Thematic Workshop

THEMATIC WORKSHOPS

Safe listening! How I enjoy music and avoid a silent future (The Global Initiative for Inclusive ICTs – G3ICT)

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(Please stand by for the ITU WSIS Forum session Safe Listening! How I Enjoy My Music and Avoid a Silent Future. The programme will begin momentarily.)

(The ITU WSIS Forum will resume momentarily. Please stand by for the session Safe Listening! How I Enjoy My Music and Avoid a Silent Future.)

>> ANDREA SAKS: Hi, ladies and gentlemen. We had a late start. I'm terribly sorry about that. We have a few technical issues. Welcome to Safe Listening! How I Enjoy My Music and Avoid a Silent Future. And rather than tell you exactly what it's about I'll let my panelists do that. Let me introduce them to you. From left to right.

First we have Dr. Shelly Chadha. Have I said it right? Oh, great, okay.

Then we have next, from WHO, excuse me, and then I'm not going to pronounce everything right. Gored di Serrano Pons also from WHO. On my right I have Professor Masahito Kawamori from keyio university and ITU Question 28. I have Stephen Wheatley who is from the U.K. and represents his company that is here, angle hour conduct and Brian Copsey who works at ITU-R and deals a great deal with assistive listening device. I'm going to open with someone who is not here who is participating remotely, a young man by the name of Matthew Brady who is a young person who is actually experienced hearing loss by using a device where he was listening to music with ear phones or ear pods in his ears. To fully understand the problem regarding this, you should listen to somebody who had the experience.

Can I have the connection with Matthew? Can we hear him? Matthew Brady? Sorry I'm mucking up your name.

>> MATTHEW BRADY: That's okay. Can you hear me loud and clear?

>> ANDREA SAKS: Can we hear Matthew?

Everybody put your ear phones on? Can we hear him?

>> MATTHEW BRADY: Can you hear me, Andrea?

>> ANDREA SAKS: I can here you! Can everybody else hear him? Okay.

What ills happening here? Oh, my lord.

There we go. More technical issues. I'll leave this slide up for a moment. Okay, Matthew. You have the floor. Just tell everybody what happened to you and why this is an important issue. Go ahead.

>> MATTHEW BRADY: All right, great. Thank you, and thank you everyone for coming and participating in this important Forum.

It was an ordinary day for me in the summer of 2009. After plugging in my earbuds and powering up my personal player. I went for a run on the treadmill. I had a player set at a high volume like I usuallily did unaware or more likely unwilling to admit that it was so loud my parents could hear it down stairs. What I did not know at the time was that I was about to pay dearly for playing my music so loud. When I was done with the run and shut down the player, I was unable to hear and I was in pain. I immediately went downstairs and talked to my mother, unsure what was wrong or what to do about it. I regularly suffer from migraines. We thought that was the problem, leading me to take my prescribed medications an get some rest. We thought that would cure the problem, but we were wrong.

Later on that day I recovered somewhat and was able to hear again, but I was still suffering from some pain. Over the next several days I noticed that this was not just a one-time event but that I was continuing to have pain in my head and ears.

I knew then that it was not a migraine since the pain was unlike anything I previously experienced. I also noticed that I was starting to have trouble hearing people, especially in situations with strong background noise. As

these issues continued I realized I needed medical help to figure out what was the matter.

This began what would ultimately become a year long quest to discover what happened and what could be done about it. Early on doctors struggled to connect my problems to what happened with my music player. Any standard hearing test they gave me would come back normal and the pain I was suffering was a total mystery to them. As time went on without answers I began to question if they thought I was crazy and making up my symptoms. Worse, though, was the struggle to participate in conversations amongst my peers at school. Given my trouble hearing in situations with a lot of background noise which includes the cafeteria, time to engage in conversations there was almost impossible. I knew people around me were speaking, but if they were anywhere other than directly next to me, it would be very difficult for me to comprehend what they were saying.

Eventually I was sent to see an audiologist who specializes in noise-related hearing loss. At this point it had been a year since I first noticed a problem. So I was relieved to finally have some concrete conclusions about what happened.

Through the use of a specialized ear scan, he was able to confirm that my hearing was damaged when exposed to high frequencies. The result of the destruction of the little tiny hairs that move sound through the ear. More importantly, he concluded that the key reason for the damage was how loud I was using my music player. Every time I turned it on, I had the volume up almost as high as it could go. Of course, I know better now. But at the time I really did not think about how loud I was playing my music. There was bad news, however, in that there was nothing I

could do to reverse the damage or improve my hearing. The best I can do is position myself so that the conversations I want to hear are in front of me so that I can see the person speaking.

Back in 2010, conversations such as the one we are having today were just starting to gain widespread attention. The study was just being released in the U.S. that revealed an alarming one in five teenagers were suffering from some degree of hearing loss. It was the beginning of the recognition of the problem and the vast number of people who suffer from it like me.

Today I still struggle with the damage done to my hearing. Every time I am in a loud environment such as a crowded restaurant or social gathering, I struggle to hear other people, even if they are right next to me.

I also have to be careful any time I am listening to music and keep the volume down and limit my listening time. If I do not, I can experience some slight discomfort in my ears. My hearing damage is going to be a problem that haunts me for the rest of my life. It is something that I can not escape.

But! I think others can escape the problem. There are many other young people who play their music at high volumes. Any time you pass someone and can hear their music through ear buds or headphones it is simply too loud. They are probably blind to how damaging that level of exposure is especially so close to the ear. Raising awareness of this problem is important to solving it. If people are unaware of the damage they are doing they will not want to change their behavior. Fortunately turning down the volume and regulating listening time are easy regulations to make. I can tell you with the utmost confidence that the benefits outweigh the

risks. I live with the consequences of playing my music that loud every day. Struggling to hear in normal situations is not a pleasurable experience and one I wish I could go without. Thanks to my previous unsafe listening it is a daily occurrence. It is something I hope others never have to experience.

As I conclude, I want to reiterate that the best thing about this type of hearing loss is that it is preventible. Safe listening practices are easy and do not take away from the overall experience of listening to music. By encouraging people to use them we will be building a better future. Our hearing is a precious sense that connects us to the world around us. We ought to do everything in our power to protect it. Thank you.

>> ANDREA SAKS: Matthew, thank you very, very much. How old.

(Applause.)

>> ANDREA SAKS: Wait a minute. Everybody wants to applaud.

How old were you when this happened?

>> MATTHEW BRADY: I was about 15 or 16 years old.

>> ANDREA SAKS: And how old are you now?

>> MATTHEW BRADY: Almost 23.

>> ANDREA SAKS: Great. You're in college and everything and you're studying to have a career. And.

>> MATTHEW BRADY: Yes.

>> ANDREA SAKS: Has this impacted your life in college?

>> MATTHEW BRADY: Absolutely. Even -- I still can hear in loud situations. Every time I'm in a social gathering, crowded reception after a speaker or something, I struggle to hear the people next to me. So dit does affect any ability to connect with other people and build

relationships.

>> ANDREA SAKS: I think you are wonldz fully brave to share this story with us today. I think it is the best way we can begin.

Are you going to be able to stay on and listen to other sphears?

>> MATTHEW BRADY: Yes.

>> ANDREA SAKS: Fabulous. Then if you want to say something, just yell at me, okay?

>> MATTHEW BRADY: Okay.

>> ANDREA SAKS: Great. Thank you very much, Matthew.

>> MATTHEW BRADY: My pleasure. Thank you for having me and listening to my story Mr. .

(Applause.)

>> ANDREA SAKS: Okay. I'm going to go to the next speaker who is Dr. Shelly Chadha, who is from WHO, who brought us together at the ITU to get involved in this particular problem and project. And she is the one that had the seminar at WHO.

So over to you, Shelly. And you tell us more.

>> SHELLY CHADHA: Sounds good. And --

>> ANDREA SAKS: Are you controlling those slides?

>> SHELLY CHADHA: I still don't have them on.

>> ANDREA SAKS: Hang on a second.

>> ANDREA SAKS: Go ahead.

>> SHELLY CHADHA: Thanks, Andrea. Yes, I did start the process of bringing us together. Thank you for taking up this cause so wholeheartedly.

I am going to briefly share what the WHO programme for prevention of deafness and hearing loss is, what it does briefly. And also why this initiative on make listening safe.

Talking briefly about the programme, I thought I was controlling it, but it looks like it is not happening. Okay. This programme works with the vision, depress once again of a whorled in which

no person experiences hearing loss due to avoidable causes and those who have hearing loss due to unavoidable causes can achieve their full potential to rehabilitation, education, and empowerment.

This programme focuses essentially on very vast effects of hearing loss, ear infections, child and adolescent hood hearing, age related, most importantly on hearing loss which is caused due to noise exposure. And one of the key elements of that, of course, is hearing loss which is due to recreation noise.

And how WHO does this is one, by undertaking advocacy, evidence based advocacy with respect to hearing loss and by providing technical support to its Member States, the 194 countries part of the U.N. system in order to develop and implement strategies on hearing care.

Last year WHO highlighted the fact that hearing loss due to recreational noise exposure is a major issue. It estimated that over 1 billion young people are at the risk of hearing loss due to the unsafe listening practices. 50 percent of people we found listened to sounds at unsafe levels through their personal music players and around 40 percent of people are exposed to potentially damaging noise at recreational venues such as diskos, clubs, et cetera.

When we say unsafe listening, as you heard Matthew saying as well, what we essentially mean is listening at high volumes, loud volumes, listening for prolonged periods of time and habitual or regular listening at such loud volumes over long periods of time.

This is what constitutes unsafe listening practices. Giving you a brief tutorial about how sounds affect our ears. So you can see here the ear. Anyway, you can see the ear and you can see

that the sound waves are coming in, striking the ear drum. It causes the sound waves cause the ear drum to vibrate, which also sets into motion the little bones which are present behind the ear drum. And this causes sound waves to travel into the snail shaped structure, the cochlea, that's where the sound waves go.

And inside the cochlea are these tiny little hair cells which move in order for us to listen. And if I show you the close-up of the hair cell it looks looks something like this. It's one single hair, at the bottom of it is a little nerve ending. So whenever the hair cells move, it actually converts, the cell converts the mechanical energy of movement into electrical impulses which are picked up by the nerve endings and then conveyed to our brains.

So this little hair cell is responsible. It is crucial for us to hear. And what happens when we listen to loud sounds, what happens if you move your arm too much, if you just start jumping here and jump 100 times when you haven't been used to that kind of activity ore even when you have been used to that kind of activity, you get fatigued, tired. That is what happens to the hair cell when it is forced to move too much or for too long. It gets fatigued.

This is something that many of you would have been experienced if you have been in a noisy situation. You come out with a little ringing in the ear or with the ears feeling a little blocked or heavy. It is because the hair cells are tired. They can no longer move with the same energy. But when you have been in a quiet environment for some time the hair cell recovers and it starts to move well again. You can listen well again.

But what happens when the hair cell faces this kind of onslaught day after day? One day it can

get up no more. It dies out. That day we start to become a little bit, start to have a little bit of hearing loss. And this hearing loss, as more and more cells start to die out, the hearing loss goes on increasing. And a hair cell which we lose once -- we are born with a number of, limited number of such cells in our body. Once it is lost, it can never be regenerated. That's why this hearing loss is permanent.

So what can we do in order to protect ourselves? In order to save our hearing? Listeners themselves have to take responsibility and they can do so by turning the control down, by limiting the number of hours that they listen to music or to any other sounds, by using ear plugs when they are in noisy surroundings such as discompanies or loud sporting -- Discos or sporting events. It wouldn't hurt you to get a regular hearing check every couple of years to make sure that actually your hair cells are healthy and doing fine.

Besides the listener, the essential responsibility for protecting one's hearing does lie with the individual. But there is a larger responsibility with other os, with the society, whether it's parents or toach teachers, doctors, manufacturers of devices, managers of entertainment venues, governments, organisations such as ITU and WHO, each one of us has to play a role in raising awareness about it and facilitating young people and facilitating the users of devices to take the right decisions in order to protect their hearing.

So what WHO did last year was launch an initiative called make listening safe initiative which is launched on the world hearing day 2015. As part of this initiative WHO is intending, trying to raise awareness among all stakeholders, all stakeholders which include people who use

such devices, listen to music, but also manufacturers, stakeholder which include ITU, WHO, audiologists, audio engineers and others to raise awareness about prevention of hearing loss which is, and what efforts can be made in order to reduce this.

So the focus of this initiative is also on personal audio devices. So last year in collaboration with ITU, WHO held a couple of meetings to understand, discuss with stakeholders what we could do in order to make devices which are used for listening a little bit safer for the users. Can it be some information which can be provided, some kind of standards put into place? And I think others will speak about it later on, but standards which will minimize the risk of losing hearing loss through use of a device.

The focus of this initiative is on bringing about a change in behavior because that is really a crucial part of making listening safe. It's for the user or for the individual to understand that hearing is important and that loud listening, prolonged listening is going to damage the hearing. It is going to be damaged permanently just as Matthew shared with us.

So to promote safe listening habits, the focus of this initiative is also on research. Research to look very systematically at the risk criteria for safe listening. And also to standardize, to try and bring about some uniformity to these risks across the world.

In the future --

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>> MASAHITO KAWAMORI: Just what Shelly has presented on human ear mechanisms, we are talking about discussion on Stapedes muscle reflection. This is called, a human has a mechanism called stapedes muscle reflection. It is supposed to, when there is 85DB sound pressure level enters the ear, there's a muscle contraction in your ears. This can be taken as evidence that the SBL, sound pressure level exceeding this level,

85 dB, is too loud for your ears and also there is a latency, short time difference between the acoustic reflection and the input of -- reflex and the input of the sound and the cochlea may be unprotected for a very, very short duration sound because this reflex doesn't take place for this 40 milliseconds to 150 milli seconds. This is what Shelly explained, this is the middle ear and os sickles. There are three bones in your ears that are crucial in getting the sound in your brains. And actually, these three bones, the hammer and the incuss and the stay piece. The stay piece is the -- Stapes that's what I'm talking about. That's the part that touches the membrane. Every time you get the sound, this thing moves.

Then this is the inner ear and this is what Shelly also explained. So you have the air pressure here. You have the three bones. And then you've got the sound going through this cochlea. That will go to the what is called the organ of Corti. Where there are many hair cells. This is the hair cells that Shelly just mention mentioned.

When you have these hair cells damaged, you lose your hearing. And this is how the hair cells are connected to the brain. So the brain gets the transmitted electronic information from the hair cells and reproduces the sound inside the brain.

Now I go back to the Stapedius muscle reflex. When the sound is louder than approximately 85 dB SPL, and presented monal aurally or binaurally, the Stapedius muscle, which is the small muscle attached to this very small bone. This small bone is actually one of the smallest bones in your body. And this is attached to the ear drum. Every time this ear drum moves, the Stapedius, the Stapes will be moved by the stapedius muscle.

This will contract so that the sound doesn't move, the sound doesn't come in. If it's over 85-decibels, this doesn't work. I'm sorry, up to 85-decibels, this doesn't happen. So that means that the ear is okay, but after that, 85, then the ear thinks this is too loud and it doesn't want to hear anymore. That's the situation.

Then this is an SMR, the stapedius muscle reflex mechanism. When you hear very loud sounds, these tendons evolved, they are contracted and so that the sound wouldn't go in. But there is a study that this is an attempt by the body to protect the ear. But this is not so efficient. So when you have sound pressure over 85 dB, this protection is not perfect. That the sound will go in any way and your ear will be damaged.

So one example, a guideline based on this SMR is that sound is recommended not to exceed the SPL of 85 dB. The intensity which may occur, may incur SMR.

If the incoming sound exceeds the sound pressure level of 85 dB, it shouldn't have a steep risement that would make the muscle contraction not fast enough.

And exposure to sound with the intensity higher than the sound pressure level of 85-decibels for a long period of time where SMR occurs continuously is recommended to be avoided.

This is what Shelly has just mentioned about the ear, the hair cells not being able to return to the original state.

This is one example of what we are discussing. And we are not actually redoing all the things that other organisations are doing, but since we don't have much text, we are offering it as a sort of background and justification for why we are doing this. Because there is actually a question: Why should WHO and ITU be doing this

kind of thing? Or is there any justification for setting any guidelines? I think this is one example of justification, a justification of having a guideline recommending specific level of sound pressure.

And more work to be done? And we are expecting more contributions. The next Question 28 meeting will be in the week of the 24th and 26th of May, this year. Actually this month. And also we are trying to get experts from various organisations to gather together to discuss how to harmonise and proceed with this document and which will be made in the form of a workshop which will be held on the 6th of June 2016 in Geneva next month.

So if you are interested, please visit our site as well as write to the Secretariat of ITU and express your interest in participating.

Thank you.

(Applause.)

>> ANDREA SAKS: Thank you very much, Masahito. I'm going to move us along a little bit because we have only so much time. I think both of those were extremely important background presentations.

I want to move to Stephen Wheatley of HearAngel. I guess we cfer you a manufacturer in some respects and became very interested in hearing loss about six years ago.

>> STEPHEN WHEATLEY: Yes, that's right.

>> ANDREA SAKS: I'll let you -- wait a minute. Okay.

So that's great. I won't worry about it. I have an assistant.

We'll let you go right ahead. There you go. Let you do your own. That works much better. Please go ahead.

>> STEPHEN WHEATLEY: Good afternoon. Yes, Stephen Wheatley.

I have been asked to talk about whether we can use Dosimetry for safe listening.

So I don't think we need to dwell on that. It's pretty well known that long-term use of headphones is causing harm. 43 million people already have hearing loss, much of it from personal audio devices and then restating Shelly's 1.1 billion people at risk in the developed world.

I think the challenge that we have is this is a very serious challenge, we have to find an effective way to protect the hearing of consumers. We can dream all we like about coming up with all sorts of limits and mechanisms, but frankly if they aren't prepared to use them or try to find ways around them, that will have been in vain.

Interestingly, the challenge that we are trying to address here has actually been addressed in the occupational market. So I would like to spend a few moments talking about that. The occupational challenge, there is an EU directive in place that applies to everybody in their working environment. They are not allowed to be exposed to more than 85 dba maximum numb over eight hours or its equivalent. This has been in place, you can see it was passed in 2003, came into law in 2005 in the United Kingdom and elsewhere in the EU.

A number of issues there. People tried using fixed level limiters, set a fixed level limiter at 85 dB. In a the love operational situations, transport particularly, live events, broadcast, the military, there are lots of situations where limiting the output that is received by the user to 85 dB will actually cause operational difficulties and can be life threatening. If you imagine in law enforcement, something like that, if you can't hear over the background noise, you

have a problem.

Also we can't mess around with the sound quality either. It municipality affect that.

In the occupational approach, our first suggestion is reduce the ambient noise if you are able to do so. So, for example, in broadcast environments we are now recommending that comment Tatetors and things of that sort wear ambient noise headphoned and reduce the sound with Dosimetry. That limits the sounds, which is offset the periods when they are not listening or not on duty. We optimize the user's dose and don't affect sound quality.

Okay. So the consumer Options are, we have to consider do nothing. We can consider fixed level limiters and look at individual dosimetry. Doing nothing doesn't seem to be an Option. That would be casting that 1.1 billion people to their own devices. It is the current situation, very little has been done to protect them. It will certainly lead to more hearing damage, possible health and financial and perhaps legal consequences. Certainly it is not acceptable long-term.

So fixed level limiters. A lot of devices already include fixed level limiters. You will notice on your mobile phone when you plug the headphones in and flick up the volume it will say you're going above a certain level. If you don't turn the limiter off, you're being operated on a fixed level limiter. It is based on assumptions about what you are listening to. And also the sensitivity of the device you are using.

As a consequence, many of them actually over protect people. If you are working on not allowing you to have a signal over 85 dB. Actually the legislation that is existent at the moment is an average of 85 dB.

It causes problems for those with hearing

issues. And it makes the devices unusable in some of the most common listening environments. So in the tube, on the Metro, on trains and generally on public transport.

If you try it, you have probably done what most of us do, which is ignore it or turn it off.

Those are the first two Options. Then we look at individual dosimetry. As in our occupational solution, we are permitting periods of listening above the average which are offset against periods when you are not listening. It optimizes the user's experience, whatever the recommended dose level is. It can't affect the sound quality otherwise the user is absolutely not going to use it and it can be accommodated by customization for those already with hearing conditions. It would be possible to look at it and get an audiologist to set new parameters that aren't necessarily those for the general public.

We look at some behavioral insights. Consumers don't like being forced or being told to do things. They tend to react badly. They like Options. And one way you can use individual dosimetry is to provide them with useful information that is accurate. And then give them Options about what they might decide to do next. They could have an Option, for example, to protect themselves automatically, but that would be their Option to do it.

So what do we do? Well, first thing is we measure. There are three variables, we are told, that contribute to hearing harm. How long you listen, how loud you listen, how intense the energy is in the signal that you are listening to.

If you measure those things, which is very difficult for consumers to do at the moment, it is actually quite difficult to do in the laboratory. So the idea would be to make it

available to consumers so they can do it using perhaps the smartphone. You then give them information. That information would suggest to them that they are perhaps listening at a level which is damaging their hearing. That is educating them. Then if they wish, you can start to protect them. At least we are giving them tools which enable them to make an informed decision.

So just to reiterate what I said a moment ago, notices two signals are both for the same period of time. They are both the same volume setting on the device. You can see the one at the back which is electronic dance music has considerably higher energy content than that at the front which is speech.

So that argument is, you can listen a lot louder for a lot longer to speech.

At the moment the consumers don't know that. They have no choice.

So as far as an adult consumer is concerned, give them information about the dose and how they are using it. Give them information. Hope that educates them. Should they wish to be protected they can select automatic protection which will protect them within whatever the hearing health recommendations are.

Perhaps more so is to protect the next generation. We recently conducted a parental survey that indicated that children as young as three are given headphones by their parents regularly for use over an hour. Goodness knows what the volume settings are in there but the children can change them. Volume settings aren't generally set on tablets and phones. One Option is to give the parent the control. Give the tablet or the device to the child with the maximum dose and volume set and they can manage it.

Thank you for your attention.

(Applause.)

>> ANDREA SAKS: Thank you very much, Stephen. I'm very grateful you came all the way from England on a bank holiday weekend. It's kind of you and I'm appreciative of your presentation.

The next person is somebody I have been working with specifically on several issues. And what happens if you do lose your hearing? You have to use hearing aid or an assistive listening device. That puts you in another realm of possible danger and possible difficulty in terms of being able to hear. I thought it was appropriate to have Brian Copsey come and explain this to us. Brian Copsey, can I say, you do use the devices yourself and I'm due to go get one. Please, Brian, go right ahead and fill us in on what happens should you lose your hearing which also should inform parents and other people that it is very wise to do as Stephen and Shelly have suggested, along with Masahito. Go ahead, please.

>> BRIAN COPSEY: Thank you very much, Andrea. Thank you for inviting me. Good afternoon, everyone.

I am going at a slight angle on what has been said before. I am focusing on the many children and adults using assistive listening devices and T-coil systems within their hearing aid. Depending on whose figures you wish to look at, something like one in four people will require some form of hearing aid or assistive listening device during their lifetime. Unfortunately, a lot of the younger generation with or without the disadvantages of the hearing loss we have been talking about, are deemed to be having worse hearing than their parents and future, earlier generations.

The existing situation for radio, assistive

listening device use radio spectrum to provide a link between the hearing aid and the microphone held by a speaker. That could be a teacher. It could obviously be a mobile phone or it could be a TV. So the radio link is pretty important in conveying that information.

The majority of these systems use the 2.483 gigahertz spectrum which they share with wifi and thousands of other systems.

This is the only short range device worldwide spectrum there is, which is needless to say why everyone wants to use it.

The existing situation with T-coil, T-coil is a magnetic field system using a wire loop to generate inductive currents which are picked up by a receiver in the hearing aid. The majority of hearing aids contain a T-coil receiver.

This gives a brief overview of the type of things that can be connected to assistive listening devices, remote controls, mobile phones, media gateways, computers, all of the wonderful things that we take for granted. And these, of course, go direct into the ear. There is no buffer between the ear and a hearing aid.

I would like to deal with the education situation. Radio aids have the potential to greatly enhance the listening experience of deaf children by improving the audience built of speech in -- audibility of speech in situations where distance, background noise and reverberation make listening difficult. This is the N D.C. S quality standards for the use of personal FM systems, 2008.

This just gives a typical picture of the use, depending on which school and which country. In many countries, each pupil with or without hearing loss has a microphone and a receiver. And they are all perceived to have the same opportunities. It can be the child talking or it

can be the teacher.

What could go wrong with such a wonderful use of radio spectrum? Well, whilst systems made by major hated manufacturers are classed as medical devices and contain audio level limiter, a few companies marketing Toure guide systems are now targeting schools and other places of learning.

A Toure guide system is designed for adults with normal hearing and who, one hopes, will use the volume control sensibly. In the case of most children, the normal situation is "as loud as possible" as we have heard previously this afternoon. Even though volume and clarity are not the same thing. In a child with already damaged hearing, this has the possibility of increasing the damage, quite dramatically in some cases.

These particular figures are taken using the standard hearing aid measurement systems and the figures in curve 4 are the ones which you should look at. You can see the figures in the graph itself.

That's the hearing aid system. And this is the Tour guide system. If you look at the figures they are considerably higher. Of course, this is only with one set of tests. If we have peak levels from some form of transient that will undoubtedly exceed these figures. There is no limiter on the Tour guide system. This is the U.K. national health service evaluation audiogram. These are probably similar for most countries around the world. If you compare the figures in the curve four with these, you'll see that the Tour guide system is not going to be very favorable for those with any form of hearing loss.

Moving on to the T-coil, audio frequency induction loop systems, wonderful acronyms we manage to end up with, also known as hearing loop

systems have been on the market since the midelled of the 20th century, with the first recognizable patents appearing in around 1938.

These improve hearing and are an important tool in the reduction of scrims against disabled people.

The use is in all forms of place is of worship, entertainment, places of entertainment, places of education and ticket booths and service counters as well as domestic situations providing huge benefits to users with impaired hearing.

Certainly in the U.K. you see this little blue sign. That's where you can use your T-coil.

They provide an audio frequency, that works with hearing aids, cochlear implants. This magnetic field is generated in a wire loop that is fed by an audio frequency amplifier which is cable of driving current through an induction loop in turn which is fed from external signals such as those generated about by microphones, audiovisual equipment and musical quirmts. They operate below 9-kilohertz and have a very limited range. They are widely used around the world. The discrank shah you are required to fit a loop with a fairly thick cable and use of fairly high currents in order to use it. You can only have a single channel. The noise level is now becoming quite high.

The possible problems that we are facing, there are a range of new technologies referred to as wireless power transfer or wireless power transmission, WPT, under development. These allow the transfer of the electrical power without the use of a cable. The examples are charging a mobile phone or bus, heating an electric kettle, charging domestic appliances in the kitchen.

The first problem, whilst so far no wireless power transfer systems are using the same

frequencies as the T-coil, they are very close neighbors. And, of course, when you are dealing with these types of frequencies it is very, very difficult to generate filters especially when you are dealing with a hearing aid which is very small. Many bus stops have miniature wire loops to inform those with hearing aids of the bus timetable or other information. This is mandatory in some countries and voluntary in others.

An electric bus requires a very high charging current. When charging is switched on and off, there may be large transient pulses which will affect the T-coil loop and receiver, producing a very large click or splat in the user's ear.

The issue here is that the bus systems may only have charging at either end of their route, or depending on how long that route is, it may also be in the intermediate stages. In many cases people have to get off, partly because of the currents which can be generated and have been found to cause problems with things like heart pace makers. In order to verify if there is a problem, thanks to Ofcon U.K., we are testing these in million con Keynes.

Problem two, T-coil receivers in many hearing aids are permanently on. Therefore, in a kitchen using WPT for, say, a kettle, the same situation as the bus occurs. We do not know how far both in frequency and physical distance the pulses will travel. We are in the process of arranging practical testing to verify the situation.

Going on to the radio use I mentioned earlier, the prime frequency band for hearing aid systems is the 2.24-2.483. As previously stated the only worldwide spectrum available for short range device family. This, of course, includes wifi, Bluetooth and many more. The adjacent band, 2.3 to 2.4, has now been allocated for mobile phones.

Practical testing has shown that dependent upon the proximity of a mobile phone using this spectrum, roughly one to 5 meters, either interests experience or loss of audio will occur.

Think about that. One minute you have your hearing operating normally in a situation. Suddenly everything goes dead. How do you explain that to a child or an old person?

We also have many hearing aids in the 863 to 865 mergts band. This is used for cordless audio within Europe and is home to many ALD systems and many hundreds of thousands if not millions of cordless audio and similar forms of device.

The proximity problem is very similar to the 2.4 gigahertz. Dr. Karcher has carried out testing with cordless audioless headphones similar to ALDs and the link below provides access to his work. I think you will be quite surprised if you click on this link and then listen to the impact. I don't think most people have appreciated yet. These bands are only just starting to be used by the mobile community. And the density of devices is still fairly low. Of course, you have the possibility that they can use something like six or seven different frequencies. So it is somewhat of pot luck whether you are by a mobile phone using this spectrum. But as the density increases, you undoubtedly will be.

Conclusion. The Safe Listening! How I Enjoy My Music and Avoid a Silent Future is much more complex than simple turn down your headphones and music player. And it is a very widespread situation than it first appears, which needs to be constantly monitored for ALD and hearing aid users. Pressure on spectrum for new systems increases daily. Most of those working on the new technologies, other than the mobile phone increasing when approached are helpful and are

attempting to min nice problems. At the same time manufacturers of ALDs and hearing aids are attempting to find solutions to the problems. It is not easy in such miniature devices.

The ITU Joint Coordinating Activity monitors these and similar issues informing other groups as information becomes available.

Thank you for your attention. Just one final point. The information I have just supplied, when provided to the wireless power transfer people, caused total consternation. They hadn't even thought these types of things could be a problem. So, therefore, there is a great need for information to be shared. That is where ITU is a prime place for that to take place. Thank you very much.

(Applause.)

>> ANDREA SAKS: Thank you, Brian. And the work goes on, doesn't it? We have been working on that for some time.

I am going to give the floor now to Dr. Gored di Serrano Pons. Afterwards we'll have a discussion. Please go ahead.

There you go.

>> JORDI SERRANO PONS: Thank you very much. You hear me well? Yeah?

I'm gored di Serrano Pons, I work in World Health Organization in department departments, innovating in several approaches, one of them is mobile apps. I am happy you invited me to participate in one of the initiatives, making listening safe photograph WHO is developing different things, different innovative approaches. One of them is the different mobile head ups, the empowerment that is working. They have launched different apps. One is the WHO CBR, the community based rehabilitation app to facilitate interviewers of communities, to develop some assessment tools. Another app that

we have been developing is assessment tool for TADDS.

Also personally I have been coordinating an app for Zika. We have been working on that. It is interesting. Because of all these initiatives, the World Health Organization has been seen lately as a little bit more innovative than usually. For example, in the, one of the best medical apps, journals of the world they were comparing to us, trying to get a better reputation compared with CDC and all that.

So the introduction of changing international organisations, after all, we are here to say why safe listening app, no? We have tried to develop or create an app that would try to be one of the initiatives of the WHO and why is easy. As Shelly plained, nearly 50 percent of people between 12 and 35 years old are listening to unsafe levels, with many of the devices. Basically, smartphones are one of these devices. So the smartphones could be one of the major potential causes of that problem. But also smartphones could be one of the major potential solutions because that would be the paradox, you know? As you see, global smartphones forecast are really very important for the next generation in Developing Countries. Everyone wants to have a smartphone. We have smartphones for 50 Euros, $30 soon. In the market we will have these smartphones soon in the market, in some of those companies called Obi, the smartphone for less than $50 in Africa. So with all these initiatives, we want to develop an app that would help people to monitor and assess the sound of their listening. The purpose of that is to monitor the sounds that you are listening.

The initial look of that app, we have a media player. We have a current sound dose level of what you are listening now. Most importantly you

will have here today's sound dose and the weekly dose, different things which facilitate the awareness of what is your current situation. You will have messages, no? We are working on the application flow with the company that is developing the app. Basically it will have, the flow will be very easy for people. They will have to say if they have the headphones connected or not. From there the graphic user interface will help people to know exactly the current situation and there will be different navigations to know exactly the data, to know the information, et cetera, et cetera.

Basically the app will provide three things. The information on sound exposure, the WHO information, and the warnings which are one of the many important things.

The sound exposure will be evaluated, tested through the estimation. We are working on that now in the weeks with the company developing that, a German company. We will have soon a system to assess that data estimation.

Basically then the information displayed by WHO will be, well, there is a lot of information that Shelly has been working many years on that.

And we will see the best way to display information, to produce behavioral changes. It is very important. And also the warnings, it will note that if you really make safe people, you are doing wrong, sometimes people don't react. We are working with a group to explain things in a proactive positive way. We will be testing all that and putting all this content in the mobile app and we expect that along the year, at the end of the year we can have a mobile app that will be called's WHO's safe listening act. It will help in the overall initiative, safe listening, thank you very much. And thank you for coming.

(Applause.)

>> ANDREA SAKS: Well, that's very interesting. I didn't know that was happening. I think that is going to be extremely helpful to many people who don't know how in the heck they can control a teenager.

I want to open the floor to anybody who has a question from the floor or do we have a remote participant who has a comment of any kind?

Mr. Capes Neto, please?

>> AUDIENCE: Thank you, Andrea. A question for Stephen, actually. Is there any emerging of the safety of, noise reduction mechanisms? You mentioned in one of the slides, one of the techniques is to reduce the environmental noise. I think there was, reducing headphones is one of the approaches.

The question myself, I have never seen a reference to tests and measurements that show how safe these technologies are to the hearing. Thank you.

>> STEPHEN WHEATLEY: If I understand the question, how do you know how safe the ambient noise reducing headphones are? That's the question.

In an occupational setting we are blessed with a set of rules called N358, I think. I might be wrong. I wasn't expecting the question.

Or even 352 even, which is a whole set of standardisation around the effect of ahead phone on a standard user. The problem is that the user wouldn't be a standard user because you have a Beard. The Beard tends to lift the cover at the side which allows leakage. You also wear spectacles. You need spectacles that don't go underneath the ear protection.

On the occupational side there is a well trodden path. For the consumer there is no such legislation at the moment, only guidance, I

believe.

>> ANDREA SAKS: Does anyone want to make a comment on that particular question?

Okay. We have some time left. One of the things that struck me is that we have quite a diversified panel. We have Shelly Chadha who is addressing the problem with people listening too long.

We have Matthew. Matthew, do you want to say anything while I have your attention? Are you there?

(There is no response.)

>> ANDREA SAKS: He is not there.

>> MATTHEW BRADY: Yeah, I don't ...

>> MATTHEW BRADY: I don't have anything to add.

>> ANDREA SAKS: Any other problems that could cause damage? Also some of the problems that are causing people who use hearing aid with an inability to hear? We have Dr. Gored Serrano Pons telling me about an app that could possibly solve problems on an individual basis.

We have Stephen who has great knowledge about noise in the workplace and headphones. Then we have Masahito Kawamori who has the standardsization thing.

It has occurred to me, could the app be used on any smartphone? Is it going to be standardized? I am going to put that question to you.

>> JORDI SERRANO PONS: So we, the app will be available in the Apple store and the Android. So that will reach 95 percent and probably later in Windows also will be 100 percent of smartphones.

And this standardisation, of course, the app shows the dose, first of all, with the connection of the headphones and there are many different devices, different types of headphones. It will be a long-term process to have it available

(indiscernible).

>> ANDREA SAKS: Go ahead, Shelly.

>> SHELLY CHADHA: So just to say that this app is actually a media player which can be downloaded on one's -- it is going to be hopefully a media player which can be downloaded.

And regards the standardisation and more importantly also a kind of technical check on it, we have a group which will evaluate it and also field test it once we are in a better, more advanced stage before it is kind of made available out there.

>> ANDREA SAKS: Mr. Capesneto, please.

>> AUDIENCE: Thank you. Yes, I would like to ask (indiscernible) whether -- yes.

(Audio is cutting out.)

Mr. Gored di, what is the algorithm that you are using to measure the level when you do the recommendations for the app? Whether it is based on any early drafts of the work that is being done in Senalak? Or you are using your own algorithm? That's one question.

The other is, it might be useful to share it with us for Question 28 to see what are the criteria and how you are implementing these measurements. It could be done in many different ways for this organisation. Thank you.

>> JORDI SERRANO PONS: So the company that is doing that will be measuring the sound pressure level using the dimensional relation between the root mean square value of the digital output with a correspondence pressure level in the ear canal of the user.

Since I am with you, I don't know more than that, of course, there is the coordinating of the development of the app, but they are especially, this company is specializing in doing that and that is, we will be visiting them soon also on the 18th of May and they will do work which is

checked by the first Committee. You want to say something?

>> SHELLY CHADHA: And regarding Senalak, we have not been in touch with Senalak about this. It is a thought which we can certainly snror. This is still at the beginning state.

I think.

(Certainly explore.

This is still in the beginning state. It is helpful to have them at the next meeting if they have knowledge to share. Also in the context, because I know that Stephen has a lot of experience and a lot of work on dosimetry. Perhaps he may want to add something to that? Or contribute to it in any way?

>> ANDREA SAKS: I think I'm going to ask Masahito.

>> MASAHITO KAWAMORI: I think it's important to have contributions if possible from Stephen's work.

One thing I am wondering about is whether there is a difference between the workplace situation and ear muffs and headphones and music situations. So that's what I'm interested in.

And as far as this application is concerned, I think, the app is concerned, it might be considered sort of a reference implementation from the point of view of WHO. Regardless of the ailing Rich actually being used, like a function of the requirements.

So we can talk -- the algorithm actually being used.

What is the relationship they will produce between input and output. At the same time we can compare that with your app, and dosimetry.

Because you set the requirements and Senalak has one way of implementing that, actually.

>> ANDREA SAKS: Go ahead, Shelly.

>> SHELLY CHADHA: Thank you, Andrea. I want

to highlight that as of now we have been following the criteria which have been set in the occupational setting. For recreational setting. So 85 dB for eight hours is the cutoff which was recommended for occupational setting. This is what we have adopted or adapted for, recreational setting.

However, there is certainly a thought that because the nature of sound one experiences in occupational setting is being more continuous, constant frequency, as compared to music which is a lot of variation in the tempo and Stephen showed that can make a difference to the dose that you are receiving.

So the standards may actually be different for recreational setting. This is one of the things which WHO is also looking at. So we are consulting with people who are experts in acoustic measurements in human ear as well as audiology. Again we are right at the beginning of all of this. We will keep kind of consulting with you as well on this.

But what we are trying to see is as of now what we have done is just like a literature search to see if there is really evidence, published evidence to show that there is a difference. And we have not found any published evidence to show that the human ear would react differently to sound in occupational versus recreational setting, which is not to say that that is set in stone. It is something we are going to be exploring in the coming years.

>> ANDREA SAKS: Of course you are going to keep me informed, aren't you?

>> SHELLY CHADHA: Every step of the way.

(Chuckles.)

>> ANDREA SAKS: Great. I was going to ask if Brian had any other comments he would like to add to this discussion, please.

>> BRIAN COPSEY: Thank you, Andrea. One of the things going through my mind is that within ETSI we have the manufacturers of all sorts of wonderful devices from mobile phones through to cordless headphones, which is my particular group. Dissemination of this information may be extremely helpful to them to understand what is happening and where. And certainly I will be having another discussion on the two standards that we have with audio devices to look at what we can achieve with pointing people towards the correct standards to use or possibly even putting some form of requirement in to those radio corrective equipment standards. Thank you.

>> ANDREA SAKS: Thank you, Brian. This makes me think of two issues here. You're working in ITU-R, Working Party 5A. Is that correct, Brian?

>> BRIAN COPSEY: Yes, I work in 5A and 6A.

>> ANDREA SAKS: And 6A. Masahito, you work in ITU-T, Study Group 16. The health question is Question 28. We do have an accessibility question, which is Question 26.

I'm wondering if, we have something called the IRG, AVA, which is an interests sector Rapporteur's group which handles audiovisual accessibility, that joins ITU-R and ITU together. I didn't know if I liked this group in the beginning but I'm warming up to it. I can see that this particular group may take this particular issue on and we can work in there with both groups at the same time. And I'm going to put a question to our counselor of study group 16 as to if he thinks that might be a possible way of working together with WHO, ITU-R, and ITU-T.

Thank you. Mr. Kapes Neto?

>> AUDIENCE: We have, a platform as I said on audio video accessibility. Currently we are collaborating with Working Party 6B. And if that would need to be extended to other Working

Parties in ITU-R, we can certainly discuss that.
>> ANDREA SAKS: Thank you. Also in the meantime, it might be interesting for WHO to attend question 28 which is before the 6th of June which meets on the days of the 24th through the 25th? Twenty-sixth of May. And I'm sure -- sorry?
>> MASAHITO KAWAMORI: (Speaker away from microphone.)
>> ANDREA SAKS: You have the Assembly at the same time?
>> SHELLY CHADHA: I don't have to be present at the Assembly throughout. So I am happy to come.
>> ANDREA SAKS: All right, fine. I think we might be able to do something a little sooner rather than a little later which would be kind of good. That's the earliest date. It is, I think, auspicious that it's -- auspicious that it's so close. This could go on the agenda, could it not?
>> MASAHITO KAWAMORI: I'm not too clear about what you want to do.
>> ANDREA SAKS: I always have crazy ideas. I'm thinking if we have a contribution or WHO puts in a contribution to Question 28, that this subject could be brought in informally from WHO to ITU --
>> MASAHITO KAWAMORI: As I said, we already have a draft recommendation we are working on. And that started out with joint work with WHO in the first place. So it is the suggestion already ...
(Audio cut out.)
>> MASAHITO KAWAMORI: I don't know what you want to do.
>> ANDREA SAKS: It is really what Shelly would like to do. If Shelly would like to contribute to that particular -- maybe offline we

can discuss this.

>> SHELLY CHADHA: We can discuss that when we meet tomorrow. For my side I'm always happy to come and speak to more and more people, to raise some awareness. The more the people who hear about it, the better it is from my perspective.

>> ANDREA SAKS: That's what I was hoping to do. Is that clear?

>> MASAHITO KAWAMORI: Well, we can have a workshop, but this particular group is dedicated to standardisation, not for promoting. But we are dedicated to standardize things, and those contributions. We have many contributions.

(Audio cutting out.)

>> MASAHITO KAWAMORI: We have an opportunity to do that on the workshop, as I mentioned, on June 6. So I think it is a perfect opportunity for WHO to present. But not for this particular question because we have already agreed to start working on it and we are expecting some contributions from other organisations as well. Of course, this app will be a very good reference model. It is always a welcome contribution. It is not just, I mean Question 28 is not for promoting something. We are doing standardisation, technical work. So the workshop would be good, but it is not for this. Actually, there is a workshop on the first Thursday afternoon, which is outside Question 28. In that particular slot, I think there will be a good opportunity to promote this work, but not for standardisation work itself. Question 28.

>> ANDREA SAKS: If I understand you correctly, unless they were going to bring a contribution towards that particular recommendation that is being worked on, the better Option would be to go for the workshop that is outside. Have I understood you correctly?

>> MASAHITO KAWAMORI: Hmm ...
(No audio.)
>> MASAHITO KAWAMORI: I'm sorry, yeah. It depends on what you want to do.
I don't disagree that from the very beginning we have been working with WHO. We have the inputs from WHO. And we work together on gap analysis and we are hopeful that we will be able to publish this as sort of a technical paper either from ITU or from WHO.
So I don't think that there is any need at this point in time to expect WHO contribution on this.
Because we have been doing this already and we already have the SLD, which is, or was initiated by the contributions from WHO. What we need is text, actual text. That's what we need. I would like to invite Stephen if possible to make some contributions together with WHO. That would be good. Or other organisations who are from ETSI as well, from Brian. That will be all welcome.
But from WHO in particular, we have been working together anyway. And I think it's a little strange for WHO to make a contribution ... It could be a liaison or ...
(Audio cutting out.)
>> SHELLY CHADHA: Because we are not a standardisation agency and we, for us, whether it's me or gored di, we don't have necessarily all the technical know how with respect to the devices and the standardisation process. So what I would like to do is to review. If we feel that there is some pertinent contribution that we need to make in terms of a contribution, we can do so. Otherwise, as Masahito said, it is a partnership venture. It is kind of we are moving togd forward on this. We can always discuss the issues -- moving togd forward on this. We can always discuss these issues.

>> MASAHITO KAWAMORI: That was our understanding. That was the first tenet of our collaboration which started with the joint workshop on consultation in October. And based on that result, we have created this new draft recommendation. So it has always been our understanding that we are working together with WHO. This is sort of a joint document actually with WHO. So it would be strange for WHO to make a contribution to this because it is part of WHO.

>> ANDREA SAKS: Thank you for that clarification. I was pointing out there was a date closer than June 6. You clarified the exact procedure for WHO to get involved if they were going to in Question 28 or possibly the workshop which is have.

But it is.

>> MASAHITO KAWAMORI: Andrea, one thing you don't understand, she has been coming to Question 28 many, many times already. So.

>> ANDREA SAKS: Thank you.

>> MASAHITO KAWAMORI: From the very beginning of this work, WHO has been involved with us.

>> ANDREA SAKS: Thank you again, Masahito, for your clarification.

We are almost at the end. Does anyone want to make any further comments?

Go ahead.

>> AUDIENCE: We mentioned the event on the proposed workshop on June 6. Maybe Masahito could say a few words about the scope of that workshop, which is not promotional in nature but for standardisation, maybe Masahito would like to let the audience know what we have on the agenda for that. Thank you.

>> MASAHITO KAWAMORI: Thank you. It is, just as I mentioned in June, on June 6 we will have workshop jointly hosted by study group 16 for multimedia, as well as study group 12 which is

for quality of service. Because study group 12 has been working with ETSI and Selanak and they have some correspondence, exchange of information between these two organisations. And they also worked on some of the QOS issues related to sound and audio.

So it will be good for us to touch base with them and see where they are and where we are, and what we have, a common understanding or not. If there is any issue with the ETSI approach or the Selanak approach as far as the quality of service is concerned from the point of view of Study Group 12.

Since as I mentioned we also have developed sort of a gap analysis of standardisation bodies and their various criteria and things. I would like to put them on the table and have some discussion on that issue, those issues. That's the nature of the workshop.

>> ANDREA SAKS: Well, I think we've come to the end of our time. I want to thank Dr. Shelly Chad ra, gored di Serrano Pons, Masahito Kawamori, Stephen Wheatley and Brian Copsey for their contribution and for the information that they have given us on safe listening and how -- Safe Listening! How I Enjoy My Music and Avoid a Silent Future.

Thank you very much to all of you. We are over.

(Applause.)

(The session concluded at 1815 CET.)

(CART provider signing off.)

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