

## DASY5 Validation Report for Head TSL

Date: 03.01.2024

Test Laboratory: SPEAG, Zurich, Switzerland

**DUT: CLA13; Type: CLA13; Serial: CLA13 - SN: 1043**

Communication System: UID 0 - CW; Frequency: 13 MHz

Medium parameters used:  $f = 13 \text{ MHz}$ ;  $\sigma = 0.71 \text{ S/m}$ ;  $\epsilon_r = 53.9$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section

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

DASY52 Configuration:

- Probe: EX3DV4 - SN3877; ConvF(15.33, 15.33, 15.33) @ 13 MHz; Calibrated: 06.01.2023
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn908; Calibrated: 03.07.2023
- Phantom: ELI v6.0; Type: QDOVA003AA; Serial: TP:2034
- DASY52 52.10.4(1535); SEMCAD X 14.6.14(7501)

**CLA Calibration for HSL-LF Tissue/CLA-13, touch configuration, Pin=1W/Zoom Scan, dist=1.4mm (8x10x8)/Cube 0:** Measurement grid:  $dx=4\text{mm}$ ,  $dy=4\text{mm}$ ,  $dz=1.4\text{mm}$

Reference Value = 29.24 V/m; Power Drift = -0.06 dB

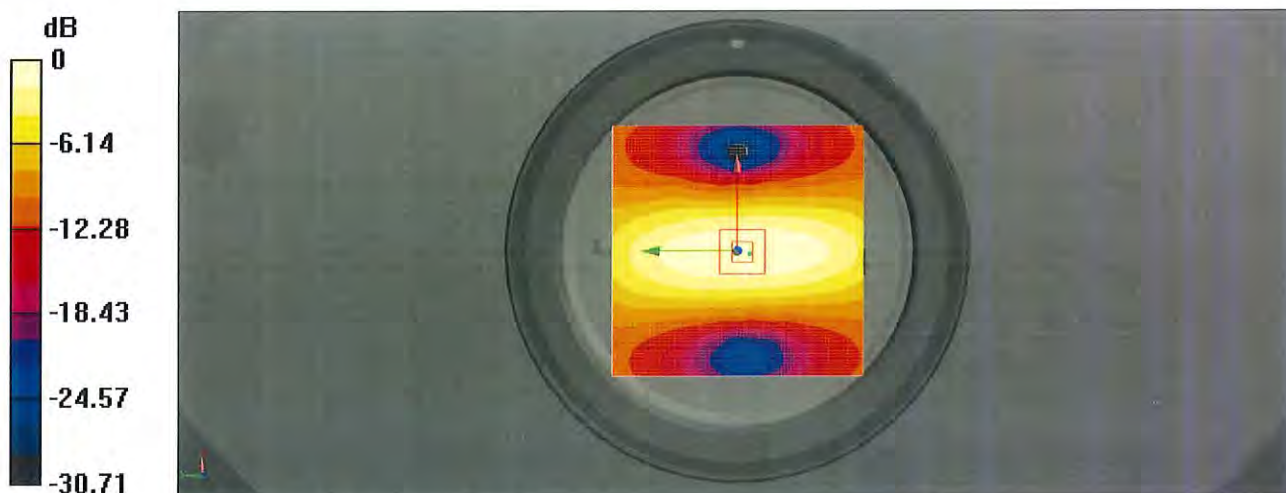
Peak SAR (extrapolated) = 1.04 W/kg

**SAR(1 g) = 0.465 W/kg; SAR(10 g) = 0.286 W/kg**

Smallest distance from peaks to all points 3 dB below = 17 mm

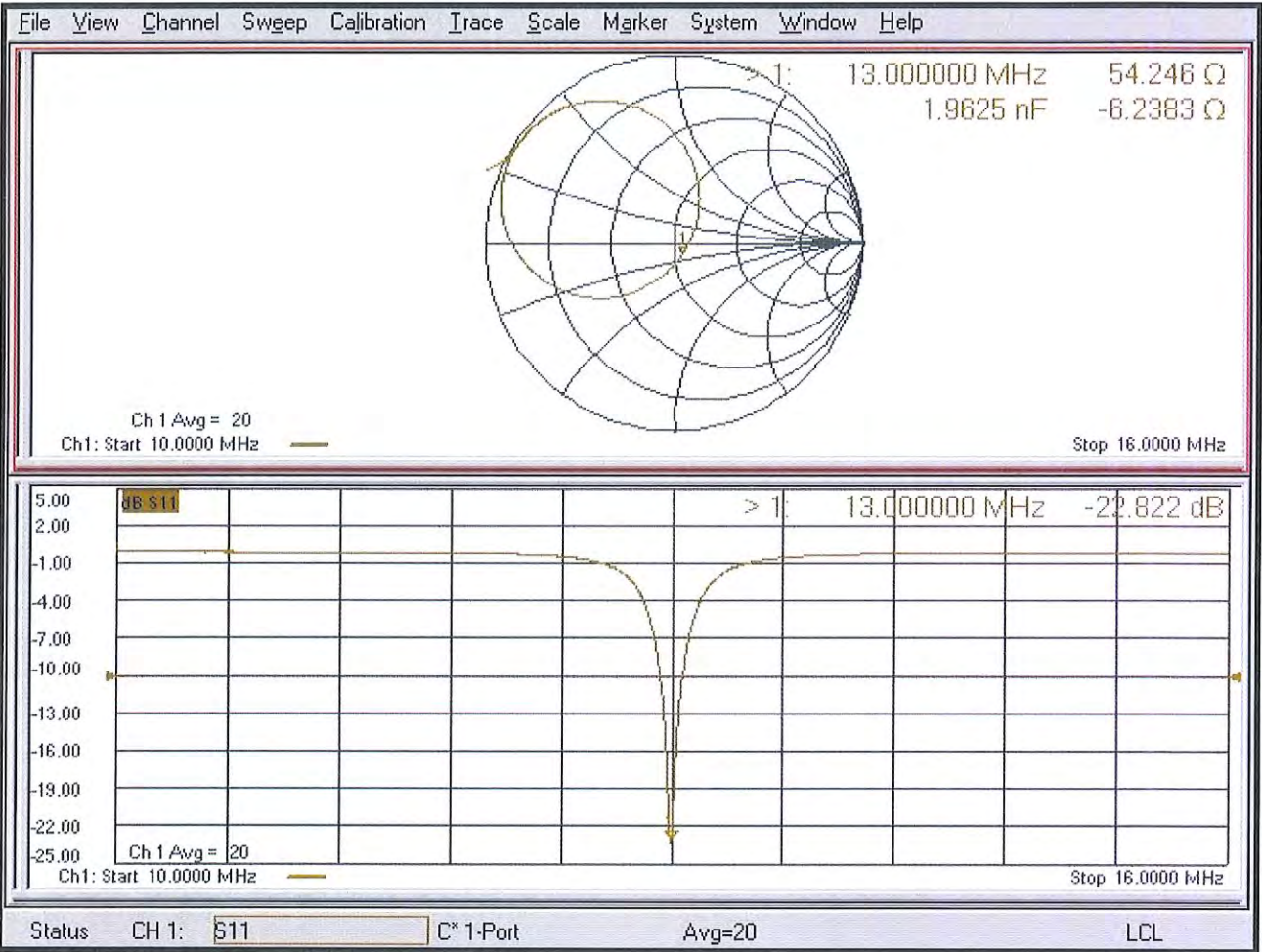
Ratio of SAR at M2 to SAR at M1 = 75.3%

Maximum value of SAR (measured) = 0.707 W/kg



0 dB = 0.707 W/kg = -1.51 dBW/kg

Impedance Measurement Plot for Head TSL



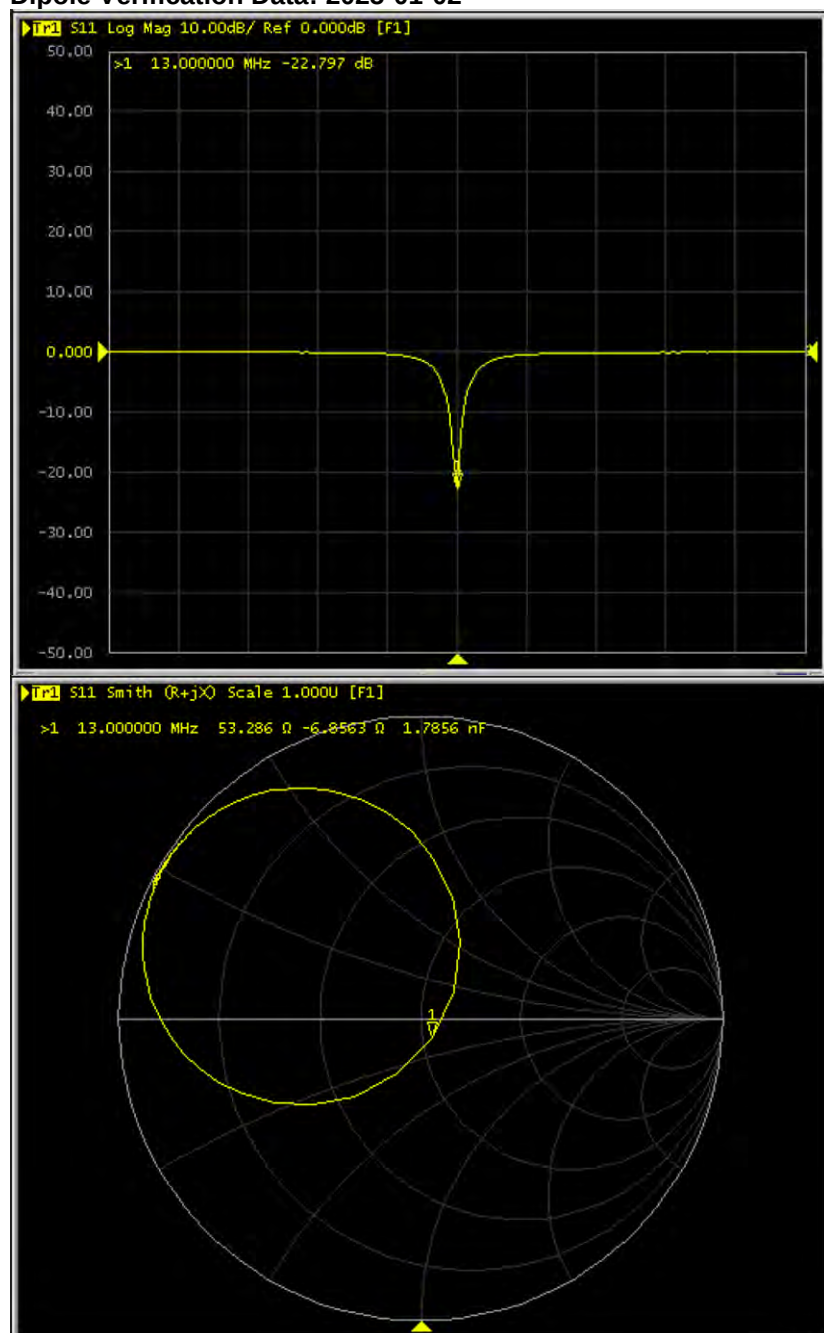
## CLA13 SN 1043 Extended Dipole Calibrations

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

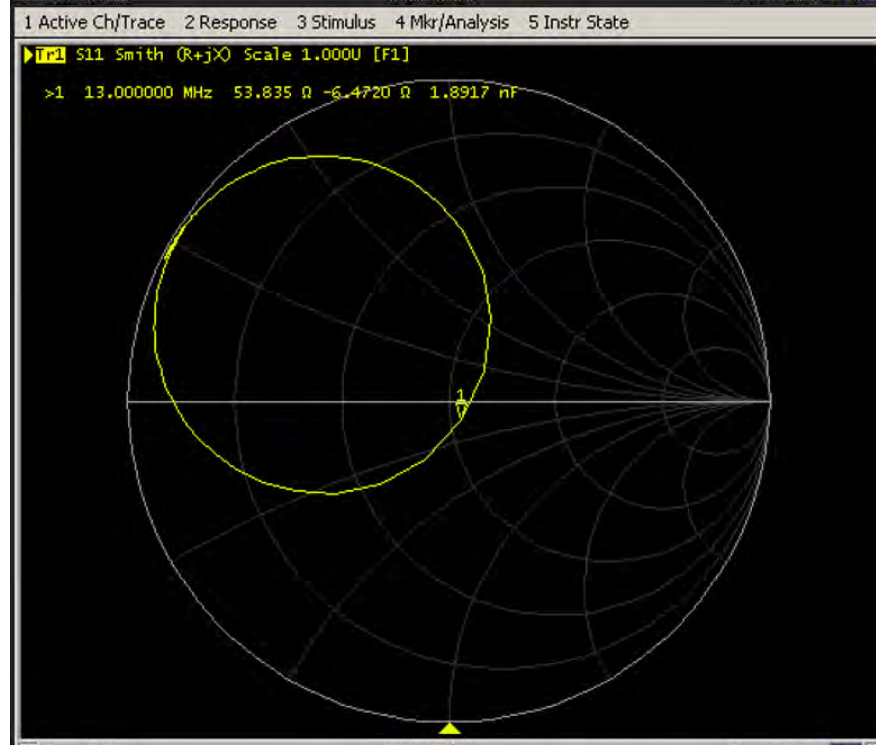
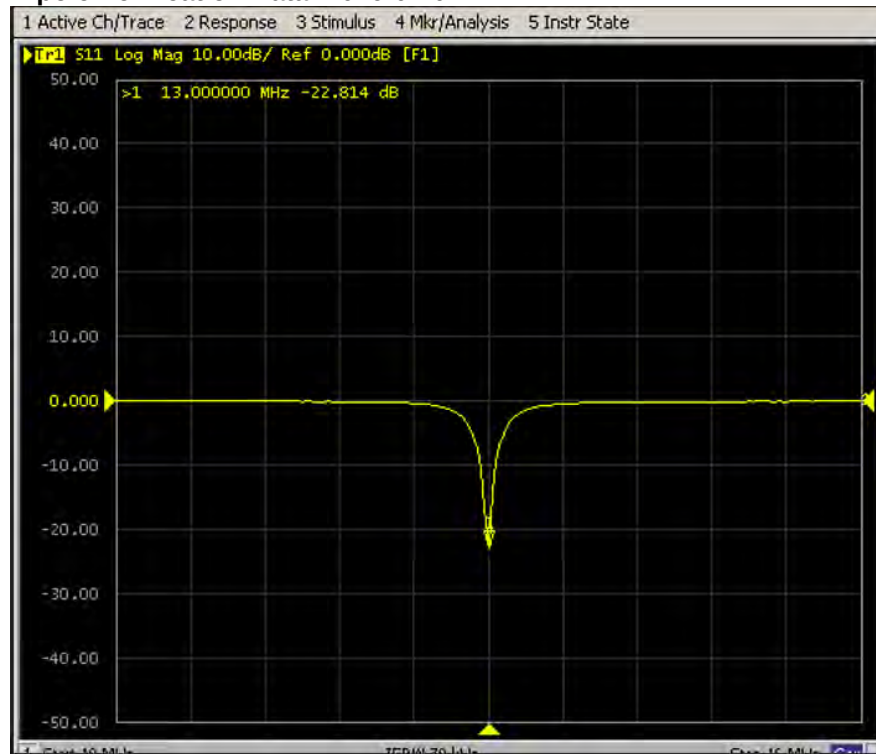
| Dipole CLA13 (SN 1043)   |                 |            |                             |                |                                  |                |
|--------------------------|-----------------|------------|-----------------------------|----------------|----------------------------------|----------------|
| 750MHz Head Liquid       |                 |            |                             |                |                                  |                |
| Date of Measurement      | Return Loss(dB) | $\Delta$ % | Real Impedance ( $\Omega$ ) | $\Delta\Omega$ | Imaginary Impedance ( $\Omega$ ) | $\Delta\Omega$ |
| 2024-01-03 (Cal. Report) | -22.8           | /          | 54.2                        | /              | -6.2                             | /              |
| 2025-01-02 (extended)    | -22.797         | -0.01      | 53.286                      | -0.914         | -6.8563                          | -0.6563        |
| 2026-01-02 (extended)    | -22.814         | 0.06       | 53.835                      | -0.365         | -6.472                           | -0.272         |

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

## Dipole Verification Data: 2025-01-02



## Dipole Verification Data: 2026-01-02



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Client

**TOWE(Shenzhen)**

Certificate No:

**26J02Z000096**

## CALIBRATION CERTIFICATE

Object **D2450V2 - SN: 1099**

Calibration Procedure(s) **FF-Z11-0003-02**  
Calibration Procedures for dipole validation kits

Calibration date: **February 5, 2026**

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       | 106276     | 16-May-25 (CTTL, No. 25J02X003423)        | May-26                |
| Power sensor NRP6A     | 101369     | 16-May-25 (CTTL, No. 25J02X003423)        | May-26                |
| Reference Probe EX3DV4 | SN 7600    | 19-Jan-26(CTTL-SPEAG, No. 26J02Z000008)   | Jan-27                |
| DAE4                   | SN 1588    | 29-Aug-25(CTTL-SPEAG, No. 25J02Z000631)   | Aug-26                |
| Secondary Standards    | ID #       | Cal Date (Calibrated by, Certificate No.) | Scheduled Calibration |
| SignalGeneratorSMA200A | 107732     | 01-Dec-25 (CTTL, No. 25J02X102467)        | Nov-26                |
| NetworkAnalyzer E5071C | MY46110673 | 26-Nov-25 (CTTL, No. 25J02X102468)        | Nov-26                |
| OCP DAKS-3.5           | 0015       | 20-Oct-25(SPEAG, No. OCP-DAKS-0015_Oct25) | Oct-26                |

|                | Name        | Function           | Signature                                                                             |
|----------------|-------------|--------------------|---------------------------------------------------------------------------------------|
| Calibrated by: | Zhao Jing   | SAR Test Engineer  |  |
| Reviewed by:   | Lin Jun     | SAR Test Engineer  |  |
| Approved by:   | Qi Dianyuan | SAR Project Leader |  |

Issued: February 13, 2026

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### Glossary:

|       |                                            |
|-------|--------------------------------------------|
| TSL   | tissue simulating liquid                   |
| ConvF | sensitivity in TSL / NORM <sub>x,y,z</sub> |
| N/A   | not applicable or not measured             |

### Calibration is Performed According to the Following Standards:

- 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
- KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

### Additional Documentation:

- DASY 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.
- *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                 | DASY6                  | V17.0.0     |
| Extrapolation                | Advanced Extrapolation |             |
| Phantom                      | Modular Flat Phantom   |             |
| Distance Dipole Center - TSL | 10 mm                  | with Spacer |
| Frequency                    | 2450 MHz $\pm$ 1 MHz   |             |

## Head TSL parameters at 2450 MHz

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 $\pm$ 0.2) °C | 39.1 $\pm$ 6 % | 1.80 mho/m $\pm$ 6 % |
| Head TSL temperature change during test | <1.0 °C             | ----           | ----                 |

## SAR result with Head TSL at 2450 MHz

|                                                |                    |                                |
|------------------------------------------------|--------------------|--------------------------------|
| SAR averaged over 1 $cm^3$ (1 g) of Head TSL   | Condition          |                                |
| SAR measured                                   | 24 dBm input power | 13.2 W/kg                      |
| SAR for nominal Head TSL parameters            | normalized to 1W   | 52.7 W/kg $\pm$ 20 % ( $k=2$ ) |
| SAR averaged over 10 $cm^3$ (10 g) of Head TSL | Condition          |                                |
| SAR measured                                   | 24 dBm input power | 6.17 W/kg                      |
| SAR for nominal Head TSL parameters            | normalized to 1W   | 24.7 W/kg $\pm$ 20 % ( $k=2$ ) |



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## Appendix (Additional assessments outside the scope of CNAS L0570)

### Antenna Parameters with Head TSL at 2450 MHz

|                                      |               |
|--------------------------------------|---------------|
| Impedance, transformed to feed point | 52.0Ω+ 5.16jΩ |
| Return Loss                          | - 25.3dB      |

### General Antenna Parameters and Design

|                                  |          |
|----------------------------------|----------|
| Electrical Delay (one direction) | 1.058 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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## DASY6 Validation Report for Head TSL

Date: 2026-02-05

Test Laboratory: CTTL, Beijing, China

### Summary

| Dipole            | Frequency [MHz] | TSL | Power [dBm] |
|-------------------|-----------------|-----|-------------|
| D2450V2 – SN 1099 | 2450            | HSL | 24          |

### Exposure Conditions

| Phantom<br>Section, TSL | Position, Test<br>Distance [mm] | Band Group,<br>UID | Frequency<br>[MHz] | Conversion<br>Factor | TSL Cond.<br>[S/m] | TSL<br>Permittivity |
|-------------------------|---------------------------------|--------------------|--------------------|----------------------|--------------------|---------------------|
| Flat                    | 10                              | CW,                | 2450               | 8.05                 | 1.80               | 39.1                |

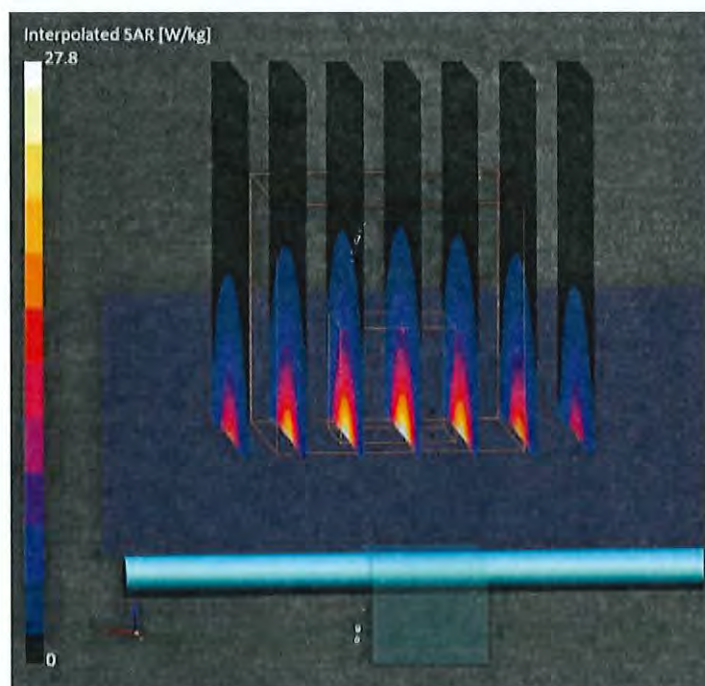
### Hardware Setup

| Phantom         | TSL       | Probe, Calibration Date     | DAE, Calibration Date   |
|-----------------|-----------|-----------------------------|-------------------------|
| MFP V8.0 Center | 2450 Head | EX3DV4 - SN7600, 2026-01-19 | DAE4 Sn1588, 2025-08-29 |

### Scan Setup

### Measurement Results

| Zoom Scan           |                | Zoom Scan           |               |
|---------------------|----------------|---------------------|---------------|
| Grid Extents [mm]   | 30.0×30.0×30.0 | psSAR1g [W/kg]      | 13.2          |
| Grid Steps [mm]     | 5.0×5.0×1.5    | psSAR10g [W/kg]     | 6.17          |
| Sensor Surface [mm] | 1.4            | Power Drift [dB]    | 0.01          |
| Graded Grid         | Yes            | Power Scaling       | Disabled      |
| Grading Ratio       | 1.5            | Scaling Factor [dB] |               |
| MAIA                | N/A            | TSL Correction      | No correction |
| Surface Detection   | VMS + 6p       | M2/M1 [%]           | 79.4          |
| Scan Method         | Measured       | Dist 3dB Peak [mm]  | 9.0           |





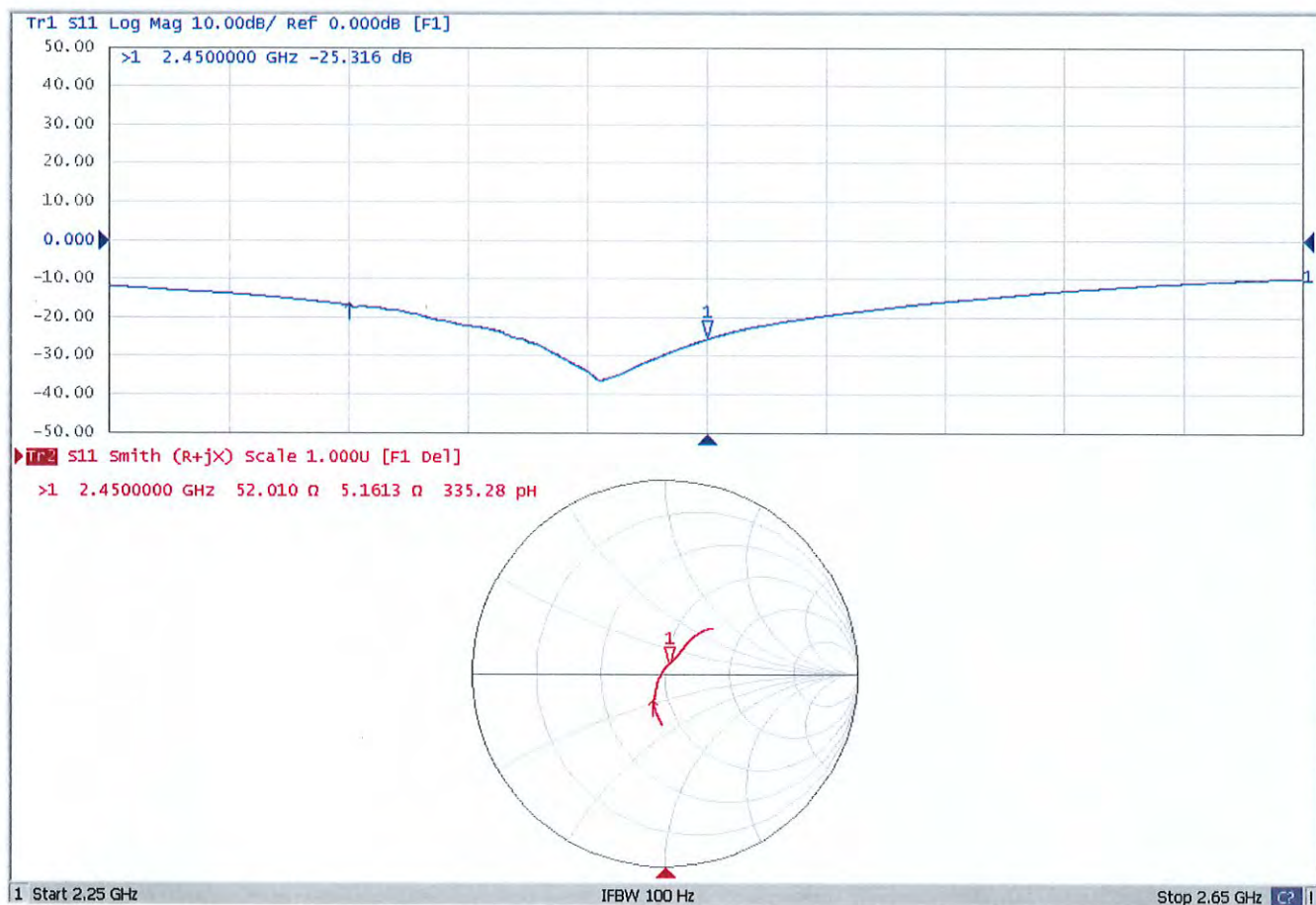
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## Impedance Measurement Plot for Head TSL



Client

**TOWE(Shenzhen)**

Certificate No:

**26J02Z000098**

## CALIBRATION CERTIFICATE

Object      D5GHzV2 - SN: 1371

Calibration Procedure(s)      FF-Z11-0003-02  
Calibration Procedures for dipole validation kits

Calibration date:      February 9, 2026

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       | 106276     | 16-May-25 (CTTL, No. 25J02X003423)        | May-26                |
| Power sensor NRP6A     | 101369     | 16-May-25 (CTTL, No. 25J02X003423)        | May-26                |
| Reference Probe EX3DV4 | SN 7307    | 27-May-25(SPEAG, No. EX-7307_May25)       | May-26                |
| DAE4                   | SN 1588    | 29-Aug-25(CTTL-SPEAG, No. 25J02Z000631)   | Aug-26                |
| Secondary Standards    | ID #       | Cal Date (Calibrated by, Certificate No.) | Scheduled Calibration |
| SignalGeneratorSMA200A | 107732     | 01-Dec-25 (CTTL, No. 25J02X102467)        | Nov-26                |
| NetworkAnalyzer E5071C | MY46110673 | 26-Nov-25 (CTTL, No. 25J02X102468)        | Nov-26                |
| OCP DAKS-3.5           | 0015       | 20-Oct-25(SPEAG, No. OCP-DAKS-0015_Oct25) | Oct-26                |

|                | Name        | Function           | Signature                                                                             |
|----------------|-------------|--------------------|---------------------------------------------------------------------------------------|
| Calibrated by: | Zhao Jing   | SAR Test Engineer  |  |
| Reviewed by:   | Lin Jun     | SAR Test Engineer  |  |
| Approved by:   | Qi Dianyuan | SAR Project Leader |  |

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### Glossary:

|       |                                            |
|-------|--------------------------------------------|
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| ConvF | sensitivity in TSL / NORM <sub>x,y,z</sub> |
| N/A   | not applicable or not measured             |

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- KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

### Additional Documentation:

- DASY 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.
- *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                 | DASY6                                                                                        | V17.0.0     |
| Extrapolation                | Advanced Extrapolation                                                                       |             |
| Phantom                      | Modular Flat Phantom                                                                         |             |
| Distance Dipole Center - TSL | 10 mm                                                                                        | with Spacer |
| Frequency                    | 5200 MHz $\pm$ 1 MHz<br>5300 MHz $\pm$ 1 MHz<br>5600 MHz $\pm$ 1 MHz<br>5800 MHz $\pm$ 1 MHz |             |

## Head TSL parameters at 5200MHz

The following parameters and calculations were applied.

|                                         | Temperature         | Permittivity   | Conductivity         |
|-----------------------------------------|---------------------|----------------|----------------------|
| Nominal Head TSL parameters             | 22.0 °C             | 36.0           | 4.66 mho/m           |
| Measured Head TSL parameters            | (22.0 $\pm$ 0.2) °C | 35.6 $\pm$ 6 % | 4.63 mho/m $\pm$ 6 % |
| Head TSL temperature change during test | <1.0 °C             | ----           | ----                 |

## SAR result with Head TSL at 5200MHz

|                                                         |                    |                            |
|---------------------------------------------------------|--------------------|----------------------------|
| SAR averaged over 1 cm <sup>3</sup> (1 g) of Head TSL   | Condition          |                            |
| SAR measured                                            | 20 dBm input power | 7.67 W/kg                  |
| SAR for nominal Head TSL parameters                     | normalized to 1W   | 76.5 W/kg $\pm$ 24 % (k=2) |
| SAR averaged over 10 cm <sup>3</sup> (10 g) of Head TSL | Condition          |                            |
| SAR measured                                            | 20 dBm input power | 2.76 W/kg                  |
| SAR for nominal Head TSL parameters                     | normalized to 1W   | 21.5 W/kg $\pm$ 24 % (k=2) |

## Head TSL parameters at 5300MHz

The following parameters and calculations were applied.

|                                         | Temperature         | Permittivity   | Conductivity         |
|-----------------------------------------|---------------------|----------------|----------------------|
| Nominal Head TSL parameters             | 22.0 °C             | 35.9           | 4.76 mho/m           |
| Measured Head TSL parameters            | (22.0 $\pm$ 0.2) °C | 35.4 $\pm$ 6 % | 4.74 mho/m $\pm$ 6 % |
| Head TSL temperature change during test | <1.0 °C             | ----           | ----                 |

## SAR result with Head TSL at 5300MHz

|                                                         |                    |                            |
|---------------------------------------------------------|--------------------|----------------------------|
| SAR averaged over 1 cm <sup>3</sup> (1 g) of Head TSL   | Condition          |                            |
| SAR measured                                            | 20 dBm input power | 7.98 W/kg                  |
| SAR for nominal Head TSL parameters                     | normalized to 1W   | 79.5 W/kg $\pm$ 24 % (k=2) |
| SAR averaged over 10 cm <sup>3</sup> (10 g) of Head TSL | Condition          |                            |
| SAR measured                                            | 20 dBm input power | 2.26 W/kg                  |
| SAR for nominal Head TSL parameters                     | normalized to 1W   | 22.5 W/kg $\pm$ 24 % (k=2) |



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### Head TSL parameters at 5600MHz

The following parameters and calculations were applied.

|                                         | Temperature     | Permittivity | Conductivity     |
|-----------------------------------------|-----------------|--------------|------------------|
| Nominal Head TSL parameters             | 22.0 °C         | 35.5         | 5.07 mho/m       |
| Measured Head TSL parameters            | (22.0 ± 0.2) °C | 34.8 ± 6 %   | 5.06 mho/m ± 6 % |
| Head TSL temperature change during test | <1.0 °C         | ----         | ----             |

### SAR result with Head TSL at 5600MHz

|                                                         |                    |                        |
|---------------------------------------------------------|--------------------|------------------------|
| SAR averaged over 1 cm <sup>3</sup> (1 g) of Head TSL   | Condition          |                        |
| SAR measured                                            | 20 dBm input power | 8.24 W/kg              |
| SAR for nominal Head TSL parameters                     | normalized to 1W   | 82.1 W/kg ± 24 % (k=2) |
| SAR averaged over 10 cm <sup>3</sup> (10 g) of Head TSL | Condition          |                        |
| SAR measured                                            | 20 dBm input power | 2.32 W/kg              |
| SAR for nominal Head TSL parameters                     | normalized to 1W   | 23.1 W/kg ± 24 % (k=2) |

### Head TSL parameters at 5800MHz

The following parameters and calculations were applied.

|                                         | Temperature     | Permittivity | Conductivity     |
|-----------------------------------------|-----------------|--------------|------------------|
| Nominal Head TSL parameters             | 22.0 °C         | 35.3         | 5.27 mho/m       |
| Measured Head TSL parameters            | (22.0 ± 0.2) °C | 34.6 ± 6 %   | 5.25 mho/m ± 6 % |
| Head TSL temperature change during test | <1.0 °C         | ----         | ----             |

### SAR result with Head TSL at 5800MHz

|                                                         |                    |                        |
|---------------------------------------------------------|--------------------|------------------------|
| SAR averaged over 1 cm <sup>3</sup> (1 g) of Head TSL   | Condition          |                        |
| SAR measured                                            | 20 dBm input power | 7.89 W/kg              |
| SAR for nominal Head TSL parameters                     | normalized to 1W   | 78.6 W/kg ± 24 % (k=2) |
| SAR averaged over 10 cm <sup>3</sup> (10 g) of Head TSL | Condition          |                        |
| SAR measured                                            | 20 dBm input power | 2.22 W/kg              |
| SAR for nominal Head TSL parameters                     | normalized to 1W   | 22.1 W/kg ± 24 % (k=2) |



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## Appendix (Additional assessments outside the scope of CNAS L0570)

### Antenna Parameters with Head TSL at 5200MHz

|                                      |                                |
|--------------------------------------|--------------------------------|
| Impedance, transformed to feed point | 47.7 $\Omega$ - 1.84j $\Omega$ |
| Return Loss                          | - 30.4dB                       |

### Antenna Parameters with Head TSL at 5300MHz

|                                      |                                |
|--------------------------------------|--------------------------------|
| Impedance, transformed to feed point | 46.9 $\Omega$ + 0.06j $\Omega$ |
| Return Loss                          | - 29.8dB                       |

### Antenna Parameters with Head TSL at 5600MHz

|                                      |                                |
|--------------------------------------|--------------------------------|
| Impedance, transformed to feed point | 52.7 $\Omega$ + 4.29j $\Omega$ |
| Return Loss                          | - 26.2dB                       |

### Antenna Parameters with Head TSL at 5800MHz

|                                      |                                |
|--------------------------------------|--------------------------------|
| Impedance, transformed to feed point | 53.4 $\Omega$ + 1.95j $\Omega$ |
| Return Loss                          | - 28.4dB                       |

### General Antenna Parameters and Design

|                                  |          |
|----------------------------------|----------|
| Electrical Delay (one direction) | 1.099 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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**DASY6 Validation Report for Head TSL**  
Test Laboratory: CTTL, Beijing, China

Date: 2026-02-05

**Summary**

| Dipole            | Frequency [MHz] | TSL | Power [dBm] |
|-------------------|-----------------|-----|-------------|
| D5GHzV2 – SN 1371 | 5200            | HSL | 20          |

**Exposure Conditions**

| Phantom<br>Section, TSL | Position, Test<br>Distance [mm] | Band Group,<br>UID | Frequency<br>[MHz] | Conversion<br>Factor | TSL Cond.<br>[S/m] | TSL<br>Permittivity |
|-------------------------|---------------------------------|--------------------|--------------------|----------------------|--------------------|---------------------|
| Flat                    | 10                              | CW,                | 5200               | 5.52                 | 4.63               | 35.6                |

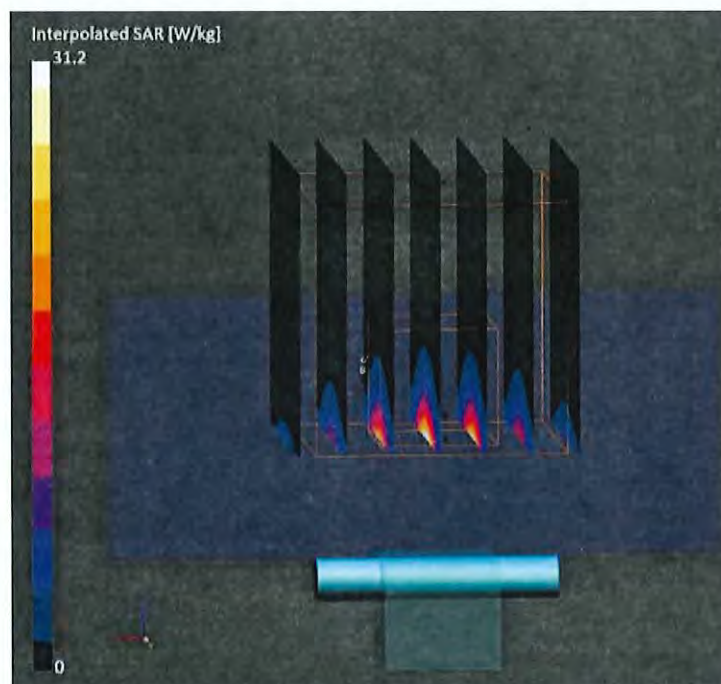
**Hardware Setup**

| Phantom         | TSL   | Probe, Calibration Date     | DAE, Calibration Date   |
|-----------------|-------|-----------------------------|-------------------------|
| MFP V8.0 Center | HSL5G | EX3DV4 - SN7307, 2025-05-27 | DAE4 Sn1588, 2025-08-29 |

**Scan Setup**

**Measurement Results**

| Zoom Scan           |                | Zoom Scan           |               |
|---------------------|----------------|---------------------|---------------|
| Grid Extents [mm]   | 22.0×22.0×22.0 | psSAR1g [W/kg]      | 7.67          |
| Grid Steps [mm]     | 4.0×4.0×1.4    | psSAR10g [W/kg]     | 2.16          |
| Sensor Surface [mm] | 1.4            | Power Drift [dB]    | 0.07          |
| Graded Grid         | Yes            | Power Scaling       | Disabled      |
| Grading Ratio       | 1.4            | Scaling Factor [dB] |               |
| MAIA                | N/A            | TSL Correction      | No correction |
| Surface Detection   | VMS + 6p       | M2/M1 [%]           | 62.8          |
| Scan Method         | Measured       | Dist 3dB Peak [mm]  | 7.2           |





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## DASY6 Validation Report for Head TSL

Date: 2026-02-06

Test Laboratory: CTTL, Beijing, China

### Summary

| Dipole            | Frequency [MHz] | TSL | Power [dBm] |
|-------------------|-----------------|-----|-------------|
| D5GHzV2 – SN 1371 | 5300            | HSL | 20          |

### Exposure Conditions

| Phantom Section, TSL | Position, Test Distance [mm] | Band Group, UID | Frequency [MHz] | Conversion Factor | TSL Cond. [S/m] | TSL Permittivity |
|----------------------|------------------------------|-----------------|-----------------|-------------------|-----------------|------------------|
| Flat                 | 10                           | CW,             | 5300            | 5.34              | 4.74            | 35.4             |

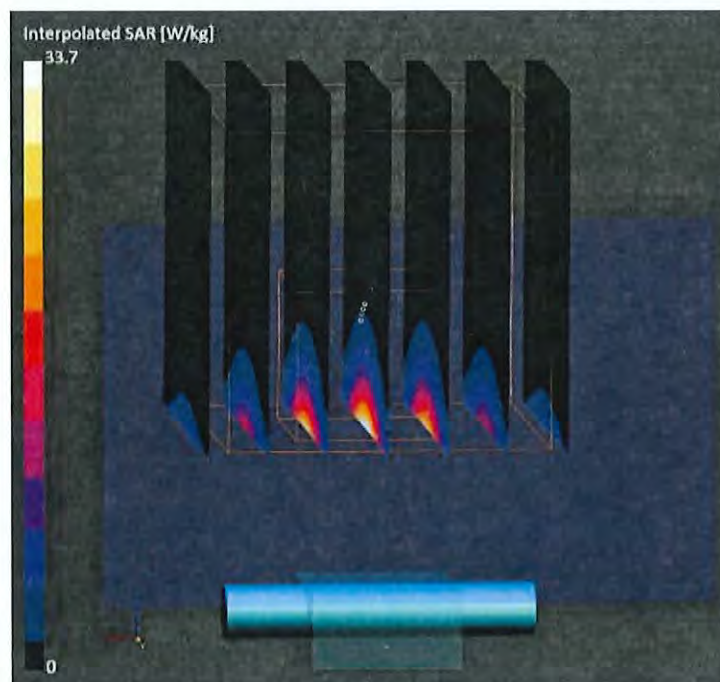
### Hardware Setup

| Phantom         | TSL   | Probe, Calibration Date     | DAE, Calibration Date   |
|-----------------|-------|-----------------------------|-------------------------|
| MFP V8.0 Center | HSL5G | EX3DV4 - SN7307, 2025-05-27 | DAE4 Sn1588, 2025-08-29 |

### Scan Setup

### Measurement Results

|                     | Zoom Scan      |                     | Zoom Scan     |
|---------------------|----------------|---------------------|---------------|
| Grid Extents [mm]   | 22.0×22.0×22.0 | psSAR1g [W/kg]      | 7.98          |
| Grid Steps [mm]     | 4.0×4.0×1.4    | psSAR10g [W/kg]     | 2.26          |
| Sensor Surface [mm] | 1.4            | Power Drift [dB]    | 0.02          |
| Graded Grid         | Yes            | Power Scaling       | Disabled      |
| Grading Ratio       | 1.4            | Scaling Factor [dB] |               |
| MAIA                | N/A            | TSL Correction      | No correction |
| Surface Detection   | VMS + 6p       | M2/M1 [%]           | 61.6          |
| Scan Method         | Measured       | Dist 3dB Peak [mm]  | 7.2           |





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## DASY6 Validation Report for Head TSL

Date: 2026-02-06

Test Laboratory: CTTL, Beijing, China

### Summary

| Dipole            | Frequency [MHz] | TSL | Power [dBm] |
|-------------------|-----------------|-----|-------------|
| D5GHzV2 – SN 1371 | 5600            | HSL | 20          |

### Exposure Conditions

| Phantom      | Position, Test | Band Group, | Frequency | Conversion | TSL Cond. | TSL          |
|--------------|----------------|-------------|-----------|------------|-----------|--------------|
| Section, TSL | Distance [mm]  | UID         | [MHz]     | Factor     | [S/m]     | Permittivity |
| Flat         | 10             | CW,         | 5600      | 4.95       | 5.06      | 34.8         |

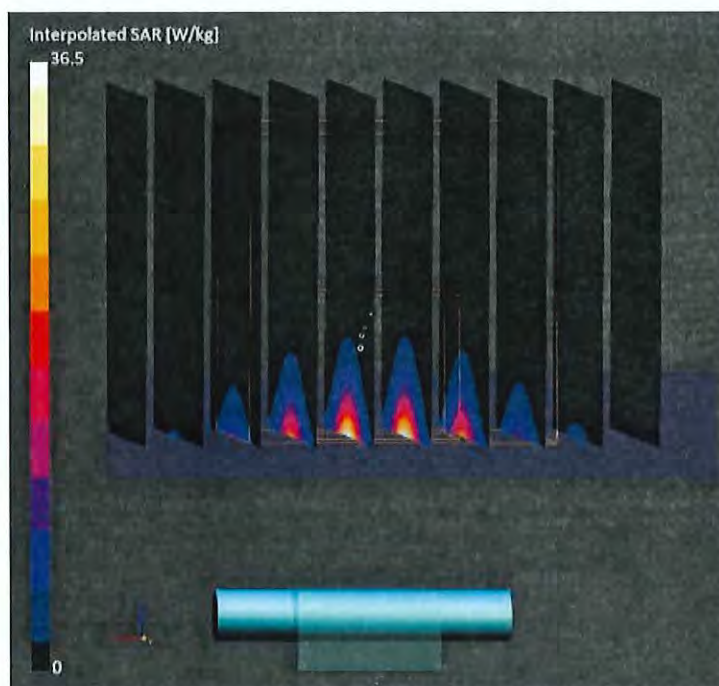
### Hardware Setup

| Phantom         | TSL   | Probe, Calibration Date     | DAE, Calibration Date   |
|-----------------|-------|-----------------------------|-------------------------|
| MFP V8.0 Center | HSL5G | EX3DV4 - SN7307, 2025-05-27 | DAE4 Sn1588, 2025-08-29 |

### Scan Setup

### Measurement Results

|                     | Zoom Scan      |                     | Zoom Scan     |
|---------------------|----------------|---------------------|---------------|
| Grid Extents [mm]   | 22.0×22.0×22.0 | psSAR1g [W/kg]      | 8.24          |
| Grid Steps [mm]     | 4.0×4.0×1.4    | psSAR10g [W/kg]     | 2.32          |
| Sensor Surface [mm] | 1.4            | Power Drift [dB]    | -0.03         |
| Graded Grid         | Yes            | Power Scaling       | Disabled      |
| Grading Ratio       | 1.4            | Scaling Factor [dB] |               |
| MAIA                | N/A            | TSL Correction      | No correction |
| Surface Detection   | VMS + 6p       | M2/M1 [%]           | 59.5          |
| Scan Method         | Measured       | Dist 3dB Peak [mm]  | 7.4           |





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## DASY6 Validation Report for Head TSL

Date: 2026-02-09

Test Laboratory: CTTL, Beijing, China

### Summary

| Dipole            | Frequency [MHz] | TSL | Power [dBm] |
|-------------------|-----------------|-----|-------------|
| D5GHzV2 – SN 1371 | 5800            | HSL | 20          |

### Exposure Conditions

| Phantom<br>Section, TSL | Position, Test<br>Distance [mm] | Band Group,<br>UID | Frequency<br>[MHz] | Conversion<br>Factor | TSL Cond.<br>[S/m] | TSL<br>Permittivity |
|-------------------------|---------------------------------|--------------------|--------------------|----------------------|--------------------|---------------------|
| Flat                    | 10                              | CW,                | 5800               | 5.03                 | 5.25               | 34.6                |

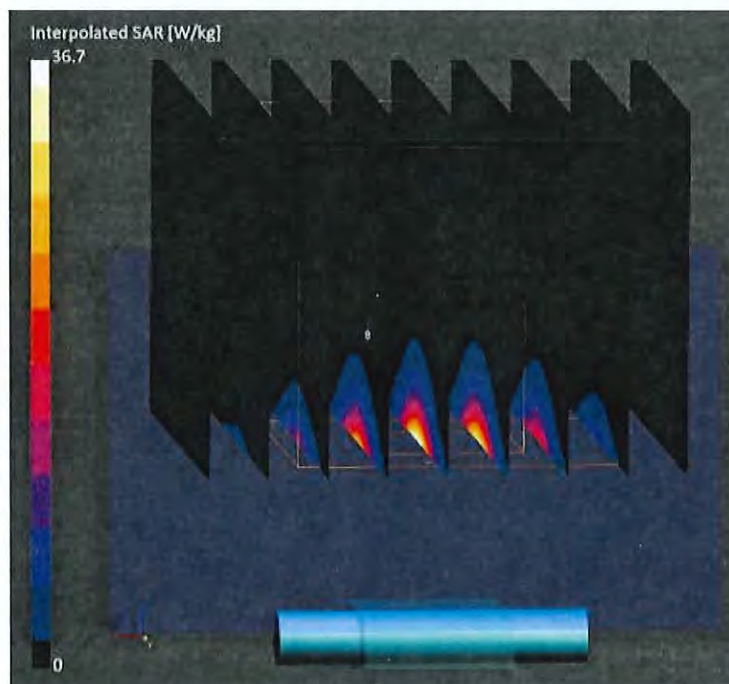
### Hardware Setup

| Phantom         | TSL   | Probe, Calibration Date     | DAE, Calibration Date   |
|-----------------|-------|-----------------------------|-------------------------|
| MFP V8.0 Center | HSL5G | EX3DV4 - SN7307, 2025-05-27 | DAE4 Sn1588, 2025-08-29 |

### Scan Setup

### Measurement Results

| Zoom Scan           |                | Zoom Scan           |               |
|---------------------|----------------|---------------------|---------------|
| Grid Extents [mm]   | 22.0×22.0×22.0 | psSAR1g [W/kg]      | 7.89          |
| Grid Steps [mm]     | 4.0×4.0×1.4    | psSAR10g [W/kg]     | 2.22          |
| Sensor Surface [mm] | 1.4            | Power Drift [dB]    | 0.02          |
| Graded Grid         | Yes            | Power Scaling       | Disabled      |
| Grading Ratio       | 1.4            | Scaling Factor [dB] |               |
| MAIA                | N/A            | TSL Correction      | No correction |
| Surface Detection   | VMS + 6p       | M2/M1 [%]           | 57.0          |
| Scan Method         | Measured       | Dist 3dB Peak [mm]  | 6.9           |





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## Impedance Measurement Plot for Head TSL





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Accreditation No.: **SCS 0108**

Client **Sushi TOWE**  
**Suzhou City, China**

Certificate No. **D6.5GHzV2-1096\_May23**

## CALIBRATION CERTIFICATE

Object **D6.5GHzV2 - SN:1096**

Calibration procedure(s) **QA CAL-22.v7**  
**Calibration Procedure for SAR Validation Sources between 3-10 GHz**

Calibration date: **May 11, 2023**

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 ( $22 \pm 3$ )°C and humidity < 70%.

Calibration Equipment used (M&TE critical for calibration)

| Primary Standards          | ID #             | Cal Date (Certificate No.)     | Scheduled Calibration |
|----------------------------|------------------|--------------------------------|-----------------------|
| Power sensor R&S NRP33T    | SN: 100967       | 03-Apr-23 (No. 217-03806)      | Apr-24                |
| Reference 20 dB Attenuator | SN: BH9394 (20k) | 30-Mar-23 (No. 217-03809)      | Mar-24                |
| Mismatch combination       | SN: 84224 / 360D | 03-Apr-23 (No. 217-03812)      | Apr-24                |
| Reference Probe EX3DV4     | SN: 7405         | 02-Jun-22 (No. EX3-7405_Jun22) | Jun-23                |
| DAE4                       | SN: 908          | 27-Jun-22 (No. DAE4-908_Jun22) | Jun-23                |

| Secondary Standards              | ID #          | Check Date (in house)             | Scheduled Check        |
|----------------------------------|---------------|-----------------------------------|------------------------|
| RF generator Anapico APSIN20G    | SN: 827       | 18-Dec-18 (in house check Dec-21) | In house check: Dec-23 |
| Power sensor NRP-Z23             | SN: 100169    | 10-Jan-19 (in house check Nov-22) | In house check: Nov-23 |
| Power sensor NRP-18T             | SN: 100950    | 28-Sep-22 (in house check Nov-22) | In house check: Nov-23 |
| Network Analyzer Keysight E5063A | SN:MY54504221 | 31-Oct-19 (in house check Oct-22) | In house check: Oct-25 |

|                |              |                       |           |
|----------------|--------------|-----------------------|-----------|
|                | Name         | Function              | Signature |
| Calibrated by: | Leif Klysner | Laboratory Technician |           |
| Approved by:   | Sven Kühn    | Technical Manager     |           |

Issued: May 11, 2023

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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) 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-Worn Wireless Communication Devices - Part 1528: Human Models, Instrumentation And Procedures (Frequency Range Of 4 MHz To 10 GHz)", October 2020.

### Additional Documentation:

- b) DASY 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.
- *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 absorbed power density (APD):* The absorbed power density is evaluated according to Samaras T, Christ A, Kuster N, "Compliance assessment of the epithelial or absorbed power density above 6 GHz using SAR measurement systems", Bioelectromagnetics, 2021 (submitted). The additional evaluation uncertainty of 0.55 dB (rectangular distribution) is considered.

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%.

## Measurement Conditions

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

|                                     |                              |                                  |
|-------------------------------------|------------------------------|----------------------------------|
| <b>DASY Version</b>                 | DASY6                        | V16.2                            |
| <b>Extrapolation</b>                | Advanced Extrapolation       |                                  |
| <b>Phantom</b>                      | Modular Flat Phantom         |                                  |
| <b>Distance Dipole Center - TSL</b> | 5 mm                         | with Spacer                      |
| <b>Zoom Scan Resolution</b>         | dx, dy = 3.4 mm, dz = 1.4 mm | Graded Ratio = 1.4 (Z direction) |
| <b>Frequency</b>                    | 6500 MHz $\pm$ 1 MHz         |                                  |

## Head TSL parameters

The following parameters and calculations were applied.

|                                                | Temperature         | Permittivity   | Conductivity         |
|------------------------------------------------|---------------------|----------------|----------------------|
| <b>Nominal Head TSL parameters</b>             | 22.0 °C             | 34.5           | 6.07 mho/m           |
| <b>Measured Head TSL parameters</b>            | (22.0 $\pm$ 0.2) °C | 34.7 $\pm$ 6 % | 6.10 mho/m $\pm$ 6 % |
| <b>Head TSL temperature change during test</b> | < 0.5 °C            | ----           | ----                 |

## SAR result with Head TSL

|                                                             |                    |                                               |
|-------------------------------------------------------------|--------------------|-----------------------------------------------|
| <b>SAR averaged over 1 cm<sup>3</sup> (1 g) of Head TSL</b> | Condition          |                                               |
| SAR measured                                                | 100 mW input power | 28.9 W/kg                                     |
| SAR for nominal Head TSL parameters                         | normalized to 1W   | <b>289 W/kg <math>\pm</math> 24.7 % (k=2)</b> |

|                                                             |                    |                                                |
|-------------------------------------------------------------|--------------------|------------------------------------------------|
| <b>SAR averaged over 8 cm<sup>3</sup> (8 g) of Head TSL</b> | Condition          |                                                |
| SAR measured                                                | 100 mW input power | 6.51 W/kg                                      |
| SAR for nominal Head TSL parameters                         | normalized to 1W   | <b>65.2 W/kg <math>\pm</math> 24.4 % (k=2)</b> |

|                                                               |                    |                                                |
|---------------------------------------------------------------|--------------------|------------------------------------------------|
| <b>SAR averaged over 10 cm<sup>3</sup> (10 g) of Head TSL</b> | condition          |                                                |
| SAR measured                                                  | 100 mW input power | 5.33 W/kg                                      |
| SAR for nominal Head TSL parameters                           | normalized to 1W   | <b>53.4 W/kg <math>\pm</math> 24.4 % (k=2)</b> |

## Appendix

### Antenna Parameters with Head TSL

|                                      |                                |
|--------------------------------------|--------------------------------|
| Impedance, transformed to feed point | 46.3 $\Omega$ - 3.4 j $\Omega$ |
| Return Loss                          | - 25.7 dB                      |

### APD (Absorbed Power Density)

| APD averaged over 1 cm <sup>2</sup> | Condition          |                                                           |
|-------------------------------------|--------------------|-----------------------------------------------------------|
| APD measured                        | 100 mW input power | 289 W/m <sup>2</sup>                                      |
| APD measured                        | normalized to 1W   | <b>2890 W/m<sup>2</sup> <math>\pm</math> 29.2 % (k=2)</b> |

| APD averaged over 4 cm <sup>2</sup> | condition          |                                                           |
|-------------------------------------|--------------------|-----------------------------------------------------------|
| APD measured                        | 100 mW input power | 130 W/m <sup>2</sup>                                      |
| APD measured                        | normalized to 1W   | <b>1300 W/m<sup>2</sup> <math>\pm</math> 28.9 % (k=2)</b> |

\*The reported APD values have been derived using the psSAR1g and psSAR8g.

### General Antenna Parameters and Design

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 |
|-----------------|-------|

DASY6 Validation Report for Head TSL

Measurement Report for D6.5GHz-1096, UID 0 -, Channel 6500 (6500.0MHz)

Device under Test Properties

| Name, Manufacturer | Dimensions [mm]    | IMEI     | DUT Type |
|--------------------|--------------------|----------|----------|
| D6.5GHz            | 16.0 x 6.0 x 300.0 | SN: 1096 | -        |

Exposure Conditions

| Phantom Section, TSL | Position, Test Distance [mm] | Band | Group, UID | Frequency [MHz] | Conversion Factor | TSL Cond. [S/m] | TSL Permittivity |
|----------------------|------------------------------|------|------------|-----------------|-------------------|-----------------|------------------|
| Flat, HSL            | 5.00                         | Band | CW,        | 6500            | 5.50              | 6.10            | 34.7             |

Hardware Setup

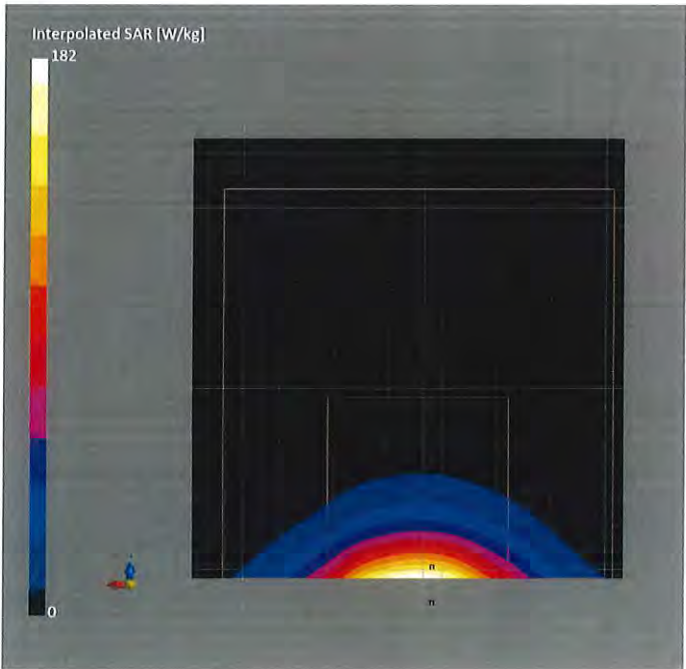
| Phantom                | TSL             | Probe, Calibration Date     | DAE, Calibration Date  |
|------------------------|-----------------|-----------------------------|------------------------|
| MFP V8.0 Center - 1182 | HBBL600-10000V6 | EX3DV4 - SN7405, 2022-06-02 | DAE4 Sn908, 2022-06-27 |

Scan Setup

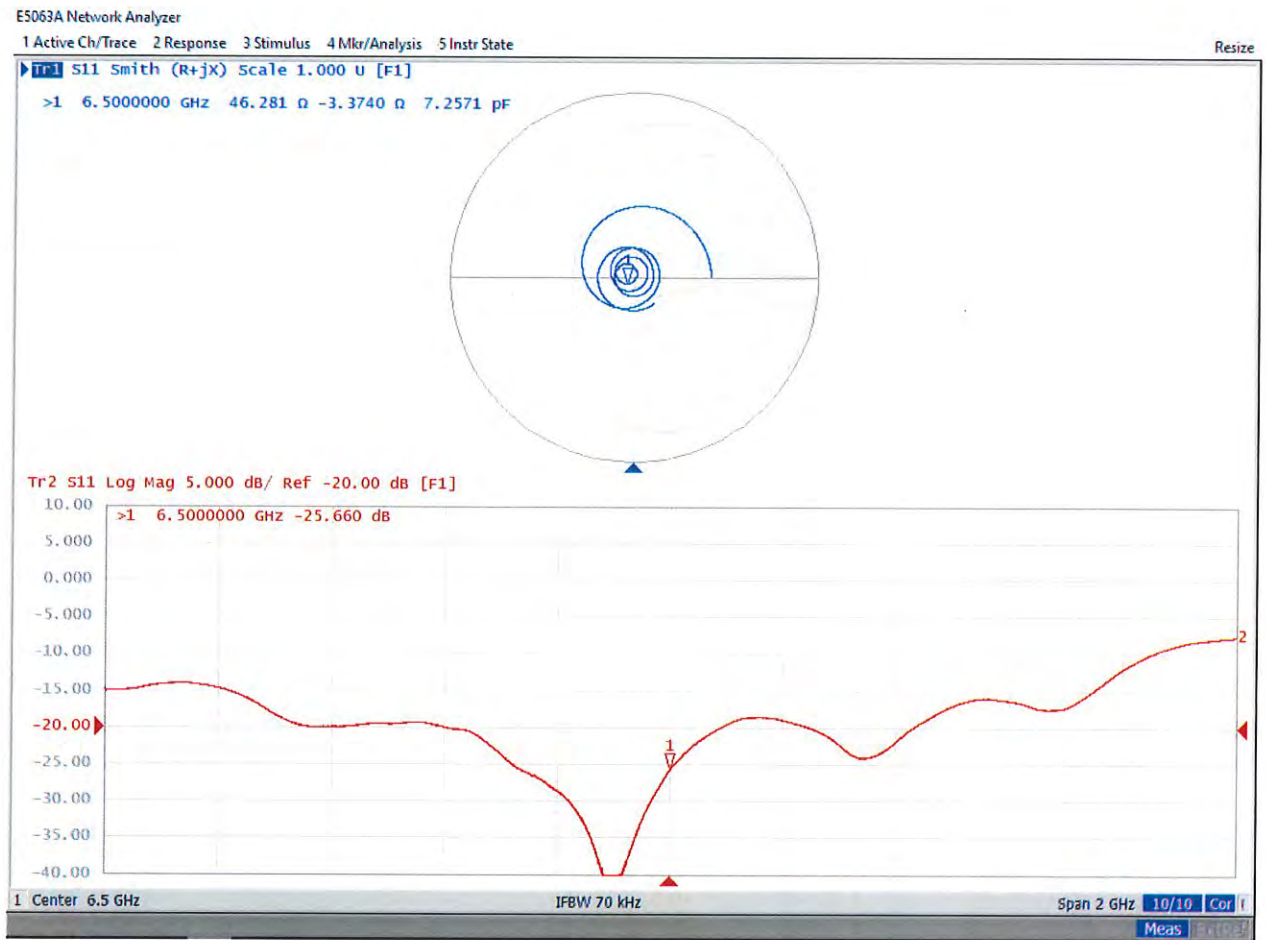
|                     | Zoom Scan          |
|---------------------|--------------------|
| Grid Extents [mm]   | 22.0 x 22.0 x 22.0 |
| Grid Steps [mm]     | 3.4 x 3.4 x 1.4    |
| Sensor Surface [mm] | 1.4                |
| Graded Grid         | Yes                |
| Grading Ratio       | 1.4                |
| MAIA                | N/A                |
| Surface Detection   | VMS + 6p           |
| Scan Method         | Measured           |

Measurement Results

|                     | Zoom Scan         |
|---------------------|-------------------|
| Date                | 2023-05-11, 11:41 |
| psSAR1g [W/Kg]      | 28.9              |
| psSAR8g [W/Kg]      | 6.51              |
| psSAR10g [W/Kg]     | 5.33              |
| Power Drift [dB]    | -0.00             |
| Power Scaling       | Disabled          |
| Scaling Factor [dB] |                   |
| TSL Correction      | No correction     |
| M2/M1 [%]           | 51.4              |
| Dist 3dB Peak [mm]  | 4.8               |



## Impedance Measurement Plot for Head TSL



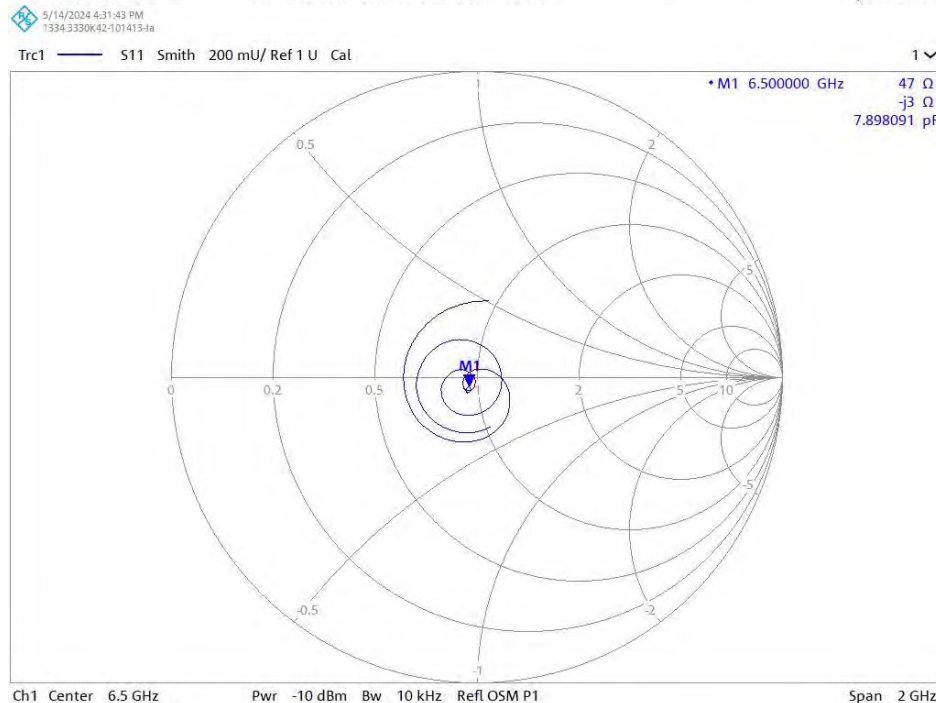
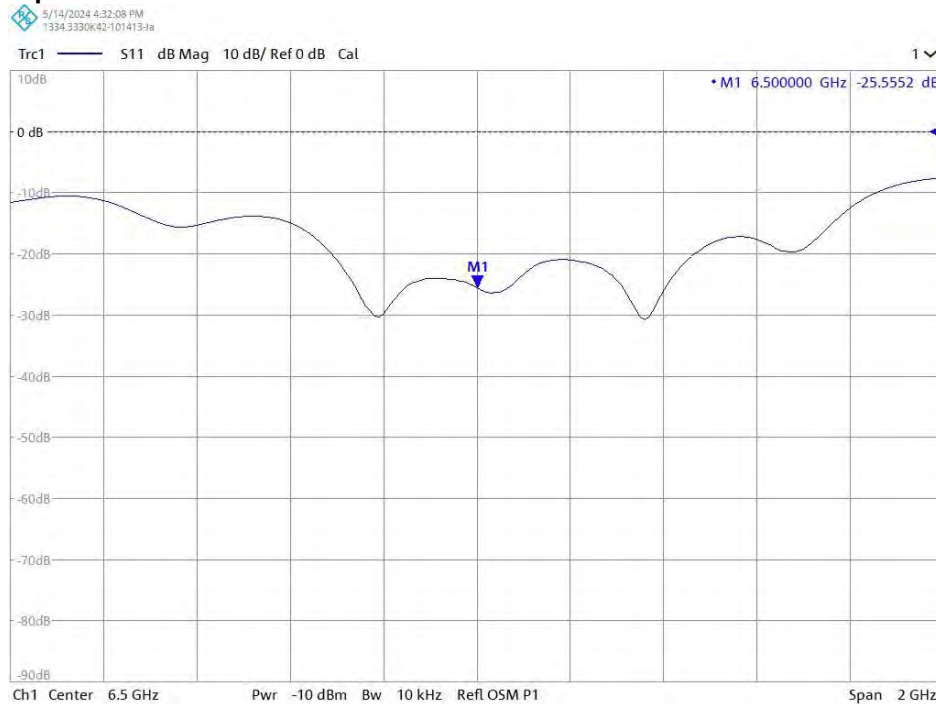
## D6.5GHzV2 SN 1096 Extended Dipole Calibrations

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

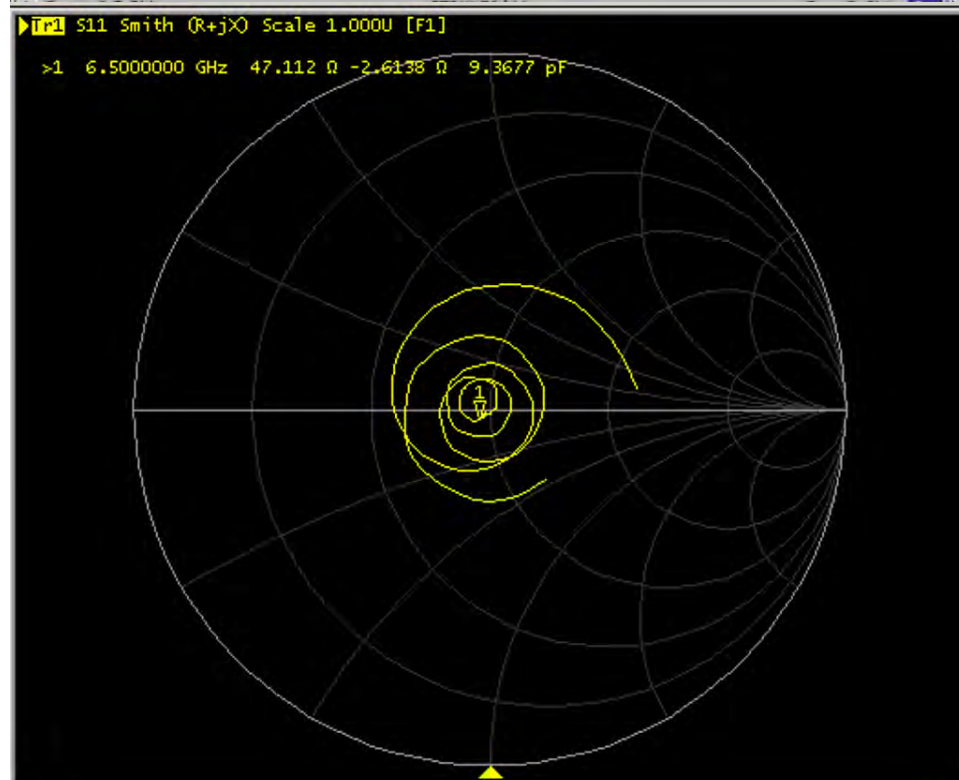
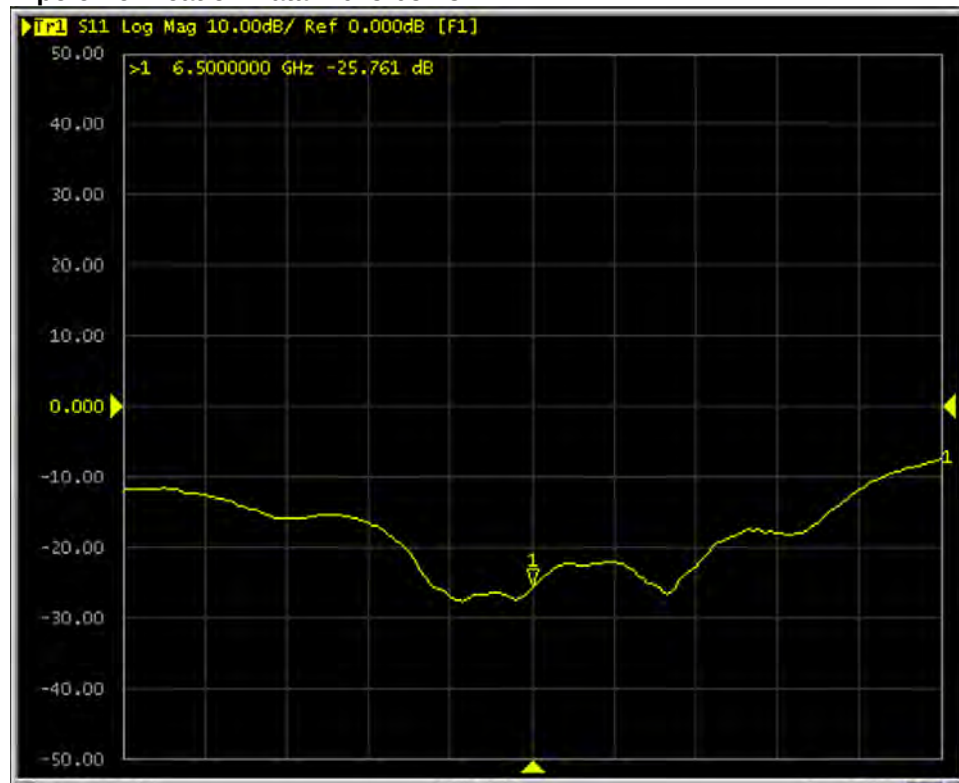
| Dipole D6.5GHzV2 (SN 1096)  |                 |            |                             |                |                                  |                |
|-----------------------------|-----------------|------------|-----------------------------|----------------|----------------------------------|----------------|
| 6.5GHz Head Liquid          |                 |            |                             |                |                                  |                |
| Date of Measurement         | Return Loss(dB) | $\Delta$ % | Real Impedance ( $\Omega$ ) | $\Delta\Omega$ | Imaginary Impedance ( $\Omega$ ) | $\Delta\Omega$ |
| 2023-05-11<br>(Cal. Report) | -25.66          | /          | 46.281                      | /              | -3.374                           | /              |
| 2024-05-14<br>(extended)    | -25.5552        | -0.41      | 47                          | 0.719          | -3                               | 0.374          |
| 2025-05-13<br>(extended)    | -25.761         | 0.39       | 47.112                      | 0.831          | -2.6138                          | 0.7602         |

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

### Dipole Verification Data: 2024-05-14



## Dipole Verification Data: 2025-05-13





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Accreditation No.: **SCS 0108**

Client **DEKRA**  
**Suzhou**

Certificate No. **5G-Veri10-1055\_Sep24**

## CALIBRATION CERTIFICATE

Object **5G Verification Source 10 GHz - SN: 1055**

Calibration procedure(s) **QA CAL-45.v5**  
**Calibration procedure for sources in air above 6 GHz**

Calibration date: **September 16, 2024**

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 ( $22 \pm 3$ )°C and humidity < 70%.

Calibration Equipment used (M&TE critical for calibration)

| Primary Standards                | ID #           | Cal Date (Certificate No.)        | Scheduled Calibration  |
|----------------------------------|----------------|-----------------------------------|------------------------|
| Reference Probe EUmmWV3          | SN: 9374       | 28-Aug-24 (No. EUmm-9374_Aug24)   | Aug-25                 |
| DAE4ip                           | SN: 1602       | 08-Nov-23 (No. DAE4ip-1602_Nov23) | Nov-24                 |
| Secondary Standards              | ID #           | Check Date (in house)             | Scheduled Check        |
| RF generator R&S SMF100A         | SN: 100184     | 29-Nov-23 (in house check Nov-23) | In house check: Nov-24 |
| Power sensor R&S NRP18S-10       | SN: 101258     | 29-Nov-23 (in house check Nov-23) | In house check: Nov-24 |
| Network Analyzer Keysight E5063A | SN: MY54504221 | 31-Oct-19 (in house check Oct-22) | In house check: Oct-25 |

|                |                        |                                   |
|----------------|------------------------|-----------------------------------|
| Calibrated by: | Name<br>Joanna Lleshaj | Function<br>Laboratory Technician |
| Approved by:   | Sven Kühn              | Technical Manager                 |

Signature

Issued: September 17, 2024

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## Glossary

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CW Continuous wave

## Calibration is Performed According to the Following Standards

- Internal procedure QA CAL-45, Calibration procedure for sources in air above 6 GHz.
- IEC/IEEE 63195-1, "Assessment of power density of human exposure to radio frequency fields from wireless devices in close proximity to the head and body (frequency range of 6 GHz to 300 GHz)", May 2022

## Methods Applied and Interpretation of Parameters

- *Coordinate System:* z-axis in the waveguide horn boresight, x-axis is in the direction of the E-field, y-axis normal to the others in the field scanning plane parallel to the horn flare and horn flange.
- *Measurement Conditions:* (1) 10 GHz: The radiated power is the forward power to the horn antenna minus ohmic and mismatch loss. The forward power is measured prior and after the measurement with a power sensor. During the measurements, the horn is directly connected to the cable and the antenna ohmic and mismatch losses are determined by far-field measurements. (2) 30, 45, 60 and 90 GHz: The verification sources are switched on for at least 30 minutes. Absorbers are used around the probe cub and at the ceiling to minimize reflections.
- *Horn Positioning:* The waveguide horn is mounted vertically on the flange of the waveguide source to allow vertical positioning of the EUmmW probe during the scan. The plane is parallel to the phantom surface. Probe distance is verified using mechanical gauges positioned on the flare of the horn.
- *E- field distribution:* E field is measured in two x-y-plane (10mm, 10mm +  $\lambda/4$ ) with a vectorial E-field probe. The E-field value stated as calibration value represents the E-field-maxima and the averaged (1cm<sup>2</sup> and 4cm<sup>2</sup>) power density values at 10mm in front of the horn.
- *Field polarization:* Above the open horn, linear polarization of the field is expected. This is verified graphically in the field representation.

## Calibrated Quantity

- Local peak E-field (V/m) and average of peak spatial components of the poynting vector (W/m<sup>2</sup>) averaged over the surface area of 1 cm<sup>2</sup> and 4cm<sup>2</sup> at the nominal operational frequency of the verification source. Both square and circular averaging results are listed.

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%.

## Measurement Conditions

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

|                                       |                               |      |
|---------------------------------------|-------------------------------|------|
| <b>DASY Version</b>                   | DASY8 Module mmWave           | V3.2 |
| <b>Phantom</b>                        | 5G Phantom                    |      |
| <b>Distance Horn Aperture - plane</b> | 10 mm                         |      |
| <b>Number of measured planes</b>      | 2 (10mm, 10mm + $\lambda/4$ ) |      |
| <b>Frequency</b>                      | 10 GHz $\pm$ 10 MHz           |      |

## Calibration Parameters, 10 GHz

### Circular Averaging

| Distance Horn Aperture to Measured Plane | <b><i>Prad</i><sup>1</sup></b><br>(mW) | <b>Max E-field</b><br>(V/m) | Uncertainty<br>(k = 2) | Avg Power Density<br>Avg (psPDn+, psPDtot+, psPDmod+)<br>(W/m <sup>2</sup> ) |                   | Uncertainty<br>(k = 2) |
|------------------------------------------|----------------------------------------|-----------------------------|------------------------|------------------------------------------------------------------------------|-------------------|------------------------|
|                                          |                                        |                             |                        | 1 cm <sup>2</sup>                                                            | 4 cm <sup>2</sup> |                        |
| 10 mm                                    | 93.3                                   | 152                         | 1.27 dB                | 60.4                                                                         | 56.2              | 1.28 dB                |

| Distance Horn Aperture to Measured Plane | <b><i>Prad</i><sup>1</sup></b><br>(mW) | <b>Max E-field</b><br>(V/m) | Uncertainty<br>(k = 2) | Power Density<br>psPDn+, psPDtot+, psPDmod+<br>(W/m <sup>2</sup> ) |                   | Uncertainty<br>(k = 2) |
|------------------------------------------|----------------------------------------|-----------------------------|------------------------|--------------------------------------------------------------------|-------------------|------------------------|
|                                          |                                        |                             |                        | 1 cm <sup>2</sup>                                                  | 4 cm <sup>2</sup> |                        |
| 10 mm                                    | 93.3                                   | 152                         | 1.27 dB                | 60.0, 60.6, 60.7                                                   | 55.6, 56.4, 56.6  | 1.28 dB                |

### Square Averaging

| Distance Horn Aperture to Measured Plane | <b><i>Prad</i><sup>1</sup></b><br>(mW) | <b>Max E-field</b><br>(V/m) | Uncertainty<br>(k = 2) | Avg Power Density<br>Avg (psPDn+, psPDtot+, psPDmod+)<br>(W/m <sup>2</sup> ) |                   | Uncertainty<br>(k = 2) |
|------------------------------------------|----------------------------------------|-----------------------------|------------------------|------------------------------------------------------------------------------|-------------------|------------------------|
|                                          |                                        |                             |                        | 1 cm <sup>2</sup>                                                            | 4 cm <sup>2</sup> |                        |
| 10 mm                                    | 93.3                                   | 152                         | 1.27 dB                | 60.4                                                                         | 56.1              | 1.28 dB                |

| Distance Horn Aperture to Measured Plane | <b><i>Prad</i><sup>1</sup></b><br>(mW) | <b>Max E-field</b><br>(V/m) | Uncertainty<br>(k = 2) | Power Density<br>psPDn+, psPDtot+, psPDmod+<br>(W/m <sup>2</sup> ) |                   | Uncertainty<br>(k = 2) |
|------------------------------------------|----------------------------------------|-----------------------------|------------------------|--------------------------------------------------------------------|-------------------|------------------------|
|                                          |                                        |                             |                        | 1 cm <sup>2</sup>                                                  | 4 cm <sup>2</sup> |                        |
| 10 mm                                    | 93.3                                   | 152                         | 1.27 dB                | 60.0, 60.5, 60.7                                                   | 55.5, 56.2, 56.5  | 1.28 dB                |

### Max Power Density

| Distance Horn Aperture to Measured Plane | <b><i>Prad</i><sup>1</sup></b><br>(mW) | <b>Max E-field</b><br>(V/m) | Uncertainty<br>(k = 2) | Max Power Density<br>Sn, Stot,  Stot <br>(W/m <sup>2</sup> ) | Uncertainty<br>(k = 2) |
|------------------------------------------|----------------------------------------|-----------------------------|------------------------|--------------------------------------------------------------|------------------------|
| 10 mm                                    | 93.3                                   | 152                         | 1.27 dB                | 61.7, 62.1, 62.2                                             | 1.28 dB                |

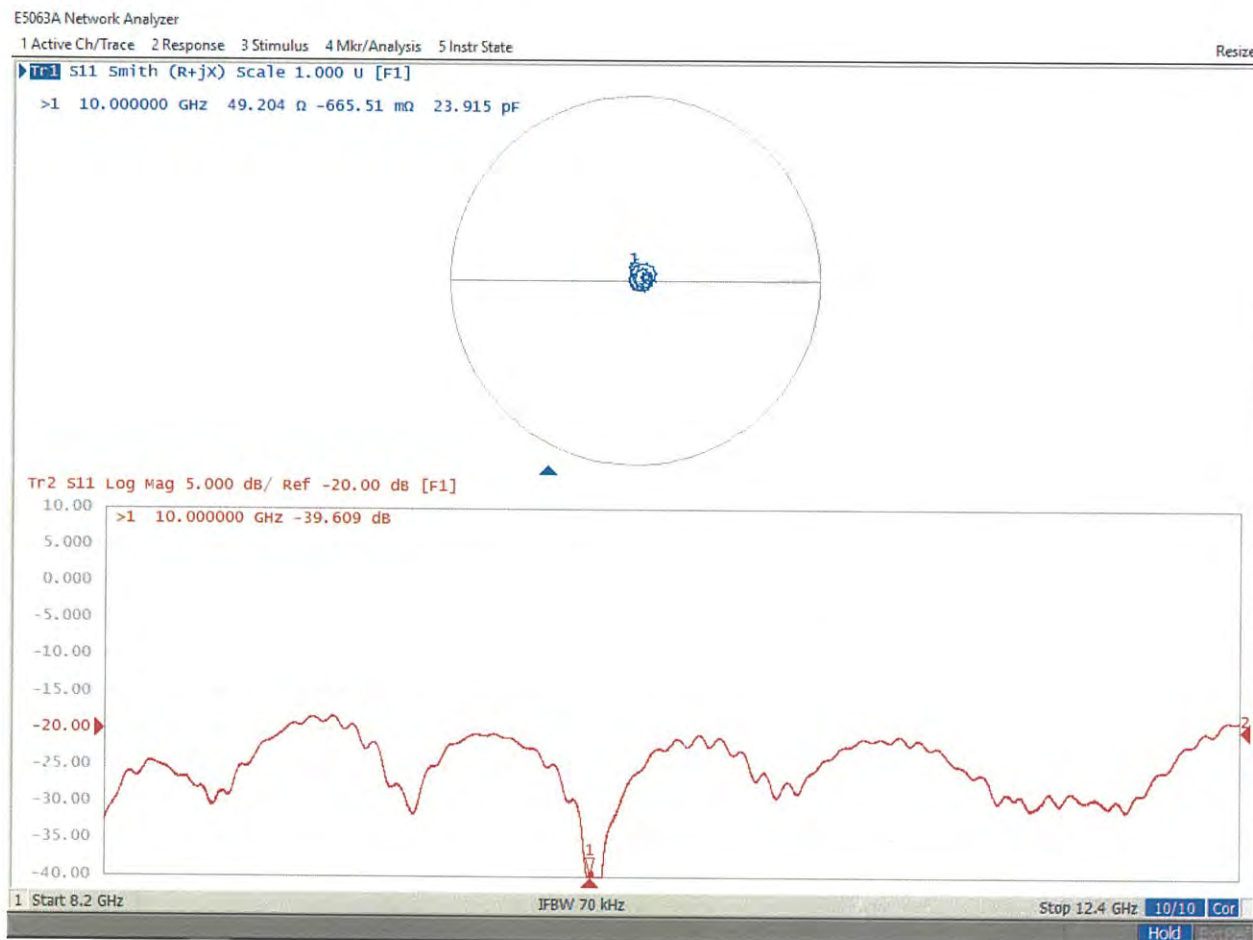
<sup>1</sup> Assessed ohmic and mismatch loss plus numerical offset: 0.30 dB

## Appendix (Additional assessments outside the scope of SCS 0108)

### Antenna Parameters

|                                      |                                |
|--------------------------------------|--------------------------------|
| Impedance, transformed to feed point | 49.2 $\Omega$ - 0.7 j $\Omega$ |
| Return Loss                          | - 39.6 dB                      |

### Impedance Measurement Plot



DASY Report

Measurement Report for 5G Verification Source 10 GHz, UID 0 -, Channel 10000 (10000.0MHz)

Device under Test Properties

|                               |                       |          |          |
|-------------------------------|-----------------------|----------|----------|
| Name, Manufacturer            | Dimensions [mm]       | IMEI     | DUT Type |
| 5G Verification Source 10 GHz | 100.0 x 100.0 x 172.0 | SN: 1055 | -        |

Exposure Conditions

|                 |                              |                 |        |                                 |                   |
|-----------------|------------------------------|-----------------|--------|---------------------------------|-------------------|
| Phantom Section | Position, Test Distance [mm] | Band            | Group, | Frequency [MHz], Channel Number | Conversion Factor |
| 5G -            | 10.0 mm                      | Validation band | CW     | 10000.0, 10000                  | 1.0               |

Hardware Setup

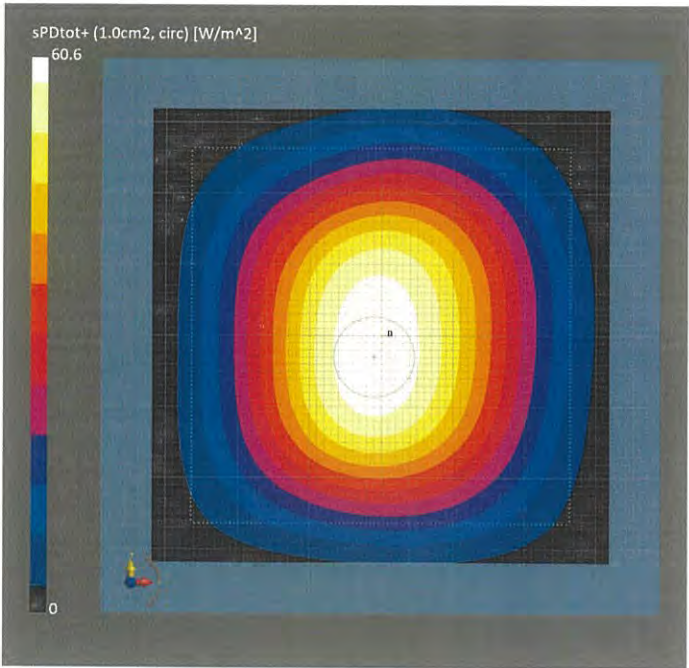
|                       |        |                                       |                           |
|-----------------------|--------|---------------------------------------|---------------------------|
| Phantom               | Medium | Probe, Calibration Date               | DAE, Calibration Date     |
| mmWave Phantom - 1002 | Air    | EUmmWV3 - SN9374_F1-55GHz, 2024-08-28 | DAE4ip Sn1602, 2023-11-08 |

Scan Setup

|                     |                       |
|---------------------|-----------------------|
| Sensor Surface [mm] | 5G Scan               |
| MAIA                | 10.0<br>MAIA not used |

Measurement Results

|                        |                    |
|------------------------|--------------------|
| Date                   | 5G Scan            |
| Avg. Area [cm²]        | 2024-09-16, 15:15  |
| Avg. Type              | 1.00               |
| psPDn+ [W/m²]          | Circular Averaging |
| psPDtot+ [W/m²]        | 60.0               |
| psPDmod+ [W/m²]        | 60.6               |
| Max(Sn) [W/m²]         | 60.7               |
| Max(Stot) [W/m²]       | 61.7               |
| Max( Stot ) [W/m²]     | 62.1               |
| E <sub>max</sub> [V/m] | 62.2               |
| Power Drift [dB]       | 152                |
|                        | 0.01               |



DASY Report

Measurement Report for 5G Verification Source 10 GHz, UID 0 -, Channel 10000 (10000.0MHz)

Device under Test Properties

| Name, Manufacturer            | Dimensions [mm]       | IMEI     | DUT Type |
|-------------------------------|-----------------------|----------|----------|
| 5G Verification Source 10 GHz | 100.0 x 100.0 x 172.0 | SN: 1055 | -        |

Exposure Conditions

| Phantom Section | Position, Test Distance [mm] | Band            | Group, | Frequency [MHz], Channel Number | Conversion Factor |
|-----------------|------------------------------|-----------------|--------|---------------------------------|-------------------|
| 5G -            | 10.0 mm                      | Validation band | CW     | 10000.0, 10000                  | 1.0               |

Hardware Setup

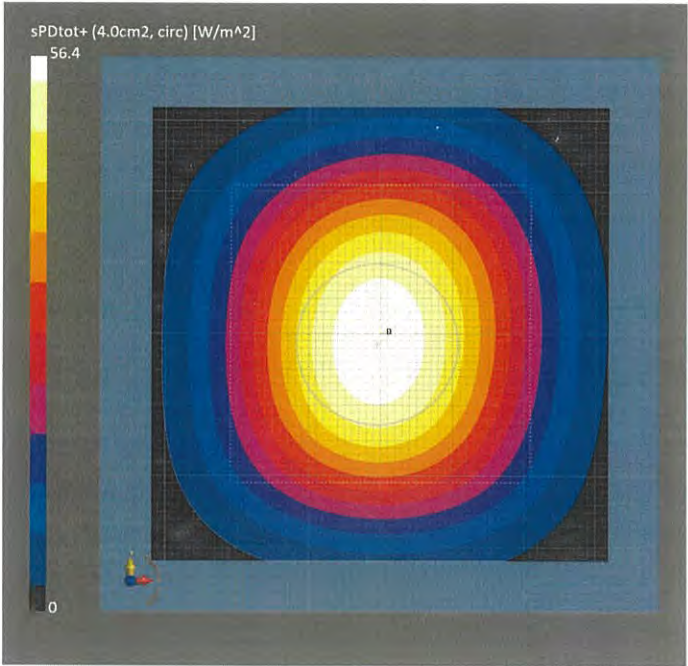
| Phantom               | Medium | Probe, Calibration Date               | DAE, Calibration Date     |
|-----------------------|--------|---------------------------------------|---------------------------|
| mmWave Phantom - 1002 | Air    | EUmmWV3 - SN9374_F1-55GHz, 2024-08-28 | DAE4ip Sn1602, 2023-11-08 |

Scan Setup

| Sensor Surface [mm] | 5G Scan               |
|---------------------|-----------------------|
| MAIA                | 10.0<br>MAIA not used |

Measurement Results

| Date                            | 5G Scan            |
|---------------------------------|--------------------|
| 2024-09-16, 15:15               |                    |
| Avg. Area [cm <sup>2</sup> ]    | 4.00               |
| Avg. Type                       | Circular Averaging |
| psPDn+ [W/m <sup>2</sup> ]      | 55.6               |
| psPDtot+ [W/m <sup>2</sup> ]    | 56.4               |
| psPDmod+ [W/m <sup>2</sup> ]    | 56.6               |
| Max(Sn) [W/m <sup>2</sup> ]     | 61.7               |
| Max(Stot) [W/m <sup>2</sup> ]   | 62.1               |
| Max( Stot ) [W/m <sup>2</sup> ] | 62.2               |
| E <sub>max</sub> [V/m]          | 152                |
| Power Drift [dB]                | 0.01               |



DASY Report

Measurement Report for 5G Verification Source 10 GHz, UID 0 -, Channel 10000 (10000.0MHz)

Device under Test Properties

|                               |                       |          |          |
|-------------------------------|-----------------------|----------|----------|
| Name, Manufacturer            | Dimensions [mm]       | IMEI     | DUT Type |
| 5G Verification Source 10 GHz | 100.0 x 100.0 x 172.0 | SN: 1055 | -        |

Exposure Conditions

|                 |                              |                 |        |                                 |                   |
|-----------------|------------------------------|-----------------|--------|---------------------------------|-------------------|
| Phantom Section | Position, Test Distance [mm] | Band            | Group, | Frequency [MHz], Channel Number | Conversion Factor |
| 5G -            | 10.0 mm                      | Validation band | CW     | 10000.0, 10000                  | 1.0               |

Hardware Setup

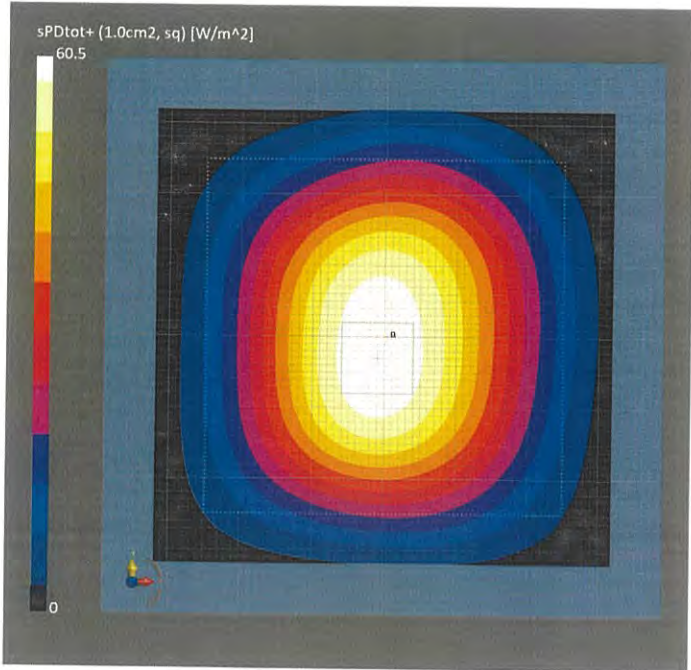
|                       |        |                                       |                           |
|-----------------------|--------|---------------------------------------|---------------------------|
| Phantom               | Medium | Probe, Calibration Date               | DAE, Calibration Date     |
| mmWave Phantom - 1002 | Air    | EUmmWV3 - SN9374_F1-55GHz, 2024-08-28 | DAE4ip Sn1602, 2023-11-08 |

Scan Setup

|                     |               |
|---------------------|---------------|
| Sensor Surface [mm] | 5G Scan       |
| MAIA                | 10.0          |
|                     | MAIA not used |

Measurement Results

|                                 |                   |
|---------------------------------|-------------------|
| Date                            | 5G Scan           |
| Avg. Area [cm <sup>2</sup> ]    | 2024-09-16, 15:15 |
| Avg. Type                       | 1.00              |
| psPDn+ [W/m <sup>2</sup> ]      | Square Averaging  |
| psPDtot+ [W/m <sup>2</sup> ]    | 60.0              |
| psPDmod+ [W/m <sup>2</sup> ]    | 60.5              |
| Max(Sn) [W/m <sup>2</sup> ]     | 60.7              |
| Max(Stot) [W/m <sup>2</sup> ]   | 61.7              |
| Max( Stot ) [W/m <sup>2</sup> ] | 62.1              |
| E <sub>max</sub> [V/m]          | 62.2              |
| Power Drift [dB]                | 152               |
|                                 | 0.01              |



DASY Report

Measurement Report for 5G Verification Source 10 GHz, UID 0 -, Channel 10000 (10000.0MHz)

Device under Test Properties

|                               |                       |          |          |
|-------------------------------|-----------------------|----------|----------|
| Name, Manufacturer            | Dimensions [mm]       | IMEI     | DUT Type |
| 5G Verification Source 10 GHz | 100.0 x 100.0 x 172.0 | SN: 1055 | -        |

Exposure Conditions

|                 |                              |                 |        |                                 |                   |
|-----------------|------------------------------|-----------------|--------|---------------------------------|-------------------|
| Phantom Section | Position, Test Distance [mm] | Band            | Group, | Frequency [MHz], Channel Number | Conversion Factor |
| 5G -            | 10.0 mm                      | Validation band | CW     | 10000.0, 10000                  | 1.0               |

Hardware Setup

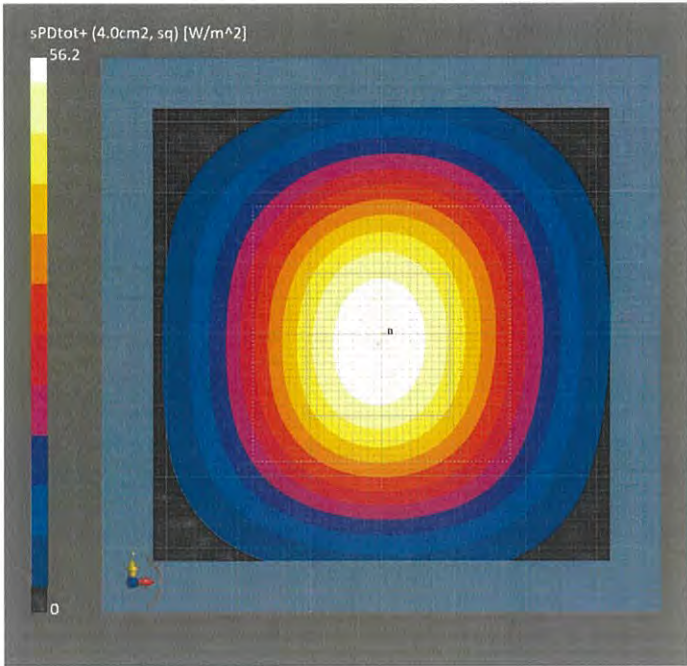
|                       |        |                                       |                           |
|-----------------------|--------|---------------------------------------|---------------------------|
| Phantom               | Medium | Probe, Calibration Date               | DAE, Calibration Date     |
| mmWave Phantom - 1002 | Air    | EUmmWV3 - SN9374_F1-55GHz, 2024-08-28 | DAE4ip Sn1602, 2023-11-08 |

Scan Setup

|                     |               |
|---------------------|---------------|
| Sensor Surface [mm] | 5G Scan       |
| MAIA                | 10.0          |
|                     | MAIA not used |

Measurement Results

|                        |                  |
|------------------------|------------------|
| Date                   | 5G Scan          |
| 2024-09-16, 15:15      |                  |
| Avg. Area [cm²]        | 4.00             |
| Avg. Type              | Square Averaging |
| psPDn+ [W/m²]          | 55.5             |
| psPDtot+ [W/m²]        | 56.2             |
| psPDmod+ [W/m²]        | 56.5             |
| Max(Sn) [W/m²]         | 61.7             |
| Max(Stot) [W/m²]       | 62.1             |
| Max( Stot ) [W/m²]     | 62.2             |
| E <sub>max</sub> [V/m] | 152              |
| Power Drift [dB]       | 0.01             |



## 10GHz SN 1055 Extended Dipole Calibrations

Referring to KDB 865664, if dipoles are verified in return loss ( $< -20\text{dB}$ , 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.

| 10GHz (SN 1055) |                 |             |                             |                 |                                  |                 |
|-----------------|-----------------|-------------|-----------------------------|-----------------|----------------------------------|-----------------|
| Measurement     | Return Loss(dB) | $\Delta \%$ | Real Impedance ( $\Omega$ ) | $\Delta \Omega$ | Imaginary Impedance ( $\Omega$ ) | $\Delta \Omega$ |
| Cal. Report     | -39.609         | /           | 49.204                      | /               | -0.66551                         | /               |
| Extended        | -38.834         | -1.96       | 47.081                      | -2.123          | -0.10471                         | 0.5608          |

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

