

A.2. System Check Test Plots

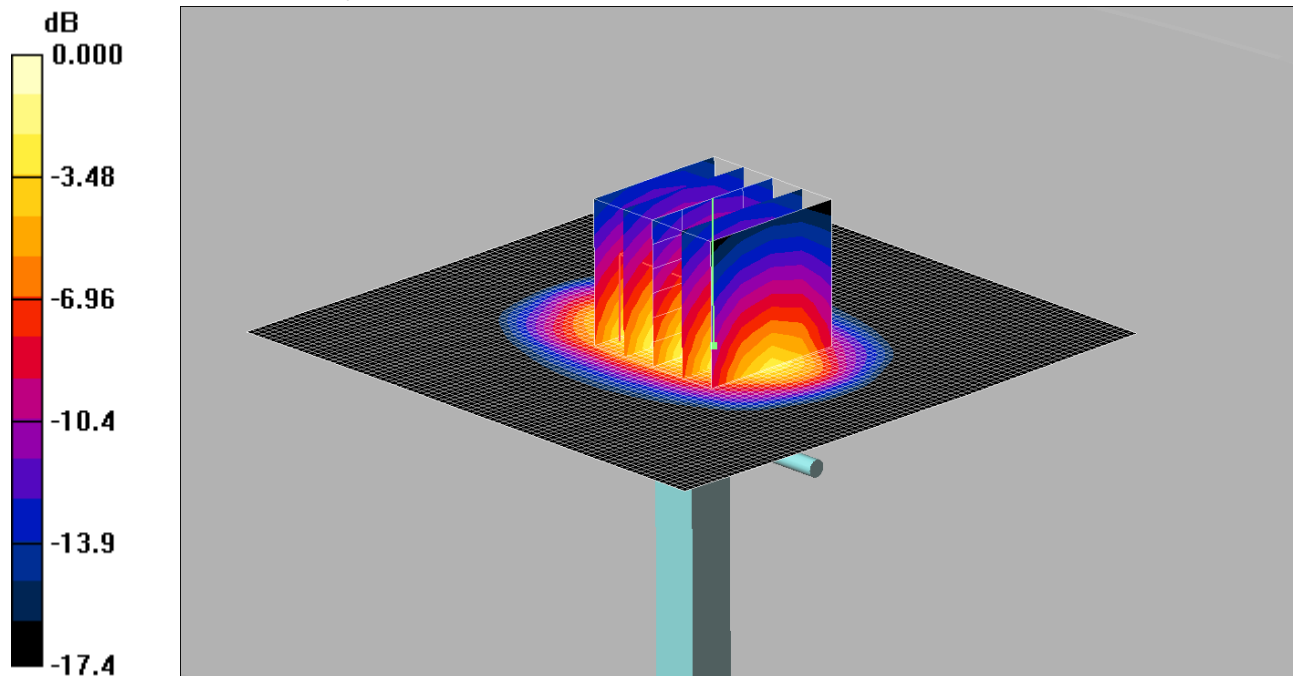
This section contains the system check plots, which are not included in the total number of pages for this report.

Scan Reference Number	Title
001	System Performance Check 1900MHz Body 05 05 15
002	System Performance Check 1900MHz Body 11 05 15

001: System Performance Check 1900MHz Body 05 05 15

Date: 05/05/2015

DUT: Dipole 1900 MHz; SN540; Type: D1900V2; Serial: SN540



0 dB = 11.4mW/g

Communication System: CW; Frequency: 1900 MHz; Duty Cycle: 1:1

Medium: 1900 MHz MSL Medium parameters used: $f = 1900 \text{ MHz}$; $\sigma = 1.52 \text{ mho/m}$; $\epsilon_r = 53.1$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section

DASY4 Configuration:

- Probe: ES3DV3 - SN3304; ConvF(4.69, 4.69, 4.69);
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn432; Calibrated: 20/08/2014
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:xxxx
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

d=10mm, Pin=250mW/Area Scan (81x81x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 11.8 mW/g

d=10mm, Pin=250mW/Zoom Scan (5x5x7) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 87.5 V/m; Power Drift = -0.021 dB

Peak SAR (extrapolated) = 18.0 W/kg

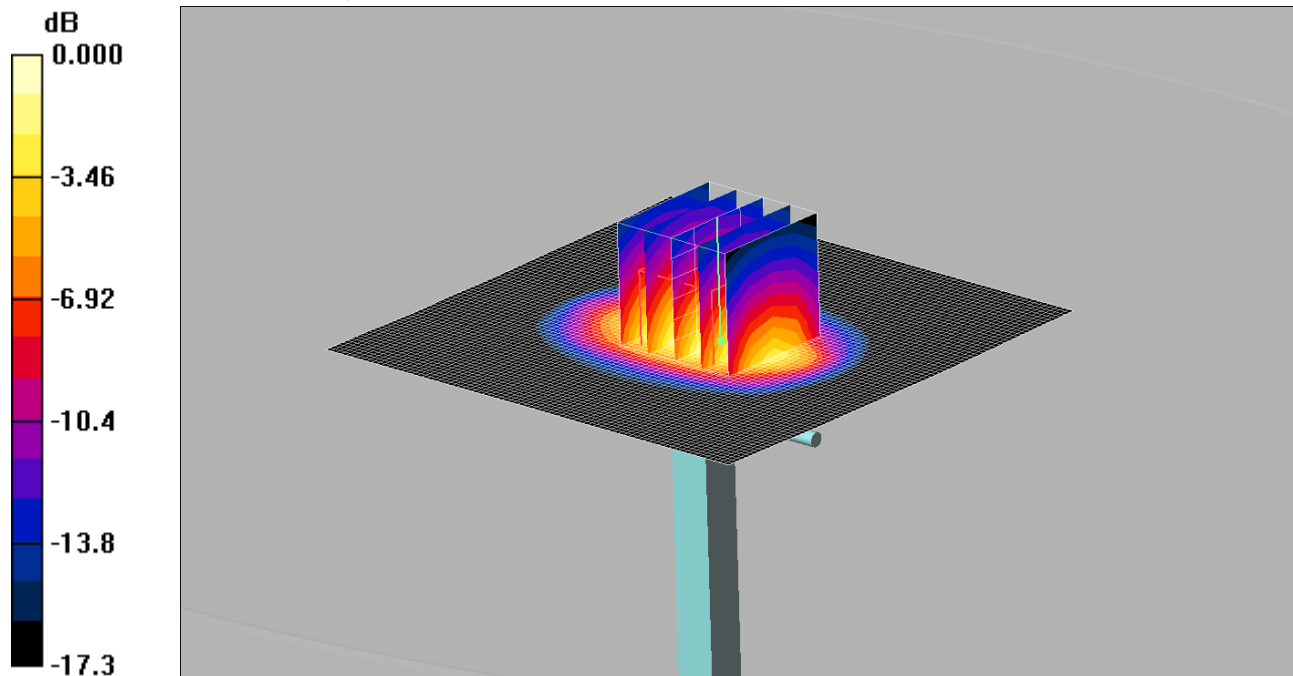
SAR(1 g) = 10.3 mW/g; SAR(10 g) = 5.49 mW/g

Maximum value of SAR (measured) = 11.4 mW/g

002: System Performance Check 1900MHz Body 11 05 15

Date: 11/05/2015

DUT: Dipole 1900 MHz; SN540; Type: D1900V2; Serial: SN540



0 dB = 11.4mW/g

Communication System: CW; Frequency: 1900 MHz; Duty Cycle: 1:1

Medium: 1900 MHz MSL Medium parameters used: $f = 1900 \text{ MHz}$; $\sigma = 1.52 \text{ mho/m}$; $\epsilon_r = 53.1$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section

DASY4 Configuration:

- Probe: ES3DV3 - SN3304; ConvF(4.69, 4.69, 4.69);
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn432; Calibrated: 20/08/2014
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:xxxx
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

d=10mm, Pin=250mW/Area Scan (81x81x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 11.8 mW/g

d=10mm, Pin=250mW/Zoom Scan (5x5x7) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 86.4 V/m; Power Drift = -0.019 dB
Peak SAR (extrapolated) = 17.9 W/kg
SAR(1 g) = 10.2 mW/g; SAR(10 g) = 5.47 mW/g
Maximum value of SAR (measured) = 11.4 mW/g

A.3. SAR Test Plots

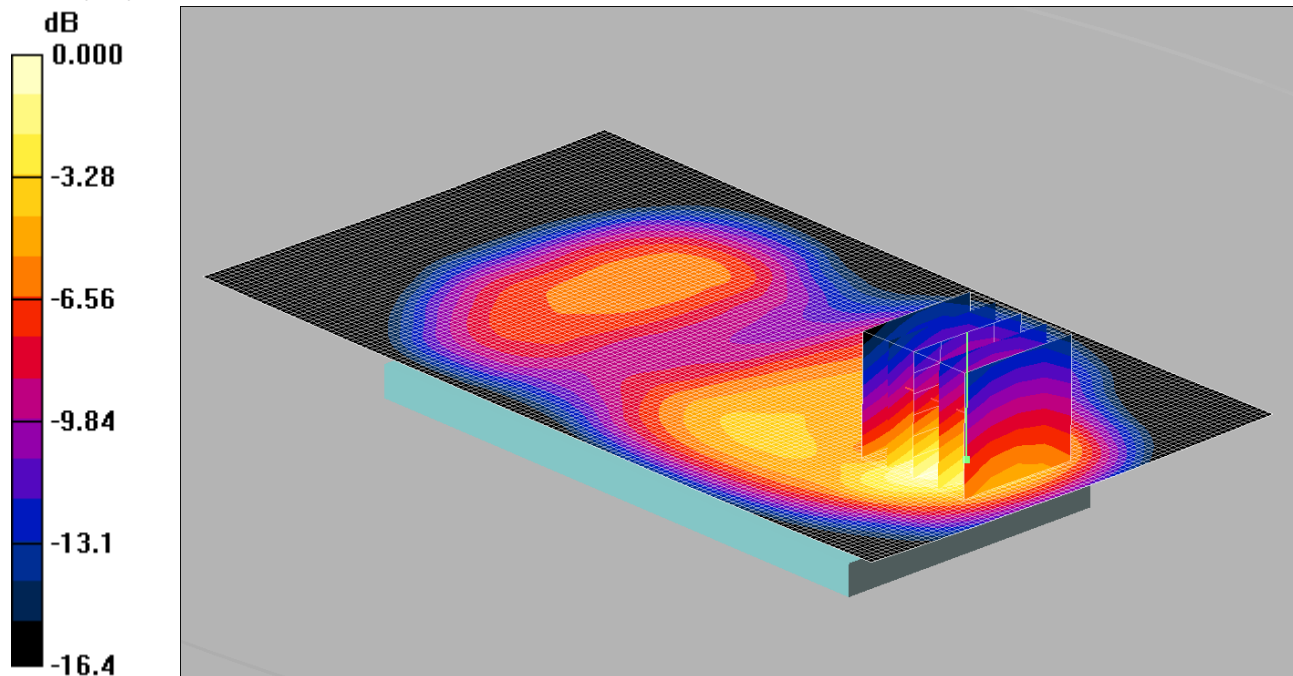
This section contains the SAR plots, which are not included in the total number of pages for this report.

Scan Reference Number	Title
001	Front_of_EUT_Facing_Phantom_GPRS1900_4Tx_CH661
002	Back_of_EUT_Facing_Phantom_GPRS1900_4Tx_CH661
003	Left_of_EUT_Facing_Phantom_GPRS1900_4Tx_CH661
004	Right_of_EUT_Facing_Phantom_GPRS1900_4Tx_CH661
005	Bottom_of_EUT_Facing_Phantom_GPRS1900_4Tx_CH661
006	Front_of_EUT_Facing_Phantom_WCDMA_FDD_2_CH9400
007	Back_of_EUT_Facing_Phantom_WCDMA_FDD_2_CH9400
008	Left_of_EUT_Facing_Phantom_WCDMA_FDD_2_CH9400
009	Right_of_EUT_Facing_Phantom_WCDMA_FDD_2_CH9400
010	Bottom_of_EUT_Facing_Phantom_WCDMA_FDD_2_CH9400
011	Front_of_EUT_Facing_Phantom_LTE_FDD_2_20MHz_1RB_Mid_CH18700
012	Front_of_EUT_Facing_Phantom_LTE_FDD_2_20MHz_50%RB_Mid_CH18700
013	Back_of_EUT_Facing_Phantom_LTE_FDD_2_20MHz_1RB_Mid_CH18700
014	Back_of_EUT_Facing_Phantom_LTE_FDD_2_20MHz_50%RB_Mid_CH18700
015	Left_of_EUT_Facing_Phantom_LTE_FDD_2_20MHz_1RB_Mid_CH18700
016	Left_of_EUT_Facing_Phantom_LTE_FDD_2_20MHz_50%RB_Mid_CH18700
017	Right_of_EUT_Facing_Phantom_LTE_FDD_2_20MHz_1RB_Mid_CH18700
018	Right_of_EUT_Facing_Phantom_LTE_FDD_2_20MHz_50%RB_Mid_CH18700
019	Bottom_of_EUT_Facing_Phantom_LTE_FDD_2_20MHz_1RB_Mid_CH18700
020	Bottom_of_EUT_Facing_Phantom_LTE_FDD_2_20MHz_50%RB_Mid_CH18700

001: Front_of_EUT_Facing_Phantom_GPRS1900_4Tx_CH661

Date: 11/05/2015

DUT: Sony; Type: FCC ID: PY7PM-0801



0 dB = 0.385mW/g

Communication System: GPRS 1900 4Tx; Frequency: 1880 MHz; Duty Cycle: 1:2

Medium: 1900 MHz MSL Medium parameters used (interpolated): f = 1880 MHz; $\sigma = 1.5 \text{ mho/m}$; $\epsilon_r = 53.2$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section

DASY4 Configuration:

- Probe: ES3DV3 - SN3304; ConvF(4.69, 4.69, 4.69);
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn432; Calibrated: 20/08/2014
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:xxxx
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Front/Area Scan (81x141x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.397 mW/g

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

Reference Value = 5.59 V/m; Power Drift = -0.078 dB

Peak SAR (extrapolated) = 0.569 W/kg

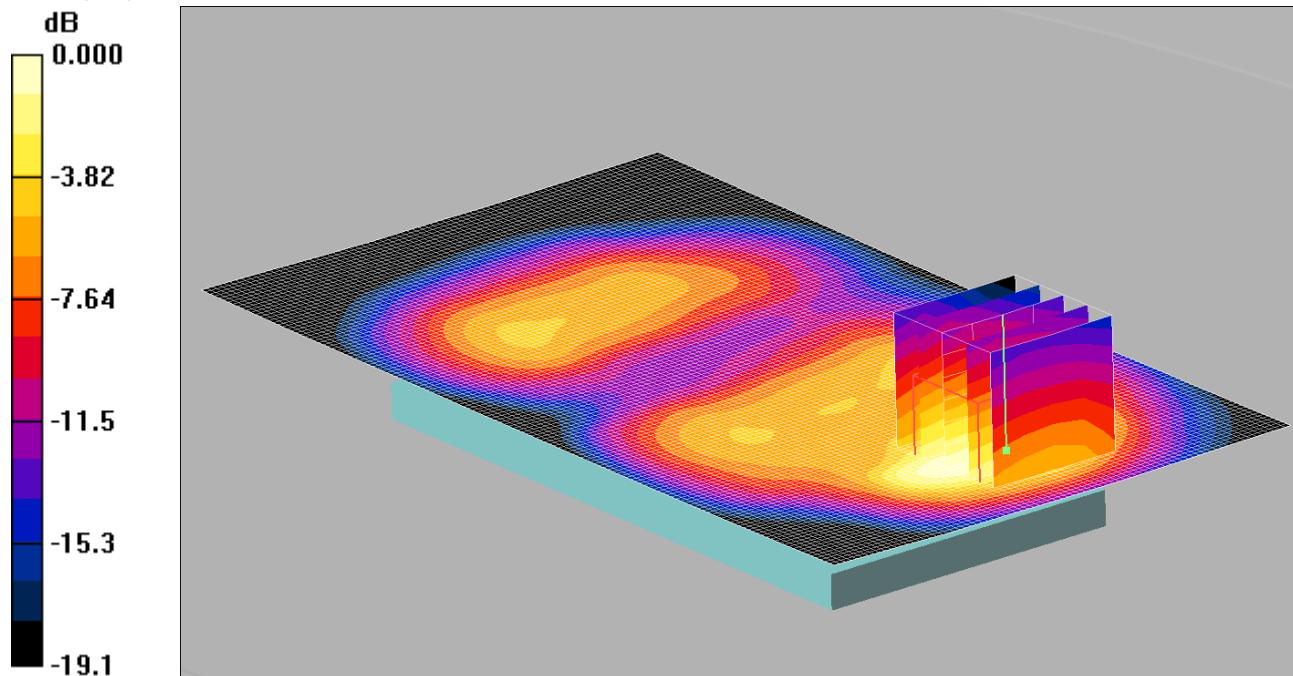
SAR(1 g) = 0.346 mW/g; SAR(10 g) = 0.197 mW/g

Maximum value of SAR (measured) = 0.385 mW/g

002: Back_of_EUT_Facing_Phantom_GPRS1900_4Tx_CH661

Date: 11/05/2015

DUT: Sony; Type: FCC ID: PY7PM-0801



0 dB = 0.340mW/g

Communication System: GPRS 1900 4Tx; Frequency: 1880 MHz; Duty Cycle: 1:2

Medium: 1900 MHz MSL Medium parameters used (interpolated): f = 1880 MHz; $\sigma = 1.5 \text{ mho/m}$; $\epsilon_r = 53.2$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section

DASY4 Configuration:

- Probe: ES3DV3 - SN3304; ConvF(4.69, 4.69, 4.69);
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn432; Calibrated: 20/08/2014
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:xxxx
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Back/Area Scan (81x141x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.359 mW/g

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

Reference Value = 4.51 V/m; Power Drift = 0.010 dB

Peak SAR (extrapolated) = 0.530 W/kg

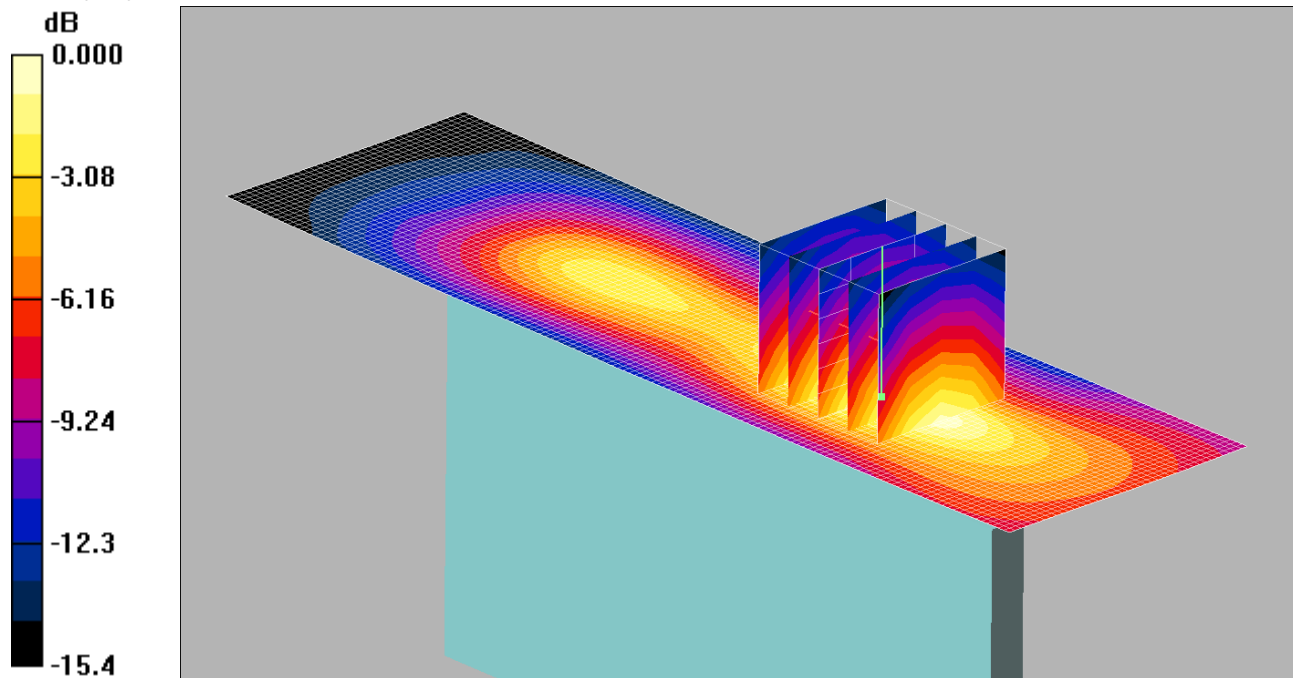
SAR(1 g) = 0.307 mW/g; SAR(10 g) = 0.178 mW/g

Maximum value of SAR (measured) = 0.340 mW/g

003: Left_of_EUT_Facing_Phantom_GPRS1900_4Tx_CH661

Date: 11/05/2015

DUT: Sony; Type: FCC ID: PY7PM-0801



0 dB = 0.130mW/g

Communication System: GPRS 1900 4Tx; Frequency: 1880 MHz; Duty Cycle: 1:2

Medium: 1900 MHz MSL Medium parameters used (interpolated): f = 1880 MHz; $\sigma = 1.5 \text{ mho/m}$; $\epsilon_r = 53.2$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section

DASY4 Configuration:

- Probe: ES3DV3 - SN3304; ConvF(4.69, 4.69, 4.69);
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn432; Calibrated: 20/08/2014
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:xxxx
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Left/Area Scan (41x141x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.132 mW/g

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

Reference Value = 6.10 V/m; Power Drift = 0.038 dB

Peak SAR (extrapolated) = 0.192 W/kg

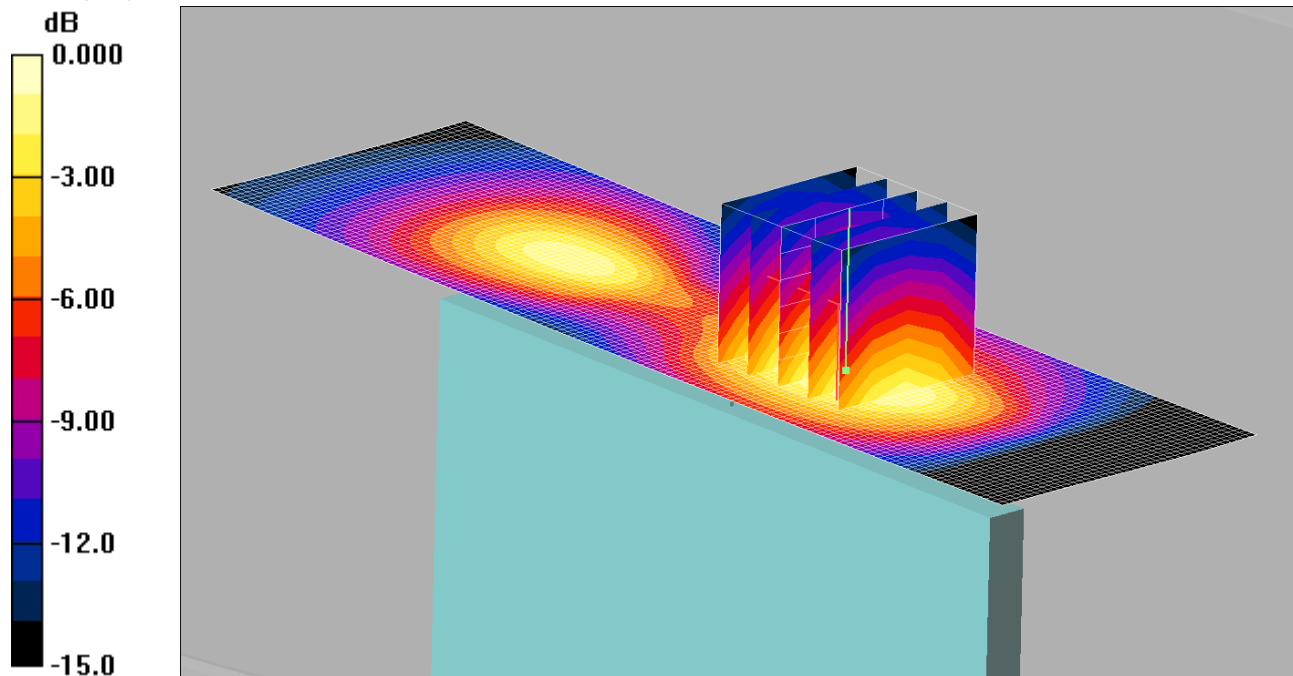
SAR(1 g) = 0.118 mW/g; SAR(10 g) = 0.069 mW/g

Maximum value of SAR (measured) = 0.130 mW/g

004: Right_of_EUT_Facing_Phantom_GPRS1900_4Tx_CH661

Date: 11/05/2015

DUT: Sony; Type: FCC ID: PY7PM-0801



0 dB = 0.176mW/g

Communication System: GPRS 1900 4Tx; Frequency: 1880 MHz; Duty Cycle: 1:2

Medium: 1900 MHz MSL Medium parameters used (interpolated): f = 1880 MHz; $\sigma = 1.5 \text{ mho/m}$; $\epsilon_r = 53.2$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section

DASY4 Configuration:

- Probe: ES3DV3 - SN3304; ConvF(4.69, 4.69, 4.69);
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn432; Calibrated: 20/08/2014
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:xxxx
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Right/Area Scan (41x141x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.181 mW/g

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

Reference Value = 5.47 V/m; Power Drift = -0.007 dB

Peak SAR (extrapolated) = 0.250 W/kg

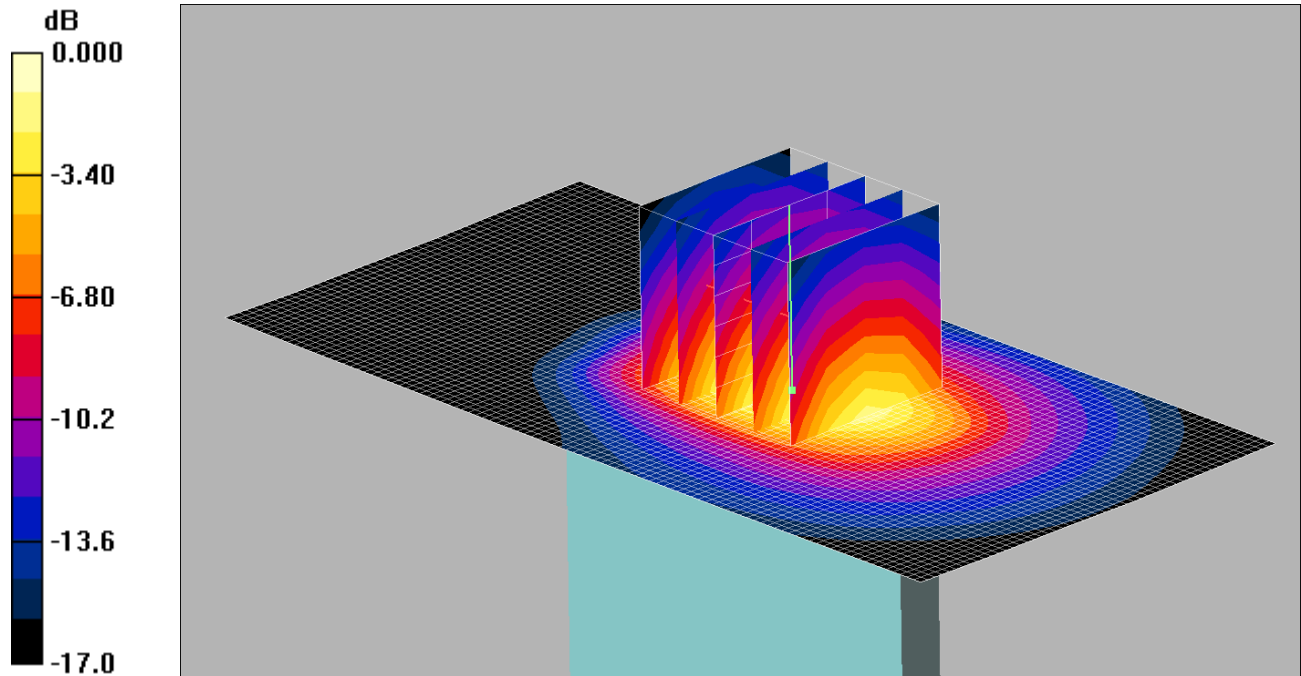
SAR(1 g) = 0.159 mW/g; SAR(10 g) = 0.094 mW/g

Maximum value of SAR (measured) = 0.176 mW/g

005: Bottom_of_EUT_Facing_Phantom_GPRS1900_4Tx_CH661

Date: 11/05/2015

DUT: Sony; Type: FCC ID: PY7PM-0801



0 dB = 0.503mW/g

Communication System: GPRS 1900 4Tx; Frequency: 1880 MHz; Duty Cycle: 1:2

Medium: 1900 MHz MSL Medium parameters used (interpolated): $f = 1880$ MHz; $\sigma = 1.5$ mho/m; $\epsilon_r = 53.2$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

DASY4 Configuration:

- Probe: ES3DV3 - SN3304; ConvF(4.69, 4.69, 4.69);
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn432; Calibrated: 20/08/2014
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:xxxx
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Bottom/Area Scan (51x101x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.555 mW/g

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

Reference Value = 17.3 V/m; Power Drift = 0.025 dB

Peak SAR (extrapolated) = 0.742 W/kg

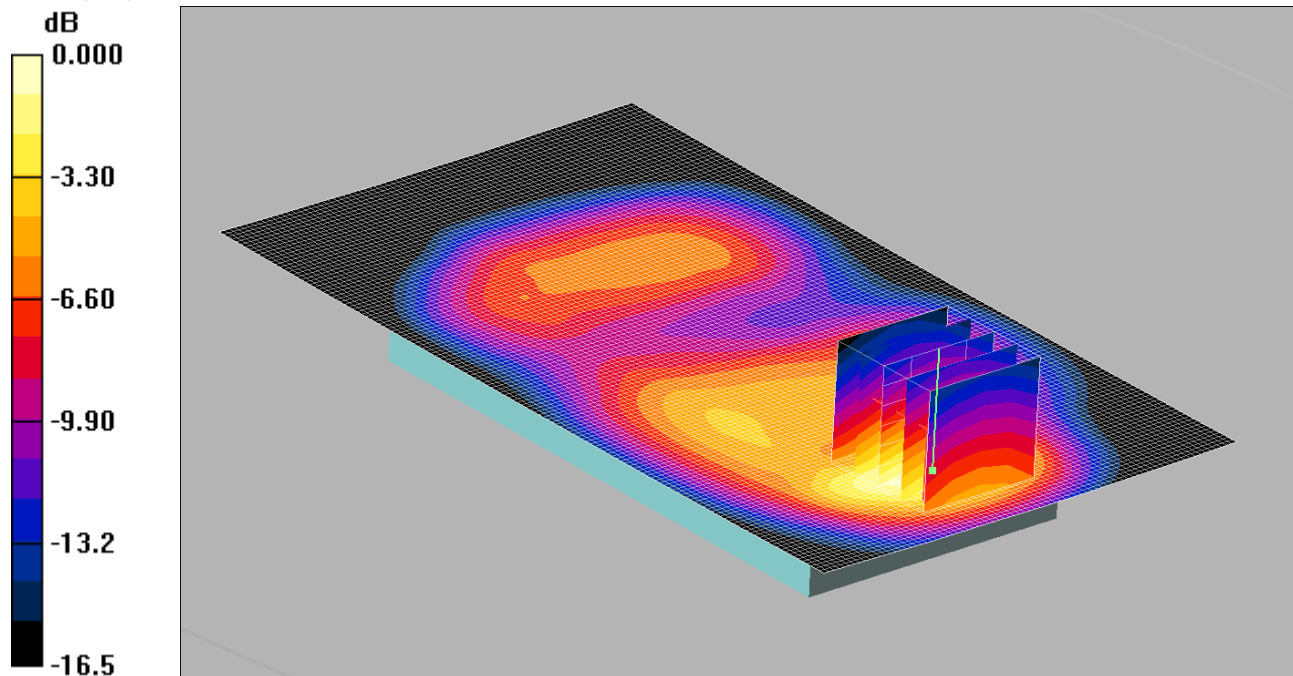
SAR(1 g) = 0.450 mW/g; SAR(10 g) = 0.248 mW/g

Maximum value of SAR (measured) = 0.503 mW/g

006: Front_of_EUT_Facing_Phantom_WCDMA_FDD_2_CH9400

Date: 07/05/2015

DUT: Sony; Type: FCC ID: PY7PM-0801



0 dB = 0.406mW/g

Communication System: WCDMA-FDD II; Frequency: 1880 MHz; Duty Cycle: 1:1

Medium: 1900 MHz MSL Medium parameters used (interpolated): $f = 1880$ MHz; $\sigma = 1.5$ mho/m; $\epsilon_r = 53.2$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

DASY4 Configuration:

- Probe: ES3DV3 - SN3304; ConvF(4.69, 4.69, 4.69);
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn432; Calibrated: 20/08/2014
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:xxxx
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Front/Area Scan (81x141x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.402 mW/g

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

Reference Value = 5.57 V/m; Power Drift = 0.049 dB

Peak SAR (extrapolated) = 0.592 W/kg

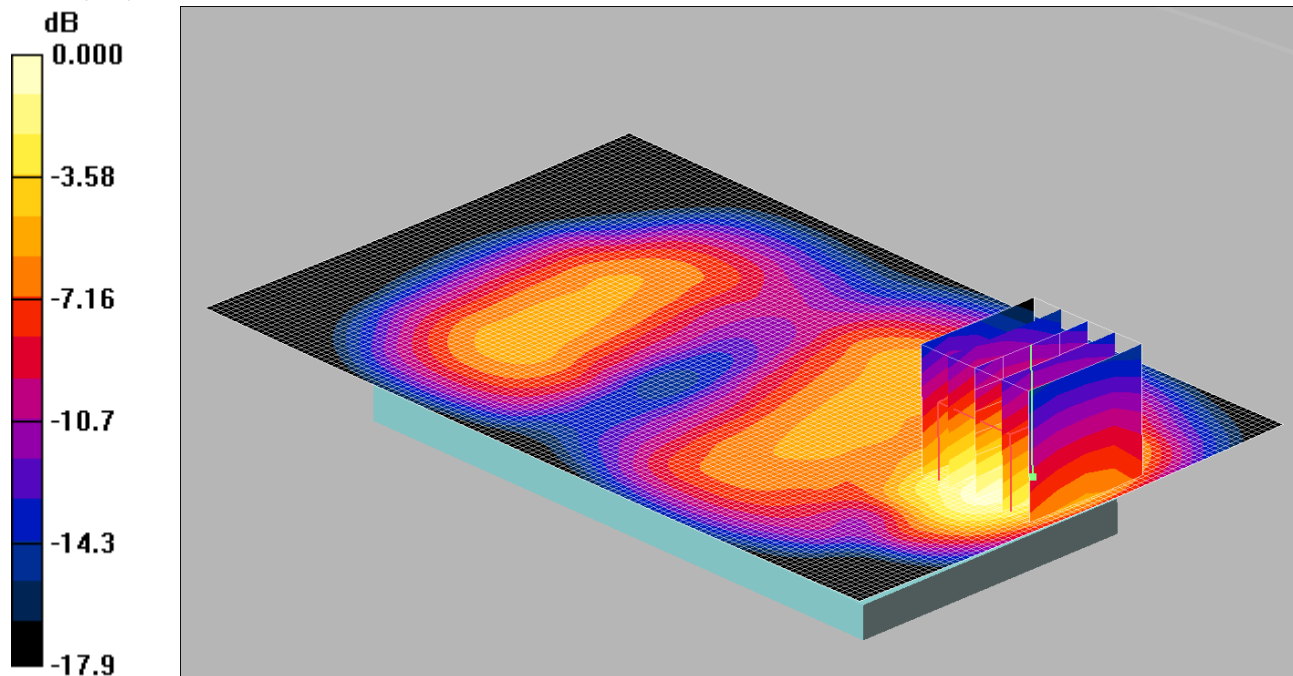
SAR(1 g) = 0.361 mW/g; SAR(10 g) = 0.205 mW/g

Maximum value of SAR (measured) = 0.406 mW/g

007: Back_of_EUT_Facing_Phantom_WCDMA_FDD_2_CH9400

Date: 07/05/2015

DUT: Sony; Type: FCC ID: PY7PM-0801



0 dB = 0.371mW/g

Communication System: WCDMA-FDD II; Frequency: 1880 MHz; Duty Cycle: 1:1

Medium: 1900 MHz MSL Medium parameters used (interpolated): f = 1880 MHz; $\sigma = 1.5 \text{ mho/m}$; $\epsilon_r = 53.2$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section

DASY4 Configuration:

- Probe: ES3DV3 - SN3304; ConvF(4.69, 4.69, 4.69);
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn432; Calibrated: 20/08/2014
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:xxxx
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Back/Area Scan (81x131x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.374 mW/g

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

Reference Value = 4.26 V/m; Power Drift = 0.101 dB

Peak SAR (extrapolated) = 0.579 W/kg

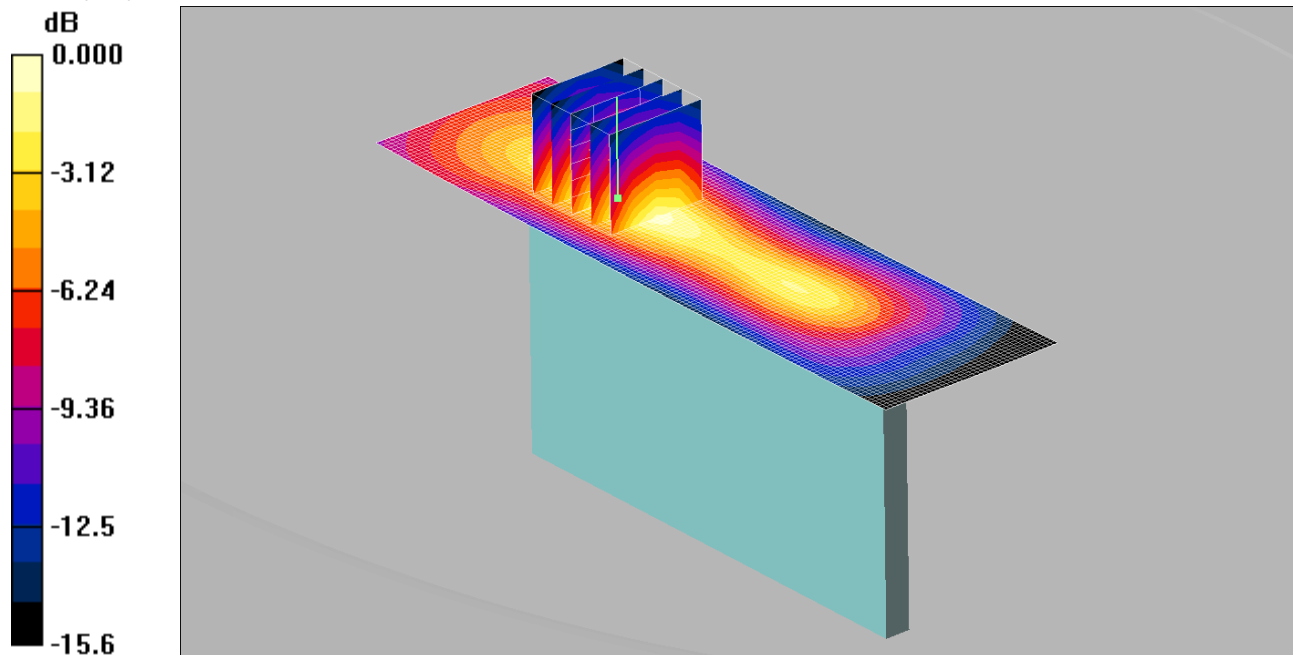
SAR(1 g) = 0.337 mW/g; SAR(10 g) = 0.195 mW/g

Maximum value of SAR (measured) = 0.371 mW/g

008: Left_of_EUT_Facing_Phantom_WCDMA_FDD_2_CH9400

Date: 07/05/2015

DUT: Sony; Type: FCC ID: PY7PM-0801



0 dB = 0.163mW/g

Communication System: WCDMA-FDD II; Frequency: 1880 MHz; Duty Cycle: 1:1

Medium: 1900 MHz MSL Medium parameters used (interpolated): f = 1880 MHz; $\sigma = 1.5 \text{ mho/m}$; $\epsilon_r = 53.2$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section

DASY4 Configuration:

- Probe: ES3DV3 - SN3304; ConvF(4.69, 4.69, 4.69);
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn432; Calibrated: 20/08/2014
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:xxxx
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Left/Area Scan (41x141x1): Measurement grid: dx=15mm, dy=15mm

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

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

Reference Value = 7.78 V/m; Power Drift = -0.020 dB

Peak SAR (extrapolated) = 0.239 W/kg

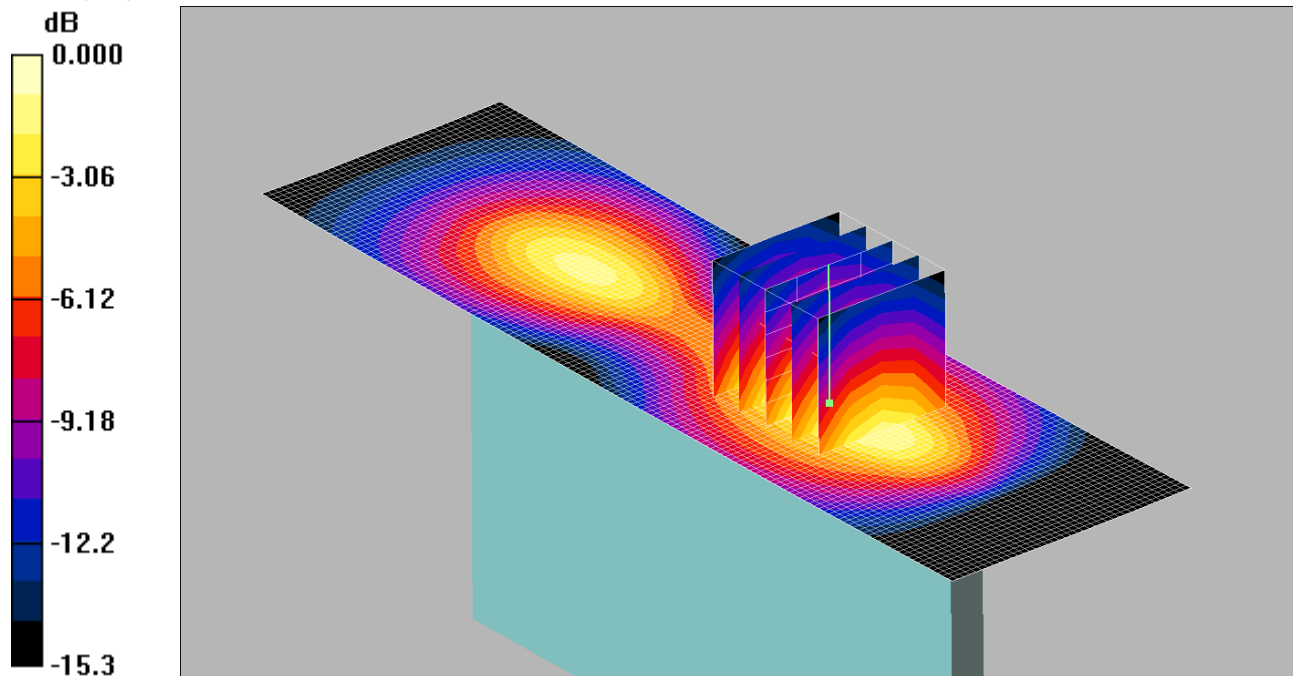
SAR(1 g) = 0.147 mW/g; SAR(10 g) = 0.084 mW/g

Maximum value of SAR (measured) = 0.163 mW/g

009: Right_of_EUT_Facing_Phantom_WCDMA_FDD_2_CH9400

Date: 07/05/2015

DUT: Sony; Type: FCC ID: PY7PM-0801



0 dB = 0.199mW/g

Communication System: WCDMA-FDD II; Frequency: 1880 MHz; Duty Cycle: 1:1

Medium: 1900 MHz MSL Medium parameters used (interpolated): f = 1880 MHz; $\sigma = 1.5 \text{ mho/m}$; $\epsilon_r = 53.2$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section

DASY4 Configuration:

- Probe: ES3DV3 - SN3304; ConvF(4.69, 4.69, 4.69);
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn432; Calibrated: 20/08/2014
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:xxxx
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Right/Area Scan (41x141x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.200 mW/g

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

Reference Value = 6.82 V/m; Power Drift = -0.006 dB

Peak SAR (extrapolated) = 0.284 W/kg

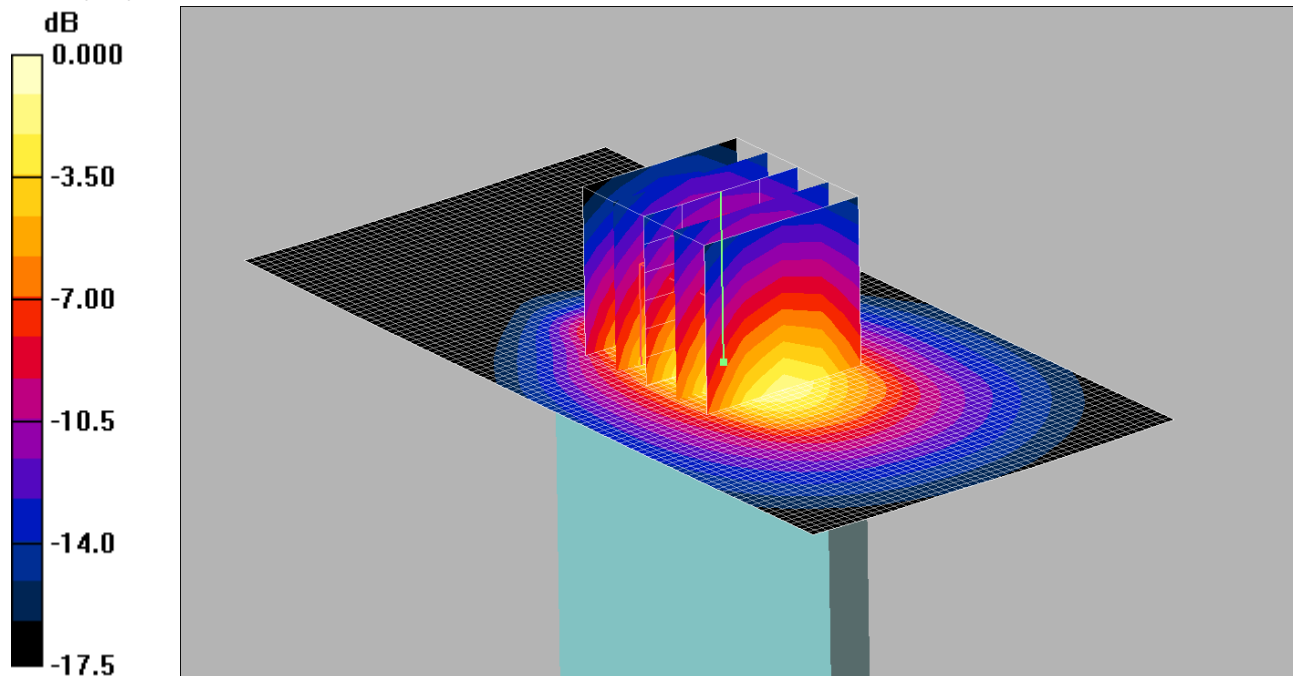
SAR(1 g) = 0.177 mW/g; SAR(10 g) = 0.101 mW/g

Maximum value of SAR (measured) = 0.199 mW/g

010: Bottom_of_EUT_Facing_Phantom_WCDMA_FDD_2_CH9400

Date: 08/05/2015

DUT: Sony; Type: FCC ID: PY7PM-0801



0 dB = 0.559mW/g

Communication System: WCDMA-FDD II; Frequency: 1880 MHz; Duty Cycle: 1:1

Medium: 1900 MHz MSL Medium parameters used (interpolated): $f = 1880$ MHz; $\sigma = 1.5$ mho/m; $\epsilon_r = 53.2$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

DASY4 Configuration:

- Probe: ES3DV3 - SN3304; ConvF(4.69, 4.69, 4.69);
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn432; Calibrated: 20/08/2014
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:xxxx
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Bottom/Area Scan (51x101x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.659 mW/g

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

Reference Value = 18.1 V/m; Power Drift = -0.027 dB

Peak SAR (extrapolated) = 0.845 W/kg

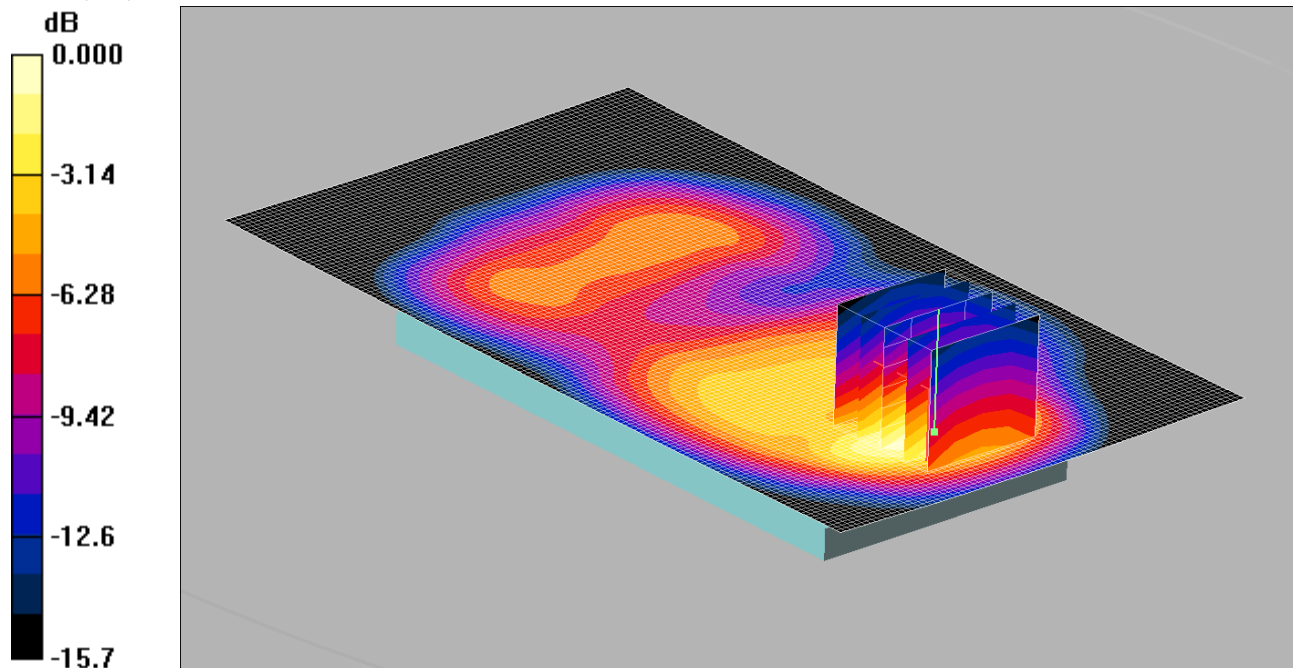
SAR(1 g) = 0.503 mW/g; SAR(10 g) = 0.275 mW/g

Maximum value of SAR (measured) = 0.559 mW/g

011: Front_of_EUT_Facing_Phantom_LTE_FDD_2_20MHz_1RB_Mid_CH18700

Date: 08/05/2015

DUT: Sony; Type: FCC ID: PY7PM-0801



0 dB = 0.524mW/g

Communication System: LTE - Band 2 / 20MHz Channel; Frequency: 1860 MHz; Duty Cycle: 1:1

Medium: 1900 MHz MSL Medium parameters used (interpolated): f = 1860 MHz; $\sigma = 1.48$ mho/m; $\epsilon_r = 53.3$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

DASY4 Configuration:

- Probe: ES3DV3 - SN3304; ConvF(4.69, 4.69, 4.69);
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn432; Calibrated: 20/08/2014
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:xxxx
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Front/Area Scan (81x141x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.524 mW/g

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

Reference Value = 6.51 V/m; Power Drift = -0.035 dB

Peak SAR (extrapolated) = 0.754 W/kg

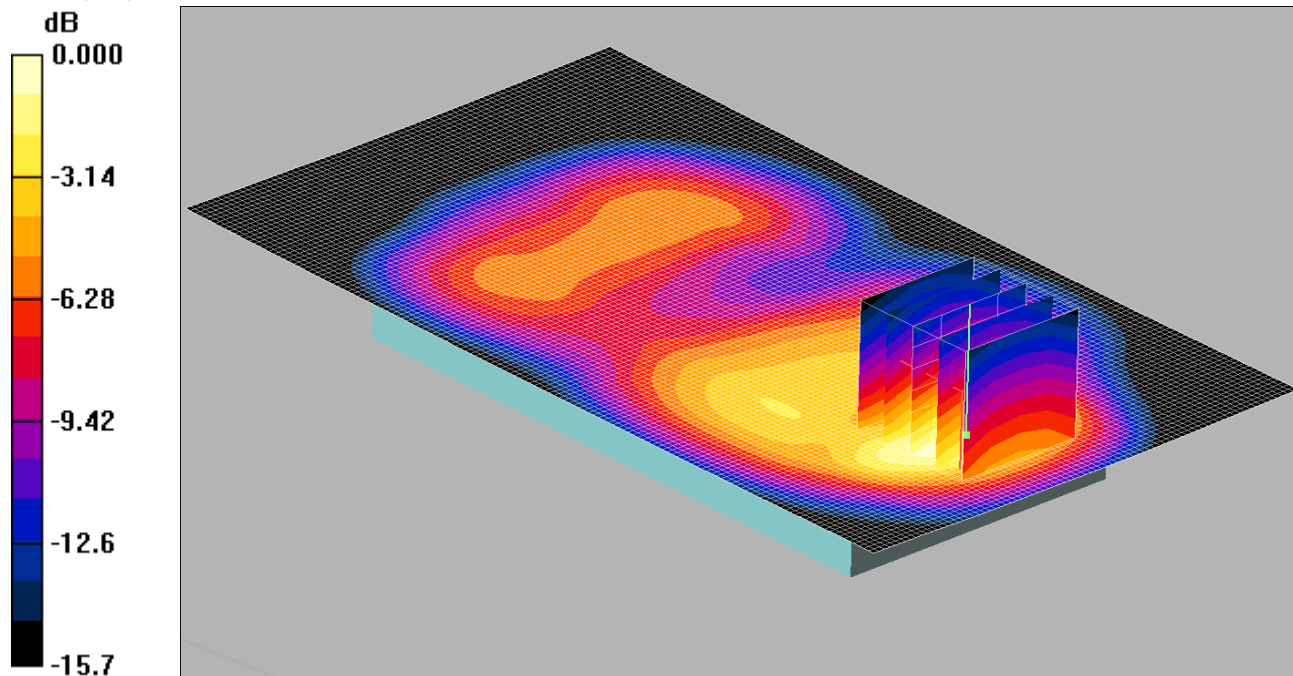
SAR(1 g) = 0.462 mW/g; SAR(10 g) = 0.263 mW/g

Maximum value of SAR (measured) = 0.524 mW/g

012: Front_of_EUT_Facing_Phantom_LTE_FDD_2_20MHz_50%RB_Mid_CH18700

Date: 08/05/2015

DUT: Sony; Type: FCC ID: PY7PM-0801



0 dB = 0.523mW/g

Communication System: LTE - Band 2 / 20MHz Channel; Frequency: 1860 MHz; Duty Cycle: 1:1

Medium: 1900 MHz MSL Medium parameters used (interpolated): f = 1860 MHz; $\sigma = 1.48 \text{ mho/m}$; $\epsilon_r = 53.3$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section

DASY4 Configuration:

- Probe: ES3DV3 - SN3304; ConvF(4.69, 4.69, 4.69);
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn432; Calibrated: 20/08/2014
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:xxxx
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Front/Area Scan (81x141x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.522 mW/g

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

Reference Value = 6.60 V/m; Power Drift = 0.026 dB

Peak SAR (extrapolated) = 0.759 W/kg

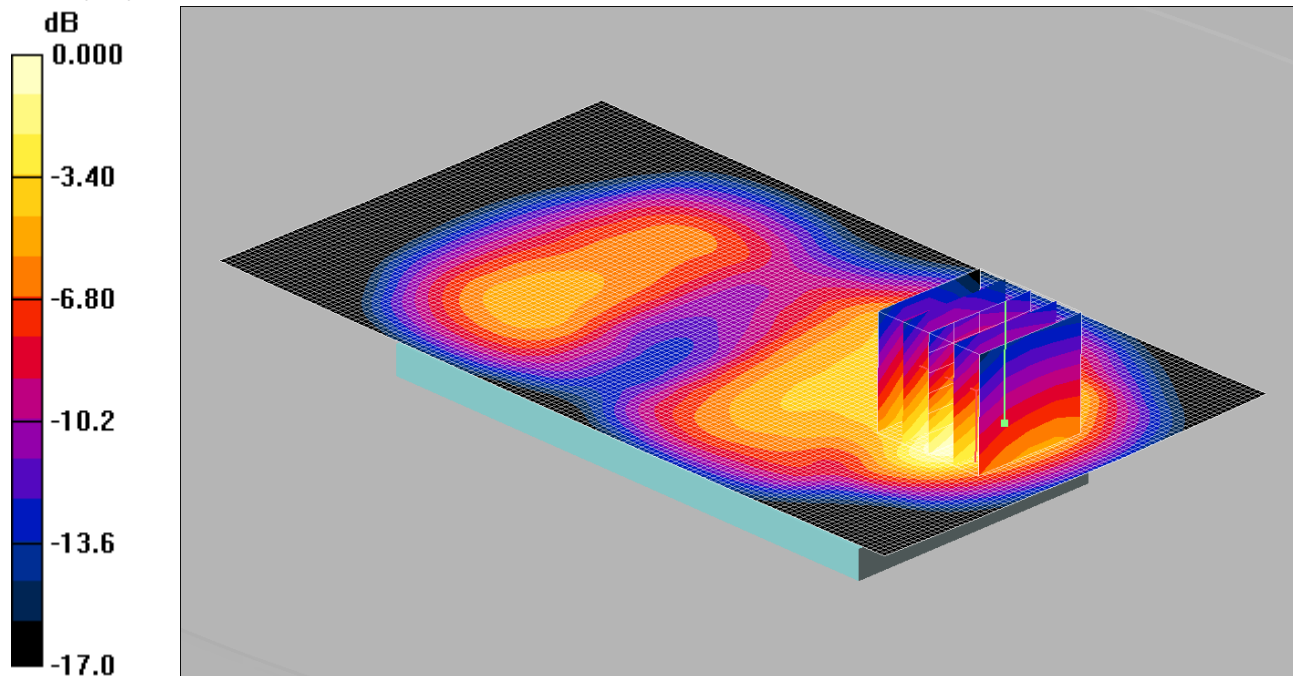
SAR(1 g) = 0.463 mW/g; SAR(10 g) = 0.263 mW/g

Maximum value of SAR (measured) = 0.523 mW/g

013: Back_of_EUT_Facing_Phantom_LTE_FDD_2_20MHz_1RB_Mid_CH18700

Date: 08/05/2015

DUT: Sony; Type: FCC ID: PY7PM-0801



0 dB = 0.736mW/g

Communication System: LTE - Band 2 / 20MHz Channel; Frequency: 1860 MHz; Duty Cycle: 1:1

Medium: 1900 MHz MSL Medium parameters used (interpolated): f = 1860 MHz; $\sigma = 1.48 \text{ mho/m}$; $\epsilon_r = 53.3$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section

DASY4 Configuration:

- Probe: ES3DV3 - SN3304; ConvF(4.69, 4.69, 4.69);
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn432; Calibrated: 20/08/2014
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:xxxx
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Back/Area Scan (81x141x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.768 mW/g

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

Reference Value = 6.99 V/m; Power Drift = 0.025 dB

Peak SAR (extrapolated) = 1.12 W/kg

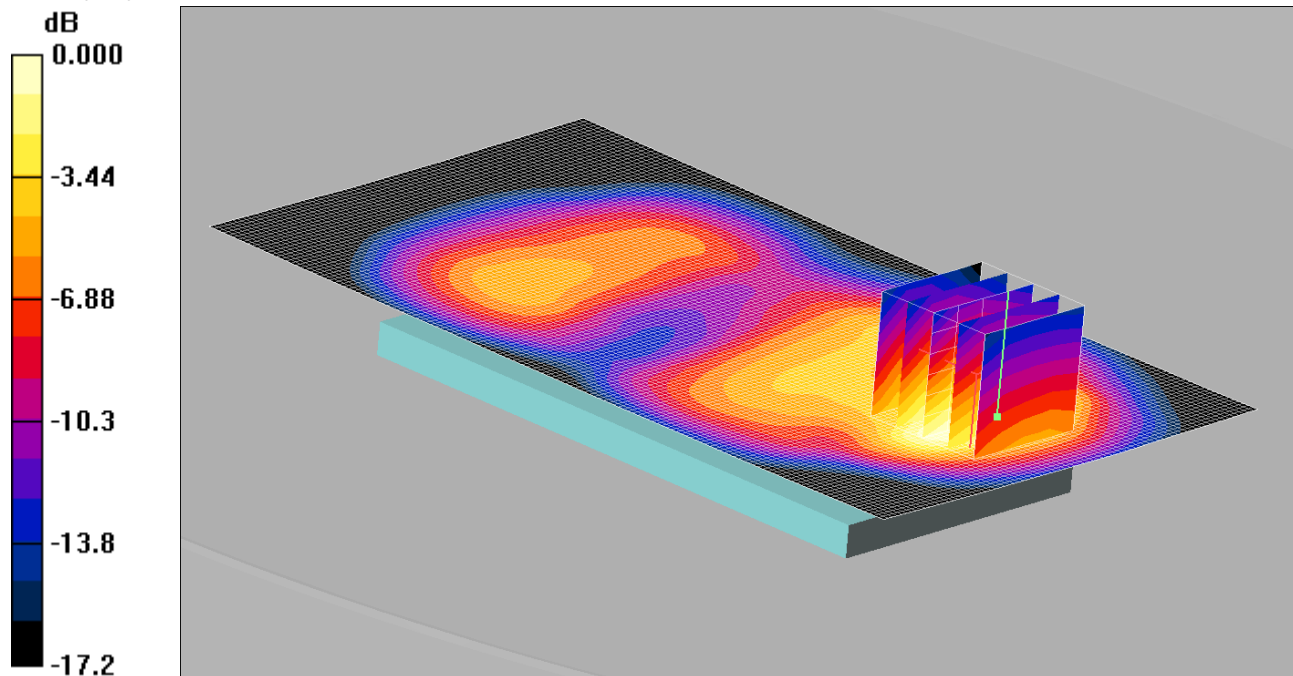
SAR(1 g) = 0.660 mW/g; SAR(10 g) = 0.386 mW/g

Maximum value of SAR (measured) = 0.736 mW/g

014: Back_of_EUT_Facing_Phantom_LTE_FDD_2_20MHz_50%RB_Mid_CH18700

Date: 08/05/2015

DUT: Sony; Type: FCC ID: PY7PM-0801



0 dB = 0.593mW/g

Communication System: LTE - Band 2 / 20MHz Channel; Frequency: 1860 MHz; Duty Cycle: 1:1

Medium: 1900 MHz MSL Medium parameters used (interpolated): f = 1860 MHz; $\sigma = 1.48$ mho/m; $\epsilon_r = 53.3$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

DASY4 Configuration:

- Probe: ES3DV3 - SN3304; ConvF(4.69, 4.69, 4.69);
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn432; Calibrated: 20/08/2014
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:xxxx
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Back/Area Scan (81x141x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.619 mW/g

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

Reference Value = 6.23 V/m; Power Drift = 0.123 dB

Peak SAR (extrapolated) = 0.903 W/kg

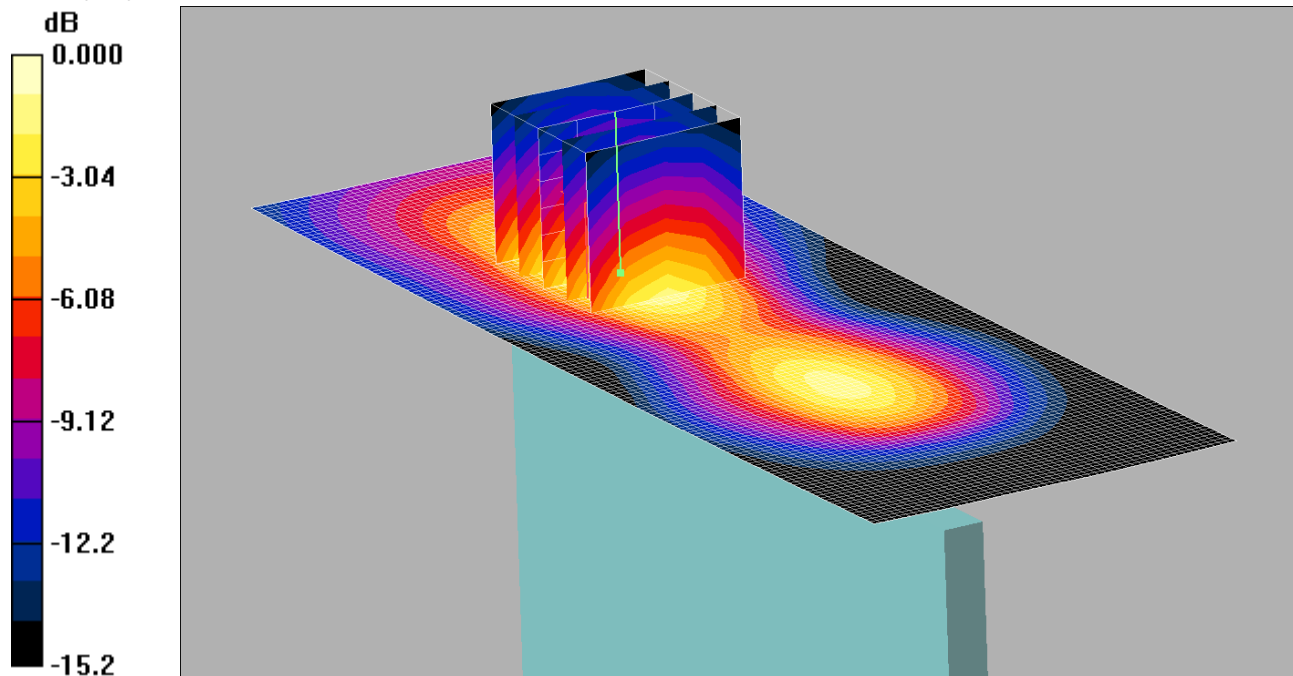
SAR(1 g) = 0.530 mW/g; SAR(10 g) = 0.310 mW/g

Maximum value of SAR (measured) = 0.593 mW/g

015: Left_of_EUT_Facing_Phantom_LTE_FDD_2_20MHz_1RB_Mid_CH18700

Date: 08/05/2015

DUT: Sony; Type: FCC ID: PY7PM-0801



0 dB = 0.407mW/g

Communication System: LTE - Band 2 / 20MHz Channel; Frequency: 1860 MHz; Duty Cycle: 1:1

Medium: 1900 MHz MSL Medium parameters used (interpolated): f = 1860 MHz; $\sigma = 1.48$ mho/m; $\epsilon_r = 53.3$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

DASY4 Configuration:

- Probe: ES3DV3 - SN3304; ConvF(4.69, 4.69, 4.69);
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn432; Calibrated: 20/08/2014
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:xxxx
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Left/Area Scan (51x141x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.426 mW/g

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

Reference Value = 8.89 V/m; Power Drift = -0.032 dB

Peak SAR (extrapolated) = 0.592 W/kg

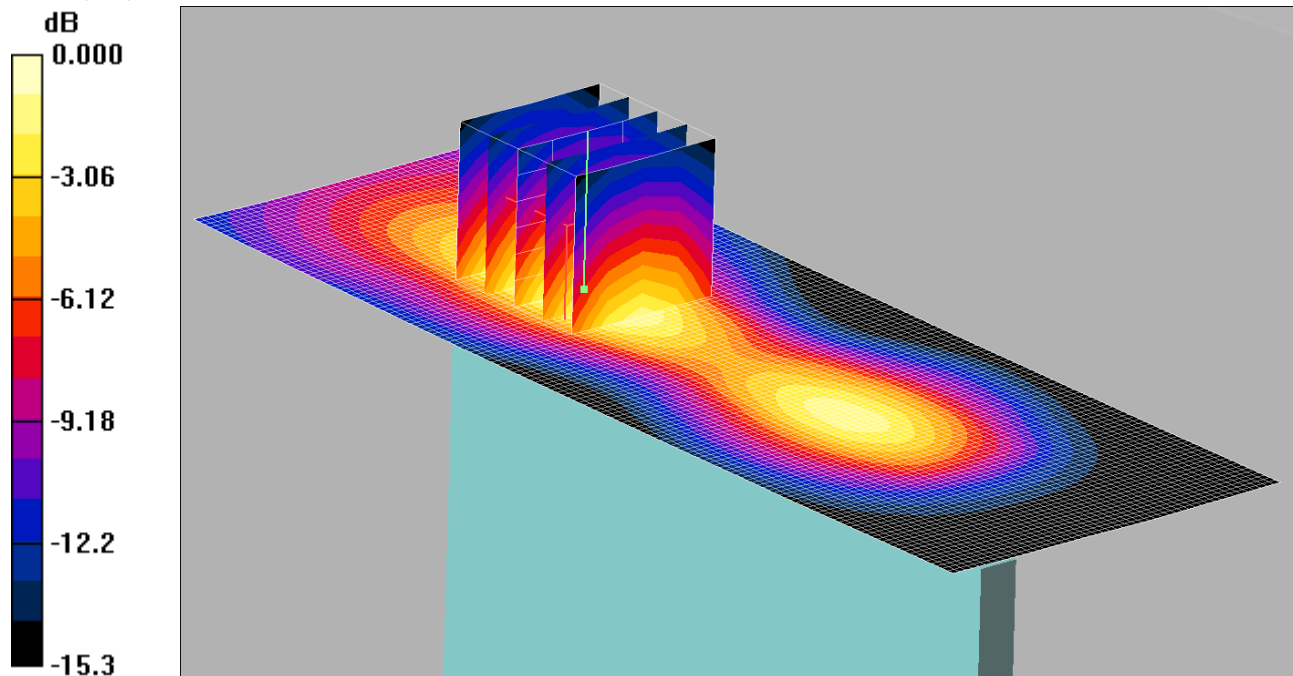
SAR(1 g) = 0.369 mW/g; SAR(10 g) = 0.213 mW/g

Maximum value of SAR (measured) = 0.407 mW/g

016: Left_of_EUT_Facing_Phantom_LTE_FDD_2_20MHz_50%RB_Mid_CH18700

Date: 08/05/2015

DUT: Sony; Type: FCC ID: PY7PM-0801



0 dB = 0.318mW/g

Communication System: LTE - Band 2 / 20MHz Channel; Frequency: 1860 MHz; Duty Cycle: 1:1

Medium: 1900 MHz MSL Medium parameters used (interpolated): f = 1860 MHz; $\sigma = 1.48 \text{ mho/m}$; $\epsilon_r = 53.3$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section

DASY4 Configuration:

- Probe: ES3DV3 - SN3304; ConvF(4.69, 4.69, 4.69);
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn432; Calibrated: 20/08/2014
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:xxxx
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Left/Area Scan (51x141x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.330 mW/g

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

Reference Value = 8.55 V/m; Power Drift = 0.010 dB

Peak SAR (extrapolated) = 0.461 W/kg

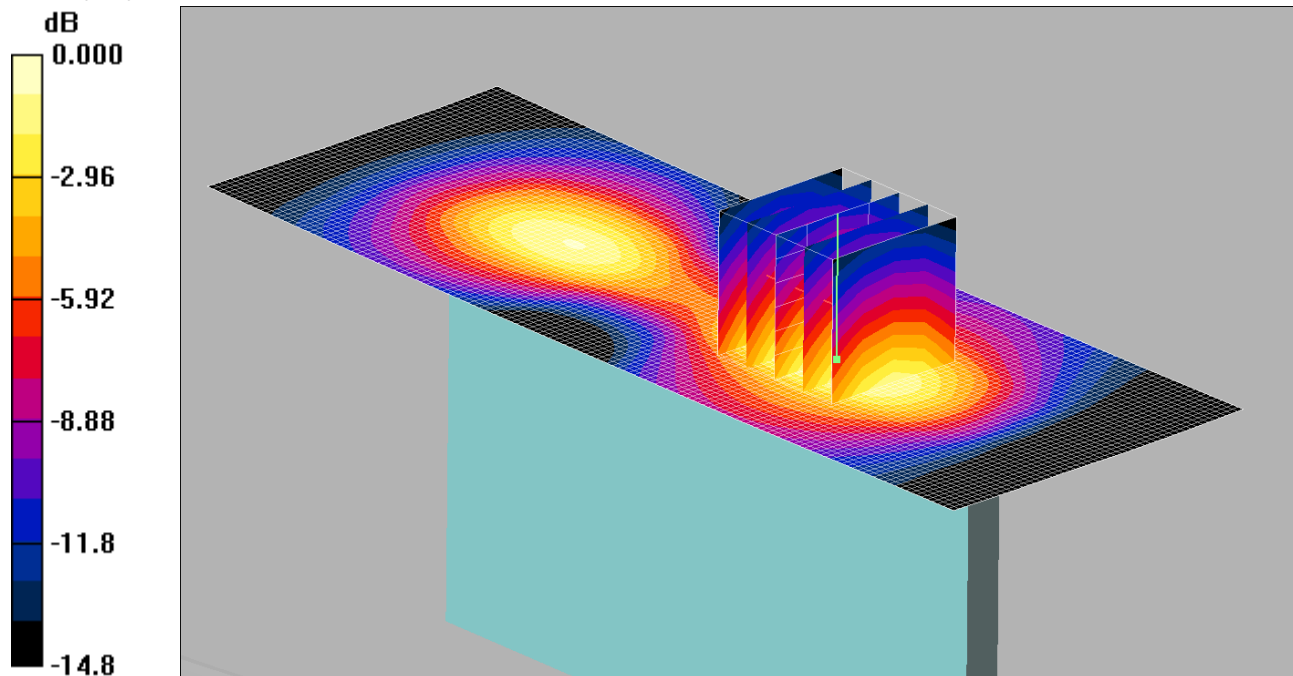
SAR(1 g) = 0.289 mW/g; SAR(10 g) = 0.166 mW/g

Maximum value of SAR (measured) = 0.318 mW/g

017: Right_of_EUT_Facing_Phantom_LTE_FDD_2_20MHz_1RB_Mid_CH18700

Date: 08/05/2015

DUT: Sony; Type: FCC ID: PY7PM-0801



0 dB = 0.326mW/g

Communication System: LTE - Band 2 / 20MHz Channel; Frequency: 1860 MHz;Duty Cycle: 1:1

Medium: 1900 MHz MSL Medium parameters used (interpolated): f = 1860 MHz; $\sigma = 1.48$ mho/m; $\epsilon_r = 53.3$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

DASY4 Configuration:

- Probe: ES3DV3 - SN3304; ConvF(4.69, 4.69, 4.69);
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn432; Calibrated: 20/08/2014
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:xxxx
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Right/Area Scan (51x141x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.322 mW/g

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

Reference Value = 8.22 V/m; Power Drift = 0.028 dB

Peak SAR (extrapolated) = 0.457 W/kg

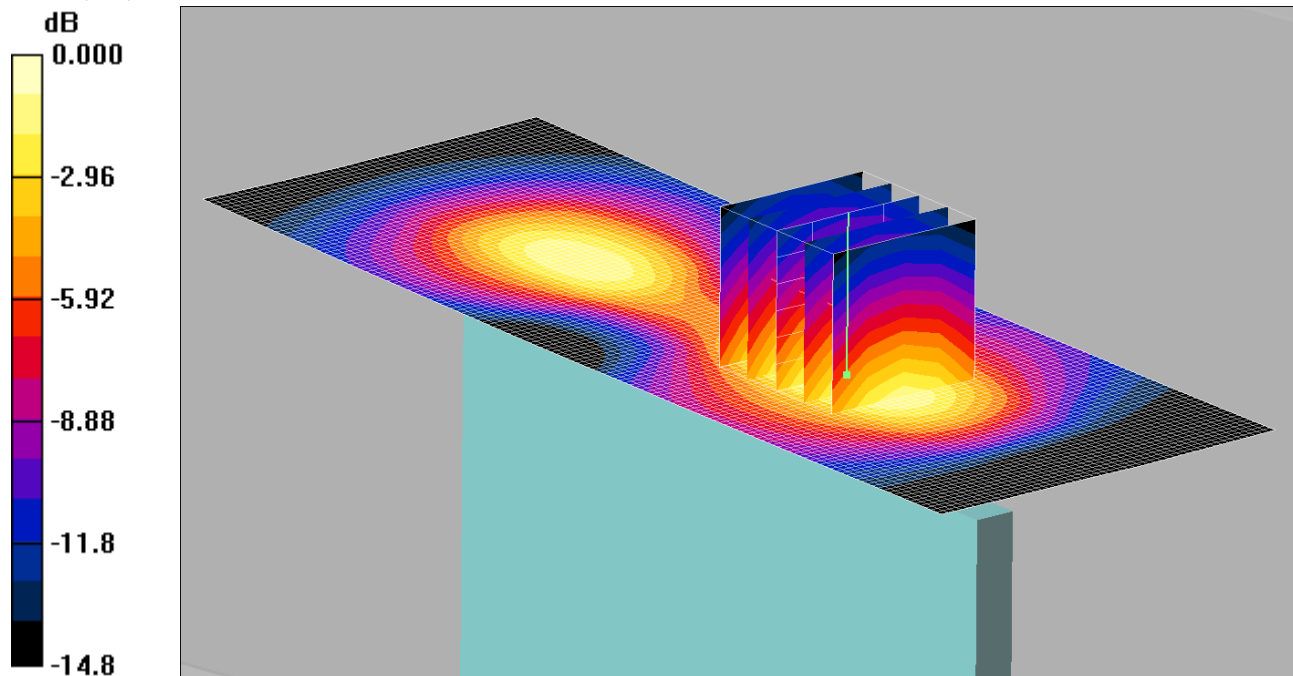
SAR(1 g) = 0.294 mW/g; SAR(10 g) = 0.175 mW/g

Maximum value of SAR (measured) = 0.326 mW/g

018: Right_of_EUT_Facing_Phantom_LTE_FDD_2_20MHz_50%RB_Mid_CH18700

Date: 08/05/2015

DUT: Sony; Type: FCC ID: PY7PM-0801



0 dB = 0.260mW/g

Communication System: LTE - Band 2 / 20MHz Channel; Frequency: 1860 MHz; Duty Cycle: 1:1

Medium: 1900 MHz MSL Medium parameters used (interpolated): f = 1860 MHz; $\sigma = 1.48 \text{ mho/m}$; $\epsilon_r = 53.3$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section

DASY4 Configuration:

- Probe: ES3DV3 - SN3304; ConvF(4.69, 4.69, 4.69);
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn432; Calibrated: 20/08/2014
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:xxxx
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Right/Area Scan (51x141x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.263 mW/g

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

Reference Value = 7.44 V/m; Power Drift = -0.032 dB

Peak SAR (extrapolated) = 0.367 W/kg

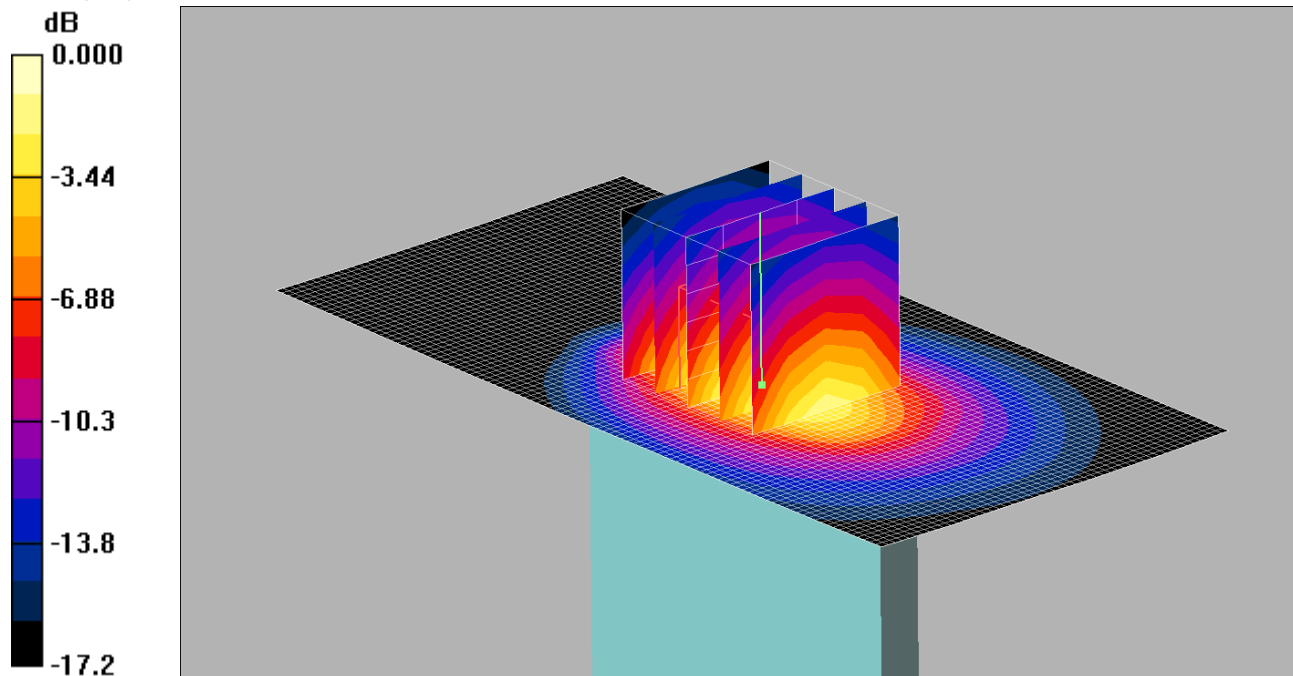
SAR(1 g) = 0.235 mW/g; SAR(10 g) = 0.140 mW/g

Maximum value of SAR (measured) = 0.260 mW/g

019: Bottom_of_EUT_Facing_Phantom_LTE_FDD_2_20MHz_1RB_Mid_CH18700

Date: 08/05/2015

DUT: Sony; Type: FCC ID: PY7PM-0801



0 dB = 0.730mW/g

Communication System: LTE - Band 2 / 20MHz Channel; Frequency: 1860 MHz; Duty Cycle: 1:1

Medium: 1900 MHz MSL Medium parameters used (interpolated): f = 1860 MHz; $\sigma = 1.48 \text{ mho/m}$; $\epsilon_r = 53.3$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section

DASY4 Configuration:

- Probe: ES3DV3 - SN3304; ConvF(4.69, 4.69, 4.69);
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn432; Calibrated: 20/08/2014
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:xxxx
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Bottom/Area Scan (51x101x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.602 mW/g

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

Reference Value = 17.0 V/m; Power Drift = 0.019 dB

Peak SAR (extrapolated) = 1.10 W/kg

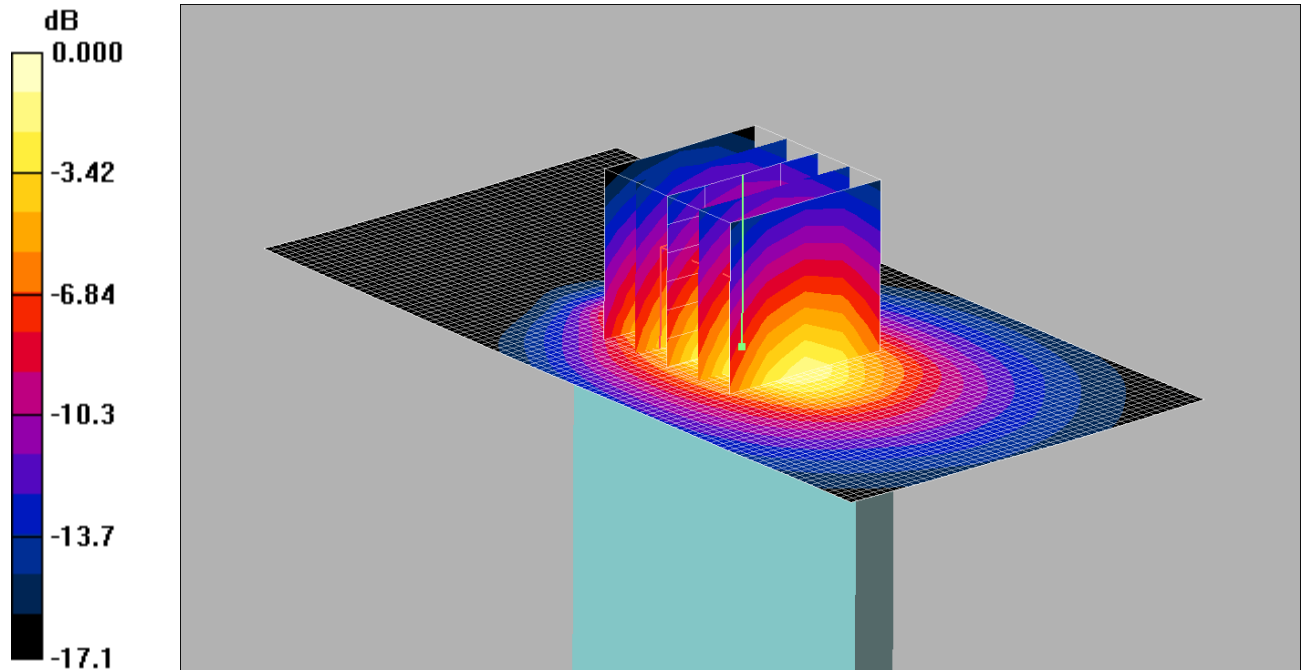
SAR(1 g) = 0.657 mW/g; SAR(10 g) = 0.362 mW/g

Maximum value of SAR (measured) = 0.730 mW/g

020: Bottom_of_EUT_Facing_Phantom_LTE_FDD_2_20MHz_50%RB_Mid_CH18700

Date: 08/05/2015

DUT: Sony; Type: FCC ID: PY7PM-0801



0 dB = 0.733mW/g

Communication System: LTE - Band 2 / 20MHz Channel; Frequency: 1860 MHz; Duty Cycle: 1:1

Medium: 1900 MHz MSL Medium parameters used (interpolated): $f = 1860$ MHz; $\sigma = 1.48$ mho/m; $\epsilon_r = 53.3$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

DASY4 Configuration:

- Probe: ES3DV3 - SN3304; ConvF(4.69, 4.69, 4.69);
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn432; Calibrated: 20/08/2014
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:xxxx
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Bottom/Area Scan (51x101x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.804 mW/g

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

Reference Value = 19.6 V/m; Power Drift = -0.076 dB

Peak SAR (extrapolated) = 1.10 W/kg

SAR(1 g) = 0.658 mW/g; SAR(10 g) = 0.362 mW/g

Maximum value of SAR (measured) = 0.733 mW/g

A.4. Calibration Certificate for E-Field Probe

This section contains the calibration certificates and data for the Probe(s) used, which are not included in the total number of pages for this report.

A2243

Checked M. Naice
26/8/2014

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 **UL RFI UK**Certificate No: **ES3-3304_Aug14**

CALIBRATION CERTIFICATE

Object **ES3DV3 - SN:3304**Calibration procedure(s) **QA CAL-01.v9, QA CAL-23.v5, QA CAL-25.v6
Calibration procedure for dosimetric E-field probes**Calibration date: **August 21, 2014**

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	03-Apr-14 (No. 217-01911)	Apr-15
Power sensor E4412A	MY41498087	03-Apr-14 (No. 217-01911)	Apr-15
Reference 3 dB Attenuator	SN: S5054 (3c)	03-Apr-14 (No. 217-01915)	Apr-15
Reference 20 dB Attenuator	SN: S5277 (20x)	03-Apr-14 (No. 217-01919)	Apr-15
Reference 30 dB Attenuator	SN: S5129 (30b)	03-Apr-14 (No. 217-01920)	Apr-15
Reference Probe ES3DV2	SN: 3013	30-Dec-13 (No. ES3-3013_Dec13)	Dec-14
DAE4	SN: 660	13-Dec-13 (No. DAE4-660_Dec13)	Dec-14
Secondary Standards	ID	Check Date (in house)	Scheduled Check
RF generator HP 8648C	US3642U01700	4-Aug-99 (in house check Apr-13)	In house check: Apr-16
Network Analyzer HP 8753E	US37390585	18-Oct-01 (in house check Oct-13)	In house check: Oct-14

	Name	Function	Signature
Calibrated by:	Leif Klysner	Laboratory Technician	
Approved by:	Katja Pokovic	Technical Manager	
			Issued: August 21, 2014

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



Accredited by the Swiss Accreditation Service (SAS)

Accreditation No.: **SCS 108**

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

Glossary:

TSL	tissue simulating liquid
NORM _{x,y,z}	sensitivity in free space
ConvF	sensitivity in TSL / NORM _{x,y,z}
DCP	diode compression point
CF	crest factor (1/duty_cycle) of the RF signal
A, B, C, D	modulation dependent linearization parameters
Polarization φ	φ rotation around probe axis
Polarization ϑ	ϑ rotation around an axis that is in the plane normal to probe axis (at measurement center), i.e., $\vartheta = 0$ is normal to probe axis
Connector Angle	information used in DASY system to align probe sensor X to the robot coordinate system

Calibration is Performed According to the Following Standards:

- IEEE Std 1528-2013, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", June 2013
- 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_{x,y,z}**: Assessed for E-field polarization $\vartheta = 0$ ($f \leq 900$ MHz in TEM-cell; $f > 1800$ MHz: R22 waveguide). NORM_{x,y,z} are only intermediate values, i.e., the uncertainties of NORM_{x,y,z} does not affect the E²-field uncertainty inside TSL (see below ConvF).
- NORM(f)_{x,y,z}** = NORM_{x,y,z} * frequency_response (see Frequency Response Chart). This linearization is implemented in DASY4 software versions later than 4.2. The uncertainty of the frequency response is included in the stated uncertainty of ConvF.
- DCP_{x,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_{x,y,z}; B_{x,y,z}; C_{x,y,z}; D_{x,y,z}; VR_{x,y,z}; 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_{x,y,z} * ConvF whereby the uncertainty corresponds to that given for ConvF. A frequency dependent ConvF is used in DASY version 4.4 and higher which allows extending the validity from ± 50 MHz to ± 100 MHz.
- Spherical isotropy (3D deviation from isotropy)**: in a field of low gradients realized using a flat phantom exposed by a patch antenna.
- Sensor Offset**: The sensor offset corresponds to the offset of virtual measurement center from the probe tip (on probe axis). No tolerance required.
- Connector Angle**: The angle is assessed using the information gained by determining the NORM_x (no uncertainty required).

Probe ES3DV3

SN:3304

Manufactured: August 27, 2010
Calibrated: August 21, 2014

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

DASY/EASY - Parameters of Probe: ES3DV3 - SN:3304

Basic Calibration Parameters

	Sensor X	Sensor Y	Sensor Z	Unc (k=2)
Norm ($\mu\text{V}/(\text{V}/\text{m})^2$) ^A	1.14	1.33	1.33	$\pm 10.1\%$
DCP (mV) ^B	104.8	103.4	100.3	

Modulation Calibration Parameters

UID	Communication System Name		A dB	B dB $\sqrt{\mu\text{V}}$	C	D dB	VR mV	Unc ^E (k=2)
0	CW	X	0.0	0.0	1.0	0.00	201.4	$\pm 3.3\%$
		Y	0.0	0.0	1.0		218.4	
		Z	0.0	0.0	1.0		224.6	

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

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

^B Numerical linearization parameter: uncertainty not required.

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

DASY/EASY - Parameters of Probe: ES3DV3 - SN:3304

Calibration Parameter Determined in Head Tissue Simulating Media

f (MHz) ^C	Relative Permittivity ^F	Conductivity (S/m) ^F	ConvF X	ConvF Y	ConvF Z	Alpha ^G	Depth ^G (mm)	Unct. (k=2)
750	41.9	0.89	6.57	6.57	6.57	0.80	1.17	± 12.0 %
835	41.5	0.90	6.38	6.38	6.38	0.28	1.98	± 12.0 %
900	41.5	0.97	6.27	6.27	6.27	0.70	1.22	± 12.0 %
1750	40.1	1.37	5.21	5.21	5.21	0.80	1.17	± 12.0 %
1900	40.0	1.40	5.03	5.03	5.03	0.58	1.35	± 12.0 %
2100	39.8	1.49	5.09	5.09	5.09	0.77	1.23	± 12.0 %
2300	39.5	1.67	4.75	4.75	4.75	0.66	1.37	± 12.0 %
2450	39.2	1.80	4.48	4.48	4.48	0.80	1.25	± 12.0 %
2600	39.0	1.96	4.37	4.37	4.37	0.75	1.27	± 12.0 %

^C Frequency validity above 300 MHz 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. Frequency validity below 300 MHz is ± 10, 25, 40, 50 and 70 MHz for ConvF assessments at 30, 64, 128, 150 and 220 MHz respectively. Above 5 GHz frequency validity can be extended to ± 110 MHz.

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

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

DASY/EASY - Parameters of Probe: ES3DV3 - SN:3304

Calibration Parameter Determined in Body Tissue Simulating Media

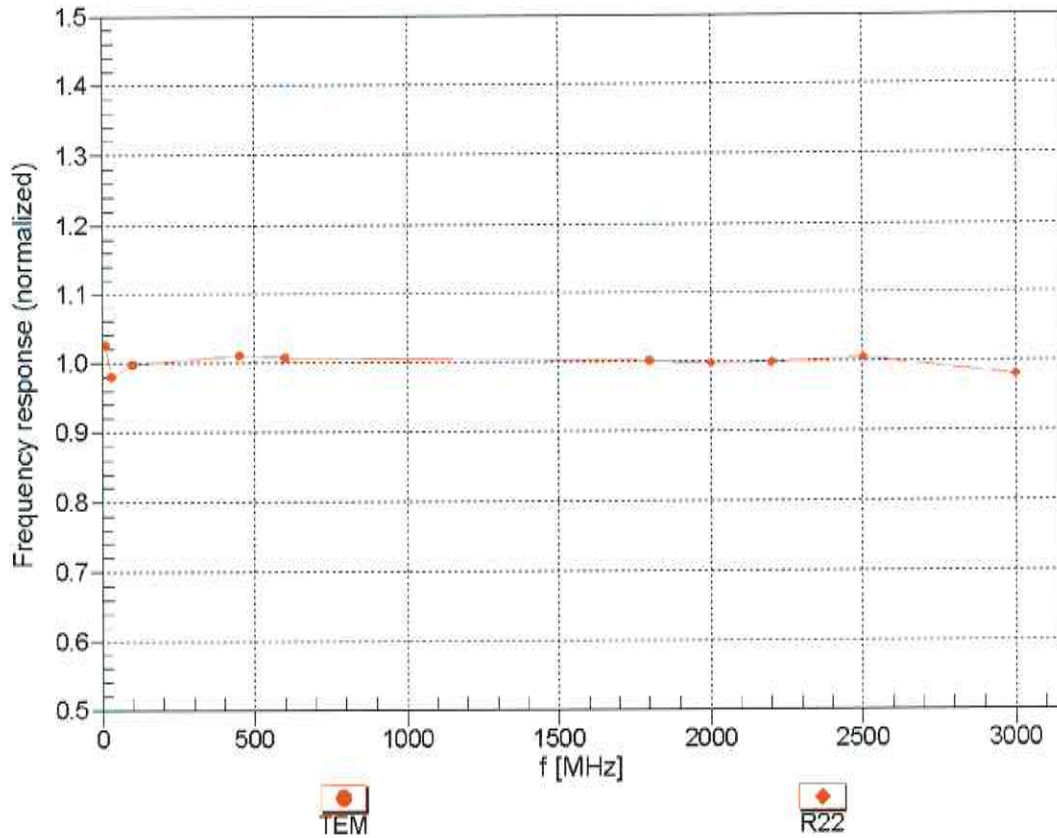
f (MHz) ^C	Relative Permittivity ^F	Conductivity (S/m) ^F	ConvF X	ConvF Y	ConvF Z	Alpha ^G	Depth (mm) ^G	Unct. (k=2)
750	55.5	0.96	6.17	6.17	6.17	0.34	1.79	± 12.0 %
835	55.2	0.97	6.17	6.17	6.17	0.80	1.16	± 12.0 %
900	55.0	1.05	6.03	6.03	6.03	0.75	1.22	± 12.0 %
1750	53.4	1.49	4.86	4.86	4.86	0.80	1.22	± 12.0 %
1900	53.3	1.52	4.69	4.69	4.69	0.51	1.62	± 12.0 %
2100	53.2	1.62	4.77	4.77	4.77	0.80	1.31	± 12.0 %
2300	52.9	1.81	4.40	4.40	4.40	0.80	1.25	± 12.0 %
2450	52.7	1.95	4.24	4.24	4.24	0.80	1.11	± 12.0 %
2600	52.5	2.16	4.12	4.12	4.12	0.70	1.01	± 12.0 %

^C Frequency validity above 300 MHz 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. Frequency validity below 300 MHz is ± 10, 25, 40, 50 and 70 MHz for ConvF assessments at 30, 64, 128, 150 and 220 MHz respectively. Above 5 GHz frequency validity can be extended to ± 110 MHz.

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

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

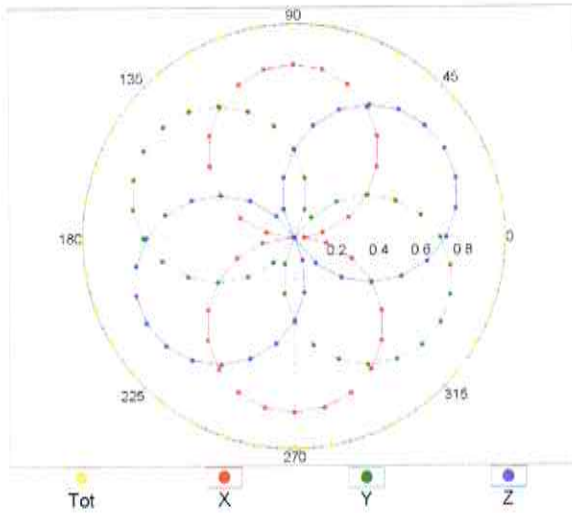
Frequency Response of E-Field (TEM-Cell:ifi110 EXX, Waveguide: R22)



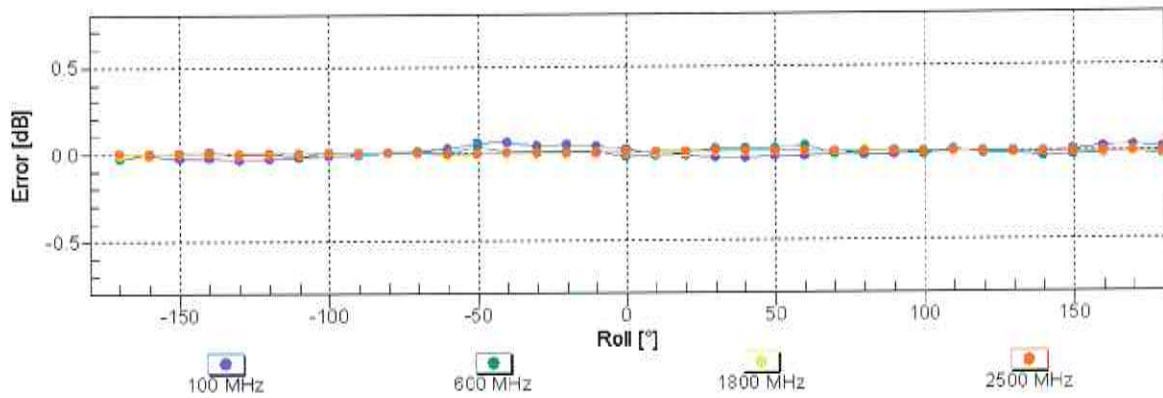
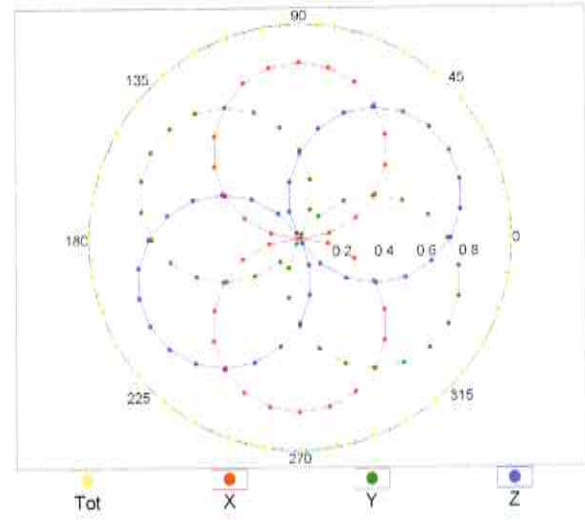
Uncertainty of Frequency Response of E-field: $\pm 6.3\%$ (k=2)

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

f=600 MHz,TEM

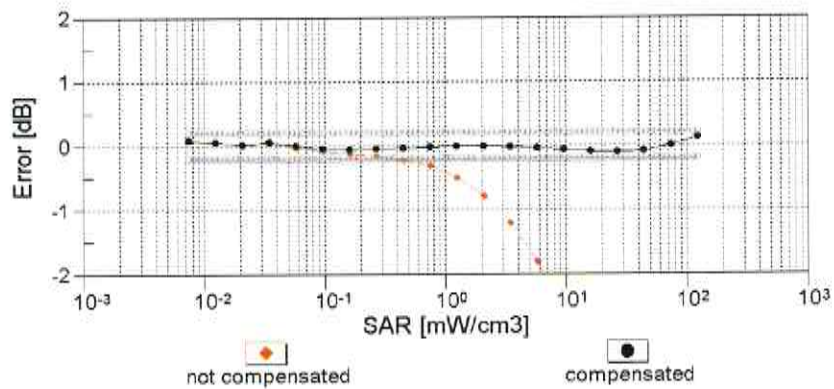
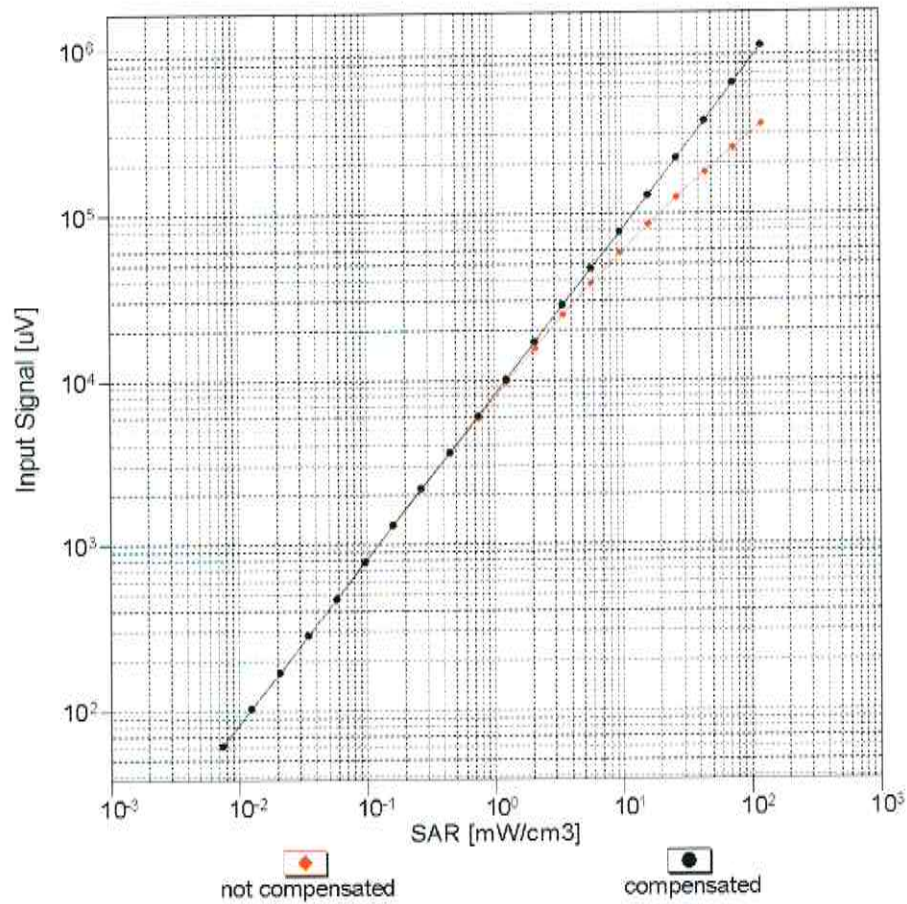


f=1800 MHz,R22



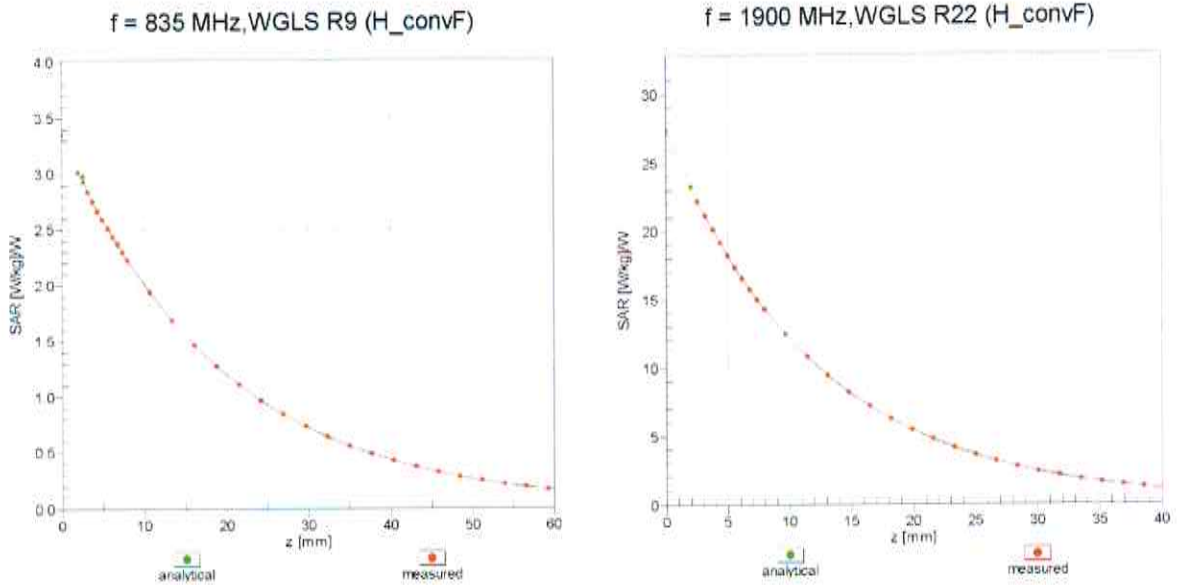
Uncertainty of Axial Isotropy Assessment: $\pm 0.5\%$ (k=2)

Dynamic Range $f(SAR_{head})$ (TEM cell, $f_{eval} = 1900$ MHz)

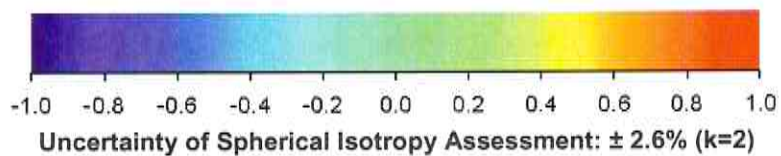
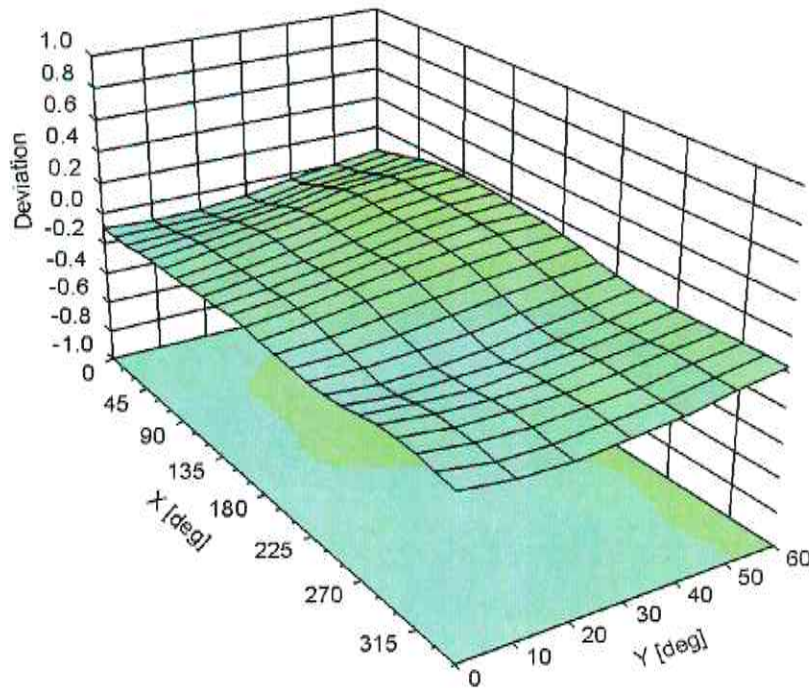


Uncertainty of Linearity Assessment: $\pm 0.6\%$ (k=2)

Conversion Factor Assessment



Deviation from Isotropy in Liquid Error (ϕ, θ), f = 900 MHz



DASY/EASY - Parameters of Probe: ES3DV3 - SN:3304

Other Probe Parameters

Sensor Arrangement	Triangular
Connector Angle (°)	29.7
Mechanical Surface Detection Mode	enabled
Optical Surface Detection Mode	disabled
Probe Overall Length	337 mm
Probe Body Diameter	10 mm
Tip Length	10 mm
Tip Diameter	4 mm
Probe Tip to Sensor X Calibration Point	2 mm
Probe Tip to Sensor Y Calibration Point	2 mm
Probe Tip to Sensor Z Calibration Point	2 mm
Recommended Measurement Distance from Surface	2 mm

A.5. Calibration Certificate for Dipole

This section contains the calibration certificates and data for the Dipole(s) used, which are not included in the total number of pages for this report.

A1237

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



Checked by
Stannich
24/12/2014

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 **UL RFI UK**

Certificate No: D1900V2-540_Dec14

CALIBRATION CERTIFICATE

Object **D1900V2 - SN: 540**

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

Calibration date: **December 08, 2014**

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	07-Oct-14 (No. 217-02020)	Oct-15
Power sensor HP 8481A	US37292783	07-Oct-14 (No. 217-02020)	Oct-15
Power sensor HP 8481A	MY41092317	07-Oct-14 (No. 217-02021)	Oct-15
Reference 20 dB Attenuator	SN: 5058 (20k)	03-Apr-14 (No. 217-01918)	Apr-15
Type-N mismatch combination	SN: 5047.2 / 06327	03-Apr-14 (No. 217-01921)	Apr-15
Reference Probe ES3DV3	SN: 3205	30-Dec-13 (No. ES3-3205_Dec13)	Dec-14
DAE4	SN: 601	18-Aug-14 (No. DAE4-601_Aug14)	Aug-15
Secondary Standards	ID #	Check Date (in house)	Scheduled Check
RF generator R&S SMT-06	100005	04-Aug-99 (in house check Oct-13)	In house check: Oct-16
Network Analyzer HP 8753E	US37390585 S4206	18-Oct-01 (in house check Oct-14)	In house check: Oct-15

Calibrated by: **Michael Weber** (Name), **Laboratory Technician** (Function), *M. Weber* (Signature)

Approved by: **Katja Pokovic** (Name), **Technical Manager** (Function), *Katja Pokovic* (Signature)

Issued: December 9, 2014

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



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

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 1528-2013, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", June 2013
- 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	V52.8.8
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom	
Distance Dipole Center - TSL	10 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	1900 MHz \pm 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	40.0	1.40 mho/m
Measured Head TSL parameters	(22.0 \pm 0.2) °C	39.6 \pm 6 %	1.38 mho/m \pm 6 %
Head TSL temperature change during test	< 0.5 °C	----	----

SAR result with Head TSL

SAR averaged over 1 cm ³ (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	9.97 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	40.1 W/kg \pm 17.0 % (k=2)

SAR averaged over 10 cm ³ (10 g) of Head TSL	condition	
SAR measured	250 mW input power	5.21 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	20.9 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	53.3	1.52 mho/m
Measured Body TSL parameters	(22.0 \pm 0.2) °C	53.3 \pm 6 %	1.50 mho/m \pm 6 %
Body TSL temperature change during test	< 0.5 °C	----	----

SAR result with Body TSL

SAR averaged over 1 cm ³ (1 g) of Body TSL	Condition	
SAR measured	250 mW input power	9.91 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	40.0 W/kg \pm 17.0 % (k=2)

SAR averaged over 10 cm ³ (10 g) of Body TSL	condition	
SAR measured	250 mW input power	5.25 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	21.1 W/kg \pm 16.5 % (k=2)

Appendix (Additional assessments outside the scope of SCS108)

Antenna Parameters with Head TSL

Impedance, transformed to feed point	53.3 Ω + 4.9 j Ω
Return Loss	- 24.9 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	48.7 Ω + 5.7 j Ω
Return Loss	- 24.6 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.199 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	July 26, 2001

DASY5 Validation Report for Head TSL

Date: 08.12.2014

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 1900 MHz; Type: D1900V2; Serial: D1900V2 - SN: 540

Communication System: UID 0 - CW; Frequency: 1900 MHz

Medium parameters used: $f = 1900$ MHz; $\sigma = 1.38$ S/m; $\epsilon_r = 39.6$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(5.06, 5.06, 5.06); Calibrated: 30.12.2013;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 18.08.2014
- Phantom: Flat Phantom 5.0 (front); Type: QD000P50AA; Serial: 1001
- DASY52 52.8.8(1222); SEMCAD X 14.6.10(7331)

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

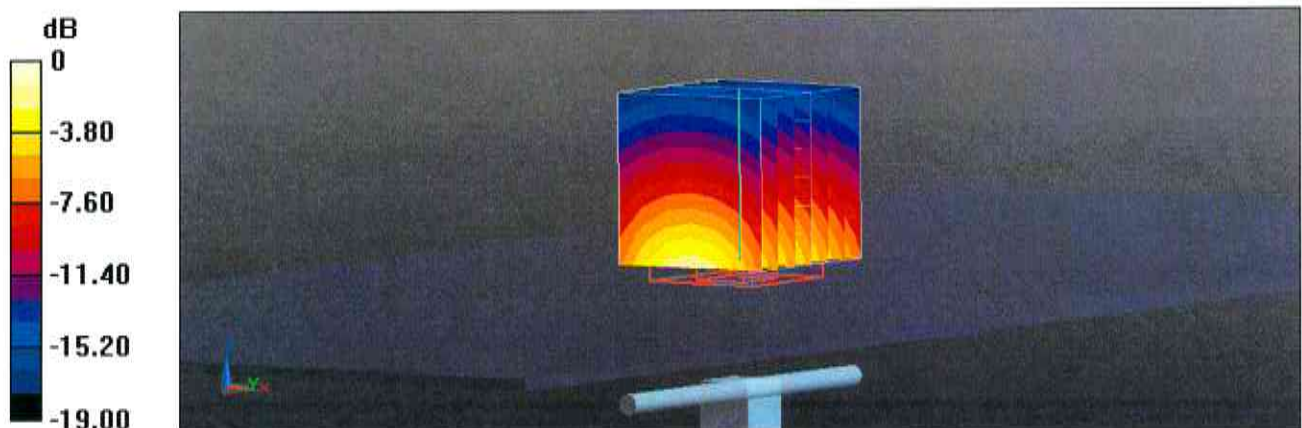
Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 98.55 V/m; Power Drift = 0.01 dB

Peak SAR (extrapolated) = 18.4 W/kg

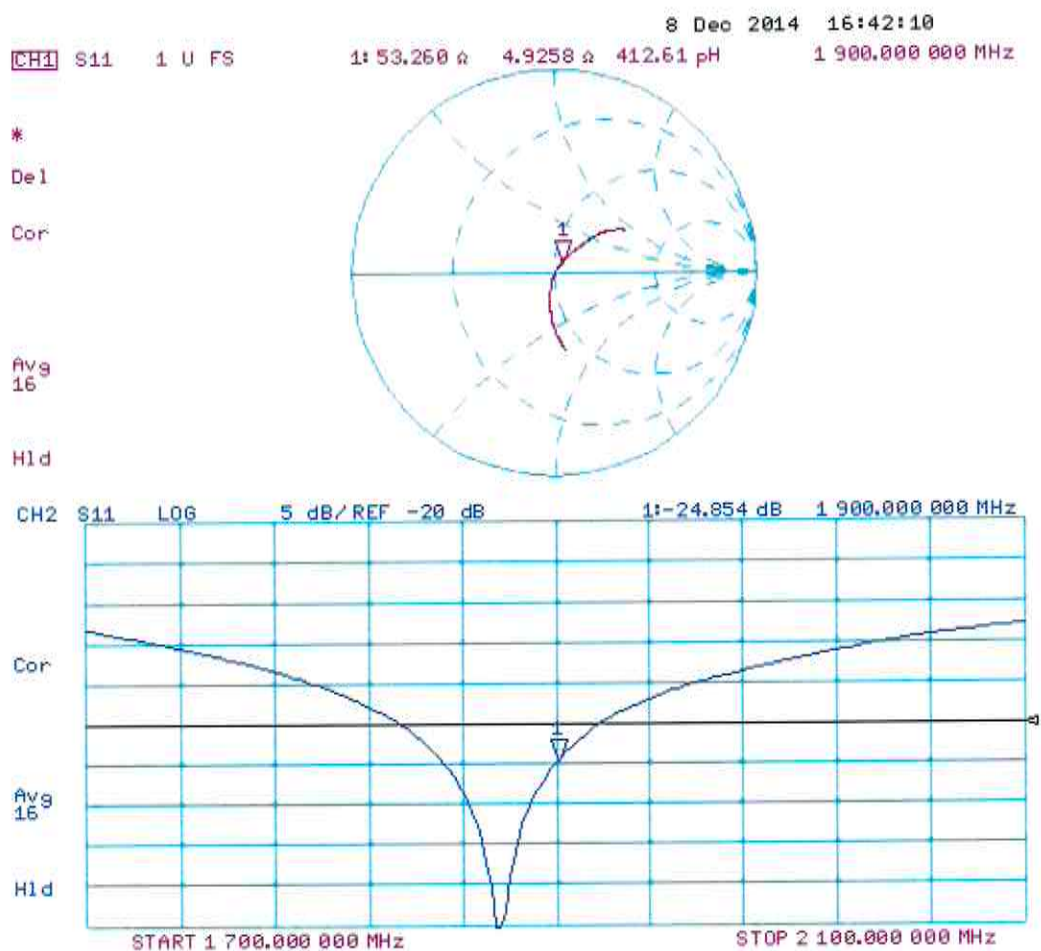
SAR(1 g) = 9.97 W/kg; SAR(10 g) = 5.21 W/kg

Maximum value of SAR (measured) = 12.7 W/kg



0 dB = 12.7 W/kg = 11.04 dBW/kg

Impedance Measurement Plot for Head TSL



DASY5 Validation Report for Body TSL

Date: 08.12.2014

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 1900 MHz; Type: D1900V2; Serial: D1900V2 - SN: 540

Communication System: UID 0 - CW; Frequency: 1900 MHz

Medium parameters used: $f = 1900$ MHz; $\sigma = 1.5$ S/m; $\epsilon_r = 53.3$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(4.76, 4.76, 4.76); Calibrated: 30.12.2013;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 18.08.2014
- Phantom: Flat Phantom 5.0 (back); Type: QD000P50AA; Serial: 1002
- DASY52 52.8.8(1222); SEMCAD X 14.6.10(7331)

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

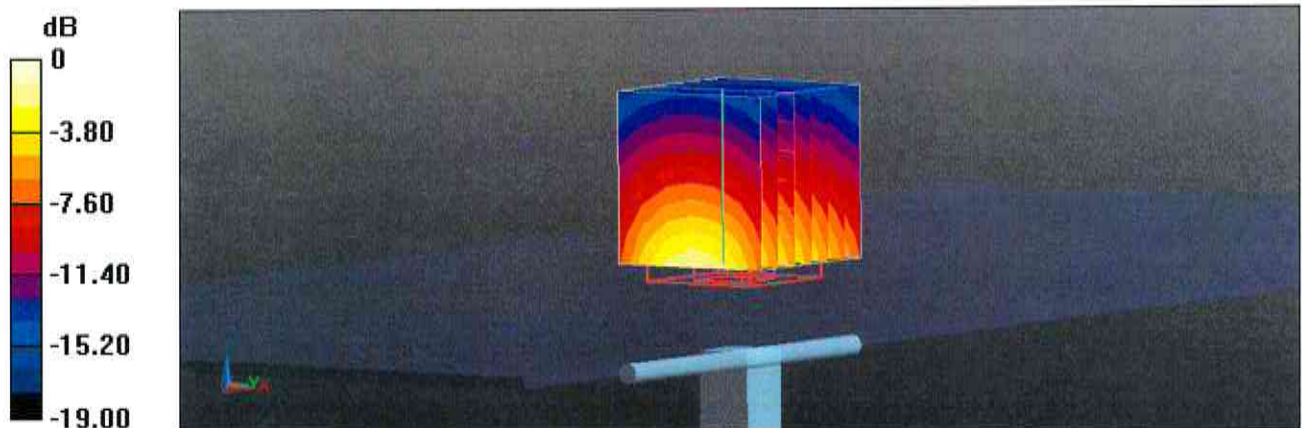
Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 94.59 V/m; Power Drift = -0.00 dB

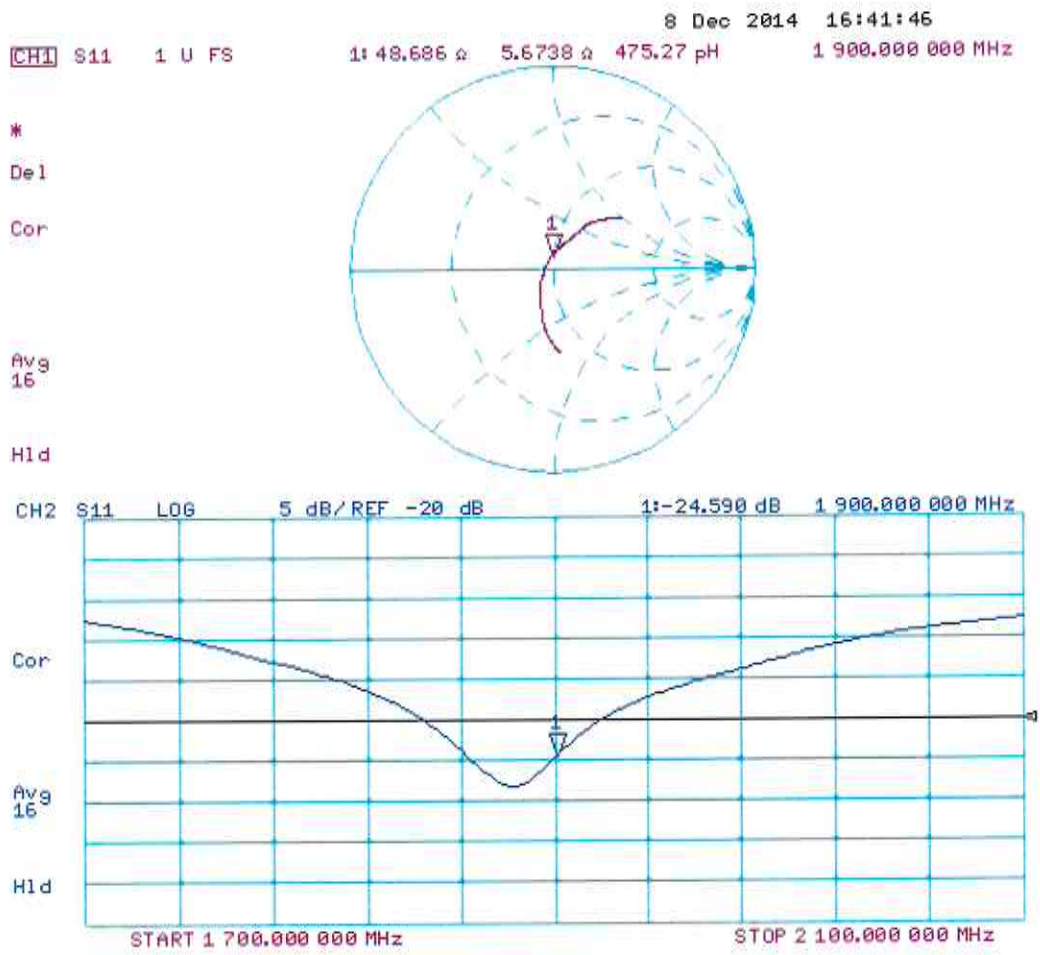
Peak SAR (extrapolated) = 17.2 W/kg

SAR(1 g) = 9.91 W/kg; SAR(10 g) = 5.25 W/kg

Maximum value of SAR (measured) = 12.4 W/kg



Impedance Measurement Plot for Body TSL



A.6. Tissues-Equivalent Media Recipes

The body mixture consists of water, Polysorbate (Tween 20) and salt. Visual inspection is made to ensure air bubbles are not trapped during the mixing process. The mixture is calibrated to obtain proper dielectric constant (permittivity) and conductivity of the tissue.

Ingredient (% by weight)	Frequency 1700/1800/1900 MHz
	Body
De-Ionized Water	71.50
Polysorbate 20	28.00
Salt	0.50