CSMAC: 5G Subcommittee

NTIA Questions

- **What technologies (including waveforms and architectures) might be included in 5G standards to facilitate sharing between federal and non-federal systems?**
  - Among other things, please consider specifically the key receiver performance requirements for sharing, particularly with respect to IoT devices, including a device's capacity for resilience and interference detection and avoidance.
  - Consider any 5G-specific technologies that might facilitate interference prevention, detection, and resolution.
  - Identify the standardization challenges with respect to such technologies and what actions NTIA should take to address these challenges.
- **What commercial 5G deployment scenarios (e.g., specific commercial use cases) exist that could potentially maximize the shared use of this spectrum (e.g., dynamic shared access between federal and non-federal users)?**

Thoughts

- Focus of interference management and sharing in 3GPP and IEEE standards is intra-technology
  - Techniques like active-antenna, coordinated resource scheduling, control channel optimization may help in spectrum sharing, but are largely designed to manage intra-technology interference.
  - Advancements in 5G receiver technology may help systems to be resilient to interference.

- The majority of standards bodies are not working on creating distinct 5G features geared solely toward sharing between federal and non-federal entities
  - Existing features identified in the draft report could possibly be used, but they are not ideal.
  - To address sharing issues, NTIA could propose work to be done by certain standards organizations.

Thoughts

- Interference management in 5G will be governed by multiple aspects
  - Technology
    - Waveform homogeneity in standards, toward OFDM based waveforms, may help manage interference across different standards.
    - Virtualization and centralized resource allocation technologies can adapt to changing interference patterns in real-time and mitigate accordingly.
  - Equipment
    - Advanced receivers, and standards-defined radio performance requirements allow for relaxed criteria for co-existence and protection.

Thoughts

- Deployment
  - Commercial 5G deployments will address user and enterprise-driven applications/services and will enable seamless mobility across multiple frequency bands, and network paths across, satellite, terrestrial and broadcast platforms
  - Each service will have different impact on spectrum sharing, depending on each service's critical requirement: reliability, data-rate, latency, or mobility.
- NTIA should create protection and network sharing criteria to account for these diverse scenarios to avoid over-protection

Thoughts

- Spectrum management utilizing automated coordination and external independent monitoring tools may be required to manage sharing across federal and non-federal systems, in some cases.
- Standardized information exchange protocol, information exchange templates, and information gathering/measurement criteria for different radio technologies could be studied.

Example of NTIA Actions

- For example at 3GPP, NTIA could introduce a study item proposal at the next RAN Plenary meeting, which proposes to study sharing techniques
  - NTIA would need [4] co-sourcing companies and proponents of the study item to get the work approved.
  - CSMAC members could help with identifying 3GPP member companies who could co-source this work.
  - Next meeting #77 to be held on dates 11 - 14 Sep 2017 at Sapporo, Japan.