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

Additional Documentation:

c) DASY System Handbook

Methods Applied and Interpretation of Parameters:

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

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

Measurement Conditions

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

DASY Version	DASY52	V52.10.4
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom	
Distance Dipole Center - TSL	10 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	2600 MHz ± 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Head TSL parameters	22.0 °C	39.0	1.96 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	37.3 ± 6 %	2.05 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	----	----

SAR result with Head TSL

SAR averaged over 1 cm³ (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	14.7 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**57.1 W/kg ± 17.0 % (k=2)**

SAR averaged over 10 cm³ (10 g) of Head TSL	condition	
SAR measured	250 mW input power	6.48 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**25.5 W/kg ± 16.5 % (k=2)**

Appendix (Additional assessments outside the scope of SCS 0108)

Antenna Parameters with Head TSL

Impedance, transformed to feed point	47.8 Ω - 5.7 jΩ
Return Loss	- 24.1 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.153 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: 26.07.2021

Test Laboratory: SPEAG, Zurich, Switzerland

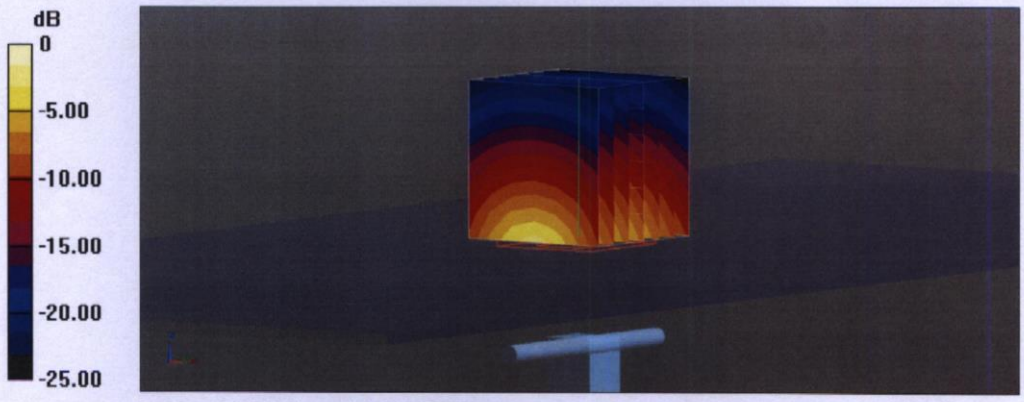
DUT: Dipole 2600 MHz; Type: D2600V2; Serial: D2600V2 - SN: 1012

Communication System: UID 0 - CW; Frequency: 2600 MHz
Medium parameters used: f = 2600 MHz; σ = 2.05 S/m; ε_r = 37.3; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

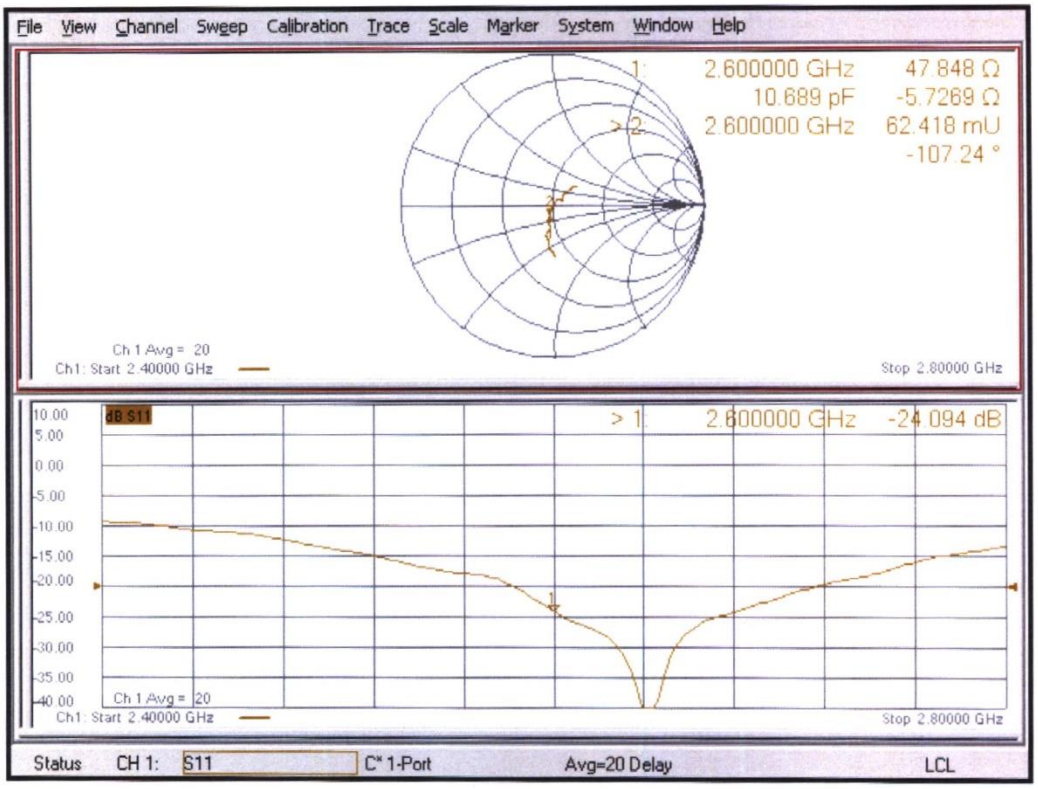
- Probe: EX3DV4 - SN7349; ConvF(7.84, 7.84, 7.84) @ 2600 MHz; Calibrated: 28.12.2020
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 02.11.2020
- Phantom: Flat Phantom 5.0 (front); Type: QD 000 P50 AA; Serial: 1001
- DASY52 52.10.4(1535); SEMCAD X 14.6.14(7501)

Dipole Calibration for Head Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 118.6 V/m; Power Drift = 0.09 dB
Peak SAR (extrapolated) = 29.5 W/kg
SAR(1 g) = 14.7 W/kg; SAR(10 g) = 6.48 W/kg
Smallest distance from peaks to all points 3 dB below = 8.9 mm
Ratio of SAR at M2 to SAR at M1 = 49.6%
Maximum value of SAR (measured) = 24.4 W/kg



0 dB = 24.4 W/kg = 13.87 dBW/kg

Impedance Measurement Plot for Head TSL



ANNEX I Variant Product Test

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 (%)
2022/8/26	Head	835 MHz	43.94	5.88%	0.9399	4.43%
2022/8/27	Head	1900 MHz	41.78	4.45%	1.481	5.79%
2022/8/28	Head	2600 MHz	40.62	4.13%	1.958	-0.10%

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
2022/8/26	835 MHz	6.24	9.63	5.92	8.96	-5.13%	-6.96%
2022/8/27	1900 MHz	20.9	40.1	19.4	37.0	-6.99%	-7.73%
2022/8/28	2600 MHz	25.5	57.1	24.2	53.6	-4.94%	-6.13%

I.2 New frequency band

I.2.1 Conducted power of selected case

Maximum Target Power for Production Unit

Band	Tune up (dBm)	
	Normal power	Low power
Band25	25.5	21.5
Band 26	25.5	25.5

LTE B25- Normal power

BANDWIDTH	Number of RBs	Frequency	QPSK	16QAM
1.4MHz	1RB-High (5)	1914.3 (26683)	24.02	22.68
		1882.5 (26365)	24.25	22.74
		1850.7 (26047)	24.07	22.72
	1RB-Middle (3)	1914.3 (26683)	24.05	22.70
		1882.5 (26365)	24.13	22.91
		1850.7 (26047)	24.11	23.02
	1RB-Low (0)	1914.3 (26683)	24.10	22.69
		1882.5 (26365)	24.00	22.70
		1850.7 (26047)	24.18	22.86
	3RB-High (3)	1914.3 (26683)	24.30	23.02
		1882.5 (26365)	24.30	23.40
		1850.7 (26047)	24.30	23.21
	3RB-Middle (1)	1914.3 (26683)	24.41	22.69
		1882.5 (26365)	24.28	23.46
		1850.7 (26047)	24.41	23.15
	3RB-Low (0)	1914.3 (26683)	24.27	23.35
		1882.5 (26365)	24.22	23.37
		1850.7 (26047)	24.35	23.18
	6RB (0)	1914.3 (26683)	23.15	22.01
		1882.5 (26365)	23.16	21.89
		1850.7 (26047)	23.28	22.23
3MHz	1RB-High (14)	1913.5 (26675)	24.13	22.67
		1882.5 (26365)	24.09	22.54
		1851.5 (26055)	24.17	22.60
	1RB-Middle (7)	1913.5 (26675)	24.08	22.74
		1882.5 (26365)	24.32	22.97
		1851.5 (26055)	24.31	22.95
	1RB-Low (0)	1913.5 (26675)	24.16	22.68
		1882.5 (26365)	24.13	22.78
		1851.5 (26055)	24.28	22.78
	8RB-High (7)	1913.5 (26675)	23.07	22.17
		1882.5 (26365)	23.29	22.26
		1851.5 (26055)	23.25	22.38
	8RB-Middle (4)	1913.5 (26675)	23.15	22.19
		1882.5 (26365)	23.15	22.09
		1851.5 (26055)	23.21	22.34
	8RB-Low (0)	1913.5 (26675)	23.15	22.18
		1882.5 (26365)	23.39	22.30
		1851.5 (26055)	23.25	22.29
	15RB (0)	1913.5 (26675)	23.27	22.09
		1882.5 (26365)	23.13	22.11
		1851.5 (26055)	23.25	22.23
5MHz	1RB-High (24)	1912.5 (26665)	24.18	22.96
		1882.5 (26365)	24.02	22.95
		1852.5 (26065)	23.89	22.83
	1RB-Middle (12)	1912.5 (26665)	24.16	22.81
		1882.5 (26365)	24.08	23.04
		1852.5 (26065)	24.24	22.88
	1RB-Low (0)	1912.5 (26665)	24.12	22.72
		1882.5 (26365)	23.89	22.72
		1852.5 (26065)	24.14	22.57
	12RB-High (13)	1912.5 (26665)	23.06	21.81
		1882.5 (26365)	23.29	21.87
		1852.5 (26065)	23.14	22.12
	12RB-Middle (6)	1912.5 (26665)	23.26	21.99
		1882.5 (26365)	23.14	22.05
		1852.5 (26065)	23.24	21.89
	12RB-Low (0)	1912.5 (26665)	23.20	22.10
		1882.5 (26365)	23.18	22.01
		1852.5 (26065)	23.26	22.25
	25RB (0)	1912.5 (26665)	23.12	22.04
		1882.5 (26365)	23.08	22.00
		1852.5 (26065)	23.20	22.18

10MHz	1RB-High (49)	1910 (26640)	23.58	23.47
		1882.5 (26365)	24.49	23.65
		1855 (26090)	24.38	22.76
	1RB-Middle (24)	1910 (26640)	24.44	22.73
		1882.5 (26365)	24.39	23.22
		1855 (26090)	24.33	22.78
	1RB-Low (0)	1910 (26640)	24.30	23.06
		1882.5 (26365)	24.00	22.64
		1855 (26090)	24.48	23.14
	25RB-High (25)	1910 (26640)	23.18	22.09
		1882.5 (26365)	23.32	22.19
		1855 (26090)	23.39	22.47
	25RB-Middle (12)	1910 (26640)	23.39	22.23
		1882.5 (26365)	23.33	22.30
		1855 (26090)	23.28	22.35
	25RB-Low (0)	1910 (26640)	23.35	22.08
		1882.5 (26365)	23.25	22.30
		1855 (26090)	23.24	22.20
	50RB (0)	1910 (26640)	23.34	22.29
		1882.5 (26365)	23.38	22.27
		1855 (26090)	23.33	22.23
15MHz	1RB-High (74)	1907.5 (26615)	23.59	22.77
		1882.5 (26365)	24.28	23.56
		1857.5 (26115)	24.22	22.83
	1RB-Middle (37)	1907.5 (26615)	24.36	23.46
		1882.5 (26365)	24.42	23.47
		1857.5 (26115)	24.28	22.75
	1RB-Low (0)	1907.5 (26615)	24.22	22.93
		1882.5 (26365)	24.23	22.89
		1857.5 (26115)	24.36	22.64
	36RB-High (38)	1907.5 (26615)	23.30	22.10
		1882.5 (26365)	23.47	22.38
		1857.5 (26115)	23.34	22.37
	36RB-Middle (19)	1907.5 (26615)	23.33	22.32
		1882.5 (26365)	23.32	22.25
		1857.5 (26115)	23.45	22.41
	36RB-Low (0)	1907.5 (26615)	23.16	22.14
		1882.5 (26365)	23.30	22.20
		1857.5 (26115)	23.23	22.17
	75RB (0)	1907.5 (26615)	23.34	22.26
		1882.5 (26365)	23.33	22.17
		1857.5 (26115)	23.31	22.17
20MHz	1RB-High (99)	1905 (26590)	23.51	22.55
		1882.5 (26365)	24.13	23.32
		1860 (26140)	24.23	22.94
	1RB-Middle (50)	1905 (26590)	24.55	22.76
		1882.5 (26365)	24.56	23.61
		1860 (26140)	24.51	23.64
	1RB-Low (0)	1905 (26590)	24.21	22.50
		1882.5 (26365)	23.97	22.72
		1860 (26140)	24.35	22.84
	50RB-High (50)	1905 (26590)	23.33	22.34
		1882.5 (26365)	23.35	22.28
		1860 (26140)	23.36	22.28
	50RB-Middle (25)	1905 (26590)	23.25	22.26
		1882.5 (26365)	23.45	22.26
		1860 (26140)	23.41	22.32
	50RB-Low (0)	1905 (26590)	23.17	22.27
		1882.5 (26365)	23.26	22.18
		1860 (26140)	23.25	22.26
	100RB (0)	1905 (26590)	23.30	22.21
		1882.5 (26365)	23.35	22.24
		1860 (26140)	23.31	22.22

LTE B25- Low power

BANDWIDTH	Number of RBs	Frequency	QPSK	16QAM
1.4MHz	1RB-High (5)	1914.3 (26683)	20.29	19.72
		1882.5 (26365)	20.32	19.83
		1850.7 (26047)	20.31	19.81
	1RB-Middle (3)	1914.3 (26683)	20.35	19.84
		1882.5 (26365)	20.32	20.00
		1850.7 (26047)	20.57	19.81
	1RB-Low (0)	1914.3 (26683)	20.13	19.85
		1882.5 (26365)	20.32	19.73
		1850.7 (26047)	20.34	19.75
	3RB-High (3)	1914.3 (26683)	20.45	20.47
		1882.5 (26365)	20.45	20.17
		1850.7 (26047)	20.53	20.42
	3RB-Middle (1)	1914.3 (26683)	20.41	20.12
		1882.5 (26365)	20.51	20.49
		1850.7 (26047)	20.45	20.31
	3RB-Low (0)	1914.3 (26683)	20.56	20.41
		1882.5 (26365)	20.47	20.28
		1850.7 (26047)	20.49	20.34
	6RB (0)	1914.3 (26683)	20.33	20.23
		1882.5 (26365)	20.35	20.21
		1850.7 (26047)	20.31	20.29
3MHz	1RB-High (14)	1913.5 (26675)	20.35	19.59
		1882.5 (26365)	20.69	19.76
		1851.5 (26055)	20.37	19.60
	1RB-Middle (7)	1913.5 (26675)	20.32	19.86
		1882.5 (26365)	20.37	20.12
		1851.5 (26055)	20.54	20.01
	1RB-Low (0)	1913.5 (26675)	20.30	20.00
		1882.5 (26365)	20.34	19.89
		1851.5 (26055)	20.47	19.86
	8RB-High (7)	1913.5 (26675)	20.35	20.46
		1882.5 (26365)	20.36	20.49
		1851.5 (26055)	20.38	20.49
	8RB-Middle (4)	1913.5 (26675)	20.30	20.48
		1882.5 (26365)	20.34	20.46
		1851.5 (26055)	20.32	20.44
	8RB-Low (0)	1913.5 (26675)	20.38	20.33
		1882.5 (26365)	20.26	20.41
		1851.5 (26055)	20.28	20.31
	15RB (0)	1913.5 (26675)	20.35	20.31
		1882.5 (26365)	20.28	20.39
		1851.5 (26055)	20.37	20.36
5MHz	1RB-High (24)	1912.5 (26665)	20.31	19.30
		1882.5 (26365)	20.25	20.49
		1852.5 (26065)	20.01	19.56
	1RB-Middle (12)	1912.5 (26665)	20.30	19.63
		1882.5 (26365)	20.14	19.76
		1852.5 (26065)	20.08	19.60
	1RB-Low (0)	1912.5 (26665)	20.29	19.38
		1882.5 (26365)	20.01	19.43
		1852.5 (26065)	20.09	19.67
	12RB-High (13)	1912.5 (26665)	20.27	19.86
		1882.5 (26365)	20.14	20.21
		1852.5 (26065)	20.11	20.14
	12RB-Middle (6)	1912.5 (26665)	20.20	19.93
		1882.5 (26365)	20.19	20.07
		1852.5 (26065)	20.02	20.05
	12RB-Low (0)	1912.5 (26665)	20.15	19.96
		1882.5 (26365)	20.10	20.04
		1852.5 (26065)	20.18	20.01
	25RB (0)	1912.5 (26665)	20.28	20.19
		1882.5 (26365)	20.17	20.15
		1852.5 (26065)	20.10	19.91

10MHz	1RB-High (49)	1910 (26640)	20.06	19.53
		1882.5 (26365)	20.23	19.65
		1855 (26090)	20.10	20.20
	1RB-Middle (24)	1910 (26640)	20.13	19.47
		1882.5 (26365)	20.08	19.34
		1855 (26090)	20.03	19.24
	1RB-Low (0)	1910 (26640)	20.14	19.69
		1882.5 (26365)	19.86	19.44
		1855 (26090)	20.05	19.60
	25RB-High (25)	1910 (26640)	20.04	19.89
		1882.5 (26365)	19.98	20.01
		1855 (26090)	19.99	20.06
	25RB-Middle (12)	1910 (26640)	20.10	20.10
		1882.5 (26365)	20.05	19.89
		1855 (26090)	19.88	19.83
	25RB-Low (0)	1910 (26640)	20.09	20.14
		1882.5 (26365)	20.12	19.96
		1855 (26090)	19.91	19.87
	50RB (0)	1910 (26640)	20.02	20.07
		1882.5 (26365)	20.15	19.99
		1855 (26090)	20.17	20.07
15MHz	1RB-High (74)	1907.5 (26615)	20.16	19.59
		1882.5 (26365)	20.24	19.66
		1857.5 (26115)	20.15	19.51
	1RB-Middle (37)	1907.5 (26615)	20.24	19.63
		1882.5 (26365)	20.24	19.44
		1857.5 (26115)	20.03	19.45
	1RB-Low (0)	1907.5 (26615)	19.87	19.29
		1882.5 (26365)	19.97	19.10
		1857.5 (26115)	20.14	19.41
	36RB-High (38)	1907.5 (26615)	20.19	20.13
		1882.5 (26365)	20.27	20.34
		1857.5 (26115)	20.26	20.13
	36RB-Middle (19)	1907.5 (26615)	20.15	20.05
		1882.5 (26365)	20.22	20.17
		1857.5 (26115)	20.15	20.00
	36RB-Low (0)	1907.5 (26615)	20.09	19.99
		1882.5 (26365)	20.18	20.10
		1857.5 (26115)	20.01	19.97
	75RB (0)	1907.5 (26615)	20.21	20.13
		1882.5 (26365)	20.21	20.14
		1857.5 (26115)	20.16	20.04
20MHz	1RB-High (99)	1905 (26590)	20.20	19.72
		1882.5 (26365)	20.28	19.57
		1860 (26140)	20.00	19.80
	1RB-Middle (50)	1905 (26590)	20.44	20.45
		1882.5 (26365)	20.53	19.86
		1860 (26140)	20.46	20.41
	1RB-Low (0)	1905 (26590)	20.09	20.00
		1882.5 (26365)	20.08	19.75
		1860 (26140)	20.02	19.84
	50RB-High (50)	1905 (26590)	20.25	20.27
		1882.5 (26365)	20.33	20.25
		1860 (26140)	20.34	20.31
	50RB-Middle (25)	1905 (26590)	20.27	20.16
		1882.5 (26365)	20.28	20.19
		1860 (26140)	20.41	20.44
	50RB-Low (0)	1905 (26590)	20.26	20.02
		1882.5 (26365)	20.48	20.30
		1860 (26140)	20.29	20.36
	100RB (0)	1905 (26590)	20.21	20.13
		1882.5 (26365)	20.25	20.24
		1860 (26140)	20.16	20.22

LTE B26- Normal/Low power

BANDWIDTH	Number of RBs	Frequency	QPSK	16QAM
1.4MHz	1RB-High (5)	848.3 (27033)	23.65	22.64
		831.5 (26865)	24.04	22.71
		814.7 (26697)	24.04	23.42
	1RB-Middle (3)	848.3 (27033)	23.82	22.90
		831.5 (26865)	24.21	22.86
		814.7 (26697)	24.15	23.61
	1RB-Low (0)	848.3 (27033)	23.83	22.67
		831.5 (26865)	24.08	22.73
		814.7 (26697)	23.88	23.31
	3RB-High (3)	848.3 (27033)	23.59	22.67
		831.5 (26865)	24.16	23.36
		814.7 (26697)	24.10	23.24
	3RB-Middle (1)	848.3 (27033)	23.77	22.82
		831.5 (26865)	24.17	23.26
		814.7 (26697)	24.09	23.17
	3RB-Low (0)	848.3 (27033)	23.77	22.83
		831.5 (26865)	24.19	23.36
		814.7 (26697)	24.01	22.93
	6RB (0)	848.3 (27033)	23.10	22.09
		831.5 (26865)	23.09	22.15
		814.7 (26697)	22.97	21.91
3MHz	1RB-High (14)	847.5 (27025)	23.72	22.73
		831.5 (26865)	24.10	23.42
		815.5 (26705)	23.97	23.34
	1RB-Middle (7)	847.5 (27025)	24.02	23.17
		831.5 (26865)	24.21	23.31
		815.5 (26705)	24.02	22.68
	1RB-Low (0)	847.5 (27025)	23.93	23.44
		831.5 (26865)	24.27	23.57
		815.5 (26705)	23.84	22.52
	8RB-High (7)	847.5 (27025)	23.00	21.83
		831.5 (26865)	23.10	22.22
		815.5 (26705)	22.98	21.99
	8RB-Middle (4)	847.5 (27025)	23.06	21.91
		831.5 (26865)	23.16	22.31
		815.5 (26705)	22.98	22.08
	8RB-Low (0)	847.5 (27025)	23.05	21.88
		831.5 (26865)	23.08	22.23
		815.5 (26705)	23.01	21.98
	15RB (0)	847.5 (27025)	23.02	22.06
		831.5 (26865)	23.06	22.25
		815.5 (26705)	22.95	21.90
5MHz	1RB-High (24)	846.5 (27015)	23.70	22.53
		831.5 (26865)	23.88	23.42
		816.5 (26715)	23.94	23.36
	1RB-Middle (12)	846.5 (27015)	24.17	22.74
		831.5 (26865)	24.16	22.72
		816.5 (26715)	24.07	23.34
	1RB-Low (0)	846.5 (27015)	24.07	22.64
		831.5 (26865)	24.04	22.56
		816.5 (26715)	23.96	23.28
	12RB-High (13)	846.5 (27015)	22.92	22.10
		831.5 (26865)	23.10	22.03
		816.5 (26715)	23.09	21.92
	12RB-Middle (6)	846.5 (27015)	22.97	21.97
		831.5 (26865)	23.08	22.12
		816.5 (26715)	23.01	21.89
	12RB-Low (0)	846.5 (27015)	23.00	22.01
		831.5 (26865)	22.91	22.10
		816.5 (26715)	22.99	21.82
	25RB (0)	846.5 (27015)	22.95	21.97
		831.5 (26865)	23.14	22.26
		816.5 (26715)	23.11	22.14

10MHz	1RB-High (49)	844 (26990)	23.51	22.71
		831.5 (26865)	23.92	22.67
		820 (26750)	23.98	22.69
	1RB-Middle (24)	844 (26990)	24.06	23.17
		831.5 (26865)	24.07	22.50
		820 (26750)	23.99	22.68
	1RB-Low (0)	844 (26990)	23.74	22.80
		831.5 (26865)	23.93	22.61
		820 (26750)	24.11	22.60
	25RB-High (25)	844 (26990)	22.89	21.96
		831.5 (26865)	23.05	22.15
		820 (26750)	22.96	21.99
	25RB-Middle (12)	844 (26990)	22.96	21.93
		831.5 (26865)	23.09	22.19
		820 (26750)	22.98	22.01
	25RB-Low (0)	844 (26990)	23.00	21.99
		831.5 (26865)	23.03	22.16
		820 (26750)	23.05	22.07
	50RB (0)	844 (26990)	22.93	21.94
		831.5 (26865)	23.06	22.00
		820 (26750)	22.94	21.82
15MHz	1RB-High (74)	841.5 (26965)	23.73	22.72
		831.5 (26865)	23.88	22.78
		822.5 (26775)	23.78	22.53
	1RB-Middle (37)	841.5 (26965)	24.12	22.57
		831.5 (26865)	24.09	23.23
		822.5 (26775)	23.75	22.52
	1RB-Low (0)	841.5 (26965)	24.02	22.68
		831.5 (26865)	24.02	22.65
		822.5 (26775)	23.81	22.60
	36RB-High (38)	841.5 (26965)	22.98	22.06
		831.5 (26865)	22.87	21.81
		822.5 (26775)	22.94	21.92
	36RB-Middle (19)	841.5 (26965)	23.06	21.89
		831.5 (26865)	22.97	22.01
		822.5 (26775)	22.89	21.94
	36RB-Low (0)	841.5 (26965)	22.89	21.78
		831.5 (26865)	23.05	21.89
		822.5 (26775)	22.96	21.91
	75RB (0)	841.5 (26965)	22.83	21.95
		831.5 (26865)	22.86	22.00
		822.5 (26775)	22.91	21.87

I.2.2 SAR Test Result

Test Position	Phantom position L/R/F	Frequency Band	Channel Number	Frequency (MHz)	Test setup	Fig	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
Cheek	L	LTE Band25	26365	1882.5	1RB-Middle	F.1	24.56	25.50	0.425	**0.53**	0.26	**0.32**	-0.09
Tilt	L	LTE Band25	26365	1882.5	1RB-Middle	\	24.56	25.50	0.194	**0.24**	0.142	**0.18**	0.19
Cheek	R	LTE Band25	26365	1882.5	1RB-Middle	\	24.56	25.50	0.399	**0.50**	0.205	**0.25**	-0.06
Tilt	R	LTE Band25	26365	1882.5	1RB-Middle	\	24.56	25.50	0.176	**0.22**	0.13	**0.16**	0.05
Cheek	L	LTE Band25	26365	1882.5	50RB-Mid	\	23.45	24.50	0.365	**0.46**	0.192	**0.24**	-0.17
Tilt	L	LTE Band25	26365	1882.5	50RB-Mid	\	23.45	24.50	0.144	**0.18**	0.105	**0.13**	0.06
Cheek	R	LTE Band25	26365	1882.5	50RB-Mid	\	23.45	24.50	0.349	**0.44**	0.19	**0.24**	-0.06
Tilt	R	LTE Band25	26365	1882.5	50RB-Mid	\	23.45	24.50	0.145	**0.18**	0.106	**0.13**	-0.17
Body	F	LTE Band25	26365	1882.5	1RB-Middle Front 15mm	\	24.56	25.50	0.37	**0.46**	0.223	**0.28**	-0.01
Body	F	LTE Band25	26590	1905	1RB-Middle Rear 15mm	\	24.55	25.50	0.627	**0.78**	0.377	**0.47**	-0.08
Body	F	LTE Band25	26365	1882.5	1RB-Middle Rear 15mm	\	24.56	25.50	0.767	**0.95**	0.469	**0.58**	-0.05
Body	F	LTE Band25	26140	1860	1RB-Middle Rear 15mm	F.2	24.51	25.50	0.888	**1.12**	0.542	**0.68**	-0.04
Body	F	LTE Band25	26590	1905	1RB-Middle Rear 15mm OPEN	\	24.55	25.50	0.841	**1.05**	0.469	**0.58**	0.11
Body	F	LTE Band25	26365	1882.5	1RB-Middle Rear 15mm OPEN	\	24.56	25.50	0.882	**1.10**	0.492	**0.61**	-0.15
Body	F	LTE Band25	26140	1860	1RB-Middle Rear 15mm OPEN	\	24.51	25.50	0.878	**1.10**	0.487	**0.61**	-0.01
Body	F	LTE Band25	26365	1882.5	50RB-Mid Front 15mm	\	23.45	24.50	0.278	**0.35**	0.168	**0.21**	0.19
Body	F	LTE Band25	26365	1882.5	50RB-Mid Rear 15mm	\	23.45	24.50	0.556	**0.71**	0.339	**0.43**	-0.07
Body	F	LTE Band25	26365	1882.5	50RB-Mid Rear 15mm OPEN	\	23.45	24.50	0.613	**0.78**	0.343	**0.44**	0.10
Body	F	LTE Band25	26365	1882.5	100RB Rear 15mm	\	23.35	24.50	0.702	**0.91**	0.429	**0.56**	0.01
Body	F	LTE Band25	26365	1882.5	100RB Rear 15mm OPEN	\	23.35	24.50	0.665	**0.87**	0.369	**0.48**	0.08
Hotspot on													
Body	F	LTE Band25	26365	1882.5	1RB-Middle Front 10mm	\	20.53	21.50	0.153	**0.19**	0.092	**0.12**	-0.19
Body	F	LTE Band25	26365	1882.5	1RB-Middle Rear 10mm	\	20.53	21.50	0.452	**0.57**	0.269	**0.34**	-0.07
Body	F	LTE Band25	26365	1882.5	1RB-Middle Rear 10mm OPEN	F.3	20.53	21.50	0.481	**0.60**	0.28	**0.35**	0.06
Body	F	LTE Band25	26365	1882.5	1RB-Middle Left Edge 10mm	\	20.53	21.50	0.14	**0.18**	0.087	**0.11**	0.03
Body	F	LTE Band25	26365	1882.5	1RB-Middle Right Edge 10mm	\	20.53	21.50	0.103	**0.13**	0.06	**0.08**	-0.06
Body	F	LTE Band25	26365	1882.5	1RB-Middle Bottom Edge 10mm	\	20.53	21.50	0.423	**0.53**	0.228	**0.29**	0.16
Body	F	LTE Band25	26365	1882.5	50RB-Low Front 10mm	\	20.48	21.50	0.166	**0.21**	0.104	**0.13**	-0.16
Body	F	LTE Band25	26365	1882.5	50RB-Low Rear 10mm	\	20.48	21.50	0.422	**0.53**	0.252	**0.32**	0.05
Body	F	LTE Band25	26365	1882.5	50RB-Low Rear 10mm OPEN	\	20.48	21.50	0.42	**0.53**	0.245	**0.31**	-0.17
Body	F	LTE Band25	26365	1882.5	50RB-Low Left Edge 10mm	\	20.48	21.50	0.219	**0.28**	0.127	**0.16**	0.01
Body	F	LTE Band25	26365	1882.5	50RB-Low Right Edge 10mm	\	20.48	21.50	0.109	**0.14**	0.06	**0.08**	0.06
Body	F	LTE Band25	26365	1882.5	50RB-Low Bottom Edge 10mm	\	20.48	21.50	0.419	**0.53**	0.227	**0.29**	0.15
Cheek	L	LTE Band26	26965	841.5	1RB-Middle	F.4	24.12	25.50	0.537	**0.74**	0.333	**0.46**	-0.10
Tilt	L	LTE Band26	26965	841.5	1RB-Middle	\	24.12	25.50	0.238	**0.33**	0.173	**0.24**	0.13
Cheek	R	LTE Band26	26965	841.5	1RB-Middle	\	24.12	25.50	0.427	**0.59**	0.253	**0.35**	0.09
Tilt	R	LTE Band26	26965	841.5	1RB-Middle	\	24.12	25.50	0.221	**0.30**	0.164	**0.23**	0.06
Cheek	L	LTE Band26	26965	841.5	36RB-Mid	\	23.06	24.50	0.413	**0.58**	0.249	**0.35**	0.03
Tilt	L	LTE Band26	26965	841.5	36RB-Mid	\	23.06	24.50	0.174	**0.24**	0.128	**0.18**	-0.12
Cheek	R	LTE Band26	26965	841.5	36RB-Mid	\	23.06	24.50	0.36	**0.50**	0.212	**0.30**	0.17
Tilt	R	LTE Band26	26965	841.5	36RB-Mid	\	23.06	24.50	0.166	**0.23**	0.124	**0.17**	0.19
Body	F	LTE Band26	26965	841.5	1RB-Middle Front 10mm	\	24.12	25.50	0.385	**0.53**	0.273	**0.38**	0.13
Body	F	LTE Band26	26965	841.5	1RB-Middle Rear 10mm	F.5	24.12	25.50	0.72	**0.99**	0.478	**0.66**	-0.04
Body	F	LTE Band26	26865	831.5	1RB-Middle Rear 10mm	\	24.09	25.50	0.658	**0.91**	0.446	**0.62**	-0.13
Body	F	LTE Band26	26775	822.5	1RB-Low Rear 10mm	\	23.81	25.50	0.63	**0.93**	0.436	**0.64**	0.06
Body	F	LTE Band26	26965	841.5	1RB-Middle Rear 10mm OPEN	\	24.12	25.50	0.481	**0.66**	0.298	**0.41**	-0.17
Body	F	LTE Band26	26965	841.5	1RB-Middle Left Edge 10mm	\	24.12	25.50	0.361	**0.50**	0.24	**0.33**	-0.11
Body	F	LTE Band26	26965	841.5	1RB-Middle Right Edge 10mm	\	24.12	25.50	0.318	**0.44**	0.214	**0.29**	0.09
Body	F	LTE Band26	26965	841.5	1RB-Middle Bottom Edge 10mm	\	24.12	25.50	0.252	**0.35**	0.137	**0.19**	0.01
Body	F	LTE Band26	26965	841.5	36RB-Mid Front 10mm	\	23.06	24.50	0.368	**0.51**	0.263	**0.37**	-0.09
Body	F	LTE Band26	26965	841.5	36RB-Mid Rear 10mm	\	23.06	24.50	0.69	**0.96**	0.458	**0.64**	-0.16
Body	F	LTE Band26	26865	831.5	36RB-Low Rear 10mm	\	23.05	24.50	0.57	**0.80**	0.394	**0.55**	-0.03
Body	F	LTE Band26	26775	822.5	36RB-Low Rear 10mm	\	22.96	24.50	0.61	**0.87**	0.411	**0.59**	-0.11
Body	F	LTE Band26	26965	841.5	36RB-Mid Rear 10mm OPEN	\	23.06	24.50	0.353	**0.49**	0.223	**0.31**	0.12
Body	F	LTE Band26	26965	841.5	36RB-Mid Left Edge 10mm	\	23.06	24.50	0.352	**0.49**	0.235	**0.33**	-0.10
Body	F	LTE Band26	26965	841.5	36RB-Mid Right Edge 10mm	\	23.06	24.50	0.309	**0.43**	0.208	**0.29**	0.12
Body	F	LTE Band26	26965	841.5	36RB-Mid Bottom Edge 10mm	\	23.06	24.50	0.234	**0.33**	0.126	**0.18**	-0.07
Body	F	LTE Band26	26865	831.5	75RB Rear 10mm	\	22.91	24.50	0.659	**0.95**	0.458	**0.66**	-0.18

I.3 Spot Check

I.3.1 Measurement results

Test Position	Phantom position L/R/F	Frequency Band	Channel Number	Frequency (MHz)	Test setup	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	F	LTE Band41	41055	2636.5	1RB-Middle Bottom Edge 10mm	21.49	22.5	0.739	**0.93**	0.34	**0.43**	0.09
Cheek	R	LTE Band7	21350	2560	1RB-Middle	24.03	24.5	0.394	**0.44**	0.174	**0.19**	0.01

I.3.2 Reported SAR Comparison

Table I.3.3-1: Highest Reported SAR (1g)

Technology Band	Head (Separation Distance 0mm)	Hotspot (Separation Distance 10mm)	Body-Worn (Separation Distance 15mm)	Equipment Class
GSM850	**0.56**	**0.59**	**0.47**	PCE
GSM1900	**0.33**	**1.09**	**0.46**	
WCDMA1900	**0.62**	**1.26**	**0.99**	
WCDMA1700	**0.65**	**0.94**	**1.16**	

WCDMA 850	**0.28**	**0.56**	**/**	
LTE Band2	**0.44**	**0.85**	**1.14**	
LTE Band5	**0.52**	**0.67**	**/**	
LTE Band7	**1.06**	**0.98**	**1.17**	
LTE Band12	**0.44**	**0.75**	**/**	
LTE Band13	**0.40**	**0.76**	**/**	
LTE Band25	**0.53**	**0.60**	**1.12**	
LTE Band26	**0.74**	**0.99**	**/**	
LTE Band41-PC3	**0.62**	**1.29**	**0.64**	
LTE Band41-PC2	**0.75**	**0.54**	**0.57**	
LTE Band66	**0.42**	**0.90**	**1.09**	
LTE Band71	**0.46**	**0.56**	**/**	
WLAN 2.4GHz	**0.48**	**0.56**	**0.18**	DTS

Spot Check

Technology Band	Head (Separation Distance 0mm)	Hotspot (Separation Distance 10mm)	Body-Worn (Separation Distance 15mm)	Equipment Class
GSM850	\	\	\	PCE
GSM1900	\	\	\	
WCDMA1900	\	\	\	
WCDMA1700	\	\	\	
WCDMA 850	\	\	\	
LTE Band2	\	\	\	
LTE Band5	\	\	\	
LTE Band7	**0.44**	\	\	
LTE Band12	\	\	\	
LTE Band13	\	\	\	
LTE Band25	\	\	\	
LTE Band26	\	\	\	
LTE Band41-PC3	\	**0.93**	\	
LTE Band41-PC2	\	\	\	
LTE Band66	\	\	\	
LTE Band71	\	\	\	
WLAN 2.4GHz	\	\	\	DTS

Note: The spot check results marked by blue are larger than the original result. So they replace the original result and others are shared.

I.4 List of Main Instruments

Table I.4-1: List of Main Instruments

No.	Name	Type	Serial Number	Calibration Date	Valid Period
01	Network analyzer	E5071C	MY46110673	January 4, 2022	One year
02	Power sensor	NRP110T	101139	January 13, 2022	One year
03	Power sensor	NRP110T	101159		
04	Signal Generator	E4438C	MY49071430	January 13, 2022	One Year
05	Amplifier	60S1G4	0331848	No Calibration Requested	
06	BTS	CMW500	159890	January 24, 2022	One year
08	DAE	SPEAG DAE4	1525	September 01, 2021	One year
09	E-field Probe	SPEAG EX3DV4	7517	January 19, 2022	One year
10	Dipole Validation Kit	SPEAG D835V2	4d092	July 5,2022	One year
11	Dipole Validation Kit	SPEAG D1900V2	5d142	July 6,2022	One year
12	Dipole Validation Kit	SPEAG D2600V2	1012	July 20,2022	One year

I.5 GRAPH RESULTS

LTE_B25_Head

Date: 8/27/2022

Electronics: DAE4 Sn1525

Medium: H700-6000M

Medium parameters used (interpolated): f = 1882.5 MHz; σ = 1.473 S/m; ε_r = 41.785; ρ = 1000 kg/m^3

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

Communication System: UID 0, LTE Band25 (0) Frequency: 1882.5 MHz Duty Cycle: 1:1

Probe: EX3DV4 - SN7517 ConvF(7.74, 7.74, 7.74); Calibrated: 1/19/2022

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

Maximum value of SAR (interpolated) = 0.678 W/kg

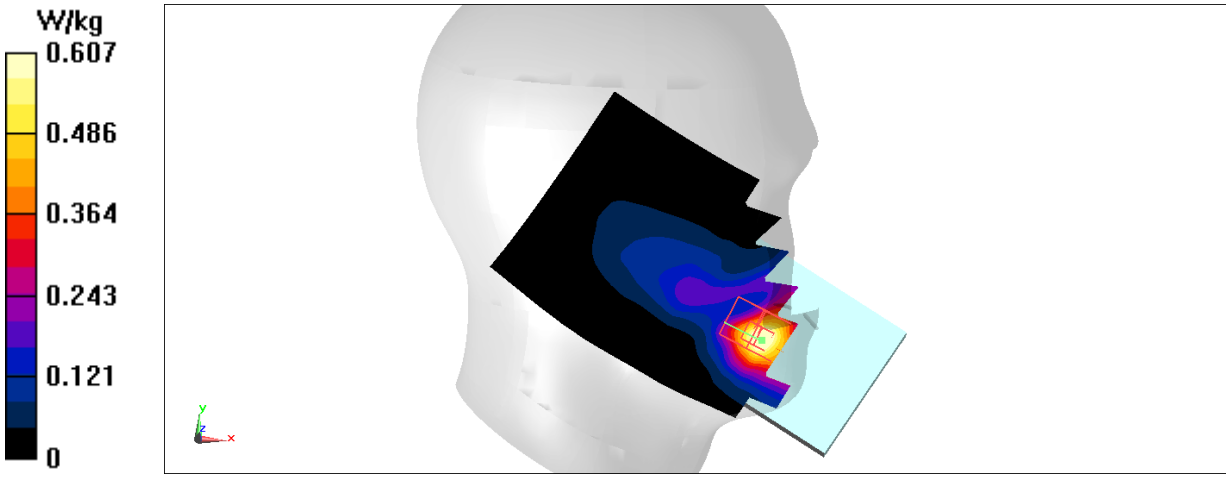
Zoom Scan (6x6x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 3.490 V/m; Power Drift = -0.09 dB

Peak SAR (extrapolated) = 0.707 W/kg

SAR(1 g) = 0.425 W/kg; SAR(10 g) = 0.260 W/kg

Maximum value of SAR (measured) = 0.607 W/kg



LTE_B25_Body

Date: 8/27/2022

Electronics: DAE4 Sn1525

Medium: H700-6000M

Medium parameters used: f = 1860 MHz; σ = 1.454 S/m; ε_r = 41.781; ρ = 1000 kg/m^3

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

Communication System: UID 0, LTE Band25 (0) Frequency: 1860 MHz Duty Cycle: 1:1

Probe: EX3DV4 - SN7517 ConvF(7.74, 7.74, 7.74); Calibrated: 1/19/2022

Area Scan (81x161x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

Maximum value of SAR (interpolated) = 1.32 W/kg

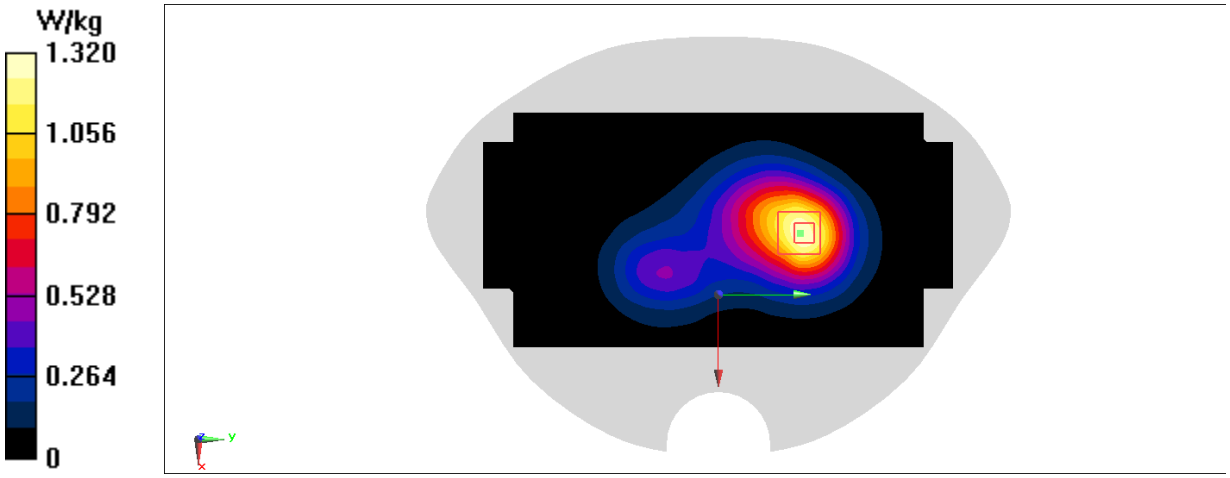
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 14.65 V/m; Power Drift = -0.04 dB

Peak SAR (extrapolated) = 1.48 W/kg

SAR(1 g) = 0.888 W/kg; SAR(10 g) = 0.542 W/kg

Maximum value of SAR (measured) = 1.25 W/kg



LTE_B25_Body-Hotspot

Date: 8/27/2022

Electronics: DAE4 Sn1525

Medium: H700-6000M

Medium parameters used (interpolated): f = 1882.5 MHz; σ = 1.473 S/m; ε_r = 41.785; ρ = 1000 kg/m^3

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

Communication System: UID 0, LTE Band25 (0) Frequency: 1882.5 MHz Duty Cycle: 1:1

Probe: EX3DV4 - SN7517 ConvF(7.74, 7.74, 7.74); Calibrated: 1/19/2022

Area Scan (81x161x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

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

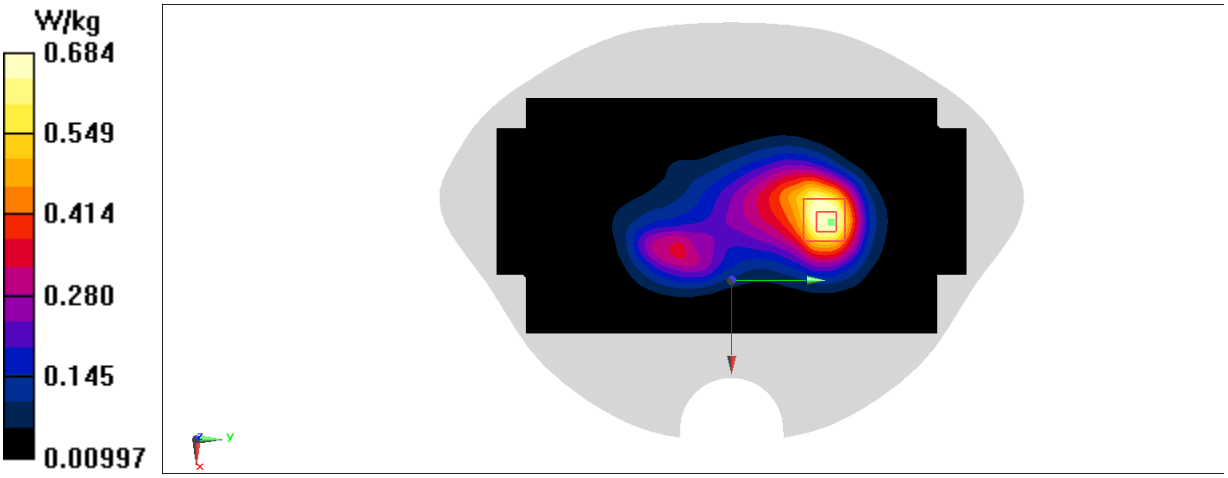
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 10.59 V/m; Power Drift = 0.06 dB

Peak SAR (extrapolated) = 0.833 W/kg

SAR(1 g) = 0.481 W/kg; SAR(10 g) = 0.280 W/kg

Maximum value of SAR (measured) = 0.684 W/kg



LTE_B26_Head

Date: 8/26/2022

Electronics: DAE4 Sn1525

Medium: H700-6000M

Medium parameters used (interpolated): f = 841.5 MHz; σ = 0.942 S/m; ε_r = 43.928; ρ = 1000 kg/m^3

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

Communication System: UID 0, LTE Band26 (0) Frequency: 841.5 MHz Duty Cycle: 1:1

Probe: EX3DV4 - SN7517 ConvF(9.7, 9.7, 9.7); Calibrated: 1/19/2022

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

Maximum value of SAR (interpolated) = 0.875 W/kg

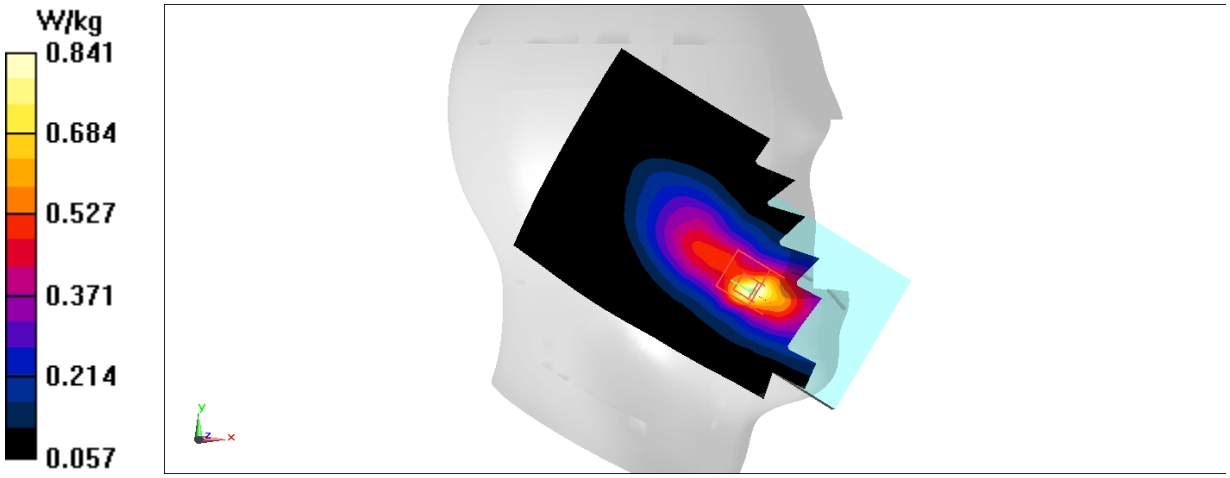
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 5.058 V/m; Power Drift = -0.10 dB

Peak SAR (extrapolated) = 1.03 W/kg

SAR(1 g) = 0.537 W/kg; SAR(10 g) = 0.333 W/kg

Maximum value of SAR (measured) = 0.841 W/kg



LTEB26_Body

Date: 8/26/2022

Electronics: DAE4 Sn1525

Medium: H700-6000M

Medium parameters used (interpolated): f = 841.5 MHz; σ = 0.942 S/m; ε_r = 43.928; ρ = 1000 kg/m^3

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

Communication System: UID 0, LTE Band26 (0) Frequency: 841.5 MHz Duty Cycle: 1:1

Probe: EX3DV4 - SN7517 ConvF(9.7, 9.7, 9.7); Calibrated: 1/19/2022

Area Scan (81x161x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

Maximum value of SAR (interpolated) = 1.07 W/kg

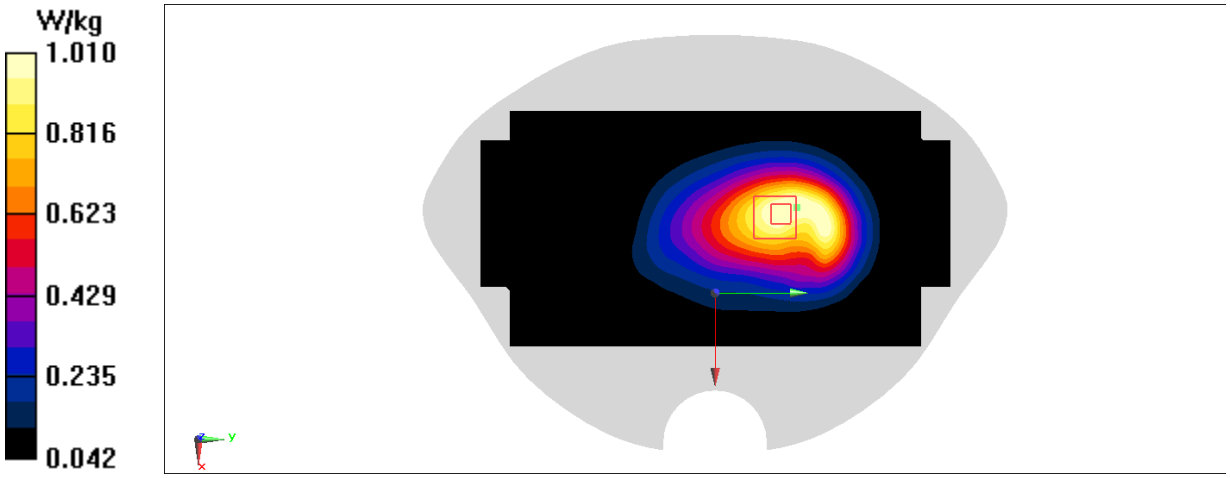
Zoom Scan (6x6x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 21.61 V/m; Power Drift = -0.04 dB

Peak SAR (extrapolated) = 1.24 W/kg

SAR(1 g) = 0.720 W/kg; SAR(10 g) = 0.478 W/kg

Maximum value of SAR (measured) = 1.01 W/kg



LTEB7-Head

Date: 8/28/2022

Electronics: DAE4 Sn1525

Medium: H700-6000M

Medium parameters used: f = 2560 MHz; σ = 1.932 S/m; ε_r = 40.759; ρ = 1000 kg/m^3

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

Communication System: UID 0, LTE Band7-20M (0) Frequency: 2560 MHz Duty Cycle: 1:1

Probe: EX3DV4 - SN7517 ConvF(6.97, 6.97, 6.97); Calibrated: 1/19/2022

Area Scan (101x191x1): Interpolated grid: dx=1.200 mm, dy=1.200 mm

Maximum value of SAR (interpolated) = 0.510 W/kg

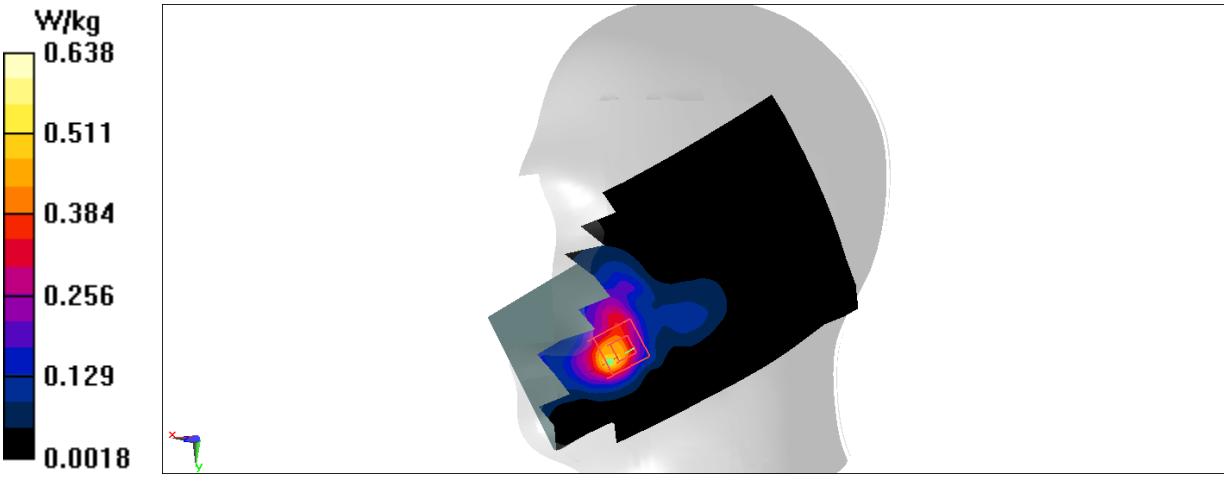
Zoom Scan (8x8x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 1.947 V/m; Power Drift = 0.01 dB

Peak SAR (extrapolated) = 0.825 W/kg

SAR(1 g) = 0.394 W/kg; SAR(10 g) = 0.174 W/kg

Maximum value of SAR (measured) = 0.638 W/kg



LTEB41_Body-hotspot

Date: 8/28/2022

Electronics: DAE4 Sn1525

Medium: H700-6000M

Medium parameters used (interpolated): f = 2636.5 MHz; σ = 1.99 S/m; ε_r = 40.564; ρ = 1000 kg/m^3

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

Communication System: UID 0, LTE Band41 PC3 (0) Frequency: 2636.5 MHz Duty Cycle: 1:1.5787

Probe: EX3DV4 - SN7517 ConvF(6.97, 6.97, 6.97); Calibrated: 1/19/2022

Area Scan (51x91x1): Interpolated grid: dx=1.200 mm, dy=1.200 mm

Maximum value of SAR (interpolated) = 1.31 W/kg

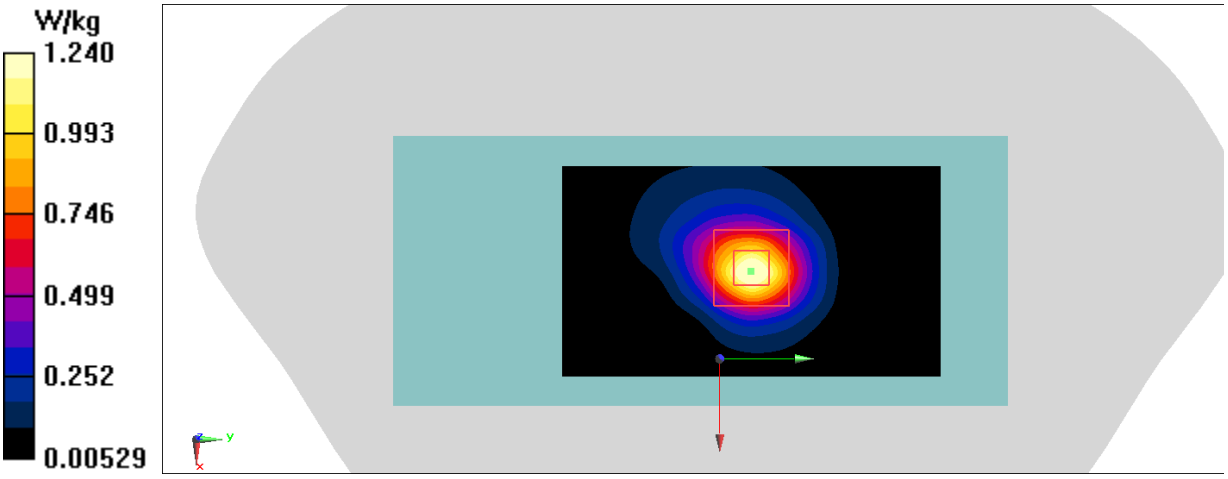
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 17.39 V/m; Power Drift = 0.09 dB

Peak SAR (extrapolated) = 1.55 W/kg

SAR(1 g) = 0.739 W/kg; SAR(10 g) = 0.340 W/kg

Maximum value of SAR (measured) = 1.24 W/kg



I.6 System Validation

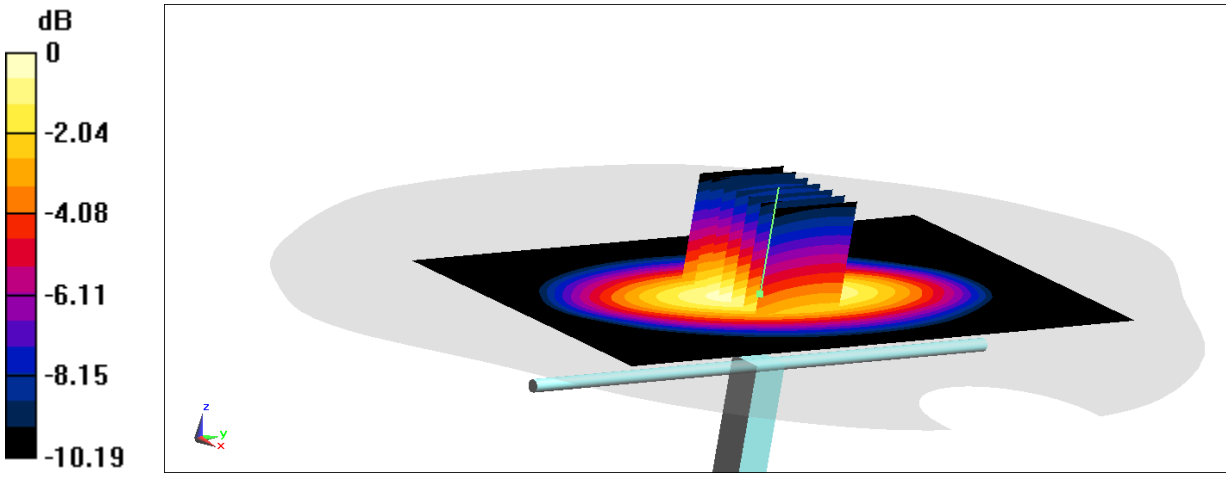
835MHz

Date/Time: 8/26/2022
Electronics: DAE4 Sn1525
Medium: H700-6000M
Medium parameters used: f = 835 MHz; σ = 0.94 S/m; ε_r = 43.943; ρ = 1000 kg/m^3
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 - SN7517 ConvF(9.7, 9.7, 9.7); Calibrated: 1/19/2022

Area Scan (61x121x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 2.78 W/kg

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

Reference Value = 54.37 V/m; Power Drift = -0.17 dB
Peak SAR (extrapolated) = 3.37 W/kg
SAR(1 g) = 2.24 W/kg; SAR(10 g) = 1.48 W/kg
Maximum value of SAR (measured) = 2.84 W/kg



0 dB = 2.84 W/kg = 4.53 dBW/kg

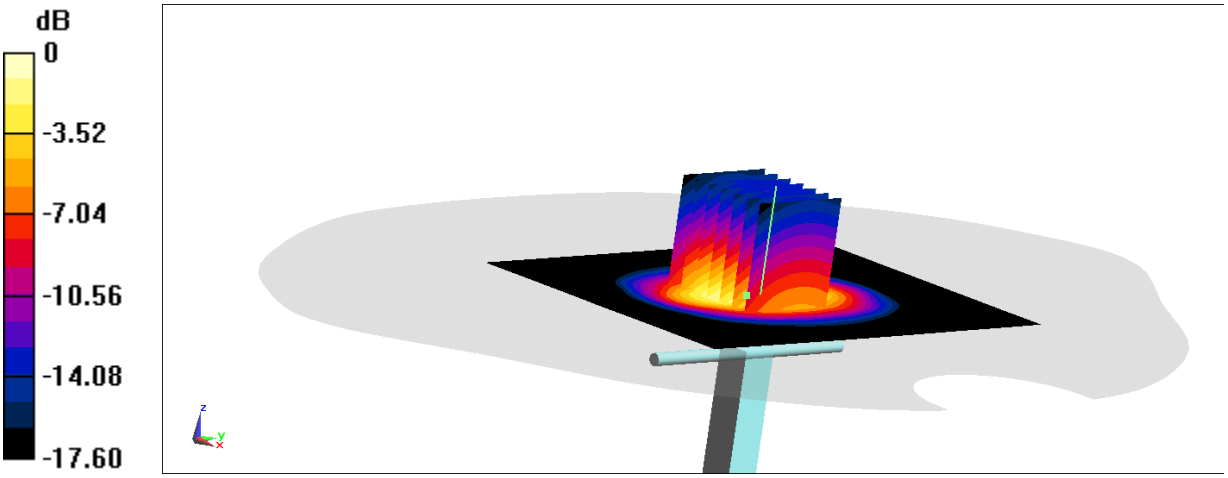
1900MHz

Date/Time: 8/27/2022
Electronics: DAE4 Sn1525
Medium: H700-6000M
Medium parameters used: f = 1900 MHz; σ = 1.481 S/m; ε_r = 41.784; ρ = 1000 kg/m^3
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 - SN7517 ConvF(7.74, 7.74, 7.74); Calibrated: 1/19/2022

Area Scan (61x81x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 13.4 W/kg

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

Reference Value = 95.60 V/m; Power Drift = -0.05 dB
Peak SAR (extrapolated) = 16.9 W/kg
SAR(1 g) = 9.25 W/kg; SAR(10 g) = 4.86 W/kg
Maximum value of SAR (measured) = 13.1 W/kg



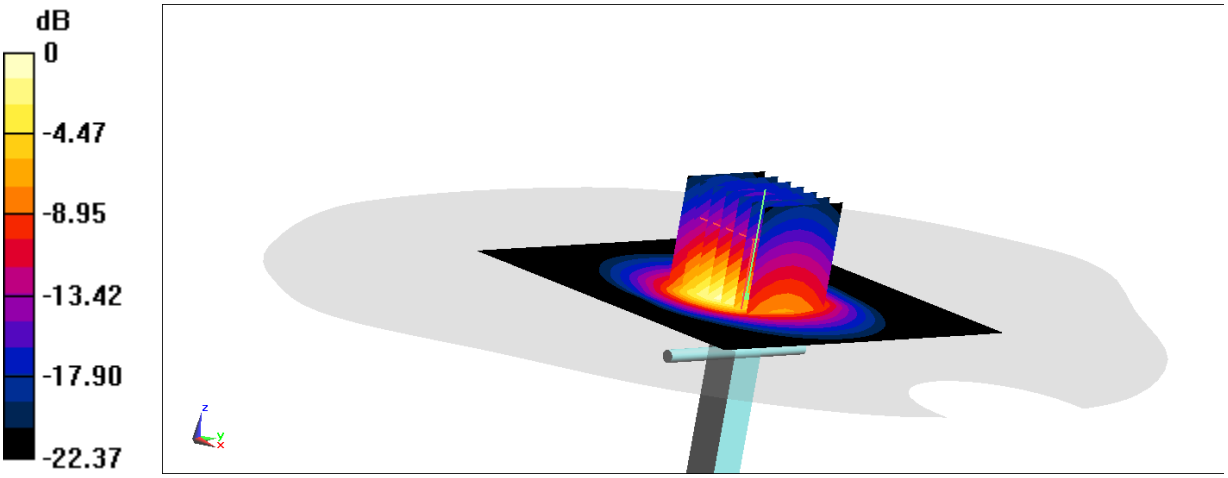
2600MHz

Date/Time: 8/28/2022
Electronics: DAE4 Sn1525
Medium: H700-6000M
Medium parameters used: f = 2600 MHz; σ = 1.958 S/m; ε_r = 40.62; ρ = 1000 kg/m^3
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 - SN7517 ConvF(6.97, 6.97, 6.97); Calibrated: 1/19/2022

Area Scan (81x91x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 21.7 W/kg

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

Reference Value = 101.8 V/m; Power Drift = -0.08 dB
Peak SAR (extrapolated) = 27.8 W/kg
SAR(1 g) = 13.4 W/kg; SAR(10 g) = 6.06 W/kg
Maximum value of SAR (measured) = 20.5 W/kg



I.7 Probe Calibration Certificate

Probe 7517 Calibration Certificate

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E-mail: cttl@chinattl.com Http://www.chinattl.cn

Client CTTL Certificate No: Z21-60558

CALIBRATION CERTIFICATE

Object EX3DV4 - SN : 7517

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

Calibration date: January 19, 2022

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 1555	20-Aug-21(SPEAG, No.DAE4-1555_Aug21/2)	Aug-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	14-Jan-22 (CTTL, No.J22X00406)	Jan -23

	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: January 21, 2022

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

Certificate No: Z21-60558 Page 1 of 10

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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:7517

Basic Calibration Parameters

	Sensor X	Sensor Y	Sensor Z	Unc (*k*=2)
Norm(μV/(V/m)²)[A]	0.49	0.51	0.55	±10.0%
DCP(mV)[B]	101.9	101.5	100.9	

Modulation Calibration Parameters

UID	Communication System Name		A dB	B dB√μV	C	D dB	VR mV	Unc[E] (*k*=2)
0	CW	X	0.0	0.0	1.0	0.00	168.0	±3.0%
		Y	0.0	0.0	1.0		172.3	
		Z	0.0	0.0	1.0		178.0	

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 4 and 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.

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DASY/EASY – Parameters of Probe: EX3DV4 – SN:7517

Calibration Parameter Determined in Head Tissue Simulating Media

f [MHz][C]	Relative Permittivity [F]	Conductivity (S/m) [F]	ConvF X	ConvF Y	ConvF Z	Alpha[G]	Depth[G] (mm)	Unct. (*k*=2)
750	41.9	0.89	9.70	9.70	9.70	0.15	1.32	±12.1%
900	41.5	0.97	9.30	9.30	9.30	0.21	1.19	±12.1%
1450	40.5	1.20	8.40	8.40	8.40	0.18	1.06	±12.1%
1640	40.3	1.29	8.20	8.20	8.20	0.30	0.90	±12.1%
1750	40.1	1.37	8.10	8.10	8.10	0.25	0.93	±12.1%
1900	40.0	1.40	7.74	7.74	7.74	0.30	0.90	±12.1%
2100	39.8	1.49	7.64	7.64	7.64	0.24	1.09	±12.1%
2300	39.5	1.67	7.44	7.44	7.44	0.64	0.68	±12.1%
2450	39.2	1.80	7.16	7.16	7.16	0.43	0.91	±12.1%
2600	39.0	1.96	6.97	6.97	6.97	0.57	0.77	±12.1%
3300	38.2	2.71	6.85	6.85	6.85	0.45	0.92	±13.3%
3500	37.9	2.91	6.60	6.60	6.60	0.40	1.03	±13.3%
3700	37.7	3.12	6.34	6.34	6.34	0.41	1.03	±13.3%
3900	37.5	3.32	6.25	6.25	6.25	0.35	1.35	±13.3%
4100	37.2	3.53	6.34	6.34	6.34	0.40	1.15	±13.3%
4200	37.1	3.63	6.26	6.26	6.26	0.35	1.35	±13.3%
4400	36.9	3.84	6.15	6.15	6.15	0.35	1.35	±13.3%
4600	36.7	4.04	6.05	6.05	6.05	0.50	1.13	±13.3%
4800	36.4	4.25	6.01	6.01	6.01	0.50	1.13	±13.3%
4950	36.3	4.40	5.74	5.74	5.74	0.45	1.25	±13.3%
5250	35.9	4.71	5.30	5.30	5.30	0.50	1.25	±13.3%
5600	35.5	5.07	4.70	4.70	4.70	0.55	1.20	±13.3%
5750	35.4	5.22	4.75	4.75	4.75	0.55	1.20	±13.3%

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

[F] At frequency below 3 GHz, the validity of tissue parameters (ε and σ) can be relaxed to ±10% if liquid compensation formula is applied to measured SAR values. At frequencies above 3 GHz, the validity of tissue parameters (ε and σ) is restricted to ±5%. The uncertainty is the RSS of the ConvF uncertainty for indicated target tissue parameters.

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

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DASY/EASY – Parameters of Probe: EX3DV4 – SN:7517

Calibration Parameter Determined in Body Tissue Simulating Media

f [MHz][C]	Relative Permittivity [F]	Conductivity (S/m) [F]	ConvF X	ConvF Y	ConvF Z	Alpha[G]	Depth[G] (mm)	Unct. (*k*=2)
750	55.5	0.96	9.65	9.65	9.65	0.40	0.85	±12.1%
900	55.0	1.05	9.20	9.20	9.20	0.24	1.18	±12.1%
1450	54.0	1.30	8.20	8.20	8.20	0.14	1.34	±12.1%
1640	53.8	1.40	8.05	8.05	8.05	0.25	1.08	±12.1%
1750	53.4	1.49	7.85	7.85	7.85	0.32	0.98	±12.1%
1900	53.3	1.52	7.58	7.58	7.58	0.24	1.13	±12.1%
2100	53.2	1.62	7.47	7.47	7.47	0.25	1.19	±12.1%
2300	52.9	1.81	7.35	7.35	7.35	0.44	0.93	±12.1%
2450	52.7	1.95	7.21	7.21	7.21	0.50	0.84	±12.1%
2600	52.5	2.16	7.02	7.02	7.02	0.68	0.70	±12.1%
3300	51.6	3.08	6.25	6.25	6.25	0.43	1.11	±13.3%
3500	51.3	3.31	6.06	6.06	6.06	0.40	1.25	±13.3%
3700	51.0	3.55	5.99	5.99	5.99	0.40	1.25	±13.3%
3900	51.2	3.78	5.95	5.95	5.95	0.40	1.30	±13.3%
4100	50.5	4.01	5.90	5.90	5.90	0.40	1.30	±13.3%
4200	50.4	4.13	5.80	5.80	5.80	0.45	1.30	±13.3%
4400	50.1	4.37	5.70	5.70	5.70	0.45	1.30	±13.3%
4600	49.8	4.60	5.58	5.58	5.58	0.50	1.25	±13.3%
4800	49.6	4.83	5.41	5.41	5.41	0.50	1.45	±13.3%
4950	49.4	5.01	5.12	5.12	5.12	0.50	1.55	±13.3%
5250	48.9	5.36	4.70	4.70	4.70	0.50	1.55	±13.3%
5600	48.5	5.77	4.10	4.10	4.10	0.55	1.50	±13.3%
5750	48.3	5.94	4.15	4.15	4.15	0.50	1.60	±13.3%

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

[F] At frequency below 3 GHz, the validity of tissue parameters (ε and σ) can be relaxed to ±10% if liquid compensation formula is applied to measured SAR values. At frequencies above 3 GHz, the validity of tissue parameters (ε and σ) is restricted to ±5%. The uncertainty is the RSS of the ConvF uncertainty for indicated target tissue parameters.

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

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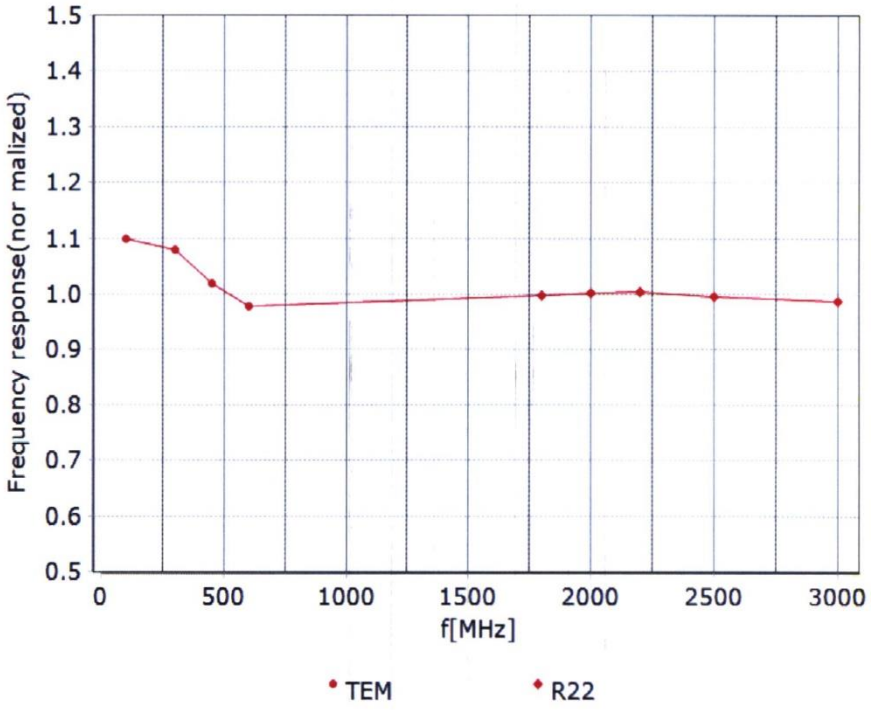
Frequency Response of E-Field
(TEM-Cell: ifi110 EXX, Waveguide: R22)



Uncertainty of Frequency Response of E-field: ±7.4% (*k*=2)

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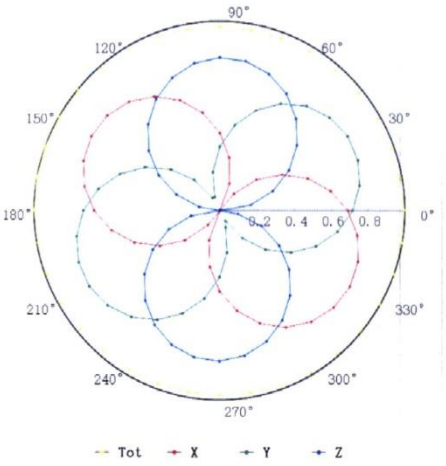
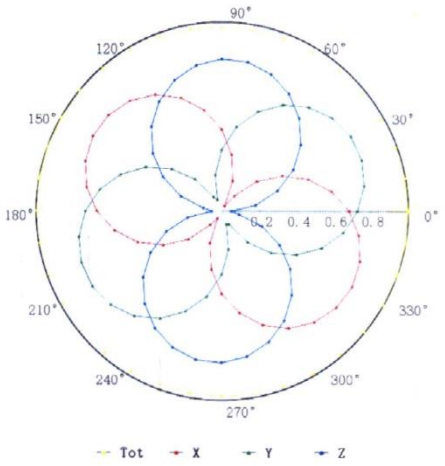
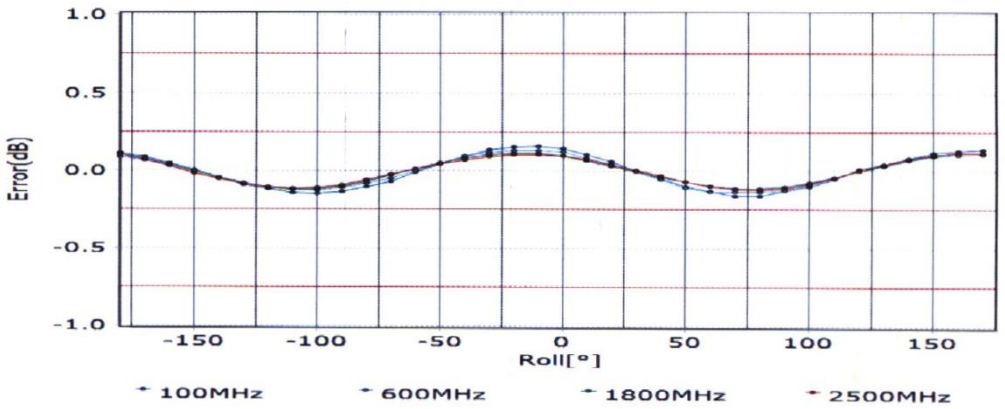
Receiving Pattern (Φ), θ=0°

f=600 MHz, TEM



f=1800 MHz, R22





Uncertainty of Axial Isotropy Assessment: ±1.2% (*k*=2)

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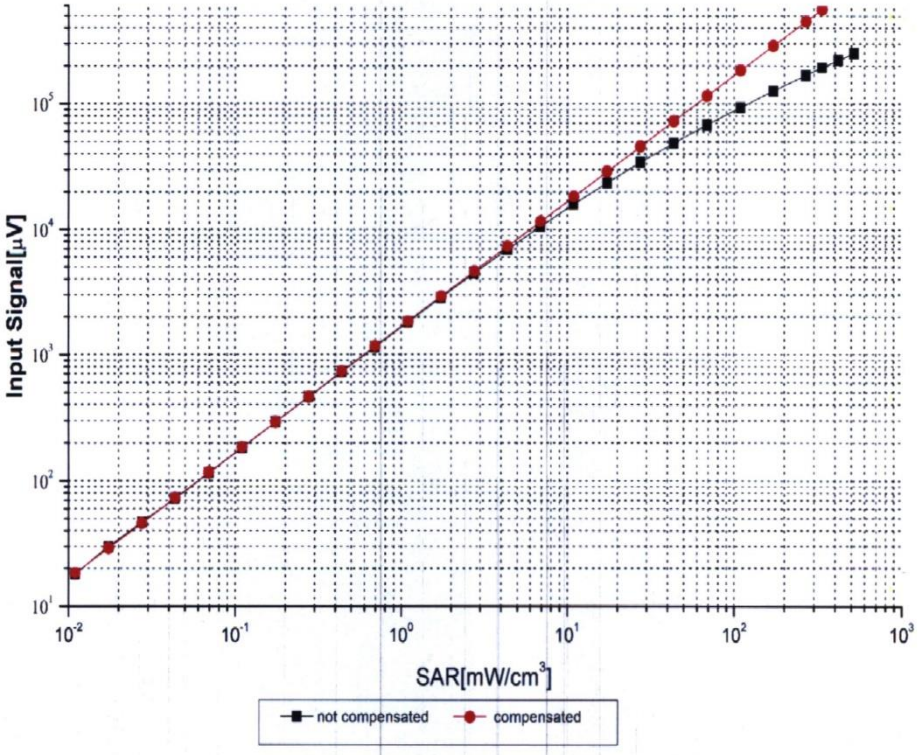
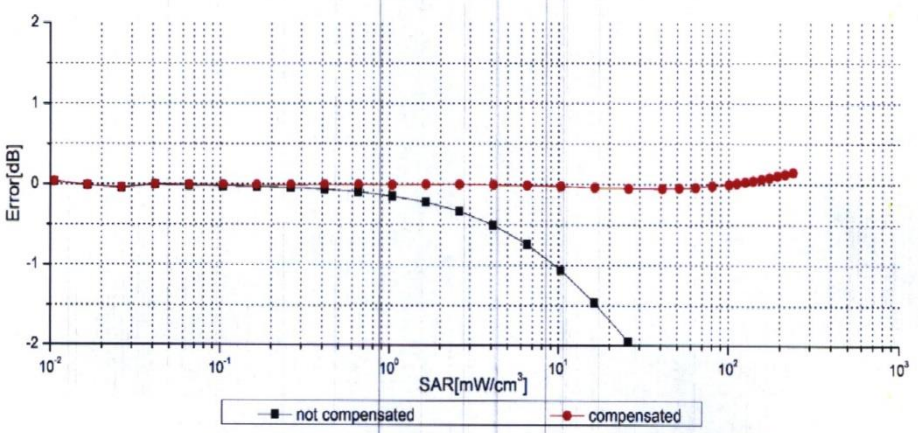
Dynamic Range f(SAR_{head})
(TEM cell, f = 900 MHz)





Uncertainty of Linearity Assessment: ±0.9% (*k*=2)

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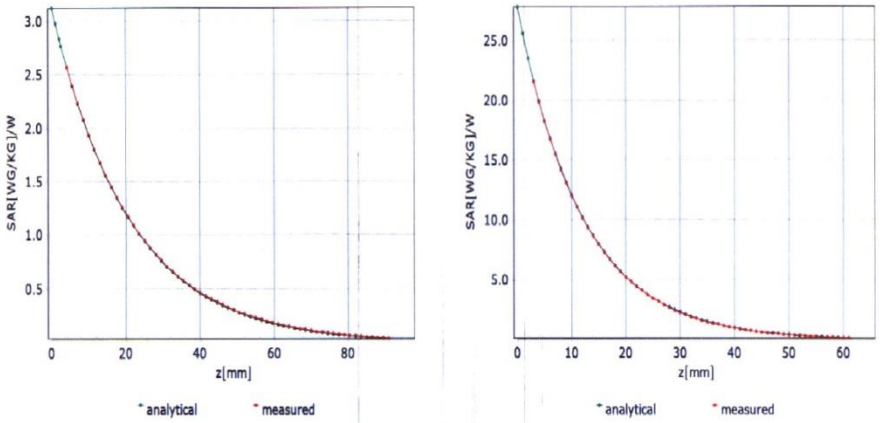
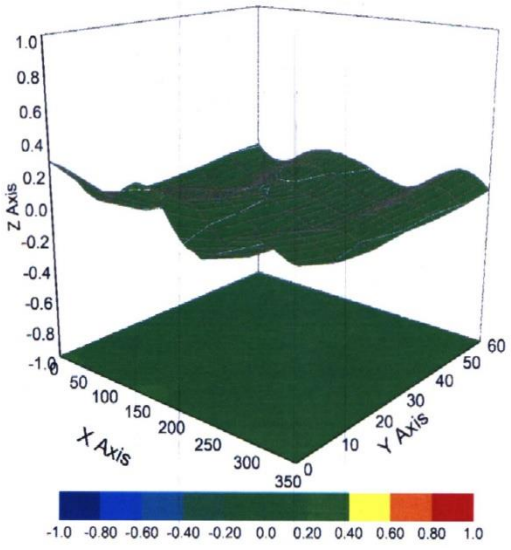
Conversion Factor Assessment

f=750 MHz,WGLS R9(H_convF) **f=1750 MHz,WGLS R22(H_convF)**



Deviation from Isotropy in Liquid



Uncertainty of Spherical Isotropy Assessment: ±3.2% (*k*=2)

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DASY/EASY – Parameters of Probe: EX3DV4 – SN:7517

Other Probe Parameters

Sensor Arrangement	Triangular
Connector Angle (°)	15.7
Mechanical Surface Detection Mode	enabled
Optical Surface Detection Mode	disable
Probe Overall Length	337mm
Probe Body Diameter	10mm
Tip Length	9mm
Tip Diameter	2.5mm
Probe Tip to Sensor X Calibration Point	1mm
Probe Tip to Sensor Y Calibration Point	1mm
Probe Tip to Sensor Z Calibration Point	1mm
Recommended Measurement Distance from Surface	1.4mm

I.8 DIPOLE CALIBRATION CERTIFICATE

835 MHz Dipole Calibration Certificate

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CNAS 中国认可 国际互认 校准 CALIBRATION CNAS L0570

CAICT

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Client **AUDEN** **Certificate No: Z22-60266**

CALIBRATION CERTIFICATE

Object	D835V2 - SN: 4d092
Calibration Procedure(s)	FF-Z11-003-01 Calibration Procedures for dipole validation kits
Calibration date:	July 5, 2022

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	106277	24-Sep-21 (CTTL, No.J21X08326)	Sep-22
Power sensor NRP8S	104291	24-Sep-21 (CTTL, No.J21X08326)	Sep-22
Reference Probe EX3DV4	SN 7464	26-Jan-22(SPEAG,No.EX3-7464_Jan22)	Jan-23
DAE4	SN 1556	12-Jan-22(CTTL-SPEAG,No.Z22-60007)	Jan-23
Secondary Standards	**ID #**	**Cal Date (Calibrated by, Certificate No.)**	**Scheduled Calibration**
Signal Generator E4438C	MY49071430	13-Jan-22 (CTTL, No.J22X00409)	Jan-23
Network Analyzer E5071C	MY46110673	14-Jan-22 (CTTL, No.J22X00406)	Jan-23

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

Issued: July 9, 2022

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

Certificate No: Z22-60266 Page 1 of 6