Add: No.52 HuaYuanBei Ro: Tel: +86-10-62304633-2117 E-mail: emf@caict.ac.cn	ad, Haidian District, http://www.caic	beijing, 100191	AS L0570
Client BACI			2-60477
CALIBRATION CE	DTIELCAT	E	
CALIDRATION CE	RIFICAL	E	
Object	D750V	3 - SN: 1167	
Calibration Procedure(s)			
Salistation roccadic(3)	FF-Z11		
	Calibra	tion Procedures for dipole validation kits	
Calibration date:	Octobe	r 31, 2022	
This calibration Certificate	documents the	traceability to national standards, which rea	lize the physical units of
measurements (SI). The me	asurements and	the uncertainties with confidence probability	are given on the following
ages and are part of the ce			
All collibrations, have been	conducted in t	he alaged laboratory facility, any ironmont	tomporature (20.2%) and
	conducted in t	he closed laboratory facility: environment t	temperature (22±3)℃ and
	conducted in t	he closed laboratory facility: environment t	temperature (22±3)°C and
	conducted in t	he closed laboratory facility: environment t	temperature (22±3)℃ and
numidity<70%.			temperature (22±3)℃ and
numidity<70%.			temperature (22±3)°C and
numidity<70%. Calibration Equipment used			temperature (22±3)°C and Scheduled Calibration
numidity<70%. Calibration Equipment used	(M&TE critical fo	or calibration)	
numidity<70%. Calibration Equipment used Primary Standards	(M&TE critical fo	Cal Date (Calibrated by, Certificate No.) 10-May-22 (CTTL, No.J22X03103) 10-May-22 (CTTL, No.J22X03103)	Scheduled Calibration
numidity<70%. Calibration Equipment used Primary Standards Power Meter NRP2	(M&TE critical fo ID # 106276 101369	Cal Date (Calibrated by, Certificate No.) 10-May-22 (CTTL, No.J22X03103)	Scheduled Calibration May-23
Calibration Equipment used Primary Standards Power Meter NRP2 Power sensor NRP6A	(M&TE critical fo ID # 106276 101369	Cal Date (Calibrated by, Certificate No.) 10-May-22 (CTTL, No.J22X03103) 10-May-22 (CTTL, No.J22X03103)	Scheduled Calibration May-23 May-23
Calibration Equipment used Primary Standards Power Meter NRP2 Power sensor NRP6A Reference Probe EX3DV4	(M&TE critical fo ID # 106276 101369 SN 7464	Cal Date (Calibrated by, Certificate No.) 10-May-22 (CTTL, No.J22X03103) 10-May-22 (CTTL, No.J22X03103) 26-Jan-22(SPEAG,No.EX3-7464_Jan22) 12-Jan-22(CTTL-SPEAG,No.Z22-60007)	Scheduled Calibration May-23 May-23 Jan-23 Jan-23
humidity<70%. Calibration Equipment used Primary Standards Power Meter NRP2 Power sensor NRP6A Reference Probe EX3DV4	(M&TE critical fo ID # 106276 101369 SN 7464	Cal Date (Calibrated by, Certificate No.) 10-May-22 (CTTL, No.J22X03103) 10-May-22 (CTTL, No.J22X03103) 26-Jan-22(SPEAG,No.EX3-7464_Jan22) 12-Jan-22(CTTL-SPEAG,No.Z22-60007) Cal Date (Calibrated by, Certificate No.)	Scheduled Calibration May-23 May-23 Jan-23
numidity<70%. Calibration Equipment used Primary Standards Power Meter NRP2 Power sensor NRP6A Reference Probe EX3DV4 DAE4	(M&TE critical fo ID # 106276 101369 SN 7464 SN 1556	Cal Date (Calibrated by, Certificate No.) 10-May-22 (CTTL, No.J22X03103) 10-May-22 (CTTL, No.J22X03103) 26-Jan-22(CTTL, No.J22X03103) 12-Jan-22(CTTL-SPEAG,No.Z22-60007) Cal Date (Calibrated by, Certificate No.) 13-Jan-22 (CTTL, No.J22X00409)	Scheduled Calibration May-23 May-23 Jan-23 Jan-23
Calibration Equipment used Primary Standards Power Meter NRP2 Power sensor NRP6A Reference Probe EX3DV4 DAE4 Secondary Standards	(M&TE critical fo ID # 106276 101369 SN 7464 SN 1556 ID #	Cal Date (Calibrated by, Certificate No.) 10-May-22 (CTTL, No.J22X03103) 10-May-22 (CTTL, No.J22X03103) 26-Jan-22(SPEAG,No.EX3-7464_Jan22) 12-Jan-22(CTTL-SPEAG,No.Z22-60007) Cal Date (Calibrated by, Certificate No.)	Scheduled Calibration May-23 May-23 Jan-23 Jan-23 Scheduled Calibration
humidity<70%. Calibration Equipment used Primary Standards Power Meter NRP2 Power sensor NRP6A Reference Probe EX3DV4 DAE4 Secondary Standards Signal Generator E4438C	(M&TE critical fo ID # 106276 101369 SN 7464 SN 1556 ID # MY49071430	Cal Date (Calibrated by, Certificate No.) 10-May-22 (CTTL, No.J22X03103) 10-May-22 (CTTL, No.J22X03103) 26-Jan-22(CTTL, No.J22X03103) 12-Jan-22(CTTL-SPEAG,No.Z22-60007) Cal Date (Calibrated by, Certificate No.) 13-Jan-22 (CTTL, No.J22X00409)	Scheduled Calibration May-23 May-23 Jan-23 Jan-23 Scheduled Calibration Jan-23
humidity<70%. Calibration Equipment used Primary Standards Power Meter NRP2 Power sensor NRP6A Reference Probe EX3DV4 DAE4 Secondary Standards Signal Generator E4438C	(M&TE critical fo ID # 106276 101369 SN 7464 SN 1556 ID # MY49071430	Cal Date (Calibrated by, Certificate No.) 10-May-22 (CTTL, No.J22X03103) 10-May-22 (CTTL, No.J22X03103) 26-Jan-22(CTTL, No.J22X03103) 12-Jan-22(CTTL-SPEAG,No.Z22-60007) Cal Date (Calibrated by, Certificate No.) 13-Jan-22 (CTTL, No.J22X00409)	Scheduled Calibration May-23 May-23 Jan-23 Jan-23 Scheduled Calibration Jan-23
numidity<70%. Calibration Equipment used Primary Standards Power Meter NRP2 Power sensor NRP6A Reference Probe EX3DV4 DAE4 Secondary Standards Signal Generator E4438C Network Analyzer E5071C	(M&TE critical fo ID # 106276 101369 SN 7464 SN 1556 ID # MY49071430 MY46110673	Cal Date (Calibrated by, Certificate No.) 10-May-22 (CTTL, No.J22X03103) 10-May-22 (CTTL, No.J22X03103) 26-Jan-22 (CTTL, No.J22X03103) 26-Jan-22 (CTTL-SPEAG,No.EX3-7464_Jan22) 12-Jan-22 (CTTL-SPEAG,No.Z22-60007) Cal Date (Calibrated by, Certificate No.) 13-Jan-22 (CTTL, No.J22X00409) 14-Jan-22 (CTTL, No.J22X00406)	Scheduled Calibration May-23 May-23 Jan-23 Jan-23 Scheduled Calibration Jan-23 Jan-23
Calibration Equipment used Primary Standards Power Meter NRP2 Power sensor NRP6A Reference Probe EX3DV4 DAE4 Secondary Standards Signal Generator E4438C Network Analyzer E5071C	(M&TE critical fo ID # 106276 101369 SN 7464 SN 1556 ID # MY49071430 MY46110673 Name	Cal Date (Calibrated by, Certificate No.) 10-May-22 (CTTL, No.J22X03103) 10-May-22 (CTTL, No.J22X03103) 26-Jan-22(SPEAG,No.EX3-7464_Jan22) 12-Jan-22(CTTL-SPEAG,No.Z22-60007) Cal Date (Calibrated by, Certificate No.) 13-Jan-22 (CTTL, No.J22X00409) 14-Jan-22 (CTTL, No.J22X00406) Function	Scheduled Calibration May-23 May-23 Jan-23 Jan-23 Scheduled Calibration Jan-23 Jan-23
Calibration Equipment used Primary Standards Power Meter NRP2 Power sensor NRP6A Reference Probe EX3DV4 DAE4 Secondary Standards Signal Generator E4438C Network Analyzer E5071C Calibrated by:	(M&TE critical fo ID # 106276 101369 SN 7464 SN 1556 ID # MY49071430 MY46110673 Name	Cal Date (Calibrated by, Certificate No.) 10-May-22 (CTTL, No.J22X03103) 10-May-22 (CTTL, No.J22X03103) 26-Jan-22(SPEAG,No.EX3-7464_Jan22) 12-Jan-22(CTTL-SPEAG,No.Z22-60007) Cal Date (Calibrated by, Certificate No.) 13-Jan-22 (CTTL, No.J22X00409) 14-Jan-22 (CTTL, No.J22X00406) Function	Scheduled Calibration May-23 May-23 Jan-23 Jan-23 Scheduled Calibration Jan-23 Jan-23
Calibration Equipment used Primary Standards Power Meter NRP2 Power sensor NRP6A Reference Probe EX3DV4 DAE4 Secondary Standards Signal Generator E4438C Network Analyzer E5071C	(M&TE critical fo ID # 106276 101369 SN 7464 SN 1556 ID # MY49071430 MY46110673 Name Zhao Jing	Cal Date (Calibrated by, Certificate No.) 10-May-22 (CTTL, No.J22X03103) 10-May-22 (CTTL, No.J22X03103) 26-Jan-22(CTTL, No.J22X03103) 26-Jan-22(CTTL-SPEAG,No.Z22-60007) 12-Jan-22(CTTL-SPEAG,No.Z22-60007) Cal Date (Calibrated by, Certificate No.) 13-Jan-22 (CTTL, No.J22X00409) 14-Jan-22 (CTTL, No.J22X00406) Function SAR Test Engineer	Scheduled Calibration May-23 May-23 Jan-23 Jan-23 Scheduled Calibration Jan-23 Jan-23
humidity<70%. Calibration Equipment used Primary Standards Power Meter NRP2 Power sensor NRP6A Reference Probe EX3DV4 DAE4 Secondary Standards Signal Generator E4438C	(M&TE critical fo ID # 106276 101369 SN 7464 SN 1556 ID # MY49071430 MY46110673 Name Zhao Jing	Cal Date (Calibrated by, Certificate No.) 10-May-22 (CTTL, No.J22X03103) 10-May-22 (CTTL, No.J22X03103) 26-Jan-22(CTTL, No.J22X03103) 26-Jan-22(CTTL-SPEAG,No.Z22-60007) 12-Jan-22(CTTL-SPEAG,No.Z22-60007) Cal Date (Calibrated by, Certificate No.) 13-Jan-22 (CTTL, No.J22X00409) 14-Jan-22 (CTTL, No.J22X00406) Function SAR Test Engineer	Scheduled Calibration May-23 May-23 Jan-23 Jan-23 Scheduled Calibration Jan-23 Jan-23

Certificate No: Z22-60477

Page 1 of 6





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) 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%.

Certificate No: Z22-60477

Page 2 of 6





Measurement Conditions

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

DASY Version	DASY52	V52.10.4
Extrapolation	Advanced Extrapolation	
Phantom	Triple Flat Phantom 5.1C	
Distance Dipole Center - TSL	15 mm with Sp	
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) ℃	42.3 ±6 %	0.88 mho/m ±6 %
Head TSL temperature change during test	<1.0 °C		

SAR result with Head TSL

SAR averaged over 1 cm ³ (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	2.09 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	8.48 W/kg ± 18.8 % (k=2)
SAR averaged over 10 cm^3 (10 g) of Head TSL	Condition	
SAR measured	250 mW input power	1.39 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	5.63 W/kg ± 18.7 % (k=2)

Certificate No: Z22-60477

Page 3 of 6





Antenna Parameters with Head TSL

Impedance, transformed to feed point	53.0Ω- 3.71jΩ	
Return Loss	- 26.7dB	

CAICT

General Antenna Parameters and Design

Electrical Delay (one direction)	0.957 ns

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

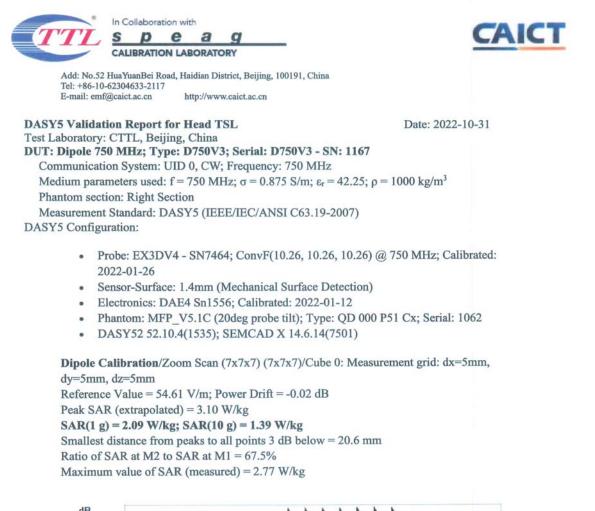
The dipole is made of standard semirigid coaxial cable. The center conductor of the feeding line is directly connected to the second arm of the dipole. The antenna is therefore short-circuited for DC-signals. On some of the dipoles, small end caps are added to the dipole arms in order to improve matching 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.

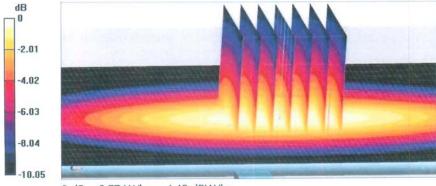
Additional EUT Data

Manufactured by	SPEAG
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Certificate No: Z22-60477

Page 4 of 6





0 dB = 2.77 W/kg = 4.42 dBW/kg

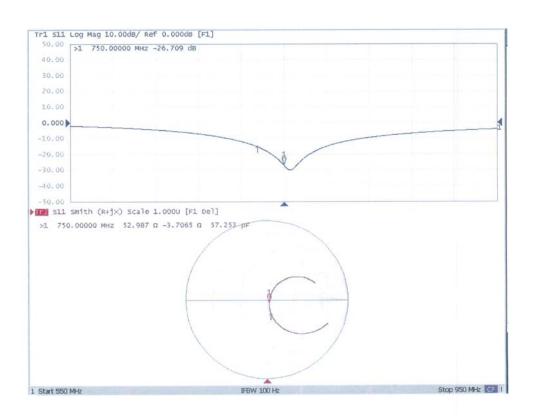
Certificate No: Z22-60477

Page 5 of 6





Impedance Measurement Plot for Head TSL



Certificate No: Z22-60477

Page 6 of 6

D750V3 - SN:1167 Extended Dipole Calibrations

Referring to KDB865664 D01, if dipoles are verified in return loss(< -20dB, within 20% of prior calibration), and in impedance(within 5 ohm of prior calibration), the annual calibration is not necessary and the calibration interval can be extended.

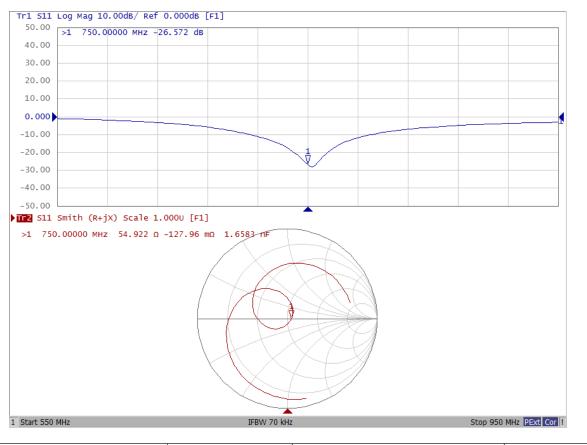
D750V3 - SN:1167						
			750MHz Head			
Impedance						Delta (ohm)
2022/10/31 (Cal. Report)	-26.709	/	52.987	/	-3.7065	/
2023/10/30 (Extended)	-26.572	-0.51	54.922	1.935	-0.12796	3.57854
2024/10/30 (Extended)	-26.223	-1.82	50.324	-2.663	-4.8956	-1.1891

Justification of the extended calibration

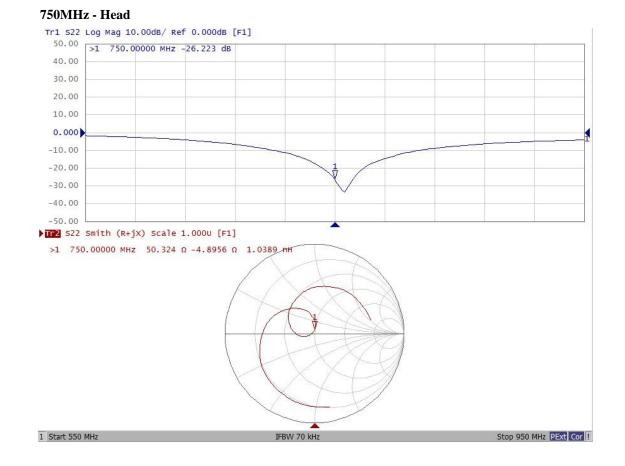
The return loss is <-20dB, within 20% of prior calibration; the impedance is within 5 ohm of prior calibration. Therefore the verification result should support extended calibration.

Dipole Verification Data> D750V3 - SN:1167 (Date of Measurement: 2023/10/30)

750MHz - Head



	Name	Title	Signature
Measure By:	Mark Dong	SAR Engineer	Mark Jong



Dipole Verification Data> D750V3 - SN:1167 (Date of Measurement: 2024/10/30)

	Name	Title	Signature	
Measure By:	Mark Dong	SAR Engineer	Mark Jong	

	tion with e a g ON LABORATORY		中国认可 国际互认 校准
Add: No.52 HuaYuanBei Ro Tel: +86-10-62304633-2117 E-mail: emf@caict.ac.cn			CALIBRATION CNAS L0570
Client BAC	L	Certificate No:	Z22-60478
CALIBRATION CI	ERTIFICAT	E	
Object	D1900\	/2 - SN: 543	
Calibration Procedure(s)	FF-Z11 Calibra	-003-01 tion Procedures for dipole validation kits	
Calibration date:	Novem	ber 2, 2022	
measurements (SI). The me pages and are part of the ce	asurements and ertificate. conducted in t	traceability to national standards, which the uncertainties with confidence probabi he closed laboratory facility: environme or calibration)	ility are given on the following
	ID #	Cal Date (Calibrated by, Certificate No.) Scheduled Calibration
Primary Standards Power Meter NRP2	106276	10-May-22 (CTTL, No.J22X03103)	May-23
Power sensor NRP6A	101369	10-May-22 (CTTL, No.J22X03103)	May-23
Reference Probe EX3DV4	SN 7464	26-Jan-22(SPEAG,No.EX3-7464 Jan22	
DAE4	SN 1556	12-Jan-22(CTTL-SPEAG,No.Z22-60007	
Secondary Standards	ID #	Cal Date (Calibrated by, Certificate No.)	Scheduled Calibration
Signal Generator E4438C	MY49071430	13-Jan-22 (CTTL, No.J22X00409)	Jan-23
Network Analyzer E5071C	MY46110673	14-Jan-22 (CTTL, No.J22X00406)	Jan-23
	Name	Function	Signature
Calibrated by:	Zhao Jing	SAR Test Engineer	A STATE
Reviewed by:	Lin Hao	SAR Test Engineer	二林光
Approved by:	Qi Dianyuan	SAR Project Leader	Na
			ovember 7, 2022
This calibration certificate sl	hall not be reproc	duced except in full without written approv	al of the laboratory.
Certificate No: Z22-6047	8	Page 1 of 6	
Certificate No: Z22-6047	8	Page 1 of 6	





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) 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%.

Certificate No: Z22-60478

Page 2 of 6







Measurement Conditions

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

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	1900 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) ℃	40.5 ±6 %	1.39 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	9.96 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	40.2 W/kg ±18.8 % (k=2)
SAR averaged over 10 cm ³ (10 g) of Head TSL	Condition	
SAR measured	250 mW input power	5.20 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	20.9 W/kg ±18.7 % (k=2)

Certificate No: Z22-60478

Page 3 of 6





Appendix (Additional assessments outside the scope of CNAS L0570)

Antenna Parameters with Head TSL

Impedance, transformed to feed point	49.9Ω+ 3.89jΩ	
Return Loss	- 28.2dB	

General Antenna Parameters and Design

Electrical Delay (one direction)	1.107 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 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	

Certificate No: Z22-60478

Page 4 of 6





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

Date: 2022-11-02

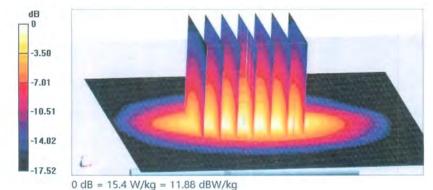
DUT: Dipole 1900 MHz; Type: D1900V2; Serial: D1900V2 - SN: 543 Communication System: UID 0, CW; Frequency: 1900 MHz; Duty Cycle: 1:1 Medium parameters used: f = 1900 MHz; $\sigma = 1.388$ S/m; $\varepsilon_r = 40.5$; $\rho = 1000$ kg/m³ Phantom section: Right Section Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: EX3DV4 SN7464; ConvF(8.18, 8.18, 8.18) @ 1900 MHz; Calibrated: 2022-01-26
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1556; Calibrated: 2022-01-12
- 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 = 100.4 V/m; Power Drift = 0.05 dB Peak SAR (extrapolated) = 18.5 W/kg

SAR(1 g) = 9.96 W/kg; SAR(10 g) = 5.2 W/kg Smallest distance from peaks to all points 3 dB below = 9.8 mm Ratio of SAR at M2 to SAR at M1 = 54.6% Maximum value of SAR (measured) = 15.4 W/kg

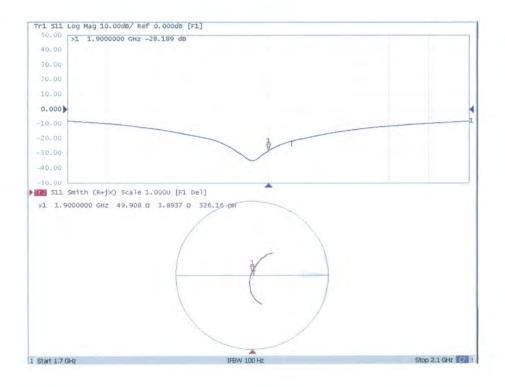


Certificate No: Z22-60478

Page 5 of 6



Impedance Measurement Plot for Head TSL



CAICT

Certificate No: Z22-60478

Page 6 of 6

D1900V2 - SN:543 Extended Dipole Calibrations

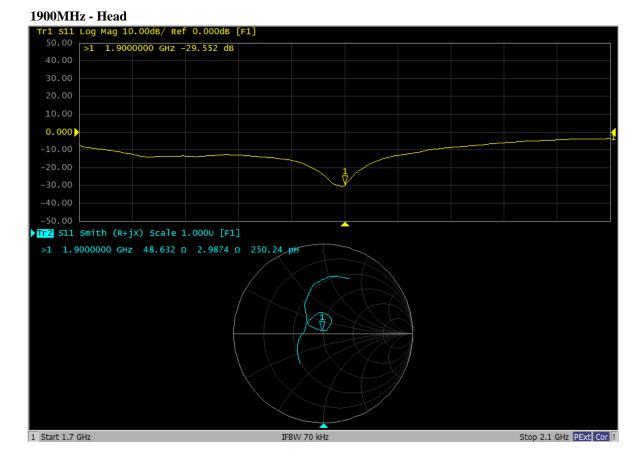
Referring to KDB865664 D01, if dipoles are verified in return loss(< -20dB, within 20% of prior calibration), and in impedance(within 5 ohm of prior calibration), the annual calibration is not necessary and the calibration interval can be extended.

Justification of th						
		D	01900V2 - SN:543			
			1900MHz Head			
Date of Measurement	Return-Loss (dB)	Delta (%)	Real Impedance (ohm)	Delta (ohm)	Imaginary Impedance (ohm)	Delta (ohm)
2022/11/2 (Cal. Report)	-28.189	/	49.908	/	3.8937	/
2023/11/1 (Extended)	-29.552	4.84	48.632	-1.276	2.9874	-0.9063
2024/11/1 (Extended)	-27.592	-2.12	47.574	-2.334	3.2721	-0.6216

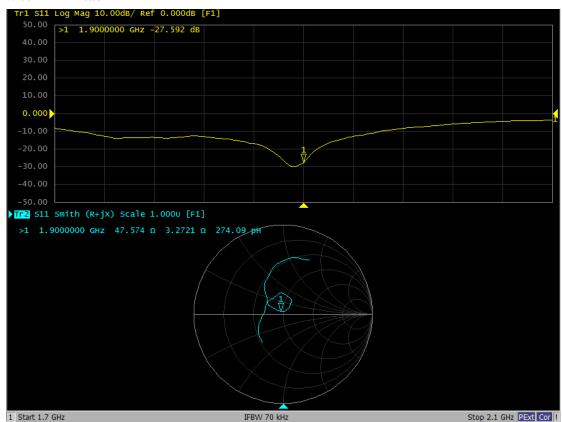
Justification of the extended calibration

The return loss is <-20dB, within 20% of prior calibration; the impedance is within 5 ohm of prior calibration. Therefore the verification result should support extended calibration.

Dipole Verification Data> D1900V2 - SN:543 (Date of Measurement: 2023/11/1)



	Name	Title	Signature
Measure By:	Mark Dong	SAR Engineer	Mark Song



Dipole Verification Data> D1900V2 - SN:543 (Date of Measurement: 2024/11/1)

1900MHz - Head

	Name	Title	Signature
Measure By:	Mark Dong	SAR Engineer	Mark Jong

Add: No.52 HuaYuanBei Ro Tel: +86-10-62304633-2117 E-mail: cttl@chinattl.com			BRATION S L0570
		ict.ac.cn	
Client BACL			2Z000372
CALIBRATION C	EDTIEICAT		
CALIBRATION	EKTIFICA		
Object	D2450	V2 - SN: 971	
Calibration Procedure(s)	FF-Z11	-003-01	
	Calibra	tion Procedures for dipole validation kits	
Calibration date:	June 1	5, 2024	
new an and the address of the code of A AC	Valid I		
This calibration Certificate	documents the	traceability to national standards, which realize	ze the physical units o
measurements (SI). The me	easurements and	the uncertainties with confidence probability and	e given on the following
bages and are part of the co	ertificate.		
		the closed laboratory facility: environment te	mperature (22±3)℃ and
Calibration Equipment used	d (M&TE critical f	or calibration)	
Calibration Equipment used	d (M&TE critical f	or calibration) Cal Date (Calibrated by, Certificate No.)	Scheduled Calibration
Calibration Equipment used Primary Standards Power Meter NRP2	ID # 106276	Cal Date (Calibrated by, Certificate No.) 17-May-24 (CTTL, No. J24X04107)	Scheduled Calibration May-25
Calibration Equipment used Primary Standards Power Meter NRP2 Power sensor NRP6A	ID # 106276 101369	Cal Date (Calibrated by, Certificate No.) 17-May-24 (CTTL, No. J24X04107) 17-May-24 (CTTL, No. J24X04107)	Scheduled Calibration May-25 May-25
Calibration Equipment used Primary Standards Power Meter NRP2 Power sensor NRP6A Reference Probe EX3DV4	ID # 106276 101369 SN 7307	Cal Date (Calibrated by, Certificate No.) 17-May-24 (CTTL, No. J24X04107) 17-May-24 (CTTL, No. J24X04107) 28-May-24(SPEAG, No. EX-7307_May24)	Scheduled Calibration May-25 May-25 May-25
Calibration Equipment used Primary Standards Power Meter NRP2 Power sensor NRP6A	ID # 106276 101369	Cal Date (Calibrated by, Certificate No.) 17-May-24 (CTTL, No. J24X04107) 17-May-24 (CTTL, No. J24X04107)	Scheduled Calibration May-25 May-25
Calibration Equipment used Primary Standards Power Meter NRP2 Power sensor NRP6A Reference Probe EX3DV4	ID # 106276 101369 SN 7307	Cal Date (Calibrated by, Certificate No.) 17-May-24 (CTTL, No. J24X04107) 17-May-24 (CTTL, No. J24X04107) 28-May-24(SPEAG, No. EX-7307_May24)	Scheduled Calibration May-25 May-25 May-25
Calibration Equipment used Primary Standards Power Meter NRP2 Power sensor NRP6A Reference Probe EX3DV4 DAE4	ID # 106276 101369 SN 7307 SN 1556	Cal Date (Calibrated by, Certificate No.) 17-May-24 (CTTL, No. J24X04107) 17-May-24 (CTTL, No. J24X04107) 28-May-24(SPEAG, No. EX-7307_May24) 03-Jan-24(CTTL-SPEAG, No.24J02Z80002)	Scheduled Calibration May-25 May-25 May-25 Jan-25
Calibration Equipment used Primary Standards Power Meter NRP2 Power sensor NRP6A Reference Probe EX3DV4 DAE4 Secondary Standards	ID # 106276 101369 SN 7307 SN 1556 ID #	Cal Date (Calibrated by, Certificate No.) 17-May-24 (CTTL, No. J24X04107) 17-May-24 (CTTL, No. J24X04107) 28-May-24(SPEAG, No. EX-7307_May24) 03-Jan-24(CTTL-SPEAG, No.24J02Z80002) Cal Date (Calibrated by, Certificate No.) 25-Dec-23 (CTTL, No. J23X13426) 25-Dec-23 (CTTL, No. J23X13425)	Scheduled Calibration May-25 May-25 Jan-25 Scheduled Calibration Dec-24 Dec-24
Calibration Equipment used Primary Standards Power Meter NRP2 Power sensor NRP6A Reference Probe EX3DV4 DAE4 Secondary Standards Signal Generator E4438C	ID # 106276 101369 SN 7307 SN 1556 ID # MY49071430	Cal Date (Calibrated by, Certificate No.) 17-May-24 (CTTL, No. J24X04107) 17-May-24 (CTTL, No. J24X04107) 28-May-24(SPEAG, No. EX-7307_May24) 03-Jan-24(CTTL-SPEAG, No.24J02Z80002) Cal Date (Calibrated by, Certificate No.) 25-Dec-23 (CTTL, No. J23X13426)	Scheduled Calibration May-25 May-25 Jan-25 Scheduled Calibration Dec-24
Calibration Equipment used Primary Standards Power Meter NRP2 Power sensor NRP6A Reference Probe EX3DV4 DAE4 Secondary Standards Signal Generator E4438C NetworkAnalyzer E5071C	D (M&TE critical f ID # 106276 101369 SN 7307 SN 1556 ID # MY49071430 MY46110673 1040	Cal Date (Calibrated by, Certificate No.) 17-May-24 (CTTL, No. J24X04107) 17-May-24 (CTTL, No. J24X04107) 28-May-24(SPEAG, No. EX-7307_May24) 03-Jan-24(CTTL-SPEAG, No.24J02Z80002) Cal Date (Calibrated by, Certificate No.) 25-Dec-23 (CTTL, No. J23X13426) 25-Dec-23 (CTTL, No. J23X13425) 22-Jan-24(SPEAG, No.OCP-DAK3.5-1040_Jan24)	Scheduled Calibration May-25 May-25 Jan-25 Scheduled Calibration Dec-24 Dec-24 Jan-25
Calibration Equipment used Primary Standards Power Meter NRP2 Power sensor NRP6A Reference Probe EX3DV4 DAE4 Secondary Standards Signal Generator E4438C NetworkAnalyzer E5071C OCP DAK-3.5(weighted)	ID # 106276 101369 SN 7307 SN 1556 ID # MY49071430 MY46110673 1040 Name	Cal Date (Calibrated by, Certificate No.) 17-May-24 (CTTL, No. J24X04107) 17-May-24 (CTTL, No. J24X04107) 28-May-24(SPEAG, No. EX-7307_May24) 03-Jan-24(CTTL-SPEAG, No.24J02Z80002) Cal Date (Calibrated by, Certificate No.) 25-Dec-23 (CTTL, No. J23X13426) 25-Dec-23 (CTTL, No. J23X13425) 22-Jan-24(SPEAG, No.OCP-DAK3.5-1040_Jan24)	Scheduled Calibration May-25 May-25 Jan-25 Scheduled Calibration Dec-24 Dec-24
Calibration Equipment used Primary Standards Power Meter NRP2 Power sensor NRP6A Reference Probe EX3DV4 DAE4 Secondary Standards Signal Generator E4438C NetworkAnalyzer E5071C OCP DAK-3.5(weighted)	D (M&TE critical f ID # 106276 101369 SN 7307 SN 1556 ID # MY49071430 MY46110673 1040	Cal Date (Calibrated by, Certificate No.) 17-May-24 (CTTL, No. J24X04107) 17-May-24 (CTTL, No. J24X04107) 28-May-24(SPEAG, No. EX-7307_May24) 03-Jan-24(CTTL-SPEAG, No.24J02Z80002) Cal Date (Calibrated by, Certificate No.) 25-Dec-23 (CTTL, No. J23X13426) 25-Dec-23 (CTTL, No. J23X13425) 22-Jan-24(SPEAG, No.OCP-DAK3.5-1040_Jan24)	Scheduled Calibration May-25 May-25 Jan-25 Scheduled Calibration Dec-24 Dec-24 Jan-25
Calibration Equipment used Primary Standards Power Meter NRP2 Power sensor NRP6A Reference Probe EX3DV4 DAE4 Secondary Standards Signal Generator E4438C NetworkAnalyzer E5071C OCP DAK-3.5(weighted) Calibrated by:	d (M&TE critical f ID # 106276 101369 SN 7307 SN 1556 ID # MY49071430 MY46110673 1040 Name Zhao Jing	Cal Date (Calibrated by, Certificate No.) 17-May-24 (CTTL, No. J24X04107) 17-May-24 (CTTL, No. J24X04107) 28-May-24(SPEAG, No. EX-7307_May24) 03-Jan-24(CTTL-SPEAG, No.24J02Z80002) Cal Date (Calibrated by, Certificate No.) 25-Dec-23 (CTTL, No. J23X13426) 25-Dec-23 (CTTL, No. J23X13425) 22-Jan-24(SPEAG, No.OCP-DAK3.5-1040_Jan24) Function SAR Test Engineer	Scheduled Calibration May-25 May-25 Jan-25 Scheduled Calibration Dec-24 Dec-24 Jan-25
Calibration Equipment used Primary Standards Power Meter NRP2 Power sensor NRP6A Reference Probe EX3DV4 DAE4 Secondary Standards Signal Generator E4438C NetworkAnalyzer E5071C OCP DAK-3.5(weighted)	ID # 106276 101369 SN 7307 SN 1556 ID # MY49071430 MY46110673 1040 Name	Cal Date (Calibrated by, Certificate No.) 17-May-24 (CTTL, No. J24X04107) 17-May-24 (CTTL, No. J24X04107) 28-May-24(SPEAG, No. EX-7307_May24) 03-Jan-24(CTTL-SPEAG, No.24J02Z80002) Cal Date (Calibrated by, Certificate No.) 25-Dec-23 (CTTL, No. J23X13426) 25-Dec-23 (CTTL, No. J23X13425) 22-Jan-24(SPEAG, No.OCP-DAK3.5-1040_Jan24)	Scheduled Calibration May-25 May-25 Jan-25 Scheduled Calibration Dec-24 Dec-24 Jan-25
Power sensor NRP6A Reference Probe EX3DV4 DAE4 Secondary Standards Signal Generator E4438C NetworkAnalyzer E5071C	d (M&TE critical f ID # 106276 101369 SN 7307 SN 1556 ID # MY49071430 MY46110673 1040 Name Zhao Jing	Cal Date (Calibrated by, Certificate No.) 17-May-24 (CTTL, No. J24X04107) 17-May-24 (CTTL, No. J24X04107) 28-May-24(SPEAG, No. EX-7307_May24) 03-Jan-24(CTTL-SPEAG, No.24J02Z80002) Cal Date (Calibrated by, Certificate No.) 25-Dec-23 (CTTL, No. J23X13426) 25-Dec-23 (CTTL, No. J23X13425) 22-Jan-24(SPEAG, No.OCP-DAK3.5-1040_Jan24) Function SAR Test Engineer	Scheduled Calibration May-25 May-25 Jan-25 Scheduled Calibration Dec-24 Dec-24 Jan-25

Certificate No: 24J02Z000372

Page 1 of 6





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) 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%.

Certificate No: 24J02Z000372

Page 2 of 6





Measurement Conditions

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

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	2450 MHz ± 1 MHz	

Head TSL parameters 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	39.1 ± 6 %	1.80 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	13.2 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	52.7 W/kg ± 18.8 % (k=2)
SAR averaged over 10 cm^3 (10 g) of Head TSL	Condition	
SAR measured	250 mW input power	6.20 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	24.8 W/kg ± 18.7 % (k=2)

Certificate No: 24J02Z000372

Page 3 of 6





Appendix (Additional assessments outside the scope of CNAS L0570)

Antenna Parameters with Head TSL

Impedance, transformed to feed point	52.3Ω+ 6.84jΩ	
Return Loss	- 23.0dB	

General Antenna Parameters and Design

Electrical Delay (one direction)	1.063 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 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

Page 4 of 6





DASY5 Validation Report for Head TSL

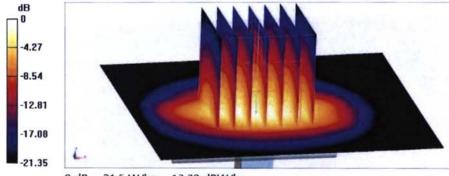
Date: 2024-06-15

Test Laboratory: CTTL, Beijing, China **DUT: Dipole 2450 MHz; Type: D2450V2; Serial: D2450V2 - SN: 971** Communication System: UID 0, CW; Frequency: 2450 MHz Medium parameters used: f = 2450 MHz; $\sigma = 1.804$ S/m; $\epsilon_r = 39.05$; $\rho = 1000$ kg/m³ Phantom section: Right Section Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007) DASY5 Configuration:

- Probe: EX3DV4 SN7307; ConvF(7.37, 7.34, 7.95) @ 2450 MHz; Calibrated: 2024-05-28
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1556; Calibrated: 2024-01-03
- 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 = 99.31 V/m; Power Drift = -0.04 dB Peak SAR (extrapolated) = 25.9 W/kg SAR(1 g) = 13.2 W/kg; SAR(10 g) = 6.2 W/kg Smallest distance from peaks to all points 3 dB below = 8.5 mm Ratio of SAR at M2 to SAR at M1 = 51.8% Maximum value of SAR (measured) = 21.5 W/kg



0 dB = 21.5 W/kg = 13.32 dBW/kg

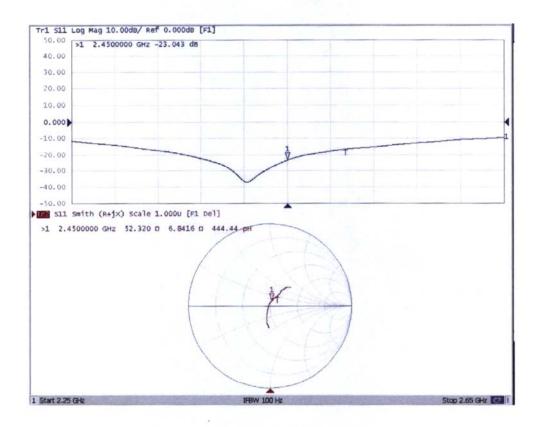
Certificate No: 24J02Z000372

Page 5 of 6





Impedance Measurement Plot for Head TSL



Certificate No: 24J02Z000372

Page 6 of 6

Add: No.52 Hua YuanBei Ros Tel: +86-10-62304633-2117	ad, Haidian District,	Beijing, 100191	AS L0570
E-mail: emf@caict.ac.cn	http://www.caict		0.00470
Client BACI			2-60479
CALIBRATION CE	ERTIFICAT	E	
Dbject	D2600\	/2 - SN: 1132	
alibration Procedure(s)	FF-Z11	-003-01	
		tion Procedures for dipole validation kits	
Calibration date:	Novem	ber 1, 2022	
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Il calibrations have been umidity<70%. Calibration Equipment used Primary Standards Power Meter NRP2 Power sensor NRP6A Reference Probe EX3DV4 DAE4	ID # 106276 101369 SN 7464	Cal Date (Calibrated by, Certificate No.) 10-May-22 (CTTL, No.J22X03103) 10-May-22 (CTTL, No.J22X03103) 26-Jan-22(SPEAG,No.EX3-7464_Jan22)	Scheduled Calibration May-23 May-23 Jan-23
Il calibrations have been umidity<70%. Calibration Equipment used Primary Standards	rtificate. conducted in the (M&TE critical for ID # 106276 101369 SN 7464 SN 1556	Cal Date (Calibrated by, Certificate No.) 10-May-22 (CTTL, No.J22X03103) 10-May-22 (CTTL, No.J22X03103) 26-Jan-22(SPEAG,No.EX3-7464_Jan22) 12-Jan-22(CTTL-SPEAG,No.Z22-60007)	Scheduled Calibration May-23 May-23 Jan-23 Jan-23
Il calibrations have been umidity<70%. Calibration Equipment used rimary Standards Power Meter NRP2 Power sensor NRP6A Reference Probe EX3DV4 DAE4 Secondary Standards Signal Generator E4438C	artificate. conducted in the conducted in t	Cal Date (Calibrated by, Certificate No.) 10-May-22 (CTTL, No.J22X03103) 10-May-22 (CTTL, No.J22X03103) 26-Jan-22(SPEAG,No.EX3-7464_Jan22) 12-Jan-22(CTTL-SPEAG,No.Z22-60007) Cal Date (Calibrated by, Certificate No.)	Scheduled Calibration May-23 May-23 Jan-23 Jan-23 Scheduled Calibration
All calibrations have been umidity<70%. Calibration Equipment used Primary Standards Power Meter NRP2 Power sensor NRP6A Reference Probe EX3DV4 DAE4 Secondary Standards	rtificate. conducted in t (M&TE critical for ID # 106276 101369 SN 7464 SN 1556 ID # ID # MY49071430	Cal Date (Calibrated by, Certificate No.) 10-May-22 (CTTL, No.J22X03103) 10-May-22 (CTTL, No.J22X03103) 26-Jan-22(SPEAG,No.EX3-7464_Jan22) 12-Jan-22(CTTL-SPEAG,No.Z22-60007) Cal Date (Calibrated by, Certificate No.) 13-Jan-22 (CTTL, No.J22X00409)	Scheduled Calibration May-23 May-23 Jan-23 Jan-23 Scheduled Calibration Jan-23
All calibrations have been umidity<70%. Calibration Equipment used Primary Standards Power Meter NRP2 Power sensor NRP6A Reference Probe EX3DV4 DAE4 Secondary Standards Signal Generator E4438C Network Analyzer E5071C	rtificate. conducted in t (M&TE critical for 108276 101369 SN 7464 SN 1556 ID # MY49071430 MY46110673	Cal Date (Calibrated by, Certificate No.) 10-May-22 (CTTL, No.J22X03103) 10-May-22 (CTTL, No.J22X03103) 26-Jan-22 (CTTL, No.J22X03103) 26-Jan-22 (CTTL-SPEAG,No.EX3-7464_Jan22) 12-Jan-22 (CTTL-SPEAG,No.Z22-60007) Cal Date (Calibrated by, Certificate No.) 13-Jan-22 (CTTL, No.J22X00409) 14-Jan-22 (CTTL, No.J22X00406)	Scheduled Calibration May-23 May-23 Jan-23 Jan-23 Scheduled Calibration Jan-23 Jan-23
All calibrations have been umidity<70%. Calibration Equipment used Primary Standards Power Meter NRP2 Power sensor NRP6A Reference Probe EX3DV4 DAE4 Secondary Standards Signal Generator E4438C	rtificate. conducted in the (M&TE critical for 106276 101369 SN 7464 SN 1556 ID # MY49071430 MY46110673 Name	Cal Date (Calibrated by, Certificate No.) 10-May-22 (CTTL, No.J22X03103) 10-May-22 (CTTL, No.J22X03103) 26-Jan-22(SPEAG,No.EX3-7464_Jan22) 12-Jan-22(CTTL-SPEAG,No.Z22-60007) Cal Date (Calibrated by, Certificate No.) 13-Jan-22 (CTTL, No.J22X00409) 14-Jan-22 (CTTL, No.J22X00406) Function	Scheduled Calibration May-23 May-23 Jan-23 Jan-23 Scheduled Calibration Jan-23 Jan-23

Certificate No: Z22-60479

Page 1 of 6





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) 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%.

Certificate No: Z22-60479

Page 2 of 6





Measurement Conditions

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

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	2600 MHz ±1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	39.0	1.96 mho/m
Measured Head TSL parameters	(22.0 ±0.2) ℃	39.0 ±6 %	1.97 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	14.0 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	55.8 W/kg ±18.8 % (k=2)
SAR averaged over 10 cm^3 (10 g) of Head TSL	Condition	
SAR measured	250 mW input power	6.35 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	25.4 W/kg ±18.7 % (k=2)

Certificate No: Z22-60479

Page 3 of 6





Appendix (Additional assessments outside the scope of CNAS L0570)

Antenna Parameters with Head TSL

Impedance, transformed to feed point	47.0Ω- 6.44jΩ
Return Loss	- 22.7dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.058 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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Page 4 of 6





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

Date: 2022-11-01

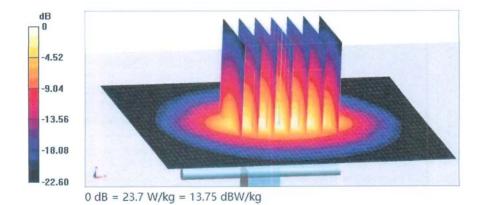
DUT: Dipole 2600 MHz; Type: D2600V2; Serial: D2600V2 - SN: 1132 Communication System: UID 0, CW; Frequency: 2600 MHz Medium parameters used: f = 2600 MHz; $\sigma = 1.974$ S/m; $\varepsilon_r = 39.04$; $\rho = 1000$ kg/m³ Phantom section: Right Section Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: EX3DV4 SN7464; ConvF(7.64, 7.64, 7.64) @ 2600 MHz; Calibrated: 2022-01-26
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1556; Calibrated: 2022-01-12
- 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 = 103.1 V/m; Power Drift = -0.04 dB Peak SAR (extrapolated) = 29.2 W/kg SAR(1 g) = 14 W/kg; SAR(10 g) = 6.35 W/kg Smallest distance from peaks to all points 3 dB below = 9 mm Ratio of SAR at M2 to SAR at M1 = 48.5% Maximum value of SAR (measured) = 23.7 W/kg

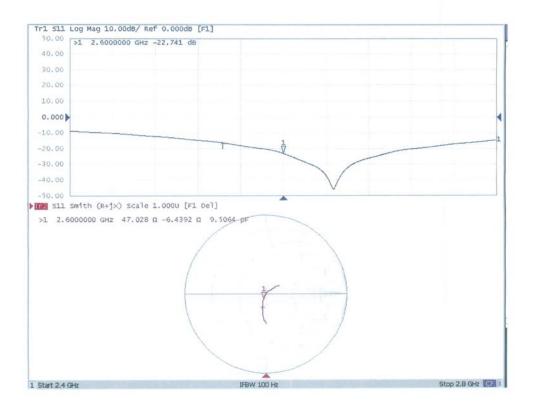


Certificate No: Z22-60479

Page 5 of 6



Impedance Measurement Plot for Head TSL



CAICT

Certificate No: Z22-60479

Page 6 of 6

D2600V2 - SN:1132 Extended Dipole Calibrations

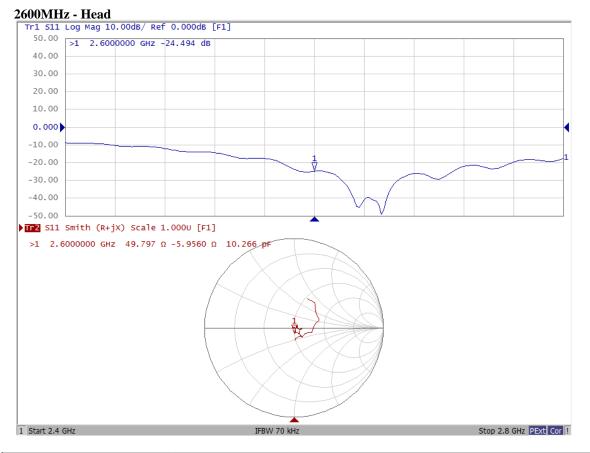
Referring to KDB 865664 D01, if dipoles are verified in return loss(< -20dB, within 20% of prior calibration), and in impedance(within 5 ohm of prior calibration), the annual calibration is not necessary and the calibration interval can be extended.

D2600V2 - SN:1132							
2600MHz Head							
Date of Measurement	Return-Loss (dB)	Delta (%)	Real Impedance (ohm)	Delta (ohm)	Imaginary Impedance (ohm)	Delta (ohm)	
2022/11/1 (Cal. Report)	-22.741	/	47.028	/	-6.4392	/	
2023/10/31 (Extended)	-24.494	7.71	49.797	2.769	-5.9560	0.4832	
2024/10/31 (Extended)	-20.609	-9.38	48.320	1.292	-9.0506	-2.6114	

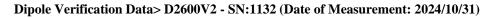
Justification of the extended calibration

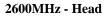
The return loss is <-20dB, within 20% of prior calibration; the impedance is within 5 ohm of prior calibration. Therefore the verification result should support extended calibration.

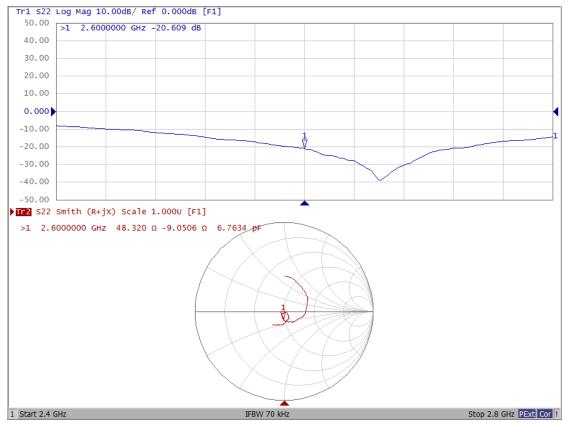
Dipole Verification Data> D2600V2 - SN:1132 (Date of Measurement: 2023/10/31)



	Name	Title	Signature
Measure By:	Mark Dong	SAR Engineer	Mark Song







	Name	Title	Signature
Measure By:	Mark Dong	SAR Engineer	Mark Song