as specified in Sec. 1.1307(b), except in the case of portable devices which shall be evaluated according to the provisions of Sec. 2.1093 of this chapter.

MPE Limit: EUT’s operating frequencies @ Bluetooth 2402 – 2480; WiFi 2412 – 2462 MHz; UNII-1 5180 – 5240 MHz; UNII-2a 5260 – 5320 MHz; UNII-2c 5500 – 5720 MHz; UNII-3 5745 – 5825 MHz; UNII-5 5955 – 6415; UNII-6 6435 – 6515; UNII-7 6535 – 6885; UNII-8 6895 – 7115;

Limit for Uncontrolled exposure: 1 mW/cm² or 10 W/m²

Equation from page 18 of OET 65, Edition 97-01

$$S = PG / 4\pi R^2 \quad \text{or} \quad R = \sqrt{PG / 4\pi S}$$

where, S = Power Density (mW/cm²)

P = Power Input to antenna (mW)

G = Antenna Gain (numeric value)

R = Distance (cm)

Test Results:

FCC									
Frequency (MHz)	Con. Pwr. (dBm)	Con. Pwr. (mW)	Ant. Gain (dBi)	Ant. Gain numeric	Pwr. Density (mW/cm ²)	Limit (mW/cm ²)	Margin	Distance (cm)	Result
2402*	2.22	1.67	6	3.98	0.00	1.0	-1.0	30	Pass
2462*	28.14	631.63	4	2.51	0.14	1.0	-0.13	30	Pass
5240*	28.22	663.74	5	3.16	0.19	1.0	-0.81	30	Pass
5310	23.66	232.27	5	3.16	0.06	1.0	-0.94	30	Pass
5530	23.82	240.99	5	3.16	0.07	1.0	-0.93	30	Pass
5745	28.21	662.22	5	3.16	0.19	1.0	-0.81	30	Pass
6585*	21.92	155.60	8	6.31	0.09	1.0	-0.91	30	Pass
WCDMA	24.5	281.84	8.5	7.08	0.18	1.0	-0.82	30	Pass
LTE*	26.0	398.11	9.5	8.91	0.31	1.0	-0.69	30	Pass
5G NR	27.5	562.34	7.5	5.62	0.28	1.0	-0.72	30	Pass
*Simultaneous Transmission (Worse case):					0.73	1.0	-0.27	30	Pass

The safe distance for SWX-UDR5GM where Power Density is less than the MPE Limit listed above was found to be 30 cm. This device does not perform power tune-ups, therefore the maximum power is used for this analysis. All chains were measured and summed under the guidance of KDB 789033 Section II. E.2. and KDB 662911 D01.

Multiple RF Sources (Colocation)

FCC Part 2 Sections §2.1091 and §2.1093

RF Exposure Requirements: §1.1307(b)(3)(ii)(B) in the case of fixed RF sources operating in the same time-averaging period, or of multiple mobile or portable RF sources within a device operating in the same time averaging period, if the sum of the fractional contributions to the applicable thresholds is less than or equal to 1 as indicated in the following equation.

$$[Pd(1) / LPd(1)] + [Pd(2) / LPd(2)] + + [Pd(n) / LPd(n)] < 1,$$

Where;

Pd(n) = Power density of nth transmitter at 30cm

LPd(n) = Power density limit for the nth transmitter

Test Results:

FCC					
Transmitter Type / Frequency (MHz)	Pwr. Density (Pd) (mW/cm ²)	Limit (LPd) (mW/cm ²)	Pd / LPd (mW/cm ²)	Margin	Result
BLE / 2402*	0.00	1.0	0.00	-1.00	Pass
Wifi / 2462*	0.14	1.0	0.14	-0.86	Pass
Wifi / 5745	0.19	1.0	0.19	-0.81	Pass
Wifi / 6585*	0.09	1.0	0.09	-0.91	Pass
WWAN (LTE)*	0.31	1.0	0.31	-0.69	Pass
Total: [Pd(1) / LPd(1)] + [Pd(2) / LPd(2)] + + [Pd(n) / LPd(n)] < 1			0.73	-0.27	Pass

The device complies with FCC's RF radiation exposure limit for general population as a mobile device (d>30cm) under the collocation conditions described above.