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Report Template Version: V04 Report Template Revision Date: 2018-07-06

# **TEST REPORT**

Report No. :	CQASZ20191001014E-01					
Applicant:	Shenzhen Times Innovation Technology Co., Ltd					
Address of Applicant:	Room 3, 6/F, Building 3, WINLEAD, Fada Road, Bantian Street, Longgang District, Shenzhen, China.					
Equipment Under Test (El	JT):					
EUT Name:	Baseus Intelligent T2 rope type					
Model No.:	ZLFDQT2-02, ZLFDQT2-03, ZLFDQT2-04					
Test Model No.:	ZLFDQT2-02					
Brand Name:	Baseus					
FCC ID:	2AN7Y-ZLFDQT2					
Standards:	47 CFR Part 15, Subpart C					
Date of Receipt:	2019-10-09					
Date of Test:	2019-10-09 to 2019-10-18					
Date of Issue:	2019-10-18					
Test Result :	PASS*					

\*In the configuration tested, the EUT complied with the standards specified above

Tor Cha. Tested By: (Tom chen) Sheek. **Reviewed By:** (Sheek Luo) PPROV Approved By: (Jack Ai)

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 CQA, this report can't be reproduced except in full.



# 1 Version

# **Revision History Of Report**

Report No.	Version	Description	Issue Date
CQASZ20191001014E-01	Rev.01	Initial report	2019-10-18



# 2 Test Summary

Test Item	Test Requirement	Test method	Result
Antenna Requirement	47 CFR Part 15, Subpart C Section 15.203/15.247 (c)	ANSI C63.10 2013	PASS
AC Power Line Conducted Emission	47 CFR Part 15, Subpart C Section 15.207	ANSI C63.10 2013	N/A
Conducted Peak Output Power	47 CFR Part 15, Subpart C Section 15.247 (b)(3)	ANSI C63.10 2013	PASS
6dB Occupied Bandwidth	47 CFR Part 15, Subpart C Section 15.247 (a)(2)	ANSI C63.10 2013	PASS
Power Spectral Density	47 CFR Part 15, Subpart C Section 15.247 (e)	ANSI C63.10 2013	PASS
Band-edge for RF Conducted Emissions	47 CFR Part 15, Subpart C Section 15.247(d)	ANSI C63.10 2013	PASS
RF Conducted Spurious Emissions	47 CFR Part 15, Subpart C Section 15.247(d)	ANSI C63.10 2013	PASS
Radiated Spurious Emissions	47 CFR Part 15, Subpart C Section 15.205/15.209	ANSI C63.10 2013	PASS
Restricted bands around fundamental frequency (Radiated Emission)	47 CFR Part 15, Subpart C Section 15.205/15.209	ANSI C63.10 2013	PASS

N/A: Not Applicable, the EUT supply by DC

Model No.: ZLFDQT2-02, ZLFDQT2-03, ZLFDQT2-04

Only the model ZLFDQT2-02 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.



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# 4 General Information

# 4.1 Client Information

Applicant:	Shenzhen Times Innovation Technology Co., Ltd
Address of Applicant:	Room 3, 6/F, Building 3, WINLEAD, Fada Road, Bantian Street, Longgang District, Shenzhen, China.
Manufacturer:	Shenzhen Juku Intelligent Technology Co;Ltd.
Address of Manufacturer:	Jinyu yunchuang 303-306, No.12 Huancheng south Road, Bantian Street, Longgang District, Shenzhen, China

# 4.2 General Description of EUT

Product Name:	Baseus Intelligent T2 rope type
Model No.:	ZLFDQT2-02, ZLFDQT2-03, ZLFDQT2-04
Test Model No.:	ZLFDQT2-02
Trade Mark:	Baseus
Hardware Version:	V1.0
Software Version:	V1.0.5
Operation Frequency:	2402MHz~2480MHz
Bluetooth Version:	V4.0
Modulation Type:	GFSK
Transfer Rate:	1Mbps
Number of Channel:	40
Product Type:	□ Mobile □ Portable □ Fix Location
Test Software of EUT:	RF Test (manufacturer declare )
Antenna Type:	PCB antenna
Antenna Gain:	0dBi
EUT Power Supply:	button battery: DC3.0V



Operation Frequency each of channel							
Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
0	2402MHz	10	2422MHz	20	2442MHz	30	2462MHz
1	2404MHz	11	2424MHz	21	2444MHz	31	2464MHz
2	2406MHz	12	2426MHz	22	2446MHz	32	2466MHz
3	2408MHz	13	2428MHz	23	2448MHz	33	2468MHz
4	2410MHz	14	2430MHz	24	2450MHz	34	2470MHz
5	2412MHz	15	2432MHz	25	2452MHz	35	2472MHz
6	2414MHz	16	2434MHz	26	2454MHz	36	2474MHz
7	2416MHz	17	2436MHz	27	2456MHz	37	2476MHz
8	2418MHz	18	2438MHz	28	2458MHz	38	2478MHz
9	2420MHz	19	2440MHz	29	2460MHz	39	2480MHz

Note:

In section 15.31(m), regards to the operating frequency range over 10 MHz, the lowest frequency, the middle frequency, and the highest frequency of channel were selected to perform the test, and the selected channel see below:

Channel	Frequency
The lowest channel (CH0)	2402MHz
The middle channel (CH19)	2440MHz
The highest channel (CH39)	2480MHz



# 4.3 Additional Instructions

EUT Test Software Settings:					
Mode:	Special software is used.				
	Through engineering command into	the engineering mode.			
	engineering command: *#*#3646633#	*#*			
EUT Power level:	Class1 (Power level is built-in set para selected)	meters and cannot be changed and			
Use test software to set the lowest frequency, the middle frequency and the highest frequency keep					
transmitting of the EUT.					
Mode	Mode Channel Frequency(MHz)				
	CH0 2402				
GFSK	GFSK CH19 2440				
	CH39 2480				

#### **Run Software:**

画 管理员: C:\Windows\system32\cmd.exe		J
Microsoft Windows [版本 6.1.7601] 版权所有 <c> 2009 Microsoft Corporation。保留所有权利。</c>	A E	
C:\Users\Administrator>cd /		
C:\>cd prod_test_cmds\Release		
C:\prod_test_cmds\Release>prodtest -p 5 pkt_tx 2402 35 6 6000 status = 0		
C:\prod_test_cmds\Release>prodtest -p 5 pkt_tx 2426 35 6 6000 status = 0		
C:\prod_test_cmds\Release>		
半 <b>:</b>	-	



# 4.4 Test Environment

Operating Environment	
Radiated Emissions:	
Temperature:	24.4 °C
Humidity:	52 % RH
Atmospheric Pressure:	992mbar
Radio conducted item te	est (RF Conducted test room):
Temperature:	25.0 °C
Humidity:	54 % RH
Atmospheric Pressure:	992mbar
Test mode:	
Transmitting mode:	Use test software to set the lowest frequency, the middle frequency and the highest frequency keep transmitting of the EUT.
	Note: In the process of transmitting of EUT, the duty cycle $>$ 98%.

# 4.5 Description of Support Units

The EUT has been tested with associated equipment below.

1) Support equipment

Description	Manufacturer	Model No.	Certification	Supplied by
PC	Lenovo	ThinkPad E450c	FCC ID and DOC	CQA

### 2) Cable

Cable No.	Description	Manufacturer	Cable Type/Length	Supplied by
/	/	1	/	/



### 4.6 Statement of the measurement uncertainty

The data and results referenced in this document are true and accurate.

The reader is cautioned that there may be errors within the calibration limits of the equipment and facilities.

The measurement uncertainty was calculated for all measurements listed in this test report acc. to CISPR 16 - 4 "Specification for radio disturbance and immunity measuring apparatus and methods – Part 4: Uncertainty in EMC Measurements" and is documented in the **Shenzhen Huaxia Testing Technology Co., Ltd.** quality system acc. to DIN EN ISO/IEC 17025.

Furthermore, component and process variability of devices similar to that tested may result in additional deviation. The manufacturer has the sole responsibility of continued compliance of the device.

No.	Item	Uncertainty	Notes
1	Radiated Emission (Below 1GHz)	5.12dB	(1)
2	Radiated Emission (Above 1GHz)	4.60dB	(1)
3	Conducted Disturbance (0.15~30MHz)	3.34dB	(1)
4	Radio Frequency	3×10 <sup>-8</sup>	(1)
5	Duty cycle	0.6 %.	(1)
6	Occupied Bandwidth	1.1%	(1)
7	RF conducted power	0.86dB	(1)
8	RF power density	0.74	(1)
9	Conducted Spurious emissions	0.86dB	(1)
10	Temperature test	0.8°C	(1)
11	Humidity test	2.0%	(1)
12	Supply voltages	0.5 %.	(1)
13	Frequency Error	5.5 Hz	(1)

Hereafter the best measurement capability for CQA laboratory is reported:

(1)This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.



# 4.7 Test Location

#### Shenzhen Huaxia Testing Technology Co., Ltd,

1F., Block A of Tongsheng Technology Building, Huahui Road, Dalang Street, Longhua District, Shenzhen, China

# 4.8 Test Facility

#### • A2LA (Certificate No. 4742.01)

Shenzhen Huaxia Testing Technology Co., Ltd., Shenzhen EMC Laboratory is accredited by the American Association for Laboratory Accreditation(A2LA). Certificate No. 4742.01.

#### • FCC Registration No.: 522263

Shenzhen Huaxia Testing Technology Co., Ltd., Shenzhen EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files. Registration No.:522263

### 4.9 Deviation from Standards

None.

# 4.10Other Information Requested by the Customer

None.



# **4.11 Equipment List**

			Instrument	Calibration	Calibration
Test Equipment	Manufacturer	Model No.	No.	Date	Due Date
EMI Test Receiver	R&S	ESR7	CQA-005	2019/9/26	2020/9/25
Spectrum analyzer	R&S	FSU26	CQA-038	2018/10/28	2019/10/27
Preamplifier	MITEQ	AFS4-00010300-18-10P- 4	CQA-035	2019/9/26	2020/9/25
Preamplifier	MITEQ	AMF-6D-02001800-29- 20P	CQA-036	2018/11/2	2019/11/1
Loop antenna	Schwarzbeck	FMZB1516	CQA-065	2018/10/28	2020/10/27
Bilog Antenna	R&S	HL562	CQA-011	2018/9/26	2020/9/25
Horn Antenna	R&S	HF906	CQA-012	2018/9/26	2020/9/25
Horn Antenna	Schwarzbeck	BBHA 9170	CQA-088	2018/9/26	2020/9/25
Coaxial Cable (Above 1GHz)	CQA	N/A	C019	2019/9/26	2020/9/25
Coaxial Cable (Below 1GHz)	CQA	N/A	C020	2019/9/26	2020/9/25
Antenna Connector	CQA	RFC-01	CQA-080	2019/9/26	2020/9/25
RF cable(9KHz~40GHz)	CQA	RF-01	CQA-079	2019/9/26	2020/9/25
Power divider	MIDWEST	PWD-2533-02-SMA-79	CQA-067	2019/9/26	2020/9/25

Note:

The temporary antenna connector is soldered on the PCB board in order to perform conducted tests and this temporary antenna connector is listed in the equipment list.



# 5 Test results and Measurement Data

### 5.1 Antenna Requirement

Standard requirement: 47 CFR Part 15C Section 15.203 /247(c)

#### 15.203 requirement:

An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator, the manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.

15.247(b) (4) requirement:

The conducted output power limit specified in paragraph (b) of this section is based on the use of antennas with directional gains that do not exceed 6 dBi. Except as shown in paragraph (c) of this section, if transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced below the stated values in paragraphs (b)(1), (b)(2), and (b)(3) of this section, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

#### EUT Antenna:



The antenna is PCB antenna. The best case gain of the antenna is 0dBi.



# 5.2 Conducted Peak Output Power



#### Measurement Data

GFSK mode						
Test channel	Peak Output Power (dBm)	Limit (dBm)	Result			
Lowest	-4.23	30.00	Pass			
Middle	-4.68	30.00	Pass			
Highest	-4.3	30.00	Pass			



#### Test plot as follows:









# 5.3 6dB Occupy Bandwidth



#### **Measurement Data**

GFSK mode						
Test channel	6dB Occupy Bandwidth (MHz)	Limit (MHz)	Result			
Lowest	0.667	≥0.5	Pass			
Middle	0.699	≥0.5	Pass			
Highest	0.705	≥0.5	Pass			



#### Test plot as follows:









# 5.4 Power Spectral Density



#### **Measurement Data**

GFSK mode							
Test channel	Power Spectral Density (dBm/3kHz)	Limit (dBm/3kHz)	Result				
Lowest	-23.020	≤8.00	Pass				
Middle	-23.460	≤8.00	Pass				
Highest	-22.800	≤8.00	Pass				



#### Test plot as follows:









# 5.5 Band-edge for RF Conducted Emissions



GFSK mode	_		_	
Test				
channel	Frequency(MHz)	Emission Level(dBm)	Limit(dBm)	Result
Lowest	2400	-43 300	-25 27	Pass
2011000	2100	10.000	20.21	1 400
Highest	2483.5	-47.710	-25.35	Pass



#### Test plot as follows:





# 5.6 Spurious RF Conducted Emissions

Test Requirement:	47 CFR Part 15C Section 15.247 (d)
Test Method:	ANSI C63.10 2013
Test Setup:	Spectrum Analyzer E.U.T Non-Conducted Table Ground Reference Plane
	Remark: Offset=Cable loss+ attenuation factor.
Limit:	In any 100 kHz bandwidth outside the frequency band in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement.
Test Mode:	Transmitting with GFSK modulation.
Test Results:	Pass



#### Test plot as follows:



















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#### Remark:

Pretest 9kHz to 25GHz, find the highest point when testing, so only the worst data were shown in the test report. Per FCC Part 15.33 (a) and 15.31 (o) ,The amplitude of spurious emissions from intentional radiators which are attenuated more than 20 dB below the permissible value need not be reported unless specifically required elsewhere in this part.



# 5.7 Radiated Spurious Emission & Restricted bands

# 5.7.1 Spurious Emissions

Test Requirement:	47 CFR Part 15C Section 15.209 and 15.205							
Test Method:	ANSI C63.10 2013							
Test Site:	Measurement Distance: 3m (Semi-Anechoic Chamber)							
Receiver Setup:	Frequency Detector RBW VBW Remark							
	0.009MHz-0.090MHz Peak		10kHz	z	30kHz	Peak		
	0.009MHz-0.090MHz Average		10kHz	z	30kHz	Average		
	0.090MHz-0.110MH	z	Quasi-peak	10kHz	z	30kHz	Quasi-peak	
	0.110MHz-0.490MHz Peak 10kHz 30kHz Pe						Peak	
	0.110MHz-0.490MHz Average 10kHz 30kHz Average							
	0.490MHz -30MHz Quasi-peak 10kHz 30kHz Quasi-p						Quasi-peak	
	30MHz-1GHz	100 kH	lz	300kHz	Quasi-peak			
	Above 1GHz Peak Peak		1MHz	2	3MHz	Peak		
			Peak	1MHz	2	10Hz	Average	
Limit:	Frequency		eld strength	Limit		Remark	Measurement	
		(IIII) 2	10001/111eter)	(abaviii)			300	
		2		-		-	300	
		24	20 20	-		-	30	
			30	-	-	-	30	
			100	40.0	Q	uasi-peak	3	
	88MHZ-216MHZ		150	43.5	Q	uasi-peak	3	
	216MHz-960MHz 200		46.0	Q	uasi-peak	3		
	960MHz-1GHz 500		54.0	Q	uasi-peak	3		
	Above 1GHz 500 54.0 Average 3							
	Note: 15.35(b), frequency emissions is limit applicable to the e peak emission level rac	Unle 20c quip liate	ess otherwise IB above the oment under t d by the device	e specified maximum est. This p ce.	d, t per beal	the limit o rmitted ave k limit app	on peak radio erage emission lies to the total	





	measurement.
	d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters (for the test frequency of below 30MHz, the antenna was tuned to heights 1 meter) and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
	e. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
	f. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.
	g. Test the EUT in the lowest channel (2402MHz),the middle channel (2440MHz),the Highest channel (2480MHz)
	h. The radiation measurements are performed in X, Y, Z axis positioning for Transmitting mode, and found the X axis positioning which it is the worst case.
	i. Repeat above procedures until all frequencies measured was complete.
Exploratory Test Mode:	Transmitting with GFSK modulation. Transmitting mode.
Final Test Mode:	Transmitting with GFSK modulation.
	For below 1GHz part, through pre-scan, the worst case is the lowest channel. Only the worst case is recorded in the report.
Test Results:	Pass











#### Transmitter Emission above 1GHz

Worse case m	ode:	GFSK	_	Test channel:		Lowest	
Frequency	Meter Reading	Factor	Emission Level	Limits	Over	Detector Type	Ant. Pol.
(MHz)	(dBµV)	(dB)	(dBµV/m)	(dBµV/m)	(dB)		H/V
2390	55.12	-9.2	45.92	74	-28.08	Peak	Н
2400	55.56	-9.39	46.17	74	-27.83	Peak	Н
4804	53.74	-4.33	49.41	74	-24.59	Peak	Н
7206	50.39	1.01	51.40	74	-22.60	Peak	Н
2390	53.99	-9.2	44.79	74	-29.21	Peak	V
2400	50.59	-9.39	41.20	74	-32.80	Peak	V
4804	53.95	-4.33	49.62	74	-24.38	Peak	V
7206	50.99	1.01	52.00	74	-22.00	Peak	V

Worse case m	ode:	GFSK		Test channel: M		Middle	
Frequency	Meter Reading	Factor	Emission Level	Limits	Over	Detector Type	Ant. Pol.
(MHz)	(dBµV)	(dB)	(dBµV/m)	(dBµV/m)	(dB)		H/V
4880	50.33	-4.11	46.22	74	-27.78	peak	Н
7320	48.67	1.51	50.18	74	-23.82	peak	Н
4880	52.32	-4.11	48.21	74	-25.79	peak	V
7320	48.61	1.51	50.12	74	-23.88	peak	V

Worse case mode:		GFSK		Test channel:		Highest	
Frequency	Meter Reading	Factor	Emission Level	Limits	Over	Detector Type	Ant. Pol.
(MHz)	(dBµV)	(dB)	(dBµV/m)	(dBµV/m)	(dB)		H/V
2483.5	54.82	-9.29	45.53	74	-28.47	Peak	Н
4960	51.51	-4.04	47.47	74	-26.53	Peak	Н
7440	50.93	1.57	52.50	74	-21.50	Peak	Н
2483.5	57.54	-9.29	48.25	74	-25.75	Peak	V
4960	50.57	-4.04	46.53	74	-27.47	Peak	V
7440	49.13	1.57	50.70	74	-23.30	Peak	V

Remark:

1) The field strength is calculated by adding the Antenna Factor, Cable Factor & Preamplifier. The basic equation with a sample calculation is as follows:

Final Test Level =Receiver Reading + Antenna Factor + Cable Factor – Preamplifier Factor

2) Scan from 9kHz to 25GHz, the disturbance above 10GHz and below 30MHz was very low. As shown in this section, for frequencies above 1GHz, the field strength limits are based on average limits. However, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation. So, only the peak measurements were shown in the report.



# 6 Photographs - EUT Test Setup

# 6.1 Radiated Spurious Emission









# 7 Photographs - EUT Constructional Details



Test Model No.: ZLFDQT2-02

























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The End