

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

In the matter of

Amendment of Part 27 of the Commission's
Rules to Govern the Operation of Wireless
Communications Services in the 2.3 GHz Band

Establishment of Rules and Policies for the
Digital Audio Radio Satellite Service in the
2310-2360 MHz Frequency Band

WT Docket No. 07-293

IB Docket No. 95-91
GEN Docket No. 90-357
RM-8610

**OPPOSITION OF AT&T INC.
TO PETITION FOR PARTIAL RECONSIDERATION AND CLARIFICATION OF
SIRIUS XM RADIO INC.; PETITION FOR RECONSIDERATION OF GREEN FLAG
WIRELESS, LLC, ET AL.; AND PETITION FOR CLARIFICATION OR PARTIAL
RECONSIDERATION OF ARRL**

James J.R. Talbot
Michael P. Goggin
Gary L. Phillips
Paul K. Mancini

Of Counsel:
Arnold & Porter LLP
555 Twelfth Street, N.W.
Washington, D.C. 20004
Telephone: (202) 942-5634

Attorneys for AT&T Inc.
1120 Twentieth Street, N.W.
Suite 1000
Washington, D.C. 20036
Telephone: (202) 457-3048

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RECONSIDERATION OF ARRL**

Pursuant to Section 1.429(f) of the Commission's rules,¹ AT&T Inc. ("AT&T") respectfully opposes the petitions filed by Sirius XM Radio Inc.,² Green Flag, et al.,³ and ARRL⁴ (collectively, "Petitioners") seeking reconsideration and clarification of the *Report and Order and Second Report and Order* in this proceeding.⁵ Many of the requirements sought by

¹ 47 C.F.R. § 1.429(f).

² Petition for Partial Reconsideration and Clarification of Sirius XM Radio Inc. (filed Sept. 1, 2010) ("Sirius XM Petition").

³ Petition for Reconsideration of Green Flag Wireless, LLC, CWC License Holding, Inc., and James McCotter (filed Sept. 1, 2010) ("Green Flag, et al. Petition").

⁴ Petition for Clarification or Partial Reconsideration of ARRL (filed Sept. 1, 2010) ("ARRL Petition").

⁵ *Amendment of Part 27 of the Comm'n's Rules to Govern the Operation of Wireless Commc'ns Servs. in the 2.3 GHz Band*, WT Dkt No. 07-293, Report and Order and Second

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Petitioners would erect significant new barriers to WCS licensees' ability to offer the broadband services for which the Commission clearly hopes the spectrum will be used.⁶ Indeed, Sirius XM's proposals would jeopardize the *existing* broadband service that AT&T offers in underserved areas of Alaska. Yet, while compromising WCS services, Sirius XM cannot identify any possible harmful interference to satellite digital audio radio service ("SDARS") operations, much less explain how its proposals would reduce it. In addition, contrary to the claims of Green Flag, et al., WCS performance requirements should not differ for incumbents and competing applicants, nor is there any reason to doubt that the Wireless Telecommunications Bureau had delegated authority to suspend the former substantial service requirements in order to effect the Commission intent expressed in the *Report and Order*. Finally, ARRL overreaches in seeking interference protection for the *secondary* amateur service in the band adjacent to WCS. The Commission should reject Petitioners' requests.

I. Imposing a Power Spectral Density Limit for Fixed CPE Materially Would Impede the Use of WCS Spectrum for Broadband Service

Without any basis in the record, Sirius XM for the first time proposes that WCS fixed CPE should be limited to a power spectral density ("PSD") of 400 milliwatts per megahertz.⁷ This proposal is an unjustified backdoor attack on longstanding CPE power levels. There is no record evidence that would suggest that the PSD levels in the *Report and Order* would cause any harmful interference to SDARS receivers. Moreover, the unwarranted PSD limits Sirius XM proposes would substantially increase the amount of network equipment required to provide a

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Report and Order, FCC 10-82 (rel. May 20, 2010); *Erratum* (rel. June 8, 2010); *Second Erratum* (rel. July 14, 2010) (collectively, "*Report and Order*").

⁶ *Id.* at 16-17, ¶ 36.

⁷ Sirius XM Petition at 3.

viable service. As noted in AT&T's Petition for Partial Reconsideration, the rules adopted in the *Report and Order*, if not revised, already would make mobile broadband service all but infeasible.⁸ Sirius XM's proposals would severely threaten the affordability of fixed broadband service. Because the proposed PSD limit is not needed to protect SDARS subscribers from interference, the Commission should not adopt it.

Sirius XM's proposed PSD limit would prevent the use of the higher-power CPE needed to provide fixed broadband service in rural areas.⁹ The proposal amounts to a request to restrict CPE to an equivalent isotropically radiated power ("EIRP") of two watts instead of 20 (at 400 milliwatts per megahertz, a transmitter with a five megahertz channel could emit only two watts). However, Sirius XM offers no evidence that questions the Commission's conclusion that CPE should continue to be allowed to operate at 20 watts:

Authorized WCS fixed CPE devices have been operating at EIRPs up to 20 W for some time in the 2.3 GHz band, but SDARS licensees have not reported any instances of interference. We expect that if we were to continue to allow WCS fixed CPE devices to use up to 20 W peak EIRP, SDARS operations would not experience any appreciable increase in interference from these WCS operations.¹⁰

Without evidence that the Commission's conclusion was wrong, there is no basis for restricting fixed CPE to two watts.

Furthermore, PSD limits substantially undercut a network's efficiency and should not be imposed without good reasons. As AT&T explained in its Petition, the PSD limit adopted in the *Report and Order* for mobile transmitters (i) is inconsistent with the way networks and equipment are designed and (ii) would require a much greater number of base stations to meet

⁸ Petition for Partial Reconsideration of AT&T Inc. at 13-20 (filed Sept. 1, 2010) ("AT&T Petition").

⁹ See *Report and Order* at 59, ¶ 141.

¹⁰ *Id.*

the link budgets needed to provide broadband service.¹¹ The increase in the number of base stations would vastly increase the costs of constructing a network and affect licensees' ability to meet construction benchmarks.¹²

For the same reasons, imposing a PSD limit on fixed CPE would create a serious disincentive for licensees to offer fixed broadband services using WCS spectrum. The WCS fixed service deployed by AT&T in Alaska uses an air interface with parameters similar to the WiMAX 802.16d standard and one watt EIRP indoor and two and four-fifths watt EIRP outdoor remote transmitters.¹³ In such a system, Sirius XM's PSD proposal would result in a four decibel reduction of WCS CPE power for the indoor units and an eight and one-half decibel reduction for the outdoor units, requiring about *seven times* as many hub stations.¹⁴ To serve even more remote customers, the rules permit a licensee to use fixed CPE operating with a peak EIRP of 20 watts.¹⁵ For such units, the proposed PSD limit would force a reduction in power of 17 decibels, and the system would require *50 times* as many hub stations to achieve the necessary link budget.¹⁶

Whether seven-fold or 50-fold, any such increase in hub stations could render fixed broadband service uneconomical and could harm existing and future customers in remote and

¹¹ AT&T Petition at 14-16.

¹² *Id.*

¹³ Declaration of Douglas Duet ¶ 10 (Oct. 18, 2010) (appended hereto) ("Oct. 18 Duet Decl."); Alvarion, *Simply Connect: 4G End User Device Power* 13, 29, available at <http://www.alvarion.com/addons/deviceportfolio/default.html> (last visited Oct. 18, 2010) (stating that the BreezeMAX[®] Si 1000 has a transmit power of 23 dBm and an antenna gain of seven dBi and that the BreezeMAX[®] PRO 1000 has a transmit power of 20 dBm and an antenna gain of 14.5 dBi).

¹⁴ Oct 18 Duet Decl. ¶ 8.

¹⁵ 47 C.F.R. § 27.50(a)(2).

¹⁶ Oct 18 Duet Decl. ¶ 8.

underserved areas. The sparse population density in many rural and remote areas requires the use of external CPE with its higher power levels just to provide a connection. Even customers in less-remote regions, where lower-power indoor transmitters are viable for all subscribers, still would suffer a four decibel loss, and AT&T still would need to deploy over twice as many hub stations to serve these customers fully.¹⁷

Beyond making it much more costly and time-consuming to construct a WCS fixed broadband network, the proposed PSD limit also would handicap the network's ability to adjust flexibly to customer demand, thus reducing the quality, throughput, and efficiency of the service provided.¹⁸

Put simply, Sirius XM's proposal for a fixed CPE 400 milliwatts per megahertz PSD limit would devastate the potential use of WCS for fixed broadband for both new entrants and existing providers. Fortunately, as discussed more fully in the WCS Coalition's opposition to the Sirius XM Petition,¹⁹ the PSD limit is unnecessary to protect SDARS subscribers. As the FCC correctly determined, fixed CPE has even less potential than mobile devices to interfere with SDARS receivers. Fixed CPE benefits from greater physical separation and structural blockages and needs even fewer restrictions to prevent harmful interference to SDARS receivers.²⁰ Moreover, Sirius XM offers no evidence of such harm from fixed CPE (and, with WCS fixed broadband systems currently in operation, any such harm should be apparent by now). Thus, the Commission should reject Sirius XM's overreaching request.

¹⁷ *Id.*

¹⁸ *Id.* ¶ 9.

¹⁹ The WCS Coalition is filing this pleading today.

²⁰ *Report and Order* at 60, ¶ 142.

II. The Commission Properly Gave All WCS Licensees the Same Time to Satisfy the New Performance Requirements and Properly Suspended the Prior Substantial Service Requirements

While the new WCS performance requirements are flawed,²¹ and Green Flag, et al. correctly identify some of the defects,²² the Commission properly applied the new requirements to all WCS licensees, and the Wireless Telecommunications Bureau acted well within its delegated authority when it suspended the previous substantial service requirements pending the effective date of the new rules. Green Flag, et al. have not offered any reasonable basis to favor competing applicants by providing them — and only them — more time to meet the aggressive new deadlines. Similarly, Green Flag, et al. wrongly argue that the Wireless Telecommunications Bureau lacked delegated authority to suspend the previous substantial service requirements, and — in any event — they have waited too long to raise this claim.

As the WCS Coalition shows at greater length in its opposition to the Green Flag, et al. Petition, the length of time WCS licensees have held their licenses has not given them any advantage that might warrant giving successful competing applicants more time than existing licensees to meet the performance requirements. The restrictive WCS OOB limits and the uncertainty regarding the operation of the SDARS terrestrial repeaters hindered access to capital, WCS equipment development, network design, and facility deployment, effectively precluding existing licensees from using their WCS spectrum.²³ It is only with the certainty afforded by settled new rules — a certainty that still has not been achieved — that WCS licensees will be

²¹ See AT&T Petition at 3-13.

²² See Green Flag, et al. Petition at 2-3 (arguing that the deadlines lack a basis in the record and are too tight), 5-7 (arguing that the “death penalty” will impede, not advance, broadband deployment).

²³ See *Consolidated Request of the WCS Coal. for Ltd. Waiver of Constr. Deadline for 132 WCS Licenses*, Order, 21 FCC Rcd. 14,134, 14,136-37, ¶¶ 5-6, 14,139-40, ¶¶ 9-10 (WTB 2006); see also *Report and Order* at 9, ¶ 15.

able to provide broadband services on the scale the Commission has prescribed. Thus, both existing licensees and any successful competing applicant are starting from more or less the same point in deploying their networks, and Green Flag, et al. have not justified the favoritism they seek.²⁴

Green Flag, et al.'s attack on the Bureau's suspension of the previous substantial service requirements²⁵ is no more convincing. As the WCS Coalition shows, the Bureau had ample delegated authority to suspend these requirements.²⁶ Furthermore, the Commission's *Report and Order* clearly shows that it intended to make these requirements inoperative.²⁷ That the rules promulgated in the *Report and Order* had not yet become effective does not negate this clear intent or deny the Bureau the guidance necessary to implement the Commission's licensing policies and procedures.²⁸

²⁴ The filing of competing applications added a new level of uncertainty which creates a cloud over the ability of existing licensees to build out their networks.

²⁵ *Wireless Telecomms. Bureau Advises 2.3 GHz Wireless Commc'ns Serv. Licensees That It Will Not Accept Substantial Serv. Performance Showings*, Public Notice, 25 FCC Rcd. 8230 (WTB 2010).

²⁶ See 47 C.F.R. §§ 0.131, 0.331. In its opposition, the WCS Coalition demonstrates that the Bureau's authority under these rules to suspend, extend, and waive performance requirements has been entrenched firmly in Commission precedent.

²⁷ See *Report and Order* at 88, ¶ 218 ("The new performance requirements *supersede* the substantial service performance requirement for all WCS licensees, including any licensee that previously filed a substantial service demonstration.") (emphasis added); *id.* at 89, ¶ 221 ("The new performance requirements also supplant AT&T's obligation to serve 25 percent of the population for each of its WCS licenses for mobile or point-to-multipoint services, or to construct at least five permanent links per one million people in the service area for fixed point-to-point services."); *id.* ("[B]ecause the new performance requirements supersede the substantial service requirement for all WCS licensees, it is unnecessary for the Wireless Telecommunications Bureau to process any pending substantial service demonstrations, and any such demonstrations and pleadings filed in opposition are hereby [dis]missed as moot.").

²⁸ In any event, Green Flag, et al. failed to question the effectiveness of the Bureau's action within 30 days of the Public Notice announcing it, as required by Section 405(a) of the Act and Section 1.106(f) of the rules. 47 U.S.C. § 405(a); 47 C.F.R. § 1.106(f). Accordingly, the

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III. AT&T Supports the WCS Coalition's Oppositions

AT&T fully endorses the oppositions to the petitions of Sirius XM; Green Flag, et al.; and ARRL that the WCS Coalition is filing today (collectively, the "WCS Coalition Oppositions"). Specifically, AT&T agrees with the WCS Coalition's position with respect to (i) the stepped spectral mask adopted by the Commission for WCS mobile and portable devices; (ii) WCS duty cycle requirements; (iii) fixed CPE; (iv) ground-level emissions limits; (v) notification and coordination between WCS and SDARS licensees; (vi) WCS performance and substantial service requirements; and (vii) interference protection with respect to the secondary amateur service in the 2.3 GHz band.

CONCLUSION

For the reasons discussed above, the Commission should reject Sirius XM's requests that WCS fixed CPE be saddled with a 400 milliwatts per megahertz PSD limit. Additionally, the Commission should reject the proposals opposed in the WCS Coalition Oppositions.

Respectfully submitted,

/s/ James J.R. Talbot

James J.R. Talbot
Michael P. Goggin
Gary L. Phillips
Paul K. Mancini

Of Counsel:
Arnold & Porter LLP
555 Twelfth Street, N.W.
Washington, D.C. 20004
Telephone: (202) 942-5634

Attorneys for AT&T Inc.
1120 Twentieth Street, N.W.
Suite 1000
Washington, D.C. 20036
Telephone: (202) 457-3048

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suspension is a final action of the Commission and only may be reversed on extraordinary grounds that Green Flag, et al. have not shown and cannot show.

DECLARATION OF DOUGLAS DUET

I, Douglas Duet, declare the following:

1. I currently serve as a Principal Member of the Technical Staff at AT&T's Radio Access and Devices—Radio Technology, a division of AT&T Labs, Inc., a wholly owned subsidiary of AT&T Inc. In that capacity I am responsible for assessing emerging wireless technologies, evaluating new wireless technologies, and WCS spectrum management support. I hold BS and MS degrees in Electrical Engineering from Louisiana Tech University, and have worked in the field of radio telecommunications since 1973. My experience includes designing mobile, maritime, and microwave radio systems; switching and facility planning; development and integration of wireless local loop technology; assessing fixed and mobile wireless access technologies; spectrum management; developing wireless video delivery and broadband technology; and participating in standards development. I am a life member of the Institute of Electrical and Electronic Engineers and a registered Professional Engineer. I hold two patents. As a result of my experience and responsibilities with AT&T, I have personal knowledge of the following:

2. In my capacity as a member of the Technical Staff at AT&T's Radio Access and Devices—Radio Technology, I have been involved on AT&T's behalf in monitoring the work of the WCS Coalition and with the problems WCS licensees have experienced as a result of the FCC's technical rules for WCS. I am familiar with the FCC's May 20, 2010 *Report & Order* adopting certain revised technical and service rules for WCS licensees and with the Petitions filed by Sirius XM; Green Flag, et al.; and ARRL seeking partial reconsideration and clarification of the *Report and Order*.

3. The 400 mW per MHz power spectral density (“PSD”) limit on fixed CPE transmissions sought by Sirius XM would prevent WCS licensees from using spectrum flexibly to accommodate large numbers of users with varying demands for spectrum and call into question the viability of fixed broadband service using 2.3 GHz WCS spectrum.

4. The rules for other bands do not require PSD limits for sub-channel bandwidths, and the WiMAX standards do not include sub-channel PSD operation. Accordingly, AT&T’s fixed CPE—and this also is true for the other fixed CPE for WCS spectrum with which I am familiar—has not been designed to adjust power proportionally with occupied bandwidth.

5. Rather, automatic transmit power control (“ATPC”) operates to reduce the PSD of the CPE’s transmission and prevent overload of the hub station’s receiver. For fixed CPE farther from the hub station, ATPC will increase the PSD to maintain the transmission’s signal-to-noise ratio at the hub station receiver despite the increase in distance. The PSD increases with distance until there is another hub station with better signal quality to the remote unit or the device’s power is at maximum, so the PSD cannot increase further. The proposed 400 mW/MHz PSD limit will interfere with this mechanism.

6. Physics teaches us that the radius of a hub station’s coverage varies with the square root of the fixed CPE’s power level. Because the PSD limit will constrain the power at which fixed CPE located near its maximum distance from a hub station can transmit, the signal-to-noise ratio will drop to unacceptable levels more rapidly than it would without a PSD limit. In other words, the effective radius of a hub station’s coverage will shrink, and the area covered by the hub station (πr^2) will be reduced by the square of the diminution of the radius. Consequently, the PSD limit will require a network operator to construct many more hub stations in order to achieve a given level of performance. As a practical matter (because hub stations are rarely

ideally located due to terrain, zoning criteria, availability of sites, etc.), the number of coverage holes likely will increase as well.

7. In a fixed WiMAX 802.16d system, subscriber stations are allocated groups of subcarriers. These subcarriers are spaced every 22.5 KHz, allowing for 200 possible subcarriers in a 5 MHz channel (after allowing for pilots and guard bands). The scheduler in the hub station allocates the subcarriers to only one subscriber station at a time, and, in the 802.16d standard, the subcarriers the scheduler assigns to a particular subscriber station will be adjacent.

8. For voice traffic,¹ subscriber stations use only 8 to 16 subcarriers to accommodate the small speech packets that are transmitted once every 20 milliseconds. Because of the way schedulers assign subcarriers in WiMAX 802.16d systems (i.e., adjacent to one another), these subcarriers will be consolidated within 1 MHz of spectrum. Without the PSD limit, a subscriber station could concentrate all of its power (e.g., 1 W, 2.8 W, or 20 W) in those 8 to 16 subcarriers. With the PSD limit, a subscriber station using the WiMAX 802.16d air interface could transmit only 400 mW. For 1 W subscriber stations, the approximately 4 dB power reduction would require more than *twice* as many hub stations to compensate. For 2.8 W subscriber stations, the approximately 8.5 dB power reduction would require about *seven times* as many hub stations to compensate. And, at the 20 W maximum for fixed CPE, the approximately 17 dB power reduction would require roughly *fifty times* as many hub stations to compensate.

9. Because of the manner in which a WiMAX 802.16d scheduler assigns subcarriers, in some circumstances the same effective power limits—and, therefore, the same increase in the required number of hub stations—would apply to best-effort data traffic. In addition, reducing the power toward the edge of a hub station's coverage area will reduce the signal-to-noise ratio,

¹ In WiMAX, all voice traffic is carried using VoIP technology.

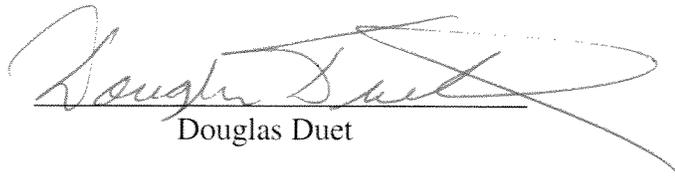
which would force the subscriber stations to a lower level of modulation that is compatible with lower signal-to-noise ratios. The lower level of modulation would reduce the data rate, which would compromise the user experience and the network's spectral efficiency.

10. AT&T principally has deployed WCS facilities using Alvarion equipment (BreezeMAX[®] PRO 1000 for outdoor installations and BreezeMAX[®] Si 1000 for indoor installations). This Alvarion equipment uses an air interface similar to WiMAX 802.16d, to provide fixed broadband service in Alaska, including to underserved areas. If the FCC were to adopt Sirius XM's proposal to limit WCS fixed CPE to 400 mW/MHz, the capital costs associated with the increased number of hub stations would drive the cost of service to levels that could be unaffordable to many of the current and likely future customers, thereby resulting in the loss of service to existing customers in underserved areas.

11. In short, the proposed PSD limit would make it much more costly and time-consuming to construct a WCS fixed broadband network for either a new entrant or an existing provider and would handicap the network's ability to adjust flexibly to customer demand, thus reducing the quality, throughput, and efficiency of the service provided.

I declare under penalty of perjury that the foregoing is true and correct to the best of my information, knowledge, and belief.

Executed this eighteenth day of October, 2010.


Douglas Duet

CERTIFICATE OF SERVICE

I hereby certify that on this eighteenth day of October, 2010, I caused true and correct copies of the foregoing Opposition of AT&T Inc. to Petition for Partial Reconsideration and Clarification of Sirius XM Radio Inc.; Petition for Reconsideration of Green Flag Wireless, LLC, et al.; and Petition for Clarification or Partial Reconsideration of ARRL to be served by first class mail, postage prepaid, upon:

James S. Blitz, Esq.
Vice President, Regulatory Counsel
Sirius XM Radio Inc.
1500 Eckington Place, N.E.
Washington, D.C. 20002

Donald J. Evans, Esq.
Fletcher, Heald & Hildreth, PLC
1300 North 17th Street
11th Floor
Arlington, VA 22209

Mr. Terrence R. Smith
Corporate Vice President and
Chief Engineering Officer
Sirius XM Radio Inc.
1221 Avenue of the Americas
New York, NY 10020

Christopher D. Imlay, Esq.
Booth, Freret, Imlay & Tepper P.C.
14356 Cape May Road
Silver Spring, MD 20904-6011

Richard E. Wiley, Esq.
Robert L. Pettit, Esq.
Jennifer Hindin, Esq.
Wiley Rein LLP
1776 K Street, N.W.
Washington, D.C. 20006

/s/ Peter J. Schildkraut

Peter J. Schildkraut