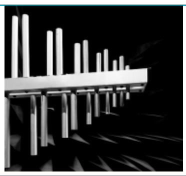
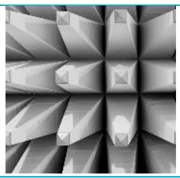
  

TEST REPORT

Test Report No.: 1-5227/22-01-14_FR
National Identification number: COM013220004

Testing Laboratory

CTC advanced GmbH
Untertuerkheimer Strasse 6 – 10
66117 Saarbruecken/Germany
Phone: + 49 681 5 98 - 0
Fax: + 49 681 5 98 - 9075
Internet: https://www.ctcadvanced.com
e-mail: mail@ctcadvanced.com

Accredited Test Laboratory:
The testing laboratory (area of testing) is accredited according to DIN EN ISO/IEC 17025 (2018-03) by the Deutsche Akkreditierungsstelle GmbH (DAkkS)
The accreditation is valid for the scope of testing procedures as stated in the accreditation certificate with the registration number: D-PL-12076-01-01.

Applicant

PROSAFE
Avenue des Arts/Kunstlaan
1040 Bruxelles/BELGIUM

Contact: Ioana Sandu
e-mail: ioana@prosafe.org

ANFR
4 rue Alphonse MATTER
88108 SAINT DIE DES VOSGES Cedex/FRANCE

Test Standard/s

EN 50360:2017	Product standard to demonstrate the compliance of wireless communication devices, with the basic restrictions and exposure limit values related to human exposure to electromagnetic fields in the frequency range from 300 MHz to 6 GHz: devices used next to the ear
EN 62209-1:2016	Measurement procedure for the assessment of specific absorption rate of human exposure to radio frequency fields from hand-held and body-mounted wireless communication devices – Part 1: Devices used next to the ear (Frequency range of 300 MHz to 6 GHz)
EN 50566:2017	Product standard to demonstrate the compliance of wireless communication devices with the basic restrictions and exposure limit values related to human exposure to electromagnetic fields in the frequency range from 30 MHz to 6 GHz: hand-held and body mounted devices in close proximity to the human body

For further applied test standards please refer to section 3 of this test report.

Test Item

Kind of test item:	SAMSUNG GALAXY A53 5G
Device type:	portable device
Model name:	**SM-A536B/DS**
S/N serial number:	RZCT70HRCTN
IMEI-Number:	352502219074712
Software status:	TP1A.220624.014.A536BXXS4BWA2
Frequency:	see technical details
Antenna:	integrated antenna
Battery option:	Integrated battery
Test sample status:	production unit
Exposure category:	general population / uncontrolled environment

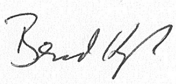
This test report is electronically signed and valid without handwriting signature. For verification of the electronic signatures, the public keys can be requested at the testing laboratory.

Test Report authorised:

cn=Alexander Hnatovskiy, o=CTC advaced GmbH, ou=HNA-211126, email=alexander.hnatovskiy@ctcadvaced.com, c=DE
2023.03.21 17:40:01 +01'00'

Alexander Hnatovskiy
Lab Manager
Radio Labs

Test performed:



cn=Bernd Heß, o=CTC advanced GmbH, ou=HES-211118, email=Bernd.Hess@ctcadvanced.com, c=DE
2023.03.21 17:40:59 +01'00'

Bernd Heß
Testing Manager
Radio Labs

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2 General information

2.1 Notes and disclaimer

The test results of this test report relate exclusively to the test item specified in this test report. CTC advanced GmbH does not assume responsibility for any conclusions and generalisations drawn from the test results with regard to other specimens or samples of the type of the equipment represented by the test item. The test report may only be reproduced or published in full. Reproduction or publication of extracts from the report requires the prior written approval of CTC advanced GmbH.
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In no case this test report can be considered as a Letter of Approval.

To carry out the tests to assess conformity with the essential requirements, the following technical options for controlling the radiated power, specific to the device under test, have been taken into account.

☒ Proximity Sensor
☐ Movement Sensor
☐ Time averaging SAR

2.2 Application details

Date of receipt of order:	2022-11-08
Date of receipt of test item:	2023-01-03
Start of test:	2023-02-09
End of test:	2023-02-17

3 Summary of Measurement Results

Maximum SAR_{10g} value measured head (W/kg)		
Frequency band	measured	limit
GSM 900MHz	0.196	2
DCS 1800MHz	0.034	2
UMTS FDD 1950MHz	0.027	2
UMTS FDD 900MHz	0.127	2
LTE FDD 1 1950MHz	0.024	2
LTE FDD 3 1800MHz	0.049	2
LTE FDD 7 2600MHz	1.300	2
LTE FDD 8 900MHz	0.220	2
LTE FDD 20 800MHz	0.201	2
LTE FDD 28 700MHz	0.135	2
N78 TDD 3500MHz	0.299	2
Maximum SAR value measured:	**1.300**	2

Maximum combined head SAR_{10g} value (W/kg)		
Frequency band	combined	limit
LTE 7 + NR TDD n78	**1.512**	2

Maximum SAR_{10g} value measured limb (W/kg)			
Frequency band	distance (mm)	measured	limit
GSM 900MHz	0	2.210	4
DCS 1800MHz	0	1.800	4
UMTS FDD 1950MHz	0	2.580	4
UMTS FDD 900MHz	0	1.410	4
LTE FDD 1 1950MHz	0	2.450	4
LTE FDD 3 1800MHz	0	2.600	4
LTE FDD 7 2600MHz	0	2.000	4
LTE FDD 8 900MHz	0	1.500	4
LTE FDD 20 800MHz	0	1.440	4
LTE FDD 28 700MHz	0	0.895	4
N78 TDD 3500MHz	0	1.020	4
Maximum SAR value measured:	0	**2.600**	4

Maximum combined limb SAR_{10g} value (W/kg)		
Frequency band	combined	limit
LTE 3 + NR TDD n78	**2.655**	4

3.1 Technical details

Band tested for this test report	Technology	Lowest transmit frequency/MHz	Highest transmit frequency/MHz	Lowest receive Frequency/MHz	Highest receive Frequency/MHz	Kind of modulation	Power Class	Tested power control level	GPRS/EGPRS mobile station class	GPRS/EGPRS multislot class	(E)GPRS voice mode or DTM	Test channel low	Test channel middle	Test channel high
☒	GSM	880.2	914.8	925.2	959.8	GMSK 8-PSK	4 E2	5	B	12	no	975	37	124
☒	GSM DCS	1710.2	1784.8	1805.2	1879.8	GMSK 8-PSK	1 E2	0	B	12	no	512	698	885
☒	UMTS FDD I	1922.4	1977.6	2112.4	2167.6	QPSK	3	max	--	--	--	9612	9750	9888
☒	UMTS FDD VIII	882.4	912.6	927.4	957.6	QPSK	3	max	--	--	--	2712	2788	2863
☒	LTE FDD 1	1920	1980	2110	2170	QPSK	3	max	--	--	--	18100	18300	18500
☒	LTE FDD 3	1710	1785	1805	1880	QPSK	3	max	--	--	--	19300	19575	19850
☒	LTE FDD 7	2500	2570	2620	2690	QPSK	3	max	--	--	--	20850	21100	21350
☒	LTE FDD 8	880	915	925	960	QPSK	3	max	--	--	--	21500	21625	21750
☒	LTE FDD 20	832	862	791	821	QPSK	3	max	--	--	--	24250	24300	24350
☒	LTE FDD 28	703	748	758	803	QPSK	3	max	--	--	--	27310	27435	27560
☒	NR TDD n78	3300	3800	3300	3800	QPSK,CP	3	max	-	-	--	626733	636667	651467

4 Test standard/s:

Test Standard	Version	Test Standard Description
EN 50360:2017	24.10.2017	Product standard to demonstrate the compliance of wireless communication devices, with the basic restrictions and exposure limit values related to human exposure to electromagnetic fields in the frequency range from 300 MHz to 6 GHz: devices used next to the ear
EN 62209-1:2016	01.06.2016	Measurement procedure for the assessment of specific absorption rate of human exposure to radio frequency fields from hand-held and body-mounted wireless communication devices – Part 1: Devices used next to the ear (Frequency range of 300 MHz to 6 GHz)
EN 50566:2017	19.10.2017	Product standard to demonstrate the compliance of wireless communication devices with the basic restrictions and exposure limit values related to human exposure to electromagnetic fields in the frequency range from 30 MHz to 6 GHz: hand-held and body mounted devices in close proximity to the human body
EN 62209-2	30.03.2010	Human Exposure to Radio Frequency Fields from Handheld and Body-Mounted Wireless Communication Devices - Human models, Instrumentation, and Procedures - Part 2: Procedure to determine the specific absorption rate (SAR) for mobile wireless communication devices used in close proximity to the human body (frequency range of 30 MHz to 6 GHz)
EN 62209-2:2010/A1:2019	21.03.2020	Human exposure to radio frequency fields from hand-held and body-mounted wireless communication devices - Human models, instrumentation, and procedures - Part 2: Procedure to determine the specific absorption rate (SAR) for wireless communication devices used in close proximity to the human body (frequency range of 30 MHz to 6 GHz)

4.1 RF exposure limits

according to the European Council Recommendation 1999/519/EC of 12 July 1999 on the limitation of exposure of the general public to electromagnetic fields (0 Hz to 300 GHz) (Official Journal L 199 of 30 July 1999):

Human Exposure	Uncontrolled Environment General Population
Spatial Peak SAR* (Head and trunk)	**2.00 W/kg**
Spatial Average SAR** (Whole Body)	0.08 W/kg
Spatial Peak SAR*** (Hands/Feet/Ankle/Wrist)	**4.00 W/kg**

Table 1: RF exposure limits

The limit applied in this test report is shown in bold letters

Notes:

* The Spatial Peak value of the SAR averaged over any 10 gram of tissue (defined as a tissue volume in the shape of a cube) and over the appropriate averaging time

** The Spatial Average value of the SAR averaged over the whole body.

*** The Spatial Peak value of the SAR averaged over any 10 grams of tissue (defined as a tissue volume in the shape of a cube) and over the appropriate averaging time.

Uncontrolled Environments are defined as locations where there is the exposure of individuals who have no knowledge or control of their exposure.

Controlled Environments are defined as locations where there is exposure that may be incurred by persons who are aware of the potential for exposure, (i.e. as a result of employment or occupation).

5 Test Environment

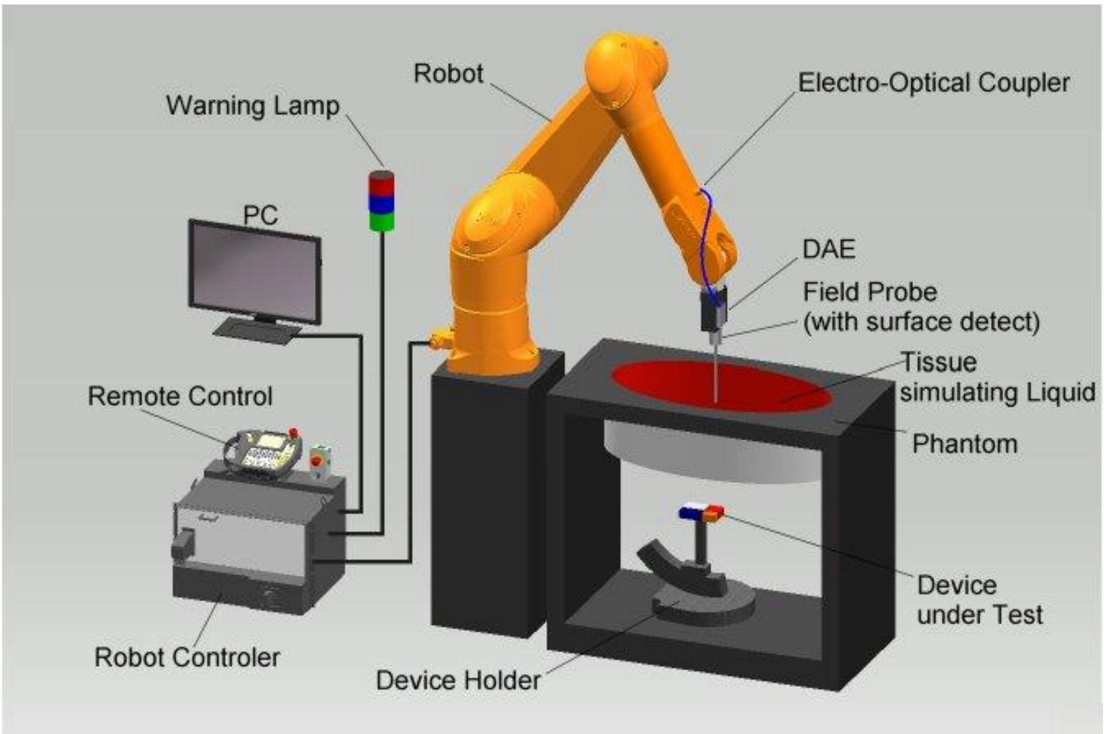
Ambient temperature:	20 – 24 °C
Tissue Simulating liquid:	20 – 24 °C
Relative humidity content:	40 – 50 %
Air pressure:	not relevant for this kind of testing
Power supply:	230 V / 50 Hz

NOTE: For the SAR measurements the exact temperature values for each test are shown in the SAR result tables and are also at the bottom of each measurement plot.

6 Test Set-up

6.1 Measurement system

6.1.1 System Description



- The DASY system for performing compliance tests consists of the following items:
- A standard high precision 6-axis robot (Stäubli RX/TX family) with controller and software. An arm extension for accommodating the data acquisition electronics (DAE).
- A dosimetric probe, i.e. an isotropic E-field probe optimized and calibrated for usage in tissue simulating liquid.
- A data acquisition electronic (DAE) which performs the signal amplification, signal multiplexing, AD-conversion, offset measurements, mechanical surface detection, collision detection, etc. The unit is battery powered with standard or rechargeable batteries. The signal is optically transmitted to the EOC.
- The Electro-Optical Coupler (EOC) performs the conversion from the optical into a digital electric signal of the DAE. The EOC is connected to the DASY measurement server.
- The DASY measurement server, which performs all real-time data evaluation for field measurements and surface detection, controls robot movements and handles safety operation. A computer operating Windows.
- DASY software and SEMCAD data evaluation software.
- Remote control with teach panel and additional circuitry for robot safety such as warning lamps, etc.
- The generic twin phantom enabling the testing of left-hand and right-hand usage.
- The triple flat and eli phantom for the testing of handheld and body-mounted wireless devices.
- The device holder for handheld mobile phones and mounting device adaptor for laptops
- Tissue simulating liquid mixed according to the given recipes.
- System check dipoles allowing to validate the proper functioning of the system.

6.1.2 Test environment

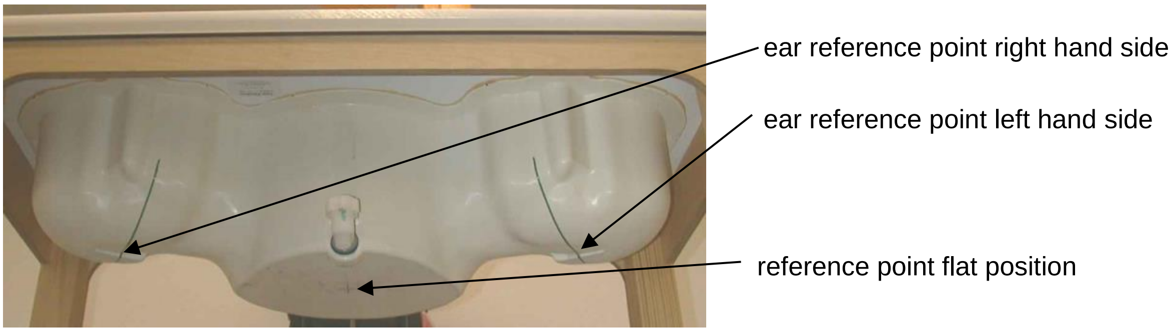
The DASY measurement system is placed in a laboratory room within an environment which avoids influence on SAR measurements by ambient electromagnetic fields and any reflection from the environment. The pictures at the beginning of the photo documentation show a complete view of the test environment. The system allows the measurement of SAR values larger than 0.005 W/kg.

6.1.3 Probe description

Isotropic E-Field Probe EX3DV4 for Dosimetric Measurements	
Technical data according to manufacturer information	
Construction	Symmetrical design with triangular core Interleaved sensors Built-in shielding against static charges PEEK enclosure material (resistant to organic solvents, e.g., DGBE)
Calibration	ISO/IEC 17025 calibration service available.
Frequency	10 MHz to >6 GHz (dosimetry); Linearity: ± 0.2 dB (30 MHz to 6 GHz)
Directivity	± 0.3 dB in HSL (rotation around probe axis) ± 0.5 dB in tissue material (rotation normal to probe axis)
Dynamic range	10 µW/g to > 100 mW/g; Linearity: ± 0.2 dB (noise: typically<1 µW/g)
Dimensions	Overall length: 337 mm (Tip: 20mm) Tip length: 2.5 mm (Body: 12mm) Typical distance from probe tip to dipole centers: 1mm
Application	High precision dosimetric measurements in any exposure scenario (e.g., very strong gradient fields). Only probe which enables compliance testing for frequencies up to 6 GHz with precision of better 30%.

6.1.4 Phantom description

The used SAM Phantom meets the requirements specified in FCC KDB865664 D01 for Specific Absorption Rate (SAR) measurements.
The phantom consists of a fibreglass shell integrated in a wooden table. It allows left-hand and right-hand head as well as body-worn measurements with a maximum liquid depth of 18 cm in head position and 22 cm in planar position (body measurements). The thickness of the Phantom shell is 2 mm +/- 0.1 mm.



Triple Modular Phantom consists of three identical modules which can be installed and removed separately without emptying the liquid. It includes three reference points for phantom installation. Covers prevent evaporation of the liquid. Phantom material is resistant to DGBE based tissue simulating liquids.

6.1.5 Device holder description

The DASY device holder has two scales for device rotation (with respect to the body axis) and the device inclination (with respect to the line between the ear openings). The plane between the ear openings and the mouth tip has a rotation angle of 65°. The bottom plate contains three pair of bolts for locking the device holder. The device holder positions are adjusted to the standard measurement positions in the three sections. This device holder is used for standard mobile phones or PDA's only. If necessary an additional support of polystyrene material is used.

Larger DUT's (e.g. notebooks) cannot be tested using this device holder. Instead a support of bigger polystyrene cubes and thin polystyrene plates is used to position the DUT in all relevant positions to find and measure spots with maximum SAR values.
Therefore those devices are normally only tested at the flat part of the SAM.

6.1.6 Scanning procedure

- The DASY installation includes predefined files with recommended procedures for measurements and system check. They are read-only document files and destined as fully defined but unmeasured masks. All test positions (head or body-worn) are tested with the same configuration of test steps differing only in the grid definition for the different test positions.
- The „reference“ and „drift“ measurements are located at the beginning and end of the batch process. They measure the field drift at one single point in the liquid over the complete procedure. The indicated drift is mainly the variation of the DUT’s output power and should vary max. +/- 5 %.
- The highest integrated SAR value is the main concern in compliance test applications. These values can mostly be found at the inner surface of the phantom and cannot be measured directly due to the sensor offset in the probe. To extrapolate the surface values, the measurement distances to the surface must be known accurately. A distance error of 0.5mm could produce SAR errors of 6% at 1800 MHz. Measurements can be performed in a fixed plane or by following an arbitrary surface.
- For an automatic and accurate detection of the phantom surface, the DASY system uses Mechanical Surface Detection:

  Mechanical Surface Detection
  Mechanical surface detection uses the probe collision detector built into the DAE. It is extremely accurate if the probe is normal to the surface (0.05 mm). For angled probes, the distance increases, because the detection is at the edge of the probe tip. It can be used in any liquid with any kind of probe. If the surface is strongly angled with respect to the probe, the probe slides along the surface and is defected sideways. The second switch system in the DAE will detect this situation and the probe will move backward until the touch condition is cleared. However, there will be some remaining uncertainty in the final probe position. In the job description, the desired distance from the probe sensors to the phantom surface can be entered. The detection is always at touch, but the probe will move backward from the surface the indicated distance before starting the measurement.

  Mother Scan in cDASY6/DASY8 Module SAR
  While the DASY5 V5.2 SAR system uses the mechanical surface detection at each point of the Area Scan / Zoom Scan, the cDASY6/DASY8 Module SAR provides the possibility to do a Mother Scan in which a high resolution Area Scan is done in the phantom filled with liquid to a fixed level using a special teaching probe. This mother scan data is used to recreate the phantom inner surface in software, and all future area and/or zoom scans, and a surface detection check is no longer required.

- The „area scan“ measures the SAR above the DUT or verification dipole on a parallel plane to the surface. It is used to locate the approximate location of the peak SAR with 2D spline interpolation. The robot performs a stepped movement along one grid axis while the local electrical field strength is measured by the probe. The probe is touching the surface of the SAM during acquisition of measurement values. The scan uses different grid spacings for different frequency measurements. Standard grid spacing for head measurements in frequency ranges ≤ 2GHz is 15 mm in x- and y-dimension. For higher frequencies a finer resolution is needed, thus for the grid spacing is reduced according the following table:

Area scan grid spacing for different frequency ranges	
Frequency range	Grid spacing
≤ 2 GHz	≤ 15 mm
2 – 4 GHz	≤ 12 mm
4 – 6 GHz	≤ 10 mm

  Grid spacing and orientation have no influence on the SAR result. For special applications where the standard scan method does not find the peak SAR within the grid, e.g. mobile phones with flip cover, the grid can be adapted in orientation. Results of this coarse scan are shown in annex B.

- A „zoom scan" measures the field in a volume around the 2D peak SAR value acquired in the previous „coarse" scan. It uses a fine meshed grid where the robot moves the probe in steps along all the 3 axis (x, y and z-axis) starting at the bottom of the Phantom. The grid spacing for the cube measurement is varied according to the measured frequency range, the dimensions are given in the following table:

Zoom scan grid spacing and volume for different frequency ranges			
Frequency range	Grid spacing for x, y axis	Grid spacing for z axis	Minimum zoom scan volume
≤ 2 GHz	≤ 8 mm	≤ 5 mm	≥ 30 mm
2 – 3 GHz	≤ 5 mm*	≤ 5 mm	≥ 28 mm
3 – 4 GHz	≤ 5 mm*	≤ 4 mm	≥ 28 mm
4 – 5 GHz	≤ 4 mm*	≤ 3 mm	≥ 25 mm
5 – 6 GHz	≤ 4 mm*	≤ 2 mm	≥ 22 mm

* When zoom scan is required and the reported SAR from the area scan based 1-g SAR estimation procedures of KDB Publication 447498 is ≤ 1.4 W/kg, ≤ 8 mm, ≤ 7 mm and ≤ 5 mm zoom scan resolution may be applied, respectively, for 2 GHz to 3 GHz, 3 GHz to 4 GHz and 4 GHz to 6 GHz.

- DASY provides an auto-extending feature to expand the size of the measurement area of the zoom scan as long as the maximum is found too close to the edge of the measured range, which eliminates the need to re-measure cubes whose maximum is found on the boundary of the defined measurement cube.

- To meet the requirements of **IEC 62209-2 AMD1 from 2019** it is necessary to perform graded grid measurements to avoid measurement mistakes.

  Below 3 GHz it defines:
  Horizontal grid step ≤ 8mm
  Vertical grid step ≤ 5mm for uniform spacing

  For variable spacing in vertical direction the maximum distance between the two closest measured points to the phantom shell (M1 and M2) shall be ≤ 4 mm and the spacing between farther points shall increase by a factor ≤ 1.5. Zoom Scan size ≤ 30 mm by 30 mm by 30 mm.

  Above 3 GHz it defines:
  Horizontal grid step ≤ (24/*f* [GHz]) mm
  Vertical grid step ≤ (10/(*f* [GHz] − 1)) mm for uniform spacing

  For variable spacing in vertical direction the maximum distance between the two closest measured points to the phantom shell (M1 and M2) shall be ≤ (12/*f* [GHz]) mm and the spacing between farther points shall increase by a factor ≤ 1.5. Zoom Scan size ≤ 22 mm by 22 mm by 22 mm.

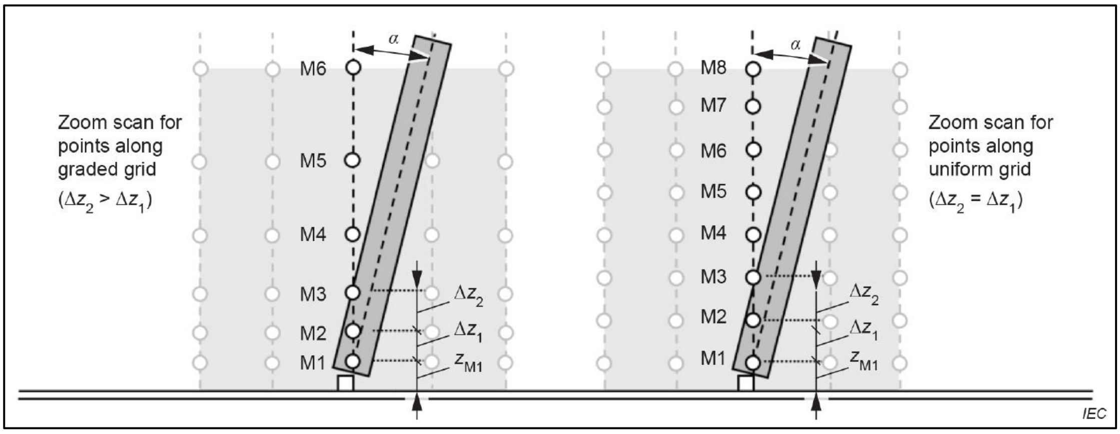
  <u>If the zoom scan measured as defined above complies with both of the following criteria, or if the peak spatial-average SAR is below 0.1 W/kg, no additional measurements are needed:</u>

  1) the smallest horizontal distance from the local SAR peaks to all points 3 dB below the SAR peak shall be larger than the horizontal grid steps in both *x* and y directions (Δ*x*, Δ*y*). This shall be checked for the measured zoom scan plane conformal to the phantom at the distance z_{M1}. The minimum distance shall be recorded in the SAR test report;
  2) the ratio of the SAR at the second measured point (M2) to the SAR at the closest measured point (M1) at the *x-y* location of the measured maximum SAR value shall be at least 30 %. This ratio (in %) shall be recorded in the SAR test report.

If one or both of the above criteria are not met, the zoom scan measurement shall be repeated using a finer resolution while keeping the other zoom scan parameters compatible with the basic requirements for zoom scans.

New horizontal and vertical grid steps shall be determined from the measured SAR distribution so that the above criteria are met. Compliance with the above two criteria shall be demonstrated for the new measured zoom scan. The size of the higher resolution zoom scan and all other parameters shall apply. The closest point to the phantom shell shall be 2 mm or less for graded grids and the grading factor shall be 1.5 or less. Uncertainties due to field distortion between the media boundary and the dielectric enclosure of the probe should also be minimized, which is achieved if the distance between the phantom surface and physical tip of the probe is larger than the probe tip diameter. Other methods may utilize correction procedures to compensate for boundary effects that enable high precision measurements closer than half the probe tip diameter. For all measurement points, the angle of the probe normal to the flat phantom surface shall be less than 5°. If this cannot be achieved, an additional uncertainty evaluation is required.

Orientation of the probe with respect to the line normal to the phantom surface, shown at two different locations:



NOTE M1 to M8 are example measurement points used for extrapolation to the surface. The maximum of the angle α between the evaluation axis and the surface normal line is called the probe angle. The distance z_{M1} is from the phantom shell to the first measurement point M1, and its maximum value is 1.4mm fixed for the DASY system equipped with an EX-Probe. The distances Δz_i (i = 1, 2, 3, ...) are the distances from measurement points M_i to M_{i-1}. For uniform grids, Δz_i are equal. For graded grids, $\Delta z_{i+1} > \Delta z_i$. $R_z = \Delta z_{i+1}/\Delta z_i$ is a ratio with a maximum value (defined in the table below). The z direction corresponds to the vertical direction, the x direction is horizontal and the y direction is horizontal into the page.

NOTE 1: The evaluation of the zoom scan is typically done by the post-processor by interpolation and extrapolation and without reconstruction of the field. More focused induced SAR distributions (e.g., for more localized sources such as capacitively coupled sources) require a more dense grid such that the same integration and extrapolation algorithms can be used for the same assessment uncertainty.

NOTE 2: The minimum ratio of 30 % is derived from the plane wave penetration depth at 6 GHz.

Detailed parameters can be seen in the following table:

Table 8 – Zoom scan parameters

Parameter	DUT transmit frequency being tested	
	$f \leq 3$ GHz	3 GHz < $f \leq 6$ GHz
Maximum distance between the closest measured points and the phantom surface (z_{M1} in Figure 14 and Table 2, in mm)	5	δ ln(2)/2 [a]
Maximum angle between the probe axis and the flat phantom surface normal (α in Figure 14)	5°	5°
Maximum spacing between measured points in the x- and y-directions (Δx and Δy, in mm)	8	24/f [b,c]
For uniform grids: Maximum spacing between measured points in the direction normal to the phantom shell (Δz_1 in Figure 14, in mm)	5	10/(f − 1)
For graded grids: Maximum spacing between the two closest measured points in the direction normal to the phantom shell (Δz_1 in Figure 14, in mm)	4	12/f
For graded grids: Maximum incremental increase in the spacing between measured points in the direction normal to the phantom shell ($R_z = \Delta z_2/\Delta z_1$ in Figure 14)	1,5	1,5
Minimum edge length of the zoom scan volume in the x- and y-directions (L_z in 7.2.5.3, in mm)	30	22
Minimum edge length of the zoom scan volume in the direction normal to the phantom shell (L_h in 7.2.5.3, in mm)	30	22
Tolerance in the probe angle	1°	1°

[a] δ is the penetration depth for a plane-wave incident normally on a planar half-space.

[b] This is the maximum spacing allowed, which may not work for all circumstances.

[c] f is the frequency in GHz.

Table M.1 – Minimum probe requirements as a function of frequency and parameters of the tissue equivalent liquid

1	2	3	4	5	6	7	8
Frequency MHz	Relative permittivity	Conductivity S/m	Wavelength in the medium (λ) mm	Plane wave Skin Depth (δ) mm	Maximum Diameter mm	50 % Distance for M1 ($z_{50\,\%} = \delta\, ln(2)/2$) mm	Min. distance for M1 (z_{M1}) mm
300	45,3	0,87	148,6	46,1	8,0	16,0	5,0
450	43,5	0,87	101,1	42,9	8,0	14,9	5,0
750	41,9	0,89	61,8	39,8	8,0	13,8	5,0
835	41,5	0,9	55,8	38,9	8,0	13,5	5,0
900	41,5	0,97	51,7	36,1	8,0	12,5	5,0
1 450	40,5	1,20	32,5	28,6	8,0	9,9	5,0
1 800	40,0	1,40	26,4	24,3	8,0	8,4	5,0
2 000	40,0	1,40	23,7	24,2	8,0	8,4	5,0
2 450	39,2	1,80	19,6	18,7	6,5	6,5	5,0
2 600	39,0	1,96	18,5	17,2	6,2	5,9	5,0
3 000	38,5	2,40	16,1	13,9	5,4	4,8	5,0
4 000	37,4	3,43	12,3	9,6	4,1	3,3	3,3
5 000	36,2	4,45	10,0	7,3	3,3	2,5	2,5
5 200	36,0	4,66	9,6	7,0	3,2	2,4	2,4
5 400	35,8	4,86	9,3	6,7	3,1	2,3	2,3
5 600	35,5	5,07	9,0	6,4	3,0	2,2	2,2
5 800	35,3	5,27	8,7	6,1	2,9	2,1	2,1
6 000	35,1	5,48	8,4	5,9	2,8	2,0	2,0

Further probe parameters can be seen in Annex M of IEC 62209-2.

6.1.7 Comparison of DASY 52 NEO and cDASY6/DASY8

CTC advanced actually uses both systems side by side and the main differences of the DASY52 NEO and cDASY6/DASY8 system are system operation, reporting tools and measurement speed. DASY 52 still uses the DASY measurement software which has further in-depth options to adapt measurements to sophisticated test setups. For the reporting of the measurement results the companion software SEMCAD X is used. cDASY6/DASY8 is a different measurement system that is especially aimed to speed up standardized compliant measurements with high repeatability and less freedom of usability. It makes it possible to handle and rate compliance tests for a standardized product like a mobile phone in one place and it provides its own backend for reporting. The higher measurement speed is bought for the cost of less flexibility in the measurement setup and adding further sophisticated maintenance as it is necessary to perform regular mother scans.

Feature comparison:		
	DASY 52 (NEO)	cDASY6/DASY8
Warning feature for Zoom Scan according IEC 62209-2 AMD1 (graded Grid conditions)*	yes**	yes
Graded Grids for Area and Zoom Scan supported	yes**	yes
Measurement software	DASY 52 NEO	cDASY6/DASY8
Reporting tool	SEMCAD X post processor	cDASY6/DASY8 integrated post processor
Collusion detection to set probe to surface distance	yes	yes
Mother scans	no	yes

*) A warning appears if the stricter zoom scan criteria as defined in IEC 62209-2 AMD1 are violated using the actual zoom scan settings. In these cases a re-measurement with graded grid is performed and the result plot is updated with the information about the graded grid. This approach guarantees that the difference between the positions with maximum SAR to any adjacent point both horizontally and vertically is below the defined thresholds and that the SAR evaluation is correct.
(respecting both the 3 dB and the 30% criteria from section 6.3.1 d) of IEC 62209-2 AMD1.)

**) features were added with version: DASY52 - 52.10.2(1504) to satisfy IEC 62209-2 AMD1.

6.1.8 Spatial Peak SAR Evaluation

Both DASY5 V5.2 and cDASY6/DASY8 Module SAR software include all numerical procedures necessary to evaluate the spatial peak SAR values. Based on the IEEE 1528 standard, a new algorithm has been implemented. The spatial-peak SAR can be computed over any required mass.
The base for the evaluation is a "cube" measurement in a volume of 30mm³ below 3GHz or 22mm³ above 3GHz. The measured volume must include the 1 g and 10 g cubes with the highest averaged SAR values. For that purpose, the center of the measured volume is aligned to the interpolated peak SAR value of a previously performed area scan. If the 10g cube or both cubes are not entirely inside the measured volumes, the system issues a warning regarding the evaluated spatial peak values within the post-processing engine. This means that if the measured volume is shifted, higher values might be possible. To get the correct values a finer measurement grid for the area scan is used. In complicated field distributions, a large grid spacing for the area scan might miss some details and give an incorrectly interpolated peak location. Both DASY5 V5.2 and cDASY6/DASY8 Module SAR allow to automatically extend the grid to make sure that both cubes are inside the measured volume.

The entire evaluation of the spatial peak values is performed within the application in case of cDASY6/DASY8 Module SAR software or within Post-processing engine (SEMCAD X) for DASY5 V5.2. The system always gives the maximum values for the 1 g and 10 g cubes. The cDASY6/DASY8 software allow to automatically extend the grid to make sure that both cubes are inside the measured volume. The algorithm to find the cube with highest averaged SAR is divided into the following stages:

1. extraction of the measured data (grid and values) from the Zoom Scan
2. calculation of the SAR value at every measurement point based on all stored data (A/D values and measurement parameters)
3. generation of a high-resolution mesh within the measured volume
4. interpolation of all measured values from the measurement grid to the high-resolution grid
5. extrapolation of the entire 3-D field distribution to the phantom surface over the distance from sensor to surface
6. calculation of the averaged SAR within masses of 1 g and 10 g The significant parts are outlined in more detail within the following sections.

Interpolation, Extrapolation and Detection of Maxima

The probe is calibrated at the center of the dipole sensors which is located 1 to 2.7mm away from the probe tip. During measurements, the probe stops shortly above the phantom surface, depending on the probe and the surface detecting system. Both distances are included as parameters in the probe configuration file. The software always knows exactly how far away the measured point is from the surface. As the probe cannot directly measure at the surface, the values between the deepest measured point and the surface must be extrapolated.

The choice of the coordinate system defining the location of the measurement points has no influence on the uncertainty of the interpolation, Maxima Search and extrapolation routines. The interpolation, extrapolation and maximum search routines are all based on the modified Quadratic Shepard's method [Robert J. Renka, "Multivariate Interpolation Of Large Sets Of Scattered Data", University of North Texas ACM Transactions on Mathematical Software, vol. 14, no. 2, June 1988, pp. 139-148.].

Thereby, the interpolation scheme combines a least-square fitted function method and a weighted average method which are the two basic types of computational interpolation and approximation. The cDASY6/DASY8 routines construct a once-continuously differentiable function that interpolates the measurement values as follows:

- For each measurement point a trivariate (3-D) / bivariate (2-D) quadratic is computed. It interpolates the measurement values at the data point and forms a least-square fit to neighbouring measurement values.
- the spatial location of the quadratic with respect to the measurement values is attenuated by an inverse distance weighting. This is performed since the calculated quadratic will fit measurement values at nearby points more accurate than at points located further away.
- After the quadratics are calculated at all measurement points, the interpolating function is calculated as a weighted average of the quadratics.

There are two control parameters that govern the behavior of the interpolation method.

One specifies the number of measurement points to be used in computing the least-square fits for the local quadratics. These measurement points are the ones nearest the input point for which the quadratic is being computed.

The second parameter specifies the number of measurement points that will be used in calculating the weights for the quadratics to produce the final function. The input data points used there are the ones nearest the point at which the interpolation is desired. Appropriate defaults are chosen for each of the control parameters.

The trivariate quadratics that have been previously computed for the 3-D interpolation and whose input data are at the closest distance from the phantom surface, are used in order to extrapolate the fields to the surface of the phantom.

In order to determine all the field maxima in 2-D (Area Scan) and 3-D (Zoom Scan), the measurement grid is refined by a default factor of 10 (area) and 5 (zoom), respectively, and the interpolation function is used to evaluate all field values between corresponding measurement points. Subsequently, a linear search is applied to find all the candidate maxima. In a last step, non physical maxima are removed and only those maxima which are within 2 dB of the global maximum value are retained.

Important: To be processable by the interpolation/extrapolation scheme, the Area Scan requires at least6 measurement points. The Zoom Scan requires at least 10 measurement points to allow the application of these algorithms.

In the Area Scan, the gradient of the interpolation function is evaluated to find all the extrema of the SAR distribution. The uncertainty on the locations of the extrema is less than 1/20 of the grid size. Only local maxima within 2 dB of the global maximum are searched and passed for the Zoom Scan measurement.

In the Zoom Scan, the interpolation function is used to extrapolate the Peak SAR from the lowest measurement points to the inner phantom surface (the extrapolation distance). The uncertainty increases with the extrapolation distance. To keep the uncertainty within 1% for the 1 g and 10 g cubes, the extrapolation distance should not be larger than 5 mm.

Averaging and Determination of spatial Peak SAR

Within DASY5 V5.2 software, the interpolated data is used to average the SAR over the 1g and 10g cubes by spatially discretizing the entire measured volume. The resolution of this spatial grid is around 1mm and chosen such that the cube side length is a multiple of the resolution. The resulting volumes are defined as cubical volumes containing the appropriate tissue parameters that are centered at the location. The location is defined as the center of the incremental volume.

The spatial-peak SAR must be evaluated in cubical volumes containing a mass that is within 5% of the required mass. The cubical volume centered at each location, as defined above, should be expanded in all directions until the desired value for the mass is reached, with no surface boundaries of the averaging volume extending beyond the outermost surface of the considered region. In addition, the cubical volume should not consist of more than 10% of non-liquid volume. If these conditions are not satisfied, then the center of the averaging volume is moved to the next location.

Reference is kept of all locations used and those not used for averaging the SAR. All average SAR values are finally assigned to the centered location in each valid averaging volume. All locations included in an averaging volume are marked as used to indicate that they have been used at least once. If a location has been marked as used, but has never been the center of a cube, the highest averaged SAR value of all other cubical volumes which have used this location for averaging is assigned to this location. For the case of an unused location, a new averaging volume must be constructed which will have the unused location centered at one surface of the cube. The remaining five surfaces are expanded evenly in all directions until the required mass is enclosed, regardless of the amount of included air. Of the six possible cubes with one surface centered on the unused location, the smallest cube is used, which still contains the required mass.

If the final cube containing the highest averaged SAR touches the surface of the measured volume, an appropriate warning is issued within the Post-processing engine.

Within cDASY6/DASY8 Module SAR software, the measured grid is interpolated to a high resolution grid, where the resolution is around 1mm and chosen such that the cube volume is a multiple of the resolution. Points which are outside of the measured grid are masked out and set to zero. Then, the antiderivative of the interpolated grid is computed by using a Gaussian quadrature consecutively for all spatial dimensions.

The antiderivative is used to compute all cube averages of the volume with the same resolution as the interpolated grid. The maximum of these SAR averages is reported. If the cube containing the maximum averaged SAR touches the surface of the measured volume, an appropriate warning is issued within the Post-processing engine.

6.1.9 Data Storage and Evaluation

Data Storage

The DASY software stores the acquired data from the data acquisition electronics as raw data (in microvolt readings from the probe sensors), together with all necessary software parameters for the data evaluation (probe calibration data, liquid parameters and device frequency and modulation data) in measurement files with the extension ".DA4", ".DA5x". The software evaluates the desired unit and format for output each time the data is visualized or exported. This allows verification of the complete software setup even after the measurement and allows correction of incorrect parameter settings. For example, if a measurement has been performed with a wrong crest factor parameter in the device setup, the parameter can be corrected afterwards and the data can be re-evaluated.

The measured data can be visualized or exported in different units or formats, depending on the selected probe type ([V/m], [A/m], [°C], [mW/g], [mW/cm²], [dBrel], etc.). Some of these units are not available in certain situations or show meaningless results, e.g., a SAR output in a lossless media will always be zero. Raw data can also be exported to perform the evaluation with other software packages.

Data Evaluation by SEMCAD

The SEMCAD software automatically executes the following procedures to calculate the field units from the microvolt readings at the probe connector. The parameters used in the evaluation are stored in the configuration modules of the software:

Probe parameters:	- Sensitivity	$Norm_i$, a_{i0}, a_{i1}, a_{i2}
	- Conversion factor	$ConvF_i$
	- Diode compression point	Dcpi
Device parameters:	- Frequency	f
	- Crest factor	cf
Media parameters:	- Conductivity	σ
	- Density	ρ

These parameters must be set correctly in the software. They can be found in the component documents or they can be imported into the software from the configuration files issued for the DASY components. In the direct measuring mode of the multimeter option, the parameters of the actual system setup are used. In the scan visualization and export modes, the parameters stored in the corresponding document files are used.

The first step of the evaluation is a linearization of the filtered input signal to account for the compression characteristics of the detector diode. The compensation depends on the input signal, the diode type and the DC-transmission factor from the diode to the evaluation electronics.

If the exciting field is pulsed, the crest factor of the signal must be known to correctly compensate for peak power. The formula for each channel can be given as:

$$V_i = U_i + U_i^2 \cdot cf/dcp_i$$

with	V_i	= compensated signal of channel i	(i = x, y, z)
	U_i	= input signal of channel i	(i = x, y, z)
	cf	= crest factor of exciting field	(DASY parameter)
	dcp_i	= diode compression point	(DASY parameter)

From the compensated input signals the primary field data for each channel can be evaluated:

E-field probes: $$E_i = (V_i / Norm_i \cdot ConvF)^{1/2}$$

H-field probes: $$H_i = (V_i)^{1/2} \cdot (a_{i0} + a_{i1}f + a_{i2}f^2)/f$$

with	V_i	= compensated signal of channel i	(i = x, y, z)
	$Norm_i$	= sensor sensitivity of channel i [mV/(V/m)^2] for E-field Probes	(i = x, y, z)
	ConvF	= sensitivity enhancement in solution	
	a_{ij}	= sensor sensitivity factors for H-field probes	
	f	= carrier frequency [GHz]	
	E_i	= electric field strength of channel i in V/m	
	H_i	= magnetic field strength of channel i in A/m	

The RSS value of the field components gives the total field strength (Hermitian magnitude):

$$E_{tot} = (E_x^2 + E_Y^2 + E_z^2)^{1/2}$$

The primary field data are used to calculate the derived field units.

$$SAR = (E_{tot}^2 \cdot \sigma) / (\rho \cdot 1000)$$

with	SAR	= local specific absorption rate in mW/g
	E_{tot}	= total field strength in V/m
	σ	= conductivity in [mho/m] or [Siemens/m]
	ρ	= equivalent tissue density in g/cm^3

Note that the density is normally set to 1 (or 1.06), to account for actual brain density rather than the density of the simulation liquid. The power flow density is calculated assuming the excitation field to be a free space field.

$$P_{pwe} = E_{tot}^2 / 3770 \quad \text{or} \quad P_{pwe} = H_{tot}^2 \cdot 37.7$$

with	P_{pwe}	= equivalent power density of a plane wave in mW/cm^2
	E_{tot}	= total electric field strength in V/m
	H_{tot}	= total magnetic field strength in A/m

Data Evaluation in cDASY6/DASY8

cDASY6/DASY8 features basic evaluation capabilities comparable to the above described SEMCAD evaluation. The main difference is that cDASY6/DASY8 is a stand-alone all-in-one solution whilst SEMCAD is only used to add these features to the DASY5.2 (NEO) platform. The final results are fully comparable no matter if they were generated by DASY5.2(NEO) + SEMCAD or in cDASY6/DASY8 directly.

6.1.10 Tissue simulating liquids: dielectric properties

HBBL600-10000MHz Simulating Head Liquid, Manufactured by SPEAG:

Ingredients	(% by weight)
Water	50-65%
Mineral oil	10-30%
Emulsifiers	8-25%
Sodium salt	0-1.5%

Table 2: Head tissue dielectric properties

6.1.11 Tissue simulating liquids: parameters

Liquid	Frequency (MHz)	Target head tissue		Measurement head tissue				Dev %	Measure-ment date
		Permittivity	Conductivity [S/m]	Permittivity	Dev %	Conductivity			
						ε''	[S/m]		
700	713	42.13	0.89	42.2	0.1	21.62	0.86	-3.7	2023-02-17
	725	42.07	0.89	42.1	0.2	21.37	0.86	-3.3	
	738	42.00	0.89	42.1	0.2	21.09	0.87	-3.0	
	750	41.94	0.89	42.1	0.3	20.83	0.87	-2.7	
900	842	41.50	0.91	42.4	2.1	19.31	0.90	-0.3	2023-02-13
	847	41.50	0.91	42.4	2.1	19.23	0.91	-0.8	
	852	41.50	0.92	42.4	2.1	19.15	0.91	-1.2	
	880	41.50	0.95	42.3	2.0	18.75	0.92	-3.2	
	897	41.50	0.97	42.3	1.9	18.51	0.92	-4.5	
	900	41.50	0.97	42.3	1.9	18.46	0.92	-4.7	
	915	41.50	0.98	42.3	1.8	18.28	0.93	-4.7	
900	842	41.50	0.91	41.8	0.8	19.22	0.90	-0.8	2023-02-16
	847	41.50	0.91	41.8	0.7	19.14	0.90	-1.2	
	852	41.50	0.92	41.8	0.7	19.06	0.90	-1.6	
	880	41.50	0.95	41.7	0.5	18.66	0.91	-3.7	
	897	41.50	0.97	41.7	0.4	18.42	0.92	-4.9	
	900	41.50	0.97	41.7	0.4	18.38	0.92	-5.1	
	915	41.50	0.98	41.6	0.3	18.19	0.93	-5.2	
1750	1710	40.13	1.35	40.7	1.5	14.05	1.34	-0.9	2023-02-14
	1720	40.11	1.35	40.7	1.5	14.04	1.34	-0.8	
	1747	40.08	1.37	40.7	1.6	14.00	1.36	-0.7	
	1750	40.07	1.37	40.7	1.6	13.99	1.36	-0.7	
	1775	40.04	1.39	40.7	1.6	13.95	1.38	-0.6	
	1785	40.02	1.39	40.7	1.6	13.94	1.38	-0.5	
1900	1900	40.00	1.40	40.5	1.3	13.78	1.46	4.1	2023-02-15
	1922	40.00	1.40	40.5	1.2	13.75	1.47	5.0	
	1950	40.00	1.40	40.4	1.1	13.71	1.49	6.3	
	1978	40.00	1.40	40.4	0.9	13.68	1.51	7.5	
2600	2510	39.12	1.87	38.6	-1.4	12.94	1.81	-3.2	2023-02-17
	2535	39.09	1.89	38.5	-1.4	12.93	1.82	-3.7	
	2560	39.06	1.92	38.5	-1.4	12.92	1.84	-4.2	
	2600	39.01	1.96	38.5	-1.4	12.92	1.87	-4.8	
3500	3500	37.90	2.91	39.2	3.4	13.81	2.69	-7.6	2023-02-09
	3550	37.85	2.96	39.1	3.3	13.81	2.73	-7.9	
	3600	37.80	3.01	39.0	3.2	13.80	2.76	-8.3	
	3700	37.70	3.12	38.8	3.0	13.82	2.84	-8.8	
	3500	37.90	2.91	39.2	3.4	13.81	2.69	-7.6	

Table 3: Parameter of the body tissue simulating liquid

Note: The dielectric properties have been measured using the contact probe method at 22°C.

6.1.12 Measurement uncertainty evaluation for SAR test

DASY6/8 Uncertainty Budget According to IEC/IEEE 62209-1528,Specific Phantoms (Frequency band: 300 MHz - 3 GHz range)								
Symbol	Error Description	Uncertainty Value	Probability Distribution	Divisor	c_i (1g)	c_i (10g)	Standard Uncertainty ± %, (1g)	Standard Uncertainty ± %, (10g)
Measurement System Errors								
CF	Probe Calibration Repeat.	± 12.0 %	Normal	2	1	1	± 6.0 %	± 6.0 %
CFdrift	Probe Calibration Drift	± 1.7 %	Rectangular	√ 3	1	1	± 1.0 %	± 1.0 %
LIN	Probe linearity	± 4.7 %	Rectangular	√ 3	1	1	± 2.7 %	± 2.7 %
BBS	Broadband Signal	± 3.0 %	Rectangular	√ 3	1	1	± 1.7 %	± 1.7 %
ISO	Probe Isotropy (axial)	± 9.6 %	Rectangular	√ 3	1	1	± 5.5 %	± 5.5 %
DAE	Data Acquisition	± 0.3 %	Normal	1	1	1	± 0.3 %	± 0.3 %
AMB	RF Ambient	± 1.8 %	Normal	1	1	1	± 1.8 %	± 1.8 %
Δ_{sys}	Probe Positioning	± 0.006 mm	Normal	1	0.14	0.14	± 0.1 %	± 0.1 %
DAT	Data Processing	± 8.7 %	Normal	1	1	1	± 8.7 %	± 8.7 %
Phantom and Device Errors								
LIQ(σ)	Conductivity (meas.)[DAK]	± 2.5 %	Normal	1	0.78	0.71	± 2.0 %	± 1.8 %
LIQ(Tσ)	Conductivity (temp.)[BB]	± 3.3 %	Rectangular	√ 3	0.78	0.71	± 1.5 %	± 1.4 %
EPS	Phantom Permittivity	± 14.0 %	Rectangular	√ 3	0	0	± 0.0 %	± 0.0 %
DIS	Distance DUT - TSL	± 2.0 %	Normal	1	2	2	± 4.0 %	± 4.0 %
D_{xyz}	Device Positioning	± 1.0 %	Normal	1	1	1	± 1.0 %	± 1.0 %
H	Device Holder	± 3.6 %	Normal	1	1	1	± 3.6 %	± 3.6 %
MOD	DUT Modulation[m]	± 2.4 %	Rectangular	√ 3	1	1	± 1.4 %	± 1.4 %
TAS	Time-average SAR	± 1.7 %	Rectangular	√ 3	1	1	± 1.0 %	± 1.0 %
RF_{drift}	DUT drift	± 2.5 %	Normal	1	1	1	± 2.5 %	± 2.5 %
VAL	Val Antenna Unc.[val]	± 0.0 %	Normal	1	1	1	± 0.0 %	± 0.0 %
RF_{in}	Unc. Input Power[val]	± 0.0 %	Normal	1	1	1	± 0.0 %	± 0.0 %
Correction to the SAR results								
C(ε, σ)	Deviation to Target	± 1.9 %	Normal	1	1	0.84	± 1.9 %	± 1.6 %
C(R)	SAR scaling[p]	± 0.0 %	Rectangular	√ 3	1	1	± 0.0 %	± 0.0 %
u(ΔSAR)	**Combined Uncertainty**						± 14.3 %	± 14.3 %
U	**Expanded Uncertainty**						± **28.7** %	± **28.5** %

Table 4: Measurement uncertainties

Worst-Case uncertainty budget for DASY6/8 assessed according to IEC/IEEE 62209-1528 [4]. The budget is valid for the frequency range 300MHz - 3GHz and represents a worst-case analysis. For specific tests and configurations, the uncertainty could be considerable smaller. All listed error components have ν_{eff} equal to ∞.

Footnote details:

[m] SMC calibration is a new method for determining the total deviation from linearity. The uncertainty is ≤ 2.4% for psSAR ≤ 2 W/kg, ≤ 4.8% for psSAR1g/10g ≤ 4 W/kg and ≤ 9.6% for psSAR1g/10g ≤ 10 W/kg (see modulation calibration parameter uncertainty in the probe calibration certificate);
[BB] if SPEAG's broad-band liquids (BBL) are used that have low temperature coefficients;
[DAK] if SPEAG's high precision dielectric probe kit (DAK) is applied;
[p] if power scaling is used, error item "SAR Scaling" must be adjusted accordingly;
[val] only applies in case of validation measurements.

DASY6/8 Uncertainty Budget According to IEC/IEEE 62209-1528,Specific Phantoms (Frequency band: 3 GHz - 6 GHz range)								
Symbol	Error Description	Uncertainty Value	Probability Distribution	Divisor	c_i (1g)	c_i (10g)	Standard Uncertainty ± %, (1g)	Standard Uncertainty ± %, (10g)
Measurement System Errors								
CF	Probe Calibration Repeat.	± 13.1 %	Normal	2	1	1	± 6.6 %	± 6.6 %
CFdrift	Probe Calibration Drift	± 1.7 %	Rectangular	√3	1	1	± 1.0 %	± 1.0 %
LIN	Probe linearity	± 4.7 %	Rectangular	√3	1	1	± 2.7 %	± 2.7 %
BBS	Broadband Signal	± 2.6 %	Rectangular	√3	1	1	± 1.5 %	± 1.5 %
ISO	Probe Isotropy (axial)	± 9.6 %	Rectangular	√3	1	1	± 5.5 %	± 5.5 %
DAE	Data Acquisition	± 0.3 %	Normal	1	1	1	± 0.3 %	± 0.3 %
AMB	RF Ambient	± 1.8 %	Normal	1	1	1	± 1.8 %	± 1.8 %
Δ_{sys}	Probe Positioning	± 0.005 mm	Normal	1	0.29	0.29	± 0.8 %	± 0.8 %
DAT	Data Processing	± 8.7 %	Normal	1	1	1	± 8.7 %	± 8.7 %
Phantom and Device Errors								
LIQ(σ)	Conductivity (meas.)[DAK]	± 2.5 %	Normal	1	0.78	0.71	± 2.0 %	± 1.8 %
LIQ(Tσ)	Conductivity (temp.)[BB]	± 3.4 %	Rectangular	√3	0.78	0.71	± 1.5 %	± 1.4 %
EPS	Phantom Permittivity	± 14.0 %	Rectangular	√3	0.25	0.25	± 2.0 %	± 2.0 %
DIS	Distance DUT - TSL	± 2.0 %	Normal	1	2	2	± 4.0 %	± 4.0 %
D_{xyz}	Device Positioning	± 1.0 %	Normal	1	1	1	± 1.0 %	± 1.0 %
H	Device Holder	± 3.6 %	Normal	1	1	1	± 3.6 %	± 3.6 %
MOD	DUT Modulation[m]	± 2.4 %	Rectangular	√3	1	1	± 1.4 %	± 1.4 %
TAS	Time-average SAR	± 1.7 %	Rectangular	√3	1	1	± 1.0 %	± 1.0 %
RF_{drift}	DUT drift	± 2.5 %	Normal	1	1	1	± 2.5 %	± 2.5 %
VAL	Val Antenna Unc.[val]	± 0.0 %	Normal	1	1	1	± 0.0 %	± 0.0 %
RF_{in}	Unc. Input Power[val]	± 0.0 %	Normal	1	1	1	± 0.0 %	± 0.0 %
Correction to the SAR results								
C(ε, σ)	Deviation to Target	± 1.9 %	Normal	1	1	0.84	± 1.9 %	± 1.6 %
C(R)	SAR scaling[p]	± 0.0 %	Rectangular	√3	1	1	± 0.0 %	± 0.0 %
u(ΔSAR)	**Combined Uncertainty**						± 14.7 %	± 14.7 %
U	**Expanded Uncertainty**						± **29.4** %	± **29.3** %

Table 5: Measurement uncertainties

Worst-Case uncertainty budget for DASY6/8 assessed according to IEC/IEEE 62209-1528 [4]. The budget is valid for the frequency range 3GHz – 6GHz and represents a worst-case analysis. For specific tests and configurations, the uncertainty could be considerable smaller. All listed error components have v_{eff} equal to ∞.

Footnote details:

[m] SMC calibration is a new method for determining the total deviation from linearity. The uncertainty is ≤ 2.4% for psSAR ≤ 2 W/kg, ≤ 4.8% for psSAR1g/10g ≤ 4 W/kg and ≤ 9.6% for psSAR1g/10g ≤ 10 W/kg (see modulation calibration parameter uncertainty in the probe calibration certificate);
[BB] if SPEAG's broad-band liquids (BBL) are used that have low temperature coefficients;
[DAK] if SPEAG's high precision dielectric probe kit (DAK) is applied;
[p] if power scaling is used, error item "SAR Scaling" must be adjusted accordingly;
[val] only applies in case of validation measurements.

DASY6/8 Uncertainty Budget According to IEC/IEEE 62209-1528 (Frequency band: 300 MHz - 3 GHz range)								
Symbol	Error Description	Uncertainty Value	Probability Distribution	Divisor	c_i (1g)	c_i (10g)	Standard Uncertainty ± %, (1g)	Standard Uncertainty ± %, (10g)
Measurement System Errors								
CF	Probe Calibration Repeat.	± 12.0 %	Normal	2	1	1	± 6.0 %	± 6.0 %
CFdrift	Probe Calibration Drift	± 1.7 %	Rectangular	√ 3	1	1	± 1.0 %	± 1.0 %
LIN	Probe linearity	± 4.7 %	Rectangular	√ 3	1	1	± 2.7 %	± 2.7 %
BBS	Broadband Signal	± 3.0 %	Rectangular	√ 3	1	1	± 1.7 %	± 1.7 %
ISO	Probe Isotropy (axial)	± 7.6 %	Rectangular	√ 3	1	1	± 4.4 %	± 4.4 %
DAE	Data Acquisition	± 0.3 %	Normal	1	1	1	± 0.3 %	± 0.3 %
AMB	RF Ambient	± 1.8 %	Normal	1	1	1	± 1.8 %	± 1.8 %
Δ_{sys}	Probe Positioning	± 0.006 mm	Normal	1	0.14	0.14	± 0.1 %	± 0.1 %
DAT	Data Processing	± 1.2 %	Normal	1	1	1	± 1.2 %	± 1.2 %
Phantom and Device Errors								
LIQ(σ)	Conductivity (meas.)[DAK]	± 2.5 %	Normal	1	0.78	0.71	± 2.0 %	± 1.8 %
LIQ(Tσ)	Conductivity (temp.)[BB]	± 3.3 %	Rectangular	√ 3	0.78	0.71	± 1.5 %	± 1.4 %
EPS	Phantom Permittivity	± 14.0 %	Rectangular	√ 3	0	0	± 0.0 %	± 0.0 %
DIS	Distance DUT - TSL	± 2.0 %	Normal	1	2	2	± 4.0 %	± 4.0 %
D_{xyz}	Device Positioning	± 1.0 %	Normal	1	1	1	± 1.0 %	± 1.0 %
H	Device Holder	± 3.6 %	Normal	1	1	1	± 3.6 %	± 3.6 %
MOD	DUT Modulation[m]	± 2.4 %	Rectangular	√ 3	1	1	± 1.4 %	± 1.4 %
TAS	Time-average SAR	± 1.7 %	Rectangular	√ 3	1	1	± 1.0 %	± 1.0 %
RF_{drift}	DUT drift	± 2.5 %	Normal	1	1	1	± 2.5 %	± 2.5 %
VAL	Val Antenna Unc.[val]	± 0.0 %	Normal	1	1	1	± 0.0 %	± 0.0 %
RF_{in}	Unc. Input Power[val]	± 0.0 %	Normal	1	1	1	± 0.0 %	± 0.0 %
Correction to the SAR results								
C(ε, σ)	Deviation to Target	± 1.9 %	Normal	1	1	0.84	± 1.9 %	± 1.6 %
C(R)	SAR scaling[p]	± 0.0 %	Rectangular	√ 3	1	1	± 0.0 %	± 0.0 %
u(ΔSAR)	**Combined Uncertainty**						± 11.0 %	± 10.9 %
U	**Expanded Uncertainty**						**± 21.9 %**	**± 21.7 %**

Table 6: Measurement uncertainties

Worst-Case uncertainty budget for DASY6/8 assessed according to IEC/IEEE 62209-1528 [4]. The budget is valid for the frequency range 300MHz - 3 GHz and represents a worst-case analysis. For specific tests and configurations, the uncertainty could be considerable smaller. All listed error components have v_{eff} equal to ∞.

Footnote details:

[m] SMC calibration is a new method for determining the total deviation from linearity. The uncertainty is ≤ 2.4% for psSAR ≤ 2 W/kg, ≤ 4.8% for psSAR1g/10g ≤ 4 W/kg and ≤ 9.6% for psSAR1g/10g ≤ 10 W/kg (see modulation calibration parameter uncertainty in the probe calibration certificate);
[BB] if SPEAG's broad-band liquids (BBL) are used that have low temperature coefficients;
[DAK] if SPEAG's high precision dielectric probe kit (DAK) is applied;
[p] if power scaling is used, error item "SAR Scaling" must be adjusted accordingly;
[val] only applies in case of validation measurements.

DASY6 Uncertainty Budget According to IEC/IEEE 62209-1528 (Frequency band: 3 GHz - 6 GHz range)								
Symbol	Error Description	Uncertainty Value	Probability Distribution	Divisor	c_i (1g)	c_i (10g)	Standard Uncertainty ± %, (1g)	Standard Uncertainty ± %, (10g)
Measurement System Errors								
CF	Probe Calibration Repeat.	± 13.1 %	Normal	2	1	1	± 6.6 %	± 6.6 %
CFdrift	Probe Calibration Drift	± 1.7 %	Rectangular	√3	1	1	± 1.0 %	± 1.0 %
LIN	Probe linearity	± 4.7 %	Rectangular	√3	1	1	± 2.7 %	± 2.7 %
BBS	Broadband Signal	± 2.6 %	Rectangular	√3	1	1	± 1.5 %	± 1.5 %
ISO	Probe Isotropy (axial)	± 7.6 %	Rectangular	√3	1	1	± 4.4 %	± 4.4 %
DAE	Data Acquisition	± 1.2 %	Normal	1	1	1	± 1.2 %	± 1.2 %
AMB	RF Ambient	± 1.8 %	Normal	1	1	1	± 1.8 %	± 1.8 %
Δ_{sys}	Probe Positioning	± 0.005 mm	Normal	1	0.29	0.29	± 0.2 %	± 0.2 %
DAT	Data Processing	± 2.3 %	Normal	1	1	1	± 2.3 %	± 2.3 %
Phantom and Device Errors								
LIQ(σ)	Conductivity (meas.)[DAK]	± 2.5 %	Normal	1	0.78	0.71	± 2.0 %	± 1.8 %
LIQ(Tσ)	Conductivity (temp.)[BB]	± 3.4 %	Rectangular	√3	0.78	0.71	± 1.5 %	± 1.4 %
EPS	Phantom Permittivity	± 14.0 %	Rectangular	√3	0.25	0.25	± 2.0 %	± 2.0 %
DIS	Distance DUT - TSL	± 2.0 %	Normal	1	2	2	± 4.0 %	± 4.0 %
D_{xyz}	Device Positioning	± 1.0 %	Normal	1	1	1	± 1.0 %	± 1.0 %
H	Device Holder	± 3.6 %	Normal	1	1	1	± 3.6 %	± 3.6 %
MOD	DUT Modulation[m]	± 2.4 %	Rectangular	√3	1	1	± 1.4 %	± 1.4 %
TAS	Time-average SAR	± 1.7 %	Rectangular	√3	1	1	± 1.0 %	± 1.0 %
RF_{drift}	DUT drift	± 2.5 %	Normal	1	1	1	± 2.5 %	± 2.5 %
VAL	Val Antenna Unc.[val]	± 0.0 %	Normal	1	1	1	± 0.0 %	± 0.0 %
RF_{in}	Unc. Input Power[val]	± 0.0 %	Normal	1	1	1	± 0.0 %	± 0.0 %
Correction to the SAR results								
C(ε, σ)	Deviation to Target	± 1.9 %	Normal	1	1	0.84	± 1.9 %	± 1.6 %
C(R)	SAR scaling[p]	± 0.0 %	Rectangular	√3	1	1	± 0.0 %	± 0.0 %
u(ΔSAR)	**Combined Uncertainty**						± 11.6 %	± 11.6 %
U	**Expanded Uncertainty**						± **23.3** %	± **23.1** %

Table 7: Measurement uncertainties

Worst-Case uncertainty budget for DASY6 assessed according to IEC/IEEE 62209-1528 [4]. The budget is valid for the frequency range 3 GHz – 6 GHz and represents a worst-case analysis. For specific tests and configurations, the uncertainty could be considerable smaller. All listed error components have v_{eff} equal to ∞.

Footnote details:

[m] SMC calibration is a new method for determining the total deviation from linearity. The uncertainty is ≤ 2.4% for psSAR ≤ 2 W/kg, ≤ 4.8% for psSAR1g/10g ≤ 4 W/kg and ≤ 9.6% for psSAR1g/10g ≤ 10 W/kg (see modulation calibration parameter uncertainty in the probe calibration certificate);
[BB] if SPEAG's broad-band liquids (BBL) are used that have low temperature coefficients;
[DAK] if SPEAG's high precision dielectric probe kit (DAK) is applied;
[p] if power scaling is used, error item "SAR Scaling" must be adjusted accordingly;
[val] only applies in case of validation measurements.

DASY8 Uncertainty Budget According to IEC/IEEE 62209-1528 (Frequency band: 3 GHz - 6 GHz range)								
Symbol	Error Description	Uncertainty Value	Probability Distribution	Divisor	c_i (1g)	c_i (10g)	Standard Uncertainty ± %, (1g)	Standard Uncertainty ± %, (10g)
Measurement System Errors								
CF	Probe Calibration Repeat.	± 13.1 %	Normal	2	1	1	± 6.6 %	± 6.6 %
CFdrift	Probe Calibration Drift	± 1.7 %	Rectangular	$\sqrt{3}$	1	1	± 1.0 %	± 1.0 %
LIN	Probe linearity	± 4.7 %	Rectangular	$\sqrt{3}$	1	1	± 2.7 %	± 2.7 %
BBS	Broadband Signal	± 2.6 %	Rectangular	$\sqrt{3}$	1	1	± 1.5 %	± 1.5 %
ISO	Probe Isotropy (axial)	± 7.6 %	Rectangular	$\sqrt{3}$	1	1	± 4.4 %	± 4.4 %
DAE	Data Acquisition	± 0.3 %	Normal	1	1	1	± 0.3 %	± 0.3 %
AMB	RF Ambient	± 1.8 %	Normal	1	1	1	± 1.8 %	± 1.8 %
Δ_{sys}	Probe Positioning	± 0.005 mm	Normal	1	0.29	0.29	± 0.2 %	± 0.2 %
DAT	Data Processing	± 2.3 %	Normal	1	1	1	± 2.3 %	± 2.3 %
Phantom and Device Errors								
LIQ(σ)	Conductivity (meas.)^{DAK}	± 2.5 %	Normal	1	0.78	0.71	± 2.0 %	± 1.8 %
LIQ(Tσ)	Conductivity (temp.)^{BB}	± 3.4 %	Rectangular	$\sqrt{3}$	0.78	0.71	± 1.5 %	± 1.4 %
EPS	Phantom Permittivity	± 14.0 %	Rectangular	$\sqrt{3}$	0.25	0.25	± 2.0 %	± 2.0 %
DIS	Distance DUT - TSL	± 2.0 %	Normal	1	2	2	± 4.0 %	± 4.0 %
D_{xyz}	Device Positioning	± 1.0 %	Normal	1	1	1	± 1.0 %	± 1.0 %
H	Device Holder	± 3.6 %	Normal	1	1	1	± 3.6 %	± 3.6 %
MOD	DUT Modulation^{m}	± 2.4 %	Rectangular	$\sqrt{3}$	1	1	± 1.4 %	± 1.4 %
TAS	Time-average SAR	± 1.7 %	Rectangular	$\sqrt{3}$	1	1	± 1.0 %	± 1.0 %
RF_{drift}	DUT drift	± 2.5 %	Normal	1	1	1	± 2.5 %	± 2.5 %
VAL	Val Antenna Unc.^{val}	± 0.0 %	Normal	1	1	1	± 0.0 %	± 0.0 %
RF_{in}	Unc. Input Power^{val}	± 0.0 %	Normal	1	1	1	± 0.0 %	± 0.0 %
Correction to the SAR results								
C(ε, σ)	Deviation to Target	± 1.9 %	Normal	1	1	0.84	± 1.9 %	± 1.6 %
C(R)	SAR scaling^{p}	± 0.0 %	Rectangular	$\sqrt{3}$	1	1	± 0.0 %	± 0.0 %
u(ΔSAR)	**Combined Uncertainty**						± 11.6 %	± 11.5 %
U	**Expanded Uncertainty**						± **23.2** %	± **23.0** %

Table 8: Measurement uncertainties

Worst-Case uncertainty budget for DASY8 assessed according to IEC/IEEE 62209-1528 [4]. The budget is valid for the frequency range 3 GHz – 6 GHz and represents a worst-case analysis. For specific tests and configurations, the uncertainty could be considerable smaller. All listed error components have v_{eff} equal to ∞.

Footnote details:

^{m} SMC calibration is a new method for determining the total deviation from linearity. The uncertainty is ≤ 2.4% for psSAR ≤ 2 W/kg, ≤ 4.8% for psSAR1g/10g ≤ 4 W/kg and ≤ 9.6% for psSAR1g/10g ≤ 10 W/kg (see modulation calibration parameter uncertainty in the probe calibration certificate);
^{BB} if SPEAG's broad-band liquids (BBL) are used that have low temperature coefficients;
^{DAK} if SPEAG's high precision dielectric probe kit (DAK) is applied;
^{p} if power scaling is used, error item "SAR Scaling" must be adjusted accordingly;
^{val} only applies in case of validation measurements.

6.1.13 Measurement uncertainty evaluation for System Check

Repeatability Budget for System Check (Frequency band: 300MHz - 6GHz range) with DASY6/8 System								
Symbol	Error Description	Uncertainty Value	Probability Distribution	Divisor	c_i (1g)	c_i (10g)	Standard Uncertainty ± %, (1g)	Standard Uncertainty ± %, (10g)
Measurement System Errors								
CF	Probe Calibration Repeat.	± 3.6 %	Normal	2	2	1	± 5.1 %	± 2.5 %
CFdrift	Probe Calibration Drift	± 1.7 %	Rectangular	√ 3	1	1	± 1.0 %	± 1.0 %
LIN	Probe linearity	± 4.7 %	Rectangular	√ 3	0	0	± 0.0 %	± 0.0 %
BBS	Broadband Signal	± 0.0 %	Rectangular	√ 3	0	0	± 0.0 %	± 0.0 %
ISO	Probe Isotropy (axial)	± 4.7 %	Rectangular	√ 3	0	0	± 0.0 %	± 0.0 %
DAE	Data Acquisition	± 0.3 %	Normal	1	0	0	± 0.0 %	± 0.0 %
AMB	RF Ambient	± 0.6 %	Normal	1	0	0	± 0.0 %	± 0.0 %
Δ_{sys}	Probe Positioning	± 0.2 %	Normal	1	0.33	0.33	± 0.1 %	± 0.1 %
DAT	Data Processing	± 0.0 %	Normal	1	1	1	± 0.0 %	± 0.0 %
Phantom and Device Errors								
LIQ(σ)	Conductivity (meas.)[DAK]	± 2.5 %	Normal	1	0.78	0.71	± 2.0 %	± 1.8 %
LIQ(Tσ)	Conductivity (temp.)[BB]	± 3.4 %	Rectangular	√ 3	0.78	0.71	± 1.5 %	± 1.4 %
EPS	Phantom Permittivity	± 14.0 %	Rectangular	√ 3	0	0	± 0.0 %	± 0.0 %
DIS	Distance Phantom - DUT	± 1.0 %	Normal	1	2	2	± 2.0 %	± 2.0 %
MOD	DUT Modulation[m]	± 0.0 %	Rectangular	√ 3	1	1	± 0.0 %	± 0.0 %
TAS	Time-average SAR	± 0.0 %	Rectangular	√ 3	1	1	± 0.0 %	± 0.0 %
VAL	Validation antenna	± 0.0 %	Normal	1	1	1	± 0.0 %	± 0.0 %
P_{in}	Accepted power	± 1.2 %	Normal	1	1	1	± 1.2 %	± 1.2 %
Correction to the SAR results								
C(ε, σ)	Deviation to Target	± 1.9 %	Normal	1	1	0.84	± 1.9 %	± 1.6 %
u(ΔSAR)	**Combined Uncertainty**						± 6.5 %	± 4.5 %
U	**Expanded Uncertainty**						± **13.0** %	± **9.1** %

Table 9: Repeatability of the system check (300MHz - 6 GHz).

All listed error components have v_{eff} equal to ∞.

Footnote details:
[BB] if SPEAG's broad-band liquids (BBL) are used that have low temperature coefficients;
[DAK] if SPEAG's high precision dielectric probe kit (DAK) is applied.

Note: Worst case probe calibration uncertainty has been applied for all probes used during the measurements.

6.1.14 System check

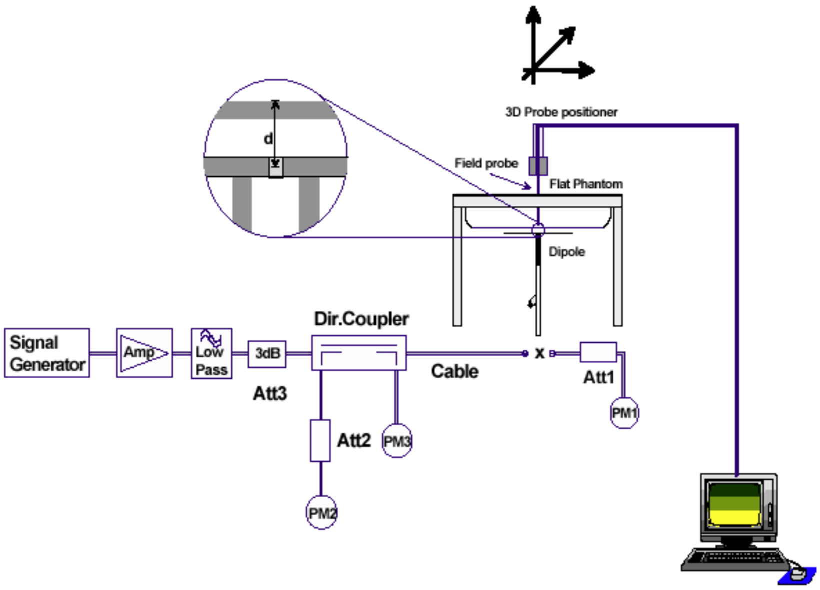
The system check is performed for verifying the accuracy of the complete measurement system and performance of the software. The system check is performed with tissue equivalent material according to IEEE 1528. The following table shows system check results for all frequency bands and tissue liquids used during the tests (plot(s) see annex A).

System Validation Kit	Frequency	Target SAR_{10g} (1000 mW) (+/- 10%)	Measured SAR_{10g} (1000 mW)	SAR_{10g} dev %	Maseured date
D750V3 S/N: 1041	750 MHz HSL	5.53	5.62	1.6	2023-02-17
D900V2 S/N: 102	900 MHz HSL	6.95	6.99	0.6	2023-02-13
D900V2 S/N: 102	900 MHz HSL	6.95	6.94	-0.1	2023-02-14
D900V2 S/N: 102	900 MHz HSL	6.95	7.22	3.9	2023-02-16
D1750V2 S/N: 1093	1750 MHz tête	19.50	19.30	-1.0	2023-02-14
D1900V2 S/N: 5d009	1900 MHz HSL	20.30	20.60	1.5	2023-02-15
D2600V2 S/N: 1040	2600 MHz HSL	25.40	23.40	-7.9	2023-02-17
D3500V2 S/N: 1003	3500 MHz HSL	25.00	24.70	-1.2	2023-02-09
D3700V2 S/N: 1062	3700 MHz HSL	24.80	25.90	4.4	2023-02-09

Table 10: Results system check

6.1.15 System check procedure

The system check is performed by using a validation dipole which is positioned parallel to the planar part of the SAM phantom at the reference point. The distance of the dipole to the SAM phantom is determined by a plexiglass spacer. The dipole is connected to the signal source consisting of signal generator and amplifier via a directional coupler, N-connector cable and adaption to SMA. It is fed with a power of 1000 mW for frequencies below 2 GHz or 100 mW for frequencies above 2 GHz. To adjust this power a power meter is used. The power sensor is connected to the cable before the system check to measure the power at this point and do adjustments at the signal generator. At the outputs of the directional coupler both return loss as well as forward power are controlled during the validation to make sure that emitted power at the dipole is kept constant. This can also be checked by the power drift measurement after the test (result on plot).
System check results have to be equal or near the values determined during dipole calibration (target SAR in table above) with the relevant liquids and test system.



7 SAR test results

7.1 General description of test procedures

- The DUT is tested using CMU 200 and CMW 500 communications testers as controller unit to set test channels and maximum output power to the DUT.
- Test positions as described in the tables below are in accordance with the specified test standard.
- UMTS was tested in RMC mode with 12.2 kbit/s and TPC bits set to ‘all 1’.
- LTE was tested in QPSK mode 10 or 20MHz bandwidth.
- WLAN and Bluetooth were not tested
- The SAR test shall be performed at the high. middle and low frequency channels of each operating mode. If the SAR measured at mid-band channel for each test configuration is at least 3.0 dB lower than the SAR limit (< 1 W/kg). testing at the high and low channels is optional. apart from the worst case configuration.

7.2 Results overview

frequency band	Ch.	Freq. (MHz)	test cond.	position	**SAR_{10g} (W/kg)** meas.	limit	liquid (°C)
GSM 900	37	897.4	1 time slot	left cheek	0.125	2.0	21.6
	37	897.4	1 time slot	left tilted 15°	0.073	2.0	21.6
	975	880.2	1 time slot	right cheek	0.158	2.0	21.6
	37	897.4	1 time slot	right cheek	**0.196**	2.0	21.6
	124	914.8	1 time slot	right cheek	0.158	2.0	21.6
	37	897.4	1 time slot	right tilted 15°	0.087	2.0	21.6
GSM 1800	512	1710.2	1 time slot	left cheek	0.024	2.0	21.5
	698	1747.4	1 time slot	left cheek	**0.034**	2.0	21.5
	885	1784.8	1 time slot	left cheek	0.025	2.0	21.5
	698	1747.4	1 time slot	left tilted 15°	0.012	2.0	21.5
	698	1747.4	1 time slot	right cheek	0.025	2.0	21.5
	698	1747.4	1 time slot	right tilted 15°	0.009	2.0	21.5

Table 11: Test results head SAR for GSM bands.

frequency band	Ch.	Freq. (MHz)	test cond.	position	SAR_{10g} (W/kg) meas.	limit	liquid (°C)
UMTS FDD I	9750	1950.0	QPSK. 12.2 kbps	left cheek	0.021	2.0	21.3
	9750	1950.0	QPSK. 12.2 kbps	left tilted 15°	0.022	2.0	21.3
	9612	1922.4	QPSK. 12.2 kbps	right cheek	0.021	2.0	21.3
	9750	1950.0	QPSK. 12.2 kbps	right cheek	0.024	2.0	21.3
	9888	1977.6	QPSK. 12.2 kbps	right cheek	**0.027**	2.0	21.3
	9750	1950.0	QPSK. 12.2 kbps	right tilted 15°	0.013	2.0	21.3
UMTS FDD VIII	2788	897.6	QPSK. 12.2 kbps	left cheek	0.079	2.0	21.9
	2788	897.6	QPSK. 12.2 kbps	left tilted 15°	0.044	2.0	21.9
	2712	882.4	QPSK. 12.2 kbps	right cheek	0.098	2.0	21.9
	2788	897.6	QPSK. 12.2 kbps	right cheek	**0.127**	2.0	21.9
	2863	912.6	QPSK. 12.2 kbps	right cheek	0.096	2.0	21.9
	2788	897.6	QPSK. 12.2 kbps	right tilted 15°	0.047	2.0	21.9
LTE FDD 1	18100	1930.0	100RB. 0RB offset	left cheek	0.019	2.0	21.3
	18300	1950.0	100RB. 0RB offset	left cheek	**0.024**	2.0	21.3
	18500	1970.0	100RB. 0RB offset	left cheek	0.019	2.0	21.3
	18300	1950.0	100RB. 0RB offset	left tilted 15°	0.016	2.0	21.3
	18300	1950.0	100RB. 0RB offset	right cheek	0.019	2.0	21.3
	18300	1950.0	100RB. 0RB offset	right tilted 15°	0.012	2.0	21.3
LTE FDD 3	19575	1747.5	50RB. 50RB offset	left cheek	0.031	2.0	21.5
	19575	1747.5	50RB. 50RB offset	left tilted 15°	0.020	2.0	21.5
	19300	1720.0	50RB. 50RB offset	right cheek	0.034	2.0	21.5
	19575	1747.5	50RB. 50RB offset	right cheek	0.033	2.0	21.5
	19850	1775.0	50RB. 50RB offset	right cheek	**0.049**	2.0	21.5
	19575	1747.5	50RB. 50RB offset	right tilted 15°	0.012	2.0	21.5
LTE FDD 7	21100	2535.0	1RB. 99RB offset	left cheek	0.131	2.0	21.5
	21100	2535.0	1RB. 99RB offset	left tilted 15°	0.510	2.0	21.5
	21100	2535.0	1RB. 99RB offset	right cheek	0.508	2.0	21.5
	20850	2510.0	1RB. 99RB offset	right tilted 15°	**1.300**	2.0	21.5
	21100	2535.0	1RB. 99RB offset	right tilted 15°	1.180	2.0	21.5
	21350	2560.0	1RB. 99RB offset	right tilted 15°	1.000	2.0	21.5
LTE FDD 8 10MHz BW	21625	897.5	1RB. 0RB offset	left cheek	0.135	2.0	21.5
	21625	897.5	1RB. 0RB offset	left tilted 15°	0.073	2.0	21.5
	21500	885.0	1RB. 0RB offset	right cheek	0.170	2.0	21.5
	21625	897.5	1RB. 0RB offset	right cheek	**0.220**	2.0	21.5
	21750	910.0	1RB. 0RB offset	right cheek	0.154	2.0	21.5
	21625	897.5	1RB. 0RB offset	right tilted 15°	0.085	2.0	21.5
LTE FDD 20	24300	847.0	1RB. 50RB offset	left cheek	0.130	2.0	21.5
	24300	847.0	1RB. 50RB offset	left tilted 15°	0.074	2.0	21.5
	24250	842.0	1RB. 50RB offset	right cheek	0.162	2.0	21.5
	24300	847.0	1RB. 50RB offset	right cheek	**0.201**	2.0	21.5
	24350	852.0	1RB. 50RB offset	right cheek	0.158	2.0	21.5
	24300	847.0	1RB. 50RB offset	right tilted 15°	0.082	2.0	21.5
LTE FDD 28	27435	725.5	1RB. 0RB offset	left cheek	0.093	2.0	22.0
	27435	725.5	1RB. 0RB offset	left tilted 15°	0.058	2.0	22.0
	27310	713.0	1RB. 0RB offset	right cheek	0.105	2.0	22.0
	27435	725.5	1RB. 0RB offset	right cheek	0.112	2.0	22.0
	27560	738.0	1RB. 0RB offset	right cheek	**0.135**	2.0	22.0
	27435	725.5	1RB. 0RB offset	right tilted 15°	0.061	2.0	22.0

Table 12: Test results head SAR for UMTS and LTE bands.

SAR$_{10g}$ head NR TDD n78 3500 MHz										
Ch.	Freq. (MHz)	test cond.					position	SAR$_{10g}$ (W/kg)		liquid (°C)
		BW MHZ	RB	RB Offset	SCS (kHz)	Mod		meas.	limit	
636666	3549.99	80	1	1	30	Pi/2 BPSK	left cheek	0.066	2.0	21.4
636666	3549.99	80	1	1	30	Pi/2 BPSK	left tilted 15°	0.072	2.0	21.4
635334	3530.01	80	1	1	30	Pi/2 BPSK	right cheek	0.263	2.0	21.4
636666	3549.99	80	1	1	30	Pi/2 BPSK	right cheek	**0.299**	2.0	21.4
650666	3759.99	80	1	1	30	Pi/2 BPSK	right cheek	0.202	2.0	21.4
636666	3549.99	80	1	1	30	Pi/2 BPSK	right tilted 15°	0.212	2.0	21.4

Table 13: Test results head SAR for NR bands.

frequency band	Ch.	Freq. (MHz)	test cond.	position	**SAR$_{10g}$ (W/kg)**		liquid (°C)	dist. (mm)
					meas.	limit		
GSM 900	37	897.4	2 time slots	front	1.680	4.0	21.6	0
	975	880.2	2 time slots	back	2.180	4.0	21.6	0
	37	897.4	2 time slots	back	2.080	4.0	21.6	0
	124	914.8	2 time slots	back	**2.210**	4.0	21.6	0
	37	897.4	2 time slots	left	0.484	4.0	21.6	0
	37	897.4	2 time slots	right	0.262	4.0	21.6	0
	37	897.4	2 time slots	top	0.043	4.0	21.6	0
	37	897.4	2 time slots	bottom	1.650	4.0	21.6	0
GSM 1800	698	1747.4	3 time slots	front	0.737	4.0	21.5	0
	698	1747.4	3 time slots	back	1.150	4.0	21.5	0
	698	1747.4	3 time slots	left	0.266	4.0	21.5	0
	698	1747.4	3 time slots	right	0.138	4.0	21.5	0
	698	1747.4	3 time slots	top	0.014	4.0	21.5	0
	512	1710.2	3 time slots	bottom	1.530	4.0	21.5	0
	698	1747.4	3 time slots	bottom	1.750	4.0	21.5	0
	885	1784.8	3 time slots	bottom	**1.800**	4.0	21.5	0
UMTS FDD I	9750	1950.0	QPSK. 12.2 kbps	front	0.885	4.0	21.3	0
	9750	1950.0	QPSK. 12.2 kbps	back	1.520	4.0	21.3	0
	9750	1950.0	QPSK. 12.2 kbps	left	0.295	4.0	21.3	0
	9750	1950.0	QPSK. 12.2 kbps	right	0.293	4.0	21.3	0
	9750	1950.0	QPSK. 12.2 kbps	top	0.005	4.0	21.3	0
	9612	1922.4	QPSK. 12.2 kbps	bottom	2.520	4.0	21.3	0
	9750	1950.0	QPSK. 12.2 kbps	bottom	2.420	4.0	21.3	0
	9888	1977.6	QPSK. 12.2 kbps	bottom	**2.580**	4.0	21.3	0
UMTS FDD VIII	2712	882.4	QPSK. 12.2 kbps	front	1.390	4.0	21.9	0
	2788	897.6	QPSK. 12.2 kbps	front	**1.410**	4.0	21.9	0
	2863	912.6	QPSK. 12.2 kbps	front	1.240	4.0	21.9	0
	2788	897.6	QPSK. 12.2 kbps	back	1.340	4.0	21.9	0
	2788	897.6	QPSK. 12.2 kbps	left	0.483	4.0	21.9	0
	2788	897.6	QPSK. 12.2 kbps	right	0.316	4.0	21.9	0
	2788	897.6	QPSK. 12.2 kbps	top	0.028	4.0	21.9	0
	2788	897.6	QPSK. 12.2 kbps	bottom	0.829	4.0	21.9	0

Table 14: Test results limb SAR for GSM and UMTS bands.

frequency band	Ch.	Freq. (MHz)	test cond.	position	SAR_{10g} (W/kg)		liquid (°C)	dist. (mm)
					meas.	limit		
LTE FDD 1	18300	1950.0	100RB. 0RB offset	front	0.975	4.0	21.3	0
	18300	1950.0	100RB. 0RB offset	back	1.490	4.0	21.3	0
	18300	1950.0	100RB. 0RB offset	left	0.171	4.0	21.3	0
	18300	1950.0	100RB. 0RB offset	right	0.171	4.0	21.3	0
	18300	1950.0	100RB. 0RB offset	top	0.005	4.0	21.3	0
	18100	1930.0	100RB. 0RB offset	bottom	2.330	4.0	21.3	0
	18300	1950.0	100RB. 0RB offset	bottom	2.310	4.0	21.3	0
	18500	1970.0	100RB. 0RB offset	bottom	**2.450**	4.0	21.3	0
LTE FDD 3	19575	1747.5	50RB. 50RB offset	front	0.997	4.0	21.5	0
	19575	1747.5	50RB. 50RB offset	back	1.580	4.0	21.5	0
	19575	1747.5	50RB. 50RB offset	left	0.283	4.0	21.5	0
	19575	1747.5	50RB. 50RB offset	right	0.150	4.0	21.5	0
	19575	1747.5	50RB. 50RB offset	top	0.022	4.0	21.5	0
	19300	1720.0	50RB. 50RB offset	bottom	2.410	4.0	21.5	0
	19575	1747.5	50RB. 50RB offset	bottom	2.510	4.0	21.5	0
	19850	1775.0	50RB. 50RB offset	bottom	**2.600**	4.0	21.5	0
LTE FDD 7	21100	2535.0	1RB. 99RB offset	front	0.744	4.0	21.5	0
	21100	2535.0	1RB. 99RB offset	back	1.730	4.0	21.5	0
	21100	2535.0	1RB. 99RB offset	left	0.848	4.0	21.5	0
	21100	2535.0	1RB. 99RB offset	right	0.003	4.0	21.5	0
	20850	2510.0	1RB. 99RB offset	top	**2.000**	4.0	21.5	0
	21100	2535.0	1RB. 99RB offset	top	1.920	4.0	21.5	0
	21350	2560.0	1RB. 99RB offset	top	1.510	4.0	21.5	0
	21100	2535.0	1RB. 99RB offset	bottom	0.043	4.0	21.5	0
LTE FDD 8	21625	897.5	1RB. 0RB offset	front	1.300	4.0	21.5	0
	21500	885.0	1RB. 0RB offset	back	**1.500**	4.0	21.5	0
	21625	897.5	1RB. 0RB offset	back	1.400	4.0	21.5	0
	21750	910.0	1RB. 0RB offset	back	1.320	4.0	21.5	0
	21625	897.5	1RB. 0RB offset	left	0.450	4.0	21.5	0
	21625	897.5	1RB. 0RB offset	right	0.316	4.0	21.5	0
	21625	897.5	1RB. 0RB offset	top	0.023	4.0	21.5	0
	21625	897.5	1RB. 0RB offset	bottom	0.803	4.0	21.5	0
LTE FDD 20	24250	842.0	1RB. 50RB offset	front	**1.440**	4.0	21.5	0
	24300	847.0	1RB. 50RB offset	front	1.370	4.0	21.5	0
	24350	852.0	1RB. 50RB offset	front	1.310	4.0	21.5	0
	24300	847.0	1RB. 50RB offset	back	1.200	4.0	21.5	0
	24300	847.0	1RB. 50RB offset	left	0.464	4.0	21.5	0
	24300	847.0	1RB. 50RB offset	right	0.283	4.0	21.5	0
	24300	847.0	1RB. 50RB offset	top	0.044	4.0	21.5	0
	24300	847.0	1RB. 50RB offset	bottom	0.662	4.0	21.5	0
LTE FDD 28	27435	725.5	1RB. 0RB offset	front	0.652	4.0	22.0	0
	27310	713.0	1RB. 0RB offset	back	**0.895**	4.0	22.0	0
	27435	725.5	1RB. 0RB offset	back	0.861	4.0	22.0	0
	27560	738.0	1RB. 0RB offset	back	0.799	4.0	22.0	0
	27435	725.5	1RB. 0RB offset	left	0.342	4.0	22.0	0
	27435	725.5	1RB. 0RB offset	right	0.151	4.0	22.0	0
	27435	725.5	1RB. 0RB offset	top	0.037	4.0	22.0	0
	27435	725.5	1RB. 0RB offset	bottom	0.378	4.0	22.0	0

Table 15: Test results limb SAR for LTE bands.

SAR$_{10g}$ limb NR TDD n78 3500 MHz												
Ch.	Freq. (MHz)	test cond.					position	SAR$_{10g}$ (W/kg)		liquid (°C)	dist. (mm)
		BW MHZ	RB	RB Offset	SCS (kHz)	Mod		meas.	limit		
636666	3549.99	80	1	1	30	Pi/2 BPSK	front	0.575	4.0	21.4	0
636666	3549.99	80	1	1	30	Pi/2 BPSK	back	0.484	4.0	21.4	0
635334	3530.01	80	1	1	30	Pi/2 BPSK	left	**1.020**	4.0	21.4	0
636666	3549.99	80	1	1	30	Pi/2 BPSK	left	0.938	4.0	21.4	0
650666	3759.99	80	1	1	30	Pi/2 BPSK	left	0.890	4.0	21.4	0
636666	3549.99	80	1	1	30	Pi/2 BPSK	right	0.005	4.0	21.4	0
636666	3549.99	80	1	1	30	Pi/2 BPSK	top	0.452	4.0	21.4	0
636666	3549.99	80	1	1	30	Pi/2 BPSK	bottom	0.055	4.0	21.4	0

Table 16: Test results limb SAR for NR bands.

ΣSAR evaluation LTE and NR n78 head				
Frequency band	Position	SARmax /W/kg		**ΣSAR**
		LTE	NR	<2W/kg
LTE 1	left cheek	0.024	0.066	0.090
	left tilted 15°	0.016	0.072	0.088
	right cheek	0.019	0.299	0.318
	right tilted 15°	0.012	0.212	0.224
LTE 3	left cheek	0.031	0.066	0.097
	left tilted 15°	0.020	0.072	0.092
	right cheek	0.049	0.299	0.348
	right tilted 15°	0.012	0.212	0.224
LTE 7	left cheek	0.131	0.066	0.197
	left tilted 15°	0.510	0.072	0.582
	right cheek	0.508	0.299	0.807
	right tilted 15°	1.300	0.212	**1.512**
LTE 8	left cheek	0.135	0.066	0.201
	left tilted 15°	0.073	0.072	0.145
	right cheek	0.220	0.299	0.519
	right tilted 15°	0.085	0.212	0.297
LTE 20	left cheek	0.130	0.066	0.196
	left tilted 15°	0.074	0.072	0.146
	right cheek	0.201	0.299	0.500
	right tilted 15°	0.082	0.212	0.294
LTE 28	left cheek	0.093	0.066	0.159
	left tilted 15°	0.058	0.072	0.130
	right cheek	0.135	0.299	0.434
	right tilted 15°	0.061	0.212	0.273

Table 17: ΣSAR evaluation for head.

ΣSAR evaluation LTE and NR n78 limb				
Frequency band	Position	SARmax /W/kg		**ΣSAR**
		LTE	NR	<4W/kg
LTE 1	front	0.975	0.575	1.550
	back	1.490	0.484	1.974
	left	0.171	1.020	1.191
	right	0.171	0.005	0.176
	top	0.005	0.452	0.457
	bottom	2.450	0.055	2.505
LTE 3	front	0.997	0.575	1.572
	back	1.580	0.484	2.064
	left	0.283	1.020	1.303
	right	0.150	0.005	0.155
	top	0.022	0.452	0.474
	bottom	2.600	0.055	**2.655**
LTE 7	front	0.744	0.575	1.319
	back	1.730	0.484	2.214
	left	0.848	1.020	1.868
	right	0.003	0.005	0.008
	top	2.000	0.452	2.452
	bottom	0.043	0.055	0.098
LTE 8	front	1.300	0.575	1.875
	back	1.500	0.484	1.984
	left	0.450	1.020	1.470
	right	0.316	0.005	0.321
	top	0.023	0.452	0.475
	bottom	0.803	0.055	0.858
LTE 20	front	1.440	0.575	2.015
	back	1.200	0.484	1.684
	left	0.464	1.020	1.484
	right	0.283	0.005	0.288
	top	0.044	0.452	0.496
	bottom	0.662	0.055	0.717
LTE 28	front	0.652	0.575	1.227
	back	0.895	0.484	1.379
	left	0.342	1.020	1.362
	right	0.151	0.005	0.156
	top	0.037	0.452	0.489
	bottom	0.378	0.055	0.433

Table 18: ΣSAR evaluation for limb.

Note: the combined SAR value (4G + 5G) is determined by summing for each test configuration the average spatial peak SAR values of the 4G anchor band and the 5G band according to the method defined in paragraph 6.3.2.2 of standard EN 62209-2. For each configuration where this increase is not sufficient to establish the compliance of the terminal, a more precise measurement of this combined SAR is carried out according to the volume scanning evaluation method provided for in paragraph 6.3.2.5 of standard EN 62209-2 to decide on its compliance.

8 Test equipment and ancillaries used for tests

To simplify the identification of the test equipment and/or ancillaries which were used, the reporting of the relevant test cases only refer to the test item number as specified in the table below.

Equipment	Type	Manufacturer	Serial No.	Last Calibration	Frequency (months)
Dosimetric E-Field Probe	EX3DV4	Schmid & Partner Engineering AG	3944	May 17, 2022	12
Dosimetric E-Field Probe	EX3DV4	Schmid & Partner Engineering AG	7566	August 23, 2022	12
750 MHz System Validation Dipole	D750V3	Schmid & Partner Engineering AG	1041	May 7, 2020	36
900 MHz System Validation Dipole	D900V2	Schmid & Partner Engineering AG	102	January 16, 2023	36
1750 MHz System Validation Dipole	D1750V2	Schmid & Partner Engineering AG	1093	May 14, 2021	36
1800 MHz System Validation Dipole	D1800V2	Schmid & Partner Engineering AG	291	May 10, 2022	36
1900 MHz System Validation Dipole	D1900V2	Schmid & Partner Engineering AG	5d009	May 8, 2020	36
2600 MHz System Validation Dipole	D2600V2	Schmid & Partner Engineering AG	1040	May 06, 2020	36
3500 MHz System Validation Dipole	D3500V2	Schmid & Partner Engineering AG	1003	August 19, 2022	36
3700 MHz System Validation Dipole	D3700V2	Schmid & Partner Engineering AG	1062	August 19, 2022	36
Data acquisition electronics	DAE3V1	Schmid & Partner Engineering AG	477	May 16, 2022	12
Data acquisition electronics	DAE4	Schmid & Partner Engineering AG	1387	August 17, 2022	12
Software	cDASY6 V16.2.2.1588	Schmid & Partner Engineering AG	---	N/A	--
Software	DASY8 V16.2.2.1588	Schmid & Partner Engineering AG	---	N/A	--
SAM Twin Phantom V8.0	QD 000 P41 AA	Schmid & Partner Engineering AG	-	N/A	--
Universal Radio Communication Tester	CMW500	Rohde & Schwarz	170616	September 16, 2021	24
5G Wireless Test Platform	MT8000A	Anritsu	6262186399	May 06, 2022	12
Network Analyser 300 kHz to 6 GHz	8753ES	Agilent Technologies)*	US39174436	December 14, 2021	24
Dielectric Assessment Kit (DAK)	DAK 200MHz – 20GHz Package	Schmid & Partner Engineering AG	1127	N/A	--
Signal Generator	8671B	Hewlett Packard	2823A00656	December 09, 2022	24
Signal Generator	SML03	Rohde & Schwarz	102519	December 06, 2021	24
RF Power Amplifier	BLMA 0760-6 (6 Watt)	BONN Elektronik	1510273	N/A	--
Power Meter	NRP	Rohde & Schwarz	101367	December 06, 2022	12
Power Meter Sensor	NRP Z22	Rohde & Schwarz	100227	December 06, 2022	12
Power Meter Sensor	NRP Z22	Rohde & Schwarz	100234	December 06, 2022	12
Directional Coupler	778D	Hewlett Packard	19171	December 06, 2022	12

)* : Network analyzer probe calibration against air, distilled water and a shorting block performed before measuring liquid parameters.

9 Observations

No observations exceeding those reported with the single test cases have been made.

Annex A: System performance check

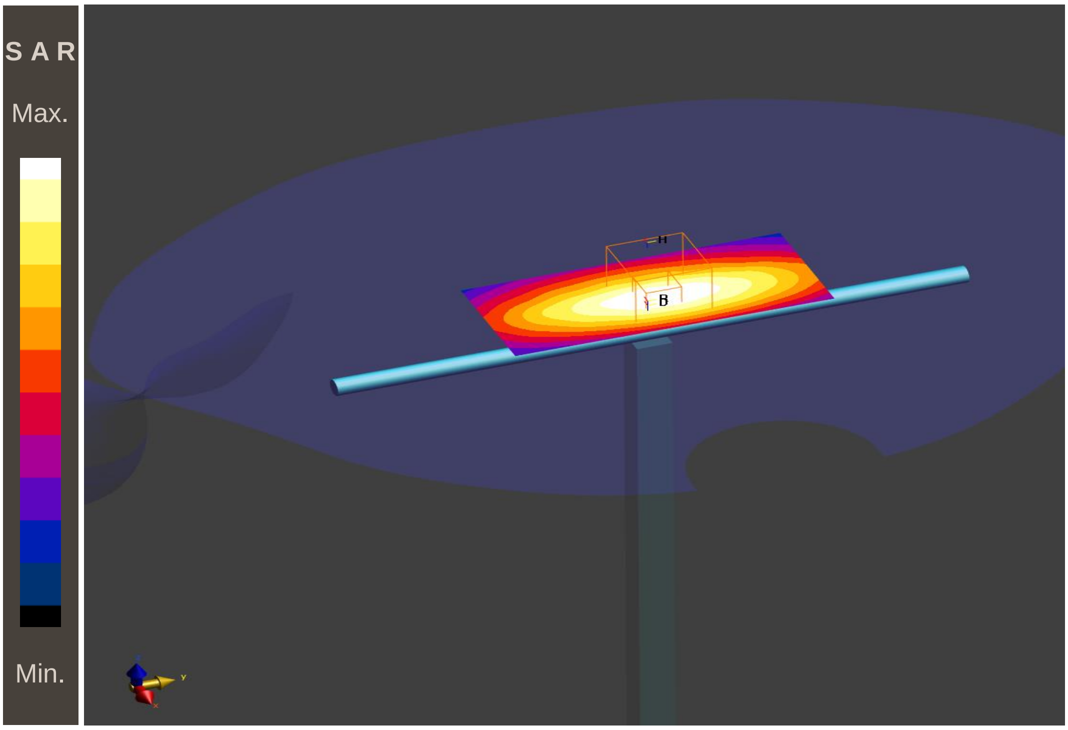
Date/Time: 2023-02-17, 08:11 2023-02-17, 08:17

SystemPerformanceCheck-D750

DUT: Dipole; Type: D750V3; Serial: SN1041
Communication System: CW; Communication System Frequency: 750.0 MHz
Medium parameters used: f = 750.0 MHz, σ = 0.869 S/m; ε_r=42.1; ρ= 1000 kg/m3
Phantom Section: Flat
Measurement Standard: DASY 6
DASY Configuration:
- Probe: EX3DV4 - SN3944; ConvF(10.53, 10.53, 10.53); Calibrated: 2022-05-17
- Sensor-Surface: 1.4 mm
- DAE: DAE3 Sn477; Calibrated: 2022-05-16
- Phantom: Twin-SAM V8.0 (30deg probe tilt); Serial: 2061;
- Software: cDASY6 (16.2.2.1588)

HBBL-600-10000/750.0MHz/Area Scan (10.0 x 15.0 x 1.0) :
Grid Extents [mm]: 40.0 x 90.0
Maximum value of SAR (interpolated) - SAR(10 g) = 0.586 W/kg

HBBL-600-10000/750.0MHz/Zoom Scan (6.0 x 6.0 x 1.5) :
Grid Extents [mm]: 30.0 x 30.0 x 30.0
Power Drift = -0.18 dB
SAR(10 g) = 0.562 W/kg



Additional information:
ambient temperature: 22.3°C; liquid temperature: 22.0°C;

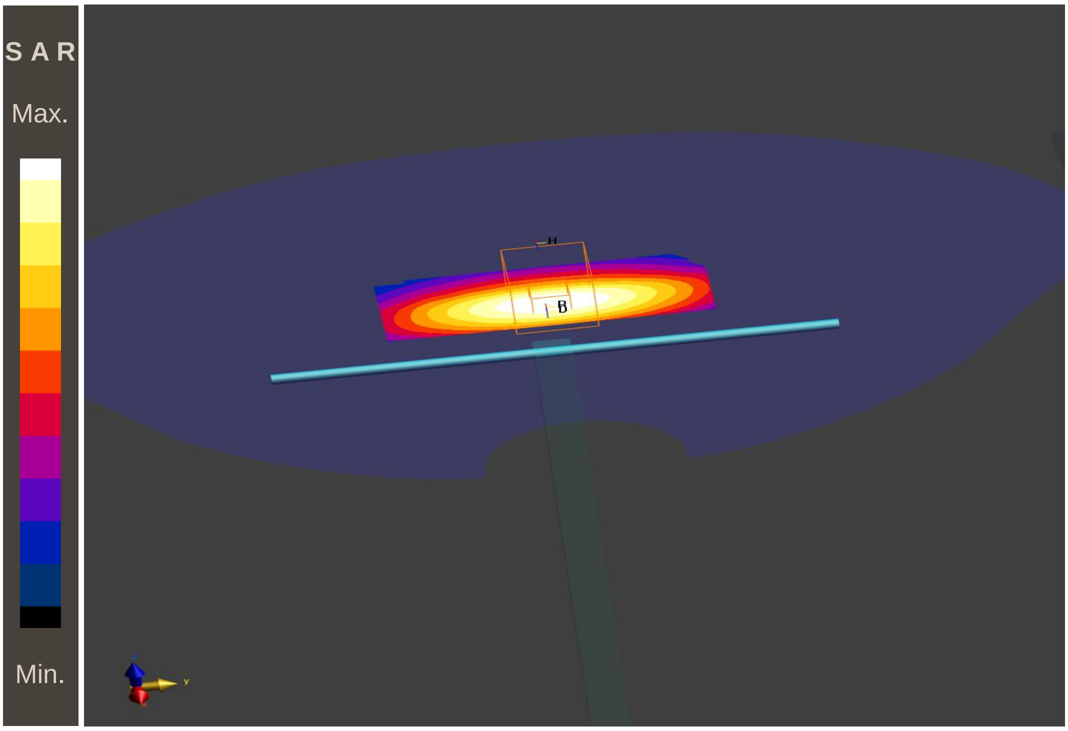
Date/Time: 2023-02-13, 08:08 2023-02-13, 08:14

SystemPerformanceCheck-D900

DUT: Dipole; Type: D900V2; Serial: SN102
Communication System: CW; Communication System Frequency: 900.0 MHz
Medium parameters used: f = 900.0 MHz, σ = 0.924 S/m; ε_r=42.3; ρ= 1000 kg/m3
Phantom Section: Flat
Measurement Standard: DASY 6
DASY Configuration:
- Probe: EX3DV4 - SN3944; ConvF(10.01, 10.01, 10.01); Calibrated: 2022-05-17
- Sensor-Surface: 1.4 mm
- DAE: DAE3 Sn477; Calibrated: 2022-05-16
- Phantom: Twin-SAM V8.0 (30deg probe tilt); Serial: 2061;
- Software: cDASY6 (16.2.2.1588)

HBBL-600-10000/900.0MHz/Area Scan (10.0 x 15.0 x 1.0) :
Grid Extents [mm]: 40.0 x 90.0
Maximum value of SAR (interpolated) - SAR(10 g) = 0.687 W/kg

HBBL-600-10000/900.0MHz/Zoom Scan (6.0 x 6.0 x 1.5) :
Grid Extents [mm]: 30.0 x 30.0 x 30.0
Power Drift = -0.01 dB
SAR(10 g) = 0.699 W/kg



Additional information:
ambient temperature: 22.9°C; liquid temperature: 21.5°C;

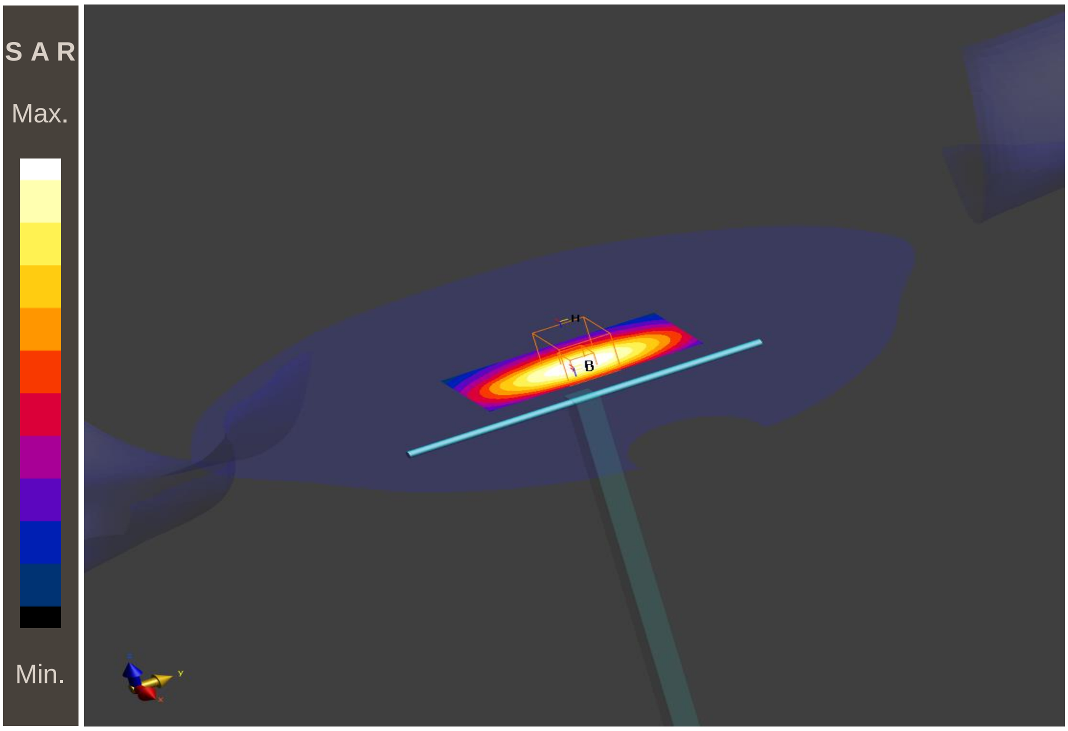
Date/Time: 2023-02-14, 08:19 2023-02-14, 08:25

SystemPerformanceCheck-D900

DUT: Dipole; Type: D900V2; Serial: SN102
Communication System: CW; Communication System Frequency: 900.0 MHz
Medium parameters used: f = 900.0 MHz, σ = 0.924 S/m; ε_r=42.3; ρ= 1000 kg/m3
Phantom Section: Flat
Measurement Standard: DASY 6
DASY Configuration:
- Probe: EX3DV4 - SN3944; ConvF(10.01, 10.01, 10.01); Calibrated: 2022-05-17
- Sensor-Surface: 1.4 mm
- DAE: DAE3 Sn477; Calibrated: 2022-05-16
- Phantom: Twin-SAM V8.0 (30deg probe tilt); Serial: 2061;
- Software: cDASY6 (16.2.2.1588)

HBBL-600-10000/900.0MHz/Area Scan (10.0 x 15.0 x 1.0) :
Grid Extents [mm]: 40.0 x 90.0
Maximum value of SAR (interpolated) - SAR(10 g) = 0.719 W/kg

HBBL-600-10000/900.0MHz/Zoom Scan (6.0 x 6.0 x 1.5) :
Grid Extents [mm]: 30.0 x 30.0 x 30.0
Power Drift = -0.03 dB
SAR(10 g) = 0.694 W/kg



Additional information:
ambient temperature: 22.1°C; liquid temperature: 21.6°C;

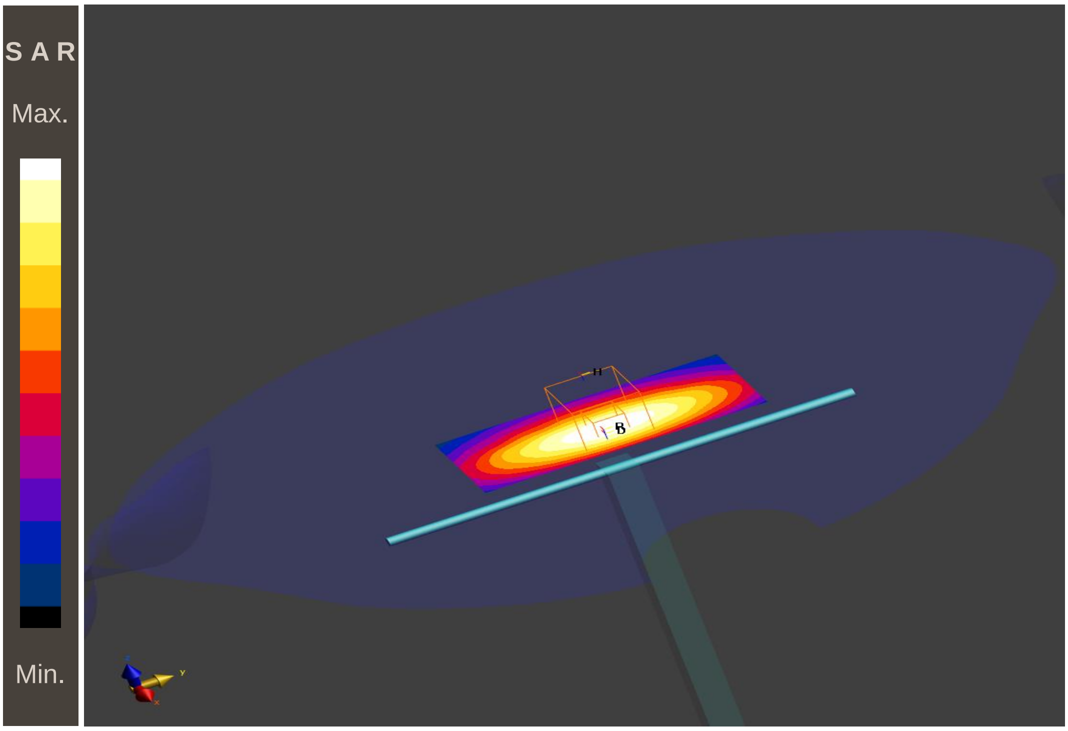
Date/Time: 2023-02-16, 07:25 2023-02-16, 07:31

SystemPerformanceCheck-D900

DUT: Dipole; Type: D900V2; Serial: SN102
Communication System: CW; Communication System Frequency: 900.0 MHz
Medium parameters used: f = 900.0 MHz, σ = 0.920 S/m; ε_r=41.7; ρ= 1000 kg/m3
Phantom Section: Flat
Measurement Standard: DASY 6
DASY Configuration:
- Probe: EX3DV4 - SN3944; ConvF(10.01, 10.01, 10.01); Calibrated: 2022-05-17
- Sensor-Surface: 1.4 mm
- DAE: DAE3 Sn477; Calibrated: 2022-05-16
- Phantom: Twin-SAM V8.0 (30deg probe tilt); Serial: 2061;
- Software: cDASY6 (16.2.2.1588)

HBBL-600-10000/900.0MHz/Area Scan (10.0 x 15.0 x 1.0) :
Grid Extents [mm]: 40.0 x 90.0
Maximum value of SAR (interpolated) - SAR(10 g) = 0.748 W/kg

HBBL-600-10000/900.0MHz/Zoom Scan (6.0 x 6.0 x 1.5) :
Grid Extents [mm]: 30.0 x 30.0 x 30.0
Power Drift = -0.04 dB
SAR(10 g) = 0.722 W/kg



Additional information:
ambient temperature: 22.3°C; liquid temperature: 21.9°C;

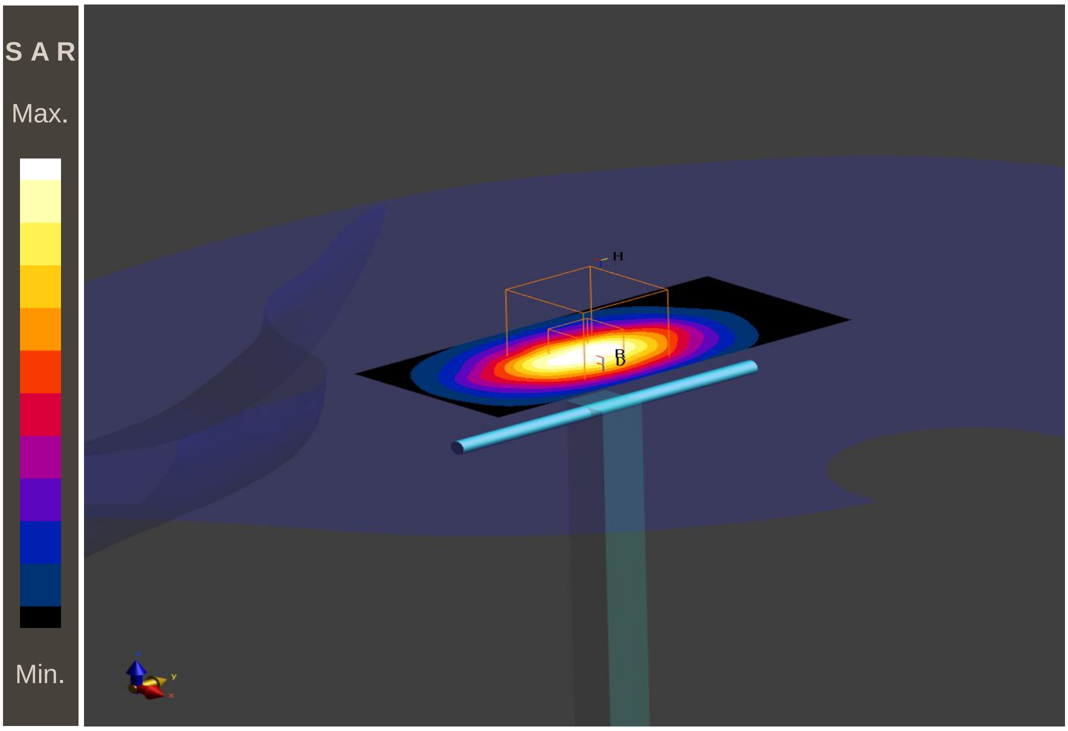
Date/Time: 2023-02-14, 07:54 2023-02-14, 07:59

SystemPerformanceCheck-D1750

DUT: Dipole; Type: D1750V2; Serial: SN1093
Communication System: CW; Communication System Frequency: 1750.0 MHz
Medium parameters used: f = 1750.0 MHz, σ = 1.36 S/m; ε_r=40.7; ρ= 1000 kg/m3
Phantom Section: Flat
Measurement Standard: DASY 8
DASY Configuration:
- Probe: EX3DV4 - SN7566; ConvF(8.65, 8.65, 8.65); Calibrated: 2022-08-23
- Sensor-Surface: 1.4 mm
- DAE: DAE4 Sn1387; Calibrated: 2022-08-17
- Phantom: Twin-SAM V8.0 (30deg probe tilt); Serial: 1977;
- Software: DASY8 Module SAR V16.2.2.1588

HBBL-600-10000/1750.0MHz/Area Scan (10.0 x 15.0 x 1.0) :
Grid Extents [mm]: 40.0 x 90.0
Maximum value of SAR (interpolated) - SAR(10 g) = 1.97 W/kg

HBBL-600-10000/1750.0MHz/Zoom Scan (6.0 x 6.0 x 1.5) :
Grid Extents [mm]: 30.0 x 30.0 x 30.0
Power Drift = -0.01 dB
SAR(10 g) = 1.93 W/kg



Additional information:
ambient temperature: 22.1°C; liquid temperature: 21.5°C;

Date/Time: 2023-02-15, 08:35 2023-02-15, 08:41

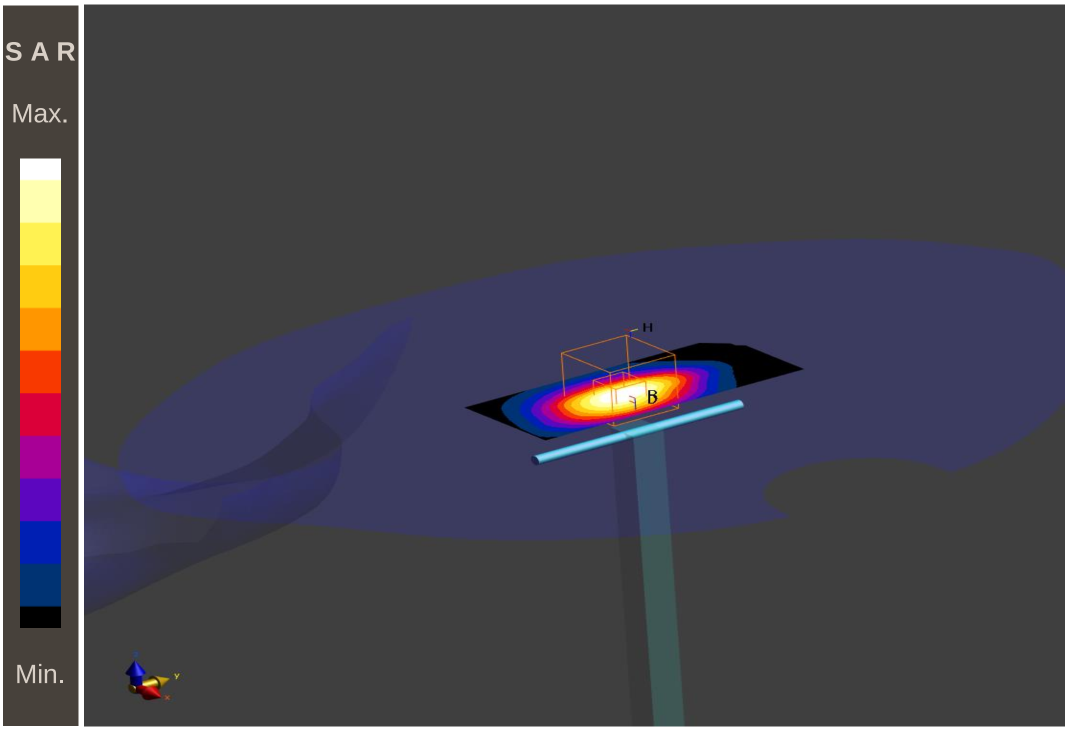
SystemPerformanceCheck-D1900

DUT: Dipole; Type: D1900V2; Serial: SN5d009

Communication System: CW; Communication System Frequency: 1900.0 MHz
Medium parameters used: f = 1900.0 MHz, σ = 1.46 S/m; ε_r=40.5; ρ= 1000 kg/m3
Phantom Section: Flat
Measurement Standard: DASY 8
DASY Configuration:
- Probe: EX3DV4 - SN7566; ConvF(8.29, 8.29, 8.29); Calibrated: 2022-08-23
- Sensor-Surface: 1.4 mm
- DAE: DAE4 Sn1387; Calibrated: 2022-08-17
- Phantom: Twin-SAM V8.0 (30deg probe tilt); Serial: 1977;
- Software: DASY8 Module SAR V16.2.2.1588

HBBL-600-10000/1900.0MHz/Area Scan (10.0 x 15.0 x 1.0) :
Grid Extents [mm]: 40.0 x 90.0
Maximum value of SAR (interpolated) - SAR(10 g) = 2.11 W/kg

HBBL-600-10000/1900.0MHz/Zoom Scan (6.0 x 6.0 x 1.5) :
Grid Extents [mm]: 30.0 x 30.0 x 30.0
Power Drift = 0.02 dB
SAR(10 g) = 2.06 W/kg



Additional information:
ambient temperature: 22.4°C; liquid temperature: 21.3°C;

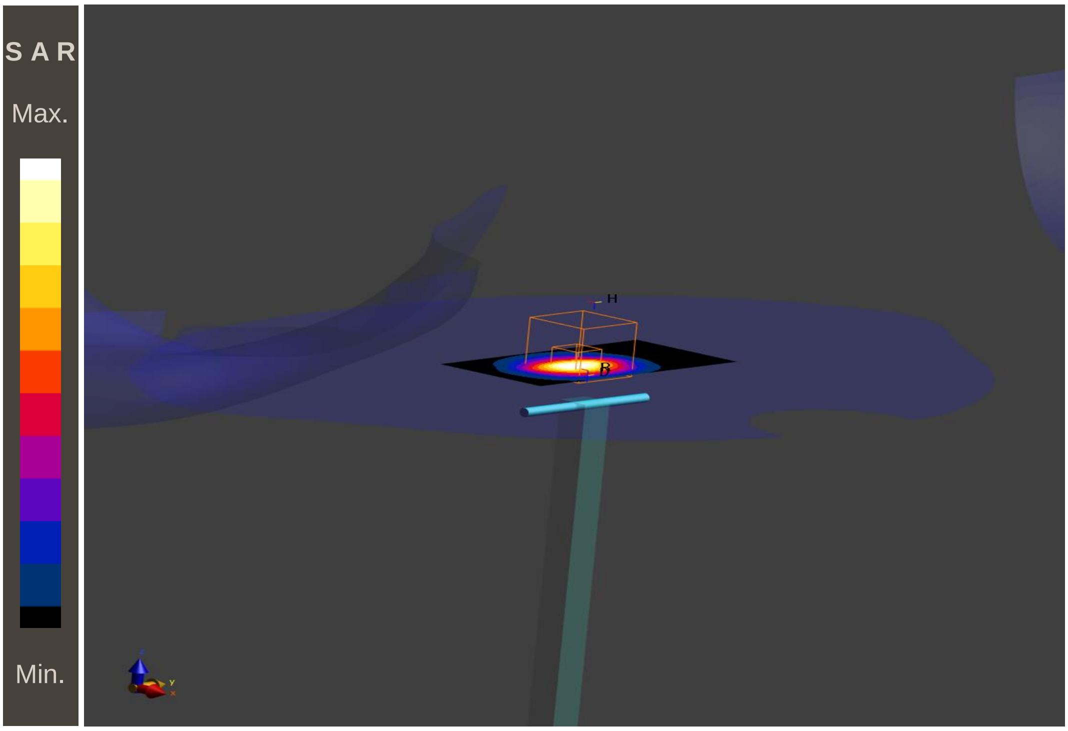
Date/Time: 2023-02-17, 06:59 2023-02-17, 07:05

SystemPerformanceCheck-D2600

DUT: Dipole; Type: D2600V2; Serial: SN1040
Communication System: CW; Communication System Frequency: 2600.0 MHz
Medium parameters used: f = 2600.0 MHz, σ = 1.87 S/m; ε_r=38.5; ρ= 1000 kg/m3
Phantom Section: Flat
Measurement Standard: DASY 8
DASY Configuration:
- Probe: EX3DV4 - SN7566; ConvF(7.54, 7.54, 7.54); Calibrated: 2022-08-23
- Sensor-Surface: 1.4 mm
- DAE: DAE4 Sn1387; Calibrated: 2022-08-17
- Phantom: Twin-SAM V8.0 (30deg probe tilt); Serial: 1977;
- Software: DASY8 Module SAR V16.2.2.1588

HBBL-600-10000/2600.0MHz/Area Scan (10.0 x 10.0 x 1.0) :
Grid Extents [mm]: 40.0 x 80.0
Maximum value of SAR (interpolated) - SAR(10 g) = 2.39 W/kg

HBBL-600-10000/2600.0MHz/Zoom Scan (5.0 x 5.0 x 1.5) :
Grid Extents [mm]: 30.0 x 30.0 x 30.0
Power Drift = 0.02 dB
SAR(10 g) = 2.34 W/kg



Additional information:
ambient temperature: 22.3°C; liquid temperature: 21.5°C;

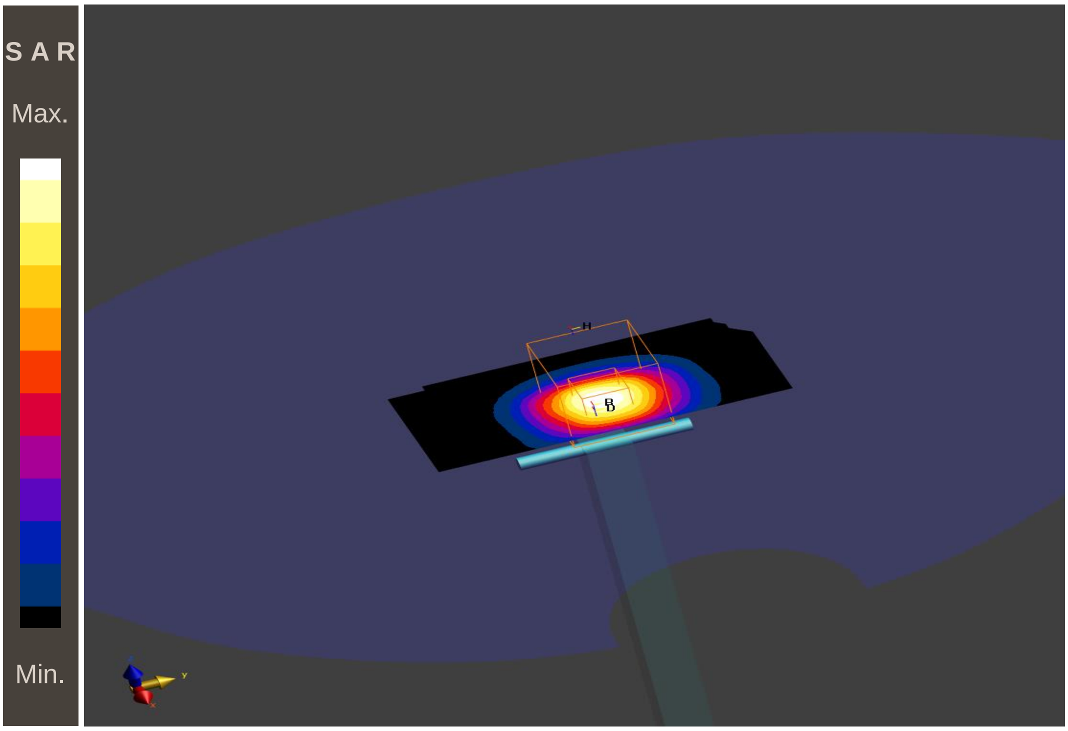
Date/Time: 2023-02-09, 10:44 2023-02-09, 10:52

SystemPerformanceCheck-D3500

DUT: Dipole; Type: D3500V2; Serial: SN1003
Communication System: CW; Communication System Frequency: 3500.0 MHz
Medium parameters used: f = 3500.0 MHz, σ = 2.69 S/m; ε_r=39.2; ρ= 1000 kg/m3
Phantom Section: Flat
Measurement Standard: DASY 6
DASY Configuration:
- Probe: EX3DV4 - SN3944; ConvF(6.96, 6.96, 6.96); Calibrated: 2022-05-17
- Sensor-Surface: 1.4 mm
- DAE: DAE3 Sn477; Calibrated: 2022-05-16
- Phantom: Twin-SAM V8.0 (30deg probe tilt); Serial: 2061;
- Software: cDASY6 (16.2.2.1588)

HBBL-600-10000/3500.0MHz/Area Scan (10.0 x 10.0 x 1.0) :
Grid Extents [mm]: 40.0 x 80.0
Maximum value of SAR (interpolated) - SAR(10 g) = 2.56 W/kg

HBBL-600-10000/3500.0MHz/Zoom Scan (5.0 x 5.0 x 1.4) :
Grid Extents [mm]: 28.0 x 28.0 x 28.0
Power Drift = 0.03 dB
SAR(10 g) = 2.47 W/kg



Additional information:
ambient temperature: 22.4°C; liquid temperature: 21.4°C;

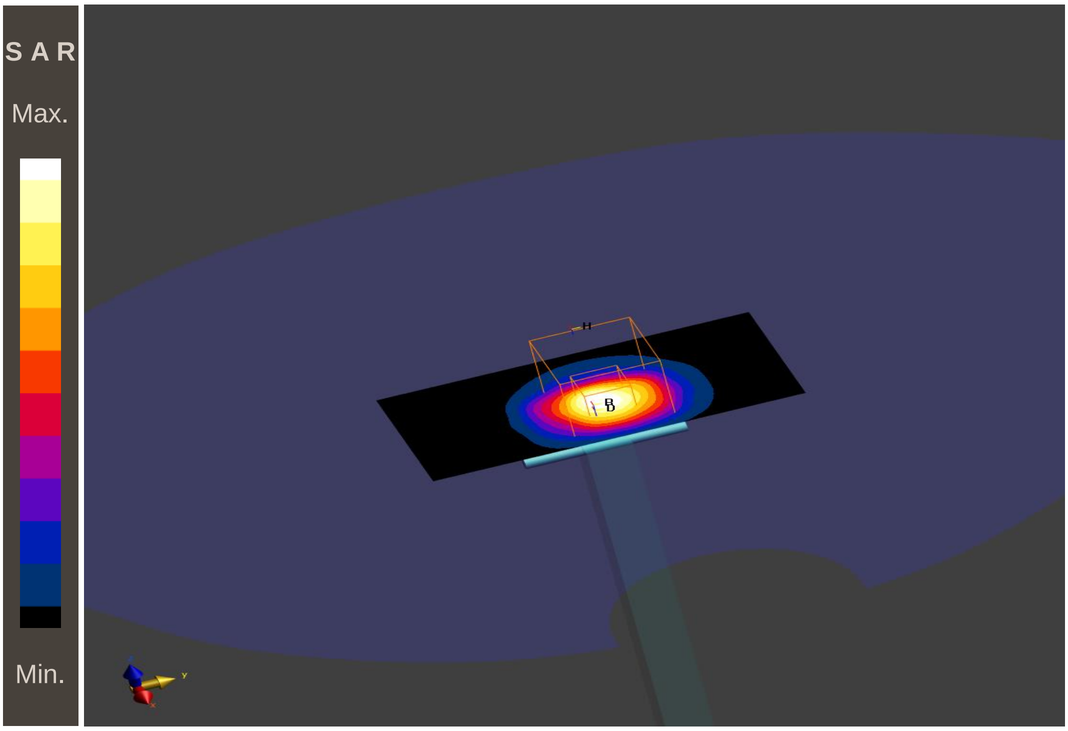
Date/Time: 2023-02-09, 11:03 2023-02-09, 11:11

SystemPerformanceCheck-D3700

DUT: Dipole; Type: D3700V2; Serial: SN1062
Communication System: CW; Communication System Frequency: 3700.0 MHz
Medium parameters used: f = 3700.0 MHz, σ = 2.84 S/m; ε_r=38.8; ρ= 1000 kg/m3
Phantom Section: Flat
Measurement Standard: DASY 6
DASY Configuration:
- Probe: EX3DV4 - SN3944; ConvF(6.91, 6.91, 6.91); Calibrated: 2022-05-17
- Sensor-Surface: 1.4 mm
- DAE: DAE3 Sn477; Calibrated: 2022-05-16
- Phantom: Twin-SAM V8.0 (30deg probe tilt); Serial: 2061;
- Software: cDASY6 (16.2.2.1588)

HBBL-600-10000/3700.0MHz/Area Scan (10.0 x 10.0 x 1.0) :
Grid Extents [mm]: 40.0 x 80.0
Maximum value of SAR (interpolated) - SAR(10 g) = 2.65 W/kg

HBBL-600-10000/3700.0MHz/Zoom Scan (5.0 x 5.0 x 1.4) :
Grid Extents [mm]: 28.0 x 28.0 x 28.0
Power Drift = 0.01 dB
SAR(10 g) = 2.59 W/kg



Additional information:
ambient temperature: 22.4°C; liquid temperature: 21.4°C;

Annex B: DASY measurement results

SAR plots for **the highest measured SAR** in each exposure configuration, wireless mode and frequency band combination

Annex B.1: SAR results – head

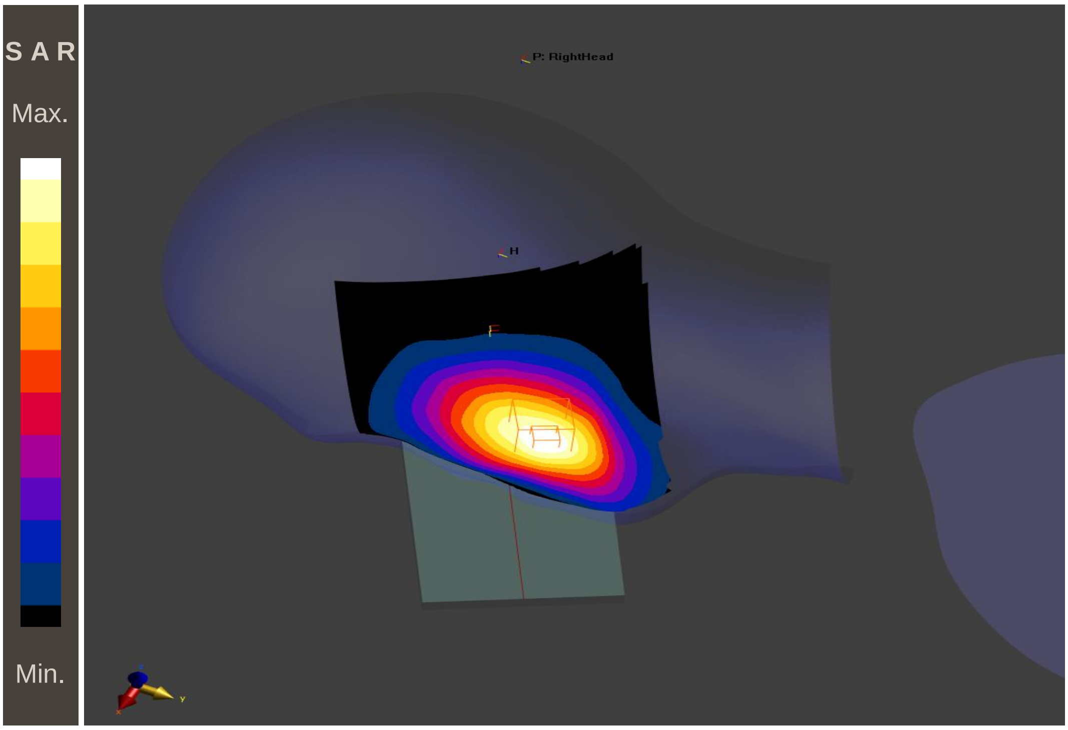
Date/Time: 2023-02-14, 11:49 2023-02-14, 12:04

EN62209-1-GSM900 head

DUT: SAMSUNG GALAXY A53 5G; Type: SM - A536B/DS; Serial: RZCT70HRCTN
Communication System: GSM-FDD (TDMA, GMSK); Communication System Band: E-GSM 900;
Communication System Frequency: 897.4 MHz
Medium parameters used: f = 897.4 MHz, σ = 0.924 S/m; ε_r=42.3; ρ= 1000 kg/m3
Phantom Section: RightHead
Measurement Standard: DASY 6
DASY Configuration:
- Probe: EX3DV4 - SN3944; ConvF(10.01, 10.01, 10.01); Calibrated: 2022-05-17
- Sensor-Surface: 1.4mm
- DAE: DAE3 Sn477; Calibrated: 2022-05-16
- Phantom: Twin-SAM V8.0 (30deg probe tilt); Serial: 2061;
- Software: cDASY6 (16.2.2.1588)

HBBL-600-10000/CHEEK, 0 mm - Channel 37/Area Scan (15.0 x 15.0 x 1.0) :
Grid Extents [mm]: 60.0 x 60.0
Maximum value of SAR (interpolated) - SAR(10 g) = 0.164 W/kg

HBBL-600-10000/CHEEK, 0 mm - Channel 37/Zoom Scan (5.0 x 5.0 x 1.5) :
Grid Extents [mm]: 30.0 x 30.0 x 30.0
Graded Grid: Yes / Ratio 1.5 - Distance Sensor to Surface 1.4 mm
Power Drift = -0.07 dB
SAR(10 g) = 0.196 W/kg



Additional information:
ambient temperature: 22.1°C; liquid temperature: 21.6°C;

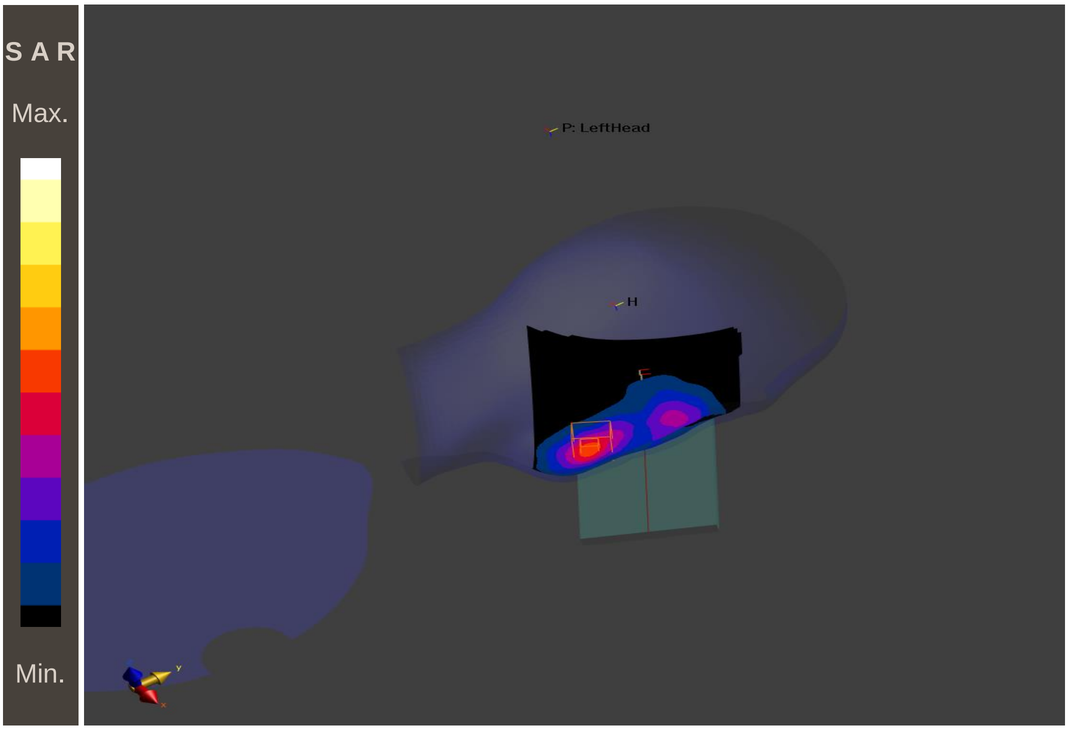
Date/Time: 2023-02-14, 16:17 2023-02-14, 16:28

EN62209-1-GSM1800 head

DUT: SAMSUNG GALAXY A53 5G; Type: SM - A536B/DS; Serial: RZCT70HRCTN
Communication System: GSM-FDD (TDMA, GMSK); Communication System Band: DCS 1800;
Communication System Frequency: 1747.4 MHz
Medium parameters used: f = 1747.4 MHz, σ = 1.36 S/m; ε_r=40.7; ρ= 1000 kg/m3
Phantom Section: LeftHead
Measurement Standard: DASY 8
DASY Configuration:
- Probe: EX3DV4 - SN7566; ConvF(8.65, 8.65, 8.65); Calibrated: 2022-08-23
- Sensor-Surface: 1.4mm
- DAE: DAE4 Sn1387; Calibrated: 2022-08-17
- Phantom: Twin-SAM V8.0 (30deg probe tilt); Serial: 1977;
- Software: DASY8 Module SAR V16.2.2.1588

HBBL-600-10000/CHEEK, 0 mm - Channel 698/Area Scan (15.0 x 15.0 x 1.0) :
Grid Extents [mm]: 120.0 x 210.0
Maximum value of SAR (interpolated) - SAR(10 g) = 0.030 W/kg

HBBL-600-10000/CHEEK, 0 mm - Channel 698/Zoom Scan (6.0 x 6.0 x 1.5) :
Grid Extents [mm]: 36.0 x 36.0 x 30.0
Graded Grid: Yes / Ratio 1.5 - Distance Sensor to Surface 1.4 mm
Power Drift = -0.03 dB
SAR(10 g) = 0.034 W/kg



Additional information:
ambient temperature: 22.2°C; liquid temperature: 21.5°C;

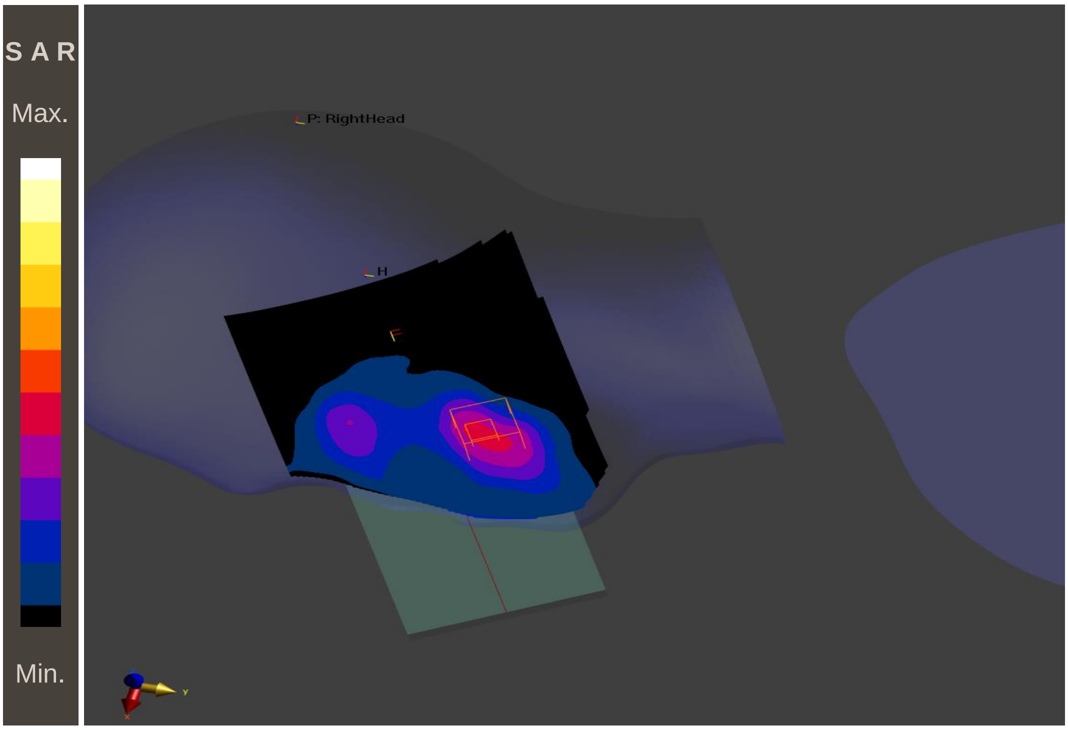
Date/Time: 2023-02-15, 15:11 2023-02-15, 15:21

EN62209-1-UMTS FDD I head

DUT: SAMSUNG GALAXY A53 5G; Type: SM - A536B/DS; Serial: RZCT70HRCTN
Communication System: UMTS-FDD (WCDMA, AMR); Communication System Band: Band 1;
Communication System Frequency: 1977.6 MHz
Medium parameters used: f = 1977.6 MHz, σ = 1.50 S/m; ε_r=40.4; ρ= 1000 kg/m3
Phantom Section: RightHead
Measurement Standard: DASY 8
DASY Configuration:
- Probe: EX3DV4 - SN7566; ConvF(8.29, 8.29, 8.29); Calibrated: 2022-08-23
- Sensor-Surface: 1.4mm
- DAE: DAE4 Sn1387; Calibrated: 2022-08-17
- Phantom: Twin-SAM V8.0 (30deg probe tilt); Serial: 1977;
- Software: DASY8 Module SAR V16.2.2.1588

HBBL-600-10000/CHEEK, 0 mm - Channel 9888/Area Scan (15.0 x 15.0 x 1.0) :
Grid Extents [mm]: 60.0 x 60.0
Maximum value of SAR (interpolated) - SAR(10 g) = 0.024 W/kg

HBBL-600-10000/CHEEK, 0 mm - Channel 9888/Zoom Scan (5.0 x 5.0 x 1.5) :
Grid Extents [mm]: 30.0 x 30.0 x 30.0
Graded Grid: Yes / Ratio 1.5 - Distance Sensor to Surface 1.4 mm
Power Drift = -0.07 dB
SAR(10 g) = 0.027 W/kg



Additional information:
ambient temperature: 22.4°C; liquid temperature: 21.3°C;

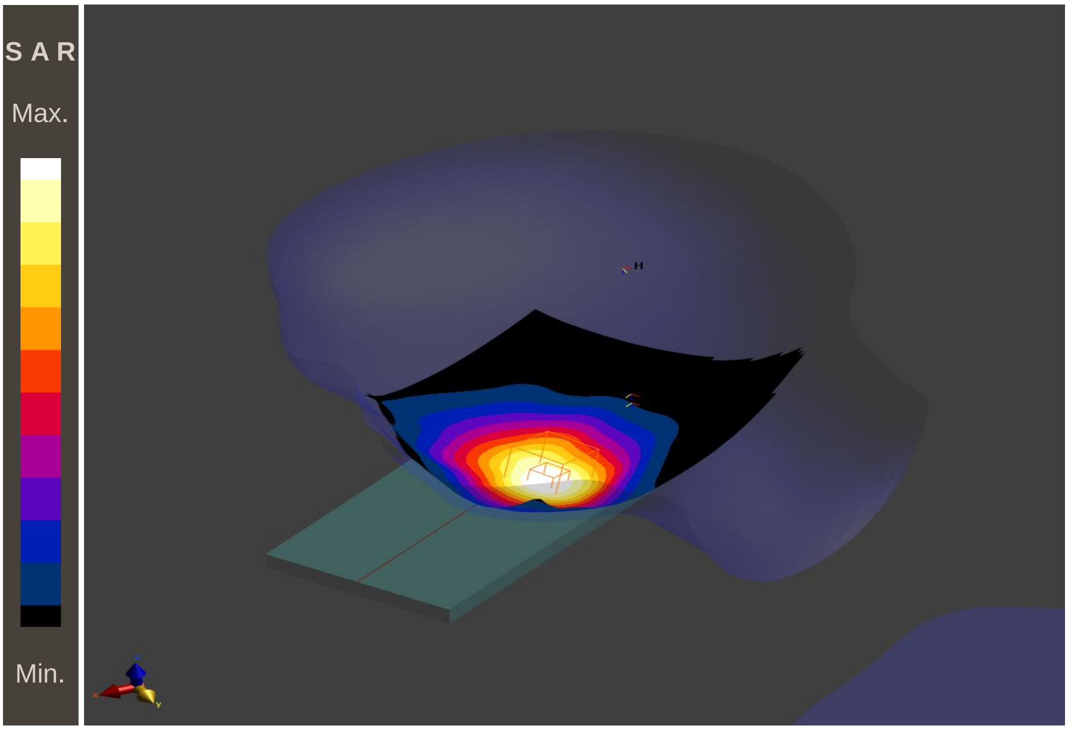
Date/Time: 2023-02-16, 22:22 2023-02-16, 22:36

EN62209-1-UMTS FDD VIII head

DUT: SAMSUNG GALAXY A53 5G; Type: SM - A536B/DS; Serial: RZCT70HRCTN
Communication System: UMTS-FDD (WCDMA, AMR); Communication System Band: Band 8;
Communication System Frequency: 897.6 MHz
Medium parameters used: f = 897.6 MHz, σ = 0.919 S/m; ε_r=41.7; ρ= 1000 kg/m3
Phantom Section: RightHead
Measurement Standard: DASY 6
DASY Configuration:
- Probe: EX3DV4 - SN3944; ConvF(10.01, 10.01, 10.01); Calibrated: 2022-05-17
- Sensor-Surface: 1.4mm
- DAE: DAE3 Sn477; Calibrated: 2022-05-16
- Phantom: Twin-SAM V8.0 (30deg probe tilt); Serial: 2061;
- Software: cDASY6 (16.2.2.1588)

HBBL-600-10000/CHEEK, 0 mm - Channel 2788/Area Scan (15.0 x 15.0 x 1.0) :
Grid Extents [mm]: 60.0 x 60.0
Maximum value of SAR (interpolated) - SAR(10 g) = 0.112 W/kg

HBBL-600-10000/CHEEK, 0 mm - Channel 2788/Zoom Scan (6.0 x 6.0 x 1.5) :
Grid Extents [mm]: 36.0 x 36.0 x 30.0
Graded Grid: Yes / Ratio 1.5 - Distance Sensor to Surface 1.4 mm
Power Drift = -0.18 dB
SAR(10 g) = 0.127 W/kg



Additional information:
ambient temperature: 23.4°C; liquid temperature: 21.9°C;

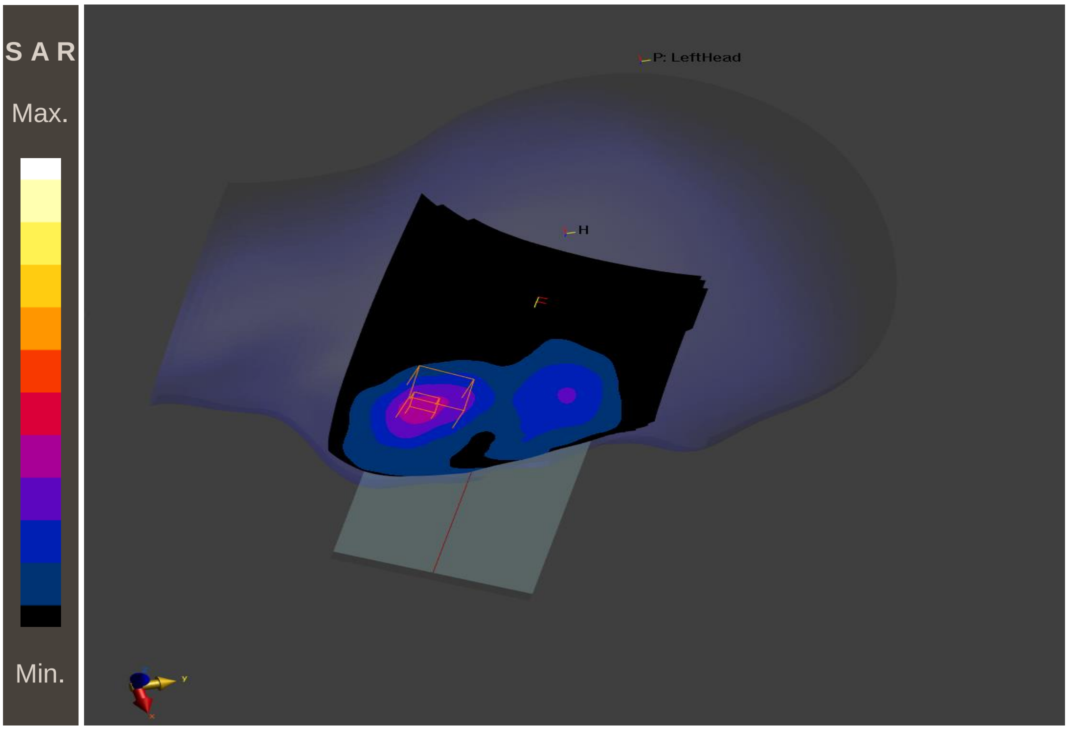
Date/Time: 2023-02-15, 14:20 2023-02-15, 14:31

EN62209-1-LTE FDD 1 head

DUT: SAMSUNG GALAXY A53 5G; Type: SM - A536B/DS; Serial: RZCT70HRCTN
Communication System: LTE-FDD (SC-FDMA, 100% RB, 20 MHz, QPSK) AntennaCfg:SISO;
Communication System Band: Band 1; Communication System Frequency: 1950.0 MHz
Medium parameters used: f = 1950.0 MHz, σ = 1.49 S/m; ε_r=40.4; ρ= 1000 kg/m3
Phantom Section: LeftHead
Measurement Standard: DASY 8
DASY Configuration:
- Probe: EX3DV4 - SN7566; ConvF(8.29, 8.29, 8.29); Calibrated: 2022-08-23
- Sensor-Surface: 1.4mm
- DAE: DAE4 Sn1387; Calibrated: 2022-08-17
- Phantom: Twin-SAM V8.0 (30deg probe tilt); Serial: 1977;
- Software: DASY8 Module SAR V16.2.2.1588

HBBL-600-10000/CHEEK, 0 mm - Channel 18300/Area Scan (15.0 x 15.0 x 1.0) :
Grid Extents [mm]: 60.0 x 60.0
Maximum value of SAR (interpolated) - SAR(10 g) = 0.021 W/kg

HBBL-600-10000/CHEEK, 0 mm - Channel 18300/Zoom Scan (5.0 x 5.0 x 1.5) :
Grid Extents [mm]: 30.0 x 30.0 x 30.0
Graded Grid: Yes / Ratio 1.5 - Distance Sensor to Surface 1.4 mm
Power Drift = 0.01 dB
SAR(10 g) = 0.024 W/kg



Additional information:
ambient temperature: 22.4°C; liquid temperature: 21.3°C;

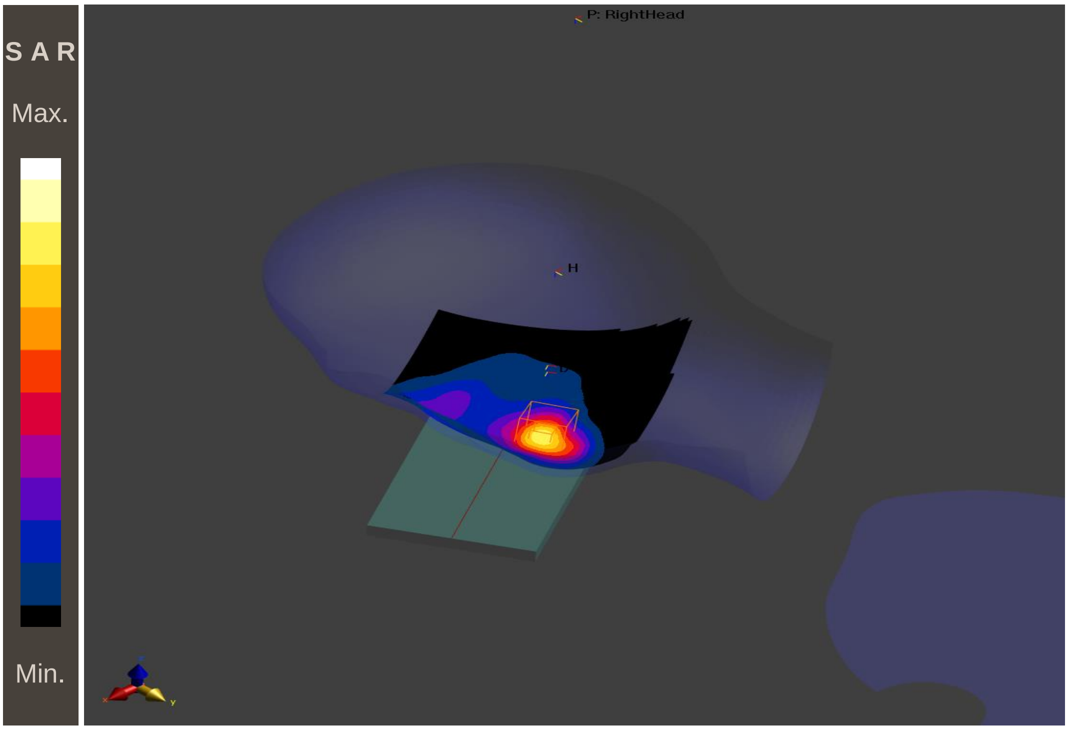
Date/Time: 2023-02-14, 18:11 2023-02-14, 18:40

EN62209-1-LTE FDD 3 head

DUT: SAMSUNG GALAXY A53 5G; Type: SM - A536B/DS; Serial: RZCT70HRCTN
Communication System: LTE-FDD (SC-FDMA, 50% RB, 20 MHz, QPSK) RBPosition:High
AntennaCfg:SISO; Communication System Band: Band 3; Communication System Frequency: 1775.0 MHz
Medium parameters used: f = 1775.0 MHz, σ = 1.38 S/m; ε_r=40.7; ρ= 1000 kg/m3
Phantom Section: RightHead
Measurement Standard: DASY 8
DASY Configuration:
- Probe: EX3DV4 - SN7566; ConvF(8.65, 8.65, 8.65); Calibrated: 2022-08-23
- Sensor-Surface: 1.4mm
- DAE: DAE4 Sn1387; Calibrated: 2022-08-17
- Phantom: Twin-SAM V8.0 (30deg probe tilt); Serial: 1977;
- Software: DASY8 Module SAR V16.2.2.1588

HBBL-600-10000/CHEEK, 0 mm - Channel 19850/Area Scan (15.0 x 15.0 x 1.0) :
Grid Extents [mm]: 60.0 x 60.0
Maximum value of SAR (interpolated) - SAR(10 g) = 0.042 W/kg

HBBL-600-10000/CHEEK, 0 mm - Channel 19850/Zoom Scan (6.0 x 6.0 x 1.5) :
Grid Extents [mm]: 36.0 x 36.0 x 30.0
Graded Grid: Yes / Ratio 1.5 - Distance Sensor to Surface 1.4 mm
Power Drift = -0.04 dB
SAR(10 g) = 0.049 W/kg



Additional information:
ambient temperature: 22.4°C; liquid temperature: 21.5°C;

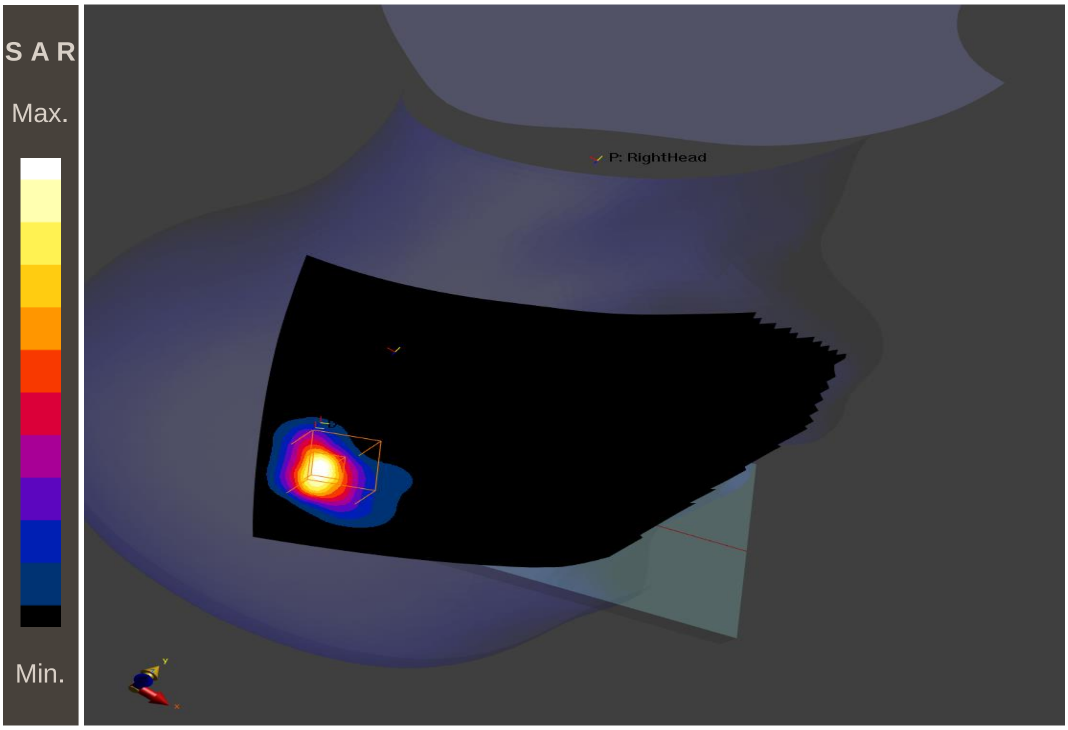
Date/Time: 2023-02-17, 10:57 2023-02-17, 11:08

EN62209-1-LTE FDD 7 head

DUT: SAMSUNG GALAXY A53 5G; Type: SM - A536B/DS; Serial: RZCT70HRCTN
Communication System: LTE-FDD (SC-FDMA, 1 RB, 20 MHz, QPSK) RBPosition:High AntennaCfg:SISO;
Communication System Band: Band 7; Communication System Frequency: 2510.0 MHz
Medium parameters used: f = 2510.0 MHz, σ = 1.81 S/m; ε_r=38.6; ρ= 1000 kg/m3
Phantom Section: RightHead
Measurement Standard: DASY 8
DASY Configuration:
- Probe: EX3DV4 - SN7566; ConvF(7.54, 7.54, 7.54); Calibrated: 2022-08-23
- Sensor-Surface: 1.4mm
- DAE: DAE4 Sn1387; Calibrated: 2022-08-17
- Phantom: Twin-SAM V8.0 (30deg probe tilt); Serial: 1977;
- Software: DASY8 Module SAR V16.2.2.1588

HBBL-600-10000/TILT, 0 mm - Channel 20850/Area Scan (10.0 x 10.0 x 1.0) :
Grid Extents [mm]: 60.0 x 60.0
Maximum value of SAR (interpolated) - SAR(10 g) = 1.31 W/kg

HBBL-600-10000/TILT, 0 mm - Channel 20850/Zoom Scan (3.75 x 3.75 x 1.5) :
Grid Extents [mm]: 30.0 x 30.0 x 30.0
Graded Grid: Yes / Ratio 1.5 - Distance Sensor to Surface 1.4 mm
Power Drift = -0.00 dB
SAR(10 g) = 1.30 W/kg



Additional information:
ambient temperature: 22.4°C; liquid temperature: 21.5°C;

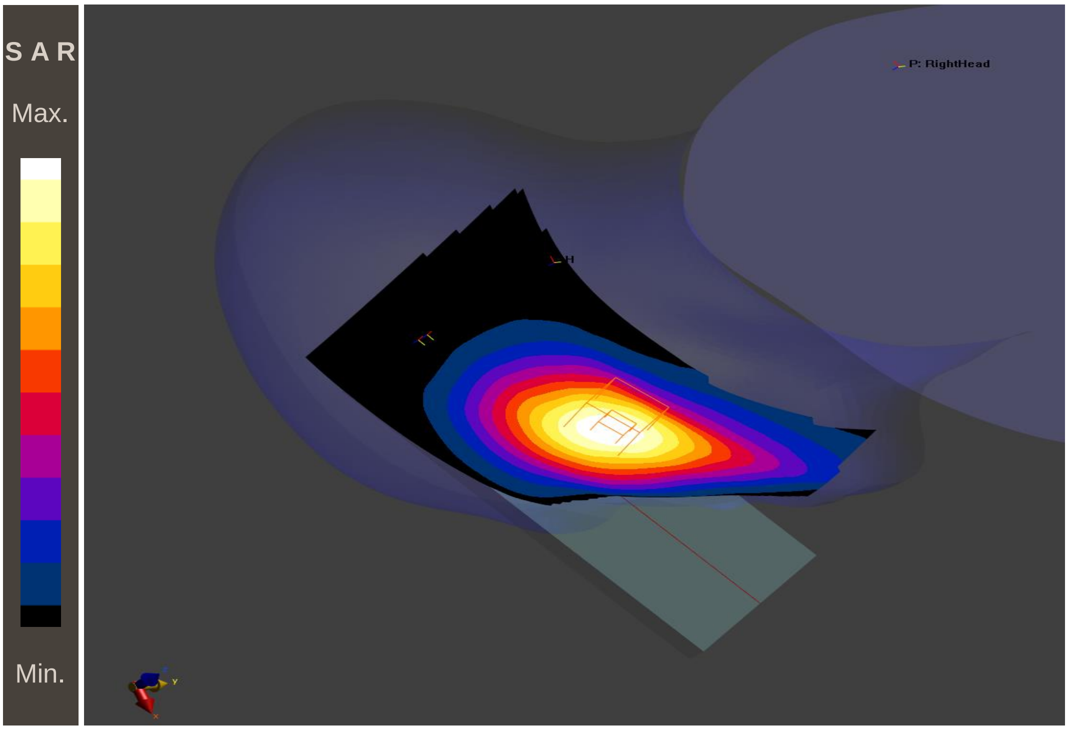
Date/Time: 2023-02-13, 15:28 2023-02-13, 15:51

EN62209-1-LTE FDD 8 head

DUT: SAMSUNG GALAXY A53 5G; Type: SM - A536B/DS; Serial: RZCT70HRCTN
Communication System: LTE-FDD (SC-FDMA, 1 RB, 10 MHz, QPSK) RBPosition:Low AntennaCfg:SISO;
Communication System Band: Band 8; Communication System Frequency: 897.5 MHz
Medium parameters used: f = 897.5 MHz, σ = 0.924 S/m; ε_r=42.3; ρ= 1000 kg/m3
Phantom Section: RightHead
Measurement Standard: DASY 6
DASY Configuration:
- Probe: EX3DV4 - SN3944; ConvF(10.01, 10.01, 10.01); Calibrated: 2022-05-17
- Sensor-Surface: 1.4mm
- DAE: DAE3 Sn477; Calibrated: 2022-05-16
- Phantom: Twin-SAM V8.0 (30deg probe tilt); Serial: 2061;
- Software: cDASY6 (16.2.2.1588)

HBBL-600-10000/CHEEK, 0 mm - Channel 21625/Area Scan (15.0 x 15.0 x 1.0) :
Grid Extents [mm]: 60.0 x 60.0
Maximum value of SAR (interpolated) - SAR(10 g) = 0.186 W/kg

HBBL-600-10000/CHEEK, 0 mm - Channel 21625/Zoom Scan (5.0 x 5.0 x 1.5) :
Grid Extents [mm]: 30.0 x 30.0 x 30.0
Graded Grid: Yes / Ratio 1.5 - Distance Sensor to Surface 1.4 mm
Power Drift = -0.15 dB
SAR(10 g) = 0.220 W/kg



Additional information:
ambient temperature: 21.9°C; liquid temperature: 21.5°C;

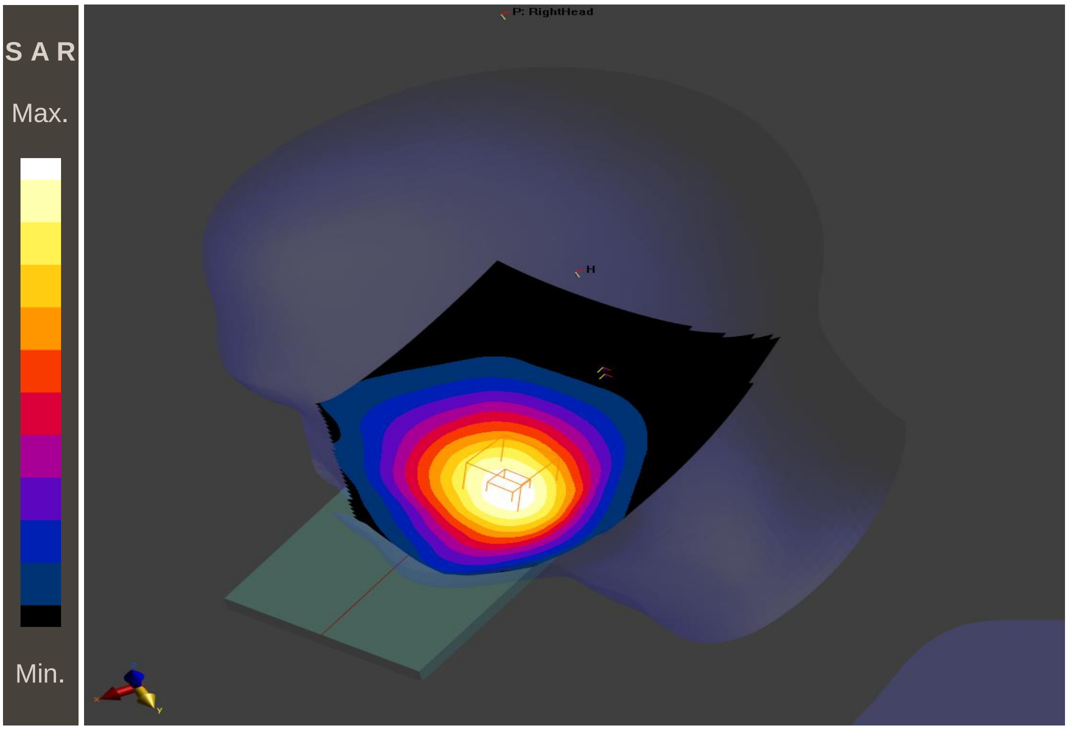
Date/Time: 2023-02-13, 16:17 2023-02-13, 16:40

EN62209-1-LTE FDD 20 head

DUT: SAMSUNG GALAXY A53 5G; Type: SM - A536B/DS; Serial: RZCT70HRCTN
Communication System: LTE-FDD (SC-FDMA, 1 RB, 20 MHz, QPSK) RBPosition:Mid AntennaCfg:SISO;
Communication System Band: Band 20; Communication System Frequency: 847.0 MHz
Medium parameters used: f = 847.0 MHz, σ = 0.906 S/m; ε_r=42.4; ρ= 1000 kg/m3
Phantom Section: RightHead
Measurement Standard: DASY 6
DASY Configuration:
- Probe: EX3DV4 - SN3944; ConvF(10.17, 10.17, 10.17); Calibrated: 2022-05-17
- Sensor-Surface: 1.4mm
- DAE: DAE3 Sn477; Calibrated: 2022-05-16
- Phantom: Twin-SAM V8.0 (30deg probe tilt); Serial: 2061;
- Software: cDASY6 (16.2.2.1588)

HBBL-600-10000/CHEEK, 0 mm - Channel 24300/Area Scan (15.0 x 15.0 x 1.0) :
Grid Extents [mm]: 60.0 x 60.0
Maximum value of SAR (interpolated) - SAR(10 g) = 0.168 W/kg

HBBL-600-10000/CHEEK, 0 mm - Channel 24300/Zoom Scan (5.0 x 5.0 x 1.5) :
Grid Extents [mm]: 30.0 x 30.0 x 30.0
Graded Grid: Yes / Ratio 1.5 - Distance Sensor to Surface 1.4 mm
Power Drift = -0.17 dB
SAR(10 g) = 0.201 W/kg



Additional information:
ambient temperature: 22.1°C; liquid temperature: 21.5°C;

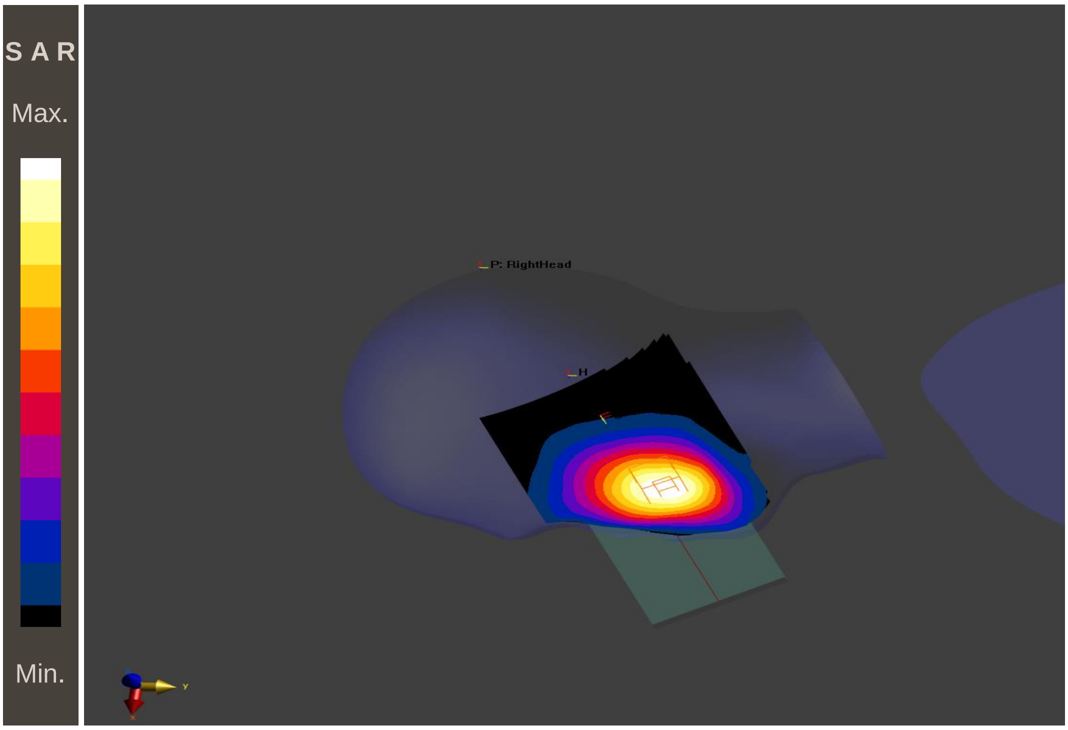
Date/Time: 2023-02-17, 13:54 2023-02-17, 14:08

EN62209-1-LTE FDD 28 head

DUT: SAMSUNG GALAXY A53 5G; Type: SM - A536B/DS; Serial: RZCT70HRCTN
Communication System: LTE-FDD (SC-FDMA, 1 RB, 20 MHz, QPSK) RBPosition:Low AntennaCfg:SISO;
Communication System Band: Band 28; Communication System Frequency: 738.0 MHz
Medium parameters used: f = 738.0 MHz, σ = 0.865 S/m; ε_r=42.1; ρ= 1000 kg/m3
Phantom Section: RightHead
Measurement Standard: DASY 6
DASY Configuration:
- Probe: EX3DV4 - SN3944; ConvF(10.53, 10.53, 10.53); Calibrated: 2022-05-17
- Sensor-Surface: 1.4mm
- DAE: DAE3 Sn477; Calibrated: 2022-05-16
- Phantom: Twin-SAM V8.0 (30deg probe tilt); Serial: 2061;
- Software: cDASY6 (16.2.2.1588)

HBBL-600-10000/CHEEK, 0 mm - Channel 27560/Area Scan (15.0 x 15.0 x 1.0) :
Grid Extents [mm]: 60.0 x 60.0
Maximum value of SAR (interpolated) - SAR(10 g) = 0.116 W/kg

HBBL-600-10000/CHEEK, 0 mm - Channel 27560/Zoom Scan (6.0 x 6.0 x 1.5) :
Grid Extents [mm]: 36.0 x 36.0 x 30.0
Graded Grid: Yes / Ratio 1.5 - Distance Sensor to Surface 1.4 mm
Power Drift = -0.01 dB
SAR(10 g) = 0.135 W/kg



Additional information:
ambient temperature: 22.4°C; liquid temperature: 22.0°C;

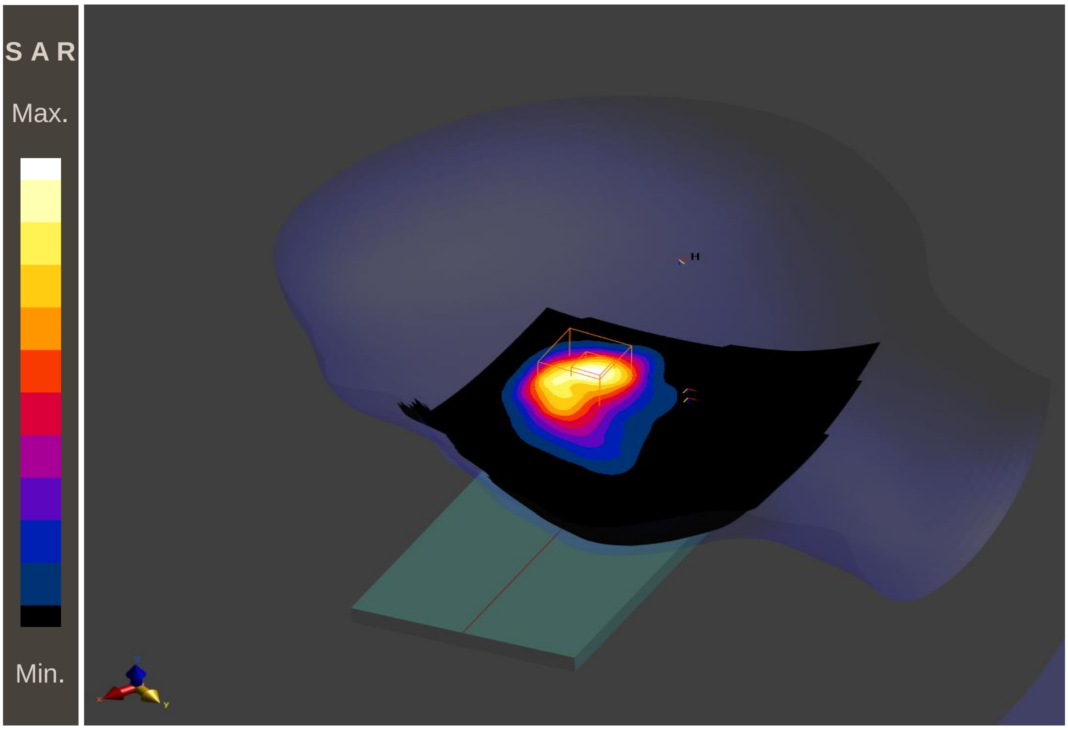
Date/Time: 2023-02-09, 21:36 2023-02-09, 21:53

EN62209-1-5G N78 TDD NSA head

DUT: SAMSUNG GALAXY A53 5G; Type: SM - A536B/DS; Serial: RZCT70HRCTN
Communication System: 5G NR (DFT-s-OFDM, 1@1 RB allocation, 80 MHz, Pi/2 BPSK, SCS 30kHz);
Communication System Band: Band n78; Communication System Frequency: 3550.0 MHz
Medium parameters used: f = 3550.0 MHz, σ = 2.73 S/m; ε_r=39.1; ρ= 1000 kg/m3
Phantom Section: RightHead
Measurement Standard: DASY 6
DASY Configuration:
- Probe: EX3DV4 - SN3944; ConvF(6.96, 6.96, 6.96); Calibrated: 2022-05-17
- Sensor-Surface: 1.4mm
- DAE: DAE3 Sn477; Calibrated: 2022-05-16
- Phantom: Twin-SAM V8.0 (30deg probe tilt); Serial: 2061;
- Software: cDASY6 (16.2.2.1588)

HBBL-600-10000/CHEEK, 0 mm - Channel 636666/Area Scan (10.0 x 10.0 x 1.0) :
Grid Extents [mm]: 60.0 x 60.0
Maximum value of SAR (interpolated) - SAR(10 g) = 0.296 W/kg

HBBL-600-10000/CHEEK, 0 mm - Channel 636666/Zoom Scan (4.0 x 4.0 x 1.4) :
Grid Extents [mm]: 32.0 x 32.0 x 28.0
Graded Grid: Yes / Ratio 1.5 - Distance Sensor to Surface 1.4 mm
Power Drift = 0.00 dB
SAR(10 g) = 0.299 W/kg



Additional information:
ambient temperature: 23.4°C; liquid temperature: 21.4°C;

Annex B.2: SAR results – limb

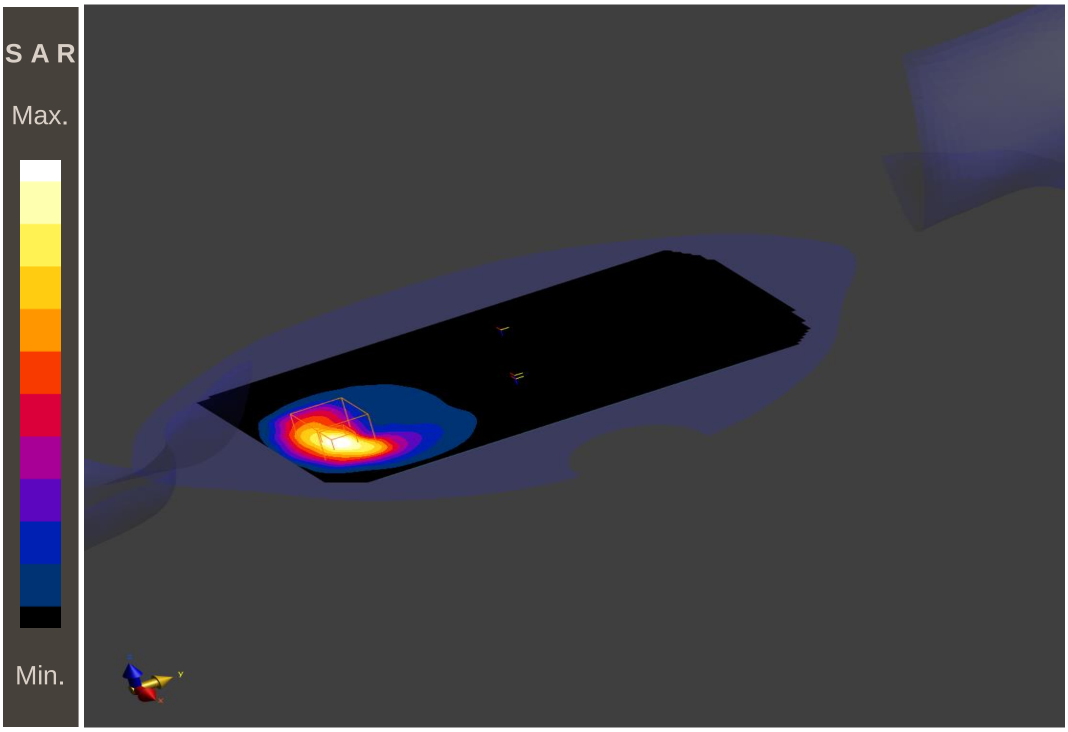
Date/Time: 2023-02-14, 10:04 2023-02-14, 10:17

EN62209-2-GSM900 2TS limb

DUT: SAMSUNG GALAXY A53 5G; Type: SM - A536B/DS; Serial: RZCT70HRCTN
Communication System: GPRS-FDD (TDMA, GMSK, TN 0-1); Communication System Band: E-GSM 900; Communication System Frequency: 914.8 MHz
Medium parameters used: f = 914.8 MHz, σ = 0.930 S/m; ε_r=42.3; ρ= 1000 kg/m3
Phantom Section: Flat
Measurement Standard: DASY 6
DASY Configuration:
- Probe: EX3DV4 - SN3944; ConvF(10.01, 10.01, 10.01); Calibrated: 2022-05-17
- Sensor-Surface: 1.4mm
- DAE: DAE3 Sn477; Calibrated: 2022-05-16
- Phantom: Twin-SAM V8.0 (30deg probe tilt); Serial: 2061;
- Software: cDASY6 (16.2.2.1588)

HBBL-600-10000/BACK, 0 mm - Channel 124/Area Scan (15.0 x 15.0 x 1.0) :
Grid Extents [mm]: 60.0 x 60.0
Maximum value of SAR (interpolated) - SAR(10 g) = 2.47 W/kg

HBBL-600-10000/BACK, 0 mm - Channel 124/Zoom Scan (3.75 x 3.75 x 1.5) :
Grid Extents [mm]: 30.0 x 30.0 x 30.0
Graded Grid: Yes / Ratio 1.5 - Distance Sensor to Surface 1.4 mm
Power Drift = -0.00 dB
SAR(10 g) = 2.21 W/kg
Additional Info for IEC 62209-2 AMD1:
TDist 3dB Peak [mm]: 5.5
M1/M2%: 72.7



Additional information:
position or distance of DUT to SAM: 0 mm
ambient temperature: 22.1°C; liquid temperature: 21.6°C;

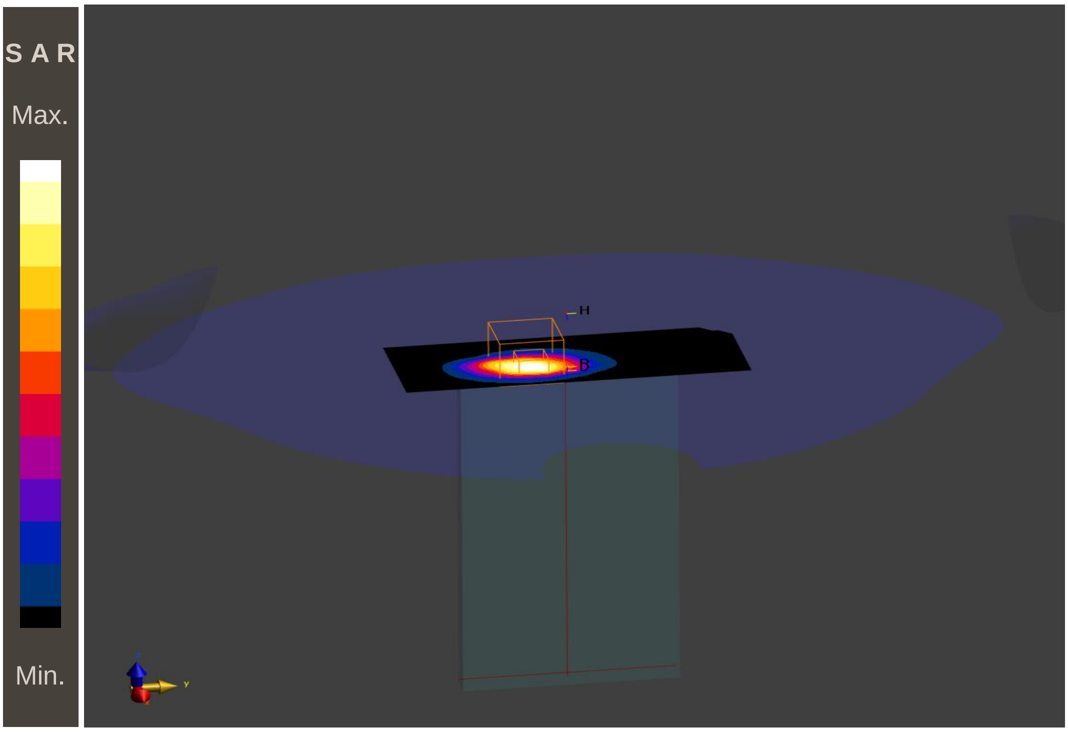
Date/Time: 2023-02-14, 14:46 2023-02-14, 14:57

EN62209-2-GSM1800 3TS limb

DUT: SAMSUNG GALAXY A53 5G; Type: SM - A536B/DS; Serial: RZCT70HRCTN
Communication System: GPRS-FDD (TDMA, GMSK, TN 0-1-2); Communication System Band: DCS 1800; Communication System Frequency: 1784.8 MHz
Medium parameters used: f = 1784.8 MHz, σ = 1.38 S/m; ε_r=40.7; ρ= 1000 kg/m3
Phantom Section: Flat
Measurement Standard: DASY 8
DASY Configuration:
- Probe: EX3DV4 - SN7566; ConvF(8.65, 8.65, 8.65); Calibrated: 2022-08-23
- Sensor-Surface: 1.4mm
- DAE: DAE4 Sn1387; Calibrated: 2022-08-17
- Phantom: Twin-SAM V8.0 (30deg probe tilt); Serial: 1977;
- Software: DASY8 Module SAR V16.2.2.1588

HBBL-600-10000/EDGE BOTTOM, 0 mm - Channel 885/Area Scan (8.0 x 15.0 x 1.0) :
Grid Extents [mm]: 48.0 x 60.0
Maximum value of SAR (interpolated) - SAR(10 g) = 1.90 W/kg

HBBL-600-10000/EDGE BOTTOM, 0 mm - Channel 885/Zoom Scan (3.75 x 3.75 x 1.5) :
Grid Extents [mm]: 30.0 x 30.0 x 30.0
Graded Grid: Yes / Ratio 1.5 - Distance Sensor to Surface 1.4 mm
Power Drift = -0.08 dB
SAR(10 g) = 1.80 W/kg
Additional Info for IEC 62209-2 AMD1:
TDist 3dB Peak [mm]: 4.8
M1/M2%: 70.0



Additional information:
position or distance of DUT to SAM: 0 mm
ambient temperature: 21.4°C; liquid temperature: 21.5°C;

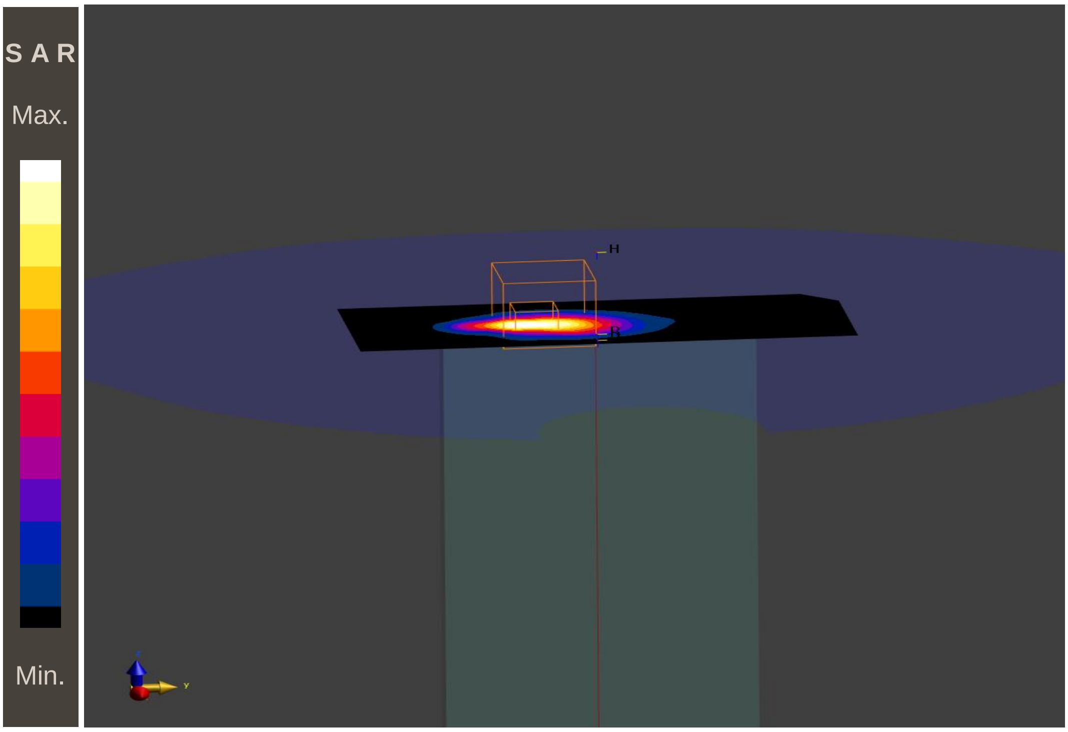
Date/Time: 2023-02-15, 10:04 2023-02-15, 10:15

EN62209-2-UMTS FDD I limb

DUT: SAMSUNG GALAXY A53 5G; Type: SM - A536B/DS; Serial: RZCT70HRCTN
Communication System: UMTS-FDD (WCDMA); Communication System Band: Band 1; Communication System Frequency: 1977.6 MHz
Medium parameters used: f = 1977.6 MHz, σ = 1.50 S/m; ε_r=40.4; ρ= 1000 kg/m3
Phantom Section: Flat
Measurement Standard: DASY 8
DASY Configuration:
- Probe: EX3DV4 - SN7566; ConvF(8.29, 8.29, 8.29); Calibrated: 2022-08-23
- Sensor-Surface: 1.4mm
- DAE: DAE4 Sn1387; Calibrated: 2022-08-17
- Phantom: Twin-SAM V8.0 (30deg probe tilt); Serial: 1977;
- Software: DASY8 Module SAR V16.2.2.1588

HBBL-600-10000/EDGE BOTTOM, 0 mm - Channel 9888/Area Scan (8.0 x 15.0 x 1.0) :
Grid Extents [mm]: 32.0 x 60.0
Maximum value of SAR (interpolated) - SAR(10 g) = 2.70 W/kg

HBBL-600-10000/EDGE BOTTOM, 0 mm - Channel 9888/Zoom Scan (3.75 x 3.75 x 1.5) :
Grid Extents [mm]: 30.0 x 30.0 x 30.0
Graded Grid: Yes / Ratio 1.5 - Distance Sensor to Surface 1.4 mm
Power Drift = 0.00 dB
SAR(10 g) = 2.58 W/kg
Additional Info for IEC 62209-2 AMD1:
TDist 3dB Peak [mm]: 5.1
M1/M2%: 70.4



Additional information:
position or distance of DUT to SAM: 0 mm
ambient temperature: 22.4°C; liquid temperature: 21.3°C;

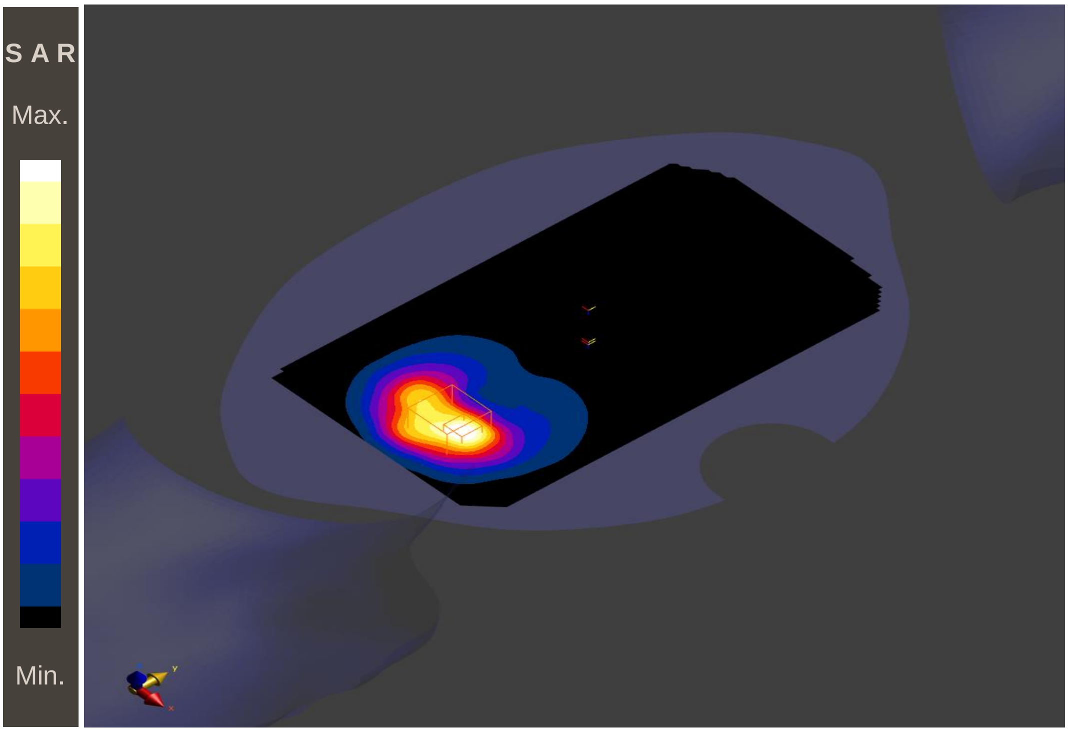
Date/Time: 2023-02-16, 21:26 Unknown

EN62209-2-UMTS FDD VIII limb

DUT: SAMSUNG GALAXY A53 5G; Type: SM - A536B/DS; Serial: RZCT70HRCTN
Communication System: UMTS-FDD (WCDMA); Communication System Band: Band 8; Communication System Frequency: 897.6 MHz
Medium parameters used: f = 897.6 MHz, σ = 0.919 S/m; ε_r=41.7; ρ= 1000 kg/m3
Phantom Section: Flat
Measurement Standard: DASY 6
DASY Configuration:
- Probe: EX3DV4 - SN3944; ConvF(10.01, 10.01, 10.01); Calibrated: 2022-05-17
- Sensor-Surface: 1.4mm
- DAE: DAE3 Sn477; Calibrated: 2022-05-16
- Phantom: Twin-SAM V8.0 (30deg probe tilt); Serial: 2061;
- Software: cDASY6 (16.2.2.1588)

HBBL-600-10000/FRONT, 0 mm - Channel 2788/Area Scan (15.0 x 15.0 x 1.0) :
Grid Extents [mm]: 60.0 x 60.0
Maximum value of SAR (interpolated) - SAR(10 g) = 1.55 W/kg

HBBL-600-10000/FRONT, 0 mm - Channel 2788/Zoom Scan (3.75 x 3.75 x 1.5) :
Grid Extents [mm]: 30.0 x 30.0 x 30.0
Graded Grid: Yes / Ratio 1.5 - Distance Sensor to Surface 1.4 mm
Power Drift = -0.02 dB
SAR(10 g) = 1.41 W/kg
Additional Info for IEC 62209-2 AMD1:
TDist 3dB Peak [mm]: 3.8
M1/M2%: 57.7



Additional information:
position or distance of DUT to SAM: 0 mm
ambient temperature: 23.4°C; liquid temperature: 21.9°C;

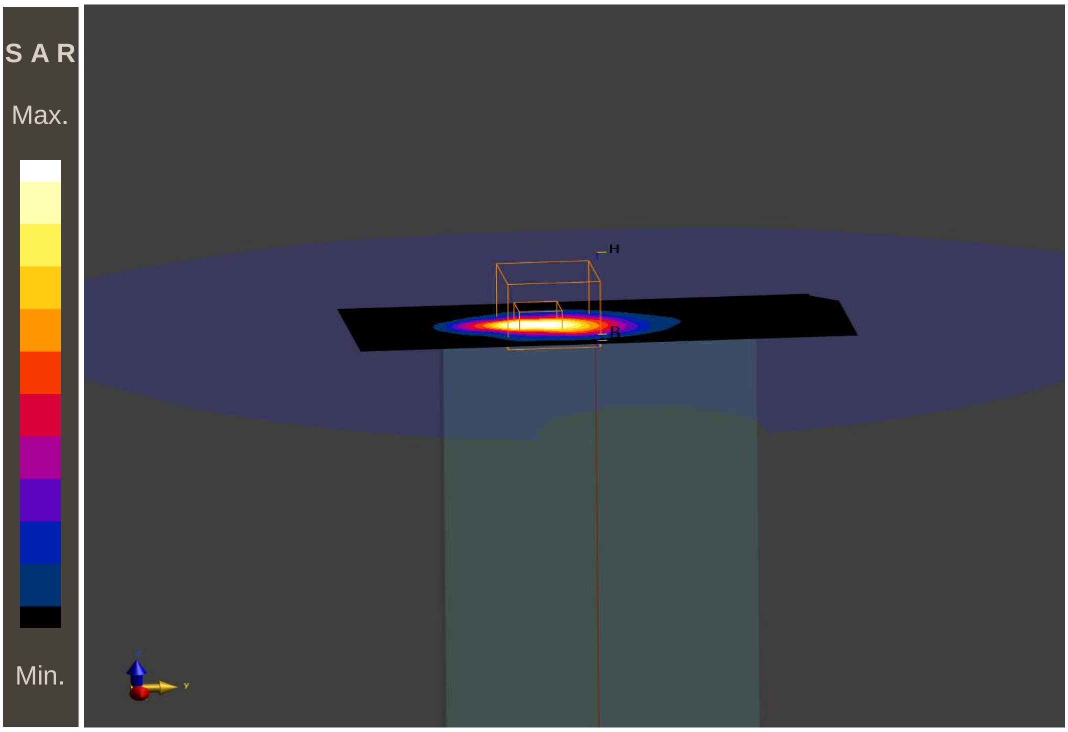
Date/Time: 2023-02-15, 11:12 2023-02-15, 11:23

EN62209-2-LTE FDD 1 limb

DUT: SAMSUNG GALAXY A53 5G; Type: SM - A536B/DS; Serial: RZCT70HRCTN
Communication System: LTE-FDD (SC-FDMA, 100% RB, 20 MHz, QPSK); Communication System Band: Band 1; Communication System Frequency: 1970.0 MHz
Medium parameters used: f = 1970.0 MHz, σ = 1.50 S/m; ε_r=40.4; ρ= 1000 kg/m3
Phantom Section: Flat
Measurement Standard: DASY 8
DASY Configuration:
- Probe: EX3DV4 - SN7566; ConvF(8.29, 8.29, 8.29); Calibrated: 2022-08-23
- Sensor-Surface: 1.4mm
- DAE: DAE4 Sn1387; Calibrated: 2022-08-17
- Phantom: Twin-SAM V8.0 (30deg probe tilt); Serial: 1977;
- Software: DASY8 Module SAR V16.2.2.1588

HBBL-600-10000/EDGE BOTTOM, 0 mm - Channel 18500/Area Scan (8.0 x 15.0 x 1.0) :
Grid Extents [mm]: 32.0 x 60.0
Maximum value of SAR (interpolated) - SAR(10 g) = 2.60 W/kg

HBBL-600-10000/EDGE BOTTOM, 0 mm - Channel 18500/Zoom Scan (3.75 x 3.75 x 1.5) :
Grid Extents [mm]: 30.0 x 30.0 x 30.0
Graded Grid: Yes / Ratio 1.5 - Distance Sensor to Surface 1.4 mm
Power Drift = 0.03 dB
SAR(10 g) = 2.45 W/kg
Additional Info for IEC 62209-2 AMD1:
TDist 3dB Peak [mm]: 5.5
M1/M2%: 71.1



Additional information:
position or distance of DUT to SAM: 0 mm
ambient temperature: 22.4°C; liquid temperature: 21.3°C;

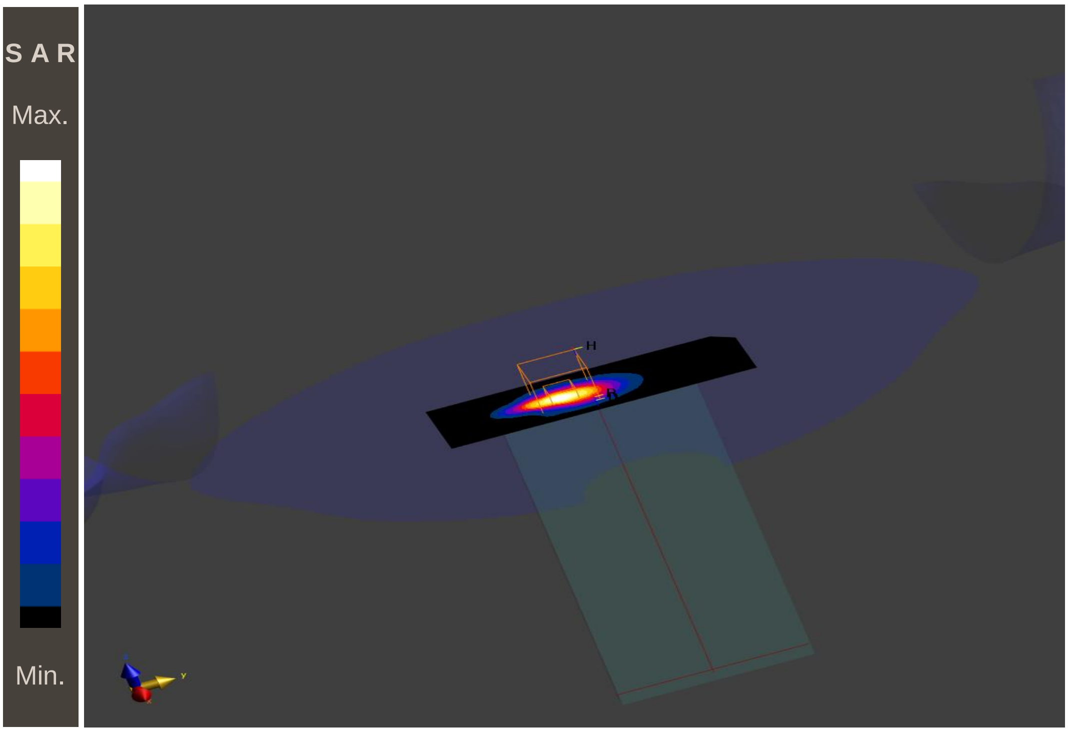
Date/Time: 2023-02-14, 17:33 2023-02-14, 17:45

EN62209-2-LTE FDD 3 limb

DUT: SAMSUNG GALAXY A53 5G; Type: SM - A536B/DS; Serial: RZCT70HRCTN
Communication System: LTE-FDD (SC-FDMA, 50% RB, 20 MHz, QPSK) RBPosition:High AntennaCfg:SISO; Communication System Band: Band 3; Communication System Frequency: 1775.0 MHz
Medium parameters used: f = 1775.0 MHz, σ = 1.38 S/m; ε_r=40.7; ρ= 1000 kg/m3
Phantom Section: Flat
Measurement Standard: DASY 8
DASY Configuration:
- Probe: EX3DV4 - SN7566; ConvF(8.65, 8.65, 8.65); Calibrated: 2022-08-23
- Sensor-Surface: 1.4mm
- DAE: DAE4 Sn1387; Calibrated: 2022-08-17
- Phantom: Twin-SAM V8.0 (30deg probe tilt); Serial: 1977;
- Software: DASY8 Module SAR V16.2.2.1588

HBBL-600-10000/EDGE BOTTOM, 0 mm - Channel 19850/Area Scan (8.0 x 15.0 x 1.0) :
Grid Extents [mm]: 32.0 x 60.0
Maximum value of SAR (interpolated) - SAR(10 g) = 2.84 W/kg

HBBL-600-10000/EDGE BOTTOM, 0 mm - Channel 19850/Zoom Scan (3.75 x 3.75 x 1.5) :
Grid Extents [mm]: 30.0 x 30.0 x 30.0
Graded Grid: Yes / Ratio 1.5 - Distance Sensor to Surface 1.4 mm
Power Drift = 0.00 dB
SAR(10 g) = 2.60 W/kg
Additional Info for IEC 62209-2 AMD1:
TDist 3dB Peak [mm]: 5.4
M1/M2%: 69.1



Additional information:
position or distance of DUT to SAM: 0 mm
ambient temperature: 22.4°C; liquid temperature: 21.5°C;

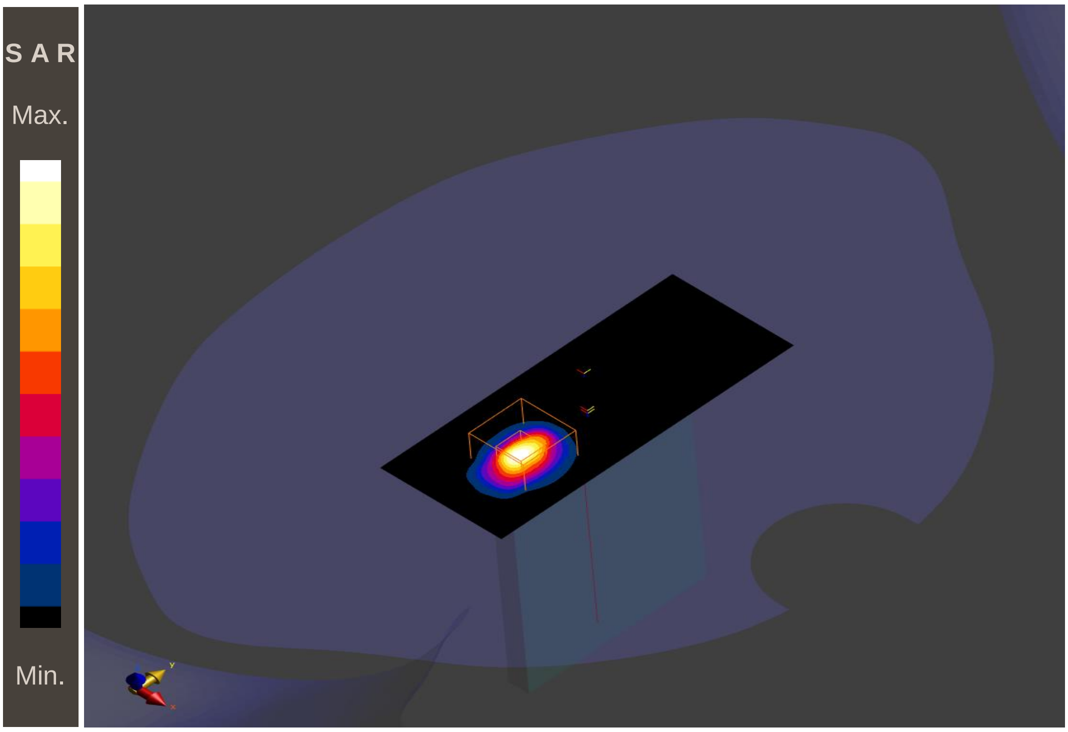
Date/Time: 2023-02-17, 10:05 2023-02-17, 10:15

EN62209-2-LTE FDD 7 limb

DUT: SAMSUNG GALAXY A53 5G; Type: SM - A536B/DS; Serial: RZCT70HRCTN
Communication System: LTE-FDD (SC-FDMA, 1 RB, 20 MHz, QPSK) RBPosition:High AntennaCfg:SISO;
Communication System Band: Band 7; Communication System Frequency: 2510.0 MHz
Medium parameters used: f = 2510.0 MHz, σ = 1.81 S/m; ε_r=38.6; ρ= 1000 kg/m3
Phantom Section: Flat
Measurement Standard: DASY 8
DASY Configuration:
- Probe: EX3DV4 - SN7566; ConvF(7.54, 7.54, 7.54); Calibrated: 2022-08-23
- Sensor-Surface: 1.4mm
- DAE: DAE4 Sn1387; Calibrated: 2022-08-17
- Phantom: Twin-SAM V8.0 (30deg probe tilt); Serial: 1977;
- Software: DASY8 Module SAR V16.2.2.1588

HBBL-600-10000/EDGE TOP, 0 mm - Channel 20850/Area Scan (8.0 x 10.0 x 1.0) :
Grid Extents [mm]: 48.0 x 120.0
Maximum value of SAR (interpolated) - SAR(10 g) = 2.07 W/kg

HBBL-600-10000/EDGE TOP, 0 mm - Channel 20850/Zoom Scan (3.75 x 3.75 x 1.5) :
Grid Extents [mm]: 30.0 x 30.0 x 30.0
Graded Grid: Yes / Ratio 1.5 - Distance Sensor to Surface 1.4 mm
Power Drift = 0.01 dB
SAR(10 g) = 2.00 W/kg
Additional Info for IEC 62209-2 AMD1:
TDist 3dB Peak [mm]: 4.5
M1/M2%: 68.8



Additional information:
position or distance of DUT to SAM: 0 mm
ambient temperature: 22.4°C; liquid temperature: 21.5°C;

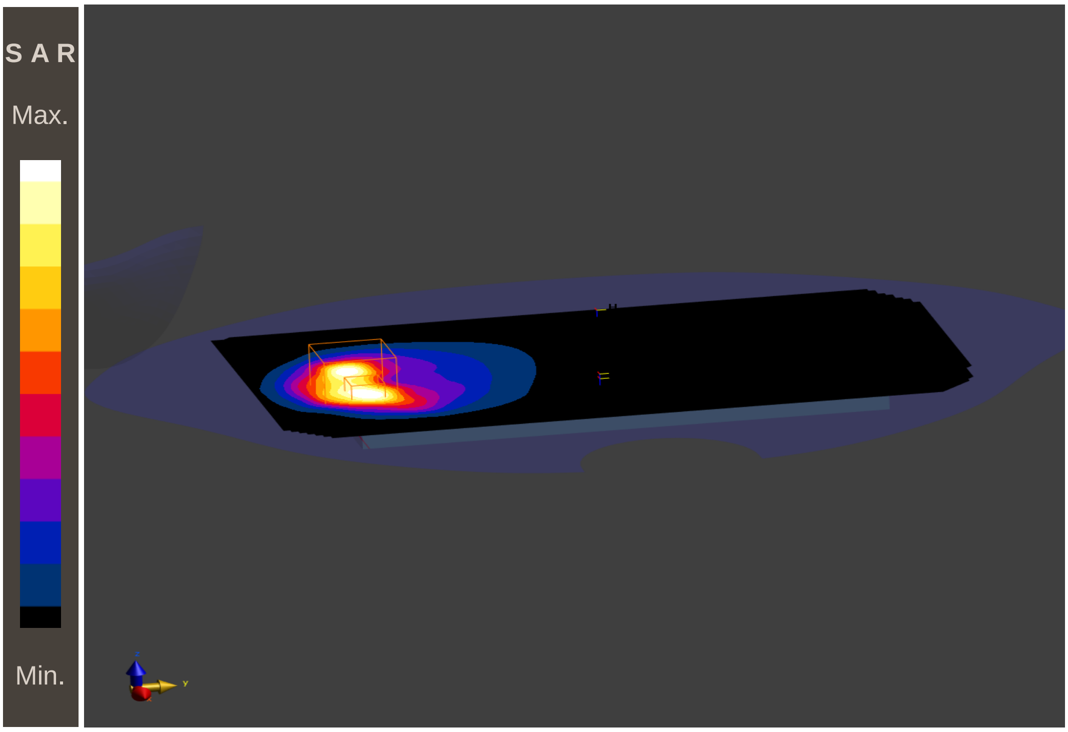
Date/Time: 2023-02-13, 14:43 2023-02-13, 14:51

EN62209-2-LTE FDD 8 limb

DUT: SAMSUNG GALAXY A53 5G; Type: SM - A536B/DS; Serial: RZCT70HRCTN
Communication System: LTE-FDD (SC-FDMA, 1 RB, 10 MHz, QPSK) RBPosition:Low AntennaCfg:SISO;
Communication System Band: Band 8; Communication System Frequency: 885.0 MHz
Medium parameters used: f = 885.0 MHz, σ = 0.919 S/m; ε_r=42.3; ρ= 1000 kg/m3
Phantom Section: Flat
Measurement Standard: DASY 6
DASY Configuration:
- Probe: EX3DV4 - SN3944; ConvF(10.01, 10.01, 10.01); Calibrated: 2022-05-17
- Sensor-Surface: 1.4mm
- DAE: DAE3 Sn477; Calibrated: 2022-05-16
- Phantom: Twin-SAM V8.0 (30deg probe tilt); Serial: 2061;
- Software: cDASY6 (16.2.2.1588)

HBBL-600-10000/BACK, 0 mm - Channel 21500/Area Scan (15.0 x 15.0 x 1.0) :
Grid Extents [mm]: 60.0 x 60.0
Maximum value of SAR (interpolated) - SAR(10 g) = 1.86 W/kg

HBBL-600-10000/BACK, 0 mm - Channel 21500/Zoom Scan (5.0 x 5.0 x 1.5) :
Grid Extents [mm]: 30.0 x 30.0 x 30.0
Graded Grid: Yes / Ratio 1.5 - Distance Sensor to Surface 1.4 mm
Power Drift = -0.03 dB
SAR(10 g) = 1.50 W/kg
Additional Info for IEC 62209-2 AMD1:
TDist 3dB Peak [mm]: 5.4
M1/M2%: 67.7



Additional information:
position or distance of DUT to SAM: 0 mm
ambient temperature: 22.4°C; liquid temperature: 21.5°C;

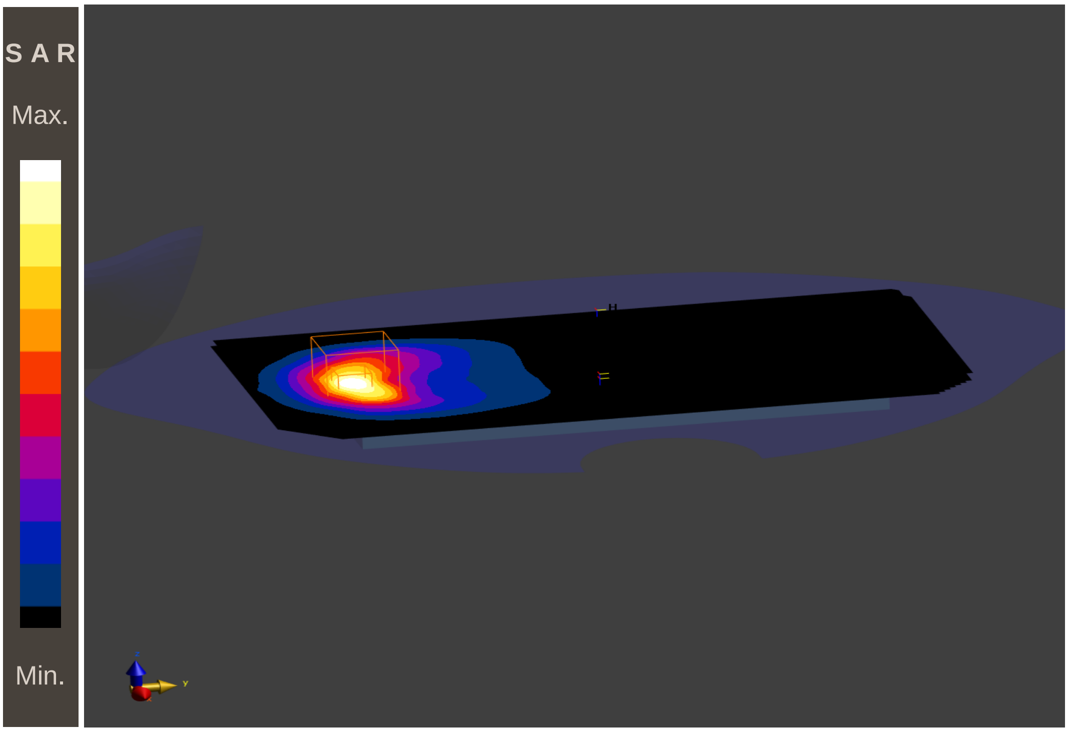
Date/Time: 2023-02-13, 13:19 2023-02-13, 13:31

EN62209-2-LTE FDD 20 limb

DUT: SAMSUNG GALAXY A53 5G; Type: SM - A536B/DS; Serial: RZCT70HRCTN
Communication System: LTE-FDD (SC-FDMA, 1 RB, 20 MHz, QPSK) RBPosition:Mid AntennaCfg:SISO;
Communication System Band: Band 20; Communication System Frequency: 842.0 MHz
Medium parameters used: f = 842.0 MHz, σ = 0.904 S/m; ε_r=42.4; ρ= 1000 kg/m3
Phantom Section: Flat
Measurement Standard: DASY 6
DASY Configuration:
- Probe: EX3DV4 - SN3944; ConvF(10.17, 10.17, 10.17); Calibrated: 2022-05-17
- Sensor-Surface: 1.4mm
- DAE: DAE3 Sn477; Calibrated: 2022-05-16
- Phantom: Twin-SAM V8.0 (30deg probe tilt); Serial: 2061;
- Software: cDASY6 (16.2.2.1588)

HBBL-600-10000/FRONT, 0 mm - Channel 24250/Area Scan (15.0 x 15.0 x 1.0) :
Grid Extents [mm]: 60.0 x 60.0
Maximum value of SAR (interpolated) - SAR(10 g) = 1.88 W/kg

HBBL-600-10000/FRONT, 0 mm - Channel 24250/Zoom Scan (3.75 x 3.75 x 1.5) :
Grid Extents [mm]: 30.0 x 30.0 x 30.0
Graded Grid: Yes / Ratio 1.5 - Distance Sensor to Surface 1.4 mm
Power Drift = 0.00 dB
SAR(10 g) = 1.44 W/kg
Additional Info for IEC 62209-2 AMD1:
TDist 3dB Peak [mm]: 5.1
M1/M2%: 59.0



Additional information:
position or distance of DUT to SAM: 0 mm
ambient temperature: 23.2°C; liquid temperature: 21.5°C;

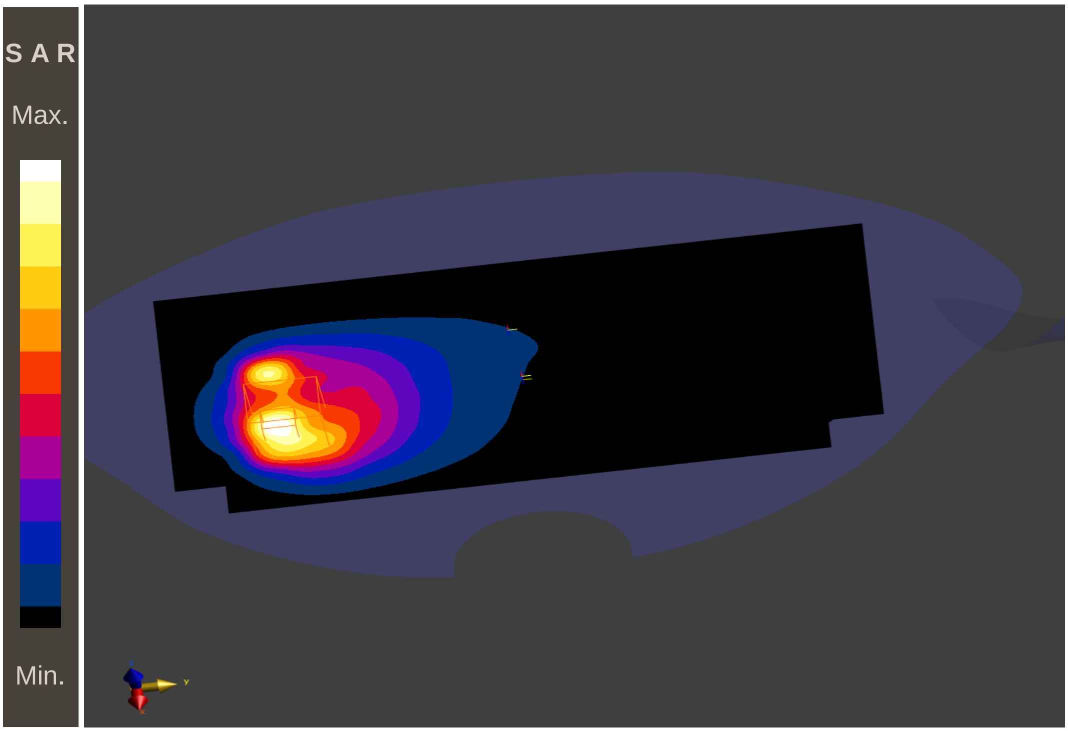
Date/Time: 2023-02-17, 14:43 2023-02-17, 15:03

EN62209-2-LTE FDD 28 limb

DUT: SAMSUNG GALAXY A53 5G; Type: SM - A536B/DS; Serial: RZCT70HRCTN
Communication System: LTE-FDD (SC-FDMA, 1 RB, 20 MHz, QPSK) RBPosition:Low AntennaCfg:SISO;
Communication System Band: Band 28; Communication System Frequency: 713.0 MHz
Medium parameters used: f = 713.0 MHz, σ = 0.857 S/m; ε_r=42.2; ρ= 1000 kg/m3
Phantom Section: Flat
Measurement Standard: DASY 6
DASY Configuration:
- Probe: EX3DV4 - SN3944; ConvF(10.53, 10.53, 10.53); Calibrated: 2022-05-17
- Sensor-Surface: 1.4mm
- DAE: DAE3 Sn477; Calibrated: 2022-05-16
- Phantom: Twin-SAM V8.0 (30deg probe tilt); Serial: 2061;
- Software: cDASY6 (16.2.2.1588)

HBBL-600-10000/BACK, 0 mm - Channel 27310/Area Scan (15.0 x 15.0 x 1.0) :
Grid Extents [mm]: 120.0 x 210.0
Maximum value of SAR (interpolated) - SAR(10 g) = 1.06 W/kg

HBBL-600-10000/BACK, 0 mm - Channel 27310/Zoom Scan (3.75 x 3.75 x 1.5) :
Grid Extents [mm]: 30.0 x 30.0 x 30.0
Graded Grid: Yes / Ratio 1.5 - Distance Sensor to Surface 1.4 mm
Power Drift = -0.00 dB
SAR(10 g) = 0.895 W/kg
Additional Info for IEC 62209-2 AMD1:
TDist 3dB Peak [mm]: 6.0
M1/M2%: 68.5



Additional information:
position or distance of DUT to SAM: 0 mm
ambient temperature: 22.4°C; liquid temperature: 22.0°C;

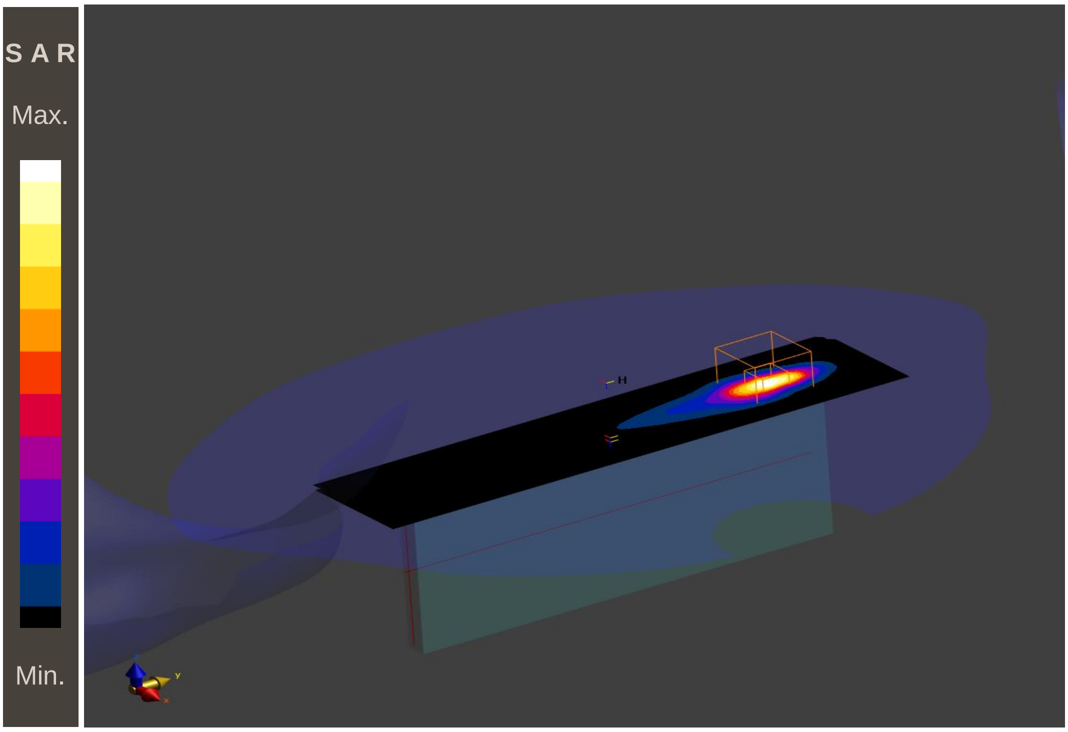
Date/Time: 2023-02-09, 22:40 2023-02-09, 22:58

EN62209-2-5G N78 TDD NSA limb

DUT: SAMSUNG GALAXY A53 5G; Type: SM - A536B/DS; Serial: RZCT70HRCTN
Communication System: 5G NR (DFT-s-OFDM, 1@1 RB allocation, 80 MHz, Pi/2 BPSK, SCS 30kHz);
Communication System Band: Band n78; Communication System Frequency: 3530.0 MHz
Medium parameters used: f = 3530.0 MHz, σ = 2.71 S/m; ε_r=39.1; ρ= 1000 kg/m3
Phantom Section: Flat
Measurement Standard: DASY 6
DASY Configuration:
- Probe: EX3DV4 - SN3944; ConvF(6.96, 6.96, 6.96); Calibrated: 2022-05-17
- Sensor-Surface: 1.4mm
- DAE: DAE3 Sn477; Calibrated: 2022-05-16
- Phantom: Twin-SAM V8.0 (30deg probe tilt); Serial: 2061;
- Software: cDASY6 (16.2.2.1588)

HBBL-600-10000/EDGE LEFT, 0 mm - Channel 635334/Area Scan (8.0 x 10.0 x 1.0) :
Grid Extents [mm]: 32.0 x 60.0
Maximum value of SAR (interpolated) - SAR(10 g) = 1.04 W/kg

HBBL-600-10000/EDGE LEFT, 0 mm - Channel 635334/Zoom Scan (3.5 x 3.5 x 1.4) :
Grid Extents [mm]: 28.0 x 28.0 x 28.0
Graded Grid: Yes / Ratio 1.5 - Distance Sensor to Surface 1.4 mm
Power Drift = -0.00 dB
SAR(10 g) = 1.02 W/kg
Additional Info for IEC 62209-2 AMD1:
TDist 3dB Peak [mm]: 4.3
M1/M2%: 69.7



Additional information:
position or distance of DUT to SAM: 0 mm
ambient temperature: 23.2°C; liquid temperature: 21.4°C;

Annex C: Photo documentation

Photo 1: Measurement System DASY

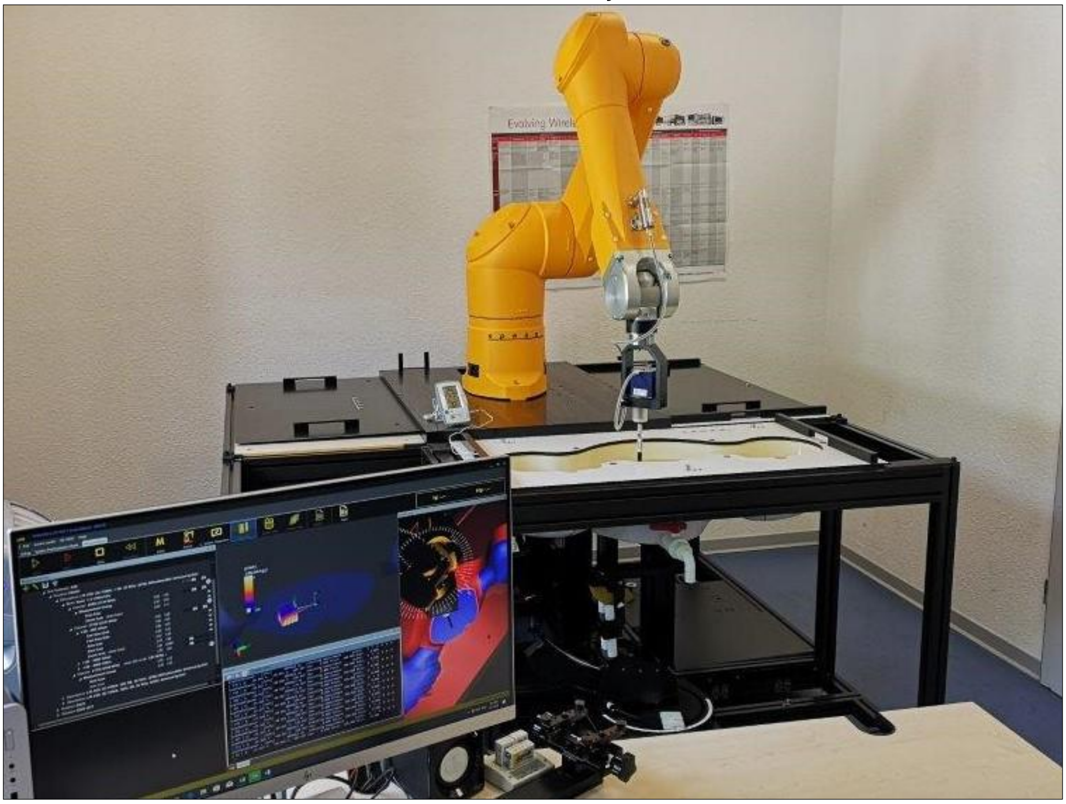


Photo 2: DUT - front view

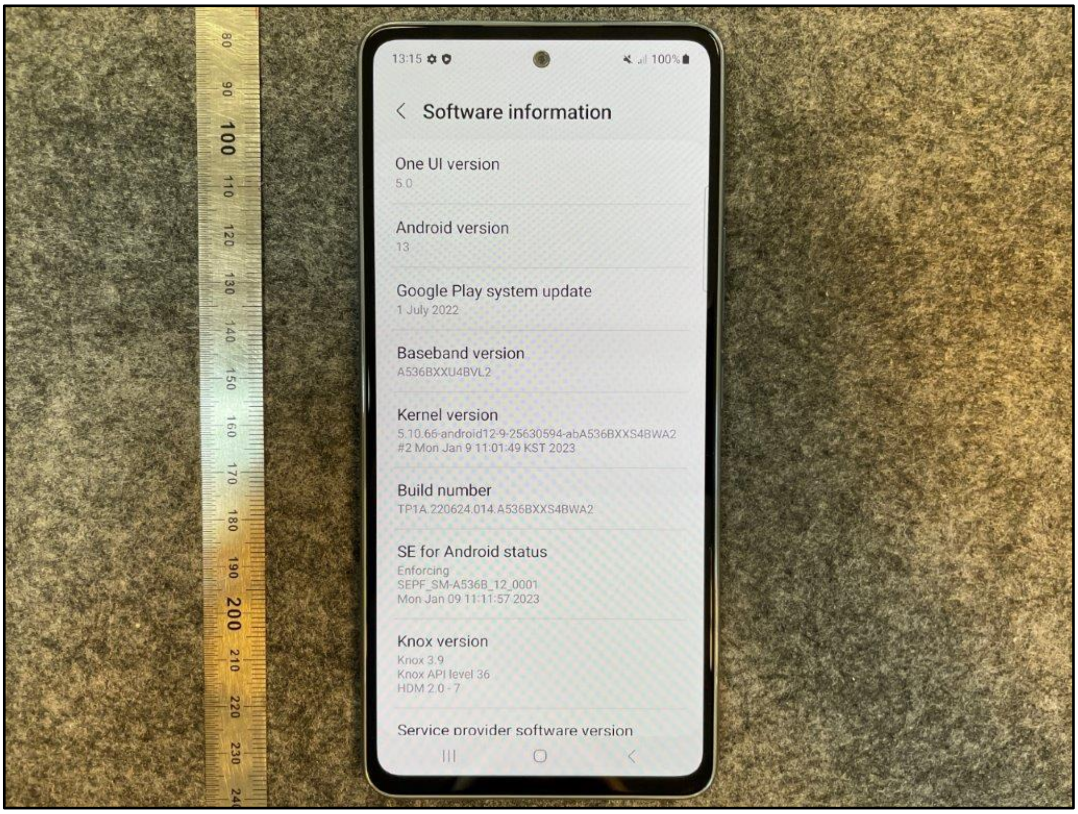


Photo 3: DUT - back view

Photo 4: DUT – side view

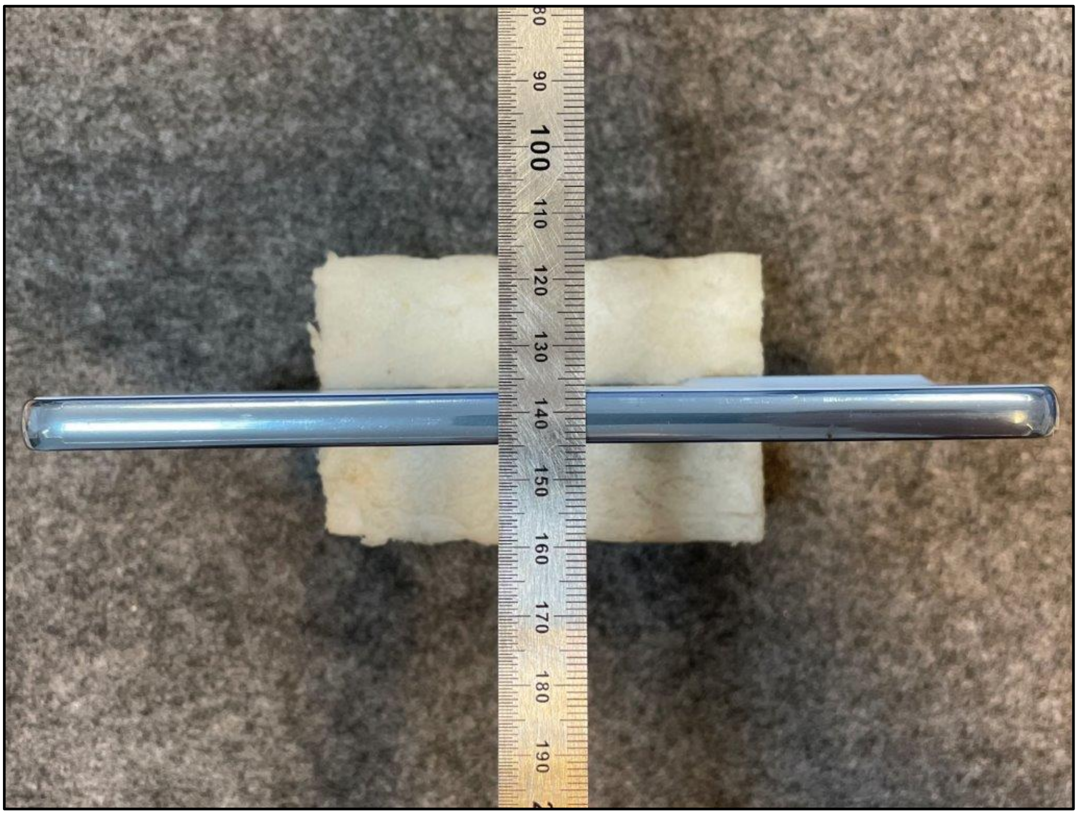


Photo 5: DUT - label

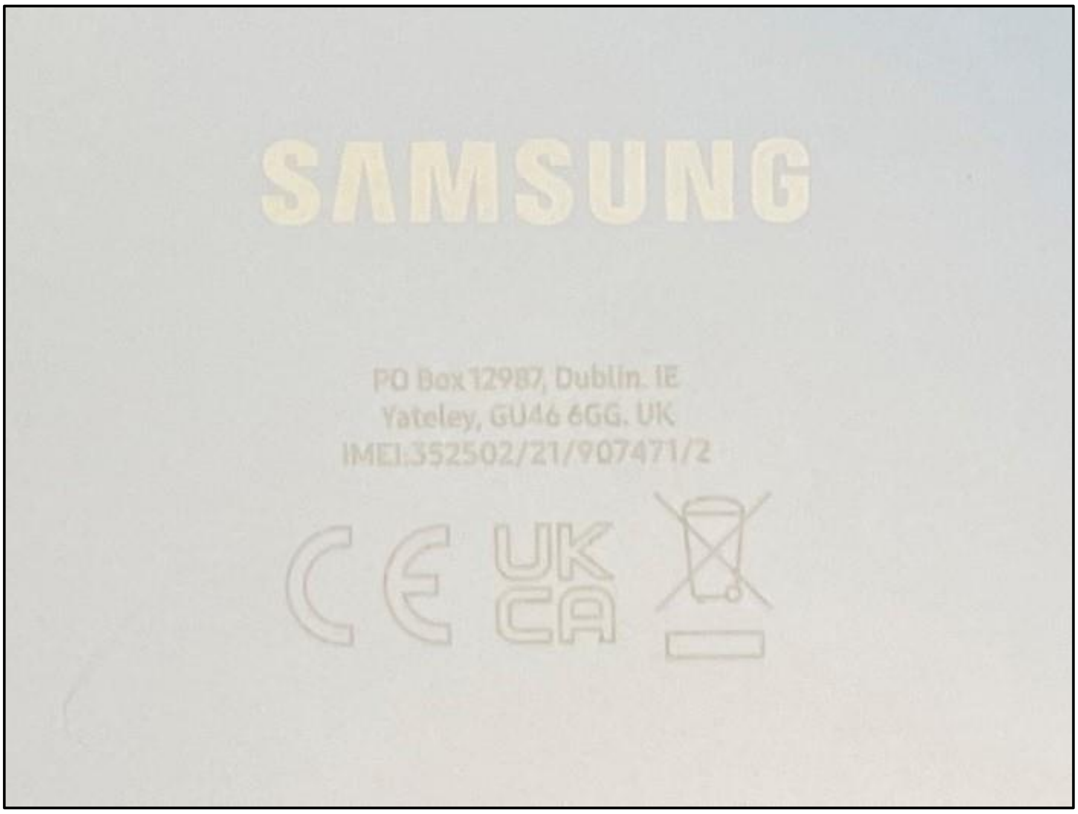


Photo 6: Packaging - label

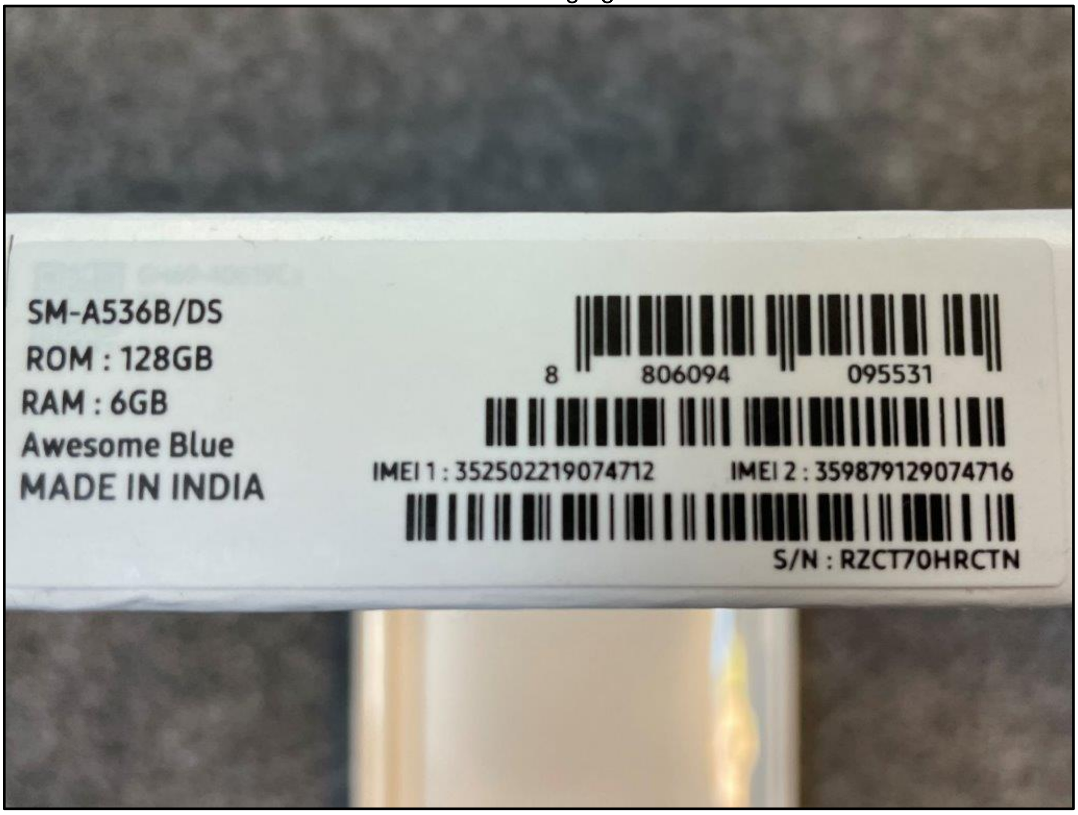


Photo 7: Test position left cheek

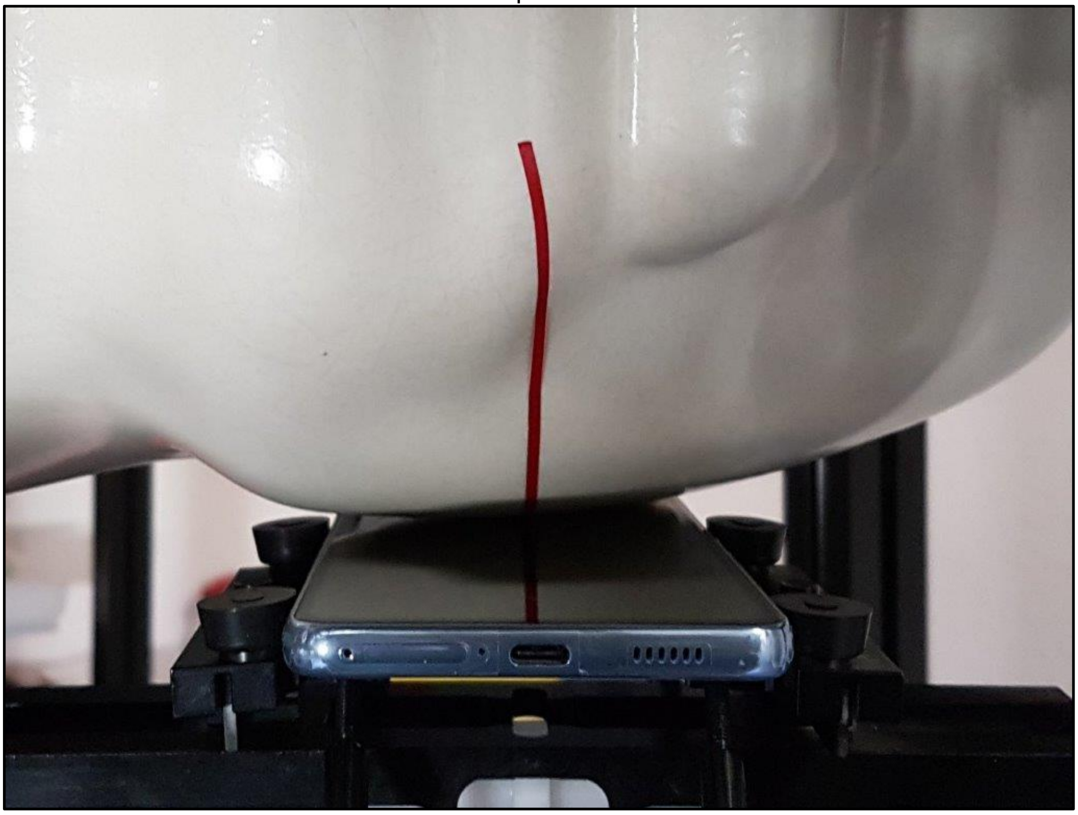


Photo 8: Test position left cheek

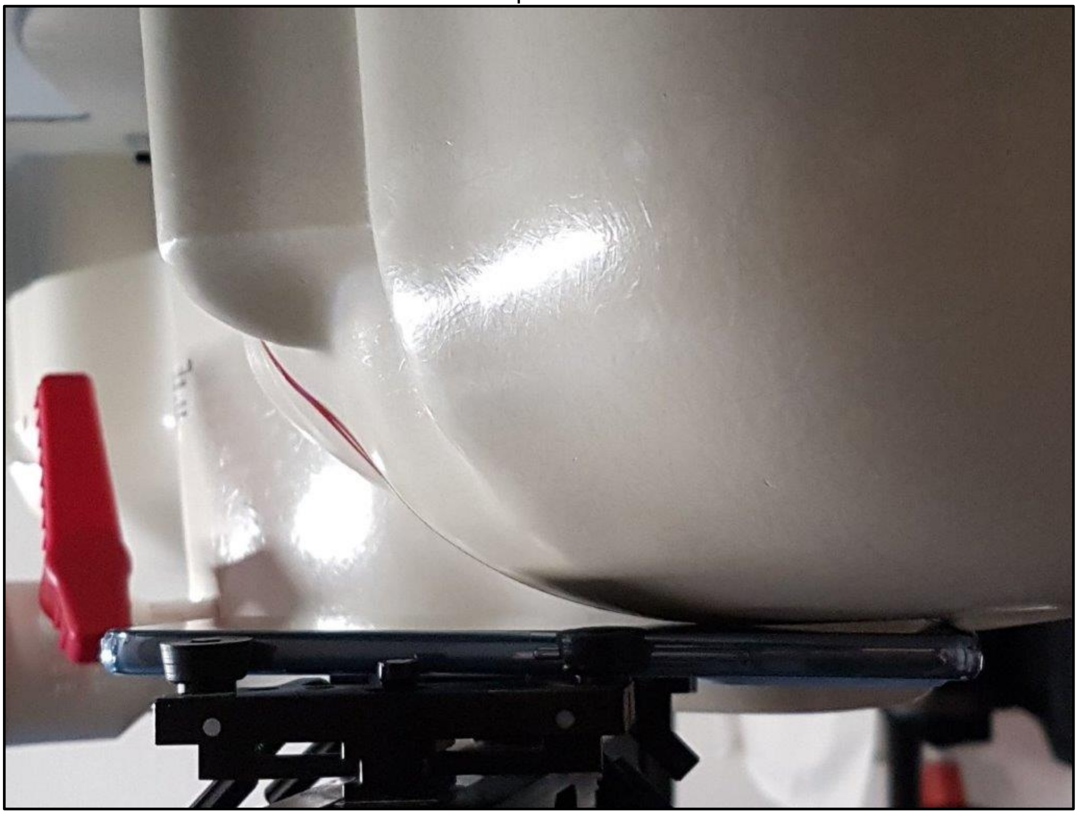


Photo 9: Test position left cheek

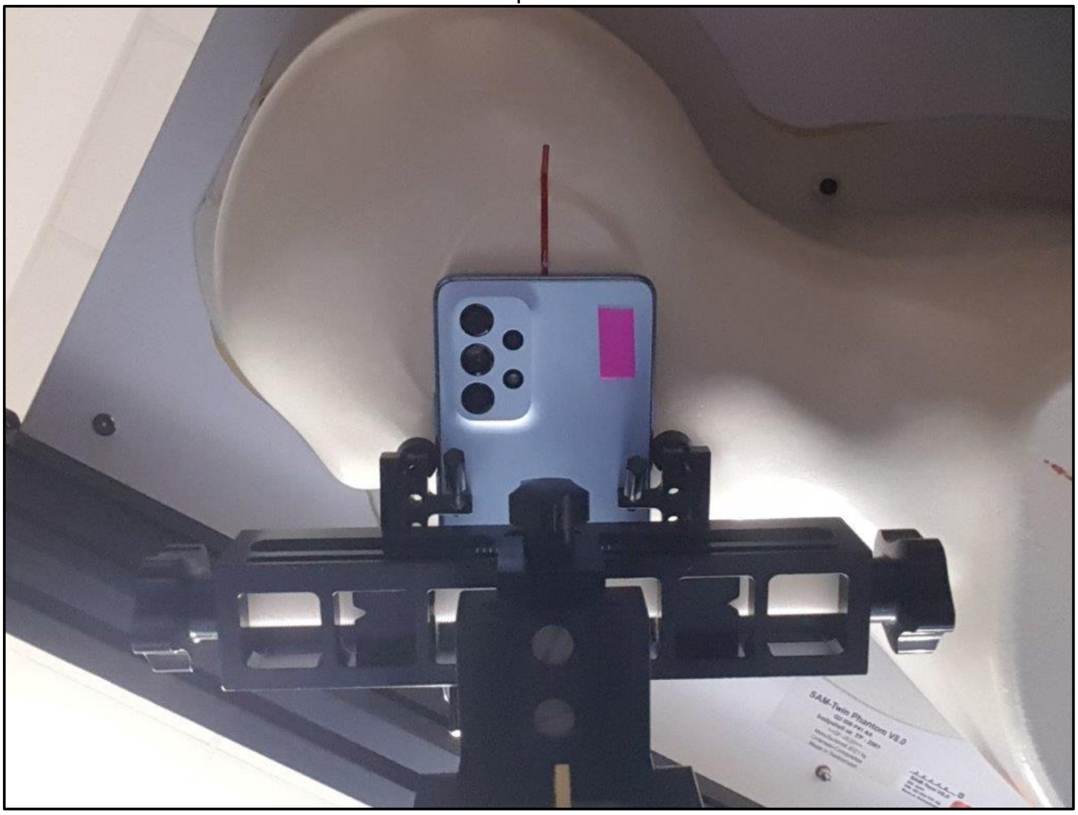


Photo 10: Test position left tilted 15°

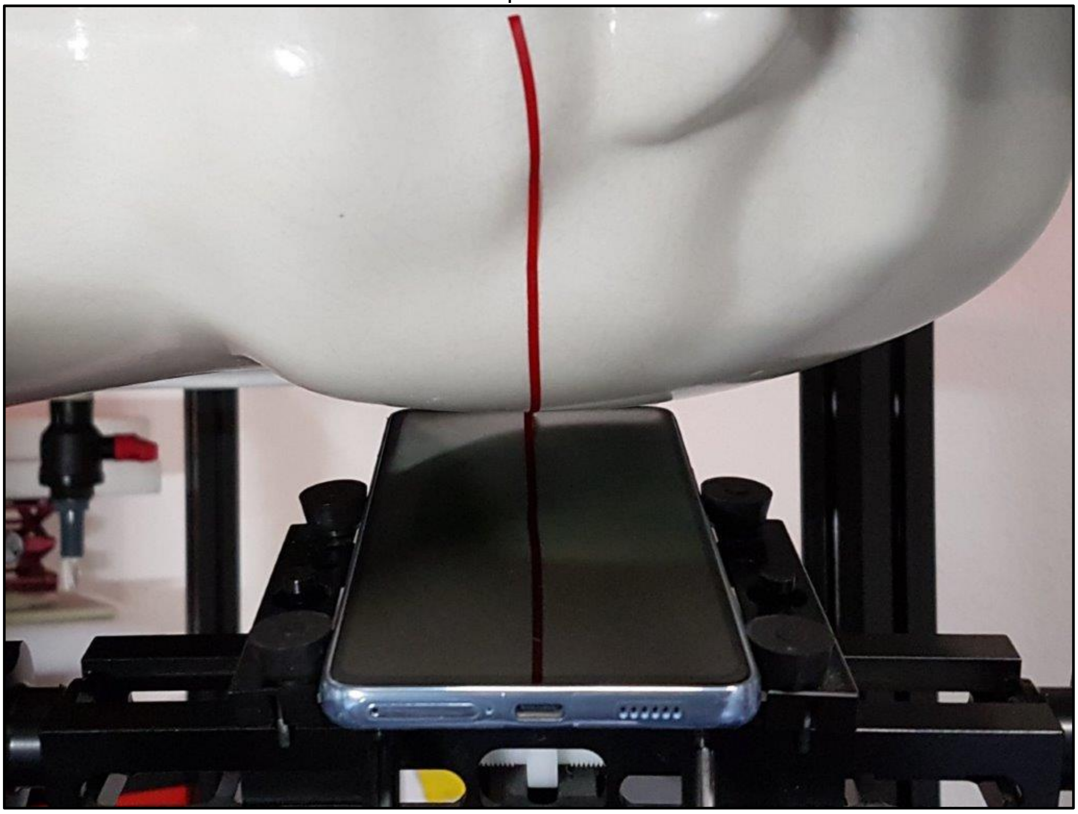


Photo 11: Test position left tilted 15°

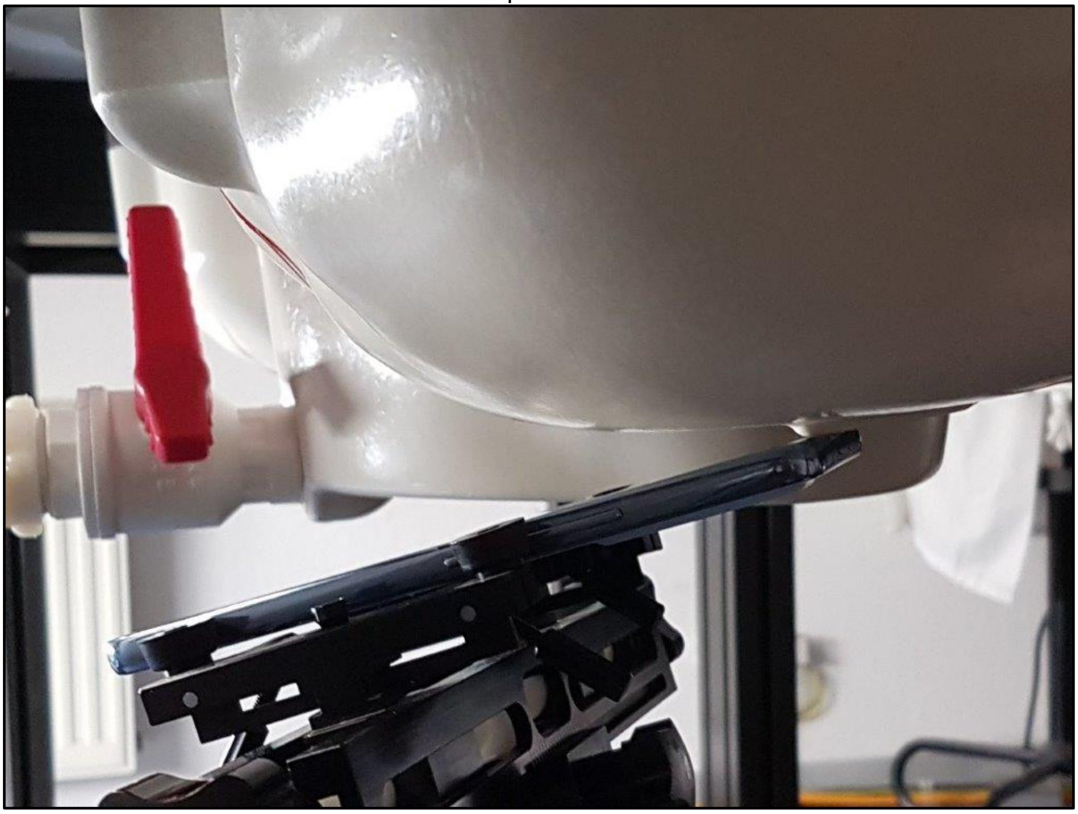


Photo 12: Test position right cheek

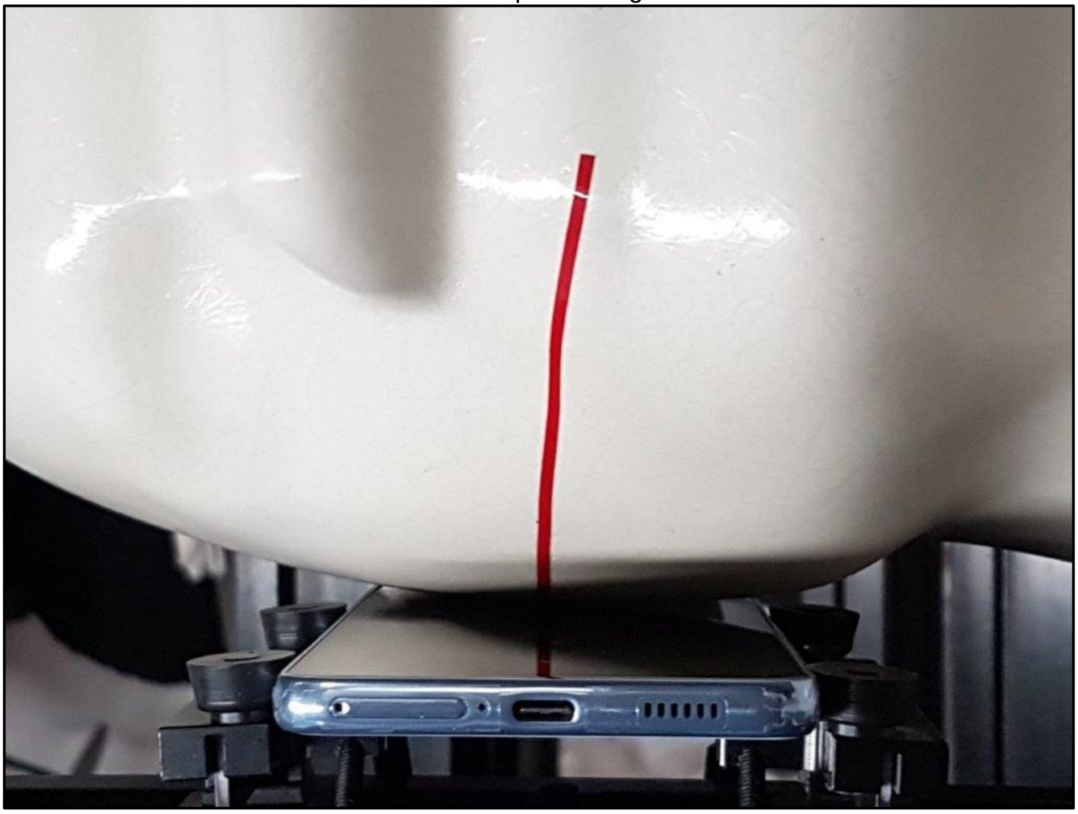


Photo 13: Test position right cheek

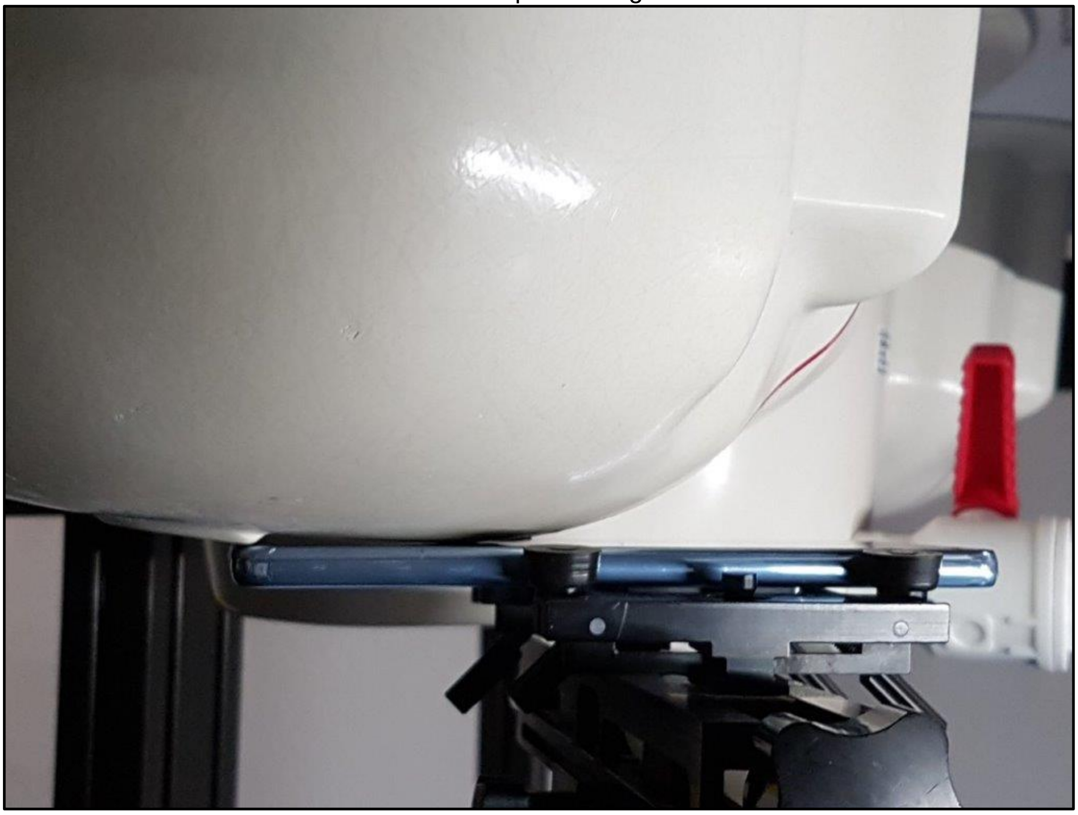


Photo 14: Test position right cheek

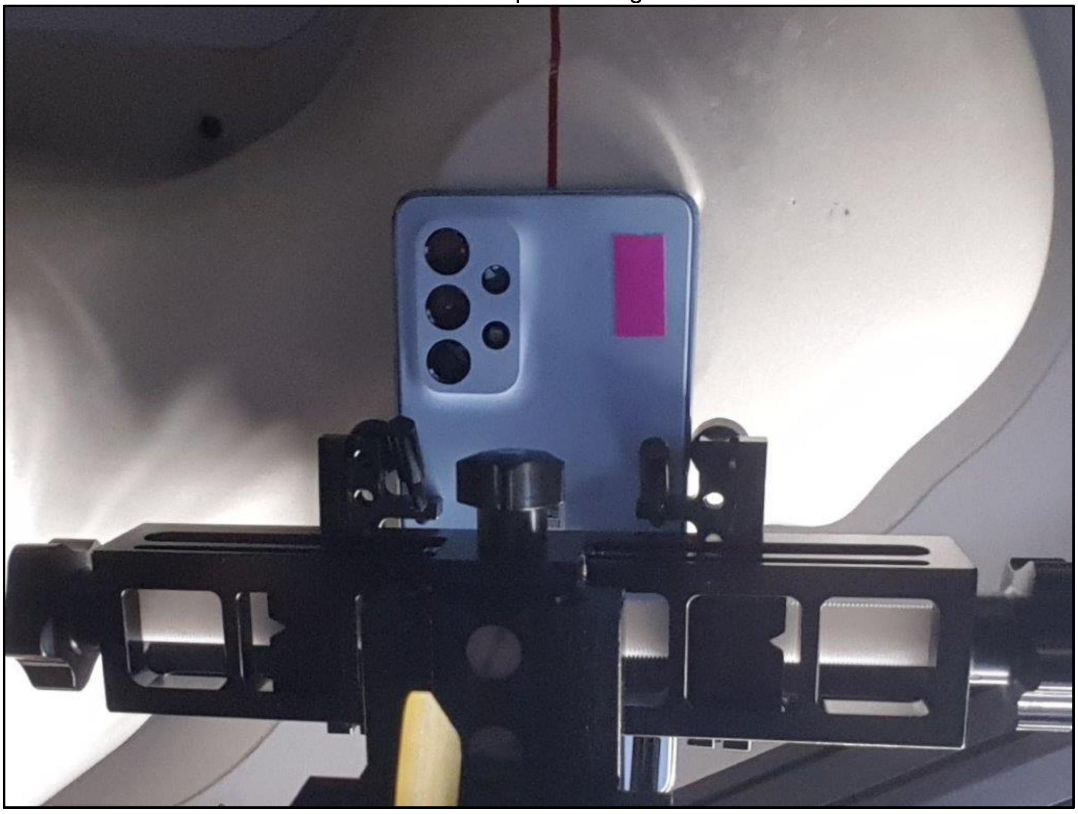


Photo 15: Test position right tilted 15°

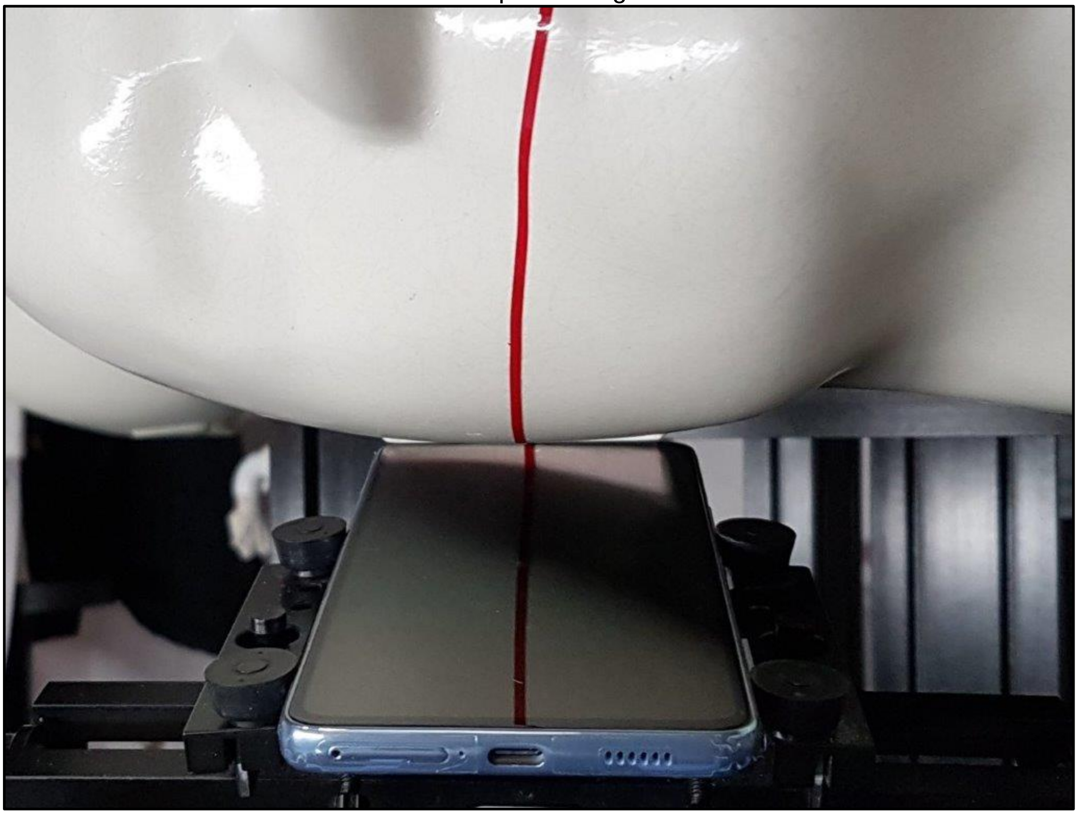


Photo 16: Test position right tilted 15°

Photo 17: Test position body worn back side with 0 mm distance

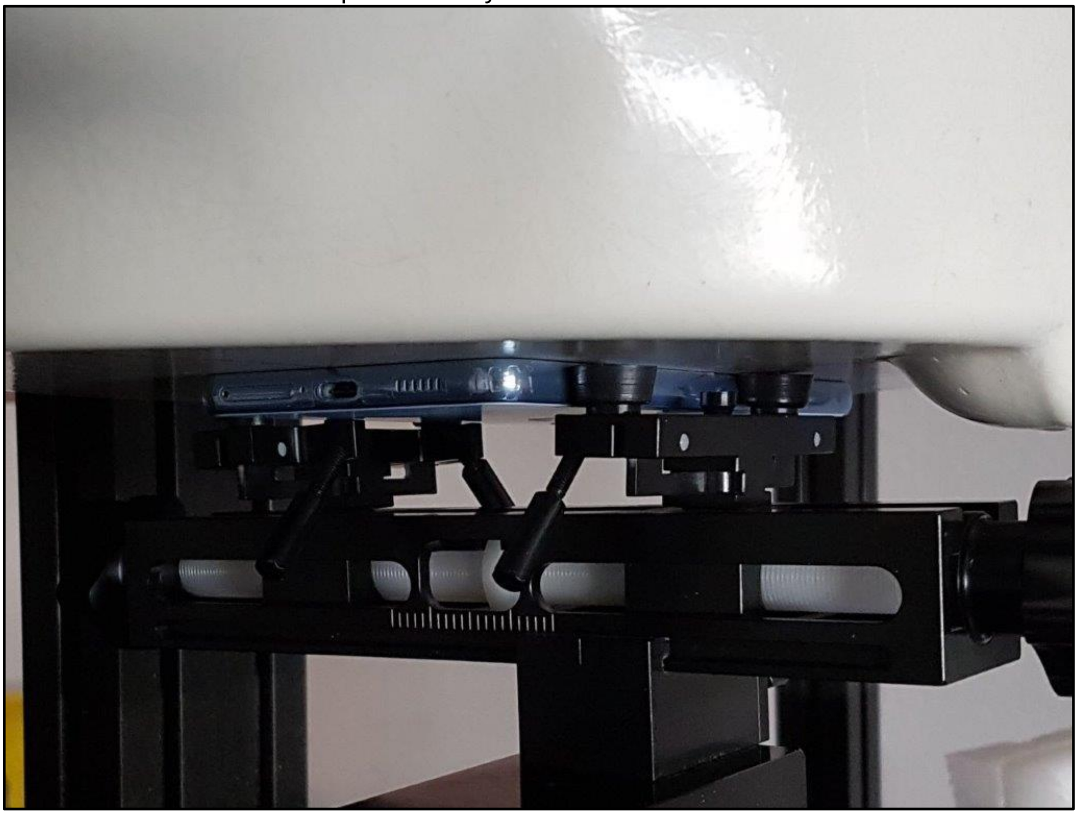


Photo 18: Test position body worn front side with 0 mm distance

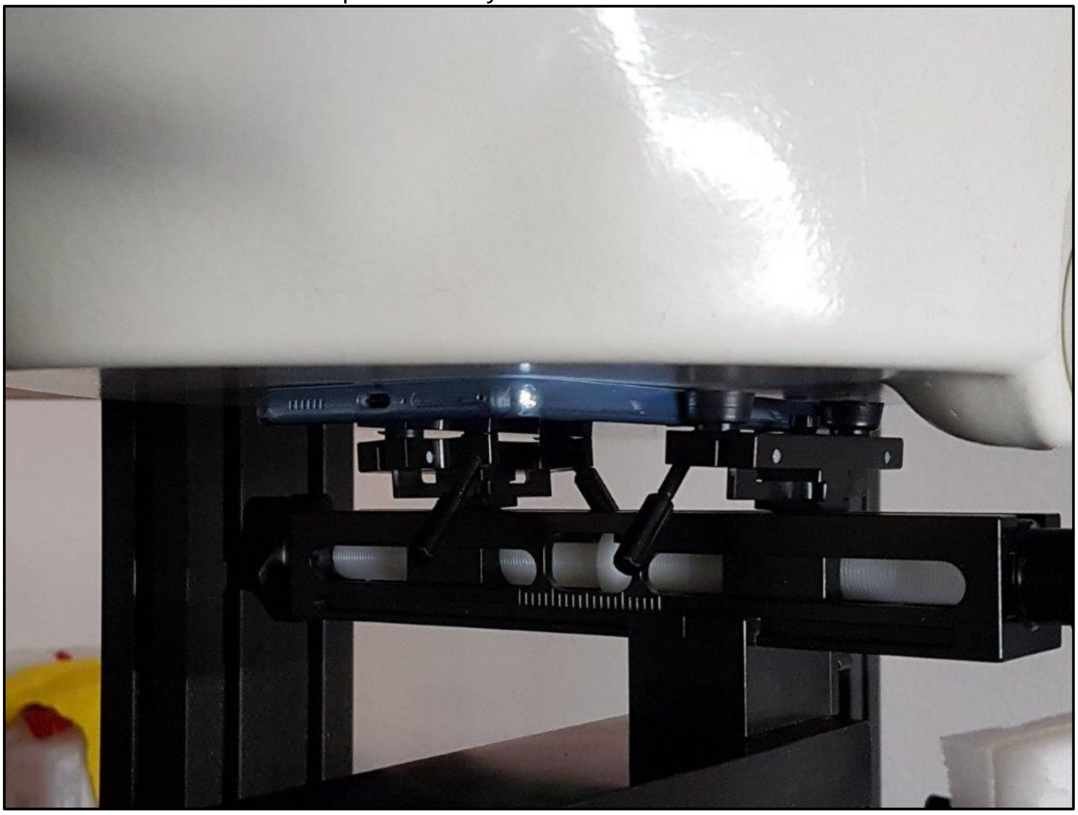


Photo 19: Test position body worn left side with 0 mm distance

Photo 20: Test position body worn right side with 0 mm distance

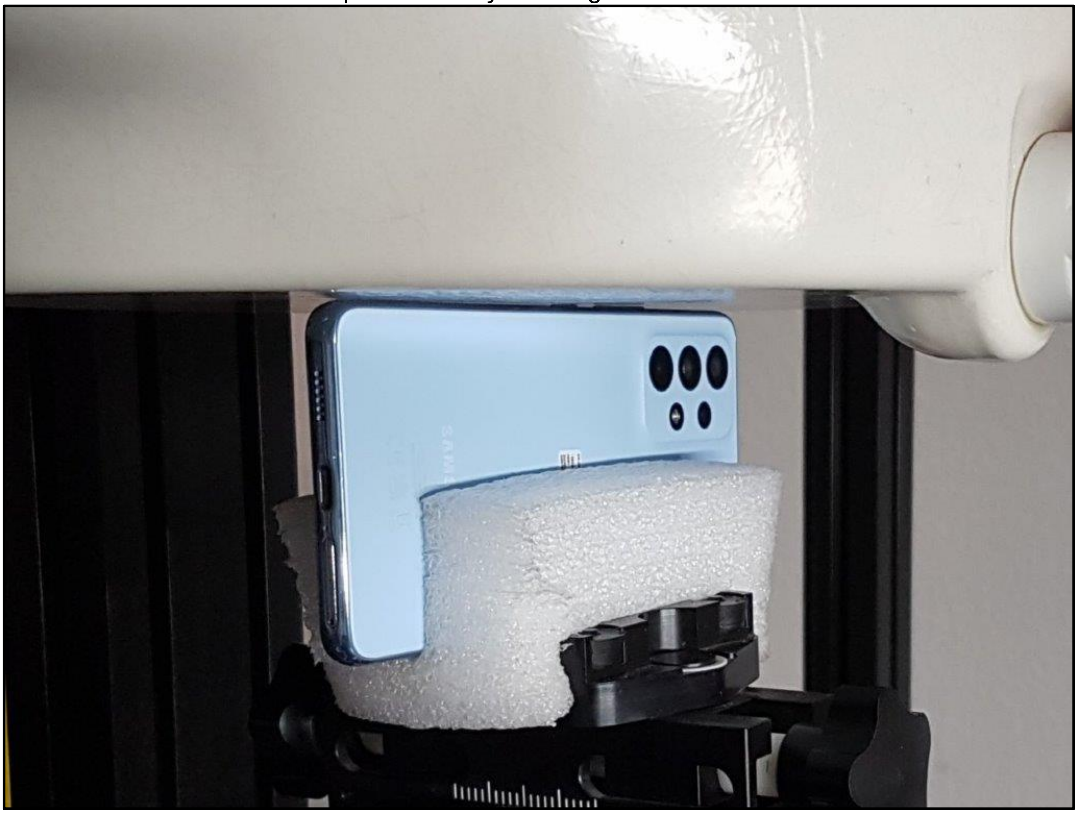


Photo 21: Test position body worn top side with 0 mm distance

Photo 22: Test position body worn bottom side with 0 mm distance

Annex D: Document History

Version	Applied Changes	Date of Release
	Initial Release	2023-02-28

Annex E: Further Information

Glossary

BW	-	Bandwidth
DUT	-	Device under Test
EUT	-	Equipment under Test
HW	-	Hardware
Inv. No.	-	Inventory number
LTE	-	Long Term Evolution
N/A	-	not applicable
OET	-	Office of Engineering and Technology
RB	-	resource block(s)
SAR	-	Specific Absorption Rate
S/N	-	Serial Number
SW	-	Software