TEST REPORT

Your Ref:

Date: 1 Nov 2003

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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

PORTABLE PC WITH BUILT IN 2.4GHz WIRELESS LAN
[MODEL : W988A]
[FCC ID : RGV0309W988A]

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JOB NUMBER 56S030690

TEST PERIOD 20 Oct 2003

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LA-2001-0212-A
LA-2001-0213-F
LA-2001-0214-E
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LA-2001-0216-G
LA-2001-0217-G

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

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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 Device at head phantom	Pass *

Note:

1. The worst-case SAR value was found to be **0.0626W/kg** which is lower than the maximum limit of 1.60 W/kg, over 1g of tissue.

* 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 **Portable PC with Built In 2.4GHz Wireless LAN.**
Device Category	Portable Device
Exposure Environment	General Population/Uncontrolled exposure
Manufacturer	InfoWave Pte Ltd
Model Number	W988A
FCC ID	RGV0309W988A
Serial Number	Nil
Operating Temperature Tolerance	(0 ~ +50) Degree Celsius
Operating / Transmitting Frequency	1) Channel 1 (2.412GHz) 2) Channel 7 (2.442GHz) 3) Channel 13 (2.472GHz)
Rated Output Power	19dBm, Maximum.
EUT Crest Factor	1.0
Input Power	19VDC, 60W via 100 - 240VAC Power Adapter
Accessories	1) Charger Only

DEVICE OPERATING CONDITION

The test software "Prism Test Appliance, Version 3.0.24" was provided by Infowave's client. The EUT was put into operation by continuous transmitting at maximum transmitting power. For each channel tested, the EUT was configured to modulate at CCK (11Mbps).

For every SAR measurement, the Portable PC internal battery was fully charged and EUT was set to maximum output power level.

TEMPERATURE AND HUMIDITY

Ambient Temperature:	27 ± 1^0 C
Tissue Temperature:	26 ± 1^0 C
Humidity:	55% to 60%

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

Table 1 - SAR Test Results – Device at Flat Phantom

Phantom Configuration	Device Test Positions	Antenna Position	SAR (W/kg), over 1g Tissue Device Test Channel & Frequency		
			Channel: 1 2412MHz	Channel: 7 2442MHz	Channel: 13 2472MHz
Flat Phantom	Section A	Fixed	0.0626	0.0294	0.0323
	Section B	Fixed	0.0430	0.0550	0.0575
	Section C	Fixed	0.0561	0.0351	0.0508
	Section D	Fixed	0.0513	0.0353	0.0513
	Section E	Fixed	0.0531	0.0541	0.0363
Output Power (dBm) Before Test			18.5	18.9	18.1
Output Power (dBm) After Test			18.3	18.8	17.9

Remarks:

1. All modes of operations were investigated and the worst-case SAR levels are reported.

2. For each mode of operation, the Portable PC internal battery was fully charged.

3. The worst-case SAR value was found to be **0.0626W/Kg** (over a 1g tissue) at **Channel 1** which is lower than the maximum limit of 1.60 W/Kg, please refer to the above table.

4. For more details of the Device Test Position at Section A to E, see Test Setup Photographs at Annex B.

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: 27 ± 1^0 C
Tissue Temperature: 26 ± 1^0 C
Humidity: 55% to 60%

Figure 1: SAR Test Distribution Plot – Device at flat phantom

Phantom Configuration	Device Test Positions	Antenna Position	Channel	SAR (W/kg), over 1g Tissue
Flat Phantom	Section A	Fixed	Channel: 1 2412MHz	0.0626

Date: 10/20/03

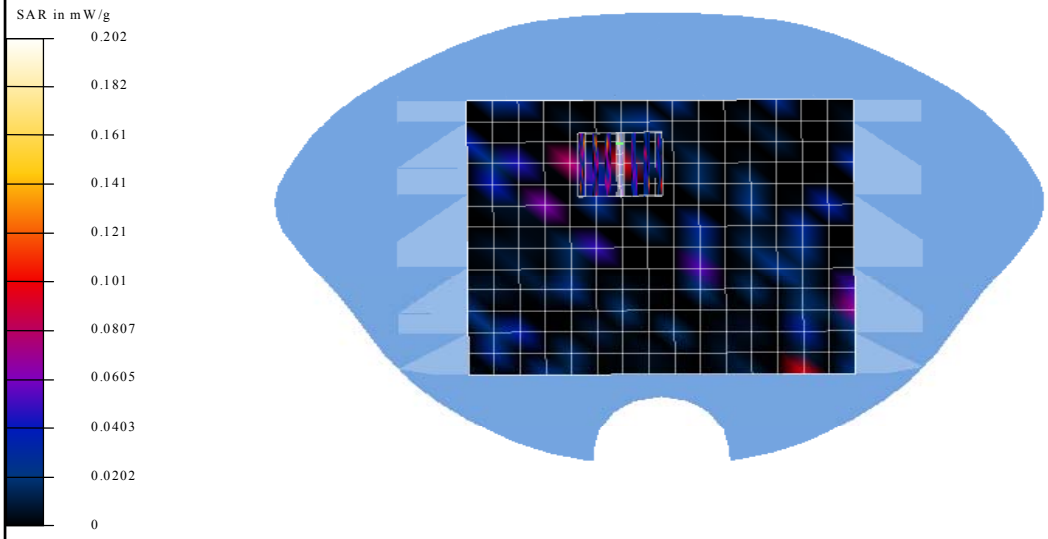
Test Laboratory: Telecom & EMC Testing Group
File Name: EUT Rear Touch_CH 1_Section A_Data 6.da4

DUT: waveon 988 PC Type & Serial Number:
Program: 56S030690; EUT Rear Touch_CH 1_Section A_Data 6

Communication System: 2450 Mhz_PC; Frequency: 2412 MHz; Duty Cycle: 1:1
Medium: Body 2450 MHz (σ = 1.9987 mho/m, ε = 54.57, ρ = 1000 kg/m3)
Phantom section: FlatSection

DASY4 Configuration:
- Probe: ET3DV6 - SN1645; ConvF(4.7, 4.7, 4.7); Calibrated: 10/9/2003
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn475; Calibrated: 11/14/2002
- Phantom: - TP:
- Software: DASY4, V4.0 Build 51

Area Scan (14x16x1): Measurement grid: dx=10mm, dy=10mm
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm
Reference Value = 2.22 V/m
Peak SAR = 0.712 mW/g
SAR(1 g) = 0.0626 mW/g; SAR(10 g) = 0.0363 mW/g
Power Drift = 0.04dB



Ambient Temperature: 27 ± 1^0 C
Tissue Temperature: 26 ± 1^0 C
Humidity: 55% to 60%

Figure 2: SAR Test Distribution Plot – Device at flat phantom

Phantom Configuration	Device Test Positions	Antenna Position	Channel	SAR (W/kg), over 1g Tissue
Flat Phantom	Section A	Fixed	Channel: 7 2442MHz	0.0294

Date: 10/20/03

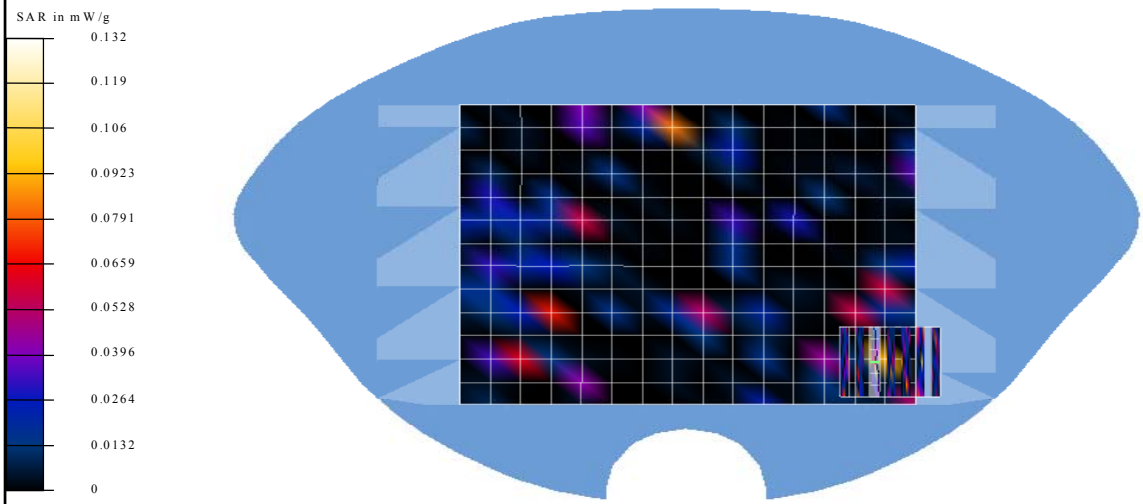
Test Laboratory: Telecom & EMC Testing Group
File Name: EUT Rear Touch_CH 7_Section A_Data 11.da4

DUT: waveon 988 PC Type & Serial Number:
Program: 56S030690; EUT Rear Touch_CH 7_Section A_Data 11

Communication System: 2450 Mhz_PC; Frequency: 2442 MHz; Duty Cycle: 1:1
Medium: Body 2450 MHz (σ = 1.9987 mho/m, ε = 54.57, ρ = 1000 kg/m3)
Phantom section: FlatSection

DASY4 Configuration:
- Probe: ET3DV6 - SN1645; ConvF(4.7, 4.7, 4.7); Calibrated: 10/9/2003
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn475; Calibrated: 11/14/2002
- Phantom: - TP:
- Software: DASY4, V4.0 Build 51

Area Scan (14x16x1): Measurement grid: dx=10mm, dy=10mm
Zoom Scan 2 (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm
Reference Value = 0.972 V/m
Peak SAR = 0.129 mW/g
SAR(1 g) = 0.0294 mW/g; SAR(10 g) = 0.0174 mW/g
Power Drift = 0.03dB



Ambient Temperature: 27 ± 1^0 C
Tissue Temperature: 26 ± 1^0 C
Humidity: 55% to 60%

Figure 3: SAR Test Distribution Plot – Device at flat phantom

Phantom Configuration	Device Test Positions	Antenna Position	Channel	SAR (W/kg), over 1g Tissue
Flat Phantom	Section A	Fixed	Channel: 13 2472MHz	0.0323

Date: 10/20/03

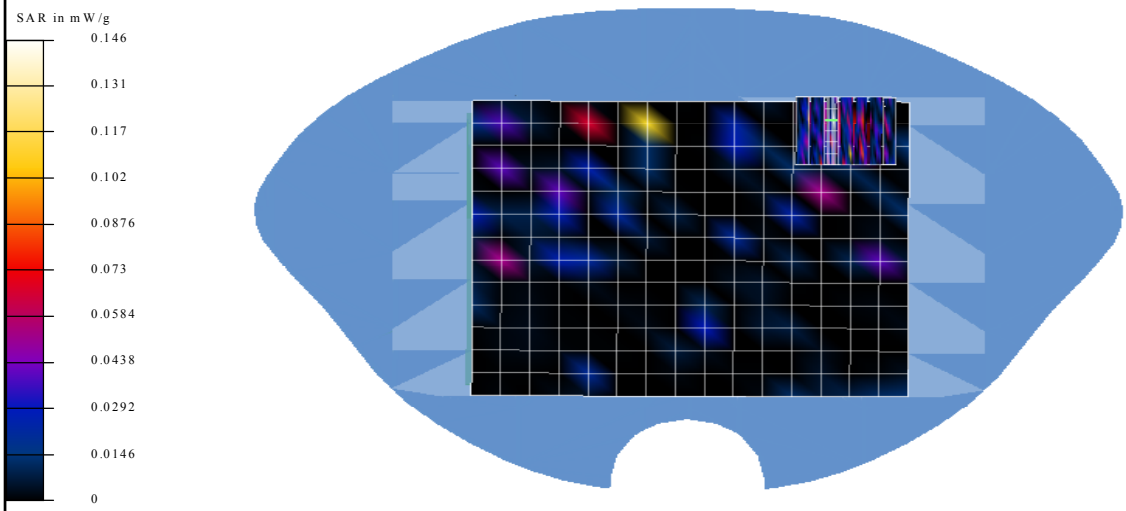
Test Laboratory: Telecom & EMC Testing Group
File Name: EUT Rear Touch_CH 13_Section A_Data 12.da4

DUT: waveon 988 PC Type & Serial Number:
Program: 56S030690; EUT Rear Touch_CH 13_Section A_Data 12

Communication System: 2450 Mhz_PC; Frequency: 2442 MHz; Duty Cycle: 1:1
Medium: Body 2450 MHz (σ = 1.9987 mho/m, ε = 54.57, ρ = 1000 kg/m3)
Phantom section: FlatSection

DASY4 Configuration:
- Probe: ET3DV6 - SN1645; ConvF(4.7, 4.7, 4.7); Calibrated: 10/9/2003
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn475; Calibrated: 11/14/2002
- Phantom: - TP:
- Software: DASY4, V4.0 Build 51

Area Scan (14x16x1): Measurement grid: dx=10mm, dy=10mm
Zoom Scan 2 (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm
Reference Value = 0.663 V/m
Peak SAR = 0.144 mW/g
SAR(1 g) = 0.0323 mW/g; SAR(10 g) = 0.0201 mW/g
Power Drift = -0.05dB



Ambient Temperature: 27 ± 1^0 C
Tissue Temperature: 26 ± 1^0 C
Humidity: 55% to 60%

Figure 4: SAR Test Distribution Plot – Device at flat phantom

Phantom Configuration	Device Test Positions	Antenna Position	Channel	SAR (W/kg), over 1g Tissue
Flat Phantom	Section B	Fixed	Channel: 1 2412MHz	0.0430

Date: 10/20/03

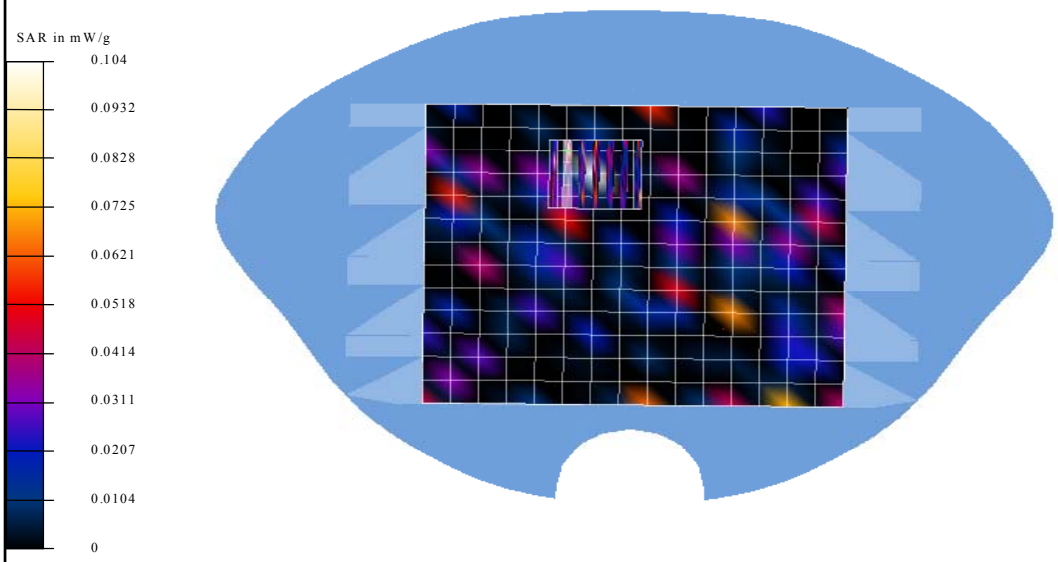
Test Laboratory: Telecom & EMC Testing Group
File Name: EUT Rear Touch_CH 1_Section B_Data 5.da4

DUT: waveon 988 PC Type & Serial Number:
Program: 56S030690; EUT Rear Touch_CH 1_Section B_Data 5

Communication System: 2450 Mhz_PC; Frequency: 2412 MHz; Duty Cycle: 1:1
Medium: Body 2450 MHz (σ = 1.9987 mho/m, ε = 54.57, ρ = 1000 kg/m3)
Phantom section: FlatSection

DASY4 Configuration:
- Probe: ET3DV6 - SN1645; ConvF(4.7, 4.7, 4.7); Calibrated: 10/9/2003
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn475; Calibrated: 11/14/2002
- Phantom: - TP:
- Software: DASY4, V4.0 Build 51

Area Scan (14x16x1): Measurement grid: dx=10mm, dy=10mm
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm
Reference Value = 0.422 V/m
Peak SAR = 0.103 mW/g
SAR(1 g) = 0.043 mW/g; SAR(10 g) = 0.023 mW/g
Power Drift = 0.06dB



Ambient Temperature: 27 ± 1^0 C
Tissue Temperature: 26 ± 1^0 C
Humidity: 55% to 60%

Figure 5: SAR Test Distribution Plot – Device at flat phantom

Phantom Configuration	Device Test Positions	Antenna Position	Channel	SAR (W/kg), over 1g Tissue
Flat Phantom	Section B	Fixed	Channel: 7 2442MHz	0.055

Date: 10/20/03

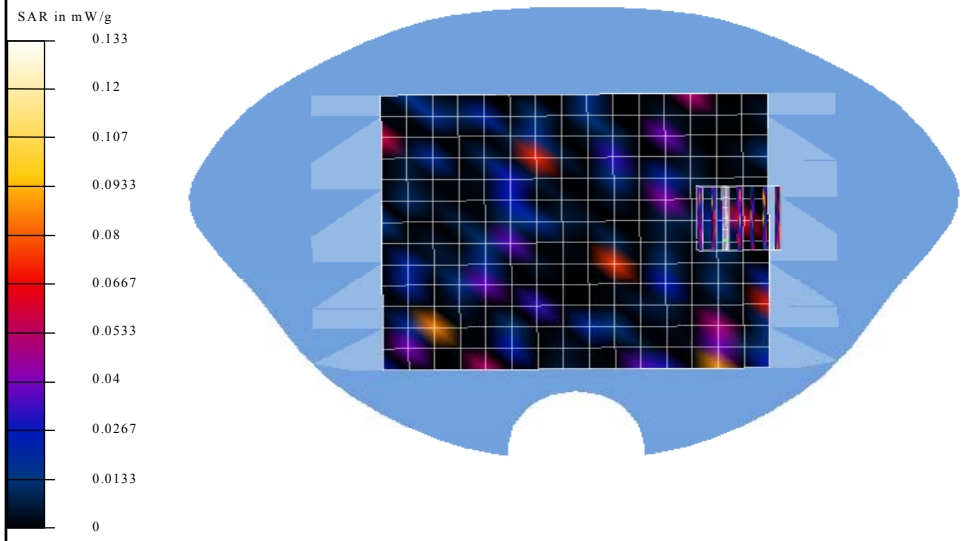
Test Laboratory: Telecom & EMC Testing Group
File Name: EUT Rear Touch_CH 7_Section B_Data 9.da4

DUT: waveon 988 PC Type & Serial Number:
Program: 56S030690; EUT Rear Touch_CH 7_Section B_Data 9

Communication System: 2450 Mhz_PC; Frequency: 2442 MHz; Duty Cycle: 1:1
Medium: Body 2450 MHz (σ = 1.9987 mho/m, ε = 54.57, ρ = 1000 kg/m3)
Phantom section: FlatSection

DASY4 Configuration:
- Probe: ET3DV6 - SN1645; ConvF(4.7, 4.7, 4.7); Calibrated: 10/9/2003
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn475; Calibrated: 11/14/2002
- Phantom: - TP:
- Software: DASY4, V4.0 Build 51

Area Scan (14x16x1): Measurement grid: dx=10mm, dy=10mm
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm
Reference Value = 1.72 V/m
Peak SAR = 0.141 mW/g
SAR(1 g) = 0.055 mW/g; SAR(10 g) = 0.0288 mW/g
Power Drift = -0.05dB



Ambient Temperature: 27 ± 1^0 C
Tissue Temperature: 26 ± 1^0 C
Humidity: 55% to 60%

Figure 6: SAR Test Distribution Plot – Device at flat phantom

Phantom Configuration	Device Test Positions	Antenna Position	Channel	SAR (W/kg), over 1g Tissue
Flat Phantom	Section B	Fixed	Channel: 13 2472MHz	0.0575

Date: 10/20/03

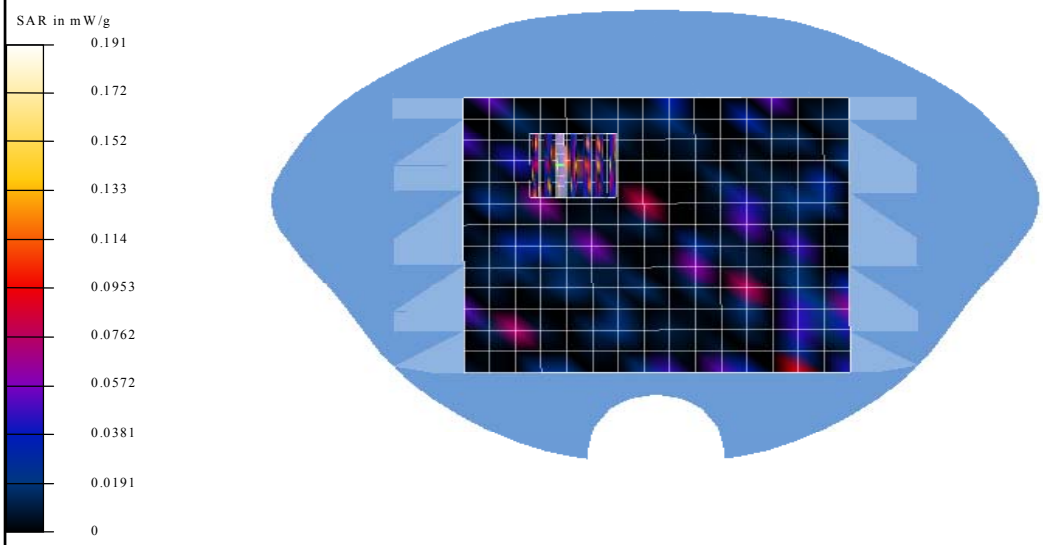
Test Laboratory: Telecom & EMC Testing Group
File Name: EUT Rear Touch_CH 13_Section B_Data 10.da4

DUT: waveon 988 PC Type & Serial Number:
Program: 56S030690; EUT Rear Touch_CH 13_Section B_Data 10

Communication System: 2450 Mhz_PC; Frequency: 2472 MHz; Duty Cycle: 1:1
Medium: Body 2450 MHz (σ = 1.9987 mho/m, ε = 54.57, ρ = 1000 kg/m3)
Phantom section: FlatSection

DASY4 Configuration:
- Probe: ET3DV6 - SN1645; ConvF(4.7, 4.7, 4.7); Calibrated: 10/9/2003
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn475; Calibrated: 11/14/2002
- Phantom: - TP:
- Software: DASY4, V4.0 Build 51

Area Scan (14x16x1): Measurement grid: dx=10mm, dy=10mm
Zoom Scan 2 (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm
Reference Value = 1.42 V/m
Peak SAR = 0.267 mW/g
SAR(1 g) = 0.0575 mW/g; SAR(10 g) = 0.0411 mW/g
Power Drift = 0.06dB



Ambient Temperature: 27 ± 1^0 C
Tissue Temperature: 26 ± 1^0 C
Humidity: 55% to 60%

Figure 7: SAR Test Distribution Plot – Device at flat phantom

Phantom Configuration	Device Test Positions	Antenna Position	Channel	SAR (W/kg), over 1g Tissue
Flat Phantom	Section C	Fixed	Channel: 1 2412MHz	0.0561

Date: 10/20/03

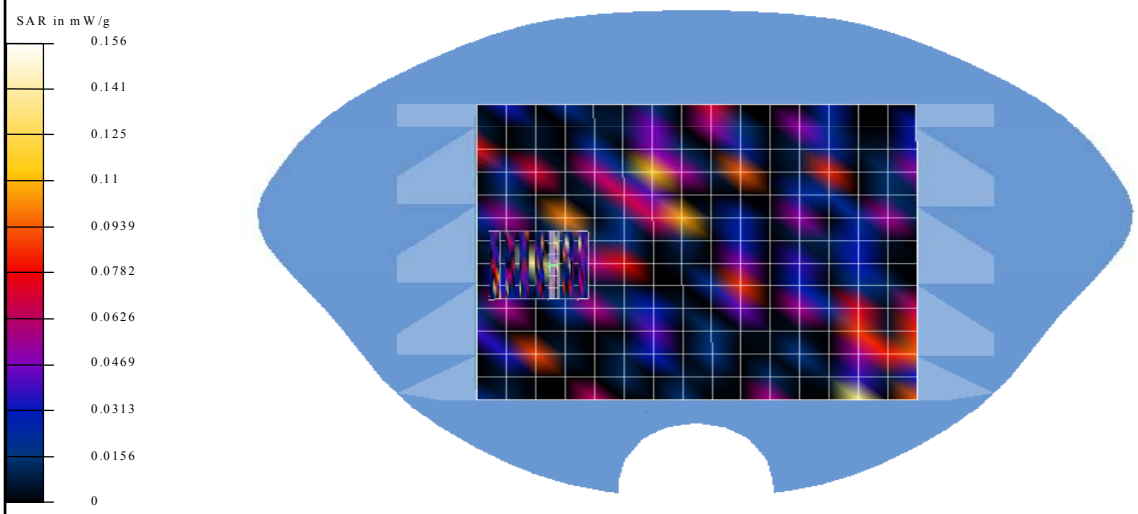
Test Laboratory: Telecom & EMC Testing Group
File Name: EUT Rear Touch_CH 1_Section C_Data 4.da4

DUT: waveon 988 PC Type & Serial Number:
Program: 56S030690; EUT Rear Touch_CH 1_Section C_Data 4

Communication System: 2450 Mhz_PC; Frequency: 2412 MHz; Duty Cycle: 1:1
Medium: Body 2450 MHz (σ = 1.9987 mho/m, ε = 54.57, ρ = 1000 kg/m3)
Phantom section: FlatSection

DASY4 Configuration:
- Probe: ET3DV6 - SN1645; ConvF(4.7, 4.7, 4.7); Calibrated: 10/9/2003
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn475; Calibrated: 11/14/2002
- Phantom: - TP:
- Software: DASY4, V4.0 Build 51

Area Scan (14x16x1): Measurement grid: dx=10mm, dy=10mm
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm
Reference Value = 1.25 V/m
Peak SAR = 0.256 mW/g
SAR(1 g) = 0.0561 mW/g; SAR(10 g) = 0.0298 mW/g
Power Drift = 0.01dB



Ambient Temperature: 27 ± 1^0 C
Tissue Temperature: 26 ± 1^0 C
Humidity: 55% to 60%

Figure 8: SAR Test Distribution Plot – Device at flat phantom

Phantom Configuration	Device Test Positions	Antenna Position	Channel	SAR (W/kg), over 1g Tissue
Flat Phantom	Section C	Fixed	Channel: 7 2442MHz	0.0351

Date: 10/20/03

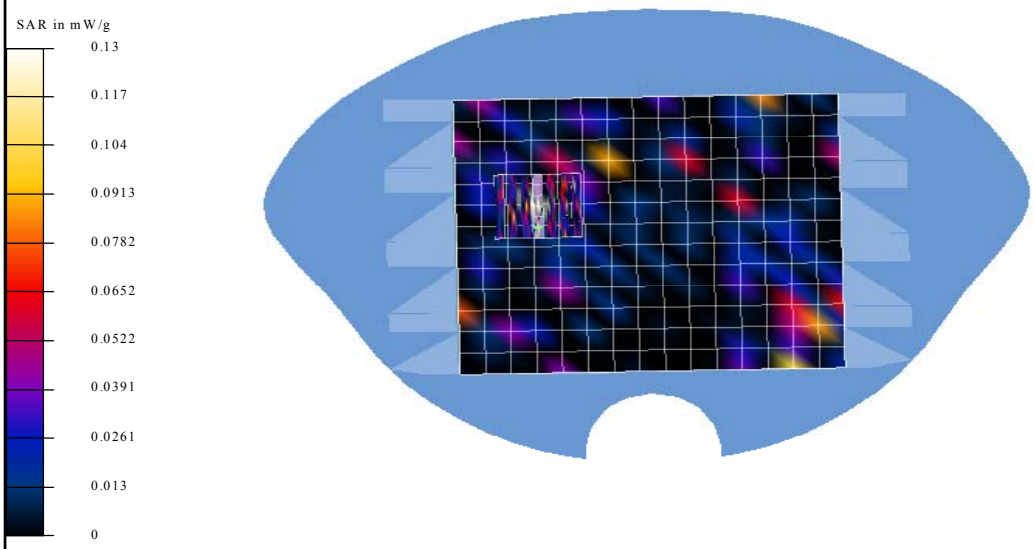
Test Laboratory: Telecom & EMC Testing Group
File Name: EUT Rear Touch_CH 7_Section C_Data 7.da4

DUT: waveon 988 PC Type & Serial Number:
Program: 56S030690; EUT Rear Touch_CH 7_Section C_Data 7

Communication System: 2450 Mhz_PC; Frequency: 2442 MHz; Duty Cycle: 1:1
Medium: Body 2450 MHz (σ = 1.9987 mho/m, ε = 54.57, ρ = 1000 kg/m3)
Phantom section: FlatSection

DASY4 Configuration:
- Probe: ET3DV6 - SN1645; ConvF(4.7, 4.7, 4.7); Calibrated: 10/9/2003
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn475; Calibrated: 11/14/2002
- Phantom: - TP:
- Software: DASY4, V4.0 Build 51

Area Scan (14x16x1): Measurement grid: dx=10mm, dy=10mm
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm
Reference Value = 2.84 V/m
Peak SAR = 0.367 mW/g
SAR(1 g) = 0.0351 mW/g; SAR(10 g) = 0.023 mW/g
Power Drift = 0.01dB



Ambient Temperature: 27 ± 1^0 C
Tissue Temperature: 26 ± 1^0 C
Humidity: 55% to 60%

Figure 9: SAR Test Distribution Plot – Device at flat phantom

Phantom Configuration	Device Test Positions	Antenna Position	Channel	SAR (W/kg), over 1g Tissue
Flat Phantom	Section C	Fixed	Channel: 13 2472MHz	0.0508

Date: 10/20/03

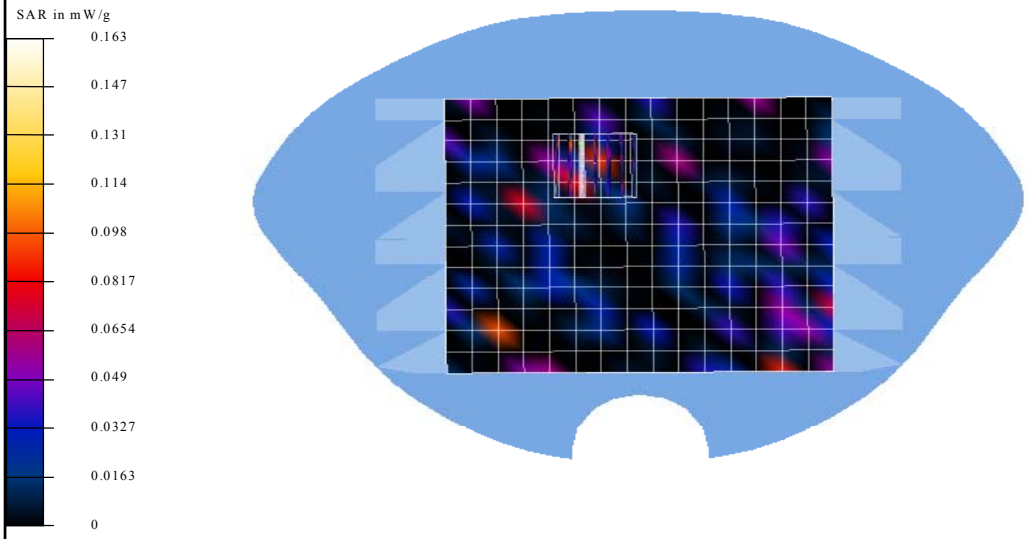
Test Laboratory: Telecom & EMC Testing Group
File Name: EUT Rear Touch_CH 13_Section C_Data 8.da4

DUT: waveon 988 PC Type & Serial Number:
Program: 56S030690; EUT Rear Touch_CH 13_Section C_Data 8

Communication System: 2450 Mhz_PC; Frequency: 2472 MHz; Duty Cycle: 1:1
Medium: Body 2450 MHz (σ = 1.9987 mho/m, ε = 54.57, ρ = 1000 kg/m3)
Phantom section: FlatSection

DASY4 Configuration:
- Probe: ET3DV6 - SN1645; ConvF(4.7, 4.7, 4.7); Calibrated: 10/9/2003
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn475; Calibrated: 11/14/2002
- Phantom: - TP:
- Software: DASY4, V4.0 Build 51

Area Scan (14x16x1): Measurement grid: dx=10mm, dy=10mm
Zoom Scan 2 (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm
Reference Value = 2.17 V/m
Peak SAR = 0.158 mW/g
SAR(1 g) = 0.0508 mW/g; SAR(10 g) = 0.0318 mW/g
Power Drift = 0.08dB



Ambient Temperature: **27 ± 1^0 C**
Tissue Temperature: **26 ± 1^0 C**
Humidity: **55% to 60%**

Figure 10: SAR Test Distribution Plot – Device at flat phantom

Phantom Configuration	Device Test Positions	Antenna Position	Channel	SAR (W/kg), over 1g Tissue
Flat Phantom	Section D	Fixed	Channel: 1 2412MHz	0.0513

Date: 10/20/03

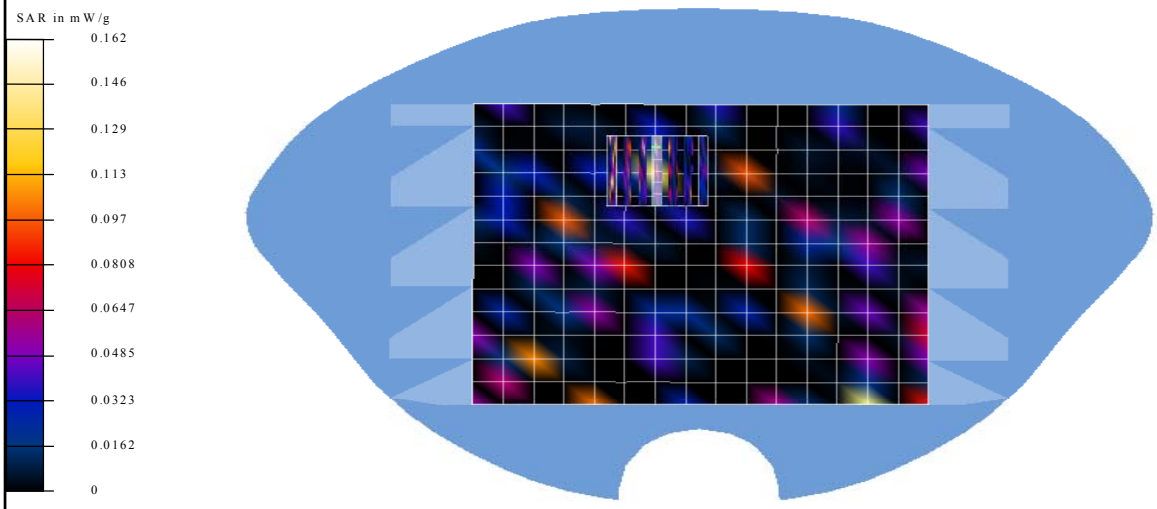
Test Laboratory: Telecom & EMC Testing Group
File Name: EUT Rear Touch_CH 1_Section D_Data 1.da4

DUT: waveon 988 PC Type & Serial Number:
Program: 56S030690; EUT Rear Touch_CH 1_Section D_Data 1

Communication System: 2450 Mhz_PC; Frequency: 2412 MHz; Duty Cycle: 1:1
Medium: Body 2450 MHz (σ = 1.9987 mho/m, ε = 54.57, ρ = 1000 kg/m3)
Phantom section: FlatSection

DASY4 Configuration:
- Probe: ET3DV6 - SN1645; ConvF(4.7, 4.7, 4.7); Calibrated: 10/9/2003
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn475; Calibrated: 11/14/2002
- Phantom: - TP:
- Software: DASY4, V4.0 Build 51

Zoom Scan 2 (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm
Reference Value = 0 V/m
Peak SAR = 0.158 mW/g
SAR(1 g) = 0.0513 mW/g; SAR(10 g) = 0.0319 mW/g
Power Drift = 0.02dB
Area Scan (14x16x1): Measurement grid: dx=10mm, dy=10mm



Ambient Temperature: 27 ± 1^0 C
Tissue Temperature: 26 ± 1^0 C
Humidity: 55% to 60%

Figure 11: SAR Test Distribution Plot – Device at flat phantom

Phantom Configuration	Device Test Positions	Antenna Position	Channel	SAR (W/kg), over 1g Tissue
Flat Phantom	Section D	Fixed	Channel: 7 2442MHz	0.0353

Date: 10/20/03

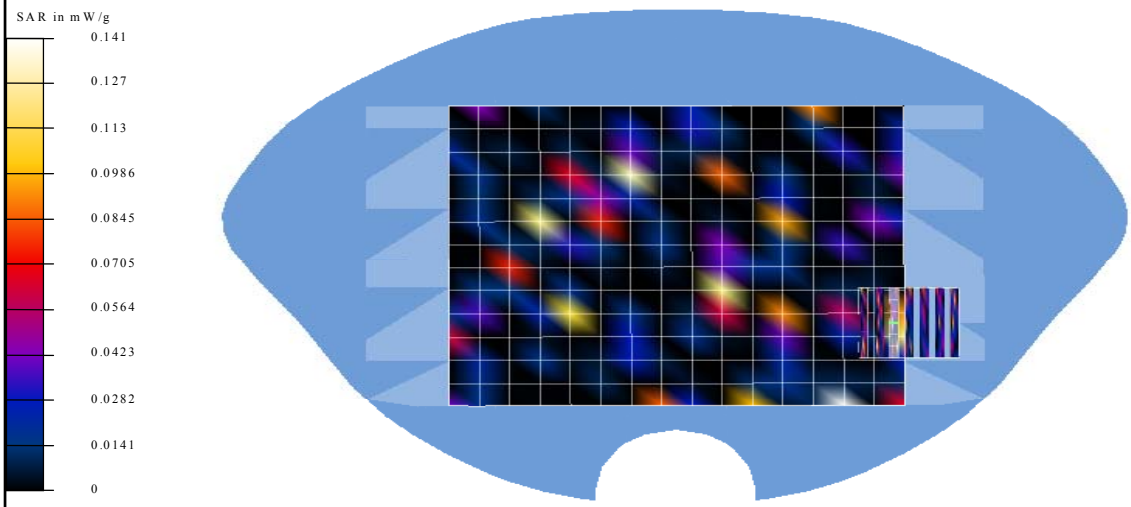
Test Laboratory: Telecom & EMC Testing Group
File Name: EUT Rear Touch_CH 7_Section D_Data 2.da4

DUT: waveon 988 PC Type & Serial Number:
Program: 56S030690; EUT Rear Touch_CH 7_Section D_Data 2

Communication System: 2450 Mhz_PC; Frequency: 2442 MHz; Duty Cycle: 1:1
Medium: Body 2450 MHz (σ = 1.9987 mho/m, ε = 54.57, ρ = 1000 kg/m3)
Phantom section: FlatSection

DASY4 Configuration:
- Probe: ET3DV6 - SN1645; ConvF(4.7, 4.7, 4.7); Calibrated: 10/9/2003
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn475; Calibrated: 11/14/2002
- Phantom: - TP:
- Software: DASY4, V4.0 Build 51

Zoom Scan 2 (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm
Reference Value = 0.428 V/m
Peak SAR = 0.388 mW/g
SAR(1 g) = 0.0353 mW/g; SAR(10 g) = 0.0234 mW/g
Power Drift = -0.08dB
Area Scan (14x16x1): Measurement grid: dx=10mm, dy=10mm



Ambient Temperature: 27 ± 1^0 C
Tissue Temperature: 26 ± 1^0 C
Humidity: 55% to 60%

Figure 12: SAR Test Distribution Plot – Device at flat phantom

Phantom Configuration	Device Test Positions	Antenna Position	Channel	SAR (W/kg), over 1g Tissue
Flat Phantom	Section D	Fixed	Channel: 13 2472MHz	0.0513

Date: 10/20/03

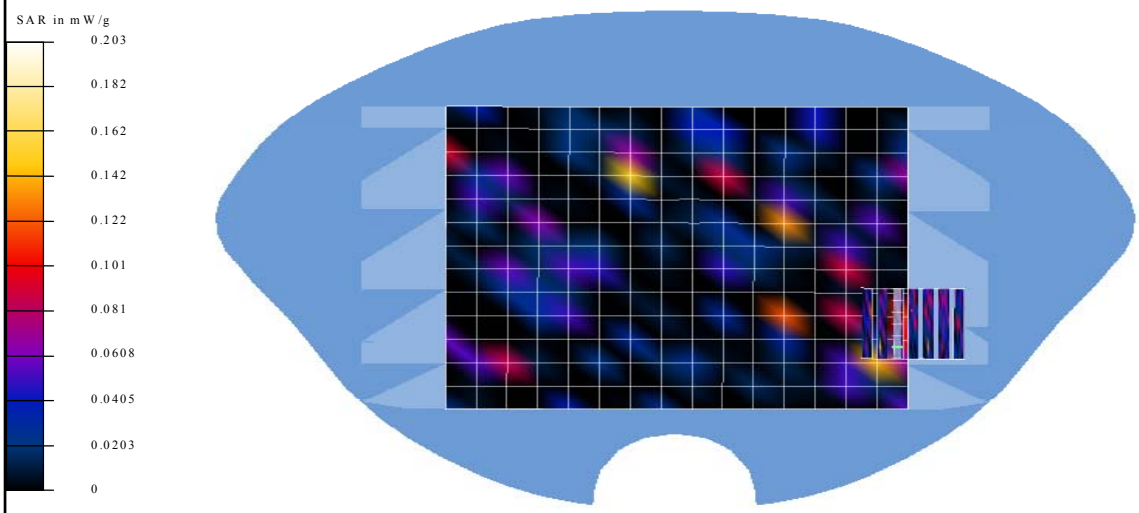
Test Laboratory: Telecom & EMC Testing Group
File Name: EUT Rear Touch_CH 13_Section D_Data 3.da4

DUT: waveon 988 PC Type & Serial Number:
Program: 56S030690; EUT Rear Touch_CH 13_Section D_Data 3

Communication System: 2450 Mhz_PC; Frequency: 2472 MHz; Duty Cycle: 1:1
Medium: Body 2450 MHz (σ = 1.9987 mho/m, ε = 54.57, ρ = 1000 kg/m3)
Phantom section: FlatSection

DASY4 Configuration:
- Probe: ET3DV6 - SN1645; ConvF(4.7, 4.7, 4.7); Calibrated: 10/9/2003
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn475; Calibrated: 11/14/2002
- Phantom: - TP:
- Software: DASY4, V4.0 Build 51

Zoom Scan 2 (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm
Reference Value = 0.298 V/m
Peak SAR = 0.192 mW/g
SAR(1 g) = 0.0513 mW/g; SAR(10 g) = 0.0333 mW/g
Power Drift = 0.01dB
Area Scan (14x16x1): Measurement grid: dx=10mm, dy=10mm



Ambient Temperature: **27 ± 1^0 C**
Tissue Temperature: **26 ± 1^0 C**
Humidity: **55% to 60%**

Figure 13: SAR Test Distribution Plot – Device at flat phantom

Phantom Configuration	Device Test Positions	Antenna Position	Channel	SAR (W/kg), over 1g Tissue
Flat Phantom	Section E	Fixed	Channel: 1 2412MHz	0.0531

Date: 10/20/03

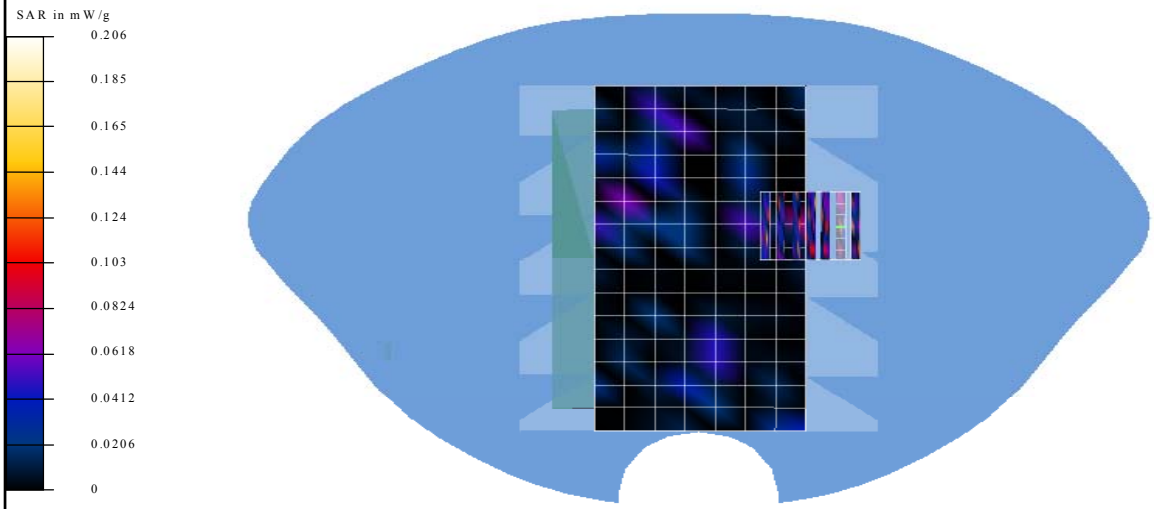
Test Laboratory: Telecom & EMC Testing Group
File Name: EUT_Vertical Positioning_CH 1_Data 13.da4

DUT: waveon 988 PC_Vertical Position Type & Serial Number:
Program: 56S030690; EUT_Vertical Positioning_CH 1_Data 13

Communication System: 2450 Mhz_PC; Frequency: 2412 MHz; Duty Cycle: 1:1
Medium: Body 2450 MHz (σ = 1.9987 mho/m, ε = 54.57, ρ = 1000 kg/m3)
Phantom section: FlatSection

DASY4 Configuration:
- Probe: ET3DV6 - SN1645; ConvF(4.7, 4.7, 4.7); Calibrated: 10/9/2003
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn475; Calibrated: 11/14/2002
- Phantom: - TP:
- Software: DASY4, V4.0 Build 51

Area Scan (16x8x1): Measurement grid: dx=10mm, dy=10mm
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm
Reference Value = 2.15 V/m
Peak SAR = 0.155 mW/g
SAR(1 g) = 0.0531 mW/g; SAR(10 g) = 0.032 mW/g
Power Drift = -0.03dB



Ambient Temperature: 27 ± 1^0 C
Tissue Temperature: 26 ± 1^0 C
Humidity: 55% to 60%

Figure 14: SAR Test Distribution Plot – Device at flat phantom

Phantom Configuration	Device Test Positions	Antenna Position	Channel	SAR (W/kg), over 1g Tissue
Flat Phantom	Section E	Fixed	Channel: 7 2442MHz	0.0541

Date: 10/20/03

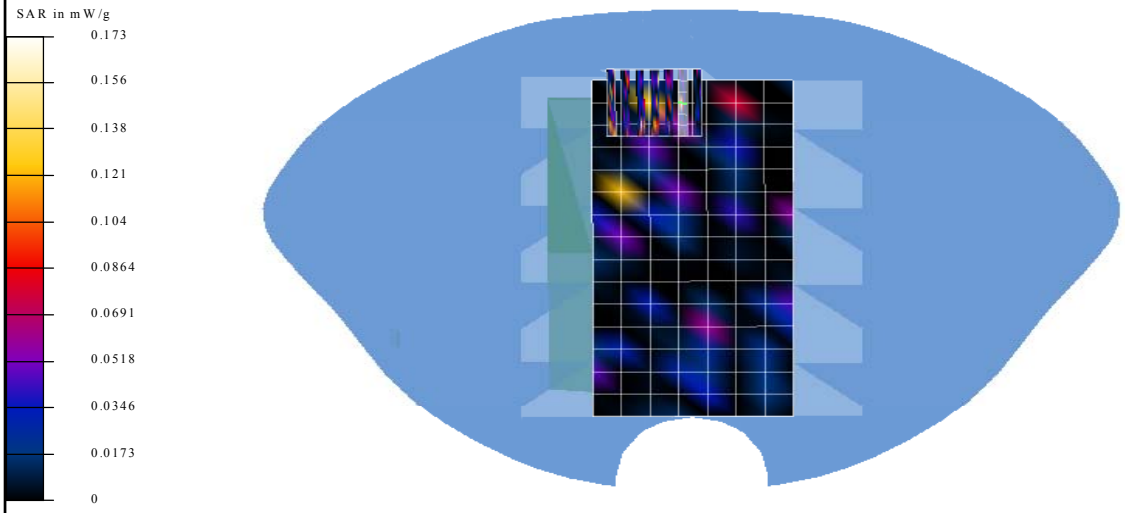
Test Laboratory: Telecom & EMC Testing Group
File Name: EUT_Vertical Positioning_CH 7_Data 14.da4

DUT: waveon 988 PC_Vertical Position Type & Serial Number:
Program: 56S030690; EUT_Vertical Positioning_CH 7_Data 14

Communication System: 2450 Mhz_PC; Frequency: 2442 MHz; Duty Cycle: 1:1
Medium: Body 2450 MHz (σ = 1.9987 mho/m, ε = 54.57, ρ = 1000 kg/m3)
Phantom section: FlatSection

DASY4 Configuration:
- Probe: ET3DV6 - SN1645; ConvF(4.7, 4.7, 4.7); Calibrated: 10/9/2003
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn475; Calibrated: 11/14/2002
- Phantom: - TP:
- Software: DASY4, V4.0 Build 51

Area Scan (16x8x1): Measurement grid: dx=10mm, dy=10mm
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm
Reference Value = 0 V/m
Peak SAR = 0.169 mW/g
SAR(1 g) = 0.0541 mW/g; SAR(10 g) = 0.0241 mW/g
Power Drift = 0.03dB



Ambient Temperature: 27 ± 1^0 C
Tissue Temperature: 26 ± 1^0 C
Humidity: 55% to 60%

Figure 15: SAR Test Distribution Plot – Device at flat phantom

Phantom Configuration	Device Test Positions	Antenna Position	Channel	SAR (W/kg), over 1g Tissue
Flat Phantom	Section E	Fixed	Channel: 13 2472MHz	0.0363

Date: 10/20/03

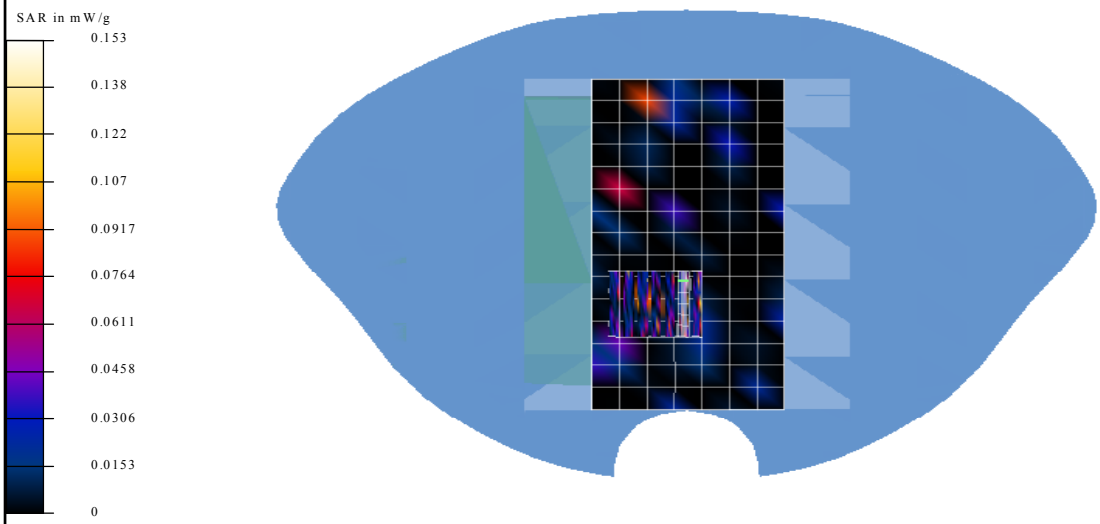
Test Laboratory: Telecom & EMC Testing Group
File Name: EUT_Vertical Positioning_CH 13_Data 15.da4

DUT: waveon 988 PC_Vertical Position Type & Serial Number:
Program: 56S030690; EUT_Vertical Positioning_CH 13_Data 15

Communication System: 2450 Mhz_PC; Frequency: 2442 MHz; Duty Cycle: 1:1
Medium: Body 2450 MHz (σ = 1.9987 mho/m, ε = 54.57, ρ = 1000 kg/m3)
Phantom section: FlatSection

DASY4 Configuration:
- Probe: ET3DV6 - SN1645; ConvF(4.7, 4.7, 4.7); Calibrated: 10/9/2003
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn475; Calibrated: 11/14/2002
- Phantom: - TP:
- Software: DASY4, V4.0 Build 51

Area Scan (16x8x1): Measurement grid: dx=10mm, dy=10mm
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm
Reference Value = 0.396 V/m
Peak SAR = 0.152 mW/g
SAR(1 g) = 0.0363 mW/g; SAR(10 g) = 0.0191 mW/g
Power Drift = 0.09dB



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2. Unless otherwise requested, a report shall contain only technical results. Analysis and interpretation of the results and professional opinion and recommendations expressed thereupon, if required, shall be clearly indicated and additional fee paid for, by the Client.

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August 2003

ANNEX A

TEST INSTRUMENTATION
&
GENERAL PROCEDURE

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: “SAM v4.0 Phantom”, 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
  Dimension: A100cm x 50cm x 85cm (L x W x H)

A.3 Test Setup

Phantom

The "SAM v4.0 Phantom", 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 phantom table comes in the sizes: A 100x50x85 cm (LxWxH) table for use with free standing robots.
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 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

ELECTRICAL CHARACTERISTIC MEASUREMENT SETUP

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

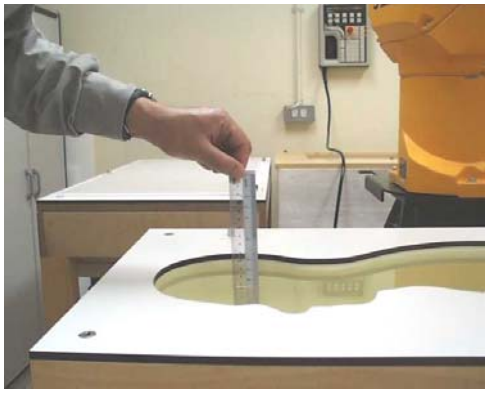
  The 85070D is a dielectric probe that is used to measure the intrinsic electrical properties of materials in the RF and microwave frequency bands. The 85070D software allows you to measure the complex dielectric constant (also called permittivity) of liquids and semi-solids, incuding the dielectric loss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

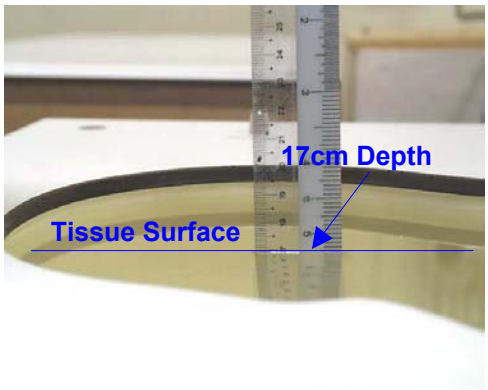
  To obtain data at hundreds of frequencies in seconds, simply immerse the probe into liquids or semi-solids - no special fixtures or containers are required. The 85070D must be used in conjunction with an Agilent network analyzer. The network analyzer provides the high frequency stimulus, and measures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

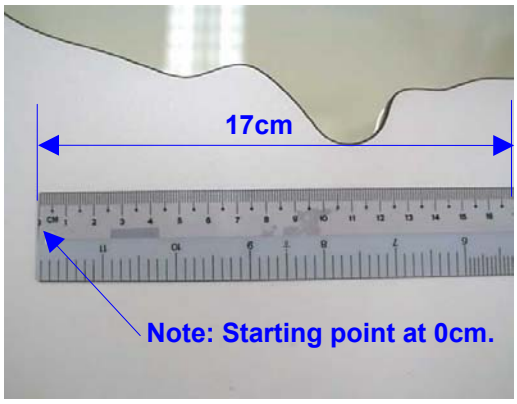
  The probe transmits a signal into the material under test (MUT). The measured reflected response from the materials is then related to its dielectric properties. A computer controls the system, and runs software that guides the user through a measurement sequence. An effort is made to keep the results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

Liquid Depth

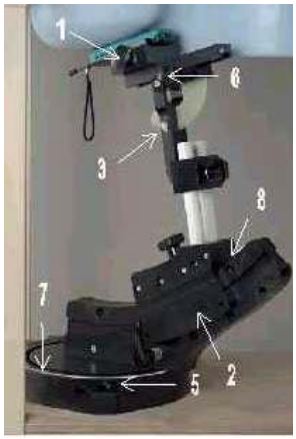
The liquid depth at the head of the SAM v4.0 Phantom is approximately 17cm.







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.

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.

Instrument	Model	S/No	Cal Due Date	
Boonton RF Power Meter (Dual Channel)	4532	97701	25 June 2004	✓
Boonton Peak Power Sensor	56218-S/1	1417	31 Aug 2003	
Boonton Power Sensor	51075	31534	-	✓
Boonton Power Sensor	51075	32002	25 June 2004	✓
S-Parameter Network Analyzer (30kHz – 3GHz)	HP8753ES	US37390533	17 Sept 2004	✓
Agilent 85070D Dielectric Probe Kit	85075D	21356	-	✓
Agilient Signal Generator (10MHz – 20GHz)	83620B	3844A01337	-	✓
Amplifier Research Power Amplifier (1MHz – 1000MHz)	25W1000B	27225	-	
Amplifier Research Power Amplifier (800MHz – 4.2GHz)	25S1G4A	29346	-	✓
Agilent Dual Directional Coupler	HP778D	18289	-	✓
Radio Test Set	2967	296501/331	-	
R&S Universal Radio Communication Tester	CMU-200	837587/068	3 Apr 2004	✓
450MHz System Validation Dipole	D450V2	1004	4 Apr 2003	
835MHz System Validation Dipole	D835V2	447	12 Nov 2003	
900MHz System Validation Dipole	D900V2	134	11 Nov 2003	
1800MHz System Validation Dipole	D1800V2	2d019	11 Nov 2003	
1900MHz System Validation Dipole	D1900V2	546	25 Nov 2003	
2450MHz System Validation Dipole	D2450V2	715	25 Sep 2004	✓
Data Acquisition Electronics (DAE)	DAE3V1	475	11 Nov 2003	✓
Dosimetric E-field Probe	ET3DV6	1645	25 Nov 2002	✓
Dosimetric E-field Probe	ET3DV6	1646	25 Nov 2002	
Dosimetric E-field Probe	ET3DV6	1647	20 Nov 2003	

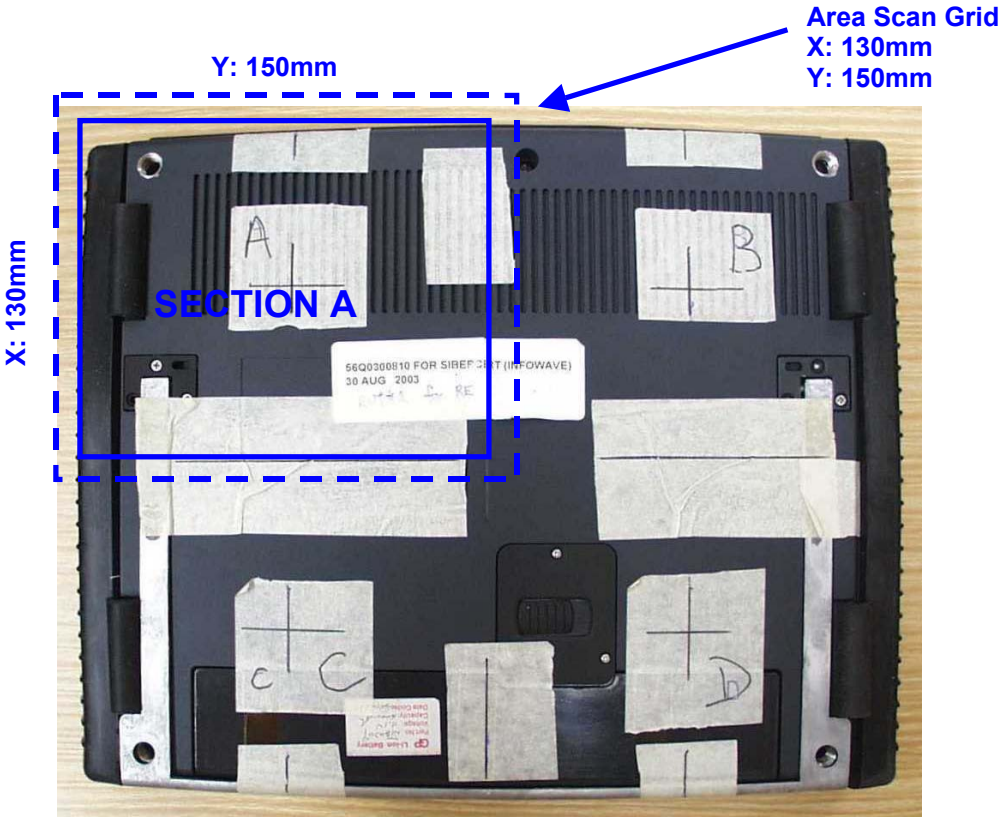
ANNEX B

TEST SETUP PHOTOGRAPHS

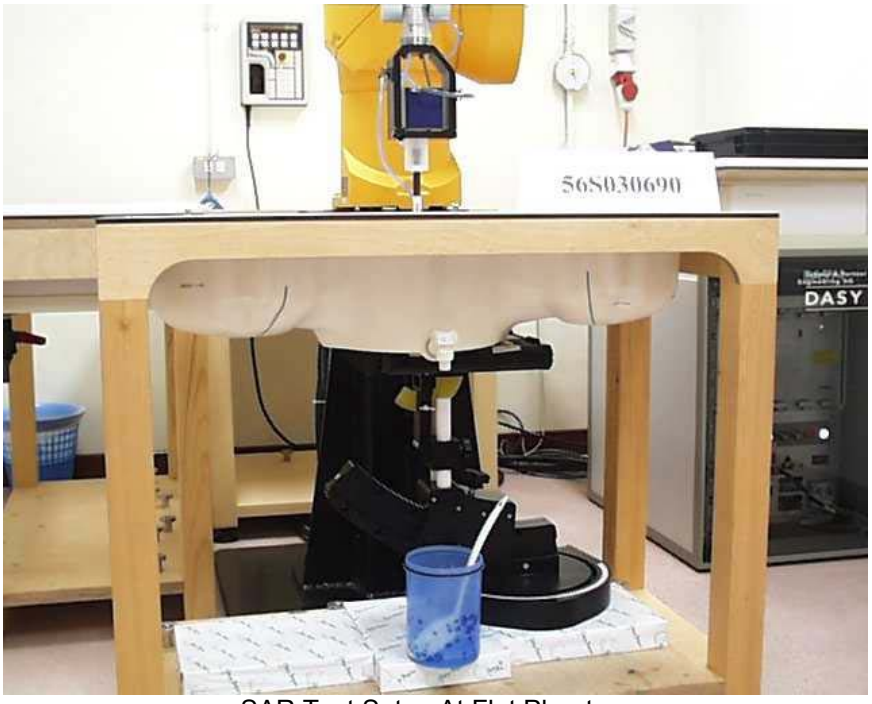
TEST SETUP PHOTOGRAPHS ANNEX B

Note:

1. Due to the large size of the Portable PC, the area scan grid dimension shown below was used to encompass each section during SAR Measurement.
2. For the test setup photographs, see next two pages.



SAR Test Setup Photographs



SAR Test Setup At Flat Phantom

SAR Test Setup Photographs

SAR Test Setup At Flat Phantom – Closer Front View (EUT **Section A** Touched Phantom)

SAR Test Setup At Flat Phantom – Closer Side View (EUT **Section A** Touched Phantom)

Note:
1. The area scan grid dimension shown below was used to encompass Section E during SAR Measurement.
2. For the test setup photographs, see next page.

SAR Test Setup Photographs

SAR Test Setup At Flat Phantom – Closer Front View (EUT **Section E** Touched Phantom)

SAR Test Setup At Flat Phantom – Closer Side View (EUT **Section E** Touched Phantom)

Conducted Power Measurement Setup

Conducted Power Measurement Setup

EUT PHOTOGRAPHS

Front of EUT

Rear of EUT

ANNEX C

TISSUE SIMULANT DATA SHEETS

Type of Tissue	Head	Body
Target Frequency (MHz)	2450	2450
Target Dielectric Constant	39.20	52.70
Target Conductivity (S/m)	1.80	1.95
Composition (by weight)	Ultra Pure Water (55.67%) Glyco (42.52%) Sugar (0%) Salt (0%) HEC (0%) Bactericide (1.81%)	Ultra Pure Water (72.55%) Glyco (27.34%) Sugar (0%) Salt (0.11%) HEC (0%) Bactericide (0%)
Measured Dielectric Constant	40.24	54.57
Measured Conductivity (S/m)	1.8566	1.9987

Probe Name	Dosimetric E-field Probe ET3DV6	Dosimetric E-field Probe ET3DV6
Probe Serial Number	1645	1645
Sensor Offset (mm)	2.7	2.7
Conversion Factor	5.1 ± 9.5%	4.7 ± 9.5%
Probe Calibration Due Date (DD/MM/YY)	9 Oct 2004	9 Oct 2004

Head Tissue at 2450MHz

Frequency	e'	e''	Conductivity
2440000000	40.28	13.62	1.8460
2441000000	40.26	13.61	1.8457
2442000000	40.27	13.61	1.8461
2443000000	40.26	13.61	1.8478
2444000000	40.26	13.62	1.8499
2445000000	40.26	13.64	1.8525
2446000000	40.25	13.63	1.8521
2447000000	40.26	13.63	1.8535
2448000000	40.24	13.64	1.8551
2449000000	40.24	13.64	1.8556
2450000000	**40.24**	**13.64**	**1.8566**
2451000000	40.22	13.65	1.8586
2452000000	40.22	13.64	1.8587
2453000000	40.22	13.66	1.8613
2454000000	40.23	13.65	1.8606
2455000000	40.22	13.65	1.8619
2456000000	40.21	13.66	1.8644
2457000000	40.21	13.66	1.8645
2458000000	40.22	13.66	1.8655
2459000000	40.20	13.66	1.8662
2460000000	40.20	13.65	1.8661
2461000000	40.18	13.66	1.8671
2462000000	40.18	13.66	1.8680
2463000000	40.18	13.67	1.8706
2464000000	40.18	13.67	1.8715
2465000000	40.17	13.69	1.8745
2466000000	40.18	13.68	1.8742
2467000000	40.16	13.68	1.8743
2468000000	40.17	13.68	1.8753
2469000000	40.16	13.69	1.8776
2470000000	40.15	13.69	1.8781
2471000000	40.15	13.69	1.8796
2472000000	40.14	13.70	1.8817
2473000000	40.14	13.69	1.8814
2474000000	40.14	13.70	1.8835
2475000000	40.12	13.70	1.8839
2476000000	40.14	13.70	1.8852
2477000000	40.12	13.71	1.8868
2478000000	40.13	13.71	1.8875
2479000000	40.10	13.72	1.8889
2480000000	40.12	13.74	1.8928

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

Tested by: NAC
Date : 20th Oct 2003
Frequency: 2450MHz
Mixture: Head Tissue
Tissue temp: 26°C

Composition		
Tap Water	0.0g	0.00%
Ultra Pure Water	20000.0g	55.67%
Sugar	0.0g	0.00%
Glyco	15278.0g	42.52%
Salt	0.0g	0.00%
Preventol D7	650.0g	1.81%
Total Weight	35928.0g	100.0%

Result (FCC)	Dielectric Constant	Conductivity
Measured	40.24	1.8566
Target (FCC)	39.2	1.8
Low Limit	37.24	1.71
High Limit	41.16	1.89
% Off Target	2.65	3.14

Body Tissue at 2450MHz

Frequency	e'	e''	Conductivity
2440000000	54.63	14.85	2.0134
2441000000	54.62	14.85	2.0137
2442000000	54.65	14.82	2.0101
2443000000	54.64	14.80	2.0092
2444000000	54.64	14.79	2.0087
2445000000	54.64	14.77	2.0063
2446000000	54.63	14.76	2.0052
2447000000	54.62	14.74	2.0034
2448000000	54.61	14.72	2.0022
2449000000	54.58	14.69	1.9990
2450000000	**54.57**	**14.68**	**1.9987**
2451000000	54.56	14.66	1.9961
2452000000	54.55	14.64	1.9943
2453000000	54.51	14.61	1.9909
2454000000	54.50	14.61	1.9915
2455000000	54.46	14.57	1.9868
2456000000	54.43	14.54	1.9844
2457000000	54.39	14.54	1.9848
2458000000	54.37	14.50	1.9800
2459000000	54.34	14.49	1.9788
2460000000	54.30	14.46	1.9768
2461000000	54.27	14.44	1.9749
2462000000	54.23	14.42	1.9730
2463000000	54.18	14.41	1.9713
2464000000	54.15	14.39	1.9695
2465000000	54.11	14.35	1.9656
2466000000	54.05	14.34	1.9641
2467000000	54.03	14.31	1.9617
2468000000	53.99	14.31	1.9618
2469000000	53.95	14.27	1.9577
2470000000	53.90	14.27	1.9582
2471000000	53.84	14.26	1.9574
2472000000	53.80	14.23	1.9544
2473000000	53.77	14.23	1.9552
2474000000	53.72	14.22	1.9541
2475000000	53.67	14.20	1.9519
2476000000	53.63	14.18	1.9506
2477000000	53.59	14.16	1.9486
2478000000	53.54	14.17	1.9510
2479000000	53.51	14.16	1.9502
2480000000	53.48	14.17	1.9518

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

Tested by: OIC
Date : 20th Oct 2003
Frequency: 2450MHz
Mixture: Body Tissue
Tissue temp: 26°C

Composition		
Tap Water	0.0g	0.00%
Ultra Pure Water	25500.0g	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	54.57	1.9987
Target (FCC)	52.7	1.95
Low Limit	50.065	1.8525
High Limit	55.335	2.0475
% Off Target	3.55	2.50

ANNEX D

SAR VALIDATION RESULTS

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

Date: 10/20/03

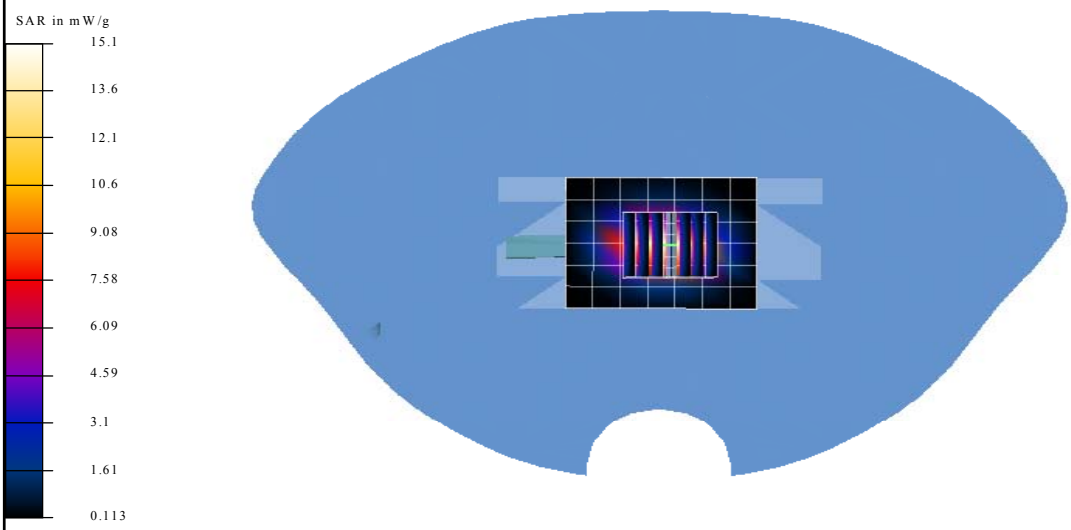
Test Laboratory: Telecom & EMC Testing Group
File Name: 2450MHz Head Dipole Validation.da4

DUT: Dipole 2450MHz Type & Serial Number: 715
Program: Dipole Validation; 2450MHz Head Dipole Validation

Communication System: CW; Frequency: 2450 MHz; Duty Cycle: 1:1
Medium: Head 2450 MHz (σ = 1.8566 mho/m, ε = 40.24, ρ = 1000 kg/m3)
Phantom section: FlatSection

DASY4 Configuration:
- Probe: ET3DV6 - SN1645; ConvF(5.1, 5.1, 5.1); Calibrated: 10/9/2003
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn475; Calibrated: 11/14/2002
- Phantom: - TP:
- Software: DASY4, V4.0 Build 51

Area Scan (7x8x1): Measurement grid: dx=10mm, dy=10mm
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm
Reference Value = 95.4 V/m
Peak SAR = 27.5 mW/g
SAR(1 g) = 13.3 mW/g; SAR(10 g) = 6.01 mW/g
Power Drift = 0.005 dB



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

Date: 10/20/03

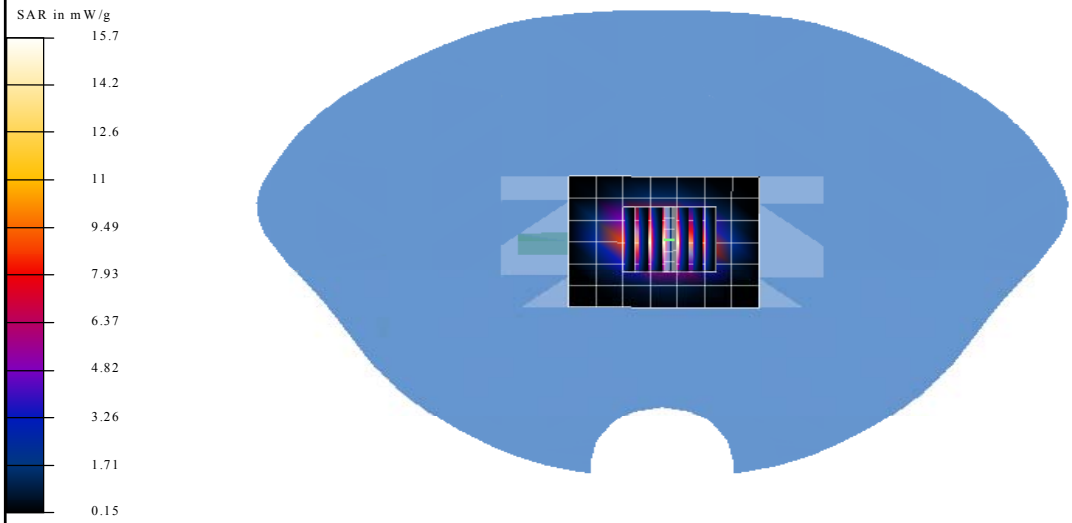
Test Laboratory: Telecom & EMC Testing Group
File Name: 56S030690_2450MHz Body_System Validation.da4

DUT: Dipole 2450MHz Type & Serial Number: 715
Program: Dipole Validation; 2450Mhz dipole validation

Communication System: CW; Frequency: 2450 MHz; Duty Cycle: 1:1
Medium: Body 2450 MHz (σ = 1.9987 mho/m, ε = 54.57, ρ = 1000 kg/m3)
Phantom section: FlatSection

DASY4 Configuration:
- Probe: ET3DV6 - SN1645; ConvF(4.7, 4.7, 4.7); Calibrated: 10/9/2003
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn475; Calibrated: 11/14/2002
- Phantom: - TP:
- Software: DASY4, V4.0 Build 51

Area Scan (7x8x1): Measurement grid: dx=10mm, dy=10mm
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm
Reference Value = 94 V/m
Peak SAR = 30.3 mW/g
SAR(1 g) = 13.9 mW/g; SAR(10 g) = 6.23 mW/g
Power Drift = -0.02 dB



SUMMARY

SAR System Validation Target & Measured:

System Validation 2450MHz: S/Nos.: 447	Target SAR W/kg (1g)	2450MHz Head	2450MHz Body
		Measured Target W/kg (1g) (Deviation %)	Measured Target W/kg (1g) (Deviation %)
	13.1[Note 1]	13.3[Note 1] (+1.50%)	13.9[Note 1] (+6.10%)

Note 1 - Dipole forward power = 250mW

ANNEX E

MEASUREMENT UNCERTAINTY

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 ± 20.8%.

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)	± 3.6	normal	1	0.6	± 2.1	∞
Combined Standard Uncertainty					± 10.4	330
Coverage Factor for 95%		**k=2**				
Extended Standard Uncertainty					± 20.8	

ANNEX F

SAR PROBE CALIBRATION CERTIFICATES

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

Client **PSB**

CALIBRATION CERTIFICATE

Object(s)	ET3DV6 - SN:1645
Calibration procedure(s)	QA CAL-01.v2 Calibration procedure for dosimetric E-field probes
Calibration date:	October 9, 2003
Condition of the calibrated item	In Tolerance (according to the specific calibration document)

This calibration statement documents traceability of M&TE used in the calibration procedures and conformity of the procedures with the ISO/IEC 17025 international standard.

All calibrations have been conducted in the closed laboratory facility: environment temperature 22 +/- 2 degrees Celsius and humidity < 75%.

Calibration Equipment used (M&TE critical for calibration)

Model Type	ID #	Cal Date (Calibrated by, Certificate No.)	Scheduled Calibration
Power meter EPM E4419B	GB41293874	2-Apr-03 (METAS, No 252-0250)	Apr-04
Power sensor E4412A	MY41495277	2-Apr-03 (METAS, No 252-0250)	Apr-04
Reference 20 dB Attenuator	SN: 5086 (20b)	3-Apr-03 (METAS No. 251-0340	Apr-04
Fluke Process Calibrator Type 702	SN: 6295803	8-Sep-03 (Sintrel SCS No. E-030020)	Sep-04
Power sensor HP 8481A	MY41092180	18-Sep-02 (Agilent, No. 20020918)	In house check: Oct 03
RF generator HP 8684C	US3642U01700	4-Aug-99 (SPEAG, in house check Aug-02)	In house check: Aug-05
Network Analyzer HP 8753E	US37390585	18-Oct-01 (Agilent, No. 24BR1033101)	In house check: Oct 03

	Name	Function	Signature
Calibrated by:	Nico Vetterli	Technician	
Approved by:	Katja Pokovic	Laboratory Director	

Date issued: October 9, 2003

This calibration certificate is issued as an intermediate solution until the accreditation process (based on ISO/IEC 17025 International Standard) for Calibration Laboratory of Schmid & Partner Engineering AG is completed.

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Schmid & Partner Engineering AG
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Zeughausstrasse 43, 8004 Zurich, Switzerland
Phone +41 1 245 9700, Fax +41 1 245 9779
info@speag.com, http://www.speag.com

Probe ET3DV6

SN:1645

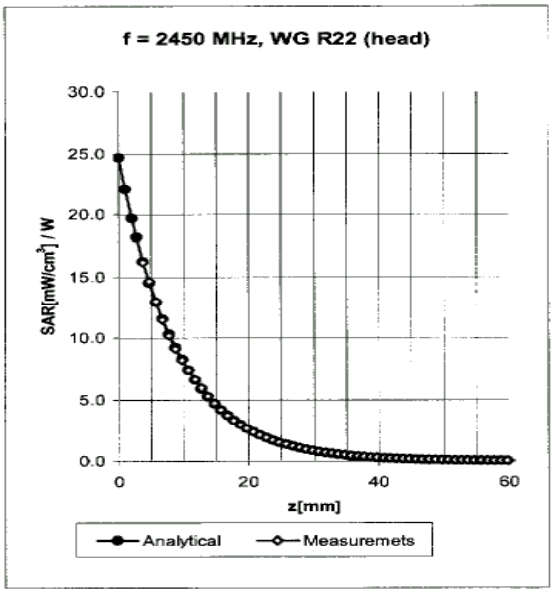
Manufactured:	November 7, 2001
Last calibration:	November 20, 2002
Recalibrated:	October 9, 2003

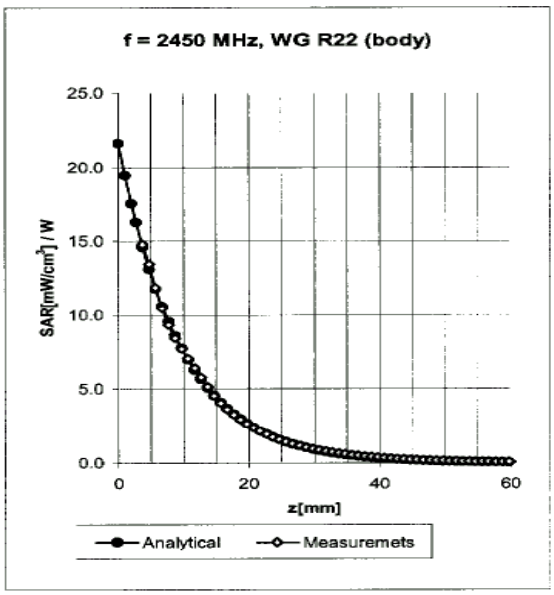
Calibrated for DASY Systems

(Note: non-compatible with DASY2 system!)

ET3DV6 SN:1645 **October 9, 2003**

Conversion Factor Assessment





Head	2450	MHz	ε_r = 39.2 ± 5%	σ = 1.80 ± 5% mho/m	
Valid for f=2400-2500 MHz with Head Tissue Simulating Liquid according to EN 50361, P1528-200X					
	ConvF X	5.1	± 9.5% (k=2)	Boundary effect:	
	ConvF Y	5.1	± 9.5% (k=2)	Alpha	0.97
	ConvF Z	5.1	± 9.5% (k=2)	Depth	1.91

Body	2450	MHz	ε_r = 52.7 ± 5%	σ = 1.95 ± 5% mho/m	
Valid for f=2400-2500 MHz with Body Tissue Simulating Liquid according to OET 65 Suppl. C					
	ConvF X	4.7	± 9.5% (k=2)	Boundary effect:	
	ConvF Y	4.7	± 9.5% (k=2)	Alpha	1.25
	ConvF Z	4.7	± 9.5% (k=2)	Depth	1.65

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ANNEX G

REFERENCES

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)