

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

In the Matter of)
)
MSS Systems at 1.6/2.4 GHz) IB Docket No. 02-364
)

To: The Commission

Petition for Reconsideration

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 Petition for Reconsideration of the above-captioned International Bureau (IB) Docket 02-364 Report & Order (R&O) relating to an ancillary terrestrial component (ATC) for the Mobile Satellite Service (MSS).

I. Filing is Timely

1. The July 16, 2004, R&O to IB Docket 02-364 was published in the Federal Register on August 9, 2004. Therefore, this September 8, 2004, SBE Petition for Reconsideration is within 30 days of the Federal Register publication, and is timely filed.

II. Co-Channel MSS ATC Base Stations and Grandfathered Operations on TV BAS Channel A10 Could Never Co-Exist in the Same Area

2. The Commission concludes, at Paragraphs 67 and 75 of the R&O, that MSS ATC base stations operating between 2,487.5–2,493 MHz with equivalent isotropic powers of up to 1,610 Watts (62.1 dBm) could co-exist with grandfathered TV Broadcast Auxiliary Services (BAS) stations operating on grandfathered TV BAS Channel A10 (2,483.5–2,500 MHz), with proper frequency coordination techniques. SBE must respectfully disagree. SBE believes that the Commission has confused out-of-band-emissions (OOBE) from ATC base stations causing *adjacent-channel interference* to analog TV BAS operations on TV BAS Channels A8 (2,450–2,467 MHz) and A9 (2,467–2,483.5 MHz), and *brute force overload (BFO) interference* to TV BAS operations at 2,025–2,110 MHz, with *co-channel* interference to grandfathered TV BAS operations on grandfathered TV BAS Channel A10. SBE agrees that, with careful frequency coordination, to ensure that a high-power *non-co-channel* ATC base station is not inadvertently situated near either a 2 or 2.5 GHz electronic news gathering receive only (ENG-

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RO) site, TV BAS operations and MSS ATC could co-exist in the same area.¹ However, no amount of frequency coordination could ever make *co-channel* TV BAS and ATC possible in the same operating area, and *co-channel* operation is exactly what would exist between grandfathered and co-primary TV BAS stations on Channel A10 at 2,483.5–2,500 MHz and terrestrial MSS base stations at 2,487.5–2,493 MHz.

3. While adjacent-channel TV BAS operations have the benefit of receiver selectivity, co-channel operations have no such advantage. SBE estimates that the adjacent channel rejection ratio (ACRR) of modern-day 2 and 2.5 GHz TV BAS receivers is on the order of -50 dB. But co-channel operation would have no such rejection, because the MSS ATC band would be entirely within grandfathered TV BAS Channel A10. Thus, the allocation conditions between TV BAS Channel A10 operations and MSS ATC would be at least 50 dB worse than the allocation conditions between TV BAS operations on Channels A1 through A9. SBE concedes that frequency coordination between a grandfathered *fixed link* TV BAS Channel A10 station and MSS ATC base stations *might* be possible, given "heroic" frequency coordination and engineering that would include use of a costly ultra high performance, shrouded, receiving antenna by the fixed-link TV BAS station. SBE cannot envision such techniques as ever working for mobile/portable/itinerant grandfathered Channel A10 TV Pickup operations, where heavy, large-diameter parabolic dish antennas are completely impractical for electronic news gathering (ENG) and manpack applications. And, as acknowledged at Footnote 68 in the IB 02-364 R&O, 78 of the 108 grandfathered TV BAS Channel A10 licenses are for TV Pickup stations. SBE must remind the Commission and other interested parties to this rulemaking that a single TV Pickup station authorizes an unlimited number of transmitters by the licensee. This is because, unlike

¹ As SBE has pointed out in its comments to other rulemakings, the Universal Licensing System (ULS) does not allow broadcasters to document the locations and heights of their ENG-RO sites. Accordingly, it is more difficult that necessary for PCS, 3G, MSS, BRS, EAS, and other licensees, to determine the locations of these many ENG-ROs.

Although SBE proposed that this rather amazing shortfall to a supposedly universal licensing system be corrected, in its ET Docket 01-75 comments, the Commission declined to take that action, on the grounds that the proposal was "outside the scope" of that rulemaking. Since the ET 01-75 rulemaking was a broad updating and harmonization of the Part 74 BAS rules, and since the addition of such information would not be to the detriment of any party, SBE was quite surprised by this decision. If in-progress informal attempts to get this capability added to the ULS ultimately prove unsuccessful, SBE expects that it will then file a petition for rulemaking for this dedicated purpose.

In the interim, SBE notes that on the SBE web site, at www.sbe.org, there are maps for all states, plus the District of Columbia and Puerto Rico, showing which counties/parishes/barrios have volunteer, SBE-affiliated BAS frequency coordinators. Also on the SBE web site is contact information for all of these BAS frequency coordinators. Parties building adjacent-band 1.9, 2.0 and 2.5 GHz terrestrial base stations in any of the large metro areas of the United States or Puerto Rico are encouraged to contact the local SBE frequency coordinator, who can provide information on the location of ENG-RO sites.

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the former FCC Form 313, which required a TV Pickup applicant to indicate the number of authorized transmitters, the replacement FCC Form 601 does not include this question, and the Universal Licensing System (ULS) has no ability to track the number of transmitters that a TV Pickup station is allowed to have.

4. The heaviest use of grandfathered TV BAS Channel A10, on a co-primary, indefinitely grandfathered basis, is by broadcast network entities (BNEs) and cable network entities (CNEs), such as ABC Sports and ESPN. Channel A10 is routinely used from blimp platforms, when covering baseball and football games, as well as when covering X (extreme) sports and NASCAR races. It appears that the Commission believes that grandfathered TV BAS operations on Channel A10 are relatively minor, but this is most definitely not the case. TV BAS Channel A10 is heavily and regularly used by the TV Pickup licensees with grandfather rights. In addition to BNEs and CNEs, many individual TV stations hold TV Pickup licenses with Channel A10 grandfather rights, and rely heavily on the availability of a third TV BAS channel at 2.5 GHz to make frequency coordination possible. Finally, this grandfathered use of Channel A10 traditionally takes place in the very same venues that MSS ATC will most likely wish to deploy. The result would be massive and mutual interference to operations in both services, and would bring chaos to good faith BAS frequency coordination efforts that SBE has so carefully fostered.

5. Of course, one alternative, albeit not a practical one for MSS ATC, would be for MSS ATC to suspend its operations in any area where grandfathered TV BAS Channel A10 operations are needed. Under the policy established by the Commission in the February 7, 2002, ET Docket 98-142 R&O (MSS feeder downlinks sharing the 7 GHz TV BAS band), and re-affirmed in the April 2, 2003, ET 98-142 Memorandum, Opinion and Order (MO&O), when two co-primary users are involved, the earlier-in-time user is entitled to protection by the newcomer. Since grandfathered operations on TV BAS Channel A10 pre-date MSS ATC by at least 19 years, grandfathered TV BAS operations are the earlier-in-time service that the newcomer MSS ATC must give way to.

III. Converting the 2.5 GHz TV BAS Band To Digital Would Solve the Co-Channel ATC MSS Problem

6. Because SBE recognizes the impracticability of suspending MSS ATC base station operations whenever a co-channel, grandfathered TV BAS Channel A10 TV Pickup station comes to town, or when local TV stations with grandfather rights elect to use Channel A10

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because it is the only available channel,² SBE proposes that the 2.5 GHz TV BAS band be converted to three 12-MHz wide digital channels. In exchange, all grandfathered TV BAS operations on 2,483.5–2,500 MHz be terminated. As indicated by the attached Figure 1, these are designated as Channel A8d (d for digital), at 2,450–2,462 MHz; Channel A9d, at 2,462–2,474 MHz; and Channel A10d, at 2,474–2,486 MHz, with all TV BAS eligible entities being entitled to use Channel A10d. This digital channel plan would entirely eliminate the present and disastrous co-channel relationship with ATC MSS, and also with Broadband Radio Service (BRS) Channel 1 ("BRS1"), at 2,496–2,502 MHz (to be discussed in greater detail in the next paragraph). It should also be noted that the proposed conversion of the 2.5 GHz TV BAS band into three 12-MHz wide digital channels would result in a 1.5-MHz guard band between the top of TV BAS Channel A10d and the bottom of the MSS ATC band.

IV. Converting the 2.5 GHz TV BAS Band To Digital Would Solve the Co-Channel BRS1 Problem

7. In the companion July 29, 2004, R&O to WT Docket 03-66, the Commission surprisingly extended the proposed re-farming of the 2,500–2,690 MHz Instructional Television Fixed Service (ITFS) and Multichannel Multipoint Distribution Service (MMDS) bands to below 2,500 MHz. This was done despite there being no mention of this in the April 2, 2003, WT 03-66 Notice of Proposed Rulemaking (NPRM). Nor was there any mention of extending the ITFS/MMDS band below 2,500 MHz in the predecessor RM-10586. Nor was there any mention of extending the ITFS/MMDS band below 2,500 MHz in the October 7, 2002, Petition for Rulemaking, or "white paper," jointly submitted by the Wireless Communications Association International, Inc. (WCA), the National ITFS Association (NIA), and the Catholic Television Network (CTN). Finally, SBE submits that extending the ITFS/MMDS band to below the present 2,500 MHz bright-line demarcation frequency could not have been reasonably anticipated as a "logical outgrowth" of the NPRM.

8. Nevertheless, SBE now finds itself confronted with a radically changed allocation condition with respect to grandfathered TV BAS Channel A10: The situation has changed from an adjacent-channel case to a co-channel case, with 4 MHz of co-channel spectrum. This completely and detrimentally changes the ability of grandfathered TV BAS Channel A10 operations to exist in the same area as BRS1 operations, which would be an intensive, cellular-

² SBE notes that in most of the top-30 TV markets, where ENG is most heavily used, Channel A10 is used almost daily, which would in effect permanently preclude later-in-time MSS ATC use of 2,487.5–2,493 MHz in these areas.

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like use with base stations and thousands of customer premises equipment (CPE) devices. Like the situation with MSS ATC, any attempt to share operations in the same area would result in disastrous co-channel interference. However, as with the MSS ATC co-channel problem, by converting the 2.5 GHz TV BAS band to three 12-MHz wide channels between 2,450 and 2,486 MHz and shifting TV BAS entirely out of the 2,487.5 MHz and up spectrum occupied by MSS ATC and by BRS1, results in an elegant solution to the problem.

V. The August 6, 2004, WT Docket 02-55 R&O Justifies This Petition for Reconsideration and the Conversion of the 2.5 GHz TV BAS Band to All Digital

9. Subsequent to the release of both the IB 02-364 R&O, and also the WT 03-66 R&O, the Commission released the August 6, 2004, WT Docket 02-55 R&O. In that rulemaking the Commission agreed to let Nextel Corporation ("Nextel") de-interleave the 800 MHz band, so as to solve a serious public safety interference problem involving maturing enhanced specialized mobile radio (ESMR) sites operated by Nextel. While public safety systems continued to operate using their high-power, distant-site facilities, a serious near-far interference problem developed as Nextel constructed more and more low-level, low-power ESMR sites in the areas that public safety agencies typically operate. A public safety radio could not reject the much stronger signal from a lower power but much closer Nextel ESMR site, perhaps in the same block at the responding public safety unit.

10. The resulting interference was not due to any inadequate ACRR by the public safety radios, or due to excessive OOBE from the Nextel ESMR sites; rather, it was due to fundamentally incompatible architectures between radio systems with interleaved channels. To solve this problem, the Commission accepted the Nextel proposal in which the 800 MHz band is de-interleaved. Since this would result in an estimated \$850 million expense for Nextel, plus a net loss of spectrum at 800 MHz, Nextel asked for 10 MHz of 1.9-GHz spectrum, in two 5-MHz blocks, at 1,910–1,915 MHz (now used for unlicensed personal communications services, or UPCS) and at 1,990–1,995 MHz (now allocated to MSS).

11. However, before Nextel could avail itself to the 1,990–1,995 MHz spectrum, current BAS operations at 1,990–2,025 MHz would have to be moved to the re-farmed 2 GHz TV BAS band at 2,025–2,110 MHz, and now consisting of seven 12-MHz wide channels, pursuant to the November 10, 2003, ET Docket 95-18 Third R&O. And, since interference to public safety operations was involved, time is of the essence in effectuating a solution. Accordingly, the Commission decreed that Nextel must accomplish moving broadcasters on a fast-track basis, giving Nextel just 18 months to complete Stage 1, and an additional 12 months for the completion

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of Stage 2. Stage 1 involves all markets where Nextel decides to deploy its 1.9 MHz spectrum, plus nearby "linked" or "daisy chain" TV markets. Stage 2 involves all other TV markets.

12. Thus, in stark contrast to the ET 95-18 Third R&O, where MSS operators would only be required to immediately clear 2 GHz TV BAS operations in the top 30 TV markets, resulting in a serious adjacent-market problem, where MSS would be allowed up to 60 months before being obligated to transition those smaller markets to the new 2 GHz TV BAS band plan, the WT 02-55 decision obligated Nextel to accomplish clearing TV BAS out of 1,990–2,025 MHz in just 30 months, and for all 210 TV markets.

13. To accomplish this transition, Nextel has budgeted \$512 million to buy new 2 GHz TV BAS radios and hardware. Because Nextel must provide "comparable facilities," and because comparable facilities in a 12-MHz wide channel are not possible using analog modulation, the new radios must use digital modulation, most likely coded orthogonal frequency division multiplexing (COFDM) modulation. The three major manufacturers of 2 GHz TV BAS radios, in alphabetical order BMS, MRC and Nucomm, have all made tremendous strides in producing practical digital radios with built-in MPEG encoders. Further, the vast majority of modern day 2 GHz TV Pickup BAS radios are also capable of transmitting on the three 2.5 GHz TV BAS channels.

14. Given the imminent replacement of all 2 GHz TV BAS radios over the next 30 months, it makes sense to now similarly re-farm the 2.5 GHz TV BAS band to three 12-MHz wide channels, and have those new radios delivered with center frequencies appropriate for the proposed new TV BAS Channels A8d, A9d and A10d. Indeed, doing so may lessen Nextel's net cost, because for a modern-day 2/2.5 GHz TV BAS radio, about \$12,000 is for the RF section, about \$22,000 is for the MPEG encoder, and about \$1,000 is for the analog modulator. If analog operations are no longer needed to support 2.5 GHz TV BAS operations, then financial savings in the equipment cost will accrue to Nextel. Nextel may also be entitled to later reimbursement from MSS ATC operators, in recognition of the benefit created by clearing TV BAS operations from 2,486–2,500 MHz.

15. There would, however, be an additional cost to relocate or convert fixed link 2.5 GHz TV BAS radios from analog to digital under this proposal. Like the situation in the 2 GHz TV BAS band, fixed link (STL and ICR) stations and TV Pickup stations operating on the 2.5 GHz TV BAS channels must both be converted, as massive interference would result if fixed link radios remained on an old, analog band plan with wide channels, while TV Pickup radios were converted to a new band plan with narrow channels. While conversion of 2.5 GHz TV Pickup radios

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would be inherent in the already funded conversion of 2 GHz TV Pickup radios, conversion of 2.5 GHz fixed link TV BAS radios would represent an additional expense. Nextel should not be expected to bear this additional cost. Rather, it seems appropriate to SBE that MSS ATC and BRS1 entities pay this additional cost, since the clearing of TV BAS operations above 2,486 MHz is to their benefit. Since MSS ATC has 5.5 MHz of spectrum, and since BRS1 has 4 MHz of otherwise co-channel spectrum, SBE suggests that the cost be shared on 5.5/9.5 and 4.0/9.5 basis; that is, MSS ATC should be responsible for 58% of the 2.5 GHz fixed link conversion cost, and BRS1 should be responsible for 42% of that cost.

16. Some fixed link TV BAS stations now operating on TV BAS Channels A8, A9 and A10 may be in areas sufficiently remote that it is unlikely to attract either 2.5 GHz TV Pickup operations, or MSS ATC operations, or BRS1 operations. Fixed TV BAS stations falling into this category should be allowed to opt out of the conversion, if they are willing to become secondary to TV Pickup operations using the new band plan. However, if at some future date MSS ATC, or BRS1, should wish to deploy in the vicinity of a grandfathered TV BAS Channel A10 fixed link station, those entities would then be responsible for the cost of converting the grandfathered fixed link station to digital, and using one of the three proposed 2.5 GHz, 12-MHz wide, channels.

VI. Additional Benefits

17. In addition to the massive advantage of clearing co-channel TV BAS operations from the MSS ATC band and the bottom four MHz of BRS1, this change would reduce the OOBE from the adjacent-channel TV BAS operations, because those BAS transmitters would now have to meet the significantly more stringent digital emission mask rather than the analog emission mask.

18. Another benefit would be that digitally modulated TV BAS operations on Channels A8d, A9d and A10d would be less susceptible to interference from co-channel ISM devices (which, unlike MSS ATC and BRS1, are not intentional radiators) and from co-channel 2,400–2,483.5 MHz Part 15 spread spectrum devices (aka wireless local area networks (WLANs) or IEEE 802.11x devices). Although these devices are intentional radiators, their allowable EIRP is much lower than for MSS ATC or BRS1 operations, and for these reasons co-channel operation has proven feasible, although with more and more instances of supposedly impermissible

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interference from unlicensed Part 15 devices being caused to licensed, Part 74, TV BAS operations.³

VII. Part 90 Public Safety Operations at 2,450–2,500 MHz

19. Part 90 public safety stations are also authorized to use 2,450–2,500 MHz, and would similarly benefit from being changed to three 12-MHz wide digital channels. First, digitally modulated channels are inherently available for encryption, an important advantage for police applications often involving covert surveillance. Second, if Public Safety operations do nothing, and continue to attempt to operate with analog modulation between 2,487.5 and 2,500 MHz, before long they will find themselves in a sea of mutual interference, and the Commission will have a new public safety interference problem to deal with. Therefore, SBE believes that the public interest is better-served by similarly transitioning Part 90 public safety operations to 2,450–2,486 MHz, using three 12-MHz wide digital channels.

20. In the event that public safety used encryption techniques for digitally modulated signals, the Commission should nevertheless require the transmission of a non-encrypted station identification. In a shared band service, station identification is all the more important to resolving interference between co-primary users.

21. Since again MSS ATC and BRS1 would be the beneficiaries of having public safety operations cleared from above 2,486 MHz, the cost of that conversion should be again born on a 58%/42% basis by MSS ATC and by BRS1.

VIII. Summary

22. SBE believes that the Commission has seriously underestimated the interference potential between grandfathered TV BAS operations at 2,483.5–2,500 MHz and the new MSS ATC operations at 2,487.5–2,493 MHz and the new BRS1 operations at 2,496–2,502 MHz. Due to the imminent replacement of all 2 GHz TV BAS radios by Nextel, a unique but short term window of opportunity exists to solve multiple technical problems involving TV BAS, MSS ATC, and BRS1, at no incremental cost to Nextel. Indeed, Nextel may well realize cost savings by concurrently converting 2.5 GHz TV BAS to digital. Accordingly, the SBE asks the

³ In this regard, see the May 3, 2004, SBE comments, and the June 1, 2004, SBE reply comments, to ET Docket 03-108 ("Cognitive," or "smart" radios). ET Docket 03-108 proposes a six-fold increase in the allowable transmitter power output (TPO) for Part 15 WLANs, from 1 watt to 6 watts, and also a six-fold increase in the allowable equivalent isotropic radiated power (EIRP), from 4 watts to 24 watts (43.8 dBm EIRP!)

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Commission to modify the 2.5 GHz TV BAS band, and the Part 90 2,450–2,500 MHz band, to three 12-MHz wide channels covering 2,450–2,486 MHz.

List of Figures

23. The following figures or exhibits have been prepared as a part of this Petition for Reconsideration of the July 16, 2004, IB Docket 02-364 R&O:

1. Proposed new TV BAS 2.5 GHz band plan.

Respectfully submitted,

Society of Broadcast Engineers, Inc.

/s/ Ray Benedict, CPBE
SBE President

/s/ Dane E. Ericksen, P.E., CSRTE
Chairman, SBE FCC Liaison Committee

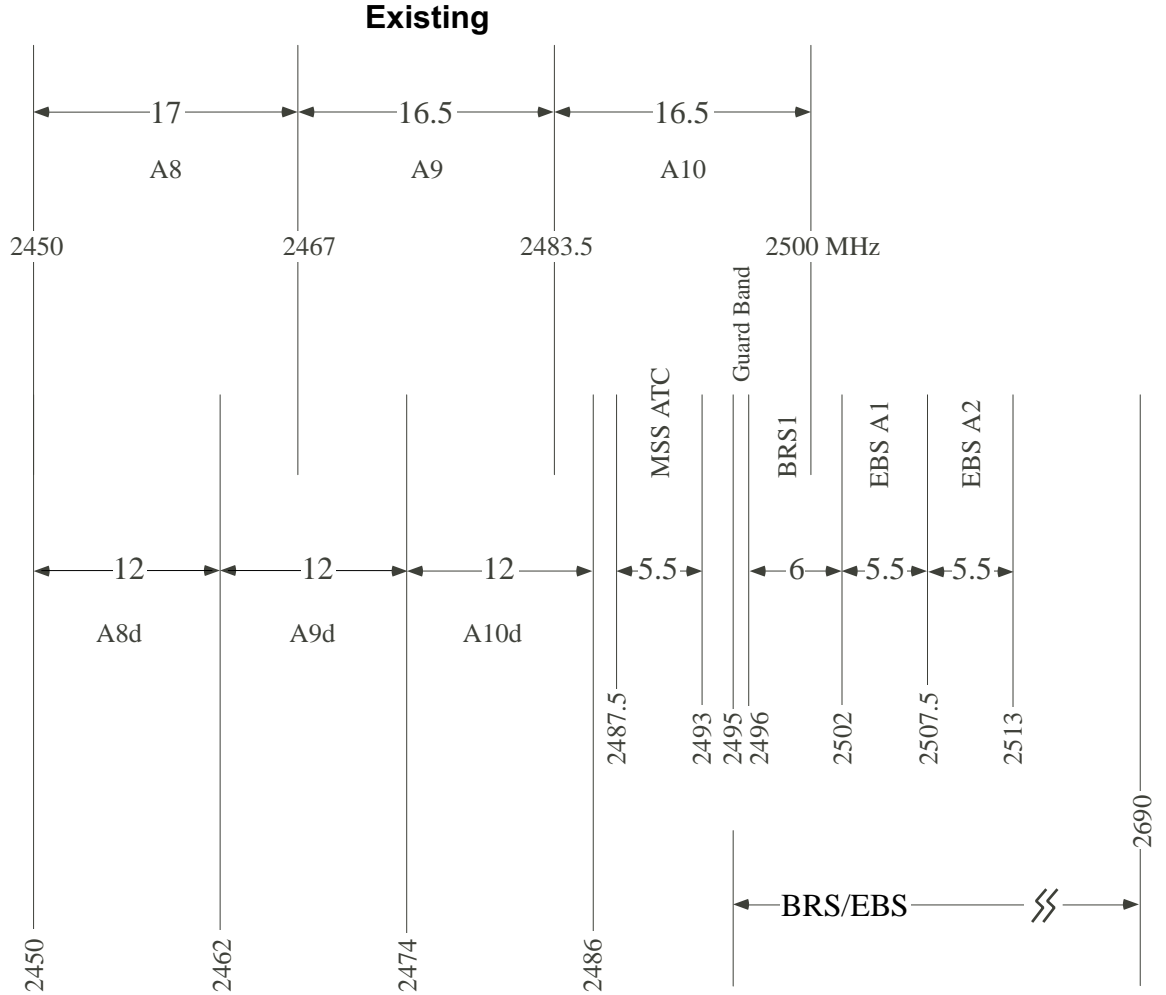
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September 8, 2004

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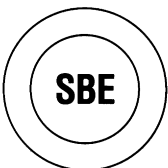
**IB Docket 02-364 Report & Order
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Existing vs Proposed New 2.5 GHz TV BAS Band Plan



**Proposed New 2.5 GHz
TV Band Plan**

All frequencies and bandwidths are in MHz.



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