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

In the Matter of	)	
	)	
Allocation of Spectrum Below 5 GHz Transferred from Federal Government Use	)	ET Docket No. 94-32

To: The Commission

COMMENTS
OF THE
NATIONAL ASSOCIATION OF BUSINESS
AND EDUCATIONAL RADIO, INC.

Respectfully submitted,

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SUMMARY

The National Association of Business and Educational Radio, Inc. ("NABER") respectfully submits its Comments in response to the Notice of Inquiry issued by the Federal Communications Commission on May 4, 1994, in the above-captioned proceeding.

Although the Commission has recently taken significant steps to increase the availability of advanced communications systems for the general public in its PCS proceeding, the Commission needs to devote attention to the needs of America's businesses, public safety agencies, utilities and industries for advanced communications services. As described further below, the Commission actions with respect to personal communications services will not satisfy the advanced communications needs of the private land mobile community. NABER urges the Commission to devote the necessary resources to a revitalized effort to bring the advances in digital signal processing, imaging, and compression technologies to private communication systems.

While NTIA has proposed the reallocation of 50 MHz of spectrum, a closer review of each band reveals that little immediate benefit will be realized. Thus, while the Commission should act expeditiously to ensure that the designated spectrum is reassigned for use as soon as possible, it must also realize that what is proposed falls far short from what is needed. Therefore, NABER encourages the Commission and NTIA to continue to work to locate reallocatable spectrum which can provide the real benefits which this proceeding is designed to achieve.

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The National Association of Business and Educational Radio, Inc. ("**NABER**") by its attorneys and pursuant to Section 1.415 of the Commission's Rules, 47 C.F.R. §1.415, respectfully submits its Comments in response to the Notice of Inquiry issued by the Federal Communications Commission on May 4, 1994, in the above-captioned proceeding.[1]

I. BACKGROUND

NABER is a national, non-profit, trade association headquartered in Alexandria, Virginia, that represents the interests of large and small businesses that use land mobile radio communications as an important adjunct to the operation of their businesses and that hold thousands of licenses in the private land mobile radio services. **NABER** has six membership sections representing Users, Private Carrier Paging licensees, radio system integrators, Technicians, Specialized Mobile Radio operators and

[1] 59 FR 25589 (May 17, 1994).

Tower Site Owners and Managers. **NABER**'s membership comprises over 6,000 of these businesses and service providers holding thousands of licenses in the private land mobile services.

For the past 19 years, **NABER** has been the recognized frequency coordinator in the 450-470 MHz and 470-512 MHz bands for the Business Radio Service. **NABER** is also the Commission's recognized frequency coordinator for the 800 MHz and 900 MHz Business Pools, 800 MHz General Category frequencies for Business eligibles and conventional SMR Systems, and for the 929 MHz paging frequencies. In its Report and Order in PR Docket No. 83-737, the Commission designated **NABER** as the frequency coordinator for all Business Radio Service frequencies below 450 MHz and, in a joint effort with the International Municipal Signal Association ("IMSA") and the International Association of Fire Chiefs ("IAFC"), the Special Emergency Radio Service frequencies.

In this proceeding, the Commission seeks comments on the potential applications for 50 MHz of spectrum that is being transferred immediately from the Federal Government to private sector use as required by the Omnibus Budget Reconciliation Act of 1993. The spectrum identified for the reallocation by the Department of Commerce is the 50 MHz in the bands 2390-2400 MHz, 2402-2417 MHz, and 4660-4685 MHz.

II. COMMENTS

A. The User Community's Need For Additional Private Spectrum

On December 23, 1993, a petition for rule making was filed with the Commission by a coalition of private users seeking an

allocation of at least 75 MHz for private and local government land mobile operations, which included NABER.[2] The Commission has included the COPE Petition in the record in this proceeding, and has requested comments on the Petition.[3]

The COPE petition proposed an allocation which would support communications systems designed to meet the emerging needs of the private radio user community for advanced wireless communications. The Petition included several examples of new uses of wireless communications, including the National Crime Information Center upgrade, which would permit the transmission of images of fingerprints, mug shots, stolen objects, contraband, and personal property between the FBI's headquarters and individual police patrol cars.[4] Such communication systems will not be possible unless additional spectrum is available.

Although the Commission has recently taken significant steps to increase the availability of advanced communications systems for the general public in its PCS proceeding, the Commission needs to devote attention to the needs of America's businesses, public safety agencies, utilities and industries for advanced communications services. As described further below, the Commission actions with respect to personal communications services

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[2]In the matter of Amendment of Parts 2 and 90 of the Commission's Rules to Allocate Spectrum to Accommodate Advanced Private Land Mobile Communication Services, filed December 23, 1993, Coalition of Private Users of Emerging Multimedia Technologies ("COPE Petition").

[3]Notice of Inquiry, at n. 21.

[4] Id. at 11.

will not satisfy the advanced communications needs of the private land mobile community. NABER urges the Commission to devote the necessary resources to a revitalized effort to bring the advances in digital signal processing, imaging, and compression technologies to private communication systems.

Public networks may begin operation, may expand, may increase their sophistication level, may go bankrupt, may increase or decrease their area of coverage, may cut rates or raise rates. Regardless of the direction public systems may take, the ability to build and operate a private radio system must be preserved. The well-engineered private network has, and will continue to have, certain attributes that are not just desirable, but essential:

(1). The private network can be customized, upgraded, and realigned as necessary to yield high performance at a reasonable infrastructure cost.

(2). The single user/operator can accommodate increased or seasonally erratic data traffic within his existing system, adding capacity in a step function, without incurring additional subscriber costs.

(3). Control of the network is in the hands of the system's owner/operator, enabling swift reaction to coverage and capacity challenges, and special traffic requirements.

In preparing its Comments in this proceeding, NABER's USER Council solicited input from its members as to the types of services the members are in need of which the members expect will not be provided by carrier systems. The following represents a sampling of the comments which were received by NABER:

B. **Federal Express**

Federal Express owns and operates a customized nationwide voice and data radio system. Millions of bits of data are carried, stored and retrieved daily, providing cost effective and operationally efficient data connectivity utilizing both wireless and wired components.

For 15 years, as Federal Express has developed and grown, the potential benefits of private and public communication service offerings have been closely examined and weighted. Two factors are foremost in Federal Express' continued decision to operate a private radio network:

(1). Having made the initial investment, the existing private system is reasonably inexpensive to operate compared to subscription costs for any existing public system; and

(2). There is, to this day, no existing public system that offers the flexibility, level of sophistication, extensive coverage, transmission through-put rate, and capacity of our private system.

It has been posited that the equipment (mobile and base) requirements of a specialized private system are "non-standard", unique to that system and, therefore, do not benefit the majority of the radio-using public. However, Federal Express has found the opposite to be true. Federal Express has pushed designers and manufacturers to develop and market better products than those on their drawing boards.

The entire private radio industry has realized the benefits from the efforts of companies such as Federal Express. For example, additional, more sophisticated, more useful equipment

options can, in time, be offered to subscribers to a public network or to other private applications, as a direct result of the development and manufacture of equipment that was originally a concept of companies such as Federal Express.

Public networks, such as cellular, while expanding their territory, still do not reach tremendous tracts of territory in the rural United States. Federal Express's customers live and work in those places, as well as in urban environments. The businesses, regardless of their location, are met by Federal Express. Because the Federal Express private radio communications system is so extensive, its drivers and couriers are reached, their pick-ups logged, their progress traced, and their on-road problems handled. If Federal Express had elected to wait for comparable coverage from a subscription service, we would still be waiting to deliver a tractor part to Kalispell, Montana, pick up a contract in Muscle Shoals, Alabama, or track a shipment of medical supplies en route to Gillette, Wyoming.

The importance of being able to locate a package at any point in time cannot be emphasized enough. The Federal Express radio system permits instant location of parcels, the potential to re-route items, quick response to a pick-up request, assistance in cases of courier mechanical difficulties or unexpected overload. Certainly other large delivery companies have invested similar company resources into developing communication networks to provide their companies with information which cannot typically be provided by carrier systems.

C. The Air Traffic Industry

1. United Airlines

United Airlines believes that there is a potential for promoting economic growth and competition and enhancing access to services when spectrum is used in the private sector. Some of the uses by the airline industry of the spectrum slated for reallocation are as follows:

(1). Dedicated spectrum use in small, defined areas such as airports and surrounding support facilities;

(2). Use for narrowband and wideband spectrum;

(a). Video imaging for aircraft maintenance, aircraft incidents and airport incidents;

(b). Data for positive baggage check (bar code reading), Aircraft maintenance-electronic logbooks and decision processing/remote terminals;

(c). Voice communications for Airport/Aircraft operations, telephone interconnect, Federally mandated safety and security programs, interoperability with public safety/service authorities, airlines needs for redundant systems and the ability to operate during natural disasters (i.e. earthquakes, tornadoes, etc.);

United Airlines supports the needs of the public safety community regarding spectrum allocations and interoperability. Airport/aircraft situations dictate interoperability not just between public safety organizations but to some extent, between airport public safety authorities and an airline carrier.

2. Northwest Airlines

Northwest Airlines has in the past been a major user of trunk radio systems along with several new technology areas, e.g. spread

spectrum, infrared transmissions, microwave etc., and it is in its view that within past experience with several large service providers in business today that a provider of new technology services will not be able to provide the special requirements and system capacity needed in the future airline operational market.

It is Northwest Airlines view that it will be in the best interest in providing service to the traveling public that the airline industry be provided necessary spectrum and technology capacity to provide these services with safety and efficient operations. As more airlines implement RF data collection, existing spectrum will soon be exhausted at airports, producing a need for more channels. The Commission must review their planning to provide this capacity since most airline systems are special to the Airline Operational requirements.

Airlines need very reliable communication systems with extensive in building coverage at Airports; for example, accurate passenger baggage data is critical to the safe dispatch of flights because of aircraft weight restrictions and FAA mandated terrorist countermeasures. Commercial carriers catering to consumers generally can not meet the stringent reliability requirements for the airlines. Northwest Airlines has found this to be true with its previous service providers both due to pricing and technical reasons where communications connections to the airline internal computer systems are restricted due to security reasons.

Commercial carriers generally can not provide small systems at a reasonable cost and profit. As a result, Northwest and

several other airlines have built systems themselves to provide all of the needed services required. In addition, a large service provider generally can not provide the necessary level of expansion in system capacity needed by the airlines. As the market for the airlines expands due to the very competitive nature of the business, Northwest believes it will be forced to expand into its special systems. Most of these expansion requirements will come via new FAA regulations for security, airport safety requirements among several others expected.

Northwest Airlines believes that it has been a victim in the past of large service provider limitations that has caused it to move and either purchase its own systems or to purchase the frequencies and sub-systems of its service provider to provide Northwest with the special system requirements required (as explained above).

Northwest believes that in the near future (approximately 5 years) systems requiring collection of aircraft maintenance data via RF links such as high performance parameters and life cycles; this type of data must be extremely reliable and provide direct interaction with company computer automation systems. Such systems are already in production and Northwest expects the needs for the systems to expand at a very rapid pace, thus requiring new technology development in new spectrum areas.

D. **Westinghouse Communication Services, Inc.**

Westinghouse utilizes spectrum in many unique ways, a partial list of which follows below. It is Westinghouse's belief such uses cannot be cost effectively replaced by carrier services.

1. Nuclear Response Team: Responds to nuclear problems nationwide. Private Radio itinerant frequencies are used by the team to coordinate activities;

2. Wireless inventory (barcode) systems within warehouses and storage facilities;

3. Bar-code tracking of hazardous waste containers within waste disposal facilities;

4. Driver Monitoring of temperatures in long haul refrigerator trucks when the drivers are way from the vehicles;

5. Facility Security Systems, where security personal cannot afford to get a "busy signal" when human life may be endangered.

6. Remote control of unmanned vehicles used in monitoring operations and processes that are not "user friendly".

Westinghouse believes that new spectrum is needed for air to ground transmission of data and video. This spectrum would be used for highway traffic monitoring, power/pipe line surveillance. Damage assessment during disasters. Law enforcement surveillance, etc.

E. **Union Pacific Railroad**

Union Pacific Railroad (and the railroad industry in general) is in need of additional spectrum for the following uses, as current spectrum is insufficient:

1. Video Transmission Applications;

a. Remote observation by railroad and regulatory officials of a derailment sites during restoration;

b. Remote observation by railroad and regulatory officials of Hazardous Material Clean-up;

c. Remote observation of terminal and yard operations by railroad managers to improve the efficiency of train make-up and yard operations;

d. Remote observation of major construction areas by railroad officials;

e. Provide one person train operations by allowing the engineer to manipulate the train movement remotely by means of radio control. The video portion is necessary so that the engineer can observe the area in front of and behind the train to ensure safety during moves.

2. Wide Band Wireless Data Transmission;

a. Provide high speed date transmission in track maintenance and construction areas, including, maps for construction, diagrams of equipment for repair purposes and engineering curves/data information;

b. Communications with electronic messaging between employees;

c. Communications with electronic massaging on public systems such as Internet.

d. Remote data base access and manipulation for train operations.

e. Host computer communications for train operations.

Union Pacific has a number of concerns with being forced to utilize a Third Party Provider/Carrier. First, railroad operations are 24 hours per day, seven days a week. Data communication systems are rapidly becoming critical to safe

operations for the employees as well as the public. Third party providers typically view all clients as customers that must endure outages periodically. Third party providers also typically do not share the passion to restore service as the railroad telecom personnel do. Secondly, to ensure best possible pricing and system quality, multiple suppliers of equipment and service must be capable of bidding.

Union Pacific believes that there will be a significant impact on the railroad industry if additional private spectrum is not allocated. For example, the trucking industry obtains federal grants for the advancement of technology which the railroad industry is not eligible to obtain. Having access to broad band spectrum will allow the railroad industry to become more efficient and customer responsive. In addition, access to additional broad band spectrum will assist the railroads' never ending quest to provide safer operations for the public and employees.

F. **Public Safety Impact**

There will be significant public cost associated with the inability of the railroad industry to access additional private spectrum. Railroads will be forced to utilize current technology instead of advanced technology for some of functions discussed above. There will also be additional cost in the utilization of third party/carriers for such services.

It is clear that many public safety, utilities and businesses will utilize the advanced features of PCS for cost-effective delivery of routine, non-emergency communications. However, for

large operations and public safety emergency communications, instantaneous access to wide blocks of spectrum will be needed for imaging and data services. Such operations will likely be beyond the capabilities of most PCS operators and, in any event, require the public safety user to be in complete control of the radio channel.

NABER's USER Council feels there is a need for restrictions and limitations on the spectrum reassigned from the Federal Government. The following are some of the restrictions and limitations the USER Council would like to see imposed:

1. License all users
2. Bandwidth restriction commensurate with its application
3. Exclusive use with defined areas
4. Type of equipment used
5. Smart, power efficient equipment similar to cellular phones

Against this background, NABER offers the following comments on the specific frequency bands proposed for immediate reallocation:

G. The Commission's Proposed Reallocation Will Not Provide Significant Benefit To Private Users

Based upon input received from Motorola, Inc., it is NABER's opinion that the reallocation of the 2402-2417 MHz band has limited potential for new non-Federal radio location and fixed and mobile communications technologies, as the 2402-2417 MHz band is in reality already allocated to exclusive non-federal use. As the current federal use of this band is limited to five shipborne

military radar testing systems, it is clear there would be little impact on federal users if the band were reallocated. However, NABER believes any benefit to the general public by reallocation of this band will be minimal.

1. **The Noise Floor in the 2402-2417 Band Is Too High**

Noise generated from ISM devices,[5] including microwave ovens, and from unlicensed RF devices,[6] will make non-federal use of this band uneconomical because of the current and growing noise level.

All microwave oven devices are broadband RF generators. The assigned band is 2400-2500 MHz, but the manufacturing industry uses a 20 MHz guard band so that most energy is contained within 2420-2480 MHz. There is no signal strength regulation, but EPA has specified a 5 mW/cm^2 leakage limit, and spurious emissions are limited by the Commission's Rules.[7] Although the 2402-2417 MHz band is in a relatively quiet part of the microwave oven band, there is nevertheless a substantial noise floor. By virtue of international and domestic regulation,[8] non-ISM operations in the band must accept interference from ISM devices.

Although advanced error correction, spread spectrum and/or packet-switched transmission methods may be able to effectively overcome the effects of impulsive noise with little increase in

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[5] See, 47 C.F.R. Section 18.101, et seq. (1992).

[6] See, 47 C.F.R. Section 15.1, et seq. (1992).

[7] See 47 C.F.R. Section 18.305 (1992).

[8] See Radio Reg. 742, International Telecommunication Union, 1992.

required transmitter power, the additional costs of producing such equipment will be considerable. In its Comments in response to the NTIA Preliminary Spectrum Reallocation Report, Telecommunications Industry Association estimates that current and predicted future interference in the band will cause the infrastructure to cost between 2.2 and 50 times the cost of the same system implemented without interference.[9]

2. **Sharing with the Amateur Service Would Be Difficult**

There is currently no experience with commercial sharing with the radio amateur service except under Part 15 of the FCC's Rules.[10] The 2402-2417 MHz band, which is allocated on a secondary basis to the amateur service, is a portion of the spectrum known in the amateur community as the 13 cm band. Although NTIA believes in its Preliminary Report the band is very lightly used by radio amateurs[11] and the amateur community can satisfy the majority of its spectrum requirements in the band in the remaining 35 MHz band,[12] no definitive analysis is revealed to substantiate and quantify this claim.

NABER's USER Council feels that there would be minimum disruptions, if any, to the amateur service licensees in the 2400-2402 MHz band. However, if there is a possibility to trade that

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[9] See Appendix.

[10] See 47 C.F.R. Section 15.1 et seq. (1992).

[11] Preliminary Report at p. 5-12.

[12] Id.

frequency portion with the amateur operations for some other spectrum, then NABER supports that option.

NABER believes that it will be extremely difficult to achieve any significant spectrum for the private community with as many problems as 2402-2417 MHz band presents. In its Comments on the NTIA Preliminary Spectrum Reallocation Report, TIA estimates that not more than 2 MHz of the 15 MHz offered in the 2402-2417 MHz band is usable as an incremental increase in spectrum for the private sector. However, NABER feels that new private services can obtain some shared use with the amateur operation in the 2390-2400 MHz bands (and with fixed-satellite service in the 4660-4685 MHz band). NABER believes that this can be accomplished by: (a) utilizing exclusive use licensing on certain applications; and (b) grandfathering existing and licensing future users. NABER believes that some private users can coexist with microwave and ISM equipment in the 2402-2417 MHz band. Such sharing can be accomplished by geographic separations. However, sharing with Part 15 devices is more troublesome.

3. **The 1390-1400 MHz, 1427-1432 MHz And 1670-1675 MHz Bands**

The 1390-1400 MHz band is used by long-range air defense radars, military test range telemetry links, tactical radio relays, and radio astronomy. Reallocating this band for non-federal use would require that airborne transmissions be prohibited to protect radio astronomy, and that the FAA and Department of Defense install filters on their adjacent band high

powered radars. Thus, there appears to be some limited use private use possible in this band.

Currently, the 1427-1432 MHz band is used for military tactical radio relay communications and military test range aeronautical telemetry applications. In order to protect sensitive radio astronomy observations in the adjacent band, reallocation for airborne or space-to-Earth communications would have to be avoided. In addition, protection of adjacent band radio astronomy operations in this band could make this band difficult to use. Similarly, necessary protection of adjacent band radio astronomy operations may make the 1670-1675 MHz band difficult to use.

4. The 1710-1755 MHz Band

The 1710-1755 MHz band is used extensively for fixed microwave communications, military tactical radio relay, and airborne telemetry systems. However, required protection to microwave communication systems operated by federal power agencies in this band (which will be allowed to continue) will restrict non-federal use.

5. The 2300-2310 MHz And 2390-2400 MHz Bands

These bands are used by the military for radar testing systems, such as target scattering and enemy radar simulators, and for telemetry systems. The amateur service also is allocated in these bands on a secondary basis. Protection of highly sensitive receivers and/or high power transmitters of NASA's deep space network in the adjacent bands may make these bands difficult to

use. Further, as discussed above, commercial sharing with the amateur service may be difficult.

6. The 3650-3700 MHz Band

The 3650-3700 MHz band is used by Navy air traffic control radars on board aircraft carriers and is allocated to a number of different radio services around the world. TIA recommends adopting regulatory or industry receiver standards for the new equipment would enhance band sharing, which NABER supports.

7. The 4635-4660 MHz Band

This band is used for military airborne telemetry and high-powered tropospheric scatter communications systems. Essential Federal airborne operations, however, will be continued for 15 years at three sites and there will be a three-year delay to re-design certain military telemetry systems. Thus, no immediate use of this band can be made by the private services.

8. The 4660-4685 MHz Band

The 4660-4685 band is used for military airborne telemetry and high-powered tropospheric scatter communications systems. According to NTIA, it has potential for a variety of new non-Federal fixed, mobile, and fixed-satellite technologies and associated applications. NABER supports the immediate reallocation of this portion of spectrum.

III. CONCLUSION

While NTIA has proposed the reallocation of 50 MHz of spectrum, a closer review of each band reveals that little immediate benefit will be realized. However, NABER Comments and

the COPE Petition demonstrate the tremendous immediate need for additional spectrum for the private services. Thus, while the Commission should act expeditiously to ensure that the designated spectrum is reassigned for use as soon as possible, it must also realize that what is proposed falls far short from what is needed. Therefore, NABER encourages the Commission and NTIA to continue to work to locate reallocatable spectrum which can provide the real benefits which this proceeding is designed to achieve.

WHEREFORE, the National Association of Business and Educational Radio, Inc. respectfully requests that the Commission act in accordance with the views expressed herein.

Respectfully submitted,

NATIONAL ASSOCIATION OF BUSINESS AND EDUCATIONAL RADIO, INC.

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