

**Body TSL parameters at 5250 MHz**

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	48.9	5.36 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	47.2 ± 6 %	5.43 mho/m ± 6 %
Body TSL temperature change during test	< 0.5 °C	----	----

**SAR result with Body TSL at 5250 MHz**

SAR averaged over 1 cm <sup>3</sup> (1 g) of Body TSL	Condition	
SAR measured	100 mW input power	7.58 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	<b>75.3 W/kg ± 19.9 % (k=2)</b>

SAR averaged over 10 cm <sup>3</sup> (10 g) of Body TSL	condition	
SAR measured	100 mW input power	2.12 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	<b>21.0 W/kg ± 19.5 % (k=2)</b>

**Body TSL parameters at 5600 MHz**

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	48.5	5.77 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	46.6 ± 6 %	5.90 mho/m ± 6 %
Body TSL temperature change during test	< 0.5 °C	----	----

**SAR result with Body TSL at 5600 MHz**

SAR averaged over 1 cm <sup>3</sup> (1 g) of Body TSL	Condition	
SAR measured	100 mW input power	7.87 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	<b>78.1 W/kg ± 19.9 % (k=2)</b>

SAR averaged over 10 cm <sup>3</sup> (10 g) of Body TSL	condition	
SAR measured	100 mW input power	2.20 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	<b>21.8 W/kg ± 19.5 % (k=2)</b>

**Body TSL parameters at 5750 MHz**

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	48.3	5.94 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	46.3 ± 6 %	6.11 mho/m ± 6 %
Body TSL temperature change during test	< 0.5 °C	----	----

**SAR result with Body TSL at 5750 MHz**

SAR averaged over 1 cm <sup>3</sup> (1 g) of Body TSL	Condition	
SAR measured	100 mW input power	7.58 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	<b>75.2 W/kg ± 19.9 % (k=2)</b>

SAR averaged over 10 cm <sup>3</sup> (10 g) of Body TSL	condition	
SAR measured	100 mW input power	2.10 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	<b>20.8 W/kg ± 19.5 % (k=2)</b>

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

#### Antenna Parameters with Head TSL at 5250 MHz

Impedance, transformed to feed point	48.4 $\Omega$ - 5.2 j $\Omega$
Return Loss	- 25.2 dB

#### Antenna Parameters with Head TSL at 5600 MHz

Impedance, transformed to feed point	52.0 $\Omega$ + 0.2 j $\Omega$
Return Loss	- 34.3 dB

#### Antenna Parameters with Head TSL at 5750 MHz

Impedance, transformed to feed point	53.2 $\Omega$ + 2.0 j $\Omega$
Return Loss	- 28.8 dB

#### Antenna Parameters with Body TSL at 5250 MHz

Impedance, transformed to feed point	47.9 $\Omega$ - 3.5 j $\Omega$
Return Loss	- 27.6 dB

#### Antenna Parameters with Body TSL at 5600 MHz

Impedance, transformed to feed point	53.9 $\Omega$ + 2.0 j $\Omega$
Return Loss	- 27.6 dB

#### Antenna Parameters with Body TSL at 5750 MHz

Impedance, transformed to feed point	53.6 $\Omega$ + 3.7 j $\Omega$
Return Loss	- 26.0 dB

### General Antenna Parameters and Design

Electrical Delay (one direction)	1.191 ns
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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
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**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

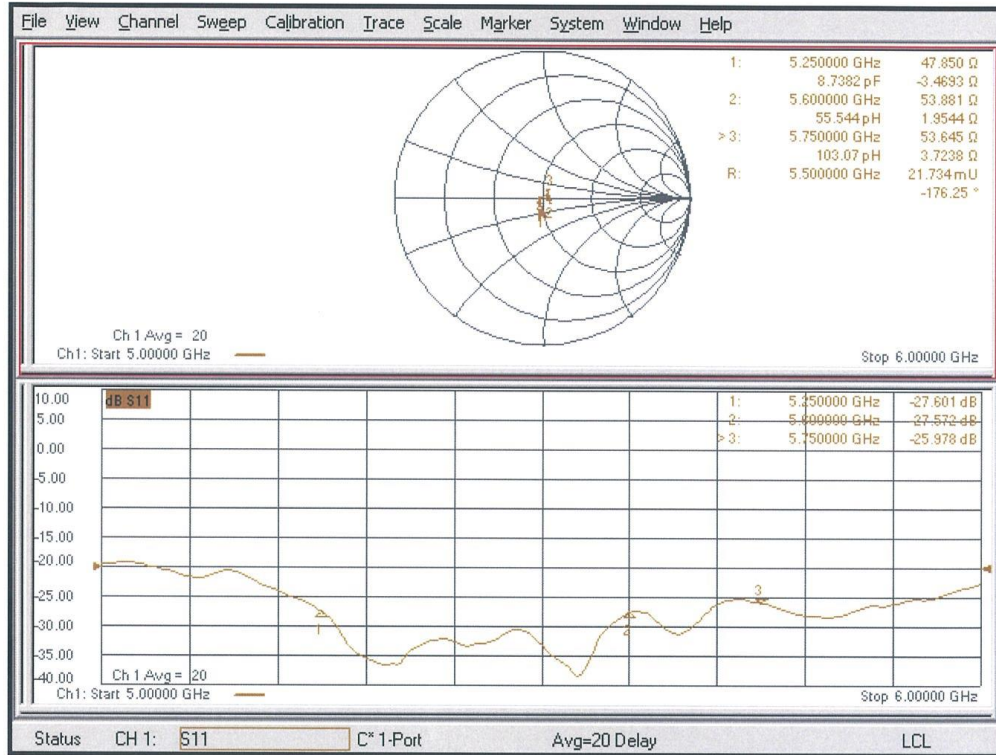
Reference Value = 74.84 V/m; Power Drift = 0.05 dB

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 Body TSL



## ANNEX I Sensor Triggering Data Summary

The trigger distance of the SAR sensor is 9mm (rear/bottom) and 4mm (Front), when the hotspot on and the sensor are triggered at the same time, the mobile phone will take the decrease of hotspot on as the priority one, the decrease of the sensor will not be activated, so that both normal body 1g SAR and extremely 10g SAR does not involve the problem of this sensor.

Trigger Position	Trigger Distance (mm)
Rear	9
Bottom	9
Front	4

According to the above description, this device was tested by the manufacturer to determine the SAR sensor triggering distances for the rear, bottom edge and front of the device. The measured power state within  $\pm 5$ mm of the triggering points (or until touching the phantom) is included for rear, bottom edge and front of the device.

### Rear

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

### Bottom Edge

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



### Front Edge

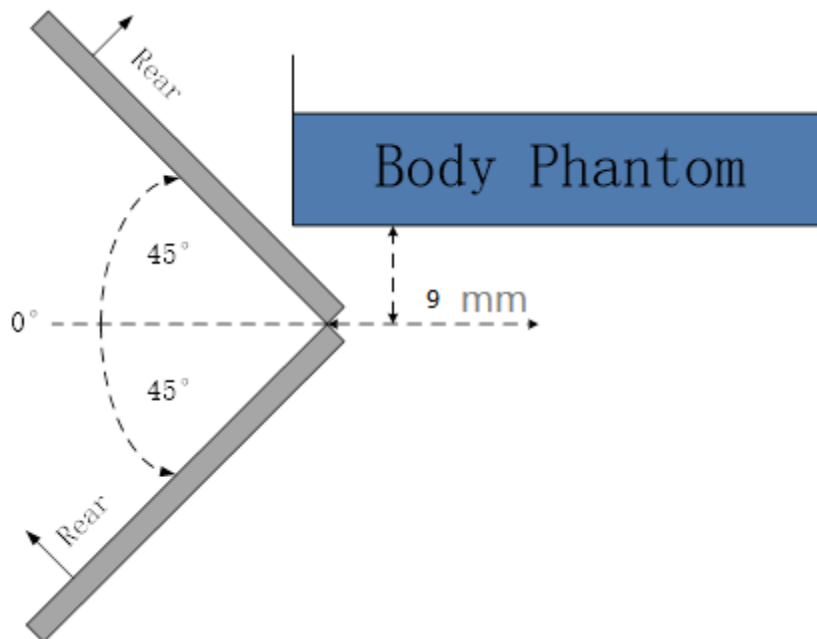
Moving device toward the phantom:

Distance [mm]	9	8	7	6	5	4	3	2	1
Main antenna	Normal	Normal	Normal	Normal	Normal	Low	Low	Low	Low

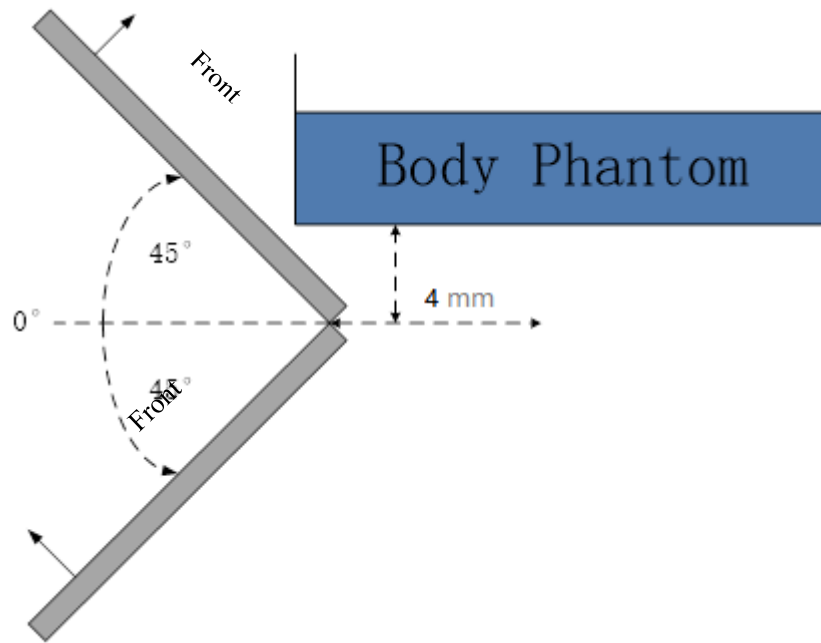
Moving device away from the phantom:

Distance [mm]	1	2	3	4	5	6	7	8	9
Main antenna	Low	Low	Low	Low	Normal	Normal	Normal	Normal	Normal

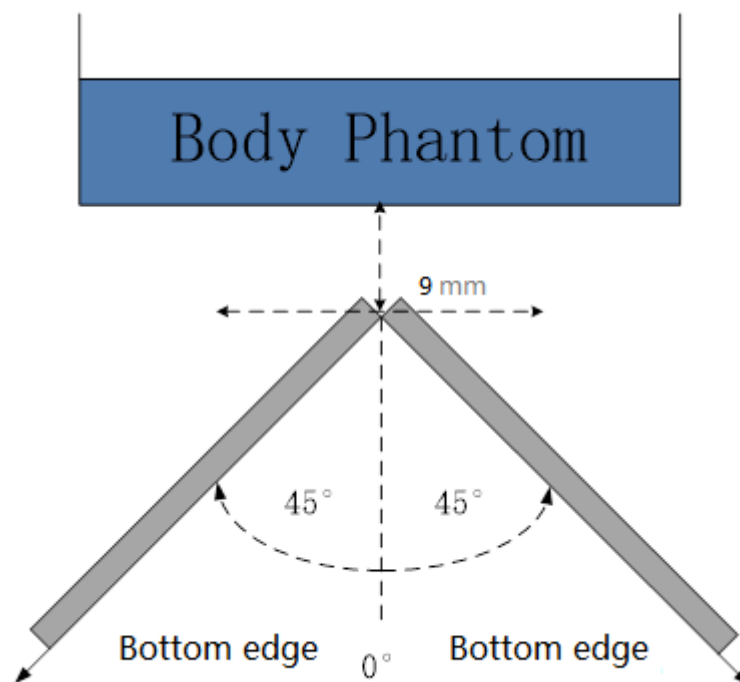
The influence of table tilt angles to proximity sensor triggering is determined by positioning each edge that contains a transmitting antenna, perpendicular to the flat phantom, at the smallest sensor triggering test distance by rotating the device around the edge next to the phantom in  $\leq 10^\circ$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



The rear evaluation



**The front edge evaluation**



**The bottom 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,  
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*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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2019-09-26 through 2020-09-30  
*Effective Dates*



  
*For the National Voluntary Laboratory Accreditation Program*