

RF EXPOSURE EVALUATION

EUT Specification

FCC ID:	2A482-E00394
EUT	Power Bank
Model Name	E00394
Frequency band (Operating)	☐ WLAN: 2.412GHz ~ 2.462GHz ☐ WLAN: 5.18GHz ~ 5.32GHz / 5.50GHz ~ 5.70GHz ☐ WLAN: 5.745GHz ~ 5825GHz ☒ Others(110.5-148.5kHz, 360kHz, 13.56MHz)
Device category	☒ Portable (<20cm separation) ☐ Mobile (>20cm separation) ☐ Others ____
Antenna diversity	☐ Single antenna ☒ Multiple antennas ☐ Tx diversity ☐ Rx diversity ☐ Tx/Rx diversity
Max. output power	NFC: 69.50dBuV/m (-25.76dBm)(0.003342mW)
Evaluation applied	☒ MPE Evaluation ☒ SAR Evaluation

Standard Requirement

Portable Device

2.1093 Radiofrequency radiation exposure evaluation: portable devices.

According to §15.247(i) and §1.1307b(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 levels in excess of the Commission's guidelines. See KDB 447498 D01 General RF Exposure Guidance V6, section 4.3.1.

The 1-g 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,¹⁶ where

· $f(\text{GHz})$ is the RF channel transmit frequency in GHz

· Power and distance are rounded to the nearest mW and mm before calculation¹⁷

· The result is rounded to one decimal place for comparison

The test exclusions are applicable only when the minimum test separation distance is ≤ 50 mm and for transmission frequencies between 100 MHz and 6 GHz. When the minimum test separation distance is < 5 mm, a distance of 5 mm is applied to determine SAR test exclusion.

For frequencies below 100 MHz, the following may be considered for SAR test exclusion (also illustrated in Appendix C):

For test separation distances > 50 mm and < 200 mm, the power threshold at the corresponding test separation distance at 100 MHz in step b) is multiplied by $[1 + \log(100/f(\text{MHz}))]$

For test separation distances ≤ 50 mm, the power threshold determined by the equation in c) 1) for 50 mm and 100 MHz is multiplied by $\frac{1}{2}$

SAR measurement procedures are not established below 100 MHz.

Appendix C

SAR Test Exclusion Thresholds for < 100 MHz and < 200 mm

Approximate SAR test exclusion power thresholds at selected frequencies and test separation distances are illustrated in the following table. The equation and threshold in 4.3.1 must be applied to determine SAR test exclusion.

MHz	< 50	50	60	70	80	90	100	110	120	130	140	150	160	170	180	190	mm
100	237	474	481	487	494	501	507	514	521	527	534	541	547	554	561	567	mW
50	308	617	625	634	643	651	660	669	677	686	695	703	712	721	729	738	
10	474	948	961	975	988	1001	1015	1028	1041	1055	1068	1081	1095	1108	1121	1135	
1	711	1422	1442	1462	1482	1502	1522	1542	1562	1582	1602	1622	1642	1662	1682	1702	
0.1	948	1896	1923	1949	1976	2003	2029	2056	2083	2109	2136	2163	2189	2216	2243	2269	
0.05	1019	2039	2067	2096	2125	2153	2182	2211	2239	2268	2297	2325	2354	2383	2411	2440	
0.01	1185	2370	2403	2437	2470	2503	2537	2570	2603	2637	2670	2703	2737	2770	2803	2837	

Routine SAR evaluation refers to that specifically required by §2.1093, using measurements or computer simulation. When routine SAR evaluation is not required, portable transmitters with output power greater than the applicable low threshold require SAR evaluation to qualify for TCB approval.

Measurement Result

Channel Frequency (MHz)	Max Output power (dBm)	Max tune-up tolerance Output power (dBm)	Max Tune Up power (dBm)	Distance (mm)	Max Output power (mW)	Threshold Value (mW)
13.56	-25.76	-25.76 ±1	-24.76	5	0.003342	443

$$E = \text{EIRP} - 20 \log D + 104.8$$

where:

E = electric field strength in dBμV/m,

EIRP = equivalent isotropic radiated power in dBm

D = specified measurement distance in meters.

$$\text{EIRP} = E - 104.8 + 20 \log D = 69.50 - 104.8 + 20 \log 3 = -25.76 \text{ dBm}$$

Note:

$$P_{\text{limit}} = P_{100\text{MHz}, \leq 50\text{mm}} \times [1 + \log(100/f(\text{MHz}))]:$$

$$P_{100\text{MHz}, \leq 50\text{mm}} = 237 \text{ mW}, f = 13.56 \text{ MHz}, \log_{10}(100/13.56) \approx 0.8677$$

$$P_{\text{limit}} = 237 \times (1 + 0.8677) = 237 \times 1.8677 \approx 443 \text{ mW}$$

According to KDB 447498-D01 V6 Section 4.3.1, SAR measurement procedures are not established for frequencies below 100 MHz. The SAR-exclusion power threshold calculated for 13.56 MHz at 5 mm separation distance is 443 mW.

The Maximum simultaneous transmission MPE Ratios is WPT+NFC:

$$\text{WPT}_{\text{RF ratio/Limit}} + \text{NFC}_{\text{RF ratio/Limit}}$$

$$= 1.1597/1.63 + 0.003342/443$$

$$= 0.71148$$

$$< 1$$

The device's maximum tune-up-tolerance output power is far below this exclusion threshold, hence SAR measurement is not necessary.