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Building The Wireless Future™

CTIA

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January 18, 1995

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

RECEIVED
JAN 18 1996
FEDERAL COMMUNICATIONS COMMISSION
OFFICE OF SECRETARY

Re: *Ex Parte* Presentation
RM-8658

Dear Mr. Caton:

On Thursday, January 18, 1996, the Cellular Telecommunications Industry Association ("CTIA") met with Ms. Ruth Milkman, Senior Legal Advisor to Chairman Reed Hundt to discuss issues raised in the above referenced proceeding. At the meeting, CTIA was represented by Ms. Elizabeth F. Maxfield, Senior Vice President for Industry Affairs, Mr. Tom Lukish, Vice President for Health and Safety Issues, Ms. Andrea Williams, Staff Counsel, and Mr. Robert Sussman of Latham and Watkins.

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

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

January 18, 1996

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, including those who do not use a t-coil hearing aid or those who do not use a hearing aid at all.

- 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, an Internet home page.

EMC CENTER AT THE UNIVERSITY OF OKLAHOMA

Status of Hearing Aid Project

- Phase I (defining the test protocol) completed.

- Phase II - Human Subject Testing in progress. The EMC Center is conducting Phase II in cooperation with the Hough Ear Institute. See Exhibit A for an outline of Phase II Research Objectives.

- Time Table for Test Results:

January 15, 1996	Partial results available from the first 20-25 patients
January 24, 1996	Report to the Design Group[1] on preliminary results
January 25, 1996	EMC Center presents report on partial results to Working Groups from Summit Meeting
March 15, 1996	Preliminary results on all 75 human subject tests
April 15, 1996	Preliminary report on: • Extent of the interference problems for hearing aid users • Effectiveness of existing or proposed short term solutions to hearing aid interaction problems

- The EMC Center will provide progress reports as significant results appear.

- The EMC Center is contacting Defense Department contractors with experience dealing with the issues relating to digital interference. While defense applications of digital RF technology are more demanding than civilian applications, such experience may be transferable to digital wireless interaction.

- The EMC Center's full participation in the recent Summit Meeting and the Working Groups on Hearing Aid Compatibility and Access to Digital Wireless Telecommunications illustrates its commitment to providing scientific research to develop interim and long-term technical solutions.

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[1] The FCC and FDA are members of the Hearing Aid Design Group.

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 is planning an in-field demonstration utilizing the PCS 1900 system that is operational in the Washington, D.C. market.
- Results will provide information on the extent of the bystander issue on a "real-world" operational system.
- Participants in the demonstration include: CTIA, American Personal Communications, Motorola, Northern Telecom, Ericsson, and representatives from the hearing impaired community.
- Results are projected for February 1996.
- Results from the bystander in-field demonstration will be provided to the appropriate Working Group from the Summit Meeting for review.

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 <u>all</u> 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 B 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 to 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 the Self Help for Hard of Hearing People (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 and accessibility to wireless telecommunications.

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. <u>Questionnaire</u>
   - 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

UNIVERSITY OF OKLAHOMA
Hearing Aid - Cellular Phone Interaction study
Participant Selection Questionnaire

NAME:_____Age:_____
Last First
Address:_____

Telephone: (Home)_____(Work)_____Gender: M F

Type of Work: _____

Do you wear Hearing Aids(HA) on
Both Ears___ Left Ear only_____ Right Ear only_____

HEARING AID EXPERIENCE	DAILY HEARING AID USE	HEARING AID TYPE
___Less than 6 weeks	___Less than 1 hour per day	___Behind the ear
___6 weeks to 11 months	___1 to 4 hours per day	___In the ear
___1 to 10 years	___4 to 8 hours per day	___In the canal
___Over 10 years	___8 to 16 hours per day	___Completely in canal

Make and Model of the hearing aid you are using_____

Do you wear glasses or contact lenses for vision correction?_____

INSTRUCTIONS: Please circle the answers (A - Frequently; B - Sometimes; and C - Never) that come closest to your everyday experience for the following questions. If you have not experienced the situation we describe, try to think of a similar situation that you have been in and respond for that situation. If you have no idea, leave that item blank. Thank you.

USE OF REGULAR (CORDED) PHONES	**Frequently**	**Sometimes**	**Never**
1. I have experienced difficulties in using a phone with my hearing aids.....	A	B	C
2. I remove my hearing aids when using the phone.....	A	B	C
3. I use the telecoil mode in my hearing aids when using the phone.....	A	B	C

Comments on difficulties_____

_____

USE OF CORDLESS PHONES (These are not cellular phones.These are the portable phones in your home or office that are part of your regular phone service)

4. I have used a cordless phone..... If you have never used a cordless phone, skip to item 7.	A	B	C
5. I have experienced difficulties when using cordless phones.....	A	B	C
6. I remove my hearing aids when using cordless phones.....	A	B	C

Comments on difficulties_____

_____

_____

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

11/17/95

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. <u>Flat</u>
     - Little of no change across Speech frequencies
     - 15 Subjects (5 BTE, 5 ITE and 5 ITC)

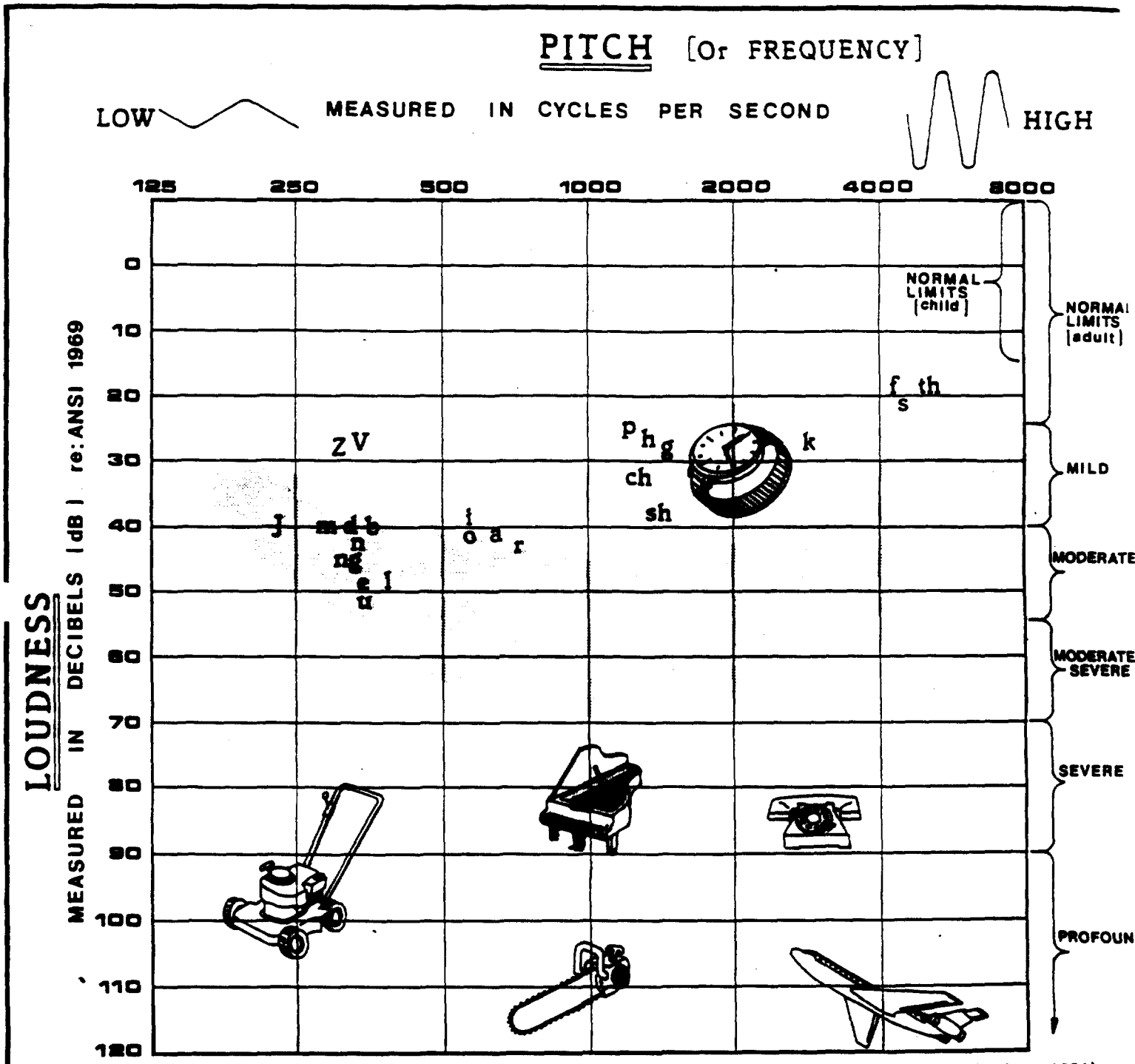
2. <u>Sloping</u>
   - 5-20 dB changes per octave across speech frequencies
   - 15 subjects

3. <u>Ski Slope</u>
   - Normal or nearly normal thresholds 250-1000 Hz with a 30dB or more drop off in the high frequencies
   - 15 subjects

4. <u>Rising</u>
   - 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	120 dB	Jet Airport
30 dB	Whisper	90 dB	Food Blender	140 dB	Shotgun Blast
0-60 dB	Conversation	100 dB	Train		
70 dB	Typewriter	110 dB	Chain Saw		

SHADED AREA REPRESENTS RANGE OF CONVERSATIONAL SPEECH

LDOS Familiar Sounds Audiogram Form-2, 6/84

B.A.Chaudoin, M.S.,CCC
To Reorder, call or write: Louisville Deaf Oral School, 414 W. Ormsby, Louisville, Ky., 40203, 1-502-636-2084

- 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)

BTE	-	20 subjects
ITE	-	20 subjects
ITC	-	20 subjects
CIC	-	5 subjects

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.	met	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		