Schmid & Partner Engineering AG

s p e a g

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

Additional Conversion Factors

for Dosimetric E-Field Probe

Type:	**ET3DV6**
Serial Number:	**1604**
Place of Assessment:	**Zurich**
Date of Assessment:	**March 21, 2005**
Probe Calibration Date:	**March 18, 2005**

Schmid & Partner Engineering AG hereby certifies that conversion factor(s) of this probe have been evaluated on the date indicated above. The assessment was performed using the FDTD numerical code SEMCAD of Schmid & Partner Engineering AG. Since the evaluation is coupled with measured conversion factors, it has to be recalculated yearly, i.e., following the re-calibration schedule of the probe. The uncertainty of the numerical assessment is based on the extrapolation from measured value at 900 MHz or at 1800 MHz.

Assessed by:

Schmid & Partner Engineering AG

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Phone +41 1 245 9700, Fax +41 1 245 9779
info@speag.com, http://www.speag.com

Dosimetric E-Field Probe ET3DV6 SN:1604

Conversion factor (± standard deviation)

f = 150 MHz	ConvF	**9.0 ± 10%**	ε_r = 52.3 ± 5% σ = 0.76 ± 5% mho/m (head tissue)
f = 150 MHz	ConvF	**8.6 ± 10%**	ε_r = 61.9 ± 5% σ = 0.80 ± 5% mho/m (body tissue)
f = 300 MHz	ConvF	**7.9 ± 9%**	ε_r = 58.2 ± 5% σ = 0.92 ± 5% mho/m (body tissue)

Important Note:

For numerically assessed probe conversion factors, parameters Alpha and Delta in the DASY software must have the following entries: Alpha = 0 and Delta = 1.

Please see also Section 4.7 of the DASY4 Manual.

APPENDIX C – DIPOLE CALIBRATION CERTIFICATES

NCL CALIBRATION LABORATORIES

Calibration File No: DC-0267
Project Number: BACL-CAL2450-3985

CERTIFICATE OF CALIBRATION

It is certified that the equipment identified below has been calibrated in the **NCL CALIBRATION LABORATORIES** by qualified personnel following recognized procedures and using transfer standards traceable to NRC/NIST.

BACL Validation Dipole

Manufacturer: APREL Laboratories
Part number: D-1800-S-1
Frequency: 1800 MHz
Serial No: BCL-049

Customer: Bay Area Compliance Laboratory

Calibrated: 4th March 2005
Released on: 4th March 2005

Released By: _____

NCL CALIBRATION LABORATORIES
51 SPECTRUM WAY
NEPEAN, ONTARIO
CANADA K2R 1E6
Division of APREL Lab.
TEL: (613) 820-4988
FAX: (613) 820-4161

NCL Calibration Laboratories
Division of APREL Laboratories.

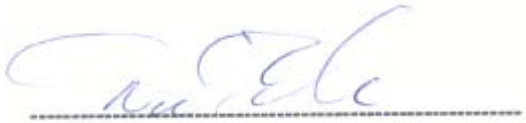
Conditions

Dipole BCL-049 received from customer, with the attribute of having a repair to one radial arm, in good condition for re-calibration. SMA connector cleaned prior to calibration.

Ambient Temperature of the Laboratory: 22 °C +/- 0.5°C
Temperature of the Tissue: 21 °C +/- 0.5°C

We the undersigned attest that to the best of our knowledge the calibration of this device has been accurately conducted and that all information contained within this report has been reviewed for accuracy.

Stuart Nicol
Director Product Development



D. Brooks
Member of Engineering Staff
(Calibration Engineer)

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NCL Calibration Laboratories
Division of APREL Laboratories.

Calibration Results Summary

The following results relate the Calibrated Dipole and should be used as a quick reference for the user.

Mechanical Dimensions

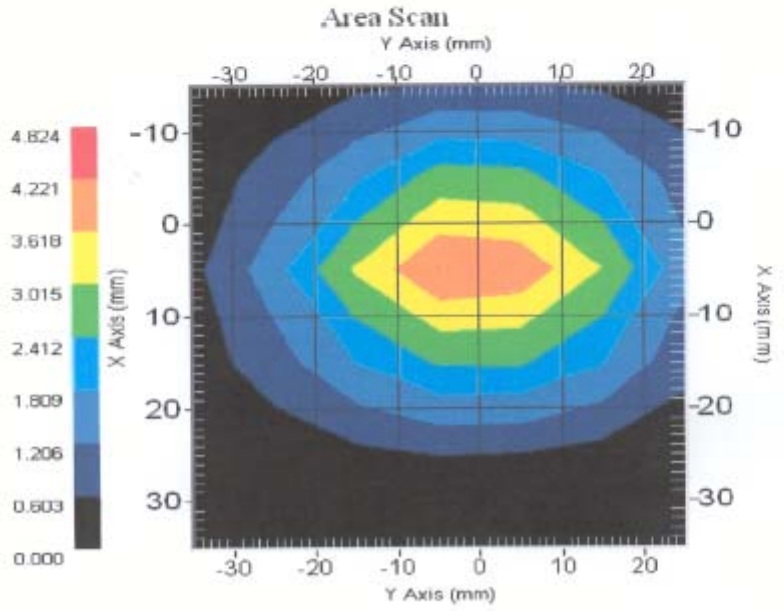
Length: 72.0 mm
Height: 41.7 mm

Electrical Specification

SWR: 1.09 U
Return Loss: -26.9 dB
Impedance: 50.9 Ω

System Validation Results

Frequency	1 Gram	10 Gram	Peak
1800 MHz	38.81	20.01	71.56



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Introduction

This Calibration Report has been produced in line with the SSI Dipole Calibration Procedure SSI-TP-018-ALSAS. The results contained within this report are for Validation Dipole BCL-049. The calibration routine consisted of a three-step process. Step 1 was a mechanical verification of the dipole to ensure that it meets the mechanical specifications. Step 2 was an Electrical Calibration for the Validation Dipole, where the SWR, Impedance, and the Return loss were assessed. Step 3 involved a System Validation using the ALSAS-10U, along with APREL E-020 130 MHz to 26 GHz E-Field Probe Serial Number 212.

References

SSI-TP-018-ALSAS Dipole Calibration Procedure
SSI-TP-016 Tissue Calibration Procedure
IEEE 1528 "Recommended Practice for Determining the Peak Spatial-Average Specific Absorption Rate (SAR) in the Human Body Due to Wireless Communications Devices: Experimental Techniques"

Conditions

Dipole BCL-049 received from customer in good condition, with the attribute of a repair of one radial arm.

Ambient Temperature of the Laboratory:	22 °C +/- 0.5°C
Temperature of the Tissue:	20 °C +/- 0.5°C

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Dipole Calibration Results

Mechanical Verification

APREL Length	APREL Height	Measured Length	Measured Height
72.0 mm	41.7 mm	71.6 mm	41.7 mm

Tissue Validation

Head Tissue 1800 MHz	Measured
Dielectric constant, ε_r	40.0
Conductivity, σ [S/m]	1.40

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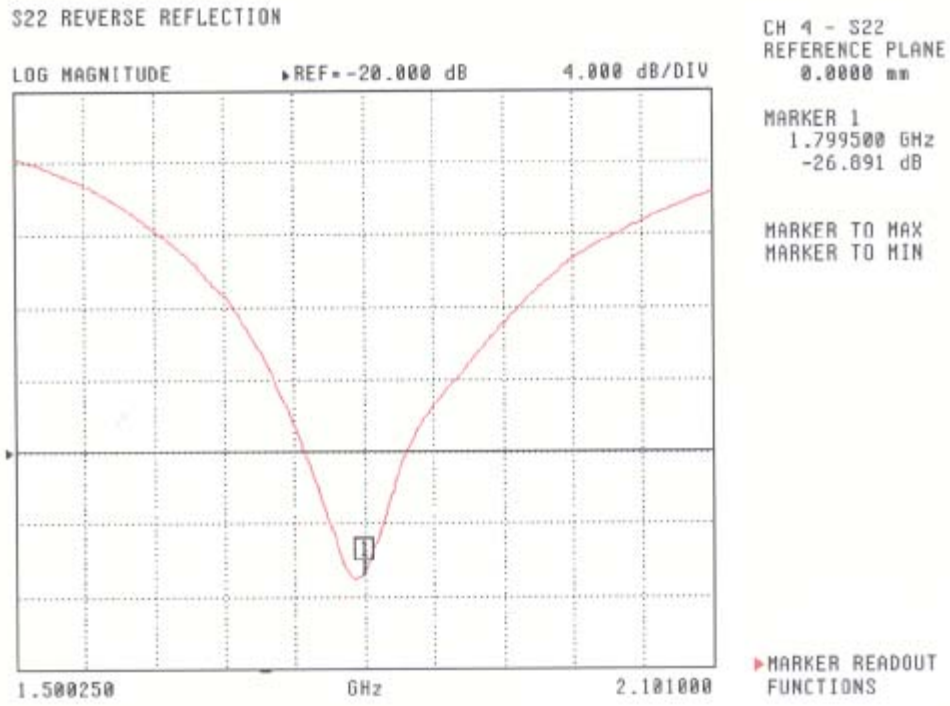
Electrical Calibration

Test	Result
S11 R/L	-26.9 dB
SWR	1.09 U
Impedance	50.9 Ω

The Following Graphs are the results as displayed on the Vector Network Analyzer.

S11 Parameter Return Loss



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SWR

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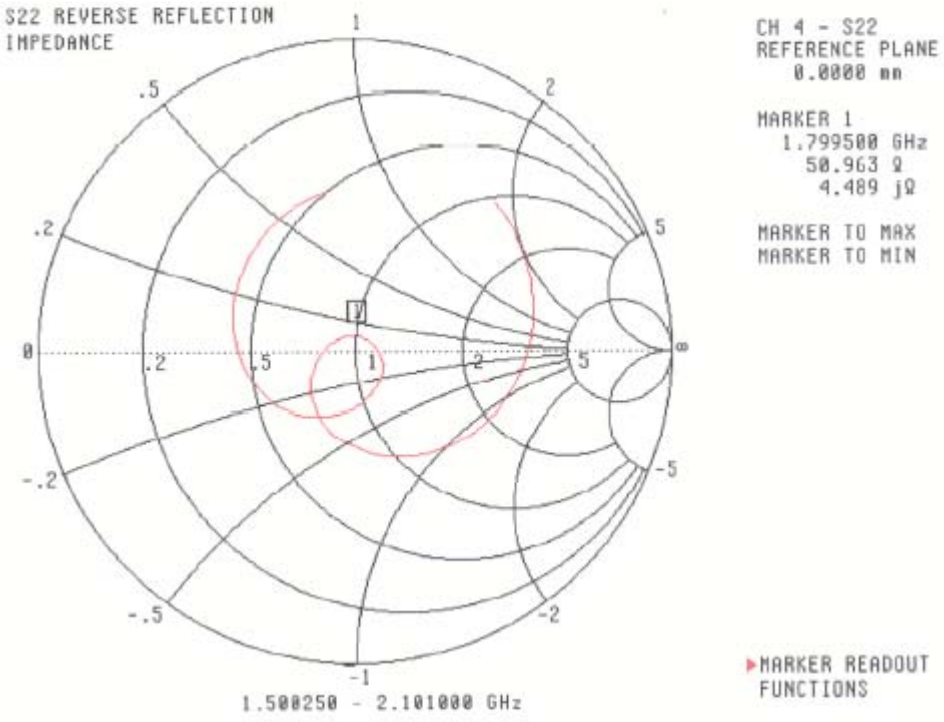
Smith Chart Dipole Impedance



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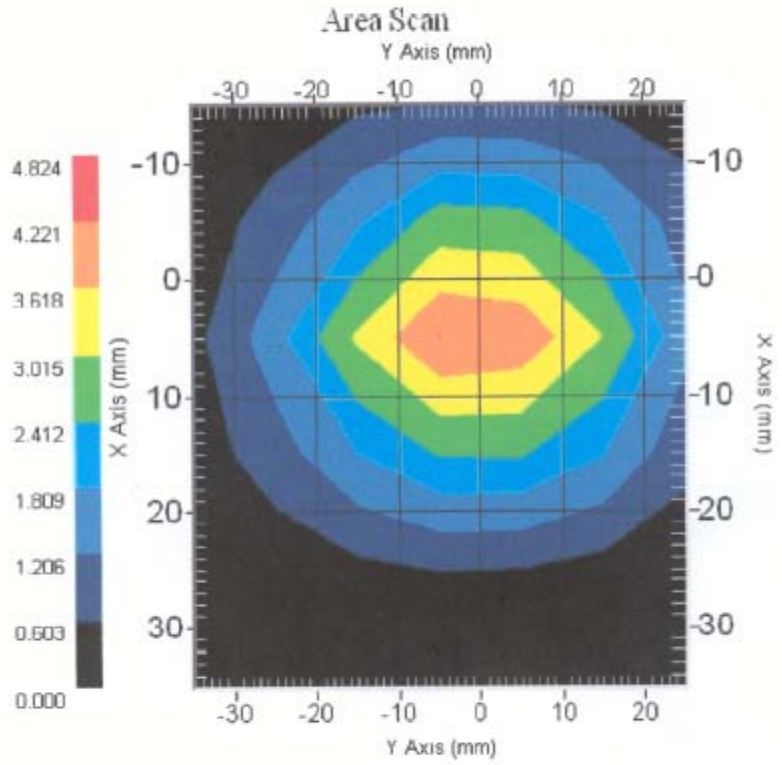
Division of APREL Laboratories.

System Validation Results Using the Electrically Calibrated Dipole

Head Tissue Frequency	1 Gram	10 Gram	Peak Above Feed Point
1800 MHz	38.81	20.01	71.56



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NCL Calibration Laboratories
Division of APREL Laboratories.

Test Equipment

The test equipment used during Probe Calibration, manufacturer, model number and, current calibration status are listed and located on the main APREL server R:\NCL\Calibration Equipment\Instrument List May 2004

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APPENDIX D - TEST SYSTEM VERIFICATIONS SCANS

Liquid Measurement Result

2005-06-29

Simulant	Freq [MHz]	Parameters	Liquid Temp [ºC]	Target Value	Measured Value	Deviation	Limits [%]
Body	1900	ε_r	22.0	53.3	51.0	-4.32	±5
		σ	22.0	1.52	1.57	3.29	±5
		1g SAR	22.0	24.97	25.2	0.92	±10
Head	1900	ε_r	22.0	40.0	39.7	-0.75	±5
		σ	22.0	1.40	1.45	3.57	±5
		1g SAR	22.0	39.7	38.3	-3.53	±10

ε_r = relative permittivity, σ = conductivity and ρ=1000kg/m^3

Test Laboratory: Bay Area Compliance Lab Corp.

ET_1604_SystemValidationCheck_D1900_Body

DUT: Dipole 1900 MHz; Type: D1900V2; Serial: D1900V2 - SN:BCL-049

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

Medium parameters used: f = 1900 MHz; σ = 1.57 mho/m; ε_r = 51; ρ = 1000 kg/m^3

Phantom section: Flat Section

DASY4 Configuration:

- Probe: ET3DV6 - SN1604; ConvF(4.79, 4.79, 4.79); Calibrated: 3/18/2005
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection (Locations From Previous Scan Used))Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn456; Calibrated: 6/1/2004
- Phantom: SAM with CRP; Type: Twin SAM; Serial: TP-1032
- Measurement SW: DASY4, V4.5 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 146

d=15mm, Pin=1W 3/Area Scan (51x91x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 33.3 mW/g

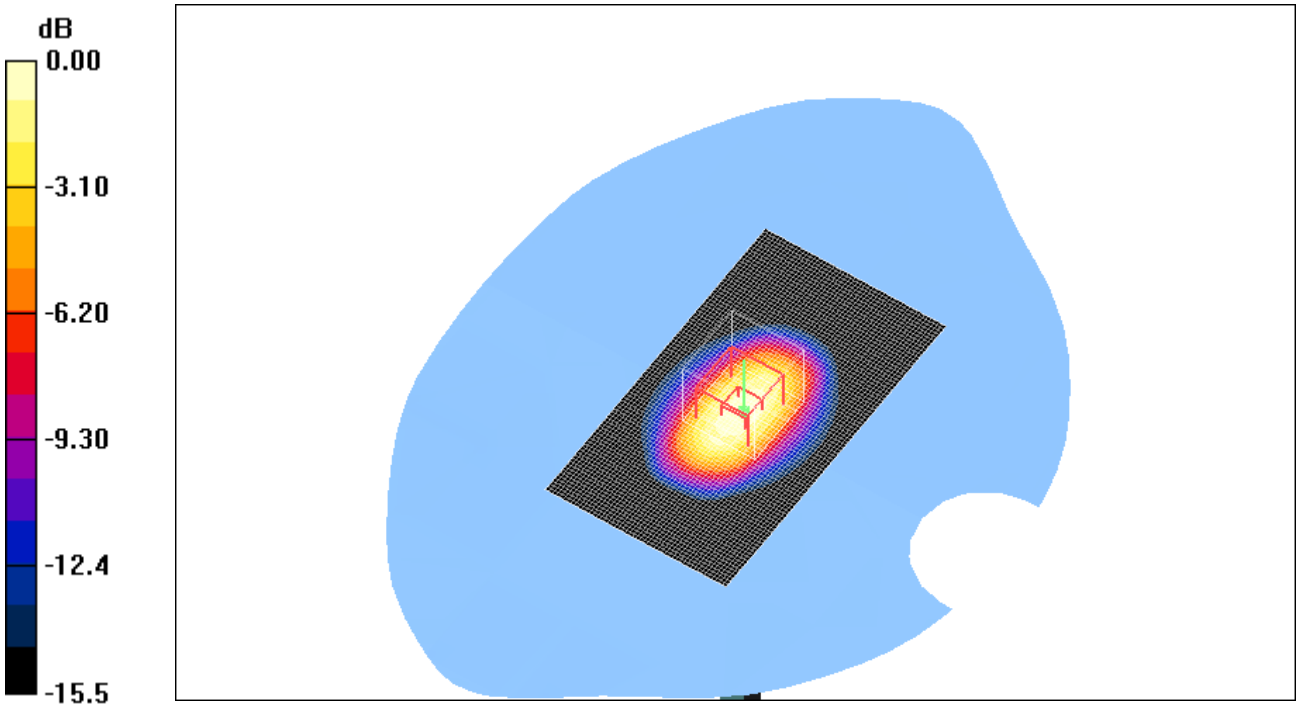
d=15mm, Pin=1W 3/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 144.0 V/m; Power Drift = 0.00 dB

Peak SAR (extrapolated) = 40.4 W/kg

SAR(1 g) = 25.2 mW/g; SAR(10 g) = 14 mW/g

Maximum value of SAR (measured) = 28.4 mW/g



0 dB = 28.4mW/g

Test Laboratory: Bay Area Compliance Lab Corp.

ET_1604_SystemValidationCheck_D1900_Head

DUT: Dipole 1800 MHz; Type: D1800V2; Serial: D1800V2 - SN:BCL-049

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

Medium parameters used: f = 1900 MHz; σ = 1.57 mho/m; ε_r = 51; ρ = 1000 kg/m^3

Phantom section: Flat Section

DASY4 Configuration:

- Probe: ET3DV6 - SN1604; ConvF(4.79, 4.79, 4.79); Calibrated: 3/18/2005
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE3 Sn456; Calibrated: 6/1/2004
- Phantom: SAM with CRP; Type: Twin SAM; Serial: TP-1032
- Measurement SW: DASY4, V4.5 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 146

d=10mm, Pin=1W 2/Area Scan (51x91x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 45.2 mW/g

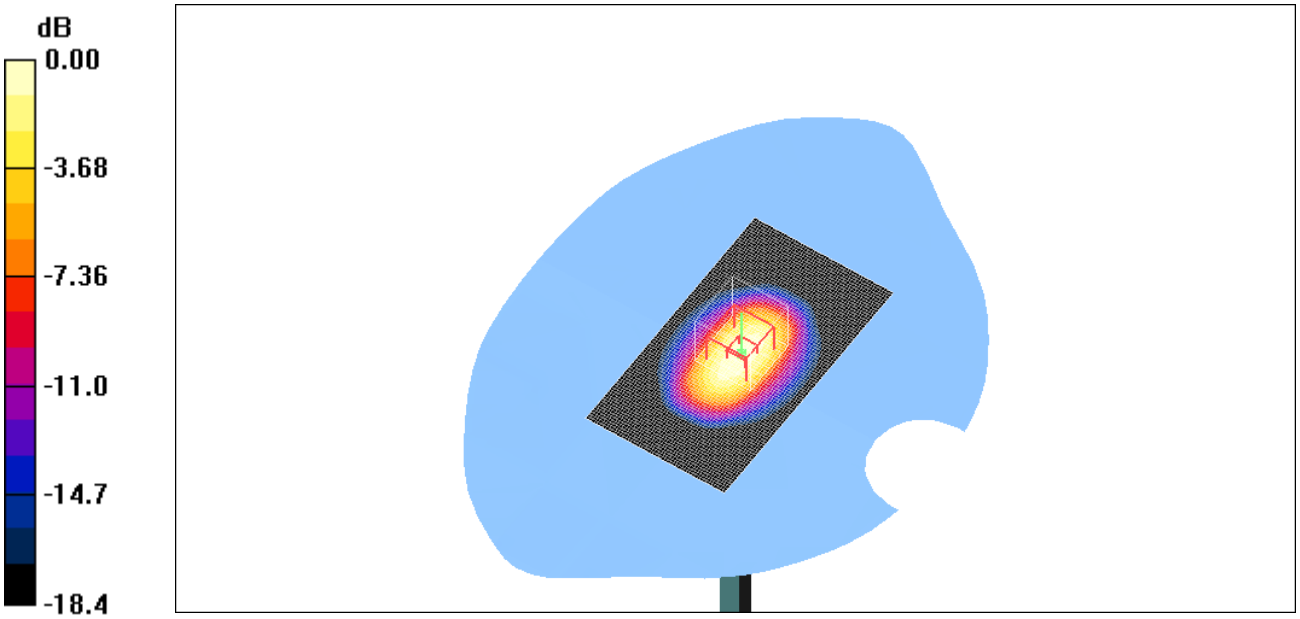
d=10mm, Pin=1W 2/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 164.8 V/m; Power Drift = 0.070 dB

Peak SAR (extrapolated) = 66.9 W/kg

SAR(1 g) = 38.3 mW/g; SAR(10 g) = 19.9 mW/g

Maximum value of SAR (measured) = 43.6 mW/g



0 dB = 43.6mW/g

APPENDIX E - EUT SCANS

Test Laboratory: Bay Area Compliance Lab Corp.

NuVision_Body

DUT: DUT; Type: Sample; Serial: 21260510096920

Communication System: DCS 1900; Frequency: 1880 MHz;Duty Cycle: 1:8.3

Medium parameters used: f = 1880 MHz; σ = 1.57 mho/m; ε_r = 51.1; ρ = 1000 kg/m^3

Phantom section: Flat Section

DASY4 Configuration:

- Probe: ET3DV6 - SN1604; ConvF(4.79, 4.79, 4.79); Calibrated: 3/18/2005
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn456; Calibrated: 6/1/2004
- Phantom: SAM with CRP; Type: Twin SAM; Serial: TP-1032
- Measurement SW: DASY4, V4.5 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 146

1.5cm Body position - Middle/Area Scan (41x101x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.186 mW/g

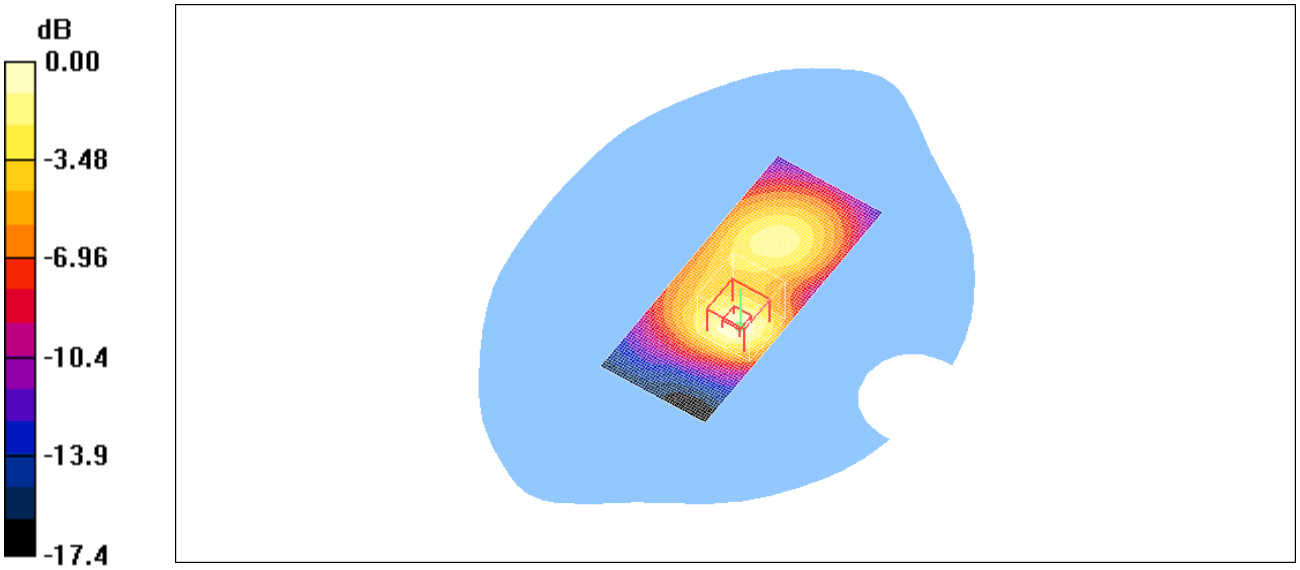
1.5cm Body position - Middle/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm

Reference Value = 7.72 V/m; Power Drift = 0.080 dB

Peak SAR (extrapolated) = 0.278 W/kg

SAR(1 g) = 0.172 mW/g; SAR(10 g) = 0.098 mW/g

Maximum value of SAR (measured) = 0.191 mW/g



0 dB = 0.191mW/g

Plot #1

Test Laboratory: Bay Area Compliance Lab Corp.

NuVision_Left Head

DUT: DUT; Type: Sample; Serial: 21260510096920

Communication System: DCS 1900; Frequency: 1880 MHz;Duty Cycle: 1:8.3

Medium parameters used: f = 1880 MHz; σ = 1.45 mho/m; ε_r = 39.7; ρ = 1000 kg/m^3

Phantom section: Left Section

DASY4 Configuration:

- Probe: ET3DV6 - SN1604; ConvF(5.19, 5.19, 5.19); Calibrated: 3/18/2005
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE3 Sn456; Calibrated: 6/1/2004
- Phantom: SAM with CRP; Type: Twin SAM; Serial: TP-1032
- Measurement SW: DASY4, V4.5 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 146

Touch position - Middle/Area Scan (41x101x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.599 mW/g

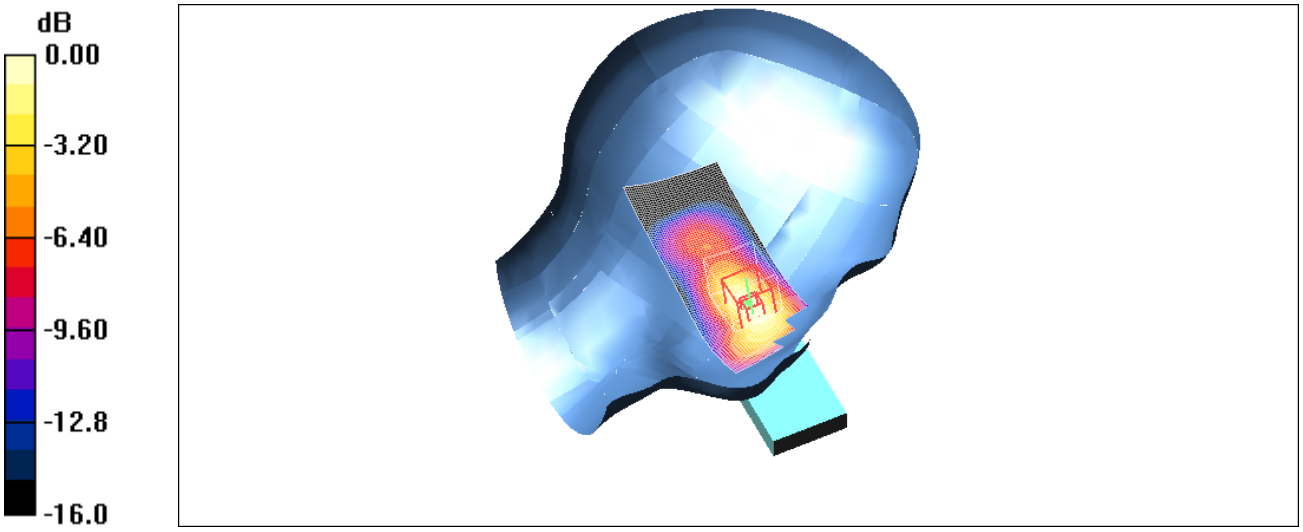
Touch position - Middle/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm

Reference Value = 9.78 V/m; Power Drift = -0.101 dB

Peak SAR (extrapolated) = 0.934 W/kg

SAR(1 g) = 0.553 mW/g; SAR(10 g) = 0.303 mW/g

Maximum value of SAR (measured) = 0.621 mW/g



0 dB = 0.621mW/g

Plot #2

Test Laboratory: Bay Area Compliance Lab Corp.

NuVision_Left Head

DUT: DUT; Type: Sample; Serial: 21260510096920

Communication System: DCS 1900; Frequency: 1880 MHz;Duty Cycle: 1:8.3

Medium parameters used: f = 1880 MHz; σ = 1.45 mho/m; ε_r = 39.7; ρ = 1000 kg/m^3

Phantom section: Left Section

DASY4 Configuration:

- Probe: ET3DV6 - SN1604; ConvF(5.19, 5.19, 5.19); Calibrated: 3/18/2005
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn456; Calibrated: 6/1/2004
- Phantom: SAM with CRP; Type: Twin SAM; Serial: TP-1032
- Measurement SW: DASY4, V4.5 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 146

Tilt position - Middle/Area Scan (41x91x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.154 mW/g

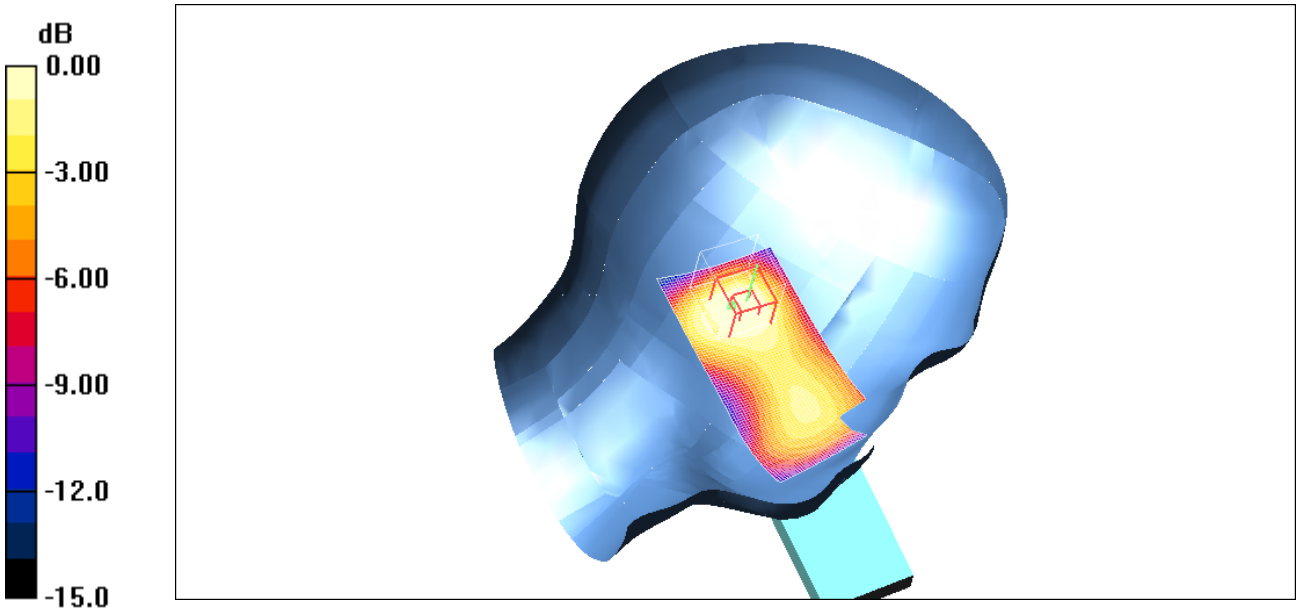
Tilt position - Middle/Zoom Scan 1 (5x5x7)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm

Reference Value = 10.3 V/m; Power Drift = -0.102 dB

Peak SAR (extrapolated) = 0.487 W/kg

SAR(1 g) = 0.113 mW/g; SAR(10 g) = 0.071 mW/g

Maximum value of SAR (measured) = 0.119 mW/g



0 dB = 0.119mW/g

Plot #3

NuVision_Right Head

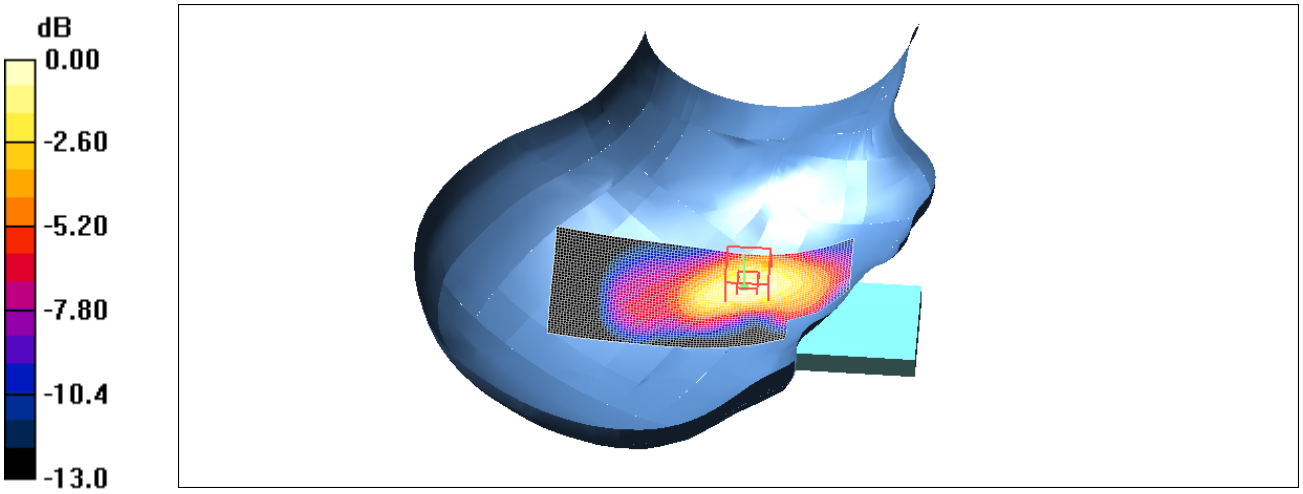
DUT: DUT; Type: Sample; Serial: 21260510096920

Communication System: DCS 1900; Frequency: 1880 MHz;Duty Cycle: 1:8.3
Medium parameters used: f = 1880 MHz; σ = 1.45 mho/m; ε_r = 39.7; ρ = 1000 kg/m^3
Phantom section: Right Section
DASY4 Configuration:

- Probe: ET3DV6 - SN1604; ConvF(5.19, 5.19, 5.19); Calibrated: 3/18/2005
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE3 Sn456; Calibrated: 6/1/2004
- Phantom: SAM with CRP; Type: Twin SAM; Serial: TP-1032
- Measurement SW: DASY4, V4.5 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 146

Touch position - Middle/Area Scan (41x101x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.638 mW/g

Touch position - Middle/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm
Reference Value = 9.62 V/m; Power Drift = 0.110 dB
Peak SAR (extrapolated) = 0.951 W/kg
SAR(1 g) = 0.569 mW/g; SAR(10 g) = 0.316 mW/g
Maximum value of SAR (measured) = 0.635 mW/g



0 dB = 0.635mW/g

Plot #4

Test Laboratory: Bay Area Compliance Lab Corp.

NuVision_Right Head

DUT: DUT; Type: Sample; Serial: 21260510096920

Communication System: DCS 1900; Frequency: 1880 MHz;Duty Cycle: 1:8.3

Medium parameters used: f = 1880 MHz; σ = 1.45 mho/m; ε_r = 39.7; ρ = 1000 kg/m^3

Phantom section: Right Section

DASY4 Configuration:

- Probe: ET3DV6 - SN1604; ConvF(5.19, 5.19, 5.19); Calibrated: 3/18/2005
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn456; Calibrated: 6/1/2004
- Phantom: SAM with CRP; Type: Twin SAM; Serial: TP-1032
- Measurement SW: DASY4, V4.5 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 146

Tilt position - Middle/Area Scan (41x91x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.154 mW/g

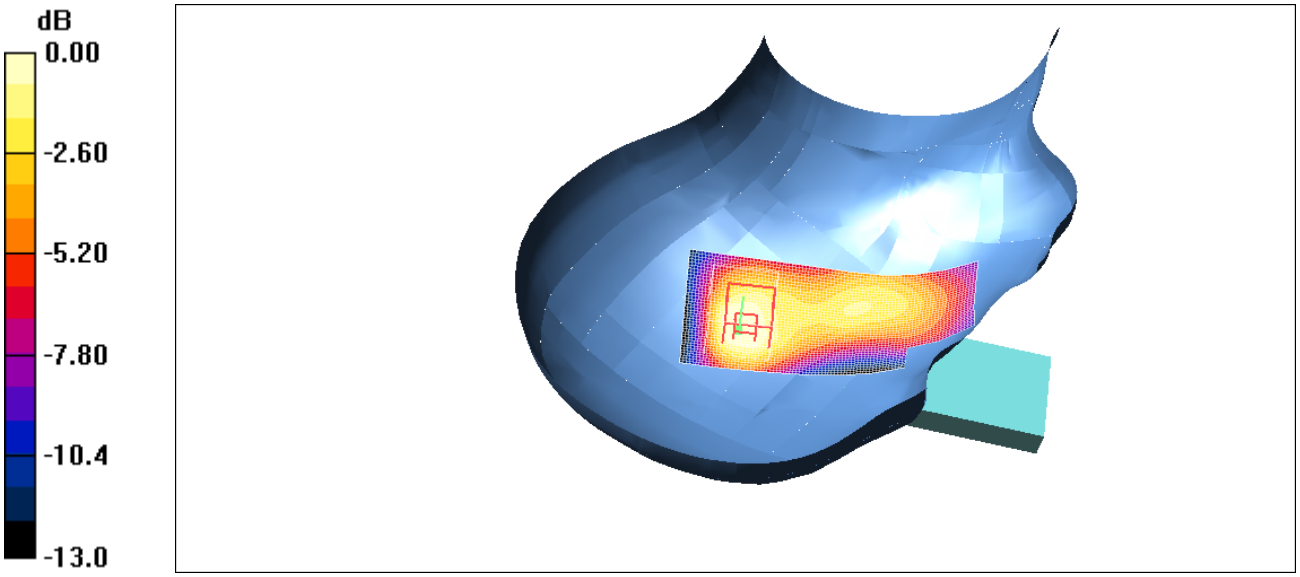
Tilt position - Middle/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm

Reference Value = 9.98 V/m; Power Drift = -0.098 dB

Peak SAR (extrapolated) = 0.191 W/kg

SAR(1 g) = 0.130 mW/g; SAR(10 g) = 0.081 mW/g

Maximum value of SAR (measured) = 0.142 mW/g



0 dB = 0.142mW/g

Plot #5

APPENDIX F – CONDUCTED OUTPUT POWER MEASUREMENT

Provision Applicable

The measured peak output power should be greater and within 5% than EMI measurement.

Test Procedure

The RF output of the transmitter was connected to the input of the spectrum analyzer through sufficient attenuation.

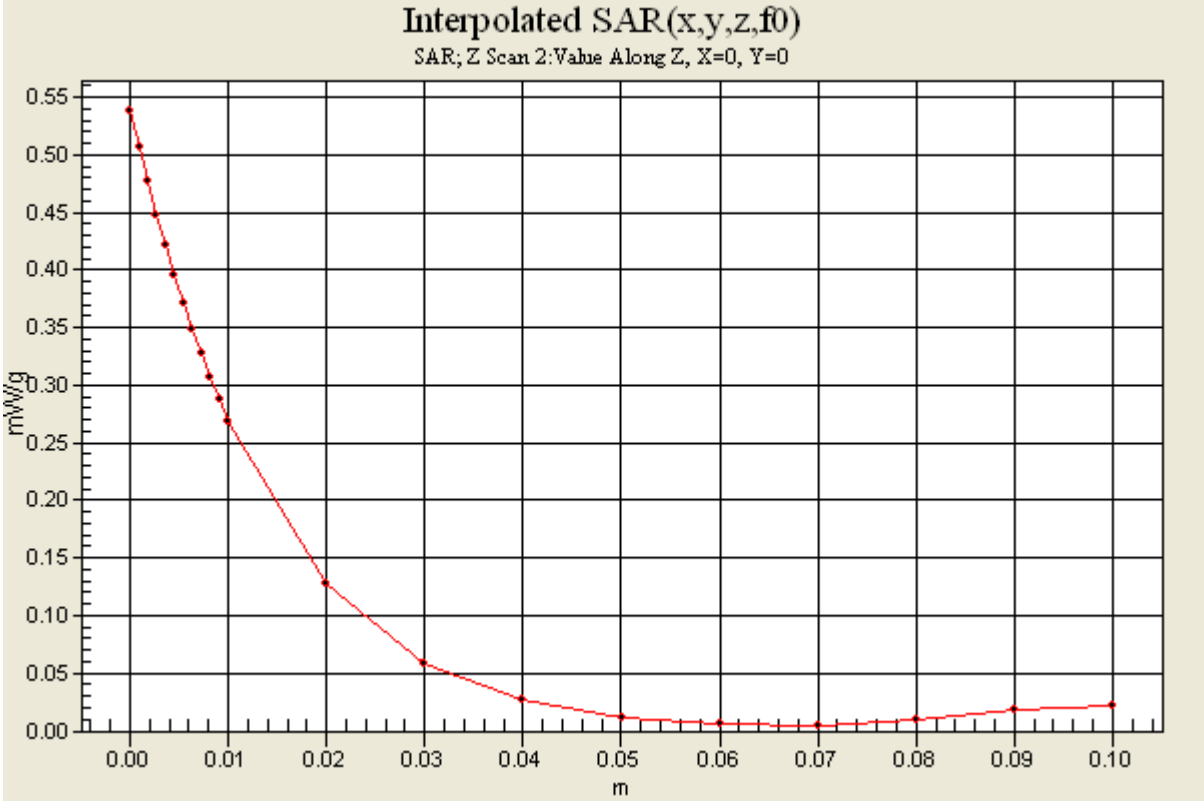
Test equipment

Hewlett Packard HP8564E Spectrum Analyzer, Calibration Due Date: 2005-10-04.
Hewlett Packard HP 7470A Plotter, Calibration not required.
A.H. Systems SAS200 Horn Antenna, Calibration Due Date: 2005-05-31
Com-Power AB-100 Dipole Antenna, Calibration Due Date: 2005-09-05

Test Results

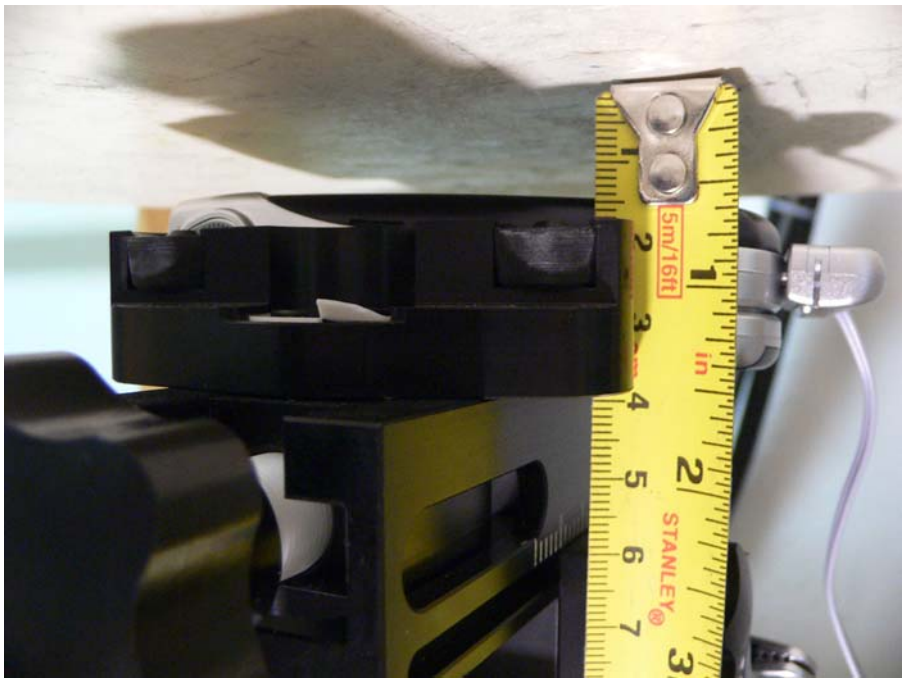
Frequency (MHz)	Output Power in dBm	Output Power in W
1880	30.00	1.000

APPENDIX G – Z-AXIS PLOT

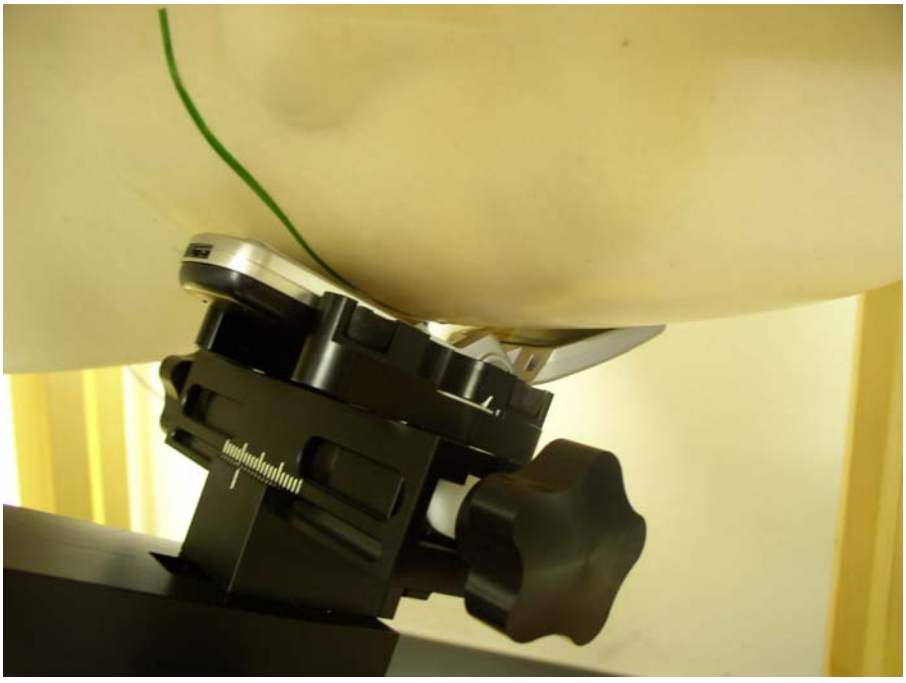


APPENDIX H – EUT TEST POSITION PHOTOS

Body Worn 1.5cm Separation View

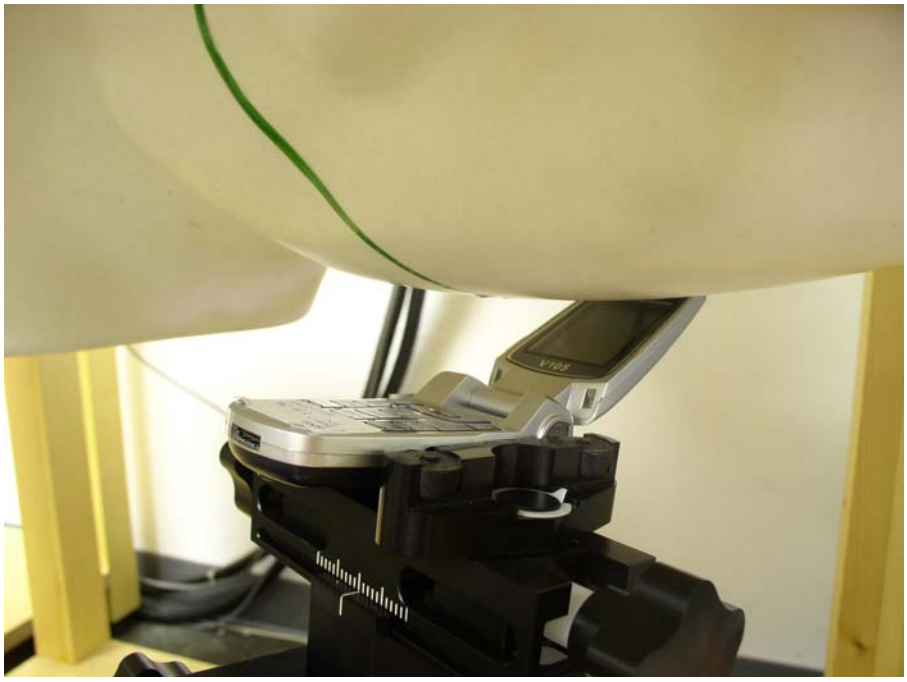


Left Head Cheek View I

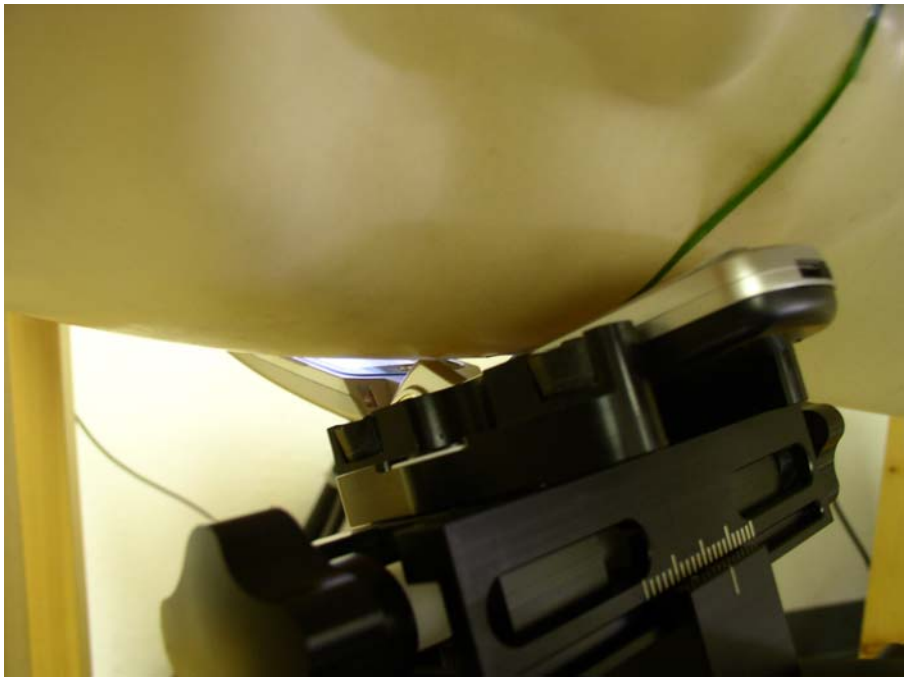


Left Head Cheek View II

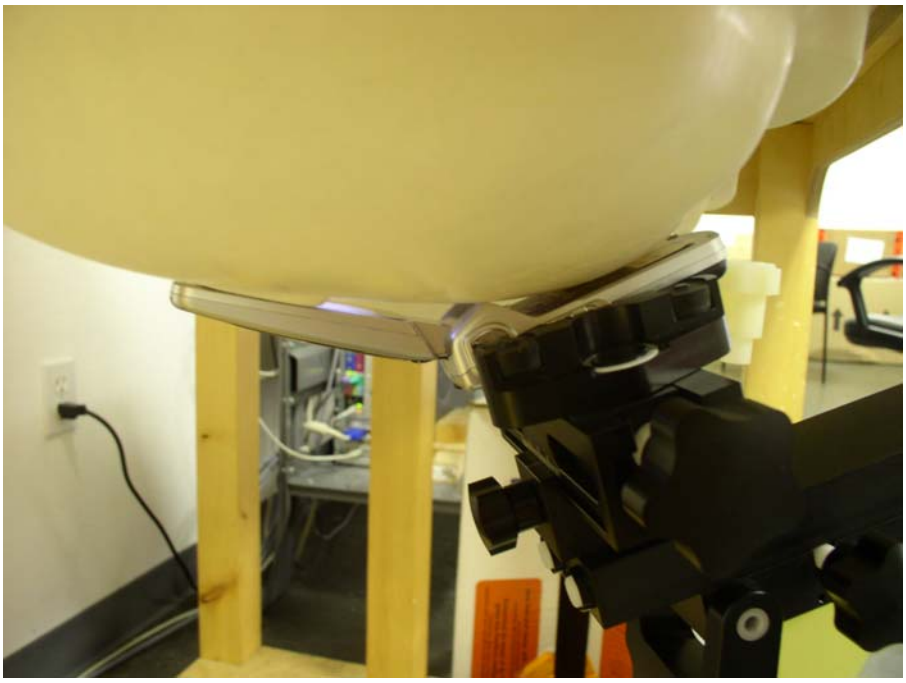
Left Head Tilted View



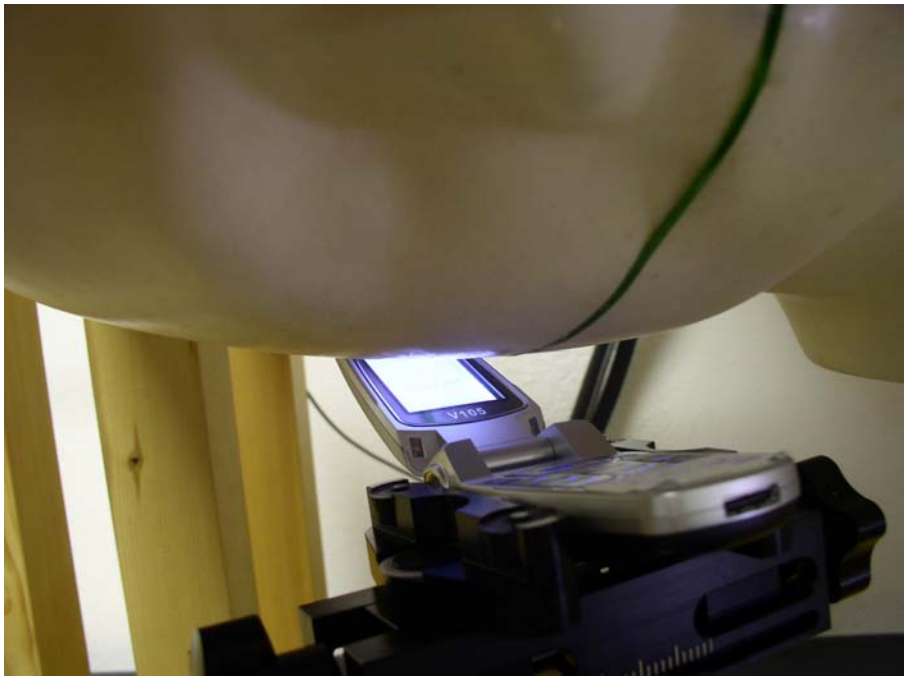
Right Left Head Cheek View I



Right Head Cheek View II



Right Head Tilted View



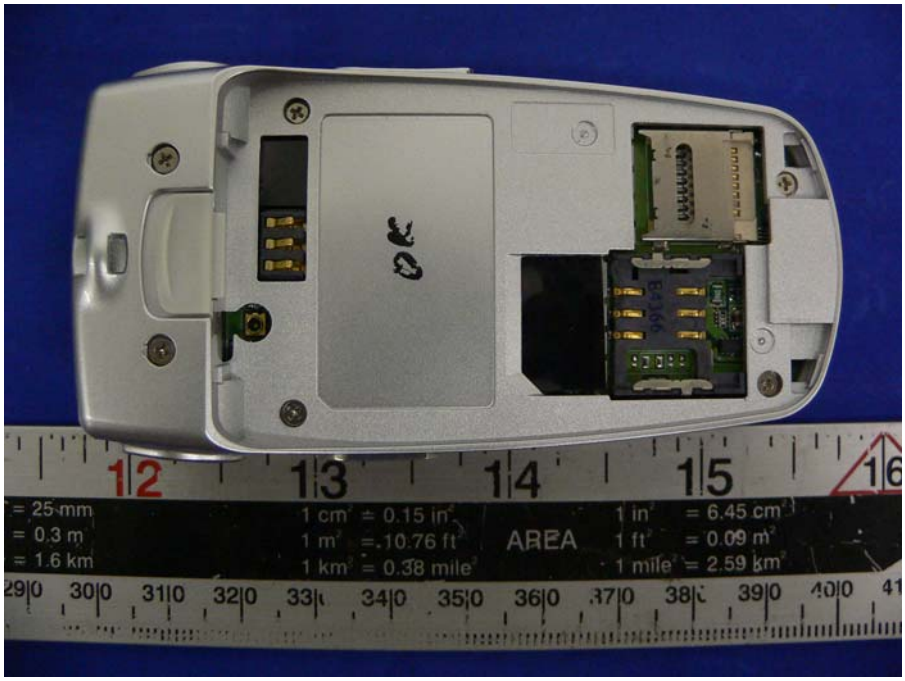
APPENDIX I – EUT & ACCESSORIES PHOTOS

EUT – Top View

EUT – Bottom View

EUT – Flip Open View

EUT – Battery off View

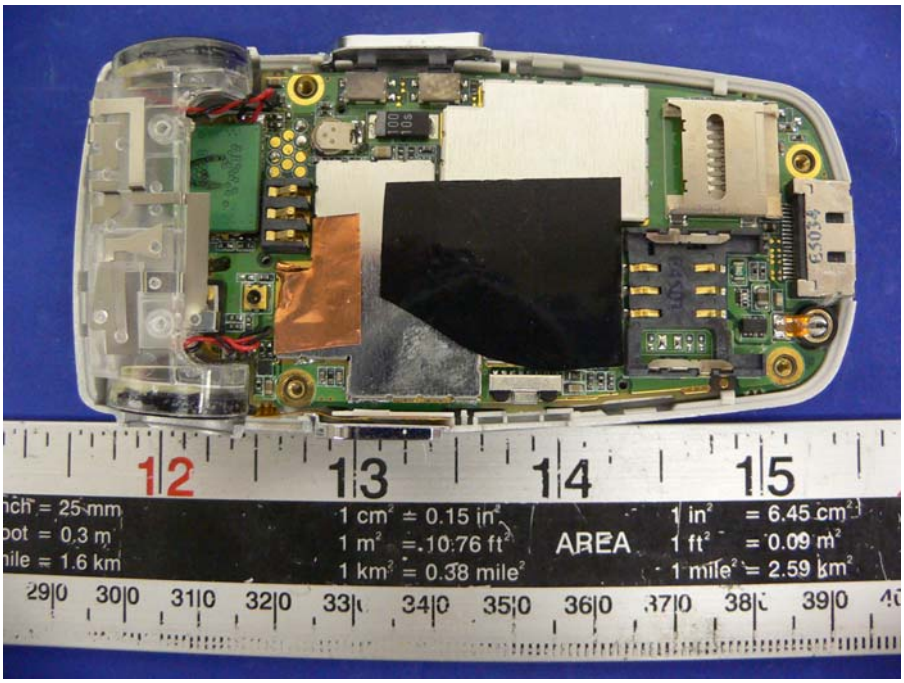


Charger View

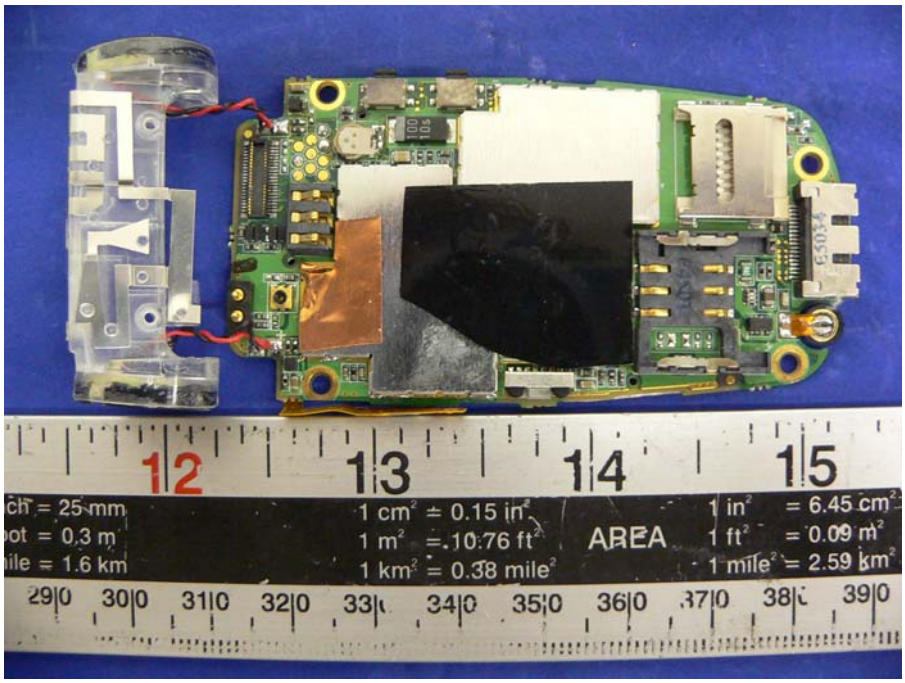
Charger Base View

EUT – Earphone View

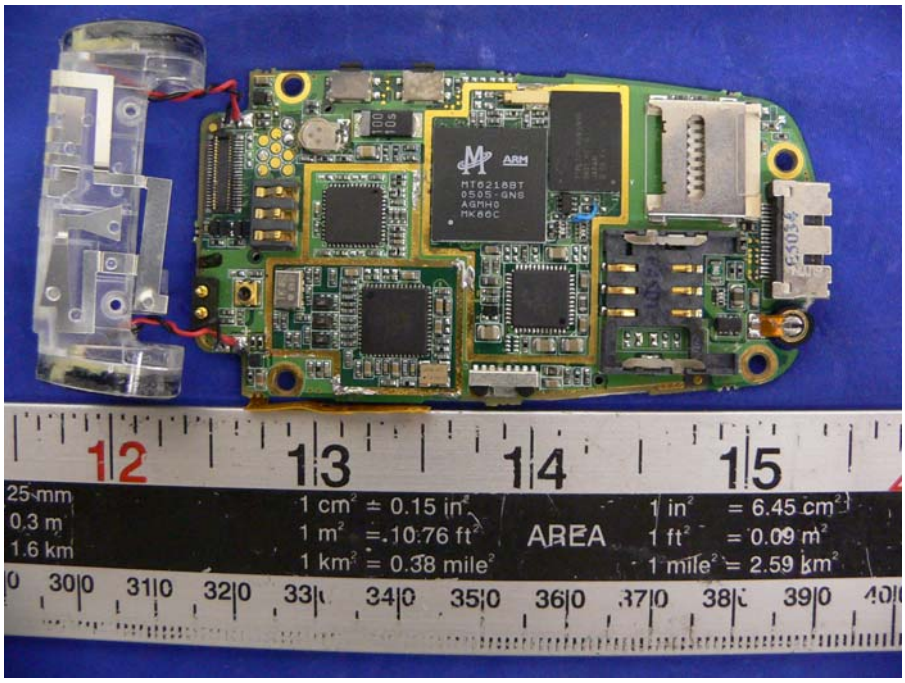
EUT – Cover off View



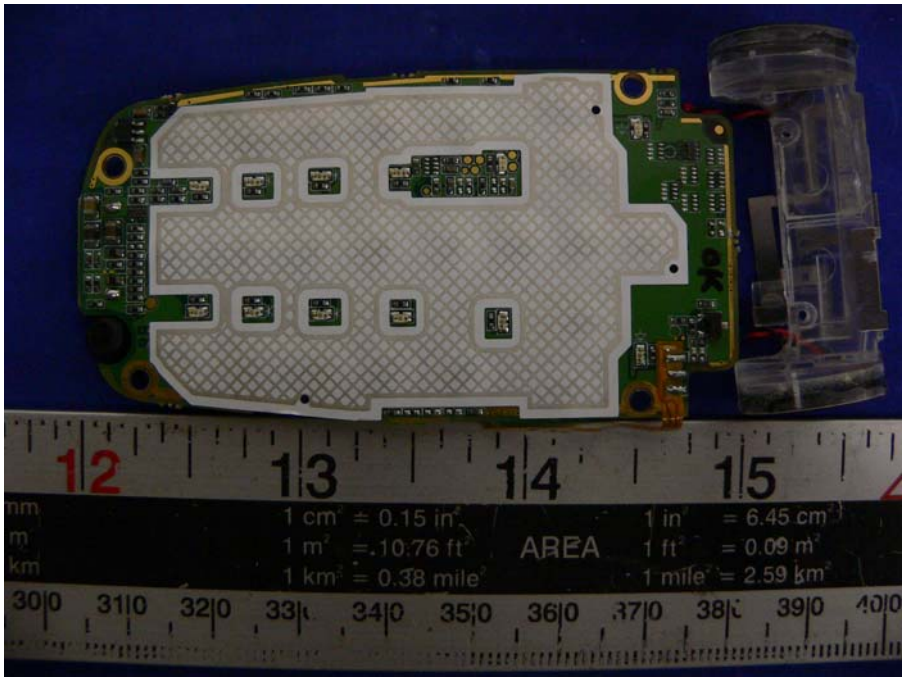
Main Board – With Shielding View



Main Board – Without Shielding View

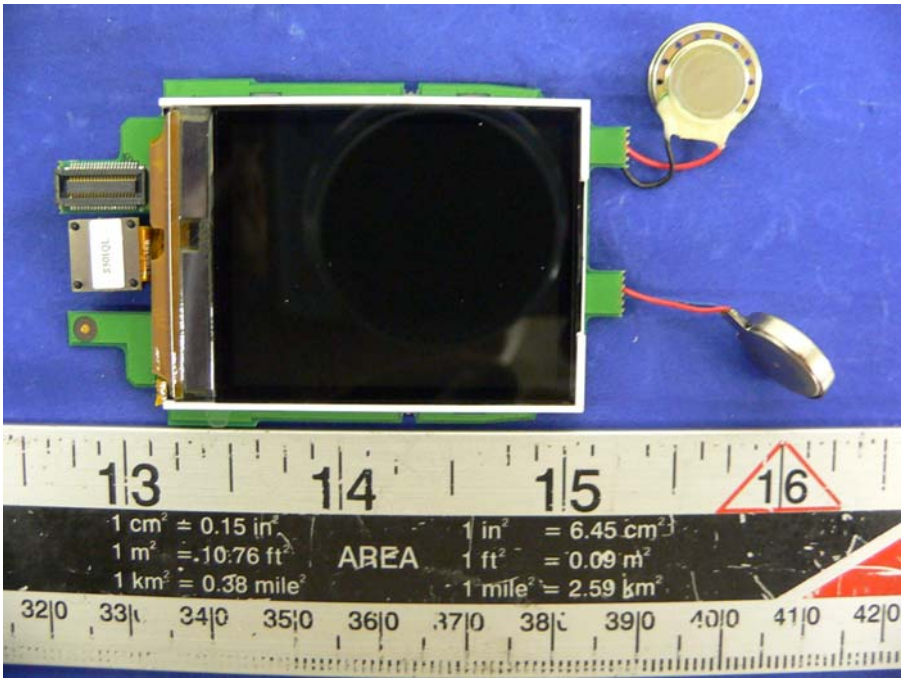


Main Board – Solder View

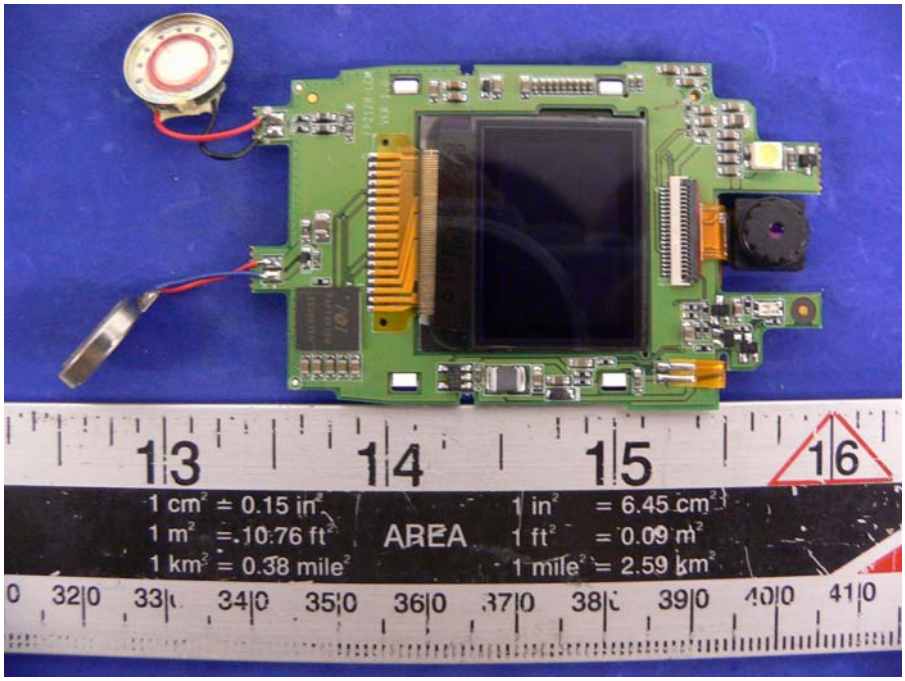


Battery View

Display View 1



Display View 2



APPENDIX J - INFORMATIVE REFERENCES

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