

## Appendix C for KSCR230900155101

### Calibration Certificate

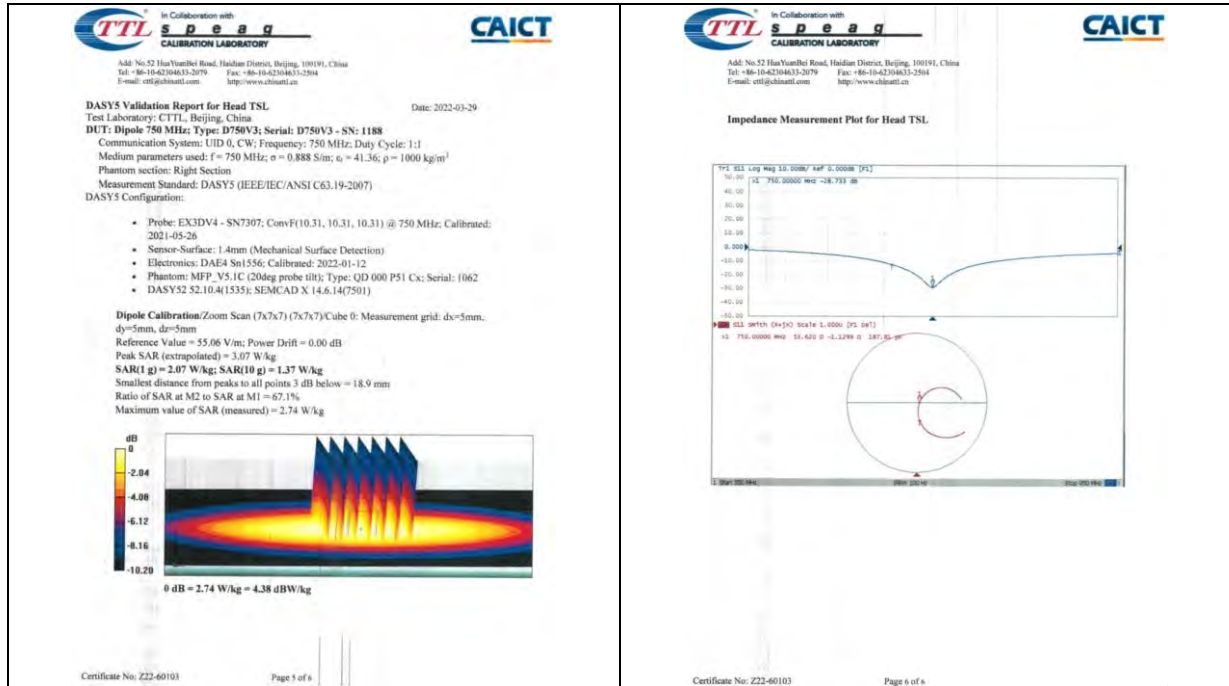
| Object | Apply                               | No | Model   | SN    | Calibration Date | Due date of calibration |
|--------|-------------------------------------|----|---------|-------|------------------|-------------------------|
| Dipole | <input checked="" type="checkbox"/> | 1  | D750V3  | 1188  | 2022/03/29       | 2025/03/28              |
|        | <input checked="" type="checkbox"/> | 2  | D835V2  | 4d114 | 2022/03/31       | 2025/03/30              |
|        | <input type="checkbox"/>            | 3  | D900V2  | 1d079 | 2022/06/07       | 2025/06/06              |
|        | <input checked="" type="checkbox"/> | 4  | D1800V2 | 2d170 | 2022/03/31       | 2025/03/30              |
|        | <input checked="" type="checkbox"/> | 5  | D1900V2 | 5d136 | 2022/06/07       | 2025/06/06              |
|        | <input type="checkbox"/>            | 6  | D2000V2 | 1041  | 2022/06/06       | 2025/06/05              |
|        | <input checked="" type="checkbox"/> | 7  | D2300V2 | 1096  | 2022/03/31       | 2025/03/30              |
|        | <input checked="" type="checkbox"/> | 8  | D2450V2 | 817   | 2022/04/01       | 2025/03/31              |
|        | <input checked="" type="checkbox"/> | 9  | D2600V2 | 1158  | 2022/03/31       | 2025/03/30              |
|        | <input checked="" type="checkbox"/> | 10 | D5GHzV2 | 1095  | 2022/06/01       | 2025/05/31              |
| DAE    | <input checked="" type="checkbox"/> | 11 | DAE4    | 1305  | 2023/04/13       | 2024/04/12              |
| Probe  | <input checked="" type="checkbox"/> | 12 | EX3DV4  | 7833  | 2023/08/24       | 2024/08/23              |

## 1 Dipole

## 1.1 D750V3 - SN 1188

| TTL Calibration Laboratory                                                                                                                                                                                                                                                 |                   | CAICT                                                                                                                                                                           |                        |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------|
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| Client: SGS-CN                                                                                                                                                                                                                                                             |                   | Certificate No: Z22-60103                                                                                                                                                       |                        |
| <b>CALIBRATION CERTIFICATE</b>                                                                                                                                                                                                                                             |                   |                                                                                                                                                                                 |                        |
| Object: D750V3 - SN: 1188                                                                                                                                                                                                                                                  |                   |                                                                                                                                                                                 |                        |
| Calibration Procedure(s): FF-211-003-01<br>Calibration Procedures for dipole validation kits                                                                                                                                                                               |                   |                                                                                                                                                                                 |                        |
| Calibration date: March 29, 2022                                                                                                                                                                                                                                           |                   |                                                                                                                                                                                 |                        |
| This calibration Certificate documents the traceability to national standards, which realize the physical units of measurements (SI). The measurements and the uncertainties with confidence probability are given on the following pages and are part of the certificate. |                   |                                                                                                                                                                                 |                        |
| All calibrations have been conducted in the closed laboratory facility: environment temperature (23±3)°C and humidity<70%.                                                                                                                                                 |                   |                                                                                                                                                                                 |                        |
| Calibration Equipment used (M&TE critical for calibration)                                                                                                                                                                                                                 |                   |                                                                                                                                                                                 |                        |
| Primary Standards                                                                                                                                                                                                                                                          | ID #              | Cal Date (Calibrated by Certificate No.)                                                                                                                                        | Scheduled Calibration  |
| Power Meter NRP2                                                                                                                                                                                                                                                           | 100277            | 24-Sep-21 (CTTL No J21X08326)                                                                                                                                                   | Sep-22                 |
| Power sensor NSP6S                                                                                                                                                                                                                                                         | 104291            | 24-Sep-21 (CTTL No J21X08326)                                                                                                                                                   | Sep-22                 |
| Reference Probe EX30V4                                                                                                                                                                                                                                                     | SN 7307           | 26-May-21 (SPEAG No EX3-7307_May21)                                                                                                                                             | May-22                 |
| DAE4                                                                                                                                                                                                                                                                       | SN 1556           | 12-Jan-22 (CTTL-SPEAG No Z22-60007)                                                                                                                                             | Jan-23                 |
| Secondary Standards                                                                                                                                                                                                                                                        | ID #              | Cal Date (Calibrated by Certificate No.)                                                                                                                                        | Scheduled Calibration  |
| Signal Generator E4438C                                                                                                                                                                                                                                                    | MY48071430        | 13-Jan-22 (CTTL No J22X00409)                                                                                                                                                   | Jan-23                 |
| Network Analyzer E5071C                                                                                                                                                                                                                                                    | MY46110673        | 14-Jan-22 (CTTL No J22X00406)                                                                                                                                                   | Jan-23                 |
| Calibrated by:                                                                                                                                                                                                                                                             | Name: Zhao Jing   | Function: SAR Test Engineer                                                                                                                                                     | Signature: [Signature] |
| Reviewed by:                                                                                                                                                                                                                                                               | Name: Lin Hao     | Function: SAR Test Engineer                                                                                                                                                     | Signature: [Signature] |
| Approved by:                                                                                                                                                                                                                                                               | Name: Qi Diqiyuan | Function: SAR Project Leader                                                                                                                                                    | Signature: [Signature] |
| Issued: April 3, 2022                                                                                                                                                                                                                                                      |                   |                                                                                                                                                                                 |                        |
| This calibration certificate shall not be reproduced except in full without written approval of the laboratory.                                                                                                                                                            |                   |                                                                                                                                                                                 |                        |
| Certificate No: Z22-60103                                                                                                                                                                                                                                                  |                   | Page 1 of 6                                                                                                                                                                     |                        |

| TTL Calibration Laboratory                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                          | CAICT                                                                                                                                                                           |                  |
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| <b>Measurement Conditions</b><br>DASY system configuration, as far as not given on page 1                                                                                                                                                                                                                                                                                                                                                                                                                                    |                          |                                                                                                                                                                                 |                  |
| DASY Version                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | DASY52                   | V52.10.4                                                                                                                                                                        |                  |
| Extrapolation                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Advanced Extrapolation   |                                                                                                                                                                                 |                  |
| Phantom                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Triple Flat Phantom 5.1C |                                                                                                                                                                                 |                  |
| Distance Dipole Center - TSL                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 15 mm                    | with Spacer                                                                                                                                                                     |                  |
| Zoom Scan Resolution                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | dx, dy, dz = 5 mm        |                                                                                                                                                                                 |                  |
| Frequency                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 750 MHz ± 1 MHz          |                                                                                                                                                                                 |                  |
| <b>Head TSL parameters</b><br>The following parameters and calculations were applied:                                                                                                                                                                                                                                                                                                                                                                                                                                        |                          |                                                                                                                                                                                 |                  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Temperature              | Permittivity                                                                                                                                                                    | Conductivity     |
| Nominal Head TSL parameters                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 22.0 °C                  | 42.0                                                                                                                                                                            | 0.90 mho/m       |
| Measured Head TSL parameters                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | (22.0 ± 0.2) °C          | 41.4 ± 6 %                                                                                                                                                                      | 0.89 mho/m ± 6 % |
| Head TSL temperature change during test                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | <1.0 °C                  | ---                                                                                                                                                                             | ---              |
| <b>SAR result with Head TSL</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                          |                                                                                                                                                                                 |                  |
| SAR averaged over 1 cm <sup>2</sup> (1 g) of Head TSL                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Condition                |                                                                                                                                                                                 |                  |
| SAR measured                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 250 mW input power       | 2.07 W/kg                                                                                                                                                                       |                  |
| SAR for nominal Head TSL parameters                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | normalized to 1W         | 8.27 W/kg ± 16.8 % (k=2)                                                                                                                                                        |                  |
| SAR averaged over 10 cm <sup>2</sup> (10 g) of Head TSL                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Condition                |                                                                                                                                                                                 |                  |
| SAR measured                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 250 mW input power       | 1.37 W/kg                                                                                                                                                                       |                  |
| SAR for nominal Head TSL parameters                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | normalized to 1W         | 5.48 W/kg ± 16.7 % (k=2)                                                                                                                                                        |                  |
| <b>Appendix (Additional assessments outside the scope of CNAS L0570)</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                          |                                                                                                                                                                                 |                  |
| <b>Antenna Parameters with Head TSL</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                          |                                                                                                                                                                                 |                  |
| Impedance, transformed to feed point                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 53.60: 1.13jΩ            |                                                                                                                                                                                 |                  |
| Return Loss                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | -26.7dB                  |                                                                                                                                                                                 |                  |
| <b>General Antenna Parameters and Design</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                          |                                                                                                                                                                                 |                  |
| Electrical Delay (one direction)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 0.947 ns                 |                                                                                                                                                                                 |                  |
| After long term use with 100W radiated power, only a slight warming of the dipole near the feed-point can be measured.                                                                                                                                                                                                                                                                                                                                                                                                       |                          |                                                                                                                                                                                 |                  |
| The dipole is made of standard semi-rigid coaxial cable. The center conductor of the feeding line is directly connected to the second arm of the dipole. The antenna is therefore short-circuited for DC-signals. On some of the dipoles, small end caps are added to the dipole arms in order to improve matching when cabled 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.                                                                                                                                                                                                                                                                                                                                                                               |                          |                                                                                                                                                                                 |                  |
| <b>Additional EUT Data</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                          |                                                                                                                                                                                 |                  |
| Manufactured by                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | SPEAG                    |                                                                                                                                                                                 |                  |
| Certificate No: Z22-60103                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                          | Page 4 of 6                                                                                                                                                                     |                  |



## 1.2 D835V2 - SN 4d114

**TTL** **speaq**  
CALIBRATION LABORATORY

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**CAICT**

In Collaboration with

**Client: SGS-CN** Certificate No: Z22-60104

**CALIBRATION CERTIFICATE**

Object: D835V2 - SN: 4d114

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

Calibration date: March 31, 2022

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

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

Calibration Equipment used (MATE critical for calibration)

| Primary Standards      | ID #    | Cal Date (Calibrated by Certificate No.) | Scheduled Calibration |
|------------------------|---------|------------------------------------------|-----------------------|
| Power Meter NRP2       | 106277  | 24-Sep-21 (CTTL No.J21X08328)            | Sep-22                |
| Power sensor NRPBS     | 104291  | 24-Sep-21 (CTTL No.J21X08328)            | Sep-22                |
| Reference Probe EX3DV4 | SN 7307 | 26-May-21 (SPEAG No EX3-7307_May21)      | May-22                |
| DAE4                   | SN 1556 | 12-Jan-22 (CTTL-SPEAG No Z22-60007)      | Jan-23                |

| Secondary Standards     | ID #       | Cal Date (Calibrated by Certificate No.) | Scheduled Calibration |
|-------------------------|------------|------------------------------------------|-----------------------|
| Signal Generator E4438C | MY46071430 | 15-Jan-22 (CTTL No.J22X00409)            | Jan-23                |
| Network Analyzer E5071C | MY46110873 | 14-Jan-22 (CTTL No.J22X00405)            | Jan-23                |

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

Issued: April 6, 2022

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Certificate No: Z22-60104 Page 1 of 5

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**Glossary:**

|       |                                |
|-------|--------------------------------|
| TSL   | issue simulating liquid        |
| ConvF | sensitivity in TSL / NORMx.y,z |
| N/A   | not applicable or not measured |

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

- 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 665664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

**Additional Documentation:**

- DASY4/5 System Handbook

**Methods Applied and Interpretation of Parameters:**

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

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

Certificate No: Z22-60104 Page 2 of 5

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**CAICT**

**Measurement Conditions**  
DASY system configuration, as far as not given on page 1

| DASY Version                 | DASY52                   | VS2 10.4    |
|------------------------------|--------------------------|-------------|
| Extrapolation                | Advanced Extrapolation   |             |
| Phantom                      | Triple Flat Phantom 5.1C |             |
| Distance Dipole Center - TSL | 15 mm                    | with Spacer |
| Zoom Scan Resolution         | dx, dy, dz = 5 mm        |             |
| Frequency                    | 835 MHz ± 1 MHz          |             |

**Head TSL parameters**  
The following parameters and calculations were applied:

|                                         | Temperature     | Permittivity | Conductivity     |
|-----------------------------------------|-----------------|--------------|------------------|
| Nominal Head TSL parameters             | 22.0 °C         | 41.6         | 0.90 mho/m       |
| Measured Head TSL parameters            | (22.0 ± 0.2) °C | 41.0 ± 6 %   | 0.91 mho/m ± 6 % |
| Head TSL temperature change during last | <1.0 °C         | —            | —                |

**SAR result with Head TSL**

|                                                         | Condition          |                          |
|---------------------------------------------------------|--------------------|--------------------------|
| SAR averaged over 1 cm <sup>3</sup> (1 g) of Head TSL   | 250 mW input power | 2.37 W/kg                |
| SAR measured                                            | normalized to 1W   | 9.40 W/kg ± 18.8 % (k=2) |
| SAR for nominal Head TSL parameters                     | Condition          |                          |
| SAR averaged over 10 cm <sup>3</sup> (10 g) of Head TSL | 250 mW input power | 1.54 W/kg                |
| SAR measured                                            | normalized to 1W   | 6.12 W/kg ± 18.7 % (k=2) |

Certificate No: Z22-60104 Page 1 of 6

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**CAICT**

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

**Antenna Parameters with Head TSL**

| Impedance, transformed to feed point | 48.70 - j22.0 Ω |
|--------------------------------------|-----------------|
| Return Loss                          | -25.3 dB        |

**General Antenna Parameters and Design**

| Electrical Delay (one direction) | 1.307 ns |
|----------------------------------|----------|

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

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

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

**Additional EUT Data**

| Manufactured by | SPEAG |
|-----------------|-------|

Certificate No: Z22-60104 Page 1 of 6

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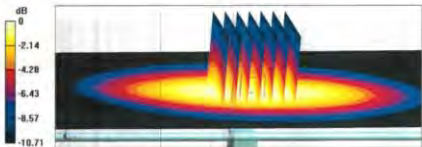
**CAICT**

**DASY Validation Report for Head TSL**  
Test Laboratory: CTTL, Beijing, China  
Date: 2022-03-31

**DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN: 40114**  
Communication System: UTD 0, CW; Frequency: 835 MHz; Duty Cycle: 1:1  
Medium parameters used: f = 835 MHz; σ = 0.907 S/m; ε<sub>r</sub> = 40.98; ρ = 1000 kg/m<sup>3</sup>  
Phantom section: Right Section  
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)  
DASY5 Configuration:

- Probe: EX3DV4 - SN7307; ConvF(10.13, 10.13, 10.13) @ 835 MHz; Calibrated: 2021-05-26
- Sensor Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DA64 Sn1556; Calibrated: 2022-01-12
- Phantom: MFP\_V5.1C (20deg probe tilt); Type: QD 000 P51 Cx; Serial: 1062
- DASY52 52.10.4(153); SEMCAD X 14.6.14(7501)

**Dipole Calibration/Zoom Scan (7x7x7) (7x7x7) Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm**  
Reference Value = 57.88 V/m; Power Drift = 0.04 dB  
Peak SAR (extrapolated) = 3.56 W/kg  
**SAR(1 g) = 2.37 W/kg; SAR(10 g) = 1.54 W/kg**  
Smallest distance from peaks to all points 3 dB below = 15.8 mm  
Ratio of SAR at M2 to SAR at M1 = 66.2%  
Maximum value of SAR (measured) = 3.17 W/kg



0 dB = 3.17 W/kg = 5.01 dBW/kg

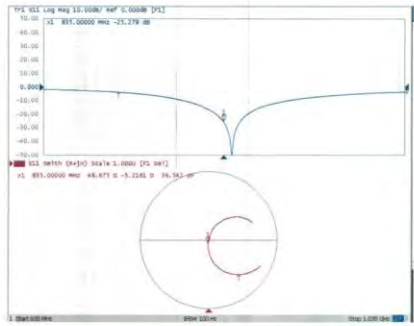
Certificate No: Z22-60104 Page 1 of 6

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**CAICT**

**Impedance Measurement Plot for Head TSL**



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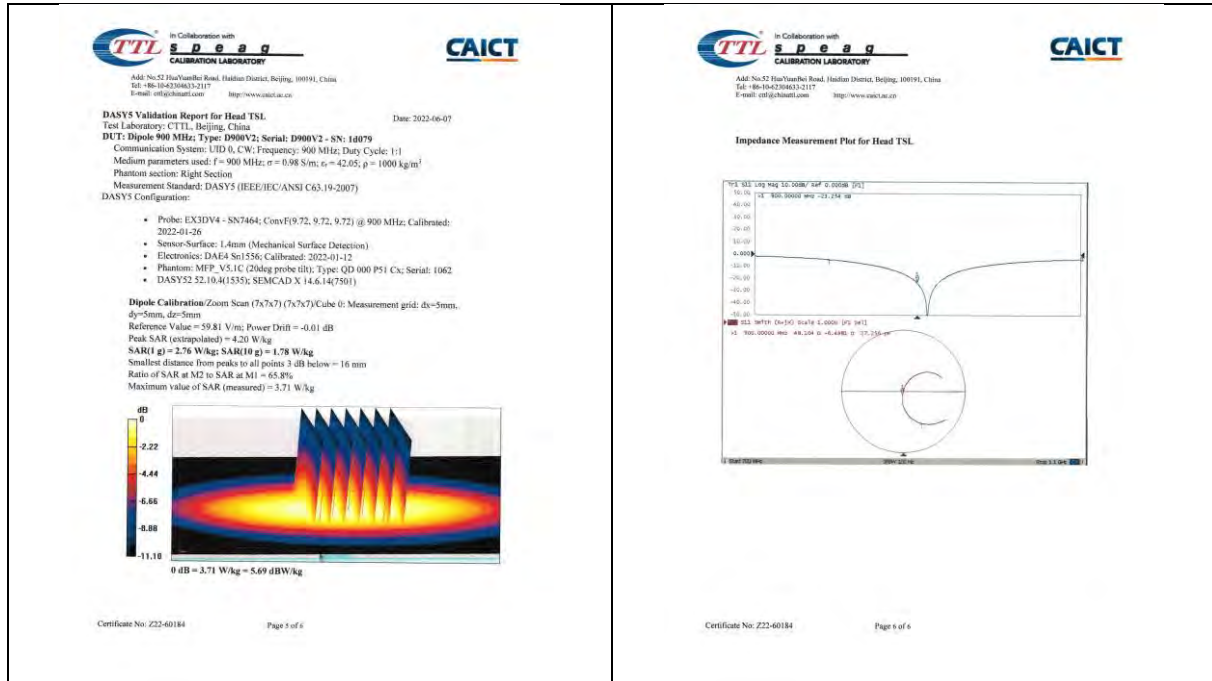
## 1.3 D900V2 - SN 1d079

| In Collaboration with                                                                                                                                                                                                                                                      |                  | CAICT                                                                                                                    |                        |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|--------------------------------------------------------------------------------------------------------------------------|------------------------|
| TTL S P E A G<br>CALIBRATION LABORATORY                                                                                                                                                                                                                                    |                  | CALIBRATION<br>CNAS 1079                                                                                                 |                        |
| Add: No.52 HuaYuan Road, Haidian District, Beijing, 100191<br>Tel: +86-10-62104633-3117<br>E-mail: cti@sgs.com.cn                                                                                                                                                          |                  | Add: No.52 HuaYuan Road, Haidian District, Beijing, 100191, China<br>Tel: +86-10-62104633-3117<br>E-mail: cti@sgs.com.cn |                        |
| Client: SGS-CN                                                                                                                                                                                                                                                             |                  | Certificate No: Z22-60184                                                                                                |                        |
| <b>CALIBRATION CERTIFICATE</b>                                                                                                                                                                                                                                             |                  |                                                                                                                          |                        |
| Object: D900V2 - SN 1d079                                                                                                                                                                                                                                                  |                  |                                                                                                                          |                        |
| Calibration Procedure(s): FF-Z11-003-01<br>Calibration Procedures for dipole validation kits                                                                                                                                                                               |                  |                                                                                                                          |                        |
| Calibration date: June 7, 2022                                                                                                                                                                                                                                             |                  |                                                                                                                          |                        |
| This calibration Certificate documents the traceability to national standards, which realize the physical units of measurements (SI). The measurements and the uncertainties with confidence probability are given on the following pages and are part of the certificate. |                  |                                                                                                                          |                        |
| All calibrations have been conducted in the closed laboratory facility: environment temperature (23±1)°C and humidity <70%.                                                                                                                                                |                  |                                                                                                                          |                        |
| Calibration Equipment used (M&TE critical for calibration)                                                                                                                                                                                                                 |                  |                                                                                                                          |                        |
| Primary Standards                                                                                                                                                                                                                                                          | ID #             | Cal Date (Calibrated by Certificate No.)                                                                                 | Scheduled Calibration  |
| Power Meter NRP2                                                                                                                                                                                                                                                           | 106277           | 24-Sep-21 (CTTL No. J21X08326)                                                                                           | Sep-22                 |
| Power sensor NRP85                                                                                                                                                                                                                                                         | 104291           | 24-Sep-21 (CTTL No. J21X08326)                                                                                           | Sep-22                 |
| Reference Probe EX3DV4                                                                                                                                                                                                                                                     | SN 7464          | 26-Jan-22 (SPEAG No. EX3-7464_Jan22)                                                                                     | Jan-23                 |
| DAE4                                                                                                                                                                                                                                                                       | SN 1586          | 12-Jan-22 (CTTL-SPEAG No. Z22-60007)                                                                                     | Jan-23                 |
| Secondary Standards                                                                                                                                                                                                                                                        | ID #             | Cal Date (Calibrated by Certificate No.)                                                                                 | Scheduled Calibration  |
| Signal Generator E2438C                                                                                                                                                                                                                                                    | MY40071430       | 13-Jan-22 (CTTL No. J22X00406)                                                                                           | Jan-23                 |
| Network Analyzer E5071C                                                                                                                                                                                                                                                    | MY40110473       | 14-Jan-22 (CTTL No. J22X00406)                                                                                           | Jan-23                 |
| Calibrated by:                                                                                                                                                                                                                                                             | Name: Zhao Jing  | Function: SAR Test Engineer                                                                                              | Signature: [Signature] |
| Reviewed by:                                                                                                                                                                                                                                                               | Name: Lin Hao    | Function: SAR Test Engineer                                                                                              | Signature: [Signature] |
| Approved by:                                                                                                                                                                                                                                                               | Name: Qi Dianyan | Function: SAR Project Leader                                                                                             | Signature: [Signature] |
| Issued: June 13, 2022                                                                                                                                                                                                                                                      |                  |                                                                                                                          |                        |
| This calibration certificate shall not be reproduced except in full without written approval of the laboratory.                                                                                                                                                            |                  |                                                                                                                          |                        |
| Certificate No: Z22-60184                                                                                                                                                                                                                                                  |                  | Page 1 of 6                                                                                                              |                        |

| In Collaboration with                                                                                                                                                                                                                                                                                                 |                                | CAICT                                                                                                                    |  |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------|--------------------------------------------------------------------------------------------------------------------------|--|
| TTL S P E A G<br>CALIBRATION LABORATORY                                                                                                                                                                                                                                                                               |                                | CALIBRATION<br>CNAS 1079                                                                                                 |  |
| Add: No.52 HuaYuan Road, Haidian District, Beijing, 100191<br>Tel: +86-10-62104633-3117<br>E-mail: cti@sgs.com.cn                                                                                                                                                                                                     |                                | Add: No.52 HuaYuan Road, Haidian District, Beijing, 100191, China<br>Tel: +86-10-62104633-3117<br>E-mail: cti@sgs.com.cn |  |
| Client: SGS-CN                                                                                                                                                                                                                                                                                                        |                                | Certificate No: Z22-60184                                                                                                |  |
| <b>Glossary:</b>                                                                                                                                                                                                                                                                                                      |                                |                                                                                                                          |  |
| TSL                                                                                                                                                                                                                                                                                                                   | tissue simulating liquid       |                                                                                                                          |  |
| ConvF                                                                                                                                                                                                                                                                                                                 | sensitivity in TSL / NORM.y,z  |                                                                                                                          |  |
| N/A                                                                                                                                                                                                                                                                                                                   | not applicable or not measured |                                                                                                                          |  |
| <b>Calibration is Performed According to the Following Standards:</b>                                                                                                                                                                                                                                                 |                                |                                                                                                                          |  |
| a) IEC/IEEE 62209-1529, "Measurement Procedures for The Assessment of Specific Absorption Rate of Human Exposure to Radio Frequency Fields from Hand-held and Body-mounted Wireless Communication Devices-Part 1529: Human Models, Instrumentation and Procedures (Frequency range of 4 MHz to 10 GHz)", October 2020 |                                |                                                                                                                          |  |
| b) KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"                                                                                                                                                                                                                                                    |                                |                                                                                                                          |  |
| <b>Additional Documentation:</b>                                                                                                                                                                                                                                                                                      |                                |                                                                                                                          |  |
| c) DASYS4 System Handbook                                                                                                                                                                                                                                                                                             |                                |                                                                                                                          |  |
| <b>Methods Applied and Interpretation of Parameters:</b>                                                                                                                                                                                                                                                              |                                |                                                                                                                          |  |
| • <b>Measurement Conditions:</b> Further details are available from the Validation Report at the end of the certificate. All figures stated in this certificate are valid at the frequency indicated.                                                                                                                 |                                |                                                                                                                          |  |
| • <b>Antenna Parameters with TSL:</b> 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.                                                                                                |                                |                                                                                                                          |  |
| • <b>Feed Point Impedance and Return Loss:</b> 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.       |                                |                                                                                                                          |  |
| • <b>Electrical Delay:</b> One-way delay between the SMA connector and the antenna feed point. No uncertainty required.                                                                                                                                                                                               |                                |                                                                                                                          |  |
| • <b>SAR measured:</b> SAR measured at the stated antenna input power.                                                                                                                                                                                                                                                |                                |                                                                                                                          |  |
| • <b>SAR normalized:</b> SAR as measured, normalized to an input power of 1 W at the antenna connector.                                                                                                                                                                                                               |                                |                                                                                                                          |  |
| • <b>SAR for nominal TSL parameters:</b> The measured TSL parameters are used to calculate the nominal SAR result.                                                                                                                                                                                                    |                                |                                                                                                                          |  |
| The reported uncertainty of measurement is stated as the standard uncertainty of Measurement multiplied by the coverage factor k=2, which for a normal distribution corresponds to a coverage probability of approximately 95%.                                                                                       |                                |                                                                                                                          |  |
| Certificate No: Z22-60184                                                                                                                                                                                                                                                                                             |                                | Page 1 of 6                                                                                                              |  |

| In Collaboration with                                                                                             |                          | CAICT                                                                                                                    |                  |
|-------------------------------------------------------------------------------------------------------------------|--------------------------|--------------------------------------------------------------------------------------------------------------------------|------------------|
| TTL S P E A G<br>CALIBRATION LABORATORY                                                                           |                          | CALIBRATION<br>CNAS 1079                                                                                                 |                  |
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| Client: SGS-CN                                                                                                    |                          | Certificate No: Z22-60184                                                                                                |                  |
| <b>Measurement Conditions</b>                                                                                     |                          |                                                                                                                          |                  |
| DASYS system configuration, as far as is given on page 1                                                          |                          |                                                                                                                          |                  |
| DASYS Version                                                                                                     | DASYS2                   | 52.10.4                                                                                                                  |                  |
| Extrapolation                                                                                                     | Advanced Extrapolation   |                                                                                                                          |                  |
| Phantom                                                                                                           | Triple Flat Phantom 5.1C |                                                                                                                          |                  |
| Distance Dipole Center - TSL                                                                                      | 15 mm                    | with Spacer                                                                                                              |                  |
| Zoom Scan Resolution                                                                                              | 0x, dy, dz = 5 mm        |                                                                                                                          |                  |
| Frequency                                                                                                         | 900 MHz ± 1 MHz          |                                                                                                                          |                  |
| <b>Head TSL parameters</b>                                                                                        |                          |                                                                                                                          |                  |
| The following parameters and calculations were applied:                                                           |                          |                                                                                                                          |                  |
|                                                                                                                   | Temperature              | Permittivity                                                                                                             | Conductivity     |
| Nominal Head TSL parameters                                                                                       | 22.0 °C                  | 41.5                                                                                                                     | 0.97 mho/m       |
| Measured Head TSL parameters                                                                                      | (22.0 ± 0.2) °C          | 42.1 ± 6 %                                                                                                               | 0.98 mho/m ± 6 % |
| Head TSL temperature change during test                                                                           | <±0.5 °C                 | —                                                                                                                        | —                |
| <b>SAR result with Head TSL</b>                                                                                   |                          |                                                                                                                          |                  |
| SAR averaged over 1 cm <sup>2</sup> (1 g) of Head TSL                                                             | Condition                |                                                                                                                          |                  |
| SAR measured                                                                                                      | 250 mW input power       | 2.75 W/kg                                                                                                                |                  |
| SAR for nominal Head TSL parameters                                                                               | normalized to 1W         | 11.0 W/kg ± 16.8 % (k=2)                                                                                                 |                  |
| SAR averaged over 10 cm <sup>2</sup> (10 g) of Head TSL                                                           | Condition                |                                                                                                                          |                  |
| SAR measured                                                                                                      | 250 mW input power       | 1.75 W/kg                                                                                                                |                  |
| SAR for nominal Head TSL parameters                                                                               | normalized to 1W         | 7.09 W/kg ± 16.7 % (k=2)                                                                                                 |                  |
| Certificate No: Z22-60184                                                                                         |                          | Page 4 of 6                                                                                                              |                  |

| In Collaboration with                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |               | CAICT                                                                                                                    |  |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|--------------------------------------------------------------------------------------------------------------------------|--|
| TTL S P E A G<br>CALIBRATION LABORATORY                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |               | CALIBRATION<br>CNAS 1079                                                                                                 |  |
| Add: No.52 HuaYuan Road, Haidian District, Beijing, 100191<br>Tel: +86-10-62104633-3117<br>E-mail: cti@sgs.com.cn                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |               | Add: No.52 HuaYuan Road, Haidian District, Beijing, 100191, China<br>Tel: +86-10-62104633-3117<br>E-mail: cti@sgs.com.cn |  |
| Client: SGS-CN                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |               | Certificate No: Z22-60184                                                                                                |  |
| <b>Appendix (Additional assessments outside the scope of CNAS 10670)</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |               |                                                                                                                          |  |
| <b>Antenna Parameters with Head TSL</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |               |                                                                                                                          |  |
| Impedance, transformed to feed point                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 48 (10-9-450) |                                                                                                                          |  |
| Return Loss                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | -23.3 dB      |                                                                                                                          |  |
| <b>General Antenna Parameters and Design</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |               |                                                                                                                          |  |
| Electrical Delay (one direction)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 1.312 ns      |                                                                                                                          |  |
| After long term use with 100W radiated power, only a slight warming of the dipole near the feed-point can be measured.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |               |                                                                                                                          |  |
| The dipole is made of standard semi-rigid coaxial cable. The center conductor of the feeding line is directly connected to the second arm of the dipole. The antenna is therefore short-circuited for DC signals. On some of the dipoles, small 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. |               |                                                                                                                          |  |
| <b>Additional EUT Data</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |               |                                                                                                                          |  |
| Manufactured by                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | SPEAG         |                                                                                                                          |  |
| Certificate No: Z22-60184                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |               | Page 4 of 6                                                                                                              |  |



#### 1.4 D1800V2 - SN 2d170

**TTL** Calibration Laboratory  
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Tel: +86-10-4230603-2117  
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http://www.china.ttl.com

**CAICT**

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

**CALIBRATION CERTIFICATE**

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

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

Calibration date: **March 31, 2022**

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

All calibrations have been conducted in the closed laboratory facility; environment temperature (23±3)°C and humidity <70%.

Calibration Equipment used (M&TE critical for calibration)

| Primary Standards      | ID #    | Cal Date (Calibrated by Certificate No.) | Scheduled Calibration |
|------------------------|---------|------------------------------------------|-----------------------|
| Power Meter NRP2       | 106277  | 24-Sep-21 (CTTL No.J21X08326)            | Sep-22                |
| Power sensor NRP8      | 104291  | 24-Sep-21 (CTTL No.J21X08326)            | Sep-22                |
| Reference Probe EX3DV4 | SN 7307 | 26-May-21 (SPEAG No.EK3-7307_May21)      | May-22                |
| DAE4                   | SN 1556 | 12-Jan-22 (CTTL-SPEAG No.Z22-60007)      | Jan-23                |

| Secondary Standards     | ID #       | Cal Date (Calibrated by Certificate No.) | Scheduled Calibration |
|-------------------------|------------|------------------------------------------|-----------------------|
| Signal Generator E4438C | MY49071430 | 13-Jan-22 (CTTL No.J22X00409)            | Jan-23                |
| Network Analyzer E5071C | MY48110673 | 14-Jan-22 (CTTL No.J22X00409)            | Jan-23                |

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

Issued: April 6, 2022

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Certificate No: Z22-60105 Page 1 of 6

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http://www.china.ttl.com

**CAICT**

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 855664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

**Additional Documentation:**  
c) DASY4/5 System Handbook

**Methods Applied and Interpretation of Parameters:**

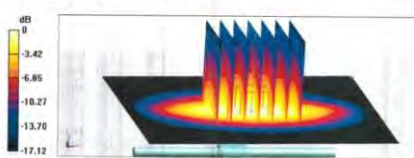
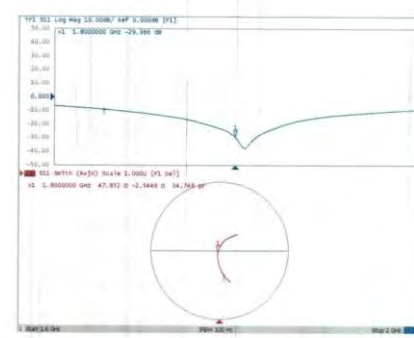
- Measurement Conditions:** Further details are available from the Validation Report at the end of the certificate. All figures stated in the certificate are valid at the frequency indicated.
- Antenna Parameters with TSL:** The dipole is mounted with the spacer to position its feed point exactly below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

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

Certificate No: Z22-60105 Page 2 of 6

| In Collaboration with                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                          | CAICT                    |                  |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------|--------------------------|------------------|
| TTL Speaq<br>CALIBRATION LABORATORY                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                          |                          |                  |
| Add: No.52 HuaYuanbei Road, Haidian District, Beijing, 100191, China<br>Tel: +86-10-42304633-2079 Fax: +86-10-42304633-2504<br>E-mail: cti@china.ttl.com http://www.china.ttl.com                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                          |                          |                  |
| <b>Measurement Conditions</b><br>DASY system configuration, as far as not given on page 1.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                          |                          |                  |
| DASY Version                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | DASY52                   | S2.10.4                  |                  |
| 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                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 1800 MHz ± 1 MHz         |                          |                  |
| <b>Head TSL parameters</b><br>The following parameters and calculations were applied:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                          |                          |                  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Temperature              | Permittivity             | Conductivity     |
| Nominal Head TSL parameters                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 22.0 °C                  | 40.0                     | 1.40 mho/m       |
| Measured Head TSL parameters                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | (22.0 ± 0.2) °C          | 40.0 ± 6 %               | 1.41 mho/m ± 6 % |
| Head TSL temperature change during test                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | < 1.0 °C                 | —                        | —                |
| <b>SAR result with Head TSL</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                          |                          |                  |
| SAR averaged over 1 cm <sup>3</sup> (1 g) of Head TSL                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Condition                |                          |                  |
| SAR measured                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 250 mW input power       | 9.73 W/kg                |                  |
| SAR for nominal Head TSL parameters                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | normalized to 1W         | 38.9 W/kg ± 18.8 % (k=2) |                  |
| SAR averaged over 10 cm <sup>3</sup> (10 g) of Head TSL                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Condition                |                          |                  |
| SAR measured                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 250 mW input power       | 5.11 W/kg                |                  |
| SAR for nominal Head TSL parameters                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | normalized to 1W         | 20.4 W/kg ± 18.7 % (k=2) |                  |
| <b>Appendix (Additional assessments outside the scope of CNAS L0570)</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                          |                          |                  |
| <b>Antenna Parameters with Head TSL</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                          |                          |                  |
| Impedance, transformed to feed point                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 47.90 - 2.54jΩ           |                          |                  |
| Return Loss                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | -29.4dB                  |                          |                  |
| <b>General Antenna Parameters and Design</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                          |                          |                  |
| Electrical Delay (one direction)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 1.116 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. |                          |                          |                  |
| <b>Additional EUT Data</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                          |                          |                  |
| Manufactured by                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | SPEAG                    |                          |                  |

Certificate No: Z22-60105 Page 3 of 6

| In Collaboration with                                                                                                                                                                                                                                                                                                                                                                                                                                             |  | CAICT |  |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|-------|--|
| TTL Speaq<br>CALIBRATION LABORATORY                                                                                                                                                                                                                                                                                                                                                                                                                               |  |       |  |
| Add: No.52 HuaYuanbei Road, Haidian District, Beijing, 100191, China<br>Tel: +86-10-42304633-2079 Fax: +86-10-42304633-2504<br>E-mail: cti@china.ttl.com http://www.china.ttl.com                                                                                                                                                                                                                                                                                 |  |       |  |
| <b>DASY5 Validation Report for Head TSL</b> Date: 2022-03-31<br>Test Laboratory: CTTL, Beijing, China<br>DUT: Dipole 1800 MHz; Type: D1800V2; Serial: D1800V2 - SN: 2d170<br>Communication System: UID 0, CW; Frequency: 1800 MHz; Duty Cycle: 1:1<br>Medium parameters used: f = 1800 MHz; σ = 1.411 S/m; ε = 40.62; ρ = 1000 kg/m <sup>3</sup><br>Phantom section: Right Section<br>Measurement Standard: DASY5 (IEEE/ANSI C63.19-2007)<br>DASY5 Configuration: |  |       |  |
| <ul style="list-style-type: none"><li>Probe: EX3DV4 - SN7307; ConvF(8.34, 8.34, 8.34) @ 1800 MHz; Calibrated: 2021-05-26</li><li>Sensor-Surface: 1.4mm (Mechanical Surface Detection)</li><li>Electronics: DAE4 Sn1556; Calibrated: 2022-01-12</li><li>Phantom: MFP-V5.1C (20deg probe tilt); Type: QD 000 P51 Cx; Serial: 1062</li><li>DASY52 S2.10.4(1535); SEMCAD X 14.6.14(7501)</li></ul>                                                                    |  |       |  |
| <b>Dipole Calibration/Zoom Scan (7x7x7) (7x7x7)Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm</b><br>Reference Value = 98.14 V/m; Power Drift = 0.03 dB<br>Peak SAR (extrapolated) = 18.2 W/kg<br>SAR(1 g) = 9.73 W/kg; SAR(10 g) = 5.11 W/kg<br>Smallest distance from peaks to all points 3 dB below = 10 mm<br>Ratio of SAR at M2 to SAR at M1 = 54%<br>Maximum value of SAR (measured) = 15.2 W/kg                                                          |  |       |  |
|                                                                                                                                                                                                                                                                                                                                                                                |  |       |  |
| <b>Impedance Measurement Plot for Head TSL</b>                                                                                                                                                                                                                                                                                                                                                                                                                    |  |       |  |
|                                                                                                                                                                                                                                                                                                                                                                               |  |       |  |

Certificate No: Z22-60105 Page 6 of 6

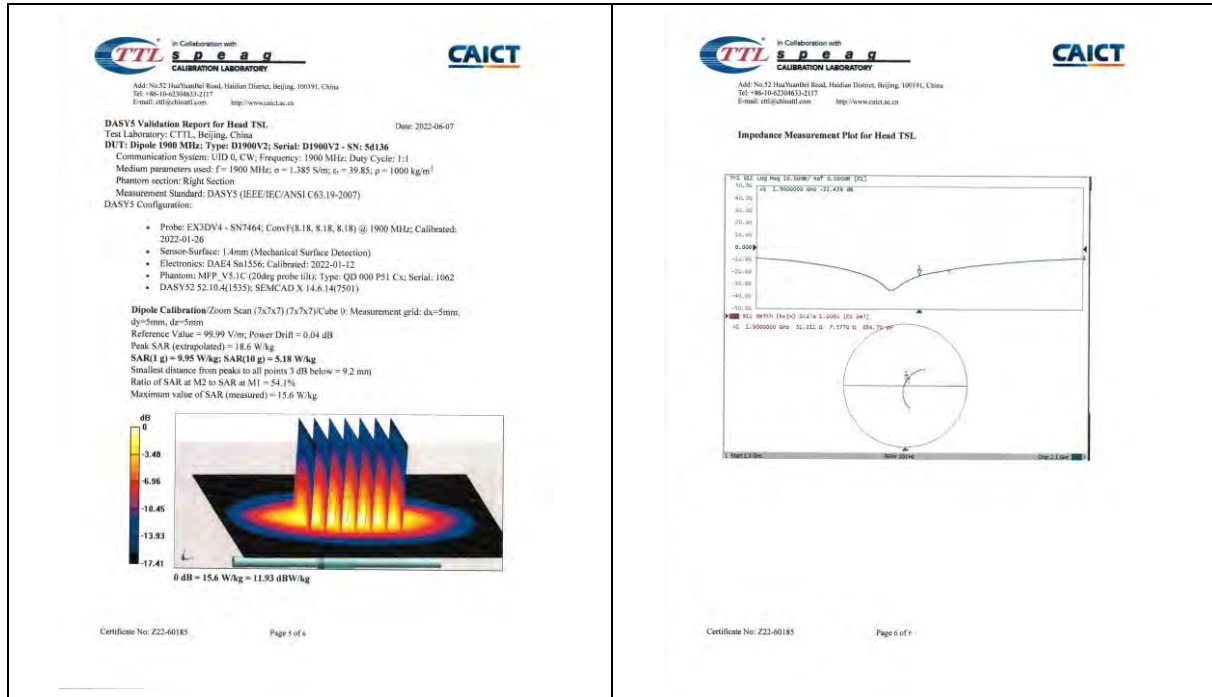
## 1.5 D1900V2 - SN 5d136

| TTL Calibration Laboratory                                                                                                                                                                                                                                                 |                                                                    | CAICT                                                                                                                |                        |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------|------------------------|
| Add: No. 52 Huayuan Road, Haidian District, Beijing, 100191<br>Tel: +86-10-4204632-2117<br>E-mail: csl@ttslab.com.cn                                                                                                                                                       |                                                                    | Add: No. 52 Huayuan Road, Haidian District, Beijing, 100191<br>Tel: +86-10-4204632-2117<br>E-mail: csl@ttslab.com.cn |                        |
| Client: SGS-CN                                                                                                                                                                                                                                                             | Certificate No: Z22-60185                                          |                                                                                                                      |                        |
| <b>CALIBRATION CERTIFICATE</b>                                                                                                                                                                                                                                             |                                                                    |                                                                                                                      |                        |
| Object                                                                                                                                                                                                                                                                     | D1900V2 - SN 5d136                                                 |                                                                                                                      |                        |
| Calibration Procedure(s)                                                                                                                                                                                                                                                   | FF-Z11-003-01<br>Calibration Procedures for dipole validation kits |                                                                                                                      |                        |
| Calibration date:                                                                                                                                                                                                                                                          | June 7, 2022                                                       |                                                                                                                      |                        |
| This calibration Certificate documents the traceability to national standards, which realize the physical units of measurements (SI). The measurements and the uncertainties with confidence probability are given on the following pages and are part of the certificate. |                                                                    |                                                                                                                      |                        |
| All calibrations have been conducted in the closed laboratory facility; environment temperature (22±0.5)°C and humidity <70%.                                                                                                                                              |                                                                    |                                                                                                                      |                        |
| Calibration Equipment used (M&E critical for calibration)                                                                                                                                                                                                                  |                                                                    |                                                                                                                      |                        |
| Primary Standards                                                                                                                                                                                                                                                          | ID #                                                               | Cal Date (Calibrated by: Certificate No.)                                                                            | Scheduled Calibration  |
| Power Meter NRP2                                                                                                                                                                                                                                                           | 106277                                                             | 24-Sep-21 (CTTL No. J21X08326)                                                                                       | Sep-22                 |
| Power sensor NRP65                                                                                                                                                                                                                                                         | 104291                                                             | 24-Sep-21 (CTTL No. J21X08326)                                                                                       | Sep-22                 |
| Reference Probe EXSDV4                                                                                                                                                                                                                                                     | SN 1404                                                            | 28-Jan-22 (SPEAG No. EX3-7464_Jan22)                                                                                 | Jan-23                 |
| DAEA                                                                                                                                                                                                                                                                       | SN 1558                                                            | 12-Jan-22 (CTTL-SPEAG No. Z22-60007)                                                                                 | Jan-23                 |
| Secondary Standards                                                                                                                                                                                                                                                        | ID #                                                               | Cal Date (Calibrated by: Certificate No.)                                                                            | Scheduled Calibration  |
| Signal Generator E4438C                                                                                                                                                                                                                                                    | MY48071430                                                         | 13-Jan-22 (CTTL No. J22X00409)                                                                                       | Jan-23                 |
| Network Analyzer E5071C                                                                                                                                                                                                                                                    | MY48110073                                                         | 14-Jan-22 (CTTL No. J22X00406)                                                                                       | Jan-23                 |
| Calibrated by:                                                                                                                                                                                                                                                             | Name: Zhao Jing                                                    | Function: SAR Test Engineer                                                                                          | Signature: [Signature] |
| Reviewed by:                                                                                                                                                                                                                                                               | Name: Lin Hao                                                      | Function: SAR Test Engineer                                                                                          | Signature: [Signature] |
| Approved by:                                                                                                                                                                                                                                                               | Name: Qi Dianyan                                                   | Function: SAR Project Leader                                                                                         | Signature: [Signature] |
| Issued: June 13, 2022                                                                                                                                                                                                                                                      |                                                                    |                                                                                                                      |                        |
| The calibration certificate shall not be reproduced except in full without written approval of the laboratory.                                                                                                                                                             |                                                                    |                                                                                                                      |                        |
| Certificate No: Z22-60185                                                                                                                                                                                                                                                  |                                                                    | Page 1 of 8                                                                                                          |                        |

| TTL Calibration Laboratory                                                                                           |                          | CAICT                                                                                                                |                   |
|----------------------------------------------------------------------------------------------------------------------|--------------------------|----------------------------------------------------------------------------------------------------------------------|-------------------|
| Add: No. 52 Huayuan Road, Haidian District, Beijing, 100191<br>Tel: +86-10-4204632-2117<br>E-mail: csl@ttslab.com.cn |                          | Add: No. 52 Huayuan Road, Haidian District, Beijing, 100191<br>Tel: +86-10-4204632-2117<br>E-mail: csl@ttslab.com.cn |                   |
| <b>Measurement Conditions</b><br>QAS system configuration, as far as not given on page 1:                            |                          |                                                                                                                      |                   |
| DASY Version                                                                                                         | DASY52                   | 52.10.4                                                                                                              |                   |
| Extrapolation                                                                                                        | Advanced Extrapolation   |                                                                                                                      |                   |
| Phantom                                                                                                              | Triple Flat Phantom 5.1C |                                                                                                                      |                   |
| Distance Dipole Center - TSL                                                                                         | 10 mm                    | with Spacer                                                                                                          |                   |
| Zoom Scan Resolution                                                                                                 | dx, dy, dz = 5 mm        |                                                                                                                      |                   |
| Frequency                                                                                                            | 1900 MHz ± 1 MHz         |                                                                                                                      |                   |
| <b>Head TSL parameters</b><br>The following parameters and calculations were applied:                                |                          |                                                                                                                      |                   |
|                                                                                                                      | Temperature              | Permittivity                                                                                                         | Conductivity      |
| Nominal Head TSL parameters                                                                                          | 22.0 °C                  | 45.0                                                                                                                 | 1.40 nS/m         |
| Measured Head TSL parameters                                                                                         | (22.0 ± 0.3) °C          | 39.9 ± 0.5 %                                                                                                         | 1.39 nS/m ± 0.5 % |
| Head TSL temperature change during test                                                                              | +1.0 °C                  |                                                                                                                      |                   |
| <b>SAR result with Head TSL</b>                                                                                      |                          |                                                                                                                      |                   |
| SAR averaged over 1 cm <sup>2</sup> (1 g) of Head TSL                                                                | Condition:               |                                                                                                                      |                   |
| SAR measured                                                                                                         | 250 mW input power       | 9.65 W/kg                                                                                                            |                   |
| SAR for nominal Head TSL parameters                                                                                  | normalized to 1W         | 40.0 W/kg ± 16.8 % (k=2)                                                                                             |                   |
| SAR averaged over 10 cm <sup>2</sup> (10 g) of Head TSL                                                              | Condition:               |                                                                                                                      |                   |
| SAR measured                                                                                                         | 250 mW input power       | 5.18 W/kg                                                                                                            |                   |
| SAR for nominal Head TSL parameters                                                                                  | normalized to 1W         | 20.8 W/kg ± 16.7 % (k=2)                                                                                             |                   |
| Certificate No: Z22-60185                                                                                            |                          | Page 3 of 8                                                                                                          |                   |

| TTL Calibration Laboratory                                                                                                                                                                                                                                                                                            |                                 | CAICT                                                                                                                |  |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------|----------------------------------------------------------------------------------------------------------------------|--|
| Add: No. 52 Huayuan Road, Haidian District, Beijing, 100191<br>Tel: +86-10-4204632-2117<br>E-mail: csl@ttslab.com.cn                                                                                                                                                                                                  |                                 | Add: No. 52 Huayuan Road, Haidian District, Beijing, 100191<br>Tel: +86-10-4204632-2117<br>E-mail: csl@ttslab.com.cn |  |
| <b>Glossary:</b>                                                                                                                                                                                                                                                                                                      |                                 |                                                                                                                      |  |
| TSL                                                                                                                                                                                                                                                                                                                   | Issue simulating liquid         |                                                                                                                      |  |
| ConF                                                                                                                                                                                                                                                                                                                  | sensitivity in TSL / NORM x y z |                                                                                                                      |  |
| N/A                                                                                                                                                                                                                                                                                                                   | not applicable or not measured  |                                                                                                                      |  |
| <b>Calibration is Performed According to the Following Standards:</b>                                                                                                                                                                                                                                                 |                                 |                                                                                                                      |  |
| a) IEC/IEEE 62209-1528, "Measurement Procedure for The Assessment of Specific Absorption Rate of Human Exposure to Radio Frequency Fields from Hand-held and Body-mounted Wireless Communication Devices- Part 1528: Human Models, Instrumentation and Procedures (Frequency range of 4 MHz to 10 GHz)", October 2020 |                                 |                                                                                                                      |  |
| b) KDB 855884, "SAR Measurement Requirements for 100 MHz to 6 GHz"                                                                                                                                                                                                                                                    |                                 |                                                                                                                      |  |
| <b>Additional Documentation:</b>                                                                                                                                                                                                                                                                                      |                                 |                                                                                                                      |  |
| c) DASY4/5 System Handbook                                                                                                                                                                                                                                                                                            |                                 |                                                                                                                      |  |
| <b>Methods Applied and Interpretation of Parameters:</b>                                                                                                                                                                                                                                                              |                                 |                                                                                                                      |  |
| • <b>Measurement Conditions:</b> 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.                                                                                                                  |                                 |                                                                                                                      |  |
| • <b>Antenna Parameters with TSL:</b> 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.                                                                                                |                                 |                                                                                                                      |  |
| • <b>Feed Point Impedance and Return Loss:</b> 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.       |                                 |                                                                                                                      |  |
| • <b>Electrical Delay:</b> One-way delay between the SMA connector and the antenna feed point. No uncertainty required.                                                                                                                                                                                               |                                 |                                                                                                                      |  |
| • <b>SAR measured:</b> SAR measured at the stated antenna input power.                                                                                                                                                                                                                                                |                                 |                                                                                                                      |  |
| • <b>SAR normalized:</b> SAR as measured, normalized to an input power of 1 W at the antenna connector.                                                                                                                                                                                                               |                                 |                                                                                                                      |  |
| • <b>SAR for nominal TSL parameters:</b> The measured TSL parameters are used to calculate the nominal SAR result.                                                                                                                                                                                                    |                                 |                                                                                                                      |  |
| The reported uncertainty of measurement is stated as the standard uncertainty of Measurement multiplied by the coverage factor k=2, which for a normal distribution corresponds to a coverage probability of approximately 95%.                                                                                       |                                 |                                                                                                                      |  |
| Certificate No: Z22-60185                                                                                                                                                                                                                                                                                             |                                 | Page 2 of 8                                                                                                          |  |

| TTL Calibration Laboratory                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                 | CAICT                                                                                                                |  |
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| Add: No. 52 Huayuan Road, Haidian District, Beijing, 100191<br>Tel: +86-10-4204632-2117<br>E-mail: csl@ttslab.com.cn                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                 | Add: No. 52 Huayuan Road, Haidian District, Beijing, 100191<br>Tel: +86-10-4204632-2117<br>E-mail: csl@ttslab.com.cn |  |
| <b>Appendix (Additional assessments outside the scope of CNAS L0570)</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                 |                                                                                                                      |  |
| <b>Antenna Parameters with Head TSL</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                 |                                                                                                                      |  |
| Impedance, transformed to feed point                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 51.5Ω ± 1.5Ω(j) |                                                                                                                      |  |
| Return Loss                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 22.4dB          |                                                                                                                      |  |
| <b>General Antenna Parameters and Design</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                 |                                                                                                                      |  |
| Electrical Delay (one direction)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 1.108 ns        |                                                                                                                      |  |
| After long term use with 100W radiated power, only a slight warming of the dipole near the feed-point can be measured.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                 |                                                                                                                      |  |
| The dipole is made of standard semirigid coaxial cable. The center conductor of the feeding line is directly connected to the second arm of the dipole. The antenna is therefore short-circuited for DC signals. On some of the dipoles, small caps are added to the dipole arms in order to improve matching when loaded according to the position as 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. |                 |                                                                                                                      |  |
| <b>Additional EUT Data</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                 |                                                                                                                      |  |
| Manufactured by                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | SPEAG           |                                                                                                                      |  |
| Certificate No: Z22-60185                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                 | Page 4 of 8                                                                                                          |  |



## 1.6 D2000V2 - SN 1041

**TTL Speaq** Calibration Laboratory  
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**CAICT**

**Client: SGS-CN Certificate No: Z22-60186**

**CALIBRATION CERTIFICATE**

Object: D2000V2 - SN 1041

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

Calibration date: June 6, 2022

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

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

Calibration Equipment used (MATE critical for calibration)

| Primary Standards      | ID #    | Cal Date (Calibrated by Certificate No.) | Scheduled Calibration |
|------------------------|---------|------------------------------------------|-----------------------|
| Power Meter NRP2       | 106277  | 24-Sep-21 (CTTL No. J21K08328)           | Sep-22                |
| Power sensor NRP5      | 104291  | 24-Sep-21 (CTTL No. J21K08328)           | Sep-22                |
| Reference Probe EX3DV4 | SN 7464 | 26-Jan-22 (SPEAQ No. EX3-7464_Jan22)     | Jan-23                |
| DAE4                   | SN 1556 | 12-Jan-22 (CTTL-SPEAQ No. Z22-60007)     | Jan-23                |

| Secondary Standards     | ID #       | Cal Date (Calibrated by Certificate No.) | Scheduled Calibration |
|-------------------------|------------|------------------------------------------|-----------------------|
| Signal Generator E4438C | MY49071430 | 13-Jan-22 (CTTL No. Z22K00408)           | Jan-23                |
| Network Analyzer E5071C | MY46110673 | 14-Jan-22 (CTTL No. Z22K00408)           | Jan-23                |

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

Issued: June 13, 2022

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Certificate No: Z22-60186 Page 1 of 6

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E-mail: ttl@ttspeaq.com http://www.ttspeaq.com

**CAICT**

**Glossary:**  
TSL: Issue simulating liquid  
ConvF: sensitivity in TSL / NORM x y,z  
N/A: not applicable or not measured

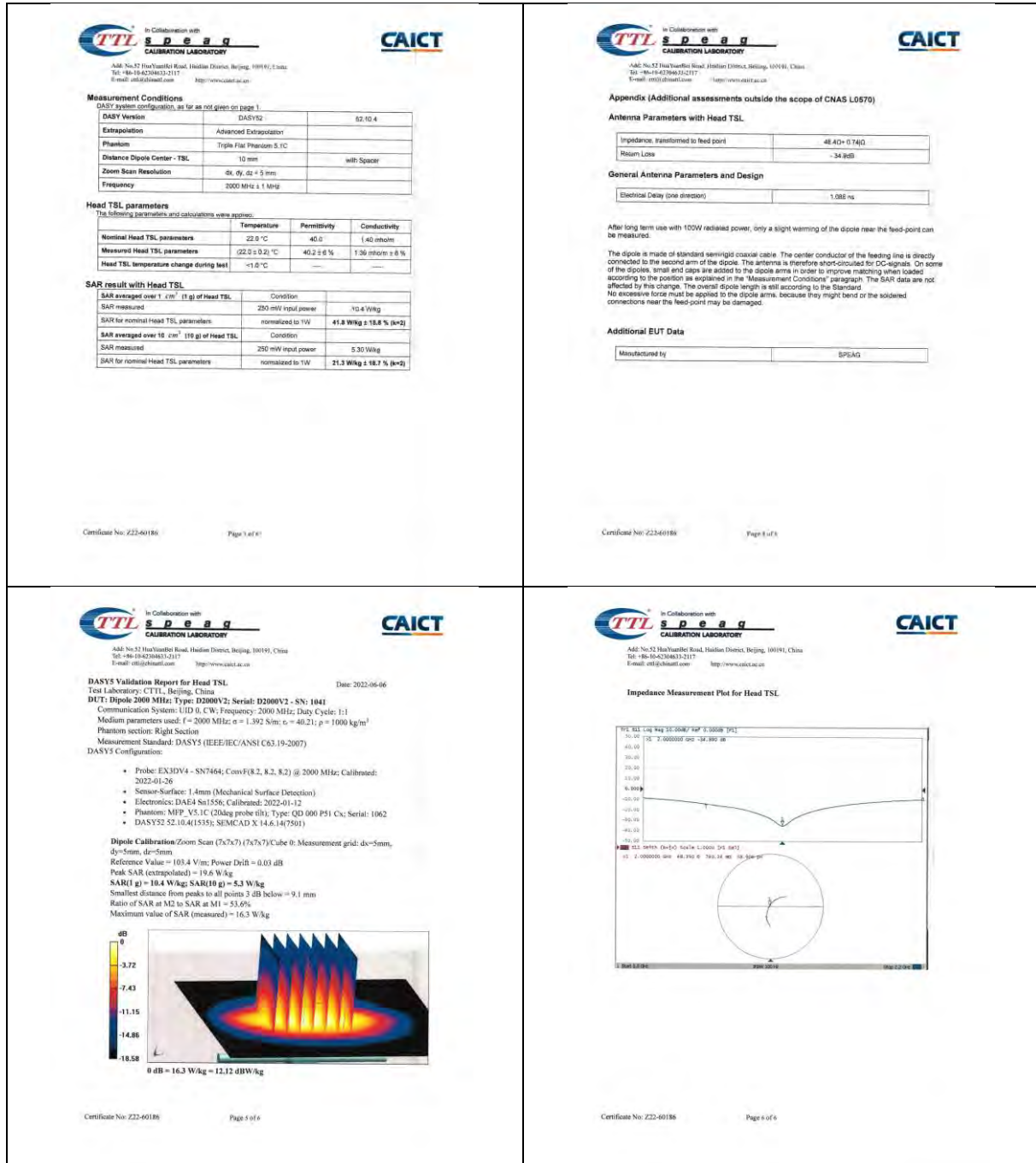
**Calibration is Performed According to the Following Standards:**  
a) IEC/IEEE 62209-1528, "Measurement Procedure for The Assessment of Specific Absorption Rate of Human Exposure to Radio Frequency Fields from Hand-Head and Body-Mounted Wireless Communication Devices: Part 1528 Human Models, Instrumentation and Procedures (Frequency range of 4 MHz to 10 GHz)", October 2020  
b) KDB 865564, "SAR Measurement Requirements for 100 MHz to 6 GHz"

**Additional Documentation:**  
c) DASY4/S System Handbook

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

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

Certificate No: Z22-60186 Page 2 of 6



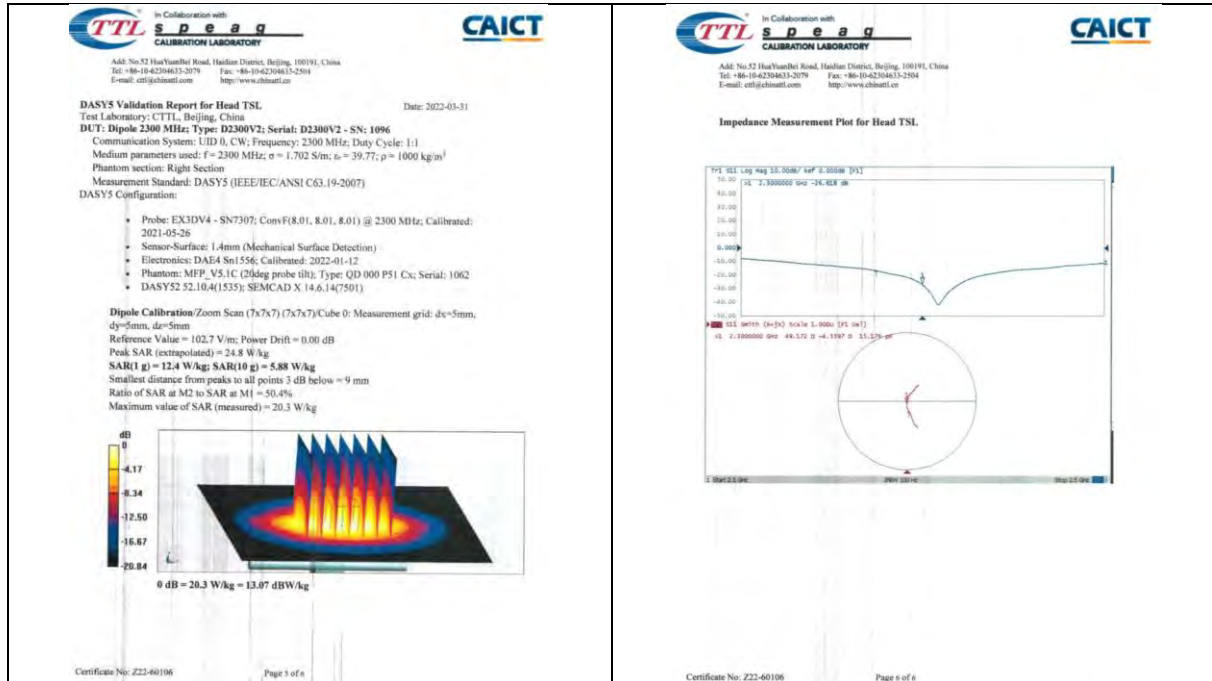
## 1.7 D2300V2 - SN 1096

| TTL Speaq CALIBRATION LABORATORY                                                                                                                                                                                                                                           |                                                                    | CAICT                                                                                                                                                                        |                       |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|
| Add: No.52 HuaYuanbei Road, Haidian District, Beijing, 100191<br>Tel: +86-10-62304633-2512 Fax: +86-10-62304633-2504<br>E-mail: cti@chinaul.com http://www.chinaul.cn                                                                                                      |                                                                    | Add: No.52 HuaYuanbei Road, Haidian District, Beijing, 100191, China<br>Tel: +86-10-62304633-2079 Fax: +86-10-62304633-2504<br>E-mail: cti@chinaul.com http://www.chinaul.cn |                       |
| Client                                                                                                                                                                                                                                                                     | SGS-CN                                                             | Certificate No.                                                                                                                                                              | Z22-60106             |
| <b>CALIBRATION CERTIFICATE</b>                                                                                                                                                                                                                                             |                                                                    |                                                                                                                                                                              |                       |
| Object                                                                                                                                                                                                                                                                     | D2300V2 - SN 1096                                                  |                                                                                                                                                                              |                       |
| Calibration Procedure(s)                                                                                                                                                                                                                                                   | FF-Z11-003-01<br>Calibration Procedures for dipole validation kits |                                                                                                                                                                              |                       |
| Calibration date:                                                                                                                                                                                                                                                          | March 31, 2022                                                     |                                                                                                                                                                              |                       |
| This calibration Certificate documents the traceability to national standards, which realize the physical units of measurements (SI). The measurements and the uncertainties with confidence probability are given on the following pages and are part of the certificate. |                                                                    |                                                                                                                                                                              |                       |
| All calibrations have been conducted in the closed laboratory facility: environment temperature (22±3)°C and humidity <70%.                                                                                                                                                |                                                                    |                                                                                                                                                                              |                       |
| Calibration Equipment used (M&TE critical for calibration)                                                                                                                                                                                                                 |                                                                    |                                                                                                                                                                              |                       |
| Primary Standards                                                                                                                                                                                                                                                          | ID #                                                               | Cal Date (Calibrated by Certificate No.)                                                                                                                                     | Scheduled Calibration |
| Power Meter NRP2                                                                                                                                                                                                                                                           | 106277                                                             | 24-Sep-21 (CTTL No.J21X08328)                                                                                                                                                | Sep-22                |
| Power sensor NRP8                                                                                                                                                                                                                                                          | 104291                                                             | 24-Sep-21 (CTTL No.J21X08328)                                                                                                                                                | Sep-22                |
| Reference Probe EX3DV4                                                                                                                                                                                                                                                     | SN 7307                                                            | 26-May-21 (SPEAG No.EK3-7307_May21)                                                                                                                                          | May-22                |
| DAE4                                                                                                                                                                                                                                                                       | SN 1556                                                            | 12-Jan-22 (CTTL-SPEAG No.Z22-60007)                                                                                                                                          | Jan-23                |
| Secondary Standards                                                                                                                                                                                                                                                        | ID #                                                               | Cal Date (Calibrated by Certificate No.)                                                                                                                                     | Scheduled Calibration |
| Signal Generator E4438C                                                                                                                                                                                                                                                    | MY49071430                                                         | 13-Jan-22 (CTTL No.J22X00406)                                                                                                                                                | Jan-23                |
| Network Analyzer E5071C                                                                                                                                                                                                                                                    | MY48110673                                                         | 14-Jan-22 (CTTL No.J22X00406)                                                                                                                                                | Jan-23                |
| Calibrated by:                                                                                                                                                                                                                                                             | Name                                                               | Function                                                                                                                                                                     | Signature             |
|                                                                                                                                                                                                                                                                            | Zhao Jing                                                          | SAR Test Engineer                                                                                                                                                            |                       |
| Reviewed by:                                                                                                                                                                                                                                                               | Lin Hao                                                            | SAR Test Engineer                                                                                                                                                            |                       |
| Approved by:                                                                                                                                                                                                                                                               | Qi Diqiyuan                                                        | SAR Project Leader                                                                                                                                                           |                       |
| Issued: April 6, 2022                                                                                                                                                                                                                                                      |                                                                    |                                                                                                                                                                              |                       |
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| Certificate No: Z22-60106                                                                                                                                                                                                                                                  |                                                                    | Page 1 of 6                                                                                                                                                                  |                       |

| TTL Speaq CALIBRATION LABORATORY                                                                                                                                             |                          | CAICT                                                                                                                                                                        |                  |
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| <b>Measurement Conditions</b><br>DASY system configuration, as far as not given on page 1:                                                                                   |                          |                                                                                                                                                                              |                  |
| DASY Version                                                                                                                                                                 | DASY2                    | 52.10.4                                                                                                                                                                      |                  |
| Extrapolation                                                                                                                                                                | Advanced Extrapolation   |                                                                                                                                                                              |                  |
| Phantom                                                                                                                                                                      | Triple Flat Phantom 5.1C |                                                                                                                                                                              |                  |
| Distance Dipole Center - TSL                                                                                                                                                 | 10 mm                    | with Spacer                                                                                                                                                                  |                  |
| Zoom Scan Resolution                                                                                                                                                         | dx, dy, dz = 5 mm        |                                                                                                                                                                              |                  |
| Frequency                                                                                                                                                                    | 2300 MHz ± 1 MHz         |                                                                                                                                                                              |                  |
| <b>Head TSL parameters</b><br>The following parameters and calculations were applied:                                                                                        |                          |                                                                                                                                                                              |                  |
|                                                                                                                                                                              | Temperature              | Permittivity                                                                                                                                                                 | Conductivity     |
| Nominal Head TSL parameters                                                                                                                                                  | 22.0 °C                  | 39.5                                                                                                                                                                         | 1.67 mho/m       |
| Measured Head TSL parameters                                                                                                                                                 | (22.0 ± 0.2) °C          | 39.8 ± 9 %                                                                                                                                                                   | 1.70 mho/m ± 6 % |
| Head TSL temperature change during test                                                                                                                                      | <1.0 °C                  | —                                                                                                                                                                            |                  |
| <b>SAR result with Head TSL</b>                                                                                                                                              |                          |                                                                                                                                                                              |                  |
| SAR averaged over 1 cm <sup>2</sup> (1 g) of Head TSL                                                                                                                        | Condition                |                                                                                                                                                                              |                  |
| SAR measured                                                                                                                                                                 | 250 mW input power       | 12.4 W/kg                                                                                                                                                                    |                  |
| SAR for nominal Head TSL parameters                                                                                                                                          | normalized to 1W         | 49.2 W/kg ± 18.8 % (k=2)                                                                                                                                                     |                  |
| SAR averaged over 10 cm <sup>2</sup> (10 g) of Head TSL                                                                                                                      | Condition                |                                                                                                                                                                              |                  |
| SAR measured                                                                                                                                                                 | 250 mW input power       | 5.88 W/kg                                                                                                                                                                    |                  |
| SAR for nominal Head TSL parameters                                                                                                                                          | normalized to 1W         | 23.4 W/kg ± 18.7 % (k=2)                                                                                                                                                     |                  |
| Certificate No: Z22-60106                                                                                                                                                    |                          | Page 3 of 6                                                                                                                                                                  |                  |

| TTL Speaq CALIBRATION LABORATORY                                                                                                                                                                                                                                                                                      |                                | CAICT                                                                                                                                                                        |  |
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| <b>Glossary:</b>                                                                                                                                                                                                                                                                                                      |                                |                                                                                                                                                                              |  |
| TSL                                                                                                                                                                                                                                                                                                                   | Issue simulating liquid        |                                                                                                                                                                              |  |
| ConvF                                                                                                                                                                                                                                                                                                                 | sensitivity in TSL / NCFMx,y,z |                                                                                                                                                                              |  |
| N/A                                                                                                                                                                                                                                                                                                                   | not applicable or not measured |                                                                                                                                                                              |  |
| <b>Calibration is Performed According to the Following Standards:</b>                                                                                                                                                                                                                                                 |                                |                                                                                                                                                                              |  |
| a) IEC/IEEE 62209-1528, "Measurement Procedure for The Assessment of Specific Absorption Rate of Human Exposure to Radio Frequency Fields from Hand-held and Body-mounted Wireless Communication Devices- Part 1528 Human Models, Instrumentation and Procedures (Frequency range of 4 MHz to 10 GHz)", October 2020. |                                |                                                                                                                                                                              |  |
| b) KDB 855664, "SAR Measurement Requirements for 100 MHz to 6 GHz"                                                                                                                                                                                                                                                    |                                |                                                                                                                                                                              |  |
| <b>Additional Documentation:</b>                                                                                                                                                                                                                                                                                      |                                |                                                                                                                                                                              |  |
| c) DASY4/5 System Handbook                                                                                                                                                                                                                                                                                            |                                |                                                                                                                                                                              |  |
| <b>Methods Applied and Interpretation of Parameters:</b>                                                                                                                                                                                                                                                              |                                |                                                                                                                                                                              |  |
| • <b>Measurement Conditions:</b> 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.                                                                                                                  |                                |                                                                                                                                                                              |  |
| • <b>Antenna Parameters with TSL:</b> 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.                                                                                                |                                |                                                                                                                                                                              |  |
| • <b>Feed Point Impedance and Return Loss:</b> 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.       |                                |                                                                                                                                                                              |  |
| • <b>Electrical Delay:</b> One-way delay between the SMA connector and the antenna feed point. No uncertainty required.                                                                                                                                                                                               |                                |                                                                                                                                                                              |  |
| • <b>SAR measured:</b> SAR measured at the stated antenna input power.                                                                                                                                                                                                                                                |                                |                                                                                                                                                                              |  |
| • <b>SAR normalized:</b> SAR as measured, normalized to an input power of 1 W at the antenna connector.                                                                                                                                                                                                               |                                |                                                                                                                                                                              |  |
| • <b>SAR for nominal TSL parameters:</b> The measured TSL parameters are used to calculate the nominal SAR result.                                                                                                                                                                                                    |                                |                                                                                                                                                                              |  |
| The reported uncertainty of measurement is stated as the standard uncertainty of Measurement multiplied by the coverage factor k=2, which for a normal distribution corresponds to a coverage probability of approximately 95%.                                                                                       |                                |                                                                                                                                                                              |  |
| Certificate No: Z22-60106                                                                                                                                                                                                                                                                                             |                                | Page 2 of 6                                                                                                                                                                  |  |

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| <b>Appendix (Additional assessments outside the scope of CNAS L0570)</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                |                                                                                                                                                                              |  |
| <b>Antenna Parameters with Head TSL</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                |                                                                                                                                                                              |  |
| Impedance, transformed to feed point                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 49.20 - 4.59jΩ |                                                                                                                                                                              |  |
| Return Loss                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | -26.66dB       |                                                                                                                                                                              |  |
| <b>General Antenna Parameters and Design</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                |                                                                                                                                                                              |  |
| Electrical Delay (one direction)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 1.083 ns       |                                                                                                                                                                              |  |
| After long term use with 100W radiated power, only a slight warming of the dipole near the feed-point can be measured.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                |                                                                                                                                                                              |  |
| The dipole is made of standard semirigid coaxial cable. The center conductor of the feeding line is directly connected to the second arm of the dipole. The antenna is therefore short-circuited for DC-signals. On some of the dipoles, small end caps are added to the dipole arms in order to improve matching when backed according to the position as explained in the "Measurement Conditions" paragraph. The SAR data are not affected by this change. The overall dipole length is still according to the Standard. No excessive force must be applied to the dipole arms, because they might bend or the soldered connections near the feed-point may be damaged. |                |                                                                                                                                                                              |  |
| <b>Additional EUT Data</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                |                                                                                                                                                                              |  |
| Manufactured by                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | SPEAG          |                                                                                                                                                                              |  |
| Certificate No: Z22-60106                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                | Page 4 of 6                                                                                                                                                                  |  |



## 1.8 D2450V2 - SN 817

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**CAICT**

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

**CALIBRATION CERTIFICATE**

Object: **D2450V2 - SN 817**

Calibration Procedure(s): **FF-Z1(1-003-3)**  
Calibration Procedures for dipole validation kits

Calibration date: **April 1, 2022**

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

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

Calibration Equipment used (M&TE critical for calibration)

| Primary Standards      | ID #    | Cal Date (Calibrated by: Certificate No.) | Scheduled Calibration |
|------------------------|---------|-------------------------------------------|-----------------------|
| Power Meter: NRP2      | 106277  | 24-Sep-21 (CTTL No.J21X08320)             | Sep-22                |
| Power sensor: NRP8S    | 104291  | 24-Sep-21 (CTTL No.J21X08320)             | Sep-22                |
| Reference Probe EX3DV4 | SN 7307 | 25-May-21(SPEAG No EX3-7307_May21)        | May-22                |
| DAE4                   | SN 1555 | 12-Jan-22(CTTL-SPEAG No Z22-60007)        | Jan-23                |

| Secondary Standards     | ID #       | Cal Date (Calibrated by: Certificate No.) | Scheduled Calibration |
|-------------------------|------------|-------------------------------------------|-----------------------|
| Signal Generator E4438C | MY49071430 | 13-Jan-22 (CTTL No. J22X00409)            | Jan-23                |
| Network Analyzer E5071C | MY46110873 | 14-Jan-22 (CTTL No. J22X00406)            | Jan-23                |

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

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

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

Issued: April 6, 2022

This calibration certificate shall not be reproduced except in full without written approval of the laboratory.

Certificate No: Z22-60107 Page 1 of 5

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Glossary:

TSL: tissue simulating liquid  
ConvF: sensitivity in TSL / NORMix.y.z  
N/A: not applicable or not measured

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

a) IEC/IEEE 62209-1528, "Measurement Procedure for The Assessment of Specific Absorption Rate of Human Exposure to Radio Frequency Fields from Hand-held and Body-mounted Wireless Communication Devices- Part 1528: Human Models, Instrumentation and Procedures (Frequency range of 4 MHz to 10 GHz)", October 2020  
b) KDB 656684, "SAR Measurement Requirements for 100 MHz to 5 GHz"

**Additional Documentation:**

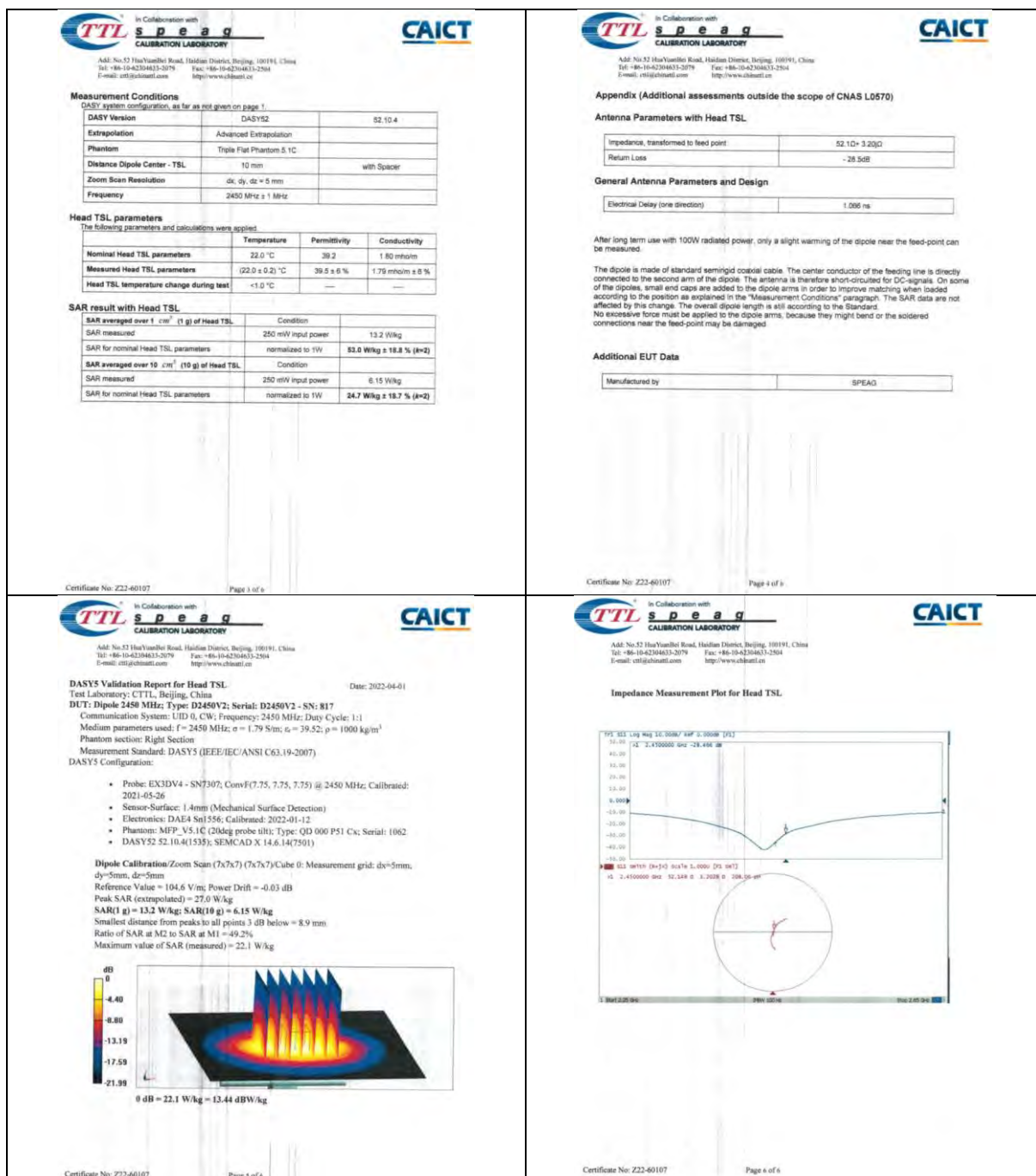
c) DASY4/5 System Handbook

**Methods Applied and Interpretation of Parameters:**

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

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

Certificate No: Z22-60107 Page 2 of 5



## 1.9 D2600V2 - SN 1158

| TTL S p e a g<br>CALIBRATION LABORATORY                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |             | CAICT                                                                                                                                                                                   |                       |                     |      |                                          |                       |                         |            |                                |        |                         |            |                                |        |                        |             |                                      |        |      |         |                                      |        |
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| Client: <b>SGS-CN</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |             | Certificate No: <b>Z22-60108</b>                                                                                                                                                        |                       |                     |      |                                          |                       |                         |            |                                |        |                         |            |                                |        |                        |             |                                      |        |      |         |                                      |        |
| <b>CALIBRATION CERTIFICATE</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |             |                                                                                                                                                                                         |                       |                     |      |                                          |                       |                         |            |                                |        |                         |            |                                |        |                        |             |                                      |        |      |         |                                      |        |
| Object: <b>D2600V2 - SN 1158</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |             |                                                                                                                                                                                         |                       |                     |      |                                          |                       |                         |            |                                |        |                         |            |                                |        |                        |             |                                      |        |      |         |                                      |        |
| Calibration Procedure(s): <b>FF-Z11-003-01</b><br>Calibration Procedures for dipole validation kits                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |             |                                                                                                                                                                                         |                       |                     |      |                                          |                       |                         |            |                                |        |                         |            |                                |        |                        |             |                                      |        |      |         |                                      |        |
| Calibration date: <b>March 31, 2022</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |             |                                                                                                                                                                                         |                       |                     |      |                                          |                       |                         |            |                                |        |                         |            |                                |        |                        |             |                                      |        |      |         |                                      |        |
| This calibration Certificate documents the traceability to national standards, which realize the physical units of measurements (SI). The measurements and the uncertainties with confidence probability are given on the following pages and are part of the certificate.                                                                                                                                                                                                                                                                                                                                                   |             |                                                                                                                                                                                         |                       |                     |      |                                          |                       |                         |            |                                |        |                         |            |                                |        |                        |             |                                      |        |      |         |                                      |        |
| All calibrations have been conducted in the closed laboratory facility: environment temperature (23±3)°C and humidity <70%.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |             |                                                                                                                                                                                         |                       |                     |      |                                          |                       |                         |            |                                |        |                         |            |                                |        |                        |             |                                      |        |      |         |                                      |        |
| Calibration Equipment used (MSTE critical for calibration)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |             |                                                                                                                                                                                         |                       |                     |      |                                          |                       |                         |            |                                |        |                         |            |                                |        |                        |             |                                      |        |      |         |                                      |        |
| <table border="1"><thead><tr><th>Primary Standards</th><th>ID #</th><th>Cal Date (Calibrated by Certificate No.)</th><th>Scheduled Calibration</th></tr></thead><tbody><tr><td>Power Meter NRP2</td><td>106377</td><td>24-Sep-21 (CTTL No. J21X08326)</td><td>Sep-22</td></tr><tr><td>Power sensor NRP8</td><td>104291</td><td>24-Sep-21 (CTTL No. J21X08326)</td><td>Sep-22</td></tr><tr><td>Reference Probe EX3DV4</td><td>SN 7307</td><td>26-May-21 (SPEAG No. EX3-7307_May21)</td><td>May-22</td></tr><tr><td>DAE4</td><td>SN 1556</td><td>12-Jan-22 (CTTL-SPEAG No. Z22-60007)</td><td>Jan-23</td></tr></tbody></table> |             |                                                                                                                                                                                         |                       | Primary Standards   | ID # | Cal Date (Calibrated by Certificate No.) | Scheduled Calibration | Power Meter NRP2        | 106377     | 24-Sep-21 (CTTL No. J21X08326) | Sep-22 | Power sensor NRP8       | 104291     | 24-Sep-21 (CTTL No. J21X08326) | Sep-22 | Reference Probe EX3DV4 | SN 7307     | 26-May-21 (SPEAG No. EX3-7307_May21) | May-22 | DAE4 | SN 1556 | 12-Jan-22 (CTTL-SPEAG No. Z22-60007) | Jan-23 |
| Primary Standards                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | ID #        | Cal Date (Calibrated by Certificate No.)                                                                                                                                                | Scheduled Calibration |                     |      |                                          |                       |                         |            |                                |        |                         |            |                                |        |                        |             |                                      |        |      |         |                                      |        |
| Power Meter NRP2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 106377      | 24-Sep-21 (CTTL No. J21X08326)                                                                                                                                                          | Sep-22                |                     |      |                                          |                       |                         |            |                                |        |                         |            |                                |        |                        |             |                                      |        |      |         |                                      |        |
| Power sensor NRP8                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 104291      | 24-Sep-21 (CTTL No. J21X08326)                                                                                                                                                          | Sep-22                |                     |      |                                          |                       |                         |            |                                |        |                         |            |                                |        |                        |             |                                      |        |      |         |                                      |        |
| Reference Probe EX3DV4                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | SN 7307     | 26-May-21 (SPEAG No. EX3-7307_May21)                                                                                                                                                    | May-22                |                     |      |                                          |                       |                         |            |                                |        |                         |            |                                |        |                        |             |                                      |        |      |         |                                      |        |
| DAE4                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | SN 1556     | 12-Jan-22 (CTTL-SPEAG No. Z22-60007)                                                                                                                                                    | Jan-23                |                     |      |                                          |                       |                         |            |                                |        |                         |            |                                |        |                        |             |                                      |        |      |         |                                      |        |
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| Secondary Standards                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | ID #        | Cal Date (Calibrated by Certificate No.)                                                                                                                                                | Scheduled Calibration |                     |      |                                          |                       |                         |            |                                |        |                         |            |                                |        |                        |             |                                      |        |      |         |                                      |        |
| Signal Generator E5436C                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | MY48071430  | 13-Jan-22 (CTTL No. J22X00409)                                                                                                                                                          | Jan-23                |                     |      |                                          |                       |                         |            |                                |        |                         |            |                                |        |                        |             |                                      |        |      |         |                                      |        |
| Network Analyzer E5071C                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | MY48110673  | 14-Jan-22 (CTTL No. J22X00409)                                                                                                                                                          | Jan-23                |                     |      |                                          |                       |                         |            |                                |        |                         |            |                                |        |                        |             |                                      |        |      |         |                                      |        |
| <table border="1"><thead><tr><th>Calibrated by:</th><th>Name</th><th>Function</th><th>Signature</th></tr></thead><tbody><tr><td></td><td>Zhao Jing</td><td>SAR Test Engineer</td><td></td></tr><tr><td>Reviewed by:</td><td>Lin Hao</td><td>SAR Test Engineer</td><td></td></tr><tr><td>Approved by:</td><td>Qi Dianyuan</td><td>SAR Project Leader</td><td></td></tr></tbody></table>                                                                                                                                                                                                                                       |             |                                                                                                                                                                                         |                       | Calibrated by:      | Name | Function                                 | Signature             |                         | Zhao Jing  | SAR Test Engineer              |        | Reviewed by:            | Lin Hao    | SAR Test Engineer              |        | Approved by:           | Qi Dianyuan | SAR Project Leader                   |        |      |         |                                      |        |
| Calibrated by:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Name        | Function                                                                                                                                                                                | Signature             |                     |      |                                          |                       |                         |            |                                |        |                         |            |                                |        |                        |             |                                      |        |      |         |                                      |        |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Zhao Jing   | SAR Test Engineer                                                                                                                                                                       |                       |                     |      |                                          |                       |                         |            |                                |        |                         |            |                                |        |                        |             |                                      |        |      |         |                                      |        |
| Reviewed by:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Lin Hao     | SAR Test Engineer                                                                                                                                                                       |                       |                     |      |                                          |                       |                         |            |                                |        |                         |            |                                |        |                        |             |                                      |        |      |         |                                      |        |
| Approved by:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Qi Dianyuan | SAR Project Leader                                                                                                                                                                      |                       |                     |      |                                          |                       |                         |            |                                |        |                         |            |                                |        |                        |             |                                      |        |      |         |                                      |        |
| Issued: April 6, 2022                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |             |                                                                                                                                                                                         |                       |                     |      |                                          |                       |                         |            |                                |        |                         |            |                                |        |                        |             |                                      |        |      |         |                                      |        |
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| Certificate No: Z22-60108                                                                                                                                                               |  |                                                                                                                                                                                         |  |
| Page 4 of 6                                                                                                                                                                             |  |                                                                                                                                                                                         |  |

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| Certificate No: Z22-60108                                                                                                                                                               |  |                                                                                                                                                                                         |  |
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**Measurement Conditions**  
DASY system configuration, as far as not given on page 1:

| Parameter                    | Value                    |
|------------------------------|--------------------------|
| DASY Version                 | DASY52                   |
| Extrapolation                | Advanced Extrapolation   |
| Phantom                      | Triple Flat Phantom S.1C |
| Distance Dipole Center - TSL | 10 mm with Spacer        |
| Zoom Scan Resolution         | dx, dy, dz = 5 mm        |
| Frequency                    | 2600 MHz ± 1 MHz         |

**Head TSL parameters**  
The following parameters and calculations were applied:

| Parameter                               | Value                                         |
|-----------------------------------------|-----------------------------------------------|
| Nominal Head TSL parameters             | 22.0 °C, 38.0, 1.96 mho/m                     |
| Measured Head TSL parameters            | (22.0 ± 0.2) °C, 38.7 ± 6 %, 1.96 mho/m ± 6 % |
| Head TSL temperature change during test | < ± 0.2 °C                                    |

**SAR result with Head TSL**

| Parameter                                   | Value                                      |
|---------------------------------------------|--------------------------------------------|
| SAR averaged over 1 cm² (1 g) of Head TSL   | Condition                                  |
| SAR measured                                | 250 mW input power, 13.7 W/kg              |
| SAR for nominal Head TSL parameters         | normalized to 1W, 54.8 W/kg ± 18.8 % (k=2) |
| SAR averaged over 10 cm² (10 g) of Head TSL | Condition                                  |
| SAR measured                                | 250 mW input power, 6.12 W/kg              |
| SAR for nominal Head TSL parameters         | normalized to 1W, 24.5 W/kg ± 18.7 % (k=2) |

**Glossary:**  
TSL: tissue simulating liquid  
ConvF: sensitivity in TSL / NORMx.y.z  
N/A: not applicable or not measured

**Calibration is Performed According to the Following Standards:**  
a) IEC/IEEE 62209-1528, "Measurement Procedure for The Assessment of Specific Absorption Rate of Human Exposure to Radio Frequency Fields from Hand-held and Body-mounted Wireless Communication Devices - Part 1528: Human Models, Instrumentation and Procedures (Frequency range of 4 MHz to 10 GHz)", October 2020  
b) KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

**Additional Documentation:**  
c) DASY4/S System Handbook

**Methods Applied and Interpretation of Parameters:**  
• **Measurement Conditions:** Further details are available from the Validation Report at the end of the certificate. All figures stated in the certificate are valid at the frequency indicated.  
• **Antenna 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%.

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

**Antenna Parameters with Head TSL**

| Parameter                            | Value         |
|--------------------------------------|---------------|
| Impedance, transformed to feed point | 49.9C- 6.48jC |
| Return Loss                          | -23.9dB       |

**General Antenna Parameters and Design**

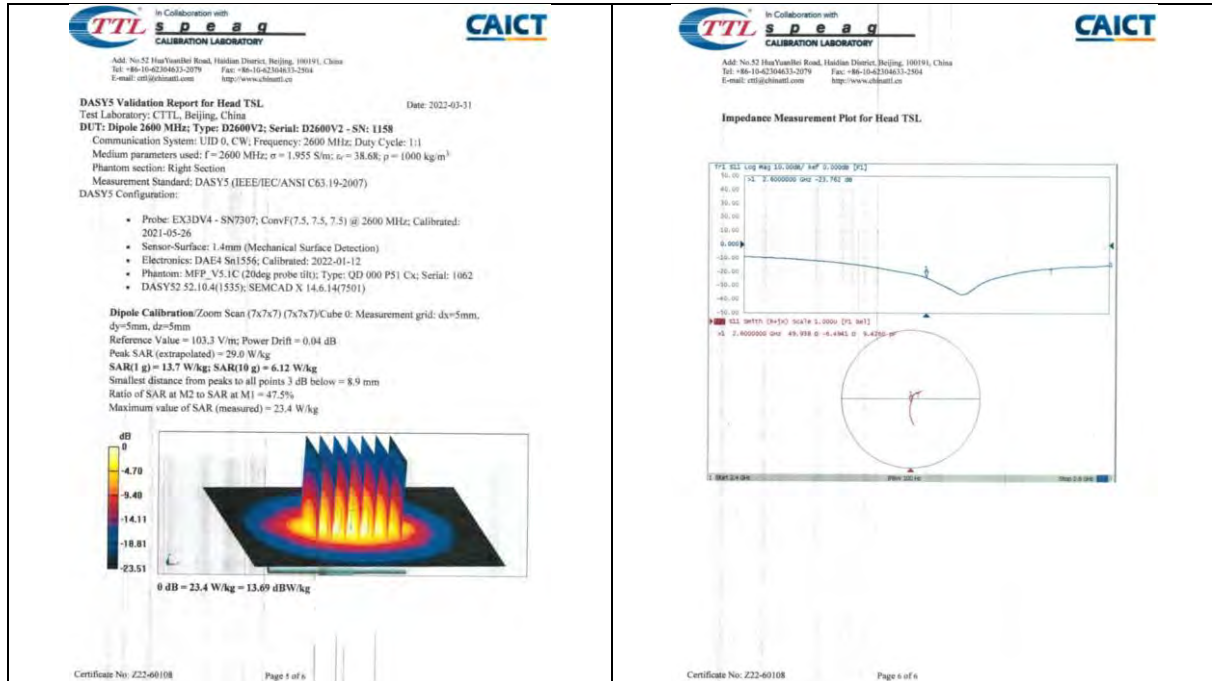
| Parameter                        | Value    |
|----------------------------------|----------|
| Electrical Delay (one direction) | 1.053 ns |

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

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

**Additional EUT Data**

| Parameter       | Value |
|-----------------|-------|
| Manufactured by | SPEAG |



## 1.10 D5GHZV2 - SN 1095

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**CAICT**

**Client: SGS-CN Certificate No: Z22-60187**

**CALIBRATION CERTIFICATE**

Object: D5GHZV2 - SN 1095

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

Calibration date: June 1, 2022

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

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

Calibration Equipment used (MSTE critical for calibration)

| Primary Standards      | ID #    | Cal Date (Calibrated by: Certificate No.) | Scheduled Calibration |
|------------------------|---------|-------------------------------------------|-----------------------|
| Power Meter NRP2       | 106277  | 24-Sep-21 (CTTL No. J21008328)            | Sep-22                |
| Power sensor NRP85     | 104291  | 24-Sep-21 (CTTL No. J21008328)            | Sep-22                |
| Reference Probe EX3DV4 | SN 7464 | 26-Jan-22 (SPEAG No. EX3-7464, Jan22)     | Jan-23                |
| DAE4                   | SN 1556 | 12-Jan-22 (CTTL-SPEAG No. Z22-60007)      | Jan-23                |

| Secondary Standards     | ID #       | Cal Date (Calibrated by: Certificate No.) | Scheduled Calibration |
|-------------------------|------------|-------------------------------------------|-----------------------|
| Signal Generator E4438C | MY48071430 | 13-Jan-22 (CTTL No. J22000409)            | Jan-23                |
| Network Analyzer E5071C | MY46110873 | 14-Jan-22 (CTTL No. J22000406)            | Jan-23                |

Calibrated by: Zhao Jing SAR Test Engineer

Reviewed by: Lin Hao SAR Test Engineer

Approved by: Qi Dianyan SAR Project Leader

Issued: June 8, 2022

This calibration certificate shall not be reproduced except in full without written approval of the laboratory.

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**Glossary:**

TSL: Issue simulating liquid

CompF: sensitivity in TSL + NORM x y z

N/A: not applicable or not measured

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

a) IEC/IEEE 62209-1528, "Measurement Procedure for The Assessment of Specific Absorption Rate of Human Exposure to Radio Frequency Fields from Hand-held and Body-mounted Wireless Communication Devices-Part 1528: Human Models, Instrumentation and Procedures (Frequency range of 4 MHz to 10 GHz)", October 2020

b) KDB 665664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

**Additional Documentation:**

c) DASY45 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%.

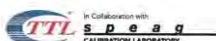
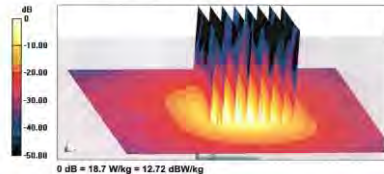
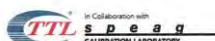
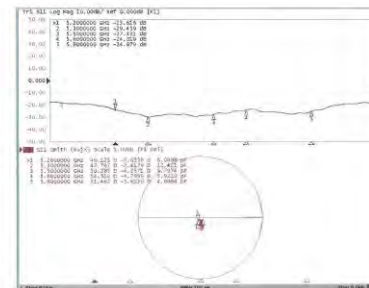
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| <b>Measurement Conditions</b><br>SAR system configuration, as far as not given on page 1.                                                     |                                                                              |                                  |                  |
| DASY Version                                                                                                                                  | DASY2                                                                        | 52.10.4                          |                  |
| Extrapolation                                                                                                                                 | Advanced Extrapolation                                                       |                                  |                  |
| Phantom                                                                                                                                       | Triple Flat Phantom S.1C                                                     |                                  |                  |
| Distance Dipole Center - TSL                                                                                                                  | 10 mm                                                                        | with Spacer                      |                  |
| Zoom Scan Resolution                                                                                                                          | dx, dy = 4 mm, dz = 1.4 mm                                                   | Graded Ratio = 1.4 (Z direction) |                  |
| Frequency                                                                                                                                     | 5000 MHz ± 1 MHz<br>5200 MHz ± 1 MHz<br>5300 MHz ± 1 MHz<br>5600 MHz ± 1 MHz |                                  |                  |
| <b>Head TSL parameters at 5200MHz</b><br>The following parameters and calculations were applied:                                              |                                                                              |                                  |                  |
| Nominal Head TSL parameters                                                                                                                   | Temperature                                                                  | Permittivity                     | Conductivity     |
|                                                                                                                                               | 22.0 °C                                                                      | 35.9                             | 4.76 mho/m       |
| Measured Head TSL parameters                                                                                                                  | (22.0 ± 0.2) °C                                                              | 35.2 ± 5 %                       | 4.73 mho/m ± 5 % |
| Head TSL temperature change during test                                                                                                       | <+1.0 °C                                                                     | —                                | —                |
| <b>SAR result with Head TSL at 5200MHz</b>                                                                                                    |                                                                              |                                  |                  |
| SAR averaged over 1 cm <sup>3</sup> (1 g) of Head TSL                                                                                         | Condition                                                                    |                                  |                  |
| SAR measured                                                                                                                                  | 100 mW input power                                                           | 7.79 W/kg                        |                  |
| SAR for nominal Head TSL parameters                                                                                                           | normalized to 1W                                                             | 77.9 W/kg ± 24.4 % (k=2)         |                  |
| SAR averaged over 10 cm <sup>3</sup> (10 g) of Head TSL                                                                                       | Condition                                                                    |                                  |                  |
| SAR measured                                                                                                                                  | 100 mW input power                                                           | 2.22 W/kg                        |                  |
| SAR for nominal Head TSL parameters                                                                                                           | normalized to 1W                                                             | 22.1 W/kg ± 24.2 % (k=2)         |                  |
| Certificate No: Z22-60187 Page 1 of 10                                                                                                        |                                                                              |                                  |                  |

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| <b>Head TSL parameters at 5300MHz</b><br>The following parameters and calculations were applied:                                              |                    |                          |                  |
| Nominal Head TSL parameters                                                                                                                   | Temperature        | Permittivity             | Conductivity     |
|                                                                                                                                               | 22.0 °C            | 35.9                     | 4.76 mho/m       |
| Measured Head TSL parameters                                                                                                                  | (22.0 ± 0.2) °C    | 35.2 ± 5 %               | 4.73 mho/m ± 5 % |
| Head TSL temperature change during test                                                                                                       | <+1.0 °C           | —                        | —                |
| <b>SAR result with Head TSL at 5300MHz</b>                                                                                                    |                    |                          |                  |
| SAR averaged over 1 cm <sup>3</sup> (1 g) of Head TSL                                                                                         | Condition          |                          |                  |
| SAR measured                                                                                                                                  | 100 mW input power | 7.84 W/kg                |                  |
| SAR for nominal Head TSL parameters                                                                                                           | normalized to 1W   | 78.1 W/kg ± 24.4 % (k=2) |                  |
| SAR averaged over 10 cm <sup>3</sup> (10 g) of Head TSL                                                                                       | Condition          |                          |                  |
| SAR measured                                                                                                                                  | 100 mW input power | 2.27 W/kg                |                  |
| SAR for nominal Head TSL parameters                                                                                                           | normalized to 1W   | 22.6 W/kg ± 24.2 % (k=2) |                  |
| <b>Head TSL parameters at 5500MHz</b><br>The following parameters and calculations were applied:                                              |                    |                          |                  |
| Nominal Head TSL parameters                                                                                                                   | Temperature        | Permittivity             | Conductivity     |
|                                                                                                                                               | 22.0 °C            | 35.8                     | 4.88 mho/m       |
| Measured Head TSL parameters                                                                                                                  | (22.0 ± 0.2) °C    | 34.8 ± 5 %               | 4.84 mho/m ± 5 % |
| Head TSL temperature change during test                                                                                                       | <+1.0 °C           | —                        | —                |
| <b>SAR result with Head TSL at 5500MHz</b>                                                                                                    |                    |                          |                  |
| SAR averaged over 1 cm <sup>3</sup> (1 g) of Head TSL                                                                                         | Condition          |                          |                  |
| SAR measured                                                                                                                                  | 100 mW input power | 8.26 W/kg                |                  |
| SAR for nominal Head TSL parameters                                                                                                           | normalized to 1W   | 82.6 W/kg ± 24.4 % (k=2) |                  |
| SAR averaged over 10 cm <sup>3</sup> (10 g) of Head TSL                                                                                       | Condition          |                          |                  |
| SAR measured                                                                                                                                  | 100 mW input power | 2.34 W/kg                |                  |
| SAR for nominal Head TSL parameters                                                                                                           | normalized to 1W   | 23.3 W/kg ± 24.2 % (k=2) |                  |
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| <b>Head TSL parameters at 5600MHz</b><br>The following parameters and calculations were applied:                                              |                    |                          |                  |
| Nominal Head TSL parameters                                                                                                                   | Temperature        | Permittivity             | Conductivity     |
|                                                                                                                                               | 22.0 °C            | 35.5                     | 5.07 mho/m       |
| Measured Head TSL parameters                                                                                                                  | (22.0 ± 0.2) °C    | 34.7 ± 5 %               | 5.05 mho/m ± 5 % |
| Head TSL temperature change during test                                                                                                       | <+1.0 °C           | —                        | —                |
| <b>SAR result with Head TSL at 5600MHz</b>                                                                                                    |                    |                          |                  |
| SAR averaged over 1 cm <sup>3</sup> (1 g) of Head TSL                                                                                         | Condition          |                          |                  |
| SAR measured                                                                                                                                  | 100 mW input power | 8.12 W/kg                |                  |
| SAR for nominal Head TSL parameters                                                                                                           | normalized to 1W   | 80.8 W/kg ± 24.4 % (k=2) |                  |
| SAR averaged over 10 cm <sup>3</sup> (10 g) of Head TSL                                                                                       | Condition          |                          |                  |
| SAR measured                                                                                                                                  | 100 mW input power | 2.38 W/kg                |                  |
| SAR for nominal Head TSL parameters                                                                                                           | normalized to 1W   | 23.8 W/kg ± 24.2 % (k=2) |                  |
| <b>Head TSL parameters at 5800MHz</b><br>The following parameters and calculations were applied:                                              |                    |                          |                  |
| Nominal Head TSL parameters                                                                                                                   | Temperature        | Permittivity             | Conductivity     |
|                                                                                                                                               | 22.0 °C            | 35.3                     | 5.27 mho/m       |
| Measured Head TSL parameters                                                                                                                  | (22.0 ± 0.2) °C    | 34.4 ± 5 %               | 5.25 mho/m ± 5 % |
| Head TSL temperature change during test                                                                                                       | <+1.0 °C           | —                        | —                |
| <b>SAR result with Head TSL at 5800MHz</b>                                                                                                    |                    |                          |                  |
| SAR averaged over 1 cm <sup>3</sup> (1 g) of Head TSL                                                                                         | Condition          |                          |                  |
| SAR measured                                                                                                                                  | 100 mW input power | 7.71 W/kg                |                  |
| SAR for nominal Head TSL parameters                                                                                                           | normalized to 1W   | 76.7 W/kg ± 24.4 % (k=2) |                  |
| SAR averaged over 10 cm <sup>3</sup> (10 g) of Head TSL                                                                                       | Condition          |                          |                  |
| SAR measured                                                                                                                                  | 100 mW input power | 2.16 W/kg                |                  |
| SAR for nominal Head TSL parameters                                                                                                           | normalized to 1W   | 21.6 W/kg ± 24.2 % (k=2) |                  |
| Certificate No: Z22-60187 Page 5 of 10                                                                                                        |                    |                          |                  |

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| <b>Appendix (Additional assessments outside the scope of CNAS L0570)</b>                                                                      |              |              |  |
| <b>Antenna Parameters with Head TSL at 5200MHz</b>                                                                                            |              |              |  |
| Impedance, transformed to feed point                                                                                                          | 46.10-5.03jΩ |              |  |
| Return Loss                                                                                                                                   | -23.8dB      |              |  |
| <b>Antenna Parameters with Head TSL at 5300MHz</b>                                                                                            |              |              |  |
| Impedance, transformed to feed point                                                                                                          | 47.80-2.42jΩ |              |  |
| Return Loss                                                                                                                                   | -23.5dB      |              |  |
| <b>Antenna Parameters with Head TSL at 5500MHz</b>                                                                                            |              |              |  |
| Impedance, transformed to feed point                                                                                                          | 50.30-4.26jΩ |              |  |
| Return Loss                                                                                                                                   | -27.4dB      |              |  |
| <b>Antenna Parameters with Head TSL at 5600MHz</b>                                                                                            |              |              |  |
| Impedance, transformed to feed point                                                                                                          | 54.80-4.86jΩ |              |  |
| Return Loss                                                                                                                                   | -24.6dB      |              |  |
| <b>Antenna Parameters with Head TSL at 5800MHz</b>                                                                                            |              |              |  |
| Impedance, transformed to feed point                                                                                                          | 51.50-5.61jΩ |              |  |
| Return Loss                                                                                                                                   | -24.9dB      |              |  |
| Certificate No: Z22-60187 Page 6 of 10                                                                                                        |              |              |  |

| <div data-bbox="272 253 488 293"></div> <div data-bbox="628 253 703 286"></div> <div data-bbox="288 295 523 327"><p>Address: No.52 HuaYuanBei Road, Haidian District, Beijing, 100191, China<br/>Tel: +86-10-62302117<br/>E-mail: cti@ttsl.com.cn</p></div> <div data-bbox="288 333 475 349"><p>General Antenna Parameters and Design</p></div> <div data-bbox="288 356 668 374"><table border="1"><tr><td>Electrical Delay (one direction)</td><td>1.101 ns</td></tr></table></div> <div data-bbox="288 383 676 407"><p>After long term use with 100W radiated power, only a slight warming of the dipole near the feed-point can be measured.</p></div> <div data-bbox="288 414 686 486"><p>The dipole is made of standard semirigid coaxial cable. The carrier conductor of the feeding line is directly connected to the second arm of the dipole. 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.<br/>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.</p></div> <div data-bbox="288 492 383 508"><p>Additional EUT Data</p></div> <div data-bbox="288 515 668 533"><table border="1"><tr><td>Manufactured by</td><td>SPEAG</td></tr></table></div> <div data-bbox="280 840 376 853"><p>Certificate No: Z22-60187</p></div> <div data-bbox="450 840 501 853"><p>Page 1 of 6</p></div>                                                                                                                                                                                                                                                                                                                 | Electrical Delay (one direction)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 1.101 ns | Manufactured by | SPEAG | <div data-bbox="879 253 1094 293"></div> <div data-bbox="1230 253 1305 286"></div> <div data-bbox="895 295 1129 327"><p>Address: No.52 HuaYuanBei Road, Haidian District, Beijing, 100191, China<br/>Tel: +86-10-62302117<br/>E-mail: cti@ttsl.com.cn</p></div> <div data-bbox="887 333 1069 349"><p>DASY5 Validation Report for Head TSL</p></div> <div data-bbox="1182 333 1254 349"><p>Date: 2022-09-01</p></div> <div data-bbox="887 356 1265 486"><p>Test Laboratory: CTTL, Beijing, China<br/>DUT: Dipole 5GHz; Type: D5GHzV2; Serial: D5GHzV2 - SN: 1095<br/>Communication System: CW; Frequency: 5200 MHz; Frequency: 5300 MHz; Frequency: 5500 MHz; Frequency: 5600 MHz; Frequency: 5800 MHz; Duty Cycle: 1:1<br/>Medium parameters used: <math>f = 5200</math> MHz; <math>\sigma = 4.82</math> S/m; <math>\epsilon = 35.39</math>; <math>\rho = 1000</math> kg/m<sup>3</sup><br/>Medium parameters used: <math>f = 5300</math> MHz; <math>\sigma = 4.73</math> S/m; <math>\epsilon = 35.19</math>; <math>\rho = 1000</math> kg/m<sup>3</sup><br/>Medium parameters used: <math>f = 5500</math> MHz; <math>\sigma = 4.939</math> S/m; <math>\epsilon = 34.83</math>; <math>\rho = 1000</math> kg/m<sup>3</sup><br/>Medium parameters used: <math>f = 5600</math> MHz; <math>\sigma = 5.051</math> S/m; <math>\epsilon = 34.89</math>; <math>\rho = 1000</math> kg/m<sup>3</sup><br/>Medium parameters used: <math>f = 5800</math> MHz; <math>\sigma = 5.247</math> S/m; <math>\epsilon = 34.42</math>; <math>\rho = 1000</math> kg/m<sup>3</sup><br/>Phantom section: Right Section<br/>Measurement Standard: DASY5 (IEEE/IEC/ANSI C38.19-2007)<br/>DASY5 Configuration:</p></div> <div data-bbox="927 492 1265 609"><ul style="list-style-type: none"><li>Probe: EX3DV4 - SN7484; ConvF(5.6, 5.6, 5.6) @ 5200 MHz; ConvF(5.32, 5.32, 5.32) @ 5300 MHz; ConvF(5.11, 5.11, 5.11) @ 5500 MHz; ConvF(4.91, 4.91, 4.91) @ 5600 MHz; ConvF(5.5, 5.5) @ 5800 MHz; Calibrated: 2022-01-26</li><li>Sensor-Surface: 1.4mm (Mechanical Surface Detection)</li><li>Electronics: DA84 Sn1556; Calibrated: 2022-01-12</li><li>Phantom: MPF_V5.1C (20deg probe tilt); Type: QD Q00 P51 Cx; Serial: 1062</li><li>DASY52 52.10.4(1535); SEMCAD X 14.6.14(7501)</li></ul></div> <div data-bbox="911 613 1265 714"><p>Dipole Calibration /Pin=100mW, d=10mm, f=5200 MHz/Zoom Scan, dist=1.4mm (8x8x7)/Cube 0; Measurement grid: dx=4mm, dy=4mm, dz=1.4mm; Reference Value = 60.80 V/m; Power Drift = -0.06 dB<br/>Peak SAR (extrapolated) = 29.8 W/kg<br/>SAR(1 g) = 7.73 W/kg; SAR(10 g) = 2.22 W/kg<br/>Smallest distance from peaks to all points 3 dB below = 7.2 mm<br/>Ratio of SAR at M2 to SAR at M1 = 66.8%<br/>Maximum value of SAR (measured) = 19.3 W/kg</p></div> <div data-bbox="911 728 1265 831"><p>Dipole Calibration /Pin=100mW, d=10mm, f=5300 MHz/Zoom Scan, dist=1.4mm (8x8x7)/Cube 0; Measurement grid: dx=4mm, dy=4mm, dz=1.4mm; Reference Value = 61.08 V/m; Power Drift = -0.07 dB<br/>Peak SAR (extrapolated) = 31.5 W/kg<br/>SAR(1 g) = 7.94 W/kg; SAR(10 g) = 2.27 W/kg<br/>Smallest distance from peaks to all points 3 dB below = 7.2 mm<br/>Ratio of SAR at M2 to SAR at M1 = 65.5%<br/>Maximum value of SAR (measured) = 19.0 W/kg</p></div> <div data-bbox="887 840 983 853"><p>Certificate No: Z22-60187</p></div> <div data-bbox="1053 840 1104 853"><p>Page 6 of 6</p></div> |
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| Electrical Delay (one direction)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 1.101 ns                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |          |                 |       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Manufactured by                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        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                                                                                                                                                                                                                                                                                                                                                                         |
| <div data-bbox="272 925 488 965"></div> <div data-bbox="628 925 703 958"></div> <div data-bbox="288 974 523 1005"><p>Address: No.52 HuaYuanBei Road, Haidian District, Beijing, 100191, China<br/>Tel: +86-10-62302117<br/>E-mail: cti@ttsl.com.cn</p></div> <div data-bbox="288 1012 652 1113"><p>Dipole Calibration /Pin=100mW, d=10mm, f=5500 MHz/Zoom Scan, dist=1.4mm (8x8x7)/Cube 0; Measurement grid: dx=4mm, dy=4mm, dz=1.4mm; Reference Value = 61.92 V/m; Power Drift = -0.08 dB<br/>Peak SAR (extrapolated) = 34.7 W/kg<br/>SAR(1 g) = 8.28 W/kg; SAR(10 g) = 2.34 W/kg<br/>Smallest distance from peaks to all points 3 dB below = 7.2 mm<br/>Ratio of SAR at M2 to SAR at M1 = 63.9%<br/>Maximum value of SAR (measured) = 20.2 W/kg</p></div> <div data-bbox="288 1120 652 1220"><p>Dipole Calibration /Pin=100mW, d=10mm, f=5600 MHz/Zoom Scan, dist=1.4mm (8x8x7)/Cube 0; Measurement grid: dx=4mm, dy=4mm, dz=1.4mm; Reference Value = 65.08 V/m; Power Drift = -0.07 dB<br/>Peak SAR (extrapolated) = 36.3 W/kg<br/>SAR(1 g) = 8.12 W/kg; SAR(10 g) = 2.3 W/kg<br/>Smallest distance from peaks to all points 3 dB below = 7.2 mm<br/>Ratio of SAR at M2 to SAR at M1 = 62.5%<br/>Maximum value of SAR (measured) = 19.1 W/kg</p></div> <div data-bbox="288 1227 652 1328"><p>Dipole Calibration /Pin=100mW, d=10mm, f=5800 MHz/Zoom Scan, dist=1.4mm (8x8x7)/Cube 0; Measurement grid: dx=4mm, dy=4mm, dz=1.4mm; Reference Value = 62.13 V/m; Power Drift = -0.06 dB<br/>Peak SAR (extrapolated) = 34.8 W/kg<br/>SAR(1 g) = 7.71 W/kg; SAR(10 g) = 2.16 W/kg<br/>Smallest distance from peaks to all points 3 dB below = 7.2 mm<br/>Ratio of SAR at M2 to SAR at M1 = 61.6%<br/>Maximum value of SAR (measured) = 18.7 W/kg</p></div> <div data-bbox="304 1335 689 1507"></div> <div data-bbox="280 1516 376 1532"><p>Certificate No: Z22-60187</p></div> <div data-bbox="450 1516 501 1532"><p>Page 9 of 10</p></div> | <div data-bbox="879 925 1094 965"></div> <div data-bbox="1230 925 1305 958"></div> <div data-bbox="895 974 1129 1005"><p>Address: No.52 HuaYuanBei Road, Haidian District, Beijing, 100191, China<br/>Tel: +86-10-62302117<br/>E-mail: cti@ttsl.com.cn</p></div> <div data-bbox="911 1021 1101 1037"><p>Impedance Measurement Plot for Head TSL</p></div> <div data-bbox="895 1066 1265 1352"></div> <div data-bbox="887 1516 983 1532"><p>Certificate No: Z22-60187</p></div> <div data-bbox="1053 1516 1104 1532"><p>Page 10 of 10</p></div> |          |                 |       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |

## 2 DAE4 - SN 1305

| Calibration Laboratory of<br>Schmid & Partner<br>Engineering AG<br>Zugheiserstrasse 51, 8004 Zurich, Switzerland                                                                                                                                                                |                    | Schweizerischer Kalibrierdienst<br>Service suisse d'étalonnage<br>Servizio svizzero di taratura<br>Swiss Calibration Service |                        |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|------------------------------------------------------------------------------------------------------------------------------|------------------------|
| Accredited by the Swiss Accreditation Service (SAS)<br>The Swiss Accreditation Service is one of the signatories to the EA<br>Multilateral Agreement for the recognition of calibration certificates                                                                            |                    | Accreditation No.: SCS 0108                                                                                                  |                        |
| Client: Auden<br>Tessalon City, Taiwan                                                                                                                                                                                                                                          |                    | Certificate No.: DAE4-1305_Apr23                                                                                             |                        |
| <b>CALIBRATION CERTIFICATE</b>                                                                                                                                                                                                                                                  |                    |                                                                                                                              |                        |
| Object: DAE4 - SD D00 D04 BM - SN: 1305                                                                                                                                                                                                                                         |                    |                                                                                                                              |                        |
| Calibration procedure(s): QA CAL-06.v30<br>Calibration procedure for the data acquisition electronics (DAE)                                                                                                                                                                     |                    |                                                                                                                              |                        |
| Calibration date: April 13, 2023                                                                                                                                                                                                                                                |                    |                                                                                                                              |                        |
| This calibration certificate documents the traceability to national standards, which resolve the physical units of measurements (SI).<br>The measurements and the uncertainties with confidence probability are given on the following pages, not any part of this certificate. |                    |                                                                                                                              |                        |
| All calibrations have been conducted in the closest laboratory facility: environmental temperature (22 ± 3)°C and humidity (45%).                                                                                                                                               |                    |                                                                                                                              |                        |
| Calibration equipment used (MUTU critical for calibration)                                                                                                                                                                                                                      |                    |                                                                                                                              |                        |
| Primary Standards                                                                                                                                                                                                                                                               | ID #               | Cal Date (Certificate No.)                                                                                                   | Scheduled Calibration  |
| Kettler Multimeter Type 2001                                                                                                                                                                                                                                                    | SPV 08102/6        | 29-Aug-22 (No.34386)                                                                                                         | Aug-23                 |
| Secondary Standards                                                                                                                                                                                                                                                             | ID #               | Check Date (in house)                                                                                                        | Scheduled Check        |
| Auto (DAE) Calibration Unit                                                                                                                                                                                                                                                     | SE UMS 903 AA 1002 | 27-Jan-23 (in house check)                                                                                                   | In house check: Jan-24 |
| Calibrator Box V0.1                                                                                                                                                                                                                                                             | SE UMS 908 AA 1002 | 27-Jan-23 (in house check)                                                                                                   | In house check: Jan-24 |
| Calibrated by:                                                                                                                                                                                                                                                                  | Name: Adnan Gökçen | Function: Laboratory Technician                                                                                              | Signature:             |
| Approved by:                                                                                                                                                                                                                                                                    | Name: Sven Kuhn    | Function: Technical Manager                                                                                                  | Signature:             |
| Issued: April 13, 2023                                                                                                                                                                                                                                                          |                    |                                                                                                                              |                        |
| This calibration certificate shall not be reproduced except in full without written approval of the laboratory.                                                                                                                                                                 |                    |                                                                                                                              |                        |
| Certificate No: DAE4-1305_Apr23                                                                                                                                                                                                                                                 |                    | Page: 1 of 3                                                                                                                 |                        |

| DC Voltage Measurement                                                    |                                                                   |
|---------------------------------------------------------------------------|-------------------------------------------------------------------|
| AD - Converter Resolution Nominal                                         |                                                                   |
| High Range: 1LSB = 6.1μV                                                  | Full range = -100...+300 mV                                       |
| Low Range: 1LSB = 61mV                                                    | Full range = -1...+3mV                                            |
| DASY measurement parameters: Auto Zero Time: 3 sec; Measuring time: 3 sec |                                                                   |
| Calibration Factors                                                       | X Y Z                                                             |
| High Range                                                                | 403.819 ± 0.02% (k=2) 403.983 ± 0.02% (k=2) 404.309 ± 0.02% (k=2) |
| Low Range                                                                 | 3.98113 ± 1.50% (k=2) 3.99180 ± 1.50% (k=2) 3.99636 ± 1.50% (k=2) |
| Connector Angle                                                           |                                                                   |
| Connector Angle to be used in DASY system                                 | 97.5 ± 1 °                                                        |

| DC Voltage Linearity |                                        |
|----------------------|----------------------------------------|
| High Range           | Reading (μV) Difference (μV) Error (%) |
| Channel X + Input    | 199995.15 1.24 0.00                    |
| Channel X + Input    | 200002.16 0.20 0.00                    |
| Channel X - Input    | -199999.30 2.54 -0.01                  |
| Channel Y + Input    | 199993.50 -0.43 -0.00                  |
| Channel Y + Input    | 199995.85 -1.57 -0.01                  |
| Channel Y - Input    | -200002.21 -0.28 0.00                  |
| Channel Z + Input    | 199995.45 1.29 0.00                    |
| Channel Z + Input    | 200000.56 -1.24 -0.01                  |
| Channel Z - Input    | -200002.62 -0.64 0.00                  |
| Low Range            | Reading (μV) Difference (μV) Error (%) |
| Channel X + Input    | 2001.11 0.15 0.01                      |
| Channel X + Input    | 201.71 0.58 0.29                       |
| Channel X - Input    | -197.58 1.01 -0.51                     |
| Channel Y + Input    | 1999.61 -1.08 -0.05                    |
| Channel Y + Input    | 200.62 -0.55 -0.27                     |
| Channel Y - Input    | -199.48 -0.85 0.43                     |
| Channel Z + Input    | 2000.44 -0.39 -0.02                    |
| Channel Z + Input    | 201.23 0.16 0.08                       |
| Channel Z - Input    | -199.50 -0.73 0.37                     |

| Common mode sensitivity                                                   |                                                                |
|---------------------------------------------------------------------------|----------------------------------------------------------------|
| DASY measurement parameters: Auto Zero Time: 3 sec; Measuring time: 3 sec |                                                                |
| Common mode Input Voltage (mV)                                            | High Range Average Reading (μV) Low Range Average Reading (μV) |
| Channel X                                                                 | 200 7.76 6.27                                                  |
| -200                                                                      | -4.89 -4.86                                                    |
| Channel Y                                                                 | 200 -22.45 -23.58                                              |
| -200                                                                      | 22.23 21.98                                                    |
| Channel Z                                                                 | 200 -8.70 -9.29                                                |
| -200                                                                      | 8.76 8.65                                                      |

| Channel separation                                                        |                                              |
|---------------------------------------------------------------------------|----------------------------------------------|
| DASY measurement parameters: Auto Zero Time: 3 sec; Measuring time: 3 sec |                                              |
| Input Voltage (mV)                                                        | Channel X (μV) Channel Y (μV) Channel Z (μV) |
| Channel X                                                                 | 200 - 0.51 -3.80                             |
| Channel Y                                                                 | 200 8.86 - 2.36                              |
| Channel Z                                                                 | 200 10.72 5.96 -                             |

#### 4. AD-Converter Values with inputs shorted

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

|           | High Range (LSB) | Low Range (LSB) |
|-----------|------------------|-----------------|
| Channel X | 15876            | 16114           |
| Channel Y | 16301            | 17045           |
| Channel Z | 15957            | 13058           |

### 5. Input Offset Measurement

**Input Offset Measurement**  
 DASY measurement parameters: Auto Zero Time: 3 sec; Measuring time: 3 sec  
 Input 10MQ

|           | Average ( $\mu V$ ) | min. Offset ( $\mu V$ ) | max. Offset ( $\mu V$ ) | Std. Deviation ( $\mu V$ ) |
|-----------|---------------------|-------------------------|-------------------------|----------------------------|
| Channel X | 1.73                | 0.47                    | 2.81                    | 0.44                       |
| Channel Y | -0.21               | -2.38                   | 1.70                    | 0.54                       |
| Channel Z | 0.13                | -1.36                   | 1.54                    | 0.55                       |

### 6. Input Offset Current

**Input Offset Current**  
Nominal input circuitry offset current on all channels:  $\pm 25\text{fA}$

| Input Resistance (Typical values for information) |                |                  |
|---------------------------------------------------|----------------|------------------|
|                                                   | Zeroing (kOhm) | Measuring (MOhm) |
| Channel X                                         | 200            | 200              |
| Channel Y                                         | 200            | 200              |
| Channel Z                                         | 200            | 200              |

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

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

## 9. Power Consumption (Typical values for information)

| Typical values | Switched off (mA) | Stand by (mA) | Transmitting (mA) |
|----------------|-------------------|---------------|-------------------|
| Supply (+ Vcc) | +0.01             | +6            | +14               |
| Supply (- Vcc) | -0.01             | -8            | -9                |

Certificate No: DAE4-1305\_Apr22

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**3 EX3DV4 - SN 7833**

[illegible]

Certificate No: EX-7833 Asid3

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[illegible]

Case#00094 No. EX-7035 August

October 19, 1997

EX3DV4 - SN:7833

August 24, 2023

## Parameters of Probe: EX3DV4 - SN:7833

## Basic Calibration Parameters

|                        | Sensor X | Sensor Y | Sensor Z | Unc (k = 2)  |
|------------------------|----------|----------|----------|--------------|
| Norm $(\mu V/V/m)^2$ A | 0.40     | 0.65     | 0.59     | $\pm 10.1\%$ |
| DOF (mv) B             | 111.0    | 108.3    | 108.3    | $\pm 4.7\%$  |

## Calibration Results for Modulation Response

| UID   | Communication System Name   | A<br>dB                      | B<br>dB                 | C<br>dB                 | D<br>dB                 | VR<br>mV                | Max<br>dev. | Max<br>Unc <sup>2</sup><br>k = 2 |
|-------|-----------------------------|------------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------|----------------------------------|
| 0     | CW                          | X 0.00<br>Y 0.00<br>Z 0.00   | 0.00<br>0.00<br>0.00    | 1.00<br>1.00<br>1.00    | 0.00<br>0.00<br>0.00    | 136.2<br>136.7<br>136.7 | $\pm 0.2\%$ | $\pm 4.7\%$                      |
| 10352 | Pulse Waveform (200Hz, 10%) | X 1.41<br>Y 1.37<br>Z 1.37   | 62.30<br>61.50<br>60.80 | 6.14<br>6.01<br>6.01    | 10.00<br>10.00<br>10.00 | 60.0<br>60.0<br>60.0    | $\pm 3.2\%$ | $\pm 9.8\%$                      |
| 10353 | Pulse Waveform (200Hz, 20%) | X 10.00<br>Y 1.84<br>Z 14.00 | 72.00<br>69.00<br>70.00 | 9.00<br>4.70<br>11.00   | 6.99<br>80.0<br>80.0    | 80.0<br>80.0<br>80.0    | $\pm 2.9\%$ | $\pm 9.8\%$                      |
| 10354 | Pulse Waveform (200Hz, 40%) | X 0.37<br>Y 0.36<br>Z 0.36   | 66.00<br>65.00<br>66.00 | 3.64<br>3.64<br>3.64    | 3.64<br>3.64<br>3.64    | 96.0<br>96.0<br>96.0    | $\pm 0.8\%$ | $\pm 9.8\%$                      |
| 10355 | Pulse Waveform (200Hz, 60%) | X 7.50<br>Y 7.50<br>Z 7.50   | 77.00<br>77.00<br>77.00 | 2.05<br>2.05<br>2.05    | 2.22<br>2.22<br>2.22    | 100.0<br>100.0<br>100.0 | $\pm 1.7\%$ | $\pm 9.8\%$                      |
| 10357 | QPSK Waveform, 1MHz         | X 0.37<br>Y 0.49<br>Z 0.49   | 66.00<br>63.39<br>64.04 | 14.25<br>12.04<br>12.04 | 1.00<br>100.0<br>100.0  | 100.0<br>100.0<br>100.0 | $\pm 3.9\%$ | $\pm 9.8\%$                      |
| 10358 | QPSK Waveform, 10MHz        | X 1.43<br>Y 1.39<br>Z 1.39   | 67.67<br>65.56<br>66.79 | 14.98<br>13.88<br>13.78 | 0.00<br>100.0<br>100.0  | 100.0<br>100.0<br>100.0 | $\pm 0.9\%$ | $\pm 9.8\%$                      |
| 10396 | 64-QAM Waveform, 100KHz     | X 1.77<br>Y 1.79<br>Z 1.76   | 65.62<br>66.30<br>65.45 | 18.47<br>16.35<br>16.14 | 3.01<br>100.0<br>100.0  | 100.0<br>100.0<br>100.0 | $\pm 1.0\%$ | $\pm 9.8\%$                      |
| 10399 | 64-QAM Waveform, 40MHz      | X 0.59<br>Y 0.58<br>Z 0.57   | 65.91<br>66.60<br>66.60 | 16.44<br>15.33<br>15.34 | 0.00<br>100.0<br>100.0  | 100.0<br>100.0<br>100.0 | $\pm 2.1\%$ | $\pm 9.8\%$                      |
| 10414 | WLAN CDD, 64-QAM, 40 MHz    | X 0.87<br>Y 0.87<br>Z 0.87   | 66.00<br>66.00<br>66.00 | 15.69<br>15.44<br>15.44 | 0.00<br>100.0<br>100.0  | 100.0<br>100.0<br>100.0 | $\pm 3.5\%$ | $\pm 9.8\%$                      |

Note: For details on UID parameters see Appendix

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%.

A The uncertainties of Norm X,Y,Z do not affect the 67 best uncertainty value. See Page 5 and 6.

B Precision parameter uncertainty for maximum specified field strength.

C Uncertainty is determined using the max. deviation from linear response applying rectangular distribution and is expressed for the square of the best value.

Certificate No: EX-7833\_Aug23

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EX3DV4 - SN:7833

August 24, 2023

## Parameters of Probe: EX3DV4 - SN:7833

## Sensor Model Parameters

|   | C1<br>dB | C2<br>dB | A<br>V/m | V1<br>mV/m | V2<br>mV/m | T3<br>mm | T4<br>mm | T5<br>mm | T6<br>mm |
|---|----------|----------|----------|------------|------------|----------|----------|----------|----------|
| x | 8.5      | 69.54    | 31.91    | 4.38       | 0.30       | 4.30     | 0.61     | 0.00     | 1.00     |
| y | 8.5      | 69.77    | 32.80    | 4.70       | 0.30       | 4.30     | 0.61     | 0.00     | 1.00     |
| z | 7.3      | 51.94    | 32.49    | 3.75       | 0.30       | 4.30     | 0.61     | 0.00     | 1.00     |

## Other Probe Parameters

|                                               |            |
|-----------------------------------------------|------------|
| Sensor Arrangement                            | Triangular |
| Connector Angle                               | 30°        |
| Mechanical Surface Detection Mode             | disabled   |
| Optical Surface Detection Mode                | disabled   |
| Probe Overall Length                          | 337 mm     |
| Probe Body Diameter                           | 16 mm      |
| Tip Diameter                                  | 9 mm       |
| Tip Length                                    | 2.5 mm     |
| Probe Tip to Sensor X Calibration Point       | 1 mm       |
| Probe Tip to Sensor Y Calibration Point       | 1 mm       |
| Probe Tip to Sensor Z Calibration Point       | 1 mm       |
| Recommended Measurement Distance from Surface | 1.4 mm     |

Note: Measurement distance from surface can be increased to 3.4 mm for an Apple iPhone.

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EX3DV4 - SN:7833

August 24, 2023

## Parameters of Probe: EX3DV4 - SN:7833

## Calibration Parameter Determined in Head Tissue Simulating Media

| f (MHz) | Relative Permittivity <sup>1</sup> | Conductivity <sup>2</sup> (S/m) | Comp F X | Comp F Y | Comp F Z | Alpha <sup>3</sup> | Depth <sup>4</sup> (mm) | Unc (k = 2)  |
|---------|------------------------------------|---------------------------------|----------|----------|----------|--------------------|-------------------------|--------------|
| 750     | 41.9                               | 0.89                            | 7.85     | 8.96     | 8.55     | 0.43               | 1.27                    | $\pm 12.0\%$ |
| 835     | 41.5                               | 0.90                            | 7.57     | 8.62     | 8.54     | 0.42               | 1.27                    | $\pm 12.0\%$ |
| 1750    | 40.1                               | 1.37                            | 7.08     | 8.09     | 7.65     | 0.28               | 1.27                    | $\pm 12.0\%$ |
| 1900    | 40.0                               | 1.40                            | 6.39     | 7.26     | 5.93     | 0.31               | 1.27                    | $\pm 12.0\%$ |
| 2100    | 39.8                               | 1.49                            | 6.25     | 7.10     | 6.75     | 0.32               | 1.27                    | $\pm 12.0\%$ |
| 2300    | 39.5                               | 1.57                            | 6.07     | 6.82     | 6.58     | 0.33               | 1.27                    | $\pm 12.0\%$ |
| 2450    | 39.2                               | 1.60                            | 5.98     | 6.77     | 6.44     | 0.31               | 1.27                    | $\pm 12.0\%$ |
| 2600    | 39.0                               | 1.56                            | 5.11     | 6.91     | 6.68     | 0.30               | 1.27                    | $\pm 12.0\%$ |
| 3300    | 38.2                               | 2.71                            | 6.16     | 7.02     | 6.07     | 0.36               | 1.27                    | $\pm 14.0\%$ |
| 3500    | 37.9                               | 2.91                            | 5.61     | 6.40     | 6.07     | 0.36               | 1.27                    | $\pm 14.0\%$ |
| 3700    | 37.7                               | 3.12                            | 5.65     | 6.46     | 6.15     | 0.32               | 1.30                    | $\pm 14.0\%$ |
| 3900    | 37.5                               | 3.32                            | 6.07     | 6.91     | 6.66     | 0.38               | 1.27                    | $\pm 14.0\%$ |
| 4100    | 37.2                               | 3.53                            | 5.78     | 6.58     | 6.21     | 0.37               | 1.27                    | $\pm 14.0\%$ |
| 4200    | 37.1                               | 3.63                            | 5.41     | 6.17     | 5.88     | 0.36               | 1.27                    | $\pm 14.0\%$ |
| 4400    | 36.9                               | 3.84                            | 5.25     | 5.96     | 5.69     | 0.37               | 1.27                    | $\pm 14.0\%$ |
| 4600    | 36.7                               | 4.04                            | 5.88     | 6.44     | 6.12     | 0.36               | 1.30                    | $\pm 14.0\%$ |
| 4800    | 36.4                               | 4.25                            | 5.77     | 6.55     | 6.25     | 0.38               | 1.27                    | $\pm 14.0\%$ |
| 4950    | 36.3                               | 4.40                            | 5.26     | 5.93     | 5.69     | 0.41               | 1.30                    | $\pm 14.0\%$ |
| 5200    | 36.0                               | 4.88                            | 5.16     | 5.87     | 5.61     | 0.34               | 1.51                    | $\pm 14.0\%$ |
| 5300    | 35.9                               | 4.76                            | 5.02     | 5.70     | 5.39     | 0.32               | 1.63                    | $\pm 14.0\%$ |
| 5500    | 35.6                               | 4.96                            | 4.50     | 5.15     | 4.85     | 0.36               | 1.61                    | $\pm 14.0\%$ |
| 5600    | 35.5                               | 5.07                            | 4.33     | 4.92     | 4.68     | 0.41               | 1.54                    | $\pm 14.0\%$ |
| 5800    | 35.3                               | 5.27                            | 4.50     | 5.13     | 4.87     | 0.31               | 1.66                    | $\pm 14.0\%$ |

<sup>1</sup> Frequency validity above 802.1084 of  $\pm 0.01\%$  only applies for QM4 v4.4 and higher (see Page 2), when it is specified to  $\pm 0.01\%$ . The uncertainty is the max of the center uncertainty of calibration frequency and the uncertainty for the indicated frequency band. Frequency validity below 802.1084 is  $\pm 0.1\%$ ,  $\pm 0.1\%$ ,  $\pm 0.1\%$  for 750, 835, 1750 and 1900 MHz respectively. Validity of CompF parameter is  $\pm 0.1\%$  for 750, 835, 1750 and 1900 MHz respectively. Validity of Alpha parameter is  $\pm 0.1\%$  for 750, 835, 1750 and 1900 MHz respectively.

<sup>2</sup> The probe is calibrated using 1600 and 1700 MHz for 750 and 835 MHz respectively. The probe is calibrated using 1600 and 1700 MHz for 1750 and 1900 MHz respectively. The probe is calibrated using 1600 and 1700 MHz for 2100 and 2300 MHz respectively. The probe is calibrated using 1600 and 1700 MHz for 2450 and 2600 MHz respectively. The probe is calibrated using 1600 and 1700 MHz for 3300 and 3500 MHz respectively. The probe is calibrated using 1600 and 1700 MHz for 3700 and 3900 MHz respectively. The probe is calibrated using 1600 and 1700 MHz for 4100 and 4200 MHz respectively. The probe is calibrated using 1600 and 1700 MHz for 4400 and 4600 MHz respectively. The probe is calibrated using 1600 and 1700 MHz for 4800 and 4950 MHz respectively. The probe is calibrated using 1600 and 1700 MHz for 5200 and 5300 MHz respectively. The probe is calibrated using 1600 and 1700 MHz for 5500 and 5600 MHz respectively. The probe is calibrated using 1600 and 1700 MHz for 5800 and 6000 MHz respectively.

<sup>3</sup> AlphaDepth is determined during calibration. IEC60601-1-2 warns that the frequency deviation due to the frequency effect after compensation is always less than  $\pm 1\%$  for frequencies below 500 Hz and below  $\pm 2\%$  for frequencies between 500 Hz and 100 kHz. The frequency effect after compensation is always less than  $\pm 1\%$  for frequencies below 500 Hz and below  $\pm 2\%$  for frequencies between 500 Hz and 100 kHz. The frequency effect after compensation is always less than  $\pm 1\%$  for frequencies below 500 Hz and below  $\pm 2\%$  for frequencies between 500 Hz and 100 kHz.

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EX3DV4 - SN:7833

August 24, 2023

## Parameters of Probe: EX3DV4 - SN:7833

## Calibration Parameter Determined in Head Tissue Simulating Media

| f (MHz) | Relative Permittivity <sup>1</sup> | Conductivity <sup>2</sup> (S/m) | Comp F X | Comp F Y | Comp F Z | Alpha <sup>3</sup> | Depth <sup>4</sup> (mm) | Unc (k = 2)  |
|---------|------------------------------------|---------------------------------|----------|----------|----------|--------------------|-------------------------|--------------|
| 6500    | 34.5                               | 6.07                            | 6.74     | 5.36     | 4.91     | 0.20               | 2.00                    | $\pm 18.6\%$ |

<sup>1</sup> Frequency validity at 6.5 GHz is  $\pm 0.01\%$  for QM4 v4.4 and higher (see Page 2), when it is specified to  $\pm 0.01\%$ . The uncertainty is the max of the center uncertainty of calibration frequency and the uncertainty for the indicated frequency band.

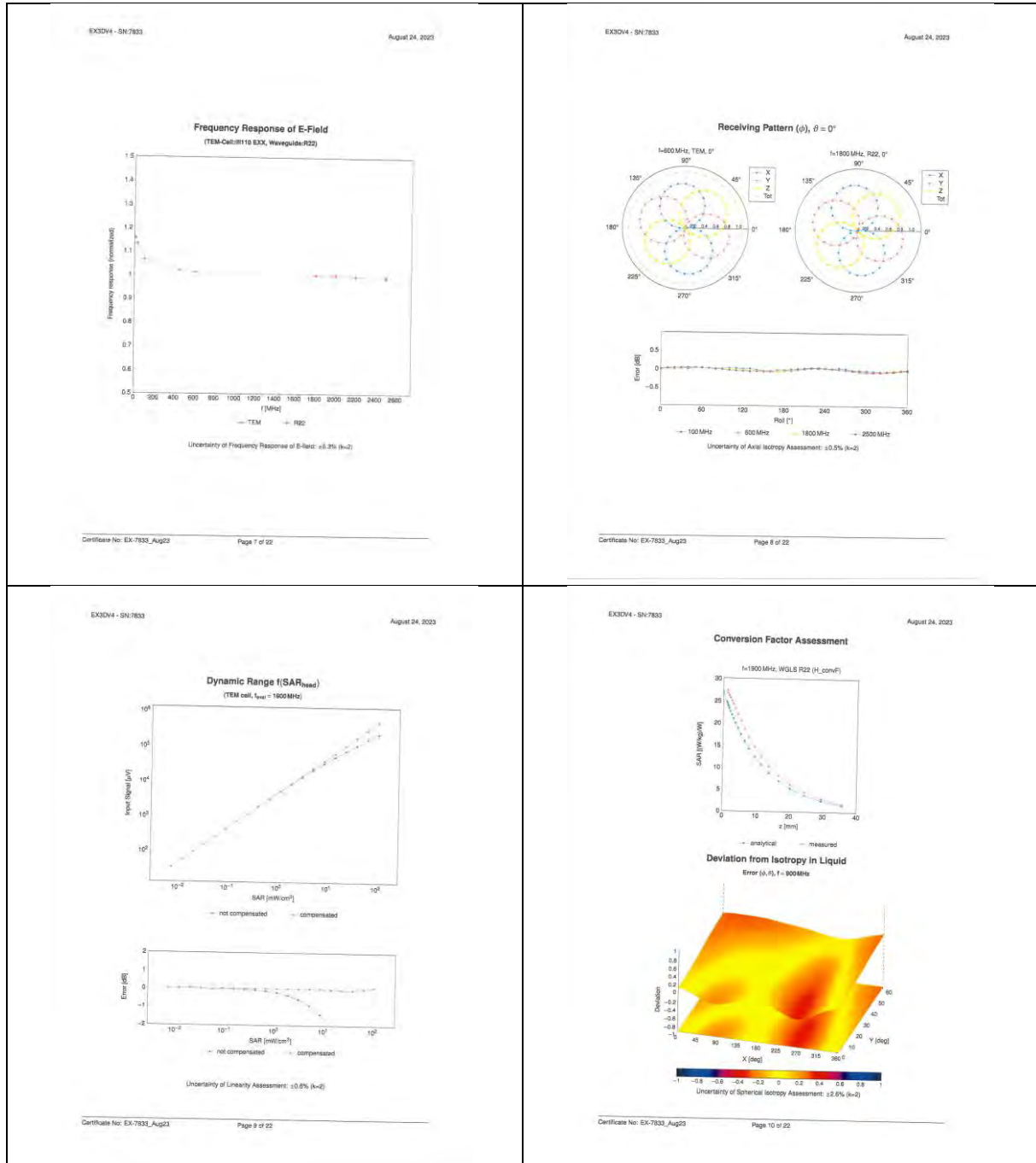
<sup>2</sup> The probe is calibrated using 1600 and 1700 MHz for 6500 MHz respectively. The probe is calibrated using 1600 and 1700 MHz for 6500 MHz respectively. The probe is calibrated using 1600 and 1700 MHz for 6500 MHz respectively.

<sup>3</sup> AlphaDepth is determined during calibration. IEC60601-1-2 warns that the frequency deviation due to the frequency effect after compensation is always less than  $\pm 1\%$  for frequencies below 500 Hz and below  $\pm 2\%$  for frequencies between 500 Hz and 100 kHz. The frequency effect after compensation is always less than  $\pm 1\%$  for frequencies below 500 Hz and below  $\pm 2\%$  for frequencies between 500 Hz and 100 kHz.

<sup>4</sup> AlphaDepth is determined during calibration. IEC60601-1-2 warns that the frequency deviation due to the frequency effect after compensation is always less than  $\pm 1\%$  for frequencies below 500 Hz and below  $\pm 2\%$  for frequencies between 500 Hz and 100 kHz. The frequency effect after compensation is always less than  $\pm 1\%$  for frequencies below 500 Hz and below  $\pm 2\%$  for frequencies between 500 Hz and 100 kHz.

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| EXODN - SN7833                              |     | August 24, 2023           |       | EXODN - SN7833 |         | August 24, 2023 |     |                           |       |          |         |
|---------------------------------------------|-----|---------------------------|-------|----------------|---------|-----------------|-----|---------------------------|-------|----------|---------|
| Appendix: Modulation Calibration Parameters |     |                           |       |                |         |                 |     |                           |       |          |         |
| UD                                          | Rev | Communication System Name | Group | PAH (dB)       | UD# 1-2 | UD              | Rev | Communication System Name | Group | PAH (dB) | UD# 1-2 |
| 1001                                        | CAI | CAI                       | CAI   | 0.00           | 0.00    | 1011            | CAI | CAI                       | CAI   | 0.00     | 0.00    |
| 1002                                        | CAI | CAI                       | CAI   | 0.00           | 0.00    | 1012            | CAI | CAI                       | CAI   | 0.00     | 0.00    |
| 1003                                        | CAI | CAI                       | CAI   | 0.00           | 0.00    | 1013            | CAI | CAI                       | CAI   | 0.00     | 0.00    |
| 1004                                        | CAI | CAI                       | CAI   | 0.00           | 0.00    | 1014            | CAI | CAI                       | CAI   | 0.00     | 0.00    |
| 1005                                        | CAI | CAI                       | CAI   | 0.00           | 0.00    | 1015            | CAI | CAI                       | CAI   | 0.00     | 0.00    |
| 1006                                        | CAI | CAI                       | CAI   | 0.00           | 0.00    | 1016            | CAI | CAI                       | CAI   | 0.00     | 0.00    |
| 1007                                        | CAI | CAI                       | CAI   | 0.00           | 0.00    | 1017            | CAI | CAI                       | CAI   | 0.00     | 0.00    |
| 1008                                        | CAI | CAI                       | CAI   | 0.00           | 0.00    | 1018            | CAI | CAI                       | CAI   | 0.00     | 0.00    |
| 1009                                        | CAI | CAI                       | CAI   | 0.00           | 0.00    | 1019            | CAI | CAI                       | CAI   | 0.00     | 0.00    |
| 1010                                        | CAI | CAI                       | CAI   | 0.00           | 0.00    | 1020            | CAI | CAI                       | CAI   | 0.00     | 0.00    |
| 1011                                        | CAI | CAI                       | CAI   | 0.00           | 0.00    | 1021            | CAI | CAI                       | CAI   | 0.00     | 0.00    |
| 1012                                        | CAI | CAI                       | CAI   | 0.00           | 0.00    | 1022            | CAI | CAI                       | CAI   | 0.00     | 0.00    |
| 1013                                        | CAI | CAI                       | CAI   | 0.00           | 0.00    | 1023            | CAI | CAI                       | CAI   | 0.00     | 0.00    |
| 1014                                        | CAI | CAI                       | CAI   | 0.00           | 0.00    | 1024            | CAI | CAI                       | CAI   | 0.00     | 0.00    |
| 1015                                        | CAI | CAI                       | CAI   | 0.00           | 0.00    | 1025            | CAI | CAI                       | CAI   | 0.00     | 0.00    |
| 1016                                        | CAI | CAI                       | CAI   | 0.00           | 0.00    | 1026            | CAI | CAI                       | CAI   | 0.00     | 0.00    |
| 1017                                        | CAI | CAI                       | CAI   | 0.00           | 0.00    | 1027            | CAI | CAI                       | CAI   | 0.00     | 0.00    |
| 1018                                        | CAI | CAI                       | CAI   | 0.00           | 0.00    | 1028            | CAI | CAI                       | CAI   | 0.00     | 0.00    |
| 1019                                        | CAI | CAI                       | CAI   | 0.00           | 0.00    | 1029            | CAI | CAI                       | CAI   | 0.00     | 0.00    |
| 1020                                        | CAI | CAI                       | CAI   | 0.00           | 0.00    | 1030            | CAI | CAI                       | CAI   | 0.00     | 0.00    |
| 1021                                        | CAI | CAI                       | CAI   | 0.00           | 0.00    | 1031            | CAI | CAI                       | CAI   | 0.00     | 0.00    |
| 1022                                        | CAI | CAI                       | CAI   | 0.00           | 0.00    | 1032            | CAI | CAI                       | CAI   | 0.00     | 0.00    |
| 1023                                        | CAI | CAI                       | CAI   | 0.00           | 0.00    | 1033            | CAI | CAI                       | CAI   | 0.00     | 0.00    |
| 1024                                        | CAI | CAI                       | CAI   | 0.00           | 0.00    | 1034            | CAI | CAI                       | CAI   | 0.00     | 0.00    |
| 1025                                        | CAI | CAI                       | CAI   | 0.00           | 0.00    | 1035            | CAI | CAI                       | CAI   | 0.00     | 0.00    |
| 1026                                        | CAI | CAI                       | CAI   | 0.00           | 0.00    | 1036            | CAI | CAI                       | CAI   | 0.00     | 0.00    |
| 1027                                        | CAI | CAI                       | CAI   | 0.00           | 0.00    | 1037            | CAI | CAI                       | CAI   | 0.00     | 0.00    |
| 1028                                        | CAI | CAI                       | CAI   | 0.00           | 0.00    | 1038            | CAI | CAI                       | CAI   | 0.00     | 0.00    |
| 1029                                        | CAI | CAI                       | CAI   | 0.00           | 0.00    | 1039            | CAI | CAI                       | CAI   | 0.00     | 0.00    |
| 1030                                        | CAI | CAI                       | CAI   | 0.00           | 0.00    | 1040            | CAI | CAI                       | CAI   | 0.00     | 0.00    |
| 1031                                        | CAI | CAI                       | CAI   | 0.00           | 0.00    | 1041            | CAI | CAI                       | CAI   | 0.00     | 0.00    |
| 1032                                        | CAI | CAI                       | CAI   | 0.00           | 0.00    | 1042            | CAI | CAI                       | CAI   | 0.00     | 0.00    |
| 1033                                        | CAI | CAI                       | CAI   | 0.00           | 0.00    | 1043            | CAI | CAI                       | CAI   | 0.00     | 0.00    |
| 1034                                        | CAI | CAI                       | CAI   | 0.00           | 0.00    | 1044            | CAI | CAI                       | CAI   | 0.00     | 0.00    |
| 1035                                        | CAI | CAI                       | CAI   | 0.00           | 0.00    | 1045            | CAI | CAI                       | CAI   | 0.00     | 0.00    |
| 1036                                        | CAI | CAI                       | CAI   | 0.00           | 0.00    | 1046            | CAI | CAI                       | CAI   | 0.00     | 0.00    |
| 1037                                        | CAI | CAI                       | CAI   | 0.00           | 0.00    | 1047            | CAI | CAI                       | CAI   | 0.00     | 0.00    |
| 1038                                        | CAI | CAI                       | CAI   | 0.00           | 0.00    | 1048            | CAI | CAI                       | CAI   | 0.00     | 0.00    |
| 1039                                        | CAI | CAI                       | CAI   | 0.00           | 0.00    | 1049            | CAI | CAI                       | CAI   | 0.00     | 0.00    |
| 1040                                        | CAI | CAI                       | CAI   | 0.00           | 0.00    | 1050            | CAI | CAI                       | CAI   | 0.00     | 0.00    |
| 1041                                        | CAI | CAI                       | CAI   | 0.00           | 0.00    | 1051            | CAI | CAI                       | CAI   | 0.00     | 0.00    |
| 1042                                        | CAI | CAI                       | CAI   | 0.00           | 0.00    | 1052            | CAI | CAI                       | CAI   | 0.00     | 0.00    |
| 1043                                        | CAI | CAI                       | CAI   | 0.00           | 0.00    | 1053            | CAI | CAI                       | CAI   | 0.00     | 0.00    |
| 1044                                        | CAI | CAI                       | CAI   | 0.00           | 0.00    | 1054            | CAI | CAI                       | CAI   | 0.00     | 0.00    |
| 1045                                        | CAI | CAI                       | CAI   | 0.00           | 0.00    | 1055            | CAI | CAI                       | CAI   | 0.00     | 0.00    |
| 1046                                        | CAI | CAI                       | CAI   | 0.00           | 0.00    | 1056            | CAI | CAI                       | CAI   | 0.00     | 0.00    |
| 1047                                        | CAI | CAI                       | CAI   | 0.00           | 0.00    | 1057            | CAI | CAI                       | CAI   | 0.00     | 0.00    |
| 1048                                        | CAI | CAI                       | CAI   | 0.00           | 0.00    | 1058            | CAI | CAI                       | CAI   | 0.00     | 0.00    |
| 1049                                        | CAI | CAI                       | CAI   | 0.00           | 0.00    | 1059            | CAI | CAI                       | CAI   | 0.00     | 0.00    |
| 1050                                        | CAI | CAI                       | CAI   | 0.00           | 0.00    | 1060            | CAI | CAI                       | CAI   | 0.00     | 0.00    |
| 1051                                        | CAI | CAI                       | CAI   | 0.00           | 0.00    | 1061            | CAI | CAI                       | CAI   | 0.00     | 0.00    |
| 1052                                        | CAI | CAI                       | CAI   | 0.00           | 0.00    | 1062            | CAI | CAI                       | CAI   | 0.00     | 0.00    |
| 1053                                        | CAI | CAI                       | CAI   | 0.00           | 0.00    | 1063            | CAI | CAI                       | CAI   | 0.00     | 0.00    |
| 1054                                        | CAI | CAI                       | CAI   | 0.00           | 0.00    | 1064            | CAI | CAI                       | CAI   | 0.00     | 0.00    |
| 1055                                        | CAI | CAI                       | CAI   | 0.00           | 0.00    | 1065            | CAI | CAI                       | CAI   | 0.00     | 0.00    |
| 1056                                        | CAI | CAI                       | CAI   | 0.00           | 0.00    | 1066            | CAI | CAI                       | CAI   | 0.00     | 0.00    |
| 1057                                        | CAI | CAI                       | CAI   | 0.00           | 0.00    | 1067            | CAI | CAI                       | CAI   | 0.00     | 0.00    |
| 1058                                        | CAI | CAI                       | CAI   | 0.00           | 0.00    | 1068            | CAI | CAI                       | CAI   | 0.00     | 0.00    |
| 1059                                        | CAI | CAI                       | CAI   | 0.00           | 0.00    | 1069            | CAI | CAI                       | CAI   | 0.00     | 0.00    |
| 1060                                        | CAI | CAI                       | CAI   | 0.00           | 0.00    | 1070            | CAI | CAI                       | CAI   | 0.00     | 0.00    |
| 1061                                        | CAI | CAI                       | CAI   | 0.00           | 0.00    | 1071            | CAI | CAI                       | CAI   | 0.00     | 0.00    |
| 1062                                        | CAI | CAI                       | CAI   | 0.00           | 0.00    | 1072            | CAI | CAI                       | CAI   | 0.00     | 0.00    |
| 1063                                        | CAI | CAI                       | CAI   | 0.00           | 0.00    | 1073            | CAI | CAI                       | CAI   | 0.00     | 0.00    |
| 1064                                        | CAI | CAI                       | CAI   | 0.00           | 0.00    | 1074            | CAI | CAI                       | CAI   | 0.00     | 0.00    |
| 1065                                        | CAI | CAI                       | CAI   | 0.00           | 0.00    | 1075            | CAI | CAI                       | CAI   | 0.00     | 0.00    |
| 1066                                        | CAI | CAI                       | CAI   | 0.00           | 0.00    | 1076            | CAI | CAI                       | CAI   | 0.00     | 0.00    |
| 1067                                        | CAI | CAI                       | CAI   | 0.00           | 0.00    | 1077            | CAI | CAI                       | CAI   | 0.00     | 0.00    |
| 1068                                        | CAI | CAI                       | CAI   | 0.00           | 0.00    | 1078            | CAI | CAI                       | CAI   | 0.00     | 0.00    |
| 1069                                        | CAI | CAI                       | CAI   | 0.00           | 0.00    | 1079            | CAI | CAI                       | CAI   | 0.00     | 0.00    |
| 1070                                        | CAI | CAI                       | CAI   | 0.00           | 0.00    | 1080            | CAI | CAI                       | CAI   | 0.00     | 0.00    |
| 1071                                        | CAI | CAI                       | CAI   | 0.00           | 0.00    | 1081            | CAI | CAI                       | CAI   | 0.00     | 0.00    |
| 1072                                        | CAI | CAI                       | CAI   | 0.00           | 0.00    | 1082            | CAI | CAI                       | CAI   | 0.00     | 0.00    |
| 1073                                        | CAI | CAI                       | CAI   | 0.00           | 0.00    | 1083            | CAI | CAI                       | CAI   | 0.00     | 0.00    |
| 1074                                        | CAI | CAI                       | CAI   | 0.00           | 0.00    | 1084            | CAI | CAI                       | CAI   | 0.00     | 0.00    |
| 1075                                        | CAI | CAI                       | CAI   | 0.00           | 0.00    | 1085            | CAI | CAI                       | CAI   | 0.00     | 0.00    |
| 1076                                        | CAI | CAI                       | CAI   | 0.00           | 0.00    | 1086            | CAI | CAI                       | CAI   | 0.00     | 0.00    |
| 1077                                        | CAI | CAI                       | CAI   | 0.00           | 0.00    | 1087            | CAI | CAI                       | CAI   | 0.00     | 0.00    |
| 1078                                        | CAI | CAI                       | CAI   | 0.00           | 0.00    | 1088            | CAI | CAI                       | CAI   | 0.00     | 0.00    |
| 1079                                        | CAI | CAI                       | CAI   | 0.00           | 0.00    | 1089            | CAI | CAI                       | CAI   | 0.00     | 0.00    |
| 1080                                        | CAI | CAI                       | CAI   | 0.00           | 0.00    | 1090            | CAI | CAI                       | CAI   | 0.00     | 0.00    |
| 1081                                        | CAI | CAI                       | CAI   | 0.00           | 0.00    | 1091            | CAI | CAI                       | CAI   | 0.00     | 0.00    |
| 1082                                        | CAI | CAI                       | CAI   | 0.00           | 0.00    | 1092            | CAI | CAI                       | CAI   | 0.00     | 0.00    |
| 1083                                        | CAI | CAI                       | CAI   | 0.00           | 0.00    | 1093            | CAI | CAI                       | CAI   | 0.00     | 0.00    |
| 1084                                        | CAI | CAI                       | CAI   | 0.00           | 0.00    | 1094            | CAI | CAI                       | CAI   | 0.00     | 0.00    |
| 1085                                        | CAI | CAI                       | CAI   | 0.00           | 0.00    | 1095            | CAI | CAI                       | CAI   | 0.00     | 0.00    |
| 1086                                        | CAI | CAI                       | CAI   | 0.00           | 0.00    | 1096            | CAI | CAI                       | CAI   | 0.00     | 0.00    |
| 1087                                        | CAI | CAI                       | CAI   | 0.00           | 0.00    | 1097            | CAI | CAI                       | CAI   | 0.00     | 0.00    |
| 1088                                        | CAI | CAI                       | CAI   | 0.00           | 0.00    | 1098            | CAI | CAI                       | CAI   | 0.00     | 0.00    |
| 1089                                        | CAI | CAI                       | CAI   | 0.00           | 0.00    | 1099            | CAI | CAI                       | CAI   | 0.00     | 0.00    |
| 1090                                        | CAI | CAI                       | CAI   | 0.00           | 0.00    | 1100            | CAI | CAI                       | CAI   | 0.00     | 0.00    |
| 1091                                        | CAI | CAI                       | CAI   | 0.00           | 0.00    | 1101            | CAI | CAI                       | CAI   | 0.00     | 0.00    |
| 1092                                        | CAI | CAI                       | CAI   | 0.00           | 0.00    | 1102            | CAI | CAI                       | CAI   | 0.00     | 0.00    |
| 1093                                        | CAI | CAI                       | CAI   | 0.00           | 0.00    | 1103            | CAI | CAI                       | CAI   | 0.00     | 0.00    |
| 1094                                        | CAI | CAI                       | CAI   | 0.00           | 0.00    | 1104            | CAI | CAI                       | CAI   | 0.00     | 0.00    |
| 1095                                        | CAI | CAI                       | CAI   | 0.00           | 0.00    | 1105            | CAI | CAI                       | CAI   | 0.00     | 0.00    |
| 1096                                        | CAI | CAI                       | CAI   | 0.00           | 0.00    | 1106            | CAI | CAI                       | CAI   | 0.00     | 0.00    |
| 1097                                        | CAI | CAI                       | CAI   | 0.00           | 0.00    | 1107            | CAI | CAI                       | CAI   | 0.00     | 0.00    |
| 1098                                        | CAI | CAI                       | CAI   | 0.00           | 0.00    | 1108            | CAI | CAI                       | CAI   | 0.00     | 0.00    |
| 1099                                        | CAI | CAI                       | CAI   | 0.00           | 0.00    | 1109            | CAI | CAI                       | CAI   | 0.00     | 0.00    |
| 1100                                        | CAI | CAI                       | CAI   | 0.00           | 0.00    | 1110            | CAI | CAI                       | CAI   | 0.00     | 0.00    |
| 1101                                        | CAI | CAI                       | CAI   | 0.00           | 0.00    | 1111            | CAI | CAI                       | CAI   | 0.00     | 0.00    |
| 1102                                        | CAI | CAI                       | CAI   | 0.00           | 0.00    | 1112            | CAI | CAI                       | CAI   | 0.00     | 0.00    |
| 1103                                        | CAI | CAI                       | CAI   | 0.00           | 0.00    | 1113            | CAI | CAI                       | CAI   | 0.00     | 0.00    |
| 1104                                        | CAI | CAI                       | CAI   | 0.00           | 0.00    | 1114            | CAI | CAI                       | CAI   | 0.00     | 0.00    |
| 1105                                        | CAI | CAI                       | CAI   | 0.00           | 0.00    | 1115            | CAI | CAI                       | CAI   | 0.00     | 0.00    |
| 1106                                        | CAI | CAI                       | CAI   | 0.00           | 0.00    | 1116            | CAI | CAI                       | CAI   | 0.00     | 0.00    |
| 1107                                        | CAI | CAI                       | CAI   | 0.00           | 0.00    | 1117            | CAI | CAI                       | CAI   | 0.00     | 0.00    |
| 1108                                        | CAI | CAI                       | CAI   | 0.00           | 0.00    | 1118            | CAI | CAI                       | CAI   | 0.00     | 0.00    |
| 1109                                        | CAI | CAI                       | CAI   | 0.00           | 0.00    | 1119            | CAI | CAI                       | CAI   | 0.00     | 0.00    |
| 1110                                        | CAI | CAI                       | CAI   | 0.00           | 0.00    | 1120            | CAI | CAI                       | CAI   | 0.00     | 0.00    |
| 1111                                        | CAI | CAI                       | CAI   | 0.00           | 0.00    | 1121            | CAI | CAI                       | CAI   | 0.00     | 0.00    |
| 1112                                        | CAI | CAI                       | CAI   | 0.00           | 0.00    | 1122            | CAI | CAI                       | CAI   | 0.00     | 0.00    |
| 1113                                        | CAI | CAI                       | CAI   | 0.00           | 0.00    | 1123            | CAI | CAI                       | CAI   | 0.00     | 0.00    |
| 1114                                        | CAI | CAI                       | CAI   | 0.00           | 0.00    | 1124            | CAI | CAI                       | CAI   | 0.00     | 0.00    |
| 1115                                        | CAI | CAI                       | CAI   | 0.00           | 0.00    | 1125            | CAI | CAI                       | CAI   | 0.00     | 0.00    |
| 1116                                        | CAI | CAI                       | CAI   | 0.00           | 0.00    | 1126            | CAI | CAI                       |       |          |         |

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| ISO  | Ref | Configuration Signature Name                | Group | Min (dB) | Unit  |
|------|-----|---------------------------------------------|-------|----------|-------|
| 1000 | ACG | IEEE Std 1380-1997, MCS0, 100 Hz/day code   | WLAN  | 1.57     | -18.5 |
| 1001 | ACG | IEEE Std 1380-1997, MCS1, 100 Hz/day code   | WLAN  | 1.79     | -18.5 |
| 1002 | ACG | IEEE Std 1380-1997, MCS2, 100 Hz/day code   | WLAN  | 2.00     | -18.5 |
| 1003 | ACG | IEEE Std 1380-1997, MCS3, 100 Hz/day code   | WLAN  | 2.21     | -18.5 |
| 1004 | ACG | IEEE Std 1380-1997, MCS4, 100 Hz/day code   | WLAN  | 2.42     | -18.5 |
| 1005 | ACG | IEEE Std 1380-1997, MCS5, 100 Hz/day code   | WLAN  | 2.63     | -18.5 |
| 1006 | ACG | IEEE Std 1380-1997, MCS6, 100 Hz/day code   | WLAN  | 2.84     | -18.5 |
| 1007 | ACG | IEEE Std 1380-1997, MCS7, 100 Hz/day code   | WLAN  | 3.05     | -18.5 |
| 1008 | ACG | IEEE Std 1380-1997, MCS8, 100 Hz/day code   | WLAN  | 3.26     | -18.5 |
| 1009 | ACG | IEEE Std 1380-1997, MCS9, 100 Hz/day code   | WLAN  | 3.47     | -18.5 |
| 1010 | ACG | IEEE Std 1380-1997, MCS10, 100 Hz/day code  | WLAN  | 3.68     | -18.5 |
| 1011 | ACG | IEEE Std 1380-1997, MCS11, 100 Hz/day code  | WLAN  | 3.89     | -18.5 |
| 1012 | ACG | IEEE Std 1380-1997, MCS12, 100 Hz/day code  | WLAN  | 4.10     | -18.5 |
| 1013 | ACG | IEEE Std 1380-1997, MCS13, 100 Hz/day code  | WLAN  | 4.31     | -18.5 |
| 1014 | ACG | IEEE Std 1380-1997, MCS14, 100 Hz/day code  | WLAN  | 4.52     | -18.5 |
| 1015 | ACG | IEEE Std 1380-1997, MCS15, 100 Hz/day code  | WLAN  | 4.73     | -18.5 |
| 1016 | ACG | IEEE Std 1380-1997, MCS16, 100 Hz/day code  | WLAN  | 4.94     | -18.5 |
| 1017 | ACG | IEEE Std 1380-1997, MCS17, 100 Hz/day code  | WLAN  | 5.15     | -18.5 |
| 1018 | ACG | IEEE Std 1380-1997, MCS18, 100 Hz/day code  | WLAN  | 5.36     | -18.5 |
| 1019 | ACG | IEEE Std 1380-1997, MCS19, 100 Hz/day code  | WLAN  | 5.57     | -18.5 |
| 1020 | ACG | IEEE Std 1380-1997, MCS20, 100 Hz/day code  | WLAN  | 5.78     | -18.5 |
| 1021 | ACG | IEEE Std 1380-1997, MCS21, 100 Hz/day code  | WLAN  | 5.99     | -18.5 |
| 1022 | ACG | IEEE Std 1380-1997, MCS22, 100 Hz/day code  | WLAN  | 6.20     | -18.5 |
| 1023 | ACG | IEEE Std 1380-1997, MCS23, 100 Hz/day code  | WLAN  | 6.41     | -18.5 |
| 1024 | ACG | IEEE Std 1380-1997, MCS24, 100 Hz/day code  | WLAN  | 6.62     | -18.5 |
| 1025 | ACG | IEEE Std 1380-1997, MCS25, 100 Hz/day code  | WLAN  | 6.83     | -18.5 |
| 1026 | ACG | IEEE Std 1380-1997, MCS26, 100 Hz/day code  | WLAN  | 7.04     | -18.5 |
| 1027 | ACG | IEEE Std 1380-1997, MCS27, 100 Hz/day code  | WLAN  | 7.25     | -18.5 |
| 1028 | ACG | IEEE Std 1380-1997, MCS28, 100 Hz/day code  | WLAN  | 7.46     | -18.5 |
| 1029 | ACG | IEEE Std 1380-1997, MCS29, 100 Hz/day code  | WLAN  | 7.67     | -18.5 |
| 1030 | ACG | IEEE Std 1380-1997, MCS30, 100 Hz/day code  | WLAN  | 7.88     | -18.5 |
| 1031 | ACG | IEEE Std 1380-1997, MCS31, 100 Hz/day code  | WLAN  | 8.09     | -18.5 |
| 1032 | ACG | IEEE Std 1380-1997, MCS32, 100 Hz/day code  | WLAN  | 8.30     | -18.5 |
| 1033 | ACG | IEEE Std 1380-1997, MCS33, 100 Hz/day code  | WLAN  | 8.51     | -18.5 |
| 1034 | ACG | IEEE Std 1380-1997, MCS34, 100 Hz/day code  | WLAN  | 8.72     | -18.5 |
| 1035 | ACG | IEEE Std 1380-1997, MCS35, 100 Hz/day code  | WLAN  | 8.93     | -18.5 |
| 1036 | ACG | IEEE Std 1380-1997, MCS36, 100 Hz/day code  | WLAN  | 9.14     | -18.5 |
| 1037 | ACG | IEEE Std 1380-1997, MCS37, 100 Hz/day code  | WLAN  | 9.35     | -18.5 |
| 1038 | ACG | IEEE Std 1380-1997, MCS38, 100 Hz/day code  | WLAN  | 9.56     | -18.5 |
| 1039 | ACG | IEEE Std 1380-1997, MCS39, 100 Hz/day code  | WLAN  | 9.77     | -18.5 |
| 1040 | ACG | IEEE Std 1380-1997, MCS40, 100 Hz/day code  | WLAN  | 9.98     | -18.5 |
| 1041 | ACG | IEEE Std 1380-1997, MCS41, 100 Hz/day code  | WLAN  | 10.19    | -18.5 |
| 1042 | ACG | IEEE Std 1380-1997, MCS42, 100 Hz/day code  | WLAN  | 10.40    | -18.5 |
| 1043 | ACG | IEEE Std 1380-1997, MCS43, 100 Hz/day code  | WLAN  | 10.61    | -18.5 |
| 1044 | ACG | IEEE Std 1380-1997, MCS44, 100 Hz/day code  | WLAN  | 10.82    | -18.5 |
| 1045 | ACG | IEEE Std 1380-1997, MCS45, 100 Hz/day code  | WLAN  | 11.03    | -18.5 |
| 1046 | ACG | IEEE Std 1380-1997, MCS46, 100 Hz/day code  | WLAN  | 11.24    | -18.5 |
| 1047 | ACG | IEEE Std 1380-1997, MCS47, 100 Hz/day code  | WLAN  | 11.45    | -18.5 |
| 1048 | ACG | IEEE Std 1380-1997, MCS48, 100 Hz/day code  | WLAN  | 11.66    | -18.5 |
| 1049 | ACG | IEEE Std 1380-1997, MCS49, 100 Hz/day code  | WLAN  | 11.87    | -18.5 |
| 1050 | ACG | IEEE Std 1380-1997, MCS50, 100 Hz/day code  | WLAN  | 12.08    | -18.5 |
| 1051 | ACG | IEEE Std 1380-1997, MCS51, 100 Hz/day code  | WLAN  | 12.29    | -18.5 |
| 1052 | ACG | IEEE Std 1380-1997, MCS52, 100 Hz/day code  | WLAN  | 12.50    | -18.5 |
| 1053 | ACG | IEEE Std 1380-1997, MCS53, 100 Hz/day code  | WLAN  | 12.71    | -18.5 |
| 1054 | ACG | IEEE Std 1380-1997, MCS54, 100 Hz/day code  | WLAN  | 12.92    | -18.5 |
| 1055 | ACG | IEEE Std 1380-1997, MCS55, 100 Hz/day code  | WLAN  | 13.13    | -18.5 |
| 1056 | ACG | IEEE Std 1380-1997, MCS56, 100 Hz/day code  | WLAN  | 13.34    | -18.5 |
| 1057 | ACG | IEEE Std 1380-1997, MCS57, 100 Hz/day code  | WLAN  | 13.55    | -18.5 |
| 1058 | ACG | IEEE Std 1380-1997, MCS58, 100 Hz/day code  | WLAN  | 13.76    | -18.5 |
| 1059 | ACG | IEEE Std 1380-1997, MCS59, 100 Hz/day code  | WLAN  | 13.97    | -18.5 |
| 1060 | ACG | IEEE Std 1380-1997, MCS60, 100 Hz/day code  | WLAN  | 14.18    | -18.5 |
| 1061 | ACG | IEEE Std 1380-1997, MCS61, 100 Hz/day code  | WLAN  | 14.39    | -18.5 |
| 1062 | ACG | IEEE Std 1380-1997, MCS62, 100 Hz/day code  | WLAN  | 14.60    | -18.5 |
| 1063 | ACG | IEEE Std 1380-1997, MCS63, 100 Hz/day code  | WLAN  | 14.81    | -18.5 |
| 1064 | ACG | IEEE Std 1380-1997, MCS64, 100 Hz/day code  | WLAN  | 15.02    | -18.5 |
| 1065 | ACG | IEEE Std 1380-1997, MCS65, 100 Hz/day code  | WLAN  | 15.23    | -18.5 |
| 1066 | ACG | IEEE Std 1380-1997, MCS66, 100 Hz/day code  | WLAN  | 15.44    | -18.5 |
| 1067 | ACG | IEEE Std 1380-1997, MCS67, 100 Hz/day code  | WLAN  | 15.65    | -18.5 |
| 1068 | ACG | IEEE Std 1380-1997, MCS68, 100 Hz/day code  | WLAN  | 15.86    | -18.5 |
| 1069 | ACG | IEEE Std 1380-1997, MCS69, 100 Hz/day code  | WLAN  | 16.07    | -18.5 |
| 1070 | ACG | IEEE Std 1380-1997, MCS70, 100 Hz/day code  | WLAN  | 16.28    | -18.5 |
| 1071 | ACG | IEEE Std 1380-1997, MCS71, 100 Hz/day code  | WLAN  | 16.49    | -18.5 |
| 1072 | ACG | IEEE Std 1380-1997, MCS72, 100 Hz/day code  | WLAN  | 16.70    | -18.5 |
| 1073 | ACG | IEEE Std 1380-1997, MCS73, 100 Hz/day code  | WLAN  | 16.91    | -18.5 |
| 1074 | ACG | IEEE Std 1380-1997, MCS74, 100 Hz/day code  | WLAN  | 17.12    | -18.5 |
| 1075 | ACG | IEEE Std 1380-1997, MCS75, 100 Hz/day code  | WLAN  | 17.33    | -18.5 |
| 1076 | ACG | IEEE Std 1380-1997, MCS76, 100 Hz/day code  | WLAN  | 17.54    | -18.5 |
| 1077 | ACG | IEEE Std 1380-1997, MCS77, 100 Hz/day code  | WLAN  | 17.75    | -18.5 |
| 1078 | ACG | IEEE Std 1380-1997, MCS78, 100 Hz/day code  | WLAN  | 17.96    | -18.5 |
| 1079 | ACG | IEEE Std 1380-1997, MCS79, 100 Hz/day code  | WLAN  | 18.17    | -18.5 |
| 1080 | ACG | IEEE Std 1380-1997, MCS80, 100 Hz/day code  | WLAN  | 18.38    | -18.5 |
| 1081 | ACG | IEEE Std 1380-1997, MCS81, 100 Hz/day code  | WLAN  | 18.59    | -18.5 |
| 1082 | ACG | IEEE Std 1380-1997, MCS82, 100 Hz/day code  | WLAN  | 18.80    | -18.5 |
| 1083 | ACG | IEEE Std 1380-1997, MCS83, 100 Hz/day code  | WLAN  | 19.01    | -18.5 |
| 1084 | ACG | IEEE Std 1380-1997, MCS84, 100 Hz/day code  | WLAN  | 19.22    | -18.5 |
| 1085 | ACG | IEEE Std 1380-1997, MCS85, 100 Hz/day code  | WLAN  | 19.43    | -18.5 |
| 1086 | ACG | IEEE Std 1380-1997, MCS86, 100 Hz/day code  | WLAN  | 19.64    | -18.5 |
| 1087 | ACG | IEEE Std 1380-1997, MCS87, 100 Hz/day code  | WLAN  | 19.85    | -18.5 |
| 1088 | ACG | IEEE Std 1380-1997, MCS88, 100 Hz/day code  | WLAN  | 20.06    | -18.5 |
| 1089 | ACG | IEEE Std 1380-1997, MCS89, 100 Hz/day code  | WLAN  | 20.27    | -18.5 |
| 1090 | ACG | IEEE Std 1380-1997, MCS90, 100 Hz/day code  | WLAN  | 20.48    | -18.5 |
| 1091 | ACG | IEEE Std 1380-1997, MCS91, 100 Hz/day code  | WLAN  | 20.69    | -18.5 |
| 1092 | ACG | IEEE Std 1380-1997, MCS92, 100 Hz/day code  | WLAN  | 20.90    | -18.5 |
| 1093 | ACG | IEEE Std 1380-1997, MCS93, 100 Hz/day code  | WLAN  | 21.11    | -18.5 |
| 1094 | ACG | IEEE Std 1380-1997, MCS94, 100 Hz/day code  | WLAN  | 21.32    | -18.5 |
| 1095 | ACG | IEEE Std 1380-1997, MCS95, 100 Hz/day code  | WLAN  | 21.53    | -18.5 |
| 1096 | ACG | IEEE Std 1380-1997, MCS96, 100 Hz/day code  | WLAN  | 21.74    | -18.5 |
| 1097 | ACG | IEEE Std 1380-1997, MCS97, 100 Hz/day code  | WLAN  | 21.95    | -18.5 |
| 1098 | ACG | IEEE Std 1380-1997, MCS98, 100 Hz/day code  | WLAN  | 22.16    | -18.5 |
| 1099 | ACG | IEEE Std 1380-1997, MCS99, 100 Hz/day code  | WLAN  | 22.37    | -18.5 |
| 1100 | ACG | IEEE Std 1380-1997, MCS100, 100 Hz/day code | WLAN  | 22.58    | -18.5 |
| 1101 | ACG | IEEE Std 1380-1997, MCS101, 100 Hz/day code | WLAN  | 22.79    | -18.5 |
| 1102 | ACG | IEEE Std 1380-1997, MCS102, 100 Hz/day code | WLAN  | 23.00    | -18.5 |
| 1103 | ACG | IEEE Std 1380-1997, MCS103, 100 Hz/day code | WLAN  | 23.21    | -18.5 |
| 1104 | ACG | IEEE Std 1380-1997, MCS104, 100 Hz/day code | WLAN  | 23.42    | -18.5 |
| 1105 | ACG | IEEE Std 1380-1997, MCS105, 100 Hz/day code | WLAN  | 23.63    | -18.5 |
| 1106 | ACG | IEEE Std 1380-1997, MCS106, 100 Hz/day code | WLAN  | 23.84    | -18.5 |
| 1107 | ACG | IEEE Std 1380-1997, MCS107, 100 Hz/day code | WLAN  | 24.05    | -18.5 |
| 1108 | ACG | IEEE Std 1380-1997, MCS108, 100 Hz/day code | WLAN  | 24.26    | -18.5 |
| 1109 | ACG | IEEE Std 1380-1997, MCS109, 100 Hz/day code | WLAN  | 24.47    | -18.5 |
| 1110 | ACG | IEEE Std 1380-1997, MCS110, 100 Hz/day code | WLAN  | 24.68    | -18.5 |
| 1111 | ACG | IEEE Std 1380-1997, MCS111, 100 Hz/day code | WLAN  | 24.89    | -18.5 |
| 1112 | ACG | IEEE Std 1380-1997, MCS112, 100 Hz/day code | WLAN  | 25.10    | -18.5 |
| 1113 | ACG | IEEE Std 1380-1997, MCS113, 100 Hz/day code | WLAN  | 25.31    | -18.5 |
| 1114 | ACG | IEEE Std 1380-1997, MCS114, 100 Hz/day code | WLAN  | 25.52    | -18.5 |
| 1115 | ACG | IEEE Std 1380-1997, MCS115, 100 Hz/day code | WLAN  | 25.73    | -18.5 |
| 1116 | ACG | IEEE Std 1380-1997, MCS116, 100 Hz/day code | WLAN  | 25.94    | -18.5 |
| 1117 | ACG | IEEE Std 1380-1997, MCS117, 100 Hz/day code | WLAN  | 26.15    | -18.5 |
| 1118 | ACG | IEEE Std 1380-1997, MCS118, 100 Hz/day code | WLAN  | 26.36    | -18.5 |
| 1119 | ACG | IEEE Std 1380-1997, MCS119, 100 Hz/day code | WLAN  | 26.57    | -18.5 |
| 1120 | ACG | IEEE Std 1380-1997, MCS120, 100 Hz/day code | WLAN  | 26.78    | -18.5 |
| 1121 | ACG | IEEE Std 1380-1997, MCS121, 100 Hz/day code | WLAN  | 26.99    | -18.5 |
| 1122 | ACG | IEEE Std 1380-1997, MCS122, 100 Hz/day code | WLAN  | 27.20    | -18.5 |
| 1123 | ACG | IEEE Std 1380-1997, MCS123, 100 Hz/day code | WLAN  | 27.41    | -18.5 |
| 1124 | ACG | IEEE Std 1380-1997, MCS124, 100 Hz/day code | WLAN  | 27.62    | -18.5 |
| 1125 | ACG | IEEE Std 1380-1997, MCS125, 100 Hz/day code | WLAN  | 27.83    | -18.5 |
| 1126 | ACG | IEEE Std 1380-1997, MCS126, 100 Hz/day code | WLAN  | 28.04    | -18.5 |
| 1127 | ACG | IEEE Std 1380-1997, MCS127, 100 Hz/day code | WLAN  | 28.25    | -18.5 |
| 1128 | ACG | IEEE Std 1380-1997, MCS128, 100 Hz/day code | WLAN  | 28.46    | -18.5 |
| 1129 | ACG | IEEE Std 1380-1997, MCS129, 100 Hz/day code | WLAN  | 28.67    | -18.5 |
| 1130 | ACG | IEEE Std 1380-1997, MCS130, 100 Hz/day code | WLAN  | 28.88    | -18.5 |
| 1131 | ACG | IEEE Std 1380-1997, MCS131, 100 Hz/day code | WLAN  | 29.09    | -18.5 |
| 1132 | ACG | IEEE Std 1380-1997, MCS132, 100 Hz/day code | WLAN  | 29.30    | -18.5 |
| 1133 | ACG | IEEE Std 1380-1997, MCS133, 100 Hz/day code | WLAN  | 29.51    | -18.5 |
| 1134 | ACG | IEEE Std 1380-1997, MCS134, 100 Hz/day code | WLAN  | 29.72    | -18.5 |
| 1135 | ACG | IEEE Std 1380-1997, MCS135, 100 Hz/day code | WLAN  | 29.93    | -18.5 |
| 1136 | ACG | IEEE Std 1380-1997, MCS136, 100 Hz/day code | WLAN  | 30.14    | -18.5 |
| 1137 | ACG | IEEE Std 1380-1997, MCS137, 100 Hz/day code | WLAN  | 30.35    | -18.5 |
| 1138 | ACG | IEEE Std 1380-1997, MCS138, 100 Hz/day code | WLAN  | 30.56    | -18.5 |
| 1139 | ACG | IEEE Std 1380-1997, MCS139, 100 Hz/day code | WLAN  | 30.77    | -18.5 |
| 1140 | ACG | IEEE Std 1380-1997, MCS140, 100 Hz/day code | WLAN  | 30.98    | -18.5 |
| 1141 | ACG | IEEE Std 1380-1997, MCS141, 100 Hz/day code | WLAN  | 31.19    | -18.5 |
| 1142 | ACG | IEEE Std 1380-1997, MCS142, 100 Hz/day code | WLAN  | 31.40    | -18.5 |
| 1143 | ACG | IEEE Std 1380-1997, MCS143, 100 Hz/day code | WLAN  | 31.61    | -18.5 |
| 1144 | ACG | IEEE Std 1380-1997, MCS144, 100 Hz/day code | WLAN  | 31.82    | -18.5 |
| 1145 | ACG | IEEE Std 1380-1997, MCS145, 100 Hz/day code | WLAN  | 32.03    | -18.5 |
| 1146 | ACG | IEEE Std 1380-1997, MCS146, 100 Hz/day code | WLAN  | 32.24    | -18.5 |
| 1147 | ACG | IEEE Std 1380-1997, MCS147, 100 Hz/day code | WLAN  | 32.45    | -18.5 |
| 1148 | ACG | IEEE Std 1380-1997, MCS148, 100 Hz/day code | WLAN  | 32.66    | -18.5 |
| 1149 | ACG | IEEE Std 1380-1997, MCS149, 100 Hz/day code | WLAN  | 32.87    | -18.5 |
| 1150 | ACG | IEEE Std 1380-1997, MCS150, 100 Hz/day code | WLAN  | 33.08    | -18.5 |
| 1151 | ACG | IEEE Std 1380-1997, MCS151, 100 Hz/day code | WLAN  | 33.29    | -18.5 |
| 1152 | ACG | IEEE Std 1380-1997, MCS152, 100 Hz/day code | WLAN  | 33.50    | -18.5 |
| 1153 | ACG | IEEE Std 1380-1997, MCS153, 100 Hz/day code | WLAN  | 33.71    | -18.5 |
| 1154 | ACG | IEEE Std 1380-1997, MCS154, 100 Hz/day code | WLAN  | 33.92    | -18.5 |
| 1155 | ACG | IEEE Std 1380-1997, MCS155, 100 Hz/day code | WLAN  | 34.13    | -18.5 |
| 1156 | ACG | IEEE Std 1380-1997, MCS156, 100 Hz/day code | WLAN  | 34.34    | -18.5 |
| 1157 | ACG | IEEE Std 1380-1997, MCS157, 100 Hz/day code | WLAN  | 34.55    | -18.5 |
| 1158 | ACG | IEEE Std 1380-1997, MCS158, 100 Hz/day code | WLAN  | 34.76    | -18.5 |
| 1159 | ACG | IEEE Std 1380-1997, MCS159, 100 Hz/day code | WLAN  | 34.97    | -18.5 |
| 1160 | ACG | IEEE Std 1380-1997, MCS160, 100 Hz/day code | WLAN  | 35.18    | -18.5 |
| 1161 | ACG | IEEE Std 1380-1997, MCS161, 100 Hz/day code | WLAN  | 35.39    | -18.5 |
| 1162 | ACG | IEEE Std 1380-1997, MCS162, 100 Hz/day code | WLAN  | 35.60    | -18.5 |
| 1163 | ACG | IEEE Std 1380-1997, MCS163, 100 Hz/day code | WLAN  | 35.81    | -18.5 |
| 1164 | ACG | IEEE Std 13                                 |       |          |       |

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#### 4 Impedance and return loss

| Dipole D750V3 SN 1188   |                 |            |                        |                |
|-------------------------|-----------------|------------|------------------------|----------------|
| Head Liquid             |                 |            |                        |                |
| Date of Measurement     | Return Loss(dB) | $\Delta$ % | Impedance ( $\Omega$ ) | $\Delta\Omega$ |
| 2022/3/29               | -28.7           | /          | 53.6                   | /              |
| 2023/3/29               | -28.3           | 1.39%      | 53.2                   | 0.4            |
| Dipole D835V2 SN 4d114  |                 |            |                        |                |
| Head Liquid             |                 |            |                        |                |
| Date of Measurement     | Return Loss(dB) | $\Delta$ % | Impedance ( $\Omega$ ) | $\Delta\Omega$ |
| 2022/3/31               | -25.3           | /          | 48.7                   | /              |
| 2023/3/31               | -24.6           | 2.77%      | 49.1                   | 0.4            |
| Dipole D900V2 SN 1d079  |                 |            |                        |                |
| Head Liquid             |                 |            |                        |                |
| Date of Measurement     | Return Loss(dB) | $\Delta$ % | Impedance ( $\Omega$ ) | $\Delta\Omega$ |
| 2022/6/7                | -23.3           | /          | 48.1                   | /              |
| 2023/6/7                | -23.6           | -1.29%     | 48.3                   | 0.2            |
| Dipole D1800V2 SN 2d170 |                 |            |                        |                |
| Head Liquid             |                 |            |                        |                |
| Date of Measurement     | Return Loss(dB) | $\Delta$ % | Impedance ( $\Omega$ ) | $\Delta\Omega$ |
| 2022/3/31               | -29.4           | /          | 47.9                   | /              |
| 2023/3/31               | -28.9           | 1.70%      | 47.2                   | 0.7            |
| Dipole D1900V2 SN 5d136 |                 |            |                        |                |
| Head Liquid             |                 |            |                        |                |
| Date of Measurement     | Return Loss(dB) | $\Delta$ % | Impedance ( $\Omega$ ) | $\Delta\Omega$ |
| 2022/6/7                | -22.4           | /          | 51.2                   | /              |
| 2023/6/7                | -22.9           | -2.23%     | 51.6                   | -0.4           |
| Dipole D2000V2 SN 1041  |                 |            |                        |                |
| Head Liquid             |                 |            |                        |                |
| Date of Measurement     | Return Loss(dB) | $\Delta$ % | Impedance ( $\Omega$ ) | $\Delta\Omega$ |
| 2022/6/6                | -34.9           | /          | 48.4                   | /              |
| 2023/6/6                | -33.5           | 4.01%      | 49.1                   | -0.7           |
| Dipole D2300V2 SN 1096  |                 |            |                        |                |
| Head Liquid             |                 |            |                        |                |
| Date of Measurement     | Return Loss(dB) | $\Delta$ % | Impedance ( $\Omega$ ) | $\Delta\Omega$ |
| 2022/3/31               | -26.6           | /          | 49.2                   | /              |
| 2023/3/31               | -27.1           | -1.88%     | 49.4                   | 0.2            |
| Dipole D2450V2 SN 817   |                 |            |                        |                |
| Head Liquid             |                 |            |                        |                |
| Date of Measurement     | Return Loss(dB) | $\Delta$ % | Impedance ( $\Omega$ ) | $\Delta\Omega$ |
| 2022/4/1                | -28.5           | /          | 52.1                   | /              |
| 2023/4/1                | -28.0           | 1.75%      | 51.6                   | 0.5            |
| Dipole D2600V2 SN 1158  |                 |            |                        |                |
| Head Liquid             |                 |            |                        |                |
| Date of Measurement     | Return Loss(dB) | $\Delta$ % | Impedance ( $\Omega$ ) | $\Delta\Omega$ |
| 2022/3/31               | -23.8           | /          | 49.9                   | /              |
| 2023/3/31               | -23.3           | 2.10%      | 50.3                   | 0.4            |

| Dipole D5GHzV2 SN 1095 for 5200 |                 |            |                        |                |
|---------------------------------|-----------------|------------|------------------------|----------------|
| Head Liquid                     |                 |            |                        |                |
| Date of Measurement             | Return Loss(dB) | $\Delta$ % | Impedance ( $\Omega$ ) | $\Delta\Omega$ |
| 2022/6/1                        | -23.6           | /          | 46.1                   | /              |
| 2023/6/1                        | -23.1           | 2.12%      | 45.6                   | 0.5            |
| Dipole D5GHzV2 SN 1095 for 5300 |                 |            |                        |                |
| Head Liquid                     |                 |            |                        |                |
| Date of Measurement             | Return Loss(dB) | $\Delta$ % | Impedance ( $\Omega$ ) | $\Delta\Omega$ |
| 2022/6/1                        | -29.5           | /          | 47.8                   | /              |
| 2023/6/1                        | -28.8           | 2.37%      | 46.9                   | 0.9            |
| Dipole D5GHzV2 SN 1095 for 5500 |                 |            |                        |                |
| Head Liquid                     |                 |            |                        |                |
| Date of Measurement             | Return Loss(dB) | $\Delta$ % | Impedance ( $\Omega$ ) | $\Delta\Omega$ |
| 2022/6/1                        | -27.4           | /          | 50.3                   | /              |
| 2023/6/1                        | -27.6           | -0.73%     | 50.8                   | -0.5           |
| Dipole D5GHzV2 SN 1095 for 5600 |                 |            |                        |                |
| Head Liquid                     |                 |            |                        |                |
| Date of Measurement             | Return Loss(dB) | $\Delta$ % | Impedance ( $\Omega$ ) | $\Delta\Omega$ |
| 2022/6/1                        | -24.0           | /          | 54.5                   | /              |
| 2023/6/1                        | -23.6           | 1.67%      | 54.9                   | -0.4           |
| Dipole D5GHzV2 SN 1095 for 5800 |                 |            |                        |                |
| Head Liquid                     |                 |            |                        |                |
| Date of Measurement             | Return Loss(dB) | $\Delta$ % | Impedance ( $\Omega$ ) | $\Delta\Omega$ |
| 2022/6/1                        | -24.9           | /          | 51.5                   | /              |
| 2023/6/1                        | -24.3           | 2.41%      | 51.0                   | 0.5            |