

* RF Exposure

1. Regulation

According to §15.247(i), 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. See § 1.1307(b)(1) of this Chapter.

KDB447498 was used as the guidance.

According to §1.1310 and §2.1093 RF exposure is calculated.

1.1 Result

Mode	Test frequency (GHz)	Conducted output power (dBm)	Conducted output power (mW)	Min. test separation distance (mm)	SAR test exclusion thresholds ≤ 7.5 for 10-g SAR
WiFi	2 472	9.00	7.94	5.00	2.50
	5 825	1.00	1.26	5.00	0.61
Bluetooth Low Energy	2 480	8.00	6.31	5.00	1.99
Bluetooth_ Module 1	2 480	1.00	1.26	5.00	0.40
Bluetooth_ Module 2	2 480	3.00	2.00	5.00	0.63
Total	WiFi 2.4 GHz + Bluetooth_ Module 2				3.13
	WiFi 5.0 GHz + Bluetooth_ Module 2				1.24
	Bluetooth Low Energy + Bluetooth_ Module 2				2.62
	Bluetooth_ Module 1 + Bluetooth_ Module 2				1.02

1. SAR test exclusion thresholds

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

WiFi (2.4 GHz) = [(7.94)/(5)] · [$\sqrt{2.480}$] = 2.50

WiFi (5.0 GHz) = [(1.26)/(5)] · [$\sqrt{5.825}$] = 0.61

Bluetooth Low Energy = [(6.31)/(5)] · [$\sqrt{2.480}$] = 1.99

Bluetooth_ Module 1 = [(1.00)/(5)] · [$\sqrt{2.480}$] = 0.40

Bluetooth_ Module 2 = [(2.00)/(5)] · [$\sqrt{2.480}$] = 0.63

- WiFi 2.4 GHz

Mode	Target power [dBm]	Tolerance [dB]	Max tuneup power [dBm]	Average Power [dBm]
802.11b_Lowest	8.00	1.00	9.00	8.77
802.11b_Middle	8.00	1.00	9.00	8.63
802.11b_Highest	8.00	1.00	9.00	8.24
802.11g_Lowest	8.00	1.00	9.00	8.68
802.11g_Middle	8.00	1.00	9.00	8.13
802.11g_Highest	8.00	1.00	9.00	8.54
802.11n HT20_Lowest	8.00	1.00	9.00	8.66
802.11n HT20_Middle	8.00	1.00	9.00	8.28
802.11n HT20_Highest	8.00	1.00	9.00	8.45
802.11n HT40_Lowest	8.00	1.00	9.00	8.13
802.11n HT40_Middle	8.00	1.00	9.00	7.85
802.11n HT40_Highest	8.00	1.00	9.00	7.96

- WiFi 5.0 GHz

Mode	Target power [dBm]	Tolerance [dB]	Max tuneup power [dBm]	Average Power [dBm]
802.11ac VHT20_Lowest	-1.00	2.00	1.00	-0.29
802.11ac VHT20_Middle	-1.00	2.00	1.00	-0.10
802.11ac VHT20_Highest	-1.00	2.00	1.00	-0.61

- WiFi 5.8 GHz

Mode	Target power [dBm]	Tolerance [dB]	Max tuneup power [dBm]	Average Power [dBm]
802.11ac VHT20_Lowest	-1.50	2.00	0.50	-1.18
802.11ac VHT20_Middle	-1.50	2.00	0.50	-0.84
802.11ac VHT20_Highest	-1.50	2.00	0.50	0.41

- Bluetooth (Module 1)

Mode	Target power [dBm]	Tolerance [dB]	Max tuneup power [dBm]	Average Power [dBm]
GFSK-Lowest	0.00	1.00	1.00	0.27
GFSK-Middle	0.00	1.00	1.00	0.60
GFSK-Highest	0.00	1.00	1.00	0.77
π/4DQPSK-Lowest	-2.00	1.00	-1.00	-1.87
π/4DQPSK-Middle	-2.00	1.00	-1.00	-1.88
π/4DQPSK-Highest	-2.00	1.00	-1.00	-2.20
8DPSK-Lowest	-2.00	1.00	-1.00	-1.89
8DPSK-Middle	-2.00	1.00	-1.00	-1.90
8DPSK-Highest	-2.00	1.00	-1.00	-2.22

- Bluetooth (Module 2)

Mode	Target power [dBm]	Tolerance [dB]	Max tuneup power [dBm]	Average Power [dBm]
GFSK-Lowest	2.00	1.00	3.00	2.91
GFSK-Middle	2.00	1.00	3.00	2.07
GFSK-Highest	2.00	1.00	3.00	1.72
π/4DQPSK-Lowest	-3.00	1.00	-2.00	-2.27
π/4DQPSK-Middle	-3.00	1.00	-2.00	-3.37
π/4DQPSK-Highest	-3.00	1.00	-2.00	-3.87
8DPSK-Lowest	-3.00	1.00	-2.00	-2.28
8DPSK-Middle	-3.00	1.00	-2.00	-3.37
8DPSK-Highest	-3.00	1.00	-2.00	-3.89

- Bluetooth Low Energy

Mode	Target power [dBm]	Tolerance [dB]	Max tuneup power [dBm]	Average Power [dBm]
Bluetooth Low Energy_Lowest	7.00	1.00	8.00	7.63
Bluetooth Low Energy_Middle	7.00	1.00	8.00	7.76
Bluetooth Low Energy_Highest	7.00	1.00	8.00	7.52

1.2 RF Exposure Compliance Issue

Therefore, EUT is not required the SAR Evaluation.