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February 9, 1995



Building The  
Wireless Future™

Mr. William F. Caton  
Secretary  
Federal Communications Commission  
1919 M Street, NW, Room 222  
Washington, DC 20554

CTIA

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Industry Association  
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RECEIVED

FEB 9 1996

Re: *Ex Parte* Presentation  
RM-8658  
FEDERAL COMMUNICATIONS COMMISSION  
OFFICE OF SECRETARY

Dear Mr. Caton:

On Thursday, February 8, 1996, the Cellular Telecommunications Industry Association ("CTIA") represented by Ms. Elizabeth F. Maxfield, Senior Vice President for Industry Affairs, and Ms. Andrea D. Williams, Staff Counsel, met with the following Commission staff to discuss issues raised in the above referenced proceeding:

Wireless Telecommunications Bureau

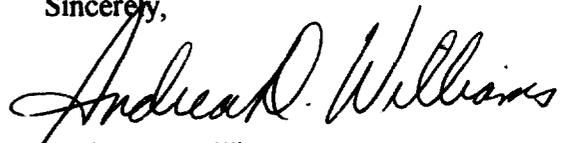
Ms. Karen Brinkmann, Senior Legal Advisor, Office of the Bureau Chief  
Mr. David Wye, Technical Advisor, Office of the Bureau Chief  
Mr. Stan Wiggins, Deputy Chief, Policy Division

Office of Engineering and Technology

Mr. Michael Buas, Physical Scientist

At the meeting, CTIA presented the attached document. Pursuant to Section 1.1206 of the Commission's Rules, an original and one copy of this letter along with the attachment are being filed with your office. If you have any questions concerning this submission, please contact the undersigned.

Sincerely,

  
Andrea D. Williams  
Staff Counsel

Attachment

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**CTIA**



***Building The Wireless Future™***

**HEARING AID COMPATIBILITY AND ACCESS TO  
WIRELESS TELECOMMUNICATIONS**

**CTIA's Interim Report on Activities and Efforts of the  
Wireless Industry**

***Ex Parte* Presentation  
RM-8658**

**February 8, 1996**

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**CTIA actively participated in and continues to support the Hearing Aid Compatibility and Access to Digital Wireless Telecommunications Summit Meeting (“Summit Meeting”) held January 3 and 4, 1996, in Washington, D.C. This interim report is not intended to provide a detailed discussion of the wireless industry’s efforts and participation at that Meeting. In support of the Summit process, CTIA recognizes the Summit Meeting’s Steering Committee as the appropriate entity to report to the Commission on the Summit Meeting and throughout the Summit process. The purpose of this report is to provide an update of proactive activities that CTIA and the wireless telecommunications industry have initiated, supported and promoted on this issue.**

## **FIVE GOALS**

- **Facilitate interference-free operation of digital wireless devices.**
- **Facilitate access to wireless telecommunications by all individuals with hearing impairments.**
- **Recognizing that hearing loss and hearing aids are unique to the individual, provide individuals with hearing impairments with a variety of choices to access the wireless network.**
- **Develop, support, and participate in efforts whereby the affected parties work cooperatively to resolve the interference challenge and to address the broader issue of access to digital wireless telecommunications, e.g., EMC Center's Hearing Aid Project and the Summit Meeting process.**
- **Facilitate communication between the affected parties by providing opportunities to exchange information, e.g., the Summit Meeting.**



## **CTIA CERTIFICATION PROGRAM**

### ***European Hearing Aid Immunity Criteria Adopted***

On December 14th, CTIA Board of Directors amended the CTIA Certification Program for wireless phones to require that effective July 1, 1997, CTIA-certified phones will not create bystander interference with hearing aids that are designed and tested to meet the requirements of IEC 118-13, the European EMC standard for hearing aids.

## **CTIA BYSTANDER EFFECT EVALUATION**

- CTIA has deferred this project until April 1996.
- After consulting with their technical experts, the Self Help for Hard of Hearing People (SHHH) asked that CTIA defer the bystander evaluation until the EMC Center makes available its preliminary report which is scheduled for release in mid-April 1996. At that time, CTIA will reevaluate whether it will proceed with the bystander effect evaluation.

## **TECHNICAL DEVELOPMENTS**

The wireless industry is committed to the process of identifying and implementing various technical approaches to managing the electromagnetic interaction between hearing aids and digital wireless technology. There has been some positive progress to date:

- On December 15th, the CDMA Development Group (CDG) announced a technical standard that provides the ability to turn off the variable rate vocoder component of the CDMA technology which reportedly was a source of interference. This information was shared with participants at the recent Summit Meeting and its Working Groups.
- In December 1995, the EHIMA GSM project issued its Final Report which indicates that there are hearing aids commercially available in Europe with sufficient immunity to be used with 2 watt GSM phones. This report was cited to at the Summit Meeting and will be provided to the appropriate Working Groups for review.
- CTIA is confident that the EMC Center's research, which includes all digital technologies (CDMA, PCS-1900, TDMA, and MIRS), and the Working Group process will help identify other solutions for use with all technologies.

## **FACILITATING ACCESS**

- In an effort to provide hearing aid users who prefer t-coil coupling to access the wireless network, CTIA has compiled a list of manufacturers' responses identifying approximately 25 analog wireless phones that meet the FCC's Part 68 definition of compatibility.
- See Exhibit C for a list of the 25 analog wireless phones and a copy of letter sent to manufacturers asking them to identify wireless phones that meet the FCC's Part 68 technical requirements.
- While the t-coil coupling with analog phones is a voluntary effort on the part of the wireless industry, it provides a t-coil user with the ability to access the wireless network today.
- Some individuals with severe hearing loss have found that external devices such as HATIS and JABRA (mild to moderate hearing loss) enable them to utilize a wireless telephone. Wireless companies such as AT&T Wireless and Sprint Spectrum are making available external devices such as HATIS and JABRA.
- To ensure that those customers with hearing impairments who prefer to use an external device can access wireless telephony, CTIA Board of Directors amended the CTIA Unit Certification Program on December 14, 1995, to provide that:
  - Effective July 1, 1997, all CTIA-certified phones must include a port that can be used for external audio access devices such as HATIS and JABRA.

## **FACILITATING COMMUNICATION BETWEEN THE AFFECTED PARTIES**

- **CTIA has actively participated in and will continue to support the Hearing Aid Compatibility and Access to Digital Wireless Telecommunications Summit Meeting and its Working Groups.**
- **CTIA will provide an Internet home page to provide information and resources on wireless technologies for individuals with hearing impairments.**
- **CTIA will continue to work with SHHH to conduct consumer trials of various wireless phones to determine which features and options are valuable to individuals with hearing impairments and should be considered in selecting a wireless phones.**
- **CTIA will provide members with an opportunity to learn about the concept of Universal Design not only as it relates to hearing impairments but also other physical impairments. CTIA will hold a panel discussion on this issue at its Annual Convention, Wireless '96, in March 1996.**

## **CONCLUSION**

- **The transition to digital technology is changing the electromagnetic environment in which hearing aids must co-exist with digital wireless devices.**
- **The proactive activities and efforts outlined above demonstrate the industry's commitment to:**
  - **achieving electromagnetic compatibility among products, particularly hearing aids and digital wireless devices so that they can operate in their intended environment,**
  - **providing individuals with hearing impairments with a variety of choices to access the wireless network,**
  - **developing and participating in activities that support an inter-industry approach to resolving these issues, and**
  - **facilitating communication between the affected parties so that through cooperative efforts we can address and solve the issues associated with hearing aid compatibility.**

# **EXHIBIT A**

## **PHASE II RESEARCH OBJECTIVES**

- 1. Extent of the interference problems to HA users**
- 2. Short term solutions to “Passer-By” interaction problems**
- 3. Short term solutions to “HA User” interaction problems**
- 4. Long term solutions to the “HA User” and “Passer-By” interaction problems**
- 5. Effects of various phone technologies on EMI**
- 6. Effects of various HA technologies on EMI**

# **DETAILS OF HUMAN SUBJECTS TESTING**

**1. Done in cooperation with the Hough Ear Institute in Oklahoma City.**

**2. Questionnaire**

- **A two-page questionnaire sent to 500 selected HA patients**
- **Questionnaires will be evaluated on the basis of**
  - **HA Type**
  - **Hearing Loss Configurations**
  - **Severity of Loss**
  - **Etiology of Hearing Loss**



USE OF CELLULAR PHONES

Frequently    Sometimes    Never

7. I have used a cellular phone..... A                    B                    C  
    If you have never used a cellular phone, skip to item 10.

8. I have experienced difficulties when using a cellular phone ..... A                    B                    C

Comments on difficulties \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

9. I remove my hearing aids when I use a cellular phone..... A                    B                    C

10. I have had occasions when a cellular phone was used in close proximity... A                    B                    C  
    If you never had such an experience, skip item 11.

11. I have experienced interference to my hearing aid when a cellular phone  
    is used in close proximity..... A                    B                    C

List any situations that have caused interference or buzzing with the hearing aid \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

THANK YOU FOR COMPLETING THE SURVEY. IF YOU WOULD BE WILLING TO BE A POTENTIAL  
SUBJECT FOR TESTING CELLULAR PHONE INTERFERENCE WITH HEARING AIDS, PLEASE INDICATE  
BELOW:

\_\_\_\_\_ YES

\_\_\_\_\_ NO

### **3. SUBJECT SELECTION**

- **10 Normal Hearing Subjects**
- **65 Hearing Impaired**
  - **Age group 18-78**
  - **Using hearing aids > 6 months and > 4 hours/day**
  - **Psychologically stable and in good health**
- **Four Hearing Loss Configurations based on audiograms (various etiologies will also be identified )**
  1. **Flat**
    - **Little of no change across Speech frequencies**
    - **15 Subjects (5 BTE, 5 ITE and 5 ITC)**

## **2. Sloping**

- **5-20 dB changes per octave across speech frequencies**
- **15 subjects**

## **3. Ski Slope**

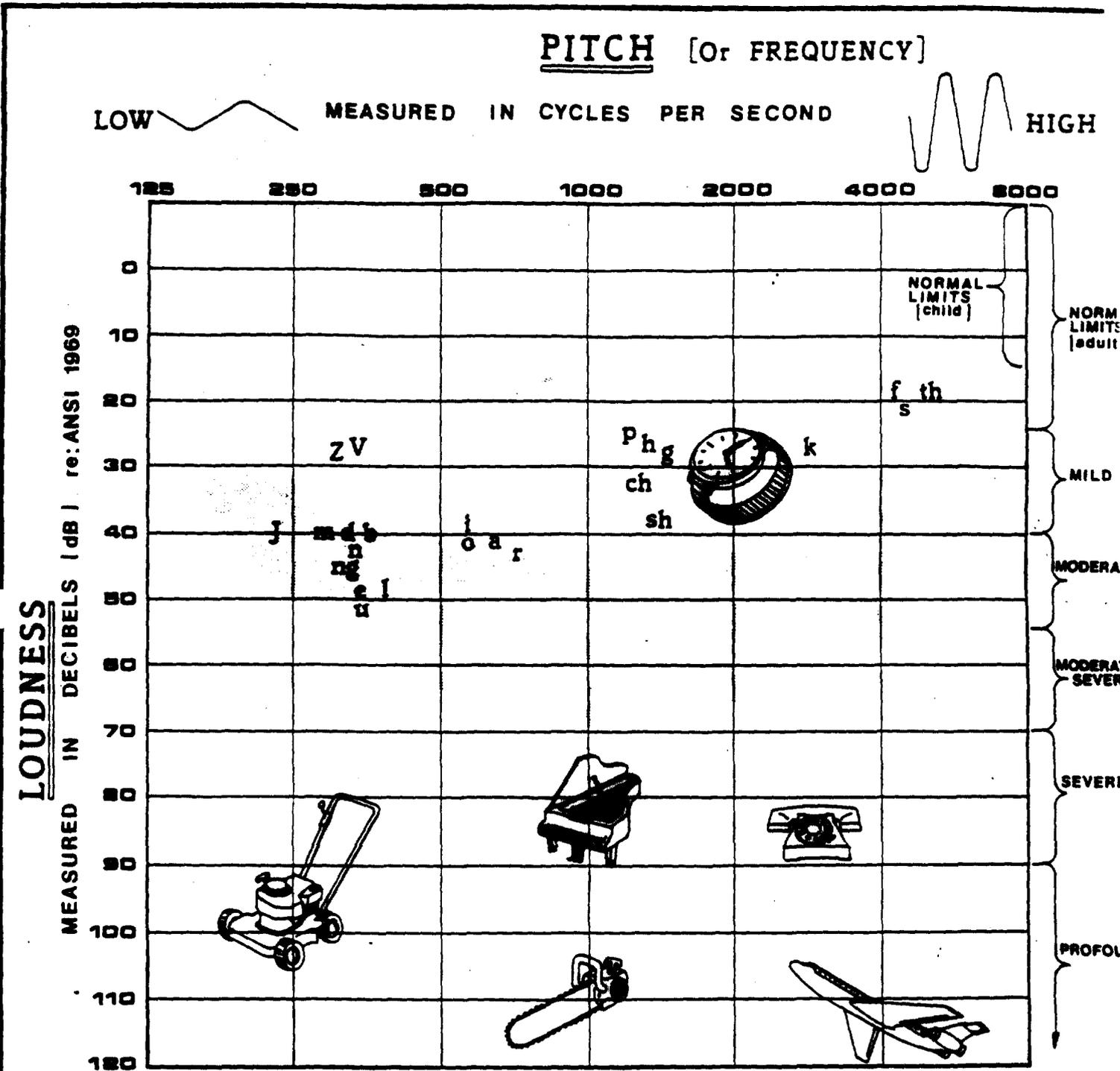
- **Normal or nearly normal thresholds 250-1000 Hz with a 30dB or more drop off in the high frequencies**
- **15 subjects**

## **4. Rising**

- **Thresholds improve 5-20dB per octave over the speech frequency range**
- **15 subjects**

# FAMILIAR SOUNDS AUDIOGRAM ©

NAME \_\_\_\_\_ DATE \_\_\_\_\_



Adapted with permission of J.L.Northern and M.P.Downs from HEARING IN CHILDREN, (Williams & Wilkins, 1984)

LOUDNESS LEVELS OF COMMON SOUNDS [IN DECIBELS]			
10 dB	Breathing	80 dB	Rush Hour Traffic
30 dB	Whisper	90 dB	Food Blender
0-50 dB	Conversation	100 dB	Train
70 dB	Typewriter	110 dB	Chain Saw
		120 dB	Jet Airport
		140 dB	Shotgun Blast

SHADED AREA REPRESENTS RANGE OF CONVERSATIONAL SPEECH

- **Five completely-In-The-Canal (CIC) HA users**

**(CIC's introduced recently, accounts for only 7% of the 1994 sales; hence, not very many users may be available for inclusion)**

- **Hearing Aid Types (Summary)**

<b>BTE</b>	<b>-</b>	<b>20 subjects</b>
<b>ITE</b>	<b>-</b>	<b>20 subjects</b>
<b>ITC</b>	<b>-</b>	<b>20 subjects</b>
<b>CIC</b>	<b>-</b>	<b>5 subjects</b>

## **4. TESTING PROTOCOL**

- **Most testing will be done in the same sound attenuated test booth in the Hough Ear Institute.**
- **Supervised by an OU Researcher and an audiologist from Hough.**
- **Some testing may be done at the AT&T Lab.**
- **Audiograms will be done on all subjects, including those with normal hearing.**
- **All hearing aids will be analyzed for performance on the Fonix hearing aid test box prior to testing on the patient.**

## **5. SUBJECTIVE TESTS**

- **Phone technologies**

- PCS 1900 MHZ (J007)
- TDMA (D-AMPS) @800MHZ (IS-54)
- CDMA @800MHZ (IS-95)
- Phones with some shielding for EMI

- **Hearing Aids**

- Subject's own HA (BTE, ITE,ITC,CIC)
- One BTE with no shielding
- One BTE with inside shielding
- One BTE with outside shielding

- **Both "Passer-by and "HA-user" interaction problems will be evaluated.**
- **Subjects will rate the annoyance level.**
- **Tests will estimate**
  - (i) the greatest distance at which interference is perceived.**
  - (ii) point of maximum interference.**
  - (iii) interference level in the normal telephone position.**
- **Psychophysical approach will be used for the above tests.**
- **Variable parameters**
  - distance**
  - orientation of phone**
- **15 test conditions to be evaluated.**

## **Subjective Tests (Continued)**

**Five Test conditions for each phone technology  
(PCS @ 1900, TDMA @ 800, and CMDA @ 800)**

- a. Own HA in phone RF field**
- b. Own HA in RF field with phone shielded**
- c. BTE hearing aid and no shielding**
- d. BTE-HA with outside shielding**
- e. BTE-HA with inside shielding**

## **6. OBJECTIVE TESTS**

- **Speech intelligibility tests using a sound field speaker, and audio taped word lists (25 words per test condition).**
- **Speech intelligibility scores obtained for each test condition.**
- **Five speech intelligibility test conditions to be evaluated.**

COCHLEAR CORPORATION

Monosyllabic Word Test Key  
(NU #6, List 1)  
Randomization 3

PRACTICE ITEMS

- |          |          |        |
|----------|----------|--------|
| 1. sheep | 2. cause | 3. rat |
|----------|----------|--------|

TEST ITEMS

- |           |           |           |
|-----------|-----------|-----------|
| 1. tough  | 21. raid  | 41. lot   |
| 2. puff   | 22. week  | 42. hurl  |
| 3. jar    | 23. moon  | 43. fall  |
| 4. net    | 24. burn  | 44. gap   |
| 5. third  | 25. bean  | 45. size  |
| 6. yes    | 26. knock | 46. whip  |
| 7. choice | 27. take  | 47. sell  |
| 8. jail   | 28. boat  | 48. reach |
| 9. dime   | 29. hash  | 49. king  |
| 10. fat   | 30. nag   | 50. mode  |
| 11. laud  | 31. goose |           |
| 12. sure  | 32. vine  |           |
| 13. rag   | 33. kite  |           |
| 14. door  | 34. sub   |           |
| 15. which | 35. death |           |
| 16. shout | 36. chalk |           |
| 17. keen  | 37. tip   |           |
| 18. raise | 38. limb  |           |
| 19. page  | 39. love  |           |
| 20. pool  | 40. home  |           |

## **Objective Tests (Continued)**

### **Five Speech Intelligibility Test Conditions**

- a. Own Hearing Aid and no RF field**
- b. Own Hearing Aid and PCS 1900 RF field**
- c. Own Hearing Aid and PCS 1900 with shielding**
- d. Own Hearing Aid and TDMA/CDMA RF field**
- e. Own Hearing Aid and TDMA/CDMA phone with shielding**