



TEST REPORT

REPORT NUMBER: I23W00016-MPE-Rev1

ON

Type of Equipment:	Tracker
Type of Designation:	Bolt-2
Manufacturer:	Micron Electronics LLC.
Brand Name:	Prime
FCC ID:	ZKQ-G601

ACCORDING TO

FCC CFR 47 Part 2.1091 《Radiofrequency radiation exposure evaluation: mobile devices》

FCC CFR 47 Part1.1310 《Radiofrequency radiation exposure limits》

Chongqing Academy of Information and Communication Technology

Month date, year

Jun. 9th , 2023

Signature

Xiang Luoyong

Director

Note:

The test results in this test report relate only to the devices specified in this report. This report shall not be reproduced except in full without the written approval of Chongqing Academy of Information and Communications Technology.



Revision Version

Report Number	Revision	Date	Memo
I23W00016-MPE	00	2023-5-24	Initial creation of test report
I23W00016-MPE-Rev1	01	2023-6-9	First change of test report
Note: This version has added the simultaneous transmission mode for CAT-M and 433MHz.			



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1. Test Laboratory

1.1. Testing Location

Company Name:	Chongqing Academy of Information and Communications Technology
Address:	Building C, Technology Innovation Center, No.8, Yuma Road, Chayuan New Area, Nan'an District, Chongqing, People's Republic of China
Postal Code:	401336
Telephone:	0086-23-88069965
Fax:	0086-23-88608777

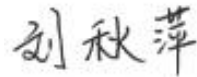
1.2. Testing Environment

Normal Temperature:	21.3℃
Relative Humidity:	65.0%

1.3. Project Data

Testing Start Date:	2023-5-24
Testing End Date:	2023-5-24

1.4. Signature



2023-6-9

Liu Qiuping
(Prepared this test report)

Date



2023-6-9

Yu Chun
(Reviewed this test report)

Date



2023-6-9

Xiang Luoyong
Director of the laboratory
(Approved this test report)

Date

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2. Client Information

2.1. Applicant Information

Company Name:	Micron Electronics LLC.
Address /Post:	1001 Yamato Road, Suite 400, Boca Raton, FL 33431, USA
Country:	USA
Telephone:	+1 888 538 3489
Fax:	--
Email:	pcheng@micron-electronics.com
Contact Person:	Ping Cheng

2.2. Manufacturer Information

Company Name:	Micron Electronics LLC.
Address /Post:	1001 Yamato Road, Suite 400, Boca Raton, FL 33431, USA
Country:	USA
Telephone:	+1 888 538 3489
Fax:	--
Email:	pcheng@micron-electronics.com
Contact Person:	Ping Cheng

3. Equipment Under Test (EUT) and Ancillary Equipment (AE)

3.1. About EUT

EUT Description:	Tracker
Model name:	Bolt-2
CAT-M1 Frequency Band:	B2/4/12/13
Operation Frequency:	433.92MHz
Note: Photographs of EUT are shown in ANNEX A of this test report.	

3.2. Internal Identification of EUT used during the test

EUT ID*	SN or IMEI	HW Version	SW Version	Date of receipt
/	/	G601-V1	G601V02.01B03.I01	2023-4-17

*EUT ID: is used to identify the test sample in the lab internally.

3.3. Internal Identification of AE used during the test

EUT ID*	SN	Description
NA	NA	NA

*AE ID: is used to identify the test sample in the lab internally.

4. Reference Documents

4.1. Applicable Standards

The MPE report was carried out on a sample equipment to demonstrate limited compliance with FCC CFR 47 Part 2.1091.

FCC CFR 47 Part 2.1091: Radiofrequency radiation exposure evaluation: mobile devices

4.2. Test Limits

Systems operating under the provisions of this section shall be operated in a manner that ensures that the public is not exposed to radio frequency energy level in excess limit for maximum permissible exposure. In accordance with 47 CFR FCC Part 2 Subpart J, section 2.1091 this device has been defined as a mobile device whereby a distance of 0.2m normally can be maintained between the user and the device.

MPE for the upper tier (people in controlled environments)

Frequency Range [MHz]	Electric field strength (V/m)	Magnetic field strength (A/m)	Power density (mW/cm ²)	Averaging time (minutes)
(A) Limits for Occupational/Controlled Exposure				
0.3-3.0	614	1.63	(100)*	6
3.0-30	1842/f	4.89/f	(900/f ²)*	6
30-300	61.4	0.163	1.0	6
300-1500	--	--	f/300	6
1500-100000	--	--	5	6
(B) Limits for General Population/Uncontrolled Exposure				
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
1500-100000	--	--	1.0	30

Note: f=frequency in MHz; *Plane-wave equivalent power density

For the DUT, the limits for the general public when an RF safety program is unavailable.

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5. Test Results

5.1. Tune Up Power

Frequency Band	Highest Averaged Tunne Up Power(dBm)	Highest Frame-Averaged Tunne Up Power (dBm)	Antenna Gain(dBi)
CAT-M1 B2	24.5	24.5	-4
CAT-M1 B4	23	23	-4
CAT-M1 B12	23	23	-5
CAT-M1 B13	23	23	-5
433.92 MHz	-14.9	-14.9	/

Notes:

1) Disclaimers: The highest tunne up power and antenna gain in the above table are provided by the customer

5.2. Calculation Information

For conservative evaluation consideration, only maximum power of each frequency band based on the tighter limits respectively are used to calculate the boundary power density.

Based on the FCC KDB 447498 D01 and 47 CFR §2.1091, the DUT is evaluated as a mobile device.

$$S = \frac{PG}{4\pi d^2}$$

Where

P = Power in Watts

G = Numeric antenna gain

d = Distance in meters

S = Power density in milliwatts / square centimeter

5.3. Results for single antenna transmission

Frequency range	Limit(mW/cm ²)	Results(mW/cm ²)	Verdict
CAT-M1 B2	1.00	0.02	PASS
CAT-M1 B4	1.00	0.02	PASS
CAT-M1 B12	0.47	0.01	PASS
CAT-M1 B13	0.52	0.01	PASS
433.92MHz	0.29	6.45×10^{-12}	PASS

5.4. Results for simultaneous transmission

Power density /Limit (mW/cm ²)				Σ (Power density /Limit) of CAT-M+ 433MHz (mW/cm ²)	Verdict
433.92 MHz	6.45×10^{-12}	CAT-M1 B2	0.02	$0.02 + 2.22 \times 10^{-11}$	PASS
		CAT-M1 B4	0.02	$0.02 + 2.22 \times 10^{-11}$	PASS
		CAT-M1 B12	0.01	$0.02 + 2.22 \times 10^{-11}$	PASS
		CAT-M1 B13	0.01	$0.02 + 2.22 \times 10^{-11}$	PASS

Notes:

1) Σ (Power density /Limit) : This is a summation of [(Power density for each transmitter/antenna included in the simultaneous transmission)/ (corresponding MPE limit)] .

2) Considering the simultaneous transmission for CAT-M1 and 433.92 MHz , the aggregated (Power density /Limit) is smaller than 1, and MPE collocated transmitters is compliant.

5.5. Result of CAT-M1 Band 2

Test Results: MPE Limit Calculation: the EUT'S operating frequencies @ 1850.0 ~ 1910.0 MHz; The maximum conducted is 24.5 dBm. The maximum gain is -4 dBi. Therefore, maximum limit for general public RF exposure: 1.00mW/cm².

$$S = \frac{PG}{4\pi d^2}$$

P= input power of the antenna (mW)

G = antenna gain (numeric)

r = distance to the center of radiation of antenna (in meter)=20 cm

S=0.02 mW/cm²

Therefore, at 20 cm the spectral power density is less than the 1.00 mW/cm² limit for uncontrolled exposure.

5.6. Result of CAT-M1 Band 4

Test Results: MPE Limit Calculation: the EUT'S operating frequencies @ 1710.0 ~ 1755.0 MHz; The maximum conducted is 23 dBm. The maximum gain is -4 dBi. Therefore, maximum limit for general public RF exposure: 1.00mW/cm².

$$S = \frac{PG}{4\pi d^2}$$

P= input power of the antenna (mW)

G = antenna gain (numeric)

r = distance to the center of radiation of antenna (in meter)=20 cm

S=0.02 mW/cm²

Therefore, at 20 cm the spectral power density is less than the 1.00 mW/cm² limit for uncontrolled exposure.

5.7. Result of CAT-M1 Band 12

Test Results: MPE Limit Calculation: the EUT'S operating frequencies @ 699.0~716.0 MHz; The maximum conducted is 23 dBm. The maximum gain is -5 dBi. Therefore, maximum limit for general public RF exposure: $699.0/1500 = 0.47 \text{ mW/cm}^2$.

$$S = \frac{PG}{4\pi d^2}$$

P= input power of the antenna (mW)

G = antenna gain (numeric)

r = distance to the center of radiation of antenna (in meter)=20 cm

S=0.01 mW/cm²

Therefore, at 20 cm the spectral power density is less than the 0.47 mW/cm² limit for uncontrolled exposure.

5.8. Result of CAT-M1 Band 13

Test Results: MPE Limit Calculation: the EUT'S operating frequencies @ 777.0~787.0 MHz; The maximum conducted is 23 dBm. The maximum gain is -5 dBi. Therefore, maximum limit for general public RF exposure: $777.0/1500 = 0.52 \text{ mW/cm}^2$.

$$S = \frac{PG}{4\pi d^2}$$

P= input power of the antenna (mW)

G = antenna gain (numeric)

r = distance to the center of radiation of antenna (in meter)=20 cm

S=0.01 mW/cm²

Therefore, at 20 cm the spectral power density is less than the 0.52 mW/cm² limit for uncontrolled exposure.

5.9. Result of 433.92MHz

Test Results: MPE Limit Calculation: the EUT'S operating frequencies @ 433.92 MHz; The maximum ERP is $3.24 \times 10^{-8} \text{ mW}$. Therefore, maximum limit for general public RF exposure: $433.92/1500 = 0.29 \text{ mW/cm}^2$.

$$S = \frac{PG}{4\pi d^2}$$

P= input power of the antenna (mW)

G = antenna gain (numeric)

r = distance to the center of radiation of antenna (in meter)=20 cm

S= $6.45 \times 10^{-12} \text{ mW/cm}^2$

Therefore, at 20 cm the spectral power density is less than the 0.29 mW/cm² limit for uncontrolled exposure.



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ANNEX A: EUT photograph

See the document "Tracker Photos".

*****END OF REPORT*****

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