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S Schweizerischer Kalibrierdienst
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S Swiss Calibration Service

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Accreditation No.: SCS 0108

Glossary:

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

Calibration is Performed According to the Following Standards:

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"

Additional Documentation:

e) DASY4/5 System Handbook

Methods Applied and Interpretation of Parameters:

- *Measurement Conditions:* Further details are available from the Validation Report at the end of the certificate. All figures stated in the certificate are valid at the frequency indicated.
- *Antenna Parameters with TSL:* The dipole is mounted with the spacer to position its feed point exactly below the center marking of the flat phantom section, with the arms oriented parallel to the body axis.
- *Feed Point Impedance and Return Loss:* These parameters are measured with the dipole positioned under the liquid filled phantom. The impedance stated is transformed from the measurement at the SMA connector to the feed point. The Return Loss ensures low reflected power. No uncertainty required.
- *Electrical Delay:* One-way delay between the SMA connector and the antenna feed point. No uncertainty required.
- *SAR measured:* SAR measured at the stated antenna input power.
- *SAR normalized:* SAR as measured, normalized to an input power of 1 W at the antenna connector.
- *SAR for nominal TSL parameters:* The measured TSL parameters are used to calculate the nominal SAR result.

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

Measurement Conditions

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

DASY Version	DASY5	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	34.7 ± 6 %	4.54 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	8.04 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**79.7 W/kg ± 19.9 % (k=2)**

SAR averaged over 10 cm³ (10 g) of Head TSL	condition	
SAR measured	100 mW input power	2.29 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**22.7 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	34.6 ± 6 %	4.59 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	8.01 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**79.5 W/kg ± 19.9 % (k=2)**

SAR averaged over 10 cm³ (10 g) of Head TSL	condition	
SAR measured	100 mW input power	2.29 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**22.7 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	34.6 ± 6 %	4.64 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	8.25 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**81.8 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	**23.2 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	34.3 ± 6 %	4.85 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	8.80 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**87.2 W/kg ± 19.9 % (k=2)**

SAR averaged over 10 cm³ (10 g) of Head TSL	condition	
SAR measured	100 mW input power	2.47 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**24.4 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	34.1 ± 6 %	4.95 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	8.45 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**83.8 W/kg ± 19.9 % (k=2)**

SAR averaged over 10 cm³ (10 g) of Head TSL	condition	
SAR measured	100 mW input power	2.40 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**23.7 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	33.9 ± 6 %	5.10 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	8.18 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**81.0 W/kg ± 19.9 % (k=2)**

SAR averaged over 10 cm³ (10 g) of Head TSL	condition	
SAR measured	100 mW input power	2.30 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	33.8 ± 6 %	5.15 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	8.19 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**81.1 W/kg ± 19.9 % (k=2)**

SAR averaged over 10 cm³ (10 g) of Head TSL	condition	
SAR measured	100 mW input power	2.31 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**22.8 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	47.6 Ω - 6.2 jΩ
Return Loss	- 23.3 dB

Antenna Parameters with Head TSL at 5250 MHz

Impedance, transformed to feed point	46.9 Ω - 4.8 jΩ
Return Loss	- 24.5 dB

Antenna Parameters with Head TSL at 5300 MHz

Impedance, transformed to feed point	46.2 Ω - 3.3 jΩ
Return Loss	- 25.6 dB

Antenna Parameters with Head TSL at 5500 MHz

Impedance, transformed to feed point	49.1 Ω - 4.2 jΩ
Return Loss	- 27.3 dB

Antenna Parameters with Head TSL at 5600 MHz

Impedance, transformed to feed point	53.9 Ω + 0.4 jΩ
Return Loss	- 28.4 dB

Antenna Parameters with Head TSL at 5750 MHz

Impedance, transformed to feed point	51.8 Ω - 0.8 jΩ
Return Loss	- 34.3 dB

Antenna Parameters with Head TSL at 5800 MHz

Impedance, transformed to feed point	50.9 Ω - 2.7 jΩ
Return Loss	- 31.0 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: 22.06.2021

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 = 4.54 S/m; ε_r = 34.7; ρ = 1000 kg/m^3 ,
Medium parameters used: f = 5250 MHz; σ = 4.59 S/m; ε_r = 34.6; ρ = 1000 kg/m^3 ,
Medium parameters used: f = 5300 MHz; σ = 4.64 S/m; ε_r = 34.6; ρ = 1000 kg/m^3 ,
Medium parameters used: f = 5500 MHz; σ = 4.85 S/m; ε_r = 34.3; ρ = 1000 kg/m^3 ,
Medium parameters used: f = 5600 MHz; σ = 4.95 S/m; ε_r = 34.1; ρ = 1000 kg/m^3 ,
Medium parameters used: f = 5750 MHz; σ = 5.1 S/m; ε_r = 33.9; ρ = 1000 kg/m^3 ,
Medium parameters used: f = 5800 MHz; σ = 5.15 S/m; ε_r = 33.8; 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: 30.12.2020
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 02.11.2020
- Phantom: Flat Phantom 5.0 (front); Type: QD 000 P50 AA; Serial: 1001
- DASY52 52.10.4(1527); SEMCAD X 14.6.14(7483)

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 = 78.84 V/m; Power Drift = 0.03 dB
Peak SAR (extrapolated) = 28.2 W/kg
SAR(1 g) = 8.04 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 = 69.1%
Maximum value of SAR (measured) = 18.5 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 = 80.04 V/m; Power Drift = 0.01 dB
Peak SAR (extrapolated) = 27.2 W/kg
SAR(1 g) = 8.01 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 = 70.3%
Maximum value of SAR (measured) = 18.2 W/kg

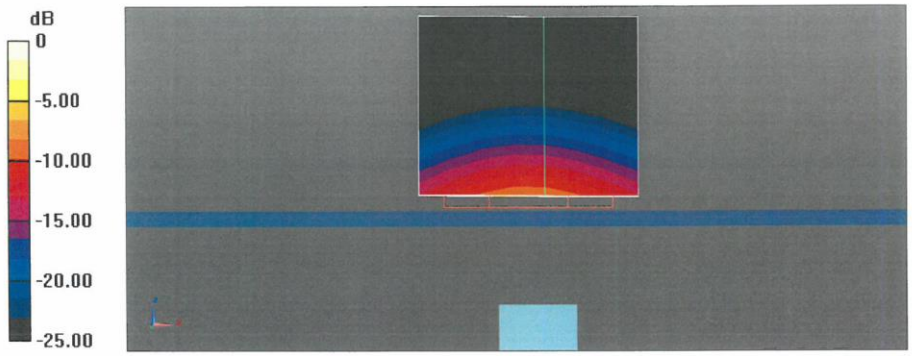
Dipole Calibration for Head Tissue/Pin=100mW, dist=10mm, f=5300 MHz/Zoom Scan, dist=1.4mm (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 80.15 V/m; Power Drift = -0.02 dB
Peak SAR (extrapolated) = 28.9 W/kg
SAR(1 g) = 8.25 W/kg; SAR(10 g) = 2.35 W/kg
Smallest distance from peaks to all points 3 dB below = 7.2 mm
Ratio of SAR at M2 to SAR at M1 = 69.1%
Maximum value of SAR (measured) = 19.1 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 = 80.07 V/m; Power Drift = -0.01 dB
Peak SAR (extrapolated) = 33.6 W/kg
SAR(1 g) = 8.80 W/kg; SAR(10 g) = 2.47 W/kg
Smallest distance from peaks to all points 3 dB below = 7.2 mm
Ratio of SAR at M2 to SAR at M1 = 66.4%
Maximum value of SAR (measured) = 20.9 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 = 80.82 V/m; Power Drift = -0.00 dB
Peak SAR (extrapolated) = 30.8 W/kg
SAR(1 g) = 8.45 W/kg; SAR(10 g) = 2.40 W/kg
Smallest distance from peaks to all points 3 dB below = 7.2 mm
Ratio of SAR at M2 to SAR at M1 = 67.5%
Maximum value of SAR (measured) = 19.9 W/kg

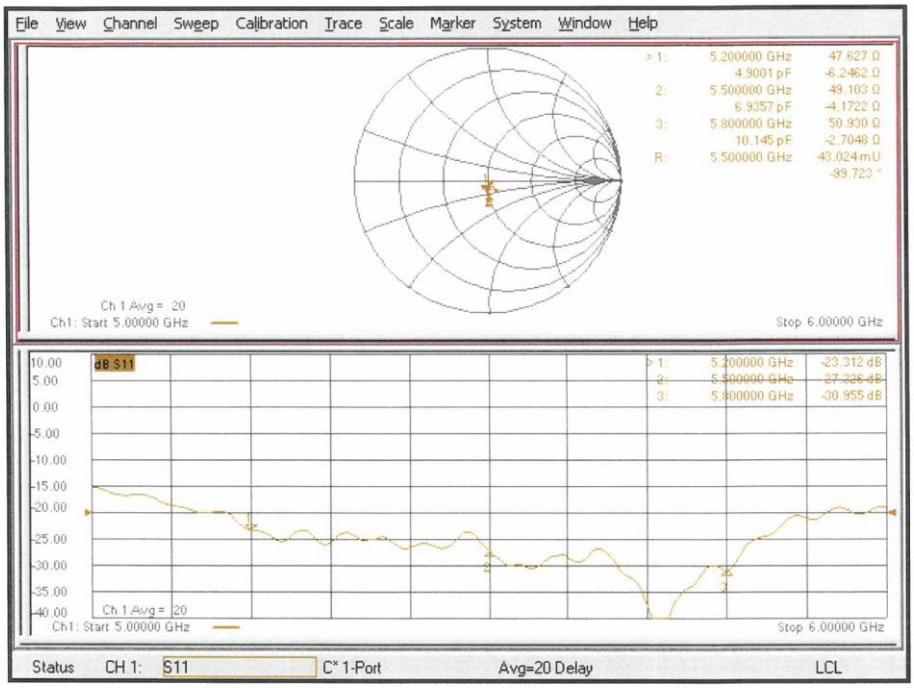
Dipole Calibration for Head Tissue/Pin=100mW, dist=10mm, f=5750 MHz/Zoom Scan, dist=1.4mm (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 78.22 V/m; Power Drift = 0.01 dB
Peak SAR (extrapolated) = 31.8 W/kg
SAR(1 g) = 8.18 W/kg; SAR(10 g) = 2.30 W/kg
Smallest distance from peaks to all points 3 dB below = 7.2 mm
Ratio of SAR at M2 to SAR at M1 = 65.8%
Maximum value of SAR (measured) = 19.5 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 = 77.53 V/m; Power Drift = -0.02 dB
Peak SAR (extrapolated) = 31.9 W/kg
SAR(1 g) = 8.19 W/kg; SAR(10 g) = 2.31 W/kg
Smallest distance from peaks to all points 3 dB below = 7.4 mm
Ratio of SAR at M2 to SAR at M1 = 65.4%
Maximum value of SAR (measured) = 19.2 W/kg

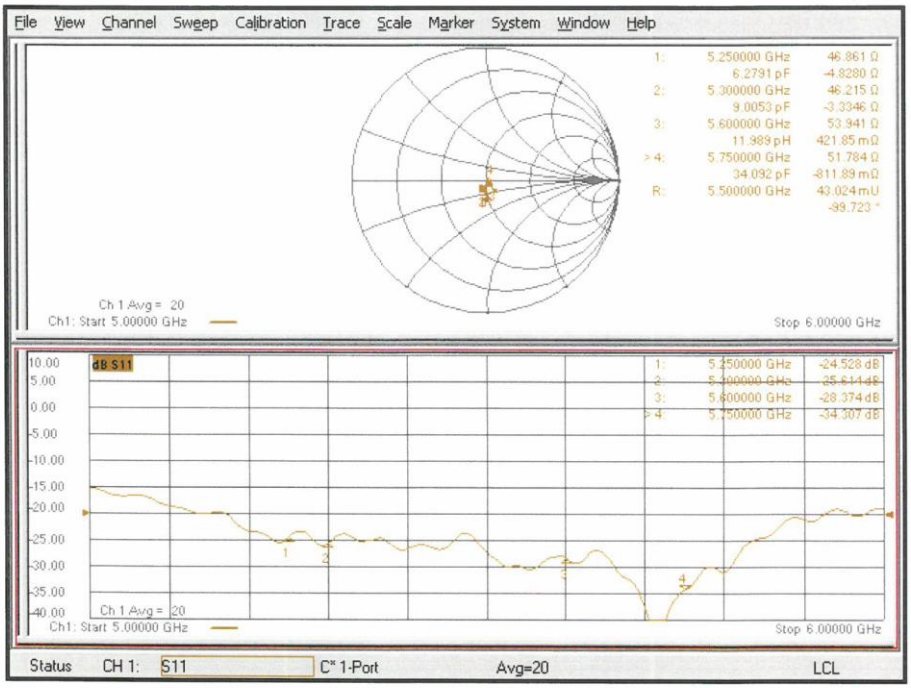


0 dB = 20.9 W/kg = 13.20 dBW/kg

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



Impedance Measurement Plot for Head TSL (5250, 5300, 5600, 5750 MHz)



ANNEX I Newly add bands and ENDC

I.1 Dielectric Performance and System Validation

Table I.1-1: Dielectric Performance of Head Tissue Simulating Liquid

Measurement Date (yyyy-mm-dd)	Type	Frequency	Permittivity ε	Drift (%)	Conductivity σ (S/m)	Drift (%)
2022-2-18	Head	835 MHz	44.69	7.69%	0.8571	-4.77%
2022-3-7	Head	3400 MHz	38.95	2.39	2.784	-0.93

Table I.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
2022-2-18	835 MHz	6.24	9.63	6.36	9.84	1.92%	2.18%
2022-3-7	3400 MHz	25.5	67.7	24.8	66.5	-2.75%	-1.77%

I.2 Conductive output power

Table I.2: Summery of Receiver detection mechanism

Antenna	Receiver on (head scenario)	Receiver off + Hotspot on (Body/other scenario)	Receiver off + Hotspot off (Body/other scenario)
Standalone	DSI3	DSI2	DSI1
ENDC	DSI6	DSI5	DSI4

Maximum Target Power for Production Unit

Band	Tune up (dBm)					
	DSI1	DSI2	DSI3	DSI4	DSI5	DSI6
LTE B5	24.5	24.5	24.5	/	/	/
n5	24.2	24.2	24.2	24.2	24.2	21
n78	22.5	20.5	22.5	22.5	20.5	22.5

LTE B5-DSI1/DSI2/DSI3					
BANDWIDTH	**Number of RBs**	**Frequency**	**QPSK**	**16QAM**	**64QAM**
1.4MHz	1RB-High (5)	848.3 (20643)	23.84	23.02	22.02
		836.5 (20525)	23.77	22.85	21.82
		824.7 (20407)	23.64	22.78	21.72
	1RB-Middle (3)	848.3 (20643)	23.86	23.09	22.00
		836.5 (20525)	23.76	22.97	21.91
		824.7 (20407)	23.65	22.86	21.70
	1RB-Low (0)	848.3 (20643)	23.89	23.05	21.96
		836.5 (20525)	23.76	23.02	21.83
		824.7 (20407)	23.61	22.77	21.65
	3RB-High (3)	848.3 (20643)	23.89	22.91	21.93
		836.5 (20525)	23.78	22.72	21.80
		824.7 (20407)	23.63	22.66	21.66
	3RB-Middle (1)	848.3 (20643)	23.90	22.94	21.99
		836.5 (20525)	23.76	22.82	21.78
		824.7 (20407)	23.65	22.69	21.67
	3RB-Low (0)	848.3 (20643)	23.92	22.96	21.98
		836.5 (20525)	23.79	22.82	21.81
		824.7 (20407)	23.63	22.60	21.62
	6RB (0)	848.3 (20643)	22.93	22.00	20.81
		836.5 (20525)	22.79	21.81	20.73
		824.7 (20407)	22.64	21.67	20.51
3MHz	1RB-High (14)	847.5 (20635)	23.86	22.99	22.01
		836.5 (20525)	23.81	22.92	21.98
		825.5 (20415)	23.72	22.86	21.82
	1RB-Middle (7)	847.5 (20635)	23.97	23.07	22.08
		836.5 (20525)	23.79	23.02	21.88
		825.5 (20415)	23.71	22.86	21.79
	1RB-Low (0)	847.5 (20635)	23.89	23.09	21.97
		836.5 (20525)	23.79	22.97	21.86
		825.5 (20415)	23.61	22.78	21.67
	8RB-High (7)	847.5 (20635)	22.87	21.91	20.84
		836.5 (20525)	22.75	21.87	20.79
		825.5 (20415)	22.65	21.69	20.64
	8RB-Middle (4)	847.5 (20635)	22.92	21.94	20.89
		836.5 (20525)	22.76	21.80	20.76
		825.5 (20415)	22.68	21.69	20.63
	8RB-Low (0)	847.5 (20635)	22.96	22.04	20.95
		836.5 (20525)	22.72	21.81	20.74
		825.5 (20415)	22.64	21.70	20.65
	15RB (0)	847.5 (20635)	22.92	21.90	20.88
		836.5 (20525)	22.75	21.77	20.71
		825.5 (20415)	22.64	21.68	20.62

5MHz	1RB-High (24)	846.5 (20625)	23.91	23.06	21.98
		836.5 (20525)	23.90	23.02	21.99
		826.5 (20425)	23.78	22.86	21.87
	1RB-Middle (12)	846.5 (20625)	23.98	23.09	22.10
		836.5 (20525)	23.81	22.99	21.90
		826.5 (20425)	23.77	22.94	21.81
	1RB-Low (0)	846.5 (20625)	23.93	23.16	22.07
		836.5 (20525)	23.87	23.07	21.94
		826.5 (20425)	23.66	22.75	21.76
	12RB-High (13)	846.5 (20625)	22.81	21.78	20.77
		836.5 (20525)	22.81	21.79	20.85
		826.5 (20425)	22.72	21.69	20.73
	12RB-Middle (6)	846.5 (20625)	22.94	21.91	20.92
		836.5 (20525)	22.76	21.76	20.81
		826.5 (20425)	22.73	21.68	20.68
	12RB-Low (0)	846.5 (20625)	23.07	22.07	21.06
		836.5 (20525)	22.81	21.81	20.82
		826.5 (20425)	22.66	21.67	20.69
	25RB (0)	846.5 (20625)	22.93	21.95	20.91
		836.5 (20525)	22.78	21.79	20.76
		826.5 (20425)	22.68	21.72	20.62
10MHz	1RB-High (49)	844 (20600)	22.52	23.00	21.98
		836.5 (20525)	23.55	22.98	21.92
		829 (20450)	23.49	22.97	21.88
	1RB-Middle (24)	844 (20600)	23.47	23.06	21.96
		836.5 (20525)	23.48	22.98	21.89
		829 (20450)	23.45	22.83	21.83
	1RB-Low (0)	844 (20600)	23.49	23.10	21.94
		836.5 (20525)	23.49	22.92	21.88
		829 (20450)	23.31	22.75	21.71
	25RB-High (25)	844 (20600)	22.53	21.72	20.65
		836.5 (20525)	22.54	21.83	20.82
		829 (20450)	22.44	21.75	20.71
	25RB-Middle (12)	844 (20600)	22.45	21.91	20.86
		836.5 (20525)	22.44	21.76	20.74
		829 (20450)	22.43	21.73	20.71
	25RB-Low (0)	844 (20600)	22.47	21.91	20.85
		836.5 (20525)	22.51	21.81	20.77
		829 (20450)	22.37	21.68	20.65
	50RB (0)	844 (20600)	22.53	21.81	20.79
		836.5 (20525)	22.54	21.80	20.80
		829 (20450)	22.39	21.68	20.68

5G n5-DSI1/DSI2/DSI3/DSI4/DSI5							
SCS (kHz)	NR BW (MHz)	Modulation	RB allocation		NR Test Freq. (MHz)	NR Test CH.	Power Results (dBm)
15	5	DFT-s-OFDM QPSK	Inner_Full	12_6	846.5	169300	23.85
15	5	DFT-s-OFDM QPSK	Inner_Full	12_6	836.5	167300	23.82
15	5	DFT-s-OFDM QPSK	Inner_Full	12_6	826.5	165300	23.99
15	20	DFT-s-OFDM QPSK	Inner_Full	50_25	839	167800	23.82
15	20	DFT-s-OFDM QPSK	Inner_Full	50_25	836.5	167300	23.87
15	20	DFT-s-OFDM QPSK	Inner_Full	50_25	834	166800	23.84
15	5	DFT-s-OFDM PI/2 BPSK1	Inner_Full	12_6	826.5	165300	23.98
15	5	DFT-s-OFDM 16QAM	Inner_Full	12_6	826.5	165300	22.89
15	5	DFT-s-OFDM 64QAM	Inner_Full	12_6	826.5	165300	21.41
15	5	DFT-s-OFDM 256QAM	Inner_Full	12_6	826.5	165300	19.42
15	5	CP-OFDM QPSK	Inner_Full	12_6	826.5	165300	22.41
15	5	CP-OFDM 16QAM	Inner_Full	12_6	826.5	165300	21.95
15	5	CP-OFDM 64QAM	Inner_Full	12_6	826.5	165300	20.41
15	5	CP-OFDM 256QAM	Inner_Full	12_6	826.5	165300	17.31
15	5	DFT-s-OFDM QPSK	Edge_Full_Right	2_23	826.5	165300	22.87
15	5	DFT-s-OFDM QPSK	Edge_Full_Left	2_0	826.5	165300	22.78
15	5	DFT-s-OFDM QPSK	Edge_1RB_Right	1_24	826.5	165300	22.82
15	5	DFT-s-OFDM QPSK	Edge_1RB_Left	1_0	826.5	165300	22.79
15	5	DFT-s-OFDM QPSK	Inner_1RB_Right	1_23	826.5	165300	23.87
15	5	DFT-s-OFDM QPSK	Inner_1RB_Left	1_1	826.5	165300	23.84
15	5	DFT-s-OFDM QPSK	Outer_Full	25_0	826.5	165300	22.93
15	10	DFT-s-OFDM QPSK	Inner_Full	25_12	829	165800	23.73
15	15	DFT-s-OFDM QPSK	Inner_Full	36_18	831.5	166300	23.87

5G n5-DSI6							
SCS (kHz)	NR BW (MHz)	Modulation	RB allocation		NR Test Freq. (MHz)	NR Test CH.	Power Results (dBm)
15	5	DFT-s-OFDM QPSK	Inner_Full	12_6	846.5	169300	20.78
15	5	DFT-s-OFDM QPSK	Inner_Full	12_6	836.5	167300	20.73
15	5	DFT-s-OFDM QPSK	Inner_Full	12_6	826.5	165300	20.89
15	20	DFT-s-OFDM QPSK	Inner_Full	50_25	839	167800	20.73
15	20	DFT-s-OFDM QPSK	Inner_Full	50_25	836.5	167300	20.72
15	20	DFT-s-OFDM QPSK	Inner_Full	50_25	834	166800	20.74
15	5	DFT-s-OFDM PI/2 BPSK1	Inner_Full	12_6	826.5	165300	20.84
15	5	DFT-s-OFDM 16QAM	Inner_Full	12_6	826.5	165300	20.74
15	5	DFT-s-OFDM 64QAM	Inner_Full	12_6	826.5	165300	20.73
15	5	DFT-s-OFDM 256QAM	Inner_Full	12_6	826.5	165300	19.39
15	5	CP-OFDM QPSK	Inner_Full	12_6	826.5	165300	20.75
15	5	CP-OFDM 16QAM	Inner_Full	12_6	826.5	165300	20.85
15	5	CP-OFDM 64QAM	Inner_Full	12_6	826.5	165300	20.37
15	5	CP-OFDM 256QAM	Inner_Full	12_6	826.5	165300	17.25
15	5	DFT-s-OFDM QPSK	Edge_Full_Right	2_23	826.5	165300	20.75
15	5	DFT-s-OFDM QPSK	Edge_Full_Left	2_0	826.5	165300	20.63
15	5	DFT-s-OFDM QPSK	Edge_1RB_Right	1_24	826.5	165300	20.73
15	5	DFT-s-OFDM QPSK	Edge_1RB_Left	1_0	826.5	165300	20.63
15	5	DFT-s-OFDM QPSK	Inner_1RB_Right	1_23	826.5	165300	20.75
15	5	DFT-s-OFDM QPSK	Inner_1RB_Left	1_1	826.5	165300	20.63
15	5	DFT-s-OFDM QPSK	Outer_Full	25_0	826.5	165300	20.80
15	10	DFT-s-OFDM QPSK	Inner_Full	25_12	829	165800	20.59
15	15	DFT-s-OFDM QPSK	Inner_Full	36_18	831.5	166300	20.73

5G n78-DSI1/DSI3/DSI4/DSI6								
SCS (kHz)	NR BW (MHz)	Modulation	RB allocation		NR Test Freq. (MHz)	NR Test CH.	Tune up	Power Results (dBm)
30	10	DFT-s-OFDM QPSK	Inner_Full	12_6	3795	653000	22.50	21.32
30	10	DFT-s-OFDM QPSK	Inner_Full	12_6	3724.98	648332	22.50	21.30
30	10	DFT-s-OFDM QPSK	Inner_Full	12_6	3654.99	643666	22.50	21.20
30	10	DFT-s-OFDM QPSK	Inner_Full	12_6	3585	639000	22.50	21.28
30	10	DFT-s-OFDM QPSK	Inner_Full	12_6	3515.01	634334	22.50	21.48
30	10	DFT-s-OFDM QPSK	Inner_Full	12_6	3444.99	629666	22.50	21.62
30	10	DFT-s-OFDM QPSK	Inner_Full	12_6	3375	625000	22.50	21.64
30	10	DFT-s-OFDM QPSK	Inner_Full	12_6	3305.01	620334	22.50	21.60
30	100	DFT-s-OFDM QPSK	Inner_Full	135_67	3750	650000	22.50	21.31
30	100	DFT-s-OFDM QPSK	Inner_Full	135_67	3692.85	646190	22.50	21.13
30	100	DFT-s-OFDM QPSK	Inner_Full	135_67	3635.73	642382	22.50	21.18
30	100	DFT-s-OFDM QPSK	Inner_Full	135_67	3578.58	638572	22.50	21.24
30	100	DFT-s-OFDM QPSK	Inner_Full	135_67	3521.43	634762	22.50	21.43
30	100	DFT-s-OFDM QPSK	Inner_Full	135_67	3464.31	630954	22.50	21.48
30	100	DFT-s-OFDM QPSK	Inner_Full	135_67	3407.16	627144	22.50	21.66
30	100	DFT-s-OFDM QPSK	Inner_Full	135_67	3350.01	623334	22.50	21.59
30	100	DFT-s-OFDM PI/2 BPSK	Inner_Full	135_67	3407.16	627144	22.50	21.58
30	100	DFT-s-OFDM 16QAM	Inner_Full	135_67	3407.16	627144	22.50	21.56
30	100	DFT-s-OFDM 64QAM	Inner_Full	135_67	3407.16	627144	22.50	20.05
30	100	DFT-s-OFDM 256QAM	Inner_Full	135_67	3407.16	627144	22.50	17.94
30	100	CP-OFDM QPSK	Inner_Full	135_67	3407.16	627144	22.50	21.06
30	100	CP-OFDM 16QAM	Inner_Full	135_67	3407.16	627144	22.50	20.58
30	100	CP-OFDM 64QAM	Inner_Full	135_67	3407.16	627144	22.50	19.19
30	100	CP-OFDM 256QAM	Inner_Full	135_67	3407.16	627144	22.50	15.88
30	100	DFT-s-OFDM QPSK	Edge_Full_Right	2@0	3407.16	627144	22.50	20.86
30	100	DFT-s-OFDM QPSK	Edge_Full_Left	2@271	3407.16	627144	22.50	20.73
30	100	DFT-s-OFDM QPSK	Edge_1RB_Right	1@0	3407.16	627144	22.50	20.78
30	100	DFT-s-OFDM QPSK	Edge_1RB_Left	1@272	3407.16	627144	22.50	20.64
30	100	DFT-s-OFDM QPSK	Inner_1RB_Right	270@0	3407.16	627144	22.50	21.45
30	100	DFT-s-OFDM QPSK	Inner_1RB_Left	1@1	3407.16	627144	22.50	20.85
30	100	DFT-s-OFDM QPSK	Outer_Full	1@271	3407.16	627144	22.50	20.66
30	15	DFT-s-OFDM QPSK	Inner_Full	19_9	3407.16	627144	22.50	21.52
30	20	DFT-s-OFDM QPSK	Inner_Full	25_12	3407.16	627144	22.50	21.60
30	25	DFT-s-OFDM QPSK	Inner_Full	33_16	3407.16	627144	22.50	21.46
30	30	DFT-s-OFDM QPSK	Inner_Full	39_19	3407.16	627144	22.50	21.53
30	40	DFT-s-OFDM QPSK	Inner_Full	53_26	3407.16	627144	22.50	21.46
30	50	DFT-s-OFDM QPSK	Inner_Full	67_33	3407.16	627144	22.50	21.51
30	60	DFT-s-OFDM QPSK	Inner_Full	81_40	3407.16	627144	22.50	21.59
30	70	DFT-s-OFDM QPSK	Inner_Full	95_47	3407.16	627144	22.50	21.59
30	80	DFT-s-OFDM QPSK	Inner_Full	109_54	3407.16	627144	22.50	21.48
30	90	DFT-s-OFDM QPSK	Inner_Full	123_61	3407.16	627144	22.50	21.51

5G n78-DSI2/DSI5								
SCS (kHz)	NR BW (MHz)	Modulation	RB allocation		NR Test Freq. (MHz)	NR Test CH.	Tune up	Power Results (dBm)
30	10	DFT-s-OFDM QPSK	Inner_Full	12_6	3795	653000	20.50	19.41
30	10	DFT-s-OFDM QPSK	Inner_Full	12_6	3724.98	648332	20.50	19.26
30	10	DFT-s-OFDM QPSK	Inner_Full	12_6	3654.99	643666	20.50	19.20
30	10	DFT-s-OFDM QPSK	Inner_Full	12_6	3585	639000	20.50	19.28
30	10	DFT-s-OFDM QPSK	Inner_Full	12_6	3515.01	634334	20.50	19.37
30	10	DFT-s-OFDM QPSK	Inner_Full	12_6	3444.99	629666	20.50	19.49
30	10	DFT-s-OFDM QPSK	Inner_Full	12_6	3375	625000	20.50	19.80
30	10	DFT-s-OFDM QPSK	Inner_Full	12_6	3305.01	620334	20.50	19.66
30	100	DFT-s-OFDM QPSK	Inner_Full	135_67	3750	650000	20.50	19.19
30	100	DFT-s-OFDM QPSK	Inner_Full	135_67	3692.85	646190	20.50	19.09
30	100	DFT-s-OFDM QPSK	Inner_Full	135_67	3635.73	642382	20.50	19.16
30	100	DFT-s-OFDM QPSK	Inner_Full	135_67	3578.58	638572	20.50	19.20
30	100	DFT-s-OFDM QPSK	Inner_Full	135_67	3521.43	634762	20.50	19.24
30	100	DFT-s-OFDM QPSK	Inner_Full	135_67	3464.31	630954	20.50	19.35
30	100	DFT-s-OFDM QPSK	Inner_Full	135_67	3407.16	627144	20.50	19.43
30	100	DFT-s-OFDM QPSK	Inner_Full	135_67	3350.01	623334	20.50	19.60
30	10	DFT-s-OFDM PI/2 BPSK	Inner_Full	12_6	3375	625000	20.50	19.72
30	10	DFT-s-OFDM 16QAM	Inner_Full	12_6	3375	625000	20.50	19.69
30	10	DFT-s-OFDM 64QAM	Inner_Full	12_6	3375	625000	20.50	19.77
30	10	DFT-s-OFDM 256QAM	Inner_Full	12_6	3375	625000	20.50	18.31
30	10	CP-OFDM QPSK	Inner_Full	12_6	3375	625000	20.50	19.68
30	10	CP-OFDM 16QAM	Inner_Full	12_6	3375	625000	20.50	19.72
30	10	CP-OFDM 64QAM	Inner_Full	12_6	3375	625000	20.50	18.99
30	10	CP-OFDM 256QAM	Inner_Full	12_6	3375	625000	20.50	16.16
30	10	DFT-s-OFDM QPSK	Edge_Full_Right	1@23	3375	625000	20.50	19.53
30	10	DFT-s-OFDM QPSK	Edge_Full_Left	1@0	3375	625000	20.50	19.65
30	10	DFT-s-OFDM QPSK	Edge_1RB_Right	2@22	3375	625000	20.50	19.66
30	10	DFT-s-OFDM QPSK	Edge_1RB_Left	2@0	3375	625000	20.50	19.76
30	10	DFT-s-OFDM QPSK	Inner_1RB_Right	1@22	3375	625000	20.50	19.56
30	10	DFT-s-OFDM QPSK	Inner_1RB_Left	1@1	3375	625000	20.50	19.62
30	10	DFT-s-OFDM QPSK	Outer_Full	24@0	3375	625000	20.50	19.70
30	15	DFT-s-OFDM QPSK	Inner_Full	18@9	3375	625000	20.50	19.73
30	20	DFT-s-OFDM QPSK	Inner_Full	25_12	3375	625000	20.50	19.68
30	25	DFT-s-OFDM QPSK	Inner_Full	32_16	3375	625000	20.50	19.66
30	30	DFT-s-OFDM QPSK	Inner_Full	36_18	3375	625000	20.50	19.69
30	40	DFT-s-OFDM QPSK	Inner_Full	50_25	3375	625000	20.50	19.67
30	50	DFT-s-OFDM QPSK	Inner_Full	64_32	3375	625000	20.50	19.69
30	60	DFT-s-OFDM QPSK	Inner_Full	81_40	3375	625000	20.50	19.63
30	80	DFT-s-OFDM QPSK	Inner_Full	108_54	3375	625000	20.50	19.60
30	90	DFT-s-OFDM QPSK	Inner_Full	120_60	3375	625000	20.50	19.62

I.3 SAR Test Results

Table I.3-1: SAR Values (LTE Band5 - Head)

Frequency		Mode	Side	Test Position	Figure No.	Conducted Power (dBm)	Max. tune-up Power (dBm)	Measured SAR(10g) (W/kg)	Reported SAR(10g)(W/kg)	Measured SAR(1g) (W/kg)	Reported SAR(1g) (W/kg)	Power Drift (dB)
Ch.	MHz											
20525	836.5	1RB_High	Left	Touch	/	23.55	24.5	0.315	**0.39**	0.533	**0.66**	-0.14
20525	836.5	1RB_High	Left	Tilt	Fig.1	23.55	24.5	0.333	**0.41**	0.62	**0.77**	0.05
20525	836.5	1RB_High	Right	Touch	/	23.55	24.5	0.284	**0.35**	0.477	**0.59**	0.18
20525	836.5	1RB_High	Right	Tilt	/	23.55	24.5	0.273	**0.34**	0.506	**0.63**	-0.13
20525	836.5	25RB_ High	Left	Touch	/	22.54	23.5	0.242	**0.30**	0.406	**0.51**	0.04
20525	836.5	25RB_ High	Left	Tilt	/	22.54	23.5	0.256	**0.32**	0.478	**0.60**	0.01
20525	836.5	25RB_ High	Right	Touch	/	22.54	23.5	0.22	**0.27**	0.369	**0.46**	0.10
20525	836.5	25RB_ High	Right	Tilt	/	22.54	23.5	0.206	**0.26**	0.376	**0.47**	-0.04

Note1: The LTE mode is QPSK_10MHz.

Table I.3-2: SAR Values (LTE Band5 - Body)

Frequency		Mode	Test Position	Figure No.	Conducted Power (dBm)	Max. tune-up Power (dBm)	Measured SAR(10g) (W/kg)	Reported SAR(10g) (W/kg)	Measured SAR(1g) (W/kg)	Reported SAR(1g) (W/kg)	Power Drift (dB)
Ch.	MHz										
20525	836.5	1RB_High	Front	/	23.55	24.5	0.158	**0.20**	0.262	**0.33**	0.14
20525	836.5	1RB_High	Rear	/	23.55	24.5	0.191	**0.24**	0.318	**0.40**	-0.06
20525	836.5	1RB_High	Left	/	23.55	24.5	0.134	**0.17**	0.203	**0.25**	0.16
20525	836.5	1RB_High	Right	/	23.55	24.5	0.129	**0.16**	0.199	**0.25**	0.13
20525	836.5	1RB_High	Top	Fig.2	23.55	24.5	0.197	**0.25**	0.368	**0.46**	0.08
20525	836.5	25RB_High	Front	/	22.54	23.5	0.129	**0.16**	0.223	**0.28**	-0.08
20525	836.5	25RB_High	Rear	/	22.54	23.5	0.155	**0.19**	0.256	**0.32**	-0.17
20525	836.5	25RB_High	Left	/	22.54	23.5	0.073	**0.09**	0.111	**0.14**	0.09
20525	836.5	25RB_High	Right	/	22.54	23.5	0.096	**0.12**	0.147	**0.18**	-0.02
20525	836.5	25RB_High	Top	/	22.54	23.5	0.106	**0.13**	0.213	**0.27**	-0.07

Note1: The distance between the EUT and the phantom bottom is 10mm.

Note2: The LTE mode is QPSK_10MHz.

Table I.3-3: SAR Values (5G NR n5-Head)

Ambient Temperature: 22.9 ºC Liquid Temperature: 22.5ºC											
Frequency		Side	Test Position	Figure No./Note	Conducted Power (dBm)	Max. tune-up Power (dBm)	Measured SAR(10g) (W/kg)	Reported SAR(10g) (W/kg)	Measured SAR(1g) (W/kg)	Reported SAR(1g) (W/kg)	Power Drift (dB)
Ch.	MHz										
169300	846.5	Left	Cheek	/	23.85	24.2	0.575	**0.62**	0.780	**0.85**	-0.02
167300	836.5	Left	Cheek	/	23.82	24.2	0.558	**0.61**	0.752	**0.82**	-0.05
165300	826.5	Left	Cheek	Fig.3	23.99	24.2	0.599	**0.63**	0.824	**0.86**	-0.03
165300	826.5	Left	Tilt	/	23.99	24.2	0.358	**0.38**	0.686	**0.72**	0.04
165300	826.5	Right	Cheek	/	23.99	24.2	0.333	**0.35**	0.567	**0.60**	-0.15
165300	826.5	Right	Tilt	/	23.99	24.2	0.292	**0.31**	0.544	**0.57**	0.09
165300	826.5	Left	Cheek	Note1	20.89	21	0.197	**0.20**	0.335	**0.34**	0.15
165300	826.5	Left	Tilt	Note1	20.89	21	0.179	**0.18**	0.349	**0.36**	0.02
165300	826.5	Right	Cheek	Note1	20.89	21	0.181	**0.19**	0.305	**0.31**	0.11
165300	826.5	Right	Tilt	Note1	20.89	21	0.144	**0.15**	0.264	**0.27**	-0.04

Note1: The results are for ENDC only. The other results are for SA.

Table I.3-4: SAR Values (5G NR n5-Body worn)

Ambient Temperature: 22.9 ºC Liquid Temperature: 22.5ºC										
Frequency		Test Position	Figure No./Note	Conducted Power (dBm)	Max. tune-up Power (dBm)	Measured SAR(10g) (W/kg)	Reported SAR(10g)(W/kg)	Measured SAR(1g) (W/kg)	Reported SAR(1g) (W/kg)	Power Drift (dB)
Ch.	MHz									
165300	826.5	Front	/	23.99	24.2	0.164	**0.17**	0.211	**0.22**	0.16
165300	826.5	Rear	Fig.4	23.99	24.2	0.203	**0.21**	0.263	**0.28**	-0.10

Note1: The distance between the EUT and the phantom bottom is 15mm.

Note2: The results are for SA&ENDC.

Table I.3-5: SAR Values (5G NR n5-Hotspot)

Ambient Temperature: 22.9 ºC Liquid Temperature: 22.5ºC										
Frequency		Test Position	Figure No./Note	Conducted Power (dBm)	Max. tune-up Power (dBm)	Measured SAR(10g) (W/kg)	Reported SAR(10g)(W/kg)	Measured SAR(1g) (W/kg)	Reported SAR(1g) (W/kg)	Power Drift (dB)
Ch.	MHz									
165300	826.5	Front	/	23.99	24.2	0.164	**0.17**	0.273	**0.29**	-0.07
165300	826.5	Rear	/	23.99	24.2	0.186	**0.20**	0.296	**0.31**	0.15
165300	826.5	Left	/	23.99	24.2	0.132	**0.14**	0.195	**0.20**	0.02
165300	826.5	Right	/	23.99	24.2	0.224	**0.24**	0.332	**0.35**	0.08
165300	826.5	Top	Fig.5	23.99	24.2	0.181	**0.19**	0.336	**0.35**	0.03

Note1: The distance between the EUT and the phantom bottom is 10mm.

Note2: The results are for SA&ENDC.

Table I.3-6: SAR Values (5G NR n78-Head)

Ambient Temperature: 22.9 ºC Liquid Temperature: 22.5ºC											
Frequency		Side	Test Position	Figure No./Note	Conducted Power (dBm)	Max. tune-up Power (dBm)	Measured SAR(10g) (W/kg)	Reported SAR(10g) (W/kg)	Measured SAR(1g) (W/kg)	Reported SAR(1g) (W/kg)	Power Drift (dB)
Ch.	MHz										
627144	3407.16	Left	Cheek	Fig.6	21.66	22.5	0.002	**0.00**	0.007	**0.01**	0.12
627144	3407.16	Left	Tilt	/	21.66	22.5	<0.01	<0.01	<0.01	<0.01	/
627144	3407.16	Right	Cheek	/	21.66	22.5	<0.01	<0.01	<0.01	<0.01	/
627144	3407.16	Right	Tilt	/	21.66	22.5	<0.01	<0.01	<0.01	<0.01	/

Note: The results are for SA and ENDC.

Table I.3-7: SAR Values (5G NR n78-Body worn)

Ambient Temperature: 22.9 ºC Liquid Temperature: 22.5ºC										
Frequency		Test Position	Figure No./Note	Conducted Power (dBm)	Max. tune-up Power (dBm)	Measured SAR(10g) (W/kg)	Reported SAR(10g)(W/kg)	Measured SAR(1g) (W/kg)	Reported SAR(1g) (W/kg)	Power Drift (dB)
Ch.	MHz									
627144	3407.16	Front	/	21.66	22.5	0.016	**0.02**	0.037	**0.04**	-0.06
627144	3407.16	Rear	Fig.7	21.66	22.5	0.059	**0.07**	0.143	**0.17**	-0.09

Note1: The distance between the EUT and the phantom bottom is 15mm.

Note2: The results are for SA and ENDC.

Table I.3-8: SAR Values (5G NR n78-Hotspot)

Ambient Temperature: 22.9 ºC Liquid Temperature: 22.5ºC										
Frequency		Test Position	Figure No./Note	Conducted Power (dBm)	Max. tune-up Power (dBm)	Measured SAR(10g) (W/kg)	Reported SAR(10g)(W/kg)	Measured SAR(1g) (W/kg)	Reported SAR(1g) (W/kg)	Power Drift (dB)
Ch.	MHz									
625000	3375	Front	/	19.8	20.5	0.027	**0.03**	0.054	**0.06**	-0.02
625000	3375	Rear	Fig.8	19.8	20.5	0.121	**0.14**	0.353	**0.41**	0.06
625000	3375	Left	/	19.8	20.5	0.042	**0.05**	0.107	**0.13**	0.14
625000	3375	Bottom	/	19.8	20.5	0.065	**0.08**	0.163	**0.19**	-0.12

Note1: The distance between the EUT and the phantom bottom is 10mm.

Note2: The results are for SA and ENDC.

Table I.3-9: SAR Values (NR5G n78 - Head) - Scaled Reported SAR

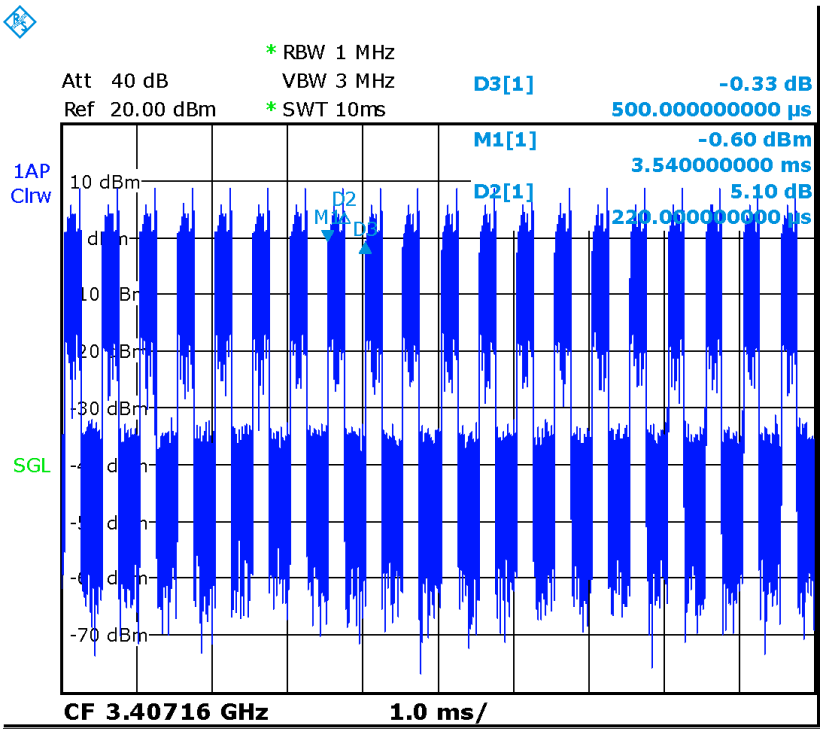
Frequency		Side	Test Position	Actual duty factor	maximum duty factor	Reported SAR (1g) (W/kg)	Scaled reported SAR (1g) (W/kg)
MHz	Ch.						
627144	3407.16	Left	Cheek	44%	50%	**0.01**	**0.01**

Table I.3-10: SAR Values (NR5G n78- Body worn) – Scaled Reported SAR

Frequency		Test Position	D (mm)	Actual duty factor	maximum duty factor	Reported SAR (1g) (W/kg)	Scaled reported SAR (1g) (W/kg)
MHz	Ch.						
627144	3407.16	Rear	15	44%	50%	**0.17**	**0.19**

Table I.3-11: SAR Values (NR5G n78- Body) – Scaled Reported SAR

Frequency		Test Position	D (mm)	Actual duty factor	maximum duty factor	Reported SAR (1g) (W/kg)	Scaled reported SAR (1g) (W/kg)
MHz	Ch.						
625000	3375	Rear	10	44%	50%	**0.41**	**0.47**



Picture I.3 Duty factor plot for n78

I.4 Evaluation of simultaneous for ENDC

Table I.4-1: The SAR values for newly add ENDC

	LTE	NR	Mode	Position	Reported SAR 1g(W/kg)
ENDC	LTE B2-ANT6	n5-ANT2	Head	Left Tilt	**0.41**
			Body	Rear 10mm	**0.46**
		n77-ANT1	Head	Right Cheek	**0.22**
			Body	Rear 10mm	**0.29**
		n78-ANT1	Head	Right Cheek	**0.09**
			Body	Rear 10mm	**0.62**
	LTE B12-ANT2	n77-ANT1	Head	Left Cheek	**0.33**
			Body	Rear 10mm	**0.79**
		n78-ANT1	Head	Left Cheek	**0.20**
			Body	Rear 10mm	**0.76**
	LTE B66-ANT6	n5-ANT2	Head	Right Cheek	**0.44**
			Body	Right 10mm	**0.46**
		n66-ANT4	Head	Right Cheek	**0.61**
			Body	Rear 10mm	**0.54**
		n77-ANT1	Head	Right Cheek	**0.26**
			Body	Rear 10mm	**0.61**
		n78-ANT1	Head	Right Cheek	**0.13**
			Body	Rear 10mm	**0.58**

I.5 Graph results

LTE850-FDD5_CH20525 Left Tilt
Date: 2/18/2022
Electronics: DAE4 Sn1331
Medium: head 835 MHz
Medium parameters used: f = 836.5 MHz; σ = 0.87 S/m; ε_r = 45.375;ρ = 1000 kg/m^3
Ambient Temperature: 22.5°C, Liquid Temperature: 22.3°C
Communication System: LTE850-FDD5 836.5 MHz Duty Cycle: 1:1
Probe: EX3DV4 – SN7548 ConvF(10.36, 10.36, 10.36)

Area Scan (81x141x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 0.961 W/kg

Zoom Scan (6x6x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 24.34 V/m; Power Drift = 0.05 dB
Peak SAR (extrapolated) = 1.41 W/kg
SAR(1 g) = 0.620 W/kg; SAR(10 g) = 0.333 W/kg
Maximum value of SAR (measured) = 0.995 W/kg

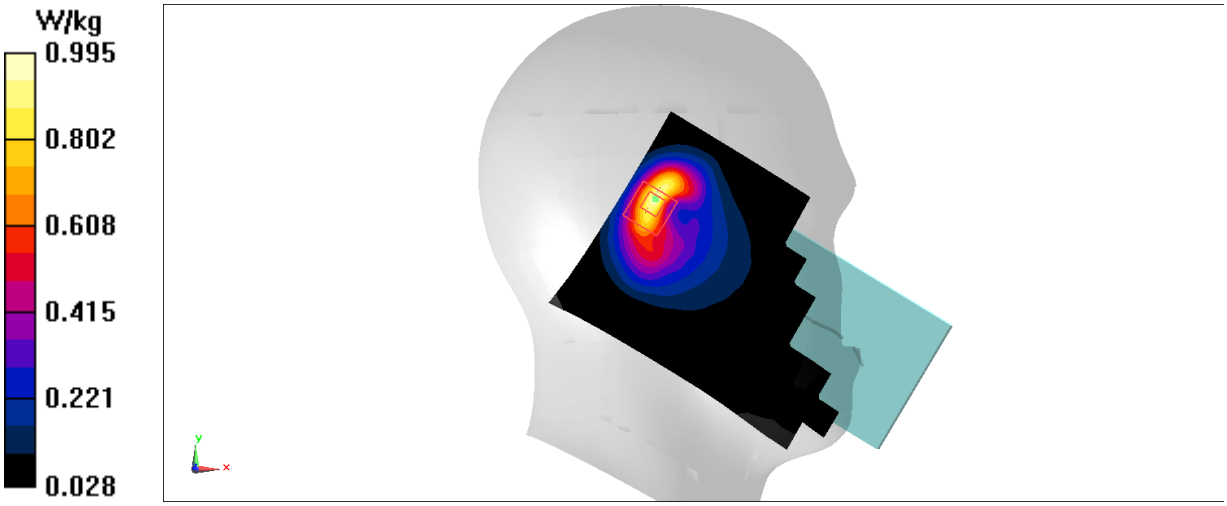


Fig I.5-1

LTE850-FDD5_CH20525 Top 10mm
Date: 2/18/2022
Electronics: DAE4 Sn1331
Medium: head 835 MHz
Medium parameters used: f = 836.5 MHz; σ = 0.87 S/m; ε_r = 45.375;ρ = 1000 kg/m^3
Ambient Temperature: 22.5ºC, Liquid Temperature: 22.3ºC
Communication System: LTE850-FDD5 836.5 MHz Duty Cycle: 1:1
Probe: EX3DV4 – SN7548 ConvF(10.36, 10.36, 10.36)

Area Scan (41x101x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 0.567 W/kg

Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 19.43 V/m; Power Drift = 0.08 dB
Peak SAR (extrapolated) = 0.744 W/kg
SAR(1 g) = 0.368 W/kg; SAR(10 g) = 0.197 W/kg
Maximum value of SAR (measured) = 0.591 W/kg

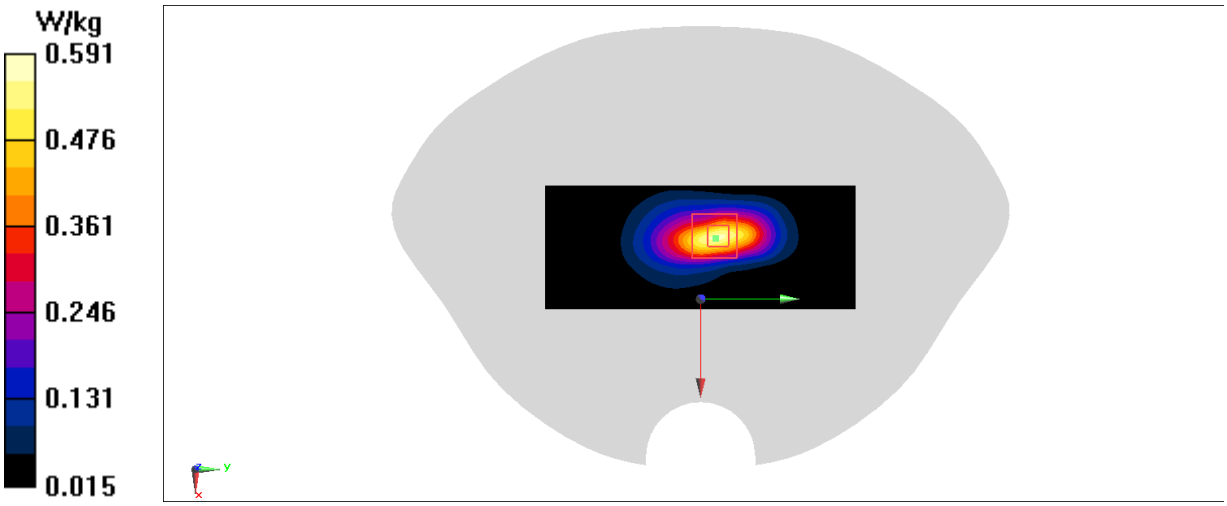


Fig I.5-2

5G n5_CH165300 Left Cheek
Date: 2/18/2022
Electronics: DAE4 Sn1331
Medium: head 835 MHz
Medium parameters used: f = 826.5 MHz; σ = 0.9 S/m; ε_r = 44.774;ρ = 1000 kg/m^3
Ambient Temperature: 22.9ºC, Liquid Temperature: 22.5ºC
Communication System: 5G n5 826.5 MHz Duty Cycle: 1:1
Probe: EX3DV4 – SN7548 ConvF(10.36,10.36,10.36)

Area Scan (81x131x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 1.56 W/kg

Zoom Scan (11x12x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 34.68 V/m; Power Drift = -0.03 dB
Peak SAR (extrapolated) = 2.04 W/kg
SAR(1 g) = 0.824 W/kg; SAR(10 g) = 0.599 W/kg
Maximum value of SAR (measured) = 1.48 W/kg

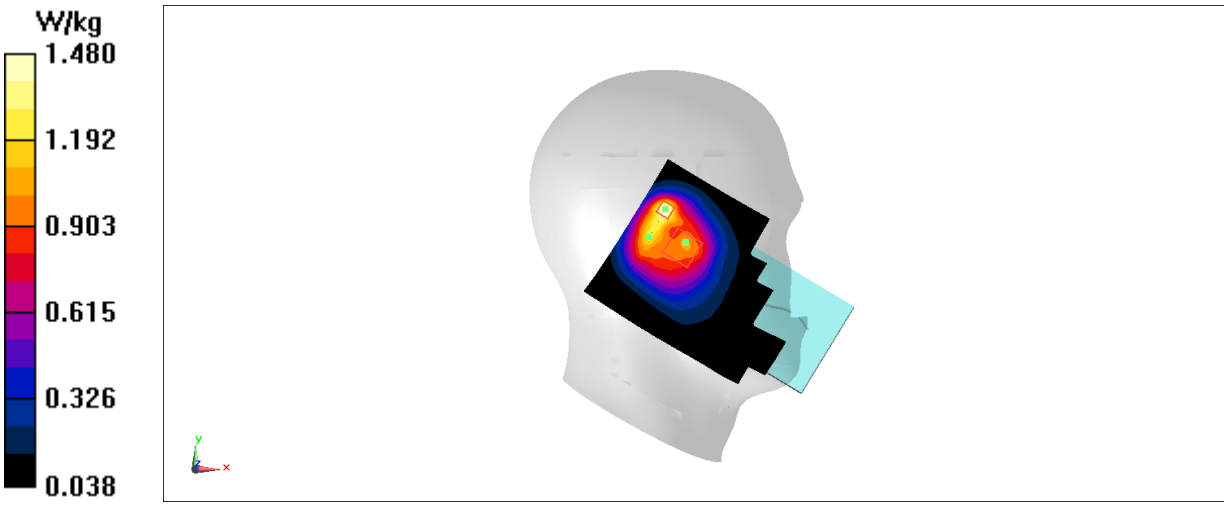


Fig I.5-3

5G n5_CH165300 Rear 15mm
Date: 2/18/2022
Electronics: DAE4 Sn1331
Medium: head 835 MHz
Medium parameters used: f = 826.5 MHz; σ = 0.9 S/m; ε_r = 44.774;ρ = 1000 kg/m^3
Ambient Temperature: 22.9ºC, Liquid Temperature: 22.5ºC
Communication System: 5G n5 826.5 MHz Duty Cycle: 1:1
Probe: EX3DV4 – SN7548 ConvF(10.36,10.36,10.36)

Area Scan (81x141x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 0.417 W/kg

Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 18.31 V/m; Power Drift =-0.1 dB
Peak SAR (extrapolated) = 0.496 W/kg
SAR(1 g) = 0.263 W/kg; SAR(10 g) = 0.203 W/kg
Maximum value of SAR (measured) = 0.412 W/kg

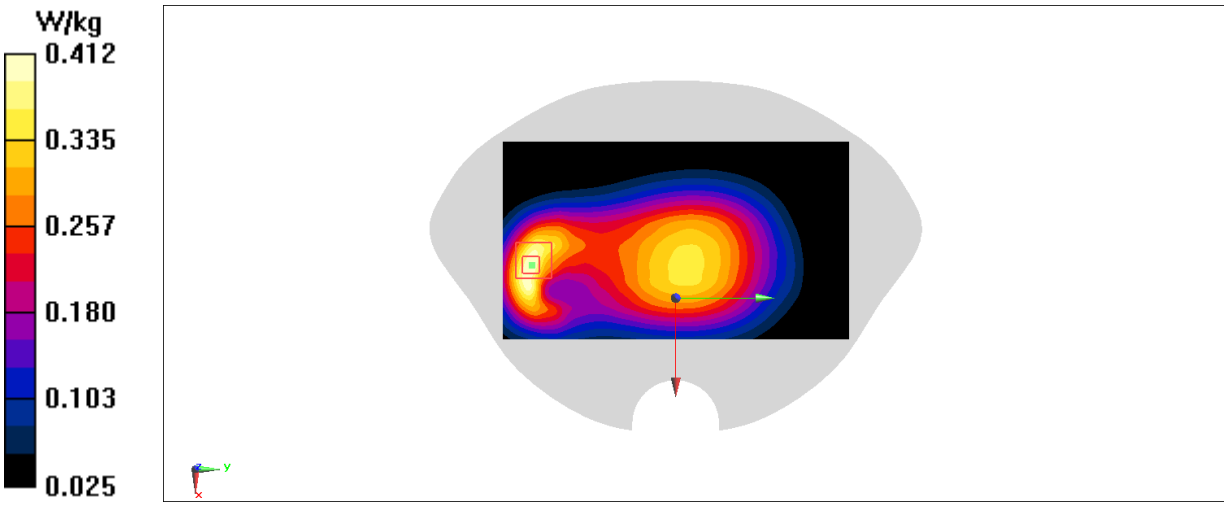


Fig I.5-4

5G n5_CH165300 Top 10mm
Date: 2/18/2022
Electronics: DAE4 Sn1331
Medium: head 835 MHz
Medium parameters used: f = 826.5 MHz; σ = 0.9 S/m; ε_r = 44.774;ρ = 1000 kg/m^3
Ambient Temperature: 22.9ºC, Liquid Temperature: 22.5ºC
Communication System: 5G n5 826.5 MHz Duty Cycle: 1:1
Probe: EX3DV4 – SN7548 ConvF(10.36,10.36,10.36)

Area Scan (41x101x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 0.479 W/kg

Zoom Scan (6x6x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 18.52 V/m; Power Drift = 0.03 dB
Peak SAR (extrapolated) = 0.691 W/kg
SAR(1 g) = 0.336 W/kg; SAR(10 g) = 0.181 W/kg
Maximum value of SAR (measured) = 0.530 W/kg

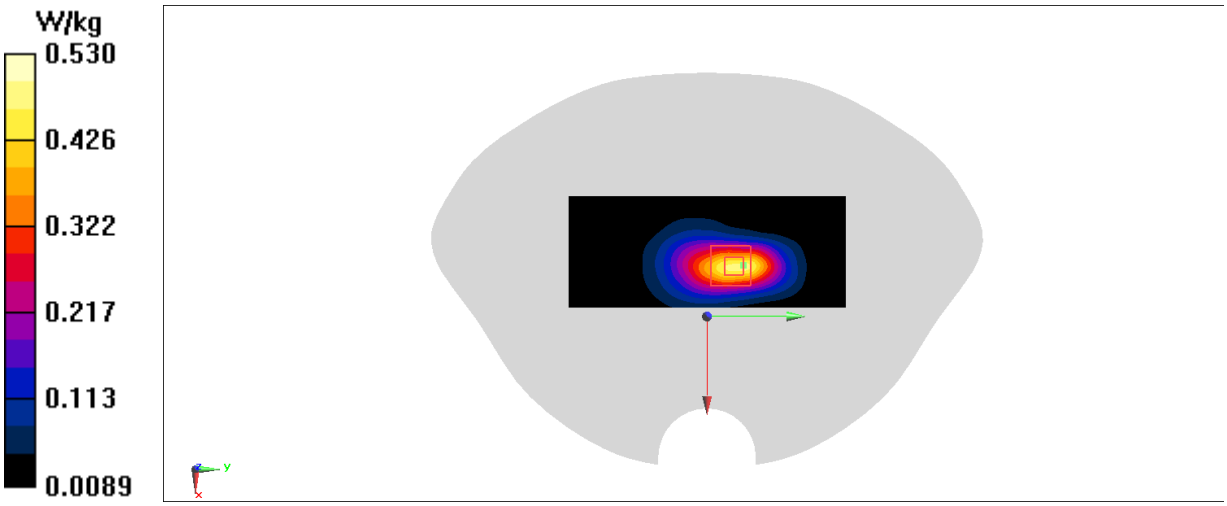


Fig I.5-5

5G NR-n78_CH627144 Left Cheek
Date: 3/7/2022
Electronics: DAE4 Sn1331
Medium: head3600MHz
Medium parameters used: f = 3407.16 MHz; σ = 2.791 S/m; ε_r = 38.937;ρ = 1000 kg/m^3
Ambient Temperature: 22.2ºC, Liquid Temperature: 22ºC
Communication System: 5G NR-n78 3407.16 MHz Duty Cycle: 1:2.27
Probe: EX3DV4 – SN7548ConvF(6.64, 6.64, 6.64)

Area Scan (121x211x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 0.0126 W/kg

Zoom Scan (9x7x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 3.12 V/m; Power Drift = 0.12 dB
Peak SAR (extrapolated) = 0.0210 W/kg
SAR(1 g) = 0.0067 W/kg; SAR(10 g) = 0.00199 W/kg
Maximum value of SAR (measured) = 0.0135 W/kg

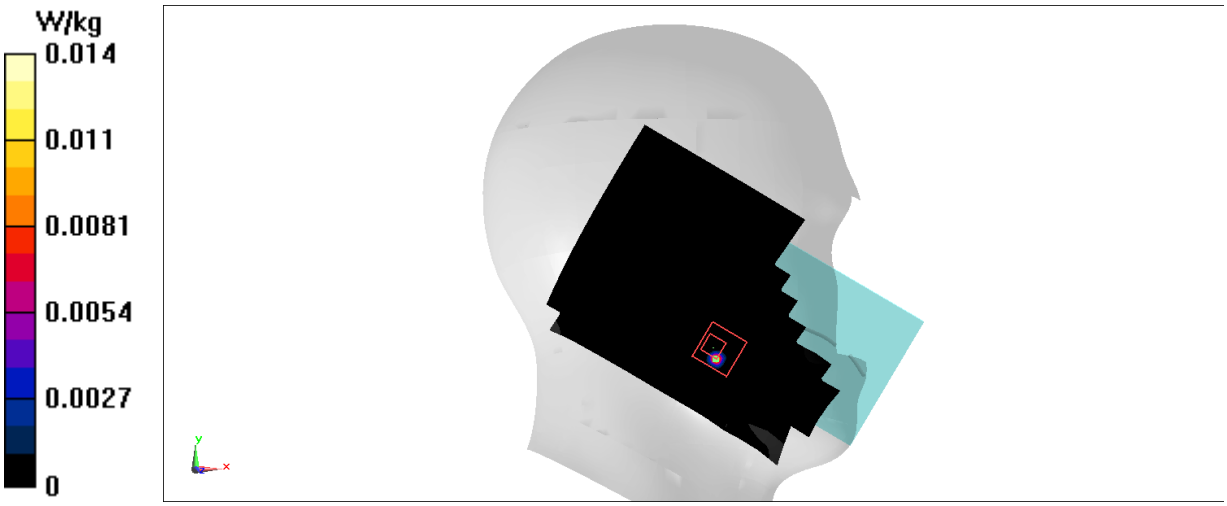


Fig I.5-6

5G NR-n78_CH627144 Rear 15mm
Date: 3/7/2022
Electronics: DAE4 Sn1331
Medium: head3600MHz
Medium parameters used: f = 3407.16 MHz; σ = 2.791 S/m; ε_r = 38.937;ρ = 1000 kg/m^3
Ambient Temperature: 22.2ºC, Liquid Temperature: 22ºC
Communication System: 5G NR-n78 3407.16 MHz Duty Cycle: 1:2.27
Probe: EX3DV4 – SN7548ConvF(6.64, 6.64, 6.64)

Area Scan (121x211x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 0.262 W/kg

Zoom Scan (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 1.293 V/m; Power Drift = -0.09 dB
Peak SAR (extrapolated) = 0.337 W/kg
SAR(1 g) = 0.143 W/kg; SAR(10 g) = 0.058 W/kg
Maximum value of SAR (measured) = 0.262 W/kg

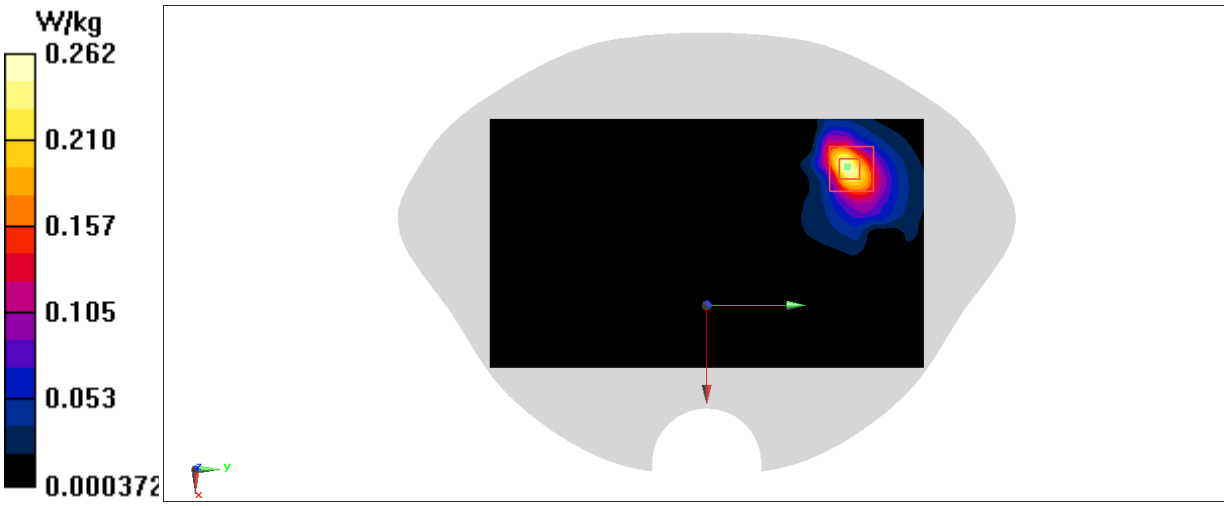


Fig I.5-7

5G NR-n78_CH625000 Rear 10mm
Date: 3/7/2022
Electronics: DAE4 Sn1331
Medium: head3600MHz
Medium parameters used: f = 3375 MHz; σ = 2.732 S/m; ε_r = 38.562;ρ = 1000 kg/m^3
Ambient Temperature: 22.2ºC, Liquid Temperature: 22ºC
Communication System: 5G NR-n78 3375 MHz Duty Cycle: 1:2.27
Probe: EX3DV4 – SN7548ConvF(6.79, 6.79, 6.79)

Area Scan (121x211x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 0.710 W/kg

Zoom Scan (8x8x8)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 0.5340 V/m; Power Drift = 0.06 dB
Peak SAR (extrapolated) = 0.944 W/kg
SAR(1 g) = 0.353 W/kg; SAR(10 g) = 0.121 W/kg
Maximum value of SAR (measured) = 0.711 W/kg

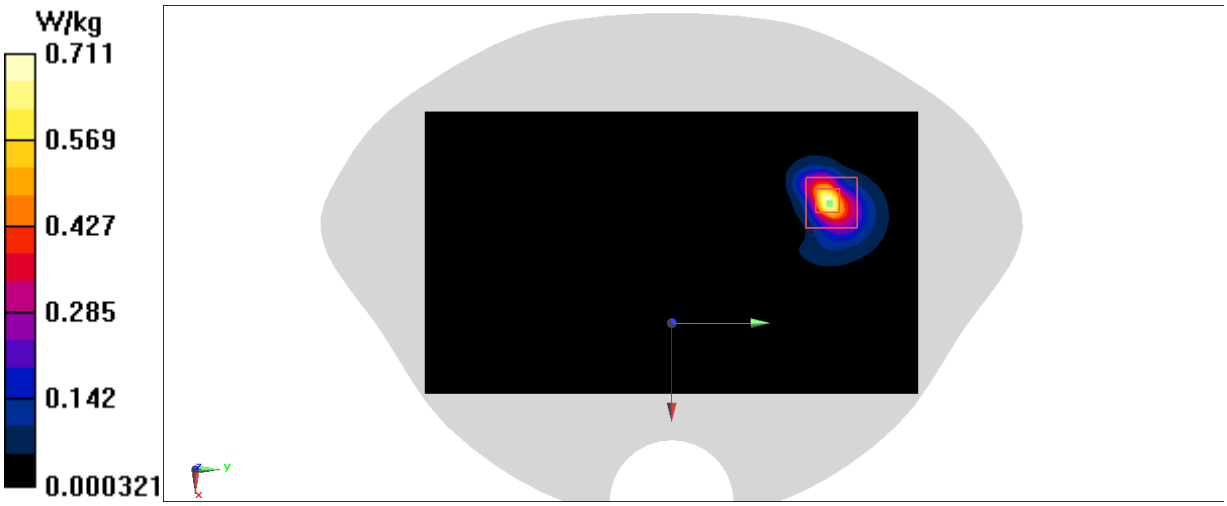
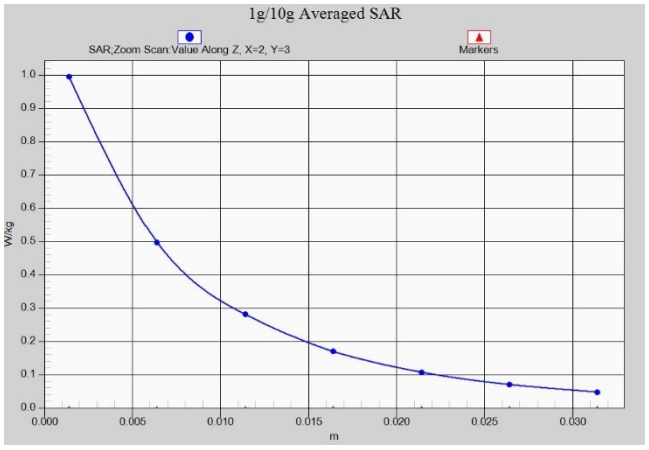
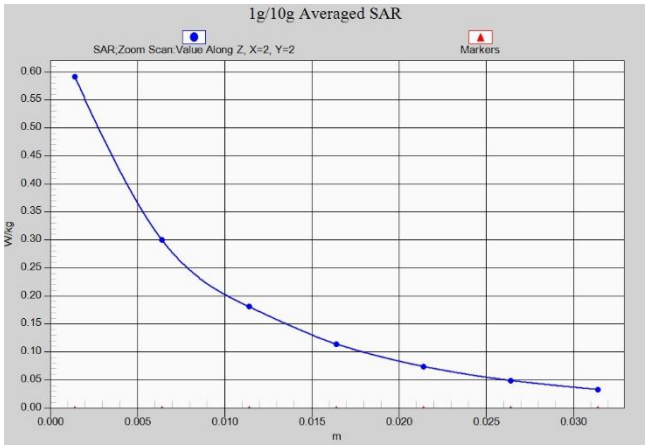


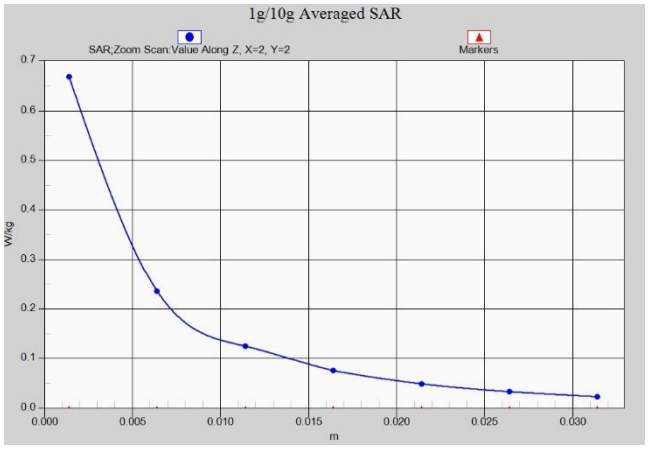
Fig I.5-8



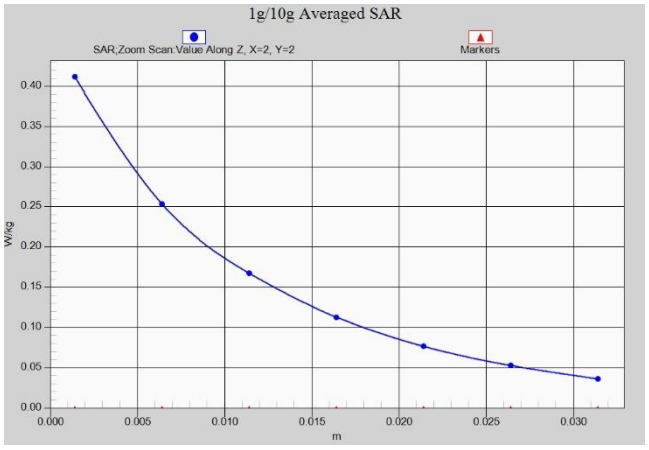
Z-Scan at power reference point (LTE Band5)



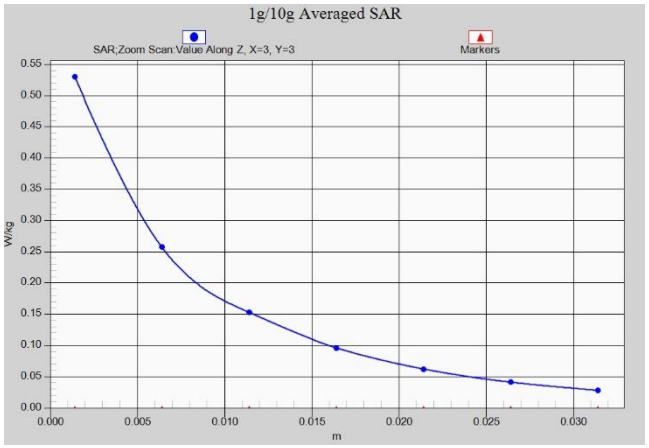
Z-Scan at power reference point (LTE Band5)



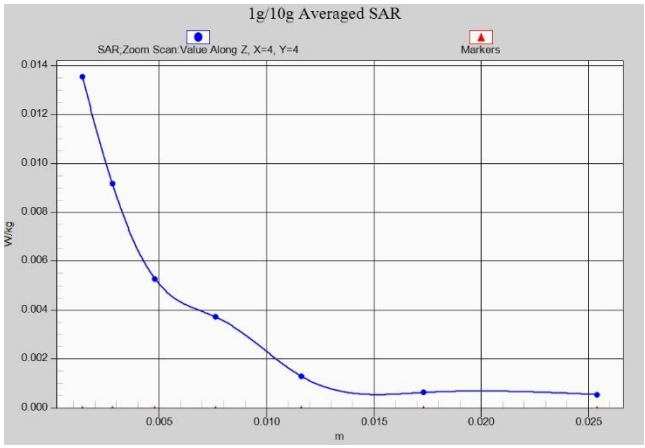
Z-Scan at power reference point (n5)



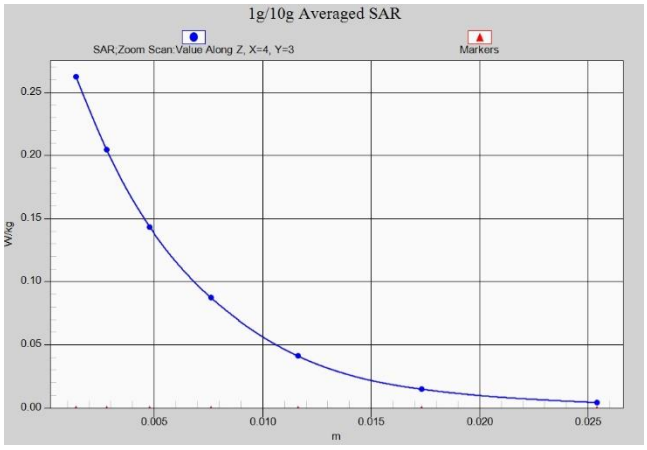
Z-Scan at power reference point (n5)



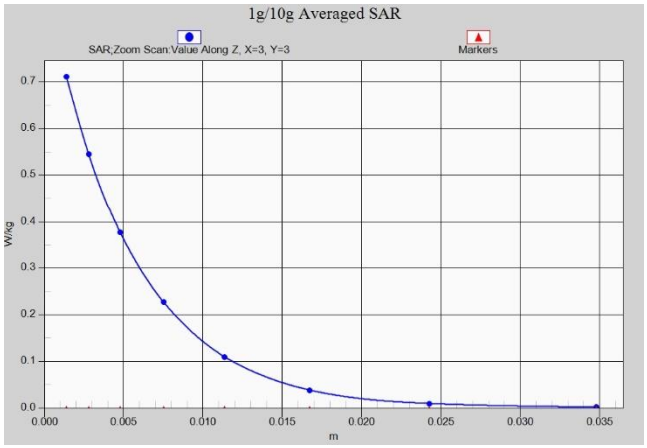
Z-Scan at power reference point (n5)



Z-Scan at power reference point (n78)



Z-Scan at power reference point (n78)



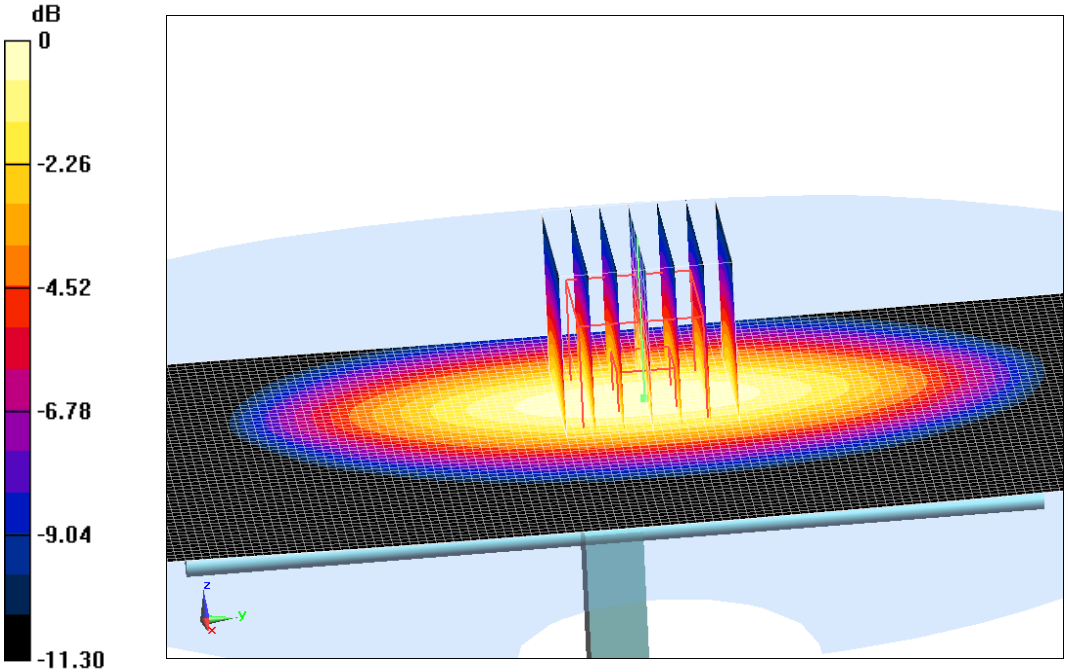
Z-Scan at power reference point (n78)

835MHz

Date: 2022-2-18
Electronics: DAE4 Sn1331
Medium: Head 835MHz
Medium parameters used: f = 835MHz; σ =0.8571 mho/m; ε_r = 44.69; ρ = 1000 kg/m^3
Ambient Temperature: 22.2ºC Liquid Temperature: 22ºC
Communication System: CW Frequency: 835MHz Duty Cycle: 1:1
Probe: EX3DV4 – SN7548 ConvF(10.36, 10.36, 10.36)

System Validation /Area Scan (81x191x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Reference Value =64.79 V/m; Power Drift =-0.12 dB
Fast SAR: SAR(1 g) = 2.43 W/kg; SAR(10 g) = 1.54 W/kg
Maximum value of SAR (interpolated) = 3.64 W/kg

System Validation /Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value =64.79 V/m; Power Drift =-0.12 dB
Peak SAR (extrapolated) = 3.57W/kg
SAR(1 g) = 2.46 W/kg; SAR(10 g) = 1.59 W/kg
Maximum value of SAR (measured) = 3.77 W/kg



0 dB = 3.77 W/kg = 5.76 dB W/kg

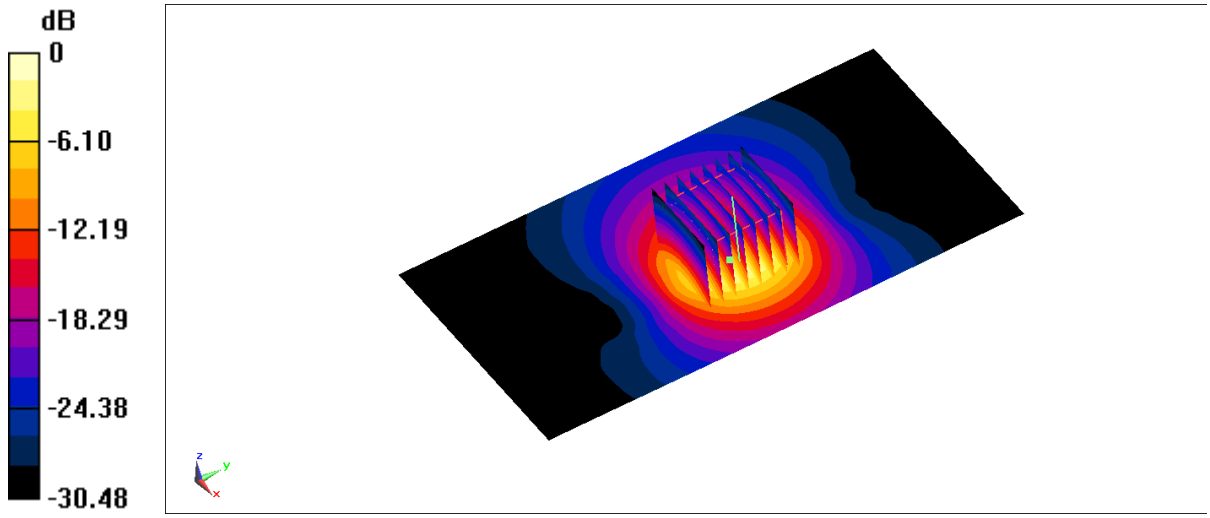
Fig I.6-1 validation 835MHz 250mW

3500 MHz

Date:3/7/2022
Electronics: DAE4 Sn1331
Medium: Head 3500 MHz
Medium parameters used: f = 3500 MHz; σ =2.784 mho/m; ε_r = 38.95; ρ = 1000 kg/m^3
Ambient Temperature: 22.9ºC Liquid Temperature: 22.5ºC
Communication System: CW Frequency: 3500 MHz Duty Cycle: 1:1
Probe: EX3DV4 – SN7548 ConvF(6.64,6.64,6.64)

System Performance Check/Area Scan (91x91x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 8.07 W/kg

System Performance Check/Zoom Scan (8x8x8)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 60.15 V/m; Power Drift = 0.15 dB
Peak SAR (extrapolated) = 15.5 W/kg
SAR(1 g) = 6.65 W/kg; SAR(10 g) = 2.48 W/kg
Maximum value of SAR (measured) = 8.05 W/kg



0 dB = 8.05 W/kg = 9.06 dBW/kg

Fig I.6-2 validation 3500 MHz 100mW

The SAR system verification must be required that the area scan estimated 1-g SAR is within 3% of the zoom scan 1-g SAR.

Table I.6-1 Comparison between area scan and zoom scan for system verification

Date	Band	Position	Area scan (1g)	Zoom scan (1g)	Drift (%)
2022-2-18	835 MHz	Head	2.43	2.46	-1.22

I.6 System Validation

Table I.6: System Validation for 7548

Probe SN.	Liquid name	Validation date	Frequency point	Status (OK or Not)
7548	Head 750MHz	July.8,2021	750 MHz	OK
7548	Head 900MHz	July.8,2021	900 MHz	OK
7548	Head 1450MHz	July.8,2021	1450 MHz	OK
7548	Head 1750MHz	July.8,2021	1750 MHz	OK
7548	Head 1810MHz	July.8,2021	1810 MHz	OK
7548	Head 1900MHz	July.9,2021	1900 MHz	OK
7548	Head 2000MHz	July.9,2021	2000 MHz	OK
7548	Head 2300MHz	July.9,2021	2300 MHz	OK
7548	Head 2450MHz	July.9,2021	2450 MHz	OK
7548	Head 2600MHz	July.9,2021	2600 MHz	OK
7548	Head 3300MHz	July.10,2021	3300 MHz	OK
7548	Head 3500MHz	July.10,2021	3500 MHz	OK
7548	Head 3700MHz	July.10,2021	3700 MHz	OK
7548	Head 5250MHz	July.10,2021	5250 MHz	OK
7548	Head 5600MHz	July.10,2021	5600 MHz	OK
7548	Head 5750MHz	July.10,2021	5750 MHz	OK

I.7 Probe Calibration Certificate

Probe 7548 Calibration Certificate

In Collaboration with
s p e a g
CALIBRATION LABORATORY
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校准
CALIBRATION
CNAS L0570

Client CTTL Certificate No: Z21-60231

CALIBRATION CERTIFICATE

Object EX3DV4 - SN : 7548

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

Calibration date: June 25, 2021

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	15-Jun-21(CTTL, No.J21X04466)	Jun-22
Power sensor NRP-Z91	101547	15-Jun-21(CTTL, No.J21X04466)	Jun-22
Power sensor NRP-Z91	101548	15-Jun-21(CTTL, No.J21X04466)	Jun-22
Reference 10dBAttenuator	18N50W-10dB	10-Feb-20(CTTL, No.J20X00525)	Feb-22
Reference 20dBAttenuator	18N50W-20dB	10-Feb-20(CTTL, No.J20X00526)	Feb-22
Reference Probe EX3DV4	SN 3617	27-Jan-21(SPEAG, No.EX3-3617_Jan21)	Jan-22
DAE4	SN 1556	15-Jan-21(SPEAG, No.DAE4-1556_Jan21)	Jan-22

Secondary Standards	ID #	Cal Date(Calibrated by, Certificate No.)	Scheduled Calibration
SignalGenerator MG3700A	6201052605	16-Jun-21(CTTL, No.J21X04467)	Jun-22
Network Analyzer E5071C	MY46110673	21-Jan-21(CTTL, No.J20X00515)	Jan-22

	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: June 27, 2021

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

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