RF Exposure Evaluation Report
KDB 447498 D01v06

Product Name　:　Electric Wheelchair (Robooter E40)

Model No.　　　:　BBR-E40-01

FCC ID　　　　:　2A7ORBBR-E40-01

Applicant　　　:　SHANGHAI BANGBANG ROBOTICS CO., LTD.

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1. General Information

1.1. EUT Description

Product Name	Electric Wheelchair (Robooter E40)
Brand Name	ROBOOTER
Model No.	BBR-E40-01
EUT Voltage	Adapter input: 100-240V AC/ 50-60Hz, 2.2A Max 　　　　　Output:29.4V, 3.0A, 88.2W Electric Wheelchair 24Vdc, 3A 3.3Vdc for Bluetooth module
Frequency Range	2402 ~ 2480 MHz
Channel Number	40
Type of Modulation	V4.0: GFSK
Data Rate	V4.0: 1Mbps, GFSK
Antenna Type	PCB
Peak Antenna Gain	0dBi

1.2. Working Frequency of Each Channel:

Bluetooth Low Energy Working Frequency of Each Channel:							
Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
00	2402 MHz	01	2404 MHz	02	2406 MHz	03	2408 MHz
04	2410 MHz	05	2412 MHz	06	2414 MHz	07	2416 MHz
08	2418 MHz	09	2420 MHz	10	2422 MHz	11	2424 MHz
12	2426 MHz	13	2428 MHz	14	2430 MHz	15	2432 MHz
16	2434 MHz	17	2436 MHz	18	2438 MHz	19	2440 MHz
20	2442 MHz	21	2444 MHz	22	2446 MHz	23	2448 MHz
24	2450 MHz	25	2452 MHz	26	2454 MHz	27	2456 MHz
28	2458 MHz	29	2460 MHz	30	2462 MHz	31	2464 MHz
32	2466 MHz	33	2468 MHz	34	2470 MHz	35	2472 MHz
36	2474 MHz	37	2476 MHz	38	2478 MHz	39	2480 MHz

1.3. Antenna information

Antenna Manufacturer							
Antenna Delivery	☒	1*TX+1*RX	☐	2*TX+2*RX	☐	3*TX+3*RX	
Antenna Technology	☒	SISO					
	☐	MIMO	☐	Basic			
			☐	Sectorized antenna systems			
			☐	Cross-polarized antennas			
			☐	Unequal antenna gains, with equal transmit powers			
			☐	Spatial Multiplexing			
			☐	CDD			
			☐	Beam-forming			
Antenna Type	☐	External	☐	Dipole			
	☒	Internal	☐	PIFA			
			☒	PCB			
			☐	Ceramic Chip Antenna			
			☐	Metal plate type F antenna			
			☐	Cross-polarize Antenna			
Antenna Gain	0dBi						

1.4. Mode of Operation by antenna

Antenna Technology	SISO
Test mode	ANT 1
1Mbps(GFSK) (BLE)	√

1.5. Power Setting

Test Software	nRFgo Studio_v5.3.2	
Antenna technology	SISO	
Test Mode	Test Frequency	Ant 1
1Mbps(GFSK) (BLE)	2402	N/A
	2442	N/A
	2480	N/A

1.6. Tested System Details

The types for all equipment, plus descriptions of all cables used in the tested system (including inserted cards) are:

No.	Product	Manufacturer	Model No.	Serial No.	Power Cord
1	Notebook	DELL	Vostro 3405	00342-36187-51618-AAOEM	Power by internal battery

1.7. Configuration of Tested System

Test setup Diagram- Radiated Emission

Chamber

1		EUT

USB controller
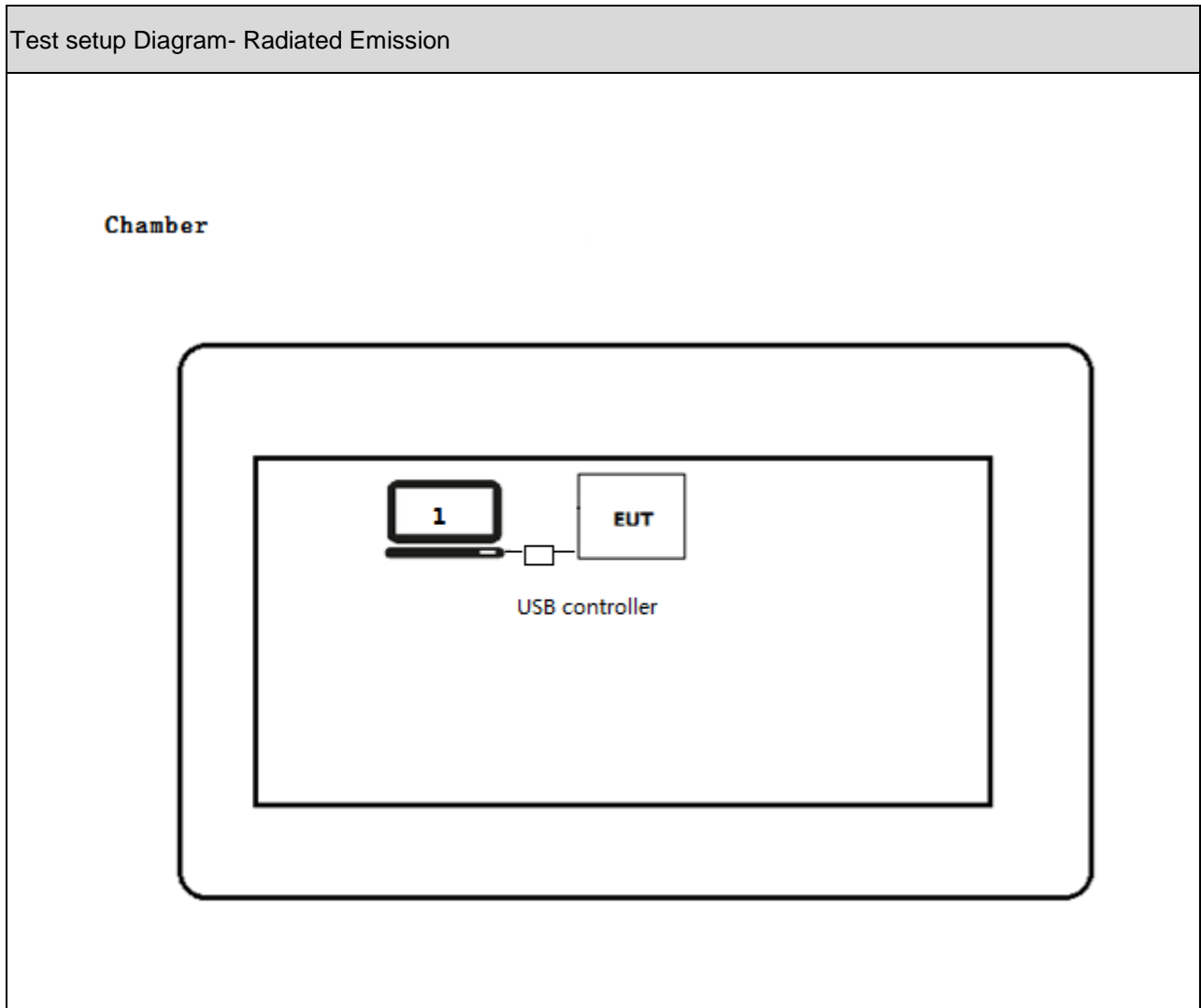
1.8. EUT Exercise Software

1	Setup the EUT and simulators as shown on above.
2	Turn on the power of all equipment.
3	Run the software nRFgo Studio_v5.3.2, and set the test mode and channel, then press start to continue for transmitting testing.

1.9. Mode of Operation

See the all test mode shown in this test report and defined as:

Test Mode Listed		
Mode 1: Transmit－1Mbps(GFSK_BLE)		
For Bluetooth Low Energy		
Lowest channel:	Channel 00	2402MHz
Middle channel:	Channel 20	2442MHz
Highest channel:	Channel 39	2480MHz

2. RF Exposure Evaluation

2.1. Product Category for RF Exposure

Product Category for using: Portable.

Note: The Bluetooth part is in the controller which is operated by hand, so we categorize this product to be portable product for RF exposure. The distance from the wireless part to the body is <5mm.

2.2. Limits

According to KDB 447498 D01 General RF Exposure Guidance v06

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: [(max. power of channel, including tune-up tolerance, mW) / (min. test separation distance, mm)] · [$\sqrt{f(GHz)}$] ≤ 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

2.3. Test Procedure

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

The temperature and related humidity: 24℃ and 53％RH.

2.4. Test Result of RF Exposure Evaluation

Product	:	Electric Wheelchair (Robooter E40)
Test Item	:	RF Exposure Evaluation
Test Site	:	Chamber

● Antenna Gain:

No.	Peak Gain	Gain in Linear
Antenna 1	0dBi	1

RF Exposure Evaluation

The Output Power into Antenna

Mode	Channel	Test Frequency (MHz)	Measurement Power Output (dBm)	Power (mW)
Transmit− 1Mbps(GFSK_BLE)	00	2402	-12.609	0.0548
	20	2442	-11.564	0.0698
	39	2480	-10.863	0.0820

For the worst: the RF power: [2480 MHz, -10.863 dBm, 0.0820 mW) output power]

$(0.0820/5) \cdot [\sqrt{2.480(GHz)}] = 0.0258 < 3.0$ for 1-g SAR

Then SAR evaluation is not required.

―――――――――――――― The End ――――――――――――――