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:

[(max. power of channel, including tune-up tolerance, mW)/(min. test separation distance, mm)]·[√f(GHZ)] ≤ 3.0 for 1-g SAR and ≤ 7.5 for 10-g extremity SAR, where:

- f(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.

MPE Calculation Method

(ii) Limits for General Population/Uncontrolled Exposure

0.3–1.34	614	1.63	*(100)	<30
1.34–30	824/f	2.19/f	*(180/f²)	<30
30–300	27.5	0.073	0.2	<30
300–1,500			f/1500	<30
1,500–100,000			1.0	<30

f = frequency in MHz. * = Plane-wave equivalent power density.

$$E \text{ (V/m)} = \frac{\sqrt{30 * P * G}}{d} \qquad \text{Power Density: } Pd \text{ (W/m}^2\text{)} = \frac{E^2}{377}$$

E = Electric field (V/m)

P = Average RF output power (W)

G = EUT Antenna numeric gain (numeric)

d = Separation distance between radiator and human body (m)

The formula can be changed to

$$Pd = \frac{30 * P * G}{377 * D^2}$$

From the EUT RF output power, the minimum mobile separation distance, d=0.005m, as well as the gain of the used antenna, the RF power density can be obtained.

BLE:
Antenna Type: Metal Antenna   Antenna Gain: 1.05dBi

Modulation	Channel Freq. (GHz)	Conducted power (dBm)	Conducted 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
BLE(1M)	2.402	-3.96	0.402	-4±1	-3	0.50	<5	0.15535	3.00	YES
	2.440	-4.01	0.397	-4±1	-3	0.50	<5	0.15658	3.00	YES
	2.480	-3.97	0.401	-4±1	-3	0.50	<5	0.15785	3.00	YES
BLE(2M)	2.402	-3.9	0.407	-4±1	-3	0.50	<5	0.15535	3.00	YES
	2.440	-3.96	0.402	-4±1	-3	0.50	<5	0.15658	3.00	YES
	2.480	-3.92	0.406	-4±1	-3	0.50	<5	0.15785	3.00	YES

ANT:
Antenna Type: Metal Antenna   Antenna Gain: 1.05dBi

Modulation	Channel Freq. (GHz)	Conducted power (dBm)	Conducted 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
ANT+ 1M	2.457	-4.54	0.352	-4±1	-3	0.50	<5	0.15712	3.00	YES
ANT+ 2M	2.457	-4.51	0.354	-4±1	-3	0.50	<5	0.15712	3.00	YES

Radar
Antenna Type: Array Antenna   Antenna Gain: 12.64dBi

Transmit power

Frequency (GHz)	Max Output power (dBuV/m)	EIRP power (dBm)	Conducted power (dBm)
24.055	90.396	-4.864	-17.504
24.155	89.473	-5.787	-18.427
24.195	88.588	-6.672	-19.312

EIRP=E-104.8+20log(D)
Conducted power = EIRP-Antenna gain

Channel Freq. (MHz)	modulation	conducted power (dBm)	Tune-up power (dBm)	Max tune-up power		Antenna Gain		Evaluation result (mW/cm2)	Power density (mW/cm2)
				(dBm)	(mW)	(dBi)	Numeric		
24055	Radar	-17.504	-18±1	-17	0.020	12.64	18.37	0.116638	1
24155		-18.427	-18±1	-17	0.020	12.64	18.37	0.116638	1
24195		-19.312	-19±1	-18	0.016	12.64	18.37	0.092649	1

SIMULTANEOUS TRANSMISSIONS

When a number of sources at different frequencies, and/or broadband sources, contribute to the total exposure, it becomes necessary to weigh each contribution relative to the MPE. To comply with the MPE, the fraction of the MPE in terms of E^2, H^2 (or power density) incurred within each frequency interval should be determined and the sum of all such fractions should not exceed unity. In order to ensure compliance with the MPE for a controlled environment, the sum of the ratios of the power density to the corresponding

$$\sum_{i=1}^{n} \frac{S_i}{MPE_i} \leq 1$$

MPE should not exceed unity. That is

Max. SIMULTANEOUS TRANSMISSIONS for BLE+ Radar

Band	Result calculation	SAR Exclusion threshold	Calculation result	LImit	Conclusion
BLE	0.15785	3.00	0.16925	1.000	Pass
Radar	0.116638	1			

Note: This product does not support the requirements under BT/ANT+ transmission simultaneous

Conclusion:
For the max result : $0.16925 \leq 1$, No SAR is required.

Signature:

Date: 2023-09-12

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