### 2. Long Form Application

After making the required down payment, the winning bidder will be required to file a long form application with the Commission on FCC Form 600.[12] In addition, each winning bidder is required to attach as an exhibit to the Form 600 application a detailed explanation of the terms and conditions and parties involved in any bidding consortia, joint venture, partnership or other agreement or arrangement they had entered into relating to the competitive bidding process prior to the close of bidding. Again, the filing date will be specified by public notice, generally within ten business days after the close of bidding. Application filing and content requirements, waiver procedures, procedures for return of defective applications, procedures for modifying applications, and the general application processing rules will be governed by Part 22 of the Commission's Rules.[13]

### 3. Public Notice and Petition To Deny Procedures

If the Commission determines that the long form application is acceptable for filing, a public notice will be issued announcing this fact. Interested parties will then have thirty days to file petitions to deny. If the Commission denies all petitions to deny, and is otherwise satisfied the applicant is qualified, the license(s) will be granted to the auction winner, which

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[12] Previously, narrowband PCS auction winners were required to file FCC Form 401 for the long form application, but did not have to submit Schedule B to FCC Form 401. If, however, an auction winner proposes to use any portion of the narrowband PCS spectrum to offer service on a private mobile radio service basis, it must overcome the presumption that PCS is CMRS. Such an applicant must attach a certification that it will offer service on a private mobile radio basis as an exhibit to the long form application. The certification must include a description of the proposed service sufficient to demonstrate that it is not within the definition of CMRS. *See* 47 C.F.R. § 20.3. A summary of narrowband PCS forms and fee requirements is attached as Appendix A.

[13] *See* 47 C.F.R. §§ 22.0 *et al.*

must then make full payment of the balance of the winning bid within five business days following award of the license. Grant of the license will be conditioned upon receipt of this payment. If, however, the Commission identifies substantial and material issues of fact in need of resolution, a hearing will be held and parties may submit evidence in written form. Alternatively, the agency may deny an application outright if it determines that an applicant is not qualified and no substantial issue of fact exists concerning that determination.

### 4. Bid Default Penalties

A winning bidder that subsequently fails to remit the required down payment within the prescribed time, fails to pay for the license, or is otherwise disqualified will be assessed a penalty equal to the difference between its high bid and the amount of the winning bid the next time the license is offered by the Commission *plus* an additional penalty of three percent of the subsequent winning bid or three percent of the defaulting bid, whichever is less. Deposits made by defaulting or disqualified auction winners will be held until full payment of the penalty is made. In addition, if a default or disqualification involves gross misconduct, misrepresentation, or bad faith by an applicant, the agency may declare such applicant and its principals ineligible to bid in future proceedings and, if appropriate, may institute proceedings to revoke any existing licenses held by the applicant. In the event that such default or disqualification occurs, the license(s) will be re-auctioned and new parties will be afforded an opportunity to file applications.

## D. Anti-Collusion Regulations

To avoid bidder collusion in the auctions for PCS licenses, the FCC intends to rely both on specific regulations governing the conduct of bidders and on existing Department of Justice ("DoJ") antitrust enforcement mechanisms. Both the FCC and DoJ regulations are based on ensuring the highest level of competition among bidders during the conduct of the auction and among providers in the PCS marketplace after licenses are issued.

### 1. Limitations on Bidders Prior to Filing an FCC Form 175

As the FCC has noted, agreements (including tacit agreements or "understandings") between two or more actual or potential competitors "to submit collusive, non-competitive or rigged bids;" "to divide or allocate territories horizontally in order to minimize competition;" or to "reserve one market for one [competitor] and another for the other" are *per se* violations of the Sherman Act. At the same time, the FCC has explicitly authorized applicants to enter into bidding consortia, which has the overall effect of lessening competition in bidding for authorizations and requires at least some discussions that, in theory, could constitute evidence of potential antitrust violations. There are no hard and fast rules resolving the tension between these conflicting policies.

Any personnel conducting discussions with other potential bidders thus should be sensitized to the following issues that could raise questions under DoJ guidelines. First, under no circumstances should any personnel engage in any conversations with other potential bidders intended to produce a market allocation or division, whether tacit or explicit. Second, bidders should avoid any discussions of global bidding strategy and any

- discussions relating to markets other than the specific market for which a consortium is to be formed. Finally, should a bidder encounter any potential partners who have not been sensitized to antitrust considerations and who mention market activities outside of a potential consortium arrangement, the bidder should advise such individuals that they must not discuss any activities outside of designated markets.

### 2. Limitations on Bidders After Filing an FCC Form 175

In general, the FCC has taken a strong position against allowing discussions that might permit collusive, anticompetitive behavior on the part of applicants. While the FCC has stated its intent to rely primarily on existing antitrust laws and rules, the FCC has established regulations specifically targeted at preventing bidding collusion, including disclosure certifications, limitations on entering into agreements or arrangements subsequent to the filing of the Form 175, and a general prohibition on collusion during the auctions. Under this scheme, formation of bidding consortium prior to the filing of the Form 175 is permitted, subject to disclosure, but generally no discussions are permitted after the filing of the Form 175.

The FCC has, however, relaxed its rules in two respects to permit auction participants to discuss post-short form consortia or equity investments that do not alter control of the bidder under certain circumstances. First, bidders can discuss consortium arrangements and equity investments between applicants if and only if the applicants are not bidding against each other in *any* of the same markets. Thus, if Applicant A is registered to bid only Markets X and Y and Applicant B is registered to bid only on Markets Y and Z, A and B

cannot discuss or form a consortium to bid on Markets X, Y, or Z. If Applicant B was registered to bid only on Market Z, however, A and B could discuss the formation of a consortium in Markets X, Y, or Z.

Second, the FCC will permit holders of non-controlling attributable interests in an applicant to form agreements with other applicants if and only if the attributable interest holder certifies to the Commission that it has observed and will observe certain restrictions on communication concerning the applicants in which it holds an attributable interest or with which it has entered into a consortium arrangement.[14] In particular, the attributable interest holder must certify that it has not communicated and will not communicate with the applicant or anyone else, concerning the bids or bidding strategies (including which licenses an applicant will or will not bid on) of more than one applicant for licenses in the same geographic area in which it holds an ownership interest or with which it has a consortium arrangement.

### 3. Consequences of Failing To Comply With Anti-Collusion Requirements

In the FCC's original competitive bidding order, it indicated that, where allegations of collusion are made in the petition to deny process, the "Commission may conduct an investigation or refer such complaints to the United States Department of Justice for investigation." Bidders who are found to have violated the antitrust laws or the Commission's rules in connection with participation in the auction process "may be subject to

[14] Although the order adopting this exemption to the anticollusion rules purports only to modify the bidding regulations for broadband PCS, the exemption is codified in the general bidding regulations in Part 1 of the Commission's rules.

forfeiture of their down payment or their full bid amount, revocation of their license(s), and may be prohibited from participating in future auctions."

## E. Special Provisions Relating to Designated Entities

The FCC has created preferences to assist small businesses and businesses owned by women and minorities, collectively referred to as "designated entities,"[15] in attracting the capital necessary to obtain a narrowband PCS license. Designated entities are groups that Congress has identified as facing particular obstacles to PCS license ownership. The procedures were designed to ensure that designated entities are "given the opportunity to participate in the provision" of PCS services, as Congress directed in Section 309(j)(4)(D) of the Communications Act of 1934, as amended.[16]

### 1. Who Qualifies as a Designated Entity

In the narrowband PCS auctions, preferential treatment will be given to qualifying small businesses and businesses owned by women or minorities. In order to qualify for treatment as a designated entity, however, applicants must comply with regulations governing the level of equity and voting rights individual designated entities hold within a corporate structure. Central to the FCC's regulations are the concepts of "affiliation" and "control groups." Affiliation rules ensure that otherwise non-qualifying companies do not create sham corporations to obtain designated entity benefits. The control group rules, on balance, permit

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[15] Unlike in the broadband PCS auctions, no "designated entity" preferences are provided for rural telephone companies in narrowband PCS bidding.

[16] *See* 47 U.S.C. § 309(j)(4)(D).

investments in designated entities by outside parties that would not qualify for treatment as designated entities while ensuring that control of the applicant remains in the hands of qualified designated entities. The regulations governing control groups are similar to, but not identical with, the regulations governing broadband PCS applicants. These regulations are also quite complex in some cases, and applicants are strongly advised to seek counsel in any case not squarely addressed by the FCC's regulations.

#### *a. Small Businesses*

Small businesses are categorized as designated entities because those businesses are at a disadvantage in competing against companies with larger gross revenues. For a small business to qualify for preferential treatment as a designated entity,[17] the applicant, including attributable investors and affiliates, must: (1) have average gross revenues for the three preceding years not in excess of $40 million, and (2) have no individual attributable investor or affiliate with $40 million or more in personal net worth. The FCC also allows a consortium of small businesses to qualify for any of the measures adopted to enhance the bidding position of designated entities. A consortium is a conglomerate organization formed as a joint venture among mutually-independent business firms. A consortium of small businesses may qualify for the preferences available to a small business if each business within the consortium individually satisfies the definition of a small business designated entity. Thus, the consortium itself need not meet the established definition criteria.

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[17] A different standard was used, however, in the nationwide auctions.

The control group and attribution rules discussed in Section III(C)(3) will govern whether an entity qualifies as a small business. It should be noted, however, that the gross revenues of each member of the control group and each member's affiliates will be counted toward the $40 million gross revenues threshold, regardless of the size of each member's total interest in the applicant. Moreover, the $40 million personal net worth limitation will apply to each member of the control group.

#### *b. Women and/or Minority Owned Businesses*

Women and/or minority owned businesses have been given designated entity status due to discriminatory lending experiences as well as the great financial resources believed to be required by PCS applicants. The FCC presents two options, summarized in Table 5, under which firms that are not wholly-owned by women and/or minorities can qualify for designated entity treatment. Under the first option, the minority and/or women control group must: (1) control the applicant; (2) own at least 50.1 percent of its equity; and (3) in the case of corporate applicants, hold at least 50.1 percent of the voting stock. Thus, other non-qualifying investors may own as much as 49.9 percent of passive equity interest.[18] As a second option, subject to the rules on control groups, a women or minority owned firm may sell up to 75 percent of the company's equity, provided that no single investor holds 25 percent or more of the firm's passive equity.

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[18] *See* Section III(E)1)(c) (defining "passive equity" for the purposes of these regulations).

| TABLE 5: CONTROL OPTIONS TO QUALIFY FOR TREATMENT AS A WOMEN-OWNED OR MINORITY-OWNED FIRM | | |
|---|---|---|
| Investor Type | Equity Stake | Voting Stake |
| Option 1: Standard Control Group Option | | |
| Designated Entity Control Group | At least 25% | At least 50.1% |
| Attributable Non-Designated Entity Investor (per investor) | Up to 25% | Up to 15% |
| Option 2: 50.1 Percent Equity Option | | |
| Designated Entity Control Group | At least 50.1% | At least 50.1% |
| Attributable Non-Designated Entity Investor (per investor) | Up to 49.9% | Up to 15% |

### *c. "Control Groups" and Passive Equity Arrangements*

Under certain circumstances, passive investments in an applicant by entities that do not themselves qualify for special treatment will not disqualify the applicant from treatment as a designated entity. In order to assure that designated entity benefits flow to the intended recipients, however, the FCC has strictly limited such passive investments to circumstances where the applicant has a "control group" consisting of one or more individuals or entities that: (1) controls the applicant; (2) holds at least 25 percent of the equity; and (3) for corporations, holds at least 50.1 percent of the voting stock. If an applicant has a control group meeting these criteria, then investments by parties outside the control group are not disqualifying unless the investor holds 25 percent or more of the applicant's passive equity. For women-owned or minority-owned firms, the entire control group must be qualifying women or minorities. Similarly, for small business firms, the gross revenues, total assets, and the personal net worth of each member of the control group, as well as of each

member's affiliates, are counted toward the financial caps. Winning bidders must identify the members of their control group on their long form application.

For the purpose of these regulations, passive equity is defined to include limited partnership interests, non-voting stock interests, or voting stock interests of 15 percent or less of the issued and outstanding stock. For partnerships, passive equity investment means limited partnership interests that do not have the power to exercise control over the applicant. The control group must hold all general partnership interests and describe a means of ensuring control on the long form application.[19] In the case of a corporation, whether publicly traded or non-publicly traded, a passive equity investor means an investor who holds only non-voting stock or a *de minimis* amount of voting stock that includes no more than 15 percent of the voting interests. The 25 percent passive equity limitation applies even if different classes of stock are held.

In addition to the limitations set forth above for financial ownership and control of designated entities bidders, the FCC has adopted several other requirements concerning the flow of financial benefits. Control group members must generally be entitled to *pro rata* shares of financial benefits. There are also some specific requirements, depending upon whether the applicant is a corporation or a partnership.

For corporations, at least 50.1 percent of the dividends paid on the voting stock must be paid to the applicant's control group members. Control group members also must be entitled to receive 100 percent of the value of each share of stock in their possession. Similarly, in the case of dissolution or liquidation of the corporation, the control group must

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[19] One means of ensuring control, for example, might be a voting trust agreement.

be entitled to receive at least 25 percent of the retained earnings of the concern, and 100 percent of the value of each share of stock in their possession.[20]

Partnerships and other non-corporate entities are subject to similar requirements. The indicia of ownership the FCC will consider in non-corporate cases include, but are not limited to:

(a) the right to share in profits and losses *pro rata*;

(b) the right to receive assets or liabilities *pro rata* upon liquidation; and

(c) the absence of opportunity to dilute the interests of designated entities, through capital calls or otherwise.

The goal is to ensure that the economic benefits generated by the rules governing the entrepreneurs' blocks actually flow to designated entities.

### 2. Affiliation

#### *a. In General*

In order to prevent entities that do not meet the size standards from receiving benefits targeted to the smaller designated entities, the FCC has adopted specific affiliation rules. Entities are affiliates of each other when, either directly or indirectly: (1) one firm controls or has the power to control the other, or (2) a third party or parties controls or has the power

[20] This requirement is subject to any applicable laws requiring debt to be paid before distribution of equity.

to control both. This control may be direct or indirect, and may be affirmative or negative, and it is immaterial whether control is exercised as long as the power to control exists.[21]

Ownership interests are calculated on a cumulative, fully-diluted basis. "Fully-diluted" means that agreements such as stock options, warrants, and convertible debentures will be considered as having a present effect and treated as if the rights thereunder have been fully exercised.[22] These agreements, however, may not be used to provide an appearance of divestiture or termination of ownership interests before such actual occurrence.

#### *b. Directors, Officers, Key Employees, and Management*

Affiliations may also arise where attributable investors or control group members of the applicant serve as directors, officers, or other key employees of another concern.[23] Affiliation arises if such persons represent either a majority or controlling element of another concern's board of directors and/or management. Thus, if a person with an attributable interest in a PCS applicant, through his or her other key employment positions or positions on the board of another firm, controls that other firm, then the other firm will be considered an affiliate of the applicant. If a director or officer does not control the applicant or otherwise have an attributable interest in the applicant, his or her outside affiliations will not

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[21] An example of negative power to control is 50 percent ownership of voting interests in a concern, which is sufficient to block any stockholder actions.

[22] The FCC will consider departing from the requirement that the equity of investors in minority and/or women owned businesses must be calculated on a fully-diluted basis only upon a demonstration, in individual cases, that options or conversion rights held by non-controlling principals will not deprive the minority and/or women principals of a substantial financial stake in the venture or impair their rights to control the designated entity.

[23] A key employee is one who, because of his/her position in the concern, has a critical influence in or substantive control over the operations or management of the concern.

be considered. Control may also arise through management positions where a concern's voting stock is so widely dispersed that no effective control can be established.

### c. *Identity of Interest*

Affiliation can arise where parties have an identity of interest between or among themselves. For example, affiliation can arise between or among members of the same family or persons with common business interests. All financial interests of an applicant's spouse are attributed to the applicant unless they are recognized as legally separated by a court of competent jurisdiction in the United States. If legally separated, only the applicant's half of jointly-held property is attributed.

Other immediate family members are presumed to have an identity of interest.[24] However, this presumption is rebuttable by showing that the family members are estranged, that family ties are remote, or that family members are not closely related in business matters.

Finally, an identity of interest may arise among persons with common investments. For example, if two persons own stock in a corporation, and also have attributable interests in an applicant, their stock will be treated as if owned by one party and considered affiliated if together they would be a controlling interest. Parties with an identity of interest are treated as one person for the purposes of determining control.

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[24] The definition of immediate family is taken from the Small Business Administration rules. "Immediate family members" means father, mother, husband, wife, son, daughter, brother, sister, father-in-law, mother-in-law, son-in-law, daughter-in-law, brother-in-law, sister-in-law, step-father, step-mother, step-son, step-daughter, step-brother, step-sister, half-brother, and half-sister. *See* 13 C.F.R. § 124.100.

### *d. Stock Ownership*

Affiliation through stock ownership is also possible, where an applicant has: (1) control or the power to control 50 percent or more of the concern's voting stock; or (2) controls or has the power to control a block that is large relative to any other outstanding block of stock. Moreover, minority stock holdings are presumed to be controlling where two or more minority stockholders have approximately equal-sized holdings and those holdings, in the aggregate, are large relative to other stockholdings in the concern.

### *e. Trusts*

Stock interests held in trusts are attributed to any person who: (1) holds or shares the power to vote such stock; (2) has the sole power to sell such stock; (3) has the right to revoke the trust at will; or (4) has the right to replace the trustee at will. Stock interests held in trust may also be attributed to the grantor or beneficiary where there is an extra-trust business, familia, or personal relationship between the trustee and either the grantor or the beneficiary. Additionally, voting trusts cannot separate voting power from beneficial ownership of voting stock if the primary purpose of the separation is to meet size eligibility rules.

### *f. Waiver of Affiliation*

The FCC will not construe affiliation rules in a manner that causes the interests of passive investors to be attributed so long as the requirements of the attribution rules are met.

#### *g. Management Agreements and Joint Marketing Agreements*

Licensees should also be aware that in some circumstances, management agreements and joint marketing agreements may create *de facto* ownership interests that are attributable for purposes of the FCC's designated entity qualifying rules and the license cap. In general, a management agreement or joint marketing agreement will create an attributable interest by the system manager or joint marketer if the entity is involved in the setting of prices, terms, or conditions of service. Because these rules are subject to interpretation on a case by case basis, licensees are advised to seek advice from FCC counsel prior to entering into management agreements or joint marketing agreements that contemplate substantial involvement by an outside party.

### 3. Controlling Abuse

Procedural mechanisms have been adopted to ensure that the eligibility of bidders and recipients is *bona fide*. First, the FCC will conduct random audits before the auctions and during the initial ten-year license period to ensure compliance with its guidelines. Second, if individuals or firms attempt to circumvent the FCC guidelines described herein, the FCC may force divestiture of such improper interests. If the abuse is severe, where appropriate, the FCC will issue forfeitures or revoke licenses. The FCC is committed to ensuring that women, minorities, and small businesses are given the opportunity to be active entrepreneurs and not merely fronts for other entities.

### 4. Preferences

#### *a. Reduced Upfront Payments*

The FCC will reduce the standard upfront payment of $0.02/MHz/POP to $0.015/MHz/POP for qualifying designated entities. This 25 percent discount should facilitate auction participation by capital-constrained companies and permit them to conserve resources for infrastructure development after winning a license while still discouraging insincere bids.

#### *b. Installment Payments*

Installment payments are available to small businesses, including those owned by women and minorities, for any of the BTA, MTA, or regional narrowband licenses. The installment payment option was not available for national licenses. Under the installment plan, small businesses may pay for their winning bids in installments over ten years. The interest rate is set equal to the ten-year U.S. Treasury note rate, and only interest payments are required during the first two years. Principal and interest are amortized over the remaining eight years. Both the upfront payment and the down payment must be paid in full. Half of the down payment (10 percent of the winning bid, less the upfront payment) is due five days after the auction closes and the other half five days after the application is granted. Timely payments of all installments will be a condition of the license grant to the specified designated entities, and failure to make such timely payment is grounds for license termination.

### c. *Bidding Credits*

The FCC has adopted bidding credit plans for designated entities who bid on specified channels. In the nationwide auction, women and minority-owned applicants were given a 25 percent credit. In the regional license auction, this credit was increased to 40 percent. The rationale behind the bidding credit is that the credit will function as a discount on the bid price a firm will actually have to pay to obtain a license, and thus will address directly the financing obstacles encountered by these entities. As discussed in Section III(C)(2), however, to ensure that bidding credits benefit the parties to whom the credits are directed, however, the FCC has adopted strict repayment penalties.

### d. *Tax Certificates*

As a means for attracting investors to designated entity enterprises and to encourage licensees to assign or transfer control of licenses to designated entities in post-auction transactions, the FCC has implemented a tax certificate program.[25] The tax certificate program entitles licensees and investors meeting the requisite criteria to defer gain realized upon a sale in two ways. The licensees or investors receiving the tax credit can defer gain by: (1) treating it as an involuntary conversion under 26 U.S.C. § 1033, with the recognition of gain avoided by the acquisition of qualified replacement property; (2) electing to reduce the basis of certain depreciable property; or (3) both. Tax certificates will be available both to initial investors in minority and women owned businesses who provide

[25] Entities seeking to make use of tax certificates should be aware that there is a bill pending before Congress that would eliminate the FCC's authority to issue tax certicates to designated entities.

"start-up" financing for acquisition of licenses at auction or in the post-auction market and investors who purchase interests within the first year after the license issuance, allowing for the stabilization of the designated entities' capital base. In addition, the FCC will issue tax certificates to PCS licensees in any frequency block that assign or transfer control of their licenses to minority and/or women owned entities.

Under this tax certificate policy, the entity in which the investment is made must satisfy the definition of women or minority owned businesses at the time of the original investment as well as after the investor's shares are sold. For post-auction market sales, tax certificates will be issued only to licensees that sell to entities that meet the definition. In general, tax certificates will be granted only upon completion of the sale.[26]

In order to prevent "sham" arrangements to obtain tax certificates, the FCC has imposed a one-year holding requirement on the transfer of control or assignment of PCS licenses by women and/or minority owned businesses that obtain such licenses through the benefit of tax certificates. An exception to this holding requirement, however, is that the FCC will permit the assignment or transfer of control of licenses during this period to other qualified minority and/or women owned businesses. An assignee or transferee who receives this license before the end of the original one-year holding period will be subject to a new one-year holding period requirement running from the date of consummation of the assignment or transfer.

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[26] Parties may, however, request a declaratory ruling from the Commission regarding the tax certificate consequence of prospective transactions.

### 5. Entrepreneurs' Blocks

Due to its experience as the narrowband PCS auctions have unfolded, the FCC has proposed additional designated entity benefits for the MTA and BTA auctions. In brief, the FCC proposes to reserve four of the six MTA frequency blocks (channels 19, 21, 22, and 24) and both BTA frequency blocks (channels 25 and 26) for "entrepreneurs." To qualify for bidding as an entrepreneur in these blocks, a company must have annual gross revenues of less than $125 million and total assets of less than $500 million. In addition to certain benefits to be accorded simply due to entrepreneurial status, the FCC would grant special preferences to qualifying small businesses, women-owned businesses, and minority-owned businesses. These proposed benefits are summarized in Table 6:

TABLE 6: PROPOSED BIDDING PREFERENCES IN ENTREPRENEUR'S BLOCKS

| Bidder Class | Bidding Credit | Installment Payment Terms | Tax Certificates for Investors |
|---|---|---|---|
| Entrepreneur | 0 | Interest only for 1 year<br>Rate equal to 10 year Treasury-note rate + 2.5%<br>Additional qualifying restrictions may apply to BTA markets | No |
| Small Business | 10% | Interest only for 2 years<br>Rate equal to 10 year Treasury-note rate + 2.5% | No |
| Women-Owned or Minority-Owned Business | 15% | Interest only for 3 years<br>Rate equal to 10 year Treasury-note rate | Yes |
| Women-Owned or Minority-Owned Small Business | 25% | Interest only for 5 years<br>Rate equal to 10 year Treasury-note rate | Yes |

The FCC has also proposed modifications to the band plan that would increase the size of some of the license areas, as well as certain conforming changes to the penalty provisions for license transfers from bidders benefiting from the entrepreneurs' block proposals.

# IV. 900 MHz NARROWBAND PCS TECHNICAL RULES

## A. Power Limits

The narrowband PCS rules are intended to provide licensees with a significant degree of flexibility to implement technically innovative services. Mobile and portable units are authorized to operate at up to 7 Watts e.r.p. In addition, to promote use of the 901-902 MHz band for "quiet" talk-back or mobile operations, all stations in that band are constrained to operate at the 7 Watt mobile limit. For base station transmitters in other bands, licensees are authorized to operate at up to 3500 Watts e.r.p. However, as discussed below, near the border of market areas, a height/power reduction table and other power limits are imposed to ensure non-interference with co-channel licensees in adjacent market areas.[27] Power levels must be expressed in terms of the maximum power, averaged over a 100 millisecond interval, when measured with instrumentation calibrated in terms of an rms-equivalent voltage with a resolution bandwidth equal to or greater than the authorized bandwidth.

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[27] Additional limitations exist on certain channels due to international coordination requirements. *See* Section VI(E).

## B. Authorized Bandwidth and Emissions Limits

Narrowband PCS licensees are required to attenuate their emissions below the transmitter power (P) outside their licensed frequency block to avoid interfering with adjacent channel licensees.[28] The degree of attenuation, however, is different depending upon the authorized bandwidth of the licensee and the displacement from the edge of the authorized bandwidth (the frequency displacement or $f_d$ in kHz). The Commission has also retained the discretion to require a greater attenuation if harmful interference occurs.

For narrowband PCS channels of 12.5 kHz with an authorized bandwidth of 10 kHz, licensees must attenuate their signals by:

| TABLE 7a: ATTENUATION FOR $\leq$10 kHz AUTHORIZED BANDWIDTH | |
|---|---|
| Displacement frequency | Minimum attenuation required |
| $0 \leq f_d \leq 20$ kHz | The lesser of:<br>$116 \text{ Log}_{10}((f_d+5)/3.05)$ dB,<br>$50 + 10 \text{ Log}_{10}(P)$ dB, or<br>70 dB. |
| $f_d > 20$ kHz | The lesser of:<br>$43 + 10 \text{ Log}_{10}(P)$ dB, or<br>80 dB |

For narrowband channels of 50 kHz, and blocks of aggregated channels, the authorized bandwidth is a maximum of 5 kHz less than the total aggregated channel width

[28] Transmitters are also subject to a frequency stability requirement. *See* 47 C.F.R. § 24.135.

(*e.g.*, 45 kHz for a 50 kHz channel, 95 kHz for a 100 kHz channel). Licensees of these channels attenuate their signals by:

| TABLE 7b: ATTENUATION FOR >10 kHz AUTHORIZED BANDWIDTH | |
|---|---|
| Displacement frequency | Minimum attenuation required |
| $0 \leq f_d \leq 40$ kHz | The lesser of:<br>$116 \text{ Log}_{10}((f_d+10)/6.1)$ dB,<br>$50 + 10 \text{ Log}_{10}(P)$ dB, or<br>70 dB. |
| $f_d > 40$ kHz | The lesser of:<br>$43 + 10 \text{ Log}_{10}(P)$ dB, or<br>80 dB |

In determining minimum attenuation, licensees are required to use a minimum spectrum analyzer resolution bandwidth of 300 Hz. Licensees may express emission power as either an average or a peak value, as long as the same parameters are used for transmitter power.

## C. Coexisting With Other PCS Users

As noted in Section IV(A), base stations in the 930-931 MHz and 940-941 MHz band are subject to height and power limitations and minimum co-channel base station separation to ensure non-interference with co-channel licensees in adjacent market areas.[29] Generally, base station transmitters are authorized to operate at up to 3500 Watts e.r.p. However, in areas located between 200 kilometers (124 miles) and 80 kilometers (50 miles) of a border, the following height/power reduction table is used:

[29] Base stations in the 901-902 MHz band are absolutely limited to 7 Watts ERP. *See* Section IV(A).

| TABLE 8: NARROWBAND PCS HEIGHT/POWER REDUCTION TABLE | |
|---|---|
| Antenna HAAT in meters (feet) | Effective Radiated Power (Watts) |
| 183 (600) and below | 3500 |
| 183 (600) to 208 (682) | 3500 to 2584 |
| 208 (682) to 236 (775) | 2584 to 1883 |
| 236 (775) to 268 (880) | 1883 to 1372 |
| 268 (880) to 305 (1000) | 1372 to 1000 |
| 305 (1000) to 346 (1137) | 1000 to 729 |
| 346 (1137) to 394 (1292) | 729 to 531 |
| 394 (1292) to 447 (1468) | 531 to 387 |
| 447 (1468) to 508 (1668) | 387 to 282 |
| 508 (1668) to 578 (1895) | 282 to 206 |
| 578 (1895) to 656 (2154) | 206 to 150 |
| 656 (2154) to 746 (2447) | 150 to 109 |
| 746 (2447) to 848 (2781) | 109 to 80 |
| 848 (2781) to 963 (3160) | 80 to 58 |
| 963 (3160) to 1094 (3590) | 58 to 42 |
| 1094 (3590) to 1244 (4080) | 42 to 31 |
| 1244 (4080) to 1413 (4636) | 31 to 22 |
| Above 1413 (4636) | 16 |
| See §24.53 for HAAT calculation method. For heights between listed values, linear interpolation should be used to calculate the maximum power limit. | |

In areas located less than 80 kilometers (50 miles) from the licensed service area border, base station effective radiated power must be limited in accordance with the following formula:

$$PW = 0.0175 \times d_{km}^{6.6666} \times h_m^{-3.1997}$$

where PW is effective radiated power in Watts; $d_{km}$ is distance to the border in kilometers, and $h_m$ is the antenna HAAT in meters.[30]

Licensees are also required to adhere to a minimum co-channel separation of 113 kilometers (70 miles) from transmitters in adjacent market areas. This co-channel separation is not required, however, in cases where the licensee has obtained written consent from the licensee in the adjacent market area.

## D. Coordination in Canadian and Mexican Border Areas

PCS licensees operating in border areas should be aware that their operations may be subject to prior coordination obligations. At the time of publishing, however, no international coordination agreements have been reached with Mexico relating to usage of the PCS bands. Accordingly, while PCS licensees are free to deploy transmitters near the Mexican border, their operations are unprotected from interference caused by Mexican radio sources. The United States has been attempting to obtain some form of agreement with Mexico that would provide for the coordinated use of PCS spectrum in Mexican border areas.

Deployment of narrowband PCS systems in Canadian border areas is currently governed by an interim sharing arrangement and a bilateral agreement entitled *Coordination and Use of Radio Frequencies Above 30 Megacycles per Second* (Oct. 1962). Under the

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[30] *See* § 24.53 for HAAT calculation method.

interim sharing arrangement, no restrictions are placed on the 11 authorized nationwide channels. As shown in Table 9, however, there are restrictions on the use of some Regional, MTA, and BTA channels, especially in the Buffalo region.

| TABLE 9: CHANNEL AVAILABILITY IN CANADIAN BORDER AREAS ("√" = Available; "X" = Use Restricted In Region) | | | | | |
|---|---|---|---|---|---|
| Channel Number | Subchannel 1 Center (MHz) | Subchannel 2 Center (MHz) | General Border Use Plan | Buffalo/ Toronto Area | Detroit/ Windsor Area |
| 50 kHz/50 kHz Regional Channels | | | | | |
| 12 | 940.275 | 901.275 | √ | √ | √ |
| 13 | 940.325 | 901.325 | √ | X | √ |
| 50 kHz/12.5 kHz Regional Channels | | | | | |
| 14 | 930.575 | 901.78875 | √ | √ | √ |
| 15 | 930.625 | 901.80625 | √ | √ | √ |
| 16 | 930.675 | 901.81875 | √ | √ | √ |
| 17 | 930.725 | 901.83125 | √ | √ | √ |
| 50 kHz/50 kHz MTA Channels | | | | | |
| 18 | 940.375 | 901.375 | X | X | √ |
| 19 | 940.425 | 901.425 | X | X | √ |
| 50 kHz/12.5 kHz MTA Channels | | | | | |
| 20 | 930.775 | 901.84375 | √ | X | √ |
| 21 | 930.825 | 901.85625 | X | X | √ |
| 22 | 930.875 | 901.86875 | X | X | √ |
| 50 kHz Unpaired MTA Channels | | | | | |
| 23 | 940.925 | n/a | √ | √ | √ |
| 24 | 940.975 | n/a | √ | X | √ |
| 50 kHz/12.5 kHz BTA Channels | | | | | |
| 25 | 930.925 | 901.88125 | X | X | √ |
| 26 | 930.975 | 901.89375 | X | X | √ |
| 12.5 kHz Response Channels | | | | | |
| A | 901.90625 | n/a | √ | √ | √ |