

US Tech Test Report:  
 FCC ID:  
 IC:  
 Test Report Number:

FCC Part 15 Certification/ RSS 247  
 2AGBW9290029816X  
 20812-29816X  
 709502006714-00 &  
 709502124202-00  
 March 12, 2021  
 9290029816

Maximum Public Exposure to RF (MPE) CFR 15.247 (i), CFR 1.1310 (e) & RSS-102, 2.5.2

**709502006714-00 BLE Test Result:**

TestMode	Channel	Conducted Peak Output Power Result[dBm]	Limit[dBm]	Verdict
BLE_125K	2402	5.62	<=30	PASS
	2440	5.5	<=30	PASS
	2480	5.43	<=30	PASS
BLE_500K	2402	5.64	<=30	PASS
	2440	<b>6.17</b>	<=30	PASS
	2480	5.95	<=30	PASS
BLE_1M	2402	5.63	<=30	PASS
	2440	5.51	<=30	PASS
	2480	5.43	<=30	PASS
BLE_2M	2402	5.62	<=30	PASS
	2440	5.5	<=30	PASS
	2480	5.41	<=30	PASS

**709502124202-00 Zigbee Test Result:**

TestMode	Channel	Conducted Peak Output Power Result[dBm]	Limit[dBm]	Verdict
Zigbee	2405	<b>6.83</b>	<=30	PASS
	2440	6.7	<=30	PASS
	2480	6.64	<=30	PASS

BLE and Zigbee can't transmit simultaneously.

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:

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

Therefore, for:

Maximum Peak Power (dBm) = 6.83 dBm at Zigbee 2405MHz

Peak Power (Watts) = 0.00482 W

Maximum Gain of Transmit Antenna = 4.7 dBi = 2.9512, numeric

d = Distance = 15 mm

$$[(\text{max. power of channel, including tune-up tolerance, mW}) / (\text{min. test separation distance, mm})] \cdot [\sqrt{f(\text{GHz})}] \leq 3.0$$

Conducted Power + antenna gain = 11.53dBm = 14.22mW

Distance = 15 mm  
 f = 2.405 GHz  
 $[14.22/15] * \text{SQRT}(2.405) = 1.47$   
 $1.47 \leq 3.0$   
 Therefore, excluded from SAR testing.

### RSS-102 Limit and Guidelines on Exposure to Electromagnetic Fields

According to RSS-102 § (2.5.1), SAR evaluation is required if the separation distance between the user and/or bystander and the antenna and/or radiating element of the device is less than or equal to 20 cm, except when the device operates at or below the applicable output power level (adjusted for tune-up tolerance) for the specified separation distance defined in below Table:

**Table 1: SAR evaluation – Exemption limits for routine evaluation based on frequency and separation distance<sup>4,5</sup>**

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

Frequency (MHz)	Exemption Limits (mW)				
	At separation distance of 30 mm	At separation distance of 35 mm	At separation distance of 40 mm	At separation distance of 45 mm	At separation distance of ≥50 mm
≤300	223 mW	254 mW	284 mW	315 mW	345 mW
450	141 mW	159 mW	177 mW	195 mW	213 mW
835	80 mW	92 mW	105 mW	117 mW	130 mW
1900	99 mW	153 mW	225 mW	316 mW	431 mW
2450	83 mW	123 mW	173 mW	235 mW	309 mW
3500	86 mW	124 mW	170 mW	225 mW	290 mW
5800	56 mW	71 mW	85 mW	97 mW	106 mW

Output power level shall be the higher of the maximum conducted or equivalent isotropically radiated power (e.i.r.p.) source-based, time-averaged output power. For controlled use devices where the 8 W/kg for 1 gram of tissue applies, the exemption limits for routine evaluation are multiplied by a factor of 5. For limb-worn devices where the 10 gram value applies, the exemption limits for routine evaluation in Table 1 are multiplied by a factor of 2.5. If the operating frequency of the device is between two frequencies located in Table 1, linear interpolation shall be applied for the applicable separation distance. For test separation distance less than 5 mm, the exemption limits for a separation distance of 5 mm can be applied to determine if a routine evaluation is required.

**Calculation method**

**709502006714-00 BLE Test Result:**

TestMode	Channel	Conducted Peak Output Power Result[dBm]	Antenna Gain[dBi]	EIRP Power [dBm]	EIRP Power [mW]
BLE_125K	2402	5.62	4.7	10.32	10.76
	2440	5.5		10.2	10.47
	2480	5.43		10.13	10.30
BLE_500K	2402	5.64		10.34	10.81
	2440	<b>6.17</b>		<b>10.87</b>	<b>12.22</b>
	2480	5.95		10.65	11.61
BLE_1M	2402	5.63		10.33	10.79
	2440	5.51		10.21	10.50
	2480	5.43		10.13	10.30
BLE_2M	2402	5.62		10.32	10.76
	2440	5.5		10.2	10.47
	2480	5.41		10.11	10.26

**709502124202-00 Zigbee Test Result:**

TestMode	Channel	Conducted Peak Output Power Result[dBm]	Antenna Gain[dBi]	EIRP Power [dBm]	EIRP Power [mW]
Zigbee	2405	<b>6.83</b>	4.7	<b>11.53</b>	<b>14.22</b>
	2440	6.7		11.4	13.80
	2480	6.64		11.34	13.61

BLE and Zigbee can't transmit simultaneously.

Maximum EIRP of the EUT is 14.22mW (11.53dBm), and the specified separation distance defined by the client is at least 15mm. According to the above table 1, the output power level is less than 15mW meet Exemption from Routine Evaluation Limits – RF Exposure Evaluation, so SAR evaluation is not necessary.