

# MPE REPORT

FCC ID: 2AAZD-ASTERI-TG

Date of issue: Mar. 19, 2020

Report number:	MTi19052008-1E3
Sample description:	High Precision Mobile GNSS Receiver
Model(s):	Asteri GNSS
Applicant:	Shanghai HowayGIS Co., Ltd
Address:	RM230,Fawkes Building, No. 1985, Road Chunshen, Shanghai, China
Date of test:	Dec. 17, 2019 to Mar. 19, 2020

Shenzhen Microtest Co., Ltd.

<http://www.mtitest.com>



<b>TEST RESULT CERTIFICATION</b>	
Applicant's name:	Shanghai HowayGIS Co., Ltd
Address:	RM230,Fawkes Building, No. 1985, Road Chunshen, Shanghai, China
Manufacture's name:	DBG (Jiaxing) Technology Electronics Co., Ltd.
Address:	No.699,Huayan Road, Jiaxing, Zhejiang, 314001, China
Product name:	High Precision Mobile GNSS Receiver
Trademark:	Asteri
Model and/or type reference .:	Asteri GNSS
Serial model.....:	N/A
RF exposure procedures.....:	KDB 447498 D01 v06

This device described above has been tested by Shenzhen Microtest Co., Ltd and the test results show that the equipment under test (EUT) is in compliance with the FCC requirements. And it is applicable only to the tested sample identified in the report.

Tested by:

Demi Mu

Mar. 19, 2020

Reviewed by:

Leo Su

Mar. 19, 2020

Approved by:

Tom Xue

Mar. 19, 2020



## RF EXPOSURE EVALUATION

According to FCC 1.1310: The criteria listed in the following table shall be used to evaluate the environment impact of human exposure to radio frequency (RF) Radiation as specified in §1.1307(b)

Limits for Maximum Permissible Exposure (MPE)

Frequency range (MHz)	Electric field strength (V/m)	Magnetic field strength (A/m)	Power density (mW/cm <sup>2</sup> )	Averaging time (minutes)
<b>(A) Limits for Occupational/Controlled Exposure</b>				
0.3-3.0	614	1.63	*100	6
3.0-30	1842/f	4.89/f	*300/f <sup>2</sup>	6
30-300	61.4	0.163	1.0	6
300-1,500			f/300	6
1,500-100,000			5	6
<b>(B) Limits for General Population/Uncontrolled Exposure</b>				
0.3-1.34	614	1.63	*100	30
1.34-30	824/f	2.19/f	*180/f <sup>2</sup>	30
30-300	27.5	0.073	0.2	30
300-1,500			f/1500	30
1,500-100,000			1.0	30

f = frequency in MHz \* = Plane-wave equivalent power density

### MPE Calculation Method

Friis transmission formula:  $P_d = (P_{out} * G) / (4 * \pi * R^2)$

Where

$P_d$  = Power density in mW/cm<sup>2</sup>

$P_{out}$  = output power to antenna in mW

G = Numeric gain of the antenna relative to isotropic antenna

$\pi$  = 3.1415926

R = distance between observation point and center of the radiator in cm (20cm)

$P_d$  the limit of MPE, 1mW/cm<sup>2</sup>. If we know the maximum gain of the antenna and total power input to the antenna, through the calculation, we will know the distance where the MPE limit is reached.



## Measurement Result

Operation Frequency: BT: GFSK,  $\pi/4$ -DQPSK, 8DPSK: 2402-2480MHz,

BLE: GFSK: 2402-2480MHz,

Power density limited: 1mW/ cm<sup>2</sup>

Antenna Type: Ceramic Antenna;

Antenna gain: 0.5dBi

R=20cm

$mW=10^{(dBm/10)}$

antenna gain Numeric= $10^{(dBi/10)}=10^{(0.5/10)}=1.12$

Channel Freq. (MHz)	modulation	conducted power (dBm)	Tune-up power (dBm)	Max		Antenna		Evaluation result (mW/cm <sup>2</sup> )	Power density Limits (mW/cm <sup>2</sup> )
				tune-up power		Gain			
				(dBm)	(mW)	(dBi)	Numeric		
2402	GFSK	-8.64	-9±1	-8	0.158	0.50	1.12	0.00003538	1
2441		-8.39	-9±1	-8	0.158	0.50	1.12	0.00003538	1
2480		-9.237	-9±1	-8	0.158	0.50	1.12	0.00003538	1
2402	$\pi/4$ -DQPSK	-9.14	-9±1	-8	0.158	0.50	1.12	0.00003538	1
2441		-8.97	-9±1	-8	0.158	0.50	1.12	0.00003538	1
2480		-9.89	-9±1	-8	0.158	0.50	1.12	0.00003538	1
2402	8DPSK	-8.885	-9±1	-8	0.158	0.50	1.12	0.00003538	1
2441		-8.85	-9±1	-8	0.158	0.50	1.12	0.00003538	1
2480		-9.53	-9±1	-8	0.158	0.50	1.12	0.00003538	1

Channel Freq. (MHz)	modulation	conducted power (dBm)	Tune-up power (dBm)	Max		Antenna		Evaluation result (mW/cm <sup>2</sup> )	Power density Limits (mW/cm <sup>2</sup> )
				tune-up power		Gain			
				(dBm)	(mW)	(dBi)	Numeric		
2402	GFSK	3.31	3±1	4	2.512	0.50	1.12	0.0006	1
2440		4.158	4±1	5	3.162	0.50	1.12	0.0007	1
2480		4.19	4±1	5	3.162	0.50	1.12	0.0007	1

### Conclusion:

For the max result:  $0.0007 \leq 1.0$  for 1g SAR, No SAR is required.

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