Shenzhen Huatongwei International Inspection Co., Ltd.
Keji S,12th , Road, Hi-tech Industrial Park, Shenzhen, Guangdong, China
Phone:86-755-26748099 Fax:86-755-26748089 http://www.szhtw.com.cn

CNASL1225

MPE TEST REPORT

FCC Per 47 CFR 2.1091(b)

Report Reference No.....:	**TRE1311014703 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)**
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)
Modulation .....:	FM&4FSK
Channel Separation.....	12.5KHz
Rated Power .....:	25 Watts(43.98dBm)/1Watts(30.00dBm)
Operation Frequency.....	From 400 MHz to 470 MHz
Ratings.....:	DC 13.60 V
Result.....:	**PASS**

MPE T E S T R E P O R T

Test Report No. :	**TRE1311014703**	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**

Contents

1. Measurement Uncertainty

The information below presents an estimate of the possible errors that are associated with the measurement system.

Description	Error
NARDA Survey Meter	**± 3%**
Repeatability Accuracy	**± 7%**

2. Method of measurement

2.1. EME measurements made on trunk mounted antennas

2.1.1. External vehicle EME measurement

(Antenna mounted in trunk center)
With the survey meter and probe, take ten (10) measurements, at the standard test distance of 60 cm to the antenna, from the back of the vehicle in a vertical line and then average the results. These measurements are taken and recorded at every twenty (20) centimeters over a range starting at twenty (20) centimeters above ground and ending at 2.0 meters.

2.1.2. Internal vehicle EME measurement

(Antenna mounted in trunk center)
While rotating survey meter probe through 180 degrees to ensure that the highest level is found, scan the inside of the vehicle, both front and back seating areas, for the highest level in each location. After the highest level is found, scan vertically making two (2) additional measurements within an area approximately 40 cm wide (representing the width of a person) so as to have a total of three (3) measured points as indicated below that will be averaged
.
a) Head area
b) Chest area
c) Lower Trunk area

2.2. EME measurements made on center roof mounted antennas

2.2.1. External vehicle EME measurement

With the survey meter and probe, take ten (10) measurements, at the standard test distance of 110 cm from the vehicle-mounted antenna, in a vertical line and then average the results. These measurements are taken and recorded at every twenty (20) centimeters over a range starting at twenty (20) centimeters above ground and ending at 2.0 meters; this would be representative of a person standing next to a vehicle during a mobile radio transmission.

2.2.2. Internal vehicle EME measurement

While rotating survey meter probe through 180 degrees to ensure that the highest level is found, scan the inside of the vehicle, both front and back seating areas, for the highest level in each location. After the highest level is found, scan vertically making two (2) additional measurements within an area approximately 40 cm wide (representing the width of a person) so as to have a total of three (3) measured points as indicated below that will be averaged.

a) Head area
b) Chest area
c) Lower Trunk area

3. Approved Accessories

Antenna:

Model: TQC-400DII
Roof Mount 400MHz-470MHz
Gain: 5.50dBi

Vehicle:

Band: BYD
Model: F6

4. Test Result

The following tables presents detailed MPE measurement information for each test configuration; person external or internal to the vehicle, TX frequency, antenna (location, model and gain), distance from antenna to probe sensor, E/H field measurements, calibration factor, MPE average over body, initial power, power density calc, power density max calc, IEEE controlled and uncontrolled limits, and maximum output power.

The Average over Body test methodology is consistent with IEEE/ANSI C95.3-2002 guidelines

MPE results are based on a 50% duty cycle which is in accordance with the User Manual instructions.

Below is an explanation of how the MPE results are calculated.

External to vehicle - 10 measurements are averaged over the body (Body_Avg).

Internal to vehicle - 3 measurements are averaged over the body (Body_Avg).

Narda Survey Meter measures in percent of the controlled limit. Therefore the averages over the body used in the calculations below reflect percentages

MPE results are based on a Push-To-Talk (PTT) 50% duty cycle in CW mode.

Therefore;

$$\text{Average\_over\_Body} = \text{Body\_Avg} * \text{Controlled\_Limit}$$

$$\text{Pwr\_Density\_Calc} = \text{Average\_over\_Body} * \text{\_Duty\_Cycle}$$

$$\text{Pwr\_Density\_Max\_Calc} = \text{Pwr\_Density\_Calc} * \frac{\text{Max\_Output\_Power}}{\text{Initial\_Output\_Power}}$$

Note; For Initial Output Power> Max_Output_Power, Max_Output_Power / Initial Output Power = 1

Measurement Information			
Measurement Frequency (MHz)	406.5	435.5	469.5
Raw Data Power(W)	29.79	29.51	29.79
Controlled Limit(mW/cm^2)	1.3350	1.4516	1.5650
Uncontrolled Limit(mW/cm^2)	0.2670	0.2903	0.3130
Calibration	1.00	1.00	1.00
Antenna / gain(dBi)	Whip / 5.50	Whip / 5.50	Whip / 5.50
External Vehicle Power Density(50% duty)	**Average over body/2**		
Internal Vehicle Power Density(50% duty)	**Average over (head/chest/leg)/2**		

External Vehicle MPE Assessment at 406.5 MHz						
Antenna Location	**Antenna/ gain**	**Measurement Distance (cm)**	**E/H Field**	**Calibration Factor**	**Average Over Body**	**Pwr. Density (mW/cm^2)**
Trunk	Whip / 5.50	60	E	1.00	0.215	0.108
Measurement Grid						
Test position	**Height (cm)**	**% of controlled limit**	**Test position**	**Height (cm)**	**% of controlled limit**	
1	20	5.92%	6	120	35.63%	
2	40	8.16%	7	140	26.82%	
3	60	18.97%	8	160	14.79%	
4	80	21.20%	9	180	20.34%	
5	100	30.14%	10	200	13.68%	

External Vehicle MPE Assessment at 435.5 MHz						
Antenna Location	**Antenna/ gain**	**Measurement Distance (cm)**	**E/H Field**	**Calibration Factor**	**Average Over Body**	**Pwr. Density (mW/cm^2)**
Trunk	Whip / 5.50	60	E	1.00	0.246	0.123
Measurement Grid						
Test position	**Height (cm)**	**% of controlled limit**	**Test position**	**Height (cm)**	**% of controlled limit**	
1	20	5.24%	6	120	33.04%	
2	40	8.97%	7	140	24.93%	
3	60	19.21%	8	160	13.32%	
4	80	22.67%	9	180	18.78%	
5	100	29.55%	10	200	12.91%	

External Vehicle MPE Assessment at 469.5 MHz						
Antenna Location	**Antenna/ gain**	**Measurement Distance (cm)**	**E/H Field**	**Calibration Factor**	**Average Over Body**	**Pwr. Density (mW/cm^2)**
Trunk	Whip / 5.50	60	E	1.00	0.204	0.102
Measurement Grid						
Test position	**Height (cm)**	**% of controlled limit**	**Test position**	**Height (cm)**	**% of controlled limit**	
1	20	6.85%	6	120	37.37%	
2	40	9.19%	7	140	29.10%	
3	60	20.34%	8	160	18.39%	
4	80	23.17%	9	180	22.08%	
5	100	32.75%	10	200	15.06%	

External Vehicle MPE Assessment at 435.5 MHz						
Antenna Location	**Antenna/ gain**	**Measurement Distance (cm)**	**E/H Field**	**Calibration Factor**	**Average Over Body**	**Pwr. Density (mW/cm^2)**
Roof	Whip / 5.50	60	E	1.00	0.158	0.079
Measurement Grid						
Test position	**Height (cm)**	**% of controlled limit**	**Test position**	**Height (cm)**	**% of controlled limit**	
1	20	4.23%	6	120	36.16%	
2	40	9.67%	7	140	28.28%	
3	60	21.19%	8	160	16.33%	
4	80	24.45%	9	180	20.56%	
5	100	31.98%	10	200	15.05%	

Internal Vehicle MPE Assessment at 406.5 MHz						
Antenna Location	**Antenna Gain**	**Measurement Distance (cm)**	**E/H Field**	**Calibration Factor**	**Average over Head,Chest,Leg Back/Front Seats (mW/cm^2)**	**Pwr. Density of Higher Level (mW/cm^2)**
Trunk	Whip / 5.50	Highest Reading	E	1.00	0.221/0.085	0.111/0.043
Measurement Grid						
Test position		**% of controlled limit Head**		**% of controlled limit Chest**		**% of controlled limit Leg**
Back Seat		15.85%		13.97%		12.53%
Front Sea		8.96%		6.74%		4.16%

Internal Vehicle MPE Assessment at 435.5 MHz						
Antenna Location	**Antenna Gain**	**Measurement Distance (cm)**	**E/H Field**	**Calibration Factor**	**Average over Head,Chest,Leg Back/Front Seats (mW/cm^2)**	**Pwr. Density of Higher Level (mW/cm^2)**
Trunk	Whip / 5.50	Highest Reading	E	1.00	0.244/0.093	0.122/0.047
Measurement Grid						
Test position		**% of controlled limit Head**		**% of controlled limit Chest**		**% of controlled limit Leg**
Back Seat		28.91%		22.80%		16.44%
Front Sea		12.37%		9.89%		6.76%

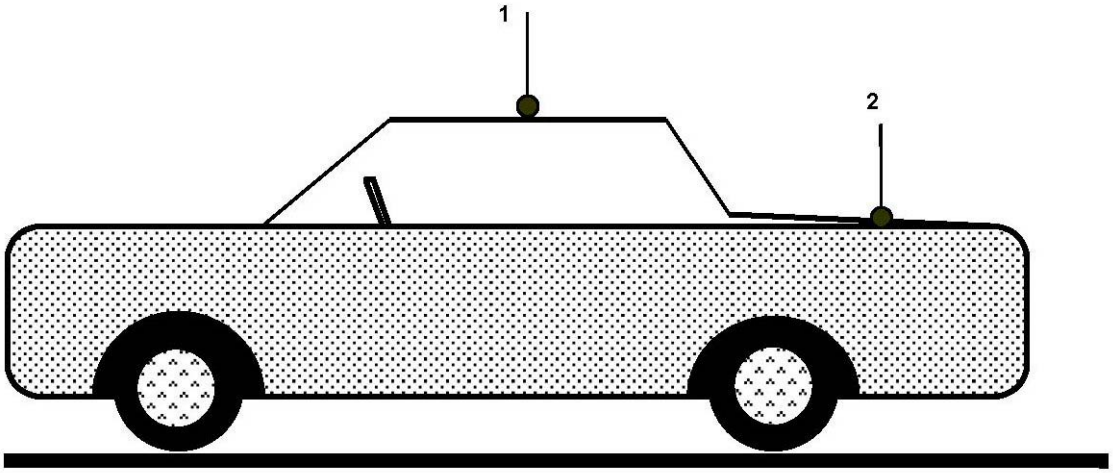
Internal Vehicle MPE Assessment at 469.5 MHz						
Antenna Location	**Antenna Gain**	**Measurement Distance (cm)**	**E/H Field**	**Calibration Factor**	**Average over Head,Chest,Leg Back/Front Seats (mW/cm^2)**	**Pwr. Density of Higher Level (mW/cm^2)**
Trunk	Whip / 5.50	Highest Reading	E	1.00	0.206/0.090	0.103/0.045
Measurement Grid						
Test position		**% of controlled limit Head**		**% of controlled limit Chest**		**% of controlled limit Leg**
Back Seat		20.17%		17.01%		11.32%
Front Sea		10.64%		8.22%		5.39%

Internal Vehicle MPE Assessment at 435.5 MHz						
Antenna Location	**Antenna Gain**	**Measurement Distance (cm)**	**E/H Field**	**Calibration Factor**	**Average over Head,Chest,Leg Back/Front Seats (mW/cm^2)**	**Pwr. Density of Higher Level (mW/cm^2)**
Roof	Whip / 5.50	Highest Reading	E	1.00	0.153/0.072	0.077/0.036
Measurement Grid						
Test position		**% of controlled limit Head**		**% of controlled limit Chest**		**% of controlled limit Leg**
Back Seat		39.82%		30.00%		22.73%
Front Sea		23.17%		15.03%		11.42%

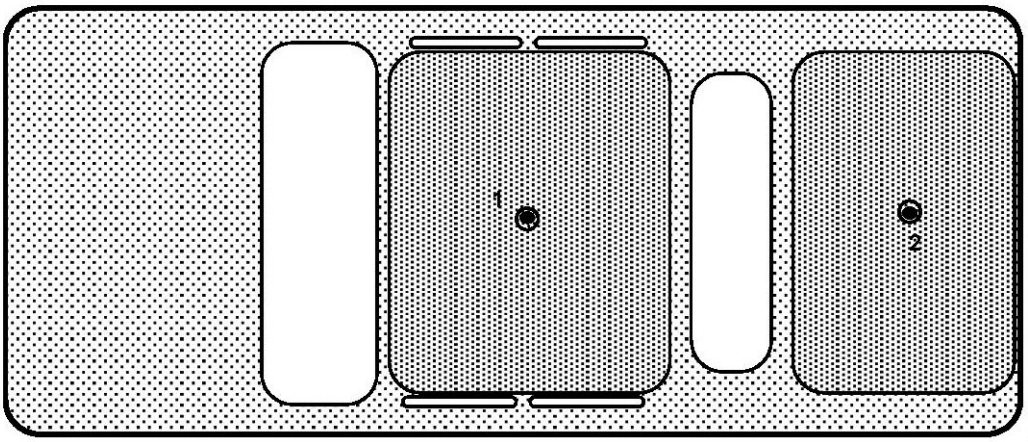
5. Conclusion

The measurement results comply with the FCC Limit Per 47 CFR 2.1091 (b) for the controlled RF Exposure.

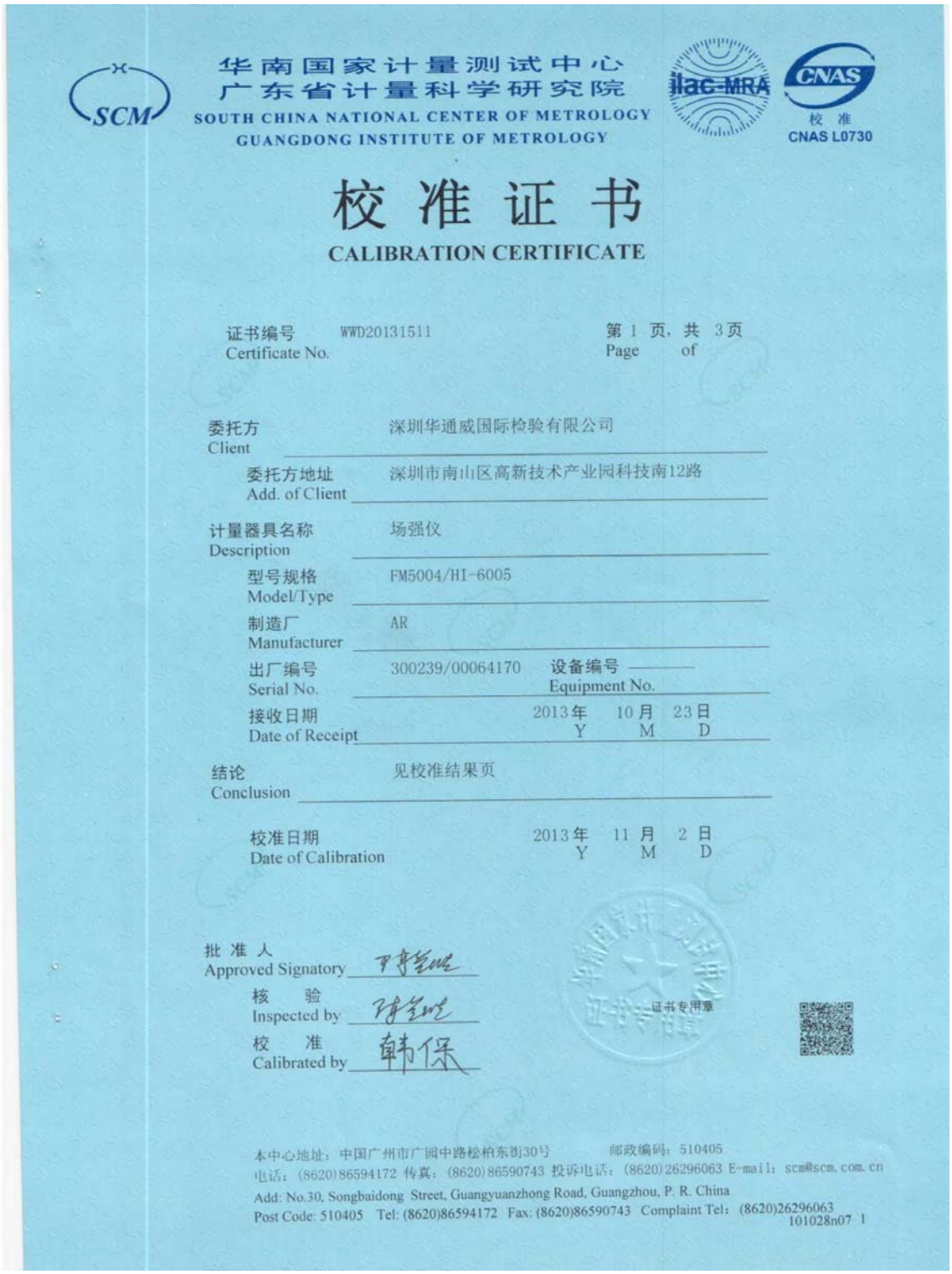
6. Antenna Location Drawing



1 - Roof (center)
2 - Trunk (center)



7. Probe Calibration Certificates



华南国家计量测试中心
广东省计量科学研究院
SOUTH CHINA NATIONAL CENTER OF METROLOGY
GUANGDONG INSTITUTE OF METROLOGY

CNAS 校准 CNAS L0730

校准证书
CALIBRATION CERTIFICATE

证书编号 Certificate No. WWD20131511 第 1 页，共 3 页 Page of

委托方 Client 深圳华通威国际检验有限公司

委托方地址 Add. of Client 深圳市南山区高新技术产业园科技南12路

计量器具名称 Description 场强仪

型号规格 Model/Type FM5004/HI-6005

制造厂 Manufacturer AR

出厂编号 Serial No. 300239/00064170 设备编号 Equipment No. ———

接收日期 Date of Receipt 2013年 Y 10月 M 23日 D

结论 Conclusion 见校准结果页

校准日期 Date of Calibration 2013年 Y 11月 M 2日 D

批准人 Approved Signatory

核验 Inspected by

校准 Calibrated by 韩保

证书专用章

本中心地址：中国广州市广园中路松柏东街30号 邮政编码：510405
电话：(8620)86594172 传真：(8620)86590743 投诉电话：(8620)26296063 E-mail：scm@scm.com.cn
Add: No.30, Songbaidong Street, Guangyuanzhong Road, Guangzhou, P. R. China
Post Code: 510405 Tel: (8620)86594172 Fax: (8620)86590743 Complaint Tel: (8620)26296063
101028n07 1

华南国家计量测试中心
广东省计量科学研究院
SOUTH CHINA NATIONAL CENTER OF METROLOGY
GUANGDONG INSTITUTE OF METROLOGY

CNAS 校准 CNAS L0730

说 明

证书编号 WWD20131511
Certificate No.

DIRECTIONS

第 2 页，共 3 页
Page of

1. 本中心是国家质量监督检验检疫总局在华南地区设立的国家法定计量检定机构，计量授权证书号是：（国）法计（2007）01043号、（国）法计（2007）01032号。本中心是中国合格评定国家认可委员会(CNAS)认可实验室，认可证书号为：CNAS L0730.

This laboratory is the National Legal Metrological Verification Institution in southern China set up by the General Administration of Quality Supervision, Inspection and Quarantine of the People's Republic of China (AQSIQ) under authorization certificates No.(2007)01043 & (2007)01032. This laboratory is accredited by China National Accreditation Service for Conformity Assessment under Laboratory Accreditation Certification No. CNAS L0730.

2. 本中心所出具的数据均可溯源至国家计量基准和国际单位制(SI)。
All data issued by this laboratory are traceable to national primary standards and International System of Units (SI).

3. 本次校准的技术依据：
Reference documents for the calibration:

IEEE 1309-2005 Calibration of electromagnetic field sensors and probes, excluding antennas, from 9 kHz to 40 HGz 频率为9KHz～40GHz的电磁场传感器和探头(天线除外)的校准
JJG 561-1988 RJ-3型近区电场测量仪试行检定规程 V.R.of Model RJ-3 Near-Zone Electric-Field Measuring Instruments

4. 本次校准所使用的主要计量标准器具：
Major standards of measurement used in the calibration:

设备名称/型号 Name of Equipment /Model	编号 Serial No.	证书号/有效期 Certificate No. /Due Date	计量特性 Metrological Characteristic
场强标准 TEM Cell /8801	014	WWD20140034 /2014-01-12	±1 dB
功率放大器 Power Amplifier /100W1000B	305581	WWS20140786 /2014-07-15	增益 :U_{rel}=1 dB(k=2) Gain :U_{rel}=1 dB(k=2)
信号发生器 Signal Generator /E8267C	US42340272	WWS20140376 /2014-04-18	电平:U_{rel}=0.20 dB 频率:$U_{rel}=1\times10^{-8}$ (k=2) Level:U_{rel}=0.20 dB , Frequency:$U_{rel}=1\times10^{-8}$ (k=2)
电场探头/读出装置 Electromagnetic Field Meter/reader /EP183/8053A	000WJ40805&1420K211 37	XDdj2014-1988 /2014-09-24	U=(0.94～1.3) dB, k=2

5. 校准地点、环境条件：
Place and environmental conditions of the calibration:

地点 Place 无线电室（Radio Lab.） 温度 Temperature (20±5) ℃ 相对湿度 RH <80 %

6. 被校准仪器限制使用条件：
Limiting condition of the instrument calibrated:

注：1. 本证书校准结果只与受校准仪器有关。
2. 未经本中心书面批准，不得部分复制此证书。

Note:1. The results relate only to the items calibrated.
2. This certificate shall not be reproduced except in full, without the written approval of our laboratory.

华南国家计量测试中心
广东省计量科学研究院
SOUTH CHINA NATIONAL CENTER OF METROLOGY
GUANGDONG INSTITUTE OF METROLOGY

CNAS 校准 CNAS L0730

校准结果
RESULTS OF CALIBRATION

证书编号 WWD20131511 原始记录号 020101511 第 3 页,共 3 页
Certificate No. Record No. Page of

1 场强测量准确度 (见表1)
Field Strength Measuring Accuracy (See Table 1)

表1 (Table 1)

探头 Probe	频率 Frequency	标准值 Reference Value	被检表示值 Indication Value	误差(dB) Error	允许误差 MPE	结论 Conclusion
HI-6005	27 MHz	1 V/m	1.08 V/m	+0.67	±2.0 dB	合格(Pass)
	27 MHz	2 V/m	2.21 V/m	+0.87	±2.0 dB	合格(Pass)
	27 MHz	5 V/m	5.07 V/m	+0.12	±2.0 dB	合格(Pass)
	27 MHz	10 V/m	9.93 V/m	-0.06	±2.0 dB	合格(Pass)
	27 MHz	20 V/m	19.29 V/m	-0.31	±2.0 dB	合格(Pass)

2 频率响应 (见表2)
Frequency Response (See Table 2)

表2 (Table 2)

探头 Probe	频率 Frequency	标准值 Reference Value	被检表示值 Indication Value	误差(dB) Error	允许误差 MPE	结论 Conclusion
HI-6005	100 kHz	10 V/m	8.30 V/m	-1.62	N/A	合格(Pass)
	1 MHz	10 V/m	9.83 V/m	-0.15	N/A	合格(Pass)
	10 MHz	10 V/m	10.44 V/m	+0.37	N/A	合格(Pass)
	27 MHz	10 V/m	9.93 V/m	-0.06	±2.0 dB	合格(Pass)
	50 MHz	10 V/m	9.74 V/m	-0.23	±2.0 dB	合格(Pass)
	100 MHz	10 V/m	9.82 V/m	-0.16	±2.0 dB	合格(Pass)
	200 MHz	10 V/m	9.68 V/m	-0.28	±2.0 dB	合格(Pass)
	300 MHz	10 V/m	9.36 V/m	-0.57	±2.0 dB	合格(Pass)
	1 GHz	10 V/m	9.12 V/m	-0.80	±2.0 dB	合格(Pass)
	2 GHz	10 V/m	9.76 V/m	-0.21	±2.0 dB	合格(Pass)
	3 GHz	10 V/m	9.03 V/m	-0.89	N/A	合格(Pass)

说明(Note):
1 测量结果的扩展不确定度:
Expanded uncertainty of measurement:
U=1.5 dB，k=2
(依据 JJF1059－1999 测量不确定度评定与表示)
(In accordance with JJF1059-1999 Evaluation and Expression of Uncertainty in Measurement)
2 建议校准周期不超过1年。
The period of calibration advised within one year.

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