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May 5, 1999

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Ms. Magalie Roman Salas  
Secretary  
Federal Communications Commission  
445 12<sup>th</sup> Street, S.W., TW-A325  
Washington, DC 20554

RECEIVED

MAY 5 1999

FEDERAL COMMUNICATIONS COMMISSION  
OFFICE OF THE SECRETARY

Re: **EX PARTE** /  
ET Docket No. 95-18; IB Docket No. 99-81

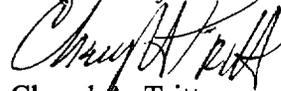
Dear Ms. Salas:

On Tuesday, May 4, 1999, representatives of ICO Global Communications, Francis Coleman, Jeffrey Binckes, and the undersigned, and Norman Leventhal and Peter Hadinger, representing the ICO U.S. Service Group, met with Julius Knapp, Rebecca Dorch, Sean White and Geraldine Matise of the Office of Engineering and Technology to discuss the above-captioned proceeding.

The discussions focused on the attached documents and on the parties' earlier comments filed in the above-captioned proceedings. The participants also discussed possible approaches to a gradual transition of 2 GHz incumbent licensees out of the 2 GHz frequencies allocated to mobile satellite services.

Pursuant to Section 1.1206(b)(2) of the Commission's Rules, two originals and two copies of this letter are provided to the Secretary for inclusion in the record.

Respectfully submitted,



Cheryl A. Tritt  
Counsel for ICO Global Communications

Enclosures

cc: Julius Knapp  
Rebecca Dorch  
Sean White  
Geraldine Matise

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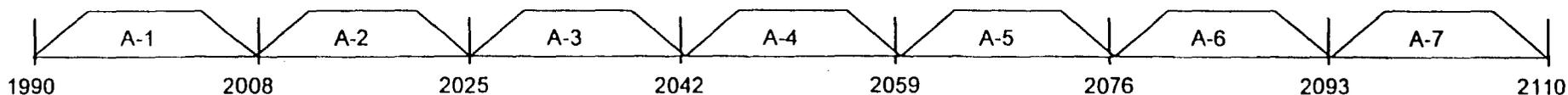
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## CRITICAL 2 GHz RELOCATION ISSUES

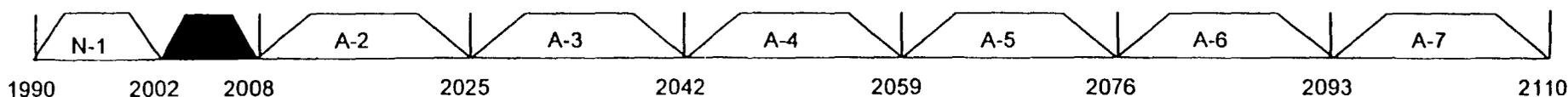
- **BAS/FS relocation required only where harmful interference to existing primary incumbents results**
    - This permits spectrum to be cleared only as needed by MSS operations (no universal, flash cut-over is possible or desirable)
    - UTC's petition for advance determination of "harmful interference" is misplaced
  
  - **MSS must be allowed to select the least cost alternative where relocation is necessary**
    - For BAS, this means a phased transition incorporating narrowband, analog channels only in that spectrum needed by MSS
    - For FS, this means allowing in-band retuning (with further relocation if necessary later)
  
  - **A reasonable Sunset Date is necessary to finalize the new band allocations by which all incumbents are subject to mandatory relocation without further compensation**
    - January 1, 2005 is appropriate
  
  - **MSS relocation obligations should relate solely to the specific spectrum each operator will actually utilize**
    - License conditions and rules fully protect later entrants
  
  - **To minimize complications and additional costs, no new 2GHz BAS or FS applications should be accepted**
  
  - **Recognition of prior tax benefits and avoidance of a windfall to incumbents require use of depreciated value in determining relocation obligations.**
-

## IUSG Suggested BAS Transition Plan

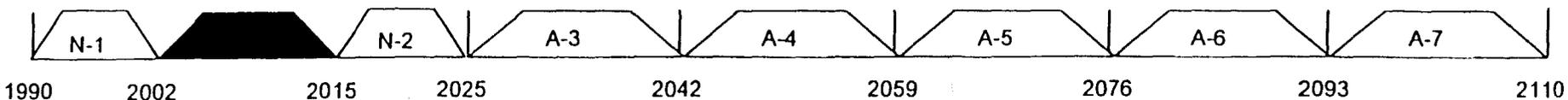
Current BAS channellization (note: A-x refers to existing analog channels; N-x refer to new 12MHz analog or 10MHz digital channels)



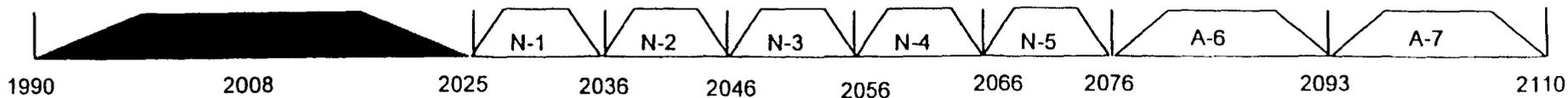
Step 1: Minimum impact to broadcasters: conversion to digital or narrow band FM analog in 12 MHz channel frees up 6 MHz for MSS



Step 2: Converts one more BAS channel to 10MHz digital for an additional 7MHz for MSS (total=12MHz) – needed only after 200x



Step 3: Clears all of MSS spectrum, leaves legacy wideband analog channels for broadcasters (important to allow continued use of portables, etc. that may not be easily converted to digital and to allow roaming of analog trucks from stations that did not have to convert earlier.





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*On April 29 California Microwave is changing its name to Adaptive Broadband.*

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## 2GHz ENG Band Upgrade Paths

Microwave Radio Communications' response to the FCC's Third Notice of Proposed Rulemaking and Order – ET Docket No. 95-18

April 6, 1999

### *ET Docket No.95-18: What does it say?*

The amendment of section 2.106 of the Commission's Rules to Allocate Spectrum at 2 GHz for Use by Mobile-Satellite Service reduces the Broadcast Auxiliary Service (BAS) spectrum, currently 120 MHz (1990 – 2110 MHz), to 85 MHz (2025 – 2110 MHz). This will result in seven 12 MHz channels:

CH1: 2025 – 2037 MHz  
CH2: 2037 – 2049 MHz  
CH3: 2049 – 2061 MHz  
CH4: 2061 – 2073 MHz  
CH5: 2073 – 2085 MHz  
CH6: 2085 – 2097 MHz  
CH7: 2097 – 2110 MHz

The proposed change is scheduled to commence on January 1, 2000. The 35 MHz of bandwidth taken from the Broadcast Auxiliary Band will be reallocated for MSS. The proposal suggests that existing analog equipment would need to be modified extensively to operate within a 12 MHz channel plan. It also suggests that more spectrally efficient digital equipment may be necessary.

There is little or no data in the record to address whether analog and digital BAS signals could be transmitted on adjacent channels without interference. The FCC claims that studies and information are available stating that it is possible to transmit FM analog signals in 12MHz channels, and digital signals in 10 MHz.

The FCC asked for comments on this proposal in December 1998. The Commission asked for the feasibility of the proposed channel plan, and comments on a proposed implementation plan. The Commission also asked for comments on the feasibility of allowing the BAS and MSS committees to negotiate a transition plan, or whether the FCC should mandate the plan. The proposal asked for information on the cost to modify existing fielded equipment, and the percentage of fielded equipment that is capable of modifications to the new plan, as well as the cost of replacement digital equipment.

***What does this mean to the broadcaster?***

Traditional broadcast television newsgathering tools have long been analog, including analog cameras, analog videotape recorders, and analog microwave systems. MRC estimates that there are approximately 8,000 portable ENG transmitters in use today in the U.S. In addition, there are at least 1,000 ENG Central Receive sites. Essentially, all of this equipment is analog, and approximately 40% of this equipment is at least ten years old. The existing equipment will need to be modified or replaced to operate in a 12 MHz channel plan. The required modifications will vary depending on the age and design of the radios.

The performance of existing radios when modified to operate in the 12 MHz channel plan may not equal the current expectations for ENG microwave radios. Existing 2 GHz ENG equipment effected by this rulemaking change will be portable transmitters, portable receivers, and central receivers. Since the available frequency band is not moving, but merely being compressed, portable antenna products will not be affected. Central receive antennas will most likely need to have new bandpass filters installed.

There is at least one potential advantage to this pending 2 GHz BAS band change: the ENG band will be moving further away from the PCS band. This action may help to minimize the interference issues that some broadcasters face currently.

The timing of the channel plan changeover is January 1, 2000. This timetable in itself will create a major logistical challenge. Thousands of radio products will either need to be upgraded or replaced at the exact same time. Because of these issues, many organizations have suggested alternative transition scenarios. These alternatives range from having rolling market-to-market changeover dates to splitting the available bandwidth into a combination of 17 and 12 MHz channels for a given period of time. Although many 2 GHz ENG systems can be upgraded, it is also critical to consider the requirement for standards and interoperability: ENG systems of different brands and vintages must be compatible if they are to be used readily under a variety of field operating conditions. Some may suggest that it will be easier to overbuild all new digital ENG systems to be ready for a national cutover date. However, this cost could exceed \$1.0 billion.

Because of these logistical and cost concerns, it is critical to develop a transition path that will allow modifications to existing products, while also offering new products that exploit the latest technologies. This transition path must allow both analog and digital operation for the foreseeable future.

***Modifying Current Product for 12 MHz Analog Operation:***

Most major brand portable microwave radio products currently being manufactured are frequency agile designs that employ digital frequency synthesizers to tune the transmitting source and local oscillator. These radios feature E-PROMs that are used to program the operating frequency. To move the channel assignments to a new plan, it is only necessary to replace the E-PROM with a properly programmed part.

In addition, programmable synthesized audio subcarriers are also employed in current radio designs. The subcarrier frequency is set by a series of dip switches within the radio, which also makes it easy to retune. Receiver IF filters are either cabled into the radio or PCB mounted bricks.

To operate with 12 MHz channels, it will be necessary to replace these IF filters with narrower, sharper filters. These modifications can be accomplished by an experienced technician in the broadcaster's lab, using appropriate parts and a written procedure from the radio manufacturer.

**Trade-offs:**

While these radio modifications are technically possible with modern radio systems, it is important to consider the performance trade-offs that are involved. Most current generation portable microwave radios are set for 4 MHz peak deviation, and are equipped with two audio subcarriers. To maintain the video deviation and number of audio channels, MRC has tuned the subcarriers to 4.83 MHz and 5.6 MHz. With 4 MHz peak video deviation and these two subcarrier frequencies, the radios meet our published specifications and fit within the 12 MHz channel bandwidth.

In support of the National Association of Broadcasters, MRC has provided a pair of modified 12 MHz modified analog radios, as well as a pair of standard 17 MHz radios to an unbiased outside test laboratory for evaluation. Both NAB and MRC will report on the test results later this spring.

A major concern with modified analog radios is the potential of degraded adjacent channel performance. To improve adjacent channel performance, radios can be restricted to one audio channel, or the video deviation can be reduced. Both trade-offs that will affect either the flexibility or the performance of the radios.

There are alternatives to giving up audio channels or radio performance. By digitizing the audio inputs and placing them onto a single 4.83 MHz subcarrier, the integrity of the radio system is maintained. The trade-off here is the added cost.

**MRC's Position:**

*All of the current portable products that MRC offers are upgradeable to the 12 MHz channel plan. MRC will provide, at no cost, new E-PROMs for any radio under warranty when the 12 MHz channel plan is implemented. For those radios no longer under warranty, MRC will offer customers a fixed price quote for replacement E-PROMs.*

MRC will also offer product enhancements to provide better performance for radio systems that are upgraded to the new channel plan. Enhancements will include sharper filters and audio upgrades. These product enhancements are currently being developed, and will be finalized upon the completion of our testing program.

**MRC's Support of Existing 2 GHz Equipment:**

MRC has a long history in the television broadcast market. For over 35 years, MRC has provided innovative, reliable products. In preparing for the pending reduction of the 2 GHz band, MRC has analyzed a long list of products that it has manufactured over the years. For many of these products, the cost to upgrade is impractical, either because the older designs do not lend themselves to an upgrade, or because limited replacement part availability has made them difficult or impossible to support.

*Accordingly, MRC has determined that it will support with upgrades all products manufactured in the past ten years.*

The products to be supported with the channel plan modification will require varying amounts of changes, depending upon the model of the radio. All products will require E-PROMs, new audio subcarrier PC boards, and new filters. The following product models will be supported:

Transmitters: 2T2	Receivers: 2MR
ProStar 2T2WB	ProStar 2MR
Millennium 2T4	Millennium TBR Series

**ProStar & Millennium 2T10  
Millennium VanPacks**

**Millennium CR  
Millennium TBR Series**

Upon the final rulemaking by the FCC, MRC will provide customers a price schedule showing a fixed upgrade cost for the supported radio platforms. In addition, depending upon parts availability, MRC will also offer support for these models that were designed prior to 1990:

**Transmitters: 2MX  
Super 2MX**

**Receivers: ProStar MRC  
ProStar MRCD**

Because of the age and parts availability issues with these older generation radios, MRC recommends that customers contact MRC for an initial assessment about the upgrade cost. MRC will also offer customers trade-in programs as an incentive to consider replacing older radios with newer MRC brand products.

***Technology Alternatives:***

Since most 2 GHz ENG equipment is currently analog, newer generations of products will be digital or digital-ready. MRC is dedicated to providing a path to this digital future with the following product offerings:

The current Millennium Series of radios consisting of the TBT, TBR, VanPack, and MCR are all capable of being upgraded to operate as analog radios in the 12 MHz channel plan.

For many broadcasters moving to digital operation, FSK modulation is a smooth transition from analog. The FSM.8 modulator and FSD.8 demodulator offer the robust, analog-like performance characteristics of FSK modulation, with the advantages of 8 Mbps transmission capability within a 12 MHz channel plan. These modems interface to existing radios at baseband, which is an advantage with this form of modulation, since most 2 GHz portable radios are directly modulated. With the FSM.8 and FSD.8, an MPEG-II encoded video data stream can be transported across an analog microwave system.

The new CodeRunner™ Series is a family of digital and digital-ready microwave radio products for portable, mobile, and central receive applications. The products consist of base microwave radio platforms that can support either analog or digital operation, a choice of analog and digital modems, and a choice of MPEG II compression systems and COFDM modulation systems. In 2 GHz configurations, the CodeRunner products support 12 MHz channel plans, including analog modulation.

***Summary:***

MRC is committed to supporting the broadcasters through this difficult transition. We will continue to develop enhancements for current products in addition to offering the latest technological advancements in our new products. When the 2 GHz channel plan change is implemented, MRC will be there to offer broadcasters the upgrades and products they require.