October 2, 2008

Via Electronic Filing

Ms. Marlene H. Dortch
Secretary
Federal Communications Commission
445 Twelfth Street, SW, TW – A325
Washington, DC 20554

Re: WT Docket Nos. 07-195 and 04-356 – Notification of Oral Ex Parte Presentation

Dear Ms. Dortch:

On October 1, 2008, John Muleta and the undersigned on behalf of M2Z Networks, Inc. met with Ms. Angela Giancarlo, Legal Advisor to Commissioner Robert M. McDowell. We explained that in our view the AWS-3 proceeding involves two key sets of issues – policy and technical. Our discussion focused on technical issues as M2Z believes these are foundational. We expressed our belief that the key technical question for the Commission is whether it will establish one-sided technical rules that would prohibit certain technologies or whether it will uphold the doctrine of technical neutrality.

We further outlined that the results from the FCC-observed AWS-3 tests on September 3-5 generally support the rules for AWS-3 that were proposed by the Commission in June 2008. Enclosed is a presentation provided to Ms. Giancarlo.

Pursuant to Section 1.1206(b) of the Commission rules, an electronic copy of this letter is being filed. Please let me know if you have any questions regarding this submission.

Sincerely,

Uzoma Onyeije

cc: Ms. Angela Giancarlo

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FCC Briefing
October 1, 2008

1. **Introductions**

2. **Background on Interference**

3. **Summary of Findings**
   - ✓ M2Z finds that Test Results Support and are Largely Consistent with the FCC's June FNPRM Proposal
   - ✓ T-Mobile's Interference Protection Proposal would prevent WiFi, Personal Computers, Bluetooth, Microwaves, and Cordless Phones from operating near AWS-1 handsets
   - ✓ Review of the T-Mobile Test and Analysis Breakdown

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Overview

- **Testing Results support FCC June 2008 Proposed Order Technical Rules**
- **Analysis from UK and T-Mobile OOBE Testing is consistent with FCC proposed OOBE rules**
- **T-Mobile and AT&T Proposed Technical Rules Imply that existing WiFi, Bluetooth, PCs and other consumer devices like Microwave Ovens and Cordless Phones would cause harmful interference to AWS-1 handsets**

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Observed AWS-3 Tests Largely Affirm the FCC's Proposed Technical Rules

Key Technical Issues Needed to be Understood and Addressed:

1. **What is the general interference environment for radios and the definition of HARMFUL INTERFERENCE?**

2. **What is the level of AWS-3 OOBE Allowed?**
   - » OOBE is the amount of in-band energy that AWS-3 is allowed to "leak" into the AWS-1 band without causing HARMFUL INTERFERENCE

3. **What is the allowed level of AWS-3 Transmit Power?**
   - » Transmit Power is the level of energy that AWS-3 can transmit into AWS-1 (assuming proper AWS-1 filters) without causing HARMFUL INTERFERENCE.

4. **What Amount of Spectrum Maximizes Efficient Use of AWS-3 for Broadband Services?**
   - » The size of spectrum band determines the total amount of broadband capacity that can be generated by OOBE and Transmit Power thresholds permitted under FCC regulations.

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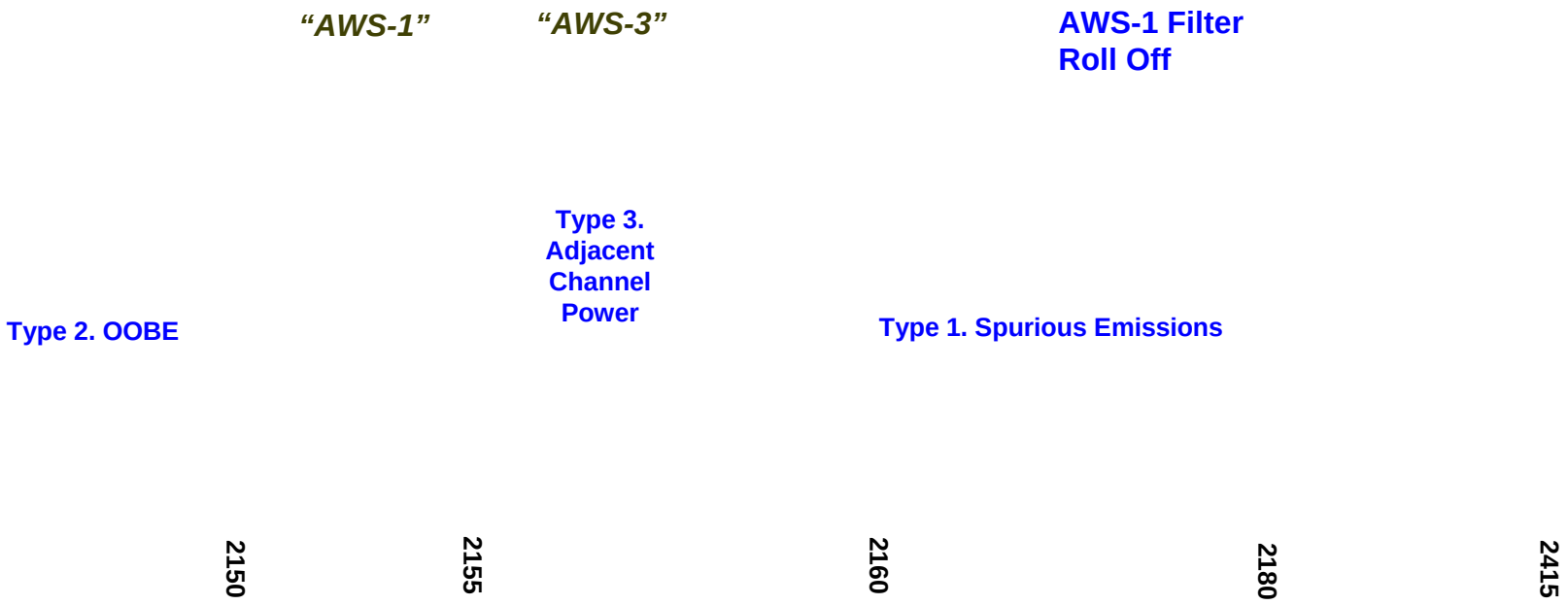
Three Sources of Interference Signals (illustrative drawing)



TYPE 1: Spurious Emissions can come from any device that is far away (in frequency) and cause interference since the signal "leaks" into the band of interest. All devices have spurious emissions and allowable thresholds are set by FCC rule.

TYPE 2: Out-of-band Emissions (OOBE) are controlled by a transmitter (AWS-3) and they are the part of the transmission that "leaks" into the band of interest to cause interference. Out-of-band emissions are stronger than Spurious Emissions and allowable thresholds are established by FCC rule.

TYPE 3: Adjacent Channel power is the residual level of interference generated by a adjacent transmitter after the filters of the receiver in the band of interest (AWS-1) have removed the adjacent signal to a desired level. Despite statements otherwise, the FCC does not regulate receivers and carriers establish that threshold based on network performance and other design parameters).

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AWS-3 Test Results Also Conform with FCC Precedent in 700 MHz and ERA Results in Europe

Technical Rule	700 MHz	FCC June Proposal	UK's OfCom Analysis April 2008	AWS-3 Test Results	AWS-3 Broadband Opponents
OOBE Rejection (per MHz)	33+10log(P)	60+10 log(P)	49+10log(P)	48+10log(P) 59+10log(P)	90+10log(P)
Transmit Power	34 dBm	23 dBm/MHz	31 dBm	42 dBm	23 dBm
Spectrum Band	6 MHz	25 MHz	25 MHz	25 MHz	12 MHz
Required Guard band	0 MHz	0 MHz	0 MHz First adjacent 5 MHz with power limits	0 MHz	12-13 MHz
Broadband Capacity (Capacity/Spectrum Ratio)	> 6 MHz (~ ≥100%)	~18 MHz (~72%)	20 MHz full power 5 MHz reduced power (~88%)	20 MHz (~90%)	Not useable for 2 way broadband– "downlink only" (0%)
Assumed FDD (e.g., AWS-1) Received Signal Limit	Not Known	Not Known	-85 dbm	-90 dbm	-105 dbm

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Threshold Policy Question Remaining After the FCC's Observation of T-Mobile's AWS-3 Test

- **What is the level of AWS-1 received signal strength (i.e., what is the "expected" field signal strength) for the AWS-1 capable handset under normal operating circumstances?**

- **What are the policy implications of the choices for received signal strength?**

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Impact of Common Local Radiators on AWS-1 at Various Served Signal Levels

Interference Source

AWS-1 Signal Level	Bluetooth @ 0.5 m	WiFi @ 1 m	Adjacent Band AWS @ 5 m	MW Oven @ 3 m
- 105 dBm	Fail	Fail	Fail	Fail
- 100 dBm	Fail	Fail	Fail	Fail
- 95 dBm	Fail	Marginal	Fail	Pass
- 90 dBm	Marginal	Pass	Fail	Pass
- 85 dBm	Pass	Pass	Marginal	Pass
- 80 dBm	Pass	Pass	Pass	Pass

Pass or Fail indicates ability of AWS-1 to initiate call

- **-90 dBm AWS-1 Signal Strength is lowest level protected by current FCC Technical Rules**
- **Consistent with FCC UWB ruling for PCS minimum signal**

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47 CFR Sections 15.209* and 15.109* Provide Limits for Intentional and Unintentional Radiators

Field-strength may not exceed 500 uV/m at AWS-1 frequencies at 3m

Potential AWS-1 Device Receiver

0.5 meter

Unlicensed Device Transmitters

- **This limit results in allowable interference of - 74 dBm at 0.5 meter**
  - » Convert 500 uV/m field strength to isotropic received power
  - » Adjust for difference in propagation loss at 0.5 meter vs 3 meters
- **Apply 5 dB loss for body & antenna mismatch at receive end**
  - » Effective interference power at receiver is – 79 dBm at 0.5 meter

* The 500 uV/m limit is not specific to 47 CFR 15.247 but for the more limiting case of protecting the 2.1735-2.1905 MHz band

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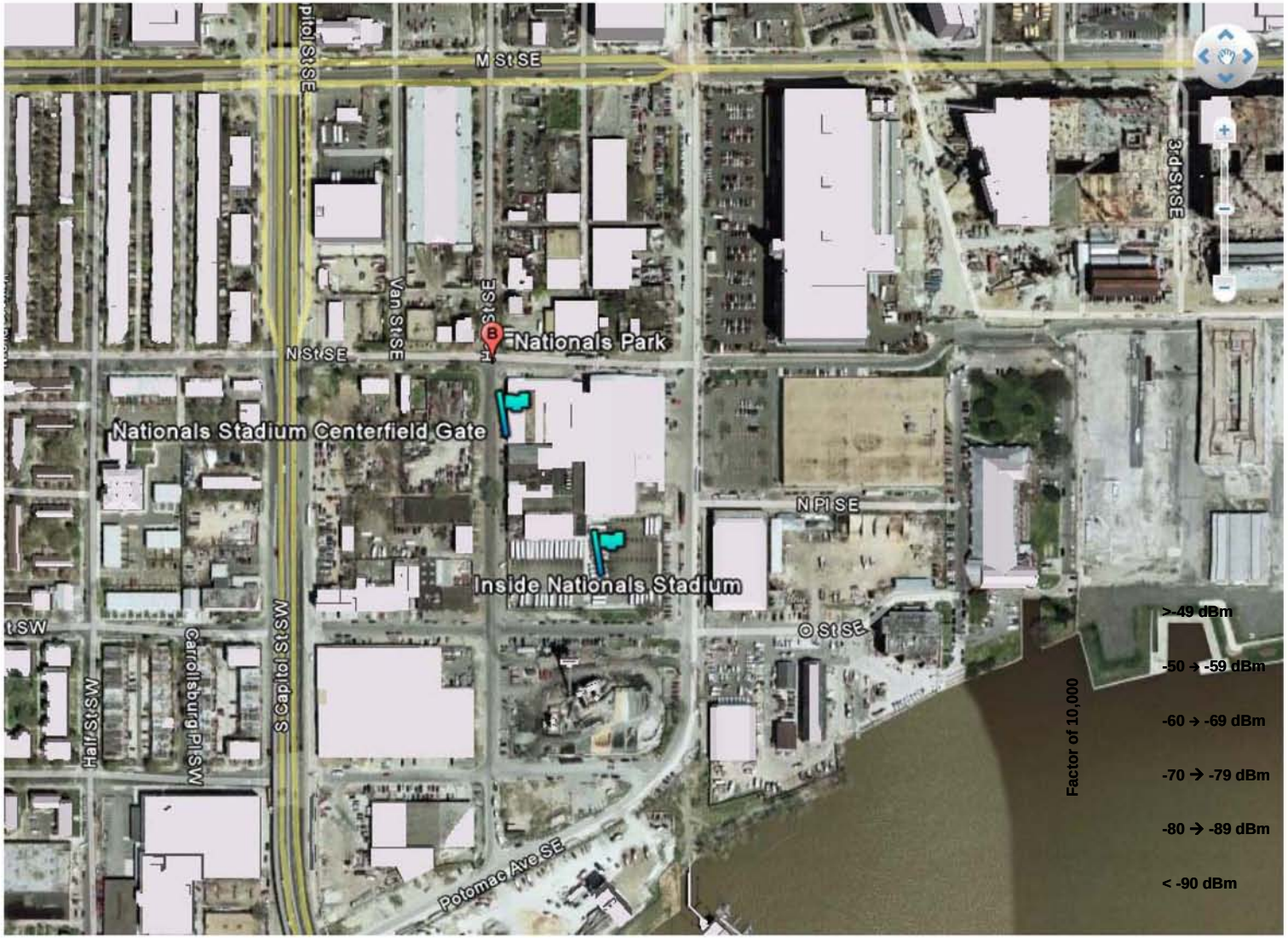
High Density – National Stadium



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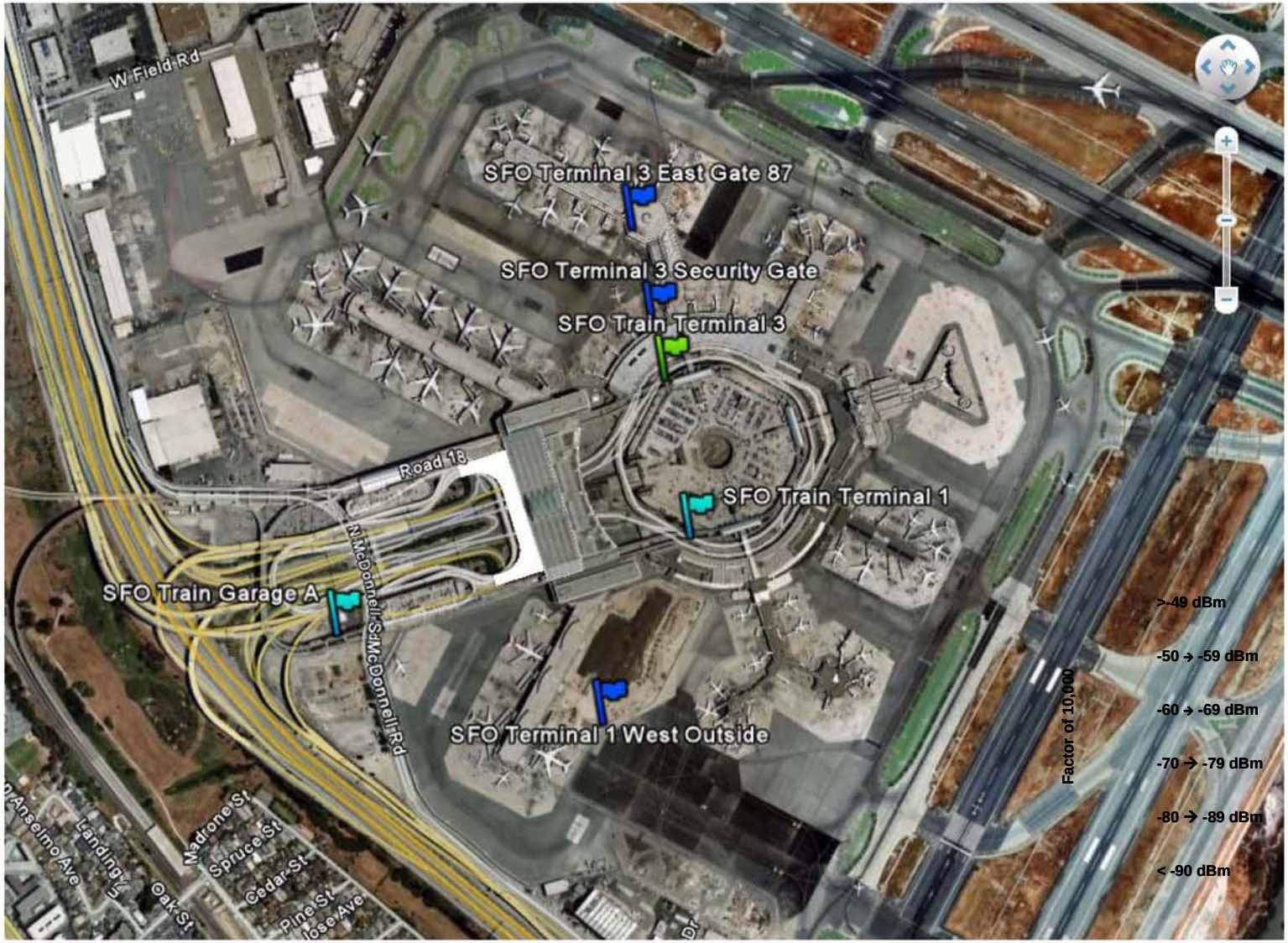
High Density – SFO Airport



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Received Signal Strength Choices & Policy Implications

	Received Signal Threshold	Policy Implications	Practical Implications
T-Mobile and other opponents to AWS-3	-105 dBm	At this level, FCC regulations allow for spurious interference from all devices – including both licensed and unlicensed (ranging from bluetooth to WiFi and licensed services like cellular and WCS) to generate interference that would degrade the AWS-1 Service per T-Mobile. This finding would require the FCC to change the spurious emissions rules covering microwave ovens, cordless phones, personal computers (PCs), and WiFi devices…	This implies that the receiver is always operating at the edge of its design threshold (at the lowest possible signal). Networks are designed to generate received signal strength that is much higher than the design threshold in order to have a competitive service. In addition, in the case of T-Mobile and AT&T, presumably their WiFi service would interfere with their AWS-1 handsets similar to AWS-3 purported impact.
FCC Previous Precedent	-90 dBm	Up to -77 dBm is the level that the FCC permits unintentional emitters (e.g., spurious interference) to generate a signal. This translates to a protected level of -90 dBm (per T-Mobile tests)	Radio equipment that meets this threshold ranges from any licensed device (cellular, PCS, etc.) to unlicensed devices including microwave ovens, femto-cells, and WiFi
Normal Operating Conditions	-85 dBm or higher	This is the signal level that achieves for good outdoor and indoor coverage in dense urban environments	Fully built networks are designed to have signal strength that on average would generate a exceeding this level in order to serve the maximum number of users with the strongest signal based on usage patterns and radio environment. Achieving this level is determined by the carrier's quality of service metrics and the number of base stations it deploys.

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Problems with T-Mobile's Tests

1. **T-Mobile input signal strength is based solely on its AWS-1 network which is not fully constructed and not operating at full design parameters**
   - T-Mobile's AWS-1 Network is not fully built out. The best way to estimate received signal strength would be to measure PCS or Cellular networks

2. **T-Mobile uses an interference protection level at the breakpoint of the AWS-1 handset — once again choosing an input that is not reflective of normal operating conditions…**
   - A large portion of T-Mobile's handsets operating at the design threshold of -105 dbm signal strength implies very poor network coverage and performance
   - Use of the -105 dBm threshold is also inconsistent with the capabilities of T-Mobile's handsets. In its latest 6K SEC filing, Deutsche Telekom explains that T-Mobile offers multiple phones capable of accessing the UMTS network and "the phones are designed to connect automatically to the best available network (3G or GSM/GPRS/EDGE) to provide [] excellent call quality."
   - Under T-Mobile's logic, the recent tests show that handsets would also fail to perform in close proximity to all other devices (licensed or unlicensed) that generate spurious interference including but not limited to Bluetooth devices, microwave ovens, and WiFi enabled devices. This raises issues about T-Mobile's claims since it provides @home WiFi services, has handsets that work with Bluetooth and sells its service as a home connectivity tool (which would make the device operate near microwave ovens and other household/office based emitters).
   - M2Z signal strength measurements at stadiums, airports, malls and "downtown" areas shows the signal on AT&T's mature network performing at median signal strength of -66 dbm (see attached table)

3. **T-Mobile's Adjacent Channel Interference Test (if correct) leads to improbable results with significant policy implications…**
   - Per the recent tests, WiFi in 2.4 GHz (250 MHz away) will cause interference to AWS-1…
   - T-Mobile's filing on statistical analysis on Friday 9/19/08 suggests that there would be a 67% chance that its @home WiFi service would cause interference to T-Mobile's AWS-1 handsets *inside* the home

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Questions

1. **T-Mobile's service rule proposals are based on a received signal strength protection level of -105 dbm**
   - Why did T-Mobile use that level of signal when it admits that only represents 5% of its sample?
   - What received signal strength is the network designed to provide in high density areas where T-Mobile thinks interference would be a problem? Would T-Mobile submit its network performance design parameters for received signal strength by density types across all of its spectrum holdings (PCS and AWS-1) and do so under oath?
   - Don't the FCC rules already permit "spurious" emissions at numbers lower than the received signal strength that T-Mobile is basing its technical rules?
   - Please explain why other devices (sold by T-Mobile) such as Bluetooth and WiFi routers would not cause interference to AWS-1 devices based on your test results and the permitted emissions from those devices pursuant to FCC regulations?

2. **T-Mobile uses a interference protection level at the breakpoint of the AWS-1 handset — once again choosing an input that is not reflective of normal operating conditions….**
   - A large portion of T-Mobile's handsets operating at the design threshold of -105 dbm signal strength implies very poor network coverage and performance
   - Isn't it true that equipment manufacturers Ericsson Inc. and Sony Ericsson have stated that "the typical AWS-1 receiver will have a noise floor of -103 dBm?"

3. **T-Mobile's Adjacent Channel Interference Test (if it was correct) leads to improbable results with significant policy implications…**
   - According to the tests observed by the FCC, WiFi in 2.4 GHz (250 MHz away) will cause interference to AWS-1…how do you explain those results?
   - T-Mobile's filing on statistical analysis on Friday 9/19/08 suggests that there would be a 67% chance that its @home WiFi service would cause interference to T-Mobile's AWS-1 handsets *inside* the home based on FCC regulations…can you explain this discrepancy?

4. **T-Mobile's recently did a probabilistic study on interference based on the assumption that there will be two AWS-3 devices for each AWS-1 device**
   - How do those assumptions make any sense? T-Mobile has 30 million subscribers, is its study suggesting that AWS-3 will have 60 million devices?
   - If the AWS-3 service has twice as many devices, would it not be a better use of the spectrum?

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