

ATTACHMENT 14

ICES TC34 SC1 Activities

Chair: Mark Douglas

IT'IS Foundation, Zurich, Switzerland

TC 34 Organization

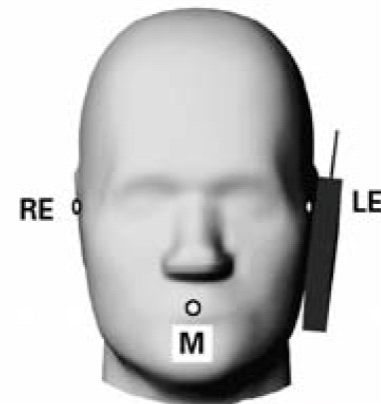
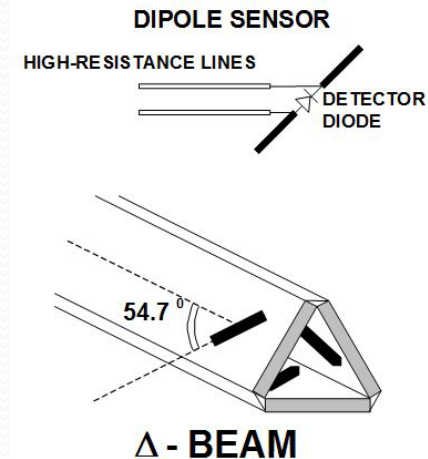
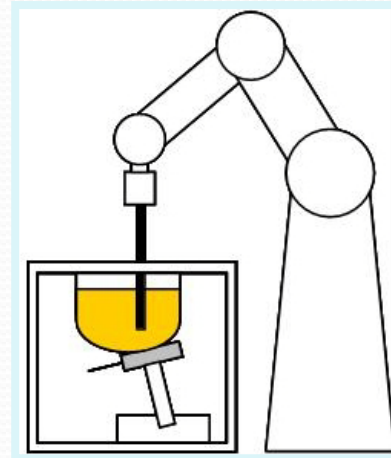
- SC1: Measurement standards (Chair: Dr. Mark Douglas)
 - IEEE 1528
 - Chair: Dr. Mark Douglas
- SC2: Computational standards (Chair: Dr. Wolfgang Kainz)
 - IEEE 1528.1: Finite-Difference Time-Domain methods
 - Chair: Dr. Andreas Christ
 - IEEE 1528.2: Vehicle-mounted antennas
 - Chair: Dr. Giorgi Bit-Babik
 - IEEE 1528.3: Wireless Handsets
 - Chair: Martin Siegbahn
 - IEEE 1528.4: Finite Element Method
 - Chair: Dr. Martin Vogel

Why a measurement standard?

- Advantages for:
 - Device manufacturers
 - Testing laboratories
 - Measurement system manufacturers
 - Regulators
 - Researchers
 - Consumers

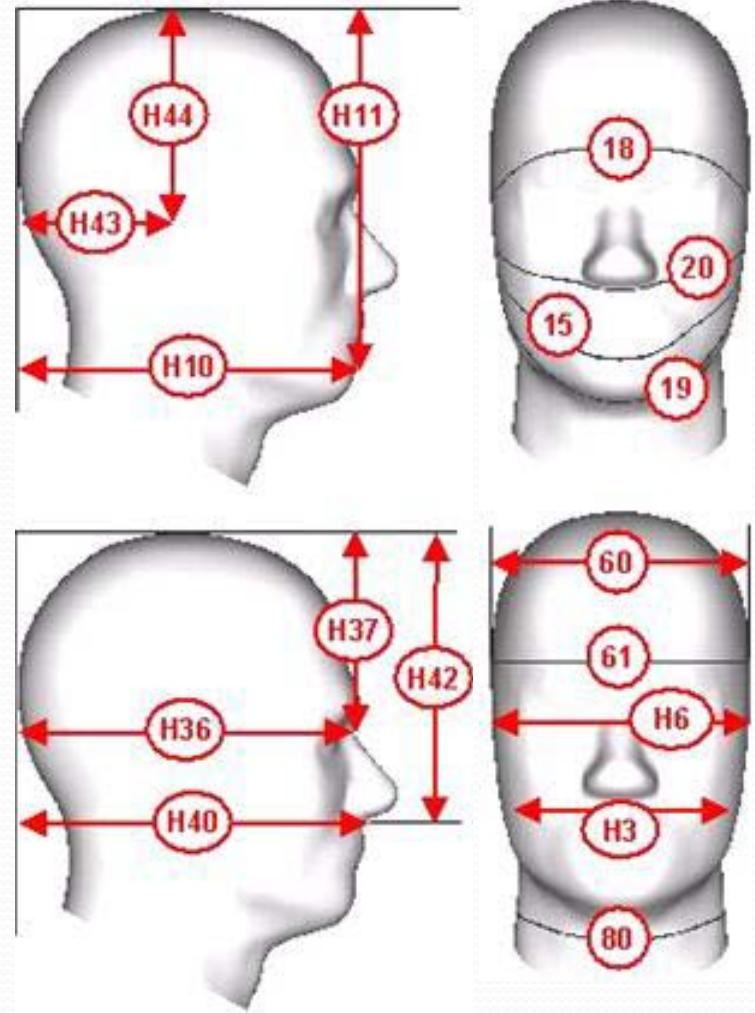
Outline of IEEE 1528

- Defining measurement system
 - Electric field probe
 - Head model
 - Choose model that results in conservative estimate of exposure
 - Tissue equivalent liquid
 - Has electrical parameters of human tissues
 - Handset positioning
 - Scanning method and post-processing
- Calibration
- Validation
- Uncertainty



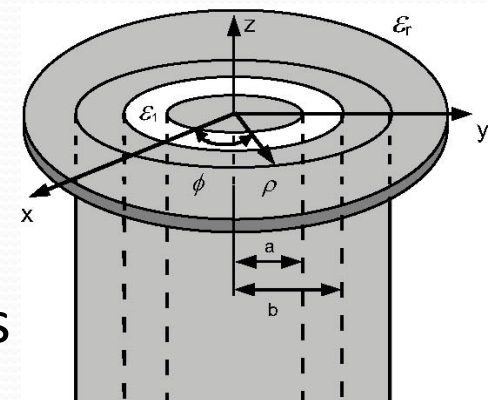
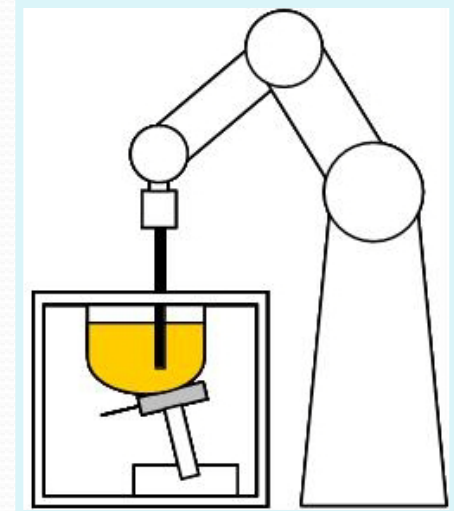
Body modeling

- Purpose
 - Must result in conservative over-estimate of SAR compared to real person
- Development of head model (SAM)
 - Anthropomorphic vs simplified
 - Large head gives higher SAR
 - Dimensions from US Army data
 - Compressed lossless ear model
 - CAD model available
- No hand model
 - It absorbs energy, lowers head SAR
 - Always conservative?



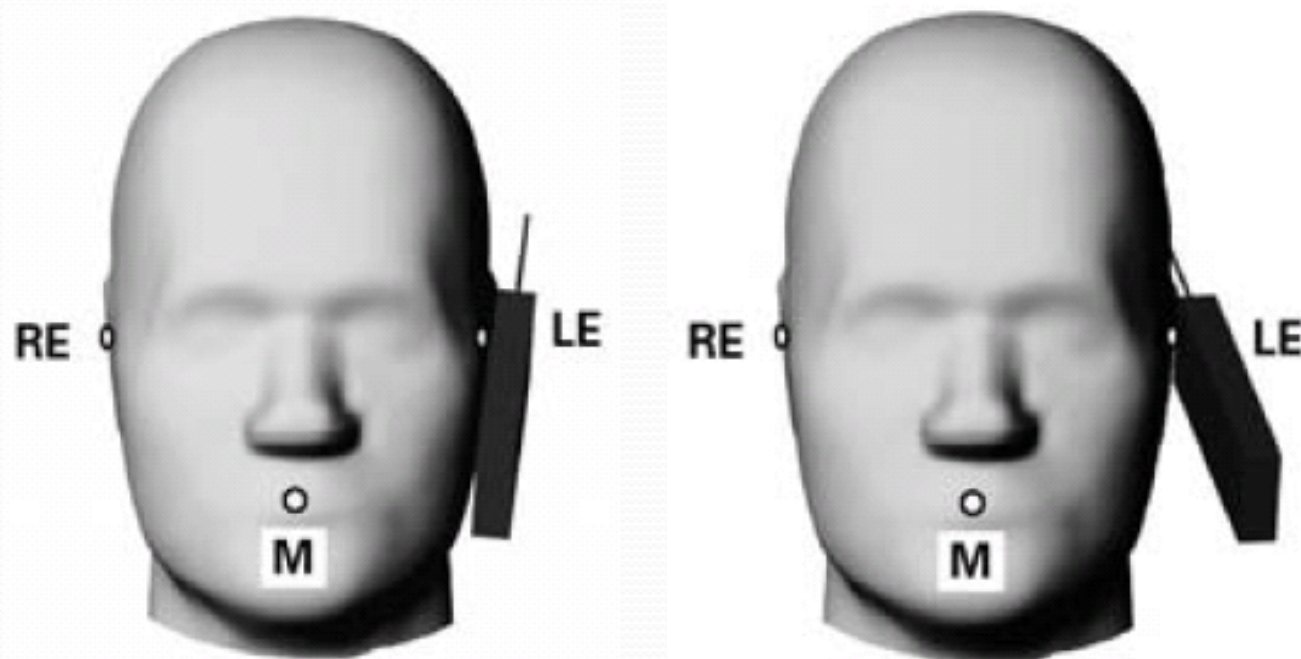
Tissue equivalent liquid

- Dielectric parameters
 - Representative of human tissue
 - Selected to result in conservative exposure
 - Consistent over time and temperature
 - Homogeneous to allow movement of E-field probe
- Other considerations
 - Low viscosity to allow easy probe movement
 - Safe to use
 - Not reactive with phantom or probe materials



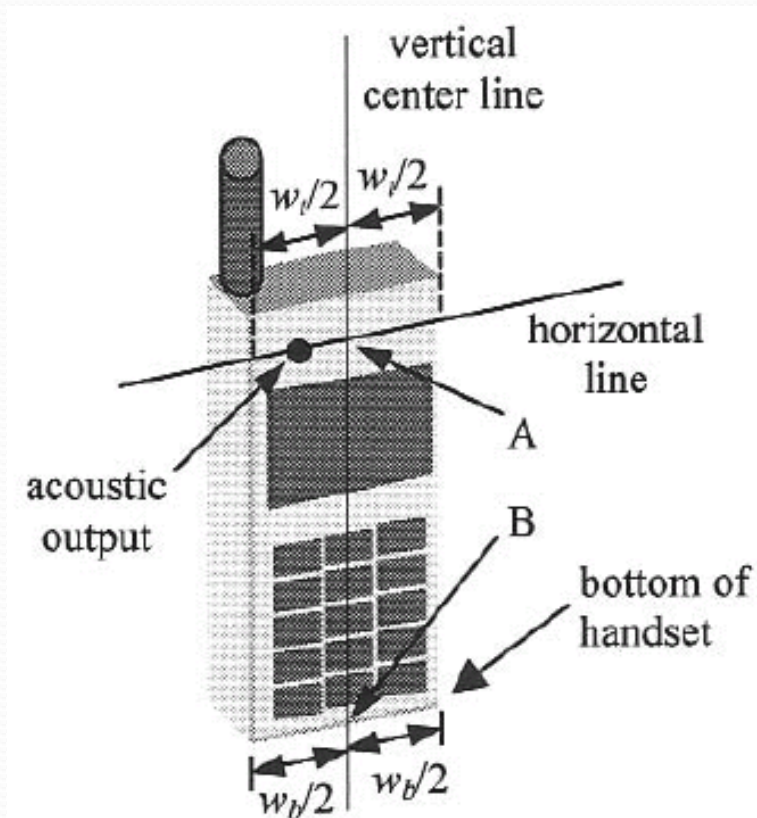
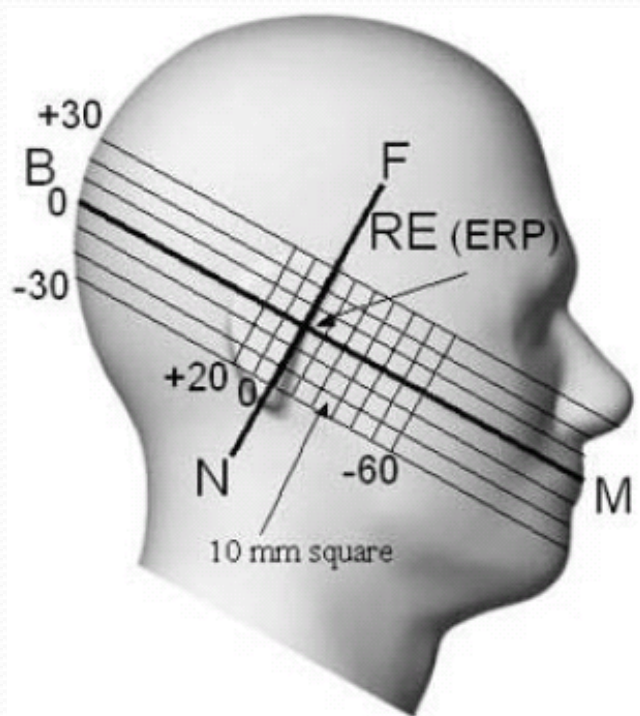
Handset Positioning

- Two handset positions:
 - Cheek
 - 15° Tilted
 - Represent exposure when device is used as intended



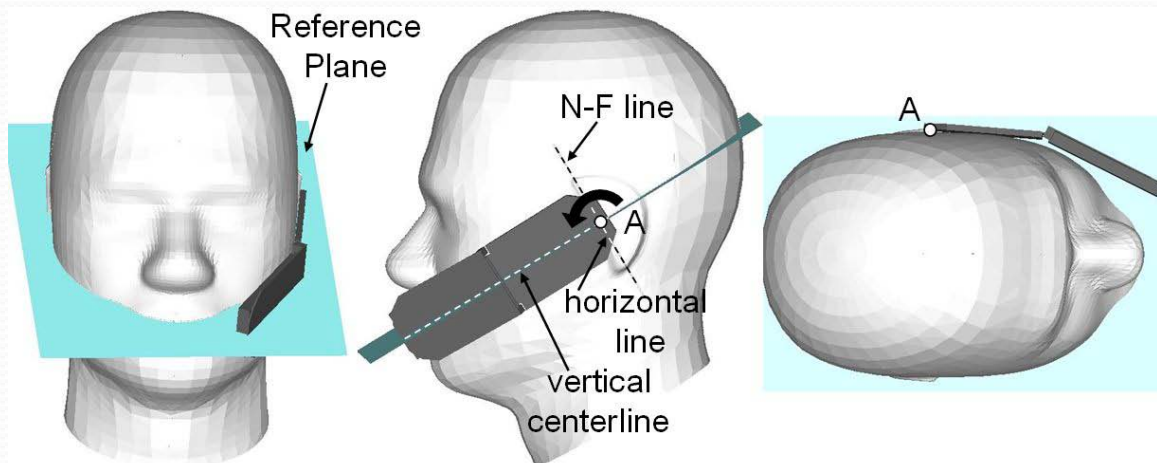
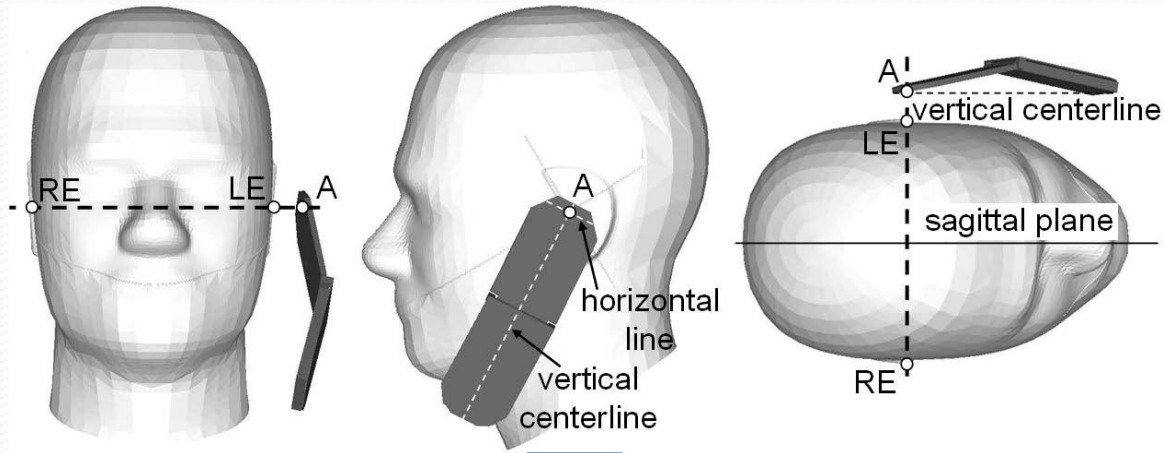
Handset Positioning

- Detailed procedures for precise positioning of handset on head phantom
 - Reference lines on handset and head phantom



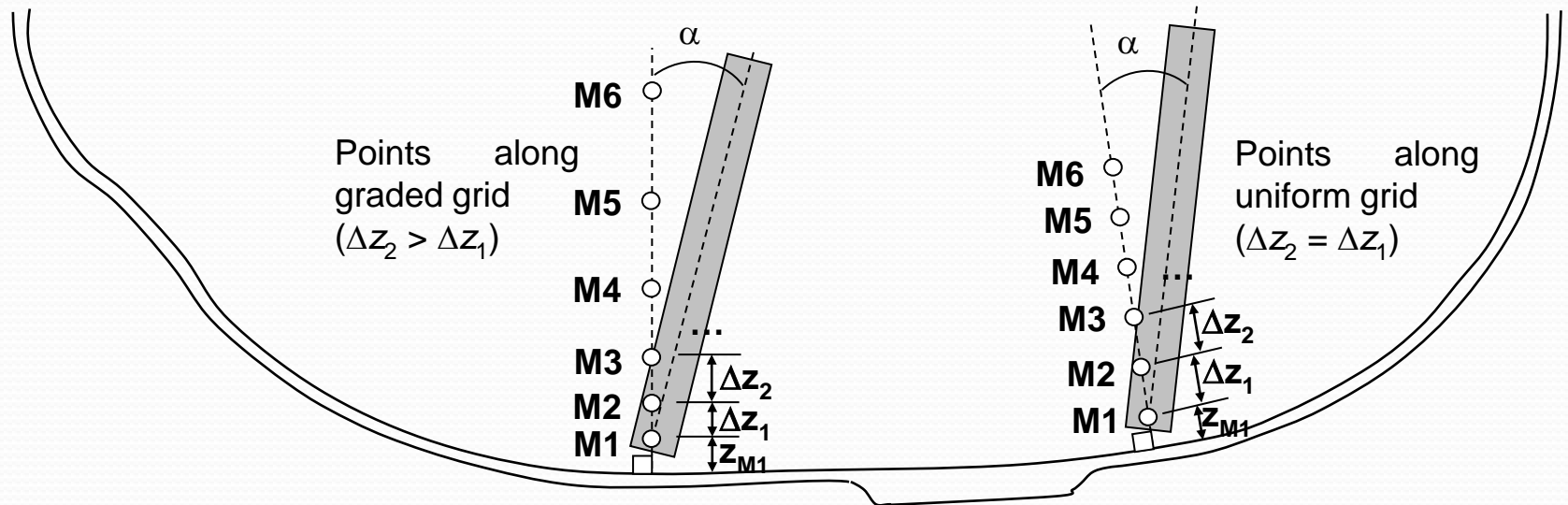
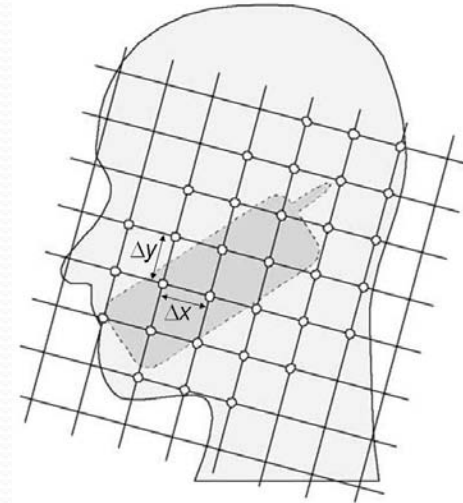
Handset Positioning

- Step-by-step positioning procedures



Measurement procedure

- Detailed procedures for
 - Measurement resolution
 - Probe positioning
 - Impact on measurement uncertainty



New / Future Issues

- Dual-logo standard with IEC TC106 PT62209
- Extended frequency range: 30 – 6000 MHz
- SAR of body-worn devices, other devices within 20 cm of body
- Multi-band SAR assessment
- New modes
 - Wi-Fi, WiMAX, WCDMA, LTE, ...
- Simultaneous transmission
 - MIMO, diversity, beam forming
- New measurement technologies / techniques
 - Fast SAR assessment methods
 - Optical methods
- Statistical techniques

Thank you.