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FEDERAL COMMUNICATIONS COMMISSION
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December 10, 1992

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Ms. Donna R. Searcy
Secretary
Federal Communications Commission
1919 M Street, NW
Washington, D.C. 20554

RE: In the Matter of Redevelopment of Spectrum to Encourage Innovation in the Use of New Telecommunications Technologies ET Docket 92-9, RM-7981, RM-8004.

Dear Secretary Searcy:

Enclosed herewith is one (1) original, and 5 (five) copies of our response to the Further Notice of Proposed Rulemaking RM-7981, RM-8004.

Sincerely,

COMSEARCH

Christopher R. Hardy
Manager
Transmission Planning Services

CRH:msw

Enclosure

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FEDERAL COMMUNICATIONS COMMISSION
OFFICE OF THE SECRETARY

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

In the matter of

Redevelopment of Spectrum to Encourage Innovation in the Use of New Telecommunications Technologies	))))	ET Docket No. 92-9 RM-7981 RM-8004

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To: The Commission

COMMENTS OF COMSEARCH

INTRODUCTION

Comsearch hereby respectfully submits these comments in response to the Further Notice of Proposed Rulemaking (FNPRM) in the above captioned proceeding.

As a provider of engineering services to both the common carrier and private microwave industry, Comsearch supports the commissions further efforts at reallocating bands above 3 GHz. We have encouraged the commission since the initial outset of the emerging technologies proceeding to dissolve the distinctions between Private (OF) and Common Carrier (CC) for the purpose of band allocation and to initiate a rechannelization of bands above 3 GHz to support narrowband and wideband operation.

Over the last 2 decades the explosive growth of the microwave and satellite industry, in both size and technology, has surpassed the regulatory framework of current spectrum allocations.

The Commission's FNPRM represents a significant milestone in the course of revamping this framework and setting the stage for improved spectrum efficiency. While we view this as a positive step forward we also recognize certain areas of the FNPRM merit further comment. The focus of our concerns are those areas that could compromise the integrity of systems for either new or incumbent users. We applaud the efforts of the Commission to move quickly in adopting needed changes but emphasize caution in pre-judging the appropriateness of recommendations too quickly and without adequate industry review.

Clarification of Affected Users

The catalyst for this process was the recent decision to reallocate portions of the 2 GHz band to new emerging technologies. As a result of this decision it became necessary to ensure accommodation of displaced users in other bands. It is understood that this was the driving force behind this FNPRM. Since initial discussions of reallocation began it was apparent that the changes proposed would benefit all common carrier and private users and not just those displaced by new emerging technologies. The FNPRM as written implies that relaxation of band qualifications will only affect the potentially displaced 2 GHz users. Further verbal discussions with the Commission staff have indicated that all qualified common carrier and private users will be subject to the relaxed qualifications and new allocations therefore, this point needs to

be clarified in the rulemaking. Our comments assume that all users are included in these changes.

GENERAL DISCUSSION

The goal of reallocating and rechannelizing the frequency bands is to meet the current and future spectrum needs of both common carriers and private users for narrowband and wide band use. Again, this is driven by the need to accommodate displaced 2 GHz users. From a technical view there are numerous channel schemes that could accomplish this goal, each with pluses and minuses. The hidden dangers, and of prime concern to Comsearch, are the regulatory loop holes that could cause the administration and use of any channel scheme to be exploited by one user group at the expense of others. This would be due in part to the relaxing of band qualifications and also to the incompatible confluence of rules regulating common carrier and private users.

WIDEBAND AND NARROWBAND

Allowing wideband and narrowband users to share the same spectrum could result in more complex spectrum management but also in better spectrum efficiency. Without qualifications of use and necessary regulations on sharing, the benefits can be outweighed by the problems created. Overlaying a narrowband channel scheme with a wideband channel scheme could actually lessen spectrum efficiency without proper regulation.

Narrowband channel users allowed to randomly select channels throughout the band could preclude any further wideband growth. If narrowband users are to share wideband spectrum it is imperative that a technique of grouping these channels together be used to minimize the segment of the band affected.

Narrowband users gaining access to wideband spectrum could apply for a much higher channel capacity than required and resell the excess capacity, in essence acting as a common carrier. In the same respect, there is a significant amount of licensed common carrier spectrum does not carry near it's authorized capacity. Both of these scenarios are examples of inefficient spectrum use. Without proper regulation on capacity requirements and periodic justification of unused capacity these are but two of a number of similar scenarios that will tie up needed spectrum.

CHANNEL PLANS

4 GHz

The current industry accepted channel plan in the 4 GHz band consists of interleaved transmit/receive channels with 20 MHz bandwidth. The twenty-four channels are divided into four groups of six designated A,B,C, and D (See Table 1). Typically, frequency groups A and C are transmitted at a given station while frequency groups B and D are received. Alternatively, groups A and D are

TABLE 1

COMMON CARRIER
4 GHz FREQUENCY PLAN

Channel Designation	Channel Center Frequency (mhz)	Channel Designation	Channel Center Frequency (mhz)
	A		B
1	3730	1	3770
2	3810	2	3850
3	3890	3	3930
4	3970	4	4010
5	4050	5	4090
6	4130	6	4170
	C		D
7	3710	7	3750
8	3790	8	3830
9	3870	9	3910
10	3950	10	3990
11	4030	11	4070
12	4110	12	4150
		ORDERWIRE	
13	4190	13	4198

sometimes transmitted while groups B and C are received. Because of the number of existing high capacity 4 GHz microwave systems, it appears desirable if not necessary to make any new narrowband frequency plans compatible with these existing plans.

The Alcatel Petition proposed subdividing the 20 MHz channels into 5 and 10 MHz bandwidths and further subdividing certain channels into narrower bandwidths. In the FNPRM, the Commission imposed transmit/receive frequency pairings on the Alcatel plan. We submit that the subchannelization proposed in the FNPRM can be accomplished, but within the confines of the existing frequency plan.

For example, the narrowband channels, frequencies in the range 3700-3720 (overlapping channel 1C) should be paired with frequencies in the range 4180-4200 (overlapping the orderwire channels). Similarly, frequencies in the range 3720-3740 (overlapping channel 1A) should be paired with frequencies in the range 4160-4180 (overlapping channel 6B). (See Tables 2 and 3) Pairing frequencies from within the C and B groups as proposed by the Commission would result in potential conflicts with both ends of a path in an area where existing paths receive both B and C channels. Conversely, pairing frequencies from within the A and B groups makes sense because existing paths pair frequencies this way, usually on the same polarization.

TABLE 2

400 kHz BANDWIDTH CHANNELS

Transmit (receive) (mhz)	Receive (transmit) (mhz)
3715.2175	4195.2175
3715.6325	4195.6325
3716.0475	4196.0475
3716.4625	4196.4625
3716.8775	4196.8775
3717.2925	4197.2925
3717.7075	4197.7075
3718.1225	4198.1225
3718.5375	4198.5375
3718.9525	4198.9525
3719.3675	4199.3675
3719.7825	4199.7825
3735.2175	4175.2175
3735.6325	4175.6325
3736.0475	4176.0475
3736.4625	4176.4625
3736.8775	4176.8775
3737.2925	4177.2925
3737.7075	4177.7075
3738.1225	4178.1225
3738.5375	4178.5375
3738.9525	4178.9525
3739.3675	4179.3675
3739.7825	4179.7825

800 kHz BANDWIDTH CHANNELS

Transmit (receive) (mhz)	Receive (transmit) (mhz)
3715.425	4195.425
3716.255	4196.255
3717.085	4197.085
3717.915	4197.915
3718.745	4198.745
3719.575	4199.575
3735.425	4175.425
3736.255	4176.255
3737.085	4177.085
3737.915	4177.915
3738.745	4178.745
3739.575	4179.575

TABLE 3

1.6 MHz BANDWIDTH CHANNELS

Transmit (receive) (mhz)	Receive (transmit) (mhz)
3700.84	4180.84
3702.50	4182.50
3704.16	4184.16
3705.84	4185.84
3707.50	4187.50
3709.16	4189.16
3710.84	4190.84
3712.50	4192.50
3714.16	4194.16
3715.84	4195.84
3717.50	4197.50
3719.16	4199.16
3720.84	4160.84
3722.50	4162.50
3724.16	4164.16
3725.84	4165.84
3727.50	4167.50
3729.16	4169.16
3730.84	4170.84
3732.50	4172.50
3734.16	4174.16
3735.84	4175.84
3737.50	4177.50
3739.16	4179.16

5 MHz BANDWIDTHS CHANNELS

Transmit (receive) (mhz)	Receive (transmit) (mhz)
3702.5	4182.5
3707.5	4187.5
3712.5	4192.5
3722.5	4162.5
3727.5	4167.5
3732.5	4172.5

In addition, the 10 MHz frequency pairings should be chosen to be compatible with existing paths in an area. Frequency planners should have the flexibility to pair frequencies from within AC with frequencies from within BD or frequencies from within AD with frequencies from within BC as conditions require.

The transmit to receive separation on a full block 4 GHz path is 20 MHz for cross polarized channels and 40 MHz for co-polarized channels. If the frequency pairs are chosen properly, new 4 GHz paths using only a single frequency pair can use much greater T/R separation (often required by equipment specifications) and still be made compatible with existing systems.

Coordinating new 4 GHz microwave systems with earth station owners is almost always a long, tedious process involving costly RFI measurements and/or field surveys to identify shielding. The time and expense involved may be worthwhile for a carrier proposing a full block system to carry high density traffic. However, it is prohibitive to a carrier needing to quickly implement a low density path - thus the Commission should recognize that while it may make sense to allow narrowband usage at 4 GHz current difficulties in coordinating frequency usage with earth station operators make 4 GHz a poor substitute for the 2 GHz bands. While not impossible, narrowband usage of the 4 GHz band could be difficult and costly to engineer.

LOWER 6 GHZ (5925-6425)

Imposing a new 30 MHz plan on a band with an established 29.65 MHz plan ("T" Plan) seems arbitrary and unnecessary. A new plan based on subdividing the industry "T" plan channels into narrower bandwidths seems more appropriate for compatibility with existing users. Whether the available channel bandwidth is 5 MHz or 4.94 MHz (obtained by dividing a 29.65 MHz bandwidth by 6) does not seem significant. Alcatel states a desire to impose a uniformity of available channel bandwidths so that radio equipment components can be designed to be interchangeable among bands. It appears that equipment designed to use a 9.88 MHz or 4.98 MHz bandwidth at 6 GHz could use a 10 or 5 MHz bandwidth in the other bands.

11 GHz

The 30 MHz plan proposed in the FNRPM has been discussed in the common carrier microwave industry for several years, and several paths have been coordinated using this plan. It should be noted that sixteen of the thirty-two frequencies specified in the 30 MHz plan are also part of either the industry established DE or JP plans. Therefore, a path requiring a single frequency pair can use frequencies that will conform to both the 30 MHz plan and whichever of the 40 MHz plans is predominant in a given area, either DE or LP. However, the frequency pairings shown in the FNPRM will make

this impossible. Frequency planners need the flexibility to pair frequencies in the most suitable manner for a given system.

GRANDFATHERING OF EXISTING SYSTEMS

If the proposed channel plans are to be adopted, allowances must be made to grandfather existing systems. In addition, some provision for further addition to and expansion of existing frequency plans must be included.[1] The capital investment in existing plant is far too extensive to require the wholesale retune of frequencies to allow for the implementation of the new channel plans. A moderate approach is required that would encourage use of the new plans while allowing the continuation of existing frequency plans where necessary. In addition, language needs to be adopted that would allow for unpaired frequency use.[2] This would provide the additional flexibility necessary to initiate the new plans within the framework of the existing environment.

While we promote the opening of the 10 GHz band to point to point users, the proposed grandfathering of existing DTS systems creates potential problems. The omnidirectional nature of a DTS system makes it difficult to share spectrum efficiently with a point to point system. We propose to change the rules to require prior coordination and licensing of DTS end user locations. This will

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[1] See, comments to the Petition for Rulemaking RM 8004, from Harris Corporation, page 8 and TIA, page 2.

[2] See, TIA comments to the Petition for Rulemaking, RM 8004, page 3

provide the required information to conduct interference analysis and lead to more efficient use of the spectrum. Otherwise, point to point users would be precluded from using large portions of the 10.5 GHz spectrum within proximity of DTS systems. Under the current licensing scheme, the DTS user could have one path that would preclude reuse of that frequency within a large area of operation which results in extremely inefficient use of the spectrum.

PRIOR COORDINATION (PCN) PROCESS

The prior coordination process as defined in CFR Part 21.100(d) is essential to the success of any band sharing arrangement. This sentiment was shared by Alcatel in its original petition and by other commenters.[3] As pointed out in the FNPRM the concept of coordination was invoked in the FCC's argument against CTI, MCI and Pactel regarding concerns of sharing and rechannelization of the band being unequitable to common carriers.[4] We agree with the commissions statement that coordination between private and common carriers will facilitate the sharing of the respective bands and

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[3] See, Petition for Rulemaking RM 8004, page 17 and NSMA comments to, page 3.

[4] FNPRM paragraph 19 "We believe that coordination among fixed microwave operations of the two services -- and coordination between these terrestrial users and satellite services -- can enable efficient sharing of these bands. Correspondingly, we believe that coordination among private users and common carriers in the 6 GHz private band can allay Harris' concerns about sharing of this band."

feel that prior coordination as established in Part 21 is the best method to achieve that goal.

The history of the PCN process is important in understanding the need for data exchange between carriers. The prior coordination process was established in 1971 after a large number of common carrier applications were received which were either mutually incompatible or posed potential interference conflicts with the frequency use of the existing wireline carriers. Rather than resort to potential costly and lengthy comparative hearings the commission decided that the proposals could be accommodated by requiring the applicants to minimize interference through proper engineering and prior coordination. During the same period and for similar reasons the Commission decided to make prior coordination of earth stations mandatory. The same potential for numerous incompatible applications will exist when common carriers begin competing for spectrum in the 6 GHz private band. Historically, whenever band sharing has been proposed, prior frequency coordination has been made the requirement. In fact, if the coordination requirements are left as proposed in the FNPRM, the upper 6 GHz band (6825-6875) would be the only rechannelized band not subject to 47 CFR 21.100. Therefore, this requirement should be a logical extension to the opening of the private 6 GHz band to common carrier users.

The Part 21 PCN process promotes spectral efficiency. As concluded in an FCC report[5] the use of prior frequency coordination is not only effective in controlling interference between licensees but creates incentives which encourages licensees to use the spectrum in an economically efficient manner. Results of the study suggest that licensees employing technical flexibility and prior coordination will voluntarily implement spectrum-efficient technology in congested areas where spectrum value is greater.

The Part 21 PCN process facilitates the protection of licensed, applied, and proposed microwave systems. Under the current rules, common carriers send notification of the intended microwave systems to all affected parties. A 30 day coordination period allows any of the affected parties or their designated agents to analyze the proposed systems for interference and technical correctness. This process allows databases to be updated immediately upon receipt of the PCN resulting in timely analysis of potentially conflicting systems. Under Part 94 rules, proposals become available for analysis only after they have appeared on Public Notice. This creates a significant time delay (potentially up to 6 months) between the initial engineering of the system and subsequent analysis and verification by affected parties. This time lag between engineering and FCC Public Notice can and has resulted in unforeseen and unpredicted interference conflicts. Several months

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[5] OPP Working Paper Series, 21. Private Frequency Coordination in the Common Carrier point to point microwave services, 1986.

may transpire before mutually incompatible applications are discovered, resulting in lost time and money. Part 94 rules make no allowances for planned or proposed systems. In the common carrier bands, cellular providers comprise the majority of new low capacity microwave systems. These users have the potential to be the predominant new entrants into the upper 6 GHz private band. Because these systems are developed to interconnect cell site configurations which can typically change rapidly and often, the engineering and coordination of several proposed (either or) paths is often necessary. This allows the microwave interconnect to keep pace with the rapid change and implementation of the cellular design.[6] With the advent of microcell technology, which increases the number of cell sites and possible interconnect configurations, the requirement to protect proposed facilities becomes even more of a necessity.

The competitive nature of the cellular industry requires quick and expedient determination of frequency availability when planning a microwave system. The need for prior coordination is recognized in this process as necessary to safeguard the carriers own operation and to eliminate any concerns or objections by others prior to application submittal.[7] This safeguard which the

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[6] According to McCaw in its Petition for Rulemaking RM 7861 the time from cell site planning to initiation of service for a vast number of cellular filings "may often occur within a matter of weeks -- or even days."

[7] See, McCaw Cellular Petition for Rulemaking RM-7861

cellular provider finds necessary in the common carrier band should be made available in the upper 6 GHz private band.

The Part 21 coordination procedures are perceived by some to be burdensome and costly[8]. We do agree that in the past the time span from initial engineering of a part 21 user to the grant of a license has been unduly long. As outlined in the McCaw Petition for Rulemaking RM 7861 this delay is found not in the coordination process but in the issuance of an application grant which is typically 75 to 95 days from the date of filing. With the transition of the common carrier license processing to Gettysburg, PA the time line from the date of application to grant of a Part 21 user should theoretically be the same as the private Part 94 applicant.[9] Therefore, the only time difference in coordination procedures between the two services is the 30 day coordination period. Part 21 rules specify 30 days as the maximum time that a coordination is required to be on notice, however, allowances are made for prior coordination periods of less than 30 days[10]. In fact many common carrier users verbally coordinate their systems and are able to complete notification and response typically within 5 to 10 days. We believe the 30 day time period specified for both coordination and public notice could be reduced. With today's

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[8] See, UTC comments to the Petition for Rulemaking , RM 8004, page 4 and 5.

[9] CFR Part 94 and CFR Part 21 both specify the same 30 Public Notice period.

[10] CFR Part 21.100 (d)(2)(i)

methods of information transfer (electronic mail and faxes) a shorter time period such as 20 days for each would be reasonable. This would not only benefit existing common carrier users, but would allay private microwave users fears of unnecessary delays. It would accomplish this without sacrificing the many benefits derived from the exchange of data found in the prior coordination process.

It should be noted that in many cases, the time line for installation of a microwave system is more contingent on the procurement of equipment and antennas than on the frequency coordination and licensing process. Private users are routinely told to delay purchasing their equipment until after the 30 day public notice period. This is a function of the data lag created by the lack of a PCN process. Common Carriers on the other hand can, with much more certainty, plan their equipment purchases after the prior coordination process due to the integrity and timeliness of industry databases.

GROWTH FREQUENCIES

The reservation of growth channels is a necessity in the common carrier microwave industry.[11] Most high capacity users do not realize an immediate return on their investment in microwave, rather it may take several years. Without some allowance made for

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[11] See, MCI comments to the Petition for Rulemaking, Rm 8004, Page 5

growth, the economic incentive to build many of these systems would disappear.

The recognition of growth channels within the common carrier industry stems from language found in CFR Part 21.100 (d).[12] Current industry practice is to respect growth channels on previously coordinated or licensed systems during the coordination process, provided the growth appears reasonable and can be avoided without causing undue hardship to the coordinating party. In the event that frequency congestion results in a conflict with a coordinated growth channel, a negotiation develops between the coordinator of the new system and the protection agent or licensee of the existing system and in most cases a settlement is derived. This system of private negotiation has been effective in the past and has helped control the harboring of growth channels in most cases. It seems reasonable to establish specific time intervals for the protection of growth, however due to the diverse nature of the common carrier market this is not an easy task. Long Haul high capacity providers may need to add 2 to 3 channels at any given time to keep up with traffic demands, while a cellular provider may

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[12] Prior frequency coordinations shall be conducted with existing users "whose facilities could affect or be affected by the new proposal in terms of frequency interference or restricted ultimate capacity". In addition, the rules state "Applicants should make every reasonable effort to avoid blocking the growth of systems that are likely to need additional capacity in the foreseeable future." Also coordinations should include "data and information concerning existing or proposed facilities and future growth plans."

need only 1 additional channel over a period of several years. The public interest would be ill served if major Long Haul networks could not reserve spectrum for future capacity requirements. We believe that growth on narrowband channels (10 mhz or less) should be limited since additional capacity could be accommodated by utilizing higher capacity bandwidths. Some justification of capacity requirements needs to be included in the applications otherwise carriers will acquire the least cost higher capacity radios without regard to actual requirements. Perhaps an industry consensus could be found for an upper limitation of time that a growth channel could be protected. This diversity of needs requires that a flexible environment exists which will allow the natural competition within the market place to drive the efficient use of the spectrum.

ANTENNA STANDARDS

The antenna standards (Category A and Category B) in 47 CFR 21.108 (c) and 47 CFR 94.75 (b) were developed more than 10 years ago, before high capacity common carrier bands were congested and prior to major advancements in antenna technology. Current shrouded, high-performance antennas in these bands provide a minimum front-to-back ratio in excess of 65 db. We feel the standards for category A antennas should be updated accordingly, with modification of the values between 100 degrees and 180 degrees. (See Table 4)

The common carrier bands are recognized to be highly congested in most of the contiguous United States. The introduction of hundreds and possibly thousands of Private microwave paths in these bands will certainly exacerbate the congestion problem. Rule parts 47 CFR 21.108 (c) allows licensees to use antennas meeting Category B "...in areas not subjected to frequency congestion..", "...subject to the liabilities in 21.109 (b)". In the common carrier bands there is no clear cut rule or method for determining non-congested areas. Allowing licensees to use category B antennas with the liabilities set forth in 21.109 (b) without defined congested areas will lead to further congestion, requiring new entrants to coordinate around systems

TABLE 4

ANTENNA STANDARDS

Frequency (MHz)	Category	Maximum beamwidth to 3 dB points (Included angle in degrees)	Minimum antenna gain(dBi)	Minimum radiation suppression to angle in degrees from center-line of main beam in decibels: 5° to 10°	10° to 15°	15° to 20°	20° to 30°	30° to 100°	100° to 140°	140° to 180°
2,500 to 5,000	A	n/a	36.0	23	29	33	36	42	**65**	**65**
	B	n/a	36.0	20	24	28	32	32	32	32
5,000 to 10,550	A	n/a	38.0	25	29	33	36	42	**65**	**65**
	B	n/a	38.0	20	24	28	32	35	36	36
10,550 to **11,700**	A	**n/a**	**38.0**	**25**	**29**	**33**	**36**	**42**	**65**	**65**
	B	**n/a**	34.0	20	24	28	32	35	35	39
17,700 to 18,820	A	n/a	38.0	25	29	33	36	42	**65**	**65**
	B	n/a	38.0	20	24	28	32	35	36	36
18,920 to 19,700	A	n/a	38.0	25	29	33	36	42	**65**	**65**
	B	n/a	38.0	20	24	28	32	35	36	36
21,200 to 23,600	A	n/a	38.0	25	29	33	36	42	**65**	**65**
	B	n/a	38.0	20	24	28	32	35	36	36
31,000 to 31,300	n/a	4.0	38.0	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Above 31,300	A	n/a	38.0	25	29	33	36	42	**65**	**65**
	B	n/a	38.0	20	24	28	32	35	36	36

(Bands 932.5 to 935 and 941.5 to 944 not included as no changes are proposed)

Proposal

1. Update where underlined and bold print.
2. Delete 10,550 to 10,680 & 10,700 to 11,700 bands (they have been combined under 10,550 to 11,700).

with sub-standard antenna systems. A detailed definition of congested areas or zones where only category A antennas can be utilized in the common carrier bands needs to be specified. In addition, private microwave congested areas which were developed in 1983 need to be updated to reflect changes in the environment over the past nine years.

ATPC

We are pleased to note that the commission recognizes the use of Automatic transmit power control (ATPC) as a legitimate form of transmitter operation[13]. This recognition, however needs to be clarified through language designed to maximize the potential benefits of ATPC[14]. This includes revising the rules in both Parts 21 and 94 to include a definition of ATPC, to allow for a variable power operation below a transmitter's maximum authorized power, and to relegate the technical process of implementing ATPC to the coordination industry. We endorse the technical guidelines developed by the National Spectrum Managers Associate (NSMA) for the successful deployment of ATPC systems in both the private and common carrier bands.

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[13] FNRPM, paragraph 33

[14] The commissions proposal in paragraph 33 to limit EIRP changes in Part 94 to 3 dB severely limits the advantages gained by the use of ATPC. Nominal transmit powers employed are typically 6 dB to 15 dB below the maximum authorized power.

SUMMARY

Comsearch agrees with the need for rechannelization and the removal of barriers between common carrier and private spectrum use. Each of the channel plans proposed presents its own set of unique potential problems with the existing environment, as discussed. These problems are not technically insurmountable, but their effectiveness will be influenced by the associated regulatory changes for their administration. We feel strongly that the key to success of any band sharing arrangement is the adoption of prior coordination procedures as outlined in CFR Part 21.100(d).

Respectfully Submitted,

COMSEARCH

Prepared by: _____

Christopher R. Hardy

Comsearch
11720 Sunrise Valley Drive
Reston, Virginia 22091