



MPE TEST REPORT

FCC Per 47 CFR 2.1091(b)

FCC ID: YAMMD78XVHF

Compiled by

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Date of issue.....: Oct 10, 2010

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

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Test item description: Digital Mobile Radio

Trade Mark:

Manufacturer: Hytera Communications Corporation Ltd.

Model/Type reference.....: MD782 VHF/ MD785 VHF/ MD786 VHF/ MD788 VHF

Listed Models: /

Ratings: DC 13.60V

Modulation: FM&4FSK

Rated Power: 50 Watts(46.99 dBm)/5 Watts(36.99 dBm)

Channel Separation.....: 12.5KHz/25KHz

Frequency Range: From 136 MHz to 174 MHz

Result.....: **Positive**

MPE T E S T R E P O R T

FCC ID :	YAMMD78XVHF	Oct 10, 2010 Date of issue
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Equipment under Test : Digital Mobile Radio

Model /Type : MD782 VHF/ MD785 VHF/ MD786 VHF/ MD788 VHF

Listed Models : /

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

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.

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1. Measurement Uncertainty

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

<u>Description</u>	<u>Error</u>
NARDA Survey Meter	$\pm 3\%$
Repeatability Accuracy	$\pm 7\%$

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-150CII
 Roof Mount 136-174 MHz
 Gain: 3.5 dBi

Vehicle:

Band: BYD
 Model: F6

4. Test Result

Measurement Information			
Measurement Freq.(MHz)	136.1250	156.1250	173.9875
Raw Data Power(W)	54.45	55.59	54.83
Controlled Limit	1.00	1.00	1.00
Uncontrolled Limit	0.20	0.20	0.20
Cal.	1.00	1.00	1.00
Antenna / gain(dBi)	Whip / 3.5	Whip / 3.5	Whip / 3.5
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 136.1250 MHz						
Antenna Location	Antenna/gain	Meas. Distance (cm)	E/H Field	Calibration Factor	Average Over Body	Pwr. Density (mW/cm^2)
Trunk	Whip / 3.5	60	E	1.00	0.38	0.19
Measurement grid						
Test position	Height (cm)	% of controlled limit	Test position	Height (cm)	% of controlled limit	
1	20	8.8	6	120	29.5	
2	40	10.3	7	140	23.6	
3	60	11.2	8	160	16.2	
4	80	18.9	9	180	15.3	
5	100	28.6	10	200	10.1	

External Vehicle MPE Assessment at 156.1250 MHz						
Antenna Location	Antenna/gain	Meas. Distance (cm)	E/H Field	Calibration Factor	Average Over Body	Pwr. Density (mW/cm^2)
Trunk	Whip / 3.5	60	E	1.00	0.32	0.16
Measurement grid						
Test position	Height (cm)	% of controlled limit	Test position	Height (cm)	% of controlled limit	
1	20	7.0	6	120	30.1	
2	40	10.2	7	140	23.0	
3	60	16.6	8	160	18.2	
4	80	23.0	9	180	15.5	
5	100	29.2	10	200	10.9	

External Vehicle MPE Assessment at 173.9875 MHz						
Antenna Location	Antenna/gain	Meas. Distance (cm)	E/H Field	Calibration Factor	Average Over Body	Pwr. Density (mW/cm^2)
Trunk	Whip / 3.5	60	E	1.00	0.34	0.17
Measurement grid						
Test position	Height (cm)	% of controlled limit		Test position	Height (cm)	% of controlled limit
1	20	8.5		6	120	25.8
2	40	11.9		7	140	24.0
3	60	13.0		8	160	11.2
4	80	16.8		9	180	9.6
5	100	25.4		10	200	8.5

External Vehicle MPE Assessment at 136.1250 MHz						
Antenna Location	Antenna/gain	Meas. Distance (cm)	E/H Field	Calibration Factor	Average Over Body	Pwr. Density (mW/cm^2)
Trunk	Whip / 3.5	110	E	1.00	0.18	0.09
Measurement grid						
Test position	Height (cm)	% of controlled limit		Test position	Height (cm)	% of controlled limit
1	20	5.2		6	120	12.3
2	40	6.0		7	140	13.0
3	60	6.5		8	160	9.7
4	80	5.4		9	180	6.6
5	100	8.6		10	200	5.9

Internal Vehicle MPE Assessment at 136.1250 MHz						
Antenna Location	Antenna/gain	Meas. 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 / 3.5	Highest Reading	E	1.00	0.200/0.010	0.010/0.005
Measurement grid						
Test position		% of controlled limit Head		% of controlled limit Chest		% of controlled limit Leg
Back Seat		9.8		6.5		2.6
Front Sea		2.6		1.0		0.8

Internal Vehicle MPE Assessment at 156.1250 MHz						
Antenna Location	Antenna/gain	Meas. 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 / 3.5	Highest Reading	E	1.00	0.180/0.0010	0.090/0.005
Measurement grid						
Test position	% of controlled limit Head			% of controlled limit Chest		% of controlled limit Leg
Back Seat	2.8			3.4		0.8
Front Sea	3.9			4.5		1.0

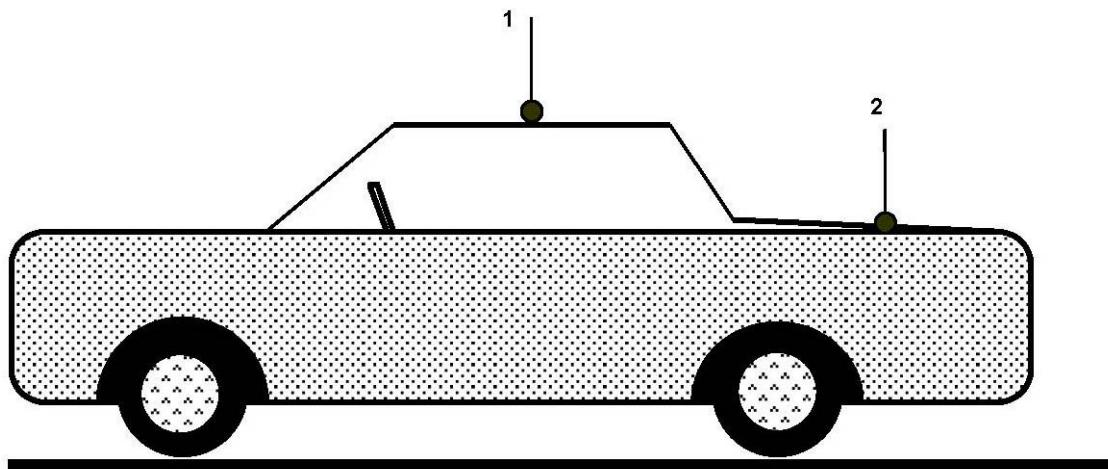
Internal Vehicle MPE Assessment at 173.9875 MHz						
Antenna Location	Antenna/gain	Meas. Distance (cm)	E/H Field	Calibration Factor	Average over Head,Chest,Leg Back/Front Seats (mW/cm^2)	Pwr. Density of Higher Level (mW/cm^2)
Trunk	Whip / 3.5	Highest Reading	E	1.00	0.120/0.006	0.060/0.003
Measurement grid						
Test position	% of controlled limit Head			% of controlled limit Chest		% of controlled limit Leg
Back Seat	10.2			11.9		7.6
Front Sea	5.5			10.3		4.8

Internal Vehicle MPE Assessment at 173.9875 MHz						
Antenna Location	Antenna/gain	Meas. 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 / 3.5	Highest Reading	E	1.00	0.100/0.006	0.050/0.003
Measurement grid						
Test position	% of controlled limit Head			% of controlled limit Chest		% of controlled limit Leg
Back Seat	1.8			3.2		5.2
Front Sea	0.8			1.2		1.0

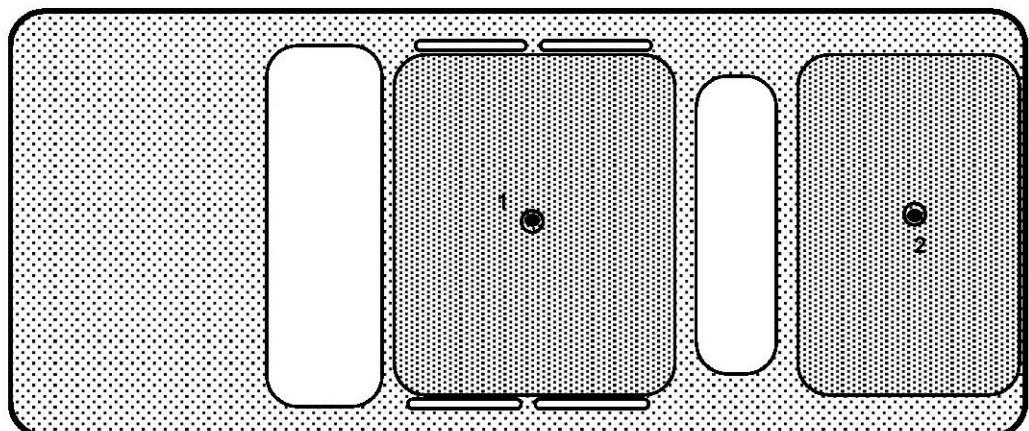
5. Conclusion

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

中国计量科学研究院



校准证书

证书编号 XDDj2008-7293

器具名称 电场探头 & 场强仪

型号/规格 HI-6005 & FM5004

生产厂家 ETS

出厂编号 00064170 & 300239

客户名称 深圳华通威国际检验有限公司

客户地址 深圳市南山区高新技术产业园科技南 12 路

校准日期 2008 年 10 月 17 日

授权批准人: 谢培鸿



计量检定机构授权证书号: (国)法计(2002)01001 号

电话: +86-10-64218631

地址: 北京市朝阳区北三环东路十八号

邮编: 100013

传真: +86-10-64271948

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2006-jz-01

中 国 计 量 科 学 研 究 院



证书编号 XDdj2008-7293

一九九九年九月中国计量科学研究院代表中国在国际计量局(BIPM)签署了“国家测量标准及国家计量研究院出具的校准和测量证书相互承认的协议”
中国实验室国家认可委员会(CNAL)认可证书号: No.L0502

校准所依据的技术文件(代号、名称)

参照 IEEE 1309 Standard for Calibration of Electromagnetic Field Sensors and Probes

校准环境条件及地点

温度: 20.5 °C 湿度: 45 %RH
地 点: 信电所 305 其 它: /

校准使用的计量(基)标准

名 称 型号/规格 不确定度/准确度 证书编号

Power Sensor NRV-Z1 2.0% XDwb2008-1923

GTEM Cell NIM8815 / XDdj2008-0033

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中国计量科学研究院



证书编号 XDdj2008-7293

校准结果

表 1 场强频率响应

频率 (MHz)	标准值 (V/m)	X 轴 实测值 (V/m)	X 轴 校准 因子	Y 轴 实测值 (V/m)	Y 轴 校准 因子	Z 轴 实测值 (V/m)	Z 轴 校准 因子	通道 匹配 (%)
10	20.1	20.6	0.97	20.6	0.97	20.5	0.97	99.5
30	19.9	19.7	1.01	19.7	1.01	19.6	1.02	99.5
50	19.8	19.5	1.03	19.4	1.03	19.4	1.03	99.5
100	19.8	18.7	1.06	18.5	1.07	18.6	1.07	98.9
200	19.8	19.4	1.03	19.7	1.01	19.9	1.00	97.5
300	20.0	20.0	1.00	19.9	1.01	19.6	1.02	98.0
400	19.9	19.6	1.03	19.6	1.03	19.2	1.05	98.0
500	20.0	18.8	1.06	19.2	1.04	18.9	1.06	97.9
600	20.0	19.4	1.03	19.1	1.05	18.9	1.06	97.4
700	20.0	19.2	1.04	19.1	1.05	19.2	1.04	99.5
800	19.9	18.4	1.09	17.4	1.15	18.1	1.10	94.6
900	20.0	20.6	0.97	19.6	1.02	18.7	1.07	90.8
1000	19.9	19.2	1.04	19.9	1.00	20.3	0.98	94.6

注：场强值=仪表指示值×校准因子

校准结果不确定度的描述

 $U=1.5\text{dB}$ ($k=2$)

敬告：

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2. 在使用过程中，如对被校准仪器的技术指标产生怀疑，请重新校准。
3. 为确保被校准仪器技术指标的准确可靠，通常情况下应一年校准一次。

校准员: 任 政

核 验 员: 孙 治 荣

2006-jz-04

中 国 计 量 科 学 研 究 院



校 准 证 书

证书编号 XDdj2008-7310器具名称 电场探头 & 场强仪型号/规格 HI-6005 & FM5004生产厂家 ETS出厂编号 00064170 & 300239客户名称 深圳华通威国际检验有限公司客户地址 深圳市南山区高新技术产业园科技南 12 路校准日期 2008 年 10 月 28 日授权批准人: 谢书鸣

计量检定机构授权证书号: (国)法计(2002)01001 号

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2006-jz-01

中 国 计 量 科 学 研 究 院



证书编号 XDdj2008-7310

一九九九年 中国计量科学研究院代表中国在国际计量局 (BIPM) 签署了“国家测量标准及国家计量研究院出具的校准和测量证书相互承认的协议”

中国实验室国家认可委员会 (CNAL) 认可证书号: No.L0502

校准所依据的技术文件 (代号、名称)

参照 IEEE 1309 Standard for Calibration of Electromagnetic Field Sensors and Probes

校准环境条件及地点

温 度: 16.5 °C

湿 度: 28.2 % (RH)

地 点: 信息电子所 419

其 它: /

校准使用的计量(基)标准

名 称	型号/规格	不确定度/准确度	证书编号
功率探头	NRV-Z51	$U=2.50\% (k=2)$	XDwb2008-1963
功率探头	NRV-Z55	$U=2.50\% (k=2)$	XDwb2008-1911
信号源	MG3694B	$U=1.0\text{dB} (k=2)$	XDst2008-8585
功率放大器	100S1G4	$U=1.5\text{dB} (k=2)$	XDdj2008-0134
功率放大器	20T4G18A	$U=1.5\text{dB} (k=2)$	XDdj2008-0135

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证书编号 XDdj2008-7310

校 准 结 果

 $f = 1.8\text{GHz}$

标准值 mW/cm ²	实测值 mW/cm ²	校准因子
0.1	0.097	1.03
0.5	0.47	1.06
1.0	0.94	1.06
2.0	1.85	1.08
5.0	4.55	1.10
8.0	7.38	1.08
10.0	9.42	1.06

 $f = 2.45\text{GHz}$

标准值 mW/cm ²	实测值 mW/cm ²	校准因子
0.1	0.098	1.02
0.5	0.48	1.04
1.0	0.95	1.05
2.0	1.87	1.07
5.0	4.58	1.09
8.0	7.27	1.10
10.0	9.04	1.11

2006-jz-03

中 国 计 量 科 学 研 究 院



证书编号 XDdj2008-7310

校 准 结 果

 $f = 4.8\text{GHz}$

标准值 mW/cm^2	实测值 mW/cm^2	校准因子
0.1	0.097	1.03
0.3	0.28	1.07
0.5	0.46	1.09
0.8	0.71	1.13
1.0	0.86	1.16
1.5	1.27	1.18
2.0	1.69	1.18

注：功率密度值=仪表指示值×校准因子

校准结果不确定度的描述

$f = 1.8\text{GHz}, U = 0.47\text{dB} (k=2);$ $f = 2.45\text{GHz}, U = 0.55\text{dB} (k=2);$
 $f = 4.8\text{GHz}, U = 0.50\text{dB} (k=2)$

敬告：

1. 被校准仪器修理后，应立即进行校准。
2. 在使用过程中，如对被校准仪器的技术指标产生怀疑，请重新校准。
3. 为确保被校准仪器技术指标的准确可靠，通常情况下应一年校准一次。

校 准 员: 佳 政

核 验 员: 飞 河 荣

2006-jz-04

National Institute of Metrology**Calibration Certificate****Certification No.: XDd j2008-7293**

Instrument	Field Monitor & Field Probe
Type/Model	HI-6005 & FM5004
Manufacturer	ETS
Serial No.	00064170 & 300239
Name of Client	Shenzhen Huatongwei International Inspection Co.,Ltd.
Address of Client	Keji 12th Road South, High-tech Industrial Park, Nanshan, Shenzhen, China
Date of Calibration	17/10/2008
Approved by	谢鸣

地址：中国·北京北三环东路十八号

邮编：100013

Address: No.18 Bei San Huan Dong Lu, Beijing, P.R.China

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传真：+86-10-64218631

Tel

Fax

网址：www.nim.ac.cn

电子邮箱：yw@nim.ac.cn

Website

Email

National Institute of Metrology

Calibration Certificate

Certification No.: XDdj2008-7293

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NIM is China's signatory to the CIPM MRA. Its Calibration and Measurement Capabilities (CMCs) that are peer reviewed by APMP are published in the BIPM Key Comparison Database (KCDB).

中国计量科学研究院的质量管理体系符合 ISO/IEC17025 标准的要求，并经中国合格评定国家认可委员会认可，认可证书号：CNAS L0502.

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测试所依据的技术文件（代号、名称）

Reference IEEE 1309 Standard for Calibration of Electromagnetic Field Sensors and Probes

测试环境条件及地点：

温 度 Temperature: 20.5 °C 湿 度 Humidity: 45 %
地 点 Location: Information and Electronic Dept 305 其 它 Others: /

测试使用的计量基（标）准装置或主要标准器

Name	Type/Model	Uncertainty/Accuracy	Certificate No.
Power Sensor	NRV-Z1	2.0%	XDwb2008-1923
GTEM Cell	NIM8815	/	XDdj2008-0033

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Calibration Certificate

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Results of Calibration

Table 1 Field Frequency Response

Frequency (MHz)	Reference Value (V/m)	X-axis Calibration Value (V./m)	X-axis Calibration Factor	Y-axis Calibration Value (V./m)	Y-axis Calibration Factor	Z-axis Calibration Value (V./m)	Z-axis Calibration Factor	Match (%)
10	20.1	20.6	0.97	20.6	0.97	20.5	0.97	99.5
30	19.9	19.7	1.01	19.7	1.01	19.6	1.02	99.5
50	19.8	19.5	1.03	19.4	1.03	19.4	1.03	99.5
100	19.8	18.7	1.06	18.5	1.07	18.6	1.07	98.9
200	19.8	19.4	1.03	19.7	1.01	19.9	1.00	97.5
300	20.0	20.0	1.00	19.9	1.01	19.6	1.02	98.0
400	19.9	19.6	1.03	19.6	1.03	19.2	1.05	98.0
500	20.0	18.8	1.06	19.2	1.04	18.9	1.06	97.9
600	20.0	19.4	1.03	19.1	1.05	18.9	1.06	97.4
700	20.0	19.2	1.04	19.1	1.05	19.2	1.04	99.5
800	19.9	18.4	1.09	17.4	1.15	18.1	1.10	94.6
900	20.0	20.6	0.97	19.6	1.02	18.7	1.07	90.8
1000	19.9	19.2	1.04	19.9	1.00	20.3	0.98	94.6

Notes: Field Values=Calibration Values * Calibration Factor

Explained uncertainty of measurement
U=1.5dB (k=2)

Notes:

1. Please recalibrate again if EUT repaired
2. Please recalibrated again if doubt the technical index of the calibrated equipment.
3. The period of calibration advised within one year.

National Institute of Metrology**Calibration Certificate****Certification No.: XDd j2008-7310**

Instrument	Field Monitor & Field Probe
Type/Model	HI-6005 & FM5004
Manufacturer	ETS
Serial No.	00064170 & 300239
Name of Client	Shenzhen Huatongwei International Inspection Co.,Ltd.
Address of Client	Keji 12th Road South, High-tech Industrial Park, Nanshan, Shenzhen, China
Date of Calibration	17/10/2008
Approved by	谢鸣

地址：中国·北京北三环东路十八号

邮编：100013

Address: No.18 Bei San Huan Dong Lu, Beijing, P.R.China Post Code 10013

电话：+86-10-64218631

传真：+86-10-64218631

Tel

Fax

网址：www.nim.ac.cn

电子邮箱：yw@nim.ac.cn

Website

Email

National Institute of Metrology

Calibration Certificate

Certification No.: XDd j2008-7310

中国计量科学研究院是国际计量委员会《国家计量基(标)准和国家计量院签发的校准与测量证书互认协议》的签署成员，经亚太计量规划组织同行评审后的校准和测量能力在国际计量局关键比对数据库中公布。
NIM is China's signatory to the CIPM MRA. Its Calibration and Measurement Capabilities (CMCs) that are peer reviewed by APMP are published in the BIPM Key Comparison Database (KCDB).

中国计量科学研究院的质量管理体系符合 ISO/IEC17025 标准的要求，并经中国合格评定国家认可委员会认可，认可证书号：CNAS L0502.

NIM is an CNAS accredited laboratory with its quality management system meeting the requirements of the ISO/IEC 17025. Accreditation Certificate No. CNAS L0502

测试所依据的技术文件（代号、名称）

Reference IEEE 1309 Standard for Calibration of Electromagnetic Field Sensors and Probes

测试环境条件及地点：

温 度 Temperature: 20.5 °C 湿 度 Humidity: 45 %

地 点 Location: Information and Electronic Dept 419 其 它 Others: /

测试使用的计量基（标）准装置或主要标准器

Name	Type/Model	Uncertainty/Accuracy	Certificate No.
Power Sensor	NRV-Z51	U=2.5 %(K=2)	XDwb2008-1963
Power Sensor	NRV-Z55	U=2.5 %(K=2)	XDwb2008-1911
Signal Generator	MG3694B	U=1.0dB (K=2)	XDst2008-5858
Power amplifier	100S1G4	U=1.5dB (K=2)	XDdj2008-0134
Power amplifier	20T4G18A	U=1.5dB (K=2)	XDdj2008-0135

注 Note:

1. 我院仅对加盖“中国计量科学研究院校准专用章”的完整证书负责。

NIM is ONLY responsible for the complete certificate with the calibration stamp of NIM.

2. 本证书的测试结果仅对所测试的计量器具有效。

The certificate is ONLY valid for the tested instrument.

3. 请妥善保管此证书。

Please keep the certification carefully.

National Institute of Metrology**Calibration Certificate**

Certification No.: XDd j2008-7310

Results of Calibration**f=1.8GHz**

Reference Value	Calibration Value	Calibration Factor
mW/cm ²	mW/cm ²	/
0.1	0.097	1.03
0.5	0.47	1.06
1.0	0.94	1.06
2.0	1.85	1.08
5.0	4.55	1.10
8.0	7.38	1.08
10.0	9.42	1.06

f=2.4GHz

Reference Value	Calibration Value	Calibration Factor
mW/cm ²	mW/cm ²	/
0.1	0.098	1.02
0.5	0.48	1.04
1.0	0.95	1.05
2.0	1.87	1.07
5.0	4.58	1.09
8.0	7.27	1.10
10.0	9.04	1.11

National Institute of Metrology**Calibration Certificate****Certification No.: XDd j2008-7310****Results of Calibration****f=4.8GHz**

Reference Value	Calibration Value	Calibration Factor
mW/cm ²	mW/cm ²	/
0.1	0.0097	1.03
0.5	0.28	1.07
1.0	0.46	1.09
2.0	0.71	1.13
5.0	0.86	1.16
8.0	1.27	1.18
10.0	1.69	1.18

Notes: Power Density Values=Calibration Values * Calibration Factor

Explained uncertainty of measurement

f=1.8GHz U=0.47 dB (k=2); f=2.45GHz U=0.55 dB (k=2);
f=4.8GHz U=0.50 dB (k=2);

Notes:

4. Please recalibrate again if EUT repaired
5. Please recalibrated again if doubt the technical index of the calibrated equipment.
6. The period of calibration advised within one year.

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