October 14, 2008

VIA ELECTRONIC FILING
Marlene H. Dortch
Secretary
Federal Communications Commission
445 12th St., SW
Washington, DC 20554

Re: *Ex Parte Presentation – Service Rules for Advanced Wireless Services (WT Docket Nos. 04-356 & 07-195)*

Dear Ms. Dortch:

CTIA—The Wireless Association® ("CTIA") submits this filing to demonstrate in practical terms how consumers who rely on AWS-1 spectrum would experience call failure under the current AWS-3 technical proposal.[1] Contrary to M2Z's claims, both empirical testing *and* statistical analysis show that these interference scenarios would not be rare – in fact, under normal operating conditions millions of consumers using AWS-1 devices would face widespread and prevalent interference should the Commission adopt the rules as proposed.

M2Z has acknowledged throughout the proceeding that its TDD proposal would cause interference to devices operating on AWS-1 spectrum, and it has tried to deflect this concern by maintaining there is a low probability that interference cases will occur. For example, M2Z sought to downplay the Seattle tests' findings, claiming the results "only show what is already known" and "interference would be present only when the interference source is very close the AWS-1 device and the AWS-1 signal received by the mobile is exceptionally low, among other things."[2] In its own words, "M2Z has never denied that some interference would occur … but the question before the Commission concerns the likelihood of such occurrences and whether such interference would be harmful."[3] M2Z urges the Commission to assess interference risks based on probabilistic studies, which – according to M2Z – show that interference events would be rare. This fallback position – that the probability of interference events is low – is incorrect and based on faulty assumptions. M2Z's probabilistic arguments also completely hinge on its own failure – if M2Z is successful then interference will occur; if M2Z fails then interference will not occur.

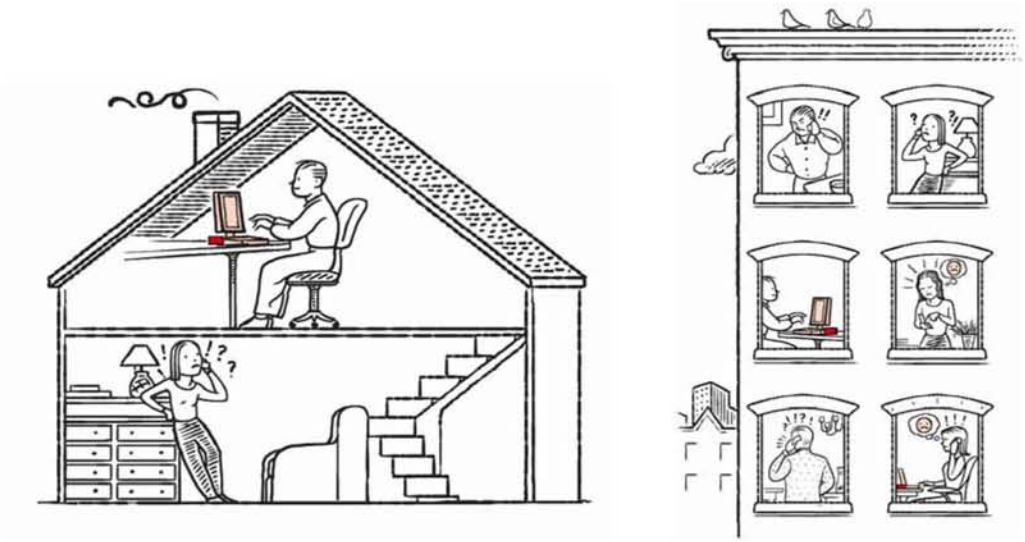
Statistical Modeling Using Real-World Parameters Shows Significant Risks of Interference. The Seattle tests – and the engineering calculations of all interested parties including M2Z's experts – show that interference will occur if an AWS-3 device transmits near a consumer with an active AWS-1 receiver. Reasonably constructed statistical modeling provides further evidence that the risk of AWS-3 devices interfering with AWS-1 users is real and significant.

T-Mobile recently submitted the results of an AWS-3 interference analysis conducted by Optimi using a "Monte Carlo" probabilistic simulation[4] – the very framework that M2Z calls for.[5]

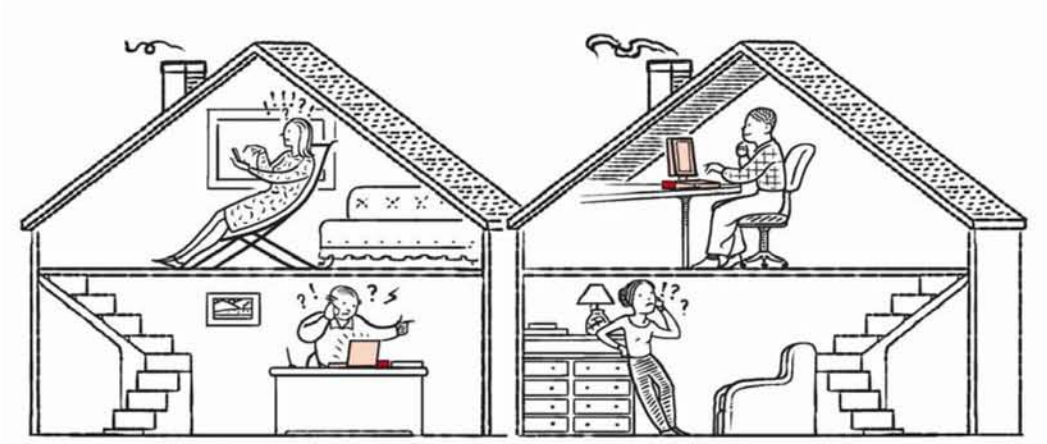
[1] Broadband PCS customers are similarly at risk of service disrupting interference resulting from the Commission's proposed rules for the AWS-2 H Block.
[2] M2Z *Ex Parte* Letter, WT Docket No. 07-195, Attachment at 5 (filed Sept. 23, 2008).
[3] M2Z Reply Comments at 17.
[4] *See* Optimi Corporation, "Analysis on the Effects of the AWS-3 to AWS-1 Mobile to Mobile Interference," at 5, attached to T-Mobile *Ex Parte* Letter, WT Docket Nos. 04-356 & 07-195, (filed Sept. 30, 2008) ("Optimi Study").

Optimi's analysis applies the technical specifications under consideration in the Commission's proposal and takes into account real-world parameters including uneven distribution of users, calling hotspots, busy hours, and indoor use.[6] Optimi applied real world usage patterns, and the results illustrate the likelihood of interference:

- AWS-1 users with an AWS-3 router operating in their homes (within 15 meters) would have a nearly 67% probability of call failure.[7] Throughout these illustrations the red devices represent interfering AWS-3 devices.



- AWS-1 users with an AWS-3 router operating in a neighboring home (within 45 meters) have a nearly 30% probability of call failure.[8]



[5] *See* M2Z Reply Comments at Appendix 1.
[6] T-Mobile reported that Optimi "used a simulation design based on conservative user traffic distribution, power settings based on the proposed AWS-3 technical rules, and simulations set at different times of the day that follow typical network behavior." T-Mobile Sept. 30 *Ex Parte* Letter at 3.
[7] *See* Optimi Study at 5.
[8] *Id.*

- AWS-3 interference would result in an overall network capacity loss up to 5.3%, with home users experiencing 10.6% capacity loss.[9]

M2Z Cannot Escape Interference Risks by Relying on Modeling with Unrealistic Parameters. M2Z's own analysis of AWS-3 interference risks, conducted by Alion Science and Technology ("Alion"), is premised on completely unrealistic operating parameters.[10] Notably, the analysis assumed that wireless users would be uniformly distributed across a cell coverage area when we know that people cluster, increasing the risk of interference and service disruption.

M2Z's Alion analysis distributed all users uniformly over the service area covered by a cell and did not account for indoor use. Specifically, it assumed that users were spread evenly over a circular service area one kilometer in diameter. To illustrate Alion's parameters, below is an aerial photo of the FCC Portals building in Washington, DC and the surrounding area with a one kilometer diameter circle superimposed.

Figure 1. – The FCC Portals Building and 1 km diameter circle, Washington DC

As is easily seen, much of the area of this "cell" consists of regions where people rarely use wireless handsets. Some of that area is covered by water; some of that area is covered by park land and railroad tracks. Although people are far more likely to be found in Starbucks than in the Tidal Basin, Alion's interference risk analysis would presume it is equally likely that individuals are at both locations.[11]

[9] *Id.*
[10] Alion Science and Technology, "AWS-3 to AWS-1 Mobile-to-Mobile Interference Effect: Preliminary Analysis Results," at 12, attached to M2Z *Ex Parte* Letter, WT Docket No. 07-195 (filed June 3, 2008) ("Alion Analysis").
[11] An analysis based on uniform density of users is not supportable in that it assumes that each person's decision regarding his or her location is independent of other people. Consider the average density of people in the District of Columbia. The District has a total land area of 169 sq. km. During the workday, there are about one

In addition, Alion itself dubbed the study a "preliminary" analysis and suggested that "[a]dditional cases should be explored to develop a more complete characterization of the possible scenarios and system parameter excursions."[12] Indeed, as Optimi demonstrates, more comprehensive simulations demonstrate that AWS-3 interference risk is significantly greater than Alion's analysis suggests.

M2Z also relies on reports developed by the United Kingdom Office of Communications ("Ofcom") but, as CTIA recently demonstrated, the assumptions used by Ofcom are not applicable to the AWS-1 operations here in the United States.[13] Specifically, total received power in the United States is much weaker for much of the AWS-1 market than in the UK; Ofcom studied the effect of TDD operations on packet-based technologies, whereas AWS-1 voice communications today are not packet-based; and Ofcom failed to model radio reception within a home or apartment setting and instead relied on a uniform distribution of TDD devices. Despite M2Z's claims, Ofcom concluded that even under its more favorable parameters, "TDD terminal stations serviced by macro-cells and operating in the 1st adjacent 5 MHz block with respect to an FDD terminal station can cause a significant (albeit graceful) degradation in throughput" and it determined there should be a 5 MHz "restricted" guard band between FDD and TDD operations.[14] Critically, Ofcom has clearly allowed potential licensees flexibility through the license auction process to: (1) plan and account for interference in advance and (2) avoid adjacent band FDD to TDD situations through the auction process.

In short, M2Z's reliance on Alion's study is faulty and reference to Ofcom's report is misplaced. M2Z's statistical modeling fails to show that the AWS-3 interference risk is small, and its "low risk" argument succeeds only if its business fails.

Interference Scenarios Will Occur in Everyday Scenarios and the Likelihood of Disruption is Significant. Finally, it is important to note what the Optimi study demonstrates: interference scenarios occur throughout the day in many locations – and these everyday occurrences would never register under the modeling with faulty parameters like uniform distribution, as M2Z puts forward. A few scenarios are worthy of consideration:

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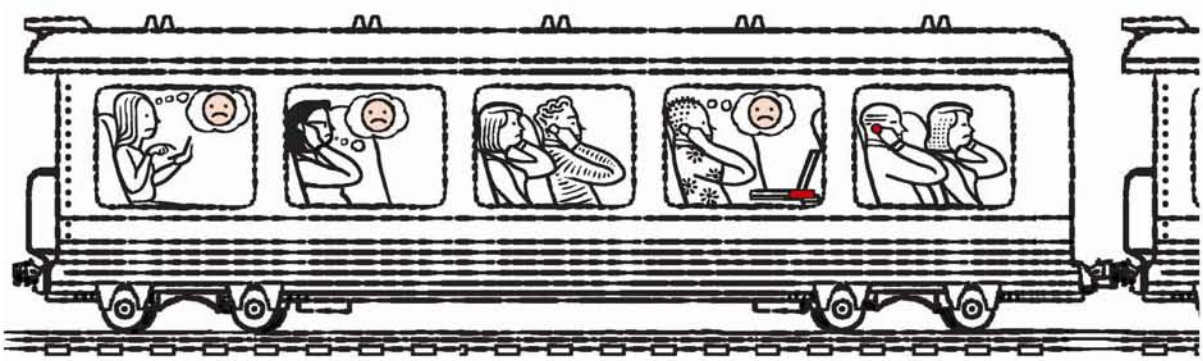
million people in the District. If these people were spread out evenly over the District, they would be located on the crossings of a grid with lines separated by 13 meters (42 feet). Each person would be 42 feet from four other people (north, south, east, and west) and farther from all others. But, in fact we know that the location decisions made by people are not independent; they are strongly related and we are frequently in situations in which the density is far higher than one person every 40 feet. One study, in fact, shows the existence of wireless communications clusters in which most users are active and that a few users are active everywhere else. *See* "Spatio-Temporal Modeling of campus WLAN traffic demand," Felix Hernandez-Campos *et al.*, Computer Science Technical Report 06-021 (finding that the distribution of access point usage roughly matches the well-known Pareto 80/20 law which predicts such an 80/20 split in many situations—in this case about 70% of the traffic comes from 20% of the access points).

[12] Alion Analysis at 7, 13.

[13] CTIA *Ex Parte* Letter, WT Docket Nos. 04-356 & 07-195 (Oct. 2, 2008), citing to Ofcom, "On the impact of interference from TDD terminal stations to FDD terminal stations in the 2.6 GHz band," (Apr. 21, 2008) ("Ofcom Report").

[14] Ofcom Report at 14.

- A Metro car is slightly more than 20 meters long, so someone in the middle of the car is *within* 10 meters of everyone else in the car.



- A lunchtime line is another example of people in close proximity.

- Further, areas like airports, train stations, stores, coffee shops, stadiums, and much more all have people in close proximity that could suffer significant interference.

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The central question at the heart of the AWS-3 technical rules proposal is whether consumers who rely on services that use adjacent AWS-1 spectrum will suffer harmful interference if the Commission adopts the AWS-3 rules as proposed. Both testing and probabilistic analysis with real-world parameters show that such interference and service disruption will occur. In light of the evidence in the record, the Commission must provide sufficient protection for consumers who rely on AWS-1 services.

Pursuant to Section 1.1206 of the Commission's Rules, this letter is being electronically filed with your office. If you have any questions regarding this submission, please contact the undersigned.

Respectfully Submitted,

/s/ *Christopher Guttman-McCabe*

Christopher Guttman-McCabe

cc: Charles Mathias
Bruce Gottlieb
Renee Crittendon
Wayne Leighton
Angela Giancarlo
Julius Knapp
James Schlichting
Bruce Romano
Ira Keltz
Ronald Repasi
Mark Settle
Patrick Forster
Ahmed Lahjouji