UTILITIES TELECOM COUNCIL
and
WINCHESTER CATOR LLC

RESPONSE TO

SATELLITE INDUSTRY ASSOCIATION

SIA Claims There Would Be "A Serious Interference Threat To Primary FSS Networks" and that the Proposal Would Fail To Meet CII Service Availability Requirements"

- To the contrary, the Winchester/UTC Petition demonstrates that several hundred thousand FS stations can operate with stated availability requirements (99.999%), using power control, without harmful interference to FSS networks

- The Winchester/UTC analysis showed that with a high probability nearly all the 500MHz Ku-Band spectrum will be available for CII deployments. Assumptions included

    - 30 FSS satellites fully utilized
    - Realistic distribution of FSS earth stations types (VSAT, ESV, VMES and AMSS)
    - Terminals deployed according to population;

- By using interference avoidance technologies CII terminals can find clean spectrum in which to operate and meet availability requirements

SIA Claims “UTC Has Failed to Prove that Access to Ku-band Spectrum Is Needed” and that “Other Spectrum is Available for CII Networks”

- Winchester/UTC has proposed a flexible deployment regime that doesn’t require links to be coordinated, thus allowing faster deployment.

- Existing FS bands are crowded and a flexible deployment regime is not appropriate in these bands. Even a listen before transmit approach could cause intermittent interference to these systems that have already been coordinated

- On the other hand, deployment in the FSS uplink band causes no harmful interference to the satellite. Any potential interference is controllable in a flexible deployment regime.

- The higher frequencies 27GHz, 38GHz, and 71GHz are appropriate only for very short haul applications due to severe rain attenuation.

SIA Claims that “Co-Primary FS/Sharing” and Deployment of FS Receivers Would Not Be Compatible with FSS

- To the contrary
  - Winchester/UTC is not asking for co-primary FS status
  - FS deployment in the 14.0-14.5 GHz band would not impact blanket licensing of FSS earth stations

- The Winchester/UTC proposed sharing would, in the worst interference case increase the noise to the worst case orbit location by no more than 0.25 dB.

- Today’s satellites are designed with enough margin to handle even such a worst, worst case situation.

SIA Claims “Winchester/UTC’s Technical Showing Has Fatal Defects”

- Using worst case assumptions Winchester/UTC’s technical showing demonstrated that hundreds of thousands of links can be deployed without causing harmful interference.

- With 500MHz of available spectrum, directional antennas, and coordination by a single CII Coordinator, a high density of terminals can be accommodated in a localized area

- High density deployments are not a risk to FSS earth terminals. The only even potential risk of interference is the aggregate interference of multiple FS stations to GSO satellites - a risk that can be mitigated, even were it to materialize under multiple worst case assumptions.

SIA Claims "Winchester/UTC Relies on 6 %ΔT/T Inappropriate Standard"

- 6 %ΔT/T is an appropriate standard for aggregate interference
  - Interference created by all FS stations would be equivalent to a single entry interference entry accepted by FSS as permissible interference. This is equivalent to the FCC and the ITU permitting all secondary co frequency AMSS earth stations to produce aggregate off axis eirp levels not greater that the interference levels of a typical FSS earth station. A 6 % ΔT/T translates to a modest degradation of 0.25 dB to the satellite link.
- Use of 6 %ΔT/T that is based upon ITU Radio Regulations
  - The Fixed service is an internationally allocated co-primary service in portions of this band, *i.e.,* the 14.4- 14.5 GHZ band is allocated world wide to the Fixed service on co primary basis. In other portions of the band the Fixed service is allocated on a co primary basis either in Region 1 and 3 or by footnote to certain countries. International FS systems are permitted to use parameters consistent with internationally allocated co-primary operations.
- The FCC and the ITU have the discretion to decide the interference criterion that applies to protect primary and secondary services
  - In the case of AMSS and LMSS, the FCC selected interference criteria based upon an FCC off-axis eirp density mask that is used to protect primary FSS services from other primary FSS services. The FCC has set a precedent that interference protection criteria that are used by primary services to protect each other can also be used to protect primary services from secondary services. This precedent can also be used in this instance as a basis to develop an interference criterion to protect the FSS service.

- **SIA Claims "The .5% ΔT/T Criterion Used in the FSS Analysis is Justified"**

  – The SIA proposed 0.5%ΔT/T is 3db less that that recommended in the FSS design objective of ITU-RS.1432-1 recommendation that SIA cites. It is not justified as an interference criterion between these services. The FCC has already determined that these design guidelines were not supported by measurement or operational experience.

- **SIA claims "the FSS Standard is Generous"**

  – The FCC already has rejected the ITU Recommendation upon which SIA bases this supposed interference criterion because it is not supported by measurement or operational experience. It is not an interference criterion. It a generic design objective applicable to all FSS bands below 15 GHz shared with co-primary or secondary services.

SIA Claims: “The Winchester/UTC Analysis Contains Other Serious Defects”

- Contrary to SIA’s claims the Winchester/UTC analysis
  - Requires all terminals to use power control to meet a 99.999% availability
  - Calculated the interference to the entire GSO arc down to a zero degree elevation angle from any location in the CONUS.

SIA Claims "The Proposed Single Licensee Cannot Possibly Prevent or Correct Interference"

- Rogue stations can cause interference in any band in which there is multi-service sharing. However, this has never been a reason for banning such sharing
- Winchester/UTC has proposed conservative operating assumptions so that even multiple rogue station operation will not exceed the interference threshold
- "Rogue" operation caused by a malfunction will result in degraded service to the rogue station itself, which would be remedied quickly to restore its own communications
- The CII Coordinator will provide a single point of contact for quickly resolving interference issues.
  - For example, after being alerted to an interference problem, the CII Coordinator using manual or automated procedures, can check transmit power levels or frequencies among all stations, if necessary using an alert protocol

SIA Claims “the 3650 – 3700 MHz proceeding dealt with co-primary operations”.

The ITU–R S. 1432 recommendation was rejected in its entirety by the FCC because it is a design objective and not a recommendation for an interference protection standard irrespective of whether the proceeding was addressing co- primary services.

SIA Claims “the 14.2- 14.4 GHz rules apply to grandfathered operations of a discontinued service”

The FCC rules for the fixed services in the 14.2 – 14.4 GHz band are consistent with the rules that apply to co primary FSS and FS allocated in this band in the ITU Radio Regulations. The grandfathered secondary Fixed Services in the US in 14.2 – 14.4 GHz are allowed to use parameters that are consistent with those parameters permitted to be used by primary fixed services in the Radio Regulations. UTC/ Winchester proposes to use fixed station parameters that are more conservative than those permitted by the FCC and the ITU.

SIA Claims: "**The Impact of Interference Would Be Most Severe in Emergency Situations"**

- The CII Coordinator will develop procedures to ensure that pointing requirements are met even in emergency situations; for example, by requiring reporting of terminal GPS location

- Emergency situations usually are localized, which makes identifying rogue stations much easier

- Having a single coordinator will facilitate quick resolution of interference from a rogue station, since the coordinator has details on every station, including those with the highest power with pointing directions close to the interfered with satellite, and can quickly isolate the most likely interference candidates and have them check their frequencies and power levels

SIA Claims "Winchester/UTC Relies on Unrealistic Assumptions Regarding FSS Spectrum Use"

- Winchester/UTC analysis made worst case assumptions regarding
  - FSS wideband operations
    - AMSS: 33 terminals using 1 satellite transponder, Power Density=-14dBW/4kHz
    - VMES (OmniVISION): 750 terminals using 3 satellite transponder, Power Density=0dBW/48MHz
  - The propagation model used in urban areas where FSS usage is dense
    - Free space loss was assumed everywhere
    - No blockage when an interfering station is within 1 Km of the FS station
    - 30% of FSS links blocked when an interfering station is between 1 and 5 Km
    - 50% of FSS links blocked when an interfering station is > 5 Km

SIA Claims “CII Users Are Least Likely to Have Reliable Spectrum Access During Emergencies”

- Winchester/UTC demonstrated spectrum availability with very high probability.
- Even in an emergency situations, full use of 500 MHz in a single localized area is unlikely.
- Further, the critical infrastructure links are delay tolerant and can use other advanced techniques such as HARQ and adaptive coding if spectrum becomes congested during emergencies