

RF Exposure Evaluation Report

Product : robosen flagship Optimus Prime
Trade mark : robosen
Model/Type reference : QTZ-40-T-01, QTZ-40-T-02, QTZ-40-T-03, QTZ-40-T-04
Test Model No. : QTZ-40-T-01
Serial Number : N/A
Report Number : EED32N80267302
FCC ID : 2ATNWOP40T
Date of Issue : Jun. 15, 2021
Test Standards : 47 CFR Part 1.1307
47 CFR Part 2.1093
KDB447498D01 General RF Exposure Guidance v06
Test result : PASS

Prepared for:

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1 Version

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3 General Information

3.1 Client Information

Applicant:	Robosen Robotics (ShenZhen) Co., Ltd.
Address of Applicant:	509, Building 6, Shenzhen Bay ECO-Tech Park, No. 6, Gaoxin South Science and Tech Rd, Nanshan Dist.t, Shenzhen
Manufacturer:	Robosen Robotics (ShenZhen) Co., Ltd.
Address of Manufacturer:	509, Building 6, Shenzhen Bay ECO-Tech Park, No. 6, Gaoxin South Science and Tech Rd, Nanshan Dist.t, Shenzhen
Factory:	Dongguan Wirear Electronic Limited
Address of Factory:	Changtang Industrial Park, Yantian Village, Fenggang Town, Dongguan City, Guangdong Province, P.R.China

3.2 General Description of EUT

Product Name:	robosen flagship Optimus Prime
Mode No.:	QTZ-40-T-01, QTZ-40-T-02, QTZ-40-T-03, QTZ-40-T-04
Test Mode No.:	QTZ-40-T-01
Trade Mark:	robosen
Bluetooth Version:	V5.0
Operation Frequency:	2402MHz~2480MHz
Modulation Type:	GFSK
Transfer Rate:	<input checked="" type="checkbox"/> 1Mbps <input type="checkbox"/> 2Mbps
Test Power Grade:	Default
Test Software of EUT:	Atmosic RF Tool
Antenna Type:	PCB antenna
Product Type:	<input type="checkbox"/> Mobile <input checked="" type="checkbox"/> Portable <input type="checkbox"/> Fix Location
Antenna Gain:	-0.8dBi
Power Supply:	Lithium battery: DC 11.1V, Charge by DC 12.6V
	1# Adapter: MODEL: GFD24-1262000U INPUT: 100-240V~50/60Hz 1.0A Max OUTPUT: 12.6V 2A
	2# Adapter: MODEL: ZL-030CL1262000US01 INPUT: 100-240V~50/60Hz 1.2A Max OUTPUT: 12.6V 2A
Sample Received Date:	Apr. 23, 2021
Sample tested Date:	Apr. 25, 2021 to May 13, 2021
Note:	<p>Model No.: QTZ-40-T-01, QTZ-40-T-02, QTZ-40-T-03, QTZ-40-T-04</p> <p>Only the model QTZ-40-T-01 was tested, since the electrical circuit design, layout, components used and internal wiring were identical for the above models, with difference being color of appearance and model name.</p> <p>Company Name and Address shown on Report, the sample(s) and sample Information was/ were provided by the applicant who should be responsible for the authenticity which CTI hasn't verified.</p>

3.3 Test Location

All tests were performed at:

Centre Testing International Group Co., Ltd

Building C, Hongwei Industrial Park Block 70, Bao'an District, Shenzhen, China

Telephone: +86 (0) 755 33683668 Fax:+86 (0) 755 33683385

No tests were sub-contracted.

FCC Designation No.: CN1164

3.4 Deviation from Standards

None.

3.5 Abnormalities from Standard Conditions

None.

3.6 Other Information Requested by the Customer

None.

4 SAR Evaluation

4.1 RF Exposure Compliance Requirement

4.1.1 Standard Requirement

According to KDB447498D01 General RF Exposure Guidance v06
Standalone SAR test exclusion considerations

Unless specifically required by the published RF exposure KDB procedures, standalone 1-g head or body and 10-g extremity SAR evaluation for general population exposure conditions, by measurement or numerical simulation, is not required when the corresponding SAR Exclusion Threshold condition, listed below, is satisfied.

Limits

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:

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

4.1.2 EUT RF Exposure

Measurement Data

GFSK mode				
Test channel	Peak Output Power (dBm)	Tune up tolerance (dBm)	Maximum tune-up Power	
			(dBm)	(mW)
Lowest(2402MHz)	2.49	2.0±1	3.0	1.995
Middle(2440MHz)	2.64	2.0±1	3.0	1.995
Highest(2480MHz)	2.89	2.0±1	3.0	1.995

Worst case: GFSK						
Channel	Maximum Peak Conducted Output Power (dBm)	Tune up tolerance (dBm)	Maximum tune- up Power		Calculated value	Exclusion threshold
			(dBm)	(mW)		
Lowest (2402MHz)	2.49	2.0±1	3.0	1.995	0.618	3.0
Middle (2440MHz)	2.64	2.0±1	3.0	1.995	0.623	
Highest (2480MHz)	2.89	2.0±1	3.0	1.995	0.628	

Conclusion: the calculated value ≤ 3.0 , SAR is exempted.

Remark: The Max Conducted Peak Output Power data refer to report Report No.: EED32N80267301.

PHOTOGRAPHS OF EUT Constructional Details

Refer to Report No. EED32N80267301 for EUT external and internal photos.

The test report is effective only with both signature and specialized stamp, The result(s) shown in this report refer only to the sample(s) tested. Without written approval of CTI, this report can't be reproduced except in full.

*** End of Report ***