

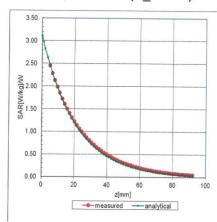


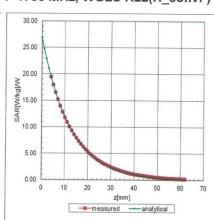
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# **Conversion Factor Assessment**

# f=750 MHz, WGLS R9(H\_convF)

# f=1750 MHz, WGLS R22(H\_convF)



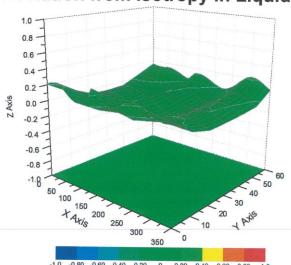


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Report Issued Date: Jan. 31, 2019

# **Deviation from Isotropy in Liquid**



-1.0 -0.80 -0.60 -0.40 -0.20 0 0.20 0.40 0.60 0.80 1.0 Uncertainty of Spherical Isotropy Assessment: ±3.2% (K=2)

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# DASY/EASY - Parameters of Probe: ES3DV3 - SN: 3252

# Other Probe Parameters

Sensor Arrangement	Triangular	
Connector Angle (°)	131.6	
Mechanical Surface Detection Mode	enabled	
Optical Surface Detection Mode	disable	
Probe Overall Length	337mm	
Probe Body Diameter	10mm	
Tip Length	10mm	
Tip Diameter	4mm	
Probe Tip to Sensor X Calibration Point	2mm	
Probe Tip to Sensor Y Calibration Point	2mm	
Probe Tip to Sensor Z Calibration Point	2mm	
Recommended Measurement Distance from Surface	3mm	

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CALIBRATION

**CNAS L0570** 





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Certificate No: Z18-60424

# **CALIBRATION CERTIFICATE**

ECIT

Object

D750V3 - SN: 1144

Calibration Procedure(s)

Client

FF-Z11-003-01

Calibration Procedures for dipole validation kits

Calibration date:

October 26, 2018

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 $\pm$ 3)°C 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	102083	01-Nov-17 (CTTL, No.J17X08756)	Oct-18
Power sensor NRV-Z5	100542	01-Nov-17 (CTTL, No.J17X08756)	Oct-18
Reference Probe EX3DV4	SN 7514	27-Aug-18(SPEAG,No.EX3-7514_Aug18)	Aug-19
DAE4	SN 1555	20-Aug-18(SPEAG,No.DAE4-1555_Aug18)	Aug-19
Secondary Standards	ID#	Cal Date(Calibrated by, Certificate No.)	Scheduled Calibration
Signal Generator E4438C	MY49071430	23-Jan-18 (CTTL, No.J18X00560)	Jan-19
NetworkAnalyzer E5071C	MY46110673	24-Jan-18 (CTTL, No.J18X00561)	Jan-19

Name Function Signature

Zhao Jing SAR Test Engineer

Reviewed by: Lin Hao SAR Test Engineer

Approved by: Qi Dianyuan SAR Project Leader

Issued: October 29, 2018

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Glossary:

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

# Calibration is Performed According to the Following Standards:

- a) IEEE Std 1528-2013, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", June 2013
- b) IEC 62209-1, "Measurement procedure for assessment of specific absorption rate of human exposure to radio frequency fields from hand-held and body-mounted wireless communication devices- Part 1: Device used next to the ear (Frequency range of 300MHz to 6GHz)", July 2016
- c) IEC 62209-2, "Procedure to measure the Specific Absorption Rate (SAR) For wireless communication devices used in close proximity to the human body (frequency range of 30MHz to 6GHz)", March 2010
- d) KDB865664, SAR Measurement Requirements for 100 MHz to 6 GHz

#### Additional Documentation:

e) 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.

The reported uncertainty of measurement is stated as the standard uncertainty of Measurement multiplied by the coverage factor k=2, which for a normal distribution Corresponds to a coverage probability of approximately 95%.

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# Measurement Conditions DASY system configuration, as

DASY Version	DASY52	52.10.2.1495
Extrapolation	Advanced Extrapolation	
Phantom	Triple Flat Phantom 5.1C	
Distance Dipole Center - TSL	15 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	750 MHz ± 1 MHz	

### **Head TSL parameters**

The following parameters and calculations were applied

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	41.9	0.89 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	42.1 ± 6 %	0.88 mho/m ± 6 %
Head TSL temperature change during test	<1.0 °C		

# SAR result with Head TSL

SAR averaged over 1 cm <sup>3</sup> (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	2.11 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	8.50 mW /g ± 18.8 % (k=2)
SAR averaged over 10 cm <sup>3</sup> (10 g) of Head TSL	Condition	
SAR measured	250 mW input power	1.39 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	5.59 mW /g ± 18.7 % (k=2)

Body TSL parameters
The following parameters and calculations were applied

	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	55.5	0.96 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	55.6 ± 6 %	0.93 mho/m ± 6 %
Body TSL temperature change during test	<1.0 °C		

# SAR result with Body TSL

SAR averaged over 1 cm <sup>3</sup> (1 g) of Body TSL	Condition	
SAR measured	250 mW input power	2.09 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	8.55 mW /g ± 18.8 % (k=2)
SAR averaged over 10 cm <sup>3</sup> (10 g) of Body TSL	Condition	
SAR measured	250 mW input power	1.40 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	5.70 mW /g ±18.7 % (k=2)

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# Appendix (Additional assessments outside the scope of CNAS L0570)

# Antenna Parameters with Head TSL

Impedance, transformed to feed point	54.5Ω+ 0.45jΩ	
Return Loss	- 27.4dB	

### Antenna Parameters with Body TSL

Impedance, transformed to feed point	49.7Ω- 2.47jΩ	
Return Loss	- 32.1dB	

### General Antenna Parameters and Design

3229 MARIE NO SER NO 101 TO 101 TO	
Electrical Delay (one direction)	0.897 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. On some of the dipoles, small end caps are added to the dipole arms in order to improve matching when loaded according to the position as explained in the "Measurement Conditions" paragraph. The SAR data are not affected by this change. The overall dipole length is still according to the Standard.

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

Certificate No: Z18-60424

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DASY5 Validation Report for Head TSL

Test Laboratory: CTTL, Beijing, China

DUT: Dipole 750 MHz; Type: D750V3; Serial: D750V3 - SN: 1144

Communication System: UID 0, CW; Frequency: 750 MHz; Duty Cycle: 1:1 Medium parameters used: f = 750 MHz;  $\sigma = 0.883$  S/m;  $\varepsilon_r = 42.07$ ;  $\rho = 1000$  kg/m3

Phantom section: Right Section

DASY5 Configuration:

- Probe: EX3DV4 SN7514; ConvF(9.47, 9.47, 9.47) @ 750 MHz; Calibrated: 8/27/2018
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1555; Calibrated: 8/20/2018
- Phantom: MFP\_V5.1C; Type: QD 000 P51CA; Serial: 1062
- Measurement SW: DASY52, Version 52.10 (2); SEMCAD X Version 14.6.12 (7450)

Dipole Calibration/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm,

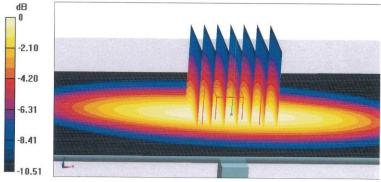
dy=5mm, dz=5mm

Reference Value = 55.73 V/m; Power Drift = 0.03 dB

Peak SAR (extrapolated) = 3.22 W/kg

SAR(1 g) = 2.11 W/kg; SAR(10 g) = 1.39 W/kg

Maximum value of SAR (measured) = 2.84 W/kg



0 dB = 2.84 W/kg = 4.53 dBW/kg

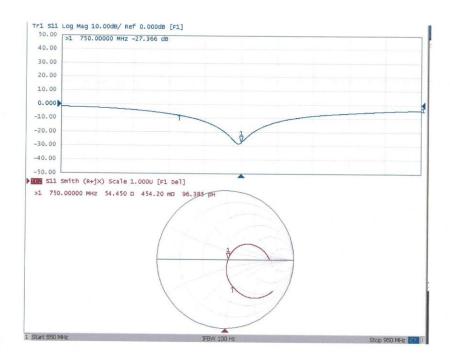
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# Impedance Measurement Plot for Head TSL



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DASY5 Validation Report for Body TSL

Date: 10.25.2018

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Report Issued Date: Jan. 31, 2019

Test Laboratory: CTTL, Beijing, China

DUT: Dipole 750 MHz; Type: D750V3; Serial: D750V3 - SN: 1144

Communication System: UID 0, CW; Frequency: 750 MHz; Duty Cycle: 1:1 Medium parameters used: f=750 MHz;  $\sigma=0.932$  S/m;  $\epsilon_r=55.6$ ;  $\rho=1000$  kg/m3

Phantom section: Center Section

DASY5 Configuration:

- Probe: EX3DV4 SN7514; ConvF(9.68, 9.68, 9.68) @ 750 MHz; Calibrated: 8/27/2018
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1555; Calibrated: 8/20/2018
- Phantom: MFP\_V5.1C; Type: QD 000 P51CA; Serial: 1062
- Measurement SW: DASY52, Version 52.10 (2); SEMCAD X Version 14.6.12 (7450)

Dipole Calibration/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm,

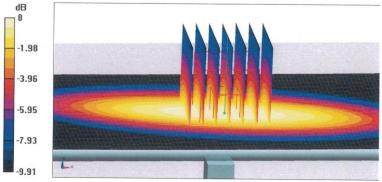
dy=5mm, dz=5mm

Reference Value = 53.86 V/m; Power Drift = -0.05 dB

Peak SAR (extrapolated) = 3.16 W/kg

SAR(1 g) = 2.09 W/kg; SAR(10 g) = 1.4 W/kg

Maximum value of SAR (measured) = 2.79 W/kg



0 dB = 2.79 W/kg = 4.46 dBW/kg

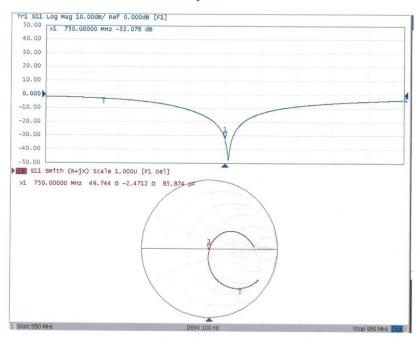
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# Impedance Measurement Plot for Body TSL



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Certificate No:

Z18-60425

# ECIT **CALIBRATION CERTIFICATE**

Object

D835V2 - SN: 4d112

Calibration Procedure(s)

Client

FF-Z11-003-01

Calibration Procedures for dipole validation kits

Calibration date:

October 25, 2018

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)

ID#	Cal Date(Calibrated by, Certificate No.)	Scheduled Calibration
102083	01-Nov-17 (CTTL, No.J17X08756)	Oct-18
100542	01-Nov-17 (CTTL, No.J17X08756)	Oct-18
SN 7514	27-Aug-18(SPEAG,No.EX3-7514_Aug18)	Aug-19
SN 1555	20-Aug-18(SPEAG,No.DAE4-1555_Aug18)	Aug-19
ID#	Cal Date(Calibrated by, Certificate No.)	Scheduled Calibration
MY49071430	23-Jan-18 (CTTL, No.J18X00560)	Jan-19
MY46110673	24-Jan-18 (CTTL, No.J18X00561)	Jan-19
	102083 100542 SN 7514 SN 1555 ID# MY49071430	102083 01-Nov-17 (CTTL, No.J17X08756) 100542 01-Nov-17 (CTTL, No.J17X08756) SN 7514 27-Aug-18(SPEAG,No.EX3-7514_Aug18) SN 1555 20-Aug-18(SPEAG,No.DAE4-1555_Aug18) ID# Cal Date(Calibrated by, Certificate No.) MY49071430 23-Jan-18 (CTTL, No.J18X00560)

	Name	Function	Signature
Calibrated by:	Zhao Jing	SAR Test Engineer	装置
Reviewed by:	Lin Hao	SAR Test Engineer	研验
Approved by:	Qi Dianyuan	SAR Project Leader	300

Issued: October 29, 2018

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Glossary:

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

# Calibration is Performed According to the Following Standards:

- a) IEEE Std 1528-2013, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", June 2013
- b) IEC 62209-1, "Measurement procedure for assessment of specific absorption rate of human exposure to radio frequency fields from hand-held and body-mounted wireless communication devices- Part 1: Device used next to the ear (Frequency range of 300MHz to 6GHz)", July 2016
- c) IEC 62209-2, "Procedure to measure the Specific Absorption Rate (SAR) For wireless communication devices used in close proximity to the human body (frequency range of 30MHz to 6GHz)", March 2010
- d) KDB865664, SAR Measurement Requirements for 100 MHz to 6 GHz

#### Additional Documentation:

e) 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.

The reported uncertainty of measurement is stated as the standard uncertainty of Measurement multiplied by the coverage factor k=2, which for a normal distribution Corresponds to a coverage probability of approximately 95%.

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Measurement Conditions

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

DASY Version	DASY52	52.10.2.1495
Extrapolation	Advanced Extrapolation	
Phantom	Triple Flat Phantom 5.1C	
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	42.4 ± 6 %	0.89 mho/m ± 6 %
Head TSL temperature change during test	<1.0 °C		

### SAR result with Head TSL

SAR averaged over 1 cm <sup>3</sup> (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	2.38 mW/g
SAR for nominal Head TSL parameters	normalized to 1W	9.63 mW /g ± 18.8 % (k=2)
SAR averaged over 10 cm <sup>3</sup> (10 g) of Head TSL	Condition	
SAR measured	250 mW input power	1.55 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	6.25 mW /g ± 18.7 % (k=2)

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	55.3 ± 6 %	0.96 mho/m ± 6 %
Body TSL temperature change during test	<1.0 °C		

# SAR result with Body TSL

SAR averaged over 1 cm <sup>3</sup> (1 g) of Body TSL	Condition	
SAR measured	250 mW input power	2.42 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	9.75 mW /g ± 18.8 % (k=2)
SAR averaged over 10 cm <sup>3</sup> (10 g) of Body TSL	Condition	
SAR measured	250 mW input power	1.59 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	6.40 mW /g ± 18.7 % (k=2)

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# Appendix (Additional assessments outside the scope of CNAS L0570)

# Antenna Parameters with Head TSL

Impedance, transformed to feed point	52.7Ω- 1.03jΩ	
Return Loss	- 31.0dB	

### Antenna Parameters with Body TSL

Impedance, transformed to feed point	49.2Ω- 6.11jΩ	
Return Loss	- 24.1dB	

### General Antenna Parameters and Design

Electrical Delay (one direction)	1.265 ns
Constitution of the second constitution of the s	1.200 110

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. On some of the dipoles, small end caps are added to the dipole arms in order to improve matching when loaded according to the position as explained in the "Measurement Conditions" paragraph. The SAR data are not affected by this change. The overall dipole length is still according to the Standard.

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

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DASY5 Validation Report for Head TSL

Test Laboratory: CTTL, Beijing, China

DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN: 4d112

Communication System: UID 0, CW; Frequency: 835 MHz; Duty Cycle: 1:1 Medium parameters used: f = 835 MHz;  $\sigma$  = 0.892 S/m;  $\varepsilon_r$  = 42.41;  $\rho$  = 1000 kg/m<sup>3</sup>

Phantom section: Right Section

DASY5 Configuration:

- Probe: EX3DV4 SN7514; ConvF(9.09, 9.09, 9.09) @ 835 MHz; Calibrated: 8/27/2018
- · Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1555; Calibrated: 8/20/2018
- Phantom: MFP\_V5.1C; Type: QD 000 P51CA; Serial: 1062
- Measurement SW: DASY52, Version 52.10 (2); SEMCAD X Version 14.6.12 (7450)

Dipole Calibration/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm,

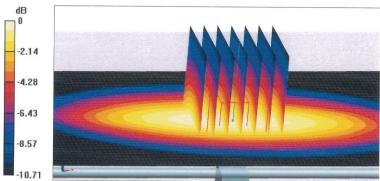
dy=5mm, dz=5mm

Reference Value = 58.97 V/m; Power Drift = 0.01 dB

Peak SAR (extrapolated) = 3.59 W/kg

SAR(1 g) = 2.38 W/kg; SAR(10 g) = 1.55 W/kg

Maximum value of SAR (measured) = 3.19 W/kg



0 dB = 3.19 W/kg = 5.04 dBW/kg

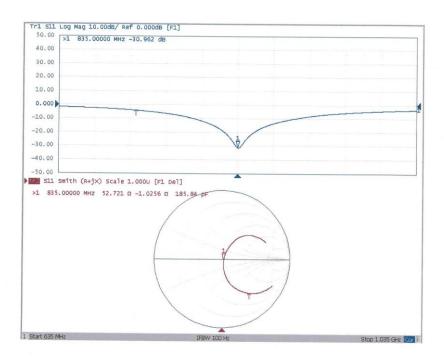
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# Impedance Measurement Plot for Head TSL



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DASY5 Validation Report for Body TSL

Date: 10.25.2018

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Report Issued Date: Jan. 31, 2019

Test Laboratory: CTTL, Beijing, China

DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN: 4d112

Communication System: UID 0, CW; Frequency: 835 MHz; Duty Cycle: 1:1

Medium parameters used: f = 835 MHz;  $\sigma$  = 0.961 S/m;  $\epsilon_r$  = 55.25;  $\rho$  = 1000 kg/m3

Phantom section: Center Section

DASY5 Configuration:

- Probe: EX3DV4 SN7514; ConvF(9.47, 9.47, 9.47) @ 835 MHz; Calibrated: 8/27/2018
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1555; Calibrated: 8/20/2018
- Phantom: MFP\_V5.1C; Type: QD 000 P51CA; Serial: 1062
- Measurement SW: DASY52, Version 52.10 (2); SEMCAD X Version 14.6.12 (7450)

Dipole Calibration/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm,

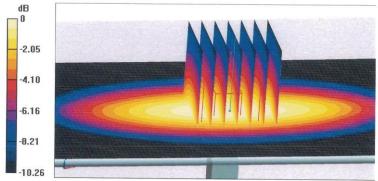
dy=5mm, dz=5mm

Reference Value = 57.14 V/m; Power Drift = -0.06 dB

Peak SAR (extrapolated) = 3.68 W/kg

SAR(1 g) = 2.42 W/kg; SAR(10 g) = 1.59 W/kg

Maximum value of SAR (measured) = 3.24 W/kg



0 dB = 3.24 W/kg = 5.11 dBW/kg

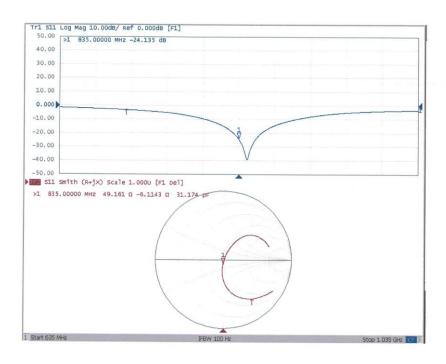
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# Impedance Measurement Plot for Body TSL



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ECIT Certificate No: Z18-60427

# **CALIBRATION CERTIFICATE** Object

D1750V2 - SN: 1044

Calibration Procedure(s) FF-Z11-003-01

Calibration Procedures for dipole validation kits

Calibration date: October 31, 2018

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)

ID#	Cal Date(Calibrated by, Certificate No.)	Scheduled Calibration
102083	01-Nov-17 (CTTL, No.J17X08756)	Oct-18
100542	01-Nov-17 (CTTL, No.J17X08756)	Oct-18
SN 7514	27-Aug-18(SPEAG,No.EX3-7514_Aug18)	Aug-19
SN 1555	20-Aug-18(SPEAG,No.DAE4-1555_Aug18)	Aug-19
ID#	Cal Date(Calibrated by, Certificate No.)	Scheduled Calibration
MY49071430	23-Jan-18 (CTTL, No.J18X00560)	Jan-19
MY46110673	24-Jan-18 (CTTL, No.J18X00561)	Jan-19
	102083 100542 SN 7514 SN 1555 ID # MY49071430	102083 01-Nov-17 (CTTL, No.J17X08756) 100542 01-Nov-17 (CTTL, No.J17X08756) SN 7514 27-Aug-18(SPEAG,No.EX3-7514_Aug18) SN 1555 20-Aug-18(SPEAG,No.DAE4-1555_Aug18) ID# Cal Date(Calibrated by, Certificate No.) MY49071430 23-Jan-18 (CTTL, No.J18X00560)

	Name	Function	Signature
Calibrated by:	Zhao Jing	SAR Test Engineer	超
Reviewed by:	Lin Jun	SAR Test Engineer	43
Approved by:	Qi Dianyuan	SAR Project Leader	-202

Issued: November 5, 2018

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

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#### Glossary:

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 1528-2013, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", June 2013
- b) IEC 62209-1, "Measurement procedure for assessment of specific absorption rate of human exposure to radio frequency fields from hand-held and body-mounted wireless communication devices- Part 1: Device used next to the ear (Frequency range of 300MHz to 6GHz)", July 2016
- c) IEC 62209-2, "Procedure to measure the Specific Absorption Rate (SAR) For wireless communication devices used in close proximity to the human body (frequency range of 30MHz to 6GHz)", March 2010 d) KDB865664, SAR Measurement Requirements for 100 MHz to 6 GHz

# Additional Documentation:

e) 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
- SAR for nominal TSL parameters: The measured TSL parameters are used to calculate the nominal SAR result.

The reported uncertainty of measurement is stated as the standard uncertainty of Measurement multiplied by the coverage factor k=2, which for a normal distribution Corresponds to a coverage probability of approximately 95%.

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