Test Report No. S09EEC01737/05
dated 17 JUL 2009

PSB Singapore

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COMPLIANCE REPORT ON TESTING IN ACCORDANCE WITH
SAR (SPECIFIC ABSORPTION RATE) REQUIREMENTS

Supplement C (Edition 01-01)
FCC OET Bulletin 65 (Edition 97-01)

OF A
CHILD TRACKING SYSTEM
Model : RF 10

TEST FACILITY	TÜV SÜD PSB Pte Ltd, Electrical & Electronics Centre (EEC), Product Services, 1 Science Park Drive, Singapore 118221
PREPARED FOR	Daviscomms (S) Pte Ltd Blk 70 Ubi Cresent #01-07 Ubi Techpark, Singapore 408570 Tel : (+65) 65471127 Fax : (+65) 65471129
QUOTATION NUMBER	Q09EEC00646
JOB NUMBER	S09EEC01737
TEST PERIOD	13-JUL-2009 – 27-JUL-2009

PREPARED BY	**APPROVED BY**
Stanley Siah Associate Engineer	Daniel Yeo Assistant Vice President

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LA-2007-0380-A
LA-2007-0380-A-1
LA-2007-0381-F
LA-2007-0382-B
LA-2007-0383-G
LA-2007-0384-G
LA-2007-0385-E
LA-2007-0386-C

The results reported herein have been performed in accordance with the laboratory's terms of accreditation under the Singapore Accreditation Council - Singapore Laboratory Accreditation Scheme. Tests/Calibrations marked "Not SAC-SINGLAS Accredited" in this Report are not included in the SAC-SINGLAS Accreditation Schedule for our laboratory.

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TÜV®

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TEST SUMMARY

The product was tested in accordance with the following standards.

Test Results Summary

Test Standards	Description	Pass / Fail
• Supplement C (Edition 01-01) to FCC OET Bulletin 65 (Edition 97-01) • ANSI/IEEE Standard C95.1-1993	SAR Measurement (Wi-Fi 2450MHz) Body worn configuration	Pass *

Note:

1. The worst-case SAR value was found to be **0.986W/kg** which is lower than the maximum limit of 1.60 W/kg, over 1g of tissue. The device conforms to the requirements of the standard when the maximum measured SAR value is less than or equal to the limit.

* Based on spatial peak uncontrolled exposure / general population level:
Head: 1.60 W/kg, over 1g of tissue.
Body: 1.60 W/kg, over 1g of tissue.

Modifications

No modifications were made.

DEVICE DESCRIPTION

Description	The Equipment Under Test (EUT) is a **Child Tracking System**. It consists of following units: - Base (Model: BU10) - Wrist Tag (Model: WT10)
Device Category	Portable Device
Exposure Environment	General Population/Uncontrolled exposure
Test Device Type	Prototype
Brand Name	i-seeka
Serial Numbers	NIL
FCC ID	**VDQBU10** (For Base unit) **VDQWT10** (For Wrist Tag)

DEVICE OPERATING CONFIGURATION

Operating Frequencies	ISM Band Channel 0 (2405Mhz) Channel 7 (2440Mhz) Channel 14 (2475Mhz)
Operating Temperature Tolerance	(-10 ~ +50) Degree Celsius
Operating Voltage Tolerance	3 Volt DC or CR2032
Continuous Transmission Tolerance	The EUT shall cause no problem after transmitting for 4 hours.
Rated Output Power	12dBm ± 1dBm, Maximum (Base Unit) 10dBm ± 1dBm, Maximum (Wrist Tag)
Antenna Type	Integrated Omni Antenna and Directional Antenna (Base) Integrated Omni Antenna (Wrist Tag)
EUT Crest Factor	8.3
Input Power	3VDC
Accessories	1) Wrist belt

MANUFACTURER

Manufacturer Address	Daviscomms (S) Pte Ltd Blk 70 Ubi Cresent #01-07 Ubi Techpark, Singapore 408570
DID	(+65) 65471127
Fax	(+65) 65471129

DEVICE OPERATING CONDITION

The EUT was put into operation. Communication between the Tag and the Base unit was established by air link. For every SAR measurement, the EUT was set to maximum output power level using DC power supply.

TEMPERATURE AND HUMIDITY

Ambient Temperature:	24 ± 1^0 C
Tissue Temperature:	24 ± 1^0 C
Humidity:	54% to 59%

TEST RESULTS

The measurement results were obtained with the EUT tested in the conditions described in this report (Annex A).

Table 1 - Body Worn Position SAR Test Results – Base Unit (Model: BU10)

Phantom Configuration	Device Test Positions	Antenna Position	SAR (W/kg), average over 1g Tissue Device Test Channel & Frequency		
			Channel: 0 2405MHz	Channel: 7 2440MHz	Channel: 14 2475MHz
Flat Phantom	EUT **Front** Touched Phantom	fixed	0.565	0.279	0.153
Flat Phantom	EUT **Rear** Touched Phantom	fixed	0.584	0.315	0.177
Output Peak Power (dBm) Before TestTest			14.275	14.152	14.078
Output Peak Power (dBm) After Test			14.229	14.082	14.044

Table 1 - Body Worn Position SAR Test Results – Wrist Tag (Model:WT10)

Phantom Configuration	Device Test Positions	Antenna Position	SAR (W/kg), average over 1g Tissue Device Test Channel & Frequency		
			Channel: 0 2405MHz	Channel: 7 2440MHz	Channel: 14 2475MHz
Flat Phantom	EUT **Front** Touched Phantom	fixed	0.549	0.986	0.841
Flat Phantom	EUT **Rear** Touched Phantom	fixed	0.569	0.590	0.573
Output Peak Power (dBm) Before TestTest			11.279	11.390	11.970
Output Peak Power (dBm) After Test			11.074	11.258	11.732

Remarks:

1. All modes of operations were investigated and the worst-case SAR levels are reported.
2. A DC power supply was used for each mode of operation.
3. For **Base Unit**, the worst-case SAR value was found to be **0.584 W/Kg** (over a 1g tissue) at **Channel 0** which is lower than the maximum limit of 1.60 W/Kg, please refer to the above table.
4. For **Wrist Tag,** the worst-case SAR value was found to be **0.986W/Kg** (over a 1g tissue) at **Channel 7** which is lower than the maximum limit of 1.60 W/Kg, please refer to the above table.
5. The SAR limit of 1.60W/Kg (Spatial Peak level for Uncontrolled Exposure / General Population) is based on the Test Standards:
   a) Supplement C (Edition 01-01) to FCC OET Bulletin 65 (Edition 97-01)
   b) ANSI/IEEE Standard C95.1-1993

Ambient Temperature: 24 ± 1^0 C
Tissue Temperature: 24 ± 1^0 C
Humidity: 54% to 59%

Test Laboratory: TUV SUD PSB PTE LTD.

Date/Time: 7/13/2009 3:15:32 PM

File Name: Base Unit - Front_Ch 0_2405MHz.da4

Program Name: EUT Front _Ch 0_2405MHz_Data 1.da4

Phantom section: Flat Section

DUT: iseeka

Communication System: 2450 Mhz

Frequency: 2480 MHz

Duty Cycle: 1:1

Medium: Body 2450 MHz Medium parameters used: f = 2450 MHz; σ = 1.97 mho/m; ε_r = 52.1; ρ = 1000 kg/m^3

DASY4 Configuration:

Electronics: DAE4 Sn627 Calibrated: 6/14/2007

Phantom: SAM 12 Measurement SW: DASY4, V4.7 Build 80

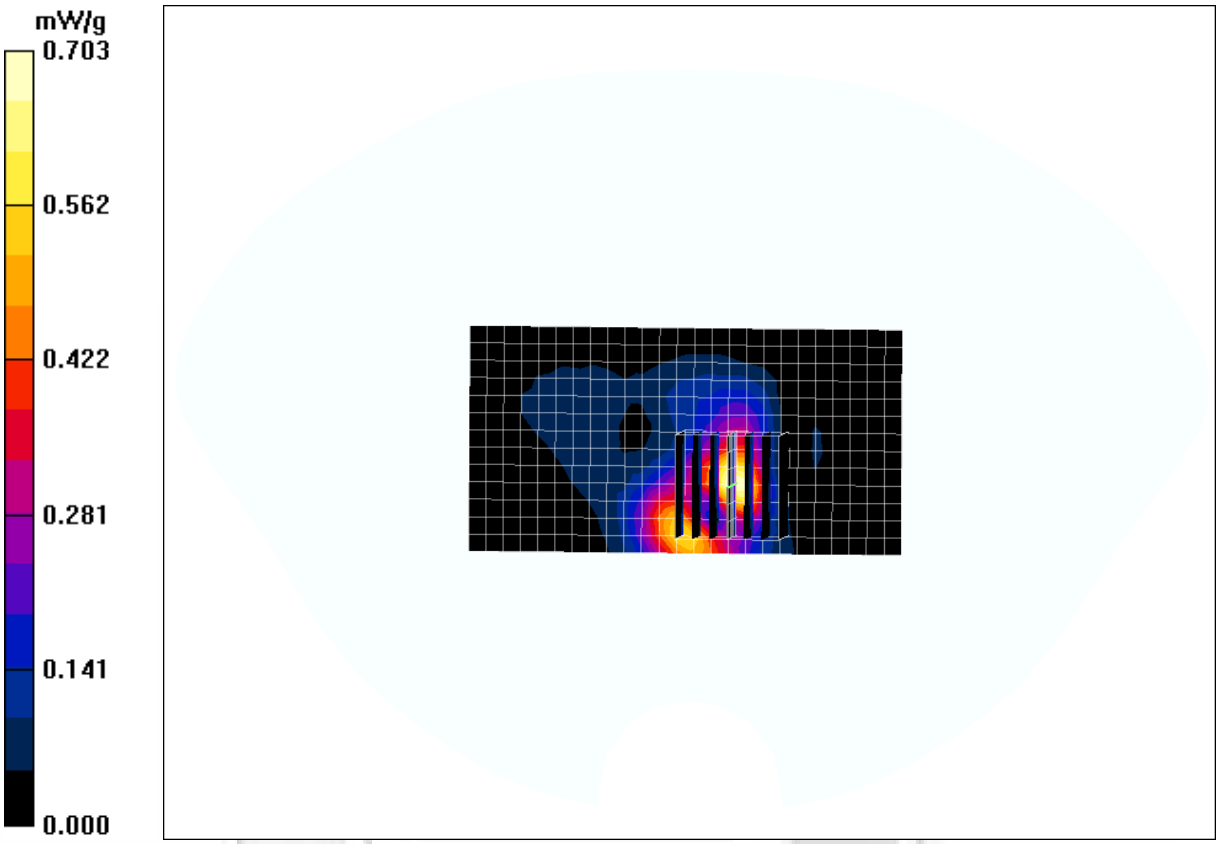
Probe: EX3DV4 - SN3541 ConvF(7.07, 7.07, 7.07) Calibrated: 7/13/2007

Post processing SW: SEMCAD, V1.8 Build 186

Sensor-Surface: 4mm (Mechanical Surface Detection)

EUT Front_Ch ow_2405MHz_Data 1/Area Scan (14x26x1): Measurement grid: dx=5mm, dy=5mm
Maximum value of SAR (measured) = 0.709 mW/g

EUT Front_Ch ow_2405MHz_Data 1/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 9.06 V/m; Power Drift = -1.05 dB
Peak SAR (extrapolated) = 1.47 W/kg
SAR(1 g) = 0.565 mW/g; SAR(10 g) = 0.213 mW/g
Maximum value of SAR (measured) = 0.703 mW/g


mW/g
0.703
0.562
0.422
0.281
0.141
0.000

Ambient Temperature: 24 ± 1^0 C
Tissue Temperature: 24 ± 1^0 C
Humidity: 54% to 59%

Test Laboratory: TUV SUD PSB PTE LTD.

Date/Time: 7/13/2009 4:10:43 PM

File Name: Base Unit - Front_Ch 7_2440MHz.da4

Program Name: EUT Front _Ch Mid_2440MHz_Data 1.da4

Phantom section: Flat Section

DUT: iseeka

Communication System: 2450 Mhz

Frequency: 2440 MHz

Duty Cycle: 1:1

Medium: Body 2450 MHz Medium parameters used: f = 2450 MHz; σ = 1.97 mho/m; ε_r = 52.1; ρ = 1000 kg/m^3

DASY4 Configuration:

Electronics: DAE4 Sn627 Calibrated: 6/14/2007

Phantom: SAM 12 Measurement SW: DASY4, V4.7 Build 80

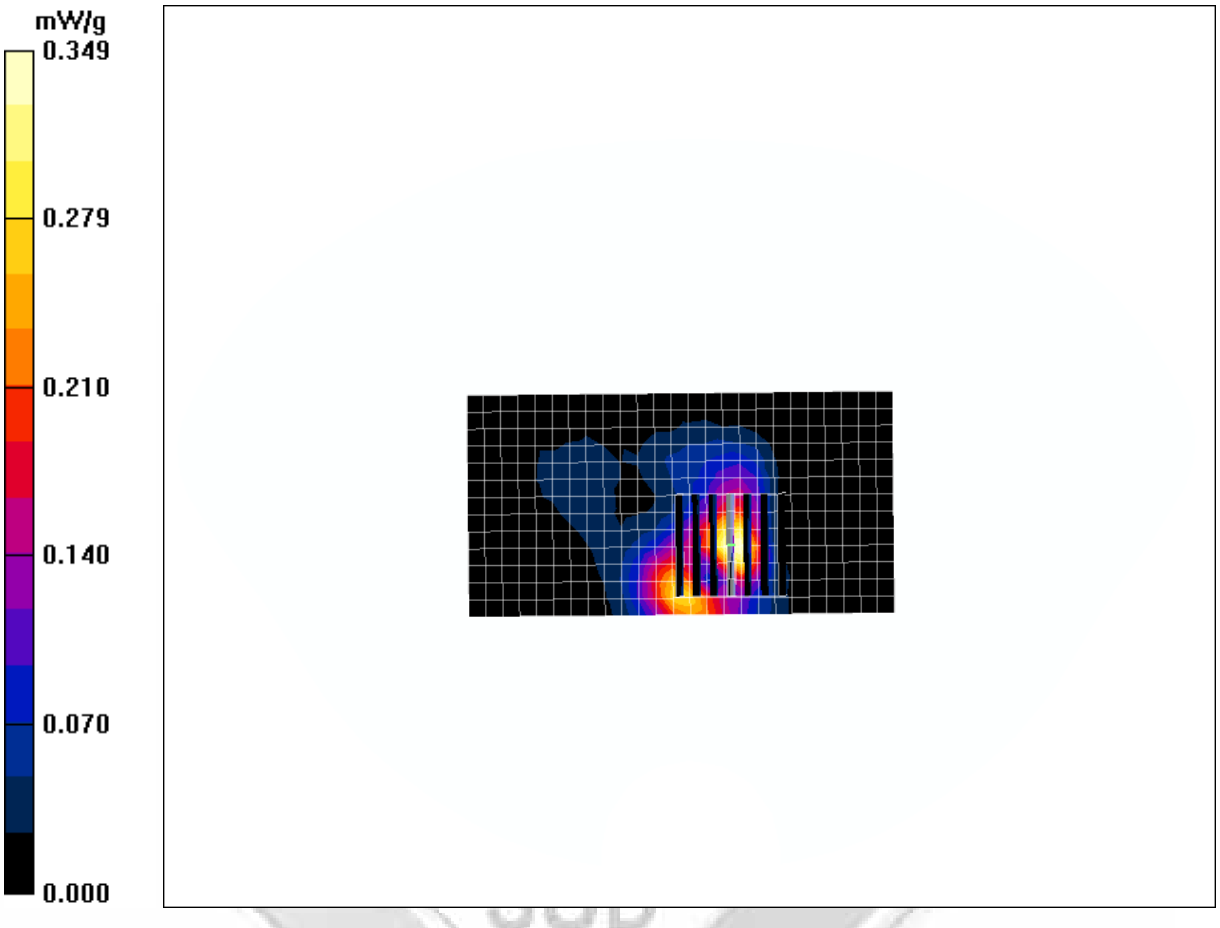
Probe: EX3DV4 - SN3541 ConvF(7.07, 7.07, 7.07) Calibrated: 7/13/2007

Post processing SW: SEMCAD, V1.8 Build 186

Sensor-Surface: 4mm (Mechanical Surface Detection)

EUT Front_Ch Mid_2440MHz_Data 1/Area Scan (14x26x1): Measurement grid: dx=5mm, dy=5mm
Maximum value of SAR (measured) = 0.357 mW/g

EUT Front_Ch Mid_2440MHz_Data 1/Zoom Scan (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 5.51 V/m; Power Drift = -0.241 dB
Peak SAR (extrapolated) = 0.787 W/kg
SAR(1 g) = 0.279 mW/g; SAR(10 g) = 0.105 mW/g
Maximum value of SAR (measured) = 0.349 mW/g


mW/g
0.349
0.279
0.210
0.140
0.070
0.000

Ambient Temperature: **24 ± 1^{0}C**
Tissue Temperature: **24 ± 1^{0}C**
Humidity: **54% to 59%**

Test Laboratory: TUV SUD PSB PTE LTD.

Date/Time: 7/14/2009 8:42:07 AM

File Name: Base Unit- Front_Ch 14_2475MHz.da4

Program Name: EUT Front _Ch High_2475MHz_Data 1.da4

Phantom section: Flat Section

DUT: iseeka

Communication System: 2450 Mhz

Frequency: 2475 MHz

Duty Cycle: 1:1

Medium: Body 2450 MHz Medium parameters used: f = 2450 MHz; σ = 1.97 mho/m; ε_r = 52.1; ρ = 1000 kg/m^3

DASY4 Configuration:

Electronics: DAE4 Sn627 Calibrated: 6/14/2007

Phantom: SAM 12 Measurement SW: DASY4, V4.7 Build 80

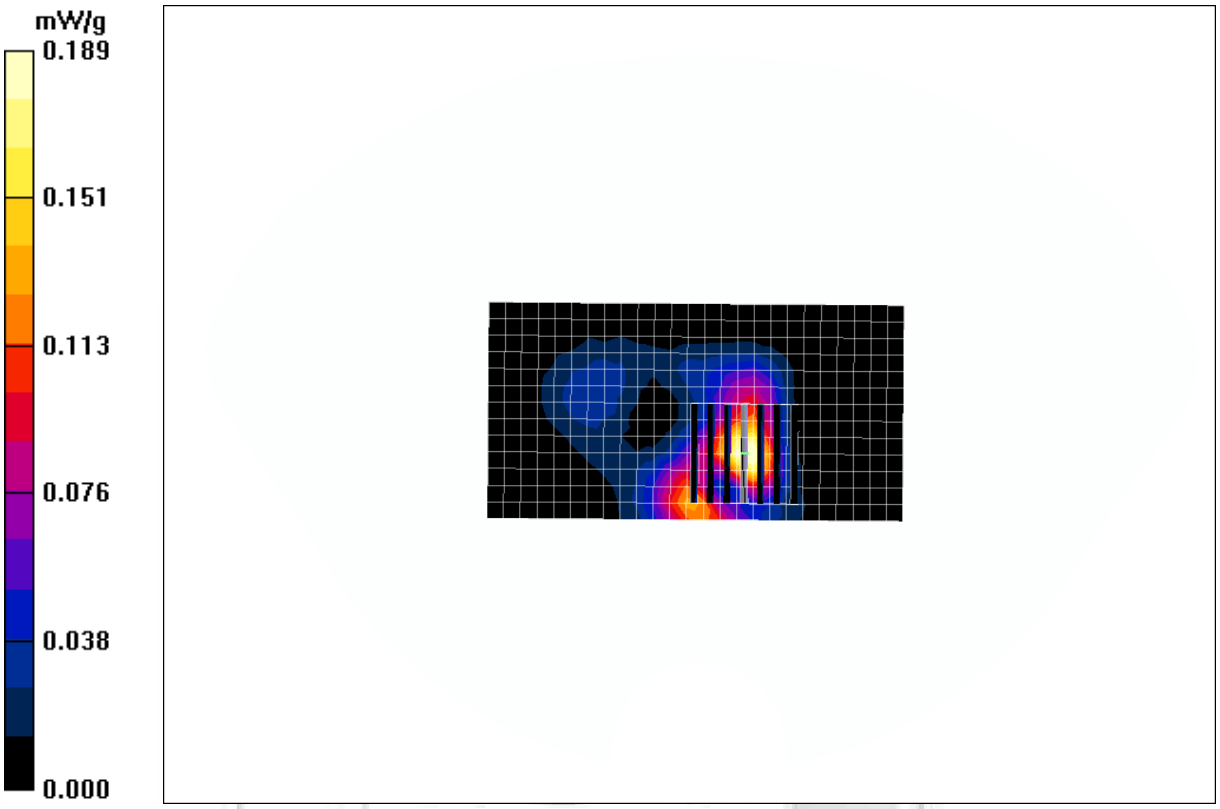
Probe: EX3DV4 - SN3541 ConvF(7.07, 7.07, 7.07) Calibrated: 7/13/2007

Post processing SW: SEMCAD, V1.8 Build 186

Sensor-Surface: 4mm (Mechanical Surface Detection)

EUT Front_Ch High_2475MHz_Data 1/Area Scan (14x26x1): Measurement grid: dx=5mm, dy=5mm
Maximum value of SAR (measured) = 0.205 mW/g

EUT Front_Ch High_2475MHz_Data 1/Zoom Scan (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 4.40 V/m; Power Drift = -1.23 dB
Peak SAR (extrapolated) = 0.351 W/kg
SAR(1 g) = 0.153 mW/g; SAR(10 g) = 0.060 mW/g
Maximum value of SAR (measured) = 0.189 mW/g


mW/g
0.189
0.151
0.113
0.076
0.038
0.000

Base TEST RESULTS

Ambient Temperature: **24 ± 1^{0}C**
Tissue Temperature: **24 ± 1^{0}C**
Humidity: **54% to 59%**

Test Laboratory: TUV SUD PSB PTE LTD.

Date/Time: 7/14/2009 1:50:08 PM

File Name: Base Unit -Rear_Ch 0_2405MHz.da4

Program Name: EUT Rear _Ch Low_2405MHz_Data 1.da4

Phantom section: Flat Section

DUT: iseeka

Communication System: 2450 Mhz

Frequency: 2480 MHz

Duty Cycle: 1:1

Medium: Body 2450 MHz Medium parameters used: f = 2450 MHz; σ = 1.97 mho/m; ε_r = 52.1; ρ = 1000 kg/m^3

DASY4 Configuration:

Electronics: DAE4 Sn627 Calibrated: 6/14/2007

Phantom: SAM 12 Measurement SW: DASY4, V4.7 Build 80

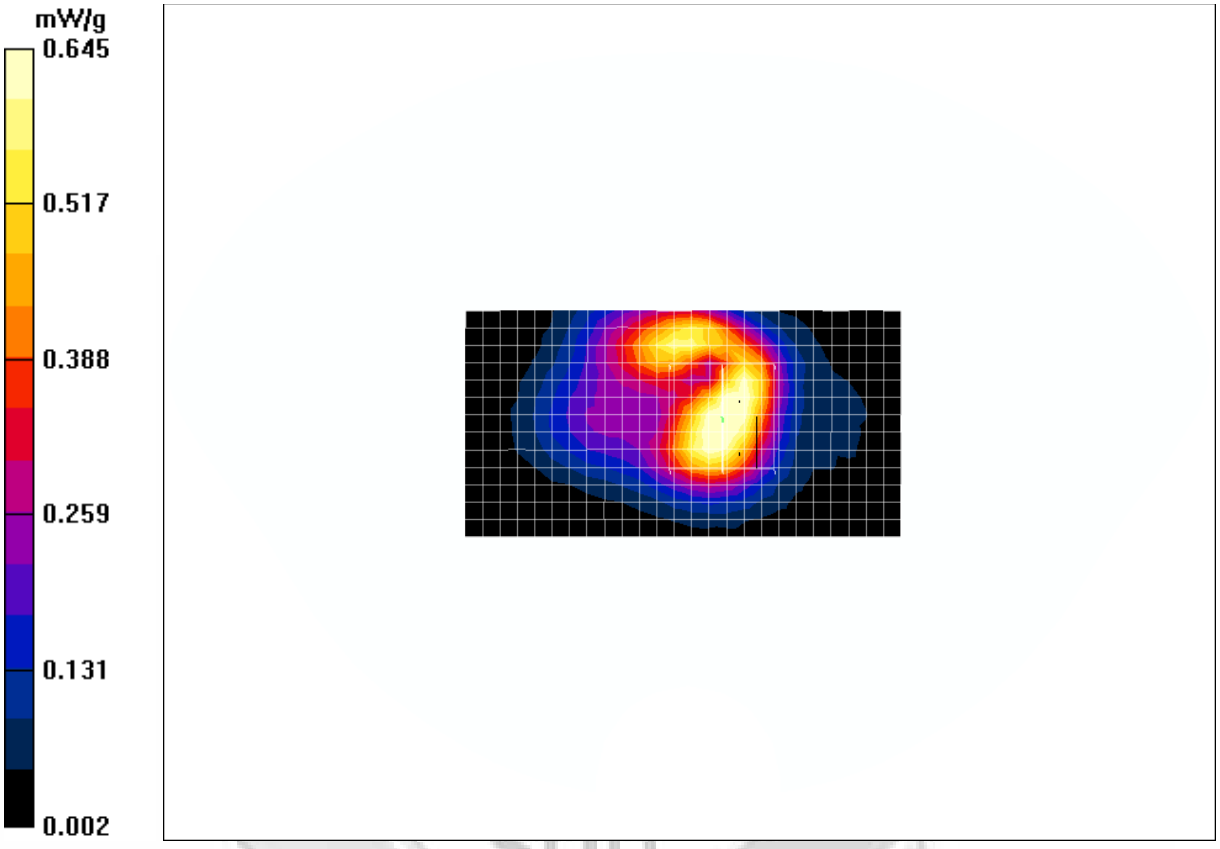
Probe: EX3DV4 - SN3541 ConvF(7.07, 7.07, 7.07) Calibrated: 7/13/2007

Post processing SW: SEMCAD, V1.8 Build 186

Sensor-Surface: 4mm (Mechanical Surface Detection)

EUT Rear_Ch Low_2405MHz_Data 1/Area Scan (14x26x1): Measurement grid: dx=5mm, dy=5mm
Maximum value of SAR (measured) = 0.694 mW/g

EUT Rear_Ch Low_2405MHz_Data 1/Zoom Scan (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 16.4 V/m; Power Drift = -0.885 dB
Peak SAR (extrapolated) = 1.13 W/kg
SAR(1 g) = 0.584 mW/g; SAR(10 g) = 0.294 mW/g
Maximum value of SAR (measured) = 0.645 mW/g


mW/g
0.645
0.517
0.388
0.259
0.131
0.002

Ambient Temperature: **24 ± 1^{0}C**
Tissue Temperature: **24 ± 1^{0}C**
Humidity: **54% to 59%**

Test Laboratory: TUV SUD PSB PTE LTD.

Date/Time: 7/14/2009 12:20:29 PM

File Name: Base Unit Rear_Ch 7_2440MHz.da4

Program Name: EUT Rear _Ch Mid_2440MHz_Data 1.da4

Phantom section: Flat Section

DUT: iseeka

Communication System: 2450 Mhz

Frequency: 2440 MHz

Duty Cycle: 1:1

Medium: Body 2450 MHz Medium parameters used: f = 2450 MHz; σ = 1.97 mho/m; ε_r = 52.1; ρ = 1000 kg/m^3

DASY4 Configuration:

Electronics: DAE4 Sn627 Calibrated: 6/14/2007

Phantom: SAM 12 Measurement SW: DASY4, V4.7 Build 80

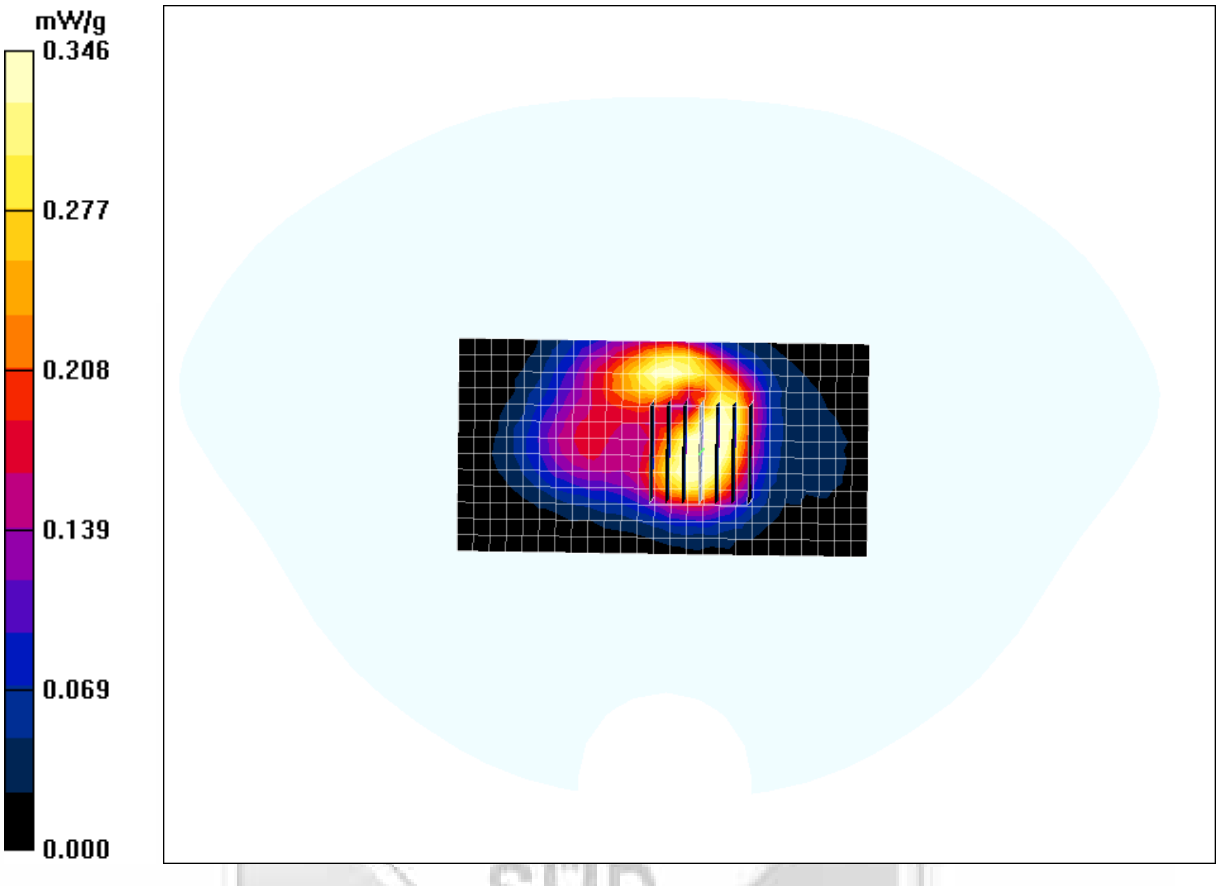
Probe: EX3DV4 - SN3541 ConvF(7.07, 7.07, 7.07) Calibrated: 7/13/2007

Post processing SW: SEMCAD, V1.8 Build 186

Sensor-Surface: 4mm (Mechanical Surface Detection)

EUT Front_Ch Mid_2440MHz_Data 1/Area Scan (14x26x1): Measurement grid: dx=5mm, dy=5mm
Maximum value of SAR (measured) = 0.398 mW/g

EUT Front_Ch Mid_2440MHz_Data 1/Zoom Scan (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 11.6 V/m; Power Drift = -0.972 dB
Peak SAR (extrapolated) = 0.609 W/kg
SAR(1 g) = 0.315 mW/g; SAR(10 g) = 0.159 mW/g
Maximum value of SAR (measured) = 0.346 mW/g


mW/g
0.346
0.277
0.208
0.139
0.069
0.000

Ambient Temperature: **24 ± 1^{0}C**
Tissue Temperature: **24 ± 1^{0}C**
Humidity: **54% to 59%**

Test Laboratory: TUV SUD PSB PTE LTD.

Date/Time: 7/14/2009 11:30:14 AM

File Name: Base Unit Rear_Ch 14_2475MHz.da4

Program Name: EUT Rear _Ch High_2475MHz_Data 1.da4

Phantom section: Flat Section

DUT: iseeka

Communication System: 2450 Mhz

Frequency: 2475 MHz

Duty Cycle: 1:1

Medium: Body 2450 MHz Medium parameters used: f = 2450 MHz; σ = 1.97 mho/m; ε_r = 52.1; ρ = 1000 kg/m^3

DASY4 Configuration:

Electronics: DAE4 Sn627 Calibrated: 6/14/2007

Phantom: SAM 12 Measurement SW: DASY4, V4.7 Build 80

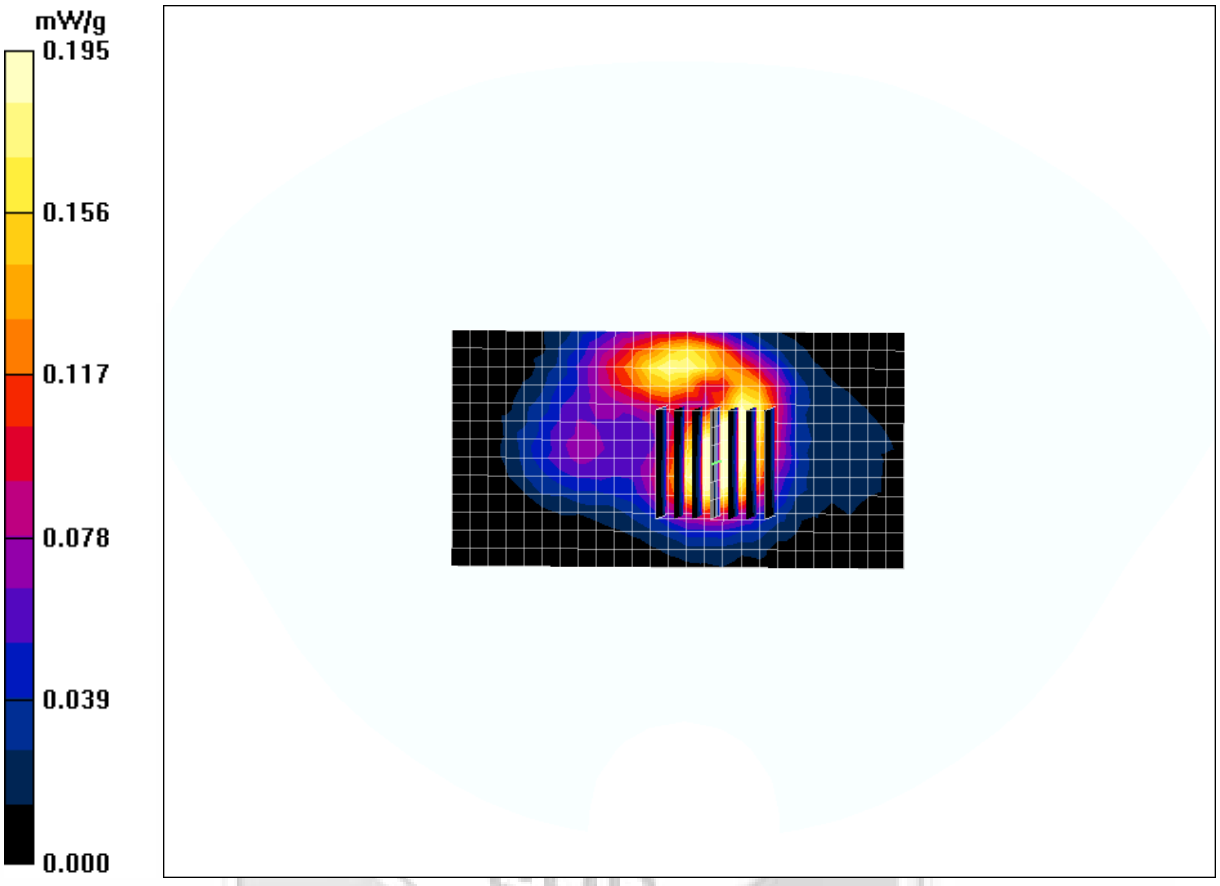
Probe: EX3DV4 - SN3541 ConvF(7.07, 7.07, 7.07) Calibrated: 7/13/2007

Post processing SW: SEMCAD, V1.8 Build 186

Sensor-Surface: 4mm (Mechanical Surface Detection)

EUT Rear_Ch High_2475MHz_Data 1/Area Scan (14x26x1): Measurement grid: dx=5mm, dy=5mm
Maximum value of SAR (measured) = 0.225 mW/g

EUT Rear_Ch High_2475MHz_Data 1/Zoom Scan (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 8.55 V/m; Power Drift = -0.822 dB
Peak SAR (extrapolated) = 0.342 W/kg
SAR(1 g) = 0.177 mW/g; SAR(10 g) = 0.089 mW/g
Maximum value of SAR (measured) = 0.195 mW/g


mW/g
0.195
0.156
0.117
0.078
0.039
0.000

Ambient Temperature: **24 ± 1^{0}C**
Tissue Temperature: **24 ± 1^{0}C**
Humidity: **54% to 59%**

Test Laboratory: TUV SUD PSB PTE LTD.

Date/Time: 7/16/2009 8:08:58 AM

File Name: Wrist Tag Front Ch 0_2405MHz.da4

Program Name: WT Front _Ch Low_2405MHz_Data 1.da4

Phantom section: Flat Section

DUT: iseeka wrist tag

Communication System: 2450 Mhz

Frequency: 2405 MHz

Duty Cycle: 1:1

Medium: Body 2450 MHz Medium parameters used: f = 2450 MHz; σ = 1.97 mho/m; ε_r = 52.1; ρ = 1000 kg/m^3

DASY4 Configuration:

Electronics: DAE4 Sn627 Calibrated: 6/14/2007

Phantom: SAM 12 Measurement SW: DASY4, V4.7 Build 80

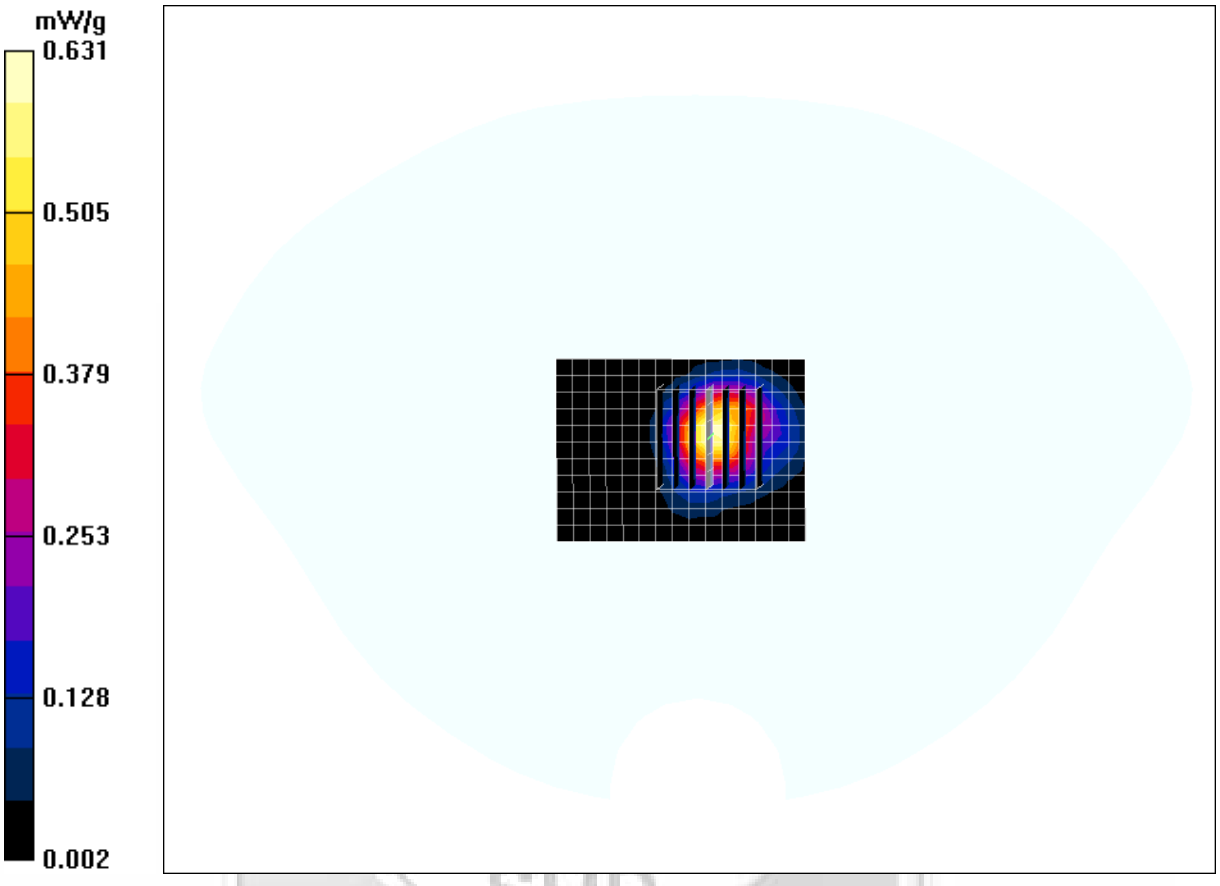
Probe: EX3DV4 - SN3541 ConvF(7.07, 7.07, 7.07) Calibrated: 7/13/2007

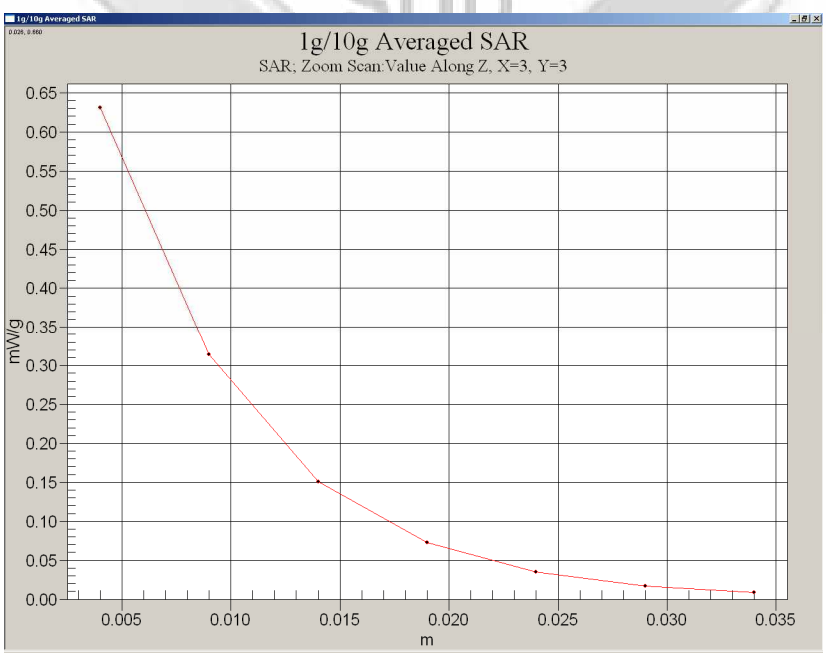
Postprocessing SW: SEMCAD, V1.8 Build 186

Sensor-Surface: 4mm (Mechanical Surface Detection)

WT Front_Ch ow_2405MHz_Data 1/Area Scan (12x16x1): Measurement grid: dx=5mm, dy=5mm
Maximum value of SAR (measured) = 0.600 mW/g

WT Front_Ch ow_2405MHz_Data 1/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 15.7 V/m; Power Drift = -0.082 dB
Peak SAR (extrapolated) = 1.21 W/kg
SAR(1 g) = 0.549 mW/g; SAR(10 g) = 0.239 mW/g
Maximum value of SAR (measured) = 0.631 mW/g


mW/g
0.631
0.505
0.379
0.253
0.128
0.002


1g/10g Averaged SAR
SAR, Zoom Scan:Value Along Z, X=3, Y=3
mW/g
0.65
0.60
0.55
0.50
0.45
0.40
0.35
0.30
0.25
0.20
0.15
0.10
0.05
0.00
0.005
0.010
0.015
0.020
0.025
0.030
0.035
m

Wrist Tag TEST RESULTS

Ambient Temperature:	**24 ± 1^{0}C**
Tissue Temperature:	**24 ± 1^{0}C**
Humidity:	**54% to 59%**

Test Laboratory: TUV SUD PSB PTE LTD.

Date/Time: 7/15/2009 6:07:56 PM

File Name: Wrist Tag Front_Ch 7_2440MHz.da4

Program Name: WT Front _Ch Mid_2440MHz_Data 1.da4

Phantom section: Flat Section

DUT: iseeka wrist tag

Communication System: 2450 Mhz

Frequency: 2440 MHz

Duty Cycle: 1:1

Medium: Body 2450 MHz Medium parameters used: f = 2450 MHz; σ = 1.97 mho/m; ε_r = 52.1; ρ = 1000 kg/m^3

DASY4 Configuration:

Electronics: DAE4 Sn627 Calibrated: 6/14/2007

Phantom: SAM 12 Measurement SW: DASY4, V4.7 Build 80

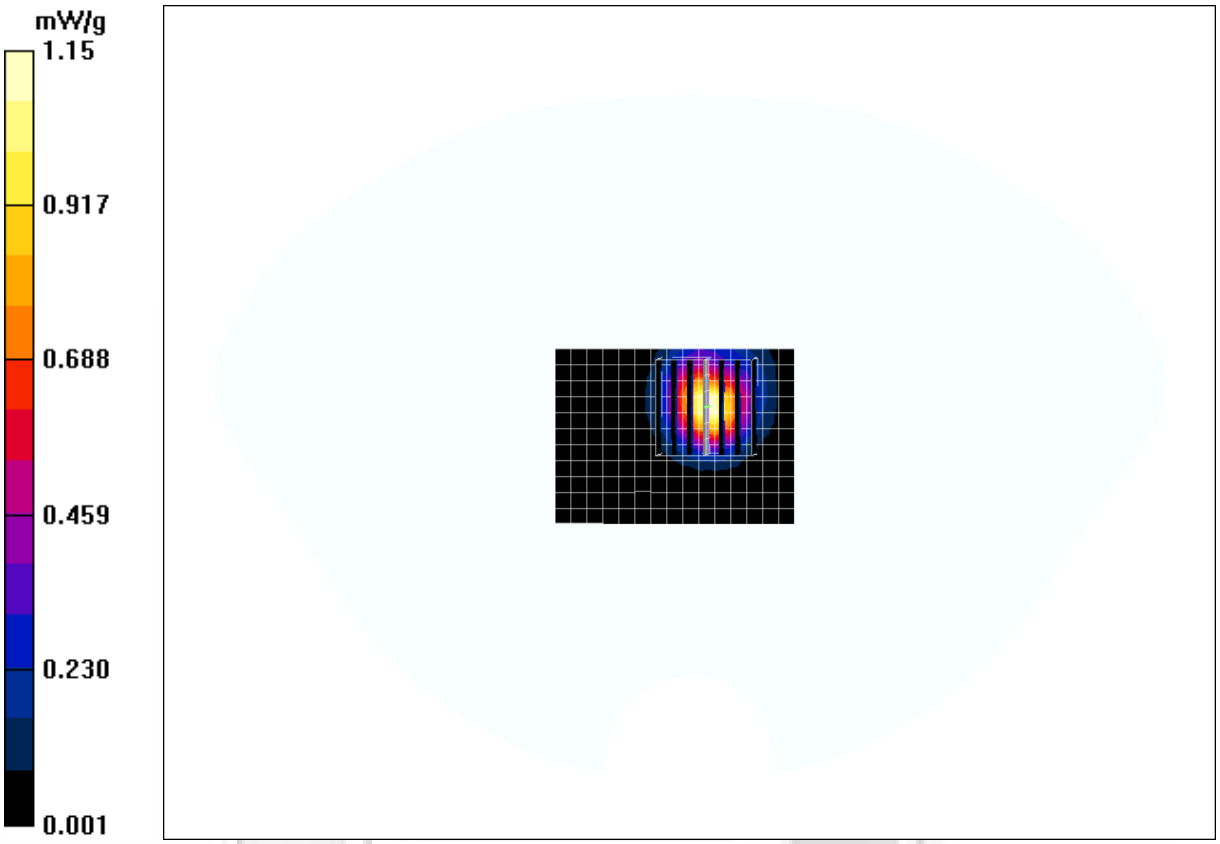
Probe: EX3DV4 - SN3541 ConvF(7.07, 7.07, 7.07) Calibrated: 7/13/2007

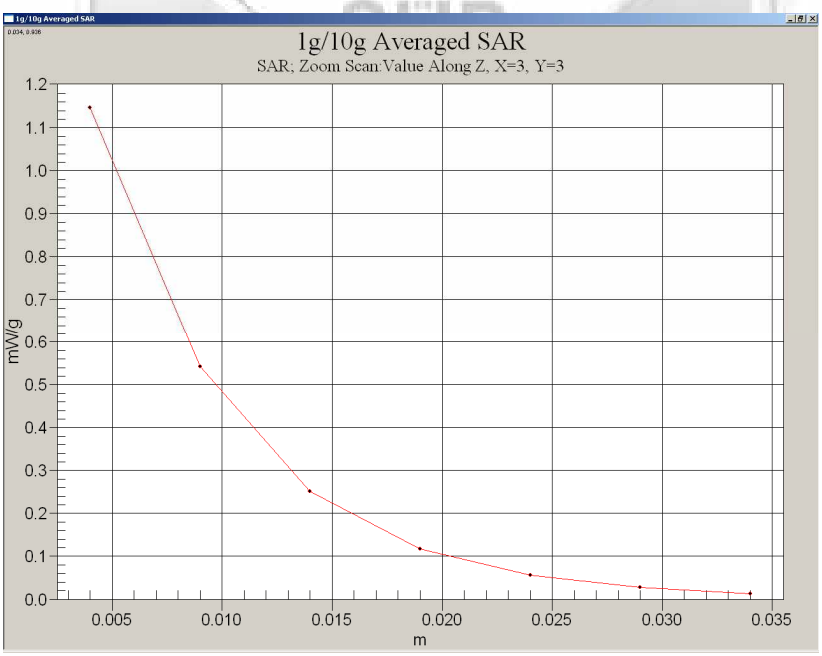
Postprocessing SW: SEMCAD, V1.8 Build 186

Sensor-Surface: 4mm (Mechanical Surface Detection)

WT Front_Ch Mid_2440MHz_Data 1/Area Scan (12x16x1): Measurement grid: dx=5mm, dy=5mm
Maximum value of SAR (measured) = 1.12 mW/g

WT Front_Ch Mid_2440MHz_Data 1/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 15.6 V/m; Power Drift = 0.000 dB
Peak SAR (extrapolated) = 2.25 W/kg
SAR(1 g) = 0.986 mW/g; SAR(10 g) = 0.402 mW/g
Maximum value of SAR (measured) = 1.15 mW/g


mW/g
1.15
0.917
0.688
0.459
0.230
0.001


1g/10g Averaged SAR
SAR; Zoom Scan:Value Along Z, X=3, Y=3
mW/g
m
1.2
1.1
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
0.005
0.010
0.015
0.020
0.025
0.030
0.035

Wrist Tag TEST RESULTS

Ambient Temperature:	**24 ± 1^{0}C**
Tissue Temperature:	**24 ± 1^{0}C**
Humidity:	**54% to 59%**

Test Laboratory: TUV SUD PSB PTE LTD.

Date/Time: 7/16/2009 10:52:40 AM

File Name: Wrist Tag Front_Ch 14_2475MHz.da4

Program Name: WT Front _Ch High_2475MHz_Data 1.da4

Phantom section: Flat Section

DUT: iseeka wrist tag

Communication System: 2450 Mhz

Frequency: 2475 MHz

Duty Cycle: 1:1

Medium: Body 2450 MHz Medium parameters used: f = 2450 MHz; σ = 1.97 mho/m; ε_r = 52.1; ρ = 1000 kg/m^3

DASY4 Configuration:

Electronics: DAE4 Sn627 Calibrated: 6/14/2007

Phantom: SAM 12 Measurement SW: DASY4, V4.7 Build 80

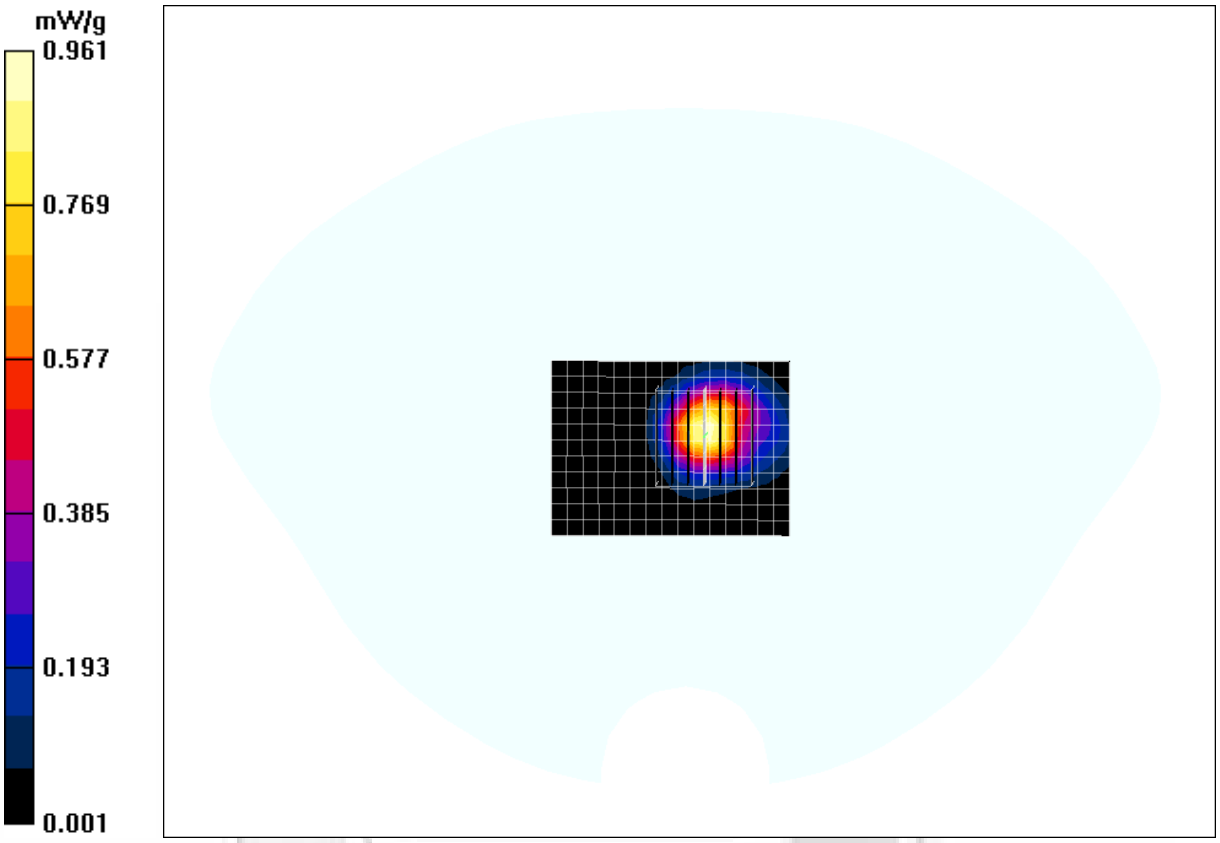
Probe: EX3DV4 - SN3541 ConvF(7.07, 7.07, 7.07) Calibrated: 7/13/2007

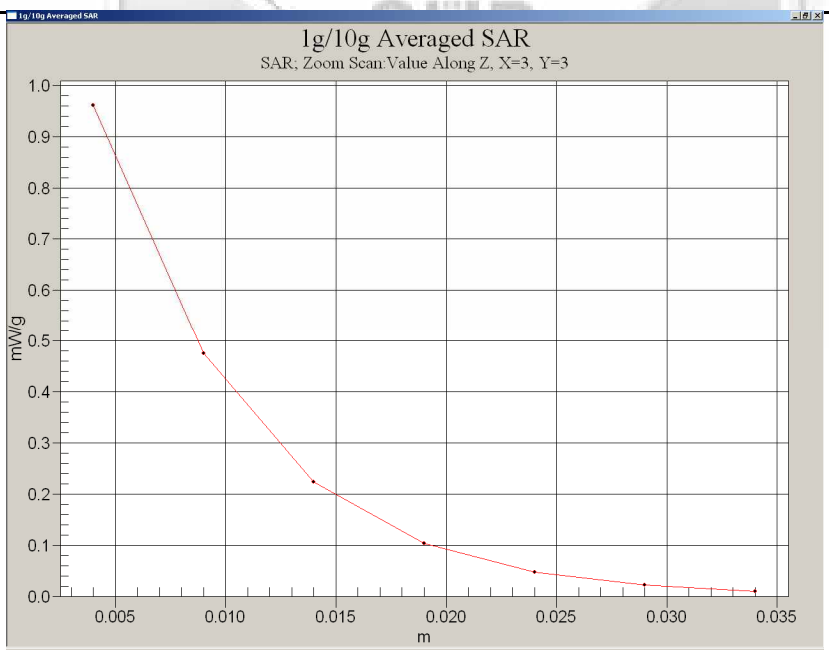
Postprocessing SW: SEMCAD, V1.8 Build 186

Sensor-Surface: 4mm (Mechanical Surface Detection)

WT Front_Ch High_2475MHz_Data 1/Area Scan (12x16x1): Measurement grid: dx=5mm, dy=5mm
Maximum value of SAR (measured) = 0.944 mW/g

WT Front_Ch High_2475MHz_Data 1/Zoom Scan (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 17.9 V/m; Power Drift = -0.148 dB
Peak SAR (extrapolated) = 1.86 W/kg
SAR(1 g) = 0.841 mW/g; SAR(10 g) = 0.356 mW/g
Maximum value of SAR (measured) = 0.961 mW/g


mW/g
0.961
0.769
0.577
0.385
0.193
0.001


1g/10g Averaged SAR
SAR, Zoom Scan:Value Along Z, X=3, Y=3
mW/g
m
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
0.005
0.010
0.015
0.020
0.025
0.030
0.035

Ambient Temperature: **24 ± 1^{0}C**
Tissue Temperature: **24 ± 1^{0}C**
Humidity: **54% to 59%**

Test Laboratory: TUV SUD PSB PTE LTD.

Date/Time: 7/16/2009 8:49:09 AM

File Name: Wrist Tag Rear_Ch 0_2405MHz.da4

Program Name: WT Rear _Ch Low_2405MHz_Data 1.da4

Phantom section: Flat Section

DUT: iseeka wrist tag

Communication System: 2450 Mhz

Frequency: 2405 MHz

Duty Cycle: 1:1

Medium: Body 2450 MHz Medium parameters used: f = 2450 MHz; σ = 1.97 mho/m; ε_r = 52.1; ρ = 1000 kg/m^3

DASY4 Configuration:

Electronics: DAE4 Sn627 Calibrated: 6/14/2007

Phantom: SAM 12 Measurement SW: DASY4, V4.7 Build 80

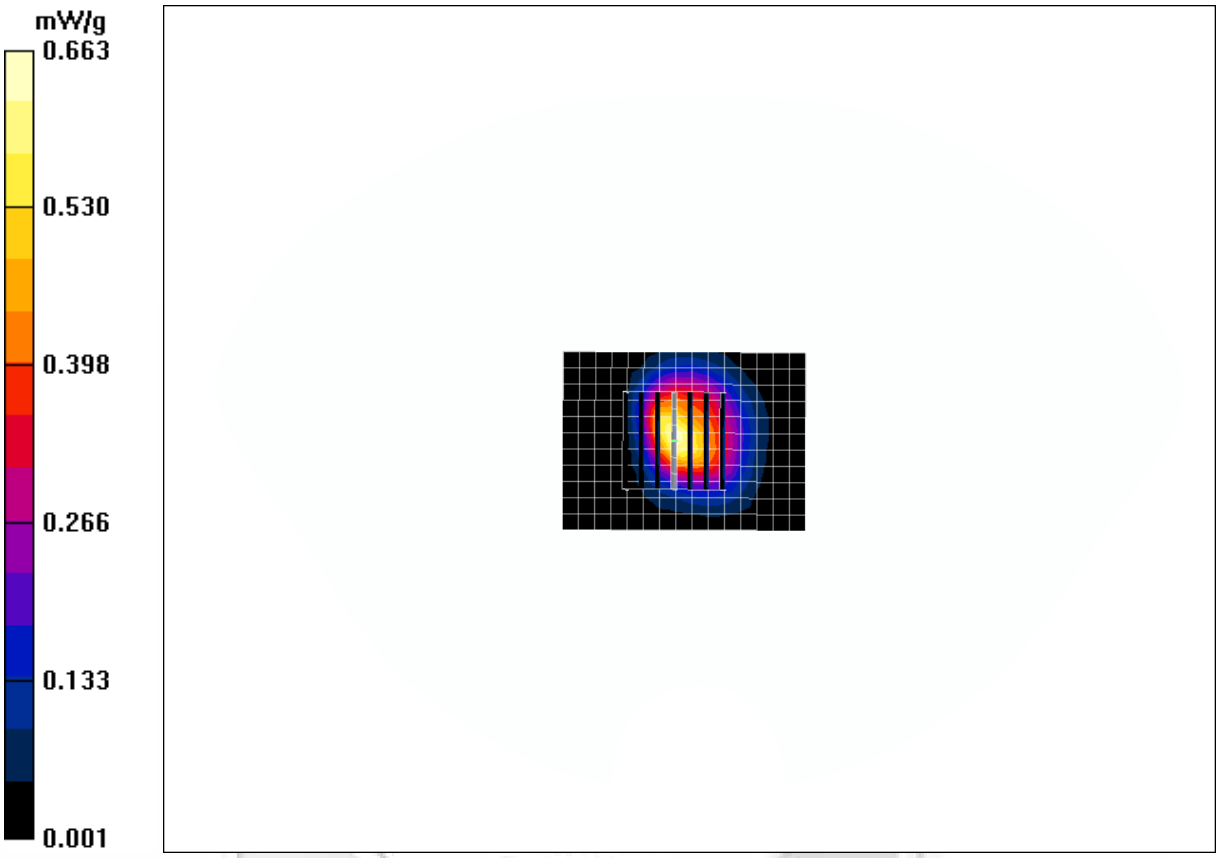
Probe: EX3DV4 - SN3541 ConvF(7.07, 7.07, 7.07) Calibrated: 7/13/2007

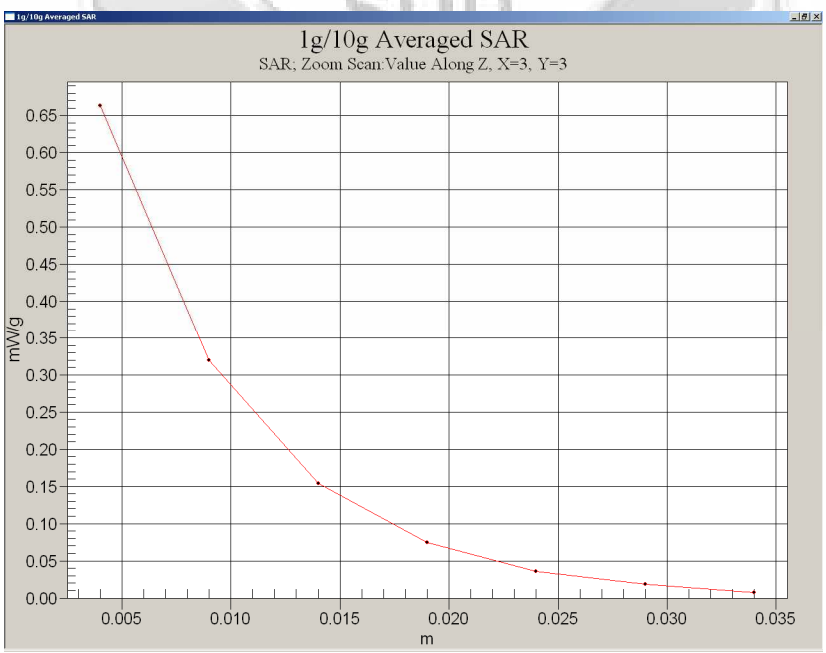
Postprocessing SW: SEMCAD, V1.8 Build 186

Sensor-Surface: 4mm (Mechanical Surface Detection)

WT Rear_Ch Low_2405MHz_Data 1/Area Scan (12x16x1): Measurement grid: dx=5mm, dy=5mm
Maximum value of SAR (measured) = 0.654 mW/g

WT Rear_Ch Low_2405MHz_Data 1/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 16.5 V/m; Power Drift = -0.126 dB
Peak SAR (extrapolated) = 1.36 W/kg
SAR(1 g) = 0.569 mW/g; SAR(10 g) = 0.257 mW/g
Maximum value of SAR (measured) = 0.663 mW/g


mW/g
0.663
0.530
0.398
0.266
0.133
0.001


1g/10g Averaged SAR
1g/10g Averaged SAR
SAR, Zoom Scan:Value Along Z, X=3, Y=3
mW/g
0.65
0.60
0.55
0.50
0.45
0.40
0.35
0.30
0.25
0.20
0.15
0.10
0.05
0.00
0.005
0.010
0.015
0.020
0.025
0.030
0.035
m

Ambient Temperature: **24 ± 1^{0}C**
Tissue Temperature: **24 ± 1^{0}C**
Humidity: **54% to 59%**

Test Laboratory: TUV SUD PSB PTE LTD.

Date/Time: 7/16/2009 9:25:15 AM

File Name: Wrist Tag Rear_Ch 7_2440MHz.da4

Program Name: WT Rear_Ch Mid_2440MHz_Data 1.da4

Phantom section: Flat Section

DUT: iseeka wrist tag

Communication System: 2450 Mhz

Frequency: 2440 MHz

Duty Cycle: 1:1

Medium: Body 2450 MHz Medium parameters used: f = 2450 MHz; σ = 1.97 mho/m; ε_r = 52.1; ρ = 1000 kg/m^3

DASY4 Configuration:

Electronics: DAE4 Sn627 Calibrated: 6/14/2007

Phantom: SAM 12 Measurement SW: DASY4, V4.7 Build 80

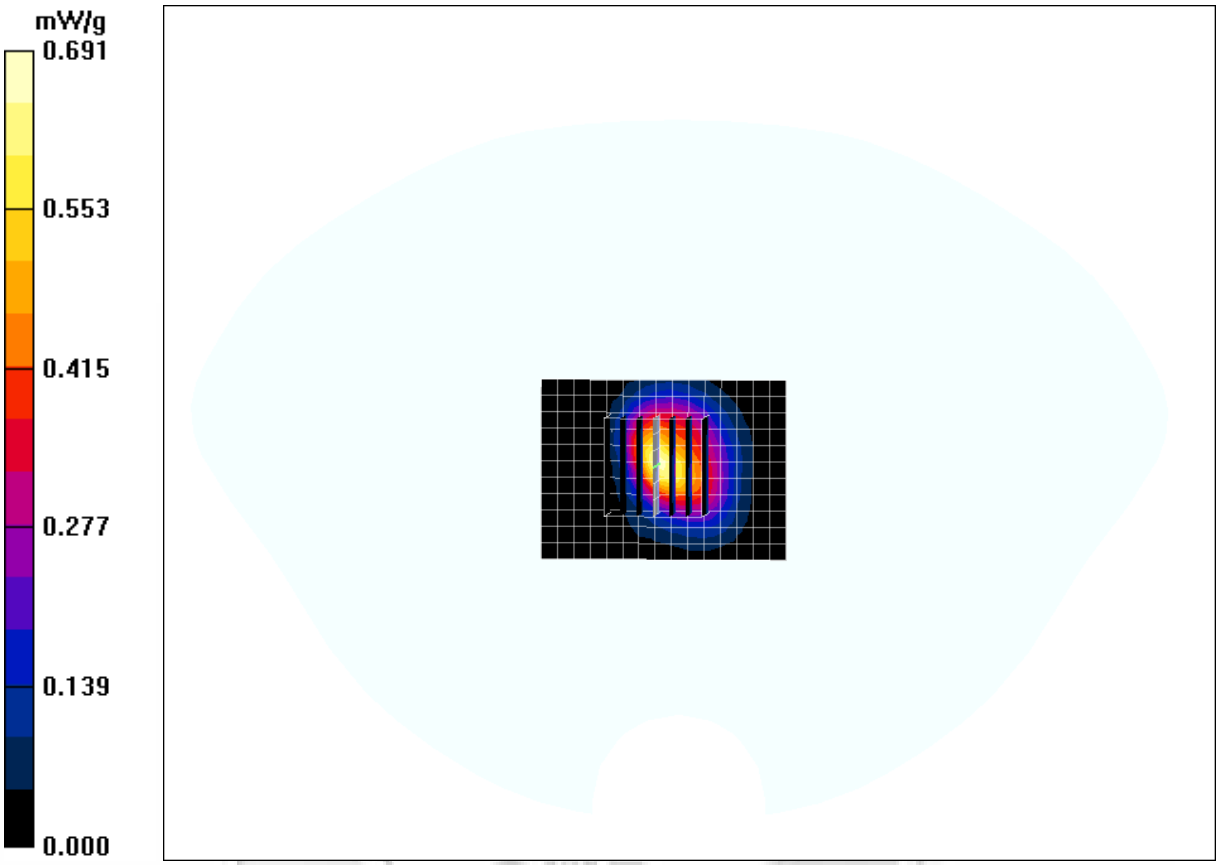
Probe: EX3DV4 - SN3541 ConvF(7.07, 7.07, 7.07) Calibrated: 7/13/2007

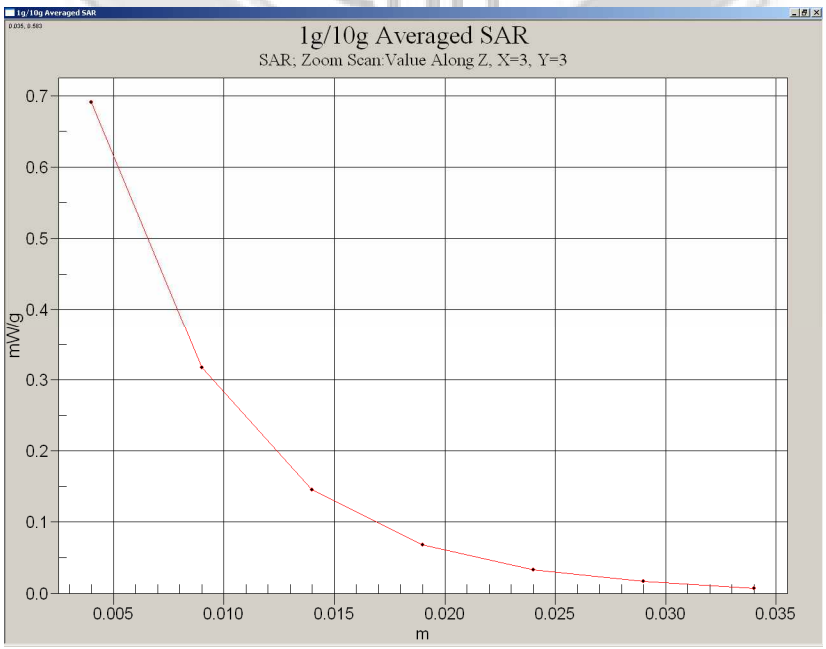
Postprocessing SW: SEMCAD, V1.8 Build 186

Sensor-Surface: 4mm (Mechanical Surface Detection)

WT Rear_Ch Mid_2440MHz_Data 1/Area Scan (12x16x1): Measurement grid: dx=5mm, dy=5mm
Maximum value of SAR (measured) = 0.687 mW/g

WT Rear_Ch Mid_2440MHz_Data 1/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 17.5 V/m; Power Drift = -0.082 dB
Peak SAR (extrapolated) = 1.42 W/kg
SAR(1 g) = 0.590 mW/g; SAR(10 g) = 0.264 mW/g
Maximum value of SAR (measured) = 0.691 mW/g


mW/g
0.691
0.553
0.415
0.277
0.139
0.000


1g/10g Averaged SAR
SAR; Zoom Scan:Value Along Z, X=3, Y=3
mW/g
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
0.005
0.010
0.015
0.020
0.025
0.030
0.035
m

Ambient Temperature: **24 ± 1^{0}C**
Tissue Temperature: **24 ± 1^{0}C**
Humidity: **54% to 59%**

Test Laboratory: TUV SUD PSB PTE LTD.

Date/Time: 7/16/2009 9:57:51 AM

File Name: Wrist Tag Rear_Ch 14_2475MHz.da4

Program Name: WT Rear_Ch High_2475MHz_Data 1.da4

Phantom section: Flat Section

DUT: iseeka wrist tag

Communication System: 2450 Mhz

Frequency: 2475 MHz

Duty Cycle: 1:1

Medium: Body 2450 MHz Medium parameters used: f = 2450 MHz; σ = 1.97 mho/m; ε_r = 52.1; ρ = 1000 kg/m^3

DASY4 Configuration:

Electronics: DAE4 Sn627 Calibrated: 6/14/2007

Phantom: SAM 12 Measurement SW: DASY4, V4.7 Build 80

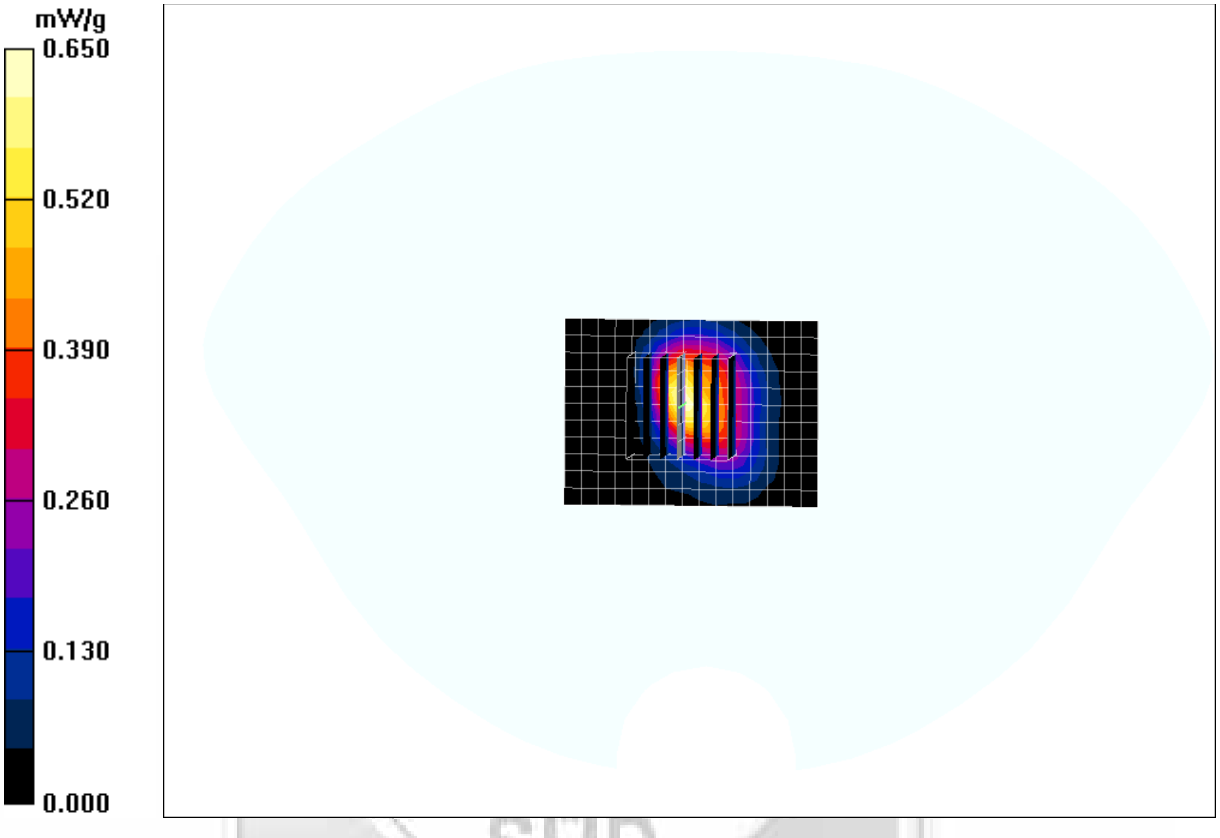
Probe: EX3DV4 - SN3541 ConvF(7.07, 7.07, 7.07) Calibrated: 7/13/2007

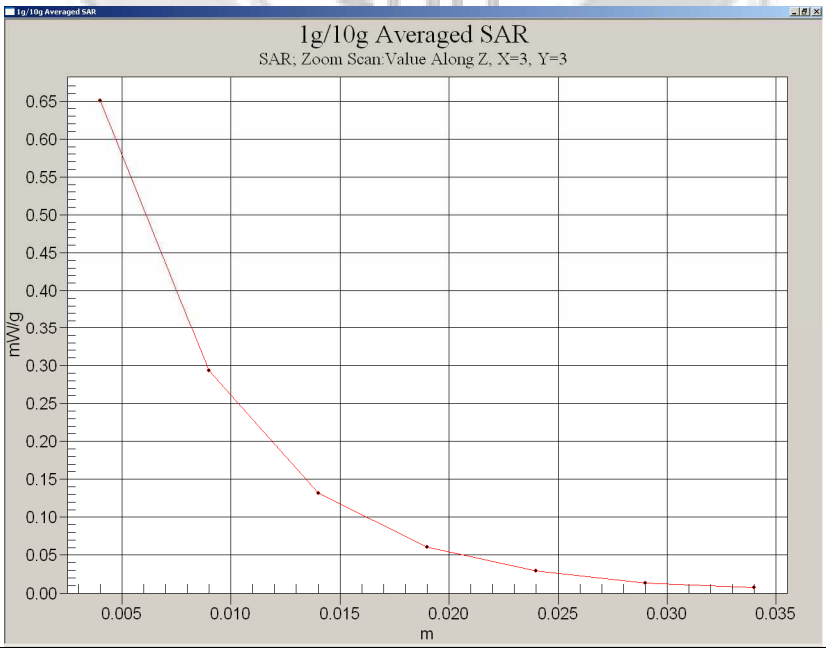
Postprocessing SW: SEMCAD, V1.8 Build 186

Sensor-Surface: 4mm (Mechanical Surface Detection)

WT Rear_Ch High_2475MHz_Data 1/Area Scan (12x16x1): Measurement grid: dx=5mm, dy=5mm
Maximum value of SAR (measured) = 0.661 mW/g

WT Rear_Ch High_2475MHz_Data 1/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 16.3 V/m; Power Drift = 0.090 dB
Peak SAR (extrapolated) = 1.46 W/kg
SAR(1 g) = 0.573 mW/g; SAR(10 g) = 0.254 mW/g
Maximum value of SAR (measured) = 0.650 mW/g


mW/g
0.650
0.520
0.390
0.260
0.130
0.000


1g/10g Averaged SAR
SAR; Zoom Scan:Value Along Z, X=3, Y=3
mW/g
0.65
0.60
0.55
0.50
0.45
0.40
0.35
0.30
0.25
0.20
0.15
0.10
0.05
0.00
0.005
0.010
0.015
0.020
0.025
0.030
0.035
m

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March 2009

TEST INSTRUMENTATION & GENERAL PROCEDURES ANNEX A

ANNEX A

TEST INSTRUMENTATION & GENERAL PROCEDURE

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A.1 General Test Procedure

In the SAR measurement, the positioning of the probes must be performed with sufficient accuracy to obtain repeatable measurements in the presence of rapid spatial attenuation phenomena. The accurate positioning of the E-field probe is accomplished by using a high precision robot. The robot can be taught to position the probe sensor following a specific pattern of points. In a first sweep, the sensor is positioned as close as possible to the interface, with the sensor enclosure touching the inside of the fiberglass shell. The SAR is measured on a grid of points, which covers the curved surface of the phantom in an area larger than the size of the EUT. After the initial scan, a high- resolution grid is used to locate the absolute maximum measured energy point. At this location, attenuation versus depth scan will be accomplished by the measurement system to calculate the SAR value.

A.2 SAR Test Instrumentation

SAR Measurement System

- **Positioning Equipment**
  Type: High Precision Industrial Robot, RX90.
  Precision: High precision (repeatability 0.02mm)
  Reliability: High reliability (industrial design)

- **Compaq Computer**
  Type: 2.4GHz Pentium
  Memory: 512MB SDRAM
  Operating System: Windows 2000
  Dell Monitor: 17" LCD

- **Dosimetric E-Field Probe**
  Type: ET3DV6
  Isotropy Error (∅): ±0.25dB
  Dynamic Range: 0.01 – 100 W/kg

- **Phantom & Tissue**
  Phantom: "Phantom SAM 12" and "450MHz Phantom" were manufactured by SPEAG.
  Tissue: Simulated Tissue with electrical characteristics similar to those of the human at normal body temperature (23 ± 1°C)
  Shell: Fiberglass shell phantom with 2mm thickness for "Phantom SAM 12".
  Fiberglass shell phantom with 2mm or 6mm thickness for "450MHz Flat Phantom".

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A.3 Test Setup

Phantom

The "Phantom SAM 12", manufactured by SPEAG is a fiberglass shell phantom with 2 mm shell thickness. It has three measurement areas:

- Left hand
- Right hand
- Flat phantom

The "450MHz Flat Phantom", manufactured by SPEAG is a fiberglass shell phantom with 2mm or 6mm shell thickness. It has one measurement areas:

- Flat phantom

1) The "Phantom SAM 12" table comes in the sizes: A 100x50x85 cm (LxWxH).
2) The "450MHz Flat Phantom – 6mm Shell Thickness" table comes in the sizes: A 82x44x18 cm (LxWxH) is used for System Validation Test.
3) The "450MHz Flat Phantom – 2mm Shell Thickness" table comes in the sizes: A 82x44x18 cm (LxWxH) is used for SAR Measurement.

The bottom plate contains three pair of bolts for locking the device holder. The device holder positions are adjusted to the standard measurement positions in the three sections. Only one device holder is necessary if two phantoms are used (e.g., for different solutions).

Simulated tissue

Simulated Tissue: Suggested in a paper by George Hartsgrove and colleagues in University of Ottawa Ref.: Bioelectromagnetics 8:29-36 (1987)

This simulated tissue is mainly composed of water, sugar and salt. At higher frequencies, in order to achieve the proper conductivity, the solution does not contain salt. Also, at these frequencies, D.I. water and alcohol is preferred.
Tissue Density : Approximately 1.25 g/cm^3

- **Preparation**
  The ingredients (i.e. water, sugar, salt, etc) required to prepare the simulated tissue are carefully weighed and poured into a clean container for mixing. A stirring paddle, that is

TEST INSTRUMENTATION & GENERAL PROCEDURES ANNEX A

attached to a hand drill is used to stir the solution for a duration of about 30 minutes or more. When the ingredients are completely dissolved, the solution is left in the container for the air bubbles to disappear.

- **Measurement of Electrical Characteristics of Simulated Tissue**
  1) S-PARAMETER Network Analyzer, Agilent 8753ES (30kHz – 6GHz)
  2) Agilent 85070D Dielectric Probe Kit

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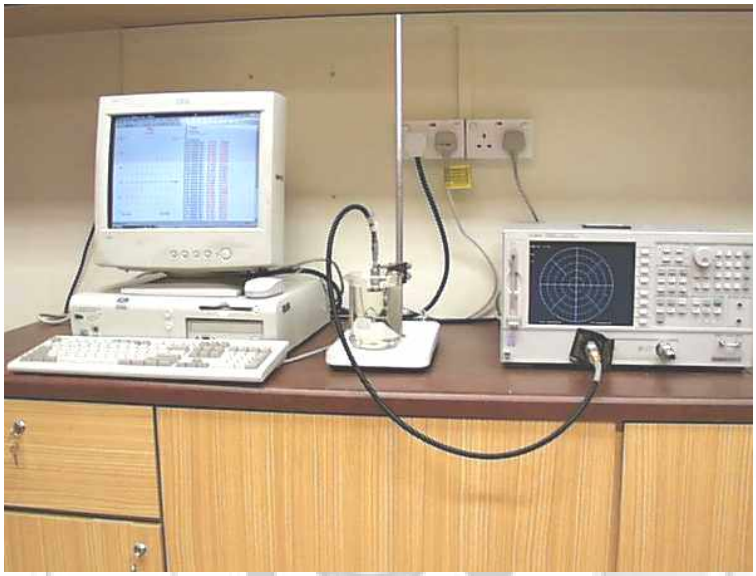
ELECTRICAL CHARACTERISTIC MEASUREMENT SETUP



- **Description of the Agilent 85070D Dielectric Probe Kit**

  The 85070D is a dielectric probe that is used to measure the intrinsic electrical properties of materials in the RF and microwave frequency bands. The 85070D software allows you to measure the complex dielectric constant (also called permittivity) of liquids and semi-solids, incuding the dielectric loss factor of loss tangent.

  To obtain data at hundreds of frequencies in seconds, simply immerse the probe into liquids or semi-solids - no special fixtures or containers are required. The 85070D must be used in conjunction with an Agilent network analyzer. The network analyzer provides the high frequency stimulus, and measures the reflected response.

  The probe transmits a signal into the material under test (MUT). The measured reflected response from the materials is then related to its dielectric properties. A computer controls the system, and runs software that guides the user through a measurement sequence. An effort is made to keep the results dielectric constant and conductivity within 5 % of published data.

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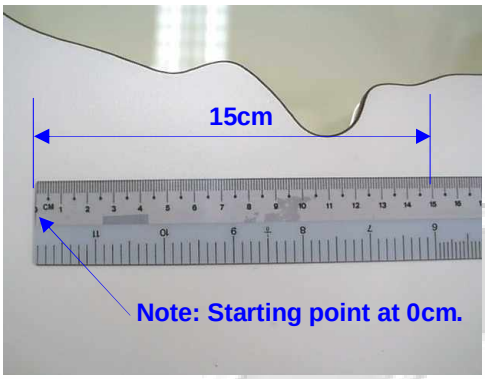
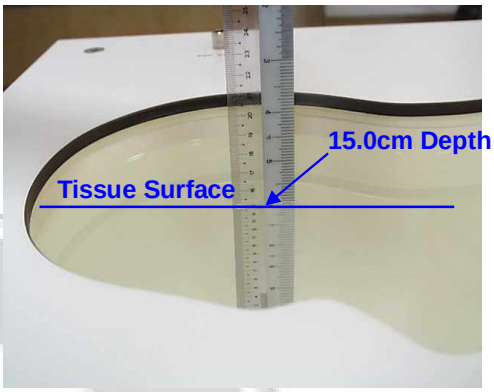
Tissue Depth

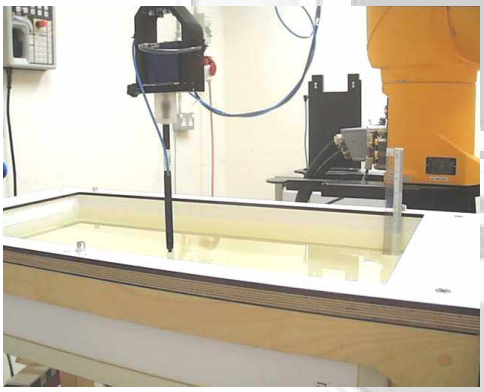
The tissue depth at the "Phantom SAM 12", "450MHz Flat Phantom – 6mm Shell Thickness" and "450MHz Flat Phantom – 2mm Shell Thickness" is approximately 15cm ±0.5cm.



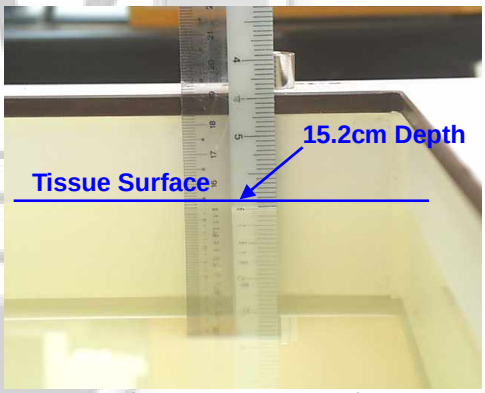
At "Phantom SAM 12"



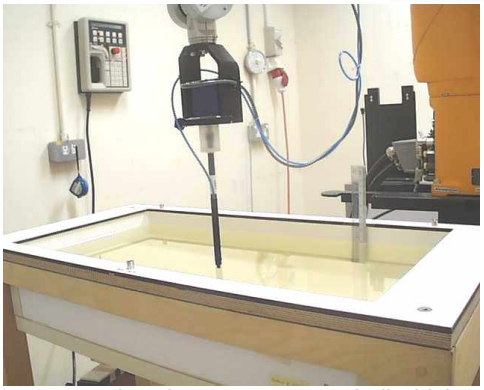
Tissue – 15.0cm Depth



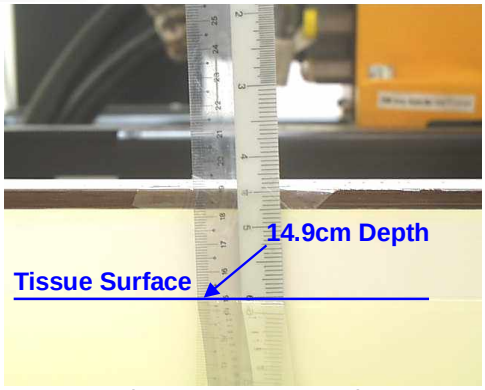
At "450MHz Flat Phantom – 6mm Shell Thickness"



Tissue – 15.2cm Depth



At "450MHz Flat Phantom – 2mm Shell Thickness"



Tissue – 14.9cm Depth

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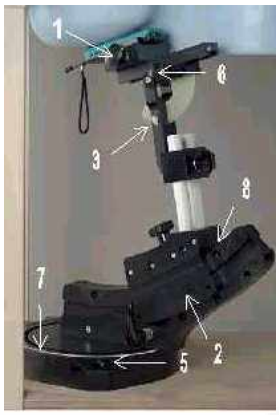
Positioning of EUT



The DASY4 holder is designed to cope with different positions given in the standard. It has two scales for the device rotation (with respect to the body axis) and the device inclination (with respect to the line between the ear openings). The plane between the ear openings and the mouth tip has a rotation angle of 65º. The intended use position in the CENELEC document is has a rotation angle of 65º and an inclination angle of 80º. The rotation centers for both scales is the ear opening. Thus the device needs no repositioning when changing the angles. The device rotation around the device axis is not changed in the holder. In the CENELEC standard it is always 0º. If the standard changes, a support will be provided with the new angle.

1. **"Cheek/Touch Position"** – the device is brought toward the mouth of the head phantom by pivoting against the "ear reference point" or along the "N-F" line for the SCC-34/SC-2 head phantom. This test position is established:

i) When any point on the display, keypad or mouthpiece portions of the handset is in contact with the phantom.

ii) (Or) When any portion of a foldout, sliding or similar keypad cover opened to its intended self-adjusting normal use position is in contact with the cheek or mouth of the phantom.

For existing head phantoms – when the handset loses contact with the phantom at the pivotingpoint, rotation should continue until the device touches the cheek of the phantom or breaks its last contact from the ear spacer.

2. **"Ear/Tilt Position"** – With the handset aligned in the "Cheek/Touch Position":

i) If the earpiece of the handset is not in full contact with the phantom's ear spacer (in the "Cheek/Touch position") and the peak SAR location for the "Cheek/Touch" position is located at the ear spacer region or corresponds to the earpiece region of the handset, the device should be returned to the "initial ear position" by rotating it away from the mouth until the earpiece is in full contact with the ear spacer.

ii) (Otherwise) The handset should be moved (translated) away from the cheek perpendicular to the line passes through both "ear reference points" (note: one of these ear reference points may not physically exist on a split head model) for approximate 2-3 cm. While it is in this position, the handset is tilted away from the mouth with respect to the "test device reference point" by 15°. After the tilt, it is then moved (translated) back toward the head perpendicular to the line passes through both "ear reference points" until the device touches the phantom or the ear spacer. If the antenna touches the head first, the positioning process should be repeated with a tilt angle less than 15° so that the device and its antenna would touch the phantom simultaneously. This test position may require a device holder or positioner to achieve the translation and tilting with acceptable positioning repeatability.

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3. **Body Worn Configuration**

All body worn accessories are tested for the FCC RF exposure compliance. The phone is positioned into carrying case (if available) and placed below of the flat phantom. Headset or ear piece (if available) is connected during measurements.

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Instrument	Model	S/No	Cal Due Date	
Boonton RF Power Meter (Dual Channel)	4532	97701	9 April 2010	√
Boonton Power Sensor	51075	51075	9 April 2010	√
Boonton Power Sensor	51075	32002	9 April 2010	√
S-Parameter Network Analyzer (30kHz – 6GHz)	8753ES	MY40001026	27 April 2010	√
Agilent 85070D Dielectric Probe Kit	85075D	21356	-	√
Anritsu RF Signal Generator (10MHz – 20GHz)	68347C	04306	-	√
Amplifier Research Power Amplifier (1MHz – 1000MHz)	25W1000B	27225	-	
Amplifier Research Power Amplifier (800MHz – 4.2GHz)	25S1G4A	29346	-	√
Agilent Dual Directional Coupler (0.1~2.0)GHz	HP778D	18289	-	√
AR Directional Coupler (0.8~4.2)GHz	DC7144	29245	-	
2450MHz System Validation Dipole	D2450V2	752	23 June 2010	√
Data Acquisition Electronics (DAE4)	DAE4	627	24 June 2010	√
Dosimetric E-field Probe	EX3DV4	3541	23 June 2010	√

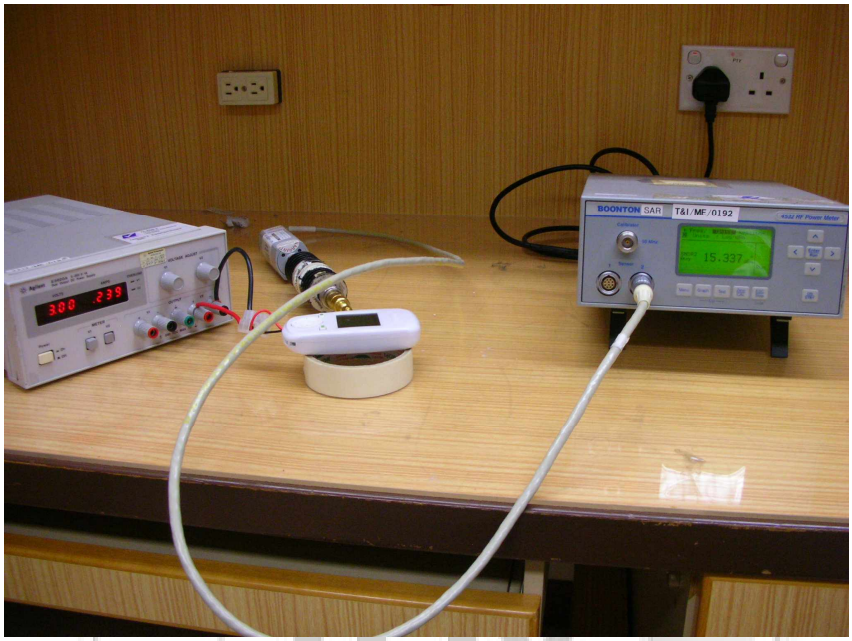
TEST SETUP PHOTOGRAPHS **ANNEX B**

ANNEX B

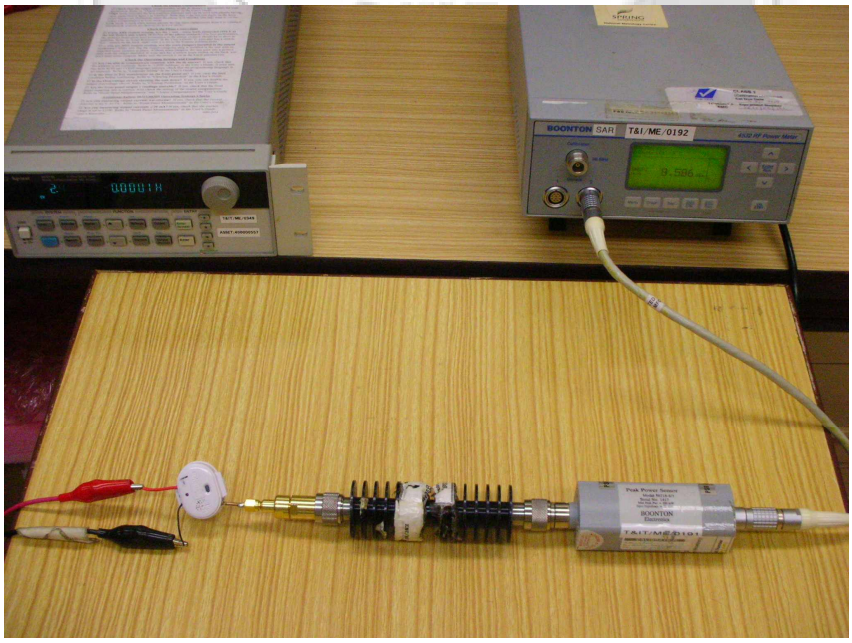
TEST SETUP PHOTOGRAPHS

TEST SETUP PHOTOGRAPHS ANNEX B

SAR Test Setup Photographs



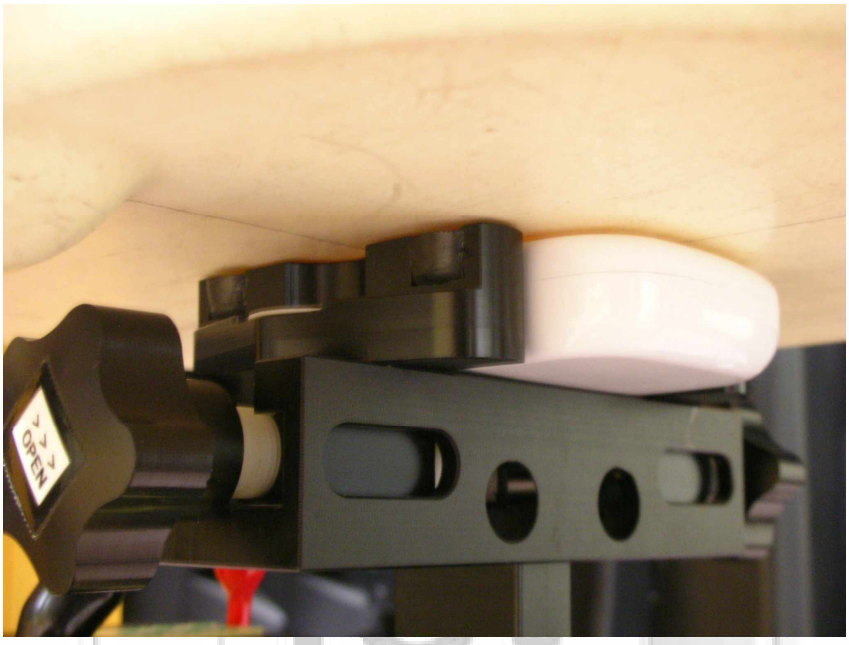
Conducted power Test Setup Base



Conducted power Test Setup Wrist Tag

TEST SETUP PHOTOGRAPHS ANNEX B

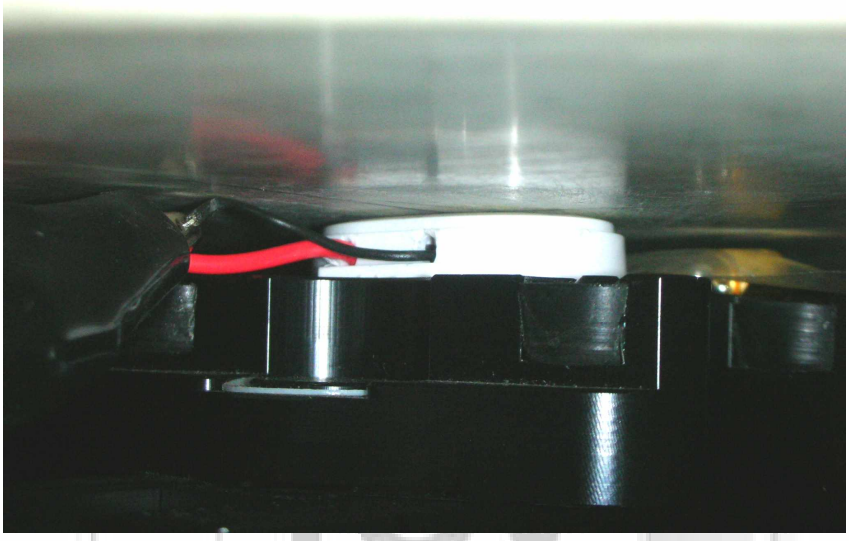
SAR Test Setup Photographs



SAR Test Setup Base (Device at Flat phantom)

TEST SETUP PHOTOGRAPHS ANNEX B

SAR Test Setup Photographs

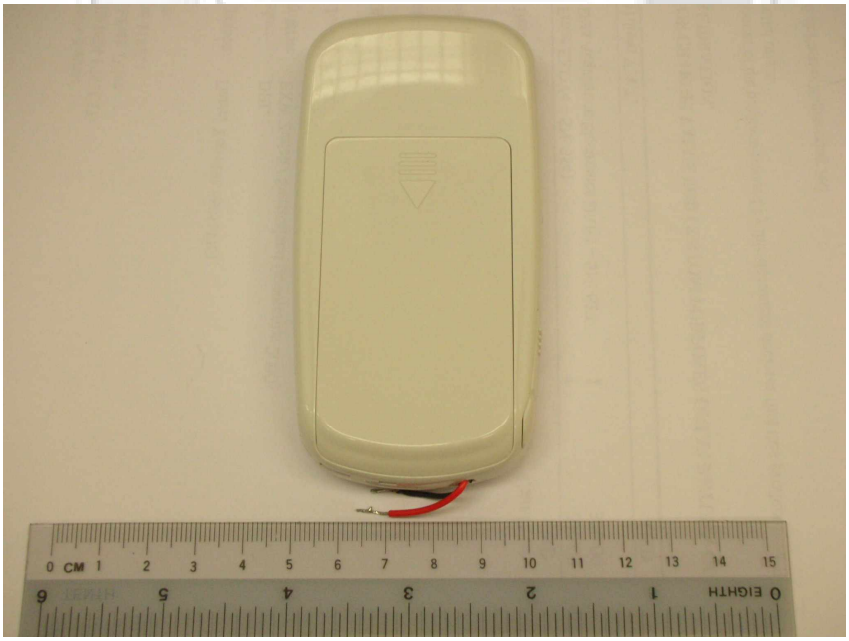


SAR Test Setup Wrist Tag (Device at Flat phantom)

TEST SETUP PHOTOGRAPHS ANNEX B

EUT PHOTOGRAPHS

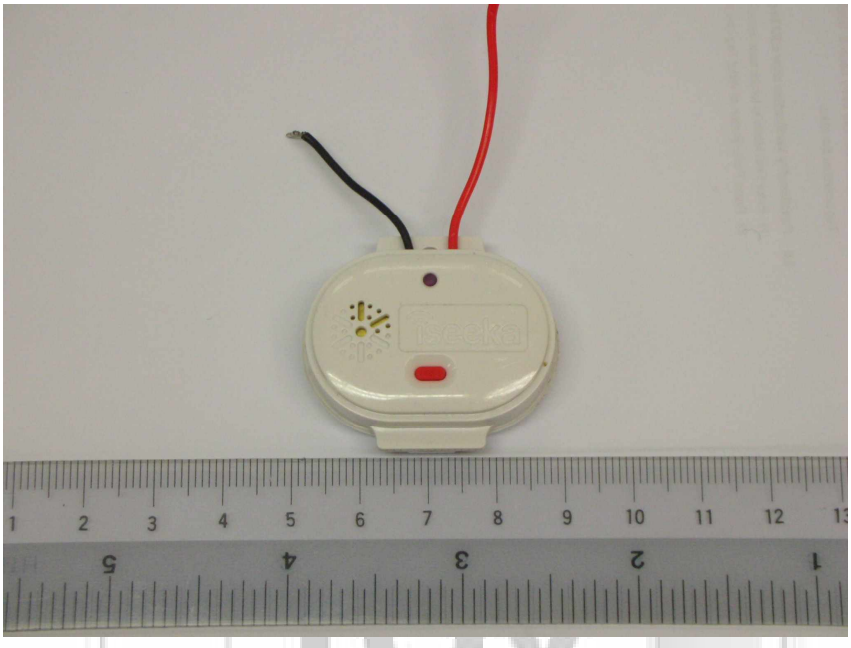
Front of EUT



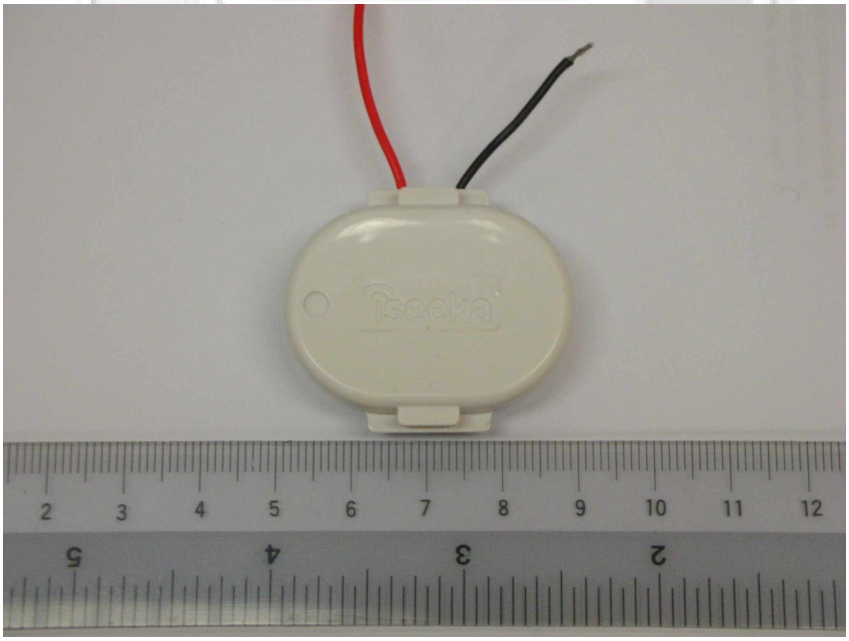
Rear of EUT

TEST SETUP PHOTOGRAPHS ANNEX B

EUT PHOTOGRAPHS



Front of Wrist Tag EUT



Rear of Wrist Tag EUT

ANNEX C

TISSUE SIMULANT DATA SHEETS

TISSUE SIMULANT DATA SHEETS ANNEX C

Date :	13-JUL-2009
Type of Tissue	**Body**
Target Frequency (MHz)	2450
Target Dielectric Constant	52.7
Target Conductivity (S/m)	1.9
Composition (by weight)	Water 25500 (72.55%) Glycol 9610 (27.34%) Sugar (0%) Salt 38.4 (0.11%) HEC (0%) Preventol D7 (0%)
Measured Dielectric Constant	54.61
Measured Conductivity (S/m)	1.9998

Probe Name	Dosimetric E-field Probe EX3DV4
Probe Serial Number	3541
Sensor Offset (mm)	1.0
Conversion Factor	7.54 ± 11.8 %
Probe Calibration Due Date (DD/MM/YY)	22/06/10

TISSUE SIMULANT DATA SHEETS — ANNEX C

Body Tissue at 2450MHz

Frequency	e'	e''	Conductivity
2440000000	52.23	14.51	1.9667
2441000000	52.20	14.49	1.9650
2442000000	52.23	14.48	1.9645
2443000000	52.20	14.50	1.9679
2444000000	52.22	14.48	1.9667
2445000000	52.18	14.49	1.9687
2446000000	52.18	14.48	1.9678
2447000000	52.17	14.48	1.9689
2448000000	52.15	14.49	1.9702
2449000000	52.16	14.50	1.9722
2450000000	**52.11**	**14.48**	**1.9704**
2451000000	52.11	14.48	1.9722
2452000000	52.10	14.50	1.9748
2453000000	52.09	14.51	1.9772
2454000000	52.08	14.50	1.9769
2455000000	52.05	14.50	1.9779
2456000000	52.03	14.51	1.9796
2457000000	52.03	14.51	1.9806
2458000000	52.00	14.53	1.9838
2459000000	52.00	14.53	1.9843
2460000000	51.98	14.53	1.9861
2461000000	51.96	14.55	1.9891
2462000000	51.95	14.55	1.9902
2463000000	51.93	14.57	1.9934
2464000000	51.92	14.55	1.9917
2465000000	51.89	14.59	1.9977
2466000000	51.87	14.59	1.9994
2467000000	51.88	14.60	2.0016
2468000000	51.86	14.62	2.0042
2469000000	51.85	14.61	2.0044
2470000000	51.85	14.64	2.0086
2471000000	51.81	14.64	2.0097
2472000000	51.81	14.66	2.0139
2473000000	51.78	14.68	2.0166
2474000000	51.77	14.68	2.0178
2475000000	51.76	14.70	2.0216
2476000000	51.74	14.71	2.0233
2477000000	51.73	14.73	2.0267
2478000000	51.73	14.74	2.0289
2479000000	51.72	14.75	2.0314
2480000000	51.70	14.77	2.0353

(e' = Dielectric Constant)
(e" = Loss Factor)

Tested by:	SSW
Date :	13-Jul-2009
Frequency:	2450MHz
Mixture:	Body Tissue
Tissue temp:	24°C

Composition		
Tap Water	0.0g	0.00%
Ultra Pure Water	25000.0g	72.55%
Sugar	0.0g	0.00%
Glyco	9610.0g	27.34%
Salt	38.4g	0.11%
Preventol D7	0.0g	0.00%
Total Weight	35148.4g	100.0%

Result (FCC)	Dielectric Constant	Conductivity
Measured	54.64	1.9301
Target (FCC)	52.7	1.95
Low Limit	50.065	1.8525
High Limit	55.335	2.0475
% Off Target	3.68	-1.02

ANNEX D

SAR VALIDATION RESULTS

SAR VALIDATION RESULTS ANNEX D

SAR Validation – Body Tissue at 2450MHz (Dipole forward power = 250mW)

Ambient Temperature: **24 ± 1^{0}C**
Tissue Temperature: **24 ± 1^{0}C**
Humidity: **54% to 59%**

Test Laboratory: TUV SUD PSB PTE LTD.

Date/Time: 7/13/2009 1:46:34 PM

File Name: 2450MHz_System validation2.da4

Program Name: 2450MHz_System validation.da4

Phantom section: Flat Section

DUT: Dipole 2450 MHz

Communication System: CW

Frequency: 2450 MHz

Duty Cycle: 1:1

Medium: Body 2450 MHz Medium parameters used: f = 2450 MHz; σ = 1.94 mho/m; ε_r = 52.1; ρ = 1000 kg/m^3

DASY4 Configuration:

Electronics: DAE4 Sn627 Calibrated: 6/14/2007

Phantom: SAM 12 Measurement SW: DASY4, V4.7 Build 80

Probe: EX3DV4 - SN3541 ConvF(7.07, 7.07, 7.07) Calibrated: 7/13/2007

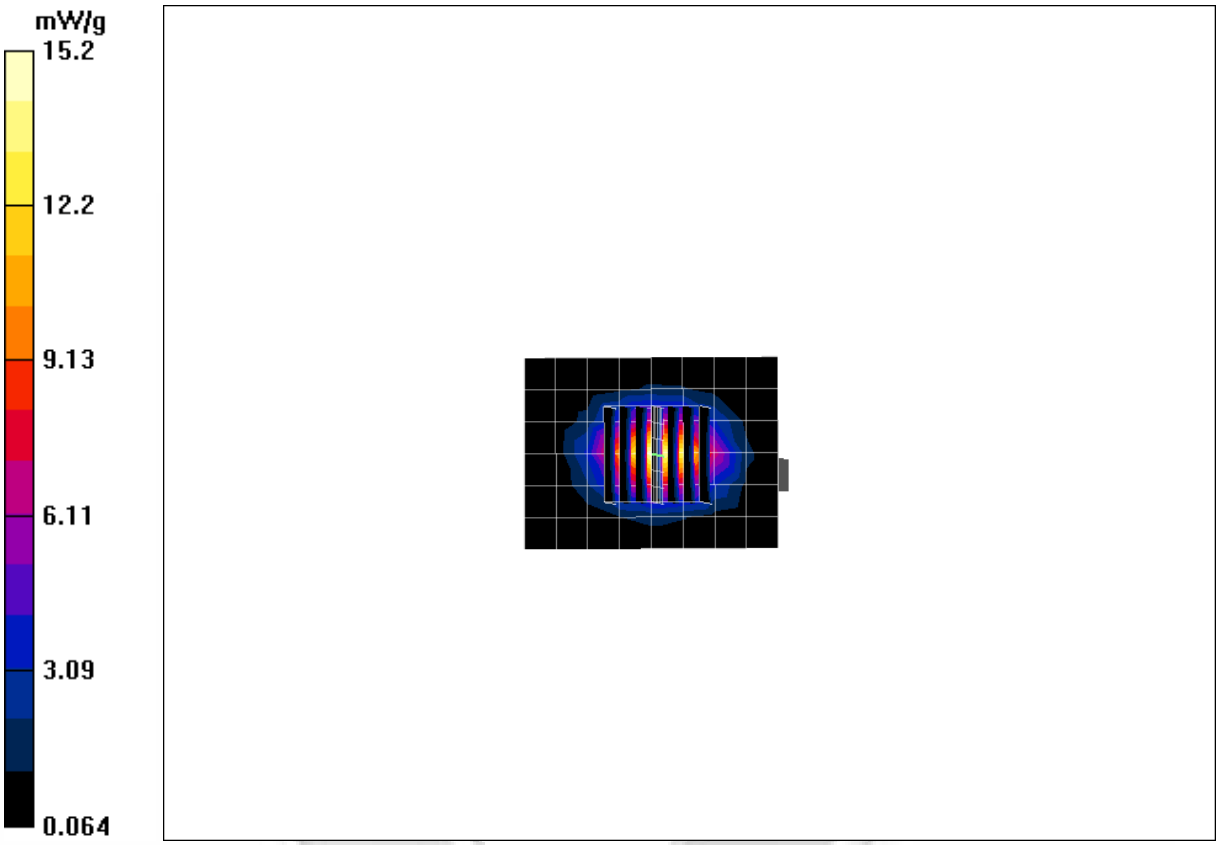
Post processing SW: SEMCAD, V1.8 Build 186

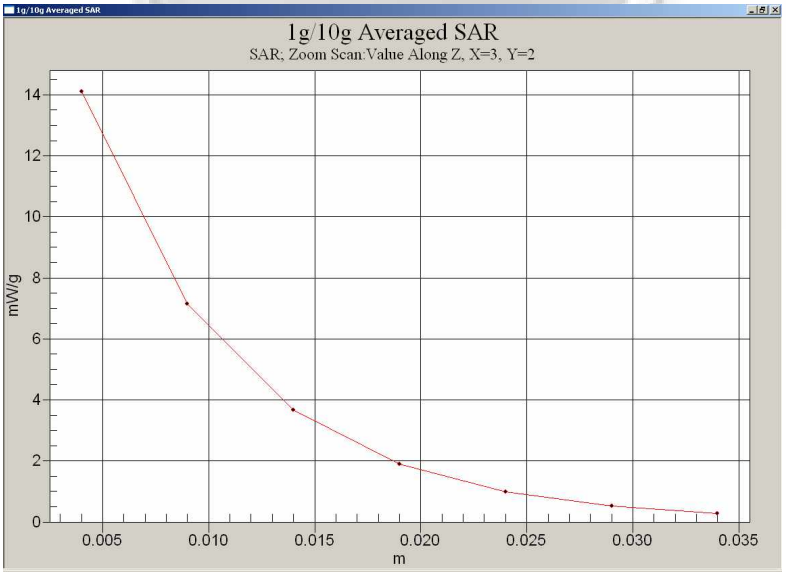
Sensor-Surface: 4mm (Mechanical Surface Detection)

2450MHz_Data 1/Area Scan (7x9x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (measured) = 14.9 mW/g

2450MHz_Data 1/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 88.0 V/m; Power Drift = -0.021 dB
Peak SAR (extrapolated) = 29.5 W/kg
SAR(1 g) = 13.3 mW/g; SAR(10 g) = 5.92 mW/g
Maximum value of SAR (measured) = 15.2 mW/g

SAR VALIDATION RESULTS ANNEX D





ANNEX E

MEASUREMENT UNCERTAINTY

MEASUREMENT UNCERTAINTY ANNEX E

Measurement Uncertainty

All test measurement carried out are traceable to national standards. The uncertainty of measurement at a confidence level of 95%, with a coverage of 2, is **±20.6%.**

Error Description	Uncertainty Value ± %	Probability Distribution	Divisor	ci 1g	Standard Unc.(1g)	Vi or Veff
Measurement System						
Probe Calibration	± 4.8	normal	1	1	± 4.8	∞
Axial isotropy	± 4.7	rectangular	√3	(1-cp)^1/2	± 1.9	∞
Hemispherical Isotropy	± 9.6	rectangular	√3	(cp)^1/2	± 3.9	∞
Spatial resolution	± 0.0	rectangular	√3	1	± 0.0	∞
Boundary effects	± 1.0	rectangular	√3	1	± 0.6	∞
Linearity	± 4.7	rectangular	√3	1	± 2.7	∞
System Detection limit	± 1.0	rectangular	√3	1	± 0.6	∞
Readout electronics	± 1.0	normal	1	1	± 1.0	∞
Response time	± 0.8	rectangular	√3	1	± 0.5	∞
Integration time	± 2.6	rectangular	√3	1	± 1.5	∞
RF ambient conditions	± 3.0	rectangular	√3	1	± 1.7	∞
Probe Positioning Mechanical Tolerance	± 0.4	rectangular	√3	1	± 0.2	∞
Probe Positioning with respect to Phantom Shell	± 2.9	rectangular	√3	1	± 1.7	∞
Extrapolation, Interpolation and Integration Algorithms for Max. SAR Evaluation	± 1.0	rectangular	√3	1	± 0.6	∞
Test Sample Related						
Device positioning	± 2.9	normal	1	1	± 2.9	145
Device holder uncertainty	± 3.6	normal	1	1	± 3.6	5
Power drift	± 5.0	rectangular	√3	1	± 2.9	∞
Phantom and Tissue Parameters						
Phantom uncertainty	± 4.0	rectangular	√3	1	± 2.3	∞
Liquid conductivity (target)	± 5.0	rectangular	√3	0.64	± 1.8	∞
Liquid conductivity (meas)	± 2.5	normal	1	0.64	± 1.6	∞
Liquid permittivity (target)	± 5.0	rectangular	√3	0.6	± 1.7	∞
Liquid permittivity (meas)	± 2.5	normal	1	0.6	± 1.5	∞
Combined Standard Uncertainty					± 10.3	330
Coverage Factor for 95%		**k=2**				
Extended Standard Uncertainty					± 20.6	

ANNEX F

SAR PROBE CALIBRATION CERTIFICATES

SAR PROBE CALIBRATION CERTIFICATES ANNEX F

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

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Accreditation No.: SCS 108

Client TUV SUD PSB Pte Ltd. **Certificate No: EX3-3541_Jun09**

CALIBRATION CERTIFICATE

Object	EX3DV4 - SN:3541
Calibration procedure(s)	QA CAL-01.v6 and QA CAL-23.v3 Calibration procedure for dosimetric E-field probes
Calibration date:	June 22, 2009
Condition of the calibrated item	In Tolerance

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

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

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Power meter E4419B	GB41293874	1-Apr-09 (No. 217-01030)	Apr-10
Power sensor E4412A	MY41495277	1-Apr-09 (No. 217-01030)	Apr-10
Power sensor E4412A	MY41498087	1-Apr-09 (No. 217-01030)	Apr-10
Reference 3 dB Attenuator	SN: S5054 (3c)	31-Mar-09 (No. 217-01026)	Mar-10
Reference 20 dB Attenuator	SN: S5086 (20b)	31-Mar-09 (No. 217-01028)	Mar-10
Reference 30 dB Attenuator	SN: S5129 (30b)	31-Mar-09 (No. 217-01027)	Mar-10
Reference Probe ES3DV2	SN: 3013	2-Jan-09 (No. ES3-3013_Jan09)	Jan-10
DAE4	SN: 660	9-Sep-08 (No. DAE4-660_Sep08)	Sep-09

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
RF generator HP 8648C	US3642U01700	4-Aug-99 (in house check Oct-07)	In house check: Oct-09
Network Analyzer HP 8753E	US37390585	18-Oct-01 (in house check Oct-08)	In house check: Oct-09

	Name	Function	Signature
Calibrated by:	Marcel Fehr	Laboratory Technician	
Approved by:	Katja Pokovic	Technical Manager	

Issued: June 22, 2009

SAR PROBE CALIBRATION CERTIFICATES ANNEX F

Calibration Laboratory of
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Zeughausstrasse 43, 8004 Zurich, Switzerland

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Accreditation No.: SCS 108

Glossary:

TSL	tissue simulating liquid
NORMx,y,z	sensitivity in free space
ConvF	sensitivity in TSL / NORMx,y,z
DCP	diode compression point
Polarization φ	φ rotation around probe axis
Polarization ϑ	ϑ rotation around an axis that is in the plane normal to probe axis (at measurement center), i.e., ϑ = 0 is normal to probe axis

Calibration is Performed According to the Following Standards:

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

Methods Applied and Interpretation of Parameters:

- *NORMx,y,z:* Assessed for E-field polarization ϑ = 0 (f ≤ 900 MHz in TEM-cell; f > 1800 MHz: R22 waveguide). NORMx,y,z are only intermediate values, i.e., the uncertainties of NORMx,y,z does not effect the E^2-field uncertainty inside TSL (see below *ConvF*).
- *NORM(f)x,y,z = NORMx,y,z * frequency_response* (see Frequency Response Chart). This linearization is implemented in DASY4 software versions later than 4.2. The uncertainty of the frequency response is included in the stated uncertainty of *ConvF*.
- *DCPx,y,z:* DCP are numerical linearization parameters assessed based on the data of power sweep (no uncertainty required). DCP does not depend on frequency nor media.
- *ConvF and Boundary Effect Parameters:* Assessed in flat phantom using E-field (or Temperature Transfer Standard for f ≤ 800 MHz) and inside waveguide using analytical field distributions based on power measurements for f > 800 MHz. The same setups are used for assessment of the parameters applied for boundary compensation (alpha, depth) of which typical uncertainty values are given. These parameters are used in DASY4 software to improve probe accuracy close to the boundary. The sensitivity in TSL corresponds to *NORMx,y,z * ConvF* whereby the uncertainty corresponds to that given for *ConvF*. A frequency dependent *ConvF* is used in DASY version 4.4 and higher which allows extending the validity from ± 50 MHz to ± 100 MHz.
- *Spherical isotropy (3D deviation from isotropy)*: in a field of low gradients realized using a flat phantom exposed by a patch antenna.
- *Sensor Offset*: The sensor offset corresponds to the offset of virtual measurement center from the probe tip (on probe axis). No tolerance required.

SAR PROBE CALIBRATION CERTIFICATES ANNEX F

EX3DV4 SN:3541 **June 22, 2009**

Probe EX3DV4

SN:3541

Manufactured:	May 3, 2004
Last calibrated:	June 23, 2008
Recalibrated:	June 22, 2009

Calibrated for DASY Systems

(Note: non-compatible with DASY2 system!)

SAR PROBE CALIBRATION CERTIFICATES ANNEX F

EX3DV4 SN:3541 **June 22, 2009**

DASY - Parameters of Probe: EX3DV4 SN:3541

Sensitivity in Free Space[A]

NormX	**0.49** ± 10.1%	$\mu V/(V/m)^2$	DCP X	**91** mV
NormY	**0.39** ± 10.1%	$\mu V/(V/m)^2$	DCP Y	**92** mV
NormZ	**0.45** ± 10.1%	$\mu V/(V/m)^2$	DCP Z	**92** mV

Diode Compression[B]

Sensitivity in Tissue Simulating Liquid (Conversion Factors)

Please see Page 8.

Boundary Effect

TSL **900 MHz** **Typical SAR gradient: 5 % per mm**

Sensor Center to Phantom Surface Distance		**2.0 mm**	**3.0 mm**
SAR_{be} [%]	Without Correction Algorithm	9.0	5.0
SAR_{be} [%]	With Correction Algorithm	0.8	0.4

TSL **1750 MHz** **Typical SAR gradient: 10 % per mm**

Sensor Center to Phantom Surface Distance		**2.0 mm**	**3.0 mm**
SAR_{be} [%]	Without Correction Algorithm	6.9	3.7
SAR_{be} [%]	With Correction Algorithm	0.8	0.5

Sensor Offset

Probe Tip to Sensor Center	**1.0** mm

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

[A] The uncertainties of NormX,Y,Z do not affect the E^2-field uncertainty inside TSL (see Page 8).

[B] Numerical linearization parameter: uncertainty not required.

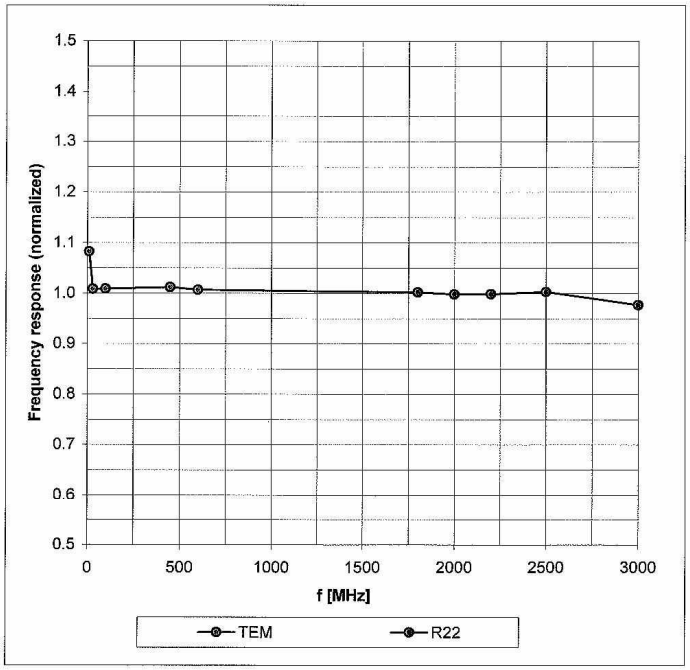
Child Tracking System [Model: PAT-20]

SAR PROBE CALIBRATION CERTIFICATES ANNEX F

EX3DV4 SN:3541 **June 22, 2009**

Frequency Response of E-Field

(TEM-Cell:ifi110 EXX, Waveguide: R22)



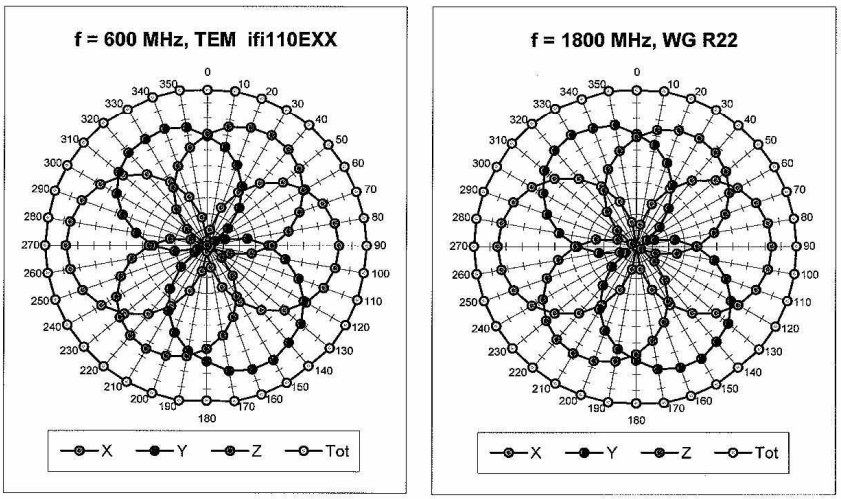
Uncertainty of Frequency Response of E-field: ± 6.3% (k=2)

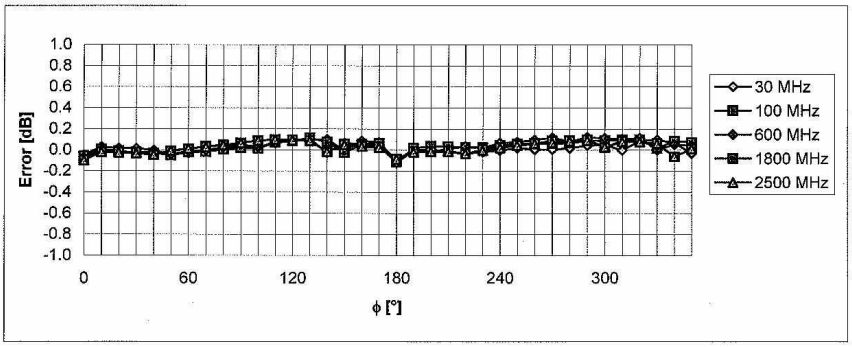
Child Tracking System [Model: PAT-10]

SAR PROBE CALIBRATION CERTIFICATES ANNEX F

EX3DV4 SN:3541 **June 22, 2009**

Receiving Pattern (ϕ), ϑ = 0°





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

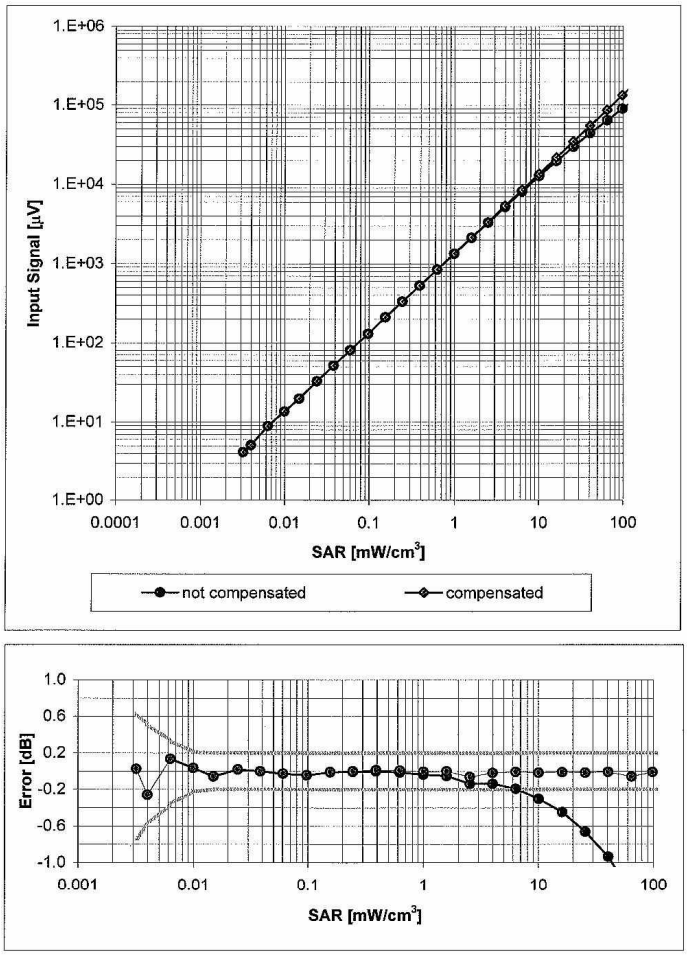
Child Tracking System [Model: PAT-20]

SAR PROBE CALIBRATION CERTIFICATES ANNEX F

EX3DV4 SN:3541 **June 22, 2009**

Dynamic Range f(SAR_{head})

(Waveguide R22, f = 1800 MHz)



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

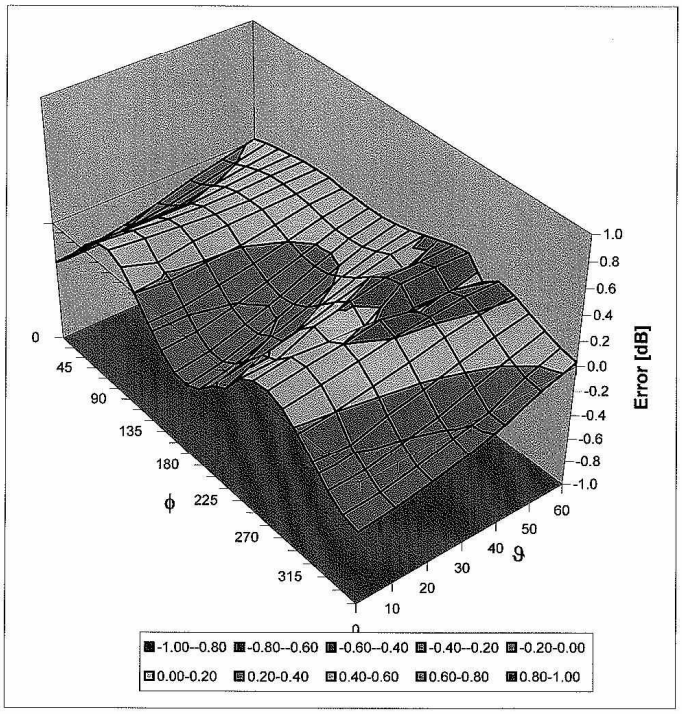
Child Tracking System [Model: PAT-10]

SAR PROBE CALIBRATION CERTIFICATES ANNEX F

EX3DV4 SN:3541 **June 22, 2009**

Deviation from Isotropy in HSL

Error (ϕ, ϑ), f = 900 MHz



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

Child Tracking System [Model: PAT-20]

SAR PROBE CALIBRATION CERTIFICATES ANNEX F

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Accreditation No.: SCS 108

Client TUV SUD PSB **Certificate No.** DAE4-627_Jun09

CALIBRATION CERTIFICATE

Object	DAE4 - SD 000 D04 BJ - SN: 627
Calibration procedure(s)	QA CAL-06.v12 Calibration procedure for the data acquisition electronics (DAE)
Calibration date:	June 24, 2009
Condition of the calibrated item	In Tolerance

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
Fluke Process Calibrator Type 702	SN: 6295803	30-Sep-08 (No: 7673)	Sep-09
Keithley Multimeter Type 2001	SN: 0810278	30-Sep-08 (No: 7670)	Sep-09
Secondary Standards	**ID #**	**Check Date (in house)**	**Scheduled Check**
Calibrator Box V1.1	SE UMS 006 AB 1004	05-Jun-09 (in house check)	In house check: Jun-10

	Name	Function	Signature
Calibrated by:	Andrea Guntli	Technician	
Approved by:	Fin Bomholt	R&D Director	

Issued: June 24, 2009

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

Certificate No: DAE4-627_Jun09 Page 1 of 5

SAR PROBE CALIBRATION CERTIFICATES ANNEX F

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Accreditation No.: SCS 108

Glossary

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

Methods Applied and Interpretation of Parameters

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

SAR PROBE CALIBRATION CERTIFICATES ANNEX F

DC Voltage Measurement

A/D - Converter Resolution nominal

High Range:	1LSB =	6.1μV ,	full range =	-100…+300 mV
Low Range:	1LSB =	61nV ,	full range =	-1…….+3mV

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

Calibration Factors	X	Y	Z
High Range	404.868 ± 0.1% (k=2)	405.259 ± 0.1% (k=2)	404.623 ± 0.1% (k=2)
Low Range	3.95284 ± 0.7% (k=2)	3.96926 ± 0.7% (k=2)	3.95605 ± 0.7% (k=2)

Connector Angle

Connector Angle to be used in DASY system	204 ° ± 1 °

SAR PROBE CALIBRATION CERTIFICATES ANNEX F

Appendix

1. DC Voltage Linearity

High Range		Input (μV)	Reading (μV)	Error (%)
Channel X	+ Input	200000	200000.5	0.00
Channel X	+ Input	20000	20006.64	0.03
Channel X	- Input	20000	-19998.14	-0.01
Channel Y	+ Input	200000	199999.9	0.00
Channel Y	+ Input	20000	20002.71	0.01
Channel Y	- Input	20000	-20006.38	0.03
Channel Z	+ Input	200000	199999.5	0.00
Channel Z	+ Input	20000	20002.83	0.01
Channel Z	- Input	20000	-20002.66	0.01

Low Range		Input (μV)	Reading (μV)	Error (%)
Channel X	+ Input	2000	2000.1	0.00
Channel X	+ Input	200	199.93	-0.03
Channel X	- Input	200	-200.33	0.17
Channel Y	+ Input	2000	2000.1	0.00
Channel Y	+ Input	200	199.52	-0.24
Channel Y	- Input	200	-200.46	0.23
Channel Z	+ Input	2000	2000	0.00
Channel Z	+ Input	200	198.83	-0.58
Channel Z	- Input	200	-201.40	0.70

2. Common mode sensitivity

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

	Common mode Input Voltage (mV)	High Range Average Reading (μV)	Low Range Average Reading (μV)
Channel X	200	7.13	6.35
	- 200	-6.33	-6.40
Channel Y	200	-3.89	-4.27
	- 200	2.79	3.07
Channel Z	200	0.58	0.54
	- 200	-2.43	-3.14

3. Channel separation

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

	Input Voltage (mV)	Channel X (μV)	Channel Y (μV)	Channel Z (μV)
Channel X	200	-	3.54	-0.13
Channel Y	200	2.29	-	5.42
Channel Z	200	0.12	0.82	-

SAR PROBE CALIBRATION CERTIFICATES ANNEX F

4. AD-Converter Values with inputs shorted

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

	High Range (LSB)	Low Range (LSB)
Channel X	15820	16014
Channel Y	15474	15871
Channel Z	16121	16858

5. Input Offset Measurement

DASY measurement parameters: Auto Zero Time: 3 sec; Measuring time: 3 sec
Input 10MΩ

	Average (μV)	min. Offset (μV)	max. Offset (μV)	Std. Deviation (μV)
Channel X	0.51	-1.09	1.58	0.46
Channel Y	-1.46	-3.36	0.77	0.66
Channel Z	-0.39	-1.58	0.94	0.41

6. Input Offset Current

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

7. Input Resistance

	Zeroing (MOhm)	Measuring (MOhm)
Channel X	0.2001	199.8
Channel Y	0.2001	200.9
Channel Z	0.2001	196.9

8. Low Battery Alarm Voltage (verified during pre test)

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

9. Power Consumption (verified during pre test)

Typical values	Switched off (mA)	Stand by (mA)	Transmitting (mA)
Supply (+ Vcc)	+0.0	+6	+14
Supply (- Vcc)	–0.01	-8	-9

ANNEX G

REFERENCES

REFERENCES ANNEX G

The methods and procedures used for the measurements contained in this report are details in the following reference standards:

Publications	Year	Title
Supplement C (Edition 01-01) to FCC OET Bulletin 65 (Edition 97-01)	2001	"Evaluating Compliance with FCC Guidelines for Human Exposure to radio Frequency Fields"
IEEE Standard 1528-200X	2000	"Product Performance Standards Relative to the safe Use of Electromagnetic Energy"
ANSI/IEEE C95.3	1992	"Recommended Practice for the Measurement of Potentially Hazardous Electromagnetic Fields - RF and Microwave"
ANSI/IEEE C95.1	1992	"Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3kHz to 300GHz"
ACA, Radio Communications (EMR Human Exposure)	2000 (No.2)	"Radiocommunication (Electromagnetic Radiation – Human Exposure)"
EN50360	2001	Product Standard to demonstrate the compliance of mobile phones with the basic restrictions related to human exposure to electromagnetic fields (300MHz – 3GHz)
EN50361	2001	Basic Standard for the measurement of Specific Absorption Rate related to human exposure to electromagnetic fields from mobile phone (300MHz – 3GHz)
EN62209-1	2006	Procedure to determine the Specific Absorption Rate (SAR) for hand-held devices used in close proximity to the ear (300MHz – 3GHz)