The Transition from Analogue to Digital Terrestrial Television in Ghana

A presentation to the Digital Broadcasting Switchover Forum (DBSF), Johannesburg, South Africa

February 2015
Outline

- Legal Framework for the Transition
- Business Case for the Transition
- Steps in the DTT Transition
- Frequency Planning
- Ghana Gov’t DTT Network
- Existing DTT Networks
- Consumer Protection Initiatives
  - Receiver Specifications & Conformance
  - Public Education
- Way Forward
- Remarks
Legal Framework for DTT Transition

- Section 2 of Electronic Communications Act, 2008, Act775
  - “… regulate the radio spectrum designated or allocated for use by broadcasting organisations and providers of broadcasting services in accordance with the standards and requirements of the International Telecommunications Union and its Radio Regulations as agreed to or adopted by the Republic.”

- ITU Geneva 2006 (GE-06) Agreement
  - Frequency Plan for DTT services in Band III, IV/V to replace analogue TV frequency plan (GE-89)
  - Transition Period ending 17 June 2015 (UHF) and 17 June 2020 (VHF)
Business Case for the DTT Transition (I)

- ITU WRC-07 Decision
  - Co-primary allocation in the band 790-862MHz for mobile services

- Auctioned in some countries

<table>
<thead>
<tr>
<th>Country</th>
<th>Revenue Realised from Auction</th>
<th>Amount of Spectrum</th>
</tr>
</thead>
<tbody>
<tr>
<td>US (700MHz)</td>
<td>$19.1 billion</td>
<td>56 MHz</td>
</tr>
<tr>
<td>Germany (800MHz)</td>
<td>Euros 3.57 billion</td>
<td>60 MHz</td>
</tr>
<tr>
<td>France (800MHz)</td>
<td>Euros 2.6 billion</td>
<td>60 MHz</td>
</tr>
</tbody>
</table>
Business Case (III)

- Spectrum use for mobile broadband is expected to have a multiplier effect in the economy.
- This will translate into positive cash inflows into the economy by the 6th year assuming a 3yr dual illumination period.

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Business Case for the DTT Transition (II)

ITU WRC-12 Decision

- Co-primary allocation in the band 694-790MHz for mobile services
- Lower edge to be confirmed at WRC-15
- ITU-R conducting studies on frequency arrangement

![Frequency Allocation Diagram]

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Steps in the Transition

- Network roll-out (Digital)
- Integrated Digital Receiver / Set Top Box
  - Specification
  - Manufacturing
  - Distribution
  - Retail
  - Installation
- Dual illumination
- Uptake
- Analogue Television Switch-off
- Yield Digital Dividend
- After sales support

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Implementation Milestones / Status
Implementation Body

- Digital Broadcasting Migration Committee (DBMC) established in December 2010:
  - Chaired by Honourable Minister of Communications
  - Membership of 13 from all stakeholder institutions
    - Ministries, Parliament, Regulators, State Broadcaster, Private Broadcasters
  - Secretariat located at National Communications Authority (the ICT regulator)
  - Responsible for:
    - policy implementation
    - integrated planning
    - budgeting
    - communication with the public
    - performance monitoring

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Frequency Planning

- GE-06 Plan
- WRC-07 created 790 – 862 MHz as 1st dividend
- WRC-12 created 694 – 790 MHz as 2nd dividend
- Re-planning of TV frequencies (470-694 MHz to amend GE-06):
  - Creation of eleven (11) allotment areas
  - Provision of four (4) layers/frequency channels for each allotment.
  - Provision of additional frequency layers in the allotments for Greater Accra, Ashanti, Western and Northern regions.
  - Suppression of 106 UHF assignments in the existing GE06
Existing DTT Systems (I)

- **Ghana Broadcasting Corporation (GBC)**
  - DVB-T/MPEG-4 transmissions in Accra and Kumasi
  - Was deployed as a pilot.

- **First Digital (formerly Skyy Digital)**
  - DVB-T/MPEG-2 transmission deployed as a replacement for MMDS analogue TV service
  - Currently available in Accra, Takoradi, Cape Coast, Koforidua, Nkawkaw & Kumasi
  - Currently upgrading to DVB-T2/MPEG-4

- **Cable Gold (CATV Limited)**
  - DVB-T/MPEG-4 transmission deployed as a replacement for MMDS analogue TV service
  - Currently available in Accra/Tema
Existing DTT Systems (II)

- **GoTV (Formerly DSTV Mobile)**
  - Obtained a Digital Terrestrial Pay TV service authorisation grandfathered from earlier UHF frequency authorisation
  - Has rolled out the first DVB-T2/MPEG-4 network in Ghana with 11 transmission sites
    - Greater Accra (2 sites in Accra, 1 site in Tema)
    - Ashanti (2 sites in Kumasi, 1 site in Obuasi)
    - Central (1 site in Cape Coast)
    - Western (1 site in Takoradi)
    - Brong Ahafo (1 site in Sunyani)
    - Northern (1 site in Tamale)
    - Eastern (1 site in Koforidua)

- **Crystal TV** has commenced DVB-T2/MPEG-4 test transmissions in Accra with plans to go nationwide in due course.

- **Next Generation Broadcasting (NGB)** has Pay TV authorisation but are yet to deploy services
“combines satellite communication with terrestrial TV to realize the transmission of digital TV”.

- Provision has been made for an Earth Station at the Central headend and
- satellite receivers have been provided for at all the major terrestrial transmission sites (except for the transposer sites and gap fillers).

- Ku Band is recommended to enhance universal access through DTH

MPEG-2 TS is sent to DVB-S2 Modulator and subsequently uplinked

Satellite

Satellite Uplink

National Headend

DVB-T2 Transmission sites
Status of Gov’t DTT Network

- $95.7m GoG Contract with Star Times DTV Ghana Ltd. signed in April 2012 for delivery of:
  - Central Headend for 2 multiplexes scalable with network monitoring and management systems
  - Call Centre, Project Management; Training
  - Earth Station (6.3m satellite uplink at headend, satellite receivers at Tx stations)
  - Transmission Network (53 sites, ≥2 transmitters per site, ≥95% population coverage)
  - Test & Measurement Equipment plus 5 Vehicles
  - Warranty & Recurrent costs for 5 years

- Contract abrogated in January 2015
  - Delays in accessing concessionary loan facility
  - >2yrs delay arising from several factors
  - Star Times seeking legal address
Consumer Protection Initiatives
Consumer Protection Initiatives

- **Standardisation of DTT Receivers**
  - Minimum Specifications for set-top boxes and iDTVs developed and standardised as GS1099
  - Ghana’s Minimum DTT Receiver specifications adopted by ECOWAS as a harmonised standard for the sub-region to enhance economies of scale
  - Conformance Logo adopted to guide consumers in purchase of DTT receivers

- **Public Education**
  - Extensive public education plan under development

- **Support for the Economically Vulnerable**
  - Plans to procure STBs for beneficiaries of LEAP programme under way

- **Universal Access**
  - Consideration of complementing terrestrial digital TV coverage with satellite DTH to ensure Universal Access
“This document … sets minimum requirements for a free-to-air DTT receiver which will result in a low cost, low maintenance unit providing basic functionality”
Key Components of Ghana DTT Spec

- **DVB-T2**: RF Operation
- **H.264**: Video & Audio Codecs
- **E-AC-3**: Video & Audio Codecs
- **HE-AAC**: Video & Audio Codecs
- **AD**: Accessibility
- **EPG**: SI/PSI Functionality
- **LCN**: SI/PSI Functionality
- **Network Changes**
CONFORMANCE PROCESS
Conformance Testing Labs

Sony (Malaysia) EMCS

Electronics Testing Centre, Taiwan

QuieTek Corporation, Taiwan

DTV Accredited Compliance Lab (Samsung)

Sony EMCS Kisarazu

CS & Environment Centre of Samsung Electronics Co. Ltd, Korea

Sony Koda EMC

EMC Compliance Co. Ltd., Korea

China National Testing & Inspection Center for Radio & TV Products (TIRT)
# RF Test Report

## GHANA DVB-T2 RF PERFORMANCE

### Evaluation Details

<table>
<thead>
<tr>
<th>Receiver Under Test (RUT)</th>
</tr>
</thead>
<tbody>
<tr>
<td>RUT Device Type (iDTV/Set top box)</td>
</tr>
</tbody>
</table>

### Evaluation Results

<table>
<thead>
<tr>
<th>Section</th>
<th>Test Category</th>
<th>Result</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.0</td>
<td>C/N Performance on Gaussian channel (dB)</td>
<td>Not Tested</td>
<td></td>
</tr>
<tr>
<td>2.0</td>
<td>C/N Performance on 0dB echo channel (dB)</td>
<td>Not Tested</td>
<td></td>
</tr>
<tr>
<td>3.0</td>
<td>Minimum receiver signal input levels on Gaussian channel (dBm)</td>
<td>Not Tested</td>
<td></td>
</tr>
<tr>
<td>4.0</td>
<td>Minimum IRD Signal Input Levels on 0dB echo channel</td>
<td>Not Tested</td>
<td></td>
</tr>
<tr>
<td>5.0</td>
<td>Maximum receiver signal input levels (dBm)</td>
<td>Not Tested</td>
<td></td>
</tr>
</tbody>
</table>

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# SI/PSI Test Report

## GHANA DVB-T2 SI/PSI CONFORMANCE

### Evaluation Details

<table>
<thead>
<tr>
<th>Test Category</th>
<th>Total Items</th>
<th>Pass</th>
<th>Fail</th>
<th>Not Tested</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Receiver Under Test (RUT)</td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tr>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>RUT HD Receiver (Yes/No)</td>
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<td></td>
<td></td>
<td></td>
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<tr>
<td>RUT Firmware Version</td>
<td></td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

### Evaluation Results

<table>
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<th>Not Tested</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.0 Basic SI/PSI</td>
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<td>2.0 Logical Channel Numbering</td>
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<td>3.0 Network Evolution</td>
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<td>4.0 Character Test</td>
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<td>32</td>
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<tr>
<td>5.0 Active Format Description</td>
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<td>0</td>
<td>0</td>
<td>5</td>
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<tr>
<td>6.0 Multiple Physical Layer Pipes (M-PLP)</td>
<td>1</td>
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<td>0</td>
<td>1</td>
<td></td>
</tr>
</tbody>
</table>

**Results Total**: 117
CONFORMANCE LOGOS

digital_ghanahd

digital_ghanasd
TV Licensing Decree, 1966, NLCD 89

- Data shall be submitted by the 15 of each month for the preceding month

- Manufacturers or Assemblers (Section 7 of NLCD 89)
  - the number of television receiving sets [(or set-top boxes) per model] manufactured or assembled by him during that month

- Customs Division of the Ghana Revenue Authority (Section 8 of NLCD 89)
  - a return indicating the names and addresses of all persons who imported television receiving sets [(or set-top boxes)] during that month and the number of such sets imported by each such person.

- Dealers and Retailers (Section 6 of NLCD 89)
  - a return indicating the names and addresses (residential (at least suburb and city) and telephone numbers) of all persons to whom any television receiving sets have been sold, let on hire or otherwise disposed of by him during that month.
Public Education Strategy

National
- to raise overall awareness

Regional
- to increase awareness and promote understanding

District
- to promote understanding and encourage action

Local Area
- to promote understanding and encourage action

- message should be **simple** and **straight forward**
- materials should be transmitted in at least the languages identified to be widely spoken in Ghana
- all media platforms should be used
- Outreach events to schools, churches, mosques, etc

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Way Forward

- **Leverage existing Pay TV networks**
  - Pay TV networks growing rapidly in major cities
  - Have capacity to carry FTA services
  - Gov’t DTT network can serve future demand
  - Have indicated commitment to extend coverage
  - This approach used successfully in Kenya & Tanzania
  - Use Satellite DTH to achieve universal access (e.g. FreeSat in the UK)

- **Technical concerns addressed**
  - Directivity (Co-location)
  - Channel Numbering (Logical Channel Numbers)
  - Develop minimum specs & conformance for DTH receivers

- **Financial Concerns addressed**
  - Incentives to achieve Universal Access
  - Charges for multiplex capacity
Remarks

- **2014 ASO target date was not met**
  - Timeline has to be revised
  - Alternative plans for network rollout has to be considered due to delays to Government funded DTT network
  - The unavailability of all existing analogue TV stations in digital mode in most current analogue TV areas is a key bottleneck in the transition programme
  - Existing private DTT networks could be leveraged as done in Tanzania & Kenya
  - Existing Pay TV operators may have to be authorized to provide signal distribution for FTA channels

- **June 2015 ASO is still a challenge**
  - Switch-off may have to be done for border areas only if necessary

- **GE-06 Agreement sets 17 June 2020 as ASO date for VHF Band III**