

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

In the Matter of)
)
Service Rules for Advanced Wireless Services in) WT Docket No. 04-356
the 1,915–1,920 MHz, 1,995–2,000 MHz,)
2,020–2,025 and 2,175–2,180 MHz Bands)
)
To: The Commission)

Comments of the Society of Broadcast Engineers, Inc.

The Society of Broadcast Engineers, Incorporated (SBE), the national association of broadcast engineers and technical communications professionals, with more than 5,000 members world wide, hereby respectfully submits its comments in the above-captioned Notice of Proposed Rulemaking (NPRM) relating to service rules for Advanced Wireless Service (AWS) stations in the 2 GHz band.

**I. AWS Stations at 2,020–2,025 MHz Remain an Interference Threat to 2 GHz TV
BAS Operations**

1. At Paragraph 98 of the NPRM, the Commission tentatively concludes that AWS transmitters at 2,020–2,025 MHz should only be required to suppress their out of band emissions (OOBE) by $43 + 10\log P$, where P is the transmitter power output (TPO) in watts. At Paragraph 102 of the NPRM, the Commission tentatively concludes that AWS base stations would not be a brute force overload (BFO) interference threat to TV Broadcast Auxiliary Service (BAS) operations at 2,025–2,110 MHz because AWS base stations at 2,020–2,025 MHz will be limited to an equivalent isotropic radiated power (EIRP) of just 1 watt (30 dBm). The NPRM notes that in comments to IB Docket 01-185, SBE expressed concern about BFO interference from high-powered ancillary terrestrial component (ATC) base stations to highly sensitive electronic news gathering receive only (ENG-RO) sites, widely used by broadcasters in the large and medium TV markets.

2. SBE agrees that a 30 dBm (1 watt) EIRP limit for AWS base stations at 2,020–2,025 MHz will ensure that those stations are not a BFO threat to ENG-RO sites. However, SBE disagrees with the Commission's conclusion that 2,020–2,025 MHz AWS base stations only need to suppress their OOBE by $43 + 10\log P$ decibels.

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3. A suppression requirement of just $43 + 10\log P$ for a 1-watt TPO 2 GHz AWS transmitter with a unity gain transmitting antenna and negligible line loss means that OOB E of -13 dBm EIRP could be radiated into the 2,025–2,110 MHz TV BAS band. For a typical ENG-RO site with a 20 dBi gain, negligible line loss, and an analog receiver with a -87 dBm sensitivity threshold¹, and with line-of-sight to an AWS base station, this means that an AWS base station as far away as 0.587 km could result in an OOB receive carrier level (RCL) of -87 dBm; that is, of the same signal level as the desired ENG signal at its sensitivity threshold!
4. Because this OOB E would be seen as co-channel interference by the TV BAS receiver, no filtering of this undesired signal would be possible at the ENG-RO site; rather, the fix can only occur at the AWS base station site.
5. The effective thermal noise for a 17 MHz wide 2 GHz TV BAS receiver is -99 dBm, according to information provided by Microwave Radio Corporation (MRC), a major manufacturer of TV BAS microwave radios. If the benchmark is no more than a 0.5 dB degradation of the noise floor of the protected receiver,² then the OOB RCL from an AWS base station cannot exceed -108.1 dBm; that is, $-99 \text{ dBm} + (-108.1 \text{ dBm}) = -98.5 \text{ dBm}$, or a 0.5 dB degradation in the noise floor. For an ENG-RO site with a 20 dBi gain receiving antenna and negligible line loss, this requires a free space path loss (FSPL) of 115.1 dB from a 30 dBm EIRP AWS base station that is suppressing its OOB E by just 43 dB. At 2,025 MHz, this would require a separation of about 6.7 km.
6. Nor is the upcoming conversion of 2 GHz TV BAS from analog to digital, and the narrowing of the channel width from 17 MHz to 12 MHz, likely to be a solution. A coded orthogonal frequency division multiplex (COFDM) digital receiver has a noise threshold of about -100 dBm, again based on information obtained from MRC. In order not to degrade this noise threshold by more than 0.5 dB, the RCL of the undesired, out-of-band AWS signal cannot exceed -109.1 dBm at the receiver input terminal. Again for the case of a 20 dBi gain receiving antenna with negligible line loss, an 30 dBm EIRP AWS base station that is only suppressing its OOB E by 43 dB must be at least 7.5 km from the ENG-RO site, if line-of-sight conditions exist.
7. Accordingly, SBE submits that a much stricter OOB E of $67 + 10\log P$ dB, is needed. This OOB E limit was recently adopted for Broadband Radio Service (BRS) base stations in the July

¹ This sensitivity threshold is defined as the RCL that will result in a demodulated video signal to noise ratio of 37 dB.

² This criteria was used by the Commission in the October 21, 2004, ET Docket 00-258 Seventh Report & Order (R&O), concerning allowing high-power Department of Defense (DoD) satellite uplink stations into the 2 GHz TV BAS band, on a co-primary basis. See Footnote 63, at pages 15–16, of that R&O.

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29, 2004, WT Docket 03-66 R&O; see new FCC rule section 27.53(l)(2). A 1-watt (30 dBm) EIRP AWS base station that is suppressing its OOB by 67 dB still has a non-trivial threat distance of 0.420 km to an analog ENG-RO site, and 0.472 km to a digital ENG-RO site, again using the 0.5 dB noise floor degradation criteria.

8. In the February 10, 2003, Third R&O to ET Docket 00-258, adopting spectrum for third-generation (3G) wireless services, at Paragraph 51 the Commission stated:

We believe that base stations could easily achieve limits of $70 + 10\log P$ at the band edge.

And the R&O to the IB Docket 01-185 rulemaking, regarding an Ancillary Terrestrial Component for the Mobile Satellite Service (MSS ATC), also dated February 10, 2003, adopted an OOB suppression requirement of $70 + 10\log P$, which is now Section 25.252(c)(2) of the FCC Rules. Thus, a 3 dB more lenient OOB limit of $67 + 10\log P$ dB should not be a problem for AWS base stations at 2,000–2,025 MHz.

9. While many ENG-RO sites use steerable antennas, it would be imprudent to assume that the ENG-RO antenna is not aimed at an AWS base station; therefore, the use of the full gain of 20 dBi for the ENG receiving antenna is proper in the above calculations.

10. Thus, SBE submits that AWS base stations at 2,020–2,025 MHz are most definitely an interference threat to ENG receive sites at 2,205–2,110 MHz. Accordingly, the Commission should a) require AWS base stations at 2,020–2,025 MHz to suppress their OOB by at least $67 + 10\log P$ decibels, and b) not allow a 2,020–2,025 MHz AWS base station to be located within 0.5 km of an ENG-RO site unless the AWS base station operator agrees to additionally suppress the station's OOB so that no more than a 0.5 dB degradation will be caused to the noise floor of the receiver in use at the ENG-RO site.

II. Identification of ENG-RO Sites in the ULS

11. Of course, the above rule will be of little help if AWS operators cannot quickly identify the locations of ENG-RO sites. So, once again,³ SBE asks the Commission to modify the Universal Licensing System (ULS) to allow TV Pickup licensees to upload information show the location(s) of their ENG-RO site(s) and height(s) of their receiving antennas (which are often substantial). Further, this information must be searchable by interested parties; that is, the ULS

³ See the July 9, 2001, SBE comments to ET Docket 01-75, at Section XXVI, Paragraph 70. Also see the April 4, 2003, SBE Petition for Partial Reconsideration of the ET Docket 01-75 R&O, at Section V, Paragraphs 12–14.

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data fields containing this information must be capable of being found by a radius search around a given set of geographic coordinates. Until this is done, ULS will stand for the Un-helpful Licensing System as far as Part 74 TV Pickup BAS licensees are concerned. Or, in other words, isn't it about time for the Commission to finally make the ULS truly "universal"?

III. Summary

12. SBE agrees that 1-watt EIRP AWS base stations are not a BFO threat to 2 GHz TV BAS ENG-RO sites. However, such stations are definitely an interference threat to 2 GHz TV BAS ENG-RO sites if they are only required to suppress their OOB by just 43 dB. The suppression requirement should be increased to 67 dB, and even then no 2,020–2,025 MHz AWS base station should be permitted within 7.5 km of an analog ENG-RO site, or within 0.25 km of a digital ENG-RO site, unless additional OOB suppression is provided. Finally, the Commission needs to modify the ULS to allow TV Pickup stations to document the location(s) and height(s) of their ENG-RO sites.

Respectfully submitted,

Society of Broadcast Engineers, Inc.

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