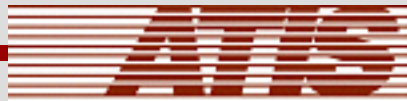


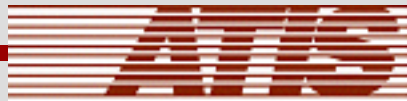
Detailed Information

The following slides are provided to
substantiate AISP.4-HAC
Interpretation of R&O



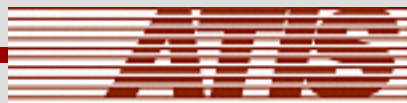
ATIS TCB Comments

6	General	<p><u>Subsets for HAC require a new FCC ID number and All digital transmission modes in all frequency bands contained in a HAC phone must meet M3 or M4 levels</u></p>	<p><u>Report and Order permits Class II permissive changes, FCC usually requires only transmission modes that operate with the USA to be tested.</u></p>	<p><u>AISP.4-HAC recommends allowing the use of a Class II Permissive Change supporting HAC, and also supports the position that only digital transmission modes used in the USA be tested for HAC compliance.</u></p>	<p><u>The ATIS understanding appears in line with FCC rules and intentions</u></p>
20	Near Field Msmnts	<p><u>Assure that HAC system mfgs recommendations are followed</u></p>	<p><u>Sys Mfgs (APREL & SPEAG) provide a calibration recommendation for the probe use. Certified with equipment and data</u></p>	<p><u>AISP.4-HAC position is all TCBs follow all probe calibration practices provided by the system manufactures even when they are in conflict with the C63.19 standard</u></p>	<p><u>Any deviations from the standard have to be fully justified. Test labs and TCBs should discuss such situations with the FCC prior to certification.</u></p>



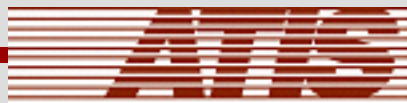
ATIS TCB Comments

22	<u>Full validation</u>	<u>Weekly validation</u>	<u>C63.19 does not require</u>	<u>AISP.4-HAC position is for dipole system validation is only CW signals to be used due to the requirement of being within 25% of the target values and the target values are CW only. AISP.4-HAC recommends standard monthly full validation unless equipment has been changed out per standard ISO 17025.</u>	<u>The intent of the validation is to help assure accurate operation and measurement. We note that there is considerable flexibility in the standard to simplify the measurement and that it does not have to be a burdensome test. For example once the maximum location is found for the CW case the other signals can be quickly measured with no additional scanning required. The current time recommendations will help TCB review assure accurate system operation and will be reevaluated in the future once TCB procedures have been fully vetted. Please see additional comments for item 11 for related subjects.</u>
25	<u>Validation</u>	<u>Measured values at 10% or greater must be investigated</u>	<u>C63.19 allows for 20-25% before investigation is necessary.</u>	<u>AISP.4-HAC position is to investigate measured values that exceed 25% based on measurement uncertainty and lab correlations per C63.19 note in table 4-1.</u>	
27	<u>Testing Guidance</u>	<u>User instructions are not considered sufficient to test a sub set of operational configurations</u>	<u>C63.19 states you can use the best/lowest level antenna position</u>	<u>AISP.4-HAC recommends allowing the use of User Manuals to define and guide the users use of a mobile per the manufacturers intended use for HAC.</u>	<u>The FCC has revised the training document to more closely follow the standard and will allow the position of maximum efficiency to be tested.</u>



ATIS TCB Comments

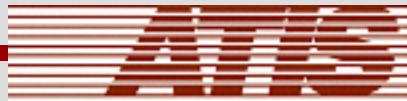
31	Automated Scanning Method	Most measurement systems measure at the probe center	Slide 20 states to use the mfgs recommendations for system measurements.	AISP.4-HAC recommends using the manufacture's probe reference calibration point for this measurement since the predicted field strengths in table 4-1 were obtained on that bases.	Validation and device measurement are two separate tasks and each should be handled appropriately. For device measurement the standard requires measurement to the closest sensor element. The FCC has provided guidance how measurement to the probe sensor centered might be justified for device measurement.
33	Probe Rotation	Probe rotation for maximum rating at final measurement	Should be handled in Uncertainty calculations	AISP.4-HAC position is the probe rotation should only be conducted on all single element probes and on omni directional probes use manufactures specified tolerance.	The FCC maintains TCB requirement to review probe rotation at the final measurement location per note 17. The FCC clarifies that this rotation only has to be performed in the worst case configuration for each air interface.
36	Automated Scanning Method	"Probe is rotated for maximum reading at the final measurement location"	Thought this was only needed for single element probes	AISP.4-HAC position is the probe rotation should only be conducted on all single element probes and on omni directional probes use manufactures specified tolerance.	The FCC maintains TCB requirement to review probe rotation at the final measurement location per note 17. The FCC clarifies that this rotation only has to be performed in the worst case configuration.
36	The expanded uncertainty (for K=2) of under 2 dB.	Does this mean HAC systems must have an uncertainty of under 2 dB?	Not possible by any system today and not required by C63.19	AISP.4-HAC position is that K=2 at 2db uncertainty is not achievable and is not required.	The training bullets provided by the FCC follows from statements in C63.19 section C.3.1.



Cingular Test Data

12 HEARING AIDS (4 MANUFACTURERS)

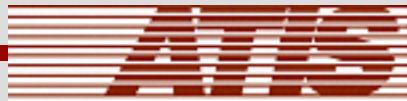
Manufacturer	Style	Type
Hearing Aid #1	ITE	Fully Digital
Hearing Aid #2	BTE	Conventional Analog
Hearing Aid #3	BTE	Fully Digital
Hearing Aid #4	BTE	Fully Digital
Hearing Aid #5	ITE	Fully Digital
Hearing Aid #6	BTE	Fully Digital
Hearing Aid #7	ITE	Fully Digital
Hearing Aid #8	ITE	Conventional Analog
Hearing Aid #9	BTE	Digitally Programmable
Hearing Aid #10	BTE	Fully Digital
Hearing Aid #11	BTE	Fully Digital
Hearing Aid #12	BTE	Fully Digital



Cingular Test Data

3 HEARING AIDS: SUSCEPTIBLE TO INTERFERENCE

Manufacturer	Style	Type
Hearing Aid #2	BTE	Conventional Analog
Hearing Aid #8	ITE	Conventional Analog
Hearing Aid #9	BTE	Digitally Programmable



Cingular Test Data

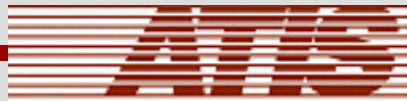
HEAD AND TORSO SIMULATOR (HATS) TEST RESULTS

Wireless Device #1

	Hearing Aid #2	Hearing Aid #8	Hearing Aid #9
Total 1900 MHz Noise (dB SPL)	111.3	83.2	103.9
Total 850 MHz Noise (dB SPL)	109.9	84.6	93.2
DIFFERENCE 1900/850 (dB)	1.3	-1.4	10.7

Wireless Device #2

	Hearing Aid #2	Hearing Aid #8	Hearing Aid #9
Total 1900 MHz Noise (dB SPL)	110.8	102.0	102.7
Total 850 MHz Noise (dB SPL)	108.6	90.7	89.9
DIFFERENCE 1900/850 (dB)	2.1	11.3	12.9



Cingular Test Data

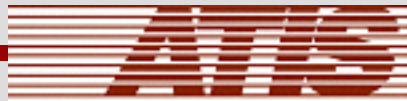
SOUND PRESSURE LEVEL (SPL) METER TEST RESULTS FOR WIRELESS DEVICE #2

Audio Levels Wireless Device #2

	Hearing Aid #2	Hearing Aid #8	Hearing Aid #9
Speech (dB SPL)	99	95	100
1900 MHz Noise (dB SPL)	116	87	98
850 MHz Noise (dB SPL)	116	76	91

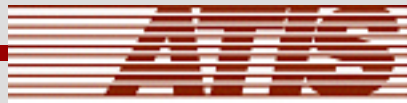
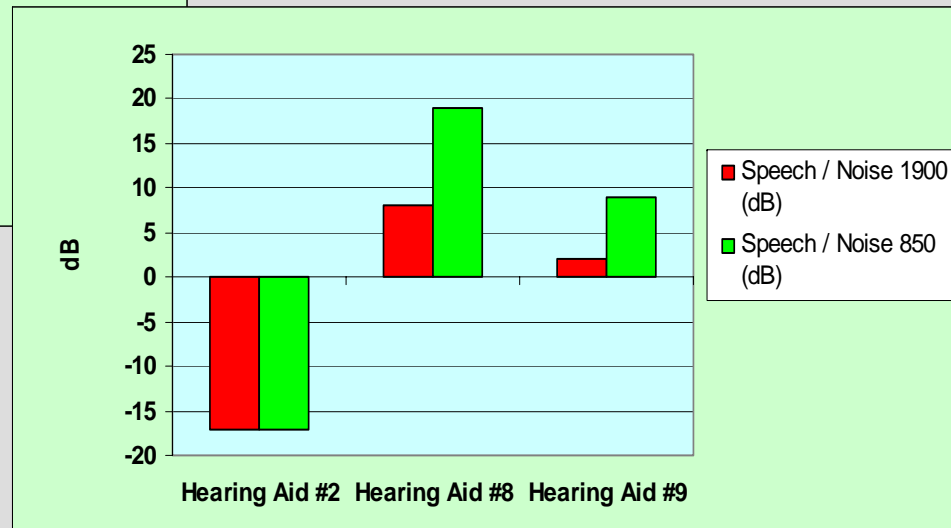
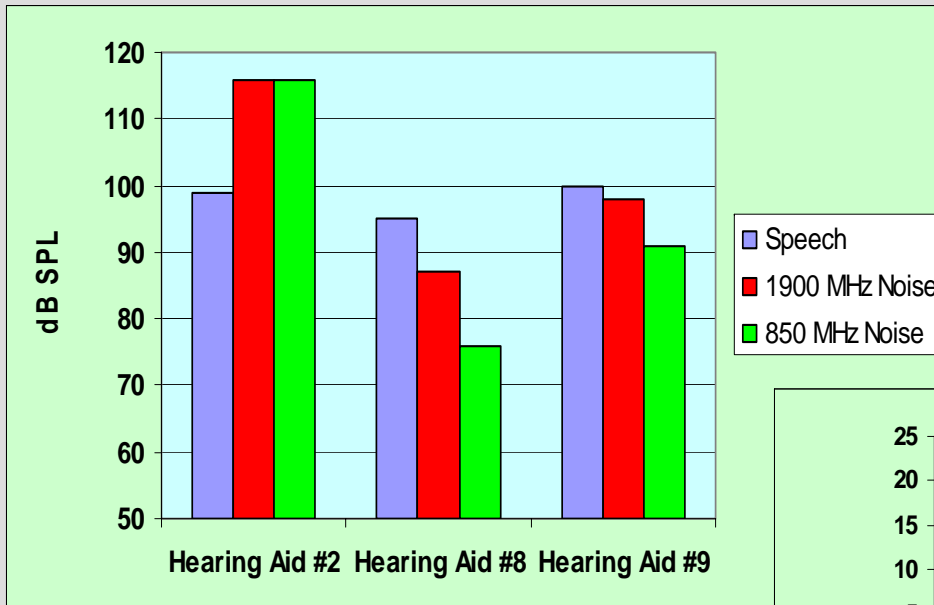
Speech to Noise Wireless Device #2

	Hearing Aid #2	Hearing Aid #8	Hearing Aid #9
Speech / Noise 1900 (dB)	-17	8	2
Speech / Noise 850 (dB)	-17	19	9
Difference 850 / 1900 (dB)	0	11	7



Cingular Test Data

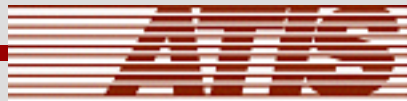
CHARTS OF SOUND PRESSURE LEVEL (SPL) METER TEST RESULTS FOR WIRELESS DEVICE #2



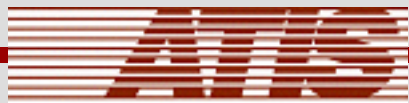
SHHH Data Collection Program: Test Screen

The screenshot shows the ATIS Test.vi software interface. The window title is "ATIS Test.vi" and it has a menu bar with "File", "Edit", "Operate", "Tools", "Window", and "Help". The interface is divided into several sections:

- Top Right:** RX Level (850 ARFCN) with a value of 0 and a slider set to 135; Power (1900 ARFCN) with a value of 0 and a slider set to 612; IMEI (redacted); and Participant ID (redacted).
- Buttons:** "Reset Testing", "Adjust Audio", "Test 1", and "Test 2".
- Form Fields:** "Best Audio?" (radio buttons for "Neither" and "Interferece"), "Aid Mode?" (radio buttons for "Unknow", "Microphone", and "T-Coil"), "Comments" (text area), "STILE" (N/A), "EAR" (N/A), "Gender Preference 1" (N/A), and "Gender Preference 2" (N/A).
- Bottom Center:** "Audio Level" (7000).
- Bottom Right:** "Save Data" button.

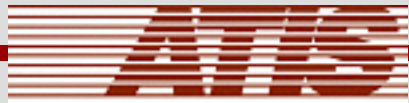


Picture of Testing at 2005 SHHH Convention



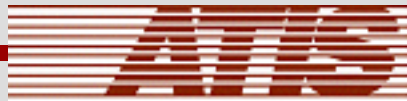
SHHH DATA

- 99 test participants
- 218 tests performed
 - Microphone mode
 - T-coil mode
 - Some participants had two different types of hearing aid devices i.e. Cochlear Implant and Hearing Aid
- 69 tests removed from dataset
 - T-coil tests: 28
 - Interference not recorded: 34
 - HA Type not recorded: 3
 - HA Mode not recorded: 4



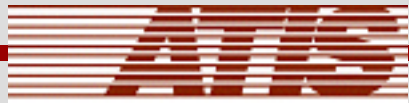
SHHH DATA Analysis

- 149 Tests with Microphone Mode (No T-Coil)
 - 102 Hearing Aids, 46 Implants, & 1 Style N/A (not recorded)
- 24 Analog HA Microphone Mode Tests
- 125 Digital HA/Implant Microphone Mode Tests
 - 78 Hearing Aids, 46 Implants, 1 Style N/A (not recorded)
- 33 Tests chose 850 over 1900
 - 20 Hearing Aids, 13 Implants
- 33 Tests chose 1900 over 850
 - 26 Hearing Aids, 7 Implants
- Frequency Band Comparison
 - 125 Digital Hearing Aid Tests in microphone mode used as the data set for the analysis



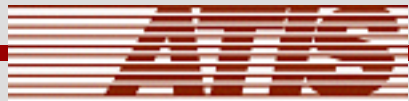
125 Digital Hearing Aid, Microphone Mode Tests

- 125 Digital Hearing Aid, Microphone Tests
- 104 tests had **NO interference** or 83.2%
- 21 tests recorded some interference or 16.8%



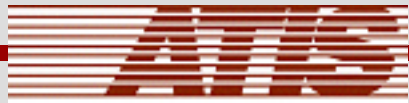
Digital HA, Microphone Mode Conclusion

- Phones: 1900 MHz was M3, 850 MHz was M1/M2
 - 19.2% (24 tests) had poor audio to make a choice.
 - 23.2% (29 tests) chose 850 MHz over 1900 MHz.
 - 22.4% (28 tests) chose 1900 MHz over 850 MHz.
 - 35.2% (44 tests) of tests had no preference.
- Phones that tested M1/M2 at 850 tested no differently than M3 phones at 1900.



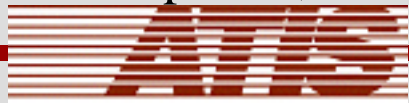
SHHH Test Conclusion

- SHHH user test backs up the DELTA test report, Cingular test results, and IEC 60118-13 and indicates that there should be two different emissions passing limits for the 850 MHz and 1900 MHz Frequency Bands



Sony Ericsson Test Conditions

- Users' hearing aids were not rated
- Mobiles were operating on live networks
 - Unknown if 850 mobiles were on the same Servicing Network as 1900 (in practice a customer should be on the same operation network)
- Mobile Transmit Power levels, Receive Signal strength, and listening environment were not controlled variables
 - Anecdotally, signal strength from the Cell Site was viewed as significantly lower at 850MHz than the mobiles operating at 1900MHz
 - Expectations for the lower Signal strength observed at 850MHz would result in a Higher Mobile Transmit Power, whereas the high Signal strength observed at 1900MHz would result in a Lower Mobile Transmit Power
- Phones used included a candy-bar style and a flip style phone
- Individual mobiles represented single frequencies (850, 850 low power, 1900)



Sony Ericsson Field Study

Interference	none	Low	Med	High	
	1	2	3	4	5

<u>Digital HA</u>	<u>Rate-1</u>	<u>Rate-2</u>	<u>Rate-3</u>	<u>Rate-4</u>	<u>Rate-5</u>
850 MHz	4	1	1	1	2
850 LP	3	0	2	2	2
1900	4	4	1	0	0

<u>Analog HA</u>	<u>Rate-1</u>	<u>Rate-2</u>	<u>Rate-3</u>	<u>Rate-4</u>	<u>Rate-5</u>
850 MHz	5	0	2	1	5
850 LP	3	4	0	4	2
1900	5	5	2	1	0

