SMPTE – NEXTGEN TV SUMMIT MOBILE & AUTOMOTIVE APPLICATIONS AND FEMBMS (5G-BROADCAST)

Thomas Janner Director of Product Management Transmitter Systems

ROHDE&SCHWARZ

Make ideas real





Produced by SMPTE and SBE with support from the NAB and ATSC



and the support of our host, WETA Television



JANUARY 16, 2020



Event Recording courtesy of the following sponsors:





JANUARY 16, 2020



With the support and generosity of the following sponsors:









DVG
Digital Video Group, Inc





ERI.

ROHDE&SCHWARZ













JANUARY 16, 2020



THANK YOU TO THE SMPTE DC, SBE AND NAB TEAM MEMBERS WHO PRODUCED THIS EVENT

Fred Willard Univision Rick Singer Singer Media Engineering Skip Pizzi NAB Tom Hackett Diversified Systems Melissa Davis Evertz Louise Shidler Chesapeake Systems Maciej Ochman CPB James Snyder US Library of Congress Nephi Griffith BMG Greg Smalfelt Ch 16 Fairfax Alex Snell BCI Digital Peter Wharton Happy Robotz

Morning Program



Afternoon Program

1	8:00 A	- M	9:00	AM	Registration and continental breakfast		01:25 PM - 01:45 F	Protecting the NextGen TV Consumer Advanced EAS and AWARN Capabilities	
1	8:55 AM -		9:00 AN	AM	Fred Willard, SBE Washington Kishore Persaud, SBE Baltimore		04.45 DM - 00.45 S	Monetizing the NextGen TV Consumer	
9	9:00 A	M -	9:05	AM	Introduction Peter Wharton, SMPTE Membership VP		01:45 PM - 02:15 F	Addressable Advertising and Analytics Rick Ducey & Mark Fratrik, BIA	
ę	9:05 A	M -	 - 9:35 AM NextGen TV: Transforming the Consumer Experience Lynn Claudy, SVP Technology, NAB and Chairman, ATSC Board of Directors Madeleine Noland, President, ATSC 			02:20 PM - 03:20 PM 602:20 PM - 03:20 PM 602:20 PM - 03:20 PM 602:20 PM 602:20 PM 702:20 PM 7			
9	9:35 A	M - 1	0:00	АМ	Creating New Opportunities with NextGen TV Joonyoung Park, VP and Fellow, DigiCAP		03:25 PM - 03:40 F	M Afternoon Break	
1	10:00 AM -	\M - 1	10:35	АМ	Improved Television Reception for Consumers Implementing NextGen TV Distribution Systems		03:40 PM - 04:10 F	The Consumer Out-of-Home Experience Mobile & Automotive Applications and FeMBMS (5G Broadcast) Thomas Janner, Product Management & R&D Director, Rhode & Schwarz	
	10:35 AM			5 AM	Jeff Andrew, Osborn Engineering Benefits of a Converged Broadcast and IP Platform Lynn Claudy, SVP Technology, NAB and Chairman, ATSC Board of Directors Content Reception Enhancements Richard Lhermitte, VP Solutions and Market Dev, ENENSYS TeamCast		4:10 PM - 4:35 P	The ATSC 3.0 Roadmap Lynn Claudy, SVP Technology, NAB and Chairman, ATSC Board of Directors Madeleine Noland, President, ATSC	
		AM - 1	11:15				4:35 PM - 5:00 P	The Consumer Technology Roadmap Brian Markwalter, SVP Research and Standards The Consumer Technology Association	
	11:15 A	M - 1	11:30	AM	Morning Break		5:00 PM - 6:00 PM	Station Group and Industry Deployment Plans Advanced Capability Implementation Strategies Skip Pizzi, VP Technology Education & Outreach, NAB (Moderator) Michael Bouchard, VP Technology Strategy, ONE Media / Sinclair Stacey Decker, CTO, Public Media Group	
	11:30 A	M - 1	11:50	АМ	Consumer Applications for Combined 5G & NextGen TV Networks Josh Arensberg, M&E Business Development, Verizon Media				
11:	11:50 A	M - 1	12:15	PM	Case Study: Hybrid Services at "Chicago 3.0" Jean Macher, Harmonic			Sasha Javid, COO, The Spectrum Co	
	12:15 F	PM - (01:20	РМ	Buffet Lunch		6:00 PM - 8:00 P	M Cocktail Reception Busboys and Poets 4251 S. Campbell Ave., Shirlington Heavy Hors d'oeuvres and open bar	



MOBILE COMMUNICATIONS

- ► Voice & Video Calls
- Social Media
- ► Live Streaming
- Linear content
- Video on demand
- ► E-commerce
- File transfer
- Online gaming

CURRENT SITUATION OF BROADCASTING INDUSTRY

Consumer behavior changes

- Streaming services are competing with linear TV
- Smartphones/Tablets more and more important

No access to smartphones

 No support of Broadcast standards by most Smartphones

How to get access to Smartphones & Mobile devices?





MNO CHALLENGES

- Exponential increase of Mobile Video including Live events & Linear TV
- Smartphone users desire to consume HD videos anytime – anywhere
- ► UHD/4K smartphones now available
 → rising demand for 4K video quality

Heavy investments ...

But what about QoS / QoE ?

POTENTIAL OF (5G-) BROADCAST

- ► Large-scale HPHT network
- ► Nation wide coverage
- New Business models
- Very low latency
- Cost & Spectrum Efficiency
- ► Higher QoS, Better QoE

Mobile streaming



- Live TV and Live streaming (e.g. sport events)
- Data offloading

Internet of things



- Software & firmware updates
- Common control
 messages to devices

Automotive



- Autonomous driving information
- Software & firmware updates
- Signage information

Public safety



- Disaster alerts (e.g. tsunami, earthquake)
- Emergency alerts (e.g. hazard, amber alert)





USING BROADCAST FOR NETWORK ENHANCEMENTS

Broadcast will improve data traffic efficiency

Berlin Nürnberg

New Josef Direct

AUTOMOTIVE - A "NEW" PLAYER NILE BROADCAST & CELLULAR WORLD



USING BROADCAST IN AUTOMOTIVE APPLICATIONS





Data Offloading for common data



Image source: Tesla



Traffic updates on local area + Emergency warning system

TV AND MOBILE EVOLUTION: CONVERGING TECHNOLOGIES



Rohde & Schwarz

FEMBMS

- Further Enhanced Multimedia Broadcast/Multicast Service
- Definition as MBMS in UMTS (Release 5/6) and Re-appearance with LTE Release 8 as eMBMS
- Known as LTE enTV (enhanced TV) in 3GPP Release 14
- Broadcast/Multicast Premium content anywhere/anytime



ENHANCING SYSTEM ARCHITECTURE & MEDIA FORMATS

► Receive-Only Mode (ROM) for devices

- Free-to-air content broadcast
- ► Simplified Architecture
- ► UHD, HDR & 4K Full Support
- Transport-only (pass-through)
 FeMBMS bearer to use the network as content delivery platform



FEMBMS : HPHT SIMPLIFIED ARCHITECTURE



Rohde & Schwarz

FEMBMS : LTE/EPC WITH HPHT ARCHITECTURE



FEMBMS DETAILS

FeMBMS was specified in 3GPP Release 14 in the summer of 2017

- → Consideration of media broadcasters' perspective
 - Support of larger inter-site distance (cyclic prefix 200 µs)
 - Dedicated MBMS transmission (100% broadcast transmission)
 - Receive-only mode
 - Numerology that fit into LTE/5G NR numerology => single chipset
 - Cellular network independent signalling and SIM card free operation

MCS Index	BW = 5MHz	BW = 10MHz	BW = 15MHz	BW = 20MHz
9 QPSK	3.9 Mbps	7.86 Mbps	11.8 Mbps	15.75 Mbps
13 16 QAM	5.57 Mbps	11.14 Mbps	16.71 Mbps	22.3 Mbps
18 64 QAM	7.67 Mbps	15.52 Mbps	23.3 Mbps	30.57 Mbps
27 64 QAM	15.4 Mbps	30.81 Mbps	46.22 Mbps	61.7 Mbps



PROJECT: 5G TODAY, GERMANY FEMBMS HPHT FIELD TRIAL

- Research and implementation of the FeMBMS specification for the large-scale transmission of media content in broadcast mode based on mobile technology
- Funded by the Bavarian Research Foundation
- Duration 28 months (1st of July 2017 to 31st October 2019)

Project partners:



Associated partners:

Telefonica **O**₂



Rohde & Schwarz

5G TODAY CURRENT STATUS

- ► Frequency: 750 758 MHz
- ► Bandwidth: 5MHz (later 10MHz)
- ► Two transmitter sites:
 - Wendelstein
 - Ismaning
 - Inter-site distance 64k
- ► Equipment installed:
 - THU9evo 5kW (Wendelstein)
 - THU9evo 6kW (Ismaning)
 - Approx. 100kW ERP each



Rohde & Schwarz

5G BROADCAST IN SFN MODE



And since August 2019/ 5G Broadcast is on air in Beijing!

广播电视塔欢迎您

WELCOME TO CHINA CENTRAL RADIO & TV TOWER



R&S VISION: EFFICIENT DISTRIBUTION OF MOBILE TV

- R&S Solution: Utilization of Broadcast/Multicast concepts
 - Broadcast/Multicast together with unicast
 - Large-scale cells
 - High Power High Tower (HPHT)
 - Frequencies < 1 GHz
- It's all about efficiency
 Efficient spectrum use by Multicast data distribution just once





→ Increase of profitability

FROM THE SMPTE WASHINGTON DC SECTION

THANK YOU