

Report No. : TESA2404000226E5 Page: 1 of 25

Appendix C

Phantom Description

Schmid & Parmer Engineering AG	S	p	e	a	g	_
Zeughausstrasee 43, 8004 Zusch, Switzeiland Pixone +41 1 245 9700, Fax +41 1 245 9779 Intel®exag.com, http://www.speeg.com	_					

Certificate of Conformity / First Article Inspection

item	SAM Twin Phantom V4.0
Type No	QD 000 P40 C
Series No	TP-1150 and higher
Manufacturer	SPEAG Zeughausstasse 43 CH-8004 Zürich Switzerland

Tests

The series production process used allows the limitation to test of first articles.

Complete tests were made on the pre-series Type No. QD 000 P40 AA. Serial No. TP-1001 and on the sories first article Type No. QD 000 P40 BA, Serial No. TP-1006. Certain parameters have been retested using further series items (called samples) or are tested at each item

Test	Requirement	Details	Units tested
Dimensions	Compliant with the geometry according to the CAD model.	(T'IS CAD File (*)	First article, Samples
Material thickness of shell	Compliant with the requirements according to the standards	2mm +/- 0.2mm in flat and specific areas of head section	First article, Samples, TP-1314 ff.
Material thickness at ERP	Compliant with the requirements according to the standards	6mm +/- 0.2mm at ERP	First article, All items
Material parameters	Dielectric parameters for required frequencies	300 MHz - 0 GHz: Relative parmittivity < 5. Loss tangent < 0.05	Material samples
Material resistivity	The material has been tested to be compatible with the liquids defined in the standards if handled and cleaned according to the instructions. Observe technical Note for material compatibility.	DEGMBE based simulating liquids	Pre-series, First article, Material samples
Segging	Compliant with the requirements according to the standards. Sagging of the flat section when filled with tissue simulating liquid	< 1% typical < 0.8% if tilled with 155mm of HSL900 and without DUT below	Prototypes, Sample testing

Standards

- CENELEC EN 50361 IEEE Std 1528-2003
- (3)村円
- IEC 62209 Part 1 FCC OET Sulletin 65, Supplement C, Edition 01-01 The ITIS CAD file is derived from [2] and is also within the tolerance requirements of the shapes of the other documents.

Conformity

Based on the sample tests above, we certify that this item is in compliance with the uncertainty requirements of SAR measurements apacified in standards [1] to [4]

0 8 9
& Pagamir Engineering AG Jacobase 43, 8084 Zurieh Switzerland AGLS Bes UPDS Year-Babri 245, 9779 Beg.com, http://www.speag.com

Doc No. 581 - 00 000 P40 C - =

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System Validation from Original Equipment Supplier

Add: No.52 HuaYuanBei Ro Tel: +86-10-62304633-2117		Beijing, 100191	
E-mail: emf@caict.ac.cn	http://www.caicl		102700040
Client SGS			3J02Z80049
CALIBRATION CE	ERTIFICAT	E	
Object	D750V3	3 - SN: 1015	
Calibration Procedure(s)	FF-Z11	-003-01	
	Calibra	tion Procedures for dipole validation kits	
Calibration date:	Septer	nber 18, 2023	
pages and are part of the ce	ertificate.		
	conducted in t	he closed laboratory facility: environment or calibration)	temperature (22±3)°C and
All calibrations have been humidity<70%.	conducted in t		temperature (22±3)°C and
NI calibrations have been numidity<70%. Calibration Equipment used	conducted in t	or calibration)	
All calibrations have been numidity<70%. Calibration Equipment used Primary Standards	conducted in the conduc	or calibration) Cal Date (Calibrated by, Certificate No.)	Scheduled Calibration
All calibrations have been numidity<70%. Calibration Equipment used Primary Standards Power Meter NRP2 Power sensor NRP8S Reference Probe EX3DV4	conducted in t (M&TE critical fo ID # 106277 104291	Cal Date (Calibrated by, Certificate No.) 22-Sep-22 (CTTL, No.J22X09561)	Scheduled Calibration Sep-23
All calibrations have been numidity<70%. Calibration Equipment used Primary Standards Power Meter NRP2 Power sensor NRP8S	conducted in t (M&TE critical fo ID # 106277 104291	Cal Date (Calibrated by, Certificate No.) 22-Sep-22 (CTTL, No.J22X09561) 22-Sep-22 (CTTL, No.J22X09561)	Scheduled Calibration Sep-23 Sep-23
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All calibrations have been numidity<70%. Calibration Equipment used Primary Standards Power Meter NRP2 Power sensor NRP8S Reference Probe EX3DV4 DAE4	conducted in ti (M&TE critical fo ID # 106277 104291 SN 3617 SN 1556	Cal Date (Calibrated by, Certificate No.) 22-Sep-22 (CTTL, No.J22X09561) 22-Sep-22 (CTTL, No.J22X09561) 31-Mar-23(CTTL-SPEAG,No.Z23-60161) 11-Jan-23(CTTL-SPEAG,No.Z23-60034)	Scheduled Calibration Sep-23 Sep-23 Mar-24 Jan-24
All calibrations have been numidity<70%. Calibration Equipment used Primary Standards Power Sensor NRP8 Reference Probe EX3DV4 DAE4 Secondary Standards	conducted in t (M&TE critical fo ID # 106277 104291 SN 3617 SN 1556 ID #	Cal Date (Calibrated by, Certificate No.) 22-Sep-22 (CTTL, No.J22X09561) 22-Sep-22 (CTTL, No.J22X09561) 31-Mar-23(CTTL-SPEAG,No.Z23-60161) 11-Jan-23(CTTL-SPEAG,No.Z23-60034) Cal Date (Calibrated by, Certificate No.)	Scheduled Calibration Sep-23 Sep-23 Mar-24 Jan-24 Scheduled Calibration
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Glossarv:

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) IEC/IEEE 62209-1528, "Measurement Procedure for The Assessment of Specific Absorption Rate of Human Exposure to Radio Frequency Fields from Hand-held and Body-mounted Wireless Communication Devices- Part 1528: Human Models, Instrumentation and Procedures (Frequency range of 4 MHz to 10 GHz)", October 2020 b) KDB 865664, "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 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 a	as not	given	on p	age	1.

DASY Version	DASY52	V52.10.4
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	42.0	0.90 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	42.0 ± 6 %	0.87 mho/m ± 6 %
Head TSL temperature change during test	<1.0 °C		

SAR result with Head TSL

SAR averaged over 1 cm^3 (1 g) of Head TSL	Condition	· · · · · · · · · · · · · · · · · · ·
SAR measured	250 mW input power	2.12 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	8.63 W/kg ± 18.8 % (k=2)
SAR averaged over 10 cm^3 (10 g) of Head TSL	Condition	
SAR measured	250 mW input power	1.37 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	5.56 W/kg ± 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	52.3Ω+ 1.13jΩ	
Return Loss	- 32.1dB	

General Antenna Parameters and Design

Electrical Delay (one direction)	0.944 ns	
----------------------------------	----------	--

After long term use with 100W radiated power, only a slight warming of the dipole near the feed-point 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 connected to the second arm of the dipole. The antenna is therefore short-cruited for DC-signals. On son 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 feed-point may be damaged.

Additional EUT Data

SPEAG

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DASY5 Validation Report for Head TSL

Date: 2023-09-18

Test Laboratory: CTTL, Beijing, China DUT: Dipole 750 MHz; Type: D750V3; Serial: D750V3 - SN: 1015 Communication System: UID 0, CW; Frequency: 750 MHz Medium parameters used: f = 750 MHz; σ = 0.87 S/m; ϵ_r = 42.01; ρ = 1000 kg/m³ Phantom section: Right Section Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

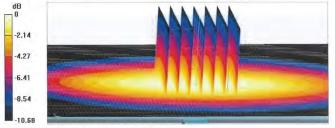
DASY5 Configuration:

- Probe: EX3DV4 SN3617; ConvF(10.1, 10.1, 10.1) @ 750 MHz; Calibrated: 2023-03-31
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1556; Calibrated: 2023-01-11 .
- Phantom: MFP_V5.1C (20deg probe tilt); Type: QD 000 P51 Cx; Serial: 1062
- DASY52 52.10.4(1535); SEMCAD X 14.6.14(7501) .

Dipole Calibration/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm Reference Value = 54.31 V/m; Power Drift = -0.03 dB

Peak SAR (extrapolated) = 3.43 W/kg

SAR(1 g) = 2.12 W/kg; SAR(10 g) = 1.37 W/kg Smallest distance from peaks to all points 3 dB below = 19.2 mmRatio of SAR at M2 to SAR at M1 = 62% Maximum value of SAR (measured) = 2.94 W/kg



0 dB = 2.94 W/kg = 4.68 dBW/kg

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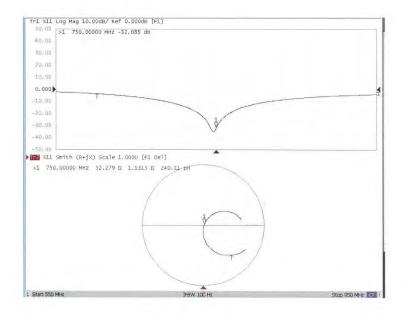
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Impedance Measurement Plot for Head TSL



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Client SGS		Certificate No: 23	3J02Z80052
CALIBRATION CE	ERTIFICAT	E	
Object	D1750	/2 - SN: 1008	
-			
Calibration Procedure(s)	FF-Z11	-003-01	
	Calibra	tion Procedures for dipole validation kits	
Calibration date:	Septer	nber 19, 2023	
pages and are part of the ce	ertificate.	the uncertainties with confidence probability	
pages and are part of the ce	ertificate. conducted in t	he closed laboratory facility: environment	
pages and are part of the ce All calibrations have been humidity<70%.	ertificate. conducted in t	he closed laboratory facility: environment	
pages and are part of the ce All calibrations have been humidity<70%. Calibration Equipment used	conducted in t (M&TE critical fo	he closed laboratory facility: environment	temperature (22±3)℃ and
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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) IEC/IEEE 62209-1528, "Measurement Procedure for The Assessment of Specific Absorption Rate of Human Exposure to Radio Frequency Fields from Hand-held and Body-mounted Wireless Communication Devices- Part 1528: Human Models, Instrumentation and
- Procedures (Frequency range of 4 MHz to 10 GHz)", October 2020 b) KDB 865664, "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 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 Version	DASY52	52.10.4
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	1750 MHz ± 1 MHz	

Head TSL parameters

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	40.1	1.37 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	40.0 ± 6 %	1.41 mho/m ± 6 %
Head TSL temperature change during test	<1.0 °C		

SAR result with Head TSL

SAR averaged over 1 cm^3 (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	9.27 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	36.4 W/kg ± 18.8 % (k=2)
SAR averaged over 10 cm^3 (10 g) of Head TSL	Condition	
SAR measured	250 mW input power	4.90 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	19.4 W/kg ± 18.7 % (k=2)

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Appendix (Additional assessments outside the scope of CNAS L0570)

Antenna Parameters with Head TSL

mpedance, transformed to feed point	48.7Ω+ 0.06jΩ
Return Loss	- 37.4dB
neral Antenna Parameters and Design	

After long term use with 100W radiated power, only a slight warming of the dipole near the feed-point 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 feed-point may be damaged.

Additional EUT Data

Manufactured by	SPEAG

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DASY5 Validation Report for Head TSL Test Laboratory: CTTL, Beijing, China

Date: 2023-09-19

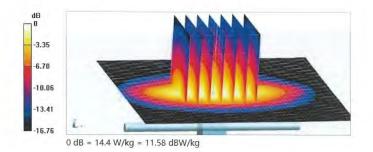
DUT: Dipole 1750 MHz; Type: D1750V2; Serial: D1750V2 - SN: 1008 Communication System: UID 0, CW; Frequency: 1750 MHz; Duty Cycle: 1:1 Medium parameters used: f = 1750 MHz; σ = 1.41 S/m; ϵ_r = 40.02; ρ = 1000 kg/m³ Phantom section: Right Section Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: EX3DV4 SN3617; ConvF(8.4, 8.4, 8.4) @ 1750 MHz; Calibrated: . 2023-03-31
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1556; Calibrated: 2023-01-11 .
- Phantom: MFP_V5.1C (20deg probe tilt); Type: QD 000 P51 Cx; Serial: 1062
- DASY52 52.10.4(1535); SEMCAD X 14.6.14(7501)

Dipole Calibration/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm Reference Value = 95.34 V/m; Power Drift = -0.02 dB Peak SAR (extrapolated) = 17.3 W/kg SAR(1 g) = 9.27 W/kg; SAR(10 g) = 4.9 W/kg Smallest distance from peaks to all points 3 dB below = 10 mm Ratio of SAR at M2 to SAR at M1 = 54%

Maximum value of SAR (measured) = 14.4 W/kg



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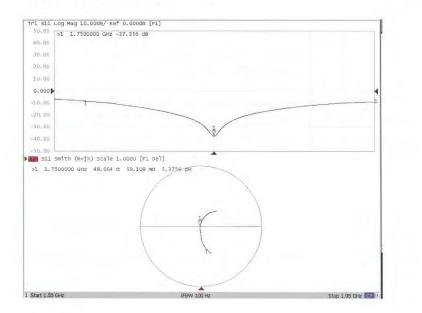






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Impedance Measurement Plot for Head TSL



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Page 1 of 6

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Glossarv:

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) IEC/IEEE 62209-1528, "Measurement Procedure for The Assessment of Specific Absorption Rate of Human Exposure to Radio Frequency Fields from Hand-held and Body-mounted Wireless Communication Devices- Part 1528: Human Models, Instrumentation and Procedures (Frequency range of 4 MHz to 10 GHz)", October 2020 b) KDB 865664, "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 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 f	ar as not given on page 1.	
DASY Version	DASY52	

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	1900 MHz ± 1 MHz	

Head TSL parameters a d'a standard anna 111 anna 1

	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	39.0 ± 6 %	1.38 mho/m ± 6 %
Head TSL temperature change during test	<1.0 °C		-

SAR result with Head TSL

SAR averaged over 1 cm^3 (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	10.1 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	40.5 W/kg ± 18.8 % (k=2)
SAR averaged over 10 cm^3 (10 g) of Head TSL	Condition	1
SAR measured	250 mW input power	5.24 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	21.0 W/kg ± 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	52.4Ω+ 6.37jΩ	
Return Loss	- 23.6dB	

General Antenna Parameters and Design

Electrical Delay (one direction)	1.109 ns
Contraction of Account of the second s	

After long term use with 100W radiated power, only a slight warming of the dipole near the feed-point 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 feed-point may be damaged.

Additional EUT Data

Manufactured by	SPEAG

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DASY5 Validation Report for Head TSL Test Laboratory: CTTL, Beijing, China

Date: 2023-08-25

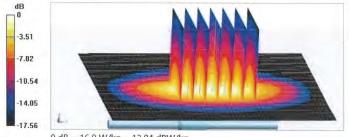
- DUT: Dipole 1900 MHz; Type: D1900V2; Serial: D1900V2 SN: 5d056 Communication System: UID 0, CW; Frequency: 1900 MHz Medium parameters used: f = 1900 MHz; $\sigma = 1.378$ S/m; $\varepsilon_r = 38.95$; $\rho = 1000$ kg/m³
 - Phantom section: Right Section Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: EX3DV4 SN3617; ConvF(8.14, 8.14, 8.14) @ 1900 MHz; Calibrated: 2023-03-31
- Sensor-Surface: 1.4mm (Mechanical Surface Detection) .
- Electronics: DAE4 Sn1556; Calibrated: 2023-01-11
- Phantom: MFP_V5.1C (20deg probe tilt); Type: QD 000 P51 Cx; Serial: 1062 .
- DASY52 52.10.4(1535); SEMCAD X 14.6.14(7501)

Dipole Calibration/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm Reference Value = 94.61 V/m; Power Drift = -0.08 dB Peak SAR (extrapolated) = 19.3 W/kg

SAR(1 g) = 10.1 W/kg; SAR(10 g) = 5.24 W/kg Smallest distance from peaks to all points 3 dB below = 9.8 mm Ratio of SAR at M2 to SAR at M1 = 53.1% Maximum value of SAR (measured) = 16.0 W/kg



0 dB = 16.0 W/kg = 12.04 dBW/kg

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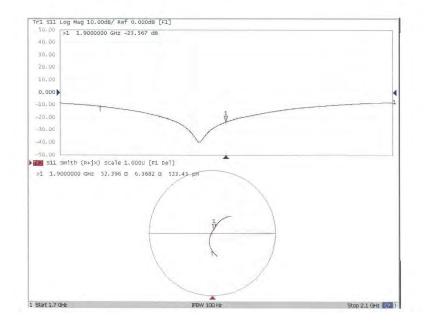






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Impedance Measurement Plot for Head TSL



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CALIBRATION CE	ERTIFICAT	Έ	
Object	D2450	/2 - SN: 728	
Calibration Procedure(s)	FF-Z11	-003-01 tion Procedures for dipole validation kits	
Calibration date:		28, 2023	
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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) IEC/IEEE 62209-1528, "Measurement Procedure for The Assessment of Specific Absorption Rate of Human Exposure to Radio Frequency Fields from Hand-held and Body-mounted Wireless Communication Devices- Part 1528: Human Models, Instrumentation and Procedures (Frequency range of 4 MHz to 10 GHz)", October 2020
- b) KDB 865664, "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 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 Version	DASY52	52.10.4
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	

Head TSL parameters

Frequency

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	39.2	1.80 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	39.0±6%	1.84 mho/m ± 6 %
Head TSL temperature change during test	<1.0 °C		

2450 MHz ± 1 MHz

SAR result with Head TSL

SAR averaged over 1 cm^3 (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	13.5 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	53.4 W/kg ± 18.8 % (k=2)
SAR averaged over 10 cm ³ (10 g) of Head TSL	Condition	
SAR measured	250 mW input power	6.26 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	24.9 W/kg ± 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	53.2Ω+ 7.39jΩ	
Return Loss	- 22.2dB	

General Antenna Parameters and Design

Electrical Delay (one direction)	1.059 ns	
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After long term use with 100W radiated power, only a slight warming of the dipole near the feed-point 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 feed-point may be damaged.

Additional EUT Data

Manufactured by	SPEAG

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DASY5 Validation Report for Head TSL Test Laboratory: CTTL, Beijing, China

Date: 2023-08-28

DUT: Dipole 2450 MHz; Type: D2450V2; Serial: D2450V2 - SN: 728 Communication System: UID 0, CW; Frequency: 2450 MHz Medium parameters used: f = 2450 MHz; $\sigma = 1.835 \text{ S/m}$; $\varepsilon_r = 39.03$; $\rho = 1000 \text{ kg/m}^3$ Phantom section: Right Section

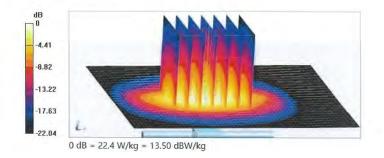
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: EX3DV4 SN3617; ConvF(7.68, 7.68, 7.68) @ 2450 MHz; Calibrated: 2023-03-31
- Sensor-Surface: 1.4mm (Mechanical Surface Detection) .
- Electronics: DAE4 Sn1556; Calibrated: 2023-01-11
- Phantom: MFP_V5.1C (20deg probe tilt); Type: QD 000 P51 Cx; Serial: 1062 .
- DASY52 52.10.4(1535); SEMCAD X 14.6.14(7501) .

Dipole Calibration/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm Reference Value = 98.25 V/m; Power Drift = -0.04 dB Peak SAR (extrapolated) = 28.0 W/kg SAR(1 g) = 13.5 W/kg; SAR(10 g) = 6.26 W/kg Smallest distance from peaks to all points 3 dB below = 9 mm Ratio of SAR at M2 to SAR at M1 = 49.1%

Maximum value of SAR (measured) = 22.4 W/kg



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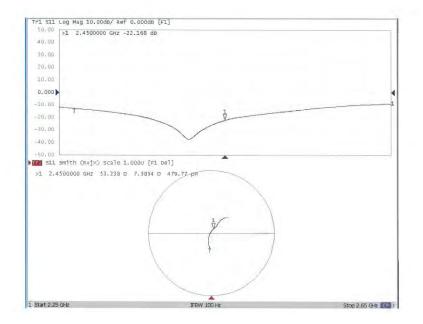






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Impedance Measurement Plot for Head TSL



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- End of report -

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