

P2650

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Type of Project: New IEEE Standard

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PAR Expiration Date: 31-Dec-2019

Status: PAR for a New IEEE Standard

Project Record: P2650

1.1 Project Number: P2650

1.2 Type of Document: Standard

1.3 Life Cycle: Full Use

2.1 Title: Standard For Enabling Mobile Device Platforms To Be Used As Pre-Screening Audiometric Systems

3.1 Working Group: Pre-Screening Audiometry Systems (EMB/Std Com/PSAS)

Contact Information for Working Group Chair

Name: MOHAN RAJAGOPAL

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Contact Information for Working Group Vice-Chair

None

3.2 Sponsoring Society and Committee: IEEE Engineering in Medicine and Biology Society/Standards Committee (EMB/Std Com)

Contact Information for Sponsor Chair

Name: Carole Carey

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Contact Information for Standards Representative

None

4.1 Type of Ballot: Individual

4.2 Expected Date of submission of draft to the IEEE-SA for Initial Sponsor Ballot: 10/2016

4.3 Projected Completion Date for Submittal to RevCom

Note: Usual minimum time between initial sponsor ballot and submission to Revcom is 6 months.: 05/2017

5.1 Approximate number of people expected to be actively involved in the development of this project: 10

5.2 Scope: This standard establishes the performance, interoperability and validation requirements of a mobile device platform that typically consists of a mobile phone device in conjunction with a portable or wearable device and associated software, to be used as an audiometric pre-screening device.

5.3 Is the completion of this standard dependent upon the completion of another standard: No

5.4 Purpose: The purpose of this standard is to enhance existing mobile platforms along with linked portable/wearable devices to enable first level of screening for the hearing impaired.

5.5 Need for the Project: Screening and Diagnosis of hearing impairment is performed by trained Audiologists and/or Clinicians using specialized Audiometric equipment like Auditory Brainstem Response (ABR), Oto-Acoustic Emissions (OAE) and Audiometers. These equipment need a specialized anechoic chamber and are expensive to procure and operate. Hence, this limits their Availability, Accessibility and Affordability (3A's) in emerging economies.

This project is intended to address these 3A's by developing standards that enable the usage of existing mobile platforms for pre-screening of the hearing impaired.

5.6 Stakeholders for the Standard: (1) People with hearing disabilities

(2) Institutional & Individual Care providers

Intellectual Property

6.1.a. Is the Sponsor aware of any copyright permissions needed for this project?: No

6.1.b. Is the Sponsor aware of possible registration activity related to this project?: No

7.1 Are there other standards or projects with a similar scope?: No

7.2 Joint Development

Is it the intent to develop this document jointly with another organization?: No

8.1 Additional Explanatory Notes: Additional supporting material to Section 5.5 :

A brief background about the problem*

* The background material here is related to the Indian population. Similar unmet needs are relevant across many parts of the world.

Hearing loss of a significant degree is present in 63 million Indians and accounts for 9% of all disabilities in Urban India and 10% in rural India. Of these, 7% are born with a hearing disability (Shelley et al 2009). Similar figures - 5 in 1000 have been obtained from (Nagapoornima et al 2001) and 4.1 in 1000 (Balaraj et al. 2014).

Rural areas has a higher prevalence of deafness -15% as compared to 5.3 % in urban areas. In children below 10 years, 5.4 % of rural children had a disabling hearing loss as compared to 1.2 % in urban populations.

Basic Design Issues in Conventional Audiometry

* Acoustic Noise levels are high in the clinical or ambient environment

* Electrophysiological responses are affected by electrical noise common in Neonatal Intensive Care Unit (NICU).

* Movement of infant or child prevents observation of response

* Varying and interrupted power supply is common in rural areas

* Frequent breakdown of portable machines and ear probes

* Repair and calibration support on a sustainable basis

* User interfaces that are simple and easy to use

Specific Audiometric criteria

Neonates and infants:

* Neonates- Size of ear canal and pinna very small.

* Diagnosis done in two levels- OAEs and if it fails, then ABR. If both ABR and OAEs could be tested simultaneously, the report would be conclusive.

* Natural stimuli to test infants with automatic response detection.

School screening:

* Ability to detect middle ear problems since incidence of Otitis Media is high in school children.

Stimuli:

* More natural sounds and a fun way of response as an option for preschoolers.

* Options to test for central auditory disorders, automated speech audiometry.

Stakeholders in India

o Government of India- Ministry of Social Justice and Empowerment (National Policy for Disabled Persons (2006))

o Services through NRHM via ASHA workers who take care of Disabled through District Disability Rehabilitation Centres

o Education for disabled through Sarva Sikshan Abhyan for 5-14 years and through IEDC Integrated Education for Disabled Children schemes for 15-18 years

o Rehabilitation Council of India- Nodal agency for training personnel to identify and habilitate persons with disability

References

1. Augustine, A.M., Jana A.K., Kuruvilla, K.A., Danda, S., Lepcha,A., Ebenezer, J., Paul, R.R., Tyagi, A., and Balraj, A (2014) Neonatal Hearing Screening - Experience from a Tertiary Care Hospital in Southern India. Indian Pediatrics Vol 51(3):179-183

2. Mishra A, Verma V, Shukla GK, Mishra SC and Dwivedi R.(2011) Prevalence of hearing impairment in the district of Lucknow, India. Indian J Public Health 2011;55:132-4.

3. Nagapoornima P, Ramesh A, Srilakshmi, Rao S, Patricia,PL, Gore M. Universal hearing screening. Indian J Pediatr. 2007;74:545-8.

4. National Policy on Disability (2006)

5. Paul ,A.,K.,(2011) Early Identification of Hearing Loss and Centralized Newborn Hearing Screening Facility-The Cochin Experience.Indian

Pediatrics vol 48(5): 355-359

6. Vaid N, Shanbag J, Nikam R, Biswas A. Neonatal hearing screening - The Indian experience. Cochlear Implants Int. 2009;10,111-4.