

biamp™



# Speech Intelligibility for Inclusive Learning

## The Importance of Audio Equity

Nevil Bounds, Business Development Manager  
Biamp Europe

# Introduction

## ▶ Nevil Bounds

- Business Development Manager
- Specializing in Higher Education
- Joined Biamp in 2019
- Active in the AV industry for over 45 years
- Email: [nevil.bounds@biamp.com](mailto:nevil.bounds@biamp.com)



# Introduction

## ▶ Hans Timmermans

- Field Sales Engineer
- Pre-sales support
- Joined Apart-Audio in 2010
- Acquired by Biamp in 2019
- Active in the AV industry for over 30 years
- Email:
- [hans.timmermans@biamp.com](mailto:hans.timmermans@biamp.com)



# AVIXA CTS Renewal Units

- ▶ This presentation entitles you to 1 RU
- ▶ Applies to CTS, CTS-I, CTS-D
- ▶ Register this with AVIXA on their website – [www.avixa.org](http://www.avixa.org) in your account section





# Global Reach

## ▶ Global Headquarters

- **b** Portland, Oregon, USA

## ▶ Manufacturing

- Portland, Philadelphia & China

## ▶ R & D

- Portland, New York, Philadelphia, Boston, Brisbane, Schoten, Horsens, Modena

## ▶ Support & Services

- USA, UK, Belgium, Spain, Germany, Italy, Denmark, Sweden, UAE, India, Hong Kong, Australia

## ▶ Sales

- Represented in over 120 countries globally



Connecting people through extraordinary audiovisual experiences

# Product Solutions



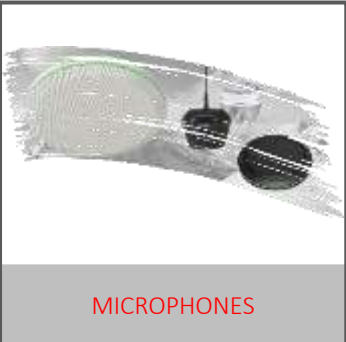
NEW PRODUCTS



CONFERENCING SOLUTIONS



FLEXIBLE DSP



MICROPHONES



AMPLIFIERS



LOUDSPEAKERS



CONTROL SOLUTIONS



WIRELESS BYOD



AUDIENCE ENGAGEMENT



SOUND MASKING



PUBLIC ADDRESS



CABLE MANAGEMENT

# Topics That We Will Cover...

- ▶ Back To The Campus – The Challenges
- ▶ Inclusivity and Audio Equity
- ▶ Sound Masking
- ▶ Good Speech Intelligibility
- ▶ Biamp's Approach to Obtaining an Extraordinary Audio Experience



# Back To The Campus – The Challenges





## At Home...

- ▶ Quite a reasonable experience
- ▶ Freedom from distraction – mostly!
- ▶ Often good speech intelligibility for them from your set up
- ▶ Often poor results for you from being on the far end of a call
- ▶ Can be frustrating and lead to a great deal of fatigue



# Back To The Campus – The Challenges



# At The Campus...

- ▶ Often highly reverberant spaces
- ▶ Little attention paid to room acoustics
- ▶ Poor speech intelligibility
- ▶ Many distractions
- ▶ Can be frustrating and lead to a great deal of fatigue





## Really Bad Audio

- ▶ When the audio during a call is really bad it's easy to tell.
- ▶ It's an obvious issue.
- ▶ Everyone in the meeting will know.
- ▶ It leads to meetings becoming a waste of time and unproductive.
- ▶ It's normally easy to identify the cause.





## “Just” Poor Audio

- ▶ If the audio quality in a call is “just” poor it’s not always blatantly obvious
- ▶ Even low levels of background noise, distortion or echo will impact the listeners
- ▶ People become distracted, stressed and less productive
- ▶ Causes are often complex to identify and rectify



# Inclusivity and Audio Equity

- ▶ Everyone must be able to have the same audio experience
- ▶ Rooms must be equipped to facilitate this
- ▶ Improve acoustics
- ▶ Spaces that are fit for purpose
- ▶ Individuals must not be at a disadvantage
- ▶ Assistive Listening Systems



# Assistive Listening Systems



ampetronic.com

**This facility is equipped with a hearing assistance system. Please ask for a receiver.**



# PARLÉ VBC 2500a Video Bar

- ▶ Support for assisted listening systems
  - Adds a 3.5mm output connector
  - Mono balanced line level





# Sound Masking – What is it?

*Sound Masking is the addition of a specifically tuned ambient background sound that targets the same frequency range as human speech and is effective when placed at the unintentional listener location to help lower the level of speech intelligibility.*



# Sound Masking – Why?

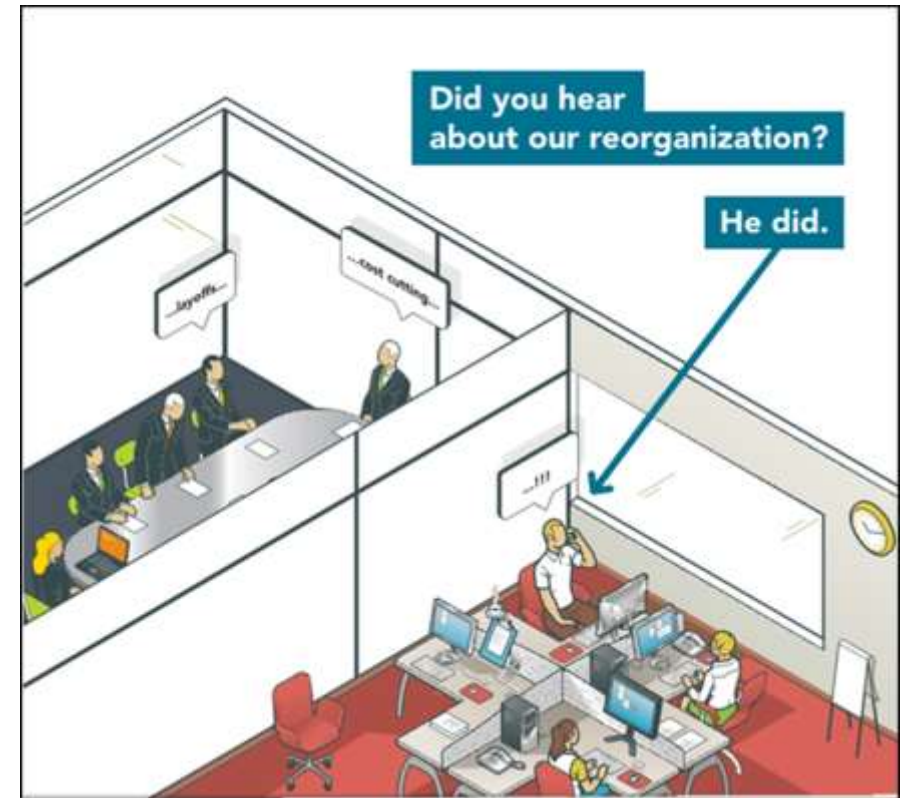
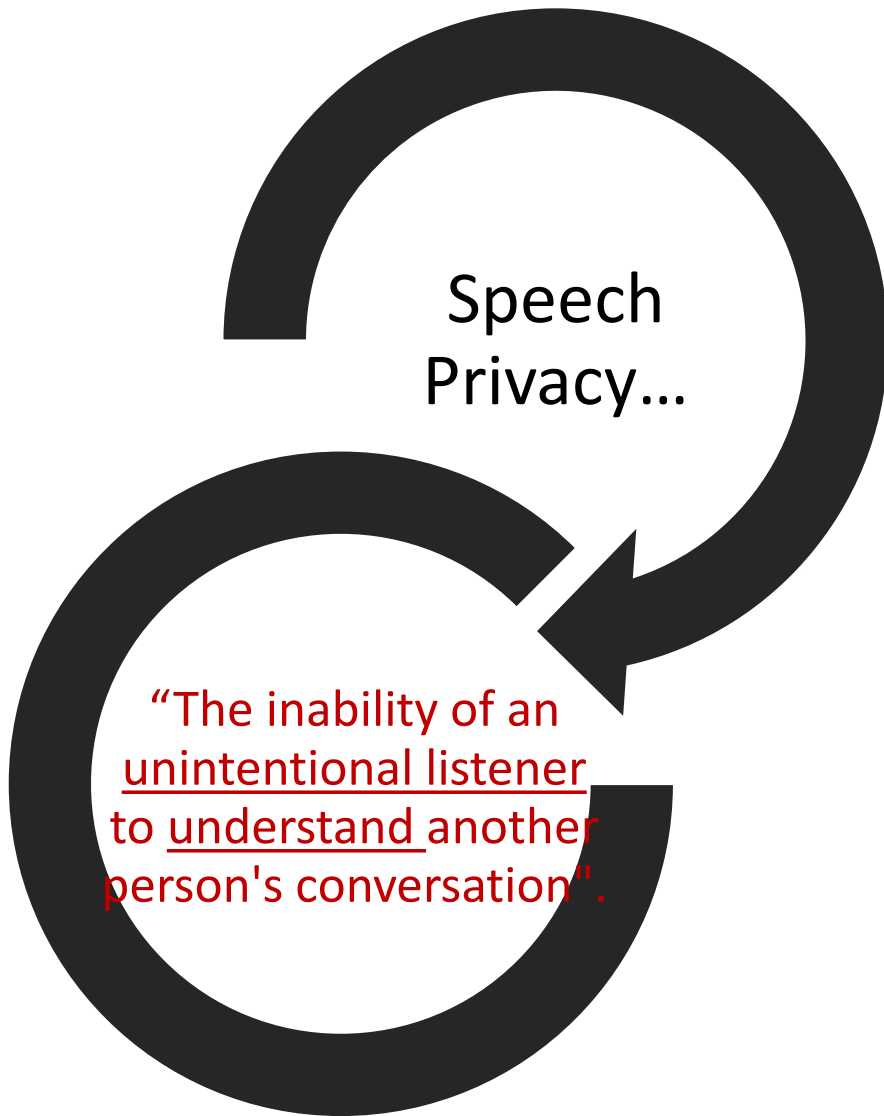
**PROTECTS  
SPEECH  
PRIVACY**

**REDUCES NOISE  
DISTRACTIONS**

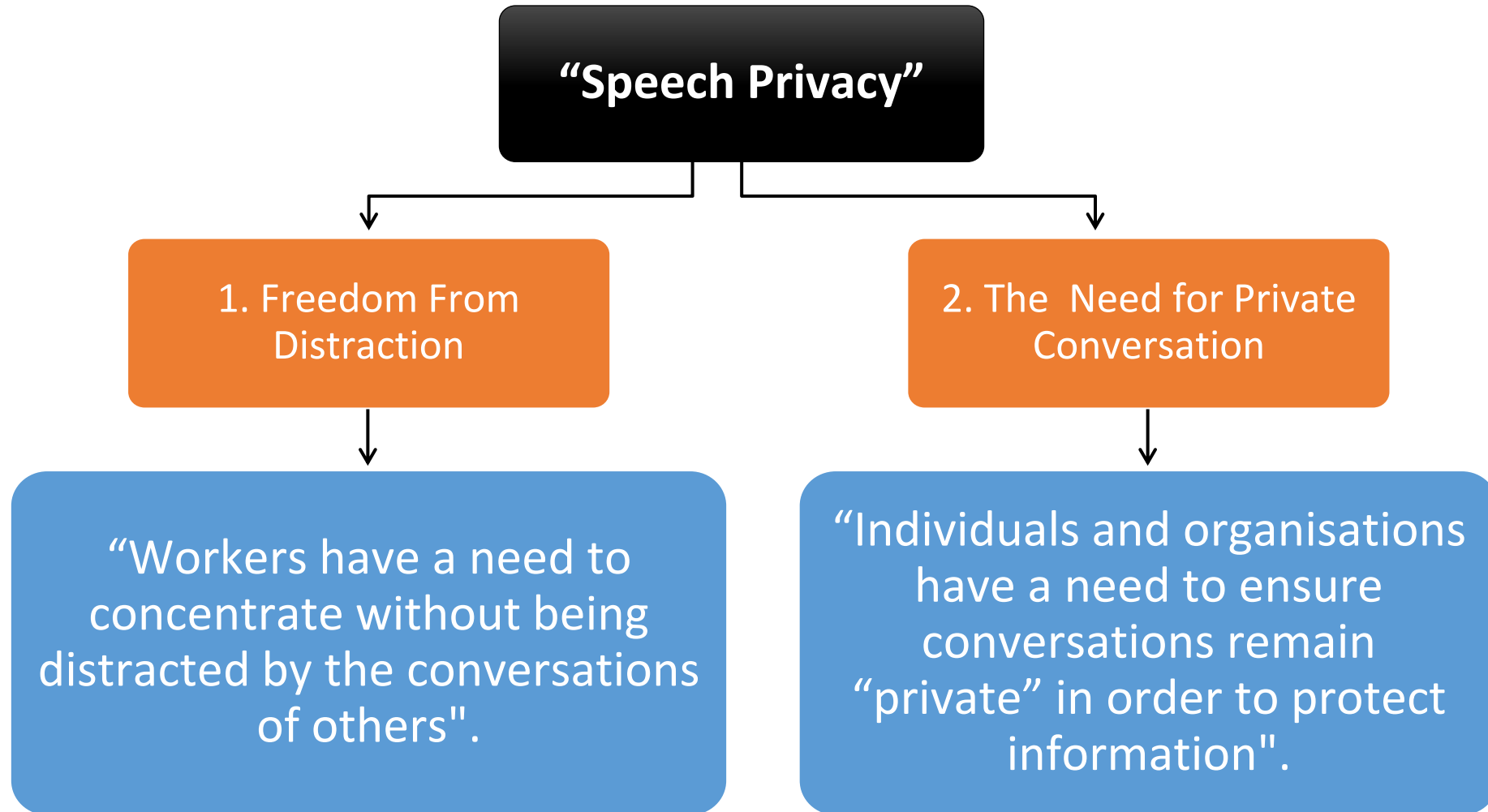
**INCREASES  
WORKPLACE  
COMFORT**



# Sound Masking – What is Speech Privacy



# Sound Masking – Speech Privacy Summary





# Sound Masking Systems



# Good Speech Intelligibility

- ▶ Why is this so difficult to achieve?
- ▶ Poor microphone technique
- ▶ Poor acoustics
- ▶ Badly set up systems
- ▶ Poorly delivered content
- ▶ Not allowing adequate understanding for international delegates



# Poor Speech Intelligibility





# Poor Speech Intelligibility



# **Biamp's Approach to Obtaining an Extraordinary Audio Experience**

Ensure that the system is tuned to  
maximise audio performance.



# Achieving Extraordinary Audio

- ▶ The three fundamental steps to experiencing extraordinary audio for every call:
  1. Understand the audio performance of the space.
  2. Select and install equipment appropriate to the space.
  3. Ensure that the system is tuned to maximise audio performance by a trained engineer.



# Achieving Extraordinary Audio

- ▶ The three fundamental steps to experiencing extraordinary audio for every call:
  1. Understand the audio performance of the space.
  2. Select & install equipment appropriate to the space.
  3. Ensure that the system is tuned to maximise audio performance by a trained engineer.
- ▶ Understanding the way the room sounds is vital.
- ▶ Data must be gathered:
  - Measure actual / define background noise.
  - Measure actual / define reverberation.
  - Measure / define room size and target coverage.
- ▶ *Some spaces will never work for conferencing!  
Technology cannot always fix bad room acoustics.*



# Achieving Extraordinary Audio

- ▶ The three fundamental steps to experiencing extraordinary audio for every call:
  1. Understand the audio performance of the space.
  2. Select & install equipment appropriate to the space.
  3. Ensure that the system is tuned to maximise audio performance by a trained engineer.
- ▶ Based on the room acoustics, select the type, number and location of both microphones and loudspeakers.
- ▶ Select a DSP, amp and UC interface solution to support microphones and speakers.
- ▶ *Install the hardware correctly, in a timely and cost-effective way.*





# Achieving Extraordinary Audio

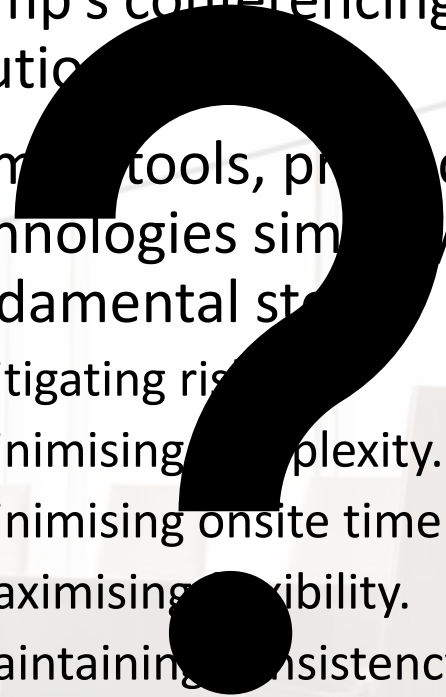
- ▶ The three fundamental steps to experiencing extraordinary audio for every call:
  1. Understand the audio performance of the space.
  2. Select & install equipment appropriate to the space.
  3. Ensure that the system is tuned to maximise audio performance by a trained engineer.
- ▶ The correct equipment selection doesn't ensure a successful solution for the customer.
- ▶ The configuration and tuning of the system by a trained and experienced engineer maybe needed to maximise performance.
- ▶ *Consistency of sound can still be an issue across different spaces and different engineers.*



# Achieving Extraordinary Audio

- ▶ The three fundamental steps to experiencing extraordinary audio for every call:
  1. Understand the audio performance of the space.
  2. Select & install equipment appropriate to the space.
  3. Ensure that the system is tuned to maximise audio performance by a trained engineer.
- ▶ Achievable every time?

- ▶ Absolutely! If you deploy Biamp's conferencing solution.
- ▶ Biamp's tools, products and technologies simplify the fundamental steps:
  - Mitigating risk.
  - Minimising complexity.
  - Minimising onsite time.
  - Maximising flexibility.
  - Maintaining consistency.
  - Maximising user satisfaction.





# Classroom Designer

## ► The single design tool

- Uses the room's dimensions
- Uses the room's acoustic data
- Delivers microphone design validation
- Delivers loudspeaker design validation
- Highly customisable
- Microphone performance demo capabilities
- Fully adaptive equipment list generation
- Delivers customer facing documentation

## ► Insures a successful outcome



[support.biamp.com](https://support.biamp.com)

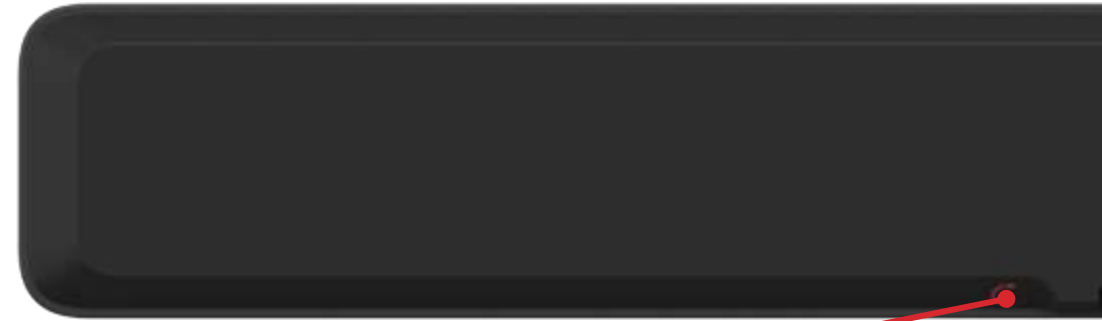


Design Tools



# Biamp LAUNCH


- ▶ What is Biamp LAUNCH?
- ▶ A single button press to get started
  - Launch discovers and programs connected devices
  - Measures the acoustics of the room
  - Compares measurements with target values
  - Tunes the system to optimal performance
  - Generates a performance report

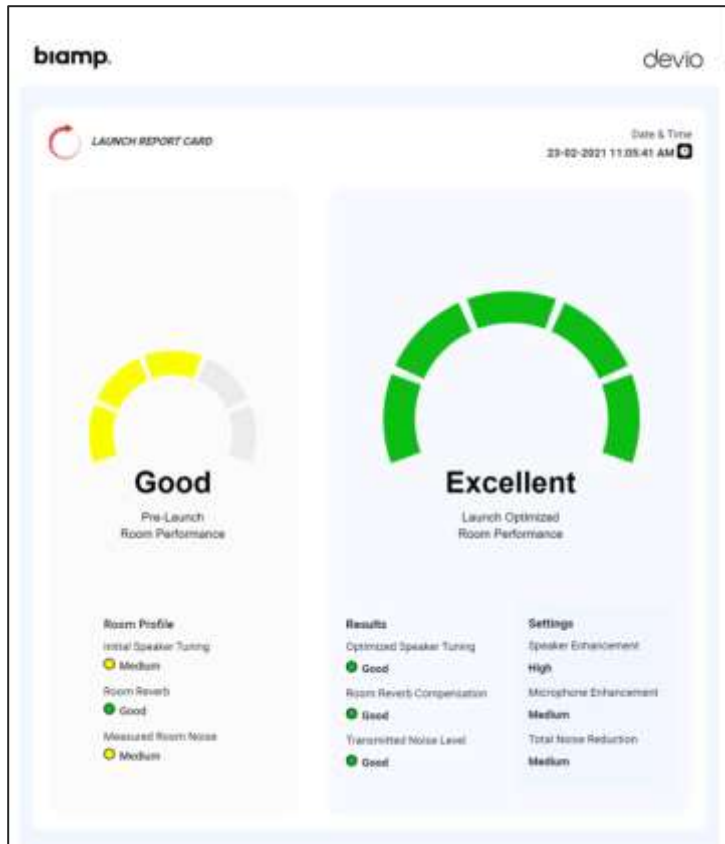


LAUNCH  
Button



# Biamp LAUNCH

- ▶ Biamp LAUNCH 
- ▶ Report card
  - An overview of key information for commissioning and ongoing support



Device Name	Microphones Detected	Speaker Channels in Use	Target SPL
TesiraFORTÉ X 1600	2	2	70 dB

Description	Serial #	Version	Health
BEC-2 FW 4.0.0.50	04303053	4.0.0.50	Good

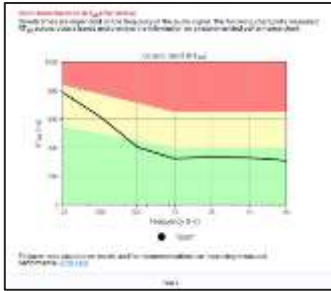
Connected Devices

Model	Device	Serial #
Park TCM-XA	Pair Ceiling Microphone with Speaker Amplifier	03807407
	Noise Reduction Applied	Medium
	Echo Reduction Applied	Medium
	Number of Available Channels	2
	Number of Used Channels	2
Park TCM-XEX	Pair Ceiling Microphone	03805497
	Noise Reduction Applied	Medium
	Echo Reduction Applied	Medium
Team EX/UST	USB / Bluetooth Device	03835175
	USB Enabled	Yes
	Bluetooth Enabled	Yes



# Biamp LAUNCH

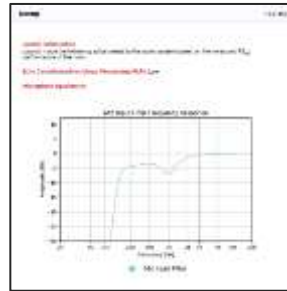
- ▶ Biamp LAUNCH
- ▶ Advanced reporting
  - 8 pages of detailed information



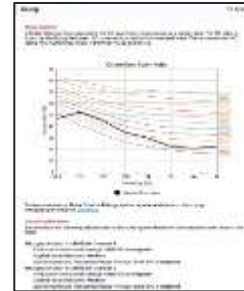
Room Reverberation by Octave



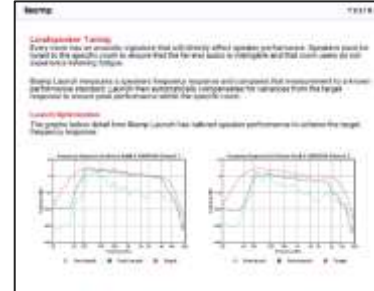
Speech Intelligibility



Microphone Equalization



Noise Criterion Scale



Loudspeaker Tuning

**Advanced Room Measurements**

**Room Reverberation (RT<sub>60</sub>)**

Room reverberation time (RT<sub>60</sub>) is a key factor in determining the intelligibility of speech in a room. A high reverberation time can result in decreased intelligibility in a conference system. Biamp Launch uses room measurements to tune the room acoustics to deliver the optimal audio quality for the far end participants.

The following table indicates the average reverberation time relative to conference room performance.

Room Performance Rating	Reverb Time (RT <sub>60</sub> )
Excellent	0.40-0.50 sec
Good	0.50-0.60 sec
Fair	0.60-0.70 sec
Poor	more than 0.70 sec

Room Reverb (RT<sub>60</sub>) Average: Good 0.65 (ms)

Room Reverberation

**Room Noise**

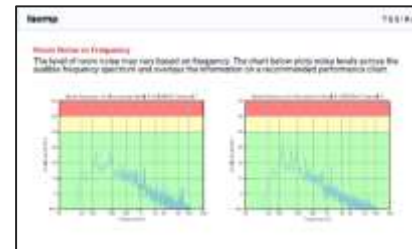
Any sound in a conference room that interferes with speech is considered room noise. In general, the more people in a room, the more difficult it is to understand speaker content. Room noise typically includes HVAC noise, projector light fixtures, and sounds from adjacent rooms. Biamp Launch takes measurements of noise levels in a room, then displays appropriate levels of noise reduction to the user in the system. The result is a natural sounding audio signal delivered to the other end of a conference call.

The following table indicates the average noise level relative to conference room performance.

Room Performance Rating	Noise Level
Excellent	40-45 dBA
Good	45-50 dBA
Fair	50-55 dBA
Poor	55-60 dBA

Average Room Noise Level: Good 45 (dBA)

Room Noise Level



Room Noise vs Frequency



# LAUNCH





# Summary

- ▶ Inclusivity and lack of audio equity is no longer optional
- ▶ Greater attention must be paid to room acoustics
- ▶ Obtain input from those who have hearing difficulties
- ▶ Improve training for those who are presenting
- ▶ ‘It costs about the same amount of money to design a system correctly as it does to design one badly’  
(Ted Scott, Sound Supervisor – ATV Studios UK, 1978)





**biamp.**<sup>™</sup>

Questions?

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**biamp**<sup>TM</sup>.