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

## Antenna Parameters with Head TSL at 4200MHz

| | |
|---|---|
| Impedance, transformed to feed point | 46.9Ω- 2.96jΩ |
| Return Loss | - 27.0dB |

## General Antenna Parameters and Design

| | |
|---|---|
| Electrical Delay (one direction) | 1.017 ns |

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

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

## Additional EUT Data

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

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**DASY5 Validation Report for Head TSL** Date: 2022-10-19

Test Laboratory: CTTL, Beijing, China

**DUT: Dipole 4200 MHz; Type: D4200V2; Serial: D4200V2 - SN: 1013**

Communication System: UID 0, CW; Frequency: 4200 MHz;

Medium parameters used: f = 4200 MHz; $\sigma$ = 3.683 S/m; $\varepsilon_r$ = 36.71; $\rho$ = 1000 kg/m$^3$

Phantom section: Right Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: EX3DV4 - SN7464; ConvF(6.6, 6.6, 6.6) @ 4200 MHz; Calibrated: 2022-01-26
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1556; Calibrated: 2022-01-12
- Phantom: MFP_V5.1C (20deg probe tilt); Type: QD 000 P51 Cx; Serial: 1062
- DASY52 52.10.4(1535); SEMCAD X 14.6.14(7501)

**Dipole Calibration /Pin=100mW, d=10mm, f=4200 MHz/Zoom Scan, dist=1.4mm (8x8x7)/Cube 0:** Measurement grid: dx=4mm, dy=4mm, dz=1.4mm

Reference Value = 64.18 V/m; Power Drift = 0.01 dB

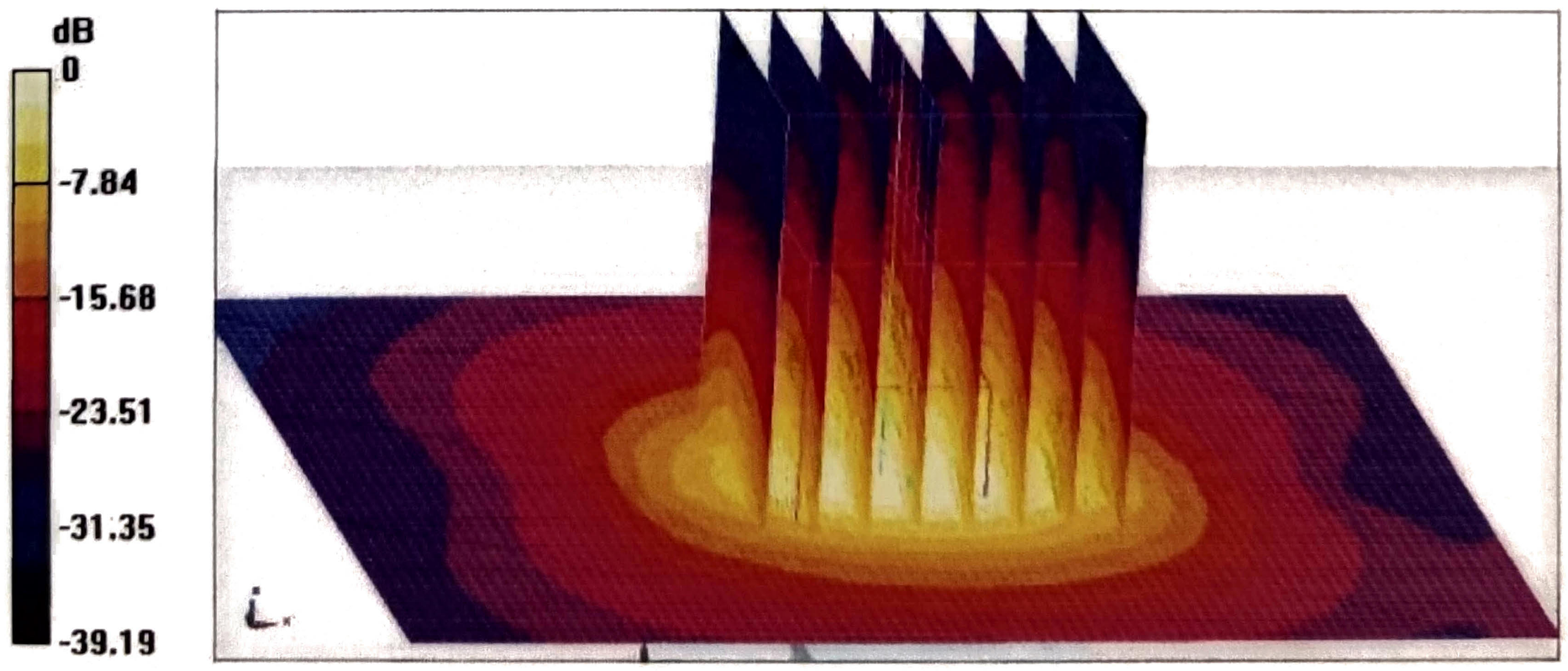
Peak SAR (extrapolated) = 18.4 W/kg

**SAR(1 g) = 6.61 W/kg; SAR(10 g) = 2.28 W/kg**

Smallest distance from peaks to all points 3 dB below = 8 mm

Ratio of SAR at M2 to SAR at M1 = 75%

Maximum value of SAR (measured) = 13.1 W/kg




0 dB = 13.1 W/kg = 11.17 dBW/kg

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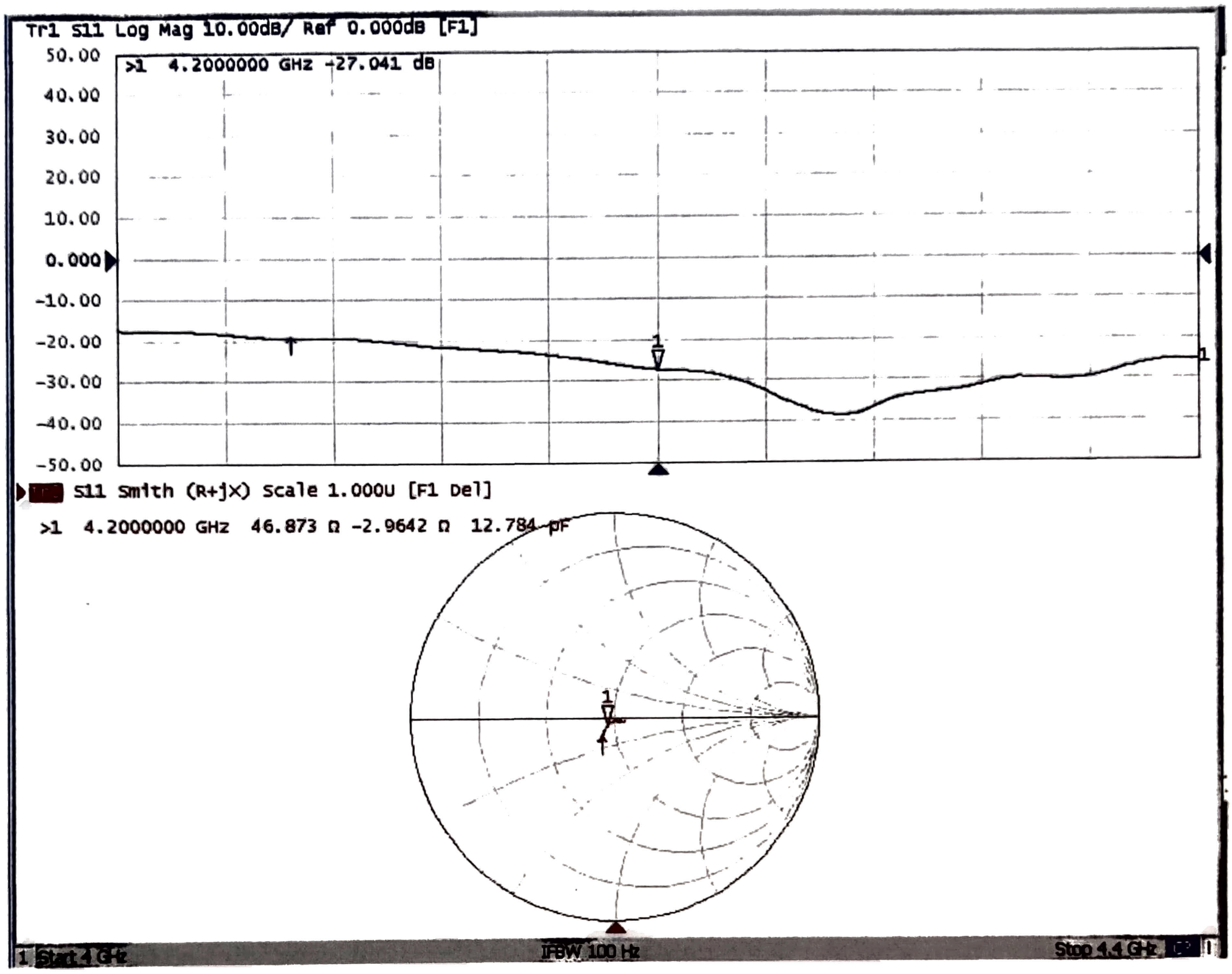
## Impedance Measurement Plot for Head TSL



In Collaboration with
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Client **SRTC** **Certificate No: Z22-60455**

# CALIBRATION CERTIFICATE

| | |
|---|---|
| Object | D4600V2 - SN: 1033 |
| Calibration Procedure(s) | FF-Z11-003-01<br>Calibration Procedures for dipole validation kits |
| Calibration date: | October 20, 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 | 106276 | 10-May-22 (CTTL, No.J22X03103) | May-23 |
| Power sensor NRP6A | 101369 | 10-May-22 (CTTL, No.J22X03103) | May-23 |
| Reference Probe EX3DV4 | SN 7464 | 26-Jan-22(SPEAG,No.EX3-7464_Jan22) | Jan-23 |
| DAE4 | SN 1556 | 12-Jan-22(CTTL-SPEAG,No.Z22-60007) | Jan-23 |
| **Secondary Standards** | **ID #** | **Cal Date (Calibrated by, Certificate No.)** | **Scheduled Calibration** |
| Signal Generator E4438C | MY49071430 | 13-Jan-22 (CTTL, No.J22X00409) | Jan-23 |
| Network Analyzer E5071C | MY46110673 | 14-Jan-22 (CTTL, No.J22X00406) | Jan-23 |

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

Issued: October 31, 2022

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