APPENDIX A: SAR TEST DATA

PCTEST

DUT: BCGA2230; Type: Tablet Device; Serial: DLXZR033P7GG

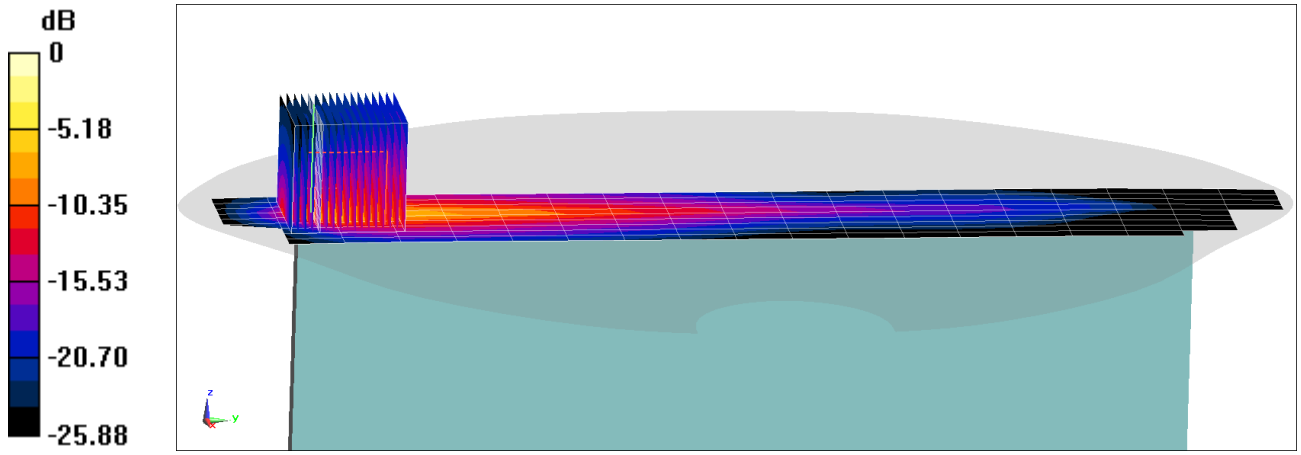
Communication System: UID 0, GSM GPRS; 2 Tx slots; Frequency: 824.2 MHz; Duty Cycle: 1:4.15
Medium: 835 MHz Body Medium parameters used (interpolated):
f = 824.2 MHz; σ = 0.996 S/m; ε_r = 56.233; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 0.0 cm

Test Date: 01-09-2020; Ambient Temp: 22.0°C; Tissue Temp: 19.8°C

Probe: EX3DV4 - SN7416; ConvF(9.71, 9.71, 9.71) @ 824.2 MHz; Calibrated: 6/19/2019
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn701; Calibrated: 6/14/2019
Phantom: Twin-SAM V8.0_Left; Type: QD 000 P41 AA; Serial: 1935
Measurement SW: DASY52, Version 52.10 (3);SEMCAD X Version 14.6.13 (7474)

Mode: GPRS 850 Antenna 1, Body SAR, Left Edge, Low.ch, 2 Tx Slots

Area Scan (10x20x1): Measurement grid: dx=5mm, dy=15mm
Zoom Scan (17x17x8)/Cube 0: Measurement grid: dx=1.9mm, dy=1.9mm, dz=1.4mm; Graded Ratio: 1.4
Reference Value = 24.37 V/m; Power Drift = -0.02 dB
Peak SAR (extrapolated) = 22.7 W/kg
SAR(1 g) = 0.989 W/kg; SAR(10 g) = 0.285 W/kg



0 dB = 3.78 W/kg = 5.77 dBW/kg

PCTEST

DUT: BCGA2230; Type: Tablet Device; Serial: DLXZR033P7GG

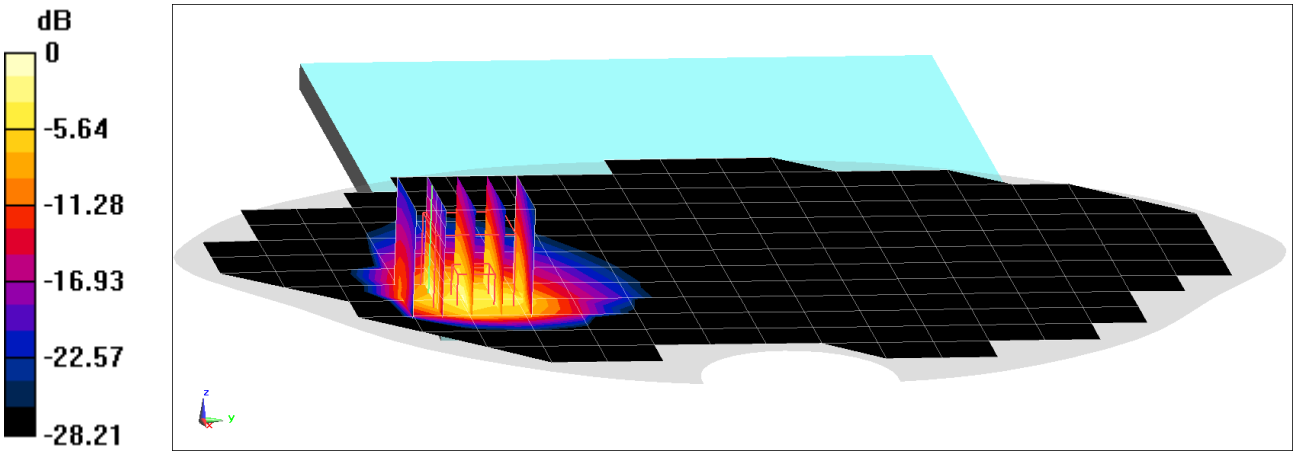
Communication System: UID 0, GSM GPRS; 2 Tx slots; Frequency: 1909.8 MHz; Duty Cycle: 1:4.15
Medium: 1900 MHz Body Medium parameters used:
f = 1910 MHz; σ = 1.585 S/m; ε_r = 52.949; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 0.0 cm

Test Date: 01-13-2020; Ambient Temp: 21.1°C; Tissue Temp: 19.7°C

Probe: EX3DV4 - SN7421; ConvF(7.6, 7.6, 7.6) @ 1909.8 MHz; Calibrated: 3/18/2019
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn604; Calibrated: 3/13/2019
Phantom: Twin-SAM V4.0; Type: QD 000 P40 CD; Serial: 1736
Measurement SW: DASY52, Version 52.10 (3);SEMCAD X Version 14.6.13 (7474)

Mode: GPRS 1900 Antenna 4a, Body SAR, Back side, High ch, 2 Tx Slots

Area Scan (15x19x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 25.29 V/m; Power Drift = -0.10 dB
Peak SAR (extrapolated) = 2.99 W/kg
SAR(1 g) = 0.998 W/kg; SAR(10 g) = 0.477 W/kg



0 dB = 1.87 W/kg = 2.72 dBW/kg

DUT: BCGA2230; Type: Tablet Device; Serial: DLXZR033P7GG

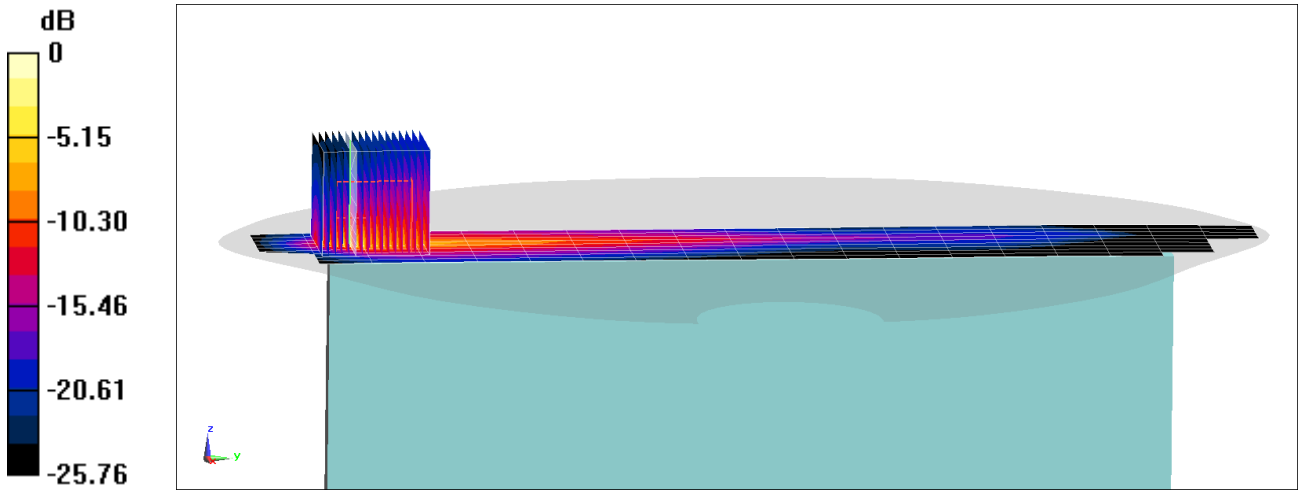
Communication System: UID 0, UMTS, Frequency: 826.4 MHz; Duty Cycle: 1:1
Medium: 835 MHz Body Medium parameters used (interpolated):
f = 826.4 MHz; σ = 0.997 S/m; ε_r = 56.19; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 0.0 cm

Test Date: 01-09-2020; Ambient Temp: 22.0°C; Tissue Temp: 19.8°C

Probe: EX3DV4 - SN7416; ConvF(9.71, 9.71, 9.71) @ 826.4 MHz; Calibrated: 6/19/2019
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn701; Calibrated: 6/14/2019
Phantom: Twin-SAM V8.0_Left; Type: QD 000 P41 AA; Serial: 1935
Measurement SW: DASY52, Version 52.10 (3);SEMCAD X Version 14.6.13 (7474)

Mode: UMTS 850 Antenna 1, Body SAR, Left Edge, Low.ch

Area Scan (10x20x1): Measurement grid: dx=5mm, dy=15mm
Zoom Scan (17x17x8)/Cube 0: Measurement grid: dx=1.9mm, dy=1.9mm, dz=1.4mm; Graded Ratio: 1.4
Reference Value = 26.40 V/m; Power Drift = 0.01 dB
Peak SAR (extrapolated) = 24.3 W/kg
SAR(1 g) = 1.1 W/kg; SAR(10 g) = 0.324 W/kg



0 dB = 4.44 W/kg = 6.47 dBW/kg

PCTEST

DUT: BCGA2230; Type: Tablet Device; Serial: DLXZR033P7GG

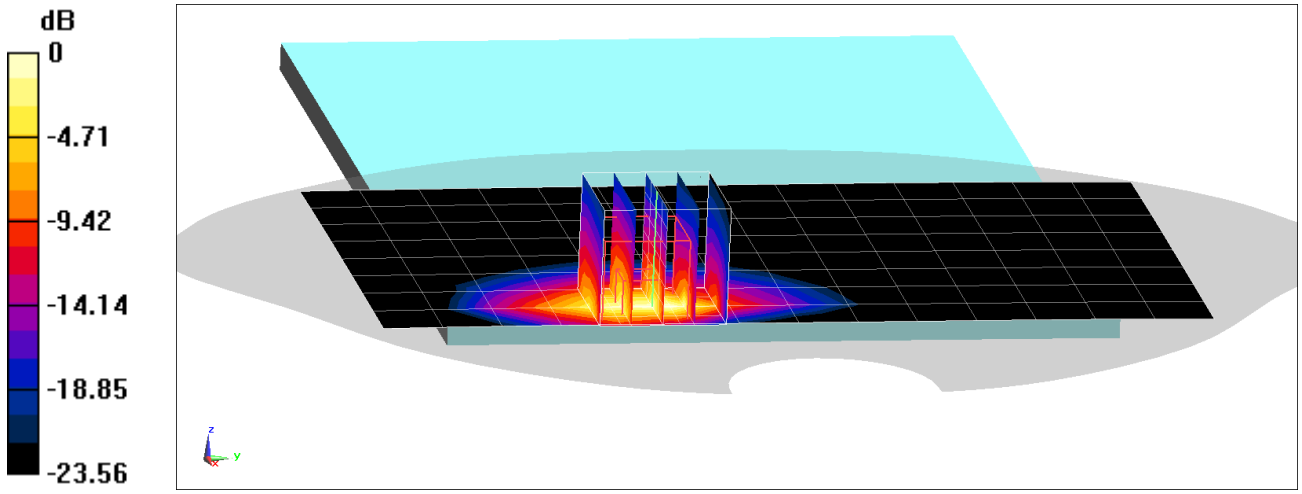
Communication System: UID 0, _UMTS , Frequency: 1752.6 MHz; Duty Cycle: 1:1
Medium: 1750 MHz Body Medium parameters used (interpolated):
f = 1752.6 MHz; σ = 1.528 S/m; ε_r = 52.671; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 0.0 cm

Test Date: 12-30-2019; Ambient Temp: 21.4°C; Tissue Temp: 20.0°C

Probe: EX3DV4 - SN3837; ConvF(7.72, 7.72, 7.72) @ 1752.6 MHz; Calibrated: 1/28/2019
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn793; Calibrated: 1/15/2019
Phantom: Twin-SAM V4.0 (20deg probe tilt) SUB use; Type: QD 000 P40 CC; Serial: 1403
Measurement SW: DASY52, Version 52.10 (3);SEMCAD X Version 14.6.13 (7474)

Mode: UMTS 1750 Antenna 2b, Body SAR, Back side, High.ch

Area Scan (7x15x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (9x9x8)/Cube 0: Measurement grid: dx=3.8mm, dy=3.8mm, dz=1.4mm; Graded Ratio: 1.4
Reference Value = 26.19 V/m; Power Drift = -0.02 dB
Peak SAR (extrapolated) = 4.38 W/kg
SAR(1 g) = 0.988 W/kg; SAR(10 g) = 0.424 W/kg



0 dB = 2.09 W/kg = 3.20 dBW/kg

DUT: BCGA2230; Type: Tablet Device; Serial: DLXZR033P7GG

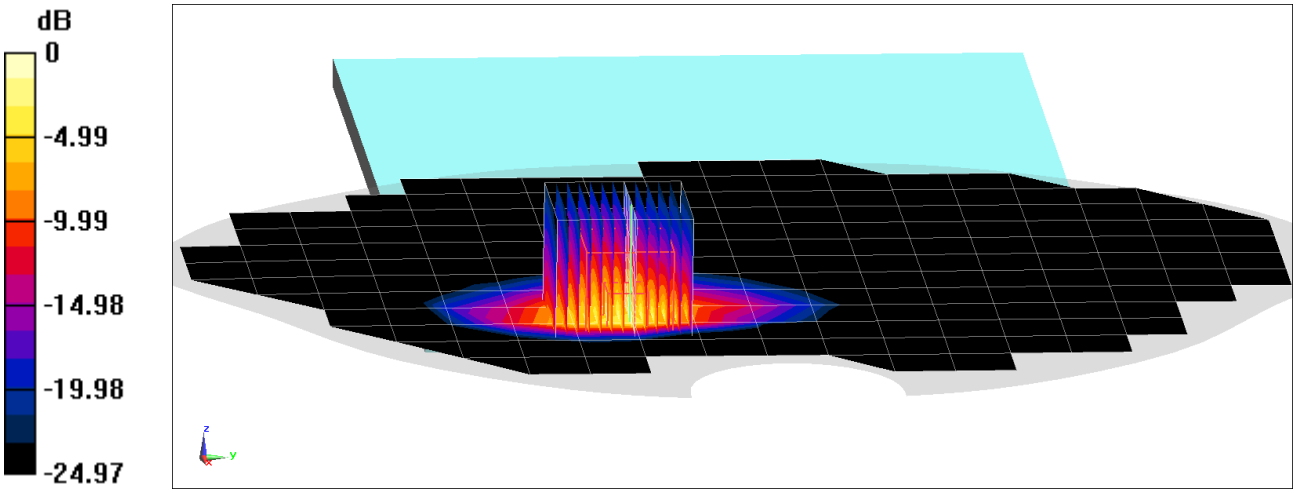
Communication System: UID 0, UMTS, Frequency: 1852.4 MHz; Duty Cycle: 1:1
Medium: 1900 MHz Body Medium parameters used (interpolated):
f = 1852.4 MHz; σ = 1.516 S/m; ε_r = 52.158; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 0.0 cm

Test Date: 01-09-2020; Ambient Temp: 22.7°C; Tissue Temp: 21.1°C

Probe: EX3DV4 - SN7491; ConvF(8.04, 8.04, 8.04) @ 1852.4 MHz; Calibrated: 7/16/2019
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1402; Calibrated: 7/10/2019
Phantom: Twin-SAM V8.0; Type: QD 000 P41 Ax; Serial: 1936
Measurement SW: DASY52, Version 52.10 (3);SEMCAD X Version 14.6.13 (7474)

Mode: UMTS 1900 Antenna 2b, Body SAR, Back side, Low.ch

Area Scan (15x19x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (13x13x8)/Cube 0: Measurement grid: dx=2.8mm, dy=2.8mm, dz=1.4mm; Graded Ratio: 1.4
Reference Value = 25.85 V/m; Power Drift = 0.01 dB
Peak SAR (extrapolated) = 5.09 W/kg
SAR(1 g) = 0.945 W/kg; SAR(10 g) = 0.383 W/kg



0 dB = 2.24 W/kg = 3.50 dBW/kg

DUT: BCGA2230; Type: Tablet Device; Serial: DLXZR031P7GG

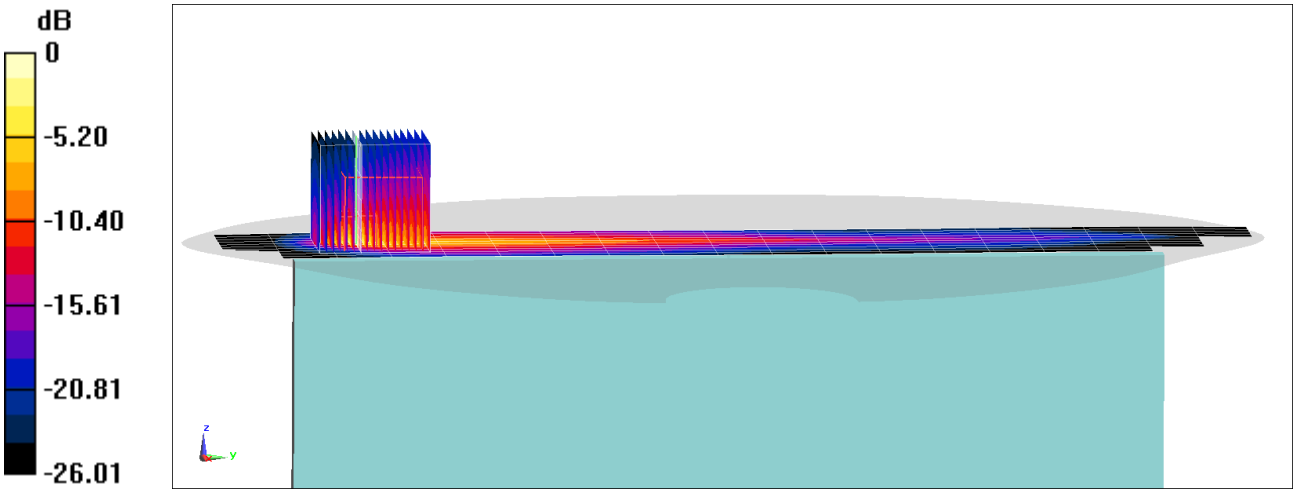
Communication System: UID 0, LTE Band 12; Frequency: 707.5 MHz; Duty Cycle: 1:1
Medium: 750 MHz Body Medium parameters used (interpolated):
f = 707.5 MHz; σ = 0.931 S/m; ε_r = 55.604; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 0.0 cm

Test Date: 01-07-2020; Ambient Temp: 20.5°C; Tissue Temp: 20.5°C

Probe: EX3DV4 - SN7421; ConvF(9.66, 9.66, 9.66) @ 707.5 MHz; Calibrated: 3/18/2019
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn604; Calibrated: 3/13/2019
Phantom: Twin-SAM V4.0; Type: QD 000 P40 CD; Serial: 1736
Measurement SW: DASY52, Version 52.10 (3);SEMCAD X Version 14.6.13 (7474)

Mode: LTE Band 12 Antenna 1, Body SAR, Left Edge, Mid.ch, 10 MHz Bandwidth, QPSK, 1 RB, 0 RB Offset

Area Scan (11x20x1): Measurement grid: dx=5mm, dy=15mm
Zoom Scan (17x20x8)/Cube 0: Measurement grid: dx=1.9mm, dy=1.9mm, dz=1.4mm; Graded Ratio: 1.4
Reference Value = 30.48 V/m; Power Drift = -0.04 dB
Peak SAR (extrapolated) = 24.7 W/kg
SAR(1 g) = 1.05 W/kg; SAR(10 g) = 0.270 W/kg



0 dB = 4.23 W/kg = 6.26 dBW/kg

DUT: BCGA2230; Type: Tablet Device; Serial: DLXZR033P7GG

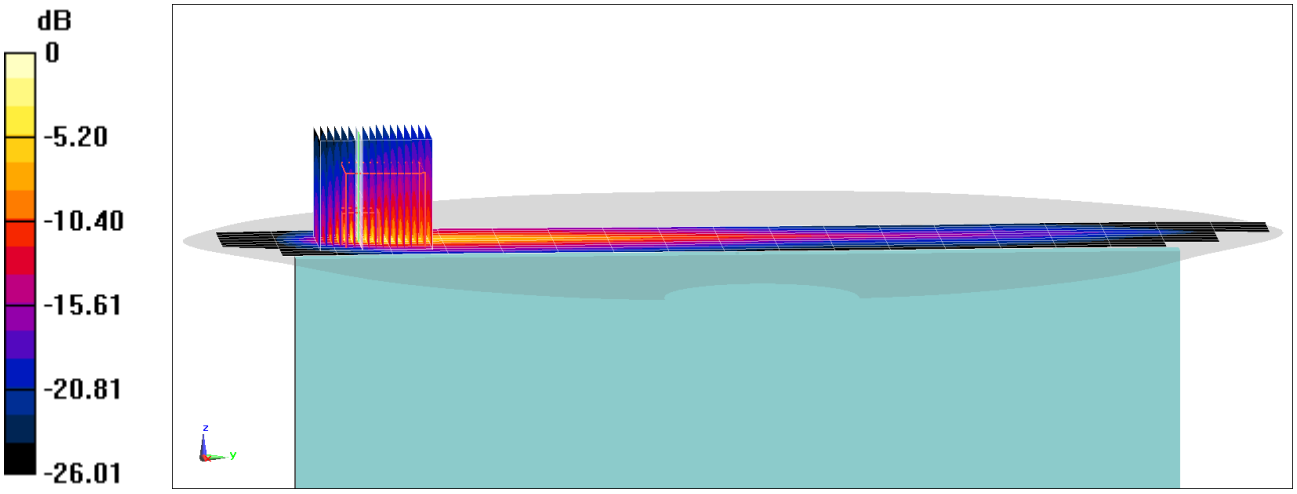
Communication System: UID 0, LTE Band 13; Frequency: 782 MHz; Duty Cycle: 1:1
Medium: 750 MHz Body Medium parameters used (interpolated):
f = 782 MHz; σ = 1.006 S/m; ε_r = 54.77; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 0.0 cm

Test Date: 01-07-2020; Ambient Temp: 20.5°C; Tissue Temp: 20.5°C

Probe: EX3DV4 - SN7421; ConvF(9.66, 9.66, 9.66) @ 782 MHz; Calibrated: 3/18/2019
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn604; Calibrated: 3/13/2019
Phantom: Twin-SAM V4.0; Type: QD 000 P40 CD; Serial: 1736
Measurement SW: DASY52, Version 52.10 (3);SEMCAD X Version 14.6.13 (7474)

Mode: LTE Band 13 Antenna 1, Body SAR, Left Edge, Mid.ch, 10 MHz Bandwidth, QPSK, 1 RB, 0 RB Offset

Area Scan (11x20x1): Measurement grid: dx=5mm, dy=15mm
Zoom Scan (17x17x8)/Cube 0: Measurement grid: dx=1.9mm, dy=1.9mm, dz=1.4mm; Graded Ratio: 1.4
Reference Value = 28.49 V/m; Power Drift = 0.00 dB
Peak SAR (extrapolated) = 19.1 W/kg
SAR(1 g) = 1.09 W/kg; SAR(10 g) = 0.330 W/kg



0 dB = 4.23 W/kg = 6.26 dBW/kg

DUT: BCGA2230; Type: Tablet Device; Serial: DLXZR01LP7GG

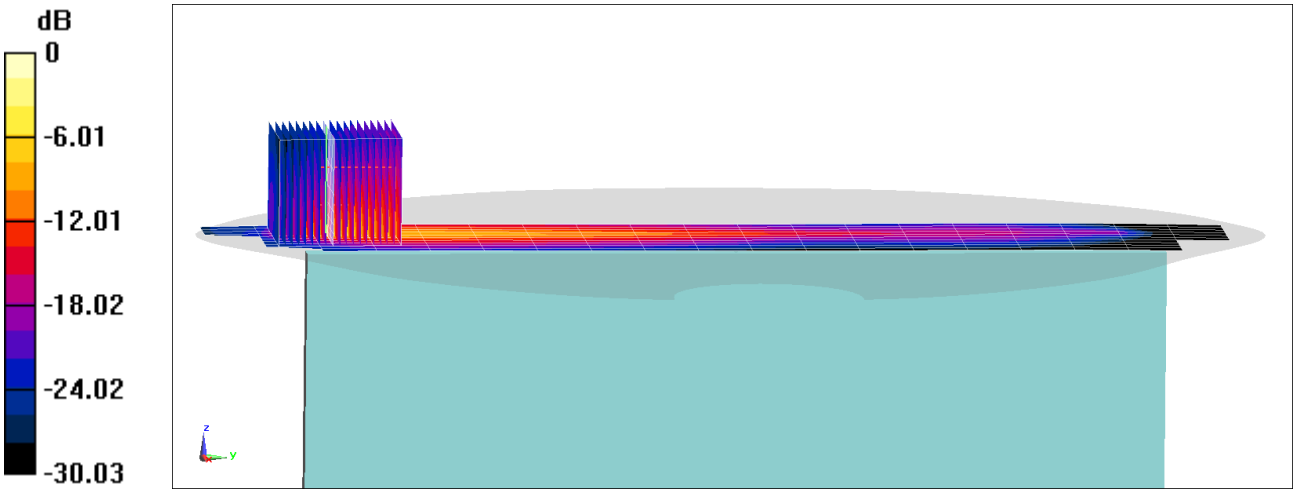
Communication System: UID 0, _LTE Band 26; Frequency: 819 MHz; Duty Cycle: 1:1
Medium: 835 MHz Body Medium parameters used (interpolated):
f = 819 MHz; σ = 0.992 S/m; ε_r = 56.32; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 0.0 cm

Test Date: 01-09-2020; Ambient Temp: 22.0°C; Tissue Temp: 19.8°C

Probe: EX3DV4 - SN7416; ConvF(9.71, 9.71, 9.71) @ 819 MHz; Calibrated: 6/19/2019
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn701; Calibrated: 6/14/2019
Phantom: Twin-SAM V8.0_Left; Type: QD 000 P41 AA; Serial: 1935
Measurement SW: DASY52, Version 52.10 (3);SEMCAD X Version 14.6.13 (7474)

Mode: LTE Band 26 (Cell.) Antenna 1, Body SAR, Left Edge, Low.ch, 10 MHz Bandwidth, QPSK, 25 RB, 12 RB Offset

Area Scan (11x20x1): Measurement grid: dx=5mm, dy=15mm
Zoom Scan (20x19x8)/Cube 0: Measurement grid: dx=1.9mm, dy=1.9mm, dz=1.4mm; Graded Ratio: 1.4
Reference Value = 34.08 V/m; Power Drift = -0.03 dB
Peak SAR (extrapolated) = 24.0 W/kg
SAR(1 g) = 1.1 W/kg; SAR(10 g) = 0.318 W/kg



0 dB = 4.37 W/kg = 6.40 dBW/kg

DUT: BCGA2230; Type: Tablet Device; Serial: DLXZR008P7H9

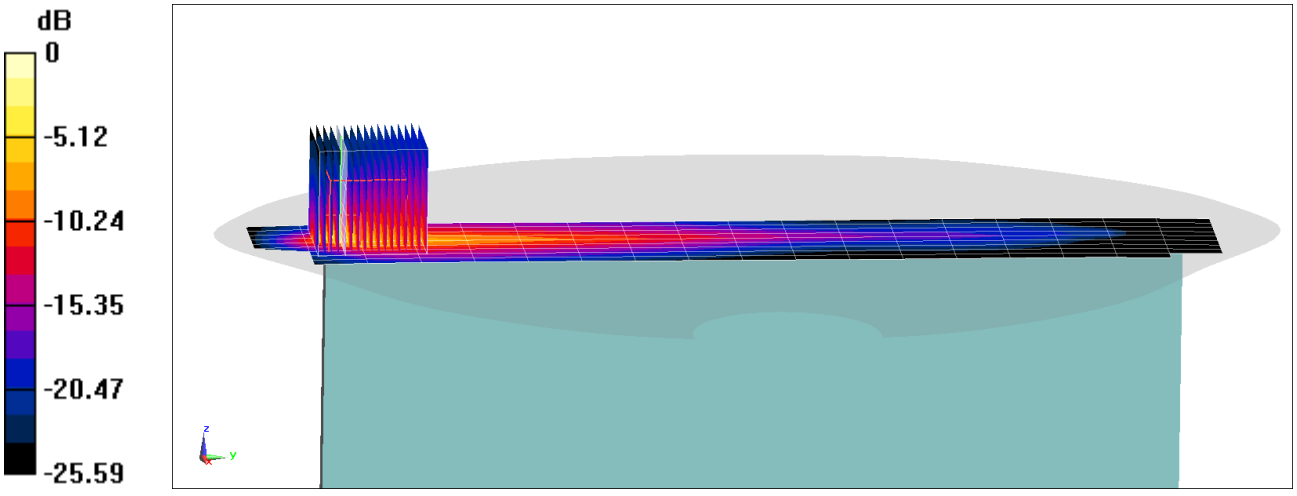
Communication System: UID 0, LTE Band 5; Frequency: 836.5 MHz; Duty Cycle: 1:1
Medium: 835 MHz Body Medium parameters used (interpolated):
f = 836.5 MHz; σ = 1.002 S/m; ε_r = 56; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 0.0 cm

Test Date: 01-09-2020; Ambient Temp: 22.0°C; Tissue Temp: 19.8°C

Probe: EX3DV4 - SN7416; ConvF(9.71, 9.71, 9.71) @ 836.5 MHz; Calibrated: 6/19/2019
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn701; Calibrated: 6/14/2019
Phantom: Twin-SAM V8.0_Left; Type: QD 000 P41 AA; Serial: 1935
Measurement SW: DASY52, Version 52.10 (3);SEMCAD X Version 14.6.13 (7474)

Mode: LTE Band 5 (Cell.) Antenna 1, Body SAR, Left Edge, Mid.ch, 10 MHz Bandwidth, QPSK, 50 RB, 0 RB Offset

Area Scan (10x19x1): Measurement grid: dx=5mm, dy=15mm
Zoom Scan (17x17x7)/Cube 0: Measurement grid: dx=1.9mm, dy=1.9mm, dz=1.4mm; Graded Ratio: 1.4
Reference Value = 25.63 V/m; Power Drift = 0.00 dB
Peak SAR (extrapolated) = 26.1 W/kg
SAR(1 g) = 1.16 W/kg; SAR(10 g) = 0.333 W/kg



0 dB = 4.67 W/kg = 6.69 dBW/kg

DUT: BCGA2230; Type: Tablet Device; Serial: DLXZR026P7GG

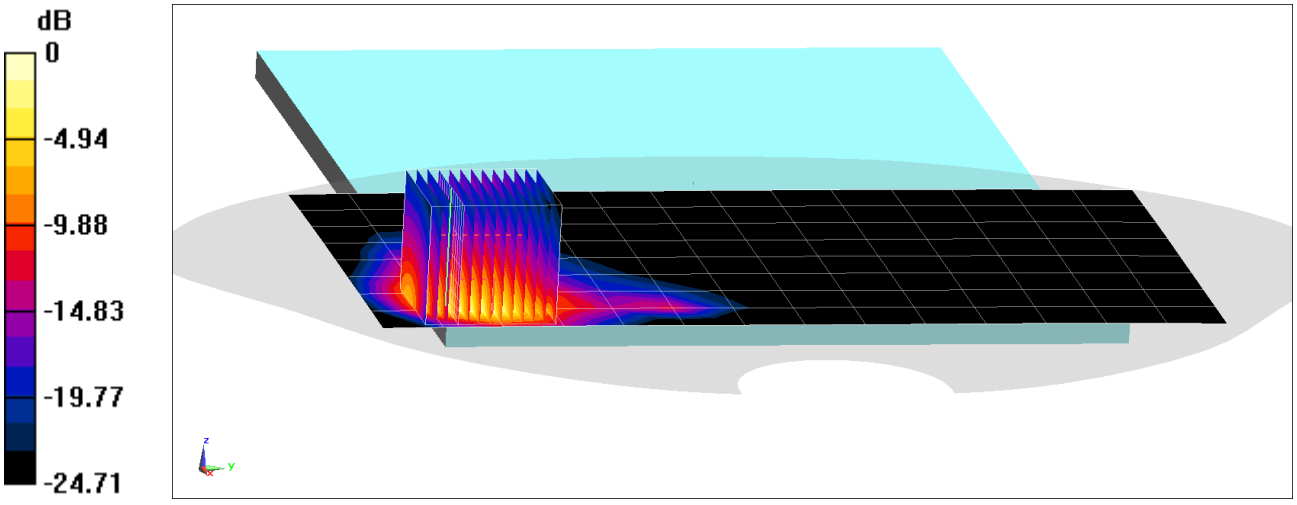
Communication System: UID 0, LTE Band 4 (AWS); Frequency: 1732.5 MHz; Duty Cycle: 1:1
Medium: 1750 MHz Body Medium parameters used (interpolated):
f = 1732.5 MHz; σ = 1.494 S/m; ε_r = 52.164; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 0.0 cm

Test Date: 01-04-2020; Ambient Temp: 19.8°C; Tissue Temp: 19.6°C

Probe: EX3DV4 – SN7416; ConvF(7.89, 7.89, 7.89) @ 1732.5 MHz; Calibrated: 6/19/2019
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn701; Calibrated: 6/14/2019
Phantom: Twin-SAM V8.0_Left; Type: QD 000 P41 AA; Serial: 1935
Measurement SW: DASY52, Version 52.10 (3);SEMCAD X Version 14.6.13 (7474)

Mode: LTE Band 4 (AWS) Antenna 2a, Body SAR, Back side, Mid.ch, 20 MHz Bandwidth, QPSK, 50 RB, 0 RB Offset

Area Scan (9x15x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (13x13x8)/Cube 0: Measurement grid: dx=2.7mm, dy=2.7mm, dz=1.4mm; Graded Ratio: 1.4
Reference Value = 26.81 V/m; Power Drift = -0.05 dB
Peak SAR (extrapolated) = 5.75 W/kg
SAR(1 g) = 1.02 W/kg; SAR(10 g) = 0.481 W/kg



0 dB = 2.44 W/kg = 3.87 dBW/kg

DUT: BCGA2230; Type: Tablet Device; Serial: DLXZR02YP7GG

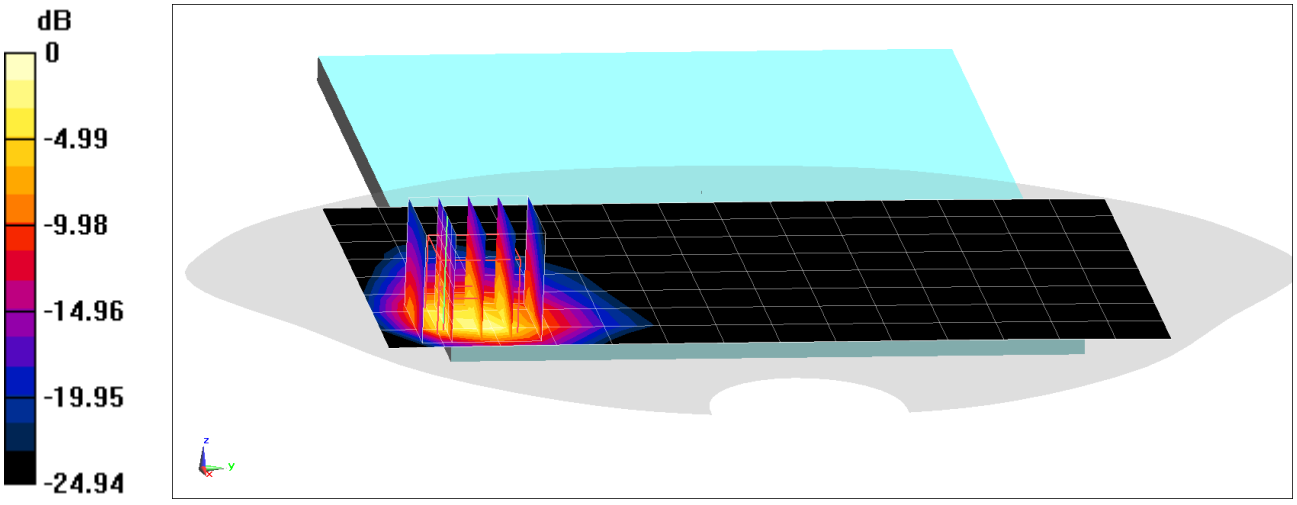
Communication System: UID 0, LTE Band 66 (AWS); Frequency: 1720 MHz; Duty Cycle: 1:1
Medium: 1750 MHz Body Medium parameters used (interpolated):
f = 1720 MHz; σ = 1.481 S/m; ε_r = 52.193; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 0.0 cm

Test Date: 01-04-2020; Ambient Temp: 19.8°C; Tissue Temp: 19.6°C

Probe: EX3DV4 - SN7416; ConvF(7.89, 7.89, 7.89) @ 1720 MHz; Calibrated: 6/19/2019
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn701; Calibrated: 6/14/2019
Phantom: Twin-SAM V8.0_Left; Type: QD 000 P41 AA; Serial: 1935
Measurement SW: DASY52, Version 52.10 (3);SEMCAD X Version 14.6.13 (7474)

Mode: LTE Band 66 (AWS) Antenna 2a, Body SAR, Back side, Low.ch, 20 MHz Bandwidth, QPSK, 1 RB, 0 RB Offset

Area Scan (9x15x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 26.17 V/m; Power Drift = -0.08 dB
Peak SAR (extrapolated) = 3.54 W/kg
SAR(1 g) = 1.03 W/kg; SAR(10 g) = 0.486 W/kg



0 dB = 2.48 W/kg = 3.94 dBW/kg

DUT: BCGA2230; Type: Tablet Device; Serial: DLXZR033P7GG

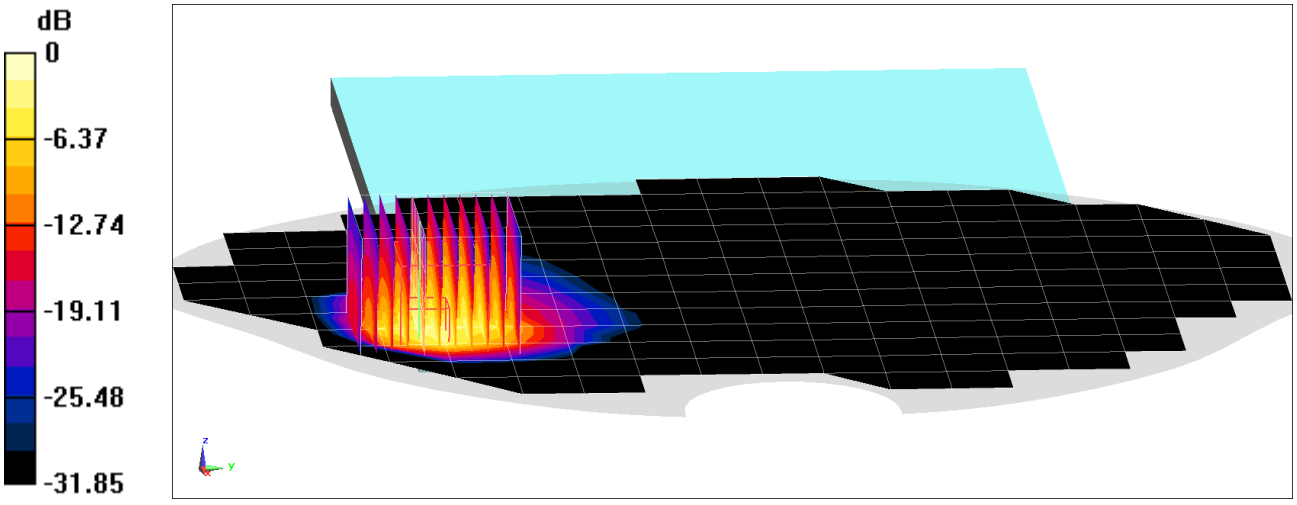
Communication System: UID 0, LTE Band 2 (PCS), Frequency: 1900 MHz; Duty Cycle: 1:1
Medium: 1900 MHz Body Medium parameters used (interpolated):
f = 1900 MHz; σ = 1.491 S/m; ε_r = 51.205; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 0.0 cm

Test Date: 12-30-2019; Ambient Temp: 21.7°C; Tissue Temp: 19.0°C

Probe: EX3DV4 - SN7491; ConvF(8.04, 8.04, 8.04) @ 1900 MHz; Calibrated: 7/16/2019
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1402; Calibrated: 7/10/2019
Phantom: Twin-SAM V8.0; Type: QD 000 P41 Ax; Serial: 1936
Measurement SW: DASY52, Version 52.10 (3);SEMCAD X Version 14.6.13 (7474)

Mode: LTE Band 2 (PCS) Antenna 4a, Body SAR, Back side, High.ch, 20 MHz Bandwidth, QPSK, 100 RB, 0 RB Offset

Area Scan (15x19x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (11x11x8)/Cube 0: Measurement grid: dx=3.9mm, dy=3.9mm, dz=1.4mm; Graded Ratio: 1.4
Reference Value = 25.16 V/m; Power Drift = 0.02 dB
Peak SAR (extrapolated) = 4.83 W/kg
SAR(1 g) = 1.04 W/kg; SAR(10 g) = 0.518 W/kg



0 dB = 2.38 W/kg = 3.77 dBW/kg

DUT: BCGA2230; Type: Tablet Device; Serial: DLXZR026P7GG

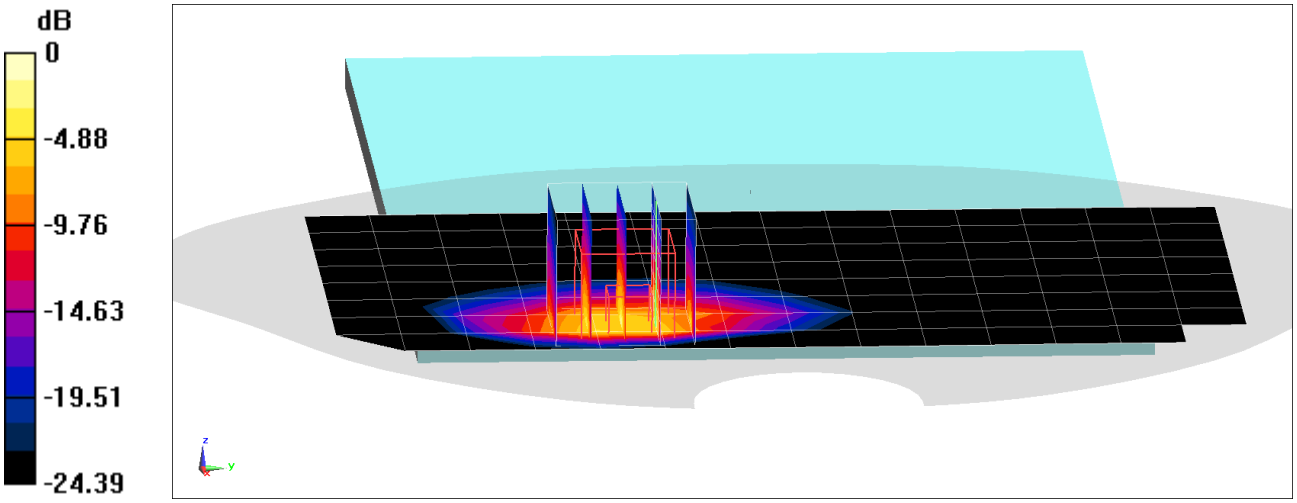
Communication System: UID 0, LTE Band 25 (PCS), Frequency: 1905 MHz; Duty Cycle: 1:1
Medium: 1900 MHz Body Medium parameters used (interpolated):
f = 1905 MHz; σ = 1.497 S/m; ε_r = 51.177; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 0.0 cm

Test Date: 12-30-2019; Ambient Temp: 21.7°C; Tissue Temp: 19.0°C

Probe: EX3DV4 - SN7491; ConvF(8.04, 8.04, 8.04) @ 1905 MHz; Calibrated: 7/16/2019
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1402; Calibrated: 7/10/2019
Phantom: Twin-SAM V8.0; Type: QD 000 P41 Ax; Serial: 1936
Measurement SW: DASY52, Version 52.10 (3);SEMCAD X Version 14.6.13 (7474)

Mode: LTE Band 25 (PCS) Antenna 2b, Body SAR, Back side, High.ch, 20 MHz Bandwidth, QPSK, 100 RB, 0 RB Offset

Area Scan (9x15x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 28.00 V/m; Power Drift = 0.05 dB
Peak SAR (extrapolated) = 3.44 W/kg
SAR(1 g) = 1.09 W/kg; SAR(10 g) = 0.435 W/kg



0 dB = 2.44 W/kg = 3.87 dBW/kg

DUT: BCGA2230; Type: Tablet Device; Serial: DLXZR007P7H9

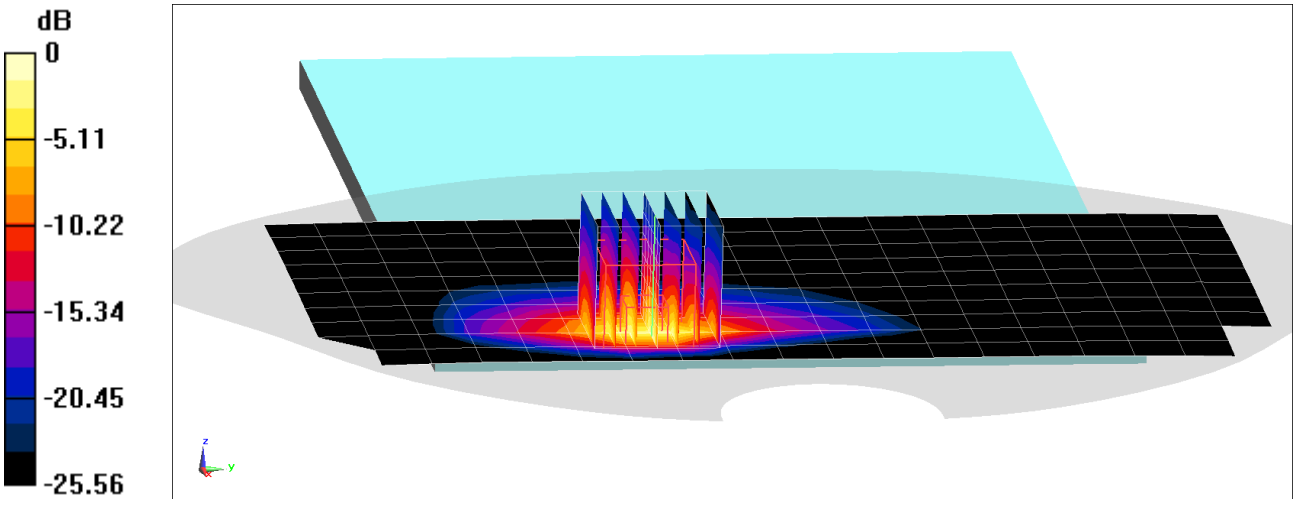
Communication System: UID 0, LTE Band 30; Frequency: 2310 MHz; Duty Cycle: 1:1
Medium: 2450 MHz Body Medium parameters used:
f = 2310 MHz; σ = 1.845 S/m; ε_r = 52.193; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 0.0 cm

Test Date: 01-12-2020; Ambient Temp: 22.1°C; Tissue Temp: 20.1°C

Probe: EX3DV4 - SN7532; ConvF(7.93, 7.93, 7.93) @ 2310 MHz; Calibrated: 4/12/2019
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn501; Calibrated: 4/17/2019
Phantom: Twin-SAM V4.0; Type: QD 000 P40 CC; Serial: 1179
Measurement SW: DASY52, Version 52.10 (3);SEMCAD X Version 14.6.13 (7474)

Mode: LTE Band 30 Antenna 4b, Body SAR, Back side, Mid.ch, 10 MHz Bandwidth, QPSK, 50 RB, 0 RB Offset

Area Scan (11x20x1): Measurement grid: dx=12mm, dy=12mm
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 22.23 V/m; Power Drift = -0.04 dB
Peak SAR (extrapolated) = 3.44 W/kg
SAR(1 g) = 1.09 W/kg; SAR(10 g) = 0.405 W/kg



0 dB = 2.51 W/kg = 4.00 dBW/kg

DUT: BCGA2230; Type: Tablet Device; Serial: DLXZR02YP7GG

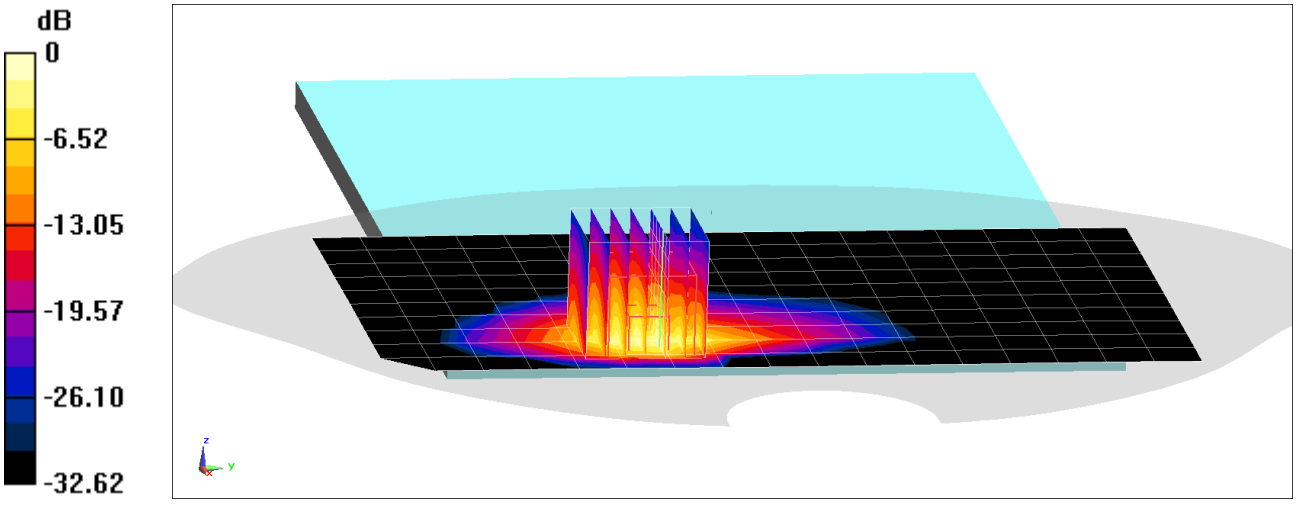
Communication System: UID 0, LTE Band 7; Frequency: 2510 MHz; Duty Cycle: 1:1
Medium: 2450 MHz Body Medium parameters used (interpolated):
f = 2510 MHz; σ = 2.066 S/m; ε_r = 50.841; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 0.0 cm

Test Date: 01-13-2020; Ambient Temp: 23.4°C; Tissue Temp: 19.5°C

Probe: EX3DV4 - SN7491; ConvF(7.57, 7.57, 7.57) @ 2510 MHz; Calibrated: 7/16/2019
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1402; Calibrated: 7/10/2019
Phantom: Twin-SAM V8.0; Type: QD 000 P41 Ax; Serial: 1936
Measurement SW: DASY52, Version 52.10 (3);SEMCAD X Version 14.6.13 (7474)

Mode: LTE Intra-Band ULCA Band 7 Antenna 4b, Body SAR, Back side,
PCC: 20 MHz Bandwidth, QPSK, Ch.20850, 50 RB, 50 RB Offset
SCC: 20 MHz Bandwidth, QPSK, Ch.21048, 50 RB, 0 RB Offset

Area Scan (11x18x1): Measurement grid: dx=12mm, dy=12mm
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 23.52 V/m; Power Drift = 0.00 dB
Peak SAR (extrapolated) = 3.41 W/kg
SAR(1 g) = 1.1 W/kg; SAR(10 g) = 0.405 W/kg



0 dB = 2.37 W/kg = 3.75 dBW/kg

DUT: BCGA2230; Type: Tablet Device; Serial: DLXZR031P7GG

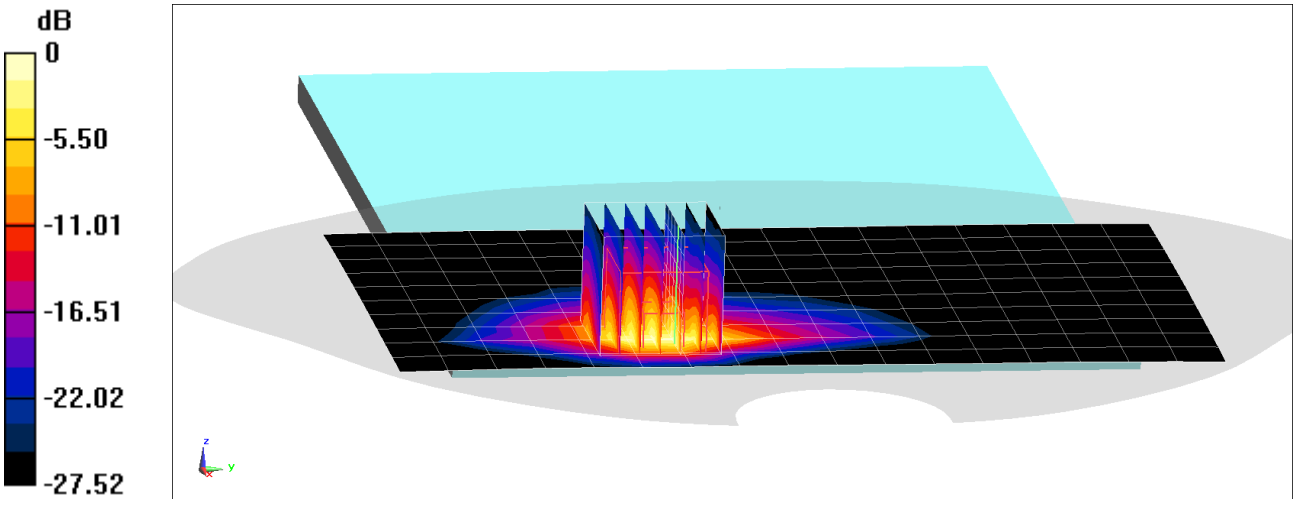
Communication System: UID 0, LTE Band 41 (Class 3); Frequency: 2593 MHz; Duty Cycle: 1:1.58
Medium: 2450 MHz Body Medium parameters used (interpolated):
f = 2593 MHz; σ = 2.252 S/m; ε_r = 52.442; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 0.0 cm

Test Date: 01-01-2020; Ambient Temp: 21.6°C; Tissue Temp: 20.6°C

Probe: EX3DV4 - SN7532; ConvF(7.47, 7.47, 7.47) @ 2593 MHz; Calibrated: 4/12/2019
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn501; Calibrated: 4/17/2019
Phantom: Twin-SAM V4.0; Type: QD 000 P40 CC; Serial: 1179
Measurement SW: DASY52, Version 52.10 (3);SEMCAD X Version 14.6.13 (7474)

Mode: LTE Band 41 Antenna 4b, Body SAR, Back side, Mid.ch, 20 MHz Bandwidth, QPSK, 50 RB, 25 RB Offset

Area Scan (11x18x1): Measurement grid: dx=12mm, dy=12mm
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 23.11 V/m; Power Drift = -0.01 dB
Peak SAR (extrapolated) = 4.03 W/kg
SAR(1 g) = 1.17 W/kg; SAR(10 g) = 0.403 W/kg



0 dB = 2.58 W/kg = 4.12 dBW/kg

DUT: BCGA2230; Type: Tablet Device; Serial: DLXZR033P7GG

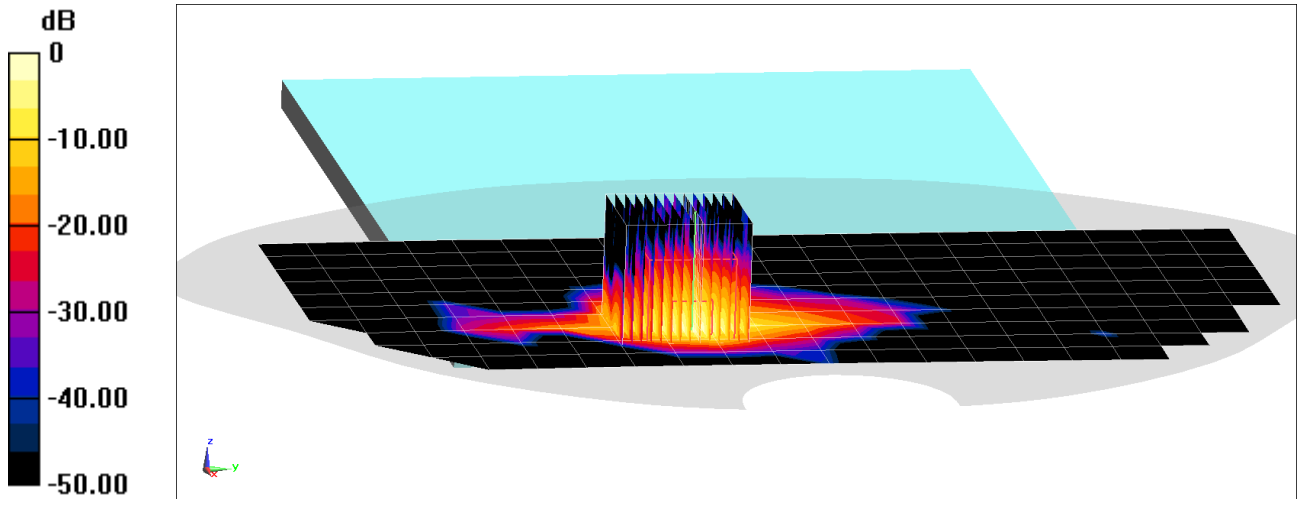
Communication System: UID 0, LTE Band 48; Frequency: 3560 MHz; Duty Cycle: 1:1.58
Medium: 3500 MHz Body Medium parameters used (interpolated):
f = 3560 MHz; σ = 3.488 S/m; ε_r = 49.496; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 0.0 cm

Test Date: 01-04-2020; Ambient Temp: 23.1°C; Tissue Temp: 21.3°C

Probe: EX3DV4 - SN3949; ConvF(6.88, 6.88, 6.88) @ 3560 MHz; Calibrated: 8/29/2019
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1408; Calibrated: 8/12/2019
Phantom: Twin-SAM V4.0; Type: QD 000 P40 CC; Serial: 1596
Measurement SW: DASY52, Version 52.10 (3);SEMCAD X Version 14.6.13 (7474)

Mode: LTE Band 48 Antenna 2b, Body SAR, Back side, Low.ch, 20 MHz Bandwidth, QPSK, 1 RB, 0 RB Offset

Area Scan (11x21x1): Measurement grid: dx=12mm, dy=12mm
Zoom Scan (13x14x8)/Cube 0: Measurement grid: dx=2.4mm, dy=2.4mm, dz=1.4mm; Graded Ratio: 1.4
Reference Value = 18.04 V/m; Power Drift = -0.01 dB
Peak SAR (extrapolated) = 4.93 W/kg
SAR(1 g) = 1.09 W/kg; SAR(10 g) = 0.321 W/kg



0 dB = 3.01 W/kg = 4.79 dBW/kg

DUT: BCGA2230; Type: Tablet Device; Serial: DLXZR01PP7GG

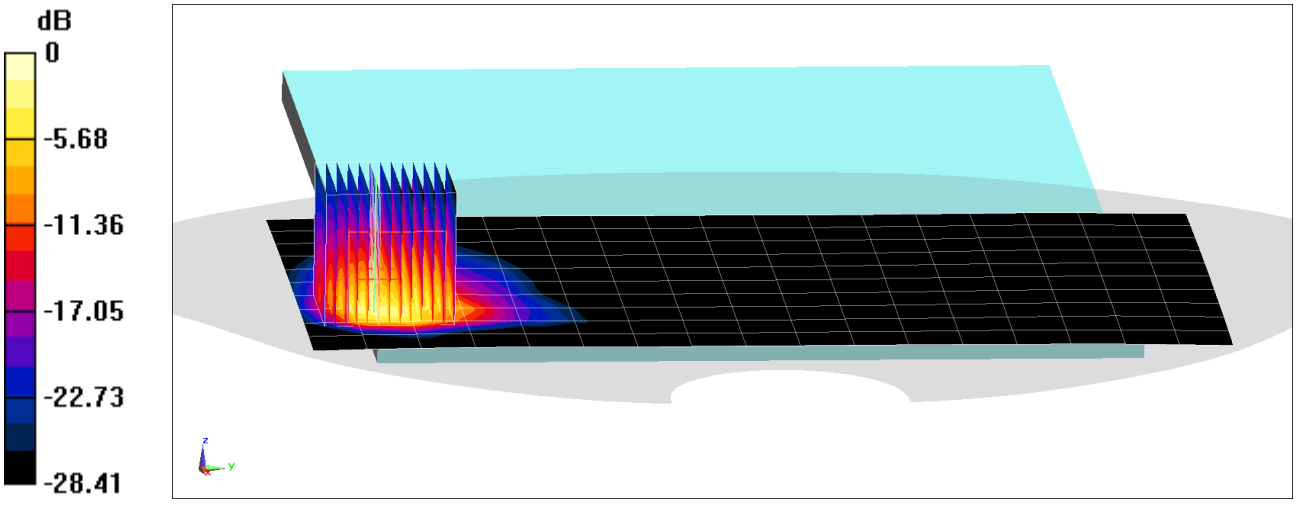
Communication System: UID 0, _IEEE 802.11b; Frequency: 2437 MHz; Duty Cycle: 1:1
Medium: 2450 MHz Body Medium parameters used (interpolated):
f = 2437 MHz; σ = 2.007 S/m; ε_r = 50.72; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 0.0 cm

Test Date: 12-18-2019; Ambient Temp: 20.6°C; Tissue Temp: 21.6°C

Probe: EX3DV4 - SN7532; ConvF(7.66, 7.66, 7.66) @ 2437 MHz; Calibrated: 4/12/2019
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn501; Calibrated: 4/17/2019
Phantom: Twin-SAM V4.0; Type: QD 000 P40 CC; Serial: 1179
Measurement SW: DASY52, Version 52.10 (3);SEMCAD X Version 14.6.13 (7474)

Mode: IEEE 802.11b Antenna 4a Variant 2, 22 MHz Bandwidth, Body SAR, Ch 6, 1 Mbps, Back Side

Area Scan (11x18x1): Measurement grid: dx=12mm, dy=12mm
Zoom Scan (13x13x8)/Cube 0: Measurement grid: dx=2.4mm, dy=2.4mm, dz=1.4mm; Graded Ratio: 1.4
Reference Value = 17.28 V/m; Power Drift = -0.12 dB
Peak SAR (extrapolated) = 4.30 W/kg
SAR(1 g) = 0.849 W/kg; SAR(10 g) = 0.346 W/kg



0 dB = 2.35 W/kg = 3.71 dBW/kg

DUT: BCGA2230; Type: Tablet Device; Serial: DLXZR01PP7GG

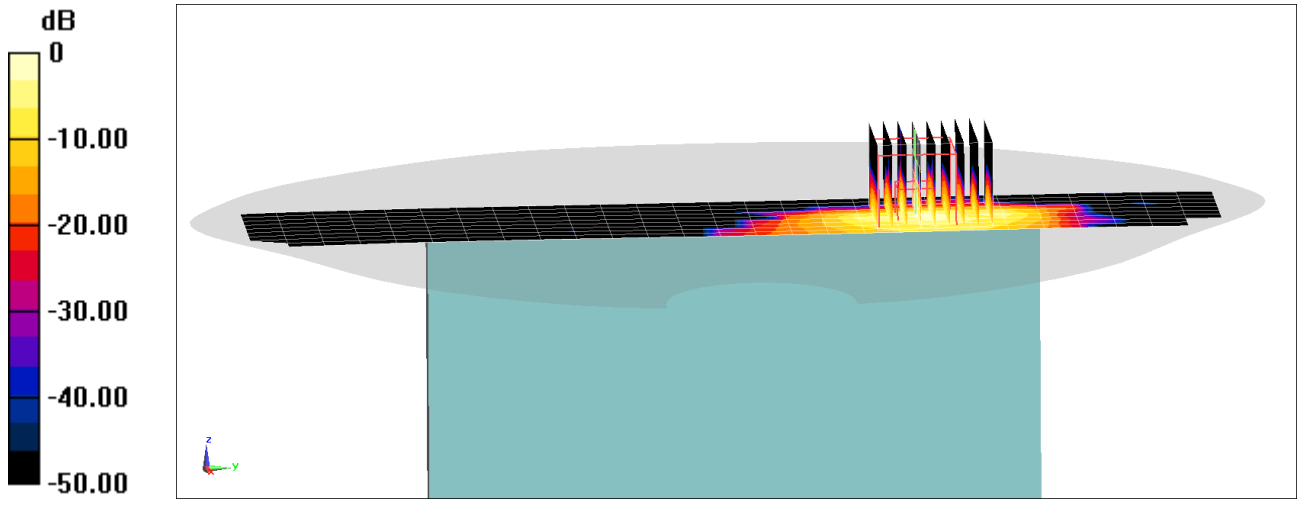
Communication System: UID 0, _IEEE 802.11ac; Frequency: 5690 MHz; Duty Cycle: 1:1
Medium: 5 GHz Body Medium parameters used (interpolated):
f = 5690 MHz; σ = 5.793 S/m; ε_r = 47.691; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 0.0 cm

Test Date: 12-16-2019; Ambient Temp: 22.7°C; Tissue Temp: 19.0°C

Probe: EX3DV4 - SN7491; ConvF(4.32, 4.32, 4.32) @ 5690 MHz; Calibrated: 7/16/2019
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1402; Calibrated: 7/10/2019
Phantom: Twin-SAM V8.0; Type: QD 000 P41 Ax; Serial: 1936
Measurement SW: DASY52, Version 52.10 (3);SEMCAD X Version 14.6.13 (7474)

Mode: IEEE 802.11ac 5GHz ANTlower Variant 2 , U-NII-2C, 80 MHz Bandwidth, Body SAR, Ch 138, 29.3 Mbps, Right Edge

Area Scan (10x28x1): Measurement grid: dx=5mm, dy=10mm
Zoom Scan (9x9x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm; Graded Ratio: 1.4
Reference Value = 11.07 V/m; Power Drift = 0.17 dB
Peak SAR (extrapolated) = 5.00 W/kg
SAR(1 g) = 0.910 W/kg; SAR(10 g) = 0.233 W/kg



0 dB = 2.73 W/kg = 4.36 dBW/kg

DUT: BCGA2230; Type: Tablet Device; Serial: DLXZN001P7GH

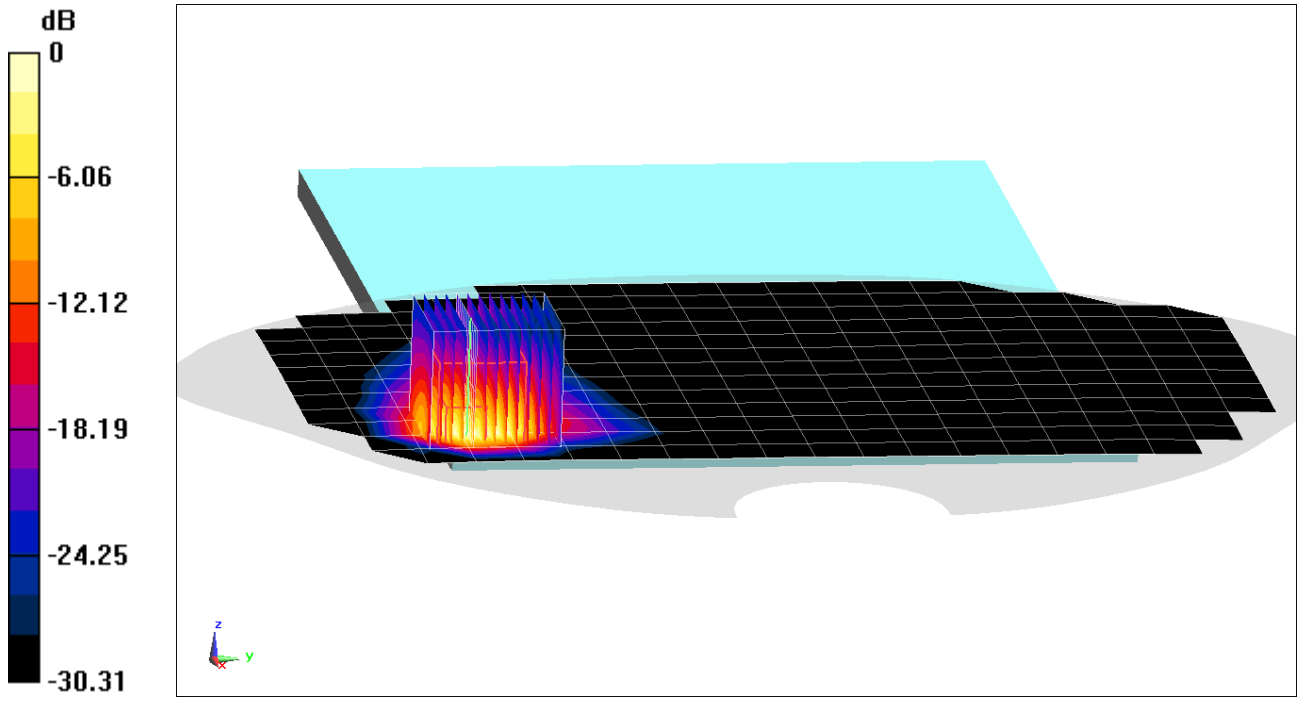
Communication System: UID 0, Bluetooth; Frequency: 2480 MHz; Duty Cycle: 1:1.302
Medium: 2450 MHz Body Medium parameters used (interpolated):
f = 2480 MHz; σ = 1.992 S/m; ε_r = 50.709; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 0.0 cm

Test Date: 01-14-2020; Ambient Temp: 22.1°C; Tissue Temp: 21.0°C

Probe: EX3DV4 - SN7532; ConvF(7.66, 7.66, 7.66) @ 2480 MHz; Calibrated: 4/12/2019
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn501; Calibrated: 4/17/2019
Phantom: Twin-SAM V4.0; Type: QD 000 P40 CC; Serial: 1179
Measurement SW: DASY52, Version 52.10 (3);SEMCAD X Version 14.6.13 (7474)

Mode: Bluetooth Antenna 2a Variant 1, Body SAR, Ch 78, 1 Mbps, Back Side

Area Scan (14x21x1): Measurement grid: dx=12mm, dy=12mm
Zoom Scan (13x13x8)/Cube 0: Measurement grid: dx=2.7mm, dy=2.7mm, dz=1.4mm; Graded Ratio: 1.4
Reference Value = 20.11 V/m; Power Drift = 0.02 dB
Peak SAR (extrapolated) = 4.68 W/kg
SAR(1 g) = 1.05 W/kg; SAR(10 g) = 0.442 W/kg



0 dB = 2.67 W/kg = 4.27 dBW/kg

APPENDIX B: SYSTEM VERIFICATION

PCTEST

DUT: Dipole 750 MHz; Type: D750V3; Serial: 1097

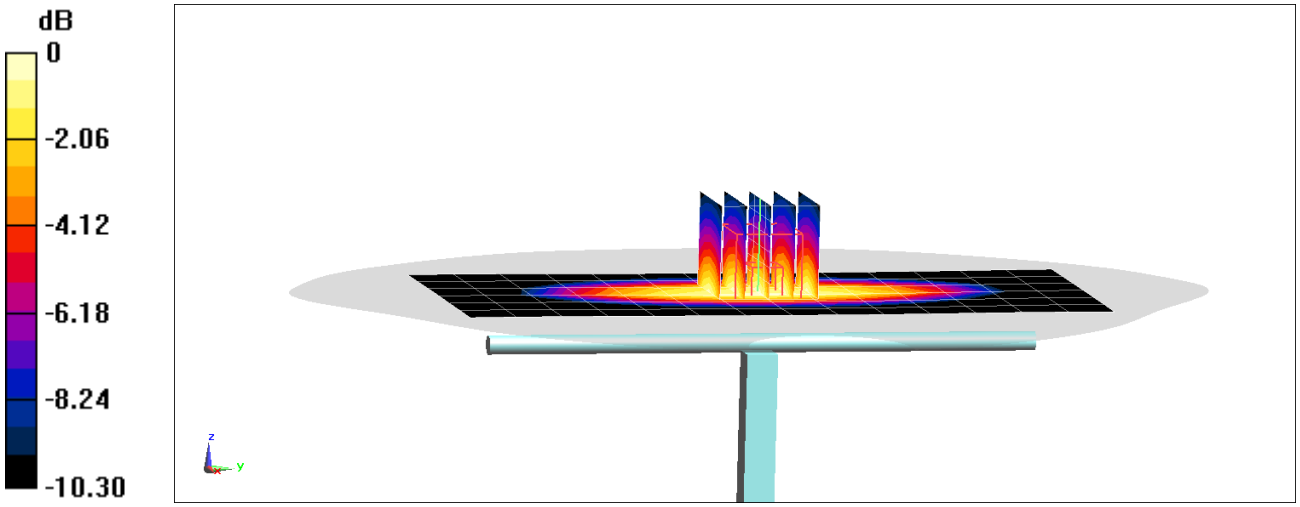
Communication System: UID 0, CW; Frequency: 750 MHz; Duty Cycle: 1:1
Medium: 750 MHz Body Medium parameters used (interpolated):
f = 750 MHz; σ = 0.976 S/m; ε_r = 54.862; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.5 cm

Test Date: 01-07-2020; Ambient Temp: 20.5°C; Tissue Temp: 20.5°C

Probe: EX3DV4 - SN7421; ConvF(9.66, 9.66, 9.66) @ 750 MHz; Calibrated: 3/18/2019
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn604; Calibrated: 3/13/2019
Phantom: Twin-SAM V4.0; Type: QD 000 P40 CD; Serial: 1736
Measurement SW: DASY52, Version 52.10 (3);SEMCAD X Version 14.6.13 (7474)

750 MHz System Verification at 23.0 dBm (200 mW)

Area Scan (7x15x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Peak SAR (extrapolated) = 2.65 W/kg
SAR(1 g) = 1.76 W/kg; SAR(10 g) = 1.16 W/kg
Deviation(1 g) = 2.80%



0 dB = 2.34 W/kg = 3.69 dBW/kg

PCTEST

DUT: Dipole 835 MHz; Type: D835V2; Serial: 4d040

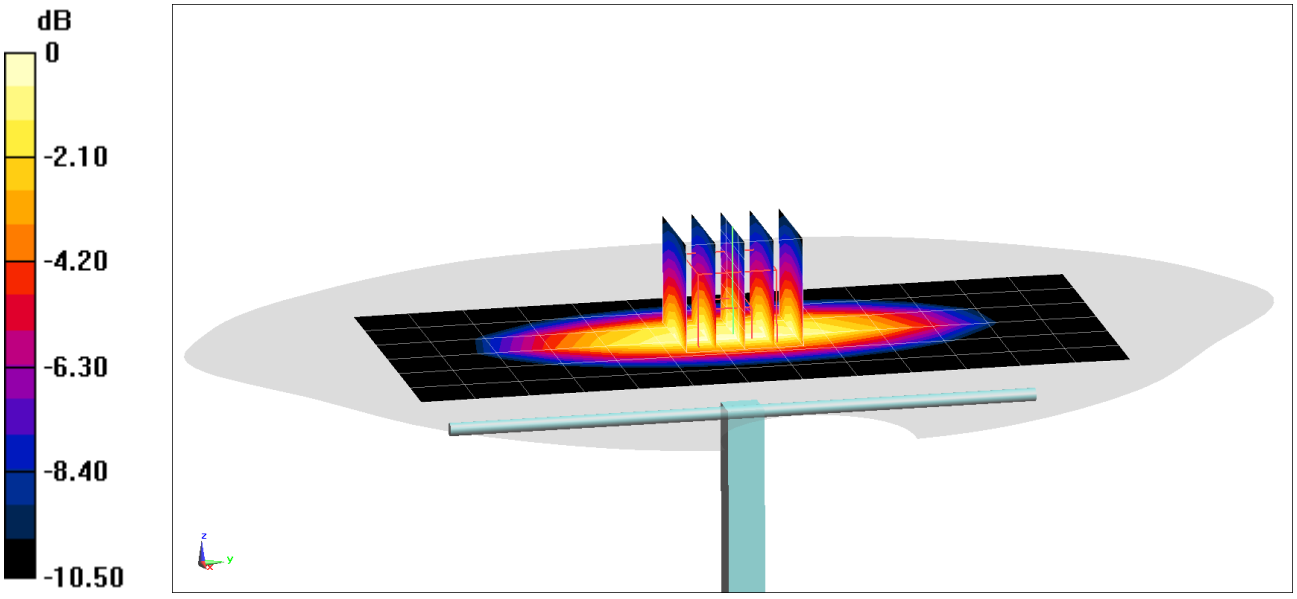
Communication System: UID 0, CW; Frequency: 835 MHz; Duty Cycle: 1:1
Medium: 835 MHz Body Medium parameters used:
f = 835 MHz; σ = 1.001 S/m; ε_r = 56.021; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.5 cm

Test Date: 01-09-2020; Ambient Temp: 22.0°C; Tissue Temp: 19.8°C

Probe: EX3DV4 - SN7416; ConvF(9.71, 9.71, 9.71) @ 835 MHz; Calibrated: 6/19/2019
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn701; Calibrated: 6/14/2019
Phantom: Twin-SAM V8.0_Left; Type: QD 000 P41 AA; Serial: 1935
Measurement SW: DASY52, Version 52.10 (3);SEMCAD X Version 14.6.13 (7474)

835 MHz System Verification at 23.0 dBm (200 mW)

Area Scan (7x14x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Peak SAR (extrapolated) = 2.85 W/kg
SAR(1 g) = 1.89 W/kg; SAR(10 g) = 1.24 W/kg
Deviation(1 g) = -0.84%



0 dB = 2.52 W/kg = 4.01 dBW/kg

PCTEST

DUT: Dipole 1750 MHz; Type: D1750V2; Serial: 1092

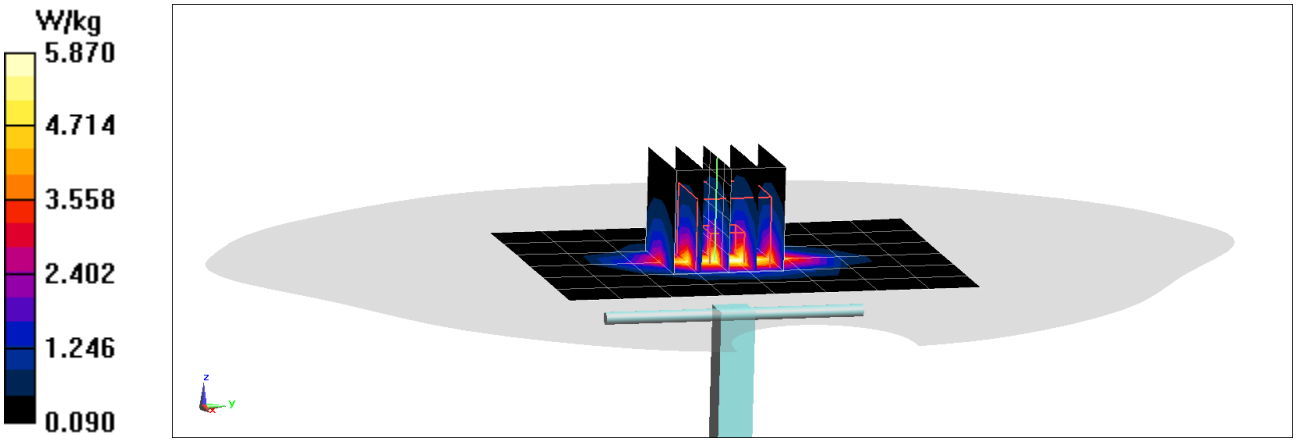
Communication System: UID 0, CW; Frequency: 1750 MHz; Duty Cycle: 1:1
Medium: 1750 MHz Body Medium parameters used:
f = 1750 MHz; σ = 1.525 S/m; ε_r = 52.685; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 12-30-2019; Ambient Temp: 21.4°C; Tissue Temp: 20.0°C

Probe: EX3DV4 - SN3837; ConvF(7.72, 7.72, 7.72) @ 1750 MHz; Calibrated: 1/28/2019
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn793; Calibrated: 1/15/2019
Phantom: Twin-SAM V4.0 (20deg probe tilt) SUB use; Type: QD 000 P40 CC; Serial: 1403
Measurement SW: DASY52, Version 52.10 (3);SEMCAD X Version 14.6.13 (7474)

1750 MHz System Verification at 20.0 dBm (100 mW)

Area Scan (7x9x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Peak SAR (extrapolated) = 7.08 W/kg
SAR(1 g) = 3.91 W/kg; SAR(10 g) = 2.04 W/kg
Deviation(1 g) = 7.42%



DUT: Dipole 1750 MHz; Type: D1750V2; Serial: 1083

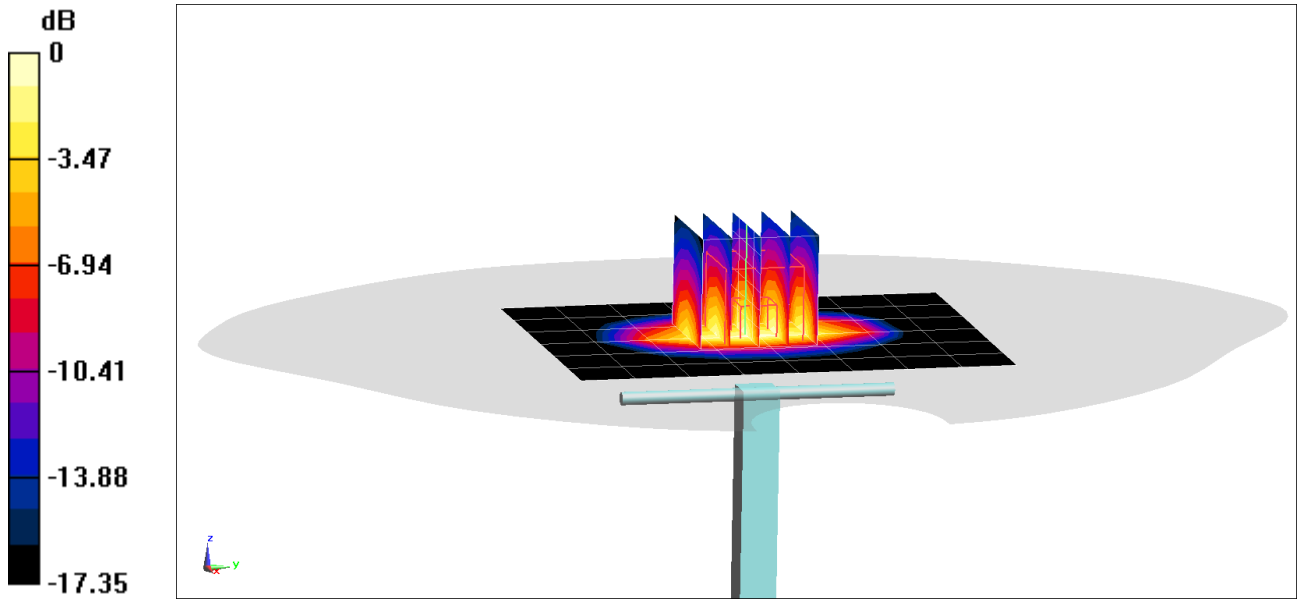
Communication System: UID 0, CW; Frequency: 1750 MHz; Duty Cycle: 1:1
Medium: 1750 MHz Body Medium parameters used:
f = 1750 MHz; σ = 1.513 S/m; ε_r = 52.124; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 01-04-2020; Ambient Temp: 19.8°C; Tissue Temp: 19.6°C

Probe: EX3DV4 - SN7416; ConvF(7.89, 7.89, 7.89) @ 1750 MHz; Calibrated: 6/19/2019
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn701; Calibrated: 6/14/2019
Phantom: Twin-SAM V8.0_Left; Type: QD 000 P41 AA; Serial: 1935
Measurement SW: DASY52, Version 52.10 (3);SEMCAD X Version 14.6.13 (7474)

1750 MHz System Verification at 20.0 dBm (100 mW)

Area Scan (7x9x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Peak SAR (extrapolated) = 7.12 W/kg
SAR(1 g) = 3.97 W/kg; SAR(10 g) = 2.11 W/kg
Deviation(1 g) = 7.01%



0 dB = 5.98 W/kg = 7.77 dBW/kg

DUT: Dipole 1900 MHz; Type: D1900V2; Serial: 5d026

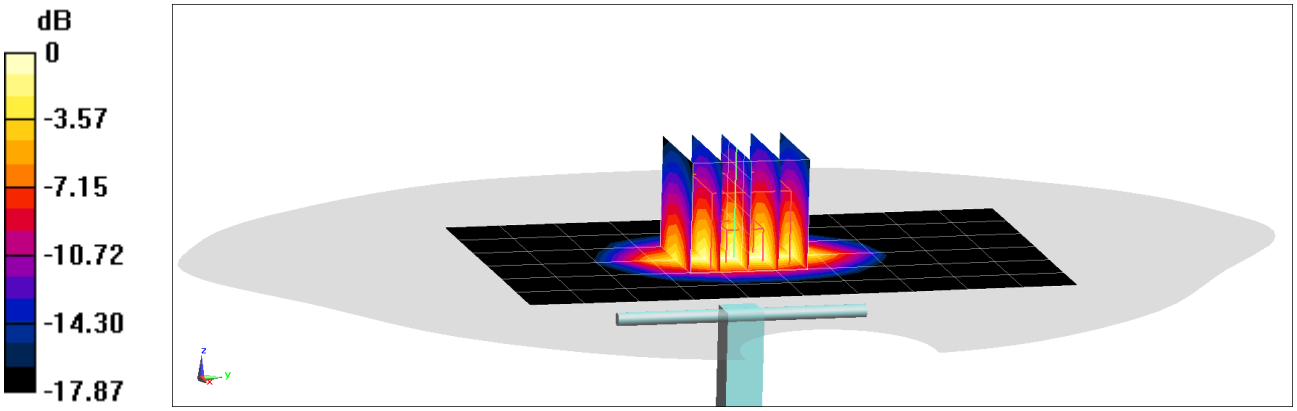
Communication System: UID 0, CW; Frequency: 1900 MHz; Duty Cycle: 1:1
Medium: 1900 MHz Body Medium parameters used (interpolated):
f = 1900 MHz; σ = 1.491 S/m; ε_r = 51.205; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 12-30-2019; Ambient Temp: 21.7°C; Tissue Temp: 19.0°C

Probe: EX3DV4 - SN7491; ConvF(8.04, 8.04, 8.04) @ 1900 MHz; Calibrated: 7/16/2019
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1402; Calibrated: 7/10/2019
Phantom: Twin-SAM V8.0; Type: QD 000 P41 Ax; Serial: 1936
Measurement SW: DASY52, Version 52.10 (3);SEMCAD X Version 14.6.13 (7474)

1900 MHz System Verification at 20.0 dBm (100 mW)

Area Scan (7x11x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Peak SAR (extrapolated) = 7.60 W/kg
SAR(1 g) = 4.18 W/kg; SAR(10 g) = 2.17 W/kg
Deviation(1 g) = 4.76%



0 dB = 6.39 W/kg = 8.06 dBW/kg

DUT: Dipole 1900 MHz; Type: D1900V2; Serial: 5d181

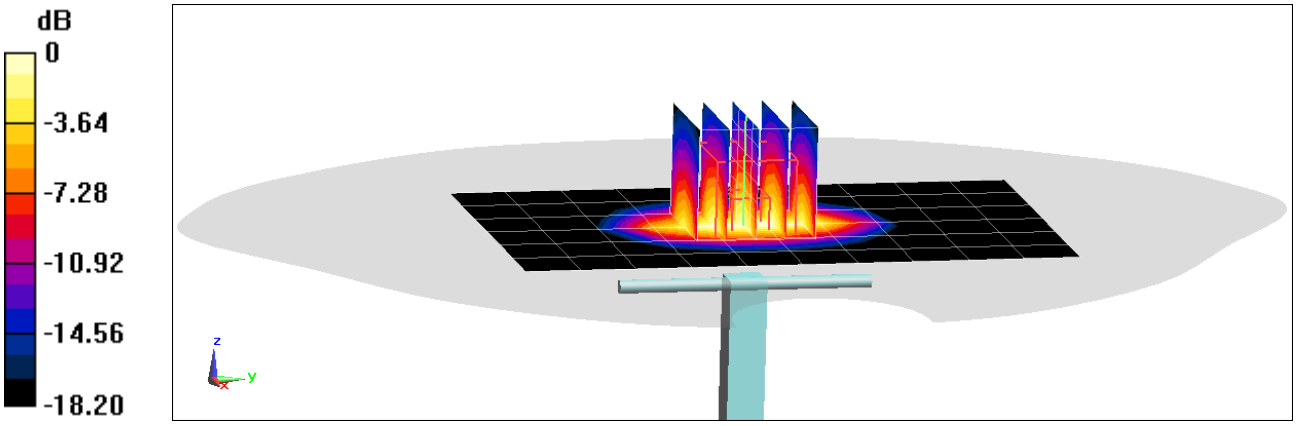
Communication System: UID 0, CW; Frequency: 1900 MHz; Duty Cycle: 1:1
Medium: 1900 MHz Body Medium parameters used (interpolated):
f = 1900 MHz; σ = 1.574 S/m; ε_r = 51.734; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 01-09-2020; Ambient Temp: 22.7°C; Tissue Temp: 21.1°C

Probe: EX3DV4 - SN7491; ConvF(8.04, 8.04, 8.04) @ 1900 MHz; Calibrated: 7/16/2019
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1402; Calibrated: 7/10/2019
Phantom: Twin-SAM V8.0; Type: QD 000 P41 Ax; Serial: 1936
Measurement SW: DASY52, Version 52.10 (3);SEMCAD X Version 14.6.13 (7474)

1900 MHz System Verification at 20.0 dBm (100 mW)

Area Scan (7x11x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Peak SAR (extrapolated) = 7.45 W/kg
SAR(1 g) = 3.96 W/kg; SAR(10 g) = 2.04 W/kg
Deviation(1 g) = 0.25%



0 dB = 6.20 W/kg = 7.92 dBW/kg

DUT: Dipole 1900 MHz; Type: D1900V2; Serial: 5d026

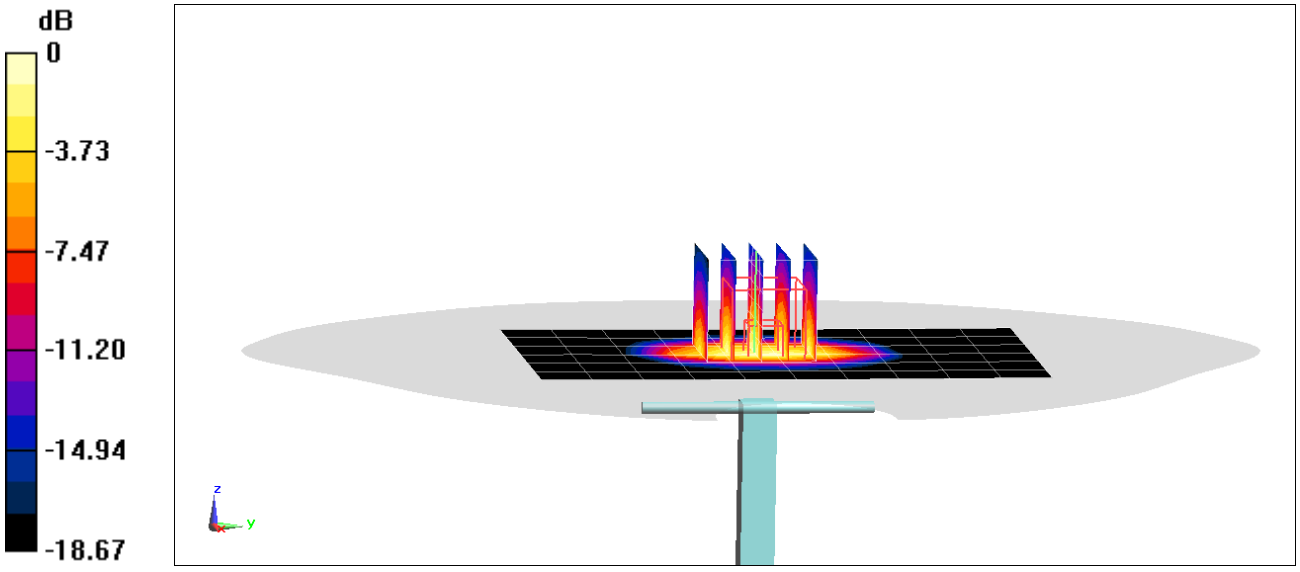
Communication System: UID 0, CW; Frequency: 1900 MHz; Duty Cycle: 1:1
Medium: 1900 MHz Body Medium parameters used (interpolated):
f = 1900 MHz; σ = 1.575 S/m; ε_r = 52.977; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 01-13-2020; Ambient Temp: 21.1°C; Tissue Temp: 19.7°C

Probe: EX3DV4 - SN7421; ConvF(7.6, 7.6, 7.6) @ 1900 MHz; Calibrated: 3/18/2019
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn604; Calibrated: 3/13/2019
Phantom: Twin-SAM V4.0; Type: QD 000 P40 CD; Serial: 1736
Measurement SW: DASY52, Version 52.10 (3);SEMCAD X Version 14.6.13 (7474)

1900 MHz System Verification at 20.0 dBm (100 mW)

Area Scan (7x11x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Peak SAR (extrapolated) = 7.51 W/kg
SAR(1 g) = 4.08 W/kg; SAR(10 g) = 2.11 W/kg
Deviation(1 g) = 2.26%



0 dB = 6.29 W/kg = 7.99 dBW/kg

PCTEST

DUT: Dipole 2300 MHz; Type: D2300V3; Serial: 1038

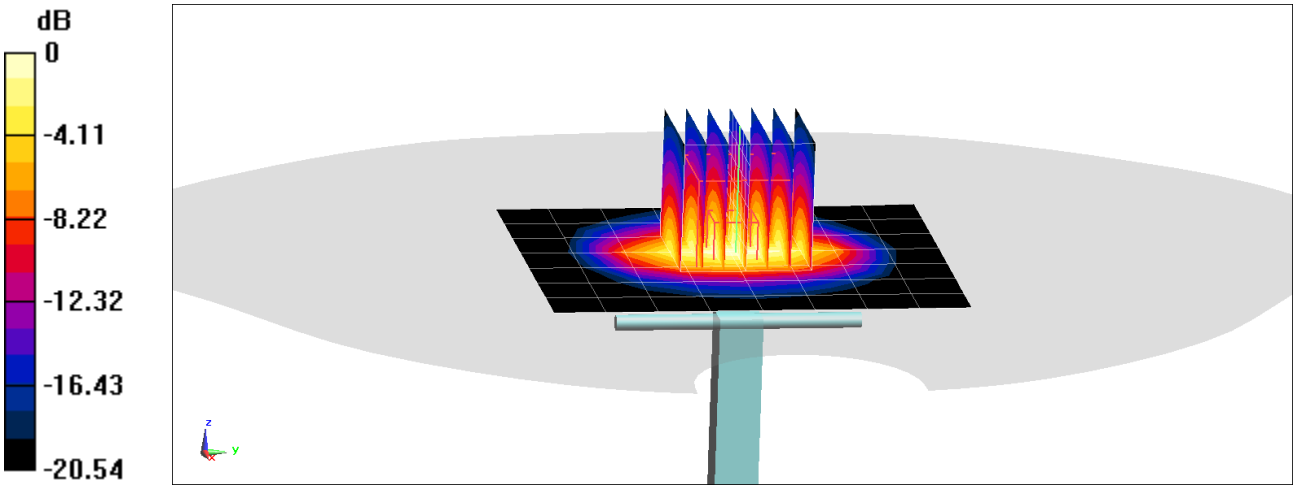
Communication System: UID 0, CW; Frequency: 2300 MHz; Duty Cycle: 1:1
Medium: 2300 MHz Body Medium parameters used:
f = 2300 MHz; σ = 1.833 S/m; ε_r = 52.242; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 01-12-2020; Ambient Temp: 22.1°C; Tissue Temp: 20.1°C

Probe: EX3DV4 - SN7532; ConvF(7.93, 7.93, 7.93) @ 2300 MHz; Calibrated: 4/12/2019
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn501; Calibrated: 4/17/2019
Phantom: Twin-SAM V4.0; Type: QD 000 P40 CC; Serial: 1179
Measurement SW: DASY52, Version 52.10 (3);SEMCAD X Version 14.6.13 (7474)

2300 MHz System Verification at 20.0 dBm (100 mW)

Area Scan (8x9x1): Measurement grid: dx=12mm, dy=12mm
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Peak SAR (extrapolated) = 8.90 W/kg
SAR(1 g) = 4.47 W/kg; SAR(10 g) = 2.12 W/kg
Deviation(1 g) = -4.28%



0 dB = 7.30 W/kg = 8.63 dBW/kg

DUT: Dipole 2450 MHz; Type: D2450V2; Serial: 921

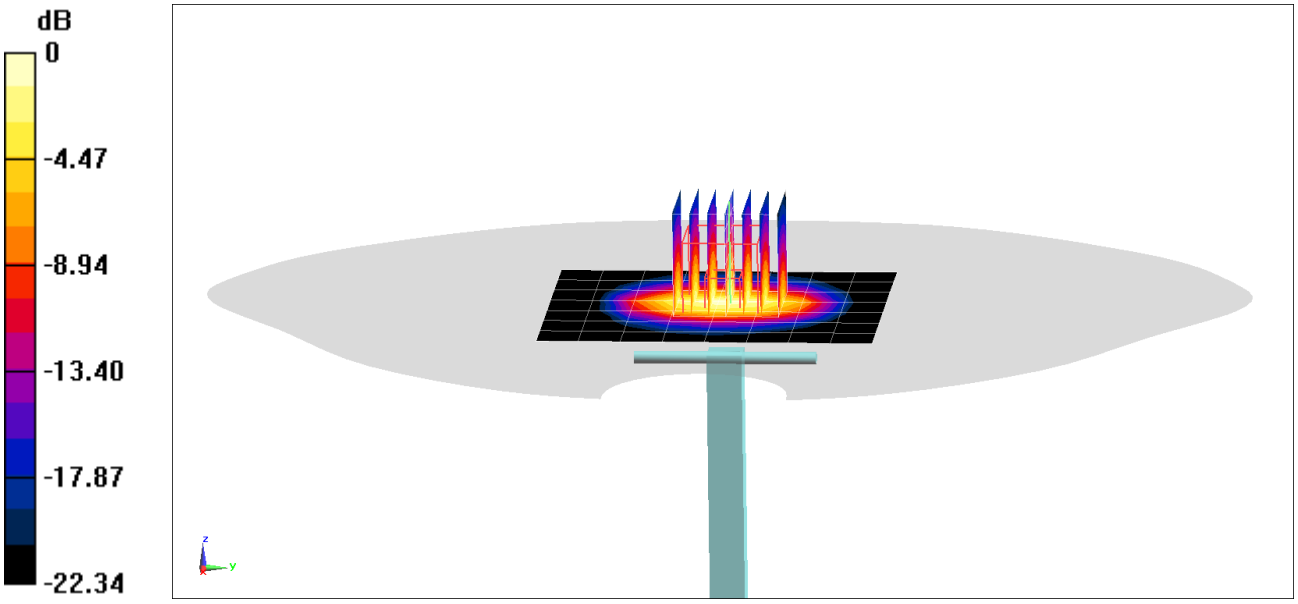
Communication System: UID 0, CW; Frequency: 2450 MHz; Duty Cycle: 1:1
Medium: 2450 MHz Body Medium parameters used:
f = 2450 MHz; σ = 2.022 S/m; ε_r = 50.678; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 12-18-2019; Ambient Temp: 20.6°C; Tissue Temp: 21.6°C

Probe: EX3DV4 - SN7532; ConvF(7.66, 7.66, 7.66) @ 2450 MHz; Calibrated: 4/12/2019
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn501; Calibrated: 4/17/2019
Phantom: Twin-SAM V4.0; Type: QD 000 P40 CC; Serial: 1179
Measurement SW: DASY52, Version 52.10 (3);SEMCAD X Version 14.6.13 (7474)

2450 MHz System Verification at 20.0 dBm (100 mW)

Area Scan (8x9x1): Measurement grid: dx=12mm, dy=12mm
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Peak SAR (extrapolated) = 10.9 W/kg
SAR(1 g) = 5.32 W/kg; SAR(10 g) = 2.45 W/kg
Deviation(1 g) = 4.72%



0 dB = 8.82 W/kg = 9.45 dBW/kg

PCTEST

DUT: Dipole 2450 MHz; Type: D2450V2; Serial: 945

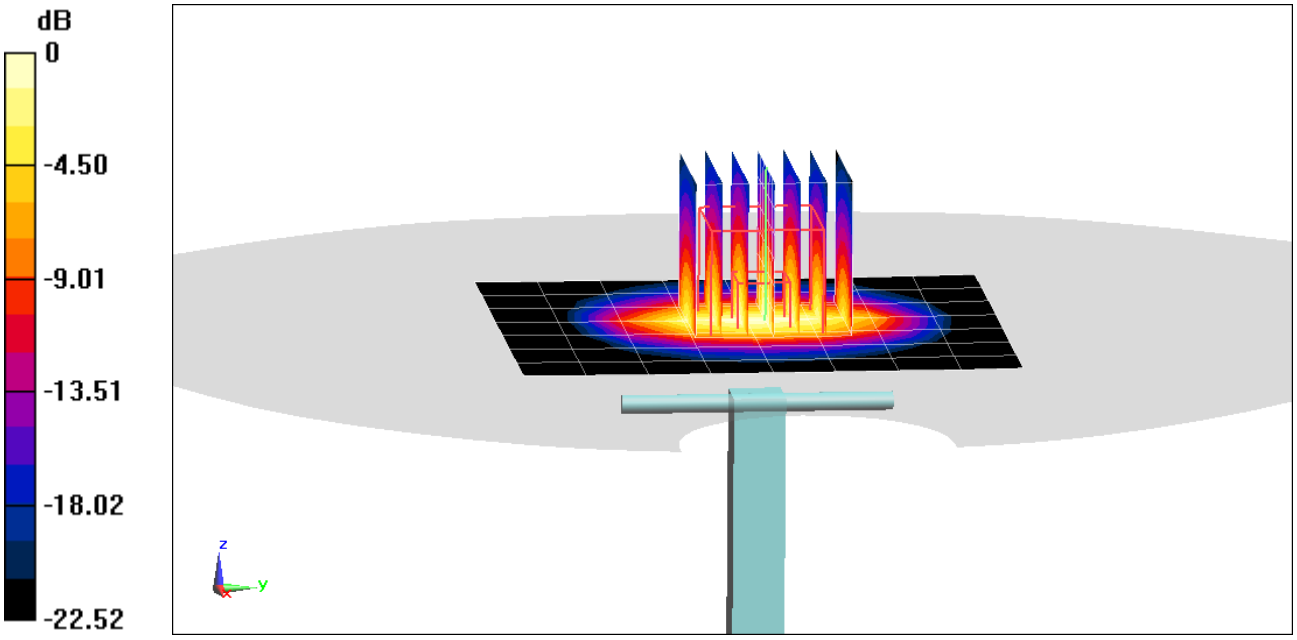
Communication System: UID 0, CW; Frequency: 2450 MHz; Duty Cycle: 1:1
Medium: 2450 MHz Body Medium parameters used:
f = 2450 MHz; σ = 2.045 S/m; ε_r = 53.045; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 01-01-2020; Ambient Temp: 21.6°C; Tissue Temp: 20.6°C

Probe: EX3DV4 - SN7532; ConvF(7.66, 7.66, 7.66) @ 2450 MHz; Calibrated: 4/12/2019
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn501; Calibrated: 4/17/2019
Phantom: Twin-SAM V4.0; Type: QD 000 P40 CC; Serial: 1179
Measurement SW: DASY52, Version 52.10 (3);SEMCAD X Version 14.6.13 (7474)

2450 MHz System Verification at 20.0 dBm (100 mW)

Area Scan (8x9x1): Measurement grid: dx=12mm, dy=12mm
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Peak SAR (extrapolated) = 11.0 W/kg
SAR(1 g) = 5.26 W/kg; SAR(10 g) = 2.4 W/kg
Deviation(1 g) = 6.48%



0 dB = 8.80 W/kg = 9.44 dBW/kg

PCTEST

DUT: Dipole 2450 MHz; Type: D2450V2; Serial: 921

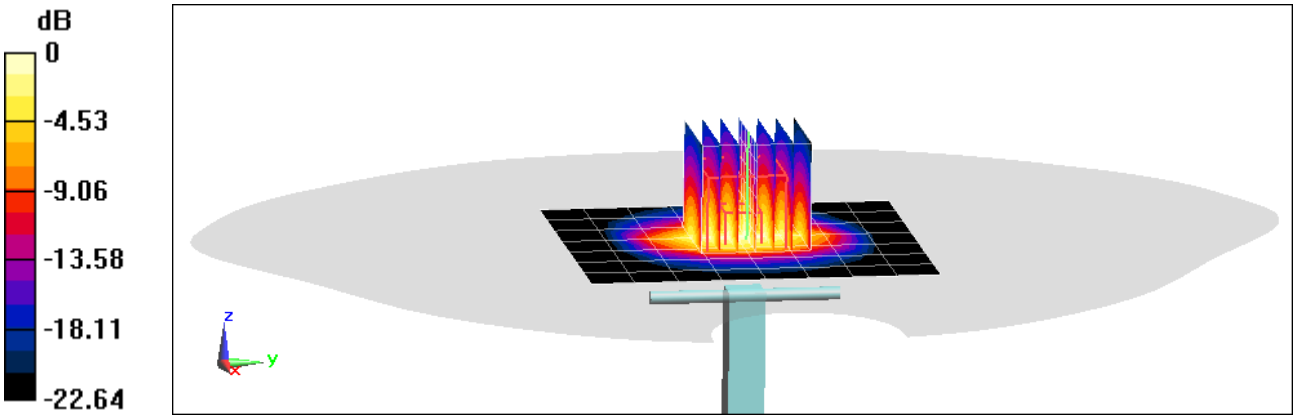
Communication System: UID 0, CW; Frequency: 2450 MHz; Duty Cycle: 1:1
Medium: 2450 MHz Body Medium parameters used:
f = 2450 MHz; σ = 2.01 S/m; ε_r = 50.958; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 01-13-2020; Ambient Temp: 23.4°C; Tissue Temp: 19.5°C

Probe: EX3DV4 - SN7491; ConvF(7.57, 7.57, 7.57) @ 2450 MHz; Calibrated: 7/16/2019
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1402; Calibrated: 7/10/2019
Phantom: Twin-SAM V8.0; Type: QD 000 P41 Ax; Serial: 1936
Measurement SW: DASY52, Version 52.10 (3);SEMCAD X Version 14.6.13 (7474)

2450 MHz System Verification at 20.0 dBm (100 mW)

Area Scan (8x9x1): Measurement grid: dx=12mm, dy=12mm
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Peak SAR (extrapolated) = 10.7 W/kg
SAR(1 g) = 5.16 W/kg; SAR(10 g) = 2.37 W/kg
Deviation(1 g) = 1.57%



0 dB = 8.61 W/kg = 9.35 dBW/kg

PCTEST

DUT: Dipole 2450 MHz; Type: D2450V2; Serial: 921

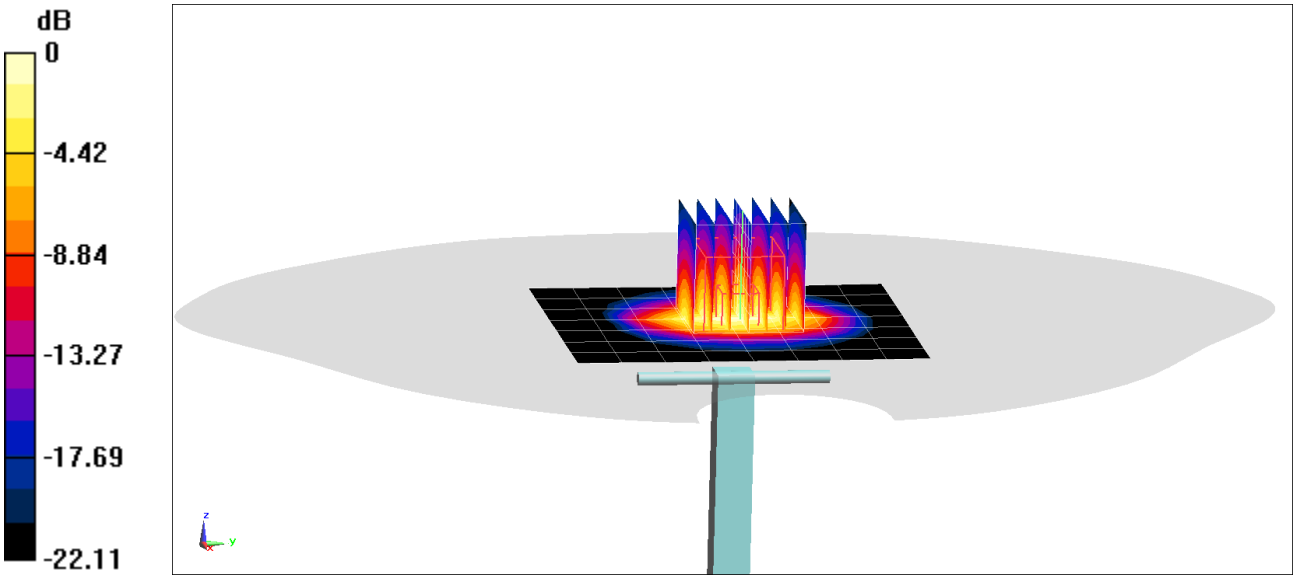
Communication System: UID 0, CW; Frequency: 2450 MHz; Duty Cycle: 1:1
Medium: 2450 MHz Body Medium parameters used:
f = 2450 MHz; σ = 1.948 S/m; ε_r = 50.877; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 01-14-2020; Ambient Temp: 22.1°C; Tissue Temp: 21.0°C

Probe: EX3DV4 - SN7532; ConvF(7.66, 7.66, 7.66) @ 2450 MHz; Calibrated: 4/12/2019
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn501; Calibrated: 4/17/2019
Phantom: Twin-SAM V4.0; Type: QD 000 P40 CC; Serial: 1179
Measurement SW: DASY52, Version 52.10 (3);SEMCAD X Version 14.6.13 (7474)

2450 MHz System Verification at 20.0 dBm (100 mW)

Area Scan (8x9x1): Measurement grid: dx=12mm, dy=12mm
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Peak SAR (extrapolated) = 10.5 W/kg
SAR(1 g) = 5.12 W/kg; SAR(10 g) = 2.36 W/kg
Deviation(1 g) = 0.79%



0 dB = 8.54 W/kg = 9.31 dBW/kg

PCTEST

DUT: Dipole 2600 MHz; Type: D2600V2; Serial: 1009

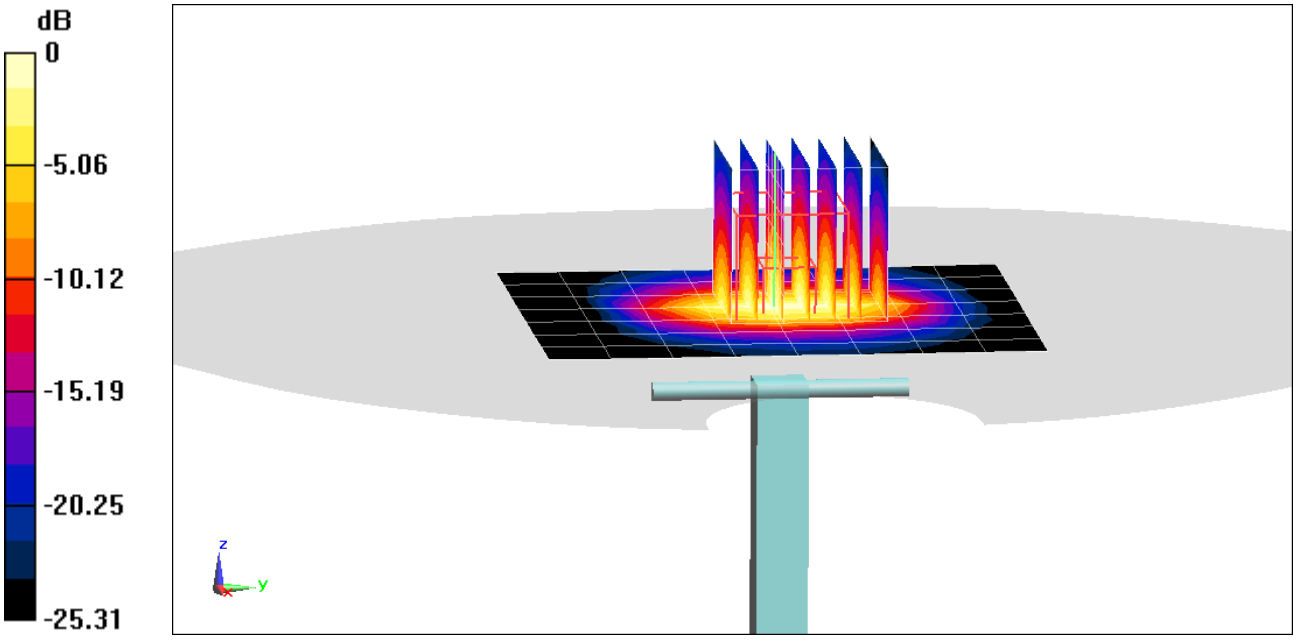
Communication System: UID 0, CW; Frequency: 2600 MHz; Duty Cycle: 1:1
Medium: 2450 MHz Body Medium parameters used:
f = 2600 MHz; σ = 2.263 S/m; ε_r = 52.409; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 01-01-2020; Ambient Temp: 21.6°C; Tissue Temp: 20.6°C

Probe: EX3DV4 - SN7532; ConvF(7.47, 7.47, 7.47) @ 2600 MHz; Calibrated: 4/12/2019
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn501; Calibrated: 4/17/2019
Phantom: Twin-SAM V4.0; Type: QD 000 P40 CC; Serial: 1179
Measurement SW: DASY52, Version 52.10 (3);SEMCAD X Version 14.6.13 (7474)

2600 MHz System Verification at 20.0 dBm (100 mW)

Area Scan (8x9x1): Measurement grid: dx=12mm, dy=12mm
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Peak SAR (extrapolated) = 12.6 W/kg
SAR(1 g) = 5.53 W/kg; SAR(10 g) = 2.38 W/kg
Deviation(1 g) = -0.36%



0 dB = 9.65 W/kg = 9.85 dBW/kg

PCTEST

DUT: Dipole 2600 MHz; Type: D2600V2; Serial: 1069

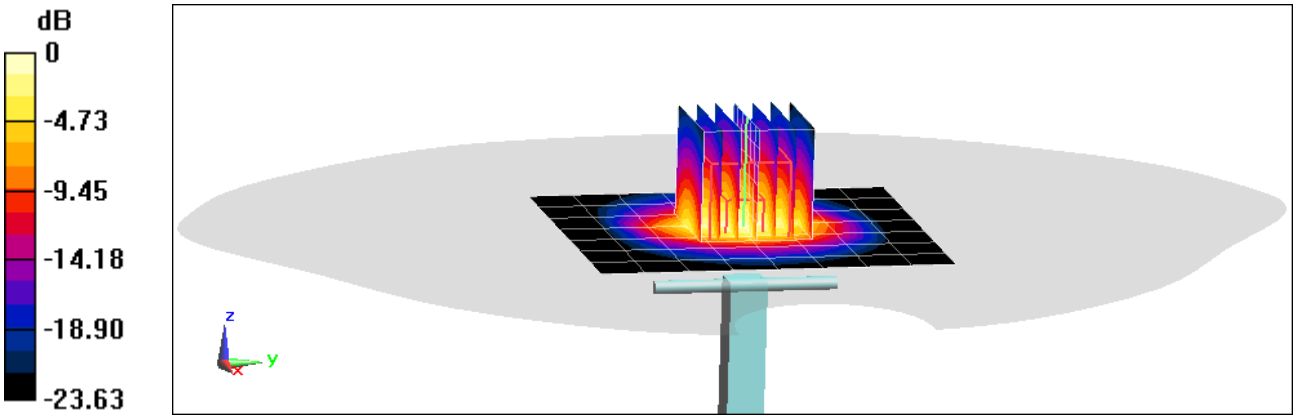
Communication System: UID 0, CW; Frequency: 2600 MHz; Duty Cycle: 1:1
Medium: 2450 MHz Body Medium parameters used:
f = 2600 MHz; σ = 2.151 S/m; ε_r = 50.698; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 01-13-2020; Ambient Temp: 23.4°C; Tissue Temp: 19.5°C

Probe: EX3DV4 - SN7491; ConvF(7.45, 7.45, 7.45) @ 2600 MHz; Calibrated: 7/16/2019
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1402; Calibrated: 7/10/2019
Phantom: Twin-SAM V8.0; Type: QD 000 P41 Ax; Serial: 1936
Measurement SW: DASY52, Version 52.10 (3);SEMCAD X Version 14.6.13 (7474)

2600 MHz System Verification at 20.0 dBm (100 mW)

Area Scan (8x9x1): Measurement grid: dx=12mm, dy=12mm
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Peak SAR (extrapolated) = 11.9 W/kg
SAR(1 g) = 5.44 W/kg; SAR(10 g) = 2.4 W/kg
Deviation(1 g) = -1.63%



0 dB = 9.44 W/kg = 9.75 dBW/kg

PCTEST

DUT: Dipole 3500 MHz; Type: D3500V2; Serial: 1068

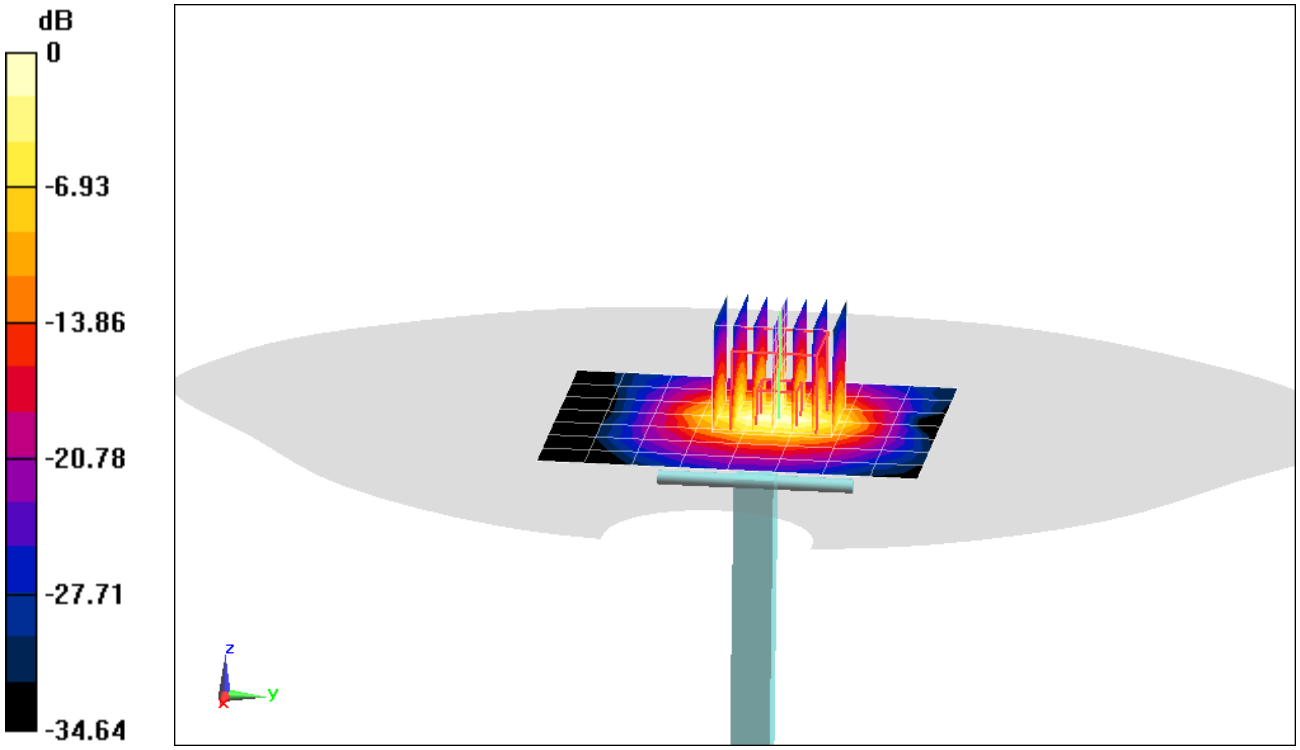
Communication System: UID 0, CW; Frequency: 3500 MHz; Duty Cycle: 1:1
Medium: 3500 MHz Body Medium parameters used:
f = 3500 MHz; σ = 3.403 S/m; ε_r = 49.675; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 01-04-2020; Ambient Temp: 23.1°C; Tissue Temp: 21.3°C

Probe: EX3DV4 - SN3949; ConvF(6.88, 6.88, 6.88) @ 3500 MHz; Calibrated: 8/29/2019
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1408; Calibrated: 8/12/2019
Phantom: Twin-SAM V4.0; Type: QD 000 P40 CC; Serial: 1596
Measurement SW: DASY52, Version 52.10 (3);SEMCAD X Version 14.6.13 (7474)

3500 MHz System Verification at 20.0 dBm (100 mW)

Area Scan (8x9x1): Measurement grid: dx=12mm, dy=12mm
Zoom Scan (7x7x8)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=4mm
Peak SAR (extrapolated) = 16.7 W/kg
SAR(1 g) = 6.44 W/kg; SAR(10 g) = 2.4 W/kg
Deviation(1 g) = -1.38%



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

DUT: Dipole 3700 MHz; Type: D3700V2; Serial: 1029

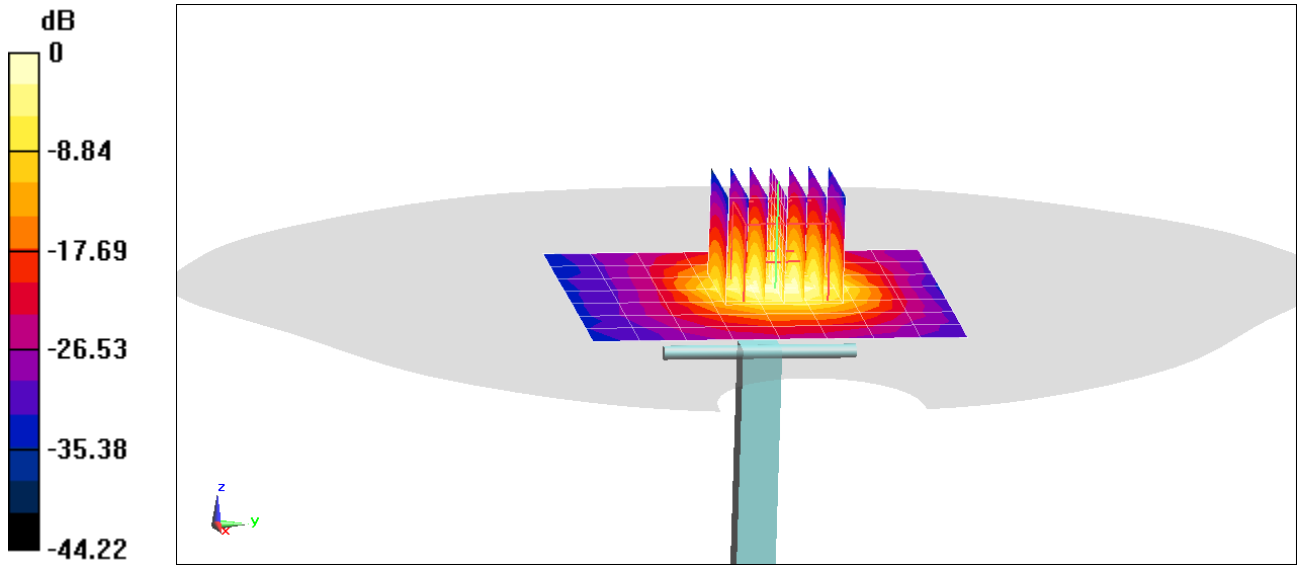
Communication System: UID 0, CW; Frequency: 3700 MHz; Duty Cycle: 1:1
Medium: 3500 MHz Body Medium parameters used (interpolated):
f = 3700 MHz; σ = 3.677 S/m; ε_r = 49.104; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 01-04-2020; Ambient Temp: 23.1°C; Tissue Temp: 21.3°C

Probe: EX3DV4 - SN3949; ConvF(6.78, 6.78, 6.78) @ 3700 MHz; Calibrated: 8/29/2019
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1408; Calibrated: 8/12/2019
Phantom: Twin-SAM V4.0; Type: QD 000 P40 CC; Serial: 1596
Measurement SW: DASY52, Version 52.10 (3);SEMCAD X Version 14.6.13 (7474)

3700 MHz System Verification at 20.0 dBm (100 mW)

Area Scan (8x9x1): Measurement grid: dx=12mm, dy=12mm
Zoom Scan (7x7x8)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=4mm
Peak SAR (extrapolated) = 17.0 W/kg
SAR(1 g) = 6.23 W/kg; SAR(10 g) = 2.23 W/kg
Deviation(1 g) = -4.01%



0 dB = 12.6 W/kg = 11.00 dBW/kg

DUT: Dipole 5 GHz; Type: D5GHzV2; Serial: 1123

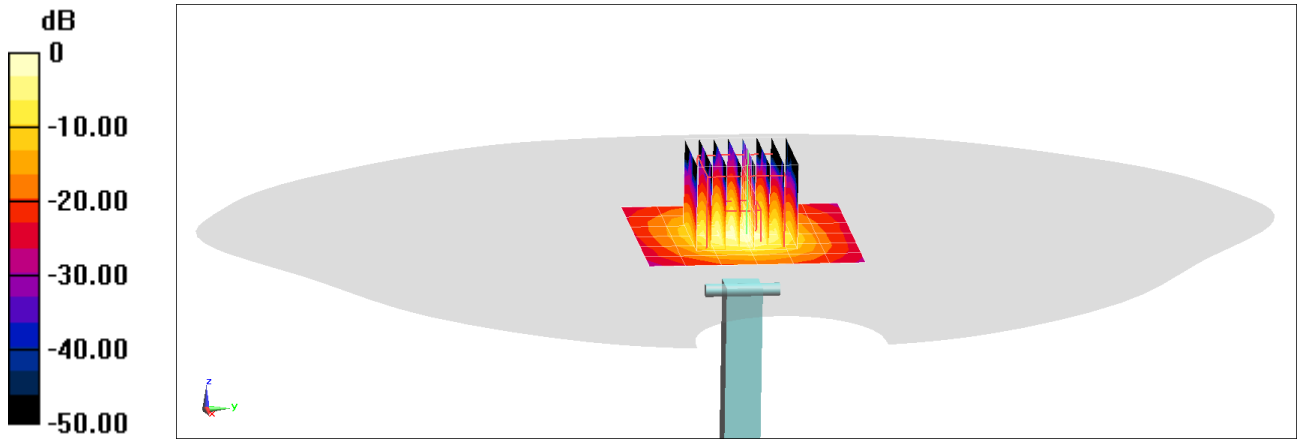
Communication System: UID 0, CW; Frequency: 5250 MHz; Duty Cycle: 1:1
Medium: 5 GHz Body Medium parameters used (interpolated):
f = 5250 MHz; σ = 5.165 S/m; ε_r = 48.505; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 12-16-2019; Ambient Temp: 22.7°C; Tissue Temp: 19.0°C

Probe: EX3DV4 - SN7491; ConvF(4.87, 4.87, 4.87) @ 5250 MHz; Calibrated: 7/16/2019
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1402; Calibrated: 7/10/2019
Phantom: Twin-SAM V8.0; Type: QD 000 P41 Ax; Serial: 1936
Measurement SW: DASY52, Version 52.10 (3);SEMCAD X Version 14.6.13 (7474)

5250 MHz System Verification at 17.0 dBm (50 mW)

Area Scan (7x7x1): Measurement grid: dx=10mm, dy=10mm
Zoom Scan (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm; Graded Ratio: 1.4
Peak SAR (extrapolated) = 13.9 W/kg
SAR(1 g) = 3.6 W/kg; SAR(10 g) = 0.996 W/kg
Deviation(1 g) = -2.70%



0 dB = 8.30 W/kg = 9.19 dBW/kg

DUT: Dipole 5 GHz; Type: D5GHzV2; Serial: 1123

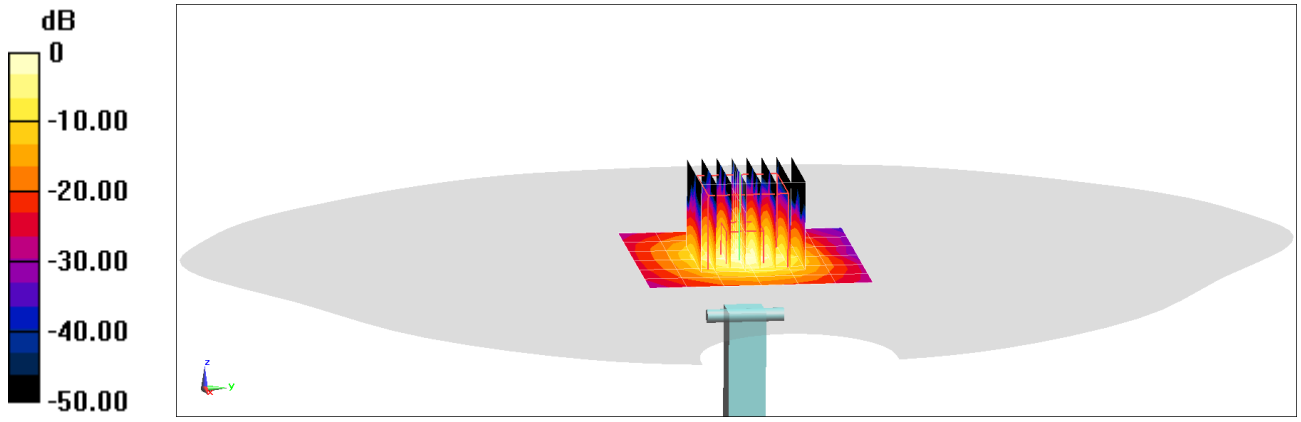
Communication System: UID 0, CW; Frequency: 5600 MHz; Duty Cycle: 1:1
Medium: 5 GHz Body Medium parameters used:
f = 5600 MHz; σ = 5.653 S/m; ε_r = 47.862; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 12-16-2019; Ambient Temp: 22.7°C; Tissue Temp: 19.0°C

Probe: EX3DV4 - SN7491; ConvF(4.23, 4.23, 4.23) @ 5600 MHz; Calibrated: 7/16/2019
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1402; Calibrated: 7/10/2019
Phantom: Twin-SAM V8.0; Type: QD 000 P41 Ax; Serial: 1936
Measurement SW: DASY52, Version 52.10 (3);SEMCAD X Version 14.6.13 (7474)

5600 MHz System Verification at 17.0 dBm (50 mW)

Area Scan (7x7x1): Measurement grid: dx=10mm, dy=10mm
Zoom Scan (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm; Graded Ratio: 1.4
Peak SAR (extrapolated) = 16.3 W/kg
SAR(1 g) = 3.83 W/kg; SAR(10 g) = 1.05 W/kg
Deviation(1 g) = -1.29%



0 dB = 9.28 W/kg = 9.68 dBW/kg

DUT: Dipole 5 GHz; Type: D5GHzV2; Serial: 1123

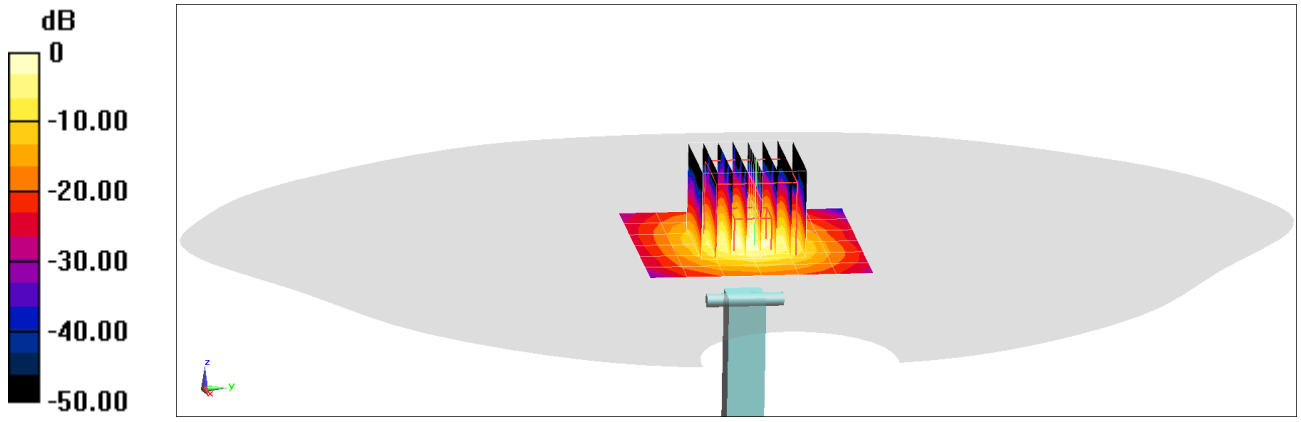
Communication System: UID 0, CW; Frequency: 5750 MHz; Duty Cycle: 1:1
Medium: 5 GHz Body Medium parameters used (interpolated):
f = 5750 MHz; σ = 5.89 S/m; ε_r = 47.568; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0cm

Test Date: 12-16-2019; Ambient Temp: 22.7°C; Tissue Temp: 19.0°C

Probe: EX3DV4 - SN7491; ConvF(4.32, 4.32, 4.32) @ 5750 MHz; Calibrated: 7/16/2019
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1402; Calibrated: 7/10/2019
Phantom: Twin-SAM V8.0; Type: QD 000 P41 Ax; Serial: 1936
Measurement SW: DASY52, Version 52.10 (3);SEMCAD X Version 14.6.13 (7474)

5750 MHz System Verification at 17.0 dBm (50 mW)

Area Scan (7x7x1): Measurement grid: dx=10mm, dy=10mm
Zoom Scan (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm; Graded Ratio: 1.4
Peak SAR (extrapolated) = 15.9 W/kg
SAR(1 g) = 3.59 W/kg; SAR(10 g) = 0.995 W/kg
Deviation(1 g) = -3.88%



0 dB = 8.95 W/kg = 9.52 dBW/kg

APPENDIX C: SAR TISSUE SPECIFICATIONS

Measurement Procedure for Tissue verification:

1) The network analyzer and probe system was configured and calibrated.
2) The probe was immersed in the tissue. The tissue was placed in a nonmetallic container. Trapped air bubbles beneath the flange were minimized by placing the probe at a slight angle.
3) The complex admittance with respect to the probe aperture was measured
4) The complex relative permittivity ε_r' can be calculated from the below equation (Pournaropoulos and Misra):

$$Y = \frac{j2\omega\varepsilon_r\varepsilon_0}{\left[\ln(b/a)\right]^2}\int_a^b\int_a^b\int_0^\pi \cos\phi' \frac{\exp\left[-j\omega r(\mu_0\varepsilon_r'\varepsilon_0)^{1/2}\right]}{r} d\phi' d\rho' d\rho$$

where *Y* is the admittance of the probe in contact with the sample, the primed and unprimed coordinates refer to source and observation points, respectively, $r^2 = \rho^2 + \rho'^2 - 2\rho\rho'\cos\phi'$, ω is the angular frequency, and $j = \sqrt{-1}$.

3 Composition / Information on ingredients

3.2 Mixtures
Description: Aqueous solution with surfactants and inhibitors
Declarable, or hazardous components:

CAS: 107-21-1 EINECS: 203-473-3 Reg.nr.: 01-2119456816-28-0000	**Ethanediol** STOT RE 2, H373; Acute Tox. 4, H302	>1.0-4.9%
CAS: 68608-26-4 EINECS: 271-781-5 Reg.nr.: 01-2119527859-22-0000	**Sodium petroleum sulfonate** Eye Irrit. 2, H319	< 2.9%
CAS: 107-41-5 EINECS: 203-489-0 Reg.nr.: 01-2119539582-35-0000	**Hexylene Glycol / 2-Methyl-pentane-2,4-diol** Skin Irrit. 2, H315; Eye Irrit. 2, H319	< 2.9%
CAS: 68920-66-1 NLP: 500-236-9 Reg.nr.: 01-2119489407-26-0000	**Alkoxylated alcohol, > C_{16}** Aquatic Chronic 2, H411; Skin Irrit. 2, H315; Eye Irrit. 2, H319	< 2.0%

Additional information:
For the wording of the listed risk phrases refer to section 16.
Not mentioned CAS-, EINECS- or registration numbers are to be regarded as Proprietary/Confidential.
The specific chemical identity and/or exact percentage concentration of proprietary components is withheld as a trade secret.

Figure C-1

Note: Liquid recipes are proprietary SPEAG. Since the composition is approximate to the actual liquids utilized, the manufacturer tissue-equivalent liquid data sheets are provided below.

Schmid & Partner Engineering AG

s p e a g

Zeughausstrasse 43, 8004 Zurich, Switzerland
Phone +41 44 245 9700, Fax +41 44 245 9779
info@speag.com, http://www.speag.com

Measurement Certificate / Material Test

Item Name	**Body Tissue Simulating Liquid (MBBL600-6000V6)**
Product No.	SL AAM U16 BC (Batch: 181029-1)
Manufacturer	SPEAG

Measurement Method

TSL dielectric parameters measured using calibrated DAK probe.

Target Parameters

Target parameters as defined in the KDB 865664 compliance standard.

Test Condition

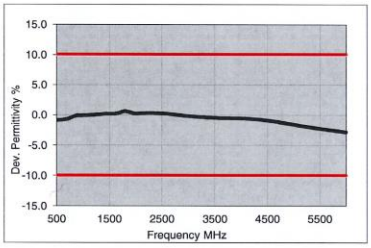
Ambient Condition	22°C ; 30% humidity
TSL Temperature	22°C
Test Date	30-Oct-18
Operator	CL

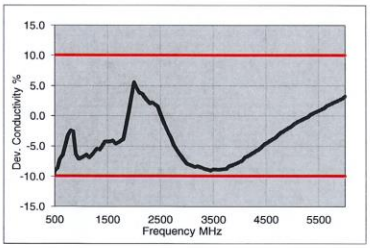
Additional Information

TSL Density
TSL Heat-capacity

Results

	Measured			Target		Diff.to Target [%]	
f [MHz]	e'	e''	sigma	eps	sigma	Δ-eps	Δ-sigma
800	55.1	21.3	0.95	55.3	0.97	-0.4	-2.1
825	55.1	20.8	0.96	55.2	0.98	-0.3	-2.0
835	55.1	20.6	0.96	55.1	0.99	0.0	-2.5
850	55.1	20.4	0.96	55.2	0.99	-0.1	-3.0
900	55.0	19.7	0.98	55.0	1.05	0.0	-6.7
1400	54.2	15.6	1.22	54.1	1.28	0.2	-4.7
1450	54.1	15.4	1.24	54.0	1.30	0.2	-4.6
1500	54.1	15.3	1.27	53.9	1.33	0.3	-4.5
1550	54.0	15.1	1.30	53.9	1.36	0.2	-4.4
1600	53.9	15.0	1.33	53.8	1.39	0.2	-4.3
1625	53.9	14.9	1.35	53.8	1.41	0.3	-4.3
1640	53.9	14.9	1.36	53.7	1.42	0.3	-4.2
1650	53.8	14.9	1.36	53.7	1.43	0.2	-4.9
1700	53.8	14.8	1.40	53.6	1.46	0.4	-4.1
1750	53.7	14.7	1.43	53.4	1.49	0.5	-4.0
1800	53.7	14.6	1.46	53.3	1.52	0.8	-3.9
1810	53.7	14.6	1.47	53.3	1.52	0.8	-3.3
1825	53.7	14.6	1.48	53.3	1.52	0.8	-2.6
1850	53.6	14.5	1.50	53.3	1.52	0.6	-1.3
1900	53.5	14.5	1.53	53.3	1.52	0.4	0.7
1950	53.5	14.5	1.57	53.3	1.52	0.4	3.3
2000	53.4	14.4	1.60	53.3	1.52	0.2	5.3
2050	53.4	14.4	1.64	53.2	1.57	0.3	4.5
2100	53.3	14.4	1.68	53.2	1.62	0.2	3.7
2150	53.3	14.4	1.72	53.1	1.66	0.4	3.6
2200	53.2	14.4	1.76	53.0	1.71	0.3	2.9
2250	53.1	14.4	1.81	53.0	1.76	0.2	2.8
2300	53.1	14.4	1.85	52.9	1.81	0.4	2.2
2350	53.0	14.5	1.89	52.8	1.85	0.3	2.2
2400	52.9	14.5	1.94	52.8	1.90	0.2	2.1
2450	52.9	14.5	1.98	52.7	1.95	0.4	1.5
2500	52.8	14.6	2.03	52.6	2.02	0.3	0.5
2550	52.7	14.6	2.07	52.6	2.09	0.2	-1.0
2600	52.6	14.7	2.12	52.5	2.16	0.2	-1.9





3500	51.1	15.5	3.02	51.3	3.31	-0.4	-8.8
3700	50.8	15.7	3.24	51.1	3.55	-0.5	-8.8
5200	48.1	18.2	5.27	49.0	5.30	-1.8	-0.6
5250	48.0	18.3	5.34	49.0	5.36	-1.9	-0.4
5300	47.9	18.4	5.41	48.9	5.42	-2.0	-0.2
5500	47.5	18.6	5.70	48.6	5.65	-2.2	0.8
5600	47.3	18.8	5.84	48.5	5.77	-2.3	1.3
5700	47.1	18.9	5.99	48.3	5.88	-2.5	1.8
5800	47.0	19.0	6.14	48.2	6.00	-2.6	2.3

Figure C-2
600 – 5800 MHz Body Tissue Equivalent Matter

APPENDIX D: SAR SYSTEM VALIDATION

Per FCC KDB Publication 865664 D02v01r02, SAR system validation status should be documented to confirm measurement accuracy. The SAR systems (including SAR probes, system components and software versions) used for this device were validated against its performance specifications prior to the SAR measurements. Reference dipoles were used with the required tissue- equivalent media for system validation, according to the procedures outlined in FCC KDB Publication 865664 D01v01r04 and IEEE 1528-2013. Since SAR probe calibrations are frequency dependent, each probe calibration point was validated at a frequency within the valid frequency range of the probe calibration point, using the system that normally operates with the probe for routine SAR measurements and according to the required tissue-equivalent media.

A tabulated summary of the system validation status including the validation date(s), measurement frequencies, SAR probes and tissue dielectric parameters has been included.

Table D-1
SAR System Validation Summary – 1g

SAR SYSTEM #	FREQ. [MHz]	DATE	PROBE SN	PROBE CAL. POINT		COND.	PERM.	CW VALIDATION			MOD. VALIDATION		
						(σ)	(εr)	SENSITIVITY	PROBE LINEARITY	PROBE ISOTROPY	MOD. TYPE	DUTY FACTOR	PAR
AM1	750	7/15/2019	7421	750	Body	0.93	53.942	PASS	PASS	PASS	N/A	N/A	N/A
AM8	835	8/2/2019	7416	835	Body	0.994	53.524	PASS	PASS	PASS	GMSK	PASS	N/A
AM7	1750	2/21/2019	3837	1750	Body	1.49	52.305	PASS	PASS	PASS	N/A	N/A	N/A
AM8	1750	8/5/2019	7416	1750	Body	1.495	52.93	PASS	PASS	PASS	N/A	N/A	N/A
AM5	1900	8/13/2019	7491	1900	Body	1.525	52.611	PASS	PASS	PASS	GMSK	PASS	N/A
AM1	1900	7/15/2019	7421	1900	Body	1.548	51.802	PASS	PASS	PASS	GMSK	PASS	N/A
AM4	2300	4/23/2019	7532	2300	Body	1.897	50.974	PASS	PASS	PASS	N/A	N/A	N/A
AM4	2450	4/23/2019	7532	2450	Body	2.027	50.762	PASS	PASS	PASS	OFDM/TDD	PASS	PASS
AM5	2450	8/14/2019	7491	2450	Body	1.972	51.904	PASS	PASS	PASS	OFDM/TDD	PASS	PASS
AM4	2600	4/23/2019	7532	2600	Body	2.167	50.527	PASS	PASS	PASS	TDD	PASS	N/A
AM5	2600	8/13/2019	7491	2600	Body	2.11	51.64	PASS	PASS	PASS	TDD	PASS	N/A
AM3	3500	12/11/2019	3949	3500	Body	3.448	50.786	PASS	PASS	PASS	TDD	PASS	N/A
AM3	3700	12/11/2019	3949	3700	Body	3.67	50.471	PASS	PASS	PASS	TDD	PASS	N/A
AM5	5250	8/27/2019	7491	5250	Body	5.352	47.481	PASS	PASS	PASS	OFDM	N/A	PASS
AM5	5600	8/14/2019	7491	5600	Body	5.897	46.808	PASS	PASS	PASS	OFDM	N/A	PASS
AM5	5750	8/14/2019	7491	5750	Body	6.122	46.512	PASS	PASS	PASS	OFDM	N/A	PASS

NOTE: While the probes have been calibrated for both CW and modulated signals, all measurements were performed using communication systems calibrated for CW signals only. Modulations in the table above represent test configurations for which the measurement system has been validated per FCC KDB Publication 865664 D01v01r04 for scenarios when CW probe calibrations are used with other signal types. SAR systems were validated for modulated signals with a periodic duty cycle, such as GMSK, or with a high peak to average ratio (>5 dB), such as OFDM according to FCC KDB Publication 865664 D01v01r04.

APPENDIX F: DOWNLINK LTE CA RF CONDUCTED POWERS

1.1 LTE Downlink Only Carrier Aggregation Test Reduction Methodology

SAR test exclusion for LTE downlink Carrier Aggregation is determined by power measurements according to the number of component carriers (CCs) supported by the product implementation. Per April 2018 TCBC Workshop Notes, the following test reduction methodology was applied to determine the combinations required for conducted power measurements.

LTE DLCA Test Reduction Methodology:

- The supported combinations were arranged by the number of component carriers in columns.
- Any limitations on the PCC or SCC for each combination were identified alongside the combination (e.g. CA_2A-2A-4A-12A, but B12 can only be configured as a SCC).
- Power measurements were performed for "supersets" (LTE CA combinations with multiple components carriers) and any "subsets" (LTE CA combinations with fewer component carriers) that were not completely covered by the supersets.
- Only subsets that have the exact same components as a superset were excluded for measurement.
- When there were certain restrictions on component carriers that existed in the superset that were not applied for the subset, the subset configuration was additionally evaluated.
- Both inter-band and intra-band downlink carrier aggregation scenarios were considered.
- Downlink CA combinations for SISO and 4x4 Downlink MIMO operations were measured independently, per May 2017 TCBC Workshop notes.
- The antenna with highest maximum output power for each LTE Band was selected for the PCC configurations of DLCA power measurements.

Table 1 – Example of Exclusion Table for SISO Configurations

Index	2CC	Supported Channel Bandwidth [MHz]		Restriction	Completely Covered by Measurement Superset
		CC1	CC2		
2CC #1	CA_2C	5, 10, 15, 20	5, 10, 15, 20		3CC #4
2CC #2	CA_2A-5A	5, 10, 15, 20	5, 10		4CC #1
2CC #3	CA_2A-12A	5, 10, 15, 20	5, 10		3CC #3
2CC #4	CA_2A-13A	5, 10, 15, 20	10		3CC #9
2CC #5	CA_2A-17A	5, 10	5, 10		No
2CC #6	CA_2A-30A	5, 10, 15, 20	5, 10		3CC #14
2CC #8	CA_2A-66A (2)	5, 10, 15, 20	5, 10, 15, 20		3CC #1
2CC #9	CA_2A-71A	5, 10, 15, 20	5, 10, 15, 20		3CC #10
2CC #10	CA_4A-4A	5, 10, 15, 20	5, 10, 15, 20		4CC #1
2CC #11	CA_4A-5A (1)	5, 10, 15, 20	5, 10		4CC #1
2CC #12	CA_4A-12A (4)	5, 10, 15, 20	5, 10		3CC #3
2CC #13	CA_4A-29A	5, 10, 15, 20	10		3CC #9
2CC #14	CA_4A-30A	5, 10	5, 10	B17 SCC Only	No
2CC #15	CA_5B	5, 10	5, 10		3CC #1
2CC #16	CA_5A-29A	5, 10	5, 10, 15, 20		No
2CC #17	CA_7C	15, 20	15, 20		No
2CC #18	CA_7A-7A (1)	5, 10, 15, 20	5, 10, 15, 20		No
2CC #19	CA_7A-12A	5, 10, 15, 20	5, 10		3CC #12
2CC #20	CA_12B	5	5, 10		3CC #13
2CC #21	CA_12A-25A	5, 10	5, 10, 15, 20		No
2CC #22	CA_12A-30A	5, 10	5, 10		3CC #14
2CC #23	CA_41A-41A (1)	5, 10, 15, 20	5, 10, 15, 20		No

Index	3CC	Supported Channel Bandwidth [MHz]			Restriction	Completely Covered by Measurement Superset
		CC1	CC2	CC3		
3CC #1	CA_2A-2A-4A	5, 10, 15, 20	5, 10, 15, 20	5, 10, 15, 20		4CC #1
3CC #2	CA_2A-2A-5A	5, 10, 15, 20	5, 10, 15, 20	5, 10		4CC #3
3CC #3	CA_2A-2A-12A	5, 10, 15, 20	5, 10, 15, 20	5, 10		No
3CC #4	CA_2C-66A	5, 10, 15, 20	5, 10, 15, 20	5, 10, 15, 20		No
3CC #5	CA_2A-2A-71A	5, 10, 15, 20	5, 10, 15, 20	5, 10, 15, 20		No
3CC #6	CA_2A-4A-4A	5, 10, 15, 20	5, 10, 15, 20	5, 10, 15, 20		No
3CC #7	CA_2A-4A-5A	5, 10, 15, 20	5, 10, 15, 20	5, 10		4CC #1
3CC #8	CA_2A-4A-12A	5, 10, 15, 20	5, 10, 15, 20	5, 10		No
3CC #9	CA_2A-4A-13A	5, 10, 15, 20	5, 10, 15, 20	10		No
3CC #10	CA_2A-4A-71A	5, 10, 15, 20	5, 10, 15, 20	5, 10, 15, 20		No
3CC #11	CA_2A-5A-7A	5, 10, 15, 20	5, 10, 15, 20	5, 10		4CC #5
3CC #12	CA_2A-7A-12A	5, 10, 15, 20	5, 10, 15, 20	5, 10		No
3CC #13	CA_2A-12B	5, 10, 15, 20	5	5, 10		No
3CC #14	CA_2A-12A-30A	5, 10, 15, 20	5, 10	5, 10		No
3CC #15	CA_4A-4A-5A	5, 10, 15, 20	5, 10, 15, 20	5, 10		No
3CC #16	CA_5B-30A	5, 10	5, 10	5, 10		3CC #1
3CC #17	CA_5B-66A	5, 10	5, 10	5, 10, 15, 20		3CC #1
3CC #18	CA_5A-30A-66A	5, 10	5, 10	5, 10, 15, 20		4CC #3
3CC #19	CA_12A-66C	5, 10	5, 10, 15, 20	5, 10, 15, 20		No
3CC #20	CA_30A-66A-66A	5, 10	5, 10, 15, 20	5, 10, 15, 20		4CC #3
3CC #21	CA_41D	15, 15, 20	10, 15, 20	10, 15, 20		No
3CC #22	CA_41A-41C	5, 10, 15, 20	5, 10, 15, 20	5, 10, 15, 20		No
3CC #23	CA_66E	5, 10, 15, 20	5, 10, 15, 20	5, 10, 15, 20		No
3CC #24	CA_66A-66C	5, 10, 15, 20	5, 10, 15, 20	5, 10, 15, 20		No

Index	4CC	Supported Channel Bandwidth [MHz]				Restriction	Completely Covered by Measurement Superset
		CC1	CC2	CC3	CC4		
4CC #1	CA_2A-2A-4A-5A	5, 10, 15, 20	5, 10, 15, 20	5, 10, 15, 20	5, 10		No
4CC #2	CA_2A-2A-4A-12A	5, 10, 15, 20	5, 10, 15, 20	5, 10, 15, 20	5, 10	B12 SCC Only	No
4CC #3	CA_2A-2A-4A-30A	5, 10, 15, 20	5, 10, 15, 20	5, 10	5, 10		No
4CC #4	CA_2A-2A-5A-66A	5, 10, 15, 20	5, 10, 15, 20	5, 10	5, 10, 15, 20		No
4CC #5	CA_2A-5B-30A	5, 10, 15, 20	5, 10	5, 10	5, 10		3CC #1
4CC #6	CA_2A-5B-66A	5, 10, 15, 20	5, 10	5, 10	5, 10, 15, 20		3CC #1
4CC #7	CA_5B-30A-66A	5, 10	5, 10	5, 10	5, 10		3CC #1
4CC #8	CA_5B-66A-66A	5, 10	5, 10	5, 10, 15, 20	5, 10, 15, 20		3CC #2
4CC #9	CA_5A-30A-66A-66A	5, 10	5, 10	5, 10, 15, 20	5, 10, 15, 20		No
4CC #10	CA_41E	15, 20	15, 20	15, 20	20		No

Index	5CC	Supported Channel Bandwidth [MHz]					Restriction	Completely Covered by Measurement Superset
		CC1	CC2	CC3	CC4	CC5		
5CC #1	CA_2A-5B-30A-66A	5, 10, 15, 20	5, 10	5, 10	5, 10	5, 10, 15, 20		No
5CC #2	CA_2A-5B-66A-66A	5, 10, 15, 20	5, 10	5, 10	5, 10, 15, 20	5, 10, 15, 20		No

Table 2 – Example of Exclusion Table for 4x4 Downlink MIMO Configurations

Index	2CC	Supported Channel Bandwidth [MHz]		Restriction	Completely Covered by Measurement Superset
		CC1	CC2		
2CC #M1	CA_[2C]	5, 10, 15, 20	5, 10, 15, 20		3CC #M6
2CC #M2	CA_[2A]-2A	5, 10, 15, 20	5, 10, 15, 20		3CC #M1
2CC #M3	CA_[2A]-[2A]	5, 10, 15, 20	5, 10, 15, 20		No
2CC #M4	CA_[2A]-4A (2)	5, 10, 15, 20	5, 10, 15, 20		3CC #M1
2CC #M5	CA_[2A]-[4A] (2)	5, 10, 15, 20	5, 10, 15, 20		No
2CC #M6	CA_[2A]-5A	5, 10, 15, 20	5, 10		3CC #M3
2CC #M7	CA_[2A]-12A (1)	5, 10, 15, 20	3, 5, 10		No
2CC #M8	CA_[2A]-13A	5, 10, 15, 20	10		3CC #M4
2CC #M9	CA_[2A]-17A	5, 10	5, 10		No
2CC #M10	CA_[2A]-29A (2)	5, 10, 15, 20	5, 10	B29 SCC Only	3CC #M12
2CC #M11	CA_[2A]-30A	5, 10, 15, 20	5, 10		3CC #M5
2CC #M12	CA_[2A]-66A (2)	5, 10, 15, 20	5, 10, 15, 20		4CC #M1
2CC #M13	CA_2A-[66A] (2)	5, 10, 15, 20	5, 10, 15, 20		4CC #M2
2CC #M14	CA_[2A]-[66A] (2)	5, 10, 15, 20	5, 10, 15, 20		No
2CC #M15	CA_[2A]-71A	5, 10, 15, 20	5, 10, 15, 20		3CC #M11
2CC #M16	CA_5A-[66A]	5, 10	5, 10, 15, 20		3CC #M16
2CC #M17	CA_12A-[66A] (4)	5, 10	5, 10, 15, 20		3CC #M17
2CC #M18	CA_13A-[66A]	5, 10	5, 10, 15, 20		3CC #M19
2CC #M19	CA_30A-[66A]	5, 10	5, 10, 15, 20		3CC #M20
2CC #M20	CA_[66B]	5, 10, 15	5, 10, 15		4CC #M4
2CC #M21	CA_[66C]	5, 10, 15, 20	5, 10, 15, 20		4CC #M6
2CC #M22	CA_[66A]-66A	5, 10, 15, 20	5, 10, 15, 20		3CC #M28
2CC #M23	CA_[66A]-[66A]	5, 10, 15, 20	5, 10, 15, 20		No

Index	3CC	Supported Channel Bandwidth [MHz]			Restriction	Completely Covered by Measurement Superset
		CC1	CC2	CC3		
3CC #M1	CA_[2A]-2A-4A	5, 10, 15, 20	5, 10, 15, 20	5, 10, 15, 20		No
3CC #M2	CA_[2A]-2A-5A	5, 10, 15, 20	5, 10, 15, 20	5, 10		No
3CC #M3	CA_[2A]-2A-12A	5, 10, 15, 20	5, 10, 15, 20	5, 10		No
3CC #M4	CA_[2A]-2A-13A	5, 10, 15, 20	5, 10, 15, 20	10		No
3CC #M5	CA_[2A]-2A-30A	5, 10, 15, 20	5, 10, 15, 20	5, 10		No
3CC #M6	CA_[2A]-[2C]-66A	5, 10, 15, 20	5, 10, 15, 20	5, 10, 15, 20		No
3CC #M7	CA_2C-[66A]	5, 10, 15, 20	5, 10, 15, 20	5, 10, 15, 20		No
3CC #M8	CA_[2C]-[66A]	5, 10, 15, 20	5, 10, 15, 20	5, 10, 15, 20		No
3CC #M9	CA_[2A]-2A-66A	5, 10, 15, 20	5, 10, 15, 20	5, 10, 15, 20		No
3CC #M10	CA_2A-2A-[66A]	5, 10, 15, 20	5, 10, 15, 20	5, 10, 15, 20		No
3CC #M11	CA_[2A]-2A-71A	5, 10, 15, 20	5, 10, 15, 20	5, 10, 15, 20		No
3CC #M12	CA_[2A]-4A-29A	5, 10, 15, 20	5, 10, 15, 20	5, 10	B29 SCC Only	No
3CC #M13	CA_[2A]-4A-71A	5, 10, 15, 20	5, 10, 15, 20	5, 10, 15, 20		No
3CC #M14	CA_[2A]-5B	5, 10, 15, 20	5, 10	5, 10		4CC #M1
3CC #M15	CA_[2A]-5A-66A	5, 10, 15, 20	5, 10	5, 10, 15, 20		No
3CC #M16	CA_2A-5A-[66A]	5, 10, 15, 20	5, 10	5, 10, 15, 20		No
3CC #M17	CA_2A-12A-[66A]	5, 10, 15, 20	5, 10	5, 10, 15, 20		No
3CC #M18	CA_[2A]-13A-66A	5, 10, 15, 20	5, 10	5, 10, 15, 20		No
3CC #M19	CA_2A-13A-[66A]	5, 10, 15, 20	5, 10	5, 10, 15, 20		No
3CC #M20	CA_2A-30A-[66A]	5, 10, 15, 20	5, 10	5, 10, 15, 20		No
3CC #M21	CA_[2A]-66B	5, 10, 15, 20	5, 10, 15	5, 10, 15		4CC #M3
3CC #M22	CA_2A-[66B]	5, 10, 15, 20	5, 10, 15	5, 10, 15		4CC #M4
3CC #M23	CA_[2A]-[66B]	5, 10, 15, 20	5, 10, 15	5, 10, 15		No
3CC #M24	CA_[2A]-66C	5, 10, 15, 20	5, 10, 15, 20	5, 10, 15, 20		4CC #M5
3CC #M25	CA_2A-[66C]	5, 10, 15, 20	5, 10, 15, 20	5, 10, 15, 20		4CC #M6
3CC #M26	CA_[2A]-[66C]	5, 10, 15, 20	5, 10, 15, 20	5, 10, 15, 20		No
3CC #M27	CA_[2A]-66A-66A	5, 10, 15, 20	5, 10, 15, 20	5, 10, 15, 20		No
3CC #M28	CA_2A-[66A]-66A	5, 10, 15, 20	5, 10, 15, 20	5, 10, 15, 20		No
3CC #M29	CA_[2A]-66A-71A	5, 10, 15, 20	5, 10, 15, 20	5, 10, 15, 20		No

Index	4CC	Supported Channel Bandwidth [MHz]				Restriction	Completely Covered by Measurement Superset
		CC1	CC2	CC3	CC4		
4CC #M1	CA_[2A]-5B-66A	5, 10, 15, 20	5, 10	5, 10	5, 10, 15, 20		No
4CC #M2	CA_2A-5B-[66A]	5, 10, 15, 20	5, 10	5, 10	5, 10, 15, 20		No
4CC #M3	CA_[2A]-5A-66B	5, 10, 15, 20	5, 10	5, 10, 15	5, 10, 15		No
4CC #M4	CA_2A-5A-[66B]	5, 10, 15, 20	5, 10	5, 10, 15	5, 10, 15		No
4CC #M5	CA_[2A]-5A-66C	5, 10, 15, 20	5, 10	5, 10, 15, 20	5, 10, 15, 20		No
4CC #M6	CA_2A-5A-[66C]	5, 10, 15, 20	5, 10	5, 10, 15, 20	5, 10, 15, 20		No

Note: [CC] indicates component carrier with 4x4 DL MIMO antenna configuration

1.2 LTE Downlink Only Carrier Aggregation Test Selection and Setup

SAR test exclusion for LTE downlink Carrier Aggregation is determined by power measurements according to the number component carriers (CCs) supported by the product implementation. For those configurations required by April 2018 TCBC Workshop Notes, conducted power measurements with LTE Carrier Aggregation (CA) (downlink only) active are made in accordance to KDB Publication 941225 D05Av01r02. The RRC connection is only handled by one cell, the primary component carrier (PCC) for downlink and uplink communications. After making a data connection to the PCC, the UE device adds secondary component carrier(s) (SCC) on the downlink only. All uplink communications and acknowledgements remain identical to specifications when downlink carrier aggregation is inactive on the PCC. Additional conducted output powers are measured with the downlink carrier aggregation active for the configuration with highest measured maximum conducted power with downlink carrier aggregation inactive measured among the channel bandwidth, modulation, and RB combinations in each frequency band.

This device supports LAA with downlink carrier aggregation only. It uses carrier aggregation in the downlink to combine LTE in the unlicensed spectrum (i.e. LTE Band 46) with LTE in the licensed band (served as PCC). All uplink communications and acknowledgements on the PCC remain identical to specifications when downlink carrier aggregation is inactive.

Per FCC KDB Publication 941225 D05Av01r02, no SAR measurements are required for carrier aggregation configurations when the maximum average output power with downlink only carrier aggregation active is not more than 0.25 dB higher than the average output power with downlink only carrier aggregation inactive. All bands required for SAR testing per FCC KDB procedures were considered. Based on the measured maximum powers below, no additional SAR tests were required for DLCA SAR configurations.

General PCC and SCC configuration selection procedure

- PCC uplink channel, channel bandwidth, modulation and RB configurations were selected based on section C)3)b)ii) of KDB 941225 D05 V01r02. The downlink PCC channel was paired with the selected PCC uplink channel according to normal configurations without carrier aggregation.
- To maximize aggregated bandwidth, highest channel bandwidth available for that CA combination was selected for SCC. For inter-band CA, the SCC downlink channels were selected near the middle of their transmission bands. For contiguous intra-band CA, the downlink channel spacing between the component carriers was set to multiple of 300 kHz less than the nominal channel spacing defined in section 5.4.1A of 3GPP TS 36.521. For non-contiguous intra-band CA, the downlink channel spacing between the component carriers was set to be larger than the nominal channel spacing and provided maximum separation between the component carriers.
- All selected PCC and SCC(s) remained fully within the uplink/downlink transmission band of the respective component carrier.

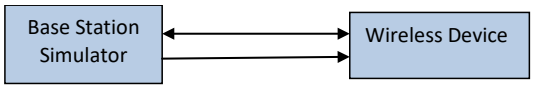


Figure 1
DL CA Power Measurement Setup

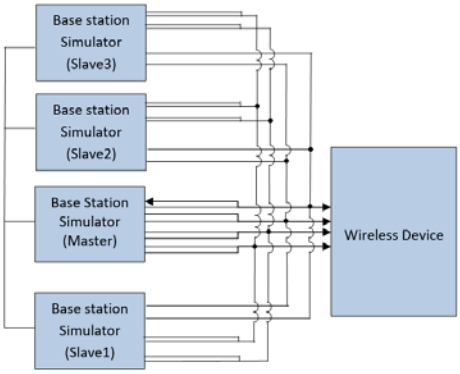


Figure 2
DL CA with DL 4x4 MIMO Power Measurement Setup

1.3 Downlink Carrier Aggregation RF Conducted Powers

1.3.1 LTE Band 12 as PCC

Table 1
Output Powers – Ant 1

	PCC									SCC 1				SCC 2				SCC 3				SCC 4				Power	
Combination	PCC Band	PCC BW [MHz]	PCC (UL) Ch.	PCC (UL) Freq. [MHz]	Mod.	PCC UL# RB	PCC UL RB Offset	PCC (DL) Channel	PCC (DL) Freq. [MHz]	SCC Band	SCC BW [MHz]	SCC (DL) Channel	SCC (DL) Freq. [MHz]	SCC Band	SCC BW [MHz]	SCC (DL) Channel	SCC (DL) Freq. [MHz]	SCC Band	SCC BW [MHz]	SCC (DL) Channel	SCC (DL) Freq. [MHz]	SCC Band	SCC BW [MHz]	SCC (DL) Channel	SCC (DL) Freq. [MHz]	LTE Tx.Power with DL CA Enabled (dBm)	LTE Single Carrier Tx Power (dBm)
CA_2A-12A (1)	LTE B12	3	23025	700.5	64QAM	1	7	5025	730.5	LTE B2	20	900	1960	-	-	-	-	-	-	-	-	-	-	-	-	21.49	21.49
CA_4A-12A (1)	LTE B12	5	23035	701.5	16QAM	1	24	5035	731.5	LTE B4	20	2175	2132.5	-	-	-	-	-	-	-	-	-	-	-	-	21.44	21.44
CA_4A-12A (2)	LTE B12	3	23025	700.5	64QAM	1	7	5025	730.5	LTE B4	20	2175	2132.5	-	-	-	-	-	-	-	-	-	-	-	-	21.49	21.49
CA_12A-25A	LTE B12	5	23035	701.5	16QAM	1	24	5035	731.5	LTE B25	20	8365	1962.5	-	-	-	-	-	-	-	-	-	-	-	-	21.44	21.44
CA_12A-46A	LTE B12	5	23035	701.5	16QAM	1	24	5035	731.5	LTE B46	20	50665	5537.5	-	-	-	-	-	-	-	-	-	-	-	-	21.44	21.44
CA_12A-66A (1)	LTE B12	5	23035	701.5	16QAM	1	24	5035	731.5	LTE B66	20	66786	2145	-	-	-	-	-	-	-	-	-	-	-	-	21.44	21.44
CA_12A-66A (2)	LTE B12	3	23025	700.5	64QAM	1	7	5025	730.5	LTE B66	20	66786	2145	-	-	-	-	-	-	-	-	-	-	-	-	21.49	21.49
CA_2C-12A	LTE B12	5	23035	701.5	16QAM	1	24	5035	731.5	LTE B2	20	900	1960	LTE B2	20	702	1940.2	-	-	-	-	-	-	-	-	21.19	21.44
CA_2A-2A-12B	LTE B12	5	23035	701.5	16QAM	1	24	5035	731.5	LTE B12	10	5107	738.7	LTE B2	20	900	1960	LTE B2	20	700	1940	-	-	-	-	21.27	21.44
CA_4A-4A-12B	LTE B12	5	23035	701.5	16QAM	1	24	5035	731.5	LTE B12	10	5107	738.7	LTE B4	20	2175	2132.5	LTE B4	10	2350	2150	-	-	-	-	21.15	21.44
CA_2A-2A-4A-12A	LTE B12	5	23035	701.5	16QAM	1	24	5035	731.5	LTE B2	20	900	1960	LTE B2	20	700	1940	LTE B4	20	2175	2132.5	-	-	-	-	21.24	21.44
CA_2A-4A-4A-12A	LTE B12	5	23035	701.5	16QAM	1	24	5035	731.5	LTE B2	20	900	1960	LTE B4	20	2175	2132.5	LTE B4	10	2350	2150	-	-	-	-	21.21	21.44
CA_2A-4A-12B	LTE B12	5	23035	701.5	16QAM	1	24	5035	731.5	LTE B12	10	5107	738.7	LTE B2	20	900	1960	LTE B4	20	2175	2132.5	-	-	-	-	21.23	21.44
CA_2A-12A-66C	LTE B12	5	23035	701.5	16QAM	1	24	5035	731.5	LTE B2	20	900	1960	LTE B66	20	66786	2145	LTE B66	20	66984	2164.8	-	-	-	-	21.27	21.44
CA_4A-4A-12A-30A	LTE B12	5	23035	701.5	16QAM	1	24	5035	731.5	LTE B4	20	2175	2132.5	LTE B4	10	2350	2150	LTE B30	10	9820	2355	-	-	-	-	21.26	21.44
CA_2A-4A-7A-12A	LTE B12	5	23035	701.5	16QAM	1	24	5035	731.5	LTE B2	20	900	1960	LTE B4	20	2175	2132.5	LTE B7	20	3100	2655	-	-	-	-	21.27	21.44
CA_2A-4A-12A-30A	LTE B12	5	23035	701.5	16QAM	1	24	5035	731.5	LTE B2	20	900	1960	LTE B4	20	2175	2132.5	LTE B30	10	9820	2355	-	-	-	-	21.21	21.44
CA_2A-7A-12A-66A	LTE B12	5	23035	701.5	16QAM	1	24	5035	731.5	LTE B2	20	900	1960	LTE B7	20	3100	2655	LTE B66	20	66786	2145	-	-	-	-	21.18	21.44
CA_2A-2A-12A-66A-66A	LTE B12	5	23035	701.5	16QAM	1	24	5035	731.5	LTE B2	20	900	1960	LTE B2	20	700	1940	LTE B66	20	66786	2145	LTE B66	20	67236	2190	21.28	21.44
CA_2A-2A-12A-30A-66A	LTE B12	5	23035	701.5	16QAM	1	24	5035	731.5	LTE B2	20	900	1960	LTE B2	20	700	1940	LTE B30	10	9820	2355	LTE B66	20	66786	2145	21.27	21.44
CA_2A-12A-30A-66A-66A	LTE B12	5	23035	701.5	16QAM	1	24	5035	731.5	LTE B2	20	900	1960	LTE B30	10	9820	2355	LTE B66	20	66786	2145	LTE B66	20	67236	2190	21.26	21.44

1.3.2 LTE Band 13 as PCC

Table 2
Output Powers – Ant 1

	PCC									SCC 1				SCC 2				SCC 3				SCC 4				Power	
Combination	PCC Band	PCC BW [MHz]	PCC (UL) Ch.	PCC (UL) Freq. [MHz]	Mod.	PCC UL# RB	PCC UL RB Offset	PCC (DL) Channel	PCC (DL) Freq. [MHz]	SCC Band	SCC BW [MHz]	SCC (DL) Channel	SCC (DL) Freq. [MHz]	SCC Band	SCC BW [MHz]	SCC (DL) Channel	SCC (DL) Freq. [MHz]	SCC Band	SCC BW [MHz]	SCC (DL) Channel	SCC (DL) Freq. [MHz]	SCC Band	SCC BW [MHz]	SCC (DL) Channel	SCC (DL) Freq. [MHz]	LTE Tx.Power with DL CA Enabled (dBm)	LTE Single Carrier Tx Power (dBm)
CA_4A-4A-13A	LTE B13	10	23230	782	QPSK	1	0	5230	751	LTE B4	20	2175	2132.5	LTE B4	10	2350	2150	-	-	-	-	-	-	-	-	21.07	21.14
CA_2A-4A-13A	LTE B13	10	23230	782	QPSK	1	0	5230	751	LTE B2	20	900	1960	LTE B4	20	2175	2132.5	-	-	-	-	-	-	-	-	21.11	21.14
CA_2A-13A-46A	LTE B13	5	23230	782	16QAM	1	24	5230	751	LTE B2	20	900	1960	LTE B46	20	50665	5537.5	-	-	-	-	-	-	-	-	20.96	21.16
CA_13A-46A-66A	LTE B13	5	23230	782	16QAM	1	24	5230	751	LTE B46	20	50665	5537.5	LTE B66	20	66786	2145	-	-	-	-	-	-	-	-	20.90	21.16
CA_13A-48A-66A	LTE B13	5	23230	782	16QAM	1	24	5230	751	LTE B48	20	55990	3625	LTE B66	20	66786	2145	-	-	-	-	-	-	-	-	21.10	21.16
CA_13A-66A-66B	LTE B13	5	23230	782	16QAM	1	24	5230	751	LTE B66	20	66786	2145	LTE B66	5	67168	2183.2	LTE B66	15	67261	2192.5	-	-	-	-	20.94	21.16
CA_13A-66A-66C	LTE B13	5	23230	782	16QAM	1	24	5230	751	LTE B66	20	66786	2145	LTE B66	20	67038	2170.2	LTE B66	20	67236	2190	-	-	-	-	20.90	21.16
CA_2A-2A-13A-66A	LTE B13	5	23230	782	16QAM	1	24	5230	751	LTE B2	20	900	1960	LTE B2	20	700	1940	LTE B66	20	66786	2145	-	-	-	-	20.93	21.16
CA_2A-13A-46C	LTE B13	5	23230	782	16QAM	1	24	5230	751	LTE B2	20	900	1960	LTE B46	20	50665	5537.5	LTE B46	20	50467	5517.7	-	-	-	-	20.95	21.16
CA_2A-13A-66A-66A	LTE B13	5	23230	782	16QAM	1	24	5230	751	LTE B2	20	900	1960	LTE B66	20	66786	2145	LTE B66	20	67236	2190	-	-	-	-	20.91	21.16
CA_2A-13A-66B	LTE B13	5	23230	782	16QAM	1	24	5230	751	LTE B2	20	900	1960	LTE B66	15	66786	2145	LTE B66	5	66879	2154.3	-	-	-	-	20.88	21.16
CA_2A-13A-66C	LTE B13	5	23230	782	16QAM	1	24	5230	751	LTE B2	20	900	1960	LTE B66	20	66786	2145	LTE B66	20	66984	2164.8	-	-	-	-	20.97	21.16
CA_13A-46C-66A	LTE B13	5	23230	782	16QAM	1	24	5230	751	LTE B46	20	50665	5537.5	LTE B46	20	50467	5517.7	LTE B66	20	66786	2145	-	-	-	-	20.93	21.16
CA_13A-48C-66A	LTE B13	5	23230	782	16QAM	1	24	5230	751	LTE B48	20	55990	3625	LTE B48	20	56188	3644.8	LTE B66	20	66786	2145	-	-	-	-	21.23	21.16
CA_13A-46E	LTE B13	5	23230	782	16QAM	1	24	5230	751	LTE B46	20	50665	5537.5	LTE B46	20	50467	5517.7	LTE B46	20	50863	5557.3	LTE B46	20	51061	5577.1	20.99	21.16
CA_2A-13A-46D	LTE B13	5	23230	782	16QAM	1	24	5230	751	LTE B2	20	900	1960	LTE B46	20	50665	5537.5	LTE B46	20	50467	5517.7	LTE B46	20	50863	5557.3	21.03	21.16
CA_13A-46D-66A	LTE B13	5	23230	782	16QAM	1	24	5230	751	LTE B46	20	50665	5537.5	LTE B46	20	50467	5517.7	LTE B46	20	50863	5557.3	LTE B66	20	66786	2145	20.96	21.16

1.3.3 LTE Band 5 as PCC

Table 3
Output Powers – Ant 1

	PCC									SCC 1					SCC 2					SCC 3					SCC 4				Power	
Combination	PCC Band	PCC BW [MHz]	PCC (UL) Ch.	PCC (UL) Freq. [MHz]	Mod.	PCC UL# RB	PCC UL RB Offset	PCC (DL) Channel	PCC (DL) Freq. [MHz]	SCC Band	SCC BW [MHz]	SCC (DL) Channel	SCC (DL) Freq. [MHz]	SCC Band	SCC BW [MHz]	SCC (DL) Channel	SCC (DL) Freq. [MHz]	SCC Band	SCC BW [MHz]	SCC (DL) Channel	SCC (DL) Freq. [MHz]	SCC Band	SCC BW [MHz]	SCC (DL) Channel	SCC (DL) Freq. [MHz]	LTE Tx.Power with DL CA Enabled (dBm)	LTE Single Carrier Tx Power (dBm)
CA_5A-7A	LTE B5	5	20625	846.5	16QAM	1	0	2625	891.5	LTE B7	20	3100	2655	-	-	-	-	-	-	-	-	-	-	-	-	20.60	20.60
CA_5A-25A	LTE B5	5	20625	846.5	16QAM	1	0	2625	891.5	LTE B25	20	8365	1962.5	-	-	-	-	-	-	-	-	-	-	-	-	20.60	20.60
CA_5A-41A	LTE B5	5	20625	846.5	16QAM	1	0	2625	891.5	LTE B41	20	40620	2593	-	-	-	-	-	-	-	-	-	-	-	-	20.60	20.60
CA_5A-46A (1)	LTE B5	5	20625	846.5	16QAM	1	0	2625	891.5	LTE B46	20	50665	5537.5	-	-	-	-	-	-	-	-	-	-	-	-	20.60	20.60
CA_5A-48A	LTE B5	5	20625	846.5	16QAM	1	0	2625	891.5	LTE B48	20	55990	3625	-	-	-	-	-	-	-	-	-	-	-	-	20.60	20.60
CA_2C-5A	LTE B5	5	20625	846.5	16QAM	1	0	2625	891.5	LTE B2	20	900	1960	LTE B2	20	702	1940.2	-	-	-	-	-	-	-	-	20.35	20.60
CA_4A-5B (1)	LTE B5	5	20625	846.5	16QAM	1	0	2625	891.5	LTE B5	5	2577	886.7	LTE B4	20	2175	2132.5	-	-	-	-	-	-	-	-	20.39	20.60
CA_5A-7A-7A	LTE B5	5	20625	846.5	16QAM	1	0	2625	891.5	LTE B7	20	3100	2655	LTE B7	20	2850	2630	-	-	-	-	-	-	-	-	20.41	20.60
CA_5A-7C	LTE B5	5	20625	846.5	16QAM	1	0	2625	891.5	LTE B7	20	3100	2655	LTE B7	20	2902	2635.2	-	-	-	-	-	-	-	-	20.37	20.60
CA_5A-46C (1)	LTE B5	5	20625	846.5	16QAM	1	0	2625	891.5	LTE B46	20	50665	5537.5	LTE B46	20	50467	5517.7	-	-	-	-	-	-	-	-	20.42	20.60
CA_2A-5A-46A	LTE B5	5	20625	846.5	16QAM	1	0	2625	891.5	LTE B2	20	900	1960	LTE B46	20	50665	5537.5	-	-	-	-	-	-	-	-	20.30	20.60
CA_5A-46A-66A	LTE B5	5	20625	846.5	16QAM	1	0	2625	891.5	LTE B46	20	50665	5537.5	LTE B66	20	66786	2145	-	-	-	-	-	-	-	-	20.34	20.60
CA_4A-4A-5B	LTE B5	5	20625	846.5	16QAM	1	0	2625	891.5	LTE B5	10	2553	884.3	LTE B4	20	2175	2132.5	LTE B4	10	2350	2150	-	-	-	-	20.47	20.60
CA_5A-46D (1)	LTE B5	5	20625	846.5	16QAM	1	0	2625	891.5	LTE B46	20	50665	5537.5	LTE B46	20	50467	5517.7	LTE B46	20	50863	5557.3	-	-	-	-	20.40	20.60
CA_5A-66A-66B	LTE B5	5	20625	846.5	16QAM	1	0	2625	891.5	LTE B66	20	66786	2145	LTE B66	5	67168	2183.2	LTE B66	15	67261	2192.5	-	-	-	-	20.35	20.60
CA_5A-66A-66C	LTE B5	5	20625	846.5	16QAM	1	0	2625	891.5	LTE B66	20	66786	2145	LTE B66	20	67038	2170.2	LTE B66	20	67236	2190	-	-	-	-	20.46	20.60
CA_2A-2A-4A-5A	LTE B5	5	20625	846.5	16QAM	1	0	2625	891.5	LTE B2	20	900	1960	LTE B2	20	700	1940	LTE B4	20	2175	2132.5	-	-	-	-	20.31	20.60
CA_2A-4A-4A-5A	LTE B5	5	20625	846.5	16QAM	1	0	2625	891.5	LTE B2	20	900	1960	LTE B4	20	2175	2132.5	LTE B4	10	2350	2150	-	-	-	-	20.49	20.60
CA_2A-4A-5B	LTE B5	5	20625	846.5	16QAM	1	0	2625	891.5	LTE B5	10	2553	884.3	LTE B2	20	900	1960	LTE B4	20	2175	2132.5	-	-	-	-	20.45	20.60
CA_2A-5A-46C	LTE B5	5	20625	846.5	16QAM	1	0	2625	891.5	LTE B2	20	900	1960	LTE B46	20	50665	5537.5	LTE B46	20	50467	5517.7	-	-	-	-	20.37	20.60
CA_4A-4A-5A-30A	LTE B5	5	20625	846.5	16QAM	1	0	2625	891.5	LTE B4	20	2175	2132.5	LTE B4	10	2350	2150	LTE B30	10	9820	2355	-	-	-	-	20.36	20.60
CA_5A-46C-66A	LTE B5	5	20625	846.5	16QAM	1	0	2625	891.5	LTE B46	20	50665	5537.5	LTE B46	20	50467	5517.7	LTE B66	20	66786	2145	-	-	-	-	20.49	20.60
CA_2A-4A-5A-30A	LTE B5	5	20625	846.5	16QAM	1	0	2625	891.5	LTE B2	20	900	1960	LTE B4	20	2175	2132.5	LTE B30	10	9820	2355	-	-	-	-	20.27	20.60
CA_2A-2A-5A-66A-66A	LTE B5	5	20625	846.5	16QAM	1	0	2625	891.5	LTE B2	20	900	1960	LTE B2	20	700	1940	LTE B66	20	66786	2145	LTE B66	20	67236	2190	20.43	20.60
CA_2A-2A-5A-66B	LTE B5	5	20625	846.5	16QAM	1	0	2625	891.5	LTE B2	20	900	1960	LTE B2	20	700	1940	LTE B66	15	66786	2145	LTE B66	5	66879	2154.3	20.51	20.60
CA_2A-2A-5A-66C	LTE B5	5	20625	846.5	16QAM	1	0	2625	891.5	LTE B2	20	900	1960	LTE B2	20	700	1940	LTE B66	20	66786	2145	LTE B66	20	66984	2164.8	20.34	20.60
CA_2A-5A-46D	LTE B5	5	20625	846.5	16QAM	1	0	2625	891.5	LTE B2	20	900	1960	LTE B46	20	50665	5537.5	LTE B46	20	50467	5517.7	LTE B46	20	50863	5557.3	20.43	20.60
CA_2A-5B-66B	LTE B5	5	20625	846.5	16QAM	1	0	2625	891.5	LTE B5	10	2553	884.3	LTE B2	20	900	1960	LTE B66	15	66786	2145	LTE B66	5	66879	2154.3	20.50	20.60
CA_2A-5B-66C	LTE B5	5	20625	846.5	16QAM	1	0	2625	891.5	LTE B5	10	2553	884.3	LTE B2	20	900	1960	LTE B66	20	66786	2145	LTE B66	20	66984	2164.8	20.38	20.60
CA_2A-5B-66A-66A	LTE B5	5	20625	846.5	16QAM	1	0	2625	891.5	LTE B5	10	2553	884.3	LTE B2	20	900	1960	LTE B66	20	66786	2145	LTE B66	20	67236	2190	20.39	20.60
CA_5A-46D-66A	LTE B5	5	20625	846.5	16QAM	1	0	2625	891.5	LTE B46	20	50665	5537.5	LTE B46	20	50467	5517.7	LTE B46	20	50863	5557.3	LTE B66	20	66786	2145	20.49	20.60
CA_5B-30A-66A-66A	LTE B5	5	20625	846.5	16QAM	1	0	2625	891.5	LTE B5	10	2553	884.3	LTE B30	10	9820	2355	LTE B66	20	66786	2145	LTE B66	20	67236	2190	20.36	20.60
CA_2A-2A-5A-30A-66A	LTE B5	5	20625	846.5	16QAM	1	0	2625	891.5	LTE B2	20	900	1960	LTE B2	20	700	1940	LTE B30	10	9820	2355	LTE B66	20	66786	2145	20.47	20.60
CA_2A-5A-30A-66A-66A	LTE B5	5	20625	846.5	16QAM	1	0	2625	891.5	LTE B2	20	900	1960	LTE B30	10	9820	2355	LTE B66	20	66786	2145	LTE B66	20	67236	2190	20.42	20.60
CA_2A-5B-30A-66A	LTE B5	5	20625	846.5	16QAM	1	0	2625	891.5	LTE B5	10	2553	884.3	LTE B2	20	900	1960	LTE B30	10	9820	2355	LTE B66	20	66786	2145	20.34	20.60

1.3.4 LTE Band 26 as PCC

Table 4
Output Powers – Ant 1

	PCC									SCC 1				SCC 2				Power	
Combination	PCC Band	PCC BW [MHz]	PCC (UL) Ch.	PCC (UL) Freq. [MHz]	Mod.	PCC UL# RB	PCC UL RB Offset	PCC (DL) Channel	PCC (DL) Freq. [MHz]	SCC Band	SCC BW [MHz]	SCC (DL) Channel	SCC (DL) Freq. [MHz]	SCC Band	SCC BW [MHz]	SCC (DL) Channel	SCC (DL) Freq. [MHz]	LTE Tx.Power with DL CA Enabled (dBm)	LTE Single Carrier Tx Power (dBm)
CA_7A-26A	LTE B26	10	26990	844	QPSK	25	25	8990	889	LTE B7	20	3100	2655	-	-	-	-	20.59	20.60
CA_25A-26A	LTE B26	10	26990	844	QPSK	25	25	8990	889	LTE B25	20	8365	1962.5	-	-	-	-	20.52	20.60
CA_26A-41A	LTE B26	10	26990	844	QPSK	25	25	8990	889	LTE B41	20	40620	2593	-	-	-	-	20.60	20.60
CA_7A-7A-26A	LTE B26	10	26990	844	QPSK	25	25	8990	889	LTE B7	20	3100	2655	LTE B7	20	2850	2630	20.58	20.60
CA_25A-25A-26A	LTE B26	5	26715	816.5	16QAM	1	0	8715	861.5	LTE B25	20	8365	1962.5	LTE B25	20	8590	1985	20.55	20.60
CA_26A-41C	LTE B26	10	26990	844	QPSK	25	25	8990	889	LTE B41	20	40620	2593	LTE B41	20	40422	2573.2	20.60	20.60

1.3.5 LTE Band 66 as PCC

Table 5
Output Powers – Ant 2B

	PCC									SCC 1					SCC 2					SCC 3					SCC 4					SCC 5				Power	
Combination	PCC Band	PCC BW [MHz]	PCC (UL) Ch.	PCC (UL) Freq. [MHz]	Mod.	PCC UL# RB	PCC UL RB Offset	PCC (DL) Channel	PCC (DL) Freq. [MHz]	SCC Band	SCC BW [MHz]	SCC (DL) Channel	SCC (DL) Freq. [MHz]	SCC Band	SCC BW [MHz]	SCC (DL) Channel	SCC (DL) Freq. [MHz]	SCC Band	SCC BW [MHz]	SCC (DL) Channel	SCC (DL) Freq. [MHz]	SCC Band	SCC BW [MHz]	SCC (DL) Channel	SCC (DL) Freq. [MHz]	SCC Band	SCC BW [MHz]	SCC (DL) Channel	SCC (DL) Freq. [MHz]	LTE Tx.Power with DL CA Enabled (dBm)	LTE Single Carrier Tx Power (dBm)
CA_2A-66A	LTE B66	20	132072	1720	16QAM	1	50	66536	2120	LTE B2	20	900	1960	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	14.60	14.60
CA_12A-66A (1)	LTE B66	20	132072	1720	16QAM	1	50	66536	2120	LTE B12	10	5095	737.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	14.46	14.60
CA_12A-66A (2)	LTE B66	20	132072	1720	16QAM	1	50	66536	2120	LTE B12	10	5095	737.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	14.46	14.60
CA_29A-66A-66A	LTE B66	20	132072	1720	16QAM	1	50	66536	2120	LTE B66	20	67236	2190	LTE B29	10	9715	722.5	-	-	-	-	-	-	-	-	-	-	-	-	14.57	14.60
CA_46A-66A-66A	LTE B66	20	132072	1720	16QAM	1	50	66536	2120	LTE B66	20	67236	2190	LTE B46	20	50665	5537.5	-	-	-	-	-	-	-	-	-	-	-	-	14.56	14.60
CA_5A-66A-66A	LTE B66	20	132072	1720	16QAM	1	50	66536	2120	LTE B5	10	2525	881.5	LTE B46	20	50665	5537.5	-	-	-	-	-	-	-	-	-	-	-	-	14.52	14.60
CA_13A-46A-66A	LTE B66	20	132072	1720	16QAM	1	50	66536	2120	LTE B13	10	5230	751	LTE B46	20	50665	5537.5	-	-	-	-	-	-	-	-	-	-	-	-	14.42	14.60
CA_13A-48A-66A	LTE B66	20	132072	1720	16QAM	1	50	66536	2120	LTE B13	10	5230	751	LTE B48	20	55990	3625	-	-	-	-	-	-	-	-	-	-	-	-	14.59	14.60
CA_2A-66A-66B	LTE B66	20	132072	1720	16QAM	1	50	66536	2120	LTE B66	5	67168	2183.2	LTE B66	15	67261	2192.5	LTE B2	20	900	1960	-	-	-	-	-	-	-	-	14.38	14.60
CA_2A-66B-66A	LTE B66	15	132047	1717.5	QPSK	75	0	66511	2117.5	LTE B66	5	66604	2126.8	LTE B66	20	67236	2190	LTE B2	20	900	1960	-	-	-	-	-	-	-	-	14.56	14.59
CA_2A-66A-66C	LTE B66	20	132072	1720	16QAM	1	50	66536	2120	LTE B66	20	67038	2170.2	LTE B66	20	67236	2190	LTE B2	20	900	1960	-	-	-	-	-	-	-	-	14.59	14.60
CA_2A-66C-66A	LTE B66	20	132072	1720	16QAM	1	50	66536	2120	LTE B66	20	66734	2139.8	LTE B66	20	67236	2190	LTE B2	20	900	1960	-	-	-	-	-	-	-	-	14.58	14.60
CA_2C-66A-66A	LTE B66	20	132072	1720	16QAM	1	50	66536	2120	LTE B66	20	67236	2190	LTE B2	20	900	1960	LTE B2	20	700	1940.2	-	-	-	-	-	-	-	-	14.60	14.60
CA_5A-66A-66B	LTE B66	20	132072	1720	16QAM	1	50	66536	2120	LTE B66	5	67168	2183.2	LTE B66	15	67261	2192.5	LTE B5	10	2525	881.5	-	-	-	-	-	-	-	-	14.56	14.60
CA_5A-66B-66A	LTE B66	15	132047	1717.5	QPSK	75	0	66511	2117.5	LTE B66	5	66604	2126.8	LTE B66	20	67236	2190	LTE B5	10	2525	881.5	-	-	-	-	-	-	-	-	14.59	14.59
CA_5A-66A-66C	LTE B66	20	132072	1720	16QAM	1	50	66536	2120	LTE B66	20	67038	2170.2	LTE B66	20	67236	2190	LTE B5	10	2525	881.5	-	-	-	-	-	-	-	-	14.59	14.60
CA_5A-66C-66A	LTE B66	20	132072	1720	16QAM	1	50	66536	2120	LTE B66	20	66734	2139.8	LTE B66	20	67236	2190	LTE B5	10	2525	881.5	-	-	-	-	-	-	-	-	14.52	14.60
CA_13A-66B-66A	LTE B66	15	132047	1717.5	QPSK	75	0	66536	2120	LTE B66	5	67168	2183.2	LTE B66	15	67261	2192.5	LTE B13	10	5230	751	-	-	-	-	-	-	-	-	14.57	14.60
CA_13A-66A-66B	LTE B66	15	132047	1717.5	QPSK	75	0	66511	2117.5	LTE B66	5	66604	2126.8	LTE B66	20	67236	2190	LTE B13	10	5230	751	-	-	-	-	-	-	-	-	14.59	14.59
CA_13A-66A-66C	LTE B66	20	132072	1720	16QAM	1	50	66536	2120	LTE B66	20	67038	2170.2	LTE B66	20	67236	2190	LTE B13	10	5230	751	-	-	-	-	-	-	-	-	14.60	14.60
CA_13A-66C-66A	LTE B66	20	132072	1720	16QAM	1	50	66536	2120	LTE B66	20	66734	2139.8	LTE B66	20	67236	2190	LTE B13	10	5230	751	-	-	-	-	-	-	-	-	14.55	14.60
CA_46C-66A-66A	LTE B66	20	132072	1720	16QAM	1	50	66536	2120	LTE B66	20	67236	2190	LTE B46	20	50665	5537.5	LTE B46	20	50467	5517.7	-	-	-	-	-	-	-	-	14.60	14.60
CA_48A-48A-66A-66A	LTE B66	20	132072	1720	16QAM	1	50	66536	2120	LTE B66	20	67236	2190	LTE B48	20	55990	3625	LTE B48	20	55340	3560	-	-	-	-	-	-	-	-	14.59	14.60
CA_48A-48C-66A	LTE B66	20	132072	1720	16QAM	1	50	66536	2120	LTE B48	20	55990	3625	LTE B48	20	55340	3560	LTE B48	20	55538	3579.8	-	-	-	-	-	-	-	-	14.58	14.60
CA_48C-66A-66A	LTE B66	20	132072	1720	16QAM	1	50	66536	2120	LTE B66	20	67236	2190	LTE B48	20	55990	3625	LTE B48	20	56188	3644.8	-	-	-	-	-	-	-	-	14.56	14.60
CA_2A-2A-13A-66A	LTE B66	20	132072	1720	16QAM	1	50	66536	2120	LTE B2	20	900	1960	LTE B2	20	700	1940	LTE B13	10	5230	751	-	-	-	-	-	-	-	-	14.60	14.60
CA_2A-12A-66C	LTE B66	20	132072	1720	16QAM	1	50	66536	2120	LTE B66	20	66734	2139.8	LTE B2	20	900	1960	LTE B12	10	5095	737.5	-	-	-	-	-	-	-	-	14.49	14.60
CA_2A-13A-66A-66A	LTE B66	20	132072	1720	16QAM	1	50	66536	2120	LTE B66	20	67236	2190	LTE B2	20	900	1960	LTE B13	10	5230	751	-	-	-	-	-	-	-	-	14.59	14.60
CA_2A-13A-66B	LTE B66	15	132047	1717.5	QPSK	75	0	66511	2117.5	LTE B66	5	66604	2126.8	LTE B2	20	900	1960	LTE B13	10	5230	751	-	-	-	-	-	-	-	-	14.58	14.59
CA_2A-13A-66C	LTE B66	20	132072	1720	16QAM	1	50	66536	2120	LTE B66	20	66734	2139.8	LTE B2	20	900	1960	LTE B13	10	5230	751	-	-	-	-	-	-	-	-	14.58	14.60
CA_2A-46A-46A-66A	LTE B66	20	132072	1720	16QAM	1	50	66536	2120	LTE B2	20	900	1960	LTE B46	20	50665	5537.5	LTE B46	20	47090	5180	-	-	-	-	-	-	-	-	14.60	14.60
CA_5A-46C-66A	LTE B66	20	132072	1720	16QAM	1	50	66536	2120	LTE B5	10	2525	881.5	LTE B46	20	50665	5537.5	LTE B46	20	50467	5517.7	-	-	-	-	-	-	-	-	14.64	14.60
CA_13A-46C-66A	LTE B66	20	132072	1720	16QAM	1	50	66536	2120	LTE B13	10	5230	751	LTE B46	20	50665	5537.5	LTE B46	20	50467	5517.7	-	-	-	-	-	-	-	-	14.52	14.60
CA_13A-48C-66A	LTE B66	20	132072	1720	16QAM	1	50	66536	2120	LTE B13	10	5230	751	LTE B48	20	55990	3625	LTE B48	20	56188	3644.8	-	-	-	-	-	-	-	-	14.60	14.60
CA_2A-7A-7A-66A	LTE B66	20	132072	1720	16QAM	1	50	66536	2120	LTE B7	20	3100	2655	LTE B7	20	2850	2630	LTE B2	20	900	1960	-	-	-	-	-	-	-	-	14.60	14.60
CA_2A-7A-12A-66A	LTE B66	20	132072	1720	16QAM	1	50	66536	2120	LTE B2	20	900	1960	LTE B7	20	3100	2655	LTE B12	10	5095	737.5	-	-	-	-	-	-	-	-	14.50	14.60
CA_2A-29A-30A-66A	LTE B66	20	132072	1720	16QAM	1	50	66536	2120	LTE B2	20	900	1960	LTE B29	10	9715	722.5	LTE B30	10	9820	2355	-	-	-	-	-	-	-	-	14.60	14.60
CA_2A-46A-48A-66A	LTE B66	20	132072	1720	16QAM	1	50	66536	2120	LTE B2	20	900	1960	LTE B46	20	50665	5537.5	LTE B48	20	55990	3625	-	-	-	-	-	-	-	-	14.57	14.59
CA_46D-66A-66A	LTE B66	20	132072	1720	16QAM	1	50	66536	2120	LTE B66	20	67236	2190	LTE B46	20	50665	5537.5	LTE B46	20	50467	5517.7	LTE B46	20	50863	5557.3	-	-	-	-	14.60	14.60
CA_48E-66A	LTE B66	20	132072	1720	16QAM	1	50	66536	2120	LTE B48	20	55990	3625	LTE B48	20	56188	3644.8	LTE B48	20	56386	3664.6	LTE B48	20	56584	3684.4	-	-	-	-	14.19	14.60
CA_2A-2A-5A-66A-66A	LTE B66	20	132072	1720	16QAM	1	50	66536	2120	LTE B66	20	67236	2190	LTE B2	20	900	1960	LTE B2	20	700	1940	LTE B5	10	2525	881.5	-	-	-	-	14.60	14.60
CA_2A-2A-5A-66B	LTE B66	15	132047	1717.5	QPSK	75	0	66511	2117.5	LTE B66	5	66604	2126.8	LTE B2	20	900	1960	LTE B2	20	700	1940	LTE B5	10	2525	881.5	-	-	-	-	14.59	14.59
CA_2A-2A-5A-66C	LTE B66	20	132072	1720	16QAM	1	50	66536	2120	LTE B66	20	66734	2139.8	LTE B2	20	900	1960	LTE B2	20	700	1940	LTE B5	10	2525	881.5	-	-	-	-	14.60	14.60
CA_2A-2A-12A-66A-66A	LTE B66	20	132072	1720	16QAM	1	50	66536	2120	LTE B66	20	67236	2190	LTE B2	20	900	1960	LTE B12	10	5095	737.5	LTE B12	10	5095	737.5	-	-	-	-	14.60	14.60
CA_2A-5B-66A-66A	LTE B66	20	132072	1720	16QAM	1	50	66536	2120	LTE B66	20	67236	2190	LTE B5	10	2525	881.5	LTE B5	5	2453	874.3	LTE B5	5	2453	874.3	-	-	-	-	14.60	14.60
CA_2A-46A-48C-66A	LTE B66	20	132072	1720	16QAM	1	50	66536	2120	LTE B2	20	900	1960	LTE B46	20	50665	5537.5	LTE B46	20	50467	5517.7	LTE B46	20	47090	5180	-	-	-	-	14.60	14.60
CA_5A-46D-66A	LTE B66	20	132072	1720	16QAM	1	50	66536	2120	LTE B5	10	2525	881.5	LTE B46	20	50665	5537.5	LTE B46	20	50467	5517.7	LTE B46	20	50863	5557.3	-	-	-	-	14.60	14.60
CA_5B-30A-66A-66A	LTE B66	20	132072	1720	16QAM	1	50	66536	2120	LTE B66	20	67236	2190	LTE B5	10	2525	881.5	LTE B5	5	2453	874.3	LTE B30	10	9820	2355	-	-	-	-	14.50	14.60
CA_13A-46D-66A	LTE B66	20	132072	1720	16QAM	1	50	66536	2120	LTE B13	10	5230	751	LTE B46	20	50665	5537.5	LTE B46	20	50467	5517.7	LTE B46	20	50863	5557.3	-	-	-	-	14.60	14.60
CA_2A-2A-5A-30A-66A	LTE B66	20	132072	1720	16QAM	1	50	66536	2120	LTE B2	20	900	1960	LTE B2	20	700	1940	LTE B5	10	2525	881.5	LTE B30	10	9820	2355	-	-	-	-	14.60	14.60
CA_2A-2A-13A-30A-66A	LTE B66	20	132072	1720	16QAM	1	50	66536	2120	LTE B2	20	900	1960	LTE B2	20	700	1940	LTE B12	10	5095	737.5	LTE B30	10	9820	2355	-	-	-	-	14.59	14.60
CA_2A-5A-30A-66A-66A	LTE B66	20	132072	1720	16QAM	1	50	66536	2120	LTE B66	20	67236	2190	LTE B2	20	900	1960	LTE B5	10	2525	881.5	LTE B30	10	9820	2355	-	-	-	-	14.60	14.60
CA_2A-5B-30A-66A	LTE B66	20	132072	1720	16QAM	1	50	66536	2120	LTE B2	20	900	1960	LTE B5	10	2525	881.5	LTE B5	5	2453	874.3	LTE B30	10	9820	2355	-	-	-	-	14.60	14.60
CA_2A-12A-30A-66A-66A	LTE B66	20	132072	1720	16QAM	1	50	66536	2120	LTE B66	20	67236	2190	LTE B2	20	900	1960	LTE B12	10	5095	737.5	LTE B30	10	9820	2355	-	-	-	-	14.60	14.60
CA_2A-46A-48C-66A	LTE B66	20	132072	1720	16QAM	1	50	66536	2120	LTE B2	20	900	1960	LTE B46	20	50665	5537.5	LTE B48	20	55990	3625	LTE B48	20	56188	3644.8	-	-	-	-	14.58	14.60
CA_2A-46C-48A-66A	LTE B66	20	132072	1720	16QAM	1	50	66536	2120	LTE B2	20	900	1960	LTE B46	20	50665	5537.5	LTE B48	20	55990	3625	LTE B48	20	56188	3644.8	-	-	-	-	14.59	14.60
CA_2A-46E-66A	LTE B66	20	132072	1720	16QAM	1	50	66536	2120	LTE B2	20	900	1960	LTE B46	20	50665	5537.5	LTE B46	20	50467	5517.7	LTE B46	20	50863	5557.3	LTE B46	20	50269	5497.9	14.60	14.60
CA_2A-46A-48D-66A	LTE B66	20	132072	1720	16QAM	1	50	66536	2120	LTE B2	20	900	1960	LTE B46	20	50665	5537.5	LTE B48	20	55990	3625	LTE B48	20	56188	3644.8	LTE B48	20	56386	3664.6	14.59	14.60
CA_2A-46C-48C-66A	LTE B66	20	132072	1720	16QAM	1	50	66536	2120	LTE B2	20	900	1960	LTE B46	20	50665	5537.5	LTE B46	20	50467	5517.7	LTE B48	20	55990	3625	LTE B48	20	56188	3644.8	14.58	14.60
CA_2A-46D-48A-66A	LTE B66	20	132072	1720	16QAM	1	50	66536	2120	LTE B2	20	900	1960	LTE B46	20	50665	5537.5	LTE B46	20	50467	5517.7	LTE B46	20	50863	5557.3	LTE B48	20	55990	3625	14.59	14.60

1.3.6 LTE Band 25 as PCC

Table 6
Output Powers – Ant 2A

	PCC									SCC 1				SCC 2				SCC 3				SCC 4				Power	
Combination	PCC Band	PCC BW [MHz]	PCC (UL) Ch.	PCC (UL) Freq. [MHz]	Mod.	PCC UL# RB	PCC UL RB Offset	PCC (DL) Channel	PCC (DL) Freq. [MHz]	SCC Band	SCC BW [MHz]	SCC (DL) Channel	SCC (DL) Freq. [MHz]	SCC Band	SCC BW [MHz]	SCC (DL) Channel	SCC (DL) Freq. [MHz]	SCC Band	SCC BW [MHz]	SCC (DL) Channel	SCC (DL) Freq. [MHz]	SCC Band	SCC BW [MHz]	SCC (DL) Channel	SCC (DL) Freq. [MHz]	LTE Tx.Power with DL CA Enabled (dBm)	LTE Single Carrier Tx Power (dBm)
CA_5A-25A	LTE B25	20	26590	1905	16QAM	1	99	8590	1985	LTE B5	10	2525	881.5	-	-	-	-	-	-	-	-	-	-	-	-	15.00	15.10
CA_12A-25A	LTE B25	20	26590	1905	16QAM	1	99	8590	1985	LTE B12	10	5095	737.5	-	-	-	-	-	-	-	-	-	-	-	-	15.01	15.10
CA_25A-26A	LTE B25	20	26590	1905	16QAM	1	99	8590	1985	LTE B26	10	8865	876.5	-	-	-	-	-	-	-	-	-	-	-	-	15.10	15.10
CA_25A-46A	LTE B25	20	26590	1905	16QAM	1	99	8590	1985	LTE B46	20	50665	5537.5	-	-	-	-	-	-	-	-	-	-	-	-	15.10	15.10
CA_25A-25A-26A	LTE B25	20	26590	1905	16QAM	1	99	8590	1985	LTE B25	20	8140	1940	LTE B26	5	8865	876.5	-	-	-	-	-	-	-	-	14.84	15.10
CA_25A-25A-41A	LTE B25	20	26590	1905	16QAM	1	99	8590	1985	LTE B25	20	8140	1940	LTE B41	20	40620	2593	-	-	-	-	-	-	-	-	14.94	15.10
CA_25A-41C	LTE B25	20	26590	1905	16QAM	1	99	8590	1985	LTE B41	20	40620	2593	LTE B41	20	40422	2573.2	-	-	-	-	-	-	-	-	14.88	15.10
CA_25A-46C	LTE B25	20	26590	1905	16QAM	1	99	8590	1985	LTE B46	20	50665	5537.5	LTE B46	20	50467	5517.7	-	-	-	-	-	-	-	-	14.91	15.10
CA_25A-25A-41C	LTE B25	20	26590	1905	16QAM	1	99	8590	1985	LTE B25	20	8140	1940	LTE B41	20	40620	2593	LTE B41	20	40422	2573.2	-	-	-	-	14.71	15.10
CA_25A-46D	LTE B25	20	26590	1905	16QAM	1	99	8590	1985	LTE B46	20	50665	5537.5	LTE B46	20	50467	5517.7	LTE B46	20	50803	5557.3	-	-	-	-	15.00	15.10
CA_25A-25A-41D	LTE B25	20	26590	1905	16QAM	1	99	8590	1985	LTE B25	20	8140	1940	LTE B41	20	40422	2573.2	LTE B41	20	40620	2593	LTE B41	20	40818	2612.8	15.08	15.10

1.3.7 LTE Band 30 as PCC

Table 7
Output Powers – Ant 4B

	PCC									SCC 1				SCC 2				SCC 3				SCC 4				Power	
Combination	PCC Band	PCC BW [MHz]	PCC (UL) Ch.	PCC (UL) Freq. [MHz]	Mod.	PCC UL# RB	PCC UL RB Offset	PCC (DL) Channel	PCC (DL) Freq. [MHz]	SCC Band	SCC BW [MHz]	SCC (DL) Channel	SCC (DL) Freq. [MHz]	SCC Band	SCC BW [MHz]	SCC (DL) Channel	SCC (DL) Freq. [MHz]	SCC Band	SCC BW [MHz]	SCC (DL) Channel	SCC (DL) Freq. [MHz]	SCC Band	SCC BW [MHz]	SCC (DL) Channel	SCC (DL) Freq. [MHz]	LTE Tx.Power with DL CA Enabled (dBm)	LTE Single Carrier Tx Power (dBm)
CA_2C-30A	LTE B30	10	27710	2310	16QAM	1	25	9820	2355	LTE B2	20	900	1960	LTE B2	20	702	1940.2	-	-	-	-	-	-	-	-	13.50	13.50
CA_2A-2A-29A-30A	LTE B30	10	27710	2310	16QAM	1	25	9820	2355	LTE B2	20	900	1960	LTE B2	20	700	1940	LTE B29	10	9715	722.5	-	-	-	-	13.50	13.50
CA_4A-4A-5A-30A	LTE B30	10	27710	2310	16QAM	1	25	9820	2355	LTE B4	20	2175	2132.5	LTE B4	10	2350	2150	LTE B5	10	2525	881.5	-	-	-	-	13.48	13.50
CA_4A-4A-12A-30A	LTE B30	10	27710	2310	16QAM	1	25	9820	2355	LTE B4	20	2175	2132.5	LTE B4	10	2350	2150	LTE B12	10	5095	737.5	-	-	-	-	13.50	13.50
CA_2A-4A-5A-30A	LTE B30	10	27710	2310	16QAM	1	25	9820	2355	LTE B2	20	900	1960	LTE B4	20	2175	2132.5	LTE B5	10	2525	881.5	-	-	-	-	13.46	13.50
CA_2A-4A-12A-30A	LTE B30	10	27710	2310	16QAM	1	25	9820	2355	LTE B2	20	900	1960	LTE B4	20	2175	2132.5	LTE B12	10	5095	737.5	-	-	-	-	13.50	13.50
CA_2A-4A-29A-30A	LTE B30	10	27710	2310	16QAM	1	25	9820	2355	LTE B2	20	900	1960	LTE B4	20	2175	2132.5	LTE B29	10	9715	722.5	-	-	-	-	13.47	13.50
CA_2A-29A-30A-66A	LTE B30	10	27710	2310	16QAM	1	25	9820	2355	LTE B2	20	900	1960	LTE B29	10	9715	722.5	LTE B66	20	66786	2145	-	-	-	-	13.49	13.50
CA_5B-30A-66A-66A	LTE B30	10	27710	2310	16QAM	1	25	9820	2355	LTE B5	10	2525	881.5	LTE B5	5	2453	874.3	LTE B66	20	66786	2145	LTE B66	20	67236	2190	13.48	13.50
CA_2A-2A-5A-30A-66A	LTE B30	10	27710	2310	16QAM	1	25	9820	2355	LTE B2	20	900	1960	LTE B2	20	700	1940	LTE B5	10	2525	881.5	LTE B66	20	66786	2145	13.49	13.50
CA_2A-2A-12A-30A-66A	LTE B30	10	27710	2310	16QAM	1	25	9820	2355	LTE B2	20	900	1960	LTE B2	20	700	1940	LTE B12	10	5095	737.5	LTE B66	20	66786	2145	13.50	13.50
CA_2A-5A-30A-66A-66A	LTE B30	10	27710	2310	16QAM	1	25	9820	2355	LTE B2	20	900	1960	LTE B5	10	2525	881.5	LTE B66	20	66786	2145	LTE B66	20	67236	2190	13.50	13.50
CA_2A-5B-30A-66A	LTE B30	10	27710	2310	16QAM	1	25	9820	2355	LTE B2	20	900	1960	LTE B5	10	2525	881.5	LTE B5	5	2453	874.3	LTE B66	20	66786	2145	13.48	13.50
CA_2A-12A-30A-66A-66A	LTE B30	10	27710	2310	16QAM	1	25	9820	2355	LTE B2	20	900	1960	LTE B12	10	5095	737.5	LTE B66	20	66786	2145	LTE B66	20	67236	2190	13.47	13.50

1.3.8 LTE Band 7 as PCC

Table 8
Output Powers – Ant 4B

	PCC									SCC 1				SCC 2				SCC 3				SCC 4				Power	
Combination	PCC Band	PCC BW [MHz]	PCC (UL) Ch.	PCC (UL) Freq. [MHz]	Mod.	PCC UL# RB	PCC UL RB Offset	PCC (DL) Channel	PCC (DL) Freq. [MHz]	SCC Band	SCC BW [MHz]	SCC (DL) Channel	SCC (DL) Freq. [MHz]	SCC Band	SCC BW [MHz]	SCC (DL) Channel	SCC (DL) Freq. [MHz]	SCC Band	SCC BW [MHz]	SCC (DL) Channel	SCC (DL) Freq. [MHz]	SCC Band	SCC BW [MHz]	SCC (DL) Channel	SCC (DL) Freq. [MHz]	LTE Tx.Power with DL CA Enabled (dBm)	LTE Single Carrier Tx Power (dBm)
CA_7B	LTE B7	15	21100	2535	QPSK	1	74	3100	2655	LTE B7	5	3007	2645.7	-	-	-	-	-	-	-	-	-	-	-	-	13.07	13.13
CA_5A-7A	LTE B7	20	21100	2535	QPSK	50	0	3100	2655	LTE B5	10	2525	881.5	-	-	-	-	-	-	-	-	-	-	-	-	13.19	13.24
CA_7A-26A	LTE B7	20	21100	2535	QPSK	50	0	3100	2655	LTE B26	10	8865	876.5	-	-	-	-	-	-	-	-	-	-	-	-	13.22	13.24
CA_7A-46A (1)	LTE B7	20	21100	2535	QPSK	50	0	3100	2655	LTE B46	20	50665	5537.5	-	-	-	-	-	-	-	-	-	-	-	-	13.26	13.24
CA_4A-4A-7A (1)	LTE B7	20	21100	2535	QPSK	50	0	3100	2655	LTE B4	20	2175	2132.5	LTE B4	10	2350	2150	-	-	-	-	-	-	-	-	13.16	13.24
CA_5A-7A-7A	LTE B7	20	21100	2535	QPSK	50	0	3100	2655	LTE B7	20	2850	2630	LTE B5	10	2525	881.5	-	-	-	-	-	-	-	-	13.20	13.24
CA_5A-7C	LTE B7	20	21100	2535	QPSK	50	0	3100	2655	LTE B7	20	2902	2635.2	LTE B5	10	2525	881.5	-	-	-	-	-	-	-	-	13.26	13.24
CA_7A-7A-26A	LTE B7	20	21100	2535	QPSK	50	0	3100	2655	LTE B7	20	2850	2630	LTE B26	10	8865	876.5	-	-	-	-	-	-	-	-	13.25	13.24
CA_7A-46C (1)	LTE B7	20	21100	2535	QPSK	50	0	3100	2655	LTE B46	20	50665	5537.5	LTE B46	20	50467	5517.7	-	-	-	-	-	-	-	-	13.26	13.24
CA_7C-46A	LTE B7	20	21100	2535	QPSK	50	0	3100	2655	LTE B7	20	2902	2635.2	LTE B46	20	50665	5537.5	-	-	-	-	-	-	-	-	13.20	13.24
CA_7A-46D (1)	LTE B7	20	21100	2535	QPSK	50	0	3100	2655	LTE B46	20	50665	5537.5	LTE B46	20	50467	5517.7	LTE B46	20	50803	5557.3	-	-	-	-	13.23	13.24
CA_7C-46C	LTE B7	20	21100	2535	QPSK	50	0	3100	2655	LTE B7	20	2902	2635.2	LTE B46	20	50665	5537.5	LTE B46	20	50467	5517.7	-	-	-	-	13.21	13.24
CA_2A-4A-7A-7A	LTE B7	20	21100	2535	QPSK	50	0	3100	2655	LTE B7	20	2850	2630	LTE B2	20	900	1960	LTE B4	20	2175	2132.5	-	-	-	-	13.17	13.24
CA_2A-4A-7C	LTE B7	20	21100	2535	QPSK	50	0	3100	2655	LTE B7	20	2902	2635.2	LTE B2	20	900	1960	LTE B4	20	2175	2132.5	-	-	-	-	13.19	13.24
CA_2A-4A-7A-12A	LTE B7	20	21100	2535	QPSK	50	0	3100	2655	LTE B2	20	900	1960	LTE B4	20	2175	2132.5	LTE B12	10	5095	737.5	-	-	-	-	13.16	13.24
CA_2A-7A-7A-66A	LTE B7	20	21100	2535	QPSK	50	0	3100	2655	LTE B7	20	2850	2630	LTE B2	20	900	1960	LTE B66	20	66786	2145	-	-	-	-	13.17	13.24
CA_2A-7A-12A-66A	LTE B7	20	21100	2535	QPSK	50	0	3100	2655	LTE B2	20	900	1960	LTE B12	10	5095	737.5	LTE B66	20	66786	2145	-	-	-	-	13.20	13.24
CA_7C-46D	LTE B7	20	21100	2535	QPSK	50	0	3100	2655	LTE B7	20	2902	2635.2	LTE B46	20	50665	5537.5	LTE B46	20	50467	5517.7	LTE B46	20	50863	5557.3	13.17	13.24

1.3.9 LTE Band 41 as PCC

Table 9
Output Powers – Ant 4B

	PCC									SCC 1				SCC 2				SCC 3				SCC 4				Power	
Combination	PCC Band	PCC BW [MHz]	PCC (UL) Ch.	PCC (UL) Freq. [MHz]	Mod.	PCC UL# RB	PCC UL RB Offset	PCC (DL) Channel	PCC (DL) Freq. [MHz]	SCC Band	SCC BW [MHz]	SCC (DL) Channel	SCC (DL) Freq. [MHz]	SCC Band	SCC BW [MHz]	SCC (DL) Channel	SCC (DL) Freq. [MHz]	SCC Band	SCC BW [MHz]	SCC (DL) Channel	SCC (DL) Freq. [MHz]	SCC Band	SCC BW [MHz]	SCC (DL) Channel	SCC (DL) Freq. [MHz]	LTE Tx.Power with DL CA Enabled (dBm)	LTE Single Carrier Tx Power (dBm)
CA_41A-41A (1)	LTE B41	20	40620	2593	16QAM	1	0	40620	2593	LTE B41	20	41490	2680	-	-	-	-	-	-	-	-	-	-	-	-	15.88	15.90
CA_5A-41A	LTE B41	20	40620	2593	16QAM	1	0	40620	2593	LTE B5	10	2525	881.5	-	-	-	-	-	-	-	-	-	-	-	-	15.89	15.90
CA_26A-41A	LTE B41	20	40620	2593	16QAM	1	0	40620	2593	LTE B26	10	8865	876.5	-	-	-	-	-	-	-	-	-	-	-	-	15.90	15.90
CA_41A-41C	LTE B41	20	40620	2593	16QAM	1	0	40620	2593	LTE B41	20	41292	2660.2	LTE B41	20	41490	2680	-	-	-	-	-	-	-	-	15.87	15.90
CA_41C-41A	LTE B41	20	40620	2593	16QAM	1	0	40620	2593	LTE B41	20	40818	2612.8	LTE B41	20	41490	2680	-	-	-	-	-	-	-	-	15.88	15.90
CA_25A-25A-41A	LTE B41	20	40620	2593	16QAM	1	0	40620	2593	LTE B25	20	8365	1962.5	LTE B25	20	8590	1985	-	-	-	-	-	-	-	-	15.88	15.90
CA_25A-41C	LTE B41	20	40620	2593	16QAM	1	0	40620	2593	LTE B41	20	40818	2612.8	LTE B25	20	8365	1962.5	-	-	-	-	-	-	-	-	15.89	15.90
CA_26A-41C	LTE B41	20	40620	2593	16QAM	1	0	40620	2593	LTE B41	20	40818	2612.8	LTE B26	10	8865	876.5	-	-	-	-	-	-	-	-	15.89	15.90
CA_41E	LTE B41	20	40620	2593	16QAM	1	0	40620	2593	LTE B41	20	40422	2573.2	LTE B41	20	40818	2612.8	LTE B41	20	41016	2632.6	-	-	-	-	15.89	15.90
CA_41A-41D	LTE B41	20	40620	2593	16QAM	1	0	40620	2593	LTE B41	20	41094	2640.4	LTE B41	20	41292	2660.2	LTE B41	20	41490	2680	-	-	-	-	15.88	15.90
CA_41D-41A	LTE B41	20	40620	2593	16QAM	1	0	40620	2593	LTE B41	20	40422	2573.2	LTE B41	20	40818	2612.8	LTE B41	20	41490	2680	-	-	-	-	15.90	15.90
CA_41C-41C	LTE B41	20	40620	2593	16QAM	1	0	40620	2593	LTE B41	20	40422	2573.2	LTE B41	20	41292	2660.2	LTE B41	20	41490	2680	-	-	-	-	15.88	15.90
CA_25A-25A-41C	LTE B41	20	40620	2593	16QAM	1	0	40620	2593	LTE B41	20	40422	2573.2	LTE B25	20	8365	1962.5	LTE B25	20	8590	1985	-	-	-	-	15.89	15.90
CA_41C-41D	LTE B41	20	40620	2593	16QAM	1	0	40620	2593	LTE B41	20	40422	2573.2	LTE B41	20	41094	2640.4	LTE B41	20	41292	2660.2	LTE B41	20	41490	2680	15.90	15.90
CA_41D-41C	LTE B41	20	40620	2593	16QAM	1	0	40620	2593	LTE B41	20	40422	2573.2	LTE B41	20	40818	2612.8	LTE B41	20	41292	2660.2	LTE B41	20	41490	2680	15.89	15.90
CA_25A-25A-41D	LTE B41	20	40620	2593	16QAM	1	0	40620	2593	LTE B41	20	40422	2573.2	LTE B41	20	40818	2612.8	LTE B25	20	8365	1962.5	LTE B25	20	8590	1985	15.90	15.90

1.3.10 LTE Band 41 PC2 as PCC

Table 10
Output Powers – Ant 4B

	PCC									SCC 1				SCC 2				SCC 3				SCC 4				Power	
Combination	PCC Band	PCC BW [MHz]	PCC (UL) Ch.	PCC (UL) Freq. [MHz]	Mod.	PCC UL# RB	PCC UL RB Offset	PCC (DL) Channel	PCC (DL) Freq. [MHz]	SCC Band	SCC BW [MHz]	SCC (DL) Channel	SCC (DL) Freq. [MHz]	SCC Band	SCC BW [MHz]	SCC (DL) Channel	SCC (DL) Freq. [MHz]	SCC Band	SCC BW [MHz]	SCC (DL) Channel	SCC (DL) Freq. [MHz]	SCC Band	SCC BW [MHz]	SCC (DL) Channel	SCC (DL) Freq. [MHz]	LTE Tx.Power with DL CA Enabled (dBm)	LTE Single Carrier Tx Power (dBm)
CA_41A-41A (1)	LTE B41 PC2	20	40620	2593	64QAM	1	0	40620	2593	LTE B41 PC2	20	41490	2680	-	-	-	-	-	-	-	-	-	-	-	-	15.89	15.90
CA_5A-41A	LTE B41 PC2	20	40620	2593	64QAM	1	0	40620	2593	LTE B5	10	2525	881.5	-	-	-	-	-	-	-	-	-	-	-	-	15.90	15.90
CA_26A-41A	LTE B41 PC2	20	40620	2593	64QAM	1	0	40620	2593	LTE B26	10	8865	876.5	-	-	-	-	-	-	-	-	-	-	-	-	15.90	15.90
CA_41A-41C	LTE B41 PC2	20	40620	2593	64QAM	1	0	40620	2593	LTE B41 PC2	20	41292	2660.2	LTE B41 PC2	20	41490	2680	-	-	-	-	-	-	-	-	15.90	15.90
CA_41C-41A	LTE B41 PC2	20	40620	2593	64QAM	1	0	40620	2593	LTE B41 PC2	20	40818	2612.8	LTE B41 PC2	20	41490	2680	-	-	-	-	-	-	-	-	15.89	15.90
CA_25A-25A-41A	LTE B41 PC2	20	40620	2593	64QAM	1	0	40620	2593	LTE B25	20	8365	1962.5	LTE B25	20	8590	1985	-	-	-	-	-	-	-	-	15.88	15.90
CA_25A-41C	LTE B41 PC2	20	40620	2593	64QAM	1	0	40620	2593	LTE B41 PC2	20	40818	2612.8	LTE B25	20	8365	1962.5	-	-	-	-	-	-	-	-	15.89	15.90
CA_26A-41C	LTE B41 PC2	20	40620	2593	64QAM	1	0	40620	2593	LTE B41 PC2	20	40818	2612.8	LTE B26	10	8865	876.5	-	-	-	-	-	-	-	-	15.88	15.90
CA_41E	LTE B41 PC2	20	40620	2593	64QAM	1	0	40620	2593	LTE B41 PC2	20	40422	2573.2	LTE B41 PC2	20	40818	2612.8	LTE B41 PC2	20	41016	2632.6	-	-	-	-	15.86	15.90
CA_41A-41D	LTE B41 PC2	20	40620	2593	64QAM	1	0	40620	2593	LTE B41 PC2	20	41094	2640.4	LTE B41 PC2	20	41292	2660.2	LTE B41 PC2	20	41490	2680	-	-	-	-	15.87	15.90
CA_41D-41A	LTE B41 PC2	20	40620	2593	64QAM	1	0	40620	2593	LTE B41 PC2	20	40422	2573.2	LTE B41 PC2	20	40818	2612.8	LTE B41 PC2	20	41490	2680	-	-	-	-	15.87	15.90
CA_41C-41C	LTE B41 PC2	20	40620	2593	64QAM	1	0	40620	2593	LTE B41 PC2	20	40422	2573.2	LTE B41 PC2	20	41292	2660.2	LTE B41 PC2	20	41490	2680	-	-	-	-	15.88	15.90
CA_25A-25A-41C	LTE B41 PC2	20	40620	2593	64QAM	1	0	40620	2593	LTE B41 PC2	20	40422	2573.2	LTE B25	20	8365	1962.5	LTE B25	20	8590	1985	-	-	-	-	15.88	15.90
CA_41C-41D	LTE B41 PC2	20	40620	2593	64QAM	1	0	40620	2593	LTE B41 PC2	20	40422	2573.2	LTE B41 PC2	20	41094	2640.4	LTE B41 PC2	20	41292	2660.2	LTE B41 PC2	20	41490	2680	15.90	15.90
CA_41D-41C	LTE B41 PC2	20	40620	2593	64QAM	1	0	40620	2593	LTE B41 PC2	20	40422	2573.2	LTE B41 PC2	20	40818	2612.8	LTE B41 PC2	20	41292	2660.2	LTE B41 PC2	20	41490	2680	15.88	15.90
CA_25A-25A-41D	LTE B41 PC2	20	40620	2593	64QAM	1	0	40620	2593	LTE B41 PC2	20	40422	2573.2	LTE B41 PC2	20	40818	2612.8	LTE B25	20	8365	1962.5	LTE B25	20	8590	1985	15.88	15.90

1.3.11 LTE Band 48 as PCC

Table 11
Output Powers – Ant 3

	PCC									SCC 1				SCC 2				SCC 3				SCC 4				SCC 5				Power	
Combination	PCC Band	PCC BW [MHz]	PCC (UL) Ch.	PCC (UL) Freq. [MHz]	Mod.	PCC UL# RB	PCC UL RB Offset	PCC (DL) Channel	PCC (DL) Freq. [MHz]	SCC Band	SCC BW [MHz]	SCC (DL) Channel	SCC (DL) Freq. [MHz]	SCC Band	SCC BW [MHz]	SCC (DL) Channel	SCC (DL) Freq. [MHz]	SCC Band	SCC BW [MHz]	SCC (DL) Channel	SCC (DL) Freq. [MHz]	SCC Band	SCC BW [MHz]	SCC (DL) Channel	SCC (DL) Freq. [MHz]	SCC Band	SCC BW [MHz]	SCC (DL) Channel	SCC (DL) Freq. [MHz]	LTE Tx.Power with DL CA Enabled (dBm)	LTE Single Carrier Tx Power (dBm)
CA_5A-48A	LTE B48	20	56207	3646.7	64QAM	1	99	56207	3646.7	LTE B5	10	2525	881.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	16.48	16.50
CA_2A-48A-48A	LTE B48	20	56207	3646.7	64QAM	1	99	56207	3646.7	LTE B48	20	55340	3560	LTE B2	20	900	1960	-	-	-	-	-	-	-	-	-	-	-	-	16.50	16.50
CA_13A-48A-66A	LTE B48	20	56207	3646.7	64QAM	1	99	56207	3646.7	LTE B13	10	5230	751	LTE B66	20	66786	2145	-	-	-	-	-	-	-	-	-	-	-	-	16.48	16.50
CA_48A-48A-66A-66A	LTE B48	20	56207	3646.7	64QAM	1	99	56207	3646.7	LTE B48	20	55340	3560	LTE B66	20	66786	2145	LTE B66	20	67236	2190	-	-	-	-	-	-	-	-	16.48	16.50
CA_48A-48C-66A	LTE B48	20	56207	3646.7	64QAM	1	99	56207	3646.7	LTE B48	20	55340	3560	LTE B48	20	55538	3579.8	LTE B66	20	66786	2145	-	-	-	-	-	-	-	-	16.46	16.50
CA_48C-48A-66A	LTE B48	20	56207	3646.7	64QAM	1	99	56207	3646.7	LTE B48	20	56099	3626.9	LTE B48	20	55340	3560	LTE B66	20	66786	2145	-	-	-	-	-	-	-	-	16.50	16.50
CA_48C-48A-66A	LTE B48	20	56207	3646.7	64QAM	1	99	56207	3646.7	LTE B48	20	56099	3626.9	LTE B48	20	56098	3626.8	LTE B66	20	67236	2190	-	-	-	-	-	-	-	-	16.50	16.50
CA_13A-48C-66A	LTE B48	20	56207	3646.7	64QAM	1	99	56207	3646.7	LTE B48	20	56099	3626.9	LTE B13	10	5230	751	LTE B66	20	66786	2145	-	-	-	-	-	-	-	-	16.50	16.50
CA_2A-46A-48A-66A	LTE B48	20	56207	3646.7	64QAM	1	99	56207	3646.7	LTE B2	20	900	1960	LTE B46	20	50665	5537.5	LTE B66	20	66786	2145	-	-	-	-	-	-	-	-	16.45	16.50
CA_2A-48E	LTE B48	20	56207	3646.7	64QAM	1	99	56207	3646.7	LTE B48	20	56099	3626.9	LTE B48	20	55811	3607.1	LTE B48	20	55613	3587.3	LTE B2	20	900	1960	-	-	-	-	16.47	16.50
CA_46C-48D	LTE B48	20	56207	3646.7	64QAM	1	99	56207	3646.7	LTE B48	20	56099	3626.9	LTE B48	20	55811	3607.1	LTE B46	20	50665	5537.5	LTE B46	20	50863	5557.3	-	-	-	-	16.49	16.50
CA_48E-66A	LTE B48	20	56207	3646.7	64QAM	1	99	56207	3646.7	LTE B48	20	56099	3626.9	LTE B48	20	55811	3607.1	LTE B48	20	55613	3587.3	LTE B66	20	66786	2145	-	-	-	-	16.48	16.50
CA_2A-46C-48C-66A	LTE B48	20	56207	3646.7	64QAM	1	99	56207	3646.7	LTE B48	20	56099	3626.9	LTE B2	20	900	1960	LTE B46	20	50665	5537.5	LTE B66	20	66786	2145	-	-	-	-	16.48	16.50
CA_2A-46C-48A-66A	LTE B48	20	56207	3646.7	64QAM	1	99	56207	3646.7	LTE B2	20	900	1960	LTE B46	20	50665	5537.5	LTE B46	20	50467	5517.7	LTE B66	20	66786	2145	-	-	-	-	16.47	16.50
CA_2A-46A-48D-66A	LTE B48	20	56207	3646.7	64QAM	1	99	56207	3646.7	LTE B48	20	56018	3627.8	LTE B48	20	55820	3608	LTE B2	20	900	1960	LTE B46	20	50665	5537.5	LTE B66	20	66786	2145	16.49	16.50
CA_2A-46C-48C-66A	LTE B48	20	56207	3646.7	64QAM	1	99	56207	3646.7	LTE B48	20	56099	3626.9	LTE B2	20	900	1960	LTE B46	20	50665	5537.5	LTE B46	20	50467	5517.7	LTE B66	20	66786	2145	16.49	16.50
CA_2A-46D-48A-66A	LTE B48	20	56207	3646.7	64QAM	1	99	56207	3646.7	LTE B2	20	900	1960	LTE B46	20	50665	5537.5	LTE B46	20	50467	5517.7	LTE B46	20	50863	5557.3	LTE B66	20	66786	2145	16.50	16.50

1.4 DL CA with DL 4x4 MIMO RF Conduction Powers

This device supports downlink 4x4 MIMO operations for some LTE bands. Uplink transmission is limited to a single output stream. When carrier aggregation was applicable, the general test selection and setup procedures described in Section 1.2 were applied.

Per May 2017 TCB Workshop Notes, SAR for 4x4 DL MIMO was not needed since the maximum average output power in 4x4 DL MIMO mode was not more than 0.25 dB higher than the maximum output power with 4x4 DL MIMO inactive. Additionally, SAR for 4x4 MIMO Downlink Carrier Aggregation was not needed since the maximum average output power in 4x4 MIMO Downlink Carrier Aggregation mode was not more than 0.25 dB higher than the maximum output power with 4x4 MIMO Downlink and downlink carrier aggregation inactive.

1.4.1 LTE 4x4 MIMO DL Standalone Powers

Table 12
Output Powers – Ant 3

LTE Band	Bandwidth [MHz]	Channel	Frequency [MHz]	Modulation	RB Size	RB Offset	4x4 DL MIMO Tx. Power [dBm]	Single Antenna Tx. Power [dBm]	Maximum Allowed Power [dBm]
48	20	56207	3646.7	64QAM	1	99	16.50	16.50	16.50

Table 13
Output Powers – Ant 2A

LTE Band	Bandwidth [MHz]	Channel	Frequency [MHz]	Modulation	RB Size	RB Offset	4x4 DL MIMO Tx. Power [dBm]	Single Antenna Tx. Power [dBm]	Maximum Allowed Power [dBm]
25	20	26590	1905	16QAM	1	99	14.98	15.10	15.10

Table 14
Output Powers – Ant 2B

LTE Band	Bandwidth [MHz]	Channel	Frequency [MHz]	Modulation	RB Size	RB Offset	4x4 DL MIMO Tx. Power [dBm]	Single Antenna Tx. Power [dBm]	Maximum Allowed Power [dBm]
66	20	132072	1720	16QAM	1	50	14.54	14.60	14.90

Table 15
Output Powers – Ant 4B

LTE Band	Bandwidth [MHz]	Channel	Frequency [MHz]	Modulation	RB Size	RB Offset	4x4 DL MIMO Tx. Power [dBm]	Single Antenna Tx. Power [dBm]	Maximum Power [dBm]
7	20	21100	2535	QPSK	50	0	13.26	13.24	13.30
30	10	27710	2310	16QAM	1	25	13.47	13.50	13.70
41	20	40620	2593	16QAM	1	0	15.81	15.90	15.90
41 PC2	20	40620	2593	64QAM	1	0	15.78	15.90	15.90

1.4.2 LTE Band 12 as PCC

Table 16
Output Powers – Ant 1

	PCC										SCC 1					SCC 2					SCC 3					SCC 4					Power	
Combination	PCC Band	PCC BW [MHz]	PCC (UL) Ch.	PCC (UL) Freq. [MHz]	Mod.	PCC UL# RB	PCC UL RB Offset	PCC (DL) Ch.	PCC (DL) Freq. [MHz]	DL Ant. Config.	SCC Band	SCC BW [MHz]	SCC (DL) Ch.	SCC (DL) Freq. [MHz]	DL Ant. Config.	SCC Band	SCC BW [MHz]	SCC (DL) Ch.	SCC (DL) Freq. [MHz]	DL Ant. Config.	SCC Band	SCC BW [MHz]	SCC (DL) Ch.	SCC (DL) Freq. [MHz]	DL Ant. Config.	SCC Band	SCC BW [MHz]	SCC (DL) Ch.	SCC (DL) Freq. [MHz]	DL Ant. Config.	LTE Tx.Power with DL CA Enabled (dBm)	LTE Single Carrier Tx Power (dBm)
CA_{2A}-12A (1)	LTE B12	3	23025	700.5	64QAM	1	7	5025	730.5	2x2	LTE B2	20	900	1960	4x4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	21.04	21.49
CA_{4A}-12A (1)	LTE B12	5	23035	701.5	16QAM	1	24	5035	731.5	2x2	LTE B4	20	2175	2132.5	4x4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	21.08	21.44
CA_{4A}-12A (2)	LTE B12	3	23025	700.5	64QAM	1	7	5025	730.5	2x2	LTE B4	20	2175	2132.5	4x4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	21.05	21.49
CA_12A-{25A}	LTE B12	5	23035	701.5	16QAM	1	24	5035	731.5	2x2	LTE B25	20	8365	1962.5	4x4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	21.01	21.44
CA_12A-{66A} (1)	LTE B12	5	23035	701.5	16QAM	1	24	5035	731.5	2x2	LTE B66	20	66786	2145	4x4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	21.06	21.44
CA_12A-{66A} (2)	LTE B12	3	23025	700.5	64QAM	1	7	5025	730.5	2x2	LTE B66	20	66786	2145	4x4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	21.06	21.44
CA_{2C}-12A	LTE B12	5	23035	701.5	16QAM	1	24	5035	731.5	2x2	LTE B2	20	900	1960	4x4	LTE B2	20	702	1940.2	4x4	-	-	-	-	-	-	-	-	-	-	21.15	21.44
CA_{2A}-{2A}-12B	LTE B12	5	23035	701.5	16QAM	1	24	5035	731.5	2x2	LTE B12	10	5107	738.7	2x2	LTE B2	20	900	1960	4x4	LTE B2	20	700	1940	4x4	-	-	-	-	-	21.40	21.44
CA_{4A}-{4A}-12B	LTE B12	5	23035	701.5	16QAM	1	24	5035	731.5	2x2	LTE B12	10	5107	738.7	2x2	LTE B4	20	2175	2132.5	4x4	LTE B4	10	2350	2150	4x4	-	-	-	-	-	21.42	21.44
CA_{2A}-{2A}-{4A}-12A	LTE B12	5	23035	701.5	16QAM	1	24	5035	731.5	2x2	LTE B2	20	900	1960	4x4	LTE B2	20	700	1940	4x4	LTE B4	20	2175	2132.5	4x4	-	-	-	-	-	21.11	21.44
CA_{2A}-{2A}-12A-{30A}	LTE B12	5	23035	701.5	16QAM	1	24	5035	731.5	2x2	LTE B2	20	900	1960	4x4	LTE B2	20	700	1940	4x4	LTE B30	10	9820	2355	4x4	-	-	-	-	-	21.09	21.44
CA_{2A}-{2A}-12A-{66A}	LTE B12	5	23035	701.5	16QAM	1	24	5035	731.5	2x2	LTE B2	20	900	1960	4x4	LTE B2	20	700	1940	4x4	LTE B66	20	66786	2145	4x4	-	-	-	-	-	20.92	21.44
CA_{2A}-{4A}-{4A}-12A	LTE B12	5	23035	701.5	16QAM	1	24	5035	731.5	2x2	LTE B2	20	900	1960	4x4	LTE B4	20	2175	2132.5	4x4	LTE B4	10	2350	2150	4x4	-	-	-	-	-	21.05	21.44
CA_{2A}-{4A}-12B	LTE B12	5	23035	701.5	16QAM	1	24	5035	731.5	2x2	LTE B12	10	5107	738.7	2x2	LTE B2	20	900	1960	4x4	LTE B4	20	2175	2132.5	4x4	-	-	-	-	-	21.06	21.44
CA_{2A}-12A-{66A}-{66A}	LTE B12	5	23035	701.5	16QAM	1	24	5035	731.5	2x2	LTE B2	20	900	1960	4x4	LTE B66	20	66786	2145	4x4	LTE B66	20	67236	2190	4x4	-	-	-	-	-	21.49	21.44
CA_{2A}-12A-{66C}	LTE B12	5	23035	701.5	16QAM	1	24	5035	731.5	2x2	LTE B2	20	900	1960	4x4	LTE B66	20	66786	2145	4x4	LTE B66	20	66984	2164.8	4x4	-	-	-	-	-	21.39	21.44
CA_{4A}-{4A}-12A-{30A}	LTE B12	5	23035	701.5	16QAM	1	24	5035	731.5	2x2	LTE B4	20	2175	2132.5	4x4	LTE B4	10	2350	2150	4x4	LTE B30	10	9820	2355	4x4	-	-	-	-	-	21.39	21.44
CA_12A-{30A}-{66A}-{66A}	LTE B12	5	23035	701.5	16QAM	1	24	5035	731.5	2x2	LTE B30	10	9820	2355	4x4	LTE B66	20	66786	2145	4x4	LTE B66	20	67236	2190	4x4	-	-	-	-	-	21.37	21.44
CA_{2A}-{4A}-{7A}-12A	LTE B12	5	23035	701.5	16QAM	1	24	5035	731.5	2x2	LTE B2	20	900	1960	4x4	LTE B4	20	2175	2132.5	4x4	LTE B7	20	3100	2655	4x4	-	-	-	-	-	21.36	21.44
CA_{2A}-{4A}-12A-{30A}	LTE B12	5	23035	701.5	16QAM	1	24	5035	731.5	2x2	LTE B2	20	900	1960	4x4	LTE B4	20	2175	2132.5	4x4	LTE B30	10	9820	2355	4x4	-	-	-	-	-	21.10	21.44
CA_{2A}-{7A}-12A-{66A}	LTE B12	5	23035	701.5	16QAM	1	24	5035	731.5	2x2	LTE B2	20	900	1960	4x4	LTE B7	20	3100	2655	4x4	LTE B66	20	66786	2145	4x4	-	-	-	-	-	21.36	21.44
CA_{2A}-12A-{30A}-{66A}	LTE B12	5	23035	701.5	16QAM	1	24	5035	731.5	2x2	LTE B2	20	900	1960	4x4	LTE B30	10	9820	2355	4x4	LTE B66	20	66786	2145	4x4	-	-	-	-	-	21.38	21.44
CA_{2A}-{2A}-12A-66A-66A	LTE B12	5	23035	701.5	16QAM	1	24	5035	731.5	2x2	LTE B2	20	900	1960	4x4	LTE B2	20	700	1940	4x4	LTE B66	20	66786	2145	2x2	LTE B66	20	67236	2190	2x2	21.38	21.44
CA_2A-2A-12A-{30A}-{66A}	LTE B12	5	23035	701.5	16QAM	1	24	5035	731.5	2x2	LTE B2	20	900	1960	2x2	LTE B2	20	700	1940	2x2	LTE B30	10	9820	2355	4x4	LTE B66	20	66786	2145	4x4	21.42	21.44
CA_2A-12A-30A-{66A}-{66A}	LTE B12	5	23035	701.5	16QAM	1	24	5035	731.5	2x2	LTE B2	20	900	1960	2x2	LTE B30	10	9820	2355	2x2	LTE B66	20	66786	2145	4x4	LTE B66	20	67236	2190	4x4	21.32	21.44

1.4.3 LTE Band 13 as PCC

Table 17
Output Powers – Ant 1

	PCC										SCC 1					SCC 2					SCC 3					SCC 4					Power	
Combination	PCC Band	PCC BW [MHz]	PCC (UL) Ch.	PCC (UL) Freq. [MHz]	Mod.	PCC UL# RB	PCC UL RB Offset	PCC (DL) Ch.	PCC (DL) Freq. [MHz]	DL Ant. Config.	SCC Band	SCC BW [MHz]	SCC (DL) Ch.	SCC (DL) Freq. [MHz]	DL Ant. Config.	SCC Band	SCC BW [MHz]	SCC (DL) Ch.	SCC (DL) Freq. [MHz]	DL Ant. Config.	SCC Band	SCC BW [MHz]	SCC (DL) Ch.	SCC (DL) Freq. [MHz]	DL Ant. Config.	SCC Band	SCC BW [MHz]	SCC (DL) Ch.	SCC (DL) Freq. [MHz]	DL Ant. Config.	LTE Tx.Power with DL CA Enabled (dBm)	LTE Single Carrier Tx Power (dBm)
CA_{4A}-{4A}-13A	LTE B13	10	23230	782	QPSK	1	0	5230	751	2x2	LTE B4	20	2175	2132.5	4x4	LTE B4	10	2350	2150	4x4	-	-	-	-	-	-	-	-	-	-	21.14	21.14
CA_{2A}-{4A}-13A	LTE B13	10	23230	782	QPSK	1	0	5230	751	2x2	LTE B2	20	900	1960	4x4	LTE B4	20	2175	2132.5	4x4	-	-	-	-	-	-	-	-	-	-	21.13	21.14
CA_{2A}-13A-46A	LTE B13	5	23230	782	16QAM	1	24	5230	751	2x2	LTE B2	20	900	1960	4x4	LTE B46	20	50665	5537.5	2x2	-	-	-	-	-	-	-	-	-	-	20.82	21.16
CA_13A-46A-{66A}	LTE B13	5	23230	782	16QAM	1	24	5230	751	2x2	LTE B46	20	50665	5537.5	2x2	LTE B66	20	66786	2145	4x4	-	-	-	-	-	-	-	-	-	-	21.15	21.16
CA_13A-{48A}-{66A}	LTE B13	5	23230	782	16QAM	1	24	5230	751	2x2	LTE B48	20	55990	3625	4x4	LTE B66	20	66786	2145	4x4	-	-	-	-	-	-	-	-	-	-	21.16	21.16
CA_13A-{66A}-{66B}	LTE B13	5	23230	782	16QAM	1	24	5230	751	2x2	LTE B66	20	66786	2145	4x4	LTE B66	5	67168	2183.2	4x4	LTE B66	15	67261	2192.5	4x4	-	-	-	-	-	20.89	21.16
CA_13A-{66A}-{66C}	LTE B13	5	23230	782	16QAM	1	24	5230	751	2x2	LTE B66	20	66786	2145	4x4	LTE B66	20	67038	2170.2	4x4	LTE B66	20	67236	2190	4x4	-	-	-	-	-	20.71	21.16
CA_{2A}-{2A}-13A-{66A}	LTE B13	5	23230	782	16QAM	1	24	5230	751	2x2	LTE B2	20	900	1960	4x4	LTE B2	20	700	1940	4x4	LTE B66	20	66786	2145	4x4	-	-	-	-	-	20.78	21.16
CA_{2A}-13A-46C	LTE B13	5	23230	782	16QAM	1	24	5230	751	2x2	LTE B2	20	900	1960	4x4	LTE B46	20	50665	5537.5	2x2	LTE B46	20	50467	5517.7	2x2	-	-	-	-	-	20.83	21.16
CA_{2A}-13A-{66A}-{66A}	LTE B13	5	23230	782	16QAM	1	24	5230	751	2x2	LTE B2	20	900	1960	4x4	LTE B66	20	66786	2145	4x4	LTE B66	20	67236	2190	4x4	-	-	-	-	-	20.77	21.16
CA_{2A}-13A-{66B}	LTE B13	5	23230	782	16QAM	1	24	5230	751	2x2	LTE B2	20	900	1960	4x4	LTE B66	15	66786	2145	4x4	LTE B66	5	66879	2154.3	4x4	-	-	-	-	-	20.71	21.16
CA_{2A}-13A-{66C}	LTE B13	5	23230	782	16QAM	1	24	5230	751	2x2	LTE B2	20	900	1960	4x4	LTE B66	20	66786	2145	4x4	LTE B66	20	66984	2164.8	4x4	-	-	-	-	-	20.71	21.16
CA_13A-46C-{66A}	LTE B13	5	23230	782	16QAM	1	24	5230	751	2x2	LTE B46	20	50665	5537.5	2x2	LTE B46	20	50467	5517.7	2x2	LTE B66	20	66786	2145	4x4	-	-	-	-	-	21.16	21.16
CA_13A-{48C}-{66A}	LTE B13	5	23230	782	16QAM	1	24	5230	751	2x2	LTE B48	20	55990	3625	4x4	LTE B48	20	56188	3644.8	4x4	LTE B66	20	66786	2145	4x4	-	-	-	-	-	21.08	21.16
CA_{2A}-13A-46D	LTE B13	5	23230	782	16QAM	1	24	5230	751	2x2	LTE B2	20	900	1960	4x4	LTE B46	20	50665	5537.5	2x2	LTE B46	20	50467	5517.7	2x2	LTE B46	20	50863	5557.3	2x2	20.86	21.16
CA_13A-46D-{66A}	LTE B13	5	23230	782	16QAM	1	24	5230	751	2x2	LTE B46	20	50665	5537.5	2x2	LTE B46	20	50467	5517.7	2x2	LTE B46	20	50863	5557.3	2x2	LTE B66	20	66786	2145	4x4	21.16	21.16

1.4.4 LTE Band 5 as PCC

Table 18
Output Powers – Ant 1

	PCC										SCC 1					SCC 2					SCC 3					SCC 4					Power	
Combination	PCC Band	PCC BW [MHz]	PCC (UL) Ch.	PCC (UL) Freq. [MHz]	Mod.	PCC UL# RB	PCC UL RB Offset	PCC (DL) Ch.	PCC (DL) Freq. [MHz]	DL Ant. Config.	SCC Band	SCC BW [MHz]	SCC (DL) Ch.	SCC (DL) Freq. [MHz]	DL Ant. Config.	SCC Band	SCC BW [MHz]	SCC (DL) Ch.	SCC (DL) Freq. [MHz]	DL Ant. Config.	SCC Band	SCC BW [MHz]	SCC (DL) Ch.	SCC (DL) Freq. [MHz]	DL Ant. Config.	SCC Band	SCC BW [MHz]	SCC (DL) Ch.	SCC (DL) Freq. [MHz]	DL Ant. Config.	LTE Tx.Power with DL CA Enabled (dBm)	LTE Single Carrier Tx Power (dBm)
CA_5A-[7A]	LTE B5	5	20625	846.5	16QAM	1	0	2625	891.5	2x2	LTE B7	20	3100	2655	4x4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	20.19	20.60
CA_5A-[25A]	LTE B5	5	20625	846.5	16QAM	1	0	2625	891.5	2x2	LTE B25	20	8365	1962.5	4x4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	20.18	20.60
CA_5A-[41A]	LTE B5	5	20625	846.5	16QAM	1	0	2625	891.5	2x2	LTE B41	20	40620	2593	4x4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	20.41	20.60
CA_5A-[48A]	LTE B5	5	20625	846.5	16QAM	1	0	2625	891.5	2x2	LTE B48	20	55990	3625	4x4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	20.57	20.60
CA_[2C]-5A	LTE B5	5	20625	846.5	16QAM	1	0	2625	891.5	2x2	LTE B2	20	900	1960	4x4	LTE B2	20	702	1940.2	4x4	-	-	-	-	-	-	-	-	-	-	20.51	20.60
CA_[4A]-5B (1)	LTE B5	5	20625	846.5	16QAM	1	0	2625	891.5	2x2	LTE B5	5	2577	886.7	2x2	LTE B4	20	2175	2132.5	4x4	-	-	-	-	-	-	-	-	-	-	20.39	20.60
CA_5A-[7A]-[7A]	LTE B5	5	20625	846.5	16QAM	1	0	2625	891.5	2x2	LTE B7	20	3100	2655	4x4	LTE B7	20	2850	2630	4x4	-	-	-	-	-	-	-	-	-	-	20.43	20.60
CA_5A-[7C]	LTE B5	5	20625	846.5	16QAM	1	0	2625	891.5	2x2	LTE B7	20	3100	2655	4x4	LTE B7	20	2902	2635.2	4x4	-	-	-	-	-	-	-	-	-	-	20.38	20.60
CA_[2A]-5A-46A	LTE B5	5	20625	846.5	16QAM	1	0	2625	891.5	2x2	LTE B2	20	900	1960	4x4	LTE B46	20	50665	5537.5	2x2	-	-	-	-	-	-	-	-	-	-	20.26	20.60
CA_5A-40A-[66A]	LTE B5	5	20625	846.5	16QAM	1	0	2625	891.5	2x2	LTE B46	20	50665	5537.5	2x2	LTE B66	20	66786	2145	4x4	-	-	-	-	-	-	-	-	-	-	20.40	20.60
CA_[4A]-[4A]-5B	LTE B5	5	20625	846.5	16QAM	1	0	2625	891.5	2x2	LTE B5	10	2553	884.3	2x2	LTE B4	20	2175	2132.5	4x4	LTE B4	10	2350	2150	4x4	-	-	-	-	-	20.25	20.60
CA_5A-[66A]-[66B]	LTE B5	5	20625	846.5	16QAM	1	0	2625	891.5	2x2	LTE B66	20	66786	2145	4x4	LTE B66	5	67168	2183.2	4x4	LTE B66	15	67261	2192.5	4x4	-	-	-	-	-	20.29	20.60
CA_5A-[66A]-[66C]	LTE B5	5	20625	846.5	16QAM	1	0	2625	891.5	2x2	LTE B66	20	66786	2145	4x4	LTE B66	20	67038	2170.2	4x4	LTE B66	20	67236	2190	4x4	-	-	-	-	-	20.37	20.60
CA_[2A]-[2A]-[4A]-5A	LTE B5	5	20625	846.5	16QAM	1	0	2625	891.5	2x2	LTE B2	20	900	1960	4x4	LTE B2	20	700	1940	4x4	LTE B4	20	2175	2132.5	4x4	-	-	-	-	-	20.12	20.60
CA_[2A]-[2A]-5A-[30A]	LTE B5	5	20625	846.5	16QAM	1	0	2625	891.5	2x2	LTE B2	20	900	1960	4x4	LTE B2	20	700	1940	4x4	LTE B30	10	9820	2355	4x4	-	-	-	-	-	20.35	20.60
CA_[2A]-[2A]-5A-[66A]	LTE B5	5	20625	846.5	16QAM	1	0	2625	891.5	2x2	LTE B2	20	900	1960	4x4	LTE B2	20	700	1940	4x4	LTE B66	20	66786	2145	4x4	-	-	-	-	-	20.37	20.60
CA_[2A]-[4A]-[4A]-5A	LTE B5	5	20625	846.5	16QAM	1	0	2625	891.5	2x2	LTE B2	20	900	1960	4x4	LTE B4	20	2175	2132.5	4x4	LTE B4	10	2350	2150	4x4	-	-	-	-	-	20.37	20.60
CA_[2A]-[4A]-5B	LTE B5	5	20625	846.5	16QAM	1	0	2625	891.5	2x2	LTE B5	10	2553	884.3	2x2	LTE B2	20	900	1960	4x4	LTE B4	20	2175	2132.5	4x4	-	-	-	-	-	20.24	20.60
CA_[2A]-5A-46C	LTE B5	5	20625	846.5	16QAM	1	0	2625	891.5	2x2	LTE B2	20	900	1960	4x4	LTE B46	20	50665	5537.5	2x2	LTE B46	20	50467	5517.7	2x2	-	-	-	-	-	20.11	20.60
CA_[2A]-5A-[66A]-[66A]	LTE B5	5	20625	846.5	16QAM	1	0	2625	891.5	2x2	LTE B2	20	900	1960	4x4	LTE B66	20	66786	2145	4x4	LTE B66	20	67236	2190	4x4	-	-	-	-	-	20.40	20.60
CA_[2A]-5A-[66B]	LTE B5	5	20625	846.5	16QAM	1	0	2625	891.5	2x2	LTE B2	20	900	1960	4x4	LTE B66	15	66786	2145	4x4	LTE B66	5	66879	2154.3	4x4	-	-	-	-	-	20.28	20.60
CA_[4A]-[4A]-5A-[30A]	LTE B5	5	20625	846.5	16QAM	1	0	2625	891.5	2x2	LTE B4	20	2175	2132.5	4x4	LTE B4	10	2350	2150	4x4	LTE B30	10	9820	2355	4x4	-	-	-	-	-	20.34	20.60
CA_5A-[30A]-[66A]-[66A]	LTE B5	5	20625	846.5	16QAM	1	0	2625	891.5	2x2	LTE B30	10	9820	2355	4x4	LTE B66	20	66786	2145	4x4	LTE B66	20	67236	2190	4x4	-	-	-	-	-	20.32	20.60
CA_5A-46C-[66A]	LTE B5	5	20625	846.5	16QAM	1	0	2625	891.5	2x2	LTE B46	20	50665	5537.5	2x2	LTE B46	20	50467	5517.7	2x2	LTE B66	20	66786	2145	4x4	-	-	-	-	-	20.33	20.60
CA_[2A]-[4A]-5A-[30A]	LTE B5	5	20625	846.5	16QAM	1	0	2625	891.5	2x2	LTE B2	20	900	1960	4x4	LTE B4	20	2175	2132.5	4x4	LTE B30	10	9820	2355	4x4	-	-	-	-	-	20.33	20.60
CA_[2A]-5A-[30A]-[66A]	LTE B5	5	20625	846.5	16QAM	1	0	2625	891.5	2x2	LTE B2	20	900	1960	4x4	LTE B30	10	9820	2355	4x4	LTE B66	20	66786	2145	4x4	-	-	-	-	-	20.31	20.60
CA_[2A]-[2A]-5A-66A-66A	LTE B5	5	20625	846.5	16QAM	1	0	2625	891.5	2x2	LTE B2	20	900	1960	4x4	LTE B2	20	700	1940	4x4	LTE B66	20	66786	2145	2x2	LTE B66	20	67236	2190	2x2	20.34	20.60
CA_[2A]-[2A]-5A-[66B]	LTE B5	5	20625	846.5	16QAM	1	0	2625	891.5	2x2	LTE B2	20	900	1960	4x4	LTE B2	20	700	1940	4x4	LTE B66	15	66786	2145	2x2	LTE B66	5	66879	2154.3	4x4	20.58	20.60
CA_2A-[2A]-5A-[66C]	LTE B5	5	20625	846.5	16QAM	1	0	2625	891.5	2x2	LTE B2	20	900	1960	4x4	LTE B2	20	700	1940	2x2	LTE B66	20	66786	2145	4x4	LTE B66	20	66984	2164.8	4x4	20.25	20.60
CA_[2A]-5A-46D	LTE B5	5	20625	846.5	16QAM	1	0	2625	891.5	2x2	LTE B2	20	900	1960	4x4	LTE B46	20	50665	5537.5	2x2	LTE B46	20	50467	5517.7	2x2	LTE B46	20	50863	5557.3	2x2	20.00	20.60
CA_[2A]-5B-[66B]	LTE B5	5	20625	846.5	16QAM	1	0	2625	891.5	2x2	LTE B5	10	2553	884.3	2x2	LTE B2	20	900	1960	4x4	LTE B66	15	66786	2145	4x4	LTE B66	5	66879	2154.3	4x4	20.30	20.60
CA_[2A]-5B-[66C]	LTE B5	5	20625	846.5	16QAM	1	0	2625	891.5	2x2	LTE B5	10	2553	884.3	2x2	LTE B2	20	900	1960	4x4	LTE B66	20	66786	2145	4x4	LTE B66	20	66984	2164.8	4x4	20.44	20.60
CA_[2A]-5B-[66A]-[66A]	LTE B5	5	20625	846.5	16QAM	1	0	2625	891.5	2x2	LTE B5	10	2553	884.3	2x2	LTE B2	20	900	1960	4x4	LTE B66	20	66786	2145	4x4	LTE B66	20	67236	2190	4x4	20.40	20.60
CA_5A-46D-[66A]	LTE B5	5	20625	846.5	16QAM	1	0	2625	891.5	2x2	LTE B46	20	50665	5537.5	2x2	LTE B46	20	50467	5517.7	2x2	LTE B46	20	50863	5557.3	2x2	LTE B66	20	66786	2145	4x4	20.49	20.60
CA_5B-[30A]-[66A]-[66A]	LTE B5	5	20625	846.5	16QAM	1	0	2625	891.5	2x2	LTE B5	10	2553	884.3	2x2	LTE B30	10	9820	2355	4x4	LTE B66	20	66786	2145	4x4	LTE B66	20	67236	2190	4x4	20.25	20.60
CA_2A-2A-5A-[30A]-[66A]	LTE B5	5	20625	846.5	16QAM	1	0	2625	891.5	2x2	LTE B2	20	900	1960	2x2	LTE B2	20	700	1940	2x2	LTE B30	10	9820	2355	4x4	LTE B66	20	66786	2145	4x4	20.34	20.60
CA_2A-5A-30A-[66A]-[66A]	LTE B5	5	20625	846.5	16QAM	1	0	2625	891.5	2x2	LTE B2	20	900	1960	2x2	LTE B30	10	9820	2355	2x2	LTE B66	20	66786	2145	4x4	LTE B66	20	67236	2190	4x4	20.41	20.60
CA_[2A]-5B-[30A]-[66A]	LTE B5	5	20625	846.5	16QAM	1	0	2625	891.5	2x2	LTE B5	10	2553	884.3	2x2	LTE B2	20	900	1960	4x4	LTE B30	10	9820	2355	4x4	LTE B66	20	66786	2145	4x4	20.31	20.60

1.4.5 LTE Band 26 as PCC

Table 19
Output Powers – Ant 1

	PCC										SCC 1					SCC 2					Power	
Combination	PCC Band	PCC BW [MHz]	PCC (UL) Ch.	PCC (UL) Freq. [MHz]	Mod.	PCC UL# RB	PCC UL RB Offset	PCC (DL) Ch.	PCC (DL) Freq. [MHz]	DL Ant. Config.	SCC Band	SCC BW [MHz]	SCC (DL) Ch.	SCC (DL) Freq. [MHz]	DL Ant. Config.	SCC Band	SCC BW [MHz]	SCC (DL) Ch.	SCC (DL) Freq. [MHz]	DL Ant. Config.	LTE Tx.Power with DL CA Enabled (dBm)	LTE Single Carrier Tx Power (dBm)
CA_[7A]-26A	LTE B26	10	26990	844	QPSK	25	25	8990	889	2x2	LTE B7	20	3100	2655	4x4	-	-	-	-	-	20.57	20.60
CA_[25A]-26A	LTE B26	10	26990	844	QPSK	25	25	8990	889	2x2	LTE B25	20	8365	1962.5	4x4	-	-	-	-	-	20.55	20.60
CA_26A-[41A]	LTE B26	10	26990	844	QPSK	25	25	8990	889	2x2	LTE B41	20	40620	2593	4x4	-	-	-	-	-	20.60	20.60
CA_[7A]-[7A]-26A	LTE B26	10	26990	844	QPSK	25	25	8990	889	2x2	LTE B7	20	3100	2655	4x4	LTE B7	20	2850	2630	4x4	20.58	20.60
CA_[25A]-[25A]-26A	LTE B26	5	26715	816.5	16QAM	1	0	8715	861.5	2x2	LTE B25	20	8365	1962.5	4x4	LTE B25	20	8590	1985	4x4	20.27	20.60
CA_26A-[41C]	LTE B26	10	26990	844	QPSK	25	25	8990	889	2x2	LTE B41	20	40620	2593	4x4	LTE B41	20	40422	2573.2	4x4	20.58	20.60

1.4.6 LTE Band 66 as PCC

Table 20
Output Powers – Ant 2B

Combination	PCC								SCC 1					SCC 2					SCC 3					SCC 4					SCC 5					SCC 6					Power
	PCC Band	PCC BW [MHz]	PCC [UL] Ch.	PCC (UL) Freq. [MHz]	Mod.	PCC UL RB	PCC UL RB Offset	PCC [DL] Ch.	PCC (DL) Freq. [MHz]	DL Ant. Config.	SCC Band	SCC BW [MHz]	SCC [UL] Ch.	SCC (DL) Freq. [MHz]	DL Ant. Config.	SCC Band	SCC BW [MHz]	SCC [UL] Ch.	SCC (DL) Freq. [MHz]	DL Ant. Config.	SCC Band	SCC BW [MHz]	SCC [UL] Ch.	SCC (DL) Freq. [MHz]	DL Ant. Config.	SCC Band	SCC BW [MHz]	SCC [UL] Ch.	SCC (DL) Freq. [MHz]	DL Ant. Config.	SCC Band	SCC BW [MHz]	SCC [UL] Ch.	SCC (DL) Freq. [MHz]	DL Ant. Config.	LTE Tx.Power with DL CA Enabled [dBm]	LTE Single Carrier Tx Power [dBm]
CA_2A-66A	LTE B66	20	132072	1720	16QAM	1	50	66536	2120	4x4	LTE B2	20	900	1960	4x4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	14.35	14.60
CA_12A-66A (1)	LTE B66	20	132072	1720	16QAM	1	50	66536	2120	4x4	LTE B12	10	5095	737.5	2x2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	14.41	14.60
CA_12A-66A (2)	LTE B66	20	132072	1720	16QAM	1	50	66536	2120	4x4	LTE B12	10	5095	737.5	2x2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	14.41	14.60
CA_29A-66A-66A	LTE B66	20	132072	1720	16QAM	1	50	66536	2120	4x4	LTE B66	20	67236	2160	4x4	LTE B29	10	9735	722.5	2x2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	14.34	14.60
CA_46A-66A-66A	LTE B66	20	132072	1720	16QAM	1	50	66536	2120	4x4	LTE B66	20	67236	2160	4x4	LTE B46	20	55665	5537.5	2x2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	14.35	14.60
CA_14AA-14AA-66A	LTE B66	20	132072	1720	16QAM	1	50	66536	2120	4x4	LTE B66	20	67236	2160	4x4	LTE B48	20	55990	3625	4x4	LTE B48	20	56188	3644.8	4x4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	14.50	14.60
CA_2A-2A-17A-66A	LTE B66	20	132072	1720	16QAM	1	50	66536	2120	4x4	LTE B2	20	900	1960	4x4	LTE B7	20	3100	2655	4x4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	14.27	14.60
CA_5A-46A-66A	LTE B66	20	132072	1720	16QAM	1	50	66536	2120	4x4	LTE B5	10	2525	881.5	2x2	LTE B46	20	55665	5537.5	2x2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	14.34	14.60
CA_13A-46A-66A	LTE B66	20	132072	1720	16QAM	1	50	66536	2120	4x4	LTE B46	10	55665	5537.5	2x2	LTE B13	20	5230	751	2x2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	14.45	14.69
CA_13A-14AA-66A	LTE B66	20	132072	1720	16QAM	1	50	66536	2120	4x4	LTE B13	10	5230	751	2x2	LTE B48	20	55990	3625	4x4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	14.40	14.60
CA_2A-2A-66A-66AA	LTE B66	20	132072	1720	16QAM	1	50	66536	2120	4x4	LTE B66	20	67236	2160	4x4	LTE B2	20	700	1940	4x4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	14.39	14.60
CA_2A-2A-66A-66B	LTE B66	15	132047	1717.5	QPSK	75	0	66511	2117.5	4x4	LTE B66	5	66604	2126.8	4x4	LTE B2	20	900	1960	4x4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	14.57	14.59
CA_2A-66A-66C	LTE B66	20	132072	1720	16QAM	1	50	66536	2120	4x4	LTE B66	20	66736	2139.8	4x4	LTE B2	20	900	1960	4x4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	14.35	14.60
CA_2A-66A-66BB	LTE B66	20	132072	1720	16QAM	1	50	66536	2120	4x4	LTE B66	5	67168	2183.2	4x4	LTE B66	15	67283	2182.3	4x4	LTE B2	20	900	1960	4x4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	14.33	14.60
CA_2A-66B-66A	LTE B66	15	132047	1717.5	QPSK	75	0	66511	2117.5	4x4	LTE B66	5	66604	2126.8	4x4	LTE B2	20	900	1960	4x4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	14.57	14.59
CA_2A-66A-66BC	LTE B66	20	132072	1720	16QAM	1	50	66536	2120	4x4	LTE B66	20	67036	2170.2	4x4	LTE B66	20	67236	2160	4x4	LTE B2	20	900	1960	4x4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	14.56	14.60
CA_2A-66C-66A	LTE B66	20	132072	1720	16QAM	1	50	66536	2120	4x4	LTE B66	20	66734	2139.8	4x4	LTE B66	20	67236	2160	4x4	LTE B2	20	900	1960	4x4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	14.35	14.60
CA_2A-66C-66AA	LTE B66	20	132072	1720	16QAM	1	50	66536	2120	4x4	LTE B66	20	67236	2160	4x4	LTE B2	20	700	1940	4x4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	14.39	14.60
CA_2A-66A-66BB	LTE B66	20	132072	1720	16QAM	1	50	66536	2120	4x4	LTE B66	5	67168	2183.2	4x4	LTE B66	15	67283	2182.3	4x4	LTE B2	20	900	1960	4x4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	14.26	14.60
CA_5A-66BB-66AA	LTE B66	15	132047	1717.5	QPSK	75	0	66511	2117.5	4x4	LTE B66	5	66604	2126.8	4x4	LTE B66	15	67236	2160	4x4	LTE B5	10	2525	881.5	2x2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	14.39	14.59
CA_5A-66AA-66BC	LTE B66	20	132072	1720	16QAM	1	50	66536	2120	4x4	LTE B66	20	67018	2170.2	4x4	LTE B66	20	67236	2160	4x4	LTE B5	10	2525	881.5	2x2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	14.57	14.60
CA_5A-66BC-66AA	LTE B66	20	132072	1720	16QAM	1	50	66536	2120	4x4	LTE B66	20	66734	2139.8	4x4	LTE B66	20	67236	2160	4x4	LTE B5	10	2525	881.5	2x2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	14.30	14.60
CA_13A-66AA-66BB	LTE B66	20	132072	1720	16QAM	1	50	66536	2120	4x4	LTE B66	5	67168	2183.2	4x4	LTE B66	15	67283	2182.3	4x4	LTE B13	10	5230	751	2x2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	14.39	14.69
CA_13A-66BB-66AA	LTE B66	15	132047	1717.5	QPSK	75	0	66511	2117.5	4x4	LTE B66	5	66604	2126.8	4x4	LTE B66	15	67236	2160	4x4	LTE B13	10	5230	751	2x2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	14.39	14.59
CA_13A-66AA-66BC	LTE B66	20	132072	1720	16QAM	1	50	66536	2120	4x4	LTE B66	20	67018	2170.2	4x4	LTE B66	20	67036	2190	4x4	LTE B13	10	5230	751	2x2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	14.39	14.60
CA_13A-66BC-66AA	LTE B66	20	132072	1720	16QAM	1	50	66536	2120	4x4	LTE B66	20	66734	2139.8	4x4	LTE B66	20	67036	2190	4x4	LTE B13	10	5230	751	2x2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	14.39	14.60
CA_46C-66A-66AA	LTE B66	20	132072	1720	16QAM	1	50	66536	2120	4x4	LTE B66	20	67236	2160	4x4	LTE B46	20	55665	5537.5	2x2	LTE B46	20	55467	5517.7	2x2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	14.38	14.60
CA_46A-66A-66BB	LTE B66	20	132072	1720	16QAM	1	50	66536	2120	4x4	LTE B66	5	67168	2183.2	4x4	LTE B66	15	67283	2182.3	4x4	LTE B46	20	55665	5537.5	2x2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	14.38	14.60
CA_14AA-66A-66AA	LTE B66	20	132072	1720	16QAM	1	50	66536	2120	4x4	LTE B66	20	67236	2160	4x4	LTE B48	20	55990	3625	4x4	LTE B48	20	56188	3644.8	4x4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	14.50	14.60
CA_2A-2A-66A-66AA	LTE B66	20	132072	1720	16QAM	1	50	66536	2120	4x4	LTE B66	20	67236	2160	4x4	LTE B2	20	700	1940	4x4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	14.39	14.60
CA_2A-66A-66BC	LTE B66	20	132072	1720	16QAM	1	50	66536	2120	4x4	LTE B66	20	66734	2139.8	4x4	LTE B66	20	67236	2160	4x4	LTE B2	20	900	1960	4x4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	14.35	14.60
CA_46C-66A-66AA	LTE B66	20	132072	1720	16QAM	1	50	66536	2120	4x4	LTE B66	20	67236	2160	4x4	LTE B46	20	55665	5537.5	2x2	LTE B46	20	55467	5517.7	2x2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	14.38	14.60
CA_46A-66A-66BB	LTE B66	20	132072	1720	16QAM	1	50	66536	2120	4x4	LTE B66	5	67168	2183.2	4x4	LTE B66	15	67283	2182.3	4x4	LTE B46	20	55665	5537.5	2x2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	14.38	14.60
CA_14AA-66A-66AA	LTE B66	20	132072	1720	16QAM	1	50	66536	2120	4x4	LTE B66	20	67236	2160	4x4	LTE B48	20	55990	3625	4x4	LTE B48	20	56188	3644.8	4x4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	14.50	14.60
CA_2A-2A-66A-66AA	LTE B66	20	132072	1720	16QAM	1	50	66536	2120	4x4	LTE B66	20	67236	2160	4x4	LTE B2	20	700	1940	4x4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	14.39	14.60
CA_2A-66A-66BC	LTE B66	20	132072	1720	16QAM	1	50	66536	2120	4x4	LTE B66	20	66734	2139.8	4x4	LTE B66	20	67236	2160	4x4	LTE B2	20	900	1960	4x4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	14.35	14.60
CA_2A-66B-66A	LTE B66	15	132047	1717.5	QPSK	75	0	66511	2117.5	4x4	LTE B66	5	66604	2126.8	4x4	LTE B2	20	900	1960	4x4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	14.57	14.59
CA_2A-66A-66BB	LTE B66	20	132072	1720	16QAM	1	50	66536	2120	4x4	LTE B66	20	66734	2139.8	4x4	LTE B2	20	900	1960	4x4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	14.35	14.60
CA_2A-66A-66BC	LTE B66	20	132072	1720	16QAM	1	50	66536	2120	4x4	LTE B66	20	67236	2160	4x4	LTE B2	20	700	1940	4x4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	14.39	14.60
CA_2A-66B-66A	LTE B66	20	132072	1720	16QAM	1	50	66536	2120	4x4	LTE B66	20	66734	2139.8	4x4	LTE B2	20	900	1960	4x4	LTE B5	5	2453	874.3	2x2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	14.52	14.60
CA_2A-66B-66AA	LTE B66	20	132072	1720	16QAM	1	50	66536	2120	4x4	LTE B66	20	67236	2160	4x4	LTE B2	20	900	1960	4x4	LTE B5	5	2453	874.3	2x2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	14.52	14.60
CA_2A-66A-66BC	LTE B66	20	132072	1720	16QAM	1	50	66536	2120	4x4	LTE B66	20	66734	2139.8	4x4	LTE B2	20	900	1960	4x4	LTE B5	5	2453	874.3	2x2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	14.52	14.60
CA_2A-66C-66A	LTE B66	20	132072	1720	16QAM	1	50	66536	2120	4x4	LTE B66	20	66734	2139.8	4x4	LTE B2	20	900	1960	4x4	LTE B5	5	2453	874.3	2x2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	14.52	14.60
CA_2A-66C-66AA	LTE B66	20	132072	1720	16QAM	1	50	66536	2120	4x4	LTE B66	20	67236	2160	4x4	LTE B2	20	700	1940	4x4	LTE B5	5	2453	874.3	2x2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	14.52	14.60
CA_2A-66A-66C	LTE B66	20	132072	1720	16QAM	1	50	66536	2120	4x4	LTE B66	20	66734	2139.8	4x4	LTE B2	20	900	1960	4x4	LTE B5	5	2453	874.3	2x2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	14.52	14.60
CA_2A-66C-66C	LTE B66	20	132072	1720	16QAM	1	50	66536	2120	4x4	LTE B66	20	66734	2139.8	4x4	LTE B2	20	900	1960	4x4	LTE B5	5	2453	874.3	2x2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	14.52	14.60
CA_5A-46C-66A	LTE B66	20	132072	1720	16QAM	1	50	66536	2120	4x4	LTE B5	10	2525	881.5	2x2	LTE B46	20	55665	5537.5	2x2	LTE B46	20	55467	5517.7	2x2	LTE B46	20	47490	5180	2x2	-	-	-	-	-	-	-	-	-	-	14.34	14.60
CA_5B-66A-66A	LTE B66	20	132072	1720	16QAM	1	50	66536	2120	4x4	LTE B5	10	2525	881.5	2x2	LTE B66	20	67236	2160	4x4	LTE B5	5	2453	874.3	2x2	LTE B30	10	9820	2355	4x4	-	-	-	-	-	-	-	-	-	-	14.58	14.60
CA_5B-66A-66AA	LTE B66	20	132072	1720	16QAM	1	50	66536	2120	4x4	LTE B66	20	67236	2160	4x4	LTE B5	10	2525	881.5	2x2	LTE B5	5	2453	874.3	2x2	LTE B30	10	9820	2355	4x4	-	-	-	-	-	-	-	-	-	-	14.58	14.60
CA_2A-66A-66BB	LTE B66	20	132072	1720	16QAM	1	50	66536	2120	4x4	LTE B66	5	67168	2183.2	4x4	LTE B66	15	67283	2182.3	4x4	LTE B2	20	900	1960	4x4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	14.33	14.60
CA_2A-66B-66AA	LTE B66	15	132047	1717.5	QPSK	75	0	66511	2117.5	4x4	LTE B66	5	66604	2126.8	4x4	LTE B66	15	67236	2160	4x4	LTE B2	20	900	1960	4x4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	14.57	14.59
CA_2A-66A-66BC	LTE B66	20	132072	1720	16QAM	1	50	66536	2120	4x4	LTE B66	20	67018	2170.2	4x4	LTE B66	20	67036	2190	4x4	LTE B2	20	900	1960	4x4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	14.56	14.60
CA_2A-66C-66AA	LTE B66	20	132072	1720	16QAM	1	50	66536	2120	4x4	LTE B66	20	66734	2139.8	4x4	LTE B66	20	67036	2190	4x4	LTE B2	20	900	1960	4x4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	14.35	14.60
CA_2A-66A-66C	LTE B66	20	132072	1720	16QAM	1	50	66536	2120	4x4	LTE B66	20	67036	2190	4x4	LTE B66	20	67236	2160	4x4	LTE B2	20	900	1960	4x4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	14.35	14.60
CA_2A-66B-66A	LTE B66	20	132072	1720	16QAM	1	50	66536	2120	4x4	LTE B66	20	67036	2190	4x4	LTE B66	20	67236	2160	4x4	LTE B5	10	2525	881.5	2x2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	14.34	14.60
CA_2A-66A-66AA	LTE B66	20	132072	1720	16QAM	1	50	66536	2120	4x4	LTE B66	20	67036	2190	4x4	LTE B66	20	67236	2160	4x4	LTE B5	10	2525	881.5	2x2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	14.57	14.60
CA_2A-66A-66BC	LTE B66	20	132072	1720	16QAM	1	50	66536	2120	4x4	LTE B66	20	67036	2190	4x4	LTE B66	20	67236	2160	4x4	LTE B5	10	2525	881.5	2x2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	14.30	14.60
CA_2A-66C-66A	LTE B66	20	132072	1720	16QAM	1	50	66536	2120	4x4	LTE B66	20	67036	2190	4x4	LTE B66	20	67236	2160	4x4	LTE B5	10	2525	881.5	2x2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	14.30	14.60
CA_2A-66C-66AA	LTE B66	20	132072	1720	16QAM	1	50	66536	2120	4x4	LTE B66	20	67036	2190	4x4	LTE B66	20	67236	2160	4x4	LTE B5	10	2525	881.5	2x2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	14.30	14.60
CA_2A-66A-66C	LTE B66	20	132072	1720	16QAM	1	50	66536	2120	4x4	LTE B66	20	67036	2190	4x4	LTE B66	20	67236	2160	4x4	LTE B5	10	2525	881.5	2x2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	14.30	14.60
CA_2A-66C-66C	LTE B66	20	132072	1720	16QAM	1	50	66536	2120	4x4	LTE B66	20	67036	2190	4x4	LTE B66	20	67236	2160	4x4	LTE B5	10	2525	881.5	2x2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	14.30	14.60
CA_2A-46A-66A	LTE B66	20	132072	1720	16QAM	1	50	66536	2120	4x4	LTE B2	20	900	1960	4x4	LTE B46	20	55665	5537.5	2x2	LTE B46	20	55467	5517.7	2x2	LTE B46	20	55990	3625	4x4	-	-	-	-	-	-	-	-	-	-	14.38	14.60
CA_2A-46C-66A	LTE B66	20	132072	1720	16QAM	1	50	66536	2120	4x4	LTE B2	20	900	1960	4x4	LTE B46	20	55665	5537.5	2x2	LTE B46	20	55467	5517.7	2x2	LTE B46	20	55990	3625	4x4	-	-	-	-	-	-	-	-	-	-	14.38	14.60
CA_2A-46A-66AA	LTE B66	20	132072	1720	16QAM	1	50	66536	2120	4x4	LTE B2	20	900	1960	4x4	LTE B46	20	55665	5537.5	2x2	LTE B46	20	55990	3625	4x4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	14.50	14.60
CA_2A-46C-66AA	LTE B66	20	132072	1720	16QAM	1	50	66536	2120	4x4	LTE B2	20	900	1960	4x4	LTE B46	20	55665	5537.5	2x2	LTE B46	20	55990	3625	4x4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	14.50	14.60
CA_2A-46A-66C	LTE B66	20	132072	1720	16QAM	1	50	66536	2120	4x4	LTE B2	20	900	1960	4x4	LTE B46	20	55665	5537.5	2x2	LTE B46	20	55467	5517.7	2x2	LTE B46	20	55990	3625	4x4	-	-	-	-	-	-	-	-	-	-	14.38	14.60
CA_2A-46C-66C	LTE B66	20	132072	1720	16QAM	1	50	66536	2120	4x4	LTE B2	20	900	1960	4x4	LTE B46	20	55665	5537.5	2x2	LTE B46	20	55467	5517.7	2x2	LTE B46	20	55990	3625	4x4	-	-	-	-	-	-	-	-	-	-	14.38	14.60
CA_2A-46D-66A	LTE B66	20	132072	1720	16QAM	1	50	66536	2120	4x4	LTE B2	20	900	1960	4x4	LTE B46	20	55665	5537.5	2x2	LTE B46	20	55467	5517.7	2x2	LTE B46	20	55990	3625	4x4	LTE B48	20	56188	3644.8	4x4	-	-	-	-	14.49	14.60

1.4.7 LTE Band 25 as PCC

Table 21
Output Powers – Ant 2A

	PCC									SCC 1					SCC 2					SCC 3					SCC 4					Power	
Combination	PCC Band	PCC BW [MHz]	PCC (UL) Ch.	PCC (UL) Freq. [MHz]	Mod.	PCC UL# RB	PCC UL RB Offset	PCC (DL) Ch.	PCC (DL) Freq. [MHz]	DL Ant. Config.	SCC Band	SCC BW [MHz]	SCC (DL) Ch.	SCC (DL) Freq. [MHz]	DL Ant. Config.	SCC Band	SCC BW [MHz]	SCC (DL) Ch.	SCC (DL) Freq. [MHz]	DL Ant. Config.	SCC Band	SCC BW [MHz]	SCC (DL) Ch.	SCC (DL) Freq. [MHz]	DL Ant. Config.	SCC Band	SCC BW [MHz]	SCC (DL) Ch.	SCC (DL) Freq. [MHz]	DL Ant. Config.	LTE Tx.Power with DL CA Enabled (dBm)	LTE Single Carrier Tx Power (dBm)
CA_5A-[25A]	LTE B25	20	26590	1905	16QAM	1	99	8590	1985	4x4	LTE B5	10	2525	881.5	2x2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	14.71	15.10
CA_12A-[25A]	LTE B25	20	26590	1905	16QAM	1	99	8590	1985	4x4	LTE B12	10	5095	737.5	2x2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	14.62	15.10
CA_25A-26A	LTE B25	20	26590	1905	16QAM	1	99	8590	1985	4x4	LTE B26	10	8865	876.5	2x2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	14.70	15.10
CA_25A-46A	LTE B25	20	26590	1905	16QAM	1	99	8590	1985	4x4	LTE B46	20	50665	5537.5	2x2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	14.65	15.10
CA_25A-[25A]-26A	LTE B25	20	26590	1905	16QAM	1	99	8590	1985	4x4	LTE B25	20	8140	1940	4x4	LTE B26	5	8865	876.5	2x2	-	-	-	-	-	-	-	-	-	-	14.69	15.10
CA_25A-[25A]-41A	LTE B25	20	26590	1905	16QAM	1	99	8590	1985	4x4	LTE B25	20	8140	1940	4x4	LTE B41	20	40620	2593	4x4	-	-	-	-	-	-	-	-	-	-	14.56	15.10
CA_25A-[41C]	LTE B25	20	26590	1905	16QAM	1	99	8590	1985	4x4	LTE B41	20	40620	2593	4x4	LTE B41	20	40422	2573.2	4x4	-	-	-	-	-	-	-	-	-	-	14.99	15.10
CA_25A-46C	LTE B25	20	26590	1905	16QAM	1	99	8590	1985	4x4	LTE B46	20	50665	5537.5	2x2	LTE B46	20	50467	5517.7	2x2	-	-	-	-	-	-	-	-	-	-	14.65	15.10
CA_25A]-[25A]-[41C]	LTE B25	20	26590	1905	16QAM	1	99	8590	1985	4x4	LTE B25	20	8140	1940	4x4	LTE B41	20	40620	2593	4x4	LTE B4	20	40422	2573.2	4x4	-	-	-	-	-	15.08	15.10
CA_25A]-[41D]	LTE B25	20	26590	1905	16QAM	1	99	8590	1985	4x4	LTE B41	20	40422	2573.2	4x4	LTE B41	20	40620	2593	4x4	LTE B41	20	40818	2612.8	4x4	-	-	-	-	-	15.07	15.10
CA_25A]-46D	LTE B25	20	26590	1905	16QAM	1	99	8590	1985	4x4	LTE B46	20	50665	5537.5	2x2	LTE B46	20	50467	5517.7	2x2	LTE B46	20	50863	5557.3	2x2	-	-	-	-	-	14.66	15.10
CA_25A]-[25A]-[41D]	LTE B25	20	26590	1905	16QAM	1	99	8590	1985	4x4	LTE B25	20	8140	1940	4x4	LTE B41	20	40422	2573.2	2x2	LTE B41	20	40620	2593	2x2	LTE B41	20	40818	2612.8	4x4	15.04	15.10

1.4.8 LTE Band 30 as PCC

Table 22
Output Powers – Ant 4B

	PCC									SCC 1					SCC 2					SCC 3					SCC 4					Power	
Combination	PCC Band	PCC BW [MHz]	PCC (UL) Ch.	PCC (UL) Freq. [MHz]	Mod.	PCC UL# RB	PCC UL RB Offset	PCC (DL) Ch.	PCC (DL) Freq. [MHz]	DL Ant. Config.	SCC Band	SCC BW [MHz]	SCC (DL) Ch.	SCC (DL) Freq. [MHz]	DL Ant. Config.	SCC Band	SCC BW [MHz]	SCC (DL) Ch.	SCC (DL) Freq. [MHz]	DL Ant. Config.	SCC Band	SCC BW [MHz]	SCC (DL) Ch.	SCC (DL) Freq. [MHz]	DL Ant. Config.	SCC Band	SCC BW [MHz]	SCC (DL) Ch.	SCC (DL) Freq. [MHz]	DL Ant. Config.	LTE Tx.Power with DL CA Enabled (dBm)	LTE Single Carrier Tx Power (dBm)
CA_[2C]-[30A]	LTE B30	10	27710	2310	16QAM	1	25	9820	2355	4x4	LTE B2	20	900	1960	4x4	LTE B2	20	702	1940.2	4x4	-	-	-	-	-	-	-	-	-	-	13.50	13.50
CA_[2A]-[2A]-5A-[30A]	LTE B30	10	27710	2310	16QAM	1	25	9820	2355	4x4	LTE B2	20	900	1960	4x4	LTE B2	20	700	1940	4x4	LTE B5	10	2525	881.5	2x2	-	-	-	-	-	13.30	13.50
CA_[2A]-[2A]-12A-[30A]	LTE B30	10	27710	2310	16QAM	1	25	9820	2355	4x4	LTE B2	20	900	1960	4x4	LTE B2	20	700	1940	4x4	LTE B12	10	5095	737.5	2x2	-	-	-	-	-	13.36	13.50
CA_[2A]-[2A]-29A-[30A]	LTE B30	10	27710	2310	16QAM	1	25	9820	2355	4x4	LTE B2	20	900	1960	4x4	LTE B2	20	700	1940	4x4	LTE B29	10	9715	722.5	2x2	-	-	-	-	-	13.30	13.50
CA_2A-[2A]-[30A]-[66A]	LTE B30	10	27710	2310	16QAM	1	25	9820	2355	4x4	LTE B2	20	900	1960	2x2	LTE B2	20	700	1940	4x4	LTE B66	20	66786	2145	4x4	-	-	-	-	-	13.31	13.50
CA_2A-[30A]-[66A]-[66A]	LTE B30	10	27710	2310	16QAM	1	25	9820	2355	4x4	LTE B2	20	900	1960	2x2	LTE B66	20	66786	2145	4x4	LTE B66	20	67236	2190	4x4	-	-	-	-	-	13.35	13.50
CA_[4A]-[4A]-5A-[30A]	LTE B30	10	27710	2310	16QAM	1	25	9820	2355	4x4	LTE B4	20	2175	2132.5	4x4	LTE B4	10	2350	2150	4x4	LTE B5	10	2525	881.5	2x2	-	-	-	-	-	13.45	13.50
CA_[4A]-[4A]-12A-[30A]	LTE B30	10	27710	2310	16QAM	1	25	9820	2355	4x4	LTE B4	20	2175	2132.5	4x4	LTE B4	10	2350	2150	4x4	LTE B12	10	5095	737.5	2x2	-	-	-	-	-	13.02	13.50
CA_5A-[30A]-[66A]-[66A]	LTE B30	10	27710	2310	16QAM	1	25	9820	2355	4x4	LTE B5	10	2525	881.5	2x2	LTE B66	20	66786	2145	4x4	LTE B66	20	67236	2190	4x4	-	-	-	-	-	13.30	13.50
CA_12A-[30A]-[66A]-[66A]	LTE B30	10	27710	2310	16QAM	1	25	9820	2355	4x4	LTE B12	10	5095	737.5	2x2	LTE B66	20	66786	2145	4x4	LTE B66	20	67236	2190	4x4	-	-	-	-	-	13.42	13.50
CA_[2A]-[4A]-5A-[30A]	LTE B30	10	27710	2310	16QAM	1	25	9820	2355	4x4	LTE B2	20	900	1960	4x4	LTE B4	20	2175	2132.5	4x4	LTE B5	10	2525	881.5	2x2	-	-	-	-	-	13.39	13.50
CA_[2A]-[4A]-12A-[30A]	LTE B30	10	27710	2310	16QAM	1	25	9820	2355	4x4	LTE B2	20	900	1960	4x4	LTE B4	20	2175	2132.5	4x4	LTE B12	10	5095	737.5	2x2	-	-	-	-	-	13.28	13.50
CA_[2A]-[4A]-29A-[30A]	LTE B30	10	27710	2310	16QAM	1	25	9820	2355	4x4	LTE B2	20	900	1960	4x4	LTE B4	20	2175	2132.5	4x4	LTE B29	10	9715	722.5	2x2	-	-	-	-	-	13.22	13.50
CA_[2A]-5A-[30A]-[66A]	LTE B30	10	27710	2310	16QAM	1	25	9820	2355	4x4	LTE B2	20	900	1960	4x4	LTE B5	10	2525	881.5	2x2	LTE B66	20	66786	2145	4x4	-	-	-	-	-	13.20	13.50
CA_[2A]-12A-[30A]-[66A]	LTE B30	10	27710	2310	16QAM	1	25	9820	2355	4x4	LTE B2	20	900	1960	4x4	LTE B12	10	5095	737.5	2x2	LTE B66	20	66786	2145	4x4	-	-	-	-	-	13.34	13.50
CA_[2A]-29A-[30A]-[66A]	LTE B30	10	27710	2310	16QAM	1	25	9820	2355	4x4	LTE B2	20	900	1960	4x4	LTE B29	10	9715	722.5	2x2	LTE B66	20	66786	2145	4x4	-	-	-	-	-	13.22	13.50
CA_5B-[30A]-[66A]-[66A]	LTE B30	10	27710	2310	16QAM	1	25	9820	2355	4x4	LTE B5	10	2525	881.5	2x2	LTE B5	5	2453	874.3	2x2	LTE B66	20	66786	2145	4x4	LTE B66	20	67236	2190	4x4	12.93	13.50
CA_2A-2A-5A-[30A]-[66A]	LTE B30	10	27710	2310	16QAM	1	25	9820	2355	4x4	LTE B2	20	900	1960	2x2	LTE B2	20	700	1940	2x2	LTE B5	10	2525	881.5	2x2	LTE B66	20	66786	2145	4x4	13.05	13.50
CA_2A-2A-12A-[30A]-[66A]	LTE B30	10	27710	2310	16QAM	1	25	9820	2355	4x4	LTE B2	20	900	1960	2x2	LTE B2	20	700	1940	2x2	LTE B12	10	5095	737.5	2x2	LTE B66	20	66786	2145	4x4	13.08	13.50
CA_2A-5A-30A-[66A]-[66A]	LTE B30	10	27710	2310	16QAM	1	25	9820	2355	2x2	LTE B2	20	900	1960	2x2	LTE B5	10	2525	881.5	2x2	LTE B66	20	66786	2145	4x4	LTE B66	20	67236	2190	4x4	12.95	13.50
CA_[2A]-5B-[30A]-[66A]	LTE B30	10	27710	2310	16QAM	1	25	9820	2355	4x4	LTE B2	20	900	1960	4x4	LTE B5	10	2525	881.5	2x2	LTE B5	5	2453	874.3	2x2	LTE B66	20	66786	2145	4x4	12.95	13.50
CA_2A-12A-30A-[66A]-[66A]	LTE B30	10	27710	2310	16QAM	1	25	9820	2355	2x2	LTE B2	20	900	1960	2x2	LTE B12	10	5095	737.5	2x2	LTE B66	20	66786	2145	4x4	LTE B66	20	67236	2190	4x4	13.00	13.50

1.4.9 LTE Band 7 as PCC

Table 23
Output Powers – Ant 4B

	PCC									SCC 1					SCC 2					SCC 3					SCC 4					Power	
Combination	PCC Band	PCC BW [MHz]	PCC (UL) Ch.	PCC (UL) Freq. [MHz]	Mod.	PCC UL# RB	PCC UL RB Offset	PCC (DL) Ch.	PCC (DL) Freq. [MHz]	DL Ant. Config.	SCC Band	SCC BW [MHz]	SCC (DL) Ch.	SCC (DL) Freq. [MHz]	DL Ant. Config.	SCC Band	SCC BW [MHz]	SCC (DL) Ch.	SCC (DL) Freq. [MHz]	DL Ant. Config.	SCC Band	SCC BW [MHz]	SCC (DL) Ch.	SCC (DL) Freq. [MHz]	DL Ant. Config.	SCC Band	SCC BW [MHz]	SCC (DL) Ch.	SCC (DL) Freq. [MHz]	DL Ant. Config.	LTE Tx.Power with DL CA Enabled (dBm)	LTE Single Carrier Tx Power (dBm)
CA_[7B]	LTE B7	15	21100	2535	QPSK	1	74	3100	2655	4x4	LTE B7	5	3007	2645.7	4x4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	13.14	13.13
CA_5A-[7A]	LTE B7	20	21100	2535	QPSK	50	0	3100	2655	4x4	LTE B5	10	2525	881.5	2x2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	13.21	13.24
CA_[7A]-29A	LTE B7	20	21100	2535	QPSK	50	0	3100	2655	4x4	LTE B26	10	8865	876.5	2x2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	13.18	13.24
CA_[7A]-46A (1)	LTE B7	20	21100	2535	QPSK	50	0	3100	2655	4x4	LTE B46	20	50665	5537.5	2x2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	13.23	13.24
CA_[2A]-[7A]-[7A]	LTE B7	20	21100	2535	QPSK	50	0	3100	2655	4x4	LTE B7	20	2850	2630	4x4	LTE B2	20	900	1960	4x4	-	-	-	-	-	-	-	-	-	-	13.13	13.24
CA_[4A]-[4A]-[7A] (1)	LTE B7	20	21100	2535	QPSK	50	0	3100	2655	4x4	LTE B4	20	2175	2132.5	4x4	LTE B4	10	2350	2150	4x4	-	-	-	-	-	-	-	-	-	-	13.12	13.24
CA_5A-[7A]-[7A]	LTE B7	20	21100	2535	QPSK	50	0	3100	2655	4x4	LTE B7	20	2850	2630	4x4	LTE B5	10	2525	881.5	2x2	-	-	-	-	-	-	-	-	-	-	13.16	13.24
CA_5A-[7C]	LTE B7	20	21100	2535	QPSK	50	0	3100	2655	4x4	LTE B7	20	2902	2635.2	4x4	LTE B5	10	2525	881.5	2x2	-	-	-	-	-	-	-	-	-	-	13.17	13.24
CA_[7A]-[7A]-26A	LTE B7	20	21100	2535	QPSK	50	0	3100	2655	4x4	LTE B7	20	2850	2630	4x4	LTE B26	10	8865	876.5	2x2	-	-	-	-	-	-	-	-	-	-	13.18	13.24
CA_[7A]-46C (1)	LTE B7	20	21100	2535	QPSK	50	0	3100	2655	4x4	LTE B46	20	50665	5537.5	2x2	LTE B46	20	50467	5517.7	2x2	-	-	-	-	-	-	-	-	-	-	13.25	13.24
CA_[7C]-46A	LTE B7	20	21100	2535	QPSK	50	0	3100	2655	4x4	LTE B7	20	2902	2635.2	4x4	LTE B46	20	50665	5537.5	2x2	-	-	-	-	-	-	-	-	-	-	13.23	13.24
CA_[2A]-[7A]-[66A]	LTE B7	20	21100	2535	QPSK	50	0	3100	2655	4x4	LTE B2	20	900	1960	4x4	LTE B66	20	66786	2145	4x4	-	-	-	-	-	-	-	-	-	-	13.18	13.24
CA_[7A]-46D (1)	LTE B7	20	21100	2535	QPSK	50	0	3100	2655	4x4	LTE B46	20	50665	5537.5	2x2	LTE B46	20	50467	5517.7	2x2	LTE B46	20	50863	5557.3	2x2	-	-	-	-	-	13.23	13.24
CA_[7C]-46C	LTE B7	20	21100	2535	QPSK	50	0	3100	2655	4x4	LTE B7	20	2902	2635.2	4x4	LTE B46	20	50665	5537.5	2x2	LTE B46	20	50467	5517.7	2x2	-	-	-	-	-	13.13	13.24
CA_2A-[4A]-[7A]-[7A]	LTE B7	20	21100	2535	QPSK	50	0	3100	2655	4x4	LTE B7	20	2850	2630	4x4	LTE B2	20	900	1960	2x2	LTE B4	20	2175	2132.5	4x4	-	-	-	-	-	13.11	13.24
CA_[2A]-[4A]-[7C]	LTE B7	20	21100	2535	QPSK	50	0	3100	2655	4x4	LTE B7	20	2902	2635.2	4x4	LTE B2	20	900	1960	4x4	LTE B4	20	2175	2132.5	4x4	-	-	-	-	-	13.19	13.24
CA_[2A]-[4A]-[7A]-12A	LTE B7	20	21100	2535	QPSK	50	0	3100	2655	4x4	LTE B2	20	900	1960	4x4	LTE B4	20	2175	2132.5	4x4	LTE B12	10	5095	737.5	2x2	-	-	-	-	-	13.18	13.24
CA_2A-[7A]-[7A]-[66A]	LTE B7	20	21100	2535	QPSK	50	0	3100	2655	4x4	LTE B7	20	2850	2630	4x4	LTE B2	20	900	1960	2x2	LTE B66	20	66786	2145	4x4	-	-	-	-	-	13.10	13.24
CA_[2A]-[7A]-12A-[66A]	LTE B7	20	21100	2535	QPSK	50	0	3100	2655	4x4	LTE B2	20	900	1960	4x4	LTE B12	10	5095	737.5	2x2	LTE B66	20	66786	2145	4x4	-	-	-	-	-	13.18	13.24
CA_[7C]-46D	LTE B7	20	21100	2535	QPSK	50	0	3100	2655	4x4	LTE B7	20	2902	2635.2	4x4	LTE B46	20	50665	5537.5	2x2	LTE B46	20	50467	5517.7	2x2	LTE B46	20	50863	5557.3	2x2	13.17	13.24

1.4.10 LTE Band 41 as PCC

Table 24
Output Powers – Ant 4B

	PCC										SCC 1					SCC 2					SCC 3					SCC 4					Power	
Combination	PCC Band	PCC BW [MHz]	PCC (UL) Ch.	PCC (UL) Freq. [MHz]	Mod.	PCC UL# RB	PCC UL RB Offset	PCC (DL) Ch.	PCC (DL) Freq. [MHz]	DL Ant. Config.	SCC Band	SCC BW [MHz]	SCC (DL) Ch.	SCC (DL) Freq. [MHz]	DL Ant. Config.	SCC Band	SCC BW [MHz]	SCC (DL) Ch.	SCC (DL) Freq. [MHz]	DL Ant. Config.	SCC Band	SCC BW [MHz]	SCC (DL) Ch.	SCC (DL) Freq. [MHz]	DL Ant. Config.	SCC Band	SCC BW [MHz]	SCC (DL) Ch.	SCC (DL) Freq. [MHz]	DL Ant. Config.	LTE Tx.Power with DL CA Enabled (dBm)	LTE Single Carrier Tx Power (dBm)
CA_41A-[41A] (1)	LTE B41	20	40620	2593	16QAM	1	0	40620	2593	4x4	LTE B41	20	41490	2680	4x4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	15.90	15.90
CA_5A-[41A]	LTE B41	20	40620	2593	16QAM	1	0	40620	2593	4x4	LTE B5	10	2525	881.5	2x2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	15.88	15.90
CA_26A-[41A]	LTE B41	20	40620	2593	16QAM	1	0	40620	2593	4x4	LTE B26	10	8865	876.5	2x2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	15.89	15.90
CA_41A-[41C]	LTE B41	20	40620	2593	16QAM	1	0	40620	2593	4x4	LTE B41	20	41292	2660.2	4x4	LTE B41	20	41490	2680	4x4	-	-	-	-	-	-	-	-	-	-	-	15.90	15.90
CA_41C-[41A]	LTE B41	20	40620	2593	16QAM	1	0	40620	2593	4x4	LTE B41	20	40818	2612.8	4x4	LTE B41	20	41490	2680	4x4	-	-	-	-	-	-	-	-	-	-	-	15.89	15.90
CA_25A]-[25A]-[41A]	LTE B41	20	40620	2593	16QAM	1	0	40620	2593	4x4	LTE B25	20	8365	1962.5	4x4	LTE B25	20	8590	1985	4x4	-	-	-	-	-	-	-	-	-	-	-	15.90	15.90
CA_25A]-[41C]	LTE B41	20	40620	2593	16QAM	1	0	40620	2593	4x4	LTE B41	20	40818	2612.8	4x4	LTE B25	20	8365	1962.5	4x4	-	-	-	-	-	-	-	-	-	-	-	15.90	15.90
CA_26A-[41C]	LTE B41	20	40620	2593	16QAM	1	0	40620	2593	4x4	LTE B41	20	40818	2612.8	4x4	LTE B26	10	8865	876.5	2x2	-	-	-	-	-	-	-	-	-	-	-	15.90	15.90
CA_[41E]	LTE B41	20	40620	2593	16QAM	1	0	40620	2593	4x4	LTE B41	20	40422	2573.2	4x4	LTE B41	20	40818	2612.8	4x4	LTE B41	20	41016	2632.6	4x4	-	-	-	-	-	-	15.89	15.90
CA_[41A]-[41D]	LTE B41	20	40620	2593	16QAM	1	0	40620	2593	4x4	LTE B41	20	41094	2640.4	4x4	LTE B41	20	41292	2660.2	4x4	LTE B41	20	41490	2680	4x4	-	-	-	-	-	-	15.90	15.90
CA_[41D]-[41A]	LTE B41	20	40620	2593	16QAM	1	0	40620	2593	4x4	LTE B41	20	40422	2573.2	4x4	LTE B41	20	40818	2612.8	4x4	LTE B41	20	41490	2680	4x4	-	-	-	-	-	-	15.89	15.90
CA_[41C]-[41C]	LTE B41	20	40620	2593	16QAM	1	0	40620	2593	4x4	LTE B41	20	40422	2573.2	4x4	LTE B41	20	41292	2660.2	4x4	LTE B41	20	41490	2680	4x4	-	-	-	-	-	-	15.90	15.90
CA_[25A]-[25A]-[41C]	LTE B41	20	40620	2593	16QAM	1	0	40620	2593	4x4	LTE B41	20	40422	2573.2	4x4	LTE B25	20	8365	1962.5	4x4	LTE B25	20	8590	1985	4x4	-	-	-	-	-	-	15.89	15.90
CA_[25A]-[41D]	LTE B41	20	40620	2593	16QAM	1	0	40620	2593	4x4	LTE B41	20	40422	2573.2	4x4	LTE B41	20	40818	2612.8	4x4	LTE B25	20	8365	1962.5	4x4	-	-	-	-	-	-	15.89	15.90
CA_41C-[41D]	LTE B41	20	40620	2593	16QAM	1	0	40620	2593	2x2	LTE B41	20	40422	2573.2	2x2	LTE B41	20	41094	2640.4	4x4	LTE B41	20	41292	2660.2	4x4	LTE B41	20	41490	2680	4x4	-	-	15.89	15.90
CA_[41D]-41C	LTE B41	20	40620	2593	16QAM	1	0	40620	2593	4x4	LTE B41	20	40422	2573.2	4x4	LTE B41	20	40818	2612.8	4x4	LTE B41	20	41292	2660.2	2x2	LTE B41	20	41490	2680	2x2	-	-	15.88	15.90
CA_[25A]-[25A]-[41D]	LTE B41	20	40620	2593	16QAM	1	0	40620	2593	2x2	LTE B41	20	40422	2573.2	2x2	LTE B41	20	40818	2612.8	4x4	LTE B25	20	8365	1962.5	4x4	LTE B25	20	8590	1985	4x4	-	-	15.90	15.90

1.4.11 LTE Band 41 PC2 as PCC

Table 25
Output Powers – Ant 4B

	PCC										SCC 1					SCC 2					SCC 3					SCC 4					Power	
Combination	PCC Band	PCC BW [MHz]	PCC (UL) Ch.	PCC (UL) Freq. [MHz]	Mod.	PCC UL# RB	PCC UL RB Offset	PCC (DL) Ch.	PCC (DL) Freq. [MHz]	DL Ant. Config.	SCC Band	SCC BW [MHz]	SCC (DL) Ch.	SCC (DL) Freq. [MHz]	DL Ant. Config.	SCC Band	SCC BW [MHz]	SCC (DL) Ch.	SCC (DL) Freq. [MHz]	DL Ant. Config.	SCC Band	SCC BW [MHz]	SCC (DL) Ch.	SCC (DL) Freq. [MHz]	DL Ant. Config.	SCC Band	SCC BW [MHz]	SCC (DL) Ch.	SCC (DL) Freq. [MHz]	DL Ant. Config.	LTE Tx.Power with DL CA Enabled (dBm)	LTE Single Carrier Tx Power (dBm)
CA_[41A]-[41A] (1)	LTE B41 PC2	20	40620	2593	64QAM	1	0	40620	2593	4x4	LTE B41 PC2	20	41490	2680	4x4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	15.87	15.90
CA_5A-[41A]	LTE B41 PC2	20	40620	2593	64QAM	1	0	40620	2593	4x4	LTE B5	10	2525	881.5	2x2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	15.88	15.90
CA_26A-[41A]	LTE B41 PC2	20	40620	2593	64QAM	1	0	40620	2593	4x4	LTE B26	10	8865	876.5	2x2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	15.89	15.90
CA_[41A]-[41C]	LTE B41 PC2	20	40620	2593	64QAM	1	0	40620	2593	4x4	LTE B41 PC2	20	41292	2660.2	4x4	LTE B41 PC2	20	41490	2680	4x4	-	-	-	-	-	-	-	-	-	-	-	15.86	15.90
CA_[41C]-[41A]	LTE B41 PC2	20	40620	2593	64QAM	1	0	40620	2593	4x4	LTE B41 PC2	20	40818	2612.8	4x4	LTE B41 PC2	20	41490	2680	4x4	-	-	-	-	-	-	-	-	-	-	-	15.87	15.90
CA_[25A]-[25A]-[41A]	LTE B41 PC2	20	40620	2593	64QAM	1	0	40620	2593	4x4	LTE B25	20	8365	1962.5	4x4	LTE B25	20	8590	1985	4x4	-	-	-	-	-	-	-	-	-	-	-	15.90	15.90
CA_[25A]-[41C]	LTE B41 PC2	20	40620	2593	64QAM	1	0	40620	2593	4x4	LTE B41 PC2	20	40818	2612.8	4x4	LTE B25	20	8365	1962.5	4x4	-	-	-	-	-	-	-	-	-	-	-	15.89	15.90
CA_26A-[41C]	LTE B41 PC2	20	40620	2593	64QAM	1	0	40620	2593	4x4	LTE B41 PC2	20	40818	2612.8	4x4	LTE B26	10	8865	876.5	2x2	-	-	-	-	-	-	-	-	-	-	-	15.89	15.90
CA_[41E]	LTE B41 PC2	20	40620	2593	64QAM	1	0	40620	2593	4x4	LTE B41 PC2	20	40422	2573.2	4x4	LTE B41 PC2	20	40818	2612.8	4x4	LTE B41 PC2	20	41016	2632.6	4x4	-	-	-	-	-	-	15.85	15.90
CA_[41A]-[41D]	LTE B41 PC2	20	40620	2593	64QAM	1	0	40620	2593	4x4	LTE B41 PC2	20	41094	2640.4	4x4	LTE B41 PC2	20	41292	2660.2	4x4	LTE B41 PC2	20	41490	2680	4x4	-	-	-	-	-	-	15.86	15.90
CA_[41D]-[41A]	LTE B41 PC2	20	40620	2593	64QAM	1	0	40620	2593	4x4	LTE B41 PC2	20	40422	2573.2	4x4	LTE B41 PC2	20	40818	2612.8	4x4	LTE B41 PC2	20	41490	2680	4x4	-	-	-	-	-	-	15.84	15.90
CA_[41C]-[41C]	LTE B41 PC2	20	40620	2593	64QAM	1	0	40620	2593	4x4	LTE B41 PC2	20	40422	2573.2	4x4	LTE B41 PC2	20	41292	2660.2	4x4	LTE B41 PC2	20	41490	2680	4x4	-	-	-	-	-	-	15.83	15.90
CA_[25A]-[25A]-[41C]	LTE B41 PC2	20	40620	2593	64QAM	1	0	40620	2593	4x4	LTE B41 PC2	20	40422	2573.2	4x4	LTE B25	20	8365	1962.5	4x4	LTE B25	20	8590	1985	4x4	-	-	-	-	-	-	15.85	15.90
CA_[25A]-[41D]	LTE B41 PC2	20	40620	2593	64QAM	1	0	40620	2593	4x4	LTE B41 PC2	20	40422	2573.2	4x4	LTE B41 PC2	20	40818	2612.8	4x4	LTE B25	20	8365	1962.5	4x4	-	-	-	-	-	-	15.87	15.90
CA_41C-[41D]	LTE B41 PC2	20	40620	2593	64QAM	1	0	40620	2593	2x2	LTE B41 PC2	20	40422	2573.2	2x2	LTE B41 PC2	20	41094	2640.4	4x4	LTE B41 PC2	20	41292	2660.2	4x4	LTE B41 PC2	20	41490	2680	4x4	-	-	15.85	15.90
CA_[41D]-41C	LTE B41 PC2	20	40620	2593	64QAM	1	0	40620	2593	4x4	LTE B41 PC2	20	40422	2573.2	4x4	LTE B41 PC2	20	40818	2612.8	4x4	LTE B41 PC2	20	41292	2660.2	2x2	LTE B41 PC2	20	41490	2680	2x2	-	-	15.83	15.90
CA_[25A]-[25A]-[41D]	LTE B41 PC2	20	40620	2593	64QAM	1	0	40620	2593	2x2	LTE B41 PC2	20	40422	2573.2	2x2	LTE B41 PC2	20	40818	2612.8	4x4	LTE B25	20	8365	1962.5	4x4	LTE B25	20	8590	1985	4x4	-	-	15.79	15.90

1.4.12 LTE Band 48 as PCC

Table 26
Output Powers – Ant 3

	PCC										SCC 1					SCC 2					SCC 3					SCC 4					SCC 5					Power	
Combination	PCC Band	PCC BW [MHz]	PCC (UL) Ch.	PCC (UL) Freq. [MHz]	Mod.	PCC UL# RB	PCC UL RB Offset	PCC (DL) Ch.	PCC (DL) Freq. [MHz]	DL Ant. Config.	SCC Band	SCC BW [MHz]	SCC (DL) Ch.	SCC (DL) Freq. [MHz]	DL Ant. Config.	SCC Band	SCC BW [MHz]	SCC (DL) Ch.	SCC (DL) Freq. [MHz]	DL Ant. Config.	SCC Band	SCC BW [MHz]	SCC (DL) Ch.	SCC (DL) Freq. [MHz]	DL Ant. Config.	SCC Band	SCC BW [MHz]	SCC (DL) Ch.	SCC (DL) Freq. [MHz]	DL Ant. Config.	SCC Band	SCC BW [MHz]	SCC (DL) Ch.	SCC (DL) Freq. [MHz]	DL Ant. Config.	LTE Tx.Power with DL CA Enabled (dBm)	LTE Single Carrier Tx Power (dBm)
CA_5A-[48A]	LTE B48	20	56207	3646.7	64QAM	1	99	56207	3646.7	4x4	LTE B5	10	2525	881.5	2x2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	16.47	16.50
CA_[2A]-[48A]-[48A]	LTE B48	20	56207	3646.7	64QAM	1	99	56207	3646.7	4x4	LTE B48	20	55340	3560	4x4	LTE B2	20	900	1960	4x4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	16.44	16.50
CA_[48A]-[48A]-[66A]	LTE B48	20	56207	3646.7	64QAM	1	99	56207	3646.7	4x4	LTE B48	20	55340	3560	4x4	LTE B66	20	66786	2145	4x4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	16.51	16.50
CA_13A-[48A]-[66A]	LTE B48	20	56207	3646.7	64QAM	1	99	56207	3646.7	4x4	LTE B13	10	5230	751	2x2	LTE B66	20	66786	2145	4x4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	16.66	16.50
CA_[48E]	LTE B48	20	56207	3646.7	64QAM	1	99	56207	3646.7	4x4	LTE B48	20	56009	3626.9	4x4	LTE B48	20	55811	3607.1	4x4	LTE B48	20	55613	3587.3	4x4	-	-	-	-	-	-	-	-	-	-	-	16.45	16.50
CA_[2A]-[48E]	LTE B48	20	56207	3646.7	64QAM	1	99	56207	3646.7	4x4	LTE B48	20	56009	3626.9	4x4	LTE B48	20	55811	3607.1	4x4	LTE B2	20	900	1960	4x4	-	-	-	-	-	-	-	-	-	-	-	16.41	16.50
CA_48A-[48A]-[66A]-[66A]	LTE B48	20	56207	3646.7	64QAM	1	99	56207	3646.7	2x2	LTE B48	20	55340	3560	4x4	LTE B66	20	66786	2145	4x4	LTE B66	20	67236	2190	4x4	-	-	-	-	-	-	-	-	-	-	-	16.43	16.50
CA_[48A]-48A-[66A]-[66A]	LTE B48	20	56207	3646.7	64QAM	1	99	56207	3646.7	4x4	LTE B48	20	55340	3560	2x2	LTE B66	20	66786	2145	4x4	LTE B66	20	67236	2190	4x4	-	-	-	-	-	-	-	-	-	-	-	16.42	16.50
CA_[48A]-[48C]-[66A]	LTE B48	20	56207	3646.7	64QAM	1	99	56207	3646.7	4x4	LTE B48	20	55340	3560	4x4	LTE B48	20	55538	3578.8	4x4	LTE B66	20	66786	2145	4x4	-	-	-	-	-	-	-	-	-	-	-	16.43	16.50
CA_[48C]-[48A]-[66A]	LTE B48	20	56207	3646.7	64QAM	1	99	56207	3646.7	4x4	LTE B48	20	56009	3626.9	4x4	LTE B48	20	55340	3560	4x4	LTE B66	20	66786	2145	4x4	-	-	-	-	-	-	-	-	-	-	-	16.42	16.50
CA_[48C]-[66A]-[66A]	LTE B48	20	56207	3646.7	64QAM	1	99	56207	3646.7	4x4	LTE B48	20	56009	3626.9	4x4	LTE B66	20	66786	2145	4x4	LTE B66	20	67236	2190	4x4	-	-	-	-	-	-	-	-	-	-	-	16.41	16.50
CA_[48D]-[66A]	LTE B48	20	56207	3646.7	64QAM	1	99	56207	3646.7	4x4	LTE B48	20	56009	3626.9	4x4	LTE B48	20	55811	3607.1	4x4	LTE B66	20	66786	2145	4x4	-	-	-	-	-	-	-	-	-	-	-	16.45	16.50
CA_[2A]-46A-[48C]	LTE B48	20	56207	3646.7	64QAM	1	99	56207	3646.7	4x4	LTE B48	20	56009	3626.9	4x4	LTE B2	20	900	1960	4x4	LTE B46	20	50665	5537.5	2x2	-	-	-	-	-	-	-	-	-	-	-	16.44	16.50
CA_[2A]-[48C]-[66A]	LTE B48	20	56207	3646.7	64QAM	1	99	56207	3646.7	4x4	LTE B48	20	56009	3626.9	4x4	LTE B2	20	900	1960	4x4	LTE B66	20	66786	2145	4x4	-	-	-	-	-	-	-	-	-	-	-	16.42	16.50
CA_13A-[48C]-[66A]	LTE B48	20	56207	3646.7	64QAM	1	99	56207	3646.7	4x4	LTE B13	10	5230	751	2x2	LTE B66	20	66786	2145	4x4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	16.42	16.50
CA_46A-[48C]-[66A]	LTE B48	20	56207	3646.7	64QAM	1	99	56207	3646.7	4x4	LTE B48	20	56009	3626.9	4x4	LTE B46	20	50665	5537.5	2x2	LTE B66	20	66786	2145	4x4	-	-	-	-	-	-	-	-	-	-	-	16.43	16.50
CA_[2A]-46A-[48A]-[66A]	LTE B48	20	56207	3646.7	64QAM	1	99	56207	3646.7	4x4	LTE B2	20	900	1960	4x4	LTE B46	20	50665	5537.5	2x2	LTE B66	20	66786	2145	4x4	-	-	-	-	-	-	-	-	-	-	-	16.49	16.50
CA_2A-[48E]	LTE B48	20	56207	3646.7	64QAM	1	99	56207	3646.7	4x4	LTE B48	20	56009	3626.9	4x4	LTE B48	20	55811	3607.1	4x4	LTE B48	20	55613	3587.3	2x2	LTE B2	20	900	1960	2x2	-	-	-	-	-	-	-	16.43	16.50
CA_2A-[48E]	LTE B48	20	56207	3646.7	64QAM	1	99	56207	3646.7	2x2	LTE B48	20	56009	3626.9	4x4	LTE B48	20	55811	3607.1	4x4	LTE B48	20	55613	3587.3	4x4	LTE B2	20	900	1960	2x2	-	-	-	-	-	-	-	16.43	16.50
CA_46C-[48D]	LTE B48	20	56207	3646.7	64QAM	1	99	56207	3646.7	4x4	LTE B48	20	56009	3626.9	4x4	LTE B48	20	55811	3607.1	4x4	LTE B46	20	50665	5537.5	2x2	LTE B46	20	53863	5557.3	2x2	-	-	-	-	-	-	-	16.41	16.50
CA_[48E]-66A	LTE B48	20	56207	3646.7	64QAM	1	99	56207	3646.7	4x4	LTE B48	20	56009	3626.9	4x4	LTE B48	20	55811	3607.1	4x4	LTE B48	20	55613	3587.3	2x2	LTE B66	20	66786	2145	2x2	-	-	-	-	-	-	-	16.41	16.50
CA_[48E]-66A	LTE B48	20	56207	3646.7	64QAM	1	99	56207	3646.7	2x2	LTE B48	20	56009	3626.9	4x4	LTE B48	20	55811	3607.1	4x4	LTE B48	20	55613	3587.3	4x4	LTE B66	20	66786	2145	2x2	-	-	-	-	-	-	-	16.43	16.50
CA_2A-46A-[48D]	LTE B48	20	56207	3646.7	64QAM	1	99	56207	3646.7	4x4	LTE B48	20	56009	3626.9	4x4	LTE B46	20	55811	3607.1	4x4	LTE B2	20	900	1960	2x2	LTE B46	20	50665	5537.5	2x2	-	-	-	-	-	-	-	16.42	16.50
CA_[2A]-46C-[48D]	LTE B48	20	56207	3646.7	64QAM	1	99	56207	3646.7	4x4	LTE B48	20	56009	3626.9	4x4	LTE B2	20	900	1960	4x4	LTE B46	20	50665	5537.5	2x2	LTE B46	20	50467	5517.7	2x2	-	-	-	-	-	-	-	16.44	16.50
CA_[2A]-46C-[48E]	LTE B48	20	56207	3646.7	64QAM	1	99	56207	3646.7	4x4	LTE B48	20	56009	3626.9	4x4	LTE B46	20	50665	5537.5	2x2	LTE B46	20	50467	5517.7	2x2	LTE B66	20	66786	2145	2x2	-	-	-	-	-	-	-	16.43	16.50
CA_[2A]-46C-[48D]-66A	LTE B48	20	56207	3646.7	64QAM	1	99	56207	3646.7	2x2	LTE B48	20	56009	3626.9	4x4	LTE B46	20	50665	5537.5	2x2	LTE B66	20	66786	2145	4x4	-	-	-	-	-	-	-	-	-	-	-	16.41	16.50
CA_[2A]-46A-[48D]-66A	LTE B48	20	56207	3646.7	64QAM	1	99	56207	3646.7	4x4	LTE B48	20	56009	3626.9	4x4	LTE B46	20	50665	5537.5	2x2	LTE B66	20	66786	2145	4x4	-	-	-	-	-	-	-	-	-	-	-	16.40	16.50
CA_[2A]-46A-[48C]-66A	LTE B48	20	56207	3646.7	64QAM	1	99	56207	3646.7	4x4	LTE B2	20	900	1960	4x4	LTE B46	20	50665	5537.5	2x2	LTE B66	20	66786	2145	4x4	-	-	-	-	-	-	-	-	-	-	-	16.40	16.50
CA_[2A]-46C-[48A]-[66A]	LTE B48	20	56207	3646.7	64QAM	1	99	56207	3646.7	4x4	LTE B2	20	900	1960	4x4	LTE B46	20	50665	5537.5	2x2	LTE B66	20	66786	2145	4x4	-	-	-	-	-	-	-	-	-	-	-	16.49	16.50
CA_[2A]-46A-[48D]-66A	LTE B48	20	56207	3646.7	64QAM	1	99	56207	3646.7	2x2	LTE B48	20	56018	3627.8	2x2	LTE B48	20	55820	3608	4x4	LTE B2	20	900	1960	4x4	LTE B46	20	50665	5537.5	2x2	LTE B66	20	66786	2145	2x2	16.43	16.50
CA_[2A]-46A-[48D]-66A	LTE B48	20	56207	3646.7	64QAM	1	99	56207	3646.7	4x4	LTE B48	20	56018	3627.8	2x2	LTE B2	20	900	1960	4x4	LTE B46	20	50665	5537.5	2x2	LTE B66	20	66786	2145	2x2	-	-	-	-	-	-	-	16.43	16.50
CA_[2A]-46C-[48D]-66A	LTE B48	20	56207	3646.7	64QAM	1	99	56207	3646.7	4x4	LTE B48	20	56009	3626.9	2x2	LTE B2	20	900	1960	4x4	LTE B46	20	50665	5537.5	2x2	LTE B66	20	66786	2145	2x2	-	-	-	-	-	-	-	16.44	16.50
CA_[2A]-46C-[48C]-66A	LTE B48	20	56207	3646.7	64QAM	1	99	56207	3646.7	2x2	LTE B48	20	56009	3626.9	4x4	LTE B2	20	900	1960	4x4	LTE B46	20	50665	5537.5	2x2	LTE B46	20	50467	5517.7	2x2	LTE B66	20	66786	2145	2x2	16.44	16.50
CA_2A-46D-[48A]-[66A]	LTE B48	20	56207	3646.7	64QAM	1	99	56207	3646.7	4x4	LTE B2	20	900	1960	2x2	LTE B46	20	50665	5537.5	2x2	LTE B46	20	50467	5517.7	2x2	LTE B46	20	50863	5557.3	2x2	LTE B66	20	66786	2145	4x4	16.44	16.50

1.5 Downlink Carrier Aggregation with Uplink Carrier Aggregation enabled

This device supports uplink carrier aggregation (ULCA) with additional Carrier Aggregation configurations active in the downlink. Power measurements were performed with ULCA active and additional CA configurations active in the downlink for the configuration per Fall 2017 TCB Workshop Notes.

Per FCC Guidance, additional SAR measurements for these configurations were not required since their maximum output power was not more than 0.25 dB higher than the maximum output power for with only ULCA active.

1.5.1 DL Carrier Aggregation RF Conducted Powers

1.5.1.1 LTE Band 41

Table 27
Output Powers – Ant 4B

		PCC							SCC 1							SCC 2				SCC 3				SCC 4				Power	
Combination	PCC Band	PCC BW [MHz]	PCC (UL) Ch.	PCC (UL) Freq. [MHz]	Mod.	PCC UL# RB	PCC UL RB Offset	PCC (DL) Channel	PCC (DL) Freq. [MHz]	SCC Band	SCC BW [MHz]	SCC (UL) Channel	SCC (UL) Freq. [MHz]	Mod	SCC UL# RB	SCC UL# RB Offset	SCC (DL) Channel	SCC (DL) Freq. [MHz]	SCC Band	SCC BW [MHz]	SCC (DL) Channel	SCC (DL) Freq. [MHz]	SCC Band	SCC BW [MHz]	SCC (DL) Channel	SCC (DL) Freq. [MHz]	SCC Band	SCC BW [MHz]	SCC (DL) Channel	SCC (DL) Freq. [MHz]	ULCA Tx Power with add'l CA config. active on DL (dBm)	ULCA Tx Power (dBm)
CA_41C-41A	LTE B41	20	40620	2593	QPSK	50	0	40620	2593	LTE B41	20	40422	2573.2	QPSK	50	50	40422	2573.2	LTE B41	20	41490	2680	-	-	-	-	-	-	-	-	15.17	15.39
CA_41D-41A	LTE B41	20	40620	2593	QPSK	50	0	40620	2593	LTE B41	20	40422	2573.2	QPSK	50	50	40422	2573.2	LTE B41	20	40224	2553.4	LTE B41	20	41490	2680	-	-	-	-	15.18	15.39
CA_41C-41C	LTE B41	20	40620	2593	QPSK	50	0	40620	2593	LTE B41	20	40422	2573.2	QPSK	50	50	40422	2573.2	LTE B41	20	41292	2660.2	LTE B41	20	41490	2680	-	-	-	-	15.18	15.39
CA_41E	LTE B41	20	40620	2593	QPSK	50	0	40620	2593	LTE B41	20	40422	2573.2	QPSK	50	50	40422	2573.2	LTE B41	20	40224	2553.4	LTE B41	20	40818	2612.8	-	-	-	-	15.18	15.39
CA_41D-41D	LTE B41	20	40620	2593	QPSK	50	0	40620	2593	LTE B41	20	40422	2573.2	QPSK	50	50	40422	2573.2	LTE B41	20	41094	2640.4	LTE B41	20	41292	2660.2	LTE B41	20	41490	2680	15.18	15.39
CA_41D-41C	LTE B41	20	40620	2593	QPSK	50	0	40620	2593	LTE B41	20	40422	2573.2	QPSK	50	50	40422	2573.2	LTE B41	20	40224	2553.4	LTE B41	20	41292	2660.2	LTE B41	20	41490	2680	15.19	15.39

1.5.1.2 LTE Band 41 PC2

Table 28
Output Powers – Ant 4B

		PCC							SCC 1							SCC 2				SCC 3				SCC 4				Power	
Combination	PCC Band	PCC BW [MHz]	PCC (UL) Ch.	PCC (UL) Freq. [MHz]	Mod.	PCC UL# RB	PCC UL RB Offset	PCC (DL) Channel	PCC (DL) Freq. [MHz]	SCC Band	SCC BW [MHz]	SCC (UL) Channel	SCC (UL) Freq. [MHz]	Mod	SCC UL# RB	SCC UL# RB Offset	SCC (DL) Channel	SCC (DL) Freq. [MHz]	SCC Band	SCC BW [MHz]	SCC (DL) Channel	SCC (DL) Freq. [MHz]	SCC Band	SCC BW [MHz]	SCC (DL) Channel	SCC (DL) Freq. [MHz]	SCC Band	SCC BW [MHz]	SCC (DL) Channel	SCC (DL) Freq. [MHz]	ULCA Tx Power with add'l CA config. active on DL (dBm)	ULCA Tx Power (dBm)
CA_41C-41A	LTE B41 PC2	20	40620	2593	QPSK	50	0	40620	2593	LTE B41 PC2	20	40422	2573.2	QPSK	50	50	40422	2573.2	LTE B41 PC2	20	41490	2680									15.11	15.28
CA_41D-41A	LTE B41 PC2	20	40620	2593	QPSK	50	0	40620	2593	LTE B41 PC2	20	40422	2573.2	QPSK	50	50	40422	2573.2	LTE B41 PC2	20	40224	2553.4	LTE B41 PC2	20	41490	2680	-	-	-	-	15.11	15.28
CA_41C-41C	LTE B41 PC2	20	40620	2593	QPSK	50	0	40620	2593	LTE B41 PC2	20	40422	2573.2	QPSK	50	50	40422	2573.2	LTE B41 PC2	20	41292	2660.2	LTE B41 PC2	20	41490	2680	-	-	-	-	15.13	15.28
CA_41E	LTE B41 PC2	20	40620	2593	QPSK	50	0	40620	2593	LTE B41 PC2	20	40422	2573.2	QPSK	50	50	40422	2573.2	LTE B41 PC2	20	40224	2553.4	LTE B41 PC2	20	40818	2612.8	-	-	-	-	15.13	15.28
CA_41C-41D	LTE B41 PC2	20	40620	2593	QPSK	50	0	40620	2593	LTE B41 PC2	20	40422	2573.2	QPSK	50	50	40422	2573.2	LTE B41 PC2	20	41094	2640.4	LTE B41 PC2	20	41292	2660.2	LTE B41 PC2	20	41490	2680	15.13	15.28
CA_41D-41C	LTE B41 PC2	20	40620	2593	QPSK	50	0	40620	2593	LTE B41 PC2	20	40422	2573.2	QPSK	50	50	40422	2573.2	LTE B41 PC2	20	40224	2553.4	LTE B41 PC2	20	41292	2660.2	LTE B41 PC2	20	41490	2680	15.14	15.28

1.5.2 DL Carrier Aggregation with DL 4x4 MIMO RF Conducted Powers

Note: 4x4 DL MIMO is only operating in the downlink. Uplink transmission is limited to a single output stream for each component carrier of ULCA.

1.5.2.1 LTE Band 41

Table 29
Output Powers – Ant 4B

	PCC									SCC 1									SCC 2					SCC 3					SCC 4					Power	
Combination	PCC Band	PCC BW [MHz]	PCC (UL) Ch.	PCC (UL) Freq. [MHz]	Mod.	PCC UL# RB	PCC UL RB Offset	PCC (DL) Ch.	PCC (DL) Freq. [MHz]	DL Ant. Config.	SCC Band	SCC BW [MHz]	SCC (UL) Ch.	SCC (UL) Freq. [MHz]	Mod	SCC UL # RB	SCC UL RB Offset	SCC (DL) Ch.	SCC (DL) Freq. [MHz]	DL Ant. Config.	SCC Band	SCC BW [MHz]	SCC (DL) Ch.	SCC (DL) Freq. [MHz]	DL Ant. Config.	SCC Band	SCC BW [MHz]	SCC (DL) Ch.	SCC (DL) Freq. [MHz]	DL Ant. Config.	SCC Band	SCC BW [MHz]	SCC (DL) Ch.	SCC (DL) Freq. [MHz]	DL Ant. Config.	ULCA Tx Power with add'l CA config. active on DL (dBm)	ULCA Tx Power (dBm)
CA_[41C]-[41A]	LTE B41	20	40620	2593	QPSK	50	0	40620	2593	4x4	LTE B41	20	40422	2573.2	QPSK	50	50	40422	2573.2	4x4	LTE B41	20	41490	2680	4x4										15.21	15.39
CA_[41D]	LTE B41	20	40620	2593	QPSK	50	0	40620	2593	4x4	LTE B41	20	40422	2573.2	QPSK	50	50	40422	2573.2	4x4	LTE B41	20	40224	2553.4	4x4	LTE B41	20	40818	2612.8	4x4	-	-	-	-	-	15.13	15.39
CA_[41D]-[41A]	LTE B41	20	40620	2593	QPSK	50	0	40620	2593	4x4	LTE B41	20	40422	2573.2	QPSK	50	50	40422	2573.2	4x4	LTE B41	20	40224	2553.4	4x4	LTE B41	20	41490	2680	4x4	-	-	-	-	-	15.11	15.39
CA_[41C]-[41C]	LTE B41	20	40620	2593	QPSK	50	0	40620	2593	4x4	LTE B41	20	40422	2573.2	QPSK	50	50	40422	2573.2	4x4	LTE B41	20	41292	2660.2	4x4	LTE B41	20	41490	2680	4x4	-	-	-	-	-	15.08	15.39
CA_41C-41D3	LTE B41	20	40620	2593	QPSK	50	0	40620	2593	2x2	LTE B41	20	40422	2573.2	QPSK	50	50	40422	2573.2	2x2	LTE B41	20	41094	2640.4	4x4	LTE B41	20	41292	2660.2	4x4	LTE B41	20	41490	2680	4x4	15.12	15.39
CA_[41D]-41C	LTE B41	20	40620	2593	QPSK	50	0	40620	2593	4x4	LTE B41	20	40422	2573.2	QPSK	50	50	40422	2573.2	4x4	LTE B41	20	40224	2553.4	4x4	LTE B41	20	41292	2660.2	2x2	LTE B41	20	41490	2680	2x2	15.11	15.39

1.5.2.2 LTE Band 41 PC2

Table 30

Output Powers – Ant 4B

	PCC									SCC 1										SCC 2										SCC 3										SCC 4					Power	
Combination	PCC Band	PCC BW [MHz]	PCC (UL) Ch.	PCC (UL) Freq. [MHz]	Mod.	PCC UL# RB	PCC UL RB Offset	PCC (DL) Ch.	PCC (DL) Freq. [MHz]	DL Ant. Config.	SCC Band	SCC BW [MHz]	SCC (UL) Ch.	SCC (UL) Freq. [MHz]	Mod	SCC UL # RB	SCC UL RB Offset	SCC (DL) Ch.	SCC (DL) Freq. [MHz]	DL Ant. Config.	SCC Band	SCC BW [MHz]	SCC (UL) Ch.	SCC (DL) Freq. [MHz]	DL Ant. Config.	SCC Band	SCC BW [MHz]	SCC (UL) Ch.	SCC (DL) Freq. [MHz]	DL Ant. Config.	SCC Band	SCC BW [MHz]	SCC (UL) Ch.	SCC (DL) Freq. [MHz]	DL Ant. Config.	ULCA Tx.Power with add'l CA config. active on DL (dBm)	ULCA Tx Power (dBm)
CA_41C-[41A]	LTE B41 PC2	20	40620	2593	QPSK	50	0	40620	2593	4x4	LTE B41 PC2	20	40422	2573.2	QPSK	50	50	40422	2573.2	4x4	LTE B41 PC2	20	41490	2680	4x4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	15.09	15.28
CA_41B	LTE B41 PC2	20	40620	2593	QPSK	50	0	40620	2593	4x4	LTE B41 PC2	20	40422	2573.2	QPSK	50	50	40422	2573.2	4x4	LTE B41 PC2	20	40224	2553.4	4x4	LTE B41 PC2	20	40818	2612.8	4x4	-	-	-	-	-	-	-	-	-	-	-	-	-	15.03	15.28
CA_41D-[41A]	LTE B41 PC2	20	40620	2593	QPSK	50	0	40620	2593	4x4	LTE B41 PC2	20	40422	2573.2	QPSK	50	50	40422	2573.2	4x4	LTE B41 PC2	20	40224	2553.4	4x4	LTE B41 PC2	20	41490	2680	4x4	-	-	-	-	-	-	-	-	-	-	-	-	-	15.05	15.28
CA_41C-[41C]	LTE B41 PC2	20	40620	2593	QPSK	50	0	40620	2593	4x4	LTE B41 PC2	20	40422	2573.2	QPSK	50	50	40422	2573.2	4x4	LTE B41 PC2	20	41292	2660.2	4x4	LTE B41 PC2	20	41490	2680	4x4	-	-	-	-	-	-	-	-	-	-	-	-	-	15.03	15.28
CA_41C-[41D]	LTE B41 PC2	20	40620	2593	QPSK	50	0	40620	2593	2x2	LTE B41 PC2	20	40422	2573.2	QPSK	50	50	40422	2573.2	2x2	LTE B41 PC2	20	41094	2640.4	4x4	LTE B41 PC2	20	41292	2660.2	4x4	LTE B41 PC2	20	41490	2680	4x4	15.50	15.28
CA_41D-41C	LTE B41 PC2	20	40620	2593	QPSK	50	0	40620	2593	4x4	LTE B41 PC2	20	40422	2573.2	QPSK	50	50	40422	2573.2	4x4	LTE B41 PC2	20	40224	2553.4	4x4	LTE B41 PC2	20	41292	2660.2	2x2	LTE B41 PC2	20	41490	2680	2x2	15.06	15.28

1.5.2.3 LTE Band 7

Table 31

Output Powers – Ant 4B

	PCC										SCC 1										Power	
Combination	PCC Band	PCC BW [MHz]	PCC (UL) Ch.	PCC (UL) Freq. [MHz]	Mod.	PCC UL# RB	PCC UL RB Offset	PCC (DL) Ch.	PCC (DL) Freq. [MHz]	DL Ant. Config.	SCC Band	SCC BW [MHz]	SCC (UL) Ch.	SCC (UL) Freq. [MHz]	Mod	SCC UL # RB	SCC UL RB Offset	SCC (DL) Ch.	SCC (DL) Freq. [MHz]	DL Ant. Config.	ULCA Tx.Power with add'l CA config. active on DL (dBm)	ULCA Tx Power (dBm)
CA_[7C]	LTE B7	20	20850	2510	QPSK	50	50	2850	2630	4x4	LTE B7	20	21048	2529.8	QPSK	50	0	3048	2649.8	4x4	13.09	13.12

APPENDIX G: POWER REDUCTION VERIFICATION

The device supports manufacturer's proprietary power reduction mechanism called "Detect Mode" for the Main Cellular Antenna. Details of this mechanism can be found in the Operational Description. When the device is being used "on-body" or "held in hand" by the user, the device will detect motion and reduce the power of the main antenna. Per the manufacturer, the mechanism is agnostic to different cellular air interfaces. Detect Mode operation was verified for two test cases, on-body and held in hand, for each supported cellular band. The power reduction verification results are below.

1.1 Main Antenna Power Reduction Verification Summary

Table G-1
Main Antenna Power Reduction Verification

Mode/Band	Antenna	Maximum Scenario Maximum Allowed Target Power [dBm]	Reduced Scenario Maximum Allowed Target Power [dBm]	Conducted Power [dBm]			
				Maximum	Test Case 1	Test Case 2	Verdict
GPRS 850 (2 Tx)	1	30.00 (± 0.75)	26.05 (± 0.75)	29.88	25.73	25.70	PASS
	3	31.50 (± 0.75)	26.55 (± 0.75)	31.62	25.84	25.91	PASS
GPRS 1900 (2 Tx)	2a	26.50 (± 0.75)	21.05 (± 0.75)	26.71	20.45	20.44	PASS
	2b	26.50 (± 0.75)	19.75 (± 0.75)	27.25	20.19	20.20	PASS
	4a	28.50 (± 0.75)	20.15 (± 0.75)	28.85	19.40	19.40	PASS
	4b	29.00 (± 0.75)	20.25 (± 0.75)	29.33	19.51	19.50	PASS
WCDMA B5	1	24.00 (± 0.5)	20.10 (± 0.5)	24.50	20.59	20.60	PASS
	3	25.20 (± 0.5)	19.80 (± 0.5)	25.33	19.95	19.98	PASS
WCDMA B4	2a	22.50 (± 0.5)	13.75 (± 1)	22.70	14.28	14.29	PASS
	2b	22.75 (± 0.5)	13.90 (± 1)	23.25	14.31	14.32	PASS
	4a	24.50 (± 0.5)	13.50 (± 1)	24.52	14.20	14.19	PASS
	4b	25.20 (± 0.5)	13.50 (± 1)	25.40	14.00	13.99	PASS
WCDMA B2	2a	22.50 (± 0.5)	14.10 (± 1)	22.70	14.80	14.79	PASS
	2b	22.75 (± 0.5)	13.10 (± 1)	23.25	14.10	14.10	PASS
	4a	24.50 (± 0.5)	13.90 (± 1)	24.65	14.55	14.50	PASS
	4b	25.20 (± 0.5)	13.70 (± 1)	25.40	14.01	14.04	PASS
LTE Band 12	1	24.00 (± 0.5)	21.00 (± 0.5)	24.50	21.41	21.50	PASS
	3	25.20 (± 0.5)	19.50 (± 0.5)	25.51	19.53	19.50	PASS
LTE Band 17	1	24.00 (± 0.5)	21.00 (± 0.5)	24.25	21.30	21.27	PASS
	3	25.20 (± 0.5)	19.50 (± 0.5)	25.40	19.80	19.50	PASS
LTE Band 13	1	24.00 (± 0.5)	21.00 (± 0.5)	24.48	21.35	21.33	PASS
	3	25.20 (± 0.5)	19.80 (± 0.5)	25.68	20.20	20.19	PASS
LTE Band 5	1	24.00 (± 0.5)	20.10 (± 0.5)	24.08	20.16	20.09	PASS
	3	25.20 (± 0.5)	19.80 (± 0.5)	25.11	19.77	19.79	PASS
LTE Band 26	1	24.00 (± 0.5)	20.10 (± 0.5)	24.13	20.15	20.14	PASS
	3	25.20 (± 0.5)	19.80 (± 0.5)	25.28	19.98	19.96	PASS
LTE Band 4	2a	22.50 (± 0.5)	13.75 (± 1)	22.57	14.04	14.10	PASS
	2b	23.00 (± 0.5)	13.90 (± 1)	23.20	14.45	14.49	PASS
	4a	24.50 (± 0.5)	13.50 (± 1)	24.57	13.71	13.69	PASS
	4b	25.20 (± 0.5)	13.50 (± 1)	25.23	13.90	13.89	PASS
LTE Band 66	2a	22.50 (± 0.5)	13.75 (± 1)	22.22	13.81	13.83	PASS
	2b	23.00 (± 0.5)	13.90 (± 1)	23.19	14.46	14.41	PASS
	4a	24.50 (± 0.5)	13.50 (± 1)	24.39	13.77	13.75	PASS
	4b	25.20 (± 0.5)	13.50 (± 1)	25.36	13.98	14.00	PASS
LTE Band 2	2a	22.50 (± 0.5)	14.10 (± 1)	22.64	14.61	14.72	PASS
	2b	23.00 (± 0.5)	13.10 (± 1)	23.50	14.06	14.10	PASS
	4a	24.50 (± 0.5)	13.90 (± 1)	24.43	13.91	13.90	PASS
	4b	25.20 (± 0.5)	13.70 (± 1)	25.39	13.92	13.91	PASS
LTE Band 25	2a	22.50 (± 0.5)	14.10 (± 1)	22.70	14.68	14.70	PASS
	2b	23.00 (± 0.5)	13.10 (± 1)	23.50	14.10	14.10	PASS
	4a	24.50 (± 0.5)	13.90 (± 1)	24.55	13.92	13.90	PASS
	4b	25.20 (± 0.5)	13.70 (± 1)	25.37	13.94	13.93	PASS
LTE Band 30	2a	22.00 (± 0.5)	12.00 (± 1)	22.01	12.01	12.00	PASS
	2b	22.75 (± 0.5)	12.40 (± 1)	23.25	12.70	12.67	PASS
	4a	23.00 (± 0.5)	12.20 (± 1)	22.93	12.21	12.20	PASS
	4b	23.50 (± 0.5)	12.70 (± 1)	23.59	13.20	13.30	PASS
LTE Band 7	2a	22.50 (± 0.5)	11.70 (± 1)	22.47	11.70	11.71	PASS
	2b	22.50 (± 0.5)	11.30 (± 1)	22.70	11.92	11.95	PASS
	4a	24.50 (± 0.5)	11.50 (± 1)	24.18	11.58	11.60	PASS
	4b	25.20 (± 0.5)	12.30 (± 1)	25.25	12.95	12.94	PASS
LTE Band 41 (PC3)	2a	22.00 (± 0.5)	13.70 (± 1)	22.20	14.02	14.01	PASS
	2b	22.50 (± 0.5)	13.20 (± 1)	22.97	14.12	14.14	PASS
	4a	25.00 (± 0.5)	13.20 (± 1)	25.31	13.81	13.83	PASS
	4b	25.20 (± 0.5)	15.40 (± 0.5)	25.40	15.60	15.57	PASS
LTE Band 41 (PC2)	2a	25.00 (± 0.5)	13.70 (± 1)	25.20	14.08	14.05	PASS
	2b	24.50 (± 0.5)	13.20 (± 1)	24.70	13.90	13.89	PASS
	4a	27.50 (± 0.5)	13.20 (± 1)	27.01	13.71	13.73	PASS
	4b	28.20 (± 0.5)	15.40 (± 0.5)	28.33	15.60	15.59	PASS
LTE Band 48	1	21.50 (± 0.5)	14.30 (± 1)	22.00	15.30	15.30	PASS
	3	24.50 (± 0.5)	16.00 (± 0.5)	24.34	15.53	15.51	PASS
	2b	21.50 (± 0.5)	14.30 (± 1)	21.68	14.97	14.95	PASS
	4b	25.20 (± 0.5)	15.80 (± 0.5)	25.00	16.30	16.30	PASS
LTE B5 Intra-Band ULCA	1	22.50 (± 1)	19.60 (± 1)	22.91	19.73	19.68	PASS
	3	24.00 (± 1)	19.30 (± 1)	24.42	18.30	18.32	PASS
LTE B7 Intra-Band ULCA	2a	21.00 (± 1)	11.70 (± 1)	21.43	10.82	10.85	PASS
	2b	20.50 (± 1)	11.30 (± 1)	20.93	10.85	10.88	PASS
	4a	23.50 (± 1)	11.50 (± 1)	22.81	10.80	10.82	PASS
	4b	24.00 (± 1)	12.30 (± 1)	23.05	12.20	12.17	PASS
LTE B41 (PC3) Intra-Band ULCA	2a	20.00 (± 1)	13.70 (± 1)	20.04	12.82	12.85	PASS
	2b	20.50 (± 1)	13.20 (± 1)	20.88	13.26	13.21	PASS
	4a	23.50 (± 1)	13.20 (± 1)	22.51	12.80	12.78	PASS
	4b	24.00 (± 1)	14.90 (± 1)	24.53	13.91	13.93	PASS
LTE B41 (PC2) Intra-Band ULCA	2a	21.50 (± 1)	13.70 (± 1)	22.01	13.57	13.55	PASS
	2b	22.50 (± 1)	13.20 (± 1)	22.68	13.34	13.37	PASS
	4a	25.50 (± 1)	13.20 (± 1)	24.50	12.85	12.81	PASS
	4b	26.00 (± 1)	14.90 (± 1)	25.00	14.24	14.26	PASS

Test Case 1: Device Held in Hand

Test Case 2: Device Resting on Lap

Test Cases represent typical scenarios in which the device power would be reduced. In these scenarios detect mode has been verified to identify typical on-body use-cases including when thin objects, such as a magazine or newspaper, are placed between the body and the device. In the absence of detect mode output, the device defaults to the most conservative power.

APPENDIX H: IEEE 802.11AX RU SAR EXCLUSION

1.1 IEEE 802.11ax RU SAR Exclusion

To make the most efficient use of the additional available subcarriers (data tones), IEEE 802.11ax can utilize Orthogonal Frequency-Division Multiple Access (OFDMA) which divides the existing 802.11 channels into smaller subchannels called Resource Units (RUs). Possible RU sizes are: 26T, 52T, 106T, 242T, 484T, 996T.

Per FCC Guidance, 802.11ax was considered a higher order 802.11 mode when compared to a/b/g/n/ac to apply KDB Publication 248227 D01v02r02 for OFDM mode selection. Therefore, SAR tests were not required for 802.11ax based on the maximum allowed output powers of OFDM modes and the reported SAR values. Per FCC Guidance, maximum conducted powers were performed for each RU size to demonstrate that the output powers would not be higher than the other OFDM 802.11 modes.

1.2 IEEE 802.11ax RU Target Powers

1.2.1 Maximum 802.11ax RU WLAN Output Power

A. Antenna 2A

Mode/ Band		Tones	26T		52T		106T		242T	
		Channel	Maximum	Nominal	Maximum	Nominal	Maximum	Nominal	Maximum	Nominal
Modulated Average - Single Tx Chain (dBm) - Antenna 2A	20 MHz Bandwidth	1	13.00	11.50	13.00	11.50	13.00	11.50	13.00	11.50
		2	13.00	11.50	13.00	11.50	13.00	11.50	13.00	11.50
		3	13.00	11.50	13.00	11.50	13.00	11.50	13.00	11.50
		4	13.00	11.50	13.00	11.50	13.00	11.50	13.00	11.50
		5	13.00	11.50	13.00	11.50	13.00	11.50	13.00	11.50
		6	13.00	11.50	13.00	11.50	13.00	11.50	13.00	11.50
		7	13.00	11.50	13.00	11.50	13.00	11.50	13.00	11.50
		8	13.00	11.50	13.00	11.50	13.00	11.50	13.00	11.50
		9	13.00	11.50	13.00	11.50	13.00	11.50	13.00	11.50
		10	13.00	11.50	13.00	11.50	13.00	11.50	13.00	11.50
		11	13.00	11.50	13.00	11.50	13.00	11.50	13.00	11.50
		12	11.00	9.50	11.00	9.50	11.00	9.50	11.00	9.50
		13	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Mode/ Band		Tones	26T		52T		106T		242T	
		Channel	Maximum	Nominal	Maximum	Nominal	Maximum	Nominal	Maximum	Nominal
Modulated Average - 2 Tx Chain (dBm) - Antenna 2A	20 MHz Bandwidth	1	10.00	8.50	10.00	8.50	10.00	8.50	10.00	8.50
		2	13.00	11.50	13.00	11.50	13.00	11.50	13.00	11.50
		3	13.00	11.50	13.00	11.50	13.00	11.50	13.00	11.50
		4	13.00	11.50	13.00	11.50	13.00	11.50	13.00	11.50
		5	13.00	11.50	13.00	11.50	13.00	11.50	13.00	11.50
		6	13.00	11.50	13.00	11.50	13.00	11.50	13.00	11.50
		7	13.00	11.50	13.00	11.50	13.00	11.50	13.00	11.50
		8	13.00	11.50	13.00	11.50	13.00	11.50	13.00	11.50
		9	13.00	11.50	13.00	11.50	13.00	11.50	13.00	11.50
		10	13.00	11.50	13.00	11.50	13.00	11.50	13.00	11.50
		11	13.00	11.50	13.00	11.50	13.00	11.50	13.00	11.50
		12	8.00	6.50	8.00	6.50	8.00	6.50	8.00	6.50
		13	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

B. Antenna 4A

Mode/ Band		Tones	26T		52T		106T		242T	
		Channel	Maximum	Nominal	Maximum	Nominal	Maximum	Nominal	Maximum	Nominal
Modulated Average - Single Tx Chain (dBm) - Antenna 4A	20 MHz Bandwidth	1	13.00	11.50	13.00	11.50	13.00	11.50	13.00	11.50
		2	13.00	11.50	13.00	11.50	13.00	11.50	13.00	11.50
		3	13.00	11.50	13.00	11.50	13.00	11.50	13.00	11.50
		4	13.00	11.50	13.00	11.50	13.00	11.50	13.00	11.50
		5	13.00	11.50	13.00	11.50	13.00	11.50	13.00	11.50
		6	13.00	11.50	13.00	11.50	13.00	11.50	13.00	11.50
		7	13.00	11.50	13.00	11.50	13.00	11.50	13.00	11.50
		8	13.00	11.50	13.00	11.50	13.00	11.50	13.00	11.50
		9	13.00	11.50	13.00	11.50	13.00	11.50	13.00	11.50
		10	13.00	11.50	13.00	11.50	13.00	11.50	13.00	11.50
		11	13.00	11.50	13.00	11.50	13.00	11.50	13.00	11.50
		12	11.00	9.50	11.00	9.50	11.00	9.50	11.00	9.50
		13	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Mode/ Band		Tones	26T		52T		106T		242T	
		Channel	Maximum	Nominal	Maximum	Nominal	Maximum	Nominal	Maximum	Nominal
Modulated Average - 2 Tx Chain (dBm) - Antenna 4A	20 MHz Bandwidth	1	12.00	10.50	12.00	10.50	12.00	10.50	12.00	10.50
		2	13.00	11.50	13.00	11.50	13.00	11.50	13.00	11.50
		3	13.00	11.50	13.00	11.50	13.00	11.50	13.00	11.50
		4	13.00	11.50	13.00	11.50	13.00	11.50	13.00	11.50
		5	13.00	11.50	13.00	11.50	13.00	11.50	13.00	11.50
		6	13.00	11.50	13.00	11.50	13.00	11.50	13.00	11.50
		7	13.00	11.50	13.00	11.50	13.00	11.50	13.00	11.50
		8	13.00	11.50	13.00	11.50	13.00	11.50	13.00	11.50
		9	13.00	11.50	13.00	11.50	13.00	11.50	13.00	11.50
		10	13.00	11.50	13.00	11.50	13.00	11.50	13.00	11.50
		11	13.00	11.50	13.00	11.50	13.00	11.50	13.00	11.50
		12	10.00	8.50	10.00	8.50	10.00	8.50	10.00	8.50
		13	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

C. 5GHz ANTlower

Mode/ Band		Tones	26T		52T		106T		242T		484T		996T	
		Channel	Maximum	Nominal	Maximum	Nominal	Maximum	Nominal	Maximum	Nominal	Maximum	Nominal	Maximum	Nominal
Modulated Average - Single Tx Chain (dBm) - 5GHz ANTlower	20 MHz Bandwidth	36	11.00	9.50	14.00	12.50	15.00	13.50	15.00	13.50				
		40	11.00	9.50	14.00	12.50	16.00	14.50	16.00	14.50				
		44	11.00	9.50	14.00	12.50	16.00	14.50	16.00	14.50				
		48	11.00	9.50	14.00	12.50	16.00	14.50	16.00	14.50				
		52	11.00	9.50	14.00	12.50	16.50	15.00	16.50	15.00				
		56	11.00	9.50	14.00	12.50	16.50	15.00	16.50	15.00				
		60	11.00	9.50	14.00	12.50	16.50	15.00	16.50	15.00				
		64	11.00	9.50	14.00	12.50	14.50	13.00	14.50	13.00				
		100	11.00	9.50	14.00	12.50	14.00	12.50	14.00	12.50				
		104	11.00	9.50	14.00	12.50	16.50	15.00	16.50	15.00				
		108	11.00	9.50	14.00	12.50	16.50	15.00	16.50	15.00				
		112	11.00	9.50	14.00	12.50	16.50	15.00	16.50	15.00				
		116	11.00	9.50	14.00	12.50	16.50	15.00	16.50	15.00				
		120	11.00	9.50	14.00	12.50	16.50	15.00	16.50	15.00				
		124	11.00	9.50	14.00	12.50	16.50	15.00	16.50	15.00				
		128	11.00	9.50	14.00	12.50	16.50	15.00	16.50	15.00				
		132	11.00	9.50	14.00	12.50	16.50	15.00	16.50	15.00				
		136	11.00	9.50	14.00	12.50	16.50	15.00	16.50	15.00				
		140	11.00	9.50	13.50	12.00	13.50	12.00	13.50	12.00				
		144	11.00	9.50	14.00	12.50	16.50	15.00	16.50	15.00				
		149	15.50	14.00	15.50	14.00	15.50	14.00	15.50	14.00				
		153	15.50	14.00	15.50	14.00	15.50	14.00	15.50	14.00				
		157	15.50	14.00	15.50	14.00	15.50	14.00	15.50	14.00				
		161	15.50	14.00	15.50	14.00	15.50	14.00	15.50	14.00				
		165	15.50	14.00	15.50	14.00	15.50	14.00	15.50	14.00				
	40 MHz Bandwidth	38	11.00	9.50	12.00	10.50	12.00	10.50	12.00	10.50	12.00	10.50		
		46	11.00	9.50	14.00	12.50	16.00	14.50	16.00	14.50	16.00	14.50		
		54	11.00	9.50	14.00	12.50	16.50	15.00	16.50	15.00	16.50	15.00		
		62	11.00	9.50	11.50	10.00	11.50	10.00	11.50	10.00	11.50	10.00		
		102	11.00	9.50	11.50	10.00	11.50	10.00	11.50	10.00	11.50	10.00		
		110	11.00	9.50	14.00	12.50	16.50	15.00	16.50	15.00	16.50	15.00		
		118	11.00	9.50	14.00	12.50	16.50	15.00	16.50	15.00	16.50	15.00		
		126	11.00	9.50	14.00	12.50	16.50	15.00	16.50	15.00	16.50	15.00		
		134	11.00	9.50	14.00	12.50	14.50	13.00	14.50	13.00	14.50	13.00		
		142	11.00	9.50	14.00	12.50	16.50	15.00	13.50	12.00	16.50	15.00		
		151	15.50	14.00	15.50	14.00	15.50	14.00	15.50	14.00	15.50	14.00		
		159	15.50	14.00	15.50	14.00	15.50	14.00	15.50	14.00	15.50	14.00		
	80 MHz Bandwidth	42	11.00	9.50	10.50	9.00	10.50	9.00	10.50	9.00	10.50	9.00	10.50	9.00
		58	10.50	9.00	10.50	9.00	10.50	9.00	10.50	9.00	10.50	9.00	10.50	9.00
		106	10.50	9.00	10.50	9.00	10.50	9.00	10.50	9.00	10.50	9.00	10.50	9.00
		122	11.00	9.50	14.00	12.50	16.50	15.00	16.50	15.00	16.50	15.00	16.50	15.00
		138	11.00	9.50	14.00	12.50	16.50	15.00	13.50	12.00	14.50	13.00	16.50	15.00
		155	15.50	14.00	15.50	14.00	15.50	14.00	15.50	14.00	15.50	14.00	15.50	14.00

Mode/ Band		Tones	26T		52T		106T		242T		484T		996T	
		Channel	Maximum	Nominal	Maximum	Nominal	Maximum	Nominal	Maximum	Nominal	Maximum	Nominal	Maximum	Nominal
Modulated Average - 2 Tx Chain (dBm) CDD - 5GHz ANTlower	20 MHz Bandwidth	36	8.00	6.50	11.00	9.50	13.50	12.00	13.50	12.00				
		40	8.00	6.50	11.00	9.50	14.00	12.50	16.00	14.50				
		44	8.00	6.50	11.00	9.50	14.00	12.50	16.00	14.50				
		48	8.00	6.50	11.00	9.50	14.00	12.50	16.00	14.50				
		52	8.00	6.50	11.00	9.50	14.00	12.50	16.50	15.00				
		56	8.00	6.50	11.00	9.50	14.00	12.50	16.50	15.00				
		60	8.00	6.50	11.00	9.50	14.00	12.50	16.50	15.00				
		64	8.00	6.50	11.00	9.50	13.50	12.00	13.50	12.00				
		100	7.75	6.25	10.75	9.25	13.50	12.00	13.50	12.00				
		104	7.75	6.25	10.75	9.25	13.75	12.25	16.50	15.00				
		108	7.75	6.25	10.75	9.25	13.75	12.25	16.50	15.00				
		112	7.75	6.25	10.75	9.25	13.75	12.25	16.50	15.00				
		116	7.75	6.25	10.75	9.25	13.75	12.25	16.50	15.00				
		120	7.75	6.25	10.75	9.25	13.75	12.25	16.50	15.00				
		124	7.75	6.25	10.75	9.25	13.75	12.25	16.50	15.00				
		128	7.75	6.25	10.75	9.25	13.75	12.25	16.50	15.00				
		132	7.75	6.25	10.75	9.25	13.75	12.25	16.50	15.00				
		136	7.75	6.25	10.75	9.25	13.50	12.00	13.50	12.00				
		140	7.75	6.25	10.00	8.50	10.00	8.50	10.00	8.50				
		144	7.75	6.25	10.75	9.25	13.75	12.25	16.50	15.00				
		149	15.50	14.00	15.50	14.00	15.50	14.00	15.50	14.00				
		153	15.50	14.00	15.50	14.00	15.50	14.00	15.50	14.00				
		157	15.50	14.00	15.50	14.00	15.50	14.00	15.50	14.00				
		161	15.50	14.00	15.50	14.00	15.50	14.00	15.50	14.00				
		165	15.50	14.00	15.50	14.00	15.50	14.00	15.50	14.00				
	40 MHz Bandwidth	38	8.00	6.50	11.00	9.50	11.00	9.50	11.00	9.50	11.00	9.50		
		46	8.00	6.50	11.00	9.50	14.00	12.50	16.00	14.50	16.00	14.50		
		54	8.00	6.50	11.00	9.50	14.00	12.50	16.50	15.00	16.50	15.00		
		62	8.00	6.50	10.50	9.00	10.50	9.00	10.00	8.50	10.50	9.00		
		102	7.75	6.25	10.00	8.50	10.00	8.50	10.00	8.50	10.00	8.50		
		110	7.75	6.25	10.75	9.25	13.75	12.25	16.50	15.00	16.50	15.00		
		118	7.75	6.25	10.75	9.25	13.75	12.25	16.50	15.00	16.50	15.00		
		126	7.75	6.25	10.75	9.25	13.75	12.25	16.50	15.00	16.50	15.00		
		134	7.75	6.25	10.75	9.25	13.00	11.50	13.00	11.50	13.00	11.50		
		142	7.75	6.25	10.75	9.25	13.75	12.25	10.00	8.50	16.50	15.00		
		151	15.50	14.00	15.50	14.00	15.50	14.00	15.50	14.00	15.50	14.00		
		159	15.50	14.00	15.50	14.00	15.50	14.00	15.50	14.00	15.50	14.00		
	80 MHz Bandwidth	42	8.00	6.50	9.00	7.50	9.00	7.50	9.00	7.50	9.00	7.50	9.00	7.50
		58	8.00	6.50	9.00	7.50	9.00	7.50	9.00	7.50	9.00	7.50	9.00	7.50
		106	7.75	6.25	9.00	7.50	9.00	7.50	9.00	7.50	9.00	7.50	9.00	7.50
		122	7.75	6.25	10.75	9.25	13.75	12.25	16.50	15.00	16.50	15.00	16.50	15.00
		138	7.75	6.25	10.75	9.25	13.75	12.25	10.00	8.50	13.00	11.50	16.50	15.00
		155	14.50	13.00	14.50	13.00	14.50	13.00	14.50	13.00	14.50	13.00	14.50	13.00

Mode/ Band		Tones	26T		52T		106T		242T		484T		996T	
		Channel	Maximum	Nominal	Maximum	Nominal	Maximum	Nominal	Maximum	Nominal	Maximum	Nominal	Maximum	Nominal
Modulated Average - 2 Tx Chain (dBm) SDM - 5GHz ANTlower	20 MHz Bandwidth	36	8.00	6.50	11.00	9.50	13.50	12.00	13.50	12.00				
		40	8.00	6.50	11.00	9.50	14.00	12.50	16.00	14.50				
		44	8.00	6.50	11.00	9.50	14.00	12.50	16.00	14.50				
		48	8.00	6.50	11.00	9.50	14.00	12.50	16.00	14.50				
		52	8.00	6.50	11.00	9.50	14.00	12.50	16.50	15.00				
		56	8.00	6.50	11.00	9.50	14.00	12.50	16.50	15.00				
		60	8.00	6.50	11.00	9.50	14.00	12.50	16.50	15.00				
		64	8.00	6.50	11.00	9.50	13.50	12.00	13.50	12.00				
		100	8.00	6.50	11.00	9.50	13.50	12.00	13.50	12.00				
		104	8.00	6.50	11.00	9.50	14.00	12.50	16.50	15.00				
		108	8.00	6.50	11.00	9.50	14.00	12.50	16.50	15.00				
		112	8.00	6.50	11.00	9.50	14.00	12.50	16.50	15.00				
		116	8.00	6.50	11.00	9.50	14.00	12.50	16.50	15.00				
		120	8.00	6.50	11.00	9.50	14.00	12.50	16.50	15.00				
		124	8.00	6.50	11.00	9.50	14.00	12.50	16.50	15.00				
		128	8.00	6.50	11.00	9.50	14.00	12.50	16.50	15.00				
		132	8.00	6.50	11.00	9.50	14.00	12.50	16.50	15.00				
		136	8.00	6.50	11.00	9.50	13.50	12.00	13.50	12.00				
		140	8.00	6.50	10.00	8.50	10.00	8.50	10.00	8.50				
		144	8.00	6.50	11.00	9.50	14.00	12.50	16.50	15.00				
		149	15.50	14.00	15.50	14.00	15.50	14.00	15.50	14.00				
		153	15.50	14.00	15.50	14.00	15.50	14.00	15.50	14.00				
		157	15.50	14.00	15.50	14.00	15.50	14.00	15.50	14.00				
		161	15.50	14.00	15.50	14.00	15.50	14.00	15.50	14.00				
		165	15.50	14.00	15.50	14.00	15.50	14.00	15.50	14.00				
	40 MHz Bandwidth	38	8.00	6.50	11.00	9.50	11.00	9.50	11.00	9.50	11.00	9.50		
		46	8.00	6.50	11.00	9.50	14.00	12.50	16.00	14.50	16.00	14.50		
		54	8.00	6.50	11.00	9.50	14.00	12.50	16.50	15.00	16.50	15.00		
		62	8.00	6.50	10.50	9.00	10.50	9.00	10.00	8.50	10.50	9.00		
		102	8.00	6.50	10.00	8.50	10.00	8.50	10.00	8.50	10.00	8.50		
		110	8.00	6.50	11.00	9.50	14.00	12.50	16.50	15.00	16.50	15.00		
		118	8.00	6.50	11.00	9.50	14.00	12.50	16.50	15.00	16.50	15.00		
		126	8.00	6.50	11.00	9.50	14.00	12.50	16.50	15.00	16.50	15.00		
		134	8.00	6.50	11.00	9.50	13.00	11.50	13.00	11.50	13.00	11.50		
		142	8.00	6.50	11.00	9.50	14.00	12.50	10.00	8.50	16.50	15.00		
		151	15.50	14.00	15.50	14.00	15.50	14.00	15.50	14.00	15.50	14.00		
		159	15.50	14.00	15.50	14.00	15.50	14.00	15.50	14.00	15.50	14.00		
	80 MHz Bandwidth	42	8.00	6.50	9.00	7.50	9.00	7.50	9.00	7.50	9.00	7.50	9.00	7.50
		58	8.00	6.50	9.00	7.50	9.00	7.50	9.00	7.50	9.00	7.50	9.00	7.50
		106	8.00	6.50	9.00	7.50	9.00	7.50	9.00	7.50	9.00	7.50	9.00	7.50
		122	8.00	6.50	11.00	9.50	14.00	12.50	16.50	15.00	16.50	15.00	16.50	15.00
		138	8.00	6.50	11.00	9.50	14.00	12.50	10.00	8.50	13.00	11.50	16.50	15.00
		155	14.50	13.00	14.50	13.00	14.50	13.00	14.50	13.00	14.50	13.00	14.50	13.00

D. 5GHz ANTupper

Mode/ Band		Tones	26T		52T		106T		242T		484T		996T	
		Channel	Maximum	Nominal	Maximum	Nominal	Maximum	Nominal	Maximum	Nominal	Maximum	Nominal	Maximum	Nominal
Modulated Average - Single Tx Chain (dBm) - 5GHz ANTupper	20 MHz Bandwidth	36	11.00	9.50	14.00	12.50	15.00	13.50	15.00	13.50				
		40	11.00	9.50	14.00	12.50	16.00	14.50	16.00	14.50				
		44	11.00	9.50	14.00	12.50	16.00	14.50	16.00	14.50				
		48	11.00	9.50	14.00	12.50	16.00	14.50	16.00	14.50				
		52	11.00	9.50	14.00	12.50	16.25	14.75	16.25	14.75				
		56	11.00	9.50	14.00	12.50	16.25	14.75	16.25	14.75				
		60	11.00	9.50	14.00	12.50	16.25	14.75	16.25	14.75				
		64	11.00	9.50	14.00	12.50	14.50	13.00	14.50	13.00				
		100	11.00	9.50	14.00	12.50	14.00	12.50	14.00	12.50				
		104	11.00	9.50	14.00	12.50	15.00	13.50	15.00	13.50				
		108	11.00	9.50	14.00	12.50	15.00	13.50	15.00	13.50				
		112	11.00	9.50	14.00	12.50	15.00	13.50	15.00	13.50				
		116	11.00	9.50	14.00	12.50	15.00	13.50	15.00	13.50				
		120	11.00	9.50	14.00	12.50	15.00	13.50	15.00	13.50				
		124	11.00	9.50	14.00	12.50	15.00	13.50	15.00	13.50				
		128	11.00	9.50	14.00	12.50	15.00	13.50	15.00	13.50				
		132	11.00	9.50	14.00	12.50	15.00	13.50	15.00	13.50				
		136	11.00	9.50	14.00	12.50	15.00	13.50	15.00	13.50				
		140	11.00	9.50	13.50	12.00	13.50	12.00	13.50	12.00				
		144	11.00	9.50	14.00	12.50	15.00	13.50	15.00	13.50				
		149	15.50	14.00	15.50	14.00	15.50	14.00	15.50	14.00				
		153	15.50	14.00	15.50	14.00	15.50	14.00	15.50	14.00				
		157	15.50	14.00	15.50	14.00	15.50	14.00	15.50	14.00				
		161	15.50	14.00	15.50	14.00	15.50	14.00	15.50	14.00				
		165	15.50	14.00	15.50	14.00	15.50	14.00	15.50	14.00				
	40 MHz Bandwidth	38	11.00	9.50	12.00	10.50	12.00	10.50	12.00	10.50	12.00	10.50		
		46	11.00	9.50	14.00	12.50	16.00	14.50	16.00	14.50	16.00	14.50		
		54	11.00	9.50	14.00	12.50	16.25	14.75	16.25	14.75	16.25	14.75		
		62	11.00	9.50	11.50	10.00	11.50	10.00	11.50	10.00	11.50	10.00		
		102	11.00	9.50	11.50	10.00	11.50	10.00	11.50	10.00	11.50	10.00		
		110	11.00	9.50	14.00	12.50	15.00	13.50	15.00	13.50	15.00	13.50		
		118	11.00	9.50	14.00	12.50	15.00	13.50	15.00	13.50	15.00	13.50		
		126	11.00	9.50	14.00	12.50	15.00	13.50	15.00	13.50	15.00	13.50		
		134	11.00	9.50	14.00	12.50	14.50	13.00	14.50	13.00	14.50	13.00		
		142	11.00	9.50	14.00	12.50	15.00	13.50	13.50	12.00	15.00	13.50		
		151	15.50	14.00	15.50	14.00	15.50	14.00	15.50	14.00	15.50	14.00		
		159	15.50	14.00	15.50	14.00	15.50	14.00	15.50	14.00	15.50	14.00		
	80 MHz Bandwidth	42	11.00	9.50	10.50	9.00	10.50	9.00	10.50	9.00	10.50	9.00	10.50	9.00
		58	10.50	9.00	10.50	9.00	10.50	9.00	10.50	9.00	10.50	9.00	10.50	9.00
		106	10.50	9.00	10.50	9.00	10.50	9.00	10.50	9.00	10.50	9.00	10.50	9.00
		122	11.00	9.50	14.00	12.50	15.00	13.50	15.00	13.50	15.00	13.50	15.00	13.50
		138	11.00	9.50	14.00	12.50	15.00	13.50	13.50	12.00	14.50	13.00	15.00	13.50
		155	15.50	14.00	15.50	14.00	15.50	14.00	15.50	14.00	15.50	14.00	15.50	14.00

Mode/ Band		Tones	26T		52T		106T		242T		484T		996T	
		Channel	Maximum	Nominal	Maximum	Nominal	Maximum	Nominal	Maximum	Nominal	Maximum	Nominal	Maximum	Nominal
Modulated Average - 2 Tx Chain (dBm) CDD - 5GHz ANTupper	20 MHz Bandwidth	36	8.00	6.50	11.00	9.50	13.50	12.00	13.50	12.00				
		40	8.00	6.50	11.00	9.50	14.00	12.50	16.00	14.50				
		44	8.00	6.50	11.00	9.50	14.00	12.50	16.00	14.50				
		48	8.00	6.50	11.00	9.50	14.00	12.50	16.00	14.50				
		52	8.00	6.50	11.00	9.50	14.00	12.50	16.25	14.75				
		56	8.00	6.50	11.00	9.50	14.00	12.50	16.25	14.75				
		60	8.00	6.50	11.00	9.50	14.00	12.50	16.25	14.75				
		64	8.00	6.50	11.00	9.50	13.50	12.00	13.50	12.00				
		100	7.75	6.25	10.75	9.25	13.50	12.00	13.50	12.00				
		104	7.75	6.25	10.75	9.25	13.75	12.25	15.00	13.50				
		108	7.75	6.25	10.75	9.25	13.75	12.25	15.00	13.50				
		112	7.75	6.25	10.75	9.25	13.75	12.25	15.00	13.50				
		116	7.75	6.25	10.75	9.25	13.75	12.25	15.00	13.50				
		120	7.75	6.25	10.75	9.25	13.75	12.25	15.00	13.50				
		124	7.75	6.25	10.75	9.25	13.75	12.25	15.00	13.50				
		128	7.75	6.25	10.75	9.25	13.75	12.25	15.00	13.50				
		132	7.75	6.25	10.75	9.25	13.75	12.25	15.00	13.50				
		136	7.75	6.25	10.75	9.25	13.50	12.00	13.50	12.00				
		140	7.75	6.25	10.00	8.50	10.00	8.50	10.00	8.50				
		144	7.75	6.25	10.75	9.25	13.75	12.25	15.00	13.50				
		149	15.50	14.00	15.50	14.00	15.50	14.00	15.50	14.00				
		153	15.50	14.00	15.50	14.00	15.50	14.00	15.50	14.00				
		157	15.50	14.00	15.50	14.00	15.50	14.00	15.50	14.00				
		161	15.50	14.00	15.50	14.00	15.50	14.00	15.50	14.00				
		165	15.50	14.00	15.50	14.00	15.50	14.00	15.50	14.00				
	40 MHz Bandwidth	38	8.00	6.50	11.00	9.50	11.00	9.50	11.00	9.50	11.00	9.50		
		46	8.00	6.50	11.00	9.50	14.00	12.50	16.00	14.50	16.00	14.50		
		54	8.00	6.50	11.00	9.50	14.00	12.50	16.25	14.75	16.25	14.75		
		62	8.00	6.50	10.50	9.00	10.50	9.00	10.00	8.50	10.50	9.00		
		102	7.75	6.25	10.00	8.50	10.00	8.50	10.00	8.50	10.00	8.50		
		110	7.75	6.25	10.75	9.25	13.75	12.25	15.00	13.50	15.00	13.50		
		118	7.75	6.25	10.75	9.25	13.75	12.25	15.00	13.50	15.00	13.50		
		126	7.75	6.25	10.75	9.25	13.75	12.25	15.00	13.50	15.00	13.50		
		134	7.75	6.25	10.75	9.25	13.00	11.50	13.00	11.50	13.00	11.50		
		142	7.75	6.25	10.75	9.25	13.75	12.25	10.00	8.50	15.00	13.50		
		151	15.50	14.00	15.50	14.00	15.50	14.00	15.50	14.00	15.50	14.00		
		159	15.50	14.00	15.50	14.00	15.50	14.00	15.50	14.00	15.50	14.00		
	80 MHz Bandwidth	42	8.00	6.50	9.00	7.50	9.00	7.50	9.00	7.50	9.00	7.50	9.00	7.50
		58	8.00	6.50	9.00	7.50	9.00	7.50	9.00	7.50	9.00	7.50	9.00	7.50
		106	7.75	6.25	9.00	7.50	9.00	7.50	9.00	7.50	9.00	7.50	9.00	7.50
		122	7.75	6.25	10.75	9.25	13.75	12.25	15.00	13.50	15.00	13.50	15.00	13.50
		138	7.75	6.25	10.75	9.25	13.75	12.25	10.00	8.50	13.00	11.50	15.00	13.50
		155	14.50	13.00	14.50	13.00	14.50	13.00	14.50	13.00	14.50	13.00	14.50	13.00

Mode/ Band		Tones	26T		52T		106T		242T		484T		996T	
		Channel	Maximum	Nominal	Maximum	Nominal	Maximum	Nominal	Maximum	Nominal	Maximum	Nominal	Maximum	Nominal
Modulated Average - 2 Tx Chain (dBm) SDM - 5GHz ANTupper	20 MHz Bandwidth	36	8.00	6.50	11.00	9.50	13.50	12.00	13.50	12.00				
		40	8.00	6.50	11.00	9.50	14.00	12.50	16.00	14.50				
		44	8.00	6.50	11.00	9.50	14.00	12.50	16.00	14.50				
		48	8.00	6.50	11.00	9.50	14.00	12.50	16.00	14.50				
		52	8.00	6.50	11.00	9.50	14.00	12.50	16.25	14.75				
		56	8.00	6.50	11.00	9.50	14.00	12.50	16.25	14.75				
		60	8.00	6.50	11.00	9.50	14.00	12.50	16.25	14.75				
		64	8.00	6.50	11.00	9.50	13.50	12.00	13.50	12.00				
		100	8.00	6.50	11.00	9.50	13.50	12.00	13.50	12.00				
		104	8.00	6.50	11.00	9.50	14.00	12.50	15.00	13.50				
		108	8.00	6.50	11.00	9.50	14.00	12.50	15.00	13.50				
		112	8.00	6.50	11.00	9.50	14.00	12.50	15.00	13.50				
		116	8.00	6.50	11.00	9.50	14.00	12.50	15.00	13.50				
		120	8.00	6.50	11.00	9.50	14.00	12.50	15.00	13.50				
		124	8.00	6.50	11.00	9.50	14.00	12.50	15.00	13.50				
		128	8.00	6.50	11.00	9.50	14.00	12.50	15.00	13.50				
		132	8.00	6.50	11.00	9.50	14.00	12.50	15.00	13.50				
		136	8.00	6.50	11.00	9.50	13.50	12.00	13.50	12.00				
		140	8.00	6.50	10.00	8.50	10.00	8.50	10.00	8.50				
		144	8.00	6.50	11.00	9.50	14.00	12.50	15.00	13.50				
		149	15.50	14.00	15.50	14.00	15.50	14.00	15.50	14.00				
		153	15.50	14.00	15.50	14.00	15.50	14.00	15.50	14.00				
		157	15.50	14.00	15.50	14.00	15.50	14.00	15.50	14.00				
		161	15.50	14.00	15.50	14.00	15.50	14.00	15.50	14.00				
		165	15.50	14.00	15.50	14.00	15.50	14.00	15.50	14.00				
	40 MHz Bandwidth	38	8.00	6.50	11.00	9.50	11.00	9.50	11.00	9.50	11.00	9.50		
		46	8.00	6.50	11.00	9.50	14.00	12.50	16.00	14.50	16.00	14.50		
		54	8.00	6.50	11.00	9.50	14.00	12.50	16.25	14.75	16.25	14.75		
		62	8.00	6.50	10.50	9.00	10.50	9.00	10.00	8.50	10.50	9.00		
		102	8.00	6.50	10.00	8.50	10.00	8.50	10.00	8.50	10.00	8.50		
		110	8.00	6.50	11.00	9.50	14.00	12.50	15.00	13.50	15.00	13.50		
		118	8.00	6.50	11.00	9.50	14.00	12.50	15.00	13.50	15.00	13.50		
		126	8.00	6.50	11.00	9.50	14.00	12.50	15.00	13.50	15.00	13.50		
		134	8.00	6.50	11.00	9.50	13.00	11.50	13.00	11.50	13.00	11.50		
		142	8.00	6.50	11.00	9.50	14.00	12.50	10.00	8.50	15.00	13.50		
		151	15.50	14.00	15.50	14.00	15.50	14.00	15.50	14.00	15.50	14.00		
		159	15.50	14.00	15.50	14.00	15.50	14.00	15.50	14.00	15.50	14.00		
	80 MHz Bandwidth	42	8.00	6.50	9.00	7.50	9.00	7.50	9.00	7.50	9.00	7.50	9.00	7.50
		58	8.00	6.50	9.00	7.50	9.00	7.50	9.00	7.50	9.00	7.50	9.00	7.50
		106	8.00	6.50	9.00	7.50	9.00	7.50	9.00	7.50	9.00	7.50	9.00	7.50
		122	8.00	6.50	11.00	9.50	14.00	12.50	15.00	13.50	15.00	13.50	15.00	13.50
		138	8.00	6.50	11.00	9.50	14.00	12.50	10.00	8.50	13.00	11.50	15.00	13.50
		155	14.50	13.00	14.50	13.00	14.50	13.00	14.50	13.00	14.50	13.00	14.50	13.00

1.2.2 Reduced 802.11ax RU WLAN Output Power

E. Ant 2a

Below table is applicable in the following conditions:
-Simultaneous conditions with Licensed Bands Antenna 2A/2B
-Simultaneous conditions with LTE Inter-band ULCA

Mode/ Band		Tones	26T		52T		106T		242T	
		Channel	Maximum	Nominal	Maximum	Nominal	Maximum	Nominal	Maximum	Nominal
Modulated Average - Single Tx Chain (dBm) - Antenna 2A	20 MHz Bandwidth	1	6.00	4.50	6.00	4.50	6.00	4.50	6.00	4.50
		2	6.00	4.50	6.00	4.50	6.00	4.50	6.00	4.50
		3	6.00	4.50	6.00	4.50	6.00	4.50	6.00	4.50
		4	6.00	4.50	6.00	4.50	6.00	4.50	6.00	4.50
		5	6.00	4.50	6.00	4.50	6.00	4.50	6.00	4.50
		6	6.00	4.50	6.00	4.50	6.00	4.50	6.00	4.50
		7	6.00	4.50	6.00	4.50	6.00	4.50	6.00	4.50
		8	6.00	4.50	6.00	4.50	6.00	4.50	6.00	4.50
		9	6.00	4.50	6.00	4.50	6.00	4.50	6.00	4.50
		10	6.00	4.50	6.00	4.50	6.00	4.50	6.00	4.50
		11	6.00	4.50	6.00	4.50	6.00	4.50	6.00	4.50
		12	6.00	4.50	6.00	4.50	6.00	4.50	6.00	4.50
		13	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Below table is applicable in the following conditions:
-Simultaneous conditions with Licensed Bands Antenna 2A/2B
-Simultaneous conditions with LTE Inter-band ULCA

Mode/ Band		Tones	26T		52T		106T		242T	
		Channel	Maximum	Nominal	Maximum	Nominal	Maximum	Nominal	Maximum	Nominal
Modulated Average - 2 Tx Chain (dBm) - Antenna 2A	20 MHz Bandwidth	1	6.00	4.50	6.00	4.50	6.00	4.50	6.00	4.50
		2	6.00	4.50	6.00	4.50	6.00	4.50	6.00	4.50
		3	6.00	4.50	6.00	4.50	6.00	4.50	6.00	4.50
		4	6.00	4.50	6.00	4.50	6.00	4.50	6.00	4.50
		5	6.00	4.50	6.00	4.50	6.00	4.50	6.00	4.50
		6	6.00	4.50	6.00	4.50	6.00	4.50	6.00	4.50
		7	6.00	4.50	6.00	4.50	6.00	4.50	6.00	4.50
		8	6.00	4.50	6.00	4.50	6.00	4.50	6.00	4.50
		9	6.00	4.50	6.00	4.50	6.00	4.50	6.00	4.50
		10	6.00	4.50	6.00	4.50	6.00	4.50	6.00	4.50
		11	6.00	4.50	6.00	4.50	6.00	4.50	6.00	4.50
		12	6.00	4.50	6.00	4.50	6.00	4.50	6.00	4.50
		13	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

F. Ant 4a

Below table is applicable in the following conditions:
-Simultaneous conditions with Licensed Bands Antenna 4A/4B
-Simultaneous conditions with LTE Inter-band ULCA

Mode/ Band		Tones	26T		52T		106T		242T	
		Channel	Maximum	Nominal	Maximum	Nominal	Maximum	Nominal	Maximum	Nominal
Modulated Average - Single Tx Chain (dBm) - Antenna 4A	20 MHz Bandwidth	1	6.00	4.50	6.00	4.50	6.00	4.50	6.00	4.50
		2	6.00	4.50	6.00	4.50	6.00	4.50	6.00	4.50
		3	6.00	4.50	6.00	4.50	6.00	4.50	6.00	4.50
		4	6.00	4.50	6.00	4.50	6.00	4.50	6.00	4.50
		5	6.00	4.50	6.00	4.50	6.00	4.50	6.00	4.50
		6	6.00	4.50	6.00	4.50	6.00	4.50	6.00	4.50
		7	6.00	4.50	6.00	4.50	6.00	4.50	6.00	4.50
		8	6.00	4.50	6.00	4.50	6.00	4.50	6.00	4.50
		9	6.00	4.50	6.00	4.50	6.00	4.50	6.00	4.50
		10	6.00	4.50	6.00	4.50	6.00	4.50	6.00	4.50
		11	6.00	4.50	6.00	4.50	6.00	4.50	6.00	4.50
		12	6.00	4.50	6.00	4.50	6.00	4.50	6.00	4.50
		13	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Below table is applicable in the following conditions:
-Simultaneous conditions with Licensed Bands Antenna 4A/4B
-Simultaneous conditions with LTE Inter-band ULCA

Mode/ Band		Tones	26T		52T		106T		242T	
		Channel	Maximum	Nominal	Maximum	Nominal	Maximum	Nominal	Maximum	Nominal
Modulated Average - 2 Tx Chain (dBm) - Antenna 4A	20 MHz Bandwidth	1	6.00	4.50	6.00	4.50	6.00	4.50	6.00	4.50
		2	6.00	4.50	6.00	4.50	6.00	4.50	6.00	4.50
		3	6.00	4.50	6.00	4.50	6.00	4.50	6.00	4.50
		4	6.00	4.50	6.00	4.50	6.00	4.50	6.00	4.50
		5	6.00	4.50	6.00	4.50	6.00	4.50	6.00	4.50
		6	6.00	4.50	6.00	4.50	6.00	4.50	6.00	4.50
		7	6.00	4.50	6.00	4.50	6.00	4.50	6.00	4.50
		8	6.00	4.50	6.00	4.50	6.00	4.50	6.00	4.50
		9	6.00	4.50	6.00	4.50	6.00	4.50	6.00	4.50
		10	6.00	4.50	6.00	4.50	6.00	4.50	6.00	4.50
		11	6.00	4.50	6.00	4.50	6.00	4.50	6.00	4.50
		12	6.00	4.50	6.00	4.50	6.00	4.50	6.00	4.50
		13	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

G. 5GHz ANTlower

Below table is applicable in the following conditions:
-Simultaneous conditions with Licensed Bands Antenna 2A
-Simultaneous conditions with LTE Inter-band ULCA

Mode/ Band		Tones	26T		52T		106T		242T		484T		996T	
		Channel	Maximum	Nominal	Maximum	Nominal	Maximum	Nominal	Maximum	Nominal	Maximum	Nominal	Maximum	Nominal
Modulated Average - Single Tx Chain (dBm) - 5GHz ANTlower	20 MHz Bandwidth	36	11.00	9.50	12.00	10.50	12.00	10.50	12.00	10.50				
		40	11.00	9.50	12.00	10.50	12.00	10.50	12.00	10.50				
		44	11.00	9.50	12.00	10.50	12.00	10.50	12.00	10.50				
		48	11.00	9.50	12.00	10.50	12.00	10.50	12.00	10.50				
		52	11.00	9.50	12.50	11.00	12.50	11.00	12.50	11.00				
		56	11.00	9.50	12.50	11.00	12.50	11.00	12.50	11.00				
		60	11.00	9.50	12.50	11.00	12.50	11.00	12.50	11.00				
		64	11.00	9.50	12.50	11.00	12.50	11.00	12.50	11.00				
		100	11.00	9.50	12.50	11.00	12.50	11.00	12.50	11.00				
		104	11.00	9.50	12.50	11.00	12.50	11.00	12.50	11.00				
		108	11.00	9.50	12.50	11.00	12.50	11.00	12.50	11.00				
		112	11.00	9.50	12.50	11.00	12.50	11.00	12.50	11.00				
		116	11.00	9.50	12.50	11.00	12.50	11.00	12.50	11.00				
		120	11.00	9.50	12.50	11.00	12.50	11.00	12.50	11.00				
		124	11.00	9.50	12.50	11.00	12.50	11.00	12.50	11.00				
		128	11.00	9.50	12.50	11.00	12.50	11.00	12.50	11.00				
		132	11.00	9.50	12.50	11.00	12.50	11.00	12.50	11.00				
		136	11.00	9.50	12.50	11.00	12.50	11.00	12.50	11.00				
		140	11.00	9.50	12.50	11.00	12.50	11.00	12.50	11.00				
		144	11.00	9.50	12.50	11.00	12.50	11.00	12.50	11.00				
		149	11.50	10.00	11.50	10.00	11.50	10.00	11.50	10.00				
		153	11.50	10.00	11.50	10.00	11.50	10.00	11.50	10.00				
		157	11.50	10.00	11.50	10.00	11.50	10.00	11.50	10.00				
		161	11.50	10.00	11.50	10.00	11.50	10.00	11.50	10.00				
		165	11.50	10.00	11.50	10.00	11.50	10.00	11.50	10.00				
	40 MHz Bandwidth	38	11.00	9.50	12.00	10.50	12.00	10.50	12.00	10.50	12.00	10.50		
		46	11.00	9.50	12.00	10.50	12.00	10.50	12.00	10.50	12.00	10.50		
		54	11.00	9.50	12.50	11.00	12.50	11.00	12.50	11.00	12.50	11.00		
		62	11.00	9.50	11.50	10.00	11.50	10.00	11.50	10.00	11.50	10.00		
		102	11.00	9.50	11.50	10.00	11.50	10.00	11.50	10.00	11.50	10.00		
		110	11.00	9.50	12.50	11.00	12.50	11.00	12.50	11.00	12.50	11.00		
		118	11.00	9.50	12.50	11.00	12.50	11.00	12.50	11.00	12.50	11.00		
		126	11.00	9.50	12.50	11.00	12.50	11.00	12.50	11.00	12.50	11.00		
		134	11.00	9.50	12.50	11.00	12.50	11.00	12.50	11.00	12.50	11.00		
		142	11.00	9.50	12.50	11.00	12.50	11.00	12.50	11.00	12.50	11.00		
		151	11.50	10.00	11.50	10.00	11.50	10.00	11.50	10.00	11.50	10.00		
		159	11.50	10.00	11.50	10.00	11.50	10.00	11.50	10.00	11.50	10.00		
	80 MHz Bandwidth	42	11.00	9.50	10.50	9.00	10.50	9.00	10.50	9.00	10.50	9.00	10.50	9.00
		58	10.50	9.00	10.50	9.00	10.50	9.00	10.50	9.00	10.50	9.00	10.50	9.00
		106	10.50	9.00	10.50	9.00	10.50	9.00	10.50	9.00	10.50	9.00	10.50	9.00
		122	11.00	9.50	12.50	11.00	12.50	11.00	12.50	11.00	12.50	11.00	12.50	11.00
		138	11.00	9.50	12.50	11.00	12.50	11.00	12.50	11.00	12.50	11.00	12.50	11.00
		155	11.50	10.00	11.50	10.00	11.50	10.00	11.50	10.00	11.50	10.00	11.50	10.00

Below table is applicable in the following conditions:
-Simultaneous conditions with Licensed Bands Antenna 2A
-Simultaneous conditions with LTE Inter-band ULCA

Mode/ Band		Tones	26T		52T		106T		242T		484T		996T	
		Channel	Maximum	Nominal	Maximum	Nominal	Maximum	Nominal	Maximum	Nominal	Maximum	Nominal	Maximum	Nominal
Modulated Average - 2 Tx Chain (dBm) CDD - 5GHz ANTlower	20 MHz Bandwidth	36	8.00	6.50	11.00	9.50	12.00	10.50	12.00	10.50				
		40	8.00	6.50	11.00	9.50	12.00	10.50	12.00	10.50				
		44	8.00	6.50	11.00	9.50	12.00	10.50	12.00	10.50				
		48	8.00	6.50	11.00	9.50	12.00	10.50	12.00	10.50				
		52	8.00	6.50	11.00	9.50	12.50	11.00	12.50	11.00				
		56	8.00	6.50	11.00	9.50	12.50	11.00	12.50	11.00				
		60	8.00	6.50	11.00	9.50	12.50	11.00	12.50	11.00				
		64	8.00	6.50	11.00	9.50	12.50	11.00	12.50	11.00				
		100	7.75	6.25	10.75	9.25	12.50	11.00	12.50	11.00				
		104	7.75	6.25	10.75	9.25	12.50	11.00	12.50	11.00				
		108	7.75	6.25	10.75	9.25	12.50	11.00	12.50	11.00				
		112	7.75	6.25	10.75	9.25	12.50	11.00	12.50	11.00				
		116	7.75	6.25	10.75	9.25	12.50	11.00	12.50	11.00				
		120	7.75	6.25	10.75	9.25	12.50	11.00	12.50	11.00				
		124	7.75	6.25	10.75	9.25	12.50	11.00	12.50	11.00				
		128	7.75	6.25	10.75	9.25	12.50	11.00	12.50	11.00				
		132	7.75	6.25	10.75	9.25	12.50	11.00	12.50	11.00				
		136	7.75	6.25	10.75	9.25	12.50	11.00	12.50	11.00				
		140	7.75	6.25	10.00	8.50	10.00	8.50	10.00	8.50				
		144	7.75	6.25	10.75	9.25	12.50	11.00	12.50	11.00				
		149	11.50	10.00	11.50	10.00	11.50	10.00	11.50	10.00				
		153	11.50	10.00	11.50	10.00	11.50	10.00	11.50	10.00				
		157	11.50	10.00	11.50	10.00	11.50	10.00	11.50	10.00				
		161	11.50	10.00	11.50	10.00	11.50	10.00	11.50	10.00				
		165	11.50	10.00	11.50	10.00	11.50	10.00	11.50	10.00				
	40 MHz Bandwidth	38	8.00	6.50	11.00	9.50	11.00	9.50	11.00	9.50	11.00	9.50		
		46	8.00	6.50	11.00	9.50	12.00	10.50	12.00	10.50	12.00	10.50		
		54	8.00	6.50	11.00	9.50	12.50	11.00	12.50	11.00	12.50	11.00		
		62	8.00	6.50	10.50	9.00	10.50	9.00	10.00	8.50	10.50	9.00		
		102	7.75	6.25	10.00	8.50	10.00	8.50	10.00	8.50	10.00	8.50		
		110	7.75	6.25	10.75	9.25	12.50	11.00	12.50	11.00	12.50	11.00		
		118	7.75	6.25	10.75	9.25	12.50	11.00	12.50	11.00	12.50	11.00		
		126	7.75	6.25	10.75	9.25	12.50	11.00	12.50	11.00	12.50	11.00		
		134	7.75	6.25	10.75	9.25	12.50	11.00	12.50	11.00	12.50	11.00		
		142	7.75	6.25	10.75	9.25	12.50	11.00	10.00	8.50	12.50	11.00		
		151	11.50	10.00	11.50	10.00	11.50	10.00	11.50	10.00	11.50	10.00		
		159	11.50	10.00	11.50	10.00	11.50	10.00	11.50	10.00	11.50	10.00		
	80 MHz Bandwidth	42	8.00	6.50	9.00	7.50	9.00	7.50	9.00	7.50	9.00	7.50	9.00	7.50
		58	8.00	6.50	9.00	7.50	9.00	7.50	9.00	7.50	9.00	7.50	9.00	7.50
		106	7.75	6.25	9.00	7.50	9.00	7.50	9.00	7.50	9.00	7.50	9.00	7.50
		122	7.75	6.25	10.75	9.25	12.50	11.00	12.50	11.00	12.50	11.00	12.50	11.00
		138	7.75	6.25	10.75	9.25	12.50	11.00	10.00	8.50	12.50	11.00	12.50	11.00
		155	11.50	10.00	11.50	10.00	11.50	10.00	11.50	10.00	11.50	10.00	11.50	10.00

Below table is applicable in the following conditions:
-Simultaneous conditions with Licensed Bands Antenna 2A
-Simultaneous conditions with LTE Inter-band ULCA

Mode/ Band		Tones	26T		52T		106T		242T		484T		996T	
		Channel	Maximum	Nominal	Maximum	Nominal	Maximum	Nominal	Maximum	Nominal	Maximum	Nominal	Maximum	Nominal
Modulated Average - 2 Tx Chain (dBm) SDM - 5GHz ANTlower	20 MHz Bandwidth	36	8.00	6.50	11.00	9.50	12.00	10.50	12.00	10.50				
		40	8.00	6.50	11.00	9.50	12.00	10.50	12.00	10.50				
		44	8.00	6.50	11.00	9.50	12.00	10.50	12.00	10.50				
		48	8.00	6.50	11.00	9.50	12.00	10.50	12.00	10.50				
		52	8.00	6.50	11.00	9.50	12.50	11.00	12.50	11.00				
		56	8.00	6.50	11.00	9.50	12.50	11.00	12.50	11.00				
		60	8.00	6.50	11.00	9.50	12.50	11.00	12.50	11.00				
		64	8.00	6.50	11.00	9.50	12.50	11.00	12.50	11.00				
		100	8.00	6.50	11.00	9.50	12.50	11.00	12.50	11.00				
		104	8.00	6.50	11.00	9.50	12.50	11.00	12.50	11.00				
		108	8.00	6.50	11.00	9.50	12.50	11.00	12.50	11.00				
		112	8.00	6.50	11.00	9.50	12.50	11.00	12.50	11.00				
		116	8.00	6.50	11.00	9.50	12.50	11.00	12.50	11.00				
		120	8.00	6.50	11.00	9.50	12.50	11.00	12.50	11.00				
		124	8.00	6.50	11.00	9.50	12.50	11.00	12.50	11.00				
		128	8.00	6.50	11.00	9.50	12.50	11.00	12.50	11.00				
		132	8.00	6.50	11.00	9.50	12.50	11.00	12.50	11.00				
		136	8.00	6.50	11.00	9.50	12.50	11.00	12.50	11.00				
		140	8.00	6.50	10.00	8.50	10.00	8.50	10.00	8.50				
		144	8.00	6.50	11.00	9.50	12.50	11.00	12.50	11.00				
		149	11.50	10.00	11.50	10.00	11.50	10.00	11.50	10.00				
		153	11.50	10.00	11.50	10.00	11.50	10.00	11.50	10.00				
		157	11.50	10.00	11.50	10.00	11.50	10.00	11.50	10.00				
		161	11.50	10.00	11.50	10.00	11.50	10.00	11.50	10.00				
		165	11.50	10.00	11.50	10.00	11.50	10.00	11.50	10.00				
	40 MHz Bandwidth	38	8.00	6.50	11.00	9.50	11.00	9.50	11.00	9.50	11.00	9.50		
		46	8.00	6.50	11.00	9.50	12.00	10.50	12.00	10.50	12.00	10.50		
		54	8.00	6.50	11.00	9.50	12.50	11.00	12.50	11.00	12.50	11.00		
		62	8.00	6.50	10.50	9.00	10.50	9.00	10.00	8.50	10.50	9.00		
		102	8.00	6.50	10.00	8.50	10.00	8.50	10.00	8.50	10.00	8.50		
		110	8.00	6.50	11.00	9.50	12.50	11.00	12.50	11.00	12.50	11.00		
		118	8.00	6.50	11.00	9.50	12.50	11.00	12.50	11.00	12.50	11.00		
		126	8.00	6.50	11.00	9.50	12.50	11.00	12.50	11.00	12.50	11.00		
		134	8.00	6.50	11.00	9.50	12.50	11.00	12.50	11.00	12.50	11.00		
		142	8.00	6.50	11.00	9.50	12.50	11.00	10.00	8.50	12.50	11.00		
		151	11.50	10.00	11.50	10.00	11.50	10.00	11.50	10.00	11.50	10.00		
		159	11.50	10.00	11.50	10.00	11.50	10.00	11.50	10.00	11.50	10.00		
	80 MHz Bandwidth	42	8.00	6.50	9.00	7.50	9.00	7.50	9.00	7.50	9.00	7.50	9.00	7.50
		58	8.00	6.50	9.00	7.50	9.00	7.50	9.00	7.50	9.00	7.50	9.00	7.50
		106	8.00	6.50	8.50	7.00	8.50	7.00	9.00	7.50	9.00	7.50	9.00	7.50
		122	8.00	6.50	11.00	9.50	12.50	11.00	12.50	11.00	12.50	11.00	12.50	11.00
		138	8.00	6.50	11.00	9.50	12.50	11.00	10.00	8.50	12.50	11.00	12.50	11.00
		155	11.50	10.00	11.50	10.00	11.50	10.00	11.50	10.00	11.50	10.00	11.50	10.00

H. 5GHz ANTupper

Below table is applicable in the following conditions:
-Simultaneous conditions with Licensed Bands Antenna 3
-Simultaneous conditions with LTE Inter-band ULCA

Mode/ Band		Tones	26T		52T		106T		242T		484T		996T	
		Channel	Maximum	Nominal	Maximum	Nominal	Maximum	Nominal	Maximum	Nominal	Maximum	Nominal	Maximum	Nominal
Modulated Average - Single Tx Chain (dBm) - 5GHz ANTupper	20 MHz Bandwidth	36	11.00	9.50	11.00	9.50	11.00	9.50	11.00	9.50				
		40	11.00	9.50	11.00	9.50	11.00	9.50	11.00	9.50				
		44	11.00	9.50	11.00	9.50	11.00	9.50	11.00	9.50				
		48	11.00	9.50	11.00	9.50	11.00	9.50	11.00	9.50				
		52	11.00	9.50	11.25	9.75	11.25	9.75	11.25	9.75				
		56	11.00	9.50	11.25	9.75	11.25	9.75	11.25	9.75				
		60	11.00	9.50	11.25	9.75	11.25	9.75	11.25	9.75				
		64	11.00	9.50	11.25	9.75	11.25	9.75	11.25	9.75				
		100	10.00	8.50	10.00	8.50	10.00	8.50	10.00	8.50				
		104	10.00	8.50	10.00	8.50	10.00	8.50	10.00	8.50				
		108	10.00	8.50	10.00	8.50	10.00	8.50	10.00	8.50				
		112	10.00	8.50	10.00	8.50	10.00	8.50	10.00	8.50				
		116	10.00	8.50	10.00	8.50	10.00	8.50	10.00	8.50				
		120	10.00	8.50	10.00	8.50	10.00	8.50	10.00	8.50				
		124	10.00	8.50	10.00	8.50	10.00	8.50	10.00	8.50				
		128	10.00	8.50	10.00	8.50	10.00	8.50	10.00	8.50				
		132	10.00	8.50	10.00	8.50	10.00	8.50	10.00	8.50				
		136	10.00	8.50	10.00	8.50	10.00	8.50	10.00	8.50				
		140	10.00	8.50	10.00	8.50	10.00	8.50	10.00	8.50				
		144	10.00	8.50	10.00	8.50	10.00	8.50	10.00	8.50				
		149	10.50	9.00	10.50	9.00	10.50	9.00	10.50	9.00				
		153	10.50	9.00	10.50	9.00	10.50	9.00	10.50	9.00				
		157	10.50	9.00	10.50	9.00	10.50	9.00	10.50	9.00				
		161	10.50	9.00	10.50	9.00	10.50	9.00	10.50	9.00				
		165	10.50	9.00	10.50	9.00	10.50	9.00	10.50	9.00				
	40 MHz Bandwidth	38	11.00	9.50	11.00	9.50	11.00	9.50	11.00	9.50	11.00	9.50		
		46	11.00	9.50	11.00	9.50	11.00	9.50	11.00	9.50	11.00	9.50		
		54	11.00	9.50	11.25	9.75	11.25	9.75	11.25	9.75	11.25	9.75		
		62	11.00	9.50	11.25	9.75	11.25	9.75	11.25	9.75	11.25	9.75		
		102	10.00	8.50	10.00	8.50	10.00	8.50	10.00	8.50	10.00	8.50		
		110	10.00	8.50	10.00	8.50	10.00	8.50	10.00	8.50	10.00	8.50		
		118	10.00	8.50	10.00	8.50	10.00	8.50	10.00	8.50	10.00	8.50		
		126	10.00	8.50	10.00	8.50	10.00	8.50	10.00	8.50	10.00	8.50		
		134	10.00	8.50	10.00	8.50	10.00	8.50	10.00	8.50	10.00	8.50		
		142	10.00	8.50	10.00	8.50	10.00	8.50	10.00	8.50	10.00	8.50		
		151	10.50	9.00	10.50	9.00	10.50	9.00	10.50	9.00	10.50	9.00		
		159	10.50	9.00	10.50	9.00	10.50	9.00	10.50	9.00	10.50	9.00		
	80 MHz Bandwidth	42	11.00	9.50	10.50	9.00	10.50	9.00	10.50	9.00	10.50	9.00	10.50	9.00
		58	10.50	9.00	10.50	9.00	10.50	9.00	10.50	9.00	10.50	9.00	10.50	9.00
		106	10.00	8.50	10.00	8.50	10.00	8.50	10.00	8.50	10.00	8.50	10.00	8.50
		122	10.00	8.50	10.00	8.50	10.00	8.50	10.00	8.50	10.00	8.50	10.00	8.50
		138	10.00	8.50	10.00	8.50	10.00	8.50	10.00	8.50	10.00	8.50	10.00	8.50
		155	10.50	9.00	10.50	9.00	10.50	9.00	10.50	9.00	10.50	9.00	10.50	9.00

Below table is applicable in the following conditions:
-Simultaneous conditions with Licensed Bands Antenna 3
-Simultaneous conditions with LTE Inter-band ULCA

Mode/ Band		Tones	26T		52T		106T		242T		484T		996T	
		Channel	Maximum	Nominal	Maximum	Nominal	Maximum	Nominal	Maximum	Nominal	Maximum	Nominal	Maximum	Nominal
Modulated Average - 2 Tx Chain (dBm) CDD - 5GHz ANTupper	20 MHz Bandwidth	36	8.00	6.50	11.00	9.50	11.00	9.50	11.00	9.50				
		40	8.00	6.50	11.00	9.50	11.00	9.50	11.00	9.50				
		44	8.00	6.50	11.00	9.50	11.00	9.50	11.00	9.50				
		48	8.00	6.50	11.00	9.50	11.00	9.50	11.00	9.50				
		52	8.00	6.50	11.00	9.50	11.25	9.75	11.25	9.75				
		56	8.00	6.50	11.00	9.50	11.25	9.75	11.25	9.75				
		60	8.00	6.50	11.00	9.50	11.25	9.75	11.25	9.75				
		64	8.00	6.50	11.00	9.50	11.25	9.75	11.25	9.75				
		100	7.75	6.25	10.00	8.50	10.00	8.50	10.00	8.50				
		104	7.75	6.25	10.00	8.50	10.00	8.50	10.00	8.50				
		108	7.75	6.25	10.00	8.50	10.00	8.50	10.00	8.50				
		112	7.75	6.25	10.00	8.50	10.00	8.50	10.00	8.50				
		116	7.75	6.25	10.00	8.50	10.00	8.50	10.00	8.50				
		120	7.75	6.25	10.00	8.50	10.00	8.50	10.00	8.50				
		124	7.75	6.25	10.00	8.50	10.00	8.50	10.00	8.50				
		128	7.75	6.25	10.00	8.50	10.00	8.50	10.00	8.50				
		132	7.75	6.25	10.00	8.50	10.00	8.50	10.00	8.50				
		136	7.75	6.25	10.00	8.50	10.00	8.50	10.00	8.50				
		140	7.75	6.25	10.00	8.50	10.00	8.50	10.00	8.50				
		144	7.75	6.25	10.00	8.50	10.00	8.50	10.00	8.50				
		149	10.50	9.00	10.50	9.00	10.50	9.00	10.50	9.00				
		153	10.50	9.00	10.50	9.00	10.50	9.00	10.50	9.00				
		157	10.50	9.00	10.50	9.00	10.50	9.00	10.50	9.00				
		161	10.50	9.00	10.50	9.00	10.50	9.00	10.50	9.00				
		165	10.50	9.00	10.50	9.00	10.50	9.00	10.50	9.00				
	40 MHz Bandwidth	38	8.00	6.50	11.00	9.50	11.00	9.50	11.00	9.50	11.00	9.50		
		46	8.00	6.50	11.00	9.50	11.00	9.50	11.00	9.50	11.00	9.50		
		54	8.00	6.50	11.00	9.50	11.25	9.75	11.25	9.75	11.25	9.75		
		62	8.00	6.50	10.50	9.00	10.50	9.00	10.00	8.50	10.50	9.00		
		102	7.75	6.25	10.00	8.50	10.00	8.50	10.00	8.50	10.00	8.50		
		110	7.75	6.25	10.00	8.50	10.00	8.50	10.00	8.50	10.00	8.50		
		118	7.75	6.25	10.00	8.50	10.00	8.50	10.00	8.50	10.00	8.50		
		126	7.75	6.25	10.00	8.50	10.00	8.50	10.00	8.50	10.00	8.50		
		134	7.75	6.25	10.00	8.50	10.00	8.50	10.00	8.50	10.00	8.50		
		142	7.75	6.25	10.00	8.50	10.00	8.50	10.00	8.50	10.00	8.50		
		151	10.50	9.00	10.50	9.00	10.50	9.00	10.50	9.00	10.50	9.00		
		159	10.50	9.00	10.50	9.00	10.50	9.00	10.50	9.00	10.50	9.00		
	80 MHz Bandwidth	42	8.00	6.50	9.00	7.50	9.00	7.50	9.00	7.50	9.00	7.50	9.00	7.50
		58	8.00	6.50	9.00	7.50	9.00	7.50	9.00	7.50	9.00	7.50	9.00	7.50
		106	7.75	6.25	9.00	7.50	9.00	7.50	9.00	7.50	9.00	7.50	9.00	7.50
		122	7.75	6.25	10.00	8.50	10.00	8.50	10.00	8.50	10.00	8.50	10.00	8.50
		138	7.75	6.25	10.00	8.50	10.00	8.50	10.00	8.50	10.00	8.50	10.00	8.50
		155	10.50	9.00	10.50	9.00	10.50	9.00	10.50	9.00	10.50	9.00	10.50	9.00

Below table is applicable in the following conditions:
-Simultaneous conditions with Licensed Bands Antenna 3
-Simultaneous conditions with LTE Inter-band ULCA

Mode/ Band		Tones	26T		52T		106T		242T		484T		996T	
		Channel	Maximum	Nominal	Maximum	Nominal	Maximum	Nominal	Maximum	Nominal	Maximum	Nominal	Maximum	Nominal
Modulated Average - 2 Tx Chain (dBm) SDM - 5GHz ANTupper	20 MHz Bandwidth	36	8.00	6.50	11.00	9.50	11.00	9.50	11.00	9.50				
		40	8.00	6.50	11.00	9.50	11.00	9.50	11.00	9.50				
		44	8.00	6.50	11.00	9.50	11.00	9.50	11.00	9.50				
		48	8.00	6.50	11.00	9.50	11.00	9.50	11.00	9.50				
		52	8.00	6.50	11.00	9.50	11.25	9.75	11.25	9.75				
		56	8.00	6.50	11.00	9.50	11.25	9.75	11.25	9.75				
		60	8.00	6.50	11.00	9.50	11.25	9.75	11.25	9.75				
		64	8.00	6.50	11.00	9.50	11.25	9.75	11.25	9.75				
		100	8.00	6.50	10.00	8.50	10.00	8.50	10.00	8.50				
		104	8.00	6.50	10.00	8.50	10.00	8.50	10.00	8.50				
		108	8.00	6.50	10.00	8.50	10.00	8.50	10.00	8.50				
		112	8.00	6.50	10.00	8.50	10.00	8.50	10.00	8.50				
		116	8.00	6.50	10.00	8.50	10.00	8.50	10.00	8.50				
		120	8.00	6.50	10.00	8.50	10.00	8.50	10.00	8.50				
		124	8.00	6.50	10.00	8.50	10.00	8.50	10.00	8.50				
		128	8.00	6.50	10.00	8.50	10.00	8.50	10.00	8.50				
		132	8.00	6.50	10.00	8.50	10.00	8.50	10.00	8.50				
		136	8.00	6.50	10.00	8.50	10.00	8.50	10.00	8.50				
		140	8.00	6.50	10.00	8.50	10.00	8.50	10.00	8.50				
		144	8.00	6.50	10.00	8.50	10.00	8.50	10.00	8.50				
		149	10.50	9.00	10.50	9.00	10.50	9.00	10.50	9.00				
		153	10.50	9.00	10.50	9.00	10.50	9.00	10.50	9.00				
		157	10.50	9.00	10.50	9.00	10.50	9.00	10.50	9.00				
		161	10.50	9.00	10.50	9.00	10.50	9.00	10.50	9.00				
		165	10.50	9.00	10.50	9.00	10.50	9.00	10.50	9.00				
	40 MHz Bandwidth	38	8.00	6.50	11.00	9.50	11.00	9.50	11.00	9.50	11.00	9.50		
		46	8.00	6.50	11.00	9.50	11.00	9.50	11.00	9.50	11.00	9.50		
		54	8.00	6.50	11.00	9.50	11.25	9.75	11.25	9.75	11.25	9.75		
		62	8.00	6.50	10.50	9.00	10.50	9.00	10.00	8.50	10.50	9.00		
		102	8.00	6.50	10.00	8.50	10.00	8.50	10.00	8.50	10.00	8.50		
		110	8.00	6.50	10.00	8.50	10.00	8.50	10.00	8.50	10.00	8.50		
		118	8.00	6.50	10.00	8.50	10.00	8.50	10.00	8.50	10.00	8.50		
		126	8.00	6.50	10.00	8.50	10.00	8.50	10.00	8.50	10.00	8.50		
		134	8.00	6.50	10.00	8.50	10.00	8.50	10.00	8.50	10.00	8.50		
		142	8.00	6.50	10.00	8.50	10.00	8.50	10.00	8.50	10.00	8.50		
		151	10.50	9.00	10.50	9.00	10.50	9.00	10.50	9.00	10.50	9.00		
		159	10.50	9.00	10.50	9.00	10.50	9.00	10.50	9.00	10.50	9.00		
	80 MHz Bandwidth	42	8.00	6.50	9.00	7.50	9.00	7.50	9.00	7.50	9.00	7.50	9.00	7.50
		58	8.00	6.50	9.00	7.50	9.00	7.50	9.00	7.50	9.00	7.50	9.00	7.50
		106	8.00	6.50	9.00	7.50	9.00	7.50	9.00	7.50	9.00	7.50	9.00	7.50
		122	8.00	6.50	10.00	8.50	10.00	8.50	10.00	8.50	10.00	8.50	10.00	8.50
		138	8.00	6.50	10.00	8.50	10.00	8.50	10.00	8.50	10.00	8.50	10.00	8.50
		155	10.50	9.00	10.50	9.00	10.50	9.00	10.50	9.00	10.50	9.00	10.50	9.00

1.3 IEEE 802.11ax Measured Powers

Table 1
Maximum 2.4 GHz 802.11ax RU Output Power – Ant 2a

Freq [MHz]	Channel	Tones	RU Index	Avg Conducted Powers (dBm)	Freq [MHz]	Channel	Tones	RU Index	Avg Conducted Powers (dBm)
2412	1	26T	0	11.72	2412	1	52T	37	11.54
			4	12.12				38	12.12
			8	12.50				40	12.98
2417	2	26T	0	12.16	2417	2	52T	37	11.55
			4	12.30				38	12.02
			8	12.50				40	12.36
2437	6	26T	0	12.36	2437	6	52T	37	12.97
			4	12.50				38	12.38
			8	12.16				40	12.29
2462	11	26T	0	12.39	2462	11	52T	37	12.34
			4	12.37				38	12.46
			8	12.50				40	12.33
2467	12	26T	0	10.36	2467	12	52T	37	10.67
			4	10.94				38	10.98
			8	9.83				40	9.14

Freq [MHz]	Channel	Tones	RU Index	Avg Conducted Powers (dBm)
2412	1	106T	53	11.78
			54	12.78
2417	2	106T	53	11.65
			54	12.47
2437	6	106T	53	12.53
			54	12.13
2462	11	106T	53	12.49
			54	12.23
2467	12	106T	53	10.98
			54	9.66

Freq [MHz]	Channel	Tones	RU Index	Avg Conducted Powers (dBm)
2412	1	242T	61	13.00
2417	2	242T	61	13.00
2437	6	242T	61	12.95
2462	11	242T	61	12.87
2467	12	242T	61	10.92

Table 2
Maximum 2.4 GHz 802.11ax RU Output Power – Ant 4a

Freq [MHz]	Channel	Tones	RU Index	Avg Conducted Powers (dBm)	Freq [MHz]	Channel	Tones	RU Index	Avg Conducted Powers (dBm)
2412	1	26T	0	12.05	2412	1	52T	37	12.23
			4	12.36				38	12.46
			8	12.93				40	12.92
2417	2	26T	0	11.76	2417	2	52T	37	12.41
			4	12.32				38	12.39
			8	12.77				40	12.73
2437	6	26T	0	12.53	2437	6	52T	37	12.66
			4	12.70				38	12.58
			8	12.85				40	12.68
2462	11	26T	0	13.00	2462	11	52T	37	12.70
			4	12.60				38	12.57
			8	12.30				40	12.45
2467	12	26T	0	10.74	2467	12	52T	37	10.75
			4	10.97				38	10.90
			8	9.55				40	9.01

Freq [MHz]	Channel	Tones	RU Index	Avg Conducted Powers (dBm)
2412	1	106T	53	12.02
			54	12.55
2417	2	106T	53	11.96
			54	12.19
2437	6	106T	53	12.32
			54	12.44
2462	11	106T	53	12.35
			54	12.17
2467	12	106T	53	10.63
			54	9.19

Freq [MHz]	Channel	Tones	RU Index	Avg Conducted Powers (dBm)
2412	1	242T	61	12.81
2417	2	242T	61	13.00
2437	6	242T	61	12.89
2462	11	242T	61	12.95
2467	12	242T	61	10.95

Table 3
Maximum 5 GHz 802.11ax RU Output Power – 5GHz ANTlower

	Band	Freq [MHz]	Channel	Tones	Avg Conducted Power (dBm)		
					RU Index		
					0	4	8
20MHz BW	1	5180	36	26T	10.91	11.00	11.00
		5200	40	26T	10.86	11.00	11.00
		5240	48	26T	10.81	11.00	11.00
	2A	5260	52	26T	10.75	11.00	11.00
		5300	60	26T	10.85	11.00	11.00
		5320	64	26T	10.91	11.00	11.00
	2C	5500	100	26T	10.80	11.00	11.00
		5520	104	26T	11.00	11.00	11.00
		5580	116	26T	10.97	11.00	11.00
		5660	132	26T	11.00	11.00	11.00
		5680	136	26T	10.98	11.00	11.00
		5700	140	26T	10.92	11.00	11.00
		5720	144	26T	10.80	11.00	11.00
	3	5745	149	26T	14.91	15.21	15.19
		5785	157	26T	14.93	15.32	15.22
		5825	165	26T	14.86	15.30	15.23

	Band	Freq [MHz]	Channel	Tones	Avg Conducted Power (dBm)		
					RU Index		
					37	39	40
20MHz BW	1	5180	36	52T	13.27	13.81	13.71
		5200	40	52T	13.86	13.92	13.84
		5240	48	52T	13.35	13.71	13.57
	2A	5260	52	52T	13.25	13.67	13.61
		5300	60	52T	13.40	13.79	13.72
		5320	64	52T	13.45	13.91	13.85
	2C	5500	100	52T	13.23	13.47	13.40
		5520	104	52T	13.07	13.59	13.52
		5580	116	52T	13.49	13.65	13.38
		5660	132	52T	13.24	13.41	13.26
		5680	136	52T	13.14	13.39	13.43
		5700	140	52T	12.84	13.14	13.00
		5720	144	52T	12.97	13.22	13.27
	3	5745	149	52T	14.53	14.92	14.91
		5785	157	52T	14.53	14.80	14.72
		5825	165	52T	14.84	15.22	15.11

	Band	Freq [MHz]	Channel	Tones	Avg Conducted Power (dBm)		
					RU Index		
					53	54	N/A
20MHz BW	1	5180	36	106T	15.00	15.00	
		5200	40	106T	16.00	16.00	
		5240	48	106T	16.00	16.00	
	2A	5260	52	106T	16.31	16.50	
		5300	60	106T	16.33	16.50	
		5320	64	106T	14.41	14.50	
	2C	5500	100	106T	13.96	14.00	
		5520	104	106T	16.31	16.50	
		5580	116	106T	15.50	16.50	
		5660	132	106T	16.44	16.50	
		5680	136	106T	16.35	16.50	
		5700	140	106T	13.38	13.50	
		5720	144	106T	16.17	16.32	
	3	5745	149	106T	15.50	15.50	
		5785	157	106T	15.50	15.50	
		5825	165	106T	15.50	15.50	

	Band	Freq [MHz]	Channel	Tones	Avg Conducted Power (dBm)		
					RU Index		
					61	N/A	N/A
20MHz BW	1	5180	36	242T	15.00		
		5200	40	242T	16.00		
		5240	48	242T	16.00		
	2A	5260	52	242T	16.47		
		5300	60	242T	16.50		
		5320	64	242T	14.50		
	2C	5500	100	242T	14.00		
		5520	104	242T	16.50		
		5580	116	242T	16.49		
		5660	132	242T	16.46		
		5680	136	242T	16.34		
		5700	140	242T	13.50		
		5720	144	242T	16.50		
	3	5745	149	242T	15.50		
		5785	157	242T	15.50		
		5825	165	242T	15.50		

	Band	Freq [MHz]	Channel	Tones	Avg Conducted Power (dBm)		
					RU Index		
					0	8	17
40MHz BW	1	5190	38	26T	10.50	11.00	10.78
		5230	46	26T	10.88	11.00	11.00
	2A	5270	54	26T	10.75	11.00	11.00
		5310	62	26T	10.50	10.96	11.00
	2C	5510	102	26T	10.74	10.82	11.00
		5550	110	26T	10.93	11.00	11.00
		5590	118	26T	10.97	10.96	11.00
		5670	134	26T	11.00	11.00	11.00
		5710	142	26T	10.99	11.00	11.00
	3	5755	151	26T	15.20	15.49	15.50
		5795	159	26T	15.50	15.50	15.50

	Band	Freq [MHz]	Channel	Tones	Avg Conducted Power (dBm)		
					RU Index		
					37	40	44
40MHz BW	1	5190	38	52T	11.19	11.91	11.41
		5230	46	52T	13.19	13.29	13.07
	2A	5270	54	52T	13.34	13.76	13.46
		5310	62	52T	11.08	11.25	11.08
	2C	5510	102	52T	10.64	10.71	10.61
		5550	110	52T	13.41	13.17	13.37
		5590	118	52T	13.64	13.19	13.35
		5670	134	52T	13.53	13.51	13.44
		5710	142	52T	13.34	13.49	13.22
	3	5755	151	52T	14.90	15.09	15.03
		5795	159	52T	15.05	15.13	15.09

40MHz BW	Band	Freq [MHz]	Channel	Tones	Avg Conducted Power (dBm)		
					RU Index		
					53	54	56
	1	5190	38	106T	11.43	11.92	11.62
		5230	46	106T	15.25	15.81	15.91
	2A	5270	54	106T	16.07	16.25	16.33
		5310	62	106T	10.95	11.27	11.28
	2C	5510	102	106T	10.58	10.72	10.75
		5550	110	106T	16.19	16.28	16.18
		5590	118	106T	16.25	16.15	16.11
		5670	134	106T	13.92	13.87	14.03
		5710	142	106T	15.93	15.82	16.11
	3	5755	151	106T	14.82	15.04	15.10
		5795	159	106T	14.92	15.09	15.22

40MHz BW	Band	Freq [MHz]	Channel	Tones	Avg Conducted Power (dBm)		
					RU Index		
					61	62	N/A
	1	5190	38	242T	12.00	12.00	
		5230	46	242T	15.99	16.00	
	2A	5270	54	242T	16.50	16.50	
		5310	62	242T	11.42	11.50	
	2C	5510	102	242T	11.50	11.50	
		5550	110	242T	16.50	16.50	
		5590	118	242T	16.41	16.50	
		5670	134	242T	14.50	14.50	
		5710	142	242T	13.37	13.50	
	3	5755	151	242T	15.48	15.43	
		5795	159	242T	15.50	15.50	

40MHz BW	Band	Freq [MHz]	Channel	Tones	Avg Conducted Power (dBm)		
					RU Index		
					65	N/A	N/A
	1	5190	38	484T	12.00		
		5230	46	484T	16.00		
	2A	5270	54	484T	16.50		
		5310	62	484T	11.46		
	2C	5510	102	484T	11.50		
		5550	110	484T	16.50		
		5590	118	484T	16.45		
		5670	134	484T	14.50		
		5710	142	484T	16.50		
	3	5755	151	484T	15.50		
		5795	159	484T	15.50		

80MHz BW	Band	Freq [MHz]	Channel	Tones	Avg Conducted Power (dBm)		
					RU Index		
					0	18	36
	1	5210	42	26T	10.79	11.00	10.89
	2A	5290	58	26T	10.47	10.50	10.50
	2C	5530	106	26T	10.24	10.50	10.23
		5610	122	26T	10.95	11.00	11.00
		5690	138	26T	11.00	11.00	11.00
	3	5775	155	26T	15.34	15.50	15.50

80MHz BW	Band	Freq [MHz]	Channel	Tones	Avg Conducted Power (dBm)		
					RU Index		
					37	44	52
	1	5210	42	52T	10.29	10.50	10.33
	2A	5290	58	52T	10.03	10.43	10.15
	2C	5530	106	52T	10.08	10.50	10.21
		5610	122	52T	13.76	13.86	13.73
		5690	138	52T	13.90	14.00	13.98
	3	5775	155	52T	15.45	15.50	15.50

80MHz BW	Band	Freq [MHz]	Channel	Tones	Avg Conducted Power (dBm)		
					RU Index		
					53	56	60
	1	5210	42	106T	10.41	10.50	10.36
	2A	5290	58	106T	10.50	10.48	10.50
	2C	5530	106	106T	10.19	10.50	10.46
		5610	122	106T	16.41	16.44	16.23
		5690	138	106T	16.50	16.50	16.47
	3	5775	155	106T	15.45	15.50	15.31

80MHz BW	Band	Freq [MHz]	Channel	Tones	Avg Conducted Power (dBm)		
					RU Index		
					61	62	64
	1	5210	42	242T	10.50	10.50	10.30
	2A	5290	58	242T	10.42	10.50	10.22
	2C	5530	106	242T	10.13	10.47	10.03
		5610	122	242T	16.15	16.26	16.15
		5690	138	242T	13.32	13.50	13.09
	3	5775	155	242T	15.33	15.50	15.23

80MHz BW	Band	Freq [MHz]	Channel	Tones	Avg Conducted Power (dBm)		
					RU Index		
					65	66	N/A
	1	5210	42	484T	10.50	10.27	
	2A	5290	58	484T	10.50	10.50	
	2C	5530	106	484T	10.50	10.50	
		5610	122	484T	16.42	16.50	
		5690	138	484T	14.50	14.50	
	3	5775	155	484T	15.50	15.50	

80MHz BW	Band	Freq [MHz]	Channel	Tones	Avg Conducted Power (dBm)		
					RU Index		
					67	N/A	N/A
	1	5210	42	996T	10.50		
	2A	5290	58	996T	10.50		
	2C	5530	106	996T	10.48		
		5610	122	996T	16.46		
		5690	138	996T	16.46		
	3	5775	155	996T	15.16		

Table 4
Maximum 5 GHz 802.11ax RU Output Power – 5GHz ANTupper

	Band	Freq [MHz]	Channel	Tones	Avg Conducted Power (dBm)		
					RU Index		
					0	4	8
20MHz BW	1	5180	36	26T	10.46	10.86	10.78
		5200	40	26T	10.56	10.97	10.91
		5240	48	26T	10.81	11.00	10.96
	2A	5260	52	26T	10.87	11.00	11.00
		5300	60	26T	10.92	11.00	11.00
		5320	64	26T	10.97	11.00	11.00
	2C	5500	100	26T	10.73	11.00	10.72
		5520	104	26T	11.00	11.00	10.99
		5580	116	26T	10.84	11.00	11.00
		5660	132	26T	10.81	11.00	11.00
		5680	136	26T	10.82	11.00	11.10
		5700	140	26T	10.79	11.00	11.00
		5720	144	26T	10.90	11.00	11.00
	3	5745	149	26T	15.28	15.50	15.50
		5785	157	26T	15.29	15.50	15.50
		5825	165	26T	15.27	15.50	15.50

	Band	Freq [MHz]	Channel	Tones	Avg Conducted Power (dBm)		
					RU Index		
					37	39	40
20MHz BW	1	5180	36	52T	13.19	13.73	13.75
		5200	40	52T	13.33	13.90	13.91
		5240	48	52T	13.31	13.78	13.73
	2A	5260	52	52T	13.38	13.82	13.80
		5300	60	52T	13.18	13.63	13.27
		5320	64	52T	12.92	13.26	13.17
	2C	5500	100	52T	13.18	13.44	13.24
		5520	104	52T	13.08	13.43	13.31
		5580	116	52T	13.29	13.45	13.35
		5660	132	52T	13.22	13.53	13.39
		5680	136	52T	13.18	13.56	13.64
		5700	140	52T	12.96	13.28	13.27
		5720	144	52T	12.97	13.25	13.19
	3	5745	149	52T	14.56	14.92	14.92
		5785	157	52T	15.24	15.45	15.50
		5825	165	52T	14.75	15.05	15.08

	Band	Freq [MHz]	Channel	Tones	Avg Conducted Power (dBm)		
					RU Index		
					53	54	N/A
20MHz BW	1	5180	36	106T	14.79	15.00	
		5200	40	106T	15.56	15.92	
		5240	48	106T	15.87	15.98	
	2A	5260	52	106T	16.17	16.25	
		5300	60	106T	16.25	16.25	
		5320	64	106T	14.50	14.50	
	2C	5500	100	106T	14.00	14.00	
		5520	104	106T	15.00	15.00	
		5580	116	106T	14.89	15.00	
		5660	132	106T	14.95	15.00	
		5680	136	106T	15.00	15.00	
		5700	140	106T	13.47	13.50	
		5720	144	106T	14.00	14.00	
	3	5745	149	106T	15.37	15.50	
		5785	157	106T	15.46	15.50	
		5825	165	106T	15.50	15.50	

	Band	Freq [MHz]	Channel	Tones	Avg Conducted Power (dBm)		
					RU Index		
					61	N/A	N/A
20MHz BW	1	5180	36	242T	14.60		
		5200	40	242T	15.99		
		5240	48	242T	16.00		
	2A	5260	52	242T	16.25		
		5300	60	242T	16.25		
		5320	64	242T	14.50		
	2C	5500	100	242T	14.00		
		5520	104	242T	14.95		
		5580	116	242T	15.00		
		5660	132	242T	14.92		
		5680	136	242T	15.00		
		5700	140	242T	13.50		
		5720	144	242T	15.00		
	3	5745	149	242T	15.50		
		5785	157	242T	15.50		
		5825	165	242T	15.50		

	Band	Freq [MHz]	Channel	Tones	Avg Conducted Power (dBm)		
					RU Index		
					0	8	17
40MHz BW	1	5190	38	26T	9.78	10.91	10.10
		5230	46	26T	10.43	11.00	10.94
	2A	5270	54	26T	11.00	11.00	11.00
		5310	62	26T	10.75	11.00	11.00
	2C	5510	102	26T	10.92	11.00	11.00
		5550	110	26T	10.95	11.00	11.00
		5590	118	26T	10.98	10.93	11.00
		5670	134	26T	11.00	11.00	11.00
		5710	142	26T	10.93	11.00	11.00
	3	5755	151	26T	15.09	15.31	15.50
		5795	159	26T	15.25	15.28	15.50

	Band	Freq [MHz]	Channel	Tones	Avg Conducted Power (dBm)		
					RU Index		
					37	40	44
40MHz BW	1	5190	38	52T	10.88	11.65	11.47
		5230	46	52T	13.23	13.70	13.94
	2A	5270	54	52T	13.22	13.45	13.52
		5310	62	52T	11.00	11.20	11.36
	2C	5510	102	52T	11.11	11.06	11.17
		5550	110	52T	13.33	13.40	13.60
		5590	118	52T	13.39	13.47	13.59
		5670	134	52T	13.28	13.27	13.54
		5710	142	52T	13.40	13.07	13.75
	3	5755	151	52T	15.08	15.27	15.49
		5795	159	52T	15.18	15.33	15.50

40MHz BW	Band	Freq [MHz]	Channel	Tones	Avg Conducted Power (dBm)		
					RU Index		
					53	54	56
	1	5190	38	106T	11.25	11.97	11.47
		5230	46	106T	14.89	15.27	15.06
	2A	5270	54	106T	15.74	16.10	15.79
		5310	62	106T	11.17	11.41	11.26
	2C	5510	102	106T	11.32	11.24	11.15
		5550	110	106T	14.86	14.96	14.64
		5590	118	106T	14.84	14.83	14.76
		5670	134	106T	14.40	14.46	14.21
		5710	142	106T	14.84	14.91	14.79
	3	5755	151	106T	15.33	15.43	15.19
		5795	159	106T	15.01	15.37	15.18

40MHz BW	Band	Freq [MHz]	Channel	Tones	Avg Conducted Power (dBm)		
					RU Index		
					61	62	N/A
	1	5190	38	242T	11.90	11.95	
		5230	46	242T	16.00	16.00	
	2A	5270	54	242T	16.07	15.99	
		5310	62	242T	11.48	11.50	
	2C	5510	102	242T	11.50	11.50	
		5550	110	242T	15.00	14.98	
		5590	118	242T	14.93	14.94	
		5670	134	242T	14.49	14.50	
		5710	142	242T	13.30	13.46	
	3	5755	151	242T	15.31	15.41	
		5795	159	242T	15.50	15.50	

40MHz BW	Band	Freq [MHz]	Channel	Tones	Avg Conducted Power (dBm)		
					RU Index		
					65	N/A	N/A
	1	5190	38	484T	11.90		
		5230	46	484T	16.00		
	2A	5270	54	484T	16.25		
		5310	62	484T	11.50		
	2C	5510	102	484T	11.50		
		5550	110	484T	15.00		
		5590	118	484T	15.00		
		5670	134	484T	14.50		
		5710	142	484T	15.00		
	3	5755	151	484T	15.50		
		5795	159	484T	15.50		

80MHz BW	Band	Freq [MHz]	Channel	Tones	Avg Conducted Power (dBm)		
					RU Index		
					0	18	36
	1	5210	42	26T	10.63	11.00	10.50
	2A	5290	58	26T	10.24	10.40	9.97
	2C	5530	106	26T	10.28	10.45	10.23
		5610	122	26T	11.00	10.88	11.00
		5690	138	26T	10.92	11.00	10.93
	3	5775	155	26T	15.20	15.39	15.01

80MHz BW	Band	Freq [MHz]	Channel	Tones	Avg Conducted Power (dBm)		
					RU Index		
					37	44	52
	1	5210	42	52T	9.72	10.32	10.10
	2A	5290	58	52T	9.84	10.25	10.17
	2C	5530	106	52T	10.08	10.33	10.21
		5610	122	52T	13.44	13.54	13.33
		5690	138	52T	13.67	13.99	13.66
	3	5775	155	52T	14.94	15.24	15.18

80MHz BW	Band	Freq [MHz]	Channel	Tones	Avg Conducted Power (dBm)		
					RU Index		
					53	56	60
	1	5210	42	106T	9.96	10.30	10.19
	2A	5290	58	106T	10.02	10.30	10.26
	2C	5530	106	106T	10.22	10.43	10.31
		5610	122	106T	14.54	14.61	14.43
		5690	138	106T	14.78	14.98	14.77
	3	5775	155	106T	15.06	15.30	15.25

80MHz BW	Band	Freq [MHz]	Channel	Tones	Avg Conducted Power (dBm)		
					RU Index		
					61	62	64
	1	5210	42	242T	10.12	10.46	9.98
	2A	5290	58	242T	10.07	10.50	9.95
	2C	5530	106	242T	10.07	10.44	10.01
		5610	122	242T	14.36	14.71	14.24
		5690	138	242T	13.15	13.44	13.03
	3	5775	155	242T	15.01	15.04	14.87

80MHz BW	Band	Freq [MHz]	Channel	Tones	Avg Conducted Power (dBm)		
					RU Index		
					65	66	N/A
	1	5210	42	484T	10.49	10.50	
	2A	5290	58	484T	10.45	10.50	
	2C	5530	106	484T	10.31	10.49	
		5610	122	484T	14.88	14.91	
		5690	138	484T	14.46	14.50	
	3	5775	155	484T	15.47	15.46	

80MHz BW	Band	Freq [MHz]	Channel	Tones	Avg Conducted Power (dBm)		
					RU Index		
					67	N/A	N/A
	1	5210	42	996T	10.42		
	2A	5290	58	996T	10.50		
	2C	5530	106	996T	10.50		
		5610	122	996T	14.96		
		5690	138	996T	15.00		
	3	5775	155	996T	15.48		

APPENDIX I: DIPOLE CALIBRATION

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 0108**

Client: PC Test

Certificate No: **D750V3-1097_Sep17**

CALIBRATION CERTIFICATE

Object: D750V3 - SN:1097

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

SCV 10/03/2017

Calibration date: September 08, 2017

SCV 9/8/2018

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.

BN 10/10/2019

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 NRP	SN: 104778	04-Apr-17 (No. 217-02521/02522)	Apr-18
Power sensor NRP-Z91	SN: 103244	04-Apr-17 (No. 217-02521)	Apr-18
Power sensor NRP-Z91	SN: 103245	04-Apr-17 (No. 217-02522)	Apr-18
Reference 20 dB Attenuator	SN: 5058 (20k)	07-Apr-17 (No. 217-02528)	Apr-18
Type-N mismatch combination	SN: 5047.2 / 06327	07-Apr-17 (No. 217-02529)	Apr-18
Reference Probe EX3DV4	SN: 7349	31-May-17 (No. EX3-7349_May17)	May-18
DAE4	SN: 601	28-Mar-17 (No. DAE4-601_Mar17)	Mar-18

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power meter EPM-442A	SN: GB37480704	07-Oct-15 (in house check Oct-16)	In house check: Oct-18
Power sensor HP 8481A	SN: US37292783	07-Oct-15 (in house check Oct-16)	In house check: Oct-18
Power sensor HP 8481A	SN: MY41092317	07-Oct-15 (in house check Oct-16)	In house check: Oct-18
RF generator R&S SMT-06	SN: 100972	15-Jun-15 (in house check Oct-16)	In house check: Oct-18
Network Analyzer HP 8753E	SN: US37390585	18-Oct-01 (in house check Oct-16)	In house check: Oct-17

	Name	Function	Signature
Calibrated by:	Claudio Leubler	Laboratory Technician	
Approved by:	Katja Pokovic	Technical Manager	

Issued: September 8, 2017

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 0108

Glossary:

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

Calibration is Performed According to the Following Standards:

a) IEEE Std 1528-2013, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", June 2013
b) IEC 62209-1, "Measurement procedure for the assessment of Specific Absorption Rate (SAR) from hand-held and body-mounted devices used next to the ear (frequency range of 300 MHz to 6 GHz)", July 2016
c) IEC 62209-2, "Procedure to determine the Specific Absorption Rate (SAR) for wireless communication devices used in close proximity to the human body (frequency range of 30 MHz to 6 GHz)", March 2010
d) KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

Additional Documentation:

e) DASY4/5 System Handbook

Methods Applied and Interpretation of Parameters:

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

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

Measurement Conditions

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

DASY Version	DASY5	V52.10.0
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom	
Distance Dipole Center - TSL	15 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	750 MHz ± 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Head TSL parameters	22.0 °C	41.9	0.89 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	41.2 ± 6 %	0.90 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	----	----

SAR result with Head TSL

SAR averaged over 1 cm^3 (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	2.08 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**8.22 W/kg ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Head TSL	condition	
SAR measured	250 mW input power	1.36 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**5.39 W/kg ± 16.5 % (k=2)**

Body TSL parameters

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Body TSL parameters	22.0 °C	55.5	0.96 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	55.5 ± 6 %	0.96 mho/m ± 6 %
Body TSL temperature change during test	< 0.5 °C	----	----

SAR result with Body TSL

SAR averaged over 1 cm^3 (1 g) of Body TSL	Condition	
SAR measured	250 mW input power	2.14 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**8.56 W/kg ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Body TSL	condition	
SAR measured	250 mW input power	1.42 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**5.68 W/kg ± 16.5 % (k=2)**

Appendix (Additional assessments outside the scope of SCS 0108)

Antenna Parameters with Head TSL

Impedance, transformed to feed point	54.4 Ω - 0.6 jΩ
Return Loss	- 27.5 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	50.0 Ω - 3.6 jΩ
Return Loss	- 28.8 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.034 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 05, 2013

DASY5 Validation Report for Head TSL

Date: 08.09.2017

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 750 MHz; Type: D750V3; Serial: D750V3 - SN:1097

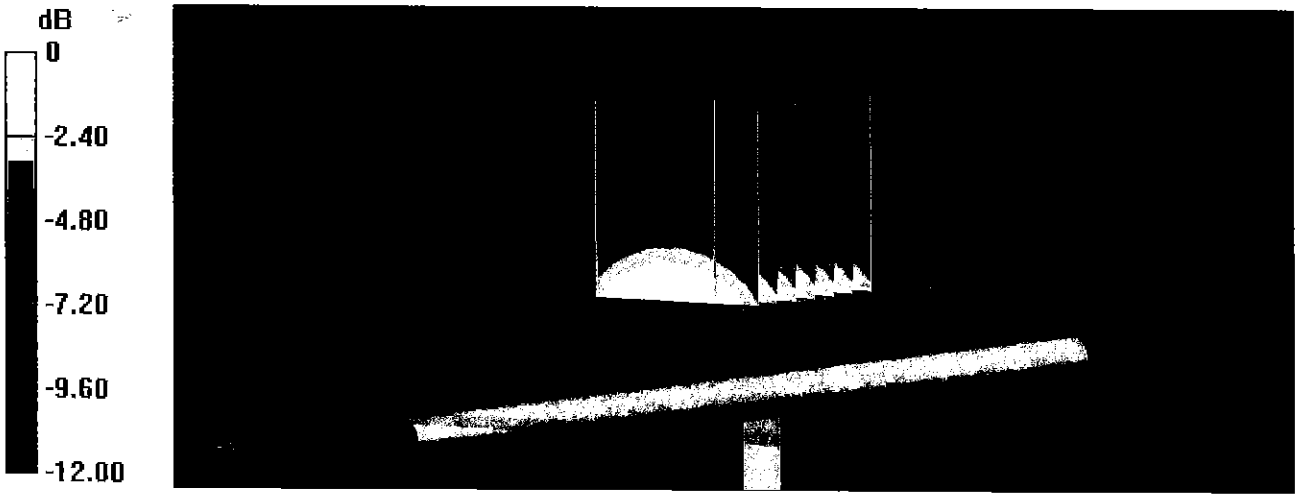
Communication System: UID 0 - CW; Frequency: 750 MHz
Medium parameters used: f = 750 MHz; σ = 0.9 S/m; ε_r = 41.2; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: EX3DV4 - SN7349; ConvF(10.49, 10.49, 10.49); Calibrated: 31.05.2017;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 28.03.2017
- Phantom: Flat Phantom 4.9 (front); Type: QD 00L P49 AA; Serial: 1001
- DASY52 52.10.0(1446); SEMCAD X 14.6.10(7417)

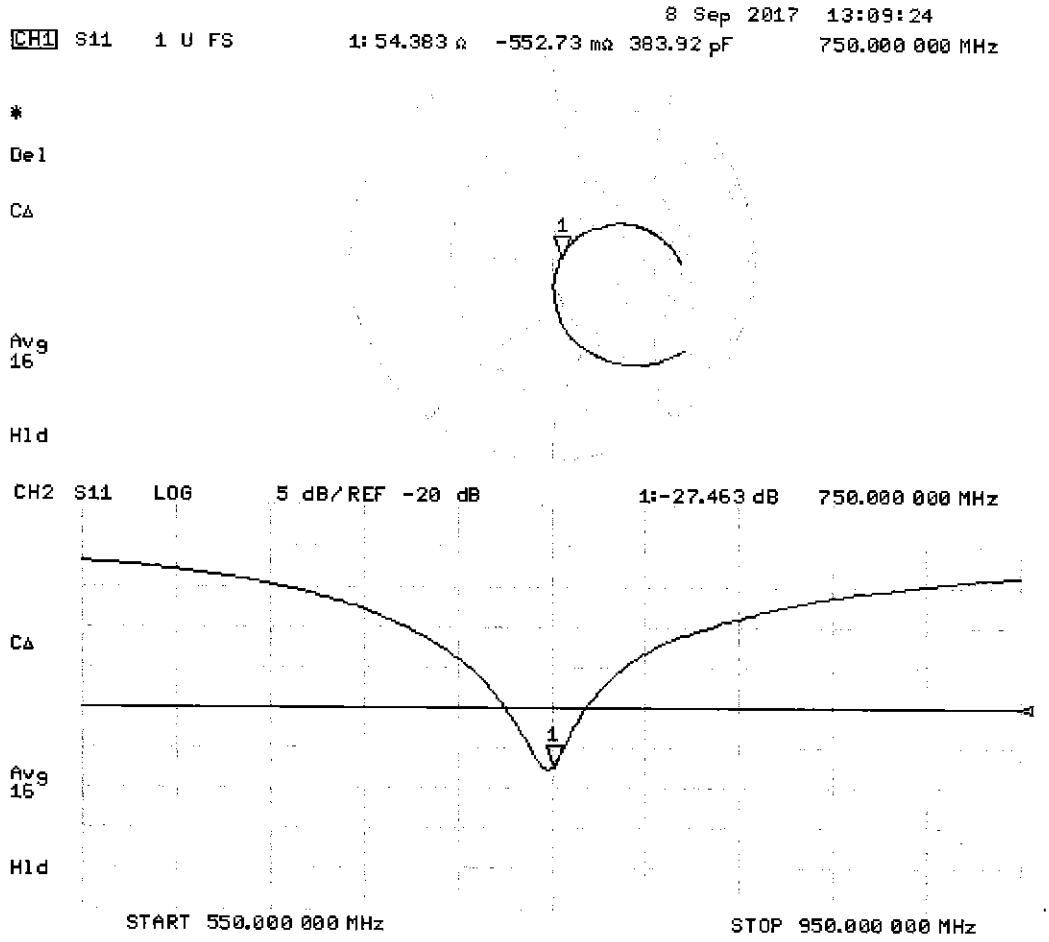
Dipole Calibration for Head Tissue/Pin=250 mW, d=15mm/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 58.59 V/m; Power Drift = 0.01 dB
Peak SAR (extrapolated) = 3.19 W/kg
SAR(1 g) = 2.08 W/kg; SAR(10 g) = 1.36 W/kg
Maximum value of SAR (measured) = 2.80 W/kg



0 dB = 2.80 W/kg = 4.47 dBW/kg

Impedance Measurement Plot for Head TSL



DASY5 Validation Report for Body TSL

Date: 08.09.2017

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 750 MHz; Type: D750V3; Serial: D750V3 - SN:1097

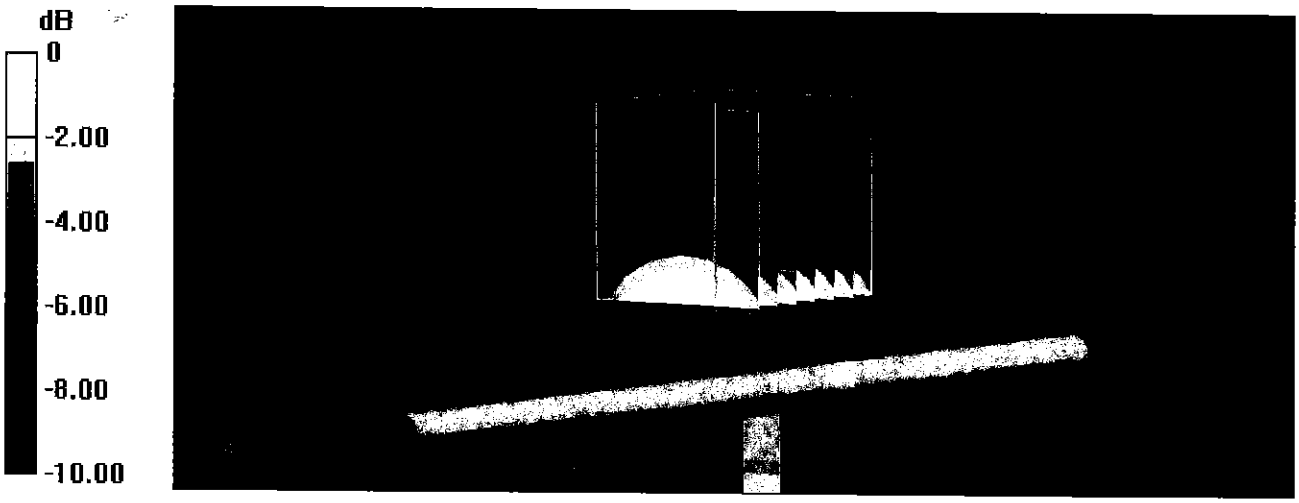
Communication System: UID 0 - CW; Frequency: 750 MHz
Medium parameters used: f = 750 MHz; σ = 0.96 S/m; ε_r = 55.5; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: EX3DV4 - SN7349; ConvF(10.35, 10.35, 10.35); Calibrated: 31.05.2017;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 28.03.2017
- Phantom: Flat Phantom 4.9 (Back); Type: QD 00R P49 AA; Serial: 1005
- DASY52 52.10.0(1446); SEMCAD X 14.6.10(7417)

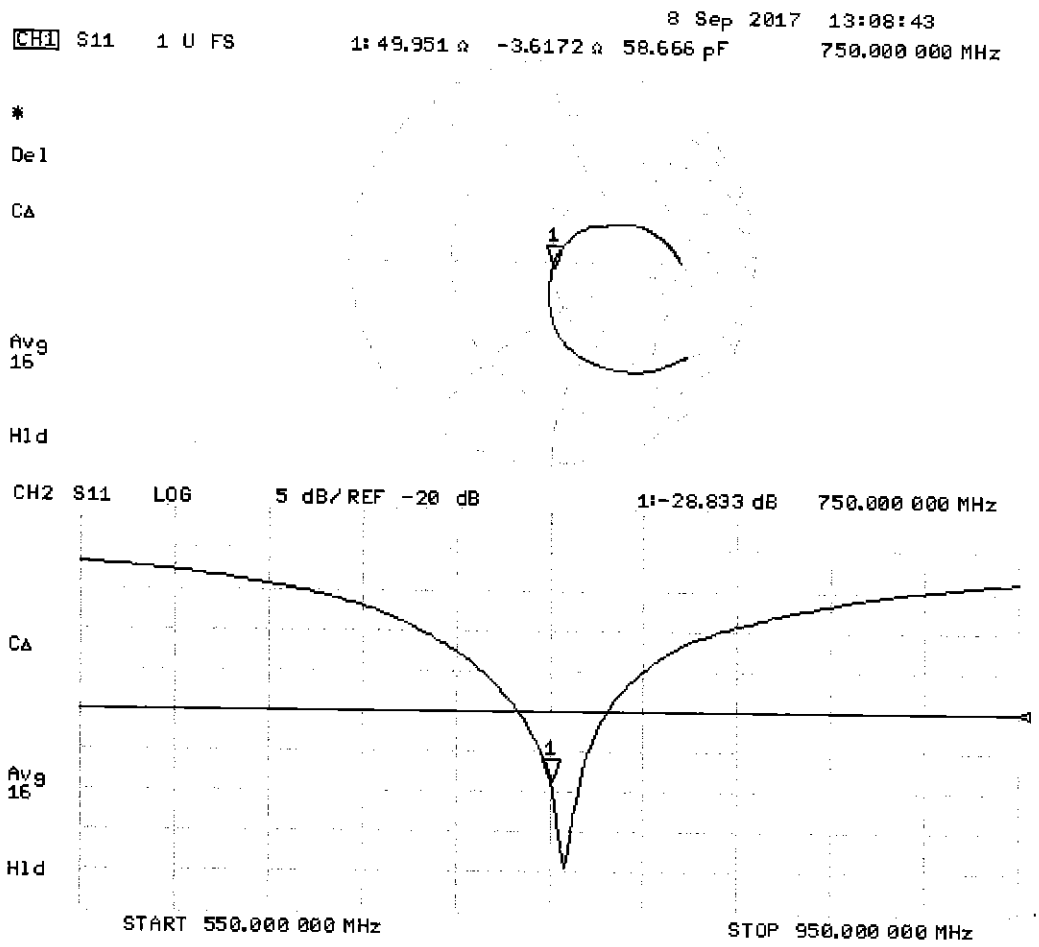
Dipole Calibration for Body Tissue/Pin=250 mW, d=15mm/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 56.96 V/m; Power Drift = -0.00 dB
Peak SAR (extrapolated) = 3.16 W/kg
SAR(1 g) = 2.14 W/kg; SAR(10 g) = 1.42 W/kg
Maximum value of SAR (measured) = 2.81 W/kg



0 dB = 2.81 W/kg = 4.49 dBW/kg

Impedance Measurement Plot for Body TSL



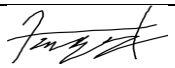
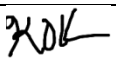
Certification of Calibration

Object	D750V3 – SN: 1097
Calibration procedure(s)	Procedure for Calibration Extension for SAR Dipoles.
Extended Calibration date:	September 08, 2018
Description:	SAR Validation Dipole at 750 MHz.

Calibration Equipment used:

Manufacturer	Model	Description	Cal Date	Cal Interval	Cal Due	Serial Number
Agilent	8753ES	S-Parameter Network Analyzer	9/14/2017	Annual	9/14/2018	US39170118
Agilent	N5182A	MXG Vector Signal Generator	3/19/2018	Annual	3/19/2019	US46240505
Amplifier Research	15S1G6	Amplifier	CBT	N/A	CBT	343972
Anritsu	ML2496A	Power Meter	10/9/2017	Annual	10/9/2018	1138001
Anritsu	MA2411B	Pulse Power Sensor	11/15/2017	Annual	11/15/2018	1339007
Anritsu	MA2411B	Pulse Power Sensor	11/22/2017	Annual	11/22/2018	1339008
Control Company	4040	Temperature / Humidity Monitor	2/28/2018	Biennial	2/28/2020	150761911
Control Company	4352	Ultra Long Stem Thermometer	2/14/2017	Biennial	2/14/2019	170112507
Keysight	772D	Dual Directional Coupler	CBT	N/A	CBT	MY52180215
Keysight Technologies	85033E	Standard Mechanical Calibration Kit (DC to 9GHz, 3.5mm)	6/4/2018	Annual	6/4/2019	MY53401181
Mini-Circuits	BW-N20W5+	DC to 18 GHz Precision Fixed 20 dB Attenuator	CBT	N/A	CBT	N/A
Mini-Circuits	NLP-2950+	Low Pass Filter DC to 2700 MHz	CBT	N/A	CBT	N/A
Narda	4772-3	Attenuator (3dB)	CBT	N/A	CBT	9406
Pasternack	PE2209-10	Bidirectional Coupler	CBT	N/A	CBT	N/A
Pasternack	PE5011-1	Torque Wrench	7/19/2017	Biennial	7/19/2019	N/A
SPEAG	DAK-3.5	Dielectric Assessment Kit	5/15/2018	Annual	5/15/2019	1070
SPEAG	ES3DV3	SAR Probe	9/18/2017	Annual	9/18/2018	3287
SPEAG	DAE4	Data Acquisition Electronics	1/26/2018	Annual	1/26/2019	1533
SPEAG	EX3DV4	SAR Probe	7/20/2018	Annual	7/20/2019	7416
SPEAG	DAE4	Dasy Data Acquisition Electronics	1/18/2018	Annual	1/18/2019	793

Measurement Uncertainty = ±23% (k=2)

	Name	Function	Signature
Calibrated By:	Sangmin Cha	Team Lead Engineer	
Approved By:	Kaitlin O'Keefe	Senior Technical Manager	

DIPOLE CALIBRATION EXTENSION

Per KDB 865664 D01, calibration intervals of up to three years may be considered for reference dipoles when it is demonstrated that the SAR target, impedance and return loss of a dipole have remained stable according to the following requirements:

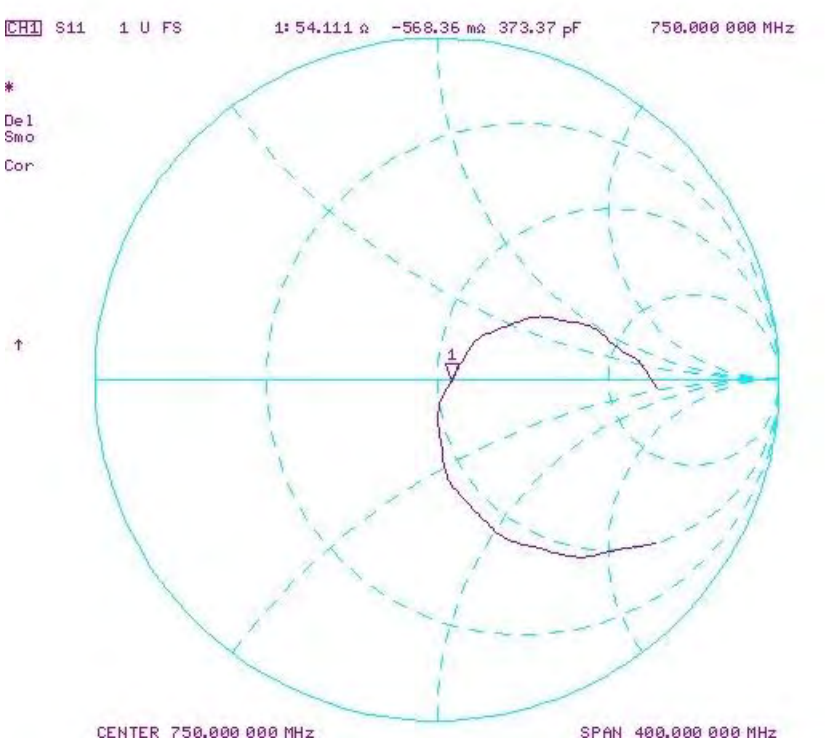
1. The measured SAR does not deviate more than 10% from the target on the calibration certificate.
2. The return-loss does not deviate more than 20% from the previous measurement and meets the required 20dB minimum return-loss requirement.
3. The measurement of real or imaginary parts of impedance does not deviate more than 5Ω from the previous measurement.

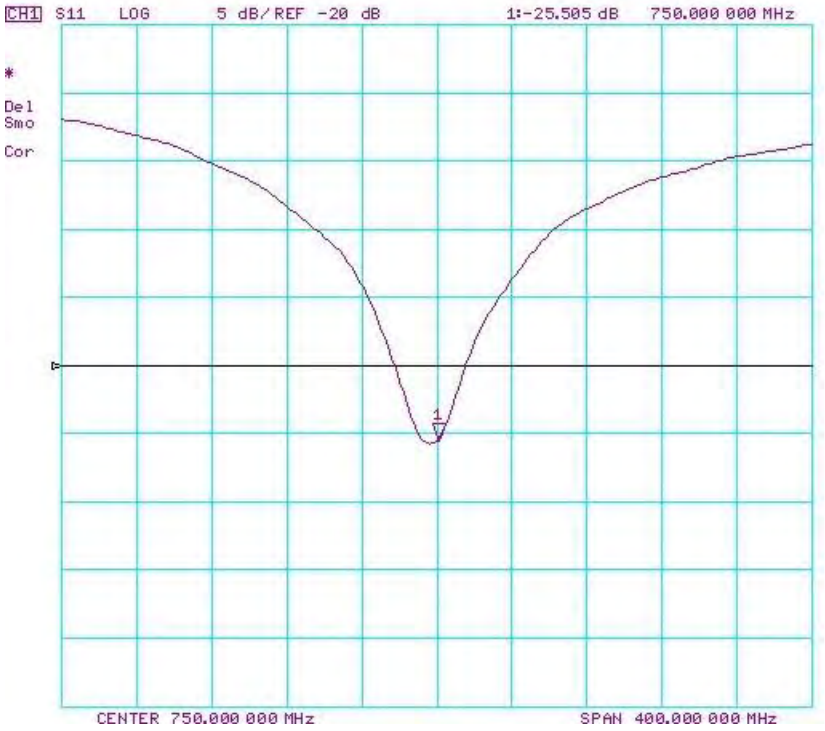
The following dipole was checked to pass the above 3 requirements to have 2-year calibration period from the calibration date:

Calibration Date	Extension Date	Certificate Electrical Delay (ns)	Certificate SAR Target Head (1g) W/kg @ 23.0 dBm	Measured Head SAR (1g) W/kg @ 23.0 dBm	Deviation 1g (%)	Certificate SAR Target Head (10g) W/kg @ 23.0 dBm	Measured Head SAR (10g) W/kg @ 23.0 dBm	Deviation 10g (%)	Certificate Impedance Head (Ohm) Real	Measured Impedance Head (Ohm) Real	Difference (Ohm) Real	Certificate Impedance Head (Ohm) Imaginary	Measured Impedance Head (Ohm) Imaginary	Difference (Ohm) Imaginary	Certificate Return Loss Head (dB)	Measured Return Loss Head (dB)	Deviation (%)	PASS/FAIL
9/8/2017	9/8/2018	1.034	1.644	1.7	3.41%	1.078	1.12	3.90%	54.4	54.1	0.3	-0.6	-0.6	0	-27.5	-25.5	7.30%	PASS

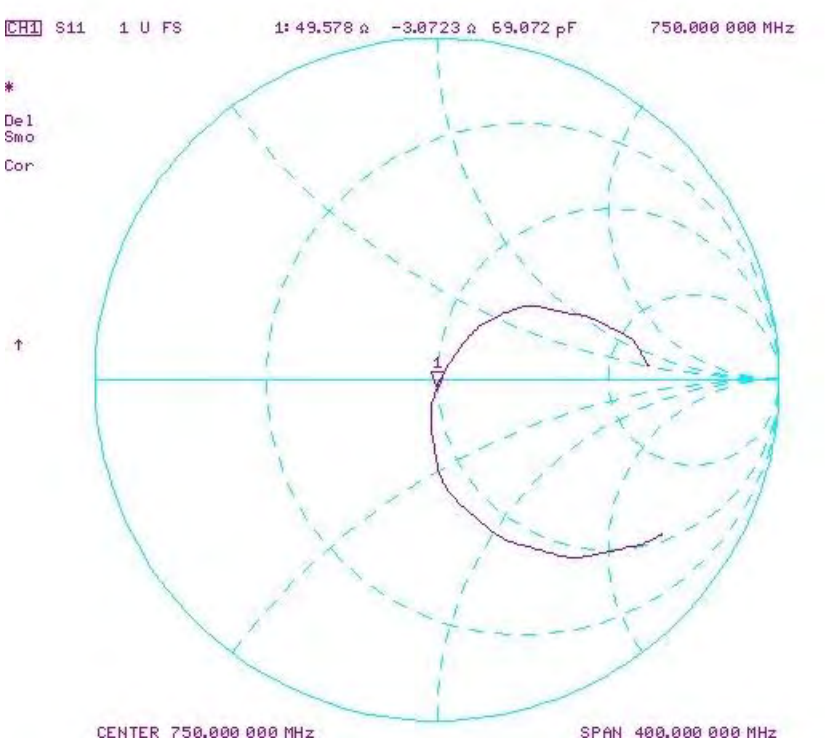
Calibration Date	Extension Date	Certificate Electrical Delay (ns)	Certificate SAR Target Body (1g) W/kg @ 23.0 dBm	Measured Body SAR (1g) W/kg @ 23.0 dBm	Deviation 1g (%)	Certificate SAR Target Body (10g) W/kg @ 23.0 dBm	Measured Body SAR (10g) W/kg @ 23.0 dBm	Deviation 10g (%)	Certificate Impedance Body (Ohm) Real	Measured Impedance Body (Ohm) Real	Difference (Ohm) Real	Certificate Impedance Body (Ohm) Imaginary	Measured Impedance Body (Ohm) Imaginary	Difference (Ohm) Imaginary	Certificate Return Loss Body (dB)	Measured Return Loss Body (dB)	Deviation (%)	PASS/FAIL
9/8/2017	9/8/2018	1.034	1.712	1.78	3.97%	1.136	1.17	2.99%	50	49.6	0.4	-3.6	-3.1	0.5	-28.8	-30.3	-5.20%	PASS

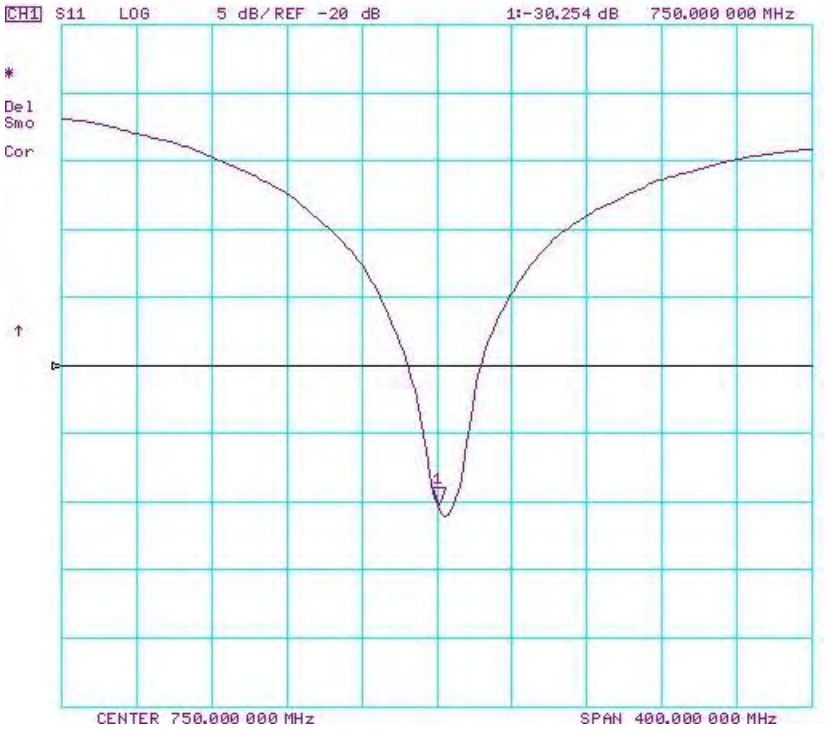
Impedance & Return-Loss Measurement Plot for Head TSL





Impedance & Return-Loss Measurement Plot for Body TSL





Certification of Calibration

Object	D750V3 – SN: 1097
Calibration procedure(s)	Procedure for Calibration Extension for SAR Dipoles.
Extended Calibration date:	September 8, 2019
Description:	SAR Validation Dipole at 750 MHz.

Calibration Equipment used:

Manufacturer	Model	Description	Cal Date	Cal Interval	Cal Due	Serial Number
Agilent	8753ES	S-Parameter Network Analyzer	10/2/2018	Annual	10/2/2019	US39170118
Agilent	E4438C	ESG Vector Signal Generator	6/27/2019	Annual	6/27/2020	MY45093852
Amplifier Research	15S1G6	Amplifier	CBT	N/A	CBT	343972
Anritsu	ML2495A	Power Meter	10/21/2018	Annual	10/21/2019	941001
Anritsu	MA2411B	Pulse Power Sensor	10/30/2018	Annual	10/30/2019	1207470
Anritsu	MA2411B	Pulse Power Sensor	11/20/2018	Annual	11/20/2019	1339007
Control Company	4040	Temperature / Humidity Monitor	2/28/2018	Biennial	2/28/2020	150761911
Control Company	4352	Ultra Long Stem Thermometer	2/28/2018	Biennial	2/28/2020	170330160
Keysight Technologies	85033E	Standard Mechanical Calibration Kit (DC to 9GHz, 3.5mm)	7/2/2019	Annual	7/2/2020	MY53401181
Keysight	772D	Dual Directional Coupler	CBT	N/A	CBT	MY52180215
Mini-Circuits	BW-N20W5+	DC to 18 GHz Precision Fixed 20 dB Attenuator	CBT	N/A	CBT	N/A
Mini-Circuits	NLP-2950+	Low Pass Filter DC to 2700 MHz	CBT	N/A	CBT	N/A
Narda	4772-3	Attenuator (3dB)	CBT	N/A	CBT	9406
Pasternack	PE2208-6	Bidirectional Coupler	CBT	N/A	CBT	N/A
Pasternack	NC-100	Torque Wrench	11/1/2017	Biennial	11/1/2019	N/A
SPEAG	DAK-3.5	Dielectric Assessment Kit	5/7/2019	Annual	5/7/2020	1070
SPEAG	EX3DV4	SAR Probe	1/24/2019	Annual	1/24/2020	7490
SPEAG	DAE4	Data Acquisition Electronics	1/15/2019	Annual	1/15/2020	1532

Measurement Uncertainty = ±23% (k=2)

	Name	Function	Signature
Calibrated By:	Parker Jones	Team Lead Engineer	Parker Jones
Approved By:	Kaitlin O'Keefe	Senior Technical Manager	

DIPOLE CALIBRATION EXTENSION

Per KDB 865664 D01, calibration intervals of up to three years may be considered for reference dipoles when it is demonstrated that the SAR target, impedance and return loss of a dipole have remained stable according to the following requirements:

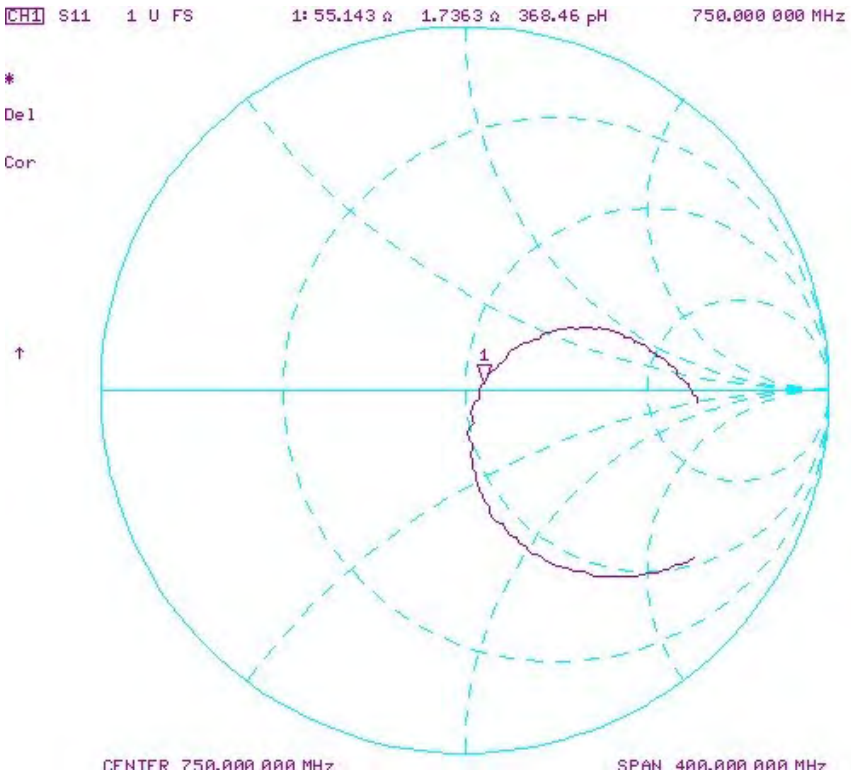
1. The measured SAR does not deviate more than 10% from the target on the calibration certificate.
2. The return-loss does not deviate more than 20% from the previous measurement and meets the required 20dB minimum return-loss requirement.
3. The measurement of real or imaginary parts of impedance does not deviate more than 5Ω from the previous measurement.

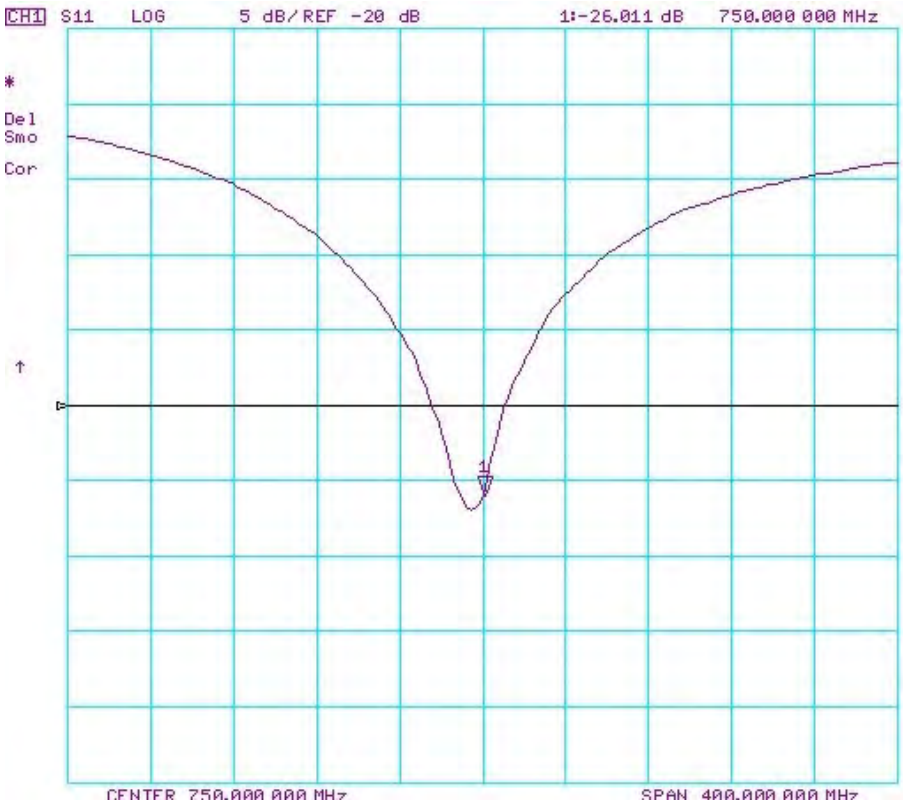
The following dipole was checked to pass the above 3 requirements to have 3-year calibration period from the calibration date:

Calibration Date	Extension Date	Certificate Electrical Delay (ns)	Certificate SAR Target Head (1g) W/kg @ 23.0 dBm	Measured Head SAR (1g) W/kg @ 23.0 dBm	Deviation 1g (%)	Certificate SAR Target Head (10g) W/kg @ 23.0 dBm	Measured Head SAR (10g) W/kg @ 23.0 dBm	Deviation 10g (%)	Certificate Impedance Head (Ohm) Real	Measured Impedance Head (Ohm) Real	Difference (Ohm) Real	Certificate Impedance Head (Ohm) Imaginary	Measured Impedance Head (Ohm) Imaginary	Difference (Ohm) Imaginary	Certificate Return Loss Head (dB)	Measured Return Loss Head (dB)	Deviation (%)	PASS/FAIL
9/8/2017	9/8/2019	1.034	1.644	1.56	-5.11%	1.078	1.03	-4.45%	54.4	55.1	0.7	-0.6	1.7	2.3	-27.5	-26	5.50%	PASS

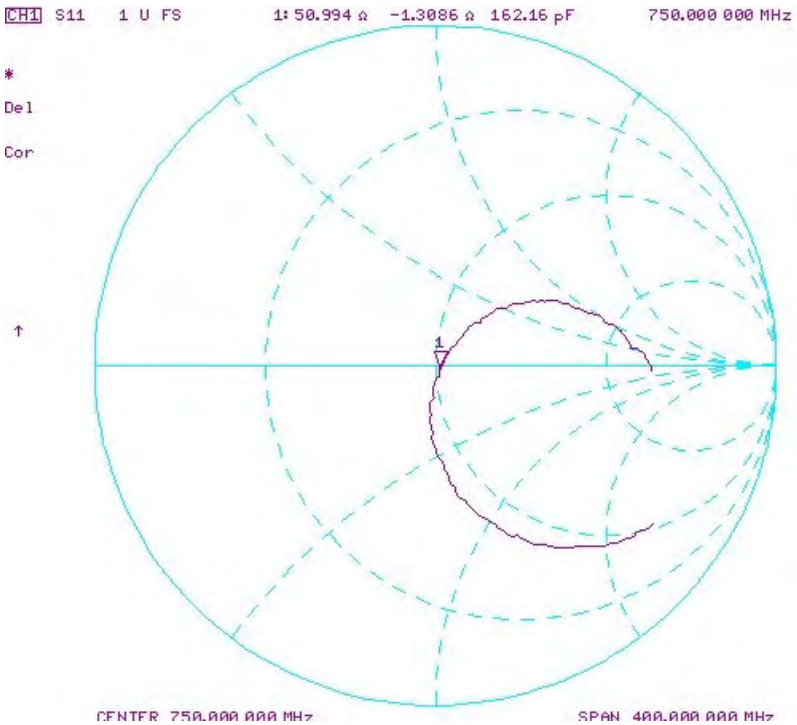
Calibration Date	Extension Date	Certificate Electrical Delay (ns)	Certificate SAR Target Body (1g) W/kg @ 23.0 dBm	Measured Body SAR (1g) W/kg @ 23.0 dBm	Deviation 1g (%)	Certificate SAR Target Body (10g) W/kg @ 23.0 dBm	Measured Body SAR (10g) W/kg @ 23.0 dBm	Deviation 10g (%)	Certificate Impedance Body (Ohm) Real	Measured Impedance Body (Ohm) Real	Difference (Ohm) Real	Certificate Impedance Body (Ohm) Imaginary	Measured Impedance Body (Ohm) Imaginary	Difference (Ohm) Imaginary	Certificate Return Loss Body (dB)	Measured Return Loss Body (dB)	Deviation (%)	PASS/FAIL
9/8/2017	9/8/2019	1.034	1.712	1.65	-3.62%	1.136	1.1	-3.17%	50	51	1	-3.6	-1.3	2.3	-28.8	-31.9	-10.80%	PASS

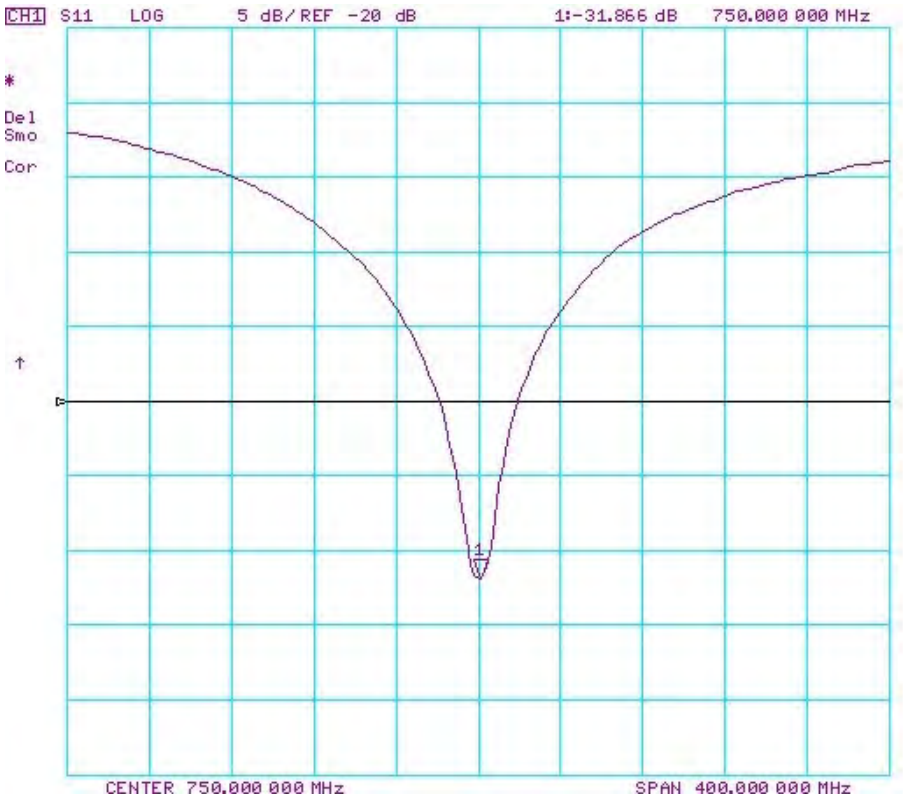
Impedance & Return-Loss Measurement Plot for Head TSL





Impedance & Return-Loss Measurement Plot for Body TSL





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 0108

Client **PC Test**

Certificate No: D835V2-4d040_Jun19

CALIBRATION CERTIFICATE

Object: D835V2 - SN:4d040

Calibration procedure(s): QA CAL-05.v11
Calibration Procedure for SAR Validation Sources between 0.7-3 GHz

Calibration date: June 20, 2019

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 NRP	SN: 104778	03-Apr-19 (No. 217-02892/02893)	Apr-20
Power sensor NRP-Z91	SN: 103244	03-Apr-19 (No. 217-02892)	Apr-20
Power sensor NRP-Z91	SN: 103245	03-Apr-19 (No. 217-02893)	Apr-20
Reference 20 dB Attenuator	SN: 5058 (20k)	04-Apr-19 (No. 217-02894)	Apr-20
Type-N mismatch combination	SN: 5047.2 / 06327	04-Apr-19 (No. 217-02895)	Apr-20
Reference Probe EX3DV4	SN: 7349	29-May-19 (No. EX3-7349_May19)	May-20
DAE4	SN: 601	30-Apr-19 (No. DAE4-601_Apr19)	Apr-20

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power meter E4419B	SN: GB39512475	30-Oct-14 (in house check Feb-19)	In house check: Oct-20
Power sensor HP 8481A	SN: US37292783	07-Oct-15 (in house check Oct-18)	In house check: Oct-20
Power sensor HP 8481A	SN: MY41092317	07-Oct-15 (in house check Oct-18)	In house check: Oct-20
RF generator R&S SMT-06	SN: 100972	15-Jun-15 (in house check Oct-18)	In house check: Oct-20
Network Analyzer Agilent E8358A	SN: US41080477	31-Mar-14 (in house check Oct-18)	In house check: Oct-19

	Name	Function	Signature
Calibrated by:	Manu Seitz	Laboratory Technician	
Approved by:	Katja Pokovic	Technical Manager	

Issued: June 21, 2019

Glossary:

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

Calibration is Performed According to the Following Standards:

a) IEEE Std 1528-2013, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", June 2013
b) IEC 62209-1, "Measurement procedure for the assessment of Specific Absorption Rate (SAR) from hand-held and body-mounted devices used next to the ear (frequency range of 300 MHz to 6 GHz)", July 2016
c) IEC 62209-2, "Procedure to determine the Specific Absorption Rate (SAR) for wireless communication devices used in close proximity to the human body (frequency range of 30 MHz to 6 GHz)", March 2010
d) KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

Additional Documentation:

e) DASY4/5 System Handbook

Methods Applied and Interpretation of Parameters:

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

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

Measurement Conditions

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

DASY Version	DASY5	V52.10.2
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom	
Distance Dipole Center - TSL	15 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	835 MHz ± 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Head TSL parameters	22.0 °C	41.5	0.90 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	41.8 ± 6 %	0.91 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	----	----

SAR result with Head TSL

SAR averaged over 1 cm³ (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	2.39 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**9.50 W/kg ± 17.0 % (k=2)**

SAR averaged over 10 cm³ (10 g) of Head TSL	condition	
SAR measured	250 mW input power	1.54 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**6.13 W/kg ± 16.5 % (k=2)**

Body TSL parameters

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Body TSL parameters	22.0 °C	55.2	0.97 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	55.4 ± 6 %	0.98 mho/m ± 6 %
Body TSL temperature change during test	< 0.5 °C	----	----

SAR result with Body TSL

SAR averaged over 1 cm³ (1 g) of Body TSL	Condition	
SAR measured	250 mW input power	2.40 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**9.53 W/kg ± 17.0 % (k=2)**

SAR averaged over 10 cm³ (10 g) of Body TSL	condition	
SAR measured	250 mW input power	1.57 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**6.24 W/kg ± 16.5 % (k=2)**

Appendix (Additional assessments outside the scope of SCS 0108)

Antenna Parameters with Head TSL

Impedance, transformed to feed point	49.6 Ω - 4.1 jΩ
Return Loss	- 27.7 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	46.6 Ω - 6.5 jΩ
Return Loss	- 22.4 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.393 ns

After long term use with 100W radiated power, only a slight warming of the dipole near the feedpoint can be measured.

The dipole is made of standard semirigid coaxial cable. The center conductor of the feeding line is directly connected to the second arm of the dipole. The antenna is therefore short-circuited for DC-signals. On some of the dipoles, small end caps are added to the dipole arms in order to improve matching when loaded according to the position as explained in the "Measurement Conditions" paragraph. The SAR data are not affected by this change. The overall dipole length is still according to the Standard.
No excessive force must be applied to the dipole arms, because they might bend or the soldered connections near the feedpoint may be damaged.

Additional EUT Data

Manufactured by	SPEAG

DASY5 Validation Report for Head TSL

Date: 20.06.2019

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN:4d040

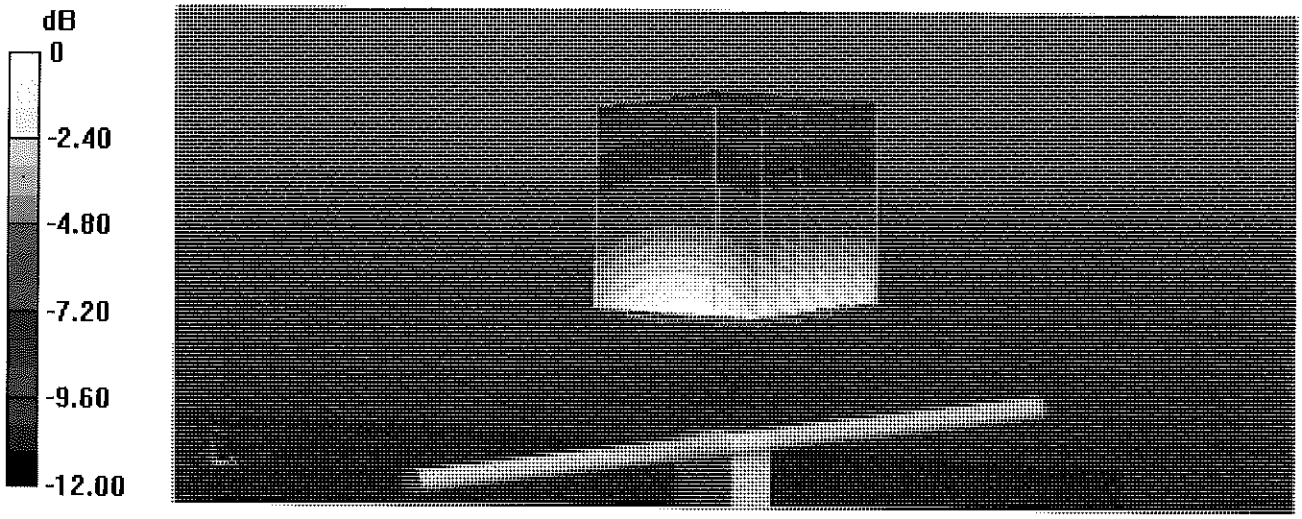
Communication System: UID 0 - CW; Frequency: 835 MHz
Medium parameters used: f = 835 MHz; σ = 0.91 S/m; ε_r = 41.8; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: EX3DV4 - SN7349; ConvF(9.89, 9.89, 9.89) @ 835 MHz; Calibrated: 29.05.2019
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 30.04.2019
- Phantom: Flat Phantom 4.9 (front); Type: QD 00L P49 AA; Serial: 1001
- DASY52 52.10.2(1504); SEMCAD X 14.6.12(7470)

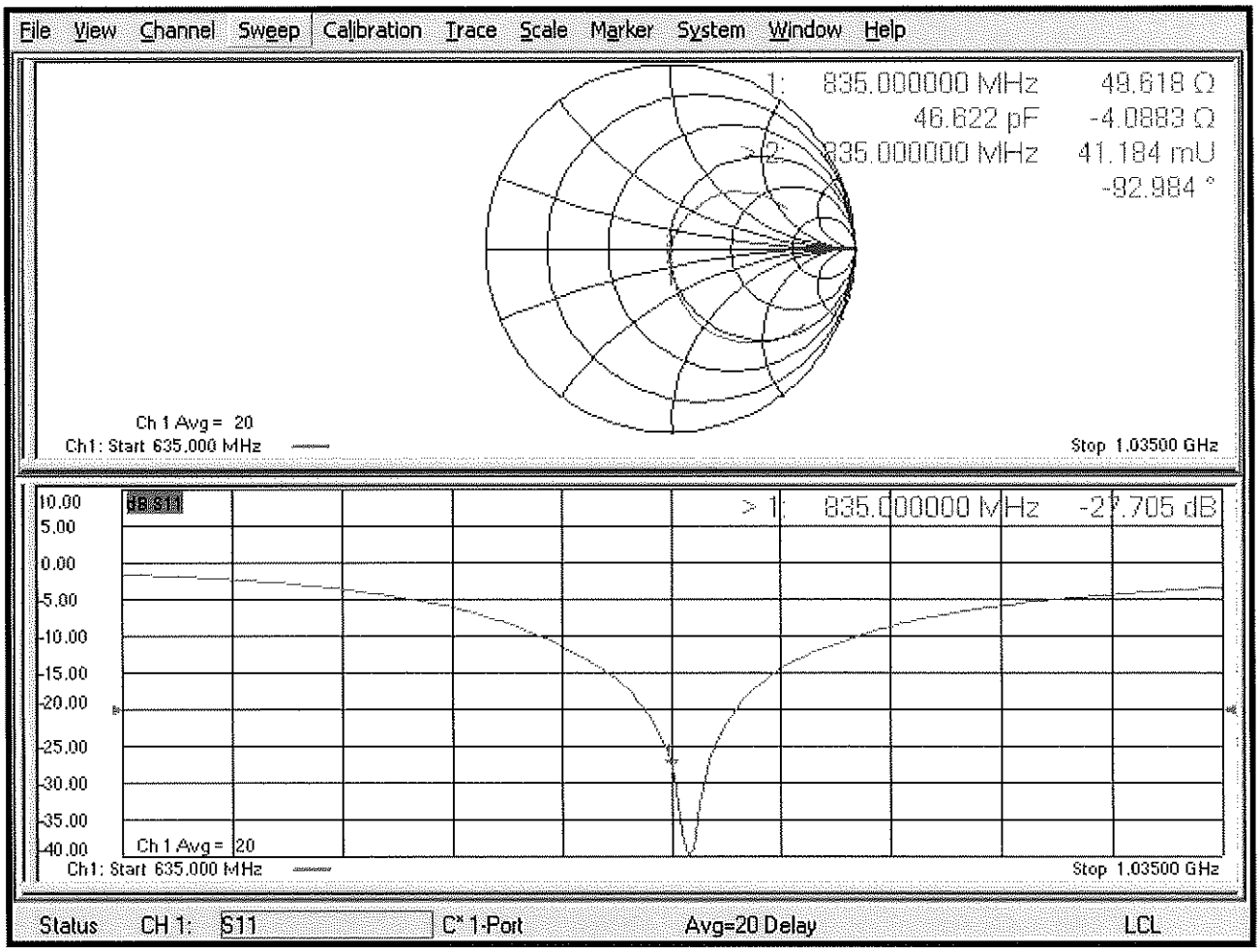
Dipole Calibration for Head Tissue/Pin=250 mW, d=15mm/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 63.05 V/m; Power Drift = -0.08 dB
Peak SAR (extrapolated) = 3.60 W/kg
SAR(1 g) = 2.39 W/kg; SAR(10 g) = 1.54 W/kg
Maximum value of SAR (measured) = 3.19 W/kg



0 dB = 3.19 W/kg = 5.04 dBW/kg

Impedance Measurement Plot for Head TSL



DASY5 Validation Report for Body TSL

Date: 13.06.2019

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN:4d040

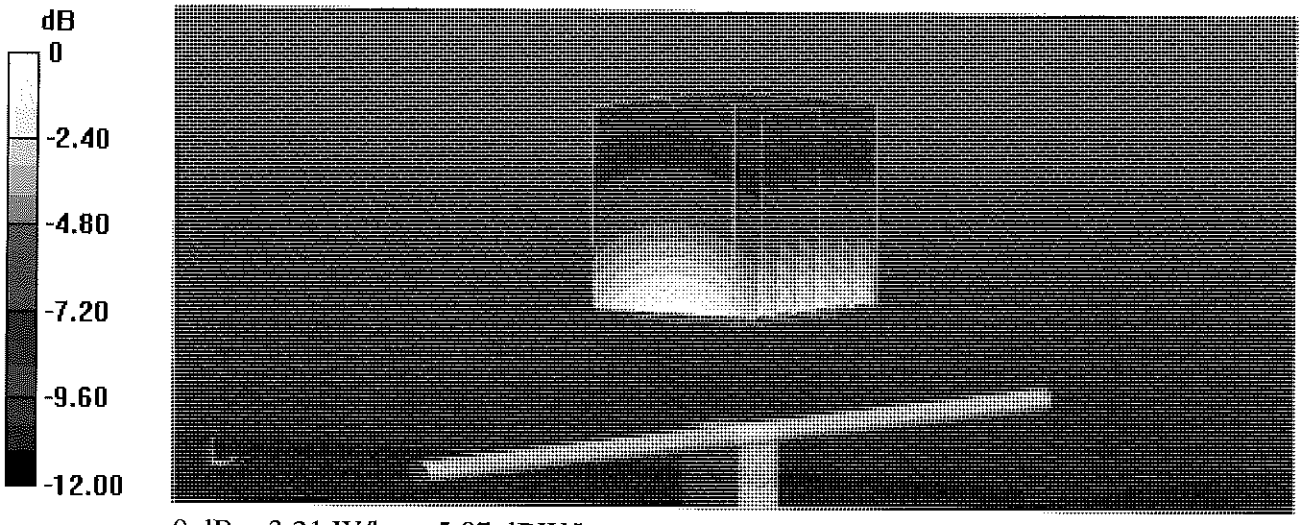
Communication System: UID 0 - CW; Frequency: 835 MHz
Medium parameters used: f = 835 MHz; σ = 0.98 S/m; ε_r = 55.4; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: EX3DV4 - SN7349; ConvF(10.16, 10.16, 10.16) @ 835 MHz; Calibrated: 29.05.2019
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 30.04.2019
- Phantom: Flat Phantom 4.9 (Back); Type: QD 00R P49 AA; Serial: 1005
- DASY52 52.10.2(1504); SEMCAD X 14.6.12(7470)

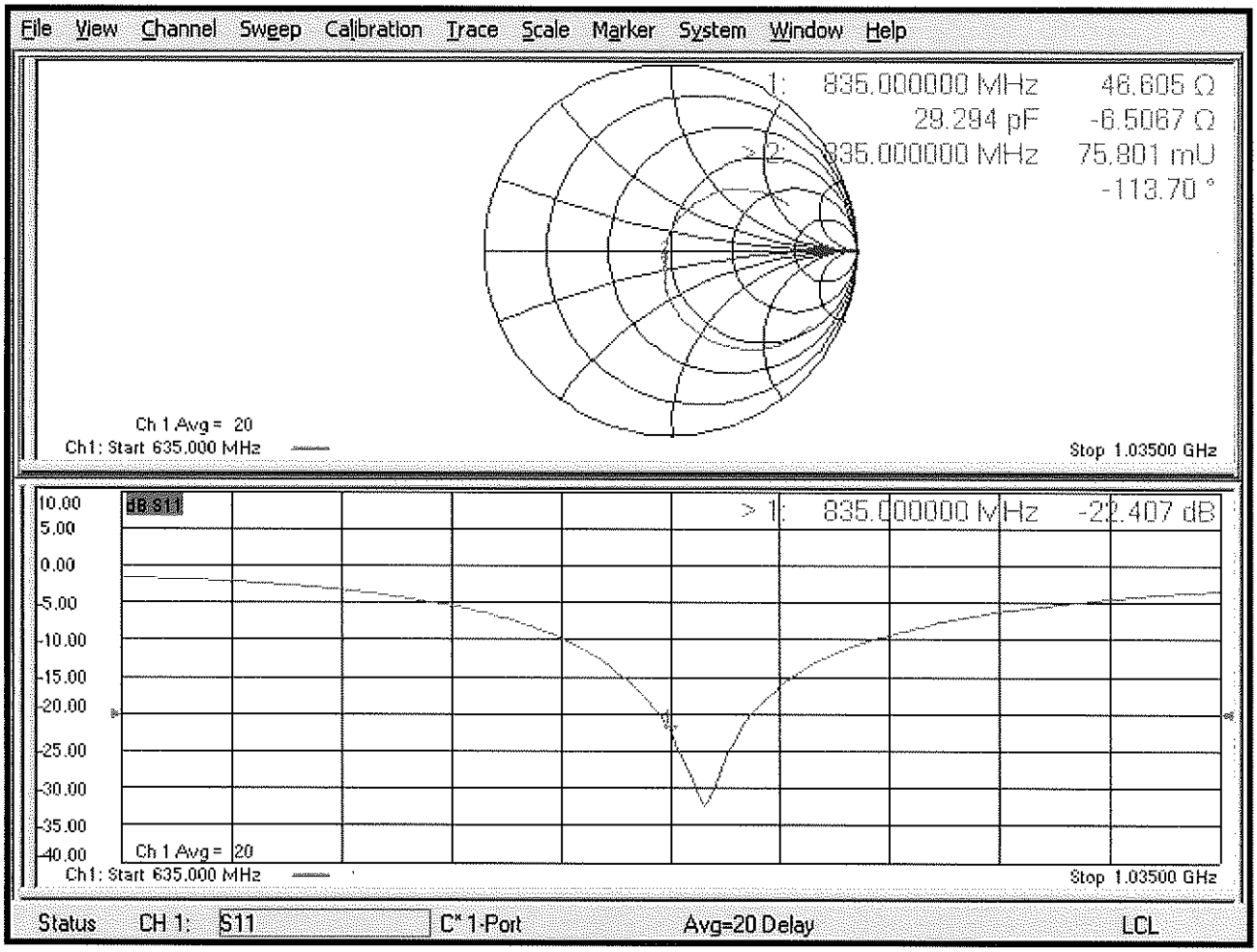
Dipole Calibration for Body Tissue/Pin=250 mW, d=15mm/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 57.73 V/m; Power Drift = -0.08 dB
Peak SAR (extrapolated) = 3.59 W/kg
SAR(1 g) = 2.4 W/kg; SAR(10 g) = 1.57 W/kg
Maximum value of SAR (measured) = 3.21 W/kg



0 dB = 3.21 W/kg = 5.07 dBW/kg

Impedance Measurement Plot for Body TSL



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Accreditation No.: SCS 0108

Client PC Test

Certificate No: D1750V2-1083_Jun19

CALIBRATION CERTIFICATE

Object: D1750V2 - SN:1083

ATH 6/27/19

Calibration procedure(s): QA CAL-05.v11
Calibration Procedure for SAR Validation Sources between 0.7-3 GHz

Calibration date: June 19, 2019

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 NRP	SN: 104778	03-Apr-19 (No. 217-02892/02893)	Apr-20
Power sensor NRP-Z91	SN: 103244	03-Apr-19 (No. 217-02892)	Apr-20
Power sensor NRP-Z91	SN: 103245	03-Apr-19 (No. 217-02893)	Apr-20
Reference 20 dB Attenuator	SN: 5058 (20k)	04-Apr-19 (No. 217-02894)	Apr-20
Type-N mismatch combination	SN: 5047.2 / 06327	04-Apr-19 (No. 217-02895)	Apr-20
Reference Probe EX3DV4	SN: 7349	29-May-19 (No. EX3-7349_May19)	May-20
DAE4	SN: 601	30-Apr-19 (No. DAE4-601_Apr19)	Apr-20

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power meter E4419B	SN: GB39512475	30-Oct-14 (in house check Feb-19)	In house check: Oct-20
Power sensor HP 8481A	SN: US37292783	07-Oct-15 (in house check Oct-18)	In house check: Oct-20
Power sensor HP 8481A	SN: MY41092317	07-Oct-15 (in house check Oct-18)	In house check: Oct-20
RF generator R&S SMT-06	SN: 100972	15-Jun-15 (in house check Oct-18)	In house check: Oct-20
Network Analyzer Agilent E8358A	SN: US41080477	31-Mar-14 (in house check Oct-18)	In house check: Oct-19

	Name	Function	Signature
Calibrated by:	Claudio Leubler	Laboratory Technician	
Approved by:	Katja Pokovic	Technical Manager	

Issued: June 20, 2019

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Accreditation No.: SCS 0108

Glossary:

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

Calibration is Performed According to the Following Standards:

a) IEEE Std 1528-2013, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", June 2013
b) IEC 62209-1, "Measurement procedure for the assessment of Specific Absorption Rate (SAR) from hand-held and body-mounted devices used next to the ear (frequency range of 300 MHz to 6 GHz)", July 2016
c) IEC 62209-2, "Procedure to determine the Specific Absorption Rate (SAR) for wireless communication devices used in close proximity to the human body (frequency range of 30 MHz to 6 GHz)", March 2010
d) KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

Additional Documentation:

e) DASY4/5 System Handbook

Methods Applied and Interpretation of Parameters:

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

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

Measurement Conditions

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

DASY Version	DASY5	V52.10.2
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom	
Distance Dipole Center - TSL	10 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	1750 MHz ± 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Head TSL parameters	22.0 °C	40.1	1.37 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	40.0 ± 6 %	1.34 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	----	----

SAR result with Head TSL

SAR averaged over 1 cm^3 (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	8.91 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**36.1 W/kg ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Head TSL	condition	
SAR measured	250 mW input power	4.70 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**19.0 W/kg ± 16.5 % (k=2)**

Body TSL parameters

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Body TSL parameters	22.0 °C	53.4	1.49 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	53.9 ± 6 %	1.46 mho/m ± 6 %
Body TSL temperature change during test	< 0.5 °C	----	----

SAR result with Body TSL

SAR averaged over 1 cm^3 (1 g) of Body TSL	Condition	
SAR measured	250 mW input power	9.14 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**37.1 W/kg ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Body TSL	condition	
SAR measured	250 mW input power	4.88 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**19.7 W/kg ± 16.5 % (k=2)**

Appendix (Additional assessments outside the scope of SCS 0108)

Antenna Parameters with Head TSL

Impedance, transformed to feed point	50.6 Ω - 1.1 jΩ
Return Loss	- 38.0 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	46.1 Ω - 2.4 jΩ
Return Loss	- 28.0 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.220 ns

After long term use with 100W radiated power, only a slight warming of the dipole near the feedpoint can be measured.

The dipole is made of standard semirigid coaxial cable. The center conductor of the feeding line is directly connected to the second arm of the dipole. The antenna is therefore short-circuited for DC-signals. On some of the dipoles, small end caps are added to the dipole arms in order to improve matching when loaded according to the position as explained in the "Measurement Conditions" paragraph. The SAR data are not affected by this change. The overall dipole length is still according to the Standard.
No excessive force must be applied to the dipole arms, because they might bend or the soldered connections near the feedpoint may be damaged.

Additional EUT Data

Manufactured by	SPEAG

DASY5 Validation Report for Head TSL

Date: 19.06.2019

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 1750 MHz; Type: D1750V2; Serial: D1750V2 - SN:1083

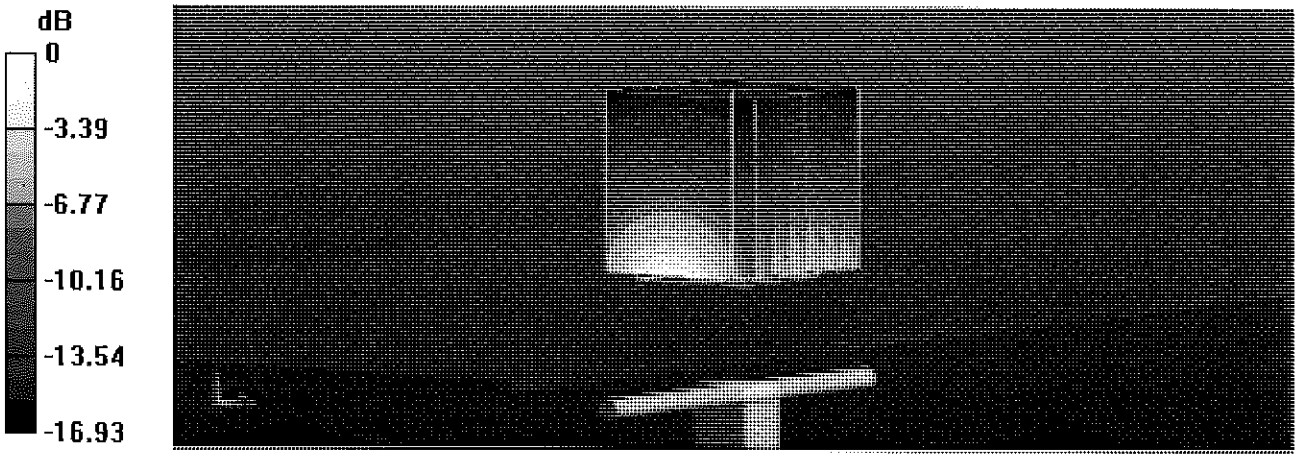
Communication System: UID 0 - CW; Frequency: 1750 MHz
Medium parameters used: f = 1750 MHz; σ = 1.34 S/m; ε_r = 40; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: EX3DV4 - SN7349; ConvF(8.67, 8.67, 8.67) @ 1750 MHz; Calibrated: 29.05.2019
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 30.04.2019
- Phantom: Flat Phantom 5.0 (front); Type: QD 000 P50 AA; Serial: 1001
- DASY52 52.10.2(1504); SEMCAD X 14.6.12(7470)

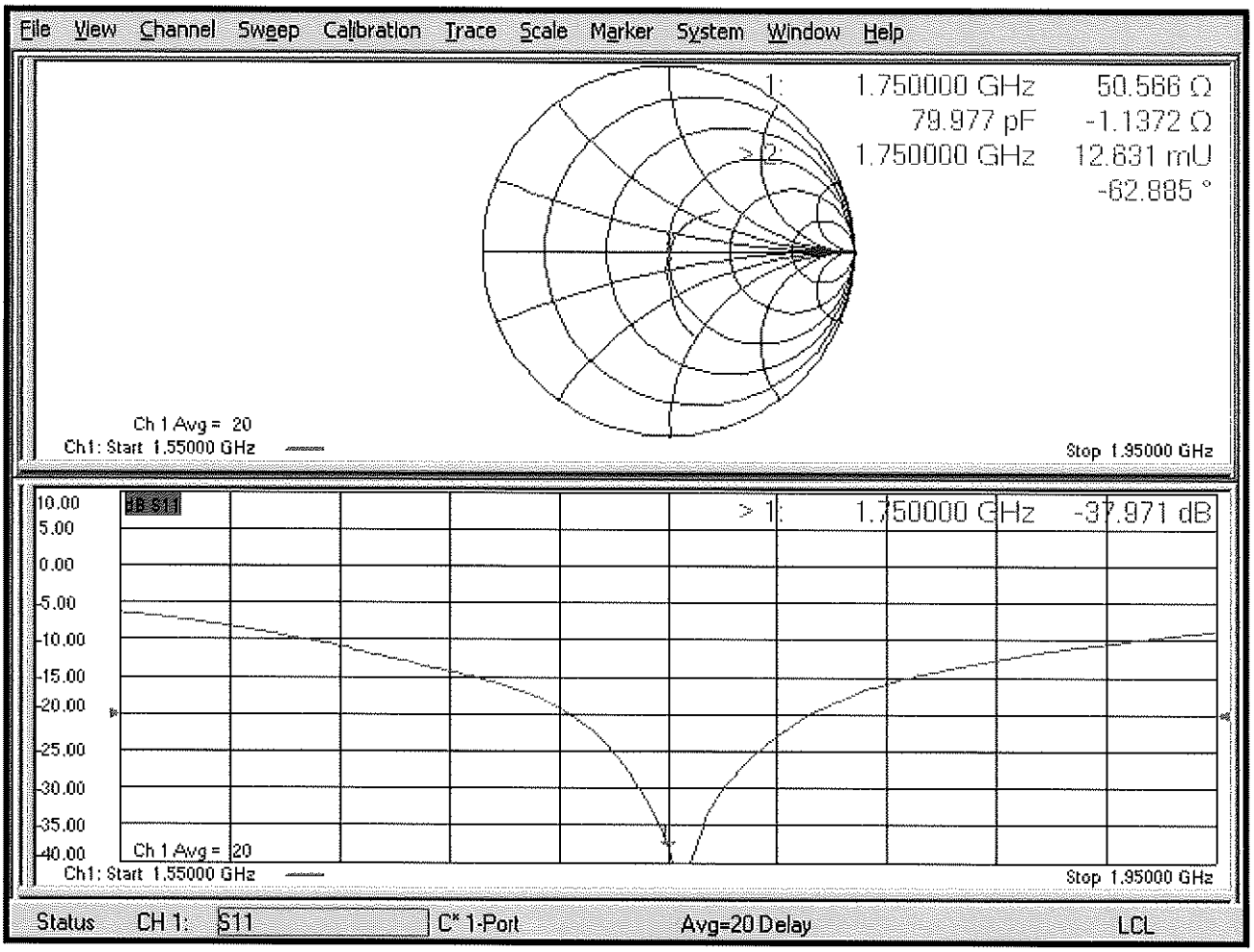
Dipole Calibration for Head Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 105.8 V/m; Power Drift = 0.04 dB
Peak SAR (extrapolated) = 16.7 W/kg
SAR(1 g) = 8.91 W/kg; SAR(10 g) = 4.7 W/kg
Maximum value of SAR (measured) = 13.9 W/kg



0 dB = 13.9 W/kg = 11.43 dBW/kg

Impedance Measurement Plot for Head TSL



DASY5 Validation Report for Body TSL

Date: 13.06.2019

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 1750 MHz; Type: D1750V2; Serial: D1750V2 - SN:1083

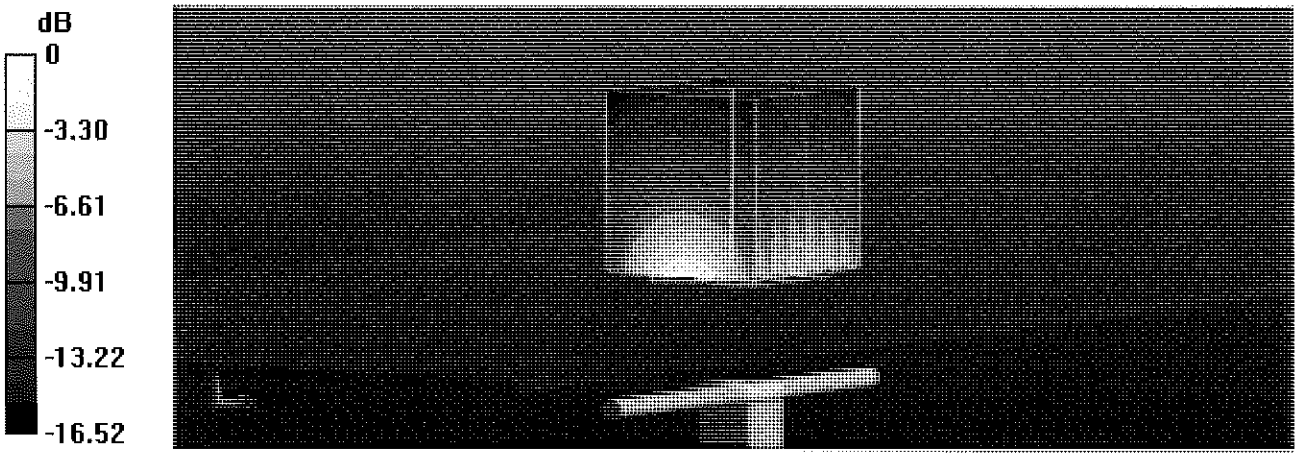
Communication System: UID 0 - CW; Frequency: 1750 MHz
Medium parameters used: f = 1750 MHz; σ = 1.46 S/m; ε_r = 53.9; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: EX3DV4 - SN7349; ConvF(8.45, 8.45, 8.45) @ 1750 MHz; Calibrated: 29.05.2019
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 30.04.2019
- Phantom: Flat Phantom 5.0 (back); Type: QD 000 P50 AA; Serial: 1002
- DASY52 52.10.2(1504); SEMCAD X 14.6.12(7470)

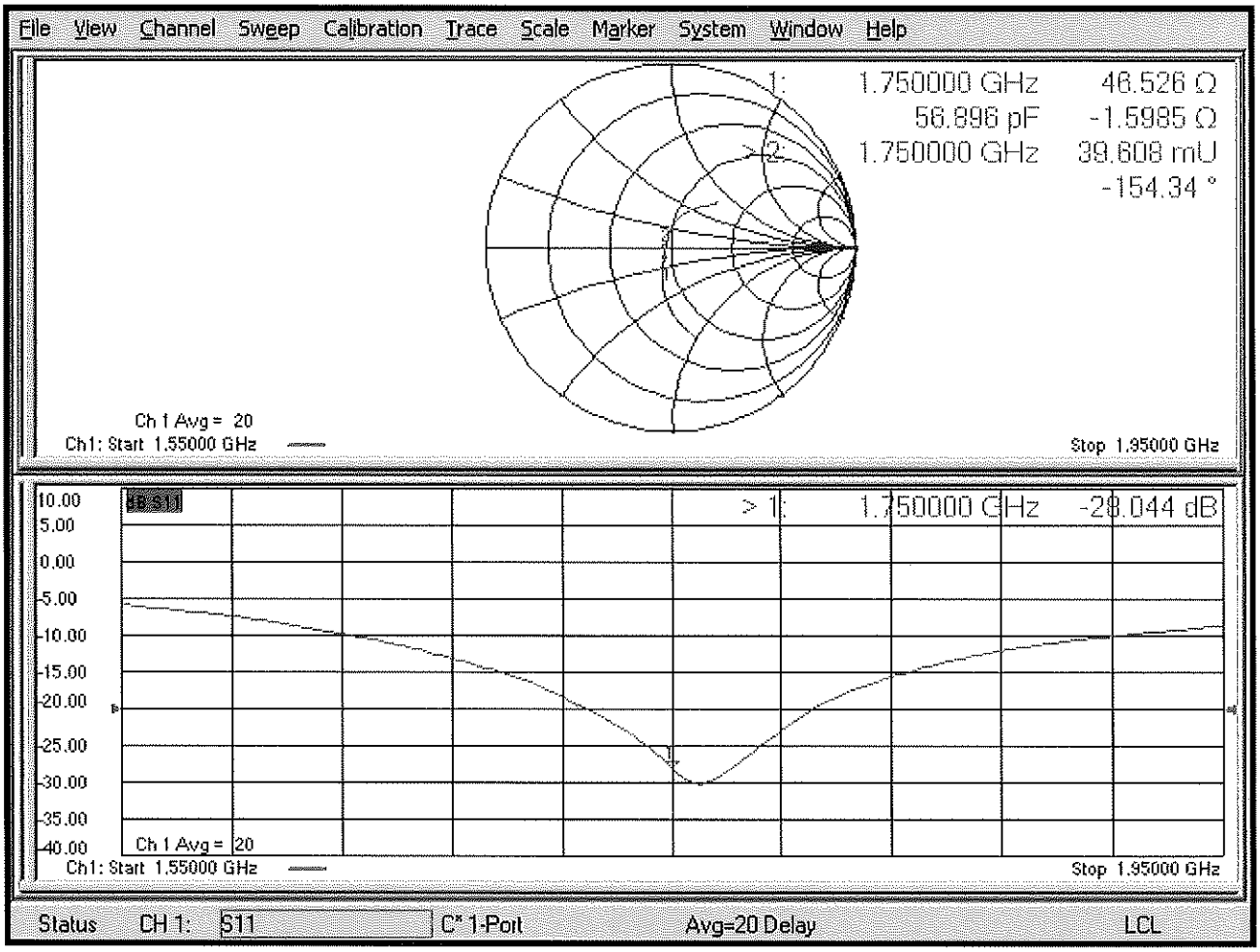
Dipole Calibration for Body Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 101.8 V/m; Power Drift = -0.04 dB
Peak SAR (extrapolated) = 16.2 W/kg
SAR(1 g) = 9.14 W/kg; SAR(10 g) = 4.88 W/kg
Maximum value of SAR (measured) = 13.7 W/kg



0 dB = 13.7 W/kg = 11.37 dBW/kg

Impedance Measurement Plot for Body TSL



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Accreditation No.: SCS 0108

Client PC Test

Certificate No: D1750V2-1092_May18

CALIBRATION CERTIFICATE

Object: D1750V2 - SN:1092

Calibration procedure(s): QA CAL-05.v10
Calibration procedure for dipole validation kits above 700 MHz

5C ✓
5/31/2018

Calibration date: May 15, 2018

BN ✓
06/01/2019

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 NRP	SN: 104778	04-Apr-18 (No. 217-02672/02673)	Apr-19
Power sensor NRP-Z91	SN: 103244	04-Apr-18 (No. 217-02672)	Apr-19
Power sensor NRP-Z91	SN: 103245	04-Apr-18 (No. 217-02673)	Apr-19
Reference 20 dB Attenuator	SN: 5058 (20k)	04-Apr-18 (No. 217-02682)	Apr-19
Type-N mismatch combination	SN: 5047.2 / 06327	04-Apr-18 (No. 217-02683)	Apr-19
Reference Probe EX3DV4	SN: 7349	30-Dec-17 (No. EX3-7349_Dec17)	Dec-18
DAE4	SN: 601	26-Oct-17 (No. DAE4-601_Oct17)	Oct-18

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power meter EPM-442A	SN: GB37480704	07-Oct-15 (in house check Oct-16)	In house check: Oct-18
Power sensor HP 8481A	SN: US37292783	07-Oct-15 (in house check Oct-16)	In house check: Oct-18
Power sensor HP 8481A	SN: MY41092317	07-Oct-15 (in house check Oct-16)	In house check: Oct-18
RF generator R&S SMT-06	SN: 100972	15-Jun-15 (in house check Oct-16)	In house check: Oct-18
Network Analyzer HP 8753E	SN: US37390585	18-Oct-01 (in house check Oct-17)	In house check: Oct-18

	Name	Function	Signature
Calibrated by:	Manu Seitz	Laboratory Technician	
Approved by:	Katja Pokovic	Technical Manager	

Issued: May 17, 2018

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Accreditation No.: SCS 0108

Glossary:

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

Calibration is Performed According to the Following Standards:

a) IEEE Std 1528-2013, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", June 2013
b) IEC 62209-1, "Measurement procedure for the assessment of Specific Absorption Rate (SAR) from hand-held and body-mounted devices used next to the ear (frequency range of 300 MHz to 6 GHz)", July 2016
c) IEC 62209-2, "Procedure to determine the Specific Absorption Rate (SAR) for wireless communication devices used in close proximity to the human body (frequency range of 30 MHz to 6 GHz)", March 2010
d) KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

Additional Documentation:

e) DASY4/5 System Handbook

Methods Applied and Interpretation of Parameters:

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

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

Measurement Conditions

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

DASY Version	DASY5	V52.10.1
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom	
Distance Dipole Center - TSL	10 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	1750 MHz ± 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Head TSL parameters	22.0 °C	40.1	1.37 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	39.0 ± 6 %	1.34 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	----	----

SAR result with Head TSL

SAR averaged over 1 cm³ (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	8.95 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**36.1 W/kg ± 17.0 % (k=2)**

SAR averaged over 10 cm³ (10 g) of Head TSL	condition	
SAR measured	250 mW input power	4.73 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**19.0 W/kg ± 16.5 % (k=2)**

Body TSL parameters

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Body TSL parameters	22.0 °C	53.4	1.49 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	53.2 ± 6 %	1.46 mho/m ± 6 %
Body TSL temperature change during test	< 0.5 °C	----	----

SAR result with Body TSL

SAR averaged over 1 cm³ (1 g) of Body TSL	Condition	
SAR measured	250 mW input power	8.99 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**36.4 W/kg ± 17.0 % (k=2)**

SAR averaged over 10 cm³ (10 g) of Body TSL	condition	
SAR measured	250 mW input power	4.81 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**19.4 W/kg ± 16.5 % (k=2)**

Appendix (Additional assessments outside the scope of SCS 0108)

Antenna Parameters with Head TSL

Impedance, transformed to feed point	49.2 Ω - 1.0 jΩ
Return Loss	- 37.8 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	44.8 Ω - 0.6 jΩ
Return Loss	- 25.2 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.217 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	November 07, 2012

Date: 15.05.2018

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 1750 MHz; Type: D1750V2; Serial: D1750V2 - SN:1092

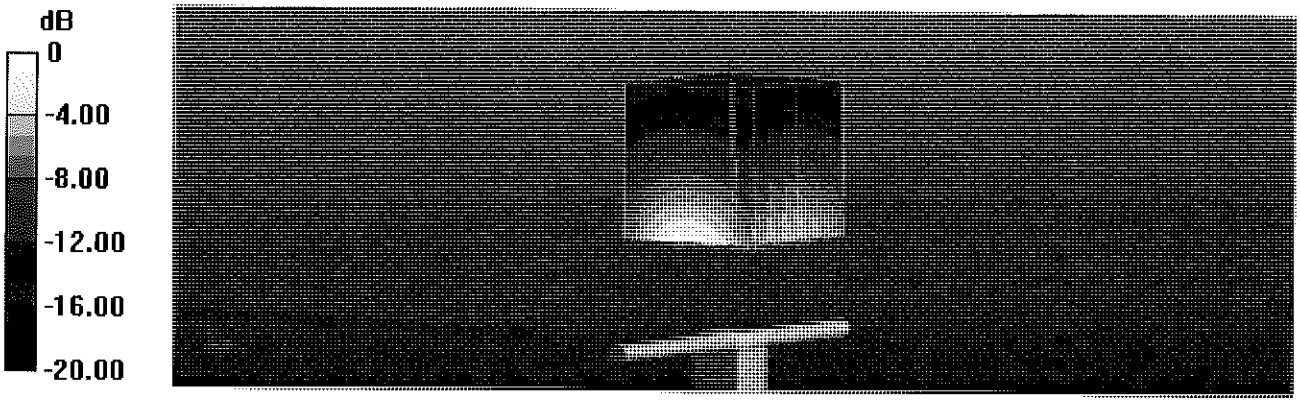
Communication System: UID 0 - CW; Frequency: 1750 MHz
Medium parameters used: f = 1750 MHz; σ = 1.34 S/m; ε_r = 39; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: EX3DV4 - SN7349; ConvF(8.5, 8.5, 8.5) @ 1750 MHz; Calibrated: 30.12.2017
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 26.10.2017
- Phantom: Flat Phantom 5.0 (front); Type: QD 000 P50 AA; Serial: 1001
- DASY52 52.10.1(1476); SEMCAD X 14.6.11(7439)

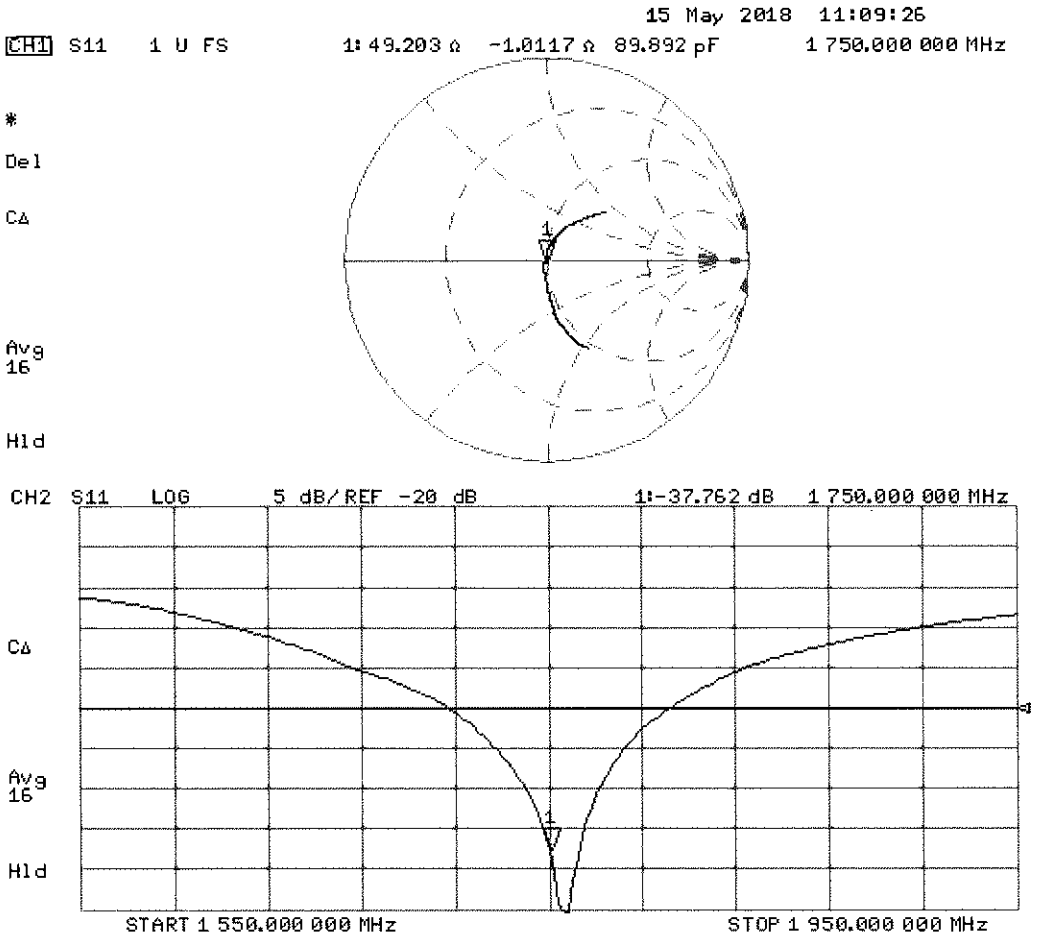
Dipole Calibration for Head Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 106.8 V/m; Power Drift = -0.09 dB
Peak SAR (extrapolated) = 16.3 W/kg
SAR(1 g) = 8.95 W/kg; SAR(10 g) = 4.73 W/kg
Maximum value of SAR (measured) = 13.8 W/kg



0 dB = 13.8 W/kg = 11.40 dBW/kg

Impedance Measurement Plot for Head TSL



DASY5 Validation Report for Body TSL

Date: 15.05.2018

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 1750 MHz; Type: D1750V2; Serial: D1750V2 - SN:1092

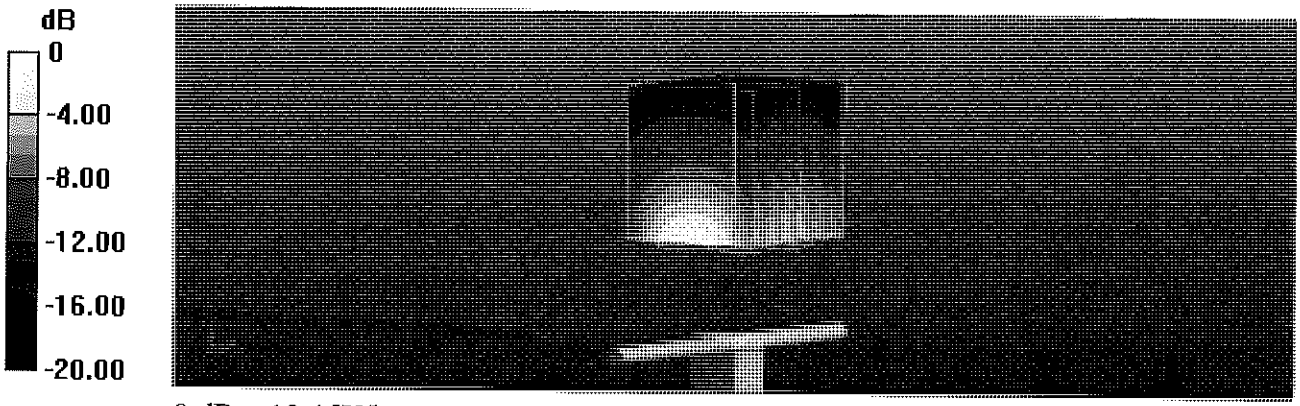
Communication System: UID 0 - CW; Frequency: 1750 MHz
Medium parameters used: f = 1750 MHz; σ = 1.46 S/m; ε_r = 53.2; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: EX3DV4 - SN7349; ConvF(8.35, 8.35, 8.35) @ 1750 MHz; Calibrated: 30.12.2017
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 26.10.2017
- Phantom: Flat Phantom 5.0 (back); Type: QD 000 P50 AA; Serial: 1002
- DASY52 52.10.1(1476); SEMCAD X 14.6.11(7439)

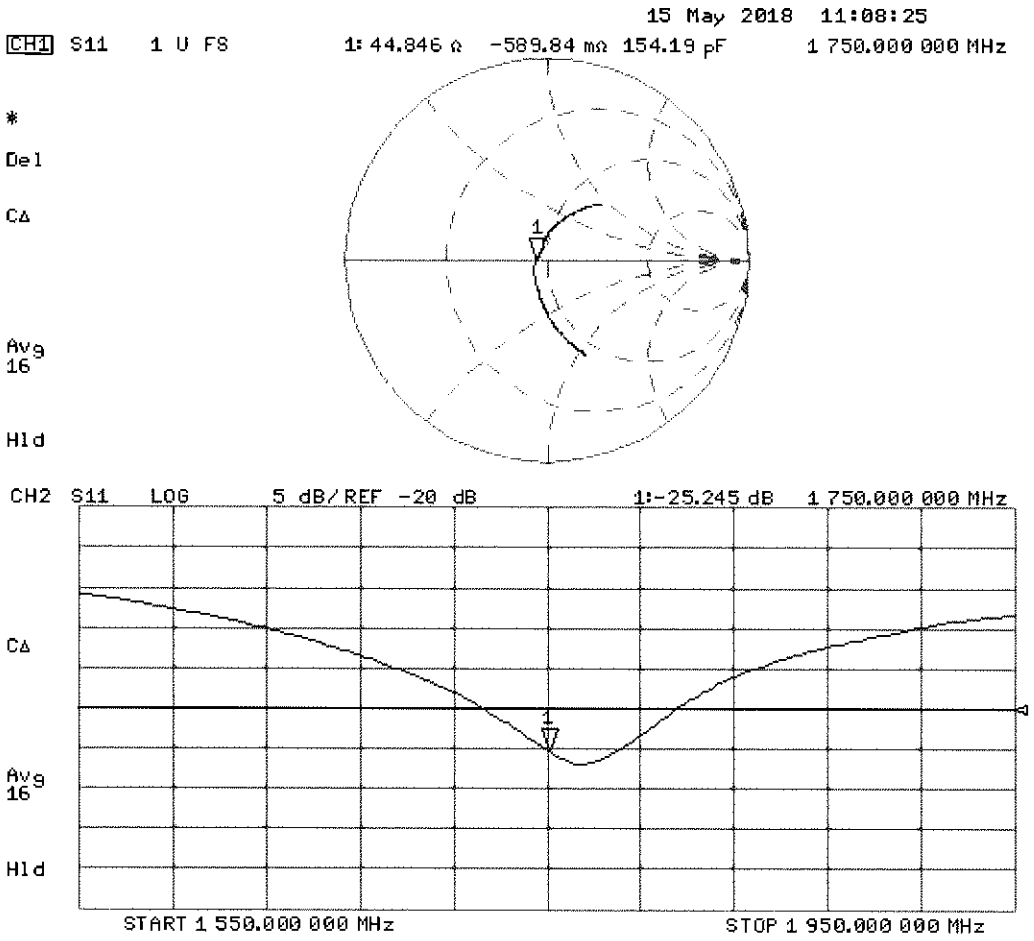
Dipole Calibration for Body Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 101.4 V/m; Power Drift = -0.06 dB
Peak SAR (extrapolated) = 15.8 W/kg
SAR(1 g) = 8.99 W/kg; SAR(10 g) = 4.81 W/kg
Maximum value of SAR (measured) = 13.4 W/kg



0 dB = 13.4 W/kg = 11.27 dBW/kg

Impedance Measurement Plot for Body TSL



Certification of Calibration

Object	D1750V2 – SN: 1092
Calibration procedure(s)	Procedure for Calibration Extension for SAR Dipoles.
Extended Calibration date:	May 15, 2019
Description:	SAR Validation Dipole at 1750 MHz.

Calibration Equipment used:

Manufacturer	Model	Description	Cal Date	Cal Interval	Cal Due	Serial Number
Agilent	8753ES	S-Parameter Network Analyzer	10/2/2018	Annual	10/2/2019	US39170118
Agilent	N5182A	MXG Vector Signal Generator	6/15/2018	Annual	6/15/2019	MY47420837
Amplifier Research	15S1G6	Amplifier	CBT	N/A	CBT	343972
Anritsu	ML2495A	Power Meter	10/21/2018	Annual	10/21/2019	941001
Anritsu	MA2411B	Pulse Power Sensor	10/30/2018	Annual	10/30/2019	1207470
Anritsu	MA2411B	Pulse Power Sensor	11/20/2018	Annual	11/20/2019	1339007
Control Company	4040	Temperature / Humidity Monitor	2/28/2018	Biennial	2/28/2020	150761911
Control Company	4352	Ultra Long Stem Thermometer	2/28/2018	Biennial	2/28/2020	170330160
Keysight	772D	Dual Directional Coupler	CBT	N/A	CBT	MY52180215
Keysight Technologies	85033E	Standard Mechanical Calibration Kit (DC to 9GHz, 3.5mm)	6/4/2018	Annual	6/4/2019	MY53401181
Mini-Circuits	BW-N20W5+	DC to 18 GHz Precision Fixed 20 dB Attenuator	CBT	N/A	CBT	N/A
Mini-Circuits	NLP-2950+	Low Pass Filter DC to 2700 MHz	CBT	N/A	CBT	N/A
Narda	4772-3	Attenuator (3dB)	CBT	N/A	CBT	9406
Pasternack	PE2209-10	Bidirectional Coupler	CBT	N/A	CBT	N/A
Pasternack	PE5011-1	Torque Wrench	7/19/2017	Biennial	7/19/2019	N/A
SPEAG	DAKS-3.5	Portable DAK	9/11/2018	Annual	9/11/2019	1045
SPEAG	EX3DV4	SAR Probe	7/20/2018	Annual	7/20/2019	7416
SPEAG	DAE4	Dasy Data Acquisition Electronics	7/10/2018	Annual	7/10/2019	1402

Measurement Uncertainty = ±23% (k=2)

	Name	Function	Signature
Calibrated By:	Parker Jones	Team Lead Engineer	Parker Jones
Approved By:	Kaitlin O'Keefe	Senior Technical Manager	

DIPOLE CALIBRATION EXTENSION

Per KDB 865664 D01, calibration intervals of up to three years may be considered for reference dipoles when it is demonstrated that the SAR target, impedance and return loss of a dipole have remained stable according to the following requirements:

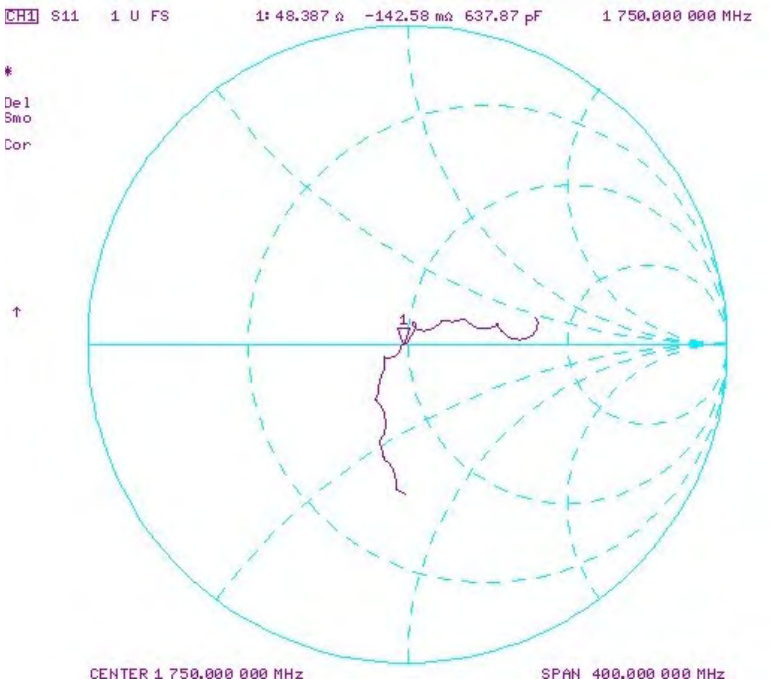
1. The measured SAR does not deviate more than 10% from the target on the calibration certificate.
2. The return-loss does not deviate more than 20% from the previous measurement and meets the required 20dB minimum return-loss requirement.
3. The measurement of real or imaginary parts of impedance does not deviate more than 5Ω from the previous measurement.

The following dipole was checked to pass the above 3 requirements to have 2-year calibration period from the calibration date:

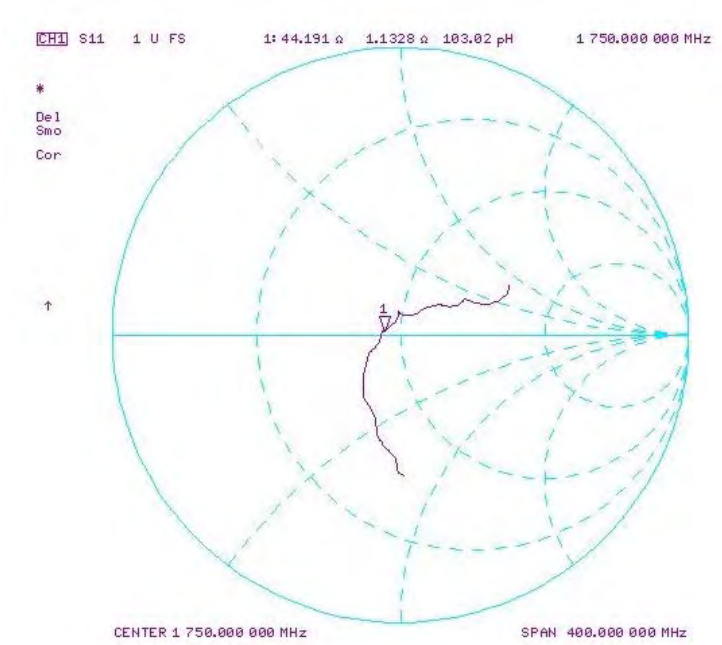
Calibration Date	Extension Date	Certificate Electrical Delay (ns)	Certificate SAR Target Head (1g) W/kg @ 20.0 dBm	Measured Head SAR (1g) W/kg @ 20.0 dBm	Deviation 1g (%)	Certificate SAR Target Head (10g) W/kg @ 20.0 dBm	Measured Head SAR (10g) W/kg @ 20.0 dBm	Deviation 10g (%)	Certificate Impedance Head (Ohm) Real	Measured Impedance Head (Ohm) Real	Difference (Ohm) Real	Certificate Impedance Head (Ohm) Imaginary	Measured Impedance Head (Ohm) Imaginary	Difference (Ohm) Imaginary	Certificate Return Loss Head (dB)	Measured Return Loss Head (dB)	Deviation (%)	PASS/FAIL
5/15/2018	5/15/2019	1.217	3.61	3.59	-0.55%	1.9	1.89	-0.53%	49.2	48.4	0.8	-1	-0.1	0.9	-37.8	-38.2	-1.00%	PASS

Calibration Date	Extension Date	Certificate Electrical Delay (ns)	Certificate SAR Target Body (1g) W/kg @ 20.0 dBm	Measured Body SAR (1g) W/kg @ 20.0 dBm	Deviation 1g (%)	Certificate SAR Target Body (10g) W/kg @ 20.0 dBm	Measured Body SAR (10g) W/kg @ 20.0 dBm	Deviation 10g (%)	Certificate Impedance Body (Ohm) Real	Measured Impedance Body (Ohm) Real	Difference (Ohm) Real	Certificate Impedance Body (Ohm) Imaginary	Measured Impedance Body (Ohm) Imaginary	Difference (Ohm) Imaginary	Certificate Return Loss Body (dB)	Measured Return Loss Body (dB)	Deviation (%)	PASS/FAIL
5/15/2018	5/15/2019	1.217	3.64	3.62	-0.55%	1.94	1.91	-1.55%	44.8	44.2	0.6	-0.6	1.1	1.7	-25.2	-24.2	3.90%	PASS

Impedance & Return-Loss Measurement Plot for Head TSL



Impedance & Return-Loss Measurement Plot for Body TSL



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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 0108

Client PC Test

Certificate No: D1900V2-5d026_May18

CALIBRATION CERTIFICATE

Object: D1900V2 - SN:5d026

Calibration procedure(s): QA CAL-05.v11
Calibration procedure for dipole validation kits above 700 MHz

SC ✓ 5/31/2018

Calibration date: May 14, 2018

BN ✓ 06/01/2019

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 NRP	SN: 104778	04-Apr-18 (No. 217-02672/02673)	Apr-19
Power sensor NRP-Z91	SN: 103244	04-Apr-18 (No. 217-02672)	Apr-19
Power sensor NRP-Z91	SN: 103245	04-Apr-18 (No. 217-02673)	Apr-19
Reference 20 dB Attenuator	SN: 5058 (20k)	04-Apr-18 (No. 217-02682)	Apr-19
Type-N mismatch combination	SN: 5047.2 / 06327	04-Apr-18 (No. 217-02683)	Apr-19
Reference Probe EX3DV4	SN: 7349	30-Dec-17 (No. EX3-7349_Dec17)	Dec-18
DAE4	SN: 601	26-Oct-17 (No. DAE4-601_Oct17)	Oct-18

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power meter EPM-442A	SN: GB37480704	07-Oct-15 (in house check Oct-16)	In house check: Oct-18
Power sensor HP 8481A	SN: US37292783	07-Oct-15 (in house check Oct-16)	In house check: Oct-18
Power sensor HP 8481A	SN: MY41092317	07-Oct-15 (in house check Oct-16)	In house check: Oct-18
RF generator R&S SMT-06	SN: 100972	15-Jun-15 (in house check Oct-16)	In house check: Oct-18
Network Analyzer HP 8753E	SN: US37390585	18-Oct-01 (in house check Oct-17)	In house check: Oct-18

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

Issued: May 14, 2018

Calibration Laboratory of
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Accreditation No.: SCS 0108

Glossary:

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

Calibration is Performed According to the Following Standards:

a) IEEE Std 1528-2013, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", June 2013
b) IEC 62209-1, "Measurement procedure for the assessment of Specific Absorption Rate (SAR) from hand-held and body-mounted devices used next to the ear (frequency range of 300 MHz to 6 GHz)", July 2016
c) IEC 62209-2, "Procedure to determine the Specific Absorption Rate (SAR) for wireless communication devices used in close proximity to the human body (frequency range of 30 MHz to 6 GHz)", March 2010
d) KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

Additional Documentation:

e) DASY4/5 System Handbook

Methods Applied and Interpretation of Parameters:

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

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

Measurement Conditions

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

DASY Version	DASY5	V52.10.1
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 ± 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Head TSL parameters	22.0 °C	40.0	1.40 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	41.2 ± 6 %	1.35 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	----	----

SAR result with Head TSL

SAR averaged over 1 cm^3 (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	9.78 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**40.2 W/kg ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Head TSL	condition	
SAR measured	250 mW input power	5.19 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**21.1 W/kg ± 16.5 % (k=2)**

Body TSL parameters

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Body TSL parameters	22.0 °C	53.3	1.52 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	55.3 ± 6 %	1.46 mho/m ± 6 %
Body TSL temperature change during test	< 0.5 °C	----	----

SAR result with Body TSL

SAR averaged over 1 cm^3 (1 g) of Body TSL	Condition	
SAR measured	250 mW input power	9.65 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**39.9 W/kg ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Body TSL	condition	
SAR measured	250 mW input power	5.19 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**21.2 W/kg ± 16.5 % (k=2)**

Appendix (Additional assessments outside the scope of SCS 0108)

Antenna Parameters with Head TSL

Impedance, transformed to feed point	53.0 Ω + 8.0 jΩ
Return Loss	- 21.6 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	47.1 Ω + 7.4 jΩ
Return Loss	- 21.8 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	December 17, 2002

DASY5 Validation Report for Head TSL

Date: 14.05.2018

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 1900 MHz; Type: D1900V2; Serial: D1900V2 - SN:5d026

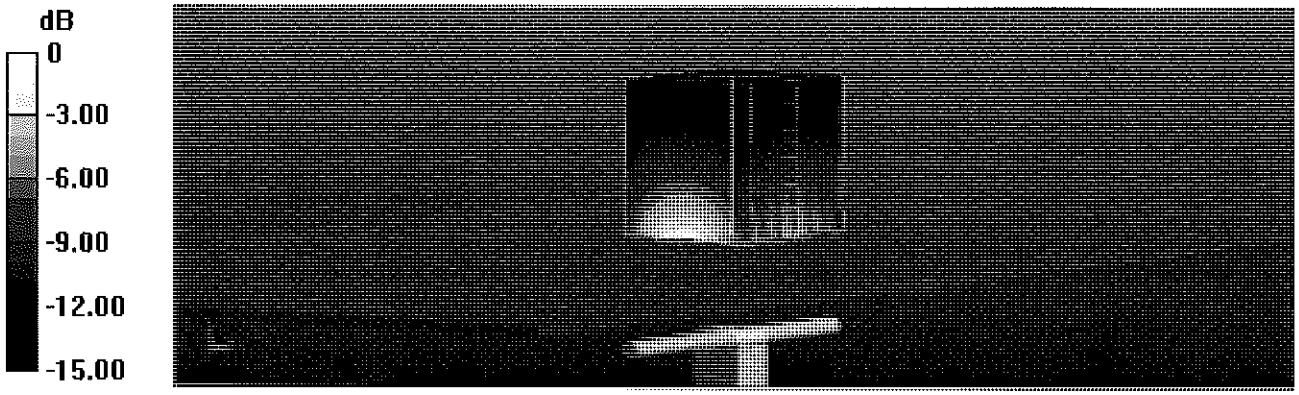
Communication System: UID 0 - CW; Frequency: 1900 MHz
Medium parameters used: f = 1900 MHz; σ = 1.35 S/m; ε_r = 41.2; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: EX3DV4 - SN7349; ConvF(8.18, 8.18, 8.18) @ 1900 MHz; Calibrated: 30.12.2017
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 26.10.2017
- Phantom: Flat Phantom 5.0 (front); Type: QD 000 P50 AA; Serial: 1001
- DASY52 52.10.1(1476); SEMCAD X 14.6.11(7439)

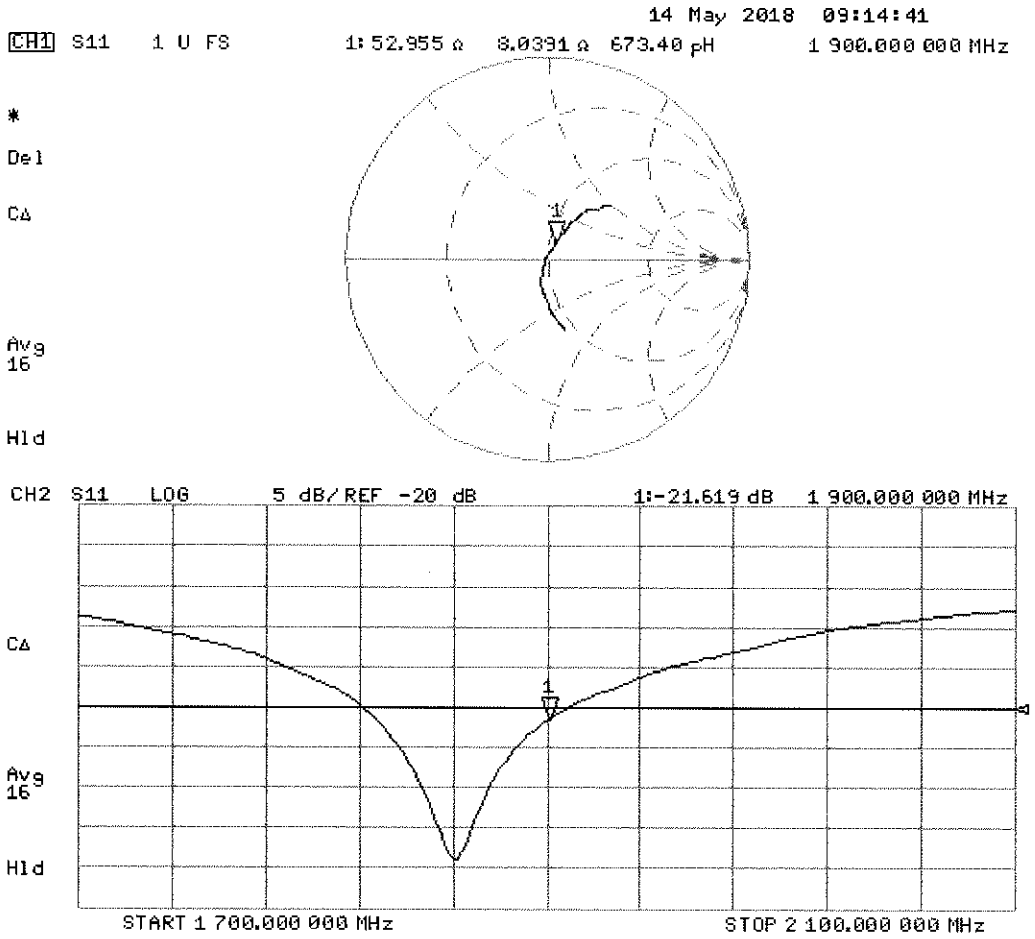
Dipole Calibration for Head Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 109.9 V/m; Power Drift = -0.04 dB
Peak SAR (extrapolated) = 17.8 W/kg
SAR(1 g) = 9.78 W/kg; SAR(10 g) = 5.19 W/kg
Maximum value of SAR (measured) = 15.0 W/kg



0 dB = 15.0 W/kg = 11.76 dBW/kg

Impedance Measurement Plot for Head TSL



DASY5 Validation Report for Body TSL

Date: 14.05.2018

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 1900 MHz; Type: D1900V2; Serial: D1900V2 - SN:5d026

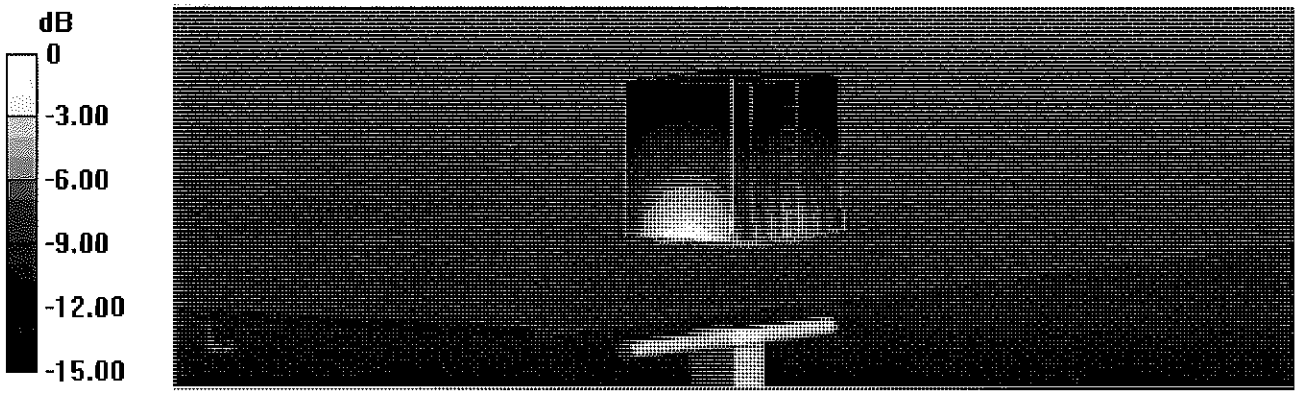
Communication System: UID 0 - CW; Frequency: 1900 MHz
Medium parameters used: f = 1900 MHz; σ = 1.46 S/m; ε_r = 55.3; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: EX3DV4 - SN7349; ConvF(8.15, 8.15, 8.15) @ 1900 MHz; Calibrated: 30.12.2017
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 26.10.2017
- Phantom: Flat Phantom 5.0 (back); Type: QD 000 P50 AA; Serial: 1002
- DASY52 52.10.1(1476); SEMCAD X 14.6.11(7439)

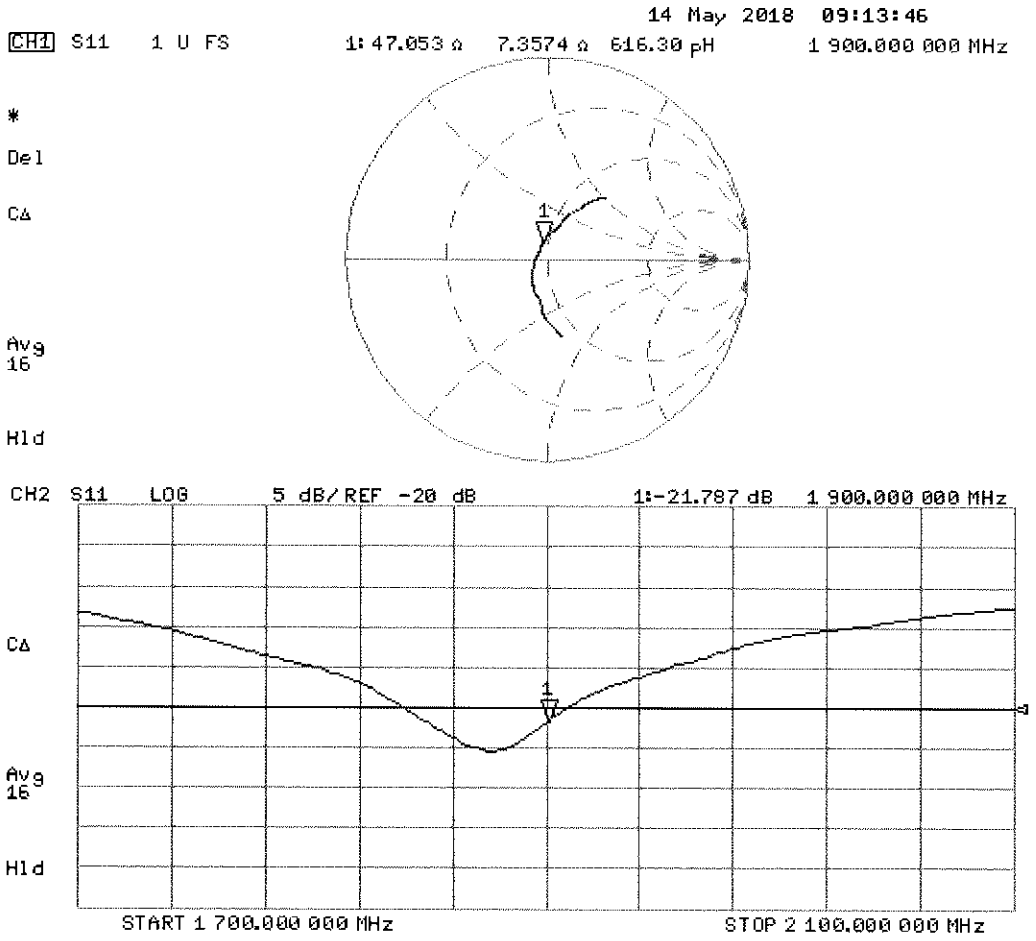
Dipole Calibration for Body Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 104.5 V/m; Power Drift = -0.02 dB
Peak SAR (extrapolated) = 16.7 W/kg
SAR(1 g) = 9.65 W/kg; SAR(10 g) = 5.19 W/kg
Maximum value of SAR (measured) = 14.4 W/kg



0 dB = 14.4 W/kg = 11.58 dBW/kg

Impedance Measurement Plot for Body TSL



Certification of Calibration

Object	D1900V2 – SN: 5d026
Calibration procedure(s)	Procedure for Calibration Extension for SAR Dipoles.
Extended Calibration date:	May 14, 2019
Description:	SAR Validation Dipole at 1900 MHz.

Calibration Equipment used:

Manufacturer	Model	Description	Cal Date	Cal Interval	Cal Due	Serial Number
Agilent	8753ES	S-Parameter Network Analyzer	10/2/2018	Annual	10/2/2019	US39170118
Agilent	N5182A	MXG Vector Signal Generator	6/15/2018	Annual	6/15/2019	MY47420837
Amplifier Research	15S1G6	Amplifier	CBT	N/A	CBT	343972
Anritsu	ML2495A	Power Meter	10/21/2018	Annual	10/21/2019	941001
Anritsu	MA2411B	Pulse Power Sensor	10/30/2018	Annual	10/30/2019	1207470
Anritsu	MA2411B	Pulse Power Sensor	11/20/2018	Annual	11/20/2019	1339007
Control Company	4040	Temperature / Humidity Monitor	2/28/2018	Biennial	2/28/2020	150761911
Control Company	4352	Ultra Long Stem Thermometer	2/28/2018	Biennial	2/28/2020	170330160
Keysight	772D	Dual Directional Coupler	CBT	N/A	CBT	MY52180215
Keysight Technologies	85033E	Standard Mechanical Calibration Kit (DC to 9GHz, 3.5mm)	6/4/2018	Annual	6/4/2019	MY53401181
Mini-Circuits	BW-N20W5+	DC to 18 GHz Precision Fixed 20 dB Attenuator	CBT	N/A	CBT	N/A
Mini-Circuits	NLP-2950+	Low Pass Filter DC to 2700 MHz	CBT	N/A	CBT	N/A
Narda	4772-3	Attenuator (3dB)	CBT	N/A	CBT	9406
Pasternack	PE2209-10	Bidirectional Coupler	CBT	N/A	CBT	N/A
Pasternack	PE5011-1	Torque Wrench	7/19/2017	Biennial	7/19/2019	N/A
SPEAG	DAKS-3.5	Portable DAK	9/11/2018	Annual	9/11/2019	1045
SPEAG	EX3DV4	SAR Probe	7/20/2018	Annual	7/20/2019	7416
SPEAG	DAE4	Dasy Data Acquisition Electronics	7/10/2018	Annual	7/10/2019	1402

Measurement Uncertainty = ±23% (k=2)

	Name	Function	Signature
Calibrated By:	Parker Jones	Team Lead Engineer	Parker Jones
Approved By:	Kaitlin O'Keefe	Senior Technical Manager	

DIPOLE CALIBRATION EXTENSION

Per KDB 865664 D01, calibration intervals of up to three years may be considered for reference dipoles when it is demonstrated that the SAR target, impedance and return loss of a dipole have remained stable according to the following requirements:

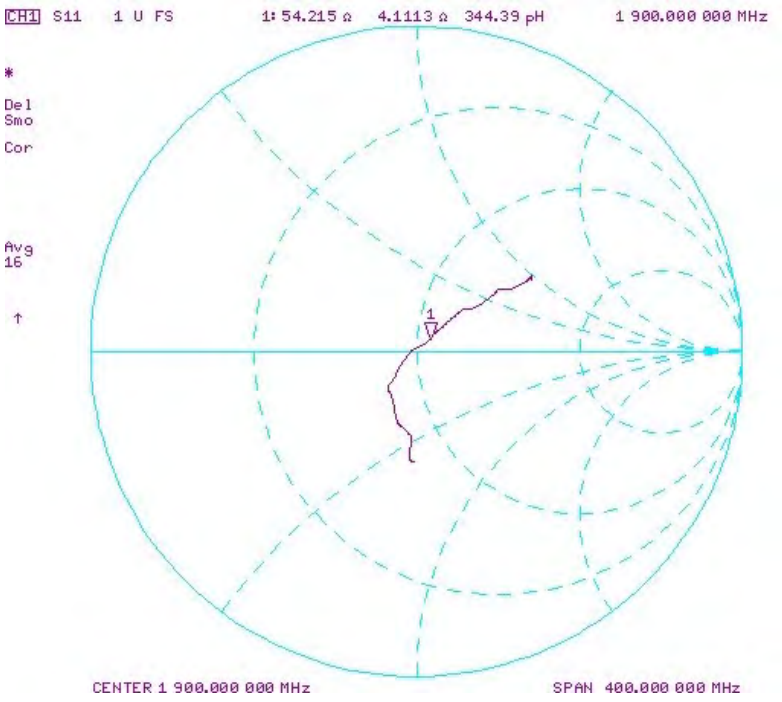
1. The measured SAR does not deviate more than 10% from the target on the calibration certificate.
2. The return-loss does not deviate more than 20% from the previous measurement and meets the required 20dB minimum return-loss requirement.
3. The measurement of real or imaginary parts of impedance does not deviate more than 5Ω from the previous measurement.

The following dipole was checked to pass the above 3 requirements to have 2-year calibration period from the calibration date:

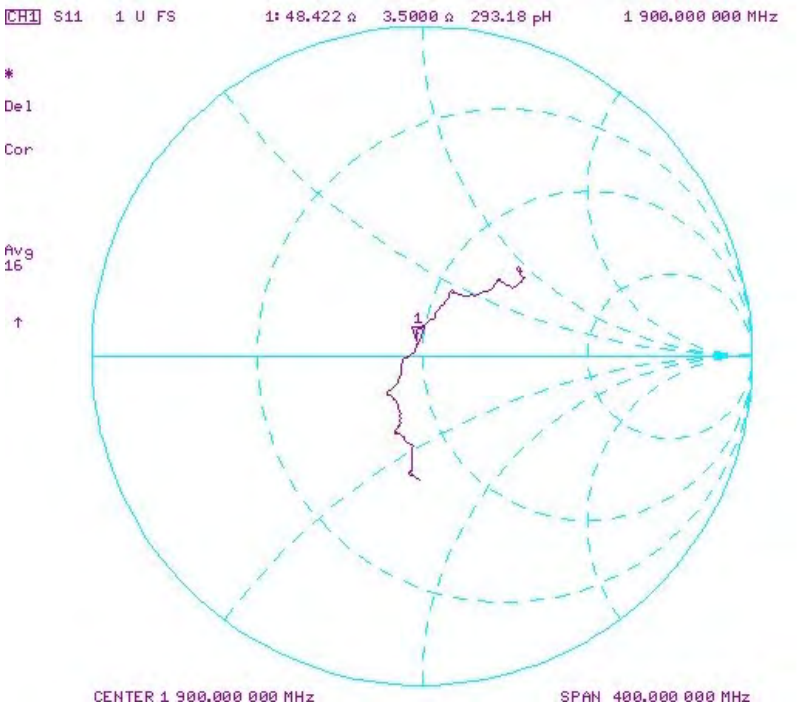
Calibration Date	Extension Date	Certificate Electrical Delay (ns)	Certificate SAR Target Head (1g) W/kg @ 20.0 dBm	Measured Head SAR (1g) W/kg @ 20.0 dBm	Deviation 1g (%)	Certificate SAR Target Head (10g) W/kg @ 20.0 dBm	Measured Head SAR (10g) W/kg @ 20.0 dBm	Deviation 10g (%)	Certificate Impedance Head (Ohm) Real	Measured Impedance Head (Ohm) Real	Difference (Ohm) Real	Certificate Impedance Head (Ohm) Imaginary	Measured Impedance Head (Ohm) Imaginary	Difference (Ohm) Imaginary	Certificate Return Loss Head (dB)	Measured Return Loss Head (dB)	Deviation (%)	PASS/FAIL
5/14/2018	5/14/2019	1.199	4.02	3.98	-1.00%	2.11	2.05	-2.84%	53	54.2	1.2	8	4.1	3.9	-21.6	-25.8	-19.30%	PASS

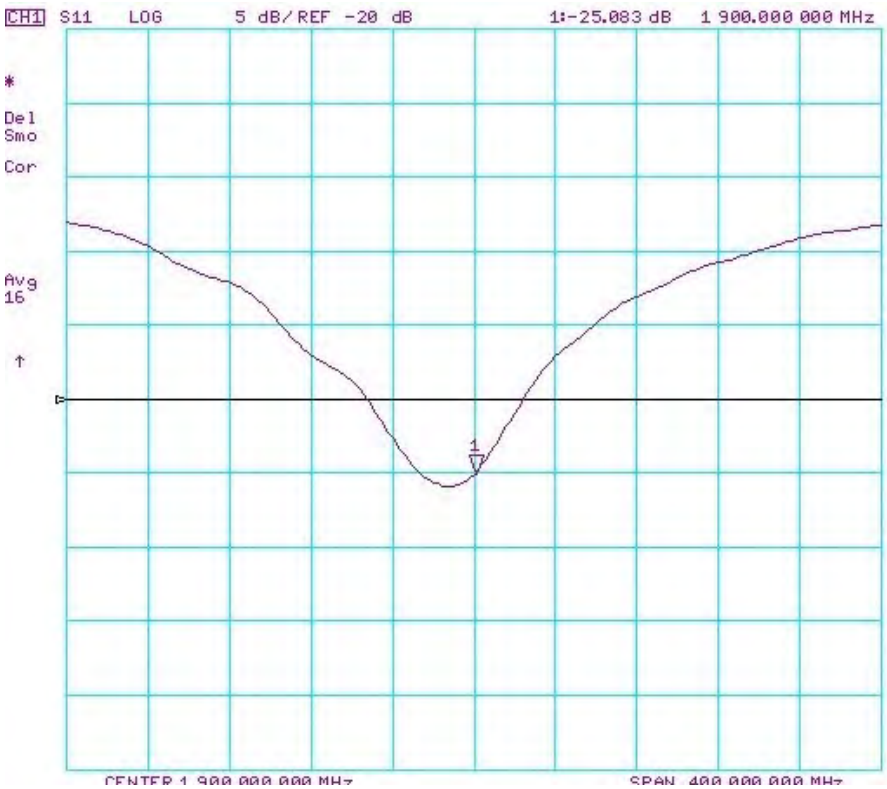
Calibration Date	Extension Date	Certificate Electrical Delay (ns)	Certificate SAR Target Body (1g) W/kg @ 20.0 dBm	Measured Body SAR (1g) W/kg @ 20.0 dBm	Deviation 1g (%)	Certificate SAR Target Body (10g) W/kg @ 20.0 dBm	Measured Body SAR (10g) W/kg @ 20.0 dBm	Deviation 10g (%)	Certificate Impedance Body (Ohm) Real	Measured Impedance Body (Ohm) Real	Difference (Ohm) Real	Certificate Impedance Body (Ohm) Imaginary	Measured Impedance Body (Ohm) Imaginary	Difference (Ohm) Imaginary	Certificate Return Loss Body (dB)	Measured Return Loss Body (dB)	Deviation (%)	PASS/FAIL
5/14/2018	5/14/2019	1.199	3.99	3.97	-0.50%	2.12	2.04	-3.77%	47.1	48.4	1.3	7.4	3.5	3.9	-21.8	-25.1	-15.10%	PASS

Impedance & Return-Loss Measurement Plot for Head TSL



Impedance & Return-Loss Measurement Plot for Body TSL





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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 0108

Client PC Test

Certificate No: D1900V2-5d181_Sep17

CALIBRATION CERTIFICATE

Object	D1900V2 - SN:5d181
Calibration procedure(s)	QA CAL-05.v9 Calibration procedure for dipole validation kits above 700 MHz
Calibration date:	September 07, 2017

SC ✓ 10/03/2017
SC ✓ 9/7/2018
BSN 10/10/2019

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 NRP	SN: 104778	04-Apr-17 (No. 217-02521/02522)	Apr-18
Power sensor NRP-Z91	SN: 103244	04-Apr-17 (No. 217-02521)	Apr-18
Power sensor NRP-Z91	SN: 103245	04-Apr-17 (No. 217-02522)	Apr-18
Reference 20 dB Attenuator	SN: 5058 (20k)	07-Apr-17 (No. 217-02528)	Apr-18
Type-N mismatch combination	SN: 5047.2 / 06327	07-Apr-17 (No. 217-02529)	Apr-18
Reference Probe EX3DV4	SN: 7949	31-May-17 (No. EX3-7349_May17)	May-18
DAE4	SN: 601	28-Mar-17 (No. DAE4-601_Mar17)	Mar-18

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power meter EPM-442A	SN: GB37480704	07-Oct-15 (in house check Oct-16)	In house check: Oct-18
Power sensor HP 8481A	SN: US37292783	07-Oct-15 (in house check Oct-16)	In house check: Oct-18
Power sensor HP 8481A	SN: MY41092317	07-Oct-15 (in house check Oct-16)	In house check: Oct-18
RF generator R&S SMT-06	SN: 100972	15-Jun-15 (in house check Oct-16)	In house check: Oct-18
Network Analyzer HP 8753E	SN: US37390585	18-Oct-01 (in house check Oct-16)	In house check: Oct-17

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

Issued: September 7, 2017

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 0108

Glossary:

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

Calibration is Performed According to the Following Standards:

a) IEEE Std 1528-2013, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", June 2013
b) IEC 62209-1, "Measurement procedure for the assessment of Specific Absorption Rate (SAR) from hand-held and body-mounted devices used next to the ear (frequency range of 300 MHz to 6 GHz)", July 2016
c) IEC 62209-2, "Procedure to determine the Specific Absorption Rate (SAR) for wireless communication devices used in close proximity to the human body (frequency range of 30 MHz to 6 GHz)", March 2010
d) KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

Additional Documentation:

e) DASY4/5 System Handbook

Methods Applied and Interpretation of Parameters:

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

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

Measurement Conditions

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

DASY Version	DASY5	V52.10.0
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 ± 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Head TSL parameters	22.0 °C	40.0	1.40 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	39.0 ± 6 %	1.38 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	----	----

SAR result with Head TSL

SAR averaged over 1 cm^3 (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	9.85 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**39.5 W/kg ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Head TSL	condition	
SAR measured	250 mW input power	5.15 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**20.6 W/kg ± 16.5 % (k=2)**

Body TSL parameters

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Body TSL parameters	22.0 °C	53.3	1.52 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	54.3 ± 6 %	1.47 mho/m ± 6 %
Body TSL temperature change during test	< 0.5 °C	----	----

SAR result with Body TSL

SAR averaged over 1 cm^3 (1 g) of Body TSL	Condition	
SAR measured	250 mW input power	9.65 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**39.5 W/kg ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Body TSL	condition	
SAR measured	250 mW input power	5.14 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**20.9 W/kg ± 16.5 % (k=2)**

Appendix (Additional assessments outside the scope of SCS 0108)

Antenna Parameters with Head TSL

Impedance, transformed to feed point	53.7 Ω + 4.6 jΩ
Return Loss	- 24.9 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	49.2 Ω + 5.6 jΩ
Return Loss	- 24.8 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.200 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	August 23, 2013

DASY5 Validation Report for Head TSL

Date: 07.09.2017

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 1900 MHz; Type: D1900V2; Serial: D1900V2 - SN:5d181

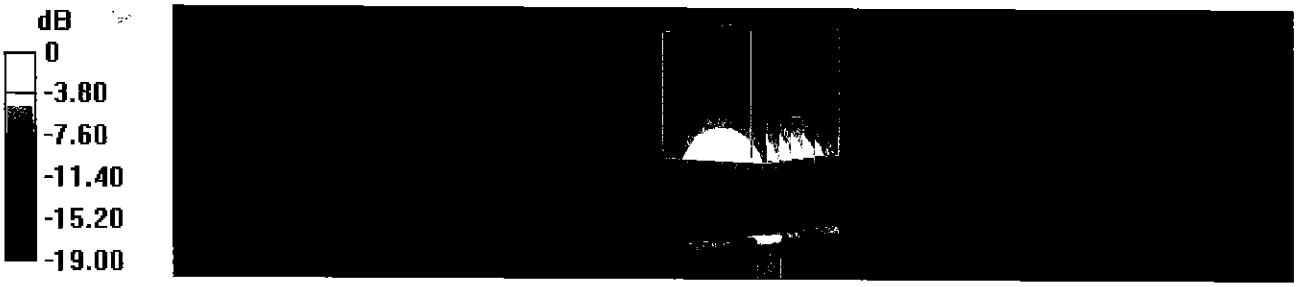
Communication System: UID 0 - CW; Frequency: 1900 MHz
Medium parameters used: f = 1900 MHz; σ = 1.38 S/m; ε_r = 39; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: EX3DV4 - SN7349; ConvF(8.43, 8.43, 8.43); Calibrated: 31.05.2017;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 28.03.2017
- Phantom: Flat Phantom 5.0 (front); Type: QD 000 P50 AA; Serial: 1001
- DASY52 52.10.0(1446); SEMCAD X 14.6.10(7417)

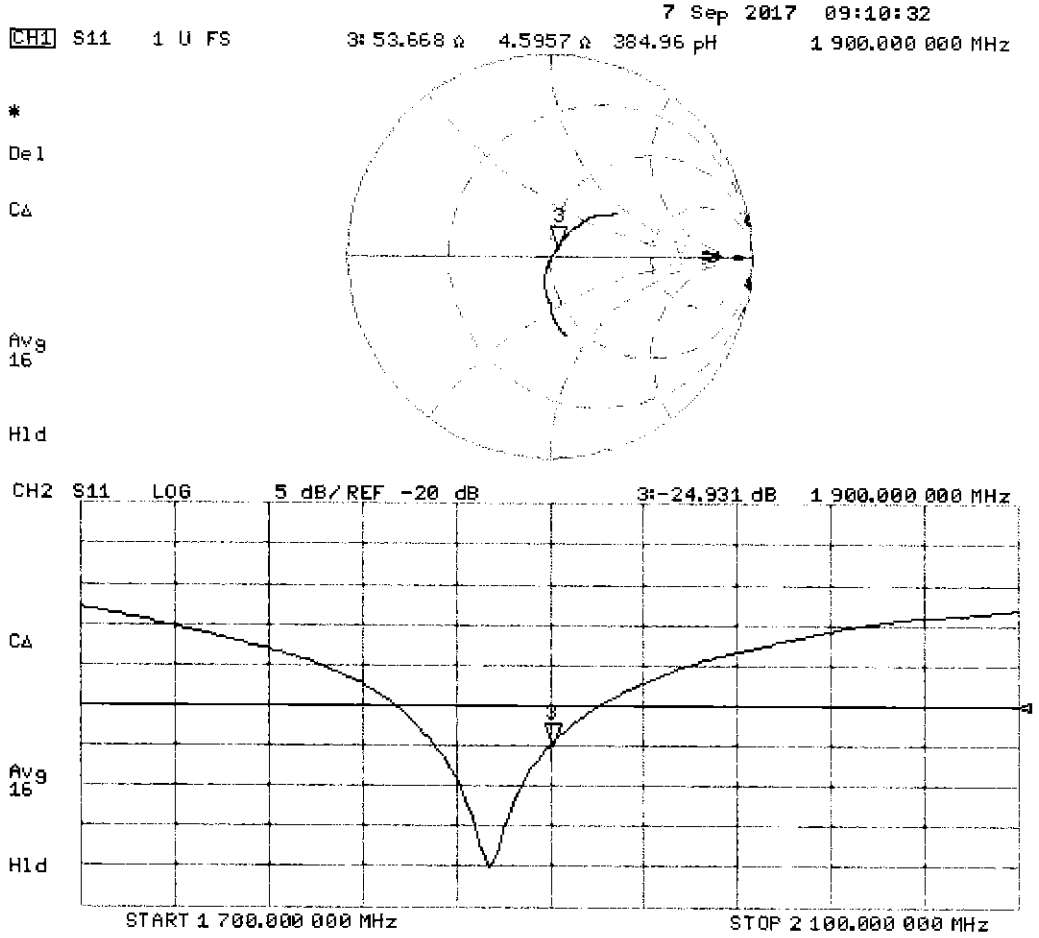
Dipole Calibration for Head Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 106.8 V/m; Power Drift = -0.06 dB
Peak SAR (extrapolated) = 18.5 W/kg
SAR(1 g) = 9.85 W/kg; SAR(10 g) = 5.15 W/kg
Maximum value of SAR (measured) = 14.8 W/kg



0 dB = 14.8 W/kg = 11.70 dBW/kg

Impedance Measurement Plot for Head TSL



DASY5 Validation Report for Body TSL

Date: 07.09.2017

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 1900 MHz; Type: D1900V2; Serial: D1900V2 - SN:5d181

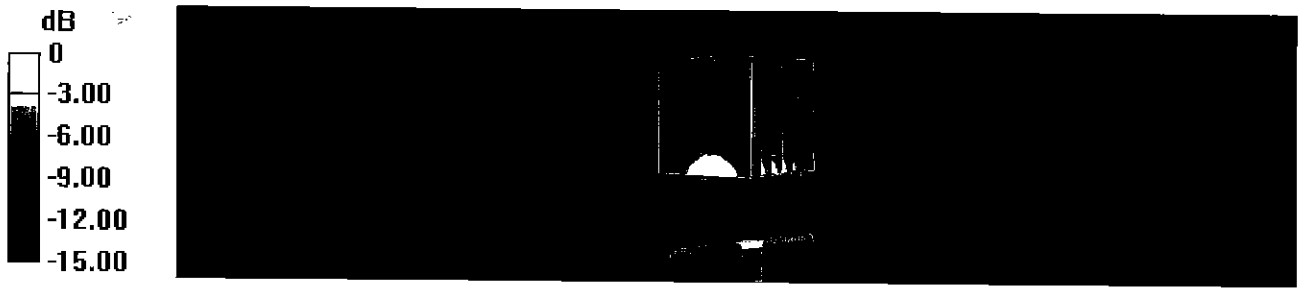
Communication System: UID 0 - CW; Frequency: 1900 MHz
Medium parameters used: f = 1900 MHz; σ = 1.47 S/m; ε_r = 54.3; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: EX3DV4 - SN7349; ConvF(8.2, 8.2, 8.2); Calibrated: 31.05.2017;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 28.03.2017
- Phantom: Flat Phantom 5.0 (back); Type: QD 000 P50 AA; Serial: 1002
- DASY52 52.10.0(1446); SEMCAD X 14.6.10(7417)

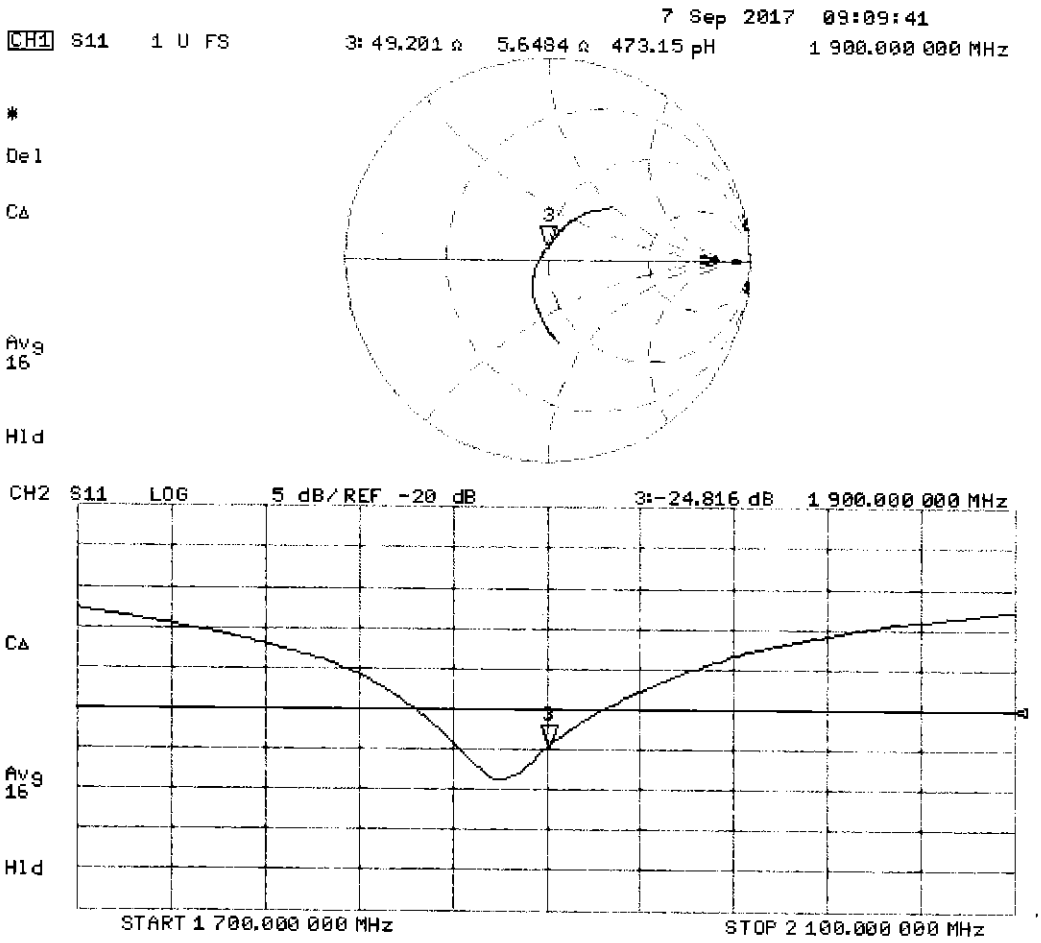
Dipole Calibration for Body Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 101.4 V/m; Power Drift = -0.04 dB
Peak SAR (extrapolated) = 17.0 W/kg
SAR(1 g) = 9.65 W/kg; SAR(10 g) = 5.14 W/kg
Maximum value of SAR (measured) = 13.8 W/kg



0 dB = 13.8 W/kg = 11.40 dBW/kg

Impedance Measurement Plot for Body TSL



Certification of Calibration

Object	D1900V2 – SN: 5d181
Calibration procedure(s)	Procedure for Calibration Extension for SAR Dipoles.
Extended Calibration date:	September 07, 2018
Description:	SAR Validation Dipole at 1900 MHz.

Calibration Equipment used:

Manufacturer	Model	Description	Cal Date	Cal Interval	Cal Due	Serial Number
Agilent	8753ES	S-Parameter Network Analyzer	9/14/2017	Annual	9/14/2018	US39170118
Agilent	N5182A	MXG Vector Signal Generator	3/19/2018	Annual	3/19/2019	US46240505
Amplifier Research	15S1G6	Amplifier	CBT	N/A	CBT	343972
Anritsu	ML2496A	Power Meter	10/9/2017	Annual	10/9/2018	1138001
Anritsu	MA2411B	Pulse Power Sensor	11/15/2017	Annual	11/15/2018	1339007
Anritsu	MA2411B	Pulse Power Sensor	11/22/2017	Annual	11/22/2018	1339008
Control Company	4040	Temperature / Humidity Monitor	2/28/2018	Biennial	2/28/2020	150761911
Control Company	4352	Ultra Long Stem Thermometer	2/14/2017	Biennial	2/14/2019	170112507
Keysight	772D	Dual Directional Coupler	CBT	N/A	CBT	MY52180215
Keysight Technologies	85033E	Standard Mechanical Calibration Kit (DC to 9GHz, 3.5mm)	6/4/2018	Annual	6/4/2019	MY53401181
Mini-Circuits	BW-N20W5+	DC to 18 GHz Precision Fixed 20 dB Attenuator	CBT	N/A	CBT	N/A
Mini-Circuits	NLP-2950+	Low Pass Filter DC to 2700 MHz	CBT	N/A	CBT	N/A
Narda	4772-3	Attenuator (3dB)	CBT	N/A	CBT	9406
Pasternack	PE2209-10	Bidirectional Coupler	CBT	N/A	CBT	N/A
Pasternack	PE5011-1	Torque Wrench	7/19/2017	Biennial	7/19/2019	N/A
SPEAG	DAK-3.5	Dielectric Assessment Kit	5/15/2018	Annual	5/15/2019	1070
SPEAG	ES3DV3	SAR Probe	9/18/2017	Annual	9/18/2018	3287
SPEAG	DAE4	Data Acquisition Electronics	1/26/2018	Annual	1/26/2019	1533
SPEAG	ES3DV3	SAR Probe	3/13/2018	Annual	3/13/2019	3131
SPEAG	DAE4	Dasy Data Acquisition Electronics	3/7/2018	Annual	3/7/2019	604

Measurement Uncertainty = ±23% (k=2)

	Name	Function	Signature
Calibrated By:	Sangmin Cha	Team Lead Engineer	
Approved By:	Kaitlin O'Keefe	Senior Technical Manager	

DIPOLE CALIBRATION EXTENSION

Per KDB 865664 D01, calibration intervals of up to three years may be considered for reference dipoles when it is demonstrated that the SAR target, impedance and return loss of a dipole have remained stable according to the following requirements:

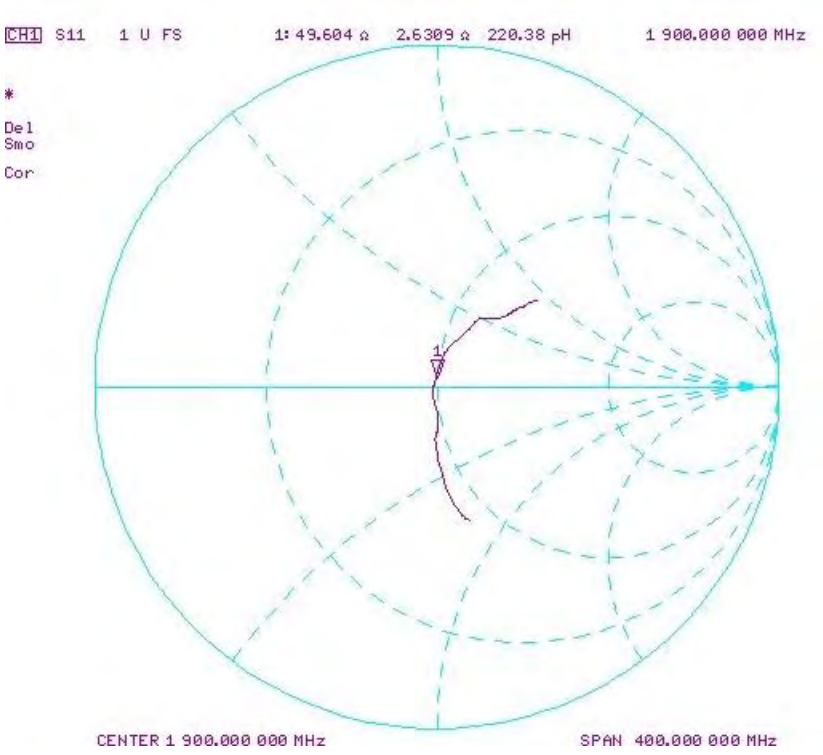
1. The measured SAR does not deviate more than 10% from the target on the calibration certificate.
2. The return-loss does not deviate more than 20% from the previous measurement and meets the required 20dB minimum return-loss requirement.
3. The measurement of real or imaginary parts of impedance does not deviate more than 5Ω from the previous measurement.

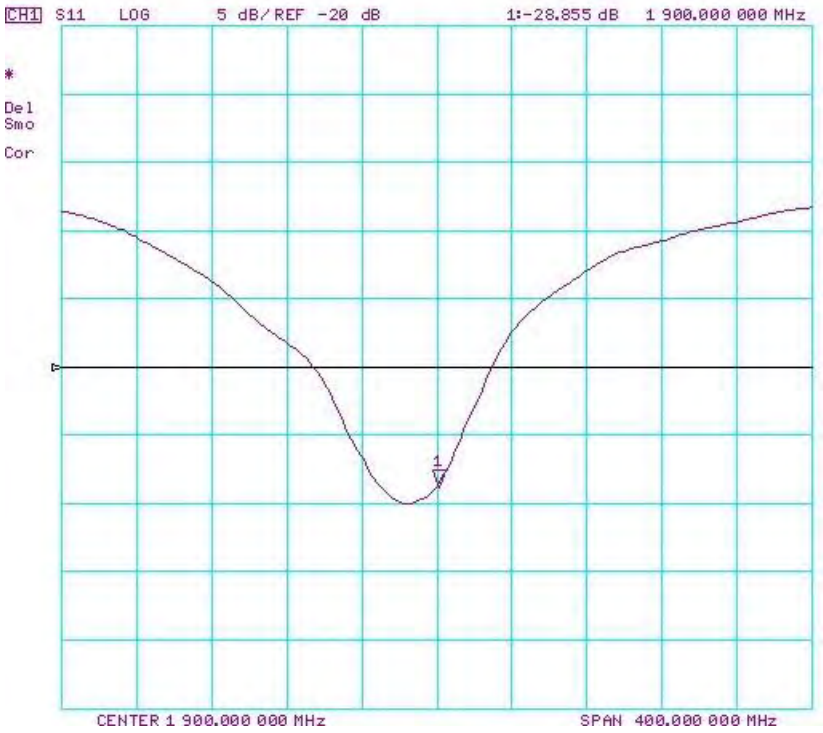
The following dipole was checked to pass the above 3 requirements to have 2-year calibration period from the calibration date:

Calibration Date	Extension Date	Certificate Electrical Delay (ns)	Certificate SAR Target Head (1g) W/kg @ 20.0 dBm	Measured Head SAR (1g) W/kg @ 20.0 dBm	Deviation 1g (%)	Certificate SAR Target Head (10g) W/kg @ 20.0 dBm	Measured Head SAR (10g) W/kg @ 20.0 dBm	Deviation 10g (%)	Certificate Impedance Head (Ohm) Real	Measured Impedance Head (Ohm) Real	Difference (Ohm) Real	Certificate Impedance Head (Ohm) Imaginary	Measured Impedance Head (Ohm) Imaginary	Difference (Ohm) Imaginary	Certificate Return Loss Head (dB)	Measured Return Loss Head (dB)	Deviation (%)	PASS/FAIL
9/7/2017	9/7/2018	1.2	3.95	3.99	1.01%	2.06	2.07	0.49%	53.7	49.6	4.1	4.6	2.6	2	-24.9	-28.9	-16.10%	PASS

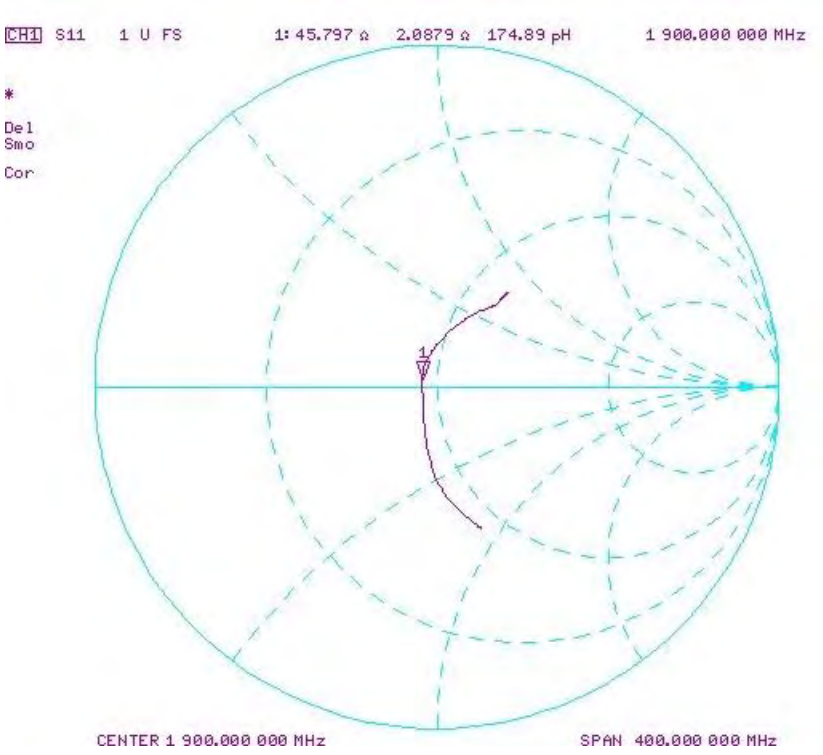
Calibration Date	Extension Date	Certificate Electrical Delay (ns)	Certificate SAR Target Body (1g) W/kg @ 20.0 dBm	Measured Body SAR (1g) W/kg @ 20.0 dBm	Deviation 1g (%)	Certificate SAR Target Body (10g) W/kg @ 20.0 dBm	Measured Body SAR (10g) W/kg @ 20.0 dBm	Deviation 10g (%)	Certificate Impedance Body (Ohm) Real	Measured Impedance Body (Ohm) Real	Difference (Ohm) Real	Certificate Impedance Body (Ohm) Imaginary	Measured Impedance Body (Ohm) Imaginary	Difference (Ohm) Imaginary	Certificate Return Loss Body (dB)	Measured Return Loss Body (dB)	Deviation (%)	PASS/FAIL
9/7/2017	9/7/2018	1.2	3.95	4.13	4.56%	2.09	2.14	2.39%	49.2	45.8	3.4	5.6	2.1	3.5	-24.8	-24.7	0.40%	PASS

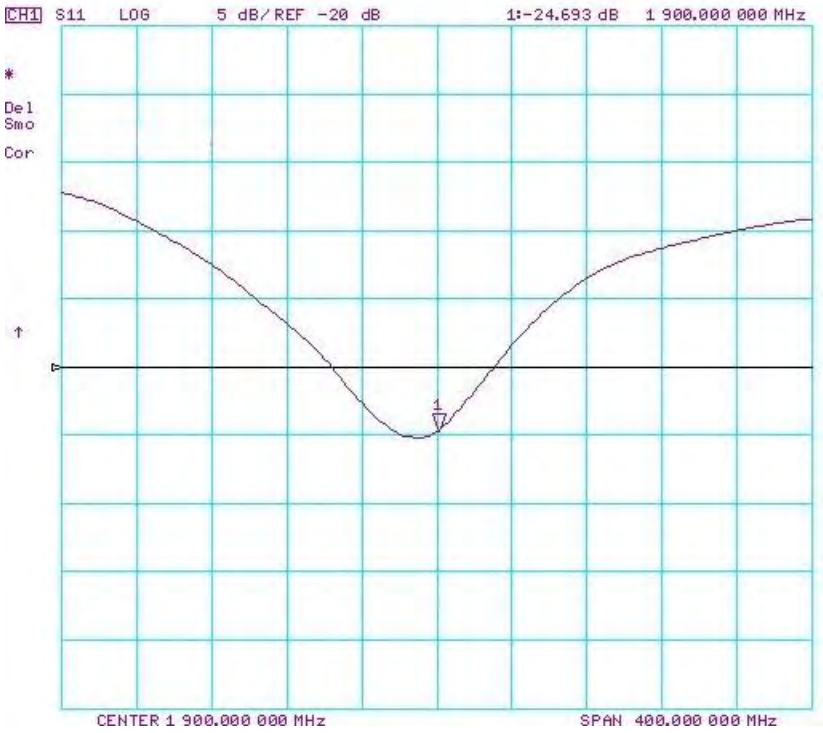
Impedance & Return-Loss Measurement Plot for Head TSL





Impedance & Return-Loss Measurement Plot for Body TSL





Certification of Calibration

Object	D1900V2 – SN: 5d181
Calibration procedure(s)	Procedure for Calibration Extension for SAR Dipoles.
Extended Calibration date:	September 7, 2019
Description:	SAR Validation Dipole at 1900 MHz.

Calibration Equipment used:

Manufacturer	Model	Description	Cal Date	Cal Interval	Cal Due	Serial Number
Agilent	8753ES	S-Parameter Network Analyzer	10/2/2018	Annual	10/2/2019	US39170118
Agilent	E4438C	ESG Vector Signal Generator	6/27/2019	Annual	6/27/2020	MY45093852
Amplifier Research	15S1G6	Amplifier	CBT	N/A	CBT	343972
Anritsu	ML2495A	Power Meter	10/21/2018	Annual	10/21/2019	941001
Anritsu	MA2411B	Pulse Power Sensor	10/30/2018	Annual	10/30/2019	1207470
Anritsu	MA2411B	Pulse Power Sensor	11/20/2018	Annual	11/20/2019	1339007
Control Company	4040	Temperature / Humidity Monitor	2/28/2018	Biennial	2/28/2020	150761911
Control Company	4352	Ultra Long Stem Thermometer	2/28/2018	Biennial	2/28/2020	170330160
Keysight Technologies	85033E	Standard Mechanical Calibration Kit (DC to 9GHz, 3.5mm)	7/2/2019	Annual	7/2/2020	MY53401181
Keysight	772D	Dual Directional Coupler	CBT	N/A	CBT	MY52180215
Mini-Circuits	BW-N20W5+	DC to 18 GHz Precision Fixed 20 dB Attenuator	CBT	N/A	CBT	N/A
Mini-Circuits	NLP-2950+	Low Pass Filter DC to 2700 MHz	CBT	N/A	CBT	N/A
Narda	4772-3	Attenuator (3dB)	CBT	N/A	CBT	9406
Pasternack	PE2208-6	Bidirectional Coupler	CBT	N/A	CBT	N/A
Pasternack	NC-100	Torque Wrench	11/1/2017	Biennial	11/1/2019	N/A
SPEAG	DAK-3.5	Dielectric Assessment Kit	5/7/2019	Annual	5/7/2020	1070
SPEAG	EX3DV4	SAR Probe	1/24/2019	Annual	1/24/2020	7490
SPEAG	DAE4	Data Acquisition Electronics	1/15/2019	Annual	1/15/2020	1532

Measurement Uncertainty = ±23% (k=2)

	Name	Function	Signature
Calibrated By:	Parker Jones	Team Lead Engineer	Parker Jones
Approved By:	Kaitlin O'Keefe	Senior Technical Manager	

DIPOLE CALIBRATION EXTENSION

Per KDB 865664 D01, calibration intervals of up to three years may be considered for reference dipoles when it is demonstrated that the SAR target, impedance and return loss of a dipole have remained stable according to the following requirements:

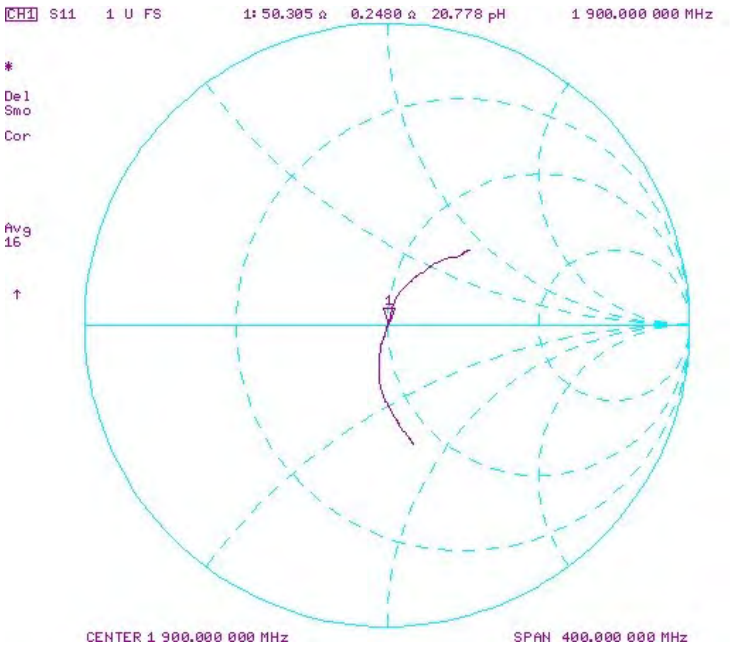
1. The measured SAR does not deviate more than 10% from the target on the calibration certificate.
2. The return-loss does not deviate more than 20% from the previous measurement and meets the required 20dB minimum return-loss requirement.
3. The measurement of real or imaginary parts of impedance does not deviate more than 5Ω from the previous measurement.

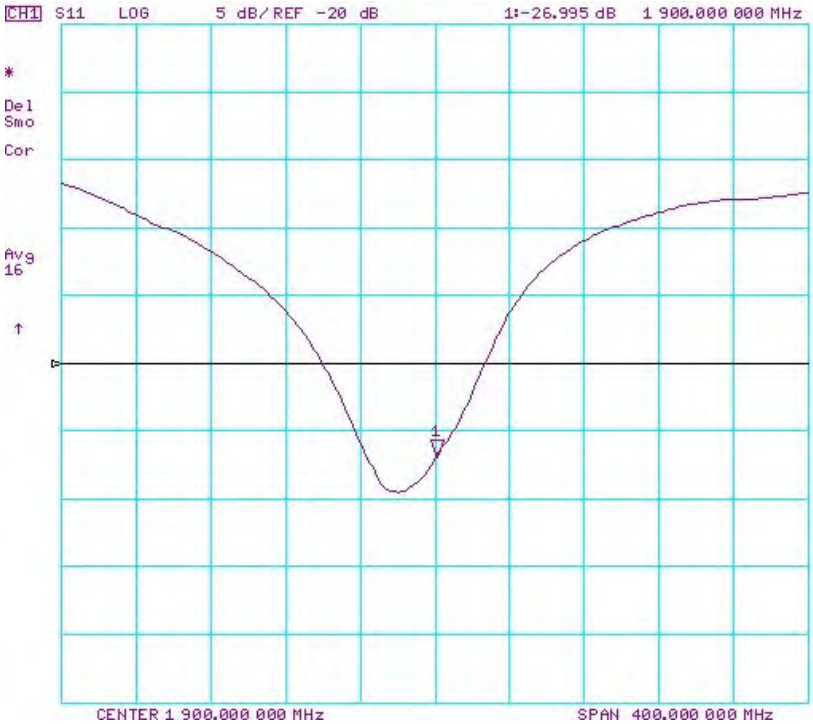
The following dipole was checked to pass the above 3 requirements to have 3-year calibration period from the calibration date:

Calibration Date	Extension Date	Certificate Electrical Delay (ns)	Certificate SAR Target Head (1g) W/kg @ 20.0 dBm	Measured Head SAR (1g) W/kg @ 20.0 dBm	Deviation 1g (%)	Certificate SAR Target Head (10g) W/kg @ 20.0 dBm	Measured Head SAR (10g) W/kg @ 20.0 dBm	Deviation 10g (%)	Certificate Impedance Head (Ohm) Real	Measured Impedance Head (Ohm) Real	Difference (Ohm) Real	Certificate Impedance Head (Ohm) Imaginary	Measured Impedance Head (Ohm) Imaginary	Difference (Ohm) Imaginary	Certificate Return Loss Head (dB)	Measured Return Loss Head (dB)	Deviation (%)	PASS/FAIL
9/7/2017	9/7/2019	1.2	3.95	3.92	-0.76%	2.06	2.04	-0.97%	53.7	50.3	3.4	4.6	0.2	4.4	-24.9	-27	-8.40%	PASS

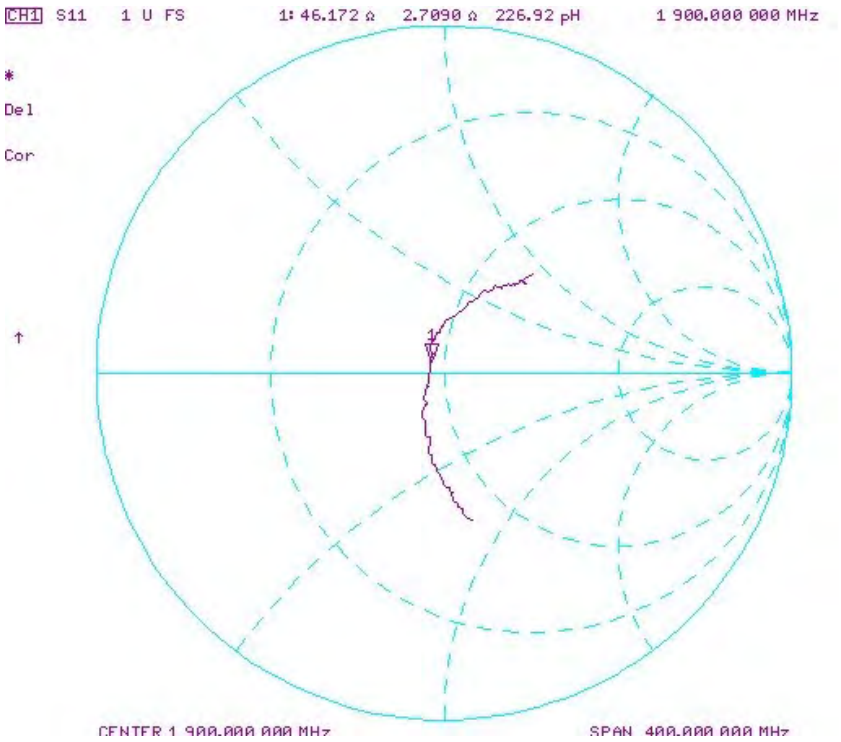
Calibration Date	Extension Date	Certificate Electrical Delay (ns)	Certificate SAR Target Body (1g) W/kg @ 20.0 dBm	Measured Body SAR (1g) W/kg @ 20.0 dBm	Deviation 1g (%)	Certificate SAR Target Body (10g) W/kg @ 20.0 dBm	Measured Body SAR (10g) W/kg @ 20.0 dBm	Deviation 10g (%)	Certificate Impedance Body (Ohm) Real	Measured Impedance Body (Ohm) Real	Difference (Ohm) Real	Certificate Impedance Body (Ohm) Imaginary	Measured Impedance Body (Ohm) Imaginary	Difference (Ohm) Imaginary	Certificate Return Loss Body (dB)	Measured Return Loss Body (dB)	Deviation (%)	PASS/FAIL
9/7/2017	9/7/2019	1.2	3.95	4.05	2.53%	2.09	2.1	0.48%	49.2	46.2	3	5.6	2.7	2.9	-24.8	-23.1	6.90%	PASS

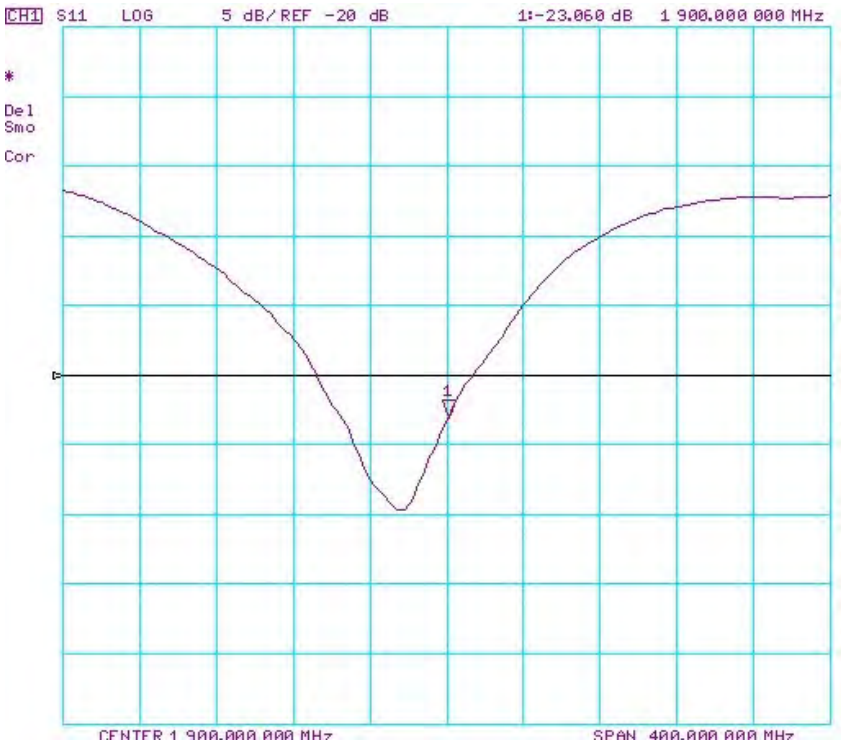
Impedance & Return-Loss Measurement Plot for Head TSL





Impedance & Return-Loss Measurement Plot for Body TSL





Calibration Laboratory of
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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 0108

Client PC Test

Certificate No: D2300V2-1038_Mar18

CALIBRATION CERTIFICATE

Object: D2300V2 - SN:1038

Calibration procedure(s): QA CAL-05.v10
Calibration procedure for dipole validation kits above 700 MHz

SC ✓ 3/21/18

SC ✓ 2/25/19

Calibration date: March 07, 2018

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 NRP	SN: 104778	04-Apr-17 (No. 217-02521/02522)	Apr-18
Power sensor NRP-Z91	SN: 103244	04-Apr-17 (No. 217-02521)	Apr-18
Power sensor NRP-Z91	SN: 103245	04-Apr-17 (No. 217-02522)	Apr-18
Reference 20 dB Attenuator	SN: 5058 (20k)	07-Apr-17 (No. 217-02528)	Apr-18
Type-N mismatch combination	SN: 5047.2 / 06327	07-Apr-17 (No. 217-02529)	Apr-18
Reference Probe EX3DV4	SN: 7349	30-Dec-17 (No. EX3-7349_Dec17)	Dec-18
DAE4	SN: 601	26-Oct-17 (No. DAE4-601_Oct17)	Oct-18

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power meter EPM-442A	SN: GB37480704	07-Oct-15 (in house check Oct-16)	In house check: Oct-18
Power sensor HP 8481A	SN: US37292783	07-Oct-15 (in house check Oct-16)	In house check: Oct-18
Power sensor HP 8481A	SN: MY41092317	07-Oct-15 (in house check Oct-16)	In house check: Oct-18
RF generator R&S SMT-06	SN: 100972	15-Jun-15 (in house check Oct-16)	In house check: Oct-18
Network Analyzer HP 8753E	SN: US37390585	18-Oct-01 (in house check Oct-17)	In house check: Oct-18

	Name	Function	Signature
Calibrated by:	Claudio Leubler	Laboratory Technician	
Approved by:	Katja Pokovic	Technical Manager	

Issued: March 9, 2018

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 0108

Glossary:

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

Calibration is Performed According to the Following Standards:

a) IEEE Std 1528-2013, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", June 2013
b) IEC 62209-1, "Measurement procedure for the assessment of Specific Absorption Rate (SAR) from hand-held and body-mounted devices used next to the ear (frequency range of 300 MHz to 6 GHz)", July 2016
c) IEC 62209-2, "Procedure to determine the Specific Absorption Rate (SAR) for wireless communication devices used in close proximity to the human body (frequency range of 30 MHz to 6 GHz)", March 2010
d) KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

Additional Documentation:

e) DASY4/5 System Handbook

Methods Applied and Interpretation of Parameters:

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

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

Measurement Conditions

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

DASY Version	DASY5	V52.10.0
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom	
Distance Dipole Center - TSL	10 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	2300 MHz ± 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Head TSL parameters	22.0 °C	39.5	1.67 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	38.6 ± 6 %	1.70 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	----	----

SAR result with Head TSL

SAR averaged over 1 cm^3 (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	12.5 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**49.3 W/kg ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Head TSL	condition	
SAR measured	250 mW input power	5.94 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**23.6 W/kg ± 16.5 % (k=2)**

Body TSL parameters

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Body TSL parameters	22.0 °C	52.9	1.81 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	51.6 ± 6 %	1.86 mho/m ± 6 %
Body TSL temperature change during test	< 0.5 °C	----	----

SAR result with Body TSL

SAR averaged over 1 cm^3 (1 g) of Body TSL	Condition	
SAR measured	250 mW input power	11.9 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**46.7 W/kg ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Body TSL	condition	
SAR measured	250 mW input power	5.69 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**22.5 W/kg ± 16.5 % (k=2)**

Appendix (Additional assessments outside the scope of SCS 0108)

Antenna Parameters with Head TSL

Impedance, transformed to feed point	47.8 Ω - 4.9 jΩ
Return Loss	- 25.2 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	45.9 Ω - 3.4 jΩ
Return Loss	- 25.0 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.170 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 02, 2013

DASY5 Validation Report for Head TSL

Date: 07.03.2018

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 2300 MHz; Type: D2300V2; Serial: D2300V2 - SN:1038

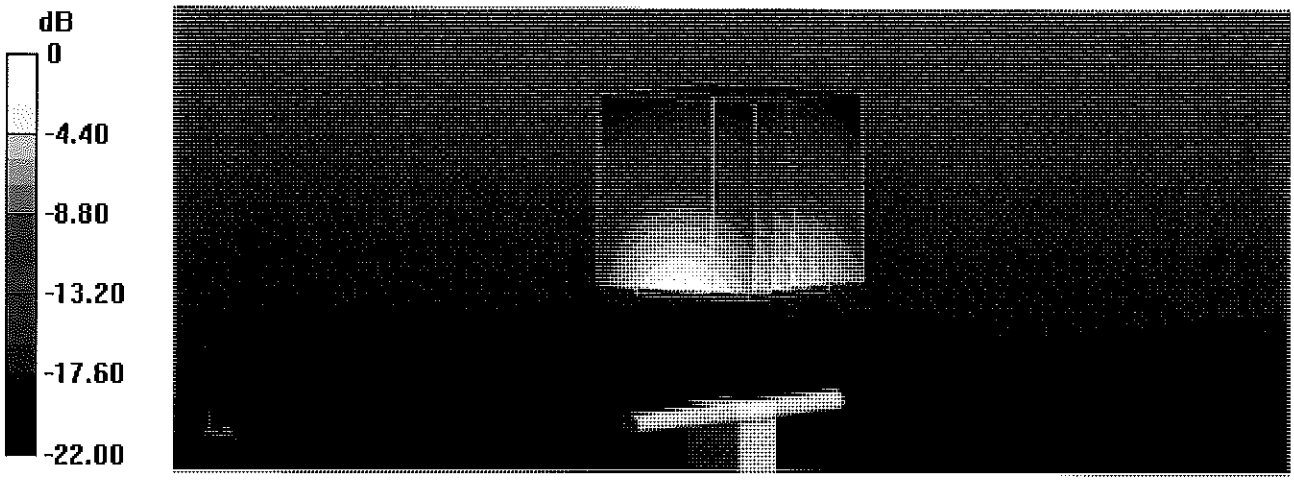
Communication System: UID 0 - CW; Frequency: 2300 MHz
Medium parameters used: f = 2300 MHz; σ = 1.7 S/m; ε_r = 38.6; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: EX3DV4 - SN7349; ConvF(8.08, 8.08, 8.08); Calibrated: 30.12.2017;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 26.10.2017
- Phantom: Flat Phantom 5.0 (front); Type: QD 000 P50 AA; Serial: 1001
- DASY52 52.10.0(1446); SEMCAD X 14.6.10(7417)

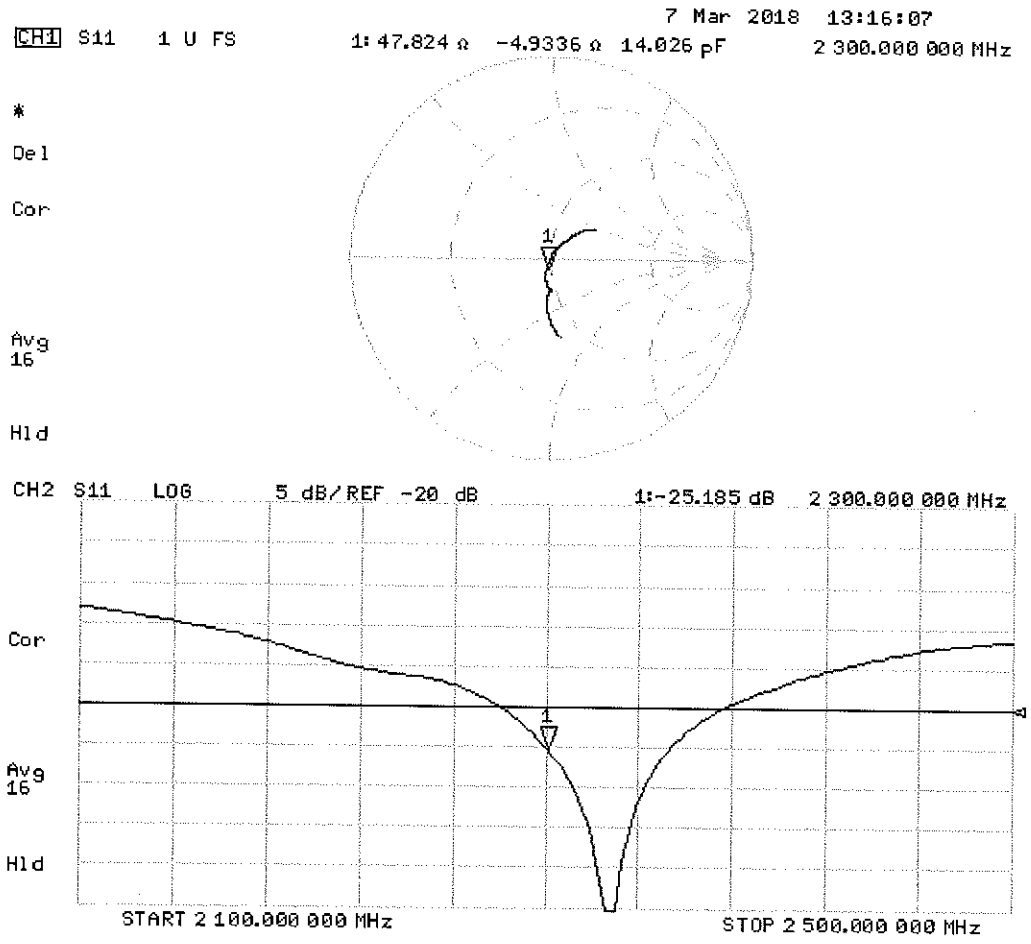
Dipole Calibration for Head Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 112.4 V/m; Power Drift = -0.07 dB
Peak SAR (extrapolated) = 24.5 W/kg
SAR(1 g) = 12.5 W/kg; SAR(10 g) = 5.94 W/kg
Maximum value of SAR (measured) = 19.6 W/kg



0 dB = 19.6 W/kg = 12.92 dBW/kg

Impedance Measurement Plot for Head TSL



DASY5 Validation Report for Body TSL

Date: 07.03.2018

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 2300 MHz; Type: D2300V2; Serial: D2300V2 - SN:1038

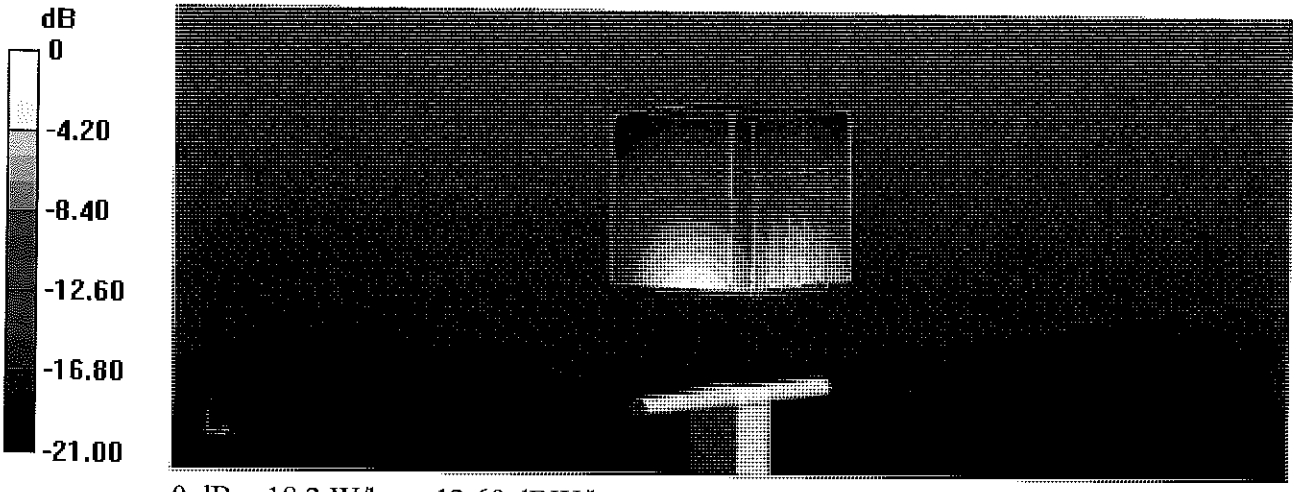
Communication System: UID 0 - CW; Frequency: 2300 MHz
Medium parameters used: f = 2300 MHz; σ = 1.86 S/m; ε_r = 51.6; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: EX3DV4 - SN7349; ConvF(8.08, 8.08, 8.08); Calibrated: 30.12.2017;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 26.10.2017
- Phantom: Flat Phantom 5.0 (back); Type: QD 000 P50 AA; Serial: 1002
- DASY52 52.10.0(1446); SEMCAD X 14.6.10(7417)

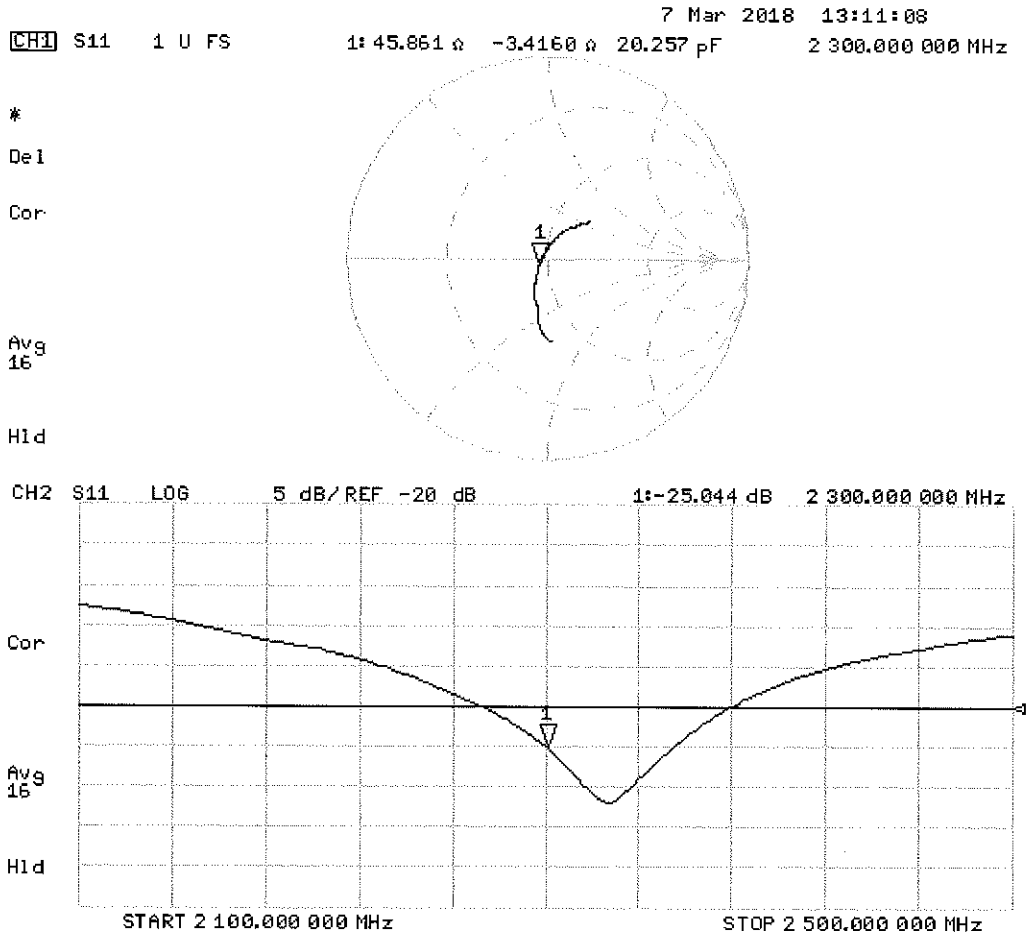
Dipole Calibration for Body Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 104.5 V/m; Power Drift = 0.06 dB
Peak SAR (extrapolated) = 23.0 W/kg
SAR(1 g) = 11.9 W/kg; SAR(10 g) = 5.69 W/kg
Maximum value of SAR (measured) = 18.2 W/kg



0 dB = 18.2 W/kg = 12.60 dBW/kg

Impedance Measurement Plot for Body TSL



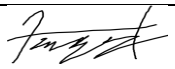
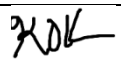
Certification of Calibration

Object	D2300V2 – SN: 1038
Calibration procedure(s)	Procedure for Calibration Extension for SAR Dipoles.
Extended Calibration date:	February 25, 2019
Description:	SAR Validation Dipole at 2300 MHz.

Calibration Equipment used:

Manufacturer	Model	Description	Cal Date	Cal Interval	Cal Due	Serial Number
Agilent	8753ES	S-Parameter Network Analyzer	10/2/2018	Annual	10/2/2019	US39170118
Agilent	N5182A	MXG Vector Signal Generator	6/15/2018	Annual	6/15/2019	MY47420837
Amplifier Research	15S1G6	Amplifier	CBT	N/A	CBT	343972
Anritsu	MA2411B	Pulse Power Sensor	10/30/2018	Annual	10/30/2019	1207470
Anritsu	MA2411B	Pulse Power Sensor	11/20/2018	Annual	11/20/2019	1339007
Anritsu	ML2496A	Power Meter	10/21/2018	Annual	10/21/2019	1138001
Control Company	4040	Therm./Clock/Humidity Monitor	3/31/2017	Biennial	3/31/2019	170232394
Control Company	4352	Ultra Long Stem Thermometer	5/2/2017	Biennial	5/2/2019	170330156
Keysight	772D	Dual Directional Coupler	CBT	N/A	CBT	MY52180215
Agilent	85033E	3.5mm Standard Calibration Kit	8/13/2018	Annual	8/13/2019	MY53402352
MiniCircuits	VLF-6000+	Low Pass Filter	CBT	N/A	CBT	N/A
Mini-Circuits	BW-N20W5+	DC to 18 GHz Precision Fixed 20 dB Attenuator	CBT	N/A	CBT	N/A
Narda	4772-3	Attenuator (3dB)	CBT	N/A	CBT	9406
Seekonk	NC-100	Torque Wrench	7/11/2018	Annual	7/11/2019	N/A
SPEAG	DAE4	Dasy Data Acquisition Electronics	4/12/2018	Annual	4/12/2019	501
SPEAG	DAE4	Dasy Data Acquisition Electronics	10/18/2018	Annual	10/18/2019	1364
SPEAG	DAK-3.5	Dielectric Assessment Kit	5/15/2018	Annual	5/15/2019	1070
SPEAG	ES3DV3	SAR Probe	4/12/2018	Annual	4/12/2019	3275
SPEAG	EX3DV4	SAR Probe	7/20/2018	Annual	7/20/2019	7491

Measurement Uncertainty = ±23% (k=2)

	Name	Function	Signature
Calibrated By:	Sangmin Cha	Team Lead Engineer	
Approved By:	Kaitlin O'Keefe	Managing Director	

DIPOLE CALIBRATION EXTENSION

Per KDB 865664 D01, calibration intervals of up to three years may be considered for reference dipoles when it is demonstrated that the SAR target, impedance and return loss of a dipole have remained stable according to the following requirements:

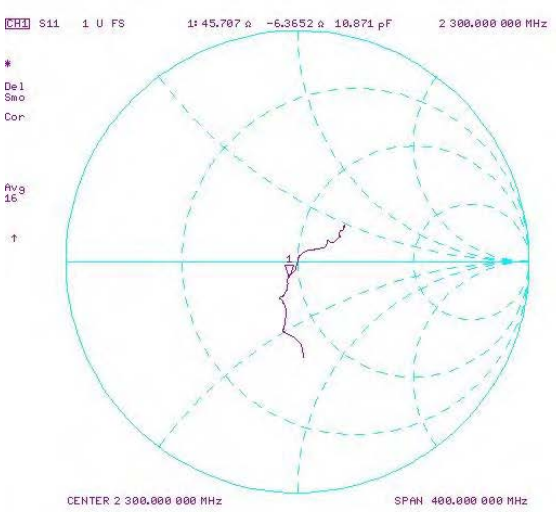
1. The measured SAR does not deviate more than 10% from the target on the calibration certificate.
2. The return-loss does not deviate more than 20% from the previous measurement and meets the required 20dB minimum return-loss requirement.
3. The measurement of real or imaginary parts of impedance does not deviate more than 5Ω from the previous measurement.

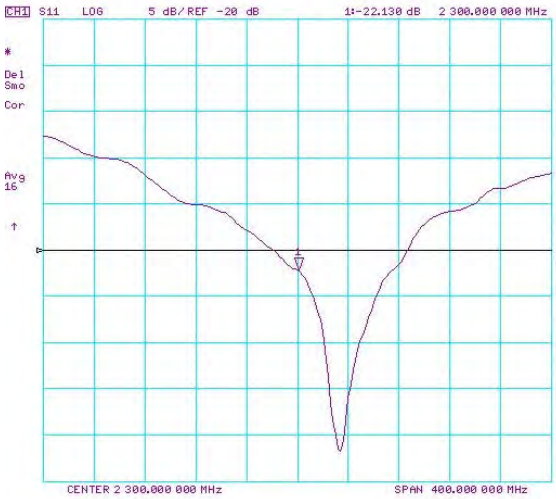
The following dipole was checked to pass the above 3 requirements to have 2-year calibration period from the calibration date:

Calibration Date	Extension Date	Certificate Electrical Delay (ns)	Certificate SAR Target Head (1g) W/kg @ 20.0 dBm	Measured Head SAR (1g) W/kg @ 20.0 dBm	Deviation 1g (%)	Certificate SAR Target Head (10g) W/kg @ 20.0 dBm	Measured Head SAR (10g) W/kg @ 20.0 dBm	Deviation 10g (%)	Certificate Impedance Head (Ohm) Real	Measured Impedance Head (Ohm) Real	Difference (Ohm) Real	Certificate Impedance Head (Ohm) Imaginary	Measured Impedance Head (Ohm) Imaginary	Difference (Ohm) Imaginary	Certificate Return Loss Head (dB)	Measured Return Loss Head (dB)	Deviation (%)	PASS/FAIL
3/7/2018	2/25/2019	1.17	4.93	4.77	-3.25%	2.36	2.29	-2.97%	47.8	45.7	2.1	-4.9	-6.4	1.5	-25.2	-22.1	12.30%	PASS

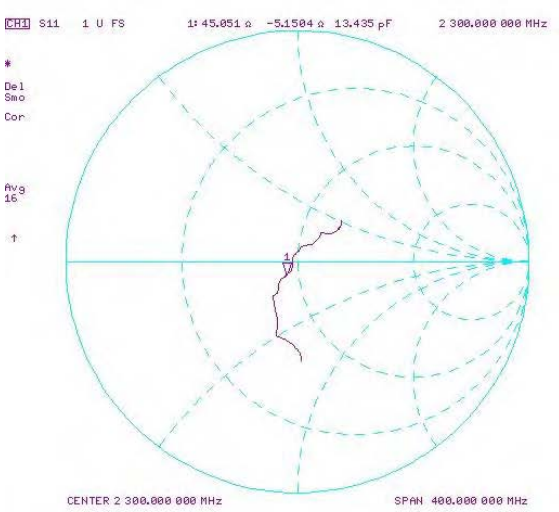
Calibration Date	Extension Date	Certificate Electrical Delay (ns)	Certificate SAR Target Body (1g) W/kg @ 20.0 dBm	Measured Body SAR (1g) W/kg @ 20.0 dBm	Deviation 1g (%)	Certificate SAR Target Body (10g) W/kg @ 20.0 dBm	Measured Body SAR (10g) W/kg @ 20.0 dBm	Deviation 10g (%)	Certificate Impedance Body (Ohm) Real	Measured Impedance Body (Ohm) Real	Difference (Ohm) Real	Certificate Impedance Body (Ohm) Imaginary	Measured Impedance Body (Ohm) Imaginary	Difference (Ohm) Imaginary	Certificate Return Loss Body (dB)	Measured Return Loss Body (dB)	Deviation (%)	PASS/FAIL
3/7/2018	2/25/2019	1.17	4.67	4.82	3.21%	2.25	2.27	0.89%	45.9	45.1	0.8	-3.4	-5.2	1.8	-25	-22.7	9.20%	PASS

Impedance & Return-Loss Measurement Plot for Head TSL





Impedance & Return-Loss Measurement Plot for Body TSL



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Accreditation No.: SCS 0108

Client PC Test

Certificate No: D2450V2-921_Nov18

CALIBRATION CERTIFICATE

Object: D2450V2 - SN:921

Calibration procedure(s): QA CAL-05.v10
Calibration procedure for dipole validation kits above 700 MHz

SC ✓ 12/4/2018
BNV ✓ 12/31/2019

Calibration date: November 12, 2018

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 NRP	SN: 104778	04-Apr-18 (No. 217-02672/02673)	Apr-19
Power sensor NRP-Z91	SN: 103244	04-Apr-18 (No. 217-02672)	Apr-19
Power sensor NRP-Z91	SN: 103245	04-Apr-18 (No. 217-02673)	Apr-19
Reference 20 dB Attenuator	SN: 5058 (20k)	04-Apr-18 (No. 217-02682)	Apr-19
Type-N mismatch combination	SN: 5047.2 / 06327	04-Apr-18 (No. 217-02683)	Apr-19
Reference Probe EX3DV4	SN: 7349	30-Dec-17 (No. EX3-7349_Dec17)	Dec-18
DAE4	SN: 601	04-Oct-18 (No. DAE4-601_Oct18)	Oct-19

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power meter EPM-442A	SN: GB37480704	07-Oct-15 (in house check Oct-18)	In house check: Oct-20
Power sensor HP 8481A	SN: US37292783	07-Oct-15 (in house check Oct-18)	In house check: Oct-20
Power sensor HP 8481A	SN: MY41092317	07-Oct-15 (in house check Oct-18)	In house check: Oct-20
RF generator R&S SMT-06	SN: 100972	15-Jun-15 (in house check Oct-18)	In house check: Oct-20
Network Analyzer Agilent E8358A	SN: US41080477	31-Mar-14 (in house check Oct-18)	In house check: Oct-19

	Name	Function	Signature
Calibrated by:	Manu Seitz	Laboratory Technician	
Approved by:	Katja Pokovic	Technical Manager	

Issued: November 12, 2018

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

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

Accreditation No.: SCS 0108

Glossary:

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

Calibration is Performed According to the Following Standards:

a) IEEE Std 1528-2013, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", June 2013
b) IEC 62209-1, "Measurement procedure for the assessment of Specific Absorption Rate (SAR) from hand-held and body-mounted devices used next to the ear (frequency range of 300 MHz to 6 GHz)", July 2016
c) IEC 62209-2, "Procedure to determine the Specific Absorption Rate (SAR) for wireless communication devices used in close proximity to the human body (frequency range of 30 MHz to 6 GHz)", March 2010
d) KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

Additional Documentation:

e) DASY4/5 System Handbook

Methods Applied and Interpretation of Parameters:

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

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

Measurement Conditions

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

DASY Version	DASY5	V52.10.2
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom	
Distance Dipole Center - TSL	10 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	2450 MHz ± 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Head TSL parameters	22.0 °C	39.2	1.80 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	37.9 ± 6 %	1.86 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	----	----

SAR result with Head TSL

SAR averaged over 1 cm³ (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	13.6 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**53.1 W/kg ± 17.0 % (k=2)**

SAR averaged over 10 cm³ (10 g) of Head TSL	condition	
SAR measured	250 mW input power	6.28 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**24.8 W/kg ± 16.5 % (k=2)**

Body TSL parameters

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Body TSL parameters	22.0 °C	52.7	1.95 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	51.4 ± 6 %	2.02 mho/m ± 6 %
Body TSL temperature change during test	< 0.5 °C	----	----

SAR result with Body TSL

SAR averaged over 1 cm³ (1 g) of Body TSL	Condition	
SAR measured	250 mW input power	13.0 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**50.8 W/kg ± 17.0 % (k=2)**

SAR averaged over 10 cm³ (10 g) of Body TSL	condition	
SAR measured	250 mW input power	6.03 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**23.8 W/kg ± 16.5 % (k=2)**

Appendix (Additional assessments outside the scope of SCS 0108)

Antenna Parameters with Head TSL

Impedance, transformed to feed point	54.7 Ω + 6.5 jΩ
Return Loss	- 22.3 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	50.7 Ω + 7.8 jΩ
Return Loss	- 22.2 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.157 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	September 26, 2013

DASY5 Validation Report for Head TSL

Date: 12.11.2018

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 2450 MHz; Type: D2450V2; Serial: D2450V2 - SN:921

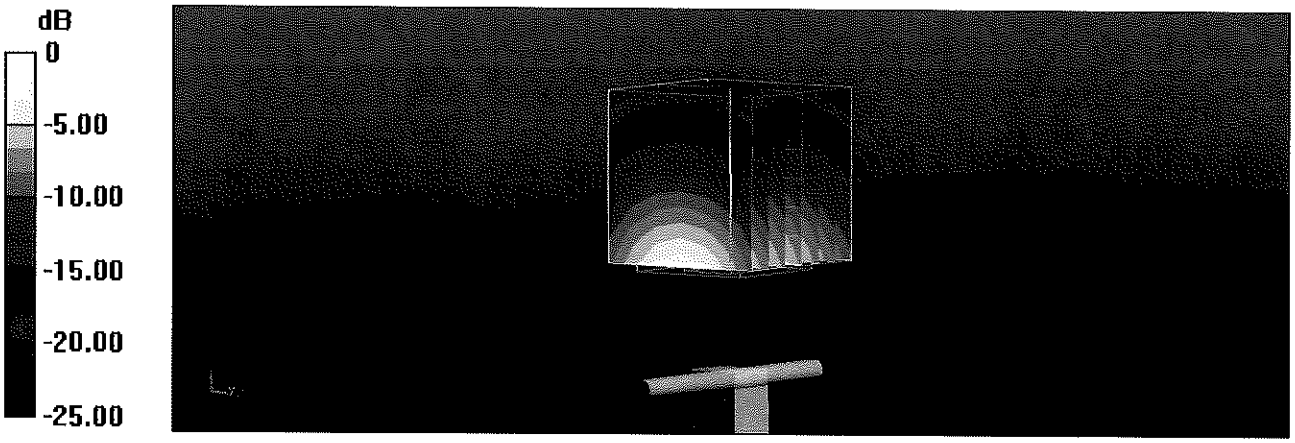
Communication System: UID 0 - CW; Frequency: 2450 MHz
Medium parameters used: f = 2450 MHz; σ = 1.86 S/m; ε_r = 37.9; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: EX3DV4 - SN7349; ConvF(7.88, 7.88, 7.88) @ 2450 MHz; Calibrated: 30.12.2017
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 04.10.2018
- Phantom: Flat Phantom 5.0 (front); Type: QD 000 P50 AA; Serial: 1001
- DASY52 52.10.2(1495); SEMCAD X 14.6.12(7450)

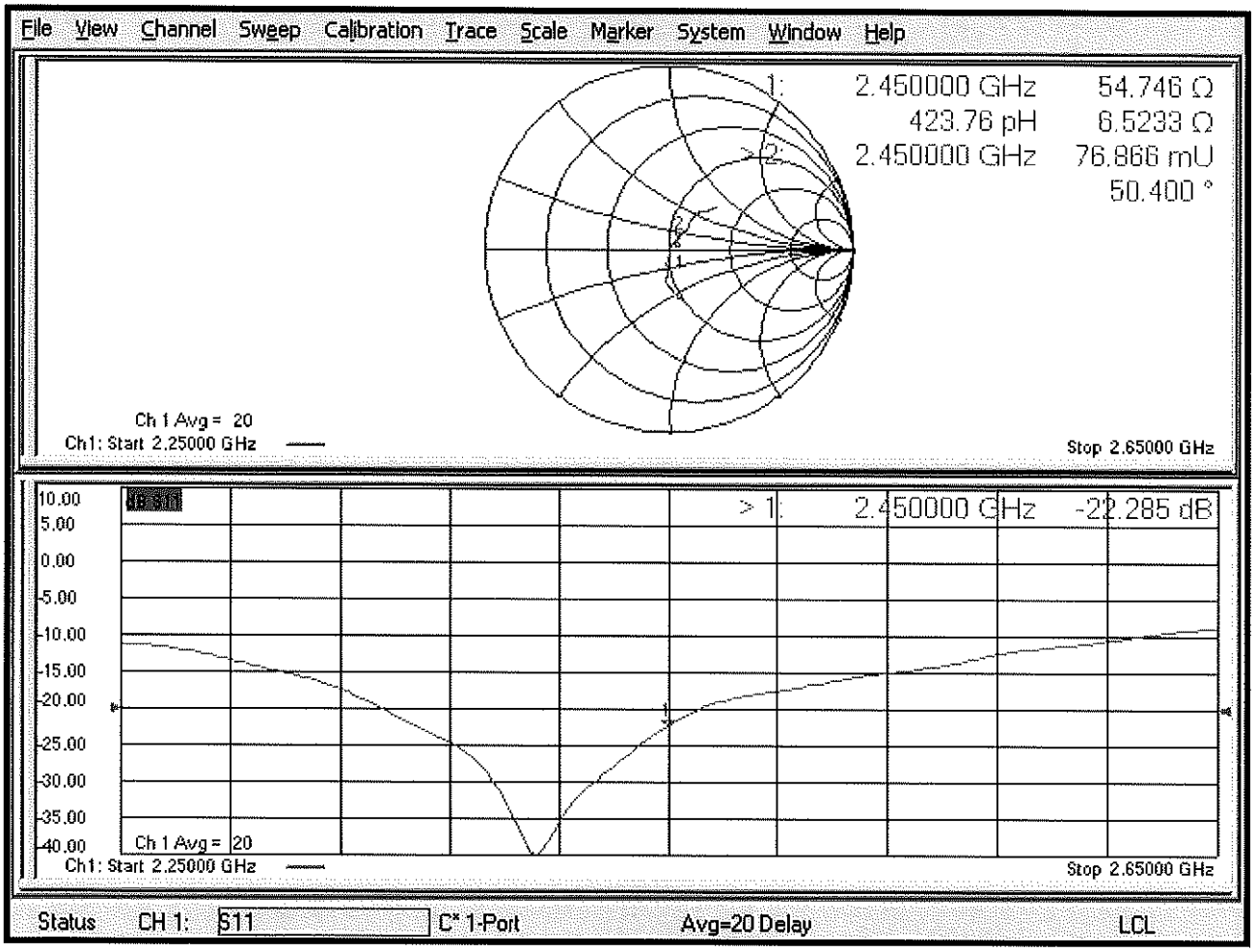
Dipole Calibration for Head Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 117.7 V/m; Power Drift = -0.09 dB
Peak SAR (extrapolated) = 27.4 W/kg
SAR(1 g) = 13.6 W/kg; SAR(10 g) = 6.28 W/kg
Maximum value of SAR (measured) = 22.4 W/kg



0 dB = 22.4 W/kg = 13.50 dBW/kg

Impedance Measurement Plot for Head TSL



DASY5 Validation Report for Body TSL

Date: 12.11.2018

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 2450 MHz; Type: D2450V2; Serial: D2450V2 - SN:921

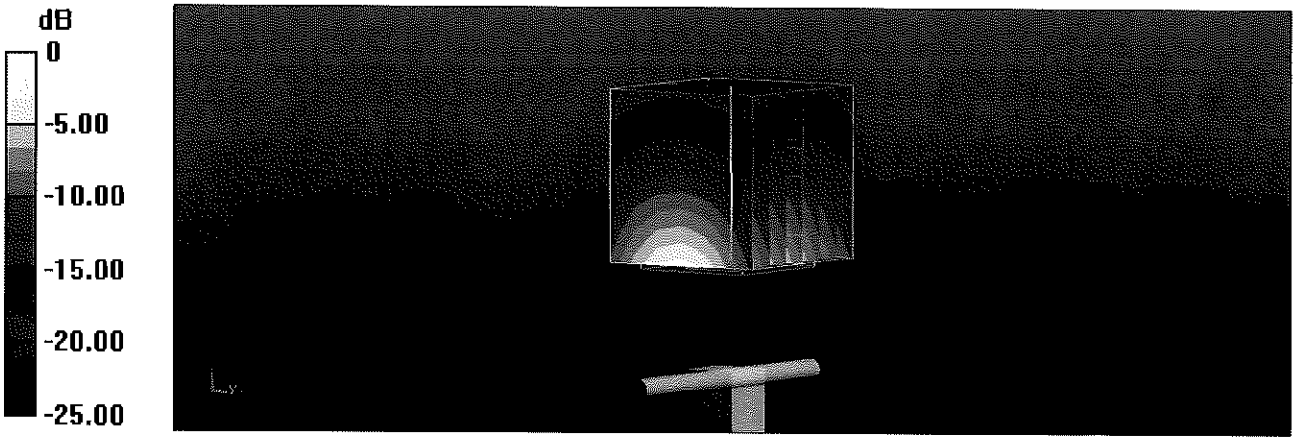
Communication System: UID 0 - CW; Frequency: 2450 MHz
Medium parameters used: f = 2450 MHz; σ = 2.02 S/m; ε_r = 51.4; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: EX3DV4 - SN7349; ConvF(8.01, 8.01, 8.01) @ 2450 MHz; Calibrated: 30.12.2017
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 04.10.2018
- Phantom: Flat Phantom 5.0 (back); Type: QD 000 P50 AA; Serial: 1002
- DASY52 52.10.2(1495); SEMCAD X 14.6.12(7450)

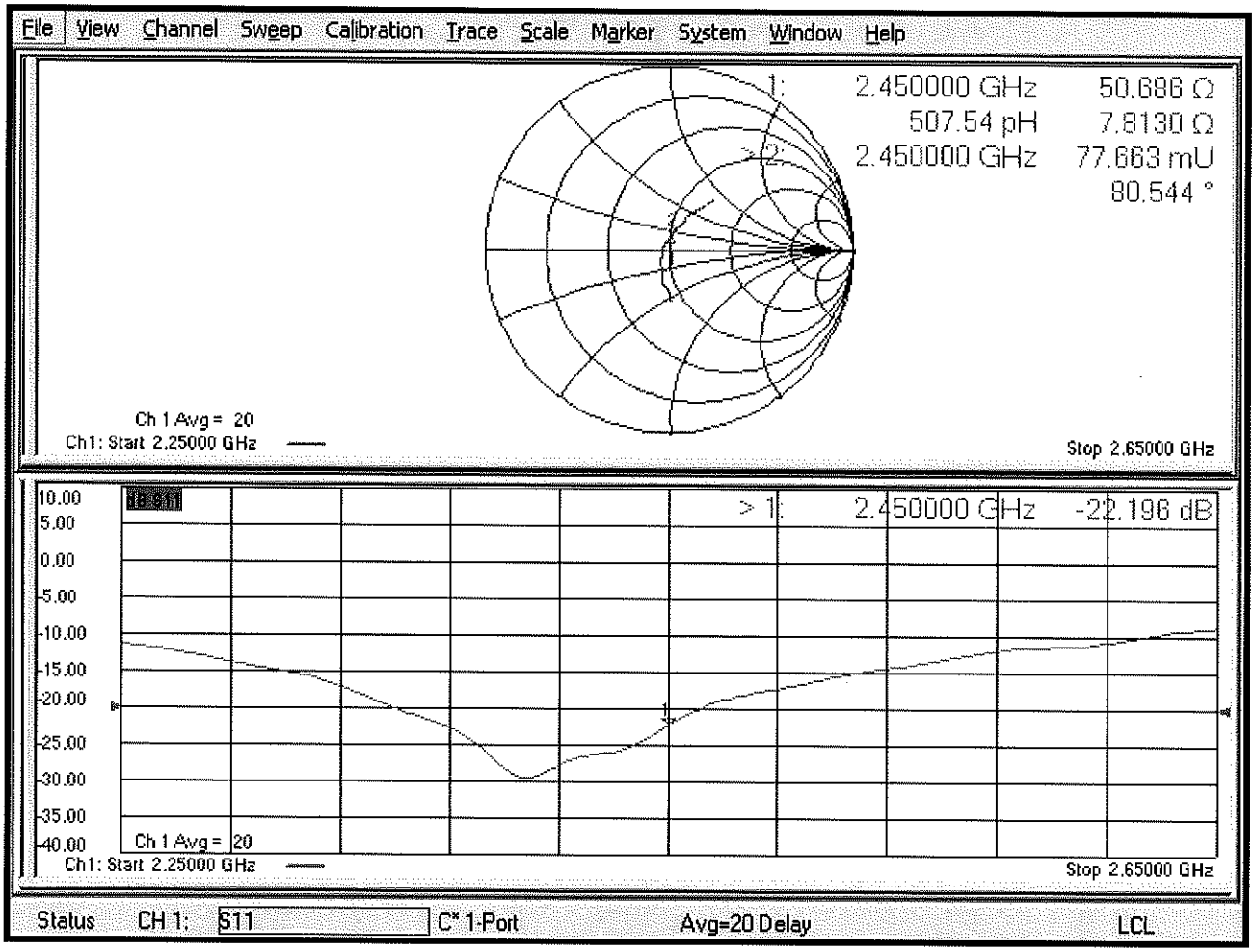
Dipole Calibration for Body Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 108.6 V/m; Power Drift = 0.01 dB
Peak SAR (extrapolated) = 26.1 W/kg
SAR(1 g) = 13 W/kg; SAR(10 g) = 6.03 W/kg
Maximum value of SAR (measured) = 21.3 W/kg



0 dB = 21.3 W/kg = 13.28 dBW/kg

Impedance Measurement Plot for Body TSL



Certification of Calibration

Object	D2450V2 – SN: 921
Calibration procedure(s)	Procedure for Calibration Extension for SAR Dipoles.
Extended Calibration date:	November 11, 2019
Description:	SAR Validation Dipole at 2450 MHz.

Calibration Equipment used:

Manufacturer	Model	Description	Cal Date	Cal Interval	Cal Due	Serial Number
Agilent	8753ES	S-Parameter Network Analyzer	8/26/2019	Annual	8/26/2020	MY40000670
Agilent	E4438C	ESG Vector Signal Generator	6/27/2019	Annual	6/27/2020	MY45093852
Amplifier Research	15S1G6	Amplifier	CBT	N/A	CBT	343972
Anritsu	ML2495A	Power Meter	11/20/2018	Annual	11/20/2019	1039008
Anritsu	MA2411B	Pulse Power Sensor	11/20/2018	Annual	11/20/2019	1027293
Anritsu	MA2411B	Pulse Power Sensor	11/20/2018	Annual	11/20/2019	1339007
Control Company	4040	Temperature / Humidity Monitor	2/28/2018	Biennial	2/28/2020	150761911
Control Company	4352	Ultra Long Stem Thermometer	2/28/2018	Biennial	2/28/2020	170330160
Keysight Technologies	85033E	Standard Mechanical Calibration Kit (DC to 9GHz, 3.5mm)	7/2/2019	Annual	7/2/2020	MY53401181
Keysight	772D	Dual Directional Coupler	CBT	N/A	CBT	MY52180215
Mini-Circuits	BW-N20W5+	DC to 18 GHz Precision Fixed 20 dB Attenuator	CBT	N/A	CBT	N/A
Mini-Circuits	NLP-2950+	Low Pass Filter DC to 2700 MHz	CBT	N/A	CBT	N/A
Narda	4772-3	Attenuator (3dB)	CBT	N/A	CBT	9406
Pasternack	PE2209-10	Bidirectional Coupler	CBT	N/A	CBT	N/A
Seekonk	NC-100	Torque Wrench	5/4/2018	Biennial	5/4/2020	22216
SPEAG	DAK-3.5	Dielectric Assessment Kit	5/7/2019	Annual	5/7/2020	1070
SPEAG	EX3DV4	SAR Probe	1/24/2019	Annual	1/24/2020	7490
SPEAG	DAE4	Data Acquisition Electronics	1/15/2019	Annual	1/15/2020	1532

Measurement Uncertainty = ±23% (k=2)

	Name	Function	Signature
Calibrated By:	Parker Jones	Team Lead Engineer	Parker Jones
Approved By:	Kaitlin O'Keefe	Senior Technical Manager	

DIPOLE CALIBRATION EXTENSION

Per KDB 865664 D01, calibration intervals of up to three years may be considered for reference dipoles when it is demonstrated that the SAR target, impedance and return loss of a dipole have remained stable according to the following requirements:

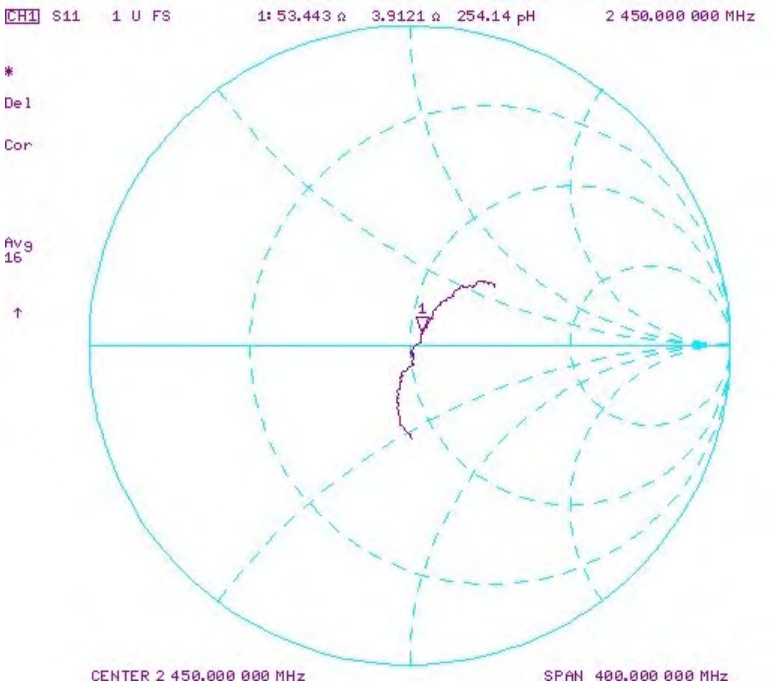
1. The measured SAR does not deviate more than 10% from the target on the calibration certificate.
2. The return-loss does not deviate more than 20% from the previous measurement and meets the required 20dB minimum return-loss requirement.
3. The measurement of real or imaginary parts of impedance does not deviate more than 5Ω from the previous measurement.

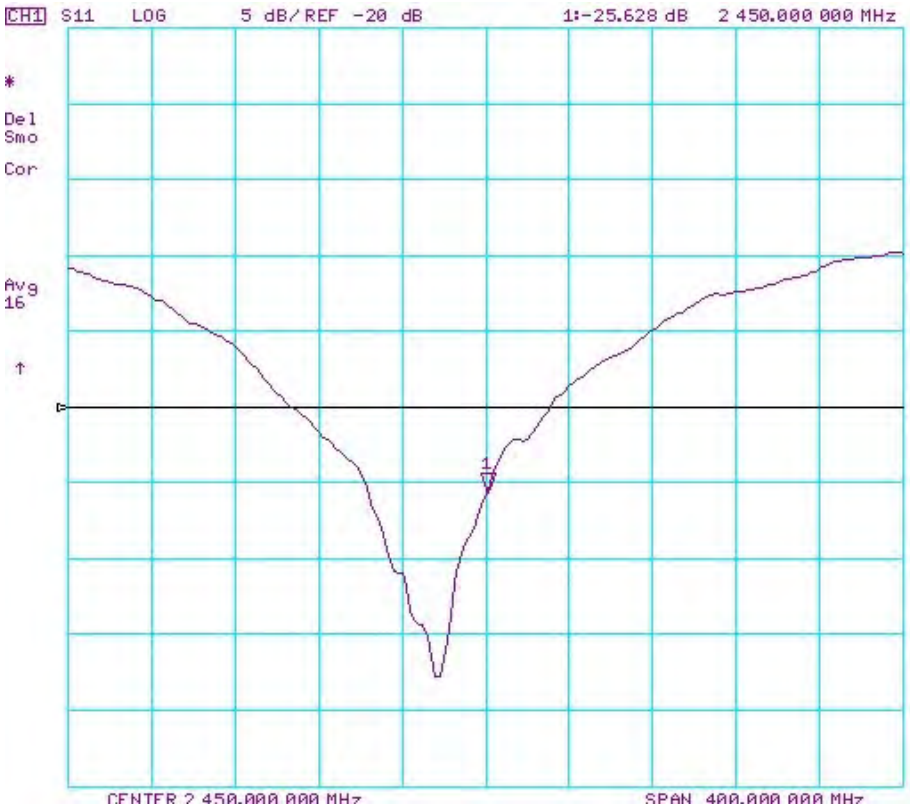
The following dipole was checked to pass the above 3 requirements to have 2-year calibration period from the calibration date:

Calibration Date	Extension Date	Certificate Electrical Delay (ns)	Certificate SAR Target Head (1g) W/kg @ 20.0 dBm	Measured Head SAR (1g) W/kg @ 20.0 dBm	Deviation 1g (%)	Certificate SAR Target Head (10g) W/kg @ 20.0 dBm	Measured Head SAR (10g) W/kg @ 20.0 dBm	Deviation 10g (%)	Certificate Impedance Head (Ohm) Real	Measured Impedance Head (Ohm) Real	Difference (Ohm) Real	Certificate Impedance Head (Ohm) Imaginary	Measured Impedance Head (Ohm) Imaginary	Difference (Ohm) Imaginary	Certificate Return Loss Head (dB)	Measured Return Loss Head (dB)	Deviation (%)	PASS/FAIL
11/12/2018	11/11/2019	1.157	5.31	5.28	-0.56%	2.48	2.38	-4.03%	54.7	53.4	1.3	6.5	3.9	2.6	-22.3	-25.6	-14.80%	PASS

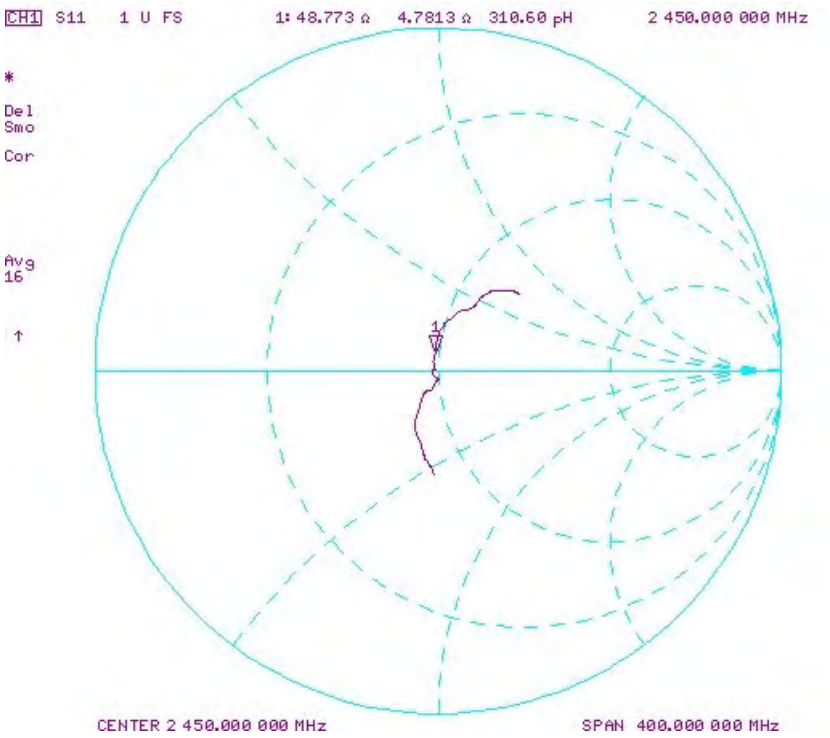
Calibration Date	Extension Date	Certificate Electrical Delay (ns)	Certificate SAR Target Body (1g) W/kg @ 20.0 dBm	Measured Body SAR (1g) W/kg @ 20.0 dBm	Deviation 1g (%)	Certificate SAR Target Body (10g) W/kg @ 20.0 dBm	Measured Body SAR (10g) W/kg @ 20.0 dBm	Deviation 10g (%)	Certificate Impedance Body (Ohm) Real	Measured Impedance Body (Ohm) Real	Difference (Ohm) Real	Certificate Impedance Body (Ohm) Imaginary	Measured Impedance Body (Ohm) Imaginary	Difference (Ohm) Imaginary	Certificate Return Loss Body (dB)	Measured Return Loss Body (dB)	Deviation (%)	PASS/FAIL
11/12/2018	11/11/2019	1.157	5.08	5.41	6.50%	2.38	2.47	3.78%	50.7	48.8	1.9	7.8	4.8	3	-22.2	-26.2	-18.00%	PASS

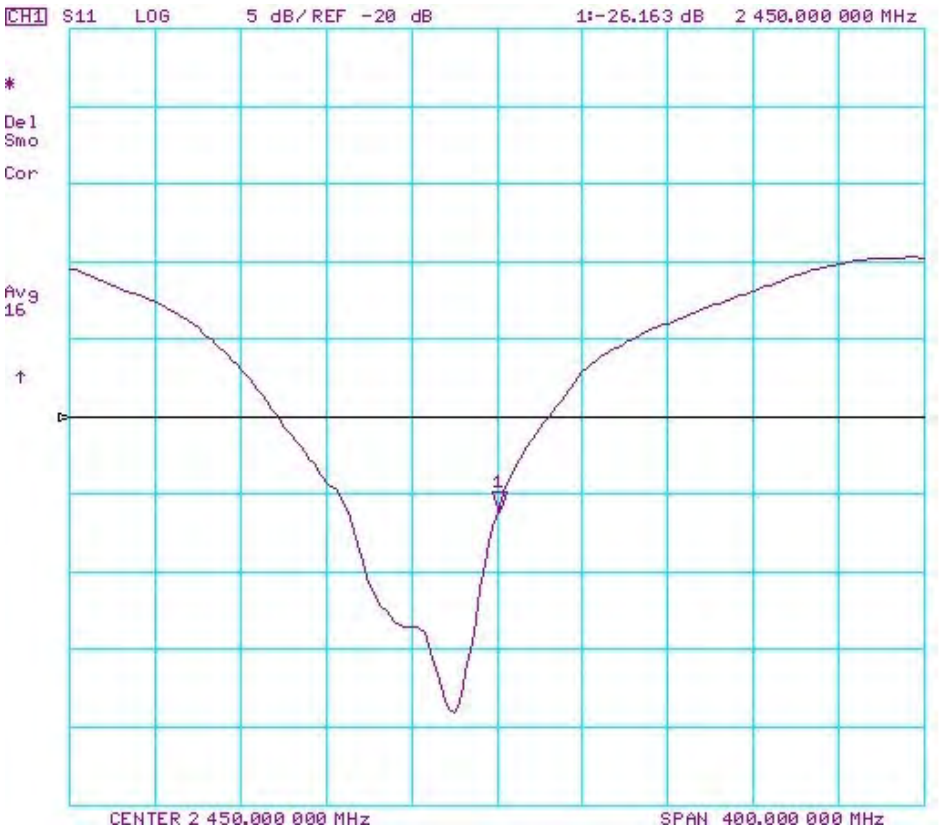
Impedance & Return-Loss Measurement Plot for Head TSL





Impedance & Return-Loss Measurement Plot for Body TSL





Calibration Laboratory of
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Zeughausstrasse 43, 8004 Zurich, Switzerland

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

Accreditation No.: SCS 0108

Client PC Test **Certificate No: D2450V2-945_May18**

CALIBRATION CERTIFICATE

Object	D2450V2 - SN:945
Calibration procedure(s)	QA CAL-05.v10 Calibration procedure for dipole validation kits above 700 MHz
Calibration date:	May 16, 2018

SCV 5/31/2018 BNV 06/01/2019

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 NRP	SN: 104778	04-Apr-18 (No. 217-02672/02673)	Apr-19
Power sensor NRP-Z91	SN: 103244	04-Apr-18 (No. 217-02672)	Apr-19
Power sensor NRP-Z91	SN: 103245	04-Apr-18 (No. 217-02673)	Apr-19
Reference 20 dB Attenuator	SN: 5058 (20k)	04-Apr-18 (No. 217-02682)	Apr-19
Type-N mismatch combination	SN: 5047.2 / 06327	04-Apr-18 (No. 217-02683)	Apr-19
Reference Probe EX3DV4	SN: 7349	30-Dec-17 (No. EX3-7349_Dec17)	Dec-18
DAE4	SN: 601	26-Oct-17 (No. DAE4-601_Oct17)	Oct-18

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power meter EPM-442A	SN: GB37480704	07-Oct-15 (in house check Oct-16)	In house check: Oct-18
Power sensor HP 8481A	SN: US37292783	07-Oct-15 (in house check Oct-16)	In house check: Oct-18
Power sensor HP 8481A	SN: MY41092317	07-Oct-15 (in house check Oct-16)	In house check: Oct-18
RF generator R&S SMT-06	SN: 100972	15-Jun-15 (in house check Oct-16)	In house check: Oct-18
Network Analyzer HP 8753E	SN: US37390585	18-Oct-01 (in house check Oct-17)	In house check: Oct-18

	Name	Function	Signature
Calibrated by:	Manu Seitz	Laboratory Technician	
Approved by:	Katja Pokovic	Technical Manager	

Issued: May 17, 2018

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

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Accreditation No.: SCS 0108

Glossary:

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

Calibration is Performed According to the Following Standards:

a) IEEE Std 1528-2013, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", June 2013
b) IEC 62209-1, "Measurement procedure for the assessment of Specific Absorption Rate (SAR) from hand-held and body-mounted devices used next to the ear (frequency range of 300 MHz to 6 GHz)", July 2016
c) IEC 62209-2, "Procedure to determine the Specific Absorption Rate (SAR) for wireless communication devices used in close proximity to the human body (frequency range of 30 MHz to 6 GHz)", March 2010
d) KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

Additional Documentation:

e) DASY4/5 System Handbook

Methods Applied and Interpretation of Parameters:

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

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

Measurement Conditions

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

DASY Version	DASY5	V52.10.1
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom	
Distance Dipole Center - TSL	10 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	2450 MHz ± 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Head TSL parameters	22.0 °C	39.2	1.80 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	38.2 ± 6 %	1.85 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	----	----

SAR result with Head TSL

SAR averaged over 1 cm³ (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	13.0 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**51.0 W/kg ± 17.0 % (k=2)**

SAR averaged over 10 cm³ (10 g) of Head TSL	condition	
SAR measured	250 mW input power	6.02 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**23.8 W/kg ± 16.5 % (k=2)**

Body TSL parameters

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Body TSL parameters	22.0 °C	52.7	1.95 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	52.3 ± 6 %	1.99 mho/m ± 6 %
Body TSL temperature change during test	< 0.5 °C	----	----

SAR result with Body TSL

SAR averaged over 1 cm³ (1 g) of Body TSL	Condition	
SAR measured	250 mW input power	12.5 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**49.4 W/kg ± 17.0 % (k=2)**

SAR averaged over 10 cm³ (10 g) of Body TSL	condition	
SAR measured	250 mW input power	5.83 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**23.2 W/kg ± 16.5 % (k=2)**

Appendix (Additional assessments outside the scope of SCS 0108)

Antenna Parameters with Head TSL

Impedance, transformed to feed point	56.1 Ω + 3.7 jΩ
Return Loss	- 23.5 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	51.9 Ω + 5.0 jΩ
Return Loss	- 25.7 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.157 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 15, 2014

DASY5 Validation Report for Head TSL

Date: 16.05.2018

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 2450 MHz; Type: D2450V2; Serial: D2450V2 - SN:945

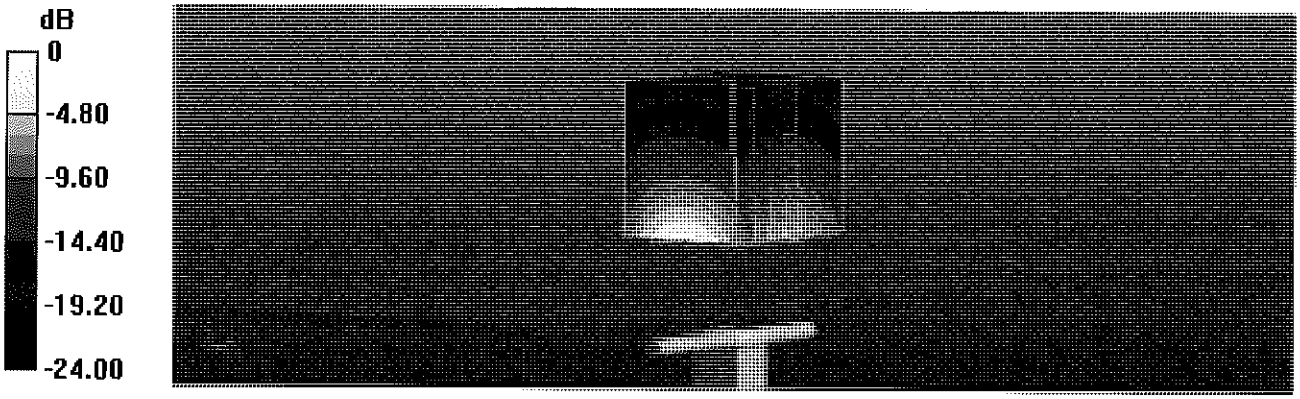
Communication System: UID 0 - CW; Frequency: 2450 MHz
Medium parameters used: f = 2450 MHz; σ = 1.85 S/m; ε_r = 38.2; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: EX3DV4 - SN7349; ConvF(7.88, 7.88, 7.88) @ 2450 MHz; Calibrated: 30.12.2017
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 26.10.2017
- Phantom: Flat Phantom 5.0 (front); Type: QD 000 P50 AA; Serial: 1001
- DASY52 52.10.1(1476); SEMCAD X 14.6.11(7439)

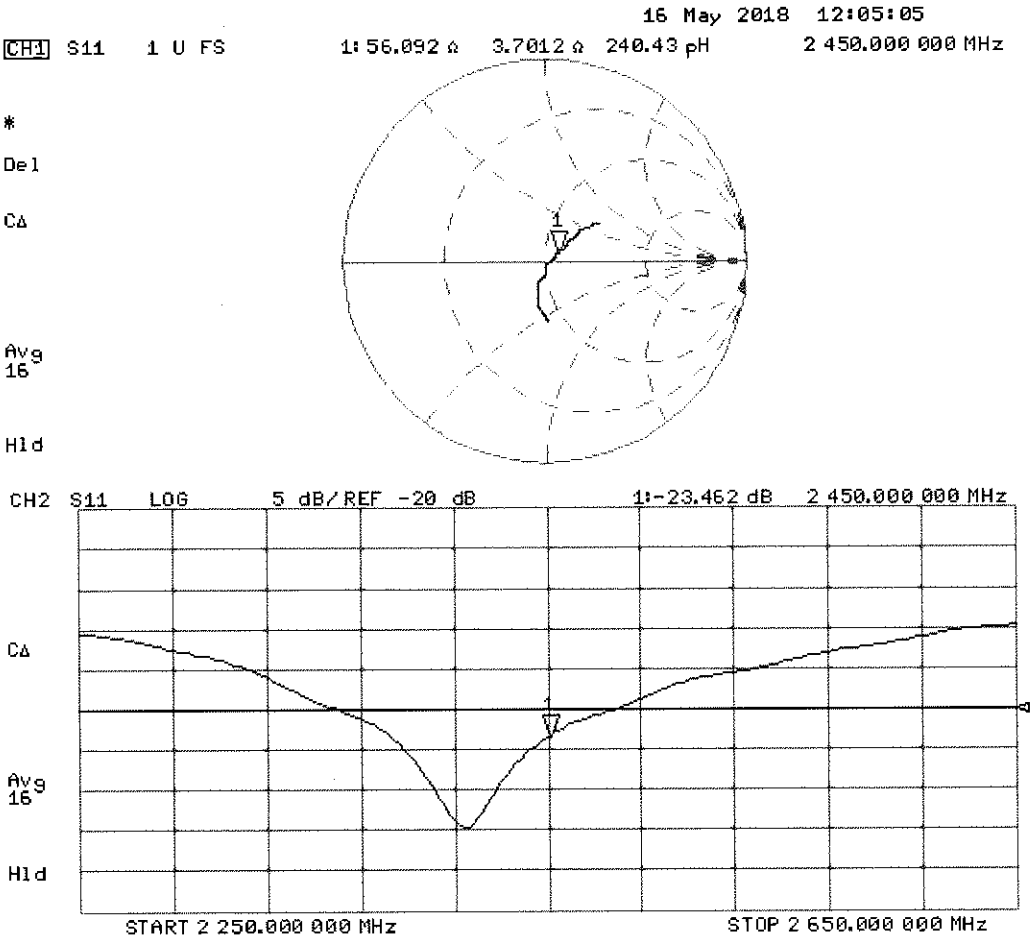
Dipole Calibration for Head Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 114.8 V/m; Power Drift = -0.01 dB
Peak SAR (extrapolated) = 25.9 W/kg
SAR(1 g) = 13 W/kg; SAR(10 g) = 6.02 W/kg
Maximum value of SAR (measured) = 21.4 W/kg



0 dB = 21.4 W/kg = 13.30 dBW/kg

Impedance Measurement Plot for Head TSL



DASY5 Validation Report for Body TSL

Date: 16.05.2018

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 2450 MHz; Type: D2450V2; Serial: D2450V2 - SN:945

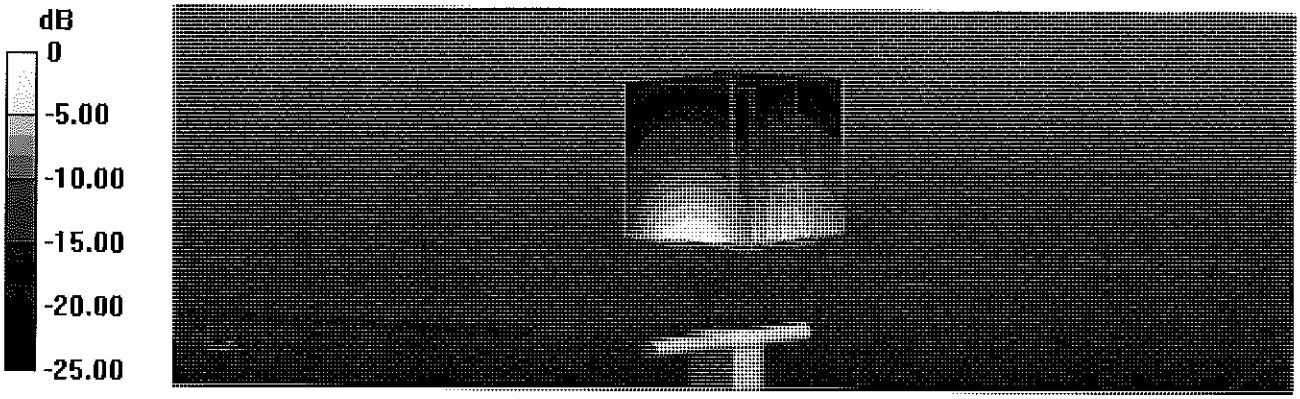
Communication System: UID 0 - CW; Frequency: 2450 MHz
Medium parameters used: f = 2450 MHz; σ = 1.99 S/m; ε_r = 52.3; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: EX3DV4 - SN7349; ConvF(8.01, 8.01, 8.01) @ 2450 MHz; Calibrated: 30.12.2017
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 26.10.2017
- Phantom: Flat Phantom 5.0 (back); Type: QD 000 P50 AA; Serial: 1002
- DASY52 52.10.1(1476); SEMCAD X 14.6.11(7439)

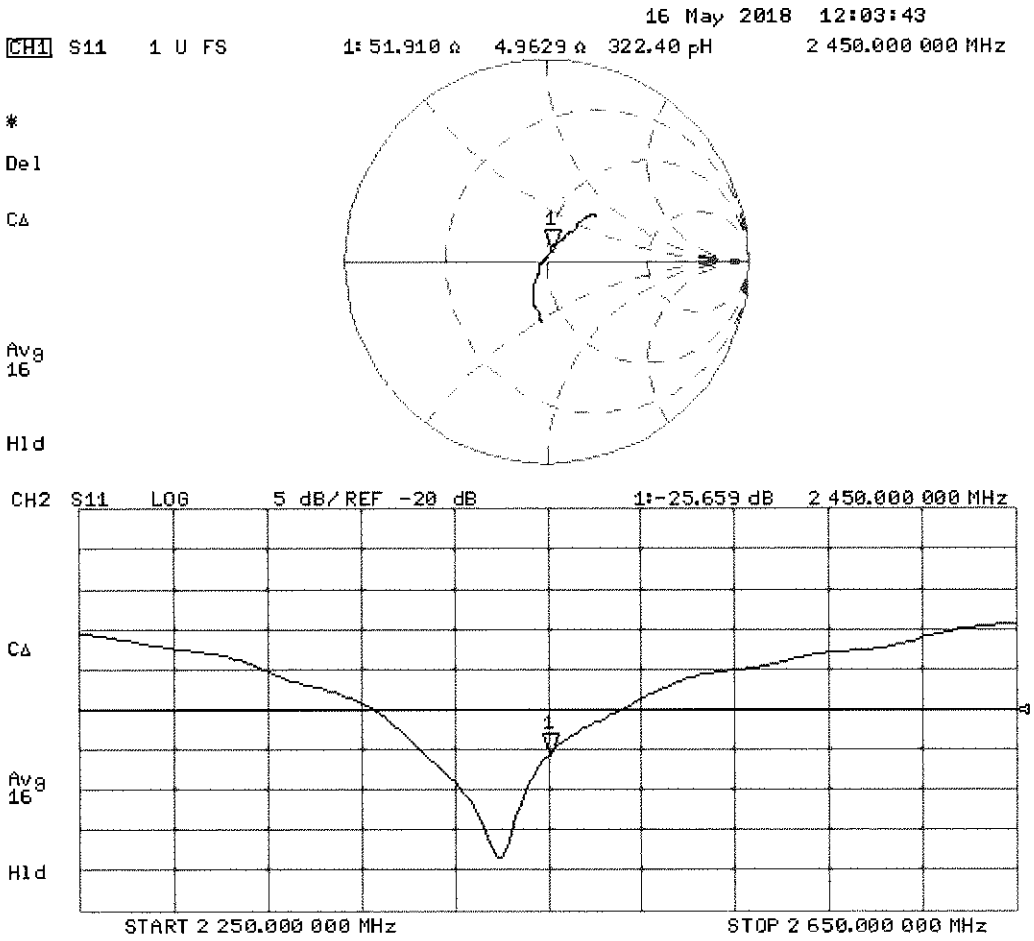
Dipole Calibration for Body Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 106.8 V/m; Power Drift = -0.09 dB
Peak SAR (extrapolated) = 25.0 W/kg
SAR(1 g) = 12.5 W/kg; SAR(10 g) = 5.83 W/kg
Maximum value of SAR (measured) = 20.2 W/kg



0 dB = 20.2 W/kg = 13.05 dBW/kg

Impedance Measurement Plot for Body TSL



Certification of Calibration

Object	D2450V2 – SN: 945
Calibration procedure(s)	Procedure for Calibration Extension for SAR Dipoles.
Extended Calibration date:	May 16, 2019
Description:	SAR Validation Dipole at 2450 MHz.

Calibration Equipment used:

Manufacturer	Model	Description	Cal Date	Cal Interval	Cal Due	Serial Number
Agilent	8753ES	S-Parameter Network Analyzer	10/2/2018	Annual	10/2/2019	US39170118
Agilent	N5182A	MXG Vector Signal Generator	6/15/2018	Annual	6/15/2019	MY47420837
Amplifier Research	15S1G6	Amplifier	CBT	N/A	CBT	343972
Anritsu	ML2495A	Power Meter	10/21/2018	Annual	10/21/2019	941001
Anritsu	MA2411B	Pulse Power Sensor	10/30/2018	Annual	10/30/2019	1207470
Anritsu	MA2411B	Pulse Power Sensor	11/20/2018	Annual	11/20/2019	1339007
Control Company	4040	Temperature / Humidity Monitor	2/28/2018	Biennial	2/28/2020	150761911
Control Company	4352	Ultra Long Stem Thermometer	2/28/2018	Biennial	2/28/2020	170330160
Keysight	772D	Dual Directional Coupler	CBT	N/A	CBT	MY52180215
Keysight Technologies	85033E	Standard Mechanical Calibration Kit (DC to 9GHz, 3.5mm)	6/4/2018	Annual	6/4/2019	MY53401181
Mini-Circuits	BW-N20W5+	DC to 18 GHz Precision Fixed 20 dB Attenuator	CBT	N/A	CBT	N/A
Mini-Circuits	NLP-2950+	Low Pass Filter DC to 2700 MHz	CBT	N/A	CBT	N/A
Narda	4772-3	Attenuator (3dB)	CBT	N/A	CBT	9406
Pasternack	PE2209-10	Bidirectional Coupler	CBT	N/A	CBT	N/A
Pasternack	PE5011-1	Torque Wrench	7/19/2017	Biennial	7/19/2019	N/A
SPEAG	DAKS-3.5	Portable DAK	9/11/2018	Annual	9/11/2019	1045
SPEAG	EX3DV4	SAR Probe	7/20/2018	Annual	7/20/2019	7416
SPEAG	DAE4	Dasy Data Acquisition Electronics	7/10/2018	Annual	7/10/2019	1402

Measurement Uncertainty = ±23% (k=2)

	Name	Function	Signature
Calibrated By:	Parker Jones	Team Lead Engineer	Parker Jones
Approved By:	Kaitlin O'Keefe	Senior Technical Manager	

DIPOLE CALIBRATION EXTENSION

Per KDB 865664 D01, calibration intervals of up to three years may be considered for reference dipoles when it is demonstrated that the SAR target, impedance and return loss of a dipole have remained stable according to the following requirements:

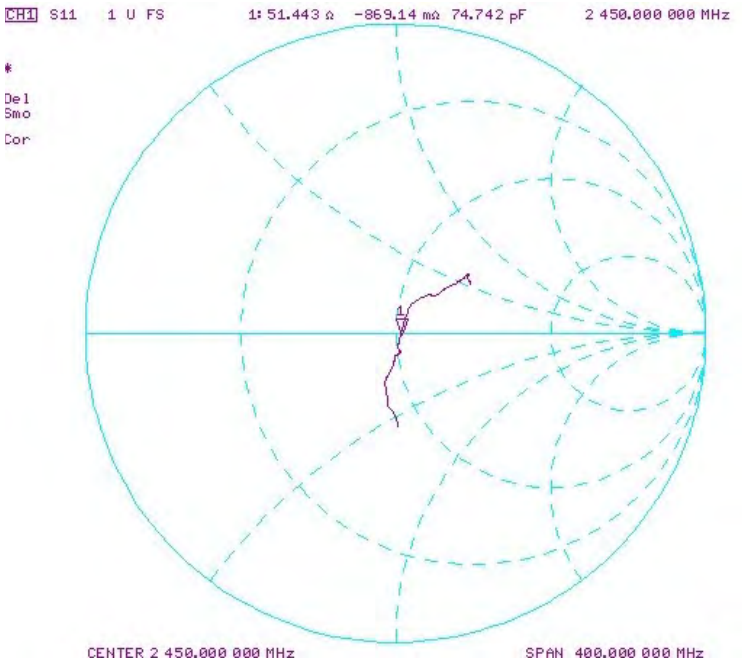
1. The measured SAR does not deviate more than 10% from the target on the calibration certificate.
2. The return-loss does not deviate more than 20% from the previous measurement and meets the required 20dB minimum return-loss requirement.
3. The measurement of real or imaginary parts of impedance does not deviate more than 5Ω from the previous measurement.

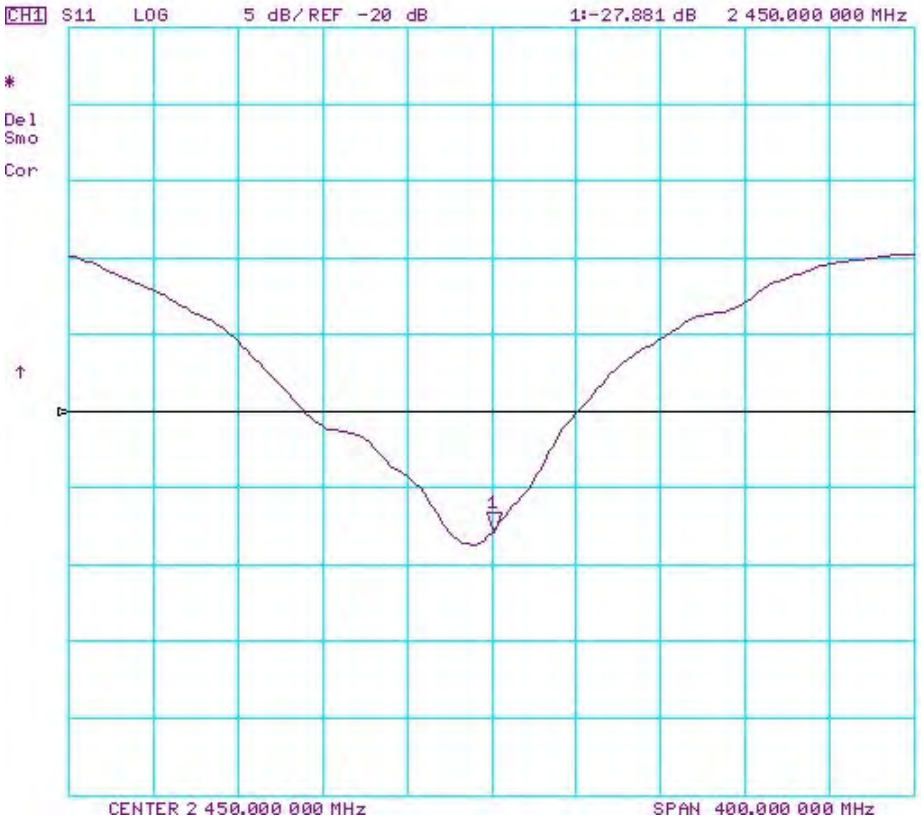
The following dipole was checked to pass the above 3 requirements to have 2-year calibration period from the calibration date:

Calibration Date	Extension Date	Certificate Electrical Delay (ns)	Certificate SAR Target Head (1g) W/kg @ 20.0 dBm	Measured Head SAR (1g) W/kg @ 20.0 dBm	Deviation 1g (%)	Certificate SAR Target Head (10g) W/kg @ 20.0 dBm	Measured Head SAR (10g) W/kg @ 20.0 dBm	Deviation 10g (%)	Certificate Impedance Head (Ohm) Real	Measured Impedance Head (Ohm) Real	Difference (Ohm) Real	Certificate Impedance Head (Ohm) Imaginary	Measured Impedance Head (Ohm) Imaginary	Difference (Ohm) Imaginary	Certificate Return Loss Head (dB)	Measured Return Loss Head (dB)	Deviation (%)	PASS/FAIL
5/16/2018	5/16/2019	1.157	5.1	5.29	3.73%	2.38	2.44	2.52%	56.1	51.4	4.7	3.7	-0.9	4.6	-23.5	-27.9	-18.60%	PASS

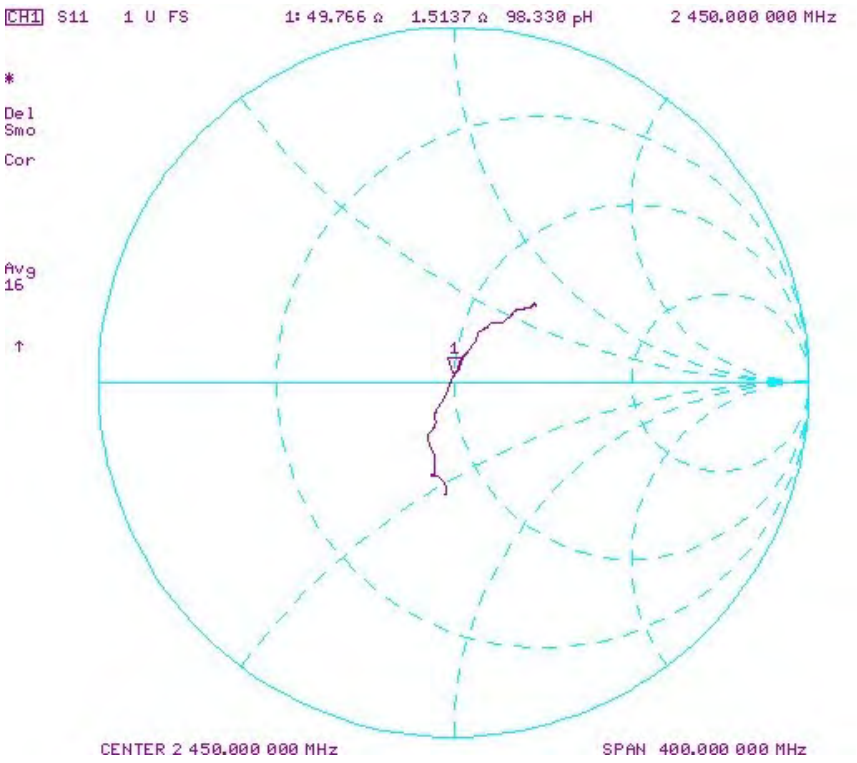
Calibration Date	Extension Date	Certificate Electrical Delay (ns)	Certificate SAR Target Body (1g) W/kg @ 20.0 dBm	Measured Body SAR (1g) W/kg @ 20.0 dBm	Deviation 1g (%)	Certificate SAR Target Body (10g) W/kg @ 20.0 dBm	Measured Body SAR (10g) W/kg @ 20.0 dBm	Deviation 10g (%)	Certificate Impedance Body (Ohm) Real	Measured Impedance Body (Ohm) Real	Difference (Ohm) Real	Certificate Impedance Body (Ohm) Imaginary	Measured Impedance Body (Ohm) Imaginary	Difference (Ohm) Imaginary	Certificate Return Loss Body (dB)	Measured Return Loss Body (dB)	Deviation (%)	PASS/FAIL
5/16/2018	5/16/2019	1.157	4.94	5.21	5.47%	2.32	2.38	2.59%	51.9	49.8	2.1	5	1.5	3.5	-25.7	-29.5	-14.70%	PASS

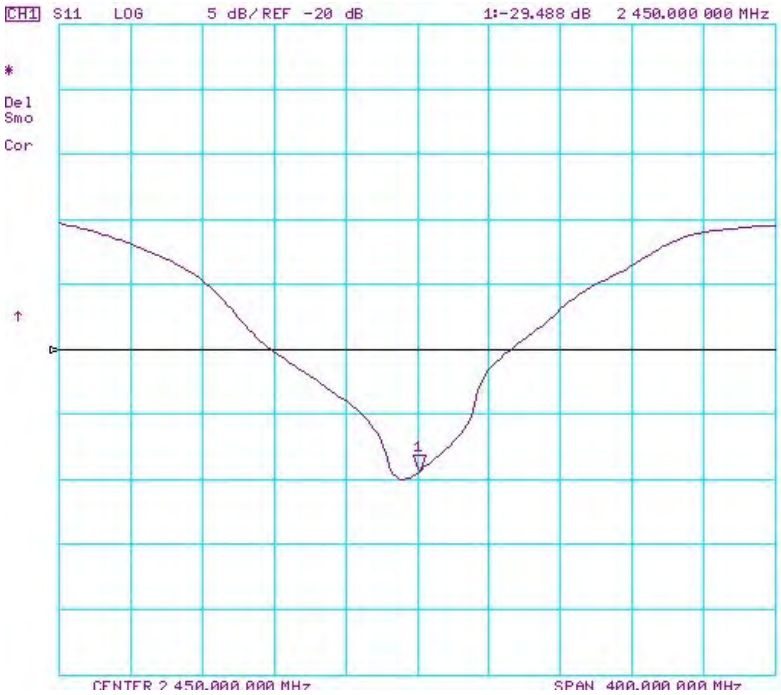
Impedance & Return-Loss Measurement Plot for Head TSL





Impedance & Return-Loss Measurement Plot for Body TSL





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Accreditation No.: SCS 0108

Client PC Test

Certificate No: D2600V2-1009_Jun18

CALIBRATION CERTIFICATE

Object: D2600V2 - SN:1009

Calibration procedure(s): QA CAL-05.v10
Calibration procedure for dipole validation kits above 700 MHz

Calibration date: June 19, 2018

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 NRP	SN: 104778	04-Apr-18 (No. 217-02672/02673)	Apr-19
Power sensor NRP-Z91	SN: 103244	04-Apr-18 (No. 217-02672)	Apr-19
Power sensor NRP-Z91	SN: 103245	04-Apr-18 (No. 217-02673)	Apr-19
Reference 20 dB Attenuator	SN: 5058 (20k)	04-Apr-18 (No. 217-02682)	Apr-19
Type-N mismatch combination	SN: 5047.2 / 06327	04-Apr-18 (No. 217-02683)	Apr-19
Reference Probe EX3DV4	SN: 7349	30-Dec-17 (No. EX3-7349_Dec17)	Dec-18
DAE4	SN: 601	26-Oct-17 (No. DAE4-601_Oct17)	Oct-18

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power meter EPM-442A	SN: GB37480704	07-Oct-15 (in house check Oct-16)	In house check: Oct-18
Power sensor HP 8481A	SN: US37292783	07-Oct-15 (in house check Oct-16)	In house check: Oct-18
Power sensor HP 8481A	SN: MY41092317	07-Oct-15 (in house check Oct-16)	In house check: Oct-18
RF generator R&S SMT-06	SN: 100972	15-Jun-15 (in house check Oct-16)	In house check: Oct-18
Network Analyzer HP 8753E	SN: US37390585	18-Oct-01 (in house check Oct-17)	In house check: Oct-18

	Name	Function	Signature
Calibrated by:	Claudio Leubler	Laboratory Technician	
Approved by:	Katja Pokovic	Technical Manager	

Issued: June 21, 2018

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Accreditation No.: SCS 0108

Glossary:

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

Calibration is Performed According to the Following Standards:

a) IEEE Std 1528-2013, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", June 2013
b) IEC 62209-1, "Measurement procedure for the assessment of Specific Absorption Rate (SAR) from hand-held and body-mounted devices used next to the ear (frequency range of 300 MHz to 6 GHz)", July 2016
c) IEC 62209-2, "Procedure to determine the Specific Absorption Rate (SAR) for wireless communication devices used in close proximity to the human body (frequency range of 30 MHz to 6 GHz)", March 2010
d) KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

Additional Documentation:

e) DASY4/5 System Handbook

Methods Applied and Interpretation of Parameters:

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

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