

P85 WLAN5G_802.11a_Top Side_1cm_Ch165_Ant6

Communication System: 802.11a; Frequency: 5825 MHz; Duty Cycle: 1:1.005

Medium: HSL5G_0622 Medium parameters used: $f = 5825$ MHz; $\sigma = 5.191$ S/m; $\epsilon_r = 34.174$; $\rho = 1000$ kg/m³

Ambient Temperature : 23.1°C; Liquid Temperature : 22.6°C

DASY5 Configuration:

- Probe: EX3DV4 - SN3873; ConvF(4.59, 4.56, 4.63) @ 5825 MHz; Calibrated: 2023/08/23
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1389; Calibrated: 2023/11/03
- Phantom: SAM Right ; Type: QD000P40CD; Serial: TP:1611
- Measurement SW: DASY52, Version 52.10 (4); SEMCAD X Version 14.6.14 (7501)

-Area Scan (41x111x1): Interpolated grid: $dx=1.000$ mm, $dy=1.000$ mm

Maximum value of SAR (interpolated) = 0.456 W/kg

-Zoom Scan (7x7x12)/Cube 0: Measurement grid: $dx=4$ mm, $dy=4$ mm, $dz=2$ mm

Reference Value = 8.195 V/m; Power Drift = 0.06 dB

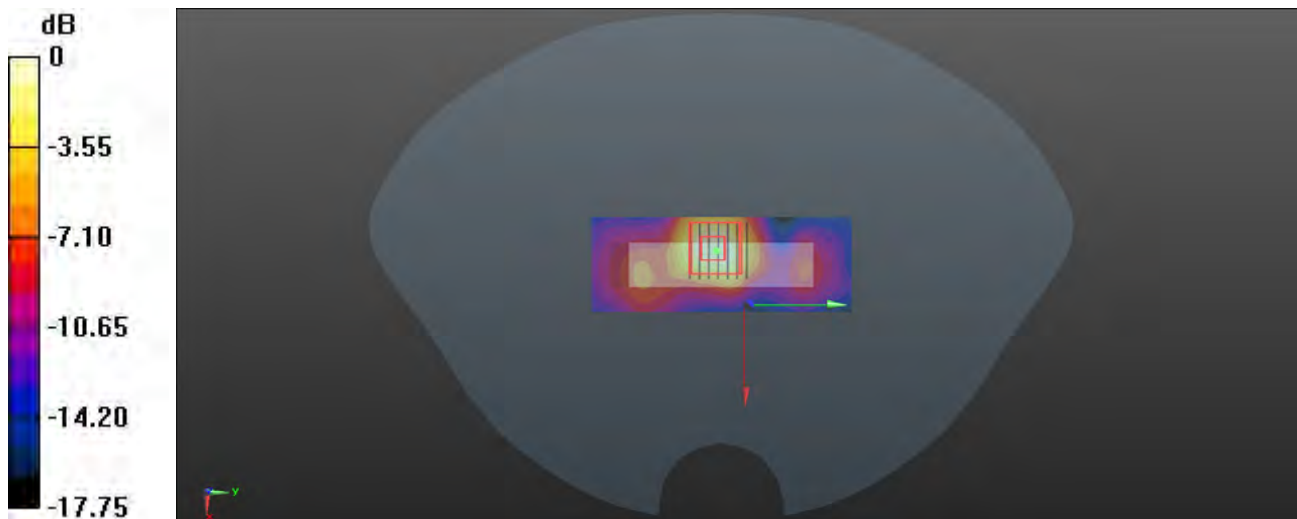
Peak SAR (extrapolated) = 0.871 W/kg

SAR(1 g) = 0.233 W/kg; SAR(10 g) = 0.084 W/kg

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

Ratio of SAR at M2 to SAR at M1 = 52.7%

Maximum value of SAR (measured) = 0.442 W/kg



0 dB = 0.442 W/kg

P86 BT_GFSK_Left Side_1cm_Ch0_Ant5

Communication System: BT; Frequency: 2402 MHz; Duty Cycle: 1:2.175

Medium: HSL2450_0607 Medium parameters used: $f = 2402$ MHz; $\sigma = 1.833$ S/m; $\epsilon_r = 39.298$; $\rho = 1000$ kg/m³

Ambient Temperature : 23.8°C; Liquid Temperature : 22.6°C

DASY5 Configuration:

- Probe: EX3DV4 - SN3873; ConvF(7.62, 7.65, 7.52) @ 2402 MHz; Calibrated: 2023/08/23
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1389; Calibrated: 2023/11/03
- Phantom: SAM Right ; Type: QD000P40CD; Serial: TP:1611
- Measurement SW: DASY52, Version 52.10 (4); SEMCAD X Version 14.6.14 (7501)

-Area Scan (41x161x1): Interpolated grid: $dx=1.200$ mm, $dy=1.200$ mm

Maximum value of SAR (interpolated) = 0.194 W/kg

-Zoom Scan (7x7x7)/Cube 0: Measurement grid: $dx=5$ mm, $dy=5$ mm, $dz=5$ mm

Reference Value = 8.182 V/m; Power Drift = 0.01 dB

Peak SAR (extrapolated) = 0.233 W/kg

SAR(1 g) = 0.049 W/kg; SAR(10 g) = 0.014 W/kg

Smallest distance from peaks to all points 3 dB below = 11.2 mm

Ratio of SAR at M2 to SAR at M1 = 53.2%

Maximum value of SAR (measured) = 0.178 W/kg



0 dB = 0.178 W/kg

P87 NR N38_DFT-QPSK40M_Rear Face_0cm_Ch518000_1RB_OS1_Ant2

Communication System: NR; Frequency: 2590 MHz; Duty Cycle: 1:1

Medium: HSL2550_0609 Medium parameters used: $f = 2590$ MHz; $\sigma = 1.972$ S/m; $\epsilon_r = 39.204$; $\rho = 1000$ kg/m³

Ambient Temperature : 23.2°C; Liquid Temperature : 22.7°C

DASY5 Configuration:

- Probe: EX3DV4 - SN3873; ConvF(7.52, 7.57, 7.43) @ 2590 MHz; Calibrated: 2023/08/23
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1389; Calibrated: 2023/11/03
- Phantom: SAM Right ; Type: QD000P40CD; Serial: TP:1611
- Measurement SW: DASY52, Version 52.10 (4); SEMCAD X Version 14.6.14 (7501)

-Area Scan (91x91x1): Interpolated grid: $dx=1.200$ mm, $dy=1.200$ mm

Maximum value of SAR (interpolated) = 3.14 W/kg

-Zoom Scan (7x7x7)/Cube 0: Measurement grid: $dx=5$ mm, $dy=5$ mm, $dz=5$ mm

Reference Value = 4.176 V/m; Power Drift = 0.06 dB

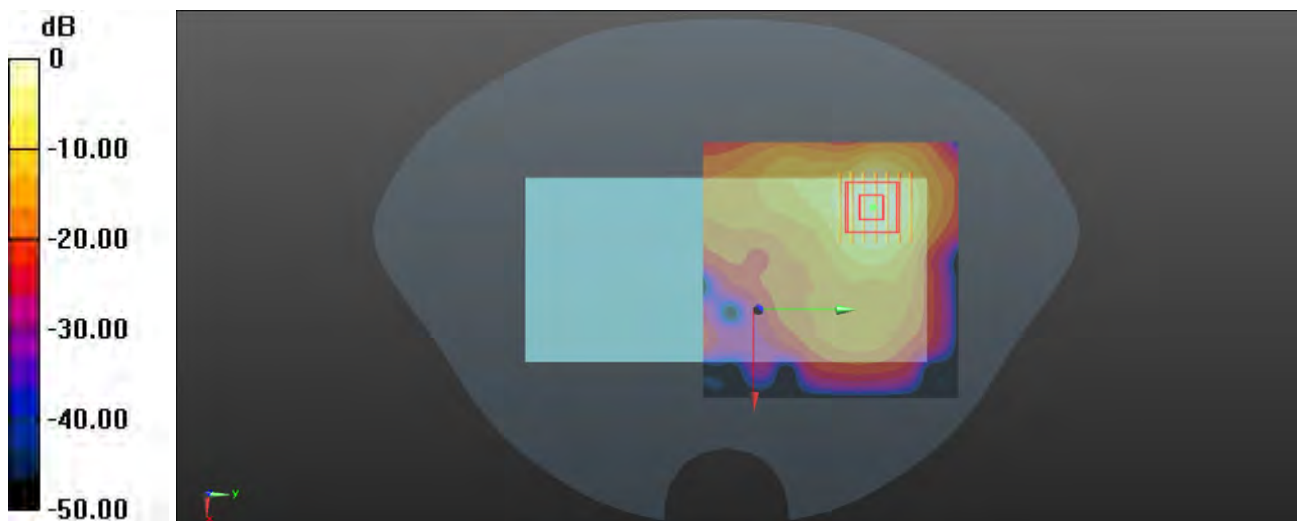
Peak SAR (extrapolated) = 5.24 W/kg

SAR(1 g) = 2.02 W/kg; SAR(10 g) = 0.889 W/kg

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

Ratio of SAR at M2 to SAR at M1 = 45.2%

Maximum value of SAR (measured) = 3.11 W/kg



0 dB = 3.11 W/kg

P88 NR N41_CP-QPSK100M_Right Side_0cm_Ch528000_1RB_OS1_Ant1+2

Communication System: NR; Frequency: 2640 MHz; Duty Cycle: 1:1

Medium: HSL2550_0610 Medium parameters used: $f = 2640$ MHz; $\sigma = 2.014$ S/m; $\epsilon_r = 39.137$; $\rho = 1000$ kg/m³

Ambient Temperature : 23.4°C; Liquid Temperature : 22.3°C

DASY5 Configuration:

- Probe: EX3DV4 - SN3873; ConvF(7.52, 7.57, 7.43) @ 2640 MHz; Calibrated: 2023/08/23
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1389; Calibrated: 2023/11/03
- Phantom: SAM Right ; Type: QD000P40CD; Serial: TP:1611
- Measurement SW: DASY52, Version 52.10 (4); SEMCAD X Version 14.6.14 (7501)

-Area Scan (41x161x1): Interpolated grid: dx=1.200 mm, dy=1.200 mm

Maximum value of SAR (interpolated) = 6.13 W/kg

-Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 24.78 V/m; Power Drift = 0.01 dB

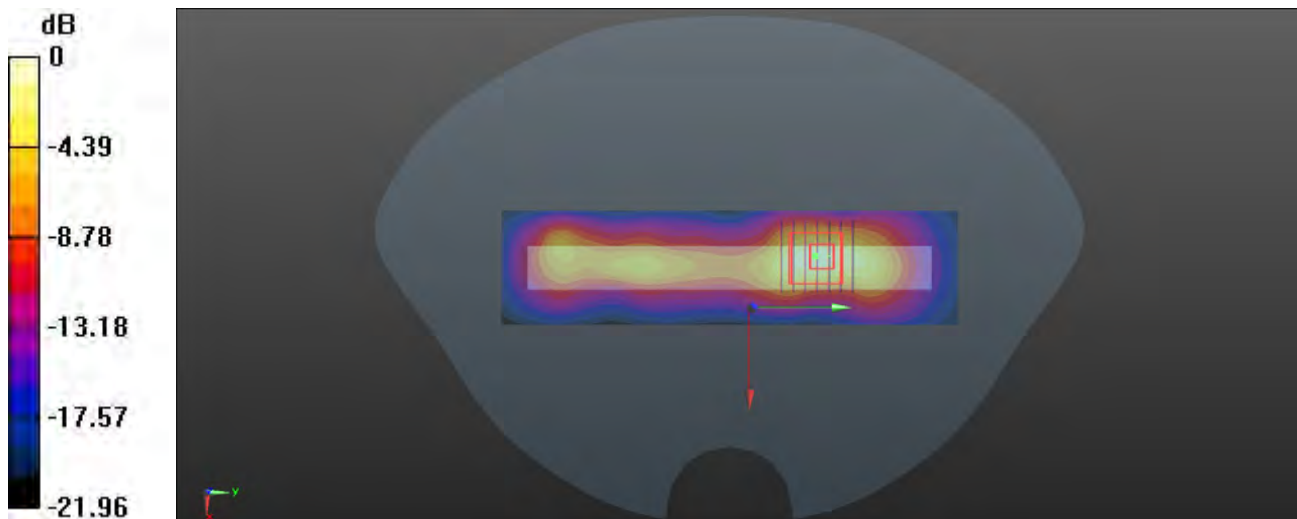
Peak SAR (extrapolated) = 10.1 W/kg

SAR(1 g) = 4.08 W/kg; SAR(10 g) = 1.73 W/kg

Smallest distance from peaks to all points 3 dB below = 7 mm

Ratio of SAR at M2 to SAR at M1 = 40.5%

Maximum value of SAR (measured) = 7.01 W/kg



0 dB = 7.01 W/kg

P89 NR N48_DFT-QPSK10M_Left Side_0cm_Ch646332_12RB_OS6_Ant5

Communication System: NR; Frequency: 3694.98 MHz; Duty Cycle: 1:1

Medium: HSL3700_0611 Medium parameters used: $f = 3694.98$ MHz; $\sigma = 3.006$ S/m; $\epsilon_r = 39.366$; $\rho = 1000$ kg/m³

Ambient Temperature : 23.4°C; Liquid Temperature : 22.8°C

DASY5 Configuration:

- Probe: EX3DV4 - SN3873; ConvF(6.61, 6.52, 6.63) @ 3694.98 MHz; Calibrated: 2023/08/23
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1389; Calibrated: 2023/11/03
- Phantom: SAM Right ; Type: QD000P40CD; Serial: TP:1611
- Measurement SW: DASY52, Version 52.10 (4); SEMCAD X Version 14.6.14 (7501)

-Area Scan (51x201x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm

Maximum value of SAR (interpolated) = 2.82 W/kg

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

Reference Value = 18.48 V/m; Power Drift = 0.03 dB

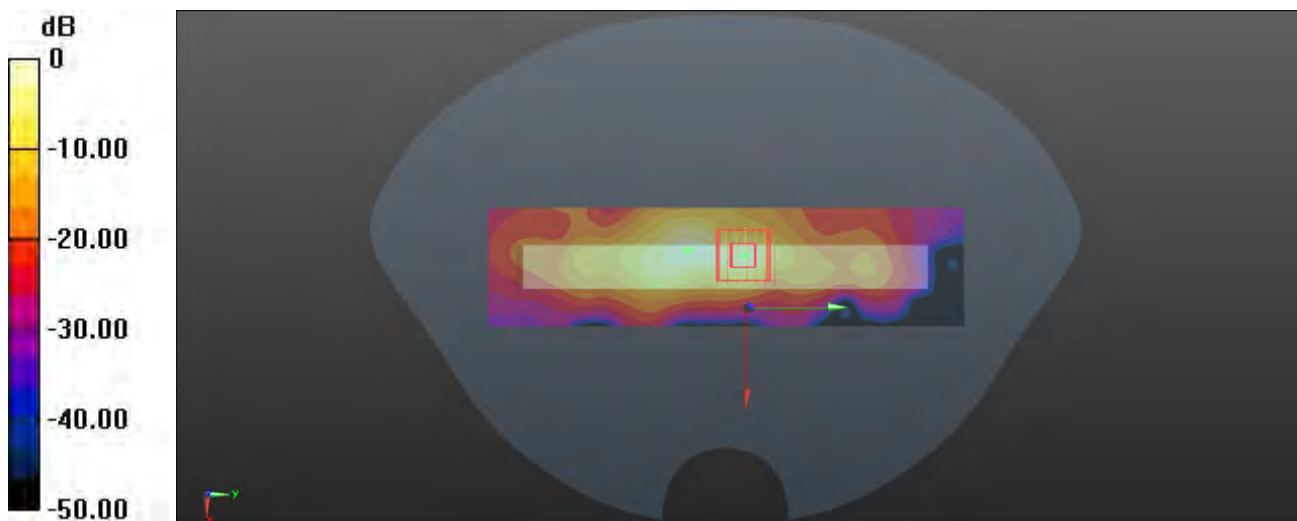
Peak SAR (extrapolated) = 4.56 W/kg

SAR(1 g) = 1.39 W/kg; SAR(10 g) = 0.409 W/kg

Smallest distance from peaks to all points 3 dB below = 4.8 mm

Ratio of SAR at M2 to SAR at M1 = 66.4%

Maximum value of SAR (measured) = 2.79 W/kg



0 dB = 2.79 W/kg

P90 NR N77_CP-QPSK100M_Rear Face_0cm_Ch633334_137RB_OS68_Ant5+3

Communication System: NR; Frequency: 3500.01 MHz; Duty Cycle: 1:1

Medium: HSL3500_0614 Medium parameters used: $f = 3500.01$ MHz; $\sigma = 2.821$ S/m; $\epsilon_r = 39.678$; $\rho = 1000$ kg/m³

Ambient Temperature : 23.5°C; Liquid Temperature : 22.3°C

DASY5 Configuration:

- Probe: EX3DV4 - SN3873; ConvF(6.7, 6.61, 6.72) @ 3500.01 MHz; Calibrated: 2023/08/23
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1389; Calibrated: 2023/11/03
- Phantom: SAM Right ; Type: QD000P40CD; Serial: TP:1611
- Measurement SW: DASY52, Version 52.10 (4); SEMCAD X Version 14.6.14 (7501)

-Area Scan (101x141x1): Interpolated grid: $dx=1.000$ mm, $dy=1.000$ mm

Maximum value of SAR (interpolated) = 9.72 W/kg

-Zoom Scan (7x7x12)/Cube 0: Measurement grid: $dx=4$ mm, $dy=4$ mm, $dz=2$ mm

Reference Value = 7.499 V/m; Power Drift = -0.03 dB

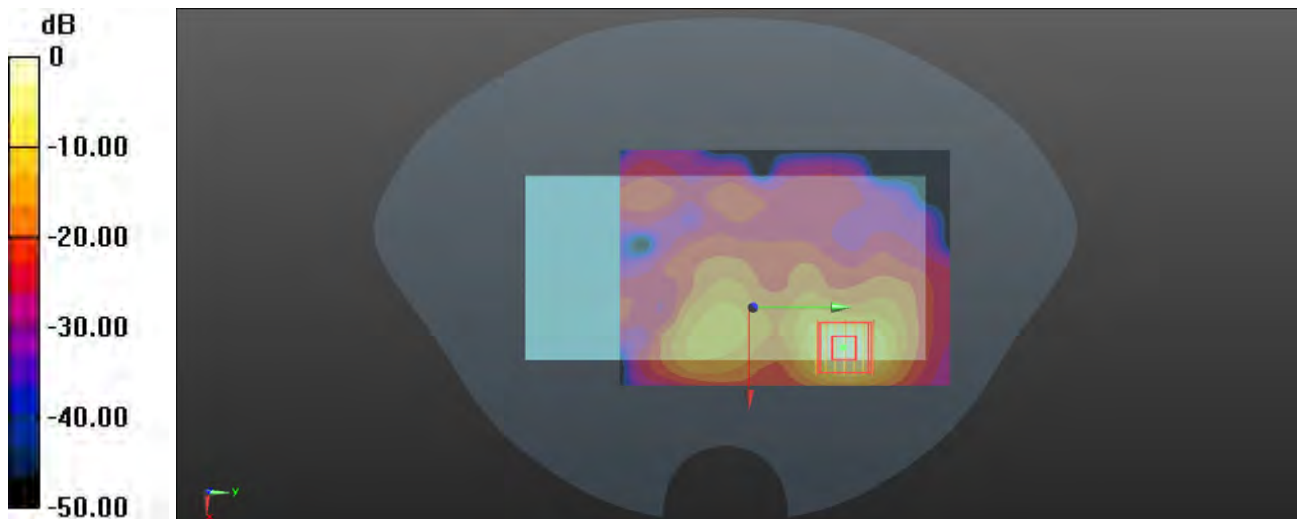
Peak SAR (extrapolated) = 13.6 W/kg

SAR(1 g) = 4.69 W/kg; SAR(10 g) = 1.45 W/kg

Smallest distance from peaks to all points 3 dB below = 5.6 mm

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

Maximum value of SAR (measured) = 8.89 W/kg



0 dB = 8.89 W/kg

P91 NR N78_CP-QPSK100M_Rear Face_0cm_Ch633334_137RB_OS0_Ant5+3

Communication System: NR; Frequency: 3500.01 MHz; Duty Cycle: 1:1

Medium: HSL3500_0614 Medium parameters used: $f = 3500.01$ MHz; $\sigma = 2.821$ S/m; $\epsilon_r = 39.678$; $\rho = 1000$ kg/m³

Ambient Temperature : 23.5°C; Liquid Temperature : 22.3°C

DASY5 Configuration:

- Probe: EX3DV4 - SN3873; ConvF(6.7, 6.61, 6.72) @ 3500.01 MHz; Calibrated: 2023/08/23
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1389; Calibrated: 2023/11/03
- Phantom: SAM Right ; Type: QD000P40CD; Serial: TP:1611
- Measurement SW: DASY52, Version 52.10 (4); SEMCAD X Version 14.6.14 (7501)

-Area Scan (91x91x1): Interpolated grid: dx=1.200 mm, dy=1.200 mm

Maximum value of SAR (interpolated) = 5.49 W/kg

-Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 5.613 V/m; Power Drift = -0.09 dB

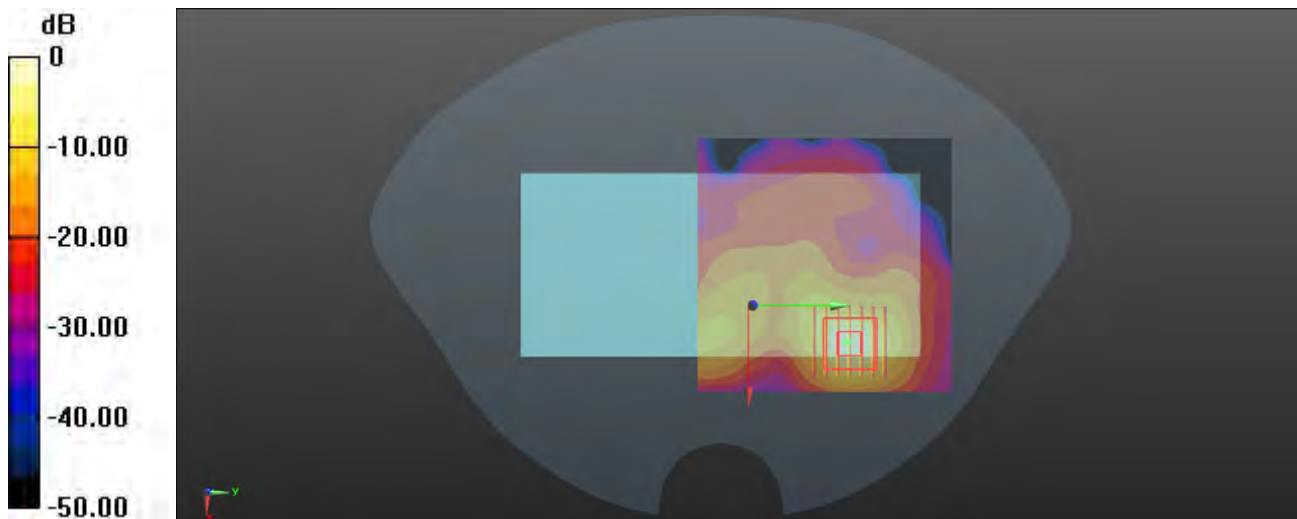
Peak SAR (extrapolated) = 12.9 W/kg

SAR(1 g) = 4.31 W/kg; SAR(10 g) = 1.36 W/kg

Smallest distance from peaks to all points 3 dB below = 6 mm

Ratio of SAR at M2 to SAR at M1 = 36.1%

Maximum value of SAR (measured) = 6.54 W/kg



0 dB = 6.54 W/kg

P92 WLAN5G_802.11a_Top Side_0cm_Ch56_Ant6

Communication System: 802.11a; Frequency: 5280 MHz; Duty Cycle: 1:1.007

Medium: HSL5G_0618 Medium parameters used: $f = 5280$ MHz; $\sigma = 4.647$ S/m; $\epsilon_r = 35.164$; $\rho = 1000$ kg/m³

Ambient Temperature : 23.5°C; Liquid Temperature : 22.7°C

DASY5 Configuration:

- Probe: EX3DV4 - SN3873; ConvF(5.05, 4.95, 5.04) @ 5280 MHz; Calibrated: 2023/08/23
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1389; Calibrated: 2023/11/03
- Phantom: SAM Right ; Type: QD000P40CD; Serial: TP:1611
- Measurement SW: DASY52, Version 52.10 (4); SEMCAD X Version 14.6.14 (7501)

-Area Scan (41x111x1): Interpolated grid: $dx=1.000$ mm, $dy=1.000$ mm

Maximum value of SAR (interpolated) = 2.15 W/kg

-Zoom Scan (7x7x12)/Cube 0: Measurement grid: $dx=4$ mm, $dy=4$ mm, $dz=2$ mm

Reference Value = 12.43 V/m; Power Drift = 0.06 dB

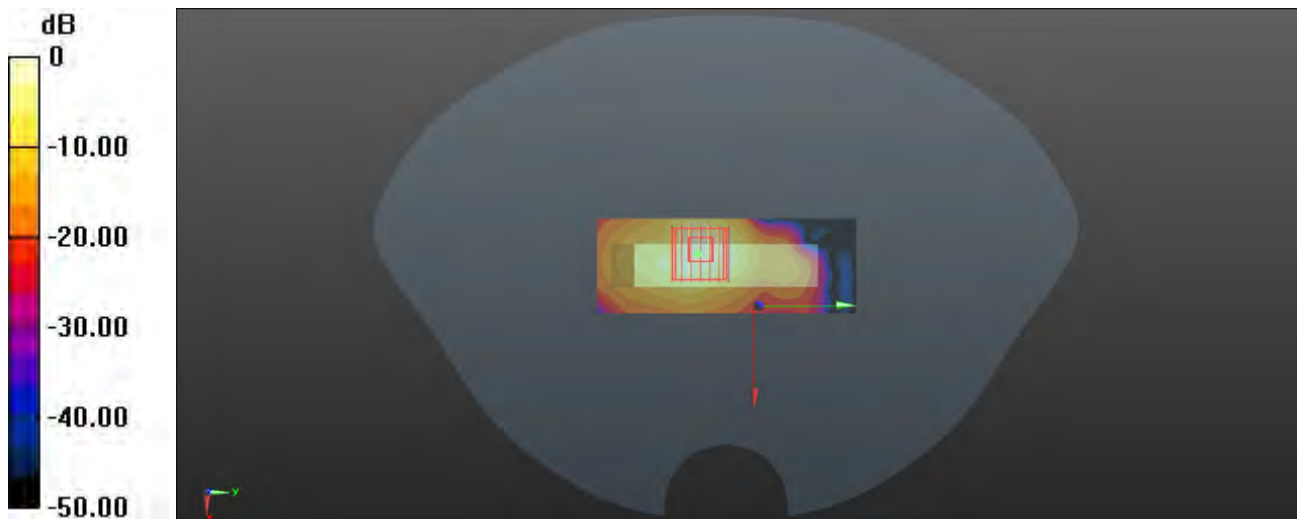
Peak SAR (extrapolated) = 4.36 W/kg

SAR(1 g) = 1.07 W/kg; SAR(10 g) = 0.336 W/kg

Smallest distance from peaks to all points 3 dB below = 5.7 mm

Ratio of SAR at M2 to SAR at M1 = 56.8%

Maximum value of SAR (measured) = 2.12 W/kg



0 dB = 2.12 W/kg

P93 WLAN5G_802.11a_Left Side_0cm_Ch140_Ant5

Communication System: 802.11a; Frequency: 5700 MHz; Duty Cycle: 1:1.007

Medium: HSL5G_0620 Medium parameters used: $f = 5700$ MHz; $\sigma = 5.151$ S/m; $\epsilon_r = 34.151$; $\rho = 1000$ kg/m³

Ambient Temperature : 23.3°C; Liquid Temperature : 22.2°C

DASY5 Configuration:

- Probe: EX3DV4 - SN3873; ConvF(4.65, 4.62, 4.65) @ 5700 MHz; Calibrated: 2023/08/23
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1389; Calibrated: 2023/11/03
- Phantom: SAM Right ; Type: QD000P40CD; Serial: TP:1611
- Measurement SW: DASY52, Version 52.10 (4); SEMCAD X Version 14.6.14 (7501)

-Area Scan (41x201x1): Interpolated grid: $dx=1.000$ mm, $dy=1.000$ mm

Maximum value of SAR (interpolated) = 3.54 W/kg

-Zoom Scan (7x7x12)/Cube 0: Measurement grid: $dx=4$ mm, $dy=4$ mm, $dz=2$ mm

Reference Value = 13.86 V/m; Power Drift = 0.14 dB

Peak SAR (extrapolated) = 7.58 W/kg

SAR(1 g) = 1.59 W/kg; SAR(10 g) = 0.407 W/kg

Smallest distance from peaks to all points 3 dB below = 4.8 mm

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

Maximum value of SAR (measured) = 3.50 W/kg



0 dB = 3.50 W/kg

Appendix C. Calibration Certificate for Probe and Dipole

The SPEAG calibration certificates are shown as follows.

Client :

B.V.ADT

Certificate No: 23J02Z80116

CALIBRATION CERTIFICATE

Object

DAE4 - SN: 1389

Calibration Procedure(s)

FF-Z11-002-01

Calibration Procedure for the Data Acquisition Electronics
(DAEx)

Calibration date:

November 03, 2023

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(Calibrated by, Certificate No.)	Scheduled Calibration
Process Calibrator 753	1971018	12-Jun-23 (CTTL, No.J23X05436)	Jun-24

	Name	Function	Signature
Calibrated by:	Yu Zongying	SAR Test Engineer	
Reviewed by:	Lin Hao	SAR Test Engineer	
Approved by:	Qi Dianyuan	SAR Project Leader	

Issued: November 06, 2023

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



Add: No.52 HuaYuanBei Road, Haidian District, Beijing, 100191, China
Tel: +86-10-62304633-2117
E-mail: emf@caict.ac.cn <http://www.caict.ac.cn>

Glossary:

DAE data acquisition electronics
Connector angle information used in DASY system to align probe sensor X to the robot coordinate system.

Methods Applied and Interpretation of Parameters:

- *DC Voltage Measurement*: Calibration Factor assessed for use in DASY system by comparison with a calibrated instrument traceable to national standards. The figure given corresponds to the full scale range of the voltmeter in the respective range.
- *Connector angle*: The angle of the connector is assessed measuring the angle mechanically by a tool inserted. Uncertainty is not required.
- The report provide only calibration results for DAE, it does not contain other performance test results.



Add: No.52 HuaYuanBei Road, Haidian District, Beijing, 100191, China
Tel: +86-10-62304633-2117
E-mail: emf@caict.ac.cn <http://www.caict.ac.cn>

DC Voltage Measurement

A/D - Converter Resolution nominal

High Range: 1LSB = 6.1 μ V, full range = -100...+300 mV

Low Range: 1LSB = 61nV, full range = -1.....+3mV

DASY measurement parameters: Auto Zero Time: 3 sec; Measuring time: 3 sec

Calibration Factors	X	Y	Z
High Range	403.774 $\pm$ 0.15% (k=2)	403.734 $\pm$ 0.15% (k=2)	404.202 $\pm$ 0.15% (k=2)
Low Range	3.98103 $\pm$ 0.7% (k=2)	3.96455 $\pm$ 0.7% (k=2)	4.02426 $\pm$ 0.7% (k=2)

Connector Angle

Connector Angle to be used in DASY system	130.5° $\pm$ 1 °
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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

ADT
Shenzhen

Certificate No.

EX-3873_Aug23

CALIBRATION CERTIFICATE

Object

EX3DV4 - SN:3873

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

August 22, 2023

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	30-Mar-23 (No. 217-03804/03805)	Mar-24
Power sensor NRP-Z91	SN: 103244	30-Mar-23 (No. 217-03804)	Mar-24
OCP DAK-3.5 (weighted)	SN: 1249	20-Oct-22 (OCP-DAK3.5-1249_Oct22)	Oct-23
OCP DAK-12	SN: 1016	20-Oct-22 (OCP-DAK12-1016_Oct22)	Oct-23
Reference 20 dB Attenuator	SN: CC2552 (20x)	30-Mar-23 (No. 217-03809)	Mar-24
DAE4	SN: 660	16-Mar-23 (No. DAE4-660_Mar23)	Mar-24
Reference Probe ES3DV2	SN: 3013	06-Jan-23 (No. ES3-3013_Jan23)	Jan-24

Secondary Standards	ID	Check Date (in house)	Scheduled Check
Power meter E4419B	SN: GB41293874	06-Apr-16 (in house check Jun-22)	In house check: Jun-24
Power sensor E4412A	SN: MY41498087	06-Apr-16 (in house check Jun-22)	In house check: Jun-24
Power sensor E4412A	SN: 000110210	06-Apr-16 (in house check Jun-22)	In house check: Jun-24
RF generator HP 8648C	SN: US3642U01700	04-Aug-99 (in house check Jun-22)	In house check: Jun-24
Network Analyzer E8358A	SN: US41080477	31-Mar-14 (in house check Oct-22)	In house check: Oct-24

	Name	Function	Signature
Calibrated by	Aidonia Georgiadou	Laboratory Technician	
Approved by	Sven Kühn	Technical Manager	
This calibration certificate shall not be reproduced except in full without written approval of the laboratory.			
Issued: August 22, 2023			

Calibration Laboratory of

Schmid & 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

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:3873

Basic Calibration Parameters

	Sensor X	Sensor Y	Sensor Z	Unc (k = 2)
Norm ($\mu\text{V}/(\text{V}/\text{m})^2$) ^A	0.37	0.46	0.47	$\pm 10.1\%$
DCP (mV) ^B	101.3	99.5	100.1	$\pm 4.7\%$

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	136.4	$\pm 0.9\%$	$\pm 4.7\%$
		Y	0.00	0.00	1.00		126.6		
		Z	0.00	0.00	1.00		121.9		
10352	Pulse Waveform (200Hz, 10%)	X	4.30	71.17	13.33	10.00	60.0	$\pm 3.0\%$	$\pm 9.6\%$
		Y	20.00	90.28	19.97		60.0		
		Z	20.00	91.52	21.10		60.0		
10353	Pulse Waveform (200Hz, 20%)	X	4.76	74.17	13.16	6.99	80.0	$\pm 1.6\%$	$\pm 9.6\%$
		Y	20.00	92.23	19.86		80.0		
		Z	20.00	92.48	20.27		80.0		
10354	Pulse Waveform (200Hz, 40%)	X	2.89	71.74	10.79	3.98	95.0	$\pm 1.3\%$	$\pm 9.6\%$
		Y	20.00	97.01	20.82		95.0		
		Z	20.00	93.37	19.07		95.0		
10355	Pulse Waveform (200Hz, 60%)	X	0.31	60.03	4.87	2.22	120.0	$\pm 1.3\%$	$\pm 9.6\%$
		Y	20.00	102.79	22.10		120.0		
		Z	20.00	90.63	16.31		120.0		
10387	QPSK Waveform, 1 MHz	X	1.56	65.45	14.39	1.00	150.0	$\pm 2.9\%$	$\pm 9.6\%$
		Y	1.75	67.46	15.67		150.0		
		Z	1.56	64.87	14.09		150.0		
10388	QPSK Waveform, 10 MHz	X	2.11	67.46	15.23	0.00	150.0	$\pm 0.9\%$	$\pm 9.6\%$
		Y	2.37	69.33	16.45		150.0		
		Z	2.09	66.92	14.87		150.0		
10396	64-QAM Waveform, 100 kHz	X	2.97	70.43	18.58	3.01	150.0	$\pm 0.7\%$	$\pm 9.6\%$
		Y	2.76	69.49	18.50		150.0		
		Z	2.95	69.45	18.12		150.0		
10399	64-QAM Waveform, 40 MHz	X	3.41	66.85	15.54	0.00	150.0	$\pm 2.5\%$	$\pm 9.6\%$
		Y	3.60	67.70	16.16		150.0		
		Z	3.43	66.68	15.41		150.0		
10414	WLAN CCDF, 64-QAM, 40 MHz	X	4.81	65.52	15.43	0.00	150.0	$\pm 4.5\%$	$\pm 9.6\%$
		Y	4.95	66.05	15.85		150.0		
		Z	4.87	65.48	15.39		150.0		

Note: For details on UID parameters see Appendix

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:3873

Sensor Model Parameters

	C1 fF	C2 fF	α V^{-1}	T1 msV^{-2}	T2 msV^{-1}	T3 ms	T4 V^{-2}	T5 V^{-1}	T6
x	47.5	357.05	36.00	8.03	0.50	5.04	0.70	0.41	1.01
y	44.8	338.44	36.40	13.33	0.00	5.10	0.14	0.43	1.01
z	50.3	382.59	36.62	11.76	0.42	5.10	0.19	0.55	1.01

Other Probe Parameters

Sensor Arrangement	Triangular
Connector Angle	21.3°
Mechanical Surface Detection Mode	enabled
Optical Surface Detection Mode	disabled
Probe Overall Length	337 mm
Probe Body Diameter	10 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:3873

Calibration Parameter Determined in Head Tissue Simulating Media

f (MHz) ^C	Relative Permittivity ^F	Conductivity ^F (S/m)	ConvF X	ConvF Y	ConvF Z	Alpha ^G	Depth ^G (mm)	Unc (k = 2)
750	41.9	0.89	9.34	8.97	9.88	0.39	1.27	±12.0%
835	41.5	0.90	9.94	9.14	8.98	0.37	1.27	±12.0%
900	41.5	0.97	9.02	8.94	8.88	0.37	1.27	±12.0%
1750	40.1	1.37	8.12	8.17	8.10	0.26	1.27	±12.0%
1900	40.0	1.40	7.76	7.82	7.71	0.29	1.27	±12.0%
2300	39.5	1.67	7.64	7.67	7.54	0.31	1.27	±12.0%
2450	39.2	1.80	7.62	7.65	7.52	0.30	1.27	±12.0%
2600	39.0	1.96	7.52	7.57	7.43	0.29	1.27	±12.0%
3300	38.2	2.71	6.73	6.65	6.76	0.30	1.27	±14.0%
3500	37.9	2.91	6.70	6.61	6.72	0.29	1.27	±14.0%
3700	37.7	3.12	6.61	6.52	6.63	0.29	1.27	±14.0%
3900	37.5	3.32	6.50	6.41	6.52	0.33	1.27	±14.0%
4100	37.2	3.53	6.52	6.41	6.54	0.31	1.27	±14.0%
5250	35.9	4.71	5.05	4.95	5.04	0.32	1.62	±14.0%
5600	35.5	5.07	4.65	4.62	4.65	0.34	1.75	±14.0%
5800	35.3	5.27	4.59	4.56	4.63	0.35	1.86	±14.0%

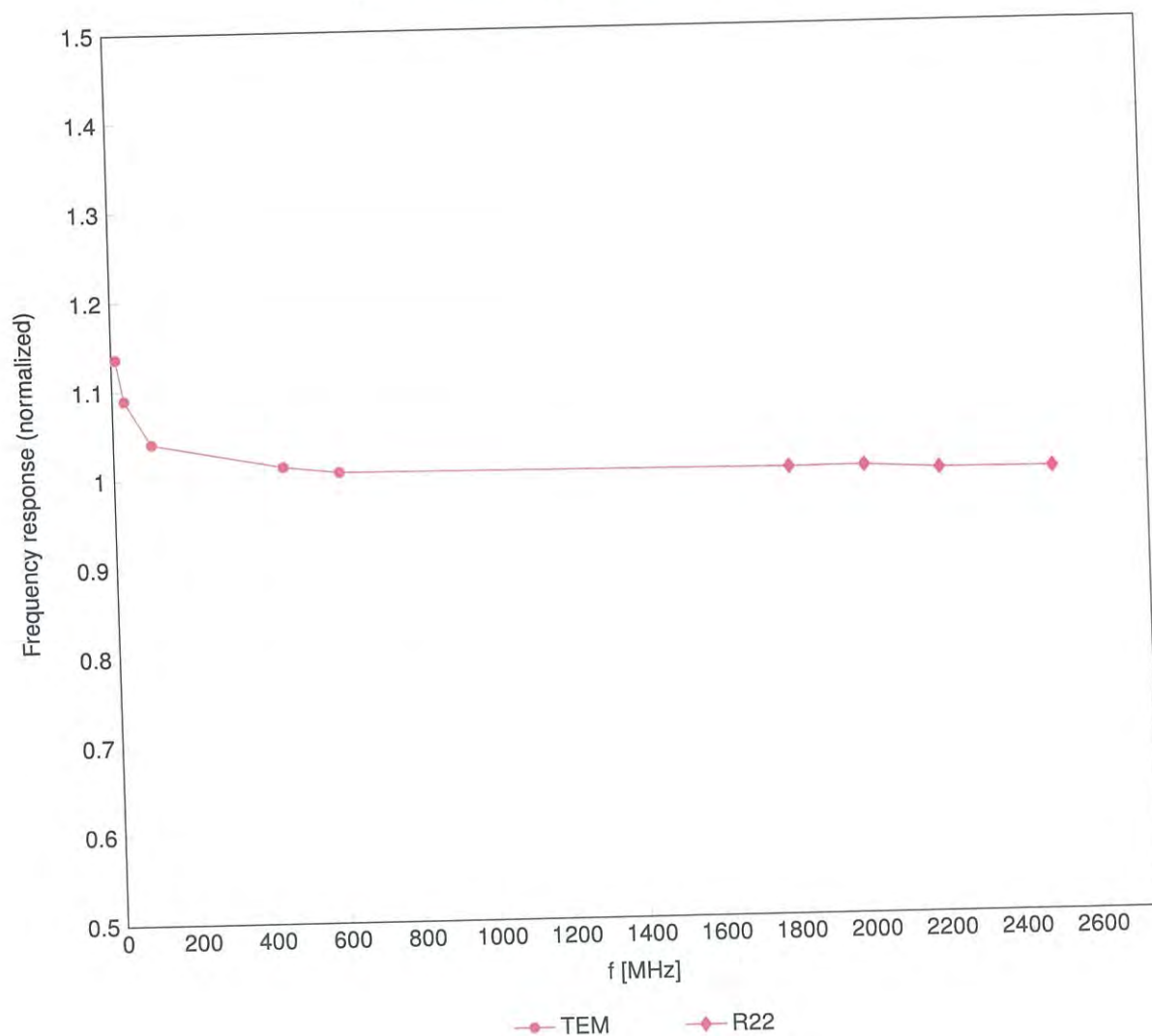
^C Frequency validity above 300 MHz of ±100 MHz only applies for DASY v4.4 and higher (see Page 2), else it is restricted to ±50 MHz. The uncertainty is the RSS of the ConvF uncertainty at calibration frequency and the uncertainty for the indicated frequency band. Frequency validity below 300 MHz is ±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 TSL with deviations from the target of less than ±5% are used, the calibration uncertainties are 11.1% for 0.7 - 3 GHz and 13.1% for 3 - 6 GHz.

^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.

Frequency Response of E-Field

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



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