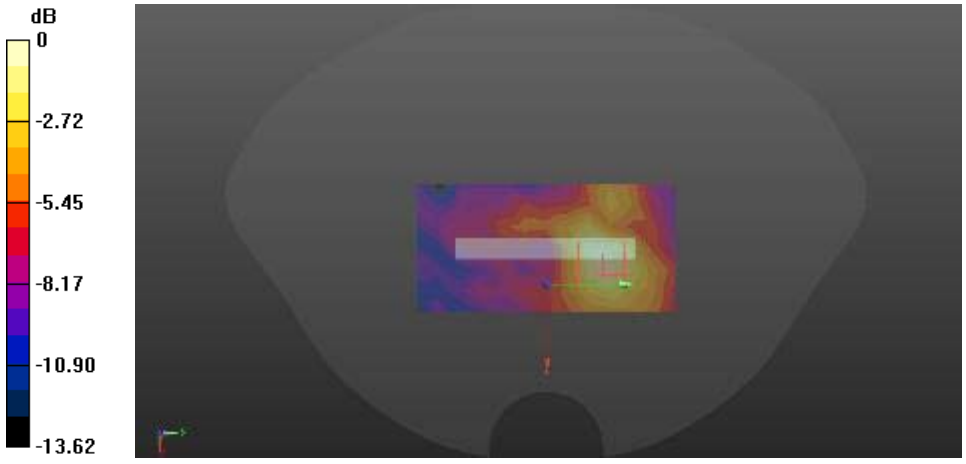
FLAT	EDGE1

Communication System: IEEE 802.11n HT20 WiFi 5 GHz; Frequency: 5785 MHz
Medium parameters used (interpolated): f = 5785 MHz; σ = 5.984 S/m; ε_r = 48.221; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3708; ConvF(4.19, 4.19, 4.19); Calibrated: 11/7/2017;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn720; Calibrated: 10/23/2017
- Phantom: Twin-SAM 1560; Type: QD 000 P40 CD; Serial: 1560
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7373)
  Flat-Section MSL WIFI 5G mimoHOT/WIFI 5785 mimo EDGE1/Area Scan (7x13x1): Measurement grid: dx=10mm, dy=10mm
  Maximum value of SAR (measured) = 0.144 W/kg
  Flat-Section MSL WIFI 5G mimoHOT/WIFI 5785 mimo EDGE1/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
  Reference Value = 2.576 V/m; Power Drift = -0.18 dB
  Peak SAR (extrapolated) = 0.319 W/kg
  SAR(1 g) = 0.071 W/kg; SAR(10 g) = 0.032 W/kg
  Maximum value of SAR (measured) = 0.165 W/kg



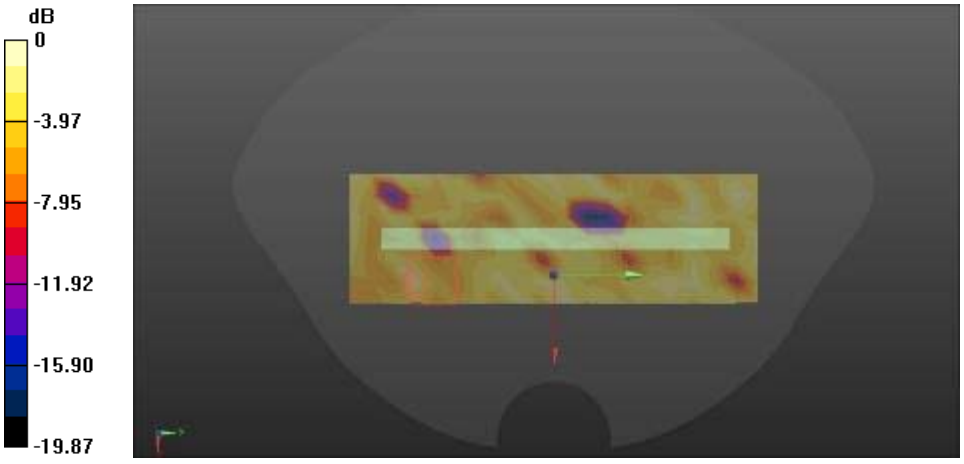
0 dB = 0.165 W/kg = -7.83 dBW/kg

FLAT	EDGE3

Communication System: IEEE 802.11n HT20 WiFi 5 GHz; Frequency: 5785 MHz
Medium parameters used (interpolated): f = 5785 MHz; σ = 5.984 S/m; ε_r = 48.221; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3708; ConvF(4.19, 4.19, 4.19); Calibrated: 11/7/2017;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn720; Calibrated: 10/23/2017
- Phantom: Twin-SAM 1560; Type: QD 000 P40 CD; Serial: 1560
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7373)
  Flat-Section MSL WIFI 5G mimoHOT/WIFI 5785 mimo EDGE 3/Area Scan (7x20x1): Measurement grid: dx=10mm, dy=10mm
  Maximum value of SAR (measured) = 0.0296 W/kg
  Flat-Section MSL WIFI 5G mimoHOT/WIFI 5785 mimo EDGE 3/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
  Reference Value = 1.337 V/m; Power Drift = -0.03 dB
  Peak SAR (extrapolated) = 0.0370 W/kg
  SAR(1 g) = 0.017 W/kg; SAR(10 g) = 0.00941 W/kg
  Maximum value of SAR (measured) = 0.0351 W/kg



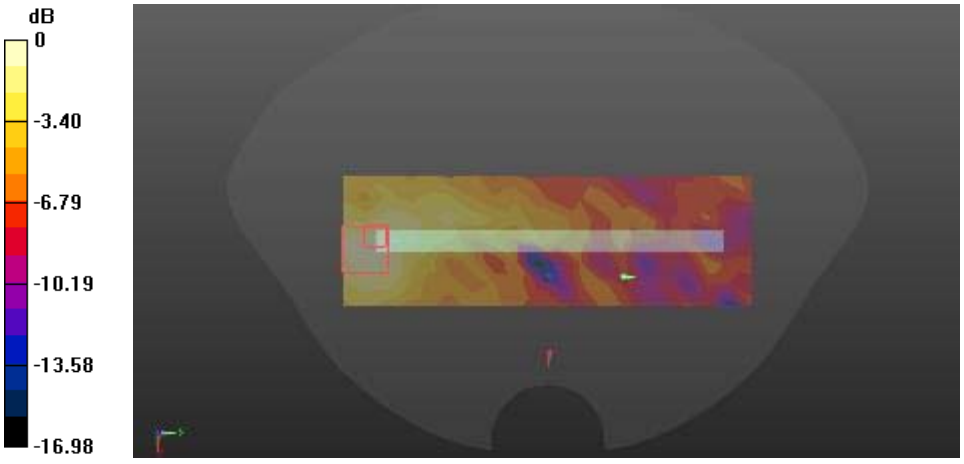
0 dB = 0.0351 W/kg = -14.55 dBW/kg

FLAT	EDGE4

Communication System: IEEE 802.11n HT20 WiFi 5 GHz; Frequency: 5785 MHz
Medium parameters used (interpolated): f = 5785 MHz; σ = 5.984 S/m; ε_r = 48.221; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3708; ConvF(4.19, 4.19, 4.19); Calibrated: 11/7/2017;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn720; Calibrated: 10/23/2017
- Phantom: Twin-SAM 1560; Type: QD 000 P40 CD; Serial: 1560
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7373)
  Flat-Section MSL WIFI 5G mimoHOT/WIFI 5785 mimo EDGE 4/Area Scan (7x20x1): Measurement grid: dx=10mm, dy=10mm
  Maximum value of SAR (measured) = 0.0959 W/kg
  Flat-Section MSL WIFI 5G mimoHOT/WIFI 5785 mimo EDGE 4/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
  Reference Value = 2.375 V/m; Power Drift = -0.03 dB
  Peak SAR (extrapolated) = 0.160 W/kg
  SAR(1 g) = 0.043 W/kg; SAR(10 g) = 0.022 W/kg
  Maximum value of SAR (measured) = 0.0939 W/kg



0 dB = 0.0939 W/kg = -10.27 dBW/kg

ANNEX B – RELEVANT PAGES FROM CALIBRATION REPORTS

DAE4 Sn:546

Client : SRTC Certificate No: Z17-97141

CALIBRATION CERTIFICATE

Object DAE4 - SN: 546

Calibration Procedure(s) FF-Z11-003-01
Calibration Procedure for the Data Acquisition Electronics (DAEx)

Calibration date September 15, 2017

Primary Standards | ID # | Cal Date (Calibrated by, Certificate No.) | Scheduled Calibration

Process Calibrator 753 | 1971018 | 27-Jun-17 (CTTL, No.J17X05883) | Jun-18

	Name	Function	Signature
Calibrated by	Yu Zongying	SAR Test Engineer	
Reviewed by	Lin Hao	SAR Test Engineer	
Approved by	Qi Dianyuan	SAR Project Leader	

Issued: September 18, 2017

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

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 report provide only calibration results for DAE, it does not contain other performance test results.

DC Voltage Measurement

Calibration Factor	X	Y	Z
High Range	405.327 ± 0.15% (k=2)	404.985 ± 0.15% (k=2)	404.215 ± 0.15% (k=2)
Low Range	3.98139 ± 0.7% (k=2)	3.98731 ± 0.7% (k=2)	3.97868 ± 0.7% (k=2)

Connector Angle

Connector Angle to be used in DASY system	236.87 ± 1°

DAE4 Sn:720

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E-mail: ctt@chinattl.com Http://www.chinattl.cn

Client : SRTC Certificate No: Z17-97215

CALIBRATION CERTIFICATE

Object	DAE4 - SN: 720
Calibration Procedure(s)	FF-Z11-002-01 Calibration Procedure for the Data Acquisition Electronics (DAEx)
Calibration date:	October 24, 2017

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
Process Calibrator 753	19710`8	27-Jun-17 (CTTL, No.J17X05858)	June-18

	Name	Function	Signature
Calibrated by:	Yu Zongying	SAR Test Engineer	
Reviewed by:	Lin Hao	SAR Test Engineer	
Approved by:	Qi Dianyuan	SAR Project Leader	

Issued: October 26, 2017

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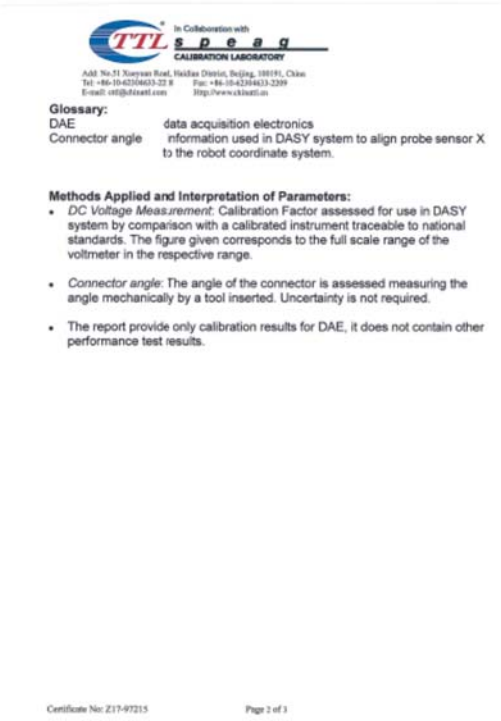
Certificate No: Z17-97215 Page 1 of 3



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E-mail: ctt@chinattl.com Http://www.chinattl.cn

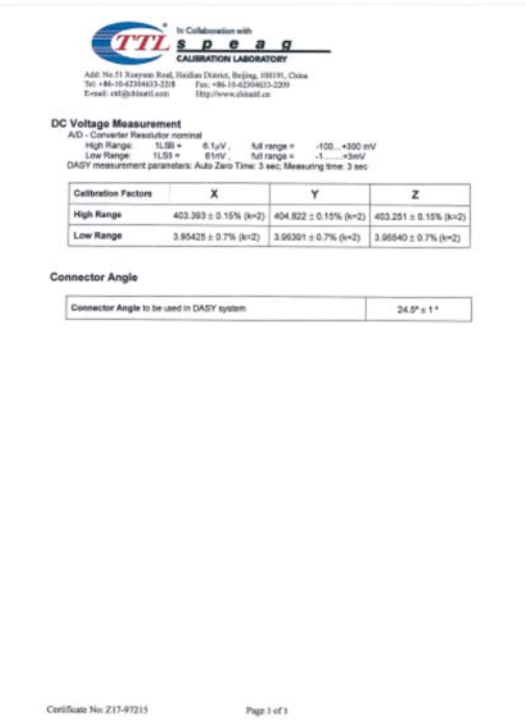
Glossary:

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 report provide only calibration results for DAE, it does not contain other performance test results.

Certificate No: Z17-97215 Page 2 of 3



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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	403.393 ± 0.15% (k=2)	404.822 ± 0.15% (k=2)	403.251 ± 0.15% (k=2)
Low Range	3.95425 ± 0.7% (k=2)	3.96391 ± 0.7% (k=2)	3.96540 ± 0.7% (k=2)

Connector Angle

Connector Angle to be used in DASY system	24.5° ± 1°

Certificate No: Z17-97215 Page 3 of 3

ES3DV3 Sn:3127

Client SRTC Certificate No: Z17-97142

CALIBRATION CERTIFICATE

Object ES3DV3 - SN:3127

Calibration Procedure(s) FT-Z11-004-01
Calibration Procedure for Dosimetric E-field Probes

Calibration date: October 11, 2017

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 (Calibrated by, Certificate No.)	Scheduled Calibration
Power Meter NRP2	101919	27-Jun-17 (CTTL, No.J17X06967)	Jun-18
Power sensor NRP-Z91	101547	27-Jun-17 (CTTL, No.J17X06967)	Jun-18
Power sensor NRP-Z91	101548	27-Jun-17 (CTTL, No.J17X06967)	Jun-18
Reference 10dB Attenuator	18N50W-10dB	13-Mar-18(CTTL, No.J18X01647)	Mar-18
Reference 20dB Attenuator	18N50W-20dB	13-Mar-18(CTTL, No.J18X01648)	Mar-18
Reference Probe ES3DV3	SN 7433	26-Sep-16(SPEAG,No.EX3-7433_Sep16)	Sep-17
DAE4	SN 545	13-Dec-16(SPEAG,No.DAE4-545_Dec16)	Dec-17

Secondary Standards	ID #	Cal Date (Calibrated by, Certificate No.)	Scheduled Calibration
Signal Generator MG3700A	6201052605	27-Jun-17 (CTTL, No.J17X06956)	Jun-18
Network Analyzer E5071C	MY46110673	13-Jun-17 (CTTL, No.J17X06355)	Jun-18

	Name	Function	Signature
Calibrated by:	Yu Zongying	SAR Test Engineer	
Reviewed by:	Lin Hao	SAR Test Engineer	
Approved by:	Qi Dianyuan	SAR Project Leader	

Issued: October 12, 2017

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Certificate No: Z17-97142 Page 1 of 11

Glossary:

TSL tissue simulating liquid
NORM(x,y,z) sensitivity in free space
ConvF sensitivity in TSL / NORM(x,y,z)
DCP diode compression point
CF crest factor (1/duty_cycle) of the RF signal
A, B, C, D modulation dependent linearization parameters
Polarization φ φ rotation around probe axis
Polarization ϑ ϑ rotation around probe axis that is in the plane normal to probe axis (at measurement center), i.e. ϑ=0 is normal to probe axis
Connector Angle information used in DASY system to align probe sensor X to the robot coordinate system

Calibration is Performed According to the Following Standards:

a) IEEE Std 1528-2013, "IEEE Recommended Practice for Determining the Peak Spatial-Average Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", June 2013
b) IEC 62209-1, "Measurement procedure for the assessment of Specific Absorption Rate (SAR) from hand-held and body-mounted devices used next to the ear (frequency range of 300 MHz to 6 GHz)", July 2016
c) IEC 62209-2, "Procedure to determine the Specific Absorption Rate (SAR) for wireless communication devices used in close proximity to the human body (frequency range of 30 MHz to 6 GHz)", March 2010
d) KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

Methods Applied and Interpretation of Parameters:

- NORMx,y,z: Assessed for E-field polarization θ=0 (f≤900 MHz in TEM-cell; f>1800 MHz: waveguide). NORMx,y,z are only intermediate values, i.e., the uncertainties of NORMx,y,z does not affect the E²-field uncertainty inside TSL (see below ConvF).
- NORM(f)x,y,z = NORMx,y,z * frequency_response (see Frequency Response Chart). This linearization is implemented in DASY4 software versions later than 4.2. The uncertainty of the frequency response is included in the stated uncertainty of ConvF.
- DCPx,y,z: DCP are numerical linearization parameters assessed based on the data of power sweep with no uncertainty values. DCP does not depend on frequency nor media.
- PAR: PAR is the Peak to Average Ratio that is not calibrated but determined based on the signal characteristics
- Ax,y,z; Bx,y,z; Cx,y,z; VRx,y,z; A, B, C are numerical linearization parameters assessed based on the data of power sweep for specific modulation signal. The parameters do not depend on frequency nor media. VR is the maximum calibration range expressed in RMS voltage across the diode.
- ConvF and Boundary Effect Parameters: Assessed in flat phantom using E-field for Temperature Transfer Standard for f≤800 MHz and inside waveguide using analytical field distributions based on power measurements for f>800 MHz. The same values are used for assessment of the parameters applied for boundary compensation (alpha, depth) of which typical uncertainty values are given. These parameters are used in DASY4 software to improve probe accuracy close to the boundary. The sensitivity in TSL corresponds to NORMx,y,z * ConvF whereby the uncertainty corresponds to that given for ConvF. A frequency dependent ConvF is used in DASY version 4.4 and higher which allows extending the validity from ±50 MHz to ±100 MHz.
- Spherical isotropy (3D deviation from isotropy): in a field of low gradients realized using a flat phantom exposed by a patch antenna.
- Sensor Offset: The sensor offset corresponds to the offset of virtual measurement center from the probe tip (on probe axis). No tolerance required.
- Connector Angle: The angle is assessed using the information gained by determining the NORMx (no uncertainty required).

Certificate No: Z17-97142 Page 2 of 11

Probe ES3DV3

SN: 3127

Calibrated: October 11, 2017

Calibrated for DASY/EASY Systems

(Note: not compatible with DASY2 system!)

Certificate No: Z17-97142 Page 1 of 11

DASY/EASY – Parameters of Probe: ES3DV3 - SN: 3127

Basic Calibration Parameters

	Sensor X	Sensor Y	Sensor Z	Unc (k=2)
Norm (μV/(V/m)²)[A]	1.36	1.20	1.23	±10.8%
DCP (mV)[B]	103.2	105.3	105.1	

Modulation Calibration Parameters

UID	Communication System Name		A dB	B dB√μV	C	D dB	VR mV	Unc[F] (k=2)
0	CW	X	0.0	0.0	1.0	0.00	282.8	±2.5%
		Y	0.0	0.0	1.0		282.9	
		Z	0.0	0.0	1.0		275.1	

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%.

[A] The uncertainties of Norm X, Y, Z do not affect the E²-field uncertainty inside TSL (see Page 5 and Page 6).
[B] Numerical linearization parameter: uncertainty not required.
[F] Uncertainty is determined using the max. deviation from linear response applying rectangular distribution and is expressed for the square of the field value.

Certificate No: Z17-97142 Page 3 of 11

ES3DV3 Sn:3127

DASY/EASY – Parameters of Probe: ES3DV3 - SN: 3127

Calibration Parameter Determined in Head Tissue Simulating Media

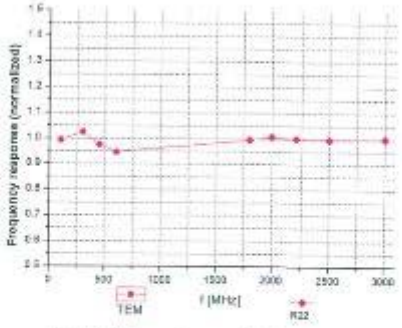
f [MHz]	Relative Permittivity	Conductivity (S/m)	ConvF X	ConvF Y	ConvF Z	Alpha	Depth (mm)	Unct. (k=2)
750	41.9	0.89	6.25	6.25	6.25	0.63	1.20	±12.1%
900	41.5	0.97	6.15	6.15	6.15	0.37	1.60	±12.1%
1810	40.0	1.40	5.06	5.06	5.06	0.47	1.23	±12.1%
2000	40.0	1.40	4.88	4.88	4.88	0.47	1.23	±12.1%
2300	39.5	1.67	4.71	4.71	4.71	0.90	1.05	±12.1%
2450	39.2	1.80	4.56	4.56	4.56	0.90	1.13	±12.1%
2600	39.0	1.96	4.32	4.32	4.32	0.80	1.39	±12.1%

DASY/EASY – Parameters of Probe: ES3DV3 - SN: 3127

Calibration Parameter Determined in Body Tissue Simulating Media

f [MHz]	Relative Permittivity	Conductivity (S/m)	ConvF X	ConvF Y	ConvF Z	Alpha	Depth (mm)	Unct. (k=2)
750	55.5	0.96	6.18	6.18	6.18	0.46	1.49	±12.1%
900	55.0	1.05	6.06	6.06	6.06	0.48	1.48	±12.1%
1810	53.3	1.52	4.83	4.83	4.83	0.65	1.29	±12.1%
2000	53.3	1.52	4.69	4.69	4.69	0.44	1.09	±12.1%
2300	52.9	1.81	4.43	4.43	4.43	0.80	1.16	±12.1%
2450	52.7	1.95	4.28	4.28	4.28	0.72	1.04	±12.1%
2600	52.5	2.16	4.07	4.07	4.07	0.80	1.18	±12.1%

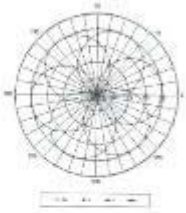
Frequency Response of E-Field
(TEM-Cell: ifi110 EXX, Waveguide: R22)



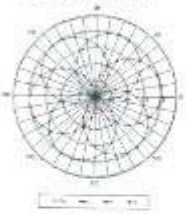
Uncertainty of Frequency Response of E-field: ±7.4% (k=2)

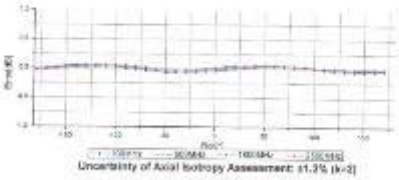
Receiving Pattern (Φ), θ=0°

f=600 MHz, TEM



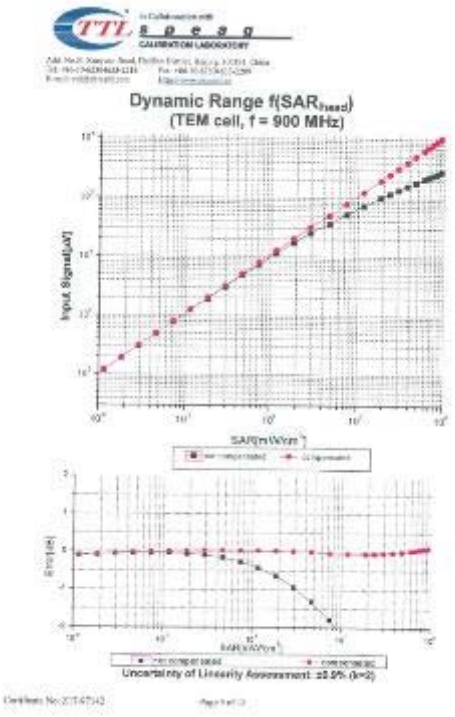
f=1800 MHz, R22

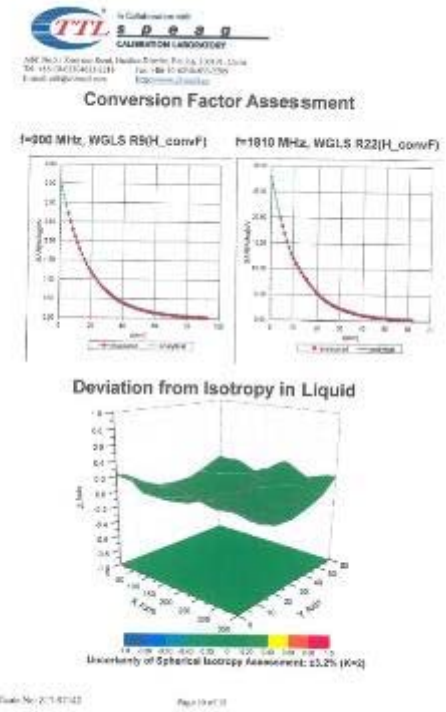




Uncertainty of Axial Isotropy Assessment: ±1.3% (k=2)

ES3DV3 Sn:3127





DASY/EASY – Parameters of Probe: ES3DV3 - SN: 3127

Other Probe Parameters

Sensor Arrangement	Triangular
Connector Angle (°)	166.1
Mechanical Surface Detection Mode	enabled
Optical Surface Detection Mode	disable
Probe Overall Length	337mm
Probe Body Diameter	10mm
Tip Length	16mm
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

Appendix: Modulation Calibration Parameters

UID	Communication System Name	PAR		A dB	B dB*uV	D	VR mV	Unc (k=2)
0	CW	0.00	X	0.0	0.0	1.0	282.3	±2.9%
			Y	0.0	0.0	1.0	280.9	
			Z	0.0	0.0	1.0	275.1	
10012	IEEE 802.11b WiFi 2.4 GHz (DSSS, 1 Mbps)	1.87	X	2.77	68.33	18.46	143.0	±1.8%
			Y	2.75	68.35	18.52	145.0	
			Z	2.71	67.79	18.35	142.3	
10100	LTE-FDD (SC-FDMA, 100% RB, 20 MHz, QPSK)	5.67	X	6.15	66.4	18.97	141.8	±1.9%
			Y	6.15	66.49	19.06	144.2	
			Z	6.09	66.32	18.96	140.9	
10168	LTE-FDD (SC-FDMA, 100% RB, 10 MHz, QPSK)	5.80	X	6.09	66.24	19.07	139.3	±1.9%
			Y	6.10	66.33	19.15	141.5	
			Z	6.05	66.16	19.05	138.0	
10154	LTE-FDD (SC-FDMA, 50% RB, 10 MHz, QPSK)	5.75	X	5.81	65.85	18.91	136.1	±1.9%
			Y	5.82	65.92	19.01	138.8	
			Z	5.78	65.84	18.91	134.7	
10168	LTE-FDD (SC-FDMA, 1 RB, 20 MHz, QPSK)	5.75	X	6.81	67.42	19.28	130.8	±1.9%
			Y	6.82	67.38	19.27	131.3	
			Z	6.80	66.88	19.24	129.1	
10175	LTE-FDD (SC-FDMA, 1 RB, 10 MHz, QPSK)	5.72	X	6.68	66.14	19.40	131.6	±1.9%
			Y	6.83	66.08	19.35	132.9	
			Z	6.79	66.02	19.29	129.3	
10297	LTE-FDD (SC-FDMA, 50% RB, 20 MHz, QPSK)	5.81	X	6.19	65.61	19.42	141.9	±1.9%
			Y	6.13	65.43	19.26	140.7	
			Z	6.14	65.52	19.31	139.6	

EX3DV4 Sn:3708

In Collaboration with speag CALIBRATION LABORATORY

Client SRTC Certificate No: Z17-97214

CALIBRATION CERTIFICATE

Object: EX3DV4 - SN:3708

Calibration Procedure(s): FF-Z11-004-01 Calibration Procedures for Dosimetric E-field Probes

Calibration date: November 07, 2017

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(Calibrated by, Certificate No.)	Scheduled Calibration
Power Meter NRP2	101919	27-Jun-17 (CTTL, No.J17X05857)	Jun-18
Power sensor NRP-Z91	101547	27-Jun-17 (CTTL, No.J17X05857)	Jun-18
Power sensor NRP-Z91	101548	27-Jun-17 (CTTL, No.J17X05857)	Jun-18
Reference10dBAttenuator	18N5W-10dB	13-Mar-16(CTTL,No.J16X01547)	Mar-18
Reference20dBAttenuator	18N5W-20dB	13-Mar-16(CTTL, No.J16X01548)	Mar-18
Reference Probe EX3DV4	SN 3617	23-Jan-17(SPEAG,No.EX3-3617_Jan17)	Jan-18
DAE4	SN 549	13-Dec-16(SPEAG, No.DAE4-549_Dec16)	Dec -17
Secondary Standards	ID #	Cal Date(Calibrated by, Certificate No.)	Scheduled Calibration
SignalGeneratorMG3700A	6201052605	27-Jun-17 (CTTL, No.J17X05858)	Jun-18
Network Analyzer E5071C	MY46110673	13-Jan-17 (CTTL, No.J17X00285)	Jan -18

	Name	Function	Signature
Calibrated by:	Yu Zongying	SAR Test Engineer	
Reviewed by:	Lin Hao	SAR Test Engineer	
Approved by:	Qi Dianyuan	SAR Project Leader	

Issued: November 09, 2017

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

Certificate No: Z17-97214 Page 1 of 12

In Collaboration with speag CALIBRATION LABORATORY

Glossary:

TSL	tissue simulating liquid
NORMx,y,z	sensitivity in free space
ConvF	sensitivity in TSL / NORMx,y,z
DCP	diode compression point
CF	crest factor (1/duty_cycle) of the RF signal
A,B,C,D	modulation dependent linearization parameters
Polarization Φ	Φ rotation around probe axis
Polarization θ	θ rotation around an axis that is in the plane normal to probe axis (at measurement center), i.e. θ=0 is normal to probe axis
Connector Angle	information used in DASY system to align probe sensor X to the robot coordinate system

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 the assessment of Specific Absorption Rate (SAR) from hand-held and body-mounted devices used next to the ear (frequency range of 300 MHz to 6 GHz)", July 2016

c) IEC 62209-2, "Procedure to determine the Specific Absorption Rate (SAR) for wireless communication devices used in close proximity to the human body (frequency range of 30 MHz to 6 GHz)", March 2010

d) KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

Methods Applied and Interpretation of Parameters:

- *NORMx,y,z*: Assessed for E-field polarization θ=0 (fs900MHz in TEM-cell; f> 1800MHz: waveguide). NORMx,y,z are only intermediate values, i.e., the uncertainties of NORMx,y,z does not effect the E^2-field uncertainty inside TSL (see below ConvF).
- *NORM(f)x,y,z = NORMx,y,z* frequency_response* (see Frequency Response Chart). This linearization is implemented in DASY4 software versions later than 4.2. The uncertainty of the frequency response is included in the stated uncertainty of ConvF.
- *DCPx,y,z*: DCP are numerical linearization parameters assessed based on the data of power sweep (no uncertainty required). DCP does not depend on frequency nor media.
- PAR: PAR is the Peak to Average Ratio that is not calibrated but determined based on the signal characteristics.
- *Ax,y,z; Bx,y,z; Cx,y,z; VRx,y,z*: A,B,C are numerical linearization parameters assessed based on the data of power sweep for specific modulation signal. The parameters do not depend on frequency nor media. VR is the maximum calibration range expressed in RMS voltage across the diode.
- *ConvF and Boundary Effect Parameters*: Assessed in flat phantom using E-field (or Temperature Transfer Standard for fs830MHz) and inside waveguide using analytical field distributions based on power measurements for f >800MHz. The same setups are used for assessment of the parameters applied for boundary compensation (alpha, depth) of which typical uncertainty values are given. These parameters are used in DASY4 software to improve probe accuracy close to the boundary. The sensitivity in TSL corresponds to NORMx,y,z* ConvF whereby the uncertainty corresponds to that given for ConvF. A frequency dependent ConvF is used in DASY version 4.4 and higher which allows extending the validity from±50MHz to±100MHz.
- *Spherical isotropy (3D deviation from isotropy)*: in a field of low gradients realized using a flat phantom exposed by a patch antenna.
- *Sensor Offset*: The sensor offset corresponds to the offset of virtual measurement center from the probe tip (on probe axis). No tolerance required.
- *Connector Angle*: The angle is assessed using the information gained by determining the NORMx (no uncertainty required).

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Probe EX3DV4

SN: 3708

Calibrated: November 07, 2017

Calibrated for DASY/EASY Systems

(Note: non-compatible with DASY2 system!)

Certificate No: Z17-97214 Page 3 of 12

In Collaboration with speag CALIBRATION LABORATORY

DASY/EASY – Parameters of Probe: EX3DV4 – SN: 3708

Basic Calibration Parameters

	Sensor X	Sensor Y	Sensor Z	Unc (k=2)
Norm(μV/(V/m)²)[A]	0.19	0.36	0.44	±10.0%
DCP(mV)[B]	95.1	102.7	105.5	

Modulation Calibration Parameters

UID	Communication System Name		A dB	B dB√μV	C	D dB	VR mV	Unc[E] (k=2)
0	CW	X	0.0	0.0	1.0	0.00	95.9	±3.1%
		Y	0.0	0.0	1.0		149.0	
		Z	0.0	0.0	1.0		169.4	

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%.

[A] The uncertainties of Norm X, Y, Z do not affect the E^2-field uncertainty inside TSL (see Page 5 and Page 6).
[B] Numerical linearization parameter: uncertainty not required.
[E] Uncertainty is determined using the max. deviation from linear response applying rectangular distribution and is expressed for the square of the field value.

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EX3DV4 Sn:3708

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DASY/EASY – Parameters of Probe: EX3DV4 – SN: 3708

Calibration Parameter Determined in Head Tissue Simulating Media

f [MHz][C]	Relative Permittivity[F]	Conductivity (S/m)[F]	ConvF X	ConvF Y	ConvF Z	Alpha[G]	Depth[G] (mm)	Unct. (k=2)
900	41.5	0.97	9.07	9.07	9.07	0.15	1.37	±12.1%
1810	40.0	1.40	7.77	7.77	7.77	0.24	1.04	±12.1%
2000	40.0	1.40	7.80	7.80	7.80	0.28	0.88	±12.1%
2450	39.2	1.80	7.19	7.19	7.19	0.34	1.03	±12.1%
5200	36.0	4.66	5.64	5.64	5.64	0.40	1.35	±13.3%
5300	35.9	4.76	5.43	5.43	5.43	0.40	1.35	±13.3%
5500	35.6	4.96	5.03	5.03	5.03	0.40	1.50	±13.3%
5600	35.5	5.07	4.89	4.89	4.89	0.40	1.60	±13.3%
5800	35.3	5.27	5.03	5.03	5.03	0.45	1.45	±13.3%

[C] Frequency validity above 300 MHz of ±100MHz only applies for DASY v4.4 and higher (Page 2), else it is restricted to ±50MHz. The uncertainty is the RSS of ConvF uncertainty at calibration frequency and the uncertainty for the indicated frequency band. Frequency validity below 300 MHz is ± 10, 25, 40, 50 and 70 MHz for ConvF assessments at 30, 64, 128, 150 and 220 MHz respectively. Above 5 GHz frequency validity can be extended to ± 110 MHz.
[F] At frequency below 3 GHz, the validity of tissue parameters (ε and σ) can be relaxed to ±10% if liquid compensation formula is applied to measured SAR values. At frequencies above 3 GHz, the validity of tissue parameters (ε and σ) is restricted to ±5%. The uncertainty is the RSS of the ConvF uncertainty for indicated target tissue parameters.
[G] Alpha/Depth are determined during calibration. SPEAG warrants that the remaining deviation due to the boundary effect after compensation is always less than ± 1% for frequencies below 3 GHz and below ± 2% for the frequencies between 3-6 GHz at any distance larger than half the probe tip diameter from the boundary.

Certificate No: Z17-97214 Page 5 of 12

In Collaboration with speag CALIBRATION LABORATORY

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DASY/EASY – Parameters of Probe: EX3DV4 – SN: 3708

Calibration Parameter Determined in Body Tissue Simulating Media

f [MHz][C]	Relative Permittivity[F]	Conductivity (S/m)[F]	ConvF X	ConvF Y	ConvF Z	Alpha[G]	Depth[G] (mm)	Unct. (k=2)
900	55.0	1.05	9.16	9.16	9.16	0.17	1.40	±12.1%
1810	53.3	1.52	7.70	7.70	7.70	0.20	1.13	±12.1%
2000	53.3	1.52	7.76	7.76	7.76	0.14	1.60	±12.1%
2450	52.7	1.95	7.30	7.30	7.30	0.66	0.70	±12.1%
5200	49.0	5.30	4.79	4.79	4.79	0.45	1.80	±13.3%
5300	48.9	5.42	4.56	4.56	4.56	0.45	1.80	±13.3%
5500	48.6	5.65	4.17	4.17	4.17	0.50	1.75	±13.3%
5600	48.5	5.77	4.10	4.10	4.10	0.50	1.90	±13.3%
5800	48.2	6.00	4.19	4.19	4.19	0.55	1.85	±13.3%

[C] Frequency validity above 300 MHz of ±100MHz only applies for DASY v4.4 and higher (Page 2), else it is restricted to ±50MHz. The uncertainty is the RSS of ConvF uncertainty at calibration frequency and the uncertainty for the indicated frequency band. Frequency validity below 300 MHz is ± 10, 25, 40, 50 and 70 MHz for ConvF assessments at 30, 64, 128, 150 and 220 MHz respectively. Above 5 GHz frequency validity can be extended to ± 110 MHz.
[F] At frequency below 3 GHz, the validity of tissue parameters (ε and σ) can be relaxed to ±10% if liquid compensation formula is applied to measured SAR values. At frequencies above 3 GHz, the validity of tissue parameters (ε and σ) is restricted to ±5%. The uncertainty is the RSS of the ConvF uncertainty for indicated target tissue parameters.
[G] Alpha/Depth are determined during calibration. SPEAG warrants that the remaining deviation due to the boundary effect after compensation is always less than ± 1% for frequencies below 3 GHz and below ± 2% for the frequencies between 3-6 GHz at any distance larger than half the probe tip diameter from the boundary.

Certificate No: Z17-97214 Page 6 of 12

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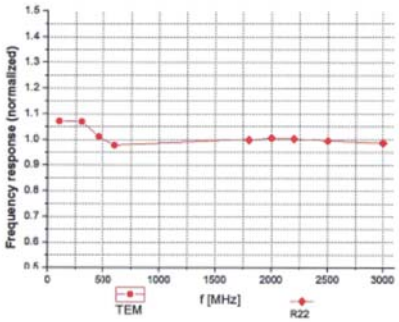
Frequency Response of E-Field
(TEM-Cell: ifi110 EXX, Waveguide: R22)



Uncertainty of Frequency Response of E-field: ±7.4% (k=2)

Certificate No: Z17-97214 Page 7 of 12

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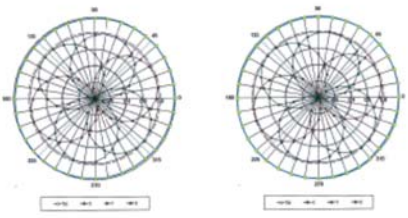
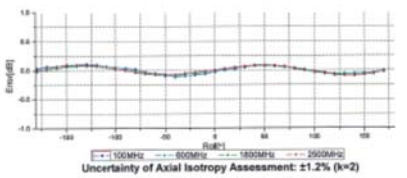
Receiving Pattern (Φ), θ=0°

f=600 MHz, TEM f=1800 MHz, R22





Uncertainty of Axial Isotropy Assessment: ±1.2% (k=2)

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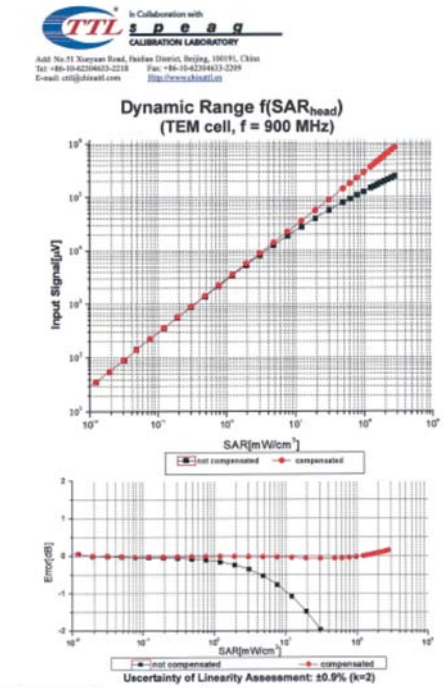
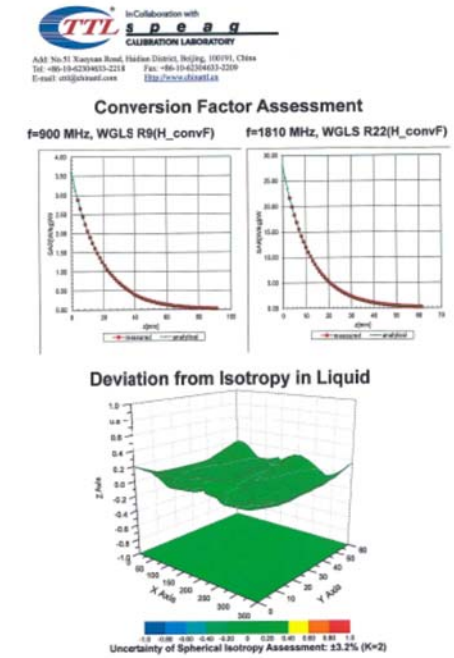
EX3DV4 Sn:3708





DASY/EASY – Parameters of Probe: EX3DV4 – SN: 3708

Other Probe Parameters	
Sensor Arrangement	Triangular
Connector Angle (°)	177.2
Mechanical Surface Detection Mode	enabled
Optical Surface Detection Mode	disable
Probe Overall Length	337mm
Probe Body Diameter	10mm
Tip Length	9mm
Tip Diameter	2.5mm
Probe Tip to Sensor X Calibration Point	1mm
Probe Tip to Sensor Y Calibration Point	1mm
Probe Tip to Sensor Z Calibration Point	1mm
Recommended Measurement Distance from Surface	1.4mm

Appendix (Additional assessments outside the scope of FCC approved dual-logo scope)

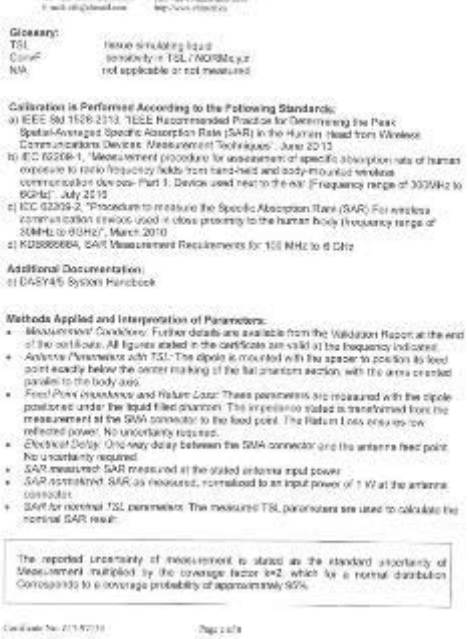
Modulation Calibration Parameters

UID	Communication System Name	PAR		A dB	B dB·μV	C	VR mV	Unc^E (k=2)
0	CW	0.00	X	0.0	0.0	1.0	95.9	±3.1%
			Y	0.0	0.0	1.0	149.0	
			Z	0.0	0.0	1.0	169.4	
10011	UMTS-FDD (WCDMA)	2.91	X	2.97	64.29	16.82	147.4	±1.8%
			Y	3.15	66.44	17.98	144.1	
			Z	3.21	67.23	18.44	141.7	
10021	GSM-FDD (TDMA GMSK)	9.39	X	0.95	57.62	9.60	48.2	±2.4%
			Y	1.22	59.57	9.93	44.1	
			Z	1.13	59.66	9.94	43.4	
10062	IEEE 802.11a/h WiFi 5 GHz (OFDM 6 Mbps)	8.68	X	9.01	65.22	19.38	92.1	±2.1%
			Y	8.26	63.95	18.73	71.9	
			Z	8.53	64.77	19.13	85.3	

D750V3 Sn:1101

Client SRTC Certificate No: Z17-97134

CALIBRATION CERTIFICATE



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 1528-2013, "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%.

Measurement Conditions

DASY Version	DASY52	52.10.2 (1494)
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

	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	41.5 ± 6 %	0.90 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	--	--

SAR result with Head TSL

SAR averaged over 1 cm³ (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	2.60 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	10.4 mW / g ± 18.8 % (k=2)
SAR averaged over 10 cm³ (10 g) of Head TSL	Condition	
SAR measured	250 mW input power	1.74 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	6.96 mW / g ± 18.7 % (k=2)

Body TSL parameters

	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	41.9	0.96 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	39.7 ± 6 %	0.93 mho/m ± 6 %
Body TSL temperature change during test	< 0.5 °C	--	--

SAR result with Body TSL

SAR averaged over 1 cm³ (1 g) of Body TSL	Condition	
SAR measured	250 mW input power	2.78 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	11.1 mW / g ± 18.8 % (k=2)
SAR averaged over 10 cm³ (10 g) of Body TSL	Condition	
SAR measured	250 mW input power	1.82 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	7.28 mW / g ± 18.7 % (k=2)

Appendix (Additional assessments outside the scope of CNAS L0570)

Antenna Parameters with Head TSL

Impedance, transformed to feed point	52.9Ω + 2.1jΩ
Return Loss	- 28.1dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	52.0Ω + 2.2jΩ
Return Loss	- 29.8dB

General Antenna Parameters and Design

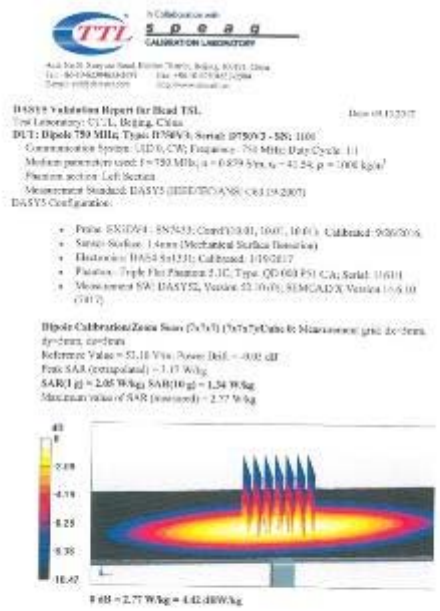
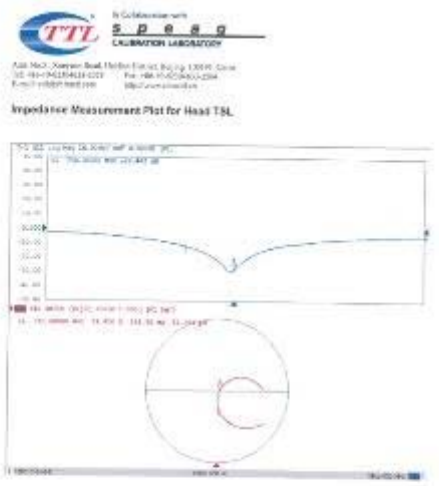
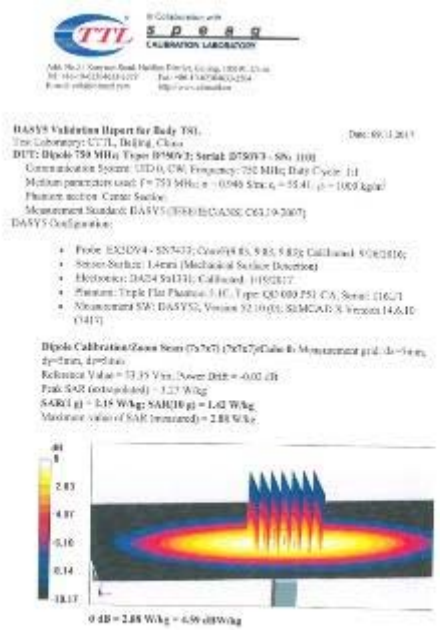
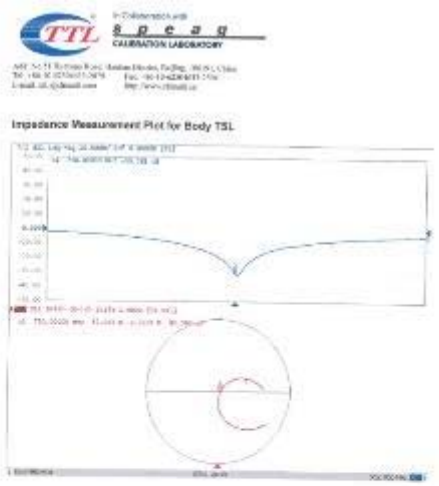
Electrical Delay (one direction)	1.135 ns

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 semi-rigid 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 break or the soldered connections near the feedpoint may be damaged.

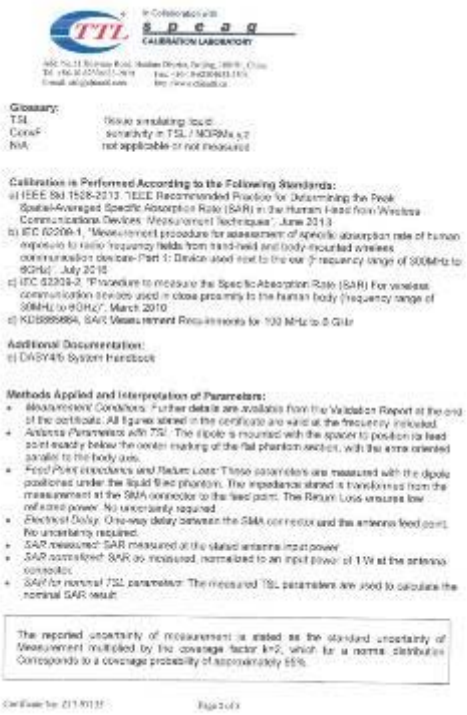
Additional EUT Data

Manufactured by	SPEAG

D750V3 Sn:1101	
	
	

D835V2 Sn:4d023

CALIBRATION CERTIFICATE



Glossary:
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ConvF sensitivity in TSL / NORMx,y,z
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Additional Documentation:
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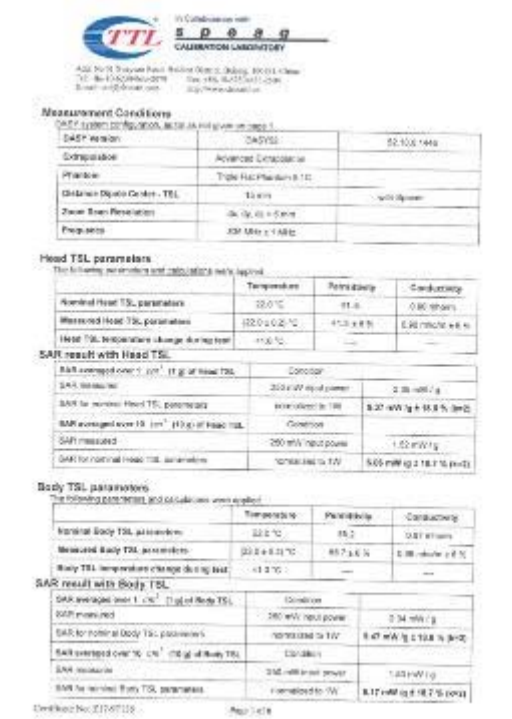


Measurement Conditions

Head TSL parameters

SAR result with Head TSL

Body TSL parameters

SAR result with Body TSL

Appendix (Additional assessments outside the scope of CNAS L0570)

Antenna Parameters with Head TSL

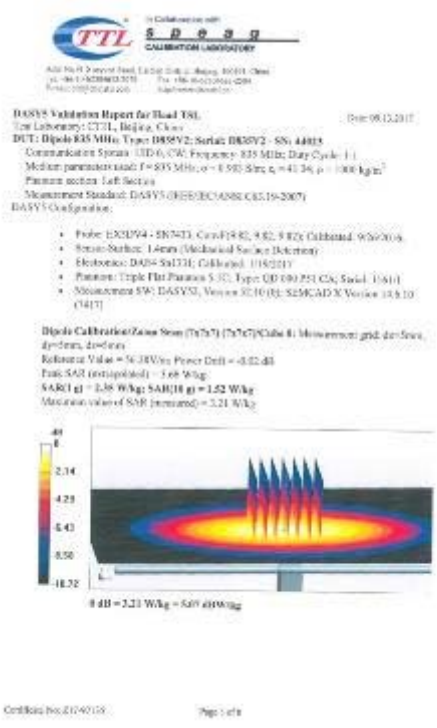
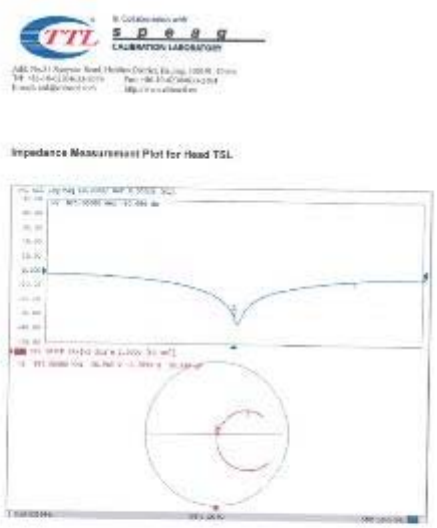
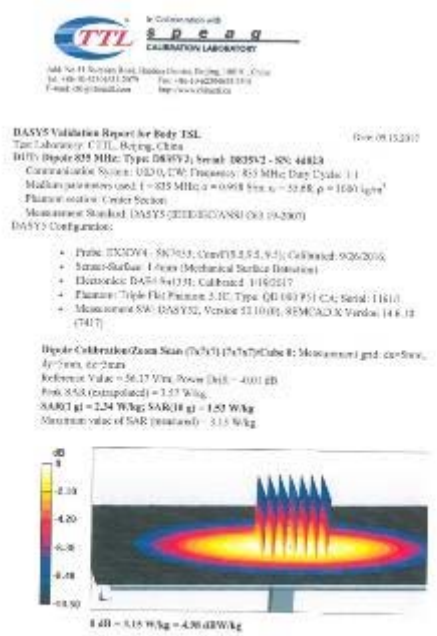
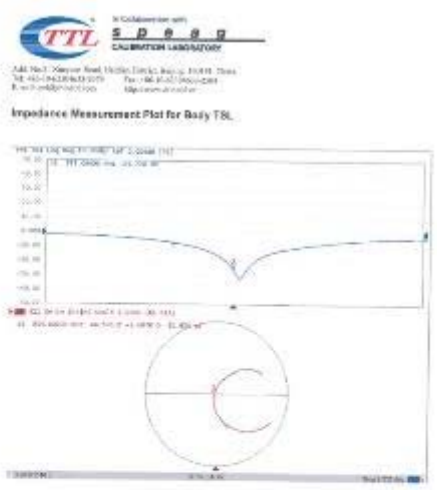
Antenna Parameters with Body TSL

General Antenna Parameters and Design

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 rigid 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.

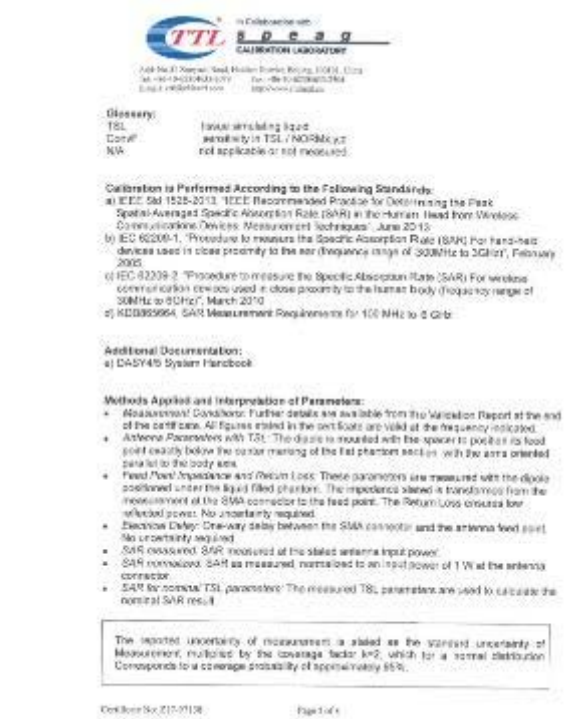
Additional EUT Data

D835V2 Sn:4d023	
	
	

D1800V2 Sn:2d084

CALIBRATION CERTIFICATE

Client SRTC Certificate No: Z17-97138



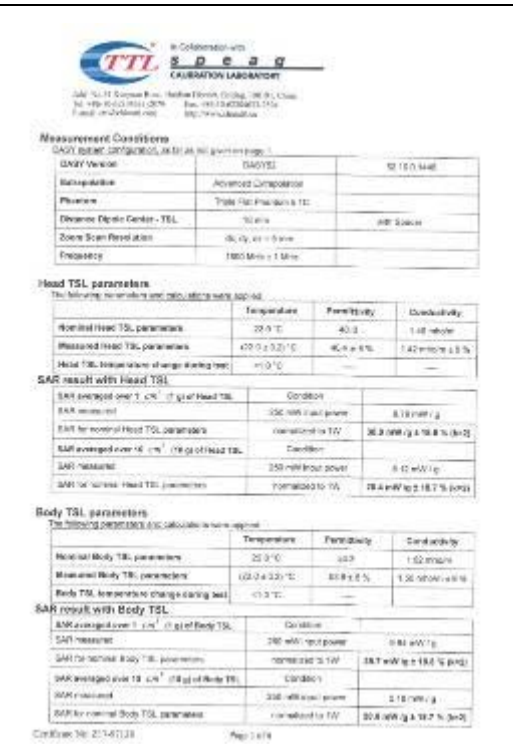
Glossary:
TSL tissue simulating liquid
ConvF sensitivity in TSL / NORMx,y,z
N/A not applicable or not measured

Calibration is Performed According to the Following Standards:
a) IEEE Std 1528-2013, "IEEE Recommended Practice for Determining the Peak Spatial-Average Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", June 2013
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) 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:
a) 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%.



Measurement Conditions

Head TSL parameters

SAR result with Head TSL

Body TSL parameters

SAR result with Body TSL

Appendix (Additional assessments outside the scope of CNAS L0570)

Antenna Parameters with Head TSL

Antenna Parameters with Body TSL

General Antenna Parameters and Design

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

The dipoles is made of standard semi-rigid coaxial cable. The center conductor of the feeding line is directly connected to the feed point 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 break or the soldered connections near the feedpoint may be damaged.

Additional EUT Data

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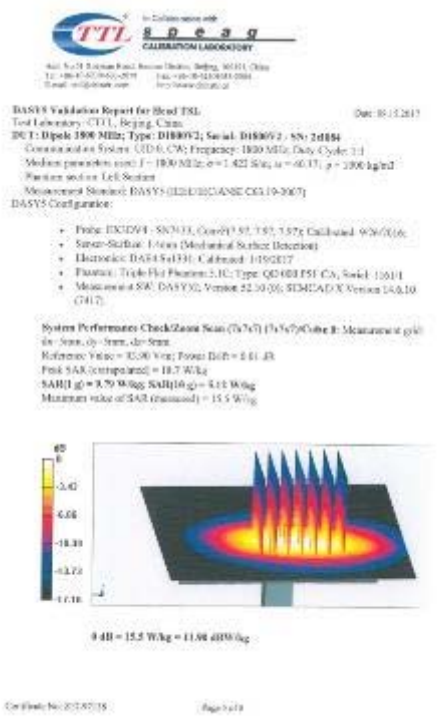	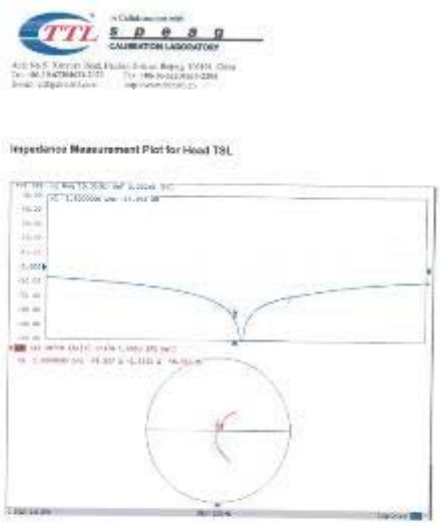
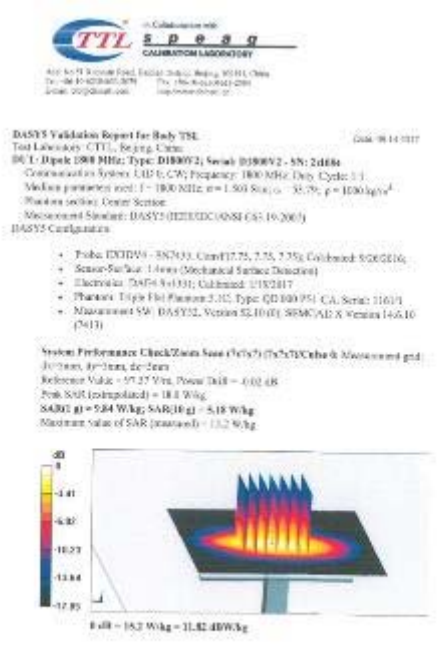	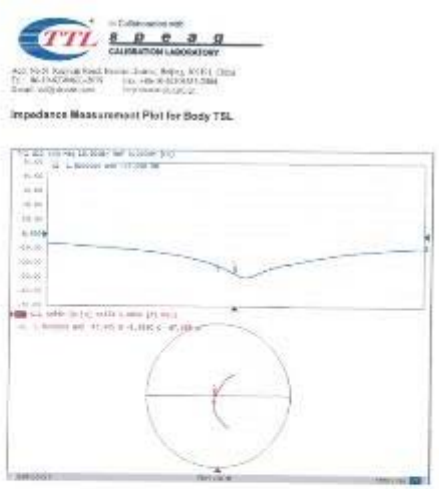

D2000V2 Sn:1009

In Collaboration with speag CALIBRATION LABORATORY

Add: No.51 Xueyuan Road, Haidian District, Beijing, 100191, China
Tel: +86-10-62304633-2079 Fax: +86-10-62304633-2504
E-mail: ctl@chinattl.com http://www.chinattl.cn

Client SRTC Certificate No: Z18-97021

CALIBRATION CERTIFICATE

Object	D2000V2 - SN: 1009
Calibration Procedure(s)	FF-Z11-003-01 Calibration Procedures for dipole validation kits
Calibration date:	February 1, 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)℃ 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	102158	02-Mar-17 (CTTL, No.J17X01254)	Mar-18
Power sensor NRV-Z5	100596	02-Mar-17 (CTTL, No.J17X01254)	Mar-18
Reference Probe EX3DV4	SN 7464	12-Sep-17(SPEAG,No.EX3-7464_Sep17)	Sep-18
DAE4	SN 1525	02-Oct-17(SPEAG,No.DAE4-1525_Oct17)	Oct-18
Secondary Standards	**ID #**	**Cal Date(Calibrated by, Certificate No.)**	**Scheduled Calibration**
Signal Generator E4438C	MY49071430	23-Jan-18 (CTTL, No.J18X00560)	Jan-19
Network Analyzer E5071C	MY46110673	24-Jan-18 (CTTL, No.J18X00561)	Jan-19

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

Issued: February 4, 2018

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E-mail: ctl@chinattl.com http://www.chinattl.cn

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 1528-2013, "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	52.10.0.1446
Extrapolation	Advanced Extrapolation	
Phantom	Triple Flat Phantom 5.1C	
Distance Dipole Center - TSL	10 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	2000 MHz ± 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	40.0	1.40 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	38.9 ± 6 %	1.42 mho/m ± 6 %
Head TSL temperature change during test	<1.0 °C	---	---

SAR result with Head TSL

	Condition	
SAR averaged over 1 cm^3 (1 g) of Head TSL		
SAR measured	250 mW input power	10.2 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	**40.3 mW / g ± 18.8 % (k=2)**
SAR averaged over 10 cm^3 (10 g) of Head TSL	Condition	
SAR measured	250 mW input power	5.17 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	**20.8 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	53.3	1.52 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	51.8 ± 6 %	1.56 mho/m ± 6 %
Body TSL temperature change during test	<1.0 °C	---	---

SAR result with Body TSL

	Condition	
SAR averaged over 1 cm^3 (1 g) of Body TSL		
SAR measured	250 mW input power	10.3 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	**40.3 mW / g ± 18.8 % (k=2)**
SAR averaged over 10 cm^3 (10 g) of Body TSL	Condition	
SAR measured	250 mW input power	5.18 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	**20.4 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	49.8Ω- 2.0jΩ
Return Loss	- 33.6dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	46.3Ω- 1.6jΩ
Return Loss	- 27.6dB

General Antenna Parameters and Design

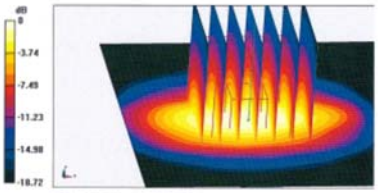
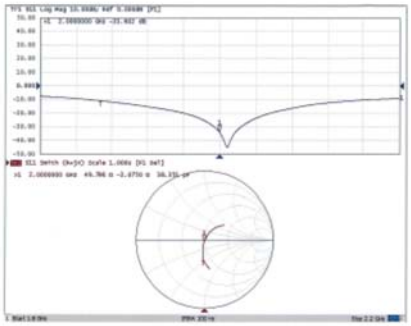
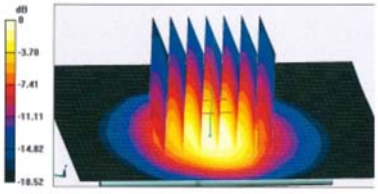
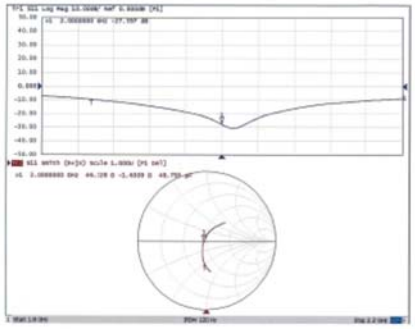
Electrical Delay (one direction)	1.047 ns

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.

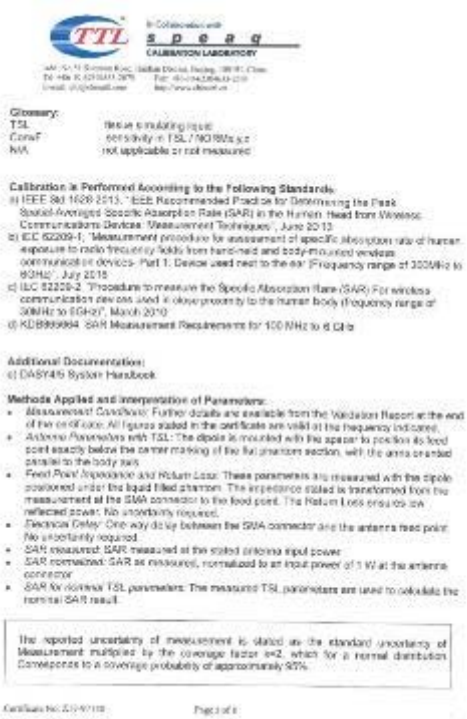
Additional EUT Data

Manufactured by	SPEAG

D2000V2 Sn:1009	
In Collaboration with TTL speag CALIBRATION LABORATORY Add: No.51 Xueyuan Road, Haidian District, Beijing, 100191, China Tel: +86-10-62304633-2079 Fax: +86-10-62304633-2504 E-mail: ctt@chinattl.com http://www.chinattl.cn **DASY5 Validation Report for Head TSL** Date: 02.01.2018 Test Laboratory: CTTL, Beijing, China **DUT: Dipole 2000 MHz; Type: D2000V2; Serial: D2000V2 - SN: 1009** Communication System: UID 0, CW; Frequency: 2000 MHz; Duty Cycle: 1:1 Medium parameters used: f = 2000 MHz; σ = 1.416 S/m; ε_r = 38.89; ρ = 1000 kg/m3 Phantom section: Left Section Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007) DASY5 Configuration: • Probe: EX3DV4 - SN7464; ConvF(8.39, 8.39, 8.39); Calibrated: 9/12/2017, • Sensor-Surface: 1.4mm (Mechanical Surface Detection) • Electronics: DAE4 Sn1525; Calibrated: 10/2/2017 • Phantom: Triple Flat Phantom 5.1C; Type: QD 000 P51 CA; Serial: 1161/1 • Measurement SW: DASY52, Version 52.10 (0); SEMCAD X Version 14.6.10 (7417) **System Performance Check/Zoom Scan (7x7x7) (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm Reference Value = 95.38 V/m; Power Drift = -0.03 dB Peak SAR (extrapolated) = 19.7 W/kg **SAR(1 g) = 10.2 W/kg; SAR(10 g) = 5.17 W/kg** Maximum value of SAR (measured) = 16.2 W/kg  0 dB = 16.2 W/kg = 12.10 dBW/kg Certificate No: Z18-97021 Page 5 of 8	In Collaboration with TTL speag CALIBRATION LABORATORY Add: No.51 Xueyuan Road, Haidian District, Beijing, 100191, China Tel: +86-10-62304633-2079 Fax: +86-10-62304633-2504 E-mail: ctt@chinattl.com http://www.chinattl.cn **Impedance Measurement Plot for Head TSL**  Certificate No: Z18-97021 Page 6 of 8
In Collaboration with TTL speag CALIBRATION LABORATORY Add: No.51 Xueyuan Road, Haidian District, Beijing, 100191, China Tel: +86-10-62304633-2079 Fax: +86-10-62304633-2504 E-mail: ctt@chinattl.com http://www.chinattl.cn **DASY5 Validation Report for Body TSL** Date: 02.01.2018 Test Laboratory: CTTL, Beijing, China **DUT: Dipole 2000 MHz; Type: D2000V2; Serial: D2000V2 - SN: 1009** Communication System: UID 0, CW; Frequency: 2000 MHz; Duty Cycle: 1:1 Medium parameters used: f = 2000 MHz; σ = 1.564 S/m; ε_r = 51.83; ρ = 1000 kg/m^3 Phantom section: Center Section Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007) DASY5 Configuration: • Probe: EX3DV4 - SN7464; ConvF(8.24,8.24,8.24); Calibrated: 9/12/2017, • Sensor-Surface: 1.4mm (Mechanical Surface Detection) • Electronics: DAE4 Sn1525; Calibrated: 10/2/2017 • Phantom: Triple Flat Phantom 5.1C; Type: QD 000 P51 CA; Serial: 1161/1 • Measurement SW: DASY52, Version 52.10 (0); SEMCAD X Version 14.6.10 (7417) **System Performance Check/Zoom Scan (7x7x7) (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm Reference Value = 93.84 V/m; Power Drift = 0.02 dB Peak SAR (extrapolated) = 19.7 W/kg **SAR(1 g) = 10.3 W/kg; SAR(10 g) = 5.18 W/kg** Maximum value of SAR (measured) = 16.3 W/kg  0 dB = 16.3 W/kg = 12.12 dBW/kg Certificate No: Z18-97021 Page 7 of 8	In Collaboration with TTL speag CALIBRATION LABORATORY Add: No.51 Xueyuan Road, Haidian District, Beijing, 100191, China Tel: +86-10-62304633-2079 Fax: +86-10-62304633-2504 E-mail: ctt@chinattl.com http://www.chinattl.cn **Impedance Measurement Plot for Body TSL**  Certificate No: Z18-97021 Page 8 of 8

D2450V2 Sn:738

CALIBRATION CERTIFICATE



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 1528-2013, "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:
c) 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 calibration. 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%.

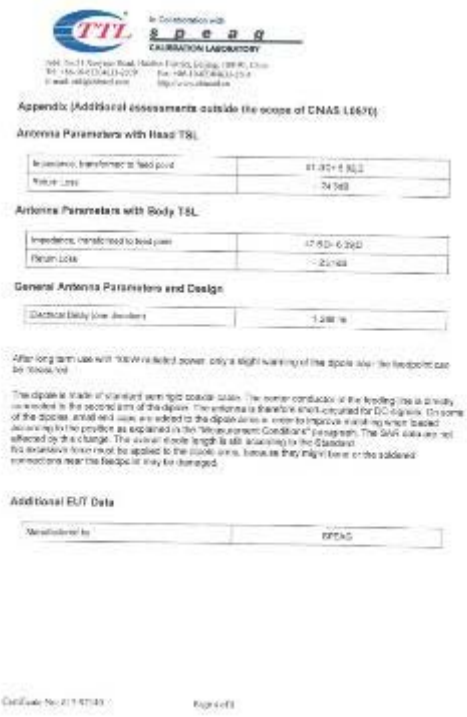
Measurement Conditions

Head TSL parameters

SAR result with Head TSL

Body TSL parameters

SAR result with Body TSL



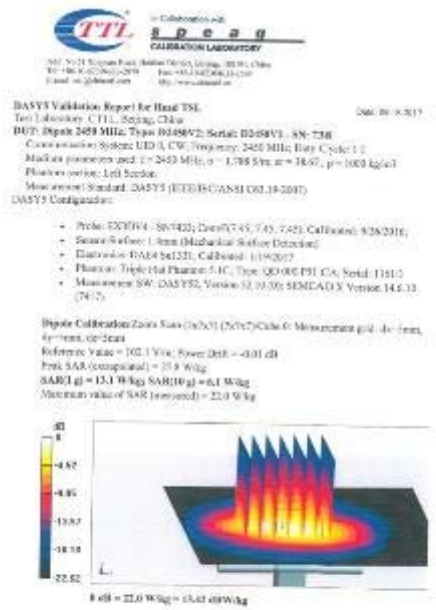
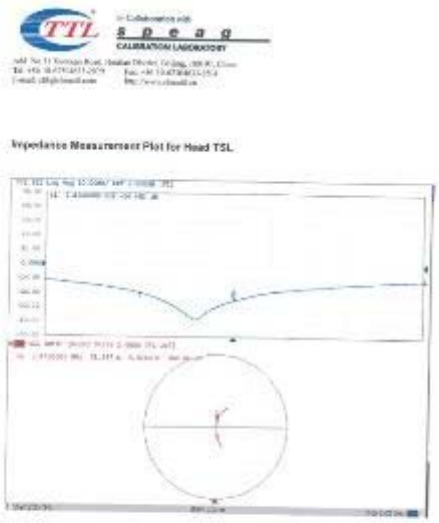
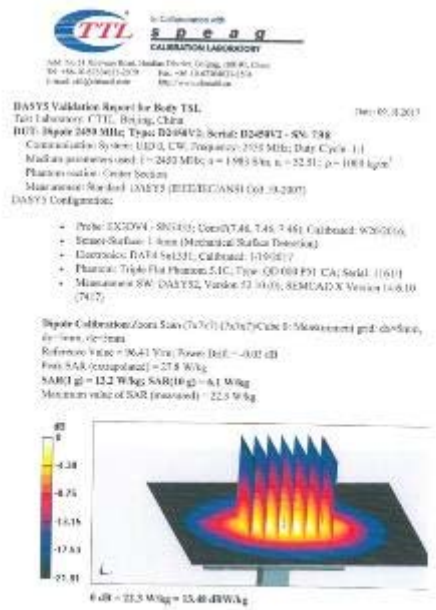
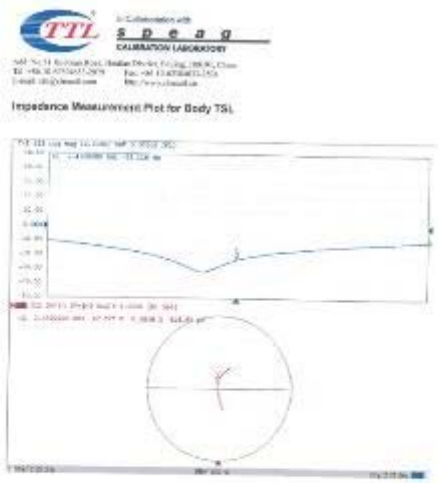
Appendix (Additional assessments outside the scope of CNAS L0570)

Antenna Parameters with Head TSL

Antenna Parameters with Body TSL

General Antenna Parameters and Design

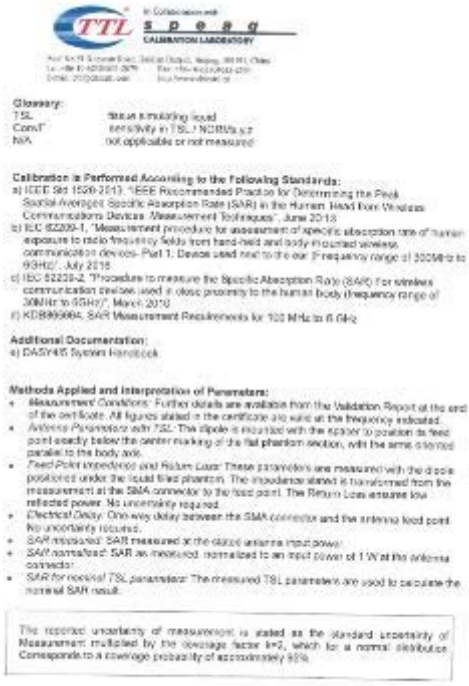
Additional EUT Data

D2450V2 Sn:738	
	
	

D5GHzV2 Sn:1079

CALIBRATION CERTIFICATE

Client SRTC Certificate No: Z17-97133



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 1528-2013, "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

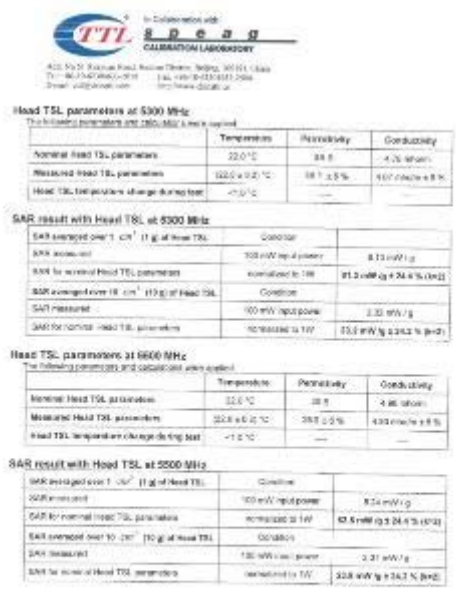
Methods Applied and Interpretation of Parameters:
- Measurement Conditions: Further details are available from the Validation Report at the end of the certificate. All figures stated in the certificate are valid at the frequency indicated.
- Antenna Parameters with TSL: The dipole is mounted with the 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 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%.

Measurement Conditions

Head TSL parameters at 5200 MHz

SAR result with Head TSL at 5200 MHz



Head TSL parameters at 5300 MHz

SAR result with Head TSL at 5300 MHz

Head TSL parameters at 5600 MHz

SAR result with Head TSL at 5600 MHz

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Head TSL parameters at 5600 MHz

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	35.5	5.07 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	36.2 ± 6 %	4.98 mho/m ± 6 %
Head TSL temperature change during test	< 1.0 °C	—	—

SAR result with Head TSL at 5600 MHz

SAR averaged over 1 cm³ (1 g) of Head TSL	Condition	
SAR measured	100 mW input power	8.18 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	81.8 mW / g ± 24.4 % (k=2)
SAR averaged over 10 cm³ (10 g) of Head TSL	Condition	
SAR measured	100 mW input power	3.24 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	32.4 mW / g ± 24.2 % (k=2)

Head TSL parameters at 5800 MHz

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	35.3	5.27 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	35.6 ± 6 %	5.18 mho/m ± 6 %
Head TSL temperature change during test	< 1.0 °C	—	—

SAR result with Head TSL at 5800 MHz

SAR averaged over 1 cm³ (1 g) of Head TSL	Condition	
SAR measured	100 mW input power	7.86 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	78.7 mW / g ± 24.4 % (k=2)
SAR averaged over 10 cm³ (10 g) of Head TSL	Condition	
SAR measured	100 mW input power	3.26 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	32.6 mW / g ± 24.2 % (k=2)

Body TSL parameters at 5200 MHz

	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	49.0	5.30 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	48.5 ± 6 %	5.59 mho/m ± 6 %
Body TSL temperature change during test	< 1.0 °C	—	—

SAR result with Body TSL at 5200 MHz

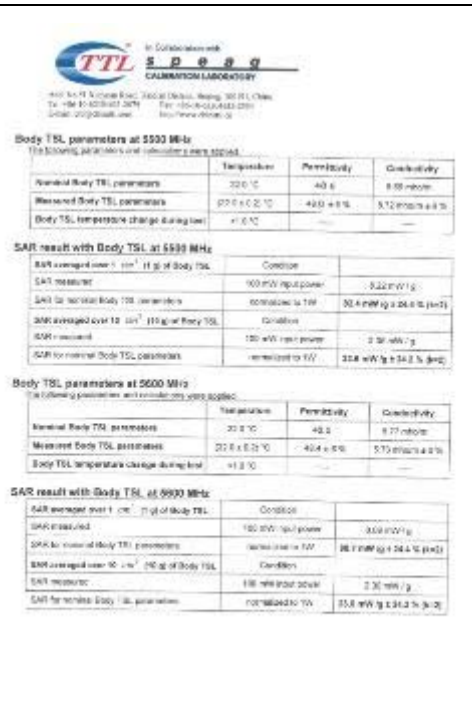
SAR averaged over 1 cm³ (1 g) of Body TSL	Condition	
SAR measured	100 mW input power	7.52 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	76.4 mW / g ± 24.4 % (k=2)
SAR averaged over 10 cm³ (10 g) of Body TSL	Condition	
SAR measured	100 mW input power	2.10 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	21.3 mW / g ± 24.2 % (k=2)

Body TSL parameters at 5300 MHz

	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	48.9	5.42 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	49.2 ± 6 %	5.53 mho/m ± 6 %
Body TSL temperature change during test	< 1.0 °C	—	—

SAR result with Body TSL at 5300 MHz

SAR averaged over 1 cm³ (1 g) of Body TSL	Condition	
SAR measured	100 mW input power	7.69 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	76.9 mW / g ± 24.4 % (k=2)
SAR averaged over 10 cm³ (10 g) of Body TSL	Condition	
SAR measured	100 mW input power	2.10 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	21.5 mW / g ± 24.2 % (k=2)



Body TSL parameters at 5500 MHz

	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	48.6	5.65 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	48.9 ± 6 %	5.72 mho/m ± 6 %
Body TSL temperature change during test	< 1.0 °C	—	—

SAR result with Body TSL at 5500 MHz

SAR averaged over 1 cm³ (1 g) of Body TSL	Condition	
SAR measured	100 mW input power	8.22 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	82.4 mW / g ± 24.4 % (k=2)
SAR averaged over 10 cm³ (10 g) of Body TSL	Condition	
SAR measured	100 mW input power	2.30 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	23.0 mW / g ± 24.2 % (k=2)

Body TSL parameters at 5600 MHz

	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	48.5	5.77 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	48.4 ± 6 %	5.70 mho/m ± 6 %
Body TSL temperature change during test	< 1.0 °C	—	—

SAR result with Body TSL at 5600 MHz

SAR averaged over 1 cm³ (1 g) of Body TSL	Condition	
SAR measured	100 mW input power	8.04 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	80.4 mW / g ± 24.4 % (k=2)
SAR averaged over 10 cm³ (10 g) of Body TSL	Condition	
SAR measured	100 mW input power	2.30 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	23.0 mW / g ± 24.2 % (k=2)

Body TSL parameters at 5800 MHz

	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	48.2	6.00 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	48.0 ± 6 %	5.94 mho/m ± 6 %
Body TSL temperature change during test	< 1.0 °C	—	—

SAR result with Body TSL at 5800 MHz

SAR averaged over 1 cm³ (1 g) of Body TSL	Condition	
SAR measured	100 mW input power	7.72 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	77.2 mW / g ± 24.4 % (k=2)
SAR averaged over 10 cm³ (10 g) of Body TSL	Condition	
SAR measured	100 mW input power	2.17 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	21.8 mW / g ± 24.2 % (k=2)

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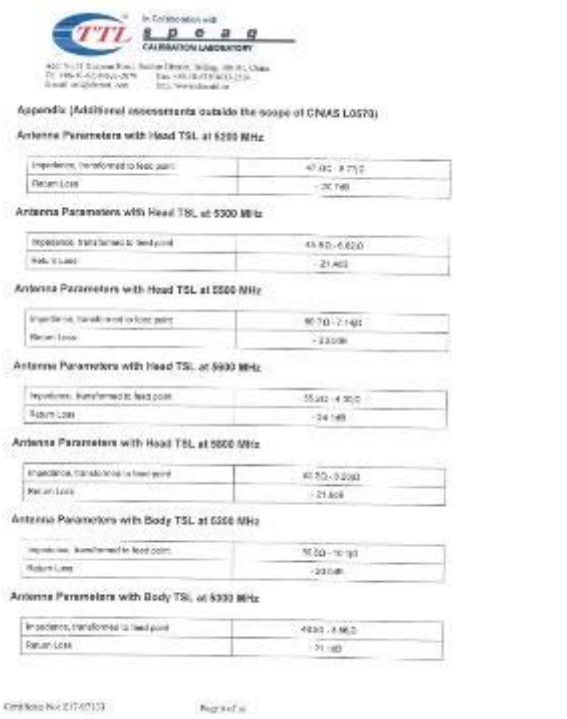


Appendix (Additional assessments outside the scope of CNAS L0570)

Antenna Parameters with Head TSL at 5200 MHz

Impedance, transformed to feed point	47.0Ω - 8.7jΩ
Return Loss	- 26.7dB

Antenna Parameters with Head TSL at 5300 MHz

Impedance, transformed to feed point	49.9Ω - 6.6jΩ
Return Loss	- 21.4dB

Antenna Parameters with Head TSL at 5500 MHz

Impedance, transformed to feed point	46.7Ω - 2.1jΩ
Return Loss	- 23.0dB

Antenna Parameters with Head TSL at 5600 MHz

Impedance, transformed to feed point	55.2Ω - 4.3jΩ
Return Loss	- 24.1dB

Antenna Parameters with Head TSL at 5800 MHz

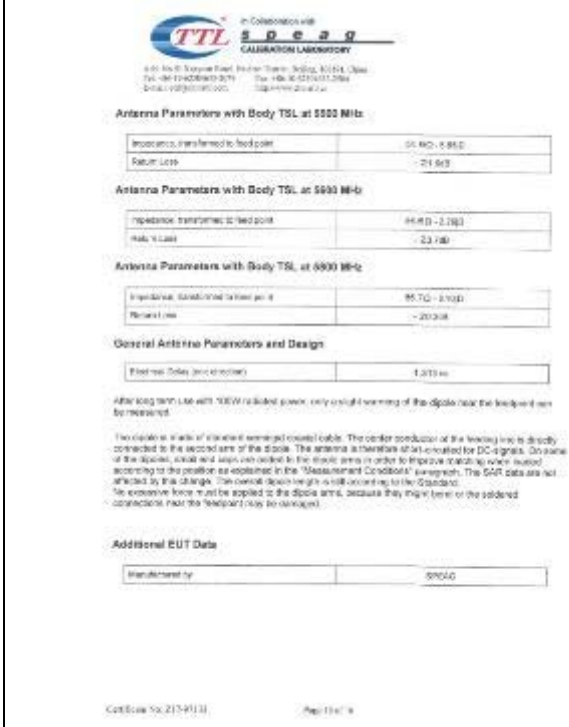
Impedance, transformed to feed point	52.7Ω - 0.2jΩ
Return Loss	- 21.8dB

Antenna Parameters with Body TSL at 5200 MHz

Impedance, transformed to feed point	50.2Ω - 10.1jΩ
Return Loss	- 23.0dB

Antenna Parameters with Body TSL at 5300 MHz

Impedance, transformed to feed point	49.8Ω - 8.9jΩ
Return Loss	- 21.1dB



Antenna Parameters with Body TSL at 5500 MHz

Impedance, transformed to feed point	44.8Ω - 2.2jΩ
Return Loss	- 23.7dB

Antenna Parameters with Body TSL at 5600 MHz

Impedance, transformed to feed point	55.7Ω - 3.1jΩ
Return Loss	- 20.0dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.013 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 semi-rigid 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 one of the dipole arms, small baluns 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

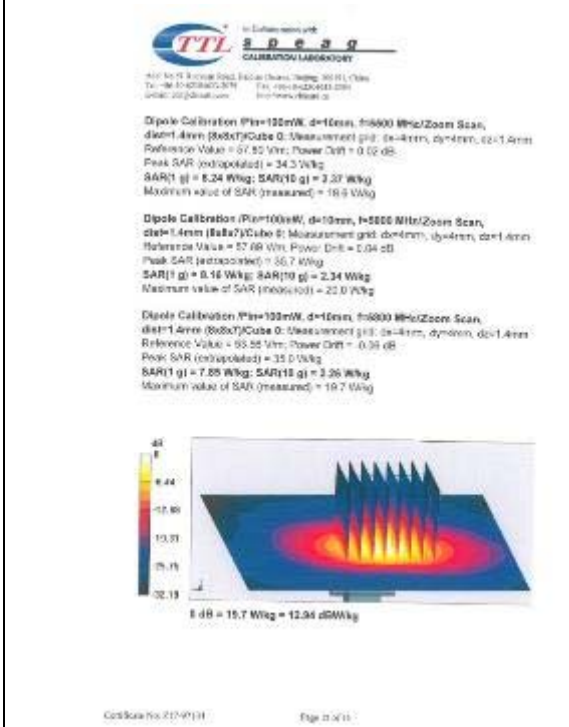
Manufactured by	SPEAG

DASY5 Validation Report for Head TSL
Date: 09.21.2017
Test Laboratory: CTTL, Beijing, China
DUT: Dipole 5GHz; Type: D5GHzV2; Serial: D5GHzV2 - SN: 1079
Communication System: CW; Frequency: 5200 MHz; Frequency: 5300 MHz; Frequency: 5500 MHz; Frequency: 5600 MHz; Frequency: 5800 MHz;
Medium parameters used: f = 5200 MHz; σ = 4.618 mho/m; εr = 36.72; ρ = 1000 kg/m3; Medium parameters used: f = 5300 MHz; σ = 4.665 mho/m; εr = 36.66; ρ = 1000 kg/m3; Medium parameters used: f = 5500 MHz; σ = 4.934 mho/m; εr = 36.32; ρ = 1000 kg/m3; Medium parameters used: f = 5600 MHz; σ = 4.994 mho/m; εr = 36.13; ρ = 1000 kg/m3; Medium parameters used: f = 5800 MHz; σ = 5.199 mho/m; εr = 35.83; ρ = 1000 kg/m3;
Phantom section: Left Section;
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)
DASY5 Configuration:

- Probe: EX3DV4 - SN3846; ConvF(5.37,5.37,5.37); Calibrated: 1/13/2017;
  ConvF(5.37,5.37,5.37); Calibrated: 1/13/2017; ConvF(4.72,4.72,4.72); Calibrated: 1/13/2017; ConvF(4.72,4.72,4.72); Calibrated: 1/13/2017;
  ConvF(4.95,4.95,4.95); Calibrated: 1/13/2017;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1331; Calibrated: 2017/1/19
- Phantom: Triple Flat Phantom 5.1C; Type: QD 000 P51 CA; Serial: 1161/5
- Measurement SW: DASY52, Version 52.10 (0); SEMCAD X Version 14.6.10 (7417)

Dipole Calibration /Pin=100mW, d=10mm, f=5200 MHz/Zoom Scan, dist=1.4mm (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 59.61 V/m; Power Drift = -0.01 dB
Peak SAR (extrapolated) = 30.8 W/kg
SAR(1 g) = 7.77 W/kg; SAR(10 g) = 2.34 W/kg
Maximum value of SAR (measured) = 18.2 W/kg

Dipole Calibration /Pin=100mW, d=10mm, f=5300 MHz/Zoom Scan, dist=1.4mm (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 65.12 V/m; Power Drift = 0.05 dB
Peak SAR (extrapolated) = 33.7 W/kg
SAR(1 g) = 8.13 W/kg; SAR(10 g) = 2.32 W/kg
Maximum value of SAR (measured) = 19.3 W/kg



Dipole Calibration /Pin=100mW, d=10mm, f=5600 MHz/Zoom Scan, dist=1.4mm (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 67.80 V/m; Power Drift = 0.02 dB
Peak SAR (extrapolated) = 34.3 W/kg
SAR(1 g) = 8.24 W/kg; SAR(10 g) = 2.37 W/kg
Maximum value of SAR (measured) = 19.9 W/kg

Dipole Calibration /Pin=100mW, d=10mm, f=5800 MHz/Zoom Scan, dist=1.4mm (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 57.69 V/m; Power Drift = 0.04 dB
Peak SAR (extrapolated) = 36.7 W/kg
SAR(1 g) = 8.16 W/kg; SAR(10 g) = 2.34 W/kg
Maximum value of SAR (measured) = 22.0 W/kg

Dipole Calibration /Pin=100mW, d=10mm, f=5800 MHz/Zoom Scan, dist=1.4mm (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 55.55 V/m; Power Drift = -0.39 dB
Peak SAR (extrapolated) = 35.0 W/kg
SAR(1 g) = 7.85 W/kg; SAR(10 g) = 2.26 W/kg
Maximum value of SAR (measured) = 19.7 W/kg

0 dB = 19.7 W/kg = 12.94 dBW/kg

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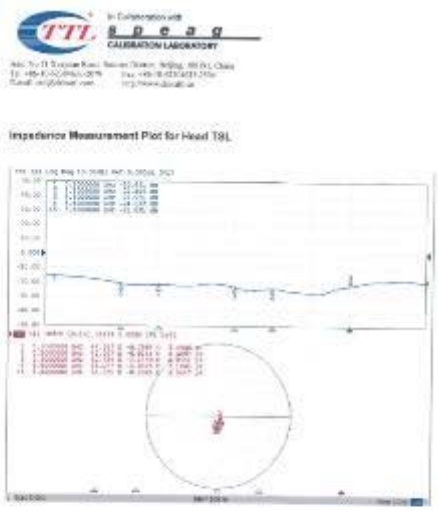


Impedance Measurement Plot for Head TSL

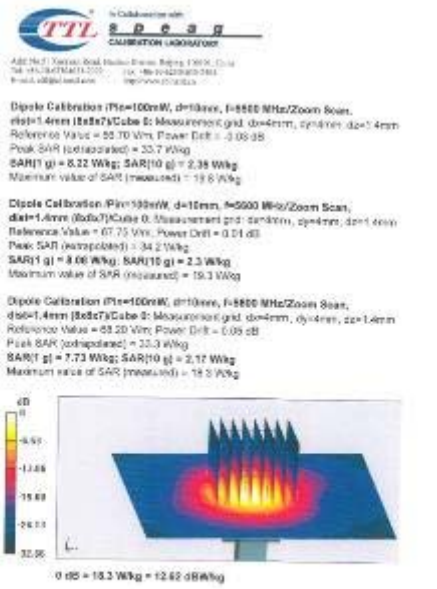
DASY6 Validation Report for Body TSL

Test Laboratory: CTTL, Beijing, China

DUT: Dipole 5GHz; Type: D5GHzV2; Serial: D5GHzV2 - SN: 1079

Dipole Calibration /Pin=100mW, d=10mm, f=5200 MHz/Zoom Scan,
dist=1.4mm (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 55.16 V/m; Power Drift = 0.01 dB
Peak SAR (extrapolated) = 30.0 W/kg
SAR(1 g) = 7.82 W/kg; SAR(10 g) = 2.12 W/kg
Maximum value of SAR (measured) = 18.2 W/kg

Dipole Calibration /Pin=100mW, d=10mm, f=5300 MHz/Zoom Scan,
dist=1.4mm (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 53.94 V/m; Power Drift = 0.01 dB
Peak SAR (extrapolated) = 31.6 W/kg
SAR(1 g) = 7.68 W/kg; SAR(10 g) = 2.15 W/kg
Maximum value of SAR (measured) = 18.3 W/kg

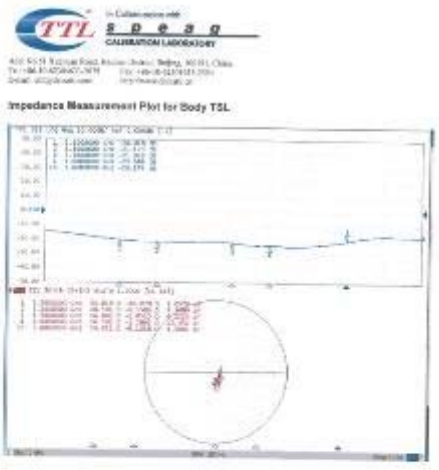


Dipole Calibration /Pin=100mW, d=10mm, f=5600 MHz/Zoom Scan,
dist=1.4mm (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 55.70 V/m; Power Drift = -0.08 dB
Peak SAR (extrapolated) = 33.7 W/kg
SAR(1 g) = 8.22 W/kg; SAR(10 g) = 2.35 W/kg
Maximum value of SAR (measured) = 19.6 W/kg

Dipole Calibration /Pin=100mW, d=10mm, f=5600 MHz/Zoom Scan,
dist=1.4mm (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 67.75 V/m; Power Drift = 0.01 dB
Peak SAR (extrapolated) = 34.2 W/kg
SAR(1 g) = 8.06 W/kg; SAR(10 g) = 2.3 W/kg
Maximum value of SAR (measured) = 19.3 W/kg

Dipole Calibration /Pin=100mW, d=10mm, f=5800 MHz/Zoom Scan,
dist=1.4mm (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 68.20 V/m; Power Drift = 0.09 dB
Peak SAR (extrapolated) = 33.3 W/kg
SAR(1 g) = 7.73 W/kg; SAR(10 g) = 2.17 W/kg
Maximum value of SAR (measured) = 18.9 W/kg

0 dB = 18.3 W/kg = 12.62 dBW/kg



Impedance Measurement Plot for Body TSL

----------End of the test report----------