

# Maximum Permissible Exposure Evaluation

## FCC ID: 2AM8GCHAMELEON5RV2

### 1. Client Information

<b>Applicant</b>	:	Guangzhou Lie Dun Electronics Technology CO., Ltd
<b>Address</b>	:	No.4 plant of No.43 South International Trade Avenue, Hualong Town, Panyu District, Guangzhou, Guangdong, China
<b>Manufacturer</b>	:	Guangzhou Lie Dun Electronics Technology CO., Ltd
<b>Address</b>	:	No.4 plant of No.43 South International Trade Avenue, Hualong Town, Panyu District, Guangzhou, Guangdong, China

### 2. General Description of EUT

<b>EUT Name</b>	:	RUGGEDIZED HAND-HELD DEVICE	
<b>Model(s) No.</b>	:	CHAMELEON 5R V2 DUAL, CHAMELEON 5R V2 SINGLE	
<b>Model Difference</b>	:	All these models are identical in the same PCB, layout and electrical circuit, the only difference is appearance size, finger print and antenna location.	
<b>Product Description</b>	:	Operation Frequency:	NFC: 13.56MHz
		Antenna Gain:	0dBi FPC Antenna
<b>Power Supply</b>	:	For adapter: (Model:MX15W-0502000UX) Input: AC 100V-240V, 50/60Hz 0.3A Output: DC 5V $\pm$ , 2000mA DC 3.85V by 7100mAh Li-ion battery	
<b>Software Version</b>	:	----	
<b>Hardware Version</b>	:	QH6601_MB_V1.1	
<b>Remark:</b> The antenna gain provided by the applicant, the adapter and verified for the RF conduction test and adapter provided by TOBY test lab.			

**Note:** More test information about the EUT please refer the RF Test Report.



**The RF Exposure Evaluation for FCC:**

**SAR Test Exclusion Calculations**

**FCC: According to 447498 D04 Interim General RF Exposure Guidance v01.**

The SAR-based exemption formula of § 1.1307(b)(3)(i)(B), repeated here as Formula (B.2), applies for single fixed, mobile, and portable RF sources with available maximum time-averaged power or effective radiated power (ERP), whichever is greater, of less than or equal to the threshold  $P_{th}$  (mW).

This method shall only be used at separation distances from 0.5 cm to 40 cm and at frequencies from 0.3 GHz to 6 GHz (inclusive).  $P_{th}$  is given by Formula (B.2).

$$P_{th} \text{ (mW)} = \begin{cases} ERP_{20 \text{ cm}} (d/20 \text{ cm})^x & d \leq 20 \text{ cm} \\ ERP_{20 \text{ cm}} & 20 \text{ cm} < d \leq 40 \text{ cm} \end{cases}$$

where

$$x = -\log_{10} \left( \frac{60}{ERP_{20 \text{ cm}} \sqrt{f}} \right)$$

and  $f$  is in GHz,  $d$  is the separation distance (cm), and  $ERP_{20 \text{ cm}}$  is per Formula (B.1). The example values shown in Table B.2 are for illustration only.

**Table B.2—Example Power Thresholds (mW)**

Frequency (MHz)	Distance (mm)									
	5	10	15	20	25	30	35	40	45	50
300	39	65	88	110	129	148	166	184	201	217
450	22	44	67	89	112	135	158	180	203	226
835	9	25	44	66	90	116	145	175	207	240
1900	3	12	26	44	66	92	122	157	195	236
2450	3	10	22	38	59	83	111	143	179	219
3600	2	8	18	32	49	71	96	125	158	195
5800	1	6	14	25	40	58	80	106	136	169





## Calculations

**1. Antenna Gain:**

NFC Antenna: 0dBi.

**2. EUT Operation Condition:**

Software provided by client enabled the EUT to transmit and receive data at lowest, middle and highest channel individually.

**3. Exposure Evaluation:**

Equation from page 18 of OET Bulletin 65, Edition 97-01

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

Where

**S:** power density

**P:** power input to the 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

**4. Test Result:**

$$E = EIRP - 20\log D + 104.8$$

where:

E = electric field strength in dB $\mu$ V/m,

EIRP = equivalent isotropic radiated power in dBm

D = specified measurement distance in meters.

$$EIRP=E-104.8+20\log D=51.93-104.8+20\log 3 = -43.33\text{dBm}$$

Frequency (MHz)	Measured Power (dBm)	Tune up Tolerance $\pm$ (dB)	Output power (Max. Turn-up Procedure) (mW)	Limit (mW)
13.56	-43.33	-43 $\pm$ 1	0.00006	39

Note: At separation distance of  $\leq$ 5 mm

**5. Conclusion:**

The measurement results comply with the FCC Limit per 47 CFR 2.1091 for the uncontrolled RF Exposure of mobile device.

-----END OF REPORT-----

