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Add: No.51 Xueyuan Road, Haidian District, Beijing, 100191, China
Tel: +86-10-62304633-2512 Fax: +86-10-62304633-2504
E-mail: cttl@chinattl.com http://www.chinattl.cn

Appendix (Additional assessments outside the scope of CNAS L0570)

Antenna Parameters with Head TSL at 5250 MHz

Impedance, transformed to feed point	48.8Ω - 4.65jΩ
Return Loss	- 26.2dB

Antenna Parameters with Head TSL at 5600 MHz

Impedance, transformed to feed point	49.2Ω + 0.58jΩ
Return Loss	- 40.0dB

Antenna Parameters with Head TSL at 5750 MHz

Impedance, transformed to feed point	50.3Ω + 1.08jΩ
Return Loss	- 39.0dB

Antenna Parameters with Body TSL at 5250 MHz

Impedance, transformed to feed point	48.8Ω - 2.02jΩ
Return Loss	- 32.5dB

Antenna Parameters with Body TSL at 5600 MHz

Impedance, transformed to feed point	51.3Ω + 3.94jΩ
Return Loss	- 27.8dB

Antenna Parameters with Body TSL at 5750 MHz

Impedance, transformed to feed point	52.2Ω + 4.77jΩ
Return Loss	- 25.8dB

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General Antenna Parameters and Design

Electrical Delay (one direction)	1.059 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

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DASY5 Validation Report for Head TSL Date: 08.28.2019

Test Laboratory: CTTL, Beijing, China

DUT: Dipole 5GHz; Type: D5GHzV2; Serial: D5GHzV2 - SN: 1238

Communication System: CW; Frequency: 5250 MHz, Frequency: 5600 MHz, Frequency: 5750 MHz,

Medium parameters used: f = 5250 MHz; σ = 4.692 S/m; ε_r = 35.71; ρ = 1000 kg/m3, Medium parameters used: f = 5600 MHz; σ = 4.992 S/m; ε_r = 35.42; ρ = 1000 kg/m3, Medium parameters used: f = 5750 MHz; σ = 5.096 S/m; ε_r = 35.13; ρ = 1000 kg/m3,

Phantom section: Center Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3617; ConvF(5.39, 5.39, 5.39) @ 5250 MHz; ConvF(5.06, 5.06, 5.06) @ 5600 MHz; ConvF(5.07, 5.07, 5.07) @ 5750 MHz; Calibrated: 1/31/2019
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1555; Calibrated: 8/22/2019
- Phantom: MFP_V5.1C ; Type: QD 000 P51CA; Serial: 1062
- Measurement SW: DASY52, Version 52.10 (2); SEMCAD X Version 14.6.12 (7470)

Dipole Calibration /Pin=100mW, d=10mm, f=5250 MHz/Zoom Scan, dist=1.4mm (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 69.41 V/m; Power Drift = -0.05 dB
Peak SAR (extrapolated) = 32.8 W/kg
SAR(1 g) = 7.81 W/kg; SAR(10 g) = 2.23 W/kg
Maximum value of SAR (measured) = 18.7 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 = 70.02 V/m; Power Drift = 0.04 dB
Peak SAR (extrapolated) = 35.7 W/kg
SAR(1 g) = 7.96 W/kg; SAR(10 g) = 2.27 W/kg
Maximum value of SAR (measured) = 19.2 W/kg

Dipole Calibration /Pin=100mW, d=10mm, f=5750 MHz/Zoom Scan, dist=1.4mm (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 68.55 V/m; Power Drift = 0.02 dB
Peak SAR (extrapolated) = 36.5 W/kg
SAR(1 g) = 7.86 W/kg; SAR(10 g) = 2.23 W/kg
Maximum value of SAR (measured) = 18.9 W/kg

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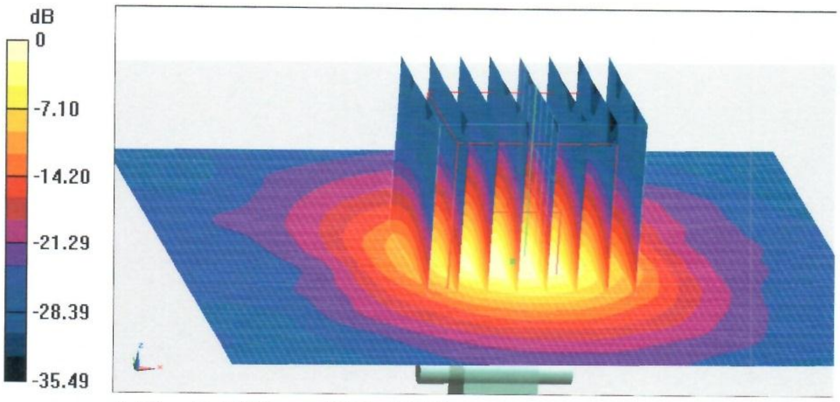

0 dB = 18.9 W/kg = 12.76 dBW/kg

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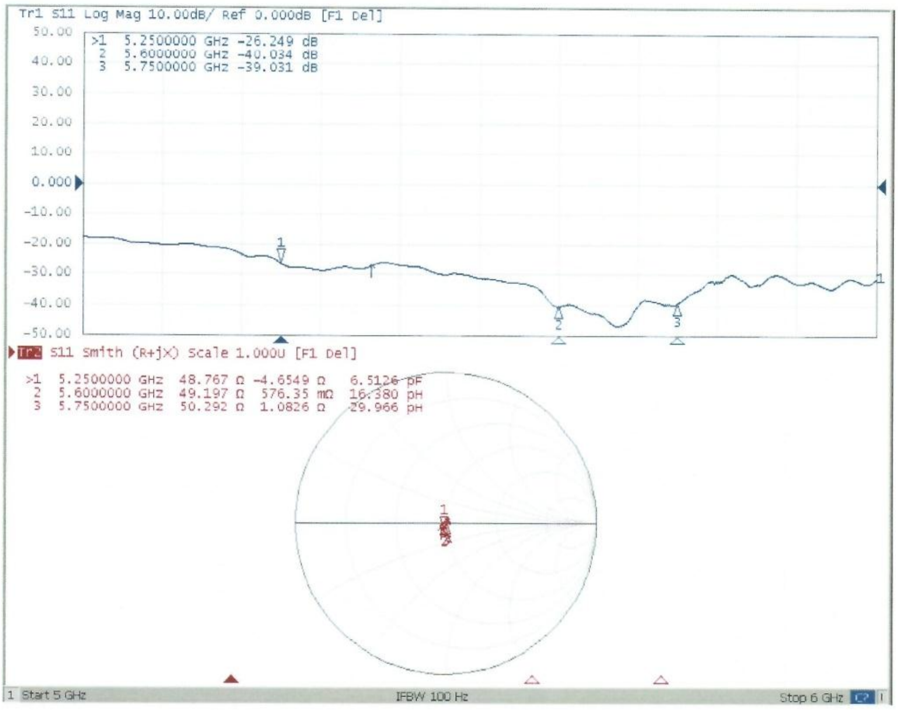
Impedance Measurement Plot for Head TSL



Certificate No: Z19-60293 Page 11 of 14

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DASY5 Validation Report for Body TSL Date: 08.29.2019

Test Laboratory: CTTL, Beijing, China

DUT: Dipole 5GHz; Type: D5GHzV2; Serial: D5GHzV2 - SN: 1238

Communication System: CW; Frequency: 5250 MHz, Frequency: 5600 MHz, Frequency: 5750 MHz,

Medium parameters used: f = 5250 MHz; σ = 5.402 S/m; ε_r = 48.05; ρ = 1000 kg/m3, Medium parameters used: f = 5600 MHz; σ = 5.703 S/m; ε_r = 47.61; ρ = 1000 kg/m3, Medium parameters used: f = 5750 MHz; σ = 5.782 S/m; ε_r = 47.49; ρ = 1000 kg/m3,

Phantom section: Right Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3617; ConvF(4.76, 4.76, 4.76) @ 5250 MHz; ConvF(4.23, 4.23, 4.23) @ 5600 MHz; ConvF(4.36, 4.36, 4.36) @ 5750 MHz; Calibrated: 1/31/2019
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1555; Calibrated: 8/22/2019
- Phantom: MFP_V5.1C ; Type: QD 000 P51CA; Serial: 1062
- Measurement SW: DASY52, Version 52.10 (2); SEMCAD X Version 14.6.12 (7470)

Dipole Calibration /Pin=100mW, d=10mm, f=5250 MHz/Zoom Scan, dist=1.4mm (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 54.85 V/m; Power Drift = 0.04 dB
Peak SAR (extrapolated) = 27.5 W/kg
SAR(1 g) = 7.17 W/kg; SAR(10 g) = 2.04 W/kg
Maximum value of SAR (measured) = 16.4 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 = 56.17 V/m; Power Drift = 0.07 dB
Peak SAR (extrapolated) = 32.3 W/kg
SAR(1 g) = 7.62 W/kg; SAR(10 g) = 2.18 W/kg
Maximum value of SAR (measured) = 18.4 W/kg

Dipole Calibration /Pin=100mW, d=10mm, f=5750 MHz/Zoom Scan, dist=1.4mm (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 55.47 V/m; Power Drift = 0.04 dB
Peak SAR (extrapolated) = 33.2 W/kg
SAR(1 g) = 7.39 W/kg; SAR(10 g) = 2.1 W/kg
Maximum value of SAR (measured) = 18.1 W/kg

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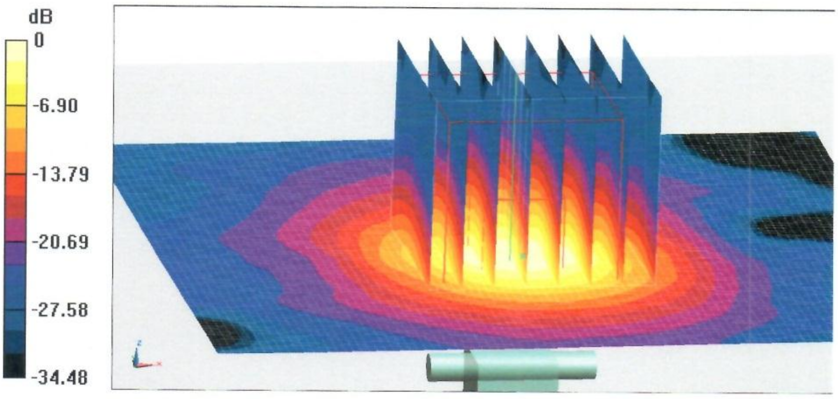

0 dB = 18.1 W/kg = 12.58 dBW/kg

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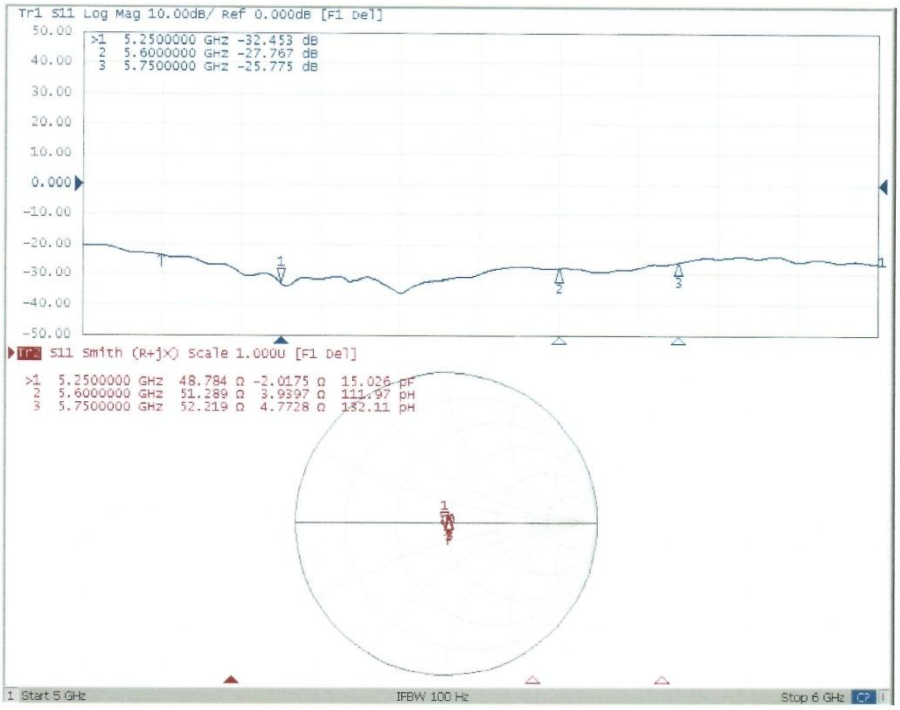
Impedance Measurement Plot for Body TSL



Certificate No: Z19-60293 Page 14 of 14

ANNEX J: Extended Calibration SAR Dipole

Referring to KDB865664 D01, if dipoles are verified in return loss (<-20dBm, within 20% of prior calibration), and in impedance (within 5 ohm of prior calibration), the annual calibration is not necessary and the calibration interval can be extended.

Justification of Extended Calibration SAR Dipole D750V3– serial no.1163

Head						
Date of Measurement	Return-Loss (dB)	Delta (%)	Real Impedance (ohm)	Delta (ohm)	Imaginary Impedance (johm)	Delta (johm)
2019-09-03	-26.9	/	50.5	/	-4.53	/
2020-09-01	-25.8	4.1	51.2	0.7	-4.29	0.24
2021-08-30	-25.2	6.3	51.7	1.2	-4.16	0.37

Justification of Extended Calibration SAR Dipole D1750V2– serial no.1152

Head						
Date of Measurement	Return-Loss (dB)	Delta (%)	Real Impedance (ohm)	Delta (ohm)	Imaginary Impedance (johm)	Delta (johm)
2019-08-30	-38.1	/	49.1	/	-0.84	/
2020-08-28	-36.5	4.2	50.2	1.1	-0.49	0.35
2021-08-26	-35.7	6.3	50.8	1.7	-0.42	0.42

ustification of Extended Calibration SAR Dipole D3550V2– serial no.1084

Head						
Date of Measurement	Return-Loss (dB)	Delta (%)	Real Impedance (ohm)	Delta (ohm)	Imaginary Impedance (johm)	Delta (johm)
2019-09-20	-32.0	/	50.7	/	2.40	/
2020-09-19	-30.3	5.3	51.5	0.8	2.53	0.13
2021-09-18	-29.2	8.8	52.1	1.4	2.66	0.26

Justification of Extended Calibration SAR Dipole D3700V2– serial no.1049

Head						
Date of Measurement	Return-Loss (dB)	Delta (%)	Real Impedance (ohm)	Delta (ohm)	Imaginary Impedance (johm)	Delta (johm)
2019-09-20	-28.0	/	46.7	/	-2.10	/
2020-09-19	-26.7	4.6	47.4	0.7	-1.91	0.19
2021-09-18	-25.5	8.9	48.2	1.5	-1.77	0.33

Justification of Extended Calibration SAR Dipole D5GHzV2– serial no.1238

Head						
Date of Measurement	Return-Loss (dB)	Delta (%)	Real Impedance (ohm)	Delta (ohm)	Imaginary Impedance (johm)	Delta (johm)
5250MHz						
2019-08-29	-26.2	/	48.8	/	-4.65	/
2020-08-28	-25.1	4.2	49.7	0.9	-4.26	0.39
2021-08-26	-24.7	5.7	50.2	1.4	-4.01	0.64
5600MHz						
2019-08-29	-40.0	/	49.2	/	0.58	/
2020-08-28	-38.1	4.8	50.3	1.1	0.85	0.27
2021-08-26	-37.7	5.7	50.8	1.6	0.92	0.34
5750MHz						
2019-08-29	-39.0	/	50.3	/	1.08	/
2020-08-28	-37.7	3.3	51.1	0.8	1.44	0.36
2021-08-26	-37.2	4.6	51.6	1.3	1.53	0.45

The Return-Loss is <-20dB, and within 20% of prior calibration; the impedance is within 5 ohm of prior calibration. Therefore the value result should support extended cabration.

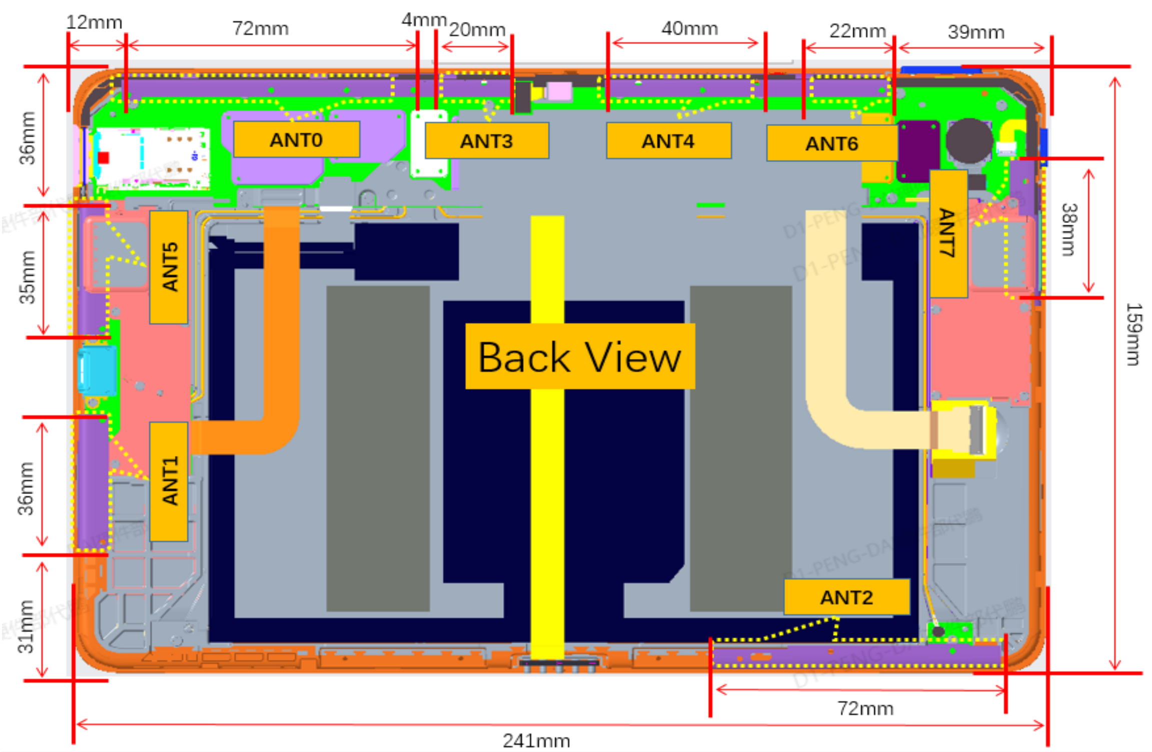
ANNEX K: Sensor Triggering Data Summary

Per FCC KDB Publication 616217 D04, this device was tested by the manufacturer to determine the proximity sensor triggering distances for all applicable sides and edges of the device. The measured output power at distances within ± 5 mm of the triggering points (or until touching the phantom) is included for back side and each applicable edge per Step i) in Section 6.2 of the KDB. The technical descriptions in the filing contain the complete set of triggering data required by Section 6 of FCC KDB Publication 616217 D04.

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

The operational description contains information explaining how this device remains compliant in the event of a sensor malfunction.

The DUT has the proximity sensors to reduce the output power. The position of the sensor and antenna are as shown in the graphic.



P-sensor coexisted with antenna

Ant.0

Rear Side:

Moving device toward the phantom:

Sensor triggered (YES or NO)											
Distance(mm)	25	24	23	22	21	20	19	18	17	16	15
Ant.0	NO	NO	NO	NO	NO	YES	YES	YES	YES	YES	YES

Moving device away from the phantom:

Sensor triggered (YES or NO)											
Distance(mm)	15	16	17	18	19	20	21	22	23	24	25
Ant.0	YES	YES	YES	YES	YES	YES	NO	NO	NO	NO	NO

Based on the most conservative measured triggering distance of 20 mm, additional SAR measurements were required at 19 mm from the rear side for the above modes.

Top Side:

Moving device toward the phantom:

Sensor triggered (YES or NO)											
Distance(mm)	25	24	23	22	21	20	19	18	17	16	15
Ant.0	NO	NO	NO	NO	NO	YES	YES	YES	YES	YES	YES

Moving device away from the phantom:

Sensor triggered (YES or NO)											
Distance(mm)	15	16	17	18	19	20	21	22	23	24	25
Ant.0	YES	YES	YES	YES	YES	YES	NO	NO	NO	NO	NO

Based on the most conservative measured triggering distance of 20 mm, additional SAR measurements were required at 19 mm from the top side for the above modes.

Ant.1

Rear Side:

Moving device toward the phantom:

Sensor triggered (YES or NO)											
Distance(mm)	20	19	18	17	16	15	14	13	12	11	10
Ant.1	NO	NO	NO	NO	NO	YES	YES	YES	YES	YES	YES

Moving device away from the phantom:

Sensor triggered (YES or NO)											
Distance(mm)	10	11	12	13	14	15	16	17	18	19	20
Ant.1	YES	YES	YES	YES	YES	YES	NO	NO	NO	NO	NO

Based on the most conservative measured triggering distance of 15 mm, additional SAR measurements were required at 14 mm from the rear side for the above modes.

Right Side:

Moving device toward the phantom:

Sensor triggered (YES or NO)											
Distance(mm)	20	19	18	17	16	15	14	13	12	11	10
Ant.1	NO	NO	NO	NO	NO	YES	YES	YES	YES	YES	YES

Moving device away from the phantom:

Sensor triggered (YES or NO)											
Distance(mm)	10	11	12	13	14	15	16	17	18	19	20
Ant.1	YES	YES	YES	YES	YES	YES	NO	NO	NO	NO	NO

Based on the most conservative measured triggering distance of 15 mm, additional SAR measurements were required at 14 mm from the right side for the above modes.

Ant.3

Rear Side:

Moving device toward the phantom:

Sensor triggered (YES or NO)											
Distance(mm)	25	24	23	22	21	20	19	18	17	16	15
Ant.3	NO	NO	NO	NO	NO	YES	YES	YES	YES	YES	YES

Moving device away from the phantom:

Sensor triggered (YES or NO)											
Distance(mm)	15	16	17	18	19	20	21	22	23	24	25
Ant.3	YES	YES	YES	YES	YES	YES	NO	NO	NO	NO	NO

Based on the most conservative measured triggering distance of 20 mm, additional SAR measurements were required at 19 mm from the rear side for the above modes.

Top Side:

Moving device toward the phantom:

Sensor triggered (YES or NO)											
Distance(mm)	25	24	23	22	21	20	19	18	17	16	15
Ant.3	NO	NO	NO	NO	NO	YES	YES	YES	YES	YES	YES

Moving device away from the phantom:

Sensor triggered (YES or NO)											
Distance(mm)	15	16	17	18	19	20	21	22	23	24	25
Ant.3	YES	YES	YES	YES	YES	YES	NO	NO	NO	NO	NO

Based on the most conservative measured triggering distance of 20 mm, additional SAR measurements were required at 19 mm from the top side for the above modes.

Ant.5

Rear Side:

Moving device toward the phantom:

Sensor triggered (YES or NO)											
Distance(mm)	20	19	18	17	16	15	14	13	12	11	10
Ant.5	NO	NO	NO	NO	NO	YES	YES	YES	YES	YES	YES

Moving device away from the phantom:

Sensor triggered (YES or NO)											
Distance(mm)	10	11	12	13	14	15	16	17	18	19	20
Ant.5	YES	YES	YES	YES	YES	YES	NO	NO	NO	NO	NO

Based on the most conservative measured triggering distance of 15 mm, additional SAR measurements were required at 14 mm from the rear side for the above modes.

Right Side:

Moving device toward the phantom:

Sensor triggered (YES or NO)											
Distance(mm)	20	19	18	17	16	15	14	13	12	11	10
Ant.5	NO	NO	NO	NO	NO	YES	YES	YES	YES	YES	YES

Moving device away from the phantom:

Sensor triggered (YES or NO)											
Distance(mm)	10	11	12	13	14	15	16	17	18	19	20
Ant.5	YES	YES	YES	YES	YES	YES	NO	NO	NO	NO	NO

Based on the most conservative measured triggering distance of 15 mm, additional SAR measurements were required at 14 mm from the right side for the above modes.

Ant.6

Rear Side:

Moving device toward the phantom:

Sensor triggered (YES or NO)											
Distance(mm)	23	22	21	20	19	18	17	16	15	14	13
Ant.6	NO	NO	NO	NO	NO	YES	YES	YES	YES	YES	YES

Moving device away from the phantom:

Sensor triggered (YES or NO)											
Distance(mm)	13	14	15	16	17	18	19	20	21	22	23
Ant.6	YES	YES	YES	YES	YES	YES	NO	NO	NO	NO	NO

Based on the most conservative measured triggering distance of 18 mm, additional SAR measurements were required at 17 mm from the rear side for the above modes.

Top Side:

Moving device toward the phantom:

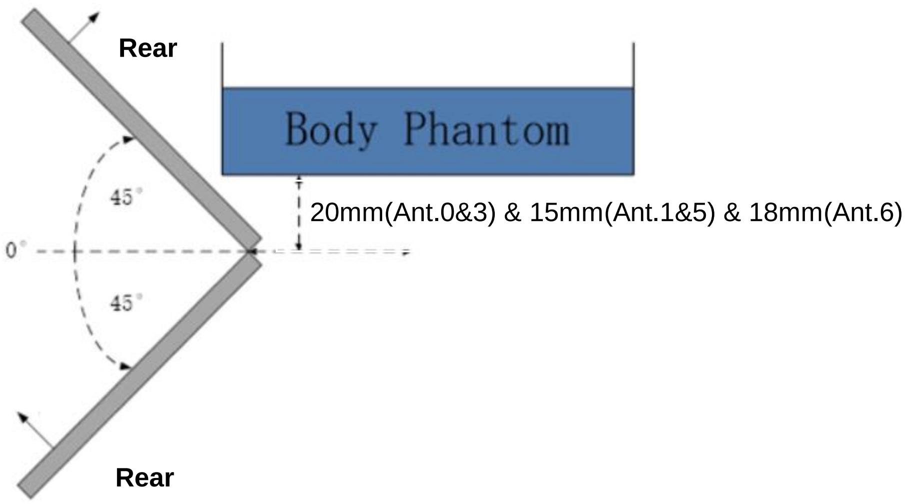
Sensor triggered (YES or NO)											
Distance(mm)	23	22	21	20	19	18	17	16	15	14	13
Ant.6	NO	NO	NO	NO	NO	YES	YES	YES	YES	YES	YES

Moving device away from the phantom:

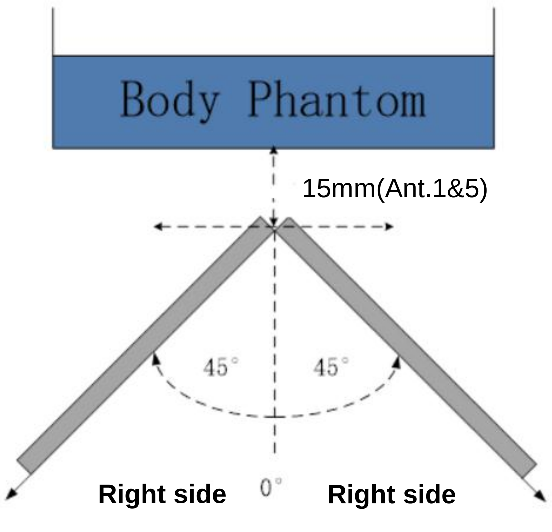
Sensor triggered (YES or NO)											
Distance(mm)	13	14	15	16	17	18	19	20	21	22	23
Ant.6	YES	YES	YES	YES	YES	YES	NO	NO	NO	NO	NO

Based on the most conservative measured triggering distance of 18 mm, additional SAR measurements were required at 17 mm from the top side for the above modes.

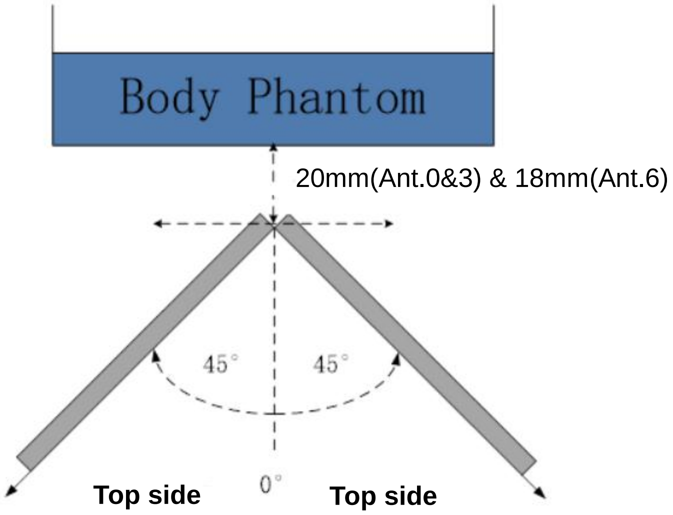
The influence of table tilt angles to proximity sensor triggering is determined by positioning each edge that contains a transmitting antenna, perpendicular to the flat phantom, at the smallest sensor triggering test distance by rotating the device around the edge next to the phantom in ≤ 10° increments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



The Rear side evaluation



The Right side evaluation



The Top side 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 ±45° range at the smallest sensor triggering test distance declared by manufacturer.

*****END OF REPORT*****