Information divide needs to be avoided as digital is accessible to all citizens

"Access to information is a basic right of all citizens of the world. At a time we are working hard to make sure there is no digital divide, digital access should not create an information divide by having barriers to access information". Dr Amal Punchihewa, Director Technology of ABU.

What is spectrum?

Spectrum, as referred to in broadcasting and in the context of WRC-15 is the range of radio frequencies that are used to carry media content. It is a part of the total radio spectrum; i.e. the range of electromagnetic radio frequencies used to transmit data wirelessly. Spectrum is used to broadcast television and radio programmes. Mobile telecommunications, wi-fi and satellite communications also rely on spectrum to deliver their services. They can be described as vehicles which transport content, (radio and television programmes) to listeners and viewers of radio and television services respectively. Frequencies (precisely signals) travel over the air carrying that content and are analogous to vehicles running on roads. Different frequencies can carry different types and quantity of content.

Why spectrum is important for us at ABU and WBU?

Delivery of content Over The Air (OTA) using frequencies is the one of the most efficient way of delivering content to large numbers of recipients. The spectrum is a natural, scarce and limited resource and today it is recognised as an economic resource. Its growth is very slow and deployments at very high frequencies are extremely expensive. For that reason, there is very high demand for services at the low end of the VHF (very high frequency) and UHF (ultra high frequency) bands. These frequencies are used, within the ever widening scope of radio and television broadcasting, to deliver content both in good times and at times of disaster, to inform, entertain and educate the public.

Digital Terrestrial Television-DTT remains the most efficient means of delivering a television programme to a mass audience. This is known as one-to-many communication and is distinct from one-to-one mobile communications focused on an individual link between a user's device (e.g. mobile phone or tablet) and a content provider.

Mobile one-to-one delivery works well if you want to watch one out of many short video clips on the Internet. However, for a live show attracting millions of viewers who want to watch at the same time (e.g. a major sports event) congestion would be inevitable and the network would not be able to support it. DTT therefore gives the best guarantee of viewer access to major live events.

Terrestrial broadcasting also has an invaluable role in terms of universal coverage. Local programming relies heavily on the secure, free-to-air (FTA) signal, and it is the only way to reach certain geographical areas and populations. Even in the case of countries, where cable and satellite television is readily available (e.g. Japan, New Zealand and Australia), terrestrial broadcasting remains an essential mechanism for universal coverage because it can be received in remote areas or sparsely populated areas, free of gate keepers to receive content. (An analogy for this being roads that do not require payment of toll charges.)

Terrestrial radio broadcasting is also crucial in emergency situations, (e.g. natural disasters) as it is often the only technology which continues to function and remain

able to reach a mass audience despite difficult external conditions. (Vis. the 2011 tsunami in Japan). In such a situation, the one-to-one model used by mobile networks is much more vulnerable to both congestion and interruption.

The need for and use of spectrum for various applications seems technical and distant from our everyday lives. However spectrum allocation impacts public access to essential media platforms such as TV, radio and the internet, creating an information divide.

Public broadcasters must ensure that their audiences have access to free-to-air (FTA) TV; this being typically implemented through digital terrestrial television (DTT) - where the signal is received through a TV aerial. The delivery of DTT relies on a certain availability of spectrum.

In the Asia-Pacific region a four billion population relies on DTT. While public broadcasts are also available on pay-TV platforms, like satellite, cable and IPTV, DTT remains the key to public TV access and the most widely used means of receiving television.

DTT's popularity is largely due to the fact that it offers viewers a wide range of television channels as well as catch-up and on-demand services at a very low cost and in excellent quality. It sustains high television viewing figures in Asia-Pacific and despite the fact that Internet consumption of audiovisual services is rising, television viewing shows no signs of declining.

Who manages spectrum and why?

Spectrum being a scarce and natural economic resource, it is important that it is managed well for the benefit of the society at large and in the interests of individual countries. Generally, frequency spectrum is managed by these countries under regulations agreed by all member countries of the ITU-International Telecommunication Union. The ITU handles spectrum management globally by assigning each country to one of three regions. The Asia-Pacific falls in region three where island countries can enjoy the spectrum quite freely, but-countries having borders need to coordinate with their neighbours.

What are the main functions of a spectrum regulator?

There are three main functions for a spectrum regulator. These are (i) allocation, allotment and assignment of frequencies, (ii) planning for future services and (iii) enabling an environment for legitimate frequency users where interference levels due to co-existing services are maintained at acceptable levels.

Are regulators missing some of these main functions?

In Asia and Europe, broadcasters are planning to introduce UHDTV-1 and UHDTV-2 terrestrial services. Though digitalisation did free up some frequencies due to multiplexing of a number of programme channels to a single frequency, UHDTV-1 and UHDTV-2 services require 4-fold and 16-fold increases in bandwidth respectively. Even then, these increases are based only on the consideration of the spatial improvements. If the temporal resolution and intensity range are also increased, with high dynamic range image sensing, then bandwidth requirement can

escalate further. Broadcasters find it difficult or impossible to carry out trials or regular services without having sufficient access to frequencies.

Some case studies from Asia-Pacific:

In Asia-Pacific only three countries, viz. Japan, New Zealand and Australia, have switched off their analogue television services and none of them are considering a switch off of analogue radio.

Malaysia, Thailand, Indonesia, Singapore and Vietnam are currently working on their DTT plans. A number of them have targeted Analogue Switch Off (ASO) after 2020. While other countries will delay this till well beyond 2030.

According to recent news, Malaysia will invest 5 billion ringgit (nearly 2 billion US$) in next 15 years in rolling out DTT. This is a huge investment that needs to be protected over at least the next two or three decades.

In New Zealand, ASO took place in December 2013. Free-to-air (FTA) DVB-T services are operated under a consortium of both public and commercial broadcaster, known as Freeview. New Zealand is a small island nation in the South Pacific, with a population of 4.5 million. It consists of two main islands and is over 1,600 kilometres (990 miles) long, yet narrow (a maximum of 400 kilometres (250 miles)).The 'Freeview' concept was extended to terrestrial broadcasts in 8 areas from 18 transmission sites covering 75% of the national population with the launch of DTT in 2008. This was extended in 2011 with a further 12 sites to increase coverage to over 87% of the population. Thus digital transmission was well established before the analogue switch off in 2013. With the large number of transmitters required to achieve a high level of coverage over such a challenging topography, the four national VHF services had already completely filled that band. There was therefore no usable frequency in which DTT services could be accommodated. At the time of ASO the Television Broadcasting section of the UHF band was reduced from 518 ~ 806MHz to 510~ 686MHz. Thus any continuing DTT transmitters that were in the upper part of the band had to be returned ('restacked') to operate in the remaining spectrum. This restacking was carried out as early as possible at each site, to minimise the number of viewers affected, given that the number of digital viewers was increasing over time. Much of this work being completed prior to ASO.

In Japan, ASO took place on 24th July 2011 and they are now planning to leap frog to UHDTV-2 (8K) with terrestrial transmissions by 2016 while UHDTV-1 (4K) is available via satellite.

Indonesia, the country with the fourth largest population (240+ million) in the world is a vast country and has a widespread network of over 400 Transmitter stations serving 50+ million TV households, investing US$ 40-80 million on DVB-T2. Channel 49 to Channel 68 in 694-854 MHz has been forgone as digital dividend. 2018 is the country's current ASO target year. Provision for disaster communication has been maintained by including the EWS-Early Warning Signal features in the technical specifications for standard STB and Digital TV Receivers.

Thailand adopted DVB-T2 in June 2012 according to a road map presented in Feb 2012. DSO-Digital Switch Over service licences were issued in 2014 using a 'beauty contest' approach. The technical standards for Transmission and minimum technical standards for receivers were decided in 2012. Thailand has 39 MFN-(Multi Frequency Network) main sites, 127 SFN (Single Frequency Network) sites and gap

fillers. The system parameters were selected for both portable and indoor reception. Thailand is committing heavy investments to DTT and will need to operate and serve over 2 to 3 decades over life cycle of the infrastructure. It is anticipated that a DTT coverage of 95% of households can be achieved by the year 2017.

Hong Kong entered a new digital broadcasting era when the two incumbent terrestrial broadcasters, ATV and TVB, successfully launched DTT services on 31 December 2007. Since then, ATV and TVB undertook the phased construction of a total of 29 transmitting stations, bringing the overall DTT coverage to at least 99% of Hong Kong households by September 2013. This coverage being on par with that of the previously existing analogue television broadcast infrastructure.

The HK Government has encouraged the viewing public to switch to DTT to enjoy its benefits and DTT take-up rate has grown with time. According to a public survey conducted in March 2014, about 80% of total number of households in Hong Kong (approximately 1.9 million households) is receiving DTT. The Government launched a dedicated digital TV website (www.digitaltv.gov.hk), to raise public awareness of DTT and promote consumer education. The website contains useful market and technical information including a database of DTT service coverage and a list of registered DTT receivers under OFCA's (office of the communication authority) labelling scheme. In June 2011, in view of the actual implementation and market situation of DTT development at that time, the Government decided to defer the working target for switching off analogue television broadcasting from end 2012 to end 2015.

In summary, it is anticipated that ASEAN (Singapore, Malaysia, Indonesia, Brunei, Vietnam, Myanmar and Thailand) will enjoy economies of scale and will leapfrog to DVB-T2. The seven countries are populated by around 470 million people.

WBU-ABU position on Spectrum and Recommendations:

ABU supports work to protect broadcasting spectrum:

The ABU declares full support for the world's broadcasters in opposing changes to the allocation of digital TV and satellite distribution spectrums.

We have worked with the World Broadcasting Union's Technical Committee's formulating recommendations on spectrum allocation to go before the World Radiocommunication Conference (WRC-15) in Geneva, Switzerland, next year.

The Union's Technology Director, Dr Amal Punchihewa, says the ABU fully endorses the work done by the WBU and its member broadcasting unions to protect important spectrum for broadcasting services. - "As radio spectrum becomes more crowded," he insists "It is vital to protect its integrity for broadcasters who serve billions of viewers and listeners around the world."

The WBU recommendations state that the use of radio-frequency spectrum by broadcasters remains, "an important vehicle for the efficient and scalable delivery of high-quality media content and emergency alerting services to both fixed and mobile audiences".

Specifically regarding DTV, the WBU does not support any change to the current spectrum allocations at UHF frequencies (470 –694/ 698 MHz), stating that contiguous spectrum should be allotted in the bands assigned to the broadcast service to allow for the robust delivery of high-quality media content, data and signalling that meets or exceeds the capabilities of current fixed and mobile reception and display devices as well as those that are expected to be deployed in the future.

The WBU does not support any change to the current spectrum allocations at C-band or extended C-band satellite distribution frequencies; Stating; “The use of downlink spectrum allocated at C-Band (3.7 – 4.2 GHz) or extended C-Band in the Fixed-Satellite Service is essential to operations of broadcasters around the world. Systems employing this FSS band have been extensively deployed over decades, primarily for the distribution of content from network centres to affiliated stations, cable head-ends and to other receiving systems.”

The WBU says its position has been supported by spectrum studies of both UHF and C-band frequencies, filed with the ITU, that have demonstrated that major interference to broadcast operations would result from sharing these bands with International Mobile Telecommunications (IMT).

It adds: “The WBU will continue to participate actively in spectrum studies of the radio-frequency bands both assigned to and associated with broadcasting, in order to ensure the continued efficient use of these bands for broadcast media content distribution.”