## DASY5 Validation Report for Head TSL

Date: 25.01.2023

Test Laboratory: SPEAG, Zurich, Switzerland

**DUT: Dipole D5GHzV2; Type: D5GHzV2; Serial: D5GHzV2 - SN:1262**

Communication System: UID 0 - CW; Frequency: 5250 MHz, Frequency: 5600 MHz, Frequency: 5750 MHz
Medium parameters used: f = 5250 MHz; $\sigma$ = 4.65 S/m; $\varepsilon_r$ = 35.6; $\rho$ = 1000 kg/m$^3$
Medium parameters used: f = 5600 MHz; $\sigma$ = 5.03 S/m; $\varepsilon_r$ = 35.4; $\rho$ = 1000 kg/m$^3$
Medium parameters used: f = 5750 MHz; $\sigma$ = 5.15 S/m; $\varepsilon_r$ = 35.3; $\rho$ = 1000 kg/m$^3$
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

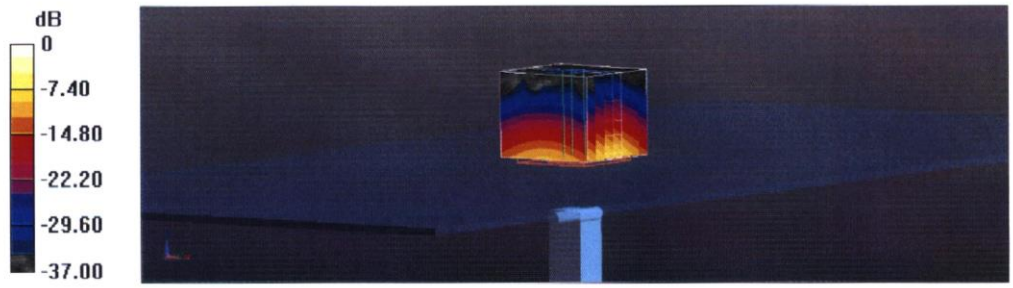
DASY52 Configuration:

- Probe: EX3DV4 - SN3503; ConvF(5.5, 5.5, 5.5) @ 5250 MHz, ConvF(5.1, 5.1, 5.1) @ 5600 MHz, ConvF(5.08, 5.08, 5.08) @ 5750 MHz; Calibrated: 08.03.2022
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 19.12.2022
- Phantom: Flat Phantom 5.0 (front); Type: QD 000 P50 AA; Serial: 1001
- DASY52 52.10.4(1535); SEMCAD X 14.6.14(7501)

**Dipole Calibration for Head Tissue/Pin=100mW, dist=10mm, f=5250 MHz/Zoom Scan, dist=1.4mm (8x8x7)/Cube 0:** Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 75.34 V/m; Power Drift = -0.03 dB
Peak SAR (extrapolated) = 27.6 W/kg
**SAR(1 g) = 8.12 W/kg; SAR(10 g) = 2.31 W/kg**
Smallest distance from peaks to all points 3 dB below = 6.8 mm
Ratio of SAR at M2 to SAR at M1 = 70.8%
Maximum value of SAR (measured) = 18.1 W/kg

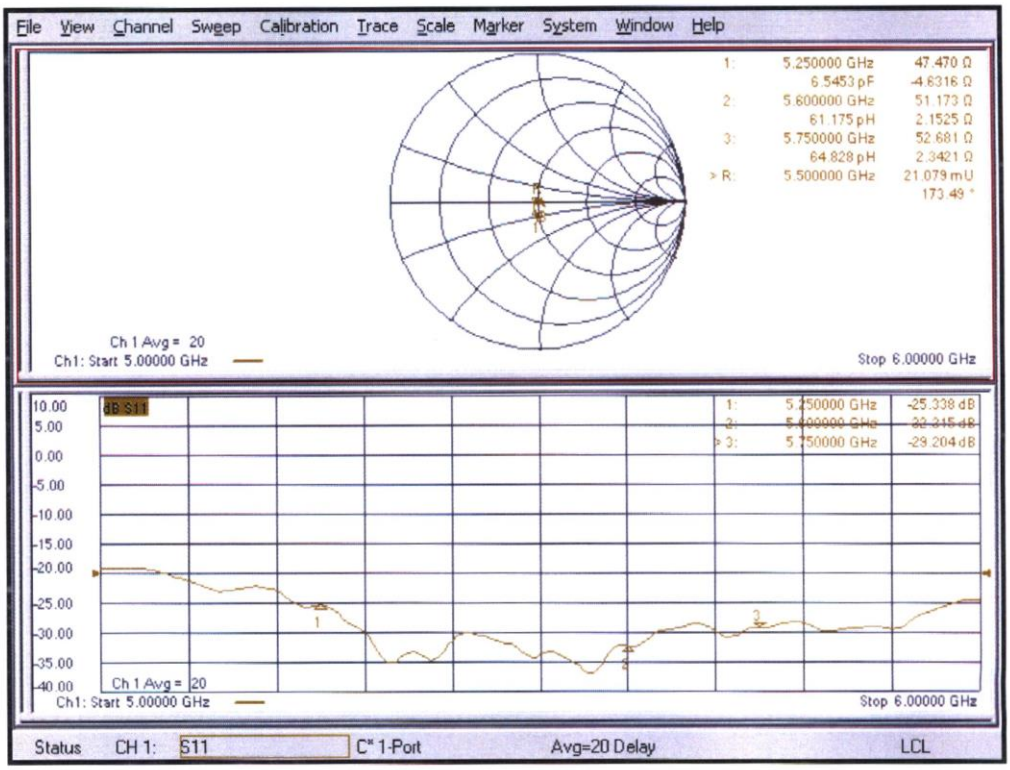
**Dipole Calibration for Head Tissue/Pin=100mW, dist=10mm, f=5600 MHz/Zoom Scan, dist=1.4mm (8x8x7)/Cube 0:** Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 75.17 V/m; Power Drift = -0.07 dB
Peak SAR (extrapolated) = 30.4 W/kg
**SAR(1 g) = 8.27 W/kg; SAR(10 g) = 2.34 W/kg**
Smallest distance from peaks to all points 3 dB below = 6.9 mm
Ratio of SAR at M2 to SAR at M1 = 67.9%
Maximum value of SAR (measured) = 18.9 W/kg

**Dipole Calibration for Head Tissue/Pin=100mW, dist=10mm, f=5750 MHz/Zoom Scan, dist=1.4mm (8x8x7)/Cube 0:** Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 72.05 V/m; Power Drift = -0.03 dB
Peak SAR (extrapolated) = 30.7 W/kg
**SAR(1 g) = 7.93 W/kg; SAR(10 g) = 2.23 W/kg**
Smallest distance from peaks to all points 3 dB below = 7.2 mm
Ratio of SAR at M2 to SAR at M1 = 66.1%
Maximum value of SAR (measured) = 18.4 W/kg




0 dB = 18.9 W/kg = 12.76 dBW/kg

**Impedance Measurement Plot for Head TSL**



# 6.5G Dipole Calibration Certificate

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

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**Accreditation No.: SCS 0108**

**Client** CTTL-BJ (Auden)

**Certificate No: D6.5GHzV2-1059_Dec21**

## CALIBRATION CERTIFICATE

| | |
|---|---|
| Object | D6.5GHzV2 - SN:1059 |
| Calibration procedure(s) | QA CAL-22.v6<br>Calibration Procedure for SAR Validation Sources between 3-10 GHz |
| Calibration date: | December 01, 2021 |

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 (Certificate No.) | Scheduled Calibration |
|---|---|---|---|
| Power meter NRP | SN: 104778 | 09-Apr-21 (No. 217-03291/03292) | Apr-22 |
| Power sensor NRP-Z91 | SN: 103244 | 09-Apr-21 (No. 217-03291) | Apr-22 |
| Power sensor NRP-Z91 | SN: 103245 | 09-Apr-21 (No. 217-03292) | Apr-22 |
| Power sensor R&S NRP33T | SN: 100967 | 08-Apr-21 (No. 217-03293) | Apr-22 |
| Reference 20 dB Attenuator | SN: BH9394 (20k) | 09-Apr-21 (No. 217-03343) | Apr-22 |
| Type-N mismatch combination | SN: 310982 / 06327 | 09-Apr-21 (No. 217-03344) | Apr-22 |
| Reference Probe EX3DV4 | SN: 7405 | 30-Dec-20 (No. EX3-7405_Dec20) | Dec-21 |
| DAE4 | SN: 908 | 24-Jun-21 (No. DAE4-908_Jun21) | Jun-22 |

| Secondary Standards | ID # | Check Date (in house) | Scheduled Check |
|---|---|---|---|
| RF generator Anapico APSIN20G | SN: 669 | 28-Mar-17 (in house check Dec-18) | In house check: Dec-21 |
| Network Analyzer R&S ZVL13 | SN: 101093 | 10-May-12 (in house check Dec-18) | In house check: Dec-21 |

| | Name | Function | Signature |
|---|---|---|---|
| Calibrated by: | Leif Klysner | Laboratory Technician | |
| Approved by: | Niels Kuster | Quality Manager | |

Issued: December 1, 2021

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**Accreditation No.: SCS 0108**

**Glossary:**

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

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

a) IEC/IEEE 62209-1528, "Measurement Procedure For The Assessment Of Specific Absorption Rate Of Human Exposure To Radio Frequency Fields From Hand-Held And Body-Worn Wireless Communication Devices - Part 1528: Human Models, Instrumentation And Procedures (Frequency Range Of 4 MHz To 10 GHz)", October 2020.

**Additional Documentation:**

b) DASY System Handbook

**Methods Applied and Interpretation of Parameters:**

- *Measurement Conditions:* Further details are available from the Validation Report at the end of the certificate. All figures stated in the certificate are valid at the frequency indicated.
- *Antenna Parameters with TSL:* The dipole is mounted with the spacer to position its feed point exactly below the center marking of the flat phantom section, with the arms oriented parallel to the body axis.
- *Feed Point Impedance and Return Loss:* These parameters are measured with the dipole positioned under the liquid filled phantom. The impedance stated is transformed from the measurement at the SMA connector to the feed point. The Return Loss ensures low reflected power. No uncertainty required.
- *SAR measured:* SAR measured at the stated antenna input power.
- *SAR normalized:* SAR as measured, normalized to an input power of 1 W at the antenna connector.
- *SAR for nominal TSL parameters:* The measured TSL parameters are used to calculate the nominal SAR result.
- *The absorbed power density (APD):* The absorbed power density is evaluated according to Samaras T, Christ A, Kuster N, "*Compliance assessment of the epithelial or absorbed power density above 6 GHz using SAR measurement systems*", Bioelectromagnetics, 2021 (submitted). The additional evaluation uncertainty of 0.55 dB (rectangular distribution) is considered.

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

## Measurement Conditions

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

| | | |
|---|---|---|
| **DASY Version** | DASY6 | V16.0 |
| **Extrapolation** | Advanced Extrapolation | |
| **Phantom** | Modular Flat Phantom | |
| **Distance Dipole Center - TSL** | 5 mm | with Spacer |
| **Zoom Scan Resolution** | dx, dy = 3.4 mm, dz = 1.4 mm | Graded Ratio = 1.4 (Z direction) |
| **Frequency** | 6500 MHz ± 1 MHz | |

## Head TSL parameters

The following parameters and calculations were applied.

| | **Temperature** | **Permittivity** | **Conductivity** |
|---|---|---|---|
| **Nominal Head TSL parameters** | 22.0 °C | 34.5 | 6.07 mho/m |
| **Measured Head TSL parameters** | (22.0 ± 0.2) °C | 34.3 ± 6 % | 6.13 mho/m ± 6 % |
| **Head TSL temperature change during test** | < 0.5 °C | ---- | ---- |

## SAR result with Head TSL

| **SAR averaged over 1 cm³ (1 g) of Head TSL** | Condition | |
|---|---|---|
| SAR measured | 100 mW input power | 29.0 W/kg |
| SAR for nominal Head TSL parameters | normalized to 1W | **289 W/kg ± 24.7 % (k=2)** |

| **SAR averaged over 10 cm³ (10 g) of Head TSL** | condition | |
|---|---|---|
| SAR measured | 100 mW input power | 5.33 W/kg |
| SAR for nominal Head TSL parameters | normalized to 1W | **53.3 W/kg ± 24.4 % (k=2)** |

## Appendix

### Antenna Parameters with Head TSL

| | |
|---|---|
| Impedance, transformed to feed point | 52.9 Ω - 6.2 jΩ |
| Return Loss | - 23.5 dB |

### APD (Absorbed Power Density)

| **APD averaged over 1 cm²** | Condition | |
|---|---|---|
| APD measured | 100 mW input power | 289 W/m² |
| APD measured | normalized to 1W | **2890 W/m² ± 29.2 % (k=2)** |

| **APD averaged over 4 cm²** | condition | |
|---|---|---|
| APD measured | 100 mW input power | 130 W/m² |
| APD measured | normalized to 1W | **1300 W/m² ± 28.9 % (k=2)** |

*The reported APD values have been derived using psSAR8g.

### General Antenna Parameters and Design

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

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

### Additional EUT Data

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

## DASY6 Validation Report for Head TSL

**Measurement Report for D6.5GHz-1059, UID 0 -, Channel 6500 (6500.0MHz)**

**Device under Test Properties**

| Name, Manufacturer | Dimensions [mm] | IMEI | DUT Type |
|---|---|---|---|
| D6.5GHz | 16.0 x 6.0 x 300.0 | SN: 1059 | - |

**Exposure Conditions**

| Phantom Section, TSL | Position, Test Distance [mm] | Band | Group, UID | Frequency [MHz] | Conversion Factor | TSL Cond. [S/m] | TSL Permittivity |
|---|---|---|---|---|---|---|---|
| Flat, HSL | 5.00 | Band | CW, | 6500 | 5.75 | 6.13 | 34.3 |

**Hardware Setup**

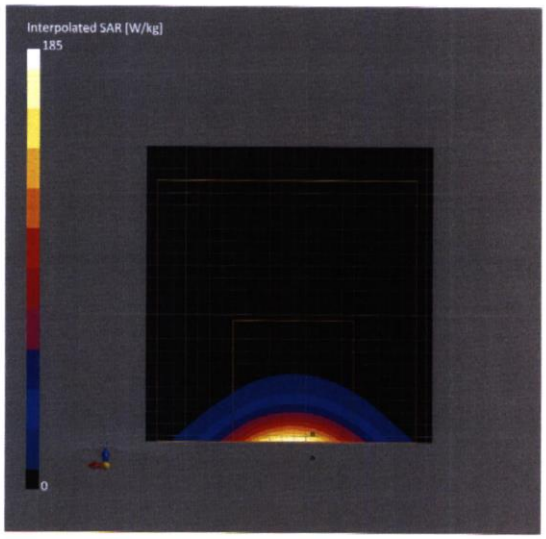
| Phantom | TSL | Probe, Calibration Date | DAE, Calibration Date |
|---|---|---|---|
| MFP V8.0 Center - 1182 | HBBL600-10000V6 | EX3DV4 - SN7405, 2020-12-30 | DAE4 Sn908, 2021-06-24 |

**Scan Setup**

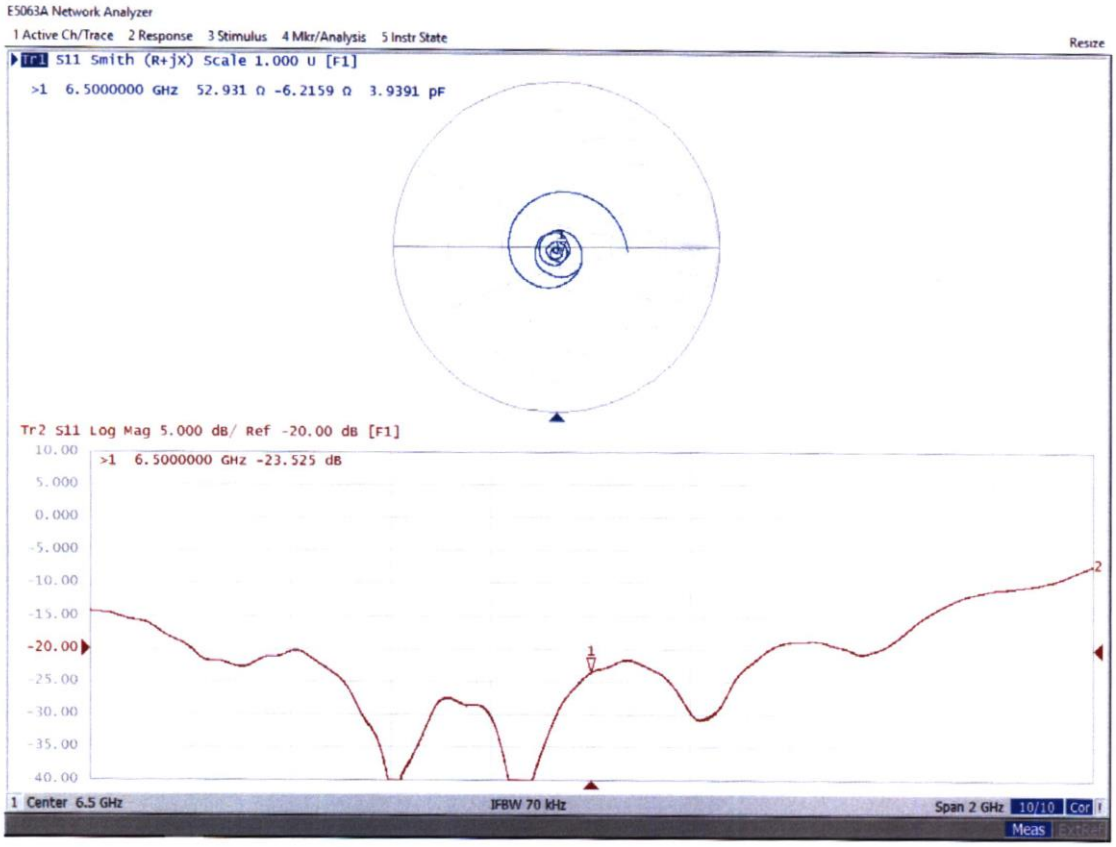
| | Zoom Scan |
|---|---|
| Grid Extents [mm] | 22.0 x 22.0 x 22.0 |
| Grid Steps [mm] | 3.4 x 3.4 x 1.4 |
| Sensor Surface [mm] | 1.4 |
| Graded Grid | Yes |
| Grading Ratio | 1.4 |
| MAIA | N/A |
| Surface Detection | VMS + 6p |
| Scan Method | Measured |

**Measurement Results**

| | Zoom Scan |
|---|---|
| Date | 2021-12-01, 13:15 |
| psSAR1g [W/Kg] | 29.0 |
| psSAR10g [W/Kg] | 5.33 |
| Power Drift [dB] | -0.00 |
| Power Scaling | Disabled |
| Scaling Factor [dB] | |
| TSL Correction | No correction |
| M2/M1 [%] | 51.1 |
| Dist 3dB Peak [mm] | 4.8 |



## Impedance Measurement Plot for Head TSL



# 10G Dipole Calibration Certificate

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

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**Accreditation No.: SCS 0108**

**Client** CTTL (Auden)

**Certificate No: 5G-Veri10-1005_Jan23**

## CALIBRATION CERTIFICATE

| | |
|---|---|
| Object | 5G Verification Source 10 GHz - SN: 1005 |
| Calibration procedure(s) | QA CAL-45.v4<br>Calibration procedure for sources in air above 6 GHz |
| Calibration date: | January 11, 2023 |

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

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

Calibration Equipment used (M&TE critical for calibration)

| Primary Standards | ID # | Cal Date (Certificate No.) | Scheduled Calibration |
|---|---|---|---|
| Reference Probe EUmmWV3 | SN: 9374 | 2023-01-03(No. EUmmWV3-9374_Jan23) | Jan-24 |
| DAE4ip | SN: 1602 | 2022-06-27 (No. DAE4ip-1602_Jun22) | Jun-23 |

| Secondary Standards | ID # | Check Date (in house) | Scheduled Check |
|---|---|---|---|
| RF generator R&S SMF100A | SN: 100184 | 19-May-22 (in house check Nov-22) | In house check: Nov-23 |
| Power sensor R&S NRP18S-10 | SN: 101258 | 31-May-22 (in house check Nov-22) | In house check: Nov-23 |

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

Issued: February 8, 2023

## Glossary

| | |
|---|---|
| CW | Continuous wave |

## Calibration is Performed According to the Following Standards

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

## Methods Applied and Interpretation of Parameters

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

## Calibrated Quantity

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

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

## Measurement Conditions

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

| | | |
|---|---|---|
| **DASY Version** | DASY8 Module mmWave | V3.2 |
| **Phantom** | 5G Phantom | |
| **Distance Horn Aperture - plane** | 10 mm | |
| **XY Scan Resolution** | dx, dy = 7.5 mm | |
| **Number of measured planes** | 2 (10mm, 10mm + λ/4) | |
| **Frequency** | 10 GHz ± 10 MHz | |

## Calibration Parameters, 10 GHz

### Circular Averaging

| Distance Horn Aperture to Measured Plane | ***Prad*[1] *(mW)*** | **Max E-field (V/m)** | Uncertainty (k = 2) | Avg Power Density Avg (psPDn+, psPDtot+, psPDmod+) (W/m²) | | Uncertainty (k = 2) |
|---|---|---|---|---|---|---|
| | | | | **1** cm² | **4** cm² | |
| 10 mm | 86.1 | **153** | 1.27 dB | **57.5** | **53.5** | 1.28 dB |

| Distance Horn Aperture to Measured Plane | ***Prad*[1] *(mW)*** | **Max E-field (V/m)** | Uncertainty (k = 2) | Power Density psPDn+, psPDtot+, psPDmod+ (W/m²) | | Uncertainty (k = 2) |
|---|---|---|---|---|---|---|
| | | | | **1** cm² | **4** cm² | |
| 10 mm | 86.1 | **153** | 1.27 dB | **55.4, 58.4, 58.6** | **51.6, 54.2, 54.6** | 1.28 dB |

### Square Averaging

| Distance Horn Aperture to Measured Plane | ***Prad*[1] *(mW)*** | **Max E-field (V/m)** | Uncertainty (k = 2) | Avg Power Density Avg (psPDn+, psPDtot+, psPDmod+) (W/m²) | | Uncertainty (k = 2) |
|---|---|---|---|---|---|---|
| | | | | **1** cm² | **4** cm² | |
| 10 mm | 86.1 | **153** | 1.27 dB | **57.5** | **53.4** | 1.28 dB |

| Distance Horn Aperture to Measured Plane | ***Prad*[1] *(mW)*** | **Max E-field (V/m)** | Uncertainty (k = 2) | Power Density psPDn+, psPDtot+, psPDmod+ (W/m²) | | Uncertainty (k = 2) |
|---|---|---|---|---|---|---|
| | | | | **1** cm² | **4** cm² | |
| 10 mm | 86.1 | **153** | 1.27 dB | **55.4, 58.4, 58.6** | **51.5, 54.1, 54.5** | 1.28 dB |

### Max Power Density

| Distance Horn Aperture to Measured Plane | ***Prad*[1] *(mW)*** | **Max E-field (V/m)** | Uncertainty (k = 2) | Max Power Density Sn, Stot, \|Stot\| (W/m²) | Uncertainty (k = 2) |
|---|---|---|---|---|---|
| 10 mm | 86.1 | **153** | 1.27 dB | **57.0, 60.2, 60.3** | 1.28 dB |

[1] Assessed ohmic and mismatch loss plus numerical offset: 0.55 dB

# DASY Report

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

### Device under Test Properties

| Name, Manufacturer | Dimensions [mm] | IMEI | DUT Type |
|---|---|---|---|
| 5G Verification Source 10 GHz | 100.0 x 100.0 x 172.0 | SN: 1005 | - |

### Exposure Conditions

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

### Hardware Setup

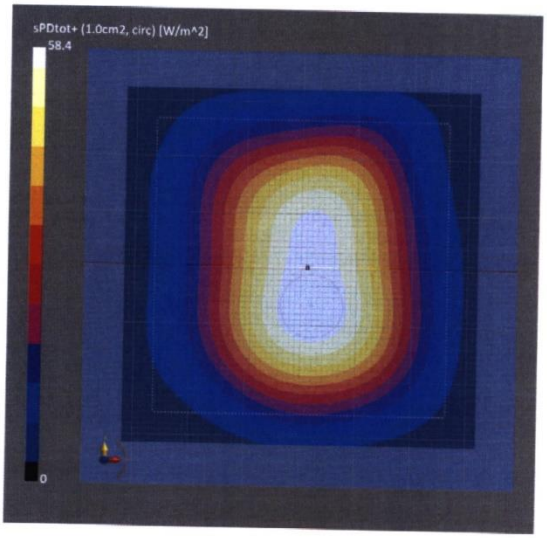
| Phantom | Medium | Probe, Calibration Date | DAE, Calibration Date |
|---|---|---|---|
| mmWave Phantom - 1002 | Air | EUmmWV3 - SN9374_F1-55GHz, 2022-01-03 | DAE4ip Sn1602, 2022-06-27 |

### Scan Setup

| | 5G Scan |
|---|---|
| Grid Extents [mm] | 120.0 x 120.0 |
| Grid Steps [lambda] | 0.25 x 0.25 |
| Sensor Surface [mm] | 10.0 |
| MAIA | MAIA not used |

### Measurement Results

| | 5G Scan |
|---|---|
| Date | 2023-01-11, 08:25 |
| Avg. Area [cm²] | 1.00 |
| Avg. Type | Circular Averaging |
| psPDn+ [W/m²] | 55.4 |
| psPDtot+ [W/m²] | 58.4 |
| psPDmod+ [W/m²] | 58.6 |
| Max(Sn) [W/m²] | 57.0 |
| Max(Stot) [W/m²] | 60.2 |
| Max(\|Stot\|) [W/m²] | 60.3 |
| $E_{max}$ [V/m] | 153 |
| Power Drift [dB] | -0.00 |



# DASY Report

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

### Device under Test Properties

| Name, Manufacturer | Dimensions [mm] | IMEI | DUT Type |
|---|---|---|---|
| 5G Verification Source 10 GHz | 100.0 x 100.0 x 172.0 | SN: 1005 | - |

### Exposure Conditions

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

### Hardware Setup

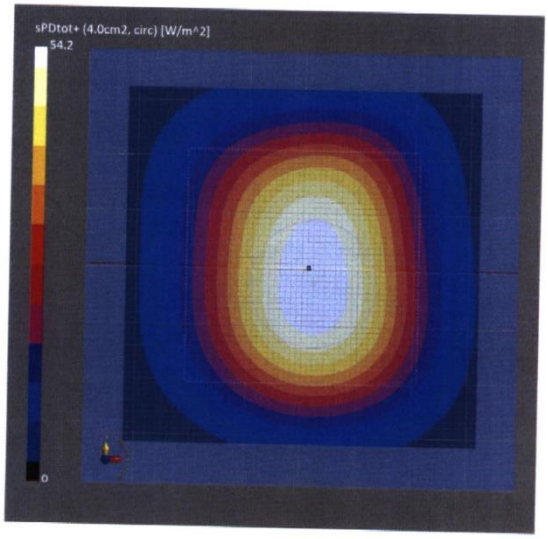
| Phantom | Medium | Probe, Calibration Date | DAE, Calibration Date |
|---|---|---|---|
| mmWave Phantom - 1002 | Air | EUmmWV3 - SN9374_F1-55GHz, 2022-01-03 | DAE4ip Sn1602, 2022-06-27 |

### Scan Setup

| | 5G Scan |
|---|---|
| Grid Extents [mm] | 120.0 x 120.0 |
| Grid Steps [lambda] | 0.25 x 0.25 |
| Sensor Surface [mm] | 10.0 |
| MAIA | MAIA not used |

### Measurement Results

| | 5G Scan |
|---|---|
| Date | 2023-01-11, 08:25 |
| Avg. Area [cm²] | 4.00 |
| Avg. Type | Circular Averaging |
| psPDn+ [W/m²] | 51.6 |
| psPDtot+ [W/m²] | 54.2 |
| psPDmod+ [W/m²] | 54.6 |
| Max(Sn) [W/m²] | 57.0 |
| Max(Stot) [W/m²] | 60.2 |
| Max(\|Stot\|) [W/m²] | 60.3 |
| $E_{max}$ [V/m] | 153 |
| Power Drift [dB] | -0.00 |



# DASY Report

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

### Device under Test Properties

| Name, Manufacturer | Dimensions [mm] | IMEI | DUT Type |
|---|---|---|---|
| 5G Verification Source 10 GHz | 100.0 x 100.0 x 172.0 | SN: 1005 | - |

### Exposure Conditions

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

### Hardware Setup

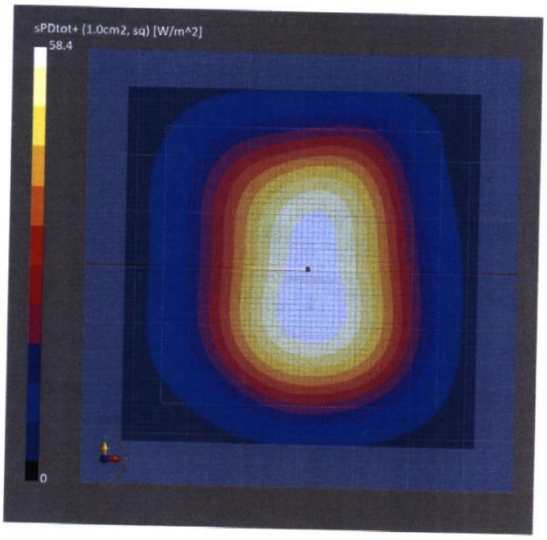
| Phantom | Medium | Probe, Calibration Date | DAE, Calibration Date |
|---|---|---|---|
| mmWave Phantom - 1002 | Air | EUmmWV3 - SN9374_F1-55GHz, 2022-01-03 | DAE4ip Sn1602, 2022-06-27 |

### Scan Setup

| | 5G Scan |
|---|---|
| Grid Extents [mm] | 120.0 x 120.0 |
| Grid Steps [lambda] | 0.25 x 0.25 |
| Sensor Surface [mm] | 10.0 |
| MAIA | MAIA not used |

### Measurement Results

| | 5G Scan |
|---|---|
| Date | 2023-01-11, 08:25 |
| Avg. Area [cm²] | 1.00 |
| Avg. Type | Square Averaging |
| psPDn+ [W/m²] | 55.4 |
| psPDtot+ [W/m²] | 58.4 |
| psPDmod+ [W/m²] | 58.6 |
| Max(Sn) [W/m²] | 57.0 |
| Max(Stot) [W/m²] | 60.2 |
| Max(\|Stot\|) [W/m²] | 60.3 |
| $E_{max}$ [V/m] | 153 |
| Power Drift [dB] | -0.00 |



# DASY Report

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

### Device under Test Properties

| Name, Manufacturer | Dimensions [mm] | IMEI | DUT Type |
|---|---|---|---|
| 5G Verification Source 10 GHz | 100.0 x 100.0 x 172.0 | SN: 1005 | - |

### Exposure Conditions

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

### Hardware Setup

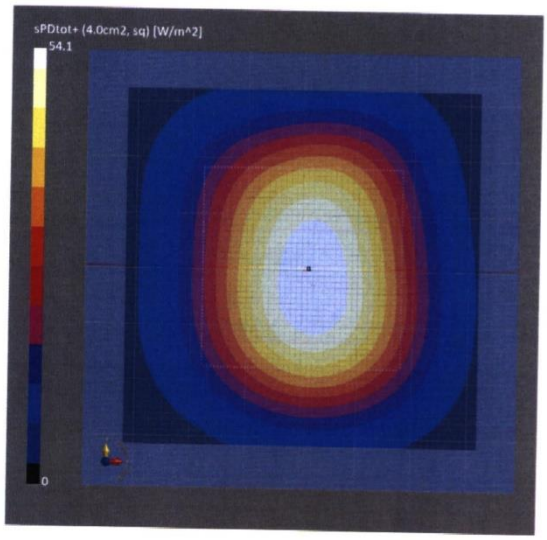
| Phantom | Medium | Probe, Calibration Date | DAE, Calibration Date |
|---|---|---|---|
| mmWave Phantom - 1002 | Air | EUmmWV3 - SN9374_F1-55GHz, 2022-01-03 | DAE4ip Sn1602, 2022-06-27 |

### Scan Setup

| | 5G Scan |
|---|---|
| Grid Extents [mm] | 120.0 x 120.0 |
| Grid Steps [lambda] | 0.25 x 0.25 |
| Sensor Surface [mm] | 10.0 |
| MAIA | MAIA not used |

### Measurement Results

| | 5G Scan |
|---|---|
| Date | 2023-01-11, 08:25 |
| Avg. Area [cm²] | 4.00 |
| Avg. Type | Square Averaging |
| psPDn+ [W/m²] | 51.5 |
| psPDtot+ [W/m²] | 54.1 |
| psPDmod+ [W/m²] | 54.5 |
| Max(Sn) [W/m²] | 57.0 |
| Max(Stot) [W/m²] | 60.2 |
| Max(\|Stot\|) [W/m²] | 60.3 |
| $E_{max}$ [V/m] | 153 |
| Power Drift [dB] | -0.00 |



# 13 MHz Dipole Calibration Certificate

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

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

Accredited by the Swiss Accreditation Service (SAS)
**The Swiss Accreditation Service is one of the signatories to the EA Multilateral Agreement for the recognition of calibration certificates**

**Accreditation No.: SCS 0108**

**Client** CTTL
Beijing

**Certificate No.** CLA13-1009_May23

## CALIBRATION CERTIFICATE

Object: CLA13 - SN: 1009

Calibration procedure(s): QA CAL-15.v10
Calibration Procedure for SAR Validation Sources below 700 MHz

Calibration date: May 19, 2023

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

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

Calibration Equipment used (M&TE critical for calibration)

| Primary Standards | ID # | Cal Date (Certificate No.) | Scheduled Calibration |
|---|---|---|---|
| Power meter NRP2 | SN: 104778 | 30-Mar-23 (No. 217-03804/03805) | Mar-24 |
| Power sensor NRP-Z91 | SN: 103244 | 30-Mar-23 (No. 217-03804) | Mar-24 |
| Power sensor NRP-Z91 | SN: 103245 | 30-Mar-23 (No. 217-03805) | Mar-24 |
| Reference 20 dB Attenuator | SN: CC2552 (20x) | 30-Mar-23 (No. 217-03809) | Mar-24 |
| Type-N mismatch combination | SN: 310982 / 06327 | 30-Mar-23 (No. 217-03810) | Mar-24 |
| Reference Probe EX3DV4 | SN: 3877 | 06-Jan-23 (No. EX3-3877_Jan23) | Jan-24 |
| DAE4 | SN: 654 | 27-Jan-23 (No. DAE4-654_Jan23) | Jan-24 |

| Secondary Standards | ID # | Check Date (in house) | Scheduled Check |
|---|---|---|---|
| Power meter NRP2 | SN: 107193 | 08-Nov-21 (in house check Dec-22) | In house check: Dec-24 |
| Power sensor NRP-Z91 | SN: 100922 | 15-Dec-09 (in house check Dec-22) | In house check: Dec-24 |
| Power sensor NRP-Z91 | SN: 100418 | 01-Jan-04 (in house check Dec-22) | In house check: Dec-24 |
| RF generator HP 8648C | SN: US3642U01700 | 04-Aug-99 (in house check Jun-22) | In house check: Jun-24 |
| Network Analyzer Agilent E8358A | SN: US41080477 | 31-Mar-14 (in house check Oct-22) | In house check: Oct-24 |

| | Name | Function | Signature |
|---|---|---|---|
| Calibrated by: | Jeton Kastrati | Laboratory Technician | |
| Approved by: | Sven Kühn | Technical Manager | |

Issued: May 23, 2023

**Glossary:**

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

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

a) IEC/IEEE 62209-1528, "Measurement Procedure For The Assessment Of Specific Absorption Rate Of Human Exposure To Radio Frequency Fields From Hand-Held And Body-Worn Wireless Communication Devices - Part 1528: Human Models, Instrumentation And Procedures (Frequency Range of 4 MHz to 10 GHz)", October 2020.
b) KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

**Additional Documentation:**

c) DASY System Handbook

**Methods Applied and Interpretation of Parameters:**

- *Measurement Conditions:* Further details are available from the Validation Report at the end of the certificate. All figures stated in the certificate are valid at the frequency indicated.
- *Antenna Parameters with TSL:* The source is mounted in a touch configuration below the center marking of the flat phantom.
- *Return Loss:* This parameter is measured with the source positioned under the liquid filled phantom (as described in the measurement condition clause). The Return Loss ensures low reflected power. No uncertainty required.
- *SAR measured:* SAR measured at the stated antenna input power.
- *SAR normalized:* SAR as measured, normalized to an input power of 1 W at the antenna connector.
- *SAR for nominal TSL parameters:* The measured TSL parameters are used to calculate the nominal SAR result.

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

## Measurement Conditions

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

| | | |
|---|---|---|
| **DASY Version** | DASY5 | V52.10.4 |
| **Extrapolation** | Advanced Extrapolation | |
| **Phantom** | ELI4 Flat Phantom | Shell thickness: 2 ± 0.2 mm |
| **EUT Positioning** | Touch Position | |
| **Zoom Scan Resolution** | dx, dy = 4.0 mm, dz = 1.4 mm | Graded Ratio = 1.4 (Z direction) |
| **Frequency** | 13 MHz ± 1 MHz | |

## Head TSL parameters

The following parameters and calculations were applied.

| | **Temperature** | **Permittivity** | **Conductivity** |
|---|---|---|---|
| **Nominal Head TSL parameters** | 22.0 °C | 55.0 | 0.75 mho/m |
| **Measured Head TSL parameters** | (22.0 ± 0.2) °C | 53.6 ± 6 % | 0.72 mho/m ± 6 % |
| **Head TSL temperature change during test** | < 0.5 °C | ---- | ---- |

## SAR result with Head TSL

| **SAR averaged over 1 cm³ (1 g) of Head TSL** | Condition | |
|---|---|---|
| SAR measured | 1 W input power | 0.558 W/kg |
| SAR for nominal Head TSL parameters | normalized to 1W | **0.573 W/kg ± 18.4 % (k=2)** |

| **SAR averaged over 10 cm³ (10 g) of Head TSL** | condition | |
|---|---|---|
| SAR measured | 1 W input power | 0.344 W/kg |
| SAR for nominal Head TSL parameters | normalized to 1W | **0.353 W/kg ± 18.0 % (k=2)** |

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

### Antenna Parameters with Head TSL

| | |
|---|---|
| Impedance, transformed to feed point | 49.6 Ω - 1.7 jΩ |
| Return Loss | - 35.2 dB |

### Additional EUT Data

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

## DASY5 Validation Report for Head TSL

Date: 19.05.2023

Test Laboratory: SPEAG, Zurich, Switzerland

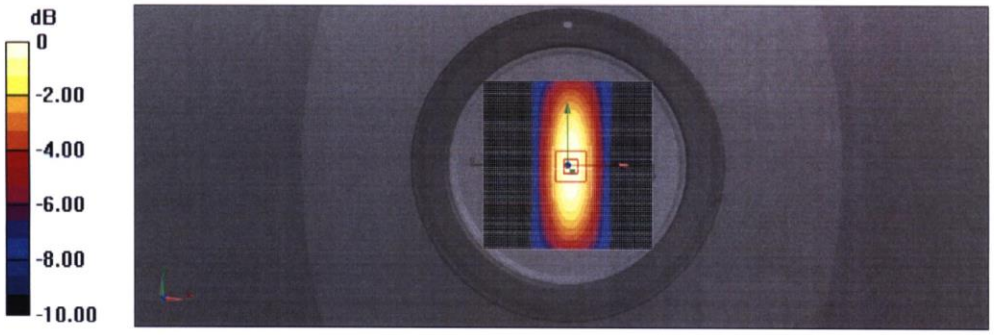
**DUT: CLA13; Type: CLA13; Serial: CLA13 - SN: 1009**

Communication System: UID 0 - CW; Frequency: 13 MHz
Medium parameters used: f = 13 MHz; $\sigma$ = 0.72 S/m; $\varepsilon_r$ = 53.6; $\rho$ = 1000 kg/m$^3$
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY52 Configuration:

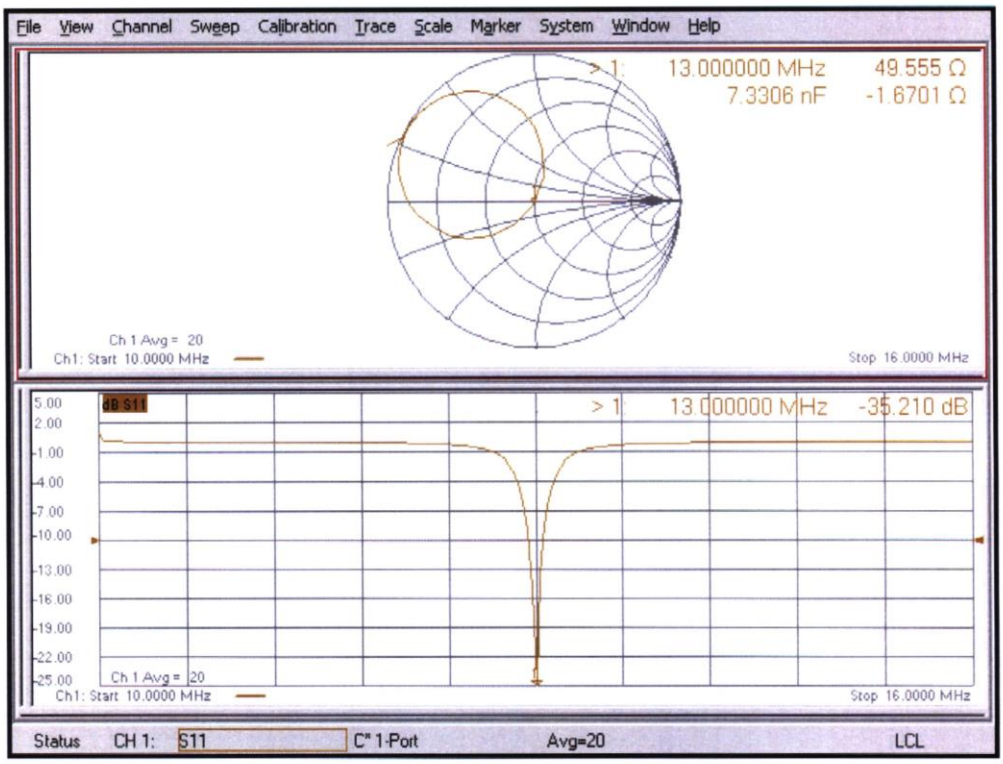
- Probe: EX3DV4 - SN3877; ConvF(15.33, 15.33, 15.33) @ 13 MHz; Calibrated: 06.01.2023
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn654; Calibrated: 27.01.2023
- Phantom: ELI v6.0; Type: QDOVA003AA; Serial: TP:2034
- DASY52 52.10.4(1535); SEMCAD X 14.6.14(7501)

**CLA Calibration for HSL-LF Tissue/CLA-13, touch configuration, Pin=1W/Zoom Scan, dist=1.4mm (8x10x8)/Cube 0:** Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 31.63 V/m; Power Drift = -0.07 dB
Peak SAR (extrapolated) = 1.17 W/kg
**SAR(1 g) = 0.558 W/kg; SAR(10 g) = 0.344 W/kg**
Smallest distance from peaks to all points 3 dB below = 15.2 mm
Ratio of SAR at M2 to SAR at M1 = 77.5%
Maximum value of SAR (measured) = 0.836 W/kg




0 dB = 0.836 W/kg = -0.778 dBW/kg

**Impedance Measurement Plot for Head TSL**



# ANNEX I Sensor Triggering Data Summary

Folder Closed ANT1:

| | | |
|---|---|---|
| SAR Sensor | Rear | 13(mm) |
| | Right | 12(mm) |
| | Bottom | 12(mm) |

Folder Closed ANT2:

| | | |
|---|---|---|
| SAR Sensor | Front | 12(mm) |
| | Top | 12(mm) |

Folder Closed ANT4:

| | | |
|---|---|---|
| SAR Sensor | Bottom | 12(mm) |

Folder Closed ANT7:

| | | |
|---|---|---|
| SAR Sensor | Front | 12(mm) |
| | Top | 12(mm) |

Folder Open ANT1:

| | | |
|---|---|---|
| SAR Sensor | Front | 10(mm) |
| | Rear | 13(mm) |
| | Right | 12(mm) |
| | Bottom | 12(mm) |

Folder Open ANT4:

| | | |
|---|---|---|
| SAR Sensor | Front | 9(mm) |
| | Rear | 12(mm) |
| | Bottom | 12(mm) |

Front, Rear, Top, Bottom and Right of the DUT was placed directly below the flat phantom. The DUT was moved toward the phantom in accordance with the steps outlined in KDB 616217 to determine the trigger distance for enabling power reduction. The DUT was moved away from the phantom to determine the trigger distance for resuming full power.

**Folder Closed ANT1:**

**Rear**

Moving device toward the phantom:

| The power state | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Distance [mm]** | **18** | **17** | **16** | **15** | **14** | **13** | **12** | **11** | **10** | **9** | **8** |
| Main antenna | Normal | Normal | Normal | Normal | Normal | Low | Low | Low | Low | Low | Low |

Moving device away from the phantom:

| The power state | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Distance [mm]** | **8** | **9** | **10** | **11** | **12** | **13** | **14** | **15** | **16** | **17** | **18** |
| Main antenna | Low | Low | Low | Low | Low | Low | Normal | Normal | Normal | Normal | Normal |

**Right**

Moving device toward the phantom:

| The power state | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Distance [mm]** | **17** | **16** | **15** | **14** | **13** | **12** | **11** | **10** | **9** | **8** | **7** |
| Main antenna | Normal | Normal | Normal | Normal | Normal | Low | Low | Low | Low | Low | Low |

Moving device away from the phantom:

| The power state | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Distance [mm]** | **7** | **8** | **9** | **10** | **11** | **12** | **13** | **14** | **15** | **16** | **17** |
| Main antenna | Low | Low | Low | Low | Low | Low | Normal | Normal | Normal | Normal | Normal |

**Bottom**

Moving device toward the phantom:

| The power state | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Distance [mm]** | **17** | **16** | **15** | **14** | **13** | **12** | **11** | **10** | **9** | **8** | **7** |
| Main antenna | Normal | Normal | Normal | Normal | Normal | Low | Low | Low | Low | Low | Low |

Moving device away from the phantom:

| The power state | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Distance [mm]** | **7** | **8** | **9** | **10** | **11** | **12** | **13** | **14** | **15** | **16** | **17** |
| Main antenna | Low | Low | Low | Low | Low | Low | Normal | Normal | Normal | Normal | Normal |

**Folder Closed ANT2/7:**

**Front**

Moving device toward the phantom:

| The power state | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Distance [mm]** | **17** | **16** | **15** | **14** | **13** | **12** | **11** | **10** | **9** | **8** | **7** |
| Main antenna | Normal | Normal | Normal | Normal | Normal | Low | Low | Low | Low | Low | Low |

Moving device away from the phantom:

| The power state | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Distance [mm]** | **7** | **8** | **9** | **10** | **11** | **12** | **13** | **14** | **15** | **16** | **17** |
| Main antenna | Low | Low | Low | Low | Low | Low | Normal | Normal | Normal | Normal | Normal |

**Top**

Moving device toward the phantom:

| The power state | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Distance [mm]** | **17** | **16** | **15** | **14** | **13** | **12** | **11** | **10** | **9** | **8** | **7** |
| Main antenna | Normal | Normal | Normal | Normal | Normal | Low | Low | Low | Low | Low | Low |

Moving device away from the phantom:

| The power state | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Distance [mm]** | **7** | **8** | **9** | **10** | **11** | **12** | **13** | **14** | **15** | **16** | **17** |
| Main antenna | Low | Low | Low | Low | Low | Low | Normal | Normal | Normal | Normal | Normal |

**Folder Closed ANT4:**

**Bottom**

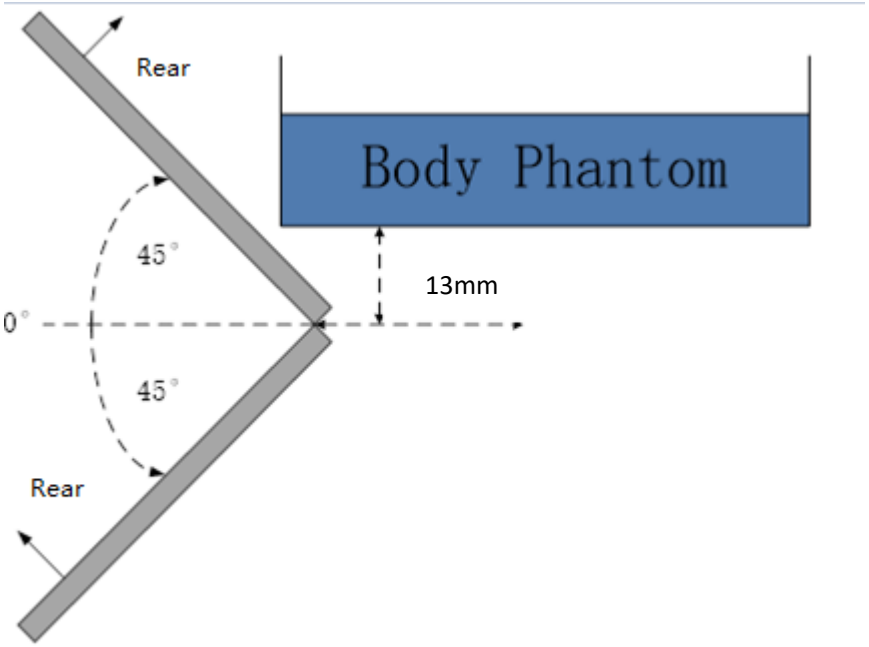
Moving device toward the phantom:

| The power state | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Distance [mm]** | **17** | **16** | **15** | **14** | **13** | **12** | **11** | **10** | **9** | **8** | **7** |
| Main antenna | Normal | Normal | Normal | Normal | Normal | Low | Low | Low | Low | Low | Low |

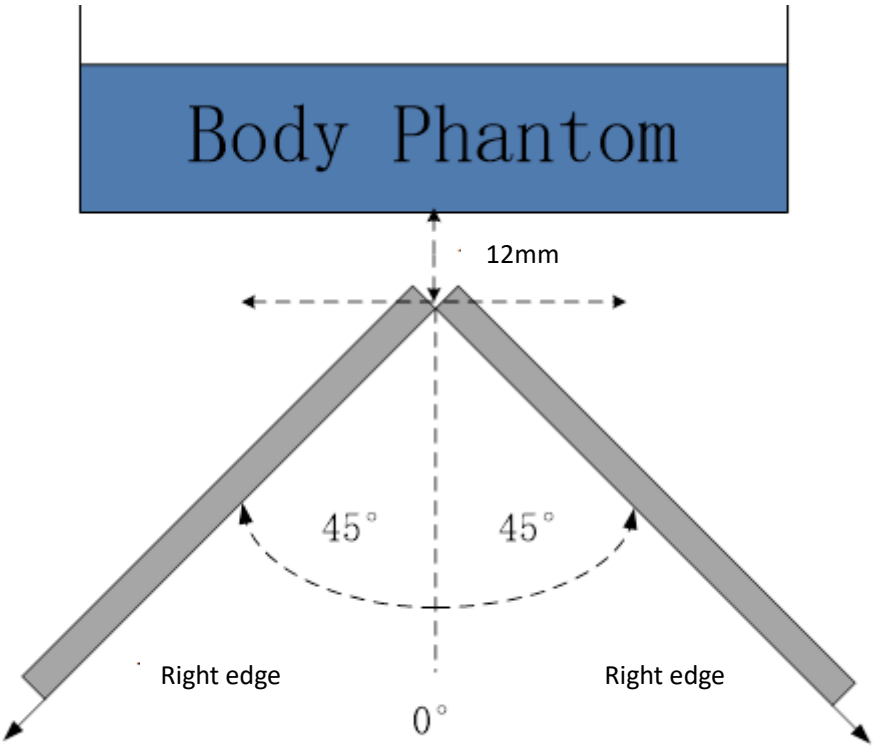
Moving device away from the phantom:

| The power state | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Distance [mm]** | **7** | **8** | **9** | **10** | **11** | **12** | **13** | **14** | **15** | **16** | **17** |
| Main antenna | Low | Low | Low | Low | Low | Low | Normal | Normal | Normal | Normal | Normal |

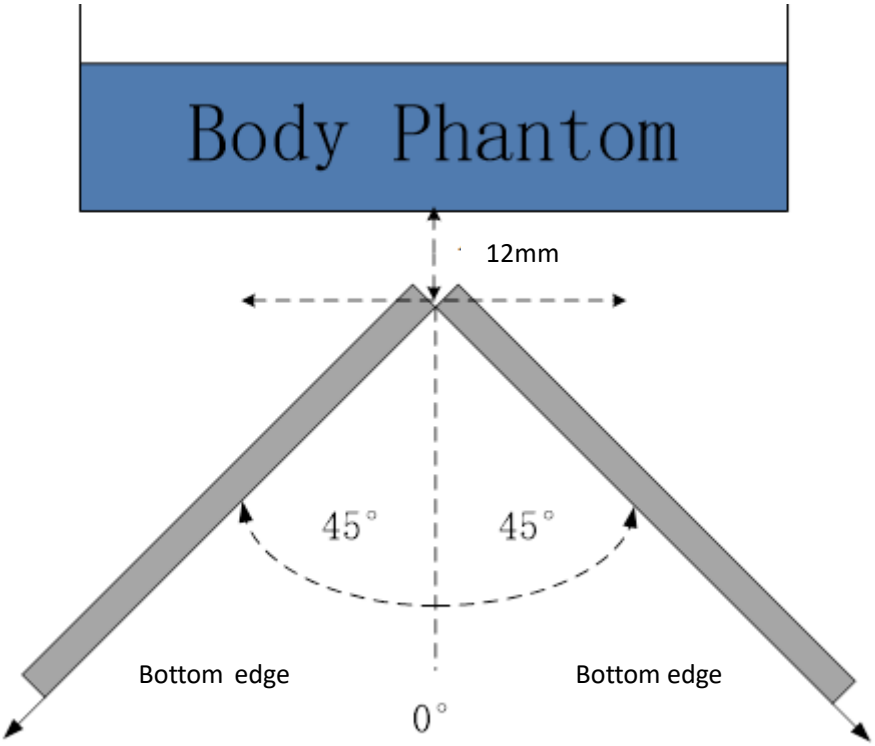
The influence of table tilt angles to proximity sensor triggering is determined by positioning each edge that contains a transmitting antenna, perpendicular to the flat phantom, at the smallest sensor triggering test distance by rotating the device around the edge next to the phantom in ≤ 10° increments until the tablet is ±45° or more from the vertical position at 0°.



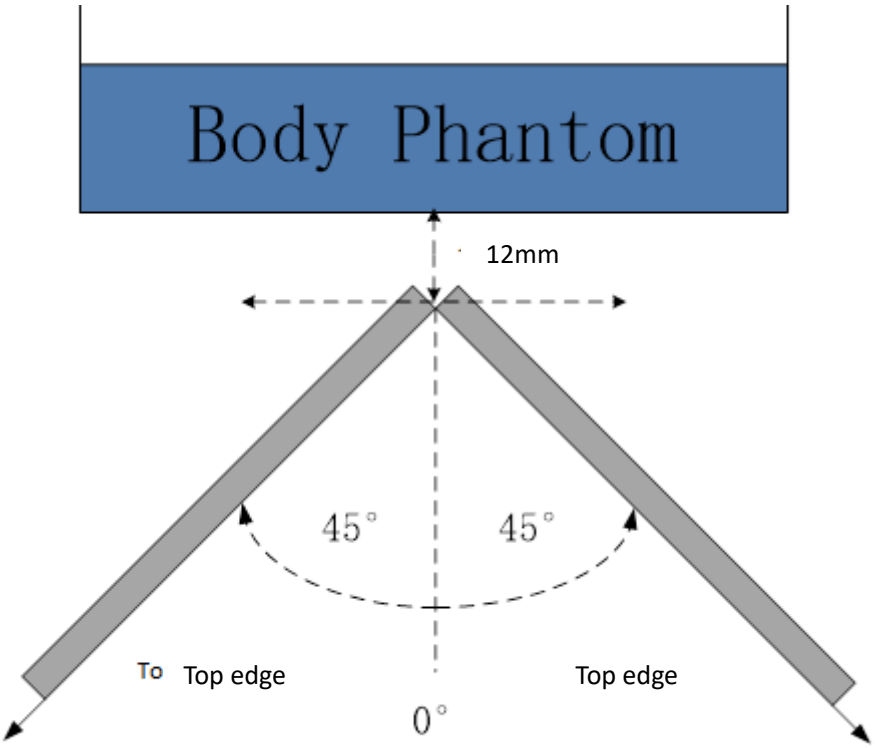

**The Rear evaluation**




**The Right edge evaluation**




**The Bottom edge evaluation**




**The Top edge evaluation**

**Folder Closed ANT1:**

**Front**

Moving device toward the phantom:

| The power state | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Distance [mm]** | **15** | **14** | **13** | **12** | **11** | **10** | **9** | **8** | **7** | **6** | **5** |
| Main antenna | Normal | Normal | Normal | Normal | Normal | Low | Low | Low | Low | Low | Low |

Moving device away from the phantom:

| The power state | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Distance [mm]** | **5** | **6** | **7** | **8** | **9** | **10** | **11** | **12** | **13** | **14** | **15** |
| Main antenna | Low | Low | Low | Low | Low | Low | Normal | Normal | Normal | Normal | Normal |

**Rear**

Moving device toward the phantom:

| The power state | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Distance [mm]** | **18** | **17** | **16** | **15** | **14** | **13** | **12** | **11** | **10** | **9** | **8** |
| Main antenna | Normal | Normal | Normal | Normal | Normal | Low | Low | Low | Low | Low | Low |

Moving device away from the phantom:

| The power state | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Distance [mm]** | **8** | **9** | **10** | **11** | **12** | **13** | **14** | **15** | **16** | **17** | **18** |
| Main antenna | Low | Low | Low | Low | Low | Low | Normal | Normal | Normal | Normal | Normal |

**Right**

Moving device toward the phantom:

| The power state | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Distance [mm]** | **17** | **16** | **15** | **14** | **13** | **12** | **11** | **10** | **9** | **8** | **7** |
| Main antenna | Normal | Normal | Normal | Normal | Normal | Low | Low | Low | Low | Low | Low |

Moving device away from the phantom:

| The power state | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Distance [mm]** | **7** | **8** | **9** | **10** | **11** | **12** | **13** | **14** | **15** | **16** | **17** |
| Main antenna | Low | Low | Low | Low | Low | Low | Normal | Normal | Normal | Normal | Normal |

**Bottom**

Moving device toward the phantom:

| The power state | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Distance [mm]** | **17** | **16** | **15** | **14** | **13** | **12** | **11** | **10** | **9** | **8** | **7** |
| Main antenna | Normal | Normal | Normal | Normal | Normal | Low | Low | Low | Low | Low | Low |

Moving device away from the phantom:

| The power state | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Distance [mm]** | **7** | **8** | **9** | **10** | **11** | **12** | **13** | **14** | **15** | **16** | **17** |
| Main antenna | Low | Low | Low | Low | Low | Low | Normal | Normal | Normal | Normal | Normal |

**Folder Closed ANT4:**

**Front**

Moving device toward the phantom:

| The power state | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Distance [mm]** | **14** | **13** | **12** | **11** | **10** | **9** | **8** | **7** | **6** | **5** | **4** |
| Main antenna | Normal | Normal | Normal | Normal | Normal | Low | Low | Low | Low | Low | Low |

Moving device away from the phantom:

| The power state | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Distance [mm]** | **4** | **5** | **6** | **7** | **8** | **9** | **10** | **11** | **12** | **13** | **14** |
| Main antenna | Low | Low | Low | Low | Low | Low | Normal | Normal | Normal | Normal | Normal |

**Rear**

Moving device toward the phantom:

| The power state | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Distance [mm]** | **17** | **16** | **15** | **14** | **13** | **12** | **11** | **10** | **9** | **8** | **7** |
| Main antenna | Normal | Normal | Normal | Normal | Normal | Low | Low | Low | Low | Low | Low |

Moving device away from the phantom:

| The power state | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Distance [mm]** | **7** | **8** | **9** | **10** | **11** | **12** | **13** | **14** | **15** | **16** | **17** |
| Main antenna | Low | Low | Low | Low | Low | Low | Normal | Normal | Normal | Normal | Normal |

**Bottom**

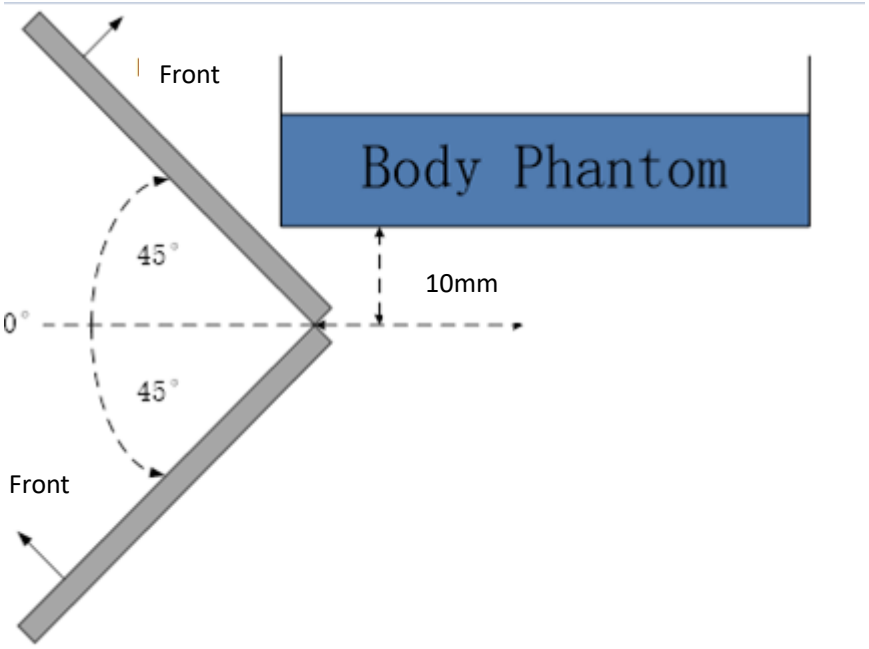
Moving device toward the phantom:

| The power state | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Distance [mm]** | **17** | **16** | **15** | **14** | **13** | **12** | **11** | **10** | **9** | **8** | **7** |
| Main antenna | Normal | Normal | Normal | Normal | Normal | Low | Low | Low | Low | Low | Low |

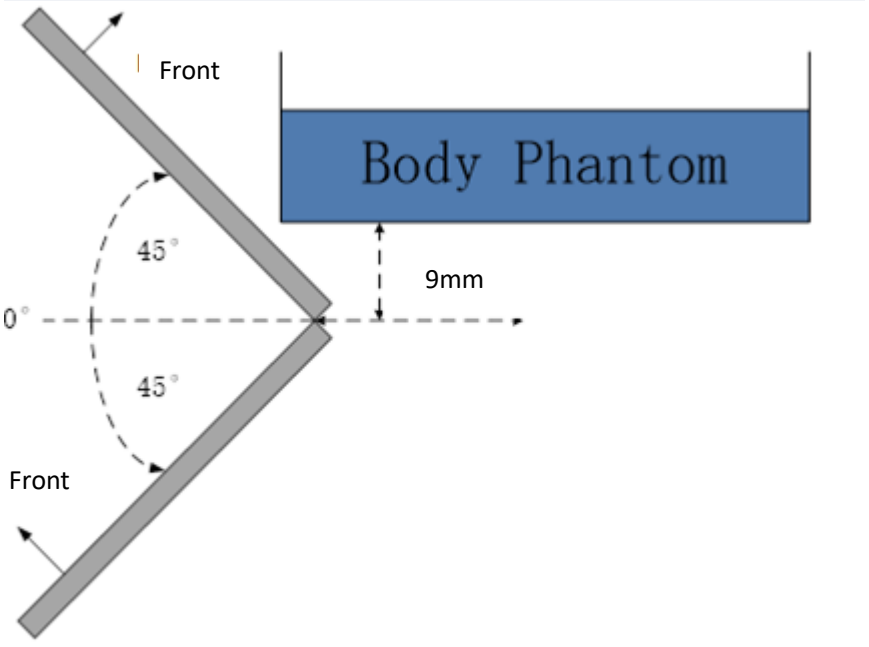
Moving device away from the phantom:

| The power state | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Distance [mm]** | **7** | **8** | **9** | **10** | **11** | **12** | **13** | **14** | **15** | **16** | **17** |
| Main antenna | Low | Low | Low | Low | Low | Low | Normal | Normal | Normal | Normal | Normal |

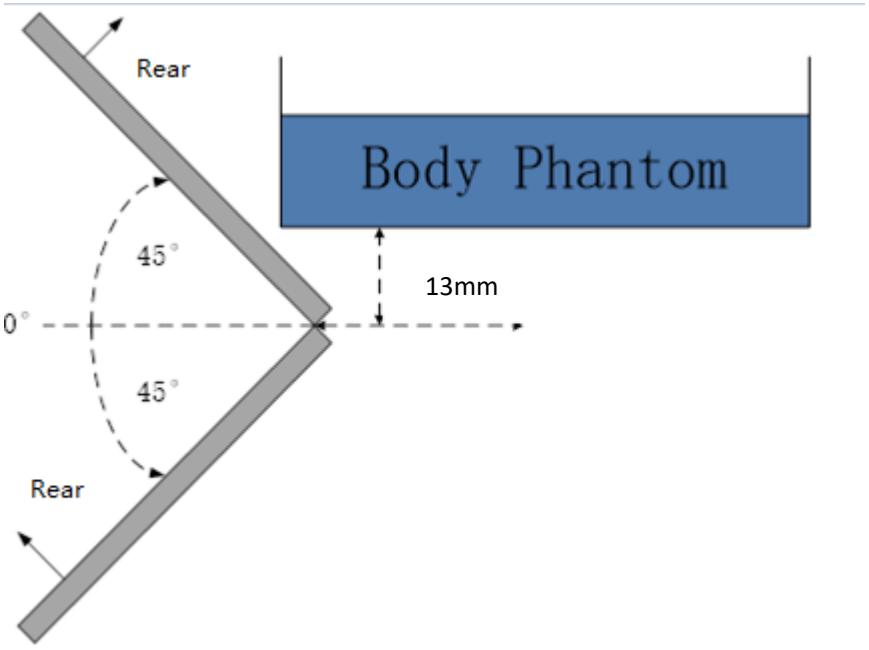
The influence of table tilt angles to proximity sensor triggering is determined by positioning each edge that contains a transmitting antenna, perpendicular to the flat phantom, at the smallest sensor triggering test distance by rotating the device around the edge next to the phantom in ≤ 10° increments until the tablet is ±45° or more from the vertical position at 0°.



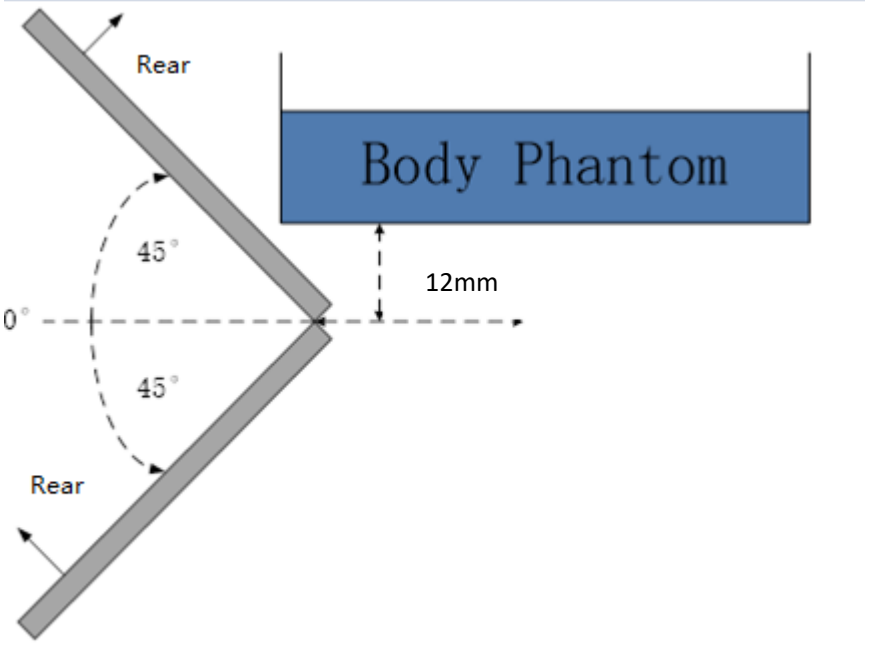

**The Front evaluation for ANT1**



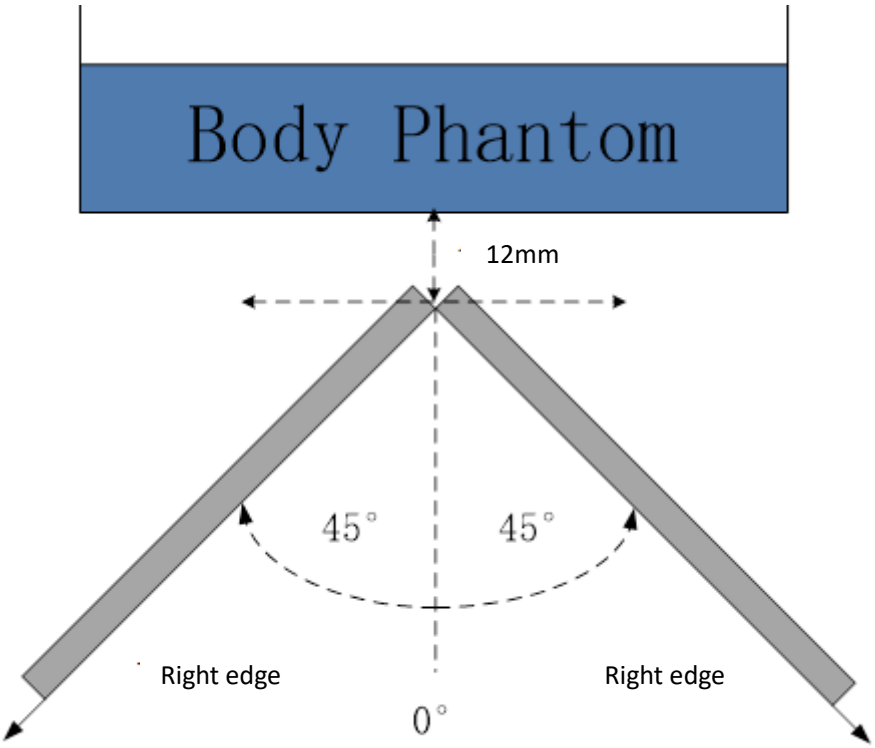

**The Front evaluation for ANT4**



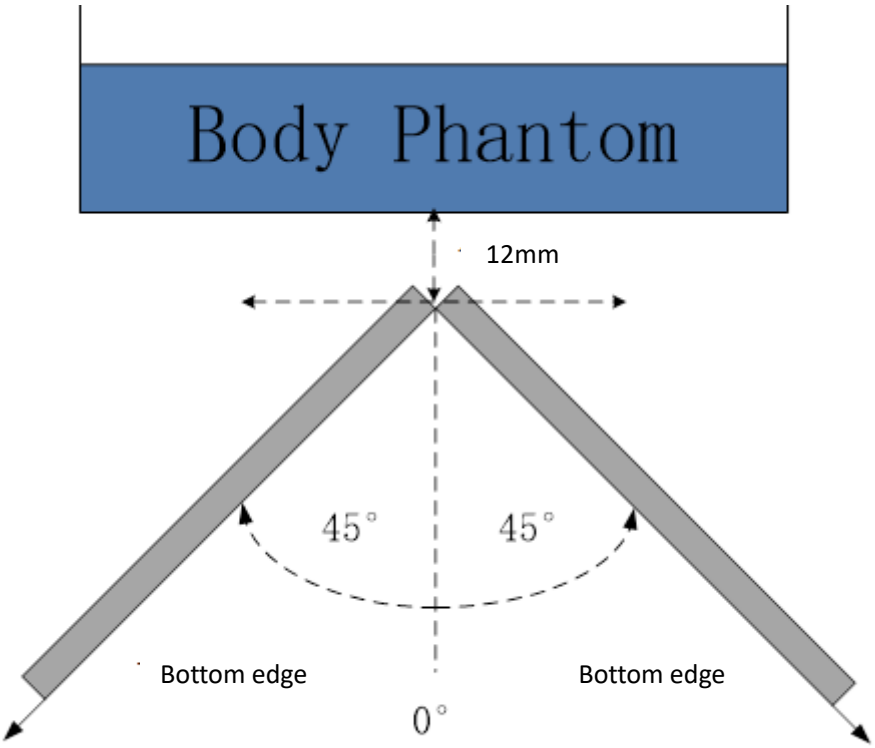

**The Rear evaluation for ANT1**




**The Rear evaluation for ANT4**




**The Right edge evaluation for ANT1**




**The Bottom edge evaluation**

# ANNEX J Accreditation Certificate

United States Department of Commerce
National Institute of Standards and Technology

NVLAP®

ilac-MRA

## Certificate of Accreditation to ISO/IEC 17025:2017

**NVLAP LAB CODE: 600118-0**

**Telecommunication Technology Labs, CAICT**
Beijing
China

*is accredited by the National Voluntary Laboratory Accreditation Program for specific services, listed on the Scope of Accreditation, for:*

**Electromagnetic Compatibility & Telecommunications**

*This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2017. This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory quality management system (refer to joint ISO-ILAC-IAF Communique dated January 2009).*

2022-10-01 through 2023-09-30
*Effective Dates*

DEPARTMENT OF COMMERCE * UNITED STATES OF AMERICA *

*For the National Voluntary Laboratory Accreditation Program*