

services. ArrayComm respectfully submits that the commercially and technically correct set of guiding regulatory principles here is as follows.

First, in-band emissions limits should be set in consideration of coordination requirements at license boundaries and RF safety issues. Second, out-of-band emissions requirements should be set in consideration of the general protection requirements of adjacent band systems. Third, in the case of adjacent band systems with relatively sparse deployments and exceptional protection requirements — as with the radioastronomy and radiosonde systems to be discussed below — appropriate protection and out-of-band emissions requirements should be applicable only at the protected sites.

Requiring each piece of equipment in a 1670-1675 MHz commercial system to provide exceptional out-of-band protection at all locations and at all times, regardless of whether there is adjacent band equipment in the vicinity requiring such protection, places an unreasonable burden on the commercial operator that benefits no one. ArrayComm submits that rules should be developed according to the principles above, thereby guaranteeing coordination, safety and protection, but that the license holder should otherwise be given maximum flexibility in selecting the technical measures it will employ to meet them.

**A. General Technical Rules (RF Emissions, Equipment Authorization, Frequency Stability)**

As stated earlier in these Comments, ArrayComm supports the Commission's general proposal to apply its Part 27 rules to the 1670-1675 MHz band. In the *Reallocation NPRM*, the Commission specifically proposes to apply certain technical provisions of Part 27 to this band.<sup>66</sup> ArrayComm supports the application of these Part 27 provisions with two significant exceptions.

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<sup>66</sup> *Reallocation NPRM* ¶ 97.

First, with respect to routine environmental evaluations,<sup>67</sup> commercial operations in the 1670-1675 MHz band should be subject to the same threshold levels as Broadband PCS. Although the Broadband PCS threshold levels are less restrictive than the Wireless Communications Services levels, the safety of the Broadband PCS levels has been established through thousands of commercially operating Broadband PCS sites. The Commission should therefore adopt the less restrictive threshold levels in the interests of reducing the regulatory burden on commercial services in the 1670-1675 MHz band, and thereby hastening the availability of consumer services in the band.

Second, with regard to the applicability of Section 27.63 of the Commission's rules — Disturbance of AM Broadcast Station Antenna Patterns — to the 1670-1675 MHz band, ArrayComm has researched the proceeding leading up to *the Part 27 Order*, the apparent genesis of Section 27.63,<sup>68</sup> but was unable to discern the motivation for that rule in the record. Section 27.63 should only be applicable to operations in the 1670-1675 MHz band if there is a valid technical concern that such operations might disturb AM broadcast station antenna patterns. Otherwise, Section 27.63 should not be applied to 1670-1675 MHz operations because it results in additional coordination burdens for licensees without a corresponding benefit.

#### **B. In-Band Emission Limits**

The Commission seeks comment on the appropriate technical restrictions for in-band, or co-channel, interference.<sup>69</sup>

ArrayComm supports the Commission's proposal to use field strength limits at license boundaries to limit co-channel interference.<sup>70</sup> Field strength limits, as opposed to coordination

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<sup>67</sup> 47 C.F.R. §1.1307, Table 1; 47 C.F.R. § 27.52.

<sup>68</sup> 47 C.F.R. § 27.63.

<sup>69</sup> *Reallocation NPRM* ¶ 98.

requirements, can be unilaterally predicted and verified by a commercial operator even for multicell deployments, which is especially important with cellular infrastructures where an operator may have multiple sites located along a license boundary. Field strength limits have proven to be adequate in the PCS service.

A field strength limit of 47 dBuV/m is appropriate for the 1670-1675 MHz band.<sup>71</sup> This is equivalent to a -95 dBm signal level at the output port of an omnidirectional antenna, and is therefore close to the receiver sensitivities of a wide range of commercial cellular devices. It thereby provides a balance of acceptable service at the boundary while limiting excessive emissions across it. In the case of fixed services, where directional antennas are typically used on both ends of the radio link, the antennas of each operator's customers will be focused at their serving base station, and vice-versa, further mitigating the effects of emissions from systems on the other side of a license boundary.

The Commission also asks if power or antenna height limits are necessary or appropriate to effect coordination.<sup>72</sup> ArrayComm has most recently proposed in-band emissions limits of 2 kW EIRP for base equipment and 4 W EIRP for mobile equipment.<sup>73</sup> These emissions limits enable, among other things, the delivery of wide-area broadband data services including high uplink data rates. They stand midway between the Broadband PCS limits of 1640 W EIRP base and 2 W EIRP mobile,<sup>74</sup> and the WCS limits of 2 kW EIRP base and 20 W EIRP mobile at 2.3

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<sup>70</sup> *Reallocation NPRM* ¶¶ 99, 101.

<sup>71</sup> *Reallocation NPRM* ¶ 102.

<sup>72</sup> *Reallocation NPRM* ¶ 104.

<sup>73</sup> ArrayComm ET 00-221 Reply Comments, Appendix, Section XX.13. In its original comments, ArrayComm had proposed 1640 W EIRP base and 4 W EIRP mobile in-band limits as noted in the *Reallocation NPRM* at paragraph 113.

<sup>74</sup> 47 C.F.R. § 24.232.

GHz.<sup>75</sup> As such, they are wholly consistent with the rules applied by the Commission to other wide-area cellular services from the perspectives of both coordination and RF safety.

At license boundaries, operators should be allowed the flexibility to use all technical tools at their disposal to meet the boundary emissions requirements. These tools would certainly include the limiting of EIRP's and antenna heights, but, with clearly stated boundary emissions requirements, there should be no need for the Commission to specify in advance the tools that the operator should employ, which might also include guardbands, for example. Should the Commission decide that antenna height limits are required, however, those appearing in the Broadband PCS rules,<sup>76</sup> suitably adjusted for any difference in EIRP limits adopted for the instant spectrum, would be appropriate.

**C. Out-of-Band Interference Control and Technical Restrictions for the 1670-1675 MHz Band**

The Commission also seeks comment on which out-of-band emission limits are appropriate for the 1670-1675 MHz band.<sup>77</sup> As stated *supra*, ArrayComm has proposed in-band per-carrier peak emissions limits of 2 kW EIRP for base operations and 4 W EIRP for mobile operations.<sup>78</sup> Compliance with these measurements can be directly verified through measurement of the in-band per-carrier power generated by a device at the input to its antenna port, and then multiplying that measured power by the gain of the device's antenna as referenced to an omnidirectional radiator. Also stated above is our belief that in-band emissions limits or antenna heights<sup>79</sup> should be specified only in consideration of RF safety and in-band emissions at

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<sup>75</sup> 47 C.F.R. § 27.50.

<sup>76</sup> 47 C.F.R. § 24.232.

<sup>77</sup> *Reallocation NPRM* ¶ 105.

<sup>78</sup> *Reallocation NPRM* ¶¶ 105, 113.

<sup>79</sup> *Reallocation NPRM* ¶ 105.

a license boundary. Out-of-band emissions limits should be set in consideration to the protection requirements of adjacent band systems; the operator should have the flexibility to determine how it can meet those protection requirements while taking the best advantage of its in-band prerogatives.

The *Reallocation NPRM* discusses the general out-of-band emissions limits suggested earlier in the record and asks the extent to which these limits will prevent harmful interference to government incumbents.<sup>80</sup> These incumbents include radioastronomy operations in the lower adjacent 1660-1670 MHz band. They also include radiosonde systems in the upper adjacent 1675-1690 MHz band. Although radiosonde systems are not mentioned in the NPRM, commercial operations in the 1670-1675 MHz band must afford them protection under the Spectrum Reallocation Final Report associated with the OBRA Act that reallocated the instant spectrum for commercial purposes.<sup>81</sup> Detailed descriptions of the services and analyses of their coexistence with commercial operations in 1670-1675 MHz were provided by ArrayComm in its earlier comments in this proceeding.<sup>82</sup>

Radioastronomy and radiosonde systems are extremely susceptible to interference in comparison to general terrestrial communications services, and clearly fall in the category of the systems described above requiring “exceptional” protection. These systems are sparsely deployed, however. The appropriate regulatory response is therefore to specify general out-of-band emissions requirements that an operator must meet system-wide, complemented by specific protection or coordination requirements that apply only in the immediate vicinity of protected sites. In contrast, an out-of-band emissions specification designed to protect radioastronomy and

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<sup>80</sup> *Reallocation NPRM* ¶¶ 106-113.

<sup>81</sup> NTIA Special Publication 95-32, Appendix C.

<sup>82</sup> ArrayComm ET 00-221 Comments at 22-34, 43, and Appendices B, C and D thereto.

radiosonde operations and applicable to all equipment operating in the instant band, at all locations and at all times, would render the 1670-1675 MHz band worthless for wide-area operations, as will be shown below. For this reason, ArrayComm proposes a general out-of-band limit that is essentially identical to the out-of-band emissions rules specified for WCS and for Broadband PCS.<sup>83</sup> In the *Reallocation NPRM*, the Commission appears to agree that this limit is appropriate.<sup>84</sup>

### 1. Protection of Radioastronomy Operations

A simple numerical example demonstrates that no commercially reasonable out-of-band emissions specification will, by itself, adequately protect radioastronomy. The example is for a generalized commercial device, one that is representative of the mobile devices for any of the applications proposed in the record for the 1670-1675 MHz band: ArrayComm's application, as well as AeroAstro's and Microtrax's. By converting the general out-of-band emissions limits proposed by each of these parties into directly comparable units, it is easily shown that none of the proposed emissions limits lead to meaningful protection for radioastronomy operations. For the reasons provided below, and as ArrayComm has consistently stated in this proceeding, site-specific protection criteria must be adopted for protected radioastronomy (and radiosonde) sites. In this context, general out-of-band emissions limits simply promote good engineering practices by moderating out-of-band emissions behavior.

Each of the commenters on the instant spectrum has proposed general out-of-band emissions limits.<sup>85</sup> To compare them, one can convert them all to equivalent EIRP power spectral densities by assuming a 0 dBi antenna, as might be found on the mobile terminals of any

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<sup>83</sup> 47 C.F.R. §§ 24.238(a), 27.53(a)(3).

<sup>84</sup> *Reallocation NPRM* ¶ 112.

<sup>85</sup> *Reallocation NPRM* ¶¶ 108-113.

of the systems, and a 500 kHz measurement bandwidth. AeroAstro's proposed limit is then 7 dBm EIRP/500 kHz, ArrayComm's is -13 dBm EIRP/500 kHz and Microtrax's is -25 dBm EIRP/500 kHz. Microtrax's proposed limit, the most conservative of the three, will be used in the sequel.<sup>86</sup>

Radioastronomy receivers, which receive signals from cosmic sources millions of light-years away, are extremely sensitive. Employing the radioastronomy specifications of ITU-R RA.769-1, and ITU-R SA.509.2, and assuming an antenna gain of 0 dBi in the horizontal direction for the telescope's antenna,<sup>87</sup> the peak permissible interference level for single-antenna radio telescopes operating at 1665 MHz, a power spectral flux density of -161 dBm/MHz-m<sup>2</sup>, can be expressed as -190 dBm EIRP/500 kHz as measured at the radio telescope's antenna. Hence, using Microtrax's conservative out-of-band emissions limit, a commercial device's signal would have to be attenuated by a factor of 165 dB (190 - 25), or thirty-thousand-trillion, to avoid interfering with operations at the radioastronomy site. This factor of thirty-thousand-trillion reduction in signal power can be converted to an equivalent distance separation required between the commercial device and the radio telescope. Employing the same shadowed COST231-Hata model employed in our Comments,<sup>88</sup> the equivalent separation distance is 17 kilometers.

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<sup>86</sup> ArrayComm's proposed out-of-band emissions limit is therefore midway between those of the other commenters'. AeroAstro's limit is the least restrictive, contrary to the inference drawn from paragraph 112 of the *Reallocation NPRM*.

<sup>87</sup> The applicability of these specifications has been independently confirmed with Dr. Tomas Gergeley, Electromagnetic Spectrum Manager of the National Science Foundation's Division of Astronomical Sciences, during a 17 January 2001 meeting. Additional details on radioastronomy and interference analysis can be found in ArrayComm's initial comments in the allocation proceeding. ArrayComm ET 00-221 Comments at 23-30 and Appendices B and C thereto.

<sup>88</sup> ArrayComm ET 00-221 Comments, Appendix C at 2.

A single portable device for any of the proposed applications in this band, operating at a general out-of-band emissions limit, which is notably more conservative than the general out-of-band limits adopted elsewhere by the Commission, would present significant interference to radiotelescope operations if it operated within 17 km of a radiotelescope site. This example demonstrates three things. First, special and exceptional protection requirements are required by radioastronomy sites. Second, the locations of protected radioastronomy sites must be known in advance by an operator. Third, attempting to protect radioastronomy sites with a general system-wide out-of-band emissions limit is neither feasible nor desirable. Such general out-of-band emissions limits would have to be billions of times more stringent than those proposed by any of the commenters, and well beyond state-of-the-art for all but very short-range commercial communications equipment.

As a practical matter, meaningful protection for radioastronomy operations in the 1660-1670 MHz band requires that commercial systems in the 1670-1675 MHz band be prevented from operating in the immediate vicinity of protected radioastronomy sites.

ArrayComm believes, and has consistently advocated, that radioastronomy requires meaningful protection and that it is only possible to do so with knowledge of the specific sites to be protected and the protection criteria.<sup>89</sup> In other parts of its rules the Commission has been willing to identify the specific radioastronomy sites to be afforded protection.<sup>90</sup> We respectfully ask that the Commission do so here.

In particular, ArrayComm asks that the Commission specify that the sites to be protected are those sites making measurements in the 1660-1670 MHz band that are operated by or in

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<sup>89</sup> ArrayComm ET 00-221 Comments at 29-30, 43-48, 57-57. *See also* ArrayComm ET 00-221 Reply Comments at 6-12, Appendix, Section XX.19(d).

<sup>90</sup> 47 C.F.R. §§ 1.924, 25.213.

conjunction with the National Science Foundation, similar to what was done in the MSS bands. We also ask that the protection requirements and coordination procedures be those described in our Reply Comments.<sup>91</sup> ArrayComm has shown that, subject to those proposals, radioastronomy operations can be protected from commercial operations in the instant band.<sup>92</sup>

The analysis above demonstrates that any alternative approach will not afford protection for radioastronomy services. As importantly, lack of specificity in protection requirements raises the chilling commercial scenario in which an operator might be required to terminate service over an area of hundreds of square kilometers due to the unexpected appearance, following the instigation of commercial service, of a radioastronomy operation for which protection is mandated. Such uncertainty would significantly increase the perceived risk associated with the instant spectrum and greatly reduce its value at auction.

During a meeting with ArrayComm last year, the National Science Foundation (“NSF”) indicated<sup>93</sup> that sites at the following locations should be protected:

- Arecibo, Puerto Rico;
- Greenbank, West Virginia;
- Very Large Array, Socorro, New Mexico;
- Hat Creek, California;
- NASA Goldstone, California; and
- Very Large Baseline Array, locations specified in §25.213(a)(1)(ii) of the Commission’s rules.

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<sup>91</sup> ArrayComm ET 00-221 Reply Comments, Appendix, Section XX.19(d).

<sup>92</sup> ArrayComm ET 00-221 Comments at 27-30.

<sup>93</sup> The site list was provided by Dr. Tomas Gergeley, Electromagnetic Spectrum Manager of the National Science Foundation’s Division of Astronomical Sciences, during a 17 January 2001 meeting.

This list is identical to that of footnote US331 to the spectrum table in Section 2.106 of the Commission's rules with the exception of the Owens Valley site appearing in that footnote.<sup>94</sup> Moreover, if the radioastronomy community is comfortable with the 1.4 GHz coordination distances and zones specified in that footnote, those coordination distances and zones would also be appropriate thresholds for triggering coordination with commercial operations in 1670-1675 MHz.<sup>95</sup>

NSF indicated at that same meeting that the construction of new NSF sites is highly unlikely within the next five years, and unlikely within the next ten years. The list of protected sites would therefore be a stable one, suitable for inclusion in the Commission's rules. ArrayComm proposes a one-year notification and comment period for modifications to the list of protected radioastronomy sites.

ArrayComm urges the Commission to adopt the NSF list of protected sites and the protection requirements described above, providing definite, final parameters to services carried over the 1670-1675 MHz band. Moreover, the Commission should adopt this clear standard well in advance of the auction in order that potential applicants can obtain accurate valuation, and hence financing, that will allow them to participate.

## **2. Protection of Radiosonde Operations**

Radiosonde operations in the upper adjacent band are also extremely sensitive, although not as sensitive as radioastronomy operations. Using the same analysis method applied to radioastronomy above and the radiosonde protection criteria of the Spectrum Reallocation Final

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<sup>94</sup> *Reallocation Order Appendix C* at page 57.

<sup>95</sup> Tolerable interference levels for radioastronomy are higher at 1670 MHz than at 1400 MHz, see ITU-R RA.769-1 at Table 1.

Report,<sup>96</sup> the peak level of interference permitted at radiosonde receiver sites operating in 1675-1690 MHz for less than 0.24% of any operating interval, a power spectral flux density of  $-120$  dBm/1.3MHz- $m^2$ , can be expressed as -150 dBm/500 kHz EIRP as measured at the radiosonde receiver's antenna. Hence, using Microtrax's conservative out-of-band emission limit, a commercial device's signal would have to be attenuated by a factor of 125 dB (150 – 25), or three-trillion, to avoid interfering with radiosonde operations at the victim site. This factor of three-trillion reduction in signal power can be converted to an equivalent distance separation required between the commercial device and the radiosonde receiver. Employing the same shadowed COST231-Hata model employed in our Comments,<sup>97</sup> the equivalent separation distance is 1.2 kilometers.

A single portable device for any of the proposed applications in this band, operating at a general out-of-band emissions limit which is notably more conservative than the general out-of-band limits adopted elsewhere by the Commission, would present significant interference to radiosonde receiver operations if it operated within 1.2 km of the receiver site. As with the protection of radioastronomy operations, the protection of radiosonde operations is an exceptional situation requiring special protection criteria applied at the radiosonde site.

As a practical matter, meaningful protection for radiosonde operations in 1660-1670 MHz requires that commercial systems in 1670-1675 MHz be prevented from operating in the immediate vicinity of protected radiosonde sites.

There are, however, three important differences from the radioastronomy case. First, as evidenced by the preceding example, the requirement to protect a radiosonde receiver site might

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<sup>96</sup> NTIA Special Publication 95-32, Appendix C. These protection criteria were affirmed by NTIA and NWS during a 6 February 2001 meeting.

<sup>97</sup> ArrayComm ET 00-221 Comments, Appendix C at 2.

only excise a few square kilometers from an operator's commercial coverage (as opposed to the hundreds of square kilometers impacted by a radioastronomy operation). Second, there is a relatively large number of radiosonde receiver sites. The National Weather Service operates approximately seventy sites in the continental United States,<sup>98</sup> and these sites must be relocated, albeit infrequently, due to operational requirements of the Weather Service. The large number of sites and their quasi-portable nature makes it impractical, if not impossible, to create a list suitable for inclusion in the Commission's rules. Third, unlike radioastronomy, radiosonde operations can shift their operating frequencies — either towards the upper end of the 1675-1690 MHz band using the tuning features of current equipment operating in that band, or perhaps even to an alternate radiosonde band such as the 401-406 MHz band — further reducing this service's susceptibility to interference from commercial operations in the 1670-1675 MHz band. With the cooperation of all involved parties, and over time, protection of radiosonde operations could become easier than it is today.

Nonetheless, because of the special and exceptional protection requirements for radiosonde operations, a commercial operator would have to at least know with whom to coordinate in order to guarantee meaningful protection and prevent the sort of commercial catastrophe describe earlier. With that knowledge, as shown in our Comments,<sup>99</sup> commercial operations in the instant band could protect radiosonde operations in 1675-1690 MHz.

As detailed in our Reply Comments,<sup>100</sup> we propose that all National Weather Service and Department of Defense radiosonde receiver sites be protected; and that the requirement to protect those radiosonde operations, and only those radiosonde operations, be included in the

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<sup>98</sup> ArrayComm ET 00-221 Comments, Appendix D at 4-9.

<sup>99</sup> ArrayComm ET 00-221 Comments at 34-35, and Appendix C thereto.

<sup>100</sup> ArrayComm ET 00-221 Reply Comments at 8-10.

Commission's ultimate rules. The required level of protection should also be well defined and based on the OBRA requirements as we attempted to do in our Reply Comments.<sup>101</sup> A well defined, bilateral coordination process could be formulated in which the 1670-1675 MHz commercial operator and the NWS and DOD radiosonde users notify one another of proposed changes to their respective networks and coordinate to ensure protection. This process would respect both the commercial imperatives of the instant spectrum, as well as the critical national security and economic role played by meteorological services.

ArrayComm urges the Commission to define the National Weather Service and the Department of Defense as the sole agencies whose radiosonde operations will be protected and to adopt the protection requirements described above, providing definite, final parameters to services carried over the 1670-1675 MHz band. Moreover, the Commission should adopt this clear standard well prior to the auction in order that potential applicants can obtain accurate valuation, and hence financing, that will allow them to participate.

### **3. Cellular Architecture**

The Commission asks whether cellular architectures should be banned in the 1670-1675 MHz band with the intent of fostering the protection of adjacent band services.<sup>102</sup> As a general matter, and as described above, ArrayComm's belief is that in-band operations and out-of-band emissions should be treated separately in the Commission's rules to allow the operator maximum flexibility in determining how it will best provide the mandated protection for adjacent band operations. With regard to the instant spectrum, all of the commenters have proposed systems with mobile devices that could range relatively freely within the license area. Banning a cellular architecture, loosely defined for the purpose of these comments as one with multiple base sites in

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<sup>101</sup> ArrayComm ET 00-221 Reply Comments, Appendix, XX.19(d).

a given market, would therefore not guarantee any level of interference protection for adjacent band systems and could proscribe some or all of the proposed applications for the band.

A cellular architecture may in fact be a key element in ensuring the protection of adjacent band services. As noted in ArrayComm's comments filed earlier in the allocation proceeding,<sup>103</sup> if a system has base stations whose downlink coverage areas can be limited and if the mobile stations for that system follow a "listen before talk" protocol in which the mobile stations do not transmit unless they can successfully receive certain downlink control channels from the base station, protection of adjacent band operations from base station and mobile transmissions can be ensured. Such systems permit the locations from which mobiles will transmit to be controlled through the design of base station downlink coverage areas.

## **VI. Coordination**

### **A. Coordination with Canada and Mexico**

The Commission seeks comment on its interim proposal to adopt the same in-band emissions requirements at the Mexican and Canadian borders with the United States as it does for borders between geographic service areas.<sup>104</sup> Assuming that a field strength limit is adopted as described *supra*, ArrayComm supports this proposal. We believe that the aforementioned 47 dBuV/m field strength limit would provide adequate protection for a wide range of potential co-channel commercial services in Canada and Mexico.

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<sup>102</sup> *Reallocation NPRM* ¶ 114.

<sup>103</sup> ArrayComm ET 00-221 Comments at 29.

<sup>104</sup> *Reallocation NPRM* ¶139.

## **B. Coordination with Incumbent Government Operations**

ArrayComm's position regarding the protection of adjacent-band radioastronomy operations<sup>105</sup> and adjacent-band radiosonde operations has been described *supra*.

As the Commission notes,<sup>106</sup> requiring site-by-site coordination for spectrum licensed on a geographic area basis would be neither efficient nor feasible. Licensees of such commercial spectrum may deploy technologies with multiple mobile and fixed stations in the general vicinity of a protected site. Adequate protection of adjacent-band or co-channel services can only be assessed through an analysis involving the entirety of the equipment under the licensee's control within some predefined coordination distance of the protected site. ArrayComm supports the Commission's proposal to require coordination of both fixed and mobile stations whose operation may impinge upon a protected site,<sup>107</sup> so long as the coordination process allows multiple fixed and mobile stations, a portion of cellular network for example, to be handled via a single coordination process. Working with the National Oceanic and Atmospheric Administration (NOAA), we developed a proposal for such a process which would apply to coordination with the Greenbelt METSAT site.<sup>108</sup> A single coordination process encompassing multiple fixed and mobile commercial stations should be an option for coordination with all adjacent band operations and with co-primary meteorological satellite operations. We ask the Commission to explicitly incorporate this option in Section 1.924(f) of its rules.<sup>109</sup>

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<sup>105</sup> *Reallocation NPRM* ¶123.

<sup>106</sup> *Reallocation NPRM* ¶128.

<sup>107</sup> *Reallocation NPRM* ¶129.

<sup>108</sup> Letter from Randall Coleman, ArrayComm, to Magalie Roman Salas, Secretary, FCC, at 3 item 4 (Dec. 21, 2001).

<sup>109</sup> *Reallocation Order*, Appendix C at 46.

We also support the Commission’s proposal that, subject to appropriate predefined coordination procedures, geographic area licensees should be responsible for determining whether a change or addition to their deployment necessitates a coordination procedure with other services.<sup>110</sup>

ArrayComm agrees that protection should be afforded to the Greenbelt METSAT site only during periods when it is in use, and that commercial operations in its vicinity should be otherwise allowed to exceed any special protection criteria for that site.<sup>111</sup> We also believe that the general coordination procedures specified for the Wallops Island and Fairbanks sites are applicable<sup>112</sup> with the following two provisos. First, as mentioned above, a single coordination procedure encompassing multiple fixed and mobile commercial stations should be available. Second, we propose that the Commission adopt the proposed coordination procedure jointly developed by NOAA and ArrayComm.<sup>113</sup>

## **VII. The Commission Should Adopt Its Proposed Bidding Credits For Small Business Applicants In The 1670-1675 MHz Band**

### **A. The Commission’s Proposed Small Business Bidding Credits Are Sufficient to Ensure that New Companies Have a Meaningful Opportunity to Compete for Licenses in the 1670-1675 MHz Band**

The Commission seeks comment on its proposed two-tiered system of bidding credits for the auction of the 1670-1675 MHz band: an “entrepreneur” credit of 15% for entities with \$40 million or less in revenue for the preceding three-year period; and a “small business” credit of 25% for entities with \$15 million or less in revenue for the preceding three-year period.<sup>114</sup> This

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<sup>110</sup> *Reallocation NPRM* ¶128.

<sup>111</sup> *Reallocation NPRM* ¶133.

<sup>112</sup> *Reallocation NPRM* ¶132.

<sup>113</sup> *Reallocation NPRM* ¶134-135.

<sup>114</sup> *Reallocation NPRM* ¶¶ 146, 148.

two-tiered structure provides an appropriate competitive bidding scheme that will allow new companies offering innovative services a meaningful opportunity to bid for licenses in this band, as Congress has mandated.

One of Congress's express requirements when it authorized the use of competitive bidding was that the Commission must "disseminat[e] licenses among a wide variety of applicants, including small businesses, rural telephone companies, and businesses owned by members of minority groups and women."<sup>115</sup> The Commission implemented this requirement in 1997 by establishing a tiered system of "designated entities" that warrant preferential treatment in competitive bidding;<sup>116</sup> it defines designated entities in terms of average gross revenues.<sup>117</sup> The Commission thus created a three-tiered scheme for designated entities that are entitled to bidding credits on a sliding scale.<sup>118</sup> The *Reallocation NPRM* largely follows this three-tiered system for the 1670-1675 MHz band.<sup>119</sup>

The proposed bidding credits of \$40 million/15% and \$15 million/25% are an appropriate application of the Commission's Part 1 designated entity scheme. These credits provide an adequate level of protection to small businesses from being prejudiced in the upcoming auction as against larger, well-established participants. At the same time, these credits ensure that the company that is awarded the license has the financial capability of satisfying the Commission's

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<sup>115</sup> 47 U.S.C. § 303(j)(3)(B).

<sup>116</sup> *Amendment of Part 1 of the Commission's Rules – Competitive Bidding Procedures*, WT Docket No. 97-82, Third Report and Order, FCC 97-413, 13 FCC Rcd. 374 (1997) ("Part 1 Third Report and Order").

<sup>117</sup> *Part 1 Third Report and Order*, 13 FCC Rcd. at 388.

<sup>118</sup> *Part 1 Third Report and Order*, 13 FCC Rcd. at 404.

<sup>119</sup> *Reallocation NPRM* ¶ 146.

renewal expectancy and performance requirements.<sup>120</sup> The Commission should therefore adopt its proposed two-tiered bidding credits structure.

**B. The Proposed Public Safety Bidding Credit Is Not Appropriate for the 1670-1675 MHz Band**

The Commission also seeks comment on the proposed public safety bidding credit available to entities that will use this spectrum for a public purpose.<sup>121</sup> Although ArrayComm strongly supports the use of spectrum for a public good, including public safety, it believes that this type of credit is inappropriate for the 1670-1675 MHz band, as it would favor an exclusive public safety use of this spectrum rather than encouraging free development of innovative value-added services. As an initial matter, ArrayComm notes that public safety spectrum uses are not subject to competitive bidding under Section 1.2101(b) of the Commission's rules.<sup>122</sup> Because the Commission has designated the 1670-1675 MHz band for commercial use, it has already determined that auctioning the spectrum is indeed appropriate. It would be anomalous to adopt public safety bidding credits for a band with a commercial use designation.<sup>123</sup>

A public safety bidding credit would unfairly prejudice certain participants in the auction, such as ArrayComm, who have developed or intend to develop public safety applications for the 1670-1675 MHz band. MicroTrax has requested that a specific additional bidding credit be provided to entities that will use the spectrum, at least in part, for a public purpose, for example, MicroTrax's proposed Personal Location and Monitoring Service (PLMS).<sup>124</sup> ArrayComm

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<sup>120</sup> ArrayComm recommends that the Commission adopt the substantial service test for each of these requirements. *See* Sections III.C and IV, *supra*.

<sup>121</sup> *Reallocation NPRM* ¶¶ 151-152.

<sup>122</sup> 47 C.F.R. § 1.2101(b). *See also* 47 U.S.C. § 309(j)(2) (permitting the Commission to set for auction spectrum for which the licensee is reasonably likely to "receiv[e] compensation from subscribers").

<sup>123</sup> *See* MicroTrax ET 00-221 Comments at iii-iv; 12-17.

<sup>124</sup> MicroTrax ET 00-221 Comments at 18. *See also Reallocation NPRM* ¶ 151.

supports the goal of encouraging spectrum use for public safety, as such applications are in keeping with the overall purpose of licensing the public radio spectrum. To provide a special, additional bidding credit to entities that claim to provide a public safety service, however, would limit the spectrum's utilization in contravention of Congress's express goals. This credit would seem to sanction, and even encourage, a reversion to a quasi-government use of this band, rather than "promot[e] the development of new technologies, products and services."<sup>125</sup>

In addition, applying a public safety bidding credit would prejudice applicants that have also developed applications for public use. ArrayComm's proposed *i-BURST* service has substantial public safety applications that ArrayComm intends to implement. ArrayComm's network will have the capacity to meet the needs of public safety entities as well as providing service to the general public. It would be extremely unfair if the applicant seeking a public safety credit on the basis that its network will be used for public safety applications won the auction based on its deeper credit and defined its eligibility for its public safety service offerings so broadly as to include virtually everyone, or sold its excess network capacity to others for commercial use. To provide a bidder a special bidding credit to the exclusion of other applicants would unfairly increase their ability to obtain a license. Moreover, to construct such a skewed competitive structure contravenes Congress's initial purpose of ensuring a truly free, unencumbered market for public spectrum.<sup>126</sup>

Finally, a public use bidding credit could unnecessarily complicate the Commission's heretofore transparent designated entity bidding credit structure. A public use bidding credit is

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<sup>125</sup> House Report, 103<sup>rd</sup> Cong., 1<sup>st</sup> Sess. at 246.

<sup>126</sup> "The bill requires the Commission to establish a competitive bidding methodology promoting the development of new technologies, products and services, and which efficiently utilizes the spectrum for the benefit of the public." House Report, 103<sup>rd</sup> Cong., 1<sup>st</sup> Sess. at 246.

an unwieldy mechanism to use in the 1670-1675 MHz mixed use environment. Because there are other entities that will use this spectrum in part for a public purpose, it would be extremely difficult to gauge the appropriate level of credit for each entity. Moreover, ArrayComm wishes to emphasize that, as commenters on this spectrum have already demonstrated, such bidding credits are unnecessary to ensure public use of the 1670-1675 MHz band, as multiple providers have already indicated their intent to adopt a mixed use service plan.

For these reasons, the Commission should consider the proposed public safety bidding credit cautiously to ensure nondiscriminatory application and in the broader context of auction administrability.

### **VIII. Conclusion**

ArrayComm commends the Commission for the vision it has shown by quickly implementing this rulemaking proceeding to put an additional 27 megahertz of spectrum to its most efficient use. ArrayComm strongly urges the Commission to continue in its efforts to spur the rapid deployment of innovative wireless services by adopting its proposed licensing plan for the 1670-1675 band. Key aspects of the Commission's plan include application of Part 27 rules, nationwide licensing, and making the full 5 MHz available as a single block.

The Commission's proposed application, ownership and license terms will also accelerate the deployment of innovative services. Permitting both commercial and private use of the spectrum, as well as broad applicant eligibility and forbearance from Title II requirements will allow service providers the commercial flexibility they will need to provide a wide variety of next-generation services to the public. In addition, the proposed 10-year license term with substantial service renewal contingency provides crucial stability that will encourage investment.

ArrayComm further urges the Commission to adopt technical rules and coordination procedures that are sufficient to avoid interference while not hindering the ability of licensees to offer innovative services. In-band and out-of-band rules must be formulated independently, and the operator must be given the freedom to determine how to meet out-of-band objectives. These rules are so fundamental to shaping the utility of the spectrum that, particularly with respect to the designation of protected adjacent band services, they must be determined clearly and specifically well in advance of the auction in order to give applicants fair opportunity to seek auction financing. By promptly adopting specific and clear rules that do not incorporate assumptions regarding eventual commercial technologies, the Commission can ensure maximum participation in the forthcoming auction and the most efficient use of the 1670-1675 MHz by subsequent licensees.

Respectfully submitted,

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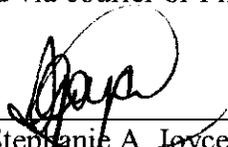
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March 4, 2002

CERTIFICATE OF SERVICE

I, Stephanie A. Joyce, certify that on this 4<sup>th</sup> day of March, 2002, a true and correct copy of the foregoing Comments of ArrayComm, Inc. were served via courier or First Class Mail\* on the following persons:

  
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