




MPE TEST REPORT

Report No. : CHTEW2104010801 Report verification 


Project No. : SHT2101077005EW

FCC ID..... : 2APPUD21000

Applicant's name..... : A Beep, LLC

Address..... : 710 W JEFFERSON ST, Joliet, IL, 60435, United States

Test item description : Digital Mobile Radio

Trade Mark : 

Model/Type reference..... : D2-1000U

Listed Model(s) : -

Standard : FCC Per 47 CFR 2.1091(b)

Date of receipt of test sample..... : Feb.20, 2021

Date of testing..... : Feb.20, 2021- Apr.20, 2021

Date of issue..... : Apr.21, 2021

Result..... : PASS

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The test report merely corresponds to the test sample.

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1 TEST STANDARDS AND REPORT VERSION

1.1. Test Standards

The tests were performed according to following standards:

[FCC Rules Part 1.1310](#): Radiofrequency radiation exposure limits.

[FCC Rules Part 1.1307](#): Actions that may have a significant environmental effect, for which Environmental Assessments (EAs) must be prepared.

[FCC Rules Part 2.1091](#): Radiofrequency radiation exposure evaluation: mobile devices.

[KDB447498 v06](#): Mobile and Portable Devices RF Exposure Procedures and Equipment Authorization Policies

[IEEE Std C95.1: 2005](#): "IEEE Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz – 300 GHz".

[FCC OET Bulletin 65, Edition 97-01](#): "Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields".

[FCC Supplement C to OET Bulletin 65, Edition 01-01](#): "Additional Information for Evaluating Compliance of Mobile and Portable Devices with FCC Limits for Human Exposure to Radiofrequency Emission".

[IEEE Std C95.3: 2002](#): "IEEE Recommended Practice for Measurements and Computations of Radio Frequency Electromagnetic Fields with Respect to Human Exposure to Such Fields, 100 kHz – 300 GHz",

1.2. Report revised information


Revised No.	Date of issued	Description
N/A	2021-04-21	Original

2 SUMMARY

2.1 Client Information

Applicant:	A Beep, LLC
Address:	710 W JEFFERSON ST,Joliet, IL, 60435,United States
Manufacturer:	A Beep, LLC
Address:	710 W JEFFERSON ST,Joliet, IL, 60435,United States
Factory:	Shenzhen HQT Science & Technology Co., Ltd.
Address:	Room 1705 & 1706, 17th Floor, Weisheng Technology Building, No.9966, Shennan Road, Maling Community, Yuehai Sub-district, Nanshan District, Shenzhen City,China

2.2 Product Description

Name of EUT:	Digital Mobile Radio
Trade mark:	
Model/Type reference:	D2-1000U
Listed model(s):	-
Power supply:	DC 13.6V
Hardware version:	D2-1000CPS
Software version:	D2-1000U

2.3 Radio Specification Description

Support Frequency Range:	400MHz~480MHz	
Permitted frequency range: * ¹	400MHz~406MHz, 406.1MHz~480MHz	
Rated Output Power:	<input checked="" type="checkbox"/> High Power: 45W	<input checked="" type="checkbox"/> Low Power: 5W
Modulation Type:	Analog:	FM
	Digital :	4FSK
Supported Digital Protocol: * ²	DMR	
Channel Separation:	Analog:	<input checked="" type="checkbox"/> 12.5kHz
	Digital :	<input type="checkbox"/> 6.25kHz <input checked="" type="checkbox"/> 12.5kHz
Emission Designator: * ³	Analog:	11K0F3E
	Digital:	7K60FXW, 7K60FXD
Support data rate:	9.6kbps	
Antenna Type:	External	

2.4 Testing Laboratory Information

Laboratory Name	Shenzhen Huatongwei International Inspection Co., Ltd.	
Laboratory Location	1/F, Bldg 3, Hongfa Hi-tech Industrial Park, Genyu Road, Tianliao, Gongming, Shenzhen, China	
Connect information:	Tel: 86-755-26715499 E-mail: cs@szhtw.com.cn http://www.szhtw.com.cn	
Qualifications	Type	Accreditation Number
	FCC	762235

3 TEST CONFIGURATION

3.1 Test frequency list

According to ANSI C63.26 section 5.1.2.1:

Measurements of transmitters shall be performed and, if required, reported for each frequency band in which the EUT can be operated with the device transmitting at the number of frequencies in each band specified in below table

Frequency range over which EUT operates	Number of frequencies	Location in frequency range of operation
1 MHz or less	1	Middle
1 MHz to 10 MHz	2	1 near top and 1 near bottom
More than 10 MHz	3	1 near top, 1 near middle, and 1 near bottom

Frequency Bands (MHz)	Test Frequency (MHz)
400MHz ~ 406MHz	CH _L 400.0125
	CH _{M1} 405.9875
406.1MHz ~480MHz	CH _{M2} 406.1125
	CH _{M3} 443.0125
	CH _H 479.9875

3.2 Operation mode

Test Mode	Transmitting	Receiving	Digital	Analog	Power Level	
			12.5kHz	12.5kHz	High	Low
TX-DNH	■		■		■	
TX-DNL	■		■			■
TX-ANH	■			■	■	
TX-ANL	■			■		■

3.3 Support unit used in test configuration and system

The EUT has been associated with peripherals and configuration operated in a manner tended to maximize its emission characteristics in a typical application.

The following peripheral devices and interface cables were connected during the measurement:

Whether support unit is used?					
✓ No					
Item	Equipement	Trade Name	Model No.	FCC ID	Power cord
1					
2					

3.4 Equipment Used during the Test

Name of Equipment	Manufacturer	Model	Serial Number	Last Cal.
Field Probe	ETS-LINDGREN	HI-6005	00064170	2020/11/13
Field Meter	AR	FM 5004	300239	2020/11/13

The calibration interval was one year.

3.5 Applicable Standard

According to FCC Part 1.1307(b)(1), 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 of the Commission's guidelines.

According to FCC Part 1.1310 and FCC Part 2.1091 RF exposure is calculated.

IEEE Std C95.1: 2005: "IEEE Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz – 300 GHz".

FCC OET Bulletin 65, Edition 97-01: "Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields".

FCC Supplement C to OET Bulletin 65, Edition 01-01: "Additional Information for Evaluating Compliance of Mobile and Portable Devices with FCC Limits for Human Exposure to Radiofrequency Emission".

IEEE Std C95.3: 2002: "IEEE Recommended Practice for Measurements and Computations of Radio Frequency Electromagnetic Fields with Respect to Human Exposure to Such Fields, 100 kHz – 300 GHz",

4 TEST CONDITIONS AND RESULTS

4.1. Limit

FCC Part 1.1310(e):

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
300-1,500			f/300	6
1,500-100,000			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
300-1,500			f/1500	30
1,500-100,000			1.0	30

f=frequency in MHz

*=Plane-wave equivalent power density

4.2. MPE Calculation Method

Predication of MPE limit at a given distance

Equation from page 18 of OET Bulletin 65, Edition 97-01

$$S=PG/4\pi R^2$$

Where: S=power density

P=power input to antenna

G=power gain of the antenna in the direction of interest relative to an isotropic radiator

R=distance to the center of radiation of the antenna

Test Frequency (MHz)	Max. Output Power (dBm)	Max Output Power (mW)	Antenna Gain (dBi)	Antenna Gain (Numeric)	Power Density Limit (mW/cm ²)	Safety Distance(cm)
DNH-433.0125	47.22	52722.99	3.5	2.239	1.44	80.79
ANH-405.9875	46.94	49431.07	3.5	2.239	1.35	80.79

Note: If the antenna gain is 3.5 dBi.

4.3. Antenna Information

Frequency:	400-480MHz
Antenna Type:	External (Whip Antenna)
Antenna Gain:	3.5dBi
Note: Product sales without antenna, this antenna supply by Lab. Only for test.	

4.4. Measurement Procedure

1. Polarization of the EUT's antenna was vertical, which is its polarization in actual use.
2. The EUT at the chosen modulation was set to transmit at the chosen frequency at maximum RF power and at 50% duty cycle (50% duty cycle is simulated either by lowering the radio's power by 3dB or by using a 3 dB pad on the output of the radio). During preliminary measurements, we set the distance between the power density probe and the investigated EUT's antenna equal to the average calculated R_{safe} applicable either for controlled or uncontrolled environments.
3. Power density measurements were taken at different heights of the probe from the ground (0.1 to 2 meters) while rotating versus azimuth (from 0° to 360°) the antenna.
4. The azimuth between the probe and the antenna position corresponding to the highest MPE level was chosen as the "worst case" position for the final measurements.
5. For the final measurements, we adjusted the distance between the test probe and the tested antenna to the real safe distance, R_{real} , such that the measured highest power density in the "worst case" position was the same or slightly less than the test limit.
6. The measurement results of final measurements conducted at the chosen azimuth and different heights of the probe above the ground.
7. Average values of power density were calculated for the imaginary whole human body (0.1–2.0 m), for the lower part of the body (0.1–0.9 m) and for the upper part of the body (1.0–2.0 m).

4.5. Test Results

EME Data:

Measuring Antenna Height (cm)	FCC Part 2.1091		
	Controlled RF Exposure(mW/cm ²)		
	3.5dBi Antenna 80.79cm	3.5dBi Antenna 90.79cm	3.5dBi Antenna 100.79cm
10	0.24	0.11	0.05
20	0.36	0.13	0.10
30	0.39	0.25	0.13
40	0.55	0.47	0.36
50	0.61	0.54	0.42
60	0.78	0.66	0.49
70	0.83	0.72	0.62
80	0.90	0.81	0.66
90	0.85	0.77	0.60
100	0.78	0.63	0.53
110	0.74	0.58	0.50
120	0.67	0.55	0.47
130	0.63	0.51	0.42
140	0.57	0.48	0.37
150	0.53	0.44	0.33
160	0.49	0.40	0.31
170	0.38	0.34	0.27
180	0.27	0.25	0.12
190	0.15	0.09	0.06
200	0.11	0.07	0.04

EME for Body Parts:

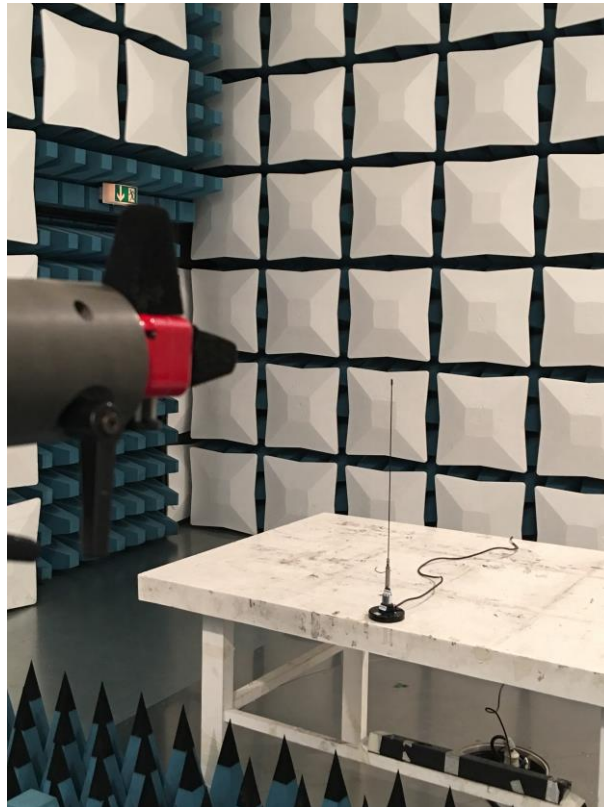
Part of the body/averaging points(m)	FCC Part 2.1091
	Controlled RF Exposure
	3.5dBi Antenna 80.79cm (mW/cm ²)
Whole body (0.1 to 2.0)	0.90
Lower body (0.1 to 0.9)	0.90
Upper body (1.0 to 2.0)	0.78

4.6. Conclusion

The User Manual shall include RF radiation safety warnings:

The antenna of this device must be installed on the roof or trunk of the vehicle. If the gain of the used antenna is 3.5dBi, the minimum mobile separation distance $R_{safe} = 80.79\text{cm}$.

5 TEST SETUP PHOTOS OF THE EUT



-----End of Report-----