December 5, 2008

EX PARTE NOTICE

Electronic Filing

Ms. Marlene H. Dortch
Secretary
Federal Communications Commission
445 12th Street, SW, Room TW-A325
Washington, D.C. 20554

Re: WT Docket No. 07-195
WC Docket No. 04-356

Dear Ms. Dortch:

On December 4, 2008, Neville Ray, Thomas Sugrue, Kathleen O'Brien Ham, Mark McDiarmid and Patrick Welsh of T-Mobile USA, Inc. ("T-Mobile"), Howard Symons of Mintz, Levin, Cohn, Ferris, Glovsky and Popeo, P.C., and Tom Dombrowsky, Engineering Consultant of Wiley Rein LLP met with staff from the Office of Engineering and Technology ("OET") and the Wireless Telecommunications Bureau ("WTB"). Representing OET were: Julius Knapp, Ira Keltz, Ron Repasi, Patrick Forster and Ahmed Lahjouji. Representing WTB were: Jennifer Tomchin, Blaise Scinto, Paul Malmud and Stephen Zak.

T-Mobile's comments were consistent with its previous filings in these dockets, as well as with the attached presentation.

Pursuant to section 1.1206(b) of the Commission's rules, an electronic copy of this letter is being filed.

T-Mobile USA, Inc.
401 9th Street, NW Suite 550
Washington, DC 20004

Sincerely,

/s/Kathleen O'Brien Ham

Kathleen O'Brien Ham
Vice President, Federal Regulatory Affairs
T-Mobile USA, Inc.

cc: Julius Knapp, Ira Keltz, Ron Repasi, Patrick Forster, Ahmed Lahjouji, Blaise Scinto, Jennifer Tomchin, Paul Malmud, Stephen Zak.

Broadband Maximization Plan for the AWS-3 Spectrum

December 4, 2008

T··Mobile·

The Broadband Maximization Plan for the AWS-3 Spectrum

Asymmetric pairing of the AWS-3 band with the J Block downlink *and* uplink will provide considerable advantages over the FNPRM TDD approach

- Far more capacity
- More efficient use of spectrum
- Better able to accommodate increasingly asymmetric traffic
- Retains possibility for a new entrant by providers that may not be licensed to use spectrum in other bands
- A greater variety of technical options to facilitate deployment of two-way wireless broadband services
- Eliminates concerns that AWS-3 operations would cause harmful interference to adjacent AWS-1 and MSS licensees

Asymmetric pairing of the AWS-3 band provides a more robust solution than the FNPRM TDD approach

The Broadband Maximization Plan for the AWS-3 Spectrum

- Enables faster and more robust broadband service than under any other proposal in the record
- Allows new entrants to provide wireless broadband services using a variety of technologies, including WiMAX
- Increases spectral efficiency by as much as 40 percent by eliminating the need for guard bands or strict technical limitations
- Does not preclude the Commission from imposing conditions on the licensee(s), including requiring the provision of free service
- Cures the significant interference problems in the adjacent AWS-1 and MSS spectrum

The FCC potentially plans to move forward with an auction for the AWS-3 band that would:

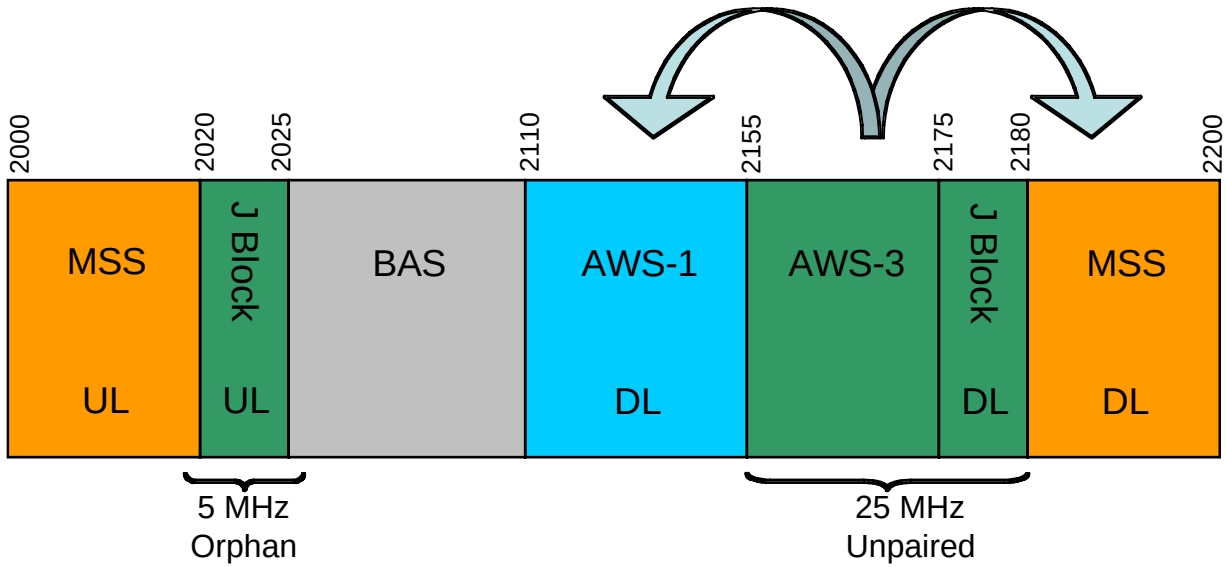
- Adopt a single nationwide license
- Require the licensee to provide free two-way broadband Internet service
  - at least 768 kbps downstream
  - using up to 25 percent of the wireless network capacity
- Require the licensee to provide coverage of
  - at least 50 percent of the population within four years of start of license
  - at least 95 percent of the population at the end of the ten year license term
- Permit downlink and uplink transmissions throughout the *entire* band

The required free broadband offering falls far short of *currently* available broadband offerings…

	Downstream Speed	Technology
FNPRM “Free Broadband”	768 kbps	WiMAX
3.5 G Wireless	Up to 7.2 Mbps	HSPA
Wi-Fi Hotspots	11 Mbps	802.11b
Digital Subscriber Link	768 kbps to 6 + Mbps	ADSL
FiOS	10 Mbps to 50 Mbps	Fiber optic cable
Cable Modem	6 Mbps to 50 Mbps	Hybrid Fiber Coax (HFC)

and would fall even more behind in the future as broadband speeds increase

In the Further Notice of Proposed Rulemaking (NPRM), the Commission proposes to combine the 20 MHz AWS-3 band with the 5 MHz downlink of the J-block to fashion a 25 MHz band for uplink/downlink operations



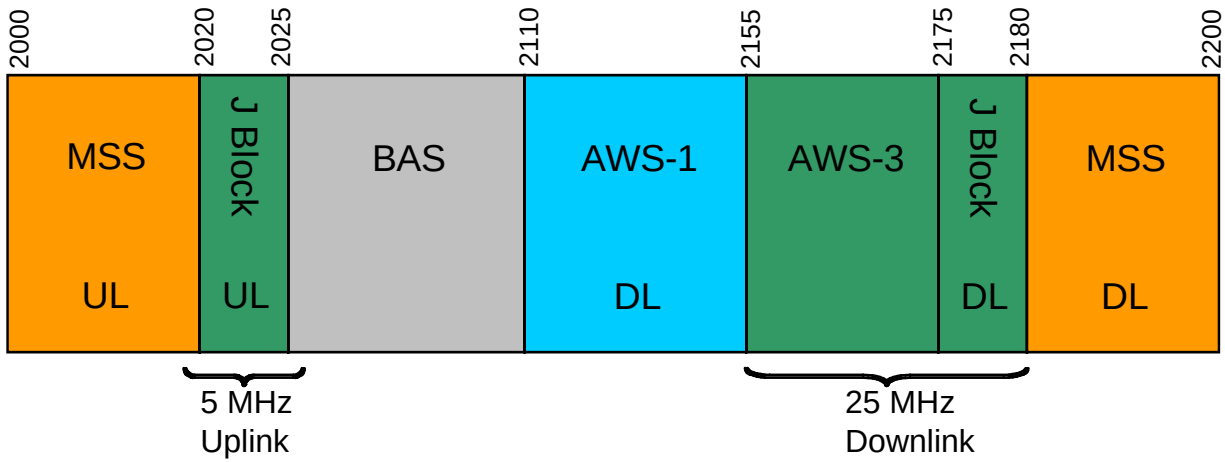
The Further Notice plan places mobile transmitters (AWS-3) next to mobile receivers (AWS-1 and MSS), which creates a serious risk of interference – at least 25 commenting parties believe interference is real

The Further Notice plan would require significant limitations on transmission power and out-of-band emissions (OOBE), as well as the use of guard bands, to prevent harmful interference to AWS-1 devices and MSS terminals

- Guard bands are necessary to enable filters in AWS-3 transmitters to achieve the necessary attenuation of out-of-band-emissions (OOBE)
- TDD technologies also require an internal guard band to avoid base station-to-base station interference
- The use of guard bands in small bandwidths can result in a significant reduction in the amount of spectrum that can be used to provide services
- For the 2500-2690 MHz band, Ofcom recommends 5 MHz guard bands at the edge of the 50 MHz wide TDD band
- For AWS-3, this would result in usable bandwidth of 15 MHz

Such an approach clearly results in an inefficient use of spectrum

Combining the AWS-3 band with the downlink *and* uplink bands of the J-block (asymmetric pairing) can eliminate the need for guard bands, significantly improving overall capacity and efficiency



These improvements can be achieved while maintaining attributes of the FNPRM plan such as permitting new entry and imposing social conditions on AWS-3 licensee(s)

Asymmetric pairing would permit new entry while providing a licensee(s) a greater variety of technical options – including several variations of WiMAX

- Pairing the AWS-3 band with the *entire* J-block affords an opportunity for a new entrant(s) to compete in an auction regardless of their spectrum position
- Asymmetric pairing provides a greater variety of technical options (than in an unpaired band plan) including several variations of WiMAX*
  - WiMAX frequency division duplex (FDD)
  - WiMAX half-frequency division duplex (H-FDD)

* The IEEE standards 802.16-2004 and 802.16-2005 include two variations that operate on paired spectrum. The WiMAX Forum has developed profiles for FDD in several bands.

Greater flexibility with respect to choices here can lead to a more competitive auction.

To provide an apples-to-apples comparison, we assume that WiMAX FDD is also deployed in asymmetric pairing

- Both TDD and FDD have the same basic average spectral efficiency *
- TDD employs advanced antenna system (AAS) technology (despite the fact that such technology is not yet supported in any WiMAX profile) **
- TDD operates at a *maximum* channel asymmetry (DL/UL) of 3:1 ***
- TDD employs 10 MHz guard bands (5 MHz per band edge), although greater separation may be required depending on power and OOBE levels ****

* DL and UL average spectral efficiency (per sector) of 1.4 bps/Hz and 0.8 bps/Hz. Equivalent to average sector efficiency as determined by WiMAX Forum et.al.

** Spatial division multiple access (SDMA) technology to enhance spectral efficiency in both the downlink and uplink. A gain of 1.4 x can be achieved with four antennas per sector

*** TDD channel asymmetry (DL/UL) can only be varied over a limited range. WiMAX supports ratios of 1:1 to 3:1.

**** Ofcom has recommended 5 MHz guard bands per TDD band edge for the 2500-2690 MHz band.

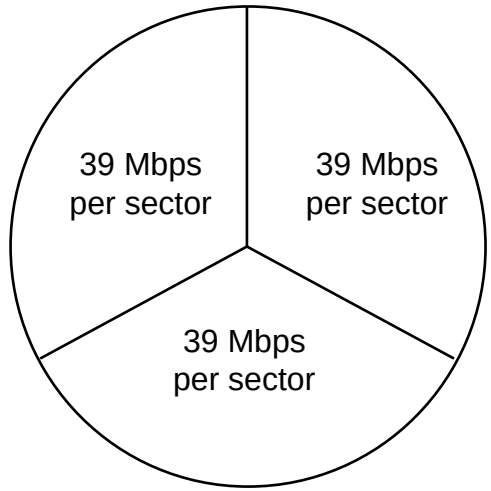
Even with these favorable assumptions, asymmetric pairing can deliver greater capacity and efficiency

The following table compares the TDD version of WiMAX -- in the FNPRM approach – with the FDD version of WiMAX in the asymmetric pairing approach

	FNPRM TDD	**Asymmetric FDD**
Band	AWS-3 + J block DL	AWS-3 + J block UL/D
Duplex Approach	TDD	FDD
Total Spectrum-MHz	25.0	30.0
Guard Band-MHz	10.0	0.0
Useable Spectrum-MHz	15.0	30.0
Time Asymmetry	3.0	
DL Bandwidth-MHz	9.5	25.0
DL Spectral Efficiency-bps/Hz	1.4	1.4
AAS Gain	1.3	1.0
DL Capacity-Mbps	17.2	35.0
UL Bandwidth-MHz	5.5	5.0
UL Spectral Efficiency-bps/Hz	0.8	0.8
AAS Gain	1.3	1.0
UL Capacity-Mbps	5.7	4.0
Total Capacity-Mbps	23.0	39.0
Channel Asymmetry	3.0	8.8
Overall Efficiency-bps/Hz	0.92	1.30
Capacity Advantage		**41.4%**

Asymmetric pairing increases the *usable* spectrum from 15 to 30 MHz – with WiMAX technology, asymmetric pairing could provide an *average* capacity per sector of about 39 Mbps – 117 Mbps for a typical three sector cell

	FNPRM TDD	Asymmetric FDD
Total Spectrum	**25 MHz**	**30 MHz**
Guard Bands	**10 MHz**	**-**
Usable Spectrum	**15 MHz**	**30 MHz**
DL Capacity	**17.2 Mbps**	**35 Mbps**
UL Capacity	**5.7 Mbps**	**4 Mbps**
Total Capacity	**23 Mbps**	**39 Mbps**



Typical 3 sector cell

Asymmetric pairing is over 40% more efficient in the use of spectrum than the FNPRM TDD proposal

- Efficiency = capacity ÷ spectrum used (capacity/spectrum)

	FNPRM TDD	Asymmetric FDD
Total Spectrum	25 MHz	30 MHz
Guard Bands	10 MHz	-
Usable Spectrum	15 MHz	30 MHz
Capacity	23 Mbps	39 Mbps
Efficiency	0.92 bps/Hz	1.30 bps/Hz

Wireless operators need to provide greater channel asymmetry to accommodate increasingly asymmetric traffic

- Wireless traffic is becoming increasingly asymmetric with overall traffic in the downlink exceeding that in the uplink
- Internet service providers (ISPs) recognize the asymmetry in traffic by offering higher downstream data rates than upstream data rates (e.g., cable operators offer services with ratios of about 6:1 to over 10:1)
- WiMAX Forum studies project *average* wireless traffic asymmetry (DL/UL) of about 5:1 in the near term – increasing to over 6:1 in the future
    - Traffic asymmetry is typically greater for consumer data than for business data
- During a typical day, however, traffic asymmetry (DL/UL) will vary and the local asymmetry (DL/UL) may be greater

If channel asymmetry is mismatched to traffic asymmetry, when the downlink (uplink) spectrum becomes fully loaded, some of the uplink (downlink) spectrum will be wasted

WiMAX Forum studies project *average* busy hour wireless traffic asymmetry of about 5:1 (2010) increasing to 6.5:1 (2020)

Traffic Projections (Busy Hour Traffic)									
	2010			2015			2020		
	UL	DL	Total	UL	DL	Total	UL	DL	Total
File Upload/Download	3.5	14.3	17.8	12.5	126.5	139.0	44.8	482.7	527.5
Video/Audio streaming	0.1	1.8	1.9	1.3	33.7	35.0	7.8	195.9	203.7
Web Browsing and Shopping	1.3	9.2	10.5	15.1	105.8	120.9	81.7	571.9	653.6
Music and Video download	0.0	0.1	0.1	0.1	2.8	2.9	1.4	34.7	36.1
Mobile Gaming	0.0	0.0	0.0	0.0	1.1	1.1	0.6	13.9	14.5
MMS	0.5	0.9	1.4	15.0	29.5	44.5	57.7	113.5	171.2
Video Conferencing/Collaborative W	0.2	0.5	0.7	6.0	16.1	22.1	43.9	119.5	163.4
Simple Voice	0.1	0.1	0.2	1.6	1.6	3.2	16.5	16.5	33.0
IP TV	0.0	1.1	1.1	3.9	32.4	36.3	49.7	429.2	478.9
M2M	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.3	0.6
Tracking	0.0	0.1	0.1	0.3	1.9	2.2	2.3	16.1	18.4
Total	5.7	28.1	33.8	55.8	351.4	407.2	306.7	1,994.2	2,300.9
DL/UL	4.93			6.30			6.50		

Traffic asymmetry is usually greater for consumer data than for business data. WiMAX Forum studies project consumer data asymmetry of about 8:1 in 2015.

Asymmetric pairing is better matched with the demand for broadband capacity, which is asymmetric and overwhelmingly focused on downloads

- Channel asymmetry = Downlink capacity ÷ Uplink capacity (DL/UL ratio)

	FNPRM TDD	Asymmetric FDD
Downlink (DL) Capacity	17.2 Mbps	35.0 Mbps
Uplink (UL) Capacity	5.7 Mbps	4.0 Mbps
Channel Asymmetry	3.0 : 1	8.8 : 1

Maximum efficiency is attained only when channel asymmetry is matched to traffic asymmetry

Asymmetric pairing would eliminate concerns about harmful interference to AWS-1 and MSS licensees

- In the Further Notice, the Commission proposed a 23 dBm/MHz power limit and a 60 + 10log(P) dB OOBE limit on mobile devices in the AWS-3 band
- By grouping downlinks together, the need for such strict power limits and OOBE limits goes away
- As a result, more relaxed limits such as 33 dBm/MHz power limit and 43 + 10log(P) dB OOBE limit can be used without concerns about interference