

The Policy Forum at AT&T

The 3.5 GHz Future Innovation Showcase

Tuesday, February 13, 2018

Speaker Biographies

Joan Marsh

Executive Vice President of Regulatory & State External Affairs, AT&T

About Marsh

- As Executive Vice President of Regulatory & State External Affairs, Joan Marsh is responsible for federal regulatory relations, the state external and legislative affairs regions and the national regulatory organization supporting AT&T Communications.
- In 2016, Joan was named Senior Vice President of Federal Regulatory, with responsibility for managing all of AT&T's interests before the Federal Communications Commission and related policy arenas.
- In 2007, Joan was named Vice President of Federal Regulatory, with responsibility for AT&T's wireless, spectrum and public safety regulatory affairs. From 1997 to 1999, she served as Senior Regional Attorney for AT&T in its Chicago offices representing AT&T before various state public utilities commissions in the Midwest.
- Prior to joining AT&T, Joan spent five years as a trial litigator with the Chicago law firm of Kirkland & Ellis. She received a J.D. with Honors from the University of Southern California Law Center in Los Angeles in 1990 and upon graduation was a law clerk for the Honorable Edward Rafeedie of the US District Court for Central District of California, Los Angeles.



About AT&T

- AT&T Inc. (NYSE:T) helps millions around the globe connect with leading entertainment, business, mobile and high speed internet services. They offer the nation's best data network and the best global coverage of any U.S. wireless provider. They're one of the world's largest providers of pay TV.
- They have TV customers in the U.S. and 11 Latin American countries. Nearly 3.5 million companies, from small to large businesses around the globe, turn to AT&T for their highly secure smart solutions.

Opening Remarks

Michael O’Rielly
Commissioner, FCC



About O’Rielly

- Michael O’Rielly was nominated for a seat on the Federal Communications Commission by President Barack Obama on August 1, 2013 and was confirmed unanimously by the United States Senate on October 29, 2013. He was sworn into office on November 4, 2013. On January 29, 2015, he was sworn into office for a new term, following his re-nomination by the President and confirmation by the United States Senate.
- Prior to joining the agency Commissioner O’Rielly served as a Policy Advisor in the Office of the Senate Republican Whip, led by U.S. Senator John Cornyn, since January 2013. He worked in the Republican Whip’s Office since 2010, as an Advisor from 2010 to 2012 and Deputy Chief of Staff and Policy Director from 2012 to 2013 for U.S. Senator Jon Kyl.
- He previously worked for the Republican Policy Committee in the U.S. Senate as a Policy Analyst for Banking, Technology, Transportation, Trade, and Commerce issues from 2009 to 2010. Prior to this, Commissioner O’Rielly worked in the Office of U.S. Senator John Sununu, as Legislative Director from 2007 to 2009, and Senior Legislative Assistant from 2003 to 2007. Before his tenure as a Senate staffer, he served as a Professional Staff Member on the Committee on Energy and Commerce in the United States House of Representatives from 1998 to 2003, and Telecommunications Policy Analyst from 1995 to 1998.

About FCC

- The Federal Communications Commission (FCC) was established by the Communications Act of 1934 as an independent U.S. government agency and is directly responsible to Congress. The FCC regulates interstate (between states) and international communications by radio, television, wire, satellite and cable in all of the 50 states, the District of Columbia and U.S. territories.
- Five Commissioners direct the FCC. They are appointed by the President and confirmed by the Senate. Only three Commissioners can be of the same political party at any given time and none can have a financial interest in any Commission-related business. The President selects one of the Commissioners to serve as Chairperson. All Commissioners, including the Chairperson, have five-year terms, except when filling an unexpired term.

Ericsson Technology Presentation

David Hammerwall

Head of Product Line 5G; Ericsson



About Hammerwall

- David Hamerwall is overall responsible for Ericsson's 5G RAN product line.
- Prior to this, David has held a number of positions within product management, including Head of RAN Services and Mobility (such as voice, positioning, and LTE broadcast); Head of Product Line 2G/3G; and was also the primary driver of Ericsson's strategy and execution to align the telco industry in the area of Cellular Internet of Things. David received his Ph.D. in Telecommunications from KTH Royal Institute of Technology in 2007, after which he joined Ericsson Research, with a primary focus on 3GPP standardization and research in areas including: Multi-antenna technologies, Coordinated Multipoint (CoMP) and Small Cell Enhancements.
- Ericsson is the driving force behind the Networked Society - a world leader in communications technology and services. Our long-term relationships with every major telecom operator in the world allow people, business and society to fulfill their potential and create a more sustainable future.

About Ericsson

- Over the past 140 years, Ericsson has been at the forefront of communications technology. Today, we are committed to maximizing customer value by continuously evolving our business portfolio and leading the ICT industry.
- Ericsson is a global leader in delivering ICT solutions. In fact, 40% of the world's mobile traffic is carried over Ericsson networks. We have customers in over 180 countries and comprehensive industry solutions ranging from Cloud services and Mobile Broadband to Network Design and Optimization.
- Our services, software and infrastructure - especially in mobility, broadband and the cloud - are enabling the communications industry and other sectors to do better business, increase efficiency, improve user experience and capture new opportunities.
- Ericsson has one of the industry's strongest patent portfolios with a total count of over 42,000 granted patents. R&D is at the heart of our business and approximately 23,700 employees are dedicated to our R&D activities. This commitment to R&D allows us to drive forward our vision for a Networked Society - one where everyone and everything is connected in real time - enabling new ways to collaborate, share and get informed.

Nokia Technology Presentation

Chris Stark

Head Business development, Nokia

About Stark

- Chris Stark is a seasoned telecoms executive, having previously held senior positions at Turin Networks, Luminous Networks and Alcatel, as well as working as a management consultant to start-up telecommunications companies, advising on business strategy, marketing, growth strategies, pricing and competitive analysis. Chris holds a bachelor's degree in electrical and electronic engineering from Plymouth University in the United Kingdom. He is based in Dallas, Texas.



About Nokia

- Powered by the research and innovation of Nokia Bell Labs, we serve communications service providers, governments, large enterprises and consumers, with the industry's most complete, end-to-end portfolio of products, services and licensing. From the enabling infrastructure for 5G and the Internet of Things, to emerging applications in virtual reality and digital health, we are shaping the future of technology to transform the human experience. A truly global company, we are 160 nationalities working in more than 100 countries.

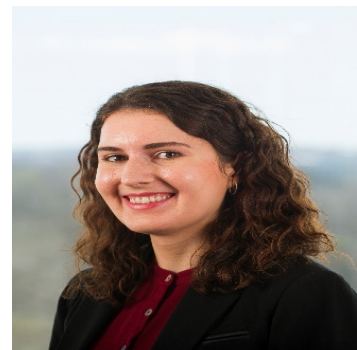
Regulatory/Policy Panel Discussion

Margaret McGill (Moderator)

Technology Reporter, POLITICO

About McGill

- Margaret Harding McGill is a technology reporter for POLITICO Pro.
- She previously wrote about telecom for Law360 in Washington, D.C. She moved to D.C. from Pittsburgh, Pa., where she spent five years covering the Pittsburgh police and other Western Pennsylvania law enforcement agencies for the Pittsburgh Tribune-Review.



About POLITICO

- POLITICO is a global news and information company at the intersection of politics and policy. With publications based in Washington, D.C., New York and Brussels - and continued expansion into various state capitals in the United States - POLITICO has one of the most robust and rapidly expanding roster of journalists covering politics and policy in the world.



The Policy Forum at AT&T

- Since its launch in 2007, POLITICO has delivered journalism about politics and policy making that is more authoritative in its sophistication and nonpartisan perspective than any competitor; that is more useful to people with a professional interest in public affairs; and that is more fun to read for a community of people who love the drama and sheer sport of politics.
- The central mission of POLITICO, from birth to our current period of growth, has been to help sustain and vastly expand nonpartisan political and policy journalism. We all believe informing readers and holding leaders accountable is and will forever be essential to smart governance, regardless of shifts in technology and consumption habits.

Paul Anuszkiewicz

Vice President, Spectrum Planning, CTIA

About Anuszkiewicz

- Paul Anuszkiewicz is responsible for technology and technical matters concerning spectrum advocacy, spectrum allocation for the network evolution to 5G and other technical areas to aid CTIA's members and as a technical resource to policy makers.
- He has 30 years of technology planning, network engineering and operational experience.
- Paul also serves on the Board of Directors of the Wireless Innovation Forum (WinnForum) and the CBRS Alliance. In addition, he also serves on the Commerce Spectrum Management Advisory Committee (CSMAC) to the Department of Commerce.
- Previously, he served as CEO of Caten McGuire. There, he provided effective leadership, technical direction and support to the Engineering, Business and Legal teams across a wide base of Caten McGuire clients.



About CTIA

- CTIA represents the U.S. wireless communications industry and the companies throughout the mobile ecosystem that enable Americans to lead a 21st century connected life.
- CTIA vigorously advocates at all levels of government for policies that foster continued wireless innovation and investment. CTIA also coordinates the industry's voluntary efforts to provide consumers with a variety of choices and information regarding their wireless products and services. CTIA also hosts educational events that promote the wireless industry and coordinates the industry's efforts to provide consumers with a variety of choices and information regarding their wireless products and services as well as the industry's voluntary best practices.
- CTIA also supports numerous important industry initiatives, such as GrowingWireless.com to provide parents with tools and information to educate themselves so they may teach their kids how to use wireless technology responsibly and AccessWireless.org, a resource for consumers to research and find information on accessible wireless products and services.

Stacey Black

Assistant Vice President, Federal Regulatory, AT&T





About Black

- Stacey Black is the Assistant Vice President for Federal Regulatory -Spectrum at AT&T.
- He recently focused on public safety broadband, and spectrum legislation and regulatory policy.
- He was also a key contributor in FirstNet's enabling legislation and led AT&T's product development efforts for public safety.
- He joined AT&T in 2002, serving in various capacities involving the development and management of wireless products and services for the public sector market.

About AT&T

- AT&T Inc. (NYSE:T) helps millions around the globe connect with leading entertainment, business, mobile and high speed internet services. They offer the nation's best data network* and the best global coverage of any U.S. wireless provider.** They're one of the world's largest providers of pay TV.
- They have TV customers in the U.S. and 11 Latin American countries. Nearly 3.5 million companies, from small to large businesses around the globe, turn to AT&T for their highly secure smart solutions.

Frederick Moorefield

Director Spectrum Policy, Department of Defense

About Moorefield

- Frederick Moorefield is currently serving as the Director of Spectrum Policy & International Engagements for the Department of Defense (DoD) Chief Information Officer (CIO).
- His primary duties include strategic oversight of DoD spectrum policy and plans as well as overall management of key DoD CIO international partnerships and outreach. Mr. Moorefield represents DoD in a variety of national and international spectrum forums and provides spectrum resource management program oversight. On a broader front, he leads overall DoD CIO international engagements and related activities to include technology transfer, foreign disclosure, and internet governance. He has served in this position since October 2012.
- Mr. Moorefield joined Federal service in 1989 in the Air Force as a civil servant, where he served for 19 years doing Research and Develop and Acquisition. He also served in the Defense Information Systems Agency at the Joint Spectrum Center for four years where he was first introduced to spectrum management.



About Department of Defense

- The mission of the Department of Defense is to provide the military forces needed to deter war and to protect the security of our country. The department's headquarters is at the Pentagon.
- The mission of Defense.gov is to support the overall mission of the Department of Defense by providing official, timely and accurate information about defense policies, organizations, functions and operations. Also, Defense.gov is the single, unified starting point for finding military information online.

- This mission is consistent with the DoD Principles of Information, which outline the Department's policy for providing information to military members, DoD civilians, military family members, the American public, the Congress, and the news media. The information you find here is cleared for public release in accordance with applicable DoD policies.

Paul Powell

Assistant Chief, Mobility Division, FCC

About Powell

- Paul Powell is an Assistant Chief in the Wireless Telecommunications Bureau, Mobility Division of the Federal Communications Commission (FCC). Paul manages rulemaking proceedings, advises on spectrum policy and licensing issues, and coordinates with other federal agencies to advance the Commission's policy goals.
- Prior to joining the FCC, Paul was an associate at Wiley Rein LLP where he worked on cable, wireless, satellite, and international telecommunications matters. He holds a JD from Columbia Law School and a Bachelor of Arts from the University of California, Santa Barbara.

**About FCC**

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- Five Commissioners direct the FCC. They are appointed by the President and confirmed by the Senate. Only three Commissioners can be of the same political party at any given time and none can have a financial interest in any Commission-related business. The President selects one of the Commissioners to serve as Chairperson. All Commissioners, including the Chairperson, have five-year terms, except when filling an unexpired term.

Patrick Welsh

Associate Vice President, Federal Regulatory, Verizon

About Welsh

- Patrick Welsh joined Verizon in January 2012 as Assistant Vice President – Wireless Policy Development, where he is engaged in the development of Verizon's public policy positions on spectrum and other wireless issues.
- Prior to joining Verizon, Patrick worked in T-Mobile's government affairs office in both the federal regulatory and legislative affairs groups. As a regulatory attorney, Patrick was responsible for a number of wireless public-policy issues, including spectrum policy, spectrum auctions, voice and data roaming, wireless open access/network neutrality, broadband reclassification, smart grid, mergers and acquisitions, and federal preemption of state regulations.





- As part of T-Mobile's legislative team, he lobbied both Democrats and Republicans on the House and Senate commerce committees. Prior to joining T-Mobile, Patrick worked at American Tower, where he managed site development and construction of wireless communications facilities in the Mid-Atlantic area.
- Patrick began his career at Gallagher, Evelius & Jones, LLP as an associate with the firm's commercial transactions group.

About Verizon

- Verizon Communications was created on June 30, 2000 by Bell Atlantic Corp. and GTE Corp., in one of the largest mergers in U.S. business history. GTE and Bell Atlantic evolved and grew through decades of mergers, acquisitions and divestitures. Today, Verizon is a global technology company delivering the promise of the digital world to millions of customers every day.

Industry Panel: Use cases, equipment, SAS/ESC, timing, issues/concerns

Kurt Schaubach (Moderator)

Chief Technology Officer, Federated Wireless



About Schaubach

- Kurt Schaubach has been Chief Technology Officer of Federated Wireless, Inc. since January 2015. Mr. Schaubach served as Chief Technology Officer and Vice President at National Rural Telecommunications Cooperative (NRTC).
- Mr. Schaubach works closely with all of the organizations business units to analyze and apply the best technologies to fit the members' needs.
- He especially monitors NRTC's many wireless activities, including WildBlue, 220 MHz, Sensus wireless AMI businesses, as well as new wireless broadband opportunities. In addition, he works closely with NTCA, NRECA and other organizations to shape technology and regulatory issues. He joined NRTC in 2009 as Vice President, broadband technologies.
- He has more than 20 years of experience in the wireless industry and 12 years of experience in senior engineering positions. This experience includes communications network design, deployment, operation and advanced technology development.
- He served at NextWave Broadband, formerly a division of NextWave Wireless, Inc., an early provider of wireless broadband products and services. Prior to joining NextWave, he provided consulting services to numerous clients, including SK/Korea Mobile Telecom, QUALCOMM and Nextel Communications. He started his career with Southwestern Bell Technology Resources.

About Federated Wireless

- Industry changing, innovative technologies are the heritage of Federated Wireless. Our innovation can be traced back to our founding scientists and their work at the Hume Center, Wireless@VT at Virginia Tech, and government agencies, such as DoD and DARPA. Dr. Charles

Clancy is the co-author of Spectrum Sharing strategy. Dr. Jeff Reed was a member of The United States President's Council of Advisors on Science and Technology (PCAST) and was influential in shaping the shared spectrum model adopted by the FCC. Dr. Robert McGwier is one of the foremost leading scientists in telecommunication systems engineering along with Dr. Joe Mitola who laid the foundation for spectrum-sensing cognitive radio.

- Our parent company is Allied Minds, who partners with universities and federal research institutions to develop new technologies, bridging the commercial gap by creating businesses based on these technologies.
- Federated Wireless is led by CEO Iyad Tarazi and a team of industry veterans who continue to build on this heritage, pioneering new territory in the commercialization of shared spectrum.

Dean Brenner

Senior Vice President, Spectrum Strategy & Technology Policy, Qualcomm

**About Brenner**

- Dean Brenner is Senior Vice President, Government Affairs for Qualcomm Incorporated. He directs Qualcomm's global spectrum acquisitions and strategy and is responsible for global technology policy. He represents Qualcomm before the Federal Communications Commission and other agencies of the United States and Canadian governments responsible for spectrum and telecommunications policy and interacts with spectrum regulators around the world. He also leads Qualcomm's policy initiatives relating to mobile healthcare.
- Mr. Brenner led Qualcomm's bidding team in recent spectrum auctions in India (the 2.3 GHz band), the United States (the 700 MHz band), and the United Kingdom (the L Band). In addition, he was responsible for obtaining the regulatory approvals for Qualcomm's sale of 700 MHz spectrum to AT&T in 2011. In 2006, he obtained the regulatory approvals to launch FLO TV, a mobile TV service. He has spoken at conferences on spectrum policy in the United States, Canada, South Korea, Belgium, Great Britain, and elsewhere around the world. He joined Qualcomm in November 2003.
- Mr. Brenner is a member of the Federal Advisory Board for Space-Based Positioning, Navigation, & Timing, which advises the Executive Branch on policy matters impacting the Global Positioning System. He is also a member of the Board of Governors of 4G Americas, the Board for Jewish Life at Duke University, and the Board of Trustees of the Field School. He lives in Washington, DC with his wife Robin Shaffert and their two sons, Michael and Steven.

About Qualcomm

- Qualcomm is an American multinational semiconductor and telecommunications equipment company that designs and markets wireless telecommunications products and services. It derives most of its revenue from chipmaking and the bulk of its profit from patent licensing businesses.[3] The company headquarters is located in San Diego, California, United States, and has 224 worldwide locations.
- The parent company is Qualcomm Incorporated (Qualcomm), which includes the Qualcomm Technology Licensing Division (QTL). Qualcomm's wholly owned subsidiary, Qualcomm

Technologies, Inc. (QTI), operates substantially all of Qualcomm's R&D activities, as well as its product and services businesses, including its semiconductor business, Qualcomm CDMA Technologies.

Paul Challoner

Vice President Network Product Solutions, Ericsson

About Challoner

- Paul Challoner is the VP Network Product Solutions at Ericsson. At Ericsson, he is a technology and Business leader specializing in wireless technologies including 5G, LTE, 3G, CDMA, GSM, Wi-Fi, Small Cells, IOT, CRAN, VRAN , MIMO & FWA.
- He serves on the board of Directors for the “CBRS Alliance” and the “WinnForum.”
- Previously, he served as the VP & Head of Product Line Wi-Fi at Ericsson where he was globally responsible for Wi-Fi Products for Ericsson, and prior to that was the VP of Radio Access.
- Prior to joining the team at Ericsson, Challoner served a VP of GSM Product Management and VP GSM/UMTS India at Nortel.

**About Ericsson**

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Andy Clegg

Spectrum Engineering Lead, Google

About Clegg

- Andrew Clegg is the Spectrum Engineering Lead for Google. He is presently focused primarily on identifying spectrum sharing opportunities for wireless broadband networks, especially in the context of the PCAST model for multi-tier spectrum sharing. He



has been integral in the adoption and implementation of the 3.5 GHz Citizens Broadband Radio Service, as founding chair of the Functional and Operational Requirements Working Group of the Wireless Innovation Forum.

- Prior to joining Google, he served from 2003 – 2013 as the electromagnetic spectrum manager for the U.S. National Science Foundation. At NSF, he founded the Enhancing Access to the Radio Spectrum (EARS) program, a \$50 million research program dedicated to funding academic and small business research focused on improving spectrum efficiency and access. Discoveries and innovations made under the EARS program continue to impact radio spectrum access today.
- Prior to NSF, he was a Lead Member of Technical Staff at what is now AT&T Mobility, and senior engineer at Comsearch.

About Google

- Google LLC is an American multinational technology company that specializes in Internet-related services and products. These include online advertising technologies, search, cloud computing, software, and hardware. Google was founded in 1998 by Larry Page and Sergey Brin while they were Ph.D. students at Stanford University, in California.
- Together, they own about 14 percent of its shares, and control 56 percent of the stockholder voting power through supervoting stock. They incorporated Google as a privately held company on September 4, 1998. An initial public offering (IPO) took place on August 19, 2004, and Google moved to its new headquarters in Mountain View, California, nicknamed the Googleplex.
- In August 2015, Google announced plans to reorganize its various interests as a conglomerate called Alphabet Inc. Google, Alphabet's leading subsidiary, will continue to be the umbrella company for Alphabet's Internet interests. Upon completion of the restructure, Sundar Pichai was appointed CEO of Google; he replaced Larry Page, who became CEO of Alphabet.

Jeffrey Marks

Senior Counsel, Policy and Regulatory, Nokia

About Marks

- Jeffrey Marks is Senior Counsel, Policy and Regulatory for Nokia. In that role, Jeff develops and presents Nokia's legal and policy positions to officials at all levels of government. Jeff advocates on a wide range of issues, including spectrum policy, net neutrality/net governance, public safety communications, privacy, cybersecurity, broadband infrastructure deployment, and intelligent transportation.
- Jeff has worked at Nokia (and Alcatel-Lucent, which was acquired by Nokia) since 2011. Prior to Nokia, Jeff served as Senior Legal Counsel for Tata Communications where he advised the company on international telecommunications regulatory frameworks, facilitating the company's global expansion. Jeff began his career with 10 years in private legal practice, most recently as Counsel in the Communications Practice Group of Latham and Watkins.



About Nokia

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Mark Gibson
Senior Director, Comsearch

About Gibson

- With over 30 years of spectrum management experience, Mark is responsible for developing domestic and international business opportunities for Comsearch.
- In addition to leading Comsearch's technical and business development efforts numerous wireless and spectrum-related products and services, he has led efforts to address spectrum sharing between Federal government and commercial users.
- He leads efforts on Comsearch's Spectrum Access System and is on the board of the Wireless Innovation Forum.
- He is a co-chair of the Commerce Spectrum Management Advisory Committee, where he has also co-chaired working groups related to spectrum sharing and data exchange issues.
- He has led Comsearch's spectrum management efforts including the development of spectrum sharing analysis protocols and sharing criteria, as well as development of Comsearch's engineering services and software products.
- He has authored several papers on spectrum sharing and relocation and has advised numerous wireless participants in their system design.



About Comsearch

- Comsearch leads the industry in providing a comprehensive portfolio of services to insurance companies, enabling them to better manage auto and property claims. They apply proven, market-tested experience and expertise to the business of property and auto claim services. And they back their services with system architectural technologies that provide system diversity, redundancy and data security.
- Since their inception in 1984, they've built a customer base of insurance companies throughout the United States, partnering with a majority of the top 20 property and casualty carriers and a multitude of other insurers.