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	)	WT Docket No. 07-293
	)	
Establishment of Rules and Policies for the Digital Audio Radio Satellite Service in the 2310-2360 MHz Frequency Band	)	IB Docket No. 95-91 GEN Docket No. 90-357 RM No. 8610

To: The Commission

REPLY COMMENTS OF AEROSPACE AND
FLIGHT TEST RADIO COORDINATING COUNCIL

Aerospace and Flight Test Radio Coordinating Council ("AFTRCC"), by its counsel, hereby responds to certain of the comments filed by other parties on Public Notice, DA 10-592, released April 2, 2010.

Introduction

In its comments AFTRCC urged that the staff revisit the proposed rules with an eye toward tightening same. Among other things, AFTRCC observed that the changes contemplated will significantly worsen the out-of-band interference to flight test telemetry (aka aeronautical mobile telemetry, or "AMT"). AFTRCC stressed the increased risks this posed for aviation safety; the Commission's long history of protecting AMT; and the fact that WCS parties had at no point challenged the technical merits of AFTRCC's several engineering studies, including field tests, which showed conclusively the interference risks.

Other parties have likewise noted these risks, and have urged the Commission to take measures to protect incumbent services. The Telecommunications Industry Association ("TIA"),

which represents 500 companies engaged in the manufacture and supply of products and services used for broadband services, i.e. the very equipment WCS parties would use, has stated in categorical terms that "it is vital that SDARS and AMT operators which are adjacent to the WCS band be protected."[1]

The Satellite Industry Association concludes that the flight test community has demonstrated that the out-of-band emission limits for WCS will not protect AMT and that "[t]herefore, the proposed coordination regime for the placement of WCS base stations and the protection of AMT receive locations is critical and should be strengthened to protect existing and future fixed and mobile AMT receive sites."[2]

Likewise, the Boeing Company has stressed the critical role that AMT plays in its operations, and the grave risks that WCS interference poses to the safe and efficient completion of its flight test programs. Among other things, Boeing observes that "[f]light testing is a critical safety-of-life service," and that the coordination requirements for WCS should be strengthened.[3]

Comments of other parties arguing contrary positions are without merit and should not be given decisional weight.

Discussion

The WCS Coalition ("WCS") argues that the coordination system proposed by the staff, "threatens to delay, if not preclude, service to 25% of the U.S. population," and is unnecessary to protect AMT.[4] In this regard, WCS argues that a 10 km coordination zone is sufficient, rather than 45 km or line-of-sight, whichever is longer. Its argument rests as an engineering statement

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[1] *Id.* at 3-4.
[2] *Id.* at 2.
[3] *Id.* at i-ii.
[4] Executive Summary.

which contends that a 20 db desired/undesired signal ratio would be provided AMT at this distance, and that this is sufficient. (Exhibit B).

Preliminarily, it should be stressed that the Coalition has had numerous opportunities to respond to AFTRCC technical submissions regarding the risk of interference from WCS operations, measurements of that interference taken at Ashburn, VA, and the consequences of WCS interference to flight test safety. At no point in this proceeding has WCS attempted a response to these points notwithstanding the public statement by one of its members at the May 12, 2008 senior staff meeting to the affect that WCS would "protect" AMT.

This aside, there is no merit to WCS' new notion that a mere 10 km represents adequate separation between a WCS station and an AMT receiver under line of sight conditions. Analysis of the statement upon which this assertion is based reveals a major flaw: The assumption on the part of the drafter that 20 dB provides an appropriate level of protection for AMT. In fact, routine fades during flight testing are as high as 15 to 25 dB due to the maneuvers of the aircraft in flight, including multipath from the ground and aircraft structures, and from shadowing from the aircraft's wings, tail and fuselage. AFTRCC has addressed this phenomenon on prior occasions.[5]

Correcting the analysis for this flaw (and the other omissions discussed in the attached Engineering Statement) reveals that a separation (i.e. coordination) distance of at least 45 - 50 km/line-of-sight is necessary to compensate for the deep fading characteristic of AMT. Any other approach risks losing data during the fades when the D/U is not met. But there is more.

Appendix B references the 2000 Coordination Agreement between AFTRCC and XM Radio, Inc. under which, for overload interference (as distinct from OOBE), AFTRCC agreed

[5] See, e.g., Comments filed October 5, 2009 in ET Docket No. 08-59 (Exhibit B at 2-5). For the record, all AFTRCC filings in ET Docket No. 08-59 discussed herein are hereby incorporated by reference.

that a power flux density of -60 dB (W/m^2) was appropriate protection for AMT antennas, a level that translates to an 8.9 km distance to protect AMT against 2 KW WCS base stations. What the Appendix fails to recognize, however, is that in the case of overload interference, the potential victim can take effective action to protect its facilities by the installation of filters at the AMT dish. Such protection is widely used at AMT ground stations. No such solution is possible in the case of WCS out-of-band emissions without filtering out the very signal AMT operators seek to receive. Moreover, the overload protection value was arrived at in recognition of the fact that AMT enjoyed the benefit of a 15 MHz guard band vis-à-vis DARS. Here, unfortunately, WCS will be operating immediately adjacent to AMT, if not hard against the band edge. And WCS has resisted anything like a meaningful guard band (or virtually any other technical solution for that matter)[6].

WCS asserts that the coordination envisioned in the Public Notice would disenfranchise 76 million people from being able to receive WCS broadband service.[7] However, this exaggerated scenario presumes the absence of any coordination. There are any number of conventional engineering techniques that could also be used to facilitate WCS operations closer than 45 km or line of sight on a non-interference basis to AMT. These include adjustments to antenna height, orientation and gain; judicious selection of terrain or man-made obstacles to block the line of sight path; the concentration of the WCS time division duplex ("TDD") operations in the lower WCS bands where capacity requirements permit; and many others. By use of these techniques WCS would be able to maximize its coverage. Taking account of these

[6] The Coalition takes AFTRCC to task for having "failed over the past thirteen years to protect themselves from WCS operations permissible under the existing rules." *Id.* at note 13. As noted in its Comments, AFTRCC is at a loss to understand how AMT can be expected to have protected themselves from interference that would become permissible largely by virtue of a change that has not yet happened, namely the proposed change from peak to average power measurement. See AFTRCC's April 23, 2010 Comments for the effects of this change, the chief of which is that the existing 43 + 10 log (P) becomes much worse for AMT, i.e. only 32 + 10 log (P).
[7] *Id.* at 10.

techniques, the 76 million figure can be seen as nothing more than a straw-man to which the Commission should give no weight.[8]

The WCS parties reference the Commission's 2002 decision regarding reallocation of the 2385-2390 MHz band, and its decision not to require adjacent band coordination.[9] The two cases could not be more dissimilar. There was virtually no record evidence in the 2002 proceeding concerning the characteristics of the anticipated new services. By contrast, the record here is, to say the least, full. It contains empirical data on the severity of interference from an actual WCS device to an actual AMT receiver; a wealth of data on the specific application and technology WCS operators intend to use; concrete examples of the specific interference effects that will ensue to adjacent operations; and in particular, the crucial importance of a robust prior coordination regime to avoiding that interference.[10]

The GEH Comments are equally unpersuasive. For openers, it is noteworthy that this party has been entirely silent in this proceeding to this point: At no point has GEH seen fit to introduce any information into the Docket regarding WiMax operations or interference concerns. Instead, it transparently seeks to grind an axe here that more properly belongs in the MBANS proceeding, ET Docket No. 08-59. Thus, its filing should be disregarded. If the Commission should nonetheless see fit to reach the merits, the arguments should be rejected.

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[8] This point applies equally to similar statements made by the Coalition in its Reply Comments on the build-out Public Notice (FCC 10-46) filed yesterday. AFTRCC takes no position on the Coalition's request for build-out relief; AFTRCC only wants the record to be clear that the population figures supplied by the Coalition for various metropolitan areas are gross calculations before coordination, not after. The relevant metric for purposes of ultimate WCS coverage is, of course, the population covered after coordination.

[9] *Id.* at page 8 citing Report and Order, 17 FCC Red 9980.

[10] The changes proposed by WCS to draft Rule 27.73(a) contemplate AFTRCC and NTIA supplying lists of non-federal and federal sites, and updating same as time goes on. *Id.*, Appendix A, at -xiv-. Data on proposed WCS deployments should be made available to AFTRCC as part of the coordination process. That data will be helpful in the event, after coordination, a WCS station causes interference. It should also be made available upon request. This matter, together with other changes to the draft rule, are set forth in an attachment hereto.

GEH makes essentially three arguments: ITU-R. Rec. M.1459 is overly protective; an exclusion zone of 10 km is sufficient; and the band is subject to emissions from other sources which military and civil flight testing must already live with, hence there is no reason to be concerned about WCS. GEH is in error on all three counts.

First, with respect to Rec. M.1459 being "overly conservative," AFTRCC would observe that the Recommendation is based on validated system and noise floor measurements that were reviewed, analyzed, and debated over the course of several years in the Radiocommunication Sector of the International Telecommunication Union. Experts from over 30 nations and from a variety of interest groups analyzed and commented upon the various drafts. The United States led that effort. The Recommendation was ultimately approved by the Radiocommunication Assembly with delegates from scores of Administrations in attendance, and it has been the recognized international standard for ten years. The United States has relied heavily on this Recommendation in numerous international fora including two successive World Radiocommunication Conferences.

Accepting the protection values in the Recommendation, at least for the sake of argument, GEH goes on to contend that it is highly unlikely that free space propagation will occur over distances of as much as "32 km – let alone 126 km" due to the terrain and the presence of buildings, and attempts to dismiss these actual values (for 2360 and 2362.5 MHz) as "outliers . . . ."[11] However, GEH's "outliers" prove the very rule it seeks to discredit: Harmful interference will in fact occur at distances which, by GEH's own admission, can far exceed 100 km. With AMT sites being located on mountaintops (in the case of facilities in the Southwest), and routinely on towers and the roofs of buildings, so as to afford a clean line-of-sight to the

[11] *Id.* at 3.

horizon, the proposed 45 km/line-of-sight standard, whichever is larger, is in fact eminently reasonable.

GEH references various analyses, such as a probabilistic study, for the proposition that 45 km/LOS is overly protective.[12] However, those analyses are wholly inappropriate in trying to determine compatibility between flight-test telemetry operations, a safety service, and consumer communications devices. The Commission itself has used static analysis when assessing the risk of interference from one technology to another. Recently, for example, the Office of Engineering and Technology conducted a careful series of tests designed to assess the risk of interference from proposed time-division duplex operations in the AWS-3 band to incumbent operations in the adjacent AWS-1 band. Those tests expressly recognized and relied upon a static case analysis, rather than the probability approach espoused by GEH.[13]

Johns Hopkins University ("JHU") studied GEH's probability analysis and concluded that this party's notion of acceptable protection for aviation safety is an interference probability ranging from 1.7% of the time to as much as 20% of the time![14] In other words, GEH (and the WCS parties) are able to proffer the notion of a 10 km coordination zone only by arrogating to themselves a decision on just how much interference aviation safety can tolerate. As the Johns Hopkins Statement observes, "Outages like this, for a safety service for which the target bit error rate is 10^{-6} are the very definition of 'harmful.'"[15]

Nevertheless, GEH argues, there are other devices, Part 15, Part 18 and amateur, which emit spurious interference in the band, and these devices are ubiquitous. From this, GEH asserts

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[12] *Id.* at 4.
[13] Advanced Wireless Service Interference Test Results and Analysis, October 10, 2008, at note 8.
[14] See Exhibit B to AFTRCC's October 5, 2009 Comments in ET Docket No. 08-59, at pages 8-11.
[15] *Id.* at 8.

that this "proves beyond any doubt that the M.1459 PFD limit is the wrong protection criteria . . . ."[16]

While there can be spurious noise in the 2360-2390 MHz band -- as in any band -- 2360-2390 MHz is remarkably free of interfering signals. This is consistent with the fact that it has long been Restricted under Rule 15.205, and allocated exclusively for flight test telemetry. It is also consistent with the long-standing experience of flight test engineers.

JHU studied this issue and has spoken directly to it in Engineering Statements filed in ET Docket No. 08-59. Among other things, JHU notes, based on test range measurements, that the "noise floor is not increased by spillover and spurs . . . ."[17] Indeed, were it otherwise, and GEH's allegations about widespread noise pollution in the band true, flight test operators would not be able to collect telemetry data at the distances they routinely do, i.e. 175, 190, 200 miles and more.

This conclusion was further corroborated by SAT Corporation, a world leader in RF spectrum monitoring and interference detection systems for satellite and terrestrial communications. AFTRCC commissioned SAT to conduct a noise study at Sunnyvale, CA, in the heart of the heavily populated San Francisco-Palo Alto corridor. Based on its measurements, SAT concluded that:

> The noise floor was measured to be below -173 dBm/Hz across the band of interest. This extremely low level of extraneous noise is remarkable, particularly given the location of the test in the congested San Francisco – Palo Alto corridor. <u>This is characteristic of the out-of-band and spurious emission levels in bands used for radio astronomy research</u>.[18]

[16] GEH Comments at p. 5.
[17] AFTRCC ex parte filed February 23, 2009 in ET Docket No. 08-59, Test Report, at page 22.
[18] AFTRCC Reply Comments filed November 4, 2009 in ET Docket No. 08-59, Exhibit B at p. 1 (emphasis added).

In other words, GEH's argument proves far too much: Were it accepted, there would be no point to protecting radio quiet zones such as Boulder, CO on the theory that 'too many people are using garage door openers and WiFi.' Fortunately, this is not the Commission's policy.

Furthermore, it is hardly apt to compare the OOBE from 2000 watt WCS base stations operating hard against the AMT band edge of 2360 MHz, for example, with WiFi devices and garage door openers operating with a guard band of fully 10 MHz between the upper band edge of the exclusive AMT allocation (2390 MHz) and their own 2400-2483.5 MHz band.

GEH references broadcaster use of the band for sporting event coverage.[19] However, each and every one of these special temporary authorizations (typically for a few days at a time) is coordinated by AFTRCC to ensure the absence of interference to flight test telemetry. Far from providing support for GEH's effort to overturn Rec. M.1459, the fact that broadcasters are able to use the band on a case-by-case, coordinated basis underscores the value of coordination as a method to avoid interference while enhancing spectrum efficiency. There is nothing in this inconsistent with Rec. M.1459.

Finally, on another matter, AFTRCC is submitting herewith suggested revisions to proposed coordination Rule 27.73. These revisions are intended to clarify the WCS obligation to provide sufficient information to facilitate coordination and interference resolution; AFTRCC's responsibility as coordinator; the WCS obligation to suspend upper band operations in the event of interference; and AFTRCC's obligation to supply a list of existing and planned non-Government AMT sites and their locations.

On this score, AFTRCC envisions that the coordination process between WCS and AMT would be facilitated by the two parties working out an agreement on procedures, terms, conditions, and techniques for accomplishing coordination. AFTRCC has struck mutually-

[19] *Id.* at 6

beneficial agreements like this with other parties and, once the rules are set for good neighborliness in this proceeding, AFTRCC would be prepared to discuss a similar arrangement with WCS representatives. Such an arrangement would simplify life for both sides.

Conclusion

For the reasons stated herein and in its opening Comments, AFTRCC urges the Commission to adhere to its basic proposals for coordination with the revisions proposed in the attachment.

Respectfully submitted,

AEROSPACE AND FLIGHT TEST RADIO COORDINATING COUNCIL

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Rule 27.73 WCS and MAT coordination requirements.

* * *

(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 any MAT entity operating an MAT receiver facility within 45 kilometers or the radio line of site, whichever distance is larger, of the intended WCS base station location. In furtherance of this, WCS base stations located within radio line of sight of an MAT receiver must be coordinated with the Aerospace and Flight Test Radio Coordinating Council (AFTRCC) for non-Government MAT receivers on a case-by-case basis prior to operation. WCS licensees shall supply sufficient information including the coordinates of WCS base stations, AGL data, and line of sight analyses to allow coordination (and interference resolution (as referenced in subsection (b), below)), to take place. ~~The location of MAT receiver sites may be obtained from the Aerospace and Flight Test Radio Coordinating Council (AFTRCC) for non-federal MAT receivers. For federal MAT receivers, the WCS licensee shall supply sufficient information to the Commission to allow coordination to take place~~. A listing of current and planned MAT receiver sites, and their locations, can be obtained from AFTRCC for non-federal sites and through the FCC's IRAC Liaison for federal MAT receiver sites.

(b) Duty to Cooperate. WCS licensees and MAT receiver operators must cooperate in good faith in the coordination and deployment of WCS and MAT 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 MAT receiver facilities to reduce the likelihood 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; provided, however, that in the event of interference to AMT, the WCS operator affected shall immediately suspend operation of upper band base stations identified by AMT as causing or contributing to the interference. 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.

Engineering Statement

30 April 2010

In its previous filings,[1] AFTRCC has demonstrated that there is a serious risk of interference to Aeronautical Mobile Telemetry (AMT) operations in the band 2360 – 2390 MHz (AMT Band) from regulations proposed for the Wireless Communications Service (WCS). This Statement provides a response to recent reply comments by the WCS Coalition[2] and GE Healthcare (GEH).[3]

This Statement first addresses the analyses presented by the WCS Coalition for the proposition that a 10 km coordination zone around AMT sites is sufficient. It next deals with analyses introduced by GEH in its November 4, 2009 filing in Docket 08-59 (the "MBANs" Proceeding) and referenced in its Comments in this Docket on April 23, 2010. It then concludes with a brief summary of key technical points which should be considered when the Commission develops its final rules for OOBE from the WCS band into the AMT band.

WCS D/U Analysis

In its link budget analyses filed on April 23 (Exhibit B), WCS takes the approach of computing the ratio D/U of Desired to Undesired signal (i.e., signal to noise plus interference) for an AMT link budget experiencing interference from WCS devices.

Exhibit B concludes that a 20 dB D/U ratio exists during normal flight test operations despite the presence of interfering WCS base stations and the presence of mobile, portable, and nomadic transmitters. This analysis is seriously flawed.

First, it should be noted that that 9 – 15 dB of this budget of 20 dB is required simply for the successful demodulation and recovery of flight test data. This leaves only 5 dB of margin to account for the 15 – 25 dB fades caused by aircraft maneuvers (e.g., signal blockage, short and long-path delay multipath, etc.). Furthermore, the analysis completely neglects the impact of the proposed 13 dB peak-to-average power excursions that are a defining characteristic of the OFDM WiMAX and LTE technologies to be used by WCS systems.

As discussed in earlier AFTRCC filings, the dynamics of flight testing are such that a single peak-to-average power excursion will wipe out 500 contiguous AMT data bits, leading to loss of bit sync and the failure of the ground station antenna tracking control loop.

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[1] See, e.g., AFTRCC ex partes filed November 17, 2008 ; August 14, 2009 ; March 23, 2010; and April 23, 2010.
[2] Docket 07-293, April 23, 2010.
[3] Ibid

This cascade of events will lead to loss of a complete flight test segment, requiring that it be re-flown at great cost and with additional risk to the pilot and crew of the test aircraft.

Furthermore, the WCS analyses do not account for the aggregate effects of the large number of WCS devices that could impact AMT ground stations -- hundreds of base stations and nomadic devices, thousands of portable devices, and several thousands of mobile devices.

Next, comments by WCS regarding the insufficiency of filtering at AMT sites are also inconsistent with fact. AMT telemetry receivers cost tens of thousands of dollars and have outstanding intermediate frequency filters (i.e., high-order brickwall filters). This is in stark contrast to commercial WCS devices which have little, if any, filtering, as demonstrated by the need to change OOBE power levels from peak-to-average even for devices whose OOBE levels are already relaxed to 43 + 10 log (P).

Furthermore, although filtering at AMT sites solves the problem of "overload" interference referenced in the Exhibit, filtering at AMT sites to exclude the portions of WCS emissions that fall directly into the AMT receive channels is not possible without "filtering out" the very signal AMT operators seek to receive

In summary, the WCS D/U analysis leaves a margin of 5 dB to account for fades of 15 – 25 dB, peak-to-average power excursions of 13 dB, and interference aggregation effects that will be as high as 10 – 20 dB.

Finally, with respect to the WCS claim that AFTRCC should have "adjust[ed]" to WCS rules when first published, we note that, without a rule change to convert peak power to average power, WCS devices are unable to comply with the existing rules. In other words, AMT could hardly be expected to have adjusted to something that has not yet happened.

GEH Analysis

Preliminarily, reference is drawn to the AFTRCC Reply Comments, filed on November 4, 2009 in ET Docket No. 08-59, which provides a detailed description of a flight test of a Bombardier Learjet CRJ-700 regional business jet flying from Wichita, Kansas.[4] In that filing, it is noted that Bombardier has measured the link availability and bit error rate performance of its flight test aircraft over a multi-year period, and that Bombardier's links exceed 99.9% availability with a BER of 10^{-6} or better. This is actual data, not supposition, and is typical of flight test ranges in the United States and abroad.

In contrast, using unsubstantiated assumptions about propagation exponents, AMT system performance, and the AMT fade environment, coupled with erroneous application of probabilistic techniques, GEH concludes from its Monte Carlo simulations that

[4] Docket 08-59, November 4, 2009.

"The most important conclusion from these baseline AMT link simulations is that AMT outage rates on the order of several percent are apparently being tolerated already and must therefore be acceptable."

GEH continues by stating,

"Having established this fact, it is now possible to define a reasonable quantitative harmful interference threshold for the allowable increase in outage rate due to interference."

However, GEH's simulations depend on unsubstantiated assumptions that free space propagation from their interfering devices is characterized by a path exponent of at least 2.4 (in contrast to the free space limit of precisely 2). GEH seeks to justify this by assuming that, despite AMT being a safety-of-life service, interfering signal levels can be arbitrarily dismissed as unimportant "outliers." See GEH Comments at page 3. However, such an approach is the polar opposite of the care with which the Commission has treated aviation safety in general, and flight test spectrum safety in particular.

Furthermore, GEH disregards the critical details of aircraft flight by using a simulation in which the kinematics of the aircraft are ignored. For example, without specifying the speed of an aircraft as its ground station antenna tracks its path across the field of view of an ensemble of interfering devices, it is impossible to characterize accurately the cumulative effects of interference during long-term interference "dwells." These effects have profound implications for AMT bit error rates, for bit synchronization with ground station data processing equipment, and for the ability of ground station antennas to consistently maintain track with their aircraft.

These issues are addressed in detail and supported by extensive empirical data in the November 4, 2009 AFTRCC Reply Comments in Docket 08-59. This is in contrast to the GEH analysis, which is based on the use of probabilistic simulation models that ignore key technical aspects of the problem being simulated and for which there is no empirical support. Consequently, the GEH Comments should be discounted.

In summary, the Coalition and GEH analyses grossly understate the extent and the impact of the interference that will be caused by WCS devices to AMT flight test telemetry systems.

Additional Points

With respect to line of sight propagation, and as shown in the Bombardier Learjet tests, a tiny ensemble of three 1 mW devices, operating at a 34% duty cycle in only 3 MHz of a 5 MHz AMT telemetry channel, and operating <u>indoors</u> at a distance of 12 miles (~20 km) from an AMT ground station, caused interference that was <u>sufficient to hijack the AMT tracking antenna.</u> This destroyed the AMT link.

Thus, coordination zones of 45 km and/or line-of-sight, whichever is larger, are eminently reasonable and more than justified given the risks to aviation safety. The notion of a 10 km coordination zone, by contrast, is neither properly supported, nor is it supportable.

With respect to the impact of the coordination zones proposed in the Public Notice (i.e. 45 km/line-of-sight), it is an exaggeration to assert that 76 million people will be denied WCS service. This claim fails to note that the lower frequency WCS spectrum blocks can be used with no coordination with AMT whatsoever. Furthermore, this figure has been arrived at in a complete vacuum, i.e. without consideration of any of the many mitigation techniques that can, and typically are, employed during coordination.

Judicious use of techniques such as adjusting WCS base station locations and tower heights, pointing base station high-gain antennas away from flight test ground stations, and adjusting WCS channel assignments so as to minimize adjacent channel occupancy to AMT systems, are all just a few of the possibilities. The WCS population statements take none of this into account.

I have read and understood the attached comments. The statements made therein are true and correct to the best of my knowledge and belief.

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