Appendix 1

SAR distribution comparisons for System Accuracy Verifications

System Accuracy Verification Measurements for Head SAR Measurements

Date/Time: 7/26/2012 5:27:54 PM

Test Laboratory: Motorola - 835MHz Head

DUT: Dipole 835MHz; Serial: D835V2 - SN:421tr; FCC ID:IHDT56NS6

Procedure Notes: 835 MHz System Performance Check; Dipole Sn# 421tr; PM1 Power =200 mW
Sim.Temp@SPC = 19.7 Room Temp @ SPC = 20.8
Communication System: _CW - Dipole; Frequency: 835 MHz;
Communication System Channel Number: 3; Duty Cycle: 1:1
Medium: Validation *HEAD Tissue* ;
Medium parameters used: f = 835 MHz; σ = 0.92 mho/m; ε_r = 40.5; ρ = 1000 kg/m^3

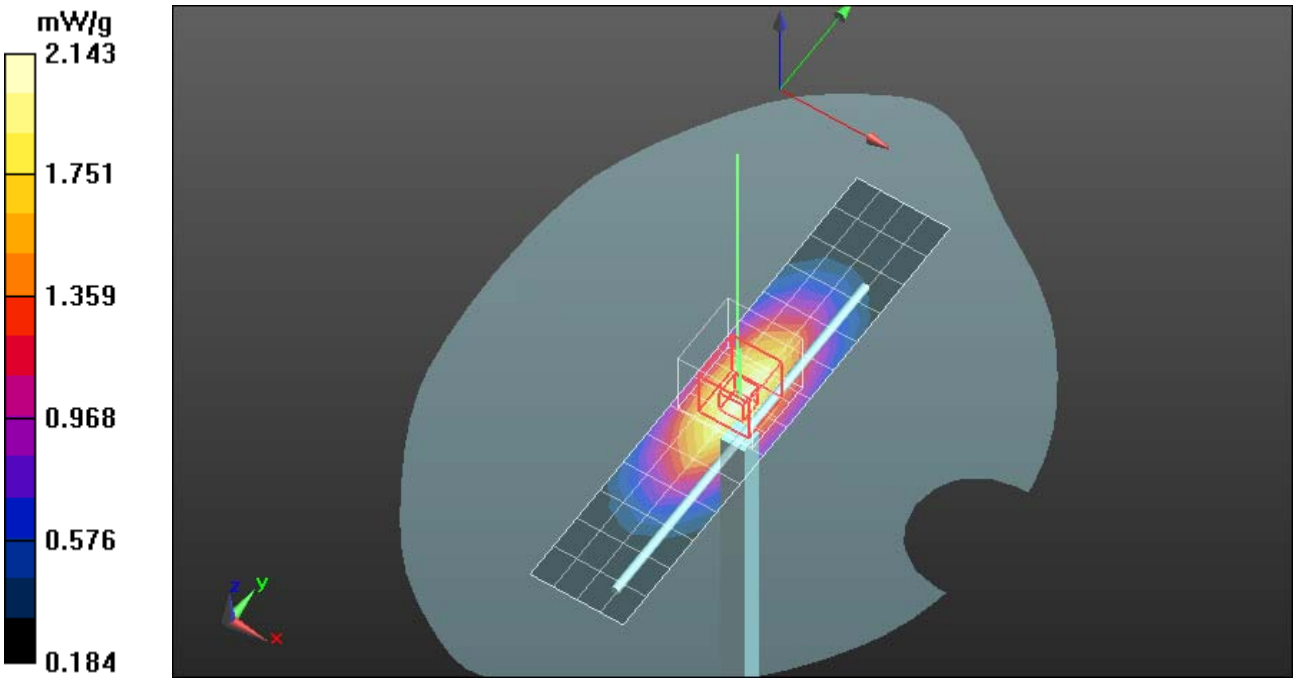
DASY4 Configuration:

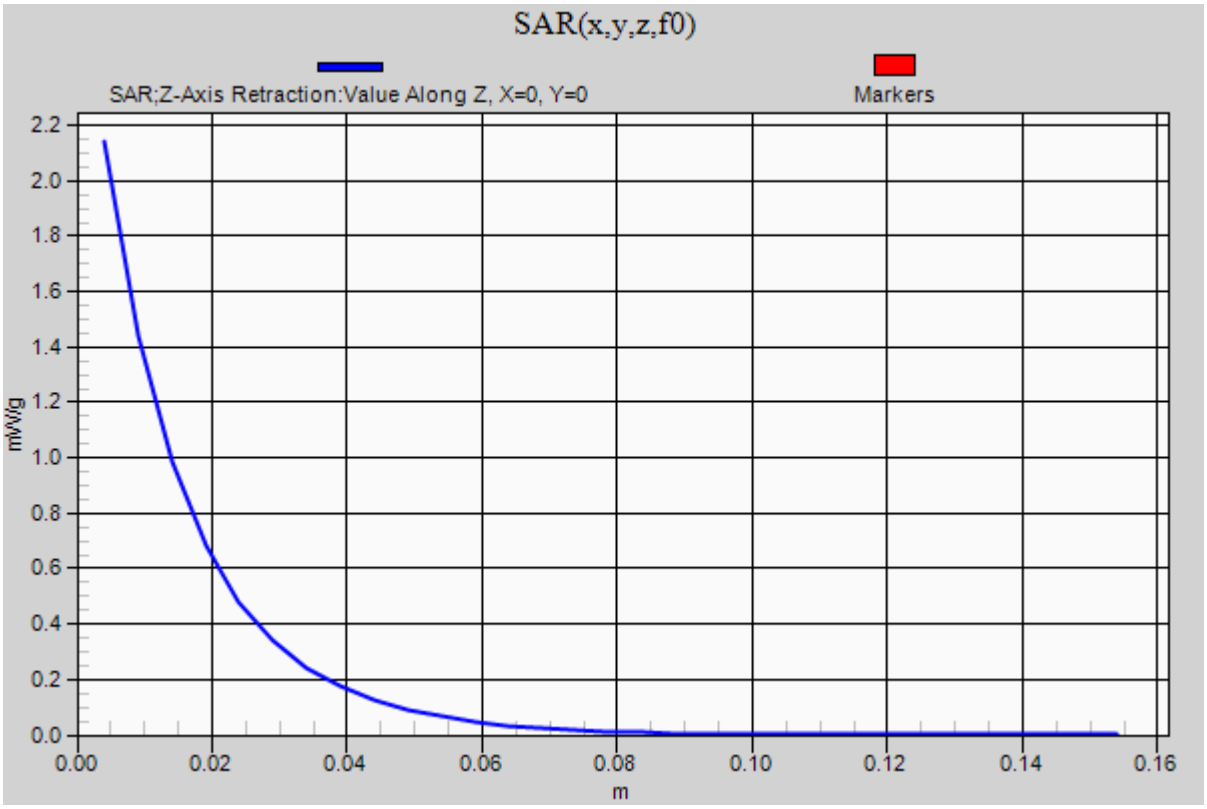
- Probe: ES3DV3 - SN3180; ConvF(6.07, 6.07, 6.07); Calibrated: 1/11/2012
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1313; Calibrated: 1/20/2012
- Phantom: R12_ Sugar SAM (extended range), Rev.2 (24-Feb-12); Type: SAM v4.0; Serial: TP-1154;
- ; SEMCAD X Version 14.6.4 (4989)

DASY5, SAM - System Performance Check Template, Rev.2 (12-Sept-11)/Daily SPC Check/Z-Axis Retraction (1x1x31): Measurement grid: dx=20mm, dy=20mm, dz=5mm
Maximum value of SAR (measured) = 2.141 mW/g

DASY5, SAM - System Performance Check Template, Rev.2 (12-Sept-11)/Daily SPC Check/Dipole Area Scan (5x15x1): Measurement grid: dx=10mm, dy=15mm
Maximum value of SAR (measured) = 2.136 mW/g

DASY5, SAM - System Performance Check Template, Rev.2 (12-Sept-11)/Daily SPC Check/0-Degree, 5x5x7 Cube (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 49.072 V/m; Power Drift = -0.01 dB
Peak SAR (extrapolated) = 2.9180
SAR(1 g) = 1.98 mW/g; SAR(10 g) = 1.3 mW/g
Maximum value of SAR (measured) = 2.143 mW/g


mW/g
2.143
1.751
1.359
0.968
0.576
0.184


SAR(x,y,z,f0)
SAR;Z-Axis Retraction:Value Along Z, X=0, Y=0
Markers
mW/g
2.2
2.0
1.8
1.6
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
0.00
0.02
0.04
0.06
0.08
0.10
0.12
0.14
0.16
m

Date/Time: 7/30/2012 12:02:11 PM

Test Laboratory: Motorola - 835MHz Head

DUT: Dipole 835MHz; Serial: D835V2 - SN:421tr; FCC ID:IHDT56NS6

Procedure Notes: 835 MHz System Performance Check; Dipole Sn# 421tr; PM1 Power =200 mW
Sim.Temp@meas =19.4 Sim.Temp@SPC = 19.5 Room Temp @ SPC =20.6
Communication System: _CW - Dipole; Frequency: 835 MHz;
Communication System Channel Number: 3; Duty Cycle: 1:1
Medium: Validation *HEAD Tissue* ;
Medium parameters used: f = 835 MHz; σ = 0.9 mho/m; ε_r = 40.1; ρ = 1000 kg/m^3

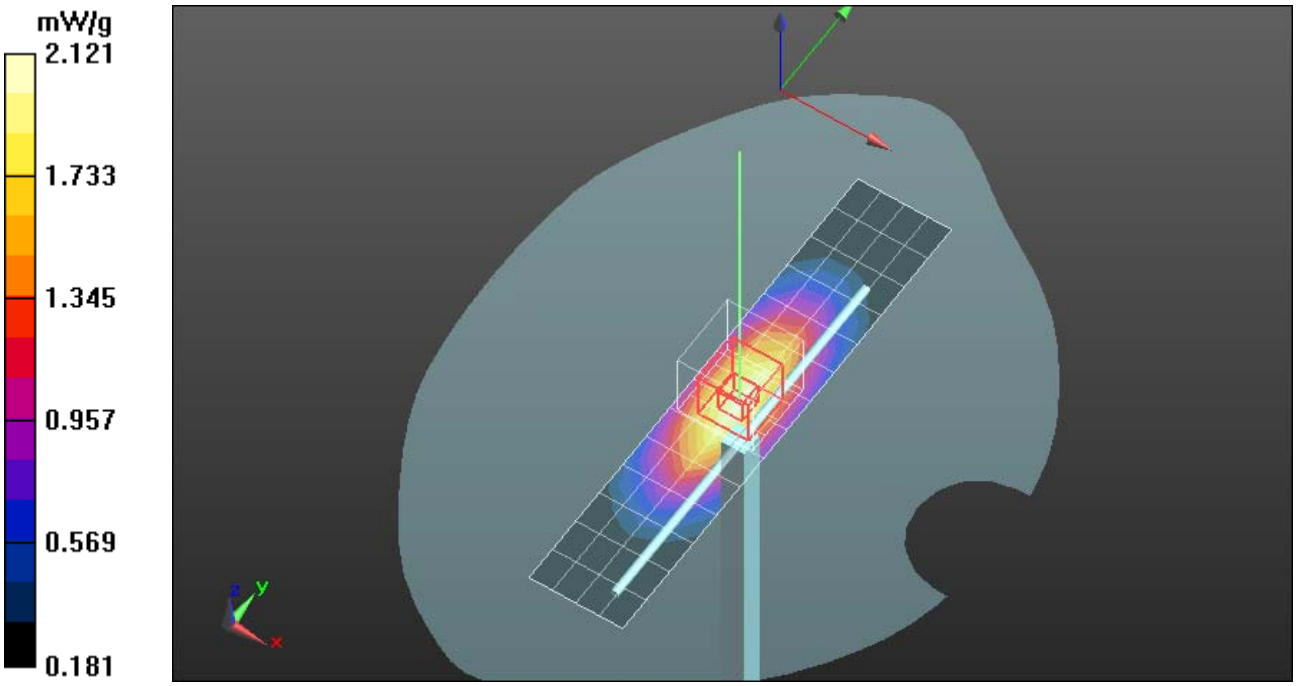
DASY4 Configuration:

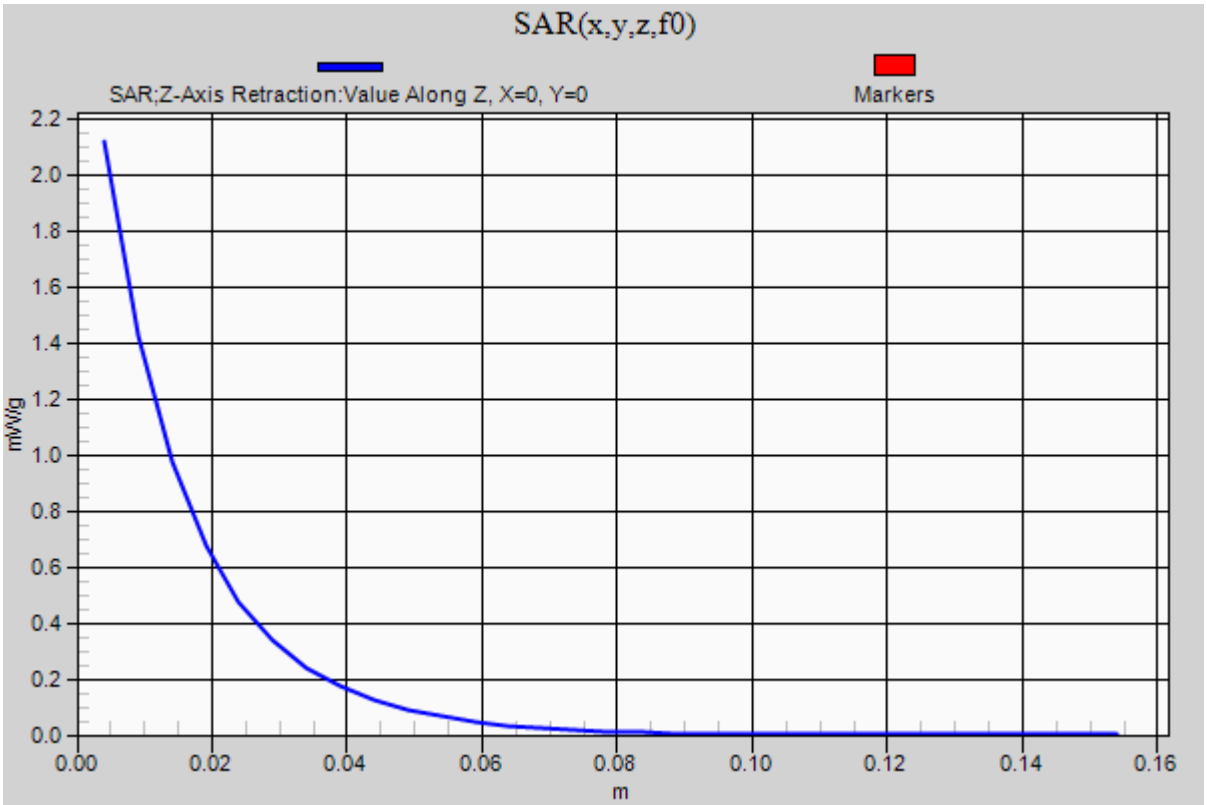
- Probe: ES3DV3 - SN3180; ConvF(6.07, 6.07, 6.07); Calibrated: 1/11/2012
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1313; Calibrated: 1/20/2012
- Phantom: R12_ Sugar SAM (extended range), Rev.2 (24-Feb-12); Type: SAM v4.0; Serial: TP-1154;
- ; SEMCAD X Version 14.6.4 (4989)

DASY5, SAM - System Performance Check Template, Rev.2 (12-Sept-11)/Daily SPC Check/Z-Axis Retraction (1x1x31): Measurement grid: dx=20mm, dy=20mm, dz=5mm
Maximum value of SAR (measured) = 2.119 mW/g

DASY5, SAM - System Performance Check Template, Rev.2 (12-Sept-11)/Daily SPC Check/Dipole Area Scan (5x15x1): Measurement grid: dx=10mm, dy=15mm
Maximum value of SAR (measured) = 2.110 mW/g

DASY5, SAM - System Performance Check Template, Rev.2 (12-Sept-11)/Daily SPC Check/0-Degree, 5x5x7 Cube (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 49.481 V/m; Power Drift = -0.04 dB
Peak SAR (extrapolated) = 2.8860
SAR(1 g) = 1.96 mW/g; SAR(10 g) = 1.28 mW/g
Maximum value of SAR (measured) = 2.121 mW/g


mW/g
2.121
1.733
1.345
0.957
0.569
0.181


SAR(x,y,z,f0)
SAR;Z-Axis Retraction:Value Along Z, X=0, Y=0
Markers
mW/g
2.2
2.0
1.8
1.6
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
0.00
0.02
0.04
0.06
0.08
0.10
0.12
0.14
0.16
m

Date/Time: 7/25/2012 9:44:53 AM

Test Laboratory: Motorola - 1800MHz Head

DUT: Dipole 1800MHz; Serial: D1800V2 - SN:2d128; FCC ID:IHDT56NS6

Procedure Notes: 1800 MHz System Performance Check; Dipole Sn# 2d128 PM1 Power = 200 mW
Sim.Temp@meas =19.9 Sim.Temp@SPC = 20.1 Room Temp @ SPC =21.3
Communication System: _CW - Dipole; Frequency: 1800 MHz;
Communication System Channel Number: 8; Duty Cycle: 1:1
Medium: Validation *HEAD Tissue* ;
Medium parameters used: f = 1800 MHz; σ = 1.38 mho/m; ε_r = 38.9; ρ = 1000 kg/m^3

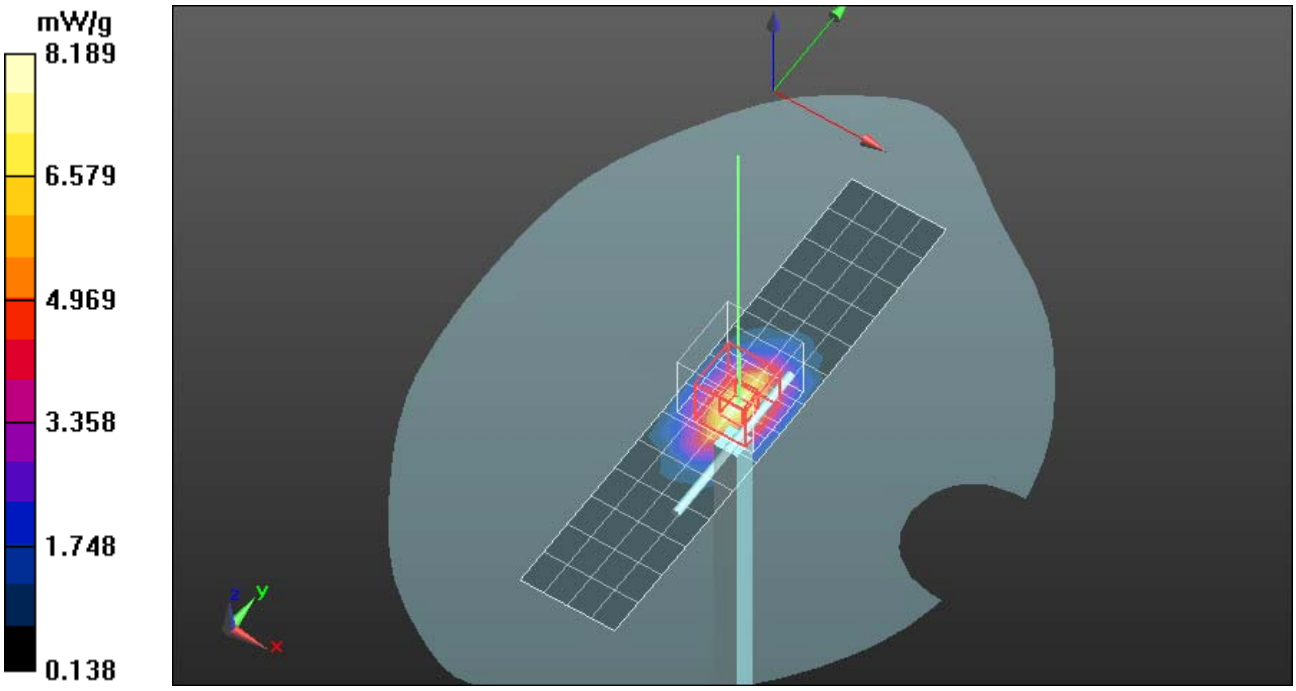
DASY4 Configuration:

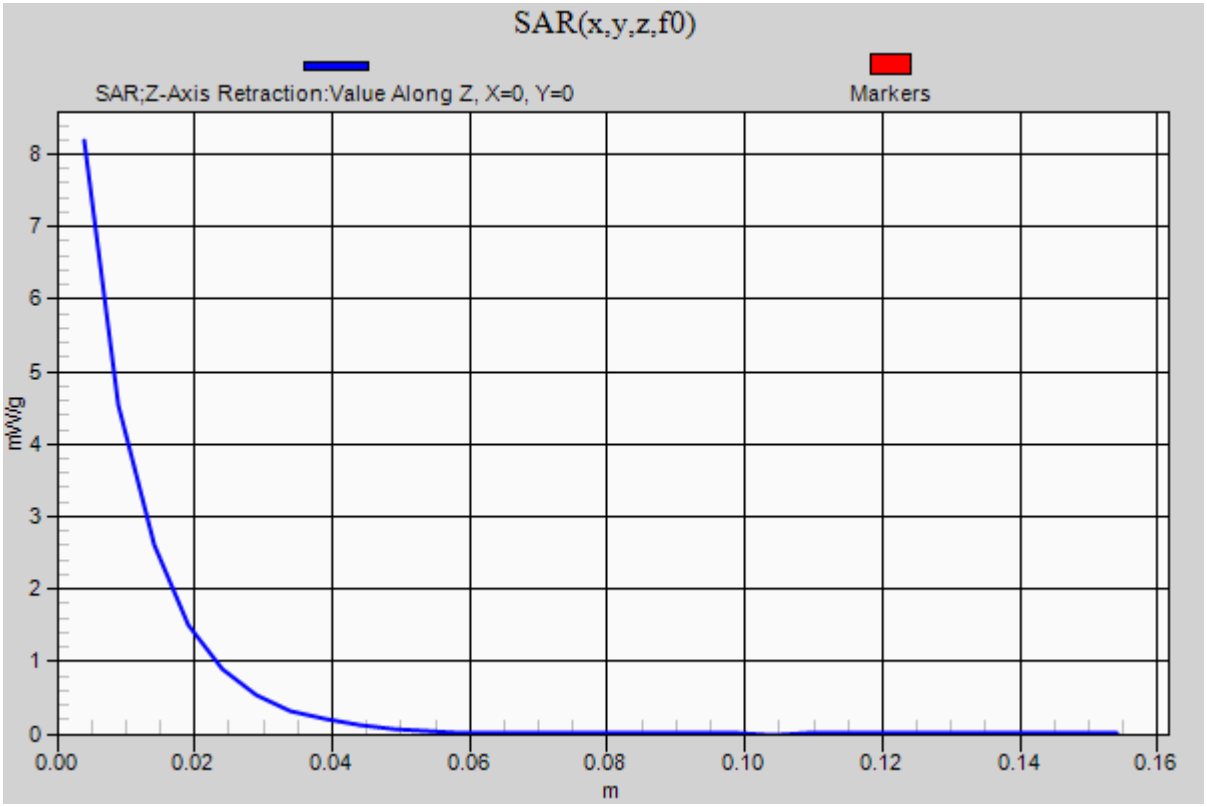
- Probe: ES3DV3 - SN3180; ConvF(5.2, 5.2, 5.2); Calibrated: 1/11/2012
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1313; Calibrated: 1/20/2012
- Phantom: R12_ Glycol SAM (extended range), Rev.2 (24-Feb-12); Type: SAM v4.0; Serial: TP-1684;
- ; SEMCAD X Version 14.6.4 (4989)

DASY5, SAM - System Performance Check Template, Rev.2 (12-Sept-11)/Daily SPC Check/Z-Axis Retraction (1x1x31): Measurement grid: dx=20mm, dy=20mm, dz=5mm
Maximum value of SAR (measured) = 8.184 mW/g

DASY5, SAM - System Performance Check Template, Rev.2 (12-Sept-11)/Daily SPC Check/Dipole Area Scan (5x15x1): Measurement grid: dx=10mm, dy=15mm
Maximum value of SAR (measured) = 8.086 mW/g

DASY5, SAM - System Performance Check Template, Rev.2 (12-Sept-11)/Daily SPC Check/0-Degree, 5x5x7 Cube (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 77.972 V/m; Power Drift = -0.02 dB
Peak SAR (extrapolated) = 13.3410
SAR(1 g) = 7.29 mW/g; SAR(10 g) = 3.81 mW/g
Maximum value of SAR (measured) = 8.189 mW/g


mW/g
8.189
6.579
4.969
3.358
1.748
0.138


SAR(x,y,z,f0)
SAR;Z-Axis Retraction:Value Along Z, X=0, Y=0
Markers
mW/g
m
0
1
2
3
4
5
6
7
8
0.00
0.02
0.04
0.06
0.08
0.10
0.12
0.14
0.16

Date/Time: 8/8/2012 4:39:29 PM

Test Laboratory: Motorola - 2450MHz Head

DUT: Dipole 2450MHz; Serial: D2450V2 - SN:879; FCC ID:IHDT56NS6

Procedure Notes: 2450 MHz System Performance Check; Dipole Sn# 879 PM1 Power = 200 mW
Sim.Temp@meas =19.6 Sim.Temp@SPC = 19.9 Room Temp @ SPC = 20.7
Communication System: _CW - Dipole; Frequency: 2450 MHz;
Communication System Channel Number: 11; Duty Cycle: 1:1
Medium: Validation *HEAD Tissue* ;
Medium parameters used: f = 2450 MHz; σ = 1.87 mho/m; ε_r = 37.7; ρ = 1000 kg/m^3

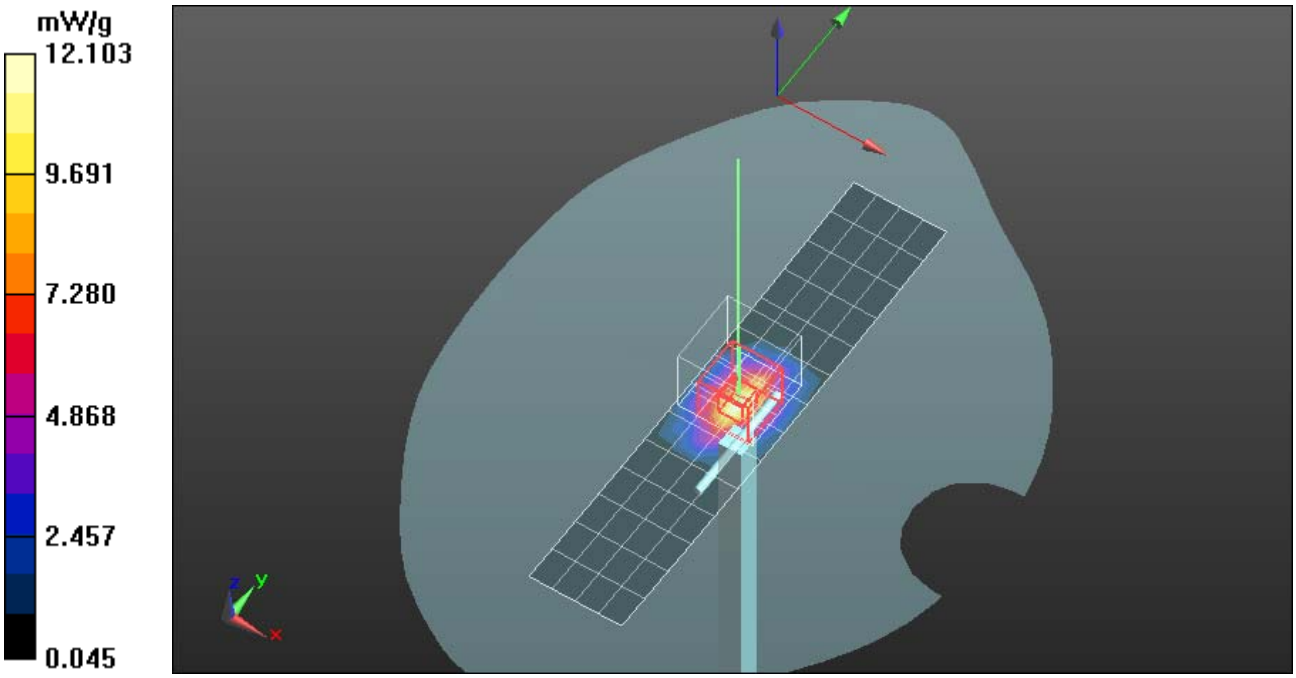
DASY4 Configuration:

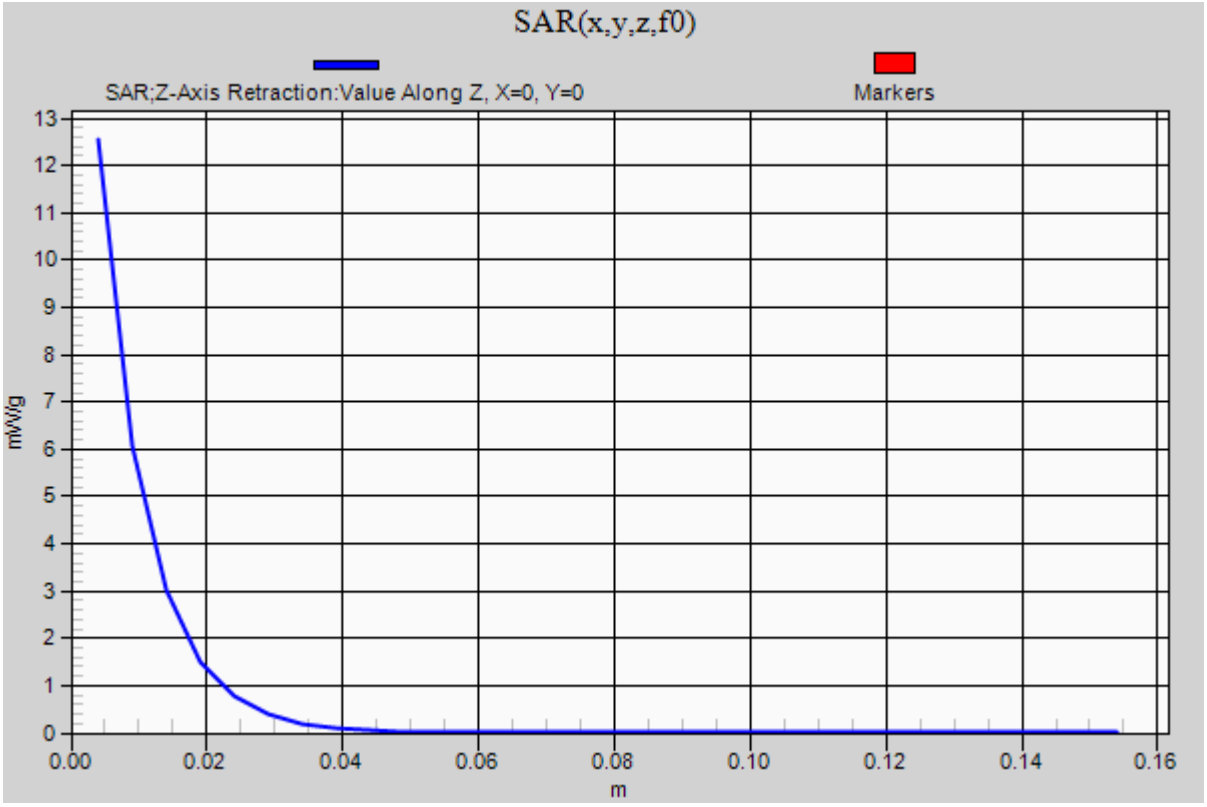
- Probe: ES3DV3 - SN3180; ConvF(4.51, 4.51, 4.51); Calibrated: 1/11/2012
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1313; Calibrated: 1/20/2012
- Phantom: R12_ Glycol SAM (extended range), Rev.2 (24-Feb-12); Type: SAM v4.0; Serial: TP-1684;
- ; SEMCAD X Version 14.6.4 (4989)

DASY5, SAM - System Performance Check Template, Rev.2 (12-Sept-11)/Daily SPC Check/Z-Axis Retraction (1x1x31): Measurement grid: dx=20mm, dy=20mm, dz=5mm
Maximum value of SAR (measured) = 12.545 mW/g

DASY5, SAM - System Performance Check Template, Rev.2 (12-Sept-11)/Daily SPC Check/Dipole Area Scan (5x15x1): Measurement grid: dx=10mm, dy=15mm
Maximum value of SAR (measured) = 12.371 mW/g

DASY5, SAM - System Performance Check Template, Rev.2 (12-Sept-11)/Daily SPC Check/0-Degree, 5x5x7 Cube (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 83.105 V/m; Power Drift = -0.03 dB
Peak SAR (extrapolated) = 23.7070
SAR(1 g) = 11 mW/g; SAR(10 g) = 5.06 mW/g
Maximum value of SAR (measured) = 12.103 mW/g


mW/g
12.103
9.691
7.280
4.868
2.457
0.045


SAR(x,y,z,f0)
SAR;Z-Axis Retraction:Value Along Z, X=0, Y=0
Markers
mW/g
m
0
1
2
3
4
5
6
7
8
9
10
11
12
13
0.00
0.02
0.04
0.06
0.08
0.10
0.12
0.14
0.16

System Accuracy Verification Measurements for Body SAR Measurements

Date/Time: 8/1/2012 11:37:43 AM

Test Laboratory: Motorola - 835MHz Body

DUT: Dipole 835MHz; Serial: D835V2 - SN:425tr; FCC ID:IHDT56NS6

Procedure Notes: 835 MHz System Performance Check; Dipole Sn# 425tr PM1 Power = 200 mW
Sim.Temp@meas = 20.3 Sim.Temp@SPC = 20.1 Room Temp @ SPC = 20.8
Communication System: _CW - Dipole; Frequency: 835 MHz;
Communication System Channel Number: 3; Duty Cycle: 1:1
Medium: Validation *BODY Tissue* ;
Medium parameters used: f = 835 MHz; σ = 1 mho/m; ε_r = 53.2; ρ = 1000 kg/m^3

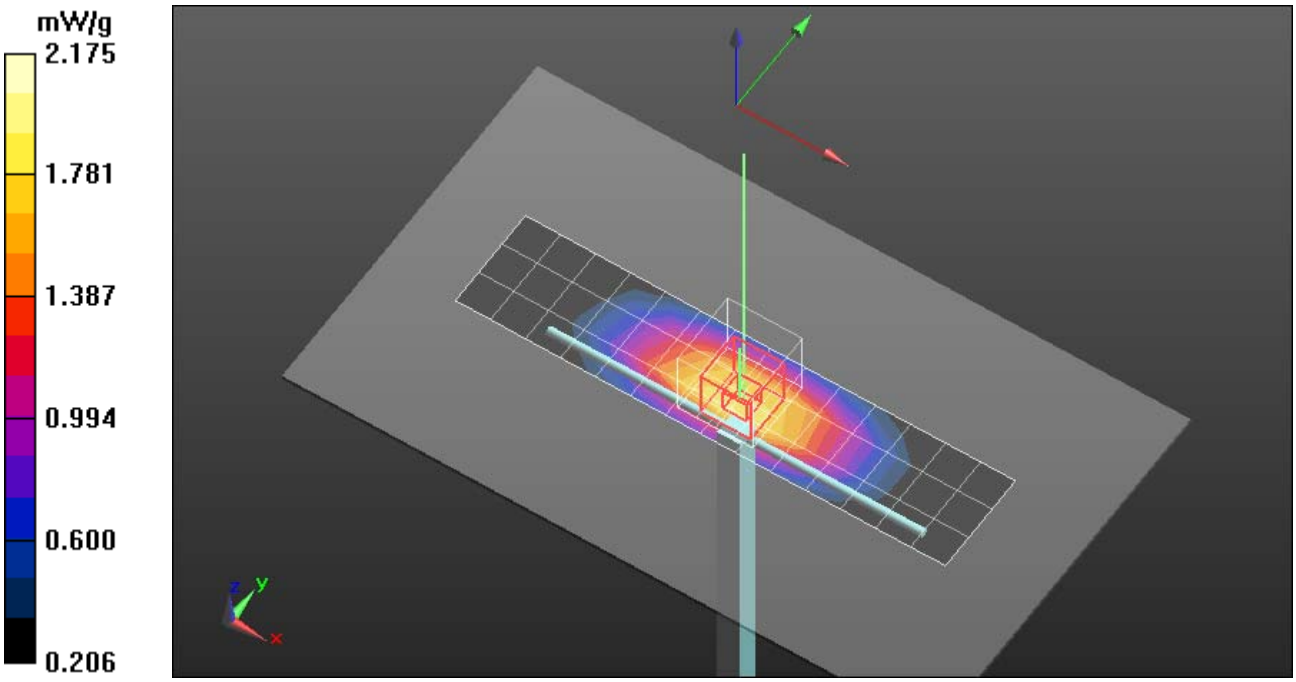
DASY4 Configuration:

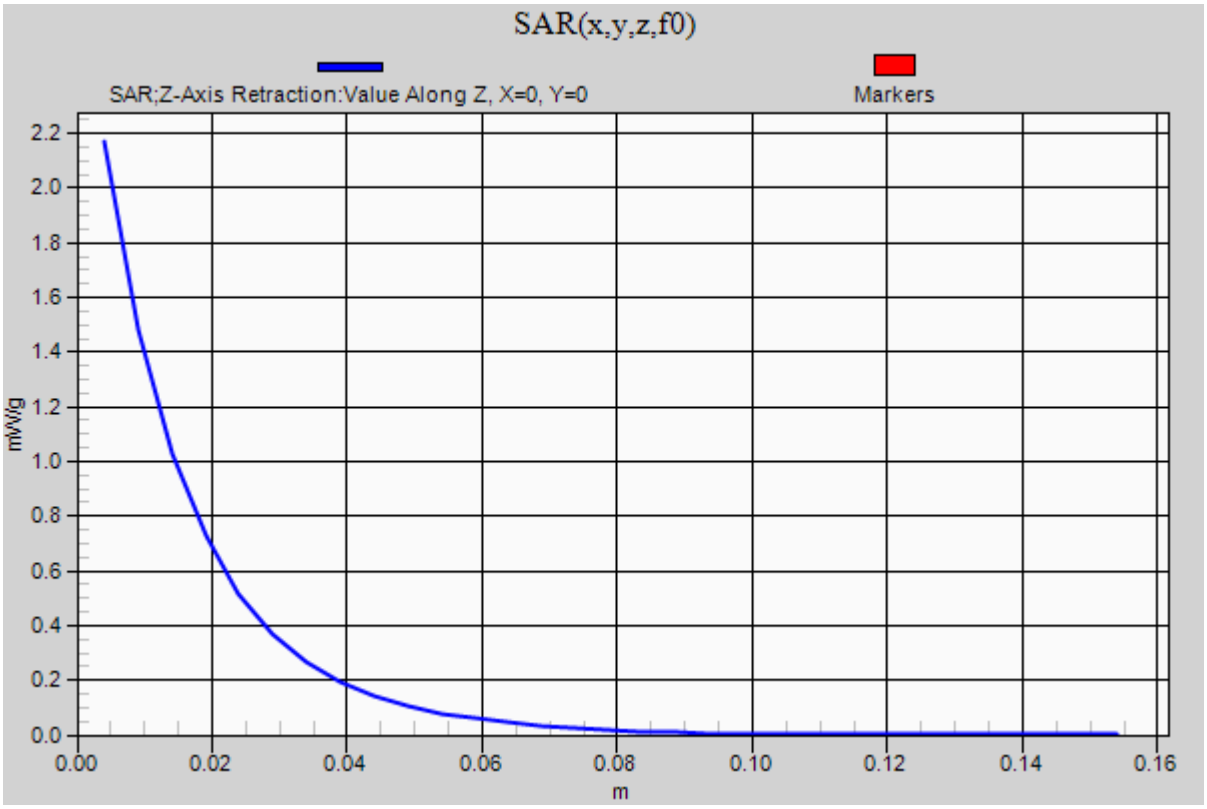
- Probe: ES3DV3 - SN3180; ConvF(5.97, 5.97, 5.97); Calibrated: 1/11/2012
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1313; Calibrated: 1/20/2012
- Phantom: R#-12, Triple Flat Phantom 5.1C (Rev.3); Type: QD 000 P51 CA; Serial: n/a;
- ; SEMCAD X Version 14.6.4 (4989)

DASY5, Triple Flat System Performance Check Template - Rev.3 (19-Sept-11)/Daily SPC Check/Z-Axis Retraction (1x1x31): Measurement grid: dx=20mm, dy=20mm, dz=5mm
Maximum value of SAR (measured) = 2.169 mW/g

DASY5, Triple Flat System Performance Check Template - Rev.3 (19-Sept-11)/Daily SPC Check/Dipole Area Scan (4x15x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 1.952 mW/g

DASY5, Triple Flat System Performance Check Template - Rev.3 (19-Sept-11)/Daily SPC Check/0-Degree 5x5x7 Cube (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 46.956 V/m; Power Drift = 0.02 dB
Peak SAR (extrapolated) = 2.9290
SAR(1 g) = 2.01 mW/g; SAR(10 g) = 1.32 mW/g
Maximum value of SAR (measured) = 2.175 mW/g


mW/g
2.175
1.781
1.387
0.994
0.600
0.206


SAR(x,y,z,f0)
SAR;Z-Axis Retraction:Value Along Z, X=0, Y=0
Markers
mW/g
2.2
2.0
1.8
1.6
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
0.00
0.02
0.04
0.06
0.08
0.10
0.12
0.14
0.16
m

Date/Time: 7/26/2012 10:06:15 AM

Test Laboratory: Motorola - 1800MHz Body

DUT: Dipole 1800MHz; Serial: D1800V2 - SN: 2d128; FCC ID:IHDT56NS6

Procedure Notes: 1800 MHz System Performance Check; Dipole Sn# 2d128; PM1 Power = 200 mW Sim.Temp@SPC = 19.9 Room Temp @ SPC =21.0
Communication System: _CW - Dipole; Frequency: 1800 MHz;
Communication System Channel Number: 8; Duty Cycle: 1:1
Medium: Validation *BODY Tissue* ;
Medium parameters used: f = 1800 MHz; σ = 1.49 mho/m; ε_r = 53.2; ρ = 1000 kg/m^3

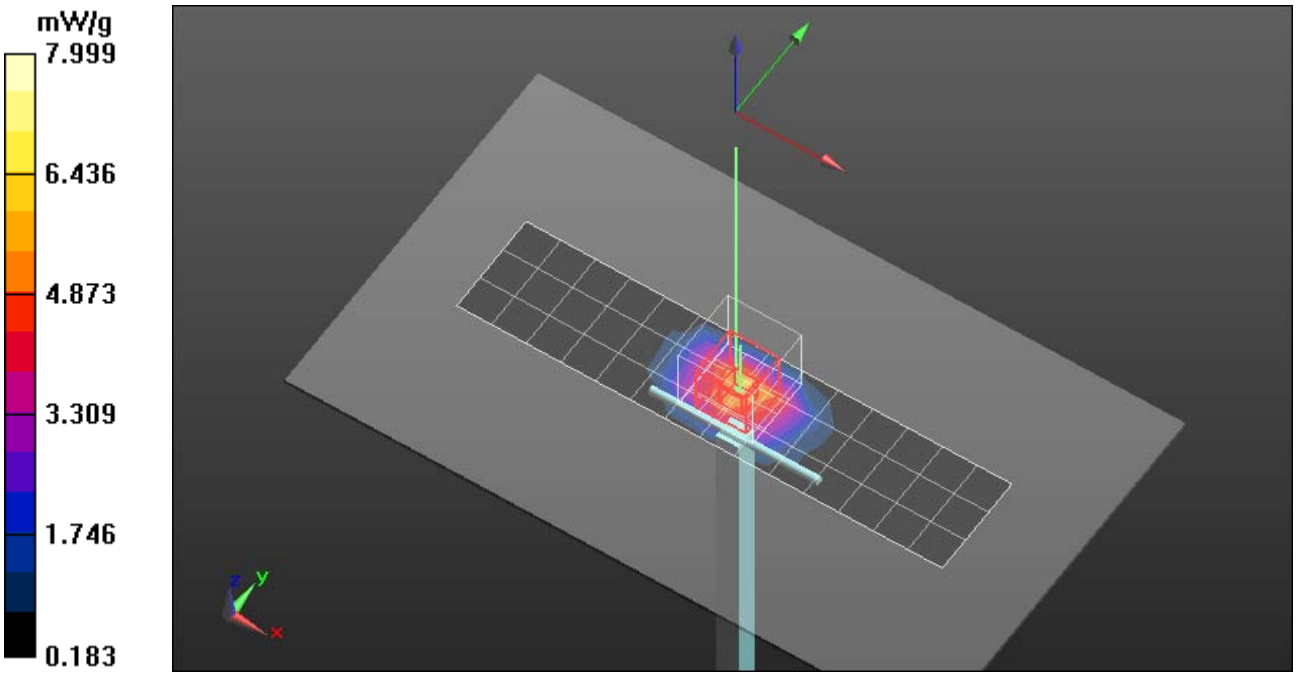
DASY4 Configuration:

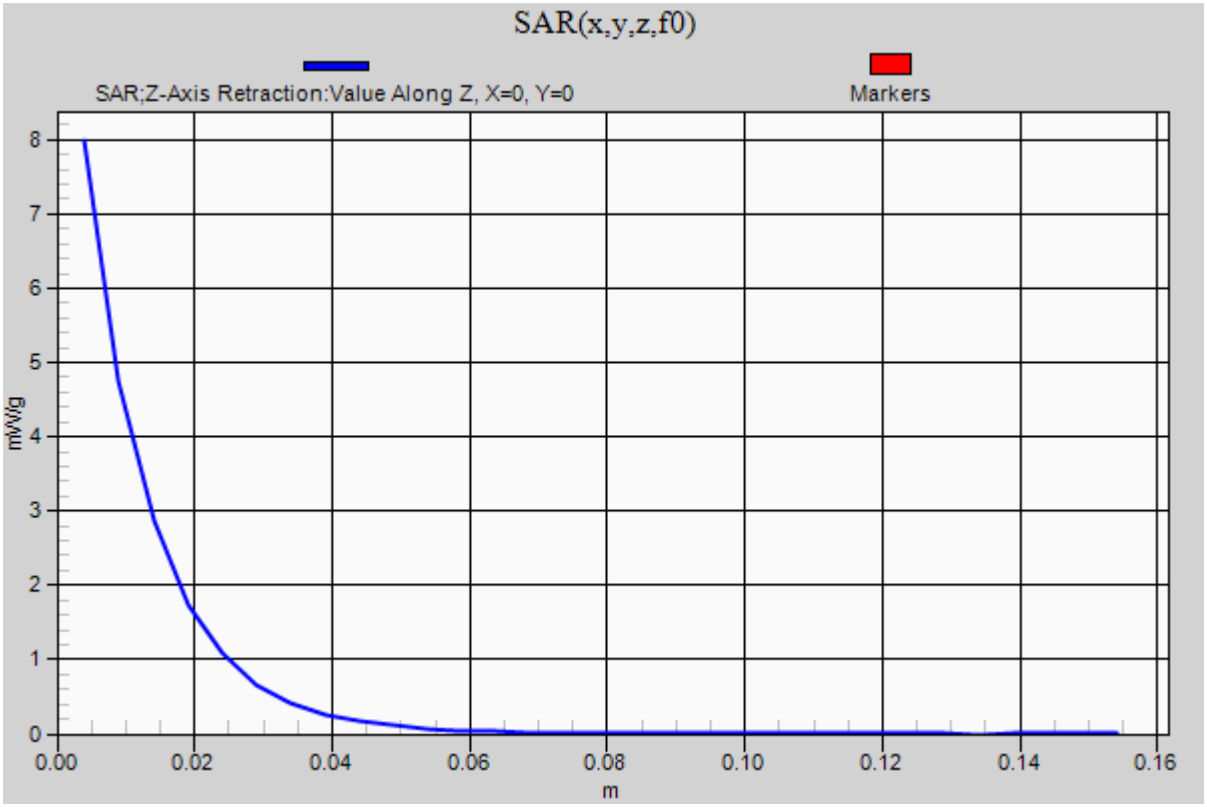
- Probe: ES3DV3 - SN3180; ConvF(5.09, 5.09, 5.09); Calibrated: 1/11/2012
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1313; Calibrated: 1/20/2012
- Phantom: R#-12, Triple Flat Phantom 5.1C (Rev.3); Type: QD 000 P51 CA; Serial: n/a;
- ; SEMCAD X Version 14.6.4 (4989)

DASY5, Triple Flat System Performance Check Template - Rev.3 (19-Sept-11)/Daily SPC Check/Z-Axis Retraction (1x1x31): Measurement grid: dx=20mm, dy=20mm, dz=5mm
Maximum value of SAR (measured) = 7.986 mW/g

DASY5, Triple Flat System Performance Check Template - Rev.3 (19-Sept-11)/Daily SPC Check/Dipole Area Scan (4x15x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 6.128 mW/g

DASY5, Triple Flat System Performance Check Template - Rev.3 (19-Sept-11)/Daily SPC Check/0-Degree 5x5x7 Cube (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 75.048 V/m; Power Drift = -0.03 dB
Peak SAR (extrapolated) = 12.2160
SAR(1 g) = 7.07 mW/g; SAR(10 g) = 3.79 mW/g
Maximum value of SAR (measured) = 7.999 mW/g


mW/g
7.999
6.436
4.873
3.309
1.746
0.183


SAR(x,y,z,f0)
SAR;Z-Axis Retraction:Value Along Z, X=0, Y=0
Markers
mW/g
m
0
1
2
3
4
5
6
7
8
0.00
0.02
0.04
0.06
0.08
0.10
0.12
0.14
0.16

Date/Time: 8/3/2012 5:14:40 PM

Test Laboratory: Motorola - 1800MHz Body

DUT: Dipole 1800MHz; Serial: D1800V2 - SN: 2d128; FCC ID:IHDT56NS6

Procedure Notes: 1800 MHz System Performance Check; Dipole Sn# 2d128 PM1 Power = 200 mW
Sim.Temp@meas = 19.8 Sim.Temp@SPC = 19.9 Room Temp @ SPC =20.8
Communication System: _CW - Dipole; Frequency: 1800 MHz;
Communication System Channel Number: 8; Duty Cycle: 1:1
Medium: Validation *BODY Tissue* ;
Medium parameters used: f = 1800 MHz; σ = 1.46 mho/m; ε_r = 52.7; ρ = 1000 kg/m^3

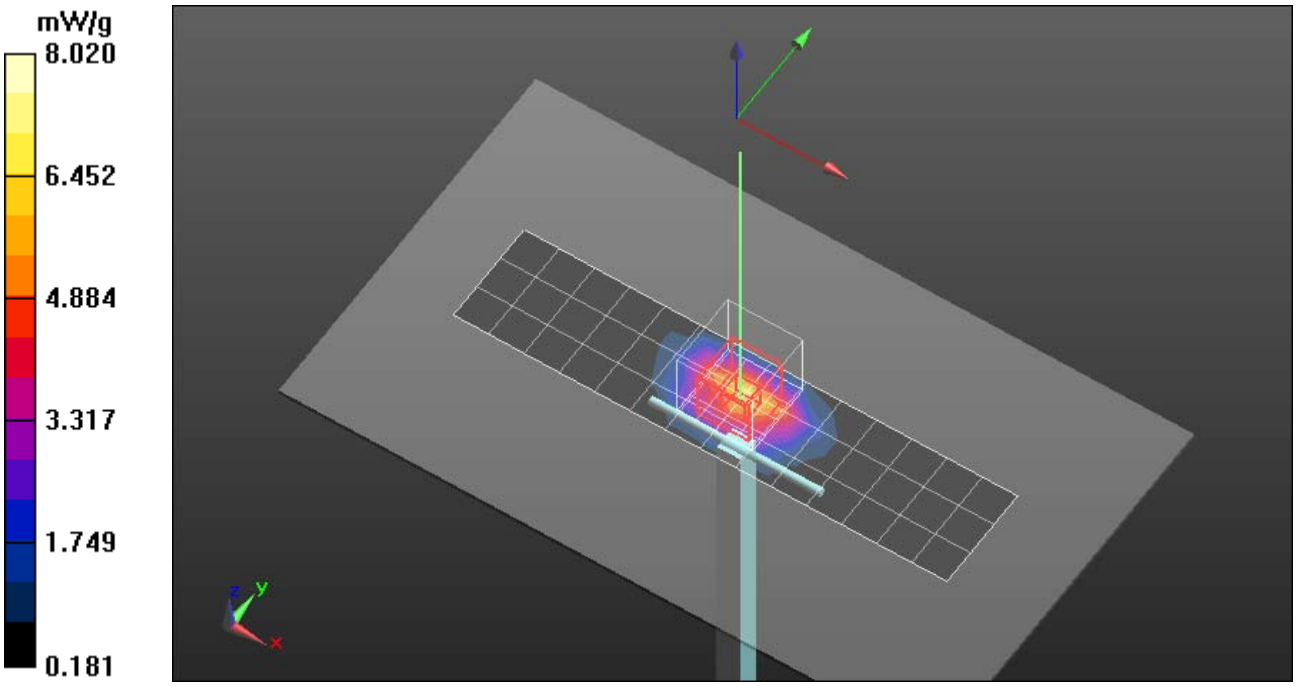
DASY4 Configuration:

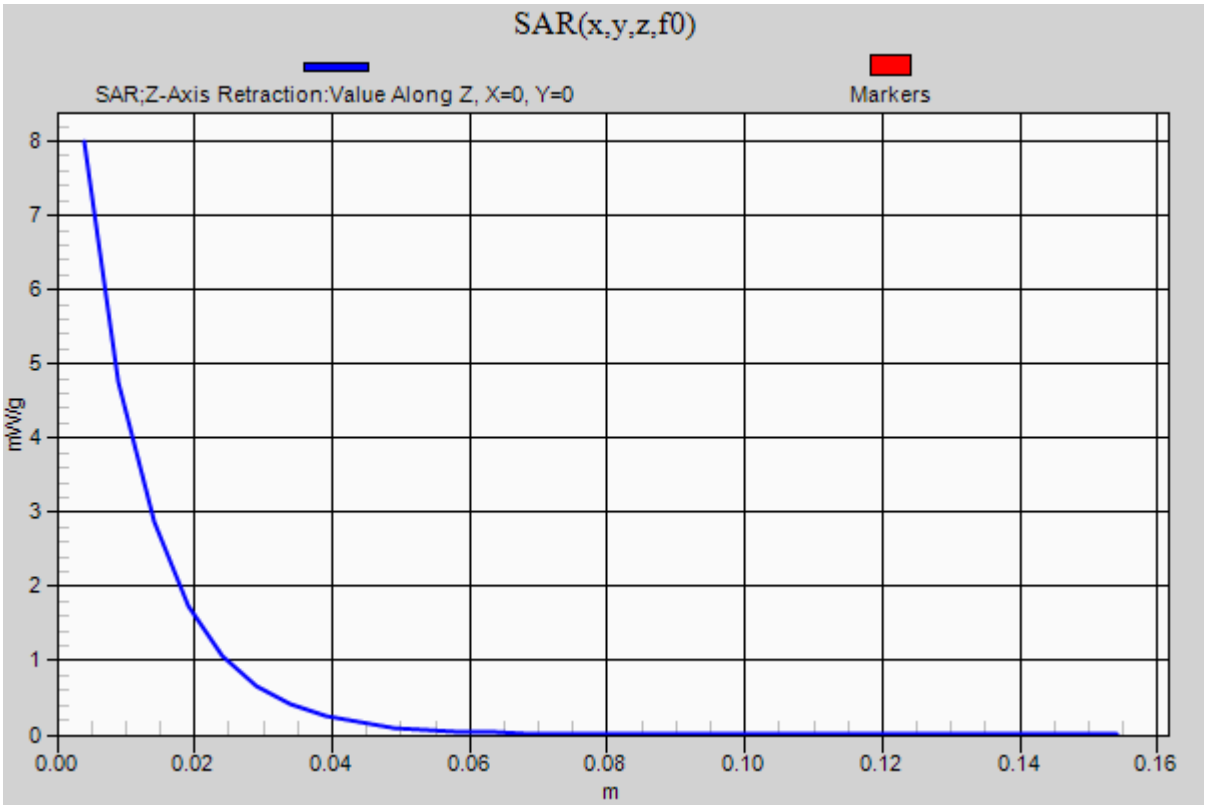
- Probe: ES3DV3 - SN3180; ConvF(5.09, 5.09, 5.09); Calibrated: 1/11/2012
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1313; Calibrated: 1/20/2012
- Phantom: R#-12, Triple Flat Phantom 5.1C (Rev.3); Type: QD 000 P51 CA; Serial: n/a;
- ; SEMCAD X Version 14.6.4 (4989)

DASY5, Triple Flat System Performance Check Template - Rev.3 (19-Sept-11)/Daily SPC Check/Z-Axis Retraction (1x1x31): Measurement grid: dx=20mm, dy=20mm, dz=5mm
Maximum value of SAR (measured) = 7.994 mW/g

DASY5, Triple Flat System Performance Check Template - Rev.3 (19-Sept-11)/Daily SPC Check/Dipole Area Scan (4x15x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 6.977 mW/g

DASY5, Triple Flat System Performance Check Template - Rev.3 (19-Sept-11)/Daily SPC Check/0-Degree 5x5x7 Cube (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 74.515 V/m; Power Drift = -0.02 dB
Peak SAR (extrapolated) = 12.1230
SAR(1 g) = 7.09 mW/g; SAR(10 g) = 3.79 mW/g
Maximum value of SAR (measured) = 8.020 mW/g


mW/g
8.020
6.452
4.884
3.317
1.749
0.181


SAR(x,y,z,f0)
SAR;Z-Axis Retraction:Value Along Z, X=0, Y=0
Markers
mW/g
m
0
1
2
3
4
5
6
7
8
0.00
0.02
0.04
0.06
0.08
0.10
0.12
0.14
0.16

Date/Time: 8/10/2012 5:20:17 PM

Test Laboratory: Motorola - 2450MHz Body

DUT: Dipole 2450MHz; Serial: D2450V2 - SN:879; FCC ID:IHDT56NS6

Procedure Notes: 2450 MHz System Performance Check; Dipole Sn# 879 PM1 Power = 200 mW
Sim.Temp@meas = 19.6 Sim.Temp@SPC = 19.7 Room Temp @ SPC = 20.8
Communication System: _CW - Dipole; Frequency: 2450 MHz;
Communication System Channel Number: 11; Duty Cycle: 1:1
Medium: Validation *BODY Tissue* ;
Medium parameters used: f = 2450 MHz; σ = 1.95 mho/m; ε_r = 51.1; ρ = 1000 kg/m^3

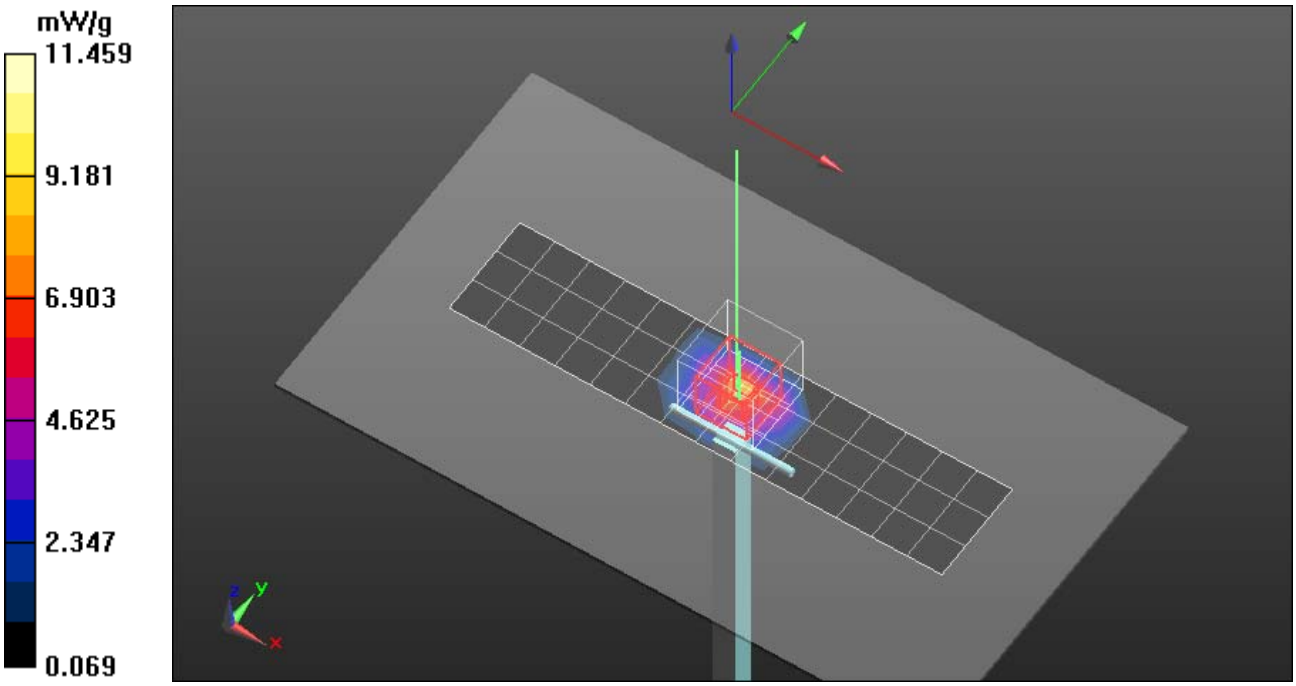
DASY4 Configuration:

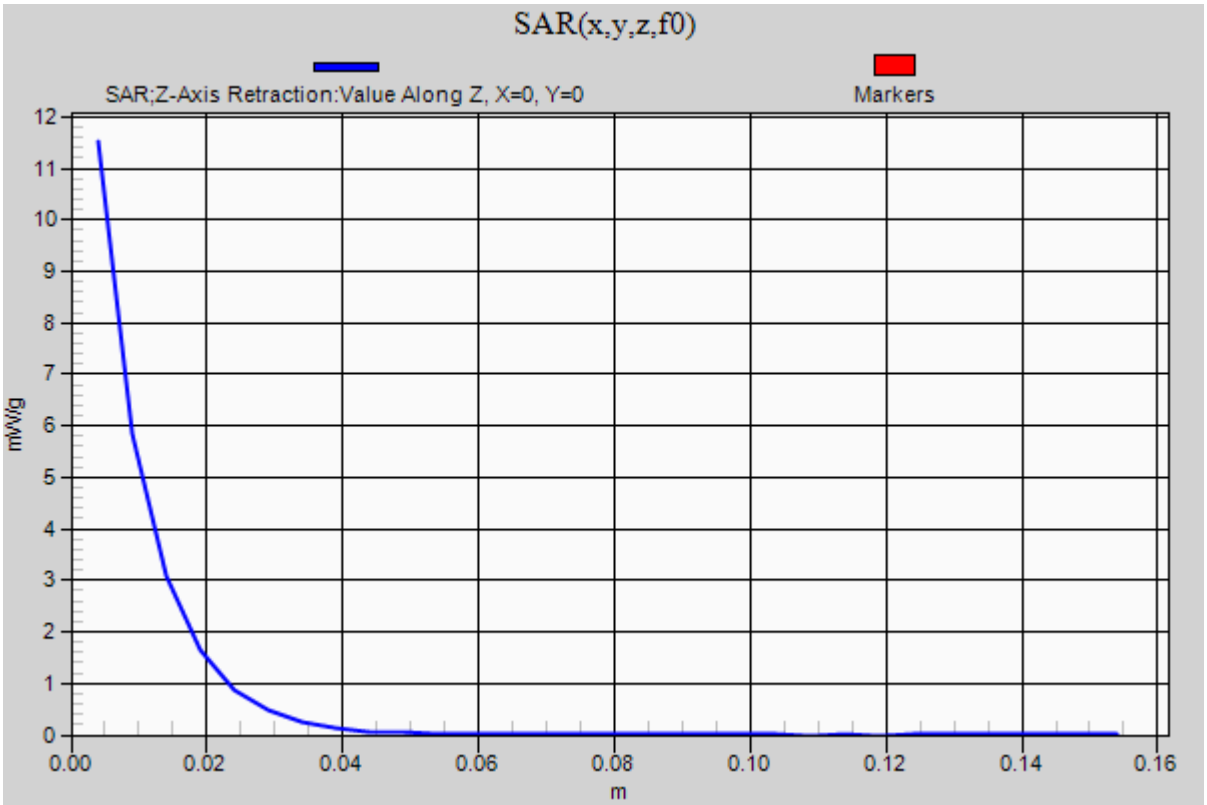
- Probe: ES3DV3 - SN3180; ConvF(4.46, 4.46, 4.46); Calibrated: 1/11/2012
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1313; Calibrated: 1/20/2012
- Phantom: R#-12, Triple Flat Phantom 5.1C (Rev.3); Type: QD 000 P51 CA; Serial: n/a;
- ; SEMCAD X Version 14.6.4 (4989)

DASY5, Triple Flat System Performance Check Template - Rev.3 (19-Sept-11)/Daily SPC Check/Z-Axis Retraction (1x1x31): Measurement grid: dx=20mm, dy=20mm, dz=5mm
Maximum value of SAR (measured) = 11.518 mW/g

DASY5, Triple Flat System Performance Check Template - Rev.3 (19-Sept-11)/Daily SPC Check/Dipole Area Scan (4x15x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 8.678 mW/g

DASY5, Triple Flat System Performance Check Template - Rev.3 (19-Sept-11)/Daily SPC Check/0-Degree 5x5x7 Cube (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 77.238 V/m; Power Drift = 0.01 dB
Peak SAR (extrapolated) = 20.8180
SAR(1 g) = 10.1 mW/g; SAR(10 g) = 4.68 mW/g
Maximum value of SAR (measured) = 11.459 mW/g


mW/g
11.459
9.181
6.903
4.625
2.347
0.069


SAR(x,y,z,f0)
SAR;Z-Axis Retraction:Value Along Z, X=0, Y=0
Markers
mW/g
m
0.00
0.02
0.04
0.06
0.08
0.10
0.12
0.14
0.16

Appendix 2

SAR distribution plots for Head Adjacent Test Results

Date/Time: 7/25/2012 11:06:15 AM

Test Laboratory: Motorola - GSM1900 Cheek

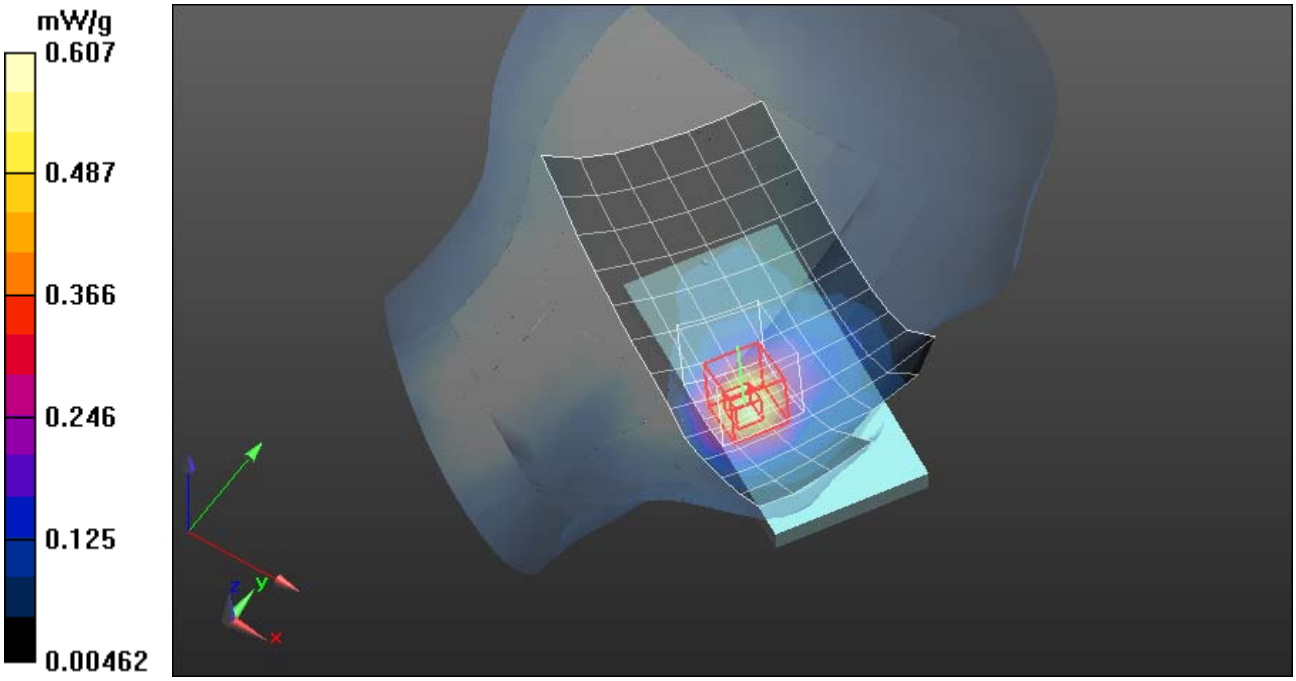
Serial: 352524050007569; FCC ID:IHDT56NS6
Procedure Notes: Pwr Step: 00 Antenna Position: internal; Battery Model #:internal;
DEVICE POSITION: cheek
Communication System: _GSM; Frequency: 1880 MHz;
Communication System Channel Number: 661; Duty Cycle: 1:8.30042
Medium: Regular Glycol Head 1750/1880;
Medium parameters used: f = 1880 MHz; σ = 1.47 mho/m; ε_r = 38.5; ρ = 1000 kg/m^3

DASY4 Configuration:

- Probe: ES3DV3 - SN3180; ConvF(5.2, 5.2, 5.2); Calibrated: 1/11/2012
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1313; Calibrated: 1/20/2012
- Phantom: R12_ Glycol SAM (extended range), Rev.2 (24-Feb-12); Type: SAM v4.0; Serial: TP-1684;
- ; SEMCAD X Version 14.6.4 (4989)

DASY5, SAM - Phone against Left Head Template, Rev.4 (20-July-12)/Left Head Template/Area Scan - Normal (15mm) (7x17x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.560 mW/g

DASY5, SAM - Phone against Left Head Template, Rev.4 (20-July-12)/Left Head Template/5x5x7 Zoom Scan (<=3GHz) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 17.570 V/m; Power Drift = -0.02 dB
Peak SAR (extrapolated) = 0.9120
SAR(1 g) = 0.552 mW/g; SAR(10 g) = 0.320 mW/g
Maximum value of SAR (measured) = 0.607 mW/g



Date/Time: 7/30/2012 1:17:00 PM

Test Laboratory: Motorola - GSM850 Cheek

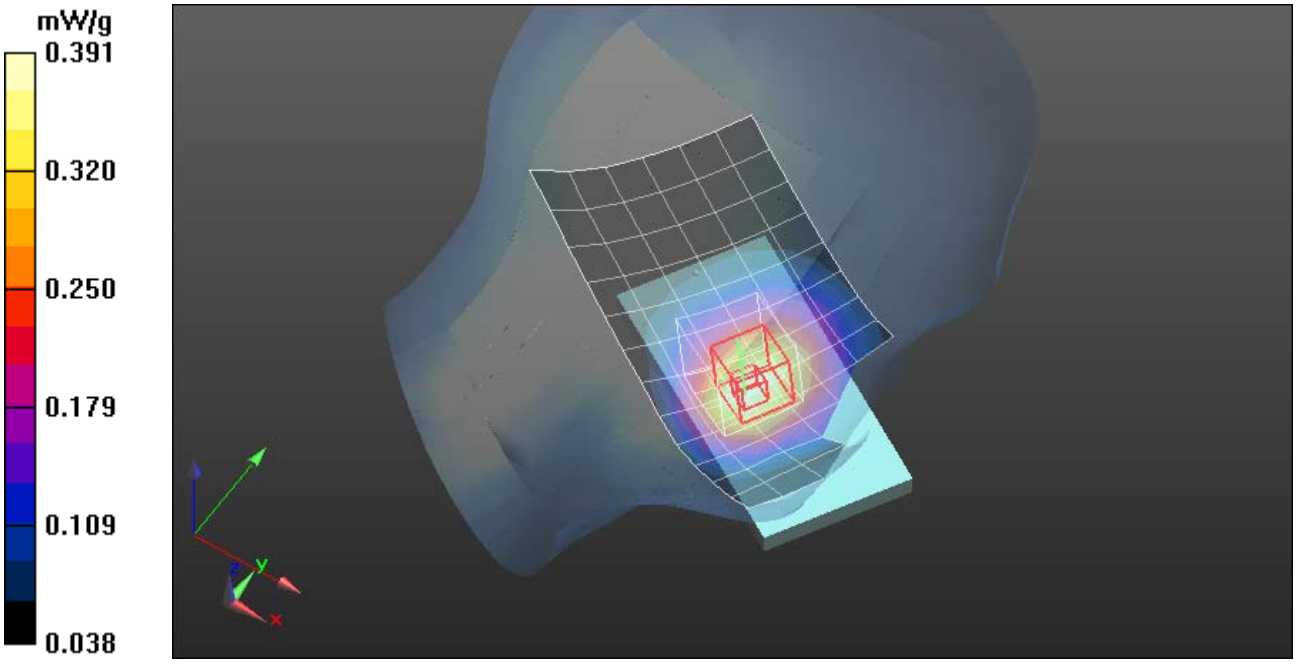
Serial: 352524050007569; FCC ID:IHDT56NS8
Procedure Notes: Pwr Step: 05; Antenna Position: internal; Battery Model #: internal
DEVICE POSITION: cheek
Communication System: _GSM; Frequency: 836.6 MHz;
Communication System Channel Number: 190; Duty Cycle: 1:8.30042
Medium: Low Freq Head;
Medium parameters used: f = 835 MHz; σ = 0.9 mho/m; ε_r = 40.1; ρ = 1000 kg/m^3

DASY4 Configuration:

- Probe: ES3DV3 - SN3180; ConvF(6.07, 6.07, 6.07); Calibrated: 1/11/2012
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1313; Calibrated: 1/20/2012
- Phantom: R12_ Sugar SAM (extended range), Rev.2 (24-Feb-12); Type: SAM v4.0; Serial: TP-1154;
- ; SEMCAD X Version 14.6.4 (4989)

DASY5, SAM - Phone against Left Head Template, Rev.4 (20-July-12)/Left Head Template/Area Scan - Normal (15mm) (7x17x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.385 mW/g

DASY5, SAM - Phone against Left Head Template, Rev.4 (20-July-12)/Left Head Template/5x5x7 Zoom Scan (<=3GHz) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 21.640 V/m; Power Drift = -0.22 dB
Peak SAR (extrapolated) = 0.4720
SAR(1 g) = 0.371 mW/g; SAR(10 g) = 0.274 mW/g
Maximum value of SAR (measured) = 0.391 mW/g



Date/Time: 8/9/2012 2:40:38 PM

Test Laboratory: Motorola - WiFi2450 Cheek

Serial: 352524050007569; FCC ID:IHDT56NS8

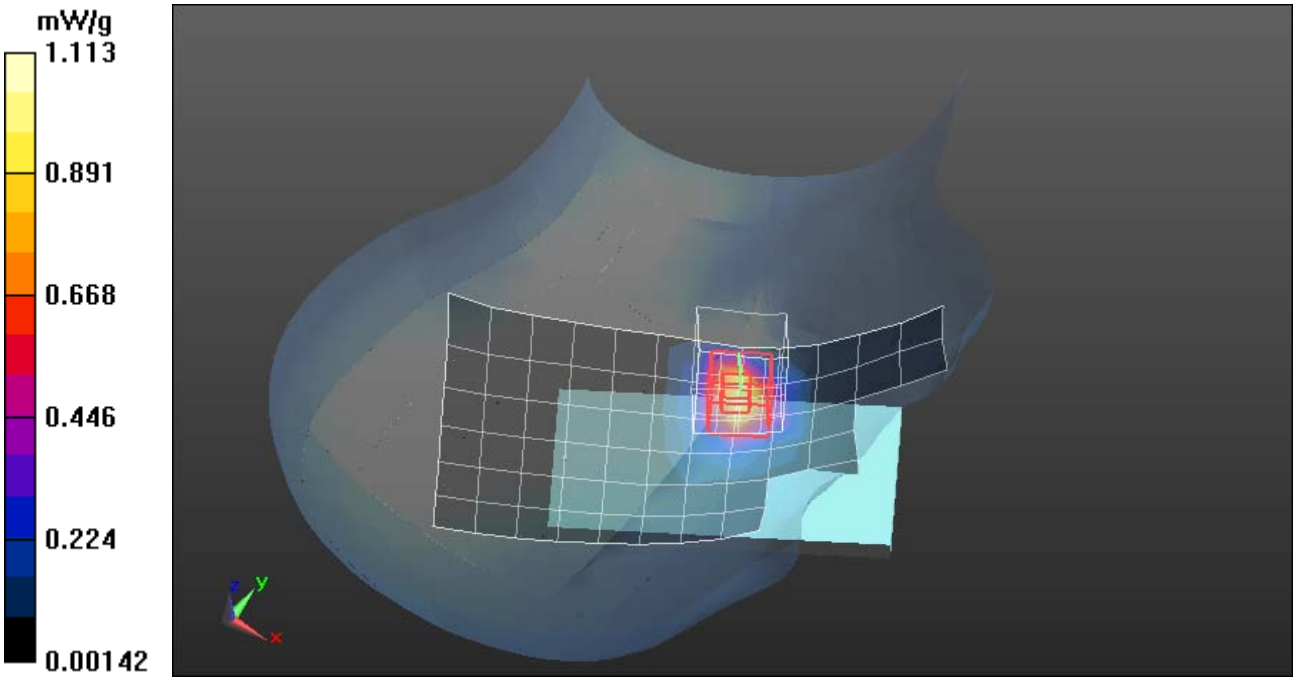
Procedure Notes: Pwr Step: 802.11b 1 Mbps; Antenna Position: internal; Battery Model #: internal
DEVICE POSITION: cheek
Communication System: _Wi-Fi 2450MHz; Frequency: 2412 MHz;
Communication System Channel Number: 1; Duty Cycle: 1:1
Medium: 2450 Diacetin Head;
Medium parameters used: f = 2450 MHz; σ = 1.87 mho/m; ε_r = 37.7; ρ = 1000 kg/m^3

DASY4 Configuration:

- Probe: ES3DV3 - SN3180; ConvF(4.51, 4.51, 4.51); Calibrated: 1/11/2012
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1313; Calibrated: 1/20/2012
- Phantom: R12_ Glycol SAM (extended range), Rev.2 (24-Feb-12); Type: SAM v4.0; Serial: TP-1684;
- ; SEMCAD X Version 14.6.4 (4989)

DASY5, SAM - Phone against RIGHT head template - Rev.2 (29-Sept-11)/Right Head Template/Area Scan - Normal (15mm) (7x17x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 1.141 mW/g

DASY5, SAM - Phone against RIGHT head template - Rev.2 (29-Sept-11)/Right Head Template/5x5x7 Zoom Scan (<=3GHz) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 15.556 V/m; Power Drift = -0.19 dB
Peak SAR (extrapolated) = 2.4950
SAR(1 g) = 1.01 mW/g; SAR(10 g) = 0.446 mW/g
Maximum value of SAR (measured) = 1.113 mW/g



Date/Time: 7/25/2012 12:51:44 PM

Test Laboratory: Motorola - GSM1900 Tilt

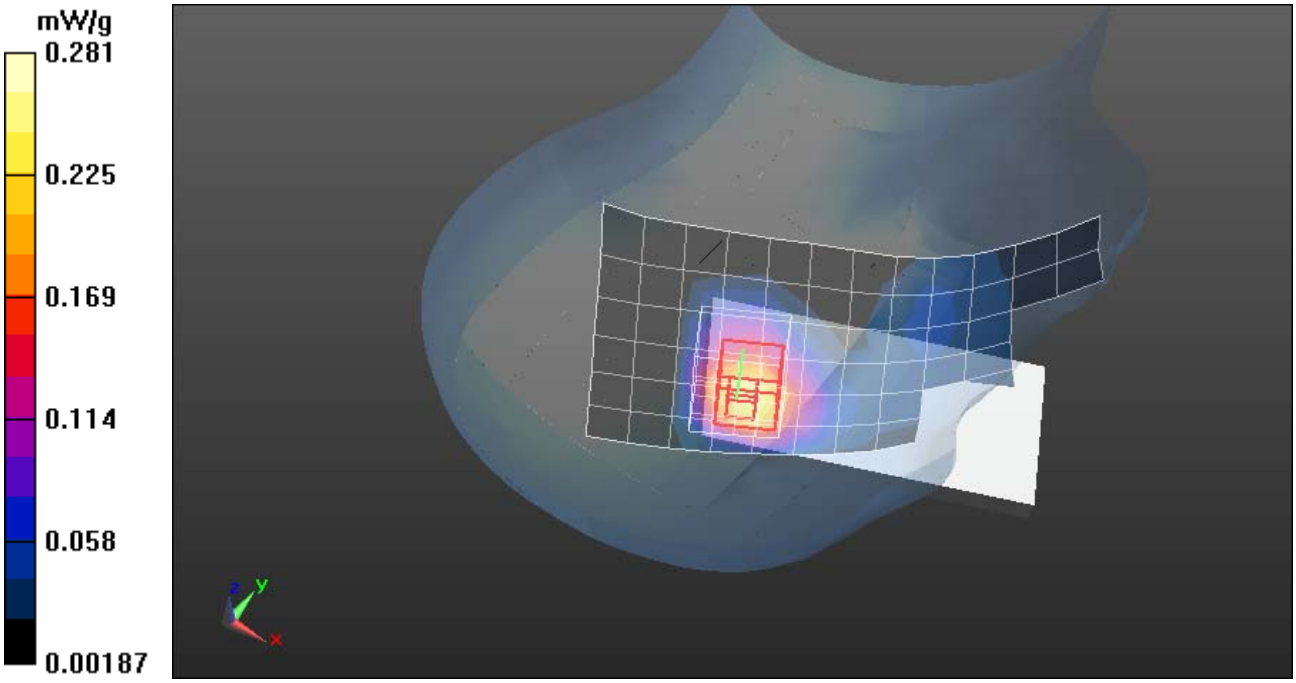
Serial: 352524050007569; FCC ID:IHDT56NS8
Procedure Notes: Pwr Step: 00 Antenna Position: internal; Battery Model #: internal
DEVICE POSITION: tilted
Communication System: _GSM; Frequency: 1880 MHz;
Communication System Channel Number: 661; Duty Cycle: 1:8.30042
Medium: Regular Glycol Head 1750/1880;
Medium parameters used: f = 1880 MHz; σ = 1.47 mho/m; ε_r = 38.5; ρ = 1000 kg/m^3

DASY4 Configuration:

- Probe: ES3DV3 - SN3180; ConvF(5.2, 5.2, 5.2); Calibrated: 1/11/2012
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1313; Calibrated: 1/20/2012
- Phantom: R12_ Glycol SAM (extended range), Rev.2 (24-Feb-12); Type: SAM v4.0; Serial: TP-1684;
- ; SEMCAD X Version 14.6.4 (4989)

DASY5, SAM - Phone against RIGHT head template - Rev.2 (29-Sept-11)/Right Head Template/Area Scan - Normal (15mm) (7x17x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.255 mW/g

DASY5, SAM - Phone against RIGHT head template - Rev.2 (29-Sept-11)/Right Head Template/5x5x7 Zoom Scan (<=3GHz) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 12.815 V/m; Power Drift = 0.03 dB
Peak SAR (extrapolated) = 0.4240
SAR(1 g) = 0.264 mW/g; SAR(10 g) = 0.155 mW/g
Maximum value of SAR (measured) = 0.281 mW/g



Date/Time: 7/30/2012 1:44:23 PM

Test Laboratory: Motorola - GSM850 Tilt

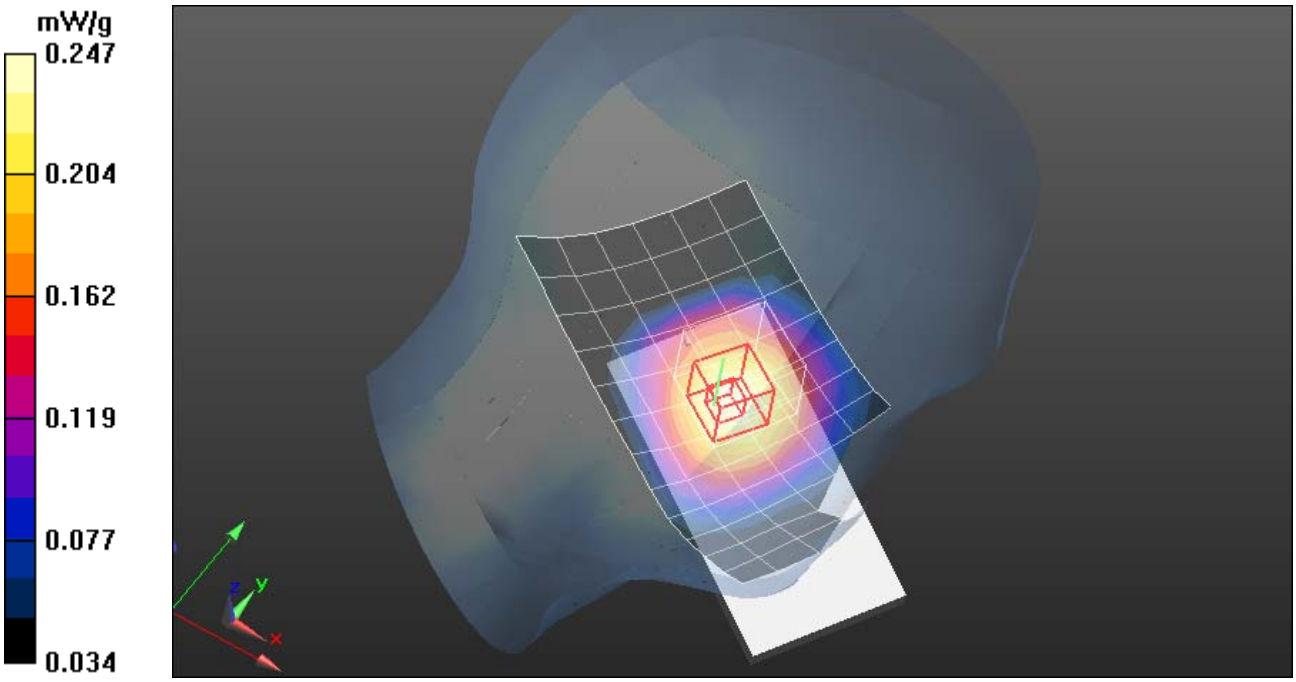
Serial: 352524050007569; FCC ID:IHDT56NS8
Procedure Notes: Pwr Step: 05 Antenna Position: internal; Battery Model #: internal;
DEVICE POSITION: rotated
Communication System: _GSM; Frequency: 836.6 MHz;
Communication System Channel Number: 190; Duty Cycle: 1:8.30042
Medium: Low Freq Head;
Medium parameters used: f = 835 MHz; σ = 0.9 mho/m; ε_r = 40.1; ρ = 1000 kg/m^3

DASY4 Configuration:

- Probe: ES3DV3 - SN3180; ConvF(6.07, 6.07, 6.07); Calibrated: 1/11/2012
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1313; Calibrated: 1/20/2012
- Phantom: R12_ Sugar SAM (extended range), Rev.2 (24-Feb-12); Type: SAM v4.0; Serial: TP-1154;
- ; SEMCAD X Version 14.6.4 (4989)

DASY5, SAM - Phone against Left Head Template, Rev.4 (20-July-12)/Left Head Template/Area Scan - Normal (15mm) (7x17x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.249 mW/g

DASY5, SAM - Phone against Left Head Template, Rev.4 (20-July-12)/Left Head Template/5x5x7 Zoom Scan (<=3GHz) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 16.653 V/m; Power Drift = -0.07 dB
Peak SAR (extrapolated) = 0.2870
SAR(1 g) = 0.237 mW/g; SAR(10 g) = 0.182 mW/g
Maximum value of SAR (measured) = 0.247 mW/g



Date/Time: 8/9/2012 2:59:00 PM

Test Laboratory: Motorola - WiFi2450 Tilt

Serial: 352524050007569; FCC ID:IHDT56NS8

Procedure Notes: Pwr Step: 802.11b 1 Mbps; Antenna Position: internal; Battery Model #: internal DEVICE POSITION: rotated

Communication System: _Wi-Fi 2450MHz; Frequency: 2412 MHz;

Communication System Channel Number: 1; Duty Cycle: 1:1

Medium: 2450 Diacetin Head;

Medium parameters used: f = 2450 MHz; σ = 1.87 mho/m; ε_r = 37.7; ρ = 1000 kg/m^3

DASY4 Configuration:

- Probe: ES3DV3 - SN3180; ConvF(4.51, 4.51, 4.51); Calibrated: 1/11/2012
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1313; Calibrated: 1/20/2012
- Phantom: R12_ Glycol SAM (extended range), Rev.2 (24-Feb-12); Type: SAM v4.0; Serial: TP-1684;
- ; SEMCAD X Version 14.6.4 (4989)

DASY5, SAM - Phone against RIGHT head template - Rev.2 (29-Sept-11)/Right Head Template/Area Scan - Normal (15mm) (7x17x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 0.160 mW/g

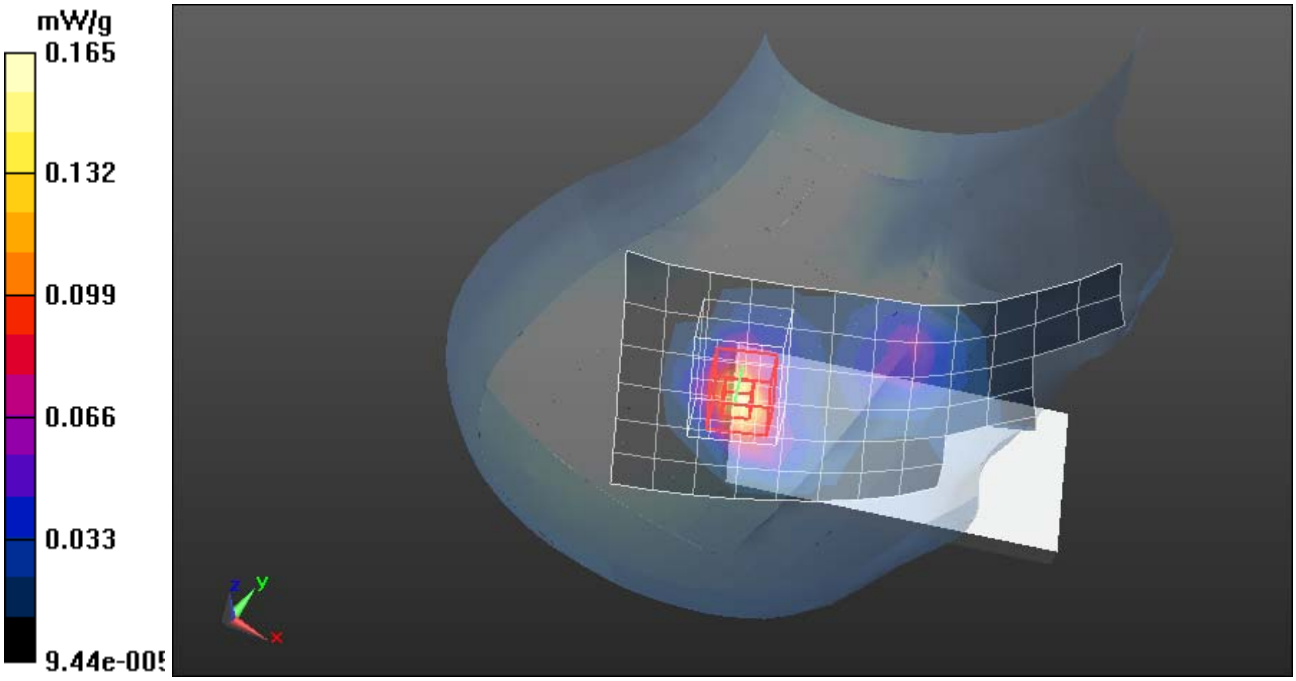
DASY5, SAM - Phone against RIGHT head template - Rev.2 (29-Sept-11)/Right Head Template/5x5x7 Zoom Scan (<=3GHz) (6x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 6.551 V/m; Power Drift = 0.10 dB

Peak SAR (extrapolated) = 0.2960

SAR(1 g) = 0.143 mW/g; SAR(10 g) = 0.067 mW/g

Maximum value of SAR (measured) = 0.165 mW/g



Appendix 3

SAR distribution plots for Body Worn Test Results

Date/Time: 7/26/2012 1:10:24 PM

Test Laboratory: Motorola - GSM1900 Body Worn

Serial: 352524050007569; FCC ID:IHDT56NS8

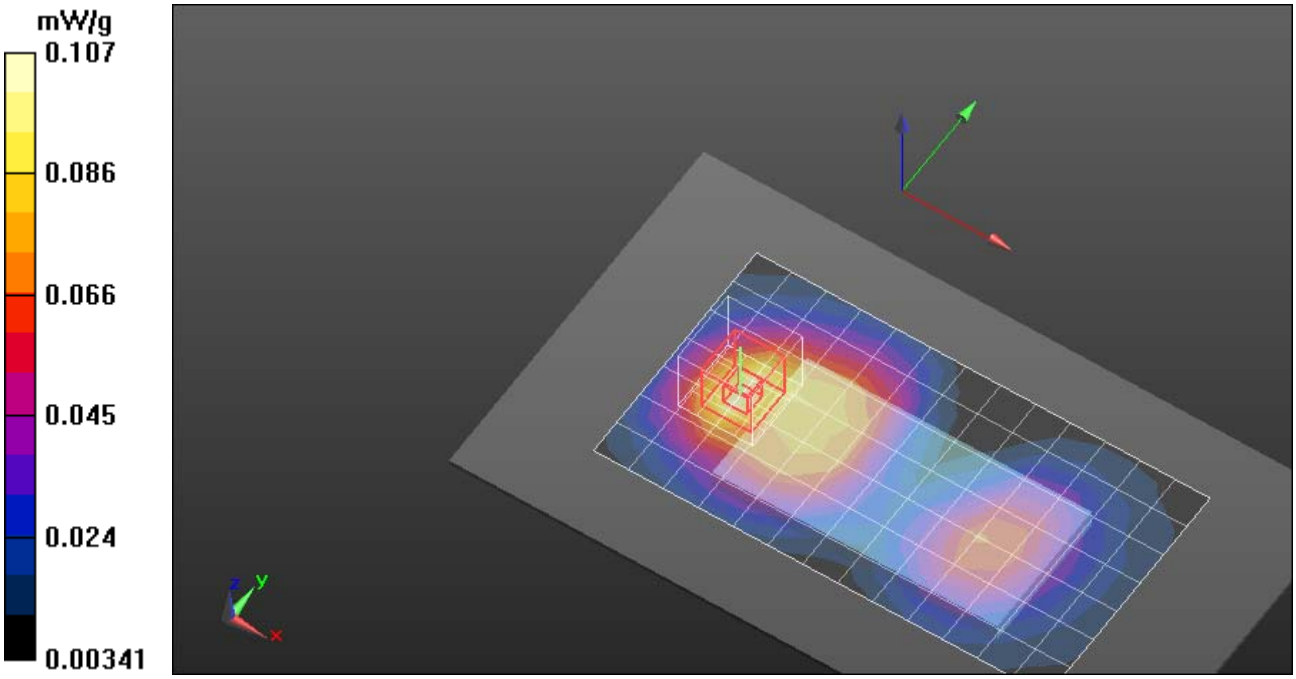
Procedure Notes: Pwr Step: 00 Antenna Position: internal; Battery Model #: internal
DEVICE POSITION: BACK OF PHONE 25MM FROM PHANTOM
Communication System: _GPRS Class 12; Frequency: 1880 MHz;
Communication System Channel Number: 661; Duty Cycle: 1:2.07491
Medium: Regular Glycol Body 1750/1880;
Medium parameters used: f = 1880 MHz; σ = 1.58 mho/m; ε_r = 52.8; ρ = 1000 kg/m^3

DASY4 Configuration:

- Probe: ES3DV3 - SN3180; ConvF(5.09, 5.09, 5.09); Calibrated: 1/11/2012
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1313; Calibrated: 1/20/2012
- Phantom: R#-12, Triple Flat Phantom 5.1C (Rev.3); Type: QD 000 P51 CA; Serial: n/a;
- ; SEMCAD X Version 14.6.4 (4989)

DASY5, Triple Flat Phone Template - Rev.5 (6-April-12)/Triple Flat Phone Template/Area Scan - Normal Body (15mm) (14x8x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.103 mW/g

DASY5, Triple Flat Phone Template - Rev.5 (6-April-12)/Triple Flat Phone Template/5x5x7 Zoom Scan (<=3GHz) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 7.985 V/m; Power Drift = -0.0055 dB
Peak SAR (extrapolated) = 0.1520
SAR(1 g) = 0.099 mW/g; SAR(10 g) = 0.061 mW/g
Maximum value of SAR (measured) = 0.107 mW/g



Date/Time: 8/1/2012 3:59:57 PM

Test Laboratory: Motorola - GSM850 Body Worn

Serial: 352524050007569; FCC ID:IHDT56NS8

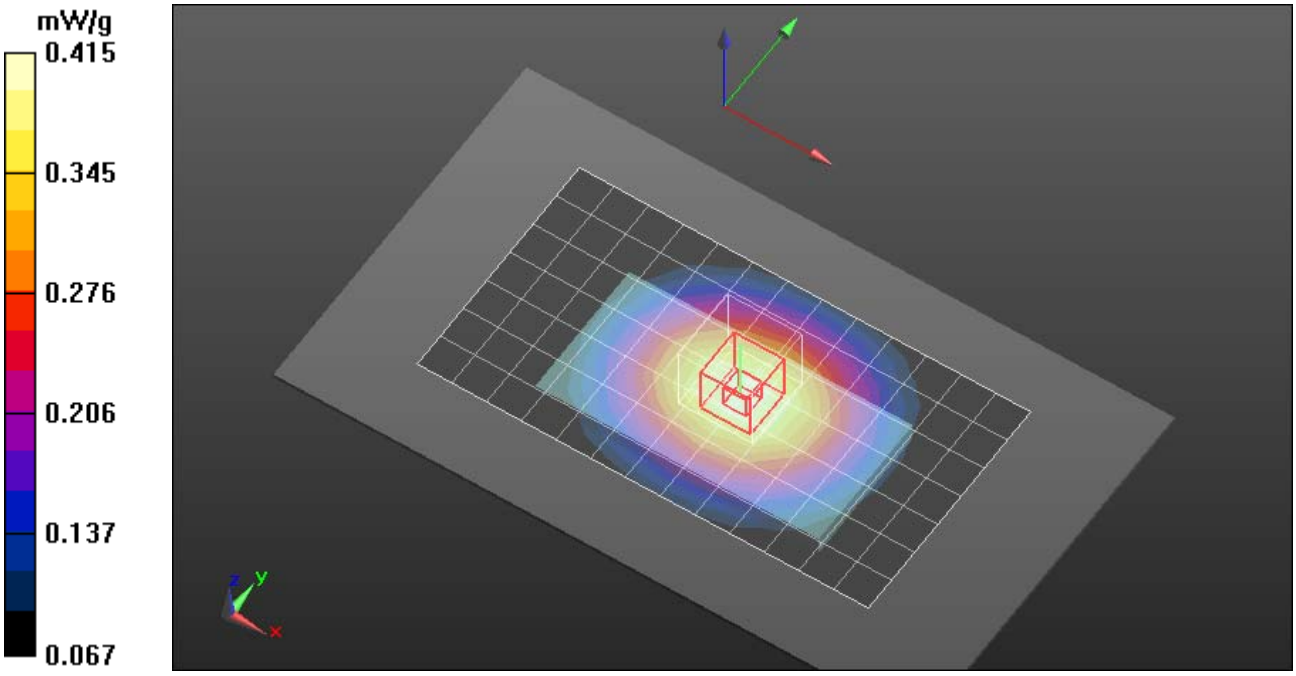
Procedure Notes: Pwr Step: 05 Antenna Position: internal; Battery Model #: internal
DEVICE POSITION: BACK OF PHONE 25MM FROM PHANTOM
Communication System: _GSM; Frequency: 836.6 MHz;
Communication System Channel Number: 190; Duty Cycle: 1:8.30042
Medium: Low Freq Body;
Medium parameters used: f = 835 MHz; σ = 1 mho/m; ε_r = 53.2; ρ = 1000 kg/m^3

DASY4 Configuration:

- Probe: ES3DV3 - SN3180; ConvF(5.97, 5.97, 5.97); Calibrated: 1/11/2012
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1313; Calibrated: 1/20/2012
- Phantom: R#-12, Triple Flat Phantom 5.1C (Rev.3); Type: QD 000 P51 CA; Serial: n/a;
- ; SEMCAD X Version 14.6.4 (4989)

DASY5, Triple Flat Phone Template - Rev.5 (6-April-12)/Triple Flat Phone Template/Area Scan - Normal Body (15mm) (14x8x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.409 mW/g

DASY5, Triple Flat Phone Template - Rev.5 (6-April-12)/Triple Flat Phone Template/5x5x7 Zoom Scan (<=3GHz) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 20.600 V/m; Power Drift = -0.07 dB
Peak SAR (extrapolated) = 0.5050
SAR(1 g) = 0.394 mW/g; SAR(10 g) = 0.293 mW/g
Maximum value of SAR (measured) = 0.415 mW/g



Date/Time: 8/11/2012 12:14:00 PM

Test Laboratory: Motorola - WiFi2450 Body Worn

Serial: 352524050007569; FCC ID:IHDT56NS8

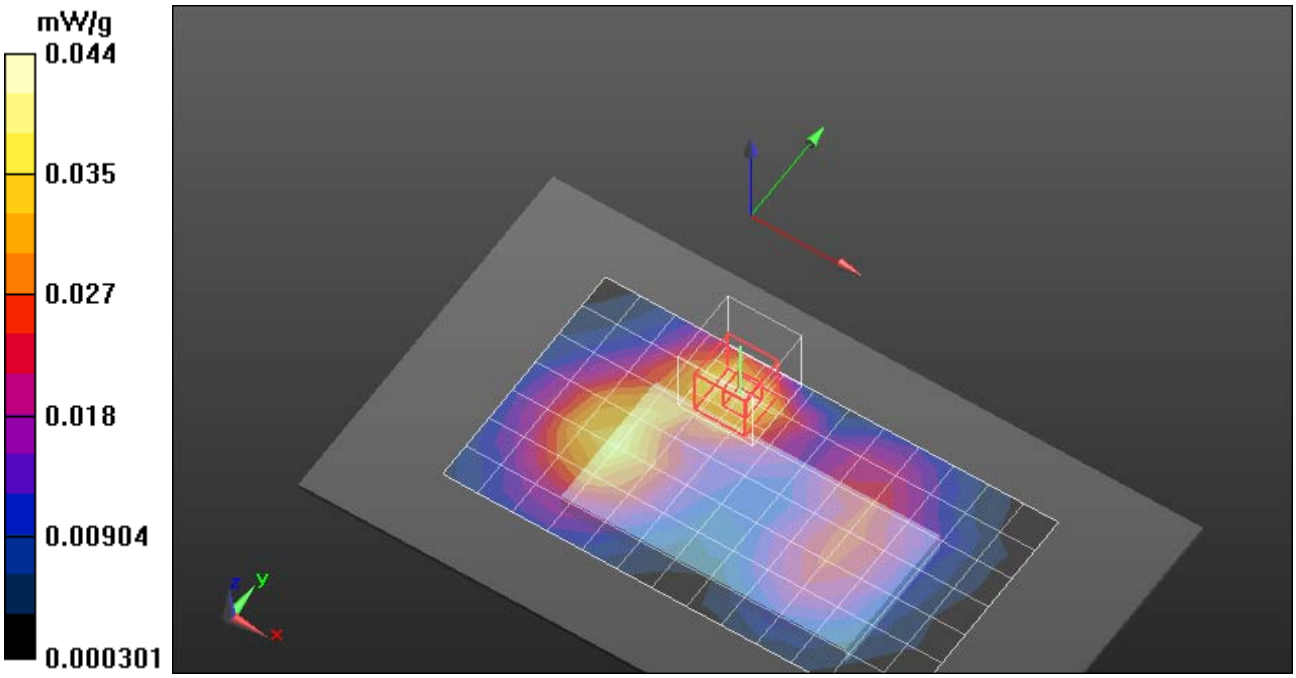
Procedure Notes: Pwr Step: 802.11b 5.5 Mbps; Antenna Position: intetnal; Battery Model #: intetrnal
DEVICE POSITION: BACK OF PHONE 25MM FROM PHONE
Communication System: _Wi-Fi 2450MHz; Frequency: 2412 MHz;
Communication System Channel Number: 1; Duty Cycle: 1:1
Medium: 2450 Diacetin Body;
Medium parameters used: f = 2450 MHz; σ = 1.95 mho/m; ε_r = 51.1; ρ = 1000 kg/m^3

DASY4 Configuration:

- Probe: ES3DV3 - SN3180; ConvF(4.46, 4.46, 4.46); Calibrated: 1/11/2012
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1313; Calibrated: 1/20/2012
- Phantom: R#-12, Triple Flat Phantom 5.1C (Rev.3); Type: QD 000 P51 CA; Serial: n/a;
- ; SEMCAD X Version 14.6.4 (4989)

DASY5, Triple Flat Phone Template - Rev.5 (6-April-12)/Triple Flat Phone Template/Area Scan - Normal Body (15mm) (14x8x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.039 mW/g

DASY5, Triple Flat Phone Template - Rev.5 (6-April-12)/Triple Flat Phone Template/5x5x7 Zoom Scan (<=3GHz) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 4.252 V/m; Power Drift = 0.18 dB
Peak SAR (extrapolated) = 0.0730
SAR(1 g) = 0.040 mW/g; SAR(10 g) = 0.022 mW/g
Maximum value of SAR (measured) = 0.044 mW/g



Appendix 4

SAR distribution plots for Mobile Hotspot Test Results

Date/Time: 8/2/2012 9:57:36 AM

Test Laboratory: Motorola - WiFi Hotspot Body Worn Back

Serial: 352524050007569; FCC ID:IHDT56NS8

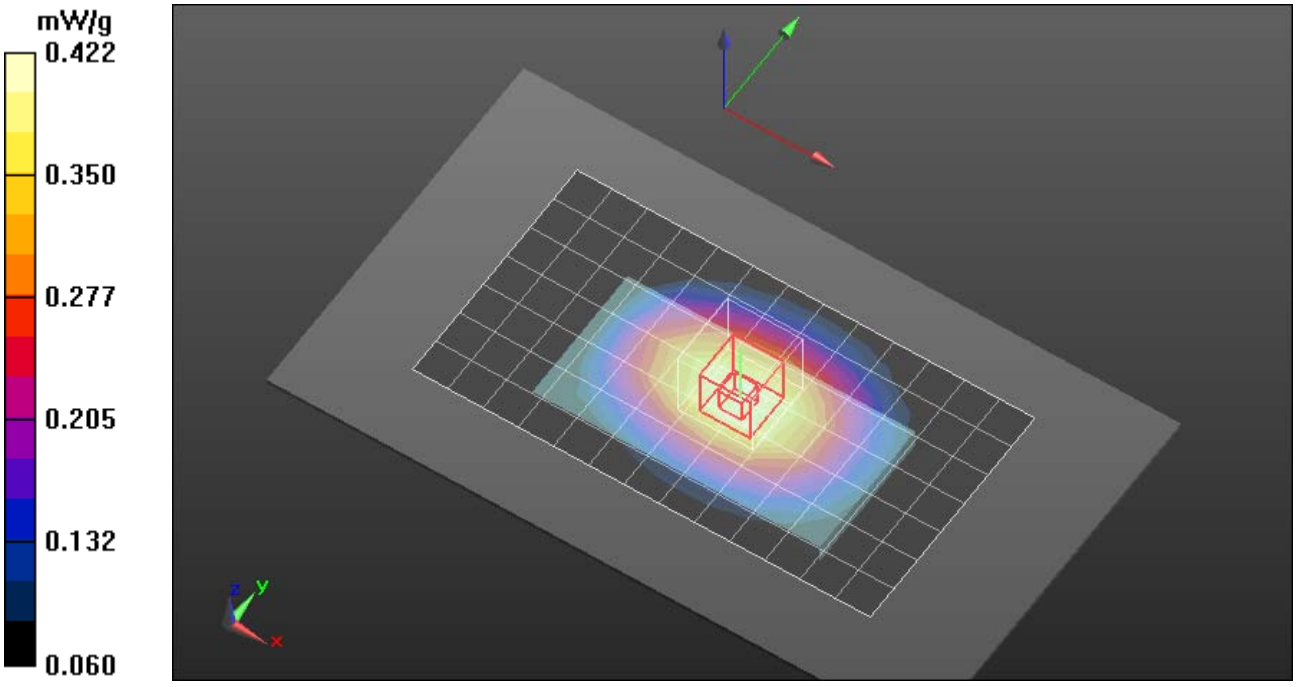
Procedure Notes: Pwr Step: 05; Antenna Position: internal; Battery Model #: internal
DEVICE POSITION: Body Worn, Back of Phone 10mm from Phantom
Communication System: _GPRS Class 12; Frequency: 836.6 MHz;
Communication System Channel Number: 190; Duty Cycle: 1:2.07491
Medium: Low Freq Body;
Medium parameters used: f = 835 MHz; σ = 1 mho/m; ε_r = 53.2; ρ = 1000 kg/m^3

DASY4 Configuration:

- Probe: ES3DV3 - SN3180; ConvF(5.97, 5.97, 5.97); Calibrated: 1/11/2012
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1313; Calibrated: 1/20/2012
- Phantom: R#-12, Triple Flat Phantom 5.1C (Rev.3); Type: QD 000 P51 CA; Serial: n/a;
- ; SEMCAD X Version 14.6.4 (4989)

DASY5, Triple Flat Phone Template - Rev.5 (6-April-12)/Triple Flat Phone Template/Area Scan - Normal Body (15mm) (14x8x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.408 mW/g

DASY5, Triple Flat Phone Template - Rev.5 (6-April-12)/Triple Flat Phone Template/5x5x7 Zoom Scan (<=3GHz) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 20.449 V/m; Power Drift = 0.03 dB
Peak SAR (extrapolated) = 0.4990
SAR(1 g) = 0.401 mW/g; SAR(10 g) = 0.301 mW/g
Maximum value of SAR (measured) = 0.422 mW/g



Date/Time: 8/3/2012 7:14:18 PM

Test Laboratory: Motorola - WiFi Hotspot Bottom Edge

Serial: 352524050007569; FCC ID:IHDT56NS8

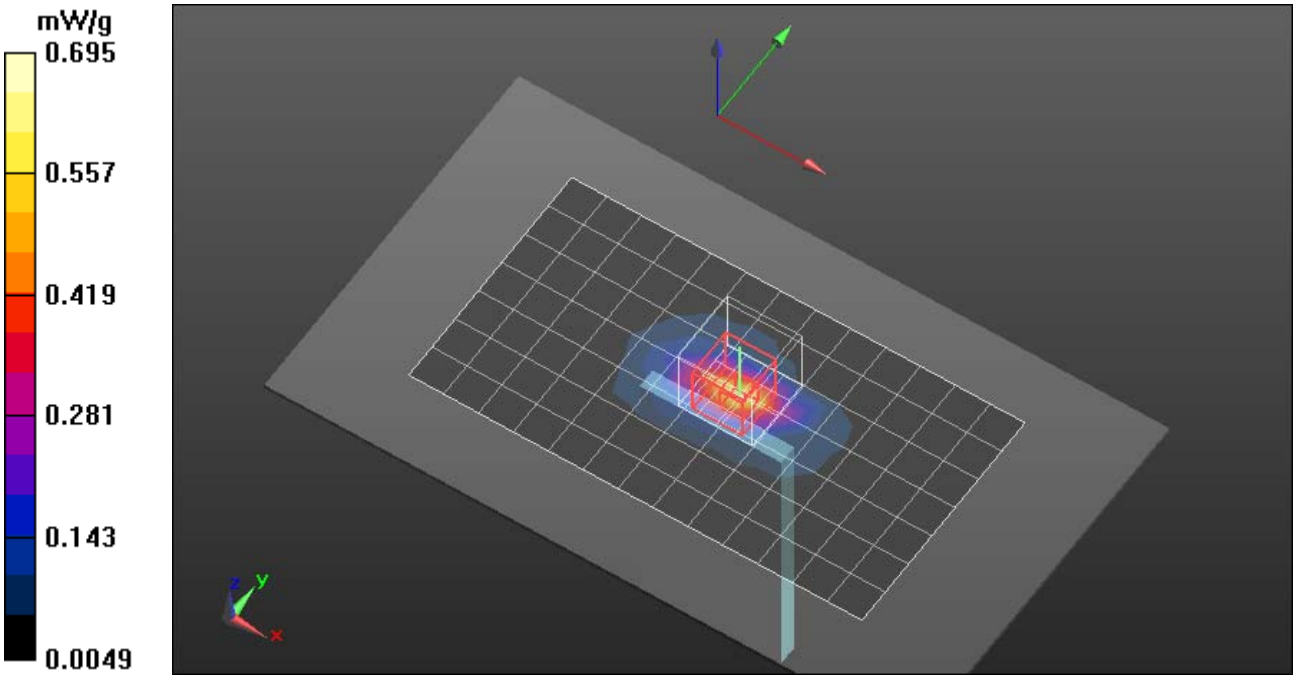
Procedure Notes: Pwr Step: 00 Antenna Position: internal; Battery Model #: internal
DEVICE POSITION: Body Worn, Bottom Edge of Phone 10mm from Phantom
Communication System: _GPRS Class 12; Frequency: 1880 MHz;
Communication System Channel Number: 661; Duty Cycle: 1:2.07491
Medium: Regular Glycol Body 1750/1880;
Medium parameters used: f = 1880 MHz; σ = 1.56 mho/m; ε_r = 52.3; ρ = 1000 kg/m^3

DASY4 Configuration:

- Probe: ES3DV3 - SN3180; ConvF(5.09, 5.09, 5.09); Calibrated: 1/11/2012
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1313; Calibrated: 1/20/2012
- Phantom: R#-12, Triple Flat Phantom 5.1C (Rev.3); Type: QD 000 P51 CA; Serial: n/a;
- ; SEMCAD X Version 14.6.4 (4989)

DASY5, Triple Flat Phone Template - Rev.5 (6-April-12)/Triple Flat Phone Template/Area Scan - Normal Body (15mm) (14x8x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.674 mW/g

DASY5, Triple Flat Phone Template - Rev.5 (6-April-12)/Triple Flat Phone Template/5x5x7 Zoom Scan (<=3GHz) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 17.831 V/m; Power Drift = -0.13 dB
Peak SAR (extrapolated) = 1.1170
SAR(1 g) = 0.590 mW/g; SAR(10 g) = 0.280 mW/g
Maximum value of SAR (measured) = 0.695 mW/g



Appendix 5

Measurement Uncertainty Budget

Uncertainty Budget for Device Under Test, for 735 MHz to 3 GHz

a	*b*	*c*	*d*	*e = f(d,k)*	*f*	*g*	*h = c x f / e*	*i = c x g / e*	*k*
Uncertainty Component	Description IEEE1528(2003) / IEC62209-1(2005)	**Tol. (± %)**	**Prob Dist**	**Div.**	**c_i (1 g)**	**c_i (10 g)**	**1 g u_i (±%)**	**10 g u_i (±%)**	**v_i**
Measurement System									
Probe Calibration [ES3DV3]	E.2.1 / 7.2.1	6.0	N	1.00	1	1	6.0	6.0	∞
Axial Isotropy	E.2.2 / 7.2.1.2	4.7	R	1.73	0.707	0.707	1.9	1.9	∞
Hemispherical Isotropy	E.2.2 / 7.2.1.2	9.6	R	1.73	0.707	0.707	3.9	3.9	∞
Boundary Effect	E.2.3 / 7.2.1.5	1.0	R	1.73	1	1	0.6	0.6	∞
Linearity	E.2.4 / 7.2.1.3	4.7	R	1.73	1	1	2.7	2.7	∞
System Detection Limits	E.2.5 / 7.2.1.4	1.0	R	1.73	1	1	0.6	0.6	∞
Readout Electronics	E.2.6 / 7.2.1.6	0.3	N	1.00	1	1	0.3	0.3	∞
Response Time	E.2.7 / 7.2.1.7	1.1	R	1.73	1	1	0.6	0.6	∞
Integration Time	E.2.8 / 7.2.1.8	1.1	R	1.73	1	1	0.6	0.6	∞
RF Ambient Conditions - Noise	E.6.1 / 7.2.3.6	3.0	R	1.73	1	1	1.7	1.7	∞
RF Ambient Conditions - Reflections	E.6.1 / 7.2.3.6	3.0	R	1.73	1	1	1.7	1.7	∞
Probe Positioner Mech. Tolerance	E.6.2 / 7.2.2.1	0.4	R	1.73	1	1	0.2	0.2	∞
Probe Positioning w.r.t Phantom	E.6.3 / 7.2.2.3	1.4	R	1.73	1	1	0.8	0.8	∞
Max. SAR Evaluation (ext., int., avg.)	E.5 / 7.2.4	3.4	R	1.73	1	1	2.0	2.0	∞
Test sample Related									
Test Sample Positioning	E.4.2 / 7.2.2.4	3.4	N	1.00	1	1	3.4	3.4	79
Device Holder Uncertainty	E.4.1 / 7.2.2.4.2	4.5	N	1.00	1	1	4.5	4.5	11
SAR drift	6.6.2 / 7.2.3.5	0.0	R	1.73	1	1	0.0	0.0	∞
Phantom and Tissue Parameters									
Phantom Uncertainty	E.3.1 / 7.2.2.2	4.0	R	1.73	1	1	2.3	2.3	∞
Liquid Conductivity (target)	E.3.2 / 7.2.3.3	5.0	R	1.73	0.64	0.43	1.8	1.2	∞
Liquid Conductivity (measurement)	E.3.3 / 7.2.3.3	2.5	N	1.00	0.64	0.43	1.6	1.1	6
Liquid Permittivity (target)	E.3.2 / 7.2.3.4	5.0	R	1.73	0.6	0.49	1.7	1.4	∞
Liquid Permittivity (measurement)	E.3.2 / 7.2.3.4	2.3	N	1.00	0.6	0.49	1.4	1.1	6
Combined Standard Uncertainty			RSS				11	11	372
Expanded Uncertainty (95% CONFIDENCE LEVEL)			*k*=2				22	22	

Appendix 6

Probe Calibration Certificate

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

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The Swiss Accreditation Service is one of the signatories to the EA Multilateral Agreement for the recognition of calibration certificates

Accreditation No.: SCS 108

Client **Motorola Beijing**

Certificate No: ES3-3180_Jan12

CALIBRATION CERTIFICATE

Object: ES3DV3 - SN:3180

Calibration procedure(s): QA CAL-01.v8, QA CAL-23.v4, QA CAL-25.v4
Calibration procedure for dosimetric E-field probes

Calibration date: January 11, 2012

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

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

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID	Cal Date (Certificate No.)	Scheduled Calibration
Power meter E4419B	GB41293874	31-Mar-11 (No. 217-01372)	Apr-12
Power sensor E4412A	MY41498087	31-Mar-11 (No. 217-01372)	Apr-12
Reference 3 dB Attenuator	SN: S5054 (3c)	29-Mar-11 (No. 217-01369)	Apr-12
Reference 20 dB Attenuator	SN: S5086 (20b)	29-Mar-11 (No. 217-01367)	Apr-12
Reference 30 dB Attenuator	SN: S5129 (30b)	29-Mar-11 (No. 217-01370)	Apr-12
Reference Probe ES3DV2	SN: 3013	29-Dec-11 (No. ES3-3013_Dec11)	Dec-12
DAE4	SN: 654	3-May-11 (No. DAE4-654_May11)	May-12
Secondary Standards	ID	Check Date (in house)	Scheduled Check
RF generator HP 8648C	US3642U01700	4-Aug-99 (in house check Apr-11)	In house check: Apr-13
Network Analyzer HP 8753E	US37390585	18-Oct-01 (in house check Oct-11)	In house check: Oct-12

	Name	Function	Signature
Calibrated by:	Jeton Kastrati	Laboratory Technician	
Approved by:	Katja Pokovic	Technical Manager	

Issued: January 13, 2012

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

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The Swiss Accreditation Service is one of the signatories to the EA Multilateral Agreement for the recognition of calibration certificates

Accreditation No.: SCS 108

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	modulation dependent linearization parameters
Polarization φ	φ rotation around probe axis
Polarization ϑ	ϑ rotation around an axis that is in the plane normal to probe axis (at measurement center), i.e., $\vartheta = 0$ is normal to probe axis

Calibration is Performed According to the Following Standards:

a) IEEE Std 1528-2003, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", December 2003
b) IEC 62209-1, "Procedure to measure the Specific Absorption Rate (SAR) for hand-held devices used in close proximity to the ear (frequency range of 300 MHz to 3 GHz)", February 2005

Methods Applied and Interpretation of Parameters:

- *NORMx,y,z:* Assessed for E-field polarization $\vartheta = 0$ ($f \leq 900$ MHz in TEM-cell; $f > 1800$ MHz: R22 waveguide). NORMx,y,z are only intermediate values, i.e., the uncertainties of NORMx,y,z does not affect 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 with CW signal (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 $f \leq 800$ MHz) and inside waveguide using analytical field distributions based on power measurements for $f > 800$ MHz. The same setups are used for assessment of the parameters applied for boundary compensation (alpha, depth) of which typical uncertainty values are given. These parameters are used in DASY4 software to improve probe accuracy close to the boundary. The sensitivity in TSL corresponds to *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 ± 50 MHz to ± 100 MHz.
- *Spherical isotropy (3D deviation from isotropy)*: in a field of low gradients realized using a flat phantom exposed by a patch antenna.
- *Sensor Offset*: The sensor offset corresponds to the offset of virtual measurement center from the probe tip (on probe axis). No tolerance required.

Probe ES3DV3

SN:3180

Manufactured: March 25, 2008
Calibrated: January 11, 2012

Calibrated for DASY/EASY Systems
(Note: non-compatible with DASY2 system!)

DASY/EASY - Parameters of Probe: ES3DV3 - SN:3180

Basic Calibration Parameters

	Sensor X	Sensor Y	Sensor Z	Unc (k=2)
Norm ($\mu V/(V/m)^2$)[A]	1.21	1.05	1.01	± 10.1 %
DCP (mV)[B]	101.4	103.7	103.5	

Modulation Calibration Parameters

UID	Communication System Name	PAR		A dB	B dB	C dB	VR mV	Unc[E] (k=2)
10000	CW	0.00	X	0.00	0.00	1.00	107.7	±3.0 %
			Y	0.00	0.00	1.00	103.4	
			Z	0.00	0.00	1.00	92.6	

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 NormX,Y,Z do not affect the E^2-field uncertainty inside TSL (see Pages 5 and 6).
[B] Numerical linearization parameter: uncertainty not required.
[E] Uncertainty is determined using the max. deviation from linear response applying rectangular distribution and is expressed for the square of the field value.

DASY/EASY - Parameters of Probe: ES3DV3 - SN:3180

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	Depth (mm)	Unct. (k=2)
750	41.9	0.89	6.30	6.30	6.30	0.26	1.99	± 12.0 %
835	41.5	0.90	6.07	6.07	6.07	0.41	1.56	± 12.0 %
1810	40.0	1.40	5.20	5.20	5.20	0.43	1.56	± 12.0 %
1950	40.0	1.40	4.97	4.97	4.97	0.72	1.23	± 12.0 %
2450	39.2	1.80	4.51	4.51	4.51	0.77	1.33	± 12.0 %

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

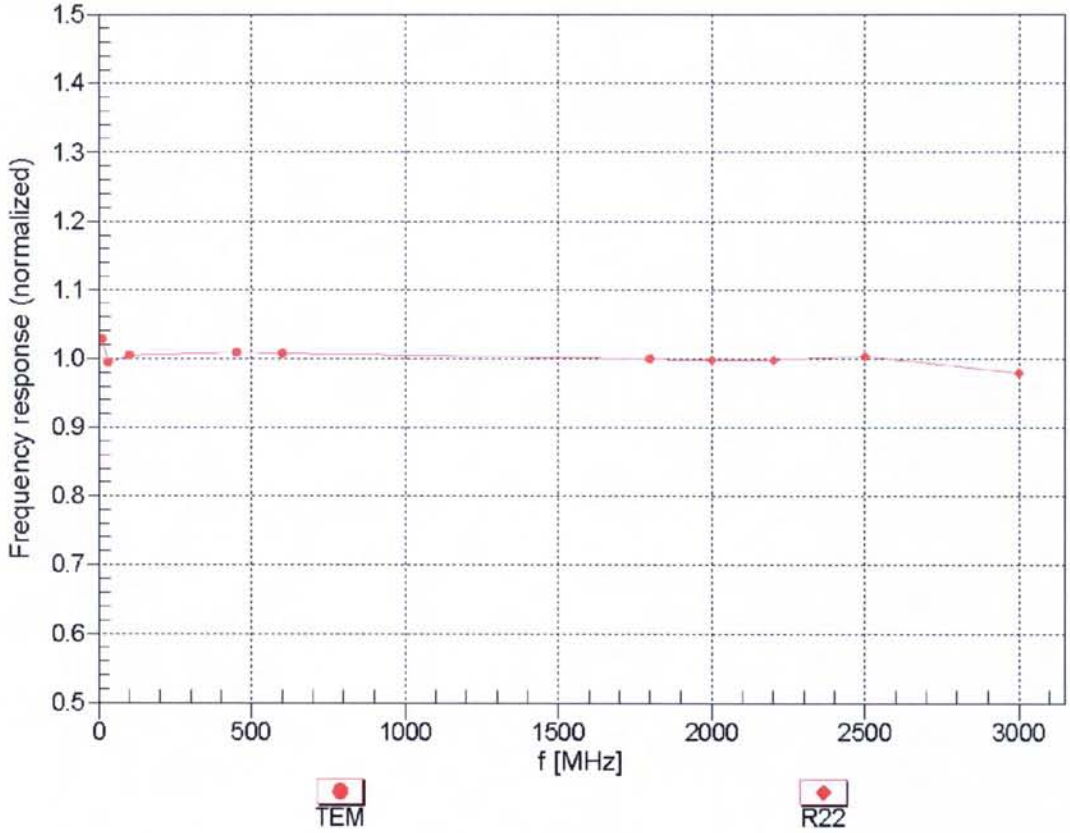
DASY/EASY - Parameters of Probe: ES3DV3 - SN:3180

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	Depth (mm)	Unct. (k=2)
750	55.5	0.96	6.06	6.06	6.06	0.35	1.71	± 12.0 %
835	55.2	0.97	5.97	5.97	5.97	0.52	1.36	± 12.0 %
1810	53.3	1.52	5.09	5.09	5.09	0.65	1.58	± 12.0 %
1950	53.3	1.52	5.03	5.03	5.03	0.64	1.52	± 12.0 %
2450	52.7	1.95	4.46	4.46	4.46	0.80	1.21	± 12.0 %

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

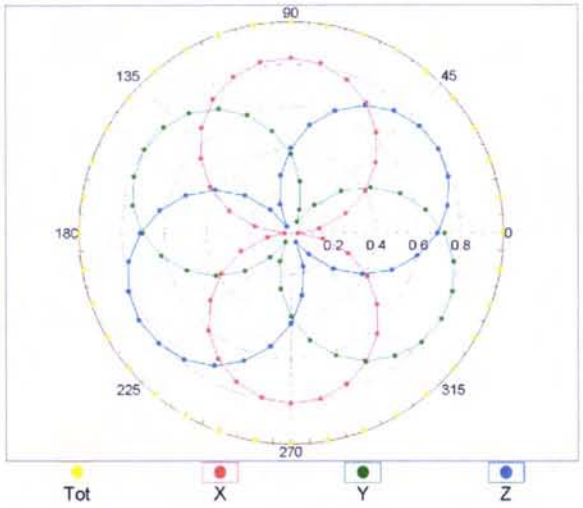
Frequency Response of E-Field
(TEM-Cell:ifi110 EXX, Waveguide: R22)



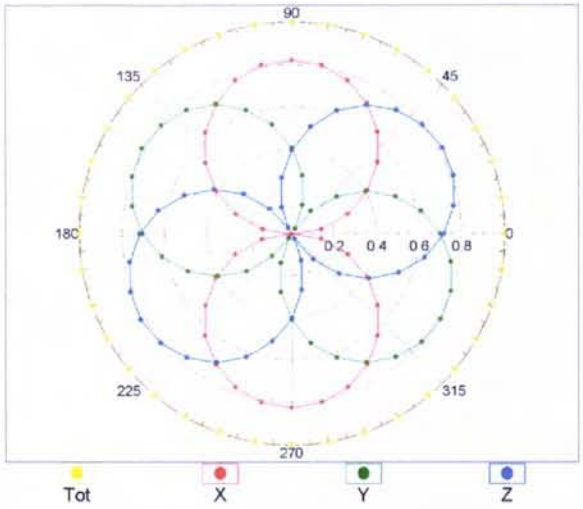
Uncertainty of Frequency Response of E-field: ± 6.3% (k=2)

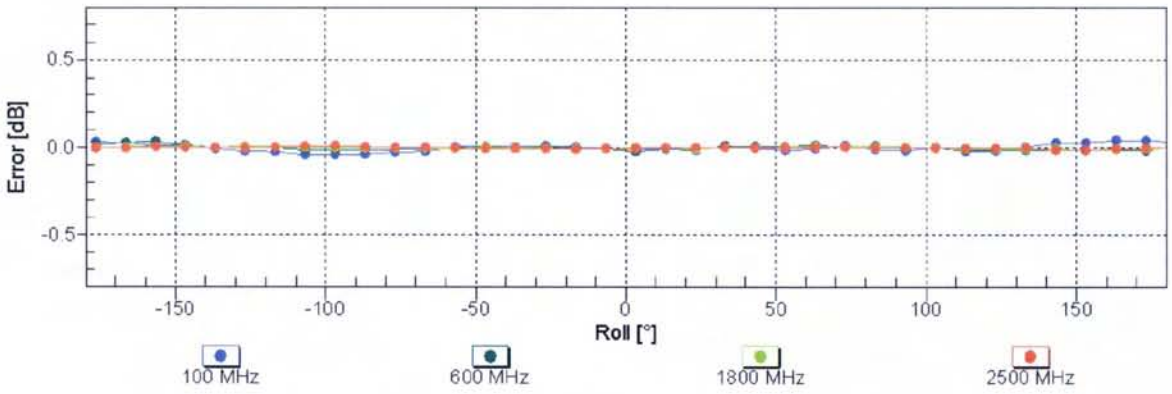
Receiving Pattern (ϕ), ϑ = 0°

f=600 MHz,TEM



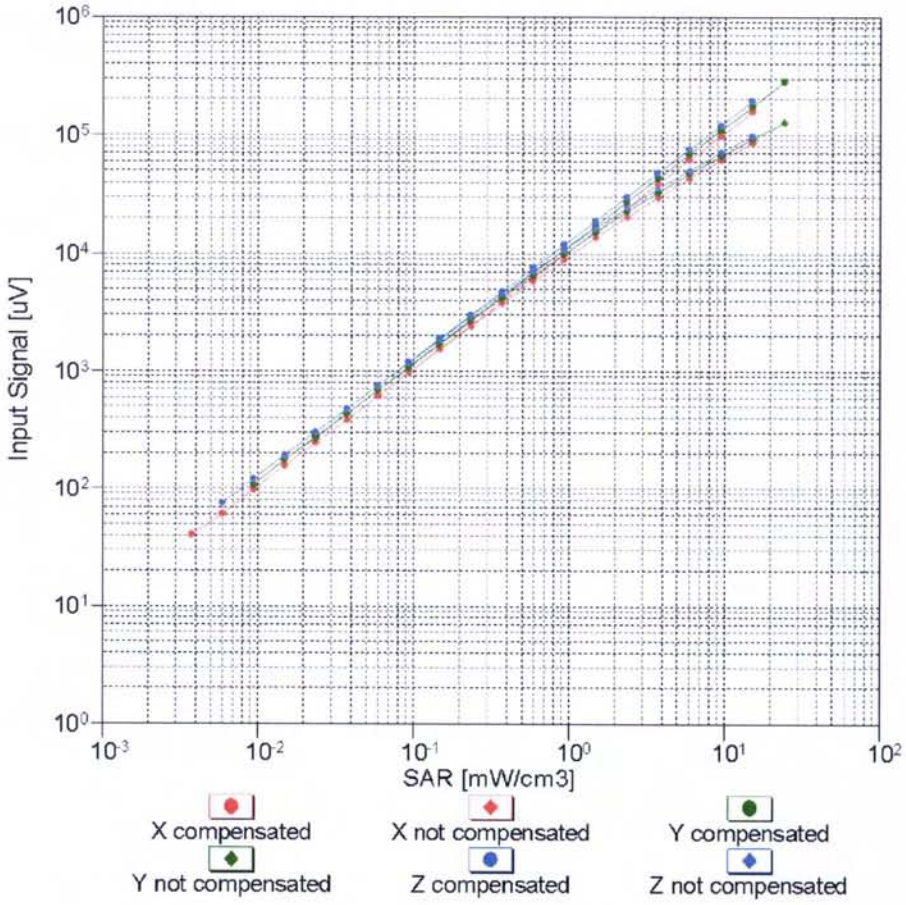
f=1800 MHz,R22

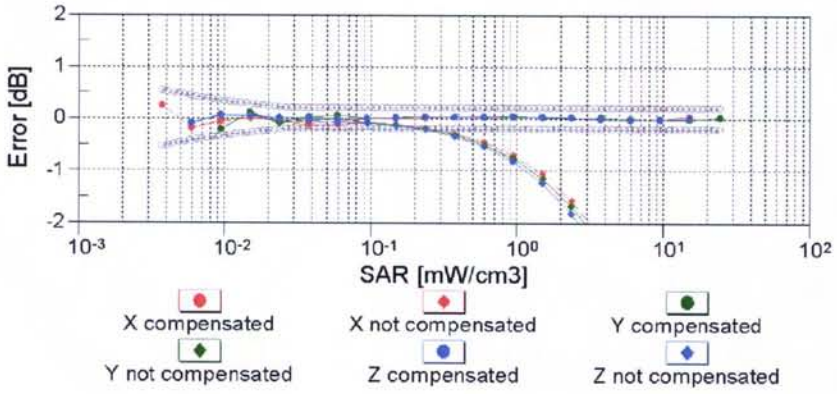




Uncertainty of Axial Isotropy Assessment: ± 0.5% (k=2)

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

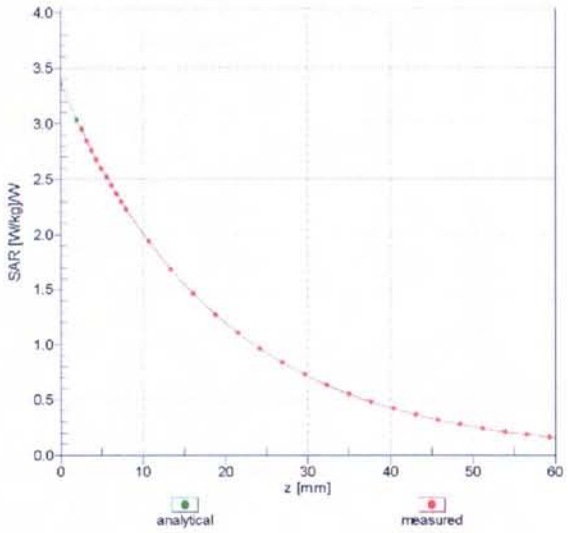




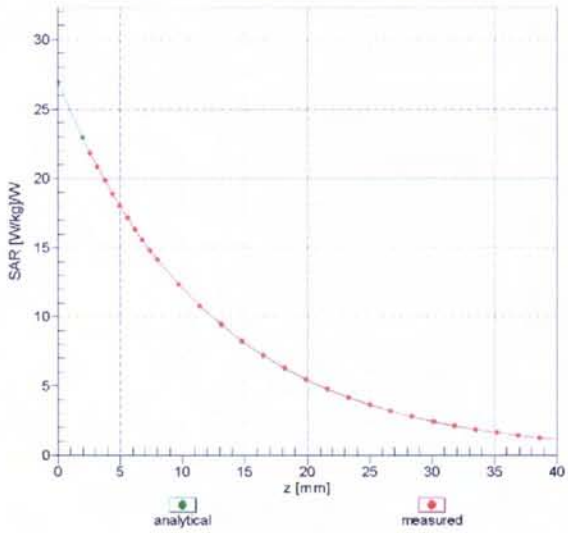
Uncertainty of Linearity Assessment: ± 0.6% (k=2)

Conversion Factor Assessment

f = 835 MHz,WGLS R9 (H_convF)

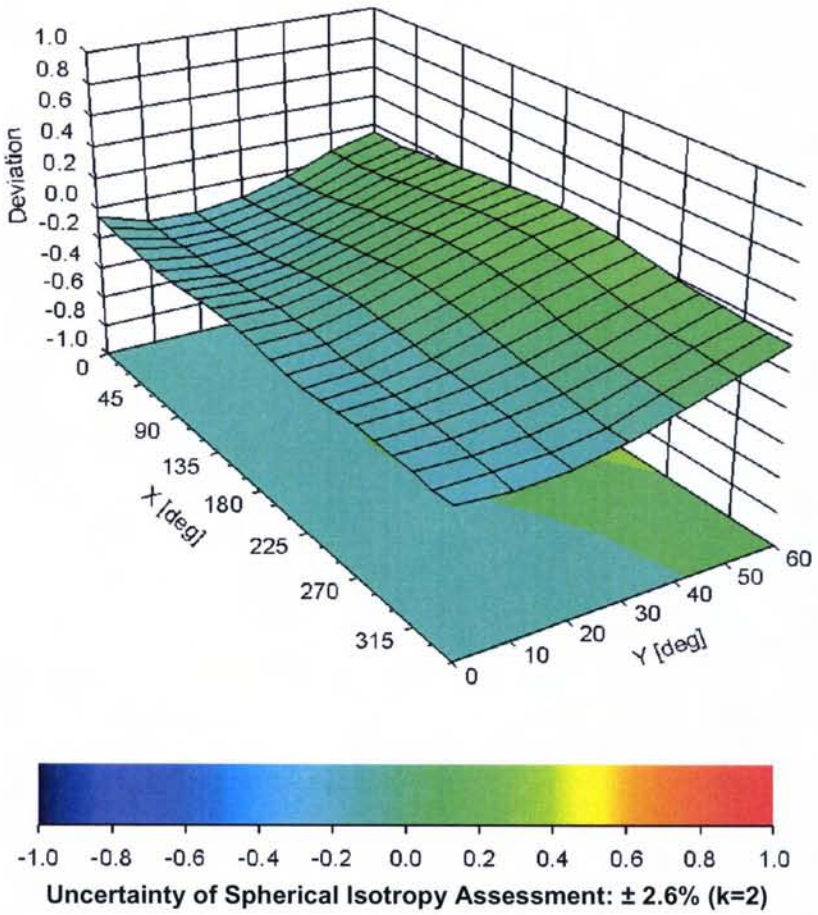


f = 1810 MHz,WGLS R22 (H_convF)



Deviation from Isotropy in Liquid

Error (ϕ, ϑ), f = 900 MHz



Uncertainty of Spherical Isotropy Assessment: ± 2.6% (k=2)

DASY/EASY - Parameters of Probe: ES3DV3 - SN:3180

Other Probe Parameters

Sensor Arrangement	Triangular
Connector Angle (°)	Not applicable
Mechanical Surface Detection Mode	enabled
Optical Surface Detection Mode	disabled
Probe Overall Length	337 mm
Probe Body Diameter	10 mm
Tip Length	10 mm
Tip Diameter	4 mm
Probe Tip to Sensor X Calibration Point	2 mm
Probe Tip to Sensor Y Calibration Point	2 mm
Probe Tip to Sensor Z Calibration Point	2 mm
Recommended Measurement Distance from Surface	3 mm

Appendix 6

Dipole Characterization Certificate

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

S Schweizerischer Kalibrierdienst
C Service suisse d'étalonnage
S Servizio svizzero di taratura
S Swiss Calibration Service

Accredited by the Swiss Accreditation Service (SAS)
The Swiss Accreditation Service is one of the signatories to the EA Multilateral Agreement for the recognition of calibration certificates

Accreditation No.: SCS 108

Client Motorola MDb

Certificate No: D835V2-425_Jul11

CALIBRATION CERTIFICATE

Object	D835V2 - SN: 425
Calibration procedure(s)	QA CAL-05.v8 Calibration procedure for dipole validation kits above 700 MHz
Calibration date:	July 08, 2011

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

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

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Power meter EPM-442A	GB37480704	06-Oct-10 (No. 217-01266)	Oct-11
Power sensor HP 8481A	US37292783	06-Oct-10 (No. 217-01266)	Oct-11
Reference 20 dB Attenuator	SN: S5086 (20b)	29-Mar-11 (No. 217-01367)	Apr-12
Type-N mismatch combination	SN: 5047.2 / 06327	29-Mar-11 (No. 217-01371)	Apr-12
Reference Probe ES3DV3	SN: 3205	29-Apr-11 (No. ES3-3205_Apr11)	Apr-12
DAE4	SN: 601	04-Jul-11 (No. DAE4-601_Jul11)	Jul-12

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power sensor HP 8481A	MY41092317	18-Oct-02 (in house check Oct-09)	In house check: Oct-11
RF generator R&S SMT-06	100005	04-Aug-99 (in house check Oct-09)	In house check: Oct-11
Network Analyzer HP 8753E	US37390585 S4206	18-Oct-01 (in house check Oct-10)	In house check: Oct-11

	Name	Function	Signature
Calibrated by:	Jeton Kastrati	Laboratory Technician	
Approved by:	Katja Pokovic	Technical Manager	

Issued: July 12, 2011

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 1528-2003, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", December 2003
b) IEC 62209-1, "Procedure to measure the Specific Absorption Rate (SAR) for hand-held devices used in close proximity to the ear (frequency range of 300 MHz to 3 GHz)", February 2005
c) Federal Communications Commission Office of Engineering & Technology (FCC OET), "Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields; Additional Information for Evaluating Compliance of Mobile and Portable Devices with FCC Limits for Human Exposure to Radiofrequency Emissions", Supplement C (Edition 01-01) to Bulletin 65

Additional Documentation:

d) 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.

Measurement Conditions

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

DASY Version	DASY5	V52.6.2
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom	
Distance Dipole Center - TSL	15 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	835 MHz ± 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Head TSL parameters	22.0 °C	41.5	0.90 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	41.0 ± 6 %	0.88 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	----	----

SAR result with Head TSL

SAR averaged over 1 cm^3 (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	2.25 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	**9.13 mW /g ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Head TSL	condition	
SAR measured	250 mW input power	1.47 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	**5.94 mW /g ± 16.5 % (k=2)**

Body TSL parameters

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Body TSL parameters	22.0 °C	55.2	0.97 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	53.8 ± 6 %	0.98 mho/m ± 6 %
Body TSL temperature change during test	< 0.5 °C	----	----

SAR result with Body TSL

SAR averaged over 1 cm^3 (1 g) of Body TSL	Condition	
SAR measured	250 mW input power	2.37 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	**9.35 mW / g ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Body TSL	condition	
SAR measured	250 mW input power	1.56 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	**6.18 mW / g ± 16.5 % (k=2)**

Appendix

Antenna Parameters with Head TSL

Impedance, transformed to feed point	53.0 Ω + 2.7 jΩ
Return Loss	- 28.2 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	49.1 Ω + 2.2 jΩ
Return Loss	- 32.4 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.401 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.
No excessive force must be applied to the dipole arms, because they might bend or the soldered connections near the feedpoint may be damaged.

Design Modification by End User

The dipole has been modified with Teflon Rings (TR) placed within identified markings close to the end of each dipole arm. Calibration has been performed with TR attached to the dipole

Additional EUT Data

Manufactured by	SPEAG
Manufactured on	August 24, 2000

DASY5 Validation Report for Head TSL

Date: 08.07.2011

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN: 425

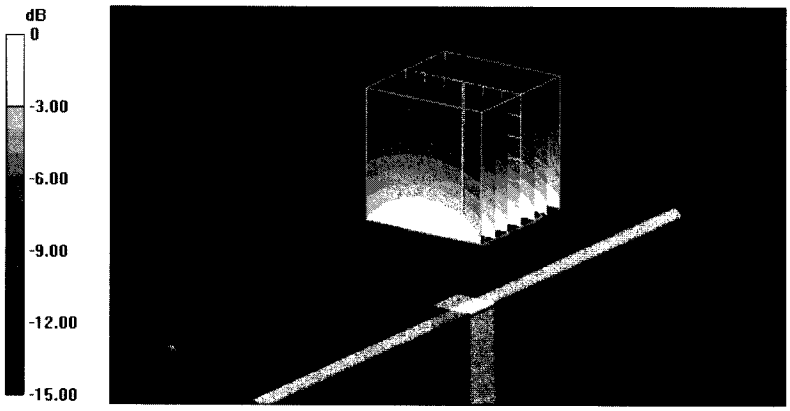
Communication System: CW; Frequency: 835 MHz
Medium parameters used: f = 835 MHz; σ = 0.88 mho/m; ε_r = 41; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY52 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(6.07, 6.07, 6.07); Calibrated: 29.04.2011
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 04.07.2011
- Phantom: Flat Phantom 4.9L; Type: QD000P49AA; Serial: 1001
- DASY52 52.6.2(482); SEMCAD X 14.4.5(3634)

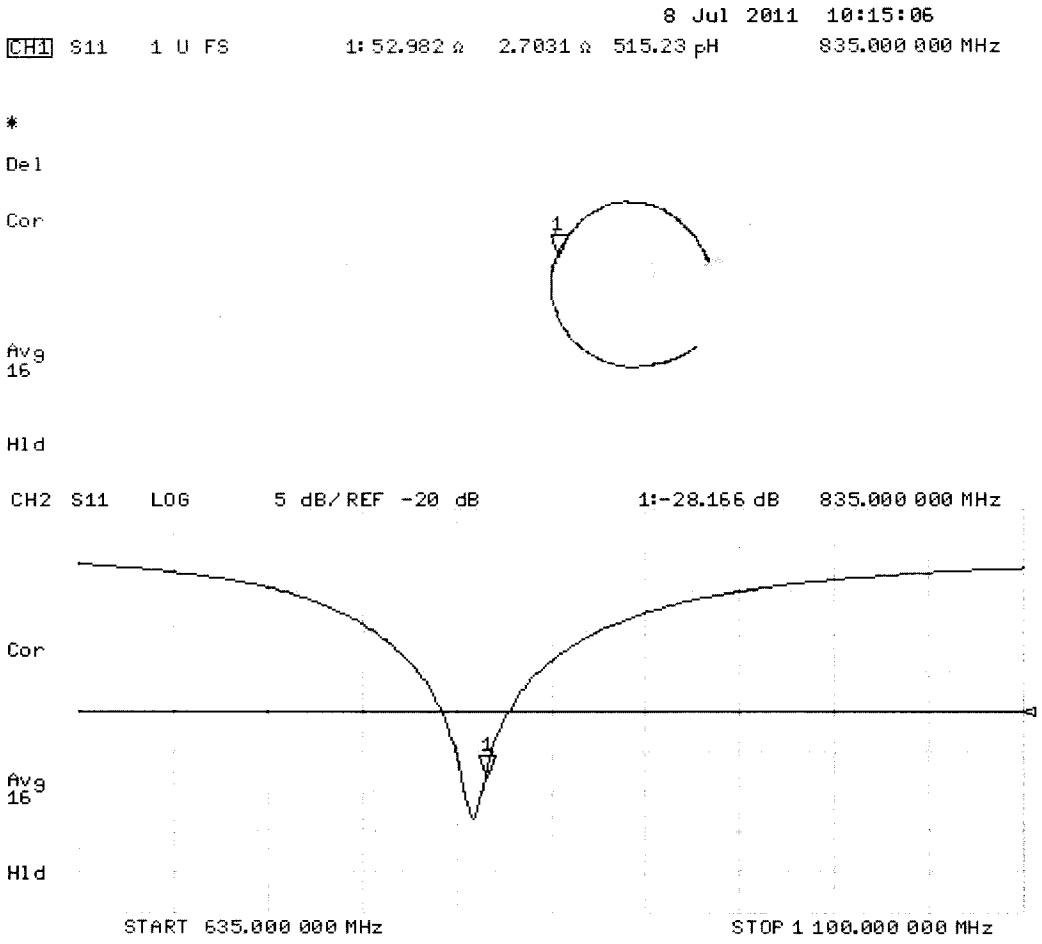
Dipole Calibration for Head Tissue/Pin=250 mW, d=15mm/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 56.396 V/m; Power Drift = 0.004 dB
Peak SAR (extrapolated) = 3.296 W/kg
SAR(1 g) = 2.25 mW/g; SAR(10 g) = 1.47 mW/g
Maximum value of SAR (measured) = 2.624 mW/g



0 dB = 2.620mW/g

Impedance Measurement Plot for Head TSL



DASY5 Validation Report for Body TSL

Date: 08.07.2011

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN: 425

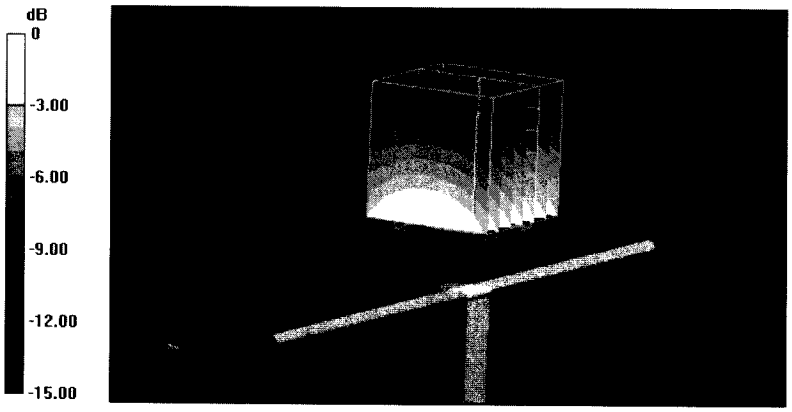
Communication System: CW; Frequency: 835 MHz
Medium parameters used: f = 835 MHz; σ = 0.98 mho/m; ε_r = 53.8; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY52 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(6.02, 6.02, 6.02); Calibrated: 29.04.2011
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 04.07.2011
- Phantom: Flat Phantom 4.9L; Type: QD000P49AA; Serial: 1001
- DASY52 52.6.2(482); SEMCAD X 14.4.5(3634)

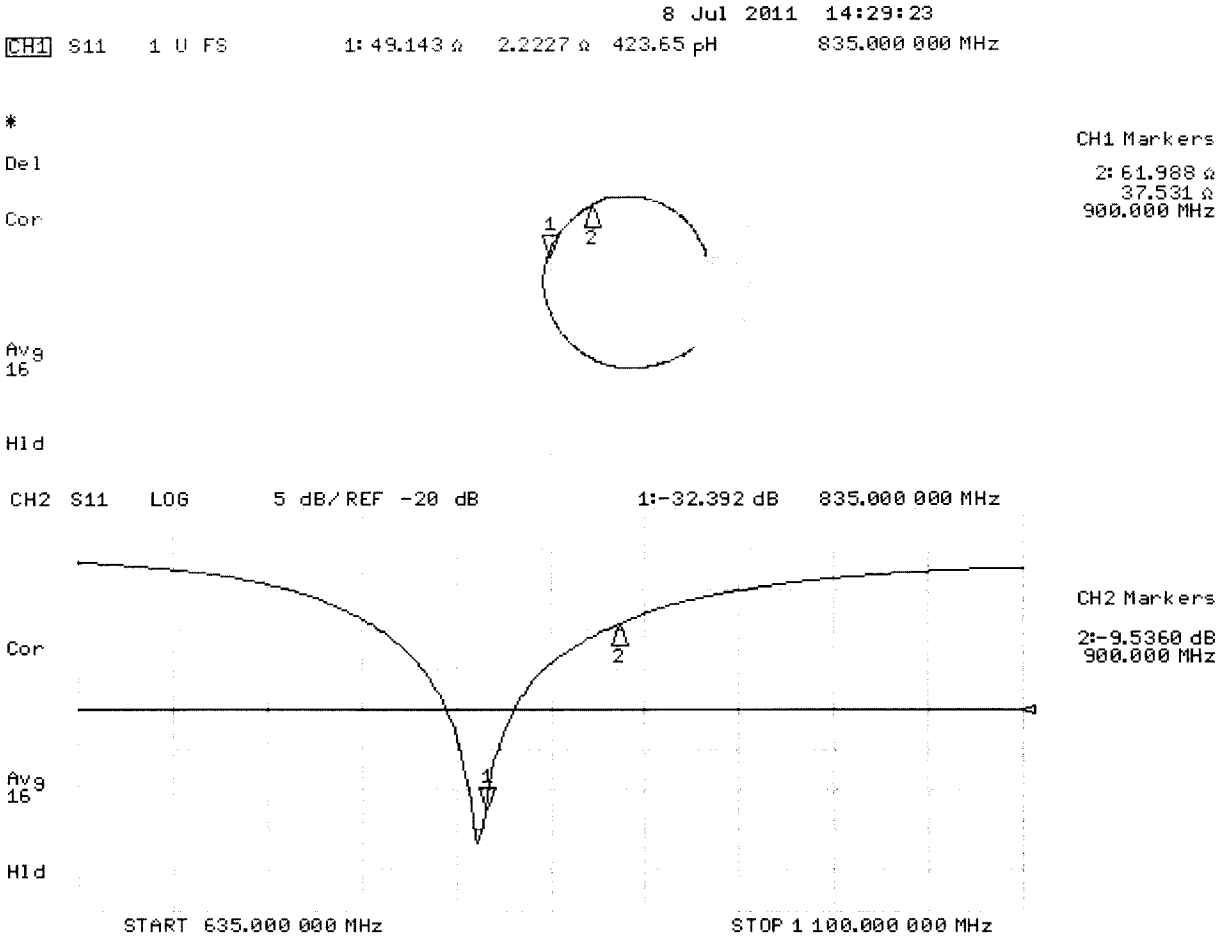
Dipole Calibration for Body Tissue/Pin=250 mW, d=15mm/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 55.024 V/m; Power Drift = 0.02 dB
Peak SAR (extrapolated) = 3.431 W/kg
SAR(1 g) = 2.37 mW/g; SAR(10 g) = 1.56 mW/g
Maximum value of SAR (measured) = 2.759 mW/g



0 dB = 2.760mW/g

Impedance Measurement Plot for Body TSL



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Accreditation No.: SCS 108

Client **Motorola Beijing**

Certificate No: D1800V2-2d129_Jul11

CALIBRATION CERTIFICATE

Object: D1800V2 - SN: 2d129

Calibration procedure(s): QA CAL-05.v8
Calibration procedure for dipole validation kits above 700 MHz

Calibration date: July 22, 2011

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

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

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Power meter EPM-442A	GB37480704	06-Oct-10 (No. 217-01266)	Oct-11
Power sensor HP 8481A	US37292783	06-Oct-10 (No. 217-01266)	Oct-11
Reference 20 dB Attenuator	SN: S5086 (20b)	29-Mar-11 (No. 217-01367)	Apr-12
Type-N mismatch combination	SN: 5047.2 / 06327	29-Mar-11 (No. 217-01371)	Apr-12
Reference Probe ES3DV3	SN: 3205	29-Apr-11 (No. ES3-3205_Apr11)	Apr-12
DAE4	SN: 601	04-Jul-11 (No. DAE4-601_Jul11)	Jul-12

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power sensor HP 8481A	MY41092317	18-Oct-02 (in house check Oct-09)	In house check: Oct-11
RF generator R&S SMT-06	100005	04-Aug-99 (in house check Oct-09)	In house check: Oct-11
Network Analyzer HP 8753E	US37390585 S4206	18-Oct-01 (in house check Oct-10)	In house check: Oct-11

	Name	Function	Signature
Calibrated by:	Dimce Iliev	Laboratory Technician	
Approved by:	Katja Pokovic	Technical Manager	

Issued: July 22, 2011

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 1528-2003, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", December 2003
b) IEC 62209-1, "Procedure to measure the Specific Absorption Rate (SAR) for hand-held devices used in close proximity to the ear (frequency range of 300 MHz to 3 GHz)", February 2005
c) Federal Communications Commission Office of Engineering & Technology (FCC OET), "Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields; Additional Information for Evaluating Compliance of Mobile and Portable Devices with FCC Limits for Human Exposure to Radiofrequency Emissions", Supplement C (Edition 01-01) to Bulletin 65

Additional Documentation:

d) 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.

Measurement Conditions

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

DASY Version	DASY5	V52.6.2
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom	
Distance Dipole Center - TSL	10 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	1800 MHz ± 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Head TSL parameters	22.0 °C	40.0	1.40 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	39.2 ± 6 %	1.37 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	----	----

SAR result with Head TSL

SAR averaged over 1 cm^3 (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	9.55 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	**38.5 mW /g ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Head TSL	condition	
SAR measured	250 mW input power	5.04 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	**20.2 mW /g ± 16.5 % (k=2)**

Body TSL parameters

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Body TSL parameters	22.0 °C	53.3	1.52 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	52.2 ± 6 %	1.50 mho/m ± 6 %
Body TSL temperature change during test	< 0.5 °C	----	----

SAR result with Body TSL

SAR averaged over 1 cm^3 (1 g) of Body TSL	Condition	
SAR measured	250 mW input power	9.67 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	**38.8 mW / g ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Body TSL	condition	
SAR measured	250 mW input power	5.14 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	**20.6 mW / g ± 16.5 % (k=2)**

Appendix

Antenna Parameters with Head TSL

Impedance, transformed to feed point	48.4 Ω - 2.3 jΩ
Return Loss	- 31.0 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	43.8 Ω - 2.8 jΩ
Return Loss	- 22.8 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.209 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.
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
Manufactured on	July 27, 2005

DASY5 Validation Report for Head TSL

Date: 20.07.2011

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 1800 MHz; Type: D1800V2; Serial: D1800V2 - SN: 2d129

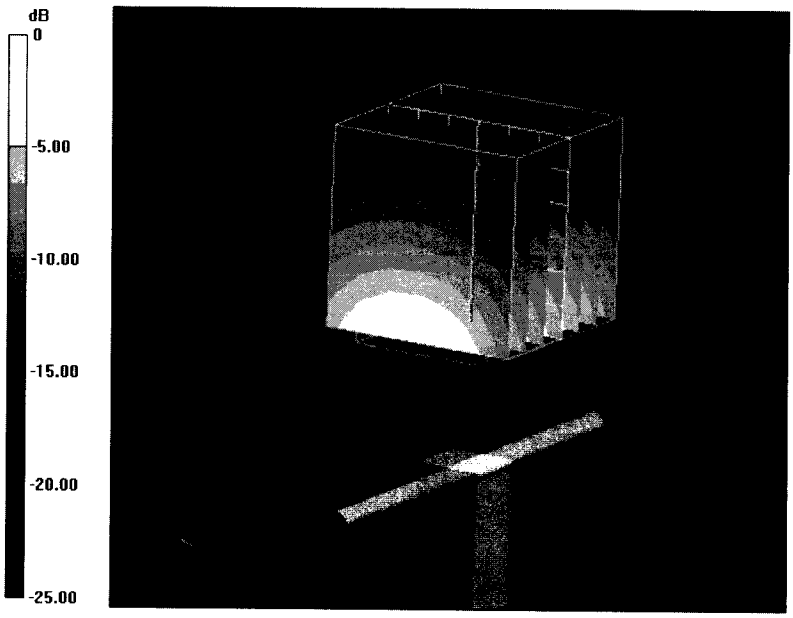
Communication System: CW; Frequency: 1800 MHz
Medium parameters used: f = 1800 MHz; σ = 1.37 mho/m; ε_r = 39.2; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY52 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(5.07, 5.07, 5.07); Calibrated: 29.04.2011
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 04.07.2011
- Phantom: Flat Phantom 5.0 (front); Type: QD000P50AA; Serial: 1001
- DASY52 52.6.2(482); SEMCAD X 14.4.5(3634)

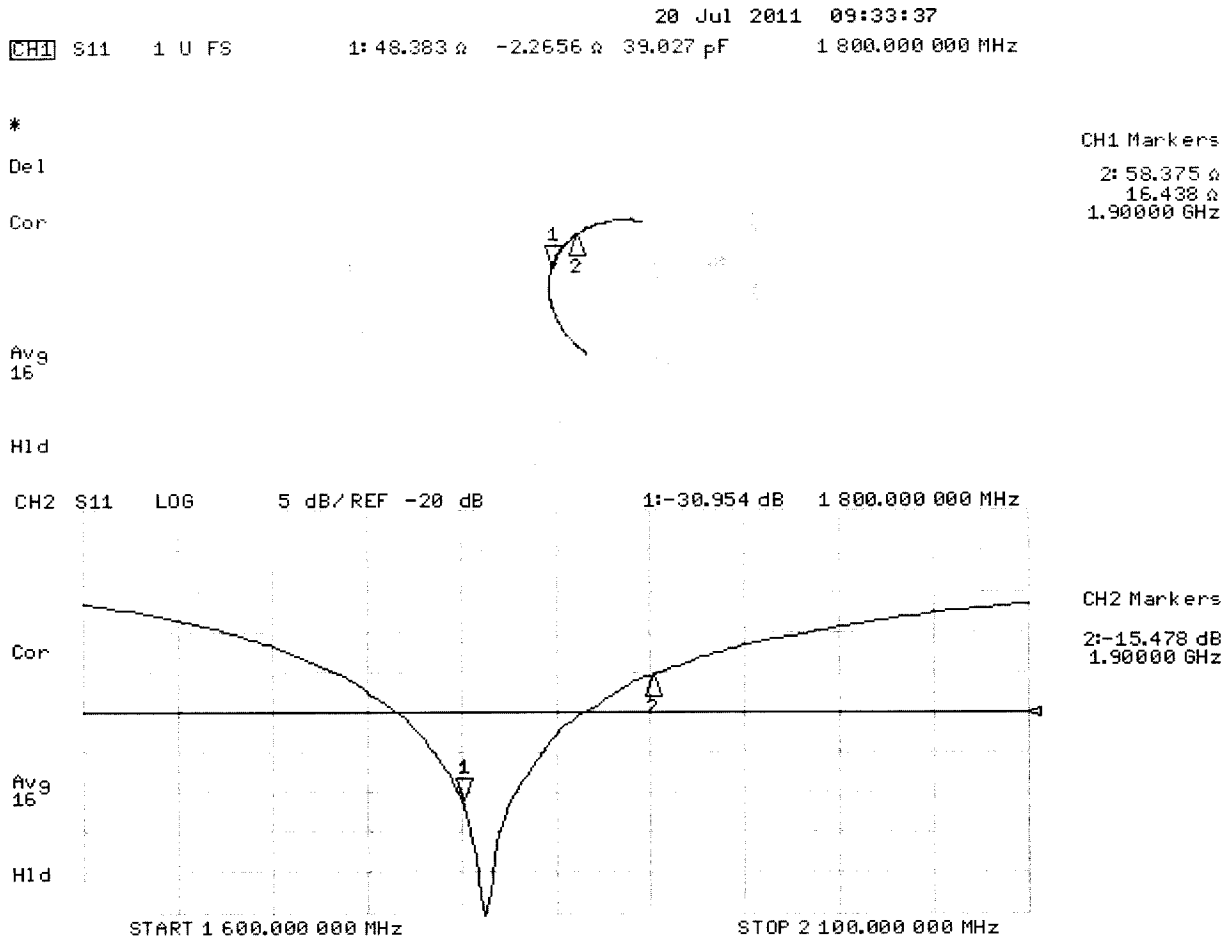
Dipole Calibration for Head Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 97.826 V/m; Power Drift = 0.02 dB
Peak SAR (extrapolated) = 17.101 W/kg
SAR(1 g) = 9.55 mW/g; SAR(10 g) = 5.04 mW/g
Maximum value of SAR (measured) = 12.040 mW/g



0 dB = 12.040mW/g

Impedance Measurement Plot for Head TSL



Date: 22.07.2011

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 1800 MHz; Type: D1800V2; Serial: D1800V2 - SN: 2d129

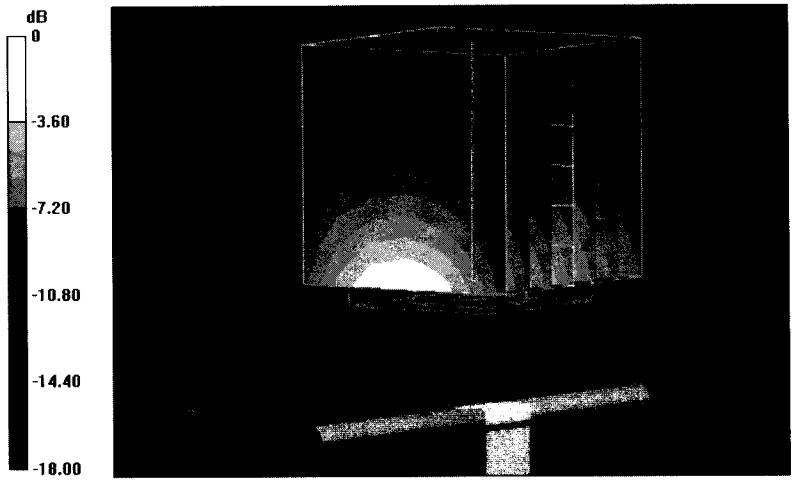
Communication System: CW; Frequency: 1800 MHz
Medium parameters used: f = 1800 MHz; σ = 1.5 mho/m; ε_r = 52.2; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY52 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(4.74, 4.74, 4.74); Calibrated: 29.04.2011
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 04.07.2011
- Phantom: Flat Phantom 5.0 (back); Type: QD000P50AA; Serial: 1002
- DASY52 52.6.2(482); SEMCAD X 14.4.5(3634)

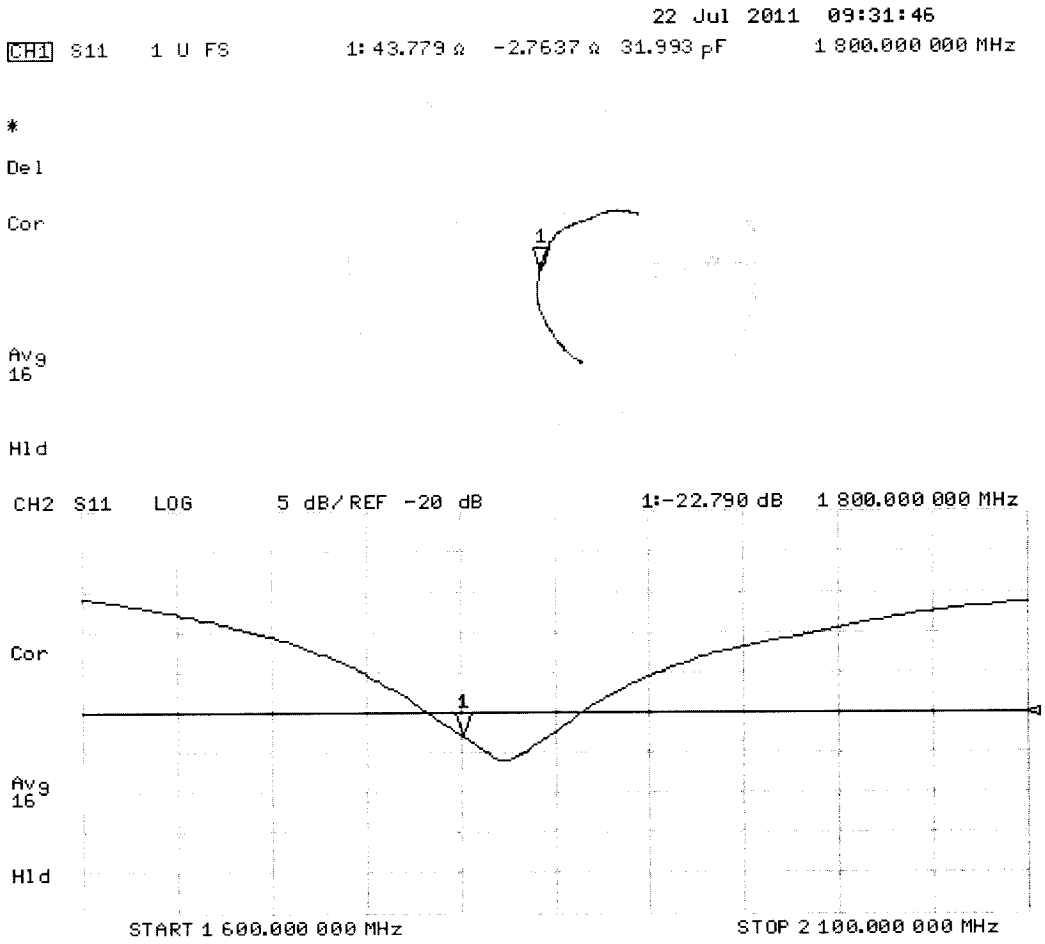
Dipole Calibration for Body Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 94.128 V/m; Power Drift = -0.03 dB
Peak SAR (extrapolated) = 16.950 W/kg
SAR(1 g) = 9.67 mW/g; SAR(10 g) = 5.14 mW/g
Maximum value of SAR (measured) = 12.225 mW/g



0 dB = 12.220mW/g

Impedance Measurement Plot for Body TSL



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Accreditation No.: SCS 108

Client **Motorola Beijing**

Certificate No: D2450V2-788_Jul11

CALIBRATION CERTIFICATE

Object: D2450V2 - SN: 788

Calibration procedure(s): QA CAL-05.v8
Calibration procedure for dipole validation kits above 700 MHz

Calibration date: July 12, 2011

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

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

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Power meter EPM-442A	GB37480704	06-Oct-10 (No. 217-01266)	Oct-11
Power sensor HP 8481A	US37292783	06-Oct-10 (No. 217-01266)	Oct-11
Reference 20 dB Attenuator	SN: S5086 (20b)	29-Mar-11 (No. 217-01367)	Apr-12
Type-N mismatch combination	SN: 5047.2 / 06327	29-Mar-11 (No. 217-01371)	Apr-12
Reference Probe ES3DV3	SN: 3205	29-Apr-11 (No. ES3-3205_Apr11)	Apr-12
DAE4	SN: 601	04-Jul-11 (No. DAE4-601_Jul11)	Jul-12

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power sensor HP 8481A	MY41092317	18-Oct-02 (in house check Oct-09)	In house check: Oct-11
RF generator R&S SMT-06	100005	04-Aug-99 (in house check Oct-09)	In house check: Oct-11
Network Analyzer HP 8753E	US37390585 S4206	18-Oct-01 (in house check Oct-10)	In house check: Oct-11

	Name	Function	Signature
Calibrated by:	Dimce Iliev	Laboratory Technician	
Approved by:	Katja Pokovic	Technical Manager	

Issued: July 12, 2011

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Accreditation No.: SCS 108

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 1528-2003, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", December 2003
b) IEC 62209-1, "Procedure to measure the Specific Absorption Rate (SAR) for hand-held devices used in close proximity to the ear (frequency range of 300 MHz to 3 GHz)", February 2005
c) Federal Communications Commission Office of Engineering & Technology (FCC OET), "Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields; Additional Information for Evaluating Compliance of Mobile and Portable Devices with FCC Limits for Human Exposure to Radiofrequency Emissions", Supplement C (Edition 01-01) to Bulletin 65

Additional Documentation:

d) 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.

Measurement Conditions

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

DASY Version	DASY5	V52.6.2
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom	
Distance Dipole Center - TSL	10 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	2450 MHz ± 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Head TSL parameters	22.0 °C	39.2	1.80 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	38.9 ± 6 %	1.85 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	----	----

SAR result with Head TSL

SAR averaged over 1 cm^3 (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	14.0 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	**55.2 mW /g ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Head TSL	condition	
SAR measured	250 mW input power	6.49 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	**25.8 mW /g ± 16.5 % (k=2)**

Body TSL parameters

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Body TSL parameters	22.0 °C	52.7	1.95 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	51.7 ± 6 %	2.00 mho/m ± 6 %
Body TSL temperature change during test	< 0.5 °C	----	----

SAR result with Body TSL

SAR averaged over 1 cm^3 (1 g) of Body TSL	Condition	
SAR measured	250 mW input power	13.0 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	**51.2 mW / g ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Body TSL	condition	
SAR measured	250 mW input power	6.02 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	**23.9 mW / g ± 16.5 % (k=2)**

Appendix

Antenna Parameters with Head TSL

Impedance, transformed to feed point	55.0 Ω + 4.3 jΩ
Return Loss	- 24.1 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	49.9 Ω + 5.6 jΩ
Return Loss	- 25.0 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.155 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.
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
Manufactured on	January 24, 2006

Date: 7/12/2011

Test Laboratory: SPEAG

DUT: Dipole 2450 MHz; Type: D2450V2; Serial: D2450V2 - SN: 788

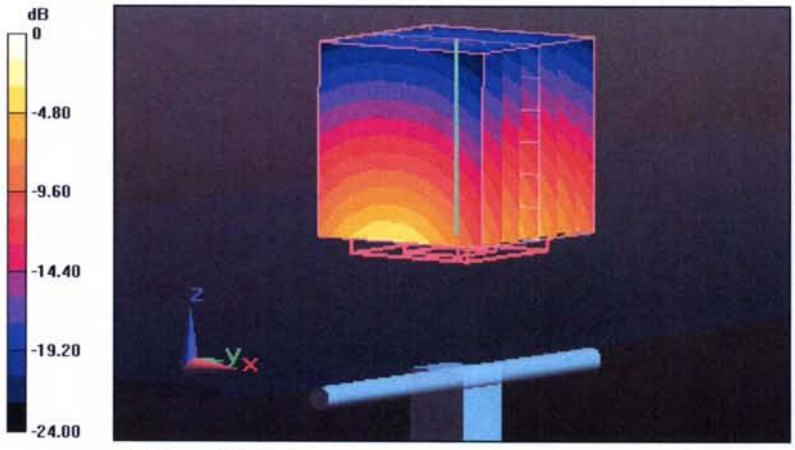
Communication System: CW; Frequency: 2450 MHz; Duty Cycle: 1:1
Medium: HBBL 1900-3800V3
Medium parameters used: f = 2450 MHz; σ = 1.85 mho/m; ε_r = 38.9; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(4.45, 4.45, 4.45); Calibrated: 4/29/2011
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 7/4/2011
- Phantom: Flat Phantom 5.0 (front); Type: QD000P50AA; Serial: 1001
- Measurement SW: DASY52, Version 52.6 (2)
- SEMCAD X Version 14.4.5 (3634)

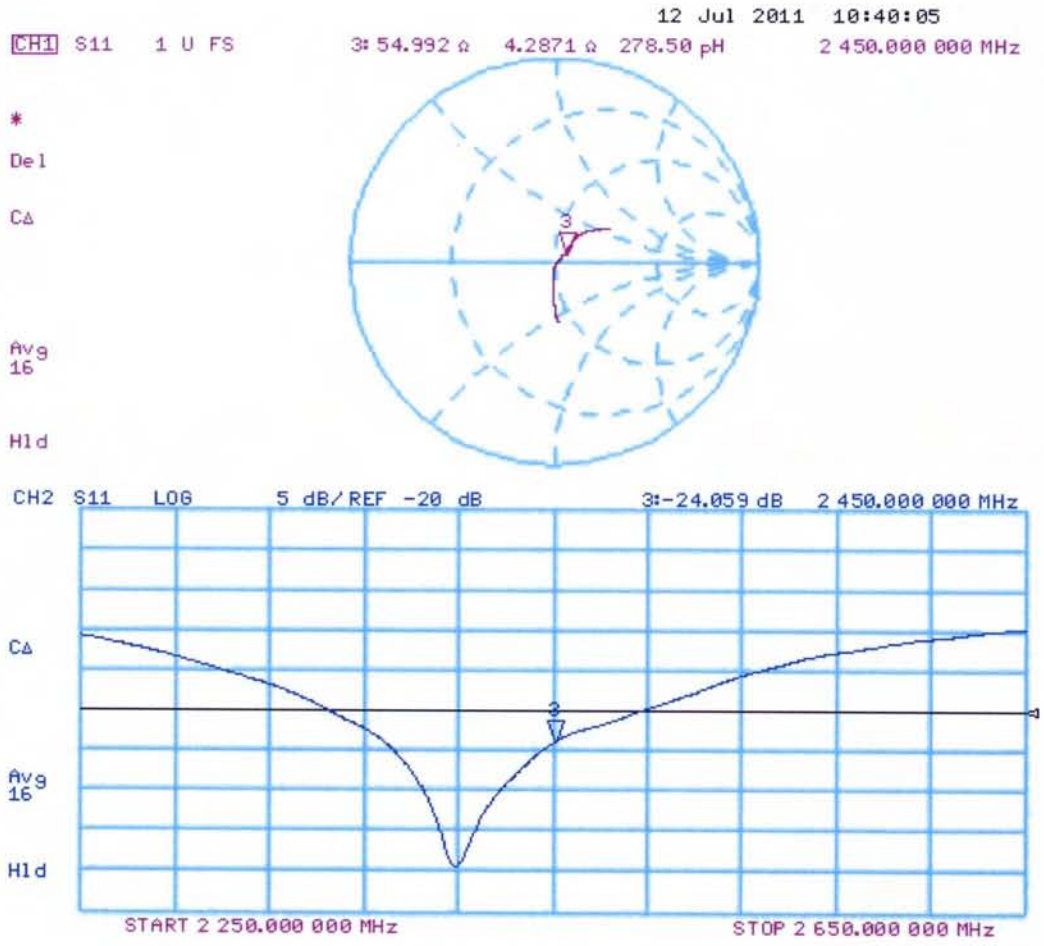
Dipole Calibration for Head Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 102.3 V/m; Power Drift = 0.04 dB
Peak SAR (extrapolated) = 28.847 W/kg
SAR(1 g) = 14 mW/g; SAR(10 g) = 6.49 mW/g
Maximum value of SAR (measured) = 17.898 mW/g



0 dB = 17.900mW/g

Impedance Measurement Plot for Head TSL



DASY5 Validation Report for Body TSL

Date: 12.07.2011

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 2450 MHz; Type: D2450V2; Serial: D2450V2 - SN: 788

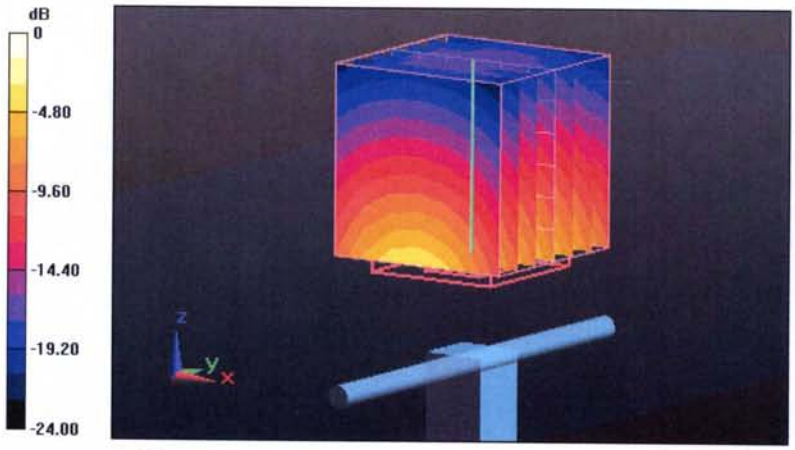
Communication System: CW; Frequency: 2450 MHz
Medium parameters used: f = 2450 MHz; σ = 2 mho/m; ε_r = 51.7; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY52 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(4.26, 4.26, 4.26); Calibrated: 29.04.2011
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 04.07.2011
- Phantom: Flat Phantom 5.0 (back); Type: QD000P50AA; Serial: 1002
- DASY52 52.6.2(482); SEMCAD X 14.4.5(3634)

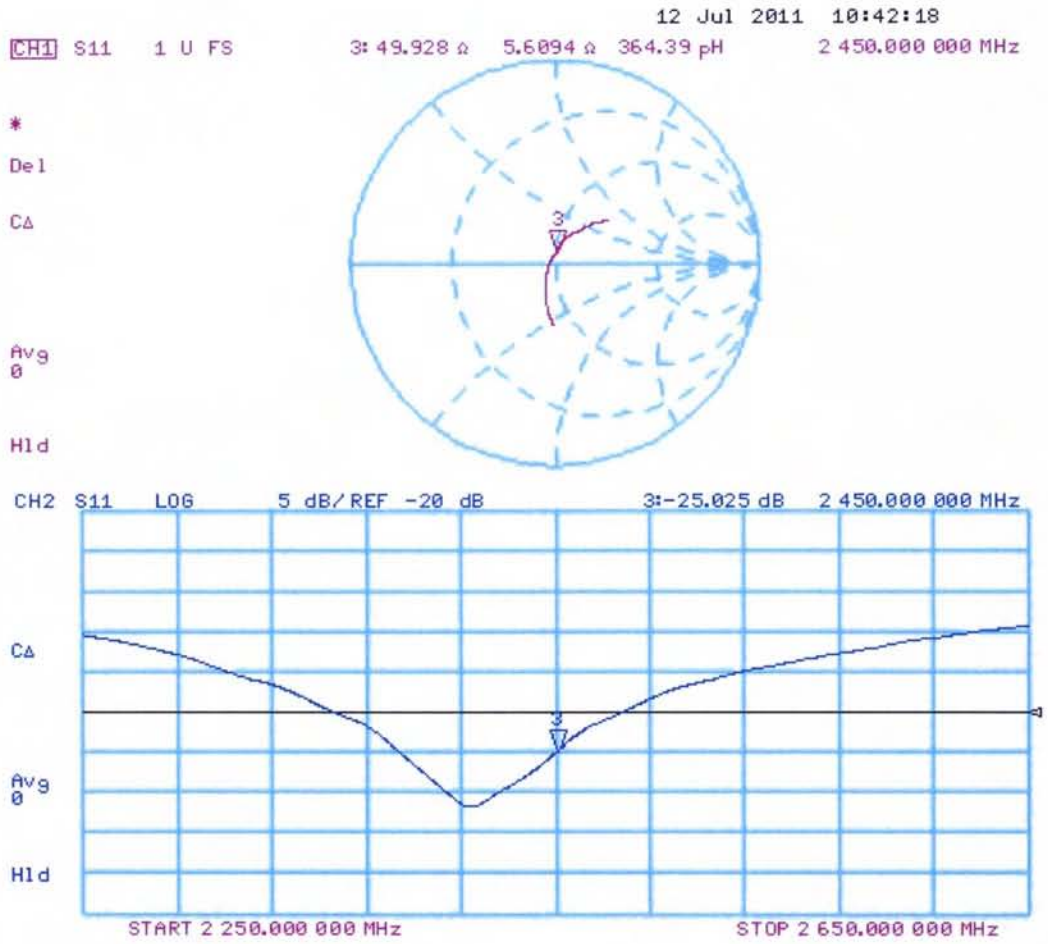
Dipole Calibration for Body Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 96.028 V/m; Power Drift = 0.01 dB
Peak SAR (extrapolated) = 26.823 W/kg
SAR(1 g) = 13 mW/g; SAR(10 g) = 6.02 mW/g
Maximum value of SAR (measured) = 17.108 mW/g



0 dB = 17.110mW/g

Impedance Measurement Plot for Body TSL



END OF REPORT