



MPE TEST REPORT

Report Reference No.	TRE1710000902	R/C.....: 43446
FCC ID	YAMRD98XSV3	
Applicant's name	Hytera Communications Corporation Limited	
Address	Hytera Tower, Hi-Tech Industrial Park North,9108# Beihuan Road, Nanshan District, Shenzhen, China	
Manufacturer.....	Hytera Communications Corporation Limited	
Address.....	Hytera Tower, Hi-Tech Industrial Park North,9108# Beihuan Road, Nanshan District, Shenzhen, China	
Test item description	DIGITAL REPEATER	
Trade Mark.....	Hytera	
Model/Type reference	RD982S V(3)	
Listed Model(s)	-	
Standard	FCC Per 47 CFR 2.1091(b) KDB447498 v05r02	
Date of receipt of test sample.....	Oct. 10, 2017	
Date of testing.....	Oct. 11, 2017 – Nov. 01, 2017	
Date of issue.....	Nov. 01, 2017	
Result	PASS	
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Supervised by (position+printed name+signature) . :	Project Engineer Cary Luo	
Approved by (position+printed name+signature) . :	RF Manager Hans Hu	
Testing Laboratory Name	Shenzhen Huatongwei International Inspection Co., Ltd.	
Address.....	Bldg3, Hongfa Hi-tech Industrial Park, Genyu Road, Shenzhen, China	

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*The test report merely corresponds to the test sample.
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1. SUMMARY

1.1. Client Information

Applicant:	Hytera Communications Corporation Limited
Address:	Hytera Tower, Hi-Tech Industrial Park North,9108# Beihuan Road, Nanshan District, Shenzhen, China
Manufacturer:	Hytera Communications Corporation Limited
Address:	Hytera Tower, Hi-Tech Industrial Park North,9108# Beihuan Road, Nanshan District, Shenzhen, China

1.2. Report version

Version No.	Date of issue	Description
00	Nov. 01, 2017	Original

1.3. Product Description

Name of EUT:	DIGITAL REPEATER	
Trade mark:	Hytera	
Model/Type reference:	RD982S V(3)	
Listed model(s):	-	
Power supply:	DC 13.6V	
Battery information:	-	
Charger information:	-	
Adapter information:	-	
Operation Frequency Range:	From 210MHz to 270MHz	
Rated Output Power:	High Power: 50W (46.99dBm); Low Power: 5W (36.99dBm)	
Modulation Type:	Analog Voice:	FM
	Digital Voice/Digital Data:	4FSK
Digital Type:	DMR	
Channel Separation:	Analog Voice:	<input checked="" type="checkbox"/> 12.5kHz
	Digital Voice /Digital Data:	<input checked="" type="checkbox"/> 12.5kHz <input type="checkbox"/> 6.25kHz
Emission Designator:	Analog Voice:	<input checked="" type="checkbox"/> 12.5kHz Channel Separation: 9K94F3E
	Digital Voice& Data:	<input checked="" type="checkbox"/> 12.5kHz Channel Separation: 7K79FXW <input type="checkbox"/> 6.25kHz Channel Separation: ---
	Digital Data:	<input checked="" type="checkbox"/> 12.5kHz Channel Separation: 7K79FXD <input type="checkbox"/> 6.25kHz Channel Separation: ---
Support data rate:	9.6kbps	
Antenna Type:	External	
Maximum Transmitter Power:	Digital	48.98W for 12.5kHz Channel Separation
	Analog	49.55W for 12.5kHz Channel Separation

Note:

- 1)The product has the same digital working characters when operating in both two digitized voice/data mode. So only one set of test results for digital modulation modes are provided in this test report.
- 2)This equipment is capable of supporting a minimum data rate of 4800 bits per second per 6.25 kHz of channel bandwidth. DMR interphone's bandwidth is 12.5 kHz, and it has a double time slot, one is the speech time slot, one is the data time slot, just language sequence is satisfied with 4800 bps/6.25 kHz BW.

1.4. Test frequency list

Mode	Modulation	Channel Separation (kHz)	Operation Frequency Range (MHz)	Test Channel	Test Frequency (MHz)
Analog	FM	12.5	210~216	CH _{L1}	210.0125
				CH _{H1}	215.9875
Digital	4FSK	12.5		CH _{L1}	210.0125
				CH _{H1}	215.9875
Analog	FM	12.5	216~220	CH _{L2}	216.0125
				CH _{H2}	219.9875
Digital	4FSK	12.5		CH _{L2}	216.0125
				CH _{H2}	219.9875
Analog	FM	12.5	220~222	CH _{L3}	220.0125
				CH _{H3}	221.9875
Digital	4FSK	12.5		CH _{L3}	220.0125
				CH _{H3}	221.9875
Analog	FM	12.5	222~270	CH _{L4}	222.0125
				CH _{H4}	269.9875
Digital	4FSK	12.5		CH _{L4}	222.0125
				CH _{H4}	269.9875

Note:

In section 15.31(m), regards to the operating frequency range over 10 MHz, the Lowest frequency, the middle frequency, and the highest frequency of channel were selected to perform the test, please see the above listed frequency for testing.

1.5. EUT operation mode

Test mode	Transmitting	Power level	Digital	Analog
		High	12.5kHz	12.5kHz
TX1	√	√	√	
TX2	√			√

√: is operation mode.

1.6. EUT configuration

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

● - supplied by the manufacturer

○ - supplied by the lab

●	Power Cable	Length (m) :	>3.00
		Shield :	Unshielded
		Detachable :	Undetachable
○	Multimeter	Manufacturer :	/
		Model No. :	/

1.7. Modifications

No modifications were implemented to meet testing criteria.

2. TEST ENVIRONMENT

2.1. Address of the test laboratory

Laboratory: Shenzhen Huatongwei International Inspection Co., Ltd.

Address: 1/F, Bldg 3, Hongfa Hi-tech Industrial Park, Genyu Road, Tianliao, Gongming, Shenzhen, China

Phone: 86-755-26748019 Fax: 86-755-26748089

The sites are constructed in conformance with the requirements of ANSI C63.7, ANSI C63.4 (2014) and CISPR Publication 22.

2.2. Environmental conditions

During the measurement the environmental conditions were within the listed ranges:

Temperature: 15-35 ° C

Humidity: 30-60 %

Atmospheric pressure: 950-1050mbar

2.3. Statement of the measurement uncertainty

The data and results referenced in this document are true and accurate. The reader is cautioned that there may be errors within the calibration limits of the equipment and facilities. The measurement uncertainty was calculated for all measurements listed in this test report acc. to TR-100028-01 "Electromagnetic compatibility and Radio spectrum Matters (ERM); Uncertainties in the measurement of mobile radio equipment characteristics; Part 1" and TR-100028-02 "Electromagnetic compatibility and Radio spectrum Matters (ERM); Uncertainties in the measurement of mobile radio equipment characteristics; Part 2" and is documented in the Shenzhen Huatongwei International Inspection Co., Ltd quality system acc. to DIN EN ISO/IEC 17025. Furthermore, component and process variability of devices similar to that tested may result in additional deviation. The manufacturer has the sole responsibility of continued compliance of the device.

Hereafter the best measurement capability for Shenzhen Huatongwei laboratory is reported:

Test Items	Measurement Uncertainty	Notes
Transmitter power conducted	0.57 dB	(1)
Transmitter power Radiated	2.20 dB	(1)

(1) This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of $k=1.96$.

3. Method of measurement

3.1. 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",

KDB447498 v05r02: Mobile and Portable Devices RF Exposure Procedures and Equipment Authorization Policies

3.2. 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

3.3. 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

TX1,TX2								
Test Frequency (MHz)	Minimum Separation Distance (cm)	Max. Output Power (W)	Max. Output Power (mW)	Antenna Gain (dBi)	Antenna Gain (Numeric)	Power Density (mW/cm ²)	Power Density Limit FCC (mW/cm ²)	Test Results
210.0125	340	60	60000	6.5	4.4668	0.18	0.2	PASS
215.9875	340	60	60000	6.5	4.4668	0.18	0.2	PASS
216.0125	340	60	60000	6.5	4.4668	0.18	0.2	PASS
219.9875	340	60	60000	6.5	4.4668	0.18	0.2	PASS
220.0125	340	60	60000	6.5	4.4668	0.18	0.2	PASS
221.9875	340	60	60000	6.5	4.4668	0.18	0.2	PASS
222.0125	340	60	60000	6.5	4.4668	0.18	0.2	PASS
269.9875	340	60	60000	6.5	4.4668	0.18	0.2	PASS

Note:

1) Max Output Power (W)= Rated Output Power (W)+ 20%*Rated Output Power (W)=50+10=60W

2) EUT Antenna Gain=6.5dBi

4. Conclusion

The measurement results comply with the FCC Limit per 47 CFR 1.1310(e) for general population/ Uncontrolled exposure.

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