

Hyundai Motor America
Mercedes-Benz USA, LLC
National Automobile Dealers Association (NADA)
Nissan North America, Inc.
Philips Healthcare Systems
Satellite Industry Association
Sirius XM
Stratos
Telecommunications Industry Association (TIA)
Vogel, Wolfhard (Balcones Industrial R&D Corporation)
WCS Coalition

In addition, 353 short comments were filed in WT Docket No. 07-293 between March 6, 2010 and April 26, 2010, from parties generally requesting that the Commission protect the reception of Sirius XM's programming.

B. Late-filed Comments

AFTRCC ("Reply Comments" filed on Apr. 30)
AIAM (Apr. 29)
American Trucking Associations (Apr. 26)
Chrysler (May 3)
Ford Motor Company (May 3)
Sirius XM ("Supplemental Comments" filed on Apr. 29; "Comments" filed on May 13)

VIII. 2010 *Ex Parte* Filings

AFTRCC
AFTRCC, Boeing, Raytheon Company, Textron Corporation, Lockheed Martin Corporation, and Dr. Jablonski
AFTRCC, Boeing, Raytheon Company, Textron Corporation, and Dr. Jablonski
Alcatel-Lucent
Alliance of Automobile Manufacturers
Anthony Weiner, Gary Ackerman, Joseph Crowley, Steve Israel, and Louise Slaughter – Members of Congress
Boeing
Chrysler
Columbia Capital
Ford Motor Company
Fred Upton and Mike Rogers – Members of Congress
General Motors North American Operations
Horizon
Horizon, Kolodzy Consulting Inc., NextWave, NRTC, and WCS Coalition
Horizon and NextWave
Horizon, NextWave, National Rural Telecommunications Cooperative, and WCS Coalition
Hyundai Motor America
Kia Motors America, Inc.
Land Rover North America Inc.
NextWave
Olympia Snowe, United States Senator
Sirius XM
Sprint Nextel
Stratos

TIA
Toyota Motor Sales, USA, Inc.
Volvo Cars of North America, LLC
WCS Coalition

APPENDIX B**Rule Revisions**

For the reasons discussed above, the Federal Communications Commission amends Title 47 of the Code of Federal Regulations, Part 25, as follows:

PART 25 – SATELLITE COMMUNICATIONS

1. The authority citation for Part 25 continues to read as follows:

Authority: 47 U.S.C. 701-744. Interprets or applies Sections 4, 301, 302, 303, 307, 309, and 332 of the Communications Act, as amended, 47 U.S.C. Sections 154, 301, 302a, 303, 307, 309, and 332, unless otherwise noted.

2. Amend Section 25.121 by revising paragraph (a) to read as follows:

§ 25.121 License term and renewals.

(a) License Term. (1) Except for licenses for DBS space stations, SDARS space stations and terrestrial repeaters, and 17/24 GHz BSS space stations licensed as broadcast facilities, licenses for facilities governed by this part will be issued for a period of 15 years.

(2) Licenses for DBS space stations and 17/24 GHz BSS space stations licensed as broadcast facilities, and for SDARS space stations and terrestrial repeaters, will be issued for a period of 8 years. Licenses for DBS space stations not licensed as broadcast facilities will be issued for a period of 10 years.

* * * * *

3. Amend Section 25.144 by revising paragraph (d) and adding paragraph (e), to read as follows:

§ 25.144 Licensing provisions for the 2.3 GHz satellite digital audio radio service.

* * * * *

(d) The license term for each digital audio radio service satellite and any associated terrestrial repeaters are specified in § 25.121 of this chapter.

(e) SDARS Terrestrial Repeaters.

(1) Only entities holding or controlling SDARS space station licenses may construct and operate SDARS terrestrial repeaters and such construction and operation is permitted only in conjunction with at least one SDARS space station that is concurrently authorized and transmitting directly to subscribers.

(2) SDARS terrestrial repeaters will be eligible for blanket licensing only under the following circumstances:

(i) The SDARS terrestrial repeaters will comply with all applicable power limits set forth in § 25.214(d)(1) of this chapter and all applicable out-of-band emission limits set forth in § 25.202(h)(1) and (2) of this chapter.

(ii) The SDARS terrestrial repeaters will meet all applicable requirements in part 1, subpart I, and part 17 of this chapter. Operators of SDARS terrestrial repeaters must maintain

demonstrations of compliance with part 1, subpart I, of this chapter and make such demonstrations available to the Commission upon request within three business days.

(iii) The SDARS terrestrial repeaters will comply with all requirements of all applicable international agreements.

(3) After [Insert release date of Order], SDARS licensees shall, before deploying any new, or modifying any existing, terrestrial repeater, notify potentially affected WCS licensees pursuant to the procedure set forth in § 25.263 of this chapter.

(4) SDARS terrestrial repeaters are restricted to the simultaneous retransmission of the complete programming, and only that programming, transmitted by the SDARS licensee's satellite(s) directly to the SDARS licensee's subscribers' receivers, and may not be used to distribute any information not also transmitted to all subscribers' receivers.

(5) Operators of SDARS terrestrial repeaters are prohibited from using those repeaters to retransmit different transmissions from a satellite to different regions within that satellite's coverage area.

(6) Operators of SDARS terrestrial repeaters are required to comply with all applicable provisions of part 1, subpart I, and part 17 of this chapter.

(7)(i) Each SDARS terrestrial repeater transmitter utilized for operation under this paragraph must be of a type that has been authorized by the Commission under its certification procedure.

(ii) In addition to the procedures set forth in subpart J of part 2 of this chapter, power measurements for SDARS repeater transmitters may be made in accordance with a Commission-approved average power technique. Peak-to-average power ratio (PAPR) measurements for SDARS repeater transmitters should be made using either an instrument with complementary cumulative distribution function (CCDF) capabilities to determine that the PAPR will not exceed 13 dB for more than 0.1 percent of the time or another Commission approved procedure. The measurement must be performed using a signal corresponding to the highest PAPR expected during periods of continuous transmission.

(iii) Any manufacturer of radio transmitting equipment to be used in these services may request equipment authorization following the procedures set forth in subpart J of part 2 of this chapter. Equipment authorization for an individual transmitter may be requested by an applicant for a station authorization by following the procedures set forth in part 2 of this chapter.

(8) Applications for blanket authority to operate terrestrial repeaters must be filed using Form 312, except that Schedule B to Form 312 need not be filed. Such applications must also include the following information as an attachment:

(i) The space station(s) with which the terrestrial repeaters will communicate, the frequencies and emission designators of such communications, and the frequencies and emission designators used by the repeaters to re-transmit the received signals.

(ii) The maximum number of terrestrial repeaters that will be deployed under the authorization at 1) power levels equal to or less than 2-watt average EIRP, and 2) power levels greater than 2-watt average EIRP (up to 12-kW average EIRP).

(iii) A certification of compliance with the requirements of § 25.144(e)(1) through (7) of this chapter.

(9) SDARS terrestrial repeaters that are ineligible for blanket licensing must be authorized on a site-by-site basis. Applications for site-by-site authorization must be filed using Form 312, except that Schedule B need not be provided. Such applications must also include the following information, as an attachment:

(i) The technical information for each repeater required to be shared with potentially affected WCS licensees as part of the notification requirement set forth in § 26.263(c)(2) of this chapter.

(ii) The space station(s) with which the terrestrial repeaters will communicate, the frequencies and emission designators of such communications, and the frequencies and emission designators used by the repeaters to re-transmit the received signals.

4. Amend Section 25.202 by adding paragraph (a)(10), revising the introductory language of paragraph (f), and adding paragraph (h), to read as follows:

§ 25.202 Frequencies, frequency tolerance, and emission limitations.

(a) * * *

(10) The following frequencies are available for use by the Satellite Digital Audio Radio Service (SDARS), and for any associated terrestrial repeaters:

2320-2345 MHz (space-to-Earth)

* * * * *

(f) Emission limitations. Except for SDARS terrestrial repeaters, the mean power of emissions shall be attenuated below the mean output power of the transmitter in accordance with the schedule set forth in paragraphs (f)(1) through (f)(4) of this section. The out-of-band emissions of SDARS terrestrial repeaters shall be attenuated in accordance with the schedule set forth in paragraph (h) of this section.

* * * * *

(h) Out-of-band emission limitations for SDARS terrestrial repeaters.

(1) Any SDARS terrestrial repeater operating at a power level greater than 2-watt average EIRP is required to attenuate its out-of-band emissions below the transmitter power P by a factor of not less than $90 + 10 \log (P)$ dB in a 1-megahertz bandwidth outside the 2320-2345 MHz band, where P is average transmitter output power in watts.

(2) Any SDARS terrestrial repeater operating at a power level equal to or less than 2-watt average EIRP is required to attenuate its out-of-band emissions below the transmitter power P by a factor of not less than $75 + 10 \log (P)$ dB in a 1-megahertz bandwidth outside the 2320-2345 MHz band, where P is average transmitter output power in watts.

(3) SDARS repeaters are permitted to attenuate out-of-band emissions less than the levels specified in paragraphs (1) and (2) above, unless a potentially affected WCS licensee provides written notice that it intends to commence commercial service within the following 365 days. Starting 180 days after receipt of such written notice, SDARS repeaters within the area notified by the potentially affected WCS licensee must attenuate out-of-band emissions to the levels specified in paragraphs (1) and (2) above.

(4) For the purpose of this section, a WCS licensee is potentially affected if it meets any of the following criteria:

(i) The WCS licensee is authorized to operate a base station in the 2305-2315 MHz or 2350-2360 MHz bands in the same Major Economic Area (MEA) as that in which a SDARS terrestrial repeater is located.

(ii) The WCS licensee is authorized to operate a base station in the 2315-2320 MHz or 2345-2350 MHz bands in the same Regional Economic Area Grouping (REAG) as that in which a SDARS terrestrial repeater is located.

(iii) A SDARS terrestrial repeater is located within 5 kilometers of the boundary of an MEA or REAG in which the WCS licensee is authorized to operate a WCS base station.

5. Amend Section 25.214 by revising the title and adding paragraph (d) to read as follows:

§ 25.214 Technical requirements for space stations in the satellite digital audio radio service and associated terrestrial repeaters.

* * * * *

(d) Power limit for SDARS terrestrial repeaters.

(1) SDARS terrestrial repeaters must be operated at a power level less than or equal to 12-kW average EIRP, with a maximum peak-to-average power ratio of 13 dB.

(2) SDARS repeaters are permitted to operate at power levels above 12-kW average EIRP, unless a potentially affected WCS licensee provides written notice that it intends to commence commercial service within the following 365 days. Starting 180 days after receipt of such written notice, SDARS repeaters within the area notified by the potentially affected WCS licensee must be operated at a power level less than or equal to 12-kW average EIRP, with a maximum peak-to-average power ratio of 13 dB.

(3) For the purpose of this section, a WCS licensee is potentially affected if it meets any of the following criteria:

(i) The WCS licensee is authorized to operate a base station in the 2305-2315 MHz or 2350-2360 MHz bands in the same Major Economic Area (MEA) as that in which a SDARS terrestrial repeater is located.

(ii) The WCS licensee is authorized to operate a base station in the 2315-2320 MHz or 2345-2350 MHz bands in the same Regional Economic Area Grouping (REAG) as that in which a SDARS terrestrial repeater is located.

(iii) A SDARS terrestrial repeater is located within 5 kilometers of the boundary of an MEA or REAG in which the WCS licensee is authorized to operate a WCS base station.

6. Add Section 25.263 to read as follows:

§ 25.263 Information sharing requirements for SDARS terrestrial repeater operators.

This section requires SDARS licensees in the 2320-2345 MHz band to share information regarding the location and operation of terrestrial repeaters with WCS licensees in the 2305-2320 MHz and 2345-2360 MHz bands. Section 27.72 of this chapter requires WCS licensees to share information

regarding the location and operation of base stations in the 2305-2320 MHz and 2345-2360 MHz bands with SDARS licensees in the 2320-2345 MHz band.

(a) SDARS licensees must select terrestrial repeater sites and frequencies, to the extent practicable, to minimize the possibility of harmful interference to WCS base station operations in the 2305-2320 MHz and 2345-2360 MHz bands.

(b) Notice Requirements. SDARS licensees that intend to operate a new terrestrial repeater must, before commencing such operation, provide 10 business days prior notice to all potentially affected WCS licensees. SDARS licensees that intend to modify an existing repeater must, before commencing such modified operation, provide 5 business days prior notice to all potentially affected WCS licensees.

(1) For purposes of this section, a "potentially affected WCS licensee" is a WCS licensee that: (i) is authorized to operate a base station in the 2305-2315 MHz or 2350-2360 MHz bands in the same Major Economic Area (MEA) as that in which the terrestrial repeater is to be located; (ii) is authorized to operate a base station in the 2315-2320 MHz or 2345-2350 MHz bands in the same Regional Economic Area Grouping (REAG) as that in which the terrestrial repeater is to be located. (iii) In addition to the WCS licensees identified in paragraphs (b)(1)(i) and (ii) of this section, in cases in which the SDARS licensee plans to deploy or modify a terrestrial repeater within 5 kilometers of the boundary of an MEA or REAG in which the terrestrial repeater is to be located, a potentially affected WCS licensee is one that is authorized to operate a WCS base station in that neighboring MEA or REAG within 5 kilometers of the location of the terrestrial repeater.

(2) For the purposes of this section, a business day is defined by § 1.4(e)(2) of this chapter.

(c) Contents of Notice.

(1) Notification must be written (*e.g.*, certified letter, fax, or email) and include the licensee's name, and the name, address, and telephone number of its coordination representative, unless the SDARS licensee and all potentially affected WCS licensees reach a mutual agreement to provide notification by some other means. WCS licensees and SDARS licensees may establish such a mutually agreeable alternative notification mechanism without prior Commission approval, provided that they comply with all other requirements of this section.

(2) Regardless of the notification method, notification must specify relevant technical details, including, at a minimum: (i) the coordinates of the proposed repeater to an accuracy of no less than ± 1 second latitude and longitude; (ii) the proposed operating power(s), frequency band(s), and emission(s); (iii) the antenna center height above ground and ground elevation above mean sea level, both to an accuracy of no less than ± 1 meter; (iv) the antenna gain pattern(s) in the azimuth and elevation planes that include the peak of the main beam; and (v) the antenna downtilt angle(s).

(3) An SDARS licensee operating terrestrial repeaters must maintain an accurate and up-to-date inventory of its terrestrial repeaters operating above 2 watts average EIRP, including the information set forth in § 25.263(c)(2) of this chapter, which shall be available upon request by the Commission.

(d) Calculation of Notice Period. Notice periods are calculated from the date of receipt by the licensee being notified. If notification is by mail, the date of receipt is evidenced by the return receipt on certified mail. If notification is by fax, the date of receipt is evidenced by the notifying party's fax transmission confirmation log. If notification is by email, the date of receipt is evidenced by a return e-mail receipt. If the SDARS licensee and all potentially affected WCS licensees reach a mutual agreement to provide notification by some other means, that agreement must specify the method for determining the beginning of the notice period.

(e) Duty to Cooperate. SDARS licensees must cooperate in good faith in the selection and use of new repeater sites to reduce interference and make the most effective use of the authorized facilities. Licensees of stations suffering or causing harmful interference must cooperate in good faith and resolve such problems by mutually satisfactory arrangements. If the licensees are unable to do so, the International Bureau, in consultation with the Office of Engineering and Technology and the Wireless Telecommunications Bureau, may impose restrictions on SDARS licensees, including specifying the transmitter power, antenna height, or area or hours of operation of the stations.

For the reasons discussed above, the Federal Communications Commission amends Title 47 of the Code of Federal Regulations, Part 27, as follows:

PART 27 – MISCELLANEOUS WIRELESS COMMUNICATIONS SERVICES

1. The authority citation for Part 27 continues to read as follows:

Authority: 47 U.S.C. 154, 301, 302a, 303, 307, 309, 332, 336, and 337 unless otherwise noted.

2. Amend Section 27.14 by revising paragraph (a) and adding paragraph (p) to read as follows:

§ 27.14 Construction requirements; Criteria for renewal.

(a) AWS and WCS licensees, with the exception of WCS licensees holding authorizations for Block A in the 698–704 MHz and 728–734 MHz bands, Block B in the 704–710 MHz and 734–740 MHz bands, Block E in the 722–728 MHz band, Block C, C1, or C2 in the 746–757 MHz and 776–787 MHz bands, Block D in the 758–763 MHz and 788–793 MHz bands, Block A in the 2305-2310 MHz and 2350-2355 MHz bands, Block B in the 2310-2315 MHz and 2355-2360 MHz bands, Block C in the 2315-2320 MHz band, and Block D in the 2345-2350 MHz band, must, as a performance requirement, make a showing of “substantial service” in their license area within the prescribed license term set forth in § 27.13. “Substantial service” is defined as service which is sound, favorable and substantially above a level of mediocre service which just might minimally warrant renewal. Failure by any licensee to meet this requirement will result in forfeiture of the license and the licensee will be ineligible to regain it.

* * * * *

(p) This section enumerates performance requirements for licensees holding authorizations for Block A in the 2305-2310 MHz and 2350-2355 MHz bands, Block B in the 2310-2315 MHz and 2355-2360 MHz bands, Block C in the 2315-2320 MHz band, and Block D in the 2345-2350 MHz band.

(1) For mobile or point-to-multipoint systems, a licensee must provide reliable signal coverage and offer service to at least 40 percent of the license area’s population by [42 MONTHS AFTER THE EFFECTIVE DATE OF ORDER], and to at least 75 percent of the license area’s population by [72 MONTHS AFTER THE EFFECTIVE DATE OF ORDER]. If, when filing the construction notification required under § 1.946(d), a WCS licensee demonstrates that 25 percent or more of the license area’s population for Block A, B or D is within a coordination zone as defined by section 27.73(a) of this rule part, the foregoing population benchmarks are reduced to 25 and 50 percent, respectively. The percentage of a license area’s population within a coordination zone equals the sum of the Census Block Centroid Populations within the area, divided by the license area’s total population.

(2) For point-to-point fixed systems, except those deployed in the Gulf of Mexico license area, a licensee must construct and operate a minimum of 15 point-to-point links per million persons (one link per 67,000 persons) in a license area by [42 MONTHS AFTER THE EFFECTIVE

DATE OF ORDER], and 30 point-to-point links per million persons (one link per 33,500 persons) in a licensed area by [72 MONTHS AFTER THE EFFECTIVE DATE OF ORDER]. The exact link requirement is calculated by dividing a license area's total population by 67,000 and 33,500 for the respective milestones, and then rounding upwards to the next whole number. For a link to be counted towards these benchmarks, both of its endpoints must be located in the license area. If only one endpoint of a link is located in a license area, it can be counted as a one-half link towards the benchmarks.

(3) For point-to-point fixed systems deployed on any spectrum block in the Gulf of Mexico license area, a licensee must construct and operate a minimum of 15 point-to-point links by [42 MONTHS AFTER THE EFFECTIVE DATE OF ORDER], and a minimum of 15 point-to-point links by [72 MONTHS AFTER THE EFFECTIVE DATE OF ORDER].

(4) Under subsection (2) and (3) above, each fixed link must provide a minimum bit rate, in bits per second, equal to or greater than the bandwidth specified by the emission designator in Hertz (e.g., equipment transmitting at a 5 Mb/s rate must not require a bandwidth of greater than 5 MHz).

(5) If an initial authorization for a license area is granted after [EFFECTIVE DATE OF ORDER], then the applicable benchmarks in subsections (1), (2) and (3) above must be met within 42 and 72 months, respectively, of the initial authorization grant date.

(6) Licensees must use the most recently available U.S. Census Data at the time of measurement to meet these performance requirements.

(7) Licensees must certify compliance with the applicable performance requirements by filing a construction notification with the Commission, within 15 days of the expiration of the relevant performance milestone, pursuant to § 1.946(d). Each construction notification must include electronic coverage maps, supporting technical documentation, and any other information as the Wireless Telecommunications Bureau may prescribe by Public Notice. Electronic coverage maps must accurately depict the boundaries of each license area (Regional Economic Area Grouping, REAG, or Major Economic Area, MEA) in the licensee's service territory. Further, REAG maps must depict MEA boundaries and MEA maps must depict Economic Area boundaries. If a licensee does not provide reliable signal coverage to an entire license area, its map must accurately depict the boundaries of the area or areas within each license area not being served. Each licensee also must file supporting documentation certifying the type of service it is providing for each REAG or MEA within its service territory and the type of technology used to provide such service. Supporting documentation must include the assumptions used to create the coverage maps, including the propagation model and the signal strength necessary to provide reliable service with the licensee's technology.

(8) If a licensee fails to meet any applicable performance requirement, its authorization will terminate automatically without further Commission action as of the applicable performance milestone and the licensee will be ineligible to regain it.

3. Amend Section 27.50 by revising paragraph (a) to read as follows:

§ 27.50 Power limits and duty cycle.

(a) The following power limits and related requirements apply to stations transmitting in the 2305-2320 MHz band or the 2345-2360 MHz band.

(1) Base and fixed stations.

(i) For base and fixed stations transmitting in the 2305-2315 MHz band or the 2350-2360 MHz band:

(A) The average equivalent isotropically radiated power (EIRP) must not exceed 2,000 watts within any 5 megahertz of authorized bandwidth and must not exceed 400 watts within any 1 megahertz of authorized bandwidth.

(B) The peak-to-average power ratio (PAPR) of the transmitter output power must not exceed 13 dB. The PAPR measurements should be made using either an instrument with complementary cumulative distribution function (CCDF) capabilities to determine that PAPR will not exceed 13 dB for more than 0.1 percent of the time or other Commission approved procedure. The measurement must be performed using a signal corresponding to the highest PAPR expected during periods of continuous transmission.

(ii) For base and fixed stations transmitting in the 2315-2320 MHz band or the 2345-2350 MHz band, the peak EIRP must not exceed 2,000 watts.

(iii) Base stations supporting frequency division duplex (FDD) mobile and portable operations are restricted to transmitting in the 2345-2360 MHz bands.

(2) Fixed and customer premises equipment stations. For fixed and customer premises equipment (CPE) stations transmitting in the 2305-2320 MHz band or in the 2345-2360 MHz band, the peak EIRP must not exceed 20 watts. Fixed and CPE stations transmitting in the 2305-2320 MHz band or in the 2345-2360 MHz band must employ automatic transmit power control when operating so the stations operate with the minimum power necessary for successful communications. The use of outdoor antennas for CPE stations or outdoor CPE station installations is prohibited. For WCS CPE using TDD technology, the duty cycle must not exceed 38 percent; for WCS CPE using FDD technology, the duty cycle must not exceed 12.5 percent in the 2315-2320 MHz band, and must not exceed 25 percent in the 2305-2315 MHz band.

(3) Mobile and portable stations.

(i) For mobile and portable stations transmitting in the 2305-2317.5 MHz band or the 2347.5-2360 MHz band, the average EIRP must not exceed 250 milliwatts within any 5 megahertz of authorized bandwidth and must not exceed 50 milliwatts within any 1 megahertz of authorized bandwidth. For mobile and portable stations using time division duplex (TDD) technology, the duty cycle must not exceed 38 percent in the 2305-2317.5 MHz and 2347.5-2360 MHz bands. For mobile and portable stations using frequency division duplex (FDD) technology, the duty cycle must not exceed 12.5 percent in the 2315-2317.5 MHz band and must not exceed 25 percent in the 2305-2315 MHz band. Mobile and portable stations using FDD technology are restricted to transmitting in the 2305-2317.5 MHz band. Power averaging shall not include intervals in which the transmitter is off.

(ii) Mobile and portable stations are not permitted to operate in the 2317.5-2320 MHz and 2345-2347.5 MHz bands.

(iii) Automatic transmit power control. Mobile and portable stations transmitting in the 2305-2317.5 MHz band or in the 2347.5-2360 MHz band must employ automatic transmit power control when operating so the stations operate with the minimum power necessary for successful communications.

(iv) Prohibition on external vehicle-mounted antennas. The use of external vehicle-mounted antennas for mobile and portable stations transmitting in the 2305-2317.5 MHz band or the 2347.5-2360 MHz band is prohibited.

* * * * *

4. Amend Section 27.53 by revising paragraphs (a)(1), (a)(2), (a)(3), (a)(4), and (a)(5), removing and reserving paragraphs (a)(6) and (a)(9), and revising paragraph (a)(10) to read as follows:

§ 27.53 Emission limits.

(a) For operations in the 2305-2320 MHz band and the 2345-2360 MHz band, the power of any emission outside a licensee's frequency band(s) of operation shall be attenuated below the transmitter power P (with averaging performed only during periods of transmission) within the licensed band(s) of operation, in watts, by the following amounts:

(1) For base and fixed stations' operations in the 2305-2320 MHz band and the 2345-2360 MHz band:

(i) By a factor of not less than $43 + 10 \log(P)$ dB on all frequencies between 2305 and 2320 MHz and on all frequencies between 2345 and 2360 MHz that are outside the licensed band of operation, and not less than $75 + 10 \log(P)$ dB on all frequencies between 2320 and 2345 MHz;

(ii) By a factor of not less than: $43 + 10 \log(P)$ dB at 2305 MHz, $70 + 10 \log(P)$ dB at 2300 MHz, $72 + 10 \log(P)$ dB at 2287.5 MHz, and $75 + 10 \log(P)$ dB below 2285 MHz;

(iii) By a factor of not less than: $43 + 10 \log(P)$ dB at 2360 MHz, $55 + 10 \log(P)$ dB at 2362.5 MHz, $70 + 10 \log(P)$ dB at 2365 MHz, $72 + 10 \log(P)$ dB at 2367.5 MHz, and $75 + 10 \log(P)$ dB above 2370 MHz.

(2) For fixed and customer premises equipment (CPE) stations operating in the 2305-2320 MHz band and the 2345-2360 MHz band transmitting with more than 2 watts average EIRP:

(i) By a factor of not less than: $43 + 10 \log(P)$ dB on all frequencies between 2305 and 2320 MHz and on all frequencies between 2345 and 2360 MHz that are outside the licensed band of operation, and not less than $75 + 10 \log(P)$ dB on all frequencies between 2320 and 2345 MHz.

(ii) By a factor of not less than: $43 + 10 \log(P)$ dB at 2305 MHz, $70 + 10 \log(P)$ dB at 2300 MHz, $72 + 10 \log(P)$ dB at 2287.5 MHz, and $75 + 10 \log(P)$ dB below 2285 MHz;

(iii) By a factor of not less than: $43 + 10 \log(P)$ dB at 2360 MHz, $55 + 10 \log(P)$ dB at 2362.5 MHz, $70 + 10 \log(P)$ dB at 2365 MHz, $72 + 10 \log(P)$ dB at 2367.5 MHz, and $75 + 10 \log(P)$ dB above 2370 MHz.

(3) For fixed CPE stations transmitting with 2 watts average EIRP or less:

(i) By a factor of not less than $43 + 10 \log(P)$ dB on all frequencies between 2305 and 2320 MHz and on all frequencies between 2345 and 2360 MHz that are outside the licensed band of operation, not less than $55 + 10 \log(P)$ dB on all frequencies between 2320 and 2324 MHz and on all frequencies between 2341 and 2345 MHz, not less than $61 + 10 \log(P)$ dB on all frequencies between 2324 and 2328 MHz and on all frequencies between 2337 and 2341 MHz, not less than $67 + 10 \log(P)$ dB on all frequencies between 2328 and 2337 MHz;

(ii) By a factor of not less than $43 + 10 \log(P)$ dB at 2305 MHz, $55 + 10 \log(P)$ dB at 2300 MHz, $61 + 10 \log(P)$ dB at 2296 MHz, $67 + 10 \log(P)$ dB at 2292 MHz, $70 + 10 \log(P)$ dB below 2288 MHz.

(iii) By a factor of not less than: $43 + 10 \log(P)$ dB at 2360 MHz and $70 + 10 \log(P)$ dB above 2365 MHz.

(4) For mobile and portable stations operating in the 2305-2317.5 MHz and 2347.5-2360 MHz bands:

(i) By a factor of not less than: $43 + 10 \log (P)$ dB on all frequencies between 2305 and 2317.5 MHz and on all frequencies between 2347.5 and 2360 MHz that are outside the licensed band of operation, not less than $55 + 10 \log (P)$ dB on all frequencies between 2320 and 2324 MHz and on all frequencies between 2341 and 2345 MHz, not less than $61 + 10 \log (P)$ dB on all frequencies between 2324 and 2328 MHz and on all frequencies between 2337 and 2341 MHz, not less than $67 + 10 \log (P)$ dB on all frequencies between 2328 and 2337 MHz.

(ii) By a factor of not less than $43 + 10 \log (P)$ dB at 2305 MHz, $55 + 10 \log (P)$ dB at 2300 MHz, $61 + 10 \log (P)$ dB at 2296 MHz, $67 + 10 \log (P)$ dB at 2292 MHz, and $70 + 10 \log (P)$ dB below 2288 MHz.

(iii) By a factor of not less than: $43 + 10 \log (P)$ dB at 2360 MHz and $70 + 10 \log (P)$ dB above 2365 MHz.

(5) Measurement procedure. Compliance with these rules is based on the use of measurement instrumentation employing a resolution bandwidth of 1 MHz or greater. However, in the 1 MHz bands immediately outside and adjacent to the frequency block (*i.e.*, 2304-2305 and 2360-2361 MHz) a resolution bandwidth of at least 1 percent of the emission bandwidth of the fundamental emission of the transmitter may be employed. A narrower resolution bandwidth is permitted in all cases to improve measurement accuracy provided the measured power is integrated over the full required measurement bandwidth (*i.e.* 1 MHz or 1 percent of emission bandwidth, as specified). The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power. With respect to television operations, measurements must be made of the separate visual and aural operating powers at sufficiently frequent intervals to ensure compliance with the rules.

* * * * *

(6) Reserved.

* * * * *

(9) Reserved.

(10) The out-of-band emissions limits in paragraphs (a)(1) through (a)(3) of this section may be modified by the private contractual agreement of all affected licensees, who must maintain a copy of the agreement in their station files and disclose it to prospective assignees, transferees, or spectrum lessees and, upon request, to the Commission.

* * * * *

5. Add Section 27.72 to read as follows:

§ 27.72 Information sharing requirements.

This section requires WCS licensees in the 2305-2320 MHz and 2345-2360 MHz bands to share information regarding the location and operation of base stations with Satellite Digital Audio Radio Service (SDARS) licensees in the 2320-2345 MHz band. Section 25.263 of this chapter requires SDARS licensees in the 2320-2345 MHz band to share information regarding the location and operation of terrestrial repeaters with WCS licensees in the 2305-2320 MHz and 2345-2360 MHz bands.

(a) WCS licensees must select base station sites and frequencies, to the extent practicable, to minimize the possibility of harmful interference to operations in the SDARS 2320-2345 MHz band.

(b) Prior Notice Periods. WCS licensees that intend to operate a base station must, before commencing such operation, provide 10 business days prior notice to all SDARS licensees. WCS licensees that intend to modify an existing base station must, before commencing such modified operation, provide 5 business days prior notice to all SDARS licensees. For the purposes of this section, a business day is defined by § 1.4(e)(2) of this chapter.

(c) Contents of Notice.

(1) Notification must be written (*e.g.*, certified letter, fax, or email) and include the licensee's name, and the name, address, and telephone number of its coordination representative, unless the SDARS licensee and all potentially affected WCS licensees reach a mutual agreement to provide notification by some other means. WCS licensees and SDARS licensees may establish such a mutually agreeable alternative notification mechanism without prior Commission approval, provided that they comply with all other requirements of this section.

(2) Regardless of the notification method, it must specify relevant technical details, including, at a minimum: (i) the coordinates of the proposed base station to an accuracy of no less than ± 1 second latitude and longitude; (ii) the proposed operating power(s), frequency band(s), and emission(s); (iii) the antenna center height above ground and ground elevation above mean sea level, both to an accuracy of no less than ± 1 meter; (iv) the antenna gain pattern(s) in the azimuth and elevation planes that include the peak of the main beam; and (v) the antenna downtilt angle(s).

(3) A WCS licensee operating base stations must maintain an accurate and up-to-date inventory of its base stations, including the information set forth in § 27.72(c)(2) of this chapter, which shall be available upon request by the Commission.

(d) Calculation of Notice Period. Notice periods are calculated from the date of receipt by the licensee being notified. If notification is by mail, the date of receipt is evidenced by the return receipt on certified mail. If notification is by fax, the date of receipt is evidenced by the notifying party's fax transmission confirmation log. If notification is by e-mail, the date of receipt is evidenced by a return e-mail receipt. If the SDARS licensee and all potentially affected WCS licensees reach a mutual agreement to provide notification by some other means, that agreement must specify the method for determining the beginning of the notice period.

(e) Duty to Cooperate. WCS licensees must cooperate in good faith in the selection and use of new station sites and new frequencies to reduce interference and make the most effective use of the authorized facilities. WCS licensees should provide SDARS licensees as much lead time as practicable to provide ample time to conduct analyses and opportunity for prudent base station site selection prior to WCS licensees entering into real estate and tower leasing or purchasing agreements. WCS licensees must have sufficient operational flexibility in their network design to implement one or more technical solutions to remedy harmful interference. Licensees of stations suffering or causing harmful interference must cooperate in good faith and resolve such problems by mutually satisfactory arrangements. If the licensees are unable to do so, the Wireless Telecommunications Bureau, in consultation with the Office of Engineering and Technology and the International Bureau, will consider the actions taken by the parties to mitigate the risk of and remedy any alleged interference. In determining the appropriate action, the Bureau will take into account the nature and extent of the interference and act promptly to remedy the interference. The Bureau may impose restrictions on WCS licensees, including specifying the transmitter power, antenna height, or other technical or operational measures to remedy the interference, and will take into account previous measures by the licensees to mitigate the risk of interference.

6. Add Section 27.73 to read as follows:

§ 27.73 WCS, AMT, and Goldstone coordination requirements.

This section requires Wireless Communications Services (WCS) licensees in the 2345-2360 MHz band to coordinate the deployment of base stations with Aeronautical Mobile Telemetry (AMT) facilities in the 2360-2395 MHz band; and to take all practicable steps necessary to minimize the risk of harmful interference to AMT facilities.

(a) Wireless Communications Service (WCS) licensees operating base stations in the 2345-2360 MHz band shall, prior to operation of such base stations, achieve a mutually satisfactory coordination agreement with the Aerospace and Flight Test Radio Coordinating Council (AFTRCC) for any AMT receiver facility within 45 kilometers or the radio line of sight, whichever distance is larger, of the intended WCS base station location. This coordination is necessary to protect AMT receive systems consistent with Recommendation ITU-R M.1459. The locations of the current and planned Federal and non-Federal AMT receiver sites may be obtained from AFTRCC.

(b) WCS licensees operating base stations in the 2305-2320 MHz band shall, prior to operation of such base stations, achieve a mutually satisfactory coordination agreement with the National Aeronautics and Space Administration (NASA) within 145 kilometers of the Goldstone, CA earth station site (35-25-33 N 116-53-23 W).

(c) After base station operations commence, upon receipt of a complaint of harmful interference, the WCS licensee(s) receiving the complaint, no matter the distance from the NASA Goldstone, CA earth station or from an AMT site, operating in the 2305-2320 or 2345-2360 MHz bands, respectively, shall take all practicable steps to immediately eliminate the interference.

(d) Duty to Cooperate. WCS licensees, AFTRCC, and NASA must cooperate in good faith in the coordination and deployment of new facilities. WCS licensees must also cooperate in good faith in the selection and use of new station sites and new frequencies when within radio line of site of AMT receiver facilities to reduce the risk of harmful interference and make the most effective use of the authorized facilities. Licensees of stations suffering or causing harmful interference must cooperate in good faith and resolve such problems by mutually satisfactory arrangements. If the licensees are unable to do so, the Wireless Telecommunications Bureau, in consultation with the Office of Engineering and Technology and the National Telecommunications and Information Administration may impose restrictions including specifying the transmitter power, antenna height, or area or hours of operation of the stations.

APPENDIX C

Final Regulatory Flexibility Analysis

Report and Order in WT Docket No. 07-293

1. As required by the Regulatory Flexibility Act of 1980, as amended (RFA),¹ Initial Regulatory Flexibility Analyses (IRFA) were incorporated in the *Notice of Proposed Rulemaking (2007 Notice)*,² as well as the *WCS Performance Public Notice*³ in WT Docket No. 07-293. The Commission sought written public comment on the proposals in the *2007 Notice* and *WCS Performance Public Notice*, including comment on the IRFAs. This present Final Regulatory Flexibility Analysis (FRFA) conforms to the RFA.⁴

A. Need for, and Objectives of, the *Report and Order*

2. In this *Report and Order*, the Commission takes a number of steps to facilitate deployment of mobile broadband products and services in the 2305-2320 MHz and 2345-2360 MHz Wireless Communications Service (WCS) bands, while safeguarding from harmful interference satellite radio services, which are provided in the interstitial 2320-2345 MHz Satellite Digital Radio Service (SDARS) band. These steps are set forth below in paragraphs 3-10.

3. In this *Report and Order*, the objective of the Commission is to resolve the issue of potential interference between the proposed simultaneous and potentially conflicting operations of SDARS and WCS licensees by establishing a regulatory framework that allows such licensees in the 2305-2360 MHz frequency band to co-exist. Specifically, the Commission revises certain power and out-of-band emissions (OOBE) rules applicable to WCS licensees.

4. *Mobile and Portable (Handheld) Power Limits.* Upon careful consideration of the technical analyses submitted in the record, the Commission revises the power limits for mobile and portable device operations in all WCS spectrum blocks. Noting that mobile handheld devices operating in other services typically employ up to approximately 250 milliwatts (mW) of power, the Commission establishes a power limit of 250 mW average equivalent isotropically radiated power (EIRP) limit for the WCS A and B blocks and for the lower 2.5 megahertz of the WCS C Block and the upper 2.5 megahertz of the WCS D Block, limited to 50 mW/MHz of EIRP. The *Report and Order*, however, prohibits WCS mobile and portable devices from operating in the upper 2.5 megahertz of the WCS C Block and the lower 2.5 megahertz of the WCS D block in light of the immediate adjacency of those blocks to the SDARS band. The Commission concludes that these restrictions are needed to provide added protection to SDARS receivers in the 2320-2345 MHz band.

¹ See 5 U.S.C. § 603. The RFA, see 5 U.S.C. § 601 – 612, has been amended by the Small Business Regulatory Enforcement Fairness Act of 1996 (SBREFA), Pub. L. No. 104-121, Title II, 110 Stat. 857 (1996).

² See Amendment of Part 27 of the Commission's Rules to Govern the Operation of Wireless Communications Services in the 2.3 GHz Band and Establishment of Rules and Policies for the Digital Audio Radio Satellite Service in the 2310-2360 MHz Frequency Band, *Notice of Proposed Rulemaking and Second Further Notice of Proposed Rulemaking*, WT Docket No. 07-293 and IB Docket No. 95-91, 22 FCC Rcd 22123, 22156-22159 (2007) ("2007 Notice").

³ See "Federal Communications Commission Requests Comment on Revision of Performance Requirements for 2.3 GHz Wireless Communications Service," WT Docket No. 07-293, *Public Notice*, FCC 10-46 (rel. March 29, 2010) (*WCS Performance Public Notice*).

⁴ See 5 U.S.C. § 604. A Final Regulatory Flexibility Analysis of the *Second Report and Order* in IB Docket No. 95-91 is contained in a separate appendix.

5. *Mobile and Portable Emission Limits.* Noting that the existing $(110 + 10 \log(P) \text{ dB})$ out-of-band emissions (OOBE) attenuation applicable to WCS mobile equipment⁵ is so restrictive such that, in effect, no mobile operation is feasible, the Commission lowers the applicable emission limits to provide WCS licensees greater flexibility. The *Report and Order* revises OOBE rules to require that a WCS mobile or portable device attenuate its output emissions below the transmitter power P by a factor of not less than $43 + 10 \log(P) \text{ dB}$ in the 2305-2317.5 MHz band on frequencies that are outside the licensed band of operation, not less than $55 + 10 \log(P) \text{ dB}$ in the four megahertz of SDARS spectrum nearest the WCS band (*i.e.*, 2320-2324 MHz and 2341-2345 MHz), $61 + 10 \log(P) \text{ dB}$ in the center four megahertz of each SDARS assignment (2324-2328 MHz and 2337-2341 MHz), and $67 + 10 \log(P) \text{ dB}$ in the spectrum shared by SDARS operators (2328-2337 MHz). These revised OOBE limits are intended to minimize the potential for interference to satellite radio users in the vast majority of circumstances, while enabling WCS licensees to deliver vital mobile broadband services to the public. To limit the potential for interference to Deep Space Network (DSN) operations in the 2290-2300 MHz band and Aeronautical Mobile Telemetry (AMT) operations in the 2360-2395 MHz band, WCS mobile and portable devices OOBE must be attenuated by a factor of not less than $43 + 10 \log(P) \text{ dB}$ at 2305 and 2360 MHz, not less than $45 + 10 \log(P) \text{ dB}$ at 2362.5 MHz, not less than $55 + 10 \log(P) \text{ dB}$ at 2365 MHz, not less than $65 + 10 \log(P) \text{ dB}$ at 2367.5 MHz, and not less than $70 + 10 \log(P) \text{ dB}$ at or below 2300 MHz and at or above 2370 MHz.

6. *Base and Fixed Station Power and OOBE Limits.* In order to appropriately balance the interests of both SDARS and WCS, the Commission concludes that base and fixed station power limits for the WCS C and D blocks should not be revised. Because of the proximity of the C and D blocks to the SDARS band, the Commission agrees with SDARS licensees that the current 2,000 Watts (W) peak EIRP limit applicable to these blocks should be retained. However, the *Report and Order* revises the power limit for base and fixed station operations in WCS Blocks A and B from the current 2,000 Watts peak EIRP limit to 2,000 W over five megahertz (400 W/MHz), which will be measured on an average basis with a maximum peak-to-average power ratio (PAPR) of 13dB. This approach, combined with the 250 mW average EIRP limit for WCS mobile and portable devices and the related OOBE limit for emissions into the SDARS band, will provide the technical flexibility for WCS licensees in these blocks to deploy much needed broadband services to the public with minimal impact on satellite radio users.

7. Additionally, in the *Report and Order*, the Commission also seeks to provide WCS licensees with greater flexibility with regard to emission limits by adopting an OOBE attenuation factor of $75 + 10 \log(P) \text{ dB}$ below the transmitter power P , as measured over a 1-megahertz resolution bandwidth, for WCS base stations, on frequencies in the SDARS band at 2320-2345 MHz. In addition, to protect DSN operations in the 2290-2300 MHz band and AMT operations in the 2360-2395 MHz band, WCS base and fixed stations' OOBE must be attenuated by a factor of not less than $43 + 10 \log(P) \text{ dB}$ at 2305 and 2360 MHz, not less than $55 + 10 \log(P) \text{ dB}$ at 2362.5 MHz, not less than $70 + 10 \log(P) \text{ dB}$ at or below 2300 MHz and at 2365 MHz, not less than $72 + 10 \log(P) \text{ dB}$ at 2367.5 MHz, and not less than $75 + 10 \log(P) \text{ dB}$ at or above 2370 MHz.

8. *Fixed Customer Premises Equipment (CPE) Power and OOBE Limits.* In the *Report and Order*, the Commission maintains the current mobile transmitter power limit of 20 W peak EIRP for WCS fixed CPE devices. The Commission notes that there have not been any significant reports of interference to SDARS operations resulting from currently authorized equipment, and does not expect SDARS operations to experience any appreciable increase in interference from these WCS operations if the current limit is retained. Moreover, the Commission believes that continuing to allow WCS fixed CPE devices to use up to 20 W EIRP will enhance the provision and quality of service in rural areas, where subscribers are often located significant distances from WCS licensees' serving base stations.

⁵ See 47 C.F.R. § 27.53(a)(2).

9. Additionally, the Commission adopts, for WCS fixed CPE devices operating above 2 Watts average transmit power, an OOB attenuation factor of not less than $75 + 10 \log(P)$ dB, as measured over a 1-megahertz resolution bandwidth, on frequencies in the 2320-2345 MHz band, $43 + 10 \log(P)$ dB at 2305 and 2360 MHz, not less than $55 + 10 \log(P)$ dB at 2362.5 MHz, not less than $70 + 10 \log(P)$ dB at or below 2300 MHz and at 2365 MHz, not less than $72 + 10 \log(P)$ dB at 2367.5 MHz, and not less than $75 + 10 \log(P)$ dB at or above 2370 MHz.

10. For lower power CPE devices operating at or below 2 W average EIRP, the Commission further relaxes the OOB attenuation levels measured over a 1-megahertz resolution bandwidth to the levels it adopts for mobile devices: not less than $43 + 10 \log(P)$ dB in the 2305-2320 MHz and 2345-2360 MHz bands on frequencies that are outside the licensed band of operation, not less than $55 + 10 \log(P)$ dB in the 2320-2324 MHz and 2341-2345 MHz bands, not less than $61 + 10 \log(P)$ dB in the 2324-2328 MHz and 2337-2341 MHz bands, not less than $67 + 10 \log(P)$ dB in the 2328-2337 MHz band, not less than $43 + 10 \log(P)$ dB at 2305 and 2360 MHz, not less than $45 + 10 \log(P)$ dB at 2362.5 MHz, not less than $55 + 10 \log(P)$ dB at 2365 MHz, not less than $65 + 10 \log(P)$ dB at 2367.5 MHz, and not less than $70 + 10 \log(P)$ dB at or below 2300 MHz and at or above 2370 MHz.

11. *Notification Requirement.* The *Report and Order* adopts new rule Section 27.72, which will require WCS licensees to notify, and share certain technical information with, SDARS licensees 10 business days prior to commencing operation of a base station and five business days prior to commencing operation of a modified base station, to avoid potential interference to SDARS operations. The *Report and Order* also requires WCS licensees to provide SDARS licensees an inventory of their deployed infrastructure consistent with, and within 30 days of the effective date of, new Section 27.72.

12. *Protection of Deep Space Network and Aeronautical Mobile Telemetry Operations.* Further, the Commission adopts measures to protect Deep Space Network (DSN) operations in the 2300-2305 MHz band, as well as Aeronautical Mobile Telemetry (AMT) operations in the 2360-2390 MHz band. To protect DSN operations in the 2300-2305 MHz band, the *Report and Order* adopts a combination of reasonable OOB limits and a coordination distance of 145 km for WCS base stations. Similarly, the Commission also adopts revised OOB limits for emissions into the 2360-2390 MHz band, and requires WCS licensees to coordinate with AMT entities in circumstances where a WCS base station is within 45 kilometers or line of sight from an AMT receiver, whichever distance is greater. The Commission finds that these measures provide appropriate protection for operations below 2305 MHz and above 2360 MHz yet give WCS licensees sufficient flexibility to deploy mobile broadband services.

13. *WCS Performance Requirements.* The Commission also adopts enhanced performance requirements, which will further the public interest by promoting the rapid deployment of new broadband services to the American public. Specifically, WCS licensees providing mobile or point-to-multipoint services must provide reliable signal coverage to 40 percent of a license area's population within 42 months, and 75 percent of a license area's population within 72 months. Further, the *Report and Order* requires that WCS licensees deploying point-to-point fixed services construct and operate 15 point-to-point links per million persons in a license area within 42 months, and 30 point-to-point links per million persons in a license area within 72 months, together with a minimum payload capacity.

14. The Commission establishes alternative performance requirements for license areas where WCS licensees providing mobile or point-to-multipoint services must coordinate with aeronautical mobile telemetry (AMT) entities to serve a significant percentage of a market's total population. Specifically, in any license area where 25 percent or more the population is within an AMT zone, affected licensees must serve 25 percent (rather than 40) of the population within 42 months, and 50 percent (rather than 75) within 72 months. Because it will be easier to coordinate point-to-point systems in the vicinity of AMT receive sites, the *Report and Order* does not find it necessary to reduce the applicable construction thresholds for point-to-point facilities.

B. Summary of Significant Issues Raised by Public Comments in Response to the IRFA

15. No comments were received in response to the IRFAs in the *2007 Notice* and the *WCS Performance Public Notice*.

C. Description and Estimate of the Number of Small Entities To Which the Rules Will Apply

16. The RFA directs agencies to provide a description of and, where feasible, an estimate of the number of small entities that may be affected by the rules adopted. The RFA generally defines the term “small entity” as having the same meaning as the terms “small business,” “small organization,” and “small governmental jurisdiction.”⁶ In addition, the term “small business” has the same meaning as the term “small business concern” under the Small Business Act.⁷ 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).⁸ A small organization is generally “any not-for-profit enterprise which is independently owned and operated and is not dominant in its field.”⁹ Below, the Commission further describes and estimates the number of small entity licensees and regulatees that may be affected by the rules changes explored in the *Notices*.

17. *WCS Licensees*. The Wireless Communication Service in the 2305-2360 MHz (2.3 GHz) frequency band has flexible rules that permit licensees in this service to provide fixed, mobile, portable, and radiolocation services. Licensees are also permitted to provide satellite digital audio radio services. The SBA rules establish a size standard for “Wireless Telecommunications Carriers,” which encompasses business entities engaged in radiotelephone communications employing no more than 1,500 persons.¹⁰ There are currently 155 active WCS licenses held by 10 licensees. Of these, 7 licensees qualify as small entities and hold a total of 50 licenses.

18. *RF Equipment Manufacturers*. The Census Bureau defines this category as follows: “This industry comprises establishments primarily engaged in manufacturing radio and television broadcast and wireless communications equipment. Examples of products made by these establishments are: transmitting and receiving antennas, cable television equipment, GPS equipment, pagers, cellular phones, mobile communications equipment, and radio and television studio and broadcasting equipment.”¹¹ The SBA has developed a small business size standard for Radio and Television Broadcasting and Wireless Communications Equipment Manufacturing, which is: all such firms having 750 or fewer employees.¹² According to Census Bureau data for 2002, there were a total of 1,041

⁶ See 5 U.S.C. § 601(6).

⁷ See 5 U.S.C. § 601(3) (incorporating by reference the definition of “small business concern” in 15 U.S.C. § 632). Pursuant to the RFA, the statutory definition of a small business applies unless an agency, after consultation with the Office of Advocacy of the Small Business Administration and after opportunity for public comment, establishes one or more definitions which are appropriate to the activities of the agency and publishes such definition(s) in the Federal Register.

⁸ See Small Business Act, 5 U.S.C. § 632 (1996).

⁹ See 5 U.S.C. § 601(4).

¹⁰ See 13 C.F.R. § 121.201, NAICS code 517110

¹¹ U.S. Census Bureau, 2002 NAICS Definitions, “334220 Radio and Television Broadcasting and Wireless Communications Equipment Manufacturing”; <http://www.census.gov/epcd/naics02/def/NDEF334.HTM#N3342>.

¹² See 13 C.F.R. § 121.201, NAICS code 334220.

establishments in this category that operated for the entire year.¹³ Of this total, 1,010 had employment of under 500, and an additional 13 had employment of 500 to 999.¹⁴ Thus, under this size standard, the majority of firms can be considered small.

D. Description of Projected Reporting, Recordkeeping, and Other Compliance Requirements for Small Entities

19. The *Report and Order* imposes certain changes in projected reporting, record keeping, and other compliance requirements. These changes affect small and large companies equally. With respect to coordination requirements in circumstances where WCS licensees are within certain distances from AMT operations, the *Report and Order* requires WCS and AMT entities to cooperate in good faith in order to minimize the likelihood of harmful interference, make the most effective use of facilities, as well as to resolve actual instances of harmful interference. The *Report and Order* also requires coordinating parties to share accurate and relevant information in a timely and efficient manner. Parties unable to reach a mutually acceptable coordination agreement may approach the Wireless Telecommunications Bureau, which, in cooperation with the Office of Engineering and Technology and the National Telecommunications & Information Administration (NTIA), may impose restrictions on operating parameters such as the transmitter power, antenna height, or area or hours of operation of the stations. Deadlines may also be imposed if it appears that parties are unable to reach a mutually acceptable arrangement within a reasonable time period.

20. The *Report and Order* requires that WCS licensees demonstrate compliance with any revised performance requirements by filing a construction notification within 15 days of the relevant benchmark and certifying that they have met the applicable performance requirements. The *Report and Order* requires that each construction notification should include electronic coverage maps and supporting documentation, which must be truthful and accurate and must not omit material information that is necessary for the Commission to determine compliance with its performance requirements. Further, the electronic coverage maps must clearly and accurately depict the boundaries of each license area (Regional Economic Area Grouping, REAG, or Major Economic Area, MEA) in the licensee's service territory, with REAG maps depicting MEA boundaries, and MEA maps depicting Economic Area boundaries. The *Report and Order* provides that if the licensee's signal does not provide service to the entire license area, the map must clearly and accurately depict the boundaries of the area or areas within each license area not being served. These procedures direct each licensee to file supporting documentation certifying the type of service it is providing for each REAG or MEA within its license service territory and the type of technology it is utilizing to provide such service. Further, the compliance procedures require the supporting documentation to provide the assumptions used to create the coverage maps, including the propagation model and the signal strength necessary to provide service with the licensee's technology.

21. Other than these requirements, as well as the notification obligations discussed in Section A, *supra*, there are no other specific reporting or recordkeeping requirements adopted in the *Report and Order*.

¹³ U.S. Census Bureau, American FactFinder, 2002 Economic Census, Industry Series, Industry Statistics by Employment Size, NAICS code 334220 (released May 26, 2005); <http://factfinder.census.gov>. The number of "establishments" is a less helpful indicator of small business prevalence in this context than would be the number of "firms" or "companies," because the latter take into account the concept of common ownership or control. Any single physical location for an entity is an establishment, even though that location may be owned by a different establishment. Thus, the numbers given may reflect inflated numbers of businesses in this category, including the numbers of small businesses. In this category, the Census breaks-out data for firms or companies only to give the total number of such entities for 2002, which were 929.

¹⁴ *Id.* An additional 18 establishments had employment of 1,000 or more.

E. Steps Taken to Minimize Significant Economic Impact on Small Entities, and Significant Alternatives Considered

22. The RFA requires an agency to describe any significant alternatives that it has considered in reaching its proposed approach, which may include the following four alternatives: (1) the establishment of differing compliance or reporting requirements or timetables that take into account the resources available to small entities; (2) the clarification, consolidation, or simplification of compliance or reporting requirements under the rule for small entities; (3) the use of performance, rather than design standards; and (4) an exemption from coverage of the rule, or any part thereof, for small entities.¹⁵

23. The Commission's principal objective in this proceeding is to enable the provision of promising mobile broadband services to the public in the WCS spectrum to the maximum extent practicable, while ensuring that satellite radio operations are not unreasonably impacted by the Commission's actions. Adopting overly stringent technical rules for WCS to protect SDARS operations from interference will preclude WCS mobile operation, while liberalizing the WCS rules too much will result in harmful interference and disruption to SDARS service. Such results would cause significant adverse economic impact on either WCS licensees, which include small entities, or on SDARS operations.¹⁶ Accordingly, the Commission has considered various alternatives, as described below, in order to best provide WCS licensees, including small-entity WCS licensees, with the flexibility to provide mobile service, while also protecting against disruptions to SDARS operations due to harmful interference.

24. *Mobile and Portable (Handheld) Device Power Limits.* In response to the 2007 Notice's request for comment regarding applicable mobile and portable device power limits, the WCS Coalition argues that, in conjunction with the use of certain OOB limits (described below), mobile and portable devices should be permitted to operate at a maximum of 250 mW average EIRP, and subject to the use of transmit power control mechanisms. In contrast, SDARS licensees initially proposed that WCS mobile and portable devices operating on WCS Blocks A and B should be limited to 10 mW EIRP, and that mobile and portable devices operating in WCS Blocks C and D should be limited to 1 mW EIRP. More recently, Sirius XM Radio, Inc., a SDARS licensee,¹⁷ advocates that no change be made to current technical restrictions for mobile and portable devices on the C and D blocks. After a review of the technical analyses submitted by the parties, the Commission determines that a power level of 250 mW average EIRP for Blocks A and B and for the lower 2.5 megahertz of the WCS C Block and upper 2.5 megahertz of the WCS D Block, limited to 50 mW/MHz of EIRP, using ATPC and subject to the OOB limit discussed below, should allow adequate user reception of satellite radio, while also enabling WCS licensees, including small entities, to provide valuable mobile services to the public. Further, the Commission believes that prohibiting mobile and portable devices from transmitting in the 2.5 megahertz portions of the WCS C and D Blocks closest to the SDARS band will further limit the potential for harmful interference to SDARS receivers in the 2320-2345 MHz band. The Commission believes that its overall approach strikes the appropriate balance between the WCS Coalition's request that the Commission adopt a 250 mW average EIRP limit for mobile and portable stations in WCS Blocks A and B and the 2.5 megahertz portions of WCS Blocks C and D furthest from the SDARS band, and its reduced stepped power levels for WCS Blocks C and D, and SDARS licensees' proposals for the WCS band.

25. *Mobile and Portable Device Out-of-Band Emission Limits.* In the 2007 Notice, the Commission asked interested parties to address how the WCS industry would be affected if the

¹⁵ See 5 U.S.C. § 603(c).

¹⁶ There are no satellite radio licensees that are considered small entities for the purposes of the RFA.

¹⁷ Sirius XM Radio, Inc. (Sirius XM), formerly Sirius Satellite Radio, Inc.

Commission were to retain the current out-of-band emission (OOBE) limits of $110 + 10 \log(P)$ dB for mobile and portable devices, and whether the limit should be revised. In response, the WCS Coalition argues that the current limit is too restrictive, and proposes that the Commission adopt stepped OOBE limits of $55 + 10 \log(P)$ dB in the 2320-2324 MHz/2341-2345 MHz bands, $61 + 10 \log(P)$ dB in the 2324-2328 MHz/2337-2341 MHz bands, and $67 + 10 \log(P)$ dB in the 2328-2337 MHz band. Another WCS licensee, NextWave Wireless (NextWave), advocates relaxing the OOBE limit to $60 + 10 \log(P)$ dB, while Sirius XM proposes an emission limit of $86 + 10 \log(P)$ dB.

26. Based on its review of the record in this proceeding, the Commission determines that it should require that WCS mobile and portable devices' OOBE be attenuated below the transmitter power P by a factor of not less than $43 + 10 \log(P)$ dB in the 2305-2317.5 MHz band on frequencies that are outside the licensed band of operation, not less than $55 + 10 \log(P)$ dB in the 2320-2324 MHz and 2341-2345 MHz bands, by $61 + 10 \log(P)$ dB in the 2324-2328 MHz and 2337-2341 MHz bands, and by $67 + 10 \log(P)$ dB in the 2328-2337 MHz band. In addition, mobile and portable devices' OOBE must be attenuated by a factor of not less than $43 + 10 \log(P)$ dB at 2305 and 2360 MHz, not less than $45 + 10 \log(P)$ dB at 2362.5 MHz, not less than $55 + 10 \log(P)$ dB at 2365 MHz, not less than $65 + 10 \log(P)$ dB at 2367.5 MHz, and not less than $70 + 10 \log(P)$ dB at 2300 and 2370 MHz. In adopting these factors, the Commission believes that these limits will help avoid significant adverse economic impact to both the WCS industry, as well as SDARS operations by enabling WCS licensees to provide mobile services that were not viable under the existing rules, and by permitting SDARS licensees to continue to operate without undue interference from the WCS band. In addition, these OOBE attenuation factors will limit the potential for interference to Deep Space Network (DSN) operations in the 2290-2300 MHz band and Aeronautical Mobile Telemetry operations in the 2360-2395 MHz band. In adopting the stepped OOBE limits, the Commission declines to adopt Sirius XM's request for a more restrictive OOBE limit because such limit would effectively preclude WCS licensees, including small entities, from deploying mobile service. The Commission also finds that the proposal by the WCS Coalition will provide greater overall protection to SDARS operations than the $60 + 10 \log(P)$ dB advocated by NextWave. Accordingly, adoption of the above-specified stepped OOBE limits into the applicable portions of the 2320-2345 MHz SDARS band best minimizes significant economic impacts on small, as well as larger, entities.

27. *Base Station Power Limits.* In the 2007 Notice, the Commission sought comment on the WCS Coalition's proposal that it revise the existing 2,000 W (2 kW) EIRP peak power limit with a 2 kW EIRP average power limit for WCS fixed and base stations. The Commission asked interested parties to address what impact, if any, adoption of an average, rather than peak, power limit for WCS would have on the ability of WCS licensees to deploy new services. In response, the WCS Coalition reiterates its support of a 2 kW EIRP average power limit, and states that applying a power limit on an average vs. peak basis will provide greater interference protection to SDARS operations. In contrast, SDARS licensees argue that applying an average power limit is not supported, and that such use will quadruple the amount of harmful interference to SDARS receivers. Sirius XM prefers the use of ground-level emission limits to govern transmitting facilities, but would accept retaining existing power limits measured on a peak basis, or other traditional power restrictions that offer sufficient protection to SDARS.

28. Based on its analysis of the record and a balancing of its objectives in this proceeding, the Commission adopts, in part, the WCS Coalition's proposal regarding base station power limits for WCS Blocks A and B, and also adopts in part Sirius XM's proposal regarding base station power limits in WCS Blocks C and D. The Commission finds that it is appropriate to modify the WCS Blocks A and B base station limit to 2 kW EIRP over 5 megahertz (400 W/MHz), which will be measured on an average basis with a maximum peak-to-average power ratio (PAPR) of 13dB. The Commission finds that these measures will adequately protect SDARS operations, and concludes that the ground-level emission limits sought by Sirius XM would be overly complex and burdensome for WCS licensees, including small entities, to comply with.

29. However, while the Commission concludes that adopting the WCS proposal is desirable with respect to the A and B blocks, it retains the power limits for WCS operations in the C and D blocks at 2,000 watts peak EIRP. Because base station operations in WCS Blocks C and D inherently pose more risk of potential interference to satellite radio users than would base station operations in Blocks A and B, which are separated from the SDARS spectrum by at least 5 megahertz, the Commission considers maintaining the current limits appropriate in order to minimize interference into satellite radio operations.

30. The Commission expects that both approaches, combined with the 250 mW average EIRP limit for WCS mobile and portable devices and the related OOB attenuation factors of not less than $43 + 10 \log(P)$ dB in the 2305-2317.5 MHz band on frequencies that are outside the licensed band of operation, not less than $55 + 10 \log(P)$ dB in the 2320-2324 MHz/2341-2345 MHz bands, $61 + 10 \log(P)$ dB in the 2324-2328 MHz/2337-2341 MHz bands, and $67 + 10 \log(P)$ dB in the 2328-2337 MHz band, and not less than $43 + 10 \log(P)$ dB at 2305 and 2360 MHz, $45 + 10 \log(P)$ dB at 2362.5 MHz, $55 + 10 \log(P)$ dB at 2365 MHz, $65 + 10 \log(P)$ dB at 2367.5 MHz, and $70 + 10 \log(P)$ dB at 2300 and 2370 MHz should provide the technical flexibility for WCS licensees to deploy mobile service, and thereby avoid the adverse economic impact to WCS licensees, including small entities, that would occur without the ability to provide such service.

31. *Base and Fixed Station OOB Limits.* In the 2007 Notice, the Commission sought comment on whether Sirius' proposal for a requirement to limit ground-level emissions would facilitate the deployment of both SDARS and WCS services to the public. The Commission also sought comment in the 2007 Notice on the WCS Coalition's proposal to require both WCS and SDARS licensees to attenuate base stations' OOB by a factor of $75 + 10 \log(P)$ dB, as measured over a 1-megahertz resolution bandwidth. In its comments on the 2007 Notice, the WCS Coalition reiterated its support for the $75 + 10 \log(P)$ dB attenuation requirement. Sirius XM also supported relaxing the OOB attenuation requirement for WCS base stations to $75 + 10 \log(P)$ dB but with a ground-level emissions limits of 100 dB μ V/m for WCS Blocks A and B and 90 dB μ V/M for WCS Blocks C and D.

32. The Commission finds it in the public interest to adopt an OOB attenuation factor of $75 + 10 \log(P)$ dB, measured over a 1-megahertz resolution bandwidth, for WCS base and fixed stations on frequencies in the 2320-2345 MHz band. Both WCS and SDARS licensees urge us to lower the current $80 + 10 \log(P)$ dB OOB attenuation factor by 5 dB. Although Sirius XM also requests that we establish ground-level emission limits, we decline to adopt ground-level emission limits for WCS base stations as proposed by Sirius XM because of the difficulties associated with characterizing and quantifying the case-specific propagation environment's effects on an RF signal's field strength that could influence the interference potential at each fixed site. The rules that would result from an attempt to deal with the anomalies associated with field strength levels, moreover, would be overly complex and difficult for licensees to comply with and would be difficult, at best, for the Commission to enforce. Furthermore, we believe that the revised power limits that we are establishing, together with a $75 + 10 \log(P)$ dB OOB attenuation factor, will provide SDARS operations reasonable interference protection while affording WCS licensees additional flexibility to offer mobile services to the public. To protect DSN and AMT operations, we find it is the public interest to adopt an OOB attenuation factor of not less than $43 + 10 \log(P)$ dB at 2305 and 2360 MHz, not less than $55 + 10 \log(P)$ dB at 2362.5 MHz, not less than $70 + 10 \log(P)$ dB at 2300 and 2365 MHz, not less than $72 + 10 \log(P)$ dB at 2367.5 MHz, and not less than $75 + 10 \log(P)$ dB at 2370 MHz.

33. *Fixed Customer Premises Equipment (CPE) Power and OOB Limits.* The Report and Order also resolves power and OOB limits proposals relating to WCS fixed CPE devices. The WCS Coalition requests that the Commission apply to WCS fixed CPE operations a power limit of 20 W average EIRP, and an OOB attenuation of $75 + 10 \log(P)$ dB. For WCS fixed CPE devices transmitting at no greater than 2 W average transmitter output power, the WCS Coalition proposes the same stepped OOB limit that it proposes for mobile devices. Sirius XM, on the other hand, proposes that WCS fixed CPE devices operating above 2 W EIRP be subject to ground level-based emission limits, and proposes

that all WCS fixed CPE devices' OOB be attenuated by $75 + 10 \log (P)$ dB regardless of the device's operating power.

34. The Commission finds it appropriate to maintain the current mobile transmitter power limit of 20 W peak EIRP for WCS fixed CPE devices because it appears that the existing limit has not resulted in interference to SDARS operation and also provides WCS licensees with operational flexibility. Also, for WCS CPE operating with an EIRP above 2 W, the Commission adopts the $75 + 10 \log (P)$ dB OOB attenuation factor for frequencies in the 2320-2345 MHz band, noting that both SDARS and WCS licensees propose that limit, and SDARS licensees have indicated that they are amenable to a lowering of the OOB limit because WCS fixed CPE device operations pose less risk of interference and disruption to SDARS licensees. Further, in light of the Commission's finding that applying the stepped OOB limits to WCS mobile and portable devices will provide sufficient protection to SDARS operations, as well as the lower likelihood of interference to SDARS receivers posed by WCS fixed CPE terminals operating at or below 2 Watts, the Commission finds it appropriate to adopt the stepped OOB limit that is applicable to WCS mobile devices (*i.e.*, $43 + 10 \log (P)$ dB in the 2305-2317.5 MHz band on frequencies that are outside the licensed band of operation, $55 + 10 \log (P)$ dB in the 2320-2324 MHz/2341-2345 MHz bands, $61 + 10 \log (P)$ dB in the 2324-2328 MHz/ 2337-2341 MHz bands, and $67 + 10 \log (P)$ dB in the 2328-2337 MHz band, and not less than $43 + 10 \log (P)$ dB at 2305 and 2360 MHz, $45 + 10 \log (P)$ dB at 2362.5 MHz, $55 + 10 \log (P)$ dB at 2365 MHz, $65 + 10 \log (P)$ dB at 2367.5 MHz, and $70 + 10 \log (P)$ dB at or below 2300 MHz and at or above 2370 MHz for these WCS CPE as well.

35. *Notification Requirement.* In the 2007 Notice, the Commission invited comment regarding the extent to which SDARS and WCS licensees should be required to coordinate deployments of repeaters and base stations, respectively. Sirius XM supports a 90-day notice requirement. Although WCS licensees support measures to encourage SDARS and WCS licensees to share certain technical information, they oppose the adoption of a 90-day notice process. The Commission agrees with SDARS licensees that the public interest will be served by requiring SDARS and WCS licensees to notify each other prior to deploying or modifying repeaters or base stations, respectively, but believes that a 90-day notice requirement as proposed by SDARS licensees to be unduly burdensome. Accordingly, the Commission will require WCS and SDARS licensees to share certain technical information at least 10 business days before operating a new base station or repeater, and at least five business days before modifying an existing facility. The Commission believes that adopting the streamlined notification requirements rather than the 90-day prior coordination requirement previously advocated by Sirius XM will enable SDARS and WCS licensees to minimize the potential for harmful interference between their services while also reducing administrative as well as economic burdens on all parties.

36. *Protection of DSN and AMT Operations.* The Report and Order establishes revised OOB and coordination rules where WCS base stations are within certain distances from DSN and AMT operations. The Commission imposes these requirements in recognition of the possible effects that WCS operations may have on DSN and AMT entities, which use sensitive receivers and high gain antennas to receive often weak signals. The Report and Order concludes that the adoption of reasonable OOB and coordination requirements will adequately protect DSN and AMT operations while enabling WCS entities to construct and operate new broadband systems. The Commission has reviewed alternatives submitted by commenters, which, for example, variously call for both more and less stringent OOB limits and coordination distances than those that are being adopted. The Commission concludes, however, that the requirements that it is adopting best balance the interests of the interested parties.

37. *WCS Performance Requirements.* Further, in this Report and Order, the Commission adopts revised performance requirements for WCS. The enhanced construction rules the Commission is adopting replace the substantial service requirement previously placed on WCS licensees with specific population-based benchmarks. In recognition of difficulties that may arise in license areas where WCS licensees must coordinate their facilities with AMT receive sites, the Report and Order reduces the level of construction required in such markets. The Commission seeks to establish a buildout requirement that

is reasonable and achievable for WCS licensees, including small entities, but which encourages rapid and meaningful deployment of mobile broadband services. The Commission has considered alternative performance benchmarks, including requirements using shorter timeframes, and lower percentages of required construction. However, the Commission concludes that other alternatives would not strike the appropriate balance. Further, with respect to the performance rules, all WCS entities will be required to file construction notifications to inform the Commission that they have successfully met the performance requirements described above. The Commission has reviewed whether there should be other requirements, such as a formal procedure in which comment would be sought from the public regarding the construction showings filed by licensees. The Commission determines, however, that it is not necessary to include other requirements to the adopted construction notification procedure.

38. **Report to Congress:** The Commission will send a copy of the Report and Order , including this FRFA, in a report to be sent to Congress pursuant to the Congressional Review Act.¹⁸ In addition, the Commission will send a copy of the Report and Order, including this FRFA, to the Chief Counsel for Advocacy of the SBA. A copy of the Report and Order and FRFA (or summaries thereof) will also be published in the Federal Register.

¹⁸ See 5 U.S.C. § 801(a)(1)(A).

APPENDIX D

Final Regulatory Flexibility Certification

Second Report and Order in IB Docket No. 95-91

1. The Regulatory Flexibility Act of 1980, as amended (RFA)¹ requires that a regulatory flexibility analysis be prepared for rulemaking proceedings, unless the agency certifies that "the rule will not have a significant economic impact on a substantial number of small entities."² The RFA generally defines "small entity" as having the same meaning as the terms "small business," "small organization," and "small governmental jurisdiction."³ In addition, the term "small business" has the same meaning as the term "small business concern" under the Small Business Act.⁴ 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).⁵

2. The rules adopted in this *Second Report and Order* affect both providers of WCS services SDARS providers. Insofar as WCS services are concerned, operators in those services consist of both large and small entities as defined by relevant SBA size standards. Accordingly, with respect to small entities in the WCS services, a Final Regulatory Flexibility Analysis has been prepared and is attached to this Report and Order in Appendix D. However, with respect to providers of SDARS services, *i.e.* providers of a nationally distributed subscription radio service, no small entities are affected by the rules adopted in this *Second Report and Order*. SDARS is a satellite service. The SBA has established a size standard for "Satellite Telecommunications," which is that any large satellite services provider must have an annual revenue of \$15.0 million.⁶ Currently, only a single operator, Sirius XM Radio Inc. ("Sirius XM"), holds licenses to provide SDARS service, which requires a great investment of capital for operation. Sirius XM has annual revenues in excess of \$15.0 million.⁷ Because SDARS service requires significant capital, we believe it is unlikely that a small entity as defined by the Small Business Administration would have the financial wherewithal to become an SDARS licensee.

3. Therefore, since only one large entity is affected by the rules adopted in this *Second Report and Order*, we certify that the requirements of the *Second Report and Order* will not have a significant economic impact on a substantial number of small entities. The Commission will send a copy of the *Second Report and Order*, including a copy of this final certification, in a report to Congress pursuant to the Small Business Regulatory Enforcement Fairness Act of 1996, *see* 5 U.S.C.

¹ The RFA, *see* § 5 U.S.C. S 601 *et. seq.*, has been amended by the Contract With America Advancement Act of 1996, Pub. L. No. 104-121, 110 Stat. 847 (1996) (CWAAA). Title II of the CWAAA is the Small Business Regulatory Enforcement Fairness Act of 1996 (SBREFA).

² 5 U.S.C. § 605(b).

³ 5 U.S.C. § 601(6).

⁴ 5 U.S.C. § 601(3) (incorporating by reference the definition of "small business concern" in Small Business Act, 15 U.S.C. S § 632). Pursuant to 5 U.S.C. § 601(3), the statutory definition of a small business applies "unless an agency, after consultation with the Office of Advocacy of the Small Business Administration and after opportunity for public comment, establishes one or more definitions of such term which are appropriate to the activities of the agency and publishes such definition(s) in the Federal Register."

⁵ Small Business Act, § 15 U.S.C. S 632.

⁶ *See* 13 C.F.R. § 121.201, NAICS code 517410.

⁷ Although Sirius XM has yet to file an annual report with the Securities and Exchange Commission ("SEC") as a merged entity, Sirius XM reports revenue of over \$456 million for the third quarter of 2008 alone. *See* Sirius XM Radio Inc., SEC Form 10-Q at 1 (filed Nov. 12, 2008).

§ 801(a)(1)(A). In addition, the *Second Report and Order* and this certification will be sent to the Chief Counsel for Advocacy of the Small Business Administration, and will be published in the Federal Register. See 5 U.S.C. § 605(b).

APPENDIX E

Description of WCS/SDARS Testing in Ashburn, Virginia (July 28-29, 2009)

1. The WCS Coalition provided two four-door sedans for the Ashburn tests. One sedan was equipped with a permanently-installed (OEM) Sirius satellite radio receiver and a portable (aftermarket) Sirius satellite radio receiver. The other sedan was equipped with a permanently-installed XM satellite radio receiver and a portable XM satellite radio receiver. Both vehicles had satellite radio antennas installed on the centerline of the roof just forward of the rear window, with the antenna for the portable receiver magnetically mounted between the rear window and the permanently-installed antenna. The WCS WiMAX mobile signal was generated by an Alvarion, Ltd. (Alvarion) PCMCIA card plugged into a notebook computer.¹ The notebook computer ran software that could generate WiMAX traffic at programmable rates, simulating voice and file-transfer modes, and could also monitor and record statistics on WiMAX traffic that was transmitted by a WiMAX base station also provided by Alvarion. Similar software was also run on the WCS WiMAX base station. The WiMAX base station included two directional panel antennas located near the southwest corner of the roof of the building at 44675 Cape Ct., Ashburn, VA, at an elevation of approximately 7 to 8 meters above the ground. The base station antennas were oriented toward the northeast. The WCS WiMAX mobile device and base station were operated in time-division duplex (“TDD”) mode, and were tuned to frequencies in the upper A and lower B blocks for tests with the Sirius receivers, and to a frequency centered on the boundary of the D and A blocks for tests with XM receivers, and to a frequency centered on the boundary of the B and C blocks for additional tests with Sirius receivers.

2. During the drive tests on the first day of testing (July 28, 2009), both WCS Coalition sedans were driven around a test route located primarily on Beaumeade Circle in Ashburn, VA, with short segments on Loudoun County Parkway and in the parking lot surrounding the base station location. The distance from the WiMAX base station to the most distant point on the test route was approximately 440 meters, and the minimum distance was less than 20 meters. The two vehicles were driven at speeds up to about 25 miles per hour. The vehicles remained within a maximum distance of few car lengths of each other, and passed each other several times along the test route. Depending on the pre-planned test scenario being executed, the notebook computer containing the WCS mobile device was held either on the operator’s lap, to simulate laptop use by an occupant of the vehicle, or at head level, to simulate the use of a WCS mobile telephone.

3. The WCS Coalition representatives ran two types of tests: one simulating a high-bandwidth download, in which the WCS mobile device transmitter duty cycle was approximately 25 percent, and another simulating a voice over Internet Protocol (VoIP) telephone call, with a much lower transmitter duty cycle. A total of six configurations for the WCS mobile device were tested; a drive test for each configuration was performed at least once; and a few of the configurations were drive tested two or more times. Some of the WCS Coalition’s tests were run with the WCS mobile device using automatic transmitter power control, and some were run with the WCS mobile device transmitting at a fixed power level of 250 mW (24 dBm). To test the effect of a WCS mobile device’s out-of-band emissions, during one test, the WCS signal was centered at 2347.5 MHz and only out-of-band emissions were transmitted from the WCS mobile device. The WCS Coalition has submitted a test matrix that shows the combinations of frequencies, Sirius and XM receivers, WiMAX traffic types, WCS mobile

¹ The Alvarion, Ltd. PC card emissions accurately represented WiMAX in-band signals, but exceeded the WCS Coalition’s proposed out-of-band emissions mask. The WCS Coalition has not provided to the Commission the transmitted spectrum measurements of the Alvarion PC card or base station emissions, or the power level of the base station transmitter.

device positioning, and WCS mobile device transmitter power that were used during the drive tests.² After observing tests with the WiMAX base station and mobile transmitting in the upper A block without any muting of the SDARS signal occurring, Commission staff requested that certain test cases expected to produce worst-case interference scenarios be run, with the understanding that if these cases resulted in prolonged muting of the SDARS receivers, then it would be appropriate to run test cases expected to produce less interference to the SDARS receivers.

4. Sirius XM demonstrated outdoor and indoor tests on the second day of the Ashburn tests (July 29, 2009). Satellite radio signals and a low-level terrestrial repeater signal were available at the test site. During the morning session, Sirius XM demonstrated interference into SDARS receivers from their WCS signal simulator. This simulator comprised a laboratory-equipment-based WCS signal and out-of-band noise generator mounted in the trunk of a four-door sedan, with a cable running from the front passenger seat and connected to an antenna.³ An occupant of this vehicle held the transmitting antenna at lap or ear height, depending on the test scenario being demonstrated. Sirius XM provided another sedan with a factory installed XM satellite radio receiver. For the first portion of the morning session, the sedan containing the WCS signal simulator remained stationary at a location in the parking lot on the north side of the Homewood Suites building at 44620 Waxpool Road, Ashburn, VA. The sedan carrying the satellite radio receiver was driven up and down an aisle of the parking lot to find a distance between the two sedans at which satellite radio signal muting would occur. Sirius XM summarized the results of the portion of these tests with the simulated WCS signal operating in the WCS D-block in a table in the Engineering Appendix of its August 3, 2009, *Ex Parte* filing.⁴ For the second portion of the morning session, both vehicles were parked adjacent to the building in order to block reception of one of the XM satellite signals.

5. During the afternoon session on the second day of testing, Sirius XM demonstrated interference into an XM receiver equipped for diagnostics and having an antenna module with a signal input port that allowed it to be connected via a cable to the test equipment. For this test, Sirius XM used simulated satellite signals generated by special test equipment and simulated WCS interfering signals generated by laboratory test equipment.⁵ Sirius XM demonstrated the effects of varying simulated WCS frequency offsets and signal power levels during both the morning and afternoon sessions. Sirius XM summarized the results of these tests in tabular form in Exhibit A of the Engineering Appendix of its August 3, 2009, *Ex Parte* filing.⁶

² Letter from Mary N. O'Connor, Counsel to the WCS Coalition, to Marlene H. Dortch, Secretary, FCC (filed August 4, 2009) at Exhibit A p. 2 (*WCS-SDARS Demonstration, Test Matrix*).

³ This equipment setup is described on page 2 of the Engineering Appendix to Sirius XM's *Ex Parte* letter dated August 3, 2009. Letter from Terrence R. Smith, Corporate VP and Chief Engineering Officer and James R. Blitz, Vice President, Regulatory Counsel, of Sirius XM Radio Inc. to Marlene H. Dortch, Secretary, FCC (filed August 3, 2009), Engineering Appendix at 2.

⁴ *Id.* at Engineering Appendix at 10.

⁵ This equipment setup is described on pages 10-11 of the Engineering Appendix to Sirius XM's *Ex Parte* letter dated August 3, 2009. *Id.* at Engineering Appendix at 10-11.

⁶ *Id.* at Engineering Appendix at 13-16.

APPENDIX F

**Applications for Additional Time to Meet the 2.3 GHz
Wireless Communications Service Substantial Service Performance Requirement**

Applicant Name	Call Sign	File Number	Receipt Date
CELLUTEC	KNLB242	0003852958	5/29/2009
CELLUTEC	KNLB216	0003852962	5/29/2009
NTELOS Inc.	KNLB243	0003854302	6/1/2009
NW Spectrum Co.	KNLB200	0003855239	6/1/2009
NW Spectrum Co.	KNLB213	0003855241	6/1/2009
NW Spectrum Co.	KNLB217	0003855243	6/1/2009
NW Spectrum Co.	KNLB206	0003855240	6/1/2009
NW Spectrum Co.	KNLB218	0003855244	6/1/2009
NW Spectrum Co.	KNLB292	0003855248	6/1/2009
NW Spectrum Co.	KNLB293	0003855249	6/1/2009
NW Spectrum Co.	KNLB322	0003855251	6/1/2009
NW Spectrum Co.	KNLB323	0003855252	6/1/2009
NW Spectrum Co.	KNLB294	0003855250	6/1/2009
NW Spectrum Co.	KNLB255	0003855247	6/1/2009
NW Spectrum Co.	KNLB215	0003855242	6/1/2009
NW Spectrum Co.	KNLB219	0003855245	6/1/2009
NW Spectrum Co.	KNLB220	0003855246	6/1/2009
Unrestricted Subsidiary Funding Company	WPSL357	0003879254	6/23/2009
Unrestricted Subsidiary Funding Company	WPSL350	0003879247	6/23/2009
Unrestricted Subsidiary Funding Company	WPSL358	0003879255	6/23/2009
Unrestricted Subsidiary Funding Company	WPSL351	0003879248	6/23/2009
Unrestricted Subsidiary Funding Company	WPSL352	0003879249	6/23/2009
Unrestricted Subsidiary Funding Company	WPSL359	0003879256	6/23/2009
Unrestricted Subsidiary Funding Company	WPSL353	0003879250	6/23/2009
Unrestricted Subsidiary Funding Company	WPSL360	0003879257	6/23/2009
Unrestricted Subsidiary Funding Company	WPSL354	0003879251	6/23/2009
Unrestricted Subsidiary Funding Company	KNLB232	0003879244	6/23/2009
Unrestricted Subsidiary Funding Company	WPSL361	0003879258	6/23/2009
Unrestricted Subsidiary Funding Company	WPSL355	0003879252	6/23/2009
Unrestricted Subsidiary Funding Company	KNLB235	0003879245	6/23/2009
Unrestricted Subsidiary Funding Company	WPSL362	0003879259	6/23/2009
Unrestricted Subsidiary Funding Company	WPSL356	0003879253	6/23/2009
Unrestricted Subsidiary Funding Company	KNLB205	0003879243	6/23/2009
Unrestricted Subsidiary Funding Company	WPYP769	0003879261	6/23/2009
Unrestricted Subsidiary Funding Company	KNLB291	0003879246	6/23/2009
Unrestricted Subsidiary Funding Company	WPYP768	0003879260	6/23/2009
WaveTel NC License Corporation	WPZA813	0003854544	6/1/2009
WaveTel NC License Corporation	WPZA811	0003854803	6/1/2009
WaveTel NC License Corporation	WPZA810	0003854841	6/1/2009
WaveTel NC License Corporation	WPZA812	0003854706	6/1/2009
WCS Wireless License Subsidiary, LLC	KNLB208	0003855280	6/1/2009
WCS Wireless License Subsidiary, LLC	KNLB302	0003855288	6/1/2009
WCS Wireless License Subsidiary, LLC	KNLB303	0003855289	6/1/2009
WCS Wireless License Subsidiary, LLC	KNLB304	0003855290	6/1/2009

Applicant Name	Call Sign	File Number	Receipt Date
WCS Wireless License Subsidiary, LLC	KNLB305	0003855291	6/1/2009
WCS Wireless License Subsidiary, LLC	KNLB306	0003855292	6/1/2009
WCS Wireless License Subsidiary, LLC	KNLB207	0003855279	6/1/2009
WCS Wireless License Subsidiary, LLC	KNLB307	0003855293	6/1/2009
WCS Wireless License Subsidiary, LLC	KNLB295	0003855281	6/1/2009
WCS Wireless License Subsidiary, LLC	KNLB296	0003855282	6/1/2009
WCS Wireless License Subsidiary, LLC	KNLB308	0003855294	6/1/2009
WCS Wireless License Subsidiary, LLC	KNLB297	0003855283	6/1/2009
WCS Wireless License Subsidiary, LLC	KNLB298	0003855284	6/1/2009
WCS Wireless License Subsidiary, LLC	KNLB299	0003855285	6/1/2009
WCS Wireless License Subsidiary, LLC	KNLB300	0003855286	6/1/2009
WCS Wireless License Subsidiary, LLC	KNLB301	0003855287	6/1/2009