

TAC Topics for 2018

5G and IoT: The TAC has previously studied and made recommendations on spectrum frontiers, often referred to as spectrum for 5G, and on the Internet of Things. As work has continued on 5G, parties often associate it with, among other things, a wide variety of IoT applications. The purpose of this working group is to study and report on the state of development of 5G IoT applications across various market sectors. For example, what is the current activity on potential use of 5G in conjunction with IoT for energy, health care, transportation, etc.? What progress has been made, what opportunities and/or barriers exist and what solutions are being developed? Are the service providers and equipment developers engaged in a dialog with the market sectors in the U.S., and if so, is this happening on a one-to-one basis, through trade associations, standards bodies, ad hoc groups, etc.? What is the expectation for deployment of network infrastructure that can support such applications? How does the activity in the United States compare internationally? The General Accounting Office recently recommended that the FCC should track the growth in (1) high-bandwidth IoT devices and (2) IoT devices that rely on unlicensed spectrum. As 5G IoT applications are being developed, are there particular ones that are apt to create significantly more traffic on networks (both wireless and wireline)? Are there ways to identify and monitor the sources that have a high impact on network traffic? For example, how might the FCC or the private sector encourage development of applications that are mindful of efficient use of spectrum resources (i.e., periodic or triggered transmissions from video cameras vs. continuous transmissions)? Although described in the context of “5G”, the work can also encompass existing technologies. Are there things that the Commission or other government agencies can or should do relative to 5G and IoT to facilitate such developments?

Mobile Device Theft Prevention: The work of the TAC has been instrumental in combatting mobile device theft in the US with guidelines for the uniform implementation of antitheft features on mobile devices in combination with the implementation of an industry supported mobile device information portal. Future work should focus on supporting FCC efforts in working with foreign regulatory agencies to combat the theft and use of illegal mobile devices. One of the challenges has been in understanding what becomes of the devices after they are stolen. While it is widely believed that the devices are shipped to places outside the United States, little has been done thus far to explore the extent to which this is true and more generally what has been happening internationally. For example, is MDTP a major concern in other countries? What are they doing? What steps do carriers take to prevent connection of stolen devices? The TAC is asked to identify ways we can further explore these topics. Would there be value in holding a workshop with other international stakeholders at appropriate venues. Or perhaps a separate FCC workshop including video participation with invited representatives from foreign carriers and law enforcement? The work group should reassess the effectiveness of the information portal and make recommendations, as appropriate, for its future improvement. In addition, the work group will study whether mobile device theft has declined in the United States since these efforts have been implemented.

Antenna Technology: Antenna technology has evolved from the time when simple omnidirectional antennas were common, to sectorized antennas on cell towers, to multiple antennas within a device that are not visible to the user. Adaptive phased array antennas have the ability to dynamically steer

signals in particular directions which create new ways to think about interference avoidance and appropriate technical standards for devices. Metamaterials offer another option to produce steerable antenna arrays at low cost. New technologies such as massive MIMO and MultiUser-MIMO promise increased spectrum efficiency. This work group is tasked to report on the state of development of antenna technologies and their implications for FCC policies, technical standards, regulatory and technical issues. The tasking is intended to cover as broad a scope of radio services as feasible as well as fixed and mobile applications.

Communication Strategies for Drones: Drones for all sorts of applications and of all sizes have come to the fore in the last few years. As noted in the Presidential Memorandum of October 25th, 2017 to the Department of Transportation, “it shall be the policy of United States to support the safe operation of unmanned aircraft systems and enable the development of UAS technologies for use in agriculture, commerce, emergency management, human transportation, and other sectors”. The focus thus far has been on air safety within the scope of jurisdiction of the Federal Aviation Administration. We understand from press reports that many consumers have lost their drones, and it is worth exploring whether this was because they were unable to communicate with the drone reliably. Many of these devices currently operate using spectrum available for unlicensed devices that is not protected against harmful interference. There has also been discussion of using licensed commercial mobile radio services for communications with drones. This work group is tasked to study the spectrum issues for drones, including, control, monitoring, and payload delivery. What frequency bands are available today? Are they sufficient? What are the trade-offs for the various alternatives? What needs to be studied or done or to meet the various spectrum needs for drones (command and control, payload, identification, collision avoidance), considering both the need to make efficient use of the spectrum and the need to avoid causing harmful interference to systems on the ground? What testing facilities are available to evaluate and prove these concepts?

Future of Power: As we look to the future of a world relying on wireless devices for all manner of applications, the means of powering them has become increasingly important. Suppliers of products such as smart phones, laptops and tablets usually advertise the estimated battery life before needing recharging and consumers can make decisions as to which products best meet their needs. Service providers also employ strategies to manage their networks for reasons of performance that have the added beneficial effect of extending battery life such as through dynamic transmitter power control. Battery life is particularly of interest relative to the Internet of Things, recognizing that different applications can have vastly different power demands. The need to replace batteries frequently could be a substantial impediment to reliable and sustainable IoT applications. This work group will study and provide information to the Commission on the state of development of battery technology, as well as techniques such as wireless charging and how these technologies will change the landscape.

Computational Power and Stress on the Networks: Big data analytics has emerged recently as a critical tool in many fields. This can involve the exchange of massive amounts of data across communications networks, often in real time, in ways perhaps not anticipated only a few short years ago. The task of this

work group is to study how big data analytics, block chain, bitcoin mining, gaming, etc. may be affecting network performance. Some parties estimate an increase in data traffic of several hundred percent in just the next few years. What strategies are network operators, both wireline and wireless, employing to monitor the growth of big data? How are the networks planning to accommodate this growth? How are operators meeting the needs of big data relative to factors such as available bandwidth, latency, reliability, security, resiliency, etc.? To what extent are big data analytics and distributed computational resources able to improve the performance of networks? The working group is encouraged to explore these and other technical matters that may be relevant to informing the Commission about the impact of big data on IT and communications network infrastructure.