

FCC ID:2BDNA-TNM9

Portable device

According to §15.247(e)(i) and §1.1307(b)(1), 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 level in excess of the Commission's guidelines.

According to KDB447498 D01 General RF Exposure Guidance V06

The 1-g SAR and 10-g SAR test exclusion thresholds for 100 MHz to 6 GHz at test separation distances ≤ 50 mm are determined by:

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

When the minimum test separation distance is < 5 mm, a distance of 5 mm is applied to determine SAR test exclusion.

BLE1M:

Modulation	Channel Freq. (GHz)	Conduct ed power (dBm)	Conducte d power (mW)	Tune-up power (dBm)	Max tune-up power (dBm)	Max tune-up power (mW)	Distance (mm)	Result calculatio n	SAR Exclusion threshold	SAR test exclusion
GFSK	2.402	0.428	1.10	0±1	1.00	1.26	<5	0.39023	3.00	YES
	2.441	1.905	1.55	1±1	2.00	1.58	<5	0.49524	3.00	YES
	2.480	2.728	1.87	2±1	3.00	2.00	<5	0.62843	3.00	YES

BLE2M:

Modulation	Channel Freq. (GHz)	Conduct ed power (dBm)	Conducte d power (mW)	Tune-up power (dBm)	Max tune-up power (dBm)	Max tune-up power (mW)	Distance (mm)	Result calculatio n	SAR Exclusion threshold	SAR test exclusion
GFSK	2.402	0.289	1.07	0±1	1.00	1.26	<5	0.39023	3.00	YES
	2.441	1.729	1.49	1±1	2.00	1.58	<5	0.49524	3.00	YES
	2.480	2.594	1.82	2±1	3.00	2.00	<5	0.62843	3.00	YES

2.4GWIFI:

Modulation	Channel Freq. (GHz)	Conduct ed power (dBm)	Conducte d power (mW)	Tune-up power (dBm)	Max tune-up power (dBm)	Max tune-up power (mW)	Distance (mm)	Result calculatio n	SAR Exclusion threshold	SAR test exclusion
802.11b	2.412	7.351	5.43	7±1	8.00	6.31	<5	1.95983	3.00	YES
	2.437	6.998	5.01	6±1	7.00	5.01	<5	1.56480	3.00	YES
	2.462	6.28	4.25	6±1	7.00	5.01	<5	1.57280	3.00	YES
802.11g	2.412	7.058	5.08	7±1	8.00	6.31	<5	1.95983	3.00	YES
	2.437	7.211	5.26	7±1	8.00	6.31	<5	1.96996	3.00	YES
	2.462	6.213	4.18	6±1	7.00	5.01	<5	1.57280	3.00	YES
802.11n(HT20)	2.412	6.989	5.00	6±1	7.00	5.01	<5	1.55675	3.00	YES
	2.437	7.111	5.14	7±1	8.00	6.31	<5	1.96996	3.00	YES
	2.462	6.181	4.15	6±1	7.00	5.01	<5	1.57280	3.00	YES
802.11n(HT40)	2.422	7.124	5.16	7±1	8.00	6.31	<5	1.96389	3.00	YES
	2.437	7.07	5.09	7±1	8.00	6.31	<5	1.96996	3.00	YES
	2.452	6.473	4.44	6±1	7.00	5.01	<5	1.56960	3.00	YES

LoRa:

Modulation	Channel Freq. (GHz)	Conduct ed power (dBm)	Conducte d power (mW)	Tune-up power (dBm)	Max tune-up power (dBm)	Max tune-up power (mW)	Distance (mm)	Result calculation	SAR Exclusion threshold	SAR test exclusion
LoRa/(G)FSK	0.915	-14.64	0.03	-14±1	-13.00	0.05	<5	0.00959	3.00	YES

Note:dbm=dbuv/m-95.2-2.15=81.08-95.2-2.15=-16.27dBm(ERP), so the conduct peak power=-16.27-(-1.63)=-14.64dBm

Conclusion:

For the max result : BLE+ LoRa+WIFI: Σ MPE Ratio =0.62843/3+0.00959/3+1.96996 /3=0.87≤
FCC Limit 3.0 for 1g SAR.