

RF Exposure Lab

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CERTIFICATE OF COMPLIANCE SAR EVALUATION

Mojoose Inc.
65 Enterprise
Aliso Viejo, CA 92656

Dates of Test: April 6-8 & 17-21, 2026
Test Report Number: SAR.20260404

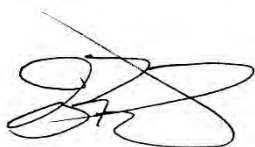
Lab Designation Number: US1195

Cellular Phone FCC ID:	A3LSMS942U (Samsung); BCG-E8949A (iPhone)
Model(s):	SM-S942U (Samsung); MG7L4LL/A (iPhone); Lynx (Receiver)
Product Marketing Number:	Samsung Galaxy S26; iPhone 17 Pro
Test Sample:	Production Unit for Phones; Engineering Unit Same as Production for Receiver
Serial Number:	RFGL23NEP4Z (Samsung); D4CMXKD0GC (iPhone); 008 (Receiver)
Equipment Type:	MagSafe Receiver for Use with Cellular Phone
Classification:	Portable Transmitter Next to Head, Body & Extremity
Antenna Type:	Internal Antenna – Cellular Phones; External
Application Type:	Certification
FCC Rule Parts:	Part 2, 9, 22, 24, 27, 90
KDB Test Methodology:	KDB 447498 D01 v06, KDB 941225 D01 v03r01, D02 v02r01, D05 v02r05, D05A v02r05
Maximum SAR Value:	1.34 W/kg Reported
Separation Distance to Probe:	0 mm

This wireless mobile and/or portable device has been shown to be compliant for localized specific absorption rate (SAR) for uncontrolled environment/general population limits specified in ANSI C95.1 – 1999 Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz, ANSI C95.3 – 2002 Recommended Practice for the Measurement of Potentially Hazardous Electromagnetic Fields, IEEE Std.1528 – 2013 Recommended Practice and had been tested in accordance with the measurement procedures specified in KDB 447498 and KDB 941225 (See test report).

I attest to the accuracy of the data. All measurements were performed by myself or were made under my supervision and are correct to the best of my knowledge and belief. I assume full responsibility for the completeness of these measurements and vouch for the qualifications of all persons taking them.

RF Exposure Lab, LLC certifies that no party to this application is subject to a denial of Federal benefits that includes FCC benefits pursuant to Section 5301 of the Anti-Drug Abuse Act of 1988, 21 U.S.C. 853(a).



Jay M. Moulton
Vice President



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Comment/Revision	Date
Original Release	April 24, 2026

Note: The latest version supersedes all previous versions listed in the above table. The latest version shall be used.

1. Introduction

This measurement report shows compliance of the Mojoose Inc. Model Lynx used with Samsung Galaxy S26 and iPhone 17 Pro FCC ID: A3LSMS942U and BCG-E8949A respectively with FCC Part 2, 1093, ET Docket 93-62 Rules for mobile and portable devices. The FCC has adopted the guidelines for evaluating the environmental effects of radio frequency radiation to protect the public and workers from the potential hazards of RF emissions due to FCC regulated portable devices. [1]

The test results recorded herein are based on a single type test of Mojoose Inc. Model Lynx and therefore apply only to the tested sample.

The test procedures, as described in ANSI C95.1 – 1999 Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz, ANSI C95.3 – 2002 Recommended Practice for the Measurement of Potentially Hazardous Electromagnetic Fields, IEEE Std.1528 – 2013 Recommended Practice, KDB 447498 and KDB 941225 were employed.

The Mojoose Inc. model Lynx is a receive only device. It magnetically attaches to a cellular phone to increase the receive sensitivity of the phone for making phone calls. The previously approved cellular phone has the only transmitter capability. This test report is to show that the addition of the Model Lynx does not negatively effect the SAR value of the cellular phones.

SAR Definition [5]

Specific Absorption Rate is defined as the time derivative (rate) of the incremental energy (dW) absorbed by (dissipated in) an incremental mass (dm) contained in a volume element (dV) of a given density (ρ).

$$SAR = \frac{d}{dt} \left(\frac{dW}{dm} \right) = \frac{d}{dt} \left(\frac{dW}{\rho dV} \right)$$

SAR is expressed in units of watts per kilogram (W/kg). SAR can be related to the electric field at a point by

$$SAR = \frac{\sigma |E|^2}{\rho}$$

where:

σ = conductivity of the tissue (S/m)

ρ = mass density of the tissue (kg/m³)

E = rms electric field strength (V/m)

2. SAR Measurement Setup

Robotic System

These measurements are performed using the DASY52 automated dosimetric assessment system. The DASY52 is made by Schmid & Partner Engineering AG (SPEAG) in Zurich, Switzerland and consists of high precision robotics system (Staubli), robot controller, Intel Core2 computer, near-field probe, probe alignment sensor, and the generic twin phantom containing the brain equivalent material. The robot is a six-axis industrial robot performing precise movements to position the probe to the location (points) of maximum electromagnetic field (EMF) (see Fig. 2.1).

System Hardware

A cell controller system contains the power supply, robot controller teach pendant (Joystick), and a remote control used to drive the robot motors. The PC consists of the HP Intel Core2 computer with Windows XP system and SAR Measurement Software DASY52, A/D interface card, monitor, mouse, and keyboard. The Staubli Robot is connected to the cell controller to allow software manipulation of the robot. A data acquisition electronic (DAE) circuit that performs the signal amplification, signal multiplexing, AD-conversion, offset measurements, mechanical surface detection, collision detection, etc. is connected to the Electro-optical coupler (EOC). The EOC performs the conversion from the optical into digital electric signal of the DAE and transfers data to the PC plug-in card.

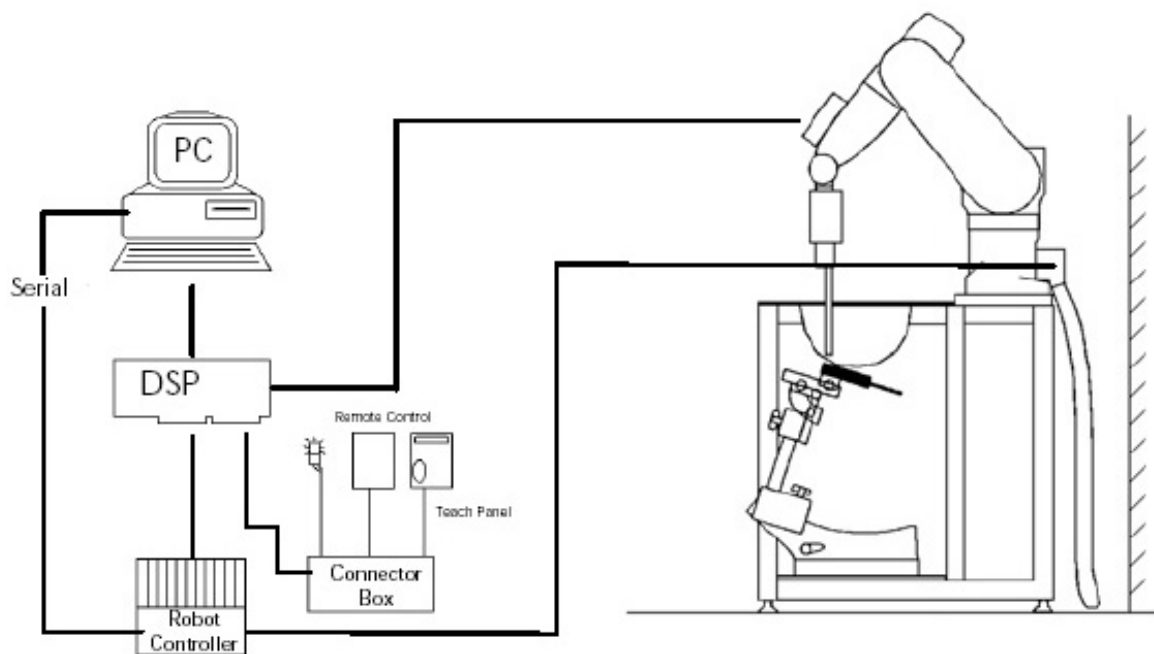


Figure 2.1 SAR Measurement System Setup

System Electronics

The DAE4 consists of a highly sensitive electrometer-grade preamplifier with auto-zeroing, a channel and gain-switching multiplexer, a fast 16 bit AD-converter and a command decoder and control logic unit. Transmission to the PC-card is accomplished through an optical downlink for data and status information and an optical uplink for commands and clock lines. The mechanical probe mounting device includes two different sensor systems for frontal and sidewise probe contacts. They are also used for mechanical surface detection and probe collision detection. The robot uses its own controller with a built in VME-bus computer. The system is described in detail in.

Probe Measurement System

The SAR measurements were conducted with the dosimetric probe EX3DV4, designed in the classical triangular configuration (see Fig. 2.2) and optimized for dosimetric evaluation. The probe is constructed using the thick film technique; with printed resistive lines on ceramic substrates. The probe is equipped with an optical multi fiber line ending at the front of the probe tip. (see Fig. 2.3) It is connected to the EOC box on the robot arm and provides an automatic detection of the phantom surface. Half of the fibers are connected to a pulsed infrared transmitter, the other half to a synchronized receiver. As the probe approaches the surface, the reflection from the surface produces a coupling from the transmitting to the receiving fibers. This reflection increases first during the approach, reaches maximum and then decreases. If the probe is flatly touching the surface, the coupling is zero. The distance of the coupling maximum to the surface is independent of the surface reflectivity and largely independent of the surface to probe angle. The DASY52 software reads the reflection during a software approach and looks for the maximum using a 2nd order fitting. The approach is stopped at reaching the maximum.



DAE System

Probe Specifications

Calibration: In air from 10 MHz to 6.0 GHz
In brain and muscle simulating tissue at Frequencies of 450 MHz, 835 MHz, 1750 MHz, 1900 MHz, 2450 MHz, 2600 MHz, 3500 MHz, 5200 MHz, 5300 MHz, 5600 MHz, 5800 MHz

Frequency: 10 MHz to 6 GHz

Linearity: $\pm 0.2\text{dB}$ (30 MHz to 6 GHz)

Dynamic: 10 mW/kg to 100 W/kg

Range: Linearity: $\pm 0.2\text{dB}$

Dimensions: Overall length: 330 mm

Tip length: 20 mm

Body diameter: 12 mm

Tip diameter: 2.5 mm

Distance from probe tip to sensor center: 1 mm

Application: SAR Dosimetry Testing
Compliance tests of wireless device

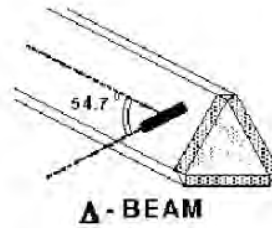


Figure 2.2 Triangular Probe Configurations



Figure 2.3 Probe Thick-Film Technique

Probe Calibration Process

Dosimetric Assessment Procedure

Each probe is calibrated according to a dosimetric assessment procedure described in with accuracy better than +/- 10%. The spherical isotropy was evaluated with the procedure described in and found to be better than +/-0.25dB. The sensitivity parameters (Norm X, Norm Y, Norm Z), the diode compression parameter (DCP) and the conversion factor (Conv F) of the probe is tested.

Free Space Assessment

The free space E-field from amplified probe outputs is determined in a test chamber. This is performed in a TEM cell for frequencies below 1 GHz, and in a waveguide above 1GHz for free space. For the free space calibration, the probe is placed in the volumetric center of the cavity at the proper orientation with the field. The probe is then rotated 360 degrees until the three channels show the maximum reading. The power density readings equates to 1 mW/cm².

Temperature Assessment *

E-field temperature correlation calibration is performed in a flat phantom filled with the appropriate simulated brain tissue. The measured free space E-field in the medium, correlates to temperature rise in a dielectric medium. For temperature correlation calibration a RF transparent thermistor based temperature probe is used in conjunction with the E-field probe

$$SAR = C \frac{\Delta T}{\Delta t}$$

where:

Δt = exposure time (30 seconds),

C = heat capacity of tissue (brain or muscle),

ΔT = temperature increase due to RF exposure.

$$SAR = \frac{|E|^2 \cdot \sigma}{\rho}$$

where:

σ = simulated tissue conductivity,

ρ = Tissue density (1.25 g/cm³ for brain tissue)

SAR is proportional to $\Delta T / \Delta t$, the initial rate of tissue heating, before thermal diffusion takes place.

Now it's possible to quantify the electric field in the simulated tissue by equating the thermally derived SAR to the E- field;

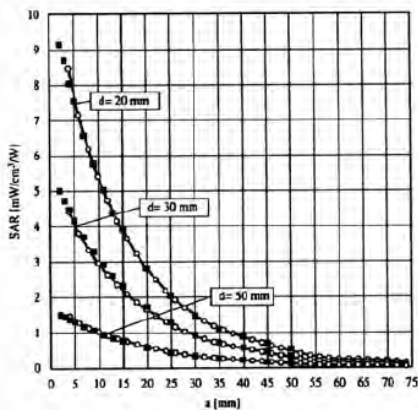


Figure 2.4 E-Field and Temperature Measurements at 900MHz

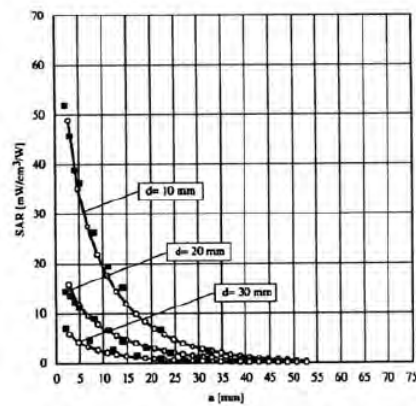


Figure 2.5 E-Field and Temperature Measurements at 1800MHz

Data Extrapolation

The DASY52 software automatically executes the following procedures to calculate the field units from the microvolt readings at the probe connector. 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 like below;

$$F_i = U_i + U_i^2 \cdot \frac{cf}{dcp_i}$$

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:

$$E_i = \sqrt{\frac{V_i}{Norm_i \cdot ConvF}}$$

with V_i = compensated signal of channel i (i = x,y,z)
 $Norm_i$ = sensor sensitivity of channel i (i = x,y,z)
 $\mu V/(V/m)^2$ for E-field probes
 $ConvF$ = sensitivity of enhancement in solution
 E_i = electric field strength of channel i in V/m

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

$$E_{tot} = \sqrt{E_x^2 + E_y^2 + E_z^2}$$

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

$$SAR = E_{tot}^2 \cdot \frac{\sigma}{\rho \cdot 1000}$$

with SAR = local specific absorption rate in W/g
 E_{tot} = total field strength in V/m
 σ = conductivity in [mho/m] or [Siemens/m]
 ρ = equivalent tissue density in g/cm³

The power flow density is calculated assuming the excitation field to be a free space field.

$$P_{free} = \frac{E_{tot}^2}{3770}$$

with P_{pwe} = equivalent power density of a plane wave in W/cm²
 E_{tot} = total electric field strength in V/m

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. Using predefined locations for measurements is not accurate enough. Any shift of the phantom (e.g., slight deformations after filling it with liquid) would produce high uncertainties. For an automatic and accurate detection of the phantom surface, the DASY5 system uses the mechanical surface detection. The detection is always at touch, but the probe will move backward from the surface the indicated distance before starting the measurement.
- 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 ≤ 2 GHz 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

DASY is also able to perform repeated zoom scans if more than 1 peak is found during area scan. In this document, the evaluated peak 1g and 10g averaged SAR values are shown in the 2D-graphics in annex B. Test results relevant for the specified standard (see section 3) are shown in table form in section 7.

Spatial Peak SAR Evaluation

The spatial peak SAR - value for 1 and 10 g is evaluated after the Cube measurements have been done. The basis of the evaluation are the SAR values measured at the points of the fine cube grid consisting of all points in the three directions x, y and z. The algorithm that finds the maximal averaged volume is separated into three different stages.

- The data between the dipole center of the probe and the surface of the phantom are extrapolated. This data cannot be measured since the center of the dipole is 1 to 2.7 mm away from the tip of the probe and the distance between the surface and the lowest measuring point is about 1 mm (see probe calibration sheet). The extrapolated data from a cube measurement can be visualized by selecting 'Graph Evaluated'.
- The maximum interpolated value is searched with a straight-forward algorithm. Around this maximum the SAR - values averaged over the spatial volumes (1g or 10 g) are computed using the 3d-spline interpolation algorithm. If the volume cannot be evaluated (i.e., if a part of the grid was cut off by the boundary of the measurement area) the evaluation will be started on the corners of the bottom plane of the cube.
- All neighbouring volumes are evaluated until no neighbouring volume with a higher average value is found.

Extrapolation

The extrapolation is based on a least square algorithm [W. Gander, Computermathematik, p.168-180]. Through the points in the first 3 cm along the z-axis, polynomials of order four are calculated. These polynomials are then used to evaluate the points between the surface and the probe tip. The points, calculated from the surface, have a distance of 1 mm from each other.

Interpolation

The interpolation of the points is done with a 3d-Spline. The 3d-Spline is composed of three one-dimensional splines with the "Not a knot"-condition [W. Gander, Computermathematik, p.141-150] (x, y and z -direction) [Numerical Recipes in C, Second Edition, p.123ff].

Volume Averaging

At First the size of the cube is calculated. Then the volume is integrated with the trapezoidal algorithm. 8000 points (20x20x20) are interpolated to calculate the average.

Advanced Extrapolation

DASY uses the advanced extrapolation option which is able to compensate boundary effects on E-field probes.

SAM PHANTOM

The SAM Twin Phantom V4.0 is constructed of a fiberglass shell integrated in a wooden table. The shape of the shell is based on data from an anatomical study designed to determine the maximum exposure in at least 90% of all users. It enables the dosimetric evaluation of left and right hand phone usage as well as body mounted usage at the flat phantom region. A cover prevents the evaporation of the liquid. Reference markings on the Phantom allow the complete setup of all predefined phantom positions and measurement grids by manually teaching three points in the robot. (see Fig. 2.6)

Phantom Specification

Phantom:	SAM Twin Phantom (V4.0)
Shell Material:	Vivac Composite
Thickness:	2.0 ± 0.2 mm



Figure 2.6 SAM Twin Phantom

Device Holder for Transmitters

In combination with the Phantom the Mounting Device (see Fig. 2.7), enables the rotation of the mounted transmitter in spherical coordinates whereby the rotation point is the ear opening. The devices can be easily, accurately, and repeat ably be positioned according to the FCC, CENELEC, IEC and IEEE specifications. The device holder can be locked at different phantom locations (left head, right head, flat phantom).



Figure 2.7 Mounting Device

Note: A simulating human hand is not used due to the complex anatomical and geometrical structure of the hand that may produce infinite number of configurations. To produce the worst-case condition (the hand absorbs antenna output power), the hand is omitted during the tests.

3. Definition of Reference Points

Ear Reference Point

Figure 3.2 shows the front, back and side views of the SAM Phantom. The point “M” is the reference point for the center of the mouth, “LE” is the left ear reference point (ERP), and “RE” is the right ERP. The ERPs are 15mm posterior to the entrance to the ear canal (EEC) along the B-M line (Back-Mouth), as shown in Figure 3.1. The plane passing through the two ear canals and M is defined as the Reference Plane. The line N-F (Neck-Front) is perpendicular to the reference plane and passing through the RE (or LE) is called the Reference Pivoting Line (see Figure 3.1). Line B-M is perpendicular to the N-F line. Both N-F and B-M lines are marked on the external phantom shell to facilitate handset positioning [5].

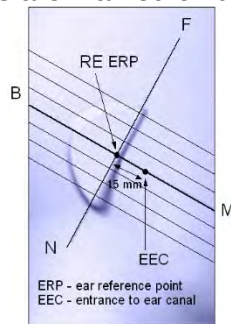


Figure 3.1 Close-up side view of ERP's



Figure 3.2 Front, back and side view of SAM

Device Reference Points

Two imaginary lines on the device need to be established: the vertical centerline and the horizontal line. The test device is placed in a normal operating position with the “test device reference point” located along the “vertical centerline” on the front of the device aligned to the “ear reference point” (See Fig. 3.3). The “test device reference point” is then located at the same level as the center of the ear reference point. The test device is positioned so that the “vertical centerline” is bisecting the front surface of the device at it's top and bottom edges, positioning the “ear reference point” on the outer surface of both the left and right head phantoms on the ear reference point [5].

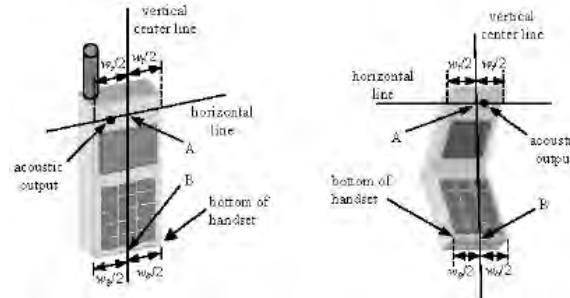


Figure 3.3 Handset Vertical Center & Horizontal Line Reference Points

4. Test Configuration Positions

Positioning for Cheek/Touch [5]

1. Position the device close to the surface of the phantom such that point A is on the (virtual) extension of the line passing through points RE and LE on the phantom (see Figure 4.1), such that the plane defined by the vertical center line and the horizontal line of the device is approximately parallel to the sagittal plane of the phantom.

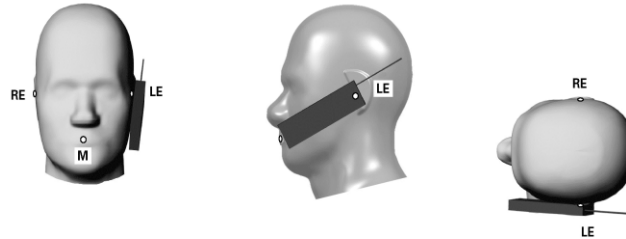


Figure 4.1 Front, Side and Top View of Cheek/Touch Position

2. Translate the device towards the phantom along the line passing through RE and LE until the device touches the ear.
3. While maintaining the device in this plane, rotate it around the LE-RE line until the vertical centerline is in the plane normal to MB-NF including the line MB (called the reference plane).
4. Rotate the device around the vertical centerline until the device (horizontal line) is symmetrical with respect to the line NF.
5. While maintaining the vertical centerline in the reference plane, keeping point A on the line passing through RE and LE and maintaining the device contact with the ear, rotate the device about the line NF until any point on the device is in contact with a phantom point below the ear (cheek). See Figure 4.2.

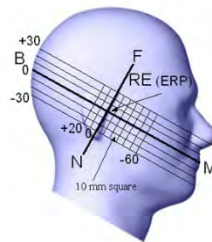


Figure 4.2 Side view w/ relevant markings

Positioning for Ear / 15° Tilt [5]

With the test device aligned in the Cheek/Touch Position”:

1. While maintaining the orientation of the device, retract the device parallel to the reference plane far enough to enable a rotation of the device by 15 degrees.
2. Rotate the device around the horizontal line by 15 degrees.
3. While maintaining the orientation of the device, move the device parallel to the reference plane until any part of the device touches the head. (In this position, point A is located on the line RE-LE). The tilted position is obtained when the contact is on the pinna. If the contact is at any location other than the pinna, the angle of the device shall be reduced. The tilted position is obtained when any part of the device is in contact with the ear as well as a second part of the device is in contact with the head (see Figure 4.3).

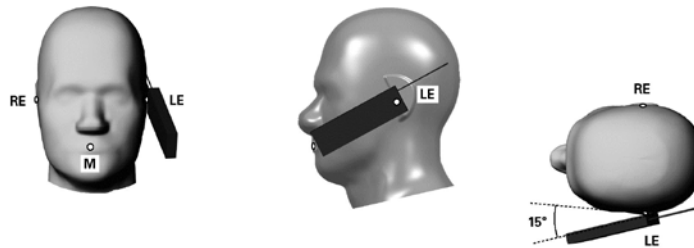


Figure 4.3 Front, Side and Top View of Ear/15° Tilt Position

Body Worn Configurations

Body-worn operating configurations are tested with the accessories attached to the device and positioned against a flat phantom in a normal use configuration. A device with a headset output is tested with a headset connected to the device. Body dielectric parameters are used.

Accessories for Body-worn operation configurations are divided into two categories: those that do not contain metallic components and those that do contain metallic components. When multiple accessories that do not contain metallic components are supplied with the device, the device is tested with only the accessory that dictates the closest spacing to the body. Then, when multiple accessories that contain metallic components are supplied with the device, the device is tested with each accessory that contains a unique metallic component. If multiple accessories share an identical metallic component (i.e. the same metallic belt-clip used with different holsters with no other metallic components) only the accessory that dictates the closest spacing to the body is tested.

Body-worn accessories may not always be supplied or available as options for some devices intended to be authorized for body-worn use. In this case, a test configuration where a separation distance between the back of the device and the flat phantom is used. All test position spacings are documented.

Transmitters that are designed to operate in front of a person's face, as in push-to-talk configurations, are tested for SAR compliance with the front of the device positioned to face the flat phantom. For devices that are carried next to the body such as a shoulder, waist or chest-worn transmitters, SAR compliance is tested with the accessory(ies), including headsets and microphones, attached to the device and positioned against a flat phantom in a normal use configuration.

In all cases SAR measurements are performed to investigate the worst-case positioning. Worst-case positioning is then documented and used to perform Body SAR testing.

In order for users to be aware of the body-worn operating requirements for meeting RF exposure compliance, operating instructions and cautions statements are included in the user's manual.

5. Probe and Dipole Calibration

See Appendix D and E.

6. Phantom & Simulating Tissue Specifications

Head Simulating Mixture Characterization

The head mixture consist of the material based on the table listed below. The mixture is calibrated to obtain proper dielectric constant (permittivity) and conductivity of the desired tissue.

Table 6.1 Typical Composition of Ingredients for Tissue

Ingredients		Simulating Tissue					
		750 MHz Head	900 MHz Head	1750 MHz Head	1900 MHz Head	2300 MHz Head	2550 MHz Head
Mixing Percentage							
Water		Proprietary Purchased From Speag					
Sugar							
Salt							
HEC							
Bactericide							
DGBE							
Dielectric Constant	Target	41.94	41.50	40.08	40.00	39.47	39.07
Conductivity (S/m)	Target	0.89	0.97	1.37	1.40	1.67	1.91

Ingredients		Simulating Tissue				
		3300 MHz Head	3500 MHz Head	3700 MHz Head	3900 MHz Head	4200 MHz Head
Mixing Percentage						
Water		Proprietary Purchased From Speag				
Sugar						
Salt						
HEC						
Bactericide						
DGBE						
Dielectric Constant	Target	38.16	37.93	37.70	37.47	36.55
Conductivity (S/m)	Target	2.70	2.91	3.12	3.34	3.68

7. RF Exposure Limits [2]

Uncontrolled Environment

Uncontrolled Environments are defined as locations where there is the exposure of individuals who have no knowledge or control of their exposure. The general population/uncontrolled exposure limits are applicable to situations in which the general public may be exposed or in which persons who are exposed as a consequence of their employment may not be made fully aware of the potential for exposure or cannot exercise control over their exposure. Members of the general public would come under this category when exposure is not employment-related; for example, in the case of a wireless transmitter that exposes persons in its vicinity.

Controlled Environment

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). In general, occupational/controlled exposure limits are applicable to situations in which persons are exposed as a consequence of their employment, who have been made fully aware of the potential for exposure and can exercise control over their exposure. This exposure category is also applicable when the exposure is of a transient nature due to incidental passage through a location where the exposure levels may be higher than the general population/uncontrolled limits, but the exposed person is fully aware of the potential for exposure and can exercise control over his or her exposure by leaving the area or by some other appropriate means.

Table 7.1 Human Exposure Limits

	UNCONTROLLED ENVIRONMENT General Population	CONTROLLED ENVIROMENT Professional Population
SPATIAL PEAK SAR ¹ Head	1.60 W/kg	8.00 W/kg
SPATIAL AVERAGE SAR ² Whole Body	0.08 W/kg	0.40 W/kg
SPATIAL PEAK SAR ³ Hands, Feet, Ankles, Wrists	4.00 W/kg	20.00 W/kg

¹ The Spatial Peak value of the SAR averaged over any 1 gram of tissue (defined as a tissue volume in the shape of a cube) and over the appropriate averaging time.

² The Spatial Average value of the SAR averaged over the whole body.

³ 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.

8. Measurement Uncertainty

Measurement uncertainty table is not required per KDB 865664 D01 v01 section 2.8.2 page 12. SAR measurement uncertainty analysis is required in the SAR report only when the highest measured SAR in a frequency band is ≥ 1.5 W/kg for 1-g SAR. The equivalent ratio (1.5/1.6) should be applied to extremity and occupational exposure conditions. The highest reported value is less than 1.5 W/kg. Therefore, the measurement uncertainty table SAR testing is not required.

9. SAR System Verification

Tissue Verification

Table 9.1 Measured Tissue Parameters

		750 MHz Head		900 MHz Head		1750 MHz Head	
Date(s)		Apr. 6, 2026		Apr. 6, 2026		Apr. 6, 2026	
Liquid Temperature (°C)	20.0	Target	Measured	Target	Measured	Target	Measured
Dielectric Constant: ϵ		41.94	40.97	41.50	40.96	40.08	39.06
Conductivity: σ		0.89	0.93	0.97	1.01	1.37	1.39
		1900 MHz Head		2300 MHz Head		2550 MHz Head	
Date(s)		Apr. 7, 2026		Apr. 7, 2026		Apr. 8, 2026	
Liquid Temperature (°C)	20.0	Target	Measured	Target	Measured	Target	Measured
Dielectric Constant: ϵ		40.00	39.55	39.47	38.69	39.07	38.74
Conductivity: σ		1.40	1.42	1.67	1.70	1.91	1.92
		750 MHz Head		900 MHz Head		1750 MHz Head	
Date(s)		Apr. 17, 2026		Apr. 17, 2026		Apr. 17, 2026	
Liquid Temperature (°C)	20.0	Target	Measured	Target	Measured	Target	Measured
Dielectric Constant: ϵ		41.94	41.46	41.50	41.34	40.08	39.24
Conductivity: σ		0.89	0.90	0.97	0.98	1.37	1.40
		1900 MHz Head		2300 MHz Head		2550 MHz Head	
Date(s)		Apr. 20, 2026		Apr. 20, 2026		Apr. 20, 2026	
Liquid Temperature (°C)	20.0	Target	Measured	Target	Measured	Target	Measured
Dielectric Constant: ϵ		40.00	39.87	39.47	38.92	39.07	38.95
Conductivity: σ		1.40	1.39	1.67	1.70	1.91	1.94
		3300 MHz Head		3500 MHz Head		3700 MHz Head	
Date(s)		Apr. 20, 2026		Apr. 21, 2026		Apr. 21, 2026	
Liquid Temperature (°C)	20.0	Target	Measured	Target	Measured	Target	Measured
Dielectric Constant: ϵ		38.16	37.59	37.93	37.36	37.70	37.13
Conductivity: σ		2.70	2.73	2.91	2.94	3.12	3.15
		3900 MHz Head		4200 MHz Head			
Date(s)		Apr. 21, 2026		Apr. 21, 2026			
Liquid Temperature (°C)	20.0	Target	Measured	Target	Measured		
Dielectric Constant: ϵ		37.47	36.90	37.12	36.55		
Conductivity: σ		3.34	3.37	3.65	3.68		

SAR System Verification

Prior to assessment, the system is verified to the $\pm 10\%$ of the specifications at the test frequency by using the system kit. Power is measured at 100 mW then normalized to 1 watt. (Graphic Plots Attached)

Table 9.2 System Dipole Validation Target & Measured

	Test Frequency	Targeted SAR _{1g} (W/kg)	Measure SAR _{1g} (W/kg)	Tissue Used for Verification	Deviation (%)	Plot Number
06-Apr-2026	750 MHz	8.76	8.58	Head	- 2.05	1
06-Apr-2026	900 MHz	11.00	11.50	Head	+ 4.55	2
06-Apr-2026	1750 MHz	36.70	37.80	Head	+ 3.00	3
07-Apr-2026	1900 MHz	40.60	41.50	Head	+ 2.22	4
07-Apr-2026	2300 MHz	48.40	49.80	Head	+ 2.89	5
08-Apr-2026	2550 MHz	54.10	56.40	Head	+ 4.25	6
17-Apr-2026	750 MHz	8.76	8.66	Head	- 1.14	7
17-Apr-2026	900 MHz	11.00	11.60	Head	+ 5.45	8
17-Apr-2026	1750 MHz	36.70	38.10	Head	+ 3.81	9
20-Apr-2026	1900 MHz	40.60	41.20	Head	+ 1.48	10
20-Apr-2026	2300 MHz	48.40	50.10	Head	+ 3.51	11
20-Apr-2026	2550 MHz	54.10	56.60	Head	+ 4.62	12
20-Apr-2026	3300 MHz	65.60	65.90	Head	+ 0.46	13
21-Apr-2026	3500 MHz	65.10	68.20	Head	+ 4.76	14
21-Apr-2026	3700 MHz	67.30	69.80	Head	+ 3.71	15
21-Apr-2026	3900 MHz	69.70	70.90	Head	+ 1.72	16
21-Apr-2026	4200 MHz	66.60	67.40	Head	+ 1.20	17

See Appendix A for data plots.

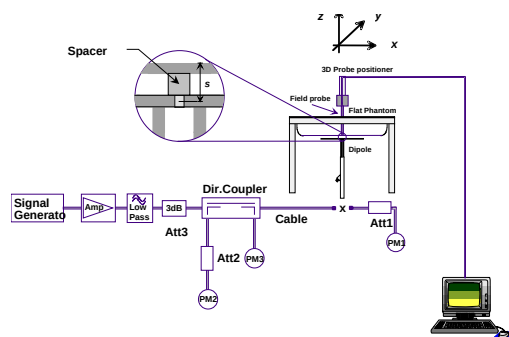


Figure 9.1 Dipole Validation Test Setup

10. SAR Test Data Summary

See Measurement Result Data Pages

See Appendix B for SAR Test Data Plots.
See Appendix C for SAR Test Setup Photos.

Procedures Used To Establish Test Signal

The device was either placed into simulated transmit mode using the manufacturer's test codes or the actual transmission is activated through a base station simulator or similar equipment. See data pages for actual procedure used in measurement.

Device Test Condition

In order to verify that the device was tested at full power, conducted output power measurements were performed before and after each SAR measurement to confirm the output power unless otherwise noted. If a conducted power deviation of more than 5% occurred, the test was repeated. The power drift of each test is measured at the start of the test and again at the end of the test. The drift percentage is calculated by the formula $((\text{end}/\text{start})-1)*100$ and rounded to three decimal places. The drift percentage is calculated into the resultant SAR value on the data sheet for each test.

Each cellular phone was first tested without the Lynx MagSafe receiver to determine a baseline in each frequency band of test. Then, the Lynx MagSafe was attached to the cellular phone and the measurement was conducted a second time. This second measurement was to show the Lynx MagSafe receiver does not negatively affect the original SAR of the phone.

The highest SAR value of all bands for both the Head and Body measurements of each phone model has the plot shown in Appendix B.

11. SAR Test Results

General Note:

1. Per KDB 447498 D01v06, the reported SAR is the measured SAR value adjusted for maximum tune-up tolerance.
 - a. Tune-up scaling Factor = tune-up limit power (mW) / EUT RF power (mW), where tune-up limit is the maximum rated power among all production units.
 - b. For SAR testing of WLAN signal with non-100% duty cycle, the measured SAR is scaled-up by the duty cycle scaling factor which is equal to "1/(duty cycle)"
 - c. For WWAN: Reported SAR(W/kg)= Measured SAR(W/kg)*Tune-up Scaling Factor
2. Per KDB 447498 D01v06, for each exposure position, testing of other required channels within the operating mode of a frequency band is not required when the *reported* 1-g or 10-g SAR for the mid-band or highest output power channel is:
 - ≤ 0.8 W/kg or 2.0 W/kg, for 1-g or 10-g respectively, when the transmission band is ≤ 100 MHz
 - ≤ 0.6 W/kg or 1.5 W/kg, for 1-g or 10-g respectively, when the transmission band is between 100 MHz and 200 MHz
 - ≤ 0.4 W/kg or 1.0 W/kg, for 1-g or 10-g respectively, when the transmission band is ≥ 200 MHz
3. Per KDB 865664 D01v01r04, for each frequency band, repeated SAR measurement is required only when the measured SAR is ≥ 0.8 W/kg.

Plot No.	Phone	Technology	Band	Configuration	With/Without Lynx	ε	σ	Gap (mm)	Ch.	Freq. (MHz)	Measured 1g SAR (W/kg)
	Samsung	3G WCDMA	Band 2	Right Head	Without	39.91	1.39	0mm	9400	1880.0	0.126
					With	39.91	1.39	0mm	9400	1880.0	0.0788
				Front Body	Without	39.91	1.39	0mm	9400	1880.0	1.15
					With	39.91	1.39	0mm	9400	1880.0	0.699
			Band 4	Right Head	Without	39.275	1.383	0mm	1413	1732.6	0.117
					With	39.275	1.383	0mm	1413	1732.6	0.0611
				Front Body	Without	39.275	1.383	0mm	1413	1732.6	1.20
					With	39.275	1.383	0mm	1413	1732.6	0.741
			Band 5	Right Head	Without	41.44	0.917	0mm	4183	836.6	0.197
					With	41.44	0.917	0mm	4183	836.6	0.0987
				Front Body	Without	41.44	0.917	0mm	4183	836.6	1.17
					With	41.44	0.917	0mm	4183	836.6	0.795
		4G LTE	Band 4	Right Head	Without	39.276	1.384	0mm	20175	1732.5	0.0438
					With	39.276	1.384	0mm	20175	1732.5	0.0207
				Front Body	Without	39.276	1.384	0mm	20175	1732.5	1.19
					With	39.276	1.384	0mm	20175	1732.5	1.07
			Band 5	Right Head	Without	41.444	0.915	0mm	20525	836.5	0.0485
					With	41.444	0.915	0mm	20525	836.5	0.0425
				Front Body	Without	41.444	0.915	0mm	20525	836.5	1.27
					With	41.444	0.915	0mm	20525	836.5	1.07
			Band 7	Right Head	Without	38.985	1.915	0mm	21100	2535.0	0.220
					With	38.985	1.915	0mm	21100	2535.0	0.0966
				Front Body	Without	38.985	1.915	0mm	21100	2535.0	1.31
					With	38.985	1.915	0mm	21100	2535.0	1.10
1			Band 12	Right Head	Without	41.708	0.868	0mm	23095	707.5	0.927
					With	41.708	0.868	0mm	23095	707.5	0.231
				Front Body	Without	41.708	0.868	0mm	23095	707.5	1.03
					With	41.708	0.868	0mm	23095	707.5	0.737
			Band 13	Right Head	Without	41.268	0.922	0mm	23230	782.0	0.0389
					With	41.268	0.922	0mm	23230	782.0	0.0307
2				Front Body	Without	41.268	0.922	0mm	23230	782.0	1.34
					With	41.268	0.922	0mm	23230	782.0	0.815
			Band 14	Right Head	Without	41.208	0.93	0mm	23330	793.0	0.0449
					With	41.208	0.93	0mm	23330	793.0	0.136
				Front Body	Without	41.208	0.93	0mm	23330	793.0	1.17
					With	41.208	0.93	0mm	23330	793.0	0.818
			Band 25	Right Head	Without	39.905	1.39	0mm	26365	1882.5	0.819
					With	39.905	1.39	0mm	26365	1882.5	0.665
				Front Body	Without	39.905	1.39	0mm	26365	1882.5	0.968
					With	39.905	1.39	0mm	26365	1882.5	0.816
			Band 30	Right Head	Without	38.16	1.70	0mm	27710	2310.0	0.0239
					With	38.16	1.70	0mm	27710	2310.0	0.0218
				Front Body	Without	38.16	1.70	0mm	27710	2310.0	1.27
					With	38.16	1.70	0mm	27710	2310.0	0.752
			Band 41	Right Head	Without	38.853	1.99	0mm	40620	2593.0	0.0615
					With	38.853	1.99	0mm	40620	2593.0	0.0119
				Front Body	Without	38.853	1.99	0mm	40620	2593.0	1.04
					With	38.853	1.99	0mm	40620	2593.0	0.842
			Band 71	Right Head	Without	41.867	0.86	0mm	133297	680.5	0.518
					With	41.867	0.86	0mm	133297	680.5	0.314
				Front Body	Without	41.867	0.86	0mm	133297	680.5	1.00
					With	41.867	0.86	0mm	133297	680.5	0.682

Plot No.	Phone	Technology	Band	Configuration	With/Without Lynx	ε	σ	Gap (mm)	Ch.	Freq. (MHz)	Measured 1g SAR (W/kg)
	Samsung	5G NR	Band n7	Right Head	Without	38.985	1.915	0mm	507000	2535.0	0.191
					With	38.985	1.915	0mm	507000	2535.0	0.0840
				Front Body	Without	38.985	1.915	0mm	507000	2535.0	1.14
					With	38.985	1.915	0mm	507000	2535.0	0.957
			Band n25	Right Head	Without	39.905	1.39	0mm	376500	1882.5	0.713
					With	39.905	1.39	0mm	376500	1882.5	0.579
				Front Body	Without	39.905	1.39	0mm	376500	1882.5	0.842
					With	39.905	1.39	0mm	376500	1882.5	0.710
			Band n41	Right Head	Without	38.853	1.99	0mm	518601	2593.0	0.0535
					With	38.853	1.99	0mm	518601	2593.0	0.0104
				Front Body	Without	38.853	1.99	0mm	518601	2593.0	0.905
					With	38.853	1.99	0mm	518601	2593.0	0.733
			Band n66	Right Head	Without	39.25	1.395	0mm	349000	1745.0	0.0381
					With	39.25	1.395	0mm	349000	1745.0	0.0180
				Front Body	Without	39.25	1.395	0mm	349000	1745.0	1.04
					With	39.25	1.395	0mm	349000	1745.0	0.931
			Band n71	Right Head	Without	41.867	0.86	0mm	136100	680.5	0.451
					With	41.867	0.86	0mm	136100	680.5	0.273
				Front Body	Without	41.867	0.86	0mm	136100	680.5	0.870
					With	41.867	0.86	0mm	136100	680.5	0.593
	iPhone	3G WCDMA	Band 2	Right Head	Without	39.91	1.39	0mm	9400	1880.0	0.183
					With	39.91	1.39	0mm	9400	1880.0	0.120
				Front Body	Without	39.91	1.39	0mm	9400	1880.0	0.800
					With	39.91	1.39	0mm	9400	1880.0	0.651
			Band 4	Right Head	Without	39.275	1.383	0mm	1413	1732.6	0.131
					With	39.275	1.383	0mm	1413	1732.6	0.0716
				Front Body	Without	39.275	1.383	0mm	1413	1732.6	1.11
					With	39.275	1.383	0mm	1413	1732.6	0.607
			Band 5	Right Head	Without	41.44	0.917	0mm	4183	836.6	0.0669
					With	41.44	0.917	0mm	4183	836.6	0.0526
				Front Body	Without	41.44	0.917	0mm	4183	836.6	0.584
					With	41.44	0.917	0mm	4183	836.6	0.119
		4G LTE	Band 7	Right Head	Without	38.985	1.915	0mm	21100	2535.0	0.0318
					With	38.985	1.915	0mm	21100	2535.0	0.0191
				Front Body	Without	38.985	1.915	0mm	21100	2535.0	0.366
					With	38.985	1.915	0mm	21100	2535.0	0.299
			Band 12	Right Head	Without	41.708	0.868	0mm	23095	707.5	0.322
					With	41.708	0.868	0mm	23095	707.5	0.301
				Front Body	Without	41.708	0.868	0mm	23095	707.5	0.886
					With	41.708	0.868	0mm	23095	707.5	0.633
			Band 13	Right Head	Without	41.268	0.922	0mm	23230	782.0	0.356
					With	41.268	0.922	0mm	23230	782.0	0.258
				Front Body	Without	41.268	0.922	0mm	23230	782.0	0.971
					With	41.268	0.922	0mm	23230	782.0	0.824
3			Band 14	Right Head	Without	41.208	0.93	0mm	23330	793.0	0.624
					With	41.208	0.93	0mm	23330	793.0	0.617
				Front Body	Without	41.208	0.93	0mm	23330	793.0	0.988
					With	41.208	0.93	0mm	23330	793.0	0.938
			Band 25	Right Head	Without	39.905	1.39	0mm	26365	1882.5	0.0216
					With	39.905	1.39	0mm	26365	1882.5	0.0137
				Front Body	Without	39.905	1.39	0mm	26365	1882.5	0.922
					With	39.905	1.39	0mm	26365	1882.5	0.858

Plot No.	Phone	Technology	Band	Configuration	With/Without Lynx	ε	σ	Gap (mm)	Ch.	Freq. (MHz)	Measured 1g SAR (W/kg)
4	iPhone	4G LTE	Band 26	Right Head	Without	41.076	0.942	0mm	26365	831.5	0.0461
					With	41.076	0.942	0mm	26365	831.5	0.0362
				Front Body	Without	41.076	0.942	0mm	26365	831.5	0.462
					With	41.076	0.942	0mm	26365	831.5	0.276
			Band 30	Right Head	Without	38.16	1.70	0mm	27710	2310.0	0.140
					With	38.16	1.70	0mm	27710	2310.0	0.0949
				Front Body	Without	38.16	1.70	0mm	27710	2310.0	0.721
					With	38.16	1.70	0mm	27710	2310.0	0.645
			Band 41	Right Head	Without	38.853	1.99	0mm	40620	2593.0	0.0597
					With	38.853	1.99	0mm	40620	2593.0	0.0194
				Front Body	Without	38.853	1.99	0mm	40620	2593.0	0.944
					With	38.853	1.99	0mm	40620	2593.0	0.749
			Band 42	Right Head	Without	37.36	2.94	0mm	42590	3500.0	0.0519
					With	37.36	2.94	0mm	42590	3500.0	0.0169
				Front Body	Without	37.36	2.94	0mm	42590	3500.0	0.821
					With	37.36	2.94	0mm	42590	3500.0	0.652
			Band 48	Right Head	Without	37.215	3.075	0mm	55990	3625.0	0.0549
					With	37.215	3.075	0mm	55990	3625.0	0.0178
				Front Body	Without	37.215	3.075	0mm	55990	3625.0	0.868
					With	37.215	3.075	0mm	55990	3625.0	0.689
			Band 66	Right Head	Without	39.07	1.385	0mm	132322	1745.0	0.163
					With	39.07	1.385	0mm	132322	1745.0	0.0584
				Front Body	Without	39.07	1.385	0mm	132322	1745.0	1.15
					With	39.07	1.385	0mm	132322	1745.0	0.963
			Band 71	Right Head	Without	41.867	0.86	0mm	133297	680.5	0.518
					With	41.867	0.86	0mm	133297	680.5	0.314
				Front Body	Without	41.867	0.86	0mm	133297	680.5	1.00
					With	41.867	0.86	0mm	133297	680.5	0.682
		5G NR	Band n7	Right Head	Without	38.985	1.915	0mm	507000	2535.0	0.0277
					With	38.985	1.915	0mm	507000	2535.0	0.0166
				Front Body	Without	38.985	1.915	0mm	507000	2535.0	0.318
					With	38.985	1.915	0mm	507000	2535.0	0.260
			Band n12	Right Head	Without	41.708	0.868	0mm	141500	707.5	0.280
					With	41.708	0.868	0mm	141500	707.5	0.262
				Front Body	Without	41.708	0.868	0mm	141500	707.5	0.771
					With	41.708	0.868	0mm	141500	707.5	0.551
			Band n14	Right Head	Without	41.208	0.93	0mm	158600	793.0	0.543
					With	41.208	0.93	0mm	158600	793.0	0.537
				Front Body	Without	41.208	0.93	0mm	158600	793.0	0.860
					With	41.208	0.93	0mm	158600	793.0	0.816
			Band n25	Right Head	Without	39.905	1.39	0mm	376500	1882.5	0.0188
					With	39.905	1.39	0mm	376500	1882.5	0.0119
				Front Body	Without	39.905	1.39	0mm	376500	1882.5	0.802
					With	39.905	1.39	0mm	376500	1882.5	0.746
			Band n26	Right Head	Without	41.076	0.942	0mm	166300	831.5	0.0401
					With	41.076	0.942	0mm	166300	831.5	0.0315
				Front Body	Without	41.076	0.942	0mm	166300	831.5	0.402
					With	41.076	0.942	0mm	166300	831.5	0.240
			Band n30	Right Head	Without	38.16	1.70	0mm	462000	2310.0	0.122
					With	38.16	1.70	0mm	462000	2310.0	0.0826
				Front Body	Without	38.16	1.70	0mm	462000	2310.0	0.627
					With	38.16	1.70	0mm	462000	2310.0	0.561

Plot No.	Phone	Technology	Band	Configuration	With/Without Lynx	ϵ	σ	Gap (mm)	Ch.	Freq. (MHz)	Measured 1g SAR (W/kg)
	iPhone	5G NR	Band n41	Right Head	Without	38.853	1.99	0mm	518601	2593.0	0.0519
					With	38.853	1.99	0mm	518601	2593.0	0.0169
				Front Body	Without	38.853	1.99	0mm	518601	2593.0	0.821
					With	38.853	1.99	0mm	518601	2593.0	0.652
			Band n48	Right Head	Without	37.215	3.075	0mm	641667	3625.0	0.0496
					With	37.215	3.075	0mm	641667	3625.0	0.0161
				Front Body	Without	37.215	3.075	0mm	641667	3625.0	0.784
					With	37.215	3.075	0mm	641667	3625.0	0.622
			Band n66	Right Head	Without	39.07	1.385	0mm	349000	1745.0	0.142
					With	39.07	1.385	0mm	349000	1745.0	0.0508
				Front Body	Without	39.07	1.385	0mm	349000	1745.0	1.00
					With	39.07	1.385	0mm	349000	1745.0	0.838
			Band n71	Right Head	Without	41.867	0.86	0mm	136100	680.5	0.451
					With	41.867	0.86	0mm	136100	680.5	0.273
				Front Body	Without	41.867	0.86	0mm	136100	680.5	0.870
					With	41.867	0.86	0mm	136100	680.5	0.593
			Band n77	Right Head	Without	36.97	3.30	0mm	650000	3840.0	0.0507
					With	36.97	3.30	0mm	650000	3840.0	0.0165
				Front Body	Without	36.97	3.30	0mm	650000	3840.0	0.802
					With	36.97	3.30	0mm	650000	3840.0	0.637

12. Test Equipment List

Table 12.1 Equipment Specifications

Type	Calibration Due Date	Calibration Done Date	Serial Number
Staubli Robot TX60L	N/A	N/A	F07/55M6A1/A/01
Measurement Controller CS8c	N/A	N/A	1012
SAM Twin Phantom	N/A	N/A	1152
Device Holder	N/A	N/A	N/A
Data Acquisition Electronics 4	01/08/2027	01/08/2026	1321
SPEAG E-Field Probe EX3DV4	09/16/2026	09/16/2025	3693
SPEAG E-Field Probe EX3DV4	01/14/2027	01/14/2026	7530
SPEAG E-Field Probe EX3DV4	04/14/2027	04/14/2026	7531
Speag Validation Dipole D750V3	05/10/2026	05/10/2024	1016
Speag Validation Dipole D900V2	05/10/2026	05/10/2024	1d044
Speag Validation Dipole D1750V2	05/10/2026	05/10/2024	1018
Speag Validation Dipole D1900V2	05/06/2026	05/06/2024	5d116
Speag Validation Dipole D2300V2	05/06/2026	05/06/2024	1060
Speag Validation Dipole D2550V2	05/06/2026	05/06/2024	1003
Speag Validation Dipole D3300V2	01/15/2027	01/15/2025	1032
Speag Validation Dipole D3500V2	04/11/2027	04/11/2024	1061
Speag Validation Dipole D3700V2	04/09/2027	04/09/2024	1024
Speag Validation Dipole D3900V2	01/15/2027	01/15/2025	1082
Speag Validation Dipole D4200V2	01/15/2027	01/15/2025	1025
Agilent N1911A Power Meter	02/19/2027	02/19/2026	GB45100254
Agilent N1922A Power Sensor	02/19/2027	02/19/2026	MY45240464
Agilent (HP) 83752A Synthesized Sweeper	02/19/2027	02/19/2026	3610A01048
Agilent (HP) 8753C Vector Network Analyzer	02/19/2027	02/19/2026	3135A01724
Agilent (HP) 85047A S-Parameter Test Set	02/19/2027	02/19/2026	2904A00595
Copper Mountain R140 Vector Reflectometer	02/19/2027	02/19/2026	21390004
Agilent 778D Dual Directional Coupler	N/A	N/A	MY48220184
MiniCircuits BW-N20W5+ Fixed 20 dB Attenuator	N/A	N/A	N/A
MiniCircuits SPL-10.7+ Low Pass Filter	N/A	N/A	R8979513746
Apriel Dielectric Probe Assembly	N/A	N/A	0011
Head Equivalent Matter (750 MHz)	N/A	N/A	N/A
Head Equivalent Matter (900 MHz)	N/A	N/A	N/A
Head Equivalent Matter (1750 MHz)	N/A	N/A	N/A
Head Equivalent Matter (1900 MHz)	N/A	N/A	N/A
Head Equivalent Matter (2300 MHz)	N/A	N/A	N/A
Head Equivalent Matter (2550 MHz)	N/A	N/A	N/A
Head Equivalent Matter (3-6 GHz)	N/A	N/A	N/A

13. Conclusion

The SAR measurement indicates that the EUT complies with the RF radiation exposure limits of the FCC. These measurements are taken to simulate the RF effects exposure under worst-case conditions. Precise laboratory measures were taken to assure repeatability of the tests. The tested device complies with the requirements in respect to all parameters subject to the test. The test results and statements relate only to the item(s) tested.

Please note that the absorption and distribution of electromagnetic energy in the body is a very complex phenomena that depends on the mass, shape, and size of the body; the orientation of the body with respect to the field vectors; and, the electrical properties of both the body and the environment. Other variables that may play a substantial role in possible biological effects are those that characterize the environment (e.g. ambient temperature, air velocity, relative humidity, and body insulation) and those that characterize the individual (e.g. age, gender, activity level, debilitation, or disease). Because innumerable factors may interact to determine the specific biological outcome of an exposure to electromagnetic fields, any protection guide shall consider maximal amplification of biological effects as a result of field-body interactions, environmental conditions, and physiological variables.

14. References

- [1] Federal Communications Commission, ET Docket 93-62, Guidelines for Evaluating the Environmental Effects of Radio Frequency Radiation, August 1996
- [2] ANSI/IEEE C95.1 – 1992, American National Standard Safety Levels with respect to Human Exposure to Radio Frequency Electromagnetic Fields, 300kHz to 100GHz, New York: IEEE, 1992.
- [3] ANSI/IEEE C95.3 – 2002, IEEE Recommended Practice for the Measurement of Potentially Hazardous Electromagnetic Fields – RF and Microwave, New York: IEEE, 2002.
- [4] IEEE Standard 1528 – 2013, IEEE Recommended Practice for Determining the Peak-Spatial Average Specific Absorption Rate (SAR) in the Human Head from Wireless Communication Devices: Measurement Techniques, June 2013.

Appendix A – System Verification Plots

RF Exposure Lab

Plot 1

DUT: Dipole 750 MHz D750V3; Type: D750V3; Serial: D750V3 - SN 1016

Communication System: CW; Frequency: 750 MHz; Duty Cycle: 1:1

Medium: HSL750; Medium parameters used (interpolated): $f = 750$ MHz; $\sigma = 0.9$ S/m; $\epsilon_r = 41.46$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Test Date: Date: 4/6/2026; Ambient Temp: 23 °C; Tissue Temp: 21 °C

Probe: EX3DV4 – SN7530; ConvF(9.88, 9.8, 10.19); Calibrated: 1/14/2026;

Sensor-Surface: 2mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1321; Calibrated: 1/8/2026

Phantom: SAM 1; Type: SAM Twin Phantom; Serial: 1152

Measurement SW: DASY52, Version 52.10 (0); SEMCAD X Version 14.6.10 (7417)

Procedure Notes:

750 MHz Head/Verification/Area Scan (41x121x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 0.883 W/kg

750 MHz Head/Verification /Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

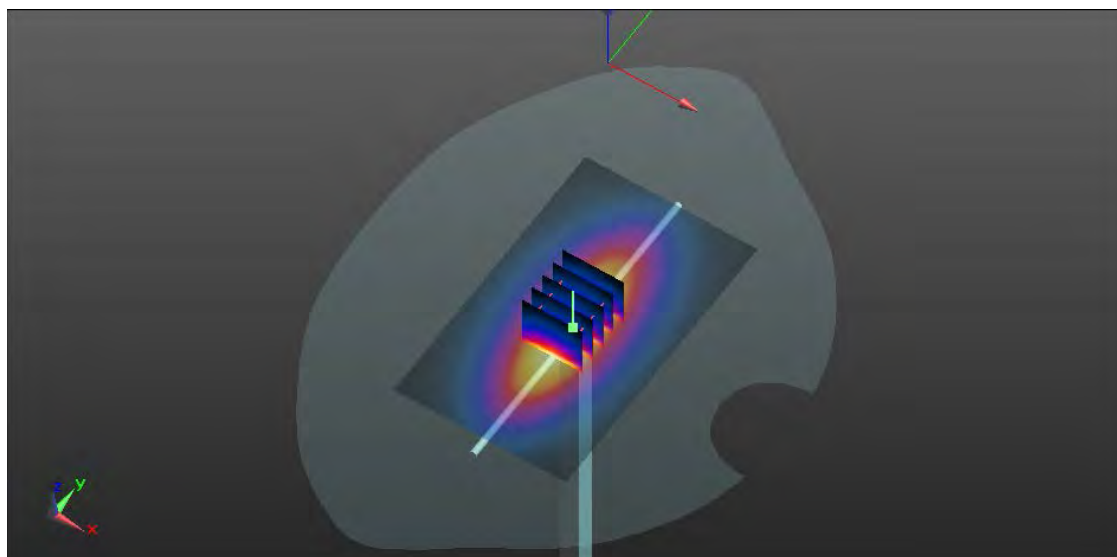
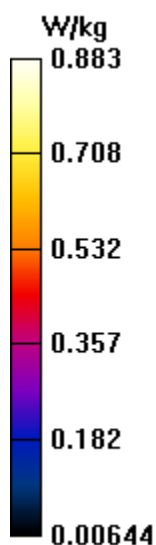
Reference Value = 31.949 V/m; Power Drift = -0.03 dB

Peak SAR (extrapolated) = 1.691 mW/g

$P_{in} = 100$ mW

SAR(1 g) = 0.858 mW/g; SAR(10 g) = 0.552 mW/g

Maximum value of SAR (measured) = 0.888 W/kg



RF Exposure Lab

Plot 2

DUT: Dipole 900 MHz D900V2; Type: D900V2; Serial: D900V2 - SN:1d044

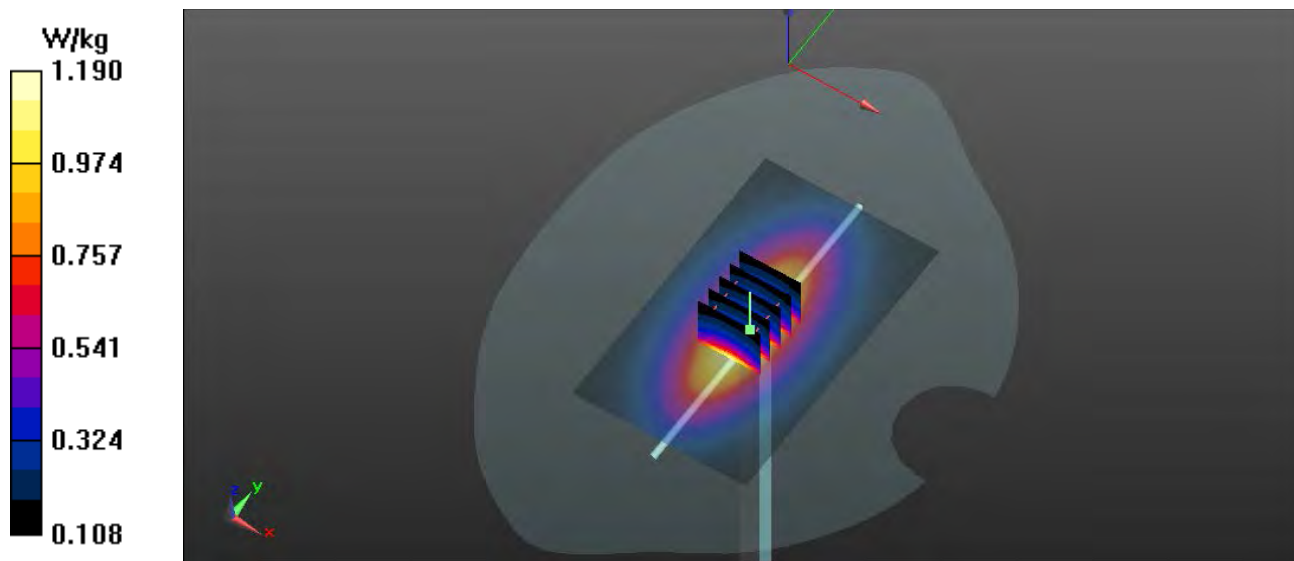
Communication System: CW; Frequency: 900 MHz; Duty Cycle: 1:1
Medium: HSL900; Medium parameters used: $f = 900$ MHz; $\sigma = 0.98$ S/m; $\epsilon_r = 41.34$; $\rho = 1000$ kg/m³
Phantom section: Flat Section

Test Date: Date: 4/6/2026; Ambient Temp: 23 °C; Tissue Temp: 21 °C
Probe: EX3DV4 – SN7530; ConvF(9.1, 9.03, 9.39); Calibrated: 1/14/2026;
Sensor-Surface: 2mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1321; Calibrated: 1/8/2026
Phantom: SAM 1; Type: SAM Twin Phantom; Serial: 1152
Measurement SW: DASY52, Version 52.10 (0); SEMCAD X Version 14.6.10 (7417)

Procedure Notes:

900 MHz Head/Verification/Area Scan (5x11x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 1.19 W/kg

900 MHz Head/Verification/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 31.568 V/m; Power Drift = -0.02 dB
Peak SAR (extrapolated) = 1.43 W/kg
 $P_{in} = 100$ mW
SAR(1 g) = 1.15 W/kg; SAR(10 g) = 0.712 W/kg
Maximum value of SAR (measured) = 1.2 W/kg



RF Exposure Lab

Plot 3

DUT: Dipole 1750 MHz D1750V2; Type: D1750V2; Serial: D1750V2 - SN:1018

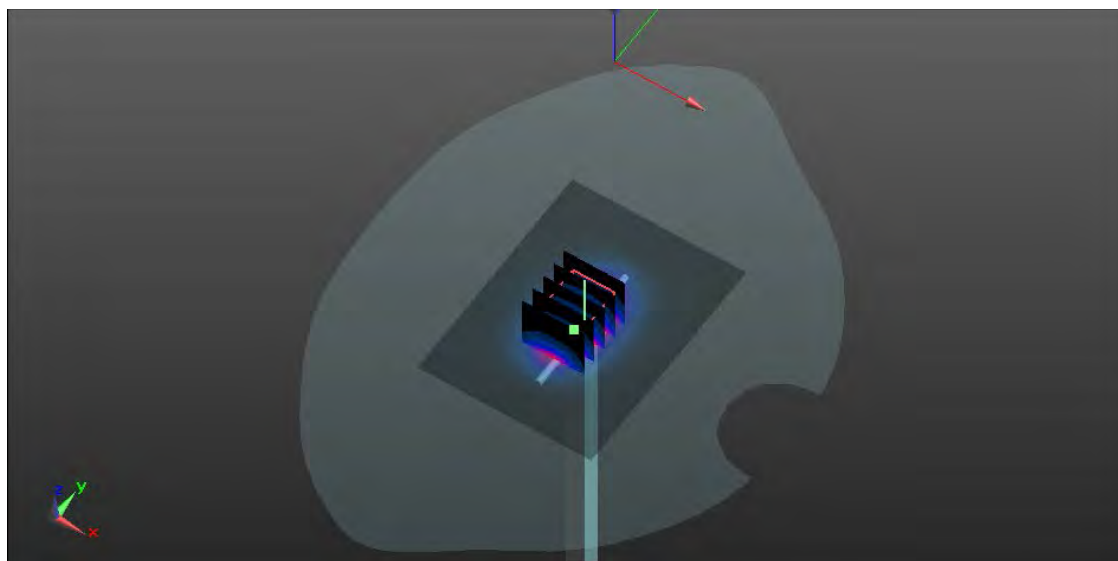
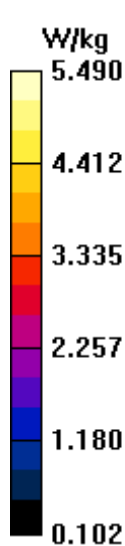
Communication System: CW; Frequency: 1750 MHz; Duty Cycle: 1:1
Medium: HSL1750; Medium parameters used: $f = 1750$ MHz; $\sigma = 1.4$ S/m; $\epsilon_r = 39.24$; $\rho = 1000$ kg/m³
Phantom section: Flat Section

Test Date: Date: 4/6/2026; Ambient Temp: 23 °C; Tissue Temp: 21 °C
Probe: EX3DV4 – SN7530; ConvF(7.76, 7.7, 8); Calibrated: 1/14/2026;
Sensor-Surface: 2mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1321; Calibrated: 1/8/2026
Phantom: SAM 1; Type: SAM Twin Phantom; Serial: 1152
Measurement SW: DASY52, Version 52.10 (0); SEMCAD X Version 14.6.10 (7417)

Procedure Notes:

1750 MHz Head/Verification/Area Scan (5x7x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 5.38 W/kg

1750 MHz Head/Verification/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 33.639 V/m; Power Drift = -0.02 dB
Peak SAR (extrapolated) = 6.87 W/kg
 $P_{in} = 100$ mW
SAR(1 g) = 3.78 W/kg; SAR(10 g) = 1.97 W/kg
Maximum value of SAR (measured) = 5.47 W/kg



RF Exposure Lab

Plot 4

DUT: Dipole 1900 MHz D1900V2; Type: D1900V2; Serial: D1900V2 - SN: 5d116

Communication System: CW; Frequency: 1900 MHz; Duty Cycle: 1:1

Medium: HSL1900; Medium parameters used: $f = 1900$ MHz; $\sigma = 1.39$ S/m; $\epsilon_r = 39.87$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Test Date: Date: 4/7/2026; Ambient Temp: 23 °C; Tissue Temp: 21 °C

Probe: EX3DV4 – SN7530; ConvF(7.57, 7.51, 7.8); Calibrated: 1/14/2026;

Sensor-Surface: 2mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1321; Calibrated: 1/8/2026

Phantom: SAM 1; Type: SAM Twin Phantom; Serial: 1152

Measurement SW: DASY52, Version 52.10 (0); SEMCAD X Version 14.6.10 (7417)

Procedure Notes:

1900 MHz Head/Verification/Area Scan (5x7x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 5.52 W/kg

1900 MHz Head/Verification/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

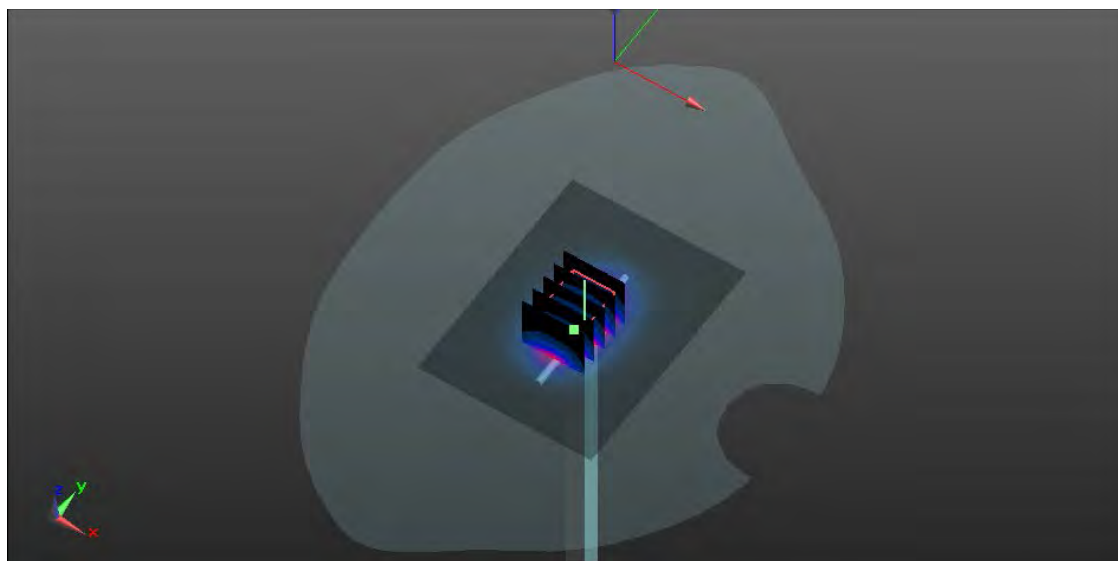
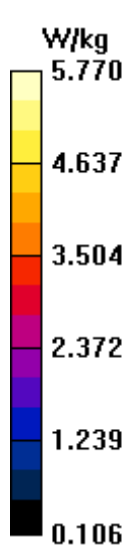
Reference Value = 32.186 V/m; Power Drift = -0.03 dB

Peak SAR (extrapolated) = 7.25 W/kg

$P_{in} = 100$ mW

SAR(1 g) = 4.15 W/kg; SAR(10 g) = 2.16 W/kg

Maximum value of SAR (measured) = 5.79 W/kg



RF Exposure Lab

Plot 5

DUT: Dipole 2300 MHz D2300V2; Type: D2300V2; Serial: D2300V2 - SN: 1060

Communication System: CW; Frequency: 2300 MHz; Duty Cycle: 1:1

Medium: HSL2300; Medium parameters used: $f = 2300$ MHz; $\sigma = 1.69$ S/m; $\epsilon_r = 38.18$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Test Date: Date: 4/7/2026; Ambient Temp: 23 °C; Tissue Temp: 21 °C

Probe: EX3DV4 – SN7530; ConvF(7.24, 7.18, 7.46); Calibrated: 1/14/2026;

Sensor-Surface: 2mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1321; Calibrated: 1/8/2026

Phantom: SAM 1; Type: SAM Twin Phantom; Serial: 1152

Measurement SW: DASY52, Version 52.10 (0); SEMCAD X Version 14.6.10 (7417)

Procedure Notes:

2300 MHz Head/Verification/Area Scan (61x101x1): Interpolated grid: dx=1.200 mm, dy=1.200 mm

Maximum value of SAR (interpolated) = 7.83 W/kg

2300 MHz Head/Verification/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

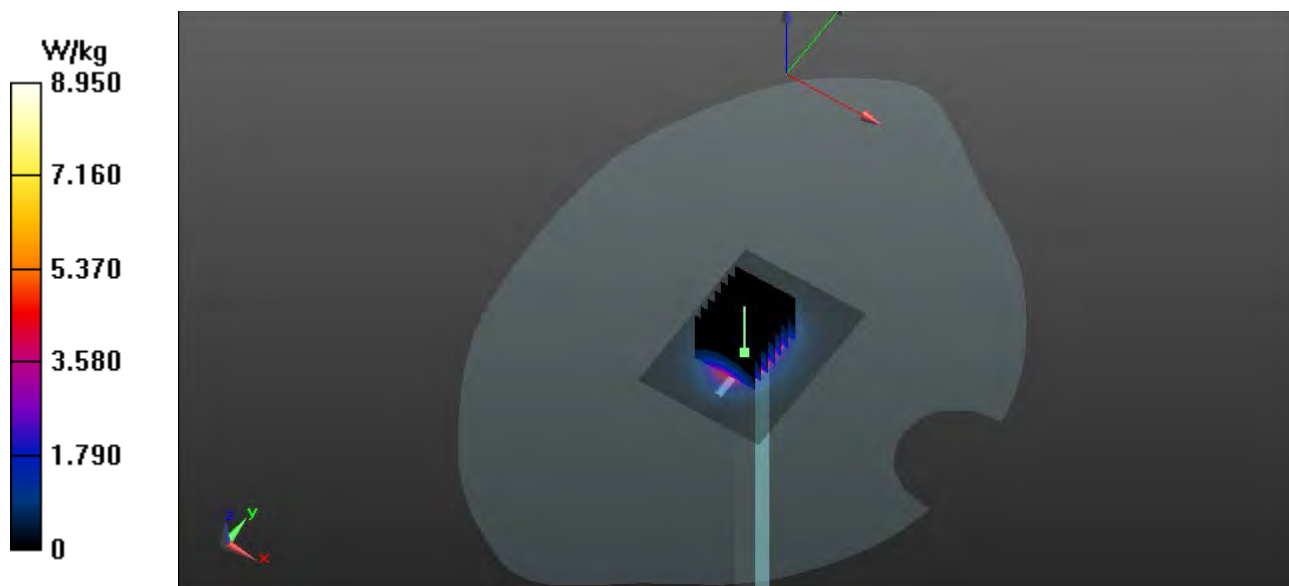
Reference Value = 55.297 V/m; Power Drift = -0.01 dB

Peak SAR (extrapolated) = 11.06 W/kg

$P_{in} = 100$ mW

SAR(1 g) = 4.98 W/kg; SAR(10 g) = 2.42 W/kg

Maximum value of SAR (measured) = 8.93 W/kg



RF Exposure Lab

Plot 6

DUT: Dipole 2550 MHz D2550V2; Type: D2550V2; Serial: D2550V2 - SN:1003

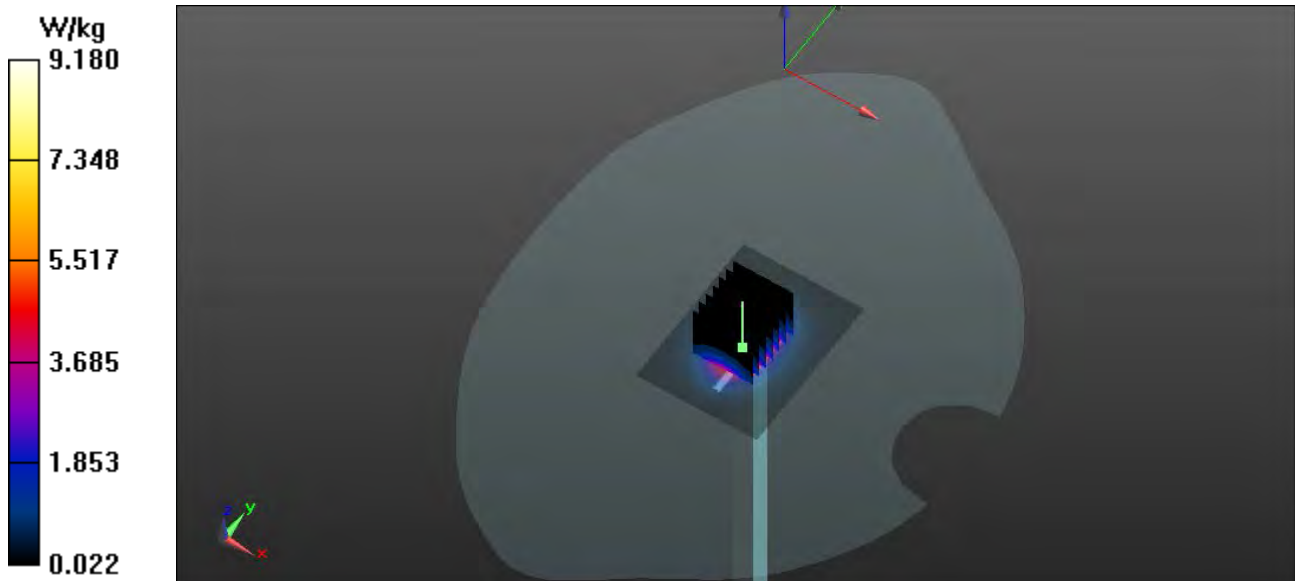
Communication System: CW; Frequency: 2550 MHz; Duty Cycle: 1:1
 Medium: HSL2550; Medium parameters used: $f = 2550 \text{ MHz}$; $\sigma = 1.94 \text{ S/m}$; $\epsilon_r = 38.95$; $\rho = 1000 \text{ kg/m}^3$
 Phantom section: Flat Section

Test Date: Date: 4/8/2026; Ambient Temp: 23 °C; Tissue Temp: 21 °C
 Probe: EX3DV4 – SN7530; ConvF(7.33, 7.27, 7.56); Calibrated: 1/14/2026;
 Sensor-Surface: 2mm (Mechanical Surface Detection)
 Electronics: DAE4 Sn1321; Calibrated: 1/8/2026
 Phantom: SAM 1; Type: SAM Twin Phantom; Serial: 1152
 Measurement SW: DASY52, Version 52.10 (0); SEMCAD X Version 14.6.10 (7417)

Procedure Notes:

2550 MHz Head/Verification/Area Scan (61x81x1): Interpolated grid: $dx=1.000 \text{ mm}$, $dy=1.000 \text{ mm}$
 Maximum value of SAR (interpolated) = 9.18 W/kg

2550 MHz Head/Verification/Zoom Scan (7x7x7)/Cube 0: Measurement grid: $dx=5\text{mm}$, $dy=5\text{mm}$, $dz=5\text{mm}$
 Reference Value = 54.541 V/m; Power Drift = -0.02 dB
 Peak SAR (extrapolated) = 11.5 W/kg
 $P_{in} = 100 \text{ mW}$
SAR(1 g) = 5.64 W/kg; SAR(10 g) = 2.48 W/kg
 Maximum value of SAR (measured) = 8.98 W/kg



RF Exposure Lab

Plot 7

DUT: Dipole 750 MHz D750V3; Type: D750V3; Serial: D750V3 - SN 1016

Communication System: CW; Frequency: 750 MHz; Duty Cycle: 1:1

Medium: HSL750; Medium parameters used (interpolated): $f = 750$ MHz; $\sigma = 0.93$ S/m; $\epsilon_r = 40.97$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Test Date: Date: 4/17/2026; Ambient Temp: 23 °C; Tissue Temp: 21 °C

Probe: EX3DV4 – SN7530; ConvF(9.88, 9.8, 10.19); Calibrated: 1/14/2026;

Sensor-Surface: 2mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1321; Calibrated: 1/8/2026

Phantom: SAM 1; Type: SAM Twin Phantom; Serial: 1152

Measurement SW: DASY52, Version 52.10 (0); SEMCAD X Version 14.6.10 (7417)

Procedure Notes:

750 MHz Head/Verification/Area Scan (41x121x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 0.871 W/kg

750 MHz Head/Verification /Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

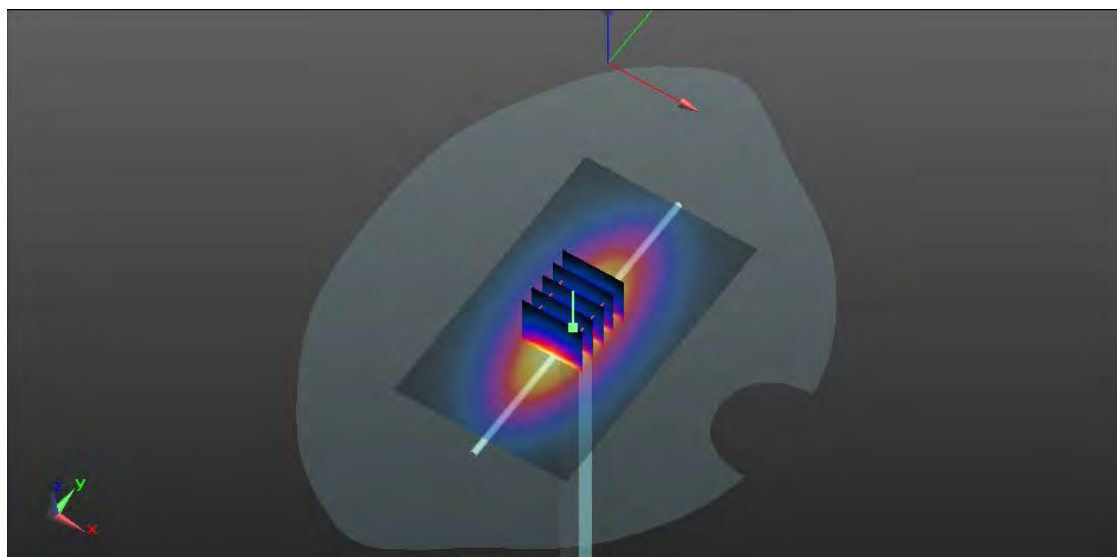
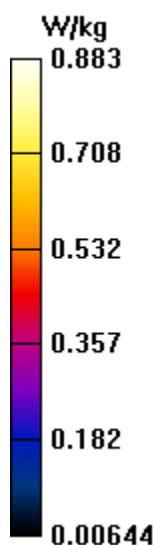
Reference Value = 33.452 V/m; Power Drift = -0.01 dB

Peak SAR (extrapolated) = 1.76 mW/g

$P_{in} = 100$ mW

SAR(1 g) = 0.866 mW/g; SAR(10 g) = 0.559 mW/g

Maximum value of SAR (measured) = 0.883 W/kg



RF Exposure Lab

Plot 8

DUT: Dipole 900 MHz D900V2; Type: D900V2; Serial: D900V2 - SN:1d044

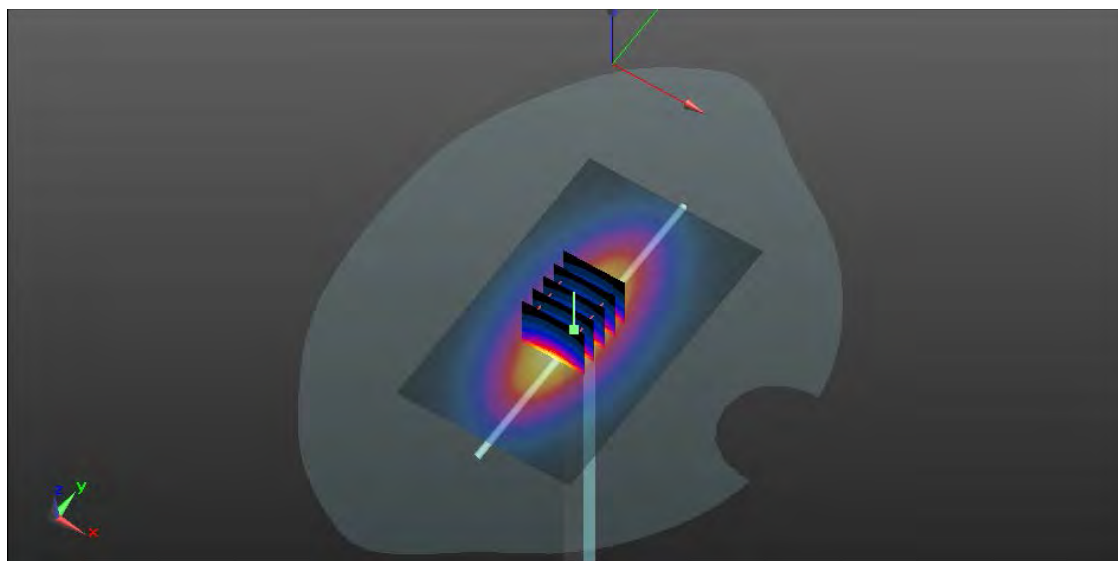
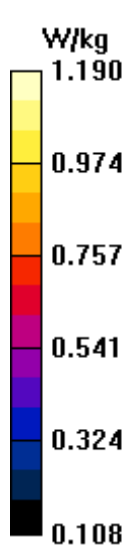
Communication System: CW; Frequency: 900 MHz; Duty Cycle: 1:1
Medium: HSL900; Medium parameters used: $f = 900$ MHz; $\sigma = 1.01$ S/m; $\epsilon_r = 40.96$; $\rho = 1000$ kg/m³
Phantom section: Flat Section

Test Date: Date: 4/17/2026; Ambient Temp: 23 °C; Tissue Temp: 21 °C
Probe: EX3DV4 – SN7530; ConvF(9.1, 9.03, 9.39); Calibrated: 1/14/2026;
Sensor-Surface: 2mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1321; Calibrated: 1/8/2026
Phantom: SAM 1; Type: SAM Twin Phantom; Serial: 1152
Measurement SW: DASY52, Version 52.10 (0); SEMCAD X Version 14.6.10 (7417)

Procedure Notes:

900 MHz Head/Verification/Area Scan (5x11x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 1.22 W/kg

900 MHz Head/Verification/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 30.119 V/m; Power Drift = -0.03 dB
Peak SAR (extrapolated) = 1.49 W/kg
 $P_{in} = 100$ mW
SAR(1 g) = 1.16 W/kg; SAR(10 g) = 0.716 W/kg
Maximum value of SAR (measured) = 1.19 W/kg



RF Exposure Lab

Plot 9

DUT: Dipole 1750 MHz D1750V2; Type: D1750V2; Serial: D1750V2 - SN:1018

Communication System: CW; Frequency: 1750 MHz; Duty Cycle: 1:1

Medium: HSL1750; Medium parameters used: $f = 1750$ MHz; $\sigma = 1.39$ S/m; $\epsilon_r = 39.06$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Test Date: Date: 4/17/2026; Ambient Temp: 23 °C; Tissue Temp: 21 °C

Probe: EX3DV4 – SN7530; ConvF(7.76, 7.7, 8); Calibrated: 1/14/2026;

Sensor-Surface: 2mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1321; Calibrated: 1/8/2026

Phantom: SAM 1; Type: SAM Twin Phantom; Serial: 1152

Measurement SW: DASY52, Version 52.10 (0); SEMCAD X Version 14.6.10 (7417)

Procedure Notes:

1750 MHz Head/Verification/Area Scan (5x7x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 5.46 W/kg

1750 MHz Head/Verification/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

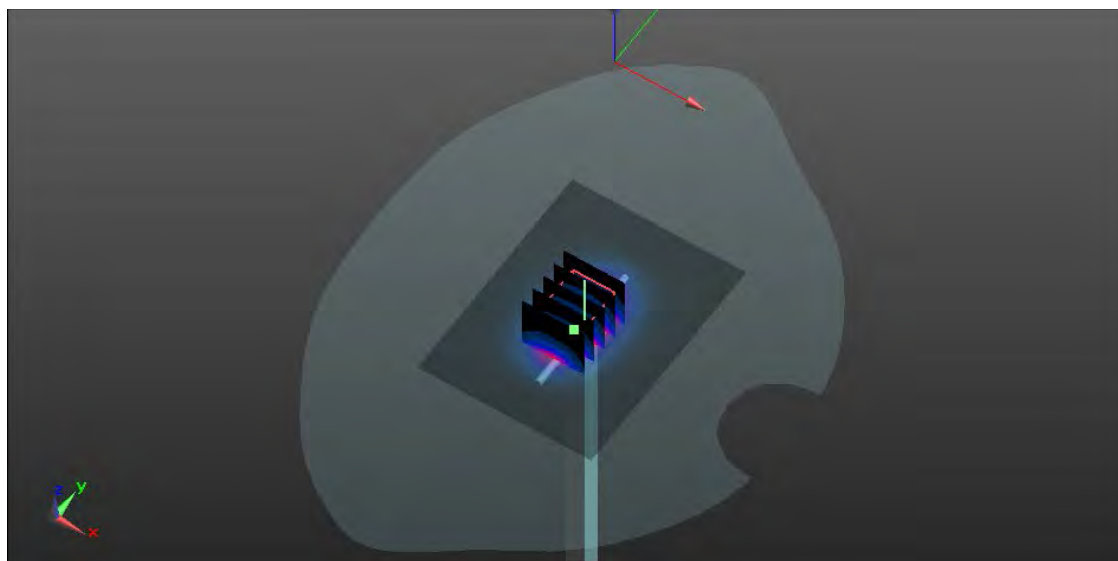
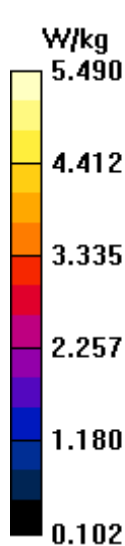
Reference Value = 34.885 V/m; Power Drift = -0.01 dB

Peak SAR (extrapolated) = 6.97 W/kg

$P_{in} = 100$ mW

SAR(1 g) = 3.81 W/kg; SAR(10 g) = 1.99 W/kg

Maximum value of SAR (measured) = 5.47 W/kg



RF Exposure Lab

Plot 10

DUT: Dipole 1900 MHz D1900V2; Type: D1900V2; Serial: D1900V2 - SN: 5d116

Communication System: CW; Frequency: 1900 MHz; Duty Cycle: 1:1

Medium: HSL1900; Medium parameters used: $f = 1900$ MHz; $\sigma = 1.42$ S/m; $\epsilon_r = 39.55$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Test Date: Date: 4/20/2026; Ambient Temp: 23 °C; Tissue Temp: 21 °C

Probe: EX3DV4 – SN7530; ConvF(7.57, 7.51, 7.8); Calibrated: 1/14/2026;

Sensor-Surface: 2mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1321; Calibrated: 1/8/2026

Phantom: SAM 1; Type: SAM Twin Phantom; Serial: 1152

Measurement SW: DASY52, Version 52.10 (0); SEMCAD X Version 14.6.10 (7417)

Procedure Notes:

1900 MHz Head/Verification/Area Scan (5x7x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 5.68 W/kg

1900 MHz Head/Verification/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

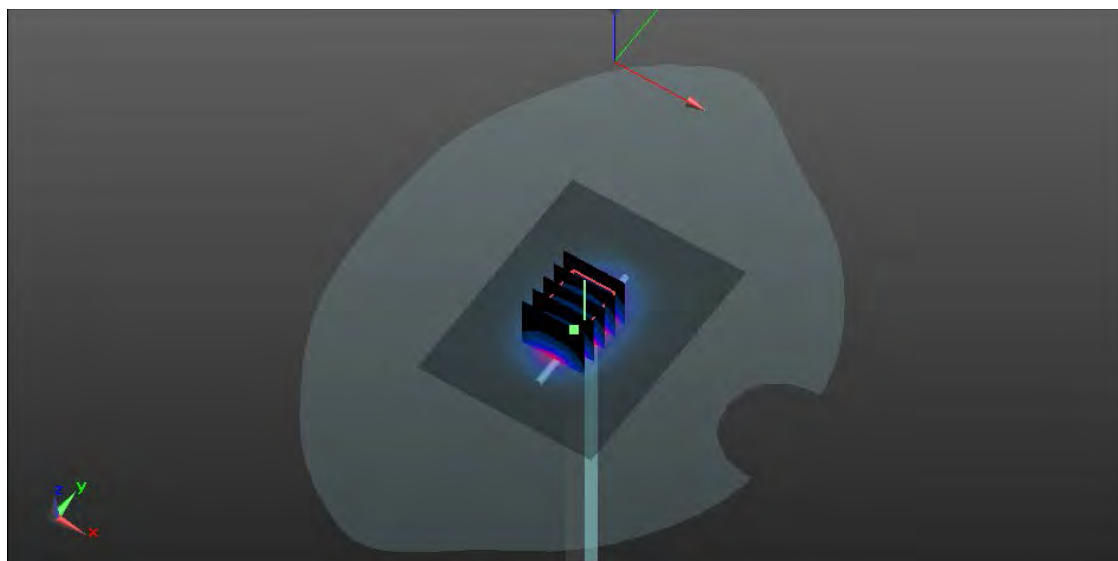
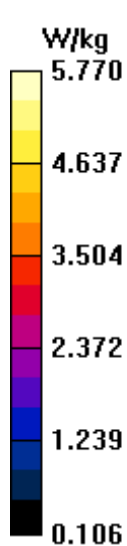
Reference Value = 34.662 V/m; Power Drift = -0.02 dB

Peak SAR (extrapolated) = 7.18 W/kg

$P_{in} = 100$ mW

SAR(1 g) = 4.12 W/kg; SAR(10 g) = 2.14 W/kg

Maximum value of SAR (measured) = 5.77 W/kg



RF Exposure Lab

Plot 11

DUT: Dipole 2300 MHz D2300V2; Type: D2300V2; Serial: D2300V2 - SN: 1060

Communication System: CW; Frequency: 2300 MHz; Duty Cycle: 1:1

Medium: HSL2300; Medium parameters used: $f = 2300$ MHz; $\sigma = 1.7$ S/m; $\epsilon_r = 38.69$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Test Date: Date: 4/20/2026; Ambient Temp: 23 °C; Tissue Temp: 21 °C

Probe: EX3DV4 – SN7530; ConvF(7.24, 7.18, 7.46); Calibrated: 1/14/2026;

Sensor-Surface: 2mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1321; Calibrated: 1/8/2026

Phantom: SAM 1; Type: SAM Twin Phantom; Serial: 1152

Measurement SW: DASY52, Version 52.10 (0); SEMCAD X Version 14.6.10 (7417)

Procedure Notes:

2300 MHz Head/Verification/Area Scan (61x101x1): Interpolated grid: dx=1.200 mm, dy=1.200 mm

Maximum value of SAR (interpolated) = 8.52 W/kg

2300 MHz Head/Verification/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

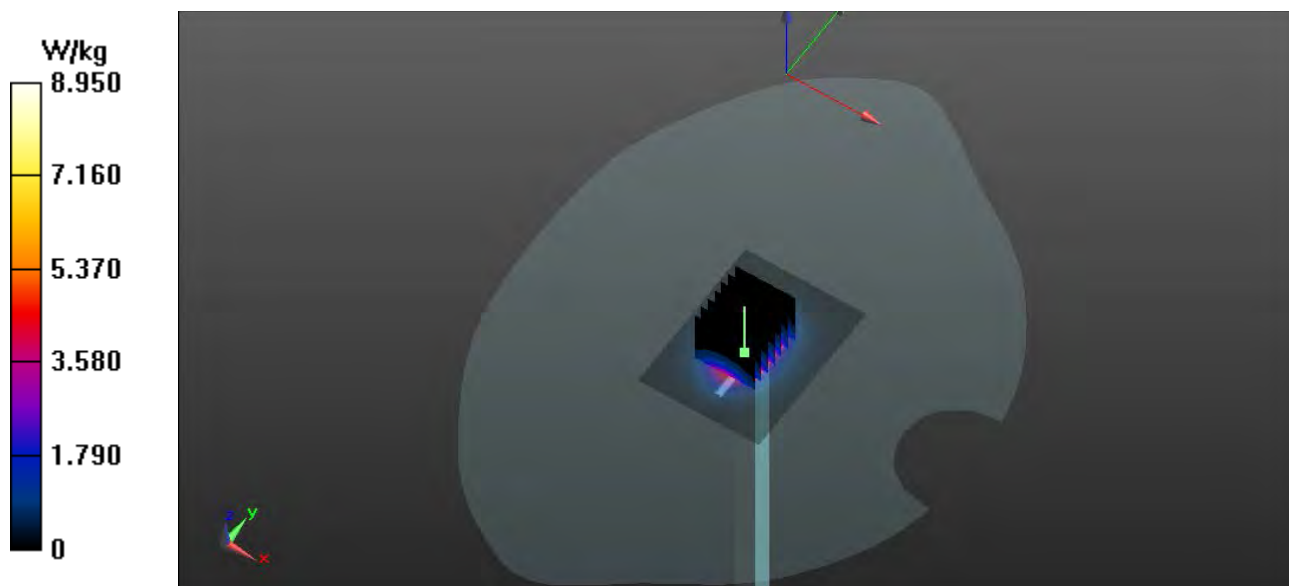
Reference Value = 59.157 V/m; Power Drift = -0.02 dB

Peak SAR (extrapolated) = 11.2 W/kg

$P_{in} = 100$ mW

SAR(1 g) = 5.01 W/kg; SAR(10 g) = 2.41 W/kg

Maximum value of SAR (measured) = 8.95 W/kg



RF Exposure Lab

Plot 12

DUT: Dipole 2550 MHz D2550V2; Type: D2550V2; Serial: D2550V2 - SN:1003

Communication System: CW; Frequency: 2550 MHz; Duty Cycle: 1:1

Medium: HSL2550; Medium parameters used: $f = 2550$ MHz; $\sigma = 1.92$ S/m; $\epsilon_r = 38.74$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Test Date: Date: 4/20/2026; Ambient Temp: 23 °C; Tissue Temp: 21 °C

Probe: EX3DV4 – SN7530; ConvF(7.33, 7.27, 7.56); Calibrated: 1/14/2026;

Sensor-Surface: 2mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1321; Calibrated: 1/8/2026

Phantom: SAM 1; Type: SAM Twin Phantom; Serial: 1152

Measurement SW: DASY52, Version 52.10 (0); SEMCAD X Version 14.6.10 (7417)

Procedure Notes:

2550 MHz Head/Verification/Area Scan (61x81x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm

Maximum value of SAR (interpolated) = 9.05 W/kg

2550 MHz Head/Verification/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

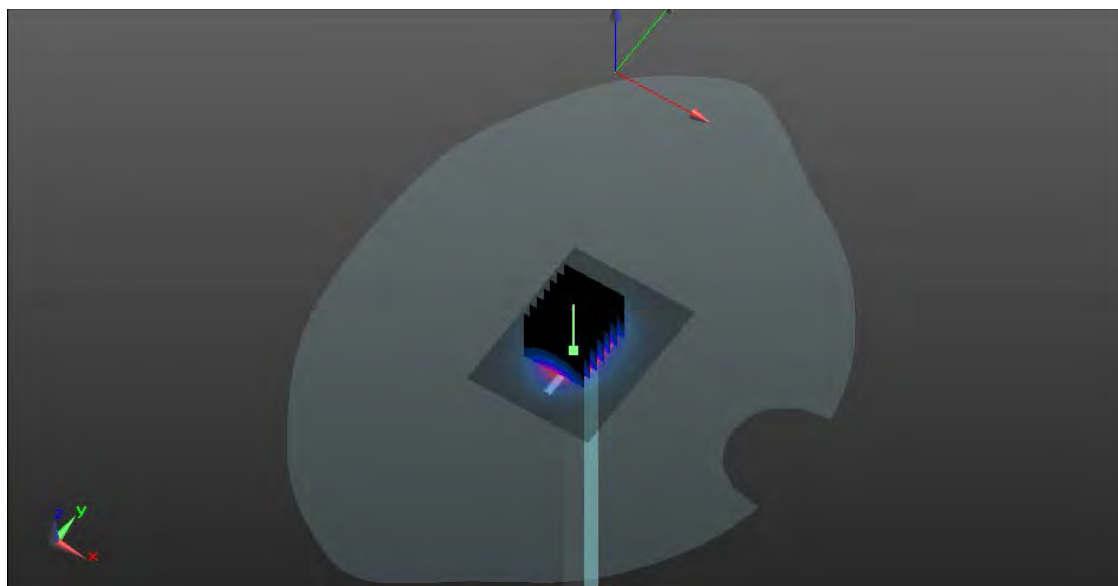
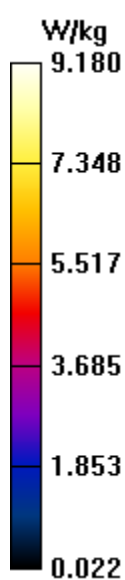
Reference Value = 55.923 V/m; Power Drift = -0.03 dB

Peak SAR (extrapolated) = 11.8 W/kg

$P_{in} = 100$ mW

SAR(1 g) = 5.66 W/kg; SAR(10 g) = 2.49 W/kg

Maximum value of SAR (measured) = 9.18 W/kg



RF Exposure Lab

Plot 13

DUT: Dipole D3300V2; Type: D3300V2; Serial: D3300V2 - SN: 1032

Communication System: CW; Frequency: 3300 MHz; Duty Cycle: 1:1

Medium: HSL 3-6 GHz; Medium parameters used: $f = 3300$ MHz; $\sigma = 2.73$ S/m; $\epsilon_r = 37.59$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Test Date: Date: 4/20/2026; Ambient Temp: 23 °C; Tissue Temp: 21 °C

Probe: EX3DV4 – SN7531; ConvF(6.56, 6.82, 7.23); Calibrated: 4/14/2026;

Sensor-Surface: 2mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1321; Calibrated: 1/8/2026

Phantom: SAM 1; Type: SAM Twin Phantom; Serial: 1152

Measurement SW: DASY52, Version 52.10 (0); SEMCAD X Version 14.6.10 (7417)

Procedure Notes:

3300 MHz Head/Verification/Area Scan (61x81x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm

Maximum value of SAR (interpolated) = 1.81 W/kg

3300 MHz Head/Verification/Zoom Scan (7x7x12)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm

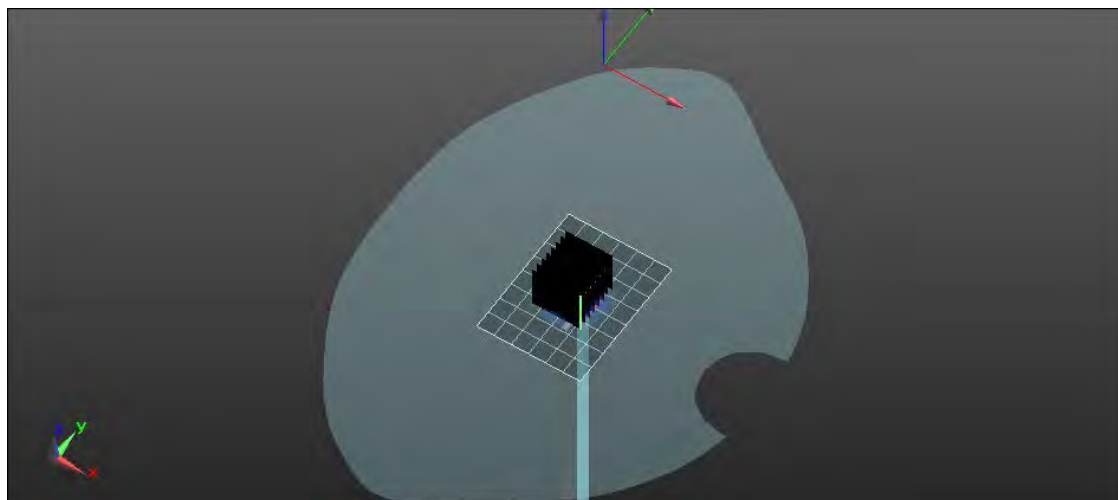
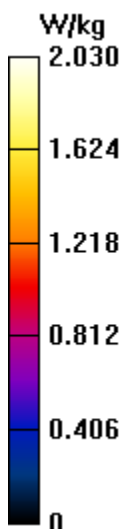
Reference Value = 14.856 V/m; Power Drift = -0.01 dB

Peak SAR (extrapolated) = 3.68 W/kg

Pin=10 mW

SAR(1 g) = 0.659 W/kg; SAR(10 g) = 0.253 W/kg

Maximum value of SAR (measured) = 2.03 W/kg



RF Exposure Lab

Plot 14

DUT: Dipole D3500V2; Type: D3500V2; Serial: D3500V2 - SN: 1061

Communication System: CW; Frequency: 3500 MHz; Duty Cycle: 1:1

Medium: HSL 3-6 GHz; Medium parameters used: $f = 3500$ MHz; $\sigma = 2.94$ S/m; $\epsilon_r = 37.36$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Test Date: Date: 4/21/2026; Ambient Temp: 23 °C; Tissue Temp: 21 °C

Probe: EX3DV4 - SN7531; ConvF(6.43, 6.69, 7.09); Calibrated: 4/14/2026;

Sensor-Surface: 2mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1321; Calibrated: 1/8/2026

Phantom: SAM 1; Type: SAM Twin Phantom; Serial: 1152

Measurement SW: DASY52, Version 52.10 (0); SEMCAD X Version 14.6.10 (7417)

Procedure Notes:

3500 MHz Head/Verification/Area Scan (7x9x1): Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (measured) = 1.65 W/kg

3500 MHz Head/Verification/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=4mm

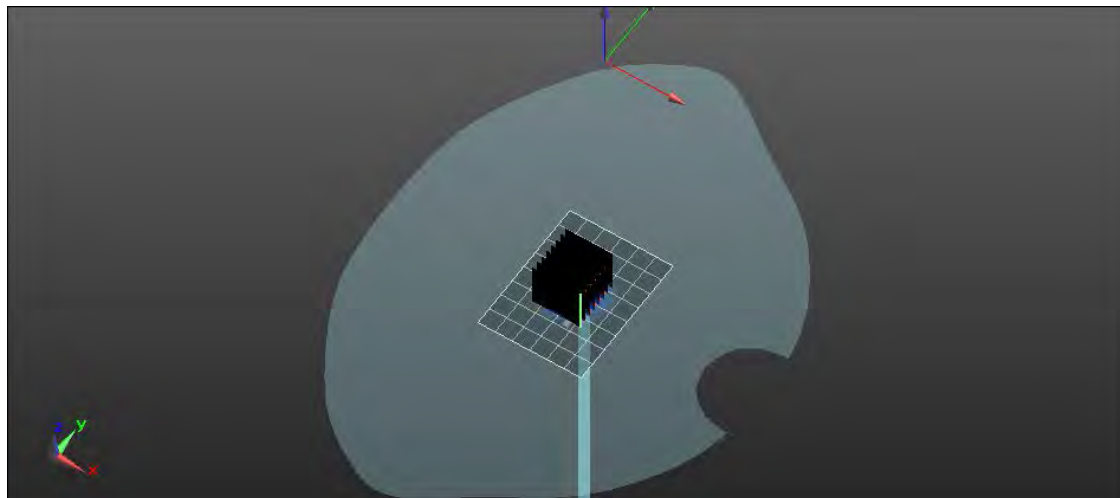
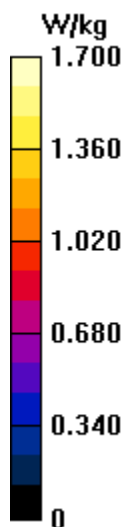
Reference Value = 21.367 V/m; Power Drift = -0.02 dB

Peak SAR (extrapolated) = 3.71 W/kg

$P_{in} = 10$ mW

SAR(1 g) = 0.682 W/kg; SAR(10 g) = 0.254 W/kg

Maximum value of SAR (measured) = 1.7 W/kg



RF Exposure Lab

Plot 15

DUT: Dipole D3700V2; Type: D3700V2; Serial: D3700V2 - SN:1024

Communication System: CW; Frequency: 3700 MHz; Duty Cycle: 1:1

Medium: HSL 3-6 GHz; Medium parameters used: $f = 3700$ MHz; $\sigma = 3.15$ S/m; $\epsilon_r = 37.13$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Test Date: Date: 4/21/2026; Ambient Temp: 23 °C; Tissue Temp: 21 °C

Probe: EX3DV4 – SN7531; ConvF(6.32, 6.57, 6.96); Calibrated: 4/14/2026;

Sensor-Surface: 2mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1321; Calibrated: 1/8/2026

Phantom: SAM 1; Type: SAM Twin Phantom; Serial: 1152

Measurement SW: DASY52, Version 52.10 (0); SEMCAD X Version 14.6.10 (7417)

Procedure Notes:

3700 MHz Head/Verification/Area Scan (61x81x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm

Maximum value of SAR (interpolated) = 1.65 W/kg

3700 MHz Head/Verification/Zoom Scan (7x7x12)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm

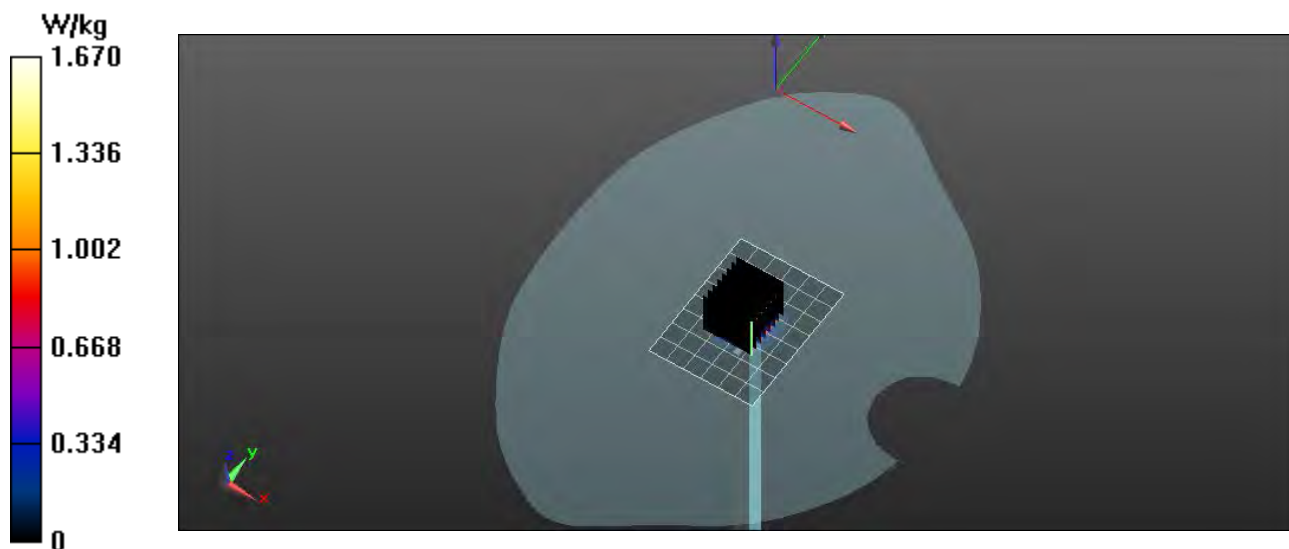
Reference Value = 21.467 V/m; Power Drift = -0.01 dB

Peak SAR (extrapolated) = 3.47 W/kg

$P_{in} = 10$ mW

SAR(1 g) = 0.698 W/kg; SAR(10 g) = 0.251 W/kg

Maximum value of SAR (measured) = 1.67 W/kg



RF Exposure Lab

Plot 16

DUT: Dipole D3900V2; Type: D3900V2; Serial: D3900V2 - SN:1082

Communication System: CW; Frequency: 3900 MHz; Duty Cycle: 1:1

Medium: HSL 3-6 GHz; Medium parameters used: $f = 3900$ MHz; $\sigma = 3.37$ S/m; $\epsilon_r = 36.9$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Test Date: Date: 4/21/2026; Ambient Temp: 23 °C; Tissue Temp: 21 °C

Probe: EX3DV4 – SN7531; ConvF(6.21, 6.46, 6.84); Calibrated: 4/14/2026;

Sensor-Surface: 2mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1321; Calibrated: 1/8/2026

Phantom: SAM 1; Type: SAM Twin Phantom; Serial: 1152

Measurement SW: DASY52, Version 52.10 (0); SEMCAD X Version 14.6.10 (7417)

Procedure Notes:

3900 MHz Head/Verification/Area Scan (61x81x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm

Maximum value of SAR (interpolated) = 1.47 W/kg

3900 MHz Head/Verification/Zoom Scan (7x7x12)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm

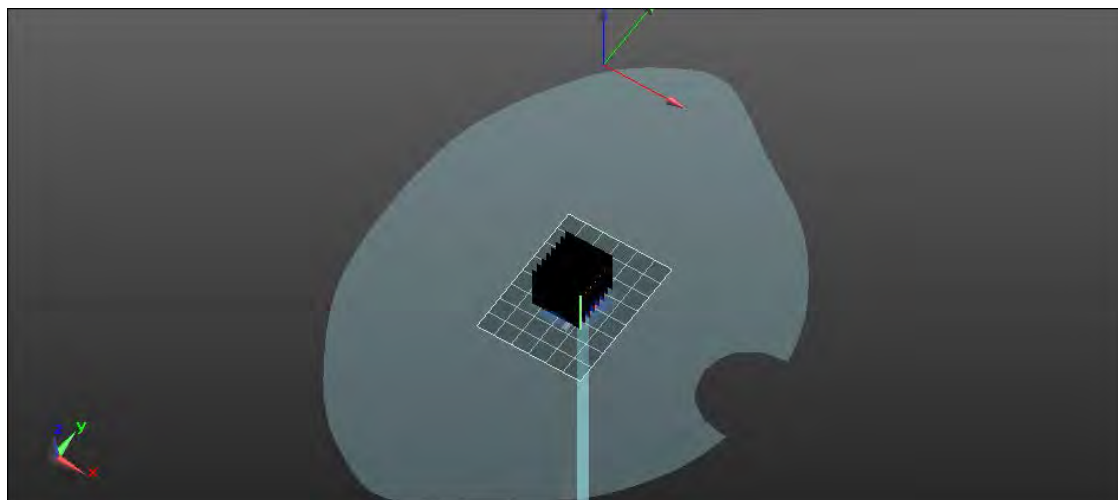
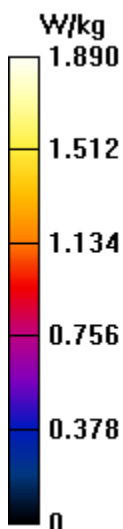
Reference Value = 15.385 V/m; Power Drift = -0.04 dB

Peak SAR (extrapolated) = 3.34 W/kg

Pin=10 mW

SAR(1 g) = 0.709 W/kg; SAR(10 g) = 0.248 W/kg

Maximum value of SAR (measured) = 1.89 W/kg



RF Exposure Lab

Plot 17

DUT: Dipole D4200V2; Type: D4200V2; Serial: D4200V2 - SN:1025

Communication System: CW; Frequency: 4200 MHz; Duty Cycle: 1:1

Medium: HSL 3-6 GHz; Medium parameters used: $f = 4200$ MHz; $\sigma = 3.68$ S/m; $\epsilon_r = 36.55$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Test Date: Date: 4/21/2026; Ambient Temp: 23 °C; Tissue Temp: 21 °C

Probe: EX3DV4 – SN3693; ConvF(5.83, 6.08, 6.52); Calibrated: 9/16/2025;

Sensor-Surface: 2mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1321; Calibrated: 1/8/2026

Phantom: SAM 1; Type: SAM Twin Phantom; Serial: 1152

Measurement SW: DASY52, Version 52.10 (0); SEMCAD X Version 14.6.10 (7417)

Procedure Notes:

4200 MHz Head/Verification/Area Scan (61x81x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm

[Info: Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (interpolated) = 1.72 W/kg

4200 MHz Head/Verification/Zoom Scan (7x7x12)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm

Reference Value = 17.167 V/m; Power Drift = -0.01 dB

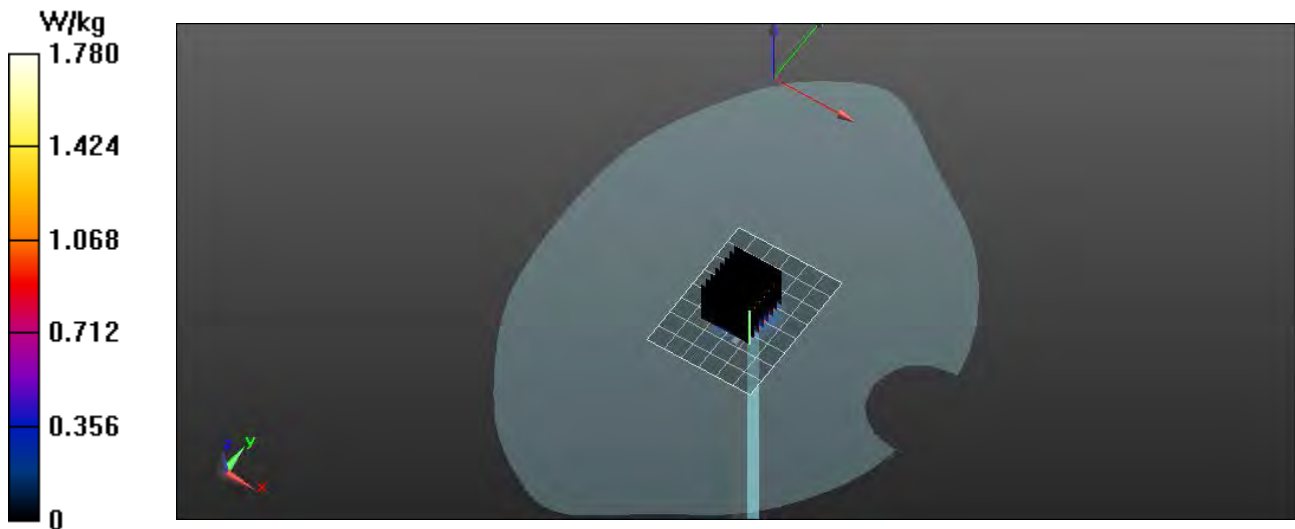
Peak SAR (extrapolated) = 2.46 W/kg

Pin=10 mW

SAR(1 g) = 0.674 W/kg; SAR(10 g) = 0.228 W/kg

[Info: Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (measured) = 1.77 W/kg



Appendix B – SAR Test Data Plots

RF Exposure Lab

Plot 1

DUT: Samsung Galaxy S26; Type: Cellular Phone; Serial: N/A

Communication System: LTE (SC-FDMA, 1 RB, 10 MHz, QPSK); Frequency: 707.5 MHz; Duty Cycle: 1:1
Medium: HSL750; Medium parameters used (interpolated): $f = 707.5$ MHz; $\sigma = 0.868$ S/m; $\epsilon_r = 41.708$; $\rho = 1000$ kg/m³
Phantom section: Right Section

Test Date: Date: 4/6/2026; Ambient Temp: 23 °C; Tissue Temp: 21 °C

Probe: EX3DV4 - SN7530; ConvF(9.88, 9.8, 10.19); Calibrated: 1/14/2026
Sensor-Surface: 2mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1321; Calibrated: 1/8/2026
Phantom: SAM 1; Type: SAM Twin Phantom; Serial: 1152
Measurement SW: DASY52, Version 52.10 (4); SEMCAD X Version 14.6.14 (7483)

Procedure Notes:

LTE Band 12 Head/Mid/Area Scan (7x13x1): Measurement grid: dx=15mm, dy=15mm

[Info: Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (measured) = 0.827 W/kg

LTE Band 12 Head/Mid/Zoom Scan (7x9x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 1.623 V/m; Power Drift = 0.0 dB

Peak SAR (extrapolated) = 1.99 W/kg

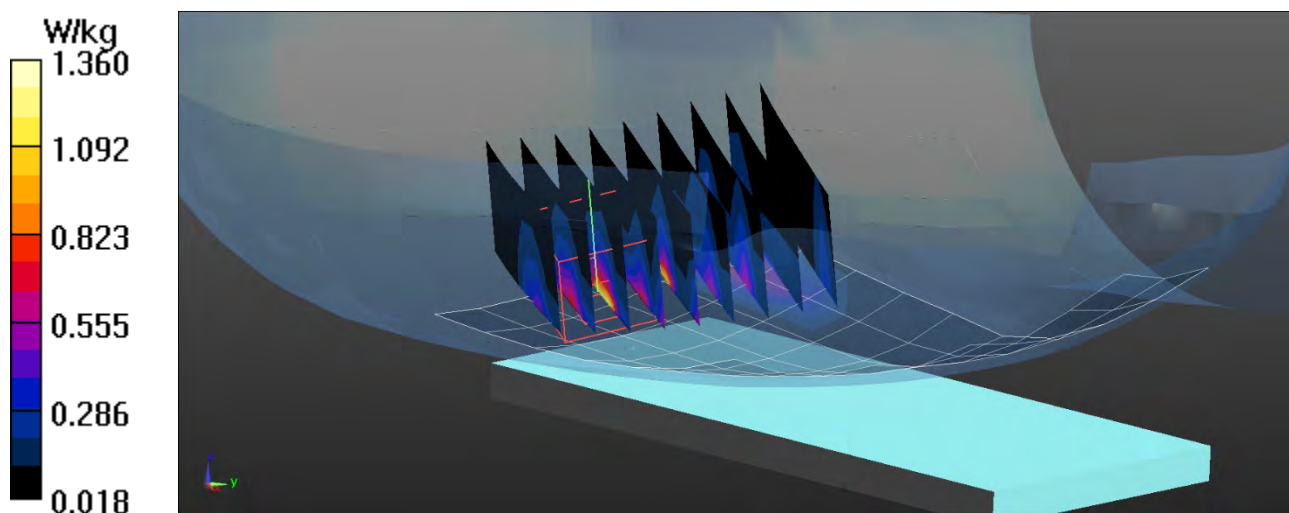
SAR(1 g) = 0.927 W/kg; SAR(10 g) = 0.383 W/kg

Smallest distance from peaks to all points 3 dB below = 9.6 mm

Ratio of SAR at M2 to SAR at M1 = 51.8%

[Info: Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (measured) = 1.36 W/kg



RF Exposure Lab

Plot 2

DUT: Samsung Galaxy S26; Type: Cellular Phone; Serial: N/A

Communication System: LTE (SC-FDMA, 1 RB, 10 MHz, QPSK); Frequency: 782 MHz; Duty Cycle: 1:1
Medium: HSL750; Medium parameters used (interpolated): $f = 782 \text{ MHz}$; $\sigma = 0.922 \text{ S/m}$; $\epsilon_r = 41.268$; $\rho = 1000 \text{ kg/m}^3$
Phantom section: Flat Section

Test Date: Date: 4/6/2026; Ambient Temp: 23 °C; Tissue Temp: 21 °C

Probe: EX3DV4 - SN7530; ConvF(9.88, 9.8, 10.19); Calibrated: 1/14/2026
Sensor-Surface: 2mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1321; Calibrated: 1/8/2026
Phantom: SAM 1; Type: SAM Twin Phantom; Serial: 1152
Measurement SW: DASY52, Version 52.10 (4); SEMCAD X Version 14.6.14 (7483)

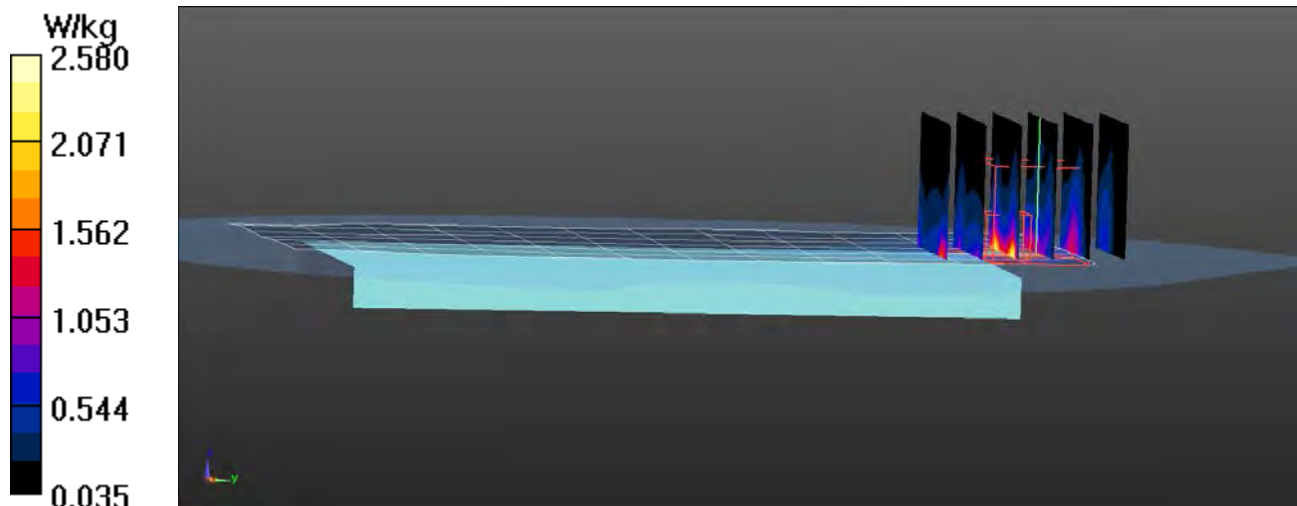
Procedure Notes:

LTE Band 13 Extremity/Back Mid/Area Scan (7x13x1): Measurement grid: dx=15mm, dy=15mm

[Info: Interpolated medium parameters used for SAR evaluation.](#)
Maximum value of SAR (measured) = 3.24 W/kg

LTE Band 13 Extremity/Back Mid/Zoom Scan (6x6x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 7.439 V/m; Power Drift = 0.05 dB
Peak SAR (extrapolated) = 3.60 W/kg
SAR(1 g) = 1.34 W/kg; SAR(10 g) = 0.648 W/kg
Smallest distance from peaks to all points 3 dB below = 9.5 mm
Ratio of SAR at M2 to SAR at M1 = 45.9%

[Info: Interpolated medium parameters used for SAR evaluation.](#)
Maximum value of SAR (measured) = 2.58 W/kg



RF Exposure Lab

Plot 3

DUT: iPhone 17 Pro; Type: Cellular Phone; Serial: N/A

Communication System: LTE (SC-FDMA, 1 RB, 10 MHz, QPSK); Frequency: 793 MHz; Duty Cycle: 1:1
Medium: HSL750; Medium parameters used (interpolated): $f = 793$ MHz; $\sigma = 0.96$ S/m; $\epsilon_r = 40.718$; $\rho = 1000$ kg/m³
Phantom section: Right Section

Test Date: Date: 4/17/2026; Ambient Temp: 23 °C; Tissue Temp: 21 °C

Probe: EX3DV4 - SN7530; ConvF(9.88, 9.8, 10.19); Calibrated: 1/14/2026
Sensor-Surface: 2mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1321; Calibrated: 1/8/2026
Phantom: SAM 1; Type: SAM Twin Phantom; Serial: 1152
Measurement SW: DASY52, Version 52.10 (4); SEMCAD X Version 14.6.14 (7483)

Procedure Notes:

LTE Band 14 Head/Mid/Area Scan (8x14x1): Measurement grid: dx=15mm, dy=15mm

[Info: Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (measured) = 0.881 W/kg

LTE Band 14 Head/Mid/Zoom Scan (6x6x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 20.27 V/m; Power Drift = 0.04 dB

Peak SAR (extrapolated) = 1.17 W/kg

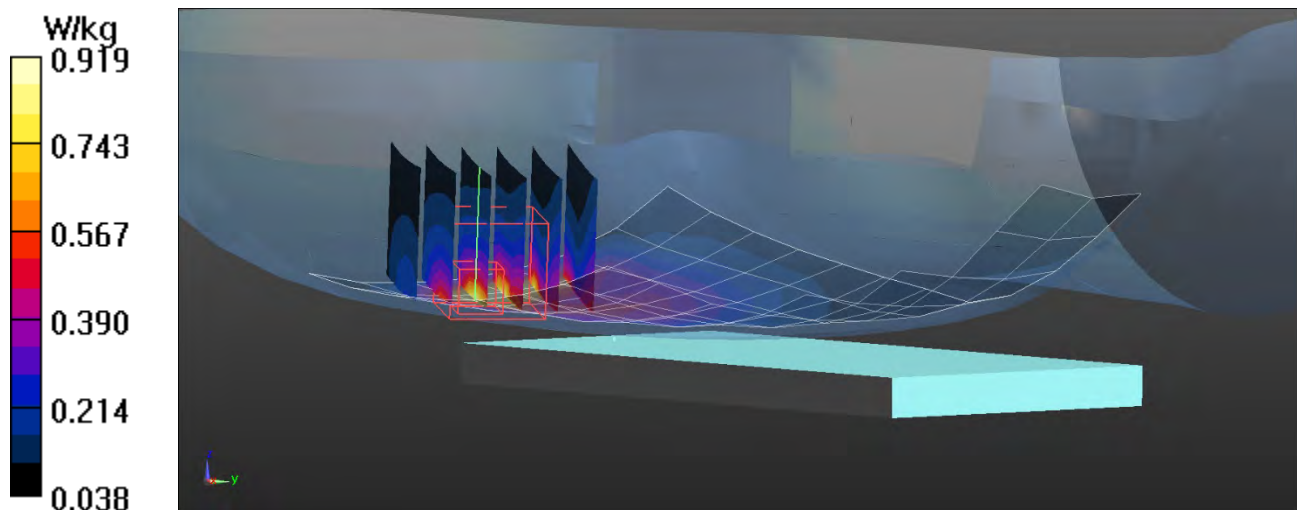
SAR(1 g) = 0.624 W/kg; SAR(10 g) = 0.371 W/kg

Smallest distance from peaks to all points 3 dB below = 10.1 mm

Ratio of SAR at M2 to SAR at M1 = 53.9%

[Info: Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (measured) = 0.919 W/kg



RF Exposure Lab

Plot 4

DUT: iPhone 17 Pro; Type: Cellular Phone; Serial: N/A

Communication System: LTE (SC-FDMA, 1 RB, 20 MHz, QPSK); Frequency: 1745 MHz; Duty Cycle: 1:1
Medium: HSL1750; Medium parameters used (interpolated): $f = 1745$ MHz; $\sigma = 1.385$ S/m; $\epsilon_r = 39.07$; $\rho = 1000$ kg/m³
Phantom section: Flat Section

Test Date: Date: 4/17/2026; Ambient Temp: 23 °C; Tissue Temp: 21 °C

Probe: EX3DV4 - SN7530; ConvF(7.76, 7.7, 8); Calibrated: 1/14/2026
Sensor-Surface: 2mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1321; Calibrated: 1/8/2026
Phantom: SAM 1; Type: SAM Twin Phantom; Serial: 1152
Measurement SW: DASY52, Version 52.10 (4); SEMCAD X Version 14.6.14 (7483)

Procedure Notes:

LTE Band 66 Extremity/Front Mid/Area Scan (7x13x1): Measurement grid: dx=15mm, dy=15mm

[Info: Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (measured) = 1.68 W/kg

LTE Band 66 Extremity/Front Mid/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 3.042 V/m; Power Drift = -0.05 dB

Peak SAR (extrapolated) = 1.98 W/kg

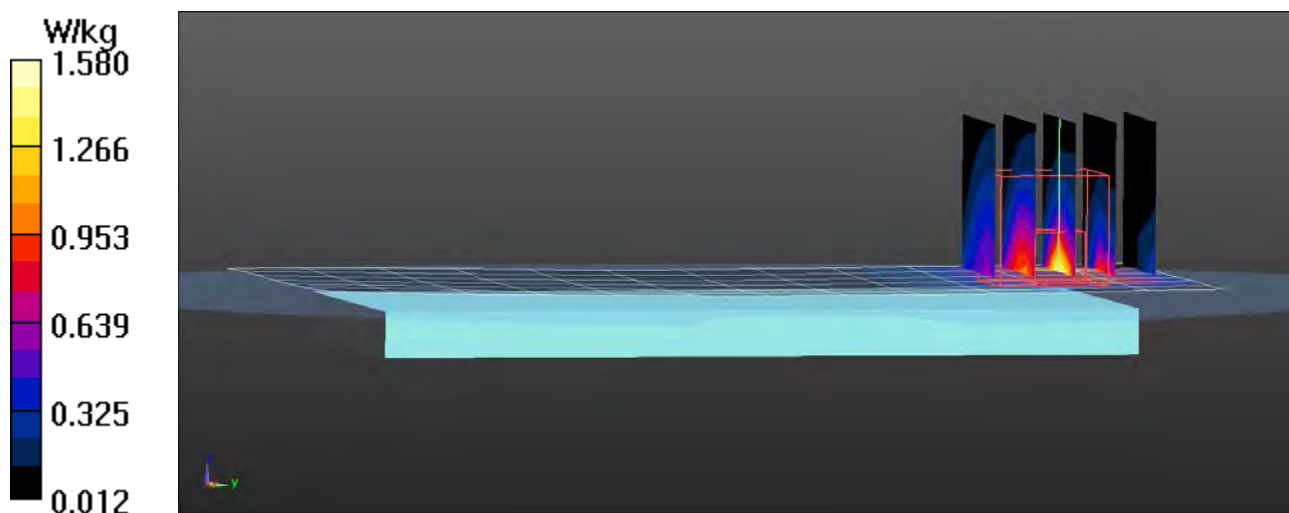
SAR(1 g) = 1.15 W/kg; SAR(10 g) = 0.588 W/kg

Smallest distance from peaks to all points 3 dB below = 9.1 mm

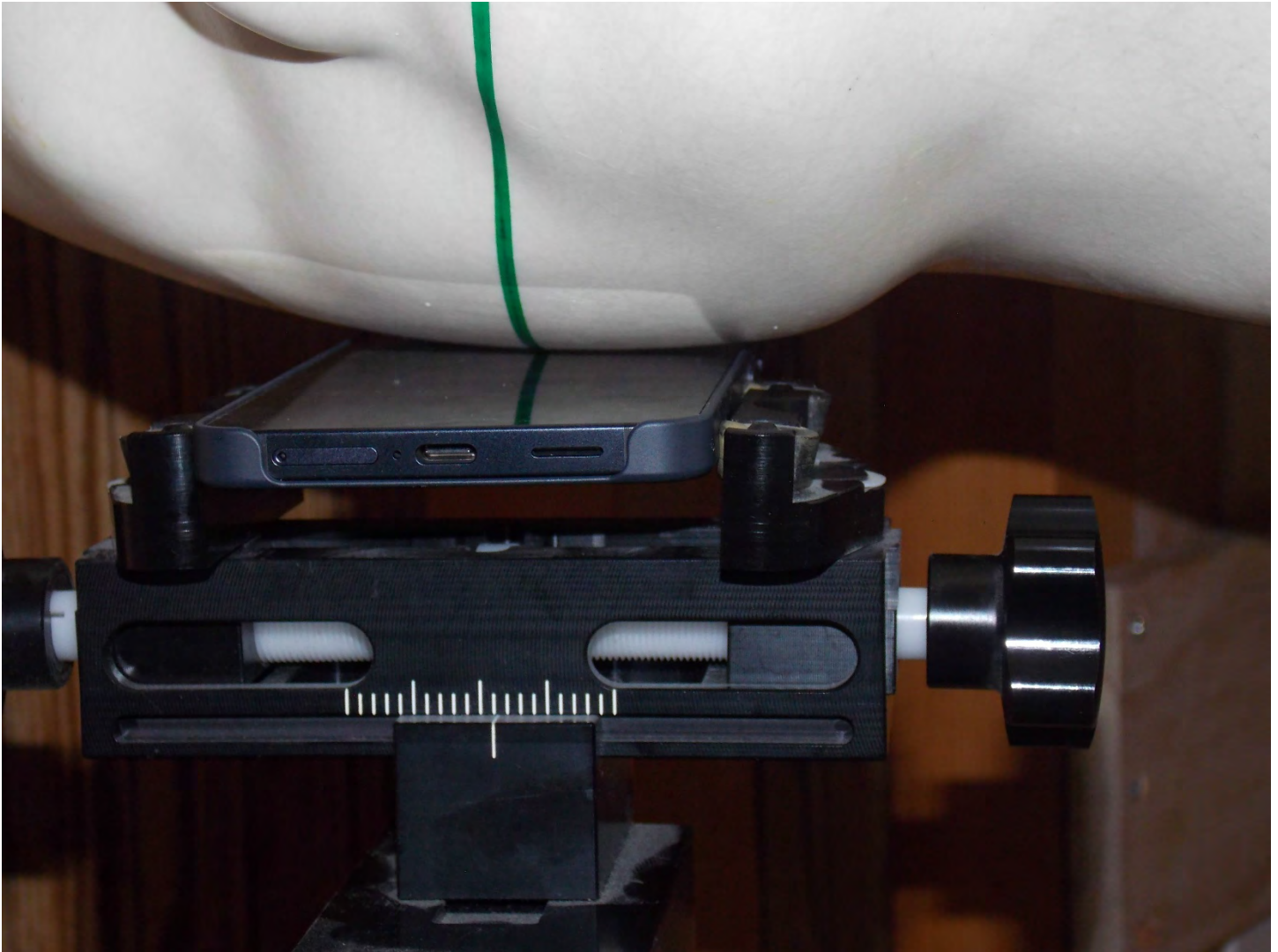
Ratio of SAR at M2 to SAR at M1 = 66.6%

[Info: Interpolated medium parameters used for SAR evaluation.](#)

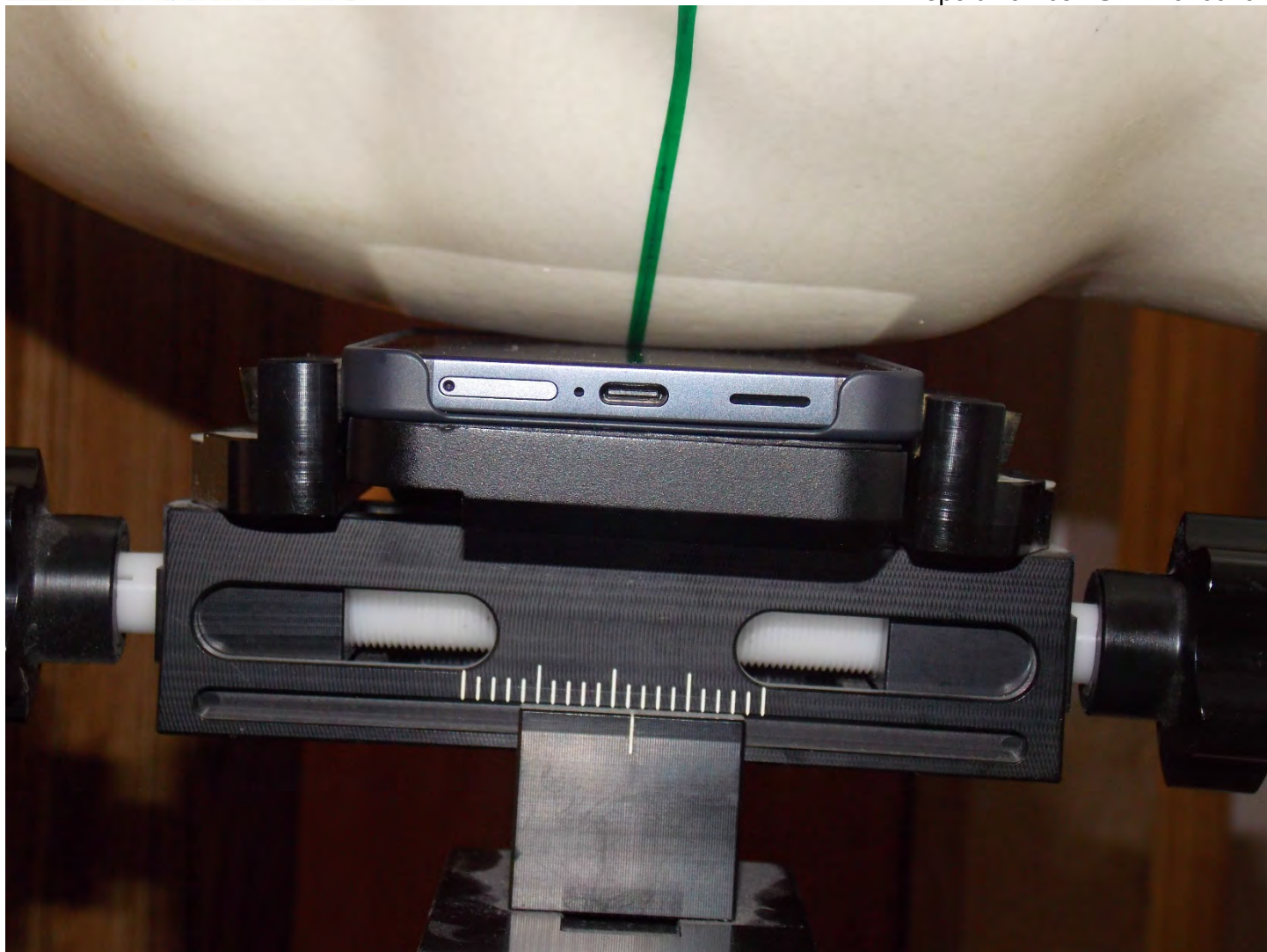
Maximum value of SAR (measured) = 1.58 W/kg



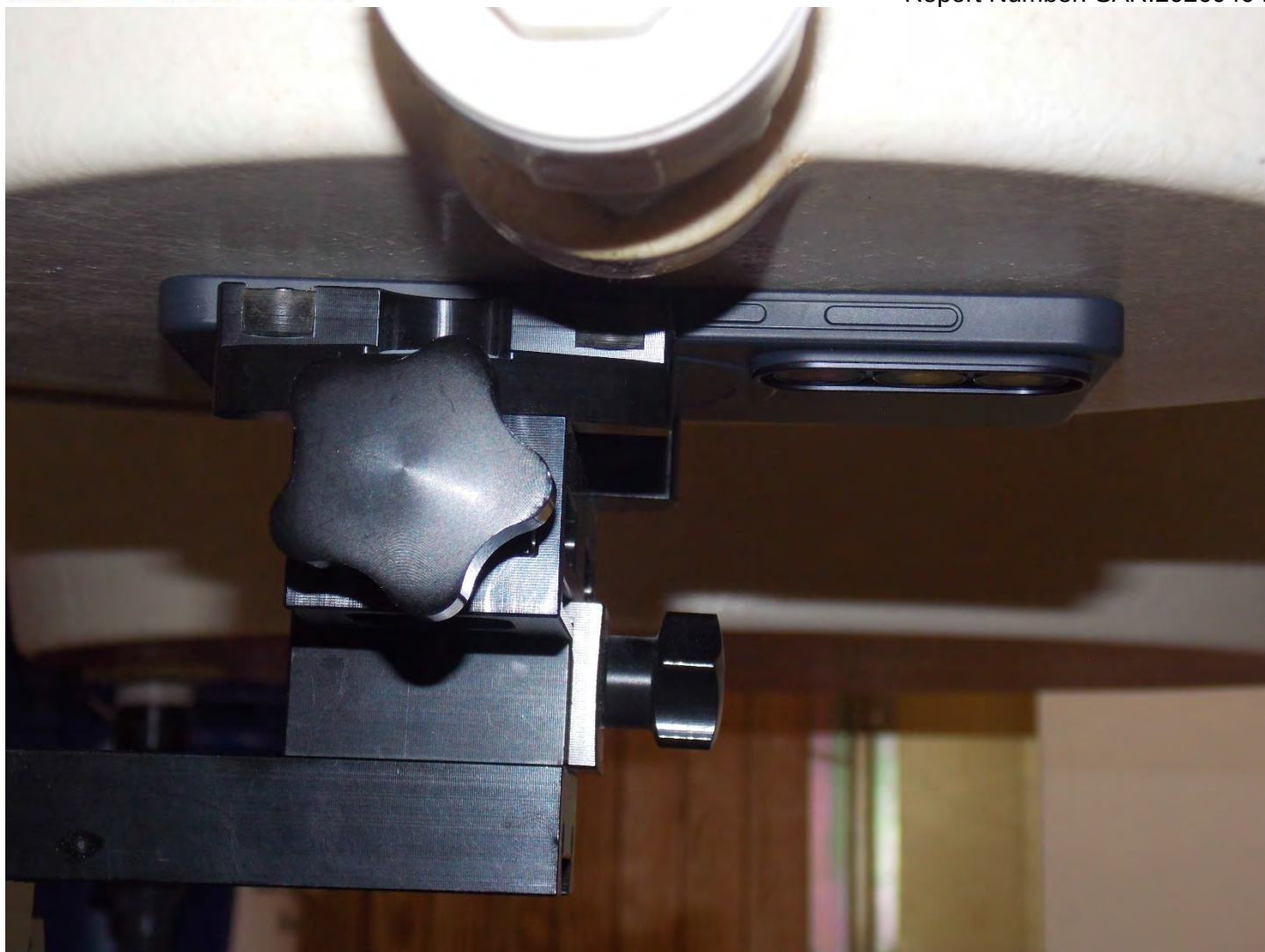
Appendix C – SAR Test Setup Photos



Samsung Test Position Right Head without Lynx 0 mm Gap



Samsung Test Position Right Head with Lynx 0 mm Gap



Samsung Test Position Front Body without Lynx 0 mm Gap



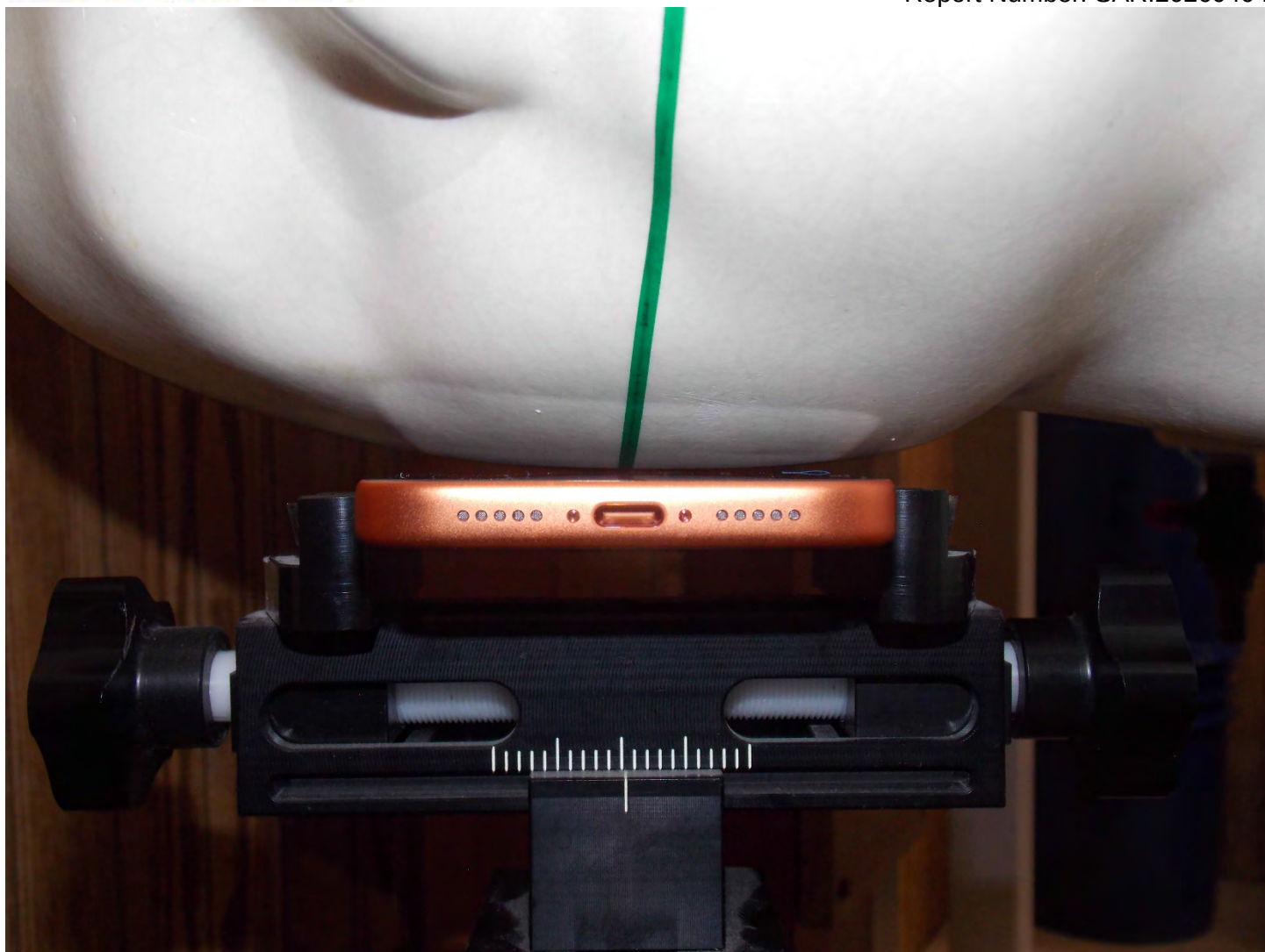
Samsung Test Position Front Body with Lynx 0 mm Gap



Samsung Front of Device



Samsung Back of Device



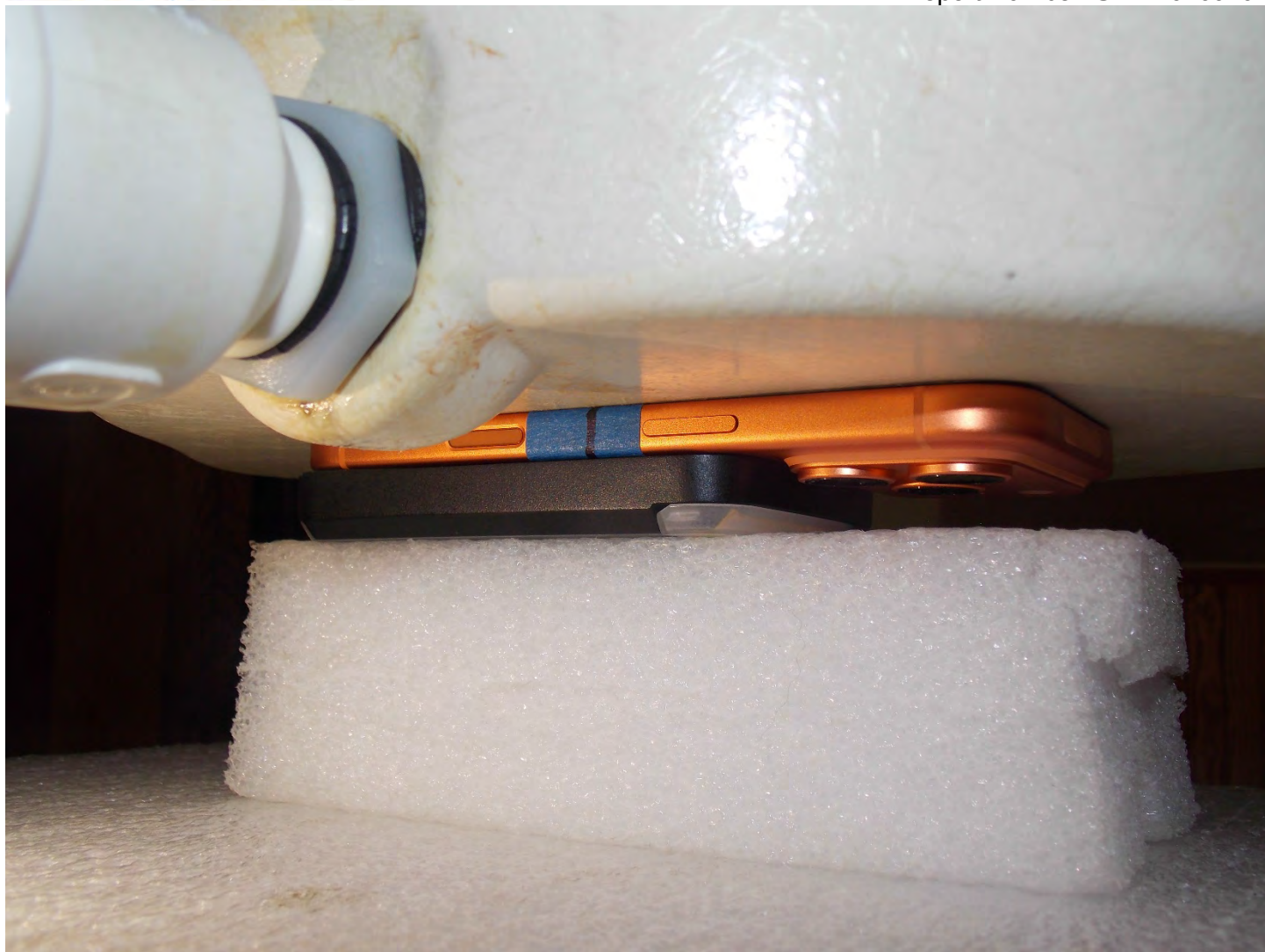
iPhone Test Position Right Head without Lynx 0 mm Gap



iPhone Test Position Right Head with Lynx 0 mm Gap



iPhone Test Position Front Body without Lynx 0 mm Gap



iPhone Test Position Front Body with Lynx 0 mm Gap



iPhone Front of Device



iPhone Back of Device



Lynx Back of Device



Lynx Back of Device Antenna Extended



Lynx Front of Device



Lynx Front of Device Antenna Extended

Appendix D – Probe Calibration Data Sheets

Calibration Laboratory ofSchmid & Partner
Engineering AG

Zeughausstrasse 43, 8004 Zurich, Switzerland

**S** Schweizerischer Kalibrierdienst
C Service suisse d'étalonnage
S Servizio svizzero di taratura
S Swiss Calibration Service

Accredited by the Swiss Accreditation Service (SAS)

**The Swiss Accreditation Service is one of the signatories to the EA
Multilateral Agreement for the recognition of calibration certificates**Accreditation No.: **SCS 0108**

Client

RF Exposure Lab

San Marcos, USA

Certificate No.

EX-3693_Sep25**CALIBRATION CERTIFICATE**Object **EX3DV4 - SN:3693**Calibration procedure(s) **QA CAL-01.v10, QA CAL-12.v10, QA CAL-14.v7, QA CAL-23.v6,
QA CAL-25.v8
Calibration procedure for dosimetric E-field probes**Calibration date **September 16, 2025**

This calibration certificate documents the traceability to national standards, which realize the physical units of measurements (SI).
The measurements and the uncertainties with confidence probability are given on the following pages and are part of the certificate.

All calibrations have been conducted in the closed laboratory facility: environment temperature $(22 \pm 3)^\circ\text{C}$ and humidity $< 70\%$.

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID	Calibration Date (Certificate No.)	Sched. Cal.
Power Sensor R&S NRP-33T	SN: 100967	30-Apr-25 (No. 1020-300791789)	Apr-26
N-type mismatch combination	SN: L1119	26-Mar-25 (No. 217-04292)	Mar-26
OCF DAK-12	SN: 1016	24-Sept-24 (No. OCF-DAK12-1016_Sep24)	Sep-25
OCF DAK-3.5	SN: 1249	23-Sept-24 (No. OCF-DAK3.5-1249_Sep24)	Sep-25
Reference Probe EX3DV4	SN: 7349	10-Jan-25 (No. EX3-7349_Jan25)	Jan-26
DAE4	SN: 1301	07-Nov-24 (No. DAE4-1301_Nov24)	Nov-25

Secondary Standards	ID	Check Date (in house)	Sched. Check
ACAP 2020 Setup 1	SN: L1404	30-Sept-24 (No. Report_ACAP2020E-Cave_20240930s)	Sep-25
OCF DAK-12	SN: 1029	27-Feb-25 (No. OCF-DAK12-1029_Feb25)	Feb-26
OCF DAK-3.5	SN: 1336	09-Dec-24 (No. OCF-DAK3.5-1336_Dec24)	Dec-25

	Name	Function	Signature
Calibrated by	Paulo Pina	Laboratory Technician	
Approved by	Sven Kühn	Technical Manager	
			Issued: September 16, 2025
This calibration certificate shall not be reproduced except in full without written approval of the laboratory.			



Accredited by the Swiss Accreditation Service (SAS)

Accreditation No.: **SCS 0108**

The Swiss Accreditation Service is one of the signatories to the EA
Multilateral Agreement for the recognition of calibration certificates

Glossary

TSL	tissue simulating liquid
NORM _{x,y,z}	sensitivity in free space
ConvF	sensitivity in TSL / NORM _{x,y,z}
DCP	diode compression point
CF	crest factor (1/duty_cycle) of the RF signal
A, B, C, D	modulation dependent linearization parameters
Polarization φ	φ rotation around probe axis
Polarization ϑ	ϑ rotation around an axis that is in the plane normal to probe axis (at measurement center), i.e., $\vartheta = 0$ is normal to probe axis
Connector Angle	information used in DASY system to align probe sensor X to the robot coordinate system

Calibration is Performed According to the Following Standards:

- IEC/IEEE 62209-1528, "Measurement Procedure For The Assessment Of Specific Absorption Rate Of Human Exposure To Radio Frequency Fields From Hand-Held And Body-Worn Wireless Communication Devices – Part 1528: Human Models, Instrumentation And Procedures (Frequency Range of 4 MHz to 10 GHz)", October 2020.
- KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

Methods Applied and Interpretation of Parameters:

- NORM_{x,y,z}**: Assessed for E-field polarization $\vartheta = 0$ ($f \leq 900$ MHz in TEM-cell; $f > 1800$ MHz: R22 waveguide). NORM_{x,y,z} are only intermediate values, i.e., the uncertainties of NORM_{x,y,z} does not affect the E²-field uncertainty inside TSL (see below ConvF).
- NORM(f)_{x,y,z}** = NORM_{x,y,z} * frequency_response (see Frequency Response Chart). This linearization is implemented in DASY4 software versions later than 4.2. The uncertainty of the frequency response is included in the stated uncertainty of ConvF.
- DCP_{x,y,z}**: DCP are numerical linearization parameters assessed based on the data of power sweep with CW signal. DCP does not depend on frequency nor media.
- PAR**: PAR is the Peak to Average Ratio that is not calibrated but determined based on the signal characteristics
- A_{x,y,z}; B_{x,y,z}; C_{x,y,z}; D_{x,y,z}; VR_{x,y,z}**: A, B, C, D are numerical linearization parameters assessed based on the data of power sweep for specific modulation signal. The parameters do not depend on frequency nor media. VR is the maximum calibration range expressed in RMS voltage across the diode.
- ConvF and Boundary Effect Parameters**: Assessed in flat phantom using E-field (or Temperature Transfer Standard for $f \leq 800$ MHz) and inside waveguide using analytical field distributions based on power measurements for $f > 800$ MHz. The same setups are used for assessment of the parameters applied for boundary compensation (alpha, depth) of which typical uncertainty values are given. These parameters are used in DASY4 software to improve probe accuracy close to the boundary. The sensitivity in TSL corresponds to NORM_{x,y,z} * ConvF whereby the uncertainty corresponds to that given for ConvF. A frequency dependent ConvF is used in DASY version 4.4 and higher which allows extending the validity from ± 50 MHz to ± 100 MHz.
- Spherical isotropy (3D deviation from isotropy)**: in a field of low gradients realized using a flat phantom exposed by a patch antenna.
- Sensor Offset**: The sensor offset corresponds to the offset of virtual measurement center from the probe tip (on probe axis). No tolerance required.
- Connector Angle**: The angle is assessed using the information gained by determining the NORM_x (no uncertainty required).

Parameters of Probe: EX3DV4 - SN:3693

Basic Calibration Parameters

	Sensor X	Sensor Y	Sensor Z	Unc ($k = 2$)
Norm ($\mu\text{V}/(\text{V}/\text{m})^2$) ^A	0.62	0.60	0.63	$\pm 10.1\%$
DCP (mV) ^B	103.8	109.1	107.3	$\pm 4.7\%$

Calibration Results for Modulation Response

UID	Communication System Name		A dB	B $\text{dB}\sqrt{\mu\text{V}}$	C	D dB	VR mV	Max dev.	Max Unc ^E $k = 2$
0	CW	X	0.00	0.00	1.00	0.00	139.4	$\pm 2.5\%$	$\pm 4.7\%$
		Y	0.00	0.00	1.00		145.5		
		Z	0.00	0.00	1.00		141.4		
10657	Pulse, 42us on, 1 ms period	X	1.55	57.10	4.30	13.77	46.9	$\pm 4.4\%$	$\pm 4.7\%$
		Y	1.31	54.20	3.50		34.4		
		Z	1.62	57.10	4.60		46.8		

The reported uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor $k=2$, which for a normal distribution corresponds to a coverage probability of approximately 95%.

^A The uncertainties of Norm X,Y,Z do not affect the E^2 -field uncertainty inside TSL (see Pages 5 and 6).

^B Linearization parameter uncertainty for maximum specified field strength.

^E Uncertainty is determined using the max. deviation from linear response applying rectangular distribution and is expressed for the square of the field value.

Parameters of Probe: EX3DV4 - SN:3693**Other Probe Parameters**

Sensor Arrangement	Triangular
Connector Angle	-68.7°
Mechanical Surface Detection Mode	enabled
Optical Surface Detection Mode	disabled
Probe Overall Length	337 mm
Probe Body Diameter	12 mm
Tip Length	9 mm
Tip Diameter	2.5 mm
Probe Tip to Sensor X Calibration Point	1 mm
Probe Tip to Sensor Y Calibration Point	1 mm
Probe Tip to Sensor Z Calibration Point	1 mm
Recommended Measurement Distance from Surface	1.4 mm

Note: Measurement distance from surface can be increased to 3–4 mm for an *Area Scan* job.

Parameters of Probe: EX3DV4 - SN:3693

Calibration Parameter Determined in HSL

f (MHz) ^C	Relative Permittivity ^F	Conductivity ^F (S/m)	ConvF X	ConvF Y	ConvF Z	Alpha ^G	Depth ^G (mm)	Unc ^H (k = 2)
13	55.0	0.75	13.82	14.29	15.46	0.00	1.25	±13.3%
64	54.2	0.75	12.34	12.76	13.80	0.00	1.25	±13.3%
128	52.8	0.76	12.02	12.43	13.45	0.00	1.25	±13.3%
300	45.3	0.87	11.76	11.76	11.76	0.09	1.00	±13.3%
600	42.7	0.88	9.99	9.99	9.99	0.10	1.25	±13.3%
1100	41.2	1.06	8.09	8.44	9.05	0.39	1.27	±11.0%
1300	40.8	1.14	7.81	8.14	8.72	0.39	1.27	±11.0%
1450	40.5	1.20	7.60	7.93	8.50	0.39	1.27	±11.0%
2100	39.8	1.49	6.99	7.30	7.82	0.39	1.27	±11.0%
2450	39.2	1.80	6.60	6.88	7.37	0.39	1.27	±11.0%
4200	37.1	3.63	5.83	6.08	6.52	0.38	1.27	±13.1%
4400	36.9	3.84	5.72	5.97	6.39	0.38	1.27	±13.1%
4600	36.7	4.04	5.60	5.84	6.26	0.38	1.27	±13.1%
4950	36.3	4.40	5.44	5.68	6.08	0.36	1.27	±13.1%
5250	35.9	4.71	5.26	5.49	5.88	0.33	1.27	±13.1%
5600	35.5	5.07	4.85	5.06	5.42	0.29	1.27	±13.1%
5750	35.4	5.22	4.88	5.09	5.46	0.28	1.27	±13.1%

^C Frequency validity above 300 MHz of ±100 MHz only applies for DASY v4.4 and higher (see Page 2), else it is restricted to ±50 MHz. The uncertainty is the RSS of the ConvF uncertainty at calibration frequency and the uncertainty for the indicated frequency band. Frequency validity below 300 MHz is ±10, 25, 40, 50 and 70 MHz for ConvF assessments at 30, 64, 128, 150 and 220 MHz respectively. Validity of ConvF assessed at 6 MHz is 4–9 MHz, and ConvF assessed at 13 MHz is 9–19 MHz. Above 5 GHz frequency validity can be extended to ±110 MHz.

^F The probes are calibrated using tissue simulating liquids (TSL) that deviate for ϵ and σ by less than ±5% from the target values (typically better than ±3%) and are valid for TSL with deviations of up to ±10% if SAR correction is applied.

^G Alpha/Depth are determined during calibration. SPEAG warrants that the remaining deviation due to the boundary effect after compensation is always less than ±1% for frequencies below 3 GHz and below ±2% for frequencies between 3–6 GHz at any distance larger than half the probe tip diameter from the boundary.

^H The stated uncertainty is the total calibration uncertainty ($k = 2$) of Norm-ConvF. This is equivalent to the uncertainty component with the symbol CF in Table 9 of IEC/IEEE 62209-1528:2020.

Parameters of Probe: EX3DV4 - SN:3693

Calibration Parameter Determined in HSL

f (MHz) ^C	Relative Permittivity ^F	Conductivity ^F (S/m)	ConvF X	ConvF Y	ConvF Z	Alpha ^G	Depth ^G (mm)	Unc ^H (k = 2)
6500	34.5	6.07	5.04	5.25	5.63	0.20	1.27	±18.6%

^C Frequency validity is -600/+700 MHz at 6.5 GHz, ±700 MHz at or above 7 GHz, and ±150 MHz at 9.85 GHz. The uncertainty is the RSS of the ConvF uncertainty at calibration frequency and the uncertainty for the indicated frequency band.

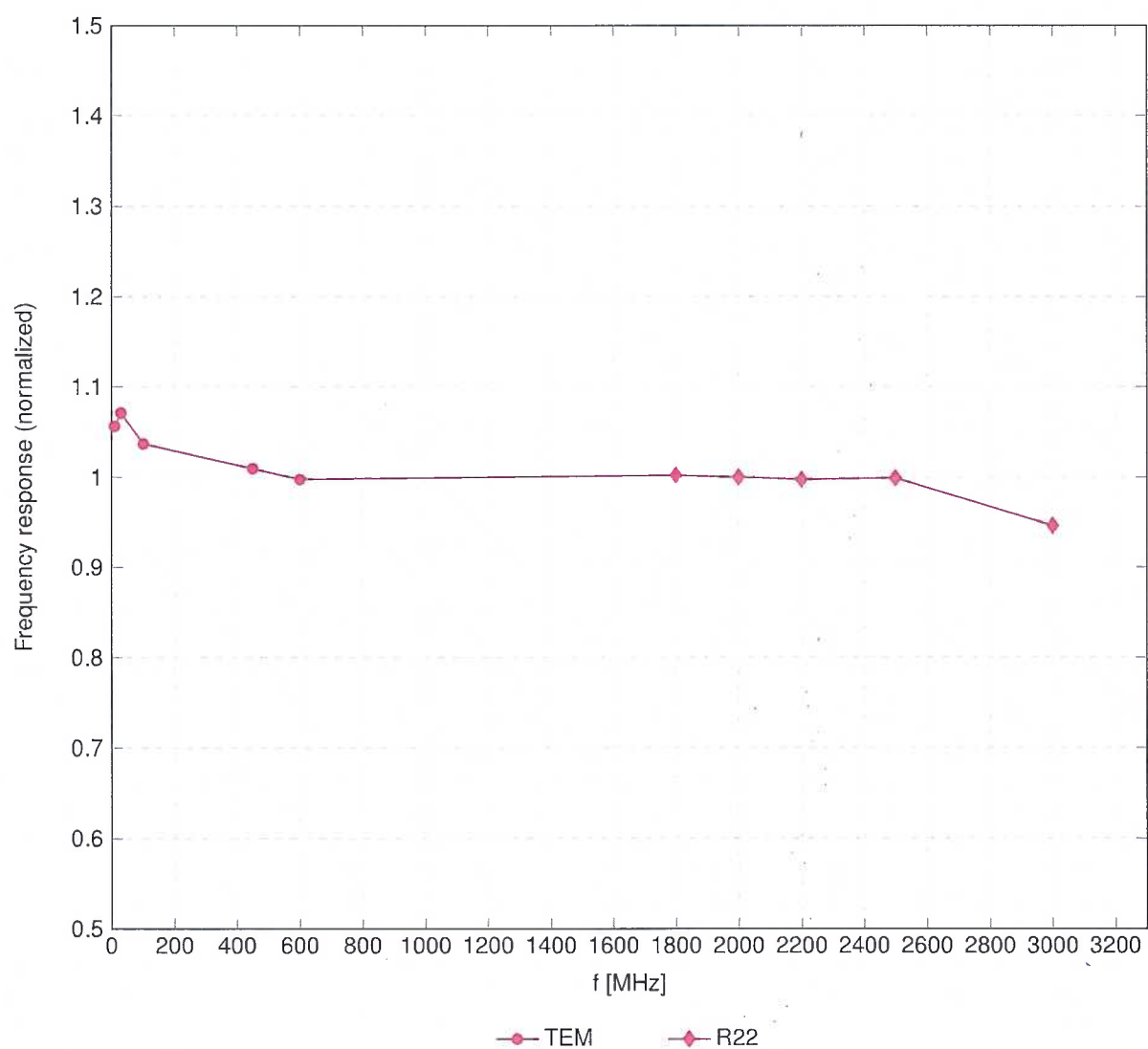
^F The probes are calibrated using tissue simulating liquids (TSL) that deviate for ϵ and σ by less than ±10% from the target values (typically better than ±6%) and are valid for TSL with deviations of up to ±10%.

^G Alpha/Depth are determined during calibration. SPEAG warrants that the remaining deviation due to the boundary effect after compensation is always less than ±1% for frequencies below 3 GHz; below ±2% for frequencies between 3–6 GHz; and below ±4% for frequencies between 6–10 GHz at any distance larger than half the probe tip diameter from the boundary.

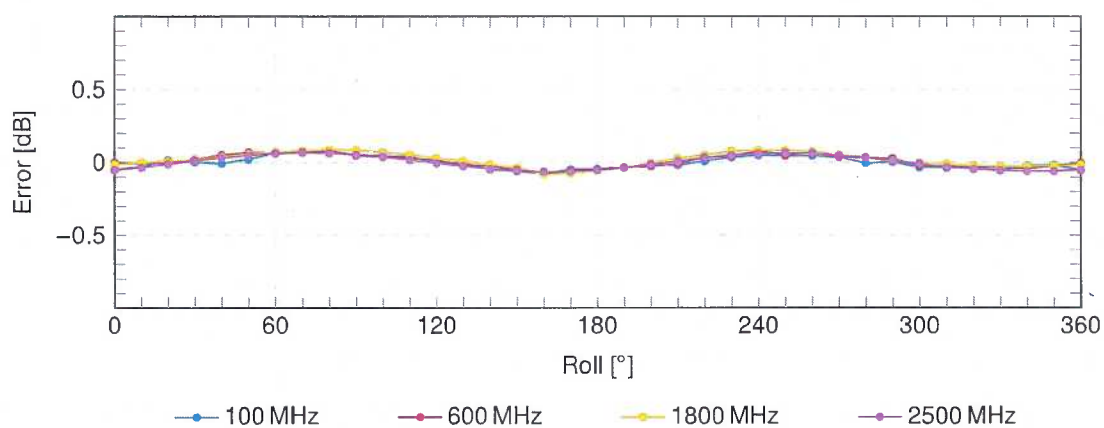
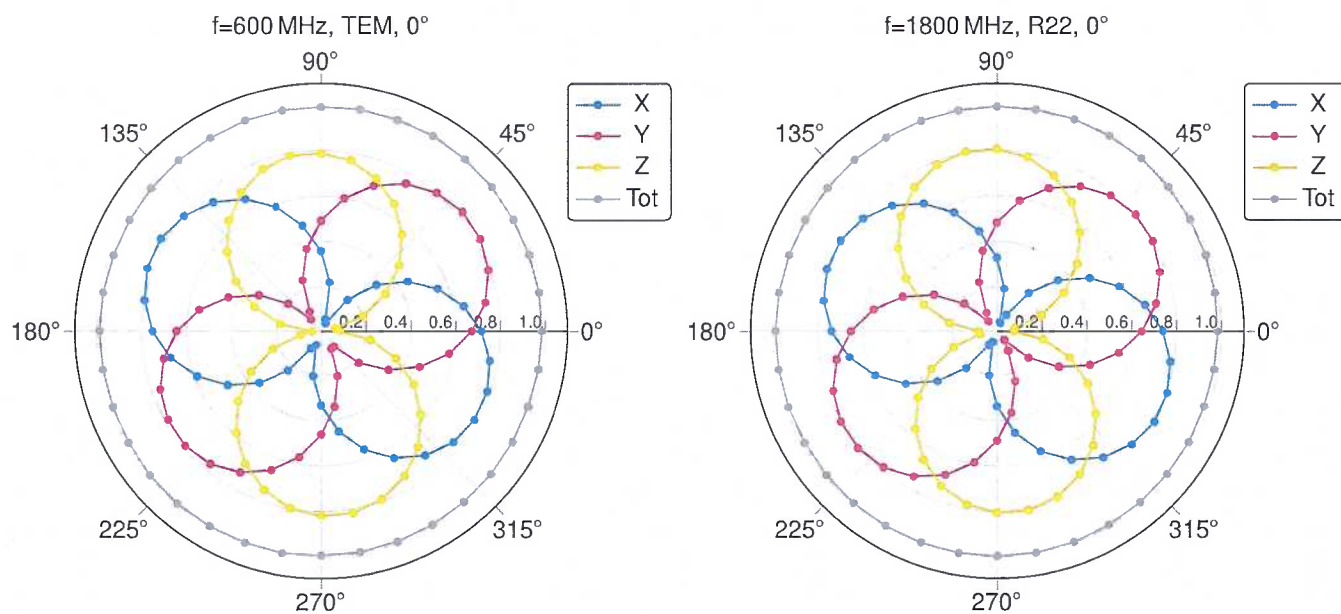
^H The stated uncertainty is the total calibration uncertainty (k = 2) of Norm-ConvF. This is equivalent to the uncertainty component with the symbol CF in Table 9 of IEC/IEEE 62209-1528:2020.

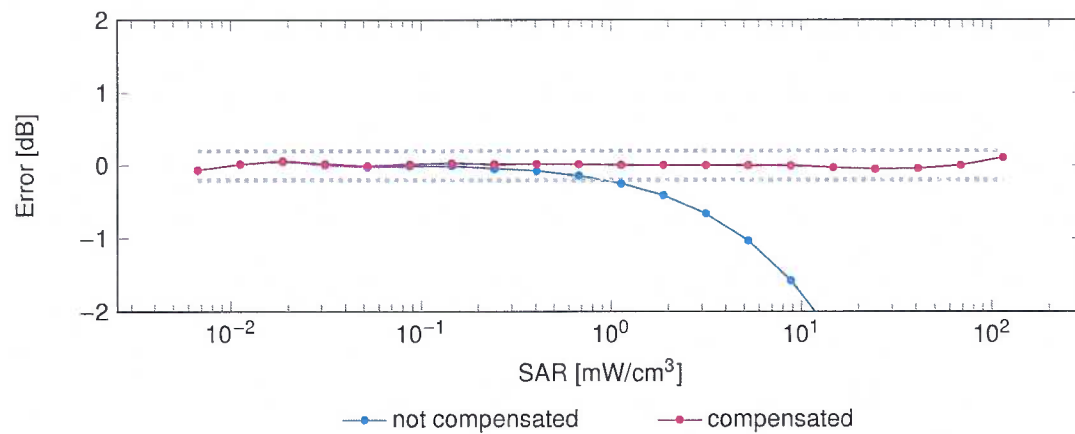
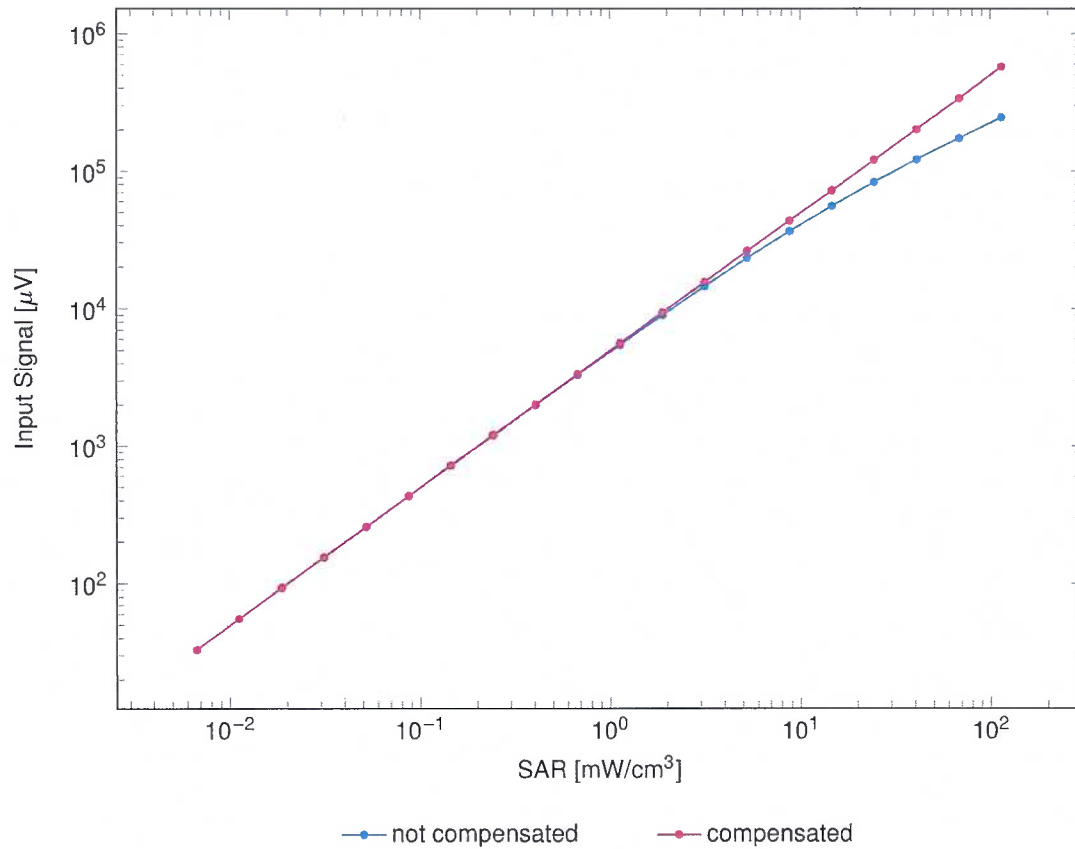
Frequency Response of E-Field

(TEM-Cell:ifi110 EXX, Waveguide:R22)

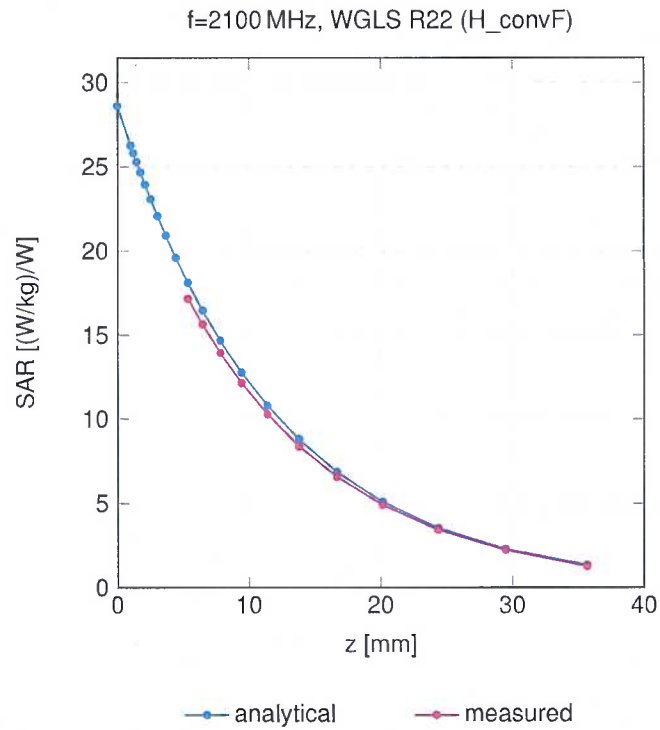


Uncertainty of Frequency Response of E-field: $\pm 6.3\%$ ($k=2$)

Receiving Pattern (ϕ), $\vartheta = 0^\circ$ Uncertainty of Axial Isotropy Assessment: $\pm 0.5\%$ ($k=2$)

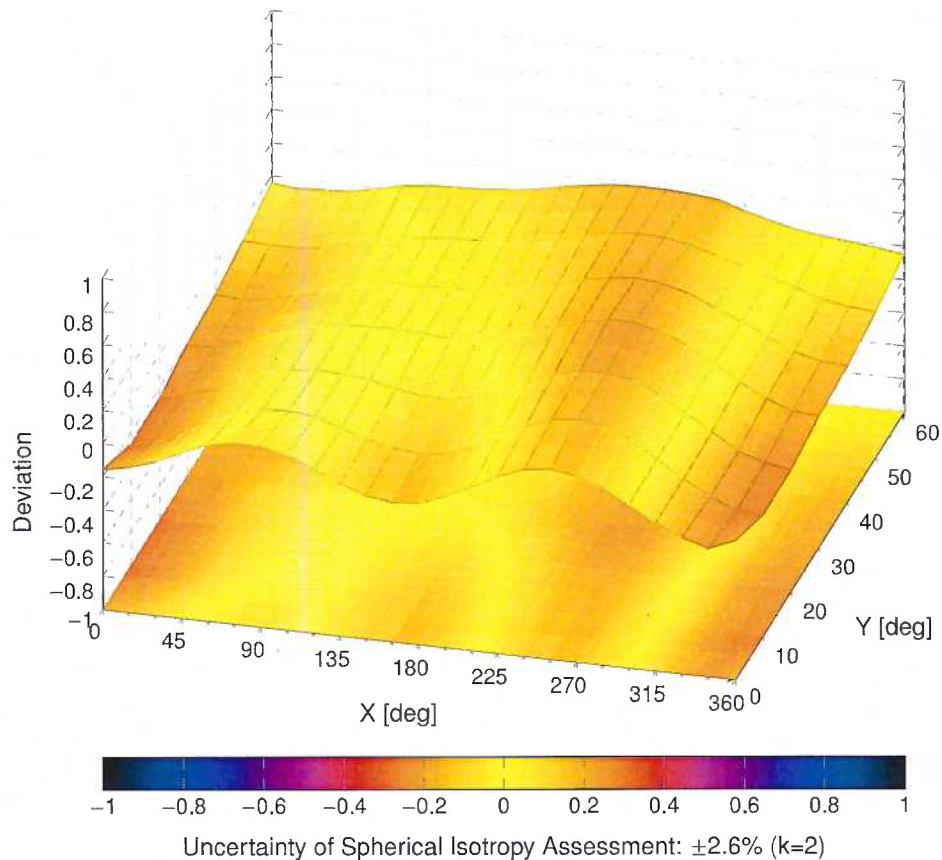
Dynamic Range $f(\text{SAR}_{\text{HSL}})$ (TEM cell, $f_{\text{eval}} = 1900\text{MHz}$)Uncertainty of Linearity Assessment: $\pm 0.6\%$ ($k=2$)

Conversion Factor Assessment



Deviation from Isotropy in Liquid

Error (ϕ, θ), f = 900 MHz





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Accreditation No.: SCS 0108

Client

RF Exposure Lab
 San Marcos, USA

Certificate No.

EX-7530_Jan26

CALIBRATION CERTIFICATE

Object EX3DV4 - SN:7530

Calibration procedure(s) QA CAL-01.v10, QA CAL-12.v10, QA CAL-14.v7, QA CAL-23.v6,
 QA CAL-25.v8, QA CAL-48.v2
 Calibration procedure for dosimetric E-field probes

Calibration date January 14, 2026

This calibration certificate documents the traceability to national standards, which realize the physical units of measurements (SI).
 The measurements and the uncertainties with confidence probability are given on the following pages and are part of the certificate.

All calibrations have been conducted in the closed laboratory facility: environment temperature $(22 \pm 3)^\circ\text{C}$ and humidity $< 70\%$.

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID	Calibration Date (Certificate No.)	Sched. Cal.
Power Sensor R&S NRP40T	SN: 101861	29-Apr-25 (No. 2025-001450)	Apr-26
N-type mismatch combination	SN: L1119	26-Mar-25 (No. 217-04292)	Mar-26
OCP DAK-12	SN: 1016	16-Sept-25 (No. OCP-DAK12-1016_Sep25)	Sep-26
OCP DAK-3.5	SN: 1249	16-Sept-25 (No. OCP-DAK3.5-1249_Sep25)	Sep-26
Reference Probe EX3DV4	SN: 7349	10-Jan-25 (No. EX3-7349_Jan25)	Jan-26
DAE4	SN: 1301	30-Oct-25 (No. DAE4-1301_Oct25)	Oct-26

Secondary Standards	ID	Check Date (in house)	Sched. Check
ACAP 2020 Setup 1	SN: L1404	01-Oct-25 (No. IHCK_ACAP2020-1_Oct25)	Oct-26
OCP DAK-12	SN: 1029	27-Feb-25 (No. OCP-DAK12-1029_Feb25)	Feb-26
OCP DAK-3.5	SN: 1336	10-Dec-25 (No. OCP-DAK3.5-1336_Dec25)	Dec-26

	Name	Function	Signature
Calibrated by	Henrique Almeida	Laboratory Technician	
Approved by	Sven Kühn	Technical Manager	
Issued: January 15, 2026			
This calibration certificate shall not be reproduced except in full without written approval of the laboratory.			

Calibration Laboratory of

Schmid & Partner
Engineering AG

Zeughausstrasse 43, 8004 Zurich, Switzerland



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The Swiss Accreditation Service is one of the signatories to the EA
Multilateral Agreement for the recognition of calibration certificates

Accreditation No.: SCS 0108

Glossary

TSL	tissue simulating liquid
NORM _{x,y,z}	sensitivity in free space
ConvF	sensitivity in TSL / NORM _{x,y,z}
DCP	diode compression point
CF	crest factor (1/duty_cycle) of the RF signal
A, B, C, D	modulation dependent linearization parameters
Polarization φ	φ rotation around probe axis
Polarization ϑ	ϑ rotation around an axis that is in the plane normal to probe axis (at measurement center), i.e., $\vartheta = 0$ is normal to probe axis
Connector Angle	information used in DASY system to align probe sensor X to the robot coordinate system

Calibration is Performed According to the Following Standards:

- IEC/IEEE 62209-1528, "Measurement Procedure For The Assessment Of Specific Absorption Rate Of Human Exposure To Radio Frequency Fields From Hand-Held And Body-Worn Wireless Communication Devices – Part 1528: Human Models, Instrumentation And Procedures (Frequency Range of 4 MHz to 10 GHz)", October 2020.
- KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

Methods Applied and Interpretation of Parameters:

- NORM_{x,y,z}**: Assessed for E-field polarization $\vartheta = 0$ ($f \leq 900$ MHz in TEM-cell; $f > 1800$ MHz: R22 waveguide). NORM_{x,y,z} are only intermediate values, i.e., the uncertainties of NORM_{x,y,z} does not affect the E²-field uncertainty inside TSL (see below ConvF).
- NORM(*f*)_{x,y,z}** = NORM_{x,y,z} * frequency_response (see Frequency Response Chart). This linearization is implemented in DASY4 software versions later than 4.2. The uncertainty of the frequency response is included in the stated uncertainty of ConvF.
- DCP_{x,y,z}**: DCP are numerical linearization parameters assessed based on the data of power sweep with CW signal. DCP does not depend on frequency nor media.
- PAR**: PAR is the Peak to Average Ratio that is not calibrated but determined based on the signal characteristics
- A_{x,y,z}; B_{x,y,z}; C_{x,y,z}; D_{x,y,z}; VR_{x,y,z}**: A, B, C, D are numerical linearization parameters assessed based on the data of power sweep for specific modulation signal. The parameters do not depend on frequency nor media. VR is the maximum calibration range expressed in RMS voltage across the diode.
- ConvF and Boundary Effect Parameters**: Assessed in flat phantom using E-field (or Temperature Transfer Standard for $f \leq 800$ MHz) and inside waveguide using analytical field distributions based on power measurements for $f > 800$ MHz. The same setups are used for assessment of the parameters applied for boundary compensation (alpha, depth) of which typical uncertainty values are given. These parameters are used in DASY4 software to improve probe accuracy close to the boundary. The sensitivity in TSL corresponds to NORM_{x,y,z} * ConvF whereby the uncertainty corresponds to that given for ConvF. A frequency dependent ConvF is used in DASY version 4.4 and higher which allows extending the validity from ± 50 MHz to ± 100 MHz.
- Spherical isotropy (3D deviation from isotropy)**: in a field of low gradients realized using a flat phantom exposed by a patch antenna.
- Sensor Offset**: The sensor offset corresponds to the offset of virtual measurement center from the probe tip (on probe axis). No tolerance required.
- Connector Angle**: The angle is assessed using the information gained by determining the NORM_x (no uncertainty required).

Parameters of Probe: EX3DV4 - SN:7530

Basic Calibration Parameters

	Sensor X	Sensor Y	Sensor Z	Unc ($k = 2$)
Norm ($\mu\text{V}/(\text{V}/\text{m})^2$) ^A	0.42	0.53	0.43	$\pm 10.1\%$
DCP (mV) ^B	97.8	99.4	100.5	$\pm 4.7\%$

Calibration Results for Modulation Response

UID	Communication System Name		A dB	B dB $\sqrt{\mu\text{V}}$	C	D dB	VR mV	Max dev.	Max Unc ^E $k = 2$
0	CW	X	0.00	0.00	1.00	0.00	121.9	$\pm 1.5\%$	$\pm 4.7\%$
		Y	0.00	0.00	1.00		149.6		
		Z	0.00	0.00	1.00		128.2		

The reported uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor $k=2$, which for a normal distribution corresponds to a coverage probability of approximately 95%.

^A The uncertainties of Norm X,Y,Z do not affect the E^2 -field uncertainty inside TSL (see Pages 5 and 6).

^B Linearization parameter uncertainty for maximum specified field strength.

^E Uncertainty is determined using the max. deviation from linear response applying rectangular distribution and is expressed for the square of the field value.

Parameters of Probe: EX3DV4 - SN:7530**Other Probe Parameters**

Sensor Arrangement	Triangular
Connector Angle	37.7°
Mechanical Surface Detection Mode	enabled
Optical Surface Detection Mode	disabled
Probe Overall Length	337 mm
Probe Body Diameter	12 mm
Tip Length	9 mm
Tip Diameter	2.5 mm
Probe Tip to Sensor X Calibration Point	1 mm
Probe Tip to Sensor Y Calibration Point	1 mm
Probe Tip to Sensor Z Calibration Point	1 mm
Recommended Measurement Distance from Surface	1.4 mm

Note: Measurement distance from surface can be increased to 3–4 mm for an *Area Scan* job.

Parameters of Probe: EX3DV4 - SN:7530

Calibration Parameter Determined in HSL

f (MHz) ^C	Relative Permittivity ^F	Conductivity ^F (S/m)	ConvF X	ConvF Y	ConvF Z	Alpha ^G	Depth ^G (mm)	Unc ^H (k = 2)
6	55.0	0.75	20.13	21.05	23.49	0.00	1.25	±13.3%
13	55.0	0.75	18.35	19.19	21.41	0.00	1.25	±13.3%
750	41.9	0.89	9.88	9.80	10.19	0.37	1.27	±11.0%
900	41.5	0.97	9.10	9.03	9.39	0.37	1.27	±11.0%
1750	40.1	1.37	7.76	7.70	8.00	0.37	1.27	±11.0%
1900	40.0	1.40	7.57	7.51	7.80	0.37	1.27	±11.0%
2300	39.5	1.67	7.24	7.18	7.46	0.37	1.27	±11.0%
2450	39.2	1.80	7.04	6.98	7.26	0.37	1.27	±11.0%
2600	39.0	1.96	7.33	7.27	7.56	0.37	1.27	±11.0%
5250	35.9	4.71	5.52	5.47	5.69	0.32	1.27	±13.1%
5600	35.5	5.07	5.02	4.97	5.17	0.29	1.27	±13.1%
5750	35.4	5.22	5.16	5.12	5.32	0.27	1.27	±13.1%

^C Frequency validity above 300 MHz of ±100 MHz only applies for DASY v4.4 and higher (see Page 2), else it is restricted to ±50 MHz. The uncertainty is the RSS of the ConvF uncertainty at calibration frequency and the uncertainty for the indicated frequency band. Frequency validity below 300 MHz is ±10, 25, 40, 50 and 70 MHz for ConvF assessments at 30, 64, 128, 150 and 220 MHz respectively. Validity of ConvF assessed at 6 MHz is 4–9 MHz, and ConvF assessed at 13 MHz is 9–19 MHz. Above 5 GHz frequency validity can be extended to ±110 MHz.

^F The probes are calibrated using tissue simulating liquids (TSL) that deviate for ϵ and σ by less than ±5% from the target values (typically better than ±3%) and are valid for TSL with deviations of up to ±10% if SAR correction is applied.

^G Alpha/Depth are determined during calibration. SPEAG warrants that the remaining deviation due to the boundary effect after compensation is always less than ±1% for frequencies below 3 GHz and below ±2% for frequencies between 3–6 GHz at any distance larger than half the probe tip diameter from the boundary.

^H The stated uncertainty is the total calibration uncertainty (k = 2) of Norm-ConvF. This is equivalent to the uncertainty component with the symbol CF in Table 9 of IEC/IEEE 62209-1528:2020.

Parameters of Probe: EX3DV4 - SN:7530

Calibration Parameter Determined in HSL

f (MHz) ^C	Relative Permittivity ^F	Conductivity ^F (S/m)	ConvF X	ConvF Y	ConvF Z	Alpha ^G	Depth ^G (mm)	Unc ^H (k = 2)
6500	34.5	6.07	5.38	5.34	5.55	0.20	1.27	±18.6%

^C Frequency validity is -600/+700 MHz at 6.5 GHz, ±700 MHz at or above 7 GHz, and ±150 MHz at 9.85 GHz. The uncertainty is the RSS of the ConvF uncertainty at calibration frequency and the uncertainty for the indicated frequency band.

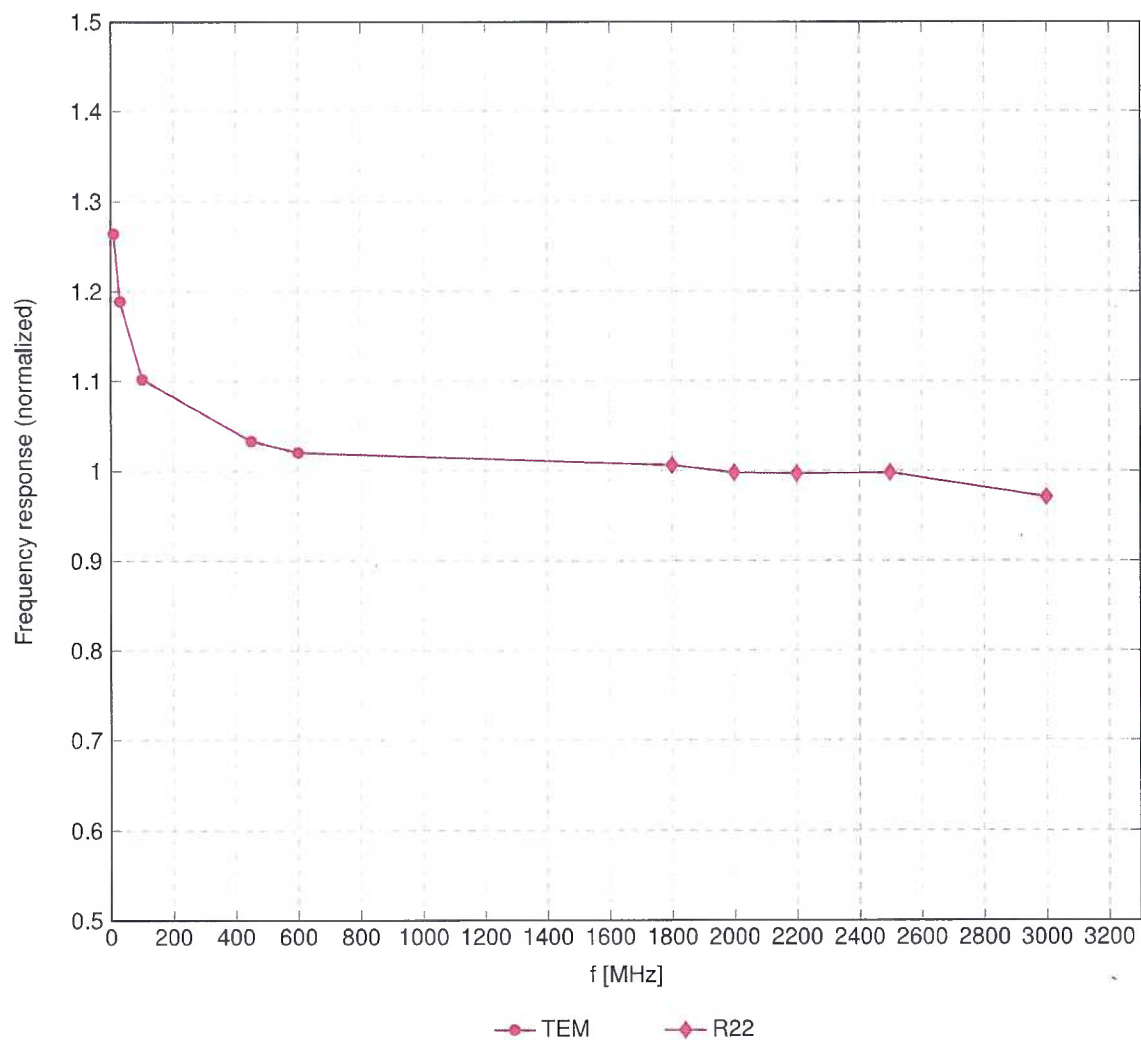
^F The probes are calibrated using tissue simulating liquids (TSL) that deviate for ϵ and σ by less than ±10% from the target values (typically better than ±6%) and are valid for TSL with deviations of up to ±10%.

^G Alpha/Depth are determined during calibration. SPEAG warrants that the remaining deviation due to the boundary effect after compensation is always less than ±1% for frequencies below 3 GHz; below ±2% for frequencies between 3–6 GHz; and below ±4% for frequencies between 6–10 GHz at any distance larger than half the probe tip diameter from the boundary.

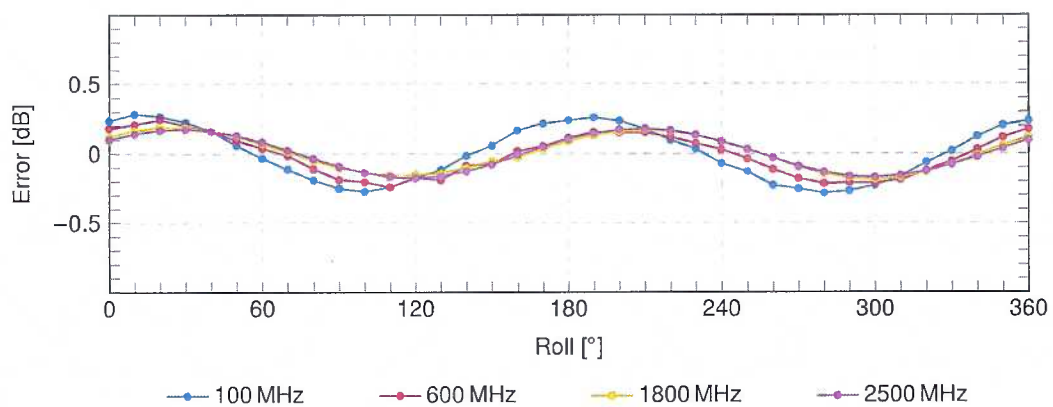
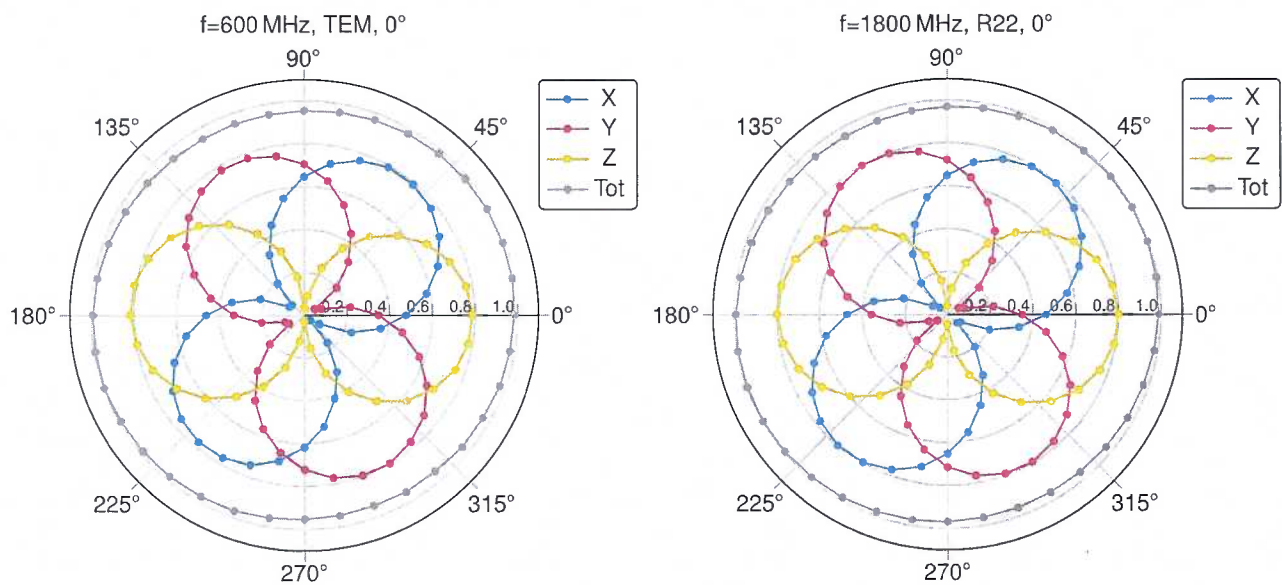
^H The stated uncertainty is the total calibration uncertainty (k = 2) of Norm-ConvF. This is equivalent to the uncertainty component with the symbol CF in Table 9 of IEC/IEEE 62209-1528:2020.

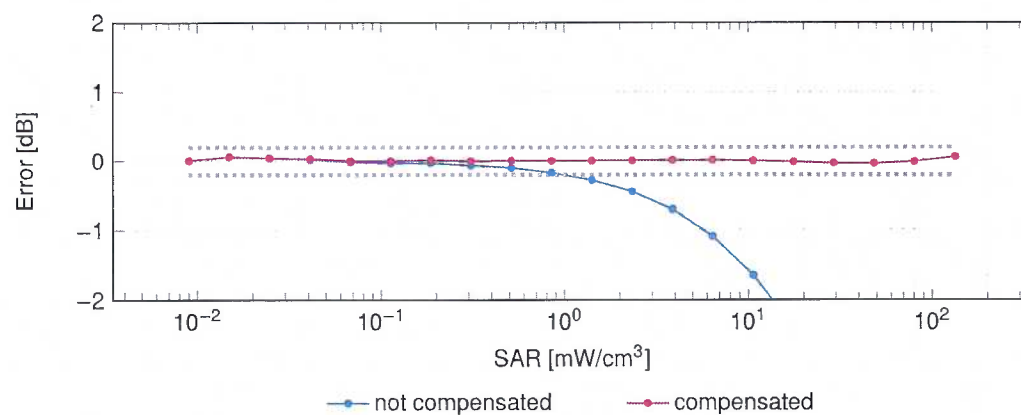
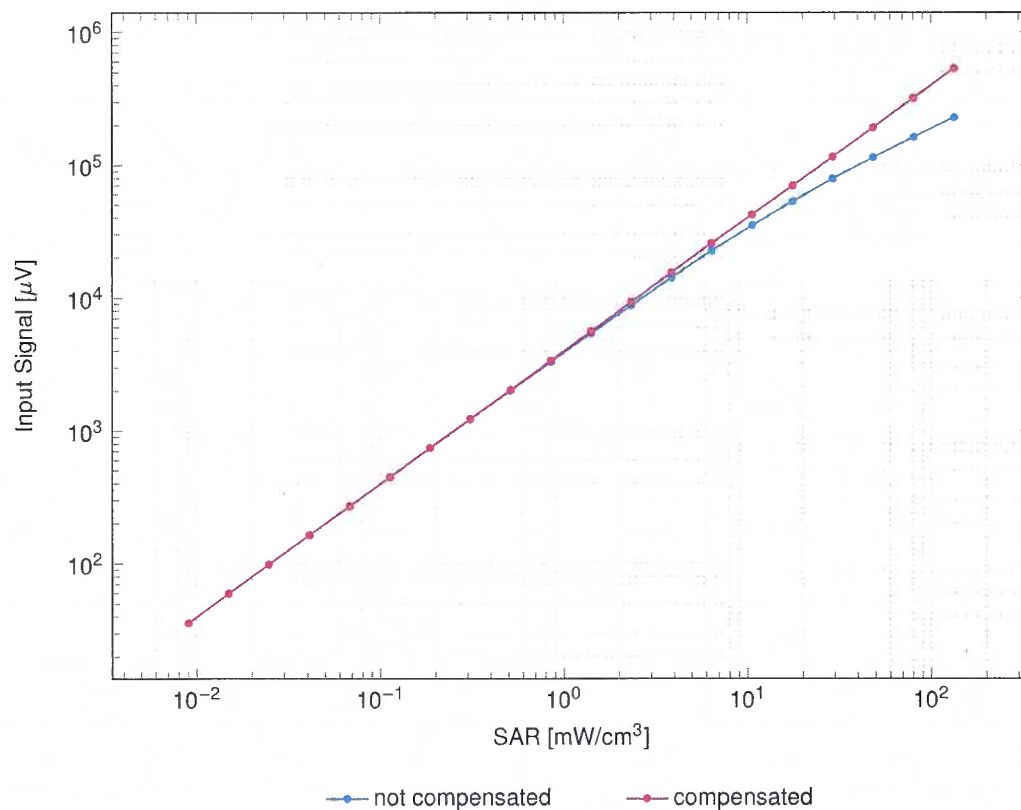
Frequency Response of E-Field

(TEM-Cell:ifi110 EXX, Waveguide:R22)

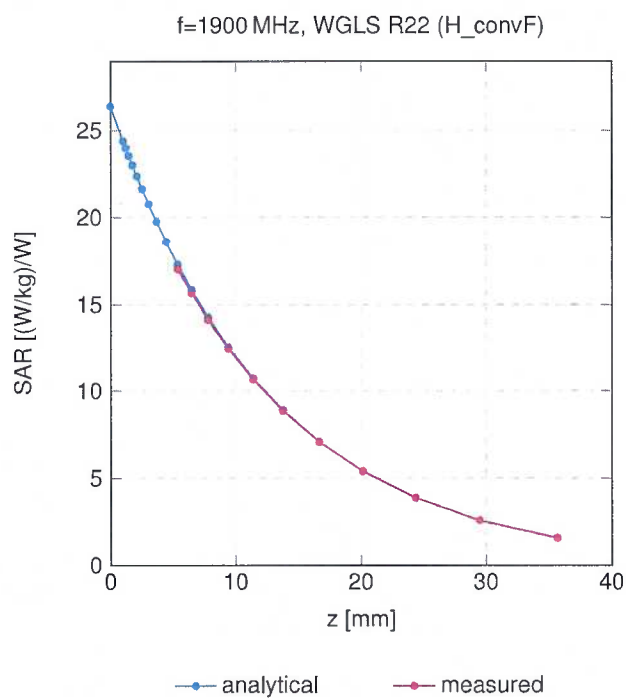


Uncertainty of Frequency Response of E-field: $\pm 6.3\%$ ($k=2$)

Receiving Pattern (ϕ), $\vartheta = 0^\circ$ Uncertainty of Axial Isotropy Assessment: $\pm 0.5\%$ ($k=2$)

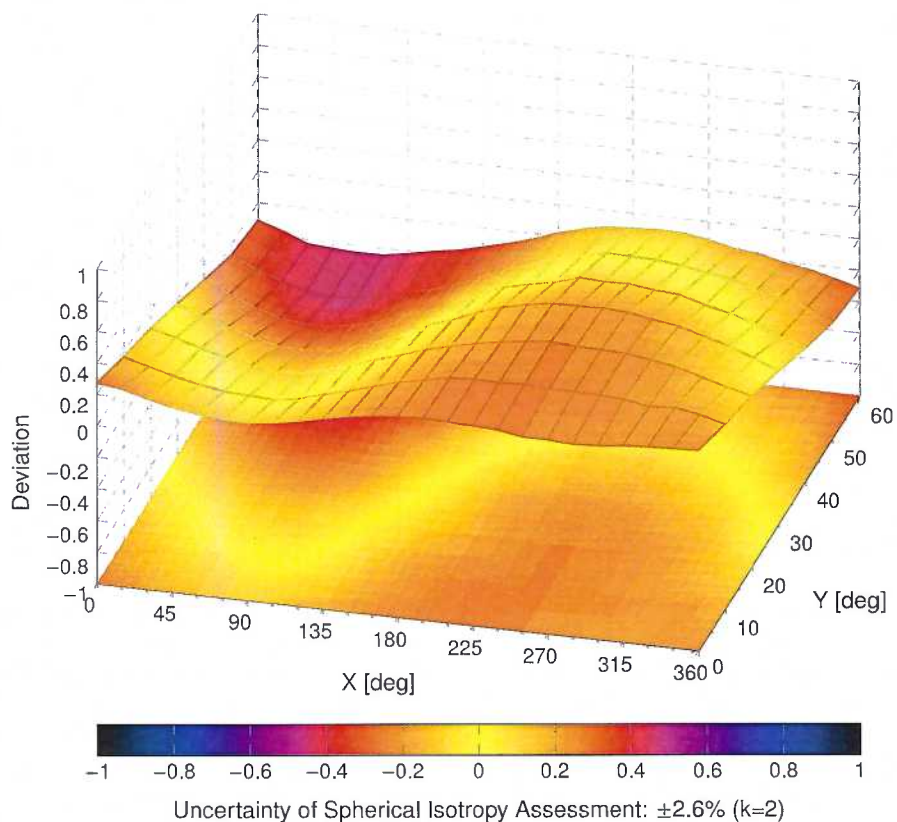
Dynamic Range $f(\text{SAR}_{\text{HSL}})$ (TEM cell, $f_{\text{eval}} = 1900 \text{ MHz}$)Uncertainty of Linearity Assessment: $\pm 0.6\%$ ($k=2$)

Conversion Factor Assessment



Deviation from Isotropy in Liquid

Error (ϕ, θ), f = 900 MHz





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The Swiss Accreditation Service is one of the signatories to the EA Multilateral Agreement for the recognition of calibration certificates

Accreditation No.: **SCS 0108**

Client

RF Exposure Lab
 San Marcos, USA

Certificate No.

EX-7531_Apr26

CALIBRATION CERTIFICATE

Object

EX3DV4 - SN:7531

Calibration procedure(s)

QA CAL-01.v10, QA CAL-12.v10, QA CAL-14.v7, QA CAL-23.v6,
 QA CAL-25.v8, QA CAL-48.v2
 Calibration procedure for dosimetric E-field probes

Calibration date

April 14, 2026

This calibration certificate documents the traceability to national standards, which realize the physical units of measurements (SI).
 The measurements and the uncertainties with confidence probability are given on the following pages and are part of the certificate.

All calibrations have been conducted in the closed laboratory facility: environment temperature $(22 \pm 3)^\circ\text{C}$ and humidity $< 70\%$.

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID	Calibration Date (Certificate No.)	Sched. Cal.
Power Sensor R&S NRP40T	SN: 101861	29-Apr-25 (No. 2025-001450)	Apr-26
N-type mismatch combination	SN: L1119	26-Mar-26 (No. 2026-005592)	Mar-27
OCP DAK-12	SN: 1016	16-Sept-25 (No. OCP-DAK12-1016_Sep25)	Sep-26
OCP DAK-3.5	SN: 1249	16-Sept-25 (No. OCP-DAK3.5-1249_Sep25)	Sep-26
Reference Probe EX3DV4	SN: 7349	29-Jan-26 (No. EX3-7349_Jan26)	Jan-27
DAE4	SN: 1301	22-Jan-26 (No. DAE4-1301_Jan26)	Jan-27

Secondary Standards	ID	Check Date (in house)	Sched. Check
ACAP 2020 Setup 1	SN: L1404	01-Oct-25 (No. IHCK_ACAP2020-1_Oct25)	Oct-26
OCP DAK-12	SN: 1029	24-Feb-26 (No. OCP-DAK12-1029_Feb26)	Feb-27
OCP DAK-3.5	SN: 1336	10-Dec-25 (No. OCP-DAK3.5-1336_Dec25)	Dec-26

	Name	Function	Signature
Calibrated by	Henrique Almeida	Laboratory Technician	<i>Henrique Almeida</i>
Approved by	Sven Kühn	Technical Manager	<i>[Signature]</i>
			Issued: April 15, 2026
This calibration certificate shall not be reproduced except in full without written approval of the laboratory.			



Accredited by the Swiss Accreditation Service (SAS)

Accreditation No.: **SCS 0108**

The Swiss Accreditation Service is one of the signatories to the EA
Multilateral Agreement for the recognition of calibration certificates

Glossary

TSL	tissue simulating liquid
NORM _{x,y,z}	sensitivity in free space
ConvF	sensitivity in TSL / NORM _{x,y,z}
DCP	diode compression point
CF	crest factor (1/duty_cycle) of the RF signal
A, B, C, D	modulation dependent linearization parameters
Polarization φ	φ rotation around probe axis
Polarization ϑ	ϑ rotation around an axis that is in the plane normal to probe axis (at measurement center), i.e., $\vartheta = 0$ is normal to probe axis
Connector Angle	information used in DASY system to align probe sensor X to the robot coordinate system

Calibration is Performed According to the Following Standards:

- IEC/IEEE 62209-1528, "Measurement Procedure For The Assessment Of Specific Absorption Rate Of Human Exposure To Radio Frequency Fields From Hand-Held And Body-Worn Wireless Communication Devices – Part 1528: Human Models, Instrumentation And Procedures (Frequency Range of 4 MHz to 10 GHz)", October 2020.
- KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

Methods Applied and Interpretation of Parameters:

- NORM_{x,y,z}**: Assessed for E-field polarization $\vartheta = 0$ ($f \leq 900$ MHz in TEM-cell; $f > 1800$ MHz: R22 waveguide). NORM_{x,y,z} are only intermediate values, i.e., the uncertainties of NORM_{x,y,z} does not affect the E²-field uncertainty inside TSL (see below ConvF).
- NORM(f)_{x,y,z}** = NORM_{x,y,z} * frequency_response (see Frequency Response Chart). This linearization is implemented in DASY4 software versions later than 4.2. The uncertainty of the frequency response is included in the stated uncertainty of ConvF.
- DCP_{x,y,z}**: DCP are numerical linearization parameters assessed based on the data of power sweep with CW signal. DCP does not depend on frequency nor media.
- PAR**: PAR is the Peak to Average Ratio that is not calibrated but determined based on the signal characteristics
- A_{x,y,z}; B_{x,y,z}; C_{x,y,z}; D_{x,y,z}; VR_{x,y,z}**: A, B, C, D are numerical linearization parameters assessed based on the data of power sweep for specific modulation signal. The parameters do not depend on frequency nor media. VR is the maximum calibration range expressed in RMS voltage across the diode.
- ConvF and Boundary Effect Parameters**: Assessed in flat phantom using E-field (or Temperature Transfer Standard for $f \leq 800$ MHz) and inside waveguide using analytical field distributions based on power measurements for $f > 800$ MHz. The same setups are used for assessment of the parameters applied for boundary compensation (alpha, depth) of which typical uncertainty values are given. These parameters are used in DASY4 software to improve probe accuracy close to the boundary. The sensitivity in TSL corresponds to NORM_{x,y,z} * ConvF whereby the uncertainty corresponds to that given for ConvF. A frequency dependent ConvF is used in DASY version 4.4 and higher which allows extending the validity from ± 50 MHz to ± 100 MHz.
- Spherical isotropy (3D deviation from isotropy)**: in a field of low gradients realized using a flat phantom exposed by a patch antenna.
- Sensor Offset**: The sensor offset corresponds to the offset of virtual measurement center from the probe tip (on probe axis). No tolerance required.
- Connector Angle**: The angle is assessed using the information gained by determining the NORM_x (no uncertainty required).

Parameters of Probe: EX3DV4 - SN:7531

Basic Calibration Parameters

	Sensor X	Sensor Y	Sensor Z	Unc ($k = 2$)
Norm ($\mu\text{V}/(\text{V}/\text{m})^2$) ^A	0.41	0.48	0.40	$\pm 10.1\%$
DCP (mV) ^B	98.1	98.8	99.7	$\pm 4.7\%$

Calibration Results for Modulation Response

UID	Communication System Name		A dB	B $\text{dB}\sqrt{\mu\text{V}}$	C	D dB	VR mV	Max dev.	Max Unc ^E $k = 2$
0	CW	X	0.00	0.00	1.00	0.00	122.8	$\pm 1.5\%$	$\pm 4.7\%$
		Y	0.00	0.00	1.00		140.3		
		Z	0.00	0.00	1.00		126.1		

The reported uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor $k=2$, which for a normal distribution corresponds to a coverage probability of approximately 95%.

^A The uncertainties of Norm X,Y,Z do not affect the E^2 -field uncertainty inside TSL (see Page 5).

^B Linearization parameter uncertainty for maximum specified field strength.

^E Uncertainty is determined using the max. deviation from linear response applying rectangular distribution and is expressed for the square of the field value.

Parameters of Probe: EX3DV4 - SN:7531

Other Probe Parameters

Sensor Arrangement	Triangular
Connector Angle	8.4°
Mechanical Surface Detection Mode	enabled
Optical Surface Detection Mode	disabled
Probe Overall Length	337 mm
Probe Body Diameter	12 mm
Tip Length	9 mm
Tip Diameter	2.5 mm
Probe Tip to Sensor X Calibration Point	1 mm
Probe Tip to Sensor Y Calibration Point	1 mm
Probe Tip to Sensor Z Calibration Point	1 mm
Recommended Measurement Distance from Surface	1.4 mm

Note: Measurement distance from surface can be increased to 3–4 mm for an *Area Scan* job.

Parameters of Probe: EX3DV4 - SN:7531

Calibration Parameter Determined in HSL

f (MHz) ^C	Relative Permittivity ^F	Conductivity ^F (S/m)	ConvF X	ConvF Y	ConvF Z	Alpha ^G	Depth ^G (mm)	Unc ^H (k = 2)
30	55.0	0.75	16.46	18.80	18.74	0.00	1.25	±13.3%
64	54.2	0.75	13.57	15.49	15.45	0.00	1.25	±13.3%
150	52.3	0.76	11.90	13.59	13.55	0.00	1.25	±13.3%
220	49.0	0.81	11.63	13.28	13.24	0.00	1.25	±13.3%
300	45.3	0.87	12.60	12.60	12.60	0.09	1.00	±13.3%
450	43.5	0.87	11.96	11.96	11.96	0.16	1.30	±13.3%
600	42.7	0.88	11.18	11.18	11.18	0.10	1.25	±13.3%
1100	41.2	1.06	8.47	8.81	9.33	0.32	1.27	±11.0%
1640	40.2	1.31	7.84	8.16	8.64	0.32	1.27	±11.0%
3300	38.2	2.71	6.56	6.82	7.23	0.34	1.27	±13.1%
3500	37.9	2.91	6.43	6.69	7.09	0.34	1.27	±13.1%
3700	37.7	3.12	6.32	6.57	6.96	0.34	1.27	±13.1%
3900	37.5	3.32	6.21	6.46	6.84	0.34	1.27	±13.1%

^C Frequency validity above 300 MHz of ±100 MHz only applies for DASY v4.4 and higher (see Page 2), else it is restricted to ±50 MHz. The uncertainty is the RSS of the ConvF uncertainty at calibration frequency and the uncertainty for the indicated frequency band. Frequency validity below 300 MHz is ±10, 25, 40, 50 and 70 MHz for ConvF assessments at 30, 64, 128, 150 and 220 MHz respectively. Validity of ConvF assessed at 6 MHz is 4–9 MHz, and ConvF assessed at 13 MHz is 9–19 MHz. Above 5 GHz frequency validity can be extended to ±110 MHz.

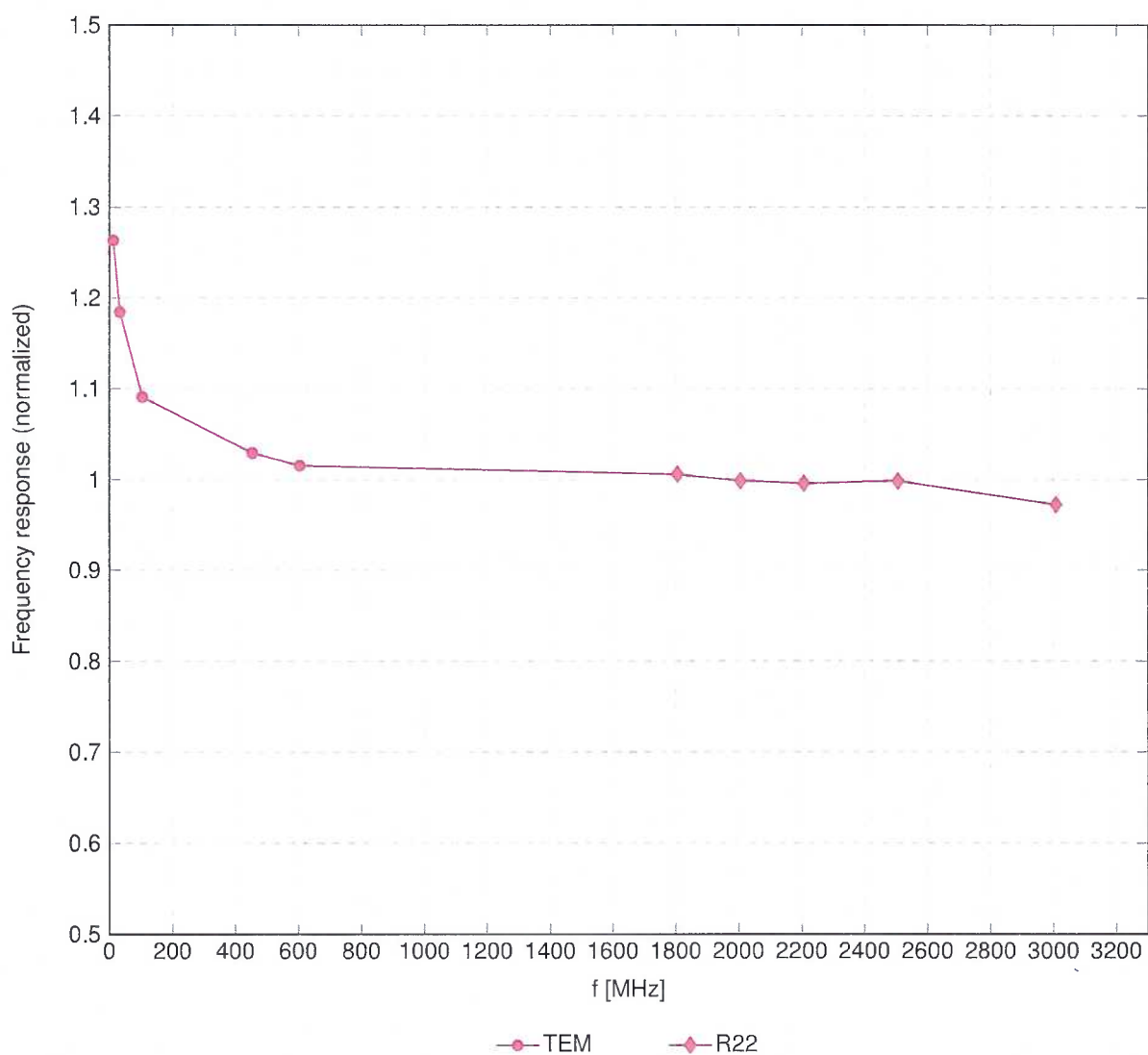
^F The probes are calibrated using tissue simulating liquids (TSL) that deviate for ϵ and σ by less than ±5% from the target values (typically better than ±3%) and are valid for TSL with deviations of up to ±10% if SAR correction is applied.

^G Alpha/Depth are determined during calibration. SPEAG warrants that the remaining deviation due to the boundary effect after compensation is always less than ±1% for frequencies below 3 GHz and below ±2% for frequencies between 3–6 GHz at any distance larger than half the probe tip diameter from the boundary.

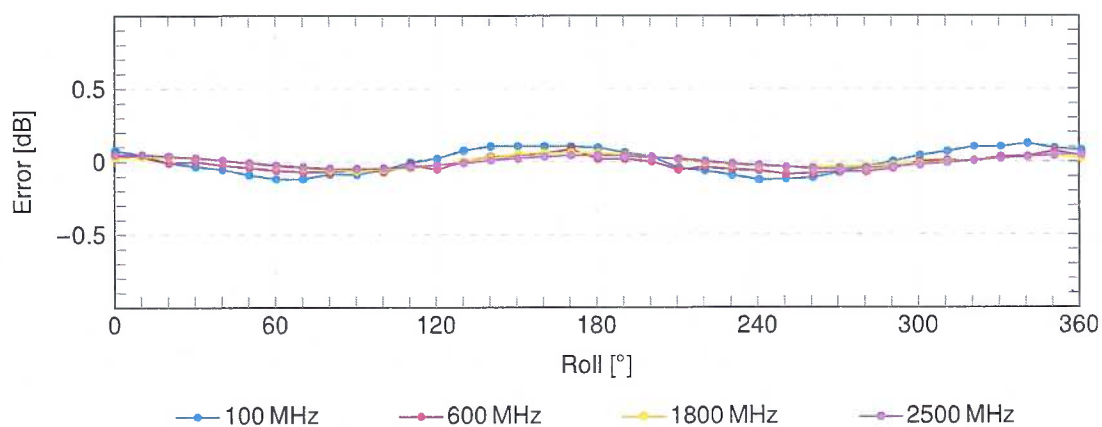
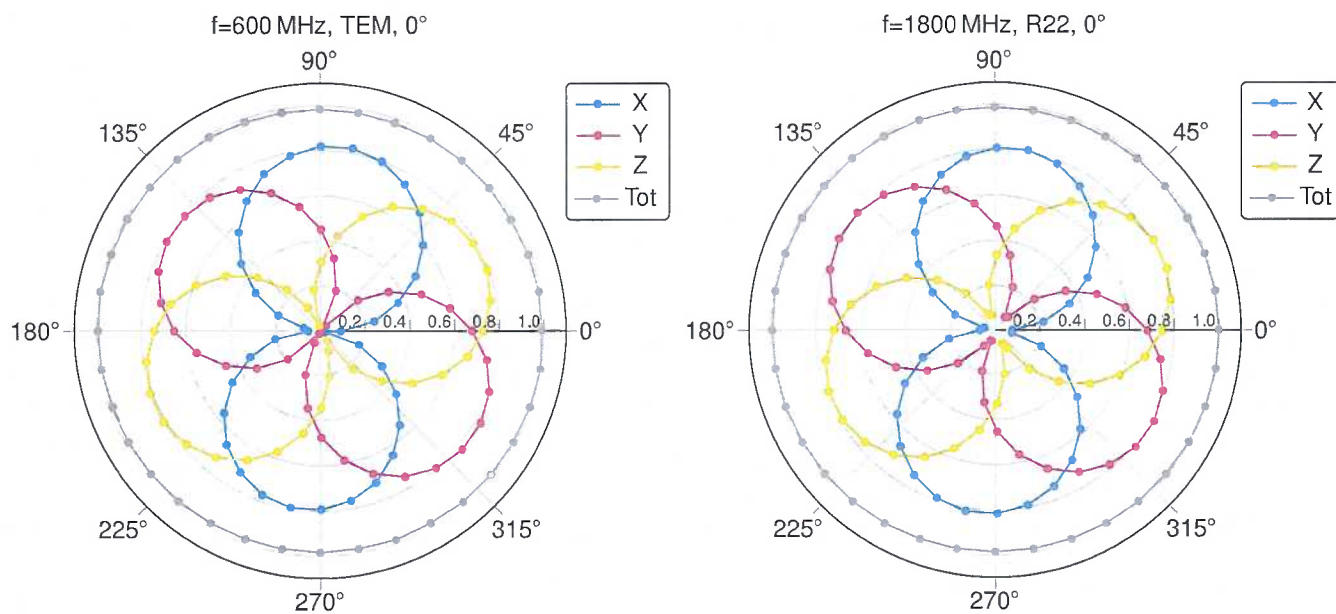
^H The stated uncertainty is the total calibration uncertainty (k = 2) of Norm-ConvF. This is equivalent to the uncertainty component with the symbol CF in Table 9 of IEC/IEEE 62209-1528:2020.

Frequency Response of E-Field

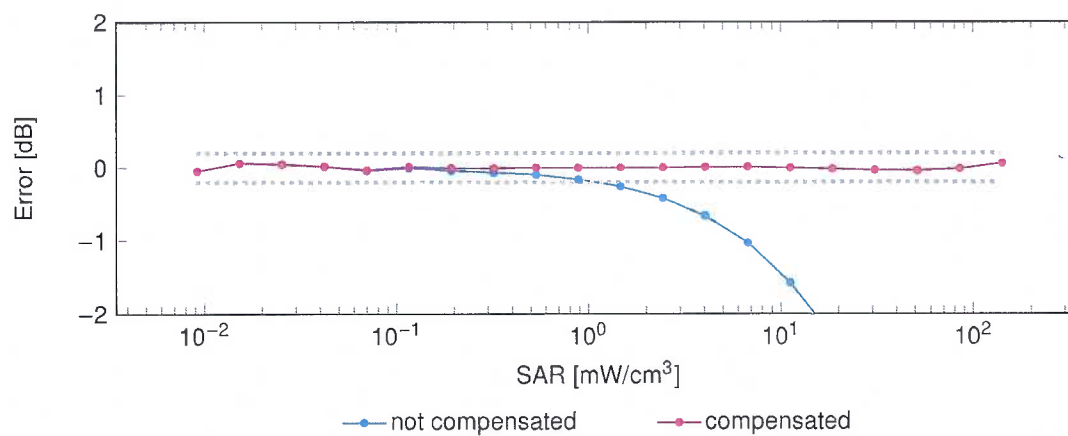
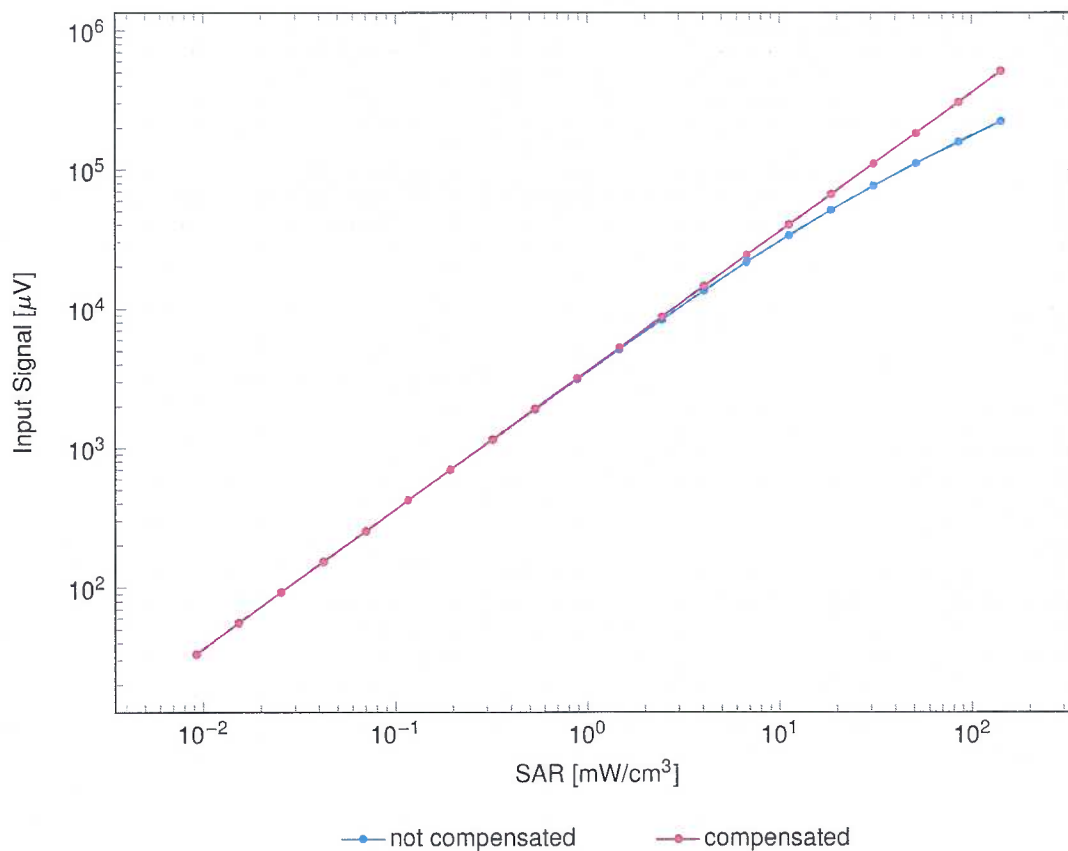
(TEM-Cell:ifi110 EXX, Waveguide:R22)



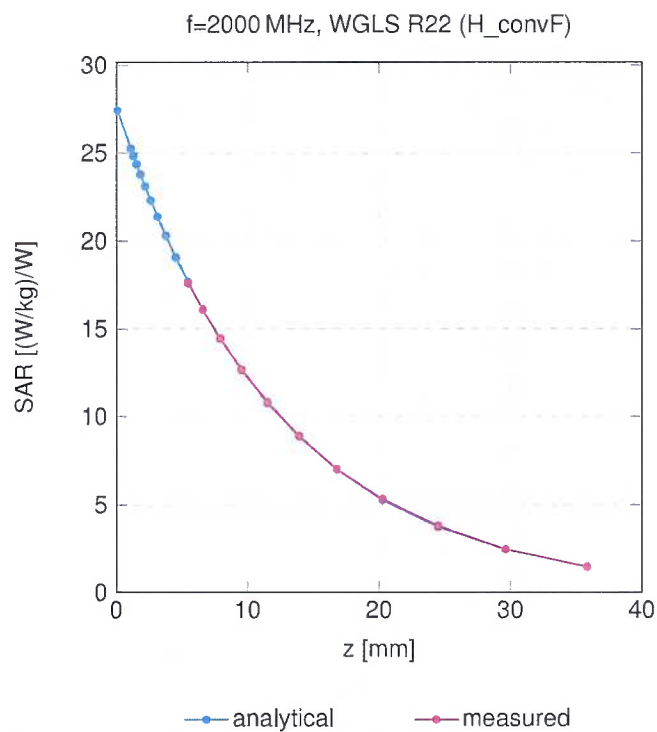
Uncertainty of Frequency Response of E-field: $\pm 6.3\%$ ($k=2$)

Receiving Pattern (ϕ), $\vartheta = 0^\circ$ 

Uncertainty of Axial Isotropy Assessment: $\pm 0.5\%$ ($k=2$)

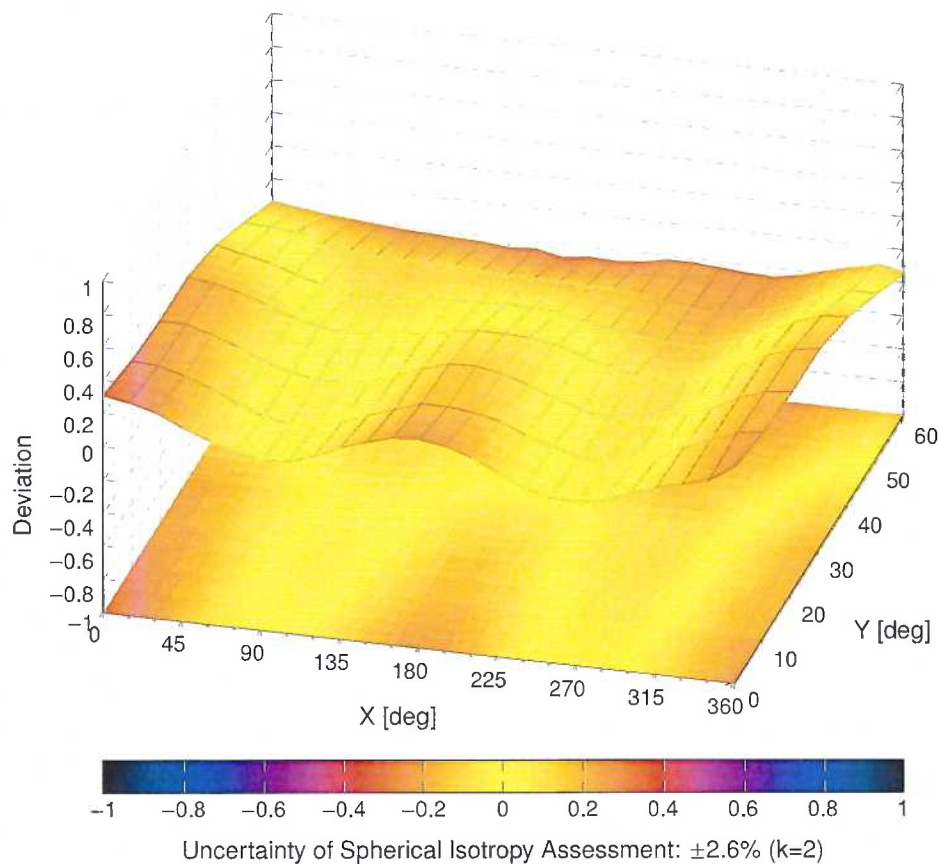
Dynamic Range $f(\text{SAR}_{\text{HSL}})$ (TEM cell, $f_{\text{eval}} = 1900 \text{ MHz}$)Uncertainty of Linearity Assessment: $\pm 0.6\%$ ($k=2$)

Conversion Factor Assessment



Deviation from Isotropy in Liquid

Error (ϕ, θ), f = 900 MHz



Appendix E – Dipole Calibration Data Sheets



Accredited by the Swiss Accreditation Service (SAS)
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 Multilateral Agreement for the recognition of calibration certificates

Client **RF Exposure Lab**
San Marcos, USA

Certificate No. **D750V3-1016_May24**

CALIBRATION CERTIFICATE

Object **D750V3 - SN:1016**

Calibration procedure(s) **QA CAL-05.v12**
Calibration Procedure for SAR Validation Sources between 0.7-3 GHz

Calibration date: **May 10, 2024**

This calibration certificate documents the traceability to national standards, which realize the physical units of measurements (SI).
 The measurements and the uncertainties with confidence probability are given on the following pages and are part of the certificate.

All calibrations have been conducted in the closed laboratory facility: environment temperature (22 ± 3)°C and humidity < 70%.

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Power meter NRP2	SN: 104778	26-Mar-24 (No. 217-04036/04037)	Mar-25
Power sensor NRP-Z91	SN: 103244	26-Mar-24 (No. 217-04036)	Mar-25
Power sensor NRP-Z91	SN: 103245	26-Mar-24 (No. 217-04037)	Mar-25
Reference 20 dB Attenuator	SN: BH9394 (20k)	26-Mar-24 (No. 217-04046)	Mar-25
Type-N mismatch combination	SN: 310982 / 06327	26-Mar-24 (No. 217-04047)	Mar-25
Reference Probe EX3DV4	SN: 7349	03-Nov-23 (No. EX3-7349_Nov23)	Nov-24
DAE4	SN: 601	30-Jan-24 (No. DAE4-601_Jan24)	Jan-25

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power meter E4419B	SN: GB39512475	30-Oct-14 (in house check Oct-22)	In house check: Oct-24
Power sensor HP 8481A	SN: US37292783	07-Oct-15 (in house check Oct-22)	In house check: Oct-24
Power sensor HP 8481A	SN: MY41093315	07-Oct-15 (in house check Oct-22)	In house check: Oct-24
RF generator R&S SMT-06	SN: 100972	15-Jun-15 (in house check Oct-22)	In house check: Oct-24
Network Analyzer Agilent E8358A	SN: US41080477	31-Mar-14 (in house check Oct-22)	In house check: Oct-24

Calibrated by: **Name** **Aidonia Georgiadou** **Function** **Laboratory Technician**

Approved by: **Sven Kühn** **Technical Manager**

Signature

Issued: May 13, 2024

This calibration certificate shall not be reproduced except in full without written approval of the laboratory.



Accredited by the Swiss Accreditation Service (SAS)

The Swiss Accreditation Service is one of the signatories to the EA
Multilateral Agreement for the recognition of calibration certificates

Glossary:

TSL	tissue simulating liquid
ConvF	sensitivity in TSL / NORM x,y,z
N/A	not applicable or not measured

Calibration is Performed According to the Following Standards:

- a) IEC/IEEE 62209-1528, "Measurement Procedure For The Assessment Of Specific Absorption Rate Of Human Exposure To Radio Frequency Fields From Hand-Held And Body-Worn Wireless Communication Devices - Part 1528: Human Models, Instrumentation And Procedures (Frequency Range of 4 MHz to 10 GHz)", October 2020.
- b) KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

Additional Documentation:

- c) DASY System Handbook

Methods Applied and Interpretation of Parameters:

- *Measurement Conditions:* Further details are available from the Validation Report at the end of the certificate. All figures stated in the certificate are valid at the frequency indicated.
- *Antenna Parameters with TSL:* The source is mounted in a touch configuration below the center marking of the flat phantom.
- *Return Loss:* This parameter is measured with the source positioned under the liquid filled phantom (as described in the measurement condition clause). The Return Loss ensures low reflected power. No uncertainty required.
- *SAR measured:* SAR measured at the stated antenna input power.
- *SAR normalized:* SAR as measured, normalized to an input power of 1 W at the antenna connector.
- *SAR for nominal TSL parameters:* The measured TSL parameters are used to calculate the nominal SAR result.

The reported uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor $k=2$, which for a normal distribution corresponds to a coverage probability of approximately 95%.

Measurement Conditions

DASY system configuration, as far as not given on page 1.

DASY Version	DASY52	V52.10.4
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom	
Distance Dipole Center - TSL	15 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	750 MHz $\pm$ 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	41.9	0.89 mho/m
Measured Head TSL parameters	(22.0 $\pm$ 0.2) °C	43.2 $\pm$ 6 %	0.89 mho/m $\pm$ 6 %
Head TSL temperature change during test	< 0.5 °C	----	----

SAR result with Head TSL

SAR averaged over 1 cm³ (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	2.18 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	8.76 W/kg $\pm$ 17.0 % (k=2)

SAR averaged over 10 cm³ (10 g) of Head TSL	condition	
SAR measured	250 mW input power	1.42 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	5.71 W/kg $\pm$ 16.5 % (k=2)

Appendix (Additional assessments outside the scope of SCS 0108)

Antenna Parameters with Head TSL

Impedance, transformed to feed point	52.8 Ω - 1.1 j Ω
Return Loss	- 30.5 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.038 ns
----------------------------------	----------

After long term use with 100W radiated power, only a slight warming of the dipole near the feedpoint can be measured.

The dipole is made of standard semirigid coaxial cable. The center conductor of the feeding line is directly connected to the second arm of the dipole. The antenna is therefore short-circuited for DC-signals. On some of the dipoles, small end caps are added to the dipole arms in order to improve matching when loaded according to the position as explained in the "Measurement Conditions" paragraph. The SAR data are not affected by this change. The overall dipole length is still according to the Standard.

No excessive force must be applied to the dipole arms, because they might bend or the soldered connections near the feedpoint may be damaged.

Additional EUT Data

Manufactured by	SPEAG
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Extended Calibration

Usage of SAR dipoles calibrated less than 3 years ago but more than 1 year ago were confirmed in maintaining return loss (<-20 dB, within 20% of prior calibration) and impedance (within 5 ohm from prior calibration) requirements per extended calibrations in KDB Publication 865664 D01 v01r04.

D750V3 SN: 1016 - Head						
Date of Measurement	Return Loss (dB)	$\Delta\%$	Impedance Real (Ω)	$\Delta\Omega$	Impedance Imaginary (j Ω)	$\Delta\Omega$
5/10/2024	-30.5		52.8		-1.1	
5/9/2025	-31.8	4.3	51.6	-1.2	-1.2	-0.1

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 750 MHz; Type: D750V3; Serial: D750V3 - SN:1016

Communication System: UID 0 - CW; Frequency: 750 MHz

Medium parameters used: $f = 750 \text{ MHz}$; $\sigma = 0.89 \text{ S/m}$; $\epsilon_r = 43.2$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section

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

DASY52 Configuration:

- Probe: EX3DV4 - SN7349; ConvF(10.11, 10.11, 10.11) @ 750 MHz; Calibrated: 03.11.2023
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 30.01.2024
- Phantom: Flat Phantom 4.9 (front); Type: QD 00L P49 AA; Serial: 1001
- DASY52 52.10.4(1535); SEMCAD X 14.6.14(7501)

Dipole Calibration for Head Tissue/Pin=250 mW, d=15mm/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: $dx=5\text{mm}$, $dy=5\text{mm}$, $dz=5\text{mm}$

Reference Value = 61.05 V/m; Power Drift = 0.01 dB

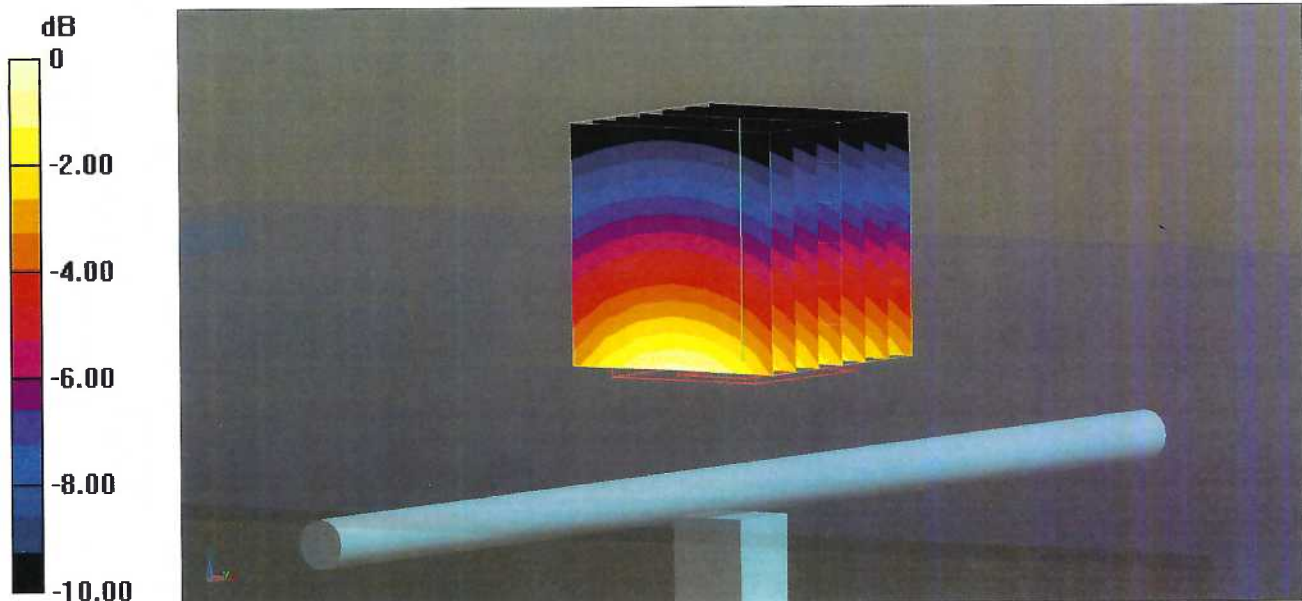
Peak SAR (extrapolated) = 3.35 W/kg

SAR(1 g) = 2.18 W/kg; SAR(10 g) = 1.42 W/kg

Smallest distance from peaks to all points 3 dB below: Larger than measurement grid ($> 15 \text{ mm}$)

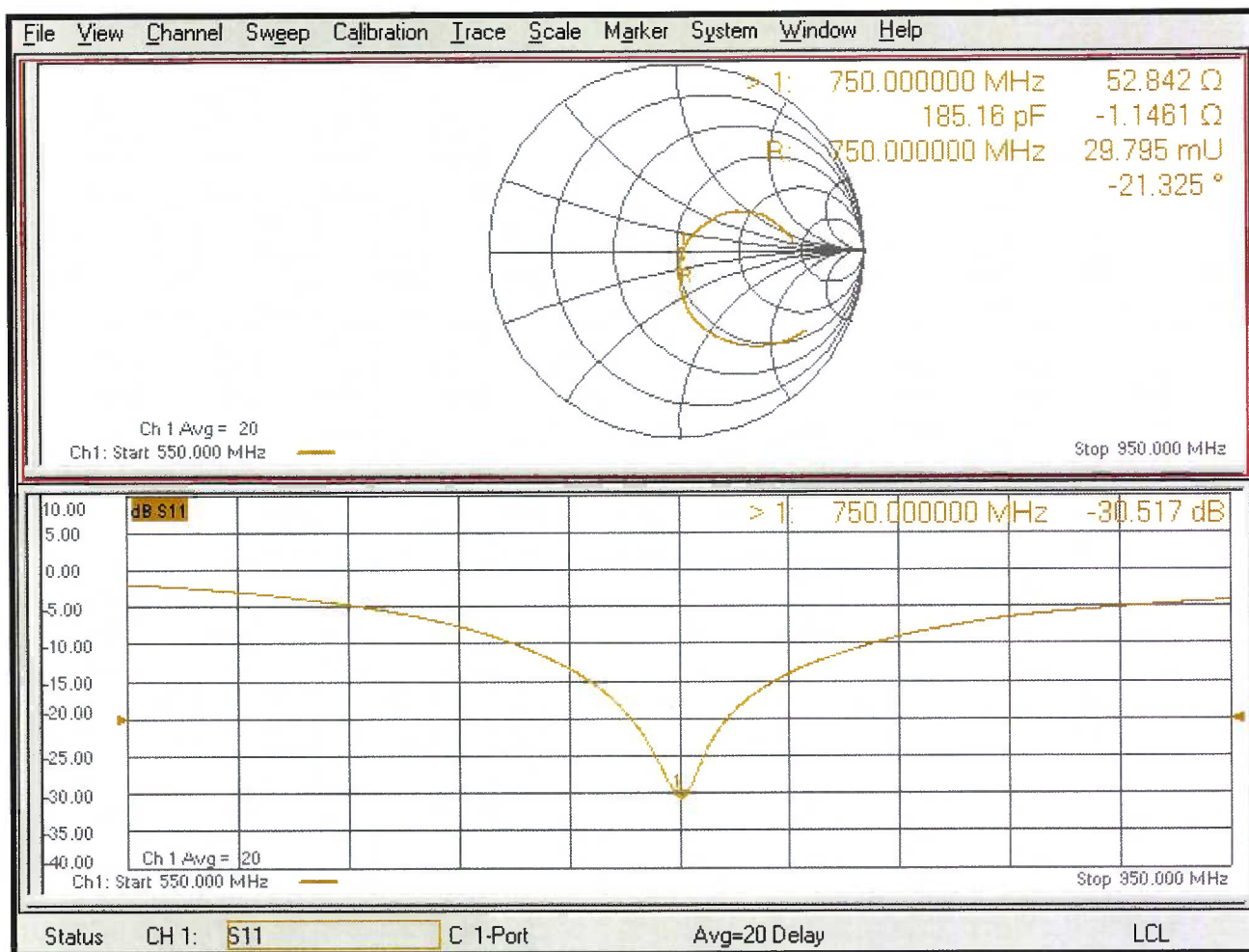
Ratio of SAR at M2 to SAR at M1 = 64.9%

Maximum value of SAR (measured) = 2.95 W/kg



0 dB = 2.95 W/kg = 4.70 dBW/kg

Impedance Measurement Plot for Head TSL





Accredited by the Swiss Accreditation Service (SAS)

The Swiss Accreditation Service is one of the signatories to the EA
Multilateral Agreement for the recognition of calibration certificates

Client **RF Exposure Lab**
San Marcos, USA

Certificate No. **D900V2-1d044_May24**

CALIBRATION CERTIFICATE

Object **D900V2 - SN:1d044**

Calibration procedure(s) **QA CAL-05.v12**
Calibration Procedure for SAR Validation Sources between 0.7-3 GHz

Calibration date: **May 10, 2024**

This calibration certificate documents the traceability to national standards, which realize the physical units of measurements (SI).
The measurements and the uncertainties with confidence probability are given on the following pages and are part of the certificate.

All calibrations have been conducted in the closed laboratory facility: environment temperature (22 ± 3)°C and humidity < 70%.

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Power meter NRP2	SN: 104778	26-Mar-24 (No. 217-04036/04037)	Mar-25
Power sensor NRP-Z91	SN: 103244	26-Mar-24 (No. 217-04036)	Mar-25
Power sensor NRP-Z91	SN: 103245	26-Mar-24 (No. 217-04037)	Mar-25
Reference 20 dB Attenuator	SN: BH9394 (20k)	26-Mar-24 (No. 217-04046)	Mar-25
Type-N mismatch combination	SN: 310982 / 06327	26-Mar-24 (No. 217-04047)	Mar-25
Reference Probe EX3DV4	SN: 7349	03-Nov-23 (No. EX3-7349_Nov23)	Nov-24
DAE4	SN: 601	30-Jan-24 (No. DAE4-601_Jan24)	Jan-25

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power meter E4419B	SN: GB39512475	30-Oct-14 (in house check Oct-22)	In house check: Oct-24
Power sensor HP 8481A	SN: US37292783	07-Oct-15 (in house check Oct-22)	In house check: Oct-24
Power sensor HP 8481A	SN: MY41093315	07-Oct-15 (in house check Oct-22)	In house check: Oct-24
RF generator R&S SMT-06	SN: 100972	15-Jun-15 (in house check Oct-22)	In house check: Oct-24
Network Analyzer Agilent E8358A	SN: US41080477	31-Mar-14 (in house check Oct-22)	In house check: Oct-24

Calibrated by: **Aldonia Georgiadou** Function: **Laboratory Technician**

Approved by: **Sven Kühn** Technical Manager

Signature

Issued: May 13, 2024

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Accredited by the Swiss Accreditation Service (SAS)

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Multilateral Agreement for the recognition of calibration certificates

Glossary:

TSL	tissue simulating liquid
ConvF	sensitivity in TSL / NORM x,y,z
N/A	not applicable or not measured

Calibration is Performed According to the Following Standards:

- IEC/IEEE 62209-1528, "Measurement Procedure For The Assessment Of Specific Absorption Rate Of Human Exposure To Radio Frequency Fields From Hand-Held And Body-Worn Wireless Communication Devices - Part 1528: Human Models, Instrumentation And Procedures (Frequency Range of 4 MHz to 10 GHz)", October 2020.
- KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

Additional Documentation:

- DASY System Handbook

Methods Applied and Interpretation of Parameters:

- Measurement Conditions:* Further details are available from the Validation Report at the end of the certificate. All figures stated in the certificate are valid at the frequency indicated.
- Antenna Parameters with TSL:* The source is mounted in a touch configuration below the center marking of the flat phantom.
- Return Loss:* This parameter is measured with the source positioned under the liquid filled phantom (as described in the measurement condition clause). The Return Loss ensures low reflected power. No uncertainty required.
- SAR measured:* SAR measured at the stated antenna input power.
- SAR normalized:* SAR as measured, normalized to an input power of 1 W at the antenna connector.
- SAR for nominal TSL parameters:* The measured TSL parameters are used to calculate the nominal SAR result.

The reported uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor $k=2$, which for a normal distribution corresponds to a coverage probability of approximately 95%.

Measurement Conditions

DASY system configuration, as far as not given on page 1.

DASY Version	DASY52	V52.10.4
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom	
Distance Dipole Center - TSL	15 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	900 MHz $\pm$ 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	41.5	0.97 mho/m
Measured Head TSL parameters	(22.0 $\pm$ 0.2) °C	42.8 $\pm$ 6 %	0.95 mho/m $\pm$ 6 %
Head TSL temperature change during test	< 0.5 °C	----	----

SAR result with Head TSL

SAR averaged over 1 cm³ (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	2.70 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	11.0 W/kg $\pm$ 17.0 % (k=2)

SAR averaged over 10 cm³ (10 g) of Head TSL	condition	
SAR measured	250 mW input power	1.73 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	7.05 W/kg $\pm$ 16.5 % (k=2)

Appendix (Additional assessments outside the scope of SCS 0108)

Antenna Parameters with Head TSL

Impedance, transformed to feed point	49.3 Ω - 6.6 j Ω
Return Loss	- 23.5 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.409 ns
----------------------------------	----------

After long term use with 100W radiated power, only a slight warming of the dipole near the feedpoint can be measured.

The dipole is made of standard semirigid coaxial cable. The center conductor of the feeding line is directly connected to the second arm of the dipole. The antenna is therefore short-circuited for DC-signals. On some of the dipoles, small end caps are added to the dipole arms in order to improve matching when loaded according to the position as explained in the "Measurement Conditions" paragraph. The SAR data are not affected by this change. The overall dipole length is still according to the Standard.

No excessive force must be applied to the dipole arms, because they might bend or the soldered connections near the feedpoint may be damaged.

Additional EUT Data

Manufactured by	SPEAG
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Extended Calibration

Usage of SAR dipoles calibrated less than 3 years ago but more than 1 year ago were confirmed in maintaining return loss (<-20 dB, within 20% of prior calibration) and impedance (within 5 ohm from prior calibration) requirements per extended calibrations in KDB Publication 865664 D01 v01r04.

D900V2 SN: 1d044 - Head						
Date of Measurement	Return Loss (dB)	$\Delta\%$	Impedance Real (Ω)	$\Delta\Omega$	Impedance Imaginary (j Ω)	$\Delta\Omega$
5/10/2024	-23.5		49.3		-6.6	
5/9/2025	-24.6	4.7	50.9	1.6	-6.2	0.4

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 900 MHz; Type: D900V2; Serial: D900V2 - SN:1d044

Communication System: UID 0 - CW; Frequency: 900 MHz

Medium parameters used: $f = 900 \text{ MHz}$; $\sigma = 0.95 \text{ S/m}$; $\epsilon_r = 42.8$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section

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

DASY52 Configuration:

- Probe: EX3DV4 - SN7349; ConvF(9.62, 9.62, 9.62) @ 900 MHz; Calibrated: 03.11.2023
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 30.01.2024
- Phantom: Flat Phantom 4.9 (front); Type: QD 00L P49 AA; Serial: 1001
- DASY52 52.10.4(1535); SEMCAD X 14.6.14(7501)

Dipole Calibration for Head Tissue/Pin=250 mW, d=15mm/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: $dx=5\text{mm}$, $dy=5\text{mm}$, $dz=5\text{mm}$

Reference Value = 65.98 V/m; Power Drift = 0.01 dB

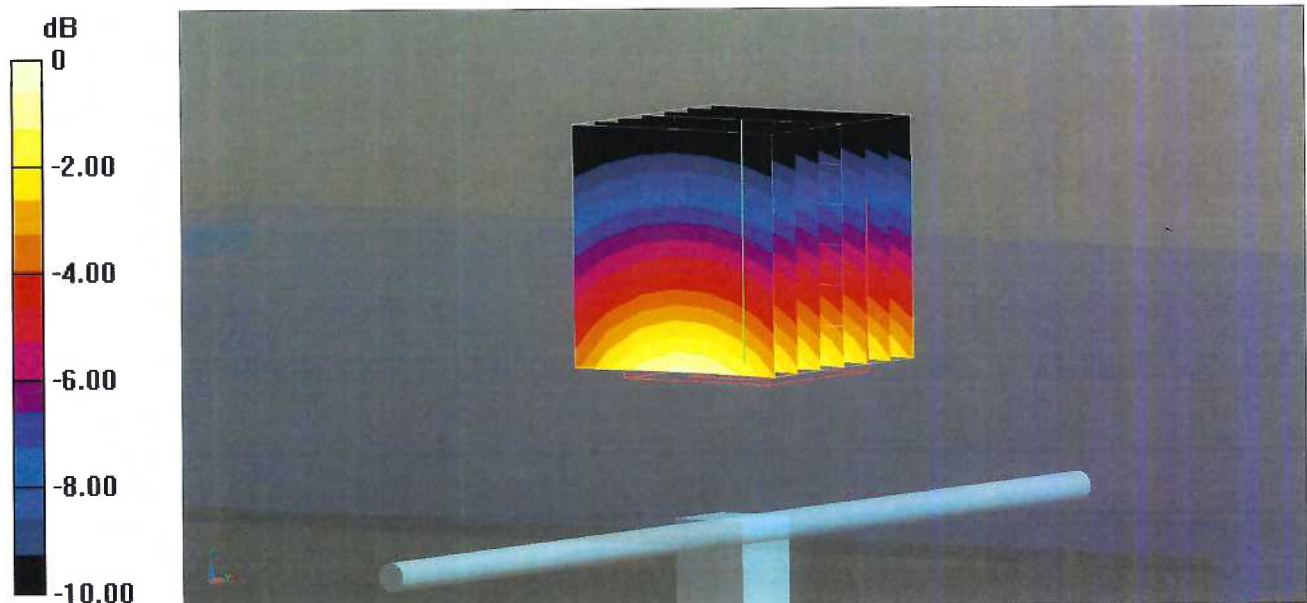
Peak SAR (extrapolated) = 4.17 W/kg

SAR(1 g) = 2.70 W/kg; SAR(10 g) = 1.73 W/kg

Smallest distance from peaks to all points 3 dB below = 16 mm

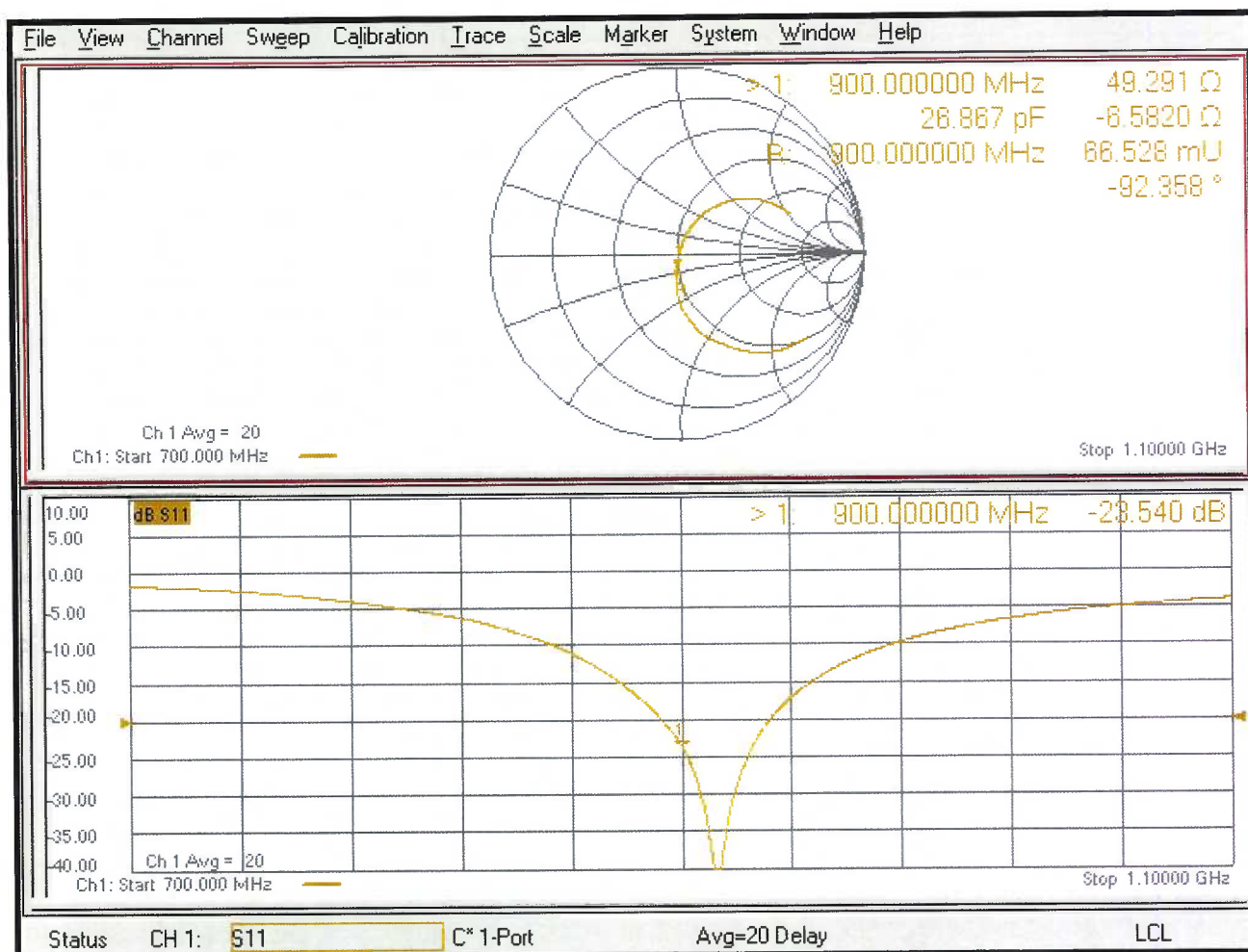
Ratio of SAR at M2 to SAR at M1 = 64.9%

Maximum value of SAR (measured) = 3.65 W/kg



0 dB = 3.65 W/kg = 5.62 dBW/kg

Impedance Measurement Plot for Head TSL





Accredited by the Swiss Accreditation Service (SAS)

The Swiss Accreditation Service is one of the signatories to the EA
Multilateral Agreement for the recognition of calibration certificates

Accreditation No.: **SCS 0108**

Client **RF Exposure Lab**
San Marcos, USA

Certificate No. **D1750V2-1018_May24**

CALIBRATION CERTIFICATE

Object **D1750V2 - SN:1018**

Calibration procedure(s) **QA CAL-05.v12**
Calibration Procedure for SAR Validation Sources between 0.7-3 GHz

Calibration date: **May 10, 2024**

This calibration certificate documents the traceability to national standards, which realize the physical units of measurements (SI).
The measurements and the uncertainties with confidence probability are given on the following pages and are part of the certificate.

All calibrations have been conducted in the closed laboratory facility: environment temperature (22 ± 3)°C and humidity < 70%.

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Power meter NRP2	SN: 104778	26-Mar-24 (No. 217-04036/04037)	Mar-25
Power sensor NRP-Z91	SN: 103244	26-Mar-24 (No. 217-04036)	Mar-25
Power sensor NRP-Z91	SN: 103245	26-Mar-24 (No. 217-04037)	Mar-25
Reference 20 dB Attenuator	SN: BH9394 (20k)	26-Mar-24 (No. 217-04046)	Mar-25
Type-N mismatch combination	SN: 310982 / 06327	26-Mar-24 (No. 217-04047)	Mar-25
Reference Probe EX3DV4	SN: 7349	03-Nov-23 (No. EX3-7349_Nov23)	Nov-24
DAE4	SN: 601	30-Jan-24 (No. DAE4-601_Jan24)	Jan-25

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power meter E4419B	SN: GB39512475	30-Oct-14 (in house check Oct-22)	In house check: Oct-24
Power sensor HP 8481A	SN: US37292783	07-Oct-15 (in house check Oct-22)	In house check: Oct-24
Power sensor HP 8481A	SN: MY41093315	07-Oct-15 (in house check Oct-22)	In house check: Oct-24
RF generator R&S SMT-06	SN: 100972	15-Jun-15 (in house check Oct-22)	In house check: Oct-24
Network Analyzer Agilent E8358A	SN: US41080477	31-Mar-14 (in house check Oct-22)	In house check: Oct-24

Calibrated by: **Aidonia Georgiadou** Name: **Aidonia Georgiadou** Function: **Laboratory Technician**

Approved by: **Sven Kühn** Name: **Sven Kühn** Function: **Technical Manager**

Signature

Issued: May 13, 2024

This calibration certificate shall not be reproduced except in full without written approval of the laboratory.



Accredited by the Swiss Accreditation Service (SAS)

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Multilateral Agreement for the recognition of calibration certificates

Glossary:

TSL	tissue simulating liquid
ConvF	sensitivity in TSL / NORM x,y,z
N/A	not applicable or not measured

Calibration is Performed According to the Following Standards:

- a) IEC/IEEE 62209-1528, "Measurement Procedure For The Assessment Of Specific Absorption Rate Of Human Exposure To Radio Frequency Fields From Hand-Held And Body-Worn Wireless Communication Devices - Part 1528: Human Models, Instrumentation And Procedures (Frequency Range of 4 MHz to 10 GHz)", October 2020.
- b) KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

Additional Documentation:

- c) DASY System Handbook

Methods Applied and Interpretation of Parameters:

- *Measurement Conditions:* Further details are available from the Validation Report at the end of the certificate. All figures stated in the certificate are valid at the frequency indicated.
- *Antenna Parameters with TSL:* The source is mounted in a touch configuration below the center marking of the flat phantom.
- *Return Loss:* This parameter is measured with the source positioned under the liquid filled phantom (as described in the measurement condition clause). The Return Loss ensures low reflected power. No uncertainty required.
- *SAR measured:* SAR measured at the stated antenna input power.
- *SAR normalized:* SAR as measured, normalized to an input power of 1 W at the antenna connector.
- *SAR for nominal TSL parameters:* The measured TSL parameters are used to calculate the nominal SAR result.

The reported uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor $k=2$, which for a normal distribution corresponds to a coverage probability of approximately 95%.

Measurement Conditions

DASY system configuration, as far as not given on page 1.

DASY Version	DASY52	V52.10.4
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom	
Distance Dipole Center - TSL	10 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	1750 MHz $\pm$ 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	40.1	1.37 mho/m
Measured Head TSL parameters	(22.0 $\pm$ 0.2) °C	41.3 $\pm$ 6 %	1.34 mho/m $\pm$ 6 %
Head TSL temperature change during test	< 0.5 °C	----	----

SAR result with Head TSL

SAR averaged over 1 cm³ (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	8.98 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	36.7 W/kg $\pm$ 17.0 % (k=2)

SAR averaged over 10 cm³ (10 g) of Head TSL	condition	
SAR measured	250 mW input power	4.76 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	19.3 W/kg $\pm$ 16.5 % (k=2)

Appendix (Additional assessments outside the scope of SCS 0108)

Antenna Parameters with Head TSL

Impedance, transformed to feed point	50.3 Ω - 0.1 j Ω
Return Loss	- 50.5 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.223 ns
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After long term use with 100W radiated power, only a slight warming of the dipole near the feedpoint can be measured.

The dipole is made of standard semirigid coaxial cable. The center conductor of the feeding line is directly connected to the second arm of the dipole. The antenna is therefore short-circuited for DC-signals. On some of the dipoles, small end caps are added to the dipole arms in order to improve matching when loaded according to the position as explained in the "Measurement Conditions" paragraph. The SAR data are not affected by this change. The overall dipole length is still according to the Standard.

No excessive force must be applied to the dipole arms, because they might bend or the soldered connections near the feedpoint may be damaged.

Additional EUT Data

Manufactured by	SPEAG
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Extended Calibration

Usage of SAR dipoles calibrated less than 3 years ago but more than 1 year ago were confirmed in maintaining return loss (<-20 dB, within 20% of prior calibration) and impedance (within 5 ohm from prior calibration) requirements per extended calibrations in KDB Publication 865664 D01 v01r04.

D1750V2 SN: 1018 - Head						
Date of Measurement	Return Loss (dB)	$\Delta\%$	Impedance Real (Ω)	$\Delta\Omega$	Impedance Imaginary (j Ω)	$\Delta\Omega$
5/10/2024	-50.5		50.3		-0.1	
5/9/2025	-52.6	4.2	48.9	-1.4	-0.3	-0.2

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 1750 MHz; Type: D1750V2; Serial: D1750V2 - SN:1018

Communication System: UID 0 - CW; Frequency: 1750 MHz

Medium parameters used: $f = 1750$ MHz; $\sigma = 1.34$ S/m; $\epsilon_r = 41.3$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

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

DASY52 Configuration:

- Probe: EX3DV4 - SN7349; ConvF(8.67, 8.67, 8.67) @ 1750 MHz; Calibrated: 03.11.2023
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 30.01.2024
- Phantom: Flat Phantom 5.0 (front); Type: QD000P50AA; Serial: 1001
- DASY52 52.10.4(1535); SEMCAD X 14.6.14(7501)

Dipole Calibration for Head Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 106.9 V/m; Power Drift = 0.07 dB

Peak SAR (extrapolated) = 16.6 W/kg

SAR(1 g) = 8.98 W/kg; SAR(10 g) = 4.76 W/kg

Smallest distance from peaks to all points 3 dB below = 10 mm

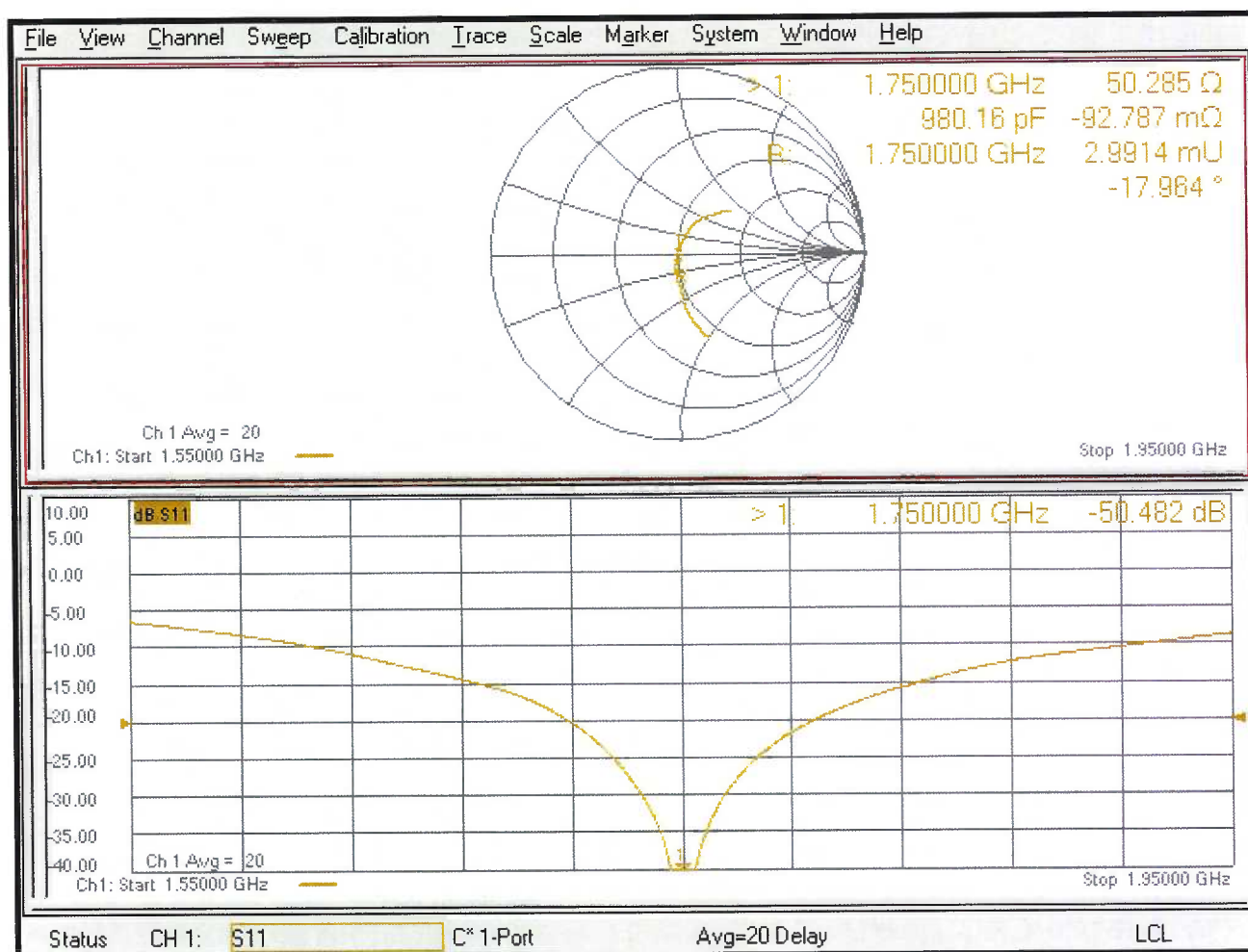
Ratio of SAR at M2 to SAR at M1 = 55.3%

Maximum value of SAR (measured) = 13.4 W/kg



0 dB = 13.4 W/kg = 11.26 dBW/kg

Impedance Measurement Plot for Head TSL





Accredited by the Swiss Accreditation Service (SAS)

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 Multilateral Agreement for the recognition of calibration certificates

Client **RF Exposure Lab**
 San Marcos, USA

Certificate No. **D1900V2-5d116_May24**

CALIBRATION CERTIFICATE

Object **D1900V2 - SN:5d116**

Calibration procedure(s) **QA CAL-05.v12**
Calibration Procedure for SAR Validation Sources between 0.7-3 GHz

Calibration date: **May 06, 2024**

This calibration certificate documents the traceability to national standards, which realize the physical units of measurements (SI).
 The measurements and the uncertainties with confidence probability are given on the following pages and are part of the certificate.

All calibrations have been conducted in the closed laboratory facility: environment temperature (22 ± 3)°C and humidity < 70%.

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Power meter NRP2	SN: 104778	26-Mar-24 (No. 217-04036/04037)	Mar-25
Power sensor NRP-Z91	SN: 103244	26-Mar-24 (No. 217-04036)	Mar-25
Power sensor NRP-Z91	SN: 103245	26-Mar-24 (No. 217-04037)	Mar-25
Reference 20 dB Attenuator	SN: BH9394 (20k)	26-Mar-24 (No. 217-04046)	Mar-25
Type-N mismatch combination	SN: 310982 / 06327	26-Mar-24 (No. 217-04047)	Mar-25
Reference Probe EX3DV4	SN: 7349	03-Nov-23 (No. EX3-7349_Nov23)	Nov-24
DAE4	SN: 601	30-Jan-24 (No. DAE4-601_Jan24)	Jan-25

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power meter E4419B	SN: GB39512475	30-Oct-14 (in house check Oct-22)	In house check: Oct-24
Power sensor HP 8481A	SN: US37292783	07-Oct-15 (in house check Oct-22)	In house check: Oct-24
Power sensor HP 8481A	SN: MY41093315	07-Oct-15 (in house check Oct-22)	In house check: Oct-24
RF generator R&S SMT-06	SN: 100972	15-Jun-15 (in house check Oct-22)	In house check: Oct-24
Network Analyzer Agilent E8358A	SN: US41080477	31-Mar-14 (in house check Oct-22)	In house check: Oct-24

Calibrated by: **Leif Klysner** Name: **Leif Klysner** Function: **Laboratory Technician**

Approved by: **Sven Kühn** Technical Manager

Signature

Issued: May 6, 2024

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Glossary:

TSL	tissue simulating liquid
ConvF	sensitivity in TSL / NORM x,y,z
N/A	not applicable or not measured

Calibration is Performed According to the Following Standards:

- a) IEC/IEEE 62209-1528, "Measurement Procedure For The Assessment Of Specific Absorption Rate Of Human Exposure To Radio Frequency Fields From Hand-Held And Body-Worn Wireless Communication Devices - Part 1528: Human Models, Instrumentation And Procedures (Frequency Range of 4 MHz to 10 GHz)", October 2020.
- b) KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

Additional Documentation:

- c) DASY System Handbook

Methods Applied and Interpretation of Parameters:

- *Measurement Conditions:* Further details are available from the Validation Report at the end of the certificate. All figures stated in the certificate are valid at the frequency indicated.
- *Antenna Parameters with TSL:* The source is mounted in a touch configuration below the center marking of the flat phantom.
- *Return Loss:* This parameter is measured with the source positioned under the liquid filled phantom (as described in the measurement condition clause). The Return Loss ensures low reflected power. No uncertainty required.
- *SAR measured:* SAR measured at the stated antenna input power.
- *SAR normalized:* SAR as measured, normalized to an input power of 1 W at the antenna connector.
- *SAR for nominal TSL parameters:* The measured TSL parameters are used to calculate the nominal SAR result.

The reported uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor $k=2$, which for a normal distribution corresponds to a coverage probability of approximately 95%.

Measurement Conditions

DASY system configuration, as far as not given on page 1.

DASY Version	DASY52	V52.10.4
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom	
Distance Dipole Center - TSL	10 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	1900 MHz $\pm$ 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	40.0	1.40 mho/m
Measured Head TSL parameters	(22.0 $\pm$ 0.2) °C	41.1 $\pm$ 6 %	1.40 mho/m $\pm$ 6 %
Head TSL temperature change during test	< 0.5 °C	----	----

SAR result with Head TSL

SAR averaged over 1 cm³ (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	10.1 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	40.6 W/kg $\pm$ 17.0 % (k=2)

SAR averaged over 10 cm³ (10 g) of Head TSL	condition	
SAR measured	250 mW input power	5.27 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	21.2 W/kg $\pm$ 16.5 % (k=2)

Appendix (Additional assessments outside the scope of SCS 0108)

Antenna Parameters with Head TSL

Impedance, transformed to feed point	49.7 Ω + 6.1 j Ω
Return Loss	- 24.3 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.202 ns
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After long term use with 100W radiated power, only a slight warming of the dipole near the feedpoint can be measured.

The dipole is made of standard semirigid coaxial cable. The center conductor of the feeding line is directly connected to the second arm of the dipole. The antenna is therefore short-circuited for DC-signals. On some of the dipoles, small end caps are added to the dipole arms in order to improve matching when loaded according to the position as explained in the "Measurement Conditions" paragraph. The SAR data are not affected by this change. The overall dipole length is still according to the Standard.

No excessive force must be applied to the dipole arms, because they might bend or the soldered connections near the feedpoint may be damaged.

Additional EUT Data

Manufactured by	SPEAG
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Extended Calibration

Usage of SAR dipoles calibrated less than 3 years ago but more than 1 year ago were confirmed in maintaining return loss (<-20 dB, within 20% of prior calibration) and impedance (within 5 ohm from prior calibration) requirements per extended calibrations in KDB Publication 865664 D01 v01r04.

D1900V2 SN: 5d116 - Head						
Date of Measurement	Return Loss (dB)	$\Delta\%$	Impedance Real (Ω)	$\Delta\Omega$	Impedance Imaginary (j Ω)	$\Delta\Omega$
5/6/2024	-24.3		49.7		6.1	
5/6/2025	-25.8	6.2	51.8	2.1	5.8	-0.3

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 1900 MHz; Type: D1900V2; Serial: D1900V2 - SN:5d116

Communication System: UID 0 - CW; Frequency: 1900 MHz

Medium parameters used: $f = 1900 \text{ MHz}$; $\sigma = 1.4 \text{ S/m}$; $\epsilon_r = 41.1$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section

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

DASY52 Configuration:

- Probe: EX3DV4 - SN7349; ConvF(8.43, 8.43, 8.43) @ 1900 MHz; Calibrated: 03.11.2023
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 30.01.2024
- Phantom: Flat Phantom 5.0 (front); Type: QD000P50AA; Serial: 1001
- DASY52 52.10.4(1535); SEMCAD X 14.6.14(7501)

Dipole Calibration for Head Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: $dx=5\text{mm}$, $dy=5\text{mm}$, $dz=5\text{mm}$

Reference Value = 109.5 V/m; Power Drift = 0.08 dB

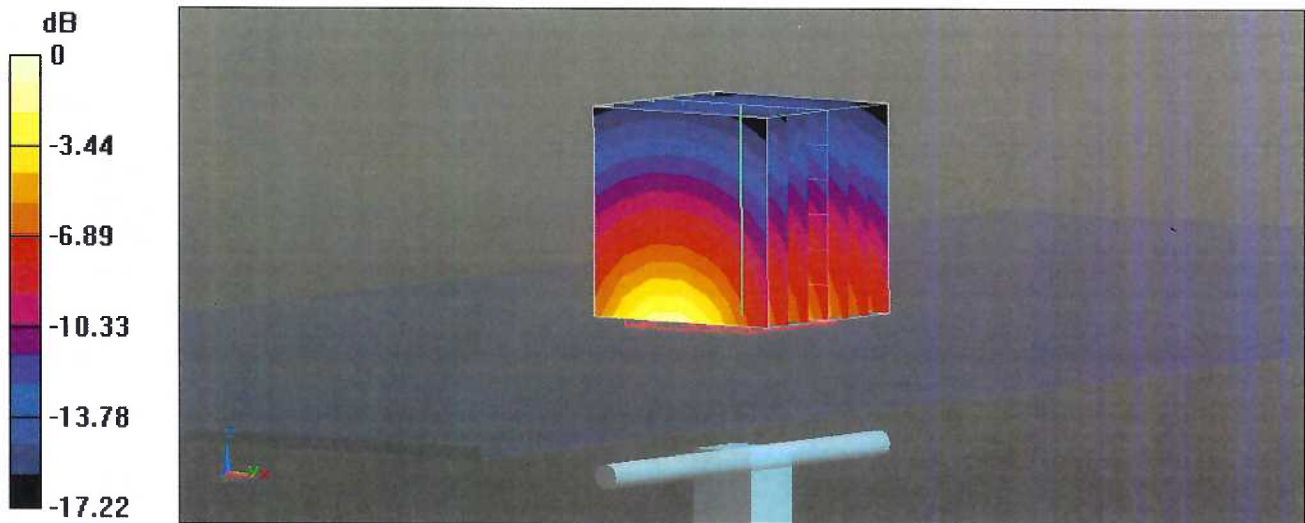
Peak SAR (extrapolated) = 18.6 W/kg

SAR(1 g) = 10.1 W/kg; SAR(10 g) = 5.27 W/kg

Smallest distance from peaks to all points 3 dB below = 9.8 mm

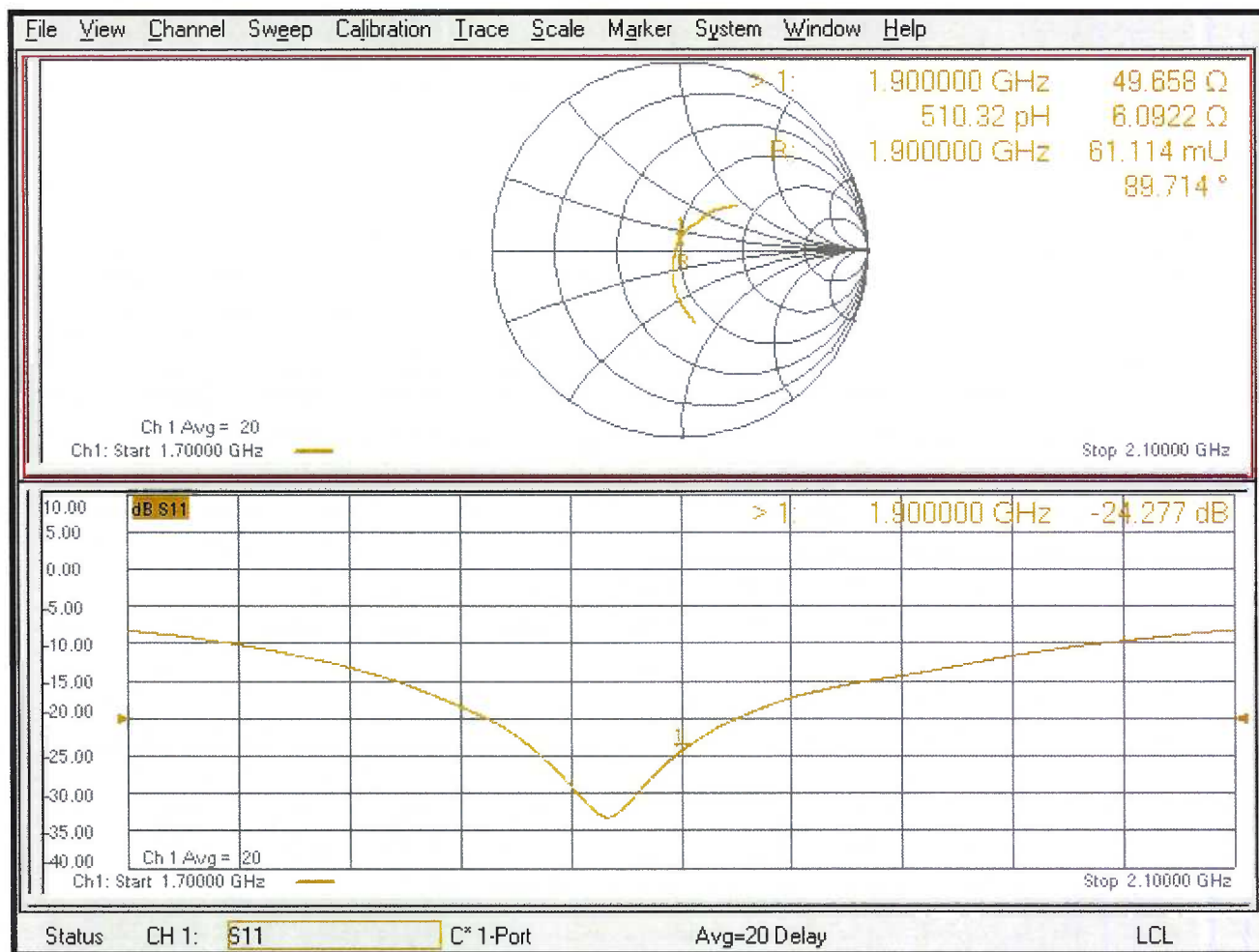
Ratio of SAR at M2 to SAR at M1 = 55%

Maximum value of SAR (measured) = 15.3 W/kg



0 dB = 15.3 W/kg = 11.85 dBW/kg

Impedance Measurement Plot for Head TSL





Accredited by the Swiss Accreditation Service (SAS)

The Swiss Accreditation Service is one of the signatories to the EA
Multilateral Agreement for the recognition of calibration certificates

Accreditation No.: **SCS 0108**

Client **RF Exposure Lab**
San Marcos, USA

Certificate No. **D2300V2-1060_May24**

CALIBRATION CERTIFICATE

Object **D2300V2 - SN:1060**

Calibration procedure(s) **QA CAL-05.v12**
Calibration Procedure for SAR Validation Sources between 0.7-3 GHz

Calibration date: **May 06, 2024**

This calibration certificate documents the traceability to national standards, which realize the physical units of measurements (SI).
The measurements and the uncertainties with confidence probability are given on the following pages and are part of the certificate.

All calibrations have been conducted in the closed laboratory facility: environment temperature (22 ± 3)°C and humidity < 70%.

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Power meter NRP2	SN: 104778	26-Mar-24 (No. 217-04036/04037)	Mar-25
Power sensor NRP-Z91	SN: 103244	26-Mar-24 (No. 217-04036)	Mar-25
Power sensor NRP-Z91	SN: 103245	26-Mar-24 (No. 217-04037)	Mar-25
Reference 20 dB Attenuator	SN: BH9394 (20k)	26-Mar-24 (No. 217-04046)	Mar-25
Type-N mismatch combination	SN: 310982 / 06327	26-Mar-24 (No. 217-04047)	Mar-25
Reference Probe EX3DV4	SN: 7349	03-Nov-23 (No. EX3-7349_Nov23)	Nov-24
DAE4	SN: 601	30-Jan-24 (No. DAE4-601_Jan24)	Jan-25

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power meter E4419B	SN: GB39512475	30-Oct-14 (in house check Oct-22)	In house check: Oct-24
Power sensor HP 8481A	SN: US37292783	07-Oct-15 (in house check Oct-22)	In house check: Oct-24
Power sensor HP 8481A	SN: MY41093315	07-Oct-15 (in house check Oct-22)	In house check: Oct-24
RF generator R&S SMT-06	SN: 100972	15-Jun-15 (in house check Oct-22)	In house check: Oct-24
Network Analyzer Agilent E8358A	SN: US41080477	31-Mar-14 (in house check Oct-22)	In house check: Oct-24

Calibrated by: **Leif Klysner** Name Function
Laboratory Technician

Approved by: **Sven Kühn** Technical Manager

Signature

Issued: May 7, 2024

This calibration certificate shall not be reproduced except in full without written approval of the laboratory.



Accredited by the Swiss Accreditation Service (SAS)

The Swiss Accreditation Service is one of the signatories to the EA
Multilateral Agreement for the recognition of calibration certificates

Glossary:

TSL	tissue simulating liquid
ConvF	sensitivity in TSL / NORM x,y,z
N/A	not applicable or not measured

Calibration is Performed According to the Following Standards:

- IEC/IEEE 62209-1528, "Measurement Procedure For The Assessment Of Specific Absorption Rate Of Human Exposure To Radio Frequency Fields From Hand-Held And Body-Worn Wireless Communication Devices - Part 1528: Human Models, Instrumentation And Procedures (Frequency Range of 4 MHz to 10 GHz)", October 2020.
- KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

Additional Documentation:

- DASY System Handbook

Methods Applied and Interpretation of Parameters:

- Measurement Conditions:** Further details are available from the Validation Report at the end of the certificate. All figures stated in the certificate are valid at the frequency indicated.
- Antenna Parameters with TSL:** The source is mounted in a touch configuration below the center marking of the flat phantom.
- Return Loss:** This parameter is measured with the source positioned under the liquid filled phantom (as described in the measurement condition clause). The Return Loss ensures low reflected power. No uncertainty required.
- SAR measured:** SAR measured at the stated antenna input power.
- SAR normalized:** SAR as measured, normalized to an input power of 1 W at the antenna connector.
- SAR for nominal TSL parameters:** The measured TSL parameters are used to calculate the nominal SAR result.

The reported uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor $k=2$, which for a normal distribution corresponds to a coverage probability of approximately 95%.

Measurement Conditions

DASY system configuration, as far as not given on page 1.

DASY Version	DASY52	V52.10.4
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom	
Distance Dipole Center - TSL	10 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	2300 MHz $\pm$ 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	39.5	1.67 mho/m
Measured Head TSL parameters	(22.0 $\pm$ 0.2) °C	38.5 $\pm$ 6 %	1.72 mho/m $\pm$ 6 %
Head TSL temperature change during test	< 0.5 °C	----	----

SAR result with Head TSL

SAR averaged over 1 cm³ (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	12.3 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	48.4 W/kg $\pm$ 17.0 % (k=2)

SAR averaged over 10 cm³ (10 g) of Head TSL	condition	
SAR measured	250 mW input power	5.96 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	23.5 W/kg $\pm$ 16.5 % (k=2)

Appendix (Additional assessments outside the scope of SCS 0108)

Antenna Parameters with Head TSL

Impedance, transformed to feed point	48.6 Ω - 5.3 j Ω
Return Loss	- 25.2 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.169 ns
----------------------------------	----------

After long term use with 100W radiated power, only a slight warming of the dipole near the feedpoint can be measured.

The dipole is made of standard semirigid coaxial cable. The center conductor of the feeding line is directly connected to the second arm of the dipole. The antenna is therefore short-circuited for DC-signals. On some of the dipoles, small end caps are added to the dipole arms in order to improve matching when loaded according to the position as explained in the "Measurement Conditions" paragraph. The SAR data are not affected by this change. The overall dipole length is still according to the Standard.

No excessive force must be applied to the dipole arms, because they might bend or the soldered connections near the feedpoint may be damaged.

Additional EUT Data

Manufactured by	SPEAG
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Extended Calibration

Usage of SAR dipoles calibrated less than 3 years ago but more than 1 year ago were confirmed in maintaining return loss (<-20 dB, within 20% of prior calibration) and impedance (within 5 ohm from prior calibration) requirements per extended calibrations in KDB Publication 865664 D01 v01r04.

D2300V2 SN: 1060 - Head						
Date of Measurement	Return Loss (dB)	$\Delta\%$	Impedance (Ω)	$\Delta\Omega$	Impedance Imaginary (j Ω)	$\Delta\Omega$
5/6/2024	-25.2		48.6		-5.3	
5/6/2025	-26.3	4.4	49.2	0.6	-4.8	0.5

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 2300 MHz; Type: D2300V2; Serial: D2300V2 - SN:1060

Communication System: UID 0 - CW; Frequency: 2300 MHz

Medium parameters used: $f = 2300$ MHz; $\sigma = 1.72$ S/m; $\epsilon_r = 38.5$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

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

DASY52 Configuration:

- Probe: EX3DV4 - SN7349; ConvF(7.98, 7.98, 7.98) @ 2300 MHz; Calibrated: 03.11.2023
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 30.01.2024
- Phantom: Flat Phantom 5.0 (front); Type: QD000P50AA; Serial: 1001
- DASY52 52.10.4(1535); SEMCAD X 14.6.14(7501)

Dipole Calibration for Head Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 115.3 V/m; Power Drift = 0.06 dB

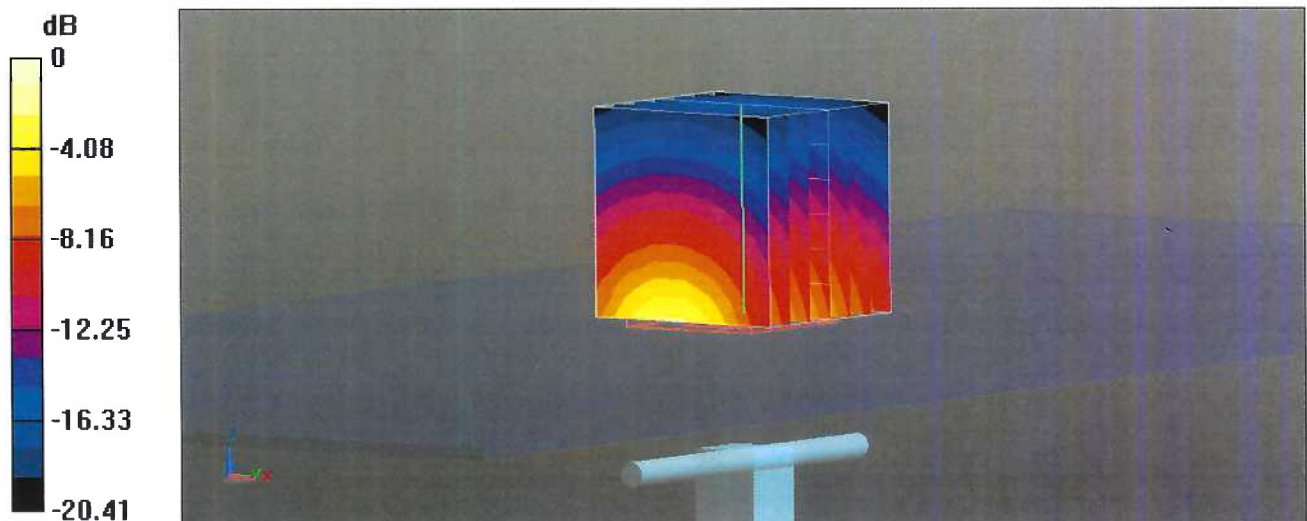
Peak SAR (extrapolated) = 22.7 W/kg

SAR(1 g) = 12.3 W/kg; SAR(10 g) = 5.96 W/kg

Smallest distance from peaks to all points 3 dB below = 9.2 mm

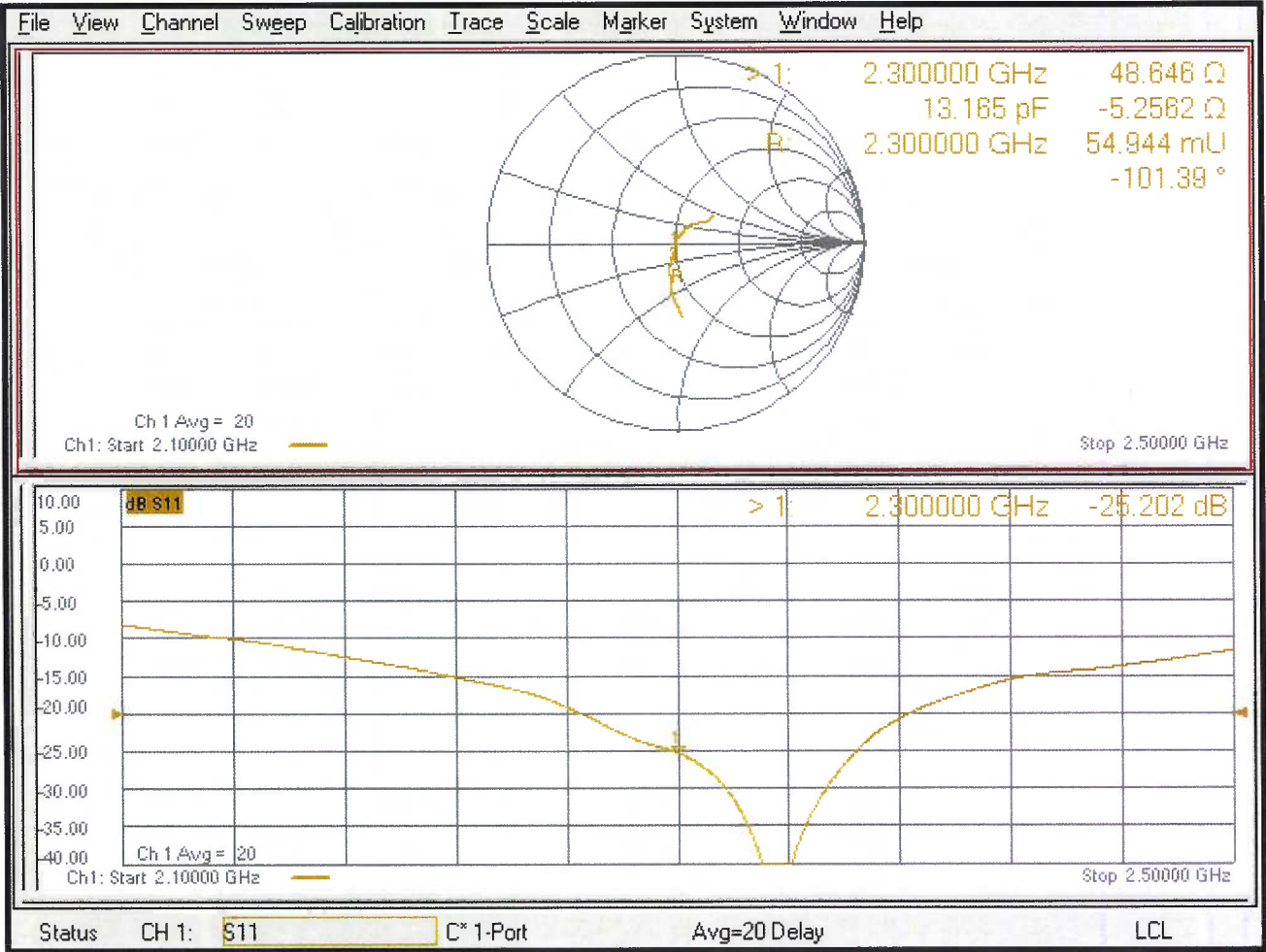
Ratio of SAR at M2 to SAR at M1 = 55.2%

Maximum value of SAR (measured) = 18.7 W/kg



0 dB = 18.7 W/kg = 12.72 dBW/kg

Impedance Measurement Plot for Head TSL





Accredited by the Swiss Accreditation Service (SAS)

The Swiss Accreditation Service is one of the signatories to the EA
Multilateral Agreement for the recognition of calibration certificates

Accreditation No.: **SCS 0108**

Client **RF Exposure Lab**
San Marcos, USA

Certificate No. **D2550V2-1003_May24**

CALIBRATION CERTIFICATE

Object **D2550V2 - SN:1003**

Calibration procedure(s) **QA CAL-05.v12**
Calibration Procedure for SAR Validation Sources between 0.7-3 GHz

Calibration date: **May 06, 2024**

This calibration certificate documents the traceability to national standards, which realize the physical units of measurements (SI).
The measurements and the uncertainties with confidence probability are given on the following pages and are part of the certificate.

All calibrations have been conducted in the closed laboratory facility: environment temperature $(22 \pm 3)^{\circ}\text{C}$ and humidity $< 70\%$.

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Power meter NRP2	SN: 104778	26-Mar-24 (No. 217-04036/04037)	Mar-25
Power sensor NRP-Z91	SN: 103244	26-Mar-24 (No. 217-04036)	Mar-25
Power sensor NRP-Z91	SN: 103245	26-Mar-24 (No. 217-04037)	Mar-25
Reference 20 dB Attenuator	SN: BH9394 (20k)	26-Mar-24 (No. 217-04046)	Mar-25
Type-N mismatch combination	SN: 310982 / 06327	26-Mar-24 (No. 217-04047)	Mar-25
Reference Probe EX3DV4	SN: 7349	03-Nov-23 (No. EX3-7349_Nov23)	Nov-24
DAE4	SN: 601	30-Jan-24 (No. DAE4-601_Jan24)	Jan-25
Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power meter E4419B	SN: GB39512475	30-Oct-14 (in house check Oct-22)	In house check: Oct-24
Power sensor HP 8481A	SN: US37292783	07-Oct-15 (in house check Oct-22)	In house check: Oct-24
Power sensor HP 8481A	SN: MY41093315	07-Oct-15 (in house check Oct-22)	In house check: Oct-24
RF generator R&S SMT-06	SN: 100972	15-Jun-15 (in house check Oct-22)	In house check: Oct-24
Network Analyzer Agilent E8358A	SN: US41080477	31-Mar-14 (in house check Oct-22)	In house check: Oct-24

Calibrated by: **Leif Klysner** Name: **Leif Klysner** Function: **Laboratory Technician**

Approved by: **Sven Kühn** Technical Manager

Signature

Issued: May 7, 2024

This calibration certificate shall not be reproduced except in full without written approval of the laboratory.



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Glossary:

TSL	tissue simulating liquid
ConvF	sensitivity in TSL / NORM x,y,z
N/A	not applicable or not measured

Calibration is Performed According to the Following Standards:

- a) IEC/IEEE 62209-1528, "Measurement Procedure For The Assessment Of Specific Absorption Rate Of Human Exposure To Radio Frequency Fields From Hand-Held And Body-Worn Wireless Communication Devices - Part 1528: Human Models, Instrumentation And Procedures (Frequency Range of 4 MHz to 10 GHz)", October 2020.
- b) KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

Additional Documentation:

- c) DASY System Handbook

Methods Applied and Interpretation of Parameters:

- *Measurement Conditions:* Further details are available from the Validation Report at the end of the certificate. All figures stated in the certificate are valid at the frequency indicated.
- *Antenna Parameters with TSL:* The source is mounted in a touch configuration below the center marking of the flat phantom.
- *Return Loss:* This parameter is measured with the source positioned under the liquid filled phantom (as described in the measurement condition clause). The Return Loss ensures low reflected power. No uncertainty required.
- *SAR measured:* SAR measured at the stated antenna input power.
- *SAR normalized:* SAR as measured, normalized to an input power of 1 W at the antenna connector.
- *SAR for nominal TSL parameters:* The measured TSL parameters are used to calculate the nominal SAR result.

The reported uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor $k=2$, which for a normal distribution corresponds to a coverage probability of approximately 95%.

Measurement Conditions

DASY system configuration, as far as not given on page 1.

DASY Version	DASY52	V52.10.4
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom	
Distance Dipole Center - TSL	10 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	2550 MHz $\pm$ 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	39.1	1.91 mho/m
Measured Head TSL parameters	(22.0 $\pm$ 0.2) °C	37.6 $\pm$ 6 %	1.99 mho/m $\pm$ 6 %
Head TSL temperature change during test	< 0.5 °C	----	----

SAR result with Head TSL

SAR averaged over 1 cm³ (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	13.9 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	54.1 W/kg $\pm$ 17.0 % (k=2)

SAR averaged over 10 cm³ (10 g) of Head TSL	condition	
SAR measured	250 mW input power	6.27 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	24.7 W/kg $\pm$ 16.5 % (k=2)

Appendix (Additional assessments outside the scope of SCS 0108)

Antenna Parameters with Head TSL

Impedance, transformed to feed point	48.4 Ω - 3.4 j Ω
Return Loss	- 28.4 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.155 ns
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After long term use with 100W radiated power, only a slight warming of the dipole near the feedpoint can be measured.

The dipole is made of standard semirigid coaxial cable. The center conductor of the feeding line is directly connected to the second arm of the dipole. The antenna is therefore short-circuited for DC-signals. On some of the dipoles, small end caps are added to the dipole arms in order to improve matching when loaded according to the position as explained in the "Measurement Conditions" paragraph. The SAR data are not affected by this change. The overall dipole length is still according to the Standard.

No excessive force must be applied to the dipole arms, because they might bend or the soldered connections near the feedpoint may be damaged.

Additional EUT Data

Manufactured by	SPEAG
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Extended Calibration

Usage of SAR dipoles calibrated less than 3 years ago but more than 1 year ago were confirmed in maintaining return loss (<-20 dB, within 20% of prior calibration) and impedance (within 5 ohm from prior calibration) requirements per extended calibrations in KDB Publication 865664 D01 v01r04.

D2550V2 SN: 1003 - Head						
Date of Measurement	Return Loss (dB)	$\Delta\%$	Impedance (Ω)	$\Delta\Omega$	Impedance Imaginary (j Ω)	$\Delta\Omega$
5/6/2024	-28.4		48.4		-3.4	
5/6/2025	-29.3	3.2	49.2	0.8	-3.2	0.2

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 2550 MHz; Type: D2550V2; Serial: D2550V2 - SN:1003

Communication System: UID 0 - CW; Frequency: 2550 MHz

Medium parameters used: $f = 2550$ MHz; $\sigma = 1.99$ S/m; $\epsilon_r = 37.6$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

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

DASY52 Configuration:

- Probe: EX3DV4 - SN7349; ConvF(7.85, 7.85, 7.85) @ 2550 MHz; Calibrated: 03.11.2023
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 30.01.2024
- Phantom: Flat Phantom 5.0 (front); Type: QD000P50AA; Serial: 1001
- DASY52 52.10.4(1535); SEMCAD X 14.6.14(7501)

Dipole Calibration for Head Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 116.0 V/m; Power Drift = 0.05 dB

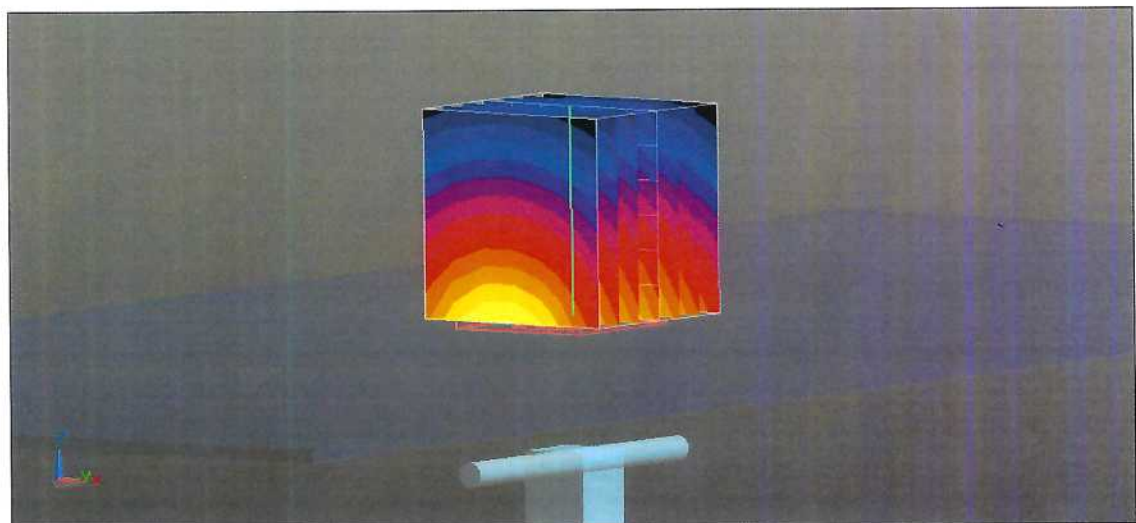
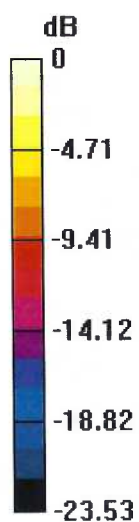
Peak SAR (extrapolated) = 29.0 W/kg

SAR(1 g) = 13.9 W/kg; SAR(10 g) = 6.27 W/kg

Smallest distance from peaks to all points 3 dB below = 9 mm

Ratio of SAR at M2 to SAR at M1 = 48.7%

Maximum value of SAR (measured) = 22.8 W/kg



0 dB = 22.8 W/kg = 13.59 dBW/kg