

APPENDIX C: RELEVANT PAGES FROM PROBE CALIBRATION REPORT(S)

The State Radio_monitoring_center Testing Center

Calibration Certificate

Instrument Dosimetric E-field Probe

Type/Model ES3DV3

Manufacturer Schmid & Partner Engineering AG

Serial No SN:3128

Name of Client The State Radio_monitoring_center Testing Center

Address of Client No.98 Bei Lishi Road XiCheng District

Calibration Date 2011.4.21

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

Approved by 

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Add: No.80 Bei Lishi Road, Xi Cheng District Beijing 100037, P.R.China

Page 1 of 6 Certificate No.SRTC2011-CAL002-003

The State Radio_monitoring_center Testing Center

Reference documents of the measurement(Code, Name)

SRTC3003-V1.0.0 Working procedure for calibration——SAR testing system

Place and environmental condition of the measurement

Temperature 23.1℃ Humidity 28.6%
Location SRTC226 room

| Primary Calibration Equipment used | Model/Type | ID# | Cal Date | Scheduled Calibration |
|--------------------------------------|------------|----------------|----------|-----------------------|
| Power meter | E4417A | SN: MY45101004 | 2010.8 | 2011.8 |
| Power sensor | E9300B | SN: MY41496001 | 2010.8 | 2011.8 |
| Power sensor | E9300B | SN: MY41496003 | 2010.8 | 2011.8 |
| Reference DAE | DAE4 | SN: 720 | 2011.1 | 2012.1 |
| Signal generator | SML03 | SN:103514 | 2010.8 | 2011.8 |
| Network analyzer | 8714ET | SN:US40372083 | 2010.8 | 2011.8 |
| Secondary Calibration Equipment used | Model/Type | ID# | | |
| Waveguide | WGLS R9 | SN:1006 | | |
| Waveguide | WGLS R14 | SN:1003 | | |
| Waveguide | WGLS R22 | SN:1006 | | |

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Page 2 of 6 Certificate No.SRTC2011-CAL002-003

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Note:

1. 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.
2. This calibration certificate is not permitted to be reproduced except in full without written the approval of the only laboratory.
3. SRTC is responsible for the whole of certificate only with stamp of SRTC.
4. The calibration results would be valid only for the items calibration.

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Page 3 of 6 Certificate No.SRTC2011-CAL002-003

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Glossary

| | |
|-------------------------|--|
| TSL | Tissue Simulating Liquid |
| NORM _{x, y, z} | The sensitivity in free space |
| ConvF | The sensitivity of the TSL/The sensitivity in free space |
| DCP | Diode Compression Point |
| Angle φ | φ rotation around probe axis |
| Angle θ | θ rotation around an axis that is in the plane normal to probe axis i.e. $\theta=0$, means that is normal to probe axis |

Methods Applied and Interpretation of Parameters

- NORM_{x, y, z}: Assessed for E-field polarization $\theta=0$ for XY sensors and $\theta=90$ for Z sensor
- NORM(f)_{x, y, z}= NORM_{x, y, z} * frequency_response. And this linearization is implemented in DASY4 software versions later than 4.2. The uncertainty of the frequency response is included in the states uncertainty of ConvF.
- DCP_{x,y,z}: DCP are numerical linearization parameters assessed based on the data of power sweep(no uncertainty required). DCP does not depend on frequency and medium.
- ConvF and boundary effect: Assessed in flat phantom using E-field and inside waveguide using analytical field distributions based on power measurements for $f > 800\text{MHz}$.The same setups are used for assessment of the parameters applied for boundary compensation(alpha,depth)of which typical uncertainty values are given. A frequency dependent ConvF is used in DASY version 4.4 and higher which allows extending the validity from $\pm 50\text{MHz}$ to $\pm 100\text{MHz}$.
- Spherical isotropy: in a locally homogeneous field realized using an open waveguide setup.

The State Radio_monitoring_center Testing Center

Measurement Conditions

| | | |
|---------------|--------------|-------------|
| DASY versions | DSAY 5 | V52.2.0.163 |
| Model | Flat phantom | —— |

Probe Sensitivity Parameters

| | Value | Unit |
|--------|-------|---------------------|
| Axis X | 1.00 | $\mu V / (V / m)^2$ |
| Axis Y | 1.00 | $\mu V / (V / m)^2$ |
| Axis Z | 1.00 | $\mu V / (V / m)^2$ |

1. Diode Compression Point

| | Value | Unit | Uncertainty (k=2) |
|--------|--------|------|-------------------|
| Axis X | 97.40 | mV | 10.82% |
| Axis Y | 101.40 | mV | 10.82% |
| Axis Z | 100.70 | mV | 10.82% |

2. Probe Conversion Factors: Head Tissue Liquid

| Frequency (MHz) | Validity (MHz) | Permittivity | Conductivity (mho/m) | Alpha | Depth (mm) | ConvFx/ ConvFy / ConvFz | | | Uncertainty (k = 2) |
|-----------------|----------------|--------------|----------------------|-------|------------|-------------------------|-------|-------|---------------------|
| | | | | | | $\mu V / (V / m)^2$ | | | |
| 835 | ±100 | 41.93 | 0.916 | 0.448 | 1.499 | 7.880 | 8.301 | 8.050 | 13.02% |
| 900 | ±100 | 42.72 | 0.968 | 0.607 | 1.271 | 9.029 | 9.525 | 9.201 | 13.02% |
| 1800 | ±100 | 39.61 | 1.354 | 0.312 | 2.126 | 6.154 | 6.495 | 6.273 | 13.02% |
| 1900 | ±100 | 39.11 | 1.463 | 0.381 | 1.832 | 4.947 | 5.220 | 5.055 | 13.02% |
| 2450 | ±100 | 38.30 | 1.890 | 0.394 | 1.808 | 3.308 | 3.487 | 3.402 | 13.02% |

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3. Probe Conversion Factors: Body Tissue Liquid

| Frequency (MHz) | Validity (MHz) | Permittivity | Conductivity (mho/m) | Alpha | Depth (mm) | ConvFx/ ConvFy/ConvFz $\mu V/(V/m)^2$ | | | Uncertainty (k=2) |
|-----------------|----------------|--------------|----------------------|-------|------------|---------------------------------------|-------|-------|-------------------|
| 835 | ±100 | 54.05 | 0.983 | 0.508 | 1.412 | 6.776 | 7.019 | 6.804 | 13.02% |
| 900 | ±100 | 54.48 | 1.055 | 0.672 | 1.244 | 8.755 | 9.243 | 8.919 | 13.02% |
| 1800 | ±100 | 53.74 | 1.567 | 0.316 | 2.446 | 5.702 | 6.018 | 5.816 | 13.02% |
| 1900 | ±100 | 53.40 | 1.679 | 0.330 | 2.414 | 4.532 | 4.785 | 4.632 | 13.02% |
| 2450 | ±100 | 52.70 | 1.950 | 0.623 | 1.368 | 4.580 | 4.859 | 4.673 | 13.02% |

4. Probe Isotropy

| | Value | Unit | Uncertainty(k=2) |
|--------------------|--------|------|------------------|
| Axial Isotropy | -0.071 | dB | 10.18% |
| Spherical Isotropy | -0.171 | dB | 10.18% |

Calibrated by 张明远

Checked by 倪正

APPENDIX D: RELEVANT PAGES FROM DIPOLE VALIDATION KIT REPORT(S)

The State Radio_monitoring_center Testing Center

Calibration Certificate



Instrument Dipole

Type/Model D900V2

Manufacturer Schmid & Partner Engineering AG

Serial No SN:171

Name of Client The State Radio_monitoring_center Testing Center

Address of Client No.98 Bei Lishi Road XiCheng District

Calibration Date 2010.6.11

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

Approved by  

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Page 1 of 8 Certificate No.SRTC2010-CAL003-003

The State Radio_monitoring_center Testing Center

| |
|---|
| Reference documents of the measurement(Code, Name) |
| SRTC3003-V1.0.0 Working procedure for calibration of SAR Testing system |
| Place and environmental condition of the measurement |
| Temperature 21.6℃ Humidity 30.7% |
| Location SRTC Room226 |

| Primary Calibration Equipment used | Model/Type | ID# | Cal Date | Scheduled Calibration |
|--------------------------------------|------------|----------------|----------|-----------------------|
| Power meter | E4417A | SN: MY45101004 | 2009.8 | 2010.8 |
| Power sensor | E9300B | SN: MY41496001 | 2009.8 | 2010.8 |
| Power sensor | E9300B | SN: MY41496003 | 2009.8 | 2010.8 |
| Reference DAE | DAE4 | SN: 720 | 2010.1 | 2011.1 |
| Reference probe | ES3DV3 | SN: 3128 | 2009.6 | 2010.6 |
| Secondary Calibration Equipment used | Model/Type | ID# | Cal Date | Scheduled Calibration |
| Signal generator | SML03 | SN:103514 | 2009.8 | 2010.8 |
| Network analyzer | 8714ET | SN:US40372083 | 2009.8 | 2010.8 |

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Page 2 of 8 Certificate No.SRTC2010-CAL003-003

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4. The calibration results would be valid only for the items calibration.
5. The certification is written by Chinese and English. Exact meaning should be explained only on Chinese version.

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Page 3 of 8 Certificate No.SRTC2010-CAL003-003

The State Radio_monitoring_center Testing Center

Glossary

| | |
|-------|--|
| TSL | Tissue Simulating Liquid |
| ConvF | The sensitivity of the TSL / sensitivity in TSL/NORM x, y, z |
| N/A | not applicable or not measured |

Calibration is preformed according to the Following Standards

- a) IEEE Std 1528-2003, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in Human Head from Wireless Communication 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 Communication 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:

- e) DASY System Handbook

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Page 4 of 8 Certificate No.SRTC2010-CAL003-003

The State Radio_monitoring_center Testing Center

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.
- 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.

Measurement Conditions

| | | |
|-----------------------------------|------------------------|---------------------------|
| DASY Version | DSAY 5 | V5.0 Build 126 |
| Extrapolation | Advanced Extrapolation | ———— |
| Phantom | ELI4 | ———— |
| Distance Dipole Center-TSL | 15mm | With spacer (See note) |
| Area Scan Resolution | dx,dy=15mm | ———— |
| Zoom Scan Resolution | dx,dy,dz=5mm | ———— |
| Frequency | 900MHz | ———— |

Note: As client can not provide a spacer for their dipole, we used a alternate method to define the distance from dipole center to TSL. Pictures in Annex 3 show the details.

The State Radio_monitoring_center Testing Center

Head TSL Parameters

The following parameters and calculation were applied

| | Temperature | Permittivity | Conductivity |
|----------------------------------|--------------|--------------|--------------|
| Nominal Head TSL parameters | 22.0°C | 41.5 | 0.97mho/m |
| Measured Head TSL parameters | (22±0.5)°C | 41.2 | 0.95m±5% |
| Head TSL temperature during test | (21.6±0.6)°C | —— | —— |

1. SAR-Head TSL

| SAR -1g SAR averaged over 1cm ³ (1g) of Head TSL | Condition | —— |
|--|-------------------|-------------------------------|
| SAR measured | 250mW input power | 2.70mW/g |
| SAR normalized | normalized to 1W | 10.80mW/g |
| SAR for nominal Head TSL parameters | normalized to 1W | 10.71 mW/g±15.20%(k=2) |

| SAR-10g SAR averaged over 10cm ³ (10g) of Head TSL | Condition | —— |
|--|-------------------|-----------------------------|
| SAR measured | 250mW input power | 1.72mW/g |
| SAR normalized | normalized to 1W | 6.88mW/g |
| SAR for nominal Head TSL parameters | normalized to 1W | 6.80mW/g±14.38%(k=2) |

The State Radio_monitoring_center Testing Center

2. Annex

Annex 1

Date/Time: 6/11/2010 8:30:47 AM

Test Laboratory: SRTC, Beijing, China

DUT: Dipole 900 MHz; Type: D900V2; Serial: D900V2 - SN:171

Communication System: CW; Frequency: 900 MHz; Duty Cycle: 1:1
Medium parameters used: $f = 900 \text{ MHz}$; $\sigma = 0.949 \text{ mho/m}$; $\epsilon_r = 41.2$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE/IEC)

DASY4 Configuration:

- Probe: ES3DV3 - SN3128; ConvF(5.52, 5.52, 5.52); Calibrated: 6/22/2009
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn720; Calibrated: 1/18/2010
- Phantom: ELI 4.0; Type: QDOVA001BA
- Measurement SW: DASY5, V5.0 Build 126; SEMCAD X Version 13.4 Build 125

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

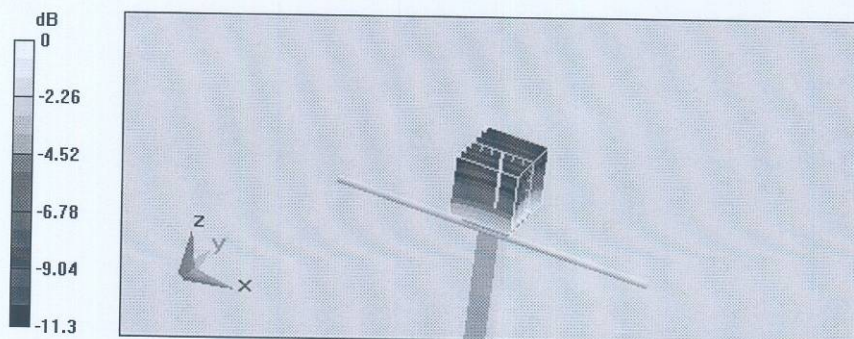
Measurement grid: $dx=5\text{mm}$, $dy=5\text{mm}$, $dz=5\text{mm}$

Reference Value = 56.3 V/m; Power Drift = -0.025 dB

Peak SAR (extrapolated) = 4.18 W/kg

SAR(1 g) = 2.7 mW/g; SAR(10 g) = 1.72 mW/g

Maximum value of SAR (measured) = 2.93 mW/g



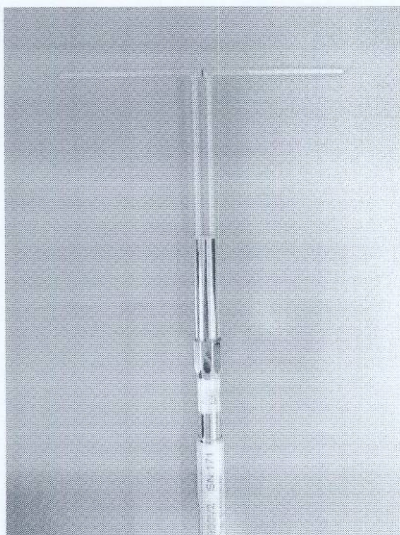
0 dB = 2.93mW/g

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Page 7 of 8 Certificate No.SRTC2010-CAL003-003

The State Radio_monitoring_center Testing Center

Annex 2



Calibrated by 张明远

Checked by 刘翔

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Page 8 of 8 Certificate No.SRTC2010-CAL003-003

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:

TSL tissue simulating liquid
ConvF sensitivity in TSL / NORM x,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 300 MHz to 3 GHz)", 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) DASY4/5 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..

Measurement Conditions

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

| | | |
|------------------------------|---------------------------|-------------|
| DASY Version | DASY4 | V4.7 |
| Extrapolation | Advanced Extrapolation | |
| Phantom | Modular Flat Phantom V4.9 | |
| 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 | 40.4 ± 6 % | 0.88 mho/m ± 6 % |
| Head TSL temperature during test | (22.0 ± 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 | 2.37 mW / g |
| SAR normalized | normalized to 1W | 9.48 mW / g |
| SAR for nominal Head TSL parameters ¹ | normalized to 1W | 9.46 mW / g ± 17.0 % (k=2) |

| SAR averaged over 10 cm ³ (10 g) of Head TSL | condition | |
|---|--------------------|-----------------------------------|
| SAR measured | 250 mW input power | 1.56 mW / g |
| SAR normalized | normalized to 1W | 6.24 mW / g |
| SAR for nominal Head TSL parameters ¹ | normalized to 1W | 6.21 mW / g ± 16.5 % (k=2) |

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

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 | 53.4 ± 6 % | 0.99 mho/m ± 6 % |
| Body TSL temperature during test | (22.0 ± 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 | 2.42 mW / g |
| SAR normalized | normalized to 1W | 9.68 mW / g |
| SAR for nominal Body TSL parameters ² | normalized to 1W | 9.36 mW / g ± 17.0 % (k=2) |

| SAR averaged over 10 cm ³ (10 g) of Body TSL | condition | |
|---|--------------------|-----------------------------------|
| SAR measured | 250 mW input power | 1.60 mW / g |
| SAR normalized | normalized to 1W | 6.40 mW / g |
| SAR for nominal Body TSL parameters ² | normalized to 1W | 6.24 mW / g ± 16.5 % (k=2) |

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

Appendix

Antenna Parameters with Head TSL

| | |
|--------------------------------------|--------------------------------|
| Impedance, transformed to feed point | 54.9 Ω - 2.6 j Ω |
| Return Loss | -25.5 dB |

Antenna Parameters with Body TSL

| | |
|--------------------------------------|--------------------------------|
| Impedance, transformed to feed point | 50.3 Ω - 4.5 j Ω |
| Return Loss | - 27.0 dB |

General Antenna Parameters and Design

| | |
|----------------------------------|----------|
| Electrical Delay (one direction) | 1.390 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.

Additional EUT Data

| | |
|-----------------|---------------|
| Manufactured by | SPEAG |
| Manufactured on | July 04, 2005 |

DASY4 Validation Report for Head TSL

Date/Time: 16.06.2008 10:59:00

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN:4d023

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

Medium: HSL 900 MHz;

Medium parameters used: $f = 835$ MHz; $\sigma = 0.88$ mho/m; $\epsilon_r = 40.4$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ES3DV2 - SN3025; ConvF(5.97, 5.97, 5.97); Calibrated: 28.04.2008
- Sensor-Surface: 3.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 14.03.2008
- Phantom: Flat Phantom 4.9L; Type: QD000P49AA; ;
- Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

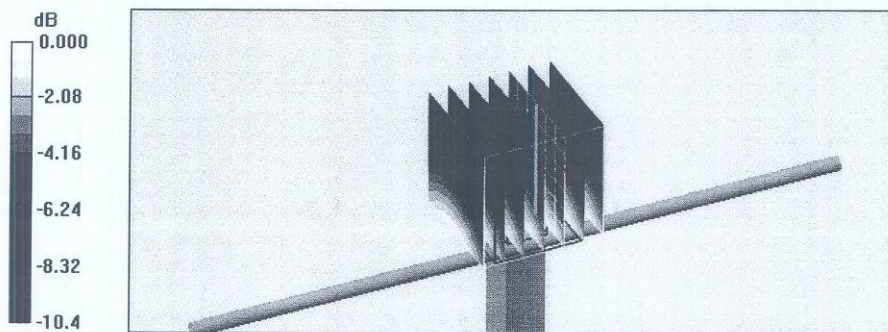
Pin=250mW; dip=15mm; dist=3.4mm/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 56.5 V/m; Power Drift = -0.056 dB

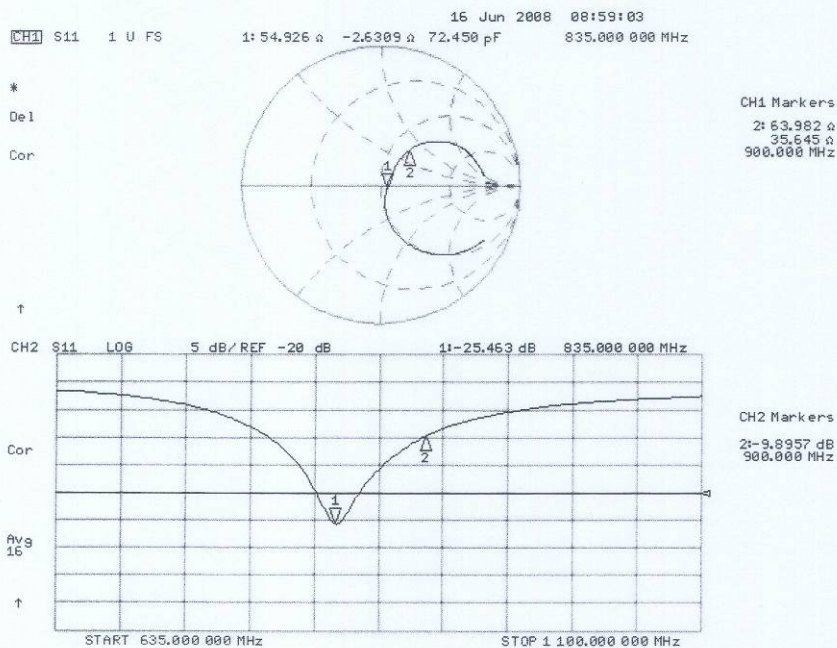
Peak SAR (extrapolated) = 3.48 W/kg

SAR(1 g) = 2.37 mW/g; SAR(10 g) = 1.56 mW/g

Maximum value of SAR (measured) = 2.68 mW/g



Impedance Measurement Plot for Head TSL



DASY4 Validation Report for Body TSL

Date/Time: 06.06.2008 12:44:11

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN:4d023

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

Medium: MSL900;

Medium parameters used: $f = 835$ MHz; $\sigma = 0.99$ mho/m; $\epsilon_r = 53.4$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ES3DV2 - SN3025; ConvF(5.9, 5.9, 5.9); Calibrated: 28.04.2008
- Sensor-Surface: 3.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 14.03.2008
- Phantom: Flat Phantom 4.9L; Type: QD000P49AA; ;
- Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

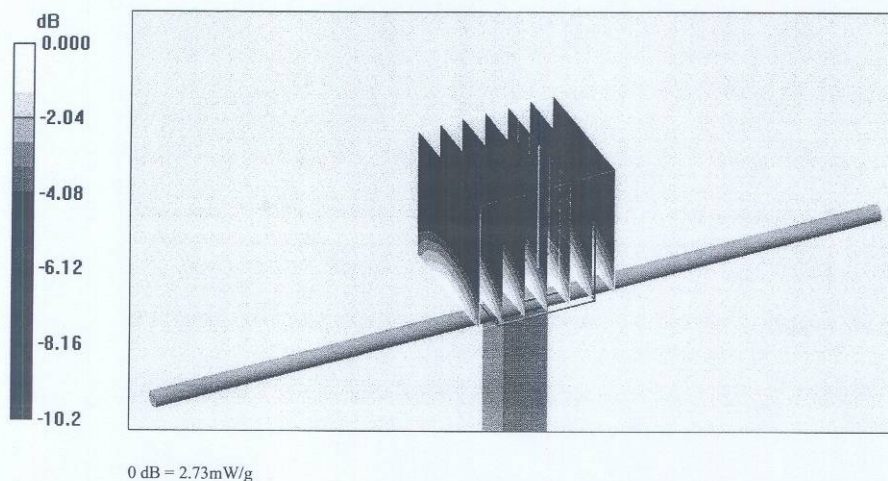
Pin = 250mW, d = 15mm/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 53.7 V/m; Power Drift = 0.008 dB

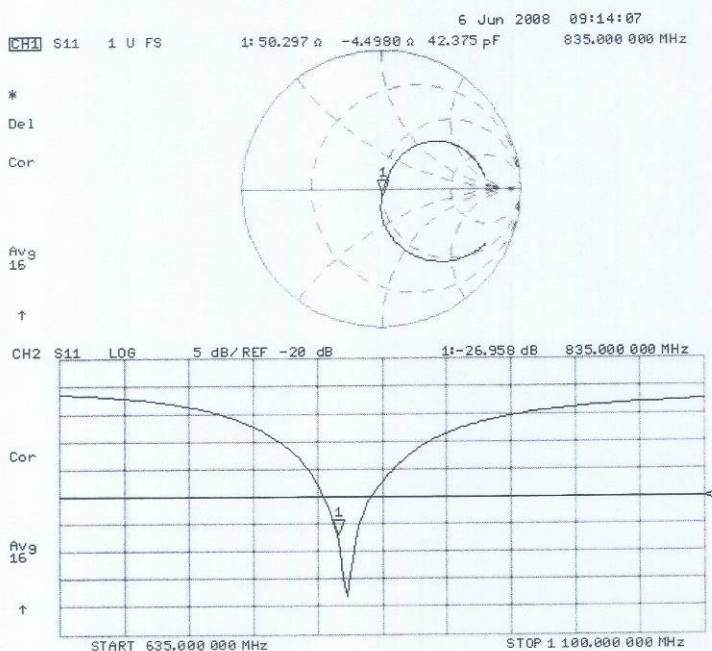
Peak SAR (extrapolated) = 3.49 W/kg

SAR(1 g) = 2.42 mW/g; SAR(10 g) = 1.6 mW/g

Maximum value of SAR (measured) = 2.73 mW/g



Impedance Measurement Plot for Body TSL



The State Radio_monitoring_center Testing Center

Calibration Certificate



Instrument Dipole

Type/Model D1800V2

Manufacturer Schmid & Partner Engineering AG

Serial No SN:2d084

Name of Client The State Radio_monitoring_center Testing Center

Address of Client No.98 Bei Lishi Road XiCheng District

Calibration Date 2010.6.11

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

Approved by



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Page 1 of 8 Certificate No.SRTC2010-CAL003-004

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| |
|---|
| Reference documents of the measurement(Code, Name) |
| SRMC3003-V1.0.0 Working procedure for calibration of SAR Testing system |
| Place and environmental condition of the measurement |
| Temperature 21.6℃ Humidity 30.7% |
| Location SRTC Room226 |

| Primary Calibration Equipment used | Model/Type | ID# | Cal Date | Scheduled Calibration |
|--------------------------------------|------------|----------------|----------|-----------------------|
| Power meter | E4417A | SN: MY45101004 | 2009.8 | 2010.8 |
| Power sensor | E9300B | SN: MY41496001 | 2009.8 | 2010.8 |
| Power sensor | E9300B | SN: MY41496003 | 2009.8 | 2010.8 |
| Reference DAE | DAE4 | SN: 720 | 2010.1 | 2011.1 |
| Reference probe | ES3DV3 | SN: 3128 | 2009.6 | 2010.6 |
| Secondary Calibration Equipment used | Model/Type | ID# | Cal Date | Scheduled Calibration |
| Signal generator | SML03 | SN:103514 | 2009.8 | 2010.8 |
| Network analyzer | 8714ET | SN:US40372083 | 2009.8 | 2010.8 |

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Page 2 of 8 Certificate No.SRTC2010-CAL003-004

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Note:

1. 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.
2. This calibration certificate is not permitted to be reproduced except in full without written the approval of the only laboratory
3. SRTC is responsible for the whole of certificate only with stamp of SRTC.
4. The calibration results would be valid only for the items calibration.
5. The certification is written by Chinese and English. Exact meaning should be explained only on Chinese version.

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Page 3 of 8 Certificate No.SRTC2010-CAL003-004

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Glossary

| | |
|-------|--|
| TSL | Tissue Simulating Liquid |
| ConvF | The sensitivity of the TSL / sensitivity in TSL/NORM x, y, z |
| N/A | not applicable or not measured |

Calibration is preformed according to the Following Standards

- a) IEEE Std 1528-2003, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in Human Head from Wireless Communication 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 Communication 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:

- e) DASY System Handbook

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Page 4 of 8 Certificate No.SRTC2010-CAL003-004

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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.
- 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.

Measurement Conditions

| | | |
|----------------------------|------------------------|---------------------------|
| DASY Version | DSAY 5 | V5.0 Build 126 |
| Extrapolation | Advanced Extrapolation | ——— |
| Phantom | ELI4 | ——— |
| Distance Dipole Center-TSL | 10mm | With spacer (See note) |
| Area Scan Resolution | dx,dy=10mm | ——— |
| Zoom Scan Resolution | dx,dy,dz=5mm | ——— |
| Frequency | 1800MHz | ——— |

Note: As client can not provide a spacer for their dipole, we used a alternate method to define the distance from dipole center to TSL. Pictures in Annex 3 show the details.

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Head TSL Parameters

The following parameters and calculation were applied

| | Temperature | Permittivity | Conductivity |
|----------------------------------|--------------|--------------|--------------|
| Nominal Head TSL parameters | 22.0°C | 40.0 | 1.40mho/m |
| Measured Head TSL parameters | (22±0.5)°C | 39.2 | 1.35m±5% |
| Head TSL temperature during test | (21.6±0.6)°C | —— | —— |

1. SAR-Head TSL

| SAR -1g SAR averaged over 1cm ³ (1g) of Head TSL | Condition | —— |
|--|-------------------|-------------------------------|
| SAR measured | 250mW input power | 9.55mW/g |
| SAR normalized | normalized to 1W | 38.20mW/g |
| SAR for nominal Head TSL parameters | normalized to 1W | 37.62 mW/g±15.20%(k=2) |

| SAR-10g SAR averaged over 10cm ³ (10g) of Head TSL | Condition | —— |
|--|-------------------|------------------------------|
| SAR measured | 250mW input power | 5.09mW/g |
| SAR normalized | normalized to 1W | 20.36mW/g |
| SAR for nominal Head TSL parameters | normalized to 1W | 20.13mW/g±14.38%(k=2) |

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2. Annex

Annex 1

Date/Time: 6/11/2010 8:30:47 AM

Test Laboratory: SRTC, Beijing, China

DUT: Dipole 1800 MHz; Type: D1800V2; Serial: D1800V2 - SN: 2d084

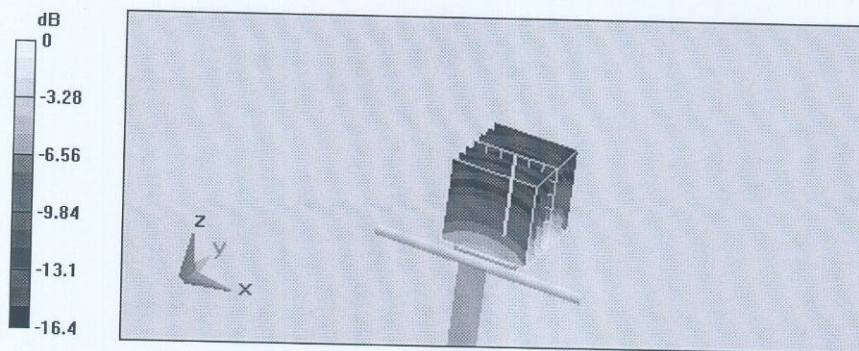
Communication System: CW; Frequency: 1800 MHz; Duty Cycle: 1:1
Medium parameters used: $f = 1800$ MHz; $\sigma = 1.35$ mho/m; $\epsilon_r = 39.2$; $\rho = 1000$ kg/m³
Phantom section: Flat Section
Measurement Standard: DASYS (IEEE/IEC)

DASY4 Configuration:

- Probe: ES3DV3 - SN3128; ConvF(4.93, 4.93, 4.93); Calibrated: 6/22/2009
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn720; Calibrated: 1/18/2010
- Phantom: ELI 4.0; Type: QDOVA001BA
- Measurement SW: DASYS, V5.0 Build 126; SEMCAD X Version 13.4 Build 125

Pin=250mW;d=10mm/Zoom Scan (7x7x7) (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 89 V/m; Power Drift = -0.119 dB
Peak SAR (extrapolated) = 17.2 W/kg
SAR(1 g) = 9.55 mW/g; SAR(10 g) = 5.09 mW/g
Maximum value of SAR (measured) = 10.7 mW/g



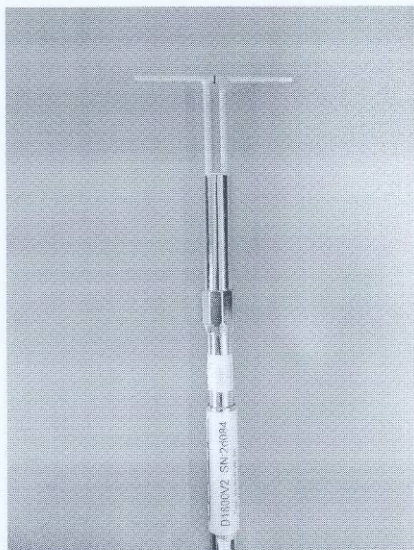
0 dB = 10.7mW/g

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Page 7 of 8 Certificate No.SRTC2010-CAL003-004

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Annex 2



Calibrated by 张明远

Checked by 刘明

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Page 8 of 8 Certificate No.SRTC2010-CAL003-004