



**中认信通**

CHINA CERTIFICATION ICT CO., LTD (DONGGUAN)



# MAXIMUM PERMISSIBLE EXPOSURE EVALUATION REPORT

**Applicant:** Hytera Communications Corporation Limited

**Address:** Hytera Tower, Hi-Tech Industrial Park North, 9108# Beihuan Road, Nanshan District, Shenzhen, 518057 China

**FCC ID:** YAMHM68XU1

**Product Name:** Digital Mobile Radio

**Model Number:** HM682 U1, HM680 U1, HM685 U1, HM686 U1,  
HM688 U1, HM689 U1, HM650 U1, HM652 U1,  
HM655 U1, HM656 U1, HM658 U1, HM659 U1

**Standard(s):** 47 CFR §1.1310, 47 CFR §2.1091

The above equipment has been tested and found compliant with the requirement of the relative standards by China Certification ICT Co., Ltd (Dongguan)

**Report Number:** CR22070026-00E

**Date Of Issue:** 2022-09-20

**Reviewed By:** Sun Zhong

*Sun Zhong*

**Title:** Manager

**Test Laboratory:** China Certification ICT Co., Ltd (Dongguan)

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**Test Facility**

The Test site used by China Certification ICT Co., Ltd (Dongguan) to collect test data is located on the No. 113, Pingkang Road, Dalang Town, Dongguan, Guangdong, China.

The lab has been recognized as the FCC accredited lab under the KDB 974614 D01 and is listed in the FCC Public Access Link (PAL) database, FCC Registration No. : 442868, the FCC Designation No. : CN1314.

The lab has been recognized by Innovation, Science and Economic Development Canada to test to Canadian radio equipment requirements, the CAB identifier: CN0123.

**Declarations**

China Certification ICT Co., Ltd (Dongguan) is not responsible for the authenticity of any test data provided by the applicant. Data included from the applicant that may affect test results are marked with a triangle symbol “▲”. Customer model name, addresses, names, trademarks etc. are not considered data.

Unless otherwise stated the results shown in this test report refer only to the sample(s) tested.

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## 1. GENERAL INFORMATION

### 1.1 Product Description for Equipment under Test (EUT)

<b>EUT Name:</b>	Digital Mobile Radio
<b>EUT Model:</b>	HM682 U1, HM652 U1
<b>Multiple Models:</b>	HM680 U1, HM685 U1, HM686 U1, HM688 U1, HM689 U1, HM650 U1, HM655 U1, HM656 U1, HM658 U1, HM659 U1
<b>Rated Input Voltage:</b>	DC 13.6V from Vehicle Battery
<b>Serial Number:</b>	CR22070026-RF-S1(Model: HM682 U1) CR22070026-RF-S2(Model: HM652 U1)
<b>EUT Received Date:</b>	2022.07.18
<b>EUT Received Status:</b>	Good
Note: The Multiple models are electrically identical with the test model. Please refer to the declaration letter for more detail, which was provided by manufacturer.	

### 1.1.2 Conducted Output power ▲:

Operation Modes	Operation Frequency (MHz)	Maximum Conducted Power including Tune-up Tolerance	
		(dBm)	(mW)
Bluetooth	2402-2480	8	6.31
UHF	400-470	47.5	56234.13
Note: The Above Parameters were provided by the manufacturer. The Bluetooth and UHF can transmit simultaneously.			

### 1.1.3 Antenna Information Detail ▲:

Antenna Chain	Manufacturer	Antenna Type	input impedance (Ohm)	Frequency Range	Antenna Gain
Bluetooth (HM652 U1)	Electric Connector Technology Co., Ltd.	FPC	50	2400-2500MHz	1.14dBi
Bluetooth (HM682 U1)	Zhejiang Haitong Communication Electronic Co., Ltd.	LDS	50	2400-2500MHz	3.8dBi
UHF	Hytera Communications Corporation Limited	Helical	50	400-470MHz	0 dBi

## 2. MAXIMUM PERMISSIBLE EXPOSURE (MPE)

### 2.1 Applicable Standard

According to 1.1310, 2.1091 systems operating under the provisions of this section shall be operated in a manner that ensures the public is not exposed to RF energy level in excess of the communication guidelines.

Limits for Maximum Permissible Exposure (MPE)

Limits for Occupational/Controlled Exposure				
Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (H) (A/m)	Power Density (S) (mW/cm <sup>2</sup> )	Averaging Time  E ,  H  or S (minutes)
0.3- 3.0	614	1.63	(100)*	6
3.0 - 30	1842/f	4.89/f	(900/f <sup>2</sup> )*	6
30-300	61.4	0.163	1.0	6
300-1500	/	/	f/300	6
1500-100,000	/	/	5	6

(B) Limits for General Population/Uncontrolled Exposure				
Frequency Range (MHz)	Electric Field Strength (V/m)	Magnetic Field Strength (A/m)	Power Density (mW/cm <sup>2</sup> )	Averaging Time (minutes)
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
300–1500	/	/	f/1500	30
1500–100,000	/	/	1.0	30

f = frequency in MHz;

\* = Plane-wave equivalent power density;

### 2.2 MPE Calculation

Prediction of power density at the distance of the applicable MPE limit

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

Where: S = power density (in appropriate units, e.g. mW/cm<sup>2</sup>);

P = power input to the antenna (in appropriate units, e.g., mW);

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 (appropriate units, e.g., cm);

For simultaneously transmit system, the calculated power density should comply with:

$$\sum_i \frac{S_i}{S_{Limit,i}} \leq 1$$

## 2.3 MPE Results

### For UHF:

Frequency (MHz)	Antenna Gain		Maximum Average output power including Tune-up Tolerance (mW)	Operation Duty Cycle (%)	Evaluation Distance (cm)	Power Density (mW/cm <sup>2</sup> )	Power Density Limit (mW/cm <sup>2</sup> )
	(dBi)	(numeric)					
400-470	0	1.0	56234.13	50	50	0.90	1.33

### For Bluetooth:

Frequency (MHz)	Antenna Gain		Conducted output power including Tune-up Tolerance		Evaluation Distance (cm)	Power Density (mW/cm <sup>2</sup> )	MPE Limit (mW/cm <sup>2</sup> )
	(dBi)	(numeric)	(dBm)	(mW)			
2402-2480	3.8	2.40	8	6.31	20.00	0.003	1.0

simultaneously transmit:

$$\sum_i \frac{S_i}{S_{Limit,i}} \leq 1$$

$$= S_{UHF}/S_{limit-UHF} + S_{BT}/S_{limit-BT}$$

$$= 0.90/1.33 + 0.003/1.0$$

$$= 0.68$$

**Result:** The device meet FCC MPE at 50 cm distance for Occupational/Controlled condition.

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