Readiness of Uganda for Analog to Digital Migration by December 2012

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ABSTRACT

International Telecommunications Union (of which Uganda is a signatory) in its Geneva 2006 conference set the analog-to-digital broadcasting transition deadline for June 2015. Uganda (under the Ministry of Information and Communications Technology) set its switchover date to 31st December 2012. This paper provides a situational analysis of whether Uganda is on track or not to meet the deadline. We discuss and analyse the actions taken by broadcasters and various government agencies including the regulator in support of this transition. Based on this analysis we recommend some further measures to both government and consumers to further enhance the chances of Uganda successfully meeting the deadline.

Keywords: Analog-to-digital broadcasting transition; digital broadcasting; set top box; analog transmission; digital transmission

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1. INTRODUCTION

Digital Broadcasting Migration is a process by which broadcasting services offered on analog networks are transferred to digital networks over a specific period [MoICT, 2009]. The main purpose of the migration process is to ensure that all analog services will be replicated on the digital networks with the aim of switching off the analog services at a specific point in time. While the migration process is applicable to both television and radio broadcasting services, this paper addresses the main issues concerning transitioning of television broadcasting since radio is less critical due to FM availability.

Although satellite broadcasting systems exist, the terrestrial broadcasting networks continue to be the primary delivery systems for television and radio broadcasting services, and in the terrestrial broadcasting services, the analog broadcasting systems require significant radio frequency spectrum which is a finite resource (Jared Baraza, 2009; MoICT, 2009).

Digital broadcasting systems, besides other attributes, are meant to improve the issue of radio spectrum which is a scarce resource, through the use of modulation and compression to transmit video, audio and data signals to the

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receiver sets or consumer access devices by digital radio transmitters broadcasting programmes such as music, news, sports and so on.

1.1 Background of the Study

Broadcasting services in Uganda started back in 1952 when the government first started radio broadcasting services and later in 1963 introduced television broadcasting services [Jonas M. Bantulaki, 2009]. The analog broadcasting services were provided by only government until the early 1990s when the broadcasting sector was liberalized. Ever since the liberalization policy was put in place, there has been tremendous growth in private radio and television broadcasting services in Uganda [MoICT, 2009]. Analog televison broadcasting services in Uganda are offered in VHF and UHF frequency bands (174-230 MHz and 470-862 MHz respectively) in accordance to the 1989 Geneva (GE-89) agreement that provides for international protection to broadcasters against any interference from other users of the radio spectrum in contracting member countries of these treaties.

Digital broadcasting spectrum is currently fragmented into relatively narrow bands, scattered over many frequencies, and intertwined with digital broadcasting channels. This is a consequence of spectrum planning options adopted by various countries based on traditional use of broadcasting spectrum [MoICT, 2009; Huawei, 2010]. The GE-89 agreement provided flexibility to open up the spectrum for other uses. However, this flexibility is limited under the existing technical conditions and, in practice, the current system is not conducive to the allocation of this spectrum to more efficient alternative uses.

Hence, the switch-over from analog to digital broadcasting by mid 2015 worldwide as the GE06 agreement (The GE06 entails the digital broadcasting plan which allows for implementation of High Definition TV services using DVB-T), shall free up significant amounts of spectrum since techniques used in digital broadcasting require less spectra for the transmission of a television signal of higher quality. Hence digital migration offers a unique opportunity to meet the fast growing demand for wireless communication services by utilizing freed spectrum to ensure that other important social and economic uses, such as broadband applications have access to spectrum [Jared Baraza, 2009].

It is also important to note that, the International Telecommunication Union (ITU) has extended the digital broadcast migration deadline for 34 countries because of challenges involving the technology, standards, licensing and investment in the necessary infrastructure and the need for people to replace their televisions. The global digital switch over date is 2015, but the ITU extended the deadline by five years to 2020 for 30 countries in Africa and four in the Middle East. Among the 30 countries in Africa that have asked for extension, North African countries like Egypt, Tunisia, and Morocco stand out, given their advanced technological investments compared to other countries in sub-Saharan Africa, which form the countries whose deadline has been extended [MoICT, 2009; David Mugabe, 2009].

1.2 Rationale for Uganda's Digital Migration

The Regional Radio communication Conference (RRC-06) of which Uganda is a signatory, set June 17, 2015 as the deadline for all countries to migrate from analog to digital terrestrial broadcasting [MoICT, 2009; David Mugabe, 2009]. The reasons for this migration are that:

i) Analog signals are expensive to maintain,
ii) They are also frequency inefficient and,
iii) They are gradually becoming obsolete.

Frequency spectrum is a scarce resource and its efficient use is critical. Digital broadcasting means that more valuable spectrum can be released and used for other services like fire, ambulance, police, military and other emergency services. All over the world, migration to digital broadcasting is taking place. Uganda however plans to shut off the analog signal by December 2012 in order to ensure a smooth transition [Jared Baraza, 2009; MoICT, 2009; Huawei, 2010].

Benefits of Digital Broadcasting

The digital migration strategy is tailored to support the following values [Jared Baraza, 2009]:

i) **Availability of Choice**:- Consumers are best served when they have choice, high quality programmes, access to different service providers and different transmission platforms and a wide selection of digital equipment having various levels of functionality. For instance, under multi-casting where multiple programming channels are transmitted over a single digital frequency. In digital broadcasting one frequency is be able to carry about 12 channels, because the service providers are encouraged to produce more content, so as to utilize more channels on a single frequency, otherwise they would be

losing, any existing channel. For example NTV, one of Uganda's largest broadcasters, will be able to provide many more channels on their own, like NTV - Sports, NTV - News, NTV - Movies all as dedicated channels.

ii) **Interoperability with different Systems:-** Equipment used should be able to receive content from any service provider in order to ensure that consumers have the ability to switch between service providers operating on the same platform.

iii) **Ensuring existence of a Competitiveness in the Market:** - Competition benefits the consumer through the provision of more affordable services, better quality, more services and innovative products.

iv) **Efficient Use of Spectrum:** - Spectrum is a finite scarce resource and should therefore, be used to its maximum potential so as to benefit from the "digital dividend".

2. RELATED WORKS

2.1 Overview of Analog & Digital Transmission

2.1.1 Analog Transmission

In the Regional Radio Communications Conferences (RRC) of 2004 (RRC-04) and 2006 (RRC-06), ITU developed a digital terrestrial broadcasting plan. The Geneva 2006 (GE06) Agreement that resulted from RRC-06 set the switch-over date for analog to digital broadcasting to June 2015 when all countries party to the agreement must have migrated from analog to digital transmssion. Therefore, Uganda developed a digital broadcasting plan in which the Ministry of Information and Communication Technology (MoICT), constituted a broadcasting group in accordance with the international decision to move from analog to digital terresterial broadcasting by 2012 as the switch over date.

In analog broadcasting, the transmission method of conveying voice, data, image, signal or video information uses a continuous signal which varies in amplitude, phase, or some other property in proportion to that of a variable. It could be the transfer of an analog source signal using an analog in modulation method such as FM or AM, or where modulation is not done at all. In Uganda, most of the air interface transmission is analog, broadcasting radio and television stations have cameras, that pick up scenes, this can be DVCAMS, video tape recorders, magnetic players, humatic players, video and audio mixers. The recorders used in the field, content players and other studio equipment are digital while beyond the studio towards the air interface, transmission is analog, hence the need for a sync process to stabilize pictures [Huawei, 2010]. The studio then sends signals to a satellite uplink system through a signal input point; it is beamed on the carrier, it is encoded, compressed, multiplexed and amplified using TWT (Travelling Wave Tube) amplifiers. It is then converted to VHF (Very High Frequency) of about 7 GHz and it is beamed to the satellite - Intelsat 906 on transponder 11, a link that belongs to UBC but shall be shared with other broadcasters after digitization. By satellite, the signal can then be down-linked to several distribution stations across the country which is normally transmitted at a frequency of 4 GHz over line of sight due to the high frequency [MoICT 2009, Huawei, 2010]. The signals received by the upcountry/ offsite station, by satellite receiver box are fed to a transmitter which amplifies the signal (both audio and video). They are amplified separately, combined and the transmitter beams it to a certain channel which acts as a carrier, through the antenna system. The signal is then broadcasted in the area of coverage. This broadcast can be on VHF or on UHF; however, VHF has its own antennas, which are heavier, relaxed and can bend signals into shadow areas not necessarily in line of sight. UHF is line of sight based and has light antennas, which operate in respect to visibility of the transmitter [Huawei, 2010]. Once transmitted, a set top box is required to convert it.

2.1.2 Digital Transmission

Digital broadcasting explains the physical transfer of data in digital bit stream over a point-to-point, point-to-multipoint transmission medium or multi point to multipoint in discrete levels. This can be over media such as copper wire, optical fiber, wireless communication media, and storage media. In digital video transmission, the cameras, recorders and studio equipment are digital. In addition, digital files are smaller compared to analog due to more sophisticated compression techniques. A digital signal is a discontinuous signal that changes from one state to another in discrete steps [Jared Baraza, 2009; Huawei, 2010]. The main push factor for network operators migrating to digital is the efficiency of bandwidth and its associated increase in service provision and service quality. In the digital system, one frequency is able to carry about 12 channels; where by the 12 channels can broadcast 12 different images/ messages at a given time unlike in the analog system where one frequency would be broadcasting a single message.

2.1.3 Operation of a Set Top box:

When a signal is received, one needs a digital receiver set to receive the digital signal that will be shown on the screen or a set top box that will receive the digital signal and convert to analog displayable on local television sets. Below is the architecture of a set top box.

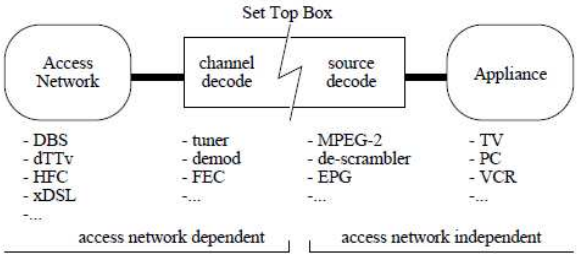


Fig. 1.1 Integrated Digital Set Box, adopted from [David Banks, etal, 1997]

Digital architecture physically separates channel decoding, which is access network dependent from source coding, which is access network independent. The separation is enhanced using a Serial Bus Firewire which supports both delay sensitive and non-real time traffic by deploying isochronous and asynchronous services, which is sent to the TV appliance. However, the cable to be used depends on the interfaces provided on the TV set. Old CRT TVs have audio/video (AV) input ports and do not cater for firewire cables, or even may have only RF input used for connecting local antennas creating the need for an extra device known as a Radio Frequency (RF) modulator.

A set top box is a device which will be required by viewers to convert the digital signals onto their analog televisions. Between a set top box and the TV set is an IEEE 1394 High Performance Serial Bus – Firewire - which caters for both non-delay tolerant and non-real time traffic through its isochronous and asynchronous services [David Banks, etal, 1997].

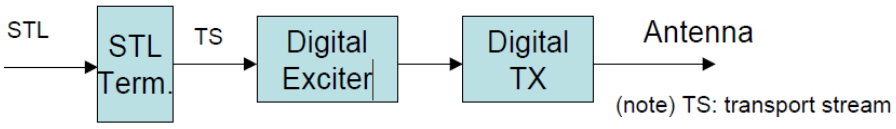


Fig. 1.2: A high power digital transmitter

In the above system in Fig. 1.2, the terminator sends a signal to the exciter which transmits the signal to the antenna of the TV and it can be viewed.

2.2 Measures undertaken by other countries

In any technological transition, an array of approaches may exist. Below are some of the options for analog - digital migration:

2.3 General Approaches For Transition To Digital Broadcasting

i) **Market Driven Technological Transition:** where a progressive replacement of analog techno logy with digital technology takes place. For instance, the South Africa government adopted a market driven approach, which allows a progressive replacement of analog technology to ensure a smooth transition [MoICT, 2009]. In this, competition among broadcasters is the drive without noticeable government intervention.

ii) **Policy Driven Technological Transition:** primarily focuses on free to air broadcasting services. Here the government sets policies that force broadcasters to make the switch.

Further, due to the advantage of early switch off, Uganda has adopted policy driven technology transition with a determined switch off date set to December, 2012 [Jonas M. Bantulaki, 2009]. In this paper, three approaches used by three chosen countries are presented as below:

2.4 United Kingdom [UK]

In Europe DVB, which is a suite of internationally accepted open standards for digital television (EBU – TECH 3334, 2009), had its project set up in 1993 and a phased approach to switch was adopted starting with a few major cities. Currently, UK is experiencing a full scale digital switchover and all analog transmitters have been switched off. An Independent group, Digital UK was setup to handle the migration. About 80% of European Cable Systems have been upgraded to support digital transmissions and digital services, but to date, a few cable operators have commercialized digital access and few households are actually receiving digital signals through cable connection [World DAB Forum, 2001].

2.5 South Africa

Currently, South Africa is the leading African country to achieve fast digital migration growth. In South Africa, digital migration is a government development agenda with a main theme of universal access to information and e-government programs. In addition, the migration strategy was strongly accelerated by the FIFA World Cup that was hosted in June, 2010. This held the biggest technology shift of TV broadcast after color TV. An Independent Communications Authority of South Africa (ICASA) issued new regulations for digital migration for all incoming broadcasters to adhere to the new digital migration policy. South Africa went ahead to quickly decide on crucial migration issues such as standards, where Digital Video Broadcasting Terrestrial Second Generation (DVB-T2) was chosen.

2.6 Kenya

Kenya considered the ITU frame work for their local transition, reviewing the broadcasting regulatory framework internally, allocating digital broadcasting frequency bands and policy and regulatory considerations in transition among others to transition from analog to digital under the Kenyan Government and Communication Regulator Commission. By April 2007, over 110 TV channels and 264 FM stations had been licensed by Kenya Broadcasting Corporation, by December, 2009, Kenya became the second country to migrate to digital television after South Africa. Kenya set the date for analog switch off as December, 2012 [Jared Baraza, 2009]. Kenya's digital migration strategy has been accelerated by government participation such as subsidizing set top boxes, ensuring that a larger portion of the populace can afford them. Further, the Kenyan government has taken a step to stop the importation of analog television sets with immediate effect in support for the digital migration growth in all areas in the country [Jared Baraza, 2009]. In terms of standard, Kenya also chose the Digital Video Broadcasting Terrestrial Second Generation (DVB-T2).

3.0 UGANDA'S DIGITAL MIGRATION SITUATIONAL ANALYSIS

This section gives an overview of the situation in Uganda including the broadcasting Industry, the pilot project that was carried out and analyzes Uganda's readiness for migration.

3.1 Players in Uganda's Digital Migration Process

The number of Television and Radio Stations available in Uganda has grown tremendously. As of December, 2008, Uganda had licensed 220 radio stations with 188 operational and 32 off air stations and 50 TV stations 35 on air and 15 off air. Uganda's electronic media has since attracted several investors following the liberalization of the sector in the early 1990s (David Mugabe, 2009). The world is going digital and so Uganda has to. By June - 2015 the analog signals shall be switched off (Jared Baraza, 2009, MoICT, 2009, David Mugabe, 2009; Huawei, 2010) thus failure to migrate shall make Uganda be isolated. Uganda has set up strategies to go digital, a full ICT ministry has been established, a pilot group has been appointed towards this, a frame work has been set up for it and a renown digital transition company Next Generation Broadcasting (NGB) has been contracted. NGB piloted similar projects in Ghana, Tanzania and Mozambique, equally developing countries like Uganda (David Mugabe, 2009].

Uganda is set to enjoy improved reception quality, a variety of channels, clear audio signals, and sharper visuals with the adoption of digital broadcasting. The switch to Digital Terrestrial Television (DTTV) is being engineered by Next Generation Broadcasting (NGB) and Uganda Broadcasting Corporation (UBC). UBC is a national broadcaster and could easily be entrusted by government in carrying out the project; it already has some infrastructure and also can acquire more infrastructure relatively easily. While NGB is a private firm that has been accepted in Uganda for trial purposes, based on the time it has spent in Uganda, it has demonstrated strong success in digital broadcasting. NGB Executive Director, Kwame Rugunda is positioning the digital switch as mandatory and insists that migration in Uganda should be completed by December 2012, which is East Africa's switch over deadline.

3.2 Uganda's Digital Migration Plan

Uganda's plan of migration to digital broadcasting can be divided in four distinct phases [Jared Baraza, 2009]:

i) **Preparatory Phase (Begun in July 2009):** This is the period that immediately follows the approval of the policy on analog to digital migration. This however also allowed licenced broadcasters to carryout digital broadcasting on a pilot basis under terms and conditions specified by UCC and Broadcasting council and policy was approved by government in June 2009.

ii) **Digital Switch On (scheduled for July 2011):** Official launch of digital broadcasting services in Uganda. Its expected that digital broadcasting infrastructure including set top boxes and all intergrated receivers will be available in the country [Jonas M. Bantulaki, 2009].

iii) **Simulcast Period (July 2011 – December 2012):** This is a one and half year transition period before total digital broadcasting system is established. The period will ensure viewers without set top boxes (Digital TV adapters) are not deprived of services. During this period analog and digital television will have to be broadcasted in tandem.

iv) **Analog Switch Off (December 2012):** Termination of analog transmission. This will assume completion of switch over process from analog to digital broadcasting.

3.3 Pilot Project

However, Private TV Broadcasters are not contented with NGB and UBC, taking a monopoly in the digital migration process since the government of Uganda awarded them the sole responsibility of distributing digital signals to all consumers. For several months, NGB in collaboration with UBC has been carrying out a DTT pilot project in which they distributed set boxes and transmitted digital signals to homes of about 200 pilot users in Kampala, whereby seven channels have been running on the pilot service, five of which are local and two international.

On the other hand, there are TV and Radio stations producing digital content that is being transmitted over analog signals. Most radio stations produce analog content and transmit over analog signals to analog radio receivers. Some television broadcasters produce digital content, which they are transmitting over analog signals, for instance UBC television, NBS TV, Record TV among others. However, NTV Uganda produces digital content using the most current broadcasting software but is still being transmitted over analog signals. UBC TV/ Radios has digital equipment and the production studios produce digital content but are transmitted over analog signals because it has not yet migrated to digital broadcasting. Hence, in reality, both digital and analog content can be transmitted using either transmission mechanisms. Digital data can be transmitted over analog signals; analog signals can be transmitted digitally.

The pilot study was carried out but was not very successful because it was a study on a small sample populace since not so many people could be availed with reception equipment for digital signals; this rendered the pilot study negligible as concluded by the technical team.

3.4 Uganda's readiness for Digital Migration [David Mugabe, 2009]

This section seeks to underline the chronological steps Uganda has taken towards achieving digital migration, they include;

- An advisory body has been set by Uganda known as the National Digital Terrestrial Migration Taskforce that is offering advisory services to NGB and Star TV which are undertaking the project. This advisory body is to help Uganda resolve seemingly far deeper issues that could still affect the digital transition such as harmonizing policy and choice of formal digital broadcasting standards. Countries that have successfully migrated chose standards that they followed.

- Neighboring and regional countries are migrating or have migrated as a technological trend as sometimes signals are rebroadcasted in neighboring countries, for instance during regional tournaments such as East and Central African Championship (CECAFA) that was hosted by Tanzania in January-2011, Uganda rebroadcasted the signal from Tanzanian national television -Tanzania Broadcasting Corporation (TBC) hence the need for a single standard.

- There are several display standards used worldwide in digital broadcasting systems including ATSC, DMB-T/H (Digital Multimedia Broadcasting-Terrestrial/Handheld), ISDB-T (Terrestrial Integrated Services Digital Broadcasting) and DVB-T/DVB-T2 (Digital Video Broadcasting Terrestrial).
  Uganda towards the end of February, 2011 (i.e. 27th) progressed by choosing the DVB-T2 as the preferred standard; DVB-T2 uses MPEG-4 compression standard as opposed to the current MPEG-2.

DVB-T2 is an upgrade of DVB-T. With its compression, at a single point the more picture elements (pixels) shall be broadcasted resulting in better picture quality for the viewers.

- Uganda stopped importing analog TV sets, and also halted the licensing of analog broadcasters [Andy Sennit, 2011]. In January 2011, Uganda effectively halted the importation of analog television sets citing that with the imminent digital transition, the sets will be obsolete hence a loss to the populace buying them [Andy Sennit, 2011].

3.5 Challenges facing Digital Migration in Uganda

Digital conversion has the potential to provide new openness and diversity to the airwaves by creating multiple new channels through the downsizing of the amount of frequencies that is needed for a single station's broadcast.

However, in LDCs, this process is not only costly but also highly politicized and could pose a significant threat to freedom of information and democracy in developing countries. For example, in situations where the applicant for frequency is an opposition member to the government in power he/she could fail in bidding for digital frequency. Also, a financial disadvantage by a given broadcaster, could send a broadcasting house out of business in a situation where the fee for digital signal is increased [John Burges, 2003].

Additionally, the outright challenges include cost of new equipment, which can accommodate high encoding algorithms for digital data over the air interface.

There is a need to replace the analog receivers with digital receivers for reception of digital signals or integrating a Set Top Box. Most of the channels in the digital plan are incompatible with the existing analog channels hence, proposed digital channels are used after existing analog channels have been converted. The GE06 Agreement requires that agreement of neighboring countries be obtained before a number of Uganda's digital channels can be utilized because they will affect these countries' existing analog stations [Jonas M. Bantulaki, 2009].

There should be an amicable measure to resolve the dissatisfaction caused by the merging of UCC and Broadcasting Council [Daily Monitor, 2010], which can lead to a diversion of attention to legal matters instead of concentrating on the technicalities of digital migration.

3.6 General observations on Digital broadcasting;

We also envisage what digital broadcasting can result into:

Digital broadcasting could easily enhance the implementation of the Ugandan ICT plan and the broadcasting policy; through the establishment of multi-channel infrastructure which should be able to reduce the overall cost of additional services.

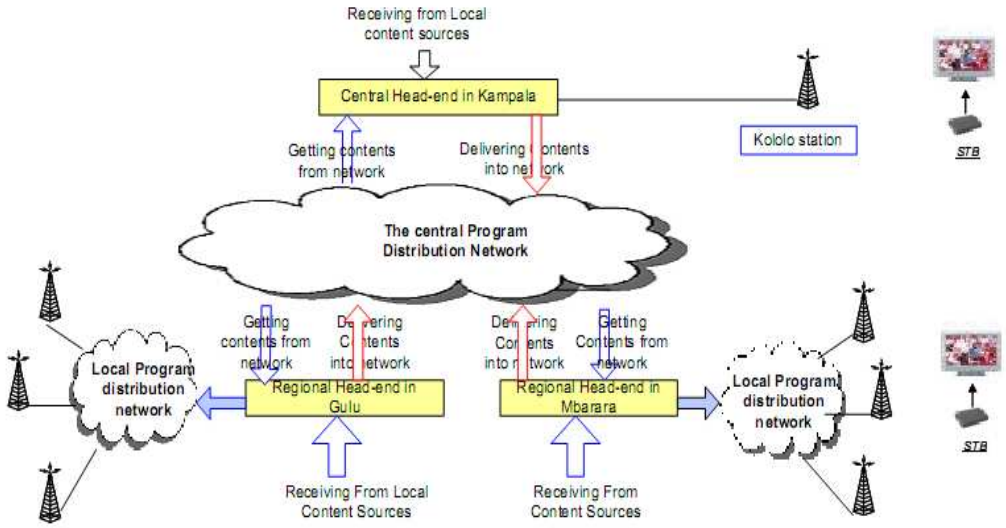
The cost of infrastructure will be reduced due to enhanced sharing. In monetary terms the cost shall be shared and still the owner of the base infrastructure shall be paid by private broadcasters using the infrastructure.

Digital television migration conversion affects most aspects of the broadcasting value chain from content production through broadcasting and reception. These all require technical upgrading to support digital broadcasts and it may even span as far as replacing support personnel.

Digital technology shall be important in eliminating the impairment caused by multi-path propagation that eventually fades the signal as it propagates. Analog signals can be impaired by low signal levels and noise as the receiver moves further from the transmitter. Very effective error correction in the receiver is able to mask the impact and continue to produce perfect pictures and sound up to the point where the error correction can no longer work and the picture will fail completely. This therefore needs adequate digital transmission power levels.

4.0 THE PROPOSED ARCHITECTURE OF THE DIGITAL SYSTEM FOR UGANDA'S BROADCASTING

This section explains the architecture of the shared transmission infrastructure based in Kololo, Kampala which shall be used by all television broadcasters to transmit their signal. The figure below shows the proposed system architecture for Uganda's digital migration plan which was developed by the Huawei Group of Companies on behalf of Uganda Broadcasting Corporation (UBC).



The Fig. 4.0. Uganda's Proposed Digital System Architecture [Adopted from Huawei, 2010]

Beakdown of the Proposed Technical Composition of the Uganda Shared Digital Television Network:

Head-End: It supports TV signal receiving, encoding, multiplexing, scrambling, EPG editing and inserting and other value-added services system. The multiplexer will integrate several SPTS (Single Program Transport Stream) into MPTS, in which SPTS is the output signal from encoder. The Head-end component receives the local programs and the external programs from microwave and satellites, and multiplexes them to several multiplex data flows. The data flows are delivered to each transmission station. Also, there are CA (Conditional Access), EPG (Electronic Program Guide) and SMS operation together with Multiplexers in Head-end. The contents for the exchanging among head-ends are without CA protection. And the contents from a head-end to transmission stations for broadcasting are protected by CA [Huawei, 2010].

Electronic Program Guide (EPG): Is also fed into the multiplexers as special program data with which the subscribers can see the program guide information on TV. The scrambler is embedded in the multiplexer and each output stream is scrambled

Network Management System (NMS) and Program Distribution Network (PDN): NMS is used for management of multiplexers in the head-end. Specifically it is used for multiplexer configuration, parameter view, edit and modification. PDN carries out the transmission task for the digitalized TV signals from head-end to head-end, and the head-end to transmission station. Usually it is done by microwave or fiber network [Huawei, 2010].

Remote Monitoring Control and Monitoring Subsystem: Remote monitoring and control is used to monitor the equipment operation status and to send the control instruction from control center to the controlled devices while monitoring subsystem monitors operation conditions of the head-end and transmission stations [Huawei, 2010].

Transmission Stations: The transmission station includes transmitters and antenna. The transmitters are the digital ones, which are used to modulate the input program data flows and broadcast them out. It broadcasts the modulated signals of a TV program to the open space by RF (Radio Frequency), and the wireless signals may cover the related service area [Huawei, 2010].

Conditional Access (CA), Service Management System (SMS) and Subscriber Authorization Management: CA is used in digital TV system for protection of content by requiring certain criteria to be met before granting access to this content. SMS is used for billing, subscriber service, accounting and resources management, and it is also a heart system for the digital TV operator. Subscriber Authorization and Management authorizes and manages user information, and provides many different client services, such as billing, charging, and querying [Huawei, 2010].

STB/ Terminal Subsystem: It helps the subscribers receive the DVB-T signals by DVB-T antenna. The signal is sent to STB. With the smart-card, the subscribers would see the digital programs using their TV set. The

signals sent digitally can be displayed on analog TV sets using the STB as the digital-analog converter [Huawei, 2010].

4.2 Approaches so far taken by the Government to ensure an effective Transition of Digital Terrestrial Broadcasting By December, 2012

Below are the measures taken by government towards the transition;

i) Put in place Policy, Legislative and Regulatory frameworks to enable smooth migration process.

ii) Undertake fiscal measures to enable consumers procure set top boxes and digital TV receivers at affordable prices, through tax waivers and subsidies.

iii) Provide appropriate incentives and support for signal distributors and broadcasters to put in place necessary digital infrastructures and systems.

iv) Support the development of local content.

v) Become engaged in consumer awareness media, workshops, public relations and marketing campaigns to encourage consumers to adapt to using digital equipment.

vi) Upon switch off of the analog broadcasting transmitters, the frequency assignment to broadcasters should revoked by UCC.

vii) As by February - 2011, there is already massive user campaign towards digital television broadcasting. Television adverts are running towards Analog to Digital Conversion on NTV- Uganda and the Monitor newspaper giving December - 2012 is given as the date when Analog TVs shall not be able to pick up signal; this gives confidence and an assurance to the populace that by that date, the transition shall have taken place.

4.3 Technical Requirements set by Uganda Communications Commission

It has been noted that UCC has no threshold for requirements both in terms of hardware and software needed to broadcast digitally. Encoding techniques for the network is of great importance because the physical equipment is able to transmit some encoding standards but not all, therefore using an encoding standard that is not supported by the network capabilities by any of the broadcasting houses sharing the transmission equipment.

Therefore UCC should come up with a minimum encoding standard to allow output/ stream display of content from all broadcasting houses since transmission infrastructure shall be shared and also the software installed on the transmitters is uniform.

4.4 Action taken by Private Broadcasters in Response to the Transition Plan:

As a directive by the government and also as a necessity, broadcasters have installed digital studio equipment. Broadcasters are required to migrate from analog to digital technology in the studio facilities; in this, the content recorded from the field is digitized through the digital system for instance NTV- Uganda, Record Television and UBC have implemented this strategy.

Additionally, broadcasting houses in the country are already translating most of their archives into digital content. This is to have the content ready to be played back over the digital system that is to be set up. Studio owners and producers are purchasing digital recording equipment, which is to allow on-air studios to play digital content without need for translation. More observably, there is use of teleprompters in news anchoring mainly for TV stations. NTV- Uganda, WBS and UBC TVs use teleprompters where content or news stories are played as the anchor reads, such content is digitized but only the transmission over the air inteface is analog [Mugabe, 2009].

5.0 RECOMMENDATIONS AND CONCLUSIONS:

First we discuss recommendations to the various issues raised and we conclude the paper.

5.1 Recommendations:

The recommendations are both to government and to cconsumers who are the ultimate users;

To Government:

i) Government should ensure availability of set top boxes through fiscal and other low cost measures. This should make it easier to access set top boxes. Currently Master Electronics, a store in Kampala provides them. Startimes DTV and Mo TV Africa Ltd also have pay television boxes.

ii) Uganda National Bureau of Standard and UCC should be able to define the minimum standard of set top boxes to be used in Uganda.

iii) UCC should be able to assign frequencies to signal distributors and also hasten the speed of frequency allocation before the simulticast period.
iv) The regulator (UCC) should ensure that signal distributors provide services to broadcasters promptly on request.
v) UCC should provide appropriate regulation and incentives towards the implementation of digital broadcasting.
vi) Find an amicable mechanism to resolve the stand-off between Law Society and the merging of UCC with Broadcasting Council so as to have one point of focus in migration other than court wrangles [Daily Monitor, 2010].
vii) Uganda should take the best practices from developed countries that have successfully migrated and are broadcasting in digital.

To Consumers:

i) Consumers are very sentive to drastic changes; therefore to avoid non compliance, consumers should be given adequate and timely information on migration implementation timeframe to enable them prepare for change.

ii) The Digital Migration Board should respond to public concerns even beyond the switchover date as all concerns may not be anticipated in time.

iii) Government is sensitizing a section of people; however Consumer Education should involve Broadcasters, Retailers and other players in the broadcasting industry as well as local users who may not read Newspapers, which is the current mode of information disemination about the transition, in order to yield the expected benefits.

iv) The importation of Set top boxes for digital broadcasting should be zero rated to reduce their cost to the final consumer (buyer).

v) The implementation strategies should target the vulnerable such as groups like people with disabilities, marginalized areas and the poor to ensure that they are included in the migration process hence social responsibility.

5.2: Conclusion and Future Work

In this paper we have discussed the current status of digital migration in Uganda, analysing the actions taken by broadcasters and government agencies as well as the prevailing challenges. Based on this analysis we have made some recommendations to government as the leading stake holder, so as to keep Uganda on track to meet the migration deadline. The following areas need further investigation.

1. IPTV: Internet Protocol Television is a system through which internet television services are delivered using the architecture and networking methods of internet protocol suite over packet switched network infrastructure. This shall be necessary incase cable TV is installed in homes and also when video-streaming is adopted to enhance wide viewability of the local TV stations online.
2. Mobile TV: Television watched on a small handheld device such as a mobile phone. Here, the small devices would need low resolution pictures that can display on mobiles that have constrained resources.

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