

### Head TSL parameters at 5750 MHz

The following parameters and calculations were applied.

|                                         | Temperature     | Permittivity | Conductivity     |
|-----------------------------------------|-----------------|--------------|------------------|
| Nominal Head TSL parameters             | 22.0 °C         | 35.4         | 5.22 mho/m       |
| Measured Head TSL parameters            | (22.0 ± 0.2) °C | 35.4 ± 6 %   | 5.14 mho/m ± 6 % |
| Head TSL temperature change during test | < 0.5 °C        | ----         | ----             |

### SAR result with Head TSL at 5750 MHz

| SAR averaged over 1 cm <sup>3</sup> (1 g) of Head TSL | Condition          |                                 |
|-------------------------------------------------------|--------------------|---------------------------------|
| SAR measured                                          | 100 mW input power | 7.99 W/kg                       |
| SAR for nominal Head TSL parameters                   | normalized to 1W   | <b>79.9 W/kg ± 19.9 % (k=2)</b> |

| SAR averaged over 10 cm <sup>3</sup> (10 g) of Head TSL | condition          |                                 |
|---------------------------------------------------------|--------------------|---------------------------------|
| SAR measured                                            | 100 mW input power | 2.28 W/kg                       |
| SAR for nominal Head TSL parameters                     | normalized to 1W   | <b>22.8 W/kg ± 19.5 % (k=2)</b> |

### Head TSL parameters at 5800 MHz

The following parameters and calculations were applied.

|                                         | Temperature     | Permittivity | Conductivity     |
|-----------------------------------------|-----------------|--------------|------------------|
| Nominal Head TSL parameters             | 22.0 °C         | 35.4         | 5.22 mho/m       |
| Measured Head TSL parameters            | (22.0 ± 0.2) °C | 35.3 ± 6 %   | 5.19 mho/m ± 6 % |
| Head TSL temperature change during test | < 0.5 °C        | ----         | ----             |

### SAR result with Head TSL at 5800 MHz

| SAR averaged over 1 cm <sup>3</sup> (1 g) of Head TSL | Condition          |                                 |
|-------------------------------------------------------|--------------------|---------------------------------|
| SAR measured                                          | 100 mW input power | 7.88 W/kg                       |
| SAR for nominal Head TSL parameters                   | normalized to 1W   | <b>78.7 W/kg ± 19.9 % (k=2)</b> |

| 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   | <b>22.2 W/kg ± 19.5 % (k=2)</b> |

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

### Antenna Parameters with Head TSL at 5200 MHz

|                                      |                                |
|--------------------------------------|--------------------------------|
| Impedance, transformed to feed point | 47.5 $\Omega$ - 4.9 j $\Omega$ |
| Return Loss                          | - 25.0 dB                      |

### Antenna Parameters with Head TSL at 5250 MHz

|                                      |                                |
|--------------------------------------|--------------------------------|
| Impedance, transformed to feed point | 46.5 $\Omega$ - 3.0 j $\Omega$ |
| Return Loss                          | - 26.5 dB                      |

### Antenna Parameters with Head TSL at 5300 MHz

|                                      |                                |
|--------------------------------------|--------------------------------|
| Impedance, transformed to feed point | 46.3 $\Omega$ - 1.1 j $\Omega$ |
| Return Loss                          | - 27.9 dB                      |

### Antenna Parameters with Head TSL at 5500 MHz

|                                      |                                |
|--------------------------------------|--------------------------------|
| Impedance, transformed to feed point | 49.5 $\Omega$ - 2.3 j $\Omega$ |
| Return Loss                          | - 32.7 dB                      |

### Antenna Parameters with Head TSL at 5600 MHz

|                                      |                                |
|--------------------------------------|--------------------------------|
| Impedance, transformed to feed point | 53.0 $\Omega$ + 1.7 j $\Omega$ |
| Return Loss                          | - 29.5 dB                      |

### Antenna Parameters with Head TSL at 5750 MHz

|                                      |                                |
|--------------------------------------|--------------------------------|
| Impedance, transformed to feed point | 51.5 $\Omega$ - 0.6 j $\Omega$ |
| Return Loss                          | - 35.8 dB                      |

### Antenna Parameters with Head TSL at 5800 MHz

|                                      |                                |
|--------------------------------------|--------------------------------|
| Impedance, transformed to feed point | 51.0 $\Omega$ - 2.4 j $\Omega$ |
| Return Loss                          | - 31.9 dB                      |

### General Antenna Parameters and Design

|                                  |          |
|----------------------------------|----------|
| Electrical Delay (one direction) | 1.202 ns |
|----------------------------------|----------|

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

## DASY5 Validation Report for Head TSL

Date: 12.06.2024

Test Laboratory: SPEAG, Zurich, Switzerland

**DUT: Dipole D5GHzV2; Type: D5GHzV2; Serial: D5GHzV2 - SN:1060**

Communication System: UID 0 - CW; Frequency: 5200 MHz, Frequency: 5250 MHz, Frequency: 5300 MHz, Frequency: 5500 MHz, Frequency: 5600 MHz, Frequency: 5750 MHz, Frequency: 5800 MHz

Medium parameters used:  $f = 5200$  MHz;  $\sigma = 4.55$  S/m;  $\epsilon_r = 36.4$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Medium parameters used:  $f = 5250$  MHz;  $\sigma = 4.6$  S/m;  $\epsilon_r = 36.3$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Medium parameters used:  $f = 5300$  MHz;  $\sigma = 4.64$  S/m;  $\epsilon_r = 36.2$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Medium parameters used:  $f = 5500$  MHz;  $\sigma = 4.86$  S/m;  $\epsilon_r = 35.8$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Medium parameters used:  $f = 5600$  MHz;  $\sigma = 4.97$  S/m;  $\epsilon_r = 35.6$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Medium parameters used:  $f = 5750$  MHz;  $\sigma = 5.14$  S/m;  $\epsilon_r = 35.4$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Medium parameters used:  $f = 5800$  MHz;  $\sigma = 5.19$  S/m;  $\epsilon_r = 35.3$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

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

DASY52 Configuration:

- Probe: EX3DV4 - SN3503; ConvF(5.63, 5.63, 5.63) @ 5200 MHz, ConvF(5.39, 5.39, 5.39) @ 5250 MHz, ConvF(5.38, 5.38, 5.38) @ 5300 MHz, ConvF(5.04, 5.04, 5.04) @ 5500 MHz, ConvF(5, 5, 5) @ 5600 MHz, ConvF(4.98, 4.98, 4.98) @ 5750 MHz, ConvF(4.86, 4.86, 4.86) @ 5800 MHz; Calibrated: 07.03.2024
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 22.05.2024
- Phantom: Flat Phantom 5.0 (front); Type: QD000P50AA; Serial: 1001
- DASY52 52.10.4(1535); SEMCAD X 14.6.14(7501)

### **Dipole Calibration for Head Tissue/Pin=100mW, dist=10mm, f=5200 MHz/Zoom Scan,**

**dist=1.4mm (8x8x7)/Cube 0:** Measurement grid: dx=4mm, dy=4mm, dz=1.4mm

Reference Value = 75.67 V/m; Power Drift = 0.02 dB

Peak SAR (extrapolated) = 27.1 W/kg

**SAR(1 g) = 7.64 W/kg; SAR(10 g) = 2.18 W/kg**

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

Ratio of SAR at M2 to SAR at M1 = 69.1%

Maximum value of SAR (measured) = 17.7 W/kg

### **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 = 77.05 V/m; Power Drift = 0.03 dB

Peak SAR (extrapolated) = 26.8 W/kg

**SAR(1 g) = 7.82 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 = 70.1%

Maximum value of SAR (measured) = 18.0 W/kg

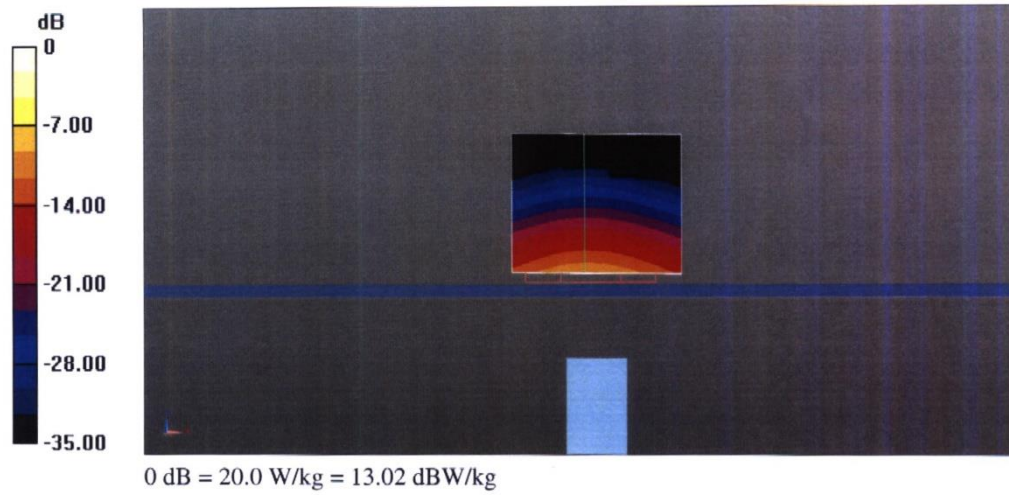
**Dipole Calibration for Head Tissue/Pin=100mW, dist=10mm, f=5300 MHz/Zoom Scan, dist=1.4mm (8x8x7)/Cube 0:** Measurement grid: dx=4mm, dy=4mm, dz=1.4mm  
Reference Value = 76.66 V/m; Power Drift = 0.05 dB  
Peak SAR (extrapolated) = 28.3 W/kg  
**SAR(1 g) = 7.94 W/kg; SAR(10 g) = 2.28 W/kg**  
Smallest distance from peaks to all points 3 dB below = 7.2 mm  
Ratio of SAR at M2 to SAR at M1 = 68.9%  
Maximum value of SAR (measured) = 18.5 W/kg

**Dipole Calibration for Head Tissue/Pin=100mW, dist=10mm, f=5500 MHz/Zoom Scan, dist=1.4mm (8x8x7)/Cube 0:** Measurement grid: dx=4mm, dy=4mm, dz=1.4mm  
Reference Value = 77.28 V/m; Power Drift = 0.01 dB  
Peak SAR (extrapolated) = 32.3 W/kg  
**SAR(1 g) = 8.34 W/kg; SAR(10 g) = 2.37 W/kg**  
Smallest distance from peaks to all points 3 dB below = 6.8 mm  
Ratio of SAR at M2 to SAR at M1 = 66.4%  
Maximum value of SAR (measured) = 20.0 W/kg

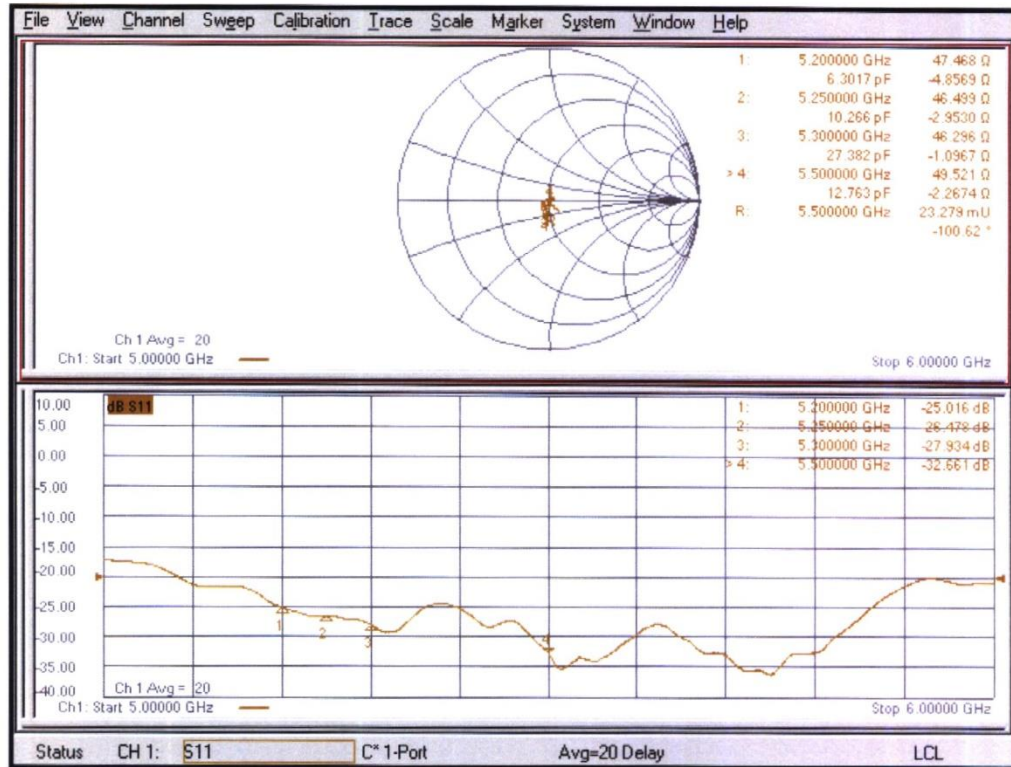
**Dipole Calibration for Head Tissue/Pin=100mW, dist=10mm, f=5600 MHz/Zoom Scan, dist=1.4mm (8x8x7)/Cube 0:** Measurement grid: dx=4mm, dy=4mm, dz=1.4mm  
Reference Value = 76.70 V/m; Power Drift = 0.04 dB  
Peak SAR (extrapolated) = 30.7 W/kg  
**SAR(1 g) = 8.17 W/kg; SAR(10 g) = 2.32 W/kg**  
Smallest distance from peaks to all points 3 dB below = 7.2 mm  
Ratio of SAR at M2 to SAR at M1 = 67.1%  
Maximum value of SAR (measured) = 19.6 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 = 74.11 V/m; Power Drift = 0.03 dB  
Peak SAR (extrapolated) = 31.5 W/kg  
**SAR(1 g) = 7.99 W/kg; SAR(10 g) = 2.28 W/kg**  
Smallest distance from peaks to all points 3 dB below = 7.2 mm  
Ratio of SAR at M2 to SAR at M1 = 65.6%  
Maximum value of SAR (measured) = 19.3 W/kg

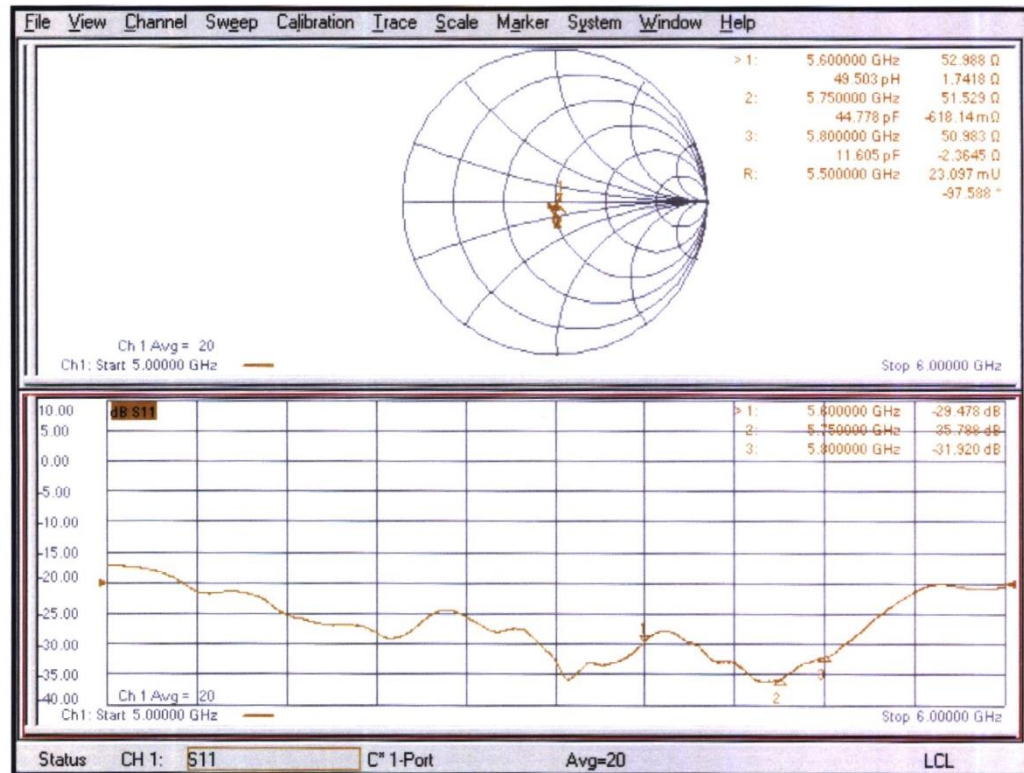
**Dipole Calibration for Head Tissue/Pin=100mW, dist=10mm, f=5800 MHz/Zoom Scan, dist=1.4mm (8x8x7)/Cube 0:** Measurement grid: dx=4mm, dy=4mm, dz=1.4mm  
Reference Value = 74.18 V/m; Power Drift = 0.02 dB  
Peak SAR (extrapolated) = 31.5 W/kg  
**SAR(1 g) = 7.88 W/kg; SAR(10 g) = 2.22 W/kg**  
Smallest distance from peaks to all points 3 dB below = 7.2 mm  
Ratio of SAR at M2 to SAR at M1 = 65.1%  
Maximum value of SAR (measured) = 19.3 W/kg



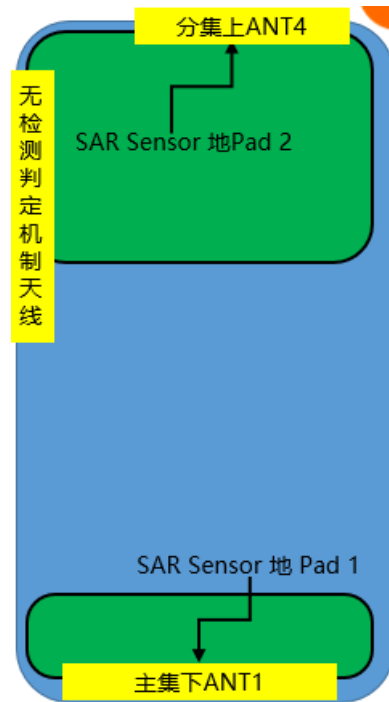
# Impedance Measurement Plot for Head TSL (5200, 5250, 5300, 5500 MHz)



# Impedance Measurement Plot for Head TSL (5600, 5750, 5800 MHz)



## ANNEX I SAR Sensor Triggering Data Summary



| SAR sensor triggering distance |        |      |
|--------------------------------|--------|------|
| ANT1                           | Front  | 16mm |
|                                | Back   | 16mm |
|                                | Bottom | 16mm |
| ANT4                           | Front  | 11mm |
|                                | Back   | 11mm |
|                                | Bottom | 11mm |

Per FCC KDB Publication 616217 D04v01r02, this device was tested by the manufacturer to determine the proximity sensor triggering distances for some positions. The measured output power within  $\pm 5\text{mm}$  of the triggering points (or until touching the phantom) is included for front, rear and each applicable edge.

To ensure all production units are compliant it is necessary to test SAR at a distance 1mm less than the smallest distance from the device and SAR phantom (determined from these triggering tests according to the KDB 616217 D04v01r02) with the device at maximum output power without power reduction. These SAR tests are included in addition to the SAR tests for the device touching the SAR phantom, with reduced power.

## ANT1:

### Front

Moving device toward the phantom:

| sensor near or far(KDB 616217 6.2.6) |     |     |     |     |     |      |      |      |      |      |      |
|--------------------------------------|-----|-----|-----|-----|-----|------|------|------|------|------|------|
| Distance [mm]                        | 21  | 20  | 19  | 18  | 17  | 16   | 15   | 14   | 13   | 12   | 11   |
| Main antenna                         | Far | Far | Far | Far | Far | Near | Near | Near | Near | Near | Near |

Moving device away from the phantom:

| sensor near or far(KDB 616217 6.2.6) |      |      |      |      |      |      |     |     |     |     |     |
|--------------------------------------|------|------|------|------|------|------|-----|-----|-----|-----|-----|
| Distance [mm]                        | 11   | 12   | 13   | 14   | 15   | 16   | 17  | 18  | 19  | 20  | 21  |
| Main antenna                         | Near | Near | Near | Near | Near | Near | Far | Far | Far | Far | Far |

### Rear

Moving device toward the phantom:

| sensor near or far(KDB 616217 6.2.6) |     |     |     |     |     |      |      |      |      |      |      |
|--------------------------------------|-----|-----|-----|-----|-----|------|------|------|------|------|------|
| Distance [mm]                        | 21  | 20  | 19  | 18  | 17  | 16   | 15   | 14   | 13   | 12   | 11   |
| Main antenna                         | Far | Far | Far | Far | Far | Near | Near | Near | Near | Near | Near |

Moving device away from the phantom:

| sensor near or far(KDB 616217 6.2.6) |      |      |      |      |      |      |     |     |     |     |     |
|--------------------------------------|------|------|------|------|------|------|-----|-----|-----|-----|-----|
| Distance [mm]                        | 11   | 12   | 13   | 14   | 15   | 16   | 17  | 18  | 19  | 20  | 21  |
| Main antenna                         | Near | Near | Near | Near | Near | Near | Far | Far | Far | Far | Far |

### Bottom Edge

Moving device toward the phantom:

| sensor near or far(KDB 616217 6.2.6) |     |     |     |     |     |      |      |      |      |      |      |
|--------------------------------------|-----|-----|-----|-----|-----|------|------|------|------|------|------|
| Distance [mm]                        | 21  | 20  | 19  | 18  | 17  | 16   | 15   | 14   | 13   | 12   | 11   |
| Main antenna                         | Far | Far | Far | Far | Far | Near | Near | Near | Near | Near | Near |

Moving device away from the phantom:

| sensor near or far(KDB 616217 6.2.6) |      |      |      |      |      |      |     |     |     |     |     |
|--------------------------------------|------|------|------|------|------|------|-----|-----|-----|-----|-----|
| Distance [mm]                        | 11   | 12   | 13   | 14   | 15   | 16   | 17  | 18  | 19  | 20  | 21  |
| Main antenna                         | Near | Near | Near | Near | Near | Near | Far | Far | Far | Far | Far |

## ANT4:

### Front

Moving device toward the phantom:

| sensor near or far(KDB 616217 6.2.6) |     |     |     |     |     |      |      |      |      |      |      |
|--------------------------------------|-----|-----|-----|-----|-----|------|------|------|------|------|------|
| Distance [mm]                        | 16  | 15  | 14  | 13  | 12  | 11   | 10   | 9    | 8    | 7    | 6    |
| Main antenna                         | Far | Far | Far | Far | Far | Near | Near | Near | Near | Near | Near |

Moving device away from the phantom:

| sensor near or far(KDB 616217 6.2.6) |      |      |      |      |      |      |     |     |     |     |     |
|--------------------------------------|------|------|------|------|------|------|-----|-----|-----|-----|-----|
| Distance [mm]                        | 6    | 7    | 8    | 9    | 10   | 11   | 12  | 13  | 14  | 15  | 16  |
| Main antenna                         | Near | Near | Near | Near | Near | Near | Far | Far | Far | Far | Far |

### Rear

Moving device toward the phantom:

| sensor near or far(KDB 616217 6.2.6) |     |     |     |     |     |      |      |      |      |      |      |
|--------------------------------------|-----|-----|-----|-----|-----|------|------|------|------|------|------|
| Distance [mm]                        | 16  | 15  | 14  | 13  | 12  | 11   | 10   | 9    | 8    | 7    | 6    |
| Main antenna                         | Far | Far | Far | Far | Far | Near | Near | Near | Near | Near | Near |

Moving device away from the phantom:

| sensor near or far(KDB 616217 6.2.6) |      |      |      |      |      |      |     |     |     |     |     |
|--------------------------------------|------|------|------|------|------|------|-----|-----|-----|-----|-----|
| Distance [mm]                        | 6    | 7    | 8    | 9    | 10   | 11   | 12  | 13  | 14  | 15  | 16  |
| Main antenna                         | Near | Near | Near | Near | Near | Near | Far | Far | Far | Far | Far |

### Top Edge

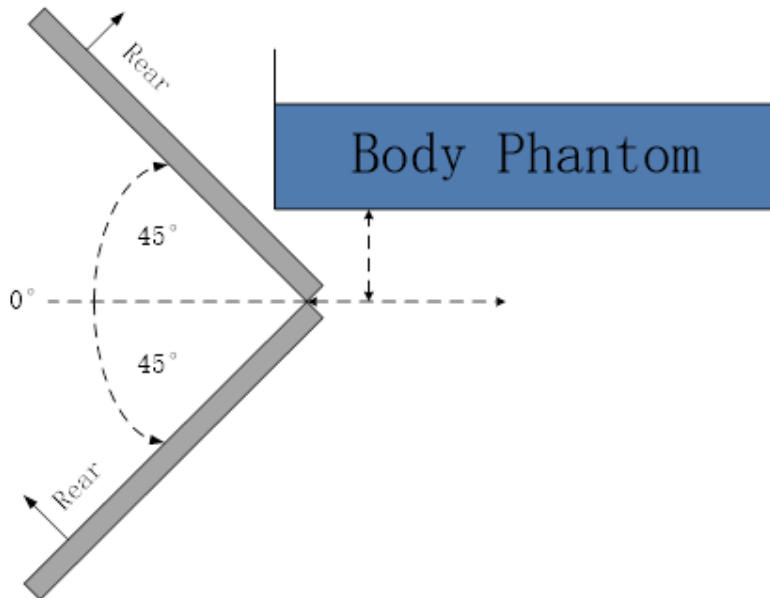
Moving device toward the phantom:

| sensor near or far(KDB 616217 6.2.6) |     |     |     |     |     |      |      |      |      |      |      |
|--------------------------------------|-----|-----|-----|-----|-----|------|------|------|------|------|------|
| Distance [mm]                        | 16  | 15  | 14  | 13  | 12  | 11   | 10   | 9    | 8    | 7    | 6    |
| Main antenna                         | Far | Far | Far | Far | Far | Near | Near | Near | Near | Near | Near |

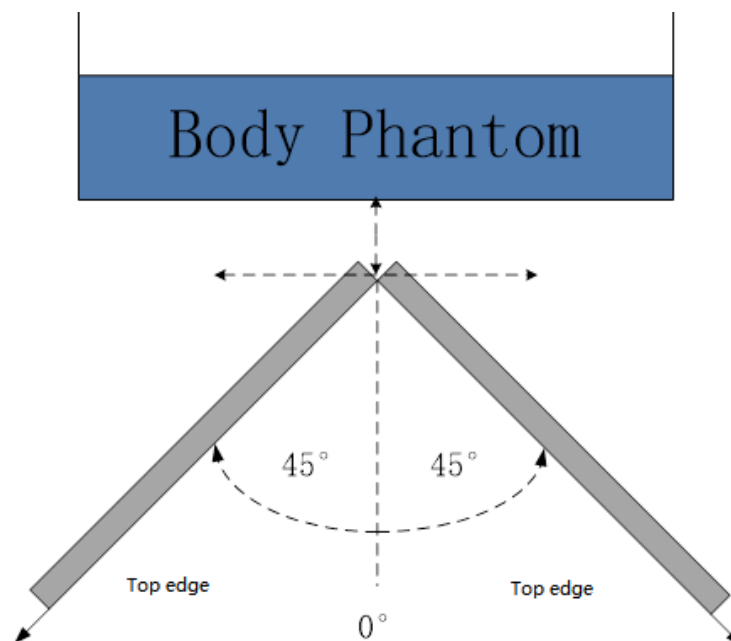
Moving device away from the phantom:

| sensor near or far(KDB 616217 6.2.6) |      |      |      |      |      |      |     |     |     |     |     |
|--------------------------------------|------|------|------|------|------|------|-----|-----|-----|-----|-----|
| Distance [mm]                        | 6    | 7    | 8    | 9    | 10   | 11   | 12  | 13  | 14  | 15  | 16  |
| Main antenna                         | Near | Near | Near | Near | Near | Near | Far | Far | Far | Far | Far |

Per FCC KDB Publication 616217 D04v01r02, 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  $\leq 10^\circ$  increments until the tablet is  $\pm 45^\circ$  or more from the vertical position at  $0^\circ$ .



**The front/rear edge evaluation**



**The bottom/top edge evaluation**

Based on the above evaluation, we come to the conclusion that the sensor triggering is not released and normal maximum output power is not restored within the  $\pm 45^\circ$  range at the smallest sensor triggering test distance declared by manufacturer.

## ANNEX J Accreditation Certificate



### Accredited Laboratory

A2LA has accredited

### TELECOMMUNICATION TECHNOLOGY LABS, CAICT

Beijing, People's Republic of China

for technical competence in the field of

### Electrical Testing

This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2017 General requirements for the competence of testing and calibration laboratories. This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory quality management system (refer to joint ISO-ILAC-IAF Communiqué dated April 2017).



Presented this 23<sup>rd</sup> day of July 2024.



Mr. Trace McInturff, Vice President, Accreditation Services  
For the Accreditation Council  
Certificate Number 7049.01  
Valid to July 31, 2026

For the tests to which this accreditation applies, please refer to the laboratory's Electrical Scope of Accreditation.