Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554

In the Matter of	)	
	)	
Amendment of the Commission's Rules with Regard to Commercial Operations in the 1695–1710 MHz, 1755–1780 MHz and 2155–2180 MHz Bands	)	GN Docket No. 13-185
	)	
Allocation of 3G Spectrum Below 3 GHz	)	ET Docket 00-258
	)	

To: The Commission

Comments of EIBASS

Engineers for the Integrity of Broadcast Auxiliary Services Spectrum (EIBASS) hereby respectfully submits its comments in the above-captioned Notice of Proposed Rulemaking (NPRM) relating to the reallocation of federal spectrum at 1.7, 1.8 and 2.2 GHz to the commercial mobile radio services (CMRS), and to move Department of Defense (DoD) operations currently in the L-band to the S-band at 2,025-2,110 MHz; that is, to the 2 GHz TV Broadcast Auxiliary Services (BAS) band.

I. Current Sharing of 2,025–2,110 MHz With DoD SGLS Uplinks

1. In the October 21, 2004, ET Docket 00-258 Seventh Report & Order, the Commission allowed limited sharing of the 2 GHz TV BAS band by DoD Space Ground Link System (SGLS) uplinks at up to 11 sites.[1] This sharing was on a co-equal, primary basis. However, since

[1] The rulemaking created new U.S. Footnote 346 to the FCC Part 2 Table of Frequency Allotments, as follows:

> US346 Except as provided for below and by footnote US222, Federal Government use of the band 2025-2110 MHz by the space operation service (Earth-to-space), Earth exploration-satellite service (Earth-to-space), and space research service (Earth-to-space) shall not constrain the deployment of the Television Broadcast Auxiliary Service, the Cable Television Relay Service, or the Local Television Transmission Service. To facilitate compatible operations between non-Federal Government terrestrial receiving stations and Federal Government earth station transmitters, coordination is required. To facilitate compatible operations between non-Federal Government terrestrial transmitting stations and Federal Government spacecraft receivers, the terrestrial transmitters shall not be high-density systems (see Recommendations ITU-R SA.1154 and ITU-R F.1247). Military satellite control stations at the following sites shall operate on a co-equal, primary basis with non-Federal Government operations:

Facility	Coordinates
Naval Satellite Control Network, Prospect Harbor, ME	44° 24' 55" N 068° 00' 50" W

between co-primary users the newcomer must demonstrate protection of the existing users (*i.e.*, TV BAS licensees), DoD was obligated to demonstrate that its uplinks protected incumbent, co-channel, electronic news gathering (ENG) operations. Because ENG originates from newsworthy events and generally does not know its needed transmitting location in advance, broadcasters have built a complex infrastructure of fixed receive sites, situated near the tops of tall towers, on the roofs of high-rise buildings, on mountain tops, and have created a voluntary cooperative method of frequency re-use, commonly referred to as "Home Channel Plans," to best utilize the limited amount of ENG BAS spectrum in major markets. These fixed ENG receive-only (ENG-RO) sites generally use steerable, remotely-controlled directional receive antennas and sharply tuned filters feeding sensitive receivers that allow the same channel to be in use at multiple sites at the same time. This approach increases the likelihood that no matter wherever and whenever a news event might occur, a mobile ENG truck will have line-of-sight to at least one ENG-RO site, and has the ability to rapidly coordinate said use of an ENG channel with the rest of their local ENG community. The incoming news feed is then routed back to the TV station's studio by a fixed, point-to-point microwave link in another microwave band, or sometimes by fiber optic cable.

2. The frequency coordination of the newcomer DoD uplinks has proven difficult, but not impossible. Because a maximum of 11 uplinks at precisely defined locations were involved, it was possible to calculate the worst-case interference that a newcomer DoD uplink would cause to an existing ENG-RO site. The Society of Broadcast Engineers, Inc. (SBE) and DoD entered into a Memorandum of Understanding (MOU), establishing that a DoD uplink would protect ENG-RO sites by not degrading the noise floor of the ENG receiver by more than 0.5 dB.[2] This approach was taken because it protected the operational area of the TV Pickup station that the ENG-RO sites were established to serve. That is, by protecting the -95 dBm receive signal level (RSL) noise floor of a typical ENG receiver, it ensured the limiting factor for a successful ENG

New Hampshire Tracking Station, New Boston AFS, NH	42° 56' 52" N	071° 37' 37" W
Eastern Vehicle Check-out Facility & GPS Ground Antenna & Monitoring Station, Cape Canaveral, FL	28° 29' 10" N	080° 34' 34" W
Buckley AFB, CO	39° 42' 55" N	104° 46' 29" W
Colorado Tracking Station, Schriever AFB, CO	38° 48' 21" N	104° 03' 43" W
Kirtland AFB, NM	35° 03' 00" N	106° 24' 00" W
Camp Parks Communications Annex, Pleasanton, CA	37° 44' 00" N	121° 52' 00" W
Naval Satellite Control Network, Laguna Peak, CA	34° 06' 55" N	119° 04' 50" W
Vandenberg Tracking Station, Vandenberg AFB, CA	34° 49' 24" N	120° 31' 54" W
Hawaii Tracking Station, Kaena Pt, Oahu, HI	21° 33' 48" N	158° 14' 54" W
Guam Tracking Stations, Anderson AFB, and Naval CTS, Guam	13° 36' 48" N	144° 51' 12" E

[2] See http://apps.fcc.gov/ecfs/document/view?id=7020354936

shot would be sufficient ENG signal from a news event in the station's operational area to the ENG-RO receiver, and not be a DoD uplink blocking or significantly degrading the news feed. In effect, a *frequency re-use* criteria rather than a *frequency sharing* criteria.

3. The difference between frequency re-use and frequency sharing is profound. Point-to-point microwave stations, and the cellular architecture of CMRS sites, are based on frequency re-use, not frequency sharing. Under frequency re-use, each station can transmit without having to coordinate its transmissions with other stations. Under frequency sharing stations must frequency coordinate, or suffer interference. When frequency sharing between co-primary users is the only option, it is generally only viable when both users would receive interference if they fail to frequency coordinate. If only one co-primary user would be likely to suffer interference, the sharing model typically fails, as there is no longer sufficient incentive for the not-at-risk co-primary user to protect the at-risk co-primary user. Of course, if one user is co-primary, and the other user secondary, the problem disappears for the co-primary user. However, this status for the newly created secondary user may be so handicapping that it constitutes a band re-allocation.

II. Further Sharing of 2,025–2,110 MHz Would Be Problematic

4. At paragraph 82 the NPRM reveals that the basis for clearing DoD operations from the L-band would be to relocate "certain aeronautical systems" to the 2,025-2,110 MHz band. According to the July 17, 2013, DoD letter to the National Telecommunications and Information Administration (NTIA), these would include:

- 4A. Small Unmanned Aerial Systems (SUAS)
- 4B. Tactical Targeting Network Technology (TTNT)
- 4C. Tactical Radio Relay (TRR)
- 4D. High-Resolution Video Systems (HRVS).

These appear to be essentially a military version of airborne ENG. The transmit location is mobile, airborne and possibly coming from and unknown-in-advance location based on unknown criteria. EIBASS does not see this as a good candidate for successful sharing with ENG.

5. The DoD letter further indicates that this relocation would be "...in accordance with Government footnote G xxx as described in Annex 1."[3] However, no footnote G xxx/Annex 1 text was provided. The reason for the missing footnote is explained in the resulting July 22, 2013, cover letter from NTIA to the FCC, forwarding the DoD letter, which states that

[3] DoD letter, at page 2, last sentence of first paragraph.

> DoD has requested that NTIA not forward at this time for inclusion in the public record the two enclosures reference in the DoD letter inasmuch as they have not been approved for public release. They will, however, be provided to FCC staff and submitted into the record after such approval is received.

Thus, the critical issue of the DoD proposal in unclear; would BAS use be co-primary with the newcomer DoD use, or is DoD proposing that its newcomer use be primary and TV BAS would be reallocated to secondary use? In other words, did DoD mean to propose *co-primary* status, not *primary* status, since primary status implies that any other users are (or would be) secondary.

6. EIBASS notes that in the March 2012 NTIA report *An Assessment of the Viability of Accommodating Wireless Broadband in the 1,755–1,850 MHz Band,*[4] Table 4-4 states

> ENG would need to relocate to a different band or operate NIB.

"NIB" is a commonly used abbreviation for non-interference basis; that is, *secondary*. This status is again given at page 36, and in Table 4-9. Thus, from the NTIA report issued in March 2012, EIBASS concludes that DoD and NTIA were talking about making federal operations at 2,025-2,110 MHz primary and TV BAS secondary.

7. If the DoD proposal is that its use would be primary and the TV BAS use secondary, EIBASS submits that the DoD/NTIA suggestion that TV BAS operations need not be relocated from 2,025–2,110 MHz is unworkable; it would effectively require broadcasters to vacate 2 GHz. If the DoD proposal is that its use would be co-primary with TV BAS, EIBASS would first like the record to confirm that, between co-primary users, the newcomer user is obligated to protect the incumbent (earlier-in-time) user. Next, EIBASS wishes the record to confirm that this includes TV Pickup stations; that is, ENG operations.

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4 See http://www.ntia.doc.gov/files/ntia/publications/ntia_1755_1850_mhz_report_march2012.pdf

8. The requirement that between users with the *same* priority (*i.e.,* two co-primary users, or two secondary users) the newcomer user must protect the earlier-in-time (*i.e.,* incumbent) user, is given in Section 2.105(c)(2)(iii) of the Commission's rules. Part 2 rules are general rules, applicable to all radio services regulated by the FCC. Further, the applicability of Section 2.105(c)(2)(iii) to TV BAS stations, including TV Pickup stations, was affirmed in the April 2, 2003, ET Docket 98-142 Memorandum, Opinion and Order, at paragraph 21 (the ET 98-142 rulemaking dealt with allowing 7 GHz Mobile Satellite Service (MSS) feeder downlinks entry to the 7 GHz TV BAS band).

III. NTIA vs. FCC Regulatory Conflict

9. EIBASS notes that in the ET Docket 13-115 rulemaking, proposing to allow federal entities electing to use commercial (*i.e.,* non-federal) satellite frequencies co-primary status and thus protection from later-in-time non-federal terrestrial Fixed Service (FS) microwave stations. In that rulemaking the Commission offered two options: Protection of the newcomer federal government Earth stations pursuant to NTIA protocols, or pursuant to FCC Part 25/Part 101 protocols; *i.e.,* the Prior Coordination Notice (PCN) methodology.[5]

10. In its August 30, 2013, comments, Comsearch supported allowing such newcomer federal use, but only if that use was subject to FCC frequency coordination protocols, not NTIA protocols (the so-called "Interference Protection Approach"). Comsearch argued that not only were the NTIA "Red Book" protocols slower and more burdensome than the well-established PCN process, but also that a newcomer federal user might attempt to "invoke special national security or other protections."[6]

11. EIBASS sees the identical issues raised in this rulemaking: If DoD is granted co-primary access to 2,025–2,110 MHz, which agency, NTIA or FCC, will have jurisdiction? This issue is recognized at paragraph 175 of the NPRM, where the rulemaking notes that while service rules would need to be written to govern FCC licensees operating in a new band, no such obligation automatically applies to newcomer federal users; *e.g.*, DoD operations. Or, as the NPRM so succinctly stated:

> Once the federal allocation is in place, NTIA could immediately begin issuing spectrum assignments.

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[5] Section 25.251(a), which in turn links to Section 25.203 for coordination with other earth stations, and Section 101.103 for terrestrial FS stations.

[6] Comsearch comments, at page 14.

12. For there to be viable sharing of 2,025–2,110 MHz, the Commission needs to instead insist that there also must be shared regulatory oversight, subject to the rulemaking process and the safeguards of the Administrative Procedures Act. EIBASS submits that the Commission can retain such jurisdiction by writing protective language into the required modifications to the Part 2 Table of Frequency Allotments. The full text of the mysterious footnote G xxx to Annex 1 (from the DoD letter) would be a good place to start.

13. Including band sharing restrictions in Part 2 of the FCC Rules would provide broadcasters with regulatory recourse if DoD doesn't keep its side of the bargain. For example, in May 2013 one of DoD's contractors contacted the Washington, DC, area broadcasters regarding adding 2,025–2,110 MHz operations to an existing DoD uplink to the Naval Research Laboratory at Blossom Point, Maryland. But, as shown by footnote 1 to these comments, Blossom Point is not one of the 11 uplink sites authorized by US346. Therefore even if broadcasters were to consent to a co-channel, high-power interfering signal in the DC market, DoD has no authority to use 2,025–2,110 MHz at Blossom Point. DoD first needs to get US346 modified; this would, of course, require an FCC rulemaking, with all the obligations (and safeguards) of the Administrative Procedures Act.

14. The Blossom Hill uplink is located just 53 km from Washington, DC, and 105 km from Baltimore, MD. Based on a 161-km radius search of the Commission's Universal Licensing System (ULS), there are forty-two 2,025–2,110 MHz TV Pickup stations in this area. The operation of a co-channel DoD uplink in the Washington DC market, the eighth largest TV market in the United States[7], and a Class I ENG market[8], would cause interference to

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[7] 2012-2013 Nielsen ranking of TV markets.

[8] At paragraph 19 of the July 6, 2000, ET Docket 95-18 *Second R&O and Second MO&O*, the Commission adopted verbatim the description submitted by the SBE for the classes of ENG markets. Those classifications are as follows:

> **Category I**. "Los Angeles" or "LA." Extremely heavy use, mostly split channel. There is lots of itinerant use and channel borrowing and sharing; even so, seven channels aren't enough.
>
> **Category II. "Metro."** Spectrum is heavily used, especially during the news hours. There is some split channel use, not a lot, and some itinerant use. There is regular channel borrowing and sharing.
>
> **Category III. "Light."** There is some electronic news gathering ("ENG"), some fixed link, maybe even some channels mostly vacant most of the time. Typically, a small-market, low-competition situation.
>
> **Category IV. "Rural."** ENG is unheard of, the use is for fixed, long-haul relays to small-market TV stations, to TV translator stations, and to cable television headends. In some areas not all channels are even used.

newsgathering operations. It is not an appropriate location for a 2 GHz band uplink. An appropriate location would be a remote uplink site, far from major TV markets.

IV. Protection Zones for Existing TV Pickup Operations

15. EIBASS sees co-primary status as viable only if the same concept as proposed at paragraphs 60–61 of the NPRM for federal operations that would remain in the L-band and at 2.2 GHz were to be adopted for earlier-in-time TV Pickup operations: Namely, Protection Zones.

16. However, having a Protection Zone for TV BAS means Exclusion Zones for DoD use of 2,025–2,110 MHz, and Exclusion Zones are something that the NTIA report stated "would not be practical," at least for ACTS use.[9] So the issue of whether the uses proposed in the March 2012 NTIA report, namely

- 9A. Military Tactical Radio Relay (MTRC)
- 9B. Air Combat Training System (ACTS)
- 9C. Precision Guided Munitions (PGM)
- 9D. Tracking, Telemetry and Commanding for Federal Space Systems (TT&C)
- 9E. Air-to-Ground Telemetry (AGT)
- 8F. Unmanned Aerial System (UAS)/Unmanned Aerial Vehicle (UAV)/Remotely Piloted Vehicle (RPV)

have morphed into the SUAS/TTNT/TRR/HRVS uses given in the 2013 DoD letter, is an important question. If the 2013 descriptors are simply changed terminology, but the same applications, then DoD has already indicated that Protection Zones are great for keeping others out of their critical areas, but find the concept Exclusion Zones for DoD use as an unacceptable restriction. If so, then EIBASS does not see how this can be characterized as "sharing." If, on the other hand, SUAS/TTNT/TRR/HRVS are changed applications, then perhaps the application of Exclusion Zones for the DoD use can be a basis for sharing between incumbent and newcomer co-primary users.

17. EIBASS submits that the simplest approach for protecting TV Pickup stations would be to make the TV BAS Protection Zone (*i.e.,* the DoD Exclusion Zone) the TV Pickup station's operational area of record, plus a buffer zone distance. EIBASS suggests a buffer zone of 42 km, which is the mean Protection Zone distance shown in Table 1 of the NPRM. For fixed-link

[9] NTIA report, at page vii and again at page 29.

TV BAS stations at 2,025–2,110 MHz, the criteria should be the TSB10-F limit of no more than a 1 dB degradation of the threshold-to-interference (T/I) ratio.[10]

18. EIBASS notes that the Commission's Universal Licensing System (ULS) shows 967 TV Pickup stations, 131 TV studio-to-transmitter link (STL) stations, 353 TV Inter City Relay (ICR) stations, and 45 TV Translator Relay stations in the 2,025-2,110 MHz band. If the DoD operation is to be co-primary, DoD needs to address how it will protect these earlier-in-time operations. If the DoD operation is to be primary, and the 2,025–2,110 MHz TV BAS operation secondary, DoD needs to explain its basis for believing that broadcasters could tolerate "sharing" on a secondary basis, as opposed to DoD relocating broadcasters to other spectrum.

19. While fixed-link paths can be shifted to higher frequency bands (albeit sometimes requiring converting the path from single-hop to multiple-hop, an expensive proposition), EIBASS has to wonder just what other viable spectrum DoD or NTIA think might exist for 2 GHz TV ENG operations. The two 2.5 GHz TV BAS channels (A8 at 2,450–2,467 MHz and A9 at 2,467–2,483.5 MHz) are incapable of absorbing this burden, and suffer interference from secondary Part 15 WiFi stations at most ENG receive sites. The four 6.5 GHz TV BAS channels are shared with Part 101 stations and also could not begin to absorb displaced 2 GHz ENG operations. The 7 and 13 GHz TV BAS bands lack the favorable propagation characteristics of 2 GHz, have higher-priority fixed-link paths, plus Part 101 Fixed Service stations are now allowed in these former TV BAS-only bands under certain conditions. The 18 GHz TV BAS band has propagation characteristics that make it unsuitable for ENG, plus is also shared with Part 101 Fixed Service stations.

V. If TV BAS and DoD Become Co-Primary, How Will Frequency Coordination for New or Modified 2 GHz BAS Be Handled?

20. Assuming that TV BAS and DoD are to be co-primary, and further assuming that DoD is able to demonstrate that it can protect all earlier-in-time TV BAS operations, what frequency coordination obligations would broadcasters incur for new or modified 2 GHz TV BAS stations? Section 74.638(a) applies an informal, real-time frequency coordination process to mobile (TV Pickup) stations, and Section 73.638(c) applies a special "positive-option" frequency coordination process for fixed-link 2 GHz TV BAS stations (as opposed to the Part 101 "negative option" PCN process). While the adoption of protection zones for TV Pickup stations would generally eliminate the need for DoD to participate in real-time frequency coordination

[10] See TIA/EIA Telecommunications System Bulletin TSB10-F, June 1994, *Interference Criteria for Microwave Systems*, at Section 2.5.5.

for ENG operations, frequency coordination for TV BAS fixed links at 2 GHz should be changed to the PCN process, so as to avoid the need for obtaining a "consent" letter from DoD.

VI. EIBASS Agrees that Mobile-to-Base Station Uplink Use of 2,020–2,025 MHz Does Not Pose an Interference Threat to 2,025–2,110 MHz TV BAS Operations

21. At paragraph 93, the NPRM notes that EIBASS did not object to a $43 + 10\log_{10}$(TPO, watts) out-of-band-emissions (OOBE) suppression requirement for low-power AWS mobile/handheld devices in the AWS-4 proceeding. This is correct, although the EIBASS concurrence was at paragraph 6 of its May 17, 2012, comments to the AWS-4 proceeding (WT Docket 12-70), rather than the paragraph 3 cited in footnote 227. Further, this concurrence had the proviso that Section 27.1133 of the AWS rules would apply to 2,020–2,025 AWS operations. In light of paragraph 111 of the NPRM, discussing that Sections 27.51 (Equipment Authorization); 27.52 (RF Safety); 27.54 (Frequency Stability); 27.56 (Antenna Structures/Air Navigation Safety); and 27.63 (Disturbance of AM broadcast station antenna patterns) would, as "general Part 27 rules," apply to AWS-3 licensees, EIBASS concludes that indeed Section 27.1133 would similarly also apply, even though not explicitly mentioned.

22. Accordingly, at paragraph 103, the NPRM concludes that if the 2,020–2,025 MHz band (the Lower J Block) is used for mobile devices-to-terrestrial base station uplinking, there would be virtually no interference threat from these low-power mobile devices to TV BAS operations at 2,025–2,110 MHz. EIBASS agrees. A mobile or handheld device with a 2-watt (33 dBm) EIRP power limit is unlikely to cause interference to TV BAS, either from out-of-band-emissions (OOBE), which must be suppressed by at least $43 + 10\log_{10}$(TPO, watts) from the in-band power, or to cause brute force overload (BFO) to the sensitive receivers typically used by broadcasters at fixed electronic news gathering (ENG) receive sites.

VII. EIBASS Agrees with DISH: TV BAS Operations Will Pose an Interference Risk To AWS Base Stations Receiving Uplinked Signals from 2,020–2,025 MHz Handsets

23. Not explicitly noted in the NPRM is the possibility that the AWS system may be at risk of interference from higher-power ENG transmitters operating in the 2,025–2,110 MHz TV BAS band (up to 65 dBm EIRP for ENG platforms vs. 33 dBm EIRP for AWS handsets). This interference would come and go on a seemingly random basis as a mobile ENG transmitter is used near an AWS base station location. This could be a challenge to the AWS user as it appears

cellular/AWS use is higher at or near locations of newsworthy events, the same events that ENG trucks would be transmitting from.

24. EIBASS notes that in its recent *ex parte* letter, DISH Network Corporation (DISH) raised this same concern.[11] However, broadcasters have had to deal with the challenge of high-power PCS and AWS base stations causing BFO to the sensitive receivers at their ENG-RO sites, and specialized filters, practical for installation at a fixed site, have been developed to overcome the problem.[12] Thus, TV BAS-into-AWS interference should be a manageable problem.

[11] August 2, 2013, letter from DISH to the Commission, at page 4, last paragraph; see http://apps.fcc.gov/ecfs/document/view?id=7520935855 .

[12] See, for example, the specialized filters offered by Phillips Microtechnology, at http://www.tvtower.com/index-FRAMES.html, and by API Technologies Corporation, at http://micro.apitech.com/wireless_filters.aspx .

VIII. Summary

25. A fundamental question is whether DoD/NTIA are proposing co-primary status for DoD and TV BAS at 2,025–2,110 MHz, or whether the Camel's-nose[13] DoD entry to 2 GHz adopted in the ET 00-258 rulemaking has now turned into a make-DoD-primary-and-broadcasters-secondary proposal, where BAS users would, in short order, be squeezed out by the entire camel. If co-primary, Protection Zones will be needed to ensure that interference is not caused to earlier-in-time and therefore must-be-protected TV BAS operations. If the proposal is for TV BAS at 2 GHz to become secondary, then this is no "sharing" but a *de facto* reallocation of the band from TV BAS to the federal government, and euphemisms suggesting otherwise should be dispensed with.

26. If TV BAS is relegated to secondary status, the viewing public would be deprived of a critical emergency resource they have come to expect from TV broadcasting: The only "first-responder" on-scene presence for news. During major American civil emergencies such as the recent Hurricane Sandy, television told the visual story showing the disaster's impact to the lives and property in a way that no other medium could. Visual real-time coverage helped national support for the hurricane victims who lost everything. Loss of TV BAS would relegate television to "second hand" news story status– a tragic loss at times where real-time visual information from the scene acts as a valuable emergency first response resource.

Respectfully submitted,

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[13] From Wikipedia: The *camel's nose* is a metaphor for a situation where permitting some small, seemingly innocuous act will open the door for larger, clearly undesirable actions.