ITU-T SG9 and the future of cable television

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Agenda

- **Cable TV Market Situation**
  - television broadcasting
  - broadband access network
  - the future of cable television and ITU-T SG9

- **Introduction of ITU-T SG9**
  - brief history of ITU-T SG9
  - structure of ITU-T SG9 and key missions
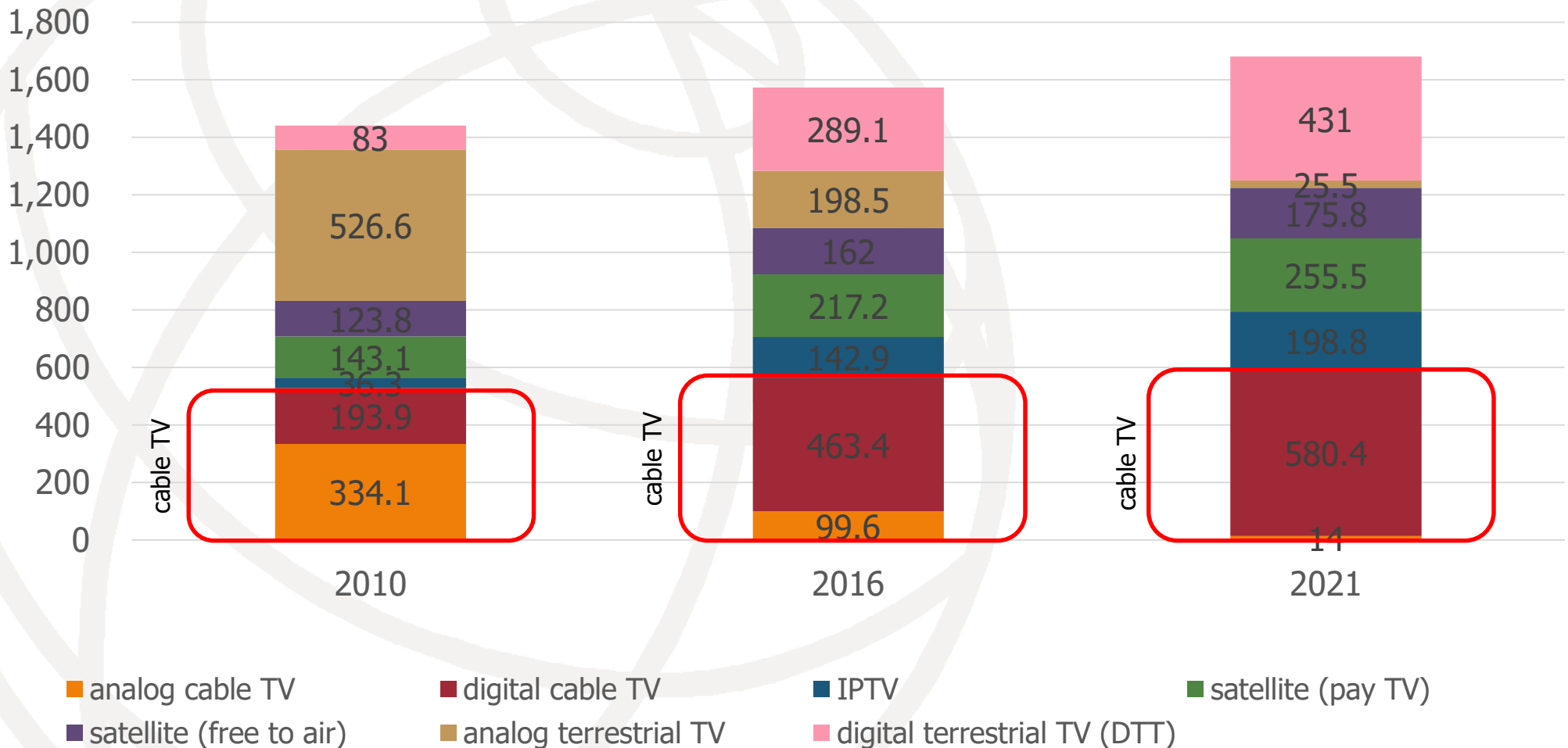 - the current work programme

CABLE TV MARKET SITUATION

TV households in the world

**Cable television is still growing and dominant as 35% share in 2021 (forecast).
Digital terrestrial TV (DTT) is rapidly growing toward 2021 mainly in developing country.**

Global TV households by platform (in million)

Source: Digital TV Research

4

Cable television subscribers by region

Cable television is still growing in all the regions except for North America. Asia and Middle East and Africa are leading the growth.
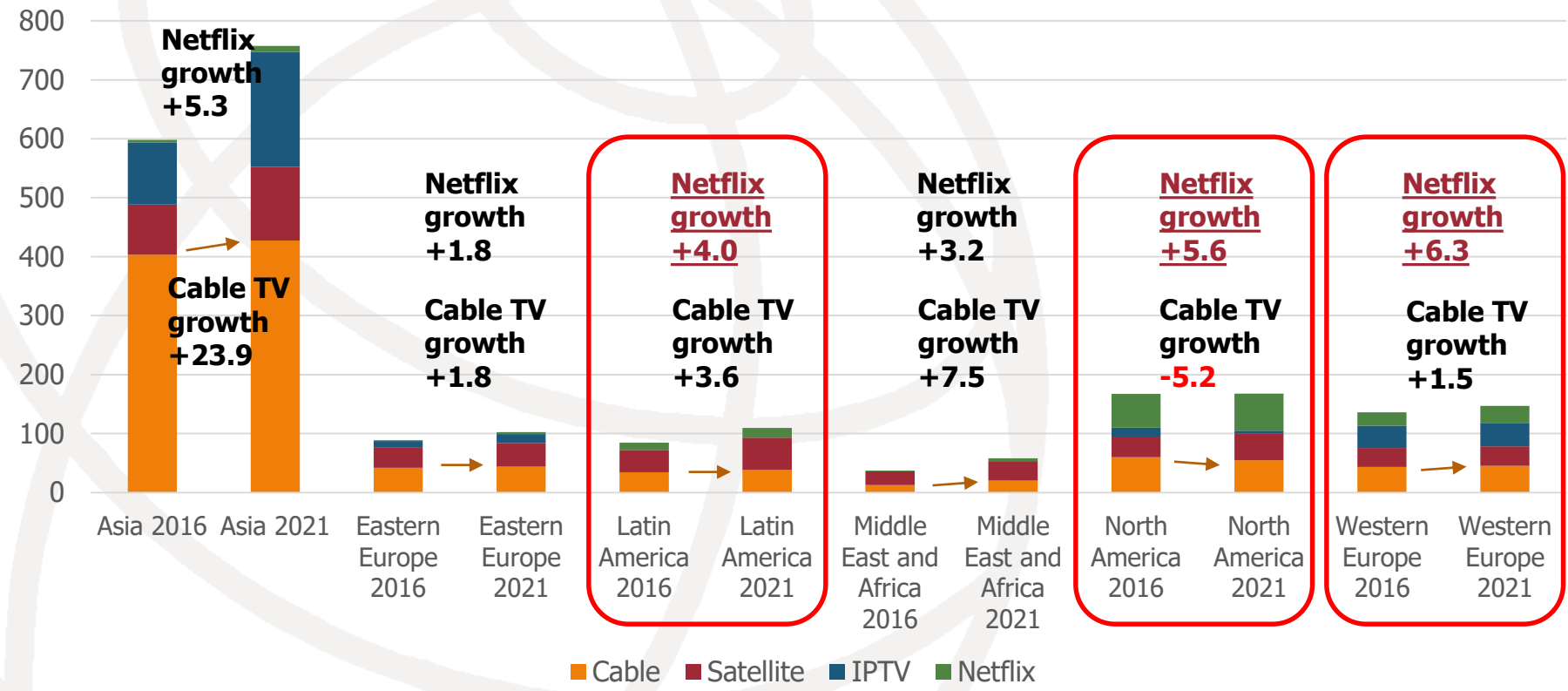
Pay TV subscribers by region and by platform (in million)

Cable TV growth +23.9

+1.8   +3.6   +7.5   -5.2   +1.5

■ Cable ■ Satellite ■ IPTV
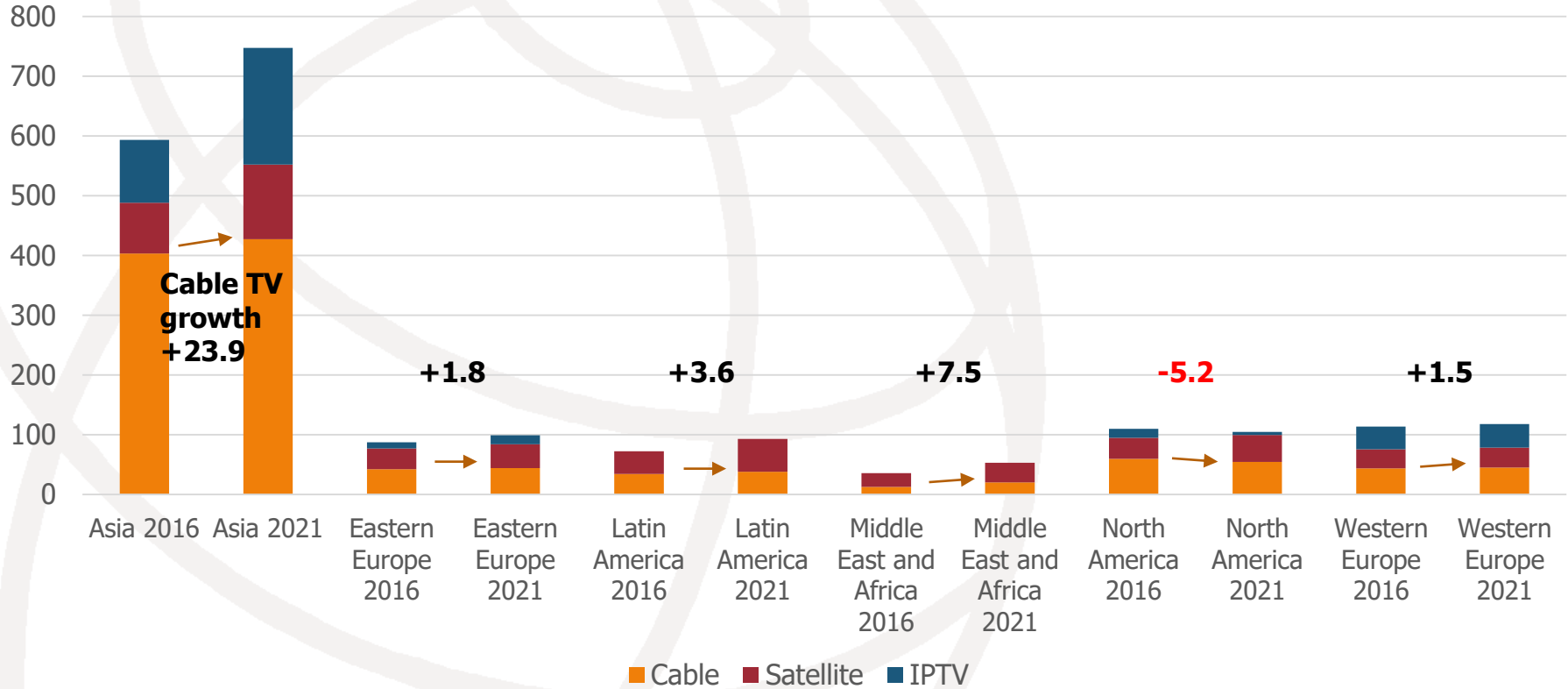
Impact by OTT

OTT like Netflix is a threat to cable TV operators in general, particularly in Americas and West Europe. Netflix is a giant OTT, but its growth (26 M for 5 yrs) is smaller than cable TV growth (33 M for 5 yrs).

Regional pay TV subscribers by platform and Netflix subscribers (in million)

Asia: Netflix growth +5.3, Cable TV growth +23.9

Eastern Europe: Netflix growth +1.8, Cable TV growth +1.8

Latin America: Netflix growth +4.0, Cable TV growth +3.6

Middle East and Africa: Netflix growth +3.2, Cable TV growth +7.5

North America: Netflix growth +5.6, Cable TV growth -5.2

Western Europe: Netflix growth +6.3, Cable TV growth +1.5

Legend: Cable, Satellite, IPTV, Netflix

Cable television as broadband access

Cable television broadband access is still growing.
Cable modem can provide gigabit per second broadband Internet by DOCSIS 3.0 and 3.1.

Global fixed broadband subscribers by type (in million)
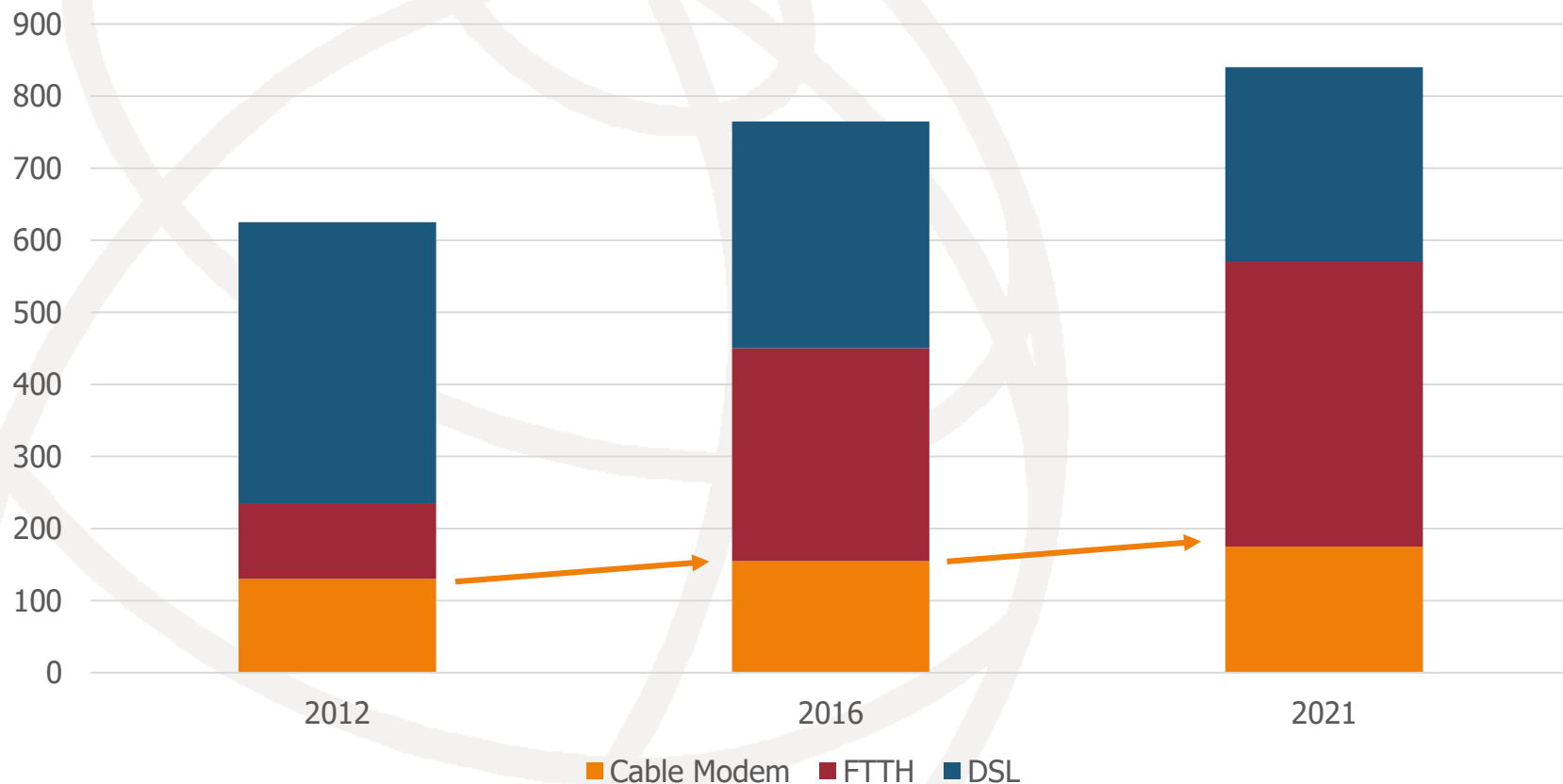
Legend: Cable Modem — FTTH — DSL

Summary: cable television in the market

1	**Global cable television market is still growing as television delivery networks.**
2	**Cable television growth in coming five years is larger than that of Netflix and is led by China, India and many other developing countries including Africa, but need to note that Netflix's growth is stronger than cable in Americas and Western Europe.**
3	**Cable television is also very important network infrastructure for broadband Internet access. OTT needs such high-speed networks to efficiently provide services to customers.**

What is cable television expected to be in the future?

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Cable television is expect to be

strong and efficient network infrastructure for broadcasting as well as ICT convergence	**services providing high-realistic entertainment experiences** e.g., 4K/8K/VR/AR	**easy to deploy in developing countries** to facilitate rapid deployment

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to facilitate rapid deployment

ITU-T SG9 has been conducting the development of global standards on cable television technology more than twenty (20) years as a de jure standardization development organization (SDO).

INTRODUCTION OF ITU-T SG9

SG9 Highlights in the past study periods

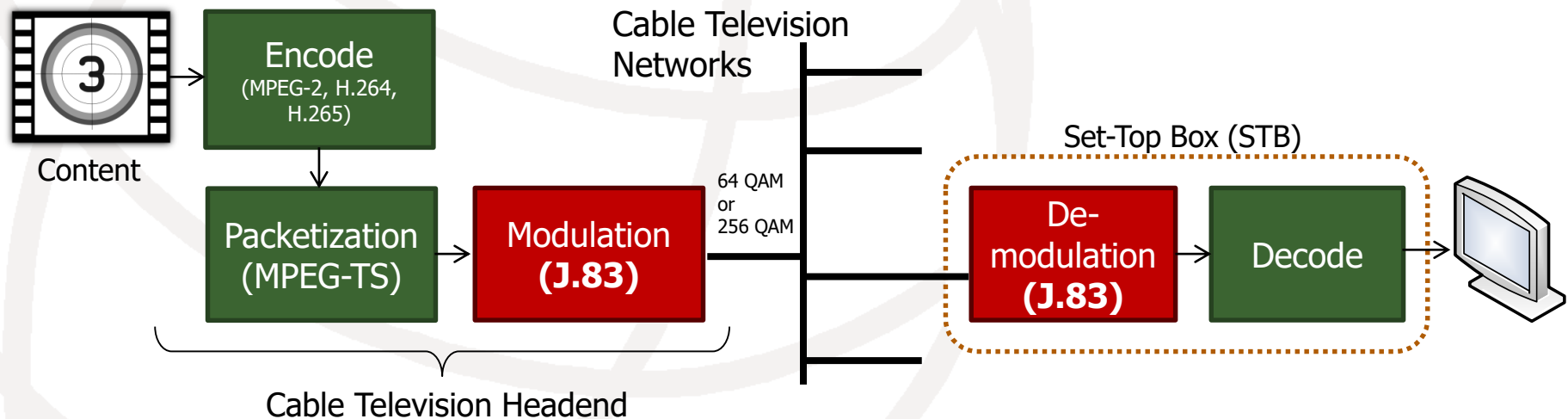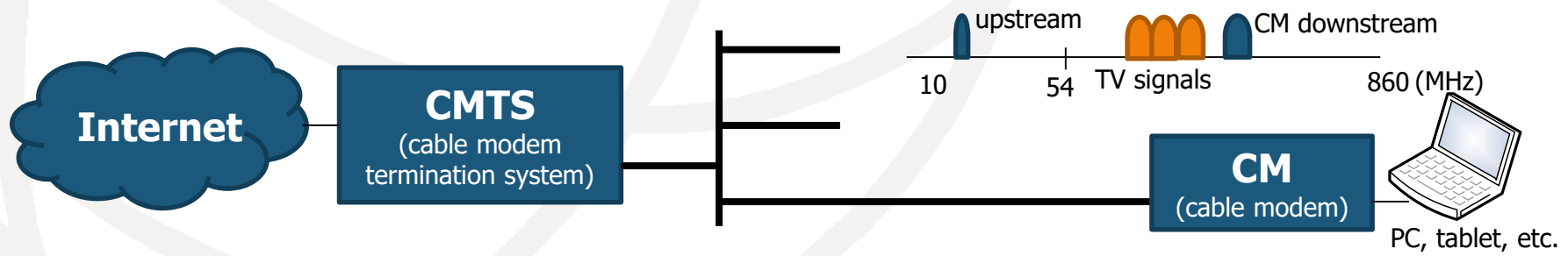| Period		
2000	**Digital Cable Television and Emerging IP Technology**	
	J.83 (1995): Digital cable TV modulation J.90 (1998): Electronic program guide	J.112 (1998): Cable modem – DOCSIS1.0 J.132 (1998): MPEG-TS transport over SDH
2001 – 2004	**DOCSIS2.0, Cable Telephony (VoIP), Optcal Transport**	
	J.122 (2002): Cable modem – DOCSIS 2.0 J.160~J.179: Cable telephony (MGCP)	J.185, J.186: Cable TV over FTTH (RF-based) J.190 (2002): Home Network Architecture J.200 ~ J.202: Interactive TV applications
2005 – 2008	**DOCSIS3.0, Advanced Television Experience, IPTV**	
	J.83rev (2007): 256QAM addition to Annex C J.210 ~ J.214, J.222.0~J.222.3: DOCSIS3.0 J.360~J.370: Cable telephony Ver.2 (SIP)	J.601 (2005): Large screen digital imagery J.700 (2007): IPTV framework for cable TV J.901 (2008): Free viewpoint television (FTV)
2009 – 2012	**Integrated Broadcast and Broadband, Hybrid Terminal**	
	J.205, J.206 (2012, 2013): IBB framework J.295, J.296 (2012): Hybrid set-top box	J.380.1 ~ 8, J.706, J.707: Target ads J.381 (2012): Advanced cable transport J.603 (2011): 4K/8K realtime transmission
2013 – 2016	**Evolution of Transport Technologies**	
	J.183rev, J.288 (2016): 4K/8K QAM transport J.195, J.196 (2014 – 2016): HiNoC v1 and v2 J.223 (2016): Cabinet DOCSIS (C-DOCSIS)	J.301, J.302 (2014 – 2016): AR TV J.382 (2014): DVB-C2 J.1010, J.1011 (2016): Exchangeable CA/DRM

The most popular Recommendation

- **J.83 (1995, 2007) – Digital multi-programme systems for television, sound and data services for cable distribution**

- **Fundamental technology for digital cable TV transport**
  - J.83 is widely deployed to all over the world regardless of the regional digital TV technology standards.
  - One TV bandwidth unit (6MHz/8MHz) can carry two or more HDTV programs. Typical frequency range is, for example, 54 MHz – 860 MHz (depending on regions).

Content → Encode (MPEG-2, H.264, H.265) → Packetization (MPEG-TS) → Modulation **(J.83)**

Cable Television Headend

Cable Television Networks

64 QAM or 256 QAM

Set-Top Box (STB): De-modulation **(J.83)** → Decode

Cable modem Recommendations

- **Cable modem system provides bi-directional IP communication over one-to-N cable television network infrastructure.**
  - Downstream technology is based on ITU-T J.83 with TDM multiplexing.
  - Upstream technology is based on TDMA access control.
  - Two different frequency spectrums are used for downstream and upstream.

- **SG9 developed three versions of cable modem Recommendations**

Recommendation	DOCSIS Version	DS Phy Rate (6MHz TV system)	US Phy Rate
J.112 (1998)	DOCSIS 1.1	42 Mbps	10 Mbps
J.122 (2002)	DOCSIS 2.0	42 Mbps	30 Mbps
J.222 series (2007)	DOCSIS 3.0	42 x n Mbps	30 x n Mbps
J.223 series (2016)	C-DOCSIS	42 x n Mbps	30 x n Mbps
J.docsis31 series	DOCSIS 3.1		

Internet — **CMTS** (cable modem termination system) — **CM** (cable modem) — PC, tablet, etc.

upstream   CM downstream
10   54   TV signals   860 (MHz)

Current structure of SG9

ITU-T SG9

WP1/9   <u>Video Transport</u>

   Q1/9   **Television and sound transmission**

   Q2/9   **Conditional access and content protection**

   Q3/9   **Digital programme switching and insertion**

   Q4/9   **Guidelines for implementations and deployment**

WP2/9   <u>Terminals and Applications</u>

   Q5/9   **APIs for advanced content distribution services**

   Q6/9   **Set-Top Box and terminals**

   Q7/9   **Cable television delivery of IP packet-based data (cable modems)**

   Q8/9   **Voice and video IP applications over cable television networks**

   Q9/9   **Advanced service platforms**

   Q10/9   **Work Programme, Coordination and Planning**

SG9 Management Team

Role	Name
Chairman:	Mr Satoshi MIYAJI (KDDI, Japan)
Vice-chairman:	Mr Blaise Corsaire MAMADOU (Central African Rep.)
Vice-chairman:	Mr TaeKyoon KIM (ETRI, Korea Rep. of)
Vice-chairman:	Mr Zhifan SHENG (ABS, China)

Role	Name
Advisor	Mr Stefano POLIDORI (SGD, TSB)
Administrative Assistant	Ms Rosa ANGELES-LEON DE VIVERO (SGD, TSB)

SG9 Key Missions in 2017 – 2020

- **Bridging the Standardization Gap (BSG)**
  - considering requirements from various regions
  - implementation and deployment guidelines (Q4/9)

- **Evolution of cable TV networks**
  - ultra-high speed cable modems
  - robust and flexible security
  - high-efficiency transport technology, etc.

- **Innovative services**
  - advanced definition video experiences (4K/8K/HDR etc.)
  - high realistic experiences (VR/AR etc.)
  - integrated broadcast and broadband services, etc.

Current work programme of ITU-T SG9

Bridging the Standardization Gap

J.dtt-dist-req
Open platform for TV program delivery over cable TV networks

J.stb-cts
Set-top box compatible with cable, terrestrial and satellite broadcasting

Sup-digTV
Guidelines for implementing and installing of digital cable television

J.tda
Up-to-date collection of terms and definitions of ITU-T SG9

Evolution of cable TV networks

J.docsis31-series
Gigabit/sec-capable cable modem system specifications

J.dmcd-series
Exchangeable CA and DRM solutions (ECI)

J.fdx-req
In-band full-duplex cable modem system

J.roip-arch
System for transport of RF signals over IP network

J.382rev
Advanced cable television signal transmission systems (DVB-C2)

Innovative services

J.acf-hrm
Harmonization for compatibility of IBB applications

J.stvos-spec
Specifications of smart TV operating system (smart TVOS)

J.qamip-req
Technology for multi-room TV viewing experiences

J.302amd-1
Augmented realty (AR) smart TV

J.207rev
IBB control framework specifications

J.297rev
4K cable television STB

Current work programme of ITU-T SG9

Bridging the Standardization Gap	Evolution of cable TV networks	Innovative services
J.dtt-dist-req Open platform for TV program delivery over cable TV networks	**J.docsis31-series** Gigabit/sec-capable cable modem system specifications	**J.acf-hrm** Harmonization for compatibility of IBB applications

A new work item will be anytime created by *Question* based on a Contribution and agreement.

J.tda Up-to-date collection of terms and definitions of ITU-T SG9	**J.roip-arch** System for transport of RF signals over IP network	**J.302amd-1** Augmented realty smart TV
	J.382rev Advanced cable television signal transmission systems (DVB-C2)	**J.207rev** IBB control framework specifications
		J.297rev 4K cable television STB

Collaboration with other SDOs

ITU-T SG16
ITU-R SG6
ITU-D BDT
and other Study Groups

TC100

TC Cable
ISG ECI

and so on...

as qualified by ITU-T A.4, A.5 and/or A.6

Thank you very much for your attention!!