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Client **RF Safety Lab**
Catonsville, USA

Certificate No. **D1900V2-5d252_Oct23**

CALIBRATION CERTIFICATE

Object **D1900V2 - SN:5d252**

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

Calibration date: **October 06, 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
Power sensor NRP-Z91	SN: 103245	30-Mar-23 (No. 217-03805)	Mar-24
Reference 20 dB Attenuator	SN: BH9394 (20k)	30-Mar-23 (No. 217-03809)	Mar-24
Type-N mismatch combination	SN: 310982 / 06327	30-Mar-23 (No. 217-03810)	Mar-24
Reference Probe EX3DV4	SN: 7349	10-Jan-23 (No. EX3-7349_Jan23)	Jan-24
DAE4	SN: 601	03-Oct-23 (No. DAE4-601_Oct23)	Oct-24
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: **Paulo Pina** **Function**
Laboratory Technician

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

Signature

Issued: October 12, 2023

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



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Multilateral Agreement for the recognition of calibration certificates

Accreditation No.: **SCS 0108**

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	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	40.7 $\pm$ 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 cm ³ (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	9.92 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	39.8 W/kg $\pm$ 17.0 % (k=2)

SAR averaged over 10 cm ³ (10 g) of Head TSL	condition	
SAR measured	250 mW input power	5.25 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	21.0 W/kg $\pm$ 16.5 % (k=2)

Body TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	53.3	1.52 mho/m
Measured Body TSL parameters	(22.0 $\pm$ 0.2) °C	53.1 $\pm$ 6 %	1.51 mho/m $\pm$ 6 %
Body TSL temperature change during test	< 0.5 °C	----	----

SAR result with Body TSL

SAR averaged over 1 cm ³ (1 g) of Body TSL	Condition	
SAR measured	250 mW input power	9.94 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	39.9 W/kg $\pm$ 17.0 % (k=2)

SAR averaged over 10 cm ³ (10 g) of Body TSL	condition	
SAR measured	250 mW input power	5.22 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	20.9 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	$48.8 \Omega + 5.9 j\Omega$
Return Loss	- 24.4 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	$45.0 \Omega + 5.8 j\Omega$
Return Loss	- 21.9 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.194 ns
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After long term use with 100W radiated power, only a slight warming of the dipole near the feedpoint can be measured.

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

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

Additional EUT Data

Manufactured by	SPEAG
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DASY5 Validation Report for Head TSL

Date: 06.10.2023

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 1900 MHz; Type: D1900V2; Serial: D1900V2 - SN:5d252

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

Medium parameters used: $f = 1900$ MHz; $\sigma = 1.4$ S/m; $\epsilon_r = 40.7$; $\rho = 1000$ kg/m³

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: 10.01.2023
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 03.10.2023
- 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 = 108.7 V/m; Power Drift = 0.08 dB

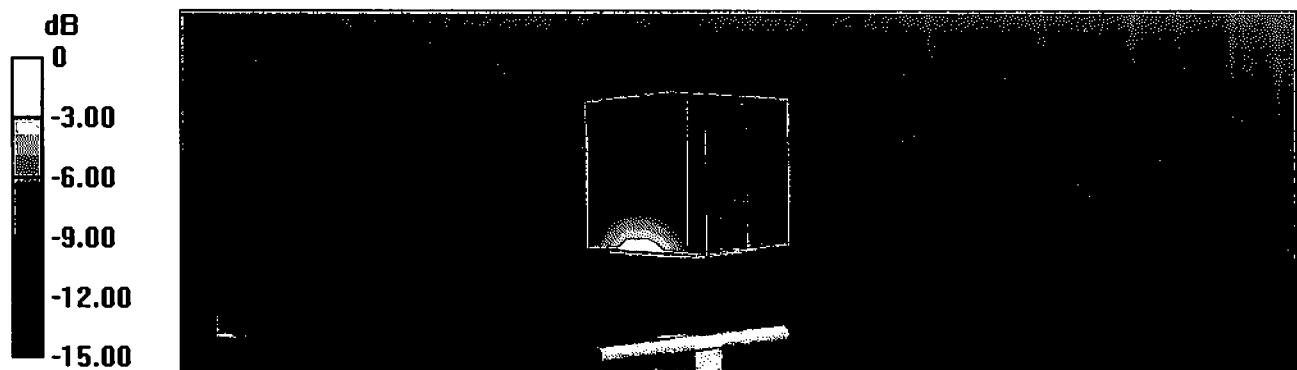
Peak SAR (extrapolated) = 18.2 W/kg

SAR(1 g) = 9.92 W/kg; SAR(10 g) = 5.25 W/kg

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

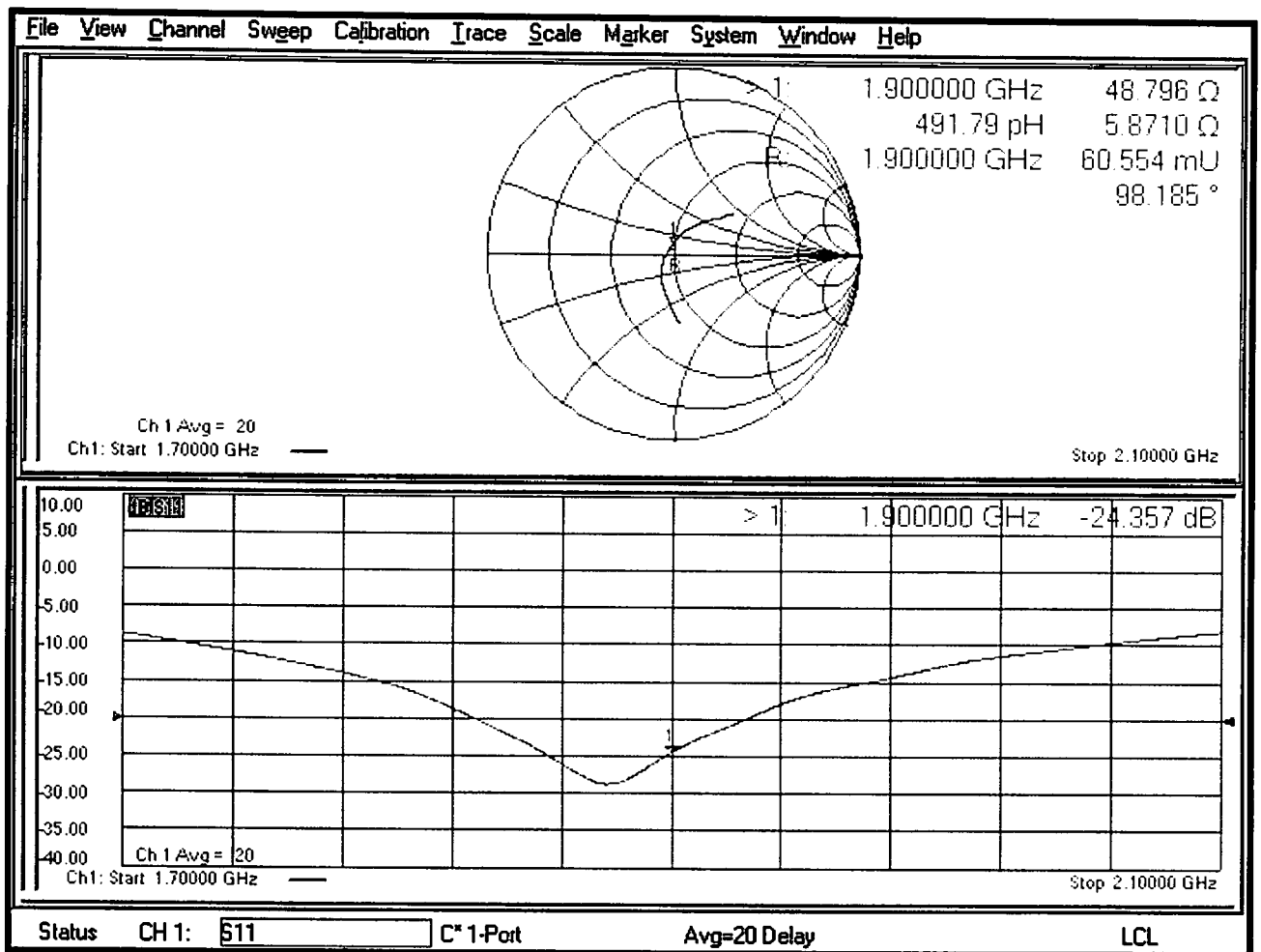
Ratio of SAR at M2 to SAR at M1 = 55.9%

Maximum value of SAR (measured) = 15.0 W/kg



0 dB = 15.0 W/kg = 11.75 dBW/kg

Impedance Measurement Plot for Head TSL



DASY5 Validation Report for Body TSL

Date: 06.10.2023

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 1900 MHz; Type: D1900V2; Serial: D1900V2 - SN:5d252

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

Medium parameters used: $f = 1900$ MHz; $\sigma = 1.51$ S/m; $\epsilon_r = 53.1$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

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

DASY52 Configuration:

- Probe: EX3DV4 - SN7349; ConvF(8.42, 8.42, 8.42) @ 1900 MHz; Calibrated: 10.01.2023
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 03.10.2023
- Phantom: Flat Phantom 5.0 (back); Type: QD 000 P50 AA; Serial: 1002
- DASY52 52.10.4(1535); SEMCAD X 14.6.14(7501)

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

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

Reference Value = 103.3 V/m; Power Drift = -0.04 dB

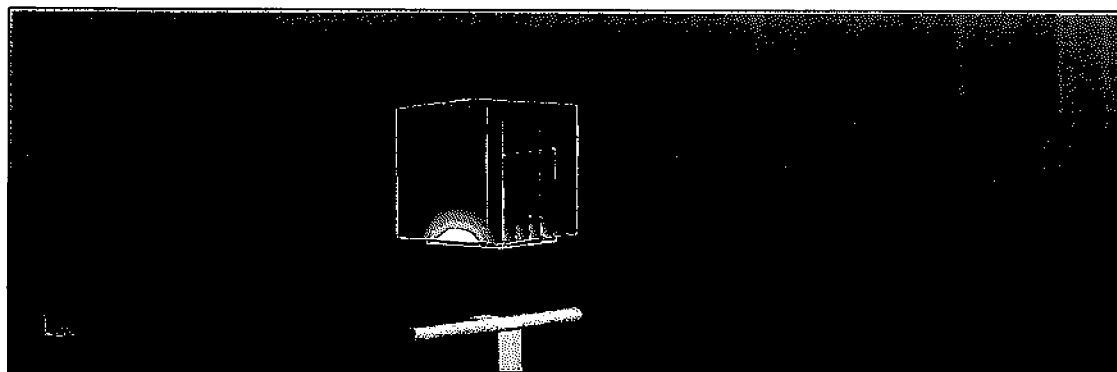
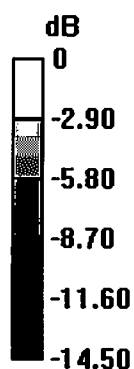
Peak SAR (extrapolated) = 18.4 W/kg

SAR(1 g) = 9.94 W/kg; SAR(10 g) = 5.22 W/kg

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

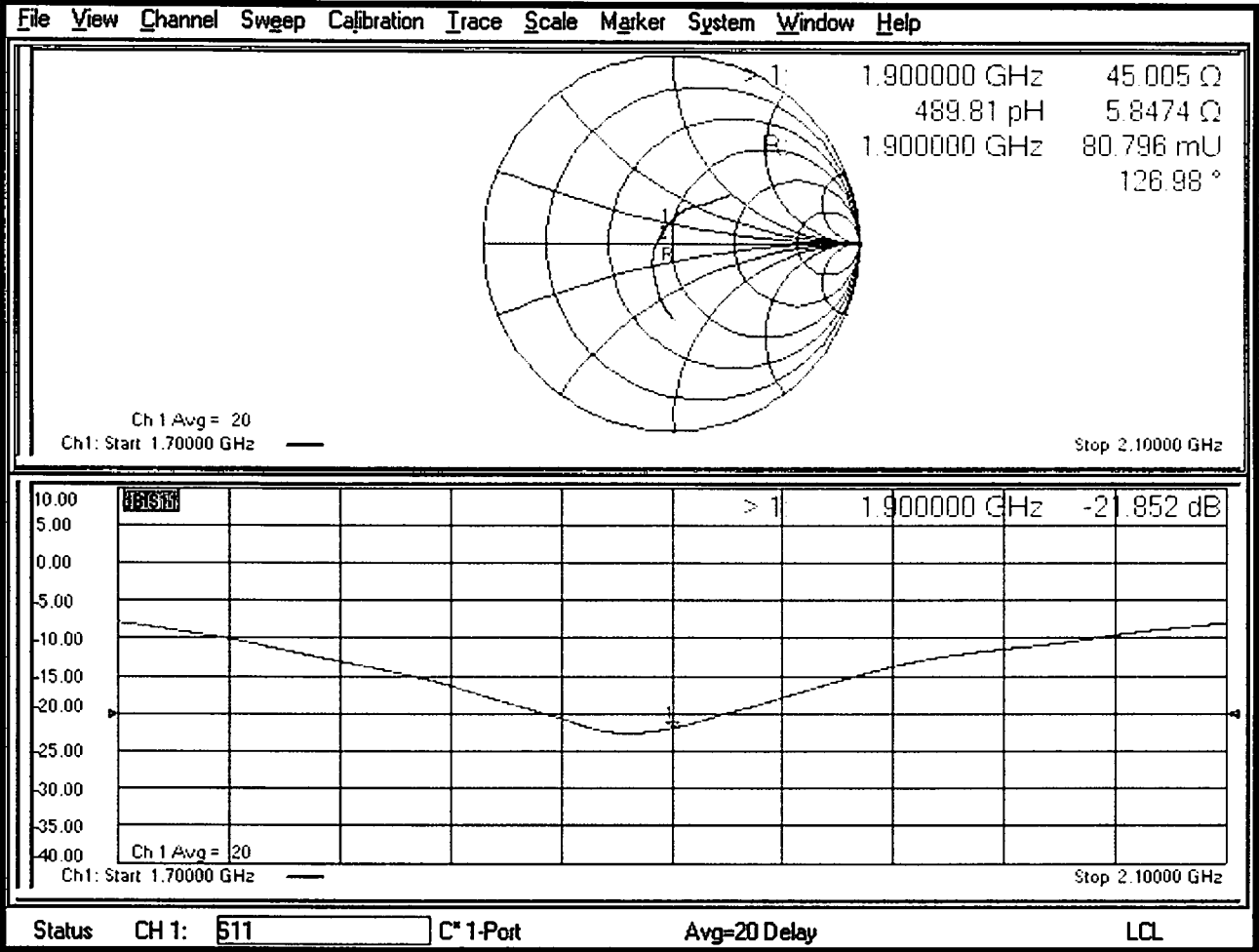
Ratio of SAR at M2 to SAR at M1 = 55.5%

Maximum value of SAR (measured) = 15.2 W/kg



0 dB = 15.2 W/kg = 11.81 dBW/kg

Impedance Measurement Plot for Body TSL



IN-HOUSE SAR VERIFICATION SOURCE CALIBRATION EXTENSION

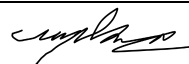
Object: D1900V2 – SN: 5d252
Description: SAR Validation Dipole at 1900 MHz
Procedure (s): Procedure for SAR Verification Source Calibration Extension
In-house Check Date: 11/7/2024

Equipment List

Manufacturer	Model	Description	Serial Number	Calibration Date	Calibration Due	CBT
Rohde & Schwarz	ZNL20	Vector Network Analyzer	101202	9/12/2024	9/12/2025	
Rohde & Schwarz	ZN-Z135	Calibration Kit	5000-309192839	10/31/24	10/31/26	
Control Company	4040	Ambient Thermometer	230581657	8/28/2023	8/28/2025	
Control Company	4352	Long Stem Liquid Thermometer	230662223	9/28/2023	9/28/2025	
Micro-Coax	UFB205A-0-0240-30x30	SMA M-F RF test Cable (DC - 18 GHz)	-			✓
Mini-Circuits	BW-N20W20+	20dB RF Fixed Attenuator (DC - 18 GHz)	-			✓
Mini-Circuits	NF-SF50+	RF Adapter N Male to SMA Female (DC - 18 GHz)	-			✓
SPEAG	DAE4ip	Data Acquisition Electronics with Integ. Power	1839	8/14/2024	8/14/2025	
SPEAG	DAK-3.5	DAK-3.5 Dielectric Probe	1349	9/2/2024	9/2/2025	
SPEAG	EX3DV4	SAR Measurement Probe	7836	3/15/2024	3/15/2025	
SPEAG	Powersource1	Signal Generator	4341	1/5/2024	1/5/2025	

CBT: Components calibrated before testing. Prior to testing, the measurement paths containing a cable, attenuator, coupler or filter were connected to a calibrated source (i.e. a signal generator, power sensor, or VNA) to determine the losses of the measurement path. The power meter offset was then adjusted to compensate for the measurement system losses. This level offset is stored within the power meter before measurements are made. This calibration verification procedure applies to the system verification and output power measurements. The calibrated reading is then taken directly from the power meter after compensation of the losses for all final power measurements.

Measurement Uncertainty = $\pm 27\%$ ($k=2$)

	Name	Function	Signature
Tested By:	Yue Li	Engineer	
Approved By:	Phuong Nguyen	Technical Manager	

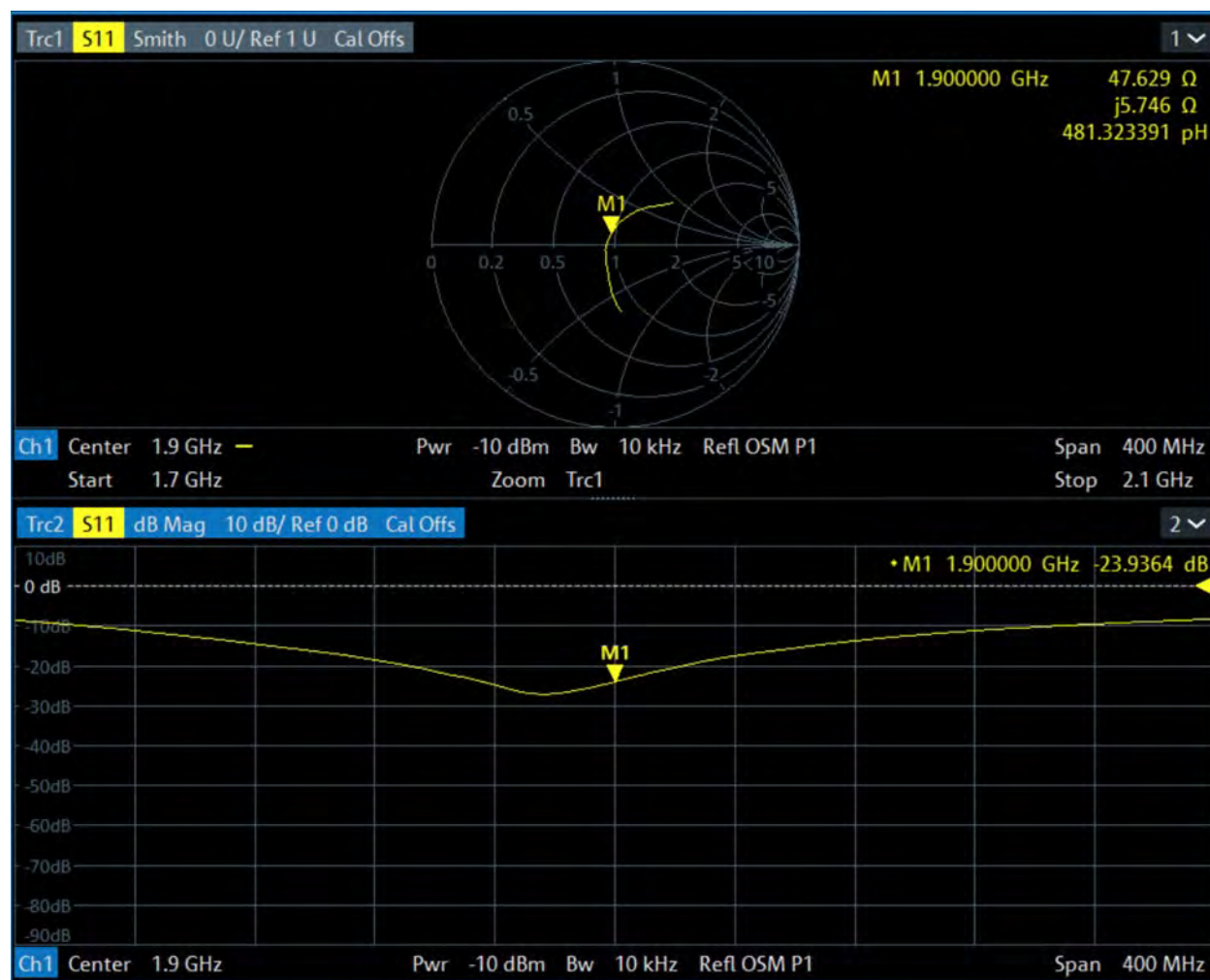
Per FCC KDB Publication 865664 D01, dipole can have longer calibration intervals of up to three years when it is demonstrated that the SAR target, impedance and return loss of the dipole have remained stable according to the following requirements:

1. Measured SAR does not deviate from the calibrated SAR value by more than 10%.
2. Return loss does not deviate by more than 20% from the previous measurement (i.e. value in dB x 0.2) and meet the required minimum return-loss.
3. Real and imaginary part of the impedance do not deviate by more than 5 Ω from the previous measurement.

The following dipole was checked to pass the above 3 requirements to have an extended calibration interval:

Dipole SN	Freq (MHz)	In-house Check Date	Cal Date	Head SAR target (1g) @ 30dBm (W/kg)	Measured Head SAR (1g) @ 17dBm (W/kg)	1g SAR Deviation (%)	Head SAR target (10g) @ 30dBm (W/kg)	Measured Head SAR (10g) @ 17dBm (W/kg)	10g SAR Deviation (%)	Cert Head Impedance (Ohm) - Real	Measured Head Impedance (Ohm) - Real	Head Impedance Deviation (Ohm) - Real	Cert Head Impedance (Ohm) - Imaginary	Measured Head Impedance (Ohm) - Imaginary	Head Impedance Deviation (Ohm) - Imaginary	Cert Head Return Loss (dB)	Measured Head Return Loss (dB)	Return Loss Deviation (%)	PASS/FAIL
5d252	1900	11/7/2024	10/6/2023	39.8	2.07	3.77%	21	1.08	2.61%	48.8	47.6	-1.2	5.9	5.7	-0.2	-24.4	-23.9	11.17%	PASS

Impedance and Return-Loss Measurement Plot for Head TSL



IN-HOUSE SAR VERIFICATION SOURCE CALIBRATION EXTENSION

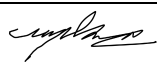
Object: D1900V2 – SN: 5d252
Description: SAR Validation Dipole at 1900 MHz
Procedure (s): Procedure for SAR Verification Source Calibration Extension
In-house Check Date: 07/29/2025

Equipment List

Manufacturer	Model	Description	Serial Number	Calibration Date	Calibration Due	CBT
Rohde & Schwarz	ZNL20	Vector Network Analyzer	101202	9/12/2024	9/12/2025	
Rohde & Schwarz	ZN-Z135	Calibration Kit	5000-309192839	10/31/24	10/31/26	
Control Company	4040	Ambient Thermometer	230581657	8/28/2023	8/28/2025	
Control Company	4040	Ambient Thermometer	230581662	8/28/2023	8/28/2025	
Control Company	4352	Long Stem Liquid Thermometer	230662223	9/28/2023	9/28/2025	
Control Company	4352	Long Stem Liquid Thermometer	230662212	9/28/2023	9/28/2025	
Micro-Coax	UFB205A-0-0240-30x30	SMA M-F RF test Cable (DC - 18 GHz)	-			✓
Maury-Micro	360D	10dB RF Fixed Attenuator (DC - 18 GHz) + Short Circuit Termination	7799	12/28/2024	12/28/2025	
Huber+Suhner	SF126	High Performance RF Cable	570292/126			✓
SPEAG	DAE4ip	Data Acquisition Electronics with Integ. Power	1839	9/4/2024	9/4/2025	
SPEAG	DAK-3.5	DAK-3.5 Dielectric Probe	1349	9/2/2024	9/2/2025	
SPEAG	EX3DV4	SAR Measurement Probe	7836	9/12/2024	9/12/2025	
SPEAG	Powersource1	Signal Generator	4341	1/9/2025	1/9/2026	

CBT: Components calibrated before testing. Prior to testing, the measurement paths containing a cable, attenuator, coupler or filter were connected to a calibrated source (i.e. a signal generator, power sensor, or VNA) to determine the losses of the measurement path. The power meter offset was then adjusted to compensate for the measurement system losses. This level offset is stored within the power meter before measurements are made. This calibration verification procedure applies to the system verification and output power measurements. The calibrated reading is then taken directly from the power meter after compensation of the losses for all final power measurements.

Measurement Uncertainty = $\pm 27\%$ (k=2)

	Name	Function	Signature
Tested By:	Yue Li	Engineer	
Approved By:	Phuong Nguyen	Technical Manager	

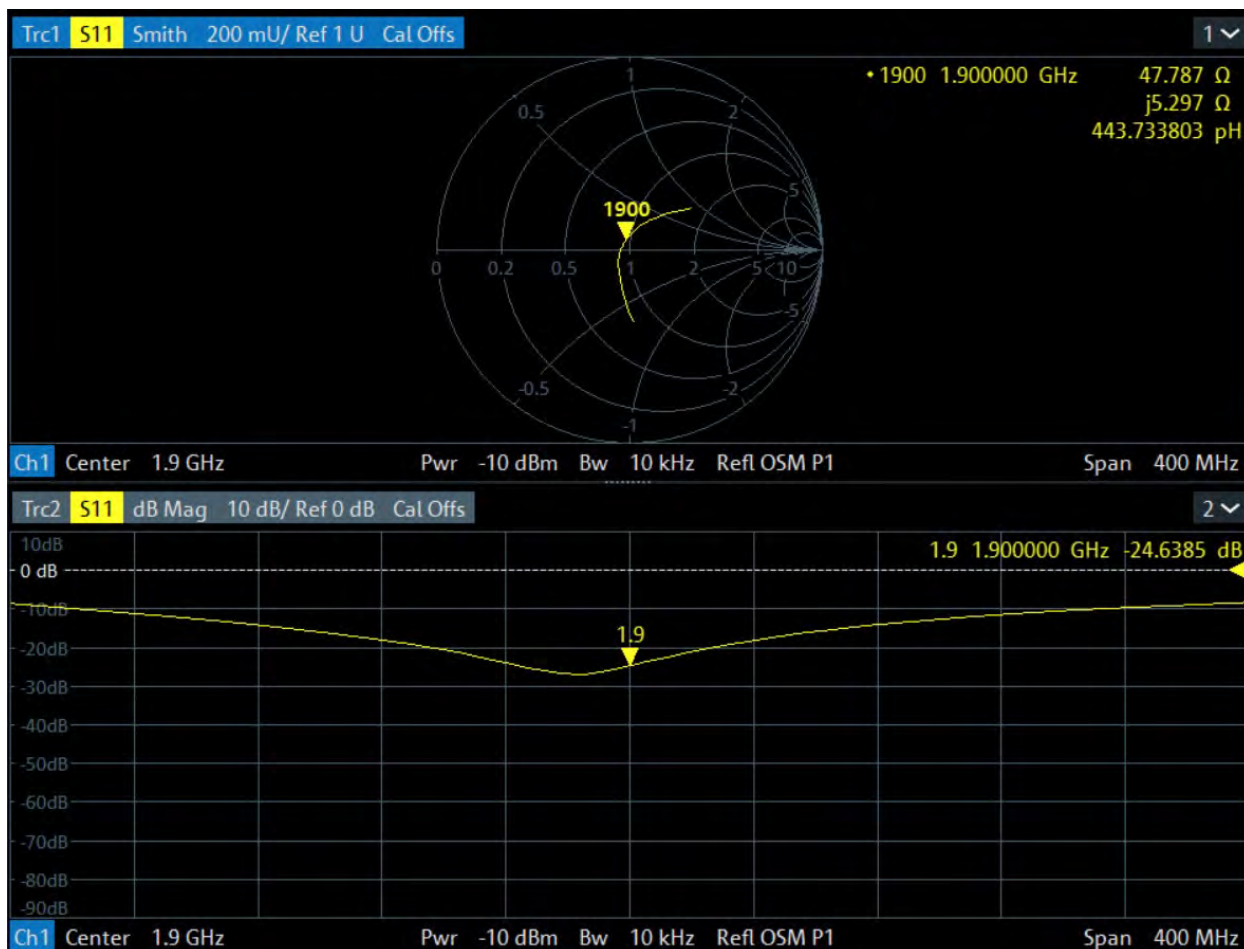
Per FCC KDB Publication 865664 D01, dipole can have longer calibration intervals of up to three years when it is demonstrated that the SAR target, impedance and return loss of the dipole have remained stable according to the following requirements:

1. Measured SAR does not deviate from the calibrated SAR value by more than 10%.
2. Return loss does not deviate by more than 20% from the previous measurement (i.e. value in dB x 0.2) and meet the required minimum return-loss.
3. Real and imaginary part of the impedance do not deviate by more than 5 Ω from the previous measurement.

The following dipole was checked to pass the above 3 requirements to have an extended calibration interval:

Dipole SN	Freq (MHz)	In-house Check Date	Cal Date	Head SAR target (1g) @ 30dBm (W/kg)	Measured Head SAR (1g) @ 17dBm (W/kg)	1g SAR Dev (%)	Head SAR target (10g) @ 30dBm (W/kg)	Measured Head SAR (10g) @ 17dBm (W/kg)	10g SAR Dev (%)	Cert Head Impedance (Ohm) - Real	Previous Head Impedance (Ohm) - Real	Measured Head Impedance (Ohm) - Real	Head Impedance Deviation (Ohm) - Real	Cert Head Impedance (Ohm) - Imaginary	Previous Head Impedance (Ohm) - Imaginary	Measured Head Impedance (Ohm) - Imaginary	Head Impedance Deviation (Ohm) - Imaginary	Cert Head Return Loss (dB)	Previous Head Return Loss (dB)	Measured Head Return Loss (dB)	Return Loss Dev (%)	PASS/FAIL
5d252	1900	11/7/2024	10/6/2023	39.8	2.07	3.77%	21	1.08	2.61%	48.8	48.8	47.6	-1.2	5.9	5.9	5.7	-0.2	-24.4	-24.4	-23.9	11.17%	PASS
5d252	1900	7/29/2025	10/6/2023	39.8	2.02	1.27%	21	1.06	0.71%	48.8	47.6	47.8	0.2	5.9	5.7	5.3	-0.4	-24.4	-23.9	-24.6	-15.64%	PASS

Impedance and Return-Loss Measurement Plot for Head TSL





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Accreditation No.: SCS 0108

Client

RF Safety Lab
Catonsville, USA

Certificate No.

D2450V2-1112_Nov24

CALIBRATION CERTIFICATE

MAB 11/21/24

Object D2450V2 - SN: 1112

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

Calibration date November 15, 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 Cal
Power Sensor R&S NRP-33T	SN: 100967	28-Mar-24 (No. 217-04038)	Mar-25
Power Sensor R&S NRP18A	SN: 101859	22-Jul-24 (No. 4030A315008547)	Jul-25
Spectrum Analyzer R&S FSV40	SN: 101832	25-Jan-24 (No. 4030-315007551)	Jan-25
Mismatch; Short [S4188] Attenuator [S4423]	SN: 1152	28-Mar-24 (No. 217-04050)	Mar-25
OCP DAK-12	SN: 1016	24-Sep-24 (No. OCP-DAK12-1016_Sep24)	Sep-25
OCP DAK-3.5	SN: 1249	23-Sep-24 (No. OCP-DAK3.5-1249_Sep24)	Sep-25
Reference Probe EX3DV4	SN: 7349	03-Jun-24 (No. EX3-7349_Jun24)	Jun-25
DAE4ip	SN: 1836	28-Oct-24 (No. DAE4ip-1836_Oct24)	Oct-25

Secondary Standards	ID	Check Date (in house)	Scheduled Check
ACAD Source Box	SN: 1000	28-May-24 (No. 675-ACAD_Source_Box-240528)	May-25
Signal Generator R&S SMB100A	SN: 182081	28-May-24 (No. 675-CAL16-S4588-240528)	May-25
Mismatch; SMA	SN: 1102	22-May-24 (No. 675-Mismatch_SMA-240522)	May-25

	Name	Function	Signature
Calibrated by	Paulo Pina	Laboratory Technician	
Approved by	Sven Kühn	Technical Manager	

Issued: November 15, 2024

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Accreditation No.: **SCS 0108**

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 dipole is mounted with the spacer to position its feed point exactly below the center marking of the flat phantom section, with the arms oriented parallel to the body axis.
- *Feed Point Impedance and Return Loss*: These parameters are measured with the dipole positioned under the liquid filled phantom. The impedance stated is transformed from the measurement at the SMA connector to the feed point. The Return Loss ensures low reflected power. No uncertainty required.
- *Electrical Delay*: One-way delay between the SMA connector and the antenna feed point. 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	DASY8 Module SAR	16.4.0
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom	
Distance Dipole Center - TSL	10 mm	with spacer
Zoom Scan Resolution	dx, dy = 5mm, dz = 1.5mm	Graded Ratio = 1.5 mm (Z direction)
Frequency	2450MHz $\pm$ 1MHz	

Head TSL parameters at 2450 MHz

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	39.2	1.80 mho/m
Measured Head TSL parameters	(22.0 $\pm$ 0.2)°C	37.8 $\pm$ 6%	1.83 mho/m $\pm$ 6%
Head TSL temperature change during test	< 0.5 °C		

SAR result with Head TSL at 2450 MHz

SAR averaged over 1 cm ³ (1 g) of Head TSL	Condition	
SAR for nominal Head TSL parameters	24 dBm input power	12.7 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	50.6 W/kg $\pm$ 17.0% (k = 2)

SAR averaged over 10 cm ³ (10 g) of Head TSL	Condition	
SAR for nominal Head TSL parameters	24 dBm input power	5.95 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	23.7 W/kg $\pm$ 16.5% (k = 2)

Appendix (Additional assessments outside the scope of SCS 0108)**Antenna Parameters with Head TSL at 2450 MHz**

Impedance	$51.6 \Omega + 4.2 j\Omega$
Return Loss	-27.1 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.152 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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System Performance Check Report

Summary

Dipole	Frequency [MHz]	TSL	Power [dBm]
D2450V2 - SN1112	2450	HSL	24

Exposure Conditions

Phantom Section, TSL	Test Distance [mm]	Band	Group, UID	Frequency [MHz], Channel Number	Conversion Factor	TSL Conductivity [S/m]	TSL Permittivity
Flat	10		CW, 0--	2450, 0	7.24	1.83	37.8

Hardware Setup

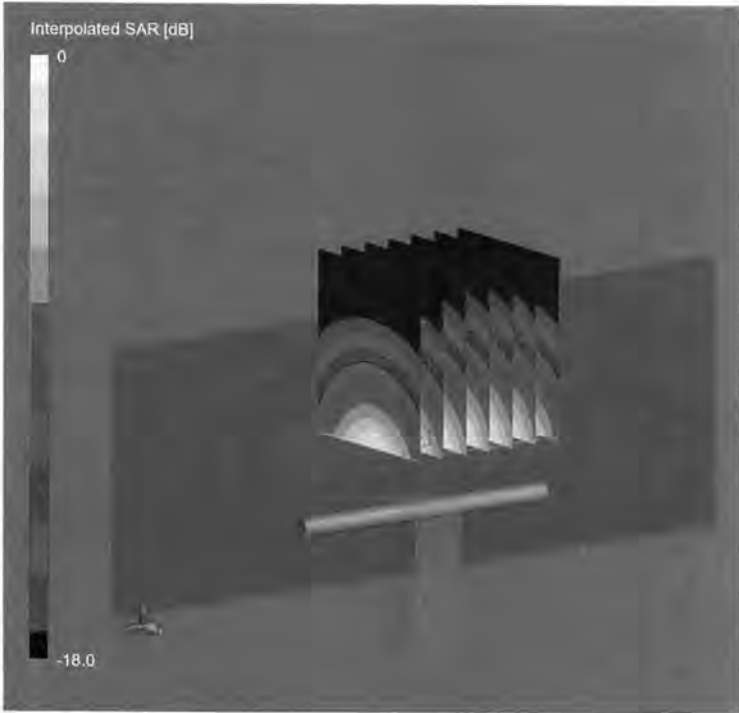
Phantom	TSL, Measured Date	Probe, Calibration Date	DAE, Calibration Date
MFP V8.0 Center	HSL, 2024-11-15	EX3DV4 - SN7349, 2024-06-03	DAE4lp Sn1836, 2024-10-28

Scans Setup

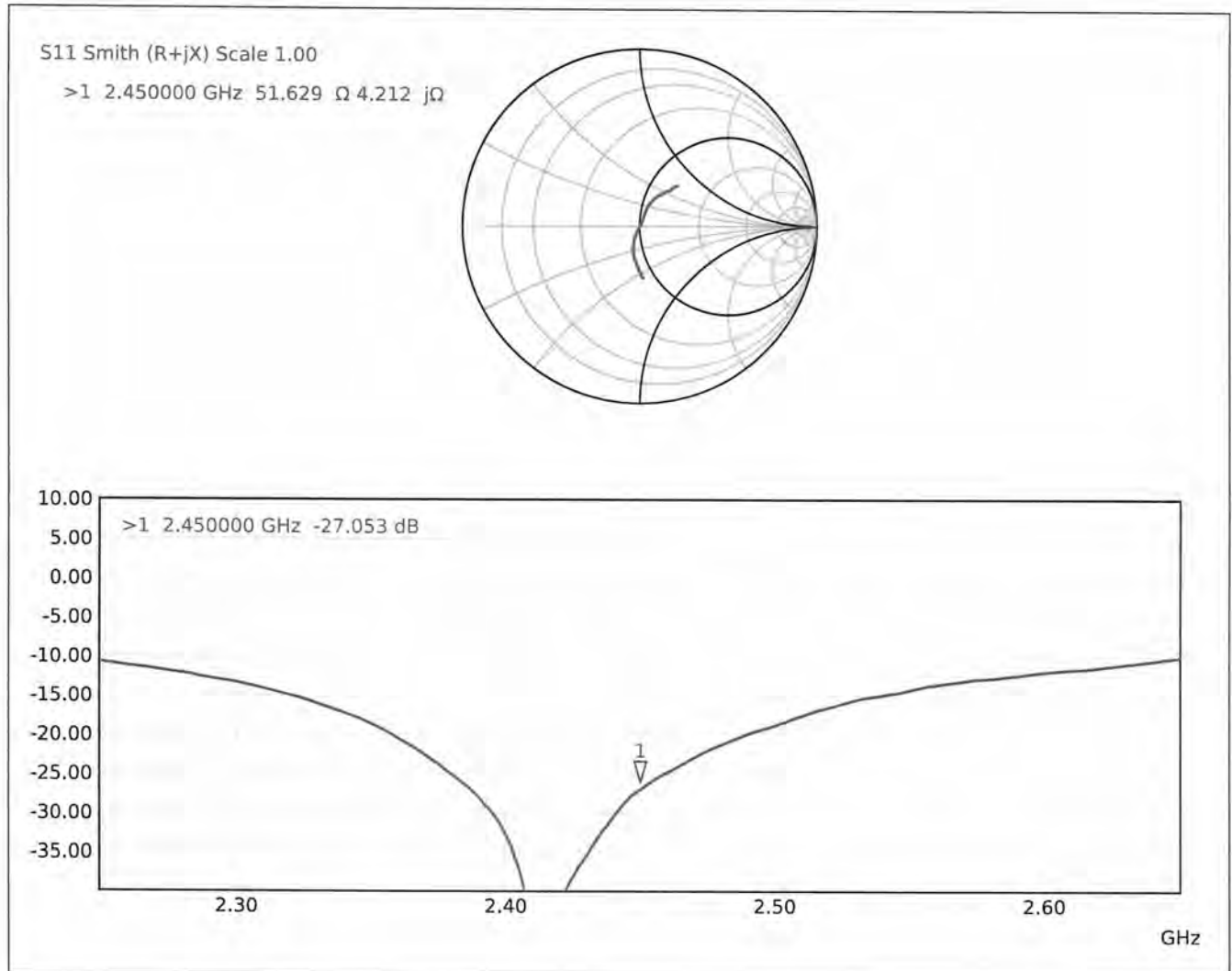
	Zoom Scan
Grid Extents [mm]	30 x 30 x 30
Grid Steps [mm]	5.0 x 5.0 x 1.5
Sensor Surface [mm]	1.4
Graded Grid	Yes
Grading Ratio	1.5
MAIA	N/A
Surface Detection	VMS + 6p
Scan Method	Measured

Measurement Results

	Zoom Scan
Date	2024-11-15
psSAR1g [W/Kg]	12.7
psSAR10g [W/Kg]	5.95
Power Drift [dB]	0.00
Power Scaling	Disabled
Scaling Factor [dB]	
TSL Correction	Positive / Negative



0 dB = 26.1 W/Kg

Impedance Measurement Plot for Head TSL

IN-HOUSE SAR VERIFICATION SOURCE CALIBRATION EXTENSION

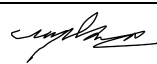
Object: D2450V2 – SN: 1112
Description: SAR Validation Dipole at 2450 MHz
Procedure (s): Procedure for SAR Verification Source Calibration Extension
In-house Check Date: 07/29/2025

Equipment List

Manufacturer	Model	Description	Serial Number	Calibration Date	Calibration Due	CBT
Rohde & Schwarz	ZNL20	Vector Network Analyzer	101202	9/12/2024	9/12/2025	
Rohde & Schwarz	ZN-Z135	Calibration Kit	5000-309192839	10/31/24	10/31/26	
Control Company	4040	Ambient Thermometer	230581657	8/28/2023	8/28/2025	
Control Company	4040	Ambient Thermometer	230581662	8/28/2023	8/28/2025	
Control Company	4352	Long Stem Liquid Thermometer	230662223	9/28/2023	9/28/2025	
Control Company	4352	Long Stem Liquid Thermometer	230662212	9/28/2023	9/28/2025	
Micro-Coax	UFB205A-0-0240-30x30	SMA M-F RF test Cable (DC - 18 GHz)	-			✓
Maury-Micro	360D	10dB RF Fixed Attenuator (DC - 18 GHz) + Short Circuit Termination	7799	12/28/2024	12/28/2025	
Huber+Suhner	SF126	High Performance RF Cable	570292/126			✓
SPEAG	DAE4ip	Data Acquisition Electronics with Integ. Power	1839	9/4/2024	9/4/2025	
SPEAG	DAK-3.5	DAK-3.5 Dielectric Probe	1349	9/2/2024	9/2/2025	
SPEAG	EX3DV4	SAR Measurement Probe	7836	9/12/2024	9/12/2025	
SPEAG	Powersource1	Signal Generator	4341	1/9/2025	1/9/2026	

CBT: Components calibrated before testing. Prior to testing, the measurement paths containing a cable, attenuator, coupler or filter were connected to a calibrated source (i.e. a signal generator, power sensor, or VNA) to determine the losses of the measurement path. The power meter offset was then adjusted to compensate for the measurement system losses. This level offset is stored within the power meter before measurements are made. This calibration verification procedure applies to the system verification and output power measurements. The calibrated reading is then taken directly from the power meter after compensation of the losses for all final power measurements.

Measurement Uncertainty = $\pm 27\%$ (k=2)

	Name	Function	Signature
Tested By:	Yue Li	Engineer	
Approved By:	Phuong Nguyen	Technical Manager	

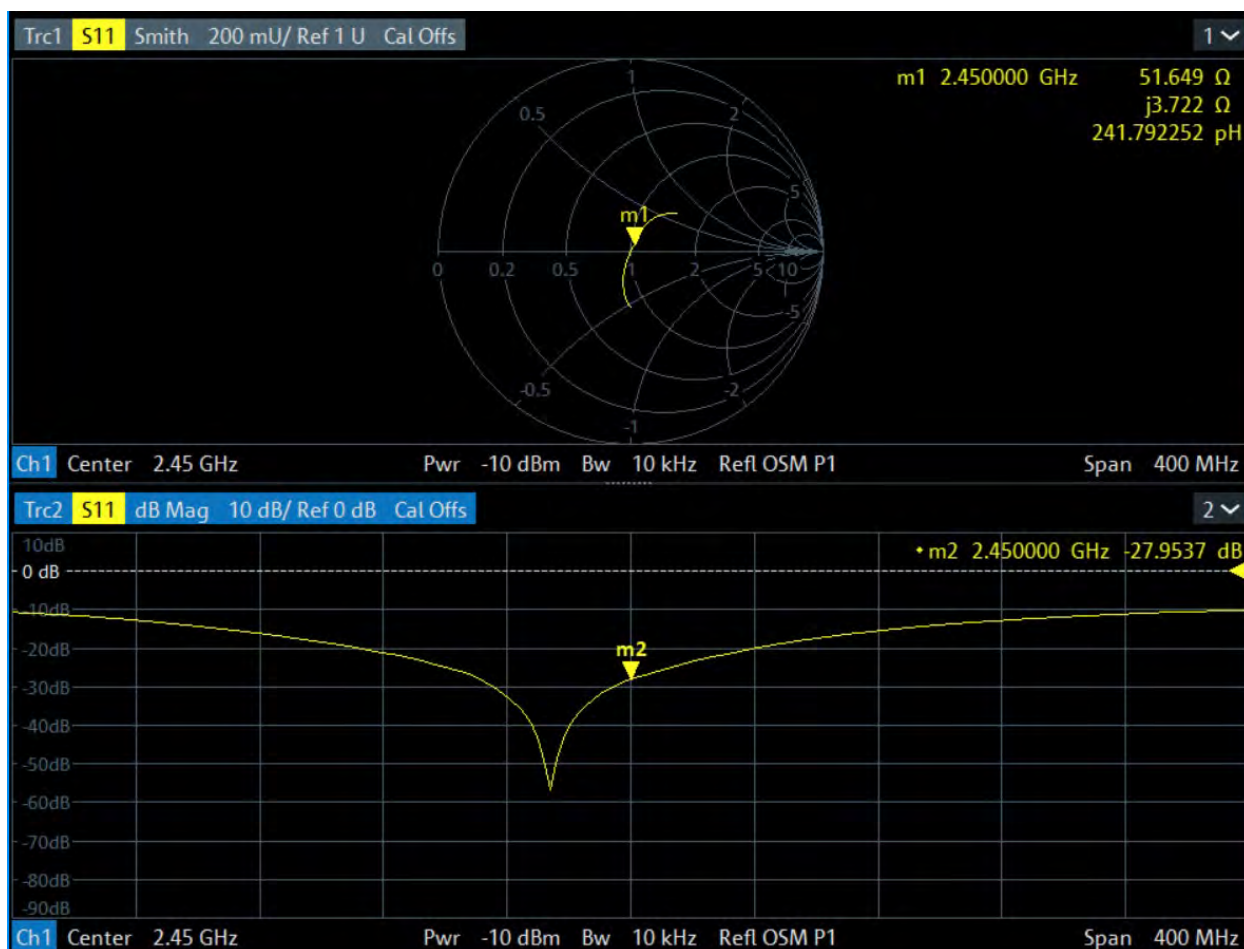
Per FCC KDB Publication 865664 D01, dipole can have longer calibration intervals of up to three years when it is demonstrated that the SAR target, impedance and return loss of the dipole have remained stable according to the following requirements:

1. Measured SAR does not deviate from the calibrated SAR value by more than 10%.
2. Return loss does not deviate by more than 20% from the previous measurement (i.e. value in dB x 0.2) and meet the required minimum return-loss.
3. Real and imaginary part of the impedance do not deviate by more than 5 Ω from the previous measurement.

The following dipole was checked to pass the above 3 requirements to have an extended calibration interval:

Dipole SN	Freq (MHz)	In-house Check Date	Cal Date	Head SAR target (1g) @ 30dBm (W/kg)	Measured Head SAR (1g) @ 17dBm (W/kg)	1g SAR Dev (%)	Head SAR target (10g) @ 30dBm (W/kg)	Measured Head SAR (10g) @ 17dBm (W/kg)	10g SAR Dev (%)	Cert Head Impedance (Ohm) - Real	Previous Head Impedance (Ohm) - Real	Measured Head Impedance (Ohm) - Real	Head Impedance Deviation (Ohm) - Real	Cert Head Impedance (Ohm) - Imaginary	Previous Head Impedance (Ohm) - Imaginary	Measured Head Impedance (Ohm) - Imaginary	Head Impedance Deviation (Ohm) - Imaginary	Cert Head Return Loss (dB)	Previous Head Return Loss (dB)	Measured Head Return Loss (dB)	Return Loss Dev (%)	PASS/FAIL	Note
1112	2450	11/21/2024	11/15/2024							51.6	51.6	49.4	-2.2	4.2	4.3	4.3	0.1	-27.1	-27.1	-27.3	-4.22%	PASS	In-house check after Calibration
1112	2450	7/29/2025	11/15/2024	50.6	2.53	-0.54%	23.7	1.19	0.18%	51.6	49.4	51.6	-2.2	4.2	4.3	3.7	-0.6	-27.1	-27.3	-28.0	-13.97%	PASS	-

Impedance and Return-Loss Measurement Plot for Head TSL





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 Multilateral Agreement for the recognition of calibration certificates

Accreditation No.: **SCS 0108**

Client

RF Safety Lab
 Catonsville, USA

Certificate No.

D2600V2-1215_Nov24

CALIBRATION CERTIFICATE

APB 11/21/24

Object **D2600V2 - SN: 1215**

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

Calibration date **November 15, 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 Cal
Power Sensor R&S NRP-33T	SN: 100967	28-Mar-24 (No. 217-04038)	Mar-25
Power Sensor R&S NRP18A	SN: 101859	22-Jul-24 (No. 4030A315008547)	Jul-25
Spectrum Analyzer R&S FSV40	SN: 101832	25-Jan-24 (No. 4030-315007551)	Jan-25
Mismatch; Short [S4188] Attenuator [S4423]	SN: 1152	28-Mar-24 (No. 217-04050)	Mar-25
OCP DAK-12	SN: 1016	24-Sep-24 (No. OCP-DAK12-1016_Sep24)	Sep-25
OCP DAK-3.5	SN: 1249	23-Sep-24 (No. OCP-DAK3.5-1249_Sep24)	Sep-25
Reference Probe EX3DV4	SN: 7349	03-Jun-24 (No. EX3-7349_Jun24)	Jun-25
DAE4ip	SN: 1836	28-Oct-24 (No. DAE4ip-1836_Oct24)	Oct-25

Secondary Standards	ID	Check Date (in house)	Scheduled Check
ACAD Source Box	SN: 1000	28-May-24 (No. 675-ACAD_Source_Box-240528)	May-25
Signal Generator R&S SMB100A	SN: 182081	28-May-24 (No. 675-CAL16-S4588-240528)	May-25
Mismatch; SMA	SN: 1102	22-May-24 (No. 675-Mismatch_SMA-240522)	May-25

	Name	Function	Signature
Calibrated by	Paulo Pina	Laboratory Technician	
Approved by	Sven Kühn	Technical Manager	

Issued: November 15, 2024

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



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Multilateral Agreement for the recognition of calibration certificates**

Accreditation No.: SCS 0108

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 dipole is mounted with the spacer to position its feed point exactly below the center marking of the flat phantom section, with the arms oriented parallel to the body axis.
- *Feed Point Impedance and Return Loss*: These parameters are measured with the dipole positioned under the liquid filled phantom. The impedance stated is transformed from the measurement at the SMA connector to the feed point. The Return Loss ensures low reflected power. No uncertainty required.
- *Electrical Delay*: One-way delay between the SMA connector and the antenna feed point. 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	DASY8 Module SAR	16.4.0
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom	
Distance Dipole Center - TSL	10 mm	with spacer
Zoom Scan Resolution	dx, dy = 5mm, dz = 1.5mm	Graded Ratio = 1.5 mm (Z direction)
Frequency	2600MHz $\pm$ 1MHz	

Head TSL parameters at 2600 MHz

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	39.0	1.96 mho/m
Measured Head TSL parameters	(22.0 $\pm$ 0.2)°C	37.2 $\pm$ 6%	1.99 mho/m $\pm$ 6%
Head TSL temperature change during test	< 0.5 °C		

SAR result with Head TSL at 2600 MHz

SAR averaged over 1 cm ³ (1 g) of Head TSL	Condition	
SAR for nominal Head TSL parameters	24 dBm input power	13.9 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	55.3 W/kg $\pm$ 17.0% (k = 2)

SAR averaged over 10 cm ³ (10 g) of Head TSL	Condition	
SAR for nominal Head TSL parameters	24 dBm input power	6.25 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	24.9 W/kg $\pm$ 16.5% (k = 2)

Appendix (Additional assessments outside the scope of SCS 0108)**Antenna Parameters with Head TSL at 2600 MHz**

Impedance	46.9 Ω + 0.1 j Ω
Return Loss	-29.9 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.142 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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System Performance Check Report

Summary

Dipole	Frequency [MHz]	TSL	Power [dBm]
D2600V2 - SN1215	2600	HSL	24

Exposure Conditions

Phantom Section, TSL	Test Distance [mm]	Band	Group, UID	Frequency [MHz], Channel Number	Conversion Factor	TSL Conductivity [S/m]	TSL Permittivity
Flat	10	CW, 0--		2600, 0	7.3	1.99	37.2

Hardware Setup

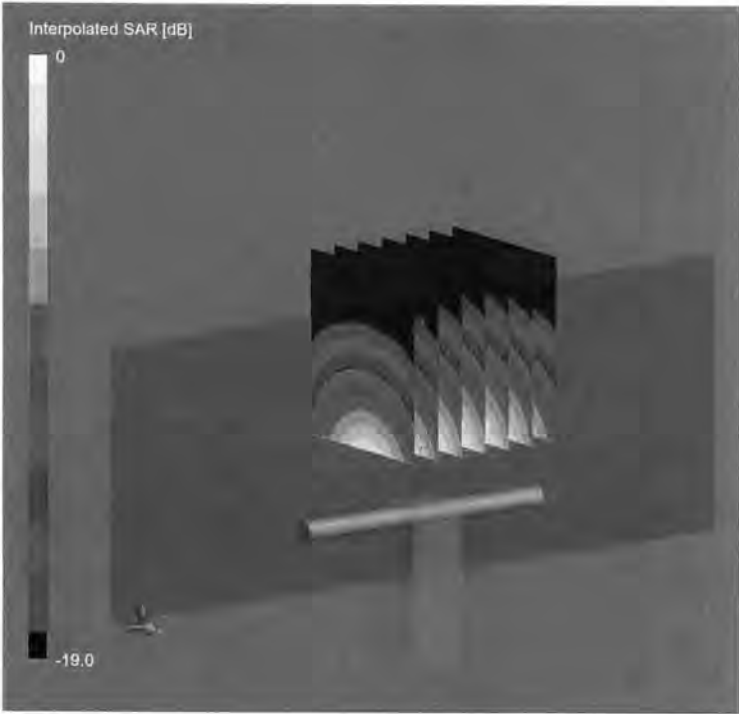
Phantom	TSL, Measured Date	Probe, Calibration Date	DAE, Calibration Date
MFP V8.0 Center	HSL, 2024-11-15	EX3DV4 - SN7349, 2024-06-03	DAE4ip Sn1836, 2024-10-28

Scans Setup

	Zoom Scan
Grid Extents [mm]	30 x 30 x 30
Grid Steps [mm]	5.0 x 5.0 x 1.5
Sensor Surface [mm]	1.4
Graded Grid	Yes
Grading Ratio	1.5
MAIA	N/A
Surface Detection	VMS + 6p
Scan Method	Measured

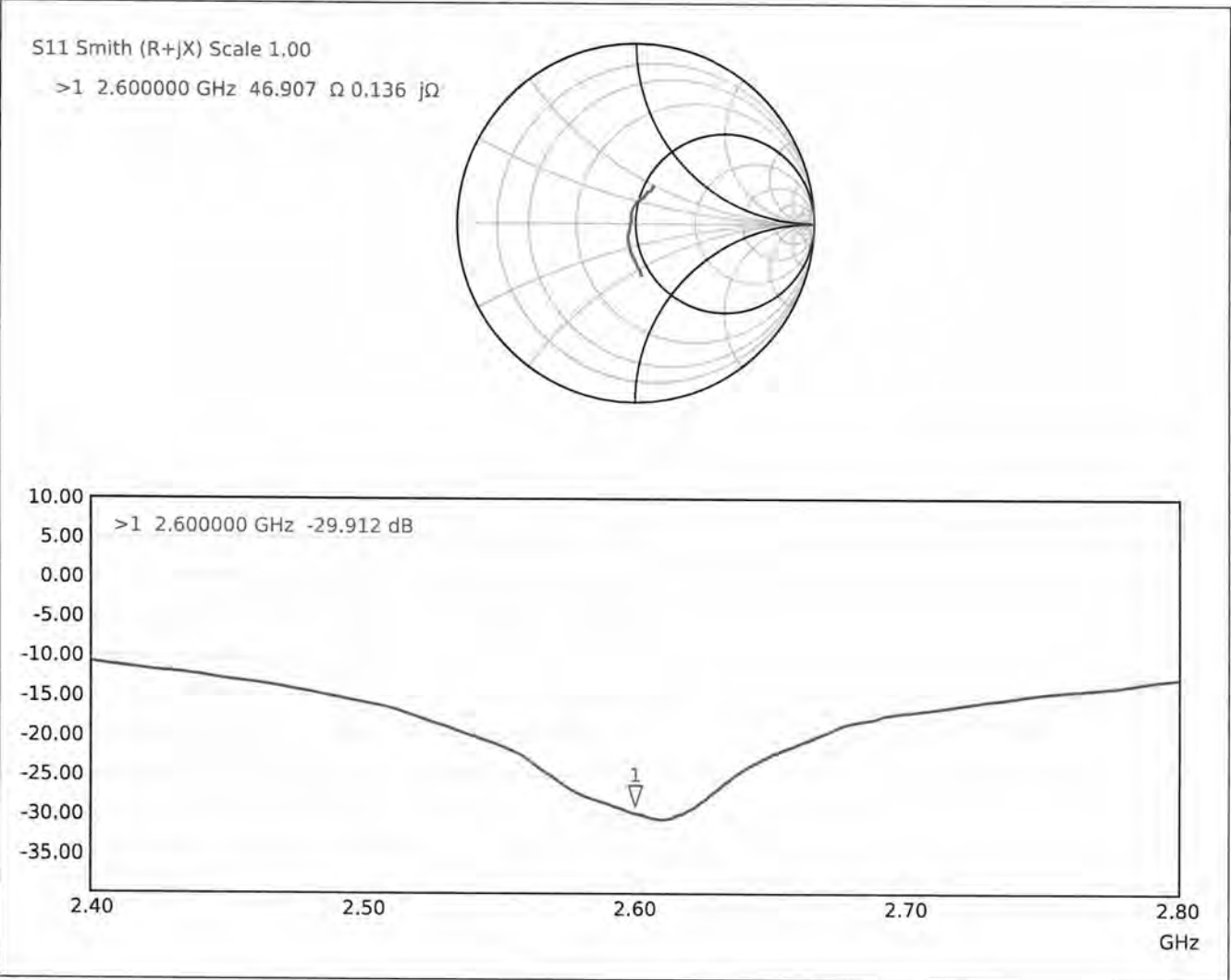
Measurement Results

	Zoom Scan
Date	2024-11-15
psSAR1g [W/Kg]	13.9
psSAR10g [W/Kg]	6.25
Power Drift [dB]	0.01
Power Scaling	Disabled
Scaling Factor [dB]	
TSL Correction	Positive / Negative



0 dB = 29.9 W/Kg

Impedance Measurement Plot for Head TSL



IN-HOUSE SAR VERIFICATION SOURCE CALIBRATION EXTENSION

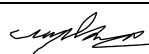
Object: D2600V2 – SN: 1215
Description: SAR Validation Dipole at 2600 MHz
Procedure (s): Procedure for SAR Verification Source Calibration Extension
In-house Check Date: 07/29/2025

Equipment List

Manufacturer	Model	Description	Serial Number	Calibration Date	Calibration Due	CBT
Rohde & Schwarz	ZNL20	Vector Network Analyzer	101202	9/12/2024	9/12/2025	
Rohde & Schwarz	ZN-Z135	Calibration Kit	5000-309192839	10/31/24	10/31/26	
Control Company	4040	Ambient Thermometer	230581657	8/28/2023	8/28/2025	
Control Company	4040	Ambient Thermometer	230581662	8/28/2023	8/28/2025	
Control Company	4352	Long Stem Liquid Thermometer	230662223	9/28/2023	9/28/2025	
Control Company	4352	Long Stem Liquid Thermometer	230662212	9/28/2023	9/28/2025	
Micro-Coax	UFB205A-0-0240-30x30	SMA M-F RF test Cable (DC - 18 GHz)	-			✓
Maury-Micro	360D	10dB RF Fixed Attenuator (DC - 18 GHz) + Short Circuit Termination	7799	12/28/2024	12/28/2025	
Huber+Suhner	SF126	High Performance RF Cable	570292/126			✓
SPEAG	DAE4ip	Data Acquisition Electronics with Integ. Power	1839	9/4/2024	9/4/2025	
SPEAG	DAK-3.5	DAK-3.5 Dielectric Probe	1349	9/2/2024	9/2/2025	
SPEAG	EX3DV4	SAR Measurement Probe	7836	9/12/2024	9/12/2025	
SPEAG	Powersource1	Signal Generator	4341	1/9/2025	1/9/2026	

CBT: Components calibrated before testing. Prior to testing, the measurement paths containing a cable, attenuator, coupler or filter were connected to a calibrated source (i.e. a signal generator, power sensor, or VNA) to determine the losses of the measurement path. The power meter offset was then adjusted to compensate for the measurement system losses. This level offset is stored within the power meter before measurements are made. This calibration verification procedure applies to the system verification and output power measurements. The calibrated reading is then taken directly from the power meter after compensation of the losses for all final power measurements.

Measurement Uncertainty = $\pm 27\%$ (k=2)

	Name	Function	Signature
Tested By:	Yue Li	Engineer	
Approved By:	Phuong Nguyen	Technical Manager	

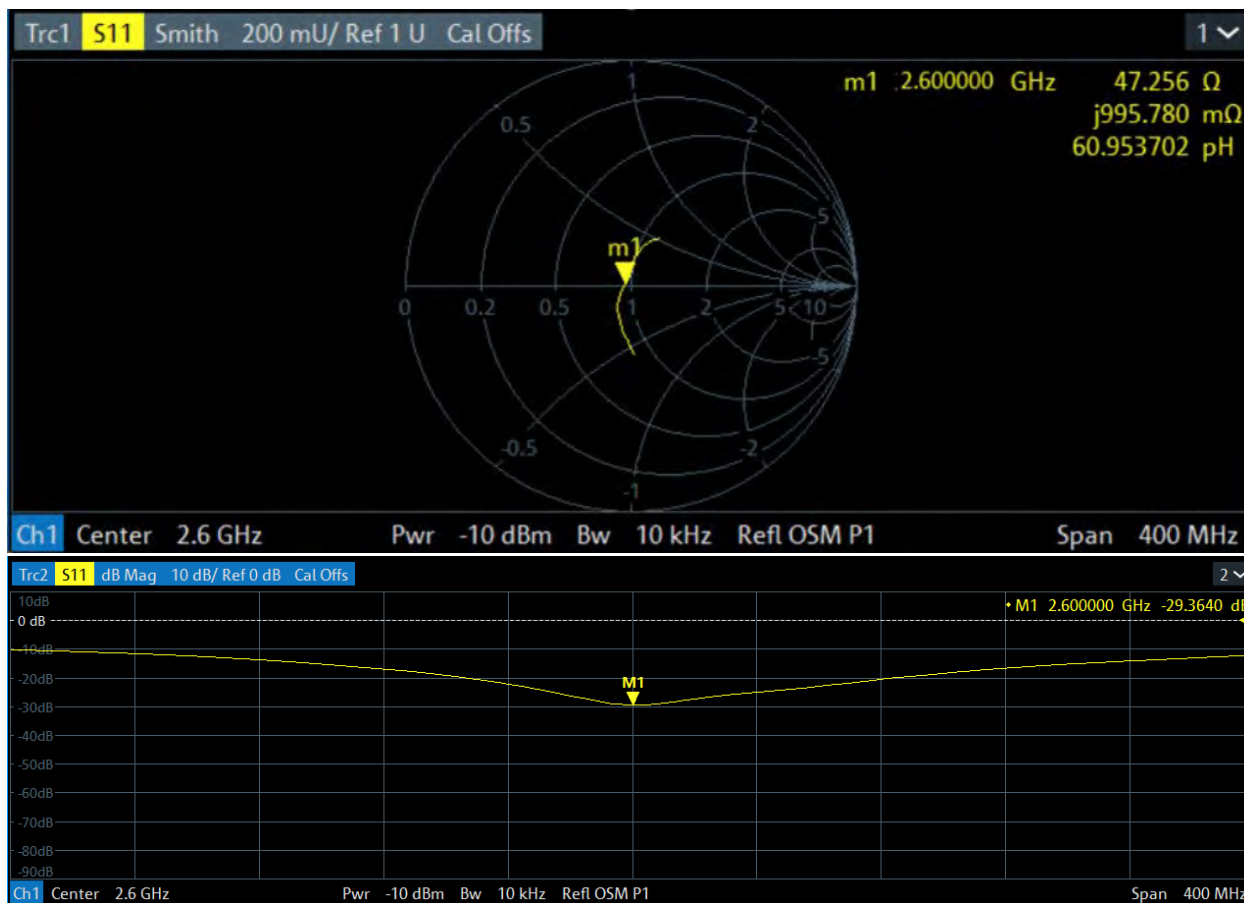
Per FCC KDB Publication 865664 D01, dipole can have longer calibration intervals of up to three years when it is demonstrated that the SAR target, impedance and return loss of the dipole have remained stable according to the following requirements:

1. Measured SAR does not deviate from the calibrated SAR value by more than 10%.
2. Return loss does not deviate by more than 20% from the previous measurement (i.e. value in dB x 0.2) and meet the required minimum return-loss.
3. Real and imaginary part of the impedance do not deviate by more than 5 Ω from the previous measurement.

The following dipole was checked to pass the above 3 requirements to have an extended calibration interval:

Dipole SN	Freq (MHz)	In-house Check Date	Cal Date	Head SAR target (1g) @ 30dBm (W/kg)	Measured Head SAR (1g) @ 17dBm (W/kg)	1g SAR Dev (%)	Head SAR target (10g) @ 30dBm (W/kg)	Measured Head SAR (10g) @ 17dBm (W/kg)	10g SAR Dev (%)	Cert Head Impedance (Ohm) - Real	Previous Head Impedance (Ohm) - Real	Measured Head Impedance (Ohm) - Real	Head Impedance Deviation (Ohm) - Real	Cert Head Impedance (Ohm) - Imaginary	Previous Head Impedance (Ohm) - Imaginary	Measured Head Impedance (Ohm) - Imaginary	Head Impedance Deviation (Ohm) - Imaginary	Cert Head Return Loss (dB)	Previous Head Return Loss (dB)	Measured Head Return Loss (dB)	Return Loss Dev (%)	PASS/FAIL	Note
1215	2600	11/21/2024	11/15/2024							46.9	46.9	47.2	0.3	0.1	0.1	1.3	1.2	-29.9	-29.9	-29.9	-0.03%	PASS	In-house check after Calibration
1215	2600	7/29/2025	11/15/2024	55.3	2.59	-8.55%	24.9	1.17	-6.25%	46.9	47.2	47.3	0.1	0.1	1.3	1.0	-0.3	-29.9	-29.9	-29.4	12.20%	PASS	-

Impedance and Return-Loss Measurement Plot for Head TSL





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Client **RF Safety Lab**
Catonsville, USA

Certificate No. **D3500V2-1154_Oct23**

CALIBRATION CERTIFICATE

Object **D3500V2 - SN:1154**

MAR 31/20/23

Calibration procedure(s) **QA CAL-22.v7**
Calibration Procedure for SAR Validation Sources between 3-10 GHz

Calibration date: **October 02, 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 (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
Power sensor NRP-Z91	SN: 103245	30-Mar-23 (No. 217-03805)	Mar-24
Reference 20 dB Attenuator	SN: BH9394 (20k)	30-Mar-23 (No. 217-03809)	Mar-24
Type-N mismatch combination	SN: 310982 / 06327	30-Mar-23 (No. 217-03810)	Mar-24
Reference Probe EX3DV4	SN: 3503	07-Mar-23 (No. EX3-3503_Mar23)	Mar-24
DAE4	SN: 601	19-Dec-22 (No. DAE4-601_Dec22)	Dec-23

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: **Paulo Pina** Function: **Laboratory Technician**

Approved by: **Sven Kühn** Technical Manager

Signature

Issued: October 6, 2023

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



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Multilateral Agreement for the recognition of calibration certificates

Accreditation No.: **SCS 0108**

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 = 4 mm, dz = 1.4 mm	Graded Ratio = 1.4 (Z direction)
Frequency	3500 MHz $\pm$ 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	37.9	2.91 mho/m
Measured Head TSL parameters	(22.0 $\pm$ 0.2) °C	37.2 $\pm$ 6 %	2.97 mho/m $\pm$ 6 %
Head TSL temperature change during test	< 0.5 °C	----	----

SAR result with Head TSL

SAR averaged over 1 cm ³ (1 g) of Head TSL	Condition	
SAR measured	100 mW input power	6.57 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	65.1 W/kg $\pm$ 19.9 % (k=2)

SAR averaged over 10 cm ³ (10 g) of Head TSL	condition	
SAR measured	100 mW input power	2.47 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	24.6 W/kg $\pm$ 19.5 % (k=2)

Body TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	51.3	3.31 mho/m
Measured Body TSL parameters	(22.0 $\pm$ 0.2) °C	51.5 $\pm$ 6 %	3.29 mho/m $\pm$ 6 %
Body TSL temperature change during test	< 0.5 °C	----	----

SAR result with Body TSL

SAR averaged over 1 cm ³ (1 g) of Body TSL	Condition	
SAR measured	100 mW input power	6.25 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	62.7 W/kg $\pm$ 19.9 % (k=2)

SAR averaged over 10 cm ³ (10 g) of Body TSL	condition	
SAR measured	100 mW input power	2.37 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	23.7 W/kg $\pm$ 19.5 % (k=2)

Appendix (Additional assessments outside the scope of SCS 0108)

Antenna Parameters with Head TSL

Impedance, transformed to feed point	52.3 Ω - 3.2 j Ω
Return Loss	- 28.3 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	54.8 Ω - 0.6 j Ω
Return Loss	- 26.7 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.132 ns
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After long term use with 100W radiated power, only a slight warming of the dipole near the feedpoint can be measured.

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

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

Additional EUT Data

Manufactured by	SPEAG
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DASY5 Validation Report for Head TSL

Date: 02.10.2023

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 3500 MHz; Type: D3500V2; Serial: D3500V2 - SN:1154

Communication System: UID 0 - CW; Frequency: 3500 MHz

Medium parameters used: $f = 3500$ MHz; $\sigma = 2.97$ S/m; $\epsilon_r = 37.2$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

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

DASY52 Configuration:

- Probe: EX3DV4 - SN3503; ConvF(7.91, 7.91, 7.91) @ 3500 MHz; Calibrated: 07.03.2023
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 19.12.2022
- Phantom: Flat Phantom 5.0 (front); Type: QD 000 P50 AA; Serial: 1001
- DASY52 52.10.4(1535); SEMCAD X 14.6.14(7501)

Dipole Calibration for Head Tissue/Pin=100 mW, d=10mm, f=3500MHz/Zoom Scan, dist=1.4mm (8x8x8)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm

Reference Value = 69.83 V/m; Power Drift = 0.02 dB

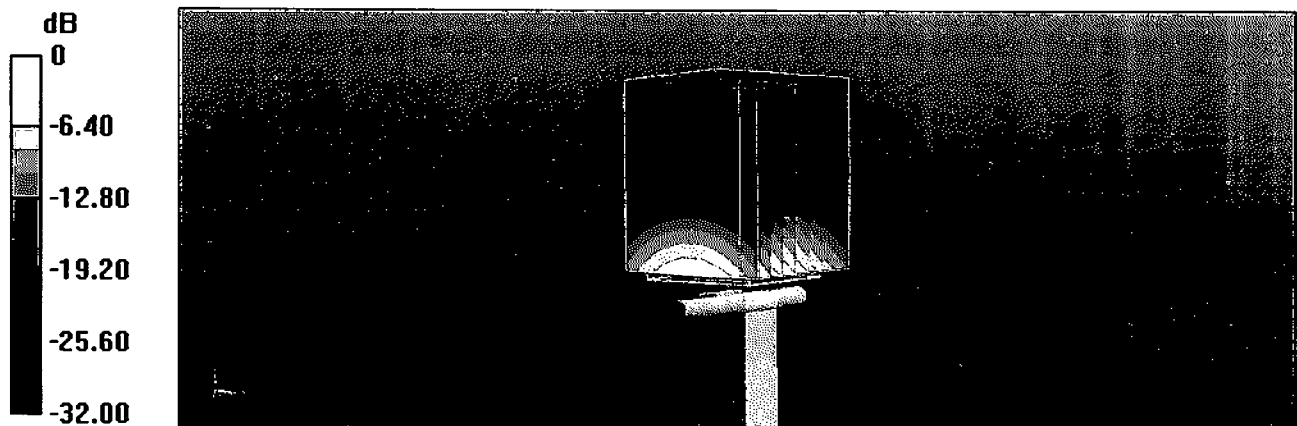
Peak SAR (extrapolated) = 17.5 W/kg

SAR(1 g) = 6.57 W/kg; SAR(10 g) = 2.47 W/kg

Smallest distance from peaks to all points 3 dB below = 8.2 mm

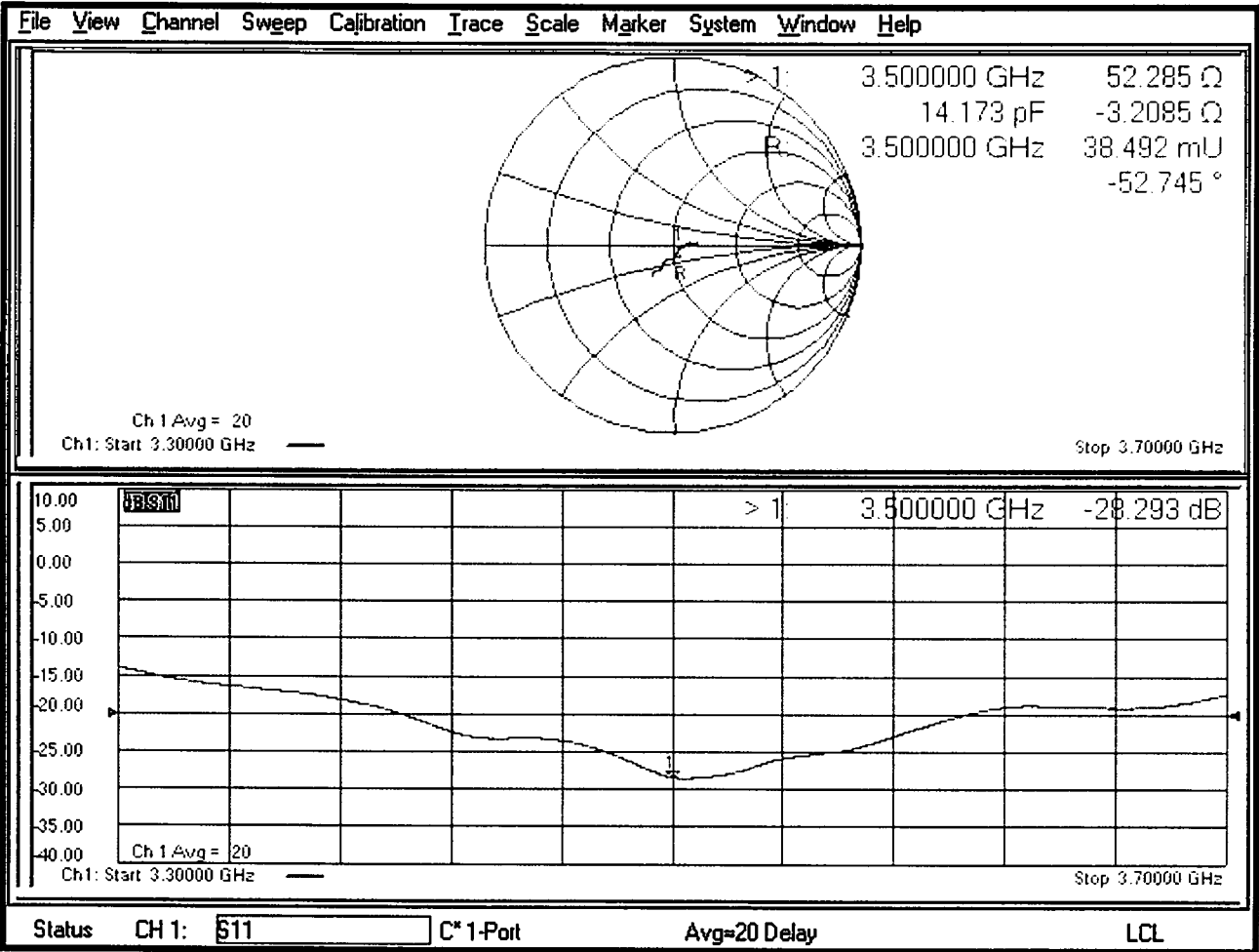
Ratio of SAR at M2 to SAR at M1 = 74.6%

Maximum value of SAR (measured) = 12.4 W/kg



0 dB = 12.4 W/kg = 10.93 dBW/kg

Impedance Measurement Plot for Head TSL



DASY5 Validation Report for Body TSL

Date: 02.10.2023

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 3500 MHz; Type: D3500V2; Serial: D3500V2 - SN:1154

Communication System: UID 0 - CW; Frequency: 3500 MHz

Medium parameters used: $f = 3500$ MHz; $\sigma = 3.29$ S/m; $\epsilon_r = 51.5$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

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

DASY52 Configuration:

- Probe: EX3DV4 - SN3503; ConvF(7.46, 7.46, 7.46) @ 3500 MHz; Calibrated: 07.03.2023
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 19.12.2022
- Phantom: Flat Phantom 5.0 (back); Type: QD 000 P50 AA; Serial: 1002
- DASY52 52.10.4(1535); SEMCAD X 14.6.14(7501)

Dipole Calibration for Body Tissue/Pin=100 mW, d=10mm, f=3500MHz/Zoom Scan , dist=1.4mm (8x8x8)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm

Reference Value = 63.36 V/m; Power Drift = 0.00 dB

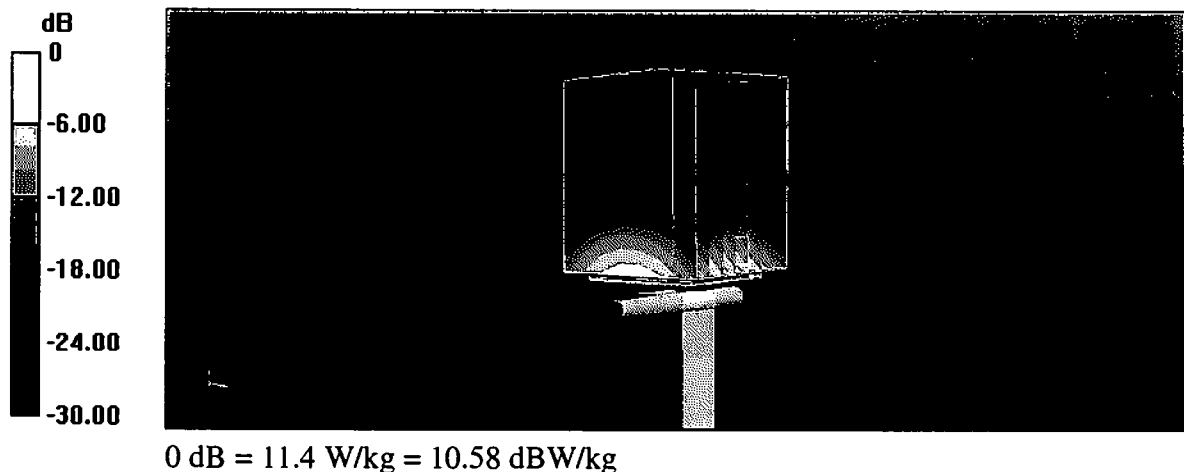
Peak SAR (extrapolated) = 16.2 W/kg

SAR(1 g) = 6.25 W/kg; SAR(10 g) = 2.37 W/kg

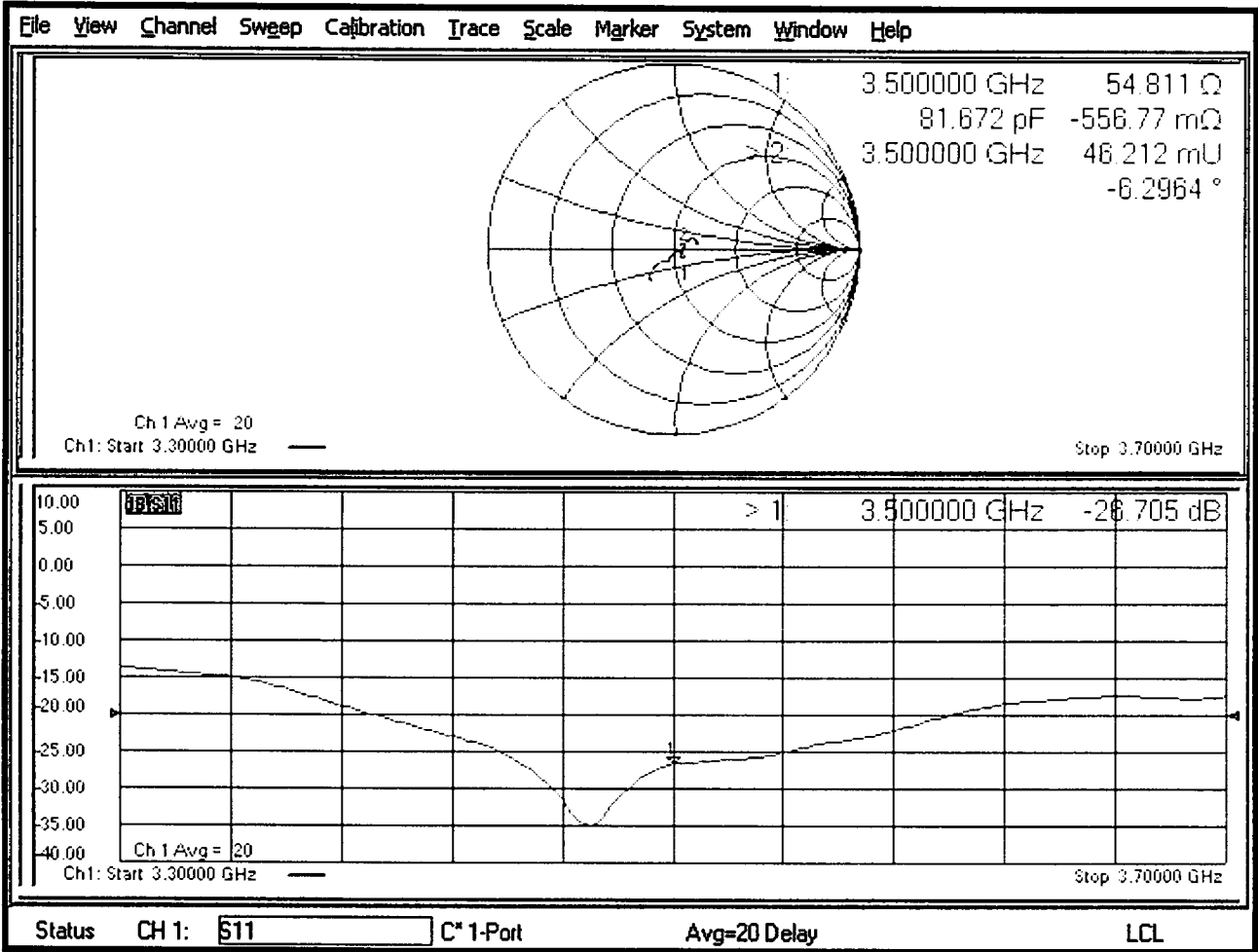
Smallest distance from peaks to all points 3 dB below = 8 mm

Ratio of SAR at M2 to SAR at M1 = 77.2%

Maximum value of SAR (measured) = 11.4 W/kg



Impedance Measurement Plot for Body TSL



IN-HOUSE SAR VERIFICATION SOURCE CALIBRATION EXTENSION

Object: D3500V2 – SN: 1154
Description: SAR Validation Dipole at 3500 MHz
Procedure (s): Procedure for SAR Verification Source Calibration Extension
In-house Check Date: 11/7/2024

Equipment List

Manufacturer	Model	Description	Serial Number	Calibration Date	Calibration Due	CBT
Rohde & Schwarz	ZNL20	Vector Network Analyzer	101202	9/12/2024	9/12/2025	
Rohde & Schwarz	ZN-Z135	Calibration Kit	5000-309192839	10/31/24	10/31/26	
Control Company	4040	Ambient Thermometer	230581657	8/28/2023	8/28/2025	
Control Company	4352	Long Stem Liquid Thermometer	230662223	9/28/2023	9/28/2025	
Micro-Coax	UFB205A-0-0240-30x30	SMA M-F RF test Cable (DC - 18 GHz)	-			✓
Mini-Circuits	BW-N20W20+	20dB RF Fixed Attenuator (DC - 18 GHz)	-			✓
Mini-Circuits	NF-SF50+	RF Adapter N Male to SMA Female (DC - 18 GHz)	-			✓
SPEAG	DAE4ip	Data Acquisition Electronics with Integ. Power	1839	8/14/2024	8/14/2025	
SPEAG	DAK-3.5	DAK-3.5 Dielectric Probe	1349	9/2/2024	9/2/2025	
SPEAG	EX3DV4	SAR Measurement Probe	7836	3/15/2024	3/15/2025	
SPEAG	Powersource1	Signal Generator	4341	1/5/2024	1/5/2025	

CBT: Components calibrated before testing. Prior to testing, the measurement paths containing a cable, attenuator, coupler or filter were connected to a calibrated source (i.e. a signal generator, power sensor, or VNA) to determine the losses of the measurement path. The power meter offset was then adjusted to compensate for the measurement system losses. This level offset is stored within the power meter before measurements are made. This calibration verification procedure applies to the system verification and output power measurements. The calibrated reading is then taken directly from the power meter after compensation of the losses for all final power measurements.

Measurement Uncertainty = $\pm 27\%$ ($k=2$)

	Name	Function	Signature
Tested By:	Yue Li	Engineer	
Approved By:	Phuong Nguyen	Technical Manager	

Per FCC KDB Publication 865664 D01, dipole can have longer calibration intervals of up to three years when it is demonstrated that the SAR target, impedance and return loss of the dipole have remained stable according to the following requirements:

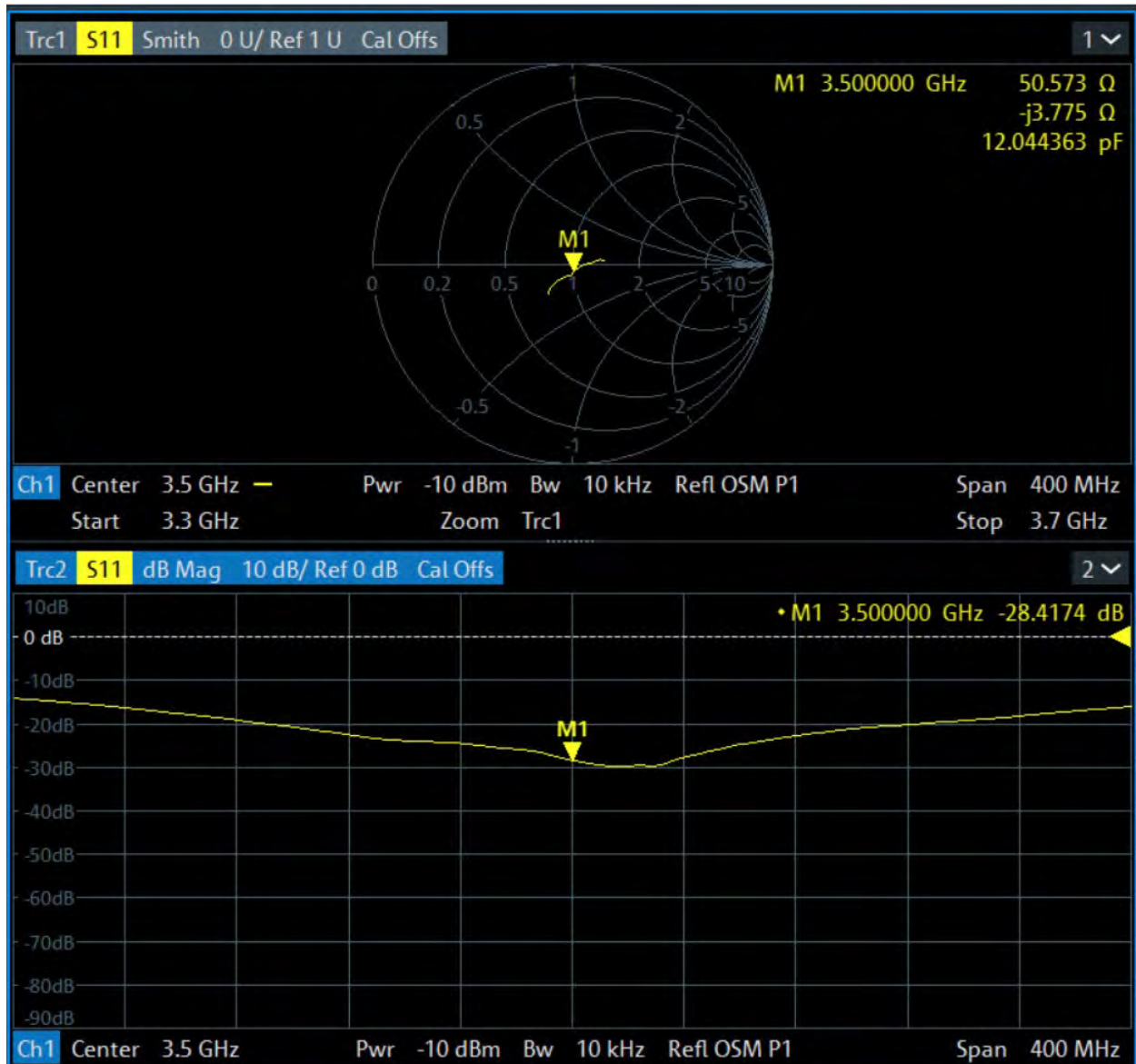
1. Measured SAR does not deviate from the calibrated SAR value by more than 10%.
2. Return loss does not deviate by more than 20% from the previous measurement (i.e. value in dB x 0.2) and meet the required minimum return-loss.
3. Real and imaginary part of the impedance do not deviate by more than 5 Ω from the previous measurement.

The following dipole was checked to pass the above 3 requirements to have an extended calibration interval:

Dipole SN	Freq (MHz)	In-house Check Date	Cal Date	Head SAR target (1g) @ 30dBm (W/kg)	Measured Head SAR (1g) @ 17dBm (W/kg)	1g SAR Deviation (%)	Head SAR target (10g) @ 30dBm (W/kg)	Measured Head SAR (10g) @ 17dBm (W/kg)	10g SAR Deviation (%)	Cert Head Impedance (Ohm) - Real	Measured Head Impedance (Ohm) - Real	Head Impedance Deviation (Ohm) - Real	Cert Head Impedance (Ohm) - Imaginary	Measured Head Impedance (Ohm) - Imaginary	Head Impedance Deviation (Ohm) - Imaginary	Cert Head Return Loss (dB)	Measured Head Return Loss (dB)	Return Loss Deviation (%)	PASS/FAIL
1154	3500	11/7/2024	10/2/2023	65.1	3.00	-8.05%	24.6	1.14	-7.54%	52.3	50.6	-1.7	-3.2	-3.8	-0.6	-28.3	-28.4	-2.66%	PASS



Impedance and Return-Loss Measurement Plot for Head TSL



IN-HOUSE SAR VERIFICATION SOURCE CALIBRATION EXTENSION

Object D3500V2 – SN: 1154
Description SAR Validation Dipole at 3500 MHz
Procedure (s) Procedure for SAR Verification Source Calibration Extension
In-house Check Date 07/30/2025

Equipment List

Manufacturer	Model	Description	Serial Number	Calibration Date	Calibration Due	CBT
Rohde & Schwarz	ZNL20	Vector Network Analyzer	101202	9/12/2024	9/12/2025	
Rohde & Schwarz	ZN-Z135	Calibration Kit	5000-309192839	10/31/24	10/31/26	
Control Company	4040	Ambient Thermometer	230581657	8/28/2023	8/28/2025	
Control Company	4040	Ambient Thermometer	230581662	8/28/2023	8/28/2025	
Control Company	4352	Long Stem Liquid Thermometer	230662223	9/28/2023	9/28/2025	
Control Company	4352	Long Stem Liquid Thermometer	230662212	9/28/2023	9/28/2025	
Micro-Coax	UFB205A-0-0240-30x30	SMA M-F RF test Cable (DC - 18 GHz)	-			✓
Maury-Micro	360D	10dB RF Fixed Attenuator (DC - 18 GHz) + Short Circuit Termination	7799	12/28/2024	12/28/2025	
Huber+Suhner	SF126	High Performance RF Cable	570292/126			✓
SPEAG	DAE4ip	Data Acquisition Electronics with Integ. Power	1844	11/6/2024	11/6/2025	
SPEAG	DAK-3.5	DAK-3.5 Dielectric Probe	1349	9/2/2024	9/2/2025	
SPEAG	EX3DV4	SAR Measurement Probe	7853	11/7/2024	11/7/2025	
SPEAG	Powersource1	Signal Generator	4341	1/9/2025	1/9/2026	

CBT: Components calibrated before testing. Prior to testing, the measurement paths containing a cable, attenuator, coupler or filter were connected to a calibrated source (i.e. a signal generator, power sensor, or VNA) to determine the losses of the measurement path. The power meter offset was then adjusted to compensate for the measurement system losses. This level offset is stored within the power meter before measurements are made. This calibration verification procedure applies to the system verification and output power measurements. The calibrated reading is then taken directly from the power meter after compensation of the losses for all final power measurements.

Measurement Uncertainty = $\pm 27\%$ ($k=2$)

	Name	Function	Signature
Tested By:	YL	Engineer	
Approved By:	PN	Technical Manager	

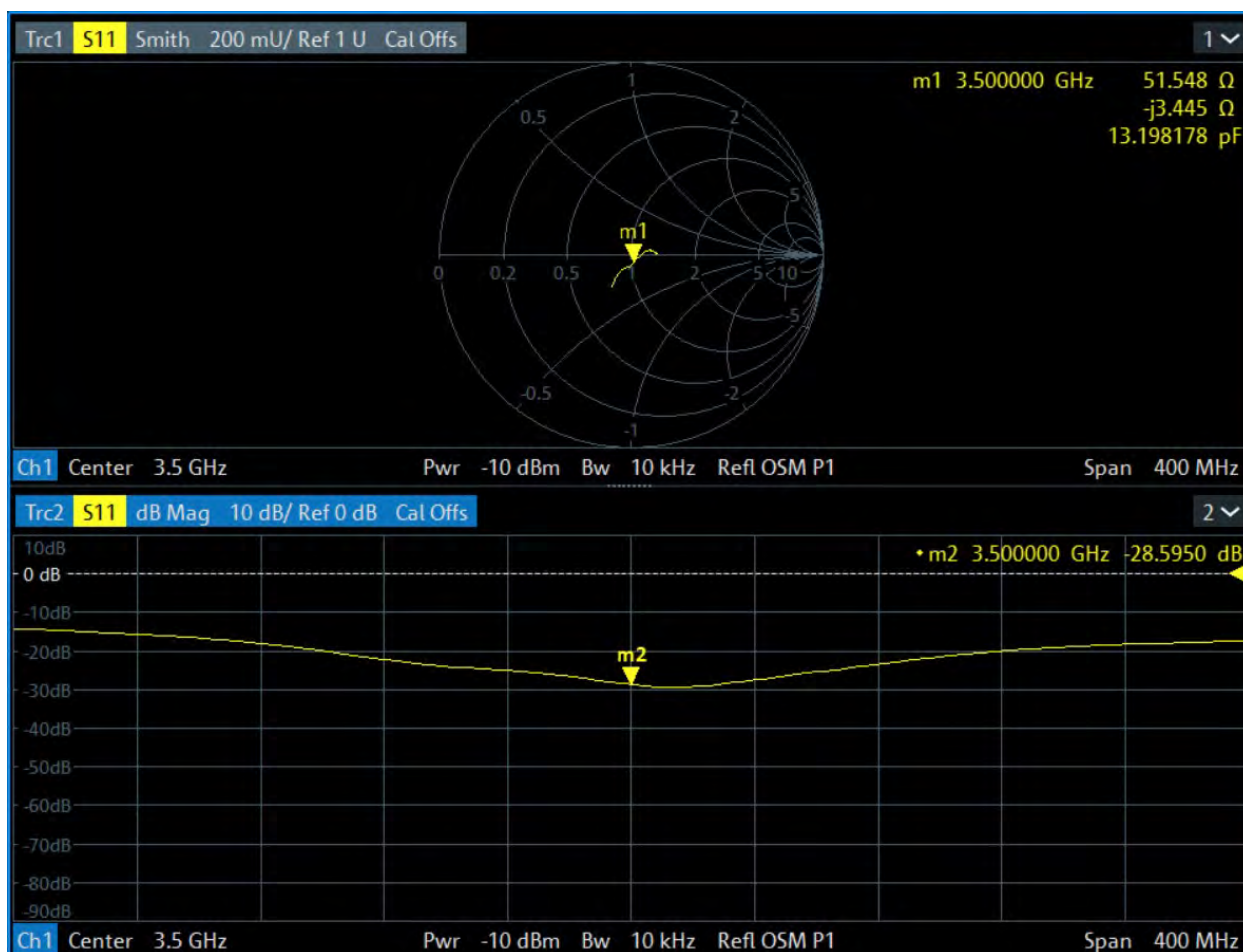
Per FCC KDB Publication 865664 D01, dipole can have longer calibration intervals of up to three years when it is demonstrated that the SAR target, impedance and return loss of the dipole have remained stable according to the following requirements:

1. Measured SAR does not deviate from the calibrated SAR value by more than 10%.
2. Return loss does not deviate by more than 20% from the previous measurement (i.e. value in dB x 0.2) and meet the required minimum return-loss.
3. Real and imaginary part of the impedance do not deviate by more than 5 Ω from the previous measurement.

The following dipole was checked to pass the above 3 requirements to have an extended calibration interval:

Dipole SN	Freq (MHz)	In-house Check Date	Cal Date	Head SAR target (1g) @ 30dBm (W/kg)	Measured Head SAR (1g) @ 17dBm (W/kg)	1g SAR Dev (%)	Head SAR target (10g) @ 30dBm (W/kg)	Measured Head SAR (10g) @ 17dBm (W/kg)	10g SAR Dev (%)	Cert Head Impedance (Ohm) - Real	Previous Head Impedance (Ohm) - Real	Measured Head Impedance (Ohm) - Real	Head Impedance Deviation (Ohm) - Real	Cert Head Impedance (Ohm) - Imaginary	Previous Head Impedance (Ohm) - Imaginary	Measured Head Impedance (Ohm) - Imaginary	Head Impedance Deviation (Ohm) - Imaginary	Cert Head Return Loss (dB)	Previous Head Return Loss (dB)	Measured Head Return Loss (dB)	Return Loss Dev (%)	PASS/FAIL
1154	3500	11/7/2024	10/2/2023	65.1	3.00	-8.05%	24.6	1.14	-7.54%	52.3	52.3	50.6	-1.7	-3.2	-3.2	-3.8	-0.6	-28.3	-28.3	-28.4	-2.66%	PASS
1154	3500	7/30/2025	10/2/2023	65.1	2.94	-9.89%	24.6	1.13	-8.35%	52.3	50.6	51.5	0.9	-3.2	-3.8	-3.4	0.4	-28.3	-28.4	-28.6	-4.39%	PASS

Impedance and Return-Loss 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 Safety Lab**
Catonsville, USA

Certificate No. **D3700V2-1130_Oct23**

CALIBRATION CERTIFICATE

Object **D3700V2 - SN:1130**

MAR 11/20/23

Calibration procedure(s) **QA CAL-22.v7**
Calibration Procedure for SAR Validation Sources between 3-10 GHz

Calibration date: **October 12, 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 (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
Power sensor NRP-Z91	SN: 103245	30-Mar-23 (No. 217-03805)	Mar-24
Reference 20 dB Attenuator	SN: BH9394 (20k)	30-Mar-23 (No. 217-03809)	Mar-24
Type-N mismatch combination	SN: 310982 / 06327	30-Mar-23 (No. 217-03810)	Mar-24
Reference Probe EX3DV4	SN: 3503	07-Mar-23 (No. EX3-3503_Mar23)	Mar-24
DAE4	SN: 601	03-Oct-23 (No. DAE4-601_Oct23)	Oct-24
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

	Name	Function	Signature
Calibrated by:	Paulo Pina	Laboratory Technician	
Approved by:	Sven Kühn	Technical Manager	

Issued: October 12, 2023

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	10 mm	with Spacer
Zoom Scan Resolution	dx, dy = 4 mm, dz = 1.4 mm	Graded Ratio = 1.4 (Z direction)
Frequency	3700 MHz $\pm$ 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	37.7	3.12 mho/m
Measured Head TSL parameters	(22.0 $\pm$ 0.2) °C	37.7 $\pm$ 6 %	3.09 mho/m $\pm$ 6 %
Head TSL temperature change during test	< 0.5 °C	---	---

SAR result with Head TSL

SAR averaged over 1 cm ³ (1 g) of Head TSL	Condition	
SAR measured	100 mW input power	6.65 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	66.6 W/kg $\pm$ 19.9 % (k=2)

SAR averaged over 10 cm ³ (10 g) of Head TSL	condition	
SAR measured	100 mW input power	2.45 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	24.5 W/kg $\pm$ 19.5 % (k=2)

Body TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	51.0	3.55 mho/m
Measured Body TSL parameters	(22.0 $\pm$ 0.2) °C	51.8 $\pm$ 6 %	3.49 mho/m $\pm$ 6 %
Body TSL temperature change during test	< 0.5 °C	---	---

SAR result with Body TSL

SAR averaged over 1 cm ³ (1 g) of Body TSL	Condition	
SAR measured	100 mW input power	6.25 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	62.9 W/kg $\pm$ 19.9 % (k=2)

SAR averaged over 10 cm ³ (10 g) of Body TSL	condition	
SAR measured	100 mW input power	2.29 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	23.0 W/kg $\pm$ 19.5 % (k=2)

Appendix (Additional assessments outside the scope of SCS 0108)

Antenna Parameters with Head TSL

Impedance, transformed to feed point	46.0 Ω + 4.4 j Ω
Return Loss	- 24.2 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	45.1 Ω + 6.1 j Ω
Return Loss	- 21.7 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.129 ns
----------------------------------	----------

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

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

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

Additional EUT Data

Manufactured by	SPEAG
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DASY5 Validation Report for Head TSL

Date: 12.10.2023

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 3700 MHz; Type: D3700V2; Serial: D3700V2 - SN:1130

Communication System: UID 0 - CW; Frequency: 3700 MHz

Medium parameters used: $f = 3700$ MHz; $\sigma = 3.09$ S/m; $\epsilon_r = 37.7$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

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

DASY52 Configuration:

- Probe: EX3DV4 - SN3503; ConvF(7.73, 7.73, 7.73) @ 3700 MHz; Calibrated: 07.03.2023
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 03.10.2023
- 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=100 mW, d=10mm, f=3700MHz/Zoom Scan, dist=1.4mm (8x8x8)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm

Reference Value = 67.63 V/m; Power Drift = 0.07 dB

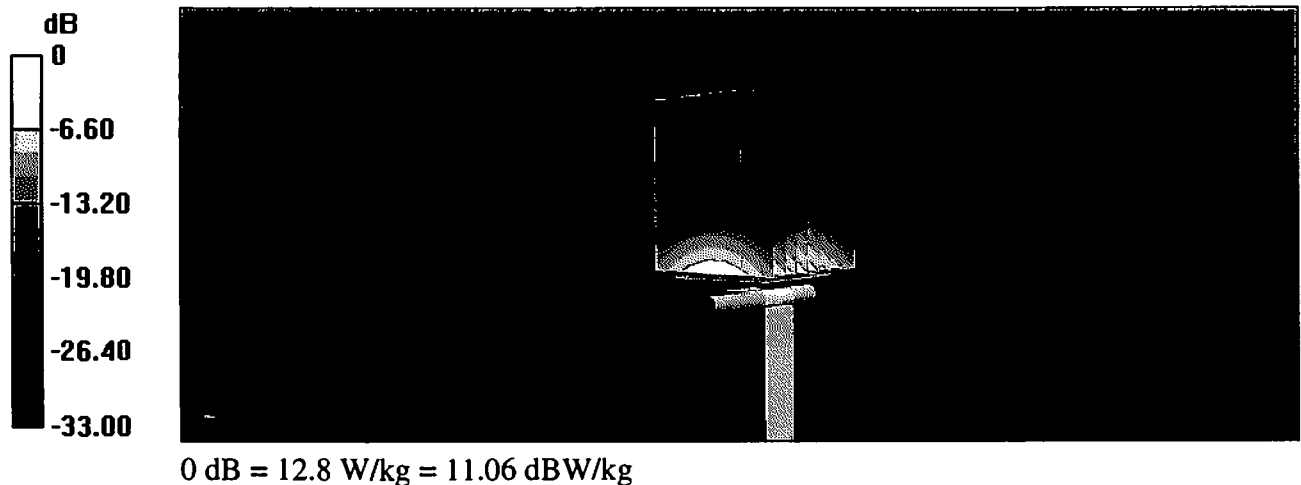
Peak SAR (extrapolated) = 18.5 W/kg

SAR(1 g) = 6.65 W/kg; SAR(10 g) = 2.45 W/kg

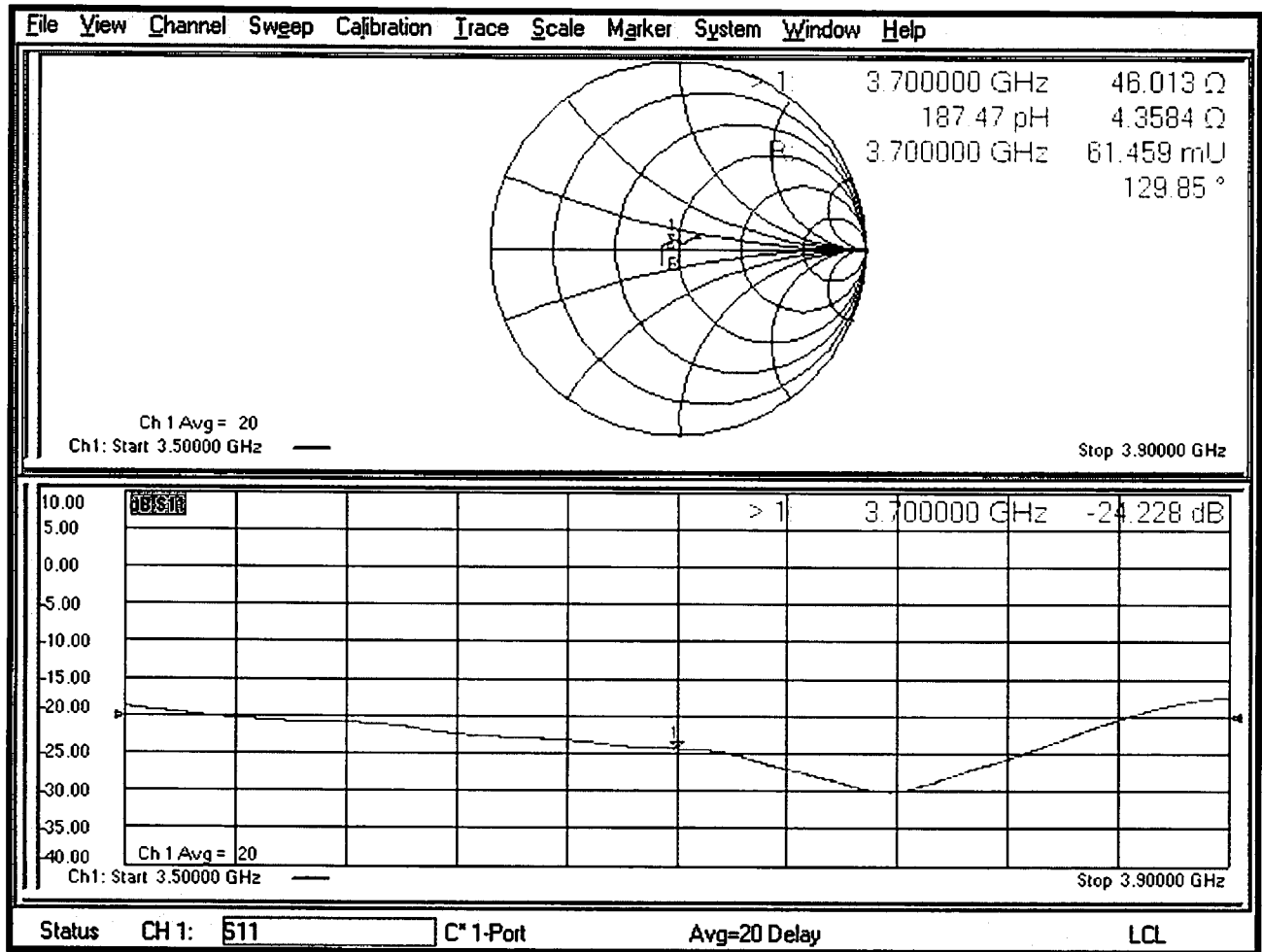
Smallest distance from peaks to all points 3 dB below = 8 mm

Ratio of SAR at M2 to SAR at M1 = 74.1%

Maximum value of SAR (measured) = 12.8 W/kg



Impedance Measurement Plot for Head TSL



DASY5 Validation Report for Body TSL

Date: 10.10.2023

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 3700 MHz; Type: D3700V2; Serial: D3700V2 - SN:1130

Communication System: UID 0 - CW; Frequency: 3700 MHz

Medium parameters used: $f = 3700$ MHz; $\sigma = 3.49$ S/m; $\epsilon_r = 51.8$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

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

DASY52 Configuration:

- Probe: EX3DV4 - SN3503; ConvF(7.31, 7.31, 7.31) @ 3700 MHz; Calibrated: 07.03.2023
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 03.10.2023
- Phantom: Flat Phantom 5.0 (back); Type: QD 000 P50 AA; Serial: 1002
- DASY52 52.10.4(1535); SEMCAD X 14.6.14(7501)

Dipole Calibration for Body Tissue/Pin=100 mW, d=10mm, f=3700MHz/Zoom Scan , dist=1.4mm (8x8x8)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm

Reference Value = 62.60 V/m; Power Drift = -0.03 dB

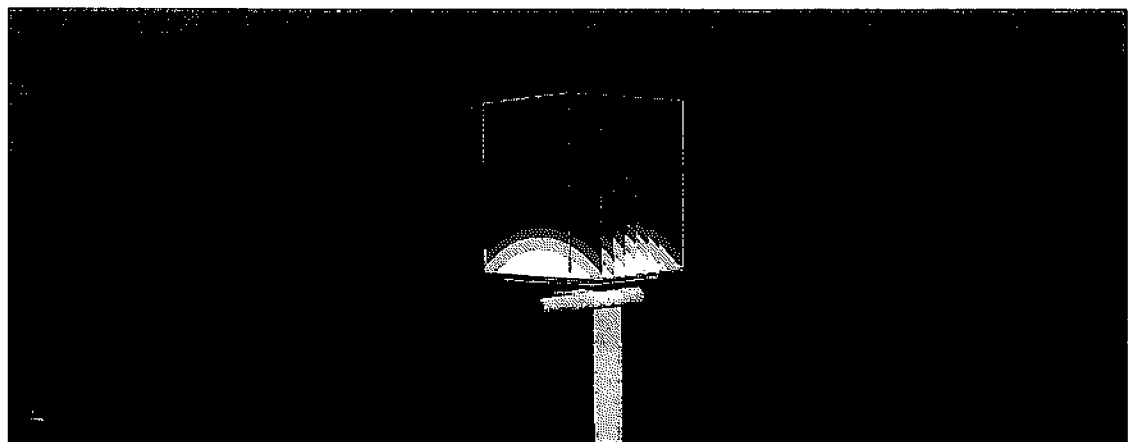
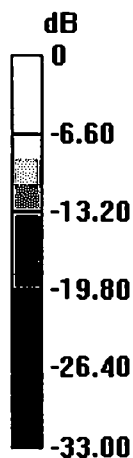
Peak SAR (extrapolated) = 16.7 W/kg

SAR(1 g) = 6.25 W/kg; SAR(10 g) = 2.29 W/kg

Smallest distance from peaks to all points 3 dB below = 8 mm

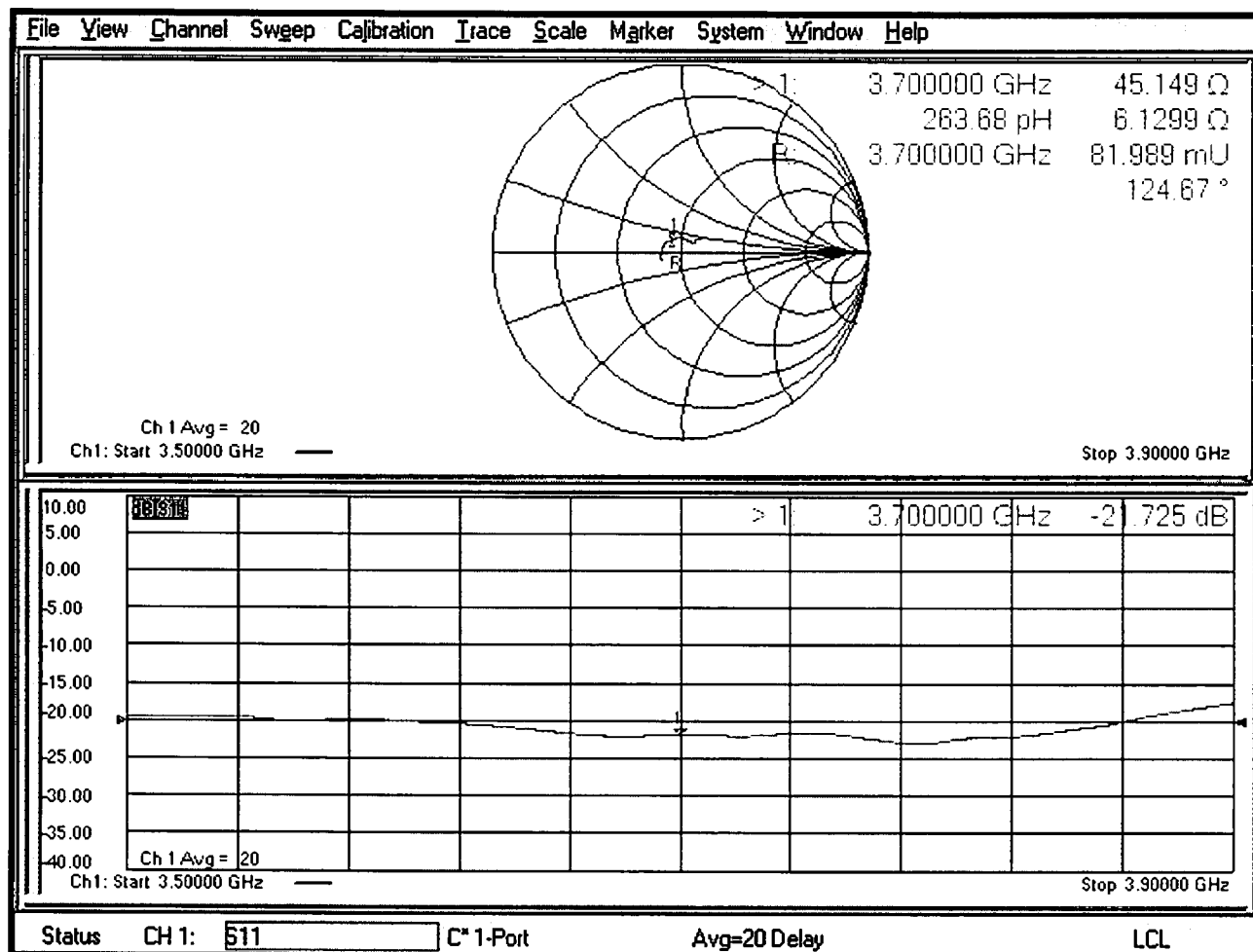
Ratio of SAR at M2 to SAR at M1 = 75.6%

Maximum value of SAR (measured) = 11.8 W/kg



0 dB = 11.8 W/kg = 10.74 dBW/kg

Impedance Measurement Plot for Body TSL



IN-HOUSE SAR VERIFICATION SOURCE CALIBRATION EXTENSION

Object: D3700V2 – SN: 1130
Description: SAR Validation Dipole at 3700 MHz
Procedure (s): Procedure for SAR Verification Source Calibration Extension
In-house Check Date: 11/7/2024

Equipment List

Manufacturer	Model	Description	Serial Number	Calibration Date	Calibration Due	CBT
Rohde & Schwarz	ZNL20	Vector Network Analyzer	101202	9/12/2024	9/12/2025	
Rohde & Schwarz	ZN-Z135	Calibration Kit	5000-309192839	10/31/24	10/31/26	
Control Company	4040	Ambient Thermometer	230581657	8/28/2023	8/28/2025	
Control Company	4352	Long Stem Liquid Thermometer	230662223	9/28/2023	9/28/2025	
Micro-Coax	UFB205A-0-0240-30x30	SMA M-F RF test Cable (DC - 18 GHz)	-			✓
Mini-Circuits	BW-N20W20+	20dB RF Fixed Attenuator (DC - 18 GHz)	-			✓
Mini-Circuits	NF-SF50+	RF Adapter N Male to SMA Female (DC - 18 GHz)	-			✓
SPEAG	DAE4ip	Data Acquisition Electronics with Integ. Power	1839	8/14/2024	8/14/2025	
SPEAG	DAK-3.5	DAK-3.5 Dielectric Probe	1349	9/2/2024	9/2/2025	
SPEAG	EX3DV4	SAR Measurement Probe	7836	3/15/2024	3/15/2025	
SPEAG	Powersource1	Signal Generator	4341	1/5/2024	1/5/2025	

CBT: Components calibrated before testing. Prior to testing, the measurement paths containing a cable, attenuator, coupler or filter were connected to a calibrated source (i.e. a signal generator, power sensor, or VNA) to determine the losses of the measurement path. The power meter offset was then adjusted to compensate for the measurement system losses. This level offset is stored within the power meter before measurements are made. This calibration verification procedure applies to the system verification and output power measurements. The calibrated reading is then taken directly from the power meter after compensation of the losses for all final power measurements.

Measurement Uncertainty = $\pm 27\%$ ($k=2$)

	Name	Function	Signature
Tested By:	Yue Li	Engineer	
Approved By:	Phuong Nguyen	Technical Manager	

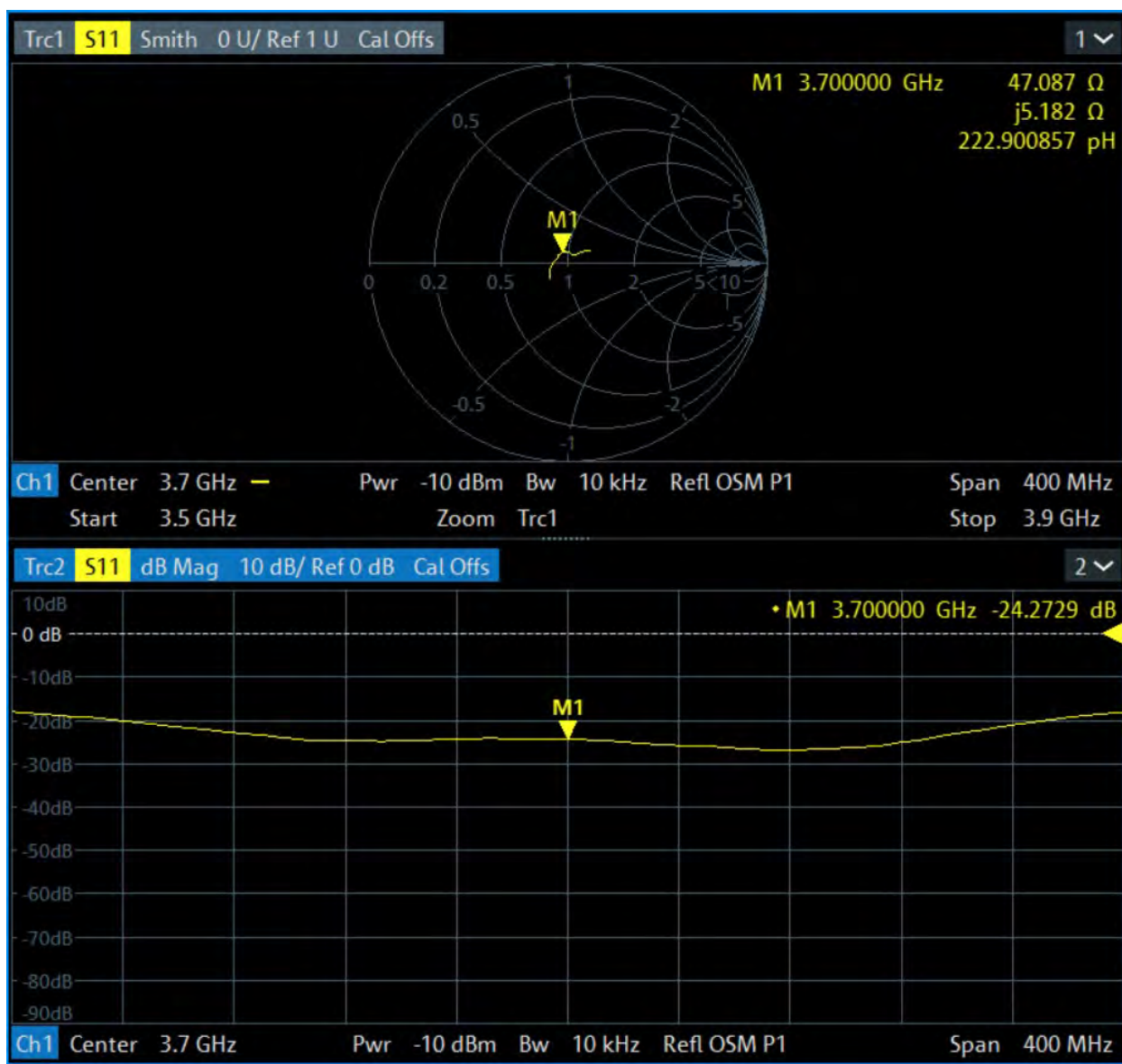
Per FCC KDB Publication 865664 D01, dipole can have longer calibration intervals of up to three years when it is demonstrated that the SAR target, impedance and return loss of the dipole have remained stable according to the following requirements:

1. Measured SAR does not deviate from the calibrated SAR value by more than 10%.
2. Return loss does not deviate by more than 20% from the previous measurement (i.e. value in dB x 0.2) and meet the required minimum return-loss.
3. Real and imaginary part of the impedance do not deviate by more than 5 Ω from the previous measurement.

The following dipole was checked to pass the above 3 requirements to have an extended calibration interval:

Dipole SN	Freq (MHz)	In-house Check Date	Cal Date	Head SAR target (1g) @ 30dBm (W/kg)	Measured Head SAR (1g) @ 17dBm (W/kg)	1g SAR Deviation (%)	Head SAR target (10g) @ 30dBm (W/kg)	Measured Head SAR (10g) @ 17dBm (W/kg)	10g SAR Deviation (%)	Cert Head Impedance (Ohm) - Real	Measured Head Impedance (Ohm) - Real	Head Impedance Deviation (Ohm) - Real	Cert Head Impedance (Ohm) - Imaginary	Measured Head Impedance (Ohm) - Imaginary	Head Impedance Deviation (Ohm) - Imaginary	Cert Head Return Loss (dB)	Measured Head Return Loss (dB)	Return Loss Deviation (%)	PASS/FAIL
1130	3700	11/7/2024	10/12/2023	66.6	3.11	-6.83%	24.5	1.16	-5.53%	46.0	47.1	1.1	4.4	5.2	0.8	-24.2	-24.3	-1.60%	PASS

Impedance and Return-Loss Measurement Plot for Head TSL



IN-HOUSE SAR VERIFICATION SOURCE CALIBRATION EXTENSION

Object: D3700V2 – SN: 1130
Description: SAR Validation Dipole at 3700 MHz
Procedure (s): Procedure for SAR Verification Source Calibration Extension
In-house Check Date: 07/30/2025

Equipment List

Manufacturer	Model	Description	Serial Number	Calibration Date	Calibration Due	CBT
Rohde & Schwarz	ZNL20	Vector Network Analyzer	101202	9/12/2024	9/12/2025	
Rohde & Schwarz	ZN-Z135	Calibration Kit	5000-309192839	10/31/24	10/31/26	
Control Company	4040	Ambient Thermometer	230581657	8/28/2023	8/28/2025	
Control Company	4040	Ambient Thermometer	230581662	8/28/2023	8/28/2025	
Control Company	4352	Long Stem Liquid Thermometer	230662223	9/28/2023	9/28/2025	
Control Company	4352	Long Stem Liquid Thermometer	230662212	9/28/2023	9/28/2025	
Micro-Coax	UFB205A-0-0240-30x30	SMA M-F RF test Cable (DC - 18 GHz)	-			✓
Maury-Micro	360D	10dB RF Fixed Attenuator (DC - 18 GHz) + Short Circuit Termination	7799	12/28/2024	12/28/2025	
Huber+Suhner	SF126	High Performance RF Cable	570292/126			✓
SPEAG	DAE4ip	Data Acquisition Electronics with Integ. Power	1844	11/6/2024	11/6/2025	
SPEAG	DAK-3.5	DAK-3.5 Dielectric Probe	1349	9/2/2024	9/2/2025	
SPEAG	EX3DV4	SAR Measurement Probe	7853	11/7/2024	11/7/2025	
SPEAG	Powersource1	Signal Generator	4341	1/9/2025	1/9/2026	

CBT: Components calibrated before testing. Prior to testing, the measurement paths containing a cable, attenuator, coupler or filter were connected to a calibrated source (i.e. a signal generator, power sensor, or VNA) to determine the losses of the measurement path. The power meter offset was then adjusted to compensate for the measurement system losses. This level offset is stored within the power meter before measurements are made. This calibration verification procedure applies to the system verification and output power measurements. The calibrated reading is then taken directly from the power meter after compensation of the losses for all final power measurements.

Measurement Uncertainty = $\pm 27\%$ (k=2)

	Name	Function	Signature
Tested By:	Yue Li	Engineer	
Approved By:	Phuong Nguyen	Technical Manager	

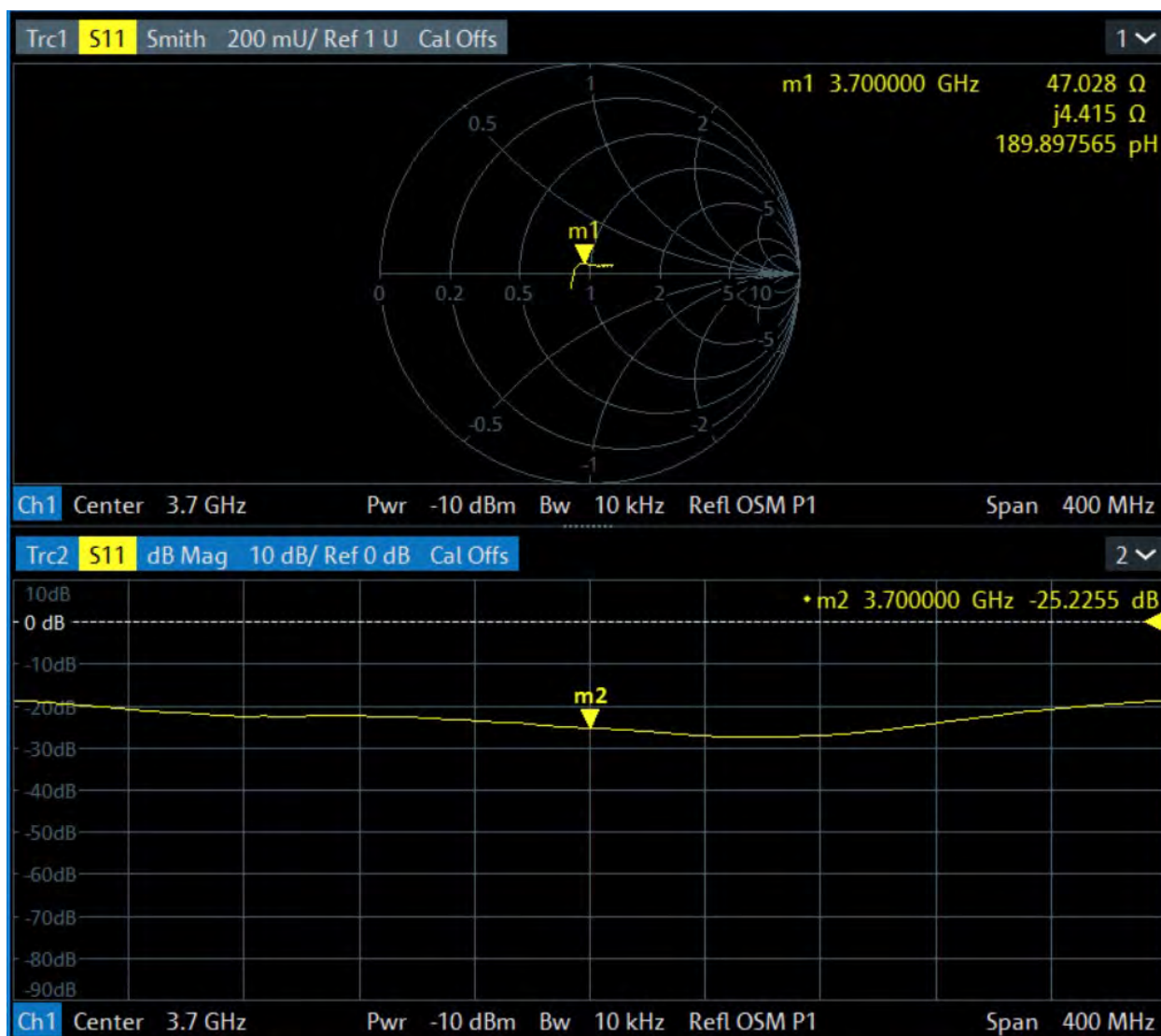
Per FCC KDB Publication 865664 D01, dipole can have longer calibration intervals of up to three years when it is demonstrated that the SAR target, impedance and return loss of the dipole have remained stable according to the following requirements:

1. Measured SAR does not deviate from the calibrated SAR value by more than 10%.
2. Return loss does not deviate by more than 20% from the previous measurement (i.e. value in dB x 0.2) and meet the required minimum return-loss.
3. Real and imaginary part of the impedance do not deviate by more than 5 Ω from the previous measurement.

The following dipole was checked to pass the above 3 requirements to have an extended calibration interval:

Dipole SN	Freq (MHz)	In-house Check Date	Cal Date	Head SAR target (1g) @ 30dBm (W/kg)	Measured Head SAR (1g) @ 17dBm (W/kg)	1g SAR Dev (%)	Head SAR target (10g) @ 30dBm (W/kg)	Measured Head SAR (10g) @ 17dBm (W/kg)	10g SAR Dev (%)	Cert Head Impedance (Ohm) - Real	Previous Head Impedance (Ohm) - Real	Measured Head Impedance (Ohm) - Real	Head Impedance Deviation (Ohm) - Real	Cert Head Impedance (Ohm) - Imaginary	Previous Head Impedance (Ohm) - Imaginary	Measured Head Impedance (Ohm) - Imaginary	Head Impedance Deviation (Ohm) - Imaginary	Cert Head Return Loss (dB)	Previous Head Return Loss (dB)	Measured Head Return Loss (dB)	Return Loss Dev (%)	PASS/FAIL
1130	3700	11/7/2024	10/12/2023	66.6	3.11	-6.83%	24.5	1.16	-5.53%	46.0	46.0	47.1	1.1	4.4	4.4	5.2	0.8	-24.2	-24.2	-24.3	-1.60%	PASS
1130	3700	7/30/2025	10/12/2023	66.6	3.22	-3.53%	24.5	1.20	-2.27%	46.0	47.1	47.0	-0.1	4.4	5.2	4.4	-0.8	-24.2	-24.3	-25.2	-19.19%	PASS

Impedance and Return-Loss Measurement Plot for Head TSL





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Multilateral Agreement for the recognition of calibration certificates

Client **RF Safety Lab**
Catonsville, USA

Certificate No. **D3900V2-1101_Oct23**

CALIBRATION CERTIFICATE

Object **D3900V2 - SN:1101**

Calibration procedure(s) **QA CAL-22.v7**
Calibration Procedure for SAR Validation Sources between 3-10 GHz

MAB 11/20/23

Calibration date: **October 02, 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 (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
Power sensor NRP-Z91	SN: 103245	30-Mar-23 (No. 217-03805)	Mar-24
Reference 20 dB Attenuator	SN: BH9394 (20k)	30-Mar-23 (No. 217-03809)	Mar-24
Type-N mismatch combination	SN: 310982 / 06327	30-Mar-23 (No. 217-03810)	Mar-24
Reference Probe EX3DV4	SN: 3503	07-Mar-23 (No. EX3-3503_Mar23)	Mar-24
DAE4	SN: 601	19-Dec-22 (No. DAE4-601_Dec22)	Dec-23

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: **Paulo Pina** **Function**
Laboratory Technician

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

Signature

Issued: October 6, 2023

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	10 mm	with Spacer
Zoom Scan Resolution	dx, dy = 4 mm, dz = 1.4 mm	Graded Ratio = 1.4 (Z direction)
Frequency	3900 MHz $\pm$ 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	37.5	3.32 mho/m
Measured Head TSL parameters	(22.0 $\pm$ 0.2) °C	36.7 $\pm$ 6 %	3.28 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	100 mW input power	7.03 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	70.2 W/kg $\pm$ 19.9 % (k=2)

SAR averaged over 10 cm³ (10 g) of Head TSL	condition	
SAR measured	100 mW input power	2.47 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	24.6 W/kg $\pm$ 19.5 % (k=2)

Body TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	50.8	3.78 mho/m
Measured Body TSL parameters	(22.0 $\pm$ 0.2) °C	51.0 $\pm$ 6 %	3.72 mho/m $\pm$ 6 %
Body TSL temperature change during test	< 0.5 °C	----	----

SAR result with Body TSL

SAR averaged over 1 cm³ (1 g) of Body TSL	Condition	
SAR measured	100 mW input power	6.41 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	64.3 W/kg $\pm$ 19.9 % (k=2)

SAR averaged over 10 cm³ (10 g) of Body TSL	condition	
SAR measured	100 mW input power	2.22 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	22.3 W/kg $\pm$ 19.5 % (k=2)

Appendix (Additional assessments outside the scope of SCS 0108)

Antenna Parameters with Head TSL

Impedance, transformed to feed point	49.9 Ω - 5.1 j Ω
Return Loss	- 25.8 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	49.2 Ω - 3.8 j Ω
Return Loss	- 28.2 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.103 ns
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After long term use with 100W radiated power, only a slight warming of the dipole near the feedpoint can be measured.

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

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

Additional EUT Data

Manufactured by	SPEAG
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DASY5 Validation Report for Head TSL

Date: 02.10.2023

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 3900 MHz; Type: D3900V2; Serial: D3900V2 - SN:1101

Communication System: UID 0 - CW; Frequency: 3900 MHz

Medium parameters used: $f = 3900$ MHz; $\sigma = 3.28$ S/m; $\epsilon_r = 36.7$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

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

DASY52 Configuration:

- Probe: EX3DV4 - SN3503; ConvF(7.39, 7.39, 7.39) @ 3900 MHz; Calibrated: 07.03.2023
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 19.12.2022
- Phantom: Flat Phantom 5.0 (front); Type: QD 000 P50 AA; Serial: 1001
- DASY52 52.10.4(1535); SEMCAD X 14.6.14(7501)

Dipole Calibration for Head Tissue/Pin=100 mW, d=10mm, f=3900MHz/Zoom Scan, dist=1.4mm (8x8x8)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm

Reference Value = 70.38 V/m; Power Drift = 0.03 dB

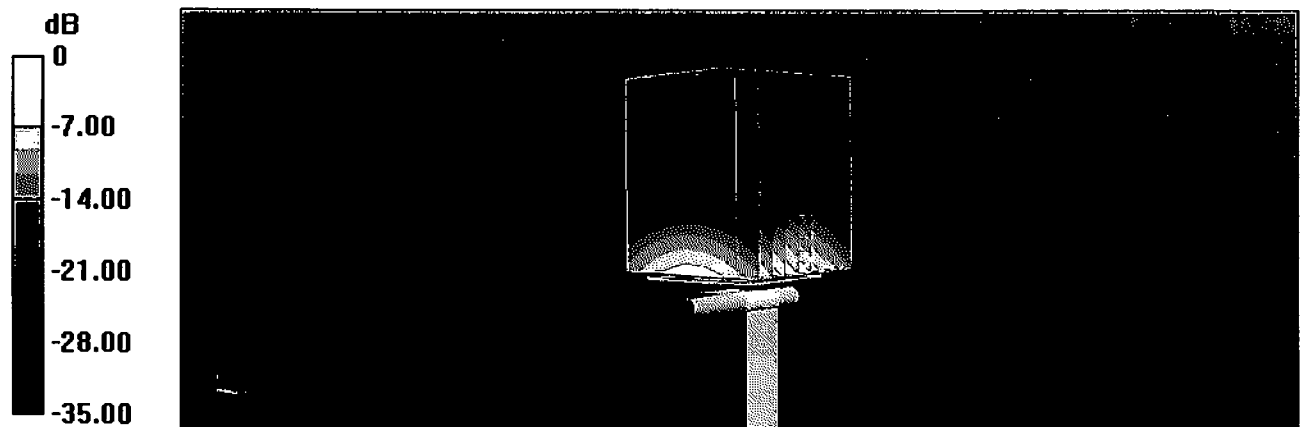
Peak SAR (extrapolated) = 19.8 W/kg

SAR(1 g) = 7.03 W/kg; SAR(10 g) = 2.47 W/kg

Smallest distance from peaks to all points 3 dB below = 8 mm

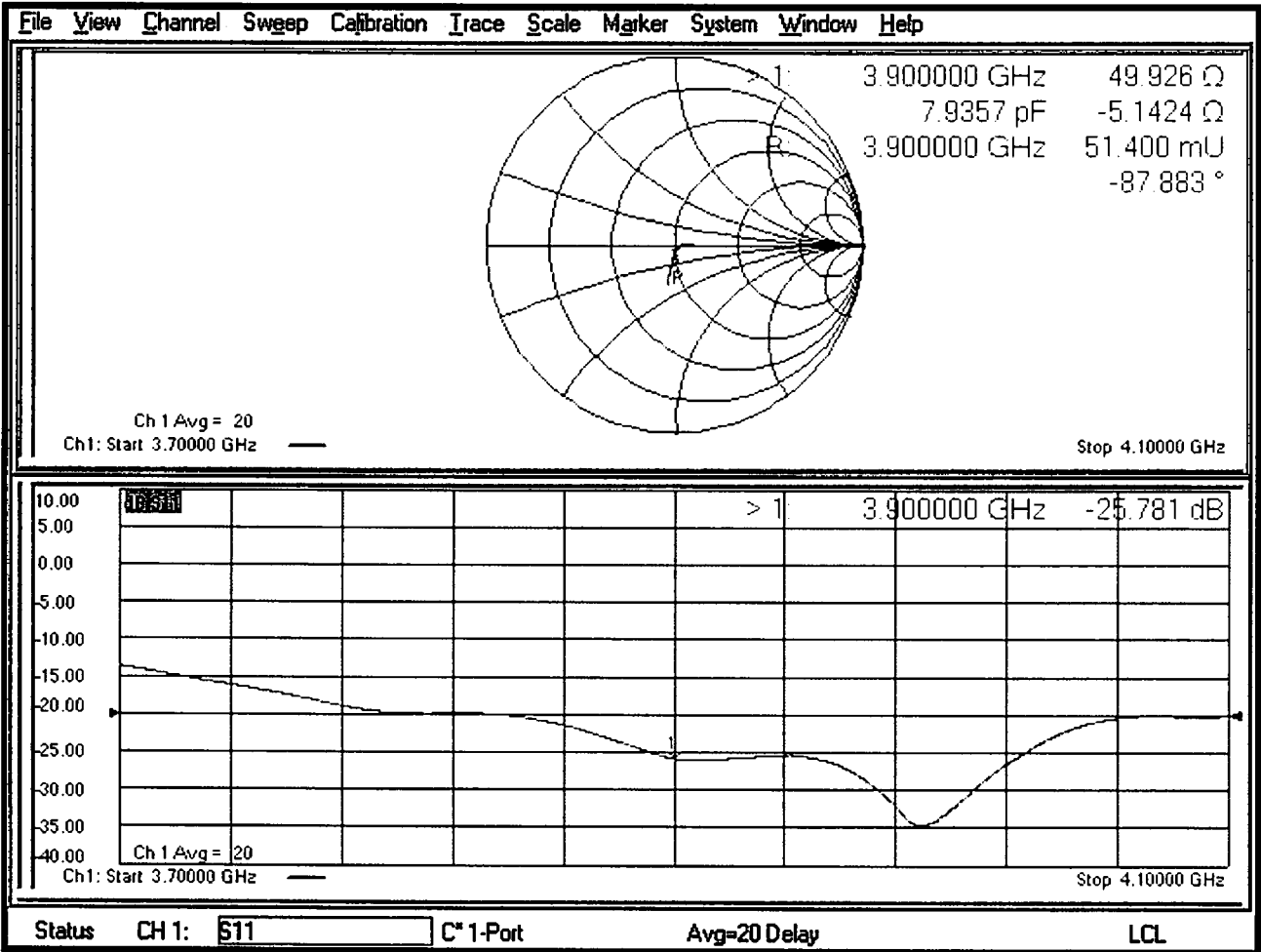
Ratio of SAR at M2 to SAR at M1 = 74.5%

Maximum value of SAR (measured) = 13.8 W/kg



0 dB = 13.8 W/kg = 11.40 dBW/kg

Impedance Measurement Plot for Head TSL



DASY5 Validation Report for Body TSL

Date: 02.10.2023

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 3900 MHz; Type: D3900V2; Serial: D3900V2 - SN:1101

Communication System: UID 0 - CW; Frequency: 3900 MHz

Medium parameters used: $f = 3900$ MHz; $\sigma = 3.72$ S/m; $\epsilon_r = 51$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

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

DASY52 Configuration:

- Probe: EX3DV4 - SN3503; ConvF(7.18, 7.18, 7.18) @ 3900 MHz; Calibrated: 07.03.2023
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 19.12.2022
- Phantom: Flat Phantom 5.0 (back); Type: QD 000 P50 AA; Serial: 1002
- DASY52 52.10.4(1535); SEMCAD X 14.6.14(7501)

Dipole Calibration for Body Tissue/Pin=100 mW, d=10mm, f=3900MHz/Zoom Scan , dist=1.4mm (8x8x8)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm

Reference Value = 62.76 V/m; Power Drift = -0.03 dB

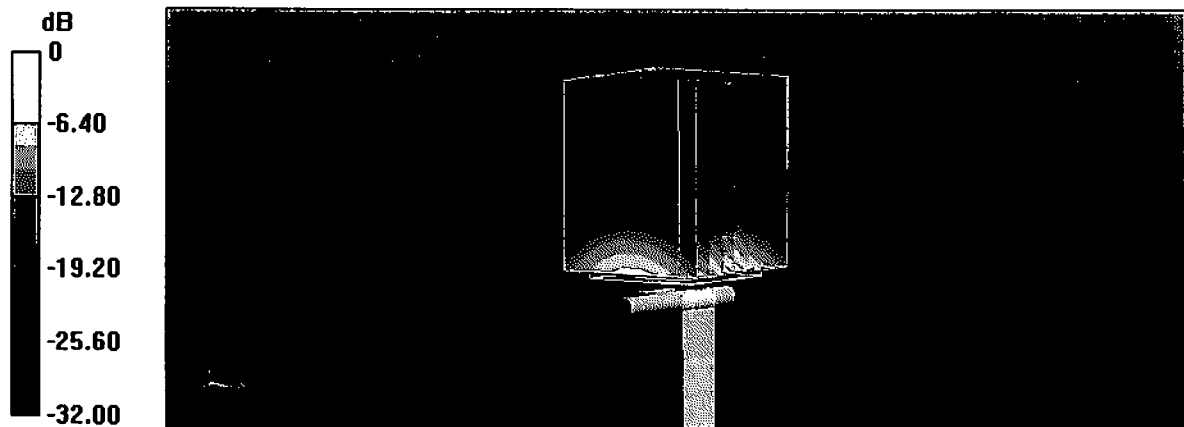
Peak SAR (extrapolated) = 18.3 W/kg

SAR(1 g) = 6.41 W/kg; SAR(10 g) = 2.22 W/kg

Smallest distance from peaks to all points 3 dB below = 7.9 mm

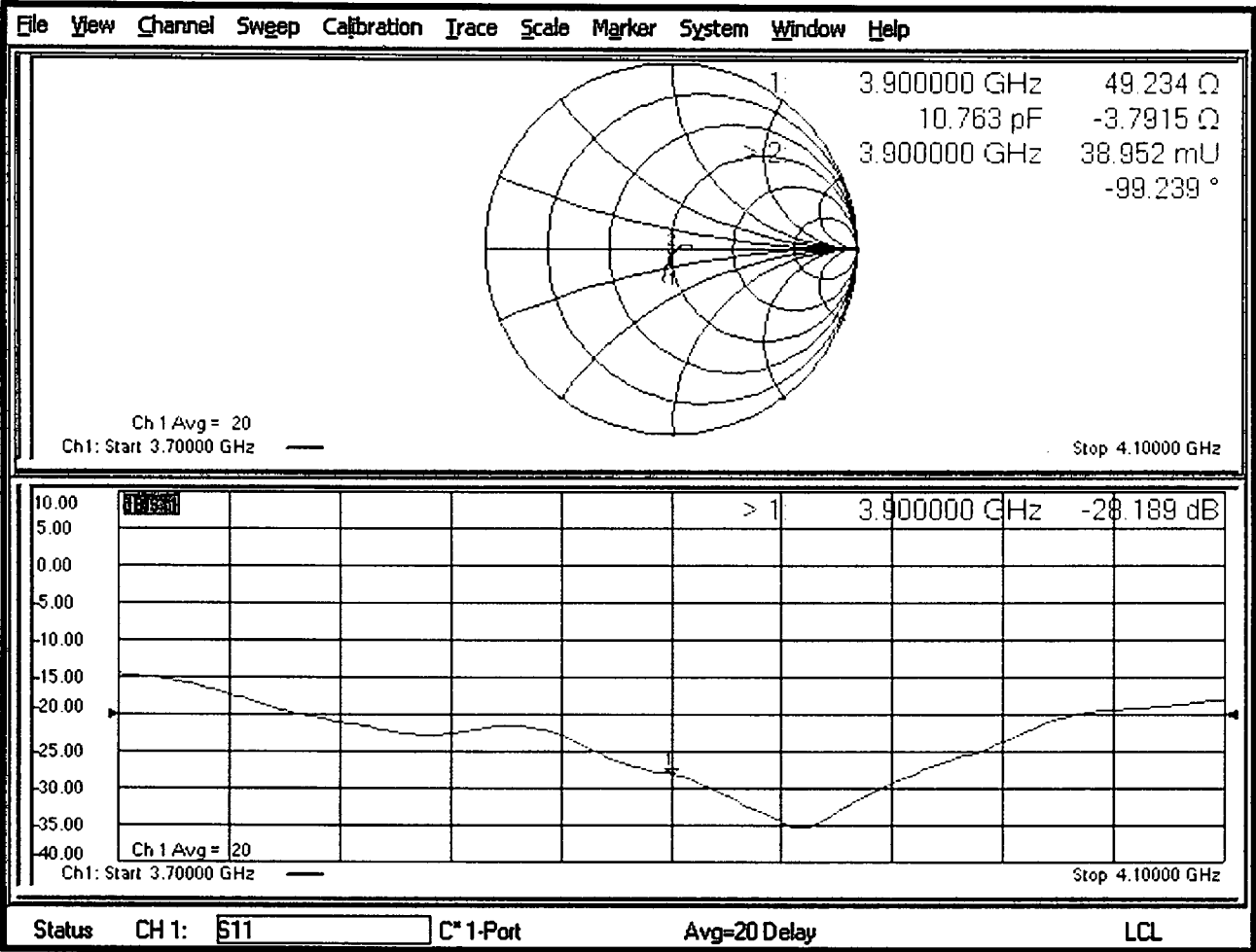
Ratio of SAR at M2 to SAR at M1 = 73.2%

Maximum value of SAR (measured) = 12.4 W/kg



0 dB = 12.4 W/kg = 10.92 dBW/kg

Impedance Measurement Plot for Body TSL





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Multilateral Agreement for the recognition of calibration certificates

Client **RF Safety Lab**
Caronsville, USA

Certificate No. **D3900V2-1101_Jan24**

CALIBRATION CERTIFICATE

Object **D3900V2 - SN-1101**

Calibration procedure(s) **QA CAL-22.v7**
Calibration Procedure for SAR Validation Sources between 3-10 GHz

Calibration date: **January 09, 2024**

BN ✓
1-17-2024

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	30-Mar-23 (No. 217-03804/03805)	Mar-24
Power sensor NRP-Z91	SN: 103244	30-Mar-23 (No. 217-03804)	Mar-24
Power sensor NRP-Z91	SN: 103245	30-Mar-23 (No. 217-03805)	Mar-24
Reference 20 dB Attenuator	SN: BH9394 (20k)	30-Mar-23 (No. 217-03809)	Mar-24
Type-N mismatch combination	SN: 310982 / 06327	30-Mar-23 (No. 217-03810)	Mar-24
Reference Probe EX3DV4	SN: 3503	07-Mar-23 (No. EX3-3503_Mar23)	Mar-24
DAE4	SN: 601	03-Oct-23 (No. DAE4-601_Oct23)	Oct-24
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

	Name	Function	Signature
Calibrated by:	Paulo Pina	Laboratory Technician	
Approved by:	Sven Kühn	Technical Manager	

Issued: January 11, 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

Accreditation No.: **SCS 0108**

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 V5.0	
Distance Dipole Center - TSL	10 mm	with Spacer
Zoom Scan Resolution	dx, dy = 4.0 mm, dz = 1.4 mm	Graded Ratio = 1.4 (Z direction)
Frequency	4100 MHz $\pm$ 1 MHz	

Head TSL parameters at 4100 MHz

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	37.2	3.53 mho/m
Measured Head TSL parameters	(22.0 $\pm$ 0.2) °C	38.1 $\pm$ 6 %	3.45 mho/m $\pm$ 6 %
Head TSL temperature change during test	< 0.5 °C	---	---

SAR result with Head TSL at 4100 MHz

SAR averaged over 1 cm³ (1 g) of Head TSL	Condition	
SAR measured	100 mW input power	6.79 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	68.4 W/kg $\pm$ 19.9 % (k=2)

SAR averaged over 10 cm³ (10 g) of Head TSL	condition	
SAR measured	100 mW input power	2.36 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	23.7 W/kg $\pm$ 19.5 % (k=2)

Appendix (Additional assessments outside the scope of SCS 0108)

Antenna Parameters with Head TSL at 4100 MHz

Impedance, transformed to feed point	59.4 Ω + 0.7 j Ω
Return Loss	- 21.3 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.103 ns
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After long term use with 100W radiated power, only a slight warming of the dipole near the feedpoint can be measured.

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

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

Additional EUT Data

Manufactured by	SPEAG
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DASY5 Validation Report for Head TSL

Date: 09.01.2024

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 3900 MHz; Type: D3900V2; Serial: D3900V2 - SN:1101

Communication System: UID 0 - CW; Frequency: 4100 MHz

Medium parameters used: $f = 4100$ MHz; $\sigma = 3.45$ S/m; $\epsilon_r = 38.1$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

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

DASY52 Configuration:

- Probe: EX3DV4 - SN3503; ConvF(7.26, 7.26, 7.26) @ 4100 MHz; Calibrated: 07.03.2023
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 03.10.2023
- 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=100 mW, d=10mm, f=4100MHz/Zoom Scan, dist=1.4mm (8x8x8)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm

Reference Value = 68.85 V/m; Power Drift = 0.04 dB

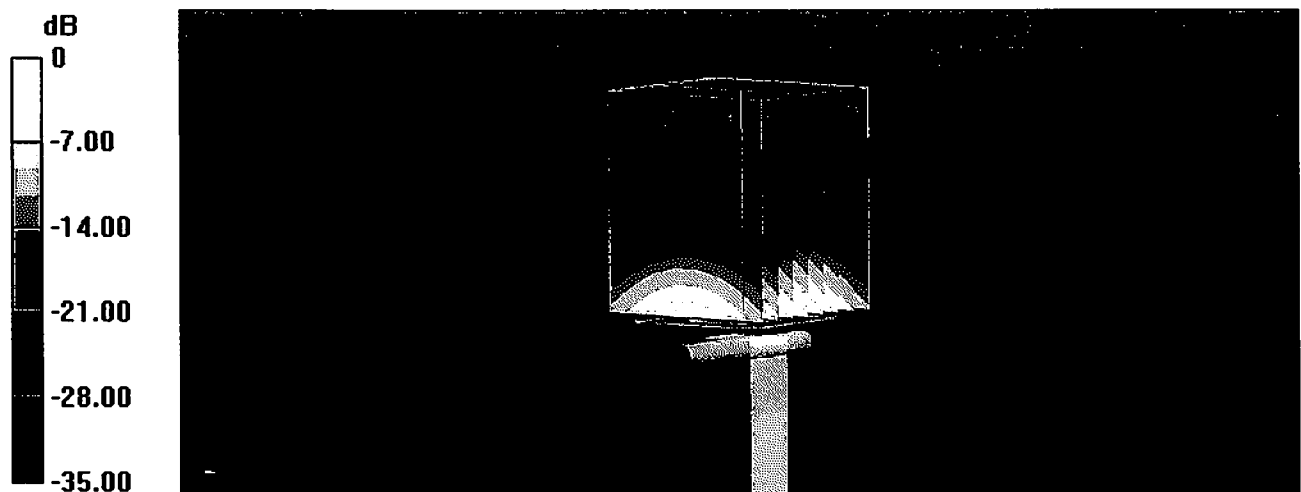
Peak SAR (extrapolated) = 19.0 W/kg

SAR(1 g) = 6.79 W/kg; SAR(10 g) = 2.36 W/kg

Smallest distance from peaks to all points 3 dB below = 8 mm

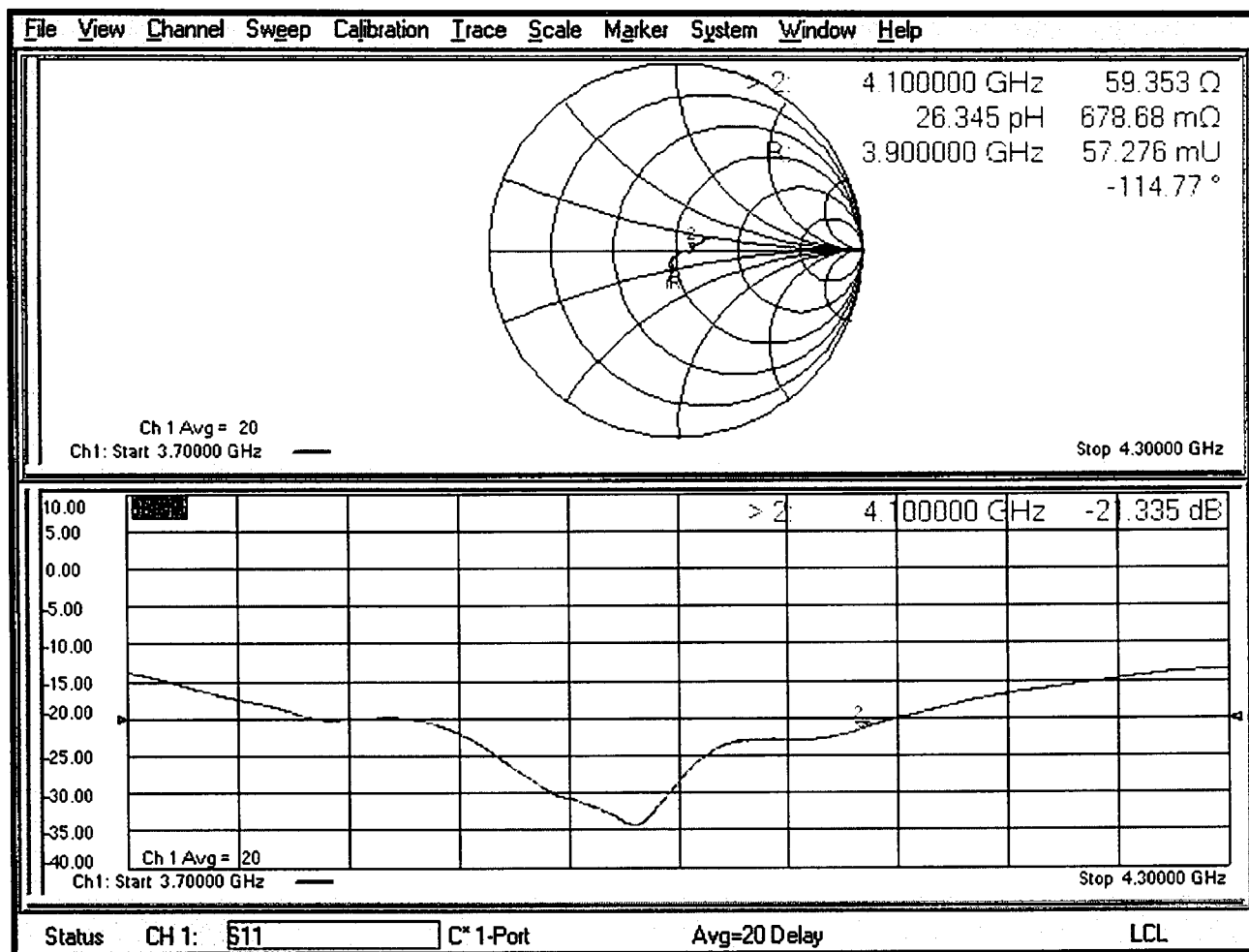
Ratio of SAR at M2 to SAR at M1 = 74.2%

Maximum value of SAR (measured) = 13.3 W/kg



0 dB = 13.3 W/kg = 11.23 dBW/kg

Impedance Measurement Plot for Head TSL



IN-HOUSE SAR VERIFICATION SOURCE CALIBRATION EXTENSION

Object: D3900V2 – SN: 1101
Description: SAR Validation Dipole at 3900 MHz and 4100 MHz
Procedure (s): Procedure for SAR Verification Source Calibration Extension
In-house Check Date: 11/8/2024

Equipment List

Manufacturer	Model	Description	Serial Number	Calibration Date	Calibration Due	CBT
Rohde & Schwarz	ZNL20	Vector Network Analyzer	101202	9/12/2024	9/12/2025	
Rohde & Schwarz	ZN-Z135	Calibration Kit	5000-309192839	10/31/24	10/31/26	
Control Company	4040	Ambient Thermometer	230581657	8/28/2023	8/28/2025	
Control Company	4352	Long Stem Liquid Thermometer	230662223	9/28/2023	9/28/2025	
Micro-Coax	UFB205A-0-0240-30x30	SMA M-F RF test Cable (DC - 18 GHz)	-			✓
Mini-Circuits	BW-N20W20+	20dB RF Fixed Attenuator (DC - 18 GHz)	-			✓
Mini-Circuits	NF-SF50+	RF Adapter N Male to SMA Female (DC - 18 GHz)	-			✓
SPEAG	DAE4ip	Data Acquisition Electronics with Integ. Power	1839	8/14/2024	8/14/2025	
SPEAG	DAK-3.5	DAK-3.5 Dielectric Probe	1349	9/2/2024	9/2/2025	
SPEAG	EX3DV4	SAR Measurement Probe	7836	3/15/2024	3/15/2025	
SPEAG	Powersource1	Signal Generator	4341	1/5/2024	1/5/2025	

CBT: Components calibrated before testing. Prior to testing, the measurement paths containing a cable, attenuator, coupler or filter were connected to a calibrated source (i.e. a signal generator, power sensor, or VNA) to determine the losses of the measurement path. The power meter offset was then adjusted to compensate for the measurement system losses. This level offset is stored within the power meter before measurements are made. This calibration verification procedure applies to the system verification and output power measurements. The calibrated reading is then taken directly from the power meter after compensation of the losses for all final power measurements.

Measurement Uncertainty = $\pm 27\%$ ($k=2$)

	Name	Function	Signature
Tested By:	Yue Li	Engineer	
Approved By:	Phuong Nguyen	Technical Manager	

Per FCC KDB Publication 865664 D01, dipole can have longer calibration intervals of up to three years when it is demonstrated that the SAR target, impedance and return loss of the dipole have remained stable according to the following requirements:

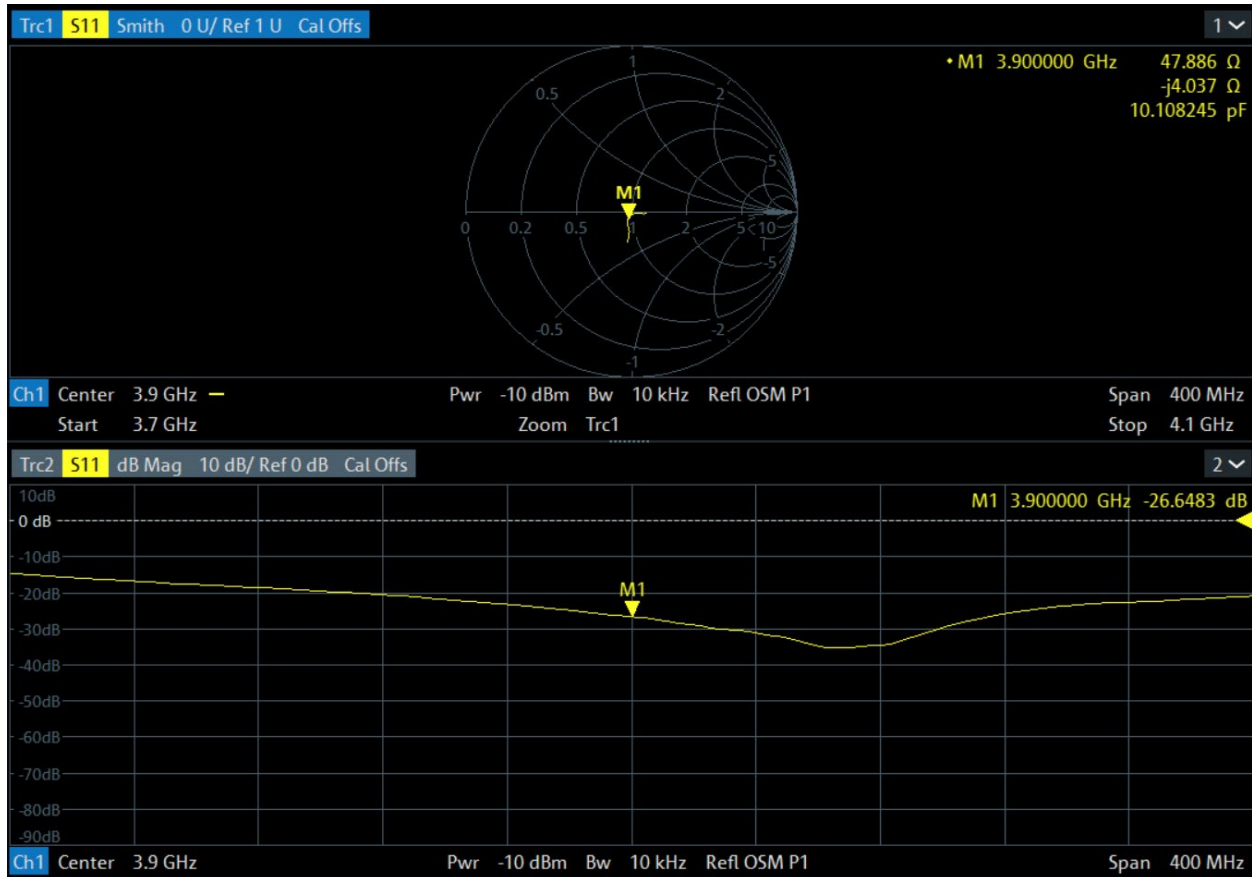
1. Measured SAR does not deviate from the calibrated SAR value by more than 10%.
2. Return loss does not deviate by more than 20% from the previous measurement (i.e. value in dB x 0.2) and meet the required minimum return-loss.
3. Real and imaginary part of the impedance do not deviate by more than 5 Ω from the previous measurement.

The following dipole was checked to pass the above 3 requirements to have an extended calibration interval:

Dipole SN	Freq (MHz)	In-house Check Date	Cal Date	Head SAR target (1g) @ 30dBm (W/kg)	Measured Head SAR (1g) @ 17dBm (W/kg)	1g SAR Deviation (%)	Head SAR target (10g) @ 30dBm (W/kg)	Measured Head SAR (10g) @ 17dBm (W/kg)	10g SAR Deviation (%)	Cert Head Impedance (Ohm) - Real	Measured Head Impedance (Ohm) - Real	Head Impedance Deviation (Ohm) - Real	Cert Head Impedance (Ohm) - Imaginary	Measured Head Impedance (Ohm) - Imaginary	Head Impedance Deviation (Ohm) - Imaginary	Cert Head Return Loss (dB)	Measured Head Return Loss (dB)	Return Loss Deviation (%)	PASS/FAIL
1101	3900	11/8/2024	10/2/2023	70.2	3.35	-4.78%	24.6	1.18	-4.29%	49.9	47.9	-2.0	-5.1	-4.0	1.1	-25.8	-26.7	-18.34%	PASS
1101	4100	11/8/2024	1/9/2024	68.4	3.28	-4.32%	23.7	1.15	-3.18%	59.4	59.7	0.3	0.7	-0.5	-1.2	-21.3	-21.1	5.93%	PASS



Impedance and Return-Loss Measurement Plot for Head TSL

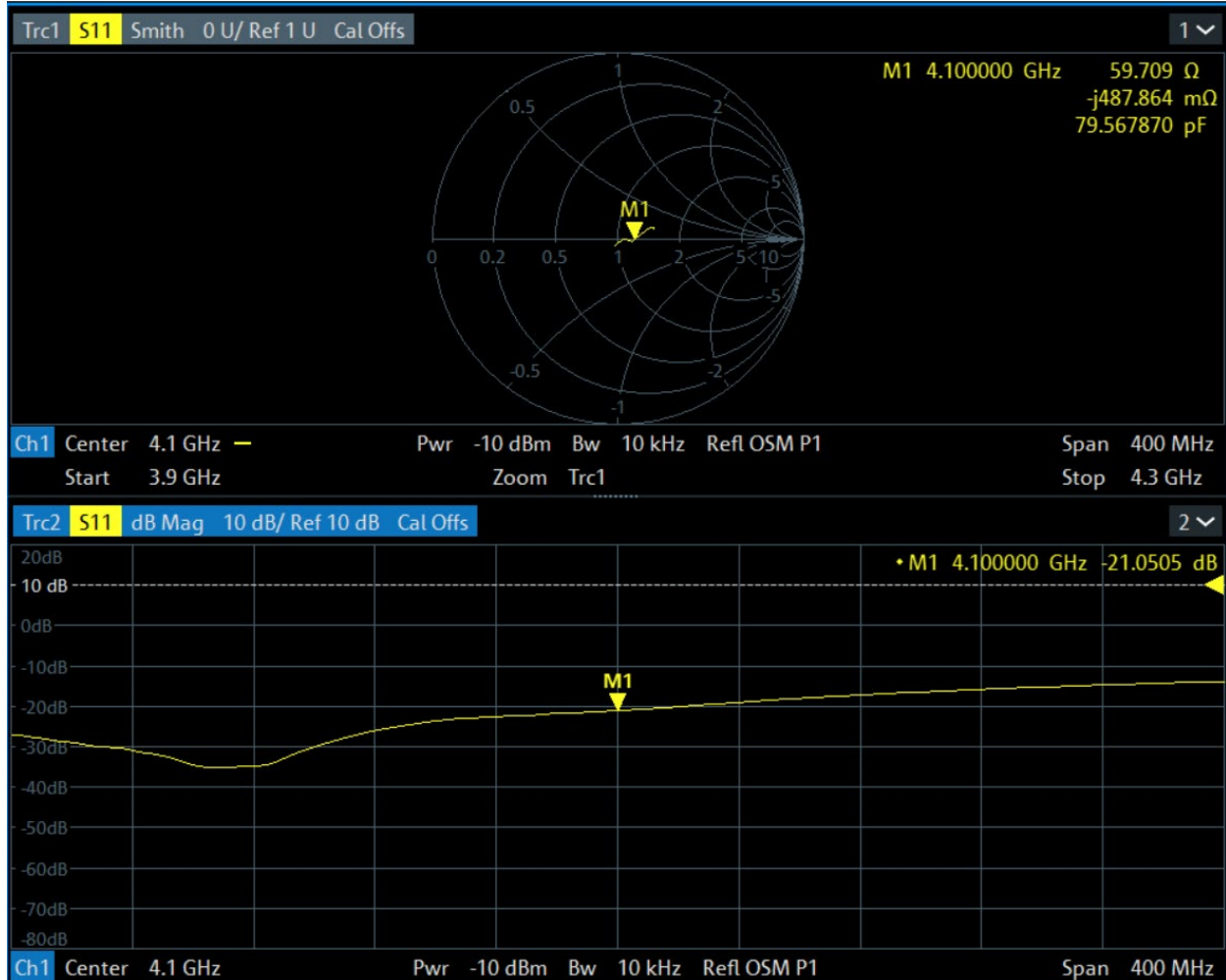




**RF SAFETY
LAB**

A NEXT GENERATION
TEST LABORATORY™

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IN-HOUSE SAR VERIFICATION SOURCE CALIBRATION EXTENSION

Object D3900V2 – SN: 1101
Description SAR Validation Dipole at 3900 MHz and 4100 MHz
Procedure (s) Procedure for SAR Verification Source Calibration Extension
In-house Check Date 07/30/2025

Equipment List

Manufacturer	Model	Description	Serial Number	Calibration Date	Calibration Due	CBT
Rohde & Schwarz	ZNL20	Vector Network Analyzer	101202	9/12/2024	9/12/2025	
Rohde & Schwarz	ZN-Z135	Calibration Kit	5000-309192839	10/31/24	10/31/26	
Control Company	4040	Ambient Thermometer	230581657	8/28/2023	8/28/2025	
Control Company	4040	Ambient Thermometer	230581662	8/28/2023	8/28/2025	
Control Company	4352	Long Stem Liquid Thermometer	230662223	9/28/2023	9/28/2025	
Control Company	4352	Long Stem Liquid Thermometer	230662212	9/28/2023	9/28/2025	
Micro-Coax	UFB205A-0-0240-30x30	SMA M-F RF Test Cable (DC - 18 GHz)	-			✓
Maury-Micro	360D	10dB RF Fixed Attenuator (DC - 18 GHz) + Short Circuit Termination	7799	12/28/2024	12/28/2025	
Huber+Suhner	SF126	High Performance RF Cable	570292/126			✓
SPEAG	DAE4ip	Data Acquisition Electronics with Integ. Power	1844	11/6/2024	11/6/2025	
SPEAG	DAE4ip	Data Acquisition Electronics with Integ. Power	1839	9/4/24	9/4/25	
SPEAG	DAK-3.5	DAK-3.5 Dielectric Probe	1349	9/2/2024	9/2/2025	
SPEAG	EX3DV4	SAR Measurement Probe	7853	11/7/2024	11/7/2025	
SPEAG	EX3DV4	SAR Measurement Probe	7836	9/12/24	9/12/25	
SPEAG	Powersource1	Signal Generator	4341	1/9/2025	1/9/2026	

CBT: Components calibrated before testing. Prior to testing, the measurement paths containing a cable, attenuator, coupler or filter were connected to a calibrated source (i.e. a signal generator, power sensor, or VNA) to determine the losses of the measurement path. The power meter offset was then adjusted to compensate for the measurement system losses. This level offset is stored within the power meter before measurements are made. This calibration verification procedure applies to the system verification and output power measurements. The calibrated reading is then taken directly from the power meter after compensation of the losses for all final power measurements.

Measurement Uncertainty = $\pm 27\%$ (k=2)

	Name	Function	Signature
Tested By:	Yue Li	Engineer	
Approved By:	Phuong Nguyen	Technical Manager	



Per FCC KDB Publication 865664 D01, dipole can have longer calibration intervals of up to three years when it is demonstrated that the SAR target, impedance and return loss of the dipole have remained stable according to the following requirements:

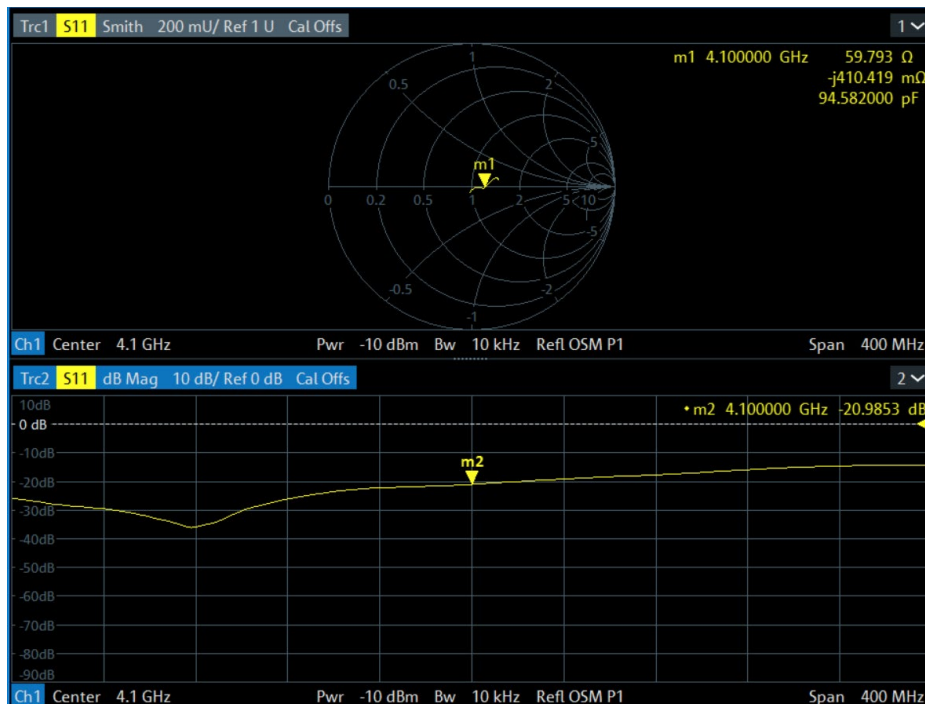
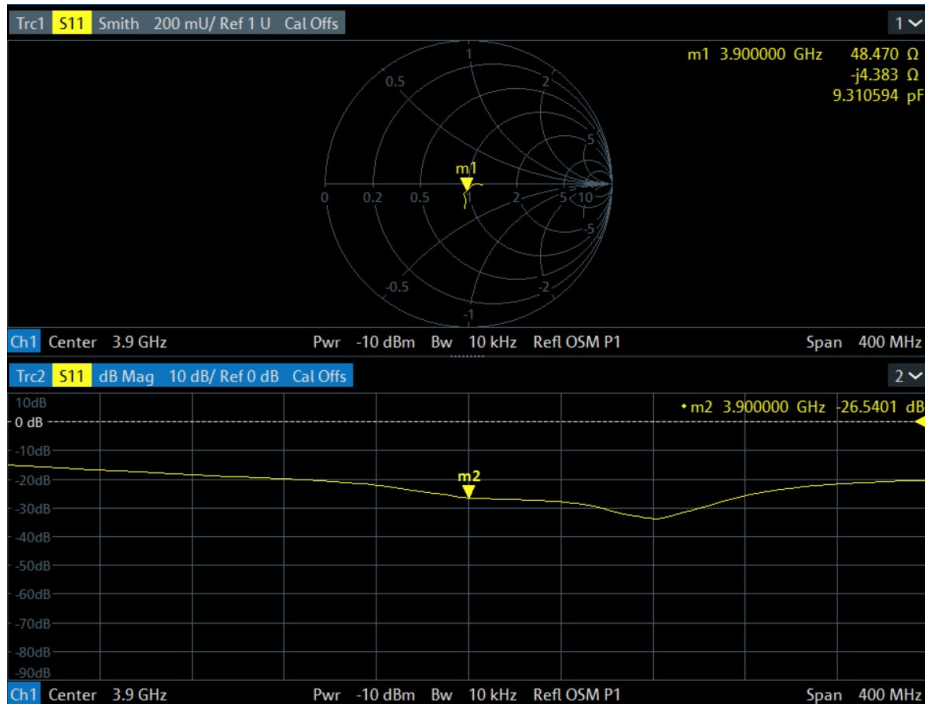
1. Measured SAR does not deviate from the calibrated SAR value by more than 10%.
2. Return loss does not deviate by more than 20% from the previous measurement (i.e. value in dB x 0.2) and meet the required minimum return-loss.
3. Real and imaginary part of the impedance do not deviate by more than 5 Ω from the previous measurement.

The following dipole was checked to pass the above 3 requirements to have an extended calibration interval:

Dipole SN	Freq (MHz)	In-house Check Date	Cal Date	Head SAR target (1g) @ 30dBm (W/kg)	Measured Head SAR (1g) @ 17dBm (W/kg)	1g SAR Dev (%)	Head SAR target (10g) @ 30dBm (W/kg)	Measured Head SAR (10g) @ 17dBm (W/kg)	10g SAR Dev (%)	Cert Head Impedance (Ohm) - Real	Previous Head Impedance (Ohm) - Real	Measured Head Impedance (Ohm) - Real	Head Impedance Deviation (Ohm) - Real	Cert Head Impedance (Ohm) - Imaginary	Previous Head Impedance (Ohm) - Imaginary	Measured Head Impedance (Ohm) - Imaginary	Head Impedance Deviation (Ohm) - Imaginary	Cert Head Return Loss (dB)	Previous Head Return Loss (dB)	Measured Head Return Loss (dB)	Return Loss Dev (%)	PASS/FAIL
1101	3900	11/8/2024	10/2/2023	70.2	3.35	-4.78%	24.6	1.18	-4.29%	49.9	49.9	47.9	-2.0	-5.1	-5.1	-4.0	1.1	-25.8	-25.8	-26.7	-18.34%	PASS
1101	4100	11/8/2024	1/9/2024	68.4	3.28	-4.32%	23.7	1.15	-3.18%	59.4	59.4	59.7	0.3	0.7	0.7	-0.5	-1.2	-21.3	-21.3	-21.1	5.93%	PASS
1101	3900	7/30/2025	10/2/2023	70.2	3.32	-5.64%	24.6	1.17	-5.10%	49.9	47.9	48.5	0.6	-5.1	-4.0	-4.4	-0.4	-25.8	-26.7	-26.5	3.75%	PASS
1101	4100	7/30/2025	1/9/2024	68.4	3.29	-4.03%	23.7	1.16	-2.34%	59.4	59.7	59.8	0.1	0.7	-0.5	-0.4	0.1	-21.3	-21.1	-21.0	2.68%	PASS



Impedance and Return-Loss Measurement Plot for Head TSL





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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 Safety Lab
Catonsville, USA

Certificate No.

D5GHzV2-1396_Nov24

CALIBRATION CERTIFICATE

Object D5GHzV2 - SN: 1396

WAB 11/21/24

Calibration procedure(s) QA CAL-22.v7
Calibration Procedure for SAR Validation Sources between 3 - 10 GHz

Calibration date November 15, 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 Cal
Power Sensor R&S NRP-33T	SN: 100967	28-Mar-24 (No. 217-04038)	Mar-25
Power Sensor R&S NRP18A	SN: 101859	22-Jul-24 (No. 4030A315008547)	Jul-25
Spectrum Analyzer R&S FSV40	SN: 101832	25-Jan-24 (No. 4030-315007551)	Jan-25
Mismatch; Short [S4188] Attenuator [S4423]	SN: 1152	28-Mar-24 (No. 217-04050)	Mar-25
OCP DAK-12	SN: 1016	24-Sep-24 (No. OCP-DAK12-1016_Sep24)	Sep-25
OCP DAK-3.5	SN: 1249	23-Sep-24 (No. OCP-DAK3.5-1249_Sep24)	Sep-25
Reference Probe EX3DV4	SN: 7349	03-Jun-24 (No. EX3-7349_Jun24)	Jun-25
DAE4ip	SN: 1836	28-Oct-24 (No. DAE4ip-1836_Oct24)	Oct-25

Secondary Standards	ID	Check Date (in house)	Scheduled Check
ACAD Source Box	SN: 1000	28-May-24 (No. 675-ACAD_Source_Box-240528)	May-25
Signal Generator R&S SMB100A	SN: 182081	28-May-24 (No. 675-CAL16-S4588-240528)	May-25
Mismatch; SMA	SN: 1102	22-May-24 (No. 675-Mismatch_SMA-240522)	May-25

	Name	Function	Signature
Calibrated by	Paulo Pina	Laboratory Technician	
Approved by	Sven Kühn	Technical Manager	

Issued: November 15, 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

Accreditation No.: **SCS 0108**

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 dipole is mounted with the spacer to position its feed point exactly below the center marking of the flat phantom section, with the arms oriented parallel to the body axis.
- *Feed Point Impedance and Return Loss*: These parameters are measured with the dipole positioned under the liquid filled phantom. The impedance stated is transformed from the measurement at the SMA connector to the feed point. The Return Loss ensures low reflected power. No uncertainty required.
- *Electrical Delay*: One-way delay between the SMA connector and the antenna feed point. 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	DASY8 Module SAR	16.4.0
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom	
Distance Dipole Center - TSL	10 mm	with spacer
Zoom Scan Resolution	dx, dy = 4mm, dz = 1.4mm	Graded Ratio = 1.4 mm (Z direction)
Frequency	5250MHz $\pm$ 1MHz 5600MHz $\pm$ 1MHz 5750MHz $\pm$ 1MHz 5850MHz $\pm$ 1MHz	

Head TSL parameters at 5250 MHz

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	35.9	4.71 mho/m
Measured Head TSL parameters	(22.0 $\pm$ 0.2) °C	36.1 $\pm$ 6%	4.55 mho/m $\pm$ 6%
Head TSL temperature change during test	< 0.5 °C		

SAR result with Head TSL at 5250 MHz

SAR averaged over 1 cm ³ (1 g) of Head TSL	Condition	
SAR for nominal Head TSL parameters	20 dBm input power	7.79 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	77.9 W/kg $\pm$ 19.9% (k = 2)

SAR averaged over 10 cm ³ (10 g) of Head TSL	Condition	
SAR for nominal Head TSL parameters	20 dBm input power	2.24 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	22.4 W/kg $\pm$ 19.5% (k = 2)

Head TSL parameters at 5600 MHz

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	35.5	5.07 mho/m
Measured Head TSL parameters	(22.0 ±0.2)°C	35.5 ±6%	4.91 mho/m ±6%
Head TSL temperature change during test	< 0.5 °C		

SAR result with Head TSL at 5600 MHz

SAR averaged over 1 cm ³ (1 g) of Head TSL	Condition	
SAR for nominal Head TSL parameters	20 dBm input power	8.11 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	81.1 W/kg ±19.9% (k = 2)

SAR averaged over 10 cm ³ (10 g) of Head TSL	Condition	
SAR for nominal Head TSL parameters	20 dBm input power	2.33 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	23.3 W/kg ±19.5% (k = 2)

Head TSL parameters at 5750 MHz

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	35.4	5.22 mho/m
Measured Head TSL parameters	(22.0 ±0.2)°C	35.3 ±6%	5.08 mho/m ±6%
Head TSL temperature change during test	< 0.5 °C		

SAR result with Head TSL at 5750 MHz

SAR averaged over 1 cm ³ (1 g) of Head TSL	Condition	
SAR for nominal Head TSL parameters	20 dBm input power	8.01 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	80.1 W/kg ±19.9% (k = 2)

SAR averaged over 10 cm ³ (10 g) of Head TSL	Condition	
SAR for nominal Head TSL parameters	20 dBm input power	2.28 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	22.8 W/kg ±19.5% (k = 2)

Head TSL parameters at 5850 MHz

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	35.2	5.32 mho/m
Measured Head TSL parameters	(22.0 ±0.2)°C	35.2 ±6%	5.18 mho/m ±6%
Head TSL temperature change during test	< 0.5 °C		

SAR result with Head TSL at 5850 MHz

SAR averaged over 1 cm ³ (1 g) of Head TSL	Condition	
SAR for nominal Head TSL parameters	20 dBm input power	7.69 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	76.9 W/kg ±19.9% (k = 2)

SAR averaged over 10 cm ³ (10 g) of Head TSL	Condition	
SAR for nominal Head TSL parameters	20 dBm input power	2.20 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	22.0 W/kg ±19.5% (k = 2)

Appendix (Additional assessments outside the scope of SCS 0108)

Antenna Parameters with Head TSL at 5250 MHz

Impedance	46.9 Ω – 1.3 j Ω
Return Loss	-29.1 dB

Antenna Parameters with Head TSL at 5600 MHz

Impedance	53.9 Ω + 3.2 j Ω
Return Loss	-26.2 dB

Antenna Parameters with Head TSL at 5750 MHz

Impedance	51.8 Ω + 2.6 j Ω
Return Loss	-30.1 dB

Antenna Parameters with Head TSL at 5850 MHz

Impedance	54.7 Ω – 1.0 j Ω
Return Loss	-26.8 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.189 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
-----------------	-------

System Performance Check Report

Summary

Dipole	Frequency [MHz]	TSL	Power [dBm]
D5GHzV2 – SN1396	5250	HSL	20

Exposure Conditions

Phantom Section, TSL	Test Distance [mm]	Band	Group, UID	Frequency [MHz], Channel Number	Conversion Factor	TSL Conductivity [S/m]	TSL Permittivity
Flat	10	CW, 0---		5250, 0	5.39	4.55	36.1

Hardware Setup

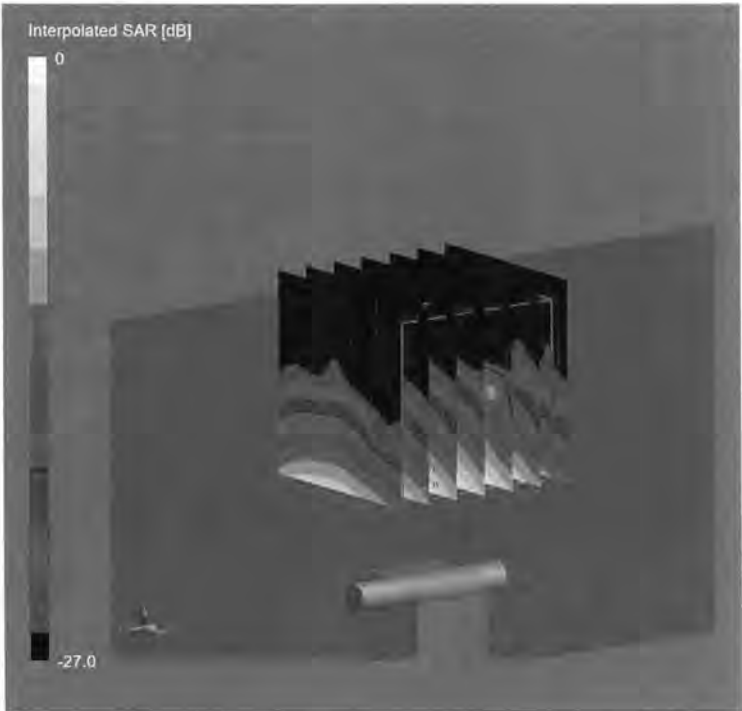
Phantom	TSL, Measured Date	Probe, Calibration Date	DAE, Calibration Date
MFP V8.0 Center	HSL, 2024-11-15	EX3DV4 – SN7349, 2024-06-03	DAE4ip Sn1836, 2024-10-28

Scans Setup

	Zoom Scan
Grid Extents [mm]	22 x 22 x 22
Grid Steps [mm]	4.0 x 4.0 x 1.4
Sensor Surface [mm]	1.4
Graded Grid	Yes
Grading Ratio	1.4
MAIA	N/A
Surface Detection	VMS + 6p
Scan Method	Measured

Measurement Results

	Zoom Scan
Date	2024-11-15
psSAR1g [W/Kg]	7.79
psSAR10g [W/Kg]	2.24
Power Drift [dB]	0.03
Power Scaling	Disabled
Scaling Factor [dB]	
TSL Correction	Positive / Negative



0 dB = 31.1 W/Kg

System Performance Check Report

Summary

Dipole	Frequency [MHz]	TSL	Power [dBm]
D5GHzV2 – SN1396	5600	HSL	20

Exposure Conditions

Phantom Section, TSL	Test Distance [mm]	Band	Group, UID	Frequency [MHz], Channel Number	Conversion Factor	TSL Conductivity [S/m]	TSL Permittivity
Flat	10	CW, 0--		5600, 0	4.93	4.91	35.5

Hardware Setup

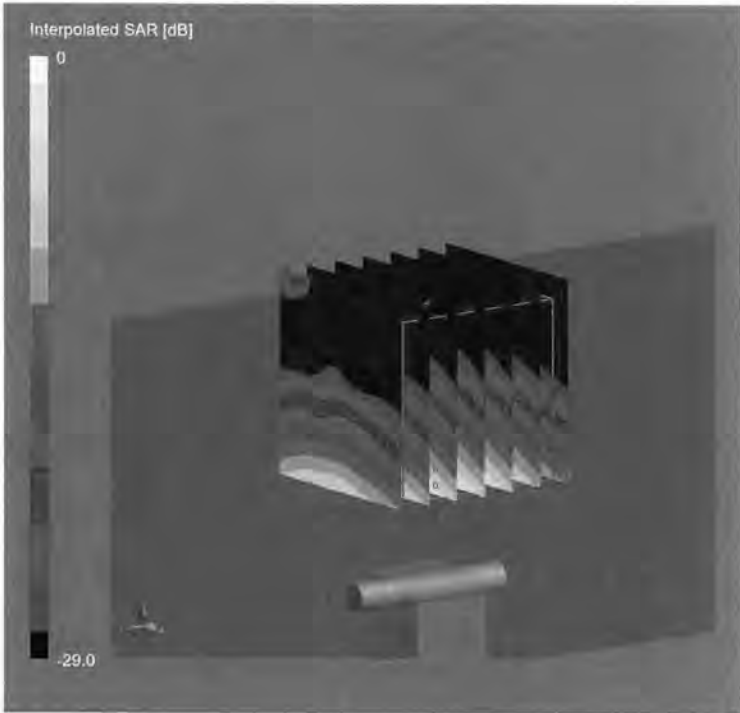
Phantom	TSL, Measured Date	Probe, Calibration Date	DAE, Calibration Date
MFP V8.0 Center	HSL, 2024-11-15	EX3DV4 – SN7349, 2024-06-03	DAE4ip Sn1836, 2024-10-28

Scans Setup

	Zoom Scan
Grid Extents [mm]	22 x 22 x 22
Grid Steps [mm]	4.0 x 4.0 x 1.4
Sensor Surface [mm]	1.4
Graded Grid	Yes
Grading Ratio	1.4
MAIA	N/A
Surface Detection	VMS + 6p
Scan Method	Measured

Measurement Results

	Zoom Scan
Date	2024-11-15
psSAR1g [W/Kg]	8.11
psSAR10g [W/Kg]	2.33
Power Drift [dB]	0.00
Power Scaling	Disabled
Scaling Factor [dB]	
TSL Correction	Positive / Negative



0 dB = 35.0 W/Kg

System Performance Check Report

Summary

Dipole	Frequency [MHz]	TSL	Power [dBm]
D5GHzV2 – SN1396	5750	HSL	20

Exposure Conditions

Phantom Section, TSL	Test Distance [mm]	Band	Group, UID	Frequency [MHz], Channel Number	Conversion Factor	TSL Conductivity [S/m]	TSL Permittivity
Flat	10		CW, 0--	5750, 0	4.93	5.08	35.3

Hardware Setup

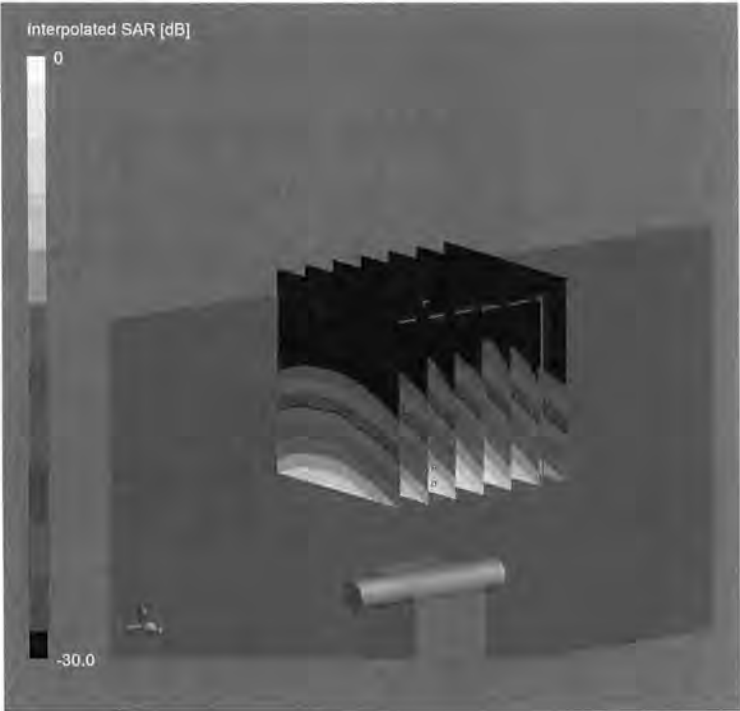
Phantom	TSL, Measured Date	Probe, Calibration Date	DAE, Calibration Date
MFP V8.0 Center	HSL, 2024-11-15	EX3DV4 – SN7349, 2024-06-03	DAE4lp Sn1836, 2024-10-28

Scans Setup

	Zoom Scan
Grid Extents [mm]	22 x 22 x 22
Grid Steps [mm]	4.0 x 4.0 x 1.4
Sensor Surface [mm]	1.4
Graded Grid	Yes
Grading Ratio	1.4
MAIA	N/A
Surface Detection	VMS + 6p
Scan Method	Measured

Measurement Results

	Zoom Scan
Date	2024-11-15
psSAR1g [W/Kg]	8.01
psSAR10g [W/Kg]	2.28
Power Drift [dB]	0.00
Power Scaling	Disabled
Scaling Factor [dB]	
TSL Correction	Positive / Negative



System Performance Check Report

Summary

Dipole	Frequency [MHz]	TSL	Power [dBm]
D5GHzV2 - SN1396	5850	HSL	20

Exposure Conditions

Phantom Section, TSL	Test Distance [mm]	Band	Group, UID	Frequency [MHz], Channel Number	Conversion Factor	TSL Conductivity [S/m]	TSL Permittivity
Flat	10	CW, 0--		5850, 0	4.96	5.18	35.2

Hardware Setup

Phantom	TSL, Measured Date	Probe, Calibration Date	DAE, Calibration Date
MFP V8.0 Center	HSL, 2024-11-15	EX3DV4 - SN7349, 2024-06-03	DAE4lp Sn1836, 2024-10-28

Scans Setup

	Zoom Scan
Grid Extents [mm]	22 x 22 x 22
Grid Steps [mm]	4.0 x 4.0 x 1.4
Sensor Surface [mm]	1.4
Graded Grid	Yes
Grading Ratio	1.4
MAIA	N/A
Surface Detection	VMS + 6p
Scan Method	Measured

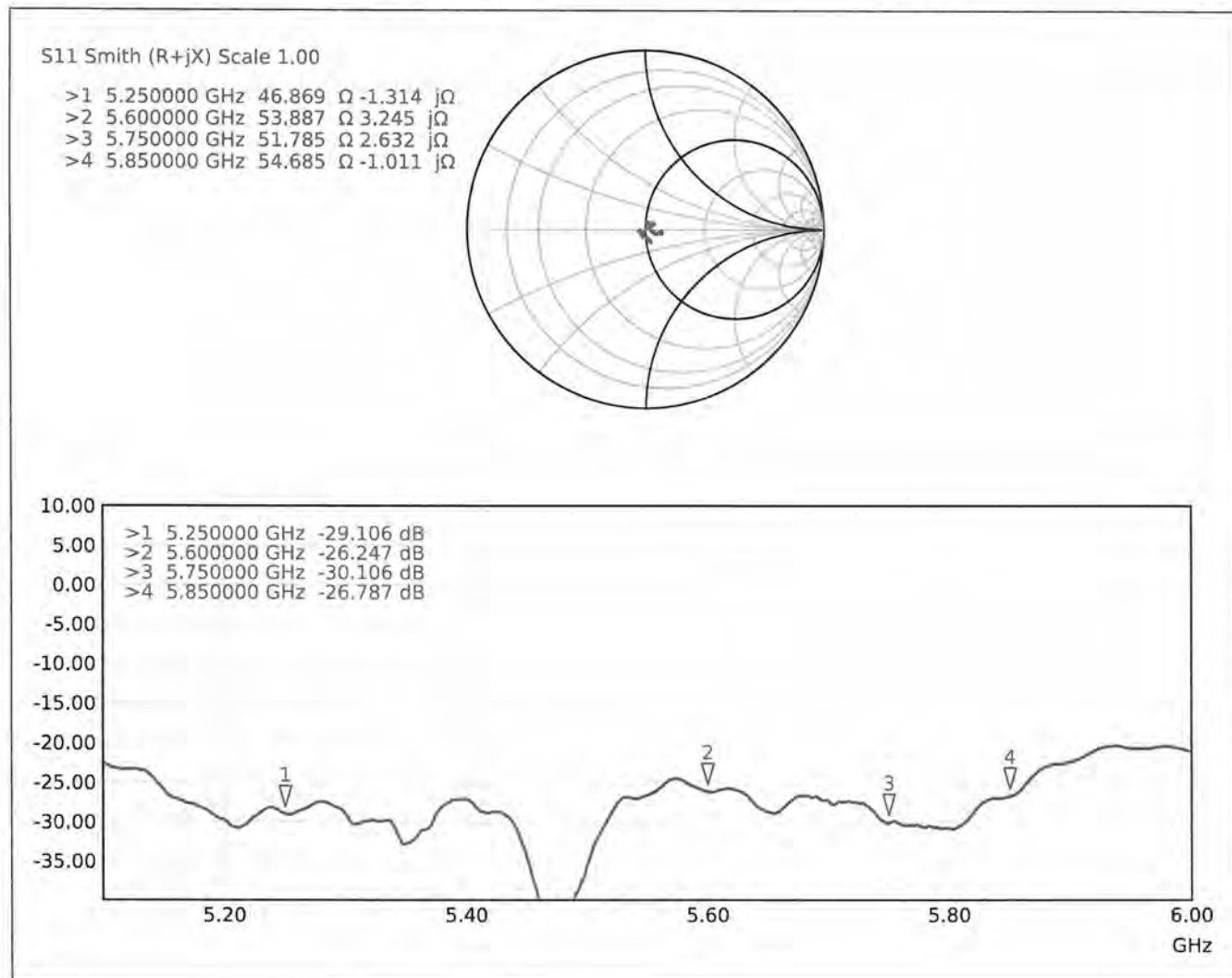
Measurement Results

	Zoom Scan
Date	2024-11-15
psSAR1g [W/Kg]	7.69
psSAR10g [W/Kg]	2.20
Power Drift [dB]	0.00
Power Scaling	Disabled
Scaling Factor [dB]	
TSL Correction	Positive / Negative



0 dB = 34.8 W/Kg

Impedance Measurement Plot for Head TSL



IN-HOUSE SAR VERIFICATION SOURCE CALIBRATION EXTENSION

Object: D5GHzV2 – SN: 1396
Description: SAR Validation Dipole at 5250, 5600, 5750, and 5850 MHz
Procedure (s): Procedure for SAR Verification Source Calibration Extension
In-house Check Date: 07/30/2025

Equipment List

Manufacturer	Model	Description	Serial Number	Calibration Date	Calibration Due	CBT
Rohde & Schwarz	ZNL20	Vector Network Analyzer	101202	9/12/2024	9/12/2025	
Rohde & Schwarz	ZN-Z135	Calibration Kit	5000-309192839	10/31/24	10/31/26	
Control Company	4040	Ambient Thermometer	230581657	8/28/2023	8/28/2025	
Control Company	4040	Ambient Thermometer	230581662	8/28/2023	8/28/2025	
Control Company	4352	Long Stem Liquid Thermometer	230662223	9/28/2023	9/28/2025	
Control Company	4352	Long Stem Liquid Thermometer	230662212	9/28/2023	9/28/2025	
Micro-Coax	UFB205A-0-0240-30x30	SMA M-F RF test Cable (DC - 18 GHz)	-			✓
Maury-Micro	360D	10dB RF Fixed Attenuator (DC - 18 GHz) + Short Circuit Termination	7799	12/28/2024	12/28/2025	
Huber+Suhner	SF126	High Performance RF Cable	570292/126			✓
SPEAG	DAE4ip	Data Acquisition Electronics with Integ. Power	1839	9/4/2024	9/4/2025	
SPEAG	DAK-3.5	DAK-3.5 Dielectric Probe	1349	9/2/2024	9/2/2025	
SPEAG	EX3DV4	SAR Measurement Probe	7836	9/12/2024	9/12/2025	
SPEAG	Powersource1	Signal Generator	4341	1/9/2025	1/9/2026	

CBT: Components calibrated before testing. Prior to testing, the measurement paths containing a cable, attenuator, coupler or filter were connected to a calibrated source (i.e. a signal generator, power sensor, or VNA) to determine the losses of the measurement path. The power meter offset was then adjusted to compensate for the measurement system losses. This level offset is stored within the power meter before measurements are made. This calibration verification procedure applies to the system verification and output power measurements. The calibrated reading is then taken directly from the power meter after compensation of the losses for all final power measurements.

Measurement Uncertainty = $\pm 27\%$ (k=2)

	Name	Function	Signature
Tested By:	Yue Li	Engineer	
Approved By:	Phuong Nguyen	Technical Manager	

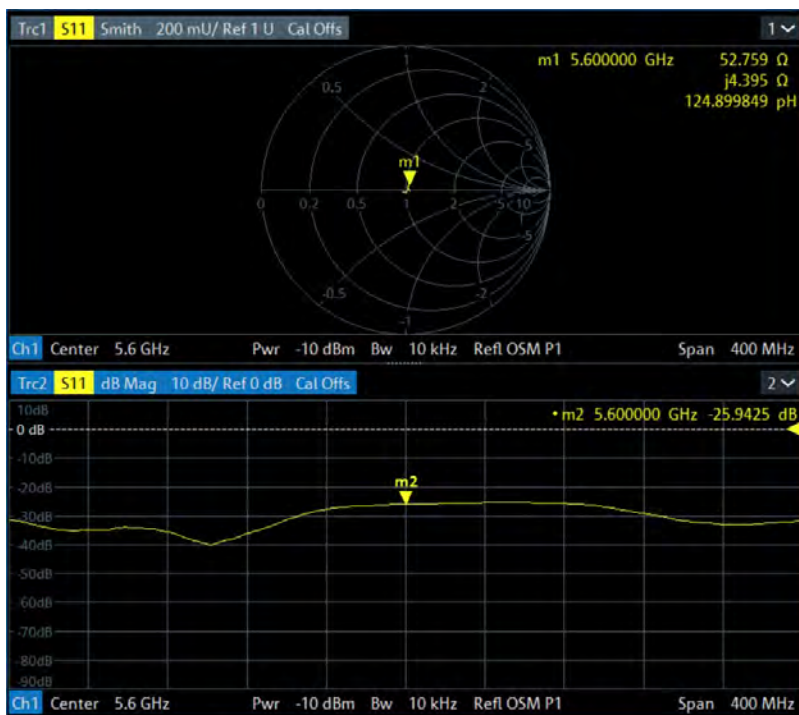
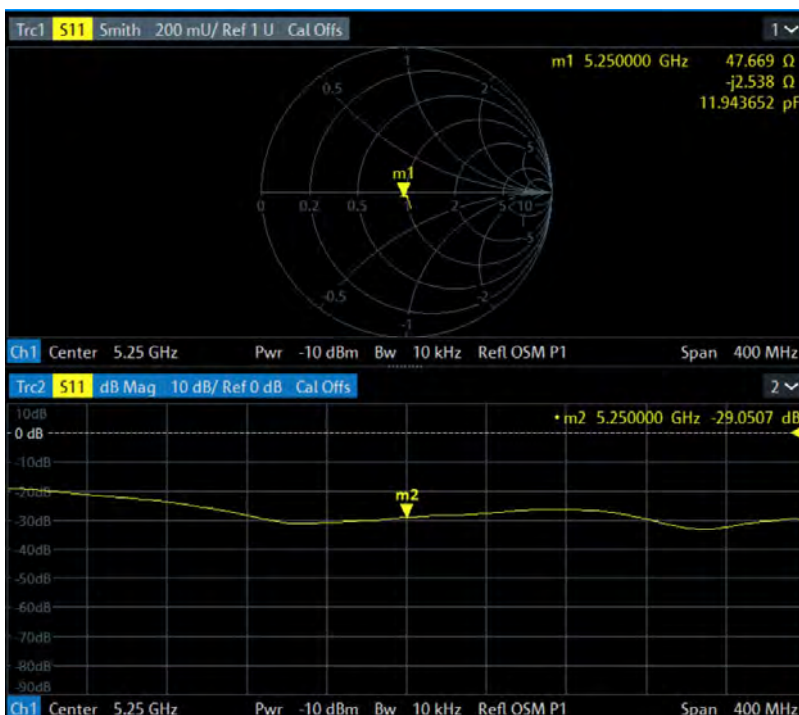
Per FCC KDB Publication 865664 D01, dipole can have longer calibration intervals of up to three years when it is demonstrated that the SAR target, impedance and return loss of the dipole have remained stable according to the following requirements:

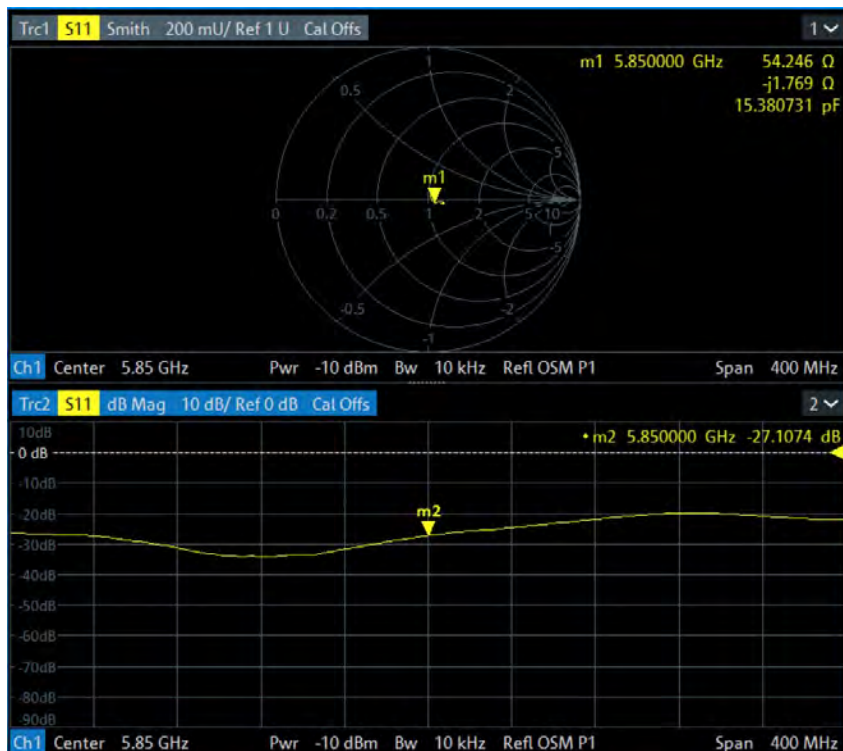
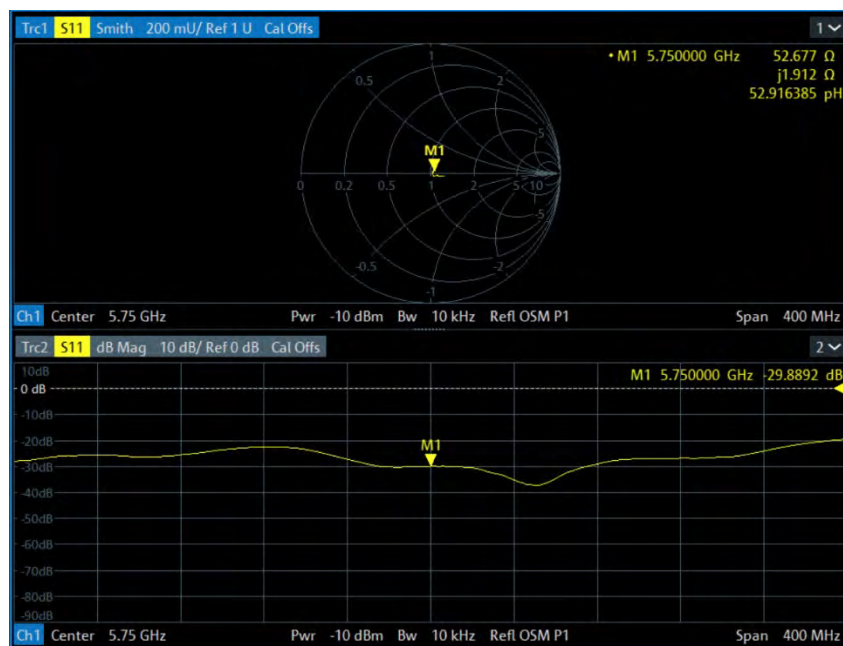
1. Measured SAR does not deviate from the calibrated SAR value by more than 10%.
2. Return loss does not deviate by more than 20% from the previous measurement (i.e. value in dB x 0.2) and meet the required minimum return-loss.
3. Real and imaginary part of the impedance do not deviate by more than 5 Ω from the previous measurement.

The following dipole was checked to pass the above 3 requirements to have an extended calibration interval:

Dipole SN	Freq (MHz)	In-house Check Date	Cal Date	Head SAR target (1g) @ 30dBm (W/kg)	Measured Head SAR (1g) @ 17dBm (W/kg)	1g SAR Dev (%)	Head SAR target (10g) @ 30dBm (W/kg)	Measured Head SAR (10g) @ 17dBm (W/kg)	10g SAR Dev (%)	Cert Head Impedance (Ohm) - Real	Previous Head Impedance (Ohm) - Real	Measured Head Impedance (Ohm) - Real	Head Impedance Deviation (Ohm) - Real	Cert Head Impedance (Ohm) - Imaginary	Previous Head Impedance (Ohm) - Imaginary	Measured Head Impedance (Ohm) - Imaginary	Head Impedance Deviation (Ohm) - Imaginary	Cert Head Return Loss (dB)	Previous Head Return Loss (dB)	Measured Head Return Loss (dB)	Return Loss Dev (%)	PASS/FAIL	Note
1396	5250	11/21/2024	11/15/2024							46.9	46.9	46.8	-0.1	-1.3	-1.3	-0.2	1.1	-29.1	-29.1	-29.5	-8.91%	PASS	In-house check after Calibration
1396	5600	11/21/2024	11/15/2024							53.9	53.9	53.3	-0.6	3.2	3.2	4.1	0.9	-26.2	-26.2	-25.9	7.60%	PASS	In-house check after Calibration
1396	5750	11/21/2024	11/15/2024							51.8	51.8	51.9	0.1	2.6	2.6	2.5	-0.1	-30.1	-30.1	-30.2	-2.27%	PASS	In-house check after Calibration
1396	5850	11/21/2024	11/15/2024							54.7	54.7	54.2	-0.5	-1.0	-1.0	-2.1	-1.1	-26.8	-26.8	-26.9	-1.76%	PASS	In-house check after Calibration
1396	5250	7/30/2025	11/15/2024	77.9	3.77	-3.44%	22.4	1.07	-4.69%	46.9	46.8	47.7	0.9	-1.3	-0.2	-2.5	-2.3	-29.1	-29.5	-29.1	10.90%	PASS	-
1396	5600	7/30/2025	11/15/2024	81.1	4.07	0.13%	23.3	1.15	-1.52%	53.9	53.3	52.8	-0.5	3.2	4.1	4.4	0.3	-26.2	-25.9	-25.9	-0.97%	PASS	-
1396	5750	7/30/2025	11/15/2024	80.1	3.79	-5.59%	22.8	1.08	-5.49%	51.8	51.9	52.7	0.8	2.6	2.5	1.9	-0.6	-30.1	-30.2	-29.9	7.42%	PASS	-
1396	5850	7/30/2025	11/15/2024	76.9	3.96	2.75%	22	1.12	1.58%	54.7	54.2	54.2	0.0	-1.0	-2.1	-3.8	0.3	-26.8	-26.9	-27.1	-4.66%	PASS	-

Impedance and Return-Loss Measurement Plot for Head TSL







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Accreditation No.: **SCS 0108**

Client **RF Safety Lab**
Catonsville, USA

Certificate No. **D6.5GHzV2-1104_Nov24**

CALIBRATION CERTIFICATE

Object **D6.5GHzV2 - SN:1104**

MAG 11/21/24

Calibration procedure(s) **QA CAL-22.v7**
Calibration Procedure for SAR Validation Sources between 3-10 GHz

Calibration date: **November 14, 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 sensor R&S NRP33T	SN: 100967	28-Mar-24 (No. 217-04038)	Mar-25
Reference 20 dB Attenuator	SN: BH9394 (20k)	26-Mar-24 (No. 217-04046)	Mar-25
Mismatch combination	SN: 84224 / 360D	28-Mar-24 (No. 217-04050)	Mar-25
Reference Probe EX3DV4	SN: 7405	01-Jul-24 (No. EX3-7405_Jul24)	Jul-25
DAE4	SN: 908	27-Mar-24 (No. DAE4-908_Mar24)	Mar-25

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
RF generator Anapico APSIN20G	SN: 827	18-Dec-18 (in house check Jan-24)	In house check: Jan-25
Power sensor NRP-Z23	SN: 100169	10-Jan-19 (in house check Jan-24)	In house check: Jan-25
Power sensor NRP-18T	SN: 100950	28-Sep-22 (in house check Jan-24)	In house check: Jan-25
Network Analyzer Keysight E5063A	SN:MY54504221	31-Oct-19 (in house check Sep-24)	In house check: Sep-26

Calibrated by:	Name Aidonia Georgiadou	Function Laboratory Technician	Signature
Approved by:	Sven Kühn	Technical Manager	

Issued: November 14, 2024

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



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Multilateral Agreement for the recognition of calibration certificates

Accreditation No.: **SCS 0108**

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.

Additional Documentation:

- b) 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 dipole is mounted with the spacer to position its feed point exactly below the center marking of the flat phantom section, with the arms oriented parallel to the body axis.
- *Feed Point Impedance and Return Loss:* These parameters are measured with the dipole positioned under the liquid filled phantom. 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 absorbed power density (APD):* The absorbed power density is evaluated according to Samaras T, Christ A, Kuster N, "Compliance assessment of the epithelial or absorbed power density above 6 GHz using SAR measurement systems", Bioelectromagnetics, 2021 (submitted). The additional evaluation uncertainty of 0.55 dB (rectangular distribution) is considered.

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	DASY6	V16.2
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom	
Distance Dipole Center - TSL	5 mm	with Spacer
Zoom Scan Resolution	dx, dy = 3.4 mm, dz = 1.4 mm	Graded Ratio = 1.4 (Z direction)
Frequency	6500 MHz $\pm$ 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	34.5	6.07 mho/m
Measured Head TSL parameters	(22.0 $\pm$ 0.2) °C	34.6 $\pm$ 6 %	6.21 mho/m $\pm$ 6 %
Head TSL temperature change during test	< 0.5 °C	----	----

SAR result with Head TSL

SAR averaged over 1 cm ³ (1 g) of Head TSL	Condition	
SAR measured	100 mW input power	29.8 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	298 W/kg $\pm$ 24.7 % (k=2)

SAR averaged over 8 cm ³ (8 g) of Head TSL	Condition	
SAR measured	100 mW input power	6.71 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	67.2 W/kg $\pm$ 24.4 % (k=2)

SAR averaged over 10 cm ³ (10 g) of Head TSL	condition	
SAR measured	100 mW input power	5.50 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	55.0 W/kg $\pm$ 24.4 % (k=2)

Appendix (Additional assessments outside the scope of SCS 0108)

Antenna Parameters with Head TSL

Impedance, transformed to feed point	48.1 Ω + 1.1 j Ω
Return Loss	- 33.1 dB

APD (Absorbed Power Density)

APD averaged over 1 cm ²	Condition	
APD measured	100 mW input power	297 W/m ²
APD measured	normalized to 1W	2970 W/m ² ± 29.2 % (k=2)

APD averaged over 4 cm ²	condition	
APD measured	100 mW input power	134 W/m ²
APD measured	normalized to 1W	1340 W/m ² ± 28.9 % (k=2)

*The reported APD values have been derived using the psSAR1g and psSAR8g.

General Antenna Parameters and Design

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
-----------------	-------

DASY6 Validation Report for Head TSL

Measurement Report for D6.5GHz-1104, UID 0 -, Channel 6500 (6500.0MHz)

Device under Test Properties

Name, Manufacturer	Dimensions [mm]	IMEI	DUT Type
D6.5GHz	16.0 x 6.0 x 300.0	SN: 1104	-

Exposure Conditions

Phantom Section, TSL	Position, Test Distance [mm]	Band	Group, UID	Frequency [MHz]	Conversion Factor	TSL Cond. [S/m]	TSL Permittivity
Flat, HSL	5.00	Band	CW,	6500	5.14	6.21	34.6

Hardware Setup

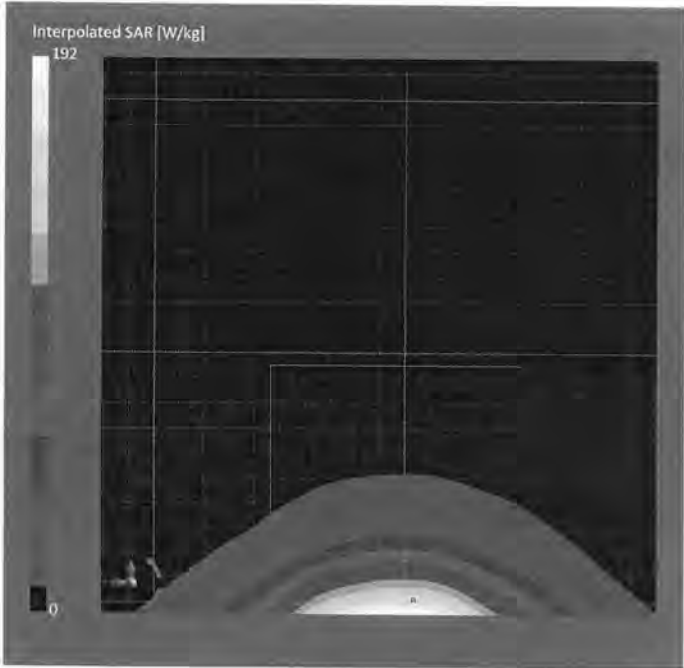
Phantom	TSL	Probe, Calibration Date	DAE, Calibration Date
MFP V8.0 Center - 1182	HBBL600-10000V6	EX3DV4 - SN7405, 2024-07-01	DAE4 Sn908, 2024-03-27

Scan Setup

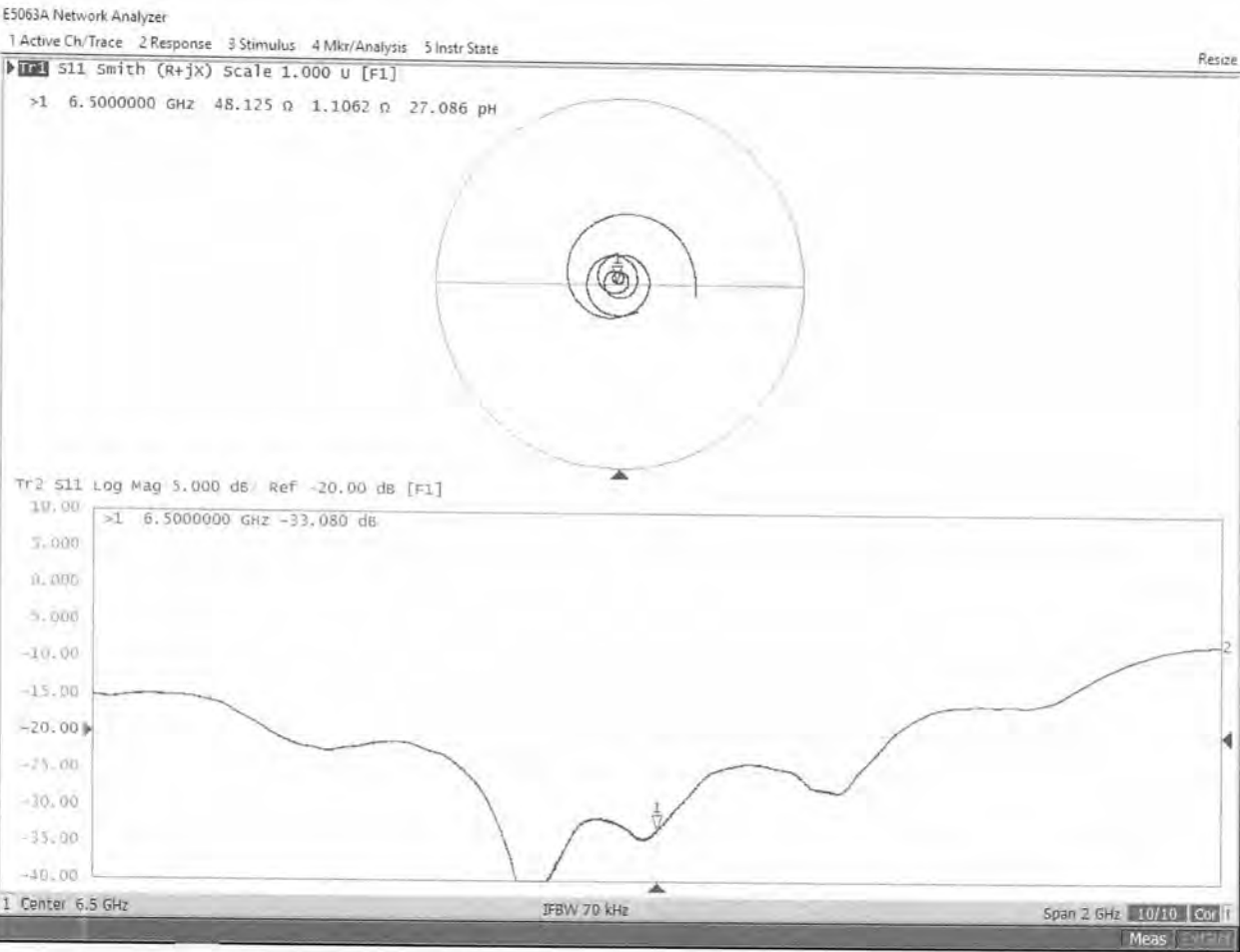
	Zoom Scan
Grid Extents [mm]	22.0 x 22.0 x 22.0
Grid Steps [mm]	3.4 x 3.4 x 1.4
Sensor Surface [mm]	1.4
Graded Grid	Yes
Grading Ratio	1.4
MAIA	N/A
Surface Detection	VMS + 6p
Scan Method	Measured

Measurement Results

	Zoom Scan
Date	2024-11-14, 11:13
psSAR1g [W/Kg]	29.8
psSAR8g [W/Kg]	6.71
psSAR10g [W/Kg]	5.50
Power Drift [dB]	-0.01
Power Scaling	Disabled
Scaling Factor [dB]	
TSL Correction	No correction
M2/M1 [%]	49.9
Dist 3dB Peak [mm]	4.6



Impedance Measurement Plot for Head TSL



IN-HOUSE SAR VERIFICATION SOURCE CALIBRATION EXTENSION

Object: D6.5GHzV2 – SN: 1104
Description: SAR Validation Dipole at 6.5 GHz
Procedure (s): Procedure for SAR Verification Source Calibration Extension
In-house Check Date: 07/30/2025

Equipment List

Manufacturer	Model	Description	Serial Number	Calibration Date	Calibration Due	CBT
Rohde & Schwarz	ZNL20	Vector Network Analyzer	101202	9/12/24	9/12/25	
Rohde & Schwarz	ZN-Z135	Calibration Kit	5000-309192839	10/31/24	10/31/26	
Control Company	4040	Ambient Thermometer	230581657	8/28/23	8/28/25	
Control Company	4040	Ambient Thermometer	230581662	8/28/23	8/28/25	
Control Company	4352	Long Stem Liquid Thermometer	230662223	9/28/23	9/28/25	
Control Company	4352	Long Stem Liquid Thermometer	230662212	9/28/23	9/28/25	
Micro-Coax	UFB205A-0-0240-30x30	SMA M-F RF test Cable (DC - 18 GHz)	-			✓
Maury-Micro	360D	10dB RF Fixed Attenuator (DC - 18 GHz) + Short Circuit Termination	7799	12/28/24	12/28/25	
Huber+Suhner	SF126	High Performance RF Cable	570292/126			✓
Mini-Circuits	VLK-8400+	Coaxial Low Pass Filter (DC - 8.4 GHz)	-			✓
SPEAG	DAE4ip	Data Acquisition Electronics with Integ. Power	1839	9/4/24	9/4/25	
SPEAG	DAK-3.5	DAK-3.5 Dielectric Probe	1349	9/2/24	9/2/25	
SPEAG	EX3DV4	SAR Measurement Probe	7836	9/12/24	9/12/25	
Anritsu	MA24118A	Microwave USB Power Sensor (10MHz - 18 GHz)	2123431	1/13/25	1/13/26	
Anritsu	MA24118A	Microwave USB Power Sensor (10MHz - 18 GHz)	2123500	1/13/25	1/13/26	
Rohde & Schwarz	SMCV100B	R&S SMCV100B Vector Signal Generator (VSG)	103882	12/21/23	12/19/25	
Amplifier Research	1554G8AM1	RF Broadband Amplifier (4 - 8 GHz)	0554497			✓
Mini-Circuits	VLK-8400+	Coaxial Low Pass Filter (DC - 8.4 GHz)	-			✓
Narda	4226-20 (26733)	20 dB SMA Directional Coupler (0.5 - 18 GHz)	0201			✓
Mini-Circuits	BW-S3W2+	3dB RF Fixed Attenuator (DC - 18 GHz)	-			✓
Mini-Circuits	BW-S3W2+	3dB RF Fixed Attenuator (DC - 18 GHz)	-			✓
Mini-Circuits	CBL-6FT-SMNM+	Precision Test Cable SMA/N (DC - 18 GHz)	3318			✓
Mini-Circuits	CBL-6FT-SMNM+	Precision Test Cable SMA/N (DC - 18 GHz)	3335			✓

CBT: Components calibrated before testing. Prior to testing, the measurement paths containing a cable, attenuator, coupler or filter were connected to a calibrated source (i.e. a signal generator, power sensor, or VNA) to determine the losses of the measurement path. The power meter offset was then adjusted to compensate for the measurement system losses. This level offset is stored within the power meter before measurements are made. This calibration verification procedure applies to the system verification and output power measurements. The calibrated reading is then taken directly from the power meter after compensation of the losses for all final power measurements.

Measurement Uncertainty = $\pm 27\%$ ($k=2$)

	Name	Function	Signature
Tested By:	Yue Li	Engineer	
Approved By:	Phuong Nguyen	Technical Manager	

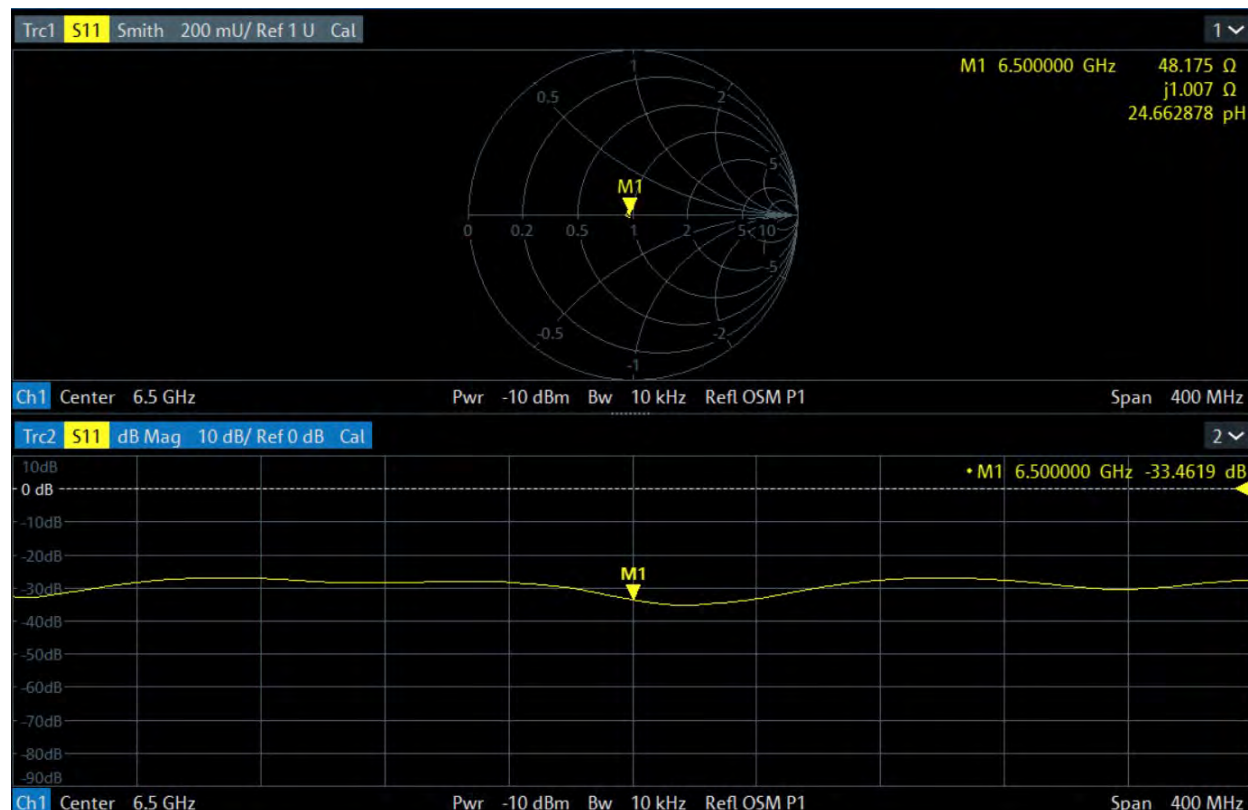
Per FCC KDB Publication 865664 D01, dipole can have longer calibration intervals of up to three years when it is demonstrated that the SAR target, impedance and return loss of the dipole have remained stable according to the following requirements:

1. Measured SAR does not deviate from the calibrated SAR value by more than 10%.
2. Return loss does not deviate by more than 20% from the previous measurement (i.e. value in dB x 0.2) and meet the required minimum return-loss.
3. Real and imaginary part of the impedance do not deviate by more than 5 Ω from the previous measurement.

The following dipole was checked to pass the above 3 requirements to have an extended calibration interval:

Dipole SN	Freq (MHz)	In-house Check Date	Cal Date	Head SAR target (1g) @ 30dBm (W/kg)	Measured Head SAR (1g) @ 17dBm (W/kg)	1g SAR Dev (%)	Head SAR target (10g) @ 30dBm (W/kg)	Measured Head SAR (10g) @ 17dBm (W/kg)	10g SAR Dev (%)	Cert Head Impedance (Ohm) - Real	Previous Head Impedance (Ohm) - Real	Measured Head Impedance (Ohm) - Real	Head Impedance Deviation (Ohm) - Real	Cert Head Impedance (Ohm) - Imaginary	Previous Head Impedance (Ohm) - Imaginary	Measured Head Impedance (Ohm) - Imaginary	Head Impedance Deviation (Ohm) - Imaginary	Cert Head Return Loss (dB)	Previous Head Return Loss (dB)	Measured Head Return Loss (dB)	Return Loss Dev (%)	PASS/FAIL	Note
1104	6500	1/3/2025	11/14/2024							48.1	48.1	48.1	0.0	1.1	1.1	1.1	0.0	-33.1	-33.1	-33.1	0.00%	PASS	In-house check after Calibration
1104	6500	7/30/2025	11/14/2024	298	35.30	2.44%	55	2.83	2.67%	48.1	48.1	48.2	0.1	1.1	1.1	1.0	-0.1	-33.1	-33.1	-33.5	-8.00%	PASS	-

Impedance and Return-Loss Measurement Plot for Head TSL





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Accreditation No.: SCS 0108

Client

RF Safety Lab
Catonsville, USA

Certificate No.

5G-Ver10-1074_Sep25

CALIBRATION CERTIFICATE

Object 5G Verification Source 10 GHz - SN: 1074

MASS
9/19/25

Calibration procedure(s) QA CAL-45.v5
Calibration procedure for sources in air > 6 GHz

Calibration date September 15, 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 ± 3)°C and humidity < 70%.

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID	Cal Date (Certificate No.)	Scheduled Cal
Reference Probe SPEAG EUMMWV3	SN: 9374	26-Aug-25 (No. Eumm_9374_Aug25)	Aug-26
DAE4ip	SN: 1602	06-Nov-24 (No. DAE4ip-1602_Nov24)	Nov-25

Secondary Standards	ID	Check Date (in house)	Scheduled Check
Signal Generator R&S SMF100A	SN: 100184	26-Nov-24 (No. 5G-Source-Cal-IHC-202411)	Nov-25
Power Sensor R&S NRP18S-10	SN: 101258	26-Nov-24 (No. 5G-Source-Cal-IHC-202411)	Nov-25
Network Analyzer Keysight E5063A	SN: MY54504221	30-Sept-24 (No. 675-CAL18-S4489-Sep24)	Sep-26

	Name	Function	Signature
Calibrated by	Joanna Lieshaj	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: September 15, 2025			



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Accreditation No.: **SCS 0108**

Glossary

CW Continuous wave

Calibration is Performed According to the Following Standards

- Internal procedure QA CAL-45, Calibration procedure for sources in air above 6 GHz.
- IEC/IEEE 63195-1, "Assessment of power density of human exposure to radio frequency fields from wireless devices in close proximity to the head and body (frequency range of 6 GHz to 300 GHz)", May 2022

Methods Applied and Interpretation of Parameters

- *Coordinate System:* z-axis in the waveguide horn boresight, x-axis is in the direction of the E-field, y-axis normal to the others in the field scanning plane parallel to the horn flare and horn flange.
- *Measurement Conditions:* (1) 10 GHz: The radiated power is the forward power to the horn antenna minus ohmic and mismatch loss. The forward power is measured prior and after the measurement with a power sensor. During the measurements, the horn is directly connected to the cable and the antenna ohmic and mismatch losses are determined by far-field measurements. (2) 30, 45, 60 and 90 GHz: The verification sources are switched on for at least 30 minutes. Absorbers are used around the probe cub and at the ceiling to minimize reflections.
- *Horn Positioning:* The waveguide horn is mounted vertically on the flange of the waveguide source to allow vertical positioning of the EUMMW probe during the scan. The plane is parallel to the phantom surface. Probe distance is verified using mechanical gauges positioned on the flare of the horn.
- *E-field distribution:* The E-field is measured in two x-y-planes (10mm, 10mm + $\lambda/4$) with a vectorial E-field probe. The E-field value stated as calibration value represents the E-field-maxima and the averaged (1cm² and 4cm²) power density values at 10mm in front of the horn.
- *Field polarization:* Above the open horn, linear polarization of the field is expected. This is verified graphically in the field representation.

Calibrated Quantity

- Local peak E-field (V/m) and average of peak spatial components of the poynting vector (W/m²) averaged over the surface area of 1 cm² and 4cm² at the nominal operational frequency of the verification source. Both square and circular averaging results are listed.

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	DASY8 Module mmWave	V3.2
Phantom	5G Phantom	
Distance Horn Aperture - plane	10 mm	
Number of measured planes	2 (10mm, 10mm + $\lambda/4$)	
Frequency	10.0 GHz $\pm$ 10 MHz	

Calibration Parameters, 10 GHz

Circular Averaging

Distance Horn Aperture to Measurement Plane	Prad ¹ (mW)	Max E-field (V/m)	Uncertainty (k = 2)	Avg Power Density Avg (psPDn+, psPDtot+, psPDmod+) (W/m ²)		Uncertainty (k = 2)
				1cm ²	4cm ²	
10 mm	93.3	152	1.27 dB	57.7	54.0	1.28 dB

Distance Horn Aperture to Measurement Plane	Prad ¹ (mW)	Max E-field (V/m)	Uncertainty (k = 2)	Power Density psPDn+, psPDtot+, psPDmod+ (W/m ²)		Uncertainty (k = 2)
				1cm ²	4cm ²	
10 mm	93.3	152	1.27 dB	57.5, 57.7, 57.9	53.7, 54.0, 54.2	1.28 dB

Square Averaging

Distance Horn Aperture to Measurement Plane	Prad ¹ (mW)	Max E-field (V/m)	Uncertainty (k = 2)	Avg Power Density Avg (psPDn+, psPDtot+, psPDmod+) (W/m ²)		Uncertainty (k = 2)
				1cm ²	4cm ²	
10 mm	93.3	152	1.27 dB	57.7	53.9	1.28 dB

Distance Horn Aperture to Measurement Plane	Prad ¹ (mW)	Max E-field (V/m)	Uncertainty (k = 2)	Power Density psPDn+, psPDtot+, psPDmod+ (W/m ²)		Uncertainty (k = 2)
				1cm ²	4cm ²	
10 mm	93.3	152	1.27 dB	57.5, 57.7, 57.9	53.6, 53.9, 54.1	1.28 dB

Max Power Density

Distance Horn Aperture to Measurement Plane	Prad ¹ (mW)	Max E-field (V/m)	Uncertainty (k = 2)	Max Power Density Sn, Stot, Stot (W/m ²)	Uncertainty (k = 2)
10 mm	93.3	152	1.27 dB	58.9, 59.0, 59.3	1.28 dB

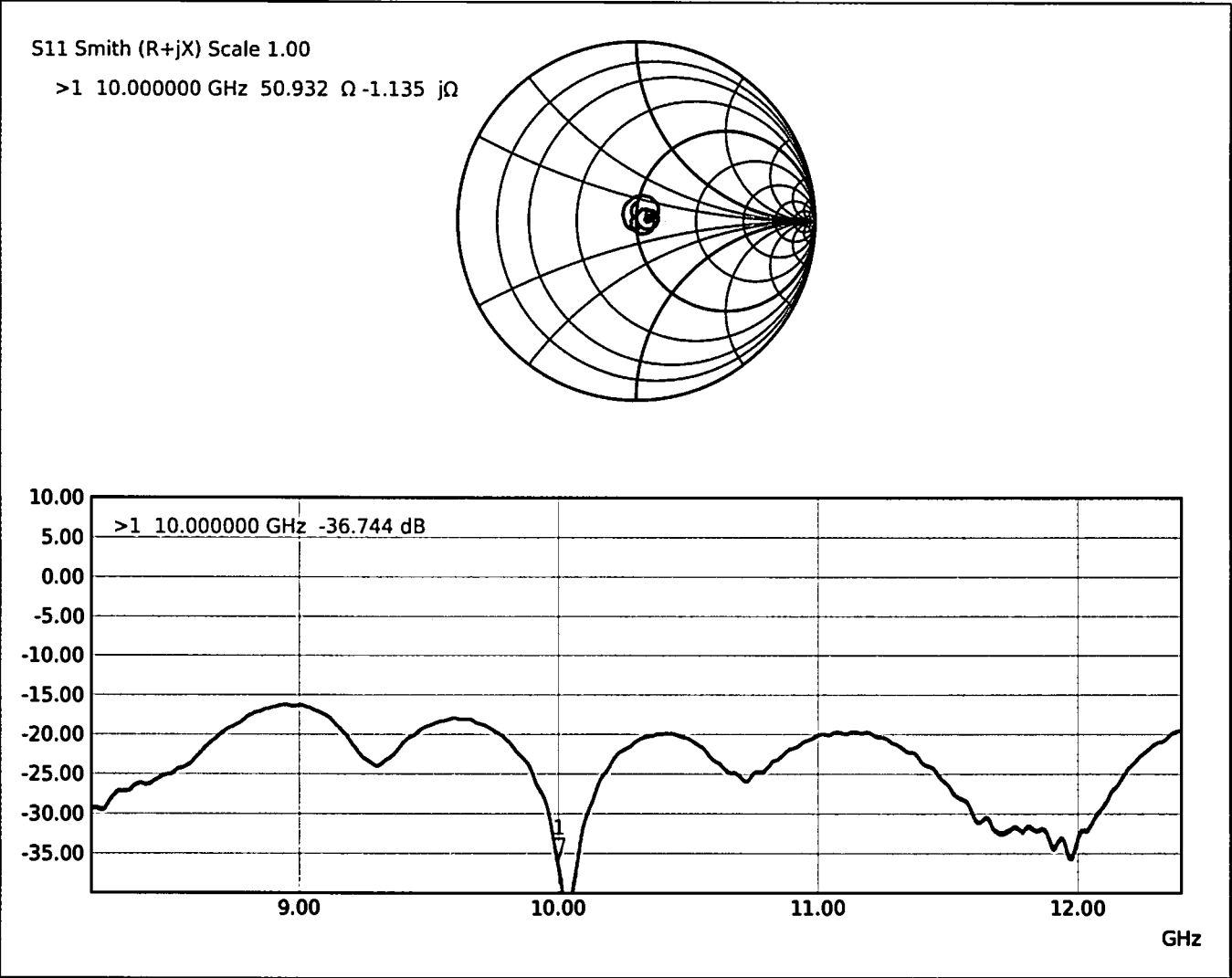
¹ Assessed ohmic and mismatch loss plus numerical offset: 0.30 dB

Appendix (Additional assessments outside the scope of SCS 0108)

Antenna Parameters

Impedance, transformed to feed point	50.9 Ω – 1.1 jΩ
Return Loss	-36.7 dB

Impedance Measurement Plot



DASY Report

Measurement Report for 5G Verification Source 10 GHz, UID 0 --, Channel 10000.0 (10000.0 MHz)

Device Under Test Properties

Model, Manufacturer	Dimensions [mm]	IMEI	DUT Type
5G Verification Source 10 GHz	100.0 x 100.0 x 172.0	SN: 1074	-

Exposure Conditions

Phantom Section	Position, Test Distance [mm]	Band	Group, UID	Frequency [MHz], Channel Number	Conversion Factor
5G --	10.0 mm	Validation band	CW, 0--	10000.0,10000	1.0

Hardware Setup

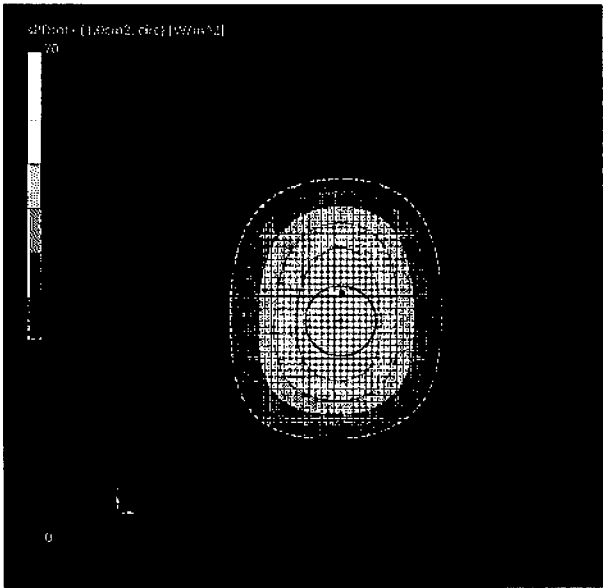
Phantom	Medium	Probe, Calibration Date	DAE, Calibration Date
mmWave Phantom --	Air --	EUmmWV3 - SN9374_F1-55GHz, 2025-08-26	DAE4lp - SN1602, 2024-11-06

Scans Setup

Sensor Surface [mm]	10.0
MAIA	MAIA not used

Measurement Results

Scan Type	5G Scan
Date	2025-09-15
Avg. Area [cm ²]	1.00
Avg. Type	Circular Averaging
psPDn+ [W/m ²]	57.5
psPDtot+ [W/m ²]	57.7
psPDmod+ [W/m ²]	57.9
Max(Sn) [W/m ²]	58.9
Max(Stot) [W/m ²]	59.0
Max(Stot) [W/m ²]	59.3
E _{max} [V/m]	152
Power Drift [dB]	-0.02



DASY Report

Measurement Report for 5G Verification Source 10 GHz, UID 0 --, Channel 10000.0 (10000.0 MHz)

Device Under Test Properties

Model, Manufacturer	Dimensions [mm]	IMEI	DUT Type
5G Verification Source 10 GHz	100.0 x 100.0 x 172.0	SN: 1074	-

Exposure Conditions

Phantom Section	Position, Test Distance [mm]	Band	Group, UID	Frequency [MHz], Channel Number	Conversion Factor
5G --	10.0 mm	Validation band	CW, 0--	10000.0,10000	1.0

Hardware Setup

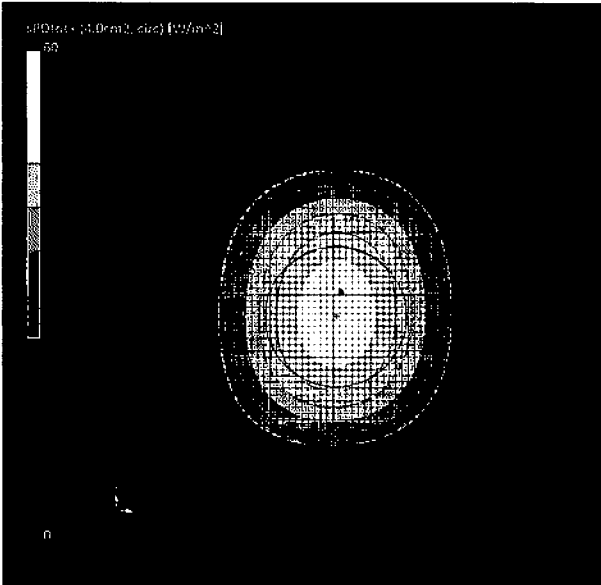
Phantom	Medium	Probe, Calibration Date	DAE, Calibration Date
mmWave Phantom --	Air --	EUmmWV3 -- SN9374_F1-55GHz, 2025-08-26	DAE4ip -- SN1602, 2024-11-06

Scans Setup

Sensor Surface [mm]	10.0
MAIA	MAIA not used

Measurement Results

Scan Type	5G Scan
Date	2025-09-15
Avg. Area [cm ²]	4.00
Avg. Type	Circular Averaging
psPDn+ [W/m ²]	53.7
psPDtot+ [W/m ²]	54.0
psPDmod+ [W/m ²]	54.2
Max(Sn) [W/m ²]	58.9
Max(Stot) [W/m ²]	59.0
Max(Stot) [W/m ²]	59.3
E _{max} [V/m]	152
Power Drift [dB]	-0.02



DASY Report

Measurement Report for 5G Verification Source 10 GHz, UID 0 --, Channel 10000.0 (10000.0 MHz)

Device Under Test Properties

Model, Manufacturer	Dimensions [mm]	IMEI	DUT Type
5G Verification Source 10 GHz	100.0 x 100.0 x 172.0	SN: 1074	-

Exposure Conditions

Phantom Section	Position, Test Distance [mm]	Band	Group, UID	Frequency [MHz], Channel Number	Conversion Factor
5G --	10.0 mm	Validation band	CW, 0--	10000.0,10000	1.0

Hardware Setup

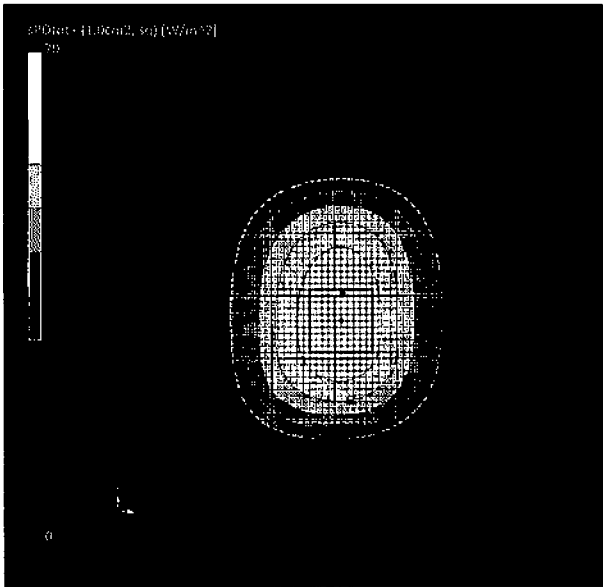
Phantom	Medium	Probe, Calibration Date	DAE, Calibration Date
mmWave Phantom --	Air --	EUmmWV3 -- SN9374_F1--55GHz, 2025-08-26	DAE4ip -- SN1602, 2024-11-06

Scans Setup

Sensor Surface [mm]	10.0
MAIA	MAIA not used

Measurement Results

Scan Type	5G Scan
Date	2025-09-15
Avg. Area [cm ²]	1.00
Avg. Type	Square Averaging
psPDn+ [W/m ²]	57.5
psPDtot+ [W/m ²]	57.7
psPDmod+ [W/m ²]	57.9
Max(Sn) [W/m ²]	58.9
Max(Stot) [W/m ²]	59.0
Max(Stot) [W/m ²]	59.3
E _{max} [V/m]	152
Power Drift [dB]	-0.02



DASY Report

Measurement Report for 5G Verification Source 10 GHz, UID 0 --, Channel 10000.0 (10000.0 MHz)

Device Under Test Properties

Model, Manufacturer	Dimensions [mm]	IMEI	DUT Type
5G Verification Source 10 GHz	100.0 x 100.0 x 172.0	SN: 1074	-

Exposure Conditions

Phantom Section	Position, Test Distance [mm]	Band	Group, UID	Frequency [MHz], Channel Number	Conversion Factor
5G --	10.0 mm	Validation band	CW, 0--	10000.0,10000	1.0

Hardware Setup

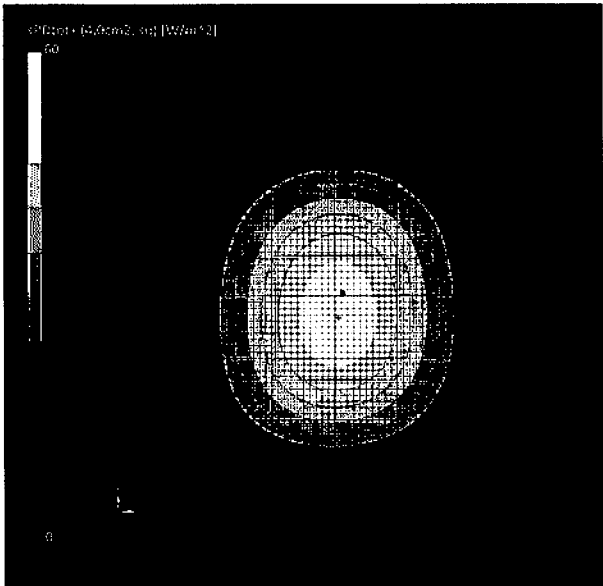
Phantom	Medium	Probe, Calibration Date	DAE, Calibration Date
mmWave Phantom --	Air --	EUmmWV3 - SN9374_F1-55GHz, 2025-08-26	DAE4ip - SN1602, 2024-11-06

Scans Setup

Sensor Surface [mm]	10.0
MAIA	MAIA not used

Measurement Results

Scan Type	5G Scan
Date	2025-09-15
Avg. Area [cm ²]	4.00
Avg. Type	Square Averaging
psPDn+ [W/m ²]	53.6
psPDtot+ [W/m ²]	53.9
psPDmod+ [W/m ²]	54.1
Max(Sn) [W/m ²]	58.9
Max(Stot) [W/m ²]	59.0
Max(Stot) [W/m ²]	59.3
E _{max} [V/m]	152
Power Drift [dB]	-0.02



Calibration Laboratory of**Schmid & Partner
Engineering AG**

Zeughausstrasse 43, 8004 Zurich, Switzerland

**S** Schweizerischer Kalibrierdienst
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Client

RF Safety Lab

Catonsville, USA

Certificate No.

EX-7836_Apr26**CALIBRATION CERTIFICATE**

Object

EX3DV4 - SN:7836

MAB
5/4/26

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 23, 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
Network Analyzer Keysight E5063A	SN: MY54504221	30-Sept-24 (No. 675-CAL18-S4489-Sep24)	Sep-26

	Name	Function	Signature
Calibrated by	Henrique Almeida	Laboratory Technician	Henrique Almeida
Approved by	Sven Kühn	Technical Manager	IA A. Kühn
Issued: April 24, 2026			
This calibration certificate shall not be reproduced except in full without written approval of the laboratory.			

Calibration Laboratory of

Schmid & Partner
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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., $\theta = 0$ 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 $\theta = 0$ ($f \leq 900$ 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:7836

Basic Calibration Parameters

	Sensor X	Sensor Y	Sensor Z	Unc (k = 2)
Norm ($\mu\text{V}/(\text{V}/\text{m})^2$) ^A	0.64	0.66	0.64	±10.1%
DCP (mV) ^B	105.9	108.9	108.6	±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	Continuous Wave	X	0.00	0.00	1.00	0.00	137.4	±2.0%	±4.7%
		Y	0.00	0.00	1.00		139.6		
		Z	0.00	0.00	1.00		141.8		
10352	Pulse (D=10%, T=5 ms)	X	0.32	60.68	15.12	10.00	23.0	±1.5%	±9.6%
		Y	0.34	60.28	14.68		24.0		
		Z	0.25	59.97	15.45		24.0		
10353	Pulse (D=20%, T=5 ms)	X	0.30	63.69	15.17	6.99	47.0	±1.3%	±9.6%
		Y	0.31	63.29	14.75		47.0		
		Z	0.23	62.98	15.52		47.0		
10354	Pulse (D=40%, T=5 ms)	X	0.28	66.70	15.23	3.98	93.0	±1.1%	±9.6%
		Y	0.28	66.30	14.83		94.0		
		Z	0.21	65.99	15.60		94.0		
10355	Pulse (D=60%, T=5 ms)	X	0.26	68.46	15.26	2.22	139.0	±1.1%	±9.6%
		Y	0.26	68.07	14.89		141.0		
		Z	0.19	67.75	15.66		141.0		
10387	Random (BW=1 MHz, MOD=QPSK)	X	0.01	65.58	16.64	0.32	106.0	±1.2%	±9.6%
		Y	0.00	63.00	16.46		108.0		
		Z	0.00	64.87	17.80		108.0		
10388	Random (BW=10 MHz, MOD=QPSK)	X	0.65	65.47	14.44	0.00	113.0	±2.7%	±9.6%
		Y	0.57	65.07	14.18		114.0		
		Z	0.45	64.75	14.75		114.0		
10396	Random (BW=100 kHz, MOD=64QAM)	X	0.00	45.89	17.97	1.45	82.0	±2.5%	±9.6%
		Y	0.00	64.01	17.67		83.0		
		Z	0.03	63.69	18.83		83.0		
10399	Random (BW=40 MHz, MOD=64QAM)	X	1.79	64.41	13.47	0.00	105.0	±3.9%	±9.6%
		Y	1.70	64.01	13.02		106.0		
		Z	1.60	63.69	12.82		106.0		
10414	Random (BW=40 MHz, HIGH PAR)	X	2.08	62.14	13.41	0.00	75.0	±2.5%	±9.6%
		Y	1.94	61.75	12.95		76.0		
		Z	1.81	61.43	12.72		76.0		

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 E²-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:7836

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	8.2	59.31	33.70	1.66	0.00	4.90	0.17	0.00	1.00
y	7.3	51.96	32.85	3.40	0.00	4.90	0.55	0.00	1.00
z	6.8	48.50	33.02	4.33	0.00	4.90	0.25	0.00	1.00

Other Probe Parameters

Sensor Arrangement	Triangular
Connector Angle	83.6°
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:7836

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	15.26	15.52	17.54	0.00	1.25	±13.3%
64	54.2	0.75	13.28	13.51	15.26	0.00	1.25	±13.3%
128	52.8	0.76	11.89	12.09	13.67	0.00	1.25	±13.3%
300	45.3	0.87	11.26	11.26	11.26	0.09	1.00	±13.3%
450	43.5	0.87	10.27	10.27	10.27	0.16	1.30	±13.3%
750	41.9	0.89	9.10	9.40	10.49	0.32	1.27	±11.0%
835	41.5	0.90	8.66	8.94	9.98	0.32	1.27	±11.0%
1750	40.1	1.37	7.37	7.61	8.49	0.33	1.27	±11.0%
1900	40.0	1.40	7.26	7.50	8.37	0.33	1.27	±11.0%
3500	37.9	2.91	6.18	6.38	7.12	0.35	1.27	±13.1%
3700	37.7	3.12	6.07	6.26	6.99	0.35	1.27	±13.1%
3900	37.5	3.32	5.96	6.16	6.87	0.36	1.27	±13.1%

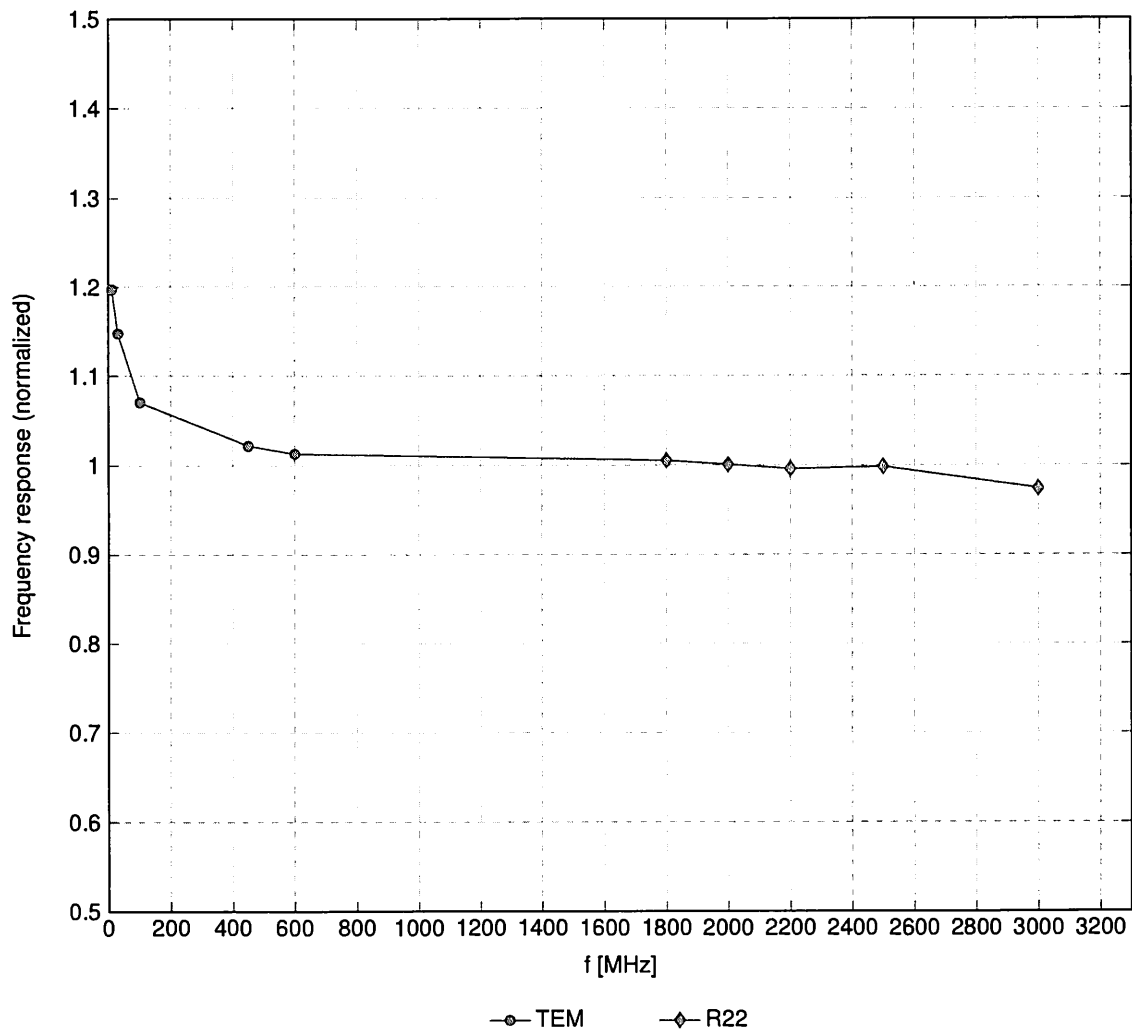
^C Frequency validity above 300 MHz of ±100 MHz only applies for DASY v4.4 and higher (see Page 2), else it is restricted to ±50 MHz. The uncertainty is the RSS of the ConvF uncertainty at calibration frequency and the uncertainty for the indicated frequency band. Frequency validity below 300 MHz is ±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.

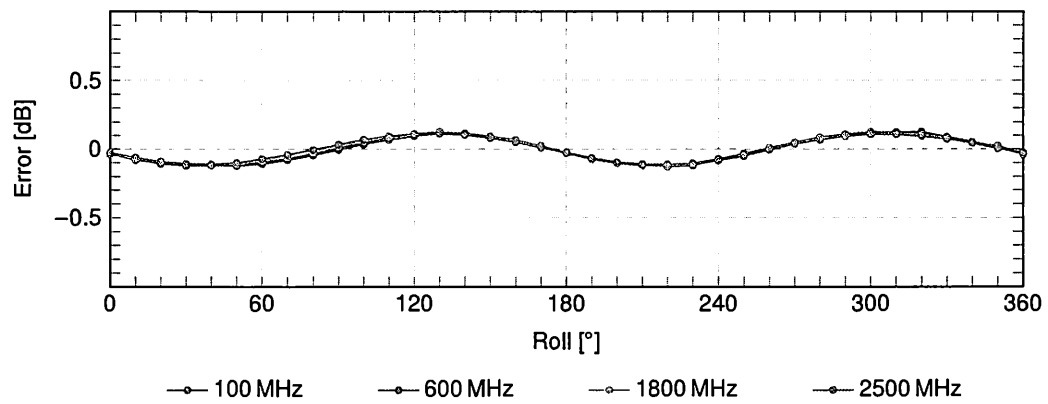
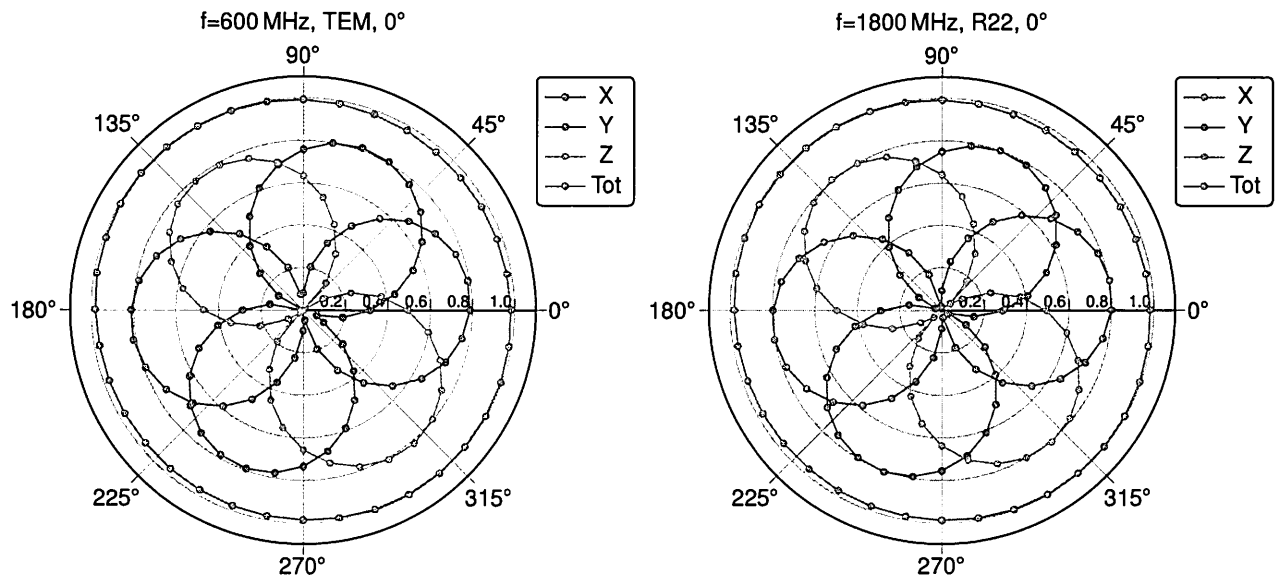
^H The stated uncertainty is the total calibration uncertainty (k = 2) of Norm-ConvF. This is equivalent to the uncertainty component with the symbol CF in Table 9 of IEC/IEEE 62209-1528:2020.

Frequency Response of E-Field
(TEM-Cell:ifl110 EXX, Waveguide:R22)

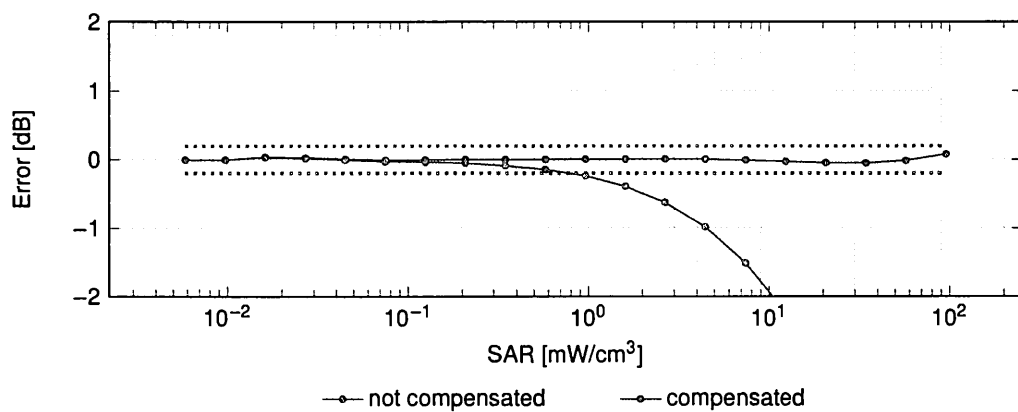
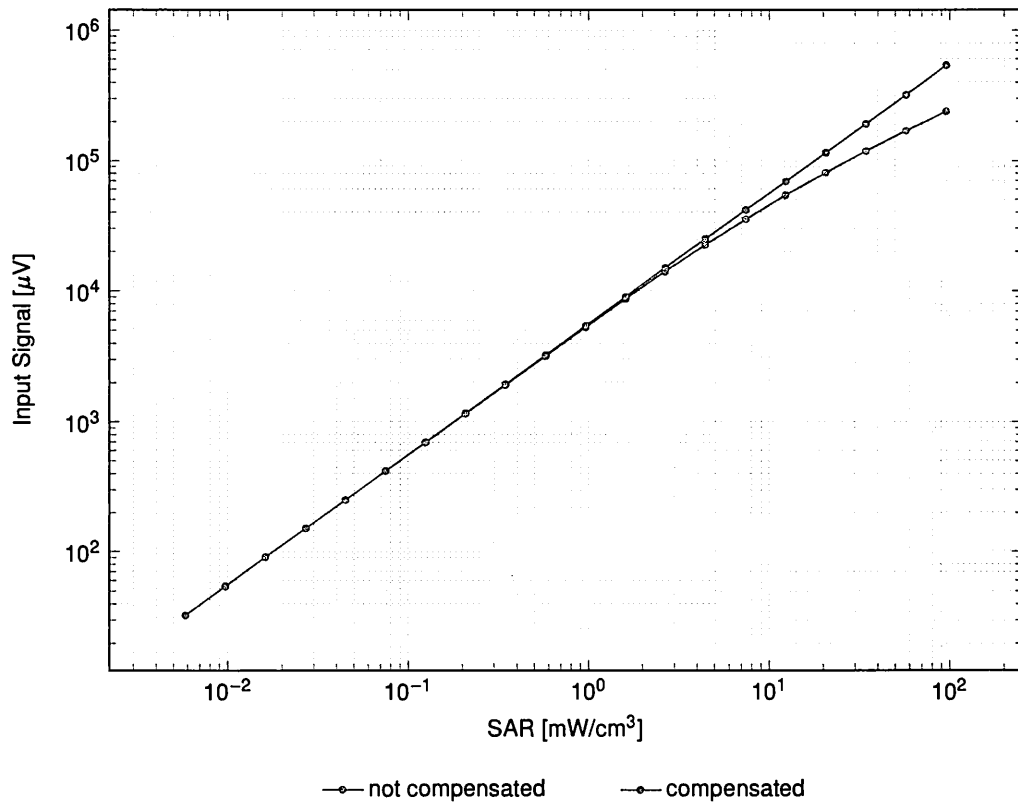


Uncertainty of Frequency Response of E-field: $\pm 6.3\%$ ($k=2$)

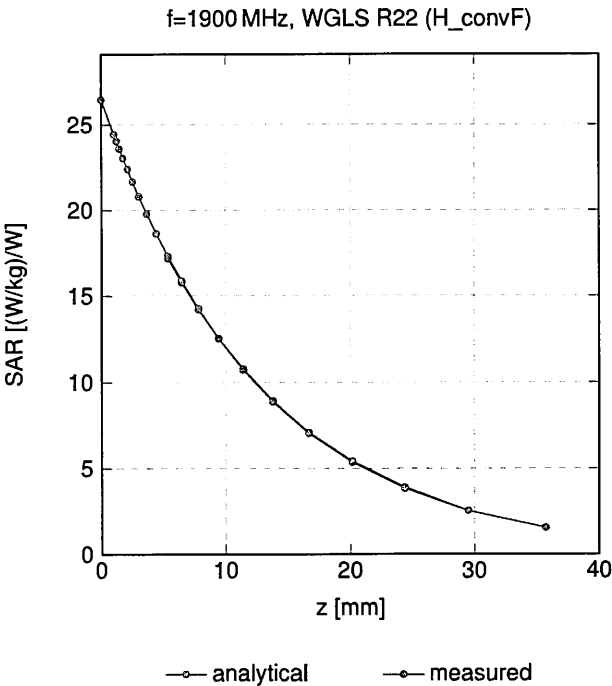
Receiving Pattern (ϕ), $\vartheta = 0^\circ$



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

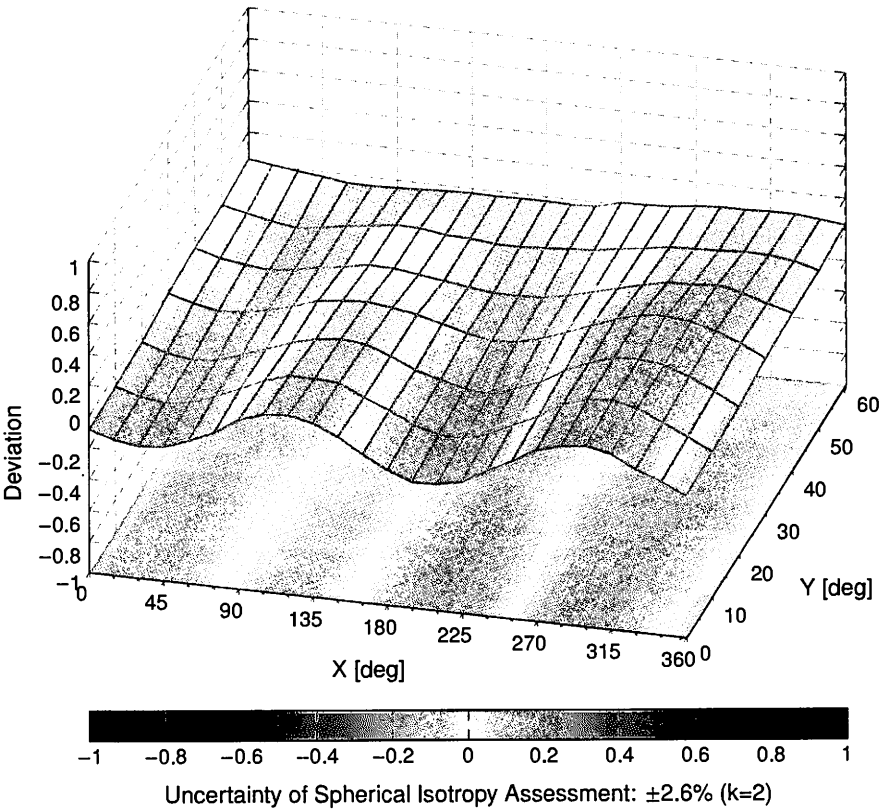
Dynamic Range $f(\text{SAR}_{\text{HSL}})$ (TEM cell, $f_{\text{eval}} = 1900 \text{ MHz}$)Uncertainty of Linearity Assessment: $\pm 0.6\%$ ($k=2$)

Conversion Factor Assessment



Deviation from Isotropy in Liquid

Error (ϕ, θ), f = 900 MHz



Appendix: Modulation Calibration Parameters

UID	Rev	Communication System Name	Group	PAR (dB)	Unc ^E $k = 2$
0		Continuous Wave	CW	0.00	±4.7
10010	CAB	Pulse (D=10%, T=100 ms)	Test	10.00	±9.6
10011	CAC	Rel. 99, RMC, QPSK, 5.0 MHz	WCDMA	2.91	±9.6
10012	CAB	DSSS, DBPSK, 1.0 Mbps, 92.5% DC	WLAN	1.87	±9.6
10013	CAB	OFDM, BPSK, 6.0 Mbps, 72.1% DC	WLAN	9.46	±9.6
10021	DAC	Voice, GMSK, 1 slot(s)	GSM	9.39	±9.6
10023	DAC	Data, GMSK, 1 slot(s)	GSM	9.57	±9.6
10024	DAC	Data, GMSK, 2 slot(s)	GSM	6.56	±9.6
10025	DAC	Data, 8PSK, 1 slot(s)	GSM	12.62	±9.6
10026	DAC	Data, 8PSK, 2 slot(s)	GSM	9.55	±9.6
10027	DAC	Data, GMSK, 3 slot(s)	GSM	4.80	±9.6
10028	DAC	Data, GMSK, 4 slot(s)	GSM	3.55	±9.6
10029	DAC	Data, 8PSK, 3 slot(s)	GSM	7.78	±9.6
10030	CAA	BR, DH1, GFSK	Bluetooth	5.30	±9.6
10031	CAA	BR, DH3, GFSK	Bluetooth	1.87	±9.6
10032	CAA	BR, DH5, GFSK	Bluetooth	1.16	±9.6
10033	CAA	EDR, DH1, pi/4-DQPSK	Bluetooth	7.74	±9.6
10034	CAA	EDR, DH3, pi/4-DQPSK	Bluetooth	4.53	±9.6
10035	CAA	EDR, DH5, pi/4-DQPSK	Bluetooth	3.83	±9.6
10036	CAA	EDR, DH1, 8-DPSK	Bluetooth	8.01	±9.6
10037	CAA	EDR, DH3, 8-DPSK	Bluetooth	4.77	±9.6
10038	CAA	EDR, DH5, 8-DPSK	Bluetooth	4.10	±9.6
10039	CAB	RC1, 1xRTT	CDMA2000	4.57	±9.6
10048	CAA	Full Slot, GFSK, 1 slot(s)	DECT	13.80	±9.6
10049	CAA	Double Slot, GFSK, 2 slot(s)	DECT	10.79	±9.6
10056	CAA	TD-SCDMA, QPSK, 1.6 MHz	TD-SCDMA	11.01	±9.6
10058	DAC	Data, 8PSK, 4 slot(s)	GSM	6.52	±9.6
10059	CAB	DSSS, DQPSK, 2.0 Mbps, 87.4% DC	WLAN	2.12	±9.6
10060	CAB	HR-DSSS, DQPSK, 5.5 Mbps, 72.7% DC	WLAN	2.83	±9.6
10061	CAB	HR-DSSS, DQPSK, 11.0 Mbps, 57.5% DC	WLAN	3.60	±9.6
10062	CAE	OFDM, BPSK, 6.0 Mbps, 89.1% DC	WLAN	8.68	±9.6
10063	CAE	OFDM, BPSK, 9.0 Mbps, 85.3% DC	WLAN	8.63	±9.6
10064	CAE	OFDM, QPSK, 12.0 Mbps, 82.0% DC	WLAN	9.09	±9.6
10065	CAE	OFDM, QPSK, 18.0 Mbps, 76.0% DC	WLAN	9.00	±9.6
10066	CAE	OFDM, 16QAM, 24.0 Mbps, 70.6% DC	WLAN	9.38	±9.6
10067	CAE	OFDM, 16QAM, 36.0 Mbps, 62.9% DC	WLAN	10.12	±9.6
10068	CAE	OFDM, 64QAM, 48.0 Mbps, 56.6% DC	WLAN	10.24	±9.6
10069	CAE	OFDM, 64QAM, 54.0 Mbps, 54.4% DC	WLAN	10.56	±9.6
10071	CAB	OFDM, BPSK, 9.0 Mbps, 65.1% DC	WLAN	9.83	±9.6
10072	CAB	OFDM, QPSK, 12.0 Mbps, 60.1% DC	WLAN	9.62	±9.6
10073	CAB	OFDM, QPSK, 18.0 Mbps, 53.1% DC	WLAN	9.94	±9.6
10074	CAB	OFDM, 16QAM, 24.0 Mbps, 48.5% DC	WLAN	10.30	±9.6
10075	CAB	OFDM, 16QAM, 36.0 Mbps, 42.9% DC	WLAN	10.77	±9.6
10076	CAB	OFDM, 64QAM, 48.0 Mbps, 39.5% DC	WLAN	10.94	±9.6
10077	CAB	OFDM, 64QAM, 54.0 Mbps, 38.5% DC	WLAN	11.00	±9.6
10081	CAB	RC3, 1xRTT	CDMA2000	3.97	±9.6
10097	CAC	Rel. 5 HSDPA, QPSK, 5.0 MHz	WCDMA	3.98	±9.6
10098	CAC	Rel. 6 HSUPA, Subset 2, QPSK, 5.0 MHz	WCDMA	3.98	±9.6
10100	CAF	20.0 MHz, QPSK, 100% RB	LTE-FDD	5.67	±9.6
10101	CAF	20.0 MHz, 16QAM, 100% RB	LTE-FDD	6.42	±9.6
10102	CAF	20.0 MHz, 64QAM, 100% RB	LTE-FDD	6.60	±9.6
10103	CAH	20.0 MHz, QPSK, UL/DL CFG: 1, SSC: 4, 100% RB	LTE-TDD	9.29	±9.6
10104	CAH	20.0 MHz, 16QAM, UL/DL CFG: 1, SSC: 4, 100% RB	LTE-TDD	9.97	±9.6
10105	CAH	20.0 MHz, 64QAM, UL/DL CFG: 1, SSC: 4, 100% RB	LTE-TDD	10.01	±9.6
10108	CAH	10.0 MHz, QPSK, 100% RB	LTE-FDD	5.80	±9.6
10109	CAH	10.0 MHz, 16QAM, 100% RB	LTE-FDD	6.43	±9.6
10110	CAH	5.0 MHz, QPSK, 100% RB	LTE-FDD	5.75	±9.6
10111	CAH	5.0 MHz, 16QAM, 100% RB	LTE-FDD	6.44	±9.6
10112	CAH	10.0 MHz, 64QAM, 100% RB	LTE-FDD	6.59	±9.6
10113	CAH	5.0 MHz, 64QAM, 100% RB	LTE-FDD	6.62	±9.6
10114	CAE	HT40 Greenfield, MCS0 (13.5 Mbps), 99.7% DC	WLAN	8.10	±9.6
10115	CAE	HT40 Greenfield, MCS4 (81.0 Mbps), 99.7% DC	WLAN	8.46	±9.6
10116	CAE	HT40 Greenfield, MCS7 (135.0 Mbps), 99.7% DC	WLAN	8.15	±9.6

UID	Rev	Communication System Name	Group	PAR (dB)	Unc ^E k = 2
10117	CAE	HT40 Mixed, MCS0 (13.5 Mbps), 99.7% DC	WLAN	8.07	±9.6
10118	CAE	HT40 Mixed, MCS4 (81.0 Mbps), 99.7% DC	WLAN	8.59	±9.6
10119	CAE	HT40 Mixed, MCS7 (135.0 Mbps), 99.7% DC	WLAN	8.13	±9.6
10140	CAF	15.0 MHz, 16QAM, 100% RB	LTE-FDD	6.49	±9.6
10141	CAF	15.0 MHz, 64QAM, 100% RB	LTE-FDD	6.53	±9.6
10142	CAF	3.0 MHz, QPSK, 100% RB	LTE-FDD	5.73	±9.6
10143	CAF	3.0 MHz, 16QAM, 100% RB	LTE-FDD	6.35	±9.6
10144	CAF	3.0 MHz, 64QAM, 100% RB	LTE-FDD	6.65	±9.6
10145	CAG	1.4 MHz, QPSK, 100% RB	LTE-FDD	5.76	±9.6
10146	CAG	1.4 MHz, 16QAM, 100% RB	LTE-FDD	6.41	±9.6
10147	CAG	1.4 MHz, 64QAM, 100% RB	LTE-FDD	6.72	±9.6
10149	CAF	20.0 MHz, 16QAM, 50% RB	LTE-FDD	6.42	±9.6
10150	CAF	20.0 MHz, 64QAM, 50% RB	LTE-FDD	6.60	±9.6
10151	CAH	20.0 MHz, QPSK, UL/DL CFG: 1, SSC: 4, 50% RB	LTE-TDD	9.28	±9.6
10152	CAH	20.0 MHz, 16QAM, UL/DL CFG: 1, SSC: 4, 50% RB	LTE-TDD	9.92	±9.6
10153	CAH	20.0 MHz, 64QAM, UL/DL CFG: 1, SSC: 4, 50% RB	LTE-TDD	10.05	±9.6
10154	CAH	10.0 MHz, QPSK, 50% RB	LTE-FDD	5.75	±9.6
10155	CAH	10.0 MHz, 16QAM, 50% RB	LTE-FDD	6.43	±9.6
10156	CAH	5.0 MHz, QPSK, 50% RB	LTE-FDD	5.79	±9.6
10157	CAH	5.0 MHz, 16QAM, 50% RB	LTE-FDD	6.49	±9.6
10158	CAH	10.0 MHz, 64QAM, 50% RB	LTE-FDD	6.62	±9.6
10159	CAH	5.0 MHz, 64QAM, 50% RB	LTE-FDD	6.56	±9.6
10160	CAF	15.0 MHz, QPSK, 50% RB	LTE-FDD	5.82	±9.6
10161	CAF	15.0 MHz, 16QAM, 50% RB	LTE-FDD	6.43	±9.6
10162	CAF	15.0 MHz, 64QAM, 50% RB	LTE-FDD	6.58	±9.6
10166	CAG	1.4 MHz, QPSK, 50% RB	LTE-FDD	5.46	±9.6
10167	CAG	1.4 MHz, 16QAM, 50% RB	LTE-FDD	6.21	±9.6
10168	CAG	1.4 MHz, 64QAM, 50% RB	LTE-FDD	6.79	±9.6
10169	CAF	20.0 MHz, QPSK, 1 RB	LTE-FDD	5.73	±9.6
10170	CAF	20.0 MHz, 16QAM, 1 RB	LTE-FDD	6.52	±9.6
10171	AAF	20.0 MHz, 64QAM, 1 RB	LTE-FDD	6.49	±9.6
10172	CAH	20.0 MHz, QPSK, UL/DL CFG: 1, SSC: 4, 1 RB	LTE-TDD	9.21	±9.6
10173	CAH	20.0 MHz, 16QAM, UL/DL CFG: 1, SSC: 4, 1 RB	LTE-TDD	9.48	±9.6
10174	CAH	20.0 MHz, 64QAM, UL/DL CFG: 1, SSC: 4, 1 RB	LTE-TDD	10.25	±9.6
10175	CAH	10.0 MHz, QPSK, 1 RB	LTE-FDD	5.72	±9.6
10176	CAH	10.0 MHz, 16QAM, 1 RB	LTE-FDD	6.52	±9.6
10177	CAJ	5.0 MHz, QPSK, 1 RB	LTE-FDD	5.73	±9.6
10178	CAH	5.0 MHz, 16QAM, 1 RB	LTE-FDD	6.52	±9.6
10179	CAH	10.0 MHz, 64QAM, 1 RB	LTE-FDD	6.50	±9.6
10180	CAH	5.0 MHz, 64QAM, 1 RB	LTE-FDD	6.50	±9.6
10181	CAF	15.0 MHz, QPSK, 1 RB	LTE-FDD	5.72	±9.6
10182	CAF	15.0 MHz, 16QAM, 1 RB	LTE-FDD	6.52	±9.6
10183	AAE	15.0 MHz, 64QAM, 1 RB	LTE-FDD	6.50	±9.6
10184	CAF	3.0 MHz, QPSK, 1 RB	LTE-FDD	5.73	±9.6
10185	CAF	3.0 MHz, 16QAM, 1 RB	LTE-FDD	6.51	±9.6
10186	AAF	3.0 MHz, 64QAM, 1 RB	LTE-FDD	6.50	±9.6
10187	CAG	1.4 MHz, QPSK, 1 RB	LTE-FDD	5.73	±9.6
10188	CAG	1.4 MHz, 16QAM, 1 RB	LTE-FDD	6.52	±9.6
10189	AAG	1.4 MHz, 64QAM, 1 RB	LTE-FDD	6.50	±9.6
10193	CAE	HT20 Greenfield, MCS0 (6.5 Mbps), 99.4% DC	WLAN	8.09	±9.6
10194	CAE	HT20 Greenfield, MCS4 (39.0 Mbps), 99.5% DC	WLAN	8.12	±9.6
10195	CAE	HT20 Greenfield, MCS7 (65.0 Mbps), 99.5% DC	WLAN	8.21	±9.6
10196	CAE	HT20 Mixed, MCS0 (6.5 Mbps), 99.4% DC	WLAN	8.10	±9.6
10197	CAE	HT20 Mixed, MCS4 (39.0 Mbps), 99.5% DC	WLAN	8.13	±9.6
10198	CAE	HT20 Mixed, MCS7 (65.0 Mbps), 99.5% DC	WLAN	8.27	±9.6
10219	CAE	HT20 Mixed, MCS0 (7.2 Mbps), 99.3% DC	WLAN	8.03	±9.6
10220	CAE	HT20 Mixed, MCS4 (43.3 Mbps), 99.4% DC	WLAN	8.13	±9.6
10221	CAE	HT20 Mixed, MCS7 (72.2 Mbps), 99.4% DC	WLAN	8.27	±9.6
10222	CAE	HT40 Mixed, MCS0 (15.0 Mbps), 99.7% DC	WLAN	8.06	±9.6
10223	CAE	HT40 Mixed, MCS4 (90.0 Mbps), 99.7% DC	WLAN	8.48	±9.6
10224	CAE	HT40 Mixed, MCS7 (150.0 Mbps), 99.7% DC	WLAN	8.08	±9.6
10225	CAC	Rel. 7 HSPA+, 16QAM, 5.0 MHz	WCDMA	5.97	±9.6
10226	CAC	1.4 MHz, 16QAM, UL/DL CFG: 1, SSC: 4, 1 RB	LTE-TDD	9.49	±9.6
10227	CAC	1.4 MHz, 64QAM, UL/DL CFG: 1, SSC: 4, 1 RB	LTE-TDD	10.26	±9.6
10228	CAC	1.4 MHz, QPSK, UL/DL CFG: 1, SSC: 4, 1 RB	LTE-TDD	9.22	±9.6
10229	CAE	3.0 MHz, 16QAM, UL/DL CFG: 1, SSC: 4, 1 RB	LTE-TDD	9.48	±9.6

UID	Rev	Communication System Name	Group	PAR (dB)	Unc ^E k = 2
10230	CAE	3.0 MHz, 64QAM, UL/DL CFG: 1, SSC: 4, 1 RB	LTE-TDD	10.25	±9.6
10231	CAE	3.0 MHz, QPSK, UL/DL CFG: 1, SSC: 4, 1 RB	LTE-TDD	9.19	±9.6
10232	CAH	5.0 MHz, 16QAM, UL/DL CFG: 1, SSC: 4, 1 RB	LTE-TDD	9.48	±9.6
10233	CAH	5.0 MHz, 64QAM, UL/DL CFG: 1, SSC: 4, 1 RB	LTE-TDD	10.25	±9.6
10234	CAH	5.0 MHz, QPSK, UL/DL CFG: 1, SSC: 4, 1 RB	LTE-TDD	9.21	±9.6
10235	CAH	10.0 MHz, 16QAM, UL/DL CFG: 1, SSC: 4, 1 RB	LTE-TDD	9.48	±9.6
10236	CAH	10.0 MHz, 64QAM, UL/DL CFG: 1, SSC: 4, 1 RB	LTE-TDD	10.25	±9.6
10237	CAH	10.0 MHz, QPSK, UL/DL CFG: 1, SSC: 4, 1 RB	LTE-TDD	9.21	±9.6
10238	CAG	15.0 MHz, 16QAM, UL/DL CFG: 1, SSC: 4, 1 RB	LTE-TDD	9.48	±9.6
10239	CAG	15.0 MHz, 64QAM, UL/DL CFG: 1, SSC: 4, 1 RB	LTE-TDD	10.25	±9.6
10240	CAG	15.0 MHz, QPSK, UL/DL CFG: 1, SSC: 4, 1 RB	LTE-TDD	9.21	±9.6
10241	CAC	1.4 MHz, 16QAM, UL/DL CFG: 1, SSC: 4, 50% RB	LTE-TDD	9.82	±9.6
10242	CAC	1.4 MHz, 64QAM, UL/DL CFG: 1, SSC: 4, 50% RB	LTE-TDD	9.86	±9.6
10243	CAC	1.4 MHz, QPSK, UL/DL CFG: 1, SSC: 4, 50% RB	LTE-TDD	9.46	±9.6
10244	CAE	3.0 MHz, 16QAM, UL/DL CFG: 1, SSC: 4, 50% RB	LTE-TDD	10.06	±9.6
10245	CAE	3.0 MHz, 64QAM, UL/DL CFG: 1, SSC: 4, 50% RB	LTE-TDD	10.06	±9.6
10246	CAE	3.0 MHz, QPSK, UL/DL CFG: 1, SSC: 4, 50% RB	LTE-TDD	9.30	±9.6
10247	CAH	5.0 MHz, 16QAM, UL/DL CFG: 1, SSC: 4, 50% RB	LTE-TDD	9.91	±9.6
10248	CAH	5.0 MHz, 64QAM, UL/DL CFG: 1, SSC: 4, 50% RB	LTE-TDD	10.09	±9.6
10249	CAH	5.0 MHz, QPSK, UL/DL CFG: 1, SSC: 4, 50% RB	LTE-TDD	9.29	±9.6
10250	CAH	10.0 MHz, 16QAM, UL/DL CFG: 1, SSC: 4, 50% RB	LTE-TDD	9.81	±9.6
10251	CAH	10.0 MHz, 64QAM, UL/DL CFG: 1, SSC: 4, 50% RB	LTE-TDD	10.17	±9.6
10252	CAH	10.0 MHz, QPSK, UL/DL CFG: 1, SSC: 4, 50% RB	LTE-TDD	9.24	±9.6
10253	CAG	15.0 MHz, 16QAM, UL/DL CFG: 1, SSC: 4, 50% RB	LTE-TDD	9.90	±9.6
10254	CAG	15.0 MHz, 64QAM, UL/DL CFG: 1, SSC: 4, 50% RB	LTE-TDD	10.14	±9.6
10255	CAG	15.0 MHz, QPSK, UL/DL CFG: 1, SSC: 4, 50% RB	LTE-TDD	9.20	±9.6
10256	CAC	1.4 MHz, 16QAM, UL/DL CFG: 1, SSC: 4, 100% RB	LTE-TDD	9.96	±9.6
10257	CAC	1.4 MHz, 64QAM, UL/DL CFG: 1, SSC: 4, 100% RB	LTE-TDD	10.08	±9.6
10258	CAC	1.4 MHz, QPSK, UL/DL CFG: 1, SSC: 4, 100% RB	LTE-TDD	9.34	±9.6
10259	CAE	3.0 MHz, 16QAM, UL/DL CFG: 1, SSC: 4, 100% RB	LTE-TDD	9.98	±9.6
10260	CAE	3.0 MHz, 64QAM, UL/DL CFG: 1, SSC: 4, 100% RB	LTE-TDD	9.97	±9.6
10261	CAE	3.0 MHz, QPSK, UL/DL CFG: 1, SSC: 4, 100% RB	LTE-TDD	9.24	±9.6
10262	CAH	5.0 MHz, 16QAM, UL/DL CFG: 1, SSC: 4, 100% RB	LTE-TDD	9.83	±9.6
10263	CAH	5.0 MHz, 64QAM, UL/DL CFG: 1, SSC: 4, 100% RB	LTE-TDD	10.16	±9.6
10264	CAH	5.0 MHz, QPSK, UL/DL CFG: 1, SSC: 4, 100% RB	LTE-TDD	9.23	±9.6
10265	CAH	10.0 MHz, 16QAM, UL/DL CFG: 1, SSC: 4, 100% RB	LTE-TDD	9.92	±9.6
10266	CAH	10.0 MHz, 64QAM, UL/DL CFG: 1, SSC: 4, 100% RB	LTE-TDD	10.07	±9.6
10267	CAH	10.0 MHz, QPSK, UL/DL CFG: 1, SSC: 4, 100% RB	LTE-TDD	9.30	±9.6
10268	CAG	15.0 MHz, 16QAM, UL/DL CFG: 1, SSC: 4, 100% RB	LTE-TDD	10.06	±9.6
10269	CAG	15.0 MHz, 64QAM, UL/DL CFG: 1, SSC: 4, 100% RB	LTE-TDD	10.13	±9.6
10270	CAG	15.0 MHz, QPSK, UL/DL CFG: 1, SSC: 4, 100% RB	LTE-TDD	9.58	±9.6
10274	CAC	Rel. 6 HSUPA Subset 2, beta_d 0, QPSK, 5.0 MHz	WCDMA	4.87	±9.6
10275	CAC	Rel. 6 HSUPA Subset 2, beta_d 15, QPSK, 5.0 MHz	WCDMA	3.96	±9.6
10290	AAB	RC1, SO55, Full frame rate, 1xRTT	CDMA2000	3.91	±9.6
10291	AAB	RC3, SO55, Full frame rate, 1xRTT	CDMA2000	3.46	±9.6
10292	AAB	RC3, SO32, Full frame rate, SCH0 disabled, 1xRTT	CDMA2000	3.39	±9.6
10293	AAB	RC3, SO3, Full frame rate, 1xRTT	CDMA2000	3.50	±9.6
10295	AAB	RC3, SO3, 1/8 frame rate, 1xRTT	CDMA2000	12.49	±9.6
10297	AAE	20.0 MHz, QPSK, 50% RB	LTE-FDD	5.81	±9.6
10298	AAE	3.0 MHz, QPSK, 50% RB	LTE-FDD	5.72	±9.6
10299	AAE	3.0 MHz, 16QAM, 50% RB	LTE-FDD	6.39	±9.6
10300	AAE	3.0 MHz, 64QAM, 50% RB	LTE-FDD	6.60	±9.6
10301	AAA	PUSC, 29:18, QPSK, 5.0 ms, 18 TRAF SYM	WiMAX	12.03	±9.6
10302	AAA	PUSC, 29:18, QPSK, 5.0 ms, 15 TRAF SYM	WiMAX	12.57	±9.6
10303	AAA	PUSC, 31:15, 64QAM, 5.0 ms, 15 TRAF SYM	WiMAX	12.52	±9.6
10304	AAA	PUSC, 29:18, 64QAM, 5.0 ms, 18 TRAF SYM	WiMAX	11.86	±9.6
10305	AAA	PUSC, 31:15, 64QAM, 10.0 ms, 15 TRAF SYM	WiMAX	15.24	±9.6
10306	AAA	PUSC, 29:18, 64QAM, 10.0 ms, 18 TRAF SYM	WiMAX	14.67	±9.6
10307	AAA	PUSC, 29:18, QPSK, 10.0 ms, 18 TRAF SYM	WiMAX	14.49	±9.6
10308	AAA	PUSC, 29:18, 16QAM, 10.0 ms, 18 TRAF SYM	WiMAX	14.46	±9.6
10309	AAA	AMC 2x3, 29:18, 16QAM, 10.0 ms, 18 TRAF SYM	WiMAX	14.58	±9.6
10310	AAA	AMC 2x3, 29:18, QPSK, 10.0 ms, 18 TRAF SYM	WiMAX	14.57	±9.6
10311	AAE	15.0 MHz, QPSK, 100% RB	LTE-FDD	6.06	±9.6
10315	AAB	DSSS, DBPSK, 1.0 Mbps, 96.0% DC	WLAN	1.71	±9.6
10316	AAB	OFDM, BPSK, 6.0 Mbps, 95.9% DC	WLAN	8.36	±9.6
10317	AAE	OFDM, BPSK, 6.0 Mbps, 95.9% DC	WLAN	8.36	±9.6

UID	Rev	Communication System Name	Group	PAR (dB)	Unc ^E k = 2
10352	AAA	Pulse (D=10%, T=5 ms)	Generic	10.00	±9.6
10353	AAA	Pulse (D=20%, T=5 ms)	Generic	6.99	±9.6
10354	AAA	Pulse (D=40%, T=5 ms)	Generic	3.98	±9.6
10355	AAA	Pulse (D=60%, T=5 ms)	Generic	2.22	±9.6
10356	AAA	Pulse (D=80%, T=5 ms)	Generic	0.97	±9.6
10387	AAA	Random (BW=1 MHz, MOD=QPSK)	Generic	5.10	±9.6
10388	AAA	Random (BW=10 MHz, MOD=QPSK)	Generic	5.22	±9.6
10396	AAA	Random (BW=100 kHz, MOD=64QAM)	Generic	6.27	±9.6
10399	AAA	Random (BW=40 MHz, MOD=64QAM)	Generic	6.27	±9.6
10400	AAF	VHT20, MCS5 (52.0 Mbps), 99.0% DC	WLAN	8.37	±9.6
10401	AAF	VHT40, MCS5 (108.0 Mbps), 96.7% DC	WLAN	8.60	±9.6
10402	AAF	VHT80, MCS5 (234.0 Mbps), 99.0% DC	WLAN	8.53	±9.6
10403	AAB	Rev. 0, 1xEV-DO	CDMA2000	3.76	±9.6
10404	AAB	Rev. A, 1xEV-DO	CDMA2000	3.77	±9.6
10406	AAB	RC3, SO32, Full frame rate, SCH0 enabled, 1xRTT	CDMA2000	5.22	±9.6
10410	AAH	10.0 MHz, QPSK, UL/DL CFG: 0, SSC: 4, 1 RB	LTE-TDD	7.82	±9.6
10414	AAA	Random (BW=40 MHz, HIGH PAR)	Generic	8.54	±9.6
10415	AAA	DSSS, DBPSK, 1.0 Mbps, 99.9% DC	WLAN	1.54	±9.6
10416	AAA	OFDM, BPSK, 6.0 Mbps, 99.9% DC	WLAN	8.23	±9.6
10417	AAD	OFDM, BPSK, 6.0 Mbps, 99.9% DC	WLAN	8.23	±9.6
10418	AAA	OFDM (LTF), BPSK, 6.0 Mbps, 99.8% DC	WLAN	8.14	±9.6
10419	AAA	OFDM (STF), BPSK, 6.0 Mbps, 99.8% DC	WLAN	8.19	±9.6
10422	AAD	HT20 Greenfield, MCS0 (7.2 Mbps), 99.3% DC	WLAN	8.32	±9.6
10423	AAD	HT20 Greenfield, MCS4 (43.3 Mbps), 99.3% DC	WLAN	8.47	±9.6
10424	AAD	HT20 Greenfield, MCS7 (72.2 Mbps), 99.3% DC	WLAN	8.40	±9.6
10425	AAD	HT40 Greenfield, MCS0 (15.0 Mbps), 99.2% DC	WLAN	8.41	±9.6
10426	AAD	HT40 Greenfield, MCS4 (90.0 Mbps), 99.2% DC	WLAN	8.45	±9.6
10427	AAD	HT40 Greenfield, MCS7 (150.0 Mbps), 99.2% DC	WLAN	8.41	±9.6
10430	AAE	5.0 MHz, 64-QAM, 100% RB	LTE-FDD	8.28	±9.6
10431	AAE	10.0 MHz, 64-QAM, 100% RB	LTE-FDD	8.38	±9.6
10432	AAD	15.0 MHz, 64-QAM, 100% RB	LTE-FDD	8.34	±9.6
10433	AAD	20.0 MHz, 64-QAM, 100% RB	LTE-FDD	8.34	±9.6
10434	AAB	BS Test Model 1, 64 DPCH, 64QAM, 5.0 MHz (DL)	WCDMA	8.60	±9.6
10435	AAG	20.0 MHz, QPSK, UL/DL CFG: 0, SSC: 7, 1 RB	LTE-TDD	7.82	±9.6
10447	AAE	5.0 MHz, 64-QAM, 100% RB	LTE-FDD	7.56	±9.6
10448	AAE	10.0 MHz, 64-QAM, 100% RB	LTE-FDD	7.53	±9.6
10449	AAD	15.0 MHz, 64-QAM, 100% RB	LTE-FDD	7.51	±9.6
10450	AAD	20.0 MHz, 64-QAM, 100% RB	LTE-FDD	7.48	±9.6
10451	AAB	BS Test Model 1, 64 DPCH, Clipping 44%, 64QAM, 5.0 MHz (DL)	WCDMA	7.59	±9.6
10456	AAD	VHT160, MCS5 (58.5 Mbps), 99.0% DC	WLAN	8.63	±9.6
10457	AAB	Rel. 5 DC-HSDPA, QPSK, 10.0 MHz	WCDMA	6.62	±9.6
10458	AAA	Rev. B, 2 carriers, 1xEV-DO	CDMA2000	6.55	±9.6
10459	AAA	Rev. B, 3 carriers, 1xEV-DO	CDMA2000	8.25	±9.6
10460	AAB	Rel. 99, AMR, QPSK, 5.0 MHz	WCDMA	2.39	±9.6
10461	AAC	1.4 MHz, QPSK, UL/DL CFG: 0, SSC: 7, 1 RB	LTE-TDD	7.82	±9.6
10462	AAC	1.4 MHz, 16QAM, UL/DL CFG: 0, SSC: 7, 1 RB	LTE-TDD	8.30	±9.6
10463	AAC	1.4 MHz, 64QAM, UL/DL CFG: 0, SSC: 7, 1 RB	LTE-TDD	8.56	±9.6
10464	AAD	3.0 MHz, QPSK, UL/DL CFG: 0, SSC: 7, 1 RB	LTE-TDD	7.82	±9.6
10465	AAD	3.0 MHz, 16QAM, UL/DL CFG: 0, SSC: 7, 1 RB	LTE-TDD	8.32	±9.6
10466	AAD	3.0 MHz, 64QAM, UL/DL CFG: 0, SSC: 7, 1 RB	LTE-TDD	8.57	±9.6
10467	AAG	5.0 MHz, QPSK, UL/DL CFG: 0, SSC: 7, 1 RB	LTE-TDD	7.82	±9.6
10468	AAG	5.0 MHz, 16QAM, UL/DL CFG: 0, SSC: 7, 1 RB	LTE-TDD	8.32	±9.6
10469	AAG	5.0 MHz, 64QAM, UL/DL CFG: 0, SSC: 7, 1 RB	LTE-TDD	8.56	±9.6
10470	AAG	10.0 MHz, QPSK, UL/DL CFG: 0, SSC: 7, 1 RB	LTE-TDD	7.82	±9.6
10471	AAG	10.0 MHz, 16QAM, UL/DL CFG: 0, SSC: 7, 1 RB	LTE-TDD	8.32	±9.6
10472	AAG	10.0 MHz, 64QAM, UL/DL CFG: 0, SSC: 7, 1 RB	LTE-TDD	8.57	±9.6
10473	AAF	15.0 MHz, QPSK, UL/DL CFG: 0, SSC: 7, 1 RB	LTE-TDD	7.82	±9.6
10474	AAF	15.0 MHz, 16QAM, UL/DL CFG: 0, SSC: 7, 1 RB	LTE-TDD	8.32	±9.6
10475	AAF	15.0 MHz, 64QAM, UL/DL CFG: 0, SSC: 7, 1 RB	LTE-TDD	8.57	±9.6
10477	AAG	20.0 MHz, 16QAM, UL/DL CFG: 0, SSC: 7, 1 RB	LTE-TDD	8.32	±9.6
10478	AAG	20.0 MHz, 64QAM, UL/DL CFG: 0, SSC: 7, 1 RB	LTE-TDD	8.57	±9.6
10479	AAC	1.4 MHz, QPSK, UL/DL CFG: 0, SSC: 7, 50% RB	LTE-TDD	7.74	±9.6
10480	AAC	1.4 MHz, 16QAM, UL/DL CFG: 0, SSC: 7, 50% RB	LTE-TDD	8.18	±9.6
10481	AAC	1.4 MHz, 64QAM, UL/DL CFG: 0, SSC: 7, 50% RB	LTE-TDD	8.45	±9.6
10482	AAD	3.0 MHz, QPSK, UL/DL CFG: 0, SSC: 7, 50% RB	LTE-TDD	7.71	±9.6
10483	AAD	3.0 MHz, 16QAM, UL/DL CFG: 0, SSC: 7, 50% RB	LTE-TDD	8.39	±9.6

UID	Rev	Communication System Name	Group	PAR (dB)	Unc ^E k = 2
10484	AAD	3.0 MHz, 64QAM, UL/DL CFG: 0, SSC: 7, 50% RB	LTE-TDD	8.47	±9.6
10485	AAG	5.0 MHz, QPSK, UL/DL CFG: 0, SSC: 7, 50% RB	LTE-TDD	7.59	±9.6
10486	AAG	5.0 MHz, 16QAM, UL/DL CFG: 0, SSC: 7, 50% RB	LTE-TDD	8.38	±9.6
10487	AAG	5.0 MHz, 64QAM, UL/DL CFG: 0, SSC: 7, 50% RB	LTE-TDD	8.60	±9.6
10488	AAG	10.0 MHz, QPSK, UL/DL CFG: 0, SSC: 7, 50% RB	LTE-TDD	7.70	±9.6
10489	AAG	10.0 MHz, 16QAM, UL/DL CFG: 0, SSC: 7, 50% RB	LTE-TDD	8.31	±9.6
10490	AAG	10.0 MHz, 64QAM, UL/DL CFG: 0, SSC: 7, 50% RB	LTE-TDD	8.54	±9.6
10491	AAF	15.0 MHz, QPSK, UL/DL CFG: 0, SSC: 7, 50% RB	LTE-TDD	7.74	±9.6
10492	AAF	15.0 MHz, 16QAM, UL/DL CFG: 0, SSC: 7, 50% RB	LTE-TDD	8.41	±9.6
10493	AAF	15.0 MHz, 64QAM, UL/DL CFG: 0, SSC: 7, 50% RB	LTE-TDD	8.55	±9.6
10494	AAG	20.0 MHz, QPSK, UL/DL CFG: 0, SSC: 7, 50% RB	LTE-TDD	7.74	±9.6
10495	AAG	20.0 MHz, 16QAM, UL/DL CFG: 0, SSC: 7, 50% RB	LTE-TDD	8.37	±9.6
10496	AAG	20.0 MHz, 64QAM, UL/DL CFG: 0, SSC: 7, 50% RB	LTE-TDD	8.54	±9.6
10497	AAC	1.4 MHz, QPSK, UL/DL CFG: 0, SSC: 7, 100% RB	LTE-TDD	7.67	±9.6
10498	AAC	1.4 MHz, 16QAM, UL/DL CFG: 0, SSC: 7, 100% RB	LTE-TDD	8.40	±9.6
10499	AAC	1.4 MHz, 64QAM, UL/DL CFG: 0, SSC: 7, 100% RB	LTE-TDD	8.68	±9.6
10500	AAD	3.0 MHz, QPSK, UL/DL CFG: 0, SSC: 7, 100% RB	LTE-TDD	7.67	±9.6
10501	AAD	3.0 MHz, 16QAM, UL/DL CFG: 0, SSC: 7, 100% RB	LTE-TDD	8.44	±9.6
10502	AAD	3.0 MHz, 64QAM, UL/DL CFG: 0, SSC: 7, 100% RB	LTE-TDD	8.52	±9.6
10503	AAG	5.0 MHz, QPSK, UL/DL CFG: 0, SSC: 7, 100% RB	LTE-TDD	7.72	±9.6
10504	AAG	5.0 MHz, 16QAM, UL/DL CFG: 0, SSC: 7, 100% RB	LTE-TDD	8.31	±9.6
10505	AAG	5.0 MHz, 64QAM, UL/DL CFG: 0, SSC: 7, 100% RB	LTE-TDD	8.54	±9.6
10506	AAG	10.0 MHz, QPSK, UL/DL CFG: 0, SSC: 7, 100% RB	LTE-TDD	7.74	±9.6
10507	AAG	10.0 MHz, 16QAM, UL/DL CFG: 0, SSC: 7, 100% RB	LTE-TDD	8.36	±9.6
10508	AAG	10.0 MHz, 64QAM, UL/DL CFG: 0, SSC: 7, 100% RB	LTE-TDD	8.55	±9.6
10509	AAF	15.0 MHz, QPSK, UL/DL CFG: 0, SSC: 7, 100% RB	LTE-TDD	7.99	±9.6
10510	AAF	15.0 MHz, 16QAM, UL/DL CFG: 0, SSC: 7, 100% RB	LTE-TDD	8.49	±9.6
10511	AAF	15.0 MHz, 64QAM, UL/DL CFG: 0, SSC: 7, 100% RB	LTE-TDD	8.51	±9.6
10512	AAG	20.0 MHz, QPSK, UL/DL CFG: 0, SSC: 7, 100% RB	LTE-TDD	7.74	±9.6
10513	AAG	20.0 MHz, 16QAM, UL/DL CFG: 0, SSC: 7, 100% RB	LTE-TDD	8.42	±9.6
10514	AAG	20.0 MHz, 64QAM, UL/DL CFG: 0, SSC: 7, 100% RB	LTE-TDD	8.45	±9.6
10515	AAA	DSSS, DQPSK, 2.0 Mbps, 99.0% DC	WLAN	1.58	±9.6
10516	AAA	HR-DSSS, DQPSK, 5.5 Mbps, 99.2% DC	WLAN	1.57	±9.6
10517	AAA	HR-DSSS, DQPSK, 11.0 Mbps, 99.0% DC	WLAN	1.58	±9.6
10518	AAD	OFDM, BPSK, 9.0 Mbps, 98.9% DC	WLAN	8.23	±9.6
10519	AAD	OFDM, QPSK, 12.0 Mbps, 99.0% DC	WLAN	8.39	±9.6
10520	AAD	OFDM, QPSK, 18.0 Mbps, 99.0% DC	WLAN	8.12	±9.6
10521	AAD	OFDM, 16QAM, 24.0 Mbps, 99.0% DC	WLAN	7.97	±9.6
10522	AAD	OFDM, 16QAM, 36.0 Mbps, 99.0% DC	WLAN	8.45	±9.6
10523	AAD	OFDM, 64QAM, 48.0 Mbps, 99.0% DC	WLAN	8.08	±9.6
10524	AAD	OFDM, 64QAM, 54.0 Mbps, 99.0% DC	WLAN	8.27	±9.6
10525	AAD	VHT20, MCS0 (6.5 Mbps), 98.9% DC	WLAN	8.36	±9.6
10526	AAD	VHT20, MCS1 (13.0 Mbps), 99.0% DC	WLAN	8.42	±9.6
10527	AAD	VHT20, MCS2 (19.5 Mbps), 99.0% DC	WLAN	8.21	±9.6
10528	AAD	VHT20, MCS3 (26.0 Mbps), 99.0% DC	WLAN	8.36	±9.6
10529	AAD	VHT20, MCS4 (39.0 Mbps), 99.0% DC	WLAN	8.36	±9.6
10531	AAD	VHT20, MCS6 (58.5 Mbps), 99.0% DC	WLAN	8.43	±9.6
10532	AAD	VHT20, MCS7 (65.0 Mbps), 99.0% DC	WLAN	8.29	±9.6
10533	AAD	VHT20, MCS8 (78.0 Mbps), 99.0% DC	WLAN	8.38	±9.6
10534	AAD	VHT40, MCS0 (13.5 Mbps), 98.9% DC	WLAN	8.45	±9.6
10535	AAD	VHT40, MCS1 (27.0 Mbps), 98.8% DC	WLAN	8.45	±9.6
10536	AAD	VHT40, MCS2 (40.5 Mbps), 98.8% DC	WLAN	8.32	±9.6
10537	AAD	VHT40, MCS3 (54.0 Mbps), 98.7% DC	WLAN	8.44	±9.6
10538	AAD	VHT40, MCS4 (81.0 Mbps), 98.5% DC	WLAN	8.54	±9.6
10540	AAD	VHT40, MCS6 (121.5 Mbps), 98.3% DC	WLAN	8.39	±9.6
10541	AAD	VHT40, MCS7 (135.0 Mbps), 98.3% DC	WLAN	8.46	±9.6
10542	AAD	VHT40, MCS8 (162.0 Mbps), 98.1% DC	WLAN	8.65	±9.6
10543	AAD	VHT40, MCS9 (180.0 Mbps), 98.0% DC	WLAN	8.65	±9.6
10544	AAD	VHT80, MCS0 (29.3 Mbps), 99.0% DC	WLAN	8.47	±9.6
10545	AAD	VHT80, MCS1 (58.5 Mbps), 99.0% DC	WLAN	8.55	±9.6
10546	AAD	VHT80, MCS2 (87.8 Mbps), 99.0% DC	WLAN	8.35	±9.6
10547	AAD	VHT80, MCS3 (117.0 Mbps), 99.0% DC	WLAN	8.49	±9.6
10548	AAD	VHT80, MCS4 (175.5 Mbps), 99.0% DC	WLAN	8.37	±9.6
10550	AAD	VHT80, MCS6 (263.3 Mbps), 99.0% DC	WLAN	8.38	±9.6
10551	AAD	VHT80, MCS7 (292.5 Mbps), 99.0% DC	WLAN	8.50	±9.6
10552	AAD	VHT80, MCS8 (351.0 Mbps), 99.0% DC	WLAN	8.42	±9.6

UID	Rev	Communication System Name	Group	PAR (dB)	Unc ^E k = 2
10553	AAD	VHT80, MCS9 (390.0 Mbps), 99.0% DC	WLAN	8.45	±9.6
10554	AAE	VHT160, MCS0 (58.5 Mbps), 99.0% DC	WLAN	8.48	±9.6
10555	AAE	VHT160, MCS1 (117.0 Mbps), 99.0% DC	WLAN	8.47	±9.6
10556	AAE	VHT160, MCS2 (175.5 Mbps), 99.0% DC	WLAN	8.50	±9.6
10557	AAE	VHT160, MCS3 (234.0 Mbps), 99.0% DC	WLAN	8.52	±9.6
10558	AAE	VHT160, MCS4 (351.0 Mbps), 99.0% DC	WLAN	8.61	±9.6
10560	AAE	VHT160, MCS6 (526.5 Mbps), 99.0% DC	WLAN	8.73	±9.6
10561	AAE	VHT160, MCS7 (585.0 Mbps), 99.0% DC	WLAN	8.56	±9.6
10562	AAE	VHT160, MCS8 (702.0 Mbps), 99.0% DC	WLAN	8.69	±9.6
10563	AAE	VHT160, MCS9 (780.0 Mbps), 99.0% DC	WLAN	8.77	±9.6
10564	AAA	OFDM, BPSK, 9.0 Mbps, 98.9% DC	WLAN	8.25	±9.6
10565	AAA	OFDM, QPSK, 12.0 Mbps, 99.0% DC	WLAN	8.45	±9.6
10566	AAA	OFDM, QPSK, 18.0 Mbps, 99.0% DC	WLAN	8.13	±9.6
10567	AAA	OFDM, 16QAM, 24.0 Mbps, 99.0% DC	WLAN	8.00	±9.6
10568	AAA	OFDM, 16QAM, 36.0 Mbps, 99.0% DC	WLAN	8.37	±9.6
10569	AAA	OFDM, 64QAM, 48.0 Mbps, 99.0% DC	WLAN	8.10	±9.6
10570	AAA	OFDM, 64QAM, 54.0 Mbps, 99.0% DC	WLAN	8.30	±9.6
10571	AAA	DSSS, DQPSK, 1.0 Mbps, 90.0% DC	WLAN	1.99	±9.6
10572	AAA	DSSS, DQPSK, 2.0 Mbps, 90.0% DC	WLAN	1.99	±9.6
10573	AAA	HR-DSSS, DQPSK, 5.5 Mbps, 90.1% DC	WLAN	1.98	±9.6
10574	AAA	HR-DSSS, DQPSK, 11.0 Mbps, 90.3% DC	WLAN	1.98	±9.6
10575	AAA	OFDM, BPSK, 6.0 Mbps, 89.9% DC	WLAN	8.59	±9.6
10576	AAA	OFDM, BPSK, 9.0 Mbps, 89.9% DC	WLAN	8.60	±9.6
10577	AAA	OFDM, QPSK, 12.0 Mbps, 90.0% DC	WLAN	8.70	±9.6
10578	AAA	OFDM, QPSK, 18.0 Mbps, 90.0% DC	WLAN	8.49	±9.6
10579	AAA	OFDM, 16QAM, 24.0 Mbps, 90.0% DC	WLAN	8.36	±9.6
10580	AAA	OFDM, 16QAM, 36.0 Mbps, 90.0% DC	WLAN	8.76	±9.6
10581	AAA	OFDM, 64QAM, 48.0 Mbps, 90.0% DC	WLAN	8.35	±9.6
10582	AAA	OFDM, 64QAM, 54.0 Mbps, 90.0% DC	WLAN	8.67	±9.6
10583	AAD	OFDM, BPSK, 6.0 Mbps, 89.9% DC	WLAN	8.59	±9.6
10584	AAD	OFDM, BPSK, 9.0 Mbps, 89.9% DC	WLAN	8.60	±9.6
10585	AAD	OFDM, QPSK, 12.0 Mbps, 90.0% DC	WLAN	8.70	±9.6
10586	AAD	OFDM, QPSK, 18.0 Mbps, 90.0% DC	WLAN	8.49	±9.6
10587	AAD	OFDM, 16QAM, 24.0 Mbps, 90.0% DC	WLAN	8.36	±9.6
10588	AAD	OFDM, 16QAM, 36.0 Mbps, 90.0% DC	WLAN	8.76	±9.6
10589	AAD	OFDM, 64QAM, 48.0 Mbps, 90.0% DC	WLAN	8.35	±9.6
10590	AAD	OFDM, 64QAM, 54.0 Mbps, 90.0% DC	WLAN	8.67	±9.6
10591	AAD	HT20 Mixed, MCS0 (6.5 Mbps), 89.9% DC	WLAN	8.63	±9.6
10592	AAD	HT20 Mixed, MCS1 (13.0 Mbps), 90.0% DC	WLAN	8.79	±9.6
10593	AAD	HT20 Mixed, MCS2 (19.5 Mbps), 90.0% DC	WLAN	8.64	±9.6
10594	AAD	HT20 Mixed, MCS3 (26.0 Mbps), 90.0% DC	WLAN	8.74	±9.6
10595	AAD	HT20 Mixed, MCS4 (39.0 Mbps), 90.0% DC	WLAN	8.74	±9.6
10596	AAD	HT20 Mixed, MCS5 (52.0 Mbps), 90.0% DC	WLAN	8.71	±9.6
10597	AAD	HT20 Mixed, MCS6 (58.5 Mbps), 90.0% DC	WLAN	8.72	±9.6
10598	AAD	HT20 Mixed, MCS7 (65.0 Mbps), 90.0% DC	WLAN	8.50	±9.6
10599	AAD	HT40 Mixed, MCS0 (13.5 Mbps), 89.9% DC	WLAN	8.79	±9.6
10600	AAD	HT40 Mixed, MCS1 (27.0 Mbps), 89.7% DC	WLAN	8.88	±9.6
10601	AAD	HT40 Mixed, MCS2 (40.5 Mbps), 89.6% DC	WLAN	8.82	±9.6
10602	AAD	HT40 Mixed, MCS3 (54.0 Mbps), 89.4% DC	WLAN	8.94	±9.6
10603	AAD	HT40 Mixed, MCS4 (81.0 Mbps), 89.2% DC	WLAN	9.03	±9.6
10604	AAD	HT40 Mixed, MCS5 (108.0 Mbps), 88.9% DC	WLAN	8.76	±9.6
10605	AAD	HT40 Mixed, MCS6 (121.5 Mbps), 88.8% DC	WLAN	8.97	±9.6
10606	AAD	HT40 Mixed, MCS7 (135.0 Mbps), 88.7% DC	WLAN	8.82	±9.6
10607	AAD	VHT20, MCS0 (6.5 Mbps), 89.9% DC	WLAN	8.64	±9.6
10608	AAD	VHT20, MCS1 (13.0 Mbps), 90.0% DC	WLAN	8.77	±9.6
10609	AAD	VHT20, MCS2 (19.5 Mbps), 90.0% DC	WLAN	8.57	±9.6
10610	AAD	VHT20, MCS3 (26.0 Mbps), 90.0% DC	WLAN	8.78	±9.6
10611	AAD	VHT20, MCS4 (39.0 Mbps), 90.0% DC	WLAN	8.70	±9.6
10612	AAD	VHT20, MCS5 (52.0 Mbps), 90.0% DC	WLAN	8.77	±9.6
10613	AAD	VHT20, MCS6 (58.5 Mbps), 90.0% DC	WLAN	8.94	±9.6
10614	AAD	VHT20, MCS7 (65.0 Mbps), 90.0% DC	WLAN	8.59	±9.6
10615	AAD	VHT20, MCS8 (78.0 Mbps), 90.0% DC	WLAN	8.82	±9.6
10616	AAD	VHT40, MCS0 (13.5 Mbps), 89.9% DC	WLAN	8.82	±9.6
10617	AAD	VHT40, MCS1 (27.0 Mbps), 89.7% DC	WLAN	8.81	±9.6
10618	AAD	VHT40, MCS2 (40.5 Mbps), 89.6% DC	WLAN	8.58	±9.6
10619	AAD	VHT40, MCS3 (54.0 Mbps), 89.4% DC	WLAN	8.86	±9.6

UID	Rev	Communication System Name	Group	PAR (dB)	Unc ^E k = 2
10620	AAD	VHT40, MCS4 (81.0 Mbps), 89.2% DC	WLAN	8.87	±9.6
10621	AAD	VHT40, MCS5 (108.0 Mbps), 88.9% DC	WLAN	8.77	±9.6
10622	AAD	VHT40, MCS6 (121.5 Mbps), 88.8% DC	WLAN	8.68	±9.6
10623	AAD	VHT40, MCS7 (135.0 Mbps), 88.6% DC	WLAN	8.82	±9.6
10624	AAD	VHT40, MCS8 (162.0 Mbps), 88.4% DC	WLAN	8.96	±9.6
10625	AAD	VHT40, MCS9 (180.0 Mbps), 88.2% DC	WLAN	8.96	±9.6
10626	AAD	VHT80, MCS0 (29.3 Mbps), 90.0% DC	WLAN	8.83	±9.6
10627	AAD	VHT80, MCS1 (58.5 Mbps), 90.0% DC	WLAN	8.88	±9.6
10628	AAD	VHT80, MCS2 (87.8 Mbps), 90.0% DC	WLAN	8.71	±9.6
10629	AAD	VHT80, MCS3 (117.0 Mbps), 90.0% DC	WLAN	8.85	±9.6
10630	AAD	VHT80, MCS4 (175.5 Mbps), 90.0% DC	WLAN	8.72	±9.6
10631	AAD	VHT80, MCS5 (234.0 Mbps), 90.0% DC	WLAN	8.81	±9.6
10632	AAD	VHT80, MCS6 (263.3 Mbps), 90.0% DC	WLAN	8.74	±9.6
10633	AAD	VHT80, MCS7 (292.5 Mbps), 90.0% DC	WLAN	8.83	±9.6
10634	AAD	VHT80, MCS8 (351.0 Mbps), 90.0% DC	WLAN	8.80	±9.6
10635	AAD	VHT80, MCS9 (390.0 Mbps), 90.0% DC	WLAN	8.81	±9.6
10636	AAE	VHT160, MCS0 (58.5 Mbps), 90.0% DC	WLAN	8.83	±9.6
10637	AAE	VHT160, MCS1 (117.0 Mbps), 90.0% DC	WLAN	8.79	±9.6
10638	AAE	VHT160, MCS2 (175.5 Mbps), 90.0% DC	WLAN	8.86	±9.6
10639	AAE	VHT160, MCS3 (234.0 Mbps), 90.0% DC	WLAN	8.85	±9.6
10640	AAE	VHT160, MCS4 (351.0 Mbps), 90.0% DC	WLAN	8.98	±9.6
10641	AAE	VHT160, MCS5 (468.0 Mbps), 90.0% DC	WLAN	9.06	±9.6
10642	AAE	VHT160, MCS6 (526.5 Mbps), 90.0% DC	WLAN	9.06	±9.6
10643	AAE	VHT160, MCS7 (585.0 Mbps), 90.0% DC	WLAN	8.89	±9.6
10644	AAE	VHT160, MCS8 (702.0 Mbps), 90.0% DC	WLAN	9.05	±9.6
10645	AAE	VHT160, MCS9 (780.0 Mbps), 90.0% DC	WLAN	9.11	±9.6
10646	AAH	5.0 MHz, QPSK, UL/DL CFG: 2, SSC: 4, 1 RB	LTE-TDD	11.96	±9.6
10647	AAG	20.0 MHz, QPSK, UL/DL CFG: 2, SSC: 7, 1 RB	LTE-TDD	11.96	±9.6
10648	AAA	RC8, SO75, 1xAdvanced	CDMA2000	3.45	±9.6
10670	AAA	LE, Test, GFSK	Bluetooth	2.19	±9.6
10671	AAC	ET20, MCS0 (8.6 Mbps), 90.0% DC	WLAN	9.09	±9.6
10672	AAC	ET20, MCS1 (17.0 Mbps), 90.0% DC	WLAN	8.57	±9.6
10673	AAC	ET20, MCS2 (26.0 Mbps), 90.0% DC	WLAN	8.78	±9.6
10674	AAC	ET20, MCS3 (34.0 Mbps), 90.0% DC	WLAN	8.74	±9.6
10675	AAC	ET20, MCS4 (52.0 Mbps), 90.0% DC	WLAN	8.90	±9.6
10676	AAC	ET20, MCS5 (69.0 Mbps), 90.0% DC	WLAN	8.77	±9.6
10677	AAC	ET20, MCS6 (77.0 Mbps), 90.0% DC	WLAN	8.73	±9.6
10678	AAC	ET20, MCS7 (86.0 Mbps), 90.0% DC	WLAN	8.78	±9.6
10679	AAC	ET20, MCS8 (103.0 Mbps), 90.0% DC	WLAN	8.89	±9.6
10680	AAC	ET20, MCS9 (115.0 Mbps), 90.0% DC	WLAN	8.80	±9.6
10681	AAC	ET20, MCS10 (122.0 Mbps), 90.0% DC	WLAN	8.62	±9.6
10682	AAC	ET20, MCS11 (135.0 Mbps), 90.0% DC	WLAN	8.83	±9.6
10683	AAC	ET20, MCS0 (8.6 Mbps), 100.0% DC	WLAN	8.42	±9.6
10684	AAC	ET20, MCS1 (17.0 Mbps), 100.0% DC	WLAN	8.26	±9.6
10685	AAC	ET20, MCS2 (26.0 Mbps), 100.0% DC	WLAN	8.33	±9.6
10686	AAC	ET20, MCS3 (34.0 Mbps), 100.0% DC	WLAN	8.28	±9.6
10687	AAC	ET20, MCS4 (52.0 Mbps), 100.0% DC	WLAN	8.45	±9.6
10688	AAC	ET20, MCS5 (69.0 Mbps), 100.0% DC	WLAN	8.29	±9.6
10689	AAC	ET20, MCS6 (77.0 Mbps), 100.0% DC	WLAN	8.55	±9.6
10690	AAC	ET20, MCS7 (86.0 Mbps), 100.0% DC	WLAN	8.29	±9.6
10691	AAC	ET20, MCS8 (103.0 Mbps), 100.0% DC	WLAN	8.25	±9.6
10692	AAC	ET20, MCS9 (115.0 Mbps), 100.0% DC	WLAN	8.29	±9.6
10693	AAC	ET20, MCS10 (122.0 Mbps), 100.0% DC	WLAN	8.25	±9.6
10694	AAC	ET20, MCS11 (135.0 Mbps), 100.0% DC	WLAN	8.57	±9.6
10695	AAC	ET40, MCS0 (17.2 Mbps), 89.8% DC	WLAN	8.78	±9.6
10696	AAC	ET40, MCS1 (34.0 Mbps), 89.8% DC	WLAN	8.91	±9.6
10697	AAC	ET40, MCS2 (52.0 Mbps), 89.7% DC	WLAN	8.61	±9.6
10698	AAC	ET40, MCS3 (69.0 Mbps), 89.7% DC	WLAN	8.89	±9.6
10699	AAC	ET40, MCS4 (103.0 Mbps), 89.9% DC	WLAN	8.82	±9.6
10700	AAC	ET40, MCS5 (138.0 Mbps), 89.8% DC	WLAN	8.73	±9.6
10701	AAC	ET40, MCS6 (155.0 Mbps), 89.8% DC	WLAN	8.86	±9.6
10702	AAC	ET40, MCS7 (172.0 Mbps), 89.8% DC	WLAN	8.70	±9.6
10703	AAC	ET40, MCS8 (207.0 Mbps), 89.8% DC	WLAN	8.82	±9.6
10704	AAC	ET40, MCS9 (229.0 Mbps), 89.8% DC	WLAN	8.56	±9.6
10705	AAC	ET40, MCS10 (258.0 Mbps), 89.8% DC	WLAN	8.69	±9.6
10706	AAC	ET40, MCS11 (267.0 Mbps), 89.8% DC	WLAN	8.66	±9.6

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10707	AAC	ET40, MCS0 (17.2 Mbps), 99.8% DC	WLAN	8.32	±9.6
10708	AAC	ET40, MCS1 (34.0 Mbps), 99.7% DC	WLAN	8.55	±9.6
10709	AAC	ET40, MCS2 (52.0 Mbps), 99.7% DC	WLAN	8.33	±9.6
10710	AAC	ET40, MCS3 (69.0 Mbps), 99.7% DC	WLAN	8.29	±9.6
10711	AAC	ET40, MCS4 (103.0 Mbps), 99.8% DC	WLAN	8.39	±9.6
10712	AAC	ET40, MCS5 (138.0 Mbps), 99.8% DC	WLAN	8.67	±9.6
10713	AAC	ET40, MCS6 (155.0 Mbps), 99.8% DC	WLAN	8.33	±9.6
10714	AAC	ET40, MCS7 (172.0 Mbps), 99.8% DC	WLAN	8.26	±9.6
10715	AAC	ET40, MCS8 (207.0 Mbps), 99.8% DC	WLAN	8.45	±9.6
10716	AAC	ET40, MCS9 (229.0 Mbps), 99.8% DC	WLAN	8.30	±9.6
10717	AAC	ET40, MCS10 (258.0 Mbps), 99.8% DC	WLAN	8.48	±9.6
10718	AAC	ET40, MCS11 (267.0 Mbps), 99.8% DC	WLAN	8.24	±9.6
10719	AAC	ET80, MCS0 (36.0 Mbps), 90.0% DC	WLAN	8.81	±9.6
10720	AAC	ET80, MCS1 (72.1 Mbps), 90.0% DC	WLAN	8.87	±9.6
10721	AAC	ET80, MCS2 (108.1 Mbps), 90.0% DC	WLAN	8.76	±9.6
10722	AAC	ET80, MCS3 (144.1 Mbps), 90.0% DC	WLAN	8.55	±9.6
10723	AAC	ET80, MCS4 (216.2 Mbps), 90.0% DC	WLAN	8.70	±9.6
10724	AAC	ET80, MCS5 (288.2 Mbps), 90.0% DC	WLAN	8.90	±9.6
10725	AAC	ET80, MCS6 (324.4 Mbps), 90.0% DC	WLAN	8.74	±9.6
10726	AAC	ET80, MCS7 (360.3 Mbps), 90.0% DC	WLAN	8.72	±9.6
10727	AAC	ET80, MCS8 (432.4 Mbps), 90.0% DC	WLAN	8.66	±9.6
10728	AAC	ET80, MCS9 (480.4 Mbps), 90.0% DC	WLAN	8.65	±9.6
10729	AAC	ET80, MCS10 (540.4 Mbps), 90.0% DC	WLAN	8.64	±9.6
10730	AAC	ET80, MCS11 (72.0 Mbps), 90.0% DC	WLAN	8.67	±9.6
10731	AAC	ET80, MCS0 (36.0 Mbps), 100.0% DC	WLAN	8.42	±9.6
10732	AAC	ET80, MCS1 (72.1 Mbps), 100.0% DC	WLAN	8.46	±9.6
10733	AAC	ET80, MCS2 (108.1 Mbps), 100.0% DC	WLAN	8.40	±9.6
10734	AAC	ET80, MCS3 (144.1 Mbps), 100.0% DC	WLAN	8.25	±9.6
10735	AAC	ET80, MCS4 (216.2 Mbps), 100.0% DC	WLAN	8.33	±9.6
10736	AAC	ET80, MCS5 (288.2 Mbps), 100.0% DC	WLAN	8.27	±9.6
10737	AAC	ET80, MCS6 (324.4 Mbps), 100.0% DC	WLAN	8.36	±9.6
10738	AAC	ET80, MCS7 (360.3 Mbps), 100.0% DC	WLAN	8.42	±9.6
10739	AAC	ET80, MCS8 (432.4 Mbps), 100.0% DC	WLAN	8.29	±9.6
10740	AAC	ET80, MCS9 (480.4 Mbps), 100.0% DC	WLAN	8.48	±9.6
10741	AAC	ET80, MCS10 (540.4 Mbps), 100.0% DC	WLAN	8.40	±9.6
10742	AAC	ET80, MCS11 (600.5 Mbps), 100.0% DC	WLAN	8.43	±9.6
10743	AAC	ET160, MCS0 (72.0 Mbps), 88.2% DC	WLAN	8.94	±9.6
10744	AAC	ET160, MCS1 (144.0 Mbps), 87.1% DC	WLAN	9.16	±9.6
10745	AAC	ET160, MCS2 (216.0 Mbps), 87.4% DC	WLAN	8.93	±9.6
10746	AAC	ET160, MCS3 (282.0 Mbps), 87.1% DC	WLAN	9.11	±9.6
10747	AAC	ET160, MCS4 (432.0 Mbps), 87.4% DC	WLAN	9.04	±9.6
10748	AAC	ET160, MCS5 (576.0 Mbps), 86.8% DC	WLAN	8.93	±9.6
10749	AAC	ET160, MCS6 (649.0 Mbps), 86.7% DC	WLAN	8.90	±9.6
10750	AAC	ET160, MCS7 (721.0 Mbps), 86.7% DC	WLAN	8.79	±9.6
10751	AAC	ET160, MCS8 (865.0 Mbps), 86.3% DC	WLAN	8.82	±9.6
10752	AAC	ET160, MCS9 (961.0 Mbps), 86.3% DC	WLAN	8.81	±9.6
10753	AAC	ET160, MCS10 (1081.0 Mbps), 86.7% DC	WLAN	9.00	±9.6
10754	AAC	ET160, MCS11 (1201.0 Mbps), 86.7% DC	WLAN	8.94	±9.6
10755	AAC	ET160, MCS0 (72.0 Mbps), 98.0% DC	WLAN	8.64	±9.6
10756	AAC	ET160, MCS1 (144.0 Mbps), 96.8% DC	WLAN	8.77	±9.6
10757	AAC	ET160, MCS2 (216.0 Mbps), 97.1% DC	WLAN	8.77	±9.6
10758	AAC	ET160, MCS3 (282.0 Mbps), 96.8% DC	WLAN	8.69	±9.6
10759	AAC	ET160, MCS4 (432.0 Mbps), 97.1% DC	WLAN	8.58	±9.6
10760	AAC	ET160, MCS5 (576.0 Mbps), 96.5% DC	WLAN	8.49	±9.6
10761	AAC	ET160, MCS6 (649.0 Mbps), 96.3% DC	WLAN	8.58	±9.6
10762	AAC	ET160, MCS7 (721.0 Mbps), 96.3% DC	WLAN	8.49	±9.6
10763	AAC	ET160, MCS8 (865.0 Mbps), 95.9% DC	WLAN	8.53	±9.6
10764	AAC	ET160, MCS9 (961.0 Mbps), 95.9% DC	WLAN	8.54	±9.6
10765	AAC	ET160, MCS10 (1081.0 Mbps), 96.3% DC	WLAN	8.54	±9.6
10766	AAC	ET160, MCS11 (1201.0 Mbps), 96.3% DC	WLAN	8.51	±9.6
10767	AAG	CP-OFDM, 5.0 MHz, QPSK, 15 kHz, 99.9% DC, 1 RB	5G NR FR1 TDD	7.99	±9.6
10768	AAE	CP-OFDM, 10.0 MHz, QPSK, 15 kHz, 100.0% DC, 1 RB	5G NR FR1 TDD	8.01	±9.6
10769	AAD	CP-OFDM, 15.0 MHz, QPSK, 15 kHz, 100.0% DC, 1 RB	5G NR FR1 TDD	8.01	±9.6
10770	AAE	CP-OFDM, 20.0 MHz, QPSK, 15 kHz, 100.0% DC, 1 RB	5G NR FR1 TDD	8.02	±9.6
10771	AAD	CP-OFDM, 25.0 MHz, QPSK, 15 kHz, 100.0% DC, 1 RB	5G NR FR1 TDD	8.02	±9.6
10772	AAE	CP-OFDM, 30.0 MHz, QPSK, 15 kHz, 100.0% DC, 1 RB	5G NR FR1 TDD	8.23	±9.6

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10773	AAF	CP-OFDM, 40.0 MHz, QPSK, 15 kHz, 100.0% DC, 1 RB	5G NR FR1 TDD	8.03	±9.6
10774	AAE	CP-OFDM, 50.0 MHz, QPSK, 15 kHz, 100.0% DC, 1 RB	5G NR FR1 TDD	8.02	±9.6
10775	AAF	CP-OFDM, 5.0 MHz, QPSK, 15 kHz, 100.0% DC, 50% RB	5G NR FR1 TDD	8.31	±9.6
10776	AAE	CP-OFDM, 10.0 MHz, QPSK, 15 kHz, 100.0% DC, 50% RB	5G NR FR1 TDD	8.30	±9.6
10777	AAC	CP-OFDM, 15.0 MHz, QPSK, 15 kHz, 100.0% DC, 50% RB	5G NR FR1 TDD	8.30	±9.6
10778	AAE	CP-OFDM, 20.0 MHz, QPSK, 15 kHz, 100.0% DC, 50% RB	5G NR FR1 TDD	8.34	±9.6
10779	AAC	CP-OFDM, 25.0 MHz, QPSK, 15 kHz, 100.0% DC, 50% RB	5G NR FR1 TDD	8.42	±9.6
10780	AAE	CP-OFDM, 30.0 MHz, QPSK, 15 kHz, 100.0% DC, 50% RB	5G NR FR1 TDD	8.38	±9.6
10781	AAF	CP-OFDM, 40.0 MHz, QPSK, 15 kHz, 100.0% DC, 50% RB	5G NR FR1 TDD	8.38	±9.6
10782	AAE	CP-OFDM, 50.0 MHz, QPSK, 15 kHz, 100.0% DC, 50% RB	5G NR FR1 TDD	8.43	±9.6
10783	AAG	CP-OFDM, 5.0 MHz, QPSK, 15 kHz, 100.0% DC, 100% RB	5G NR FR1 TDD	8.31	±9.6
10784	AAE	CP-OFDM, 10.0 MHz, QPSK, 15 kHz, 100.0% DC, 100% RB	5G NR FR1 TDD	8.29	±9.6
10785	AAD	CP-OFDM, 15.0 MHz, QPSK, 15 kHz, 100.0% DC, 100% RB	5G NR FR1 TDD	8.40	±9.6
10786	AAE	CP-OFDM, 20.0 MHz, QPSK, 15 kHz, 100.0% DC, 100% RB	5G NR FR1 TDD	8.35	±9.6
10787	AAD	CP-OFDM, 25.0 MHz, QPSK, 15 kHz, 100.0% DC, 100% RB	5G NR FR1 TDD	8.44	±9.6
10788	AAE	CP-OFDM, 30.0 MHz, QPSK, 15 kHz, 100.0% DC, 100% RB	5G NR FR1 TDD	8.39	±9.6
10789	AAF	CP-OFDM, 40.0 MHz, QPSK, 15 kHz, 100.0% DC, 100% RB	5G NR FR1 TDD	8.37	±9.6
10790	AAE	CP-OFDM, 50.0 MHz, QPSK, 15 kHz, 100.0% DC, 100% RB	5G NR FR1 TDD	8.39	±9.6
10791	AAG	CP-OFDM, 5.0 MHz, QPSK, 30 kHz, 99.9% DC, 1 RB	5G NR FR1 TDD	7.83	±9.6
10792	AAE	CP-OFDM, 10.0 MHz, QPSK, 30 kHz, 99.9% DC, 1 RB	5G NR FR1 TDD	7.92	±9.6
10793	AAD	CP-OFDM, 15.0 MHz, QPSK, 30 kHz, 100.0% DC, 1 RB	5G NR FR1 TDD	7.95	±9.6
10794	AAE	CP-OFDM, 20.0 MHz, QPSK, 30 kHz, 100.0% DC, 1 RB	5G NR FR1 TDD	7.82	±9.6
10795	AAD	CP-OFDM, 25.0 MHz, QPSK, 30 kHz, 100.0% DC, 1 RB	5G NR FR1 TDD	7.84	±9.6
10796	AAE	CP-OFDM, 30.0 MHz, QPSK, 30 kHz, 100.0% DC, 1 RB	5G NR FR1 TDD	7.82	±9.6
10797	AAF	CP-OFDM, 40.0 MHz, QPSK, 30 kHz, 100.0% DC, 1 RB	5G NR FR1 TDD	8.01	±9.6
10798	AAE	CP-OFDM, 50.0 MHz, QPSK, 30 kHz, 100.0% DC, 1 RB	5G NR FR1 TDD	7.89	±9.6
10799	AAF	CP-OFDM, 60.0 MHz, QPSK, 30 kHz, 100.0% DC, 1 RB	5G NR FR1 TDD	7.93	±9.6
10801	AAF	CP-OFDM, 80.0 MHz, QPSK, 30 kHz, 100.0% DC, 1 RB	5G NR FR1 TDD	7.89	±9.6
10802	AAE	CP-OFDM, 90.0 MHz, QPSK, 30 kHz, 100.0% DC, 1 RB	5G NR FR1 TDD	7.87	±9.6
10803	AAF	CP-OFDM, 100.0 MHz, QPSK, 30 kHz, 100.0% DC, 1 RB	5G NR FR1 TDD	7.93	±9.6
10805	AAE	CP-OFDM, 10.0 MHz, QPSK, 30 kHz, 100.0% DC, 50% RB	5G NR FR1 TDD	8.34	±9.6
10806	AAD	CP-OFDM, 15.0 MHz, QPSK, 30 kHz, 100.0% DC, 50% RB	5G NR FR1 TDD	8.37	±9.6
10809	AAE	CP-OFDM, 30.0 MHz, QPSK, 30 kHz, 100.0% DC, 50% RB	5G NR FR1 TDD	8.34	±9.6
10810	AAF	CP-OFDM, 40.0 MHz, QPSK, 30 kHz, 100.0% DC, 50% RB	5G NR FR1 TDD	8.34	±9.6
10812	AAF	CP-OFDM, 60.0 MHz, QPSK, 30 kHz, 100.0% DC, 50% RB	5G NR FR1 TDD	8.35	±9.6
10817	AAG	CP-OFDM, 5.0 MHz, QPSK, 30 kHz, 100.0% DC, 100% RB	5G NR FR1 TDD	8.35	±9.6
10818	AAE	CP-OFDM, 10.0 MHz, QPSK, 30 kHz, 100.0% DC, 100% RB	5G NR FR1 TDD	8.34	±9.6
10819	AAD	CP-OFDM, 15.0 MHz, QPSK, 30 kHz, 100.0% DC, 100% RB	5G NR FR1 TDD	8.33	±9.6
10820	AAE	CP-OFDM, 20.0 MHz, QPSK, 30 kHz, 100.0% DC, 100% RB	5G NR FR1 TDD	8.30	±9.6
10821	AAD	CP-OFDM, 25.0 MHz, QPSK, 30 kHz, 100.0% DC, 100% RB	5G NR FR1 TDD	8.41	±9.6
10822	AAE	CP-OFDM, 30.0 MHz, QPSK, 30 kHz, 100.0% DC, 100% RB	5G NR FR1 TDD	8.41	±9.6
10823	AAF	CP-OFDM, 40.0 MHz, QPSK, 30 kHz, 100.0% DC, 100% RB	5G NR FR1 TDD	8.36	±9.6
10824	AAE	CP-OFDM, 50.0 MHz, QPSK, 30 kHz, 100.0% DC, 100% RB	5G NR FR1 TDD	8.39	±9.6
10825	AAF	CP-OFDM, 60.0 MHz, QPSK, 30 kHz, 100.0% DC, 100% RB	5G NR FR1 TDD	8.41	±9.6
10827	AAF	CP-OFDM, 80.0 MHz, QPSK, 30 kHz, 100.0% DC, 100% RB	5G NR FR1 TDD	8.42	±9.6
10828	AAE	CP-OFDM, 90.0 MHz, QPSK, 30 kHz, 100.0% DC, 100% RB	5G NR FR1 TDD	8.43	±9.6
10829	AAF	CP-OFDM, 100.0 MHz, QPSK, 30 kHz, 100.0% DC, 100% RB	5G NR FR1 TDD	8.40	±9.6
10830	AAE	CP-OFDM, 10.0 MHz, QPSK, 60 kHz, 99.9% DC, 1 RB	5G NR FR1 TDD	7.63	±9.6
10831	AAD	CP-OFDM, 15.0 MHz, QPSK, 60 kHz, 99.9% DC, 1 RB	5G NR FR1 TDD	7.73	±9.6
10832	AAE	CP-OFDM, 20.0 MHz, QPSK, 60 kHz, 99.9% DC, 1 RB	5G NR FR1 TDD	7.74	±9.6
10833	AAD	CP-OFDM, 25.0 MHz, QPSK, 60 kHz, 99.9% DC, 1 RB	5G NR FR1 TDD	7.70	±9.6
10834	AAE	CP-OFDM, 30.0 MHz, QPSK, 60 kHz, 100.0% DC, 1 RB	5G NR FR1 TDD	7.75	±9.6
10835	AAF	CP-OFDM, 40.0 MHz, QPSK, 60 kHz, 100.0% DC, 1 RB	5G NR FR1 TDD	7.70	±9.6
10836	AAE	CP-OFDM, 50.0 MHz, QPSK, 60 kHz, 100.0% DC, 1 RB	5G NR FR1 TDD	7.66	±9.6
10837	AAF	CP-OFDM, 60.0 MHz, QPSK, 60 kHz, 100.0% DC, 1 RB	5G NR FR1 TDD	7.68	±9.6
10839	AAF	CP-OFDM, 80.0 MHz, QPSK, 60 kHz, 100.0% DC, 1 RB	5G NR FR1 TDD	7.70	±9.6
10840	AAE	CP-OFDM, 90.0 MHz, QPSK, 60 kHz, 100.0% DC, 1 RB	5G NR FR1 TDD	7.67	±9.6
10841	AAF	CP-OFDM, 100.0 MHz, QPSK, 60 kHz, 100.0% DC, 1 RB	5G NR FR1 TDD	7.71	±9.6
10843	AAD	CP-OFDM, 15.0 MHz, QPSK, 60 kHz, 100.0% DC, 50% RB	5G NR FR1 TDD	8.49	±9.6
10844	AAE	CP-OFDM, 20.0 MHz, QPSK, 60 kHz, 100.0% DC, 50% RB	5G NR FR1 TDD	8.34	±9.6
10846	AAE	CP-OFDM, 30.0 MHz, QPSK, 60 kHz, 100.0% DC, 50% RB	5G NR FR1 TDD	8.41	±9.6
10854	AAE	CP-OFDM, 10.0 MHz, QPSK, 60 kHz, 100.0% DC, 100% RB	5G NR FR1 TDD	8.34	±9.6
10855	AAD	CP-OFDM, 15.0 MHz, QPSK, 60 kHz, 100.0% DC, 100% RB	5G NR FR1 TDD	8.36	±9.6
10856	AAE	CP-OFDM, 20.0 MHz, QPSK, 60 kHz, 100.0% DC, 100% RB	5G NR FR1 TDD	8.37	±9.6
10857	AAD	CP-OFDM, 25.0 MHz, QPSK, 60 kHz, 100.0% DC, 100% RB	5G NR FR1 TDD	8.35	±9.6
10858	AAE	CP-OFDM, 30.0 MHz, QPSK, 60 kHz, 100.0% DC, 100% RB	5G NR FR1 TDD	8.36	±9.6

UID	Rev	Communication System Name	Group	PAR (dB)	Unc ^E k = 2
10859	AAF	CP-OFDM, 40.0 MHz, QPSK, 60 kHz, 100.0% DC, 100% RB	5G NR FR1 TDD	8.34	±9.6
10860	AAE	CP-OFDM, 50.0 MHz, QPSK, 60 kHz, 100.0% DC, 100% RB	5G NR FR1 TDD	8.41	±9.6
10861	AAF	CP-OFDM, 60.0 MHz, QPSK, 60 kHz, 100.0% DC, 100% RB	5G NR FR1 TDD	8.40	±9.6
10863	AAF	CP-OFDM, 80.0 MHz, QPSK, 60 kHz, 100.0% DC, 100% RB	5G NR FR1 TDD	8.41	±9.6
10864	AAE	CP-OFDM, 90.0 MHz, QPSK, 60 kHz, 100.0% DC, 100% RB	5G NR FR1 TDD	8.37	±9.6
10865	AAF	CP-OFDM, 100.0 MHz, QPSK, 60 kHz, 100.0% DC, 100% RB	5G NR FR1 TDD	8.41	±9.6
10866	AAF	DFT-s-OFDM, 100.0 MHz, QPSK, 30 kHz, 100.0% DC, 1 RB	5G NR FR1 TDD	5.68	±9.6
10868	AAF	DFT-s-OFDM, 100.0 MHz, QPSK, 30 kHz, 100.0% DC, 100% RB	5G NR FR1 TDD	5.89	±9.6
10869	AAE	DFT-s-OFDM, 100.0 MHz, QPSK, 120 kHz, 100.0% DC, 1 RB	5G NR FR2 TDD	5.75	±9.6
10870	AAE	DFT-s-OFDM, 100.0 MHz, QPSK, 120 kHz, 100.0% DC, 100% RB	5G NR FR2 TDD	5.86	±9.6
10871	AAE	DFT-s-OFDM, 100.0 MHz, 16QAM, 120 kHz, 100.0% DC, 1 RB	5G NR FR2 TDD	5.75	±9.6
10872	AAE	DFT-s-OFDM, 100.0 MHz, 16QAM, 120 kHz, 100.0% DC, 100% RB	5G NR FR2 TDD	6.52	±9.6
10873	AAE	DFT-s-OFDM, 100.0 MHz, 64QAM, 120 kHz, 100.0% DC, 1 RB	5G NR FR2 TDD	6.61	±9.6
10874	AAE	DFT-s-OFDM, 100.0 MHz, 64QAM, 120 kHz, 100.0% DC, 100% RB	5G NR FR2 TDD	6.65	±9.6
10875	AAE	CP-OFDM, 100.0 MHz, QPSK, 120 kHz, 100.0% DC, 1 RB	5G NR FR2 TDD	7.78	±9.6
10876	AAE	CP-OFDM, 100.0 MHz, QPSK, 120 kHz, 100.0% DC, 100% RB	5G NR FR2 TDD	8.39	±9.6
10877	AAE	CP-OFDM, 100.0 MHz, 16QAM, 120 kHz, 100.0% DC, 1 RB	5G NR FR2 TDD	7.95	±9.6
10878	AAE	CP-OFDM, 100.0 MHz, 16QAM, 120 kHz, 100.0% DC, 100% RB	5G NR FR2 TDD	8.41	±9.6
10879	AAE	CP-OFDM, 100.0 MHz, 64QAM, 120 kHz, 100.0% DC, 1 RB	5G NR FR2 TDD	8.12	±9.6
10880	AAE	CP-OFDM, 100.0 MHz, 64QAM, 120 kHz, 100.0% DC, 100% RB	5G NR FR2 TDD	8.38	±9.6
10881	AAE	DFT-s-OFDM, 50.0 MHz, QPSK, 120 kHz, 100.0% DC, 1 RB	5G NR FR2 TDD	5.75	±9.6
10882	AAE	DFT-s-OFDM, 50.0 MHz, QPSK, 120 kHz, 100.0% DC, 100% RB	5G NR FR2 TDD	5.96	±9.6
10883	AAE	DFT-s-OFDM, 50.0 MHz, 16QAM, 120 kHz, 100.0% DC, 1 RB	5G NR FR2 TDD	6.57	±9.6
10884	AAE	DFT-s-OFDM, 50.0 MHz, 16QAM, 120 kHz, 100.0% DC, 100% RB	5G NR FR2 TDD	6.53	±9.6
10885	AAE	DFT-s-OFDM, 50.0 MHz, 64QAM, 120 kHz, 100.0% DC, 1 RB	5G NR FR2 TDD	6.61	±9.6
10886	AAE	DFT-s-OFDM, 50.0 MHz, 64QAM, 120 kHz, 100.0% DC, 100% RB	5G NR FR2 TDD	6.65	±9.6
10887	AAE	CP-OFDM, 50.0 MHz, QPSK, 120 kHz, 99.9% DC, 1 RB	5G NR FR2 TDD	7.78	±9.6
10888	AAE	CP-OFDM, 50.0 MHz, QPSK, 120 kHz, 100.0% DC, 100% RB	5G NR FR2 TDD	8.35	±9.6
10889	AAE	CP-OFDM, 50.0 MHz, 16QAM, 120 kHz, 100.0% DC, 1 RB	5G NR FR2 TDD	8.02	±9.6
10890	AAE	CP-OFDM, 50.0 MHz, 16QAM, 120 kHz, 100.0% DC, 100% RB	5G NR FR2 TDD	8.40	±9.6
10891	AAE	CP-OFDM, 50.0 MHz, 64QAM, 120 kHz, 100.0% DC, 1 RB	5G NR FR2 TDD	8.13	±9.6
10892	AAE	CP-OFDM, 50.0 MHz, 64QAM, 120 kHz, 100.0% DC, 100% RB	5G NR FR2 TDD	8.41	±9.6
10897	AAE	DFT-s-OFDM, 5.0 MHz, QPSK, 30 kHz, 99.9% DC, 1 RB	5G NR FR1 TDD	5.66	±9.6
10898	AAC	DFT-s-OFDM, 10.0 MHz, QPSK, 30 kHz, 100.0% DC, 1 RB	5G NR FR1 TDD	5.67	±9.6
10899	AAB	DFT-s-OFDM, 15.0 MHz, QPSK, 30 kHz, 100.0% DC, 1 RB	5G NR FR1 TDD	5.67	±9.6
10900	AAC	DFT-s-OFDM, 20.0 MHz, QPSK, 30 kHz, 100.0% DC, 1 RB	5G NR FR1 TDD	5.68	±9.6
10901	AAB	DFT-s-OFDM, 25.0 MHz, QPSK, 30 kHz, 100.0% DC, 1 RB	5G NR FR1 TDD	5.68	±9.6
10902	AAC	DFT-s-OFDM, 30.0 MHz, QPSK, 30 kHz, 100.0% DC, 1 RB	5G NR FR1 TDD	5.68	±9.6
10903	AAD	DFT-s-OFDM, 40.0 MHz, QPSK, 30 kHz, 100.0% DC, 1 RB	5G NR FR1 TDD	5.68	±9.6
10904	AAC	DFT-s-OFDM, 50.0 MHz, QPSK, 30 kHz, 100.0% DC, 1 RB	5G NR FR1 TDD	5.68	±9.6
10905	AAD	DFT-s-OFDM, 60.0 MHz, QPSK, 30 kHz, 100.0% DC, 1 RB	5G NR FR1 TDD	5.68	±9.6
10906	AAD	DFT-s-OFDM, 80.0 MHz, QPSK, 30 kHz, 100.0% DC, 1 RB	5G NR FR1 TDD	5.68	±9.6
10907	AAE	DFT-s-OFDM, 5.0 MHz, QPSK, 30 kHz, 100.0% DC, 50% RB	5G NR FR1 TDD	5.78	±9.6
10908	AAC	DFT-s-OFDM, 10.0 MHz, QPSK, 30 kHz, 100.0% DC, 50% RB	5G NR FR1 TDD	5.93	±9.6
10909	AAB	DFT-s-OFDM, 15.0 MHz, QPSK, 30 kHz, 100.0% DC, 50% RB	5G NR FR1 TDD	5.96	±9.6
10910	AAC	DFT-s-OFDM, 20.0 MHz, QPSK, 30 kHz, 100.0% DC, 50% RB	5G NR FR1 TDD	5.83	±9.6
10911	AAC	DFT-s-OFDM, 25.0 MHz, QPSK, 30 kHz, 100.0% DC, 50% RB	5G NR FR1 TDD	5.93	±9.6
10912	AAB	DFT-s-OFDM, 30.0 MHz, QPSK, 30 kHz, 100.0% DC, 50% RB	5G NR FR1 TDD	5.84	±9.6
10913	AAD	DFT-s-OFDM, 40.0 MHz, QPSK, 30 kHz, 100.0% DC, 50% RB	5G NR FR1 TDD	5.84	±9.6
10914	AAC	DFT-s-OFDM, 50.0 MHz, QPSK, 30 kHz, 100.0% DC, 50% RB	5G NR FR1 TDD	5.85	±9.6
10915	AAD	DFT-s-OFDM, 60.0 MHz, QPSK, 30 kHz, 100.0% DC, 50% RB	5G NR FR1 TDD	5.83	±9.6
10916	AAD	DFT-s-OFDM, 80.0 MHz, QPSK, 30 kHz, 100.0% DC, 50% RB	5G NR FR1 TDD	5.87	±9.6
10917	AAD	DFT-s-OFDM, 100.0 MHz, QPSK, 30 kHz, 100.0% DC, 50% RB	5G NR FR1 TDD	5.94	±9.6
10918	AAE	DFT-s-OFDM, 5.0 MHz, QPSK, 30 kHz, 100.0% DC, 100% RB	5G NR FR1 TDD	5.86	±9.6
10919	AAC	DFT-s-OFDM, 10.0 MHz, QPSK, 30 kHz, 100.0% DC, 100% RB	5G NR FR1 TDD	5.86	±9.6
10920	AAB	DFT-s-OFDM, 15.0 MHz, QPSK, 30 kHz, 100.0% DC, 100% RB	5G NR FR1 TDD	5.87	±9.6
10921	AAC	DFT-s-OFDM, 20.0 MHz, QPSK, 30 kHz, 100.0% DC, 100% RB	5G NR FR1 TDD	5.84	±9.6
10922	AAB	DFT-s-OFDM, 25.0 MHz, QPSK, 30 kHz, 100.0% DC, 100% RB	5G NR FR1 TDD	5.82	±9.6
10923	AAC	DFT-s-OFDM, 30.0 MHz, QPSK, 30 kHz, 100.0% DC, 100% RB	5G NR FR1 TDD	5.84	±9.6
10924	AAD	DFT-s-OFDM, 40.0 MHz, QPSK, 30 kHz, 100.0% DC, 100% RB	5G NR FR1 TDD	5.84	±9.6
10925	AAC	DFT-s-OFDM, 50.0 MHz, QPSK, 30 kHz, 100.0% DC, 100% RB	5G NR FR1 TDD	5.95	±9.6
10926	AAD	DFT-s-OFDM, 60.0 MHz, QPSK, 30 kHz, 100.0% DC, 100% RB	5G NR FR1 TDD	5.84	±9.6
10927	AAD	DFT-s-OFDM, 80.0 MHz, QPSK, 30 kHz, 100.0% DC, 100% RB	5G NR FR1 TDD	5.94	±9.6
10928	AAD	DFT-s-OFDM, 5.0 MHz, QPSK, 15 kHz, 1 RB	5G NR FR1 FDD	5.52	±9.6
10929	AAD	DFT-s-OFDM, 10.0 MHz, QPSK, 15 kHz, 1 RB	5G NR FR1 FDD	5.52	±9.6
10930	AAC	DFT-s-OFDM, 15.0 MHz, QPSK, 15 kHz, 1 RB	5G NR FR1 FDD	5.52	±9.6

UID	Rev	Communication System Name	Group	PAR (dB)	Unc ^E $k = 2$
10931	AAC	DFT-s-OFDM, 20.0 MHz, QPSK, 15 kHz, 1 RB	5G NR FR1 FDD	5.51	±9.6
10932	AAC	DFT-s-OFDM, 25.0 MHz, QPSK, 15 kHz, 1 RB	5G NR FR1 FDD	5.51	±9.6
10933	AAC	DFT-s-OFDM, 30.0 MHz, QPSK, 15 kHz, 1 RB	5G NR FR1 FDD	5.51	±9.6
10934	AAC	DFT-s-OFDM, 40.0 MHz, QPSK, 15 kHz, 1 RB	5G NR FR1 FDD	5.51	±9.6
10935	AAD	DFT-s-OFDM, 50.0 MHz, QPSK, 15 kHz, 1 RB	5G NR FR1 FDD	5.51	±9.6
10936	AAD	DFT-s-OFDM, 5.0 MHz, QPSK, 15 kHz, 50% RB	5G NR FR1 FDD	5.90	±9.6
10937	AAD	DFT-s-OFDM, 10.0 MHz, QPSK, 15 kHz, 50% RB	5G NR FR1 FDD	5.77	±9.6
10938	AAC	DFT-s-OFDM, 15.0 MHz, QPSK, 15 kHz, 50% RB	5G NR FR1 FDD	5.90	±9.6
10939	AAC	DFT-s-OFDM, 20.0 MHz, QPSK, 15 kHz, 50% RB	5G NR FR1 FDD	5.82	±9.6
10940	AAC	DFT-s-OFDM, 25.0 MHz, QPSK, 15 kHz, 50% RB	5G NR FR1 FDD	5.89	±9.6
10941	AAC	DFT-s-OFDM, 30.0 MHz, QPSK, 15 kHz, 50% RB	5G NR FR1 FDD	5.83	±9.6
10942	AAC	DFT-s-OFDM, 40.0 MHz, QPSK, 15 kHz, 50% RB	5G NR FR1 FDD	5.85	±9.6
10943	AAD	DFT-s-OFDM, 50.0 MHz, QPSK, 15 kHz, 50% RB	5G NR FR1 FDD	5.95	±9.6
10944	AAD	DFT-s-OFDM, 5.0 MHz, QPSK, 15 kHz, 100% RB	5G NR FR1 FDD	5.81	±9.6
10945	AAD	DFT-s-OFDM, 10.0 MHz, QPSK, 15 kHz, 100% RB	5G NR FR1 FDD	5.85	±9.6
10946	AAC	DFT-s-OFDM, 15.0 MHz, QPSK, 15 kHz, 100% RB	5G NR FR1 FDD	5.83	±9.6
10947	AAC	DFT-s-OFDM, 20.0 MHz, QPSK, 15 kHz, 100% RB	5G NR FR1 FDD	5.87	±9.6
10948	AAC	DFT-s-OFDM, 25.0 MHz, QPSK, 15 kHz, 100% RB	5G NR FR1 FDD	5.94	±9.6
10949	AAC	DFT-s-OFDM, 30.0 MHz, QPSK, 15 kHz, 100% RB	5G NR FR1 FDD	5.87	±9.6
10950	AAC	DFT-s-OFDM, 40.0 MHz, QPSK, 15 kHz, 100% RB	5G NR FR1 FDD	5.94	±9.6
10951	AAD	DFT-s-OFDM, 50.0 MHz, QPSK, 15 kHz, 100% RB	5G NR FR1 FDD	5.92	±9.6
10978	AAA	BDR, 1.0 MHz, 76.7% DC	ULLA	1.16	±9.6
10979	AAA	HDR4, 2.0 MHz, 25.1% DC	ULLA	8.58	±9.6
10980	AAA	HDR8, 4.0 MHz, 16.5% DC	ULLA	10.32	±9.6
10981	AAA	HDRp4, 2.0 MHz, 89.0% DC	ULLA	3.19	±9.6
10982	AAA	HDRp8, 4.0 MHz, 90.3% DC	ULLA	3.43	±9.6
11013	AAB	EHT320, MCS1 (272.0 Mbps), 100.0% DC	WLAN	8.47	±9.6
11014	AAB	EHT320, MCS2 (408.0 Mbps), 100.0% DC	WLAN	8.45	±9.6
11015	AAB	EHT320, MCS3 (544.0 Mbps), 100.0% DC	WLAN	8.44	±9.6
11016	AAB	EHT320, MCS4 (817.0 Mbps), 100.0% DC	WLAN	8.44	±9.6
11017	AAB	EHT320, MCS5 (1089.0 Mbps), 100.0% DC	WLAN	8.41	±9.6
11018	AAB	EHT320, MCS6 (1225.0 Mbps), 100.0% DC	WLAN	8.40	±9.6
11019	AAB	EHT320, MCS7 (1361.0 Mbps), 100.0% DC	WLAN	8.29	±9.6
11020	AAB	EHT320, MCS8 (1633.0 Mbps), 100.0% DC	WLAN	8.27	±9.6
11021	AAB	EHT320, MCS9 (1815.0 Mbps), 100.0% DC	WLAN	8.46	±9.6
11022	AAB	EHT320, MCS10 (2042.0 Mbps), 100.0% DC	WLAN	8.36	±9.6
11023	AAB	EHT320, MCS11 (2269.0 Mbps), 100.0% DC	WLAN	8.09	±9.6
11024	AAB	EHT320, MCS12 (2450.0 Mbps), 100.0% DC	WLAN	8.42	±9.6
11025	AAB	EHT320, MCS13 (2722.0 Mbps), 100.0% DC	WLAN	8.37	±9.6
11026	AAB	EHT320, MCS0 (136.0 Mbps), 100.0% DC	WLAN	8.39	±9.6

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