

## WLAN 2450 MHz Body SAR Test

Date: 2014-01-04

Test Laboratory: SGS Korea (Gunpo Laboratory)  
 File Name: [WLAN\\_Base\\_802.11b\\_1Mbps\\_CH6\\_Main\\_Ant.da4](#)

Ambient Temp : 23.0 °C Tissue Temp : 21.5 °C

DUT: NP930X5J; Type: Notebook; Serial: JKHA91KDC00071Y  
 Program Name: WLAN\_Body

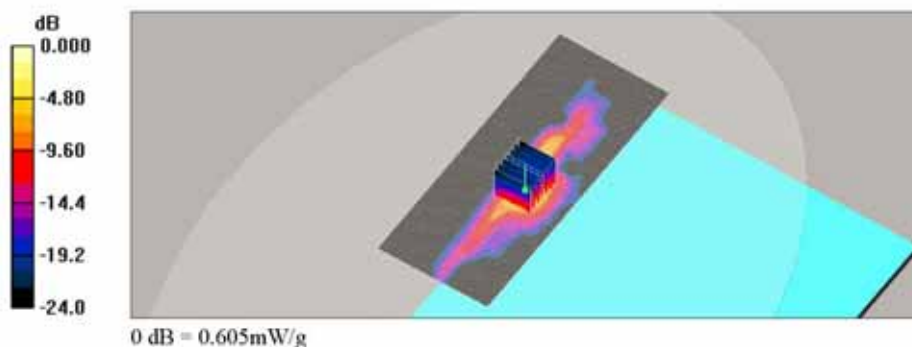
Communication System: WLAN; Frequency: 2437 MHz; Duty Cycle: 1:1  
 Medium parameters used:  $f = 2437 \text{ MHz}$ ;  $\sigma = 1.96 \text{ mho/m}$ ;  $\epsilon_r = 50.6$ ;  $\rho = 1000 \text{ kg/m}^3$   
 Phantom section: Flat Section

DASY4 Configuration:

- Probe: EX3DV4 - SN3791; ConvF(6.62, 6.62, 6.62); Calibrated: 2013-06-04
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn567; Calibrated: 2013-01-25
- Phantom: ELI v4.0 Phantom TP:1169; Type: ELI v4.0 Phantom; Serial: TP:1169
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

**WLAN\_Base\_802.11b\_1Mbps\_CH6\_Main Ant/Area Scan (91x221x1):** Measurement grid:  $dx=10\text{mm}$ ,  $dy=10\text{mm}$   
 Maximum value of SAR (interpolated) = 0.447 mW/g

**WLAN\_Base\_802.11b\_1Mbps\_CH6\_Main Ant/Zoom Scan (7x7x7)/Cube 0:** Measurement grid:  $dx=5\text{mm}$ ,  $dy=5\text{mm}$ ,  $dz=5\text{mm}$   
 Reference Value = 0.774 V/m; Power Drift = -0.002 dB  
 Peak SAR (extrapolated) = 1.03 W/kg  
**SAR(1 g) = 0.296 mW/g; SAR(10 g) = 0.102 mW/g**  
 Maximum value of SAR (measured) = 0.605 mW/g



Date: 2014-01-04

Test Laboratory: SGS Korea (Gunpo Laboratory)  
 File Name: WLAN\_Base\_802.11b\_1Mbps\_CH6\_Aux Ant.da4

Ambient Temp : 23.0 °C Tissue Temp : 21.5 °C

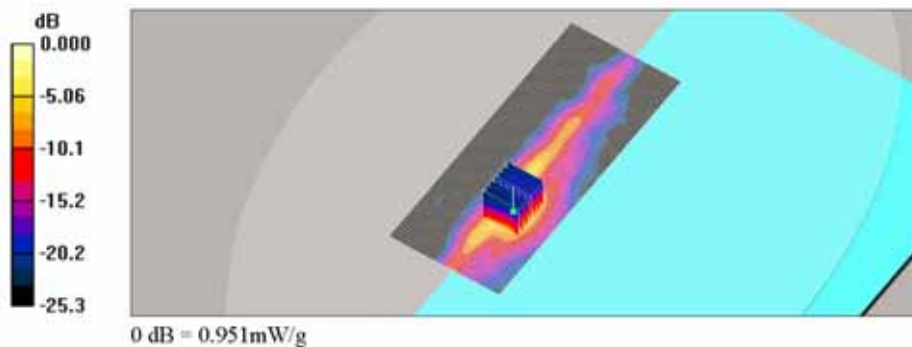
DUT: NP930X5J; Type: Notebook; Serial: JKHA91KDC00071Y  
 Program Name: WLAN\_Body

Communication System: WLAN; Frequency: 2437 MHz; Duty Cycle: 1:1  
 Medium parameters used:  $f = 2437 \text{ MHz}$ ;  $\sigma = 1.96 \text{ mho/m}$ ;  $\epsilon_r = 50.6$ ;  $\rho = 1000 \text{ kg/m}^3$   
 Phantom section: Flat Section

DASY4 Configuration:  
 - Probe: EX3DV4 - SN3791; ConvF(6.62, 6.62, 6.62); Calibrated: 2013-06-04  
 - Sensor-Surface: 2mm (Mechanical Surface Detection)  
 - Electronics: DAE3 Sn567; Calibrated: 2013-01-25  
 - Phantom: ELI v4.0 Phantom TP:1169; Type: ELI v4.0 Phantom; Serial: TP:1169  
 - Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

**WLAN\_Base\_802.11b\_1Mbps\_CH6\_Aux Ant/Area Scan (91x221x1):** Measurement grid:  $dx=10\text{mm}$ ,  $dy=10\text{mm}$   
 Maximum value of SAR (interpolated) = 0.796 mW/g

**WLAN\_Base\_802.11b\_1Mbps\_CH6\_Aux Ant/Zoom Scan (7x7x7)/Cube 0:** Measurement grid:  $dx=5\text{mm}$ ,  $dy=5\text{mm}$ ,  $dz=5\text{mm}$   
 Reference Value = 3.79 V/m; Power Drift = 0.044 dB  
 Peak SAR (extrapolated) = 1.56 W/kg  
**SAR(1 g) = 0.525 mW/g; SAR(10 g) = 0.192 mW/g**  
 Maximum value of SAR (measured) = 0.951 mW/g



Date: 2014-01-04

Test Laboratory: SGS Korea (Gunpo Laboratory)  
 File Name: [WLAN\\_Base\\_802.11g\\_6Mbps\\_CH6\\_Main\\_Ant.da4](#)

Ambient Temp : 23.0 °C Tissue Temp : 21.5 °C

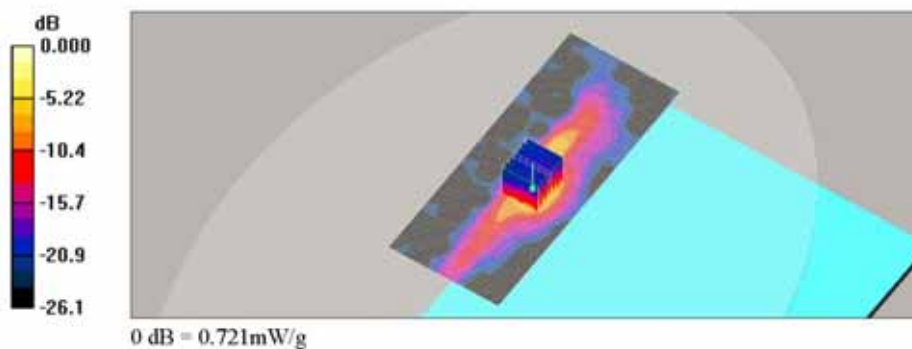
DUT: NP930X5J; Type: Notebook; Serial: JKHA91KDC00071Y  
 Program Name: WLAN\_Body

Communication System: WLAN; Frequency: 2437 MHz; Duty Cycle: 1:1  
 Medium parameters used:  $f = 2437 \text{ MHz}$ ;  $\sigma = 1.96 \text{ mho/m}$ ;  $\epsilon_r = 50.6$ ;  $\rho = 1000 \text{ kg/m}^3$   
 Phantom section: Flat Section

DASY4 Configuration:  
 - Probe: EX3DV4 - SN3791; ConvF(6.62, 6.62, 6.62); Calibrated: 2013-06-04  
 - Sensor-Surface: 2mm (Mechanical Surface Detection)  
 - Electronics: DAE3 Sn567; Calibrated: 2013-01-25  
 - Phantom: ELI v4.0 Phantom TP:1169; Type: ELI v4.0 Phantom; Serial: TP:1169  
 - Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

**WLAN\_Base\_802.11g\_6Mbps\_CH6\_Main\_Ant/Area Scan (91x221x1):** Measurement grid:  $dx=10\text{mm}$ ,  $dy=10\text{mm}$   
 Maximum value of SAR (interpolated) = 0.583 mW/g

**WLAN\_Base\_802.11g\_6Mbps\_CH6\_Main\_Ant/Zoom Scan (7x7x7)/Cube 0:** Measurement grid:  
 $dx=5\text{mm}$ ,  $dy=5\text{mm}$ ,  $dz=5\text{mm}$   
 Reference Value = 0.711 V/m; Power Drift = -0.015 dB  
 Peak SAR (extrapolated) = 1.21 W/kg  
**SAR(1 g) = 0.351 mW/g; SAR(10 g) = 0.122 mW/g**  
 Maximum value of SAR (measured) = 0.721 mW/g



Date: 2014-01-04

Test Laboratory: SGS Korea (Gunpo Laboratory)  
 File Name: [WLAN\\_Base\\_802.11g\\_6Mbps\\_CH1\\_Main\\_Ant.da4](#)

Ambient Temp : 23.0 °C Tissue Temp : 21.5 °C

DUT: NP930X5J; Type: Notebook; Serial: JKHA91KDC00071Y  
 Program Name: WLAN\_Body

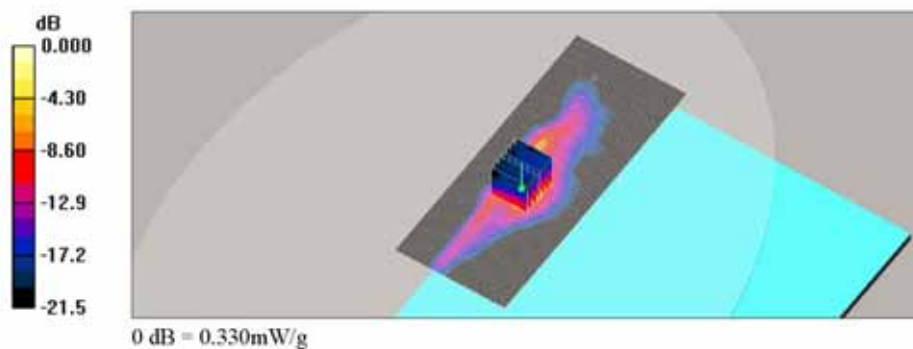
Communication System: WLAN; Frequency: 2412 MHz; Duty Cycle: 1:1  
 Medium parameters used:  $f = 2412 \text{ MHz}$ ;  $\sigma = 1.92 \text{ mho/m}$ ;  $\epsilon_r = 50.7$ ;  $\rho = 1000 \text{ kg/m}^3$   
 Phantom section: Flat Section

DASY4 Configuration:

- Probe: EX3DV4 - SN3791; ConvF(6.62, 6.62, 6.62); Calibrated: 2013-06-04
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn567; Calibrated: 2013-01-25
- Phantom: ELI v4.0 Phantom TP:1169; Type: ELI v4.0 Phantom; Serial: TP:1169
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

**WLAN\_Base\_802.11g\_6Mbps\_CH1\_Main Ant/Area Scan (91x221x1):** Measurement grid:  $dx=10\text{mm}$ ,  $dy=10\text{mm}$   
 Maximum value of SAR (interpolated) = 0.333 mW/g

**WLAN\_Base\_802.11g\_6Mbps\_CH1\_Main Ant/Zoom Scan (7x7x7)/Cube 0:** Measurement grid:  
 $dx=5\text{mm}$ ,  $dy=5\text{mm}$ ,  $dz=5\text{mm}$   
 Reference Value = 2.49 V/m; Power Drift = 0.172 dB  
 Peak SAR (extrapolated) = 0.552 W/kg  
**SAR(1 g) = 0.161 mW/g; SAR(10 g) = 0.057 mW/g**  
 Maximum value of SAR (measured) = 0.330 mW/g



Date: 2014-01-04

Test Laboratory: SGS Korea (Gunpo Laboratory)  
 File Name: [WLAN\\_Base\\_802.11g\\_6Mbps\\_CH11\\_Main\\_Ant.da4](#)

Ambient Temp : 23.0 °C Tissue Temp : 21.5 °C

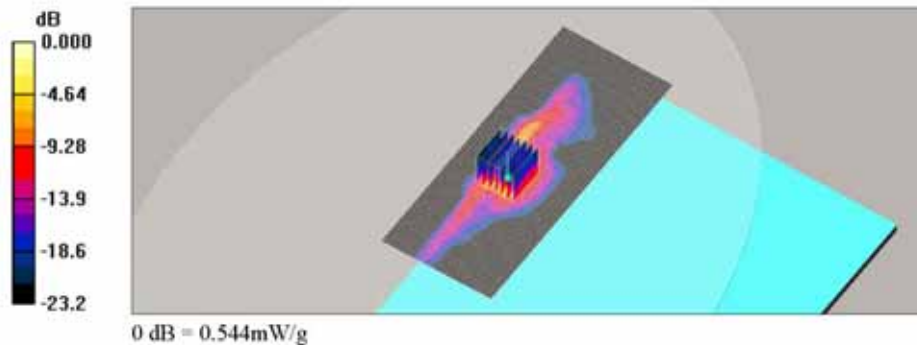
DUT: NP930X5J; Type: Notebook; Serial: JKHA91KDC00071Y  
 Program Name: WLAN\_Body

Communication System: WLAN; Frequency: 2462 MHz; Duty Cycle: 1:1  
 Medium parameters used:  $f = 2462 \text{ MHz}$ ;  $\sigma = 1.99 \text{ mho/m}$ ;  $\epsilon_r = 50.5$ ;  $\rho = 1000 \text{ kg/m}^3$   
 Phantom section: Flat Section

DASY4 Configuration:  
 - Probe: EX3DV4 - SN3791; ConvF(6.62, 6.62, 6.62); Calibrated: 2013-06-04  
 - Sensor-Surface: 2mm (Mechanical Surface Detection)  
 - Electronics: DAE3 Sn567; Calibrated: 2013-01-25  
 - Phantom: ELI v4.0 Phantom TP:1169; Type: ELI v4.0 Phantom; Serial: TP:1169  
 - Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

**WLAN\_Base\_802.11g\_6Mbps\_CH11\_Main Ant/Area Scan (91x221x1):** Measurement grid:  $dx=10\text{mm}$ ,  $dy=10\text{mm}$   
 Maximum value of SAR (interpolated) = 0.534 mW/g

**WLAN\_Base\_802.11g\_6Mbps\_CH11\_Main Ant/Zoom Scan (7x7x7)/Cube 0:** Measurement grid:  
 $dx=5\text{mm}$ ,  $dy=5\text{mm}$ ,  $dz=5\text{mm}$   
 Reference Value = 2.99 V/m; Power Drift = 0.093 dB  
 Peak SAR (extrapolated) = 0.923 W/kg  
**SAR(1 g) = 0.272 mW/g; SAR(10 g) = 0.094 mW/g**  
 Maximum value of SAR (measured) = 0.544 mW/g



Date: 2014-01-04

Test Laboratory: SGS Korea (Gunpo Laboratory)  
 File Name: WLAN\_Base\_802.11g\_6Mbps\_CH6\_Aux Ant.da4

Ambient Temp : 23.0 °C Tissue Temp : 21.5 °C

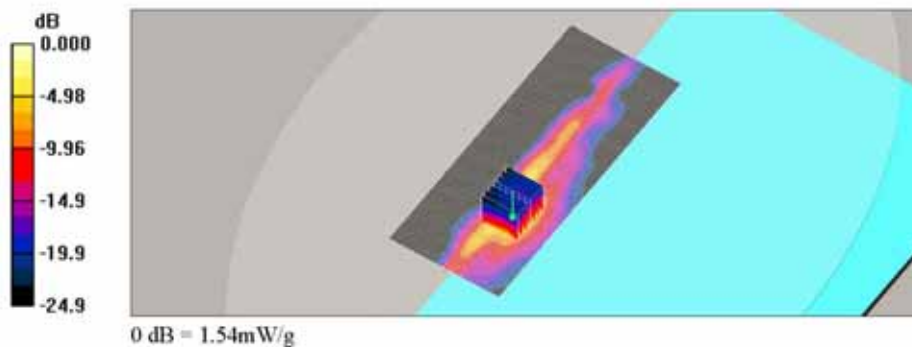
DUT: NP930X5J; Type: Notebook; Serial: JKHA91KDC00071Y  
 Program Name: WLAN\_Body

Communication System: WLAN; Frequency: 2437 MHz; Duty Cycle: 1:1  
 Medium parameters used:  $f = 2437 \text{ MHz}$ ;  $\sigma = 1.96 \text{ mho/m}$ ;  $\epsilon_r = 50.6$ ;  $\rho = 1000 \text{ kg/m}^3$   
 Phantom section: Flat Section

DASY4 Configuration:  
 - Probe: EX3DV4 - SN3791; ConvF(6.62, 6.62, 6.62); Calibrated: 2013-06-04  
 - Sensor-Surface: 2mm (Mechanical Surface Detection)  
 - Electronics: DAE3 Sn567; Calibrated: 2013-01-25  
 - Phantom: ELI v4.0 Phantom TP:1169; Type: ELI v4.0 Phantom; Serial: TP:1169  
 - Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

**WLAN\_Base\_802.11g\_6Mbps\_CH6\_Aux Ant/Area Scan (91x221x1):** Measurement grid:  $dx=10\text{mm}$ ,  $dy=10\text{mm}$   
 Maximum value of SAR (interpolated) = 1.36 mW/g

**WLAN\_Base\_802.11g\_6Mbps\_CH6\_Aux Ant/Zoom Scan (7x7x7)/Cube 0:** Measurement grid:  $dx=5\text{mm}$ ,  $dy=5\text{mm}$ ,  $dz=5\text{mm}$   
 Reference Value = 4.72 V/m; Power Drift = 0.054 dB  
 Peak SAR (extrapolated) = 2.64 W/kg  
**SAR(1 g) = 0.875 mW/g; SAR(10 g) = 0.319 mW/g**  
 Maximum value of SAR (measured) = 1.54 mW/g



Date: 2014-01-04

Test Laboratory: SGS Korea (Gunpo Laboratory)  
 File Name: WLAN\_Base\_802.11g\_6Mbps\_CH1\_Aux Ant.da4

Ambient Temp : 23.0 °C Tissue Temp : 21.5 °C

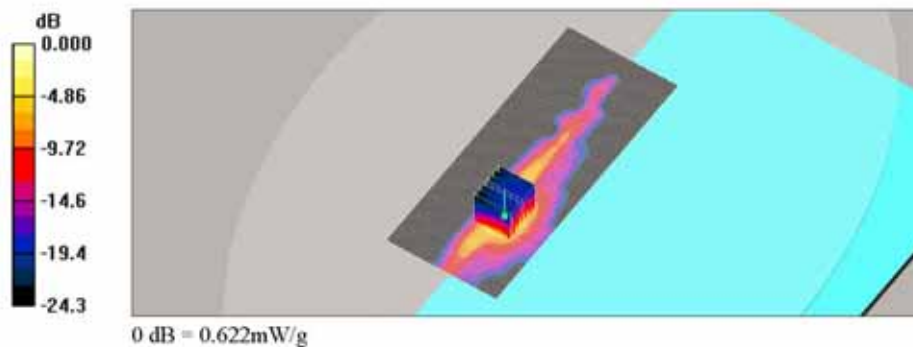
DUT: NP930X5J; Type: Notebook; Serial: JKHA91KDC00071Y  
 Program Name: WLAN\_Body

Communication System: WLAN; Frequency: 2412 MHz; Duty Cycle: 1:1  
 Medium parameters used:  $f = 2412 \text{ MHz}$ ;  $\sigma = 1.92 \text{ mho/m}$ ;  $\epsilon_r = 50.7$ ;  $\rho = 1000 \text{ kg/m}^3$   
 Phantom section: Flat Section

DASY4 Configuration:  
 - Probe: EX3DV4 - SN3791; ConvF(6.62, 6.62, 6.62); Calibrated: 2013-06-04  
 - Sensor-Surface: 2mm (Mechanical Surface Detection)  
 - Electronics: DAE3 Sn567; Calibrated: 2013-01-25  
 - Phantom: ELI v4.0 Phantom TP:1169; Type: ELI v4.0 Phantom; Serial: TP:1169  
 - Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

**WLAN\_Base\_802.11g\_6Mbps\_CH1\_Aux Ant/Area Scan (91x221x1):** Measurement grid:  $dx=10\text{mm}$ ,  $dy=10\text{mm}$   
 Maximum value of SAR (interpolated) = 0.496 mW/g

**WLAN\_Base\_802.11g\_6Mbps\_CH1\_Aux Ant/Zoom Scan (7x7x7)/Cube 0:** Measurement grid:  $dx=5\text{mm}$ ,  $dy=5\text{mm}$ ,  $dz=5\text{mm}$   
 Reference Value = 2.24 V/m; Power Drift = -0.011 dB  
 Peak SAR (extrapolated) = 1.02 W/kg  
**SAR(1 g) = 0.323 mW/g; SAR(10 g) = 0.118 mW/g**  
 Maximum value of SAR (measured) = 0.622 mW/g



Date: 2014-01-04

Test Laboratory: SGS Korea (Gunpo Laboratory)  
 File Name: [WLAN\\_Base\\_802.11g\\_6Mbps\\_CH11\\_Aux\\_Ant.da4](#)

Ambient Temp : 23.0 °C Tissue Temp : 21.5 °C

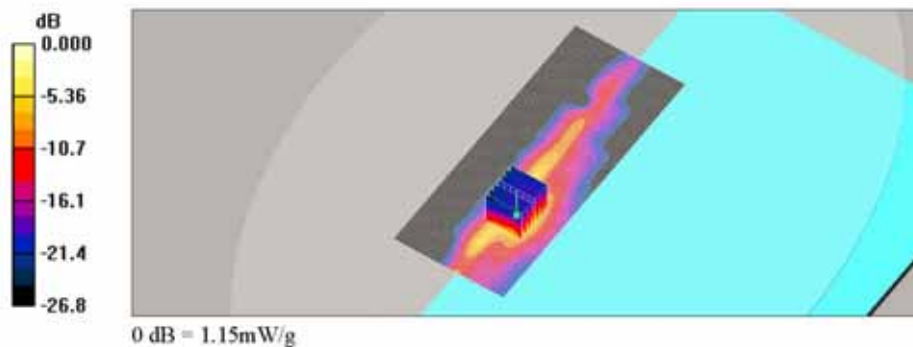
DUT: NP930X5J; Type: Notebook; Serial: JKHA91KDC00071Y  
 Program Name: WLAN\_Body

Communication System: WLAN; Frequency: 2462 MHz; Duty Cycle: 1:1  
 Medium parameters used:  $f = 2462 \text{ MHz}$ ;  $\sigma = 1.99 \text{ mho/m}$ ;  $\epsilon_r = 50.5$ ;  $\rho = 1000 \text{ kg/m}^3$   
 Phantom section: Flat Section

DASY4 Configuration:  
 - Probe: EX3DV4 - SN3791; ConvF(6.62, 6.62, 6.62); Calibrated: 2013-06-04  
 - Sensor-Surface: 2mm (Mechanical Surface Detection)  
 - Electronics: DAE3 Sn567; Calibrated: 2013-01-25  
 - Phantom: ELI v4.0 Phantom TP:1169; Type: ELI v4.0 Phantom; Serial: TP:1169  
 - Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

**WLAN\_Base\_802.11g\_6Mbps\_CH11\_Aux Ant/Area Scan (91x221x1):** Measurement grid:  $dx=10\text{mm}$ ,  $dy=10\text{mm}$   
 Maximum value of SAR (interpolated) = 0.974 mW/g

**WLAN\_Base\_802.11g\_6Mbps\_CH11\_Aux Ant/Zoom Scan (7x7x7)/Cube 0:** Measurement grid:  
 $dx=5\text{mm}$ ,  $dy=5\text{mm}$ ,  $dz=5\text{mm}$   
 Reference Value = 3.93 V/m; Power Drift = 0.029 dB  
 Peak SAR (extrapolated) = 1.86 W/kg  
 SAR(1 g) = 0.617 mW/g; SAR(10 g) = 0.224 mW/g  
 Maximum value of SAR (measured) = 1.15 mW/g



Date: 2014-01-04

Test Laboratory: SGS Korea (Gunpo Laboratory)

File Name: WLAN\_Back Screen\_802.11g\_6Mbps\_CH6\_Main Ant.da4

Ambient Temp : 23.0 °C Tissue Temp : 21.5 °C

DUT: NP930X5J; Type: Notebook; Serial: JKHA91KDC00071Y

Program Name: WLAN\_Body

Communication System: WLAN; Frequency: 2437 MHz; Duty Cycle: 1:1

Medium parameters used:  $f = 2437$  MHz;  $\sigma = 1.96$  mho/m;  $\epsilon_r = 50.6$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

DASY4 Configuration:

- Probe: EX3DV4 - SN3791; ConvF(6.62, 6.62, 6.62); Calibrated: 2013-06-04
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn567; Calibrated: 2013-01-25
- Phantom: ELI v4.0 Phantom TP:1169; Type: ELI v4.0 Phantom; Serial: TP:1169
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

**WLAN\_Back Screen\_802.11g\_6Mbps\_CH6\_Main Ant/Area Scan (141x201x1):** Measurement grid:

$dx=10$ mm,  $dy=10$ mm

Maximum value of SAR (interpolated) = 0.019 mW/g

**WLAN\_Back Screen\_802.11g\_6Mbps\_CH6\_Main Ant/Zoom Scan (7x7x7)/Cube 0:** Measurement

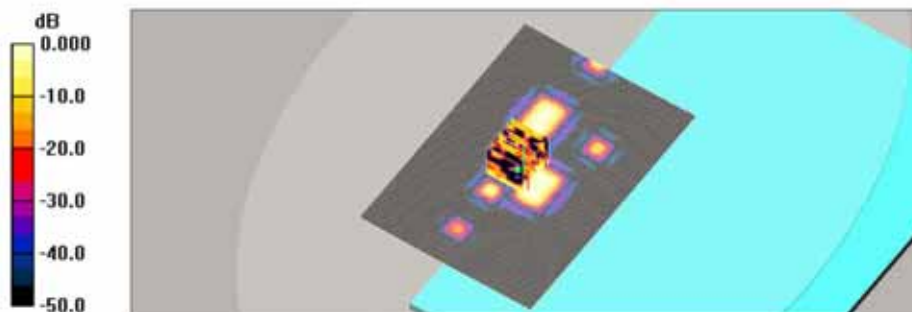
grid:  $dx=5$ mm,  $dy=5$ mm,  $dz=5$ mm

Reference Value = 0.698 V/m; Power Drift = 0.139 dB

Peak SAR (extrapolated) = 0.013 W/kg

SAR(1 g) = 0.00361 mW/g; SAR(10 g) = 0.00119 mW/g

Maximum value of SAR (measured) = 0.006 mW/g



0 dB = 0.006mW/g

Date: 2014-01-04

Test Laboratory: SGS Korea (Gunpo Laboratory)  
 File Name: WLAN\_Back Screen\_802.11g\_6Mbps\_CH6\_Aux Ant.da4

Ambient Temp : 23.0 °C Tissue Temp : 21.5 °C

DUT: NP930X5J; Type: Notebook; Serial: JKHA91KDC00071Y  
 Program Name: WLAN\_Body

Communication System: WLAN; Frequency: 2437 MHz; Duty Cycle: 1:1  
 Medium parameters used:  $f = 2437 \text{ MHz}$ ;  $\sigma = 1.96 \text{ mho/m}$ ;  $\epsilon_r = 50.6$ ;  $\rho = 1000 \text{ kg/m}^3$   
 Phantom section: Flat Section

DASY4 Configuration:

- Probe: EX3DV4 - SN3791; ConvF(6.62, 6.62, 6.62); Calibrated: 2013-06-04
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn567; Calibrated: 2013-01-25
- Phantom: ELI v4.0 Phantom TP:1169; Type: ELI v4.0 Phantom; Serial: TP:1169
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

**WLAN\_Back Screen\_802.11g\_6Mbps\_CH6\_Aux Ant/Area Scan (181x281x1):** Measurement grid:

$dx=10\text{mm}$ ,  $dy=10\text{mm}$

Maximum value of SAR (interpolated) = 0.013 mW/g

**WLAN\_Back Screen\_802.11g\_6Mbps\_CH6\_Aux Ant/Zoom Scan (7x7x7)/Cube 0:** Measurement grid:

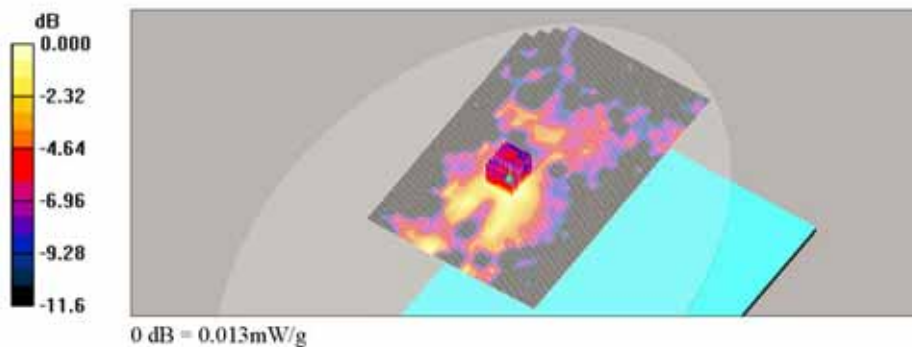
$dx=5\text{mm}$ ,  $dy=5\text{mm}$ ,  $dz=5\text{mm}$

Reference Value = 1.57 V/m; Power Drift = -0.117 dB

Peak SAR (extrapolated) = 0.019 W/kg

SAR(1 g) = 0.00909 mW/g; SAR(10 g) = 0.00564 mW/g

Maximum value of SAR (measured) = 0.013 mW/g



Date: 2014-01-04

Test Laboratory: SGS Korea (Gunpo Laboratory)

File Name: WLAN\_Base\_802.11g\_6Mbps\_CH6\_Aux Ant\_Repeat Test.da4

Ambient Temp : 23.0 °C Tissue Temp : 21.5 °C

DUT: NP930X5J; Type: Notebook; Serial: JKHA91KDC00071Y

Program Name: WLAN\_Body

Communication System: WLAN; Frequency: 2437 MHz; Duty Cycle: 1:1

Medium parameters used:  $f = 2437$  MHz;  $\sigma = 1.96$  mho/m;  $\epsilon_r = 50.6$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

DASY4 Configuration:

- Probe: EX3DV4 - SN3791; ConvF(6.62, 6.62, 6.62); Calibrated: 2013-06-04
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn567; Calibrated: 2013-01-25
- Phantom: ELI v4.0 Phantom TP:1169; Type: ELI v4.0 Phantom; Serial: TP:1169
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

**WLAN\_Base\_802.11g\_6Mbps\_CH6\_Aux Ant\_Repeat Test/Area Scan (91x221x1):** Measurement grid:

$dx=10$ mm,  $dy=10$ mm

Maximum value of SAR (interpolated) = 1.35 mW/g

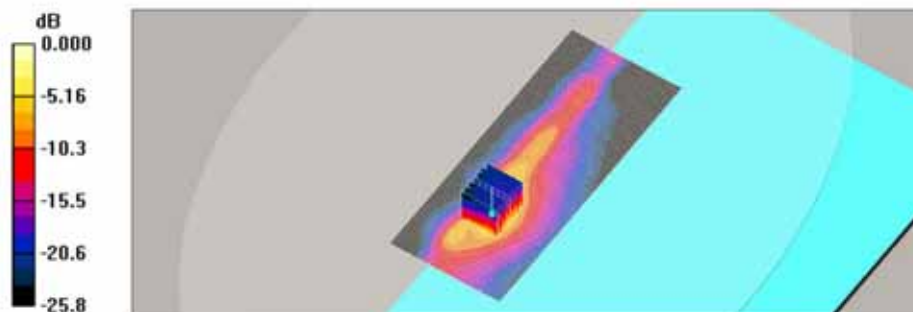
**WLAN\_Base\_802.11g\_6Mbps\_CH6\_Aux Ant\_Repeat Test/Zoom Scan (7x7x7)/Cube 0:** Measurement grid:  $dx=5$ mm,  $dy=5$ mm,  $dz=5$ mm

Reference Value = 12.1 V/m; Power Drift = 0.061 dB

Peak SAR (extrapolated) = 2.49 W/kg

SAR(1 g) = 0.817 mW/g; SAR(10 g) = 0.302 mW/g

Maximum value of SAR (measured) = 1.55 mW/g



0 dB = 1.55mW/g

## WLAN 5200 MHz Body SAR Test

Date: 2014-01-06

Test Laboratory: SGS Korea (Gunpo Laboratory)  
 File Name: [WLAN\\_Base\\_802.11a\\_6Mbps\\_CH44\\_Main\\_Ant.da4](#)

Ambient Temp : 22.7 °C Tissue Temp : 21.5 °C

DUT: NP930X5J; Type: Notebook; Serial: JKHA91KDC00071Y  
 Program Name: WLAN\_Body

Communication System: WLAN(11a\_U-NII Low); Frequency: 5220 MHz; Duty Cycle: 1:1  
 Medium parameters used:  $f = 5220 \text{ MHz}$ ;  $\sigma = 5.34 \text{ mho/m}$ ;  $\epsilon_r = 50.8$ ;  $\rho = 1000 \text{ kg/m}^3$   
 Phantom section: Flat Section

DASY4 Configuration:

- Probe: EX3DV4 - SN3791; ConvF(4.23, 4.23, 4.23); Calibrated: 2013-06-04
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn567; Calibrated: 2013-01-25
- Phantom: ELI v4.0 Phantom TP:1169; Type: ELI v4.0 Phantom; Serial: TP:1169
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

**WLAN\_Base\_802.11a\_6Mbps\_CH44\_Main Ant/Area Scan (91x201x1):** Measurement grid:  $dx=10\text{mm}$ ,  $dy=10\text{mm}$

Maximum value of SAR (interpolated) = 0.663 mW/g

**WLAN\_Base\_802.11a\_6Mbps\_CH44\_Main Ant/Zoom Scan (7x7x12)/Cube 0:** Measurement grid:

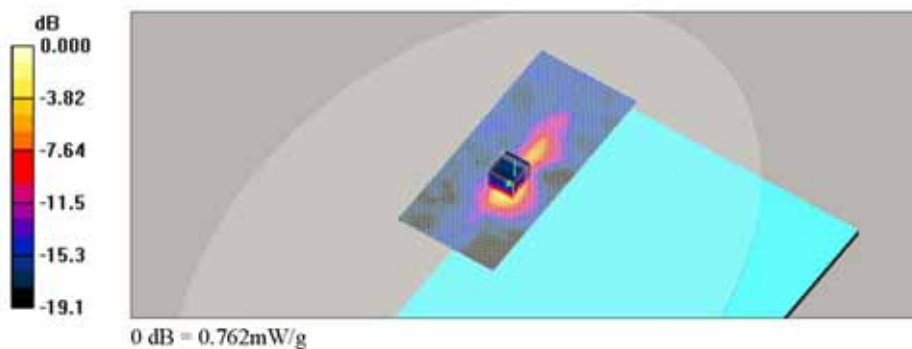
$dx=4\text{mm}$ ,  $dy=4\text{mm}$ ,  $dz=2\text{mm}$

Reference Value = 1.38 V/m; Power Drift = 0.092 dB

Peak SAR (extrapolated) = 2.12 W/kg

SAR(1 g) = 0.321 mW/g; SAR(10 g) = 0.114 mW/g

Maximum value of SAR (measured) = 0.762 mW/g



Date: 2014-01-06

Test Laboratory: SGS Korea (Gunpo Laboratory)  
 File Name: WLAN\_Base\_802.11a\_6Mbps\_CH40\_Main\_Ant.da4

Ambient Temp : 22.7 °C Tissue Temp : 21.5 °C

DUT: NP930X5J; Type: Notebook; Serial: JKHA91KDC00071Y  
 Program Name: WLAN\_Body

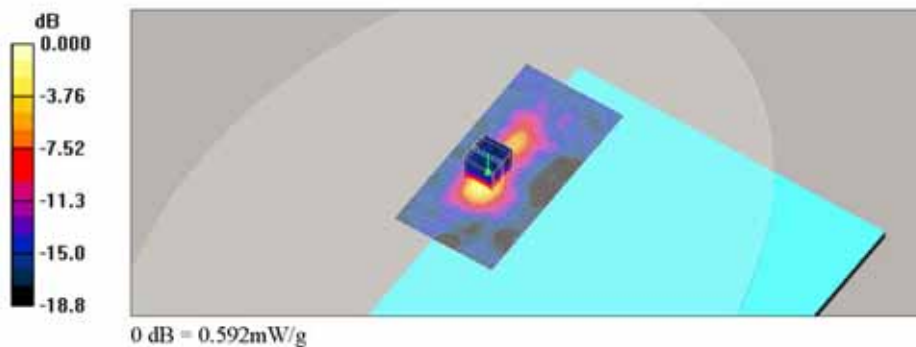
Communication System: WLAN(11a\_U-NII Low); Frequency: 5200 MHz; Duty Cycle: 1:1  
 Medium parameters used:  $f = 5200 \text{ MHz}$ ;  $\sigma = 5.3 \text{ mho/m}$ ;  $\epsilon_r = 50.8$ ;  $\rho = 1000 \text{ kg/m}^3$   
 Phantom section: Flat Section

DASY4 Configuration:

- Probe: EX3DV4 - SN3791; ConvF(4.23, 4.23, 4.23); Calibrated: 2013-06-04
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn567; Calibrated: 2013-01-25
- Phantom: ELI v4.0 Phantom TP:1169; Type: ELI v4.0 Phantom; Serial: TP:1169
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

**WLAN\_Base\_802.11a\_6Mbps\_CH40\_Main Ant/Area Scan (81x161x1):** Measurement grid:  $dx=10\text{mm}$ ,  $dy=10\text{mm}$   
 Maximum value of SAR (interpolated) = 0.806 mW/g

**WLAN\_Base\_802.11a\_6Mbps\_CH40\_Main Ant/Zoom Scan (7x7x12)/Cube 0:** Measurement grid:  
 $dx=4\text{mm}$ ,  $dy=4\text{mm}$ ,  $dz=2\text{mm}$   
 Reference Value = 0.979 V/m; Power Drift = -0.199 dB  
 Peak SAR (extrapolated) = 1.78 W/kg  
 SAR(1 g) = 0.273 mW/g; SAR(10 g) = 0.089 mW/g  
 Maximum value of SAR (measured) = 0.592 mW/g



Date: 2014-01-06

Test Laboratory: SGS Korea (Gunpo Laboratory)  
 File Name: WLAN\_Base\_802.11a\_6Mbps\_CH44\_AUX\_Ant.da4

Ambient Temp : 22.7 °C Tissue Temp : 21.5 °C

DUT: NP930X5J; Type: Notebook; Serial: JKHA91KDC00071Y  
 Program Name: WLAN\_Body

Communication System: WLAN(11a\_U-NII Low); Frequency: 5220 MHz; Duty Cycle: 1:1  
 Medium parameters used:  $f = 5220 \text{ MHz}$ ;  $\sigma = 5.34 \text{ mho/m}$ ;  $\epsilon_r = 50.8$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section

DASY4 Configuration:

- Probe: EX3DV4 - SN3791; ConvF(4.23, 4.23, 4.23); Calibrated: 2013-06-04
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn567; Calibrated: 2013-01-25
- Phantom: ELI v4.0 Phantom TP:1169; Type: ELI v4.0 Phantom; Serial: TP:1169
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

**WLAN\_Base\_802.11a\_6Mbps\_CH44\_Aux Ant/Area Scan (81x161x1):** Measurement grid:  $dx=10\text{mm}$ ,  $dy=10\text{mm}$

Maximum value of SAR (interpolated) = 0.469 mW/g

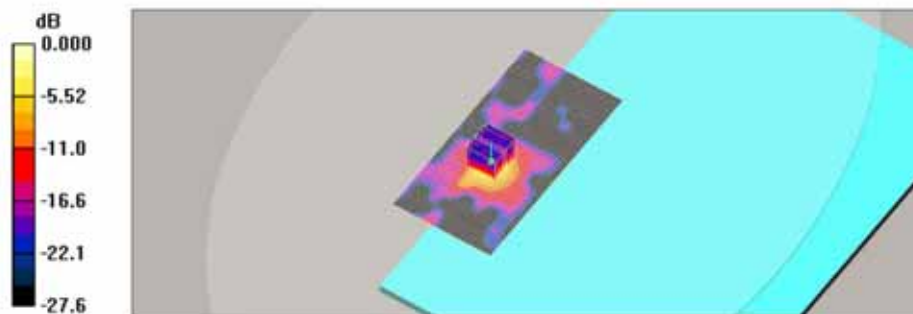
**WLAN\_Base\_802.11a\_6Mbps\_CH44\_Aux Ant/Zoom Scan (7x7x12)/Cube 0:** Measurement grid:  $dx=4\text{mm}$ ,  $dy=4\text{mm}$ ,  $dz=2\text{mm}$

Reference Value = 0.881 V/m; Power Drift = -0.036 dB

Peak SAR (extrapolated) = 1.53 W/kg

SAR(1 g) = 0.274 mW/g; SAR(10 g) = 0.075 mW/g

Maximum value of SAR (measured) = 0.660 mW/g



0 dB = 0.660mW/g

Date: 2014-01-06

Test Laboratory: SGS Korea (Gunpo Laboratory)

File Name: WLAN\_Back Screen\_802.11a\_6Mbps\_CH44\_Main Ant.da4

Ambient Temp : 22.7 °C Tissue Temp : 21.5 °C

DUT: NP930X5J; Type: Notebook; Serial: JKHA91KDC00071Y

Program Name: WLAN\_Body

Communication System: WLAN(11a\_U-NII Low); Frequency: 5220 MHz; Duty Cycle: 1:1

Medium parameters used:  $f = 5220$  MHz;  $\sigma = 5.34$  mho/m;  $\epsilon_r = 50.8$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

DASY4 Configuration:

- Probe: EX3DV4 - SN3791; ConvF(4.23, 4.23, 4.23); Calibrated: 2013-06-04
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn567; Calibrated: 2013-01-25
- Phantom: ELI v4.0 Phantom TP:1169; Type: ELI v4.0 Phantom; Serial: TP:1169
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

**WLAN\_Back Screen\_802.11a\_6Mbps\_CH44\_Main Ant/Area Scan (141x201x1):** Measurement grid:

dx=10mm, dy=10mm

Maximum value of SAR (interpolated) = 0.079 mW/g

**WLAN\_Back Screen\_802.11a\_6Mbps\_CH44\_Main Ant/Zoom Scan (7x7x12)/Cube 0:** Measurement

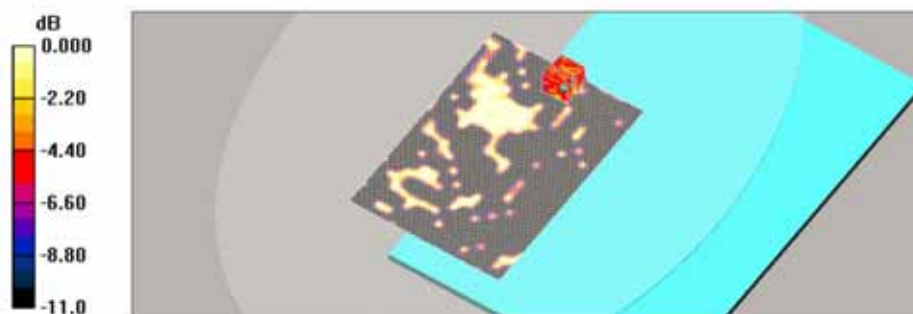
grid: dx=4mm, dy=4mm, dz=2mm

Reference Value = 1.68 V/m; Power Drift = -0.003 dB

Peak SAR (extrapolated) = 0.090 W/kg

SAR(1 g) = 0.00618 mW/g; SAR(10 g) = 0.00263 mW/g

Maximum value of SAR (measured) = 0.019 mW/g



Date: 2014-01-06

Test Laboratory: SGS Korea (Gunpo Laboratory)

File Name: WLAN\_Back Screen\_802.11a\_6Mbps\_CH44\_AUX Ant.da4

Ambient Temp : 22.7 °C Tissue Temp : 21.5 °C

DUT: NP930X5J; Type: Notebook; Serial: JKHA91KDC00071Y

Program Name: WLAN\_Body

Communication System: WLAN(11a\_U-NII Low); Frequency: 5220 MHz; Duty Cycle: 1:1

Medium parameters used:  $f = 5220 \text{ MHz}$ ;  $\sigma = 5.34 \text{ mho/m}$ ;  $\epsilon_r = 50.8$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section

DASY4 Configuration:

- Probe: EX3DV4 - SN3791; ConvF(4.23, 4.23, 4.23); Calibrated: 2013-06-04
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn567; Calibrated: 2013-01-25
- Phantom: ELI v4.0 Phantom TP:1169; Type: ELI v4.0 Phantom; Serial: TP:1169
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

**WLAN\_Back Screen\_802.11a\_6Mbps\_CH44\_AUX Ant/Area Scan (141x201x1):** Measurement grid:

$dx=10\text{mm}$ ,  $dy=10\text{mm}$

Maximum value of SAR (interpolated) = 0.028 mW/g

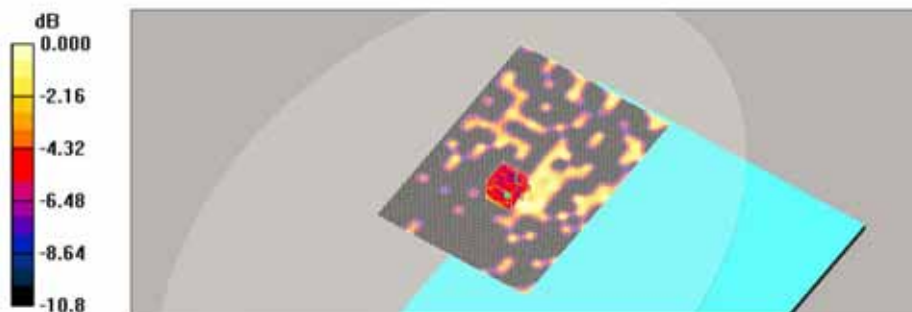
**WLAN\_Back Screen\_802.11a\_6Mbps\_CH44\_AUX Ant/Zoom Scan (7x7x12)/Cube 0:** Measurement grid:  $dx=4\text{mm}$ ,  $dy=4\text{mm}$ ,  $dz=2\text{mm}$

Reference Value = 1.64 V/m; Power Drift = 0.032 dB

Peak SAR (extrapolated) = 0.129 W/kg

SAR(1 g) = 0.011 mW/g; SAR(10 g) = 0.0056 mW/g

Maximum value of SAR (measured) = 0.023 mW/g



0 dB = 0.023mW/g

Date: 2014-01-06

Test Laboratory: SGS Korea (Gunpo Laboratory)  
 File Name: [WLAN\\_Base\\_802.11ac\\_VHT6\\_CH42\\_Main\\_Ant.da4](#)

Ambient Temp : 22.7 °C Tissue Temp : 21.5 °C

DUT: NP930X5J; Type: Notebook; Serial: JKHA91KDC00071Y  
 Program Name: WLAN\_Body

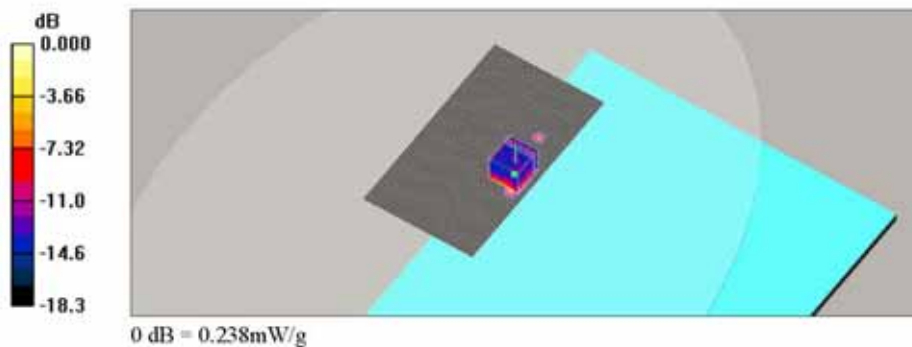
Communication System: WLAN(802.11ac 80MHz); Frequency: 5210 MHz; Duty Cycle: 1:1  
 Medium parameters used:  $f = 5210 \text{ MHz}$ ;  $\sigma = 5.32 \text{ mho/m}$ ;  $\epsilon_r = 50.8$ ;  $\rho = 1000 \text{ kg/m}^3$   
 Phantom section: Flat Section

DASY4 Configuration:

- Probe: EX3DV4 - SN3791; ConvF(4.23, 4.23, 4.23); Calibrated: 2013-06-04
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn567; Calibrated: 2013-01-25
- Phantom: ELI v4.0 Phantom TP:1169; Type: ELI v4.0 Phantom; Serial: TP:1169
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

**WLAN\_Base\_802.11ac\_6Mbps\_CH42\_Main Ant/Area Scan (91x161x1):** Measurement grid:  $dx=10\text{mm}$ ,  $dy=10\text{mm}$   
 Maximum value of SAR (interpolated) = 0.547 mW/g

**WLAN\_Base\_802.11ac\_6Mbps\_CH42\_Main Ant/Zoom Scan (7x7x12)/Cube 0:** Measurement grid:  $dx=4\text{mm}$ ,  $dy=4\text{mm}$ ,  $dz=2\text{mm}$   
 Reference Value = 1.03 V/m; Power Drift = -0.049 dB  
 Peak SAR (extrapolated) = 0.437 W/kg  
**SAR(1 g) = 0.074 mW/g; SAR(10 g) = 0.023 mW/g**  
 Maximum value of SAR (measured) = 0.238 mW/g



Date: 2014-01-06

Test Laboratory: SGS Korea (Gunpo Laboratory)  
 File Name: [WLAN\\_Base\\_802.11ac\\_VHT6\\_CH42\\_AUX\\_Ant.da4](#)

Ambient Temp : 22.7 °C Tissue Temp : 21.5 °C

DUT: NP930X5J; Type: Notebook; Serial: JKHA91KDC00071Y  
 Program Name: WLAN\_Body

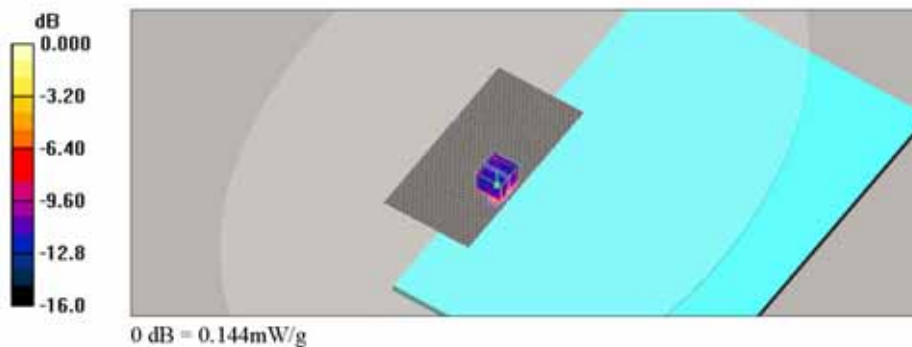
Communication System: WLAN(802.11ac 80MHz); Frequency: 5210 MHz; Duty Cycle: 1:1  
 Medium parameters used:  $f = 5210 \text{ MHz}$ ;  $\sigma = 5.32 \text{ mho/m}$ ;  $\epsilon_r = 50.8$ ;  $\rho = 1000 \text{ kg/m}^3$   
 Phantom section: Flat Section

DASY4 Configuration:

- Probe: EX3DV4 - SN3791; ConvF(4.23, 4.23, 4.23); Calibrated: 2013-06-04
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn567; Calibrated: 2013-01-25
- Phantom: ELI v4.0 Phantom TP:1169; Type: ELI v4.0 Phantom; Serial: TP:1169
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

**WLAN\_Base\_802.11ac\_VHT6\_CH42\_Aux Ant/Area Scan (81x161x1):** Measurement grid:  $dx=10\text{mm}$ ,  $dy=10\text{mm}$   
 Maximum value of SAR (interpolated) = 0.102 mW/g

**WLAN\_Base\_802.11ac\_VHT6\_CH42\_Aux Ant/Zoom Scan (7x7x12)/Cube 0:** Measurement grid:  
 $dx=4\text{mm}$ ,  $dy=4\text{mm}$ ,  $dz=2\text{mm}$   
 Reference Value = 1.22 V/m; Power Drift = -0.090 dB  
 Peak SAR (extrapolated) = 0.452 W/kg  
**SAR(1 g) = 0.056 mW/g; SAR(10 g) = 0.012 mW/g**  
 Maximum value of SAR (measured) = 0.144 mW/g



## WLAN 5300 MHz Body SAR Test

Date: 2014-01-08

Test Laboratory: SGS Korea (Gunpo Laboratory)  
 File Name: [WLAN\\_Base\\_802.11a\\_6Mbps\\_CH56\\_Main\\_Ant.da4](#)

Ambient Temp : 23.3 °C Tissue Temp : 22.0 °C

DUT: NP930X5J; Type: Notebook; Serial: JKHA91KDC00071Y  
 Program Name: WLAN\_Body

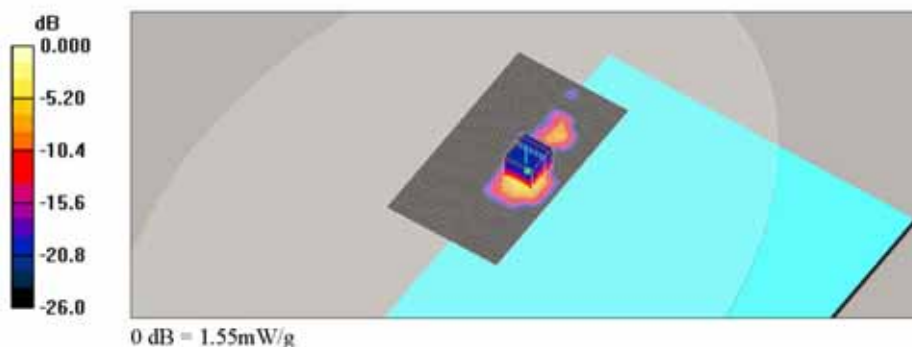
Communication System: WLAN(11a\_U-NII Low); Frequency: 5280 MHz; Duty Cycle: 1:1  
 Medium parameters used:  $f = 5280 \text{ MHz}$ ;  $\sigma = 5.2 \text{ mho/m}$ ;  $\epsilon_r = 49.5$ ;  $\rho = 1000 \text{ kg/m}^3$   
 Phantom section: Flat Section

DASY4 Configuration:

- Probe: EX3DV4 - SN3791; ConvF(4.07, 4.07, 4.07); Calibrated: 2013-06-04
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn567; Calibrated: 2013-01-25
- Phantom: ELI v4.0 Phantom TP:1169; Type: ELI v4.0 Phantom; Serial: TP:1169
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

**WLAN\_Base\_802.11a\_6Mbps\_CH56\_Main Ant/Area Scan (91x161x1):** Measurement grid:  $dx=10\text{mm}$ ,  $dy=10\text{mm}$   
 Maximum value of SAR (interpolated) = 1.21 mW/g

**WLAN\_Base\_802.11a\_6Mbps\_CH56\_Main Ant/Zoom Scan (7x7x12)/Cube 0:** Measurement grid:  
 $dx=4\text{mm}$ ,  $dy=4\text{mm}$ ,  $dz=2\text{mm}$   
 Reference Value = 1.60 V/m; Power Drift = 0.144 dB  
 Peak SAR (extrapolated) = 4.11 W/kg  
 SAR(1 g) = 0.662 mW/g; SAR(10 g) = 0.185 mW/g  
 Maximum value of SAR (measured) = 1.55 mW/g



Date: 2014-01-08

Test Laboratory: SGS Korea (Gunpo Laboratory)  
 File Name: [WLAN\\_Base\\_802.11a\\_6Mbps\\_CH60\\_Main\\_Ant.da4](#)

Ambient Temp : 23.3 °C Tissue Temp : 22.0 °C

DUT: NP930X5J; Type: Notebook; Serial: JKHA91KDC00071Y  
 Program Name: WLAN\_Body

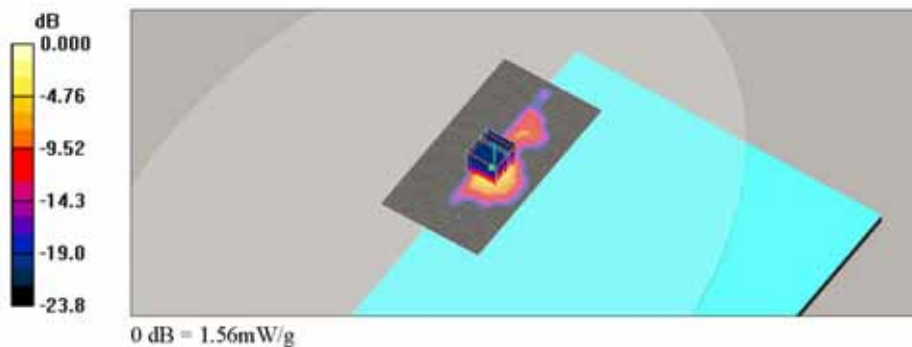
Communication System: WLAN(11a\_U-NII Low); Frequency: 5300 MHz; Duty Cycle: 1:1  
 Medium parameters used:  $f = 5300 \text{ MHz}$ ;  $\sigma = 5.22 \text{ mho/m}$ ;  $\epsilon_r = 49.5$ ;  $\rho = 1000 \text{ kg/m}^3$   
 Phantom section: Flat Section

DASY4 Configuration:

- Probe: EX3DV4 - SN3791; ConvF(4.07, 4.07, 4.07); Calibrated: 2013-06-04
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn567; Calibrated: 2013-01-25
- Phantom: ELI v4.0 Phantom TP:1169; Type: ELI v4.0 Phantom; Serial: TP:1169
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

**WLAN\_Base\_802.11a\_6Mbps\_CH60 Main Ant/Area Scan (81x151x1):** Measurement grid:  $dx=10\text{mm}$ ,  $dy=10\text{mm}$   
 Maximum value of SAR (interpolated) = 1.14 mW/g

**WLAN\_Base\_802.11a\_6Mbps\_CH60 Main Ant/Zoom Scan (7x7x12)/Cube 0:** Measurement grid:  $dx=4\text{mm}$ ,  $dy=4\text{mm}$ ,  $dz=2\text{mm}$   
 Reference Value = 1.67 V/m; Power Drift = 0.049 dB  
 Peak SAR (extrapolated) = 8.82 W/kg  
**SAR(1 g) = 0.655 mW/g; SAR(10 g) = 0.175 mW/g**  
 Maximum value of SAR (measured) = 1.56 mW/g



Date: 2014-01-08

Test Laboratory: SGS Korea (Gunpo Laboratory)  
 File Name: WLAN\_Base\_802.11a\_6Mbps\_CH60\_AUX\_Ant.da4

Ambient Temp : 23.3 °C Tissue Temp : 22.0 °C

DUT: NP930X5J; Type: Notebook; Serial: JKHA91KDC00071Y  
 Program Name: WLAN\_Body

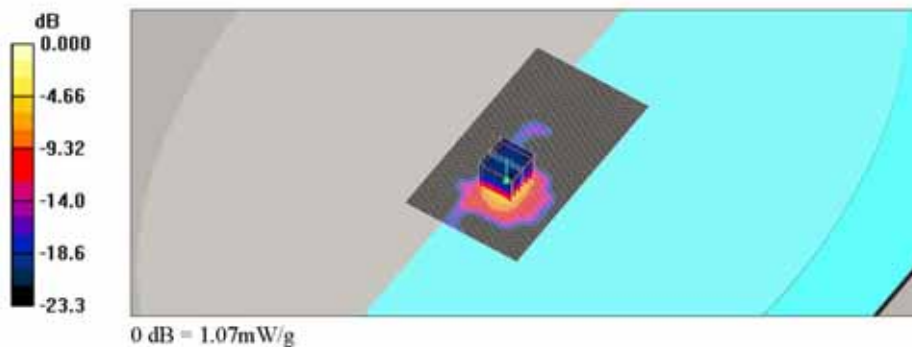
Communication System: WLAN(11a\_U-NII Low); Frequency: 5300 MHz; Duty Cycle: 1:1  
 Medium parameters used:  $f = 5300 \text{ MHz}$ ;  $\sigma = 5.22 \text{ mho/m}$ ;  $\epsilon_r = 49.5$ ;  $\rho = 1000 \text{ kg/m}^3$   
 Phantom section: Flat Section

DASY4 Configuration:

- Probe: EX3DV4 - SN3791; ConvF(4.07, 4.07, 4.07); Calibrated: 2013-06-04
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn567; Calibrated: 2013-01-25
- Phantom: ELI v4.0 Phantom TP:1169; Type: ELI v4.0 Phantom; Serial: TP:1169
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

**WLAN\_Base\_802.11a\_6Mbps\_CH60\_Aux Ant/Area Scan (81x141x1):** Measurement grid:  $dx=10\text{mm}$ ,  $dy=10\text{mm}$   
 Maximum value of SAR (interpolated) = 0.918 mW/g

**WLAN\_Base\_802.11a\_6Mbps\_CH60\_Aux Ant/Zoom Scan (7x7x12)/Cube 0:** Measurement grid:  
 $dx=4\text{mm}$ ,  $dy=4\text{mm}$ ,  $dz=2\text{mm}$   
 Reference Value = 1.77 V/m; Power Drift = -0.102 dB  
 Peak SAR (extrapolated) = 2.65 W/kg  
**SAR(1 g) = 0.467 mW/g; SAR(10 g) = 0.119 mW/g**  
 Maximum value of SAR (measured) = 1.07 mW/g



Date: 2014-01-08

Test Laboratory: SGS Korea (Gunpo Laboratory)  
 File Name: WLAN\_Base\_802.11a\_6Mbps\_CH56\_AUX\_Ant.da4

Ambient Temp : 23.3 °C Tissue Temp : 22.0 °C

DUT: NP930X5J; Type: Notebook; Serial: JKHA91KDC00071Y  
 Program Name: WLAN\_Body

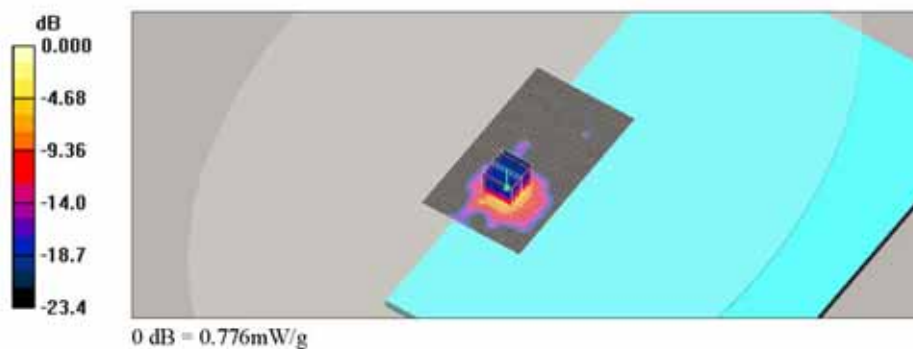
Communication System: WLAN(11a\_U-NII Low); Frequency: 5280 MHz; Duty Cycle: 1:1  
 Medium parameters used:  $f = 5280 \text{ MHz}$ ;  $\sigma = 5.2 \text{ mho/m}$ ;  $\epsilon_r = 49.5$ ;  $\rho = 1000 \text{ kg/m}^3$   
 Phantom section: Flat Section

DASY4 Configuration:

- Probe: EX3DV4 - SN3791; ConvF(4.07, 4.07, 4.07); Calibrated: 2013-06-04
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn567; Calibrated: 2013-01-25
- Phantom: ELI v4.0 Phantom TP:1169; Type: ELI v4.0 Phantom; Serial: TP:1169
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

**WLAN\_Base\_802.11a\_6Mbps\_CH56\_Aux Ant/Area Scan (81x141x1):** Measurement grid: dx=10mm, dy=10mm  
 Maximum value of SAR (interpolated) = 0.610 mW/g

**WLAN\_Base\_802.11a\_6Mbps\_CH56\_Aux Ant/Zoom Scan (7x7x12)/Cube 0:** Measurement grid: dx=4mm, dy=4mm, dz=2mm  
 Reference Value = 1.62 V/m; Power Drift = -0.190 dB  
 Peak SAR (extrapolated) = 2.00 W/kg  
**SAR(1 g) = 0.353 mW/g; SAR(10 g) = 0.091 mW/g**  
 Maximum value of SAR (measured) = 0.776 mW/g



Date: 2014-01-08

Test Laboratory: SGS Korea (Gunpo Laboratory)

File Name: WLAN\_Back Screen\_802.11a\_6Mbps\_CH56\_Main Ant.da4

Ambient Temp : 23.3 °C Tissue Temp : 22.0 °C

DUT: NP930X5J; Type: Notebook; Serial: JKHA91KDC00071Y

Program Name: WLAN\_Body

Communication System: WLAN(11a\_U-NII Low); Frequency: 5280 MHz; Duty Cycle: 1:1

Medium parameters used:  $f = 5280 \text{ MHz}$ ;  $\sigma = 5.2 \text{ mho/m}$ ;  $\epsilon_r = 49.5$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section

DASY4 Configuration:

- Probe: EX3DV4 - SN3791; ConvF(4.07, 4.07, 4.07); Calibrated: 2013-06-04
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn567; Calibrated: 2013-01-25
- Phantom: ELI v4.0 Phantom TP:1169; Type: ELI v4.0 Phantom; Serial: TP:1169
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

**WLAN\_Back Screen\_802.11a\_6Mbps\_CH56\_Main Ant/Area Scan (141x201x1):** Measurement grid:

$dx=10\text{mm}$ ,  $dy=10\text{mm}$

Maximum value of SAR (interpolated) = 0.031 mW/g

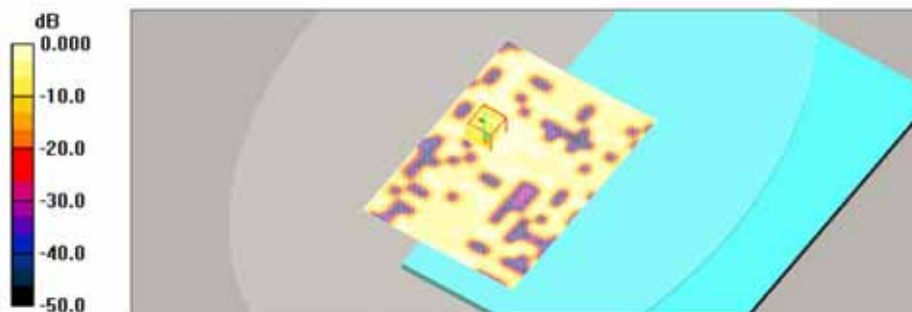
**WLAN\_Back Screen\_802.11a\_6Mbps\_CH56\_Main Ant/Zoom Scan (7x7x12)/Cube 0:** Measurement grid:  $dx=4\text{mm}$ ,  $dy=4\text{mm}$ ,  $dz=2\text{mm}$

Reference Value = 1.36 V/m; Power Drift = 0.021 dB

Peak SAR (extrapolated) = 0.091 W/kg

SAR(1 g) = 0.016 mW/g; SAR(10 g) = 0.00913 mW/g

Maximum value of SAR (measured) = 0.029 mW/g



0 dB = 0.029mW/g

Date: 2014-01-08

Test Laboratory: SGS Korea (Gunpo Laboratory)

File Name: WLAN\_Back Screen\_802.11a\_6Mbps\_CH60\_AUX Ant.da4

Ambient Temp : 23.3 °C Tissue Temp : 22.0 °C

DUT: NP930X5J; Type: Notebook; Serial: JKHA91KDC00071Y

Program Name: WLAN\_Body

Communication System: WLAN(11a\_U-NII Low); Frequency: 5300 MHz; Duty Cycle: 1:1

Medium parameters used:  $f = 5300$  MHz;  $\sigma = 5.22$  mho/m;  $\epsilon_r = 49.5$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

DASY4 Configuration:

- Probe: EX3DV4 - SN3791; ConvF(4.07, 4.07, 4.07); Calibrated: 2013-06-04
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn567; Calibrated: 2013-01-25
- Phantom: ELI v4.0 Phantom TP:1169; Type: ELI v4.0 Phantom; Serial: TP:1169
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

**WLAN\_Back Screen\_802.11a\_6Mbps\_CH60\_AUX Ant/Area Scan (141x201x1):** Measurement grid:

dx=10mm, dy=10mm

Maximum value of SAR (interpolated) = 0.039 mW/g

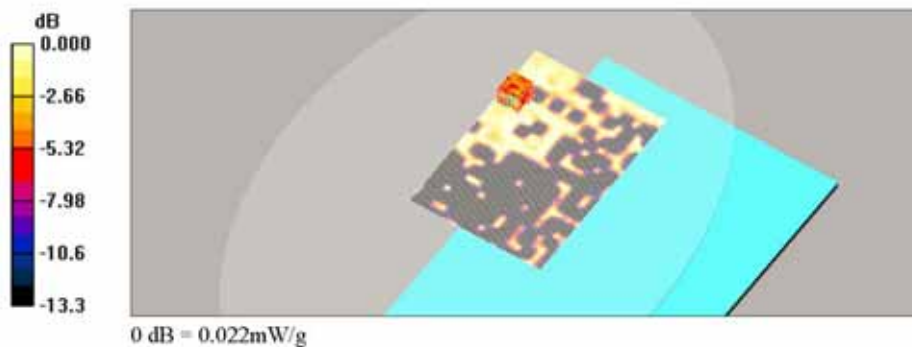
**WLAN\_Back Screen\_802.11a\_6Mbps\_CH60\_AUX Ant/Zoom Scan (7x7x12)/Cube 0:** Measurement grid: dx=4mm, dy=4mm, dz=2mm

Reference Value = 1.10 V/m; Power Drift = -0.049 dB

Peak SAR (extrapolated) = 0.177 W/kg

SAR(1 g) = 0.011 mW/g; SAR(10 g) = 0.0061 mW/g

Maximum value of SAR (measured) = 0.022 mW/g



Date: 2014-01-08

Test Laboratory: SGS Korea (Gunpo Laboratory)  
 File Name: WLAN\_Base\_802.11ac\_VHT6\_CH58\_Main Ant.da4

Ambient Temp : 23.3 °C Tissue Temp : 22.0 °C

DUT: NP930X5J; Type: Notebook; Serial: JKHA91KDC00071Y  
 Program Name: WLAN\_Body

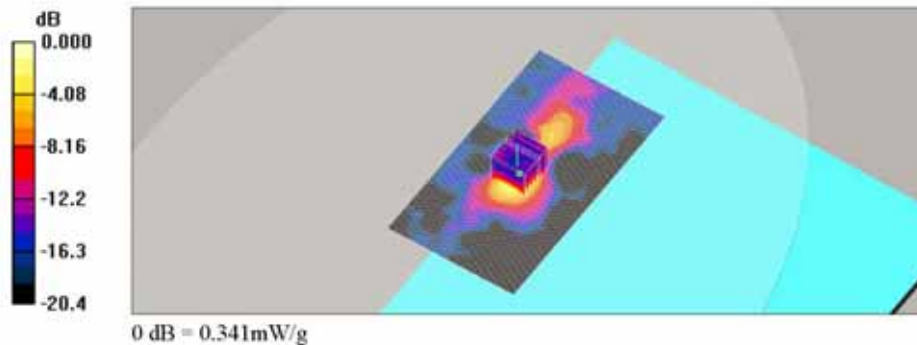
Communication System: WLAN(802.11ac 80MHz); Frequency: 5290 MHz; Duty Cycle: 1:1  
 Medium parameters used:  $f = 5290 \text{ MHz}$ ;  $\sigma = 5.21 \text{ mho/m}$ ;  $\epsilon_r = 49.5$ ;  $\rho = 1000 \text{ kg/m}^3$   
 Phantom section: Flat Section

DASY4 Configuration:

- Probe: EX3DV4 - SN3791; ConvF(4.07, 4.07, 4.07); Calibrated: 2013-06-04
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn567; Calibrated: 2013-01-25
- Phantom: ELI v4.0 Phantom TP:1169; Type: ELI v4.0 Phantom; Serial: TP:1169
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

**WLAN\_Base\_802.11ac\_VHT6\_CH58\_Main Ant/Area Scan (91x161x1):** Measurement grid:  $dx=10\text{mm}$ ,  $dy=10\text{mm}$   
 Maximum value of SAR (interpolated) = 0.382 mW/g

**WLAN\_Base\_802.11ac\_VHT6\_CH58\_Main Ant/Zoom Scan (7x7x12)/Cube 0:** Measurement grid:  
 $dx=4\text{mm}$ ,  $dy=4\text{mm}$ ,  $dz=2\text{mm}$   
 Reference Value = 1.13 V/m; Power Drift = 0.194 dB  
 Peak SAR (extrapolated) = 1.04 W/kg  
**SAR(1 g) = 0.170 mW/g; SAR(10 g) = 0.063 mW/g**  
 Maximum value of SAR (measured) = 0.341 mW/g



Date: 2014-01-08

Test Laboratory: SGS Korea (Gunpo Laboratory)  
 File Name: [WLAN\\_Base\\_802.11ac\\_VHT6\\_CH58\\_AUX\\_Ant.da4](#)

Ambient Temp : 23.3 °C Tissue Temp : 22.0 °C

DUT: NP930X5J; Type: Notebook; Serial: JKHA91KDC00071Y  
 Program Name: WLAN\_Body

Communication System: WLAN(802.11ac 80MHz); Frequency: 5290 MHz; Duty Cycle: 1:1  
 Medium parameters used:  $f = 5290$  MHz;  $\sigma = 5.21$  mho/m;  $\epsilon_r = 49.5$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

DASY4 Configuration:

- Probe: EX3DV4 - SN3791; ConvF(4.07, 4.07, 4.07); Calibrated: 2013-06-04
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn567; Calibrated: 2013-01-25
- Phantom: ELI v4.0 Phantom TP:1169; Type: ELI v4.0 Phantom; Serial: TP:1169
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

**WLAN\_Base\_802.11ac\_VHT6\_CH58\_Aux Ant/Area Scan (81x131x1):** Measurement grid:  $dx=10$ mm,  $dy=10$ mm

Maximum value of SAR (interpolated) = 0.443 mW/g

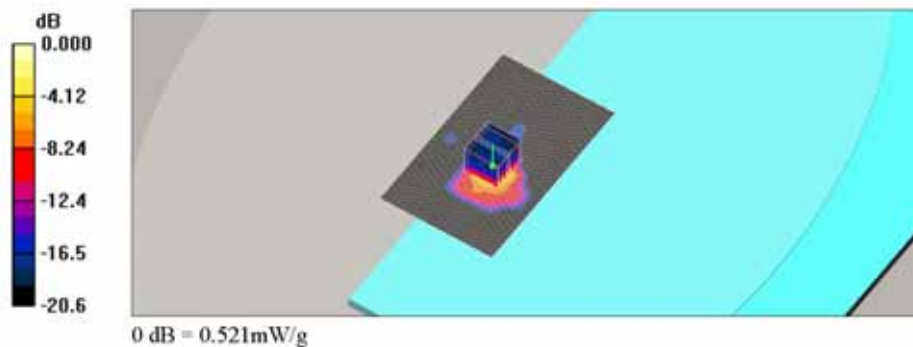
**WLAN\_Base\_802.11ac\_VHT6\_CH58\_Aux Ant/Zoom Scan (7x7x12)/Cube 0:** Measurement grid:  $dx=4$ mm,  $dy=4$ mm,  $dz=2$ mm

Reference Value = 1.23 V/m; Power Drift = 0.113 dB

Peak SAR (extrapolated) = 1.50 W/kg

SAR(1 g) = 0.217 mW/g; SAR(10 g) = 0.053 mW/g

Maximum value of SAR (measured) = 0.521 mW/g



## WLAN 5500 MHz Body SAR Test

Date: 2014-01-09

Test Laboratory: SGS Korea (Gunpo Laboratory)  
 File Name: [WLAN\\_Base\\_802.11a\\_6Mbps\\_CH132\\_Main\\_Ant.da4](#)

Ambient Temp : 23.8 °C Tissue Temp : 22.4 °C

DUT: NP930X5J; Type: Notebook; Serial: JKHA91KDC00071Y  
 Program Name: WLAN\_Body

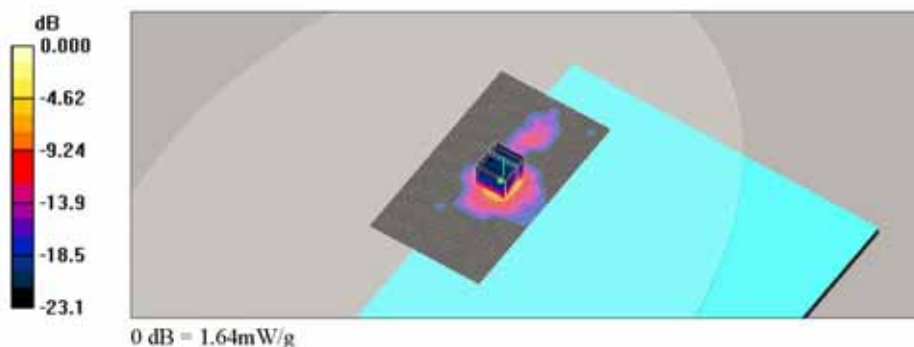
Communication System: WLAN(11a\_H or CEPT); Frequency: 5660 MHz; Duty Cycle: 1:1  
 Medium parameters used:  $f = 5660$  MHz;  $\sigma = 5.79$  mho/m;  $\epsilon_r = 50.3$ ;  $\rho = 1000$  kg/m<sup>3</sup>  
 Phantom section: Flat Section

DASY4 Configuration:

- Probe: EX3DV4 - SN3791; ConvF(3.79, 3.79, 3.79); Calibrated: 2013-06-04
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn567; Calibrated: 2013-01-25
- Phantom: ELI v4.0 Phantom TP:1169; Type: ELI v4.0 Phantom; Serial: TP:1169
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

**WLAN\_Base\_802.11a\_6Mbps\_CH132\_Main Ant/Area Scan (91x161x1):** Measurement grid: dx=10mm, dy=10mm  
 Maximum value of SAR (interpolated) = 1.36 mW/g

**WLAN\_Base\_802.11a\_6Mbps\_CH132\_Main Ant/Zoom Scan (7x7x12)/Cube 0:** Measurement grid: dx=4mm, dy=4mm, dz=2mm  
 Reference Value = 1.46 V/m; Power Drift = 0.111 dB  
 Peak SAR (extrapolated) = 5.15 W/kg  
 SAR(1 g) = 0.738 mW/g; SAR(10 g) = 0.186 mW/g  
 Maximum value of SAR (measured) = 1.64 mW/g



Date: 2014-01-09

Test Laboratory: SGS Korea (Gunpo Laboratory)  
 File Name: [WLAN\\_Base\\_802.11a\\_6Mbps\\_CH116\\_Main\\_Ant.da4](#)

Ambient Temp : 23.8 °C Tissue Temp : 22.4 °C

DUT: NP930X5J; Type: Notebook; Serial: JKHA91KDC00071Y  
 Program Name: WLAN\_Body

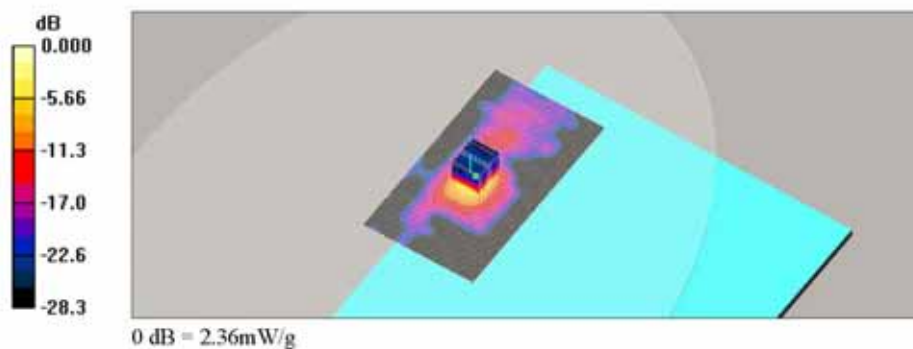
Communication System: WLAN(11a\_H or CEPT); Frequency: 5580 MHz; Duty Cycle: 1:1  
 Medium parameters used:  $f = 5580 \text{ MHz}$ ;  $\sigma = 5.69 \text{ mho/m}$ ;  $\epsilon_r = 50.5$ ;  $\rho = 1000 \text{ kg/m}^3$   
 Phantom section: Flat Section

DASY4 Configuration:

- Probe: EX3DV4 - SN3791; ConvF(3.79, 3.79, 3.79); Calibrated: 2013-06-04
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn567; Calibrated: 2013-01-25
- Phantom: ELI v4.0 Phantom TP:1169; Type: ELI v4.0 Phantom; Serial: TP:1169
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

**WLAN\_Base\_802.11a\_6Mbps\_CH116\_Main Ant/Area Scan (91x161x1):** Measurement grid:  $dx=10\text{mm}$ ,  $dy=10\text{mm}$   
 Maximum value of SAR (interpolated) = 2.02 mW/g

**WLAN\_Base\_802.11a\_6Mbps\_CH116\_Main Ant/Zoom Scan (7x7x12)/Cube 0:** Measurement grid:  
 $dx=4\text{mm}$ ,  $dy=4\text{mm}$ ,  $dz=2\text{mm}$   
 Reference Value = 1.56 V/m; Power Drift = -0.024 dB  
 Peak SAR (extrapolated) = 6.69 W/kg  
**SAR(1 g) = 0.983 mW/g; SAR(10 g) = 0.243 mW/g**  
 Maximum value of SAR (measured) = 2.36 mW/g



Date: 2014-01-09

Test Laboratory: SGS Korea (Gunpo Laboratory)  
 File Name: [WLAN\\_Base\\_802.11a\\_6Mbps\\_CH104\\_Main\\_Ant.da4](#)

Ambient Temp : 23.8 °C Tissue Temp : 22.4 °C

DUT: NP930X5J; Type: Notebook; Serial: JKHA91KDC00071Y  
 Program Name: WLAN\_Body

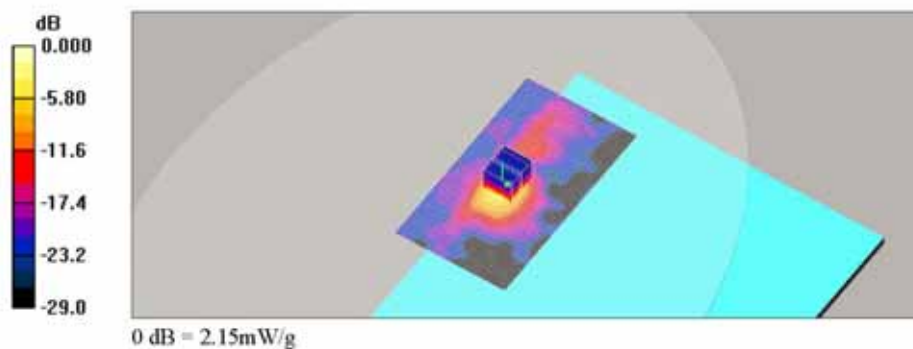
Communication System: WLAN(11a\_H or CEPT); Frequency: 5520 MHz; Duty Cycle: 1:1  
 Medium parameters used:  $f = 5520 \text{ MHz}$ ;  $\sigma = 5.61 \text{ mho/m}$ ;  $\epsilon_r = 50.6$ ;  $\rho = 1000 \text{ kg/m}^3$   
 Phantom section: Flat Section

DASY4 Configuration:

- Probe: EX3DV4 - SN3791; ConvF(3.95, 3.95, 3.95); Calibrated: 2013-06-04
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn567; Calibrated: 2013-01-25
- Phantom: ELI v4.0 Phantom TP:1169; Type: ELI v4.0 Phantom; Serial: TP:1169
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

**WLAN\_Base\_802.11a\_6Mbps\_CH104\_Main Ant/Area Scan (91x161x1):** Measurement grid:  $dx=10\text{mm}$ ,  $dy=10\text{mm}$   
 Maximum value of SAR (interpolated) = 1.50 mW/g

**WLAN\_Base\_802.11a\_6Mbps\_CH104\_Main Ant/Zoom Scan (7x7x12)/Cube 0:** Measurement grid:  
 $dx=4\text{mm}$ ,  $dy=4\text{mm}$ ,  $dz=2\text{mm}$   
 Reference Value = 1.47 V/m; Power Drift = -0.067 dB  
 Peak SAR (extrapolated) = 6.01 W/kg  
 SAR(1 g) = 0.919 mW/g; SAR(10 g) = 0.232 mW/g  
 Maximum value of SAR (measured) = 2.15 mW/g



Date: 2014-01-09

Test Laboratory: SGS Korea (Gunpo Laboratory)  
 File Name: WLAN\_Base\_802.11a\_6Mbps\_CH136\_Main\_Ant.da4

Ambient Temp : 23.8 °C Tissue Temp : 22.4 °C

DUT: NP930X5J; Type: Notebook; Serial: JKHA91KDC00071Y  
 Program Name: WLAN\_Body

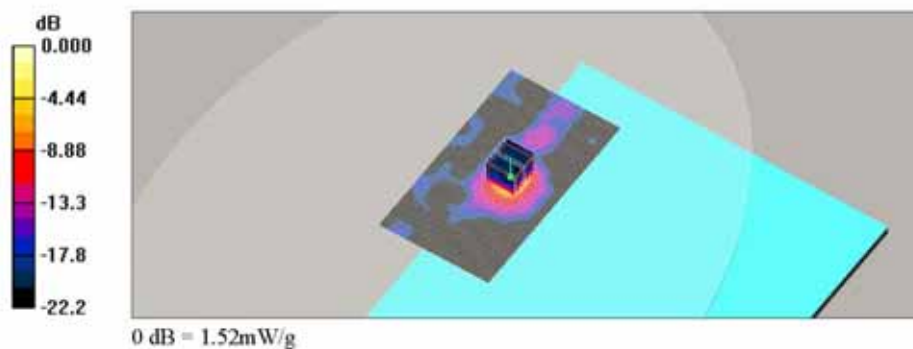
Communication System: WLAN(11a\_H or CEPT); Frequency: 5680 MHz; Duty Cycle: 1:1  
 Medium parameters used:  $f = 5680$  MHz;  $\sigma = 5.82$  mho/m;  $\epsilon_r = 50.3$ ;  $\rho = 1000$  kg/m<sup>3</sup>  
 Phantom section: Flat Section

DASY4 Configuration:

- Probe: EX3DV4 - SN3791; ConvF(3.79, 3.79, 3.79); Calibrated: 2013-06-04
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn567; Calibrated: 2013-01-25
- Phantom: ELI v4.0 Phantom TP:1169; Type: ELI v4.0 Phantom; Serial: TP:1169
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

**WLAN\_Base\_802.11a\_6Mbps\_CH136\_Main Ant/Area Scan (91x161x1):** Measurement grid: dx=10mm, dy=10mm  
 Maximum value of SAR (interpolated) = 1.13 mW/g

**WLAN\_Base\_802.11a\_6Mbps\_CH136\_Main Ant/Zoom Scan (7x7x12)/Cube 0:** Measurement grid: dx=4mm, dy=4mm, dz=2mm  
 Reference Value = 1.26 V/m; Power Drift = 0.067 dB  
 Peak SAR (extrapolated) = 4.33 W/kg  
 SAR(1 g) = 0.636 mW/g; SAR(10 g) = 0.165 mW/g  
 Maximum value of SAR (measured) = 1.52 mW/g



Date: 2014-01-09

Test Laboratory: SGS Korea (Gunpo Laboratory)  
 File Name: WLAN\_Base\_802.11a\_6Mbps\_CH116\_Aux\_Ant.da4

Ambient Temp : 23.8 °C Tissue Temp : 22.4 °C

DUT: NP930X5J; Type: Notebook; Serial: JKHA91KDC00071Y  
 Program Name: WLAN\_Body

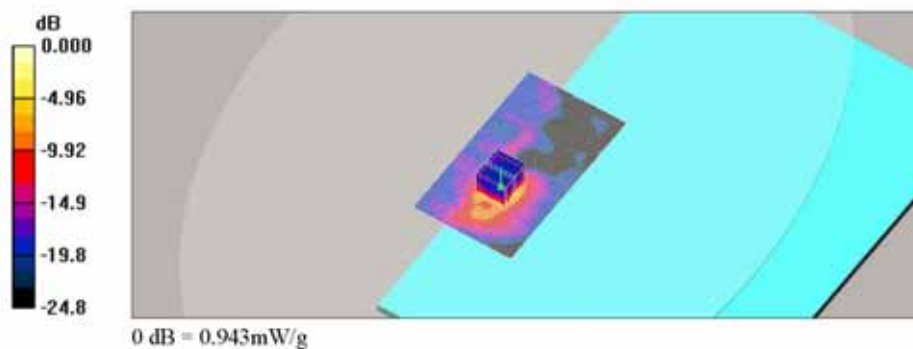
Communication System: WLAN(11a\_H or CEPT); Frequency: 5580 MHz; Duty Cycle: 1:1  
 Medium parameters used:  $f = 5580 \text{ MHz}$ ;  $\sigma = 5.69 \text{ mho/m}$ ;  $\epsilon_r = 50.5$ ;  $\rho = 1000 \text{ kg/m}^3$   
 Phantom section: Flat Section

DASY4 Configuration:

- Probe: EX3DV4 - SN3791; ConvF(3.79, 3.79, 3.79); Calibrated: 2013-06-04
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn567; Calibrated: 2013-01-25
- Phantom: ELI v4.0 Phantom TP:1169; Type: ELI v4.0 Phantom; Serial: TP:1169
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

**WLAN\_Base\_802.11a\_6Mbps\_CH116\_Aux Ant/Area Scan (81x141x1):** Measurement grid: dx=10mm, dy=10mm  
 Maximum value of SAR (interpolated) = 0.725 mW/g

**WLAN\_Base\_802.11a\_6Mbps\_CH116\_Aux Ant/Zoom Scan (7x7x12)/Cube 0:** Measurement grid: dx=4mm, dy=4mm, dz=2mm  
 Reference Value = 2.79 V/m; Power Drift = 0.123 dB  
 Peak SAR (extrapolated) = 2.67 W/kg  
**SAR(1 g) = 0.411 mW/g; SAR(10 g) = 0.109 mW/g**  
 Maximum value of SAR (measured) = 0.943 mW/g



Date: 2014-01-09

Test Laboratory: SGS Korea (Gunpo Laboratory)  
 File Name: WLAN\_Base\_802.11a\_6Mbps\_CH104\_Aux\_Ant.da4

Ambient Temp : 23.8 °C Tissue Temp : 22.4 °C

DUT: NP930X5J; Type: Notebook; Serial: JKHA91KDC00071Y  
 Program Name: WLAN\_Body

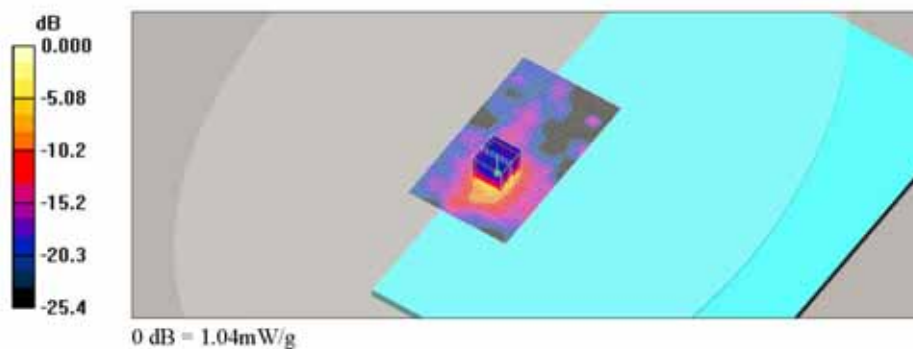
Communication System: WLAN(11a\_H or CEPT); Frequency: 5520 MHz; Duty Cycle: 1:1  
 Medium parameters used:  $f = 5520 \text{ MHz}$ ;  $\sigma = 5.61 \text{ mho/m}$ ;  $\epsilon_r = 50.6$ ;  $\rho = 1000 \text{ kg/m}^3$   
 Phantom section: Flat Section

DASY4 Configuration:

- Probe: EX3DV4 - SN3791; ConvF(3.95, 3.95, 3.95); Calibrated: 2013-06-04
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn567; Calibrated: 2013-01-25
- Phantom: ELI v4.0 Phantom TP:1169; Type: ELI v4.0 Phantom; Serial: TP:1169
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

**WLAN\_Base\_802.11a\_6Mbps\_CH104\_Aux Ant/Area Scan (81x141x1):** Measurement grid:  $dx=10\text{mm}$ ,  $dy=10\text{mm}$   
 Maximum value of SAR (interpolated) = 0.849 mW/g

**WLAN\_Base\_802.11a\_6Mbps\_CH104\_Aux Ant/Zoom Scan (7x7x12)/Cube 0:** Measurement grid:  
 $dx=4\text{mm}$ ,  $dy=4\text{mm}$ ,  $dz=2\text{mm}$   
 Reference Value = 2.42 V/m; Power Drift = 0.144 dB  
 Peak SAR (extrapolated) = 2.80 W/kg  
**SAR(1 g) = 0.455 mW/g; SAR(10 g) = 0.122 mW/g**  
 Maximum value of SAR (measured) = 1.04 mW/g



Date: 2014-01-09

Test Laboratory: SGS Korea (Gunpo Laboratory)  
 File Name: WLAN\_Base\_802.11a\_6Mbps\_CH136\_Aux\_Ant.da4

Ambient Temp : 23.8 °C Tissue Temp : 22.4 °C

DUT: NP930X5J; Type: Notebook; Serial: JKHA91KDC00071Y  
 Program Name: WLAN\_Body

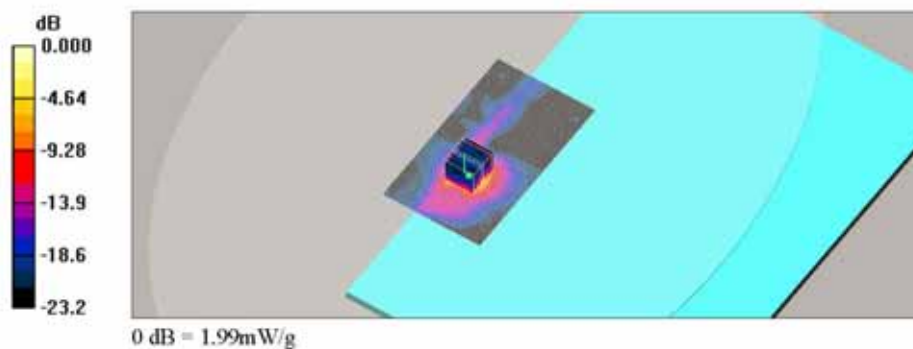
Communication System: WLAN(11a\_H or CEPT); Frequency: 5680 MHz; Duty Cycle: 1:1  
 Medium parameters used:  $f = 5680$  MHz;  $\sigma = 5.82$  mho/m;  $\epsilon_r = 50.3$ ;  $\rho = 1000$  kg/m<sup>3</sup>  
 Phantom section: Flat Section

DASY4 Configuration:

- Probe: EX3DV4 - SN3791; ConvF(3.79, 3.79, 3.79); Calibrated: 2013-06-04
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn567; Calibrated: 2013-01-25
- Phantom: ELI v4.0 Phantom TP:1169; Type: ELI v4.0 Phantom; Serial: TP:1169
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

**WLAN\_Base\_802.11a\_6Mbps\_CH136\_Aux Ant/Area Scan (81x141x1):** Measurement grid: dx=10mm, dy=10mm  
 Maximum value of SAR (interpolated) = 1.49 mW/g

**WLAN\_Base\_802.11a\_6Mbps\_CH136\_Aux Ant/Zoom Scan (7x7x12)/Cube 0:** Measurement grid: dx=4mm, dy=4mm, dz=2mm  
 Reference Value = 3.74 V/m; Power Drift = -0.183 dB  
 Peak SAR (extrapolated) = 5.63 W/kg  
**SAR(1 g) = 0.876 mW/g; SAR(10 g) = 0.230 mW/g**  
 Maximum value of SAR (measured) = 1.99 mW/g



Date: 2014-01-09

Test Laboratory: SGS Korea (Gunpo Laboratory)

File Name: WLAN\_Back Screen\_802.11a\_6Mbps\_CH132\_Main Ant.da4

Ambient Temp : 23.8 °C Tissue Temp : 22.4 °C

DUT: NP930X5J; Type: Notebook; Serial: JKHA91KDC00071Y

Program Name: WLAN\_Body

Communication System: WLAN(11a\_H or CEPT); Frequency: 5660 MHz; Duty Cycle: 1:1

Medium parameters used:  $f = 5660$  MHz;  $\sigma = 5.79$  mho/m;  $\epsilon_r = 50.3$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

DASY4 Configuration:

- Probe: EX3DV4 - SN3791; ConvF(3.79, 3.79, 3.79); Calibrated: 2013-06-04
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn567; Calibrated: 2013-01-25
- Phantom: ELI v4.0 Phantom TP:1169; Type: ELI v4.0 Phantom; Serial: TP:1169
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

**WLAN\_Back Screen\_802.11a\_6Mbps\_CH132\_Main Ant/Area Scan (141x201x1):** Measurement grid:

dx=10mm, dy=10mm

Maximum value of SAR (interpolated) = 0.038 mW/g

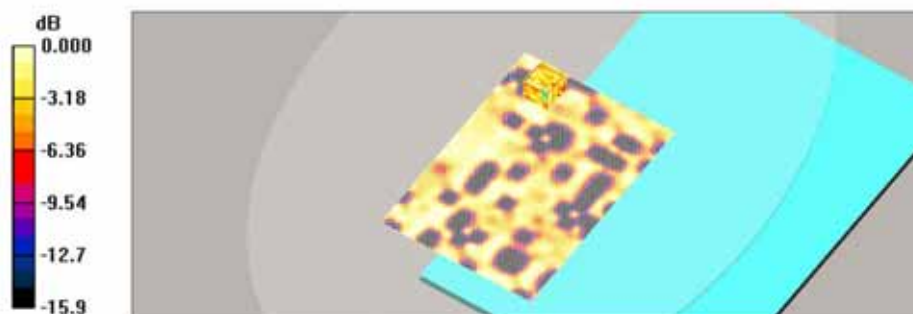
**WLAN\_Back Screen\_802.11a\_6Mbps\_CH132\_Main Ant/Zoom Scan (7x7x12)/Cube 0:** Measurement grid: dx=4mm, dy=4mm, dz=2mm

Reference Value = 1.36 V/m; Power Drift = -0.095 dB

Peak SAR (extrapolated) = 0.058 W/kg

SAR(1 g) = 0.012 mW/g; SAR(10 g) = 0.00821 mW/g

Maximum value of SAR (measured) = 0.022 mW/g



0 dB = 0.022mW/g

Date: 2014-01-09

Test Laboratory: SGS Korea (Gunpo Laboratory)

File Name: WLAN\_Back Screen\_802.11a\_6Mbps\_CH116\_Aux Ant.da4

Ambient Temp : 23.8 °C Tissue Temp : 22.4 °C

DUT: NP930X5J; Type: Notebook; Serial: JKHA91KDC00071Y

Program Name: WLAN\_Body

Communication System: WLAN(11a\_H or CEPT); Frequency: 5580 MHz; Duty Cycle: 1:1

Medium parameters used:  $f = 5580$  MHz;  $\sigma = 5.69$  mho/m;  $\epsilon_r = 50.5$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

DASY4 Configuration:

- Probe: EX3DV4 - SN3791; ConvF(3.79, 3.79, 3.79); Calibrated: 2013-06-04
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn567; Calibrated: 2013-01-25
- Phantom: ELI v4.0 Phantom TP:1169; Type: ELI v4.0 Phantom; Serial: TP:1169
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

**WLAN\_Back Screen\_802.11a\_6Mbps\_CH116\_Aux Ant/Area Scan (141x201x1):** Measurement grid:

dx=10mm, dy=10mm

Maximum value of SAR (interpolated) = 0.030 mW/g

**WLAN\_Back Screen\_802.11a\_6Mbps\_CH116\_Aux Ant/Zoom Scan (7x7x12)/Cube 0:** Measurement

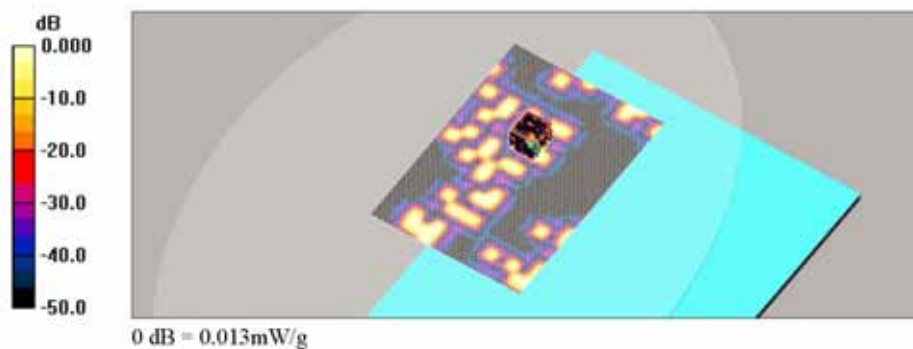
grid: dx=4mm, dy=4mm, dz=2mm

Reference Value = 1.33 V/m; Power Drift = -0.080 dB

Peak SAR (extrapolated) = 0.049 W/kg

SAR(1 g) = 0.00127 mW/g; SAR(10 g) = 0.000198 mW/g

Maximum value of SAR (measured) = 0.013 mW/g



Date: 2014-01-09

Test Laboratory: SGS Korea (Gunpo Laboratory)  
 File Name: WLAN\_Base\_802.11ac\_VHT6\_CH138\_Main\_Ant.da4

Ambient Temp : 23.8 °C Tissue Temp : 22.4 °C

DUT: NP930X5J; Type: Notebook; Serial: JKHA91KDC00071Y  
 Program Name: WLAN\_Body

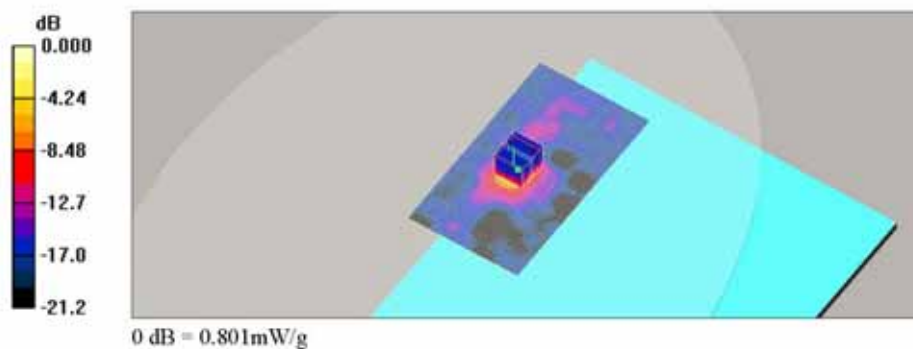
Communication System: WLAN(802.11ac 80MHz); Frequency: 5690 MHz; Duty Cycle: 1:1  
 Medium parameters used:  $f = 5690$  MHz;  $\sigma = 5.84$  mho/m;  $\epsilon_r = 50.3$ ;  $\rho = 1000$  kg/m<sup>3</sup>  
 Phantom section: Flat Section

DASY4 Configuration:

- Probe: EX3DV4 - SN3791; ConvF(3.79, 3.79, 3.79); Calibrated: 2013-06-04
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn567; Calibrated: 2013-01-25
- Phantom: ELI v4.0 Phantom TP:1169; Type: ELI v4.0 Phantom; Serial: TP:1169
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

**WLAN\_Base\_802.11ac\_VHT6\_CH138\_Main Ant/Area Scan (91x161x1):** Measurement grid: dx=10mm, dy=10mm  
 Maximum value of SAR (interpolated) = 0.502 mW/g

**WLAN\_Base\_802.11ac\_VHT6\_CH138\_Main Ant/Zoom Scan (7x7x12)/Cube 0:** Measurement grid: dx=4mm, dy=4mm, dz=2mm  
 Reference Value = 1.33 V/m; Power Drift = -0.023 dB  
 Peak SAR (extrapolated) = 2.34 W/kg  
**SAR(1 g) = 0.340 mW/g; SAR(10 g) = 0.094 mW/g**  
 Maximum value of SAR (measured) = 0.801 mW/g



Date: 2014-01-09

Test Laboratory: SGS Korea (Gunpo Laboratory)  
 File Name: [WLAN\\_Base\\_802.11ac\\_VHT6\\_CH138\\_Aux\\_Ant.da4](#)

Ambient Temp : 23.8 °C Tissue Temp : 22.4 °C

DUT: NP930X5J; Type: Notebook; Serial: JKHA91KDC00071Y  
 Program Name: WLAN\_Body

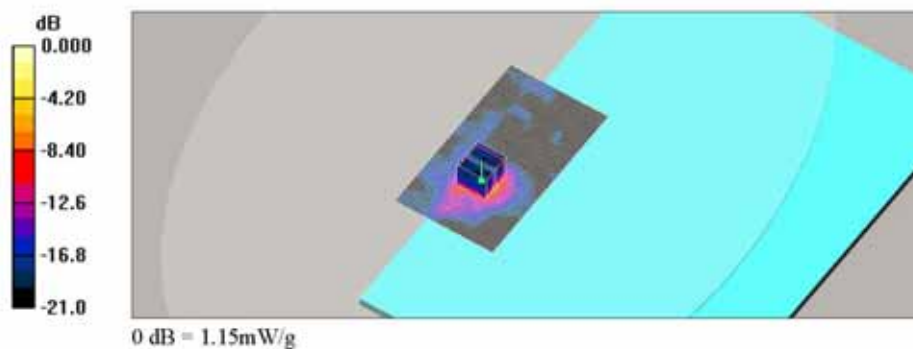
Communication System: WLAN(802.11ac 80MHz); Frequency: 5690 MHz; Duty Cycle: 1:1  
 Medium parameters used:  $f = 5690 \text{ MHz}$ ;  $\sigma = 5.84 \text{ mho/m}$ ;  $\epsilon_r = 50.3$ ;  $\rho = 1000 \text{ kg/m}^3$   
 Phantom section: Flat Section

DASY4 Configuration:

- Probe: EX3DV4 - SN3791; ConvF(3.79, 3.79, 3.79); Calibrated: 2013-06-04
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn567; Calibrated: 2013-01-25
- Phantom: ELI v4.0 Phantom TP:1169; Type: ELI v4.0 Phantom; Serial: TP:1169
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

**WLAN\_Base\_802.11ac\_VHT6\_CH138\_Aux Ant/Area Scan (81x141x1):** Measurement grid:  $dx=10\text{mm}$ ,  $dy=10\text{mm}$   
 Maximum value of SAR (interpolated) = 0.913 mW/g

**WLAN\_Base\_802.11ac\_VHT6\_CH138\_Aux Ant/Zoom Scan (7x7x12)/Cube 0:** Measurement grid:  
 $dx=4\text{mm}$ ,  $dy=4\text{mm}$ ,  $dz=2\text{mm}$   
 Reference Value = 2.86 V/m; Power Drift = 0.100 dB  
 Peak SAR (extrapolated) = 3.32 W/kg  
 SAR(1 g) = 0.517 mW/g; SAR(10 g) = 0.136 mW/g  
 Maximum value of SAR (measured) = 1.15 mW/g



Date: 2014-01-09

Test Laboratory: SGS Korea (Gunpo Laboratory)  
 File Name: WLAN\_Base\_802.11a\_6Mbps\_CH116\_Main\_Ant\_Repeat\_Test.da4

Ambient Temp : 23.8 °C Tissue Temp : 22.4 °C

DUT: NP930X5J; Type: Notebook; Serial: JKHA91KDC00071Y  
 Program Name: WLAN\_Body

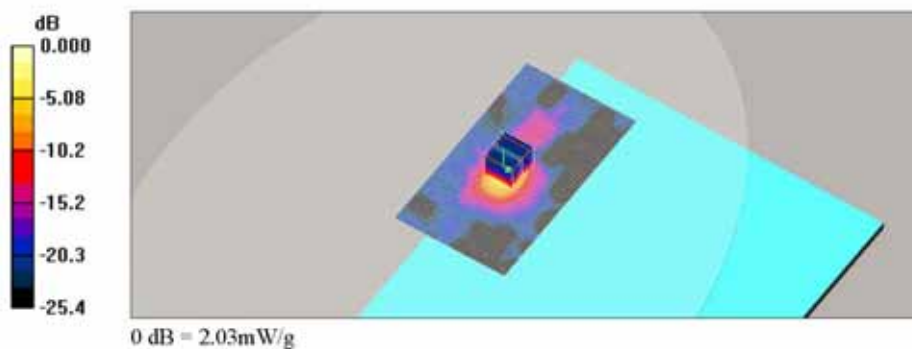
Communication System: WLAN(11a\_H or CEPT); Frequency: 5580 MHz; Duty Cycle: 1:1  
 Medium parameters used:  $f = 5580 \text{ MHz}$ ;  $\sigma = 5.69 \text{ mho/m}$ ;  $\epsilon_r = 50.5$ ;  $\rho = 1000 \text{ kg/m}^3$   
 Phantom section: Flat Section

DASY4 Configuration:

- Probe: EX3DV4 - SN3791; ConvF(3.79, 3.79, 3.79); Calibrated: 2013-06-04
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn567; Calibrated: 2013-01-25
- Phantom: ELI v4.0 Phantom TP:1169; Type: ELI v4.0 Phantom; Serial: TP:1169
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

**WLAN\_Base\_802.11a\_6Mbps\_CH116\_Main\_Ant\_Repeat\_Test/Area Scan (91x161x1): Measurement**  
 grid:  $dx=10\text{mm}$ ,  $dy=10\text{mm}$   
 Maximum value of SAR (interpolated) = 1.83 mW/g

**WLAN\_Base\_802.11a\_6Mbps\_CH116\_Main\_Ant\_Repeat\_Test/Zoom Scan (7x7x12)/Cube 0:**  
 Measurement grid:  $dx=4\text{mm}$ ,  $dy=4\text{mm}$ ,  $dz=2\text{mm}$   
 Reference Value = 1.48 V/m; Power Drift = 0.053 dB  
 Peak SAR (extrapolated) = 5.80 W/kg  
**SAR(1 g) = 0.889 mW/g; SAR(10 g) = 0.225 mW/g**  
 Maximum value of SAR (measured) = 2.03 mW/g



Date: 2014-01-09

Test Laboratory: SGS Korea (Gunpo Laboratory)  
 File Name: WLAN\_Base\_802.11a\_6Mbps\_CH136\_Aux Ant\_Repeat Test.da4

Ambient Temp : 23.8 °C Tissue Temp : 22.4 °C

DUT: NP930X5J; Type: Notebook; Serial: JKHA91KDC00071Y  
 Program Name: WLAN\_Body

Communication System: WLAN(11a\_H or CEPT); Frequency: 5680 MHz; Duty Cycle: 1:1  
 Medium parameters used:  $f = 5680$  MHz;  $\sigma = 5.82$  mho/m;  $\epsilon_r = 50.3$ ;  $\rho = 1000$  kg/m<sup>3</sup>  
 Phantom section: Flat Section

DASY4 Configuration:

- Probe: EX3DV4 - SN3791; ConvF(3.79, 3.79, 3.79); Calibrated: 2013-06-04
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn567; Calibrated: 2013-01-25
- Phantom: ELI v4.0 Phantom TP:1169; Type: ELI v4.0 Phantom; Serial: TP:1169
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

**WLAN\_Base\_802.11a\_6Mbps\_CH136\_Aux Ant\_Repeat Test/Area Scan (81x141x1): Measurement**

grid: dx=10mm, dy=10mm

Maximum value of SAR (interpolated) = 1.68 mW/g

**WLAN\_Base\_802.11a\_6Mbps\_CH136\_Aux Ant\_Repeat Test/Zoom Scan (7x7x12)/Cube 0:**

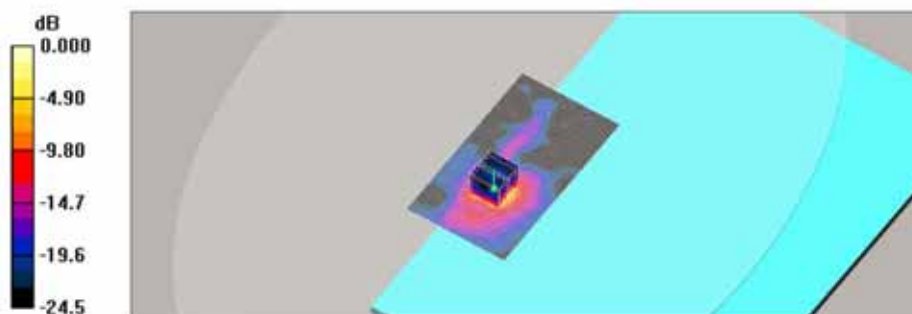
Measurement grid: dx=4mm, dy=4mm, dz=2mm

Reference Value = 3.44 V/m; Power Drift = 0.140 dB

Peak SAR (extrapolated) = 5.52 W/kg

SAR(1 g) = 0.870 mW/g; SAR(10 g) = 0.227 mW/g

Maximum value of SAR (measured) = 2.04 mW/g



0 dB = 2.04mW/g

## WLAN 5800 MHz Body SAR Test

Date: 2014-01-10

Test Laboratory: SGS Korea (Gunpo Laboratory)  
 File Name: [WLAN\\_Base\\_802.11a\\_6Mbps\\_CH157\\_Main\\_Ant.da4](#)

Ambient Temp : 23.1 °C Tissue Temp : 21.9 °C

DUT: NP930X5J; Type: Notebook; Serial: JKHA91KDC00071Y  
 Program Name: WLAN\_Body

Communication System: WLAN(11a\_U-NII Upper); Frequency: 5785 MHz; Duty Cycle: 1:1  
 Medium parameters used:  $f = 5785 \text{ MHz}$ ;  $\sigma = 5.82 \text{ mho/m}$ ;  $\epsilon_r = 48.9$ ;  $\rho = 1000 \text{ kg/m}^3$   
 Phantom section: Flat Section

DASY4 Configuration:

- Probe: EX3DV4 - SN3791; ConvF(4, 4, 4); Calibrated: 2013-06-04
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn567; Calibrated: 2013-01-25
- Phantom: ELI v4.0 Phantom TP:1169; Type: ELI v4.0 Phantom; Serial: TP:1169
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

**WLAN\_Base\_802.11a\_6Mbps\_CH157\_Main Ant/Area Scan (81x141x1):** Measurement grid:  $dx=10\text{mm}$ ,  $dy=10\text{mm}$

Maximum value of SAR (interpolated) = 2.17 mW/g

**WLAN\_Base\_802.11a\_6Mbps\_CH157\_Main Ant/Zoom Scan (7x7x12)/Cube 0:** Measurement grid:

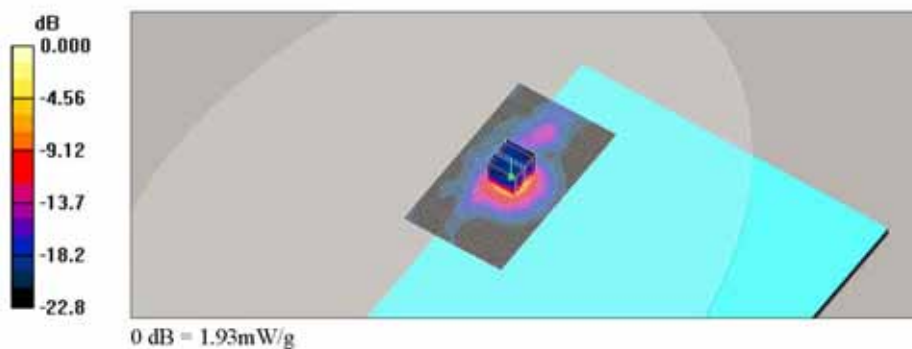
$dx=4\text{mm}$ ,  $dy=4\text{mm}$ ,  $dz=2\text{mm}$

Reference Value = 1.28 V/m; Power Drift = 0.082 dB

Peak SAR (extrapolated) = 5.30 W/kg

SAR(1 g) = 0.804 mW/g; SAR(10 g) = 0.210 mW/g

Maximum value of SAR (measured) = 1.93 mW/g



Date: 2014-01-10

Test Laboratory: SGS Korea (Gunpo Laboratory)

File Name: WLAN\_Base\_802.11a\_6Mbps\_CH149\_Main\_Ant.da4

Ambient Temp : 23.1 °C Tissue Temp : 21.9 °C

DUT: NP930X5J; Type: Notebook; Serial: JKHA91KDC00071Y

Program Name: WLAN\_Body

Communication System: WLAN(11a\_U-NII Upper); Frequency: 5745 MHz; Duty Cycle: 1:1

Medium parameters used:  $f = 5745 \text{ MHz}$ ;  $\sigma = 5.78 \text{ mho/m}$ ;  $\epsilon_r = 49$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section

DASY4 Configuration:

- Probe: EX3DV4 - SN3791; ConvF(4, 4, 4); Calibrated: 2013-06-04
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn567; Calibrated: 2013-01-25
- Phantom: ELI v4.0 Phantom TP:1169; Type: ELI v4.0 Phantom; Serial: TP:1169
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

**WLAN\_Base\_802.11a\_6Mbps\_CH149\_Main Ant/Area Scan (81x131x1):** Measurement grid:  $dx=10\text{mm}$ ,  $dy=10\text{mm}$

Maximum value of SAR (interpolated) = 1.73 mW/g

**WLAN\_Base\_802.11a\_6Mbps\_CH149\_Main Ant/Zoom Scan (7x7x12)/Cube 0:** Measurement grid:

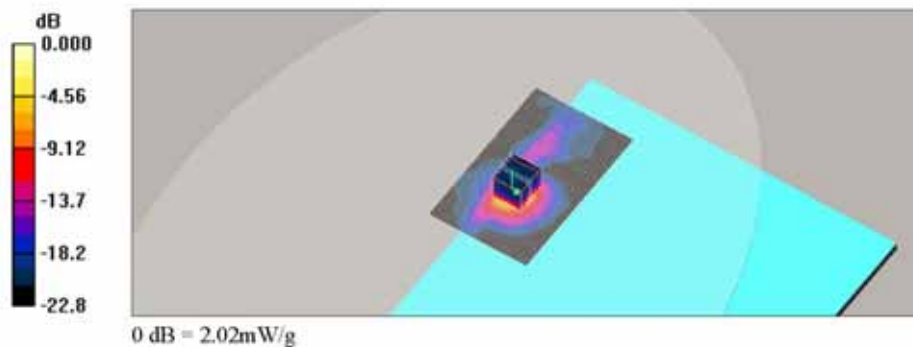
$dx=4\text{mm}$ ,  $dy=4\text{mm}$ ,  $dz=2\text{mm}$

Reference Value = 1.49 V/m; Power Drift = -0.013 dB

Peak SAR (extrapolated) = 5.47 W/kg

SAR(1 g) = 0.863 mW/g; SAR(10 g) = 0.225 mW/g

Maximum value of SAR (measured) = 2.02 mW/g



Date: 2014-01-10

Test Laboratory: SGS Korea (Gunpo Laboratory)

File Name: WLAN\_Base\_802.11a\_6Mbps\_CH165\_Main\_Ant.da4

Ambient Temp : 23.1 °C Tissue Temp : 21.9 °C

DUT: NP930X5J; Type: Notebook; Serial: JKHA91KDC00071Y

Program Name: WLAN\_Body

Communication System: WLAN(11a\_U-NII Upper); Frequency: 5825 MHz; Duty Cycle: 1:1

Medium parameters used:  $f = 5825$  MHz;  $\sigma = 5.87$  mho/m;  $\epsilon_r = 48.9$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

DASY4 Configuration:

- Probe: EX3DV4 - SN3791; ConvF(4, 4, 4); Calibrated: 2013-06-04
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn567; Calibrated: 2013-01-25
- Phantom: ELI v4.0 Phantom TP:1169; Type: ELI v4.0 Phantom; Serial: TP:1169
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

**WLAN\_Base\_802.11a\_6Mbps\_CH165\_Main Ant/Area Scan (81x131x1):** Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (interpolated) = 1.90 mW/g

**WLAN\_Base\_802.11a\_6Mbps\_CH165\_Main Ant/Zoom Scan (7x7x12)/Cube 0:** Measurement grid:

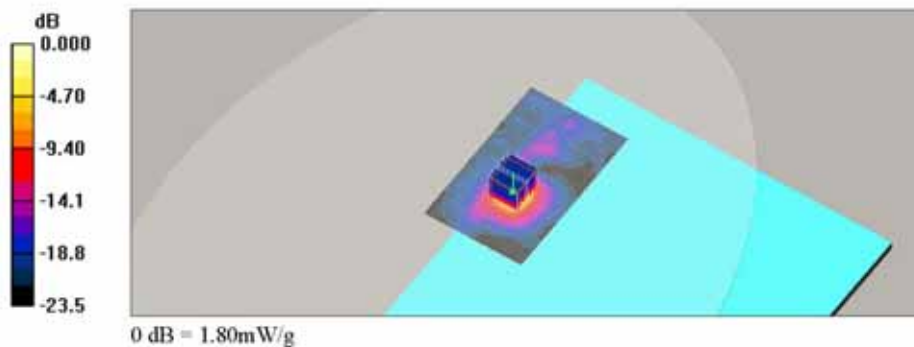
dx=4mm, dy=4mm, dz=2mm

Reference Value = 1.47 V/m; Power Drift = -0.046 dB

Peak SAR (extrapolated) = 4.95 W/kg

SAR(1 g) = 0.751 mW/g; SAR(10 g) = 0.198 mW/g

Maximum value of SAR (measured) = 1.80 mW/g



Date: 2014-01-10

Test Laboratory: SGS Korea (Gunpo Laboratory)

File Name: WLAN\_Base\_802.11a\_6Mbps\_CH157\_AUX\_Ant.da4

Ambient Temp : 23.1 °C Tissue Temp : 21.9 °C

DUT: NP930X5J; Type: Notebook; Serial: JKHA91KDC00071Y  
 Program Name: WLAN\_Body

Communication System: WLAN(11a\_U-NII Upper); Frequency: 5785 MHz; Duty Cycle: 1:1

Medium parameters used:  $f = 5785 \text{ MHz}$ ;  $\sigma = 5.82 \text{ mho/m}$ ;  $\epsilon_r = 48.9$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section

DASY4 Configuration:

- Probe: EX3DV4 - SN3791; ConvF(4, 4, 4); Calibrated: 2013-06-04
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn567; Calibrated: 2013-01-25
- Phantom: ELI v4.0 Phantom TP:1169; Type: ELI v4.0 Phantom; Serial: TP:1169
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

**WLAN\_Base\_802.11a\_6Mbps\_CH157\_AUX Ant/Area Scan (81x131x1):** Measurement grid:  $dx=10\text{mm}$ ,  $dy=10\text{mm}$

Maximum value of SAR (interpolated) = 1.52 mW/g

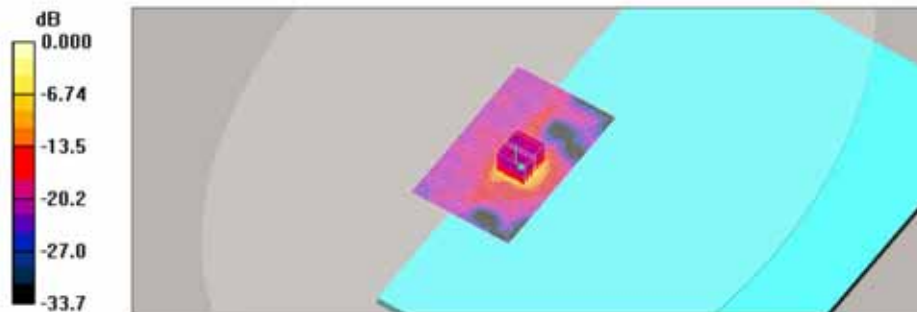
**WLAN\_Base\_802.11a\_6Mbps\_CH157\_AUX Ant/Zoom Scan (7x7x12)/Cube 0:** Measurement grid:  $dx=4\text{mm}$ ,  $dy=4\text{mm}$ ,  $dz=2\text{mm}$

Reference Value = 3.19 V/m; Power Drift = -0.169 dB

Peak SAR (extrapolated) = 4.94 W/kg

SAR(1 g) = 0.753 mW/g; SAR(10 g) = 0.195 mW/g

Maximum value of SAR (measured) = 1.90 mW/g



0 dB = 1.90mW/g

Date: 2014-01-10

Test Laboratory: SGS Korea (Gunpo Laboratory)

File Name: WLAN\_Base\_802.11a\_6Mbps\_CH149\_AUX\_Ant.da4

Ambient Temp : 23.1 °C Tissue Temp : 21.9 °C

DUT: NP930X5J; Type: Notebook; Serial: JKHA91KDC00071Y

Program Name: WLAN\_Body

Communication System: WLAN(11a\_U-NII Upper); Frequency: 5745 MHz; Duty Cycle: 1:1

Medium parameters used:  $f = 5745 \text{ MHz}$ ;  $\sigma = 5.78 \text{ mho/m}$ ;  $\epsilon_r = 49$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section

DASY4 Configuration:

- Probe: EX3DV4 - SN3791; ConvF(4, 4, 4); Calibrated: 2013-06-04
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn567; Calibrated: 2013-01-25
- Phantom: ELI v4.0 Phantom TP:1169; Type: ELI v4.0 Phantom; Serial: TP:1169
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

**WLAN\_Base\_802.11a\_6Mbps\_CH149\_AUX Ant/Area Scan (81x131x1):** Measurement grid:  $dx=10\text{mm}$ ,  $dy=10\text{mm}$

Maximum value of SAR (interpolated) = 2.05 mW/g

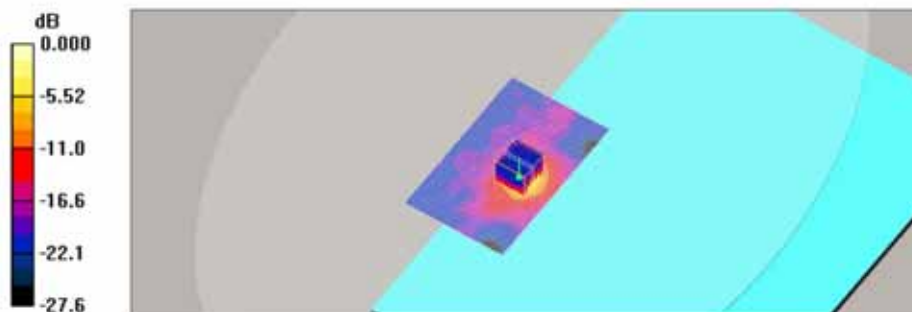
**WLAN\_Base\_802.11a\_6Mbps\_CH149\_AUX Ant/Zoom Scan (7x7x12)/Cube 0:** Measurement grid:  $dx=4\text{mm}$ ,  $dy=4\text{mm}$ ,  $dz=2\text{mm}$

Reference Value = 3.46 V/m; Power Drift = -0.123 dB

Peak SAR (extrapolated) = 6.08 W/kg

SAR(1 g) = 0.948 mW/g; SAR(10 g) = 0.251 mW/g

Maximum value of SAR (measured) = 2.33 mW/g



0 dB = 2.33mW/g

Date: 2014-01-10

Test Laboratory: SGS Korea (Gunpo Laboratory)

File Name: WLAN\_Base\_802.11a\_6Mbps\_CH165\_AUX\_Ant.da4

Ambient Temp : 23.1 °C Tissue Temp : 21.9 °C

DUT: NP930X5J; Type: Notebook; Serial: JKHA91KDC00071Y

Program Name: WLAN\_Body

Communication System: WLAN(11a\_U-NII Upper); Frequency: 5825 MHz; Duty Cycle: 1:1

Medium parameters used:  $f = 5825$  MHz;  $\sigma = 5.87$  mho/m;  $\epsilon_r = 48.9$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

DASY4 Configuration:

- Probe: EX3DV4 - SN3791; ConvF(4, 4, 4); Calibrated: 2013-06-04
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn567; Calibrated: 2013-01-25
- Phantom: ELI v4.0 Phantom TP:1169; Type: ELI v4.0 Phantom; Serial: TP:1169
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

**WLAN\_Base\_802.11a\_6Mbps\_CH165\_AUX Ant/Area Scan (81x131x1):** Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (interpolated) = 1.21 mW/g

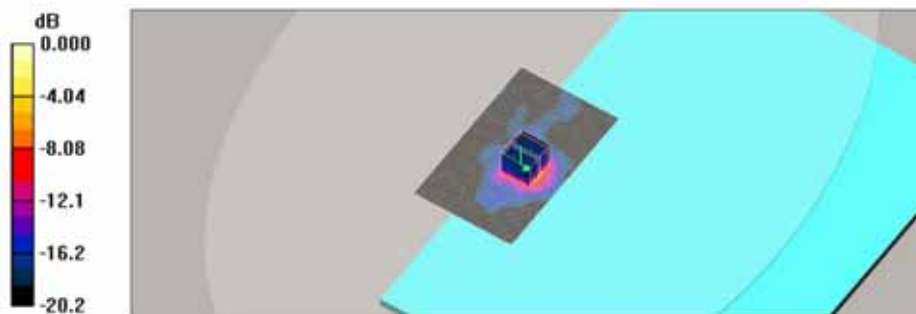
**WLAN\_Base\_802.11a\_6Mbps\_CH165\_AUX Ant/Zoom Scan (7x7x12)/Cube 0:** Measurement grid: dx=4mm, dy=4mm, dz=2mm

Reference Value = 2.48 V/m; Power Drift = 0.008 dB

Peak SAR (extrapolated) = 3.58 W/kg

SAR(1 g) = 0.527 mW/g; SAR(10 g) = 0.141 mW/g

Maximum value of SAR (measured) = 1.21 mW/g



0 dB = 1.21mW/g

Date: 2014-01-10

Test Laboratory: SGS Korea (Gunpo Laboratory)

File Name: WLAN\_Back Screen\_802.11a\_6Mbps\_CH157\_Main Ant.da4

Ambient Temp : 23.1 °C Tissue Temp : 21.9 °C

DUT: NP930X5J; Type: Notebook; Serial: JKHA91KDC00071Y

Program Name: WLAN\_Body

Communication System: WLAN(11a\_U-NII Upper); Frequency: 5785 MHz; Duty Cycle: 1:1

Medium parameters used:  $f = 5785 \text{ MHz}$ ;  $\sigma = 5.82 \text{ mho/m}$ ;  $\epsilon_r = 48.9$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section

DASY4 Configuration:

- Probe: EX3DV4 - SN3791; ConvF(4, 4, 4); Calibrated: 2013-06-04
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn567; Calibrated: 2013-01-25
- Phantom: ELI v4.0 Phantom TP:1169; Type: ELI v4.0 Phantom; Serial: TP:1169
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

**WLAN\_Back Screen\_802.11a\_6Mbps\_CH157\_Main Ant 2/Area Scan (141x201x1): Measurement**

grid:  $dx=10\text{mm}$ ,  $dy=10\text{mm}$

Maximum value of SAR (interpolated) = 0.019 mW/g

**WLAN\_Back Screen\_802.11a\_6Mbps\_CH157\_Main Ant 2/Zoom Scan (7x7x12)/Cube 0:**

Measurement grid:  $dx=4\text{mm}$ ,  $dy=4\text{mm}$ ,  $dz=2\text{mm}$

Reference Value = 1.01 V/m; Power Drift = 0.104 dB

Peak SAR (extrapolated) = 0.117 W/kg

SAR(1 g) = 0.00989 mW/g; SAR(10 g) = 0.00349 mW/g

Maximum value of SAR (measured) = 0.016 mW/g



Date: 2014-01-10

Test Laboratory: SGS Korea (Gunpo Laboratory)

File Name: WLAN\_Back Screen\_802.11a\_6Mbps\_CH157\_Aux Ant.da4

Ambient Temp : 23.1 °C Tissue Temp : 21.9 °C

DUT: NP930X5J; Type: Notebook; Serial: JKHA91KDC00071Y

Program Name: WLAN\_Body

Communication System: WLAN(11a\_U-NII Upper); Frequency: 5785 MHz; Duty Cycle: 1:1

Medium parameters used:  $f = 5785 \text{ MHz}$ ;  $\sigma = 5.82 \text{ mho/m}$ ;  $\epsilon_r = 48.9$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section

DASY4 Configuration:

- Probe: EX3DV4 - SN3791; ConvF(4, 4, 4); Calibrated: 2013-06-04
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn567; Calibrated: 2013-01-25
- Phantom: ELI v4.0 Phantom TP:1169; Type: ELI v4.0 Phantom; Serial: TP:1169
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

**WLAN\_Back Screen\_802.11a\_6Mbps\_CH157\_Aux Ant/Area Scan (141x201x1):** Measurement grid:

$dx=10\text{mm}$ ,  $dy=10\text{mm}$

Maximum value of SAR (interpolated) = 0.040 mW/g

**WLAN\_Back Screen\_802.11a\_6Mbps\_CH157\_Aux Ant/Zoom Scan (7x7x12)/Cube 0:** Measurement

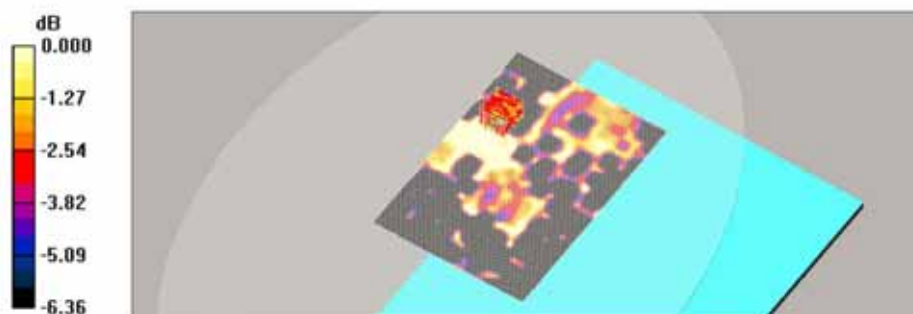
grid:  $dx=4\text{mm}$ ,  $dy=4\text{mm}$ ,  $dz=2\text{mm}$

Reference Value = 0.721 V/m; Power Drift = 0.130 dB

Peak SAR (extrapolated) = 0.169 W/kg

SAR(1 g) = 0.014 mW/g; SAR(10 g) = 0.010 mW/g

Maximum value of SAR (measured) = 0.021 mW/g



0 dB = 0.021mW/g

Date: 2014-01-10

Test Laboratory: SGS Korea (Gunpo Laboratory)  
 File Name: [WLAN\\_Base\\_802.11ac\\_VHT6\\_CH155\\_Main\\_Ant.da4](#)

Ambient Temp : 23.1 °C Tissue Temp : 21.9 °C

DUT: NP930X5J; Type: Notebook; Serial: JKHA91KDC00071Y  
 Program Name: WLAN\_Body

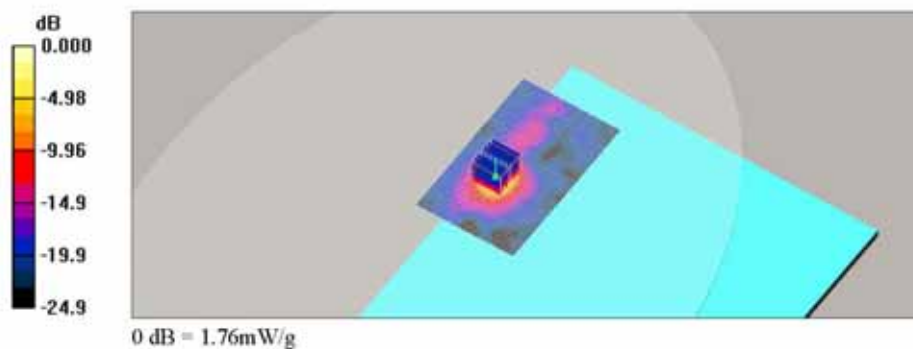
Communication System: WLAN(11a\_U-NII Upper); Frequency: 5775 MHz; Duty Cycle: 1:1  
 Medium parameters used:  $f = 5775 \text{ MHz}$ ;  $\sigma = 5.81 \text{ mho/m}$ ;  $\epsilon_r = 48.9$ ;  $\rho = 1000 \text{ kg/m}^3$   
 Phantom section: Flat Section

DASY4 Configuration:

- Probe: EX3DV4 - SN3791; ConvF(4, 4, 4); Calibrated: 2013-06-04
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn567; Calibrated: 2013-01-25
- Phantom: ELI v4.0 Phantom TP:1169; Type: ELI v4.0 Phantom; Serial: TP:1169
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

**WLAN\_Base\_802.11ac\_VHT6\_CH155\_Main Ant/Area Scan (81x131x1):** Measurement grid:  $dx=10\text{mm}$ ,  $dy=10\text{mm}$   
 Maximum value of SAR (interpolated) = 1.87 mW/g

**WLAN\_Base\_802.11ac\_VHT6\_CH155\_Main Ant/Zoom Scan (7x7x12)/Cube 0:** Measurement grid:  
 $dx=4\text{mm}$ ,  $dy=4\text{mm}$ ,  $dz=2\text{mm}$   
 Reference Value = 1.46 V/m; Power Drift = 0.152 dB  
 Peak SAR (extrapolated) = 4.66 W/kg  
**SAR(1 g) = 0.708 mW/g; SAR(10 g) = 0.183 mW/g**  
 Maximum value of SAR (measured) = 1.76 mW/g



Date: 2014-01-10

Test Laboratory: SGS Korea (Gunpo Laboratory)

File Name: WLAN\_Base\_802.11ac\_VHT6\_CH155\_AUX\_Ant.da4

Ambient Temp : 23.1 °C Tissue Temp : 21.9 °C

DUT: NP930X5J; Type: Notebook; Serial: JKHA91KDC00071Y

Program Name: WLAN\_Body

Communication System: WLAN(11a\_U-NII Upper); Frequency: 5775 MHz; Duty Cycle: 1:1

Medium parameters used:  $f = 5775$  MHz;  $\sigma = 5.81$  mho/m;  $\epsilon_r = 48.9$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

DASY4 Configuration:

- Probe: EX3DV4 - SN3791; ConvF(4, 4, 4); Calibrated: 2013-06-04
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn567; Calibrated: 2013-01-25
- Phantom: ELI v4.0 Phantom TP:1169; Type: ELI v4.0 Phantom; Serial: TP:1169
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

**WLAN\_Base\_802.11ac\_VHT6\_CH155\_AUX Ant/Area Scan (81x131x1):** Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (interpolated) = 1.40 mW/g

**WLAN\_Base\_802.11ac\_VHT6\_CH155\_AUX Ant/Zoom Scan (7x7x12)/Cube 0:** Measurement grid:

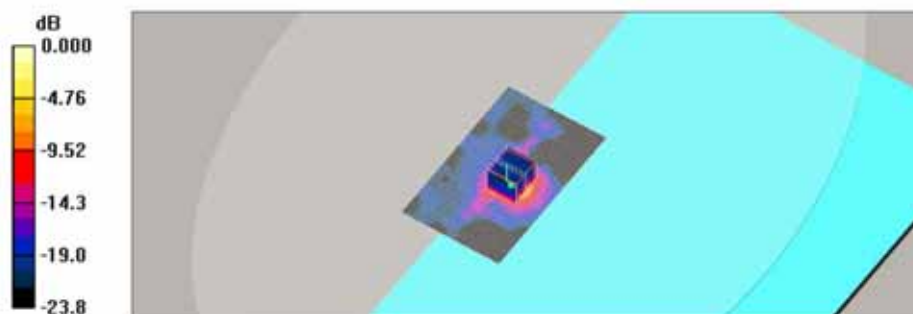
dx=4mm, dy=4mm, dz=2mm

Reference Value = 3.21 V/m; Power Drift = 0.179 dB

Peak SAR (extrapolated) = 4.81 W/kg

SAR(1 g) = 0.760 mW/g; SAR(10 g) = 0.196 mW/g

Maximum value of SAR (measured) = 1.72 mW/g



0 dB = 1.72mW/g

Date: 2014-01-10

Test Laboratory: SGS Korea (Gunpo Laboratory)  
 File Name: WLAN\_Base\_802.11a\_6Mbps\_CH149\_Main Ant Repeat Test.da4

Ambient Temp : 23.1 °C Tissue Temp : 21.9 °C

DUT: NP930X5J; Type: Notebook; Serial: JKHA91KDC00071Y  
 Program Name: WLAN\_Body

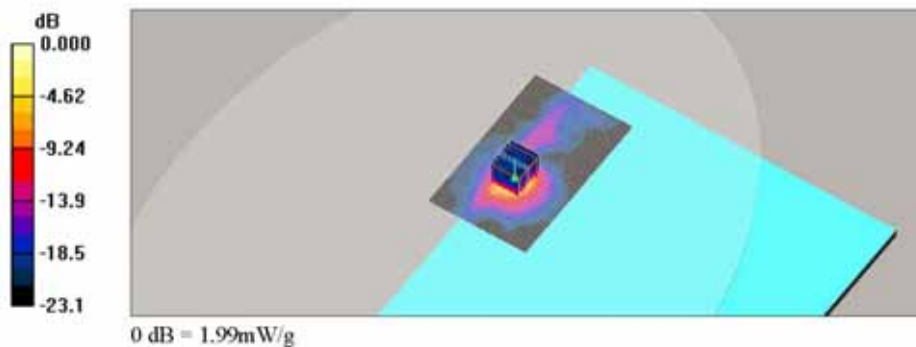
Communication System: WLAN(11a\_U-NII Upper); Frequency: 5745 MHz; Duty Cycle: 1:1  
 Medium parameters used:  $f = 5745 \text{ MHz}$ ;  $\sigma = 5.78 \text{ mho/m}$ ;  $\epsilon_r = 49$ ;  $\rho = 1000 \text{ kg/m}^3$   
 Phantom section: Flat Section

DASY4 Configuration:

- Probe: EX3DV4 - SN3791; ConvF(4, 4, 4); Calibrated: 2013-06-04
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn567; Calibrated: 2013-01-25
- Phantom: ELI v4.0 Phantom TP:1169; Type: ELI v4.0 Phantom; Serial: TP:1169
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

**WLAN\_Base\_802.11a\_6Mbps\_CH149\_Main Ant Repeat Test/Area Scan (81x131x1): Measurement**  
 grid:  $dx=10\text{mm}$ ,  $dy=10\text{mm}$   
 Maximum value of SAR (interpolated) = 1.70 mW/g

**WLAN\_Base\_802.11a\_6Mbps\_CH149\_Main Ant Repeat Test/Zoom Scan (7x7x12)/Cube 0:**  
 Measurement grid:  $dx=4\text{mm}$ ,  $dy=4\text{mm}$ ,  $dz=2\text{mm}$   
 Reference Value = 1.62 V/m; Power Drift = -0.109 dB  
 Peak SAR (extrapolated) = 5.82 W/kg  
 SAR(1 g) = 0.886 mW/g; SAR(10 g) = 0.229 mW/g  
 Maximum value of SAR (measured) = 1.99 mW/g



Date: 2014-01-10

Test Laboratory: SGS Korea (Gunpo Laboratory)

File Name: WLAN\_Base\_802.11a\_6Mbps\_CH149\_AUX Ant Repeat Test.da4

Ambient Temp : 23.1 °C Tissue Temp : 21.9 °C

DUT: NP930X5J; Type: Notebook; Serial: JKHA91KDC00071Y

Program Name: WLAN\_Body

Communication System: WLAN(11a\_U-NII Upper); Frequency: 5745 MHz; Duty Cycle: 1:1

Medium parameters used:  $f = 5745 \text{ MHz}$ ;  $\sigma = 5.78 \text{ mho/m}$ ;  $\epsilon_r = 49$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section

DASY4 Configuration:

- Probe: EX3DV4 - SN3791; ConvF(4, 4, 4); Calibrated: 2013-06-04
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn567; Calibrated: 2013-01-25
- Phantom: ELI v4.0 Phantom TP:1169; Type: ELI v4.0 Phantom; Serial: TP:1169
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

**WLAN\_Base\_802.11a\_6Mbps\_CH149\_AUX Ant Repeat Test 2/Area Scan (81x131x1): Measurement**

grid:  $dx=10\text{mm}$ ,  $dy=10\text{mm}$

Maximum value of SAR (interpolated) = 2.11 mW/g

**WLAN\_Base\_802.11a\_6Mbps\_CH149\_AUX Ant Repeat Test 2/Zoom Scan (7x7x12)/Cube 0:**

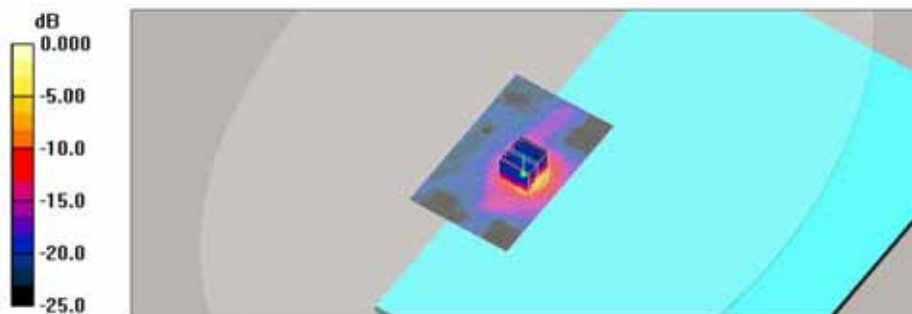
Measurement grid:  $dx=4\text{mm}$ ,  $dy=4\text{mm}$ ,  $dz=2\text{mm}$

Reference Value = 3.21 V/m; Power Drift = -0.044 dB

Peak SAR (extrapolated) = 5.74 W/kg

SAR(1 g) = 0.914 mW/g; SAR(10 g) = 0.246 mW/g

Maximum value of SAR (measured) = 2.17 mW/g



0 dB = 2.17mW/g

## Appendix B

### Uncertainty Analysis

| a                                                    | b                   | c          | d               | e = f(d,k) | g          | i =<br>cxg/e | k            |
|------------------------------------------------------|---------------------|------------|-----------------|------------|------------|--------------|--------------|
| Uncertainty Component                                | Section in<br>P1528 | Tol<br>(%) | Prob .<br>Dist. | Div.       | Ci<br>(1g) | 1g<br>ui (%) | Vi<br>(Veff) |
| Probe calibration                                    | E.2.1               | 6.55       | N               | 1          | 1          | 6.55         | ∞            |
| Axial isotropy                                       | E.2.2               | 0.5        | R               | 1.73       | 0.71       | 0.20         | ∞            |
| hemispherical isotropy                               | E.2.2               | 2.6        | R               | 1.73       | 0.71       | 1.06         | ∞            |
| Boundary effect                                      | E.2.3               | 2.0        | R               | 1.73       | 1          | 1.15         | ∞            |
| Linearity                                            | E.2.4               | 0.6        | R               | 1.73       | 1          | 0.35         | ∞            |
| System detection limit                               | E.2.5               | 1.0        | R               | 1.73       | 1          | 0.58         | ∞            |
| Readout electronics                                  | E.2.6               | 0.3        | N               | 1          | 1          | 0.30         | ∞            |
| Response time                                        | E.2.7               | 0.5        | R               | 1.73       | 1          | 0.29         | ∞            |
| Integration time                                     | E.2.8               | 2.6        | R               | 1.73       | 1          | 1.50         | ∞            |
| RF ambient Condition -Noise                          | E.6.1               | 3          | R               | 1.73       | 1          | 1.73         | ∞            |
| RF ambient Condition - reflections                   | E.6.1               | 3          | R               | 1.73       | 1          | 1.73         | ∞            |
| Probe positioning- mechanical tolerance              | E.6.2               | 0.4        | R               | 1.73       | 1          | 0.23         | ∞            |
| Probe positioning- with respect to phantom           | E.6.3               | 2.9        | R               | 1.73       | 1          | 1.67         | ∞            |
| Max. SAR evaluation                                  | E.5.2               | 2.0        | R               | 1.73       | 1          | 1.15         | ∞            |
| Test sample positioning                              | E.4.2               | 1.45       | N               | 1          | 1          | 1.45         | 19           |
| Device holder uncertainty                            | E.4.1               | 3.6        | N               | 1          | 1          | 3.60         | ∞            |
| Output power variation -SAR drift measurement        | 6.6.3               | 5          | R               | 1.73       | 1          | 2.89         | ∞            |
| Phantom uncertainty (shape and thickness tolerances) | E.3.1               | 6.1        | R               | 1.73       | 1          | 3.52         | ∞            |
| Liquid conductivity - deviation from target values   | E.3.2               | 5          | R               | 1.73       | 0.64       | 1.85         | ∞            |
| Liquid conductivity<br>- measurement uncertainty     | E.3.2               | 1.91       | N               | 1          | 0.64       | 1.22         | 9            |
| Liquid permittivity - deviation from target values   | E.3.3               | 5          | R               | 1.73       | 0.6        | 1.73         | ∞            |
| Liquid permittivity - deviation from target values   | E.3.3               | 1.91       | N               | 1          | 0.6        | 1.15         | 9            |
| Combined standard uncertainty                        |                     |            |                 | RSS        |            | 10.17        | 35809        |
| Expanded uncertainty (95%<br>CONFIDENCE INTERVAL)    |                     |            |                 | k=2        |            | 20.34        |              |



Report File No. : F690501/RF-SAR002147  
Date of Issue : 2014-01-16  
Page : 87 / 127

## **Appendix C**

### **Calibration Certificate**

**- PROBE**

**- DAE**

**- 2450 MHz, 5000 MHz DIPOLE**

## - PROBE Calibration Certificate

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



**S** Schweizerischer Kalibrierdienst  
**S** Service suisse d'étalonnage  
**C** 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 **SGS (Dymstec)**

Certificate No: EX3-3791\_Jun13

### CALIBRATION CERTIFICATE

Object **EX3DV4 - SN:3791**

Calibration procedure(s) **QA CAL-01.v8, QA CAL-14.v3, QA CAL-23.v4, QA CAL-25.v4**  
 Calibration procedure for dosimetric E-field probes

Calibration date: **June 4, 2013**

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      | 04-Apr-13 (No. 217-01733)         | Apr-14                 |
| Power sensor E4412A        | MY41498087      | 04-Apr-13 (No. 217-01733)         | Apr-14                 |
| Reference 3 dB Attenuator  | SN: S5054 (3c)  | 04-Apr-13 (No. 217-01737)         | Apr-14                 |
| Reference 20 dB Attenuator | SN: S5277 (20x) | 04-Apr-13 (No. 217-01735)         | Apr-14                 |
| Reference 30 dB Attenuator | SN: S5129 (30b) | 04-Apr-13 (No. 217-01738)         | Apr-14                 |
| Reference Probe ES3DV2     | SN: 3013        | 28-Dec-12 (No. ES3-3013_Dec12)    | Dec-13                 |
| DAE4                       | SN: 660         | 31-Jan-13 (No. DAE4-660_Jan13)    | Jan-14                 |
| Secondary Standards        | ID              | Check Date (in house)             | Scheduled Check        |
| RF generator HP B648C      | US3642U01700    | 4-Aug-99 (in house check Apr-13)  | In house check: Apr-15 |
| Network Analyzer HP 8753E  | US37390585      | 18-Oct-01 (in house check Oct-12) | In house check: Oct-13 |

|                                                                                                                 | Name           | Function              | Signature            |
|-----------------------------------------------------------------------------------------------------------------|----------------|-----------------------|----------------------|
| Calibrated by:                                                                                                  | Jeton Kastrati | Laboratory Technician |                      |
| Approved by:                                                                                                    | Katja Pokovic  | Technical Manager     |                      |
| This calibration certificate shall not be reproduced except in full without written approval of the laboratory. |                |                       | Issued: June 4, 2013 |

Certificate No: EX3-3791\_Jun13

Page 1 of 11

**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  
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**

## Glossary:

|                          |                                                                                                                                                         |
|--------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------|
| TSL                      | tissue simulating liquid                                                                                                                                |
| NORM <sub>x,y,z</sub>    | sensitivity in free space                                                                                                                               |
| ConvF                    | sensitivity in TSL / NORM <sub>x,y,z</sub>                                                                                                              |
| DCP                      | diode compression point                                                                                                                                 |
| CF                       | crest factor (1/duty_cycle) of the RF signal                                                                                                            |
| A, B, C, D               | modulation dependent linearization parameters                                                                                                           |
| Polarization $\varphi$   | $\varphi$ rotation around probe axis                                                                                                                    |
| Polarization $\vartheta$ | $\vartheta$ rotation around an axis that is in the plane normal to probe axis (at measurement center),<br>i.e., $\vartheta = 0$ is normal to probe axis |

## Calibration is Performed According to the Following Standards:

- 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
- 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:

- NORM<sub>x,y,z</sub>**: Assessed for E-field polarization  $\vartheta = 0$  ( $f \leq 900$  MHz in TEM-cell;  $f > 1800$  MHz: R22 waveguide). NORM<sub>x,y,z</sub> are only intermediate values, i.e., the uncertainties of NORM<sub>x,y,z</sub> does not affect the  $E^2$ -field uncertainty inside TSL (see below ConvF).
- NORM(f)<sub>x,y,z</sub>** = NORM<sub>x,y,z</sub> \* 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
- A<sub>x,y,z</sub>; B<sub>x,y,z</sub>; C<sub>x,y,z</sub>; D<sub>x,y,z</sub>; VR<sub>x,y,z</sub>; A, B, C, D** are numerical linearization parameters assessed based on the data of power sweep for specific modulation signal. The parameters do not depend on frequency nor media. VR is the maximum calibration range expressed in RMS voltage across the diode.
- ConvF and Boundary Effect Parameters**: Assessed in flat phantom using E-field (or Temperature Transfer Standard for  $f \leq 800$  MHz) and inside waveguide using analytical field distributions based on power measurements for  $f > 800$  MHz. The same setups are used for assessment of the parameters applied for boundary compensation (alpha, depth) of which typical uncertainty values are given. These parameters are used in DASY4 software to improve probe accuracy close to the boundary. The sensitivity in TSL corresponds to NORM<sub>x,y,z</sub> \* 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  $\pm 50$  MHz to  $\pm 100$  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.

EX3DV4 – SN:3791

June 4, 2013

# Probe EX3DV4

## SN:3791

Manufactured: February 18, 2011  
Calibrated: June 4, 2013

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

EX3DV4- SN:3791

June 4, 2013

## DASY/EASY - Parameters of Probe: EX3DV4 - SN:3791

### Basic Calibration Parameters

|                                       | Sensor X | Sensor Y | Sensor Z | Unc (k=2) |
|---------------------------------------|----------|----------|----------|-----------|
| Norm ( $\mu V/(V/m)^2$ ) <sup>A</sup> | 0.55     | 0.54     | 0.53     | ± 10.1 %  |
| DCP (mV) <sup>B</sup>                 | 103.1    | 99.9     | 101.4    |           |

### Modulation Calibration Parameters

| UID | Communication System Name |   | A<br>dB | B<br>dB $\sqrt{\mu V}$ | C   | D<br>dB | VR<br>mV | Unc <sup>E</sup><br>(k=2) |
|-----|---------------------------|---|---------|------------------------|-----|---------|----------|---------------------------|
| 0   | CW                        | X | 0.0     | 0.0                    | 1.0 | 0.00    | 168.0    | ±2.7 %                    |
|     |                           | Y | 0.0     | 0.0                    | 1.0 |         | 165.4    |                           |
|     |                           | Z | 0.0     | 0.0                    | 1.0 |         | 171.3    |                           |

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%.

<sup>A</sup> The uncertainties of NormX,Y,Z do not affect the E<sup>2</sup>-field uncertainty inside TSL (see Pages 5 and 6).

<sup>B</sup> Numerical linearization parameter; uncertainty not required.

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

EX3DV4- SN:3791

June 4, 2013

## DASY/EASY - Parameters of Probe: EX3DV4 - SN:3791

### Calibration Parameter Determined in Head Tissue Simulating Media

| f (MHz) <sup>C</sup> | Relative Permittivity <sup>F</sup> | Conductivity (S/m) <sup>F</sup> | ConvF X | ConvF Y | ConvF Z | Alpha | Depth (mm) | Unct. (k=2) |
|----------------------|------------------------------------|---------------------------------|---------|---------|---------|-------|------------|-------------|
| 835                  | 41.5                               | 0.90                            | 8.46    | 8.46    | 8.46    | 0.28  | 1.10       | ± 12.0 %    |
| 900                  | 41.5                               | 0.97                            | 8.33    | 8.33    | 8.33    | 0.61  | 0.68       | ± 12.0 %    |
| 1750                 | 40.1                               | 1.37                            | 7.85    | 7.85    | 7.85    | 0.58  | 0.71       | ± 12.0 %    |
| 1900                 | 40.0                               | 1.40                            | 7.61    | 7.61    | 7.61    | 0.57  | 0.70       | ± 12.0 %    |
| 2450                 | 39.2                               | 1.80                            | 6.74    | 6.74    | 6.74    | 0.49  | 0.77       | ± 12.0 %    |
| 2600                 | 39.0                               | 1.96                            | 6.56    | 6.56    | 6.56    | 0.36  | 0.92       | ± 12.0 %    |
| 5200                 | 36.0                               | 4.66                            | 4.71    | 4.71    | 4.71    | 0.45  | 1.80       | ± 13.1 %    |
| 5300                 | 35.9                               | 4.76                            | 4.68    | 4.68    | 4.68    | 0.30  | 1.80       | ± 13.1 %    |
| 5500                 | 35.6                               | 4.96                            | 4.52    | 4.52    | 4.52    | 0.40  | 1.80       | ± 13.1 %    |
| 5600                 | 35.5                               | 5.07                            | 4.31    | 4.31    | 4.31    | 0.40  | 1.80       | ± 13.1 %    |
| 5800                 | 35.3                               | 5.27                            | 4.24    | 4.24    | 4.24    | 0.45  | 1.90       | ± 13.1 %    |

<sup>C</sup> 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.

<sup>F</sup> At frequencies below 3 GHz, the validity of tissue parameters ( $\epsilon$  and  $\sigma$ ) 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 ( $\epsilon$  and  $\sigma$ ) is restricted to ± 5%. The uncertainty is the RSS of the ConvF uncertainty for indicated target tissue parameters.

EX3DV4- SN:3791

June 4, 2013

## DASY/EASY - Parameters of Probe: EX3DV4 - SN:3791

### Calibration Parameter Determined in Body Tissue Simulating Media

| f (MHz) <sup>C</sup> | Relative Permittivity <sup>F</sup> | Conductivity (S/m) <sup>F</sup> | ConvF X | ConvF Y | ConvF Z | Alpha | Depth (mm) | Unct. (k=2) |
|----------------------|------------------------------------|---------------------------------|---------|---------|---------|-------|------------|-------------|
| 835                  | 55.2                               | 0.97                            | 8.70    | 8.70    | 8.70    | 0.66  | 0.68       | ± 12.0 %    |
| 900                  | 55.0                               | 1.05                            | 8.58    | 8.58    | 8.58    | 0.77  | 0.66       | ± 12.0 %    |
| 1750                 | 53.4                               | 1.49                            | 7.52    | 7.52    | 7.52    | 0.35  | 0.92       | ± 12.0 %    |
| 1900                 | 53.3                               | 1.52                            | 7.15    | 7.15    | 7.15    | 0.25  | 1.06       | ± 12.0 %    |
| 2450                 | 52.7                               | 1.95                            | 6.62    | 6.62    | 6.62    | 0.76  | 0.60       | ± 12.0 %    |
| 2600                 | 52.5                               | 2.16                            | 6.33    | 6.33    | 6.33    | 0.80  | 0.50       | ± 12.0 %    |
| 5200                 | 49.0                               | 5.30                            | 4.23    | 4.23    | 4.23    | 0.40  | 1.90       | ± 13.1 %    |
| 5300                 | 48.9                               | 5.42                            | 4.07    | 4.07    | 4.07    | 0.40  | 1.90       | ± 13.1 %    |
| 5500                 | 48.6                               | 5.65                            | 3.95    | 3.95    | 3.95    | 0.40  | 1.90       | ± 13.1 %    |
| 5600                 | 48.5                               | 5.77                            | 3.79    | 3.79    | 3.79    | 0.40  | 1.90       | ± 13.1 %    |
| 5800                 | 48.2                               | 6.00                            | 4.00    | 4.00    | 4.00    | 0.50  | 1.90       | ± 13.1 %    |

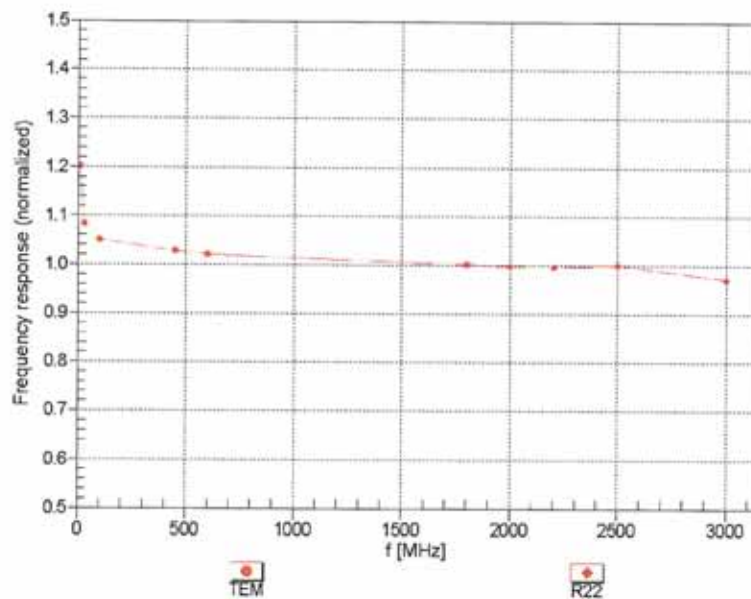
<sup>C</sup> Frequency validity of ± 100 MHz only applies for DASY v4.4 and higher (see Page 2), else it is restricted to ± 50 MHz. The uncertainty is the RSS of the ConvF uncertainty at calibration frequency and the uncertainty for the indicated frequency band.

<sup>F</sup> At frequencies below 3 GHz, the validity of tissue parameters ( $\epsilon$  and  $\sigma$ ) 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 ( $\epsilon$  and  $\sigma$ ) is restricted to ± 5%. The uncertainty is the RSS of the ConvF uncertainty for indicated target tissue parameters.

EX3DV4- SN:3791

June 4, 2013

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

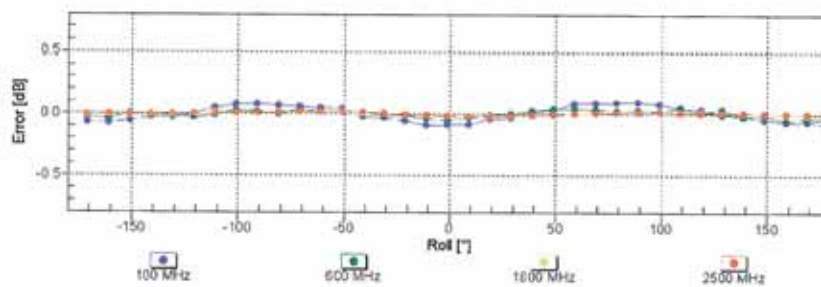
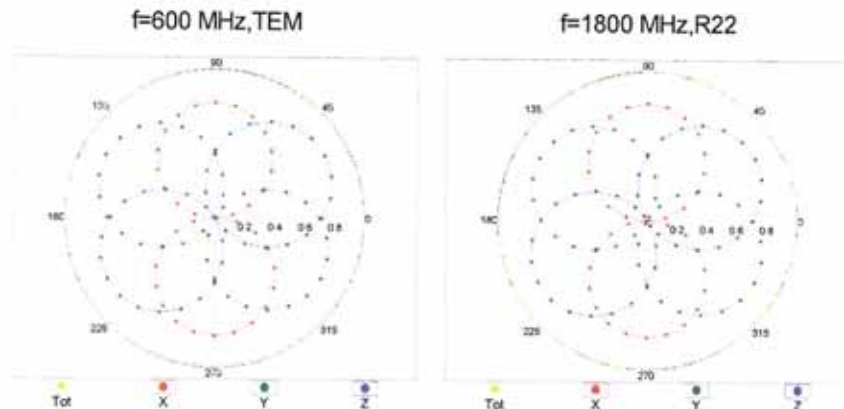


Uncertainty of Frequency Response of E-field:  $\pm 6.3\%$  ( $k=2$ )

EX3DV4- SN:3791

June 4, 2013

## Receiving Pattern ( $\phi$ ), $\theta = 0^\circ$

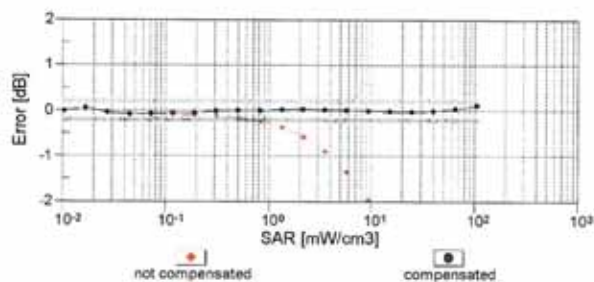
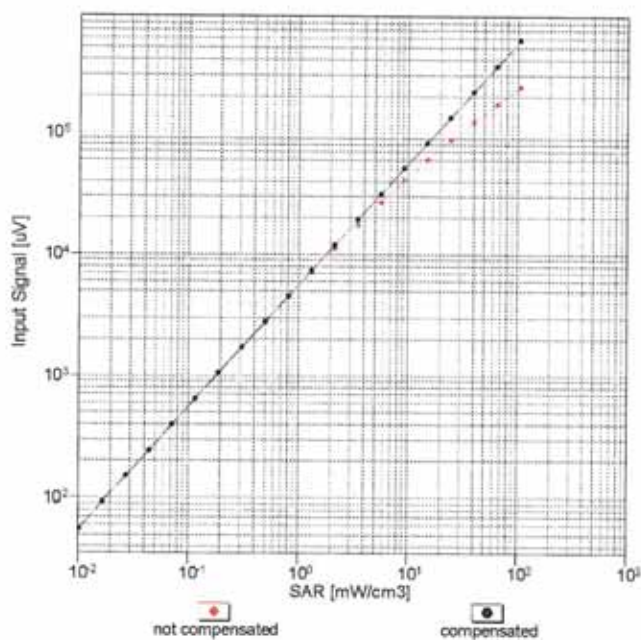


Uncertainty of Axial Isotropy Assessment:  $\pm 0.5\%$  ( $k=2$ )

EX3DV4- SN:3791

June 4, 2013

## Dynamic Range $f(\text{SAR}_{\text{head}})$ (TEM cell, $f = 900 \text{ MHz}$ )

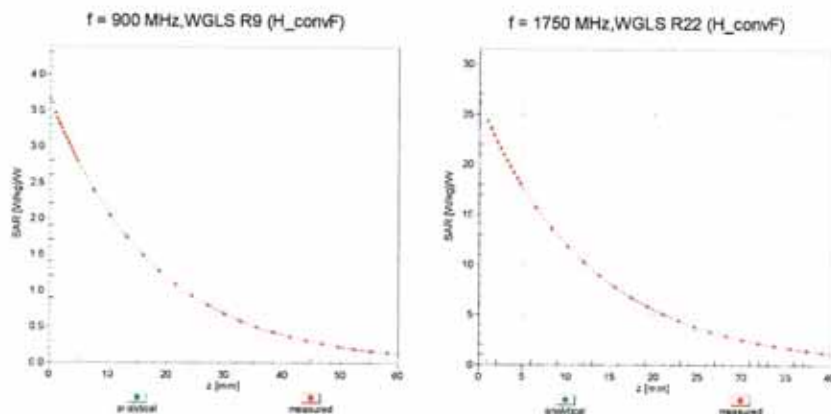


Uncertainty of Linearity Assessment:  $\pm 0.6\%$  ( $k=2$ )

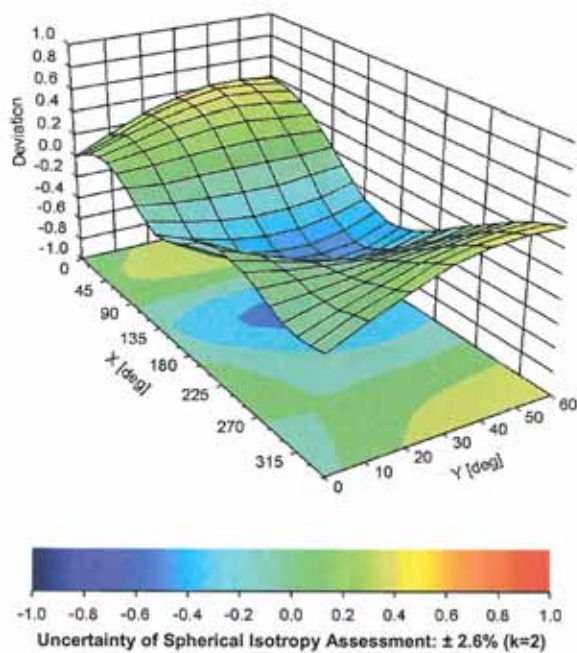
EX3DV4- SN:3791

June 4, 2013

## Conversion Factor Assessment



## Deviation from Isotropy in Liquid Error ( $\phi$ , $\theta$ ), $f = 900 \text{ MHz}$



EX3DV4- SN:3791

June 4, 2013

## DASY/EASY - Parameters of Probe: EX3DV4 - SN:3791

### Other Probe Parameters

|                                               |            |
|-----------------------------------------------|------------|
| Sensor Arrangement                            | Triangular |
| Connector Angle (°)                           | -111.1     |
| Mechanical Surface Detection Mode             | enabled    |
| Optical Surface Detection Mode                | disabled   |
| Probe Overall Length                          | 337 mm     |
| Probe Body Diameter                           | 10 mm      |
| Tip Length                                    | 9 mm       |
| Tip Diameter                                  | 2.5 mm     |
| Probe Tip to Sensor X Calibration Point       | 1 mm       |
| Probe Tip to Sensor Y Calibration Point       | 1 mm       |
| Probe Tip to Sensor Z Calibration Point       | 1 mm       |
| Recommended Measurement Distance from Surface | 2 mm       |

## - DAE3 Calibration 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 **SGS (Dymstec)**

Certificate No: **DAE3-567\_Jan13**

### CALIBRATION CERTIFICATE

Object **DAE3 - SD 000 D03 AA - SN: 567**

Calibration procedure(s) **QA CAL-06.v25**  
 Calibration procedure for the data acquisition electronics (DAE)

Calibration date: **January 25, 2013**

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

All calibrations have been conducted in the closed laboratory facility: environment temperature  $(22 \pm 3)^{\circ}\text{C}$  and humidity  $< 70\%$ .

Calibration Equipment used (M&TE critical for calibration)

| Primary Standards                                | ID #               | Cal Date (Certificate No.) | Scheduled Calibration  |
|--------------------------------------------------|--------------------|----------------------------|------------------------|
| Keithley Multimeter Type 2001                    | SN: 0610278        | 02-Oct-12 (No:12728)       | Oct-13                 |
| Secondary Standards                              | ID #               | Check Date (in house)      | Scheduled Check        |
| Auto DAE Calibration Unit<br>Calibrator Box V2.1 | SE UWS 053 AA 1001 | 07-Jan-13 (in house check) | In house check: Jan-14 |
|                                                  | SE UMS 006 AA 1002 | 07-Jan-13 (in house check) | In house check: Jan-14 |

|                |                   |                          |               |
|----------------|-------------------|--------------------------|---------------|
| Calibrated by: | Name<br>R. Mayraz | Function<br>Technician   | Signature<br> |
| Approved by:   | Fin Bornholt      | Deputy Technical Manager |               |

Issued: January 25, 2013

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

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



**S** Schweizerischer Kalibrierdienst  
**S** Service suisse d'étalonnage  
**C** 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**

## Glossary

**DAE** data acquisition electronics  
**Connector angle** information used in DASY system to align probe sensor X to the robot coordinate system.

## Methods Applied and Interpretation of Parameters

- **DC Voltage Measurement:** Calibration Factor assessed for use in DASY system by comparison with a calibrated instrument traceable to national standards. The figure given corresponds to the full scale range of the voltmeter in the respective range.
- **Connector angle:** The angle of the connector is assessed measuring the angle mechanically by a tool inserted. Uncertainty is not required.
- The following parameters as documented in the Appendix contain technical information as a result from the performance test and require no uncertainty.
  - **DC Voltage Measurement Linearity:** Verification of the Linearity at +10% and -10% of the nominal calibration voltage. Influence of offset voltage is included in this measurement.
  - **Common mode sensitivity:** Influence of a positive or negative common mode voltage on the differential measurement.
  - **Channel separation:** Influence of a voltage on the neighbor channels not subject to an input voltage.
  - **AD Converter Values with inputs shorted:** Values on the internal AD converter corresponding to zero input voltage
  - **Input Offset Measurement:** Output voltage and statistical results over a large number of zero voltage measurements.
  - **Input Offset Current:** Typical value for information; Maximum channel input offset current, not considering the input resistance.
  - **Input resistance:** Typical value for information: DAE input resistance at the connector, during internal auto-zeroing and during measurement.
  - **Low Battery Alarm Voltage:** Typical value for information. Below this voltage, a battery alarm signal is generated.
  - **Power consumption:** Typical value for information. Supply currents in various operating modes.

### DC Voltage Measurement

A/D - Converter Resolution nominal

High Range: 1LSB = 6.1 $\mu$ V , full range = -100...+300 mV  
 Low Range: 1LSB = 61nV , full range = -1.....+3mV

DASY measurement parameters: Auto Zero Time: 3 sec; Measuring time: 3 sec

| Calibration Factors | X                         | Y                         | Z                         |
|---------------------|---------------------------|---------------------------|---------------------------|
| High Range          | 404.652 $\pm$ 0.02% (k=2) | 404.401 $\pm$ 0.02% (k=2) | 404.491 $\pm$ 0.02% (k=2) |
| Low Range           | 3.95362 $\pm$ 1.55% (k=2) | 3.97148 $\pm$ 1.55% (k=2) | 3.96078 $\pm$ 1.55% (k=2) |

### Connector Angle

|                                           |                                 |
|-------------------------------------------|---------------------------------|
| Connector Angle to be used in DASY system | 7 $^{\circ}$ $\pm$ 1 $^{\circ}$ |
|-------------------------------------------|---------------------------------|

## Appendix

### 1. DC Voltage Linearity

| High Range |         | Reading ( $\mu\text{V}$ ) | Difference ( $\mu\text{V}$ ) | Error (%) |
|------------|---------|---------------------------|------------------------------|-----------|
| Channel X  | + Input | 199995.32                 | -0.62                        | -0.00     |
| Channel X  | + Input | 20002.46                  | 1.32                         | 0.01      |
| Channel X  | - Input | -19998.40                 | 1.69                         | -0.01     |
| Channel Y  | + Input | 199997.71                 | 1.34                         | 0.00      |
| Channel Y  | + Input | 19999.63                  | -1.28                        | -0.01     |
| Channel Y  | - Input | -19997.89                 | 2.47                         | -0.01     |
| Channel Z  | + Input | 199996.03                 | 0.01                         | 0.00      |
| Channel Z  | + Input | 19998.99                  | -1.92                        | -0.01     |
| Channel Z  | - Input | -19998.51                 | 1.81                         | -0.01     |

| Low Range |         | Reading ( $\mu\text{V}$ ) | Difference ( $\mu\text{V}$ ) | Error (%) |
|-----------|---------|---------------------------|------------------------------|-----------|
| Channel X | + Input | 2002.18                   | 0.83                         | 0.04      |
| Channel X | + Input | 201.83                    | 0.08                         | 0.04      |
| Channel X | - Input | -198.32                   | -0.18                        | 0.09      |
| Channel Y | + Input | 2001.92                   | 0.81                         | 0.04      |
| Channel Y | + Input | 201.24                    | -0.29                        | -0.15     |
| Channel Y | - Input | -199.03                   | -0.72                        | 0.36      |
| Channel Z | + Input | 2001.88                   | 0.72                         | 0.04      |
| Channel Z | + Input | 200.70                    | -0.97                        | -0.48     |
| Channel Z | - Input | -199.17                   | -0.97                        | 0.49      |

### 2. Common mode sensitivity

DASY measurement parameters: Auto Zero Time: 3 sec; Measuring time: 3 sec

|           | Common mode Input Voltage (mV) | High Range Average Reading ( $\mu\text{V}$ ) | Low Range Average Reading ( $\mu\text{V}$ ) |
|-----------|--------------------------------|----------------------------------------------|---------------------------------------------|
| Channel X | 200                            | 3.30                                         | 1.64                                        |
|           | - 200                          | 0.20                                         | -1.94                                       |
| Channel Y | 200                            | -0.21                                        | -0.42                                       |
|           | - 200                          | 0.96                                         | 0.59                                        |
| Channel Z | 200                            | 4.66                                         | 3.87                                        |
|           | - 200                          | -5.94                                        | -6.09                                       |

### 3. Channel separation

DASY measurement parameters: Auto Zero Time: 3 sec; Measuring time: 3 sec

|           | Input Voltage (mV) | Channel X ( $\mu\text{V}$ ) | Channel Y ( $\mu\text{V}$ ) | Channel Z ( $\mu\text{V}$ ) |
|-----------|--------------------|-----------------------------|-----------------------------|-----------------------------|
| Channel X | 200                | -                           | -0.86                       | -3.62                       |
| Channel Y | 200                | 7.58                        | -                           | -0.08                       |
| Channel Z | 200                | 5.96                        | 5.73                        | -                           |

#### 4. AD-Converter Values with inputs shorted

DASY measurement parameters: Auto Zero Time: 3 sec; Measuring time: 3 sec

|           | High Range (LSB) | Low Range (LSB) |
|-----------|------------------|-----------------|
| Channel X | 16316            | 14587           |
| Channel Y | 16163            | 15684           |
| Channel Z | 15966            | 15490           |

#### 5. Input Offset Measurement

DASY measurement parameters: Auto Zero Time: 3 sec; Measuring time: 3 sec

Input 10M $\Omega$

|           | Average ( $\mu$ V) | min. Offset ( $\mu$ V) | max. Offset ( $\mu$ V) | Std. Deviation ( $\mu$ V) |
|-----------|--------------------|------------------------|------------------------|---------------------------|
| Channel X | 0.52               | -0.92                  | 1.43                   | 0.45                      |
| Channel Y | -0.20              | -2.46                  | 1.17                   | 0.46                      |
| Channel Z | -0.70              | -1.79                  | 0.17                   | 0.39                      |

#### 6. Input Offset Current

Nominal Input circuitry offset current on all channels: <25fA

#### 7. Input Resistance (Typical values for information)

|           | Zeroing (kOhm) | Measuring (MOhm) |
|-----------|----------------|------------------|
| Channel X | 200            | 200              |
| Channel Y | 200            | 200              |
| Channel Z | 200            | 200              |

#### 8. Low Battery Alarm Voltage (Typical values for information)

| Typical values | Alarm Level (VDC) |
|----------------|-------------------|
| Supply (+ Vcc) | +7.9              |
| Supply (- Vcc) | -7.6              |

#### 9. Power Consumption (Typical values for information)

| Typical values | Switched off (mA) | Stand by (mA) | Transmitting (mA) |
|----------------|-------------------|---------------|-------------------|
| Supply (+ Vcc) | +0.01             | +6            | +14               |
| Supply (- Vcc) | -0.01             | -8            | -9                |

## - 2450 MHz Dipole Calibration 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

아동현  
 2013. 10. 14

Client **SGS (Dymstec)**

Certificate No: D2450V2-892\_Sep13

### CALIBRATION CERTIFICATE

Object **D2450V2 - SN: 892**

Calibration procedure(s) **QA CAL-05.v9**  
 Calibration procedure for dipole validation kits above 700 MHz

Calibration date: **September 26, 2013**

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         | 01-Nov-12 (No. 217-01640)         | Oct-13                 |
| Power sensor HP 8481A       | US37292783         | 01-Nov-12 (No. 217-01640)         | Oct-13                 |
| Reference 20 dB Attenuator  | SN: 5058 (20k)     | 04-Apr-13 (No. 217-01736)         | Apr-14                 |
| Type-N mismatch combination | SN: 5047.3 / 06327 | 04-Apr-13 (No. 217-01739)         | Apr-14                 |
| Reference Probe ES3DV3      | SN: 3205           | 28-Dec-12 (No. ES3-3205_Dec12)    | Dec-13                 |
| DAE4                        | SN: 601            | 25-Apr-13 (No. DAE4-601_Apr13)    | Apr-14                 |
| Secondary Standards         | ID #               | Check Date (in house)             | Scheduled Check        |
| Power sensor HP 8481A       | MY41092317         | 18-Oct-02 (in house check Oct-11) | In house check: Oct-13 |
| RF generator R&S SMT-06     | 100005             | 04-Aug-99 (in house check Oct-11) | In house check: Oct-13 |
| Network Analyzer HP 8753E   | US37390585 S4206   | 18-Oct-01 (in house check Oct-12) | In house check: Oct-13 |

Calibrated by: **Jeton Kastrati** Name: **Jeton Kastrati** Function: **Laboratory Technician** Signature:

Approved by: **Katja Pokovic** Name: **Katja Pokovic** Function: **Technical Manager** Signature:

Issued: September 27, 2013

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

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



**S** Schweizerischer Kalibrierdienst  
**S** Service suisse d'étalonnage  
**C** 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**

## 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:

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

## Additional Documentation:

- DASY4/5 System Handbook

## Methods Applied and Interpretation of Parameters:

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

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

### Measurement Conditions

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

|                              |                        |             |
|------------------------------|------------------------|-------------|
| DASY Version                 | DASY5                  | V52.8.7     |
| 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 $\pm$ 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 $\pm$ 0.2) °C | 39.4 $\pm$ 6 % | 1.83 mho/m $\pm$ 6 % |
| Head TSL temperature change during test | < 0.5 °C            | ----           | ----                 |

### SAR result with Head TSL

|                                                       |                    |                              |
|-------------------------------------------------------|--------------------|------------------------------|
| SAR averaged over 1 cm <sup>3</sup> (1 g) of Head TSL | Condition          |                              |
| SAR measured                                          | 250 mW input power | 13.2 W/kg                    |
| SAR for nominal Head TSL parameters                   | normalized to 1W   | 52.4 W/kg $\pm$ 17.0 % (k=2) |

|                                                         |                    |                              |
|---------------------------------------------------------|--------------------|------------------------------|
| SAR averaged over 10 cm <sup>3</sup> (10 g) of Head TSL | condition          |                              |
| SAR measured                                            | 250 mW input power | 6.12 W/kg                    |
| SAR for nominal Head TSL parameters                     | normalized to 1W   | 24.4 W/kg $\pm$ 16.5 % (k=2) |

### Body TSL parameters

The following parameters and calculations were applied.

|                                         | Temperature         | Permittivity   | Conductivity         |
|-----------------------------------------|---------------------|----------------|----------------------|
| Nominal Body TSL parameters             | 22.0 °C             | 52.7           | 1.95 mho/m           |
| Measured Body TSL parameters            | (22.0 $\pm$ 0.2) °C | 52.2 $\pm$ 6 % | 2.00 mho/m $\pm$ 6 % |
| Body TSL temperature change during test | < 0.5 °C            | ----           | ----                 |

### SAR result with Body TSL

|                                                       |                    |                              |
|-------------------------------------------------------|--------------------|------------------------------|
| SAR averaged over 1 cm <sup>3</sup> (1 g) of Body TSL | Condition          |                              |
| SAR measured                                          | 250 mW input power | 12.7 W/kg                    |
| SAR for nominal Body TSL parameters                   | normalized to 1W   | 50.1 W/kg $\pm$ 17.0 % (k=2) |

|                                                         |                    |                              |
|---------------------------------------------------------|--------------------|------------------------------|
| SAR averaged over 10 cm <sup>3</sup> (10 g) of Body TSL | condition          |                              |
| SAR measured                                            | 250 mW input power | 5.85 W/kg                    |
| SAR for nominal Body TSL parameters                     | normalized to 1W   | 23.2 W/kg $\pm$ 16.5 % (k=2) |

## Appendix

### Antenna Parameters with Head TSL

|                                      |                                |
|--------------------------------------|--------------------------------|
| Impedance, transformed to feed point | 53.9 $\Omega$ + 2.2 j $\Omega$ |
| Return Loss                          | - 27.2 dB                      |

### Antenna Parameters with Body TSL

|                                      |                                |
|--------------------------------------|--------------------------------|
| Impedance, transformed to feed point | 50.1 $\Omega$ + 4.3 j $\Omega$ |
| Return Loss                          | - 27.3 dB                      |

### General Antenna Parameters and Design

|                                  |          |
|----------------------------------|----------|
| Electrical Delay (one direction) | 1.125 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            |
| Manufactured on | October 06, 2011 |

## DASY5 Validation Report for Head TSL

Date: 26.09.2013

Test Laboratory: SPEAG, Zurich, Switzerland

**DUT: Dipole 2450 MHz; Type: D2450V2; Serial: D2450V2 - SN: 892**

Communication System: UID 0 - CW ; Frequency: 2450 MHz

Medium parameters used:  $f = 2450$  MHz;  $\sigma = 1.83$  S/m;  $\epsilon_r = 39.4$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY52 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(4.52, 4.52, 4.52); Calibrated: 28.12.2012;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 25.04.2013
- Phantom: Flat Phantom 5.0 (front); Type: QD000P50AA; Serial: 1001
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

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

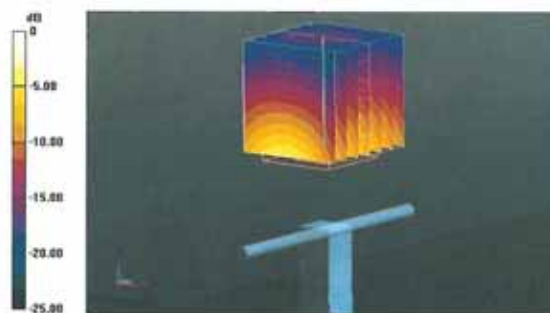
Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 93.764 V/m; Power Drift = 0.04 dB

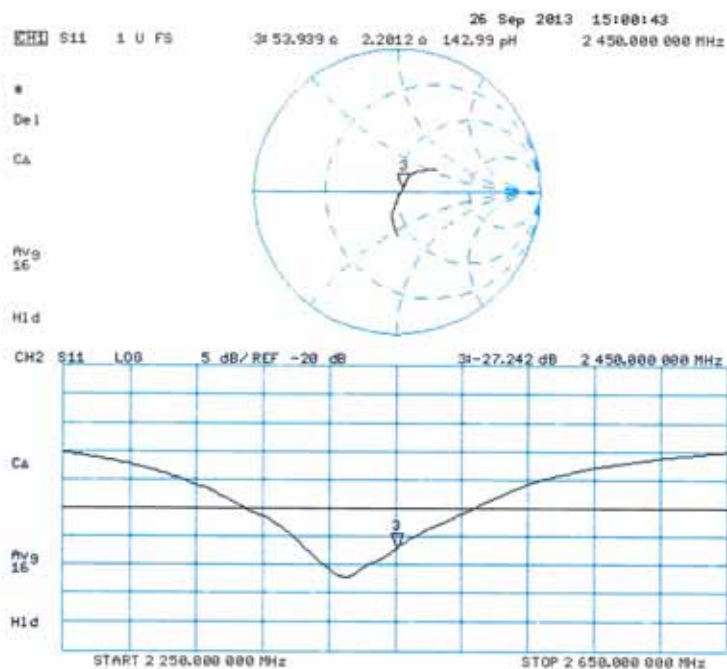
Peak SAR (extrapolated) = 27.5 W/kg

**SAR(1 g) = 13.2 W/kg; SAR(10 g) = 6.12 W/kg**

Maximum value of SAR (measured) = 16.9 W/kg



## Impedance Measurement Plot for Head TSL



## DASY5 Validation Report for Body TSL

Date: 26.09.2013

Test Laboratory: SPEAG, Zurich, Switzerland

**DUT: Dipole 2450 MHz; Type: D2450V2; Serial: D2450V2 - SN: 892**

Communication System: UID 0 - CW ; Frequency: 2450 MHz

Medium parameters used:  $f = 2450$  MHz;  $\sigma = 2$  S/m;  $\epsilon_r = 52.2$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY52 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(4.42, 4.42, 4.42); Calibrated: 28.12.2012;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 25.04.2013
- Phantom: Flat Phantom 5.0 (back); Type: QD000P50AA; Serial: 1002
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

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

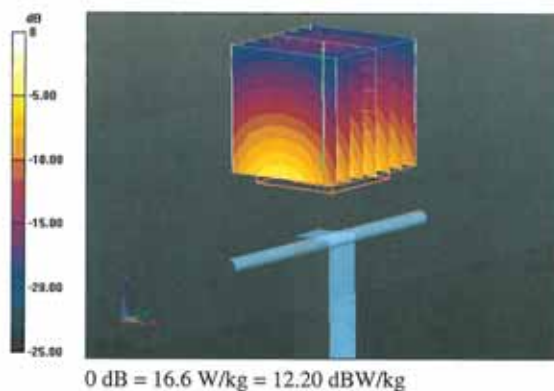
Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 93.764 V/m; Power Drift = 0.01 dB

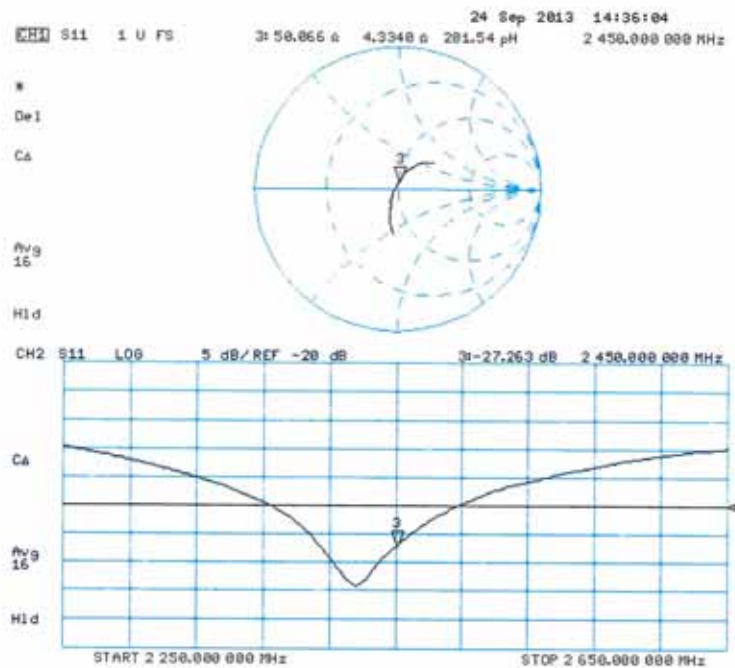
Peak SAR (extrapolated) = 26.5 W/kg

**SAR(1 g) = 12.7 W/kg; SAR(10 g) = 5.85 W/kg**

Maximum value of SAR (measured) = 16.6 W/kg



## Impedance Measurement Plot for Body TSL



## - 5000 MHz Dipole Calibration 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

*Handwritten signature*

Client **SGS (Dymstec)**

Certificate No: D5GHzV2-1106\_Mar13

### CALIBRATION CERTIFICATE

Object **D5GHzV2 - SN: 1106**

Calibration procedure(s) **QA CAL-22.v2**  
 Calibration procedure for dipole validation kits between 3-6 GHz

Calibration date: **March 15, 2013**

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         | 01-Nov-12 (No. 217-01640)         | Oct-13                 |
| Power sensor HP 8481A       | US37292783         | 01-Nov-12 (No. 217-01640)         | Oct-13                 |
| Reference 20 dB Attenuator  | SN: 5058 (20k)     | 27-Mar-12 (No. 217-01530)         | Apr-13                 |
| Type-N mismatch combination | SN: 5047.3 / 06327 | 27-Mar-12 (No. 217-01533)         | Apr-13                 |
| Reference Probe EX3DV4      | SN: 3503           | 28-Dec-12 (No. EX3-3503_Dec12)    | Dec-13                 |
| DAE4                        | SN: 601            | 27-Jun-12 (No. DAE4-601_Jun12)    | Jun-13                 |
| Secondary Standards         | ID #               | Check Date (in house)             | Scheduled Check        |
| Power sensor HP 8481A       | MY41082317         | 18-Oct-02 (in house check Oct-11) | In house check: Oct-13 |
| RF generator R&S SMT-06     | 100005             | 04-Aug-99 (in house check Oct-11) | In house check: Oct-13 |
| Network Analyzer HP 8753E   | US37390585 S4206   | 18-Oct-01 (in house check Oct-12) | In house check: Oct-13 |

|                |                        |                                   |                                    |
|----------------|------------------------|-----------------------------------|------------------------------------|
| Calibrated by: | Name<br>Israe El-Naouq | Function<br>Laboratory Technician | Signature<br><i>Israe El-Naouq</i> |
| Approved by:   | Katja Pokovic          | Technical Manager                 | <i>Katja Pokovic</i>               |

Issued: March 15, 2013

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

Certificate No: D5GHzV2-1106\_Mar13

Page 1 of 16

**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**

## Glossary:

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

## Calibration is Performed According to the Following Standards:

- IEC 62209-2, "Evaluation of Human Exposure to Radio Frequency Fields from Handheld and Body-Mounted Wireless Communication Devices in the Frequency Range of 30 MHz to 6 GHz: Human models, Instrumentation, and Procedures"; Part 2: "Procedure to determine the Specific Absorption Rate (SAR) for including accessories and multiple transmitters", March 2010
- 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:

- DASY4/5 System Handbook

## Methods Applied and Interpretation of Parameters:

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

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

### Measurement Conditions

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

|                              |                                                                                                                      |                                  |
|------------------------------|----------------------------------------------------------------------------------------------------------------------|----------------------------------|
| DASY Version                 | DASY5                                                                                                                | V52.8.5                          |
| Extrapolation                | Advanced Extrapolation                                                                                               |                                  |
| Phantom                      | Modular Flat Phantom V5.0                                                                                            |                                  |
| Distance Dipole Center - TSL | 10 mm                                                                                                                | with Spacer                      |
| Zoom Scan Resolution         | dx, dy = 4.0 mm, dz = 1.4 mm                                                                                         | Graded Ratio = 1.4 (Z direction) |
| Frequency                    | 5200 MHz $\pm$ 1 MHz<br>5300 MHz $\pm$ 1 MHz<br>5500 MHz $\pm$ 1 MHz<br>5600 MHz $\pm$ 1 MHz<br>5800 MHz $\pm$ 1 MHz |                                  |

### Head TSL parameters at 5200 MHz

The following parameters and calculations were applied.

|                                         | Temperature         | Permittivity   | Conductivity         |
|-----------------------------------------|---------------------|----------------|----------------------|
| Nominal Head TSL parameters             | 22.0 °C             | 36.0           | 4.66 mho/m           |
| Measured Head TSL parameters            | (22.0 $\pm$ 0.2) °C | 34.4 $\pm$ 6 % | 4.52 mho/m $\pm$ 6 % |
| Head TSL temperature change during test | < 0.5 °C            | ----           | ----                 |

### SAR result with Head TSL at 5200 MHz

|                                                       |                    |                              |
|-------------------------------------------------------|--------------------|------------------------------|
| SAR averaged over 1 cm <sup>3</sup> (1 g) of Head TSL | Condition          |                              |
| SAR measured                                          | 100 mW input power | 8.26 W/kg                    |
| SAR for nominal Head TSL parameters                   | normalized to 1W   | 81.8 W/kg $\pm$ 19.9 % (k=2) |

|                                                         |                    |                              |
|---------------------------------------------------------|--------------------|------------------------------|
| SAR averaged over 10 cm <sup>3</sup> (10 g) of Head TSL | condition          |                              |
| SAR measured                                            | 100 mW input power | 2.36 W/kg                    |
| SAR for nominal Head TSL parameters                     | normalized to 1W   | 23.3 W/kg $\pm$ 19.5 % (k=2) |

#### Head TSL parameters at 5300 MHz

The following parameters and calculations were applied.

|                                         | Temperature     | Permittivity | Conductivity     |
|-----------------------------------------|-----------------|--------------|------------------|
| Nominal Head TSL parameters             | 22.0 °C         | 35.9         | 4.76 mho/m       |
| Measured Head TSL parameters            | (22.0 ± 0.2) °C | 34.3 ± 6 %   | 4.62 mho/m ± 6 % |
| Head TSL temperature change during test | < 0.5 °C        | ----         | ----             |

#### SAR result with Head TSL at 5300 MHz

| SAR averaged over 1 cm <sup>3</sup> (1 g) of Head TSL | Condition          |                                   |
|-------------------------------------------------------|--------------------|-----------------------------------|
| SAR measured                                          | 100 mW input power | 8.42 W/kg                         |
| SAR for nominal Head TSL parameters                   | normalized to 1W   | <b>83.3 W / kg ± 19.9 % (k=2)</b> |

| SAR averaged over 10 cm <sup>3</sup> (10 g) of Head TSL | condition          |                                 |
|---------------------------------------------------------|--------------------|---------------------------------|
| SAR measured                                            | 100 mW input power | 2.40 W/kg                       |
| SAR for nominal Head TSL parameters                     | normalized to 1W   | <b>23.7 W/kg ± 19.5 % (k=2)</b> |

#### Head TSL parameters at 5500 MHz

The following parameters and calculations were applied.

|                                         | Temperature     | Permittivity | Conductivity     |
|-----------------------------------------|-----------------|--------------|------------------|
| Nominal Head TSL parameters             | 22.0 °C         | 35.6         | 4.96 mho/m       |
| Measured Head TSL parameters            | (22.0 ± 0.2) °C | 34.0 ± 6 %   | 4.80 mho/m ± 6 % |
| Head TSL temperature change during test | < 0.5 °C        | ----         | ----             |

#### SAR result with Head TSL at 5500 MHz

| SAR averaged over 1 cm <sup>3</sup> (1 g) of Head TSL | Condition          |                                 |
|-------------------------------------------------------|--------------------|---------------------------------|
| SAR measured                                          | 100 mW input power | 8.64 W/kg                       |
| SAR for nominal Head TSL parameters                   | normalized to 1W   | <b>85.4 W/kg ± 19.9 % (k=2)</b> |

| SAR averaged over 10 cm <sup>3</sup> (10 g) of Head TSL | condition          |                                 |
|---------------------------------------------------------|--------------------|---------------------------------|
| SAR measured                                            | 100 mW input power | 2.46 W/kg                       |
| SAR for nominal Head TSL parameters                     | normalized to 1W   | <b>24.3 W/kg ± 19.5 % (k=2)</b> |

#### Head TSL parameters at 5600 MHz

The following parameters and calculations were applied.

|                                         | Temperature     | Permittivity | Conductivity     |
|-----------------------------------------|-----------------|--------------|------------------|
| Nominal Head TSL parameters             | 22.0 °C         | 35.5         | 5.07 mho/m       |
| Measured Head TSL parameters            | (22.0 ± 0.2) °C | 33.9 ± 6 %   | 4.91 mho/m ± 6 % |
| Head TSL temperature change during test | < 0.5 °C        | ----         | ----             |

#### SAR result with Head TSL at 5600 MHz

| SAR averaged over 1 cm <sup>3</sup> (1 g) of Head TSL | Condition          |                                 |
|-------------------------------------------------------|--------------------|---------------------------------|
| SAR measured                                          | 100 mW input power | 8.55 W/kg                       |
| SAR for nominal Head TSL parameters                   | normalized to 1W   | <b>84.6 W/kg ± 19.9 % (k=2)</b> |

| SAR averaged over 10 cm <sup>3</sup> (10 g) of Head TSL | condition          |                                 |
|---------------------------------------------------------|--------------------|---------------------------------|
| SAR measured                                            | 100 mW input power | 2.43 W/kg                       |
| SAR for nominal Head TSL parameters                     | normalized to 1W   | <b>24.0 W/kg ± 19.5 % (k=2)</b> |

#### Head TSL parameters at 5800 MHz

The following parameters and calculations were applied.

|                                         | Temperature     | Permittivity | Conductivity     |
|-----------------------------------------|-----------------|--------------|------------------|
| Nominal Head TSL parameters             | 22.0 °C         | 35.3         | 5.27 mho/m       |
| Measured Head TSL parameters            | (22.0 ± 0.2) °C | 33.6 ± 6 %   | 5.11 mho/m ± 6 % |
| Head TSL temperature change during test | < 0.5 °C        | ----         | ----             |

#### SAR result with Head TSL at 5800 MHz

| SAR averaged over 1 cm <sup>3</sup> (1 g) of Head TSL | Condition          |                                 |
|-------------------------------------------------------|--------------------|---------------------------------|
| SAR measured                                          | 100 mW input power | 8.21 W/kg                       |
| SAR for nominal Head TSL parameters                   | normalized to 1W   | <b>81.2 W/kg ± 19.9 % (k=2)</b> |

| SAR averaged over 10 cm <sup>3</sup> (10 g) of Head TSL | condition          |                                 |
|---------------------------------------------------------|--------------------|---------------------------------|
| SAR measured                                            | 100 mW input power | 2.33 W/kg                       |
| SAR for nominal Head TSL parameters                     | normalized to 1W   | <b>23.0 W/kg ± 19.5 % (k=2)</b> |

### Body TSL parameters at 5200 MHz

The following parameters and calculations were applied.

|                                         | Temperature     | Permittivity | Conductivity     |
|-----------------------------------------|-----------------|--------------|------------------|
| Nominal Body TSL parameters             | 22.0 °C         | 49.0         | 5.30 mho/m       |
| Measured Body TSL parameters            | (22.0 ± 0.2) °C | 47.0 ± 6 %   | 5.42 mho/m ± 6 % |
| Body TSL temperature change during test | < 0.5 °C        | ----         | ----             |

### SAR result with Body TSL at 5200 MHz

| SAR averaged over 1 cm <sup>3</sup> (1 g) of Body TSL | Condition          |                                 |
|-------------------------------------------------------|--------------------|---------------------------------|
| SAR measured                                          | 100 mW input power | 7.55 W/kg                       |
| SAR for nominal Body TSL parameters                   | normalized to 1W   | <b>74.9 W/kg ± 19.9 % (k=2)</b> |

| SAR averaged over 10 cm <sup>3</sup> (10 g) of Body TSL | condition          |                                 |
|---------------------------------------------------------|--------------------|---------------------------------|
| SAR measured                                            | 100 mW input power | 2.11 W/kg                       |
| SAR for nominal Body TSL parameters                     | normalized to 1W   | <b>20.9 W/kg ± 19.5 % (k=2)</b> |

### Body TSL parameters at 5300 MHz

The following parameters and calculations were applied.

|                                         | Temperature     | Permittivity | Conductivity     |
|-----------------------------------------|-----------------|--------------|------------------|
| Nominal Body TSL parameters             | 22.0 °C         | 48.9         | 5.42 mho/m       |
| Measured Body TSL parameters            | (22.0 ± 0.2) °C | 46.9 ± 6 %   | 5.55 mho/m ± 6 % |
| Body TSL temperature change during test | < 0.5 °C        | ----         | ----             |

### SAR result with Body TSL at 5300 MHz

| SAR averaged over 1 cm <sup>3</sup> (1 g) of Body TSL | Condition          |                                 |
|-------------------------------------------------------|--------------------|---------------------------------|
| SAR measured                                          | 100 mW input power | 7.74 W/kg                       |
| SAR for nominal Body TSL parameters                   | normalized to 1W   | <b>76.8 W/kg ± 19.9 % (k=2)</b> |

| SAR averaged over 10 cm <sup>3</sup> (10 g) of Body TSL | condition          |                                 |
|---------------------------------------------------------|--------------------|---------------------------------|
| SAR measured                                            | 100 mW input power | 2.17 W/kg                       |
| SAR for nominal Body TSL parameters                     | normalized to 1W   | <b>21.5 W/kg ± 19.5 % (k=2)</b> |

#### Body TSL parameters at 5500 MHz

The following parameters and calculations were applied.

|                                         | Temperature     | Permittivity | Conductivity     |
|-----------------------------------------|-----------------|--------------|------------------|
| Nominal Body TSL parameters             | 22.0 °C         | 48.6         | 5.65 mho/m       |
| Measured Body TSL parameters            | (22.0 ± 0.2) °C | 46.5 ± 6 %   | 5.80 mho/m ± 6 % |
| Body TSL temperature change during test | < 0.5 °C        | ----         | ----             |

#### SAR result with Body TSL at 5500 MHz

| SAR averaged over 1 cm <sup>3</sup> (1 g) of Body TSL | Condition          |                          |
|-------------------------------------------------------|--------------------|--------------------------|
| SAR measured                                          | 100 mW input power | 8.14 W/kg                |
| SAR for nominal Body TSL parameters                   | normalized to 1W   | 80.8 W/kg ± 19.9 % (k=2) |

| SAR averaged over 10 cm <sup>3</sup> (10 g) of Body TSL | condition          |                          |
|---------------------------------------------------------|--------------------|--------------------------|
| SAR measured                                            | 100 mW input power | 2.25 W/kg                |
| SAR for nominal Body TSL parameters                     | normalized to 1W   | 22.3 W/kg ± 19.5 % (k=2) |

#### Body TSL parameters at 5600 MHz

The following parameters and calculations were applied.

|                                         | Temperature     | Permittivity | Conductivity     |
|-----------------------------------------|-----------------|--------------|------------------|
| Nominal Body TSL parameters             | 22.0 °C         | 48.5         | 5.77 mho/m       |
| Measured Body TSL parameters            | (22.0 ± 0.2) °C | 46.4 ± 6 %   | 5.94 mho/m ± 6 % |
| Body TSL temperature change during test | < 0.5 °C        | ----         | ----             |

#### SAR result with Body TSL at 5600 MHz

| SAR averaged over 1 cm <sup>3</sup> (1 g) of Body TSL | Condition          |                          |
|-------------------------------------------------------|--------------------|--------------------------|
| SAR measured                                          | 100 mW input power | 8.20 W/kg                |
| SAR for nominal Body TSL parameters                   | normalized to 1W   | 81.4 W/kg ± 19.9 % (k=2) |

| SAR averaged over 10 cm <sup>3</sup> (10 g) of Body TSL | condition          |                          |
|---------------------------------------------------------|--------------------|--------------------------|
| SAR measured                                            | 100 mW input power | 2.27 W/kg                |
| SAR for nominal Body TSL parameters                     | normalized to 1W   | 22.5 W/kg ± 19.5 % (k=2) |

#### Body TSL parameters at 5800 MHz

The following parameters and calculations were applied.

|                                         | Temperature     | Permittivity | Conductivity     |
|-----------------------------------------|-----------------|--------------|------------------|
| Nominal Body TSL parameters             | 22.0 °C         | 48.2         | 6.00 mho/m       |
| Measured Body TSL parameters            | (22.0 ± 0.2) °C | 46.1 ± 6 %   | 6.21 mho/m ± 6 % |
| Body TSL temperature change during test | < 0.5 °C        | ----         | ----             |

#### SAR result with Body TSL at 5800 MHz

| SAR averaged over 1 cm <sup>3</sup> (1 g) of Body TSL | Condition          |                                 |
|-------------------------------------------------------|--------------------|---------------------------------|
| SAR measured                                          | 100 mW input power | 7.57 W/kg                       |
| SAR for nominal Body TSL parameters                   | normalized to 1W   | <b>75.1 W/kg ± 19.9 % (k=2)</b> |

| SAR averaged over 10 cm <sup>3</sup> (10 g) of Body TSL | condition          |                                 |
|---------------------------------------------------------|--------------------|---------------------------------|
| SAR measured                                            | 100 mW input power | 2.09 W/kg                       |
| SAR for nominal Body TSL parameters                     | normalized to 1W   | <b>20.7 W/kg ± 19.5 % (k=2)</b> |

## Appendix

### Antenna Parameters with Head TSL at 5200 MHz

|                                      |                                |
|--------------------------------------|--------------------------------|
| Impedance, transformed to feed point | 50.1 $\Omega$ - 9.7 j $\Omega$ |
| Return Loss                          | - 20.3 dB                      |

### Antenna Parameters with Head TSL at 5300 MHz

|                                      |                                |
|--------------------------------------|--------------------------------|
| Impedance, transformed to feed point | 50.4 $\Omega$ - 3.9 j $\Omega$ |
| Return Loss                          | - 28.3 dB                      |

### Antenna Parameters with Head TSL at 5500 MHz

|                                      |                                |
|--------------------------------------|--------------------------------|
| Impedance, transformed to feed point | 49.0 $\Omega$ - 4.1 j $\Omega$ |
| Return Loss                          | - 27.5 dB                      |

### Antenna Parameters with Head TSL at 5600 MHz

|                                      |                                |
|--------------------------------------|--------------------------------|
| Impedance, transformed to feed point | 53.9 $\Omega$ - 5.1 j $\Omega$ |
| Return Loss                          | - 24.3 dB                      |

### Antenna Parameters with Head TSL at 5800 MHz

|                                      |                                |
|--------------------------------------|--------------------------------|
| Impedance, transformed to feed point | 54.5 $\Omega$ - 1.4 j $\Omega$ |
| Return Loss                          | - 26.9 dB                      |

### Antenna Parameters with Body TSL at 5200 MHz

|                                      |                                |
|--------------------------------------|--------------------------------|
| Impedance, transformed to feed point | 50.3 $\Omega$ - 9.3 j $\Omega$ |
| Return Loss                          | - 20.6 dB                      |

### Antenna Parameters with Body TSL at 5300 MHz

|                                      |                                |
|--------------------------------------|--------------------------------|
| Impedance, transformed to feed point | 50.9 $\Omega$ - 3.2 j $\Omega$ |
| Return Loss                          | - 29.8 dB                      |

### Antenna Parameters with Body TSL at 5500 MHz

|                                      |                                |
|--------------------------------------|--------------------------------|
| Impedance, transformed to feed point | 49.7 $\Omega$ - 2.5 j $\Omega$ |
| Return Loss                          | - 31.9 dB                      |

### Antenna Parameters with Body TSL at 5600 MHz

|                                      |                                |
|--------------------------------------|--------------------------------|
| Impedance, transformed to feed point | 54.5 $\Omega$ - 4.2 j $\Omega$ |
| Return Loss                          | - 24.6 dB                      |

#### Antenna Parameters with Body TSL at 5800 MHz

|                                      |                                |
|--------------------------------------|--------------------------------|
| Impedance, transformed to feed point | 54.4 $\Omega$ + 1.0 j $\Omega$ |
| Return Loss                          | - 27.2 dB                      |

#### General Antenna Parameters and Design

|                                  |          |
|----------------------------------|----------|
| Electrical Delay (one direction) | 1.198 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          |
| Manufactured on | March 11, 2011 |

## DASY5 Validation Report for Head TSL

Date: 15.03.2013

Test Laboratory: SPEAG, Zurich, Switzerland

**DUT: Dipole 5GHz; Type: D5GHzV2; Serial: D5GHzV2 - SN: 1106**

Communication System: CW; Frequency: 5200 MHz, Frequency: 5300 MHz, Frequency: 5500 MHz,  
 Frequency: 5600 MHz, Frequency: 5800 MHz  
 Medium parameters used:  $f = 5200 \text{ MHz}$ ;  $\sigma = 4.52 \text{ S/m}$ ;  $\epsilon_r = 34.4$ ;  $\rho = 1000 \text{ kg/m}^3$ , Medium parameters  
 used:  $f = 5300 \text{ MHz}$ ;  $\sigma = 4.62 \text{ S/m}$ ;  $\epsilon_r = 34.3$ ;  $\rho = 1000 \text{ kg/m}^3$ , Medium parameters used:  $f = 5500 \text{ MHz}$ ;  $\sigma =$   
 $4.8 \text{ S/m}$ ;  $\epsilon_r = 34$ ;  $\rho = 1000 \text{ kg/m}^3$ , Medium parameters used:  $f = 5600 \text{ MHz}$ ;  $\sigma = 4.91 \text{ S/m}$ ;  $\epsilon_r = 33.9$ ;  $\rho =$   
 $1000 \text{ kg/m}^3$ , Medium parameters used:  $f = 5800 \text{ MHz}$ ;  $\sigma = 5.11 \text{ S/m}$ ;  $\epsilon_r = 33.6$ ;  $\rho = 1000 \text{ kg/m}^3$   
 Phantom section: Flat Section  
 Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

### DASY52 Configuration:

- Probe: EX3DV4 - SN3503; ConvF(5.41, 5.41, 5.41); Calibrated: 28.12.2012, ConvF(5.1, 5.1, 5.1);  
 Calibrated: 28.12.2012, ConvF(4.91, 4.91, 4.91); Calibrated: 28.12.2012, ConvF(4.76, 4.76, 4.76);  
 Calibrated: 28.12.2012, ConvF(4.81, 4.81, 4.81); Calibrated: 28.12.2012;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 27.06.2012
- Phantom: Flat Phantom 5.0 (front); Type: QD000P50AA; Serial: 1001
- DASY52 52.8.5(1059); SEMCAD X 14.6.8(7028)

### Dipole Calibration for Head Tissue/Pin=100mW, dist=10mm, f=5200 MHz/Zoom Scan,

**dist=1.4mm (8x8x7)/Cube 0:** Measurement grid: dx=4mm, dy=4mm, dz=1.4mm

Reference Value = 65.348 V/m; Power Drift = 0.02 dB

Peak SAR (extrapolated) = 30.6 W/kg

**SAR(1 g) = 8.26 W/kg; SAR(10 g) = 2.36 W/kg**

Maximum value of SAR (measured) = 19.2 W/kg

### Dipole Calibration for Head Tissue/Pin=100mW, dist=10mm, f=5300 MHz/Zoom Scan,

**dist=1.4mm (8x8x7)/Cube 0:** Measurement grid: dx=4mm, dy=4mm, dz=1.4mm

Reference Value = 65.418 V/m; Power Drift = 0.04 dB

Peak SAR (extrapolated) = 32.1 W/kg

**SAR(1 g) = 8.42 W/kg; SAR(10 g) = 2.4 W/kg**

Maximum value of SAR (measured) = 19.8 W/kg

### Dipole Calibration for Head Tissue/Pin=100mW, dist=10mm, f=5500 MHz/Zoom Scan,

**dist=1.4mm (8x8x7)/Cube 0:** Measurement grid: dx=4mm, dy=4mm, dz=1.4mm

Reference Value = 65.553 V/m; Power Drift = 0.03 dB

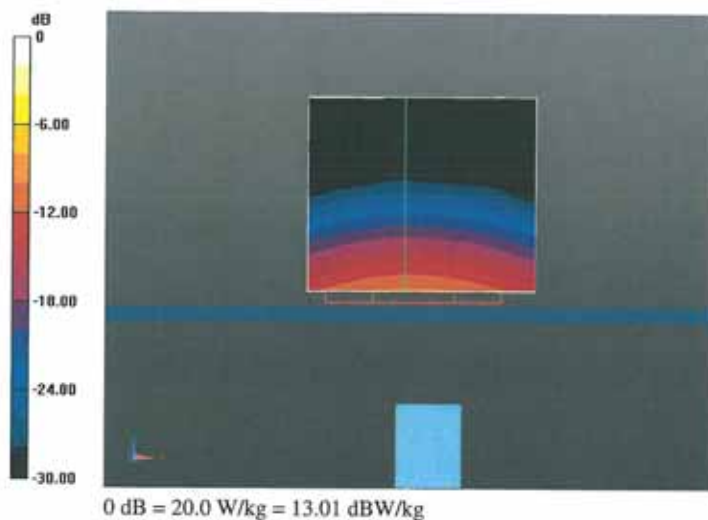
Peak SAR (extrapolated) = 34.1 W/kg

**SAR(1 g) = 8.64 W/kg; SAR(10 g) = 2.46 W/kg**

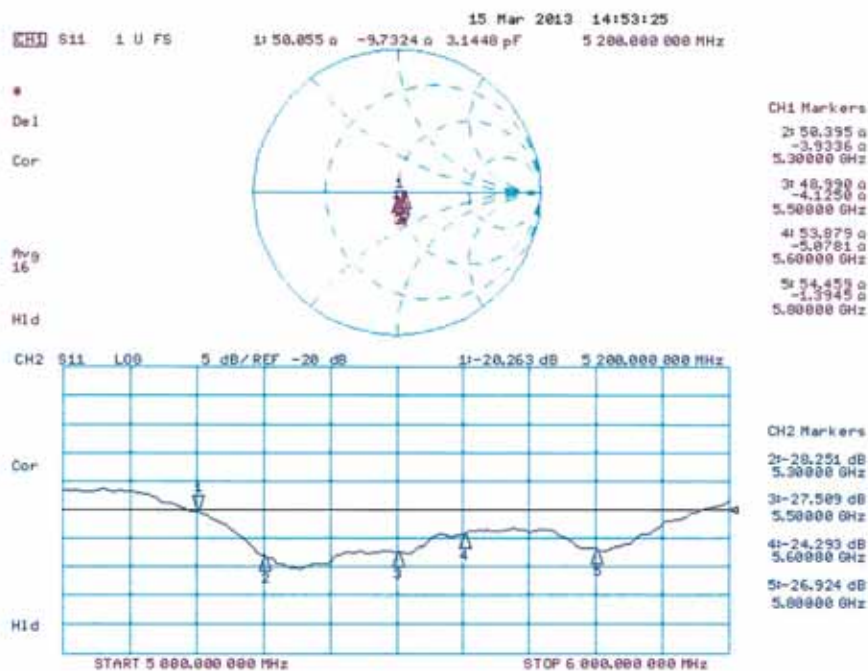
Maximum value of SAR (measured) = 20.5 W/kg

**Dipole Calibration for Head Tissue/Pin=100mW, dist=10mm, f=5600 MHz/Zoom Scan, dist=1.4mm (8x8x7)/Cube 0:** Measurement grid: dx=4mm, dy=4mm, dz=1.4mm  
 Reference Value = 64.766 V/m; Power Drift = 0.01 dB  
 Peak SAR (extrapolated) = 34.2 W/kg  
 SAR(1 g) = 8.55 W/kg; SAR(10 g) = 2.43 W/kg  
 Maximum value of SAR (measured) = 20.4 W/kg

**Dipole Calibration for Head Tissue/Pin=100mW, dist=10mm, f=5800 MHz/Zoom Scan, dist=1.4mm (8x8x7)/Cube 0:** Measurement grid: dx=4mm, dy=4mm, dz=1.4mm  
 Reference Value = 62.008 V/m; Power Drift = 0.01 dB  
 Peak SAR (extrapolated) = 34.5 W/kg  
 SAR(1 g) = 8.21 W/kg; SAR(10 g) = 2.33 W/kg  
 Maximum value of SAR (measured) = 20.0 W/kg



## Impedance Measurement Plot for Head TSL



## DASY5 Validation Report for Body TSL

Date: 14.03.2013

Test Laboratory: SPEAG, Zurich, Switzerland

### DUT: Dipole 5GHz; Type: D5GHzV2; Serial: D5GHzV2 - SN: 1106

Communication System: CW; Frequency: 5200 MHz, Frequency: 5300 MHz, Frequency: 5500 MHz,  
 Frequency: 5600 MHz, Frequency: 5800 MHz  
 Medium parameters used:  $f = 5200 \text{ MHz}$ ;  $\sigma = 5.42 \text{ S/m}$ ;  $\epsilon_r = 47$ ;  $\rho = 1000 \text{ kg/m}^3$ , Medium parameters used:  $f = 5300 \text{ MHz}$ ;  $\sigma = 5.55 \text{ S/m}$ ;  $\epsilon_r = 46.9$ ;  $\rho = 1000 \text{ kg/m}^3$ , Medium parameters used:  $f = 5500 \text{ MHz}$ ;  $\sigma = 5.8 \text{ S/m}$ ;  $\epsilon_r = 46.5$ ;  $\rho = 1000 \text{ kg/m}^3$ , Medium parameters used:  $f = 5600 \text{ MHz}$ ;  $\sigma = 5.94 \text{ S/m}$ ;  $\epsilon_r = 46.4$ ;  $\rho = 1000 \text{ kg/m}^3$ , Medium parameters used:  $f = 5800 \text{ MHz}$ ;  $\sigma = 6.21 \text{ S/m}$ ;  $\epsilon_r = 46.1$ ;  $\rho = 1000 \text{ kg/m}^3$   
 Phantom section: Flat Section  
 Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

#### DASY52 Configuration:

- Probe: EX3DV4 - SN3503; ConvF(4.91, 4.91, 4.91); Calibrated: 28.12.2012, ConvF(4.67, 4.67, 4.67); Calibrated: 28.12.2012, ConvF(4.43, 4.43, 4.43); Calibrated: 28.12.2012, ConvF(4.22, 4.22, 4.22); Calibrated: 28.12.2012, ConvF(4.38, 4.38, 4.38); Calibrated: 28.12.2012;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 27.06.2012
- Phantom: Flat Phantom 5.0 (back); Type: QD000P50AA; Serial: 1002
- DASY52 52.8.5(1059); SEMCAD X 14.6.8(7028)

#### Dipole Calibration for Body Tissue/Pin=100mW, dist=10mm, f=5200 MHz/Zoom Scan,

dist=1.4mm (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm

Reference Value = 59.488 V/m; Power Drift = -0.02 dB

Peak SAR (extrapolated) = 29.8 W/kg

SAR(1 g) = 7.55 W/kg; SAR(10 g) = 2.11 W/kg

Maximum value of SAR (measured) = 17.6 W/kg

#### Dipole Calibration for Body Tissue/Pin=100mW, dist=10mm, f=5300 MHz/Zoom Scan,

dist=1.4mm (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm

Reference Value = 59.529 V/m; Power Drift = -0.01 dB

Peak SAR (extrapolated) = 31.5 W/kg

SAR(1 g) = 7.74 W/kg; SAR(10 g) = 2.17 W/kg

Maximum value of SAR (measured) = 18.3 W/kg

#### Dipole Calibration for Body Tissue/Pin=100mW, dist=10mm, f=5500 MHz/Zoom Scan,

dist=1.4mm (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm

Reference Value = 59.873 V/m; Power Drift = -0.02 dB

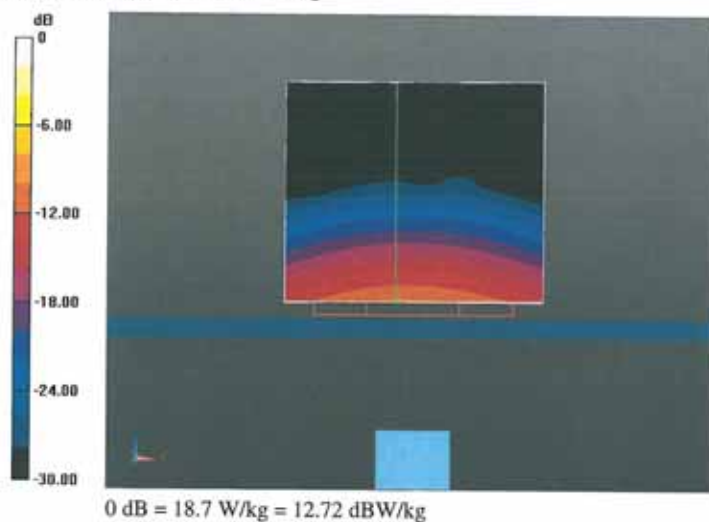
Peak SAR (extrapolated) = 35.1 W/kg

SAR(1 g) = 8.14 W/kg; SAR(10 g) = 2.25 W/kg

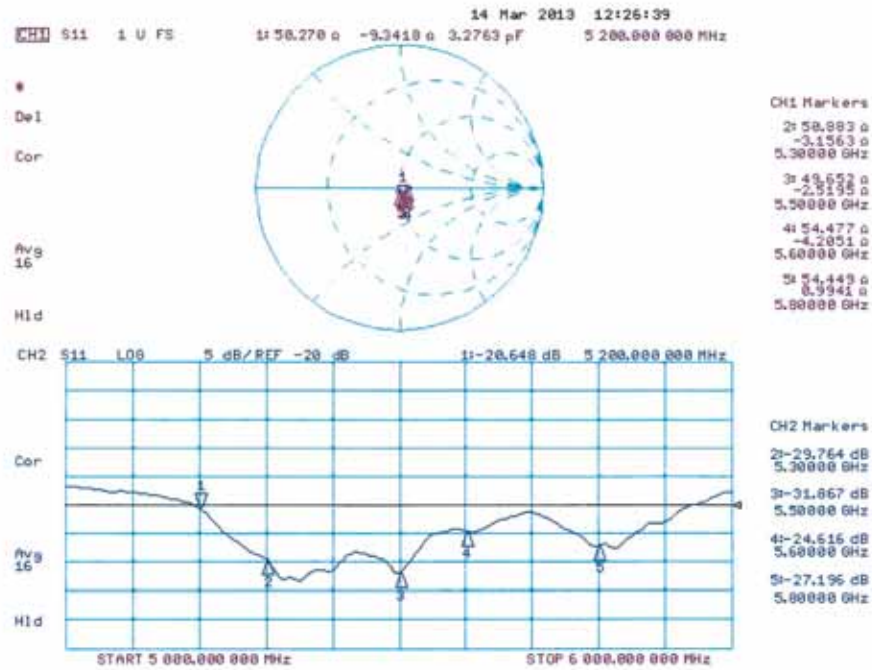
Maximum value of SAR (measured) = 19.7 W/kg

**Dipole Calibration for Body Tissue/Pin=100mW, dist=10mm, f=5600 MHz/Zoom Scan, dist=1.4mm (8x8x7)/Cube 0:** Measurement grid: dx=4mm, dy=4mm, dz=1.4mm  
 Reference Value = 59.492 V/m; Power Drift = -0.01 dB  
 Peak SAR (extrapolated) = 36.4 W/kg  
**SAR(1 g) = 8.2 W/kg; SAR(10 g) = 2.27 W/kg**  
 Maximum value of SAR (measured) = 20.1 W/kg

**Dipole Calibration for Body Tissue/Pin=100mW, dist=10mm, f=5800 MHz/Zoom Scan, dist=1.4mm (8x8x7)/Cube 0:** Measurement grid: dx=4mm, dy=4mm, dz=1.4mm  
 Reference Value = 56.370 V/m; Power Drift = 0.00 dB  
 Peak SAR (extrapolated) = 35.1 W/kg  
**SAR(1 g) = 7.57 W/kg; SAR(10 g) = 2.09 W/kg**  
 Maximum value of SAR (measured) = 18.7 W/kg



## Impedance Measurement Plot for Body TSL



**-THE END-**