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CALIBRATION LABORATORY



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Appendix (Additional assessments outside the scope of CNAS L0570)

Antenna Parameters with Head TSL at 5200MHz

Impedance, transformed to feed point	49.0Ω- 9.07jΩ
Return Loss	- 20.8dB

Antenna Parameters with Head TSL at 5300MHz

Impedance, transformed to feed point	49.6Ω- 5.54jΩ
Return Loss	- 25.1dB

Antenna Parameters with Head TSL at 5500MHz

Impedance, transformed to feed point	53.4Ω- 4.03jΩ
Return Loss	- 25.9dB

Antenna Parameters with Head TSL at 5600MHz

Impedance, transformed to feed point	55.4Ω- 2.43jΩ
Return Loss	- 25.0dB

Antenna Parameters with Head TSL at 5800MHz

Impedance, transformed to feed point	56.2Ω- 5.30jΩ
Return Loss	- 22.3dB



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General Antenna Parameters and Design

Electrical Delay (one direction)	1.110 ns
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After long term use with 100W radiated power, only a slight warming of the dipole near the 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: 2023-09-07

Test Laboratory: CTTL, Beijing, China

DUT: Dipole 5GHz; Type: D5GHzV2; Serial: D5GHzV2 - SN: 1172

Communication System: CW; Frequency: 5200 MHz, Frequency: 5300 MHz,

Frequency: 5500 MHz, Frequency: 5600 MHz, Frequency: 5800 MHz

Medium parameters used: $f = 5200 \text{ MHz}$; $\sigma = 4.633 \text{ S/m}$; $\epsilon_r = 35.51$; $\rho = 1000 \text{ kg/m}^3$

Medium parameters used: $f = 5300 \text{ MHz}$; $\sigma = 4.746 \text{ S/m}$; $\epsilon_r = 35.31$; $\rho = 1000 \text{ kg/m}^3$

Medium parameters used: $f = 5500 \text{ MHz}$; $\sigma = 4.956 \text{ S/m}$; $\epsilon_r = 34.95$; $\rho = 1000 \text{ kg/m}^3$

Medium parameters used: $f = 5600 \text{ MHz}$; $\sigma = 5.068 \text{ S/m}$; $\epsilon_r = 34.8$; $\rho = 1000 \text{ kg/m}^3$

Medium parameters used: $f = 5800 \text{ MHz}$; $\sigma = 5.261 \text{ S/m}$; $\epsilon_r = 34.54$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Right Section

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

DASY5 Configuration:

- Probe: EX3DV4 - SN3617; ConvF(5.5, 5.5, 5.5) @ 5200 MHz; ConvF(5.5, 5.5, 5.5) @ 5300 MHz; ConvF(5.01, 5.01, 5.01) @ 5500 MHz; ConvF(5.01, 5.01, 5.01) @ 5600 MHz; ConvF(5.15, 5.15, 5.15) @ 5800 MHz; Calibrated: 2023-03-31
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1556; Calibrated: 2023-01-11
- 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=5200 MHz/Zoom Scan,

dist=1.4mm (8x8x7)/Cube 0: Measurement grid: $dx=4\text{mm}$, $dy=4\text{mm}$, $dz=1.4\text{mm}$

Reference Value = 65.41 V/m; Power Drift = -0.08 dB

Peak SAR (extrapolated) = 31.1 W/kg

SAR(1 g) = 7.76 W/kg; SAR(10 g) = 2.19 W/kg

Smallest distance from peaks to all points 3 dB below = 7.2 mm

Ratio of SAR at M2 to SAR at M1 = 65.3%

Maximum value of SAR (measured) = 18.5 W/kg

Dipole Calibration /Pin=100mW, d=10mm, f=5300 MHz/Zoom Scan,

dist=1.4mm (8x8x7)/Cube 0: Measurement grid: $dx=4\text{mm}$, $dy=4\text{mm}$, $dz=1.4\text{mm}$

Reference Value = 66.39 V/m; Power Drift = -0.07 dB

Peak SAR (extrapolated) = 32.5 W/kg

SAR(1 g) = 7.97 W/kg; SAR(10 g) = 2.26 W/kg

Smallest distance from peaks to all points 3 dB below = 7.2 mm

Ratio of SAR at M2 to SAR at M1 = 64.8%

Maximum value of SAR (measured) = 19.0 W/kg

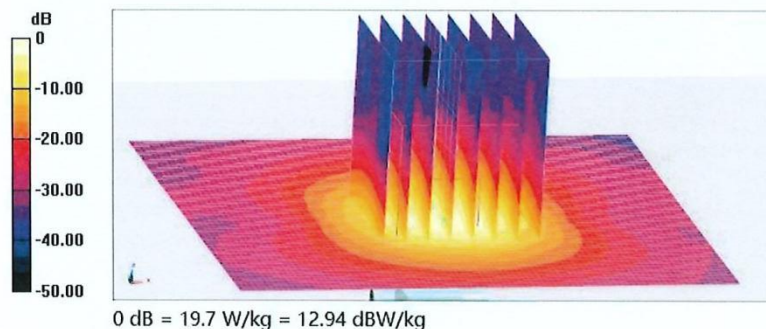


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Dipole Calibration /Pin=100mW, d=10mm, f=5500 MHz/Zoom Scan, dist=1.4mm (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 66.45 V/m; Power Drift = -0.04 dB
Peak SAR (extrapolated) = 35.6 W/kg
SAR(1 g) = 8.36 W/kg; SAR(10 g) = 2.35 W/kg
Smallest distance from peaks to all points 3 dB below = 7.2 mm
Ratio of SAR at M2 to SAR at M1 = 63.4%
Maximum value of SAR (measured) = 20.2 W/kg

Dipole Calibration /Pin=100mW, d=10mm, f=5600 MHz/Zoom Scan, dist=1.4mm (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 66.24 V/m; Power Drift = -0.03 dB
Peak SAR (extrapolated) = 35.7 W/kg
SAR(1 g) = 8.27 W/kg; SAR(10 g) = 2.33 W/kg
Smallest distance from peaks to all points 3 dB below = 7.2 mm
Ratio of SAR at M2 to SAR at M1 = 62.9%
Maximum value of SAR (measured) = 20.2 W/kg

Dipole Calibration /Pin=100mW, d=10mm, f=5800 MHz/Zoom Scan, dist=1.4mm (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 63.52 V/m; Power Drift = -0.04 dB
Peak SAR (extrapolated) = 36.0 W/kg
SAR(1 g) = 7.89 W/kg; SAR(10 g) = 2.21 W/kg
Smallest distance from peaks to all points 3 dB below = 7.2 mm
Ratio of SAR at M2 to SAR at M1 = 61.2%
Maximum value of SAR (measured) = 19.7 W/kg

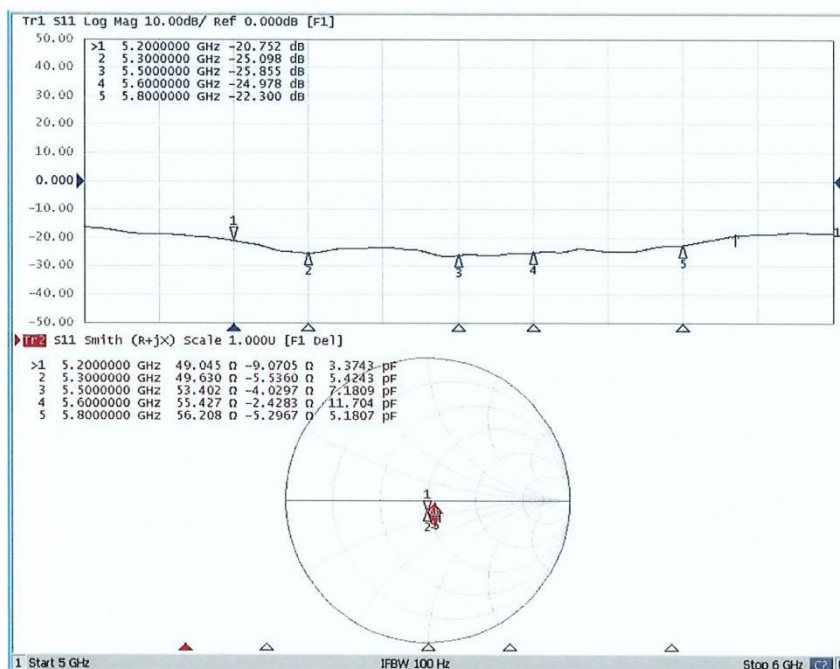




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Impedance Measurement Plot for Head TSL



Annex C: Revised History

Version	Revised Content
V0	Initial

Annex D: Accreditation Certificate**END OF REPORT**