

Appendix C for KSCR220500086301

Calibration Certificate

Object	Apply	No	Model	SN	Calibration Date
Dipole	☐	1	CLA150	4025	2021/04/26
	☐	2	D450V3	1103	2021/04/21
	☐	3	D750V3	1188	2022/03/29
	☐	4	D835V2	4d114	2022/03/31
	☐	5	D900V2	1d079	2022/06/07
	☐	6	D1800V2	2d170	2022/03/31
	☐	7	D1900V2	5d1136	2022/06/07
	☐	8	D2000V2	1041	2022/06/06
	☐	9	D2300V2	1096	2022/03/31
	☒	10	D2450V2	817	2022/04/01
	☐	11	D2600V2	1158	2022/03/31
	☐	12	D5GHzV2	1095	2022/06/01
DAE	☒	13	DAE4	1245	2022/05/30
Probe	☒	14	EX3DV4	7346	2022/03/30



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1 Dipole

1.1 CLA150 - SN 4025

Calibration Laboratory of Schmid & Partner Engineering AG Zugstrasse 43, 8004 Zurich, Switzerland		S Schweizerischer Kalibrierdienst Service suisse d'étalonnage Servizio svizzero di taratura S Swiss Calibration Service	
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		Accreditation No.: SCS 0108	
Client: SGS-CN (Audeon)		Certificate No.: CLA150-4025_Apr21	
CALIBRATION CERTIFICATE			
Object: CLA150 - SN: 4025			
Calibration procedure(s): QA CAL-15.v9 Calibration Procedure for SAR Validation Sources below 700 MHz			
Calibration date: April 26, 2021			
The calibration certificate documents the traceability to national standards, which require the physical units of measurements (SI). The measurements and the uncertainties with confidence probability are given on the following pages and on part of the certificate.			
All calibrations have been conducted in the closed laboratory facility; environment temperature (22 ± 3) °C and humidity < 70%.			
Calibration Equipment Used (M&E critical for calibration)			
Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Power meter NRP	SN: 10475	09-Apr-21 (No. 217-03001/03002)	Apr-22
Power sensor NRP Z01	SN: 10344	09-Apr-21 (No. 217-03001)	Apr-22
Power sensor NRP Z01	SN: 10345	09-Apr-21 (No. 217-03002)	Apr-22
Reference 20 dB Attenuator	SN: CC2002 (200)	09-Apr-21 (No. 217-03003)	Apr-22
Type-N mismatch combination	SN: 310007 / 0007	09-Apr-21 (No. 217-03004)	Apr-22
Reference Probe EX300A	SN: 3877	30-Dec-20 (No. 203-3077_Dec20)	Dec-21
EXE4	SN: 661	16-Jan-20 (No. 19459-659_Jan20)	Jan-21
Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power meter S4419E	SN: G341303024	09-Apr-15 (in house check Jun-20)	In house check Jun-20
Power sensor E413A	SN: MY4169007	09-Apr-15 (in house check Jun-20)	In house check Jun-20
Power sensor E413A	SN: 00010010	09-Apr-15 (in house check Jun-20)	In house check Jun-20
RF generator HP 8594C	SN: U504001070	04-Aug-19 (in house check Jun-20)	In house check Jun-20
Network Analyzer Agilent T8368A	SN: U541000477	31-Mar-14 (in house check Oct-19)	In house check Oct-19
Calibrated by:	Janis Johannes Katsch	Function: Laboratory Technician	Signature: 
Approved by:	Kajsa Polovic	Technical Manager	Signature: 
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Issued: April 26, 2021			
Certificate No: CLA150-4025_Apr21 Page 1 of 5			

Calibration Laboratory of Schmid & Partner Engineering AG Zugstrasse 43, 8004 Zurich, Switzerland		S Schweizerischer Kalibrierdienst Service suisse d'étalonnage Servizio svizzero di taratura S Swiss Calibration Service	
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		Accreditation No.: SCS 0108	
Glossary:			
TSL	Issue 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 Technique", 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 865864, "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 source is mounted in a touch configuration below the center marking of the flat phantom.			
• Return Loss: This parameter is measured with the source positioned under the liquid filled phantom (as described in the measurement condition clause). The Return Loss ensures low reflected power. 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 reported SAR result.			
The reported uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor k=2, which for a normal distribution corresponds to a coverage probability of approximately 95%.			
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Measurement Conditions		
DASY system configuration, as far as not given on page 1.		
DASY Version	DASY5	V52.10.4
Extrapolation	Advanced Extrapolation	
Phantom	ELIA Flat Phantom	Shell thickness: 2 ± 0.2 mm
EUT Positioning	Touch Position	
Zoom Scan Resolution	dx, dy = 4.0 mm, dz = 1.4 mm	Graded Ratio = 1.4 (Z direction)
Frequency	150 MHz ± 1 MHz	

Head TSL parameters			
The following parameters and calculations were applied.			
	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	52.3	0.75 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	51.1 ± 6 %	0.75 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	1 W input power	3.90 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	3.88 W/kg ± 19.4 % (k=2)
SAR averaged over 10 cm ³ (10 g) of Head TSL	condition	
SAR measured	1 W input power	2.60 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	2.59 W/kg ± 18.0 % (k=2)

Appendix (Additional assessments outside the scope of SCS 0108)	
Antenna Parameters with Head TSL	
Impedance, transformed to feed point	47.9 Ω ± 1.5 Ω
Return Loss	-31.4 dB
Additional EUT Data	
Manufactured by	SPLEAG

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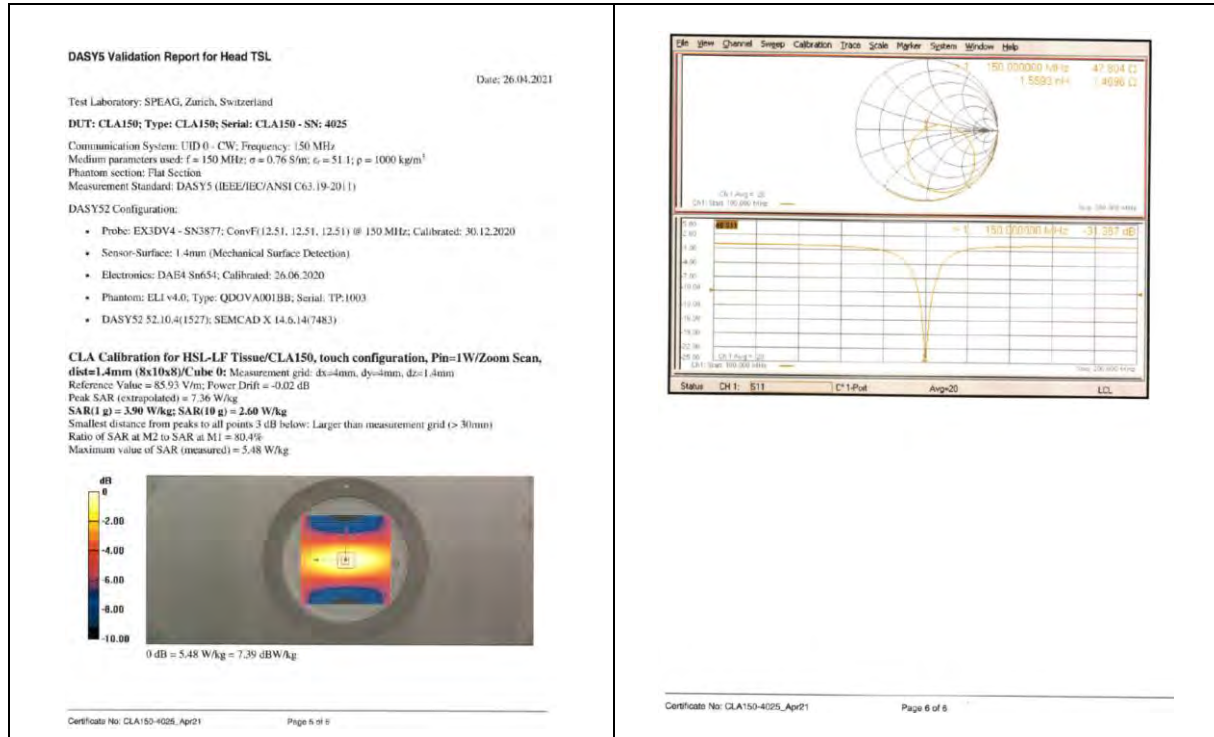
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1.2 D450V3 - SN 1103

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Client: **SGS-CN (Aiden)** Certificate No: **D450V3-1103_Apr21**

CALIBRATION CERTIFICATE

Object: **D450V3 - SN: 1103**

Calibration procedure(s): **QA CAL-15-V9**
Calibration Procedure for SAR Validation Sources below 700 MHz

Calibration date: **April 21, 2021**

This calibration certificate documents the traceability to national standards, which realize the physical units of measurements (SI). The measurements and the uncertainties with confidence probability are given on the following pages and are part of the certificate.

All calibrations have been conducted in the closed laboratory facility: environment temperature (20 ± 0.5) °C and humidity < 75%.

Calibration Equipment used (MTE critical for calibration)

Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Power meter NRP	SN 104779	09-Apr-21 (No. 217-030110300)	Apr-22
Power sensor MHP-291	SN 103344	09-Apr-21 (No. 217-03011)	Apr-22
Power sensor MHP-291	SN 103345	09-Apr-21 (No. 217-03015)	Apr-22
Reference 20 dB Attenuator	SN C2552 (200)	09-Apr-21 (No. 217-03049)	Apr-22
Type-N impedance calibration	SN 310852 / 06327	09-Apr-21 (No. 217-03044)	Apr-22
Reference Probe EX3DV4	SN 3877	30-Dec-20 (No. EX3-2077 Dec20)	Dec-21
DAEA	SN 454	06-Jun-20 (No. D454-664-Jun20)	Jun-21

Secondary Standards

ID #	Cal Date (In House)	Scheduled Check
Power meter E41188	06-Apr-19 (In house check Jun-20)	In house check Jun-20
Power sensor E4112A	06-Apr-19 (In house check Jun-20)	In house check Jun-20
Power sensor E4112A	06-Apr-19 (In house check Jun-20)	In house check Jun-20
RF generator HP 8440C	06-Aug-19 (In house check Jun-20)	In house check Jun-20
Network Analyzer Agilent E8358A	31-Mar-14 (In house check Dec-20)	In house check Oct-21

Calibrated by: **Kuba Fomala** Function: **Laboratory Technician**

Approved by: **Kuba Fomala** Technical Manager

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Client: **SGS-CN (Aiden)** Certificate No: **D450V3-1103_Apr21**

Glossary:

TSL: Issue simulating liquid sensitivity in TSL / NORM x,y,z

ConvF: not applicable or not measured

N/A: not applicable or not measured

Calibration is Performed According to the Following Standards:

- IEC 61010-1:2013, "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
- 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
- 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
- KDB 665664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

Additional Documentation:

e) DASY4/5 System Handbook

Methods Applied and Interpretation of Parameters:

- Measurement Conditions:** Further details are available from the Validation Report at the end of the certificate. All figures stated in the certificate are valid at the frequency indicated.
- Antenna Parameters with TSL:** The dipole is mounted with the spacer to position its feed point exactly below the center marking of the flat phantom section, with the arms oriented parallel to the body axis.
- Feed Point Impedance and Return Loss:** These parameters are measured with the dipole positioned under the liquid filled phantom. The impedance stated is transformed from the measurement at the SMA connector to the feed point. The Return Loss ensures low reflected power. No uncertainty required.
- Electrical Delay:** One-way delay between the SMA connector and the antenna feed point. No uncertainty required.
- SAR measured:** SAR measured at the stated antenna input power.
- SAR normalized:** SAR as measured, normalized to an input power of 1 W at the antenna connector.
- SAR for nominal TSL parameters:** The measured TSL parameters are used to calculate the nominal SAR result.

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

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Measurement Conditions		
DASY system configuration, as far as not given on page 1.		
DASY Version	DASY5	V82.10.4
Extrapolation	Advanced Extrapolation	
Phantom	ELJ Flat Phantom	Shell thickness: 2 ± 0.2 mm
Distance Dipole Center - TSL	15 mm	with Spacer
Zoom Scan Resolution	$dx, dy, dz \leq 5$ mm	
Frequency	450 MHz ± 1 MHz	

Head TSL parameters			
The following parameters and calculations were applied:			
	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	43.5	0.57 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	$43.1 \pm 6 \%$	0.07 mho/m $\pm 8 \%$
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	1.14 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	4.55 W/kg $\pm 18.1 \%$ (k=2)

SAR result with Head TSL		
SAR averaged over 10 cm^3 (10 g) of Head TSL	Condition	
SAR measured	250 mW input power	0.757 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	3.06 W/kg $\pm 17.6 \%$ (k=2)

Appendix (Additional assessments outside the scope of SCS 0106)		
Antenna Parameters with Head TSL		
Impedance, transformed to feed point	57.1 $\Omega - j2.8 \Omega$	
Return Loss	-23.0 dB	

General Antenna Parameters and Design	
Electrical Delay (one direction)	1.346 ns

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

The dipole is made of standard 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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Certificate No: D450V3-1103_Apr21

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DASY5 Validation Report for Head TSL

Date: 21.04.2021

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 450 MHz; Type: D450V3; Serial: D450V3 - SN:1103

Communication System: UTD 0 - CW; Frequency: 450 MHz

Medium parameters used: $f = 450$ MHz, $\alpha = 0.87$ S/m; $\epsilon_r = 43.1$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Measurement Standard: DASY5 (IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: EX3DV4 - SN3877; ConvF [10.64, 10.64] @ 450 MHz; Calibrated: 30.12.2020
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn654; Calibrated: 26.06.2020
- Phantom: ELJ v4.0; Type: QDOVA001BB; Serial: TP:1003
- DASY52 52.10.4 (1527); SEMCAD X (4.6.14/7483)

Dipole Calibration for Head Tissue/d=15mm, Pin=250mW/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: $dx=5$ mm, $dy=5$ mm, $dz=5$ mm

Reference Value = 39.18 V/m; Power DfM = -0.08 dB

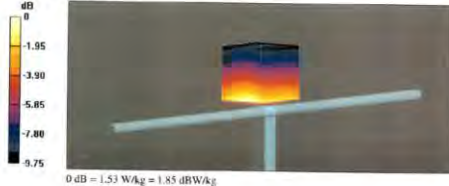
Peak SAR (extrapolated) = 1.76 W/kg

SAR(1 g) = 1.14 W/kg; SAR(10 g) = 0.767 W/kg

Smallest distance from peaks to all points 3 dB below: Larger than measurement grid

Ratio of SAR at M2 to SAR at M1 = 64.9%

Maximum value of SAR (measured) = 1.53 W/kg

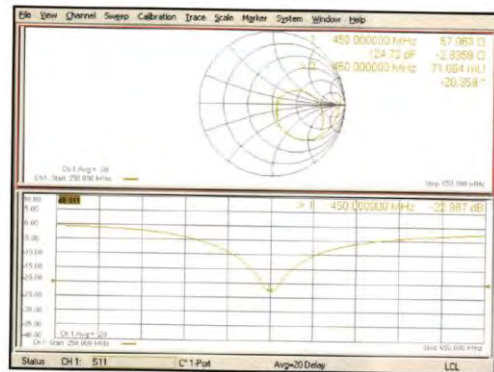


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1.3 D750V3 - SN 1188

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Client: SGS-CN		Certificate No.: Z22-60103																					
CALIBRATION CERTIFICATE																							
Object: D750V3 - SN: 1188																							
Calibration Procedure(s): FF-Z11-003-01 Calibration Procedures for dipole validation kits																							
Calibration date: March 28, 2022																							
This calibration Certificate documents the traceability to national standards, which realize the physical units of measurements (SI). The measurements and the uncertainties with confidence probability are given on the following pages and are part of the certificate.																							
All calibrations have been conducted in the closed laboratory facility; environment temperature (22±3)°C and humidity <70%.																							
Calibration Equipment used (M&TE critical for calibration)																							
<table border="1"><thead><tr><th>Primary Standards</th><th>ID #</th><th>Cal Date (Calibrated by Certificate No.)</th><th>Scheduled Calibration</th></tr></thead><tbody><tr><td>Power Meter NRP2</td><td>104277</td><td>24-Sep-21 (CTTL No.J21X08328)</td><td>Sep-22</td></tr><tr><td>Power sensor NRP88</td><td>104291</td><td>24-Sep-21 (CTTL No.J21X08328)</td><td>Sep-22</td></tr><tr><td>Reference Probe EX30V4</td><td>SN 7307</td><td>26-May-21 (SPEAG No.EX3-7307_May21)</td><td>May-22</td></tr><tr><td>DAE4</td><td>SN 1556</td><td>12-Jan-22 (CTTL-SPEAG No.Z22-60007)</td><td>Jan-23</td></tr></tbody></table>				Primary Standards	ID #	Cal Date (Calibrated by Certificate No.)	Scheduled Calibration	Power Meter NRP2	104277	24-Sep-21 (CTTL No.J21X08328)	Sep-22	Power sensor NRP88	104291	24-Sep-21 (CTTL No.J21X08328)	Sep-22	Reference Probe EX30V4	SN 7307	26-May-21 (SPEAG No.EX3-7307_May21)	May-22	DAE4	SN 1556	12-Jan-22 (CTTL-SPEAG No.Z22-60007)	Jan-23
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Power sensor NRP88	104291	24-Sep-21 (CTTL No.J21X08328)	Sep-22																				
Reference Probe EX30V4	SN 7307	26-May-21 (SPEAG No.EX3-7307_May21)	May-22																				
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Network Analyzer E5071C	MY46110673	14-Jan-22 (CTTL No.J22X00406)	Jan-23																				
Calibrated by: Zhao Jing SAR Test Engineer																							
Reviewed by: Lin Hao SAR Test Engineer																							
Approved by: Qi Dianyun SAR Project Leader																							
Issued: April 3, 2022																							
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Certificate No: Z22-60103		Page 1 of 6																					

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Measurement Conditions DASY system configuration, as far as not given on page 1:			
DASY Version		DASY52	
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		22.0 °C	
Permittivity		42.0	
Conductivity		0.90 mho/m	
Nominal Head TSL parameters		(22.0 ± 0.2) °C	
Measured Head TSL parameters		(22.0 ± 0.2) °C	
Head TSL temperature change during test		<1.0 °C	
SAR result with Head TSL			
SAR averaged over 1 cm ² (1 g) of Head TSL		Condition	
SAR measured		250 mW input power	
SAR for nominal Head TSL parameters		normalized to 1W	
SAR averaged over 10 cm ² (10 g) of Head TSL		Condition	
SAR measured		250 mW input power	
SAR for nominal Head TSL parameters		normalized to 1W	

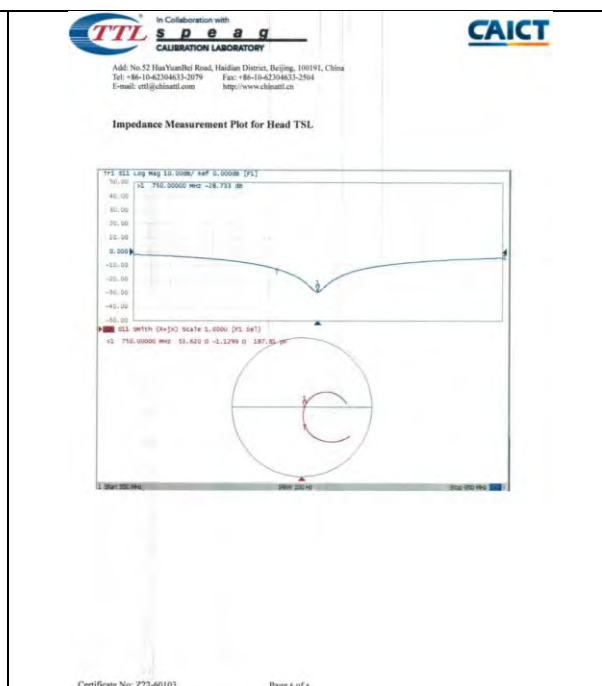
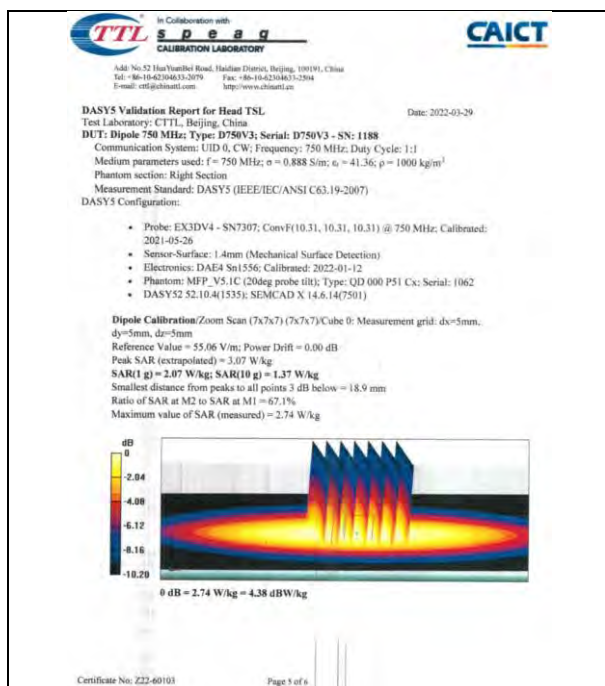
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Appendix (Additional assessments outside the scope of CNAS L0570)			
Antenna Parameters with Head TSL			
Impedance, transformed to feed point		53.60- 1.13jΩ	
Return Loss		>28.7dB	
General Antenna Parameters and Design			
Electrical Delay (one direction)		0.947 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 and caps are added to the dipole arms in order to improve matching when placed 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: Z22-60103		Page 1 of 6	



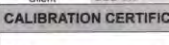
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1.4 D835V2 - SN 4d114

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Client SOS-CN	Certificate No: 223-60104																					
CALIBRATION CERTIFICATE																						
Object	D835V2 - SN: 41114																					
Calibration Procedure(s)	FF-Z11-003-01 Calibration Procedures for dipole validation kits																					
Calibration date	March 31, 2022																					
This calibration Certificate documents the traceability to national standards, which realize the physical units of measurements (SI). The measurements and the uncertainties with confidence probability are given on the following pages and are part of the certificate.																						
All calibrations have been conducted in the closed laboratory facility, environment temperature (22±3)°C and humidity<70%.																						
Calibration Equipment used (MATE critical for calibration)																						
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Network Analyzer ES071C	MY48110673	14-Jan-22 (CTTL, No.Z22X0409)	Jan-23																			
Calibrated by:	Name Function Zhao Jing SAR Test Engineer	Signature 																				
Reviewed by:	Lin Hao SAR Test Engineer																					
Approved by:	Qi Dianyun SAR Project Leader																					
Issued: April 6, 2022																						
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Glossary: <table border="0"> <tr> <td>TSL</td> <td>tissue simulating liquid</td> </tr> <tr> <td>Conv#</td> <td>sensitivity in TSL / NORMx.y.z</td> </tr> <tr> <td>N/A</td> <td>not applicable or not measured</td> </tr> </table>		TSL	tissue simulating liquid	Conv#	sensitivity in TSL / NORMx.y.z	N/A	not applicable or not measured
TSL	tissue simulating liquid						
Conv#	sensitivity in TSL / NORMx.y.z						
N/A	not applicable or not measured						
Calibration is Performed According to the Following Standards: - IECIEEIE 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 - KDB 826564, "SAR Measurement Requirements for 100 MHz to 6 GHz"							
Additional Documentation: DASY4A5 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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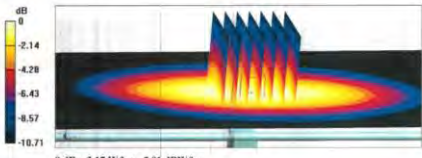
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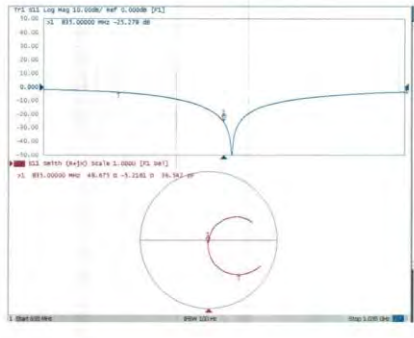
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Measurement Conditions DASY system configuration, as far as not given on page 1			
DASY Version	DASY52	VS2 10.4	
Extrapolation	Advanced Extrapolation		
Phantom	Triple Flat Phantom 5.1C		
Distance Dipole Center - TSL	15 mm	with Spacer	
Zoom Scan Resolution	dx, dy, dz = 5 mm		
Frequency	835 MHz ± 1 MHz		
Head TSL parameters The following parameters and calculations were applied:			
	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	41.5	0.80 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	41.0 ± 0.5	0.81 mho/m ± 0.5%
Head TSL temperature change during last	< 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	2.37 W/kg	
SAR for nominal Head TSL parameters	normalized to 1W	6.40 W/kg ± 18.8 % (k=2)	
SAR averaged over 10 cm ³ (10 g) of Head TSL	Condition		
SAR measured	250 mW input power	1.54 W/kg	
SAR for nominal Head TSL parameters	normalized to 1W	6.12 W/kg ± 18.7 % (k=2)	
Certificate No: Z22-60104 Page 1 of 6			

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Appendix (Additional assessments outside the scope of CNAS L0570)			
Antenna Parameters with Head TSL			
Impedance, transformed to feed point	48.70 - j 22.0 Ω		
Return Loss	-25.3 dB		
General Antenna Parameters and Design			
Electrical Delay (one direction)	1.307 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: Z22-60104 Page 1 of 6			

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DASY5 Validation Report for Head TSL Test Laboratory: CTTL, Beijing, China Date: 2022-03-31			
DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN: 40114			
Communication System: UTD 0, CW; Frequency: 835 MHz; Duty Cycle: 1:1			
Medium parameters used: f = 835 MHz; σ = 0.907 S/m; ε _r = 40.98; ρ = 1000 kg/m ³			
Phantom section: Right Section			
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)			
DASY5 Configuration:			
• Probe: EX3DV4 - SN7307; ConvF(10.13, 10.13, 10.13) @ 835 MHz; Calibrated: 2021-05-26			
• Sensor Surface: 1.4mm (Mechanical Surface Detection)			
• Electronics: DA64 Sn1556; Calibrated: 2022-01-12			
• Phantom: MFP_V5.1C (20deg probe tilt); Type: QD 000 P51 Cx; Serial: 1062			
• DASY52 52.10.4(153); SEMCAD X 14.6.14(7501)			
Dipole Calibration/Zoom Scan (7x7x7) (7x7x7) Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm			
Reference Value = 57.88 V/m; Power Drift = 0.04 dB			
Peak SAR (extrapolated) = 3.56 W/kg			
SAR(1 g) = 2.37 W/kg; SAR(10 g) = 1.54 W/kg			
Smallest distance from peaks to all points 3 dB below = 15.8 mm			
Ratio of SAR at M2 to SAR at M1 = 66.2%			
Maximum value of SAR (measured) = 3.17 W/kg			
			
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Impedance Measurement Plot for Head TSL			
			
Certificate No: Z22-60104 Page 6 of 6			



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1.5 D900V2 - SN 1d079

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Client: SGS-CN		Certificate No: Z22-60184																																	
CALIBRATION CERTIFICATE Object: D900V2 - SN 1d079 Calibration Procedure(s): PF-Z11-003-01 Calibration date: June 7, 2022 The calibration Certificate documents the traceability to national standards, which realize the physical units of measurements (SI). The measurements and the uncertainties with confidence probability are given on the following pages and are part of the certificate. All calibrations have been conducted in the closed laboratory facility, environment temperature (23±1°C) and humidity >70%. Calibration Equipment used (MATE critical for calibration) <table border="1"> <thead> <tr> <th>Primary Standards</th> <th>ID #</th> <th>Cal Date (Calibrated by Certificate No.)</th> <th>Scheduled Calibration</th> </tr> </thead> <tbody> <tr> <td>Power Meter NRP2</td> <td>106277</td> <td>24-Sep-21 (CTTL No. J21X08326)</td> <td>Sep-22</td> </tr> <tr> <td>Power sensor NRP85</td> <td>104291</td> <td>24-Sep-21 (CTTL No. J21X08326)</td> <td>Sep-22</td> </tr> <tr> <td>Reference Probe EX32V4</td> <td>SN 7484</td> <td>28-Jan-22 (SPEAG No. EX3-7484_Jan22)</td> <td>Jan-23</td> </tr> <tr> <td>DAE4</td> <td>SN 1586</td> <td>12-Jan-22 (CTTL-SPEAG No. Z22-60007)</td> <td>Jan-23</td> </tr> <tr> <th>Secondary Standards</th> <th>ID #</th> <th>Cal Date (Calibrated by Certificate No.)</th> <th>Scheduled Calibration</th> </tr> <tr> <td>Signal Generator E2438C</td> <td>MY48071430</td> <td>13-Jan-22 (CTTL No. J22X00406)</td> <td>Jan-23</td> </tr> <tr> <td>Network Analyzer E5071C</td> <td>MY48110473</td> <td>14-Jan-22 (CTTL No. J22X00406)</td> <td>Jan-23</td> </tr> </tbody> </table> Calibrated by: Name: Zhao Jing, Function: SAR Test Engineer, Signature: [Signature] Reviewed by: Lin Hao, Function: SAR Test Engineer, Signature: [Signature] Approved by: Qi Dianyan, Function: SAR Project Leader, Signature: [Signature] Issued: June 13, 2022 This calibration certificate shall not be reproduced except in full without written approval of the laboratory.				Primary Standards	ID #	Cal Date (Calibrated by Certificate No.)	Scheduled Calibration	Power Meter NRP2	106277	24-Sep-21 (CTTL No. J21X08326)	Sep-22	Power sensor NRP85	104291	24-Sep-21 (CTTL No. J21X08326)	Sep-22	Reference Probe EX32V4	SN 7484	28-Jan-22 (SPEAG No. EX3-7484_Jan22)	Jan-23	DAE4	SN 1586	12-Jan-22 (CTTL-SPEAG No. Z22-60007)	Jan-23	Secondary Standards	ID #	Cal Date (Calibrated by Certificate No.)	Scheduled Calibration	Signal Generator E2438C	MY48071430	13-Jan-22 (CTTL No. J22X00406)	Jan-23	Network Analyzer E5071C	MY48110473	14-Jan-22 (CTTL No. J22X00406)	Jan-23
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Certificate No: Z22-60184		Page 1 of 6																																	

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Certificate No: Z22-60184		Page 1 of 6	

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Address: No.52 Huayuan Road, Haidian District, Beijing, 100191 Tel: +86-10-4235813-3117 E-mail: cti@sgs.com.cn		Address: No.52 Huayuan Road, Haidian District, Beijing, 100191 Tel: +86-10-4235813-3117 E-mail: cti@sgs.com.cn	
Certificate No: Z22-60184		Page 1 of 6	

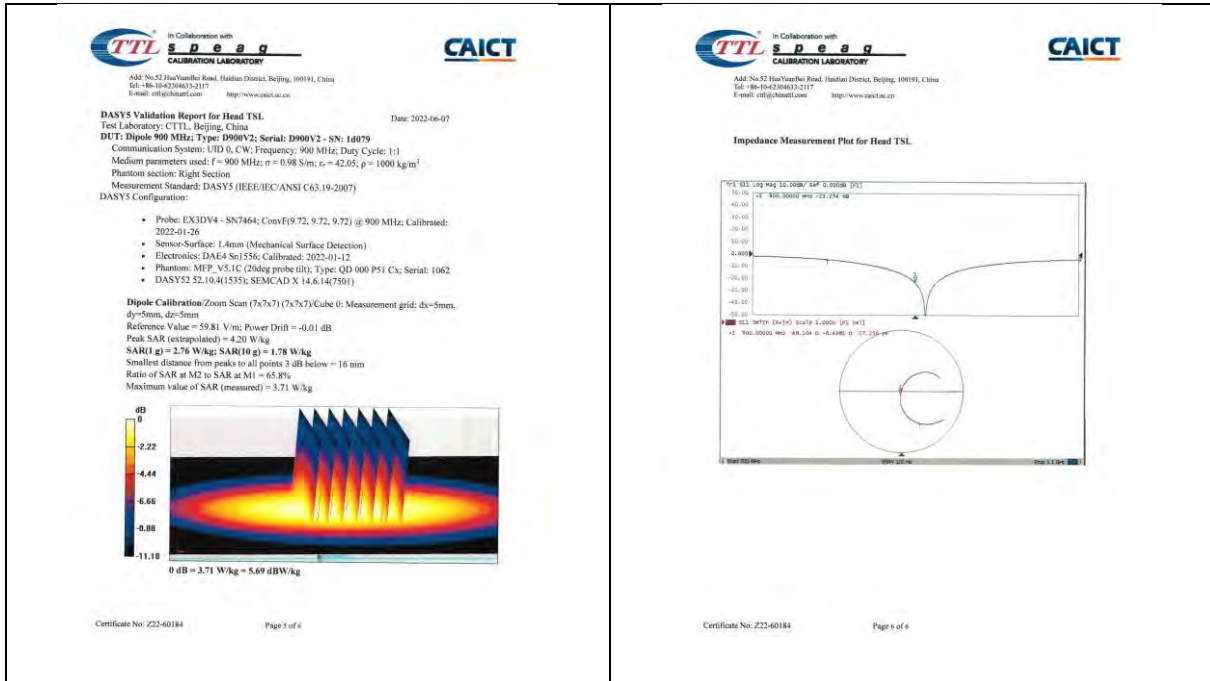


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1.6 D1800V2 - SN 2d170

TTL Calibration Laboratory
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Tel: +86-10-42306033-2117
E-mail: cti@china.ttl.com
http://www.china.ttl.com

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Client: **SGS-CN** Certificate No: **Z22-60105**

CALIBRATION CERTIFICATE

Object: **D1800V2 - SN: 2d170**

Calibration Procedure(s): **FF-Z11-003-01**
Calibration Procedures for dipole validation kits

Calibration date: **March 31, 2022**

This calibration Certificate documents the traceability to national standards, which realize the physical units of measurements (SI). The measurements and the uncertainties with confidence probability are given on the following pages and are part of the certificate.

All calibrations have been conducted in the closed laboratory facility, environment temperature (22±3)°C and humidity <70%.

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Calibrated by Certificate No.)	Scheduled Calibration
Power Meter NRP2	106277	24-Sep-21 (CTTL No.J21X08326)	Sep-22
Power sensor NRP8S	104291	24-Sep-21 (CTTL No.J21X08326)	Sep-22
Reference Probe EX3DV4	SN 7307	26-May-21 (SPEAG No.EX3-7307_May21)	May-22
DAE4	SN 1556	12-Jan-22 (CTTL-SPEAG No.Z22-60007)	Jan-23

Secondary Standards	ID #	Cal Date (Calibrated by Certificate No.)	Scheduled Calibration
Signal Generator E4438C	MY48071430	13-Jan-22 (CTTL No.J22X00409)	Jan-23
Network Analyzer E5071C	MY48110673	14-Jan-22 (CTTL No.J22X00409)	Jan-23

Calibrated by: **Zhao Jing** SAR Test Engineer
Reviewed by: **Lin Hao** SAR Test Engineer
Approved by: **Qi Diqiyuan** SAR Project Leader

Issued: April 6, 2022
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Certificate No: Z22-60105 Page 1 of 6

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E-mail: cti@china.ttl.com
http://www.china.ttl.com

CAICT

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) 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 855664, "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: Z22-60105 Page 2 of 6

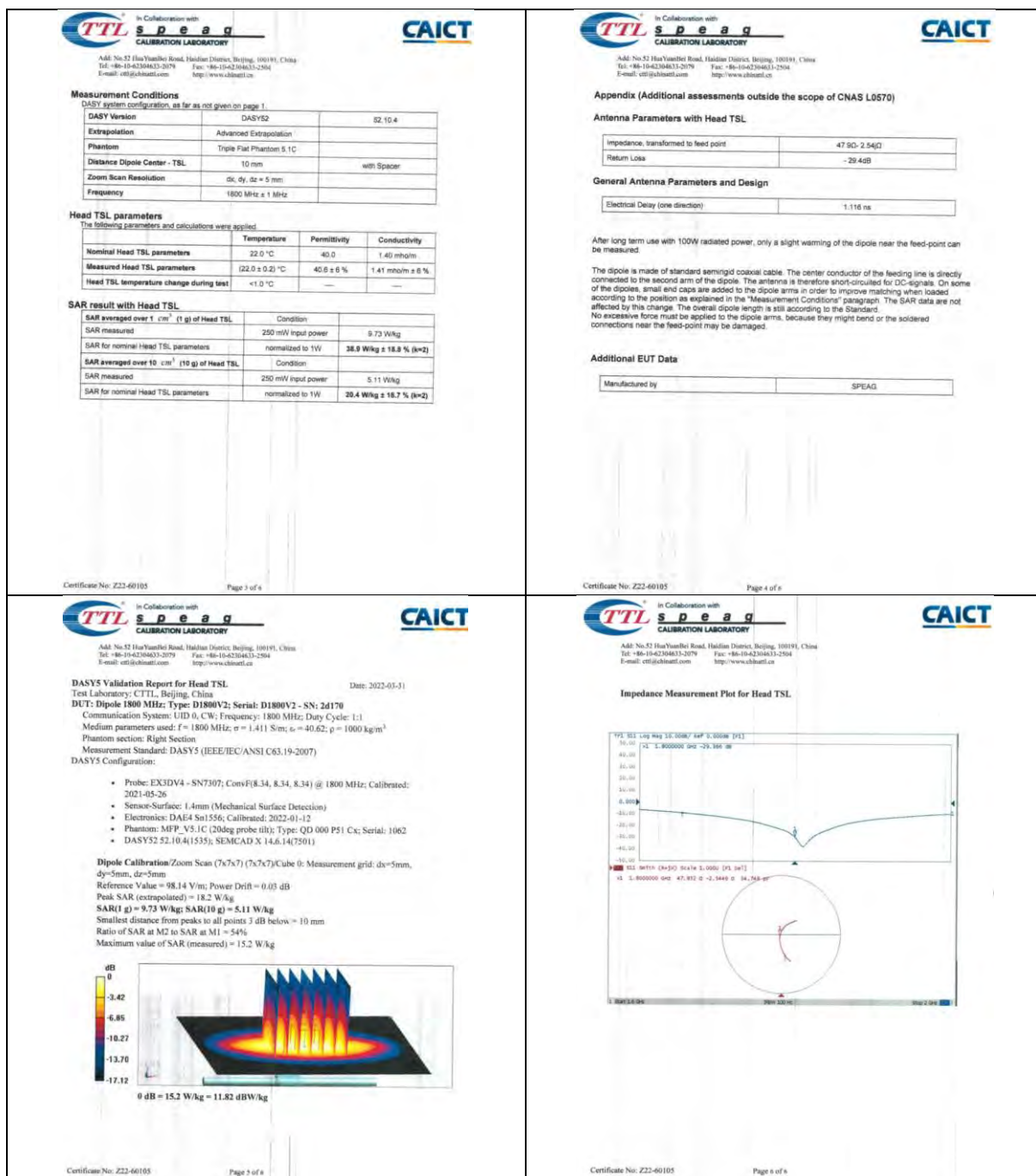


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1.7 D1900V2 - SN 5d136

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Client: SGS-CN		Certificate No: Z22-60185																					
CALIBRATION CERTIFICATE																							
Object: D1900V2 - SN 5d136																							
Calibration Procedure(s): FF-Z11-003-01 Calibration Procedures for dipole validation kits																							
Calibration date: June 7, 2022																							
This calibration Certificate documents the traceability to national standards, which realize the physical units of measurements (SI). The measurements and the uncertainties with confidence probability are given on the following pages and are part of the certificate.																							
All calibrations have been conducted in the closed laboratory facility, environment temperature (23±1)°C and humidity <70%.																							
Calibration Equipment used (M&E critical for calibration)																							
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Network Analyser E5071C	MY48110073	14-Jan-22 (CTTL No.J22X00406)	Jan-23																				
Calibrated by: Name: Zhao Jing, Function: SAR Test Engineer, Signature: [Signature]																							
Reviewed by: Lin Hao, SAR Test Engineer, Signature: [Signature]																							
Approved by: Qi Dianyan, SAR Project Leader, Signature: [Signature]																							
Issued: June 13, 2022																							
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Certificate No: Z22-60185		Page 1 of 8																					

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Measurement Conditions QASYS system configuration, as far as not given on page 1:																					
<table border="1"><thead><tr><th>DASY Version</th><th>DASY152</th><th>52.10.4</th></tr></thead><tbody><tr><td>Extrapolation</td><td>Advanced Extrapolation</td><td></td></tr><tr><td>Phantom</td><td>Triple Flat Phantom 5.1C</td><td></td></tr><tr><td>Distance Dipole Center - TSL</td><td>10 mm</td><td>with Spacer</td></tr><tr><td>Zoom Scan Resolution</td><td>dx, dy, dz = 5 mm</td><td></td></tr><tr><td>Frequency</td><td>1900 MHz ± 1 MHz</td><td></td></tr></tbody></table>				DASY Version	DASY152	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	
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Frequency	1900 MHz ± 1 MHz																				
Head TSL parameters The following parameters and calculations were applied:																					
<table border="1"><thead><tr><th>Parameter</th><th>Temperature</th><th>Permittivity</th><th>Conductivity</th></tr></thead><tbody><tr><td>Nominal Head TSL parameters</td><td>22.0 °C</td><td>46.0</td><td>1.40 return</td></tr><tr><td>Measured Head TSL parameters</td><td>(22.0 ± 0.5) °C</td><td>39.9 ± 0.5 %</td><td>1.39 return ± 0.5 %</td></tr><tr><td>Head TSL temperature change during test</td><td>+1.0 °C</td><td></td><td></td></tr></tbody></table>				Parameter	Temperature	Permittivity	Conductivity	Nominal Head TSL parameters	22.0 °C	46.0	1.40 return	Measured Head TSL parameters	(22.0 ± 0.5) °C	39.9 ± 0.5 %	1.39 return ± 0.5 %	Head TSL temperature change during test	+1.0 °C				
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SAR result with Head TSL																					
<table border="1"><thead><tr><th>SAR averaged over 1 cm² (1 g) of Head TSL</th><th>Condition</th><th>Value</th></tr></thead><tbody><tr><td>SAR measured</td><td>250 mW input power</td><td>9.65 W/kg</td></tr><tr><td>SAR for nominal Head TSL parameters</td><td>normalized to 1W</td><td>40.0 W/kg ± 16.8 % (k=2)</td></tr></tbody></table>				SAR averaged over 1 cm ² (1 g) of Head TSL	Condition	Value	SAR measured	250 mW input power	9.65 W/kg	SAR for nominal Head TSL parameters	normalized to 1W	40.0 W/kg ± 16.8 % (k=2)									
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<table border="1"><thead><tr><th>SAR averaged over 10 cm² (10 g) of Head TSL</th><th>Condition</th><th>Value</th></tr></thead><tbody><tr><td>SAR measured</td><td>250 mW input power</td><td>5.18 W/kg</td></tr><tr><td>SAR for nominal Head TSL parameters</td><td>normalized to 1W</td><td>20.8 W/kg ± 16.7 % (k=2)</td></tr></tbody></table>				SAR averaged over 10 cm ² (10 g) of Head TSL	Condition	Value	SAR measured	250 mW input power	5.18 W/kg	SAR for nominal Head TSL parameters	normalized to 1W	20.8 W/kg ± 16.7 % (k=2)									
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Certificate No: Z22-60185		Page 3 of 8																			

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Glossary: TSL: Issue simulating liquid sensitivity in TSL / NORM.y.z ConF: not applicable or not measured NA: 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 855884, "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: Z22-60185		Page 2 of 8	

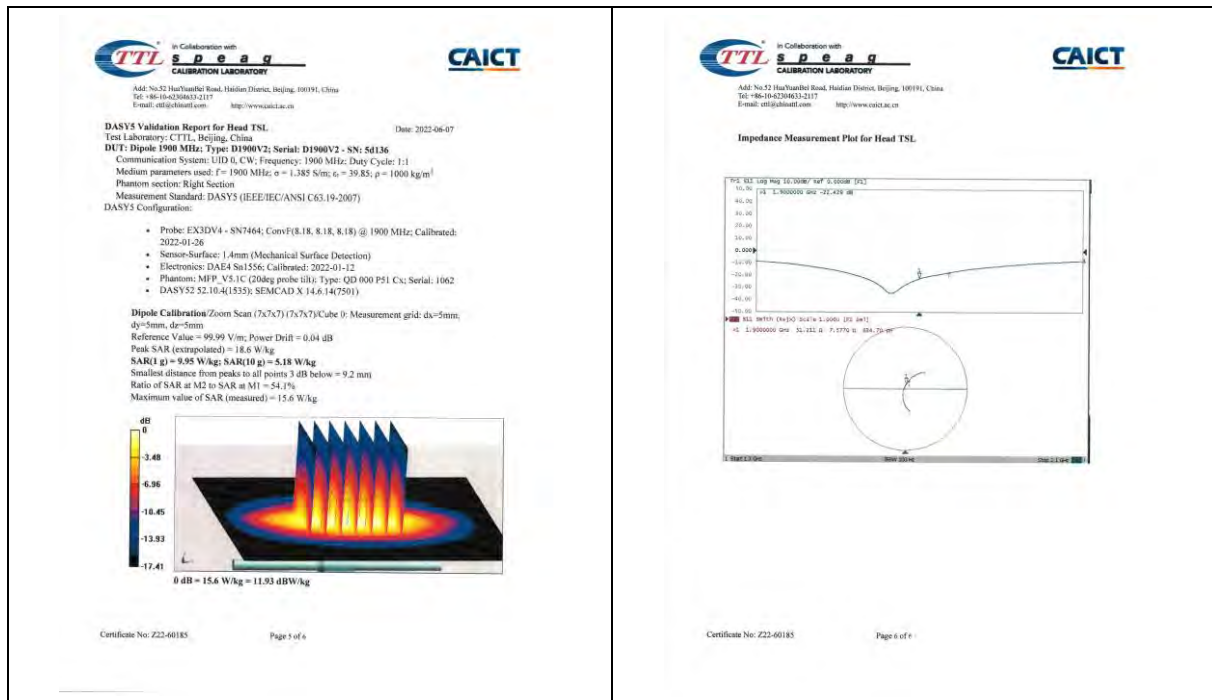
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Appendix (Additional assessments outside the scope of CNAS L0570)									
Antenna Parameters with Head TSL									
<table border="1"><thead><tr><th>Parameter</th><th>Value</th></tr></thead><tbody><tr><td>Impedance, transformed to feed point</td><td>51.0Ω ± 1.5Ω (k=2)</td></tr><tr><td>Return Loss</td><td>22.4dB</td></tr></tbody></table>				Parameter	Value	Impedance, transformed to feed point	51.0Ω ± 1.5Ω (k=2)	Return Loss	22.4dB
Parameter	Value								
Impedance, transformed to feed point	51.0Ω ± 1.5Ω (k=2)								
Return Loss	22.4dB								
General Antenna Parameters and Design									
<table border="1"><thead><tr><th>Parameter</th><th>Value</th></tr></thead><tbody><tr><td>Electrical Delay (one direction)</td><td>1.109 ns</td></tr></tbody></table>				Parameter	Value	Electrical Delay (one direction)	1.109 ns		
Parameter	Value								
Electrical Delay (one direction)	1.109 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 caps are added to the dipole arms in order to improve matching when loaded according to the position as specified 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									
<table border="1"><thead><tr><th>Manufacturer by</th><th>SPEAG</th></tr></thead><tbody><tr><td></td><td></td></tr></tbody></table>				Manufacturer by	SPEAG				
Manufacturer by	SPEAG								
Certificate No: Z22-60185		Page 4 of 8							



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1.8 D2000V2 - SN 1041

Calibration Certificate
 Client: SGS-CN Certificate No: Z22-60186
 Object: D2000V2 - SN 1041
 Calibration Procedure(s): FF-Z11-003-01
 Calibration date: June 5, 2022
 This calibration certificate documents the traceability to national standards, which realize the physical units of measurements (SI). The measurements and the uncertainties with confidence probability are given on the following pages and are part of the certificate.
 All calibrations have been conducted in the closed laboratory facility: environment temperature (22±3)°C and humidity <70%.
 Calibration Equipment used (MATE critical for calibration):

Primary Standards	ID #	Cal Date (Calibrated by Certificate No.)	Scheduled Calibration
Power Meter NRP2	106277	24-Sep-21 (CTTL No. J21X08328)	Sep-22
Power sensor NRP5	104291	24-Sep-21 (CTTL No. J21X08328)	Sep-22
Reference Probe EX3DV4	SN 7464	26-Jan-22 (SPEAG No. EX3-7464, Jan22)	Jan-23
DAE4	SN 1556	12-Jan-22 (CTTL - SPEAG No. Z22-60007)	Jan-23
Secondary Standards	ID #	Cal Date (Calibrated by Certificate No.)	Scheduled Calibration
Signal Generator E4438C	MY49071430	13-Jan-22 (CTTL No. Z22X00408)	Jan-23
Network Analyzer E5071C	MY46110673	14-Jan-22 (CTTL No. Z22X00408)	Jan-23

Calibrated by: Zhao Jing SAR Test Engineer
 Reviewed by: Lin Hao SAR Test Engineer
 Approved by: Qi Danyuan SAR Project Leader
 Issued: June 13, 2022
 This calibration certificate shall not be reproduced except in full without written approval of the laboratory.

Glossary:
 TSL: Issue 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-Head 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 865564, "SAR Measurement Requirements for 100 MHz to 6 GHz"
 Additional Documentation:
 c) DASY4/S 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 Parameter 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 data 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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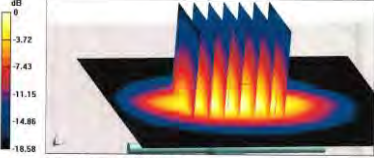
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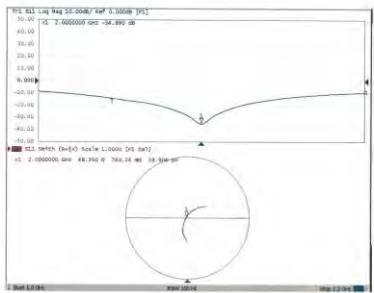
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Measurement Conditions DASY system configuration, as for as not given on page 1.			
DASY Version	DASYV2	52.10.4	
Extrapolation	Advanced Extrapolation		
Phantom	Triple Flat Phantom S.1C		
Distance Dipole Center - TSL	10 mm	with Spacer	
Zoom Scan Resolution	dx, dy, dz = 5 mm		
Frequency	2000 MHz ± 1 MHz		
Head TSL parameters The following parameters and calculations were applied:			
Nominal Head TSL parameters	Temperature	Permittivity	Conductivity
	22.9 °C	40.0	1.40 mho/cm
Measured Head TSL parameters	(22.0 ± 0.2) °C	40.2 ± 0.6 %	1.36 mho/cm ± 0.6 %
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	10.4 W/kg	
SAR for nominal Head TSL parameters	normalized to 1W	41.8 W/kg ± 15.8 % (n=2)	
SAR averaged over 10 cm ³ (10 g) of Head TSL	Condition		
SAR measured	250 mW input power	5.30 W/kg	
SAR for nominal Head TSL parameters	normalized to 1W	21.3 W/kg ± 18.7 % (n=2)	
Certificate No: Z22-60186 Page 3 of 6			

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Appendix (Additional assessments outside the scope of CNAS L0570)			
Antenna Parameters with Head TSL			
Impedance, transformed to feed point	48.4Ω ± 0.74Ω		
Return Loss	-34 dB		
General Antenna Parameters and Design			
Electrical Delay (one direction)	1.08 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 semi-rigid coaxial cable. The center conductor of the feeding line is directly connected to the second arm of the dipole. The antenna is therefore short-circuited for DC-signals. On some of the dipoles, small and large 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: Z22-60188 Page 8 of 8			

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DASY Validation Report for Head TSL Test Laboratory: CTTL, Beijing, China DUT: Dipole 2000 MHz; Type: D2000V2; Serial: D2000V2 - SN: 1041 Communication System: UTD 0; CW; Frequency: 2000 MHz; Duty Cycle: 1:1 Medium parameters used: f = 2000 MHz; σ = 1.392 S/m; ε = 40.21; ρ = 1000 kg/m ³ Phantom section: Right Section Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007) DASY5 Configuration:			
• Probe: EX3DV4 - SN7464; ConvF(R2, R2, R2) @ 2000 MHz; Calibrated: 2022-01-26			
• Sensor Surface: 1.4mm (Mechanical Surface Detection)			
• Electronics: DA64 Sn1556; Calibrated: 2022-01-12			
• Phantom: MPP_V5.1C (20deg probe tilt); Type: QD 000 P51 Cx; Serial: 1062			
• DASY5: S2.10.4(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 = 103.4 V/m; Power Drift = 0.03 dB Peak SAR (extrapolated) = 19.6 W/kg SAR(1 g) = 10.4 W/kg; SAR(10 g) = 5.3 W/kg Smallest distance from peaks to all points 3 dB below = 9.1 mm Ratio of SAR at M2 to SAR at M1 = 51.0 % Maximum value of SAR (measured) = 16.3 W/kg			
			
0 dB = 16.3 W/kg = 12.12 dBW/kg			
Certificate No: Z22-60186 Page 5 of 6			

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Impedance Measurement Plot for Head TSL			
			
Certificate No: Z22-60188 Page 6 of 6			



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1.9 D2300V2 - SN 1096

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Client: SGS-CN		Certificate No: Z22-60106	
CALIBRATION CERTIFICATE			
Object	D2300V2 - SN 1096		
Calibration Procedure(s)	FF-Z11-003-01 Calibration Procedures for dipole validation kits		
Calibration date:	March 31, 2022		
This calibration Certificate documents the traceability to national standards, which realize the physical units of measurements (SI). The measurements and the uncertainties with confidence probability are given on the following pages and are part of the certificate.			
All calibrations have been conducted in the closed laboratory facility: environment temperature (22±3)°C and humidity <70%.			
Calibration Equipment used (M&TE critical for calibration)			
Primary Standards	ID #	Cal Date (Calibrated by Certificate No.)	Scheduled Calibration
Power Meter NRP2	108277	24-Sep-21 (CTTL No.J21X08328)	Sep-22
Power sensor NRP8	104291	24-Sep-21 (CTTL No.J21X08328)	Sep-22
Reference Probe EX33V4 DA4	SN 7307 SN 1556	26-May-21 (SPEAG No.EK3-7307_May21) 12-Jan-22 (CTTL-SPEAG No.Z22-60007)	May-22 Jan-23
Secondary Standards	ID #	Cal Date (Calibrated by Certificate No.)	Scheduled Calibration
Signal Generator E4438C	MY49071430	13-Jan-22 (CTTL No.J22X00406)	Jan-23
Network Analyzer E5071C	MY48110673	14-Jan-22 (CTTL No.J22X00406)	Jan-23
Calibrated by:	Name	Function	Signature
	Zhao Jing	SAR Test Engineer	
Reviewed by:	Lin Hao	SAR Test Engineer	
Approved by:	Qi Diqiyuan	SAR Project Leader	
Issued: April 6, 2022			
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Certificate No: Z22-60106		Page 1 of 6	

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Measurement Conditions DASY system configuration, as far as not given on page 1:			
DASY Version	DASY2	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	2300 MHz ± 1 MHz		
Head TSL parameters The following parameters and calculations were applied:			
	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	39.5	1.67 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	39.8 ± 9 %	1.70 mho/m ± 6 %
Head TSL temperature change during test	<1.0 °C	—	
SAR result with Head TSL			
SAR averaged over 1 cm ² (1 g) of Head TSL	Condition		
SAR measured	250 mW input power	12.4 W/kg	
SAR for nominal Head TSL parameters	normalized to 1W	49.2 W/kg ± 18.8 % (k=2)	
SAR averaged over 10 cm ² (10 g) of Head TSL	Condition		
SAR measured	250 mW input power	5.88 W/kg	
SAR for nominal Head TSL parameters	normalized to 1W	23.4 W/kg ± 18.7 % (k=2)	
Certificate No: Z22-60106		Page 3 of 6	

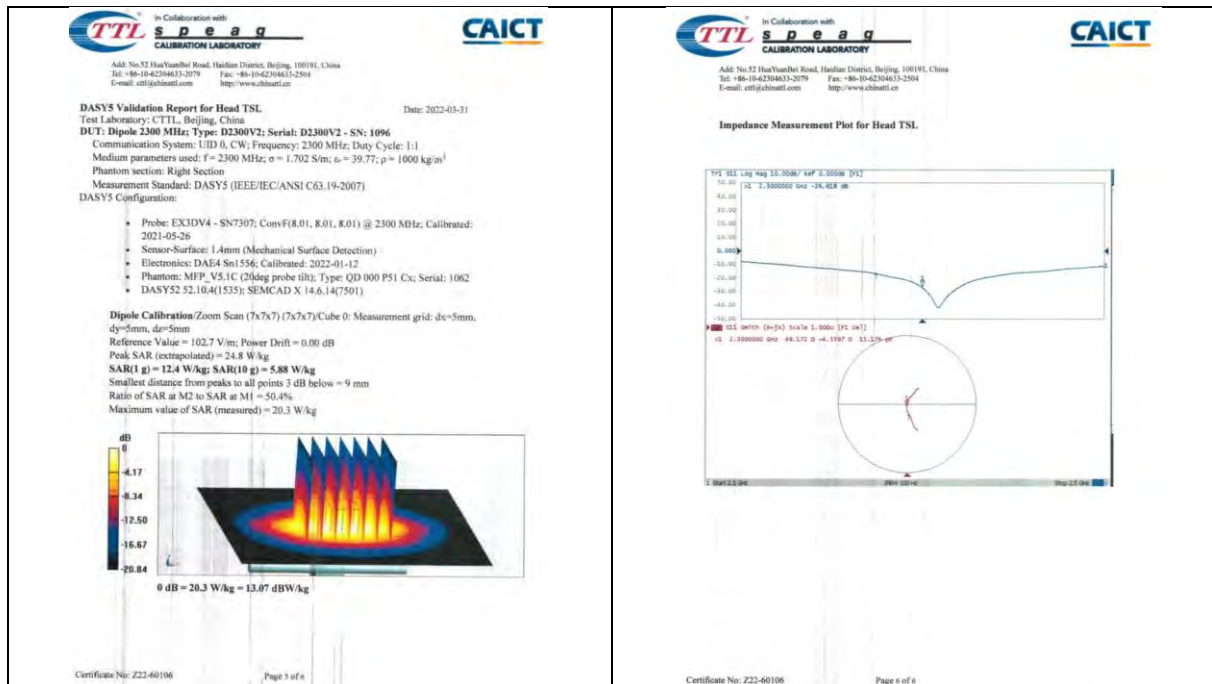
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Appendix (Additional assessments outside the scope of CNAS L0570)			
Antenna Parameters with Head TSL			
Impedance, transformed to feed point	49.20 - 4.50j		
Return Loss	-26.6dB		
General Antenna Parameters and Design			
Electrical Delay (one direction)	1.083 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 backed 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: Z22-60106		Page 4 of 6	



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1.10 D2450V2 - SN 817

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Client: **SGS-CN** Certificate No: **Z22-60107**

CALIBRATION CERTIFICATE

Object: **D2450V2 - SN 817**

Calibration Procedure(s): **FF-Z11-003-3**
Calibration Procedures for dipole validation kits

Calibration date: **April 1, 2022**

This calibration Certificate documents the traceability to national standards, which realize the physical units of measurements [B]. The measurements and the uncertainties with confidence probability are given on the following pages and are part of the certificate.

All calibrations have been conducted in the closed laboratory facility: environment temperature (22±3)°C and humidity <70%.

Calibration Equipment used (M&E critical for calibration)

Primary Standards	ID #	Cal Date (Calibrated by: Certificate No.)	Scheduled Calibration
Power Meter: NRP2	106277	24-Sep-21 (CTTL No.J21X08326)	Sep-22
Power sensor: NRP8S	104291	24-Sep-21 (CTTL No.J21X08326)	Sep-22
Reference Probe EX3DV4	SN 7307	25-May-21(SPEAG.No EX3-7307_May21)	May-22
DAE4	SN 1555	12-Jan-22(CTTL-SPEAG.No Z22-60007)	Jan-23

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

Calibrated by: **Zhao Jing** SAR Test Engineer

Reviewed by: **Liu Hao** SAR Test Engineer

Approved by: **Qi Dianyan** SAR Project Leader

Issued: April 6, 2022

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Glossary:

TSL: tissue simulating liquid
ConvF: sensitivity in TSL / NORMix.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 5 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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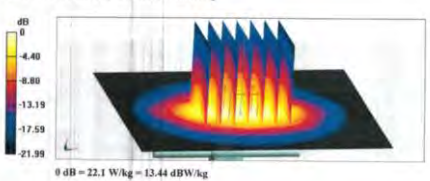
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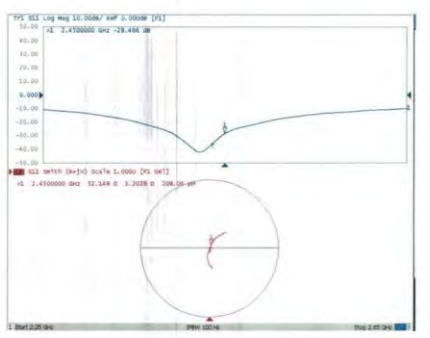
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Measurement Conditions DASY system configuration, as far as not given on page 1:			
DASY Version	DASY52	52.10.4	
Extrapolation	Advanced Extrapolation		
Phantom	Triple Flat Phantom 5.1C		
Distance Dipole Center - TSL	10 mm	with Spacer	
Zoom Scan Resolution	dx, dy, dz = 5 mm		
Frequency	2450 MHz ± 1 MHz		
Head TSL parameters The following parameters and calculations were applied:			
Normalised Head TSL parameters	Temperature	Permittivity	Conductivity
Measured Head TSL parameters	(22.0 ± 0.2) °C	39.5 ± 6 %	1.79 mho/m ± 8 %
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 normalised Head TSL parameters	normalized to 1W	53.0 W/kg ± 18.8 % (k=2)	
SAR averaged over 10 cm ³ (10 g) of Head TSL	Condition		
SAR measured	250 mW input power	6.15 W/kg	
SAR for normalised Head TSL parameters	normalized to 1W	24.7 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	52.10 ± 3.20Ω		
Return Loss	~28.5dB		
General Antenna Parameters and Design			
Electrical Delay (one direction)	1.006 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 ferrinoid 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: 2022-04-01 DUT: Dipole 2450 MHz; Type: D2450V2; Serial: D2450V2 - SN: 817 Communication System: UTD 0, CW; Frequency: 2450 MHz; Duty Cycle: 1:1 Medium parameters used: f = 2450 MHz; σ = 1.79 S/m; ε = 39.52; ρ = 1000 kg/m ³ Phantom section: Right Section Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007) DASY5 Configuration:			
- Probe: EX3DV4 - SN7307; ConvF(7.75, 7.75) @ 2450 MHz; Calibrated: 2021-05-26 - Sensor-Surface: 1.4mm (Mechanical Surface Detection) - Electronics: DA14 Snt 556; 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 = 104.6 V/m; Power Drift = -0.03 dB Peak SAR (extrapolated) = 27.0 W/kg SAR(1 g) = 13.2 W/kg; SAR(10 g) = 6.15 W/kg Smallest distance from peaks to all points 3 dB below = 8.9 mm Ratio of SAR at M2 to SAR at M1 = -49.2% Maximum value of SAR (measured) = 22.1 W/kg			
			
Certificate No: Z22-40107 Page 6 of 6			

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Impedance Measurement Plot for Head TSL			
			
Certificate No: Z22-40107 Page 6 of 6			



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1.11 D2600V2 - SN 1158

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Client: SGS-CN	Certificate No: Z22-60108		
CALIBRATION CERTIFICATE			
Object	D2600V2 - SN: 1158		
Calibration Procedure(s)	FF-Z11-003-01 Calibration Procedures for dipole validation kits		
Calibration date	March 31, 2022		
This calibration Certificate documents the traceability to national standards, which realize the physical units of measurements (SI). The measurements and the uncertainties with confidence probability are given on the following pages and are part of the certificate.			
All calibrations have been conducted in the closed laboratory facility: environment temperature (23±3)°C and humidity<70%.			
Calibration Equipment used (MSTE critical for calibration)			
Primary Standards	ID #	Cal Date (Calibrated by Certificate No.)	Scheduled Calibration
Power Meter NRP2	102377	24-Sep-21 (CTTL No.J21X08326)	Sep-22
Power sensor NRP8	104291	24-Sep-21 (CTTL No.J21X08326)	Sep-22
Reference Probe EX30V4	SN 7307	26-May-21 (SPEAG No.EX3-7307_May21)	May-22
DAE4	SN 1556	12-Jan-22 (CTTL-SPEAG No.Z22-60007)	Jan-23
Secondary Standards	ID #	Cal Date (Calibrated by Certificate No.)	Scheduled Calibration
Signal Generator E4438C	MY48071430	13-Jan-22 (CTTL No.Z22X00406)	Jan-23
Network Analyzer E5071C	MY48110673	14-Jan-22 (CTTL No.Z22X00406)	Jan-23
Calibrated by:	Name: Zhao Jing	Function: SAR Test Engineer	Signature: [Signature]
Reviewed by:	Name: Lin Hao	Function: SAR Test Engineer	Signature: [Signature]
Approved by:	Name: Qi Dianyan	Function: SAR Project Leader	Signature: [Signature]
Issued: April 6, 2022			
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Certificate No: Z22-60108	Page 1 of 6	Certificate No: Z22-60108	Page 2 of 6

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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	38.0	1.96 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	38.7 ± 8 %	1.96 mho/m ± 8 %
Head TSL temperature change during test	< ± 0.2 °C		
SAR result with Head TSL			
SAR averaged over 1 cm² (1 g) of Head TSL		Condition	
SAR measured	250 mW input power	13.7 W/kg	
SAR for nominal Head TSL parameters	normalized to 1W	54.8 W/kg ± 18.8 % (k=2)	
SAR averaged over 10 cm² (10 g) of Head TSL		Condition	
SAR measured	250 mW input power	6.12 W/kg	
SAR for nominal Head TSL parameters	normalized to 1W	24.5 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	49.90 - j6.48Ω		
Return Loss	-23.9dB		
General Antenna Parameters and Design			
Electrical Delay (one direction)	1.053 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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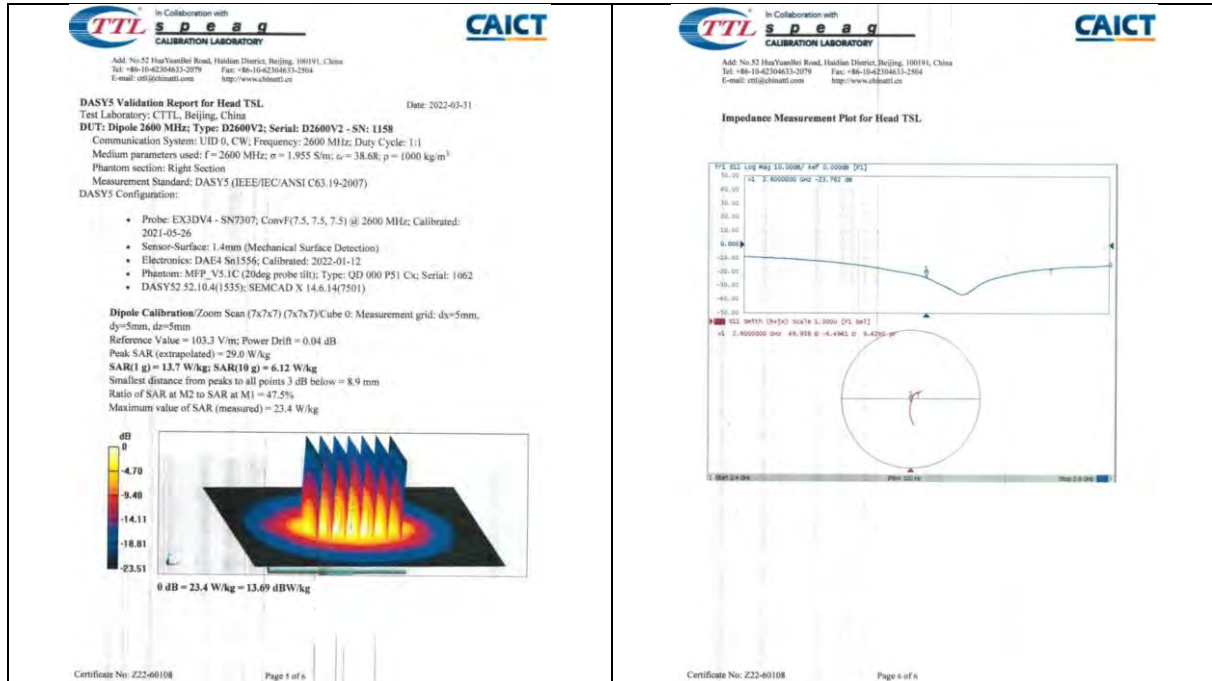
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1.12 D5GHZV2 - SN 1095

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Client: SGS-CN Certificate No: Z22-60187

CALIBRATION CERTIFICATE

Object: D5GHZV2 - SN 1095

Calibration Procedure(s): FF-Z11-003-01
Calibration Procedures for dipole validation kit

Calibration date: June 1, 2022

This calibration Certificate documents the traceability to national standards, which realize the physical units of measurements (SI). The measurements and the uncertainties with confidence probability are given on the following pages and are part of the certificate.

All calibrations have been conducted in the closed laboratory facility: environment temperature (23±1)°C and humidity <70%.

Calibration Equipment used (MSTE critical for calibration)

Primary Standards	ID #	Cal Date (Calibrated by: Certificate No.)	Scheduled Calibration
Power Meter NRP2	106277	24-Sep-21 (CTTL No. J21008328)	Sep-22
Power sensor NRP8	104201	24-Sep-21 (CTTL No. J21008328)	Sep-22
Reference Probe EX3DV4	SN 7464	26-Jan-22 (SPEAG No. EX3-7464, Jan22)	Jan-23
DA64	SN 1556	12-Jan-22 (CTTL-SPEAG No. Z22-60007)	Jan-23

Secondary Standards	ID #	Cal Date (Calibrated by: Certificate No.)	Scheduled Calibration
Signal Generator E4438C	MY48071430	13-Jan-22 (CTTL No. J22000408)	Jan-23
Network Analyzer E5071C	MY46110673	14-Jan-22 (CTTL No. J22000406)	Jan-23

Calibrated by: Zhao Jing SAR Test Engineer

Reviewed by: Lin Hao SAR Test Engineer

Approved by: Qi Dianyan SAR Project Leader

Issued: June 6, 2022

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Certificate No: Z22-60187 Page 1 of 10

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Glossary:

TSL: Issue simulating liquid

CompF: sensitivity in TSL + NORM(x,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 665664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

Additional Documentation:

c) DASY5 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 station 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 SAR system configuration, as for as not given on page 1.			
DASY Version	DASY2		52.10.4
Extrapolation	Advanced Extrapolation		
Phantom	Triple Flat Phantom S.1C		
Distance Dipole Center - TSL	10 mm	with Spacer	
Zoom Scan Resolution	dx, dy = 4 mm, dz = 1.4 mm	Graded Ratio = 1.4 (Z direction)	
Frequency	500 MHz ± 1 MHz 800 MHz ± 1 MHz 1500 MHz ± 1 MHz 5600 MHz ± 1 MHz		

Head TSL parameters at 5200MHz			
The following parameters and calculations were applied:			
Nominal Head TSL parameters	Temperature	Permittivity	Conductivity
	22.0 °C	35.9	4.76 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	35.2 ± 5 %	4.73 mho/m ± 5 %
Head TSL temperature change during test	<1.0 °C	—	—

SAR result with Head TSL at 5200MHz			
SAR averaged over 1 cm ³ (1 g) of Head TSL			
SAR measured	Condition		
	100 mW input power	7.94 W/kg	
SAR for nominal Head TSL parameters	normalized to 1W	79.1 W/kg ± 24.4 % (k=2)	
SAR averaged over 10 cm ³ (10 g) of Head TSL			
SAR measured	Condition		
	100 mW input power	2.27 W/kg	
SAR for nominal Head TSL parameters	normalized to 1W	22.6 W/kg ± 24.2 % (k=2)	

Head TSL parameters at 5500MHz			
The following parameters and calculations were applied:			
Nominal Head TSL parameters	Temperature	Permittivity	Conductivity
	22.0 °C	35.8	4.88 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	34.8 ± 5 %	4.84 mho/m ± 5 %
Head TSL temperature change during test	<1.0 °C	—	—

SAR result with Head TSL at 5500MHz			
SAR averaged over 1 cm ³ (1 g) of Head TSL			
SAR measured	Condition		
	100 mW input power	8.26 W/kg	
SAR for nominal Head TSL parameters	normalized to 1W	82.5 W/kg ± 24.4 % (k=2)	
SAR averaged over 10 cm ³ (10 g) of Head TSL			
SAR measured	Condition		
	100 mW input power	2.34 W/kg	
SAR for nominal Head TSL parameters	normalized to 1W	23.3 W/kg ± 24.2 % (k=2)	

Certificate No: Z22-60187 Page 4 of 10

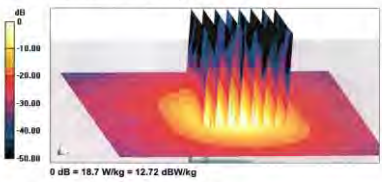
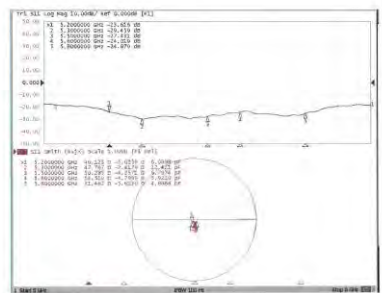


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TTL In Collaboration with CAICT CALIBRATION LABORATORY Add: No.52 Huayuan Road, Haidian District, Beijing, 100191, China Tel: +86-10-62302117 E-mail: csl@caict.ac.cn http://www.caict.ac.cn General Antenna Parameters and Design Electrical Delay (one direction): 1.021 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 carrier conductor of the feeding line is directly connected to the second arm of the dipole. This 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: Z22-60187 Page 1 of 6	TTL In Collaboration with CAICT CALIBRATION LABORATORY Add: No.52 Huayuan Road, Haidian District, Beijing, 100191, China Tel: +86-10-62302117 E-mail: csl@caict.ac.cn http://www.caict.ac.cn DASY5 Validation Report for Head TSL (Date: 2022-09-01) Test Laboratory: CTTL, Beijing, China DUT: Dipole 5GHz; Type: D5GHzV2; Serial: D5GHzV2 - SN: 1095 Communication System: CW; Frequency: 5200 MHz; Frequency: 5300 MHz; Frequency: 5500 MHz; Frequency: 5600 MHz; Frequency: 5800 MHz; Duty Cycle: 1:1 Medium parameters used: $f = 5200 \text{ MHz}$; $\sigma = 4.82 \text{ S/m}$; $\epsilon = 35.39$; $\rho = 1000 \text{ kg/m}^3$ Medium parameters used: $f = 5300 \text{ MHz}$; $\sigma = 4.73 \text{ S/m}$; $\epsilon = 35.19$; $\rho = 1000 \text{ kg/m}^3$ Medium parameters used: $f = 5500 \text{ MHz}$; $\sigma = 4.939 \text{ S/m}$; $\epsilon = 34.83$; $\rho = 1000 \text{ kg/m}^3$ Medium parameters used: $f = 5600 \text{ MHz}$; $\sigma = 5.051 \text{ S/m}$; $\epsilon = 34.89$; $\rho = 1000 \text{ kg/m}^3$ Medium parameters used: $f = 5800 \text{ MHz}$; $\sigma = 5.247 \text{ S/m}$; $\epsilon = 34.42$; $\rho = 1000 \text{ kg/m}^3$ Phantom section: Right Section Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007) DASY5 Configuration: - Probe: EX3DV4 - SN7484; ConvF(5.6, 5.6, 5.6) @ 5200 MHz; ConvF(5.32, 5.32, 5.32) @ 5300 MHz; ConvF(5.11, 5.11, 5.11) @ 5500 MHz; ConvF(4.91, 4.91, 4.91) @ 5600 MHz; ConvF(5.5, 5.5, 5.5) @ 5800 MHz; Calibrated: 2022-01-28 - Sensor-Surface: 1.4mm (Mechanical Surface Detection) - Electronics: DA84 Sn1556; Calibrated: 2022-01-12 - Phantom: MPF_V5.1C (20deg probe tilt); Type: QD 000 P51 Cx; Serial: 1062 - DASY52 52.10.4(1535); SEMCAD X 14.8.14(7501) Dipole Calibration /Pin=100mW, d=10mm, f=5200 MHz/Zoom Scan, dist=1.4mm (8x8x7)/Cube 0; Measurement grid: dx=4mm, dy=4mm, dz=1.4mm; Reference Value = 60.80 V/m; Power Drift = -0.06 dB Peak SAR (extrapolated) = 29.8 W/kg SAR(1 g) = 7.73 W/kg; SAR(10 g) = 2.22 W/kg Smallest distance from peaks to all points 3 dB below = 7.2 mm Ratio of SAR at M2 to SAR at M1 = 66.8% Maximum value of SAR (measured) = 19.3 W/kg Dipole Calibration /Pin=100mW, d=10mm, f=5300 MHz/Zoom Scan, dist=1.4mm (8x8x7)/Cube 0; Measurement grid: dx=4mm, dy=4mm, dz=1.4mm; Reference Value = 61.08 V/m; Power Drift = -0.07 dB Peak SAR (extrapolated) = 31.5 W/kg SAR(1 g) = 7.94 W/kg; SAR(10 g) = 2.27 W/kg Smallest distance from peaks to all points 3 dB below = 7.2 mm Ratio of SAR at M2 to SAR at M1 = 65.5% Maximum value of SAR (measured) = 19.0 W/kg Certificate No: Z22-60187 Page 2 of 6
TTL In Collaboration with CAICT CALIBRATION LABORATORY Add: No.52 Huayuan Road, Haidian District, Beijing, 100191, China Tel: +86-10-62302117 E-mail: csl@caict.ac.cn http://www.caict.ac.cn Dipole Calibration /Pin=100mW, d=10mm, f=5500 MHz/Zoom Scan, dist=1.4mm (8x8x7)/Cube 0; Measurement grid: dx=4mm, dy=4mm, dz=1.4mm; Reference Value = 61.92 V/m; Power Drift = -0.08 dB Peak SAR (extrapolated) = 34.7 W/kg SAR(1 g) = 8.28 W/kg; SAR(10 g) = 2.34 W/kg Smallest distance from peaks to all points 3 dB below = 7.2 mm Ratio of SAR at M2 to SAR at M1 = 63.9% Maximum value of SAR (measured) = 20.2 W/kg Dipole Calibration /Pin=100mW, d=10mm, f=5600 MHz/Zoom Scan, dist=1.4mm (8x8x7)/Cube 0; Measurement grid: dx=4mm, dy=4mm, dz=1.4mm; Reference Value = 65.08 V/m; Power Drift = -0.07 dB Peak SAR (extrapolated) = 35.3 W/kg SAR(1 g) = 8.12 W/kg; SAR(10 g) = 2.3 W/kg Smallest distance from peaks to all points 3 dB below = 7.2 mm Ratio of SAR at M2 to SAR at M1 = 62.5% Maximum value of SAR (measured) = 19.1 W/kg Dipole Calibration /Pin=100mW, d=10mm, f=5800 MHz/Zoom Scan, dist=1.4mm (8x8x7)/Cube 0; Measurement grid: dx=4mm, dy=4mm, dz=1.4mm; Reference Value = 62.13 V/m; Power Drift = -0.06 dB Peak SAR (extrapolated) = 34.8 W/kg SAR(1 g) = 7.71 W/kg; SAR(10 g) = 2.16 W/kg Smallest distance from peaks to all points 3 dB below = 7.2 mm Ratio of SAR at M2 to SAR at M1 = 61.6% Maximum value of SAR (measured) = 18.7 W/kg  0 dB = 18.7 W/kg = 12.72 dBW/kg Certificate No: Z22-60187 Page 3 of 6	TTL In Collaboration with CAICT CALIBRATION LABORATORY Add: No.52 Huayuan Road, Haidian District, Beijing, 100191, China Tel: +86-10-62302117 E-mail: csl@caict.ac.cn http://www.caict.ac.cn Impedance Measurement Plot for Head TSL  Certificate No: Z22-60187 Page 4 of 6



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2 DAE4 - SN 1245

Schmid & Partner Engineering AG Zugzwangstrasse 43, 8004 Zurich, Switzerland Phone +41 (0)43 9702, Fax +41 (0)43 9775 info@sgs.ch, info@sgs.ch IMPORTANT NOTICE USAGE OF THE DAE4 The DAE4 unit is a delicate, high precision instrument and requires careful treatment by the user. There are no serviceable parts inside the DAE4. Special attention shall be given to the following points: Battery Exchange: The battery cover of the DAE4 unit is fixed using a screw, over tightening the screw may cause the threads inside the DAE4 to wear out. Shipping of the DAE4: Before shipping the DAE4 to SPEAG for calibration, remove the batteries and pack the DAE4 in an anti-static bag. This anti-static bag shall then be packed into a larger box or container which protects the DAE4 from impacts during transportation. The package shall be marked to indicate that a fragile instrument is inside. E-stop Failures: Touch detection may be malfunctioning due to broken magnets in the E-stop. Rough handling of the E-stop may lead to damage of these magnets. Touch and collision errors are often caused by dust and dirt accumulated in the E-stop. To prevent E-stop failure, the customer shall always mount the probe to the DAE4 carefully and keep the DAE4 unit in a non-dusty environment if not used for measurements. Repair: Minor repairs are performed at no extra cost during the annual calibration. However, SPEAG reserves the right to charge for any repair especially if rough unprofessional handling caused the defect. DASY Configuration Files: Since the exact values of the DAE input resistances, as measured during the calibration procedure of a DAE unit, are not used by the DASY software, a nominal value of 200 MOhm is given in the corresponding configuration file. Important Note: Warranty and calibration is void if the DAE unit is disassembled partly or fully by the Customer. Important Note: Never attempt to grease or oil the E-stop assembly. Cleaning and readjusting of the E-stop assembly is allowed by certified SPEAG personnel only and is part of the annual calibration procedure. Important Note: To prevent damage of the DAE probe connector pins, use great care when installing the probe to the DAE. Carefully connect the probe with the connector notch oriented in the mating position. Avoid any rotational movement of the probe body versus the DAE while turning the locking nut of the connector. The same care shall be used when disconnecting the probe from the DAE. TN_EH190306AE_DAE4.docx 07.03.2019	Calibration Laboratory of Schmid & Partner Engineering AG Zugzwangstrasse 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 Client: SGS-CN (Auden) Certificate No.: DAE4-1245_May22 CALIBRATION CERTIFICATE Object: DAE4 - SD 000 D04 BM - SN: 1245 Calibration procedure(s): QA CAL-06 v30 Calibration procedure for the data acquisition electronics (DAE) Calibration date: May 30, 2022 This calibration certificate documents the traceability to national standards, which include the physical units of measurement (SI). The measurement and the uncertainties with confidence probability are given on the following pages and are part of the certificate. All calibrations have been conducted in the closed laboratory facility: environment temperature (22 ± 1) °C and humidity < 70%. Calibration Equipment used (MATE critical for calibration) <table border="1"><thead><tr><th>Primary Standards</th><th>Q#</th><th>Due Date (Certificate No.)</th><th>Scheduled Calibration</th></tr></thead><tbody><tr><td>Kathrein Multimeter Type 2001</td><td>SN: 0810278</td><td>31-Aug-21 (No: 31368)</td><td>Aug-22</td></tr></tbody></table> <table border="1"><thead><tr><th>Secondary Standards</th><th>Q#</th><th>Check Date (in hours)</th><th>Scheduled Check</th></tr></thead><tbody><tr><td>Auto DAE Calibration Unit</td><td>SE LWS 053 AA 1001</td><td>24-Jan-22 (in hours check)</td><td>In house check: Jan-22</td></tr><tr><td>Calibrator Box V1</td><td>SE LWS 006 AA 1002</td><td>24-Jan-22 (in hours check)</td><td>In house check: Jan-22</td></tr></tbody></table> Calibrated by: Dominique Steiner Function: Laboratory Technician Signature: <i>[Signature]</i> Approved by: (Ben Kuhn) Technical Manager: <i>[Signature]</i> This calibration certificate shall not be reproduced except in full without written approval of the laboratory. Certificate No.: DAE4-1245_May22 Page 1 of 5	Primary Standards	Q#	Due Date (Certificate No.)	Scheduled Calibration	Kathrein Multimeter Type 2001	SN: 0810278	31-Aug-21 (No: 31368)	Aug-22	Secondary Standards	Q#	Check Date (in hours)	Scheduled Check	Auto DAE Calibration Unit	SE LWS 053 AA 1001	24-Jan-22 (in hours check)	In house check: Jan-22	Calibrator Box V1	SE LWS 006 AA 1002	24-Jan-22 (in hours check)	In house check: Jan-22
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Calibration Laboratory of Schmid & Partner Engineering AG Zugzwangstrasse 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 DAE: data acquisition electronics Connector angle: information used in DASY system to align probe sensor X to the robot coordinate system. Methods Applied and Interpretation of Parameters • DC Voltage Measurement: Calibration Factor assessed for use in DASY system by comparison with a calibrated instrument traceable to national standards. The figure given corresponds to the full scale range of the voltmeter in the respective range. • Connector angle: The angle of the connector is assessed measuring the angle mechanically by a tool inserted. Uncertainty is not required. • The following parameters as documented in the Appendix contain technical information as a result from the performance test and require no uncertainty. • DC Voltage Measurement Linearity: Verification of the Linearity at +10% and -10% of the nominal calibration voltage. Influence of offset voltage is included in this measurement. • Common mode sensitivity: Influence of a positive or negative common mode voltage on the differential measurement. • Channel separation: Influence of a voltage on the neighbor channels not subject to an input voltage. • AD Converter Values with inputs shorted: Values on the internal AD converter corresponding to zero input voltage. • Input Offset Measurement: Output voltage and statistical results over a large number of zero voltage measurements. • Input Offset Current: Typical value for information; Maximum channel input offset current, not considering the input resistance. • Input resistance: Typical value for information; DAE input resistance at the connector, during internal auto-zeroing and during measurement. • Low Battery Alarm Voltage: Typical value for information. Below this voltage, a battery alarm signal is generated. • Power consumption: Typical value for information. Supply currents in various operating modes. Certificate No.: DAE4-1245_May22 Page 2 of 5	DC Voltage Measurement AD - Converter Resolution nominal High Range: 1LSB = 6.1 μV, full range = -190...+320 mV Low Range: 1LSB = 61 μV, full range = -1...+32 mV DASY measurement parameters: Auto Zero-Time: 3 sec; Measuring time: 3 sec <table border="1"><thead><tr><th>Calibration Factors</th><th>X</th><th>Y</th><th>Z</th></tr></thead><tbody><tr><td>High Range</td><td>405.265 ± 0.02% (k=2)</td><td>403.974 ± 0.02% (k=2)</td><td>406.092 ± 0.02% (k=2)</td></tr><tr><td>Low Range</td><td>3.99534 ± 1.50% (k=2)</td><td>3.99508 ± 1.50% (k=2)</td><td>4.01015 ± 1.50% (k=2)</td></tr></tbody></table> Connector Angle <table border="1"><thead><tr><th>Connector Angle to be used in DASY system</th><th>30.0° ± 1°</th></tr></thead></table> Certificate No.: DAE4-1245_May22 Page 3 of 5	Calibration Factors	X	Y	Z	High Range	405.265 ± 0.02% (k=2)	403.974 ± 0.02% (k=2)	406.092 ± 0.02% (k=2)	Low Range	3.99534 ± 1.50% (k=2)	3.99508 ± 1.50% (k=2)	4.01015 ± 1.50% (k=2)	Connector Angle to be used in DASY system	30.0° ± 1°						
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Appendix (Additional assessments outside the scope of SCS0108)

1. DC Voltage Linearity

High Range	Reading (µV)	Difference (µV)	Error (%)
Channel X + Input	19994.45	1.52	0.00
Channel X - Input	20004.58	2.22	0.01
Channel X + Input	-20001.14	1.12	-0.01
Channel Y + Input	19994.72	1.58	0.00
Channel Y - Input	20001.22	-1.00	-0.00
Channel Y + Input	-20003.05	1.57	0.01
Channel Z + Input	19992.44	0.19	0.00
Channel Z - Input	20003.09	0.58	0.00
Channel Z + Input	-20001.73	-0.27	0.00

Low Range	Reading (µV)	Difference (µV)	Error (%)
Channel X + Input	2001.91	0.41	0.22
Channel X - Input	202.54	0.65	0.32
Channel X + Input	-197.86	0.07	-0.04
Channel Y + Input	2002.05	0.58	0.03
Channel Y - Input	201.27	-0.67	-0.28
Channel Y + Input	-196.23	-0.06	0.03
Channel Z + Input	2001.96	0.08	0.00
Channel Z - Input	200.09	-1.03	-0.76
Channel Z + Input	-199.85	-1.57	0.79

2. Common mode sensitivity

Channel	Common mode Input Voltage (mV)	High Range Average Reading (µV)	Low Range Average Reading (µV)
Channel X	200	-5.87	-7.69
	-200	9.12	7.79
Channel Y	200	-8.68	-9.28
	-200	8.52	6.36
Channel Z	200	-5.36	-5.60
	-200	3.58	3.08

3. Channel separation

Channel	Input Voltage (mV)	Channel X (µV)	Channel Y (µV)	Channel Z (µV)
Channel X	200	-	4.07	-3.14
Channel Y	200	9.36	-	4.27
Channel Z	200	10.11	7.14	-

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4. AD-Converter Values with inputs shorted

DASY measurement parameters: Auto Zero Time: 3 sec; Measuring time: 3 sec

	High Range (LSB)	Low Range (LSB)
Channel X	15984	17040
Channel Y	16562	16768
Channel Z	16035	15968

5. Input Offset Measurement

DASY measurement parameters: Auto Zero Time: 3 sec; Measuring time: 3 sec

Input (mV)	Average (µV)	min. Offset (µV)	max. Offset (µV)	Std. Deviation (µV)
Channel X	1.00	-0.15	1.93	0.45
Channel Y	-0.18	-1.28	0.94	0.45
Channel Z	-0.58	-2.81	0.58	0.60

6. Input Offset Current

Nominal input circuitry offset current on all channels: <25nA

7. Input Resistance (Typical values for information)

	Zeroing (Ohm)	Measuring (MOhm)
Channel X	200	200
Channel Y	200	200
Channel Z	200	200

8. Low Battery Alarm Voltage (Typical values for information)

Typical values	Alarm Level (VDC)
Supply (+ Vcc)	+7.9
Supply (- Vcc)	-7.6

9. Power Consumption (Typical values for information)

Typical values	Switched off (mA)	Stand by (mA)	Transmitting (mA)
Supply (+ Vcc)	+0.01	+8	+14
Supply (- Vcc)	-0.01	-8	-9

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3 EX3DV4 - SN 7346

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CALIBRATION CERTIFICATE Object: EX3DV4 - SN 7346 Calibration procedure: QA CAL-01 v6, QA CAL-14 v6, QA CAL-23 v5, QA CAL-25 v7 Calibration procedure for domestic E-field probes Calibration date: March 30, 2022 This calibration certificate documents the traceability to national standards, which requires the physical units of measurement (SI). The measurement and the uncertainty with confidence probability are given on the following pages and are part of the certificate. All calibrations have been conducted in the closed laboratory facility, environment temperature (22 ± 0.5 °C and humidity < 70%). Calibration Equipment used (MPE): (value for calibration): <table><tr><th>Primary Standards</th><th>SI</th><th>Cal Date (Certificate No.)</th><th>Scheduled Calibration</th></tr><tr><td>Power meter MPE</td><td>86.10479</td><td>08-Apr-21 (No. 217-02501-0303)</td><td>Apr-22</td></tr><tr><td>Power sensor MPE-291</td><td>86.10304</td><td>08-Apr-21 (No. 217-02501-0303)</td><td>Apr-22</td></tr><tr><td>Power sensor MPE-291</td><td>86.10304</td><td>08-Apr-21 (No. 217-02502)</td><td>Apr-22</td></tr><tr><td>Reference DUT attenuator</td><td>86.10304 (20)</td><td>08-Apr-21 (No. 217-02503)</td><td>Apr-22</td></tr><tr><td>DUT</td><td>86.10304</td><td>13-Dec-21 (No. DAE4-1245_May22)</td><td>Dec-22</td></tr><tr><td>Reference Probe (S202)</td><td>86.10304</td><td>13-Dec-21 (No. DAE4-1245_May22)</td><td>Dec-22</td></tr></table> Secondary Standards <table><tr><th>SI</th><th>Check Date (in house)</th><th>Scheduled Date</th></tr><tr><td>Power meter E4138</td><td>08-Apr-21 (in house check Jan-22)</td><td>In house check Jan-22</td></tr><tr><td>Power meter E4138A</td><td>08-Apr-21 (in house check Jan-22)</td><td>In house check Jan-22</td></tr><tr><td>Power sensor E4138A</td><td>08-Apr-21 (in house check Jan-22)</td><td>In house check Jan-22</td></tr><tr><td>Power sensor E4138A</td><td>08-Apr-21 (in house check Jan-22)</td><td>In house check Jan-22</td></tr><tr><td>RF generator HP 8446C</td><td>08-Apr-21 (in house check Jan-22)</td><td>In house check Jan-22</td></tr><tr><td>Network Analyzer B 8700A</td><td>08-Apr-21 (in house check Jan-22)</td><td>In house check Jan-22</td></tr></table> Calibrated by: Name: (blank) Function: Laboratory Technician Signature: (blank) Approved by: (blank) Function: (blank) Signature: (blank) This calibration certificate and not be reproduced except in full without written approval of the laboratory. Certificate No: EX3-7346_May22 Page 1 of 24		Primary Standards	SI	Cal Date (Certificate No.)	Scheduled Calibration	Power meter MPE	86.10479	08-Apr-21 (No. 217-02501-0303)	Apr-22	Power sensor MPE-291	86.10304	08-Apr-21 (No. 217-02501-0303)	Apr-22	Power sensor MPE-291	86.10304	08-Apr-21 (No. 217-02502)	Apr-22	Reference DUT attenuator	86.10304 (20)	08-Apr-21 (No. 217-02503)	Apr-22	DUT	86.10304	13-Dec-21 (No. DAE4-1245_May22)	Dec-22	Reference Probe (S202)	86.10304	13-Dec-21 (No. DAE4-1245_May22)	Dec-22	SI	Check Date (in house)	Scheduled Date	Power meter E4138	08-Apr-21 (in house check Jan-22)	In house check Jan-22	Power meter E4138A	08-Apr-21 (in house check Jan-22)	In house check Jan-22	Power sensor E4138A	08-Apr-21 (in house check Jan-22)	In house check Jan-22	Power sensor E4138A	08-Apr-21 (in house check Jan-22)	In house check Jan-22	RF generator HP 8446C	08-Apr-21 (in house check Jan-22)	In house check Jan-22	Network Analyzer B 8700A	08-Apr-21 (in house check Jan-22)	In house check Jan-22	Glossary: TSL: Issue simulating liquid NORM(x,y,z): sensitivity in free space Comp: correction OCF: crest factor (10/10, cycle) of the RF signal A, B, C, D: modulation dependent measurement parameters Polarization: (x, y, z) rotation around probe axis Connector Angle: (information used in DASY system to align probe sensor X to the robot coordinate system) Calibration is Performed According to the Following Standards: - IEC 61010-1:2011, Measurement Procedure for the Assessment of Specific Absorption Rate (SAR) Exposure to Radio Frequency Fields From Hand-Held And Body-Worn Wireless Communication Devices, Part 1: SAR Measurement, Implementation And Procedures (Frequency Range of 4 MHz to 10 GHz), October 2020 - ISO 9001:2015, "SAR Measurement Requirements for 100 MHz to 6 GHz" Methods Applied and Interpretation of Parameters: - NORM(x,y,z): Assessed for E-field polarization: $E = 0$ (1 = 1000 MHz in TEM-cell; 1 = 1000 MHz R22 waveguide). NORM(x,y,z) are only reference values, i.e., the uncertainties of NORM(x,y,z) does not affect the E-field uncertainty model TSL (see below Comp). - NORM(x,y,z) = NORM(x,y,z) * frequency response (see Frequency Response Chart). The frequency response is implemented in DASY software version 1.0. The uncertainty of the frequency response is included in the stated uncertainty of Comp. - OCF: OCF is a nominal measurement parameter assessed based on the data of power sweep with CW signal (no uncertainty required). OCF does not depend on frequency nor media. - PAC: PAC is the Peak to Average Ratio that is not calculated but determined based on the signal characteristics. - A(x,y,z), B(x,y,z), C(x,y,z), D(x,y,z), V(x,y,z), A, B, C, D are numerical measurement parameters assessed based on the data of power sweep for specific modulation signal. The parameters do not depend on frequency nor media. V(x,y,z) is the maximum calibration range assessed in RMS voltage across the probe. - Comp: Comp and Boundary Effect Parameters: Assessed in the probe using E-field (or Temperature Transfer Standard for f < 400 MHz) and inside waveguide using analytical field distributions based on power measurements for f > 400 MHz. The same values are used for assessment of the parameters applied by boundary compensation (alpha, depth) of which typical uncertainty values are given. These parameters are NORM(x,y,z) * Comp. The uncertainty of NORM(x,y,z) is not given for Comp. A frequency dependent Comp is used in DASY version 1.0 and higher which allows assessing the validity from 50 MHz to 100 MHz. - Sensor offset: Sensor offset (or deviation from zero) in a field of low gradients measured using a flat phantom exposed by a patch antenna. - Sensor Offset: The sensor offset corresponds to the offset of virtual measurement center from the probe tip (see probe axis). No tolerance required. - Connector Angle: The angle is assessed using the information given by determining the NORM(x,y,z) uncertainty required. Certificate No: EX3-7346_May22 Page 2 of 24
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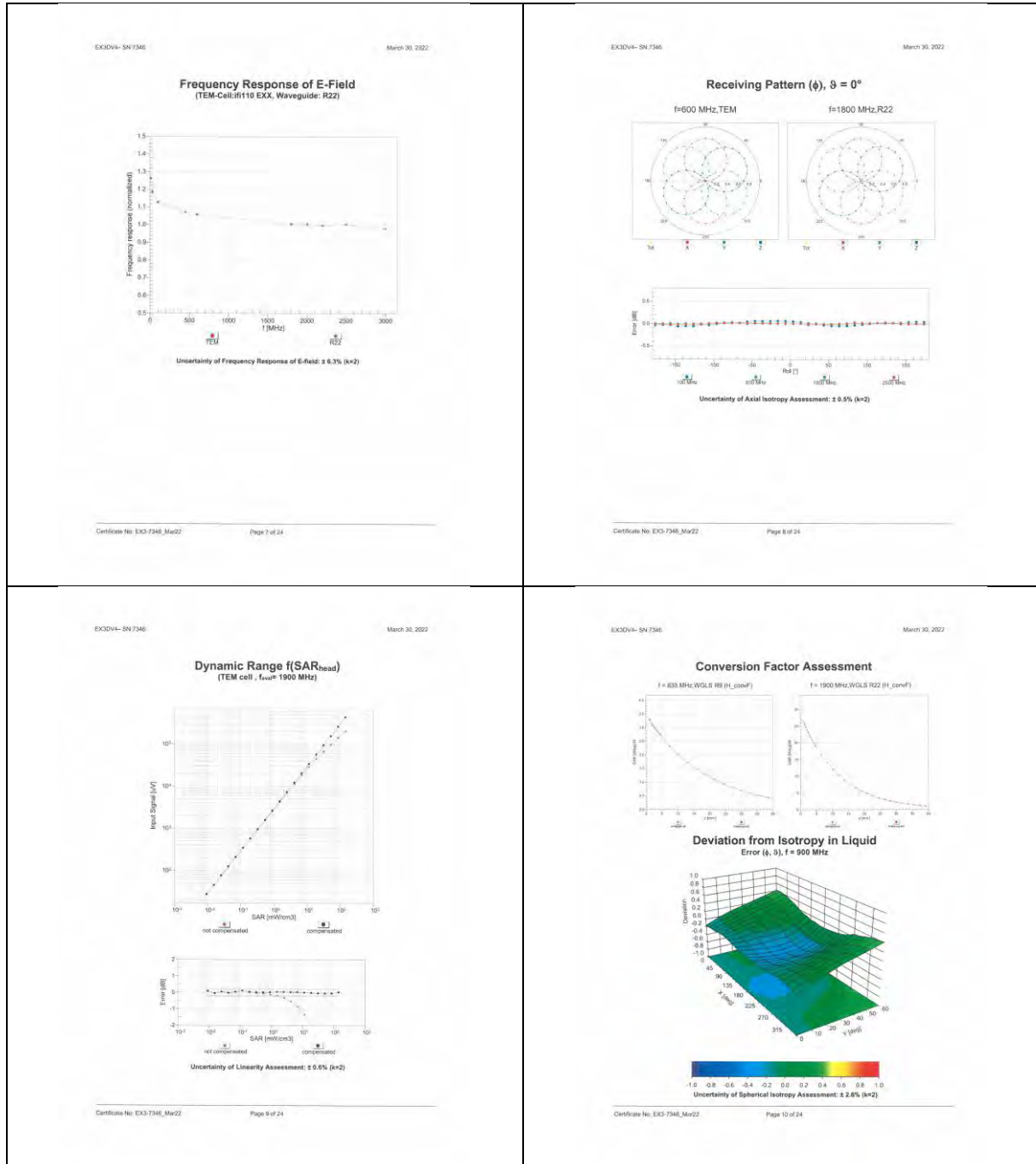


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EX3034-SN-7346				March 30, 2022			
10414	AAA	WLAN CDF4 64-QAM 40MHz	Generic	8.54	± 0.6 %		
10415	AAA	IEEE 802.11b WFI 2.4 GHz (DSSS, 1 Mbps, R90c-d)	WLAN	1.54	± 0.6 %		
10416	AAA	IEEE 802.11g WFI 2.4 GHz (DSSS-OFDM, 5.5 Mbps, R90c-d)	WLAN	8.23	± 0.6 %		
10417	AAC	IEEE 802.11n WFI 5 GHz (OFDM, 6 Mbps, R90c-d)	WLAN	8.23	± 0.6 %		
10418	AAA	IEEE 802.11g WFI 2.4 GHz (DSSS-OFDM, 5.5 Mbps, R90c-d)	WLAN	8.14	± 0.6 %		
10419	AAA	IEEE 802.11g WFI 2.4 GHz (DSSS-OFDM, 5.5 Mbps, R90c-d)	WLAN	8.19	± 0.6 %		
10420	AAC	IEEE 802.11n HT Overhead, 7.2 Mbps, R90c-d	WLAN	8.32	± 0.6 %		
10421	AAC	IEEE 802.11n HT Overhead, 6.3 Mbps, 16-QAM	WLAN	8.47	± 0.6 %		
10424	AAC	IEEE 802.11n HT Overhead, 7.2 Mbps, 64-QAM	WLAN	8.40	± 0.6 %		
10425	AAC	IEEE 802.11n HT Overhead, 14 Mbps, R90c-d	WLAN	8.34	± 0.6 %		
10426	AAC	IEEE 802.11n HT Overhead, 30 Mbps, 16-QAM	WLAN	8.45	± 0.6 %		
10427	AAC	IEEE 802.11n HT Overhead, 130 Mbps, 64-QAM	WLAN	8.41	± 0.6 %		
10428	AAD	LTE-FDD (OFDMA, 5 MHz, E-TRP 3.1)	LTE-FDD	8.38	± 0.6 %		
10431	AAD	LTE-FDD (OFDMA, 15 MHz, E-TRP 3.1)	LTE-FDD	8.38	± 0.6 %		
10432	AAC	LTE-FDD (OFDMA, 15 MHz, E-TRP 3.1)	LTE-FDD	8.34	± 0.6 %		
10433	AAC	LTE-FDD (OFDMA, 20 MHz, E-TRP 3.1)	LTE-FDD	8.34	± 0.6 %		
10434	AAA	WCDMA (BS Test Model 1, 64 DPM) WCDMA	WCDMA	8.80	± 0.6 %		
10435	AAF	LTE-TDD (SC-FDMA, 1 RB, 3.1 MHz, QPSK, UL Sub)	LTE-TDD	7.82	± 0.6 %		
10447	AAD	LTE-FDD (OFDMA, 5 MHz, E-TRP 3.1, Clipping 44%)	LTE-FDD	7.86	± 0.6 %		
10448	AAD	LTE-FDD (OFDMA, 10 MHz, E-TRP 3.1, Clipping 44%)	LTE-FDD	7.93	± 0.6 %		
10449	AAC	LTE-FDD (OFDMA, 15 MHz, E-TRP 3.1, Clipping 44%)	LTE-FDD	7.91	± 0.6 %		
10450	AAC	LTE-FDD (OFDMA, 20 MHz, E-TRP 3.1, Clipping 44%)	LTE-FDD	7.88	± 0.6 %		
10451	AAA	WCDMA (BS Test Model 1, 64 DPM, Clipping 44%)	WCDMA	7.89	± 0.6 %		
10452	AAD	Validation (Spurious, 10ms, 1ms)	Test	10.00	± 0.6 %		
10453	AAC	IEEE 802.11ac WFI (160MHz, 64-QAM, R90c-d)	WLAN	8.63	± 0.6 %		
10457	AAA	UMTS FDD (SC-HSPA)	WCDMA	6.62	± 0.6 %		
10458	AAA	CDMA2000 (1xEV-DO Rev. B, 3.1c)	CDMA2000	8.58	± 0.6 %		
10459	AAA	CDMA2000 (1xEV-DO Rev. B, 3.1c)	CDMA2000	8.25	± 0.6 %		
10462	AAA	UMTS FDD (HSPA, R90c-d)	WCDMA	2.39	± 0.6 %		
10463	AAB	LTE-TDD (SC-FDMA, 1 RB, 1.4 MHz, QPSK, UL Sub)	LTE-TDD	7.82	± 0.6 %		
10462	AAB	LTE-TDD (SC-FDMA, 1 RB, 1.4 MHz, 16-QAM, UL Sub)	LTE-TDD	8.30	± 0.6 %		
10463	AAB	LTE-TDD (SC-FDMA, 1 RB, 1.4 MHz, 64-QAM, UL Sub)	LTE-TDD	8.30	± 0.6 %		
10464	AAC	LTE-TDD (SC-FDMA, 1 RB, 3.1 MHz, QPSK, UL Sub)	LTE-TDD	7.82	± 0.6 %		
10465	AAC	LTE-TDD (SC-FDMA, 1 RB, 3.1 MHz, 16-QAM, UL Sub)	LTE-TDD	8.32	± 0.6 %		
10466	AAC	LTE-TDD (SC-FDMA, 1 RB, 3.1 MHz, 64-QAM, UL Sub)	LTE-TDD	8.32	± 0.6 %		
10467	AAF	LTE-TDD (SC-FDMA, 1 RB, 3.1 MHz, QPSK, UL Sub)	LTE-TDD	7.82	± 0.6 %		
10468	AAF	LTE-TDD (SC-FDMA, 1 RB, 3.1 MHz, 16-QAM, UL Sub)	LTE-TDD	8.32	± 0.6 %		
10469	AAF	LTE-TDD (SC-FDMA, 1 RB, 3.1 MHz, 64-QAM, UL Sub)	LTE-TDD	8.32	± 0.6 %		
10470	AAF	LTE-TDD (SC-FDMA, 1 RB, 3.1 MHz, QPSK, UL Sub)	LTE-TDD	7.82	± 0.6 %		
10471	AAF	LTE-TDD (SC-FDMA, 1 RB, 3.1 MHz, 16-QAM, UL Sub)	LTE-TDD	8.32	± 0.6 %		
10472	AAF	LTE-TDD (SC-FDMA, 1 RB, 3.1 MHz, 64-QAM, UL Sub)	LTE-TDD	8.32	± 0.6 %		
10473	AAB	LTE-TDD (SC-FDMA, 1 RB, 3.1 MHz, QPSK, UL Sub)	LTE-TDD	7.82	± 0.6 %		
10474	AAB	LTE-TDD (SC-FDMA, 1 RB, 3.1 MHz, 16-QAM, UL Sub)	LTE-TDD	8.32	± 0.6 %		
10475	AAB	LTE-TDD (SC-FDMA, 1 RB, 3.1 MHz, 64-QAM, UL Sub)	LTE-TDD	8.32	± 0.6 %		
10476	AAF	LTE-TDD (SC-FDMA, 1 RB, 3.1 MHz, QPSK, UL Sub)	LTE-TDD	7.82	± 0.6 %		
10477	AAF	LTE-TDD (SC-FDMA, 1 RB, 3.1 MHz, 16-QAM, UL Sub)	LTE-TDD	8.32	± 0.6 %		
10478	AAF	LTE-TDD (SC-FDMA, 1 RB, 3.1 MHz, 64-QAM, UL Sub)	LTE-TDD	8.32	± 0.6 %		
10479	AAB	LTE-TDD (SC-FDMA, 1 RB, 3.1 MHz, QPSK, UL Sub)	LTE-TDD	7.82	± 0.6 %		
10480	AAB	LTE-TDD (SC-FDMA, 1 RB, 3.1 MHz, 16-QAM, UL Sub)	LTE-TDD	8.32	± 0.6 %		
10481	AAB	LTE-TDD (SC-FDMA, 1 RB, 3.1 MHz, 64-QAM, UL Sub)	LTE-TDD	8.32	± 0.6 %		
10482	AAC	LTE-TDD (SC-FDMA, 1 RB, 3.1 MHz, QPSK, UL Sub)	LTE-TDD	7.82	± 0.6 %		
10483	AAC	LTE-TDD (SC-FDMA, 1 RB, 3.1 MHz, 16-QAM, UL Sub)	LTE-TDD	8.32	± 0.6 %		
10484	AAC	LTE-TDD (SC-FDMA, 1 RB, 3.1 MHz, 64-QAM, UL Sub)	LTE-TDD	8.32	± 0.6 %		
10485	AAF	LTE-TDD (SC-FDMA, 1 RB, 3.1 MHz, QPSK, UL Sub)	LTE-TDD	7.82	± 0.6 %		
10486	AAF	LTE-TDD (SC-FDMA, 1 RB, 3.1 MHz, 16-QAM, UL Sub)	LTE-TDD	8.32	± 0.6 %		
10487	AAF	LTE-TDD (SC-FDMA, 1 RB, 3.1 MHz, 64-QAM, UL Sub)	LTE-TDD	8.32	± 0.6 %		
10488	AAF	LTE-TDD (SC-FDMA, 1 RB, 3.1 MHz, QPSK, UL Sub)	LTE-TDD	7.82	± 0.6 %		

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10489	AAF	LTE-TDD (SC-FDMA, 1 RB, 3.1 MHz, QPSK, UL Sub)	LTE-TDD	7.82	± 0.6 %		
10490	AAF	LTE-TDD (SC-FDMA, 1 RB, 3.1 MHz, 16-QAM, UL Sub)	LTE-TDD	8.32	± 0.6 %		
10491	AAF	LTE-TDD (SC-FDMA, 1 RB, 3.1 MHz, 64-QAM, UL Sub)	LTE-TDD	8.32	± 0.6 %		
10492	AAC	LTE-TDD (SC-FDMA, 1 RB, 3.1 MHz, QPSK, UL Sub)	LTE-TDD	7.82	± 0.6 %		
10493	AAC	LTE-TDD (SC-FDMA, 1 RB, 3.1 MHz, 16-QAM, UL Sub)	LTE-TDD	8.32	± 0.6 %		
10494	AAF	LTE-TDD (SC-FDMA, 1 RB, 3.1 MHz, QPSK, UL Sub)	LTE-TDD	7.82	± 0.6 %		
10495	AAF	LTE-TDD (SC-FDMA, 1 RB, 3.1 MHz, 16-QAM, UL Sub)	LTE-TDD	8.32	± 0.6 %		
10496	AAF	LTE-TDD (SC-FDMA, 1 RB, 3.1 MHz, 64-QAM, UL Sub)	LTE-TDD	8.32	± 0.6 %		
10497	AAB	LTE-TDD (SC-FDMA, 1 RB, 3.1 MHz, QPSK, UL Sub)	LTE-TDD	7.82	± 0.6 %		
10498	AAB	LTE-TDD (SC-FDMA, 1 RB, 3.1 MHz, 16-QAM, UL Sub)	LTE-TDD	8.32	± 0.6 %		
10499	AAB	LTE-TDD (SC-FDMA, 1 RB, 3.1 MHz, 64-QAM, UL Sub)	LTE-TDD	8.32	± 0.6 %		
10500	AAC	LTE-TDD (SC-FDMA, 1 RB, 3.1 MHz, QPSK, UL Sub)	LTE-TDD	7.82	± 0.6 %		
10501	AAC	LTE-TDD (SC-FDMA, 1 RB, 3.1 MHz, 16-QAM, UL Sub)	LTE-TDD	8.32	± 0.6 %		
10502	AAC	LTE-TDD (SC-FDMA, 1 RB, 3.1 MHz, 64-QAM, UL Sub)	LTE-TDD	8.32	± 0.6 %		
10503	AAF	LTE-TDD (SC-FDMA, 1 RB, 3.1 MHz, QPSK, UL Sub)	LTE-TDD	7.82	± 0.6 %		
10504	AAF	LTE-TDD (SC-FDMA, 1 RB, 3.1 MHz, 16-QAM, UL Sub)	LTE-TDD	8.32	± 0.6 %		
10505	AAF	LTE-TDD (SC-FDMA, 1 RB, 3.1 MHz, 64-QAM, UL Sub)	LTE-TDD	8.32	± 0.6 %		
10506	AAF	LTE-TDD (SC-FDMA, 1 RB, 3.1 MHz, QPSK, UL Sub)	LTE-TDD	7.82	± 0.6 %		
10507	AAF	LTE-TDD (SC-FDMA, 1 RB, 3.1 MHz, 16-QAM, UL Sub)	LTE-TDD	8.32	± 0.6 %		
10508	AAF	LTE-TDD (SC-FDMA, 1 RB, 3.1 MHz, 64-QAM, UL Sub)	LTE-TDD	8.32	± 0.6 %		
10509	AAC	LTE-TDD (SC-FDMA, 1 RB, 3.1 MHz, QPSK, UL Sub)	LTE-TDD	7.82	± 0.6 %		
10510	AAC	LTE-TDD (SC-FDMA, 1 RB, 3.1 MHz, 16-QAM, UL Sub)	LTE-TDD	8.32	± 0.6 %		
10511	AAC	LTE-TDD (SC-FDMA, 1 RB, 3.1 MHz, 64-QAM, UL Sub)	LTE-TDD	8.32	± 0.6 %		
10512	AAF	LTE-TDD (SC-FDMA, 1 RB, 3.1 MHz, QPSK, UL Sub)	LTE-TDD	7.82	± 0.6 %		
10513	AAF	LTE-TDD (SC-FDMA, 1 RB, 3.1 MHz, 16-QAM, UL Sub)	LTE-TDD	8.32	± 0.6 %		
10514	AAF	LTE-TDD (SC-FDMA, 1 RB, 3.1 MHz, 64-QAM, UL Sub)	LTE-TDD	8.32	± 0.6 %		
10515	AAA	IEEE 802.11b WFI 2.4 GHz (DSSS, 1 Mbps, R90c-d)	WLAN	1.58	± 0.6 %		
10516	AAA	IEEE 802.11b WFI 2.4 GHz (DSSS, 5.5 Mbps, R90c-d)	WLAN	1.57	± 0.6 %		
10517	AAA	IEEE 802.11g WFI 2.4 GHz (DSSS, 11 Mbps, R90c-d)	WLAN	1.58	± 0.6 %		
10518	AAC	IEEE 802.11n WFI 5 GHz (OFDM, 6 Mbps, R90c-d)	WLAN	8.23	± 0.6 %		
10519	AAC	IEEE 802.11n WFI 5 GHz (OFDM, 12 Mbps, R90c-d)	WLAN	8.39	± 0.6 %		
10520	AAC	IEEE 802.11n WFI 5 GHz (OFDM, 18 Mbps, R90c-d)	WLAN	8.12	± 0.6 %		
10521	AAC	IEEE 802.11n WFI 5 GHz (OFDM, 24 Mbps, R90c-d)	WLAN	7.97	± 0.6 %		
10522	AAC	IEEE 802.11n WFI 5 GHz (OFDM, 36 Mbps, R90c-d)	WLAN	8.45	± 0.6 %		
10523	AAC	IEEE 802.11n WFI 5 GHz (OFDM, 48 Mbps, R90c-d)	WLAN	8.48	± 0.6 %		
10524	AAC	IEEE 802.11n WFI 5 GHz (OFDM, 54 Mbps, R90c-d)	WLAN	8.27	± 0.6 %		
10525	AAC	IEEE 802.11ac WFI (20MHz, MCS9, R90c-d)	WLAN	8.36	± 0.6 %		
10526	AAC	IEEE 802.11ac WFI (20MHz, MCS1, R90c-d)	WLAN	8.42	± 0.6 %		
10527	AAC	IEEE 802.11ac WFI (20MHz, MCS3, R90c-d)	WLAN	8.21	± 0.6 %		
10528	AAC	IEEE 802.11ac WFI (20MHz, MCS5, R90c-d)	WLAN	8.39	± 0.6 %		
10529	AAC	IEEE 802.11ac WFI (20MHz, MCS7, R90c-d)	WLAN	8.36	± 0.6 %		
10530	AAC	IEEE 802.11ac WFI (20MHz, MCS9, R90c-d)	WLAN	8.29	± 0.6 %		
10531	AAC	IEEE 802.11ac WFI (20MHz, MCS1, R90c-d)	WLAN	8.39	± 0.6 %		
10532	AAC	IEEE 802.11ac WFI (20MHz, MCS3, R90c-d)	WLAN	8.29	± 0.6 %		
10533	AAC	IEEE 802.11ac WFI (20MHz, MCS5, R90c-d)	WLAN	8.30	± 0.6 %		
10534	AAC	IEEE 802.11ac WFI (20MHz, MCS7, R90c-d)	WLAN	8.45	± 0.6 %		
10535	AAC	IEEE 802.11ac WFI (20MHz, MCS9, R90c-d)	WLAN	8.45	± 0.6 %		
10536	AAC	IEEE 802.11ac WFI (20MHz, MCS1, R90c-d)	WLAN	8.32	± 0.6 %		
10537	AAC	IEEE 802.11ac WFI (20MHz, MCS3, R90c-d)	WLAN	8.44	± 0.6 %		
10538	AAC	IEEE 802.11ac WFI (20MHz, MCS5, R90c-d)	WLAN	8.34	± 0.6 %		
10539	AAC	IEEE 802.11ac WFI (20MHz, MCS7, R90c-d)	WLAN	8.39	± 0.6 %		
10540	AAC	IEEE 802.11ac WFI (20MHz, MCS9, R90c-d)	WLAN	8.39	± 0.6 %		
10541	AAC	IEEE 802.11ac WFI (20MHz, MCS1, R90c-d)	WLAN	8.46	± 0.6 %		
10542	AAC	IEEE 802.11ac WFI (20MHz, MCS3, R90c-d)	WLAN	8.45	± 0.6 %		
10543	AAC	IEEE 802.11ac WFI (20MHz, MCS5, R90c-d)	WLAN	8.45	± 0.6 %		
10544	AAC	IEEE 802.11ac WFI (20MHz, MCS7, R90c-d)	WLAN	8.47	± 0.6 %		
10545	AAC	IEEE 802.11ac WFI (20MHz, MCS9, R90c-d)	WLAN	8.55	± 0.6 %		
10546	AAC	IEEE 802.11ac WFI (20MHz, MCS1, R90c-d)	WLAN	8.35	± 0.6 %		

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10547	AAC	IEEE 802.11ac WFI (20MHz, MCS9, R90c-d)	WLAN	8.49	± 0.6 %		
10548	AAC	IEEE 802.11ac WFI (20MHz, MCS1, R90c-d)	WLAN	8.37	± 0.6 %		
10549	AAC	IEEE 802.11ac WFI (20MHz, MCS3, R90c-d)	WLAN	8.39	± 0.6 %		
10550	AAC	IEEE 802.11ac WFI (20MHz, MCS5, R90c-d)	WLAN	8.39	± 0.6 %		
10551	AAC	IEEE 802.11ac WFI (20MHz, MCS7, R90c-d)	WLAN	8.39	± 0.6 %		
10552	AAC	IEEE 802.11ac WFI (20MHz, MCS9, R90c-d)	WLAN	8.42	± 0.6 %		
10553	AAC	IEEE 802.11ac WFI (20MHz, MCS1, R90c-d)	WLAN	8.48	± 0.6 %		
10554	AAC	IEEE 802.11ac WFI (20MHz, MCS3, R90c-d)	WLAN	8.48	± 0.6 %		
10555	AAC	IEEE 802.11ac WFI (20MHz, MCS5, R90c-d)	WLAN	8.47	± 0.6 %		
10556	AAC	IEEE 802.11ac WFI (20MHz, MCS7, R90c-d)	WLAN	8.47	± 0.6 %		
10557	AAC	IEEE 802.11ac WFI (20MHz, MCS9, R90c-d)	WLAN	8.52	± 0.6 %		
10558	AAC	IEEE 802.11ac WFI (20MHz, MCS1, R90c-d)	WLAN	8.50	± 0.6 %		
10559	AAC	IEEE 802.11ac WFI (20MHz, MCS3, R90c-d)	WLAN	8.52	± 0.6 %		
10560	AAC	IEEE 802.11ac WFI (20MHz, MCS5, R90c-d)	WLAN	8.73	± 0.6 %		
10561	AAC	IEEE 802.11ac WFI (20MHz, MCS7, R90c-d)	WLAN	8.56	± 0.6 %		
10562	AAC	IEEE 802.11ac WFI (20MHz, MCS9, R90c-d)	WLAN	8.69	± 0.6 %		
10563	AAD	IEEE 802.11ac WFI (20MHz, MCS9, R90c-d)	WLAN	8.77	± 0.6 %		
10564	AAA	IEEE 802.11b WFI 2.4 GHz (DSSS, 1 Mbps, R90c-d)	WLAN	8.23	± 0.6 %		
10565	AAA	IEEE 802.11b WFI 2.4 GHz (DSSS-OFDM, 12 Mbps, R90c-d)	WLAN	8.45	± 0.6 %		
10566	AAA	IEEE 802.11b WFI 2.4 GHz (DSSS-OFDM, 18 Mbps, R90c-d)	WLAN	8.13	± 0.6 %		
10567	AAA	IEEE 802.11b WFI 2.4 GHz (DSSS-OFDM, 24 Mbps, R90c-d)	WLAN	8.09	± 0.6 %		
10568	AAA	IEEE 802.11b WFI 2.4 GHz (DSSS-OFDM, 36 Mbps, R90c-d)	WLAN	8.37	± 0.6 %		
10569	AAA	IEEE 802.11b WFI 2.4 GHz (DSSS-OFDM, 48 Mbps, R90c-d)	WLAN	8.10	± 0.6 %		
10570	AAA	IEEE 802.11b WFI 2.4 GHz (DSSS-OFDM, 54 Mbps, R90c-d)					

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10673	AAC	IEEE 802.11ax (20MHz, MCS2, 90deg)	WLAN	8.78	± 0.6%
10674	AAC	IEEE 802.11ax (20MHz, MCS3, 90deg)	WLAN	8.74	± 0.6%
10675	AAC	IEEE 802.11ax (20MHz, MCS4, 90deg)	WLAN	8.80	± 0.6%
10676	AAC	IEEE 802.11ax (20MHz, MCS5, 90deg)	WLAN	8.77	± 0.6%
10677	AAC	IEEE 802.11ax (20MHz, MCS6, 90deg)	WLAN	8.73	± 0.6%
10678	AAC	IEEE 802.11ax (20MHz, MCS7, 90deg)	WLAN	8.78	± 0.6%
10679	AAC	IEEE 802.11ax (20MHz, MCS8, 90deg)	WLAN	8.89	± 0.6%
10680	AAC	IEEE 802.11ax (20MHz, MCS9, 90deg)	WLAN	8.80	± 0.6%
10681	AAC	IEEE 802.11ax (20MHz, MCS10, 90deg)	WLAN	8.62	± 0.6%
10682	AAC	IEEE 802.11ax (20MHz, MCS11, 90deg)	WLAN	8.83	± 0.6%
10683	AAC	IEEE 802.11ax (20MHz, MCS9, 90deg)	WLAN	8.43	± 0.6%
10684	AAC	IEEE 802.11ax (20MHz, MCS11, 90deg)	WLAN	8.26	± 0.6%
10685	AAC	IEEE 802.11ax (20MHz, MCS2, 90deg)	WLAN	8.33	± 0.6%
10686	AAC	IEEE 802.11ax (20MHz, MCS3, 90deg)	WLAN	8.28	± 0.6%
10687	AAC	IEEE 802.11ax (20MHz, MCS4, 90deg)	WLAN	8.45	± 0.6%
10688	AAC	IEEE 802.11ax (20MHz, MCS5, 90deg)	WLAN	8.29	± 0.6%
10689	AAC	IEEE 802.11ax (20MHz, MCS6, 90deg)	WLAN	8.55	± 0.6%
10690	AAC	IEEE 802.11ax (20MHz, MCS7, 90deg)	WLAN	8.29	± 0.6%
10691	AAC	IEEE 802.11ax (20MHz, MCS8, 90deg)	WLAN	8.25	± 0.6%
10692	AAC	IEEE 802.11ax (20MHz, MCS9, 90deg)	WLAN	8.29	± 0.6%
10693	AAC	IEEE 802.11ax (20MHz, MCS10, 90deg)	WLAN	8.25	± 0.6%
10694	AAC	IEEE 802.11ax (20MHz, MCS11, 90deg)	WLAN	8.57	± 0.6%
10695	AAC	IEEE 802.11ax (20MHz, MCS9, 90deg)	WLAN	8.78	± 0.6%
10696	AAC	IEEE 802.11ax (20MHz, MCS11, 90deg)	WLAN	8.91	± 0.6%
10697	AAC	IEEE 802.11ax (20MHz, MCS2, 90deg)	WLAN	8.61	± 0.6%
10698	AAC	IEEE 802.11ax (20MHz, MCS3, 90deg)	WLAN	8.89	± 0.6%
10699	AAC	IEEE 802.11ax (20MHz, MCS4, 90deg)	WLAN	8.82	± 0.6%
10700	AAC	IEEE 802.11ax (20MHz, MCS5, 90deg)	WLAN	8.73	± 0.6%
10701	AAC	IEEE 802.11ax (20MHz, MCS6, 90deg)	WLAN	8.86	± 0.6%
10702	AAC	IEEE 802.11ax (20MHz, MCS7, 90deg)	WLAN	8.70	± 0.6%
10703	AAC	IEEE 802.11ax (20MHz, MCS8, 90deg)	WLAN	8.82	± 0.6%
10704	AAC	IEEE 802.11ax (20MHz, MCS9, 90deg)	WLAN	8.56	± 0.6%
10705	AAC	IEEE 802.11ax (20MHz, MCS10, 90deg)	WLAN	8.69	± 0.6%
10706	AAC	IEEE 802.11ax (20MHz, MCS11, 90deg)	WLAN	8.68	± 0.6%
10707	AAC	IEEE 802.11ax (20MHz, MCS9, 90deg)	WLAN	8.32	± 0.6%
10708	AAC	IEEE 802.11ax (20MHz, MCS10, 90deg)	WLAN	8.58	± 0.6%
10709	AAC	IEEE 802.11ax (20MHz, MCS2, 90deg)	WLAN	8.33	± 0.6%
10710	AAC	IEEE 802.11ax (20MHz, MCS3, 90deg)	WLAN	8.29	± 0.6%
10711	AAC	IEEE 802.11ax (20MHz, MCS4, 90deg)	WLAN	8.39	± 0.6%
10712	AAC	IEEE 802.11ax (20MHz, MCS5, 90deg)	WLAN	8.67	± 0.6%
10713	AAC	IEEE 802.11ax (20MHz, MCS6, 90deg)	WLAN	8.33	± 0.6%
10714	AAC	IEEE 802.11ax (20MHz, MCS7, 90deg)	WLAN	8.26	± 0.6%
10715	AAC	IEEE 802.11ax (20MHz, MCS8, 90deg)	WLAN	8.43	± 0.6%
10716	AAC	IEEE 802.11ax (20MHz, MCS9, 90deg)	WLAN	8.30	± 0.6%
10717	AAC	IEEE 802.11ax (20MHz, MCS10, 90deg)	WLAN	8.48	± 0.6%
10718	AAC	IEEE 802.11ax (20MHz, MCS11, 90deg)	WLAN	8.24	± 0.6%
10719	AAC	IEEE 802.11ax (20MHz, MCS9, 90deg)	WLAN	8.81	± 0.6%
10720	AAC	IEEE 802.11ax (20MHz, MCS10, 90deg)	WLAN	8.87	± 0.6%
10721	AAC	IEEE 802.11ax (20MHz, MCS2, 90deg)	WLAN	8.78	± 0.6%
10722	AAC	IEEE 802.11ax (20MHz, MCS3, 90deg)	WLAN	8.55	± 0.6%
10723	AAC	IEEE 802.11ax (20MHz, MCS4, 90deg)	WLAN	8.79	± 0.6%
10724	AAC	IEEE 802.11ax (20MHz, MCS5, 90deg)	WLAN	8.90	± 0.6%
10725	AAC	IEEE 802.11ax (20MHz, MCS6, 90deg)	WLAN	8.74	± 0.6%
10726	AAC	IEEE 802.11ax (20MHz, MCS7, 90deg)	WLAN	8.72	± 0.6%
10727	AAC	IEEE 802.11ax (20MHz, MCS8, 90deg)	WLAN	8.86	± 0.6%
10728	AAC	IEEE 802.11ax (20MHz, MCS9, 90deg)	WLAN	8.85	± 0.6%

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10729	AAC	IEEE 802.11ax (20MHz, MCS11, 90deg)	WLAN	8.64	± 0.6%
10730	AAC	IEEE 802.11ax (20MHz, MCS11, 90deg)	WLAN	8.67	± 0.6%
10731	AAC	IEEE 802.11ax (20MHz, MCS11, 90deg)	WLAN	8.43	± 0.6%
10732	AAC	IEEE 802.11ax (20MHz, MCS11, 90deg)	WLAN	8.46	± 0.6%
10733	AAC	IEEE 802.11ax (20MHz, MCS11, 90deg)	WLAN	8.40	± 0.6%
10734	AAC	IEEE 802.11ax (20MHz, MCS11, 90deg)	WLAN	8.27	± 0.6%
10735	AAC	IEEE 802.11ax (20MHz, MCS11, 90deg)	WLAN	8.73	± 0.6%
10736	AAC	IEEE 802.11ax (20MHz, MCS11, 90deg)	WLAN	8.42	± 0.6%
10737	AAC	IEEE 802.11ax (20MHz, MCS11, 90deg)	WLAN	8.78	± 0.6%
10738	AAC	IEEE 802.11ax (20MHz, MCS11, 90deg)	WLAN	8.45	± 0.6%
10739	AAC	IEEE 802.11ax (20MHz, MCS11, 90deg)	WLAN	8.29	± 0.6%
10740	AAC	IEEE 802.11ax (20MHz, MCS11, 90deg)	WLAN	8.48	± 0.6%
10741	AAC	IEEE 802.11ax (20MHz, MCS11, 90deg)	WLAN	8.40	± 0.6%
10742	AAC	IEEE 802.11ax (20MHz, MCS11, 90deg)	WLAN	8.46	± 0.6%
10743	AAC	IEEE 802.11ax (20MHz, MCS11, 90deg)	WLAN	8.74	± 0.6%
10744	AAC	IEEE 802.11ax (20MHz, MCS11, 90deg)	WLAN	8.56	± 0.6%
10745	AAC	IEEE 802.11ax (20MHz, MCS11, 90deg)	WLAN	8.85	± 0.6%
10746	AAC	IEEE 802.11ax (20MHz, MCS11, 90deg)	WLAN	8.71	± 0.6%
10747	AAC	IEEE 802.11ax (20MHz, MCS11, 90deg)	WLAN	8.65	± 0.6%
10748	AAC	IEEE 802.11ax (20MHz, MCS11, 90deg)	WLAN	8.75	± 0.6%
10749	AAC	IEEE 802.11ax (20MHz, MCS11, 90deg)	WLAN	8.88	± 0.6%
10750	AAC	IEEE 802.11ax (20MHz, MCS11, 90deg)	WLAN	8.79	± 0.6%
10751	AAC	IEEE 802.11ax (20MHz, MCS11, 90deg)	WLAN	8.82	± 0.6%
10752	AAC	IEEE 802.11ax (20MHz, MCS11, 90deg)	WLAN	8.81	± 0.6%
10753	AAC	IEEE 802.11ax (20MHz, MCS11, 90deg)	WLAN	8.51	± 0.6%
10754	AAC	IEEE 802.11ax (20MHz, MCS11, 90deg)	WLAN	8.56	± 0.6%
10755	AAC	IEEE 802.11ax (20MHz, MCS11, 90deg)	WLAN	8.84	± 0.6%
10756	AAC	IEEE 802.11ax (20MHz, MCS11, 90deg)	WLAN	8.77	± 0.6%
10757	AAC	IEEE 802.11ax (20MHz, MCS11, 90deg)	WLAN	8.77	± 0.6%
10758	AAC	IEEE 802.11ax (20MHz, MCS11, 90deg)	WLAN	8.88	± 0.6%
10759	AAC	IEEE 802.11ax (20MHz, MCS11, 90deg)	WLAN	8.58	± 0.6%
10760	AAC	IEEE 802.11ax (20MHz, MCS11, 90deg)	WLAN	8.58	± 0.6%
10761	AAC	IEEE 802.11ax (20MHz, MCS11, 90deg)	WLAN	8.58	± 0.6%
10762	AAC	IEEE 802.11ax (20MHz, MCS11, 90deg)	WLAN	8.58	± 0.6%
10763	AAC	IEEE 802.11ax (20MHz, MCS11, 90deg)	WLAN	8.58	± 0.6%
10764	AAC	IEEE 802.11ax (20MHz, MCS11, 90deg)	WLAN	8.58	± 0.6%
10765	AAC	IEEE 802.11ax (20MHz, MCS11, 90deg)	WLAN	8.58	± 0.6%
10766	AAC	IEEE 802.11ax (20MHz, MCS11, 90deg)	WLAN	8.58	± 0.6%
10767	AAC	IEEE 802.11ax (20MHz, MCS11, 90deg)	WLAN	8.58	± 0.6%
10768	AAC	IEEE 802.11ax (20MHz, MCS11, 90deg)	WLAN	8.58	± 0.6%
10769	AAC	IEEE 802.11ax (20MHz, MCS11, 90deg)	WLAN	8.58	± 0.6%
10770	AAC	IEEE 802.11ax (20MHz, MCS11, 90deg)	WLAN	8.58	± 0.6%
10771	AAC	IEEE 802.11ax (20MHz, MCS11, 90deg)	WLAN	8.58	± 0.6%
10772	AAC	IEEE 802.11ax (20MHz, MCS11, 90deg)	WLAN	8.58	± 0.6%
10773	AAC	IEEE 802.11ax (20MHz, MCS11, 90deg)	WLAN	8.58	± 0.6%
10774	AAC	IEEE 802.11ax (20MHz, MCS11, 90deg)	WLAN	8.58	± 0.6%
10775	AAC	IEEE 802.11ax (20MHz, MCS11, 90deg)	WLAN	8.58	± 0.6%
10776	AAC	IEEE 802.11ax (20MHz, MCS11, 90deg)	WLAN	8.58	± 0.6%
10777	AAC	IEEE 802.11ax (20MHz, MCS11, 90deg)	WLAN	8.58	± 0.6%
10778	AAC	IEEE 802.11ax (20MHz, MCS11, 90deg)	WLAN	8.58	± 0.6%
10779	AAC	IEEE 802.11ax (20MHz, MCS11, 90deg)	WLAN	8.58	± 0.6%
10780	AAC	IEEE 802.11ax (20MHz, MCS11, 90deg)	WLAN	8.58	± 0.6%
10781	AAC	IEEE 802.11ax (20MHz, MCS11, 90deg)	WLAN	8.58	± 0.6%
10782	AAC	IEEE 802.11ax (20MHz, MCS11, 90deg)	WLAN	8.58	± 0.6%
10783	AAC	IEEE 802.11ax (20MHz, MCS11, 90deg)	WLAN	8.58	± 0.6%
10784	AAC	IEEE 802.11ax (20MHz, MCS11, 90deg)	WLAN	8.58	± 0.6%

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t(86-512)57355888 f(86-512)57370818 sqs.china@sqs.com

EXCIV4-SN 7346 March 30, 2022 15985 AAA 50 NR DL (CP-CFOM, TM 3.1, 40 MHz, 64-QAM, 30 kHz) 50 NR PR1 TDD 9.54 ± 9.8 % 15986 AAA 50 NR DL (CP-CFOM, TM 3.1, 50 MHz, 64-QAM, 30 kHz) 50 NR PR1 TDD 9.50 ± 9.8 % 15987 AAA 50 NR DL (CP-CFOM, TM 3.1, 60 MHz, 64-QAM, 30 kHz) 50 NR PR1 TDD 9.50 ± 9.8 % 15988 AAA 50 NR DL (CP-CFOM, TM 3.1, 70 MHz, 64-QAM, 30 kHz) 50 NR PR1 TDD 9.38 ± 9.8 % 15989 AAA 50 NR DL (CP-CFOM, TM 3.1, 80 MHz, 64-QAM, 30 kHz) 50 NR PR1 TDD 9.33 ± 9.8 % 15990 AAA 50 NR DL (CP-CFOM, TM 3.1, 90 MHz, 64-QAM, 30 kHz) 50 NR PR1 TDD 9.52 ± 9.8 % 1 Uncertainty is determined using the max. deviation from linear response applying rectangular distribution and is expressed for the square of the field value. Certificate No. EXC-7346_Mar22 Page 24 of 24	EXCIV4-SN 7346 March 30, 2022 15985 AAA 50 NR DL (CP-CFOM, TM 3.1, 40 MHz, 64-QAM, 30 kHz) 50 NR PR1 TDD 9.54 ± 9.8 % 15986 AAA 50 NR DL (CP-CFOM, TM 3.1, 50 MHz, 64-QAM, 30 kHz) 50 NR PR1 TDD 9.50 ± 9.8 % 15987 AAA 50 NR DL (CP-CFOM, TM 3.1, 60 MHz, 64-QAM, 30 kHz) 50 NR PR1 TDD 9.50 ± 9.8 % 15988 AAA 50 NR DL (CP-CFOM, TM 3.1, 70 MHz, 64-QAM, 30 kHz) 50 NR PR1 TDD 9.38 ± 9.8 % 15989 AAA 50 NR DL (CP-CFOM, TM 3.1, 80 MHz, 64-QAM, 30 kHz) 50 NR PR1 TDD 9.33 ± 9.8 % 15990 AAA 50 NR DL (CP-CFOM, TM 3.1, 90 MHz, 64-QAM, 30 kHz) 50 NR PR1 TDD 9.52 ± 9.8 % 1 Uncertainty is determined using the max. deviation from linear response applying rectangular distribution and is expressed for the square of the field value. Certificate No. EXC-7346_Mar22 Page 24 of 24
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4 Impedance and return loss

Dipole CLA150 SN 4025				
Head Liquid				
Date of Measurement	Return Loss(dB)	Δ %	Impedance (Ω)	ΔΩ
2021/4/26	-31.4	/	47.8	/
Dipole D450V3 SN 1103				
Head Liquid				
Date of Measurement	Return Loss(dB)	Δ %	Impedance (Ω)	ΔΩ
2021/4/21	-23	/	57.1	/



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