# Hearing Aid Compatibility

# ‘HAC’

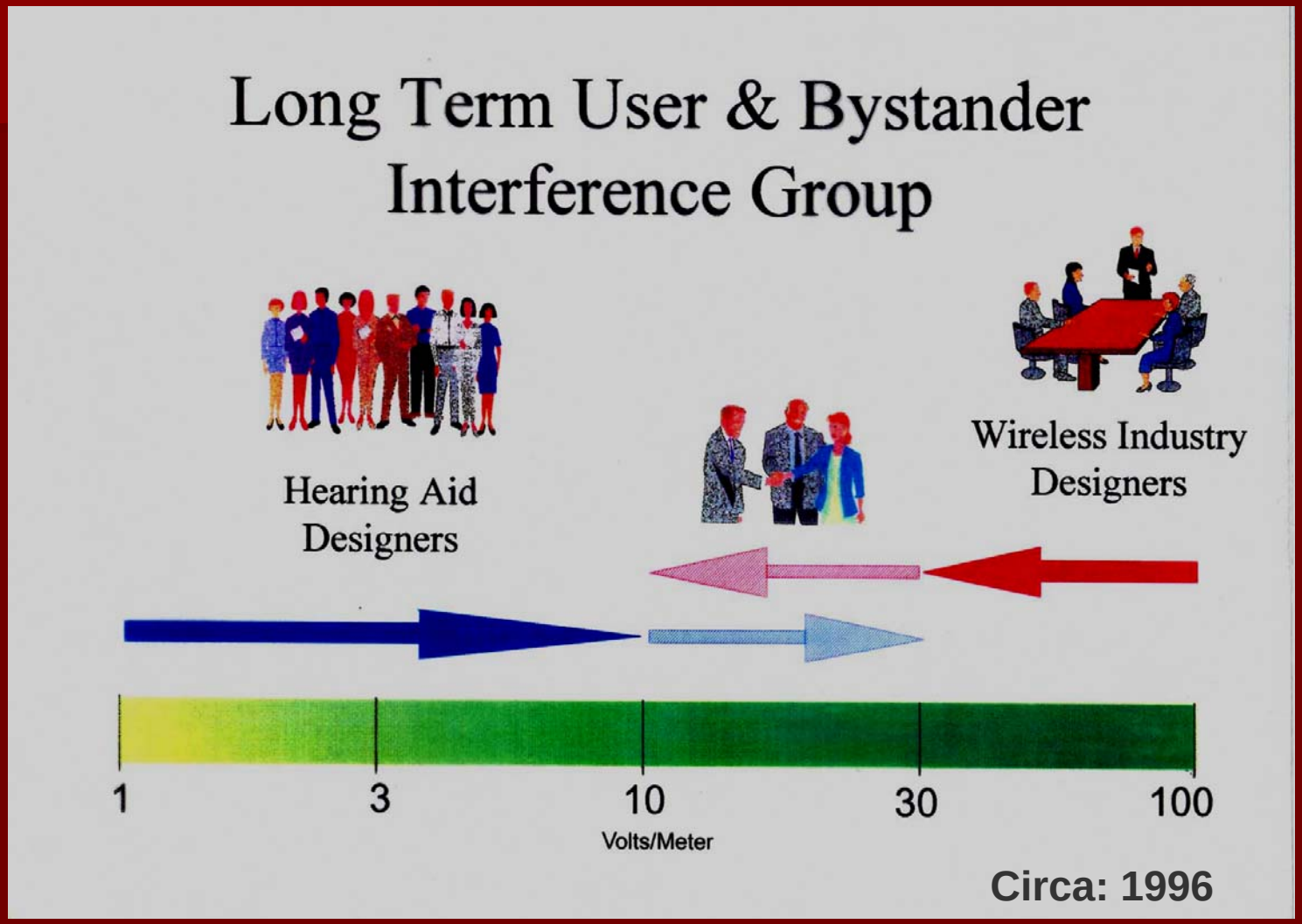
## Update

**FCC HIA Meeting**
**December 9, 2004**

**Tom Victorian**
**Co-chair ANSI C63.19**
**HIA Tech Committee Chair**

# Awareness

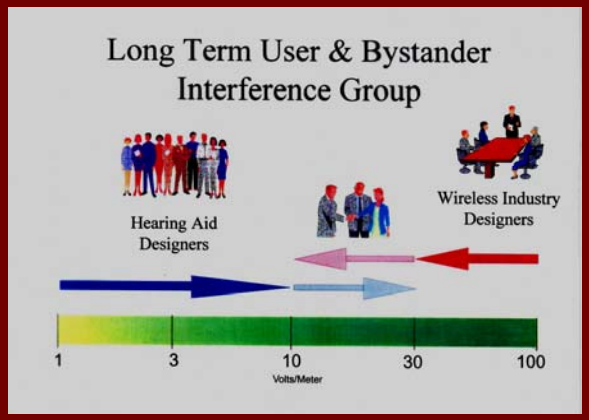
# Emissions & Immunity Improvement Goals



# Emissions & Immunity Improvement Goals

## ANSI C63.19

- Combines immunity with emissions testing/limits
- Built upon two independent clinical studies
- Numerous verification and validation activities
- International review by EHIMA
- Approved via the rigorous ANSI process



# ANSI C63.19 Participating Hearing Aid Organizations 1996 - 2003

- Beltone Electronics
- Dahlberg
- Etymotic Research
- FDA
- Gennum Corp
- HIA
- Micro~Tech
- RTI
- Siemens Hearing
- SHHH
- Starkey Laboratories
- Telex
- Unitron Industries

# ANSI C63.19 Participating Wireless Organizations 1996 - 2003

- Motorola
- CTIA
- Siemens
- Ericsson
- FCC
- Pac Bell Mobile
- Nokia
- Nortel
- Lucent
- Qualcomm
- U of Oklahoma
- AEG Mobile
- Northern Telecom
- AT&T
- Omnipoint
- TUV

# ANSI C63.19 Parameters

| RF PARAMETERS | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Category | Hearing Aid Parameters (Hearing Aid must maintain < 55 dB IRIL interference level and < 6 dB Gain Compression) | | | | Telephone Parameters | | | | |
| Near Field | E-Field Immunity (CW) | | H-Field Immunity (CW) | | AWF | E-Field Emissions (Peak) | | H-Field Emissions (Peak) | |
| Category M1 | 30.0 – 35.0 | dB (V/m) | -23.0 – -18.0 | (A/m) | 0 | 46 – 51 | dB (V/m) | -4.4 – 0.6 | dB (A/m) |
| | 31.6 – 56.2 | V/m | 0.071 – 0.126 | A/m | | 199.5 – 354.8 | V/m | 0.60 – 1.07 | A/m |
| | | | | | -5 | 43.5 – 48.5 | dB (V/m) | -6.9 – -1.9 | dB (A/m) |
| | | | | | | 149.6 – 266.1 | V/m | 0.45 – 0.80 | A/m |
| Category M2 | 35.0 – 40.0 | dB (V/m) | -18.0 – -13.0 | (A/m) | 0 | 41 – 46 | dB (V/m) | -9.4 – -4.4 | dB (A/m) |
| | 56.2 – 100.0 | V/m | 0.126 – 0.224 | A/m | | 112.2 – 199.5 | V/m | 0.34 – 0.60 | A/m |
| | | | | | -5 | 38.5 – 43.5 | dB (V/m) | -11.9 – -6.9 | dB (A/m) |
| | | | | | | 84.1 – 149.6 | V/m | 0.25 – 0.45 | A/m |
| Category M3 | 40.0 – 45.0 | dB (V/m) | -13.0 – -8.0 | (A/m) | 0 | 36 – 41 | dB (V/m) | -14.4 – -9.4 | dB (A/m) |
| | 100.0 – 177.8 | V/m | 0.224 – 0.398 | A/m | | 63.1 – 112.2 | V/m | 0.19 – 0.34 | A/m |
| | | | | | -5 | 33.5 – 38.5 | dB (V/m) | -16.9 – -11.9 | dB (A/m) |
| | | | | | | 47.3 – 84.1 | V/m | 0.15 – 0.25 | A/m |
| Category M4 | >45.0 | dB (V/m) | >-8.0 | (A/m) | 0 | <36 | dB (V/m) | <-14.4 | dB (A/m) |
| | >177.8 | V/m | >0.398 | A/m | | <63.1 | V/m | <0.19 | A/m |
| | | | | | -5 | <33.5 | dB (V/m) | <-16.9 | dB (A/m) |
| | | | | | | <47.3 | V/m | <0.15 | A/m |
| Category MX | special | | special | | | special | | special | |

# ANSI C63.19 Classifications

| SYSTEM CLASSIFICATION | | |
|---|---|---|
| System Classification | Articulation Index | Category Sum |
| | AI | Sum of Hearing Aid Category + Telephone Category |
| Usable | 0.3 | Hearing Aid Category + Telephone Category = 4 |
| Normal Use | 0.5 | Hearing Aid Category + Telephone Category = 5 |
| Excellent Performance | 0.7 | Hearing Aid Category + Telephone Category $\geq$ 6 |

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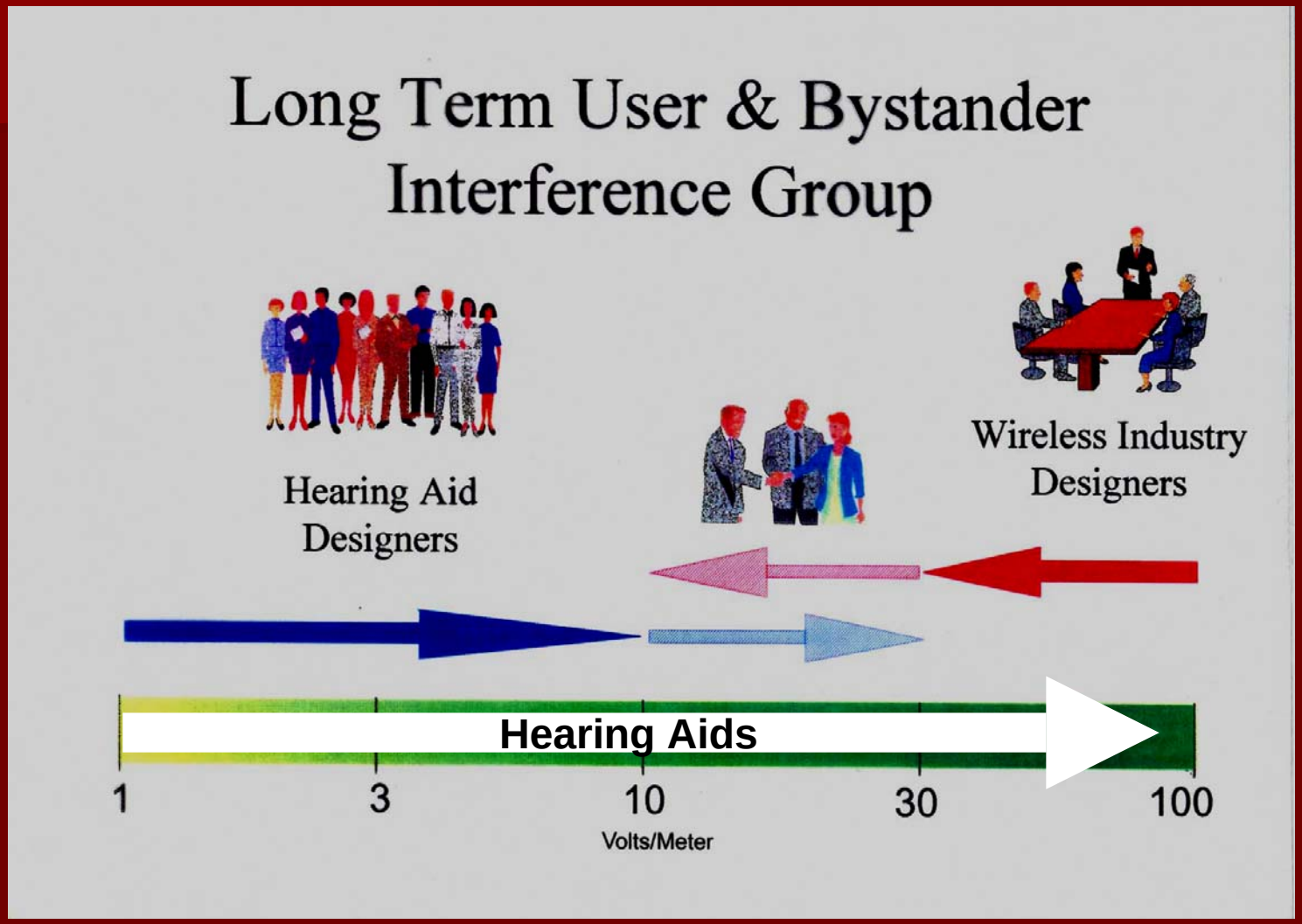
# Hearing Aid Immunity Improvement



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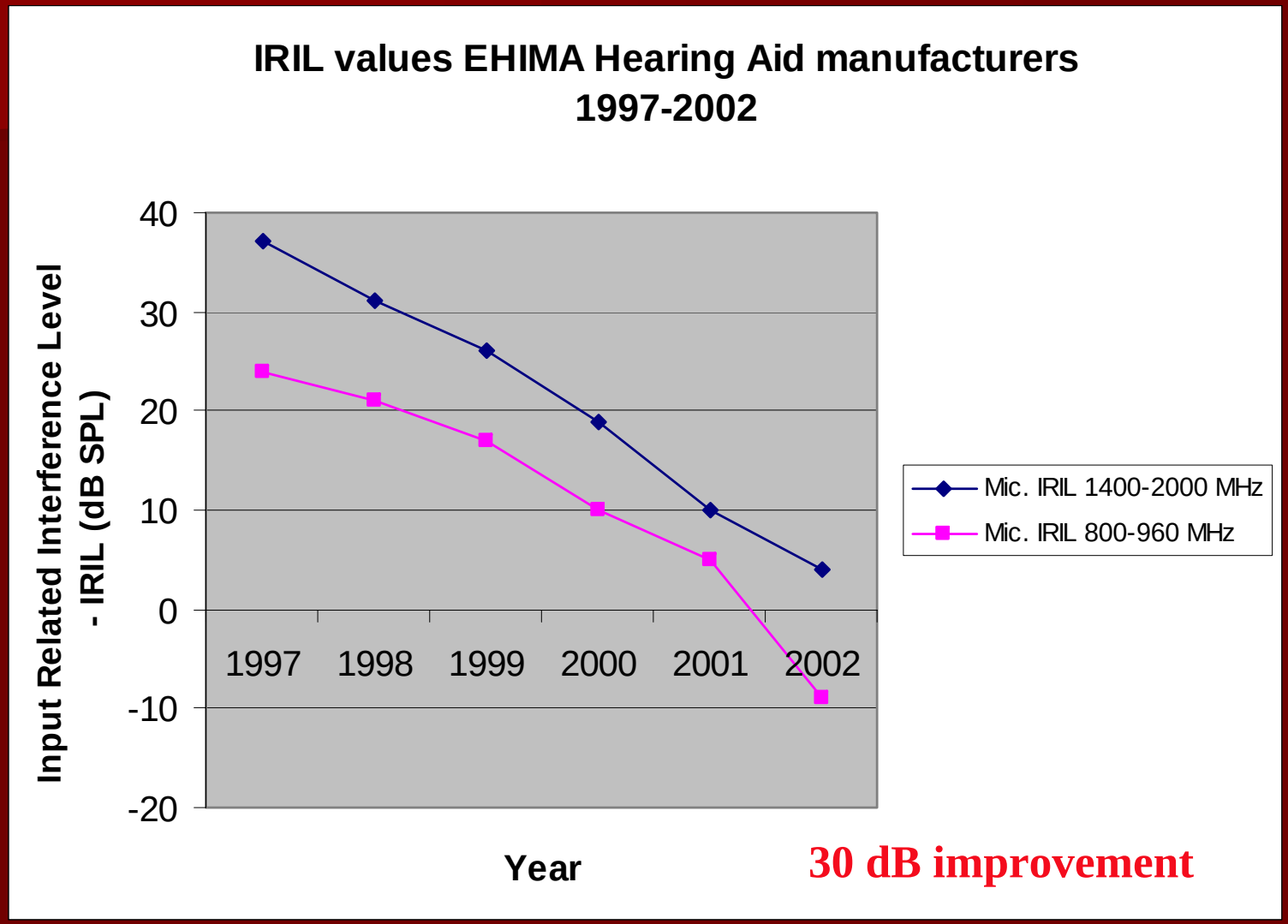



**30 dB improvement**

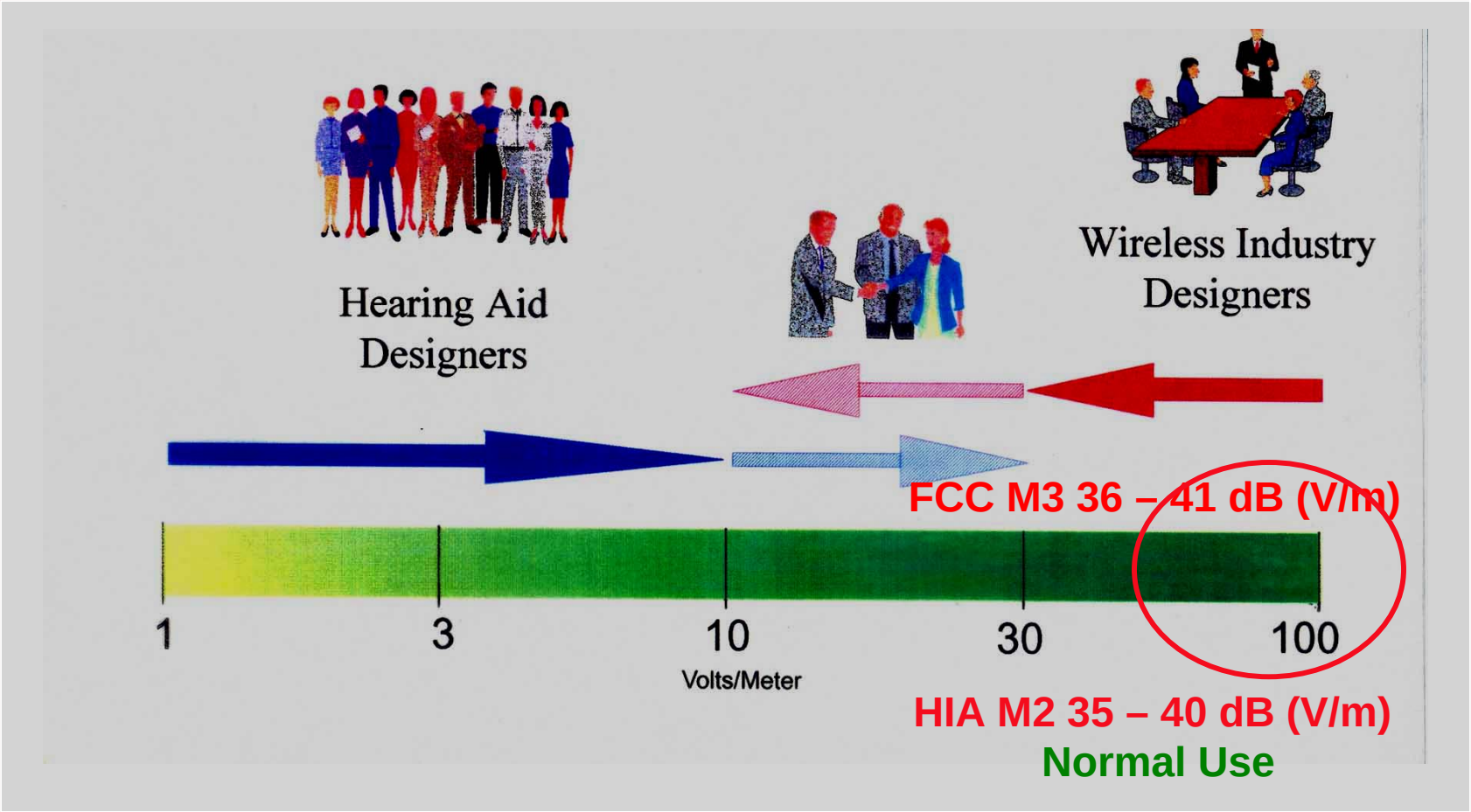
# FCC Rule & Order

- Recognition of ANSI C63.19
- By 2005 provide two M3 level handsets
- By 2006 provide two T3 level handsets
- By 2008 provide 50% T3 level handsets
- Handset compliancy labeling and consumer handbook HAC information
- Establish adherence reporting to the FCC

Federal Communications Commission

# FCC Rule & Order

**(adopted August, 2003)**



# Industry Activities

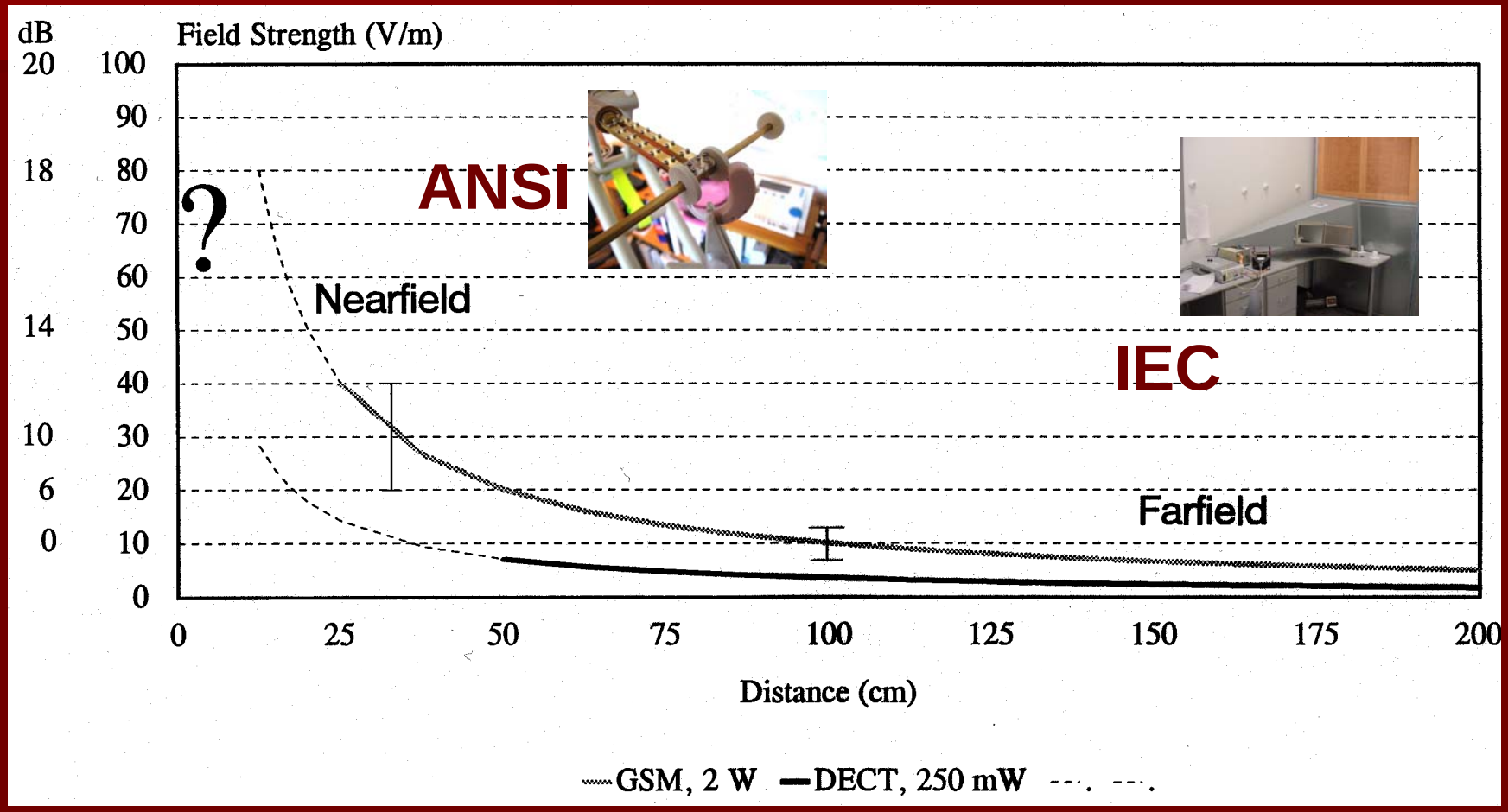
- HI 30dB product improvement
- HIA worked with the FCC on R&O
- 2003 Industry meetings
  - **ANSI C63 workshop, Gallaudet and ATIS**
- ATIS Incubator Participant
- Revised ANSI C63.19 (IEC GTEM)
  - Alignment of field strengths
  - GTEM is a ‘tougher’ test
  - FDA has approved with comments
- 2004 SHHH convention

# ANSI vs. IEC

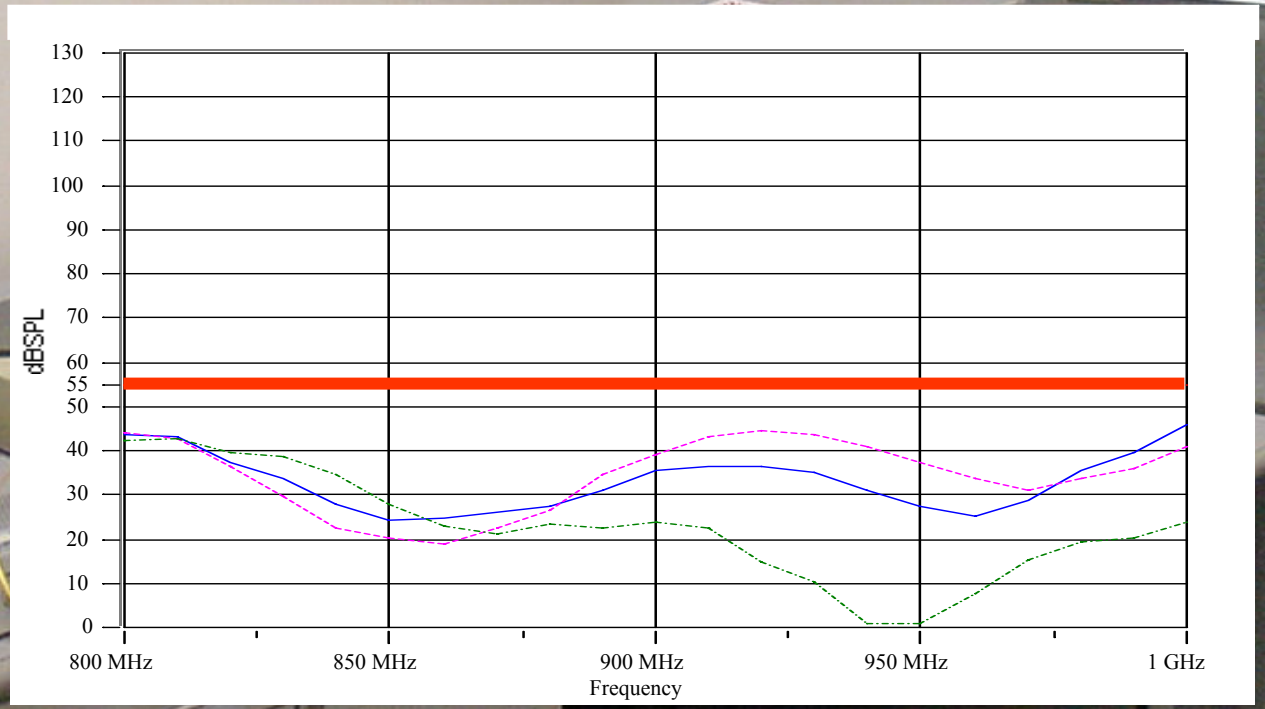
**ANSI near field measurement**

**IEC far field measurement**

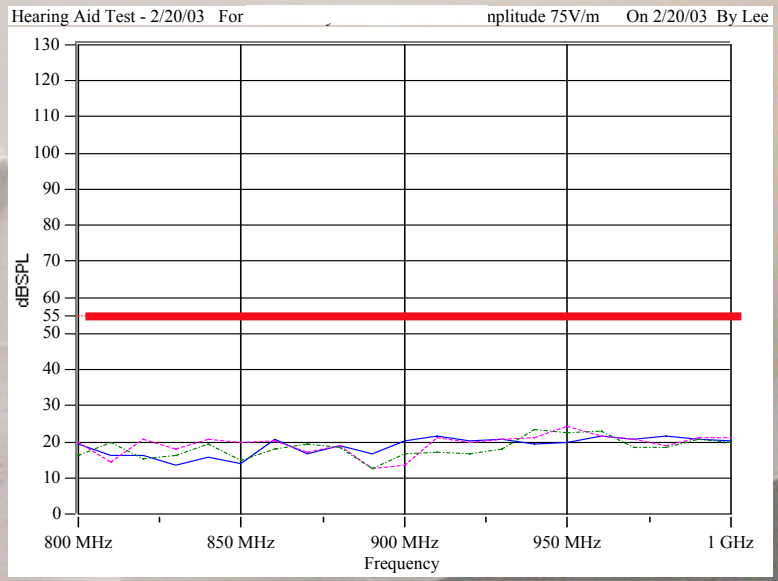
# ANSI vs. IEC

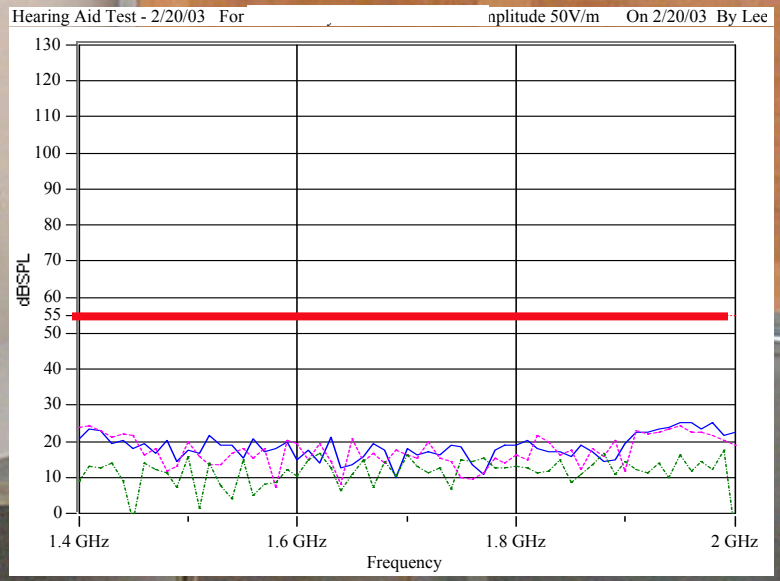

dB
Field Strength (V/m)
20
18
14
10
6
0
100
90
80
70
60
50
40
30
20
10
0
?
ANSI
Nearfield
IEC
Farfield
0
25
50
75
100
125
150
175
200
Distance (cm)
GSM, 2 W
DECT, 250 mW

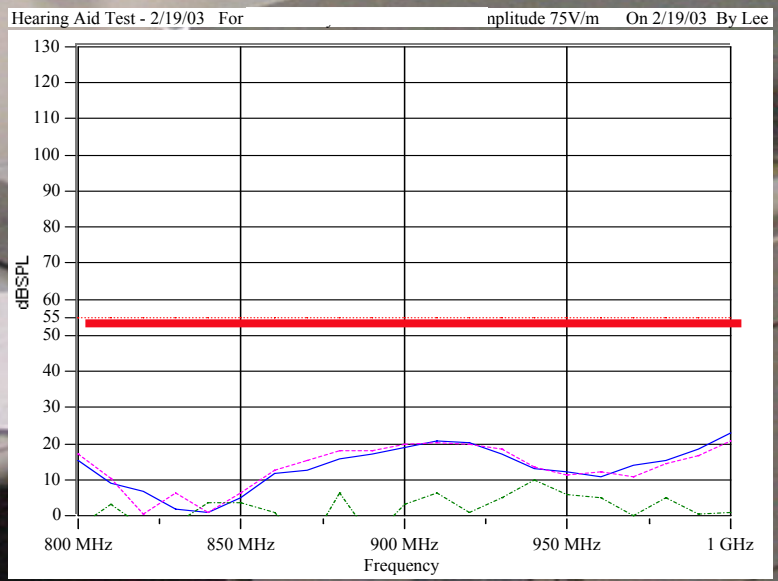
# Revised ANSI C63.19 Parameters

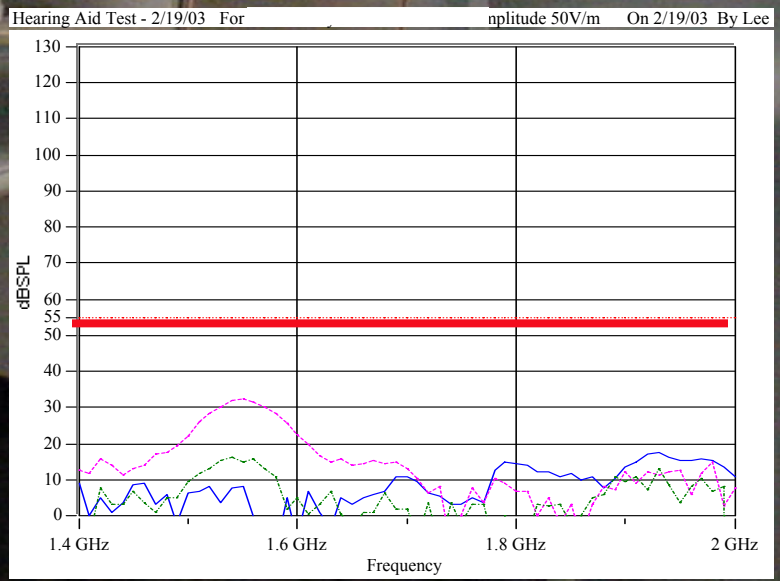


# Custom Product

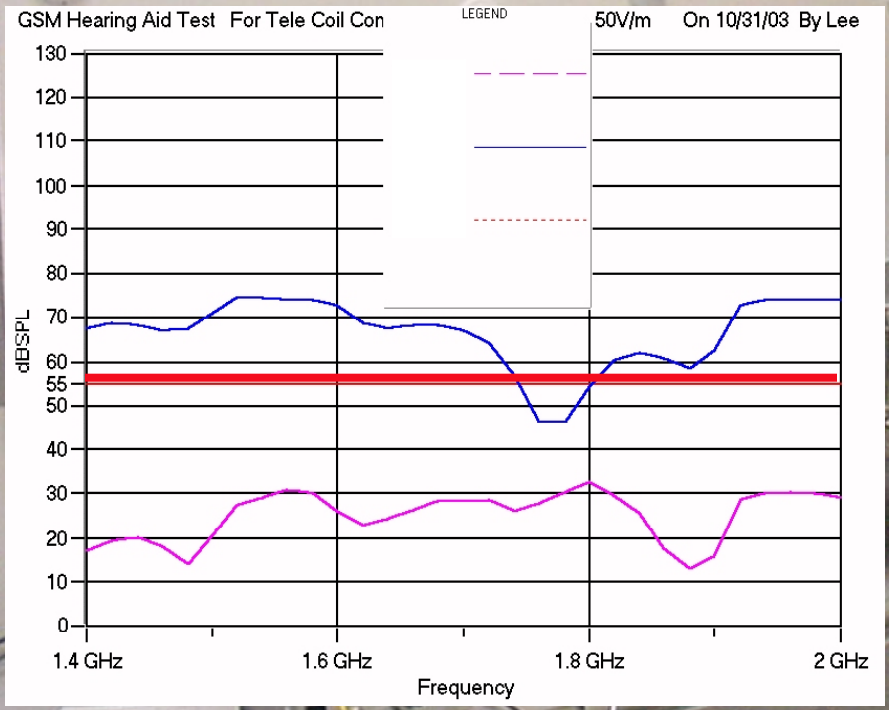


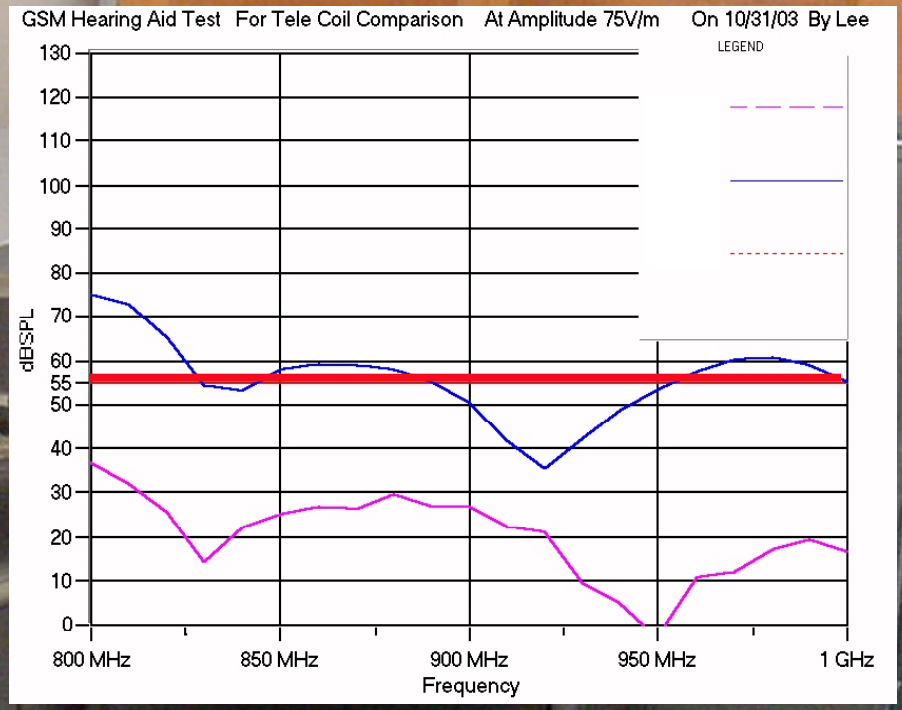



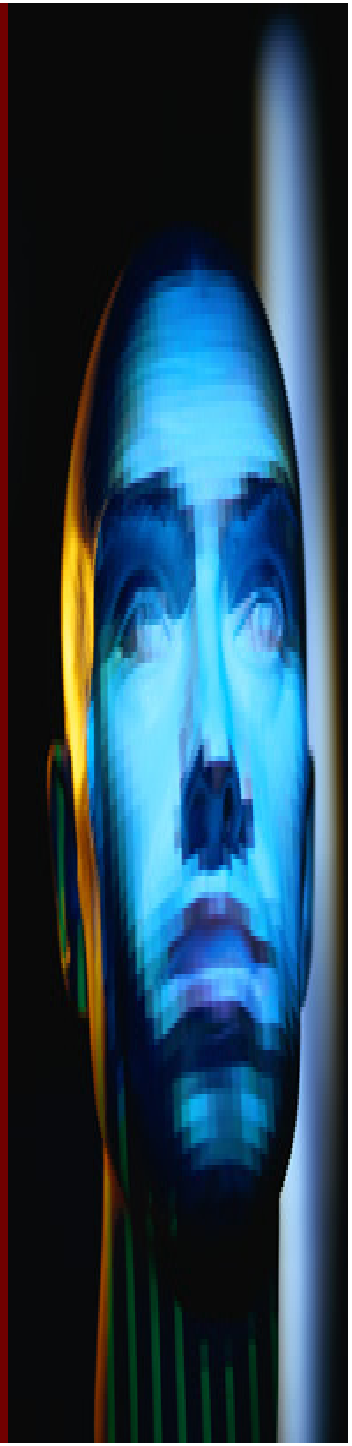
# Hearing Aid Telecoil Immunity Improvement



# The Future

- ANSI C63.19 dipole/GTEM co-exist
- Continued industry efforts:
  - Directional RF antennas
  - Separate phone T-coil component
  - SAR (Specific Absorption Rate)
  - EHIMA has begun EU HAC initiative
- Hearing aid product initiatives:
  - Current hearing aids meet or exceed all FCC 2008 reciprocity requirements



Thank You