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October 20, 2008

57739-000020

Marlene H. Dortch
Secretary
Federal Communications Commission
445 12th Street, SW
Washington, DC 20554

Re: Service Rules for Advanced Wireless Services in the 2155-2175 MHz Band (WT Docket No. 07-195) (AWS-3); Service Rules for Advanced Wireless Services in the 1915-1920 MHz, 1995-2000 MHz, 2020-2025 MHz and 2175-2180 MHz Bands (WT Docket No. 04-356) (AWS-2)

Dear Ms. Dortch:

On October 10, 2008, the Office of Engineering and Technology (“OET”) released its analysis of the AWS-3 interference testing that it conducted on September 3-5, 2008 at a test facility in Seattle, Washington (“OET Report”).¹ OET concluded that its proposed technical specifications from the *FNPRM* in the above referenced proceedings would not cause harmful interference to licensees in the AWS-1 spectrum band, and stated that its analysis was “based on reasonable assumptions that support allowing power levels of up to 23 dBm/MHz and an OOB limit of $60 + 10 \cdot \log(P)$ dB.”²

Mr. Ahmad Armand, Director of Engineering of MetroPCS Communications, Inc. (“MetroPCS”), attended the OET testing in Seattle,³ and has reviewed the OET Report, including the conclusions reached and the assumptions associated with such conclusions. Based on his review, he has prepared the attached preliminary analysis of the OET Report. In his analysis, Mr. Armand concludes that the OET Report and its resulting conclusions were based on certain flawed, and in some cases, unrealistic, assumptions. These unsupported assumptions resulted in approximately 24 dB of losses to the AWS-3 interfering signal that did not exist in any of the previous filings regarding the testing. By using assumptions that accurately take into account these losses, Mr. Armand concludes that there would be harmful interference to AWS-1 operations from AWS-3 operations at

¹ “The FCC’s Office of Engineering and Technology Releases Analysis of AWS-3 Interference Tests,” Public Notice, WT Docket Nos. 07-195 and 04-356, DA 08-2245 (rel. Oct. 10, 2008).

² OET Report at 18.

³ See *Ex Parte* of AT&T, Inc., CTIA, MetroPCS Communications, Inc., Nokia Inc., and T-Mobile USA, Inc., WT Docket No. 07-195 (filed Sept. 10, 2008).

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23 dBm/MHz and an OOB limit of $60 + 10 \cdot \log(P)$ dB. This conclusion is consistent with prior filings in this docket which use more appropriate and realistic assumptions.

Mr. Armand also points out inconsistencies between the approaches taken toward interference testing, and the conclusions reached with regard to the prospects for interference, in the AWS-3 proceeding and the TV White Spaces proceeding,⁴ such that the OET conclusion that the previously-proposed technical specifications for AWS-3 are adequate to prevent against interference are subject to question.

In addition, the Commission must seek public comment on the OET Report. As stated by the D.C. Circuit in *American Radio Relay League v FCC*,⁵ the Commission must allow parties to “focus on the information relied upon by the agency”⁶ to reach its decisions, including the “core scientific recommendations”⁷ of the agency. This includes allowing parties the opportunity to “point out where that information is erroneous or where the agency may be drawing improper conclusions from it.”⁸ Without an opportunity for full public comment, the Commission risks violating the Administrative Procedure Act and thus leaves any final decision vulnerable to legal challenge.

Kindly refer any questions in connection with this letter to the undersigned.

Respectfully submitted,



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of PAUL, HASTINGS, JANOFKY & WALKER LLP

cc: (via email) Julius Knapp
Ira Keltz
Patrick Forster
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⁴ See ET Docket No. 04-186

⁵ *American Radio Relay League v FCC*, 524 F.3d 227 (D.C. Cir. 2008).

⁶ *Id.* at 236.

⁷ *Id.* at 238.

⁸ *Id.* at 236.

Comments on OET's Analysis of AWS-3 Tests, Prepared by Ahmad Armand, Director of Engineering, MetroPCS Communications, Inc.

OET has used the results of AWS-3 testing in Boeing lab and analyzed the expected interference from AWS-3 to AWS-1 handset. In their analysis, they've made a number of assumptions regarding the losses in the environment between the two handsets. As we show in the following, OET's assumptions are either not realistic, have serious flaws, or fail to carry through to all parts of the analysis.

Assumptions used in OET's analysis

- Desired AWS-1 serving signal to be protected is -95 dBm
- Interference criterion is call setup failure
- Separation distance = 2 meters
- Free Space Propagation Model
- Head-body loss of 6 dB
- Loss due to antenna mismatch of 2 dB
- No loss was considered due to antenna efficiency
- AWS-1 OOB slope of 3 dB
- Multipath/Shadowing loss of 3.5 dB
- Signal Bandwidth = 5 megahertz
- Technologies: UMTS and WiMAX

Desired AWS-1 serving signal to be protected is -95 dBm

In the OET Report, OET refers to -95 dBm as the desired AWS-1 signal to be protected. However, when OET applies this assumption, it uses the interference measurement values for -100 dBm and -90 dBm *pilot signal strength* levels and performs an interpolation to come up with the corresponding interference levels for -95 dBm pilot signal strength. In the MetroPCS network, pilot strength is 7 dB below total signal strength. Therefore, -95 dBm pilot strength is equivalent to having -88 dBm signal strength. So, all of OET's conclusions regarding protection of AWS-1 handsets would only apply to areas where coverage is stronger than -88 dBm, not -95 dBm. As a result, this assumption means that an AWS-3 transmitter operating within the parameters established by the Commission would interfere with a majority of the MetroPCS customers – as most of MetroPCS' customer calls are placed from indoors or in-vehicle.

Separation distance = 2 meters

Previous filings had shown multiple examples of situations where the separation distance is 1 meter or less. The + two meter separation assumption obviously excludes such cases. This assumption brings in an additional 6 dB of loss compared to 1-meter separation case.

Head-body loss of 6 dB

The coverage of mobile networks typically is based on the reverse link budget which accounts for the gains and losses between the mobile and base station. So, the acceptable signal levels like -95 dBm are based on the assumptions made in the link budget. The MetroPCS' link budget doesn't factor a head-body loss. If OET wants to use that loss in their calculation, they need to modify the acceptable signal level value accordingly. For example, -88 dBm would be -82 dBm. In other words, to be consistent, if OET adds a 6 dB head-body loss in the path of interfering AWS-3 handset, OET would need to consider it in the path of the received AWS-1 signal as well.

AWS-1 OOB slope of 3 dB

It is true that the AWS-1 OOB slope would reduce the overall interference due to OOB of AWS-3 handset. However, in the tests conducted in Seattle the in-band interference signal was injected into the AWS-1 handsets to simulate the amount of interference that would have entered the passband of the AWS-1 handset due to an AWS-3 handset. So, in these measurements the interference source was not set to a frequency outside of the AWS-1 passband. Therefore, it could have not been attenuated by the OOB slope of the AWS-1 handset. Therefore, the use of 3 dB loss due to OOB slope is not appropriate in this case.

Multipath/Shadowing loss of 3.5 dB

Interference scenarios generally occur within the distances of few meters, and, thus, are predominantly line-of-sight. This means that the analysis should focus on cases in which there's no obstacle between the two handsets. So, inclusion of a 3.5 dB multipath/shadowing loss is not realistic.

Relation to TV White Spaces Testing

I have reviewed the report entitled "*Evaluation of the Performance of Prototype TV-Band White Space Devices*" released on October 15, 2008 (the "*White Spaces Report*") by OET in ET Docket No. 04-186 ("TV White Spaces") and note some significant inconsistencies in the approach taken by the Commission there and in the AWS-3 proceeding. Specifically:

- One of the principal considerations in the TV White Spaces proceeding is the extent to which "spectrum sensing" techniques can be used that listen for incumbent uses and employ a "listen before talk" or "detect and avoid" strategy to avoid interference. The *White Spaces Report* observes that spectrum sensing, in combination with other techniques, is a viable approach to allow white space devices ("WSDs") to operate without disrupting incumbent television and other authorized services that operate in the TV bands. Notably, MetroPCS previously advocated in the AWS-3 proceeding that the Commission explore and test similar spectrum sensing techniques so that AWS-3 transmitters could detect nearby

AWS-1 units and avoid interference. The results of the TV White Spaces tests as set forth in the *White Spaces Report*, coupled with the ongoing controversy over the interference potential created by the AWS-3 allocation backed by M2Z, justify revisiting the possible use of spectrum sensing techniques by AWS-3 transmitting devices.

- The proposed rules in the TV White Spaces proceeding set a limit of 100 mV for a WSD mobile device if it uses a database interference avoidance technique and is not operating on a channel adjacent to an occupied DTV channel. The *White Spaces Report* also reflects the use of a WSD transmitting with an output power of 21.7 dBm/4.5 MHz (15.2 dBm/MHz) resulting in an OOB of -71.3 dBm/MHz (using a rule of $101 + 10 \log(P)$ dB). Notably, this level of OOB is consistent with what MetroPCS has requested for AWS-3 devices.

Conclusions

Questionable assumptions result in 18.5 dB of losses that did not exist in any of the previous reports. In addition, using -95 dBm pilot power as the operating level of AWS-1 handset is equivalent to another 5-6 dB of loss. Therefore, altogether OET has incorporated 23.5 to 24.5 dB of unrealistic losses between the AWS-3 and AWS-1 handset, which resulted in the erroneous conclusion that the AWS-3 handset's OOB and max power proposed in the FNPRM protect the AWS-1 handsets from harmful interference from AWS-3 handsets. Had actual, real-world losses been properly accounted for, OET would find harmful interference to AWS-1 operations from AWS-3 operations – as demonstrated by prior filings in this docket which used more appropriate assumptions.

There also appear to be inconsistencies between the manner in which the FCC has approached the interference tests for TV white spaces and AWS-3, with the result that the conclusion that the Commission's proposed technical specifications for AWS-3 will avoid harmful interference is suspect.

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