RE051-14-102508-5-A Ed. 0

SAR TEST REPORT

According to the standard:
EN 62209-2 : 2010
Fast measurements

Equipment under test:
Antenna patch for mobile phone
FAZUP
Tested with an Apple iPhone 5S (A1457)

Company:
FAZUP

DISTRIBUTION: Messrs SAMAKH **Company: FAZUP**

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This document is the result of testing a specimen or a sample of the product submitted. It does not imply an assessment of the conformity of the whole production of the tested sample.

EQUIPMENT UNDER TEST:	Antenna patch for mobile phone
Reference 1:	FAZUP (antenna patch)
Serial number:	-
Reference 2:	Apple iPhone 5S Model A1457 (mobile phone)
Serial number:	IMEI 358688050811736
MANUFACTURER:	-
APPLICANT:	
Company:	FAZUP
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DATE(S) OF TEST(S):	May 26, 27 and 28, 2014
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TEST(S) OPERATOR(S):	Emmanuel TOUTAIN

SUMMARY

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1. INTRODUCTION

In this test report, Specific Absorption Rate (SAR) measurements for the mobile phone Apple iPhone 5S (A1457) used with the antenna patch FAZUP are presented.

The measurements were made according to the EN 62209-2 standard for evaluating the SAR level attenuation provided by the patch.
Full SAR testing according to the EN 62209-2 standard is not required by the applicant; the testing program using a fast measurement method is described in §7. MEASUREMENT RESULTS.

2. REFERENCE DOCUMENTS

The reference documents referred throughout this report are listed below.
These reference documents are applicable to the entire report, although extensions (version, date and amendment) are not repeated.

Reference	Document title	Date
EN 62209-2	Human exposure to radio frequency fields from hand-held and body-mounted wireless communication devices - Human models, instrumentation, and procedures - Part 2: procedure to determine the specific absorption rate (SAR) for mobile wireless communication devices used in close proximity to the human body (frequency range of 30 MHz to 6 GHz)	2010

3. PRESENTATION OF EQUIPMENT FOR TESTING PURPOSES

The photographs of the mobile phone Apple iPhone 5S (A1457) and the antenna patch FAZUP are shown in Fig. 1.
The standard used by the mobile phone for this test is the LTE in the 800, 1800 and 2600MHz frequency bands, the antenna is integrated.

The antenna patch FAZUP was placed on the rear side of the mobile phone by the applicant.

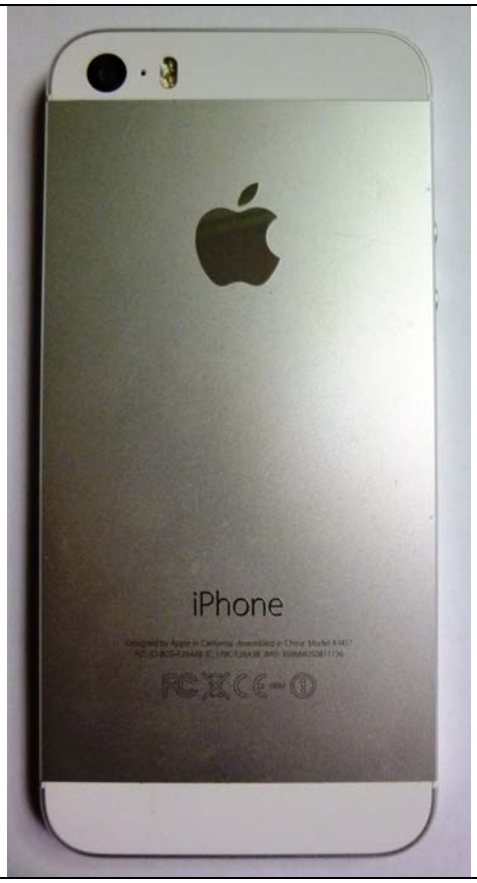
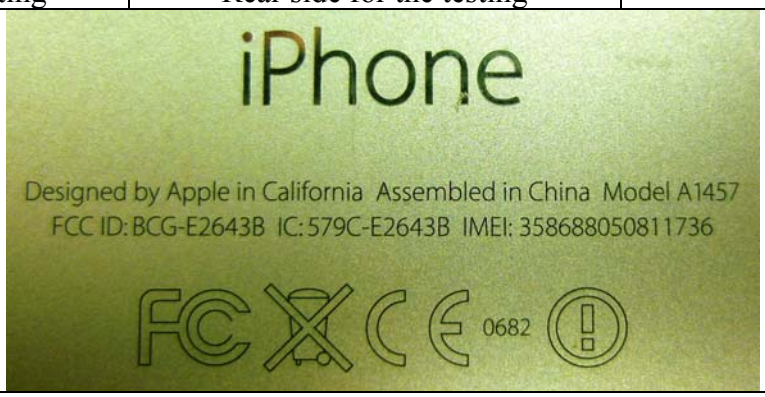
		
Apple iPhone 5S (A1457) Front side for the testing	Apple iPhone 5S (A1457) Rear side for the testing	Apple iPhone 5S (A1457) and FAZUP
		
Mobile phone marking		

Fig. 1: Photographs of the equipment under test

4. TESTS RESULTS SUMMARY

Configuration	SAR level attenuation		
	LTE800 Channel 24300 847.0 MHz	LTE1800 Channel 19575 1747.5 MHz	LTE2600 Channel 21100 2535.0 MHz
Apple iPhone 5S (A1457) + FAZUP, rear side at 0cm from the phantom	44.2%	-	53.3%
Apple iPhone 5S (A1457) + FAZUP, front side at 0cm from the phantom	41.4%	64.4%	63.1%

This test report only relates to SAR measurements; radiated performances evaluation of the mobile phone with and without the protective device is not part of this report.

5. ENVIRONNEMENTAL CONDITIONS

Condition	Measured Value
Liquid Temperature	*See Graphical Representations and §14*
Ambient Temperature	*See Graphical Representations and §14*

6. EQUIPMENT USED FOR THE TESTING

Platform ID	Platform	Equipment	Type	Manufacturer	Internal Number	Software Version
1	BTS Simulator	CMW500	Radio tester	Rohde-Schwarz	7041	
2	DASY4	DASY4	Software	Speag	7321	V4.5 Build 19
		ES3DV3	E-Field Probe	Speag	9485	
		DAE3	Data acquisition	Speag	7192	
		D835V2	Dipole 835MHz	Speag	7198	
		D1800V2	Dipole 1800MHz	Speag	7193	
		D2450V3	Dipole 2450MHz	Speag	7323	
		SAM	Phantom	Speag	7204	
		ELI4	Phantom	Speag	7324	
3	Liquid Measure	HP85070C	Software	Hewlett-Packard	-	C1.01
		HP8753C	Network analyzer	Hewlett-Packard	1402	
		HP85070C	Dielectric probe	Hewlett-Packard	7218	
		922	Thermometer	Testo	6980	
4	System Validation	SMH	Signal generator	Rohde-Schwarz	7082	
		SMP22	Signal generator	Rohde-Schwarz	7014	
		ZHL42	Amplifier	Mini-circuits	7209	
		PMC18-2	Power Supply	Kikusui	7214	
		NRVD	Power meter	Rohde-Schwarz	7085	
		NRV-Z1	Probe power meter	Rohde-Schwarz	7033	
		RK100	Coupler	MEB	7210	
		3877	Coupler	Suhner	7208	
		33-3-34	Attenuator	Weinschel Engineering	7213	
		R411810124 R411806124	Attenuator	Radiall	7315	
		R404563000	50 ohms load	Radiall	7313	
		17-0193	50 ohms load	Diconex	9161	

7. MEASUREMENT RESULTS

The output power and frequency are controlled using a base station simulator. The mobile phone is set to transmit at its highest output peak power level.

The mobile phone was placed with its front and rear sides against the flat phantom without accessory in communication mode: BW = 5MHz, Allocation 1RB, RB position/start 0.

For each operating band, the SAR level of the mobile phone is measured on the flat part of the phantom only at the centre frequency of operating bands.

A fast measurement method was applied using a reduced number of measurement points: Zoom Scan with a grid step size in x and y directions of 10mm and 7mm in z direction (cube size: 30mm x 30mm x 28mm).

Measurement results for LTE800 (SAR values averaged over a mass of 10g):

Test Position	SAR 10g (W/kg)
	Channel 24300 847.0 MHz
Rear side at 0cm from the phantom without FAZUP	1.42
Rear side at 0cm from the phantom with FAZUP	0.793
Front side at 0cm from the phantom without FAZUP	1.09
Front side at 0cm from the phantom with FAZUP	0.639

Measurement results for LTE1800 (SAR values averaged over a mass of 10g):

Test Position	SAR 10g (W/kg)
	Channel 19575 1747.5 MHz
Rear side at 0cm from the phantom without FAZUP	(1)
Rear side at 0cm from the phantom with FAZUP	(1)
Front side at 0cm from the phantom without FAZUP	1.47
Front side at 0cm from the phantom with FAZUP	0.524

Note (1): test position not measured as defined by the applicant.

Measurement results for LTE2600 (SAR values averaged over a mass of 10g):

Test Position	SAR 10g (W/kg)
	Channel 21100 2535.0 MHz
Rear side at 0cm from the phantom without FAZUP	4.97
Rear side at 0cm from the phantom with FAZUP	2.32
Front side at 0cm from the phantom without FAZUP	2.33
Front side at 0cm from the phantom with FAZUP	0.859

8. GRAPHICAL REPRESENTATIONS

The graphical representations are shown in Fig. 2 to Fig. 11.

DUT: APPLE iPhone 5S (A1457)

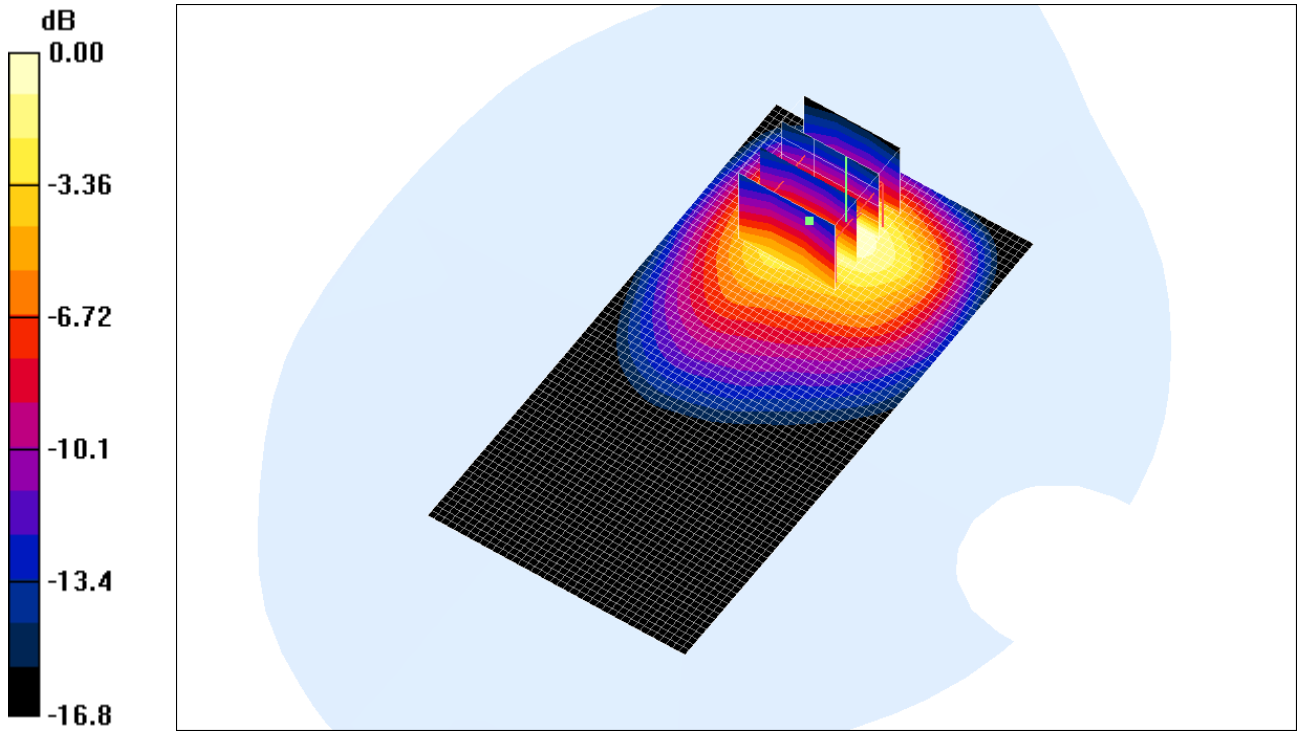
Communication System: LTE Band 20 BW5MHz; Frequency: 847 MHz; Duty Cycle: 1:1
Medium parameters used: $\sigma = 0.89$ mho/m, $\varepsilon_r = 41.7$; $\rho = 1000$ kg/m^3
Phantom section: Flat Section

Program Notes: Ambient temperature: 23.8°C, Liquid temperature: 21.0°C

DASY4 Configuration:
- Probe: ES3DV3 - SN3303; ConvF(6.01, 6.01, 6.01); Calibrated: 8/21/2013
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn402; Calibrated: 8/14/2013
- Phantom: SAM 12; Type: QD; Serial: TP-1111
- Measurement SW: DASY4, V4.5 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 145

Position 0cm, Middle channel/Area Scan (41x81x1): Measurement grid: dx=20mm, dy=20mm
Maximum value of SAR (interpolated) = 3.94 mW/g

Position 0cm, Middle channel/Zoom Scan (7x7x7) (4x4x5)/Cube 0: Measurement grid: dx=10mm, dy=10mm, dz=7mm
Reference Value = 66.3 V/m; Power Drift = -0.090 dB
Peak SAR (extrapolated) = 8.61 W/kg
SAR(1 g) = 2.76 mW/g; SAR(10 g) = 1.42 mW/g
Maximum value of SAR (measured) = 3.59 mW/g



0 dB = 3.59mW/g

Fig. 2: SAR distribution for LTE800 of the mobile phone alone:
channel 24300 (847.0 MHz), rear side at 0cm

DUT: APPLE iPhone 5S (A1457)

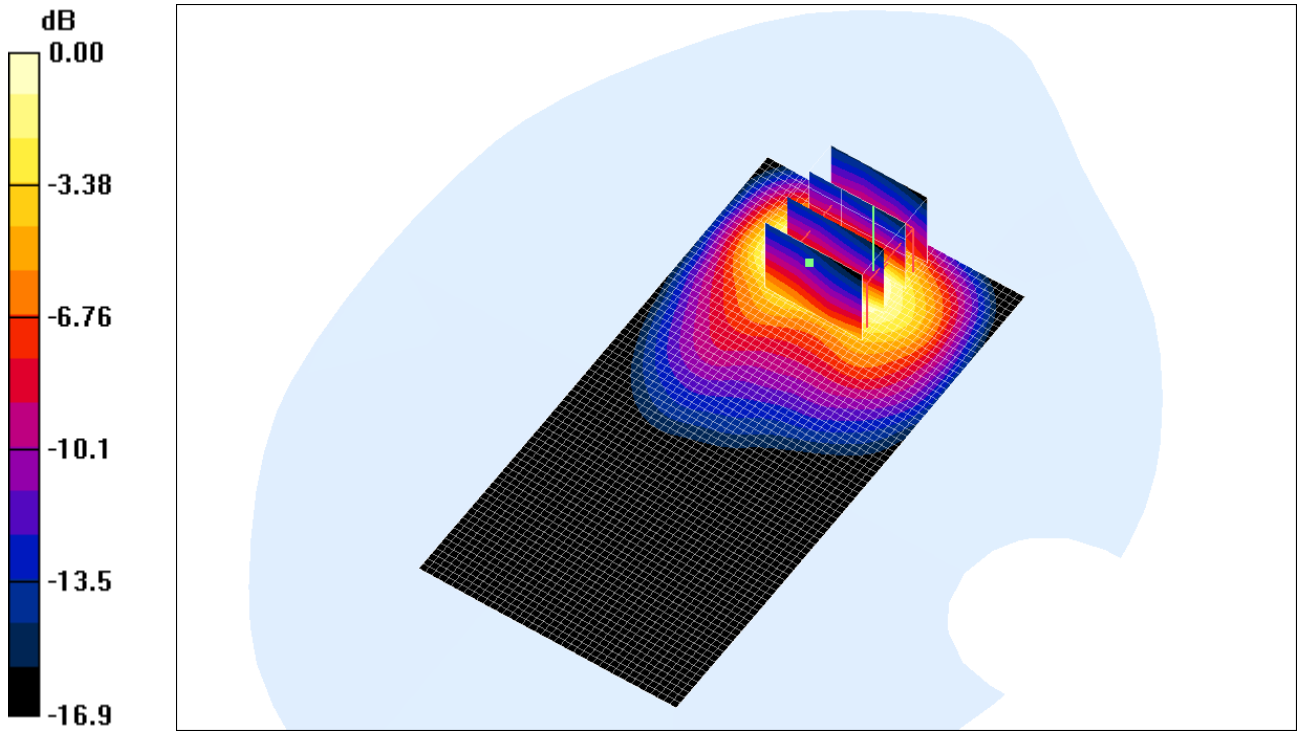
Communication System: LTE Band 20 BW5MHz; Frequency: 847 MHz; Duty Cycle: 1:1
Medium parameters used: $\sigma = 0.89$ mho/m, $\varepsilon_r = 41.7$; $\rho = 1000$ kg/m^3
Phantom section: Flat Section

Program Notes: Ambient temperature: 23.6°C, Liquid temperature: 21.0°C

DASY4 Configuration:
- Probe: ES3DV3 - SN3303; ConvF(6.01, 6.01, 6.01); Calibrated: 8/21/2013
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn402; Calibrated: 8/14/2013
- Phantom: SAM 12; Type: QD; Serial: TP-1111
- Measurement SW: DASY4, V4.5 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 145

Position 0cm, Middle channel/Area Scan (41x81x1): Measurement grid: dx=20mm, dy=20mm
Maximum value of SAR (interpolated) = 3.33 mW/g

Position 0cm, Middle channel/Zoom Scan (7x7x7) (4x4x5)/Cube 0: Measurement grid: dx=10mm, dy=10mm, dz=7mm
Reference Value = 46.0 V/m; Power Drift = -0.012 dB
Peak SAR (extrapolated) = 3.69 W/kg
SAR(1 g) = 1.63 mW/g; SAR(10 g) = 0.793 mW/g
Maximum value of SAR (measured) = 2.15 mW/g



0 dB = 2.15mW/g

Fig. 3: SAR distribution for LTE800 of the mobile phone with FAZUP: channel 24300 (847.0 MHz), rear side at 0cm

DUT: APPLE iPhone 5S (A1457)

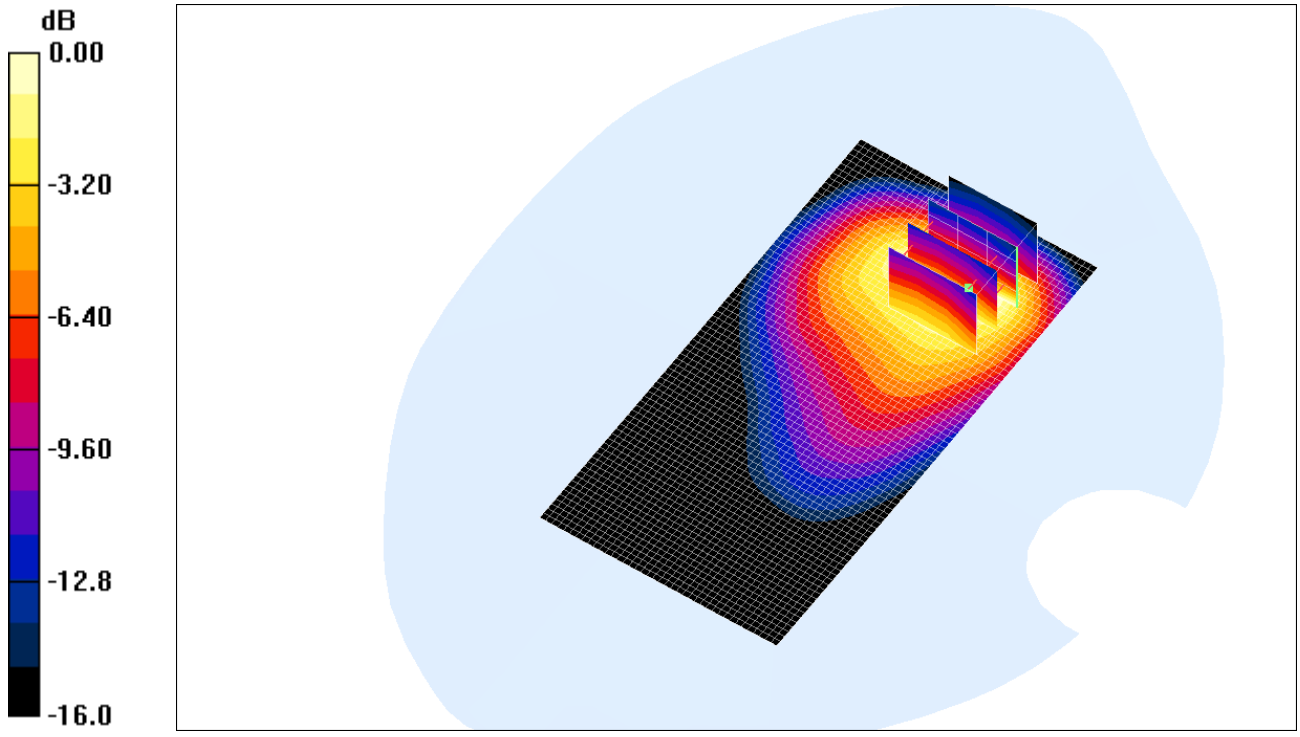
Communication System: LTE Band 20 BW5MHz; Frequency: 847 MHz; Duty Cycle: 1:1
Medium parameters used: $\sigma = 0.89$ mho/m, $\varepsilon_r = 41.7$; $\rho = 1000$ kg/m^3
Phantom section: Flat Section

Program Notes: Ambient temperature: 24.0°C, Liquid temperature: 21.1°C

DASY4 Configuration:
- Probe: ES3DV3 - SN3303; ConvF(6.01, 6.01, 6.01); Calibrated: 8/21/2013
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn402; Calibrated: 8/14/2013
- Phantom: SAM 12; Type: QD; Serial: TP-1111
- Measurement SW: DASY4, V4.5 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 145

Position 0cm, Middle channel/Area Scan (41x81x1): Measurement grid: dx=20mm, dy=20mm
Maximum value of SAR (interpolated) = 3.24 mW/g

Position 0cm, Middle channel/Zoom Scan (7x7x7) (4x4x5)/Cube 0: Measurement grid: dx=10mm, dy=10mm, dz=7mm
Reference Value = 31.7 V/m; Power Drift = -0.032 dB
Peak SAR (extrapolated) = 5.48 W/kg
SAR(1 g) = 1.86 mW/g; SAR(10 g) = 1.09 mW/g
Maximum value of SAR (measured) = 2.55 mW/g



0 dB = 2.55mW/g

Fig. 4: SAR distribution for LTE800 of the mobile phone alone:
channel 24300 (847.0 MHz), front side at 0cm

DUT: APPLE iPhone 5S (A1457)

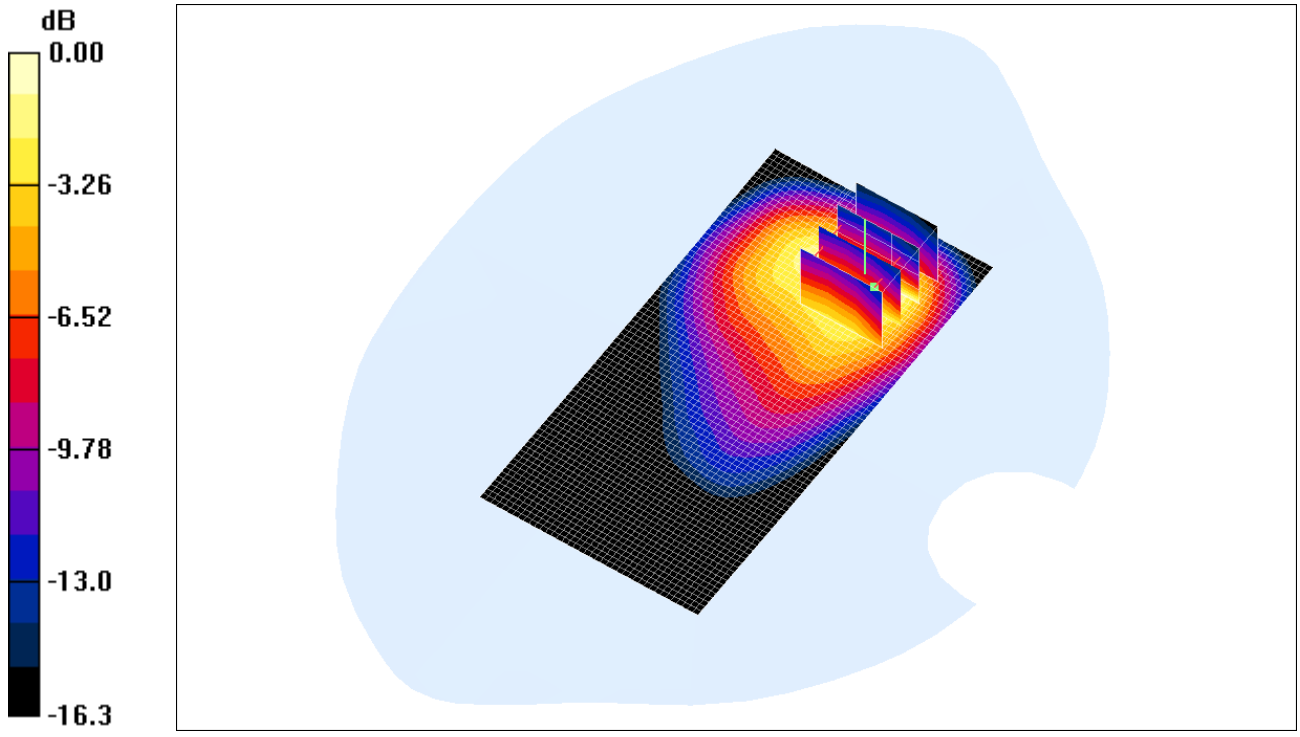
Communication System: LTE Band 20 BW5MHz; Frequency: 847 MHz; Duty Cycle: 1:1
Medium parameters used: $\sigma = 0.89$ mho/m, $\varepsilon_r = 41.7$; $\rho = 1000$ kg/m^3
Phantom section: Flat Section

Program Notes: Ambient temperature: 24.2°C, Liquid temperature: 21.1°C

DASY4 Configuration:
- Probe: ES3DV3 - SN3303; ConvF(6.01, 6.01, 6.01); Calibrated: 8/21/2013
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn402; Calibrated: 8/14/2013
- Phantom: SAM 12; Type: QD; Serial: TP-1111
- Measurement SW: DASY4, V4.5 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 145

Position 0cm, Middle channel/Area Scan (41x81x1): Measurement grid: dx=20mm, dy=20mm
Maximum value of SAR (interpolated) = 1.83 mW/g

Position 0cm, Middle channel/Zoom Scan (7x7x7) (4x4x5)/Cube 0: Measurement grid: dx=10mm, dy=10mm, dz=7mm
Reference Value = 26.1 V/m; Power Drift = 0.012 dB
Peak SAR (extrapolated) = 3.08 W/kg
SAR(1 g) = 1.18 mW/g; SAR(10 g) = 0.639 mW/g
Maximum value of SAR (measured) = 1.61 mW/g



0 dB = 1.61mW/g

Fig. 5: SAR distribution for LTE800 of the mobile phone with FAZUP: channel 24300 (847.0 MHz), front side at 0cm

DUT: APPLE iPhone 5S (A1457)

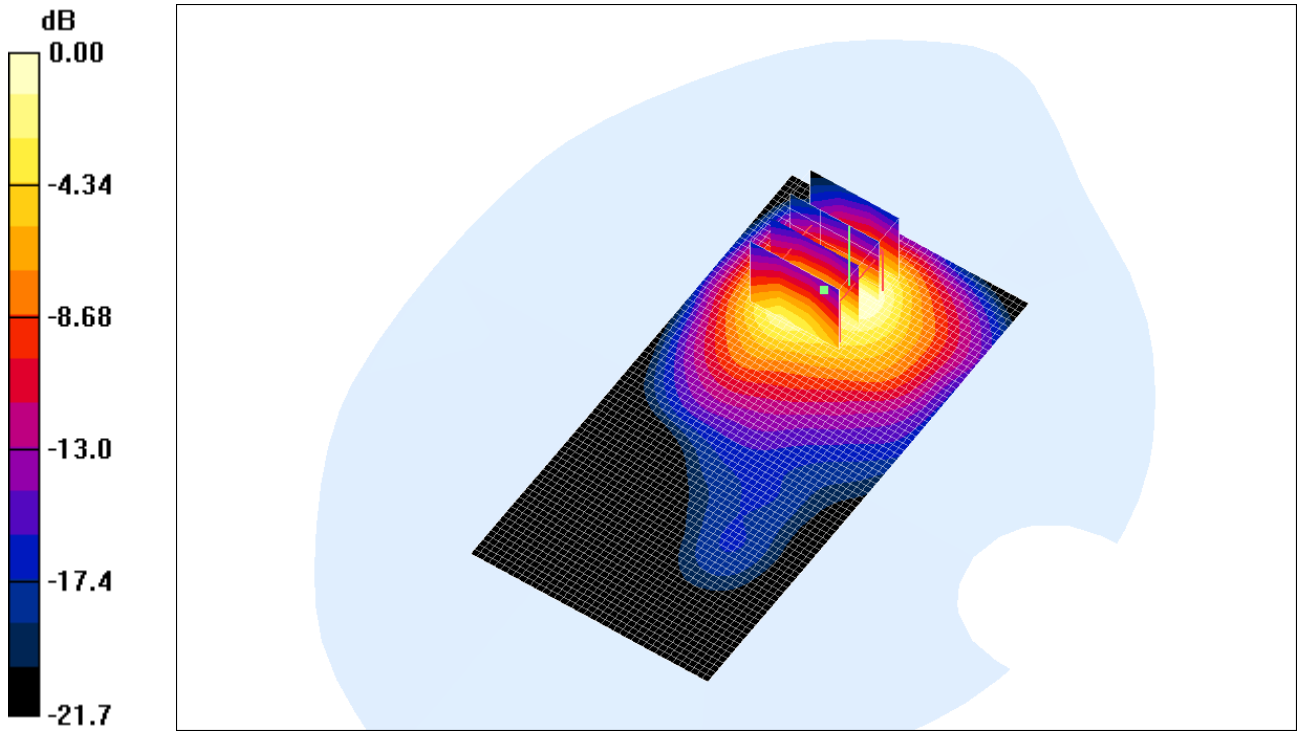
Communication System: LTE Band 3 BW5MHz; Frequency: 1747.5 MHz; Duty Cycle: 1:1
Medium parameters used: $\sigma = 1.35$ mho/m, $\varepsilon_r = 38.9$; $\rho = 1000$ kg/m^3
Phantom section: Flat Section

Program Notes: Ambient temperature: 24.0°C, Liquid temperature: 21.0°C

DASY4 Configuration:
- Probe: ES3DV3 - SN3303; ConvF(5.09, 5.09, 5.09); Calibrated: 8/21/2013
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn402; Calibrated: 8/14/2013
- Phantom: SAM 12; Type: QD; Serial: TP-1111
- Measurement SW: DASY4, V4.5 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 145

Position 0cm, Middle channel/Area Scan (41x81x1): Measurement grid: dx=20mm, dy=20mm
Maximum value of SAR (interpolated) = 5.04 mW/g

Position 0cm, Middle channel/Zoom Scan (7x7x7) (4x4x5)/Cube 0: Measurement grid: dx=10mm, dy=10mm, dz=7mm
Reference Value = 48.1 V/m; Power Drift = -0.029 dB
Peak SAR (extrapolated) = 6.64 W/kg
SAR(1 g) = 2.96 mW/g; SAR(10 g) = 1.47 mW/g
Maximum value of SAR (measured) = 3.53 mW/g



0 dB = 3.53mW/g

Fig. 6: SAR distribution for LTE1800 of the mobile phone alone:
channel 19575 (1747.5 MHz), front side at 0cm

DUT: APPLE iPhone 5S (A1457)

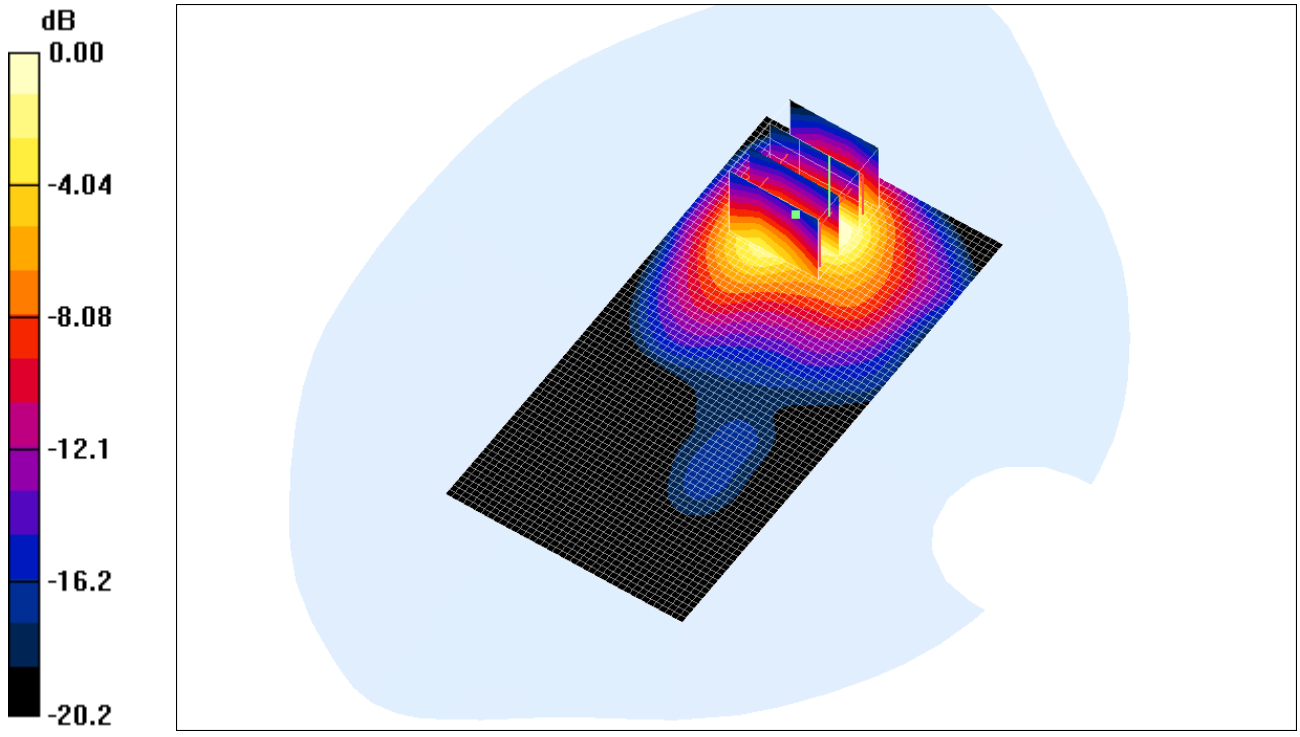
Communication System: LTE Band 3 BW5MHz; Frequency: 1747.5 MHz; Duty Cycle: 1:1
Medium parameters used: σ = 1.35 mho/m, ε_r = 38.9; ρ = 1000 kg/m^3
Phantom section: Flat Section

Program Notes: Ambient temperature: 24.2°C, Liquid temperature: 21.1°C

DASY4 Configuration:
- Probe: ES3DV3 - SN3303; ConvF(5.09, 5.09, 5.09); Calibrated: 8/21/2013
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn402; Calibrated: 8/14/2013
- Phantom: SAM 12; Type: QD; Serial: TP-1111
- Measurement SW: DASY4, V4.5 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 145

Position 0cm, Middle channel/Area Scan (41x81x1): Measurement grid: dx=20mm, dy=20mm
Maximum value of SAR (interpolated) = 2.14 mW/g

Position 0cm, Middle channel/Zoom Scan (7x7x7) (4x4x5)/Cube 0: Measurement grid: dx=10mm, dy=10mm, dz=7mm
Reference Value = 24.6 V/m; Power Drift = -0.062 dB
Peak SAR (extrapolated) = 2.51 W/kg
SAR(1 g) = 1.09 mW/g; SAR(10 g) = 0.524 mW/g
Maximum value of SAR (measured) = 1.40 mW/g



0 dB = 1.40mW/g

Fig. 7: SAR distribution for LTE1800 of the mobile phone with FAZUP: channel 19575 (1747.5 MHz), front side at 0cm

DUT: APPLE iPhone 5S (A1457)

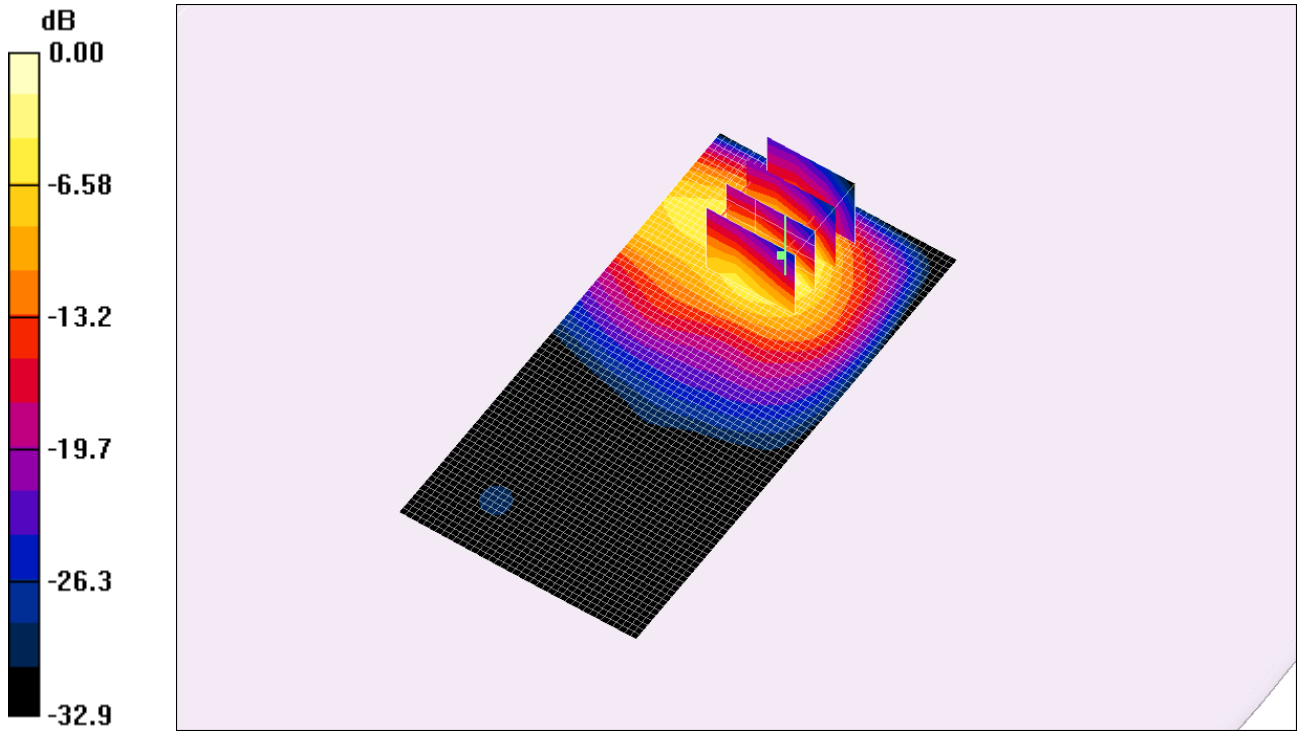
Communication System: LTE Band 7 BW5MHz; Frequency: 2535 MHz; Duty Cycle: 1:1
Medium parameters used: $\sigma = 2.02$ mho/m, $\varepsilon_r = 37$; $\rho = 1000$ kg/m^3
Phantom section: Flat Section

Program Notes: Ambient temperature: 24.4°C, Liquid temperature: 21.8°C

DASY4 Configuration:
- Probe: ES3DV3 - SN3303; ConvF(4.35, 4.35, 4.35); Calibrated: 8/21/2013
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn402; Calibrated: 8/14/2013
- Phantom: ELI 4.0; Type: QDOVA001BA; Serial: 1067
- Measurement SW: DASY4, V4.5 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 145

Position 0cm, Middle channel/Area Scan (41x81x1): Measurement grid: dx=20mm, dy=20mm
Maximum value of SAR (interpolated) = 14.6 mW/g

Position 0cm, Middle channel/Zoom Scan (7x7x7) (4x4x5)/Cube 0: Measurement grid: dx=10mm, dy=10mm, dz=7mm
Reference Value = 50.4 V/m; Power Drift = 0.050 dB
Peak SAR (extrapolated) = 39.4 W/kg
SAR(1 g) = 13.4 mW/g; SAR(10 g) = 4.97 mW/g
Maximum value of SAR (measured) = 14.3 mW/g



0 dB = 14.3mW/g

Fig. 8: SAR distribution for LTE2600 of the mobile phone alone:
channel 21100 (2535.0 MHz), rear side at 0cm

DUT: APPLE iPhone 5S (A1457)

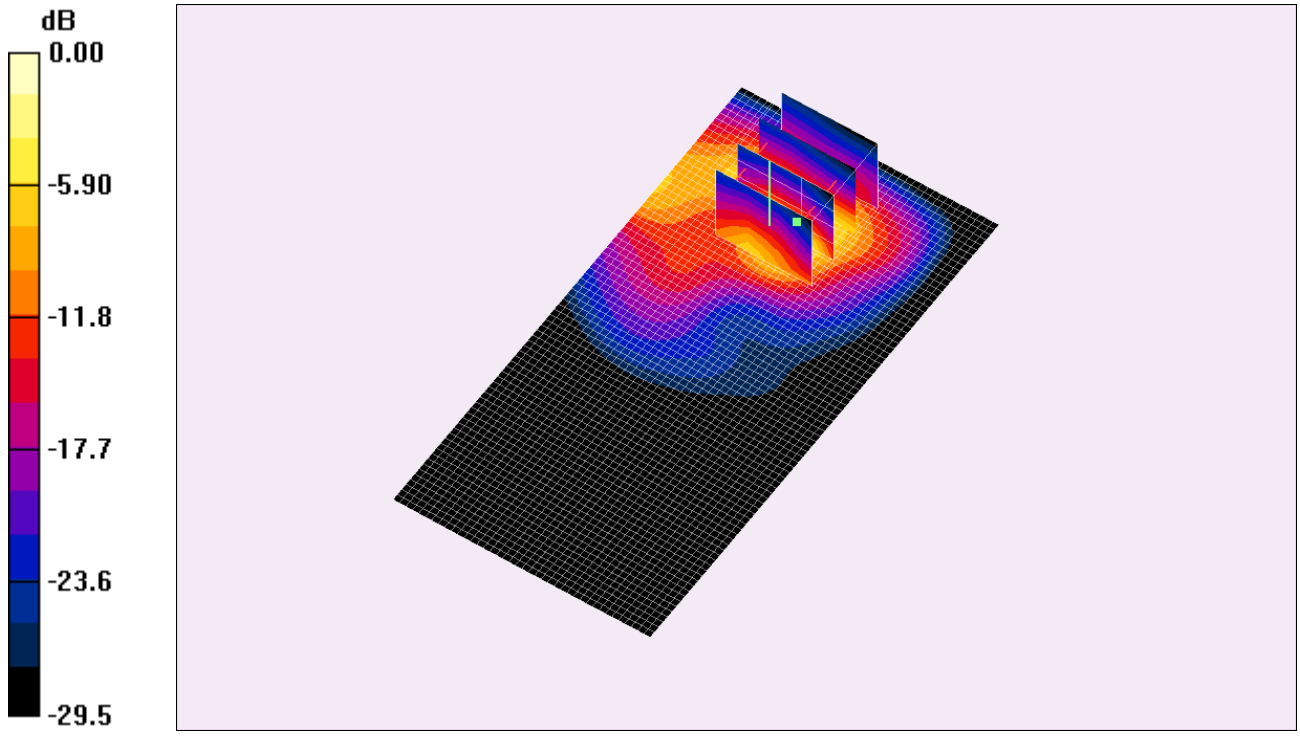
Communication System: LTE Band 7 BW5MHz; Frequency: 2535 MHz; Duty Cycle: 1:1
Medium parameters used: $\sigma = 2.02$ mho/m, $\varepsilon_r = 37$; $\rho = 1000$ kg/m^3
Phantom section: Flat Section

Program Notes: Ambient temperature: 24.5°C, Liquid temperature: 21.8°C

DASY4 Configuration:
- Probe: ES3DV3 - SN3303; ConvF(4.35, 4.35, 4.35); Calibrated: 8/21/2013
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn402; Calibrated: 8/14/2013
- Phantom: ELI 4.0; Type: QDOVA001BA; Serial: 1067
- Measurement SW: DASY4, V4.5 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 145

Position 0cm, Middle channel/Area Scan (41x81x1): Measurement grid: dx=20mm, dy=20mm
Maximum value of SAR (interpolated) = 4.77 mW/g

Position 0cm, Middle channel/Zoom Scan (7x7x7) (4x4x5)/Cube 0: Measurement grid: dx=10mm, dy=10mm, dz=7mm
Reference Value = 22.3 V/m; Power Drift = -0.147 dB
Peak SAR (extrapolated) = 23.3 W/kg
SAR(1 g) = 7.08 mW/g; SAR(10 g) = 2.32 mW/g
Maximum value of SAR (measured) = 10.5 mW/g



0 dB = 10.5mW/g

Fig. 9: SAR distribution for LTE2600 of the mobile phone with FAZUP: channel 21100 (2535.0 MHz), rear side at 0cm

DUT: APPLE iPhone 5S (A1457)

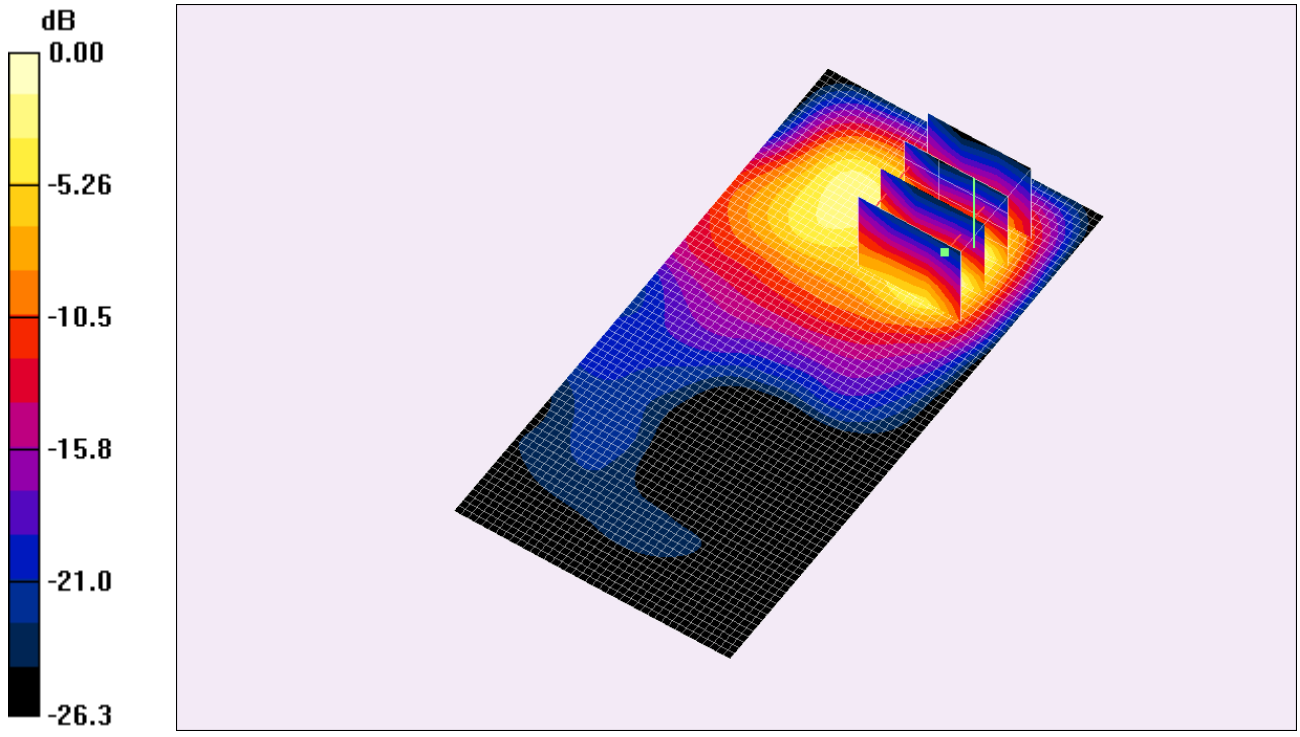
Communication System: LTE Band 7 BW5MHz; Frequency: 2535 MHz; Duty Cycle: 1:1
Medium parameters used: $\sigma = 2.02$ mho/m, $\varepsilon_r = 37$; $\rho = 1000$ kg/m^3
Phantom section: Flat Section

Program Notes: Ambient temperature: 24.0°C, Liquid temperature: 21.0°C

DASY4 Configuration:
- Probe: ES3DV3 - SN3303; ConvF(4.35, 4.35, 4.35); Calibrated: 8/21/2013
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn402; Calibrated: 8/14/2013
- Phantom: ELI 4.0; Type: QDOVA001BA; Serial: 1067
- Measurement SW: DASY4, V4.5 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 145

Position 0cm, Middle channel/Area Scan (41x81x1): Measurement grid: dx=20mm, dy=20mm
Maximum value of SAR (interpolated) = 9.65 mW/g

Position 0cm, Middle channel/Zoom Scan (7x7x7) (4x4x5)/Cube 0: Measurement grid: dx=10mm, dy=10mm, dz=7mm
Reference Value = 33.2 V/m; Power Drift = -0.076 dB
Peak SAR (extrapolated) = 18.2 W/kg
SAR(1 g) = 6.01 mW/g; SAR(10 g) = 2.33 mW/g
Maximum value of SAR (measured) = 8.13 mW/g



0 dB = 8.13mW/g

Fig. 10: SAR distribution for LTE2600 of the mobile phone alone:
channel 21100 (2535.0 MHz), front side at 0cm

DUT: APPLE iPhone 5S (A1457)

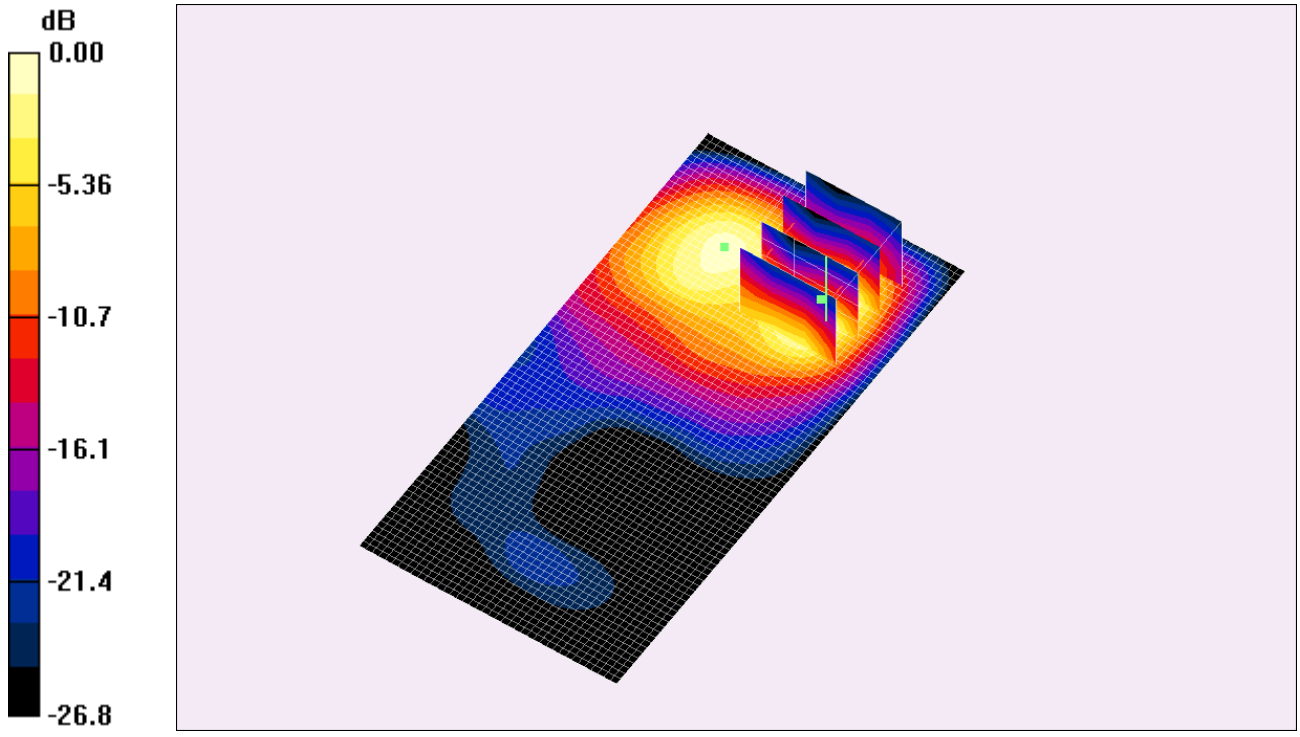
Communication System: LTE Band 7 BW5MHz; Frequency: 2535 MHz; Duty Cycle: 1:1
Medium parameters used: $\sigma = 2.02$ mho/m, $\varepsilon_r = 37$; $\rho = 1000$ kg/m^3
Phantom section: Flat Section

Program Notes: Ambient temperature: 24.3°C, Liquid temperature: 21.7°C

DASY4 Configuration:
- Probe: ES3DV3 - SN3303; ConvF(4.35, 4.35, 4.35); Calibrated: 8/21/2013
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn402; Calibrated: 8/14/2013
- Phantom: ELI 4.0; Type: QDOVA001BA; Serial: 1067
- Measurement SW: DASY4, V4.5 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 145

Position 0cm, Middle channel/Area Scan (41x81x1): Measurement grid: dx=20mm, dy=20mm
Maximum value of SAR (interpolated) = 3.86 mW/g

Position 0cm, Middle channel/Zoom Scan (7x7x7) (4x4x5)/Cube 0: Measurement grid: dx=10mm, dy=10mm, dz=7mm
Reference Value = 23.5 V/m; Power Drift = 0.061 dB
Peak SAR (extrapolated) = 6.53 W/kg
SAR(1 g) = 2.24 mW/g; SAR(10 g) = 0.859 mW/g
Maximum value of SAR (measured) = 3.12 mW/g



0 dB = 3.12mW/g

Fig. 11: SAR distribution for LTE2600 of the mobile phone with FAZUP: channel 21100 (2535.0 MHz), front side at 0cm

9. PHOTOGRAPHS OF THE EQUIPMENT UNDER TEST

The photographs of the equipment under test are shown in Fig. 12 and Fig. 13.

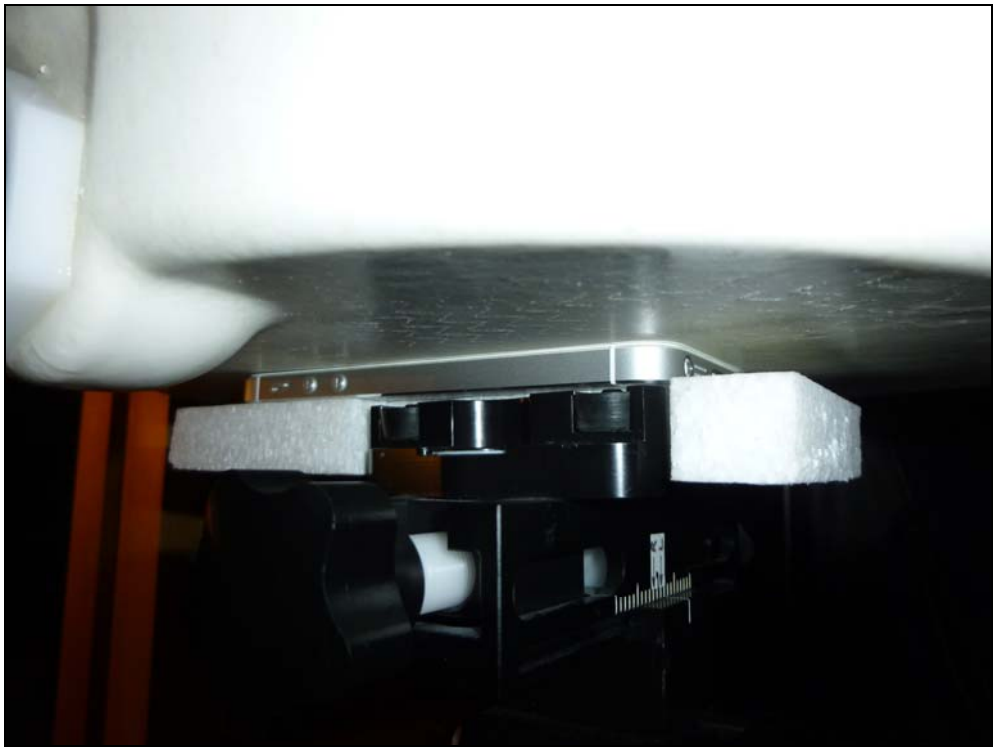


Fig. 12: Rear side at 0cm from the phantom

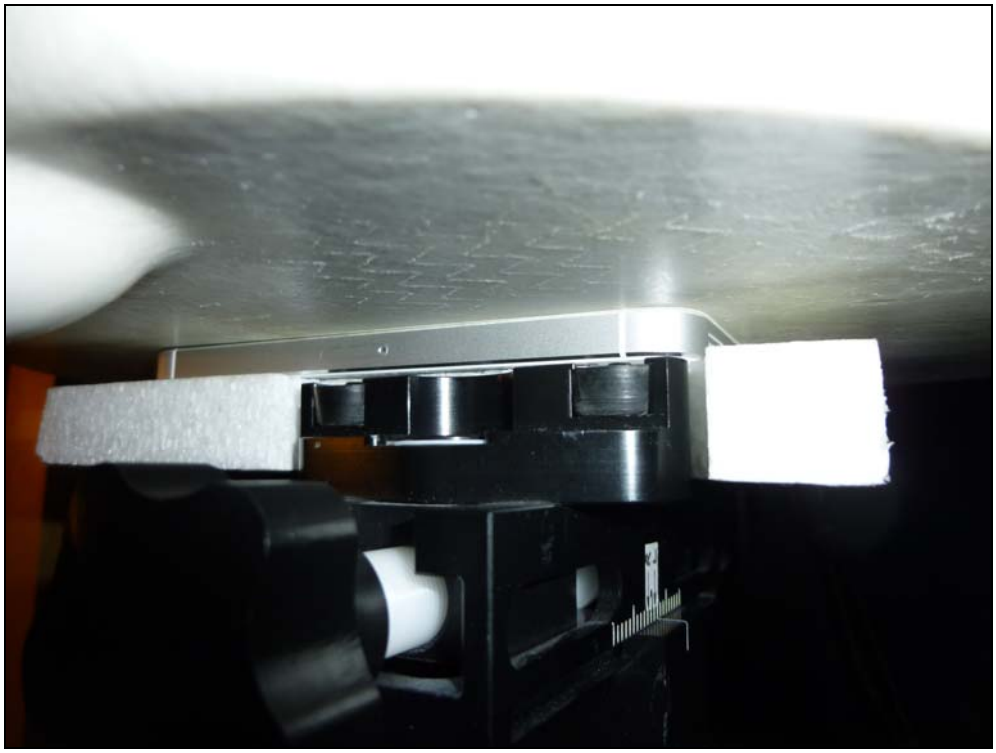


Fig. 13: Front side at 0cm from the phantom

10. MEASUREMENT UNCERTAINTY

The expanded uncertainty with a confidence interval of 95 % shall not exceed 30 % for averaged SAR values in the range from 0.4 to 10 W/kg.

The uncertainty of the measurements was evaluated according to the EN 62209-2, including fast measurement method. The expanded uncertainty is ± 25.0%.

ERROR SOURCES	Uncertainty Value (%)	Probability Distribution	Divisor	Ci	Standard Uncertainty (%)
Measurement System					
Probe Calibration	± 6.7	Normal	1	1	± 6.7
Axial Isotropy	± 4.7	Rectangular	√3	1	± 2.7
Hemispherical Isotropy	± 9.6	Rectangular	√3	1	± 5.5
Boundary Effect	± 1.0	Rectangular	√3	1	± 0.6
Linearity	± 4.7	Rectangular	√3	1	± 2.7
Detection Limits	± 1.0	Rectangular	√3	1	± 0.6
Readout Electronics	± 0.3	Normal	1	1	± 0.3
Response Time	± 0.8	Rectangular	√3	1	± 0.5
Integration Time	± 2.6	Rectangular	√3	1	± 1.5
RF Ambient Conditions-Noise	± 3.0	Rectangular	√3	1	± 1.7
RF Ambient Conditions-Reflections	± 3.0	Rectangular	√3	1	± 1.7
Probe Positioner Mechanical Restrictions	± 0.4	Rectangular	√3	1	± 0.2
Probe Positioning with respect to Phantom Shell	± 2.9	Rectangular	√3	1	± 1.7
Post-Processing Fast SAR	± 6.0	Rectangular	√3	1	± 3.5
Test Sample Related					
Test Sample Positioning	± 2.9	Normal	1	1	± 2.9
Device Holder Uncertainty	± 3.6	Normal	1	1	± 3.6
Drift of Output Power	± 5.0	Rectangular	√3	1	± 2.9
Phantom and Set-Up					
Phantom Uncertainty (shape and thickness tolerances)	± 4.0	Rectangular	√3	1	± 2.3
Algorithm for correcting SAR for deviations in permittivity and conductivity	± 1.9	Normal	1	0.84	± 1.6
Liquid Conductivity (Target)	± 2.5	Normal	1	0.71	± 1.7
Liquid Conductivity (Measurement)	± 2.5	Normal	1	0.26	± 0.7
Liquid Permittivity (Target)	± 1.9	Rectangular	√3	0.71	± 0.8
Liquid Permittivity (Measurement)	± 2.8	Rectangular	√3	0.26	± 0.4
Combined standard uncertainty					± 12.5
Expanded uncertainty (confidence interval of 95%)					± 25.0

11. TEST CONDITIONS

The equipment is controlled during test using platform n° 1 (BTS simulator) referenced in paragraph 6 of this test report. The following test conditions are given for information; the maximum output powers were not measured.

Standard:	LTE (3GPP TS 36.521)
Crest factor:	1
Modulation:	QPSK
Traffic Channel:	LTE 800: middle = 24300
	LTE 1800: middle = 19575
	LTE 2600: middle = 21100
Maximum output power:	Class 3 = 23 dBm (± 2dB)
Configuration:	BW = 5MHz, Allocation 1RB, RB position/start 0.

Note: The tested EUT could contain an antenna diversity technology, as MIMO or MISO. The control of the antenna's scheme has not been provided by the applicant. Thus, the radiated performances of the EUT are dependent on the test set-up; an antenna diversity control could lead to different results from those reported in this test report.

12. MEASUREMENT SYSTEM DESCRIPTION

The automated near-field scanning system Dosimetric Assessment System DASY4 from Schmid & Partner Engineering AG was used. The measurement is performed using platform n° 2 referenced in paragraph 6 ("Equipment used for the testing") of this report. The system consists of a computer controlled, high precision robotics system, robot controller, extreme near-field probes and the phantom containing the liquid. The six axis robot precisely positions the probe at the points of maximum electromagnetic field. A device holder made of low-loss dielectric material is used to maintain the test position of the equipment under test against the phantom. The measurements were conducted in an RF controlled environment (i.e. semi anechoic room). Fig. 14 shows the system.

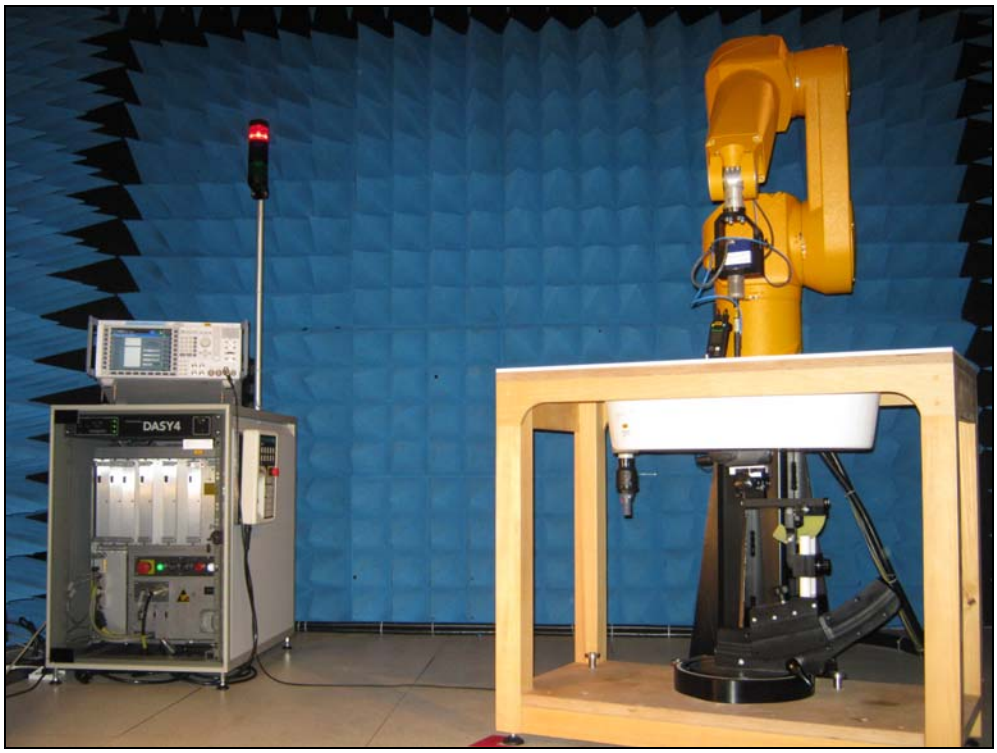


Fig. 14: The measurement setup with equipment under test.

13. LIQUID MEASUREMENT: TEST CONDITIONS & RESULTS

The measurement is performed using platform n° 3 referenced in paragraph 6 (“Equipment used for the testing”) of this report. The following ingredients (in % by weight) are theoretical and given for information.

800MHz liquid:	Sucrose 56.50 % De-ionised water 40.92 % NaCl salt 1.48 % - HEC 1.00 % - Bactericide 0.10 %
1800 MHz liquid:	Diethylenglykol-monobutylether 44.92 % De-ionised water 54.90 % NaCl salt 0.18 %
2600 MHz liquid:	Diethylenglykol-monobutylether 7.99 % De-ionised water 71.88 % Triton X-100 19.97% NaCl salt 0.16 %

The dielectric parameters of the body simulating liquid were controlled prior to assessment (contact probe method).

Dielectric properties measured:

Frequency (MHz)	ε_r (F/m) Targeted value	ε_r (F/m) Measured value	σ (S/m) Targeted value	σ (S/m) Measured value	Liquid temperature (°C)	Ambient temperature (°C)
835	41.5 ± 5 %	41.8	0.90 ± 5 %	0.88	22.2	22.0
845	41.5 ± 5 %	41.7	0.91 ± 5 %	0.89		
1750	40.1 ± 5 %	38.3	1.37 ± 5 %	1.40	20.1	22.0
1800	40.0 ± 5 %	38.1	1.40 ± 5 %	1.44		
2450	39.2 ± 5 %	37.4	1.80 ± 10 %	1.89	21.5	23.5
2535	39.1 ± 5 %	37.0	1.89 ± 10 %	2.02		

14. SYSTEM VALIDATION: TEST CONDITIONS & RESULTS

The measurement is performed using platform n° 4 referenced in paragraph 6 (“Equipment used for the testing”) of this report.

Measurement conditions: The measurements were performed in the flat section of the SAM or ELI4 phantom filled with liquids simulating tissue. The validation dipole input power was 250mW.
Prior to the assessment, the validation dipole is used to check whether the system was operating within its specification of ± 10 %.

Measurement results: The results are hereafter below and shown in Fig. 15 to Fig. 17.

Frequency (MHz)	SAR 10g (W/kg) Targeted value	SAR 10g (W/kg) Measured value
835	1.55 ± 10 %	1.54
1800	4.95 ± 10 %	4.95
2450	6.00 ± 10 %	5.97

DUT: Dipole 835 MHz

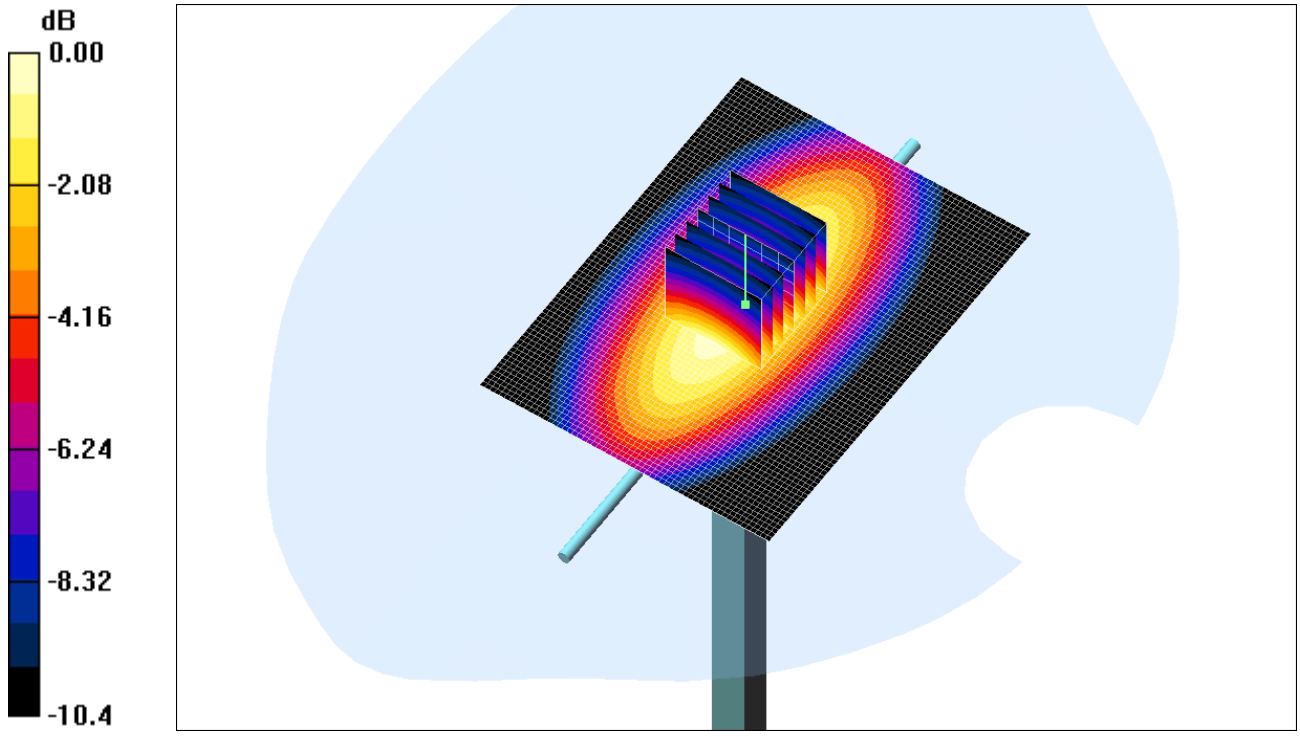
Communication System: CW; Frequency: 835 MHz; Duty Cycle: 1:1
Medium parameters used: $\sigma = 0.88$ mho/m, $\varepsilon_r = 41.8$; $\rho = 1000$ kg/m^3
Phantom section: Flat Section

Program Notes: Ambient temperature: 23.5°C, Liquid temperature: 20.9°C

DASY4 Configuration:
- Probe: ES3DV3 - SN3303; ConvF(6.01, 6.01, 6.01); Calibrated: 8/21/2013
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn402; Calibrated: 8/14/2013
- Phantom: SAM 12; Type: QD; Serial: TP-1111
- Measurement SW: DASY4, V4.5 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 145

d=15mm, Pin=250mW/Area Scan (61x81x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 2.71 mW/g

d=15mm, Pin=250mW/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 57.4 V/m; Power Drift = -0.010 dB
Peak SAR (extrapolated) = 3.50 W/kg
SAR(1 g) = 2.35 mW/g; SAR(10 g) = 1.54 mW/g
Maximum value of SAR (measured) = 2.74 mW/g



0 dB = 2.74mW/g

Fig. 15: 835 MHz validation result

DUT: Dipole 1800 MHz

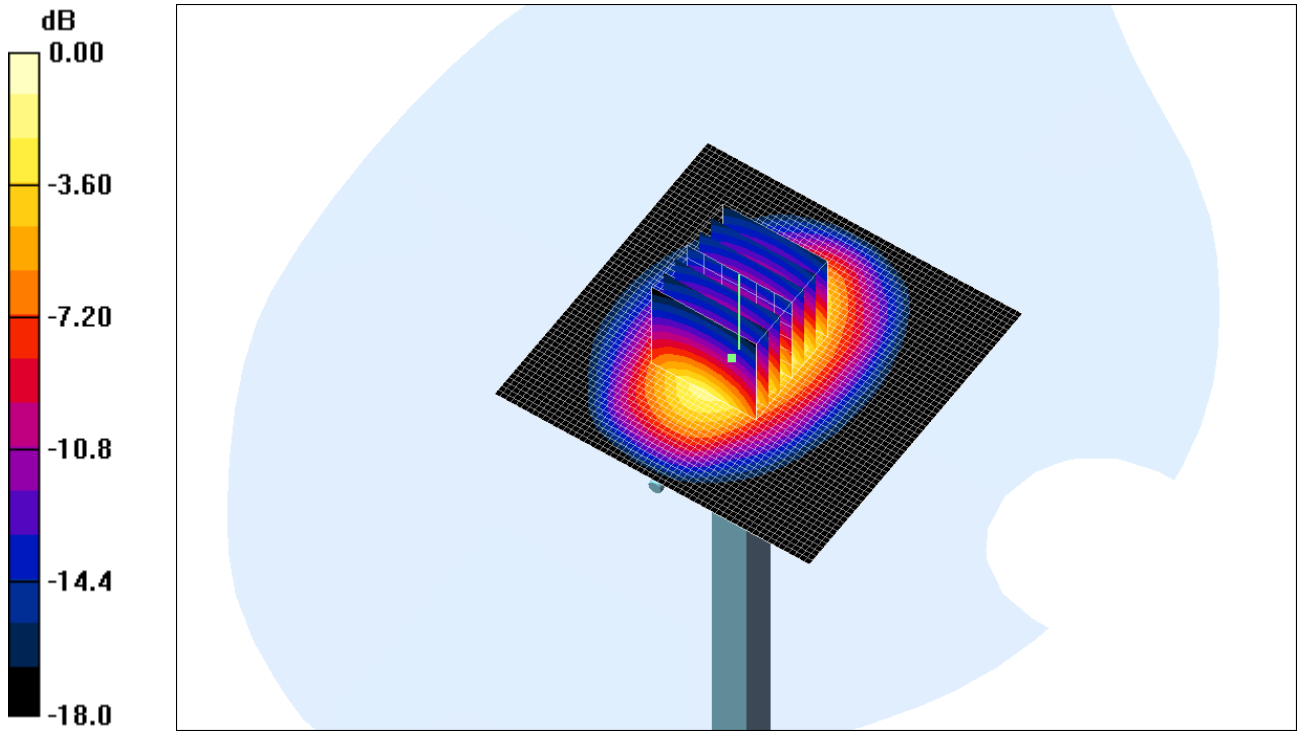
Communication System: CW; Frequency: 1800 MHz; Duty Cycle: 1:1
Medium parameters used: $\sigma = 1.44$ mho/m, $\varepsilon_r = 38.1$; $\rho = 1000$ kg/m^3
Phantom section: Flat Section

Program Notes: Ambient temperature: 23.0°C, Liquid temperature: 20.4°C

DASY4 Configuration:
- Probe: ES3DV3 - SN3303; ConvF(5.09, 5.09, 5.09); Calibrated: 8/21/2013
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn402; Calibrated: 8/14/2013
- Phantom: SAM 12; Type: QD; Serial: TP-1111
- Measurement SW: DASY4, V4.5 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 145

d=10mm, Pin=250mW/Area Scan (61x61x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 12.5 mW/g

d=10mm, Pin=250mW/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 94.1 V/m; Power Drift = 0.055 dB
Peak SAR (extrapolated) = 17.7 W/kg
SAR(1 g) = 9.55 mW/g; SAR(10 g) = 4.95 mW/g
Maximum value of SAR (measured) = 12.0 mW/g



0 dB = 12.0mW/g

Fig. 16: 1800 MHz validation result

DUT: Dipole 2450 MHz

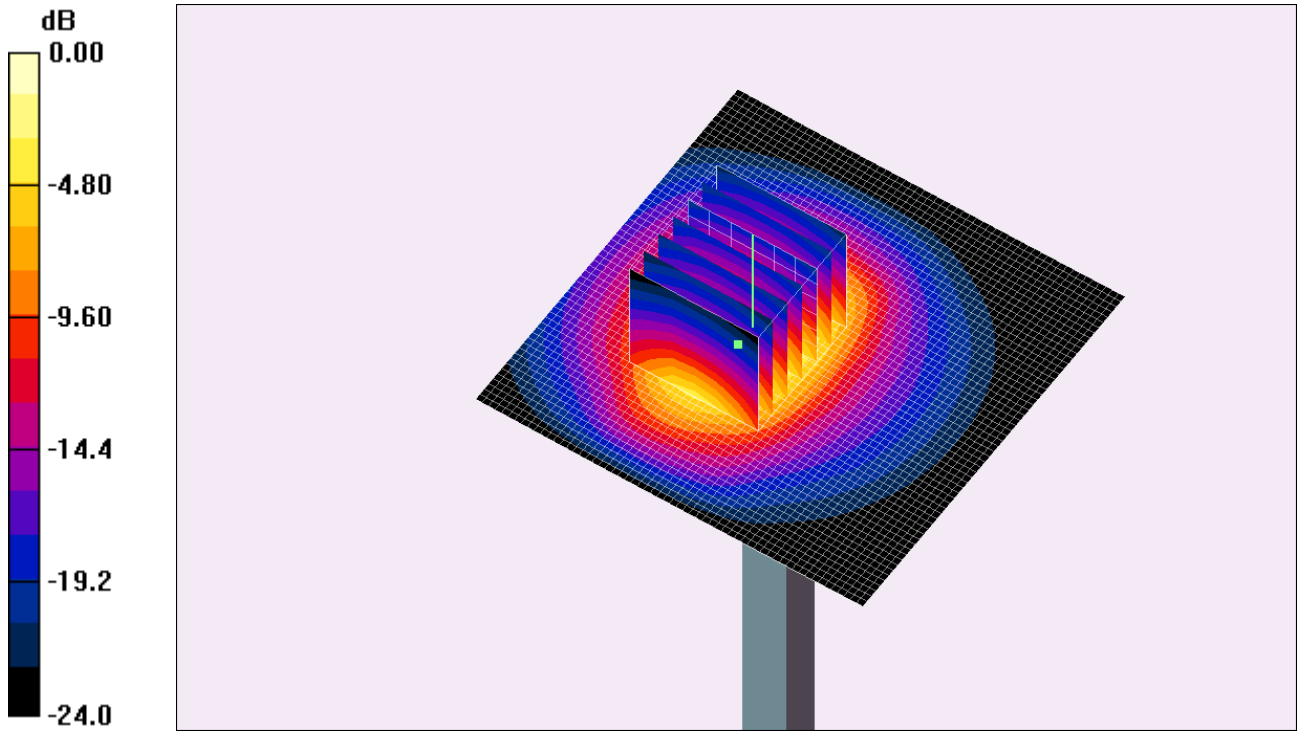
Communication System: CW; Frequency: 2450 MHz; Duty Cycle: 1:1
Medium parameters used: $\sigma = 1.89$ mho/m, $\varepsilon_r = 37.4$; $\rho = 1000$ kg/m^3
Phantom section: Flat Section

Program Notes: Ambient temperature: 24.0°C, Liquid temperature: 21.5°C

DASY4 Configuration:
- Probe: ES3DV3 - SN3303; ConvF(4.46, 4.46, 4.46); Calibrated: 8/21/2013
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn402; Calibrated: 8/14/2013
- Phantom: ELI 4.0; Type: QDOVA001BA; Serial: 1067
- Measurement SW: DASY4, V4.5 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 145

d=10mm, Pin=250mW/Area Scan (61x61x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 19.0 mW/g

d=10mm, Pin=250mW/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 88.6 V/m; Power Drift = -0.068 dB
Peak SAR (extrapolated) = 27.9 W/kg
SAR(1 g) = 13.1 mW/g; SAR(10 g) = 5.97 mW/g
Maximum value of SAR (measured) = 17.4 mW/g



0 dB = 17.4mW/g

Fig. 17: 2450 MHz validation result

□□□ End of report □□□