

FCC MPE REPORT

Class II Permissive Change

Applicant Name:
Socket Mobile, Inc.

Address:
39700 Eureka Drive
Newark, CA, USA 94560

Date of Issue:
December 26, 2018

Location:
EMCE Engineering
1726 Ringwood Avenue San Jose, California USA
Report No.: EMCE-R-1812-F002

FCC ID:	LUBMA41
APPLICANT:	Socket Mobile

Model: S800, S840, S860

EUT Type: Barcode Scanner

The measurements shown in this report were made in accordance with the procedures specified in §2.947. I assume full responsibility for the accuracy and completeness of these measurements, and for the qualifications of all persons taking them.



Steve.In
Test Engineer
Certification Division



Billy Kim
Technical Manager
Certification Division

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Version

TEST REPORT NO.	DATE	DESCRIPTION
EMCE-RF-1812-F002	December 26, 2018	- First Approval Report

EXPOSURE EVALUATION OF PORTABLE DEVICE

The RF exposure from portable device (47 CFR §2.1091), as defined by FCC, must be evaluated with respect to FCC-adopted limits for SAR.

When no other RF exposure testing or reporting are required, a statement of justification and compliance must be included in the equipment approval, in lieu of the SAR report, to qualify for SAR test exclusion.

SAR Test Exclusion Thresholds for 100 MHz – 6 GHz and ≤ 50 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	5	10	15	20	25	mm
150	39	77	116	155	194	SAR Test Exclusion Threshold (mW)
300	27	55	82	110	137	
450	22	45	67	89	112	
835	16	33	49	66	82	
900	16	32	47	63	79	
1500	12	24	37	49	61	
1900	11	22	33	44	54	
2450	10	19	29	38	48	
3600	8	16	24	32	40	
5200	7	13	20	26	33	
5400	6	13	19	26	32	
5800	6	12	19	25	31	

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:

$$[(\text{max. power of channel, including tune-up tolerance, mW}) / (\text{min. test separation distance, mm})] \cdot [\sqrt{f(\text{GHz})}] \leq 3.0 \text{ for 1-g SAR, and } \leq 7.5 \text{ for 10-g extremity SAR.}$$

EVALUATION RESULTS

Modulation Mode	Freq.(MHz)	Max Power (dBm)	Ratd Power (dBm)	Ratd Power (mW)	Antenna Gain (dBm)
GFSK	2402	-7.133	4.000	2.512	0.36
	2440	-7.787	4.000	2.512	0.36
	2480	-8.473	4.000	2.512	0.36
8DPSK	2402	3.303	4.000	2.512	0.36
	2440	2.576	4.000	2.512	0.36
	2480	1.758	4.000	2.512	0.36
π/4DQPSK	2402	3.101	4.000	2.512	0.36
	2440	2.332	4.000	2.512	0.36
	2480	1.561	4.000	2.512	0.36

$[(\text{max. power of channel, including tune-up tolerance, mW}) / (\text{min. test separation distance, mm})] \cdot [\sqrt{f(\text{GHz})}] \leq 3.0$ for 1-g SAR = $(2.512/5) \cdot \sqrt{2.480} = 0.79$

SAR Test Exclusion Thresholds is < 10 mW and 3.0 for separation distance 5mm.
Therefore, SAR test is not required.

RF Exposure Statement

1. LIMITS

According to §1.1310 and §2.1091 RF exposure is calculated.

(B) Limits for General Population/Uncontrolled Exposures

Frequency range (MHz)	Electric field Strength (V/m)	Magnetic field Strength (A/m)	Power density (mW/cm ²)	Averaging time (minutes)
0.3 - 1.34.....	614	1.63	*(100)	30
1.34 - 30.....	824/f	2.19/f	*(180/ f ²)	30
30 - 300.....	27.5	0.073	0.2	30
300 - 1500.....	f/1500	30
1500 - 100.000.....	1.0	30

F = frequency in MHz

* = Plane-wave equivalent power density

2. MAXIMUM PERMISSIBLE EXPOSURE Prediction

Prediction of MPE limit at a given distance

$$S = PG/4\pi R^2$$

S = Power density

P = power input to antenna

G = power gain of the antenna in the direction of interest relative to an isotropic radiator

R = distance to the center of radiation of the antenna

3.RESULTS

Peak Max output Power at antenna input terminal(dBm)	4.00
Peak Max output Power at antenna input terminal(mW)	2.51
Prediction distance (cm)	0.5
Prediction frequency (MHz)	2440.00
Antenna Gain(peak) (dBi)	0.36
Antenna Gain(numeric)	1.086
Power density at prediction frequency (mW/cm ²)	0.868661
MPE limit for uncontrolled exposure at prediction frequency(mW/cm ²)	1.00000