3900 MHz Dipole Calibration Certificate

Calibration Laboratory of
Schmid & Partner
Engineering AG
Zeughausstrasse 43, 8004 Zurich, Switzerland

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Accreditation No.: **SCS 0108**

Accredited by the Swiss Accreditation Service (SAS)
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Client	**CTTL** **Beijing**	**Certificate No.**	**D3900V2-1024_Jun23**

CALIBRATION CERTIFICATE

Object	D3900V2 - SN:1024
Calibration procedure(s)	QA CAL-22.v7 Calibration Procedure for SAR Validation Sources between 3-10 GHz
Calibration date:	June 21, 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

	Name	Function	Signature
Calibrated by:	Krešimir Franjić	Laboratory Technician	
Approved by:	Sven Kühn	Technical Manager	

Issued: June 22, 2023

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

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Glossary:

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

Calibration is Performed According to the Following Standards:

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

Additional Documentation:

c) DASY System Handbook

Methods Applied and Interpretation of Parameters:

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

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

Measurement Conditions

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

DASY Version	DASY52	V52.10.4
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom 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	3900 MHz ± 1 MHz 4000 MHz ± 1 MHz 4100 MHz ± 1 MHz	

Head TSL parameters at 3900 MHz

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 ± 0.2) °C	37.4 ± 6 %	3.25 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	----	----

SAR result with Head TSL at 3900 MHz

SAR averaged over 1 cm³ (1 g) of Head TSL	Condition	
SAR measured	100 mW input power	6.97 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**69.9 W/kg ± 19.9 % (k=2)**

SAR averaged over 10 cm³ (10 g) of Head TSL	condition	
SAR measured	100 mW input power	2.42 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**24.2 W/kg ± 19.5 % (k=2)**

Head TSL parameters at 4000 MHz

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Head TSL parameters	22.0 °C	37.4	3.43 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	37.3 ± 6 %	3.33 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	----	----

SAR result with Head TSL at 4000 MHz

SAR averaged over 1 cm³ (1 g) of Head TSL	Condition	
SAR measured	100 mW input power	6.84 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**68.7 W/kg ± 19.9 % (k=2)**

SAR averaged over 10 cm³ (10 g) of Head TSL	condition	
SAR measured	100 mW input power	2.38 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**23.8 W/kg ± 19.5 % (k=2)**

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 ± 0.2) °C	37.1 ± 6 %	3.42 mho/m ± 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	6.83 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**68.6 W/kg ± 19.9 % (k=2)**

SAR averaged over 10 cm³ (10 g) of Head TSL	condition	
SAR measured	100 mW input power	2.38 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**23.8 W/kg ± 19.5 % (k=2)**

Appendix (Additional assessments outside the scope of SCS 0108)

Antenna Parameters with Head TSL at 3900 MHz

Impedance, transformed to feed point	46.3 Ω - 5.4 jΩ
Return Loss	- 23.4 dB

Antenna Parameters with Head TSL at 4000 MHz

Impedance, transformed to feed point	51.8 Ω - 2.7 jΩ
Return Loss	- 29.8 dB

Antenna Parameters with Head TSL at 4100 MHz

Impedance, transformed to feed point	59.2 Ω - 0.8 jΩ
Return Loss	- 21.5 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.107 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

DASY5 Validation Report for Head TSL

Date: 21.06.2023

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 3900 MHz; Type: D3900V2; Serial: D3900V2 - SN:1024

Communication System: UID 0 - CW; Frequency: 3900 MHz, Frequency: 4000 MHz, Frequency: 4100 MHz
Medium parameters used: f = 3900 MHz; σ = 3.25 S/m; ε_r = 37.4; ρ = 1000 kg/m^3
Medium parameters used: f = 4000 MHz; σ = 3.33 S/m; ε_r = 37.3; ρ = 1000 kg/m^3
Medium parameters used: f = 4100 MHz; σ = 3.42 S/m; ε_r = 37.1; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

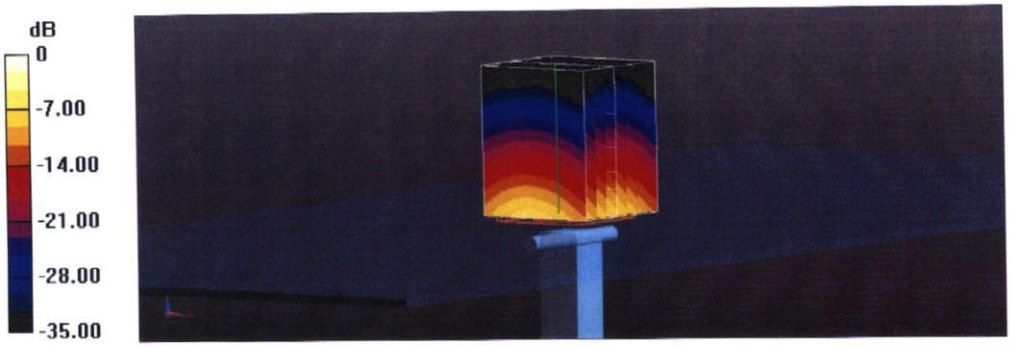
DASY52 Configuration:

- Probe: EX3DV4 - SN3503; ConvF(7.39, 7.39, 7.39) @ 3900 MHz, ConvF(7.39, 7.39, 7.39) @ 4000 MHz, ConvF(7.26, 7.26, 7.26) @ 4100 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 = 71.68 V/m; Power Drift = -0.01 dB
Peak SAR (extrapolated) = 19.7 W/kg
SAR(1 g) = 6.97 W/kg; SAR(10 g) = 2.42 W/kg
Smallest distance from peaks to all points 3 dB below = 8 mm
Ratio of SAR at M2 to SAR at M1 = 74.3%
Maximum value of SAR (measured) = 14.0 W/kg

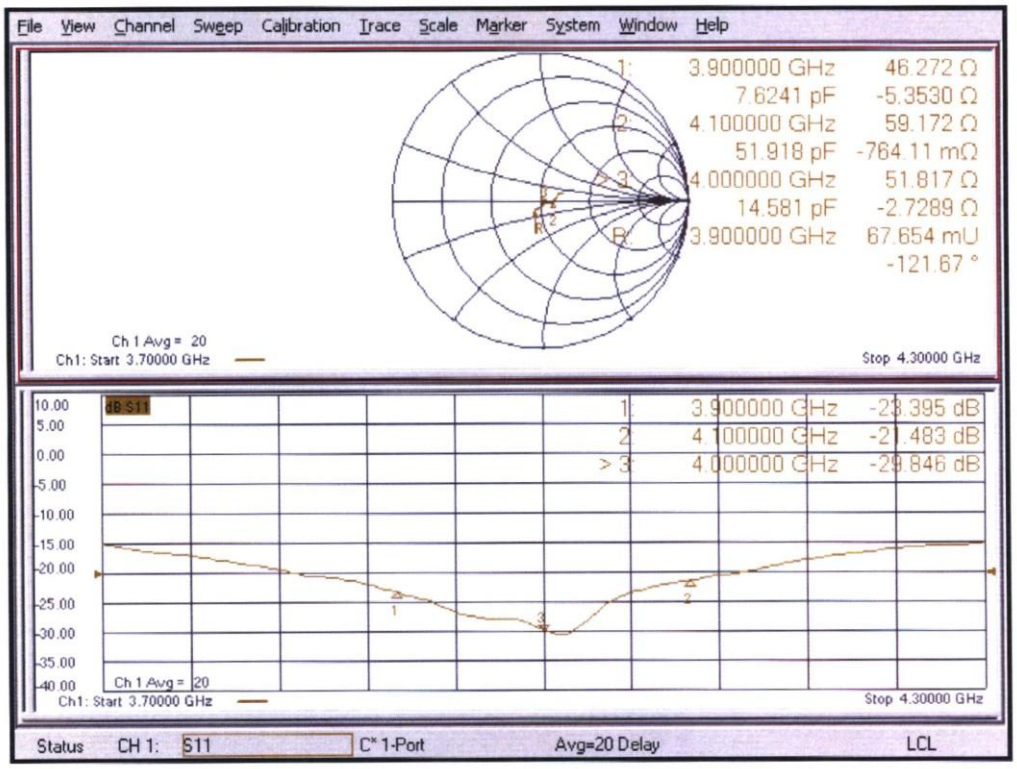
Dipole Calibration for Head Tissue/Pin=100 mW, d=10mm, f=4000MHz/Zoom Scan, dist=1.4mm (8x8x8)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 72.34 V/m; Power Drift = 0.00 dB
Peak SAR (extrapolated) = 19.6 W/kg
SAR(1 g) = 6.84 W/kg; SAR(10 g) = 2.38 W/kg
Smallest distance from peaks to all points 3 dB below = 8 mm
Ratio of SAR at M2 to SAR at M1 = 73.7%
Maximum value of SAR (measured) = 13.9 W/kg

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 = 69.41 V/m; Power Drift = 0.04 dB
Peak SAR (extrapolated) = 19.2 W/kg
SAR(1 g) = 6.83 W/kg; SAR(10 g) = 2.38 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) = 13.9 W/kg



0 dB = 14.0 W/kg = 11.47 dBW/kg

Impedance Measurement Plot for Head TSL



5 GHz Dipole Calibration Certificate

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Accreditation No.: SCS 0108

Client CTTL
Beijing

Certificate No. D5GHzV2-1060_Jun23

CALIBRATION CERTIFICATE

Object: D5GHzV2 - SN:1060

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

Calibration date: June 19, 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

	Name	Function	Signature
Calibrated by:	Jeffrey Katzman	Laboratory Technician	
Approved by:	Sven Kühn	Technical Manager	i.A.

Issued: June 20, 2023

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Glossary:

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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	5200 MHz ± 1 MHz 5250 MHz ± 1 MHz 5300 MHz ± 1 MHz 5500 MHz ± 1 MHz 5600 MHz ± 1 MHz 5750 MHz ± 1 MHz 5800 MHz ± 1 MHz	

Head TSL parameters at 5200 MHz

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Head TSL parameters	22.0 °C	36.0	4.66 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	35.5 ± 6 %	4.53 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	----	----

SAR result with Head TSL at 5200 MHz

SAR averaged over 1 cm³ (1 g) of Head TSL	Condition	
SAR measured	100 mW input power	7.92 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**78.9 W/kg ± 19.9 % (k=2)**

SAR averaged over 10 cm³ (10 g) of Head TSL	condition	
SAR measured	100 mW input power	2.27 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**22.6 W/kg ± 19.5 % (k=2)**

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 ± 0.2) °C	35.5 ± 6 %	4.60 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	----	----

SAR result with Head TSL at 5250 MHz

SAR averaged over 1 cm³ (1 g) of Head TSL	Condition	
SAR measured	100 mW input power	7.98 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**79.6 W/kg ± 19.9 % (k=2)**

SAR averaged over 10 cm³ (10 g) of Head TSL	condition	
SAR measured	100 mW input power	2.29 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**22.8 W/kg ± 19.5 % (k=2)**

Head TSL parameters at 5300 MHz

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	35.9	4.76 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	35.5 ± 6 %	4.67 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	----	----

SAR result with Head TSL at 5300 MHz

SAR averaged over 1 cm³ (1 g) of Head TSL	Condition	
SAR measured	100 mW input power	8.24 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**82.1 W/kg ± 19.9 % (k=2)**

SAR averaged over 10 cm³ (10 g) of Head TSL	condition	
SAR measured	100 mW input power	2.35 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**23.4 W/kg ± 19.5 % (k=2)**

Head TSL parameters at 5500 MHz

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	35.6	4.96 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	35.4 ± 6 %	4.89 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	----	----

SAR result with Head TSL at 5500 MHz

SAR averaged over 1 cm³ (1 g) of Head TSL	Condition	
SAR measured	100 mW input power	8.56 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**85.5 W/kg ± 19.9 % (k=2)**

SAR averaged over 10 cm³ (10 g) of Head TSL	condition	
SAR measured	100 mW input power	2.42 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**24.1 W/kg ± 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	35.3 ± 6 %	4.97 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	----	----

SAR result with Head TSL at 5600 MHz

SAR averaged over 1 cm³ (1 g) of Head TSL	Condition	
SAR measured	100 mW input power	8.38 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**83.6 W/kg ± 19.9 % (k=2)**

SAR averaged over 10 cm³ (10 g) of Head TSL	condition	
SAR measured	100 mW input power	2.38 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**23.8 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	35.1 ± 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 cm³ (1 g) of Head TSL	Condition	
SAR measured	100 mW input power	8.07 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**80.5 W/kg ± 19.9 % (k=2)**

SAR averaged over 10 cm³ (10 g) of Head TSL	condition	
SAR measured	100 mW input power	2.28 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**22.7 W/kg ± 19.5 % (k=2)**

Head TSL parameters at 5800 MHz

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	35.3	5.27 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	35.0 ± 6 %	5.11 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	----	----

SAR result with Head TSL at 5800 MHz

SAR averaged over 1 cm³ (1 g) of Head TSL	Condition	
SAR measured	100 mW input power	8.22 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**81.9 W/kg ± 19.9 % (k=2)**

SAR averaged over 10 cm³ (10 g) of Head TSL	condition	
SAR measured	100 mW input power	2.32 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**23.1 W/kg ± 19.5 % (k=2)**

Appendix (Additional assessments outside the scope of SCS 0108)

Antenna Parameters with Head TSL at 5200 MHz

Impedance, transformed to feed point	48.6 Ω - 5.3 jΩ
Return Loss	- 25.1 dB

Antenna Parameters with Head TSL at 5250 MHz

Impedance, transformed to feed point	47.7 Ω - 4.1 jΩ
Return Loss	- 26.2 dB

Antenna Parameters with Head TSL at 5300 MHz

Impedance, transformed to feed point	46.9 Ω - 2.2 jΩ
Return Loss	- 28.0 dB

Antenna Parameters with Head TSL at 5500 MHz

Impedance, transformed to feed point	50.6 Ω - 4.0 jΩ
Return Loss	- 28.0 dB

Antenna Parameters with Head TSL at 5600 MHz

Impedance, transformed to feed point	53.6 Ω + 1.2 jΩ
Return Loss	- 28.6 dB

Antenna Parameters with Head TSL at 5750 MHz

Impedance, transformed to feed point	51.4 Ω - 0.3 jΩ
Return Loss	- 37.3 dB

Antenna Parameters with Head TSL at 5800 MHz

Impedance, transformed to feed point	51.2 Ω - 2.2 jΩ
Return Loss	- 32.0 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.201 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

DASY5 Validation Report for Head TSL

Date: 19.06.2023

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole D5GHzV2; Type: D5GHzV2; Serial: D5GHzV2 - SN:1060

Communication System: UID 0 - CW; Frequency: 5200 MHz, Frequency: 5250 MHz, Frequency: 5300 MHz, Frequency: 5500 MHz, Frequency: 5600 MHz, Frequency: 5750 MHz, Frequency: 5800 MHz
Medium parameters used: f = 5200 MHz; σ = 4.53 S/m; ε_r = 35.5; ρ = 1000 kg/m^3 ,
Medium parameters used: f = 5250 MHz; σ = 4.60 S/m; ε_r = 35.5; ρ = 1000 kg/m^3 ,
Medium parameters used: f = 5300 MHz; σ = 4.67 S/m; ε_r = 35.5; ρ = 1000 kg/m^3 ,
Medium parameters used: f = 5500 MHz; σ = 4.89 S/m; ε_r = 35.4; ρ = 1000 kg/m^3 ,
Medium parameters used: f = 5600 MHz; σ = 4.97 S/m; ε_r = 35.3; ρ = 1000 kg/m^3 ,
Medium parameters used: f = 5750 MHz; σ = 5.08 S/m; ε_r = 35.1; ρ = 1000 kg/m^3 ,
Medium parameters used: f = 5800 MHz; σ = 5.11 S/m; ε_r = 35.0; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: EX3DV4 - SN3503; ConvF(5.8, 5.8, 5.8) @ 5200 MHz, ConvF(5.5, 5.5, 5.5) @ 5250 MHz, ConvF(5.49, 5.49, 5.49) @ 5300 MHz, ConvF(5.25, 5.25, 5.25) @ 5500 MHz, ConvF(5.1, 5.1, 5.1) @ 5600 MHz, ConvF(5.08, 5.08, 5.08) @ 5750 MHz, ConvF(5.01, 5.01, 5.01) @ 5800 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=100mW, dist=10mm, f=5200 MHz/Zoom Scan, dist=1.4mm (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 76.08 V/m; Power Drift = -0.08 dB
Peak SAR (extrapolated) = 27.3 W/kg
SAR(1 g) = 7.92 W/kg; SAR(10 g) = 2.27 W/kg
Smallest distance from peaks to all points 3 dB below = 6.9 mm
Ratio of SAR at M2 to SAR at M1 = 70.9%
Maximum value of SAR (measured) = 18.0 W/kg

Dipole Calibration for Head Tissue/Pin=100mW, dist=10mm, f=5250 MHz/Zoom Scan, dist=1.4mm (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 75.90 V/m; Power Drift = 0.04 dB
Peak SAR (extrapolated) = 26.7 W/kg
SAR(1 g) = 7.98 W/kg; SAR(10 g) = 2.29 W/kg
Smallest distance from peaks to all points 3 dB below = 7.2 mm
Ratio of SAR at M2 to SAR at M1 = 71.8%
Maximum value of SAR (measured) = 18.0 W/kg

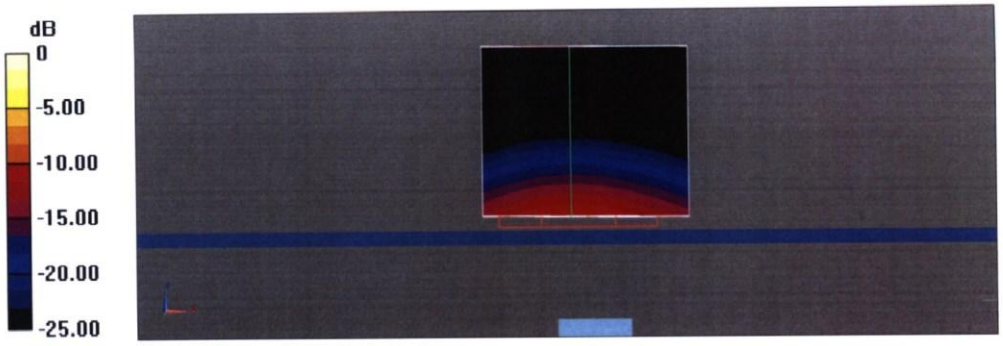
Dipole Calibration for Head Tissue/Pin=100mW, dist=10mm, f=5300 MHz/Zoom Scan, dist=1.4mm (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 76.02 V/m; Power Drift = 0.08 dB
Peak SAR (extrapolated) = 28.5 W/kg
SAR(1 g) = 8.24 W/kg; SAR(10 g) = 2.35 W/kg
Smallest distance from peaks to all points 3 dB below = 6.8 mm
Ratio of SAR at M2 to SAR at M1 = 70.8%
Maximum value of SAR (measured) = 18.8 W/kg

Dipole Calibration for Head Tissue/Pin=100mW, dist=10mm, f=5500 MHz/Zoom Scan, dist=1.4mm (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 75.86 V/m; Power Drift = 0.04 dB
Peak SAR (extrapolated) = 32.2 W/kg
SAR(1 g) = 8.56 W/kg; SAR(10 g) = 2.42 W/kg
Smallest distance from peaks to all points 3 dB below = 7.2 mm
Ratio of SAR at M2 to SAR at M1 = 67.3%
Maximum value of SAR (measured) = 20.1 W/kg

Dipole Calibration for Head Tissue/Pin=100mW, dist=10mm, f=5600 MHz/Zoom Scan, dist=1.4mm (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 76.37 V/m; Power Drift = 0.04 dB
Peak SAR (extrapolated) = 30.3 W/kg
SAR(1 g) = 8.38 W/kg; SAR(10 g) = 2.38 W/kg
Smallest distance from peaks to all points 3 dB below = 7.2 mm
Ratio of SAR at M2 to SAR at M1 = 68.5%
Maximum value of SAR (measured) = 19.6 W/kg

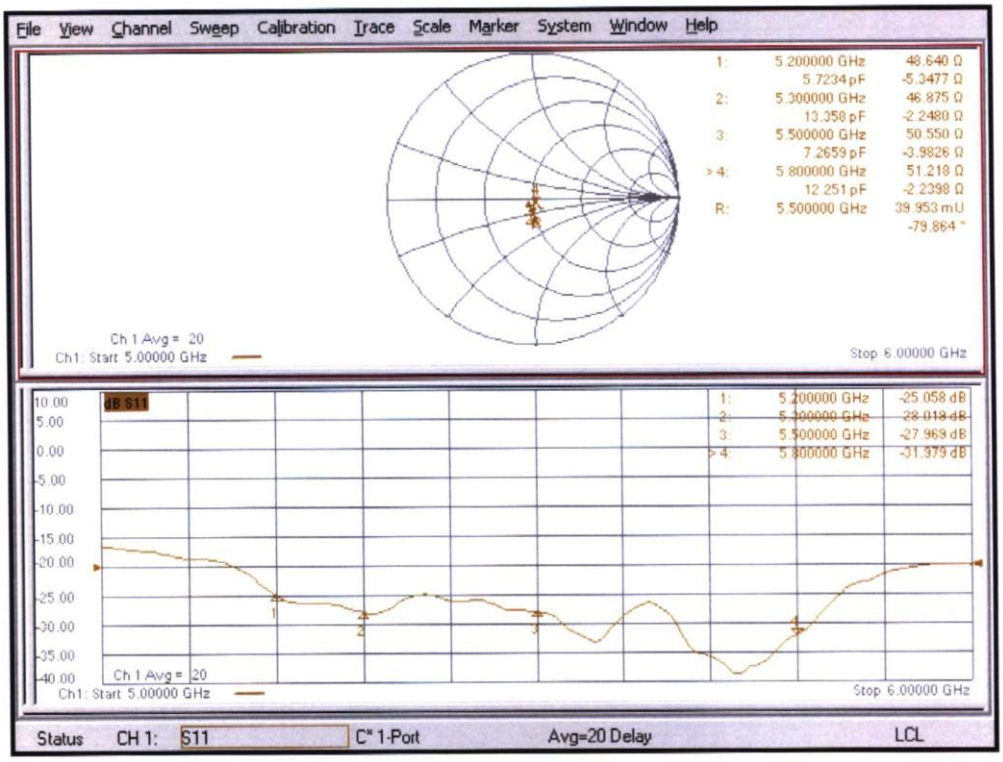
Dipole Calibration for Head Tissue/Pin=100mW, dist=10mm, f=5750 MHz/Zoom Scan, dist=1.4mm (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 73.46 V/m; Power Drift = 0.04 dB
Peak SAR (extrapolated) = 30.9 W/kg
SAR(1 g) = 8.07 W/kg; SAR(10 g) = 2.28 W/kg
Smallest distance from peaks to all points 3 dB below = 7.2 mm
Ratio of SAR at M2 to SAR at M1 = 66.6%
Maximum value of SAR (measured) = 19.3 W/kg

Dipole Calibration for Head Tissue/Pin=100mW, dist=10mm, f=5800 MHz/Zoom Scan, dist=1.4mm (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 74.09 V/m; Power Drift = 0.05 dB
Peak SAR (extrapolated) = 31.5 W/kg
SAR(1 g) = 8.22 W/kg; SAR(10 g) = 2.32 W/kg
Smallest distance from peaks to all points 3 dB below = 7.2 mm
Ratio of SAR at M2 to SAR at M1 = 66.5%
Maximum value of SAR (measured) = 19.6 W/kg

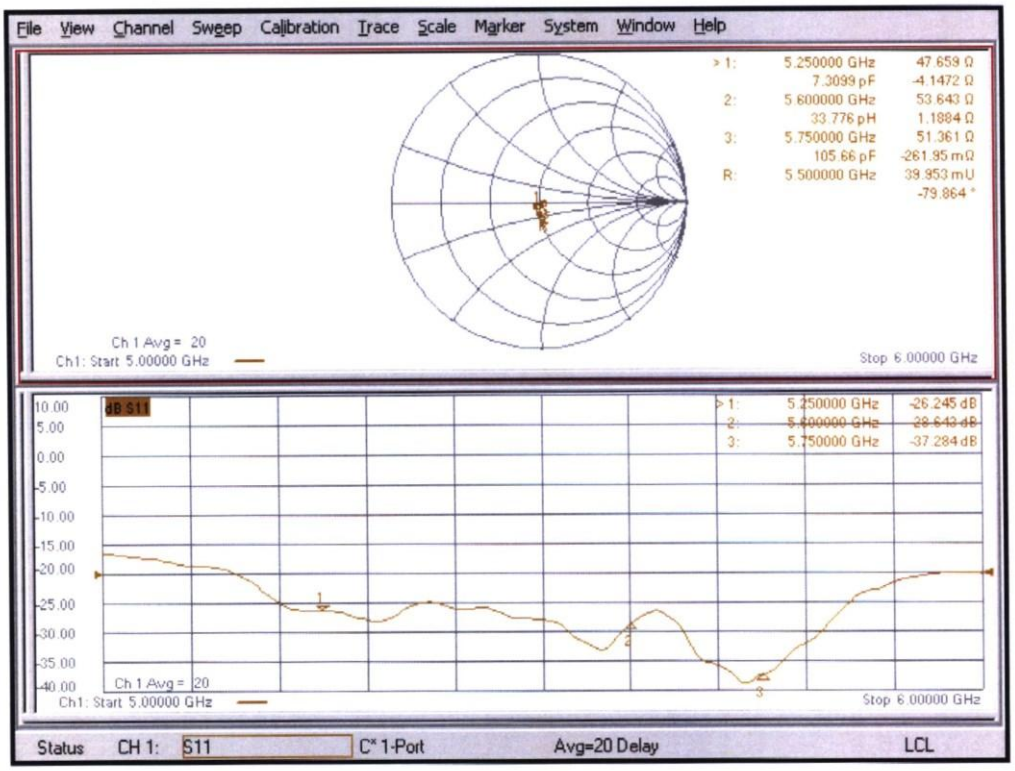


0 dB = 20.1 W/kg = 13.03 dBW/kg

Impedance Measurement Plot for Head TSL (5200, 5300, 5500, 5800 MHz)



Impedance Measurement Plot for Head TSL (5250, 5600, 5750 MHz)



ANNEX I G-Sensor Triggering Data Summary

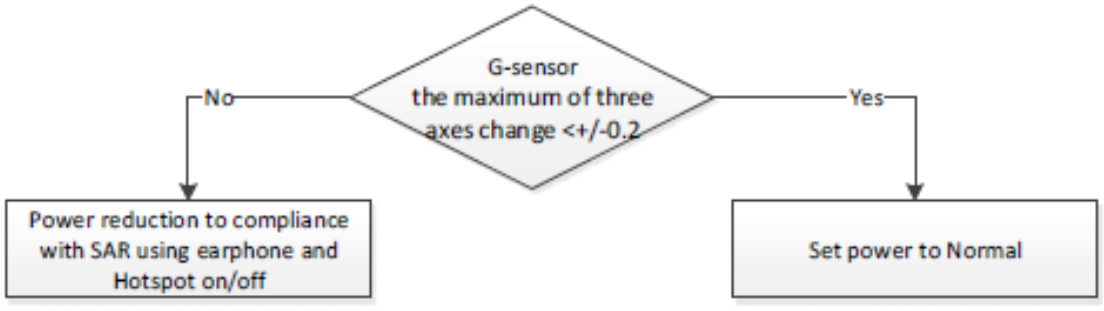
In order to judge whether the mobile phone is on the person's body, the method of using G-sensor is proposed as follows.

First, G-sensor can judge if the phone is "moving" or not by axes x, y, z variation. If we set the judgment conditions to be sensitive enough, then all of user cases which phone proximity to human body are in "moving".

Main user cases of Mobile phone and the maximum of three axes(x, y, z) change from G-sensor is as below table:

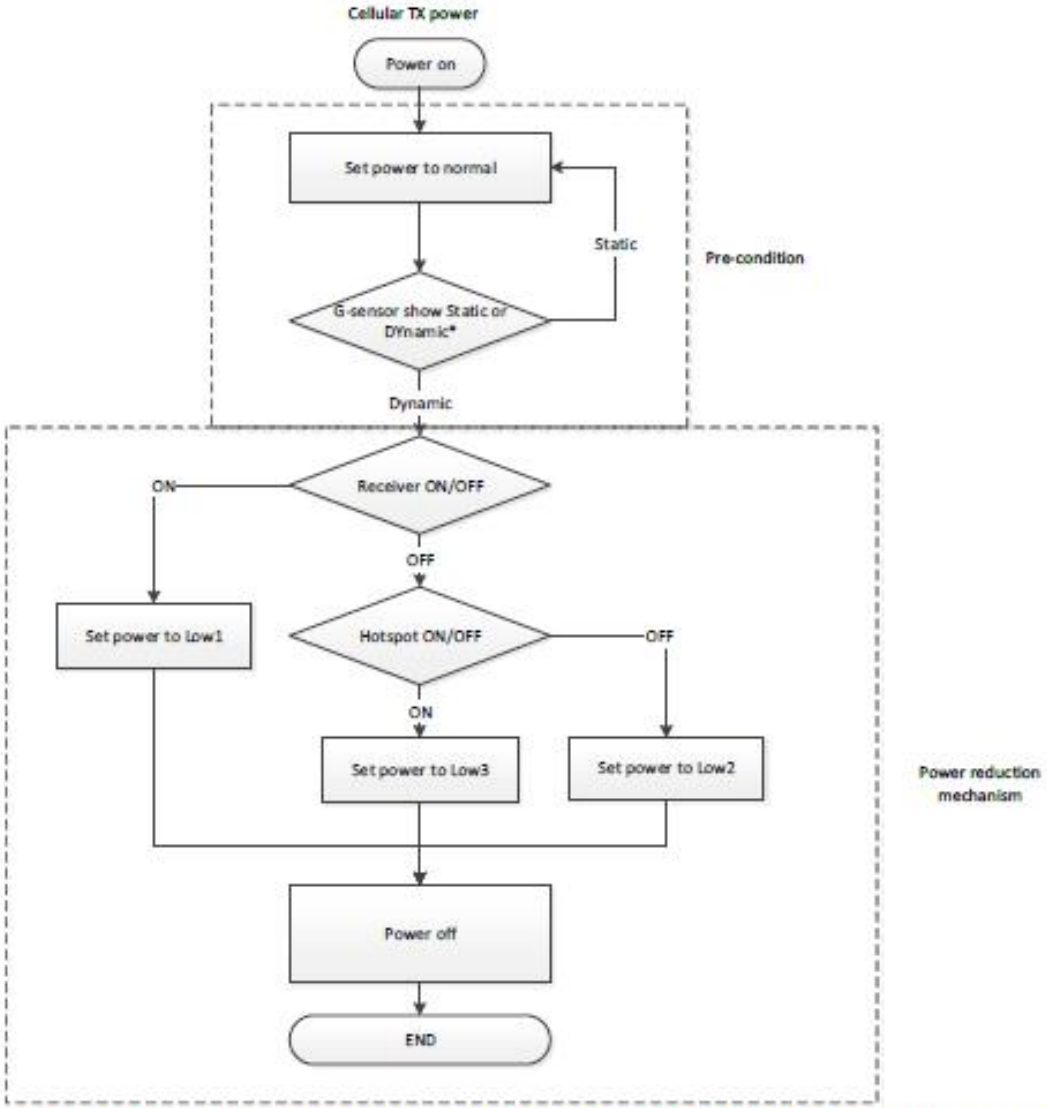
User Case	Making call and beside head and hand	Browsing	In people's pockets(Sit still)	Leaving the body and putting on a stationary table	Leaving the body and putting in a moving place
The maximum of three axes change from G-sensor	>+/-0.5	>+/-0.5	>+/-0.5	+/-0.05~0.1	>+/-0.5
Power reduction is on or off	On	On	On	Off	On

We choose the maximum of three axes change <+/-0.2 as judgment conditions. Detect interval is 200ms.



When the maximum of three axes change <+/-0.2, the user case MUST be mobile phone stay away from the body, but if it is>+/-0.2, it MAY be on the person's body, power reduction is on.

Detail Power reduction mechanism



*When it is in "static" state, the detection frequency is 200ms. When it is In "Dynamic" state, the detection frequency is 30s.

ANNEX J SPOT CHECK

J.1 Dielectric Performance and System Validation

Table J.1-1: Dielectric Performance of Tissue Simulating Liquid

Measurement Date (yyyy-mm-dd)	Type	Frequency	Permittivity ε	Drift (%)	Conductivity σ (S/m)	Drift (%)
2024/03/20	Head	835 MHz	42.70	2.89	0.923	2.56
2024/03/21	Head	1750 MHz	40.54	1.15	1.390	1.46
2024/03/21	Head	1900 MHz	40.23	0.57	1.448	3.43
2024/03/20	Head	2600 MHz	39.07	0.15	1.988	1.43

Table J.1-2: System Validation of Head

Measurement Date (yyyy-mm-dd)	Frequency	Target value (W/kg)		Measured value(W/kg)		Deviation	
		10 g Average	1 g Average	10 g Average	1 g Average	10 g Average	1 g Average
2024/03/20	835 MHz	6.25	9.62	6.20	9.56	-0.80%	-0.62%
2024/03/21	1750 MHz	18.9	35.8	19.4	36.4	2.43%	1.68%
2024/03/21	1900 MHz	20.7	39.8	21.0	40.4	1.45%	1.51%
2024/03/20	2600 MHz	25.1	55.2	25.3	56.8	0.88%	2.90%

J.2 New frequency band

J.2.1 Conducted power of selected case

Hotspot off/on+Receiver on	Hotspot on+Receiver off	Hotspot off+Receiver off
DSI3	DSI2	DSI1

LTE Band2(ANT1 DSI2)

BANDWIDTH	Number of RBs	Frequency	QPSK	16QAM	64QAM
1.4MHz	1RB-High (5)	1909.3 (19193)	15.45	15.66	15.59
		1880 (18900)	15.75	15.58	15.64
		1850.7 (18607)	15.73	15.50	15.60
	1RB-Middle (3)	1909.3 (19193)	15.45	15.70	15.71
		1880 (18900)	15.69	15.74	15.70
		1850.7 (18607)	15.63	15.49	15.50
	1RB-Low (0)	1909.3 (19193)	15.45	15.72	15.61
		1880 (18900)	15.48	15.59	15.54
		1850.7 (18607)	15.62	15.56	15.69
	3RB-High (3)	1909.3 (19193)	15.70	15.49	15.61
		1880 (18900)	15.55	15.74	15.70
		1850.7 (18607)	15.46	15.63	15.47
	3RB-Middle (1)	1909.3 (19193)	15.65	15.63	15.60
		1880 (18900)	15.52	15.72	15.48
		1850.7 (18607)	15.57	15.74	15.52
	3RB-Low (0)	1909.3 (19193)	15.74	15.45	15.73
		1880 (18900)	15.73	15.63	15.59
		1850.7 (18607)	15.50	15.75	15.70
	6RB (0)	1909.3 (19193)	15.45	15.73	15.51
		1880 (18900)	15.61	15.50	15.65
		1850.7 (18607)	15.75	15.58	15.56
3MHz	1RB-High (14)	1908.5 (19185)	15.60	15.46	15.74
		1880 (18900)	15.61	15.74	15.64
		1851.5 (18615)	15.69	15.54	15.72
	1RB-Middle (7)	1908.5 (19185)	15.69	15.60	15.69
		1880 (18900)	15.68	15.67	15.51
		1851.5 (18615)	15.60	15.53	15.71
	1RB-Low (0)	1908.5 (19185)	15.55	15.51	15.70
		1880 (18900)	15.68	15.64	15.57
		1851.5 (18615)	15.68	15.74	15.46
	8RB-High (7)	1908.5 (19185)	15.74	15.55	15.55
		1880 (18900)	15.52	15.57	15.57
		1851.5 (18615)	15.62	15.49	15.72
	8RB-Middle (4)	1908.5 (19185)	15.69	15.64	15.54
		1880 (18900)	15.50	15.52	15.51
		1851.5 (18615)	15.61	15.60	15.51
	8RB-Low (0)	1908.5 (19185)	15.60	15.48	15.71
		1880 (18900)	15.70	15.48	15.47
		1851.5 (18615)	15.74	15.73	15.50
	15RB (0)	1908.5 (19185)	15.71	15.72	15.73
		1880 (18900)	15.47	15.68	15.54
		1851.5 (18615)	15.68	15.75	15.48

5MHz	1RB-High (24)	1907.5 (19175)	15.70	15.68	15.74
		1880 (18900)	15.63	15.71	15.75
		1852.5 (18625)	15.64	15.57	15.75
	1RB-Middle (12)	1907.5 (19175)	15.61	15.58	15.63
		1880 (18900)	15.51	15.66	15.73
		1852.5 (18625)	15.71	15.71	15.64
	1RB-Low (0)	1907.5 (19175)	15.49	15.48	15.74
		1880 (18900)	15.47	15.75	15.46
		1852.5 (18625)	15.67	15.60	15.54
	12RB-High (13)	1907.5 (19175)	15.67	15.56	15.65
		1880 (18900)	15.55	15.51	15.52
		1852.5 (18625)	15.52	15.74	15.47
	12RB-Middle (6)	1907.5 (19175)	15.48	15.50	15.55
		1880 (18900)	15.46	15.58	15.64
		1852.5 (18625)	15.72	15.67	15.50
	12RB-Low (0)	1907.5 (19175)	15.69	15.61	15.55
		1880 (18900)	15.74	15.45	15.72
		1852.5 (18625)	15.47	15.59	15.53
	25RB (0)	1907.5 (19175)	15.57	15.65	15.75
		1880 (18900)	15.45	15.53	15.57
		1852.5 (18625)	15.45	15.56	15.74
10MHz	1RB-High (49)	1905 (19150)	15.72	15.53	15.69
		1880 (18900)	15.66	15.65	15.56
		1855 (18650)	15.68	15.49	15.74
	1RB-Middle (24)	1905 (19150)	15.70	15.72	15.48
		1880 (18900)	15.52	15.48	15.51
		1855 (18650)	15.46	15.55	15.60
	1RB-Low (0)	1905 (19150)	15.70	15.57	15.58
		1880 (18900)	15.51	15.73	15.46
		1855 (18650)	15.75	15.57	15.61
	25RB-High (25)	1905 (19150)	15.59	15.45	15.60
		1880 (18900)	15.74	15.51	15.59
		1855 (18650)	15.48	15.64	15.46
	25RB-Middle (12)	1905 (19150)	15.54	15.55	15.68
		1880 (18900)	15.70	15.50	15.67
		1855 (18650)	15.63	15.75	15.71
	25RB-Low (0)	1905 (19150)	15.63	15.72	15.45
		1880 (18900)	15.57	15.52	15.61
		1855 (18650)	15.61	15.73	15.73
	50RB (0)	1905 (19150)	15.70	15.69	15.53
		1880 (18900)	15.70	15.65	15.65
		1855 (18650)	15.51	15.71	15.63

15MHz	1RB-High (74)	1902.5 (19125)	15.67	15.58	15.51
		1880 (18900)	15.50	15.73	15.46
		1857.5 (18675)	15.73	15.75	15.50
	1RB-Middle (37)	1902.5 (19125)	15.63	15.47	15.61
		1880 (18900)	15.67	15.45	15.61
		1857.5 (18675)	15.63	15.69	15.55
	1RB-Low (0)	1902.5 (19125)	15.57	15.48	15.46
		1880 (18900)	15.45	15.72	15.71
		1857.5 (18675)	15.50	15.53	15.67
	36RB-High (38)	1902.5 (19125)	15.54	15.46	15.57
		1880 (18900)	15.74	15.68	15.51
		1857.5 (18675)	15.63	15.48	15.73
	36RB-Middle (19)	1902.5 (19125)	15.49	15.48	15.52
		1880 (18900)	15.64	15.75	15.48
		1857.5 (18675)	15.74	15.54	15.51
	36RB-Low (0)	1902.5 (19125)	15.54	15.62	15.72
		1880 (18900)	15.52	15.70	15.61
		1857.5 (18675)	15.75	15.69	15.56
	75RB (0)	1902.5 (19125)	15.52	15.75	15.50
		1880 (18900)	15.54	15.51	15.48
		1857.5 (18675)	15.48	15.48	15.70
20MHz	1RB-High (99)	1900 (19100)	15.71	15.53	15.66
		1880 (18900)	15.63	15.46	15.58
		1860 (18700)	15.39	15.22	15.34
	1RB-Middle (50)	1900 (19100)	15.72	15.54	15.67
		1880 (18900)	15.52	15.34	15.46
		1860 (18700)	15.36	15.19	15.31
	1RB-Low (0)	1900 (19100)	15.67	15.49	15.61
		1880 (18900)	15.47	15.30	15.42
		1860 (18700)	15.34	15.17	15.29
	50RB-High (50)	1900 (19100)	15.78	15.60	15.73
		1880 (18900)	15.64	15.46	15.59
		1860 (18700)	15.38	15.21	15.33
	50RB-Middle (25)	1900 (19100)	15.76	15.59	15.71
		1880 (18900)	15.59	15.41	15.53
		1860 (18700)	15.62	15.45	15.57
	50RB-Low (0)	1900 (19100)	15.78	15.60	15.73
		1880 (18900)	15.50	15.32	15.45
		1860 (18700)	15.39	15.22	15.34
	100RB (0)	1900 (19100)	15.78	15.60	15.73
		1880 (18900)	15.57	15.39	15.52
		1860 (18700)	15.46	15.29	15.41

LTE Band2(ANT1 DSI1)

BANDWIDTH	Number of RBs	Frequency	QPSK	16QAM	64QAM
1.4MHz	1RB-High (5)	1909.3 (19193)	17.79	17.63	17.74
		1880 (18900)	17.66	17.67	17.53
		1850.7 (18607)	17.72	17.56	17.45
	1RB-Middle (3)	1909.3 (19193)	17.65	17.63	17.79
		1880 (18900)	17.59	17.73	17.53
		1850.7 (18607)	17.70	17.51	17.54
	1RB-Low (0)	1909.3 (19193)	17.52	17.75	17.71
		1880 (18900)	17.76	17.52	17.80
		1850.7 (18607)	17.70	17.50	17.52
	3RB-High (3)	1909.3 (19193)	17.55	17.61	17.73
		1880 (18900)	17.66	17.45	17.50
		1850.7 (18607)	17.46	17.71	17.55
	3RB-Middle (1)	1909.3 (19193)	17.48	17.74	17.55
		1880 (18900)	17.73	17.71	17.61
		1850.7 (18607)	17.55	17.54	17.57
	3RB-Low (0)	1909.3 (19193)	17.52	17.70	17.76
		1880 (18900)	17.73	17.55	17.76
		1850.7 (18607)	17.55	17.69	17.60
	6RB (0)	1909.3 (19193)	17.67	17.54	17.48
		1880 (18900)	17.75	17.77	17.51
		1850.7 (18607)	17.75	17.65	17.50
3MHz	1RB-High (14)	1908.5 (19185)	17.67	17.59	17.55
		1880 (18900)	17.80	17.77	17.45
		1851.5 (18615)	17.78	17.64	17.47
	1RB-Middle (7)	1908.5 (19185)	17.48	17.54	17.66
		1880 (18900)	17.72	17.52	17.76
		1851.5 (18615)	17.62	17.45	17.63
	1RB-Low (0)	1908.5 (19185)	17.47	17.66	17.45
		1880 (18900)	17.77	17.80	17.54
		1851.5 (18615)	17.46	17.76	17.59
	8RB-High (7)	1908.5 (19185)	17.80	17.51	17.74
		1880 (18900)	17.58	17.58	17.66
		1851.5 (18615)	17.79	17.57	17.75
	8RB-Middle (4)	1908.5 (19185)	17.80	17.56	17.50
		1880 (18900)	17.70	17.62	17.61
		1851.5 (18615)	17.79	17.51	17.63
	8RB-Low (0)	1908.5 (19185)	17.66	17.63	17.68
		1880 (18900)	17.77	17.53	17.66
		1851.5 (18615)	17.65	17.73	17.79
	15RB (0)	1908.5 (19185)	17.65	17.69	17.62
		1880 (18900)	17.47	17.58	17.54
		1851.5 (18615)	17.68	17.73	17.80

5MHz	1RB-High (24)	1907.5 (19175)	17.71	17.62	17.67
		1880 (18900)	17.76	17.72	17.80
		1852.5 (18625)	17.64	17.55	17.58
	1RB-Middle (12)	1907.5 (19175)	17.46	17.54	17.49
		1880 (18900)	17.70	17.59	17.45
		1852.5 (18625)	17.59	17.53	17.67
	1RB-Low (0)	1907.5 (19175)	17.51	17.68	17.78
		1880 (18900)	17.69	17.47	17.45
		1852.5 (18625)	17.68	17.76	17.51
	12RB-High (13)	1907.5 (19175)	17.79	17.55	17.79
		1880 (18900)	17.61	17.80	17.46
		1852.5 (18625)	17.65	17.60	17.63
	12RB-Middle (6)	1907.5 (19175)	17.73	17.60	17.72
		1880 (18900)	17.52	17.58	17.47
		1852.5 (18625)	17.74	17.46	17.47
	12RB-Low (0)	1907.5 (19175)	17.52	17.66	17.78
		1880 (18900)	17.58	17.53	17.67
		1852.5 (18625)	17.77	17.72	17.77
	25RB (0)	1907.5 (19175)	17.51	17.51	17.72
		1880 (18900)	17.78	17.58	17.54
		1852.5 (18625)	17.58	17.70	17.70
10MHz	1RB-High (49)	1905 (19150)	17.67	17.59	17.59
		1880 (18900)	17.67	17.62	17.56
		1855 (18650)	17.78	17.58	17.64
	1RB-Middle (24)	1905 (19150)	17.52	17.78	17.65
		1880 (18900)	17.77	17.51	17.48
		1855 (18650)	17.76	17.69	17.73
	1RB-Low (0)	1905 (19150)	17.54	17.59	17.58
		1880 (18900)	17.75	17.51	17.53
		1855 (18650)	17.57	17.48	17.59
	25RB-High (25)	1905 (19150)	17.72	17.55	17.48
		1880 (18900)	17.70	17.71	17.65
		1855 (18650)	17.70	17.66	17.71
	25RB-Middle (12)	1905 (19150)	17.52	17.75	17.48
		1880 (18900)	17.57	17.51	17.60
		1855 (18650)	17.45	17.45	17.64
	25RB-Low (0)	1905 (19150)	17.68	17.60	17.79
		1880 (18900)	17.51	17.80	17.65
		1855 (18650)	17.74	17.51	17.75
	50RB (0)	1905 (19150)	17.52	17.63	17.79
		1880 (18900)	17.71	17.77	17.60
		1855 (18650)	17.65	17.70	17.72

15MHz	1RB-High (74)	1902.5 (19125)	17.45	17.62	17.79
		1880 (18900)	17.66	17.77	17.77
		1857.5 (18675)	17.70	17.77	17.56
	1RB-Middle (37)	1902.5 (19125)	17.80	17.76	17.70
		1880 (18900)	17.53	17.49	17.79
		1857.5 (18675)	17.61	17.65	17.53
	1RB-Low (0)	1902.5 (19125)	17.57	17.52	17.64
		1880 (18900)	17.63	17.69	17.57
		1857.5 (18675)	17.63	17.77	17.52
	36RB-High (38)	1902.5 (19125)	17.57	17.76	17.50
		1880 (18900)	17.75	17.70	17.50
		1857.5 (18675)	17.75	17.58	17.64
	36RB-Middle (19)	1902.5 (19125)	17.52	17.71	17.74
		1880 (18900)	17.64	17.51	17.64
		1857.5 (18675)	17.55	17.60	17.75
	36RB-Low (0)	1902.5 (19125)	17.64	17.51	17.62
		1880 (18900)	17.63	17.74	17.80
		1857.5 (18675)	17.57	17.67	17.77
	75RB (0)	1902.5 (19125)	17.69	17.50	17.54
		1880 (18900)	17.66	17.63	17.75
		1857.5 (18675)	17.51	17.49	17.72
20MHz	1RB-High (99)	1900 (19100)	17.73	17.93	17.79
		1880 (18900)	17.64	17.84	17.70
		1860 (18700)	17.37	17.57	17.43
	1RB-Middle (50)	1900 (19100)	17.74	17.94	17.80
		1880 (18900)	17.51	17.71	17.57
		1860 (18700)	17.34	17.54	17.40
	1RB-Low (0)	1900 (19100)	17.68	17.88	17.74
		1880 (18900)	17.46	17.66	17.52
		1860 (18700)	17.31	17.51	17.37
	50RB-High (50)	1900 (19100)	17.81	18.01	17.87
		1880 (18900)	17.65	17.85	17.71
		1860 (18700)	17.36	17.56	17.42
	50RB-Middle (25)	1900 (19100)	17.79	17.99	17.85
		1880 (18900)	17.59	17.79	17.65
		1860 (18700)	17.63	17.83	17.69
	50RB-Low (0)	1900 (19100)	17.81	18.01	17.87
		1880 (18900)	17.49	17.69	17.55
		1860 (18700)	17.37	17.57	17.43
	100RB (0)	1900 (19100)	17.81	18.01	17.87
		1880 (18900)	17.57	17.77	17.63
		1860 (18700)	17.45	17.65	17.51

LTE Band5(ANT0 DSI1_2)

BANDWIDTH	Number of RBs	Frequency	QPSK	16QAM	64QAM
1.4MHz	1RB-High (5)	848.3 (20643)	23.46	22.85	21.72
		836.5 (20525)	23.39	22.68	21.66
		824.7 (20407)	23.00	22.62	21.25
	1RB-Middle (3)	848.3 (20643)	23.61	22.82	21.67
		836.5 (20525)	23.50	22.73	21.60
		824.7 (20407)	23.11	22.44	21.29
	1RB-Low (0)	848.3 (20643)	23.44	22.88	21.67
		836.5 (20525)	23.24	22.67	21.59
		824.7 (20407)	23.09	22.34	21.13
	3RB-High (3)	848.3 (20643)	23.44	22.69	21.60
		836.5 (20525)	23.42	22.61	21.59
		824.7 (20407)	23.09	22.20	21.22
	3RB-Middle (1)	848.3 (20643)	23.53	22.58	21.58
		836.5 (20525)	23.36	22.64	21.55
		824.7 (20407)	23.07	22.30	21.22
	3RB-Low (0)	848.3 (20643)	23.49	22.63	21.60
		836.5 (20525)	23.43	22.60	21.50
		824.7 (20407)	23.07	22.22	21.14
	6RB (0)	848.3 (20643)	22.55	21.64	20.65
		836.5 (20525)	22.39	21.54	20.40
		824.7 (20407)	22.15	21.17	20.23
3MHz	1RB-High (14)	847.5 (20635)	23.46	23.00	21.65
		836.5 (20525)	23.29	22.62	21.59
		825.5 (20415)	23.39	22.58	21.45
	1RB-Middle (7)	847.5 (20635)	23.47	22.86	21.63
		836.5 (20525)	23.41	22.68	21.69
		825.5 (20415)	23.43	22.81	21.35
	1RB-Low (0)	847.5 (20635)	23.33	22.75	21.53
		836.5 (20525)	23.46	22.99	21.58
		825.5 (20415)	23.50	22.60	21.21
	8RB-High (7)	847.5 (20635)	22.57	21.61	20.59
		836.5 (20525)	22.52	21.57	20.61
		825.5 (20415)	22.50	21.62	20.28
	8RB-Middle (4)	847.5 (20635)	22.64	21.72	20.72
		836.5 (20525)	22.41	21.56	20.46
		825.5 (20415)	22.42	21.54	20.38
	8RB-Low (0)	847.5 (20635)	22.49	21.71	20.62
		836.5 (20525)	22.45	21.46	20.54
		825.5 (20415)	22.44	21.57	20.33
	15RB (0)	847.5 (20635)	22.47	21.57	20.64
		836.5 (20525)	22.37	21.46	20.49
		825.5 (20415)	22.40	21.47	20.36

5MHz	1RB-High (24)	846.5 (20625)	23.59	22.97	21.85
		836.5 (20525)	23.38	22.77	21.52
		826.5 (20425)	23.01	22.42	21.30
	1RB-Middle (12)	846.5 (20625)	23.46	22.96	21.77
		836.5 (20525)	23.47	22.82	21.81
		826.5 (20425)	23.15	22.68	21.32
	1RB-Low (0)	846.5 (20625)	23.48	22.98	21.66
		836.5 (20525)	23.33	22.71	21.41
		826.5 (20425)	23.09	22.46	21.34
	12RB-High (13)	846.5 (20625)	22.57	21.66	20.66
		836.5 (20525)	22.50	21.57	20.61
		826.5 (20425)	22.20	21.24	20.35
	12RB-Middle (6)	846.5 (20625)	22.61	21.64	20.75
		836.5 (20525)	22.44	21.50	20.55
		826.5 (20425)	22.22	21.33	20.34
	12RB-Low (0)	846.5 (20625)	22.56	21.60	20.59
		836.5 (20525)	22.38	21.53	20.47
		826.5 (20425)	22.09	21.22	20.22
	25RB (0)	846.5 (20625)	22.55	21.64	20.64
		836.5 (20525)	22.40	21.39	20.52
		826.5 (20425)	22.14	21.21	20.19
10MHz	1RB-High (49)	844 (20600)	23.35	22.37	21.51
		836.5 (20525)	23.56	22.57	21.70
		829 (20450)	23.41	22.43	21.57
	1RB-Middle (24)	844 (20600)	23.44	22.46	21.59
		836.5 (20525)	23.50	22.51	21.65
		829 (20450)	23.39	22.41	21.55
	1RB-Low (0)	844 (20600)	23.47	22.48	21.62
		836.5 (20525)	23.37	22.39	21.53
		829 (20450)	23.41	22.43	21.57
	25RB-High (25)	844 (20600)	22.38	21.41	20.44
		836.5 (20525)	22.42	21.45	20.48
		829 (20450)	22.34	21.37	20.40
	25RB-Middle (12)	844 (20600)	22.40	21.43	20.46
		836.5 (20525)	22.37	21.40	20.43
		829 (20450)	22.32	21.35	20.39
	25RB-Low (0)	844 (20600)	22.46	21.49	20.51
		836.5 (20525)	22.35	21.38	20.41
		829 (20450)	22.36	21.39	20.42
	50RB (0)	844 (20600)	22.41	21.44	20.47
		836.5 (20525)	22.42	21.45	20.48
		829 (20450)	22.33	21.36	20.39

LTE Band5(ANT0 DSI3)

BANDWIDTH	Number of RBs	Frequency	QPSK	16QAM	64QAM
1.4MHz	1RB-High (5)	848.3 (20643)	22.41	22.40	21.60
		836.5 (20525)	22.35	22.23	21.54
		824.7 (20407)	21.97	22.17	21.13
	1RB-Middle (3)	848.3 (20643)	22.55	22.37	21.55
		836.5 (20525)	22.45	22.28	21.48
		824.7 (20407)	22.08	21.99	21.16
	1RB-Low (0)	848.3 (20643)	22.39	22.43	21.55
		836.5 (20525)	22.20	22.22	21.47
		824.7 (20407)	22.06	21.90	21.01
	3RB-High (3)	848.3 (20643)	22.39	22.24	21.48
		836.5 (20525)	22.38	22.16	21.47
		824.7 (20407)	22.06	21.77	21.10
	3RB-Middle (1)	848.3 (20643)	22.48	22.14	21.45
		836.5 (20525)	22.32	22.19	21.42
		824.7 (20407)	22.04	21.86	21.10
	3RB-Low (0)	848.3 (20643)	22.44	22.18	21.48
		836.5 (20525)	22.39	22.15	21.38
		824.7 (20407)	22.04	21.79	21.02
	6RB (0)	848.3 (20643)	22.40	21.22	20.53
		836.5 (20525)	22.24	21.11	20.28
		824.7 (20407)	22.01	21.25	20.12
3MHz	1RB-High (14)	847.5 (20635)	22.41	22.54	21.37
		836.5 (20525)	22.25	22.17	21.48
		825.5 (20415)	22.35	22.14	21.45
	1RB-Middle (7)	847.5 (20635)	22.42	22.41	21.77
		836.5 (20525)	22.37	22.23	21.64
		825.5 (20415)	22.39	22.36	21.49
	1RB-Low (0)	847.5 (20635)	22.28	22.30	21.48
		836.5 (20525)	22.41	22.53	21.42
		825.5 (20415)	22.45	22.15	21.54
	8RB-High (7)	847.5 (20635)	22.41	21.19	20.56
		836.5 (20525)	22.37	21.14	20.50
		825.5 (20415)	22.35	21.20	21.50
	8RB-Middle (4)	847.5 (20635)	22.48	21.29	20.48
		836.5 (20525)	22.26	21.13	20.41
		825.5 (20415)	22.27	21.11	20.54
	8RB-Low (0)	847.5 (20635)	22.34	21.28	20.43
		836.5 (20525)	22.29	21.04	20.35
		825.5 (20415)	22.28	21.14	20.34
	15RB (0)	847.5 (20635)	22.32	21.14	20.47
		836.5 (20525)	22.22	21.04	20.42
		825.5 (20415)	22.25	21.05	20.49

5MHz	1RB-High (24)	846.5 (20625)	22.53	22.51	21.72
		836.5 (20525)	22.34	22.33	21.40
		826.5 (20425)	21.98	21.97	21.17
	1RB-Middle (12)	846.5 (20625)	22.41	22.51	21.65
		836.5 (20525)	22.42	22.37	21.68
		826.5 (20425)	22.12	22.23	21.20
	1RB-Low (0)	846.5 (20625)	22.43	22.52	21.54
		836.5 (20525)	22.28	22.26	21.29
		826.5 (20425)	22.06	22.02	21.22
	12RB-High (13)	846.5 (20625)	22.41	21.24	20.54
		836.5 (20525)	22.35	21.14	20.49
		826.5 (20425)	22.06	21.15	20.23
	12RB-Middle (6)	846.5 (20625)	22.45	21.22	20.64
		836.5 (20525)	22.28	21.07	20.43
		826.5 (20425)	22.08	21.11	20.22
	12RB-Low (0)	846.5 (20625)	22.40	21.18	20.47
		836.5 (20525)	22.23	21.10	20.36
		826.5 (20425)	21.95	21.18	20.11
	25RB (0)	846.5 (20625)	22.40	21.22	20.52
		836.5 (20525)	22.25	21.27	20.41
		826.5 (20425)	22.00	21.19	20.08
10MHz	1RB-High (49)	844 (20600)	22.33	22.42	21.53
		836.5 (20525)	22.53	22.42	21.72
		829 (20450)	22.39	22.48	21.59
	1RB-Middle (24)	844 (20600)	22.42	22.51	21.62
		836.5 (20525)	22.47	22.36	21.66
		829 (20450)	22.37	22.46	21.57
	1RB-Low (0)	844 (20600)	22.44	22.53	21.64
		836.5 (20525)	22.35	22.44	21.55
		829 (20450)	22.39	22.48	21.59
	25RB-High (25)	844 (20600)	22.42	21.45	20.47
		836.5 (20525)	22.46	21.49	20.51
		829 (20450)	22.38	21.41	20.43
	25RB-Middle (12)	844 (20600)	22.44	21.47	20.49
		836.5 (20525)	22.41	21.44	20.46
		829 (20450)	22.36	21.39	20.42
	25RB-Low (0)	844 (20600)	22.50	21.53	20.54
		836.5 (20525)	22.39	21.42	20.44
		829 (20450)	22.40	21.43	20.45
	50RB (0)	844 (20600)	22.45	21.48	20.50
		836.5 (20525)	22.46	21.49	20.51
		829 (20450)	22.37	21.40	20.42

n2(ANT2 DSI1)

No.	Test Freq Description	5G-n2							Tune up	Power Results (dBm)
		SCS (kHz)	NR BW (MHz)	Modulation	RB allocation		NR Test Freq. (MHz)	NR Test CH.		n2
1	High	15	5	DFT-s-OFDM QPSK	Inner_Full	12_6	1907.5	381500	24.00	23.85
2	Middle	15	5	DFT-s-OFDM QPSK	Inner_Full	12_6	1880	376000	24.00	23.89
3	Low	15	5	DFT-s-OFDM QPSK	Inner_Full	12_6	1852.5	370500	24.00	23.77
4	High	15	20	DFT-s-OFDM QPSK	Inner_Full	50_25	1900	380000	24.00	23.84
5	Middle	15	20	DFT-s-OFDM QPSK	Inner_Full	50_25	1880	376000	24.00	23.80
6	Low	15	20	DFT-s-OFDM QPSK	Inner_Full	50_25	1860	372000	24.00	23.87

According to the table above, the maximum power configuration is selected as the default test configuration

No.	Test Freq Description	5G-n2							Tune up	Power Results (dBm)
		SCS (kHz)	NR BW (MHz)	Modulation	RB allocation		NR Test Freq. (MHz)	NR Test CH.		n2
1	Middle	15	5	DFT-s-OFDM PI/2 BPSK1	Inner_Full	12_6	1880	376000	24.00	23.77
2	Middle	15	5	DFT-s-OFDM 16QAM	Inner_Full	12_6	1880	376000	24.00	22.74
3	Middle	15	5	DFT-s-OFDM 64QAM	Inner_Full	12_6	1880	376000	22.50	21.29
4	Middle	15	5	DFT-s-OFDM 256QAM	Inner_Full	12_6	1880	376000	20.50	19.45
5	Middle	15	5	CP-OFDM QPSK	Inner_Full	12_6	1880	376000	23.50	22.62
6	Middle	15	5	CP-OFDM 16QAM	Inner_Full	12_6	1880	376000	23.00	22.03
7	Middle	15	5	CP-OFDM 64QAM	Inner_Full	12_6	1880	376000	21.50	20.53
8	Middle	15	5	CP-OFDM 256QAM	Inner_Full	12_6	1880	376000	18.50	17.24
9	Middle	15	5	DFT-s-OFDM QPSK	Edge_Full_Right	2_23	1880	376000	24.00	22.89
10	Middle	15	5	DFT-s-OFDM QPSK	Edge_Full_Left	2_0	1880	376000	24.00	22.87
11	Middle	15	5	DFT-s-OFDM QPSK	Edge_1RB_Right	1_24	1880	376000	24.00	22.82
12	Middle	15	5	DFT-s-OFDM QPSK	Edge_1RB_Left	1_0	1880	376000	24.00	22.79
13	Middle	15	5	DFT-s-OFDM QPSK	Inner_1RB_Right	1_23	1880	376000	24.00	23.86
14	Middle	15	5	DFT-s-OFDM QPSK	Inner_1RB_Left	1_1	1880	376000	24.00	23.87
15	Middle	15	5	DFT-s-OFDM QPSK	Outer_Full	25_0	1880	376000	24.00	22.89
16	Middle	15	10	DFT-s-OFDM QPSK	Inner_Full	25_12	1880	376000	24.00	23.83
17	Middle	15	15	DFT-s-OFDM QPSK	Inner_Full	36_18	1880	376000	24.00	23.76
18	Middle	15	25	DFT-s-OFDM QPSK	Inner_Full	64_32	1880	376000	24.00	23.81
19	Middle	15	30	DFT-s-OFDM QPSK	Inner_Full	80_40	1880	376000	24.00	23.84
20	Middle	15	40	DFT-s-OFDM QPSK	Inner_Full	108_54	1880	376000	24.00	23.8

n2(ANT2 DSI2)

No.	Test Freq Description	5G-n2							Tune up	Power Results (dBm)
		SCS (kHz)	NR BW (MHz)	Modulation	RB allocation		NR Test Freq. (MHz)	NR Test CH.		n2
1	High	15	5	DFT-s-OFDM QPSK	Inner_Full	12_6	1907.5	381500	21.50	21.40
2	Middle	15	5	DFT-s-OFDM QPSK	Inner_Full	12_6	1880	376000	21.50	21.44
3	Low	15	5	DFT-s-OFDM QPSK	Inner_Full	12_6	1852.5	370500	21.50	21.33
4	High	15	20	DFT-s-OFDM QPSK	Inner_Full	50_25	1900	380000	21.50	21.40
5	Middle	15	20	DFT-s-OFDM QPSK	Inner_Full	50_25	1880	376000	21.50	21.36
6	Low	15	20	DFT-s-OFDM QPSK	Inner_Full	50_25	1860	372000	21.50	21.42

According to the table above, the maximum power configuration is selected as the default test configuration

No.	Test Freq Description	5G-n2							Tune up	Power Results (dBm)
		SCS (kHz)	NR BW (MHz)	Modulation	RB allocation		NR Test Freq. (MHz)	NR Test CH.		n2
1	Middle	15	5	DFT-s-OFDM PI/2 BPSK1	Inner_Full	12_6	1880	376000	21.50	21.36
2	Middle	15	5	DFT-s-OFDM 16QAM	Inner_Full	12_6	1880	376000	21.50	21.32
3	Middle	15	5	DFT-s-OFDM 64QAM	Inner_Full	12_6	1880	376000	21.50	21.39
4	Middle	15	5	DFT-s-OFDM 256QAM	Inner_Full	12_6	1880	376000	20.50	19.53
5	Middle	15	5	CP-OFDM QPSK	Inner_Full	12_6	1880	376000	21.50	21.29
6	Middle	15	5	CP-OFDM 16QAM	Inner_Full	12_6	1880	376000	21.50	21.28
7	Middle	15	5	CP-OFDM 64QAM	Inner_Full	12_6	1880	376000	21.50	20.60
8	Middle	15	5	CP-OFDM 256QAM	Inner_Full	12_6	1880	376000	18.50	17.31
9	Middle	15	5	DFT-s-OFDM QPSK	Edge_Full_Right	2_23	1880	376000	21.50	21.43
10	Middle	15	5	DFT-s-OFDM QPSK	Edge_Full_Left	2_0	1880	376000	21.50	21.42
11	Middle	15	5	DFT-s-OFDM QPSK	Edge_1RB_Right	1_24	1880	376000	21.50	21.33
12	Middle	15	5	DFT-s-OFDM QPSK	Edge_1RB_Left	1_0	1880	376000	21.50	21.32
13	Middle	15	5	DFT-s-OFDM QPSK	Inner_1RB_Right	1_23	1880	376000	21.50	21.33
14	Middle	15	5	DFT-s-OFDM QPSK	Inner_1RB_Left	1_1	1880	376000	21.50	21.33
15	Middle	15	5	DFT-s-OFDM QPSK	Outer_Full	25_0	1880	376000	21.50	21.42
16	Middle	15	10	DFT-s-OFDM QPSK	Inner_Full	25_12	1880	376000	21.50	21.29
17	Middle	15	15	DFT-s-OFDM QPSK	Inner_Full	36_18	1880	376000	21.50	21.22
18	Middle	15	25	DFT-s-OFDM QPSK	Inner_Full	64_32	1880	376000	21.50	21.21
19	Middle	15	30	DFT-s-OFDM QPSK	Inner_Full	80_40	1880	376000	21.50	21.20
20	Middle	15	40	DFT-s-OFDM QPSK	Inner_Full	108_54	1880	376000	21.50	21.25

n2(ANT2 DSI3)

No.	Test Freq Description	5G-n2								Power Results (dBm)
		SCS (kHz)	NR BW (MHz)	Modulation	RB allocation		NR Test Freq. (MHz)	NR Test CH.	Tune up	n2
1	High	15	5	DFT-s-OFDM QPSK	Inner_Full	12_6	1907.5	381500	16.00	15.83
2	Middle	15	5	DFT-s-OFDM QPSK	Inner_Full	12_6	1880	376000	16.00	15.86
3	Low	15	5	DFT-s-OFDM QPSK	Inner_Full	12_6	1852.5	370500	16.00	15.78
4	High	15	20	DFT-s-OFDM QPSK	Inner_Full	50_25	1900	380000	16.00	15.83
5	Middle	15	20	DFT-s-OFDM QPSK	Inner_Full	50_25	1880	376000	16.00	15.79
6	Low	15	20	DFT-s-OFDM QPSK	Inner_Full	50_25	1860	372000	16.00	15.84

According to the table above, the maximum power configuration is selected as the default test configuration

No.	Test Freq Description	5G-n2								Power Results (dBm)
		SCS (kHz)	NR BW (MHz)	Modulation	RB allocation		NR Test Freq. (MHz)	NR Test CH.	Tune up	n2
1	Middle	15	5	DFT-s-OFDM PI/2 BPSK1	Inner_Full	12_6	1880	376000	16.00	15.79
2	Middle	15	5	DFT-s-OFDM 16QAM	Inner_Full	12_6	1880	376000	16.00	15.77
3	Middle	15	5	DFT-s-OFDM 64QAM	Inner_Full	12_6	1880	376000	16.00	15.82
4	Middle	15	5	DFT-s-OFDM 256QAM	Inner_Full	12_6	1880	376000	16.00	15.83
5	Middle	15	5	CP-OFDM QPSK	Inner_Full	12_6	1880	376000	16.00	15.85
6	Middle	15	5	CP-OFDM 16QAM	Inner_Full	12_6	1880	376000	16.00	15.74
7	Middle	15	5	CP-OFDM 64QAM	Inner_Full	12_6	1880	376000	16.00	15.84
8	Middle	15	5	CP-OFDM 256QAM	Inner_Full	12_6	1880	376000	16.00	15.48
9	Middle	15	5	DFT-s-OFDM QPSK	Edge_Full_Right	2_23	1880	376000	16.00	15.85
10	Middle	15	5	DFT-s-OFDM QPSK	Edge_Full_Left	2_0	1880	376000	16.00	15.84
11	Middle	15	5	DFT-s-OFDM QPSK	Edge_1RB_Right	1_24	1880	376000	16.00	15.78
12	Middle	15	5	DFT-s-OFDM QPSK	Edge_1RB_Left	1_0	1880	376000	16.00	15.77
13	Middle	15	5	DFT-s-OFDM QPSK	Inner_1RB_Right	1_23	1880	376000	16.00	15.78
14	Middle	15	5	DFT-s-OFDM QPSK	Inner_1RB_Left	1_1	1880	376000	16.00	15.78
15	Middle	15	5	DFT-s-OFDM QPSK	Outer_Full	25_0	1880	376000	16.00	15.84
16	Middle	15	10	DFT-s-OFDM QPSK	Inner_Full	25_12	1880	376000	16.00	15.74
17	Middle	15	15	DFT-s-OFDM QPSK	Inner_Full	36_18	1880	376000	16.00	15.69
18	Middle	15	25	DFT-s-OFDM QPSK	Inner_Full	64_32	1880	376000	16.00	15.66
19	Middle	15	30	DFT-s-OFDM QPSK	Inner_Full	80_40	1880	376000	16.00	15.64
20	Middle	15	40	DFT-s-OFDM QPSK	Inner_Full	108_54	1880	376000	16.00	15.62

n25(ANT2 DSI3)

No.	Test Freq Description	5G-n25								Power Results (dBm)
		SCS (kHz)	NR BW (MHz)	Modulation	RB allocation		NR Test Freq. (MHz)	NR Test CH.	Tune up	n25
1	High	15	5	DFT-s-OFDM QPSK	Inner_Full	12_6	1912.5	382500	18.00	16.88
2	Middle	15	5	DFT-s-OFDM QPSK	Inner_Full	12_6	1882.5	376500	18.00	16.95
3	Low	15	5	DFT-s-OFDM QPSK	Inner_Full	12_6	1852.5	370500	18.00	16.86
4	High	15	20	DFT-s-OFDM QPSK	Inner_Full	50_25	1905	381000	18.00	16.88
5	Middle	15	20	DFT-s-OFDM QPSK	Inner_Full	50_25	1882.5	376500	18.00	16.93
6	Low	15	20	DFT-s-OFDM QPSK	Inner_Full	50_25	1860	372000	18.00	16.92

According to the table above, the maximum power configuration is selected as the default test configuration

No.	Test Freq Description	5G-n25								Power Results (dBm)
		SCS (kHz)	NR BW (MHz)	Modulation	RB allocation		NR Test Freq. (MHz)	NR Test CH.	Tune up	n25
1	Middle	15	5	DFT-s-OFDM PI/2 BPSK1	Inner_Full	12_6	1882.5	376500	18.00	16.83
2	Middle	15	5	DFT-s-OFDM 16QAM	Inner_Full	12_6	1882.5	376500	18.00	16.78
3	Middle	15	5	DFT-s-OFDM 64QAM	Inner_Full	12_6	1882.5	376500	18.00	16.84
4	Middle	15	5	DFT-s-OFDM 256QAM	Inner_Full	12_6	1882.5	376500	18.00	16.82
5	Middle	15	5	CP-OFDM QPSK	Inner_Full	12_6	1882.5	376500	18.00	16.83
6	Middle	15	5	CP-OFDM 16QAM	Inner_Full	12_6	1882.5	376500	18.00	16.80
7	Middle	15	5	CP-OFDM 64QAM	Inner_Full	12_6	1882.5	376500	18.00	16.83
8	Middle	15	5	CP-OFDM 256QAM	Inner_Full	12_6	1882.5	376500	18.00	16.65
9	Middle	15	5	DFT-s-OFDM QPSK	Edge_Full_Right	2_23	1882.5	376500	18.00	16.92
10	Middle	15	5	DFT-s-OFDM QPSK	Edge_Full_Left	2_0	1882.5	376500	18.00	16.92
11	Middle	15	5	DFT-s-OFDM QPSK	Edge_1RB_Right	1_24	1882.5	376500	18.00	16.78
12	Middle	15	5	DFT-s-OFDM QPSK	Edge_1RB_Left	1_0	1882.5	376500	18.00	16.80
13	Middle	15	5	DFT-s-OFDM QPSK	Inner_1RB_Right	1_23	1882.5	376500	18.00	16.80
14	Middle	15	5	DFT-s-OFDM QPSK	Inner_1RB_Left	1_1	1882.5	376500	18.00	16.81
15	Middle	15	5	DFT-s-OFDM QPSK	Outer_Full	25_0	1882.5	376500	18.00	16.78
16	High	15	10	DFT-s-OFDM QPSK	Inner_Full	25_12	1882.5	376500	18.00	16.79
17	Middle	15	15	DFT-s-OFDM QPSK	Inner_Full	36-18	1882.5	376500	18.00	16.78
18	High	15	25	DFT-s-OFDM QPSK	Inner_Full	64-32	1882.5	376500	18.00	16.77
19	Middle	15	30	DFT-s-OFDM QPSK	Inner_Full	80-40	1882.5	376500	18.00	16.73
20	Middle	15	40	DFT-s-OFDM QPSK	Inner_Full	108_54	1882.5	376500	18.00	16.74

n66(ANT2 DSI3)

No.	Test Freq Description	5G-n66								Power Results (dBm)
		SCS (kHz)	NR BW (MHz)	Modulation	RB allocation		NR Test Freq. (MHz)	NR Test CH.	Tune up	n66
1	High	15	5	DFT-s-OFDM QPSK	Inner_Full	12_6	1777.5	355500	19.00	17.95
2	Middle	15	5	DFT-s-OFDM QPSK	Inner_Full	12_6	1745	349000	19.00	17.99
3	Low	15	5	DFT-s-OFDM QPSK	Inner_Full	12_6	1712.5	342500	19.00	17.96
4	High	15	40	DFT-s-OFDM QPSK	Inner_Full	108_54	1760	352000	19.00	17.95
5	Middle	15	40	DFT-s-OFDM QPSK	Inner_Full	108_54	1745	349000	19.00	17.96
6	Low	15	40	DFT-s-OFDM QPSK	Inner_Full	108_54	1730	346000	19.00	17.94

According to the table above, the maximum power configuration is selected as the default test configuration

No.	Test Freq Description	5G-n66								Power Results (dBm)
		SCS (kHz)	NR BW (MHz)	Modulation	RB allocation		NR Test Freq. (MHz)	NR Test CH.	Tune up	n66
1	Middle	15	5	DFT-s-OFDM PI/2 BPSK1	Inner_Full	12_6	1745	349000	19.00	17.98
2	Middle	15	5	DFT-s-OFDM 16QAM	Inner_Full	12_6	1745	349000	19.00	17.91
3	Middle	15	5	DFT-s-OFDM 64QAM	Inner_Full	12_6	1745	349000	19.00	17.93
4	Middle	15	5	DFT-s-OFDM 256QAM	Inner_Full	12_6	1745	349000	19.00	17.96
5	Middle	15	5	CP-OFDM QPSK	Inner_Full	12_6	1745	349000	19.00	17.98
6	Middle	15	5	CP-OFDM 16QAM	Inner_Full	12_6	1745	349000	19.00	17.97
7	Middle	15	5	CP-OFDM 64QAM	Inner_Full	12_6	1745	349000	19.00	17.86
8	Middle	15	5	CP-OFDM 256QAM	Inner_Full	12_6	1745	349000	18.50	16.60
9	Middle	15	5	DFT-s-OFDM QPSK	Edge_Full_Right	2_23	1745	349000	19.00	17.97
10	Middle	15	5	DFT-s-OFDM QPSK	Edge_Full_Left	2_0	1745	349000	19.00	17.96
11	Middle	15	5	DFT-s-OFDM QPSK	Edge_1RB_Right	1_24	1745	349000	19.00	17.90
12	Middle	15	5	DFT-s-OFDM QPSK	Edge_1RB_Left	1_0	1745	349000	19.00	17.89
13	Middle	15	5	DFT-s-OFDM QPSK	Inner_1RB_Right	1_23	1745	349000	19.00	17.95
14	Middle	15	5	DFT-s-OFDM QPSK	Inner_1RB_Left	1_1	1745	349000	19.00	17.95
15	Middle	15	5	DFT-s-OFDM QPSK	Outer_Full	25_0	1745	349000	19.00	17.96
16	Middle	15	10	DFT-s-OFDM QPSK	Inner_Full	25_12	1745	349000	19.00	17.97
17	Middle	15	15	DFT-s-OFDM QPSK	Inner_Full	36_18	1745	349000	19.00	17.95
18	Middle	15	20	DFT-s-OFDM QPSK	Inner_Full	50_25	1745	349000	19.00	17.95
19	Middle	15	25	DFT-s-OFDM QPSK	Inner_Full	64-32	1745	349000	19.00	17.98
20	Middle	15	30	DFT-s-OFDM QPSK	Inner_Full	80_40	1745	349000	19.00	17.95

J.2.2 SAR Test Result

ANT	RF Exposure Conditions	Frequency Band	Channel Number	Frequency (MHz)	Mode/RB	Test setup	Distance	Figure No.	EUT Measured Power (dBm)	Tune up (dBm)	Measured SAR 1g (W/kg)	Calculated SAR 1g (W/kg)	Measured SAR 10g (W/kg)	Calculated SAR 10g (W/kg)	Power Drift
1	Body	LTE Band2	19100	1900	1RB-Middle	Front	10mm	\	15.72	16.5	0.063	**0.08**	0.039	**0.05**	0.04
1	Body	LTE Band2	19100	1900	1RB-Middle	Rear	10mm	\	15.72	16.5	0.152	**0.18**	0.085	**0.10**	0.06
1	Body	LTE Band2	19100	1900	1RB-Middle	Left	10mm	\	15.72	16.5	0.051	**0.06**	0.027	**0.03**	0.13
1	Body	LTE Band2	19100	1900	1RB-Middle	Right	10mm	\	15.72	16.5	0.044	**0.05**	0.025	**0.03**	0.14
1	Body	LTE Band2	19100	1900	1RB-Middle	Bottom	10mm	FIG J.1	15.72	16.5	0.209	**0.25**	0.115	**0.14**	0.02
1	Body	LTE Band2	19100	1900	50RB-Low	Front	10mm	\	15.78	16.5	0.060	**0.07**	0.037	**0.04**	-0.19
1	Body	LTE Band2	19100	1900	50RB-Low	Rear	10mm	\	15.78	16.5	0.141	**0.17**	0.078	**0.09**	-0.17
1	Body	LTE Band2	19100	1900	50RB-Low	Left	10mm	\	15.78	16.5	0.040	**0.05**	0.022	**0.03**	-0.19
1	Body	LTE Band2	19100	1900	50RB-Low	Right	10mm	\	15.78	16.5	0.046	**0.05**	0.025	**0.03**	0.11
1	Body	LTE Band2	19100	1900	50RB-Low	Bottom	10mm	\	15.78	16.5	0.198	**0.23**	0.107	**0.13**	-0.18
1	Body	LTE Band2	19100	1900	1RB-Middle	Front	15mm	\	17.74	18.5	0.056	**0.07**	0.035	**0.04**	0.15
1	Body	LTE Band2	19100	1900	1RB-Middle	Rear	15mm	FIG J.2	17.74	18.5	0.164	**0.20**	0.095	**0.11**	-0.07
1	Body	LTE Band2	19100	1900	50RB-Low	Front	15mm	\	17.81	18.5	0.056	**0.04**	0.035	**0.04**	-0.10
1	Body	LTE Band2	19100	1900	50RB-Low	Rear	15mm	\	17.81	18.5	0.131	**0.07**	0.074	**0.09**	0.11
0	Head	LTE Band5	20525	836.5	1RB-High	Cheek Left	0mm	\	22.53	23	0.604	**0.67**	0.315	**0.35**	-0.10
0	Head	LTE Band5	20525	836.5	1RB-High	Tilt Left	0mm	\	22.53	23	0.575	**0.64**	0.272	**0.30**	0.12
0	Head	LTE Band5	20525	836.5	1RB-High	Cheek Right	0mm	\	22.53	23	0.590	**0.66**	0.303	**0.34**	0.06
0	Head	LTE Band5	20525	836.5	1RB-High	Tilt Right	0mm	FIG J.3	22.53	23	0.637	**0.71**	0.334	**0.37**	0.15
0	Head	LTE Band5	20600	844	25RB-Low	Cheek Left	0mm	\	22.5	23	0.460	**0.52**	0.240	**0.27**	-0.12
0	Head	LTE Band5	20600	844	25RB-Low	Tilt Left	0mm	\	22.5	23	0.452	**0.51**	0.213	**0.24**	0.03
0	Head	LTE Band5	20600	844	25RB-Low	Cheek Right	0mm	\	22.5	23	0.463	**0.52**	0.248	**0.28**	-0.04
0	Head	LTE Band5	20600	844	25RB-Low	Tilt Right	0mm	\	22.5	23	0.500	**0.56**	0.274	**0.31**	0.04
0	Body	LTE Band5	20525	836.5	1RB-High	Front	10mm	\	23.56	25	0.225	**0.31**	0.150	**0.21**	0.08
0	Body	LTE Band5	20525	836.5	1RB-High	Rear	10mm	\	23.56	25	0.293	**0.41**	0.191	**0.27**	-0.02
0	Body	LTE Band5	20525	836.5	1RB-High	Left	10mm	\	23.56	25	0.267	**0.37**	0.165	**0.23**	0.05
0	Body	LTE Band5	20525	836.5	1RB-High	Right	10mm	\	23.56	25	0.150	**0.21**	0.093	**0.13**	-0.04
0	Body	LTE Band5	20525	836.5	1RB-High	Top	10mm	FIG J.4	23.56	25	0.389	**0.54**	0.205	**0.29**	-0.06
0	Body	LTE Band5	20600	844	25RB-Low	Front	10mm	\	22.46	24	0.178	**0.25**	0.100	**0.14**	-0.07
0	Body	LTE Band5	20600	844	25RB-Low	Rear	10mm	\	22.46	24	0.226	**0.32**	0.150	**0.21**	0.04
0	Body	LTE Band5	20600	844	25RB-Low	Left	10mm	\	22.46	24	0.259	**0.37**	0.160	**0.23**	-0.12
0	Body	LTE Band5	20600	844	25RB-Low	Right	10mm	\	22.46	24	0.115	**0.16**	0.068	**0.10**	0.05
0	Body	LTE Band5	20600	844	25RB-Low	Top	10mm	\	22.46	24	0.316	**0.45**	0.146	**0.21**	-0.11
2	Head	N2	381500	1907.5	DFT-QPSK 15K 5M 12_6	Cheek Left	0mm	\	15.83	16	0.446	**0.46**	0.238	**0.25**	-0.09
2	Head	N2	376000	1880	DFT-QPSK 15K 5M 12_6	Cheek Left	0mm	FIG J.5	15.86	16	0.535	**0.55**	0.280	**0.29**	0.02
2	Head	N2	370500	1852.5	DFT-QPSK 15K 5M 12_6	Cheek Left	0mm	\	15.78	16	0.501	**0.53**	0.270	**0.28**	0.11
2	Head	N2	376000	1880	DFT-QPSK 15K 5M 12_6	Tilt Left	0mm	\	15.86	16	0.174	**0.18**	0.096	**0.10**	0.05
2	Head	N2	376000	1880	DFT-QPSK 15K 5M 12_6	Cheek Right	0mm	\	15.86	16	0.187	**0.19**	0.121	**0.12**	0.13
2	Head	N2	376000	1880	DFT-QPSK 15K 5M 12_6	Tilt Right	0mm	\	15.86	16	0.159	**0.16**	0.093	**0.10**	0.12
2	Head	N2	376000	1880	CP-QPSK 15K 5M 12_6	Cheek Left	0mm	\	15.85	16	0.422	**0.44**	0.228	**0.24**	0.04
2	Body	N2	376000	1880	DFT-QPSK 15K 5M 12_6	Front	10mm	\	21.44	21.5	0.284	**0.29**	0.181	**0.18**	-0.15
2	Body	N2	376000	1880	DFT-QPSK 15K 5M 12_6	Rear	10mm	\	21.44	21.5	0.378	**0.38**	0.221	**0.22**	-0.19
2	Body	N2	381500	1907.5	DFT-QPSK 15K 5M 12_6	Right	10mm	\	21.4	21.5	0.457	**0.47**	0.246	**0.25**	-0.09
2	Body	N2	376000	1880	DFT-QPSK 15K 5M 12_6	Right	10mm	FIG J.6	21.44	21.5	0.460	**0.47**	0.250	**0.25**	-0.16
2	Body	N2	370500	1852.5	DFT-QPSK 15K 5M 12_6	Right	10mm	\	21.33	21.5	0.430	**0.45**	0.239	**0.25**	0.02
2	Body	N2	376000	1880	DFT-QPSK 15K 5M 12_6	Top	10mm	\	21.44	21.5	0.183	**0.19**	0.110	**0.11**	0.10
2	Body	N2	376000	1880	CP-QPSK 15K 5M 12_6	Right	10mm	\	21.29	21.5	0.436	**0.46**	0.238	**0.25**	0.10
2	Body	N2	376000	1880	DFT-QPSK 15K 5M 12_6	Front	15mm	\	23.89	24	0.236	**0.24**	0.149	**0.15**	-0.09
2	Body	N2	381500	1907.5	DFT-QPSK 15K 5M 12_6	Rear	10mm	FIG J.7	23.85	24	0.392	**0.41**	0.221	**0.23**	-0.01
2	Body	N2	376000	1880	DFT-QPSK 15K 5M 12_6	Rear	10mm	\	23.89	24	0.350	**0.36**	0.214	**0.22**	0.13
2	Body	N2	370500	1852.5	DFT-QPSK 15K 5M 12_6	Rear	10mm	\	23.77	24	0.381	**0.40**	0.216	**0.23**	0.02
2	Body	N2	376000	1880	CP-QPSK 15K 5M 12_6	Rear	10mm	\	22.62	24	0.331	**0.45**	0.204	**0.28**	0.19
2	Head	N25	382500	1912.5	DFT-QPSK 15K 5M 12_6	Cheek Left	0mm	\	16.88	18	0.393	**0.51**	0.201	**0.26**	0.06
2	Head	N25	376500	1882.5	DFT-QPSK 15K 5M 12_6	Cheek Left	0mm	FIG J.8	16.95	18	0.471	**0.60**	0.237	**0.30**	0.11
2	Head	N25	370500	1852.5	DFT-QPSK 15K 5M 12_6	Cheek Left	0mm	\	16.86	18	0.441	**0.57**	0.229	**0.30**	-0.14
2	Head	N25	376500	1882.5	DFT-QPSK 15K 5M 12_6	Tilt Left	0mm	\	16.95	18	0.154	**0.20**	0.082	**0.10**	-0.19
2	Head	N25	376500	1882.5	DFT-QPSK 15K 5M 12_6	Cheek Right	0mm	\	16.95	18	0.165	**0.21**	0.102	**0.13**	-0.17
2	Head	N25	376500	1882.5	DFT-QPSK 15K 5M 12_6	Tilt Right	0mm	\	16.95	18	0.140	**0.18**	0.078	**0.10**	0.18
2	Head	N25	376500	1882.5	CP-QPSK 15K 5M 12_6	Cheek Left	0mm	\	16.83	18	0.372	**0.49**	0.193	**0.25**	-0.13
2	Head	N66	355500	1777.5	DFT-QPSK 15K 5M 12_6	Cheek Left	0mm	\	17.95	19	0.383	**0.49**	0.202	**0.26**	-0.05
2	Head	N66	349000	1745	DFT-QPSK 15K 5M 12_6	Cheek Left	0mm	FIG J.9	17.99	19	0.420	**0.53**	0.236	**0.30**	0.14
2	Head	N66	342500	1712.5	DFT-QPSK 15K 5M 12_6	Cheek Left	0mm	\	17.96	19	0.414	**0.53**	0.234	**0.30**	-0.04
2	Head	N66	349000	1745	DFT-QPSK 15K 5M 12_6	Tilt Left	0mm	\	17.99	19	0.184	**0.23**	0.116	**0.15**	0.02
2	Head	N66	349000	1745	DFT-QPSK 15K 5M 12_6	Cheek Right	0mm	\	17.99	19	0.190	**0.24**	0.123	**0.16**	-0.13
2	Head	N66	349000	1745	DFT-QPSK 15K 5M 12_6	Tilt Right	0mm	\	17.99	19	0.157	**0.20**	0.096	**0.12**	-0.01
2	Head	N66	349000	1745	CP-QPSK 15K 5M 12_6	Cheek Left	0mm	\	17.98	19	0.392	**0.50**	0.197	**0.25**	0.05

J.3 Spot Check

J.3.1 Measurement results

RF Exposure Conditions	Frequency Band	Channel Number	Frequency (MHz)	Mode/RB	Test Position	Distance	Figure No.	EUT Measured Power (dBm)	Tune up (dBm)	Measured SAR 1g (W/kg)	Calculated SAR 1g (W/kg)	Measured SAR 10g (W/kg)	Calculated SAR 10g (W/kg)	Power Drift
Body	WCDMA1700 ANT2	1412	1732.5	RMC	Right Edge	10mm	FIG J.10	23.00	23.50	0.347	0.39	0.209	0.23	0.04
Head	LTE Band7 ANT4	21100	2535	1RB-High	Right Cheek	0mm	FIG J.11	18.18	18.50	1.050	1.13	0.481	0.52	0.08

J.3.2 Reported SAR Comparison

Technology Band	Antenna	Head Original	Hotspot Original	Body Worn Original	Head Spot check	Hotspot Spot check	Body Worn Spot check
GSM850	**0**	**0.91**	**0.46**	**0.46**	/	/	/
GSM1900	**2**	**0.60**	**0.22**	**0.22**	/	/	/
WCDMA1900	**2**	**1.05**	**0.84**	**0.84**	/	/	/
WCDMA1700	**2**	**0.95**	**0.87**	**0.87**	/	**0.39**	/
WCDMA 850	**0**	**0.64**	**0.45**	**0.45**	/	/	/
LTE Band7	**4**	**1.22**	**0.70**	**0.46**	**1.13**	/	/
LTE Band12	**0**	**0.73**	**0.43**	**0.43**	/	/	/
LTE Band13	**0**	**0.82**	**0.62**	**0.62**	/	/	/
LTE Band25	**2**	**0.76**	**0.74**	**0.36**	/	/	/
LTE Band26	**0**	**0.98**	**0.64**	**0.64**	/	/	/
LTE Band41-PC3	**4**	**0.65**	**0.45**	**0.29**	/	/	/
LTE Band41-PC2	**4**	**0.73**	**0.65**	**0.49**	/	/	/
LTE Band66	**1**	**0.19**	**0.10**	**0.33**	/	/	/
LTE Band66	**2**	**0.87**	**0.47**	**0.26**	/	/	/
LTE Band71	**0**	**0.56**	**0.44**	**0.44**	/	/	/
5G NR n25	**2**	**1.12**	**0.63**	**0.35**	/	/	/
5G NR n41-PC2	**1**	**0.20**	**0.18**	**0.25**	/	/	/
5G NR n41-PC2	**4**	**0.96**	**0.71**	**0.44**	/	/	/
5G NR n66	**2**	**0.94**	**0.30**	**0.27**	/	/	/
5G NR n71	**0**	**0.52**	**0.43**	**0.43**	/	/	/
5G NR n77L-PC2	**2**	**0.48**	**0.63**	**0.30**	/	/	/
5G NR n77H-PC2	**2**	**0.66**	**0.33**	**0.59**	/	/	/
5G NR n77L-PC2	**6**	**0.35**	**0.31**	**0.05**	/	/	/
5G NR n77H-PC2	**6**	**0.38**	**0.29**	**0.25**	/	/	/
WLAN 2.4GHz	**7**	**0.81**	**0.10**	**0.23**	/	/	/
WLAN 5GHz	**7**	**0.75**	**0.03**	**0.68**	/	/	/
BT	**7**	**<0.01**	**<0.01**	**<0.01**	/	/	/
NFC		**<0.01**	**<0.01**	**<0.01**		/	/

J.4 Main Test Instruments

No.	Name	Type	Serial Number	Calibration Date	Valid Period
01	Network analyzer	N5239A	MY55491241	June 5, 2023	One year
02	Power sensor	NRP50S	101488	June 14, 2023	One year
03	Power sensor	NRP50S	101489		
04	Signal Generator	MG3700A	6201052605	June 12 2023	One Year
05	Amplifier	60S1G4	0331848	No Calibration Requested	
06	DAE	SPEAG DAE4	1525	September 14,2023	One year
07	E-field Probe	SPEAG EX3DV4	7600	December 19，2023	One year
08	Dipole Validation Kit	SPEAG D835V2	4d069	July 14,2023	One year
09	Dipole Validation Kit	SPEAG D1750V2	1003	July 12,2023	One year
10	Dipole Validation Kit	SPEAG D1900V2	5d101	July 17,2023	One year
11	Dipole Validation Kit	SPEAG D2600V2	1012	July 11,2023	One year

J.5 Evaluation of Simultaneous

Test Position	SAR 1g/10g(W/kg)	ANT2 N2	ANT0 LTE B5	ANT0 LTE B12	5A_n2A (ANT0+2)	12A_n2A (ANT0+2)	MAX. SAR 10g
Head	Left Cheek	0.55	0.67	0.64	1.22	1.19	1.22
	Left Tilt	0.18	0.64	0.54	0.82	0.72	0.82
	Right Cheek	0.19	0.66	0.70	0.85	0.89	0.89
	Right Tilt	0.16	0.71	0.73	0.88	0.89	0.89
Body	Front 10mm	0.29	0.31	0.26	0.60	0.55	0.60
	Rear 10mm	0.38	0.41	0.36	0.79	0.74	0.79
	Left 10mm		0.37	0.43	0.37	0.43	0.43
	Right 10mm	0.47	0.21		0.68	0.47	0.68
	Bottom 10mm				0.00	0.00	0.00
	Top 10mm	0.19	0.54	0.35	0.73	0.54	0.73
	Front 15mm	0.24	0.31	0.26	0.56	0.50	0.56
	Rear 15mm	0.41	0.41	0.36	0.81	0.77	0.81

Test Position	SAR 1g/10g(W/kg)	1 WWAN	2 WIFI2.4G	3 WIFI5G	4 BT
Head	Left Cheek	1.22	0.17	0.34	0.00
	Left Tilt	0.82	0.17	0.33	0.00
	Right Cheek	0.89	0.08	0.13	0.00
	Right Tilt	0.89	0.08	0.12	0.00
Body	Front 10mm	0.60	0.07	0.03	0.00
	Rear 10mm	0.79	0.06	0.03	0.00
	Left 10mm	0.43			0.00
	Right 10mm	0.68	0.10	0.02	0.00
	Bottom 10mm	0.00			0.00
	Top 10mm	0.73	0.04	0.02	0.00
	Front 15mm	0.56	0.04	0.04	0.00
	Rear 15mm	0.81	0.04	0.07	0.00

t Position	SAR 1g/10g(W/	simultaneous transmission 1+2	1+3	1+4	1+3+4
Head	Left Cheek	1.39	1.56	1.22	1.56
	Left Tilt	0.99	1.15	0.82	1.15
	Right Cheek	0.97	1.02	0.89	1.02
	Right Tilt	0.97	1.01	0.89	1.01
Body	Front 10mm	0.67	0.63	0.60	0.63
	Rear 10mm	0.85	0.82	0.79	0.82
	Left 10mm	0.43	0.43	0.43	0.43
	Right 10mm	0.78	0.70	0.68	0.70
	Bottom 10mm	0.00	0.00	0.00	0.00
	Top 10mm	0.77	0.75	0.73	0.75
	Front 15mm	0.60	0.60	0.56	0.60
	Rear 15mm	0.85	0.88	0.81	0.88

Test Position	SAR 1g/10g(W/kg)	ANT2 N25	ANT0 LTE B12	12A_n25A (ANT0+2)
Head	Left Cheek	0.60	0.64	1.24
	Left Tilt	0.20	0.54	0.74
	Right Cheek	0.21	0.70	0.91
	Right Tilt	0.18	0.73	0.91
Body	Front 10mm	0.34	0.26	0.60
	Rear 10mm	0.44	0.36	0.80
	Left 10mm		0.43	0.43
	Right 10mm	0.63		0.63
	Bottom 10mm			0.00
	Top 10mm		0.35	0.35
	Front 15mm	0.29	0.26	0.55
	Rear 15mm	0.35	0.36	0.71

Test Position	SAR 1g/10g(W/kg)	1.00 WWAN	2.00 WIFI2.4G	3.00 WIFI5G	4.00 BT
Head	Left Cheek	1.24	0.17	0.34	0.00
	Left Tilt	0.74	0.17	0.33	0.00
	Right Cheek	0.91	0.08	0.13	0.00
	Right Tilt	0.91	0.08	0.12	0.00
Body	Front 10mm	0.60	0.07	0.03	0.00
	Rear 10mm	0.80	0.06	0.03	0.00
	Left 10mm	0.43			0.00
	Right 10mm	0.63	0.10	0.02	0.00
	Bottom 10mm	0.00			
	Top 10mm	0.35	0.04	0.02	0.00
	Front 15mm	0.55	0.04	0.04	0.00
	Rear 15mm	0.71	0.04	0.07	0.00

t Position	SAR 1g/10g(W/	simultaneous transmission 1+2	1+3	1+4	1+3+4
Head	Left Cheek	1.41	1.58	1.24	1.58
	Left Tilt	0.91	1.07	0.74	1.07
	Right Cheek	0.99	1.04	0.91	1.04
	Right Tilt	0.99	1.03	0.91	1.03
Body	Front 10mm	0.67	0.63	0.60	0.63
	Rear 10mm	0.86	0.83	0.80	0.83
	Left 10mm	0.43	0.43	0.43	0.43
	Right 10mm	0.73	0.65	0.63	0.65
	Bottom 10mm	0.00	0.00	0.00	0.00
	Top 10mm	0.39	0.37	0.35	0.37
	Front 15mm	0.59	0.59	0.55	0.59
	Rear 15mm	0.75	0.78	0.71	0.78

Test Position	SAR 1g/10g(W/kg)	ANT2 N66	ANT1 LTE B2	ANT0 LTE B12	2A_n66A (ANT1+2)	12A_n66A (ANT0+2)	MAX. SAR 10g
Head	Left Cheek	0.53	0.28	0.64	0.81	1.17	1.17
	Left Tilt	0.23	0.24	0.54	0.47	0.77	0.77
	Right Cheek	0.24	0.35	0.70	0.59	0.94	0.94
	Right Tilt	0.20	0.24	0.73	0.44	0.93	0.93
Body	Front 10mm	0.20	0.08	0.26	0.28	0.46	0.46
	Rear 10mm	0.22	0.18	0.36	0.40	0.58	0.58
	Left 10mm		0.06	0.43	0.06	0.43	0.43
	Right 10mm	0.30	0.05		0.35	0.30	0.35
	Bottom 10mm		0.25		0.25	0.00	0.25
	Top 10mm	0.18		0.35	0.18	0.53	0.53
	Front 15mm	0.27	0.07	0.26	0.34	0.53	0.53
	Rear 15mm	0.26	0.20	0.36	0.46	0.62	0.62

Test Position	SAR 1g/10g(W/kg)	1.00 WWAN	2.00 WIFI2.4G	3.00 WIFI5G	4.00 BT
Head	Left Cheek	1.17	0.17	0.34	0.00
	Left Tilt	0.77	0.17	0.33	0.00
	Right Cheek	0.94	0.08	0.13	0.00
	Right Tilt	0.93	0.08	0.12	0.00
Body	Front 10mm	0.46	0.07	0.03	0.00
	Rear 10mm	0.58	0.06	0.03	0.00
	Left 10mm	0.43			0.00
	Right 10mm	0.35	0.10	0.02	0.00
	Bottom 10mm	0.25			
	Top 10mm	0.53	0.04	0.02	0.00
	Front 15mm	0.53	0.04	0.04	0.00
	Rear 15mm	0.62	0.04	0.07	0.00

t Position	SAR 1g/10g(W/	simultaneous transmission 1+2	1+3	1+4	1+3+4
Head	Left Cheek	1.34	1.51	1.17	1.51
	Left Tilt	0.94	1.10	0.77	1.10
	Right Cheek	1.02	1.07	0.94	1.07
	Right Tilt	1.01	1.05	0.93	1.05
Body	Front 10mm	0.53	0.49	0.46	0.49
	Rear 10mm	0.64	0.61	0.58	0.61
	Left 10mm	0.43	0.43	0.43	0.43
	Right 10mm	0.45	0.37	0.35	0.37
	Bottom 10mm	0.25	0.25	0.25	0.25
	Top 10mm	0.57	0.55	0.53	0.55
	Front 15mm	0.57	0.57	0.53	0.57
	Rear 15mm	0.66	0.69	0.62	0.69

J.6 Graph Results

LTE Band2 Body 10mm

Date: 2024-03-21

Electronics: DAE4 Sn1588

Medium: H700-6000M

Medium parameters used: f = 1900 MHz; σ = 1.448 S/m; εr = 40.23; ρ = 1000 kg/m3

Ambient Temperature:23.3°C Liquid Temperature: 22.5°C

Communication System: UID 0, 1LTE Band2 (0) Frequency: 1900 MHz Duty Cycle: 1:1

Probe: EX3DV4 - SN7548 ConvF(7.85, 7.85, 7.85)

Area Scan (141x71x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

Maximum value of SAR (interpolated) = 0.312 W/kg

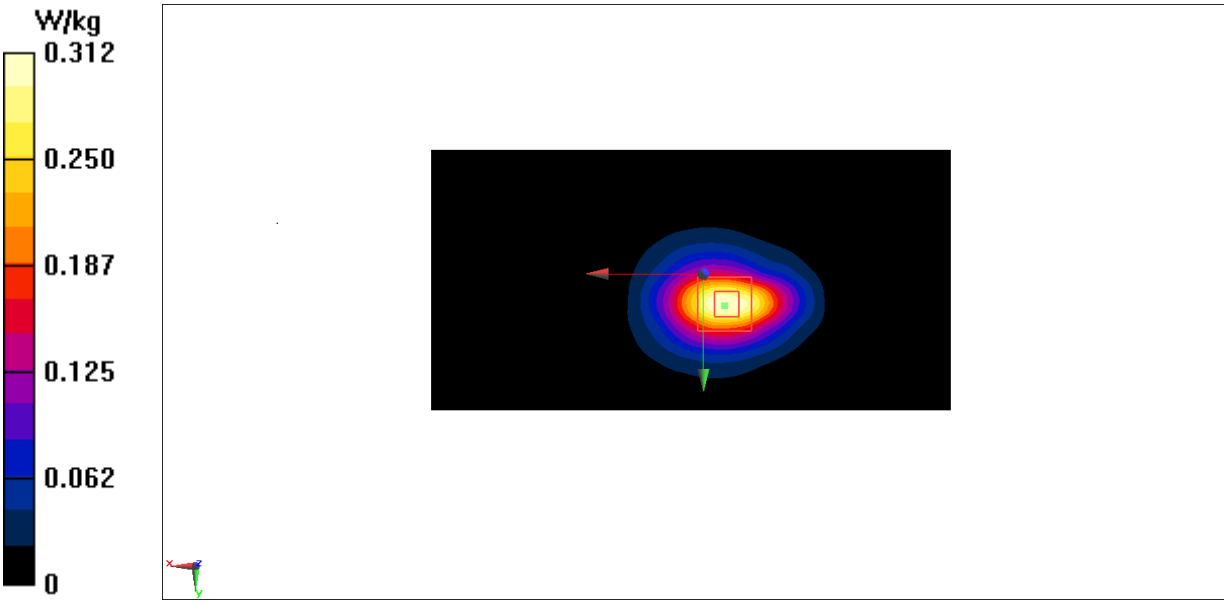
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 8.869 V/m; Power Drift = 0.02 dB

Peak SAR (extrapolated) = 0.370 W/kg

SAR(1 g) = 0.209 W/kg; SAR(10 g) = 0.115 W/kg

Maximum value of SAR (measured) = 0.307 W/kg



LTE Band2 Body 15mm

Date: 2024-03-21

Electronics: DAE4 Sn1588

Medium: H700-6000M

Medium parameters used: f = 1900 MHz; σ = 1.448 S/m; εr = 40.23; ρ = 1000 kg/m3

Ambient Temperature:23.3°C Liquid Temperature: 22.5°C

Communication System: UID 0, 1LTE Band2 (0) Frequency: 1900 MHz Duty Cycle: 1:1

Probe: EX3DV4 - SN7548 ConvF(7.85, 7.85, 7.85)

Area Scan (141x71x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

Maximum value of SAR (interpolated) = 0.244 W/kg

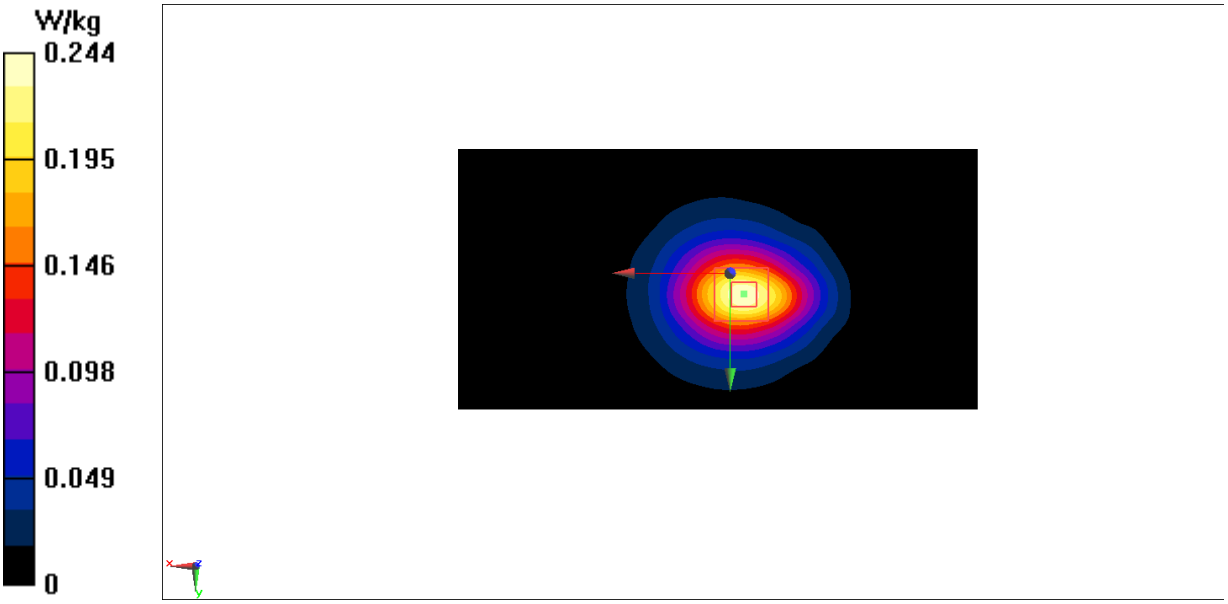
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 9.700 V/m; Power Drift = -0.07 dB

Peak SAR (extrapolated) = 0.279 W/kg

SAR(1 g) = 0.164 W/kg; SAR(10 g) = 0.095 W/kg

Maximum value of SAR (measured) = 0.237 W/kg



LTE Band5 Head

Date: 2024-03-20

Electronics: DAE4 Sn1588

Medium: H700-6000M

Medium parameters used (interpolated): f = 836.5 MHz; σ = 0.924 S/m; εr = 42.71; ρ = 1000 kg/m3

Ambient Temperature:23.3°C Liquid Temperature: 22.5°C

Communication System: UID 0, LTE Band5 (0) Frequency: 836.5 MHz Duty Cycle: 1:1

Probe: EX3DV4 - SN7548 ConvF(10.25, 10.25, 10.25)

Area Scan (81x121x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

Maximum value of SAR (interpolated) = 0.895 W/kg

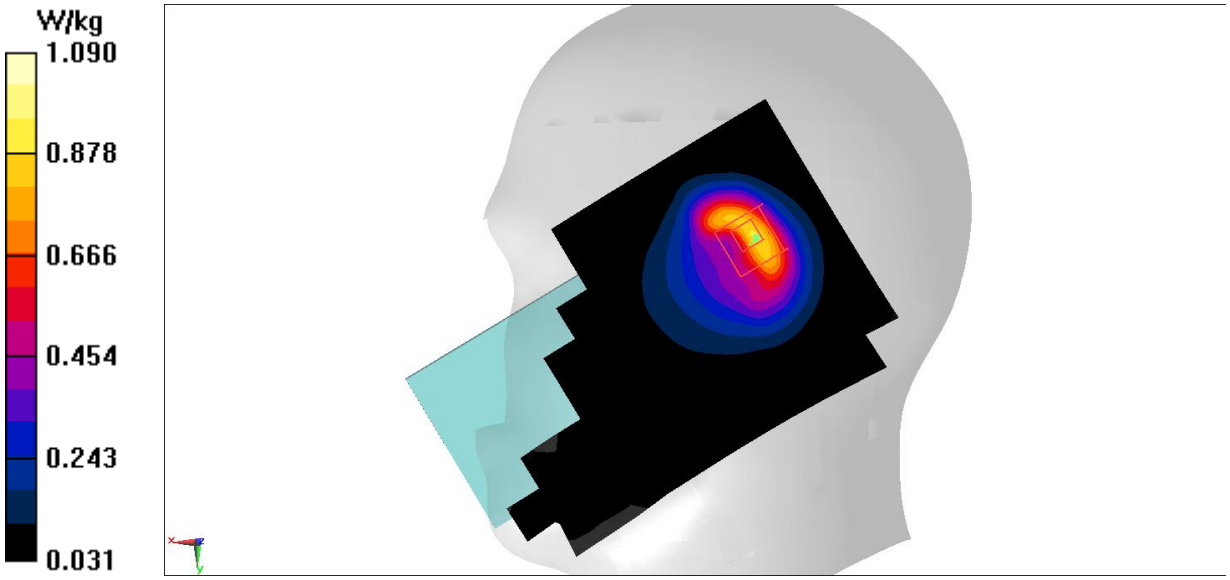
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 23.92 V/m; Power Drift = 0.15 dB

Peak SAR (extrapolated) = 1.52 W/kg

SAR(1 g) = 0.637 W/kg; SAR(10 g) = 0.334 W/kg

Maximum value of SAR (measured) = 1.09 W/kg



LTE Band5 Body 10mm

Date: 2024-03-20

Electronics: DAE4 Sn1588

Medium: H700-6000M

Medium parameters used (interpolated): f = 836.5 MHz; σ = 0.924 S/m; εr = 42.71; ρ = 1000 kg/m3

Ambient Temperature:23.3°C Liquid Temperature: 22.5°C

Communication System: UID 0, LTE Band5 (0) Frequency: 836.5 MHz Duty Cycle: 1:1

Probe: EX3DV4 - SN7548 ConvF(10.25, 10.25, 10.25)

Area Scan (141x71x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

Maximum value of SAR (interpolated) = 0.565 W/kg

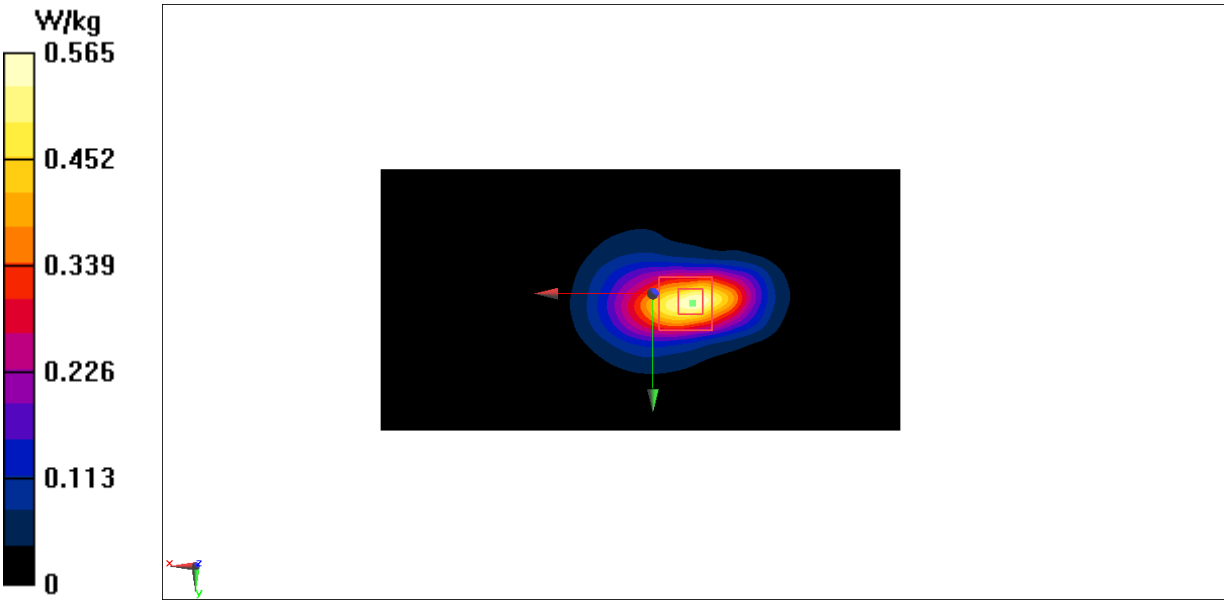
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 18.40 V/m; Power Drift = -0.06 dB

Peak SAR (extrapolated) = 0.795 W/kg

SAR(1 g) = 0.389 W/kg; SAR(10 g) = 0.205 W/kg

Maximum value of SAR (measured) = 0.608 W/kg



N2 Head

Date: 2024-03-21

Electronics: DAE4 Sn1588

Medium: H700-6000M

Medium parameters used: f = 1880 MHz; σ = 1.436 S/m; εr = 40.258; ρ = 1000 kg/m3

Ambient Temperature:23.3°C Liquid Temperature: 22.5°C

Communication System: UID 0, 5G n2 (0) Frequency: 1880 MHz Duty Cycle: 1:1

Probe: EX3DV4 - SN7548 ConvF(7.85, 7.85, 7.85)

Area Scan (81x121x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

Maximum value of SAR (interpolated) = 1.28 W/kg

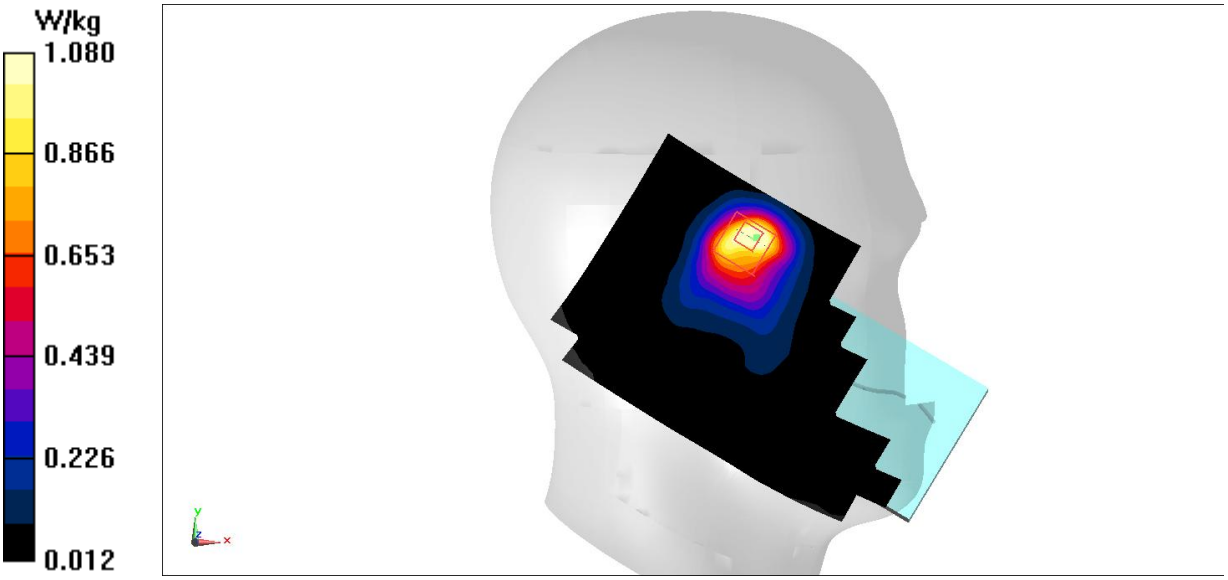
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 8.724 V/m; Power Drift = 0.02 dB

Peak SAR (extrapolated) = 1.37 W/kg

SAR(1 g) = 0.535 W/kg; SAR(10 g) = 0.280 W/kg

Maximum value of SAR (measured) = 1.08 W/kg



N2 Body 10mm

Date: 2024-03-21

Electronics: DAE4 Sn1588

Medium: H700-6000M

Medium parameters used: f = 1880 MHz; σ = 1.436 S/m; εr = 40.258; ρ = 1000 kg/m3

Ambient Temperature:23.3°C Liquid Temperature: 22.5°C

Communication System: UID 0, 5G n2 (0) Frequency: 1880 MHz Duty Cycle: 1:1

Probe: EX3DV4 - SN7548 ConvF(7.85, 7.85, 7.85)

Area Scan (81x141x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

Maximum value of SAR (interpolated) = 0.695 W/kg

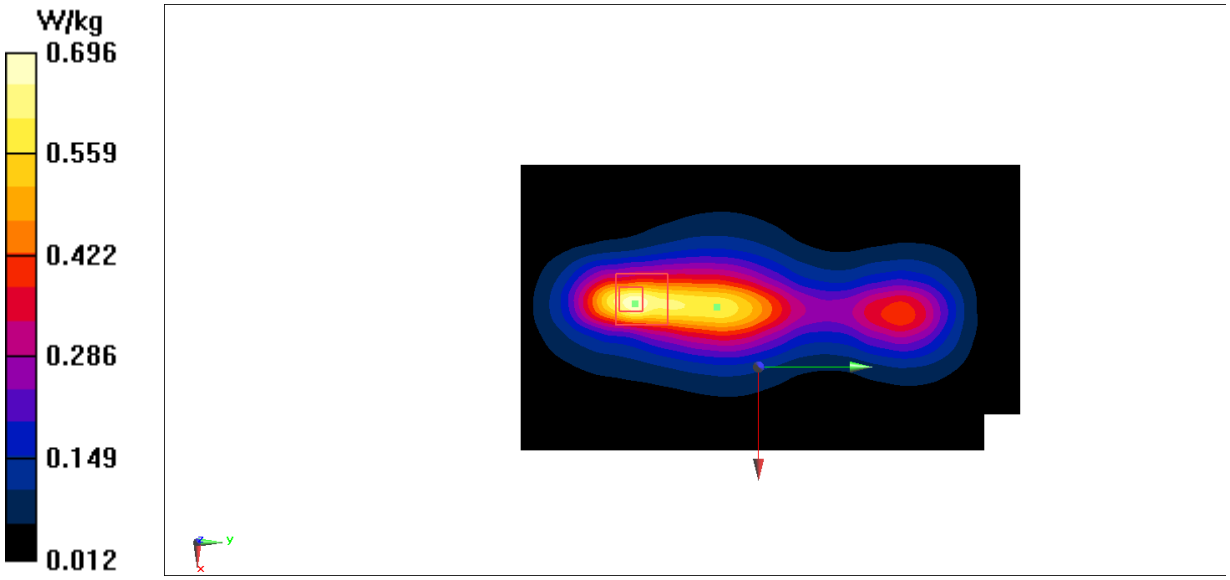
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 19.50 V/m; Power Drift = -0.16 dB

Peak SAR (extrapolated) = 0.832 W/kg

SAR(1 g) = 0.460 W/kg; SAR(10 g) = 0.250 W/kg

Maximum value of SAR (measured) = 0.696 W/kg



N2 Body 15mm

Date: 2024-03-21

Electronics: DAE4 Sn1588

Medium: H700-6000M

Medium parameters used: f = 1905 MHz; σ = 1.451 S/m; εr = 40.219; ρ = 1000 kg/m3

Ambient Temperature:23.3°C Liquid Temperature: 22.5°C

Communication System: UID 0, 5G NR N2 15kHz (0) Frequency: 1907.5 MHz Duty Cycle: 1:1

Probe: EX3DV4 - SN7548 ConvF(7.85, 7.85, 7.85)

Area Scan (141x71x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

Maximum value of SAR (interpolated) = 0.589 W/kg

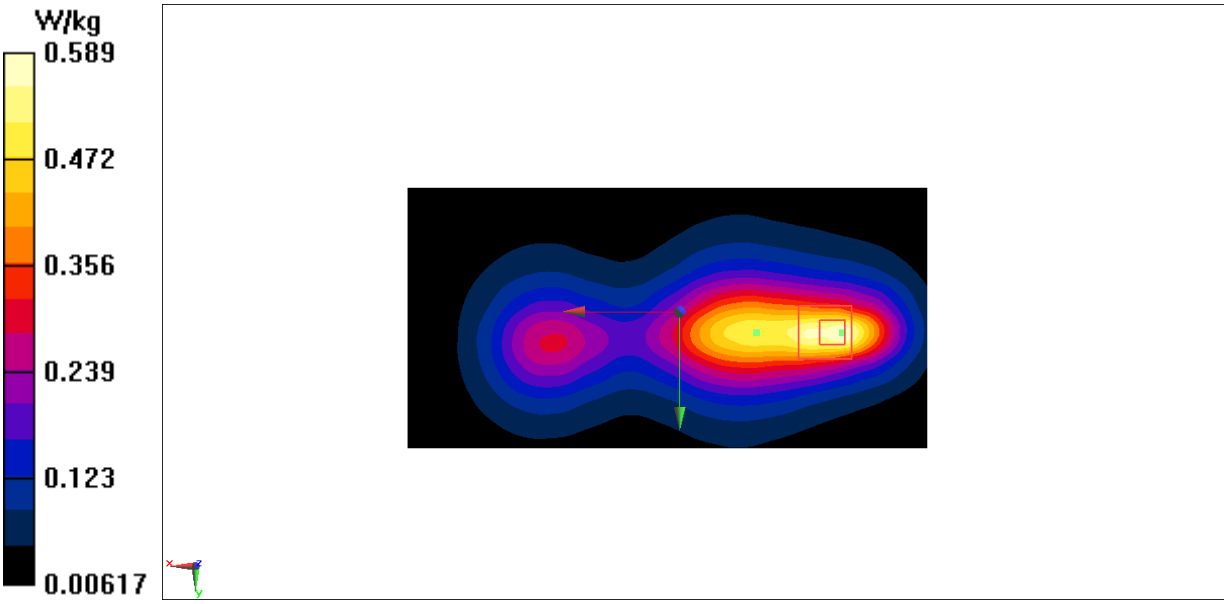
Zoom Scan (6x6x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 11.47 V/m; Power Drift = -0.01 dB

Peak SAR (extrapolated) = 0.692 W/kg

SAR(1 g) = 0.392 W/kg; SAR(10 g) = 0.221 W/kg

Maximum value of SAR (measured) = 0.573 W/kg



N25 Head

Date: 2024-03-21

Electronics: DAE4 Sn1588

Medium: H700-6000M

Medium parameters used (interpolated): f = 1882.5 MHz; σ = 1.442 S/m; εr = 40.249; ρ = 1000 kg/m3

Ambient Temperature:23.3°C Liquid Temperature: 22.5°C

Communication System: UID 0, 5G NR (0) Frequency: 1882.5 MHz Duty Cycle: 1:1

Probe: EX3DV4 - SN7548 ConvF(7.85, 7.85, 7.85)

Area Scan (81x121x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

Maximum value of SAR (interpolated) = 0.685 W/kg

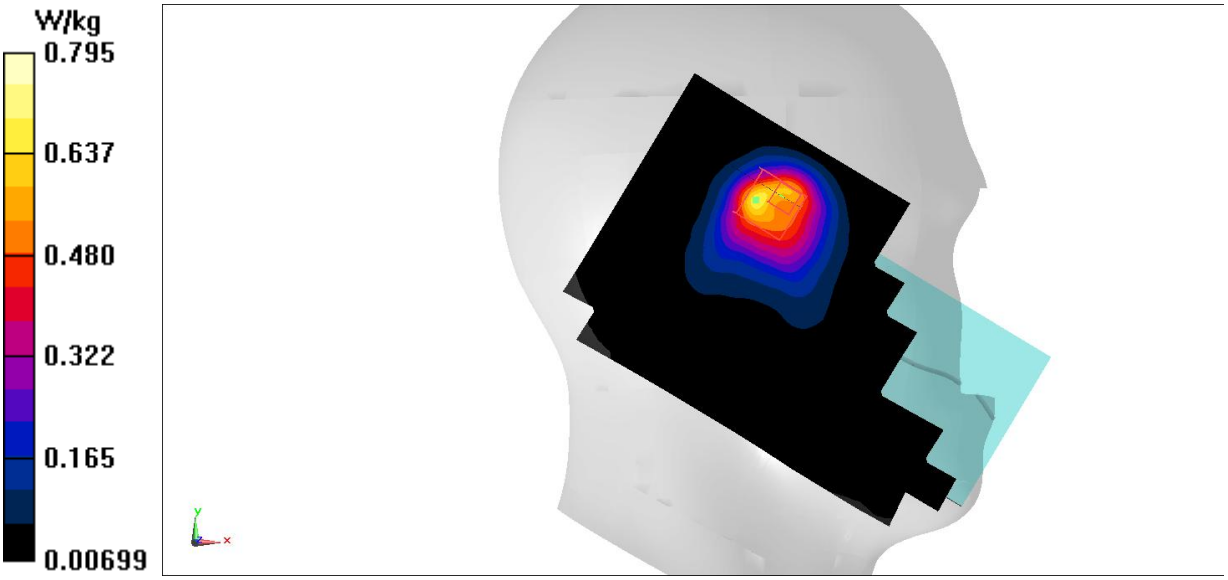
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 7.943 V/m; Power Drift = 0.11 dB

Peak SAR (extrapolated) = 1.00 W/kg

SAR(1 g) = 0.471 W/kg; SAR(10 g) = 0.237 W/kg

Maximum value of SAR (measured) = 0.795 W/kg



N66 Head

Date: 2024-03-21

Electronics: DAE4 Sn1588

Medium: H700-6000M

Medium parameters used: f = 1745 MHz; σ = 1.387 S/m; εr = 40.564; ρ = 1000 kg/m3

Ambient Temperature:23.3°C Liquid Temperature: 22.5°C

Communication System: UID 0, 5G NR (0) Frequency: 1745 MHz Duty Cycle: 1:1

Probe: EX3DV4 - SN7548 ConvF(8.15, 8.15, 8.15)

Area Scan (81x121x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

Maximum value of SAR (interpolated) = 0.682 W/kg

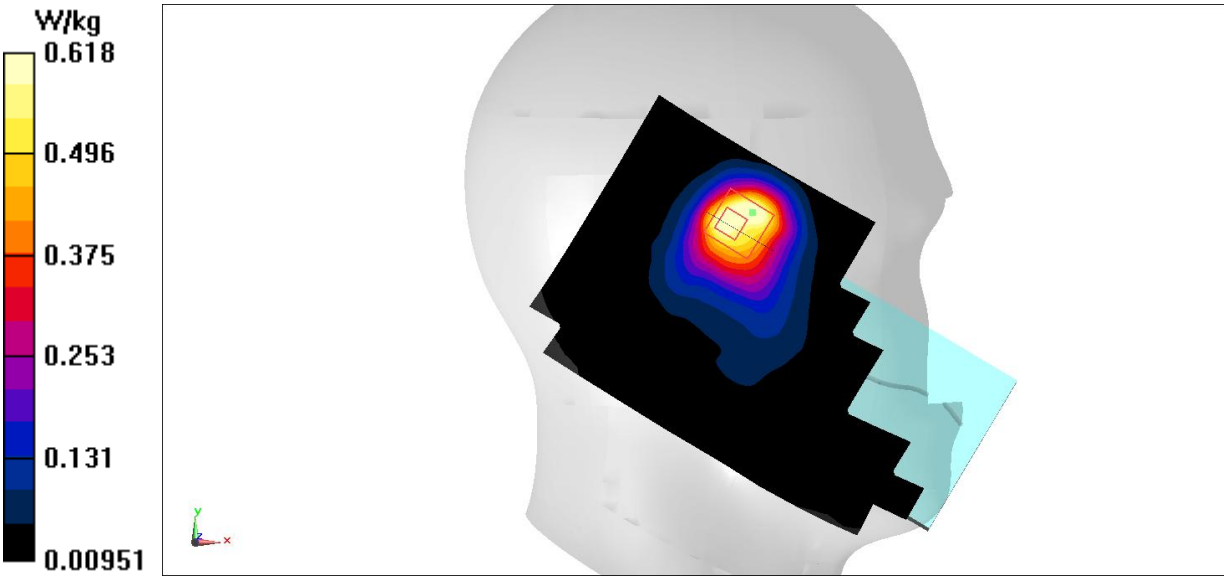
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 7.887 V/m; Power Drift = 0.14 dB

Peak SAR (extrapolated) = 0.793 W/kg

SAR(1 g) = 0.420 W/kg; SAR(10 g) = 0.236 W/kg

Maximum value of SAR (measured) = 0.618 W/kg



WCDMA1700 Body 10mm

Date: 2024-03-21

Electronics: DAE4 Sn1588

Medium: H700-6000M

Medium parameters used: f = 1730 MHz; σ = 1.377 S/m; εr = 40.594; ρ = 1000 kg/m3

Ambient Temperature:23.3°C Liquid Temperature: 22.5°C

Communication System: UID 0, 1WCDMA1700 (B4) (0) Frequency: 1732.5 MHz Duty Cycle: 1:1

Probe: EX3DV4 - SN7548 ConvF(8.15, 8.15, 8.15)

Area Scan (141x81x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

Maximum value of SAR (interpolated) = 0.509 W/kg

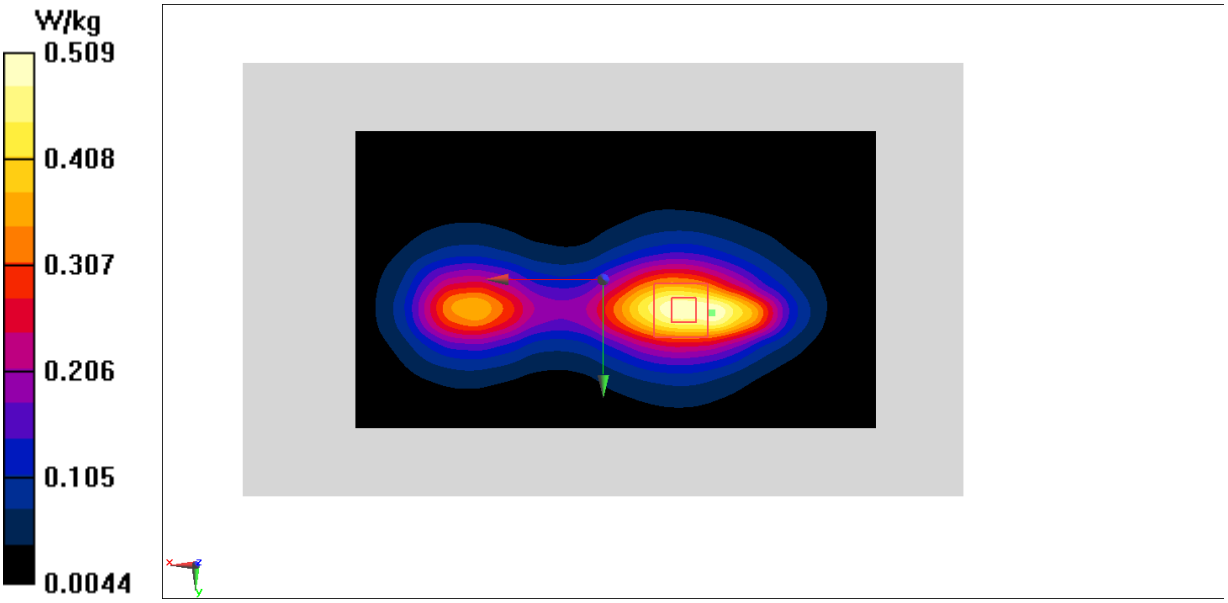
Zoom Scan (7x6x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 9.713 V/m; Power Drift = 0.04 dB

Peak SAR (extrapolated) = 0.589 W/kg

SAR(1 g) = 0.347 W/kg; SAR(10 g) = 0.209 W/kg

Maximum value of SAR (measured) = 0.492 W/kg



LTE Band7 Head

Date: 2024-03-20

Electronics: DAE4 Sn1588

Medium: H700-6000M

Medium parameters used: f = 2535 MHz; σ = 1.937 S/m; εr = 39.184; ρ = 1000 kg/m3

Ambient Temperature:23.3°C Liquid Temperature: 22.5°C

Communication System: UID 0, LTE Band7-20M (0) Frequency: 2535 MHz Duty Cycle: 1:1

Probe: EX3DV4 - SN7548 ConvF(7.4, 7.4, 7.4)

Area Scan (81x141x1): Interpolated grid: dx=1.200 mm, dy=1.200 mm

Maximum value of SAR (interpolated) = 1.71 W/kg

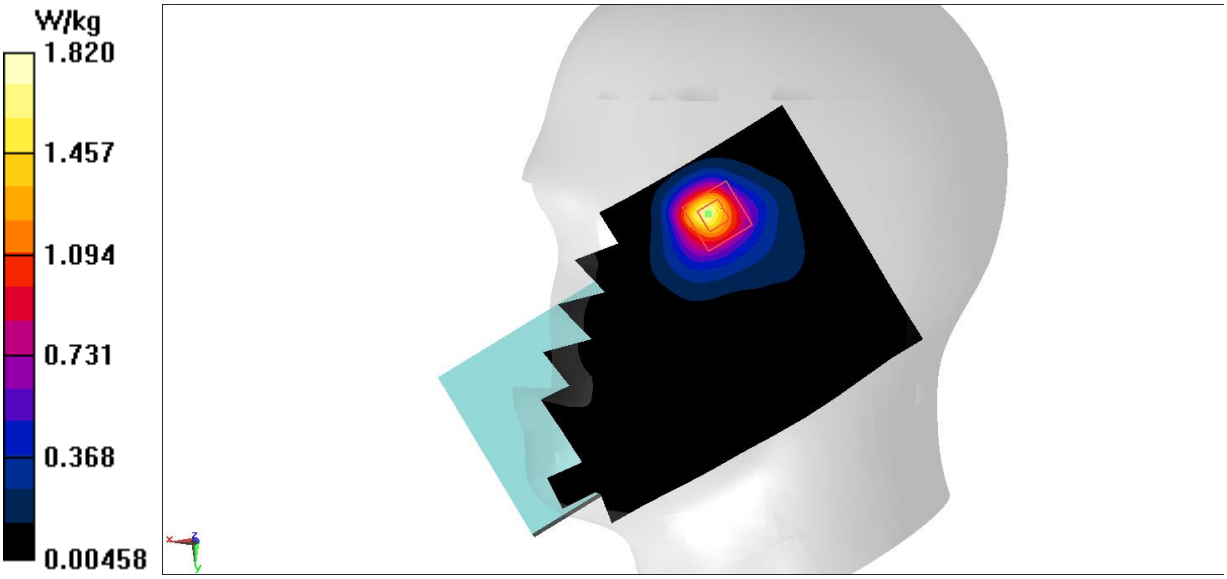
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 7.259 V/m; Power Drift = 0.08 dB

Peak SAR (extrapolated) = 2.37 W/kg

SAR(1 g) = 1.05 W/kg; SAR(10 g) = 0.481 W/kg

Maximum value of SAR (measured) = 1.82 W/kg



J.7 System Validation Results

835MHz

Date: 2024-03-20

Electronics: DAE4 Sn1588

Medium: H700-6000M

Medium parameters used: f = 835 MHz; σ = 0.923 S/m; εr = 42.7; ρ = 1000 kg/m3

Ambient Temperature:23.3°C Liquid Temperature: 22.5°C

Communication System: UID 0, CW (0) Frequency: 835 MHz Duty Cycle: 1:1

Probe: EX3DV4 - SN7548 ConvF(10.25, 10.25, 10.25)

Area Scan (131x61x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

Maximum value of SAR (interpolated) = 3.29 W/kg

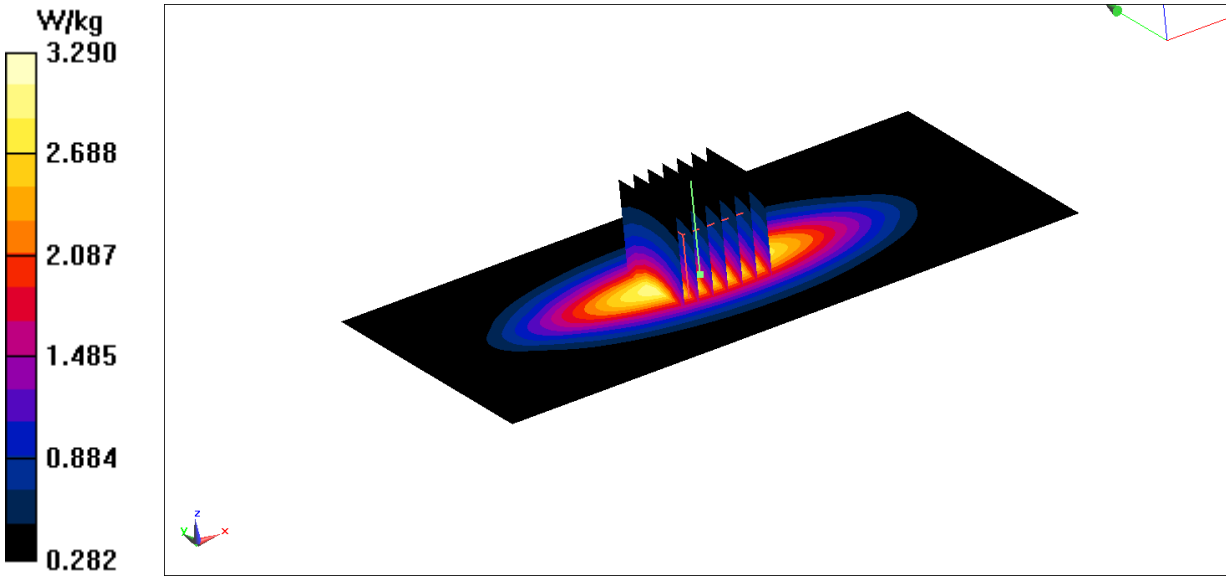
Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 58.24 V/m; Power Drift = 0.03 dB

Peak SAR (extrapolated) = 3.82 W/kg

SAR(1 g) = 2.39 W/kg; SAR(10 g) = 1.55 W/kg

Maximum value of SAR (measured) = 3.29 W/kg



1750MHz

Date: 2024-03-21

Electronics: DAE4 Sn1588

Medium: H700-6000M

Medium parameters used: f = 1750 MHz; σ = 1.39 S/m; εr = 40.54; ρ = 1000 kg/m3

Ambient Temperature:23.3°C Liquid Temperature: 22.5°C

Communication System: UID 0, CW (0) Frequency: 1750 MHz Duty Cycle: 1:1

Probe: EX3DV4 - SN7548 ConvF(8.15, 8.15, 8.15)

Area Scan (61x61x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

Maximum value of SAR (interpolated) = 13.7 W/kg

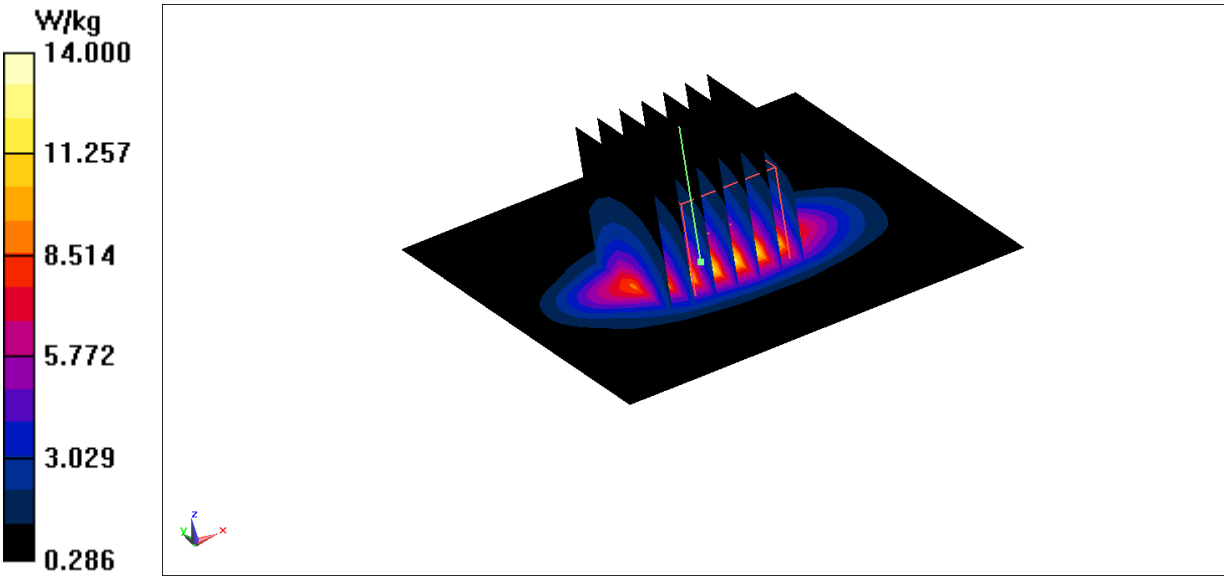
Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 93.14 V/m; Power Drift = -0.03 dB

Peak SAR (extrapolated) = 16.9 W/kg

SAR(1 g) = 9.1 W/kg; SAR(10 g) = 4.84 W/kg

Maximum value of SAR (measured) = 14.0 W/kg



1900MHz

Date: 2024-03-21

Electronics: DAE4 Sn1588

Medium: H700-6000M

Medium parameters used: f = 1900 MHz; σ = 1.448 S/m; εr = 40.23; ρ = 1000 kg/m3

Ambient Temperature:23.3°C Liquid Temperature: 22.5°C

Communication System: UID 0, CW (0) Frequency: 1900 MHz Duty Cycle: 1:1

Probe: EX3DV4 - SN7548 ConvF(7.85, 7.85, 7.85)

Area Scan (61x61x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

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

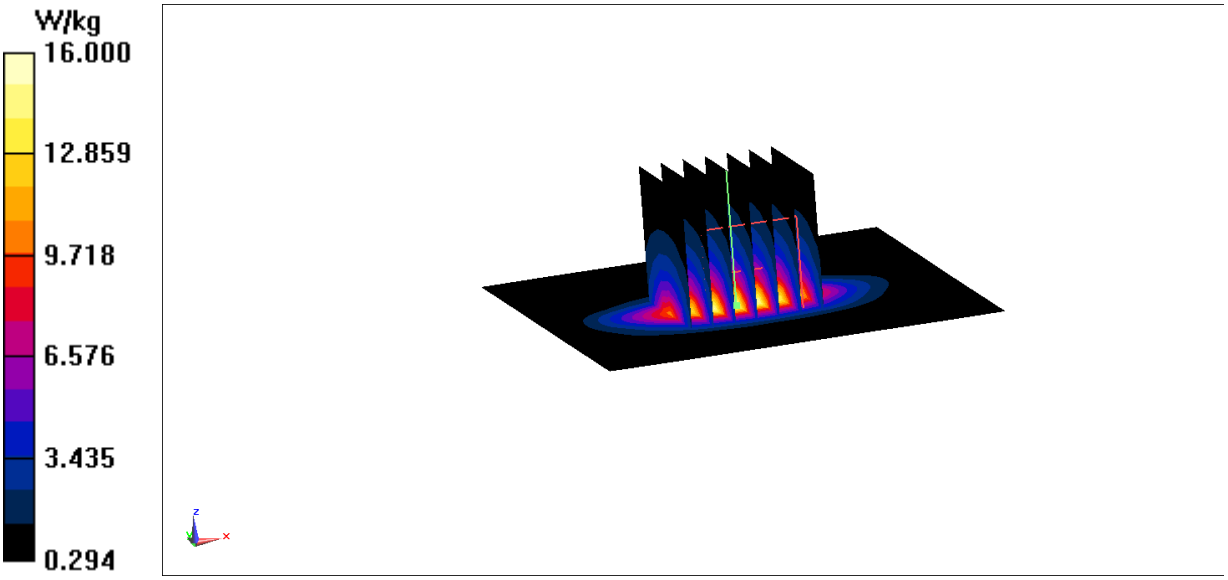
Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 94.44 V/m; Power Drift = -0.02 dB

Peak SAR (extrapolated) = 19.2 W/kg

SAR(1 g) = 10.1 W/kg; SAR(10 g) = 5.25 W/kg

Maximum value of SAR (measured) = 16.0 W/kg



2600MHz

Date: 2024-03-20

Electronics: DAE4 Sn1588

Medium: H700-6000M

Medium parameters used: f = 2600 MHz; σ = 1.988 S/m; εr = 39.07; ρ = 1000 kg/m3

Ambient Temperature:23.3°C Liquid Temperature: 22.5°C

Communication System: UID 0, CW (0) Frequency: 2600 MHz Duty Cycle: 1:1

Probe: EX3DV4 - SN7548 ConvF(7.21, 7.21, 7.21)

Area Scan (61x61x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

Maximum value of SAR (interpolated) = 23.3 W/kg

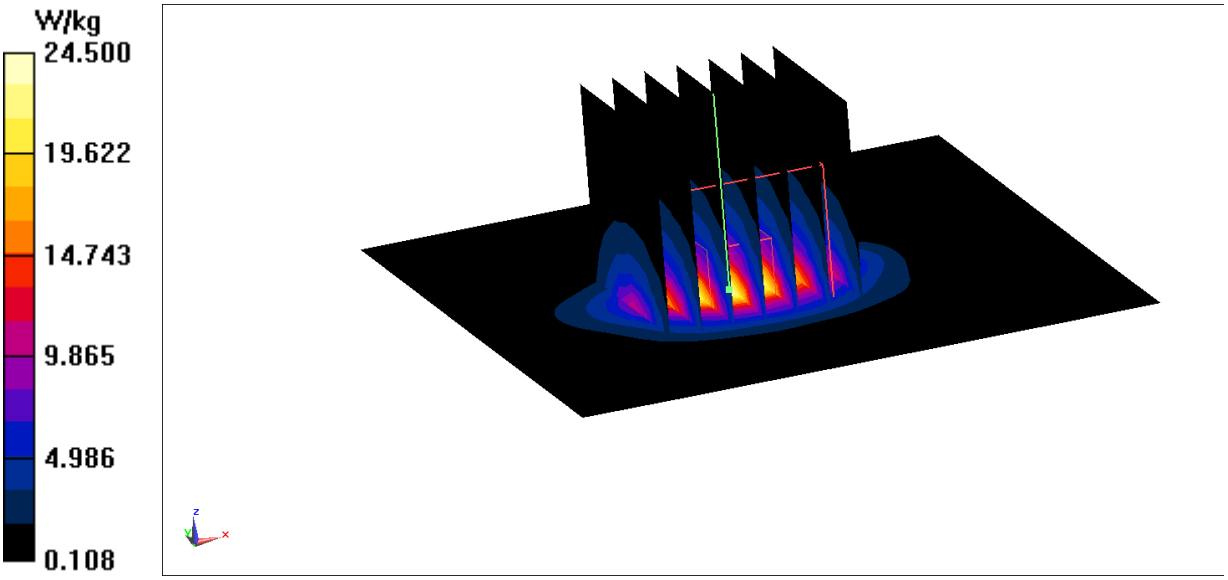
Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 101.3 V/m; Power Drift = -0.07 dB

Peak SAR (extrapolated) = 30.8 W/kg

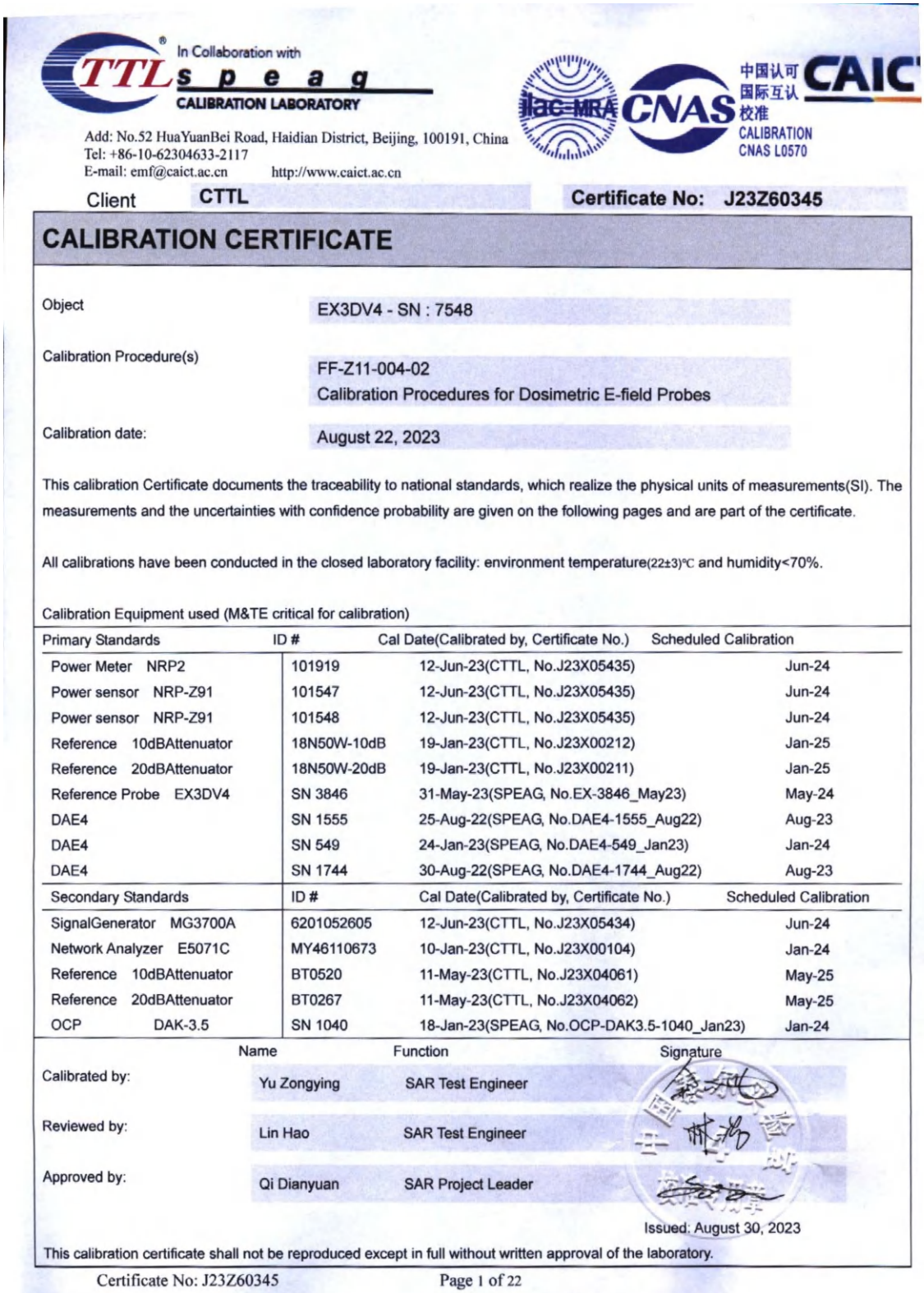
SAR(1 g) = 14.2 W/kg; SAR(10 g) = 6.33 W/kg

Maximum value of SAR (measured) = 24.5 W/kg



J.8 Probe Calibration Certificate

Probe 7548 Calibration Certificate



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CNAS CALIBRATION CNAS L0570

Client CTTL Certificate No: J23Z60345

CALIBRATION CERTIFICATE

Object EX3DV4 - SN : 7548

Calibration Procedure(s) FF-Z11-004-02
Calibration Procedures for Dosimetric E-field Probes

Calibration date: August 22, 2023

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

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

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date(Calibrated by, Certificate No.)	Scheduled Calibration
Power Meter NRP2	101919	12-Jun-23(CTTL, No.J23X05435)	Jun-24
Power sensor NRP-Z91	101547	12-Jun-23(CTTL, No.J23X05435)	Jun-24
Power sensor NRP-Z91	101548	12-Jun-23(CTTL, No.J23X05435)	Jun-24
Reference 10dBAttenuator	18N50W-10dB	19-Jan-23(CTTL, No.J23X00212)	Jan-25
Reference 20dBAttenuator	18N50W-20dB	19-Jan-23(CTTL, No.J23X00211)	Jan-25
Reference Probe EX3DV4	SN 3846	31-May-23(SPEAG, No.EX-3846_May23)	May-24
DAE4	SN 1555	25-Aug-22(SPEAG, No.DAE4-1555_Aug22)	Aug-23
DAE4	SN 549	24-Jan-23(SPEAG, No.DAE4-549_Jan23)	Jan-24
DAE4	SN 1744	30-Aug-22(SPEAG, No.DAE4-1744_Aug22)	Aug-23
Secondary Standards	**ID #**	**Cal Date(Calibrated by, Certificate No.)**	**Scheduled Calibration**
SignalGenerator MG3700A	6201052605	12-Jun-23(CTTL, No.J23X05434)	Jun-24
Network Analyzer E5071C	MY46110673	10-Jan-23(CTTL, No.J23X00104)	Jan-24
Reference 10dBAttenuator	BT0520	11-May-23(CTTL, No.J23X04061)	May-25
Reference 20dBAttenuator	BT0267	11-May-23(CTTL, No.J23X04062)	May-25
OCP DAK-3.5	SN 1040	18-Jan-23(SPEAG, No.OCP-DAK3.5-1040_Jan23)	Jan-24

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

Issued: August 30, 2023

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

Certificate No: J23Z60345 Page 1 of 22

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Glossary:

TSL	tissue simulating liquid
NORMx,y,z	sensitivity in free space
ConvF	sensitivity in TSL / NORMx,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 θ=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:

a) IEEE Std 1528-2013, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", June 2013

b) IEC 62209-1, "Measurement procedure for the assessment of Specific Absorption Rate (SAR) from hand-held and body-mounted devices used next to the ear (frequency range of 300 MHz to 6 GHz)", July 2016

c) IEC 62209-2, "Procedure to determine the Specific Absorption Rate (SAR) for wireless communication devices used in close proximity to the human body (frequency range of 30 MHz to 6 GHz)", March 2010

d) KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

Methods Applied and Interpretation of Parameters:

- *NORMx,y,z:* Assessed for E-field polarization θ=0 (f≤900MHz in TEM-cell; f>1800MHz: waveguide). NORMx,y,z are only intermediate values, i.e., the uncertainties of NORMx,y,z does not effect the E^2-field uncertainty inside TSL (see below ConvF).
- *NORM(f)x,y,z = NORMx,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.
- *DCPx,y,z:* DCP are numerical linearization parameters assessed based on the data of power sweep (no uncertainty required). 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.
- *Ax,y,z; Bx,y,z; Cx,y,z; VRx,y,z:* A,B,C 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≤800MHz) and inside waveguide using analytical field distributions based on power measurements for f >800MHz. The same setups are used for assessment of the parameters applied for boundary compensation (alpha, depth) of which typical uncertainty valued are given. These parameters are used in DASY4 software to improve probe accuracy close to the boundary. The sensitivity in TSL corresponds to NORMx,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±50MHz to±100MHz.
- *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 *NORMx* (no uncertainty required).

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DASY/EASY – Parameters of Probe: EX3DV4 – SN: 7548

Basic Calibration Parameters

	Sensor X	Sensor Y	Sensor Z	Unc (*k*=2)
Norm(μV/(V/m)²)[A]	0.62	0.70	0.63	±10.0%
DCP(mV)[B]	103.3	103.2	103.4	

Calibration Results for Modulation Response

UID	Communication System Name		A dB	B dB√μV	C	D dB	VR mV	Max Dev.	Max Unc[E] (*k*=2)
0	CW	X	0.0	0.0	1.0	0.00	214.2	±2.0%	±4.7%
		Y	0.0	0.0	1.0		224.4		
		Z	0.0	0.0	1.0		209.3		
10352-AAA	Pulse Waveform (200Hz, 10%)	X	1.70	60.35	6.23	10.00	60	±4.4%	±9.6%
		Y	1.68	60.77	6.33		60		
		Z	1.79	60.28	6.30		60		
10353-AAA	Pulse Waveform (200Hz, 20%)	X	1.22	60.00	5.36	6.99	80	±3.0%	±9.6%
		Y	1.10	60.00	5.14		80		
		Z	1.36	60.00	5.55		80		
10354-AAA	Pulse Waveform (200Hz, 40%)	X	0.79	60.00	4.70	3.98	95	±1.9%	±9.6%
		Y	0.69	60.00	4.42		95		
		Z	0.91	60.00	4.93		95		
10355-AAA	Pulse Waveform (200Hz, 60%)	X	0.50	60.00	4.15	2.22	120	±2.8%	±9.6%
		Y	19.90	144.37	9.66		120		
		Z	0.59	60.00	4.39		120		
10387-AAA	QPSK Waveform, 1 MHz	X	1.49	65.68	13.97	1.00	150	±2.7%	±9.6%
		Y	1.39	64.17	12.73		150		
		Z	1.41	63.99	12.72		150		
10388-AAA	QPSK Waveform, 10 MHz	X	2.07	67.48	15.14	0.00	150	±1.6%	±9.6%
		Y	1.95	66.09	14.07		150		
		Z	1.95	65.95	13.91		150		
10396-AAA	64-QAM Waveform, 100 kHz	X	2.60	70.11	19.57	3.01	150	±0.8%	±9.6%
		Y	2.58	69.80	19.05		150		
		Z	2.69	70.26	19.23		150		
10414-AAA	WLAN CCDF, 64-QAM, 40MHz	X	4.80	66.01	15.63	0.00	150	±3.8%	±9.6%
		Y	4.70	65.52	15.20		150		
		Z	4.72	65.47	15.14		150		

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] Numerical linearization parameter: uncertainty not required.
[E] Uncertainly is determined using the max. deviation from linear response applying rectangular distribution and is expressed for the square of the field value.

