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Appendix (Additional assessments outside the scope of CNAS L0570)

Antenna Parameters with Head TSL

Impedance, transformed to feed point	53.7Ω+ 6.80jΩ	
Return Loss	- 22.6dB	

General Antenna Parameters and Design

Electrical Delay (one direction)	1.110 ns	
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After long term use with 100W radiated power, only a slight warming of the dipole near the feedpoint can be measured.

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

Additional EUT Data

Manufactured by	SPEAG
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Certificate No: Z21-60357

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

Date: 10.18.2021

DUT: Dipole 1900 MHz; Type: D1900V2; Serial: D1900V2 - SN: 5d088 Communication System: UID 0, CW; Frequency: 1900 MHz; Duty Cycle: 1:1 Medium parameters used: f = 1900 MHz; $\sigma = 1.387$ S/m; $\varepsilon_t = 39.88$; $\rho = 1000$ kg/m³ Phantom section: Right Section

DASY5 Configuration:

- Probe: EX3DV4 SN7517; ConvF(7.81, 7.81, 7.81) @ 1900 MHz; Calibrated: 2021-02-03
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1556; Calibrated: 2021-01-15
- Phantom: MFP_V5.1C (20deg probe tilt); Type: QD 000 P51 Cx; Serial: 1062
- Measurement SW: DASY52, Version 52.10 (4); SEMCAD X Version 14.6.14 (7501)

System Performance Check/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm Reference Value = 103.6 V/m; Power Drift = 0.00 dB

Peak SAR (extrapolated) = 19.2 W/kg SAR(1 g) = 10 W/kg; SAR(10 g) = 5.1 W/kg Smallest distance from peaks to all points 3 dB below = 10 mm Ratio of SAR at M2 to SAR at M1 = 52.1% Maximum value of SAR (measured) = 15.8 W/kg



0 dB = 15.8 W/kg = 11.99 dBW/kg

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Impedance Measurement Plot for Head TSL



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2450MHz Dipole Calibration Certificate (2018)

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	CALIBRA	TION LABORATORY	CNAS 校准
Add: No.51 Xueyu: Tel: +86-10-623046 E-mail: cttl@chinat	an Road, Haidian Dis 533-2079 Fax: - tl.com http:/	trict, Beijing, 100191, China -86-10-62304633-2504 www.chinattl.cn	CALIBRATION CNAS L0570
Client CTTI	(South Brand	ch) Certificate No:	Z18-60388
CALIBRATION CI	ERTIFICAT	Е	
Object	D2450	√2 - SN: 873	
Calibration Procedure(s)	FF-Z11	-003-01	
	Calibra	tion Procedures for dipole validation kit	S
Calibration date:	Octobe	r 26, 2018	
This calibration Certificate measurements(SI). The me pages and are part of the ce All calibrations have been humidity<70%	documents the asurements and ertificate. conducted in	traceability to national standards, whi the uncertainties with confidence proba the closed laboratory facility: enviror	ch realize the physical units of ability are given on the following ment temperature(22±3)°C and
Calibration Equipment used	(M&TE critical fo	or calibration)	
Primary Standards	ID #	Cal Date(Calibrated by, Certificate N	o.) Scheduled Calibration
Power sensor NRV-75	102083	01-Nov-17 (CTTL, No. J17X08756)	Oct-18
Reference Probe FX3DV/4	SN 7514	27-Aug-18(SPEAG No EX3-7514 Aug	a18) Aug 10
DAE4	SN 1555	20-Aug-18(SPEAG No DAE4-1555 A	ua18) Aug-19
			ag (o)
Secondary Standards	ID #	Cal Date(Calibrated by, Certificate No	.) Scheduled Calibration
Signal Generator E4438C	MY49071430	23-Jan-18 (CTTL, No.J18X00560)	Jan-19
NetworkAnalyzer E5071C	MY46110673	24-Jan-18 (CTTL, No.J18X00561)	Jan-19
	Name	Function	Signature
Calibrated by:	Zhao ling	SAR Test Engineer	
	Zildo yilly	OAR TEST ENGINEER	22
Reviewed by:	Lin Hao	SAR Test Engineer	antor
Approved by:	Qi Dianyuan	SAR Project Leader	502
		leened.	October 29, 2018
This calibration certificate sh	all not be reproc	uced except in full without written appr	oval of the laboratory

Certificate No: Z18-60388

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Glossary:

T C

N

SL	tissue simulating liquid
onvF	sensitivity in TSL / NORMx,y,z
/A	not applicable or not measured

Calibration is Performed According to the Following Standards:

- a) IEEE Std 1528-2013, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", June 2013
- b) IEC 62209-1, "Measurement procedure for assessment of specific absorption rate of human exposure to radio frequency fields from hand-held and body-mounted wireless communication devices- Part 1: Device used next to the ear (Frequency range of 300MHz to 6GHz)", July 2016
- c) IEC 62209-2, "Procedure to measure the Specific Absorption Rate (SAR) For wireless communication devices used in close proximity to the human body (frequency range of 30MHz to 6GHz)", March 2010
- d) KDB865664, SAR Measurement Requirements for 100 MHz to 6 GHz

Additional Documentation:

e) DASY4/5 System Handbook

Methods Applied and Interpretation of Parameters:

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

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

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Measurement Conditions

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

DASY Version	DASY52	52.10.2.1495
Extrapolation	Advanced Extrapolation	
Phantom	Triple Flat Phantom 5.1C	
Distance Dipole Center - TSL	10 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	2450 MHz ± 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

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

SAR result with Head TSL

SAR averaged over 1 cm^3 (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	13.0 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	52.0 mW /g ± 18.8 % (k=2)
SAR averaged over 10 cm ³ (10 g) of Head TSL	Condition	
SAR measured	250 mW input power	6.02 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	24.1 mW /g ± 18.7 % (k=2)

Body TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	52.7	1.95 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	52.8 ± 6 %	2.01 mho/m ± 6 %
Body TSL temperature change during test	<1.0 °C		

SAR result with Body TSL

SAR averaged over 1 cm^3 (1 g) of Body TSL	Condition	
SAR measured	250 mW input power	12.8 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	50.5 mW /g ± 18.8 % (k=2)
SAR averaged over 10 cm^3 (10 g) of Body TSL	Condition	
SAR measured	250 mW input power	5.91 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	23.5 mW /g ± 18.7 % (k=2)

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Appendix (Additional assessments outside the scope of CNAS L0570)

Antenna Parameters with Head TSL

Impedance, transformed to feed point	53.5Ω+ 2.11 jΩ	-
Return Loss	- 28.0dB	

Antenna Parameters with Body TSL

Impedance, transformed to feed point	51.3Ω+ 4.51 jΩ	
Return Loss	- 26.7dB	

General Antenna Parameters and Design

Electrical Delay (one direction)	1.024 ns

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

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

Additional EUT Data

Manufactured by	SPEAG

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Date: 10.26.2018

Test Laboratory: CTTL, Beijing, China DUT: Dipole 2450 MHz; Type: D2450V2; Serial: D2450V2 - SN: 873

DASY5 Validation Report for Head TSL

Date: 10.26.2018

Communication System: UID 0, CW; Frequency: 2450 MHz; Duty Cycle: 1:1 Medium parameters used: f = 2450 MHz; $\sigma = 1.802$ S/m; $\varepsilon_r = 39.2$; $\rho = 1000$ kg/m3 Phantom section: Right Section

DASY5 Configuration:

- Probe: EX3DV4 SN7514; ConvF(6.95, 6.95, 6.95) @ 2450 MHz; Calibrated: 8/27/2018
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1555; Calibrated: 8/20/2018
- Phantom: MFP_V5.1C; Type: QD 000 P51CA; Serial: 1062
- Measurement SW: DASY52, Version 52.10 (2); SEMCAD X Version 14.6.12 (7450)

Dipole Calibration/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm Reference Value = 105.0 V/m; Power Drift = 0.09 dB

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Peak SAR (extrapolated) = 26.8 \text{ W/kg}
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SAR(1 g) = 13 W/kg; SAR(10 g) = 6.02 W/kg Maximum value of SAR (measured) = 21.8 W/kg



0 dB = 21.8 W/kg = 13.38 dBW/kg

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Impedance Measurement Plot for Head TSL



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Date: 10.26.2018

Test Laboratory: CTTL, Beijing, China DUT: Dipole 2450 MHz; Type: D2450V2; Serial: D2450V2 - SN: 873

DASY5 Validation Report for Body TSL

Communication System: UID 0, CW; Frequency: 2450 MHz; Duty Cycle: 1:1 Medium parameters used: f = 2450 MHz; $\sigma = 2.008$ S/m; $\varepsilon_r = 52.76$; $\rho = 1000$ kg/m3

Phantom section: Center Section

DASY5 Configuration:

- Probe: EX3DV4 SN7514; ConvF(7.13, 7.13, 7.13) @ 2450 MHz; Calibrated: 8/27/2018
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1555; Calibrated: 8/20/2018
- Phantom: MFP_V5.1C; Type: QD 000 P51CA; Serial: 1062
- Measurement SW: DASY52, Version 52.10 (2); SEMCAD X Version 14.6.12 (7450)

Dipole Calibration/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 98.89 V/m; Power Drift = -0.03 dB Peak SAR (extrapolated) = 26.4 W/kg SAR(1 g) = 12.8 W/kg; SAR(10 g) = 5.91 W/kg

Maximum value of SAR (measured) = 21.3 W/kg



0 dB = 21.3 W/kg = 13.28 dBW/kg

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Impedance Measurement Plot for Body TSL



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2450MHz Dipole Calibration Certificate (2021)

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Client SAIC	T	Certificate No: Z	21-60358
CALIBRATION CE	ERTIFICAT	E	
Object	D2450	V2 - SN: 873	
Calibration Procedure(s)	FF-Z11	-003-01	
Calibration date:	Octobe	r 21, 2021	
pages and are part of the ce All calibrations have been	rtificate. conducted in t	he closed laboratory facility: environment	temperature (22±3)°C and
humidity<70%. Calibration Equipment used	(M&TE critical fo	or calibration)	
humidity<70%. Calibration Equipment used	(M&TE critical fo	or calibration)	Schoduled Calibration
numidity<70%. Calibration Equipment used Primary Standards Power Meter NRP2	(M&TE critical fo	Cal Date (Calibrated by, Certificate No.)	Scheduled Calibration
numidity<70%. Calibration Equipment used Primary Standards Power Meter NRP2 Power sensor NRP8S	(M&TE critical fo ID # 106277 104291	Cal Date (Calibrated by, Certificate No.) 24-Sep-21 (CTTL, No.J21X08326) 24-Sep-21 (CTTL, No.J21X08326)	Scheduled Calibration Sep-22 Sen-22
numidity<70%. Calibration Equipment used Primary Standards Power Meter NRP2 Power sensor NRP8S Reference Probe EX3DV4	(M&TE critical fo ID # 106277 104291 SN 7517	Cal Date (Calibrated by, Certificate No.) 24-Sep-21 (CTTL, No.J21X08326) 24-Sep-21 (CTTL, No.J21X08326) 03-Feb-21(CTTL-SPEAG.No.Z21-60001)	Scheduled Calibration Sep-22 Sep-22 Feb-22
humidity<70%. Calibration Equipment used Primary Standards Power Meter NRP2 Power sensor NRP8S Reference Probe EX3DV4 DAE4	(M&TE critical fo ID # 106277 104291 SN 7517 SN 1556	Cal Date (Calibrated by, Certificate No.) 24-Sep-21 (CTTL, No.J21X08326) 24-Sep-21 (CTTL, No.J21X08326) 03-Feb-21(CTTL-SPEAG,No.Z21-60001) 15-Jan-21(SPEAG,No.DAE4-1556_Jan21)	Scheduled Calibration Sep-22 Sep-22 Feb-22 Jan-22
numidity<70%. Calibration Equipment used Primary Standards Power Meter NRP2 Power sensor NRP8S Reference Probe EX3DV4 DAE4	(M&TE critical fo ID # 106277 104291 SN 7517 SN 1556	Cal Date (Calibrated by, Certificate No.) 24-Sep-21 (CTTL, No.J21X08326) 24-Sep-21 (CTTL, No.J21X08326) 03-Feb-21(CTTL-SPEAG,No.Z21-60001) 15-Jan-21(SPEAG,No.DAE4-1556_Jan21)	Scheduled Calibration Sep-22 Sep-22 Feb-22 Jan-22 Scheduled Calibration
humidity<70%. Calibration Equipment used Primary Standards Power Meter NRP2 Power sensor NRP8S Reference Probe EX3DV4 DAE4 Secondary Standards Signal Generator E4438C	(M&TE critical fo ID # 106277 104291 SN 7517 SN 1556 ID # MX49071430	Cal Date (Calibrated by, Certificate No.) 24-Sep-21 (CTTL, No.J21X08326) 24-Sep-21 (CTTL, No.J21X08326) 03-Feb-21(CTTL-SPEAG,No.Z21-60001) 15-Jan-21(SPEAG,No.DAE4-1556_Jan21) Cal Date (Calibrated by, Certificate No.) 01-Eeb-21 (CTTL_No.J21X00593)	Scheduled Calibration Sep-22 Sep-22 Feb-22 Jan-22 Scheduled Calibration
humidity<70%. Calibration Equipment used Primary Standards Power Meter NRP2 Power sensor NRP8S Reference Probe EX3DV4 DAE4 Secondary Standards Signal Generator E4438C NetworkAnalyzer E5071C	(M&TE critical fo ID # 106277 104291 SN 7517 SN 1556 ID # MY49071430 MY46110673	Cal Date (Calibrated by, Certificate No.) 24-Sep-21 (CTTL, No.J21X08326) 24-Sep-21 (CTTL, No.J21X08326) 03-Feb-21(CTTL-SPEAG,No.Z21-60001) 15-Jan-21(SPEAG,No.DAE4-1556_Jan21) Cal Date (Calibrated by, Certificate No.) 01-Feb-21 (CTTL, No.J21X00593) 14-Jan-21 (CTTL, No.J21X00232)	Scheduled Calibration Sep-22 Sep-22 Feb-22 Jan-22 Scheduled Calibration Jan-22 Jan-22
humidity<70%. Calibration Equipment used Primary Standards Power Meter NRP2 Power sensor NRP8S Reference Probe EX3DV4 DAE4 Secondary Standards Signal Generator E4438C NetworkAnalyzer E5071C	(M&TE critical fo ID # 106277 104291 SN 7517 SN 1556 ID # MY49071430 MY46110673 Name	Cal Date (Calibrated by, Certificate No.) 24-Sep-21 (CTTL, No.J21X08326) 24-Sep-21 (CTTL, No.J21X08326) 03-Feb-21 (CTTL-SPEAG,No.Z21-60001) 15-Jan-21 (SPEAG,No.DAE4-1556_Jan21) Cal Date (Calibrated by, Certificate No.) 01-Feb-21 (CTTL, No.J21X00593) 14-Jan-21 (CTTL, No.J21X00232) Function	Scheduled Calibration Sep-22 Sep-22 Feb-22 Jan-22 Scheduled Calibration Jan-22 Jan-22
humidity<70%. Calibration Equipment used Primary Standards Power Meter NRP2 Power sensor NRP8S Reference Probe EX3DV4 DAE4 Secondary Standards Signal Generator E4438C NetworkAnalyzer E5071C	(M&TE critical fo ID # 106277 104291 SN 7517 SN 1556 ID # MY49071430 MY46110673 Name Zhao Jing	Cal Date (Calibrated by, Certificate No.) 24-Sep-21 (CTTL, No.J21X08326) 24-Sep-21 (CTTL, No.J21X08326) 03-Feb-21 (CTTL-SPEAG.No.Z21-60001) 15-Jan-21 (SPEAG.No.DAE4-1556_Jan21) Cal Date (Calibrated by, Certificate No.) 01-Feb-21 (CTTL, No.J21X00593) 14-Jan-21 (CTTL, No.J21X00232) Function SAR Test Engineer	Scheduled Calibration Sep-22 Sep-22 Feb-22 Jan-22 Scheduled Calibration Jan-22 Jan-22
humidity<70%. Calibration Equipment used Primary Standards Power Meter NRP2 Power sensor NRP8S Reference Probe EX3DV4 DAE4 Secondary Standards Signal Generator E4438C NetworkAnalyzer E5071C Calibrated by: Reviewed by:	(M&TE critical fo ID # 106277 104291 SN 7517 SN 1556 ID # MY49071430 MY46110673 Name Zhao Jing Lin Hao	Cal Date (Calibrated by, Certificate No.) 24-Sep-21 (CTTL, No.J21X08326) 24-Sep-21 (CTTL, No.J21X08326) 03-Feb-21 (CTTL-SPEAG,No.Z21-60001) 15-Jan-21 (SPEAG,No.DAE4-1556_Jan21) Cal Date (Calibrated by, Certificate No.) 01-Feb-21 (CTTL, No.J21X00593) 14-Jan-21 (CTTL, No.J21X00232) Function SAR Test Engineer	Scheduled Calibration Sep-22 Sep-22 Feb-22 Jan-22 Scheduled Calibration Jan-22 Jan-22
humidity<70%. Calibration Equipment used Primary Standards Power Meter NRP2 Power sensor NRP8S Reference Probe EX3DV4 DAE4 Secondary Standards Signal Generator E4438C NetworkAnalyzer E5071C Calibrated by: Reviewed by: Approved by:	(M&TE critical fo ID # 106277 104291 SN 7517 SN 1556 ID # MY49071430 MY46110673 Name Zhao Jing Lin Hao Qi Dianyuan	Cal Date (Calibrated by, Certificate No.) 24-Sep-21 (CTTL, No.J21X08326) 24-Sep-21 (CTTL, No.J21X08326) 03-Feb-21 (CTTL-SPEAG,No.Z21-60001) 15-Jan-21 (SPEAG,No.DAE4-1556_Jan21) Cal Date (Calibrated by, Certificate No.) 01-Feb-21 (CTTL, No.J21X00593) 14-Jan-21 (CTTL, No.J21X00232) Function SAR Test Engineer SAR Test Engineer	Scheduled Calibration Sep-22 Sep-22 Feb-22 Jan-22 Scheduled Calibration Jan-22 Jan-22 Signature
humidity<70%. Calibration Equipment used Primary Standards Power Meter NRP2 Power sensor NRP8S Reference Probe EX3DV4 DAE4 Secondary Standards Signal Generator E4438C NetworkAnalyzer E5071C Calibrated by: Reviewed by: Approved by:	(M&TE critical fo ID # 106277 104291 SN 7517 SN 1556 ID # MY49071430 MY46110673 Name Zhao Jing Lin Hao Qi Dianyuan	Cal Date (Calibrated by, Certificate No.) 24-Sep-21 (CTTL, No.J21X08326) 24-Sep-21 (CTTL, No.J21X08326) 03-Feb-21(CTTL-SPEAG,No.Z21-60001) 15-Jan-21(SPEAG,No.DAE4-1556_Jan21) Cal Date (Calibrated by, Certificate No.) 01-Feb-21 (CTTL, No.J21X00593) 14-Jan-21 (CTTL, No.J21X00232) Function SAR Test Engineer SAR Test Engineer	Scheduled Calibration Sep-22 Sep-22 Feb-22 Jan-22 Scheduled Calibration Jan-22 Jan-22 Signature

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Glossary:

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

Calibration is Performed According to the Following Standards:

- a) IEEE Std 1528-2013, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", June 2013
- b) IEC 62209-1, "Measurement procedure for assessment of specific absorption rate of human exposure to radio frequency fields from hand-held and body-mounted wireless communication devices- Part 1: Device used next to the ear (Frequency range of 300MHz to 6GHz)", July 2016
- c) IEC 62209-2, "Procedure to measure the Specific Absorption Rate (SAR) For wireless communication devices used in close proximity to the human body (frequency range of 30MHz to 6GHz)", March 2010
- d) KDB865664, SAR Measurement Requirements for 100 MHz to 6 GHz

Additional Documentation:

e) DASY4/5 System Handbook

Methods Applied and Interpretation of Parameters:

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

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

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Measurement Conditions

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

DASY Version	DASY52	V52.10.4
Extrapolation	Advanced Extrapolation	
Phantom	Triple Flat Phantom 5.1C	
Distance Dipole Center - TSL	10 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	2450 MHz ± 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	39.2	1.80 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	39.5±6%	1.81 mho/m ± 6 %
Head TSL temperature change during test	<1.0 °C	2112	

SAR result with Head TSL

SAR averaged over 1 cm^3 (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	13.3 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	53.2 W/kg ± 18.8 % (k=2)
SAR averaged over 10 cm^3 (10 g) of Head TSL	Condition	
SAR measured	250 mW input power	6.05 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	24.2 W/kg ± 18.7 % (k=2)

Certificate No: Z21-60358

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 http://www.chinattl.en

Appendix (Additional assessments outside the scope of CNAS L0570)

Antenna Parameters with Head TSL

Impedance, transformed to feed point	53.6Ω+ 1.26jΩ	
Return Loss	- 28.8dB	

General Antenna Parameters and Design

Electrical Delay (one direction)	1.066 ns
----------------------------------	----------

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

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

Additional EUT Data

Manufactured by	SPEAG
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Certificate No: Z21-60358

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

Date: 10.21.2021

DUT: Dipole 2450 MHz; Type: D2450V2; Serial: D2450V2 - SN: 873 Communication System: UID 0, CW; Frequency: 2450 MHz; Duty Cycle: 1:1 Medium parameters used: f = 2450 MHz; $\sigma = 1.809$ S/m; $\epsilon_r = 39.51$; $\rho = 1000$ kg/m³ Phantom section: Right Section

DASY5 Configuration:

- Probe: EX3DV4 SN7517; ConvF(7.34, 7.34, 7.34) @ 2450 MHz; Calibrated: 2021-02-03
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1556; Calibrated: 2021-01-15
- Phantom: MFP_V5.1C (20deg probe tilt); Type: QD 000 P51 Cx; Serial: 1062
- Measurement SW: DASY52, Version 52.10 (4); SEMCAD X Version 14.6.14 (7501)

Dipole Calibration/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

```
Reference Value = 108.0 V/m; Power Drift = -0.03 dB
Peak SAR (extrapolated) = 28.0 W/kg
SAR(1 g) = 13.3 W/kg; SAR(10 g) = 6.05 W/kg
Smallest distance from peaks to all points 3 dB below = 9.2 mm
Ratio of SAR at M2 to SAR at M1 = 46.9%
Maximum value of SAR (measured) = 22.6 W/kg
```



0 dB = 22.6 W/kg = 13.54 dBW/kg

Certificate No: Z21-60358

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Impedance Measurement Plot for Head TSL



Certificate No: Z21-60358

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2550MHz Dipole Calibration Certificate (2018)

Calibration Laboratory of Schmid & Partner Engineering AG Zeughausstrasse 43, 8004 Zurich, Switzerland

CTTL (Auden)



Schweizerischer Kalibrierdienst Service suisse d'étalonnage Servizio svizzero di taratura Swiss Calibration Service

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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 CTTL (Auden)		Certificate N	lo: D2550V2-1010_Aug18
CALIBRATION C	ERTIFICATI		
Object	D2550V2 - SN:1	010	
Calibration procedure(s)	QA CAL-05.v10 Calibration proce	edure for dipole validation kits ab	ove 700 MHz
Calibration date:	August 24, 2018		
This calibration certificate documer The measurements and the uncert All calibrations have been conducte Calibration Equipment used (M&TE	nts the traceability to nat ainties with confidence p ed in the closed laborato critical for calibration)	ional standards, which realize the physical u robability are given on the following pages a ry facility: environment temperature (22 ± 3)	nits of measurements (SI). nd are part of the certificate. 'C and humidity < 70%.
Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Power meter NRP	SN: 104778	04-Apr-18 (No. 217-02672/02673)	Apr-19
ower sensor NRP-Z91	SN: 103244	04-Apr-18 (No. 217-02672)	Apr-19
ower sensor NRP-Z91	SN: 103245	04-Apr-18 (No. 217-02673)	Apr-19
leference 20 dB Attenuator	SN: 5058 (20k)	04-Apr-18 (No. 217-02682)	Apr-19
ype-N mismatch combination	SN: 5047.2 / 06327	04-Apr-18 (No. 217-02683)	Apr-19
Reference Probe EX3DV4	SN: 7349	30-Dec-17 (No. EX3-7349_Dec17)	Dec-18
DAE4	SN: 601	26-Oct-17 (No. DAE4-601_Oct17)	Oct-18
Secondary Standards	ID #	Check Date (in house)	Scheduled Check
ower meter EPM-442A	SN: GB37480704	07-Oct-15 (in house check Oct-16)	In house check: Oct-18
ower sensor HP 8481A	SN: US37292783	07-Oct-15 (in house check Oct-16)	In house check: Oct-18
'ower sensor HP 8481A	SN: MY41092317	07-Oct-15 (in house check Oct-16)	In house check: Oct-18
RF generator R&S SMT-06	SN: 100972	15-Jun-15 (in house check Oct-16)	In house check: Oct-18
letwork Analyzer Agilent E8358A	SN: US41080477	31-Mar-14 (in house check Oct-17)	In house check: Oct-18
	Name	Function	Signature
Salibrated by:	Manu Seitz	Laboratory Technician	fut
Approved by:	Katja Pokovic	Technical Manager	Delle
This calibration certificate shall not	be reproduced except in	full without written annroval of the laboraton	Issued: August 24, 2018

Certificate No: D2550V2-1010_Aug18

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Calibration Laboratory of

Schmid & Partner Engineering AG Zeughausstrasse 43, 8004 Zurich, Switzerland





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Schweizerischer Kalibrierdienst Service suisse d'étalonnage Servizio svizzero di taratura Swiss Calibration Service

Accreditation No.: SCS 0108

Accredited by the Swiss Accreditation Service (SAS)

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Glossary:

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

Calibration is Performed According to the Following Standards:

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

Additional Documentation:

e) DASY4/5 System Handbook

Methods Applied and Interpretation of Parameters:

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

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

Certificate No: D2550V2-1010_Aug18

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Measurement Conditions

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

DASY Version	DASY5	V52.10.1
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom	
Distance Dipole Center - TSL	10 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	2550 MHz ± 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	39.1	1.91 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	37.3 ± 6 %	1.97 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C		

SAR result with Head TSL

SAR averaged over 1 cm ³ (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	14.8 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	57.8 W/kg ± 17.0 % (k=2)
SAR averaged over 10 cm ³ (10 g) of Head TSL	condition	
SAR averaged over 10 cm ³ (10 g) of Head TSL SAR measured	condition 250 mW input power	6.73 W/kg

Body TSL parameters The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	52.6	2.09 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	51.5 ± 6 %	2.14 mho/m ± 6 %
Body TSL temperature change during test	< 0.5 °C		

SAR result with Body TSL

SAR averaged over 1 cm ³ (1 g) of Body TSL	Condition	
SAR measured	250 mW input power	13.7 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	54.0 W/kg ± 17.0 % (k=2)
SAR averaged over 10 cm ³ (10 g) of Body TSL	condition	
SAR averaged over 10 cm ³ (10 g) of Body TSL SAR measured	condition 250 mW input power	6.22 W/kg

Certificate No: D2550V2-1010_Aug18

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Appendix (Additional assessments outside the scope of SCS 0108)

Antenna Parameters with Head TSL

Impedance, transformed to feed point	54.9 Ω - 2.3 jΩ	
Return Loss	- 25.7 dB	

Antenna Parameters with Body TSL

Impedance, transformed to feed point	49.6 Ω - 2.0 jΩ	
Return Loss	- 33.8 dB	

General Antenna Parameters and Design

Electrical Delay (one direction)	1.151 ns

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

The dipole is made of standard semirigid coaxial cable. The center conductor of the feeding line is directly connected to the second arm of the dipole. The antenna is therefore short-circuited for DC-signals. On some of the dipoles, small end caps are added to the dipole arms in order to improve matching when loaded according to the position as explained in the "Measurement Conditions" paragraph. The SAR data are not affected by this change. The overall dipole length is still according to the Standard.

No excessive force must be applied to the dipole arms, because they might bend or the soldered connections near the feedpoint may be damaged.

Additional EUT Data

Manufactured by	SPEAG	
Manufactured on	August 03, 2012	

Certificate No: D2550V2-1010_Aug18

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DASY5 Validation Report for Head TSL

Date: 24.08.2018

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 2550 MHz; Type: D2550V2; Serial: D2550V2 - SN:1010

 $\begin{array}{l} \mbox{Communication System: UID 0 - CW; Frequency: 2550 MHz} \\ \mbox{Medium parameters used: } f = 2550 \mbox{ MHz; } \sigma = 1.97 \mbox{ S/m; } \epsilon_r = 37.3; \mbox{$\rho = 1000 \mbox{ kg/m}^3$} \\ \mbox{Phantom section: Flat Section} \\ \mbox{Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)} \\ \end{array}$

DASY52 Configuration:

- Probe: EX3DV4 SN7349; ConvF(7.43, 7.43, 7.43) @ 2550 MHz; Calibrated: 30.12.2017
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 26.10.2017
- Phantom: Flat Phantom 5.0 (front); Type: QD 000 P50 AA; Serial: 1001
- DASY52 52.10.1(1476); SEMCAD X 14.6.11(7439)

Dipole Calibration for Head Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm Reference Value = 119.6 V/m; Power Drift = -0.07 dB Peak SAR (extrapolated) = 30.5 W/kg SAR(1 g) = 14.8 W/kg; SAR(10 g) = 6.73 W/kg Maximum value of SAR (measured) = 24.9 W/kg





Certificate No: D2550V2-1010_Aug18

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Impedance Measurement Plot for Head TSL



Certificate No: D2550V2-1010_Aug18

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DASY5 Validation Report for Body TSL

Date: 24.08.2018

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 2550 MHz; Type: D2550V2; Serial: D2550V2 - SN:1010

Communication System: UID 0 - CW; Frequency: 2550 MHz Medium parameters used: f = 2550 MHz; σ = 2.14 S/m; ϵ_r = 51.5; ρ = 1000 kg/m³ Phantom section: Flat Section Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: EX3DV4 SN7349; ConvF(7.68, 7.68, 7.68) @ 2550 MHz; Calibrated: 30.12.2017
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 26.10.2017
- Phantom: Flat Phantom 5.0 (back); Type: QD 000 P50 AA; Serial: 1002
- DASY52 52.10.1(1476); SEMCAD X 14.6.11(7439)

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

Measurement grid: dx=5mm, dy=5mm, dz=5mmReference Value = 109.2 V/m; Power Drift = -0.03 dB Peak SAR (extrapolated) = 27.9 W/kg SAR(1 g) = 13.7 W/kg; SAR(10 g) = 6.22 W/kg Maximum value of SAR (measured) = 22.9 W/kg





Certificate No: D2550V2-1010_Aug18

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Impedance Measurement Plot for Body TSL



Certificate No: D2550V2-1010_Aug18

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2550MHz Dipole Calibration Certificate (2021)

Calibration Laboratory of Schmid & Partner Engineering AG Zeughausstrasse 43, 8004 Zurich, Switzerland



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Client TMC-SZ (Auden)

Certificate No: D2550V2-1010_May21

Accreditation No.: SCS 0108

bject	D2550V2 - SN:10	10	
alibration procedure(s)	QA CAL-05.v11 Calibration Proce	dure for SAR Validation Sources	between 0.7-3 GHz
alibration date:	May 21, 2021		
is calibration certificate documen is measurements and the uncerta I calibrations have been conducte alibration Equipment used (M&TE	ts the traceability to national interest with confidence providence of the closed laborator of the closed laborator of the closed for calibration).	onal standards, which realize the physical uni cohability are given on the following pages an γ facility: environment temperature (22 ± 3)*0	its of measurements (SI), d are part of the contilicate. C and humidity < 70%.
rimary Standards	10 #	Cal Date (Certificate No.)	Scheduled Calibration
'ower meter NRP	SN: 104778	09-Apr-21 (No. 217-03291/03292)	Apr-22
	The second s		
ower sensor NRP-Z91	SN: 103244	09-Apr-21 (No. 217-03291)	Apr-22
wer sensor NRP-Z91 wer sensor NRP-Z91	SN: 103244 SN: 103245	09-Apr-21 (No. 217-03291) 09-Apr-21 (No. 217-03292)	Apr-22 Apr-22
ower sensor NRP-Z91 ower sensor NRP-Z91 eference 20 dB Attenuator	SN: 103244 SN: 103245 SN: BH9394 (20k)	09-Apr-21 (No. 217-03291) 09-Apr-21 (No. 217-03292) 09-Apr-21 (No. 217-03343)	Apr-22 Apr-22 Apr-22
ower sensor NRP-291 wer sensor NRP-291 eference 20 dB Attenuator rpe-N mismatch combination	SN: 103244 SN: 103245 SN: BH9394 (20k) SN: 310962 / 06327	09-Apr-21 (No. 217-03291) 09-Apr-21 (No. 217-03292) 09-Apr-21 (No. 217-03343) 09-Apr-21 (No. 217-03344)	Apr-22 Apr-22 Apr-22 Apr-22
wer eensor NRP-Z91 wer eensor NRP-Z91 sference 20 dB Attenuator spe-N mismatch combination sference Probe EX3DV4	SN: 103244 SN: 103245 SN: BH9394 (20k) SN: 310962 / 06327 SN: 7349	09-Apr-21 (No. 217-03291) 09-Apr-21 (No. 217-03292) 09-Apr-21 (No. 217-03343) 09-Apr-21 (No. 217-03344) 28-Dec-20 (No. EX3-7349_Dec20)	Apr-22 Apr-22 Apr-22 Apr-22 Dec-21
ower sensor NRP-281 ower sensor NRP-291 eference 20 dB Attenuator ype-N mismatch combination eference Probe EX3DV4 AE4	SN: 103244 SN: 103245 SN: BH9394 (20k) SN: 310962 / 06327 SN: 7349 SN: 601	09-Apr-21 (No. 217-03291) 09-Apr-21 (No. 217-03292) 09-Apr-21 (No. 217-03343) 09-Apr-21 (No. 217-03344) 28-Dec-20 (No. EX3-7349_Dec20) 02-Nov-20 (No. DAE4-601_Nov20)	Apr-22 Apr-22 Apr-22 Apr-22 Dec-21 Nov-21
ower sensor NRP-291 ower sensor NRP-291 eference 20 dB Attenuator ype-N mismatch combination eference Probe EX3DV4 AE4 econdary Standards	SN: 103244 SN: 103245 SN: BH9394 (20k) SN: 310982 / 06327 SN: 7349 SN: 601	09-Apr-21 (No. 217-03291) 09-Apr-21 (No. 217-03292) 09-Apr-21 (No. 217-03343) 09-Apr-21 (No. 217-03344) 28-Dec-20 (No. EX3-7349_Dec20) 02-Nov-20 (No. DAE4-601_Nov20) Check Date (in house)	Apr-22 Apr-22 Apr-22 Apr-22 Dec-21 Nov-21 Scheduled Check
ower sensor NRP-291 ower sensor NRP-291 eference 20 dB Attenuator ype-N mismatch combination eference Probe EX3DV4 AE4 econdary Standards ower meter E4419B	SN: 103244 SN: 103245 SN: BH9394 (20k) SN: 310982 / 06327 SN: 7349 SN: 601 ID # SN: GB39512475	09-Apr-21 (No. 217-03291) 09-Apr-21 (No. 217-03292) 09-Apr-21 (No. 217-03343) 09-Apr-21 (No. 217-03344) 28-Dec-20 (No. EX3-7349_Dec20) 02-Nov-20 (No. DAE4-601_Nov20) Check Date (in house) 30-Oct-14 (in house check Oct-20)	Apr-22 Apr-22 Apr-22 Apr-22 Dec-21 Nov-21 Scheduled Check In house check: Oct-22
ower sensor NRP-291 ower sensor NRP-291 leference 20 dB Attenuator ype-N mismatch combination leference Probe EX3DV4 /AE4 econdary Standards ower meter E4419B ower sensor HP 8481A	SN: 103244 SN: 103245 SN: BH9394 (20k) SN: 310962 / 06327 SN: 7349 SN: 601 ID # SN: GB39512475 SN: US37292783	09-Apr-21 (No. 217-03291) 09-Apr-21 (No. 217-03292) 09-Apr-21 (No. 217-03343) 09-Apr-21 (No. 217-03344) 28-Dec-20 (No. EX3-7349_Dec20) 02-Nov-20 (No. DAE4-601_Nov20) Check Date (in house) 30-Oct-14 (in house check Oct-20) 07-Oct-15 (in house check Oct-20)	Apr-22 Apr-22 Apr-22 Apr-22 Dec-21 Nov-21 Scheduled Check In house check: Oct-22 In house check: Oct-22
ower sensor NRP-291 tower sensor NRP-291 teference 20 dB Attenuator ype-N mismatch combination leference Probe EX3DV4 IAE4 tecondary Standards tower meter E44198 tower sensor HP 8481A tower sensor HP 8481A	SN: 103244 SN: 103245 SN: BH9394 (20k) SN: 310982 / 06327 SN: 7349 SN: 601 ID # SN: GB39512475 SN: US37292783 SN: WY41092317	09-Apr-21 (No. 217-03291) 09-Apr-21 (No. 217-03292) 09-Apr-21 (No. 217-03343) 09-Apr-21 (No. 217-03344) 28-Dec-20 (No. EX3-7349_Dec20) 02-Nov-20 (No. DAE4-601_Nov20) Check Date (in house) 30-Oct-14 (in house check Oct-20) 07-Oct-15 (in house check Oct-20) 07-Oct-15 (in house check Oct-20)	Apr-22 Apr-22 Apr-22 Dec-21 Nov-21 Scheduled Check In house check: Oct-22 In house check: Oct-22 In house check: Oct-22
ower sensor NRP-291 ower sensor NRP-291 leference 20 dB Attenuator ype-N mismatch combination leference Probe EX3DV4 iAE4 econdary Standards ower meter E44198 ower sensor HP 8481A ower sensor HP 8481A iF generator R&S SMT-06	SN: 103244 SN: 103245 SN: BH9394 (20k) SN: 310982 / 06327 SN: 7349 SN: 601 ID:# SN: GB39512475 SN: US37292783 SN: WY41092317 SN: 100972	09-Apr-21 (No. 217-03291) 09-Apr-21 (No. 217-03292) 09-Apr-21 (No. 217-03343) 09-Apr-21 (No. 217-03344) 28-Dec-20 (No. EX3-7349, Dec20) 02-Nov-20 (No. DAE4-601, Nov20) Check Date (In house) 30-Oct-14 (In house check Oct-20) 07-Oct-15 (In house check Oct-20) 07-Oct-15 (In house check Oct-20) 15-Jun-15 (In house check Oct-20)	Apr-22 Apr-22 Apr-22 Dec-21 Nov-21 Scheduled Check In house check: Oct-22 In house check: Oct-22 In house check: Oct-22 In house check: Oct-22 In house check: Oct-22
ower sensor NRP-291 ower sensor NRP-291 leference 20 dB Attenuator ype-N mismatch combination leference Probe EX3DV4 NAE4 econdary Standards ower meter E44198 rower sensor HP 8481A rower sensor HP 8481A is generator R&S SMT-06 letwork Analyzer Agilent E8358A	SN: 103244 SN: 103245 SN: BH9394 (20k) SN: 310982 / 06327 SN: 7349 SN: 601 ID # SN: GB39512475 SN: US37292783 SN: MY41092317 SN: 100972 SN: US41080477	09-Apr-21 (No. 217-03291) 09-Apr-21 (No. 217-03292) 09-Apr-21 (No. 217-03343) 09-Apr-21 (No. 217-03344) 28-Dec-20 (No. EX3-7349_Dec20) 02-Nov-20 (No. DAE4-601_Nov20) Check Date (in house) 30-Oct-14 (in house check Oct-20) 07-Oct-15 (in house check Oct-20) 07-Oct-15 (in house check Oct-20) 15-Jun-15 (in house check Oct-20) 31-Mar-14 (in house check Oct-20)	Apr-22 Apr-22 Apr-22 Apr-22 Dec-21 Nov-21 Scheduled Check In house check: Oct-22 In house check: Oct-22
Power sensor NRP-291 Power sensor NRP-291 Reference 20 dB Attenuator ype-N mismatch combination teterence Probe EX3DV4 VAE4 Secondary Standards Power sensor HP 8481A Power sensor HP 8481A Power sensor HP 8481A Power sensor HP 8481A Regenurator R&S SMT-06 letwork Analyzor Agilent E8358A	SN: 103244 SN: 103245 SN: BH9394 (20k) SN: 310982 / 06327 SN: 7349 SN: 601 ID # SN: GB39512475 SN: US37292783 SN: MY41092317 SN: 100972 SN: US41080477 Name	09-Apr-21 (No. 217-03291) 09-Apr-21 (No. 217-03292) 09-Apr-21 (No. 217-03343) 09-Apr-21 (No. 217-03343) 09-Apr-21 (No. 217-03344) 28-Dec-20 (No. EX3-7349_Dec20) 02-Nov-20 (No. DAE4-601_Nov20) Check Date (In house) 30-Oct-14 (In house check Oct-20) 07-Oct-15 (In house check Oct-20) 07-Oct-15 (In house check Oct-20) 15-Jun-15 (In house check Oct-20) 31-Mar-14 (In house check Oct-20) Function	Apr-22 Apr-22 Apr-22 Dec-21 Nov-21 Scheduled Check In house check: Oct-22 In house check: Oct-21 Signature
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Power sensor NRP-281 Power sensor NRP-291 Reference 20 dB Attenuator Type-N mismatch combination Reference Probe EX3DV4 DAE4 Secondary Standards Power sensor HP 8481A Power sensor HP 8481A Power sensor HP 8481A Pr generator R&S SMT-06 Vetwork Analyzor Agilent E8358A Calibrated by:	SN: 103244 SN: 103245 SN: BH9394 (20k) SN: 310982 / 06327 SN: 7349 SN: 601 ID # SN: GB39512475 SN: US37292783 SN: MY41092317 SN: 100972 SN: US41080477 Name Jeffrey Katzman	09-Apr-21 (No. 217-03291) 09-Apr-21 (No. 217-03292) 09-Apr-21 (No. 217-03343) 09-Apr-21 (No. 217-03344) 28-Dec-20 (No. 217-03344) 28-Dec-20 (No. DAE4-601 Nov20) 02-Nov-20 (No. DAE4-601 Nov20) 02-Nov-20 (No. DAE4-601 Nov20) 07-Oct-14 (in house check Oct-20) 07-Oct-15 (in house check Oct-20) 07-Oct-15 (in house check Oct-20) 15-Jun-15 (in house check Oct-20) 31-Mar-14 (in house check Oct-20) Function Laboratory Technician	Apr-22 Apr-22 Apr-22 Dec-21 Nov-21 Scheduled Check In house check: Oct-22 In house check: Oct-21 Signature
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Calibration Laboratory of Schmid & Partner Engineering AG Zeughausstrasse 43, 8004 Zurich, Switzerland





- Schweizerischer Kalibrierdienst Service suisse d'étalonnage
- Servizio svizzero di taratura Swiss Calibration Service

Accreditation No.: SCS 0108

Accredited by the Swiss Accreditation Service (SAS)

The Swiss Accreditation Service is one of the signatories to the EA Multilateral Agreement for the recognition of calibration certificates

Glossary:

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

Calibration is Performed According to the Following Standards:

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

Additional Documentation:

e) DASY4/5 System Handbook

Methods Applied and Interpretation of Parameters:

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

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

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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	Modular Flat Phantom	
Distance Dipole Center - TSL	10 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	2550 MHz ± 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	39.1	1.91 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) "C	$37.4\pm6~\%$	1.99 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C		12222

SAR result with Head TSL

SAR averaged over 1 cm ³ (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	14.4 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	55.9 W/kg ± 17.0 % (k=2)
SAP suprand over 10 cm ³ (10 c) of Head TSI	Control of the You of the	
SALL averaged over to cill (10 g) of flead tot.	condition	
SAR measured	250 mW input power	6.42 W/kg
SAR measured SAR for nominal Head TSL parameters	250 mW input power normalized to 1W	6.42 W/kg 25.2 W/kg ± 16.5 % (k=2

Body TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	52.6	2.09 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) "C	50,8 ± 6 %	2.16 mho/m ± 6 %
Body TSL temperature change during test	< 0.5 °C		1 and

SAR result with Body TSL

SAR averaged over 1 cm3 (1 g) of Body TSL	Condition	
SAR measured	250 mW input power	13.4 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	52.4 W/kg ± 17.0 % (k=2)
SAR averaged over 10 cm ³ (10 g) of Body TSL	condition	
SAR averaged over 10 cm ³ (10 g) of Body TSL SAR measured	condition 250 mW input power	6.04 W/kg

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Appendix (Additional assessments outside the scope of SCS 0108)

Antenna Parameters with Head TSL

Impedance, transformed to feed point	52.8 Ω - 3.8 jΩ		
Return Loss	- 26,8 dB		

Antenna Parameters with Body TSL

Impedance, transformed to feed point	49.3 Ω - 1.8 jΩ
Return Loss	- 34,3 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.153 ns

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

The dipole is made of standard semirigid coaxial cable. The center conductor of the feeding line is directly connected to the second arm of the dipole. The antenna is therefore short-circuited for DC-signals. On some of the dipoles, small end caps are added to the dipole arms in order to improve matching when loaded according to the position as explained in the "Measurement Conditions" paragraph. The SAR data are not affected by this change. The overall dipole length is still according to the Standard.

No excessive force must be applied to the dipole arms, because they might bend or the soldered connections near the feedpoint may be damaged.

Additional EUT Data

Manufactured by	SPEAG
La contra y antima se contra de la contra de	CONCEPTING OFFICE

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DASY5 Validation Report for Head TSL

Date: 21.05.2021

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 2550 MHz; Type: D2550V2; Serial: D2550V2 - SN:1010

Communication System: UID 0 - CW: Frequency: 2550 MHz Medium parameters used: f = 2550 MHz; $\sigma = 1.99$ S/m; $\epsilon_r = 37.4$; $\rho = 1000$ kg/m³ Phantom section: Flat Section Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: EX3DV4 SN7349; ConvF(7.85, 7.85, 7.85) @ 2550 MHz; Calibrated: 28.12.2020
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 02.11.2020
- Phantom: Flat Phantom 5.0 (front); Type: QD 000 P50 AA; Serial: 1001
- DASY52 52.10.4(1527); SEMCAD X 14.6.14(7483)

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

Measurement grid: dx=5mm, dy=5mm, dz=5mm Reference Value = 119.0 V/m; Power Drift = 0.05 dB Peak SAR (extrapolated) = 29.6 W/kg SAR(1 g) = 14.4 W/kg; SAR(10 g) = 6.42 W/kg Smallest distance from peaks to all points 3 dB below = 8.9 mm Ratio of SAR at M2 to SAR at M1 = 48.2% Maximum value of SAR (measured) = 24.3 W/kg



0 dB = 24.3 W/kg = 13.86 dBW/kg

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Impedance Measurement Plot for Head TSL



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DASY5 Validation Report for Body TSL

Date: 21.05.2021

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 2550 MHz; Type: D2550V2; Serial: D2550V2 - SN:1010

Communication System: UID 0 - CW; Frequency: 2550 MHz Medium parameters used: f = 2550 MHz; $\sigma = 2.16$ S/m; $\epsilon_r = 50.8$; $\rho = 1000$ kg/m³ Phantom section: Flat Section Measurement Standard; DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: EX3DV4 SN7349; ConvF(7.98, 7.98, 7.98) @ 2550 MHz; Calibrated: 28.12.2020
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 02.11.2020
- Phantom: Flat Phantom 5.0 (back); Type: QD 000 P50 AA; Serial: 1002
- DASY52 52.10.4(1527); SEMCAD X 14.6.14(7483)

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

Measurement grid: dx=5mm, dy=5mm, dz=5mm Reference Value = 110.2 V/m; Power Drift = -0.01 dB Peak SAR (extrapolated) = 26.1 W/kg SAR(1 g) = 13.4 W/kg; SAR(10 g) = 6.04 W/kg Smallest distance from peaks to all points 3 dB below = 8 mm Ratio of SAR at M2 to SAR at M1 = 51.9% Maximum value of SAR (measured) = 22.1 W/kg



0 dB = 22.1 W/kg = 13.44 dBW/kg

Certificate No: D2550V2-1010_May21

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Impedance Measurement Plot for Body TSL



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ANNEX J: Extended Calibration SAR Dipole

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

Justification of Extended Calibration SAR Dipole D750V3– serial no.1163 Head

Head						
Date of Measurement	Return-Loss (dB)	Delta (%)	Real Impedance (ohm)	Delta (ohm)	Imaginary Impedance (johm)	Delta (johm)
2019-09-03	-26.9	/	50.5	/	-4.53	/
2020-09-01	-25.8	4.1	51.2	0.7	-4.29	0.24
2020-10-05	-22.8	7.3	50.1	1.3	-5.48	0.24

Justification of Extended Calibration SAR Dipole D835V2– serial no.4d057

Head						
Date of Measurement	Return-Loss (dB)	Delta (%)	Real Impedance (ohm)	Delta (ohm)	Imaginary Impedance (johm)	Delta (johm)
2018-10-09	-27.7	/	49.6	/	-4.08	/
2019-10-06	-26.9	2.9	50.1	0.5	-3.95	0.13
2020-10-05	-25.4	8.3	56.7	1.8	-2.15	0.15

Justification of Extended Calibration SAR Dipole D1750V2– serial no.1152

Head						
Date of Measurement	Return-Loss (dB)	Delta (%)	Real Impedance (ohm)	Delta (ohm)	Imaginary Impedance (johm)	Delta (johm)
2019-08-30	-38.1	/	49.1	/	-0.84	/
2020-08-28	-36.5	4.2	50.2	1.1	-0.49	0.35
2021-08-26	-35.7	6.3	50.8	1.7	-0.42	0.42

Justification of Extended Calibration SAR Dipole D1900V2– serial no.5d088

			Head			
Date of Measurement	Return-Loss (dB)	Delta (%)	Real Impedance (ohm)	Delta (ohm)	Imaginary Impedance (johm)	Delta (johm)
2018-10-24	-23.2	/	52.7	/	6.63	/
2019-10-22	-22.9	1.3	53.5	0.8	6.86	0.23
2020-10-20	-20.7	10.8	54.4	1.7	6.95	0.32



			Head			
Date of Measurement	Return-Loss (dB)	Delta (%)	Real Impedance (ohm)	Delta (ohm)	Imaginary Impedance (johm)	Delta (johm)
2018-10-26	-28.0	/	53.5	/	2.11	/
2019-10-22	-27.3	2.5	54.4	0.9	2.29	0.18
2020-10-20	-24.9	11.1	55.1	1.6	2.46	0.35

Justification of Extended Calibration SAR Dipole D2450V2– serial no.873

Justification of Extended Calibration SAR Dipole D2550V2– serial no.1010

	Head										
Date of Measurement	Return-Loss (dB)	Delta (%)	Real Impedance (ohm)	Delta (ohm)	Imaginary Impedance (johm)	Delta (johm)					
2018-08-24	-25.7	/	54.9	/	-2.30	/					
2019-08-22	-24.8	3.5	55.8	0.9	-2.22	0.08					
2020-08-20	-23.2	9.7	56.4	1.5	-2.13	0.17					

The Return-Loss is <-20dB, and within 20% of prior calibration; the impedance is within 5 ohm of prior calibration. Therefore the value result should support extended cabration.



ANNEX K: Spot Check Test

As the test lab for TA-1339 from HMD Global Oy, we, Shenzhen Academy of Information and Communications Technology, declare on our sole responsibility that, according to "Justification Letter" provided by applicant, only the Spot check test should be performed. The test results are as below.

K.1. Internal Identification of EUT used during the spot check test

EUT ID*	IMEI	HW Version	SW Version	Receipt Date
UT04aa	357321211569925	V01B	000T_0_513	2022-01-05
UT06aa	357321211569628	V01B	000T_0_513	2022-01-05

K.2. Measurement results

GSM850 SAR Values

Freq	uency			Conducted	Max	SAR(1g) (W/kg)		
	Test Desition		Dowor	tune-up	Spot che	eck data	Original	
Ch.	MHz		SUPUSITION	(dBm)	Power	Measured	Reported	data
				(dBill)	(abm)	SAR	SAR	uala
190	836.6	Head	Left Cheek	31.89	33.0	0.216	0.28	0.30
190	836.6	Body	Rear	29.84	31.0	0.312	0.41	0.42

GSM1900 SAR Values

Freq	uency			Conducted	Max	SAR(1g) (W/kg)		
	Test Position		Power	tune-up Power	Spot che	eck data	Original	
Ch.	Ch. MHz Test Position	Measured			Reported	data		
				(dbiii)	(abm)	SAR	SAR	uala
512	1850.2	Head	Right Cheek	29.05	30.0	0.005	0.01	0.04
512	1850.2	Body	Rear	23.04	23.5	0.390	0.43	0.61

WCDMA Band 2 SAR Values

Freq	uency			Conducted	Max	SAR(1g) (W/kg)		
	Test Desition			tune-up	Spot check data		Original	
Ch.	MHz	Ie Ie	SUPUSITION	(dBm)	Power	Measured	Reported	data
				(ubiii)	(abm)	SAR	SAR	uala
9400	1800.0	Head	Right Cheek	23.60	24.5	0.125	0.15	0.06
9400	1800.0	Body	Rear	19.60	20.5	0.667	0.82	1.05

WCDMA Band 4 SAR Values

Freq	uency			Conducted	Max	SAR(1g) (W/kg)		
	Test Position		Dowor	tune-up	Spot check data		Original	
Ch.	MHz	Ie Ie	SUPUSITION	(dBm)	Power	Measured	Reported	data
				(ubiii)	(aBm)	SAR	SAR	uala
1413	1732.6	Head	Left Tilt	24.60	25.0	0.104	0.11	0.26
1413	1732.6	Body	Rear	22.60	23.0	0.474	0.52	0.43



WCDMA Band 5 SAR Values

Freq	uency			Conducted	Max	SA	R(1g) (W/kg)
	То	st Position	Bower	tune-up	Spot check data		Original	
Ch.	Ch. MHz Test Position		Power (dBm)	Measured	Reported	doto		
				SAR	SAR	uala		
4182	836.4	Head	Left Cheek	23.40	24.5	0.251	0.32	0.33
4182	836.4	Body	Rear	23.40	24.5	0.363	0.47	0.37

LTE Band 2 SAR Values

Freq	uency			Conducted	Max	SAR(1g) (W/kg)		
	Test Position		Dowor	tune-up	Spot check data		Original	
Ch.	MHz	ie ie	SUPUSITION	(dBm)	Power	Measured	Reported	data
				(dBill)	(abm)	SAR	SAR	uala
18900	1880.0	Head	Right Cheek	23.17	24.0	0.116	0.14	0.10
18900	1880.0	Body	Rear	19.98	21.0	0.817	1.03	1.12

LTE Band 5 SAR Values

Freq	uency			Conducted	Max	SAR(1g) (W/kg)		
	Test Position		Power	tune-up Power	Spot check data		Original	
Ch.	Ch. MHz Test Position	Measured			Reported	data		
				(ubiii)	(aBm)	SAR	SAR	uala
20525	836.5	Head	Left Cheek	23.23	24.0	0.245	0.29	0.23
20525	836.5	Body	Right	23.23	24.0	0.275	0.33	0.29

LTE Band 7 SAR Values

Freq	uency			Conducted	Max	SAR(1g) (W/kg)		
	Test Position		Power	tune-up Power	Spot che	Spot check data		
Ch.	Ch. MHz	Measured			Reported	data		
				(ubiii)	(артт)	SAR	SAR	uala
20850	2510.0	Head	Left Cheek	21.87	22.5	0.216	0.25	0.13
21350	2560.0	Body	Rear	21.85	22.5	0.565	0.66	1.16

LTE Band 12 SAR Values

Freq	uency			Conducted	Max.	SAR(1g) (W/kg)		
	Test Desition		Dowor	tune-up	Spot che	eck data	Original	
Ch.	MHz		SUPOSITION	(dBm)	Power	Measured	Reported	data
				(dbiii)	(abm)	SAR	SAR	uala
23095	707.5	Head	Left Cheek	23.21	24.0	0.109	0.13	0.07
23095	707.5	Body	Rear	23.21	24.0	0.186	0.22	0.15



LTE Band 28 SAR Values

Freq	uency			Conducted	Max	SAR(1g) (W/kg)		
	Test Position		Power	tune-up Power (dBm)	Spot check data		Original	
Ch.	n. MHz Test Position	Measured			Reported	data		
		(dbiii)	SAR		SAR	uala		
27460	728.0	Head	Left Cheek	22.98	24.0	0.167	0.21	0.13
27460	728.0	Body	Rear	22.98	24.0	0.268	0.34	0.25

LTE Band 66 SAR Values

Frequency				Conducted	Max	SAR(1g) (W/kg)		
Ch.	MHz	Test Position		Power (dBm)	tune-up Power (dBm)	Spot check data		Original
						Measured	Reported	data
						SAR	SAR	
132072	1720.0	Head	Right Cheek	23.27	24.0	0.179	0.21	0.18
132322	1745.0	Body	Rear	17.98	19.0	0.641	0.81	1.10

WLAN 2.4G SAR Values

Frequency				Conducted	Мах	SAR(1g) (W/kg)		
Ch.	MHz	Test Position		Power (dBm)	tune-up Power (dBm)	Spot check data		Original
						Measured	Reported	data
						SAR	SAR	
11	2462.0	Head	Right Cheek	17.53	18.5	0.461	0.58	0.74
11	2462.0	Body	Rear	17.53	18.5	0.164	0.21	0.21



K.3. Graph Results for Spot Check

GSM850 Head

Date: 2022-1-27 Electronics: DAE4 Sn786 Medium: Head 835MHz Medium parameters used (interpolated): f = 836.6 MHz; σ = 0.917 S/m; ϵ_r = 40.823; ρ = 1000 kg/m³ Communication System: UID 0, GSM (0) Frequency: 836.6 MHz Duty Cycle: 1:8.3 Probe: ES3DV3 – SN3151 ConvF (6.40, 6.40, 6.40);

Left Cheek Middle/Area Scan (61x61x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm Maximum value of SAR (interpolated) = 0.234 W/kg

Left Cheek Middle/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm Reference Value = 4.907 V/m; Power Drift = 0.08 dB Peak SAR (extrapolated) = 0.277 W/kg SAR(1 g) = 0.216 W/kg; SAR(10 g) = 0.166 W/kg Maximum value of SAR (measured) = 0.237 W/kg





GSM850 Body

Date: 2022-1-27 Electronics: DAE4 Sn786

Medium: Head 835MHz

Medium parameters used (interpolated): f = 836.6 MHz; σ = 0.917 S/m; ϵ_r = 40.823; ρ = 1000 kg/m³ Communication System: UID 0, GPRS 2Txslot (0) Frequency: 836.6 MHz Duty Cycle: 1:4 Probe: ES3DV3 – SN3151 ConvF (6.40, 6.40, 6.40);

Rear Side Middle/Area Scan (61x71x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm Maximum value of SAR (interpolated) = 0.339 W/kg

Rear Side Middle/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm Reference Value = 17.70 V/m; Power Drift = 0.05 dB Peak SAR (extrapolated) = 0.400 W/kg SAR(1 g) = 0.312 W/kg; SAR(10 g) = 0.239 W/kg Maximum value of SAR (measured) = 0.341 W/kg





GSM1900 Head

Date: 2022-1-28 Electronics: DAE4 Sn786 Medium: Head 1900MHz Medium parameters used (interpolated): f = 1850.2 MHz; σ = 1.374 S/m; ϵ_r = 39.418; ρ = 1000 kg/m³ Communication System: UID 0, GSM (0) Frequency: 1850.2 MHz Duty Cycle: 1:8.3 Probe: ES3DV3 – SN3151 ConvF (5.09, 5.09);

Right Cheek Low/Area Scan (61x61x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm Maximum value of SAR (interpolated) = 0.008 W/kg

Right Cheek Low/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm Reference Value = 1.033 V/m; Power Drift = 0.09 dB Peak SAR (extrapolated) = 0.035 W/kg SAR(1 g) = 0.005 W/kg; SAR(10 g) = 0.002 W/kg

Maximum value of SAR (measured) = 0.011 W/kg





GSM1900 Body

Date: 2022-1-28

Electronics: DAE4 Sn786

Medium: Head 1900MHz

Medium parameters used (interpolated): f = 1850.2 MHz; σ = 1.374 S/m; ϵ_r = 39.418; ρ = 1000 kg/m^3

Communication System: UID 0, GPRS 4Txslot (0) Frequency: 1850.2 MHz Duty Cycle: 1:2 Probe: ES3DV3 – SN3151 ConvF (5.09, 5.09, 5.09);

Rear Side Low/Area Scan (61x61x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm Maximum value of SAR (interpolated) = 0.568 W/kg

Rear Side Low/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm Reference Value = 4.810 V/m; Power Drift = -0.02 dB Peak SAR (extrapolated) = 0.708 W/kg SAR(1 g) = 0.390 W/kg; SAR(10 g) = 0.203 W/kg

Maximum value of SAR (measured) = 0.541 W/kg





WCDMA Band 2 Head

Date: 2022-1-28 Electronics: DAE4 Sn786 Medium: Head 1900MHz Medium parameters used: f = 1880 MHz; σ = 1.4 S/m; ϵ_r = 39.302; ρ = 1000 kg/m³ Communication System: UID 0, WCDMA (0) Frequency: 1880 MHz Duty Cycle: 1:1 Probe: ES3DV3 – SN3151 ConvF (5.09, 5.09, 5.09);

Right Cheek Middle/Area Scan (61x61x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm Maximum value of SAR (interpolated) = 0.153 W/kg

Right Cheek Middle/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 3.173 V/m; Power Drift = -0.14 dB Peak SAR (extrapolated) = 0.194 W/kg SAR(1 g) = 0.125 W/kg; SAR(10 g) = 0.076 W/kg

SAR(1 g) = 0.125 W/Rg; SAR(10 g) = 0.078 W/Rg

Maximum value of SAR (measured) = 0.147 W/kg





WCDMA Band 2 Body

Date: 2022-1-28 Electronics: DAE4 Sn786 Medium: Head 1900MHz Medium parameters used: f = 1880 MHz; σ = 1.4 S/m; ϵ_r = 39.302; ρ = 1000 kg/m³ Communication System: UID 0, WCDMA (0) Frequency: 1880 MHz Duty Cycle: 1:1 Probe: ES3DV3 – SN3151 ConvF (5.09, 5.09, 5.09);

Rear Side Middle/Area Scan (61x61x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm Maximum value of SAR (interpolated) = 0.772 W/kg

Rear Side Middle/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm Reference Value = 3.832 V/m; Power Drift = 0.12 dB Peak SAR (extrapolated) = 1.26 W/kg SAR(1 g) = 0.667 W/kg; SAR(10 g) = 0.334 W/kg Maximum value of SAR (measured) = 0.798 W/kg

