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MPE TEST REPORT

FCC Per 47 CFR 2.1091(b)

Report Reference No.....:	**TRE1311014702 R/C: 84170**
FCC ID.....:	**YAMMD65XU1**
Compiled by (position+printed name+signature)..:	File administrators Jerome Luo
Supervised by (position+printed name+signature)..:	Test Engineer Yuchao Wang
Approved by (position+printed name+signature)..:	Manager Wenliang Li
Date of issue.....:	Dec 16, 2013
Testing Laboratory Name.....:	**Shenzhen Huatongwei International Inspection Co., Ltd**
Address.....:	Keji Nan No.12 Road, Hi-tech Park, Shenzhen, China
Applicant's name.....:	**Hytera Communications Corporation Ltd.**
Address.....:	HYT Tower,Hi-Tech Industrial Park North,Nanshan District,Shenzhen China.518057
Test specification ..... **:**	
Standard .....:	**FCC Per 47 CFR 2.1091(b)**
	KDB447498 v05r01
TRF Originator.....:	Shenzhen Huatongwei International Inspection CO., Ltd
Master TRF.....:	Dated 2006-06

Test item description ..... :	Digital Mobile Radio
Trade Mark .....:	Hytera
Manufacturer .....:	**Hytera Communications Corporation Ltd.**
Model/Type reference.....:	MD652 U(1)
Listed Models .....:	MD650 U(1), MD655 U(1), MD656 U(1),MD658 U(1)
Ratings.....:	DC 13.6V
Modulation .....:	FM&4FSK
Channel Separation.....	12.5KHz
Rated Power	25 Watts(43.98dBm)/1Watts(30.00dBm)
Operation Frequency Range	From 400 MHz to 470 MHz
Result.....:	**PASS**

MPE TEST REPORT

Test Report No. :	**TRE1311014702**	Dec 16, 2013 Date of issue

Equipment under Test	:	Digital Mobile Radio
Model /Type	:	MD652 U(1)
Listed Models	:	MD650 U(1), MD655 U(1), MD656 U(1),MD658 U(1)
Applicant	:	**Hytera Communications Corporation Ltd.**
Address	:	HYT Tower,Hi-Tech Industrial Park North,Nanshan District,Shenzhen China.518057
Manufacturer		**Hytera Communications Corporation Ltd.**
Address	:	HYT Tower,Hi-Tech Industrial Park North,Nanshan District,Shenzhen China.518057

Test Result	**PASS**

The test report merely corresponds to the test sample.
It is not permitted to copy extracts of these test result without the written permission of the test laboratory.

Contents

1. SUMMARY

1.1. 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. :	/

1.2. Product Description

The Hytera Communications Corporation Ltd.'s Model: MD652 U(1) or the "EUT" as referred to in this report; more general information as follows, for more details, refer to the user's manual of the EUT.

Name of EUT	Digital Mobile Radio	
Model Number	MD650 U(1), MD652 U(1), MD655 U(1), MD656 U(1),MD658 U(1)	
FCC ID	YAMMD65XU1	
Rated Output Power	25 Watts(43.98dBm)/1 Watts(30.00dBm)	
Support data rate	9.6kbps	
Modilation Type	FM for Analog Voice	
	4FSK for Digital Voice/Digital Data	
	4FSK for Digital Data	
	Analog	11K0F3E for 12.5KHz Channel Separation
	Digital	7K60FXD for Digital Data only
		7K60FXW for Digital Data & Digital Voice
Channel Separation	Analog Voice	12.5KHz
	Digital Voice/Data	12.5KHz
	Digital Data	12.5KHz
Antenna Type	External	
Frequency Range	From 406 MHz to 470 MHz	
Maximum Transmitter Power	Analog	29.51W for 12.5 KHz Channel Separation
	Digital	29.79W for 12.5 KHz Channel Separation

Note: The product has the same digital working characters when operating in both two digitized voice/data mode (7K60FXD and 7K60FXW). So only one set of test results for digital modulation modes are provided in this test report.

1.3. EUT operation mode

The EUT has been tested under typical operating condition and The Transmitter was operated in the normal operating mode. The TX frequency was fixed which was for the purpose of the measurements.

EUT operation mode no.	Description of operation mode	Additional information
Op 1	FM+BW12.5KHz+TX	The equipment is set with FM modulation and 12.5KHz bandwidth at maximum rated power for transmitter,powered by DC 13.60V
Op 2	FM+BW12.5KHz+TX	The equipment is set with FM modulation and 12.5KHz bandwidth at minimum rated power for transmitter,powered by DC 13.60V
Op 3	4FSK+BW12.5KHz+TX	The equipment is set with 4FSK modulation and 12.5KHz bandwidth at maximum rated power for transmitter,powered by DC 13.60V
Op 4	4FSK+BW12.5KHz+TX	The equipment is set with 4FSK modulation and 12.5KHz bandwidth at minimum rated power for transmitter,powered by DC 13.60V
Op 5	FM+BW12.5KHz+RX	The equipment is set to 12.5KHz bandwidth FM channel for receiver,powered by DC 13.60V
Op 6	4FSK+BW12.5KHz+RX	The equipment is set to 12.5KHz bandwidth Digital channel for receiver,powered by DC 13.60V

1.4. Note

1. The EUT is a U frequency band (400-470MHz) Digital Mobile Radio with GPS function,The functions of the EUT listed as below:

	Test Standards	Reference Report
Radio	FCC Part 90	TRE1311014701
MPE	FCC Part 2.1093	TRE1311014702
MPE	FCC Part 2.1093	TRE1311014703

2. TEST ENVIRONMENT

2.1. Address of the test laboratory

Shenzhen Huatongwei International Inspection Co., Ltd
Keji Nan No.12 Road, Hi-tech Park, Shenzhen, China
Phone: 86-755-26715686 Fax: 86-755-26748089

The sites are constructed in conformance with the requirements of ANSI C63.7, ANSI C63.4 (2009) 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)

(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 §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 §1.1310 and §2.1091 RF exposure is calculated.
KDB447498 v05r01:Mobile and Portable Devices RF Exposure Procedures and Equipment Authorization Policies

3.2. Limit

Limits for Maximum Permissible Exposure (MPE)/Controlled Exposure

Frequency Range(MHz)	Electric Field Strength(V/m)	Magnetic Field Strength(A/m)	Power Density (mW/cm²)	Averaging Time (minute)
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 – 1500	/	/	f/300	6
1500 – 100,000	/	/	5	6

Limits for Maximum Permissible Exposure (MPE)/Uncontrolled Exposure

Frequency Range(MHz)	Electric Field Strength(V/m)	Magnetic Field Strength(A/m)	Power Density (mW/cm²)	Averaging Time (minute)
Limits for Occupational/Controlled Exposure				
0.3 – 3.0	614	1.63	(100) *	30
3.0 – 30	824/f	2.19/f	($180/f^2$)*	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

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

As declared by the Applicant, the EUT transmits with the maximum soure-baed Duty Cycle of 100%-see the User manual, and the EUT is a wireless device used in a mobile application, at least 108 cm from any body part of the user or nearby persons; from the maximum EUT RF output power, the minimum mobile separation distance, r =108cm, as well as the gain of the used antenna is 5.50dBi, the RF power density can be obtained.

TEST RESULTS

For Op 1

Test Frequency (MHz)	Minimum Separation Distance (cm)	Output Power (dBm)	Output Power (mW)	Antenna Gain (Numeric)	Power Density At 108 cm (mW/cm^2)	Power Density Limit (mW/cm^2)	Test Results
406.5000	108.00	44.59	28773.98	3.5481	0.6965	1.3550	PASS
435.5000	108.00	44.70	29512.09	3.5481	0.7144	1.4516	PASS
469.5000	108.00	44.58	28707.81	3.5481	0.6949	1.5650	PASS

For Op 2

Test Frequency (MHz)	Minimum Separation Distance (cm)	Output Power (dBm)	Output Power (mW)	Antenna Gain (Numeric)	Power Density At 108 cm (mW/cm^2)	Power Density Limit (mW/cm^2)	Test Results
406.5000	108.00	30.24	1056.818	3.5481	0.0256	1.3550	PASS
435.5000	108.00	30.02	1004.616	3.5481	0.0243	1.4516	PASS
469.5000	108.00	30.29	1069.055	3.5481	0.0259	1.5650	PASS

For Op 3

Test Frequency (MHz)	Minimum Separation Distance (cm)	Output Power (dBm)	Output Power (mW)	Antenna Gain (Numeric)	Power Density At 108 cm (mW/cm^2)	Power Density Limit (mW/cm^2)	Test Results
406.5000	108.00	44.74	29785.16	3.5481	0.7210	1.3550	PASS
435.5000	108.00	44.69	29444.22	3.5481	0.7128	1.4516	PASS
469.5000	108.00	44.74	29785.16	3.5481	0.7210	1.5650	PASS

For Op 4

Test Frequency (MHz)	Minimum Separation Distance (cm)	Output Power (dBm)	Output Power (mW)	Antenna Gain (Numeric)	Power Density At 108 cm (mW/cm^2)	Power Density Limit (mW/cm^2)	Test Results
406.5000	108.00	30.50	1122.02	3.5481	0.0272	1.3550	PASS
435.5000	108.00	30.26	1061.70	3.5481	0.0257	1.4516	PASS
469.5000	108.00	30.38	1091.44	3.5481	0.0264	1.5650	PASS

4. Conclusion

The measurement results comply with the FCC Limit per 47 CFR 2.1091 for the controlled RF Exposure.

.....End of Report.....