



MPE TEST REPORT

Report No. : CHTEW2010002501 Report verification 

Project No. : SHT2009016002EW

FCC ID..... : 2AARFBFTM85001

Applicant's name..... : Fujian BelFone Communications Technology Co., Ltd.

Address..... : A15 Huaqiao Economic Development Zone,
Shuangyang Luojiang, Quanzhou, Fujian, China

Test item description : DMR MOBILE RADIO

Trade Mark : BFDX, BelFone

Model/Type reference..... : BF-TM8500

Listed Model(s) : -

Standard : FCC Per 47 CFR 2.1091(b); KDB447498 v06

Date of receipt of test sample..... : Sept.08, 2020

Date of testing..... : Sept.08, 2020- Oct.30, 2020

Date of issue..... : Nov.02, 2020

Result..... : PASS

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Testing Laboratory Name : Shenzhen Huatongwei International Inspection Co., Ltd

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The test report merely corresponds to the test sample.

Contents

<u>1</u>	<u>TEST STANDARDS AND REPORT VERSION</u>	<u>3</u>
1.1.	Test Standards	3
1.2.	Report revised information	3
<u>2</u>	<u>SUMMARY</u>	<u>4</u>
2.1	Client Information	4
2.2	Product Description	4
2.3	Radio Specification Description	4
2.4	Testing Laboratory Information	5
<u>3</u>	<u>TEST CONFIGURATION</u>	<u>6</u>
3.1	Test frequency list	6
3.2	Operation mode	6
3.3	Support unit used in test configuration and system	6
3.4	Equipment Used during the Test	7
<u>4</u>	<u>TEST RESULTS</u>	<u>8</u>
<u>5</u>	<u>TEST SETUP PHOTOS</u>	<u>11</u>

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	2020-11-02	Original

2 SUMMARY

2.1 Client Information

Applicant:	Fujian BelFone Communications Technology Co., Ltd.
Address:	A15 Huaqiao Economic Development Zone, Shuangyang Luojiang, Quanzhou, Fujian, China
Manufacturer:	Fujian BelFone Communications Technology Co., Ltd.
Address:	A15 Huaqiao Economic Development Zone, Shuangyang Luojiang, Quanzhou, Fujian, China

2.2 Product Description

Name of EUT:	DMR MOBILE RADIO
Trade mark:	BFDX, BelFone
Model/Type reference:	BF-TM8500
Listed model(s):	-
Power supply:	DC 13.8V
Hardware version:	BF136A2
Software version:	TM8500_V1.0.1

2.3 Radio Specification Description

Support Frequency Range:	400MHz~480MHz	
Permitted frequency range: * ¹	400MHz~406MHz, 406.1MHz~480MHz	
Rated Output Power:	☒ High Power: 50W	☒ Low Power: 10W
Modulation Type:	Analog:	FM
	Digital :	4FSK
Supported Digital Protocol: * ²	DMR	
Channel Separation:	Analog:	☒ 12.5kHz
	Digital :	☐ 6.25kHz ☒ 12.5kHz
Emission Designator: * ³	Analog:	11K0F3E
	Digital:	7K60FXW, 7K60FXD
Support data rate:	9.6kbps	
Antenna Type:	Sucker antenna	
Antenna Gain:	5.5dBi	

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	
Qualifications	Type	Accreditation Number
	CNAS	L1225
	A2LA	3902.01
	FCC	762235
	Canada	5377A

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} 443.05
	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	√			√		√
RX-DN		√	√			
RX-AN		√		√		

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.

4 TEST RESULTS

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

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 Rsafe 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, Rreal, 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).

TEST RESULTS

☒ Passed ☐ Not Applicable

Calculating the Safe Distance

Before starting EME measurements, we calculated the safe distance, R_{safe} using the following formula:

$$R_{\text{safe}} = \sqrt{\frac{P_{\text{max}} \cdot G_n \cdot \eta}{4\pi \cdot S}}$$

G_n : antenna gain (numeric)

P_{max} : maximum power input to the antenna (mW)

S : power density limit (mW/m²) respectively

η : duty cycle (decimal number), for these measurements $\eta = 0.5$

The results of R_{safe} calculations:

FCC Part 2.1091:

RF Field Strength Limits for Occupational/Controlled Exposure

Frequency range (MHz)	Maximum tune-up power(dBm)	Antenna gain (dBi)	Power Density limit (mW/cm ²)	Minimum safety distance (cm)	Result
400MHz~480MHz for PMR	47.75	5.50	1.33	79.42	Pass

EME Data:

Measuring Antenna Height (cm)	Controlled RF Exposure (mW/cm ²)		
	Test distance 80cm	Test distance 90cm	Test distance 100cm
10	0.11	0.07	0.05
20	0.26	0.17	0.13
30	0.29	0.22	0.18
40	0.37	0.26	0.19
50	0.42	0.34	0.27
60	0.53	0.41	0.35
70	0.66	0.52	0.46
80	0.81	0.67	0.57
90	0.82	0.64	0.58
100	0.97	0.78	0.73
110	1.01	0.88	0.74
120	1.04	0.83	0.72
130	1.12	0.95	0.82
140	0.88	0.79	0.8
150	0.71	0.66	0.52
160	0.59	0.51	0.44
170	0.33	0.27	0.17
180	0.27	0.19	0.16
190	0.18	0.11	0.08
200	0.11	0.08	0.05

EME for Body Parts:

Part of the body/averaging points (m)	Controlled RF Exposure (mW/cm ²)
	Test distance 80cm
Whole body (0.1 to 2.0)	1.13
Lower body (0.1 to 0.9)	1.07
Upper body (1.0 to 2.0)	1.09

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 5.5dBi, the minimum mobile separation distance $R_{safe} = 80\text{cm}$.

5 TEST SETUP PHOTOS



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