Current Spectrum Issues of Interest or Concern to NOAA/NESDIS

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Space Spectrum Issues

- **Small Sat:** Extremely large growth in small sat deployments are being projected and observed. Spectrum use is increasing and placing pressure on established systems for coordination in UHF, S, and X bands as well as other space allocated bands.

- **Passive Bands:** Various international mobile telecommunications (IMT) groups are examining spectrum above 6 GHz as part of 5G growth. Several bands in consideration are adjacent to critical passive bands used for remote sensing. Degradation in ability to use passive bands is a growing concern.

- **Space Weather:** In accordance with ITU Resolution 657 (WRC-15), review the results of studies, conducted for WRC-2019, relating to the technical and operational characteristics, spectrum requirements and appropriate radio service designations for space weather sensors, with a view to providing appropriate recognition and protection in the Radio Regulations without placing additional constraints on incumbent services.

Remote Sensing Spectrum
There are no alternative frequencies for detecting natural properties

- The transmission spectrum of the atmosphere and the opacity of the atmosphere to particular frequencies allow the detection of weak natural radio frequency emissions
- “Line radiation spectra can be used to obtain temperature and humidity profiles in the atmosphere from the surface up into the mesosphere” (Source: NAP, 2010)
- Potential interference to these measurements from proposed commercial broadband wireless should be investigated for developing mitigation methods and implementation

Source: http://www.nap.edu/read/12800/chapter/1
NOAA Satellite Spectrum in Consideration for Repurposing

• **1695-1710 MHz**: Recently repurposed for sharing with AWS-3 (Advanced Wireless Services -3) licensees for use as LTE uplink band. Affects 27 critical federal sites and numerous other federal and nonfederal sites. Operations by AWS-3 has not begun so no validation of mitigation steps.

• **1675-1680 MHz**: In consideration for repurposing for use by commercial fix and mobile operations and continued shared use as a METSAT downlink band. Consideration primarily due to commercial party petition to US FCC in Proceeding RM-11681. Significant concern by NOAA on DCP downlink interference risk to GOES-R series.

• **400.15-420 and 150.05-174 MHz**: WRC-19 agenda item 1.7, resolution 659, assessment of the suitability of using existing SOS allocations below 1 GHz to accommodate the TT&C requirements for NGSO satellites with short duration missions.

• **5150-5925 MHz**: WRC-19 agenda item 1.16, to consider issues related to wireless access systems, including radio local area networks. May include additional spectrum allocations to the mobile service.

• **24.5-27.5 GHz**: WRC-19 agenda item 1.13, to consider identification of frequency bands for the future development of IMT, including possible additional allocations to the mobile service on a primary basis, in accordance with Resolution 238.

• **Above 24 GHz**: FCC Notice of Proposed Rulemaking, “Use of Spectrum Bands Above 24 GHz for Mobile Radio Services, GN Docket No. 14-177”: Solicitation of comments on mobile use in the following bands – 27.5-28.35 GHz, 37-38.6 GHz, 38.6-40 GHz, 64-71 GHz
Possible GOES DCS Spectrum Conflicts

Spectrum occupancy by **Smallsats**

- The output power levels of these TT&C (Earth-to-space) can be much higher than the power levels used by the DCS platforms. Consequently, the **operation of these TT&C links to Smallsats would cause harmful interference to the DCS receivers onboard the EESS or MetSat satellites.**

- For the **space-to-Earth direction**, the space station antennas used by **Smallsats** are omnidirectional antennas, which could result in significant levels of interference towards the DCS receivers on the satellite. (The omnidirectional space station antennas transmit energy in all directions, including the space high above, even though it is meant to send signals to the ground stations.)
Broadband a Growing Concern

WRC-15
AI 1.1: IMT < 6 GHz

5.6 GHz

Examine

Many Studies

0.8 GHz

Allocated

WRC-19

Broadband AIs < 86 GHz

AI 1.6: NGSO FSS
6.7 GHz Add’l

AI 1.13: IMT > 6 GHz
33.25 GHz Add’l

AI 1.14: HAPS
5.35 GHz Add’l

AI 1.16: RLANs
0.52 GHz Add’l

45.82 GHz

Examine

Allocate

Many Studies

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Summary

• NOAA’s National Weather Service relies on accurate, timely and reliable satellite observations to provide better information to save lives and property -- as it builds a Weather-Ready Nation
• Reliable access to spectrum is a critical component for achieving NOAA’s missions in support of the public
• NOAA satellite operations have experienced interference in the 1670-1675 MHz for the past several years
• Federal and non-federal users of Data Collection Platform outside AWS-3 protection zones cannot be protected and will be subject to interference
  • Potential impacts to emergency management, weather warnings, aviation, and wildfire management capability
• These data are the basis for satellite products provided by NOAA to the public and other government agencies, and further used by the weather enterprise
• Additional studies required prior to any additional auction of NOAA authorized frequencies
Thank You!