

Before the
Federal Communications Commission
Washington, D.C. 20554

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JUL 27 2006

In the Matter of)
Amendment of the Commission's Rules) WT Docket No. 01-90
Regarding Dedicated Short-Range Communication)
Services in the 5.850-5.925 GHz Band (5.9 GHz)
Band))
Amendment of Parts 2 and 90 of the Commission's) ET Docket No. 98-95
Rules to Allocate the 5.850-5.925 GHz Band to the) RM-9096
Mobile Service for Dedicated Short Range)
Communications of Intelligent Transportation)
Services)

MEMORANDUM OPINION AND ORDER

Adopted: July 20, 2006

Released: July 26, 2006

By the Commission:

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I. INTRODUCTION AND EXECUTIVE SUMMARY

1. In this *Memorandum Opinion and Order (MO&O)*, we consider four petitions for reconsideration filed respectively by the 3M Company, ARINC Incorporated, Intelligent Transportation Society of America and Johns Hopkins University Applied Physics Laboratory on September 2, 2004.¹ Each petitioner seeks reconsideration of the Commission's December 17, 2003 *Report and Order*, which adopted licensing and service rules for the Dedicated Short Range Communications (DSRC) Service in the Intelligent Transportation Systems (ITS) Radio Service, located in the 5.850-5.925 GHz band (5.9 GHz band).² In this *MO&O*, we reach the following key decisions:

- *New Channel Designations.* We designate Channel 172 (frequencies 5.855-5.865 GHz) exclusively for vehicle-to-vehicle safety communications for accident avoidance and mitigation, and safety of life and property applications; and designate Channel 184 (frequencies 5.915-5.925 GHz) exclusively for high-power, longer-distance communications to be used for public safety applications involving safety of life and property, including road intersection collision mitigation.
- *Site Construction and Priorities.* We amend our rules to require licensees to file a notice of construction with the Commission for each site registered and to clarify that site priority attaches to prior registered sites that have been fully constructed within the requisite twelve-month construction period.
- *Increased Power.* We amend the power reduction rule to only apply to DSRC Roadside Unit antenna height only between eight and fifteen meters, thereby providing increased flexibility and reduced implementation costs.
- We decline to:
 - Adopt rules that would implement a software-based prior frequency coordination protocol that directs or recommends that licensees use particular service channels, or that would establish a third party database manager to coordinate and maintain site registrations.
 - Amend the current emission mask applicable to DSRC Class D devices, pending further developments and recommendations from the ASTM E17.51 DSRC Standards Writing Group.

¹ See 3M Company (3M), Petition For Reconsideration (filed Sept. 2, 2004) by Edmund J. Ring (3M Petition); ARINC Incorporated (ARINC), Petition For Reconsideration and/or Clarification of ARINC, Incorporated (filed Sept. 2, 2004) by Robert B. Kelly, Esq., of the law firm of Squires, Sanders & Dempsey, L.L.P. (ARINC Petition); Intelligent Transportation Society of America (ITS America), Petition For Reconsideration or Clarification, WT Docket 01-90 (filed Sept. 2, 2004) by Neil D. Schuster (ITS America Petition); and Johns Hopkins University Applied Physics Laboratory (JHU/APL), Comments to Federal Communications Commission (filed Sept. 2, 2004) by Robert T. Soranno and Ronald K. Char (JHU/APL Petition).

² See Amendment of the Commission's Rules Regarding Dedicated Short-Range Communication Services in the 5.850-5.925 GHz Band (5.9 GHz Band), WT Docket No. 01-90, *Report and Order*, 19 FCC Rcd 2458 (2004) (*DSRC Report and Order*). On September 30, 2004, the Bureau issued a public notice providing additional information on the licensing and transmitter location registration process for DSRC. See Wireless Telecommunications Bureau Announces Details Concerning the Licensing and Transmitter Location Registration Process for the Dedicated Short Range Communications Service in the Intelligent Transportation Service, *Public Notice*, 20 FCC Rcd 954 (PSCID WTB 2004).

- Adopt rules governing frequency coordination between DSRC licensees and Fixed Satellite Service (FSS) licensees, pending results of studies of interference methodology and ongoing industry discussions.
- Adopt a rule establishing a separate class of On-Board Units to be used exclusively by public safety eligibles, *i.e.*, “public safety OBUs.”
- Require dual-band DSRC devices to be uniquely identified in order to be used to provide DSRC services in the 5.9 GHz band.

Our action today furthers the Commission’s goal of implementing widespread deployment of DSRC systems in the ITS Radio Service³ in order to promote the safety of life and property of the traveling public and to improve the efficiency of the nation’s surface transportation infrastructure.

II. BACKGROUND

2. The ITS program was created by Congress in the Intermodal Surface Transportation Efficiency Act of 1991,⁴ and is administered by the Department of Transportation (DOT). The program uses advanced electronics to improve traveler safety, decrease traffic congestion, facilitate the reduction of air pollution, and conserve vital fossil fuels.⁵ Pursuant to the Transportation Equity Act for the 21st Century,⁶ the Commission, in consultation with the DOT, allocated the 5.850-5.925 GHz band to DSRC in October 1999.⁷ On November 7, 2002, the Commission adopted a *Notice of Proposed Rule Making (NPRM)*⁸ seeking comment on proposed DSRC service rules in the 5.9 GHz band, and on December 17, 2003, it adopted the DSRC service rules.⁹

3. To promote the widespread use and evaluation of intelligent vehicle-highway systems technology, the Commission in the *DSRC Report and Order* adopted, *inter alia*, the ASTM E2213-03 Standard (ASTM-DSRC), which was supported by most commenters and which had been developed

³ See 47 C.F.R. § 90.371.

⁴ See § 6051 of the Intermodal Surface Transportation Efficiency Act of 1991, Pub. L. 102-240, 105 Stat. 1914 (1991) (ISTEA).

⁵ See ISTEA § 6053(b). Section 6053(b) states:

The Secretary shall develop and implement standards and protocols to promote the widespread use and evaluation of intelligent vehicle-highway systems technology as a component of the Nation’s surface transportation systems. To the extent practicable, such standards and protocols shall promote compatibility among intelligent vehicle-highway systems technologies implemented throughout the States. In carrying out this subsection, the Secretary may use the services of such existing standards-setting organizations as the Secretary determines appropriate.

⁶ See Transportation Equity Act for the 21st Century, Pub. L. 105-178, 112 Stat. 107 § 5206(f) (1998) (TEA-21).

⁷ See Amendment of Parts 2 and 90 of the Commission’s Rules to Allocate the 5.850-5.925 GHz Band to the Mobile Service for Dedicated Short Range Communications of Intelligent Transportation Services, ET Docket No. 98-95, *Report and Order*, 14 FCC Rcd 18221 (1999) (*Allocation Report and Order*).

⁸ See Amendment of the Commission’s Rules Regarding Dedicated Short Range Communication Services in the 5.850-5.925 GHz Band (5.9 GHz Band), WT Docket No. 01-90, and Amendment of Parts 2 and 90 of the Commission’s Rules to Allocate the 5.850-5.925 GHz Band to the Mobile Services for Dedicated Short Range Communications of Intelligent Transportation Services, ET Docket No. 98-95, RM 9096, *Notice of Proposed Rulemaking and Order*, 17 FCC Rcd 23136 (2002) (*NPRM*).

⁹ See *DSRC Report and Order*, note 2, *supra*.

under an accredited standard setting process.¹⁰ To achieve interoperability, allow open eligibility, and encourage the development of a market for equipment that will meet the needs of public safety DSRC licensees, the rules adopted by the Commission require all DSRC operations in the 5.9 GHz band to comply with the ASTM-DSRC standard. DSRC Roadside Units (RSUs) (*i.e.*, communication units that are fixed along the roadside) are licensed under Part 90 Subpart M of the Commission's rules ("Intelligent Transportation Systems Radio Service").¹¹ On-Board Units (OBUs) (*i.e.*, in-vehicle communications units) are licensed by rule under new Subpart L of Part 95 of the Commission's Rules.¹² Licensees receive non-exclusive geographic-area licenses authorizing operation on seventy of the seventy-five megahertz of the 5.9 GHz band.¹³

4. On September 2, 2004, 3M, ARINC, ITS America and JHU/APL filed petitions for reconsideration and/or clarification of the *DSRC Report and Order*. Petitioners request that the Commission: (1) modify its site registration process to include certain active spectrum management techniques that could identify harmful interference between stations prior to deployment or operation;¹⁴ (2) modify its Universal Licensing System (ULS) to accommodate active registration or consider whether one or more third parties should function as site registration database managers;¹⁵ (3) require DSRC licensees to provide a notice of construction within twelve months after registration, and assign priority rights based on the date of construction notification, rather than on the date of registration in the database;¹⁶ (4) designate Channel 172 exclusively for high-availability, low-latency public safety communications,¹⁷ and designate Channel 184 for longer-range, high power public safety DSRC systems;¹⁸ (5) revise the DSRC Class D emission mask;¹⁹ (6) amend Section 90.375 of the Rules, to create a separate class of OBUs for exclusive use by public safety eligibles;²⁰ (7) revise Section 90.377(b) of the Rules, the antenna height correction factor requirement intended to minimize potential interference;²¹ (8) require that dual-band DSRC devices must be uniquely identified to provide DSRC services in the 5.9 GHz band;²² and (9) keep Docket WT 01-90 open for future consideration of revisions to the ASTM

¹⁰ See American Society for Testing and Materials (ASTM), Standard Specification for Telecommunications and Information Exchange Between Roadside and Vehicle Systems – 5 GHz Band Dedicated Short Range Communications (DSRC) Medium Access Control (MAC) and Physical Layer (PHY) Specifications, Designation: E 2213-03 (published September 2003) (ASTM-DSRC Standard).

¹¹ See 47 C.F.R. Part 90, Subpart M.

¹² See 47 C.F.R. Part 90, Subpart L.

¹³ See *DSRC Report and Order*, 19 FCC Rcd at 2489 ¶ 58.

¹⁴ See ARINC Petition at 3-6; ARINC August 5, 2005 *Ex Parte* at 8-9; ITS America Petition at 2; JHU Petition at 2, 14.

¹⁵ See ARINC Petition at 11.

¹⁶ See *Id.* at 12-13.

¹⁷ ITS America Petition at 2-3.

¹⁸ See ARINC Petition at 15-17; see also DOT *Ex Parte* submission (filed Nov. 23, 2004) at 1.

¹⁹ See 3M Petition at 12-14.

²⁰ See 47 C.F.R. § 90.375. See ARINC Petition at 19-20.

²¹ See 3M Petition at 4-8.

²² See ARINC Petition at 14.

DSRC Standard.²³ We received comments in opposition to, and in support of, the foregoing requests. Parties filing comments, reply comments, *ex parte* submissions and presentations in this proceeding are listed in Appendix C.

5. On August 5, 2005, ARINC filed an *ex parte* submission advancing the purported benefits of a third party site registration manager (SRM) to oversee the site registration process. In its submission, ARINC argued that relying on a message access priority framework for DSRC “would not adequately address RF [radio frequency] concerns.”²⁴ In support of the need for an SRM, ARINC cites the Commission’s implementation of Advance Site Review Interference Analysis for the 71-76 GHz, 81-86 and 92-95 GHz bands, where a third party site registration manager is used for a similar purpose.²⁵ In addition, ARINC claims that the priority access framework for DSRC is not sufficient to “adequately address frequency sharing issues,” and that therefore another mechanism is needed to “balance” DSRC priority access requirements.²⁶ ARINC proposes that an SRM would serve the following functions: (1) advance site review interference analysis; (2) identification of RSU sites requiring coordination with Government radar sites; (3) management of the site registration database, and (4) interference dispute resolution.²⁷ ARINC also argues that a priority access framework,²⁸ which it expects to be included in a new ASTM standard being developed, would be inadequate because it would “not adequately address frequency sharing issues” in the band.²⁹ ARINC also asserts that a “listen-before-send” protocol³⁰ (which it also expects in the new ASTM standard being developed) could be overwhelmed by interference problems under various scenarios,³¹ and that flexibility in channel selection is required to maximize reliable access for low latency, public safety communications applications.³²

III. DISCUSSION

A. Site Registration and Third Party Database Manager

6. In the *DSRC Report and Order*, the Commission adopted a non-exclusive geographic area licensing scheme, coupled with a post-license registration requirement similar to that adopted in the

²³ See *id.* at ii. We also note that the Satellite Industry Association (SIA) urges that the Commission should delay the licensing of DSRC stations until technical studies to define interference contours are conducted. See SIA reply comments (filed Oct. 27, 2004) at 1.

²⁴ ARINC August 5, 2005 *Ex Parte* at 6.

²⁵ See Allocations and Service Rules for the 71-76 GHz, 81-86 GHz and 92-95 GHz Bands, WT Docket No. 02-146, *Report and Order*, 18 FCC Rcd 23318 (2003) (*70/80/90 GHz Report and Order*); Allocations and Service Rules for the 71-76 GHz, 81-86 GHz and 92-95 GHz Bands, WT Docket 02-146, *Memorandum Opinion and Order*, 20 FCC Rcd 4889 (2005).

²⁶ ARINC August 5, 2005 *Ex Parte* at 6.

²⁶ See *Id.* at 8-9.

²⁷ *Id.* at 6-8.

²⁸ In a priority access framework, higher priority messages, *i.e.*, safety-of-life first followed by public safety, would precede lower priority or non-priority messages.

²⁹ *Id.* at 6.

³⁰ Under a “listen-before-send” protocol, prior to sending messages, communications equipment first listens for any other transmissions, and then sends the information only if no other transmissions are detected.

³¹ Potential scenarios could include, ARINC states, situations where two messages to be transmitted contain the same priority designations. *Id.* at 7.

³² See *id.* at 8.

70/80/90 GHz Report and Order.³³ The Commission determined that this approach strikes the appropriate balance between the benefits of site-based licensing and the efficiencies and administrative convenience of geographic area licensing.³⁴

7. In their petitions, ARINC, ITS America, and JHU/APL each urge the Commission to augment its licensing approach for RSUs to include “active” spectrum management techniques.³⁵ ARINC, in its subsequent *ex parte* filing, claims that the message access priority framework for DSRC is not sufficient, by itself, to create the most appropriate DSRC RF environment.³⁶ To facilitate proper frequency assignment, ARINC supports the concept of site registration management endorsed by Comsearch.³⁷ Under ARINC’s approach, licensees must register for particular service channels³⁸ established using a software-driven, frequency coordination analysis integral to the site registration process.³⁹ ARINC observes that the recommended approach is similar to the site review interference analysis procedures adopted for the “Above 70 GHz Service,”⁴⁰ and claims that the proposed process would identify potential interference before DSRC stations are deployed, thus making it easier to define interference mitigation parameters and minimize post-registration conflicts.⁴¹ ARINC, ITS America, JHU/APL and DOT all support this notion of a third party database manager to handle site registrations.⁴²

8. In its August 5, 2005 *Ex Parte*, ARINC submits that an SRM is necessary because the priority access framework and the listen-before-send protocol, which it anticipates will be addressed in the current ASTM DSRC standard, do not “adequately address frequency sharing issues, especially in a multi-repeater environment.”⁴³ It also posits that “multiple adjacent repeaters may all be seeking to use the same Service Channel”⁴⁴ such that low-priority messages could overwhelm time-sensitive, low-latency, high priority safety of life and public safety messages. It submits that the possibility of such interference could be avoided by an SRM who applied “channel load balancing” in advance of the activation of the repeaters.⁴⁵

9. *Decision.* In the *DSRC Report and Order*, the Commission stated that the asserted benefits of an “active” site-based licensing scheme, including frequency coordination, were outweighed

³³ See *70/80/90 GHz Report and Order*, 18 FCC Rcd 23318, 23339-342 ¶¶ 48-57 (2003).

³⁴ See *DSRC Report and Order*, 19 FCC Rcd at 2485 ¶ 56.

³⁵ See ARINC Petition at 3-4; ITS America Petition at 2; JHU/APL Petition at 12.

³⁶ See ARINC August 5, 2005 *Ex Parte* at 5-9.

³⁷ See Comsearch *Ex Parte* at 4.

³⁸ Service Channels are channels specifically assigned or designated based on frequency coordinator recommendation.

³⁹ See ARINC Petition at 4-7.

⁴⁰ See ARINC August 5, 2005 *Ex Parte* at 10-11, citing *Allocations and Service Rules for the 71-76 GHz and 92-95 GHz Bands*, WT Docket No. 02-146, 18 FCC Rcd 23318, 23338 (2003). See also, *Allocations and Service Rules for the 71-76 GHz and 92-95 GHz Bands*, WT Docket No. 02-146, *Memorandum Opinion and Order*, 20 FCC Rcd 4889, 4894 ¶ 11 (2005) (*70/80/90 GHz MO&O*).

⁴¹ See *id.* at 6-7, 12-13. ARINC asserts that the analysis would be conducted based on established interference protection criteria, but that the relevant protection criteria would need to be developed. *Id.* at 13 n.35.

⁴² See *id.* at 15; ITS America Petition at 1-2; JHU/APL Petition at 12.

⁴³ ARINC Aug. 5, 2005 *Ex Parte* at 6.

⁴⁴ *Id.* at 7.

⁴⁵ *Id.*

by the flexibility, economies of scale, and administrative efficiency of geographic licensing.⁴⁶ The Commission's decision rested on the fact that DSRC is a low power, short range system, and on the interference mitigation mechanisms incorporated into the ASTM-DRC standard. As explained below, the proponents of site-based systems with prior frequency coordination have not persuaded us that geographical licensing for this service is deficient and should be abandoned.

10. The analogies that ARINC has made between DSRC and the Wireless Medical Telemetry Service, and DSRC and the 70/80/90 GHz fixed microwave service, are not persuasive. First, Section 95.1115 of the Commission's Rules contains specific operating parameter limitation criteria that may be used by a frequency coordinator to predict interference to WMTS devices.⁴⁷ Because no comparable criteria exist for DSRC, there are no usable metrics from which a frequency coordinator can make an interference determination. Second, the interference analysis procedures used in the 70/80/90 GHz fixed microwave service are inapplicable here because, *inter alia*, 70/80/90 GHz systems are highly directional point-to-point systems, whereas DSRC uses a base station in a mobile environment where the antennas are not highly directional. Moreover, fixed microwave systems typically use elevated antennas, whereas DSRC devices operate at low power with antennas that will be located near the roadway level. Because the DSRC signals are rapidly attenuated by surrounding foliage, terrain, structures, *etc.*, they will have far less interference potential.⁴⁸ The Commission, in the *DSRC Report and Order*, concluded that the benefits of frequency coordination in this service would be at best marginal, and would introduce an unnecessary degree of complexity and cost relative to geographical licensing.

11. Finally, we believe that our reservation of Channel 172 for public safety high availability, low power (33 dBm), low-latency applications⁴⁹ also argues against requiring frequency coordination of DSRC systems. Reserving Channel 172 for public safety applications in which low latency channels are essential, eliminates the possibility that non-public safety co-channel stations, in a shared-channel environment, could interfere with critical vehicle-to-vehicle crash avoidance functions. Similarly, the dedication of Channel 184 exclusively for higher-power (40 dBm), longer-distance public safety applications, such as intersection violation mitigation, lessens interference concerns and further obviates the need for DSRC frequency coordination.

12. The Commission concluded in the *DSRC Report and Order* that safe, economical and efficient operation of DSRC systems can be maintained without the need for frequency coordination. The proponents of such a requirement have presented no new information that persuades us to alter this conclusion, particularly given that we have addressed their safety concerns via other, less burdensome means. Accordingly, we decline to adopt ARINC's recommendation to establish a third party DSRC database manager.

B. Channels 172 and 184

13. In the *DSRC Report and Order*, the Commission declined to designate Channels 172 (5.855-5.865 GHz) and 184 (5.915-5.925 GHz) for public safety-related applications,⁵⁰ as advocated by ITS America. Earlier in the proceeding, ITS America argued that Channel 172 should be designated for "vehicle safety and other high priority applications to prevent lower priority transmissions from limiting

⁴⁶ See *DSRC Report and Order* 19 FCC Rcd at 2487 ¶ 57.

⁴⁷ 47 C.F.R. § 95.1115.

⁴⁸ See 47 C.F.R. § 90.377.

⁴⁹ See paragraphs 16-17, *infra*.

⁵⁰ See *DSRC Report and Order*, 19 FCC Rcd at 2473 ¶ 29.

the availability of the channel or increasing the latency of the communications on the channel.”⁵¹ ITS America also recommended that Channel 184 be designated for long range public safety applications and intersection collision applications.⁵² However, in the *DSRC Report and Order*, the Commission found it premature to adopt rules that would reserve certain channels for specific applications.⁵³ Instead, citing overwhelming support by commenters, the Commission concluded that, consistent with an open channel structure, both public safety and non-public safety users should be eligible for licensing on all channels, subject to the priority for public safety.⁵⁴

14. In its petition, ARINC supports special designations for Channels 172 and 184, for applications that involve accident avoidance and mitigation techniques.⁵⁵ ITS America supports a special designation for Channel 172, suggesting that a specific channel designated for vehicle safety applications would ensure timely, adequate capacity for the core safety applications that are a critical component of ITS.⁵⁶ The Alliance of Automobile Manufacturers (Alliance) filed *ex parte* comments in support of ARINC and ITS America with respect to Channel 172.⁵⁷

15. ARINC argues that Channel 172 should receive special designation because increasing numbers of DSRC-equipped vehicles could eventually lead to saturation of the DSRC control channel, rendering it unsuitable for high availability, low latency purposes.⁵⁸ It cites a joint project by certain Alliance members and DOT that confirms that “high priority messages – while still enjoying better performance than routine ones -- . . . [can be] nevertheless slowed down by . . . [a high] channel occupancy level.”⁵⁹ To foreclose that possibility, ARINC proposes that the system migrate public safety applications to Channel 172 before the control channel becomes fully saturated, and that Channel 172 should be reserved strictly for “high availability, low-latency” vehicle-to-vehicle collision avoidance and mitigation.⁶⁰ ARINC recommends that Channel 184 be designated the primary channel for high-power, coordinated RSU applications that will be used by public safety licensees “for ‘signal light preemption’ applications for emergency and transit vehicles,”⁶¹ and points out that these applications require higher

⁵¹ ITS America *Ex Parte* Comments (filed Nov. 14, 2003) (emphasis in original). See also *DSRC Report and Order*, 19 FCC Rcd at 2473 ¶ 28.

⁵² See ITS America *Ex Parte* Comments (filed Nov. 14, 2003): Status Report and Recommendations for Licensing and Service Rules for the DSRC Spectrum in the 5850-5925 MHz Band from Mark D. Johnson, counsel to ITS America, to Federal Communications Commission (filed July 9, 2002) at Appendix D. See also *DSRC Report and Order*, 19 FCC Rcd at 2473 ¶ 28.

⁵³ See *DSRC Report and Order*, 19 FCC Rcd at 2473 ¶ 29.

⁵⁴ *Id.*

⁵⁵ See ARINC Petition at 15-17; ITS America Petition at 2-3 (ITS America filed its petition on this issue only with respect to Channel 172).

⁵⁶ ITS America did not comment on the reservation of Channel 184. See ITS America Petition at 2-3.

⁵⁷ See Alliance *Ex Parte* Comments at 1.

⁵⁸ ARINC Petition at 16.

⁵⁹ Alliance *Ex Parte* Comments at 3-5, citing a report prepared by the Vehicle Safety Communications Project, a joint project involving certain Alliance members and the Department of Transportation.

⁶⁰ See ARINC Petition at 16.

⁶¹ *Id.* at 17. ARINC states that with DSRC signal light preemption, “the signal lights at an intersection can be turned to green or held green longer before an oncoming police car or bus, creating a ‘green wave’ and allowing higher priority vehicles to reach their destination faster or maintain their route timing.” *Id.*

power because of the greater distances involved.⁶² Both ARINC and Alliance urge us to act promptly on the Channel 172 proposal before RSUs are licensed and incumbent operations become established, and point out that timely action is important because automobile manufacturers require significant lead time to integrate DSRC devices into future vehicles.⁶³

16. Based on the record before us, we agree with ARINC and Alliance that vehicle-to-vehicle collision avoidance and mitigation applications are exceptionally time-sensitive and should not be conducted on potentially congested channels.⁶⁴ Although the Commission has long recognized that shared use of spectrum promotes spectrum efficiency,⁶⁵ there are cases in which public safety concerns dictate exclusive use of frequencies.⁶⁶ We believe that such is the case here where the delay associated with shared use of a time-critical DSRC channel could be literally life-threatening in the context of collision avoidance. Thus, we agree that there should be an exclusive-use DSRC channel (Channel 172) for public safety applications involving safety of life and property, including vehicle-to-vehicle collision avoidance and mitigation. Were this channel shared and only given priority when needed, the requirement to electronically identify and execute the priority event—even if measured only in milliseconds—could result in an otherwise avoidable vehicular collision. By dedicating Channel 172 for public safety applications, we significantly reduce the potential for interference that would otherwise be expected were the channel shared with non-public safety applications, which in turn reduces the chance that a few milliseconds communications delay could defeat measures crucial to avoiding a collision between vehicles.

17. We disagree, however, with the suggestion that Channel 172 be dedicated strictly to “high availability, low-latency” use.⁶⁷ First, the record does not set forth a specific definition of this term, which we understand to include safety applications including communications between vehicles and infrastructure (such as highway/rail collision warning) and communications between vehicles (such as

⁶² *Id.*

⁶³ See ARINC Petition at 16; see Alliance *Ex Parte* Comments at 4.

⁶⁴ See ARINC Petition at 15-17; see Alliance *Ex Parte* Comments at 4.

⁶⁵ Section 90.173 of the Commission’s Rules states that private land mobile radio frequencies are available on a shared basis and will not be assigned for the exclusive use of any licensee, unless specifically excepted under Part 90 of the Commission’s rules. See 47 C.F.R. § 90.173(a). Section 90.173(b) also provides that licensees shall cooperate in the use of frequencies in order to reduce interference and to make the most efficient use of the spectrum authorized, and that licensees of stations suffering or causing harmful interference are expected to cooperate and to resolve the problem of interference by mutually satisfactory arrangements. See 47 C.F.R. § 90.173(b). Section 90.403 contains operating requirements, such as restriction of transmissions to the minimum practicable transmission time and monitoring of the transmitting frequency for communications in progress. See 47 C.F.R. § 90.403. See also, e.g., Spectrum Efficiency in the Private Land Mobile Radio Bands in Use Prior to 1968, PR Docket No. 91-170, *Notice of Inquiry*, 6 FCC Rcd 4126, 4129 ¶ 22 (1991); Part 74, Subpart F of the Commission’s Rules to Permit Shared Use of Broadcast Auxiliary Facilities with Other Broadcast and Non-broadcast Entities and to Establish New Licensing Policies for Television Broadcast Auxiliary Stations, BC Docket No. 81-794, *Report and Order*, 93 FCC 2d 570, 573 ¶10 (1983).

⁶⁶ See 47 U.S.C. § 405; 47 C.F.R. §§ 1.429, 1.106; *Hazel-Atlas Co. v. Hartford Co.*, 322 U.S. 238, 64 S.Ct. 997 (1944), *Greater Boston Television Corporation v. FCC*, 463 F.2d 268 (D.C. Cir. 1971); *KIRO, Inc., v. FCC*, 438 F.2d 141 (D.C. Cir. 1970); *Radio Para La Raza, Memorandum Opinion and Order*, 40 FCC 2d 1102 (1973); *ADF Communications, Inc.; Applications for a New 470 MHz Radio Station in Boston, Massachusetts, File No. A007179, Memorandum Opinion and Order*, 14 FCC Rcd 17037, 17038 (1999).

⁶⁷ See ARINC Petition at 15.

blind spot warning).⁶⁸ In addition, we believe that precluding non-public safety use of the channel will adequately protect public safety uses from harmful delay by significantly reducing the channel's occupancy level.⁶⁹ Moreover, our decision to designate Channel 184, a higher power channel, for public safety applications involving safety of life and property, as requested, in the recognition that applications such as traffic signal preemption are conducted over greater distances than other applications and therefore require higher power for reliable operation, will further reduce occupancy of Channel 172. Moreover, we are concerned that an unnecessarily restrictive definition of permissible uses for Channel 172 could exclude other types of public safety applications contemplated or subsequently developed for this channel. Therefore, the rules adopted today provide that Channel 172 may be used both for vehicle-to-vehicle collision avoidance or mitigation and other safety of life and property applications.

C. Emission Mask

18. In the *DSRC Report and Order*, the Commission adopted the ASTM E2213-03 DSRC technical standard for OBUs and RSUs,⁷⁰ but stated that it would revisit the technical standard as DSRC technology develops.⁷¹ Our current Rules contain four emission masks corresponding to Class A, B, C and D DSRC devices.⁷² The emission mask for Class D DSRC devices is: 0 dBr (dB relative to the maximum power spectral density of the signal) at a frequency offset of plus or minus 4.5 MHz from the center frequency, -35 dBr at an offset of plus or minus 5.0 MHz, -45 dBr at an offset of plus or minus 5.5 MHz, -55 dBr at an offset of plus or minus 10 MHz, and -65 dBr at an offset of 15 MHz. 3M argues that the Class D emission mask is too restrictive, may make Class D devices unaffordable, and has not been commercially proven.⁷³ It recommends that the Commission forgo implementing the Class D emission mask until valid technical limits can be defined.

19. While the *DSRC Report and Order* indicated that the Commission would exercise its discretion to revisit the emission mask issue, we foresee that problems could arise if we were to forgo implementation of the Class D mask at this time. For example, without a Class D mask, users could be unable to operate equipment at the highest permitted power level of 28.8 dBm, a power level which may be necessary for longer range applications.⁷⁴ 3M has also expressed its concerns to the ASTM Working Group, resulting in the Working Group adopting a recommendation that the approval of licenses for Class 4 (Class D) operation be delayed until evidence is provided that equipment compliant with the Class D emissions mask is commercially realizable.⁷⁵ Because more study is needed to understand the

⁶⁸ See Alliance *Ex Parte* Comments at 6.

⁶⁹ We believe that vehicle-to-vehicle collision avoidance and mitigation communications will not suffer delays from being on the same channel as other public safety operations since collision avoidance will likely have the highest priority, enabling it to precede or interrupt other public safety communication.

⁷⁰ See ASTM, Standard Specification for Telecommunications and Information Exchange Between Roadside and Vehicle Systems – 5 GHz Band Dedicated Short Range Communications (DSRC) Medium Access Control (MAC) and Physical Layer (PHY) Specifications, Designation: E 2213-03 (published September 2003) (ASTM-DSRC Standard). See also 47 C.F.R. §§ 90.379, 95.1509.

⁷¹ See *DSRC Report and Order*, 19 FCC Rcd at 2470 ¶¶ 21-22.

⁷² See 47 C.F.R. § 90.379. Also, in the 4.9 GHz proceeding, the Commission adopted two of the emission masks from the ASTM-DSRC standard: the Class A mask -- for low power (20 dBm and less), and the Class C mask -- for higher power operations. See *The 4.9 GHz Band Transferred from Federal Government Use, Memorandum Opinion and Order*, WT Docket No. 00-32, 19 FCC Rcd 22325, 2237-329 ¶¶ 5-13 (2004).

⁷³ See 3M Petition at 12-14.

⁷⁴ See ASTM DSRC Standard at 11.

⁷⁵ See 3M petition at 13-14.

implications of alternative courses of action, we encourage 3M to continue working with the ASTM Working Group on this issue, as we believe it appropriate for the ASTM E17.51 DSRC Standards Writing Group to evaluate the question of whether a revision to the Class D mask is appropriate, and then incorporate any necessary changes into the DSRC Standard. In sum, the information provided to date does not warrant revising or deleting the Class D emission mask and we therefore decline to do so. However, we retain discretion to revisit the matter at such time as the ASTM E17.51 DSRC Standards Writing Group may determine that revisions are necessary.

D. Fixed Satellite Service Coordination

20. In both the *DSRC Report and Order* and the *Allocation Report and Order*, the Commission declined to adopt a coordination requirement governing DSRC Service and Fixed Satellite Service (FSS) operations.⁷⁶ At that time, ITS America and SIA reported that they were discussing the development of a sharing protocol.⁷⁷ The Commission found that the effect of the ASTM-DSRC Standard relative to FSS uplinks had not fully been analyzed and noted that industry study and discussions remained ongoing.⁷⁸ Accordingly, the Commission declined to adopt coordination requirements.

21. Following the release of the *DSRC Report and Order*, ITS America, members of the DSRC Standards Development Group and SIA formed the FSS Interference Study Group (FSSISG) to investigate interference issues.⁷⁹ Based upon an apparently soon-to-be-released report,⁸⁰ JHU/APL concludes that "there is potential for interference to the DSRC service from existing FSS earth stations," and recommends interference assessment and channel allocation via third party coordination.⁸¹ JHU/APL disagrees with NTIA's earlier FSS Study in which NTIA found that co-channel operations of DSRC systems and FSS systems can be avoided through existing frequency coordination mechanisms.⁸²

22. Specifically, JHU/APL argues that the use of interference zones⁸³ should become the

⁷⁶ See *DSRC Report and Order* 19 FCC Rcd at 2492-94 ¶¶ 76-80; Amendment of Parts 2 and 90 of the Commission's Rules to Allocate the 5.850-5.925 GHz Band to the Mobile Service for Dedicated Short Range Communications of Intelligent Transportation Services, ET Docket No. 98-95, *Report and Order*, 14 FCC Rcd 18221, 18228 ¶ 15 (1999) (*Allocation Report and Order*).

⁷⁷ See *id.* at 2494 ¶ 79.

⁷⁸ See *id.* at 2494 ¶ 80; JHU/APL Petition at 2 n.1, citing Frank H. Sanders, "Measured Occupancy of 5850-5925 MHz and Adjacent 5-GHz Spectrum in the United States," NTIA Report 00-373 to U.S. Department of Commerce, William M. Daley, Secretary, December 1999 (FSS Study); see also JHU/APL Petition, Enclosure to SSD-PL-04-0457 at 4: Formation of the FSS Interference Study Group (membership comprised of participants from the Federal Highway Administration, ITS America, JHU/APL, ARINC, Mitretek Systems and SIA (PanAmSat, New Skies, and Intelsat)).

⁷⁹ JHU/APL Petition, Enclosure to SSD-PL-04-0457 at 3-4.

⁸⁰ See JHU/APL Petition at 4. To date, the Commission has not received this study nor notice of release of this study.

⁸¹ *Id.* at 1-2. SIA concurs in this assessment of the interference potential to DSRC stations from in-band and adjacent FSS earth stations. See SIA reply comments at 1.

⁸² JHU/APL Petition, Enclosure to SSD-PL-04-0457 at 2-4 citing FSS Study.

⁸³ The interference contour, *i.e.*, mitigation zone plot, is a composite mapping of all of the worst case side lobe and rear lobe emissions from an earth station to a specified interference objective as a function of its licensed latitudinal and longitudinal arcs. *Id.* at 5. It is a graphical representation of the effects of the earth station transmitter's power, (continued....)

primary tool in the licensing of both future RSUs and FSS earth stations.⁸⁴ JHU/APL asserts that applicants can determine the interference zone by assessing the worst case emissions from an FSS earth station, and comparing that information to the interference objective/threshold of the affected DSRC devices.⁸⁵ The FSS Interference Study Group selected nine earth station sites to represent the different FSS-satellite orientations.⁸⁶ When this analysis is applied to existing FSS earth station sites, it is assumed that any DSRC device operation within this zone could experience interference and may require a more detailed interference analysis prior to acquiring an operating license.⁸⁷ However, any DSRC device operating outside this zone could be assured that it would not encounter interference from the subject earth station.⁸⁸ JHU/APL maintains that its coordination scheme for the installation of DSRC RSUs incurs only one additional step in the existing in-band licensing framework between co-primary services.⁸⁹

23. SIA seeks revisions to our rules to protect FSS/DSRC operations, which would: (i) define interference contours for FSS, (ii) require applicants for RSUs within these zones to make detailed interference assessments, (iii) decline to license DSRC stations until the applicants complete the "interference contours" assessment for in-band cases, and (iv) require the design of DSRC stations to be compatible with the out-of-band emission levels for FSS earth stations established pursuant to Section 25.202 of our Rules.⁹⁰ We also note that SIA indicates that the FSSISG remains in the process of finalizing the "interference contours" for each of the existing in-band FSS sites.⁹¹

24. Similarly, ARINC seeks rule revisions such that prior to registering a proposed RSU site, a DSRC licensee would have to conduct an interference analysis of the potential for each proposed site to cause interference or receive interference from incumbent systems in the band.⁹² ARINC asserts that this analysis would be based upon interference protection criteria, which still must be developed.⁹³ Finally, ARINC maintains that technical studies, including recommended analysis standards, have been largely completed,⁹⁴ that discussions between the DSRC and FSS industries will continue,⁹⁵ and that updated

(Continued from previous page)

the RSU antenna gain, the RSU's maximum permissible interference power criteria and the earth station horizon gain. *Id.* at 5-6.

⁸⁴ *Id.* at 6.

⁸⁵ *Id.* at 10.

⁸⁶ The nine sites were in Atlanta, Georgia; Boston, Massachusetts; Fargo, North Dakota; Brewster, Washington; San Francisco, California; Three Peaks, California; Lincoln, Nebraska; Miami, Florida; and DeSoto, Texas. JHU/APL Petition, Enclosure to SSD-PL-04-0457 at 6. The group chose these sites to represent the northern, central and southern portions of the east coast, west coast and central United States. *Id.*

⁸⁷ JHU/APL Petition, Enclosure to SSD-PL-04-0457 at 10.

⁸⁸ *Id.*

⁸⁹ *Id.* at 11.

⁹⁰ SIA reply comments at 1-2.

⁹¹ *Id.* at 2.

⁹² ARINC Petition at 9.

⁹³ ARINC *Ex Parte* at 13 n.35.

⁹⁴ *See* ARINC Petition at 21.

⁹⁵ *Id.* The two industry groups initiated discussions to ascertain the potential for harmful interference, and to develop a "sharing protocol" for DSRC and FSS operations. *See also* ARINC *Ex Parte* at 9 n.20.

information will be provided to the Commission as events warrant.⁹⁶

25. While commenters generally agree that an interference analysis may be necessary to determine FSS interference to DSRC devices, they also indicate that the final results of the FSSISG's study are not yet completed.⁹⁷ We believe that because the record lacks a complete analysis of the ASTM-DSRC Standard relative to FSS uplinks, and given that discussions and contour studies within the industry apparently have continued,⁹⁸ a decision at this time would be premature. Accordingly, we encourage the industry to reach consensus on a DSRC/FSS interference methodology, at which time we will consider appropriate changes to the DSRC rules. We caution, however, that DSRC devices that begin operation prior to resolution of this issue will be subject to any coordination requirements that are ultimately adopted.

E. Construction Requirements

26. ARINC asks that we clarify that Section 1.946(d) of the Rules⁹⁹ requires licensees to "provide notice to the registration database" of the date when the licensee constructs and places an RSU site into operation,¹⁰⁰ and that failure to provide the notification will result in the automatic purging of the site registration from the database.¹⁰¹ ARINC also requests that we authorize priority rights for protection against interference for non-public safety licensees on the date that construction notification is provided to the database and only for Channels 180, 181, and 182.¹⁰²

27. We agree with ARINC that requiring construction notification poses no undue burden on licensees and will increase the accuracy of the Commission's licensing records and facilitate the overall assignment of unused spectrum.¹⁰³ Accordingly, we will require licensees to notify the Commission of the date when the licensee constructs and places an RSU site into operation. Furthermore, if the construction period expires without notice of construction and operation being filed, the site registration will be placed in Termination Pending status, and will be terminated automatically if the licensee does not file a timely petition for rulemaking.¹⁰⁴ As noted in the *DSRC Report and Order*, the purpose of our construction notification is to maintain the integrity of the information in the relevant databases by correctly reflecting the actual record,¹⁰⁵ and we conclude that requiring construction notification furthers this purpose. Licensees whose RSU sites are registered prior to the release of this *MO&O* are not required to file construction notifications for the sites. However, we remind those licensees that Section

⁹⁶ ARINC Petition at 21.

⁹⁷ See ARINC Petition at 21; JHU/APL Petition at 4; and SIA comments at 2.

⁹⁸ See *DSRC Report and Order*, 19 FCC Rcd at 2494 ¶¶ 79-80. Also see SIA reply comments at 2.

⁹⁹ 47 C.F.R. § 1.946(d) provides that a licensee that commences service or operations within the construction period or meets its coverage or substantial service obligations within the coverage period must notify the Commission by filing FCC Form 601.

¹⁰⁰ See ARINC Petition at 12-13.

¹⁰¹ *Id.* at 13.

¹⁰² *Id.*

¹⁰³ See Wireless Telecommunications Bureau to Enhance its Universal Licensing System to More Accurately Reflect Termination of Unconstructed Licenses, *Public Notice*, 20 FCC Rcd 1455 (WTB 2005).

¹⁰⁴ See Wireless Telecommunications Bureau Announces Deployment of "Auto-Term," the Automated Feature in its Universal Licensing System That Identifies Unconstructed Stations Resulting in Automatic Termination of Licensees, *Public Notice*, 21 FCC Rcd 163 (WTB 2006).

¹⁰⁵ See *DSRC Report and Order*, 19 FCC Rcd at 2495 ¶ 83.

90.155(i) of our Rules¹⁰⁶ still requires that these grandfathered locations be constructed within one year of their respective registration dates or the authority to operate the RSU cancels automatically. Thus, we grant ARINC's petition as to this construction notification to the extent discussed above.

28. ARINC also argues that interference protection should be based on the date the licensee places an RSU site into operation, in order to avoid creating a further incentive for licensees to register speculative sites, making those sites unavailable to other licensees who may be in a better position to actually construct and operate from those stations.¹⁰⁷ We disagree. The construction period rules were designed to afford all licensees adequate time to construct their facilities.¹⁰⁸ Although it may be true that planning, staffing and financing advantages might allow one licensee to construct sooner than another, deeming a licensee the "winner" in a race for interference protection serves no apparent productive purpose. Indeed it could unfairly prejudice licensees who, through no fault of their own, cannot construct facilities as rapidly as other licensees with greater resources. Accordingly, we decline to adopt ARINC's "first in time" proposal.

F. Public Safety On-Board Units

29. In the *NPRM*, the Commission noted that there were two types of OBUs, those associated with a specific fixed system and those not associated with a fixed system.¹⁰⁹ In the *DSRC Report and Order*, the Commission decided to license OBUs by rule under Part 95 of the Commission's rules.¹¹⁰ Although ARINC supports the Commission's decision, it asserts that continuing industry discussions after the release of the *DSRC Report and Order* highlighted the need for the establishment of a separate class of OBUs to be used exclusively by public safety eligibles – public safety OBUs or PSOBUs.¹¹¹ ARINC asserts that PSOBUs are allowed by the ASTM-DSRC Standard to operate at higher power than other OBUs, may be operated while mobile as well as when stationary, and will be capable of transmitting beacons and actions frames to other OBUs to provide channel assignments and other instructions.¹¹²

30. Accordingly, ARINC requests that we modify our rules to accommodate the use of PSOBUs by public safety eligibles.¹¹³ ARINC states that this class of OBUs would provide public safety personnel operational flexibility in configuring capabilities in response to exigent situations without the cost or delay otherwise attendant on the registration and construction of an RSU.¹¹⁴ This flexibility

¹⁰⁶ 47 C.F.R. § 90.155(i).

¹⁰⁷ See ARINC Petition at 13.

¹⁰⁸ Amendment of the Commission's Rules to Establish New Personal Communications Services, GEN Docket No. 90-314, *Memorandum Opinion and Order*, 9 FCC Rcd 4957 (1994) (purpose of construction requirement is to make [spectrum] available to as many communities as possible and ensure that the spectrum is used effectively); see also *Winstar Wireless Fiber Corporation and New Winstar Spectrum, LLC, Order*, 17 FCC Rcd 7118, 7124 ¶ 15 (PSPWD WTB 2002) (underlying purpose of the construction requirement includes ensuring the effective use of spectrum; recovering licenses quickly from licensees unable to construct).

¹⁰⁹ *NPRM*, 17 FCC Rcd at 23167 ¶ 51.

¹¹⁰ See *DSRC Report and Order*, 19 FCC Rcd at 2485 ¶ 67.

¹¹¹ ARINC Petition at 19.

¹¹² *Id.*

¹¹³ *Id.* at 19-20.

¹¹⁴ *Id.* at 19.

includes the ability to provide channel assignments and operating instructions to OBUs.¹¹⁵

31. We find that it is premature to address this matter. As JHU/APL notes, the subject of appropriate categories for DSRC devices “is still being written . . . by the DSRC Standards Writing Group.”¹¹⁶ Similar to our reasoning on the emission mask issue addressed herein,¹¹⁷ we believe it would be more appropriate for the DSRC Standards Writing Group to complete its evaluation of this subject and incorporate any necessary changes into the DSRC Standard before we consider incorporating the principles into our rules on an *ad hoc*, piecemeal basis. Accordingly, we decline to adopt another class of OBUs at this time.

G. Antenna Height Correction Factor

32. Section 90.377 of our Rules¹¹⁸ requires that RSUs with antenna elevations from between six and fifteen meters¹¹⁹ must operate at reduced power levels as a function of their antenna height, where the reduction in power level in dB is given by $20 \log(Ht/6)$, where Ht is the height of the radiation center of the antenna in meters.¹²⁰ 3M essentially argues that this power reduction requirement, at least as it applies to public safety priority systems, is excessive and unnecessary, because the reduced power would limit the range within which emergency responders could preempt traffic lights unless multiple antennas were installed to control a single intersection.¹²¹ It contends that the “data bursts” used for intersection control are sufficiently brief that they offer little interference potential and that an acceptable compromise between range and interference potential would result if we (a) applied the power reduction factor only to RSUs with antenna heights greater than eight meters; or (b) exempted public safety priority systems from the power reduction rule.¹²² ARINC agrees with 3M that the power reduction should apply only to antenna heights above eight meters, but opposes 3M’s request that the antenna correction factor not apply to public safety priority systems because of the potential for interference inherent in higher RSU antenna elevations.¹²³

33. 3M is currently involved in the research and development of DSRC intersection priority control systems, and we credit its representation that maintaining the current power reduction factor could restrict system range unless additional, and more costly, antennas were installed at each controlled intersection.¹²⁴ We agree with ARINC that modifying the antenna factor to $20 \log(Ht/8)$ does not undermine the technical provisions in the ASTM standard.¹²⁵ While we understand that the modified

¹¹⁵ *Id.*

¹¹⁶ JHU/APL, Enclosure SSD-PL-04-0457 at 14.

¹¹⁷ See paragraphs 18-19, *supra*.

¹¹⁸ 47 C.F.R. § 90.377.

¹¹⁹ An RSU may not employ an antenna height that exceeds 15 meters above the roadway bed surface. See *id.*

¹²⁰ See *id.* The reduction factor employed was proposed by ITS America. See *NPRM*, 17 FCC Rcd at 23177-8 ¶ 72 citing Ex Parte Comments of the Intelligent Transportation Society of America: Status Report and Recommendations for Licensing and Service Rules for the DSRC Spectrum in the 5850-5925 MHz Band from Mark D. Johnson, Squire, Sanders & Dempsey to Federal Communications Commission at 19 (filed July 9, 2002) (July Ex Parte Comments).

¹²¹ See 3M Petition at 5-8.

¹²² See *id.* at 2; see 3M Ex Parte Comments (filed Oct. 31, 2003) at 10.

¹²³ ARINC Comments on 3M’s Petition For Reconsideration at 5-6.

¹²⁴ See 3M Petition at ii, 1-2.

¹²⁵ ARINC Comments on 3M’s Petition For Reconsideration at 5-6.

antenna factor will also permit stations higher power,¹²⁶ we agree with 3M that considering the short duration of communications, harmful interference to other licensees is unlikely.¹²⁷ However, we are concerned that a blanket exemption from the power reduction requirement for public safety systems could result in unacceptable increases in potential interference.¹²⁸ Accordingly, we amend the power reduction rule to apply only to RSU antenna heights between eight and fifteen meters, but apply the rule to all users.

H. Dual-Band DSRC

34. ARINC observes that DSRC services were envisioned in both the 5.9 GHz ITS band and the adjoining Unlicensed National Information Infrastructure (UNII) band at 5.725-7.825 GHz, but is concerned that dual band operation, involving an adjacent unlicensed service, could result in unauthorized use of the 5.9 GHz band.¹²⁹ It therefore requests that DSRC devices have a “unique identifier or other mechanism to be authorized and/or enabled to provide DSRC services in the 5.9 GHz band.”¹³⁰ ARINC’s comments, without more, are too speculative and non-specific to warrant Commission action at this time. Indeed, ARINC itself notes that the issue it raises is still preliminary and is under consideration by the Institute of Electrical and Electronics Engineers.¹³¹ Accordingly, we decline to take action on the request at this time.

I. Further Proceedings

35. As stated in the *DSRC Report and Order*, we recognize that the ASTM-DSRC Standard will be subject to future revision in order to reflect technological advances.¹³² However, in consideration of the “rigorous and detailed mandates” of the standard and how future revisions might affect a “widespread” incumbent base, we specifically declined to adopt an “automatic update” rule.¹³³ ARINC now suggests that the instant docket be “kept open” until a revised ASTM DSRC Standard is developed and the public is afforded an opportunity for review and comment.¹³⁴ Since the Commission’s adoption of the ASTM-DSRC Standard in February 2004, the ASTM E17.51 DSRC Standards Writing Group has prepared several revisions to the standard,¹³⁵ and ARINC notes that the revisions are expected to be voted on by ASTM members in the near future, then published shortly thereafter.¹³⁶

36. *Decision.* We recognize that the ASTM-DSRC Standard may be subject to periodic

¹²⁶ For example, at a height of ten meters, the $20 \log(H/6)$ formula requires a 4.44 dB reduction in power, while the $20 \log(H/8)$ formula only requires a 1.94 dB reduction, a 2.5 dB increase (or a proportional increase in power of 7/9) permitted under the new formula.

¹²⁷ See 3M *Ex Parte* at 9.

¹²⁸ ARINC Comments on 3 M’s Petition For Reconsideration at 7.

¹²⁹ ARINC Petition at 14.

¹³⁰ *Id.*

¹³¹ *Id.* The IEEE is a non-profit, technical professional association of more than 360,000 individual members in approximately 175 countries. It publishes technical papers, conducts conferences and consensus-based standards activities. See <http://www.ieee.org>.

¹³² See *DSRC Report and Order*, 19 FCC Rcd at 2470 ¶ 22.

¹³³ *Id.* With respect to the term “automatic update,” ITS America and several other commenters urged the adoption of a rule that automatically requires new equipment to meet future versions of the ASTM-DSRC Standard. See *id.*

¹³⁴ See ARINC Petition at 19.

¹³⁵ *Id.* at 18.

¹³⁶ *Id.* at 19. ARINC expected the revisions to be voted on in late 2005, but that has not yet occurred.

revisions in the future. We will accept proposals filed in this docket to incorporate revisions to the ASTM standard from the ASTM E17.51 DSRC Standards Writing Group upon publication of the revisions referred to *supra*.¹³⁷

IV. PROCEDURAL MATTERS

A. Supplemental Final Regulatory Flexibility Certification

37. As required by the Final Regulatory Flexibility Act (RFA), *see* 5 U.S.C. § 604, the Commission has prepared a Supplemental Final Regulatory Certification for the *Memorandum Opinion and Order*, and is included at Appendix B.

V. ORDERING CLAUSES

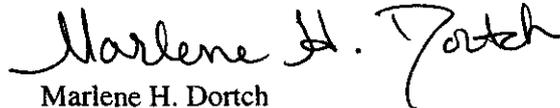
38. ACCORDINGLY, IT IS ORDERED that, pursuant to Sections 1, 4(i), 302, 303(f) and (r), and 332 of the Communications Act of 1934, as amended, 47 U.S.C. §§ 1, 154(i), 302, 303(f) and (r), and 332, this *Memorandum Opinion and Order* is ADOPTED.

39. IT IS FURTHER ORDERED that, Parts 90 and 95 of the Commission's Rules, 47 C.F.R. Parts 90, 95, ARE AMENDED as specified in Appendix A, effective sixty days after publication of this *Memorandum Opinion and Order* in the Federal Register.

40. IT IS FURTHER ORDERED, pursuant to Sections 4(i) and 405 of the Communications Act of 1934, as amended, 47 U.S.C. §§ 154(i), 405, and Section 1.106(a)(1) of the Commission's Rules, 47 C.F.R. § 1.106(a)(1), the petitions for reconsideration of 3M Company, ARINC Incorporated, Intelligent Transportation Society of America, and Johns Hopkins University Applied Physics Laboratory, filed on September 2, 2004 in WT Docket 01-90, ARE GRANTED IN PART to the extent discussed herein, and otherwise ARE DENIED.

41. IT IS FURTHER ORDERED that the Commission's Consumer and Governmental Affairs Bureau, Reference Information Center, SHALL SEND a copy of this *Memorandum Opinion and Order*, including the Supplemental Final Flexibility Certification, to the Chief Counsel for Advocacy of the U.S. Small Business Administration.

FEDERAL COMMUNICATIONS COMMISSION



Marlene H. Dortch
Secretary

¹³⁷ Pursuant to the Commission's rules, parties may initiate a new proceeding by filing a petition for rule making or the Commission may institute such a proceeding on its own motion. *See* 47 C.F.R. § 1.411. In either event, a new docket number will be assigned. *See* 47 C.F.R. § 1.413(d).

APPENDIX A

FINAL RULES

Parts 1, 90, and 95 of Title 47 of the Code of Federal Regulations are amended as follows:

I. PART 1 – PRACTICE AND PROCEDURE

1. The authority citation for Part 1 continues to read as follows:

AUTHORITY: 47 U.S.C. 151, 154(i), 154(j), 155, 225, 303(r), 309 and 325(e).

2. Section 1.946 is amended by revising paragraph (d) to read as follows:

§ 1.946 Construction and coverage requirements.

* * * * *

(d) Licensee notification of compliance. A licensee who commences service or operations within the construction period or meets its coverage or substantial services obligations within the coverage period must notify the Commission by filing FCC Form 601. The notification must be filed within 15 days of the expiration of the applicable construction or coverage period. Where the authorization is site-specific, if service or operations have begun using some, but not all, of the authorized transmitters, the notification must show to which specific transmitters it applies.

* * * * *

II. PART 90 – PRIVATE LAND MOBILE RADIO SERVICES

3. The authority citation for Part 90 continues to read as follows:

AUTHORITY: Sections 4(i), 11, 303(g), 303(r) and 332(c)(7) of the Communications Act of 1934, as amended, 47 U.S.C. 154(i), 161, 303(g), 303(r), 332(c)(7).

* * * * *

4. Section 90.155 is amended by revising paragraph (i) to read as follows:

§ 90.155 Time in which station must be placed in operation.

* * * * *

(i) DSRCS Roadside Units (RSUs) in the 5850-5925 MHz band must be placed in operation within 12 months from the date of registration (see § 90.375 of this part) or the authority to operate the RSUs cancels automatically (see § 1.955 of this chapter). Such registration date(s) do not change the overall renewal period of the single license. Licensees must notify the Commission in accordance with § 1.946 of this chapter when registered units are placed in operation within their construction period.

5. Section 90.377 is amended to read as follows:

§ 90.377 Frequencies available; maximum EIRP and antenna height, and priority communications.

(a) Licensees shall transmit only the power (EIRP) needed to communicate with an OBU within the communications zone and must take steps to limit the Roadside Unit (RSU) signal within the zone to

the maximum extent practicable.

(b) Frequencies available for assignment to eligible applicants within the 5850-5925 MHz band for RSUs and the maximum EIRP permitted for an RSU with an antenna height not exceeding 8 meters above the roadway bed surface are specified in the table below. Where two EIRP limits are given, the higher limit is permitted only for state or local governmental entities.

Channel No.	Frequency Range (MHz)	Max. EIRP ¹ (dBm)	Channel Use
170	5850-5855		Reserved
172	5855-5865	33	Service Channel ²
174	5865-5875	33	Service Channel
175	5865-5885	23	Service Channel ³
176	5875-5885	33	Service Channel
178	5885-5895	33 / 44.8	Control Channel
180	5895-5905	23	Service Channel
181	5895-5915	23	Service Channel ³
182	5905-5915	23	Service Channel
184	5915-5925	33 / 40	Service Channel ⁴

\1\ An RSU may employ an antenna with a height exceeding 8 meters but not exceeding 15 meters provided the EIRP specified in the table above is reduced by a factor of $20 \log(Ht/8)$ in dB where Ht is the height of the radiation center of the antenna in meters above the roadway bed surface. The EIRP is measured as the maximum EIRP toward the horizon or horizontal, whichever is greater, of the gain associated with the main or center of the transmission beam. The RSU antenna height shall not exceed 15 meters above the roadway bed surface.

\2\ Channel 172 is designated for public safety applications involving safety of life and property.

\3\ Channel Nos. 174/176 may be combined to create a twenty megahertz channel, designated Channel No. 175. Channels 180/182 may be combined to create a twenty-megahertz channel, designated Channel No. 181.

\4\ Channel 184 is designated for public safety applications involving safety of life and property. Only those entities meeting the requirements of 90.373(a) are eligible to hold an authorization to operate on this channel.

(c) Except as provided in paragraphs (d) and (e), non-reserve DSRCS channels are available on a shared basis only for use in accordance with the Commission's Rules. All licensees shall cooperate in the selection and use of channels in order to reduce interference. This includes monitoring for communications in progress and any other measures as may be necessary to minimize interference. Licensees of RSUs suffering or causing harmful interference within a communications zone are expected to cooperate and resolve this problem by mutually satisfactory arrangements. If the licensees are unable to do so, the Commission may impose restrictions including specifying the transmitter power, antenna height and direction, additional filtering, or area or hours of operation of the stations concerned. Further the use of any channel at a given geographical location may be denied when, in the judgment of the Commission, its use at that location is not in the public interest; use of any such channel may be restricted as to specified geographical areas, maximum power, or such other operating conditions, contained in this part or in the station authorization.

(d) *Safety/public safety priority.* The following access priority governs all DSRC operations:

(1) communications involving the safety of life have access priority over all other DSRC communications;

(2) subject to a control channel priority system management strategy (see ASTM E2213-03 DSRC Standard at § 4.1.1.2(4)), DSRC communications involving public safety have access priority over all other DSRC communications not listed in paragraph (d)(1). Roadside Units (RSUs) operated by state or local governmental entities are presumptively engaged in public safety priority communications.

(e) *Non-priority communications.* DSRC communications not listed in paragraph (d) are non-priority communications. If a dispute arises concerning non-priority communications, the licensee of the later-registered RSU must accommodate the operation of the early registered RSU, *i.e.*, interference protection rights are date-sensitive, based on the date that the RSU is first registered (see § 90.375 of this part) and the later-registered RSU must modify its operations to resolve the dispute in accordance with paragraph (f).

(f) Except as otherwise provided in the ASTM-DSRC Standard (see § 90.379 of this part) for the purposes of paragraph (e), objectionable interference will be considered to exist when the Commission receives a complaint and the difference in signal strength between the earlier-registered RSU and the later-registered RSU (anywhere within the earlier-registered RSU's communication zone) is 18 dB or less (co-channel). Later-registered RSUs causing objectionable interference must correct the interference immediately unless written consent is obtained from the licensee of the earlier-registered RSU.

III. PART 95 – PERSONAL RADIO SERVICES

6. The authority citation for Part 95 continues to read as follows:

AUTHORITY: Sections 4, 303, 48 Stat. 1066, 1082, as amended; 47 U.S.C. 154, 303.

5. Section 95.1511 is amended to read as follows:

§ 95.1511 Frequencies available.

(a) The following table indicates the channel designations of frequencies available for assignment to eligible applicants within the 5850-5925 MHz band for On-Board Units (OBUs):¹

Channel No.	Channel Use	Frequency Range (MHz)
170	Reserved	5850-5855
172	Service Channel ²	5855-5865
174	Service Channel	5865-5875
175	Service Channel ³	5865-5885
176	Service Channel	5875-5885
178	Control Channel	5885-5895
180	Service Channel	5895-5905
181	Service Channel ³	5895-5915
182	Service Channel	5905-5915
184	Service Channel ⁴	5915-5925

¹ The maximum output power for portable DSRC-OBUs is 1.0 mW. See § 95.639(i).

\2\ Channel 172 is designated for public safety applications involving safety of life and property.

\3\ Channel Nos. 174/176 may be combined to create a twenty megahertz channel, designated Channel No. 175. Channels 180/182 may be combined to create a twenty-megahertz channel, designated Channel No. 181.

\4\ Channel 184 is designated for public safety applications involving safety of life and property.

(b) Except as provided in paragraph (c), non-reserve DSRCS channels are available on a shared basis only for use in accordance with the Commission's Rules. All licensees shall cooperate in the selection and use of channels in order to reduce interference. This includes monitoring for communications in progress and any other measures as may be necessary to minimize interference. Licensees suffering or causing harmful interference within a communications zone are expected to cooperate and resolve this problem by mutually satisfactory arrangements. If the licensees are unable to do so, the Commission may impose restrictions, including specifying the transmitter power, antenna height and direction, additional filtering, or area or hours of operation of the stations concerned. Further, the use of any channel at a given geographical location may be denied when, in the judgment of the Commission, its use at that location is not in the public interest; the use of any channel may be restricted as to specified geographical areas, maximum power, or such other operating conditions, contained in this part or in the station authorization.

(c) *Safety/public safety priority.* The following access priority governs all DSRCS operations:

(1) communications involving the safety of life have access priority over all other DSRCS communications;

(2) subject to a control channel priority system management strategy (see ASTM E2213-03 DSRC Standard at § 4.1.1.2(4)), DSRCS communications involving public safety have access priority over all other DSRC communications not listed in paragraph (c)(1). On-Board Units (OBUs) operated by state or local governmental entities are presumptively engaged in public safety priority communications.

(d) *Non-priority communications.* DSRCS communications not listed in paragraph (c) are non-priority communications. If a dispute arises concerning non-priority DSRCS-OBU communications with Roadside Units (RSUs), the provisions of §§ 90.377(e) and (f) of this chapter will apply. Disputes concerning non-priority DSRCS-OBU communications not associated with RSUs are governed by paragraph (b) of this section.

APPENDIX B

SUPPLEMENTAL FINAL REGULATORY FLEXIBILITY CERTIFICATION

1. As required by the Regulatory Flexibility Act (RFA),¹³⁸ a Supplemental Final Regulatory Flexibility Analysis (FRFA) was incorporated in the *DSRC Report and Order*.¹³⁹ In view of the fact that we have adopted further rule amendments in this *Memorandum Opinion and Order (MO&O)*, we have included this Supplemental Final Regulatory Flexibility Certification. This Certification conforms to the RFA.¹⁴⁰

2. The RFA requires that regulatory flexibility analysis be prepared for rulemaking proceedings unless the agency certifies that "the rule will not, if promulgated, have a significant economic impact on a substantial number of small entities." The RFA generally defines "small entity" as having the same meaning as the term "small business," "small organization," and "small governmental jurisdiction." In addition, the term "small business" has the same meaning as the term "small business concern" under the Small Business Act. A small business concern is one which: (1) is independently owned and operated; (2) is not dominant in its field of operation; and (3) satisfies any additional criteria established by the Small Business Administration (SBA).

3. This *Memorandum Opinion and Order* amends our rules to require licensees to file a notice of construction to the Commission for each site registered and clarify that site priority attaches to prior registered sites that have fully constructed within the twelve month construction period; amends the antenna height correction factor adopted for DSRC to increase flexibility and reduce implementation costs to public safety, and designates Channel 172 (5.855-5.865 GHz) for vehicle-to-vehicle safety communications for accident avoidance and mitigation, and Channel 184 (5.915-5.925 GHz) for high-power, longer-distance communications for public safety applications and road intersection vehicular collision mitigation. These rule changes are not expected to affect the cost of DSRC equipment or implementation. Therefore, we certify that the requirements of this *Memorandum Opinion and Order* will not have a significant economic impact on a substantial number of small entities.

4. The Commission will send a copy of the *Memorandum Opinion and Order*, including a copy of this final certification, in a report to Congress pursuant to the Congressional Review Act, see U.S.C. § 801(a)(1)(A). In addition, the *Memorandum Opinion and Order* and this certification will be sent to the Chief Counsel for Advocacy of the Small Business Administration. A copy of this *Memorandum Opinion and Order* and (or summaries thereof) will also be published in the Federal Register.¹⁴¹

¹³⁸ Regulatory Flexibility Act § 603, 5 U.S.C. § 603 (2005).

¹³⁹ See Amendment of the Commission's Rules Regarding Dedicated Short-Range Communication Services in the 5.850-5.925 GHz Band (5.9 GHz Band), *Report and Order*, 19 FCC Rcd 2458, 2496 ¶ 87 (2004) (*DSRC Report and Order*).

¹⁴⁰ See 5 U.S.C. § 604.

¹⁴¹ See 5 U.S.C. § 604(b).

APPENDIX C

LIST OF PETITIONERS AND COMMENTERS

Petitioners

3M Company (3M)

ARINC, Incorporated (ARINC)

Applied Physics Laboratory of John Hopkins University (JHU/APL)

Intelligent Transport Society of America (ITS America)

Commenter

ARINC

Reply Commenters

3M

Alliance of Automobile Manufacturers (Alliance)

ARINC

Mark IV IVHS, Inc. (Mark IV)

Raytheon Company (Raytheon)

Satellite Industry Association (SIA)

SIRIT Technologies (SIRIT)

TransCore (Transcore)

JHU/APL

Ex Partes

ARINC

Comsearch

DSRC/FSS Industry Working Group (jointly sponsored by ITS America, American Association of State Highway and Transportation Offices (AASHTO) and SIA

U.S. Department of Transportation (DOT)

Alliance