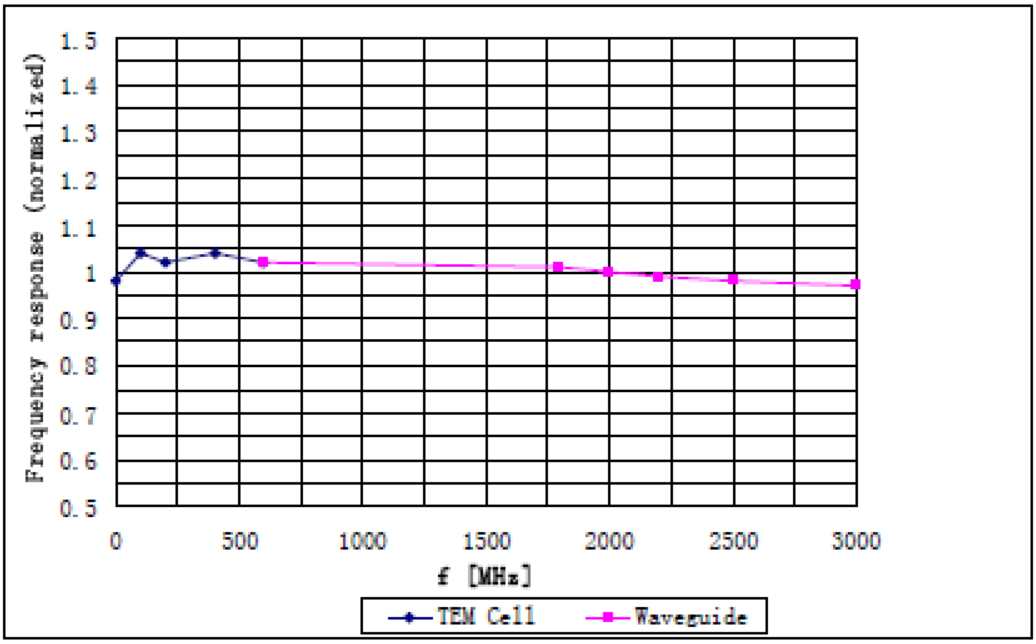
Add: No.52 Huayuanbei Road, Haidian District, Beijing, 100191, China
Tel: +86-10-62303288-2082 Fax: +86-10-62304793
E-mail: Info@emcite.com Http://www.emcite.com

Frequency Response of E-Field



Uncertainty of Frequency Response of E-field: ±5.0% (k=2)

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Tel: +86-10-62303288-2082 Fax: +86-10-62304793
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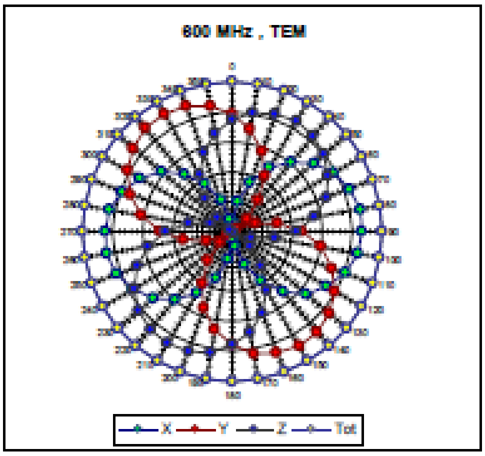
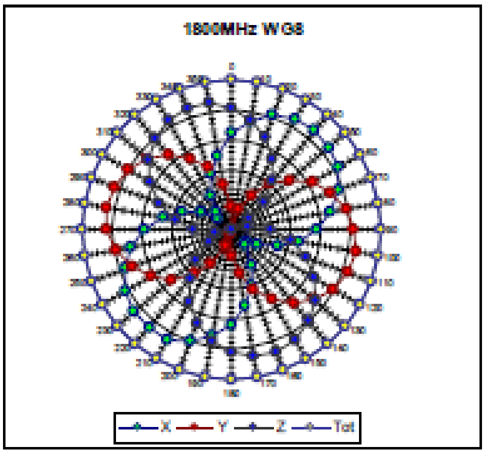
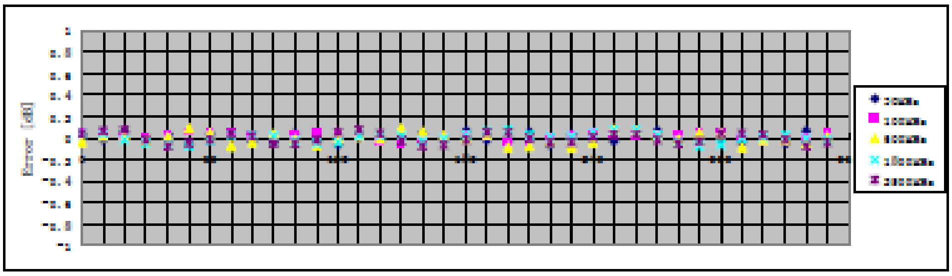
Receiving Pattern (ϕ), $\theta = 0°$







Uncertainty of Axial Isotropy Assessment: ±0.5% (k=2)

Add: No.52 Huayuanbei Road, Haidian District, Beijing, 100191, China
Tel: +86-10-62303288-2082 Fax: +86-10-62304793
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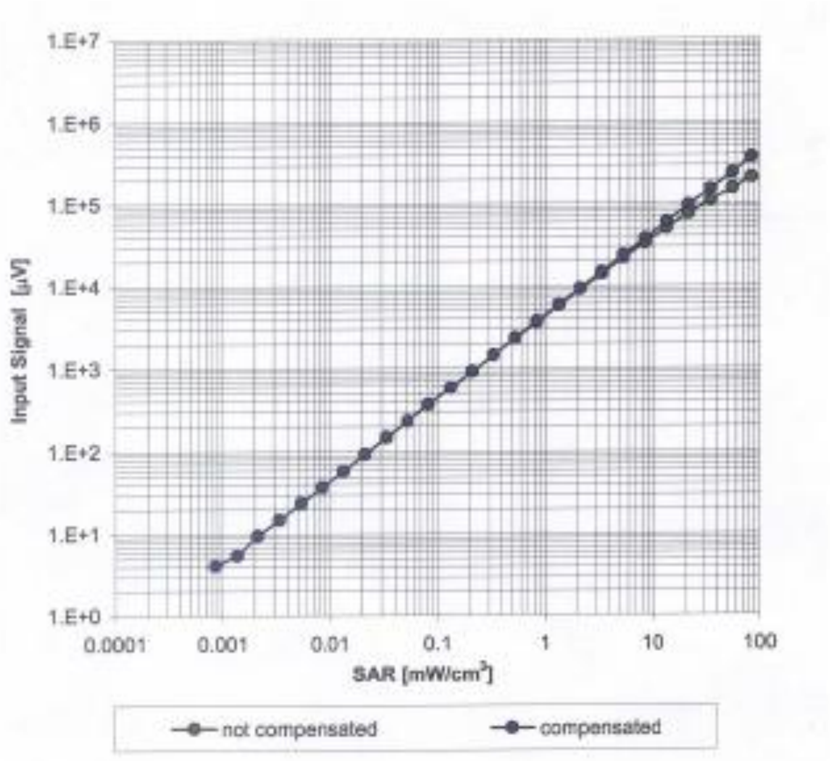
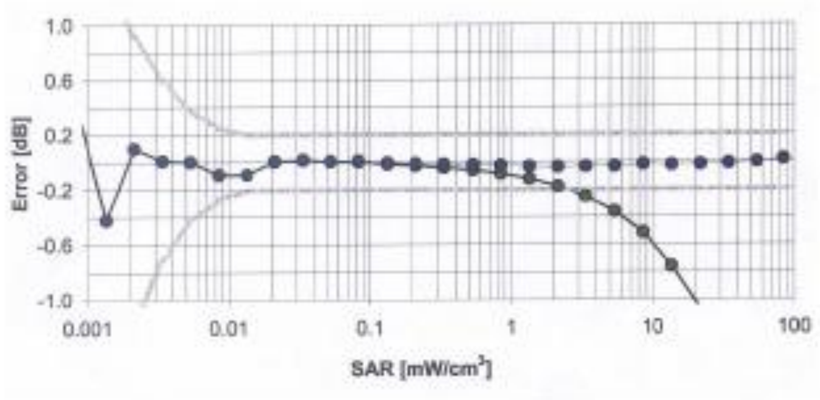
Dynamic Range f(SAR$_{head}$)

(Waveguide: WG8, f = 1750 MHz)





Uncertainty of Linearity Assessment: ±0.5% (k=2)

Certificate No: EX3-3736_Nov10 Page 6 of 9

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Tel: +86-10-62303288-2082 Fax: +86-10-62304793
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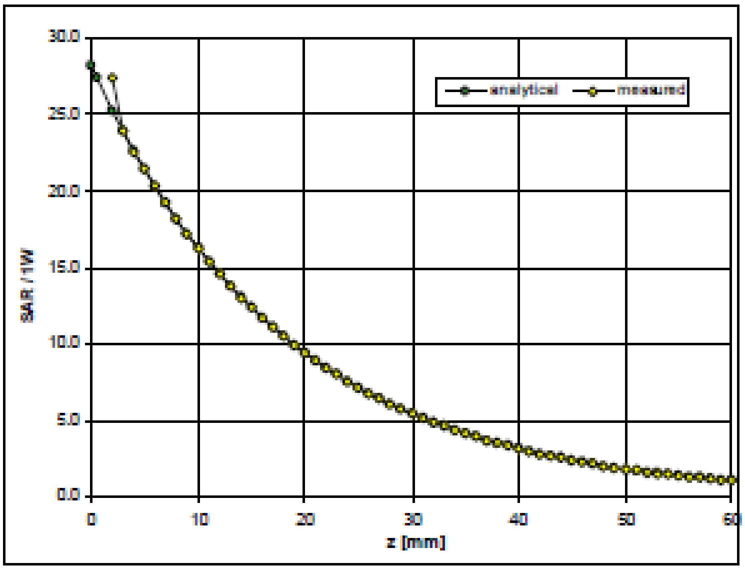
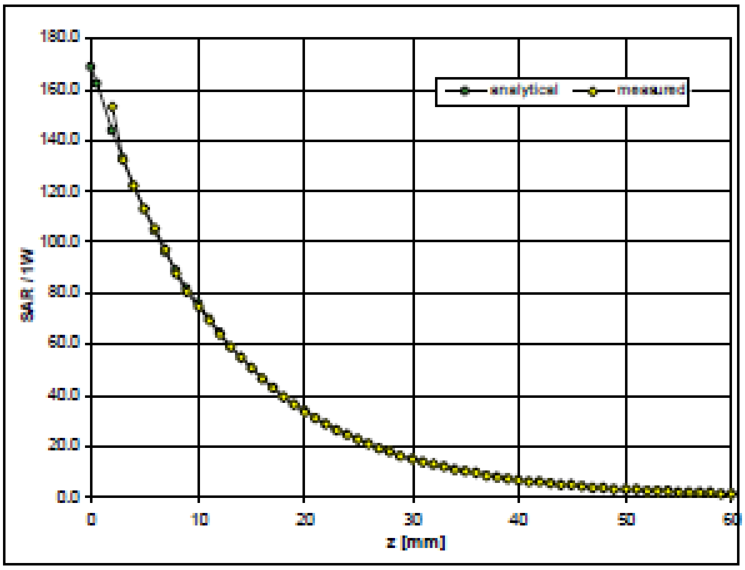
Conversion Factor Assessment



900MHz



1900MHz

Certificate No: EX3-3736_Nov10 Page 7 of 9

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Freq	Frequency	ε	σ	ε	σ	Sensitivity X sensor			Sensitivity Y sensor			Sensitivity Z sensor			Uncertainty
[MHz]	Range	target	[S/m]	used	used	ConvF	Alpha	Depth	ConvF	Alpha	Depth	ConvF	Alpha	Depth	k=2
		±5%	±5%												
Probe Conversion Factors: Head Tissue Liquid															
850	±50 / ±100	41.5	0.9	43	0.88	8.33	0.26	1.74	8.56	0.62	1.09	8.97	0.64	1.06	±11%
900	±50 / ±100	41.5	0.97	42.6	0.94	8.17	0.36	1.47	8.4	0.81	1	8.34	0.39	1.35	±11%
1750	±50 / ±100	40.08	1.37	39.7	1.35	7.76	0.12	2.55	7.86	0.28	1.45	8.22	0.21	1.67	±11%
1900	±50 / ±100	40	1.4	40.5	1.35	7.61	0.09	4.19	7.76	0.1	3.79	8.09	0.1	3.66	±11%
2000	±50 / ±100	40	1.4	40.2	1.45	6.56	0.12	3.58	6.73	0.11	3.18	7.04	0.13	2.12	±11%
2450	±50 / ±100	39.2	1.8	39.9	1.87	8.07	0.13	3.92	8.22	0.15	4.32	8.62	0.18	3.61	±11%
2600	±50 / ±100	39	1.96	38.7	2.05	8.01	0.13	3.29	8.13	0.14	2.82	8.44	0.09	4.43	±11%
Probe Conversion Factors: Body Tissue Liquid															
850	±50 / ±100	55.2	0.97	54.8	0.96	8.79	0.27	1.74	8.99	0.33	1.52	9.47	0.34	1.44	±11%
900	±50 / ±100	55	1.05	54.2	1.02	8.29	0.62	1.1	8.44	0.36	1.38	8.89	0.47	1.24	±11%
1750	±50 / ±100	53.4	1.49	53.7	1.5	8.28	0.07	3.74	8.42	0.06	5.55	8.83	0.12	3.24	±11%
1900	±50 / ±100	53.3	1.52	52.8	1.54	7.49	0.16	3.22	7.65	0.16	3.23	8.03	0.17	3.04	±11%
2000	±50 / ±100	53.3	1.52	53.6	1.58	6.72	0.31	1.37	6.91	0.85	0.87	7.19	0.25	1.51	±11%
2450	±50 / ±100	52.7	1.95	51.9	1.95	7.23	0.14	6.05	7.51	0.16	5.63	7.98	0.15	5.85	±11%
2600	±50 / ±100	52.5	2.16	51.9	2.26	7.38	0.31	2.23	7.46	0.28	2.68	7.92	0.25	2.77	±11%

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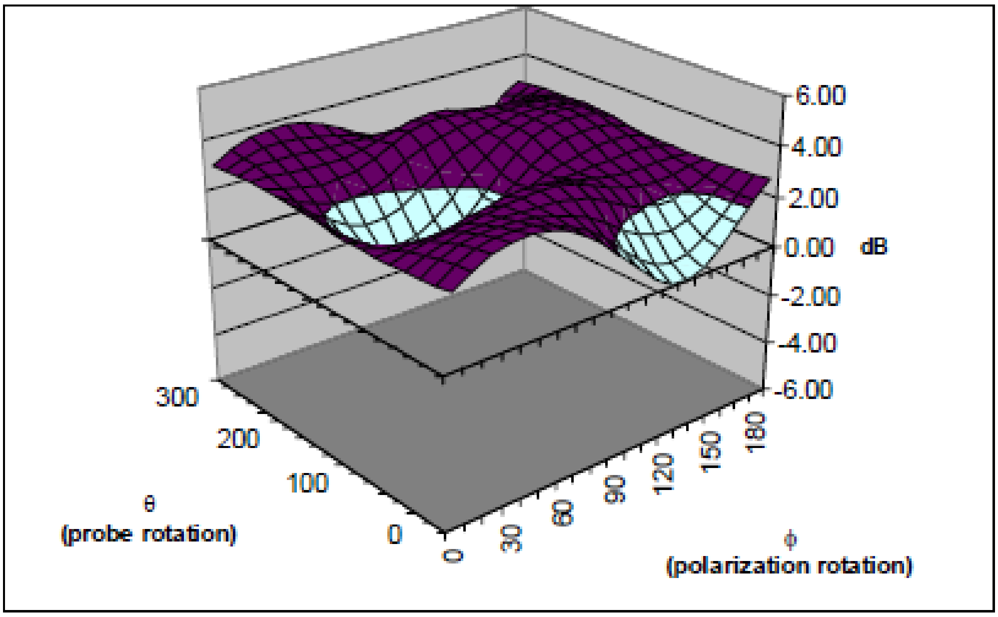
Deviation from Isotropy

Error (ϕ , θ), f = 900 MHz



Uncertainty of Spherical Isotropy Assessment: ±2.5% (k=2)

Annex 3.2 Calibration report “Data Acquisition Unit (DAE)”

Calibration Laboratory of
Schmid & Partner
Engineering AG
Zeughausstrasse 43, 8004 Zurich, Switzerland

S Schweizerischer Kalibrierdienst
C Service suisse d'étalonnage
S Servizio svizzero di taratura
Swiss Calibration Service

Accredited by the Swiss Accreditation Service (SAS)
The Swiss Accreditation Service is one of the signatories to the EA
Multilateral Agreement for the recognition of calibration certificates

Accreditation No.: **SCS 108**

Client **Huawei SH (Auden)**

Certificate No: **DAE4-1236_Oct10**

CALIBRATION CERTIFICATE

Object	DAE4 - SD 000 D04 BJ - SN: 1236
Calibration procedure(s)	QA CAL-06.v22 Calibration procedure for the data acquisition electronics (DAE)
Calibration date:	October 26, 2010

This calibration certificate documents the traceability to national standards, which realize the physical units of measurements (SI).
The measurements and the uncertainties with confidence probability are given on the following pages and are part of the certificate.

All calibrations have been conducted in the closed laboratory facility: environment temperature (22 ± 3)°C and humidity < 70%.

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Keithley Multimeter Type 2001	SN: 0810278	28-Sep-10 (No:10376)	Sep-11
Secondary Standards	**ID #**	**Check Date (in house)**	**Scheduled Check**
Calibrator Box V1.1	SE UMS 006 AB 1004	07-Jun-10 (in house check)	In house check: Jun-11

	Name	Function	Signature
Calibrated by:	Eric Hainfeld	Technician	
Approved by:	Fin Bomholt	R&D Director	i.V.

Issued: October 26, 2010

This calibration certificate shall not be reproduced except in full without written approval of the laboratory.

Certificate No: DAE4-1236_Oct10 Page 1 of 5

Calibration Laboratory of
Schmid & Partner
Engineering AG
Zeughausstrasse 43, 8004 Zurich, Switzerland

S Schweizerischer Kalibrierdienst
C Service suisse d'étalonnage
S Servizio svizzero di taratura
S Swiss Calibration Service

Accredited by the Swiss Accreditation Service (SAS)
The Swiss Accreditation Service is one of the signatories to the EA
Multilateral Agreement for the recognition of calibration certificates

Accreditation No.: **SCS 108**

Glossary

DAE	data acquisition electronics
Connector angle	information used in DASY system to align probe sensor X to the robot coordinate system.

Methods Applied and Interpretation of Parameters

- *DC Voltage Measurement:* Calibration Factor assessed for use in DASY system by comparison with a calibrated instrument traceable to national standards. The figure given corresponds to the full scale range of the voltmeter in the respective range.
- *Connector angle*: The angle of the connector is assessed measuring the angle mechanically by a tool inserted. Uncertainty is not required.
- The following parameters as documented in the Appendix contain technical information as a result from the performance test and require no uncertainty.
  - *DC Voltage Measurement Linearity:* Verification of the Linearity at +10% and -10% of the nominal calibration voltage. Influence of offset voltage is included in this measurement.
  - *Common mode sensitivity:* Influence of a positive or negative common mode voltage on the differential measurement.
  - *Channel separation:* Influence of a voltage on the neighbor channels not subject to an input voltage.
  - *AD Converter Values with inputs shorted:* Values on the internal AD converter corresponding to zero input voltage
  - *Input Offset Measurement*: Output voltage and statistical results over a large number of zero voltage measurements.
  - *Input Offset Current:* Typical value for information; Maximum channel input offset current, not considering the input resistance.
  - *Input resistance:* Typical value for information: DAE input resistance at the connector, during internal auto-zeroing and during measurement.
  - *Low Battery Alarm Voltage:* Typical value for information. Below this voltage, a battery alarm signal is generated.
  - *Power consumption:* Typical value for information. Supply currents in various operating modes.

DC Voltage Measurement

A/D - Converter Resolution nominal

High Range: 1LSB = 6.1μV , full range = -100...+300 mV

Low Range: 1LSB = 61nV , full range = -1.......+3mV

DASY measurement parameters: Auto Zero Time: 3 sec; Measuring time: 3 sec

Calibration Factors	X	Y	Z
High Range	404.985 ± 0.1% (k=2)	404.913 ± 0.1% (k=2)	405.914 ± 0.1% (k=2)
Low Range	3.98821 ± 0.7% (k=2)	3.96798 ± 0.7% (k=2)	4.00517 ± 0.7% (k=2)

Connector Angle

Connector Angle to be used in DASY system	136.0 ° ± 1 °

Appendix

1. DC Voltage Linearity

High Range		Reading (μV)	Difference (μV)	Error (%)
Channel X	+ Input	199987.8	-5.07	-0.00
Channel X	+ Input	19999.45	-0.25	-0.00
Channel X	- Input	-19998.46	1.54	-0.01
Channel Y	+ Input	199997.8	-3.16	-0.00
Channel Y	+ Input	19996.97	-2.53	-0.01
Channel Y	- Input	-20000.89	-1.19	0.01
Channel Z	+ Input	200011.7	1.18	0.00
Channel Z	+ Input	19996.30	-3.10	-0.02
Channel Z	- Input	-20000.89	-1.19	0.01

Low Range		Reading (μV)	Difference (μV)	Error (%)
Channel X	+ Input	2000.1	0.05	0.00
Channel X	+ Input	200.81	0.71	0.35
Channel X	- Input	-199.97	-0.07	0.04
Channel Y	+ Input	2000.5	0.57	0.03
Channel Y	+ Input	199.61	-0.29	-0.15
Channel Y	- Input	-201.03	-1.03	0.52
Channel Z	+ Input	2001.1	1.19	0.06
Channel Z	+ Input	199.04	-0.86	-0.43
Channel Z	- Input	-200.59	-0.59	0.30

2. Common mode sensitivity

DASY measurement parameters: Auto Zero Time: 3 sec; Measuring time: 3 sec

	Common mode Input Voltage (mV)	High Range Average Reading (μV)	Low Range Average Reading (μV)
Channel X	200	16.27	14.87
	- 200	-14.51	-15.98
Channel Y	200	-15.41	-15.97
	- 200	14.99	14.94
Channel Z	200	-14.10	-14.71
	- 200	12.74	12.83

3. Channel separation

DASY measurement parameters: Auto Zero Time: 3 sec; Measuring time: 3 sec

	Input Voltage (mV)	Channel X (μV)	Channel Y (μV)	Channel Z (μV)
Channel X	200	-	2.01	1.24
Channel Y	200	-0.12	-	2.79
Channel Z	200	1.72	-0.74	-

4. AD-Converter Values with inputs shorted

DASY measurement parameters: Auto Zero Time: 3 sec; Measuring time: 3 sec

	High Range (LSB)	Low Range (LSB)
Channel X	15748	17238
Channel Y	16003	17264
Channel Z	16296	16350

5. Input Offset Measurement

DASY measurement parameters: Auto Zero Time: 3 sec; Measuring time: 3 sec
Input 10MΩ

	Average (μV)	min. Offset (μV)	max. Offset (μV)	Std. Deviation (μV)
Channel X	-0.08	-2.17	2.32	0.78
Channel Y	-0.81	-3.36	2.26	0.79
Channel Z	-0.94	-2.13	0.38	0.54

6. Input Offset Current

Nominal Input circuitry offset current on all channels: <25fA

7. Input Resistance (Typical values for information)

	Zeroing (kOhm)	Measuring (MOhm)
Channel X	200	200
Channel Y	200	200
Channel Z	200	200

8. Low Battery Alarm Voltage (Typical values for information)

Typical values	Alarm Level (VDC)
Supply (+ Vcc)	+7.9
Supply (- Vcc)	-7.6

9. Power Consumption (Typical values for information)

Typical values	Switched off (mA)	Stand by (mA)	Transmitting (mA)
Supply (+ Vcc)	+0.01	+6	+14
Supply (- Vcc)	-0.01	-8	-9

Annex 3.3 Calibration report "835 MHz System validation dipole"

工业和信息化部通信计量中心
Telecommunication Metrology Center of MIIT

TMC

CNAS L0442

Client: Huawei

Certificate No: D835V2-4d095_Feb11

CALIBRATION CERTIFICATE

Object	D835V2 - SN: 4d095
Calibration Procedure(s)	TMC-XZ-01-027 Calibration procedure for dipole validation kits
Calibration date:	February 23, 2011
Condition of the calibrated item	In Tolerance

This calibration Certificate documents the traceability to national standards, which realize the physical units of measurements(SI). The measurements and the uncertainties with confidence probability are given on the following pages and are part of the certificate.

All calibrations have been conducted in the closed laboratory facility: environment temperature(22±3)℃ and humidity<70%.

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date(Calibrated by, Certificate No.)	Scheduled Calibration
Power Meter NRVD	101253	18-Jun-10 (TMC, No.JZ10-248)	Jun-11
Power sensor NRV-Z5	100333	18-Jun-10 (TMC, No. JZ10-248)	Jun-11
Reference Probe ES3DV3	SN 3149	25-Sep-10 (SPEAG, No.ES3-3149_Sep10)	Sep-11
DAE4	SN 771	21-Nov-10 (TMC, No.JZ10-653)	Nov-11
RF generator E4438C	MY45092879	17-Jun-10 (TMC, No.JZ10-302)	Jun-11
Network Analyzer 8753E	US38433212	02-Aug-10 (TMC, No.JZ10-056)	Aug-11

	Name	Function	Signature
Calibrated by:	Lin Hao	SAR Test Engineer	林浩
Reviewed by:	Qi Dianyuan	SAR Project Leader	[signature]
Approved by:	Lu Bingsong	Deputy Director of the laboratory	[signature]

Issued: February 23, 2011

This calibration certificate shall not be reproduced except in full without written approval of the laboratory.

Certificate No: D835V2-4d095_Feb11 Page 1 of 9

工业和信息化部通信计量中心
Telecommunication Metrology Center of MIIT

Glossary:

TSL	tissue simulating liquid
ConvF	sensitivity in TSL / NORMx,y,z
N/A	not applicable or not measured

Calibration is Performed According to the Following Standards:

a) IEEE Std 1528-2003, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", December 2003
b) IEC 62209-1, "Procedure to measure the Specific Absorption Rate (SAR) For hand-held devices used in close proximity to the ear (frequency range of 300MHz to 3GHz)", February 2005
c) Federal Communications Commission Office of Engineering & Technology (FCC OET), "Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields; Additional Information for Evaluating Compliance of Mobile and Portable Devices with FCC Limits for Human Exposure to Radiofrequency Emissions", Supplement C (Edition 01-01) to Bulletin 65

Additional Documentation:

d) DASY System Handbook

Methods Applied and Interpretation of Parameters:

- Measurement Conditions: Further details are available from the Validation Report at the end of the certificate. All figures stated in the certificate are valid at the frequency indicated.
- Antenna Parameters with TSL: The dipole is mounted with the spacer to position its feed point exactly below the center marking of the flat phantom section, with the arms oriented parallel to the body axis.
- Feed Point Impedance and Return Loss: These parameters are measured with the dipole positioned under the liquid filled phantom. The impedance stated is transformed from the measurement at the SMA connector to the feed point. The Return Loss ensures low reflected power. No uncertainty required.
- Electrical Delay: One-way delay between the SMA connector and the antenna feed point. No uncertainty required.
- SAR measured: SAR measured at the stated antenna input power.
- SAR normalized: SAR as measured, normalized to an input power of 1 W at the antenna connector.
- SAR for nominal TSL parameters: The measured TSL parameters are used to calculate the nominal SAR result.

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Telecommunication Metrology Center of MIIT

Measurement Conditions

DASY system configuration, as far as not given on page 1.

DASY Version	DASY5	V5.2.157
Extrapolation	Advanced Extrapolation	
Phantom	2mm Oval Phantom ELI4	
Distance Dipole Center - TSL	15 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	835 MHz ± 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	41.5	0.90 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	41.9 ± 6 %	0.93mho/m ± 6 %
Head TSL temperature during test	(22.5 ± 0.2) °C	----	----

SAR result with Head TSL

SAR averaged over 1 cm^3 (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	2.39 mW / g
SAR normalized	normalized to 1W	9.56 mW / g
SAR for nominal Head TSL parameters [1]	normalized to 1W	**9.42 mW /g ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Head TSL	Condition	
SAR measured	250 mW input power	1.54 mW / g
SAR normalized	normalized to 1W	6.16 mW / g
SAR for nominal Head TSL parameters [1]	normalized to 1W	**6.13 mW /g ± 16.5 % (k=2)**

[1] Correction to nominal TSL parameters according to d), chapter "SAR Sensitivities"

Certificate No: D835V2-4d095_Feb11 Page 3 of 9

工业和信息化部通信计量中心 TMC

Telecommunication Metrology Center of MIIT

Body TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	55.2	0.97 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	53.8 ± 6%	1.00mho/m ± 6 %
Body TSL temperature during test	(22.4 ± 0.2) °C	----	----

SAR result with Body TSL

SAR averaged over 1 cm^3 (1 g) of Body TSL	Condition	
SAR measured	250 mW input power	2.47 mW / g
SAR normalized	normalized to 1W	9.88 mW / g
SAR for nominal Body TSL parameters [2]	normalized to 1W	**9.56 mW /g ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Body TSL	Condition	
SAR measured	250 mW input power	1.61 mW / g
SAR normalized	normalized to 1W	6.44 mW / g
SAR for nominal Body TSL parameters [2]	normalized to 1W	**6.28 mW /g ± 16.5 % (k=2)**

[2] Correction to nominal TSL parameters according to d), chapter "SAR Sensitivities"

Certificate No: D835V2-4d095_Feb11 Page 4 of 9

Appendix

Antenna Parameters with Head TSL

Impedance, transformed to feed point	47.2Ω + 7.0 jΩ
Return Loss	- 22.3dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	46.5Ω + 3.4 jΩ
Return Loss	- 25.9dB

General Antenna Parameters and Design

Electrical Delay (one direction)	3.184 ns

After long term use with 100W radiated power, only a slight warming of the dipole near the feedpoint can be measured.

The dipole is made of standard semirigid coaxial cable. The center conductor of the feeding line is directly connected to the second arm of the dipole. The antenna is therefore short-circuited for DC-signals.
No excessive force must be applied to the dipole arms, because they might bend or the soldered connections near the feedpoint may be damaged.

工业和信息化部通信计量中心 TMC

Telecommunication Metrology Center of MIIT

DASY5 Validation Report for Head TSL

Date/Time: 2011-2-23 9:15:24

Test Laboratory: TMC, Beijing, China

DUT: Dipole 835 MHz; Type: D835V2; Serial: SN: 4d095

Communication System: CW Frequency: 835 MHz Duty Cycle: 1:1

Medium: Head 835MHz

Medium parameters used: f = 835 MHz; σ = 0.93 mho/m; ε_r = 41.9; ρ = 1000 kg/m^3

Phantom section: Flat Section

DASY5 Configuration:

- Probe: ES3DV3 - SN3149; ConvF(6.56, 6.56, 6.56); Calibrated: 25.09.10
- Electronics: DAE4 Sn771; Calibration: 21.11.10
- Phantom: 2mm Oval Phantom ELI4; Type: QDOVA001BB
- Measurement SW: DASY5, V5.2.157; Postprocessing SW: SEMCAD, V14.0 Build 57

Pin=250mW; d=15mm/Zoom Scan (7x7x7)/Cube 0:

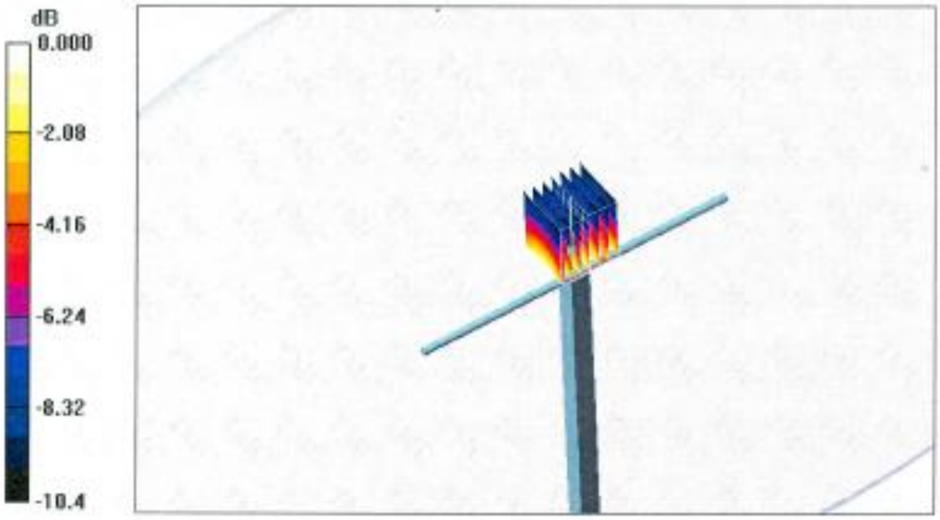
Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 56.3 V/m; Power Drift = 0.104 dB

Peak SAR (extrapolated) = 3.475 W/kg

SAR(1 g) = 2.39 mW/g; SAR(10 g) = 1.54 mW/g

Maximum value of SAR (measured) = 2.56 mW/g



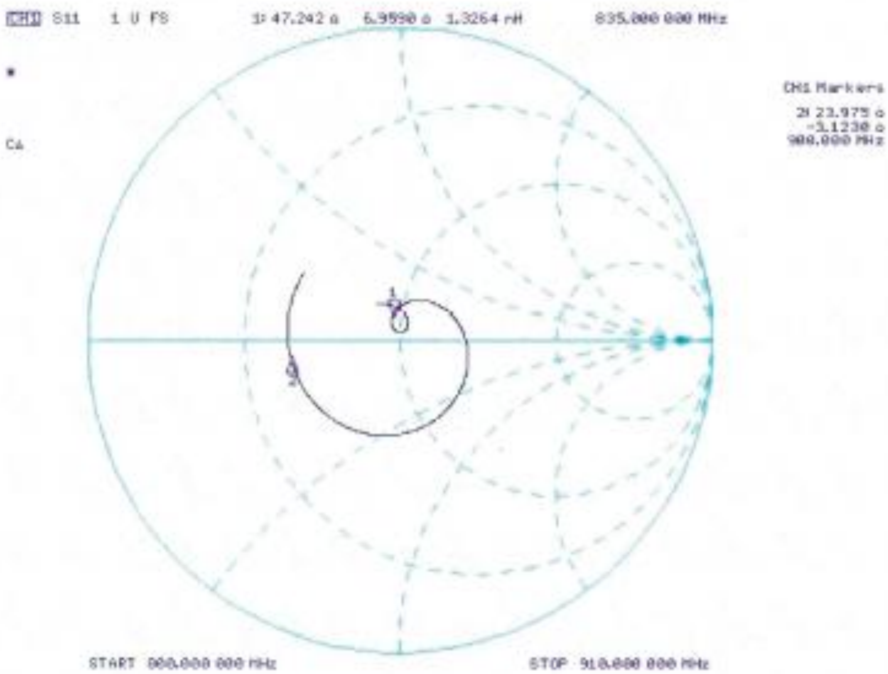
0 dB = 2.56mW/g

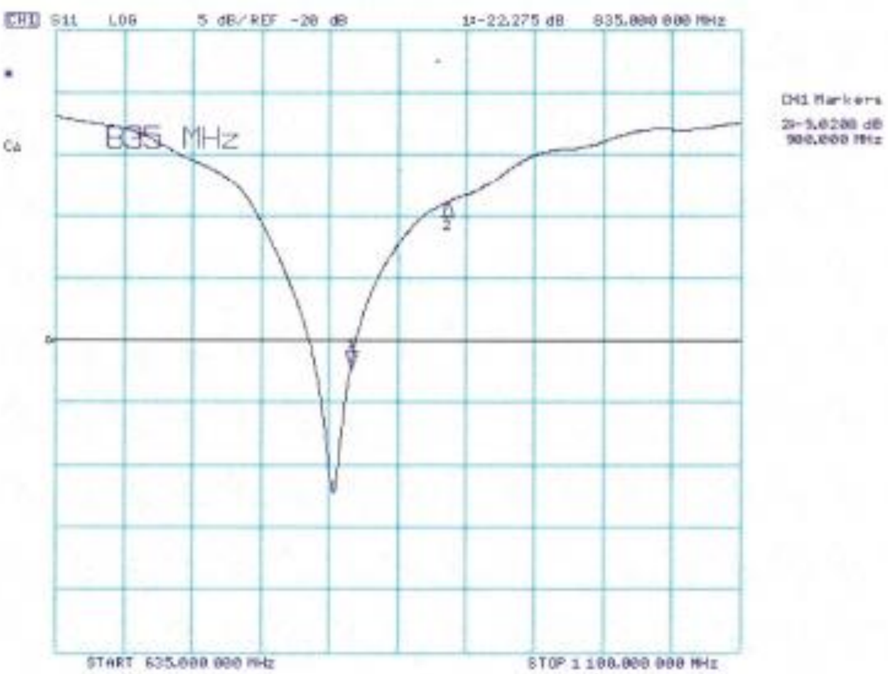
Certificate No: D835V2-4d095_Feb11 Page 6 of 9

工业和信息化部通信计量中心

Telecommunication Metrology Center of MIIT

Impedance Measurement Plot for Head TSL





Certificate No: D835V2-4d095_Feb11 Page 7 of 9

工业和信息化部通信计量中心 TMC
Telecommunication Metrology Center of MIIT

DASY5 Validation Report for Body TSL

Date/Time: 2011-2-23 10:36:18

Test Laboratory: TMC, Beijing, China

DUT: Dipole 835 MHz; Type: D835V2; Serial: SN: 4d095

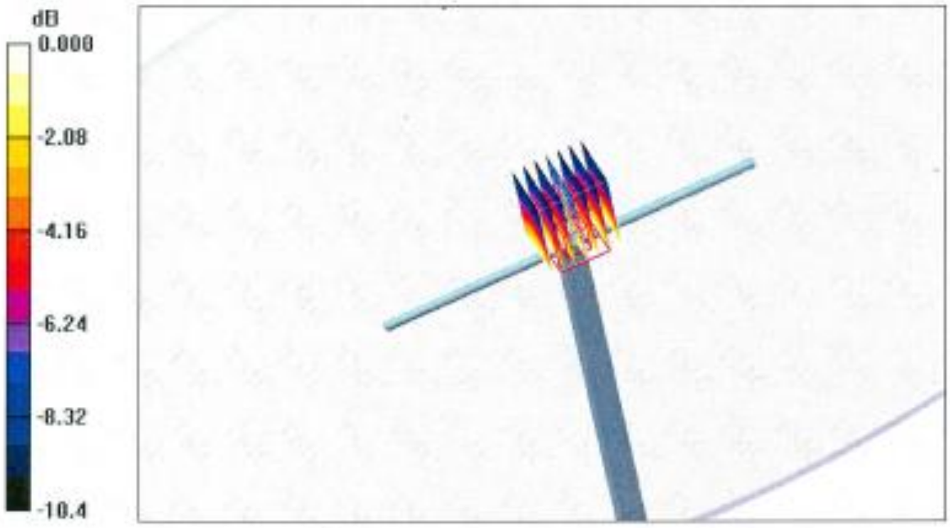
Communication System: CW Frequency: 835 MHz Duty Cycle: 1:1
Medium: Body 835MHz
Medium parameters used: f = 835 MHz; σ = 1 mho/m; ε_r = 53.8; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY5 Configuration:

- Probe: ES3DV3 - SN3149; ConvF(6.22, 6.22, 6.22); Calibrated: 25.09.10
- Electronics: DAE4 Sn771; Calibration: 21.11.10
- Phantom: 2mm Oval Phantom ELI4; Type: QDOVA001BB
- Measurement SW: DASY5, V5.2.157; Postprocessing SW: SEMCAD, V14.0 Build 57

Pin=250mW; d=15mm/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 41.7 V/m; Power Drift = -0.065 dB
Peak SAR (extrapolated) = 3.475 W/kg
SAR(1 g) = 2.47 mW/g; SAR(10 g) = 1.61 mW/g
Maximum value of SAR (measured) = 2.68 mW/g



0 dB = 2.68mW/g

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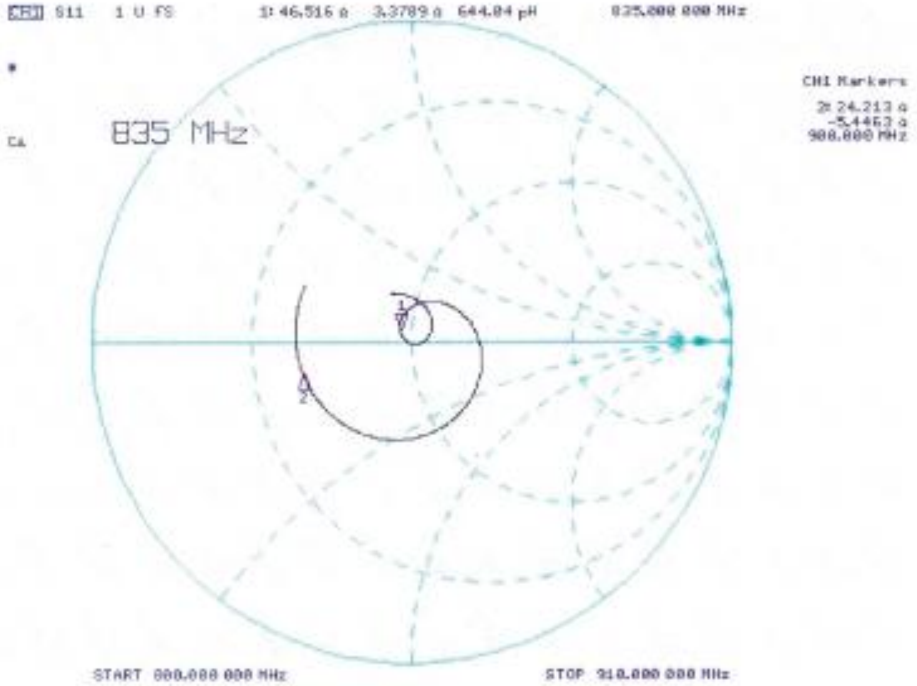
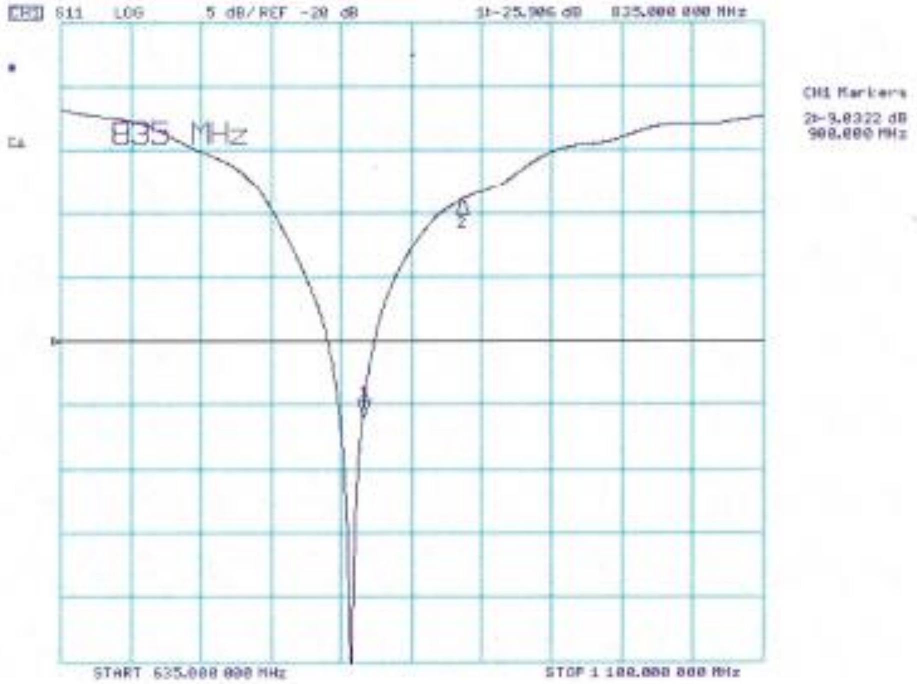
工业和信息化部通信计量中心

Telecommunication Metrology Center of MIIT

Impedance Measurement Plot for Body TSL





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