

**DASY5 Validation Report for Head TSL**

Date: 30.01.2019

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;  $\sigma = 4.54$  S/m;  $\epsilon_r = 36.7$ ;  $\rho = 1000$  kg/m<sup>3</sup>,Medium parameters used:  $f = 5600$  MHz;  $\sigma = 4.9$  S/m;  $\epsilon_r = 36.2$ ;  $\rho = 1000$  kg/m<sup>3</sup>,Medium parameters used:  $f = 5750$  MHz;  $\sigma = 5.06$  S/m;  $\epsilon_r = 36$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

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

**DASY52 Configuration:**

- Probe: EX3DV4 - SN3503; ConvF(5.45, 5.45, 5.45) @ 5250 MHz, ConvF(5, 5, 5) @ 5600 MHz, ConvF(4.98, 4.98, 4.98) @ 5750 MHz; Calibrated: 31.12.2018
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 04.10.2018
- Phantom: Flat Phantom 5.0 (front); Type: QD 000 P50 AA; Serial: 1001
- DASY52 52.10.2(1495); SEMCAD X 14.6.12(7450)

**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 = 77.10 V/m; Power Drift = 0.03 dB

Peak SAR (extrapolated) = 28.3 W/kg

**SAR(1 g) = 8.05 W/kg; SAR(10 g) = 2.3 W/kg**

Maximum value of SAR (measured) = 18.3 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 = 76.81 V/m; Power Drift = 0.07 dB

Peak SAR (extrapolated) = 31.7 W/kg

**SAR(1 g) = 8.34 W/kg; SAR(10 g) = 2.37 W/kg**

Maximum value of SAR (measured) = 19.5 W/kg

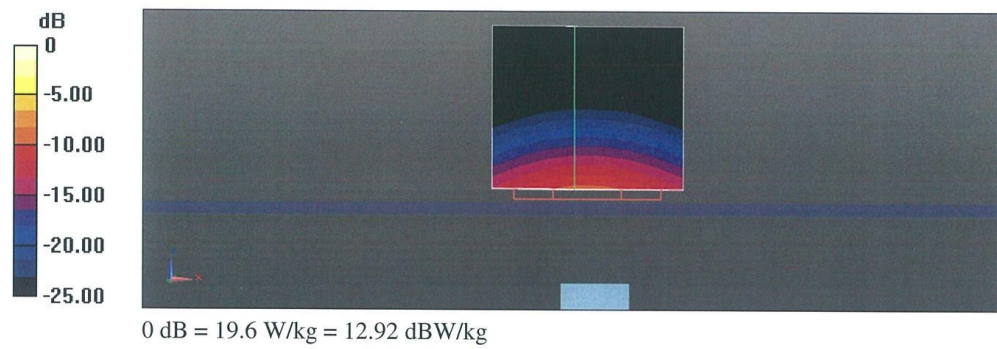
**Dipole Calibration for Head Tissue/Pin=100mW, dist=10mm, f=5750 MHz/Zoom Scan,****dist=1.4mm (8x8x7)/Cube 0:** Measurement grid: dx=4mm, dy=4mm, dz=1.4mm

Reference Value = 74.84 V/m; Power Drift = 0.05 dB

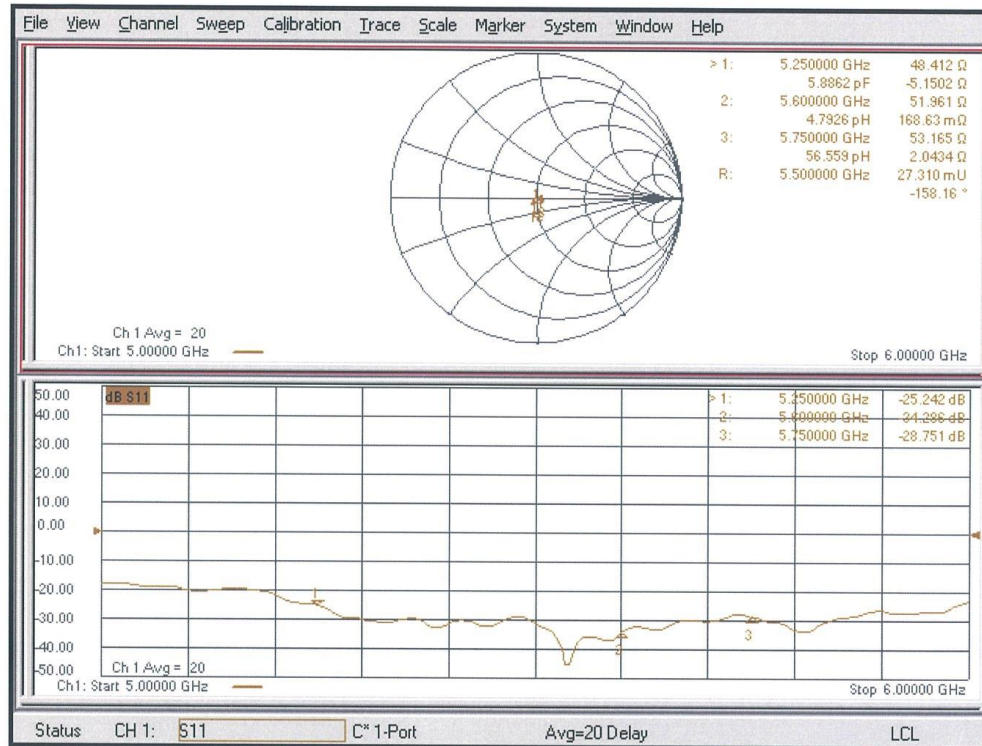
Peak SAR (extrapolated) = 32.9 W/kg

**SAR(1 g) = 8.15 W/kg; SAR(10 g) = 2.3 W/kg**

Maximum value of SAR (measured) = 19.6 W/kg



### Impedance Measurement Plot for Head TSL



**DASY5 Validation Report for Body TSL**

Date: 31.01.2019

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;  $\sigma = 5.43$  S/m;  $\epsilon_r = 47.2$ ;  $\rho = 1000$  kg/m<sup>3</sup>,Medium parameters used:  $f = 5600$  MHz;  $\sigma = 5.9$  S/m;  $\epsilon_r = 46.6$ ;  $\rho = 1000$  kg/m<sup>3</sup>,Medium parameters used:  $f = 5750$  MHz;  $\sigma = 6.11$  S/m;  $\epsilon_r = 46.3$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

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

DASY52 Configuration:

- Probe: EX3DV4 - SN3503; ConvF(5.26, 5.26, 5.26) @ 5250 MHz, ConvF(4.7, 4.7, 4.7) @ 5600 MHz, ConvF(4.62, 4.62, 4.62) @ 5750 MHz; Calibrated: 31.12.2018
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 04.10.2018
- Phantom: Flat Phantom 5.0 (back); Type: QD 000 P50 AA; Serial: 1002
- DASY52 52.10.2(1495); SEMCAD X 14.6.12(7450)

**Dipole Calibration for Body 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 = 68.34 V/m; Power Drift = -0.01 dB

Peak SAR (extrapolated) = 29.6 W/kg

**SAR(1 g) = 7.58 W/kg; SAR(10 g) = 2.12 W/kg**

Maximum value of SAR (measured) = 17.6 W/kg

**Dipole Calibration for Body 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 = 67.75 V/m; Power Drift = -0.03 dB

Peak SAR (extrapolated) = 33.7 W/kg

**SAR(1 g) = 7.87 W/kg; SAR(10 g) = 2.2 W/kg**

Maximum value of SAR (measured) = 18.9 W/kg

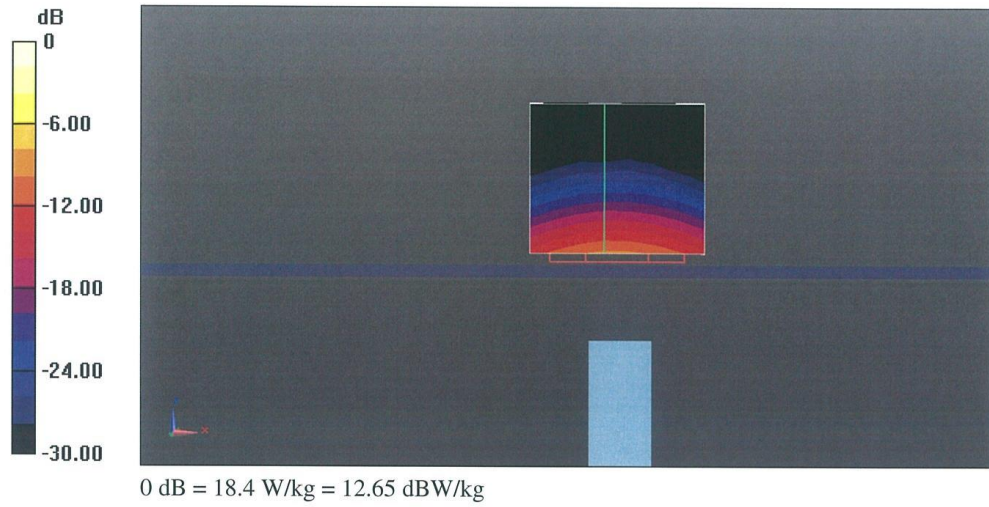
**Dipole Calibration for Body Tissue/Pin=100mW, dist=10mm, f=5750 MHz/Zoom Scan,****dist=1.4mm (8x8x7)/Cube 0:** Measurement grid: dx=4mm, dy=4mm, dz=1.4mm

Reference Value = 67.01 V/m; Power Drift = 0.00 dB

Peak SAR (extrapolated) = 33.2 W/kg

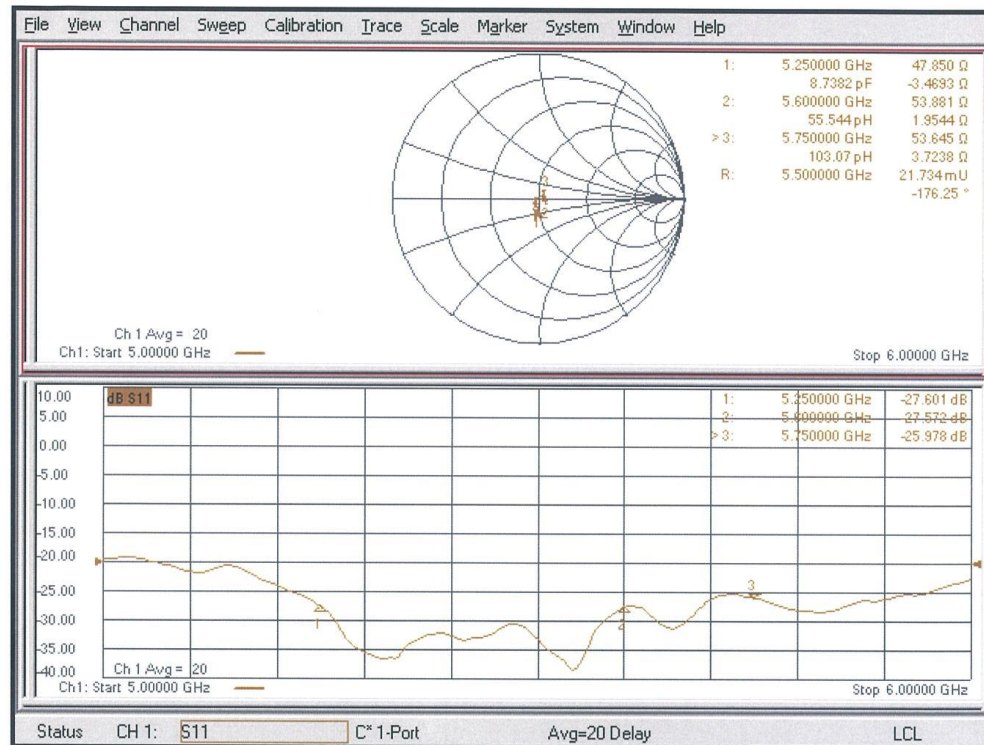
**SAR(1 g) = 7.58 W/kg; SAR(10 g) = 2.1 W/kg**

Maximum value of SAR (measured) = 18.4 W/kg

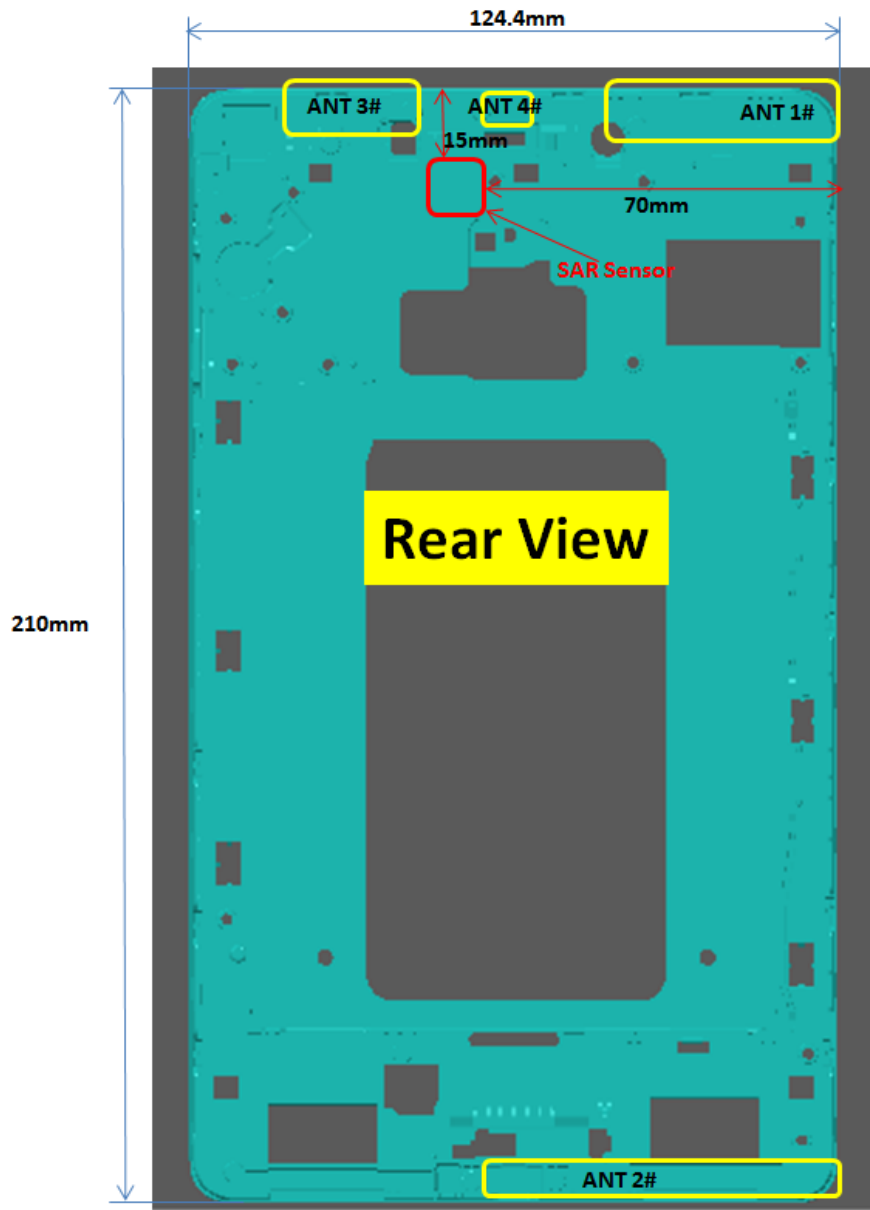




### Impedance Measurement Plot for Body TSL



## ANNEX I Sensor Triggering Data Summary



Antenna	Trigger position	Trigger distance (mm)
1# (Main ANT)	Back	20
	Left	15
	Top	30
	Front	18
3# (WIFI 2.4G)	Back	10
	Top	5
	Front	8
4# (WIFI 5G)	Back	10
	Top	5
	Front	8

Antenna	Band	Influence Bands	Conducted power reduced (dB)
1# (Main ANT)	GSM (GMSK)	850 (5)	8
		900 (8)	3
		1800 (3)	1.5
		1900(2)	9
	GSM (8PSK)	850 (5)	2
		1900(2)	6.5
	WCDMA	1	6.5
		2	12
		4	11
		5	6
	LTE	1	5
		2	10.5
		3	4.5
		4	10.7
		5	5.5
		7	10.5
		12	7.5
		17	7.5
		28	1
		38	7
		40	8.5
		41	8
3# (WIFI 2.4G)	2.4G		9.5
4# (WIFI 5G)	5G		3.5

According to the above description, this device was tested by the manufacturer to determine the SAR sensor triggering distances for the rear, left edge and top edge of the device. The measured power state within  $\pm 5\text{mm}$  of the triggering points (or until touching the phantom) is included for 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 with the device at maximum output power without power reduction.

We tested the power and got the different proximity sensor triggering distances for rear, left edge and top edge. But the manufacturer has declared 20mm (rear) / 15mm (left edge) / 30mm (top edge) are the most conservative triggering distance for main antenna and 10mm (rear) / 5mm (top edge) for wifi antenna. Therefore base on the most conservative triggering distances as above, additional SAR measurements were required at 19mm (rear) / 14mm (left edge) / 29mm (top edge) for main antenna and 9mm (rear) / 4mm (top edge) for wifi antenna.

#### Rear of main antenna

Moving device toward the phantom:

The power state											
Distance [mm]	25	24	23	22	21	20	19	18	17	16	15
Main antenna	Normal	Normal	Normal	Normal	Normal	Low	Low	Low	Low	Low	Low

Moving device away from the phantom:

The power state											
Distance [mm]	15	16	17	18	19	20	21	22	23	24	25
Main antenna	Low	Low	Low	Low	Low	Low	Normal	Normal	Normal	Normal	Normal



### Left Edge of main antenna

Moving device toward the phantom:

The power state											
Distance [mm]	20	19	18	17	16	15	14	13	12	11	10
Main antenna	Normal	Normal	Normal	Normal	Normal	Low	Low	Low	Low	Low	Low

Moving device away from the phantom:

The power state											
Distance [mm]	10	11	12	13	14	15	16	17	18	19	20
Main antenna	Low	Low	Low	Low	Low	Low	Normal	Normal	Normal	Normal	Normal

### Top Edge of main antenna

Moving device toward the phantom:

The power state											
Distance [mm]	35	34	33	32	31	30	29	28	27	26	25
Main antenna	Normal	Normal	Normal	Normal	Normal	Low	Low	Low	Low	Low	Low

Moving device away from the phantom:

The power state											
Distance [mm]	25	26	27	28	29	30	31	32	33	34	35
Main antenna	Low	Low	Low	Low	Low	Low	Normal	Normal	Normal	Normal	Normal

### Rear of wifi antenna

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

### Top Edge of wifi antenna

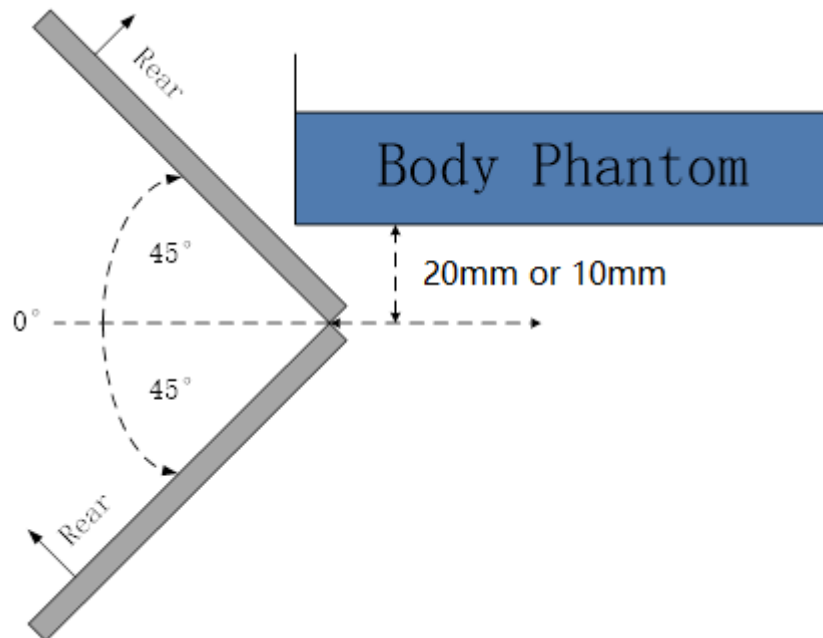
Moving device toward the phantom:

The power state											
Distance [mm]	10	9	8	7	6	5	4	3	2	1	0
Main antenna	Normal	Normal	Normal	Normal	Normal	Low	Low	Low	Low	Low	Low

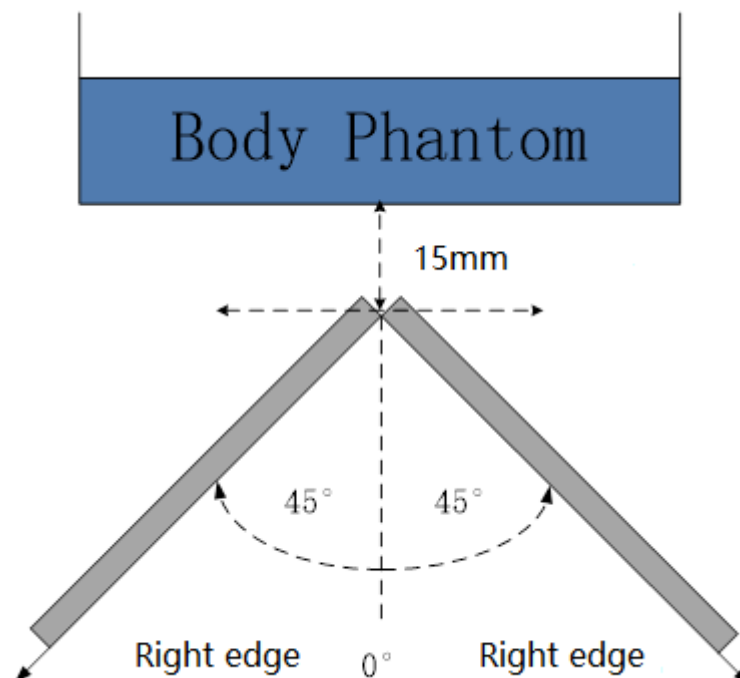
Moving device away from the phantom:

The power state											
Distance [mm]	0	1	2	3	4	5	6	7	8	9	10
Main antenna	Low	Low	Low	Low	Low	Low	Normal	Normal	Normal	Normal	Normal

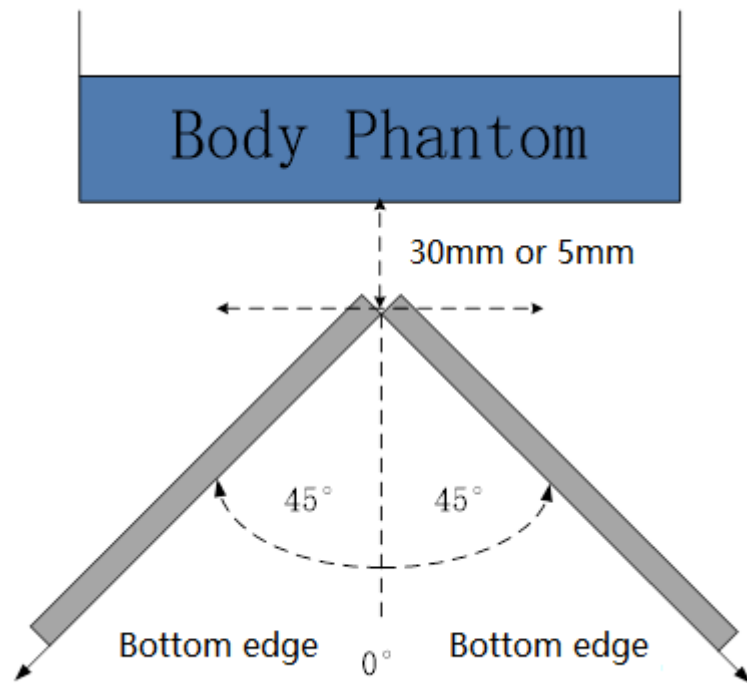
The influence of table tilt angles to proximity sensor triggering is determined by positioning each edge that contains a transmitting antenna, perpendicular to the flat phantom, at the smallest sensor triggering test distance by rotating the device around the edge next to the phantom in  $\leq 10^\circ$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



**The rear evaluation**



**The left edge evaluation**



**The 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**

United States Department of Commerce  
National Institute of Standards and Technology



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**Certificate of Accreditation to ISO/IEC 17025:2005**

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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:*

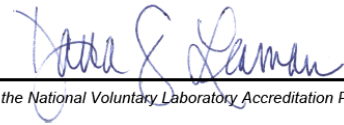
**Electromagnetic Compatibility & Telecommunications**

*This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2005.  
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 January 2009).*

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2016-09-29 through 2017-09-30

Effective Dates



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For the National Voluntary Laboratory Accreditation Program