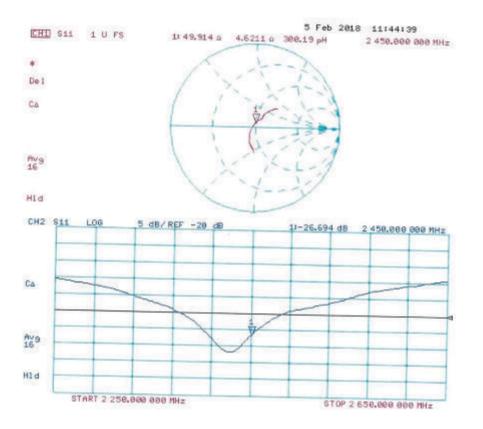
Impedance Measurement Plot for Body TSL



Certificate No: D2450V2-1009_Feb18

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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.

Head-2450						
Date of	Potura loog (dP)	Dolta $(9/)$	Real Impedance	Delta	Imaginary	Delta
measurement	Return-loss (dB)	Delta (%)	(ohm)	(ohm)	impedance (ohm)	(ohm)
2018-02-05	-27.4		53.8		2.2	
2019-02-03	-26.8	2.19%	52.9	0.9	1.9	0.3
2020-01-22	-27.1	1.09%	53.1	0.7	1.8	0.4

The return loss is <-20dB, within 20% of prior calibration; the impedance is within 50hm of prior calibration. Therefore the verification result should support extended calibration.

1.4. D2600V2 Dipole Calibration Certificate

ALIBRATION CE	one of the signatories gnition of callbration o m)	to the EA sertificates Certificate No	creditation No.: SCS 0108 D2600V2-1150_Feb18
ALIBRATION CE	RTIFICATE	Contraction and a second s	: D2600V2-1150_Feb18
	D2600V2 - SN:11		for the man shade
allbration procedure(s)		50	
	QA CAL-05.v9 Calibration proces	dure for dipole validation kits ab	ove 700 MHz
alibration date:	February 05, 201	8	
Calibration Equipment used (M&TE	critical for calibration)	Cal Date (Certificate No.)	Scheduled Calibration
Primary Standards	SN: 104778	04-Apr-17 (No. 217-02521/02522)	Apr-18
Power meter NRP Power sensor NRP-Z91	SN: 103244	04-Apr-17 (No. 217-02521)	Apr-18
Power sensor NRP-Z91	SN: 103245	04-Apr-17 (No. 217-02522)	Apr-18
leference 20 dB Attenuator	SN: 5058 (20k)	07-Apr-17 (No. 217-02528)	Apr-18
ype-N mismatch combination	SN: 5047.2 / 06327	07-Apr-17 (No. 217-02529)	Apr-18
Reference Probe EX3DV4	SN: 7349	30-Dec-17 (No. EX3-7349_Dec17)	Dec-18
DAE4	SN: 601	26-Oct-17 (No. DAE4-601_Oct17)	Oct-18
	Lin +	Check Date (in house)	Scheduled Check
Secondary Standards Power meter EPM-442A	ID # SN: GB37480704	07-Oct-15 (in house check Oct-16)	In house check: Oct-18
Power sensor HP 8481A	SN: US37292783	07-Oct-15 (in house check Oct-16)	In house check: Oct-18
Power sensor HP 8481A	SN: MY41092317	07-Oct-15 (in house check Oct-16)	In house check: Oct-18
RF generator R&S SMT-06	SN: 100972	15-Jun-15 (in house check Oct-16)	In house check: Oct-18
Network Analyzer HP 8753E	SN: US37390585	18-Oct-01 (in house check Oct-17)	In house check: Oct-18
	Name	Function	Signature
Calibrated by:	Lelf Klysner	Laboratory Technician	Sel The
			014
Approved by:	Katja Pokovic	Technical Manager	for the
			Issued: February 6, 2018

Calibration Laboratory of Schmid & Partner

Engineering AG Zeughausstrasse 43, 8004 Zurich, Switzerland

Accredited by the Swiss Accreditation Service (SAS) The Swiss Accreditation Service is one of the signatories to the EA Multilateral Agreement for the recognition of calibration certificates

Glossary:

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

Calibration is Performed According to the Following Standards:

- a) IEEE Std 1528-2013, "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"

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%.

Certificate No: D2600V2-1150_Feb18

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Schweizerlscher Kalibrierdienst

- S Service suisse d'étalonnage C
- Servizio svizzero di taratura S
- Swiss Calibration Service

Accreditation No.: SCS 0108

Measurement Conditions

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

DASY Version	DASY5	V52.10.0
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom	
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.

te following parameters and sales and set	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	39.0	1.96 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	37.3 ± 6 %	2.04 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C		

SAR result with Head TSL

SAR averaged over 1 cm ³ (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	14.3 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	55.6 W/kg ± 17.0 % (k=2)
3 /40 -1 -4114 TO	condition	
SAR averaged over 10 cm ³ (10 g) of Head TSL	condition	6 36 W/ka
SAR averaged over 10 cm ³ (10 g) of Head TSL SAR measured	condition 250 mW input power normalized to 1W	6.36 W/kg 25.0 W/kg ± 16.5 % (k=2)

Body TSL parameters The following parameters and calculations were applied.

ne following parameters and calculations were appa	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	52.5	2.16 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	51.0 ± 6 %	2.22 mho/m ± 6 %
Body TSL temperature change during test	< 0.5 °C	10.500.02	2222

SAR result with Body TSL

SAR averaged over 1 cm ³ (1 g) of Body TSL	Condition	
SAR measured	250 mW input power	13.9 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	54.6 W/kg ± 17.0 % (k=2)
SALL OF HOLIMAN DOOY TO PARAMETER		
	condition	
SAR averaged over 10 cm ³ (10 g) of Body TSL	condition 250 mW input power	6.16 W/kg

Certificate No: D2600V2-1150_Feb18

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Appendix (Additional assessments outside the scope of SCS 0108)

Antenna Parameters with Head TSL

Impedance, transformed to feed point	49,4 Ω - 7.1 jΩ	
Return Loss	- 22.9 dB	

Antenna Parameters with Body TSL

Impedance, transformed to feed point	46.9 Ω - 4.4 jΩ
Return Loss	- 25.1 dB
Heiuni Loss	

General Antenna Parameters and Design

Electrical Delay (one direction)	1.141 ns
Electrical being (ene	

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
Manufactured on	August 29, 2017
Manufactured on	

Certificate No: D2600V2-1150_Feb18

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DASY5 Validation Report for Head TSL

Date: 05.02.2018

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 2600 MHz; Type: D2600V2; Serial: D2600V2 - SN:1150

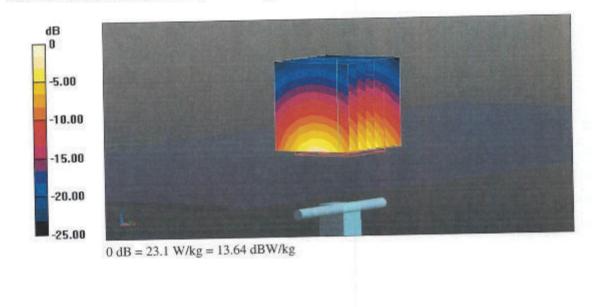
Communication System: UID 0 - CW; Frequency: 2600 MHz Medium parameters used: f = 2600 MHz; σ = 2.04 S/m; ϵ_r = 37.3; ρ = 1000 kg/m³ Phantom section: Flat Section Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: EX3DV4 SN7349; ConvF(7.7, 7.7, 7.7); Calibrated: 30.12.2017;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 26.10.2017
- Phantom: Flat Phantom 5.0 (front); Type: QD 000 P50 AA; Serial: 1001
- DASY52 52.10.0(1446); SEMCAD X 14.6.10(7417)

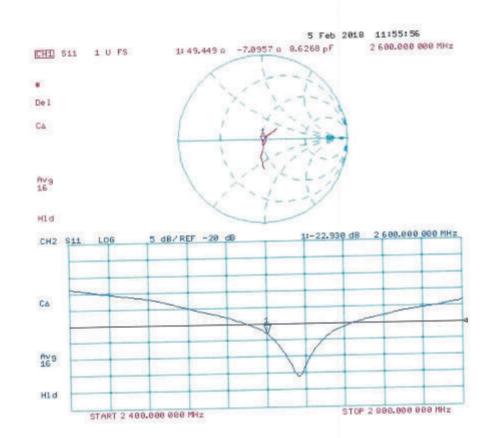
Dipole Calibration for Head Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm Reference Value = 116.4 V/m; Power Drift = -0.04 dB Peak SAR (extrapolated) = 28.9 W/kg SAR(1 g) = 14.3 W/kg; SAR(10 g) = 6.36 W/kg Maximum value of SAR (measured) = 23.1 W/kg



Certificate No: D2600V2-1150_Feb18

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Impedance Measurement Plot for Head TSL

Certificate No: D2600V2-1150_Feb18

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DASY5 Validation Report for Body TSL

Date: 05.02.2018

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 2600 MHz; Type: D2600V2; Serial: D2600V2 - SN:1150

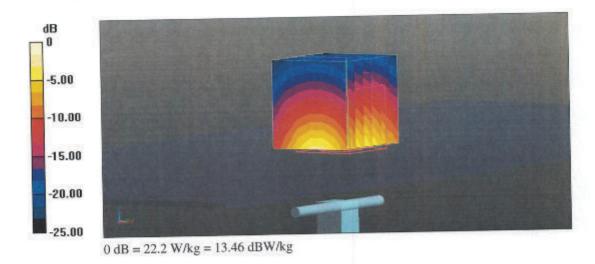
Communication System: UID 0 - CW; Frequency: 2600 MHz Medium parameters used: f = 2600 MHz; σ = 2.22 S/m; ϵ_r = 51; ρ = 1000 kg/m³ Phantom section: Flat Section Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: EX3DV4 SN7349; ConvF(7.81, 7.81, 7.81); Calibrated: 30.12.2017;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 26.10.2017
- Phantom: Flat Phantom 5.0 (back); Type: QD 000 P50 AA; Serial: 1002
- DASY52 52.10.0(1446); SEMCAD X 14.6.10(7417)

Dipole Calibration for Body Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:

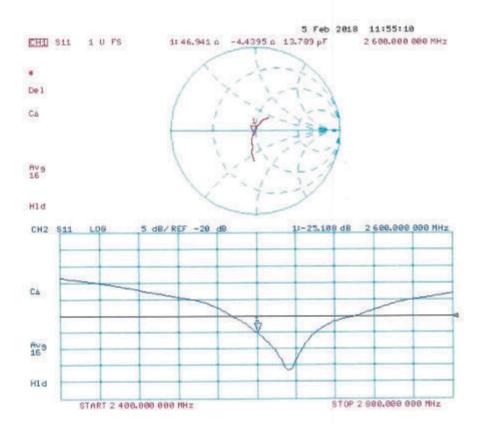
Measurement grid: dx=5mm, dy=5mm, dz=5mm Reference Value = 105.5 V/m; Power Drift = -0.07 dB Peak SAR (extrapolated) = 29.0 W/kg SAR(1 g) = 13.9 W/kg; SAR(10 g) = 6.16 W/kg Maximum value of SAR (measured) = 22.2 W/kg



Certificate No: D2600V2-1150_Feb18

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Certificate No: D2600V2-1150_Feb18

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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.

			Head-750			
Date of	Doturn loop (dD)	Delta (%)	Real Impedance	Delta	Imaginary	Delta
measurement	Return-loss (dB)	Della (%)	(ohm)	(ohm)	impedance (ohm)	(ohm)
2018/2/5	-22.9		49.4		-7.1	
2019/2/3	-23.4	-2.18%	48.8	0.6	-6.7	0.4
2020/1/22	-23.1	-0.87%	48.6	0.8	-6.5	0.6

The return loss is <-20dB, within 20% of prior calibration; the impedance is within 50hm of prior calibration. Therefore the verification result should support extended calibration.

1.1. D835V2 Dipole Calibration Certificate

	86-10-62304633-2504		CIANO	L0570		
com http://	www.chinattl.cn Certificate No	: Z21-60	017			
RTIFICAT	E		Land Martin	1		
Constant Andrews and the set			1	12.00		
D835V	2 - SN: 4d238		The second			
EE 711	002.01					
	Calibration Procedures for dipole validation kits					
Januar	y 22, 2021					
M&TE critical fo ID # 106276 101369 SN 7600 SN 771	Cal Date(Calibrated by, Certificate 12-May-20 (CTTL, No.J20X02965) 12-May-20 (CTTL, No.J20X02965) 30-Nov-20(CTTL-SPEAG,No.Z20-6 10-Feb-20(CTTL-SPEAG,No.Z20-6	0421)	neduled Calibra May-21 May-21 Nov-21 Feb-21	ation		
ID # 106276 101369 SN 7600 SN 771	Cal Date(Calibrated by, Certificate 12-May-20 (CTTL, No.J20X02965) 12-May-20 (CTTL, No.J20X02965) 30-Nov-20(CTTL-SPEAG,No.Z20-6 10-Feb-20(CTTL-SPEAG,No.Z20-6	0421) 0017)	May-21 May-21 Nov-21 Feb-21			
ID # 106276 101369 SN 7600 SN 771 ID # MY49071430	Cal Date(Calibrated by, Certificate 12-May-20 (CTTL, No.J20X02965) 12-May-20 (CTTL, No.J20X02965) 30-Nov-20(CTTL-SPEAG,No.Z20-6	0421) 0017)	May-21 May-21 Nov-21			
ID # 106276 101369 SN 7600 SN 771 ID # MY49071430	Cal Date(Calibrated by, Certificate 12-May-20 (CTTL, No.J20X02965) 12-May-20 (CTTL, No.J20X02965) 30-Nov-20(CTTL-SPEAG,No.Z20-6 10-Feb-20(CTTL-SPEAG,No.Z20-6 Cal Date(Calibrated by, Certificate N 25-Feb-20 (CTTL, No.J20X00516)	0421) 0017)	May-21 May-21 Nov-21 Feb-21 neduled Calibra Feb-21 Feb-21			
ID # 106276 101369 SN 7600 SN 771 ID # MY49071430 MY46110673	Cal Date(Calibrated by, Certificate 12-May-20 (CTTL, No.J20X02965) 12-May-20 (CTTL, No.J20X02965) 30-Nov-20(CTTL-SPEAG,No.Z20-6) 10-Feb-20(CTTL-SPEAG,No.Z20-6) Cal Date(Calibrated by, Certificate N 25-Feb-20 (CTTL, No.J20X00516) 10-Feb-20 (CTTL, No.J20X00515)	0421) 0017)	May-21 May-21 Nov-21 Feb-21 neduled Calibra Feb-21			
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	D835V FF-Z11 Calibra Januar ocuments the surements and ificate.	RTIFICATE D835V2 - SN: 4d238 FF-Z11-003-01 Calibration Procedures for dipole validation I January 22, 2021 ocuments the traceability to national standards, with surements and the uncertainties with confidence pro- ificate.	RTIFICATE D835V2 - SN: 4d238 FF-Z11-003-01 Calibration Procedures for dipole validation kits January 22, 2021 ocuments the traceability to national standards, which realize to surements and the uncertainties with confidence probability are given by the surements and the uncertainties with confidence probability are given by the surements and the uncertainties with confidence probability are given by the surements and the uncertainties with confidence probability are given by the surements and the uncertainties with confidence probability are given by the surements and the uncertainties with confidence probability are given by the surements and the uncertainties with confidence probability are given by the surements and the uncertainties with confidence probability are given by the surements and the uncertainties with confidence probability are given by the surements and the uncertainties with confidence probability are given by the surements and the uncertainties with confidence probability are given by the surements and the uncertainties with confidence probability are given by the surements and the uncertainties with confidence probability are given by the surements and the uncertainties with confidence probability are given by the surements are given by the surement of the sure	RTIFICATE D835V2 - SN: 4d238 FF-Z11-003-01 Calibration Procedures for dipole validation kits January 22, 2021 ocuments the traceability to national standards, which realize the physical unsurements and the uncertainties with confidence probability are given on the following the standards of the st		

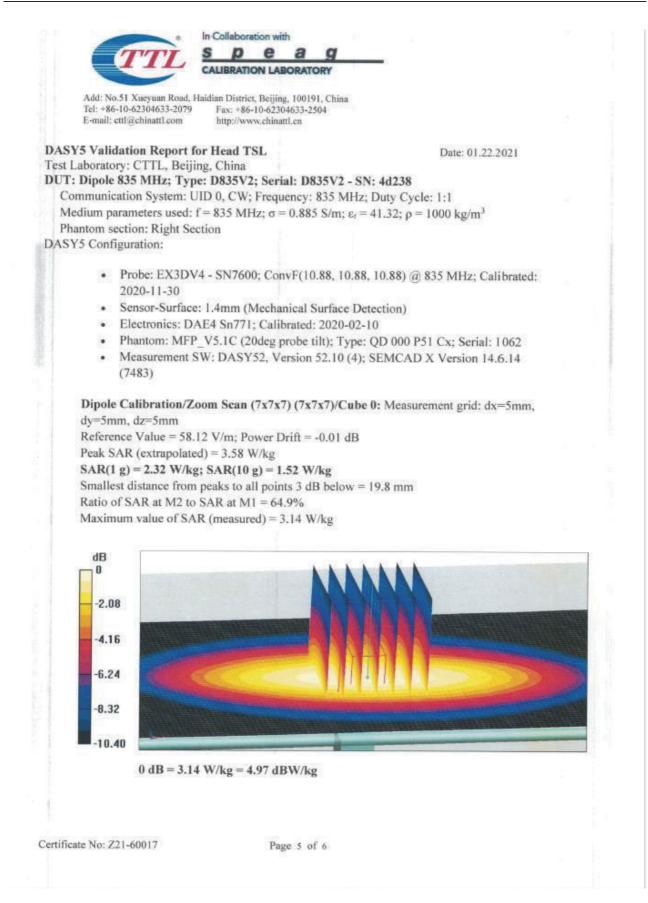
	S D B B C
	CALIBRATION LABORATORY
Add: No.5	1 Xueyuan Road, Haidian District, Beijing, 100191, China
Tel: +86-1	0-62304633-2079 Fax: +86-10-62304633-2504 tl@chinattl.com http://www.chinattl.cn
	a (Second Second S
Glossary:	
TSL	tissue simulating liquid
ConvF	sensitivity in TSL / NORMx,y,z
N/A	not applicable or not measured
Calibration is	Performed According to the Following Standards:
	528-2013, "IEEE Recommended Practice for Determining the Peak
	raged Specific Absorption Rate (SAR) in the Human Head from Wireless
	ations Devices: Measurement Techniques", June 2013
	1, "Measurement procedure for assessment of specific absorption rate of huma
exposure to	radio frequency fields from hand-held and body-mounted wireless
	tion devices- Part 1: Device used next to the ear (Frequency range of 300MHz
6GHz)", Jul	
	2, "Procedure to measure the Specific Absorption Rate (SAR) For wireless tion devices used in close proximity to the human body (frequency range of
	GHz)", March 2010
Additional Do	4, SAR Measurement Requirements for 100 MHz to 6 GHz ocumentation: ystem Handbook
Additional Do e) DASY4/5 S Methods App • Measurem of the cert • Antenna F point exact parallel to • Feed Point positioned measurem reflected p • Electrical I No uncerta • SAR meas • SAR norm connector.	becomentation: ystem Handbook Ilied and Interpretation of Parameters: ment Conditions: Further details are available from the Validation Report at the e ificate. All figures stated in the certificate are valid at the frequency indicated. Parameters with TSL: The dipole is mounted with the spacer to position its feed thy below the center marking of the flat phantom section, with the arms oriented the body axis. <i>t Impedance and Return Loss:</i> These parameters are measured with the dipole under the liquid filled phantom. The impedance stated is transformed from the nent at the SMA connector to the feed point. The Return Loss ensures low power. No uncertainty required. Delay: One-way delay between the SMA connector and the antenna feed point. ainty required. sured: SAR measured at the stated antenna input power. adized: SAR as measured, normalized to an input power of 1 W at the antenna
Additional Do e) DASY4/5 S Methods App • Measurem of the cert • Antenna F point exact parallel to • Feed Point positioned measurem reflected p • Electrical I No uncerta • SAR meas • SAR norm connector. • SAR for no nominal S	becomentation: ystem Handbook Ilied and Interpretation of Parameters: ment Conditions: Further details are available from the Validation Report at the e ificate. All figures stated in the certificate are valid at the frequency indicated. Parameters with TSL: The dipole is mounted with the spacer to position its feed thy below the center marking of the flat phantom section, with the arms oriented the body axis. <i>t Impedance and Return Loss:</i> These parameters are measured with the dipole under the liquid filled phantom. The impedance stated is transformed from the nent at the SMA connector to the feed point. The Return Loss ensures low hower. No uncertainty required. Delay: One-way delay between the SMA connector and the antenna feed point. ainty required. sured: SAR measured at the stated antenna input power. adized: SAR as measured, normalized to an input power of 1 W at the antenna <i>cominal TSL parameters:</i> The measured TSL parameters are used to calculate the context of the stated antenna input power of 1 W at the antenna

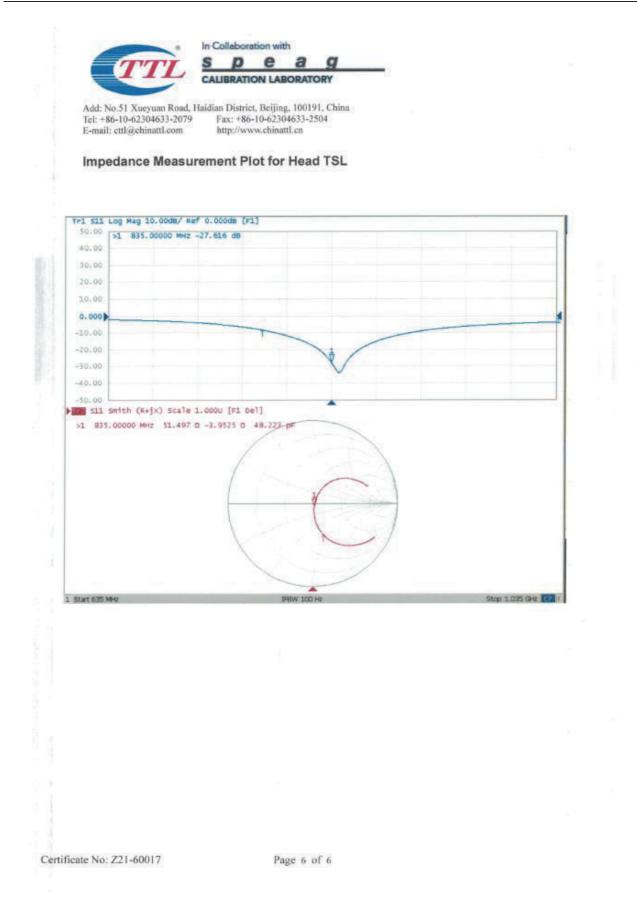
	In Collaboration w	ith			
TTT	spe	ag			
III	CALIBRATION LA	BORATORY			
Add: No.51 Xueyuan Road, Ha Tel: +86-10-62304633-2079 E-mail: cttl@chinattl.com	aidian District, Beijir Fax: +86-10-623 http://www.china	04633-2504			
DASY system configuration, as	far as not given o	n page 1.			
DASY Version		DASY52		V52.10.4	
Extrapolation	Advan	ced Extrapolation			
Phantom	Triple	Flat Phantom 5.1C			
Distance Dipole Center - TS	L	15 mm	5 mm w		with Spacer
Zoom Scan Resolution	Scan Resolution dx, o		/, dz = 5 mm		
Frequency	835	MHz ± 1 MHz			
ead TSL parameters The following parameters and ca	alculations were a	pplied.		vitv	Conduction
		Temperature	Permitti		Conductivity
Nominal Head TSL parameter	Irs	Temperature 22.0 °C	Permitti 41.5		0.90 mho/m
Nominal Head TSL parameter		22.0 °C	0.00000000		0.90 mho/m
Nominal Head TSL parameter Measured Head TSL parame	ters	22.0 °C (22.0 ± 0.2) °C	41.5		
Nominal Head TSL paramete Measured Head TSL parame Head TSL temperature chan	ters	22.0 °C	41.5 41.3 ± 6		0.90 mho/m
Nominal Head TSL parameter Measured Head TSL parame	ters ge during test	22.0 °C (22.0 ± 0.2) °C	41.5 41.3 ± (0.90 mho/m
Nominal Head TSL paramete Measured Head TSL parame Head TSL temperature chan AR result with Head TSL	ters ge during test	22.0 °C (22.0 ± 0.2) °C <1.0 °C	41.5 41.3 ± 0 		0.90 mho/m
Nominal Head TSL parameter Measured Head TSL parameter Head TSL temperature chan AR result with Head TSL SAR averaged over 1 cm ³ (1	eters ge during test I g) of Head TSL	22.0 °C (22.0 ± 0.2) °C <1.0 °C Condit	41.5 41.3 ± 6 	3 %	0.90 mho/m 0.89 mho/m ± 6 %
Nominal Head TSL parameter Measured Head TSL parameter Head TSL temperature chan AR result with Head TSL SAR averaged over 1 cm ² (1 SAR measured	ters ge during test 1 g) of Head TSL trameters	22.0 °C (22.0 ± 0.2) °C <1.0 °C Condit 250 mW in normalize	41.5 41.3 ± 6 ion put power d to 1W	3 %	0.90 mho/m 0.89 mho/m ± 6.% 2.32 W/kg
Nominal Head TSL parameter Measured Head TSL parameter Head TSL temperature chan AR result with Head TSL SAR averaged over 1 cm ³ (1 SAR measured SAR for nominal Head TSL parameter	ters ge during test 1 g) of Head TSL trameters	22.0 °C (22.0 ± 0.2) °C <1.0 °C Condit 250 mW in normalize	41.5 41.3 ± 6 ion put power d to 1W ion	3 %	0.90 mho/m 0.89 mho/m ± 6.% 2.32 W/kg

Certificate No: Z21-60017

Page 3 of 6

		g	
	ALIBRATION LABORATOR	RY	
Add: No.51 Xueyuan Road, Haio Tel: +86-10-62304633-2079	dian District, Beijing, 100191, Fax: +86-10-62304633-250		
E-mail: cttl@chinattl.com	http://www.chinattl.cn	4	
hannen dies 7.6 de likie met een e		(0) (0) 0 (0)	
Appendix (Additional asse	essments outside ti	he scope of CNAS L0570)	
Intenna Parameters with I	Head TSL		
Impedance, transformed to feed	d point	51.5Ω- 3.95jΩ	
Return Loss		- 27.6dB	
eneral Antenna Paramete	are and Decign		
	oro and Design		
Electrical Delay (one direction)		1.298 ns	
onnected to the second arm of t f the dipoles, small end caps ar	semirigid coaxial cable. the dipole. The antenna e added to the dipole a	The center conductor of the feedin a is therefore short-circuited for DC rms in order to improve matching v	g line is directly -signals. On some when loaded
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Extended Dipole Calibrations

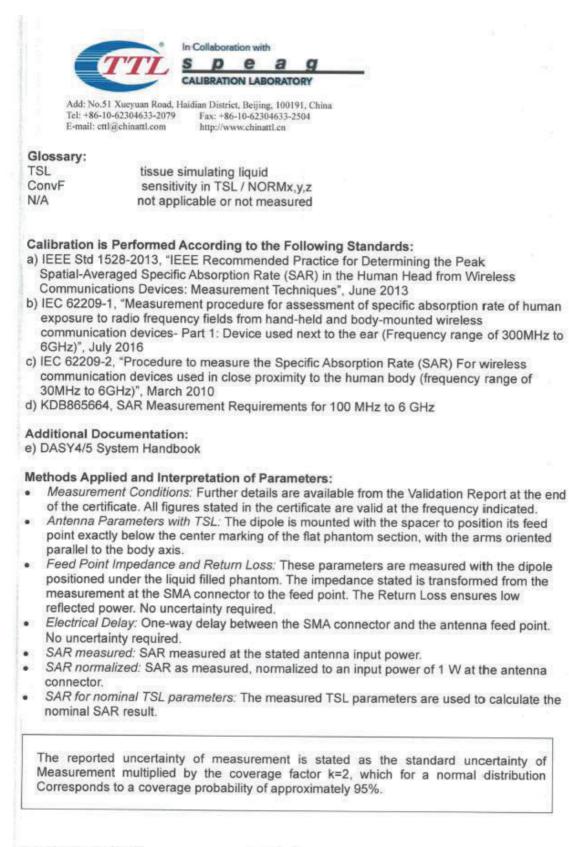
Referring to KDB865664 D01, if dipoles are verified in return loss (<-20dB, within 20% of prior calibration), and in impedance (within 5 ohm of prior calibration), the annual calibration is not necessary and the calibration interval can be extended.

			Head-835			
Date of	Return-loss (dB)	Delta (%)	Real Impedance	Delta	Imaginary	Delta
measurement	Return-1055 (ub)	Della (%)	(ohm)	(ohm)	impedance (ohm)	(ohm)
2022-01-22	-27.6		51.5		-3.95	
2022-01-17	-27.3	1.09	51.8	0.3	-3.45	0.5

The return loss is <-20dB, within 20% of prior calibration; the impedance is within 50hm of prior calibration. Therefore the verification result should support extended calibration.

1.2. D1750V2 Dipole Calibration Certificate

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	CONTRACTOR DESCRIPTION OF THE PROPERTY OF THE	21-60018			
ERTIFICAT	E				
D1750	V2 - SN: 1164				
FF-Z11	-003-01				
Calibra	Calibration Procedures for dipole validation kits				
Januar	y 22, 2021				
ID # 106276 101369	Cal Date(Calibrated by, Certificate No.) 12-May-20 (CTTL, No.J20X02965) 12-May-20 (CTTL, No.J20X02965)	Scheduled Calibration May-21 May-21			
SN 771		Nov-21 Feb-21			
Lange and the second seco					
ID #	Cal Date(Calibrated by, Certificate No.)	Scheduled Calibration			
MY49071430 MY46110673	25-Feb-20 (CTTL, No.J20X00516) 10-Feb-20 (CTTL, No.J20X00515)	Feb-21 Feb-21			
Name	Function	Signature			
Zhao Jing	SAR Test Engineer	and a			
Lin Hao	SAR Test Engineer	一林子			
Qi Dianyuan	SAR Project Leader	Cor and			
	D1750 FF-Z11 Calibra Januar documents the sasurements and ertificate. a conducted in (M&TE critical for 106276 101369 SN 7600 SN 771 ID # MY49071430 MY49110673 Name Zhao Jing	January 22, 2021 documents the traceability to national standards, which reasurements and the uncertainties with confidence probabilitientificate. a conducted in the closed laboratory facility: environments (M&TE critical for calibration) ID # Cal Date(Calibrated by, Certificate No.) 106276 12-May-20 (CTTL, No.J20X02965) 101369 12-May-20 (CTTL, No.J20X02965) SN 7600 30-Nov-20(CTTL-SPEAG,No.Z20-60421) SN 771 10-Feb-20(CTTL-SPEAG,No.Z20-60017) ID # Cal Date(Calibrated by, Certificate No.) MY49071430 25-Feb-20 (CTTL, No.J20X00516) MY49071430 25-Feb-20 (CTTL, No.J20X00515) Name Function Xano Function			



Certificate No: Z21-60018

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Measurement Conditions DASY system configuration, as far as	s not given or	nage 1			
DASY Version		DASY52	1		V52.10.4
Extrapolation	Advand	ced Extrapolation			
Phantom	Triple Flat Phantom 5.1C			-	
Distance Dipole Center - TSL		10 mm		-	with Spacer
Zoom Scan Resolution	dv	dy, dz = 5 mm	2		with opacer
0000	-				
Frequency	1/5	0 MHz ± 1 MHz			
Iead TSL parameters The following parameters and calcula	ations were a	oplied. Temperature	Permitti	vity	Conductivity
Nominal Head TSL parameters		22.0 °C	40.1		1.37 mho/m
Measured Head TSL parameters		(22.0 ± 0.2) °C	39.8 ± 6	3 %	1.37 mho/m ± 6 %
Head TSL temperature change de	urina test	<1.0 °C			
AR result with Head TSL	3				
SAR averaged over 1 cm ³ (1 g) o	f Head TSL	Condit	tion		
SAR measured		250 mW input power			9.13 W/kg
SAR for nominal Head TSL parame	eters	normalize	normalized to 1W		W/kg ± 18.8 % (k=2)
SAR averaged over 10 cm ³ (10 g) of Head TSL	Condition			
SAR measured		250 mW input power		-	4.80 W/kg
SAR for nominal Head TSL parame	ters	10 10 10 10 10 10 10 10 10 10 10 10 10 1	normalized to 1W		W/kg ± 18.7 % (k=2)
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Certificate No: Z21-60018

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		CAL	IBRATIC	ON LAP	ORAT	ORY

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

Appendix (Additional assessments outside the scope of CNAS L0570)

Antenna Parameters with Head TSL

Impedance, transformed to feed point	49.9Ω- 3.86jΩ	
Return Loss	- 28.3 dB	

General Antenna Parameters and Design

Electrical Delay (one direction)	1.124 ns
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After long term use with 100W radiated power, only a slight warming of the dipole near the feedpoint can be measured.

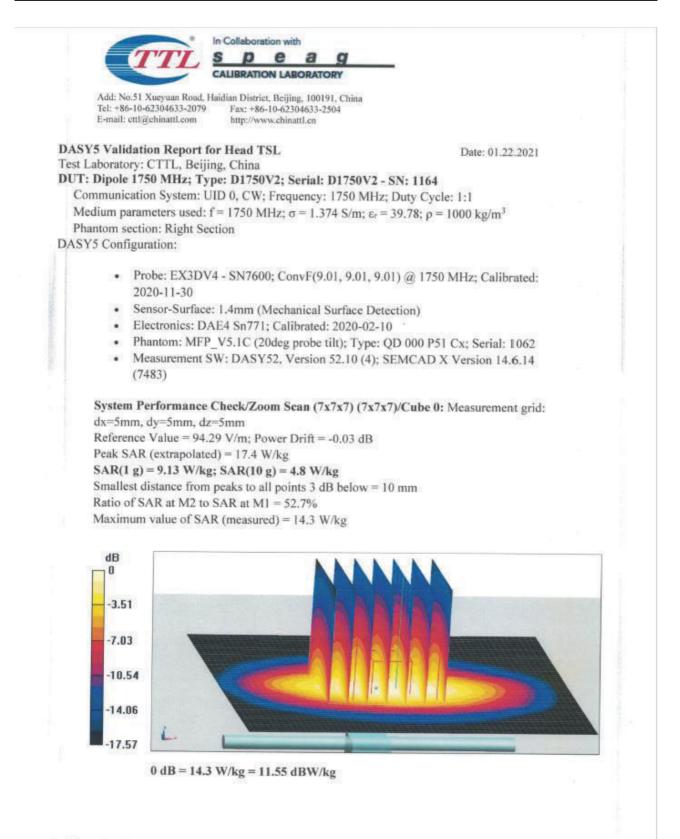
The dipole is made of standard semirigid coaxial cable. The center conductor of the feeding line is directly connected to the second arm of the dipole. The antenna is therefore short-circuited for DC-signals. On some of the dipoles, small end caps are added to the dipole arms in order to improve matching when loaded according to the position as explained in the "Measurement Conditions" paragraph. The SAR data are not affected by this change. The overall dipole length is still according to the Standard. No excessive force must be applied to the dipole arms, because they might bend or the soldered connections near the feedpoint may be damaged.

Additional EUT Data

Manufactured by	SPEAG
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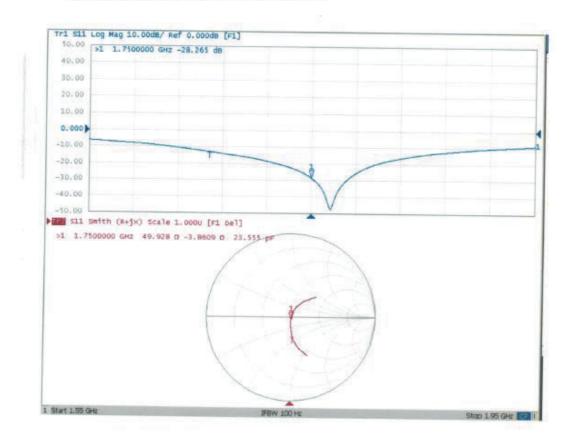


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Impedance Measurement Plot for Head TSL



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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.

Head-1750						
Date of	Return-loss (dB)	Delta (%)	Real Impedance	Delta	Imaginary	Delta
measurement			(ohm)	(ohm)	impedance (ohm)	(ohm)
2021-01-22	-28.3		49.9		-3.86	
2022-01-17	-27.9	1.41	50.4	0.5	-3.46	0.4

The return loss is <-20dB, within 20% of prior calibration; the impedance is within 50hm of prior calibration. Therefore the verification result should support extended calibration.