July 28, 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, 04-356, 07-16 and 07-30 – Notification of Oral Ex Parte Presentation

Dear Ms. Dortch:

On July 25, 2008, Paul Kolodzy, Kalle Konston and the undersigned, on behalf of M2Z, met with Julius Knapp, Ira Keltz, Geraldine Matise, Bruce Romano, Jamison Prime, Ahmed Lahjouji and Ron Repasi of the Office of Engineering and Technology and Jim Schlichting, Joel Taubenblatt, Blaise Scinto, Peter Daronco, David Hu and Steve Zak of the Wireless Telecommunications Bureau. During the meeting, we dispelled T-Mobile's claim that it is impossible for TDD operations in AWS-3 to coexist with FDD operations in AWS-1 by demonstrating how TDD and FDD operations are deployed next to each other globally, using generally accepted OOBE and power limits. The departure from FCC precedent advocated by T-Mobile will be a step backward relative to the findings of other international regulators and their decisions to use spectrum efficiently to promote greater access to broadband.

To further emphasize the modern approach used by other international regulatory bodies; we devoted a portion of our presentation to a discussion that focused on T-Mobile's operations in the Czech Republic. As the attached presentation points out, T-Mobile is currently deploying a mobile broadband network in a UMTS TDD band adjacent to a UMTS FDD band in the Czech Republic despite the fact that: (1) there are no mobile power limits; (2) there are no "large guard bands;"[1] (3) T-Mobile's operations are well within the 15 MHz separation it claims is needed between FDD and TDD and (4) T-Mobile as the potential victim of mobile-to-mobile interference is protected by an OOBE limit of 43 + 10 log (P). The very conditions under which T-Mobile successfully operates in the Czech Republic are those that it claims are insurmountable in the United States. The Czech Republic example is additional evidence that the FCC need not heed the calls for radical departure from its technical precedent as it establishes service rules for the AWS-3 band.

[1] Letter of Howard J. Symons, Counsel for T-Mobile to Marlene H. Dortch, WT Docket 07-195 (July 18, 2008).

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Enclosed are the two presentations provided at the meeting. 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: Julius Knapp
Ira Keltz
Geraldine Matise
Bruce Romano
Jamison Prime
Ahmed Lahjouji
Ron Repasi
Jim Schlichting
Joel Taubenblatt
Blaise Scinto
Peter Daronco
David Hu
Stephen Zak

Attachments (2)

M2Z networks

Freedom. Innovation.

Technical Analysis of TDD-FDD Coexistence

Presentation to WTB-OET

25 July 2008

Non-Standard and Overly Stringent Technical Rules in the AWS-3 Proceeding Would Be Detrimental to the U.S.' Global Competitiveness by Limiting Choices for Affordable Broadband for American Consumers

- The opponents of free broadband in AWS-3 would have the FCC ignore its own precedents, international precedent, and T-Mobile's own European experience when calling for technical rules with severe power limits and unnecessarily large guard bands.

- These parties are asking the FCC to go backward and act out of step with modern spectrum regulations and state of the art interference management techniques.

- The draconian rules proposed by these parties will exacerbate the U.S.' declining global competitiveness by denying millions of American consumers the benefit of a free nationwide broadband service.

Incumbent Carriers Falsely Claim that TDD Operations Cannot Operate Adjacent to FDD Operations

- "While manufacturers could develop specialized filters that could screen out AWS-3 frequencies (which are part of the AWS-1 band in other countries), *that would not prevent harmful interference absent a large guard band and significant restrictions on AWS-3 power levels and out-of-band emissions*." Ex Parte Presentation by T-Mobile filed July 18, 2008

- "Without guard bands between the adjacent services, that task is exceedingly difficult if not impossible." Reply Comments Filed by AT&T on January 14, 2008

- T-Mobile and other incumbents claim that it is practically impossible for TDD (un-paired) operations to be deployed adjacent to its FDD (paired) operations in the 2.1 GHz band regardless of available interference mitigation techniques because AWS-1 downlink operations would be irreparably harmed from mobile-to-mobile interference.

TDD and FDD Coexistence

UMTS TDD UMTS TDD/FDD Uplink

1900 MHZ **1920 MHZ** **1980 MHZ**

- **TDD – FDD are allocated and assigned in adjacent bands in Europe as UMTS TDD and FDD**
  - » Assignments have been made in both bands

- **TDD – FDD are allocated in UK in adjacent blocks**
  - » Ofcom has performed substantial analysis to show coexistence is possible and practical in the 2500-2690 MHz band
  - » Analysis used real equipment values from 5 UMTS devices already deployed in the 2110-2180 MHz bands in Europe, within statistical analysis for extremely high user density

Ofcom believes that blocking is not limiting factor for mobile

5.125 Qualcomm commented that: "UE blocking is not the limiting factor in terms of minimum centre to centre frequency separation" and that: "The limiting factor in terms of minimum centre to centre frequency separation is the out-of-band / spurious emissions from the TDD MSs interferer into the victim UMTS UE Rx band, which has not been studied by Ofcom in Annex 6".

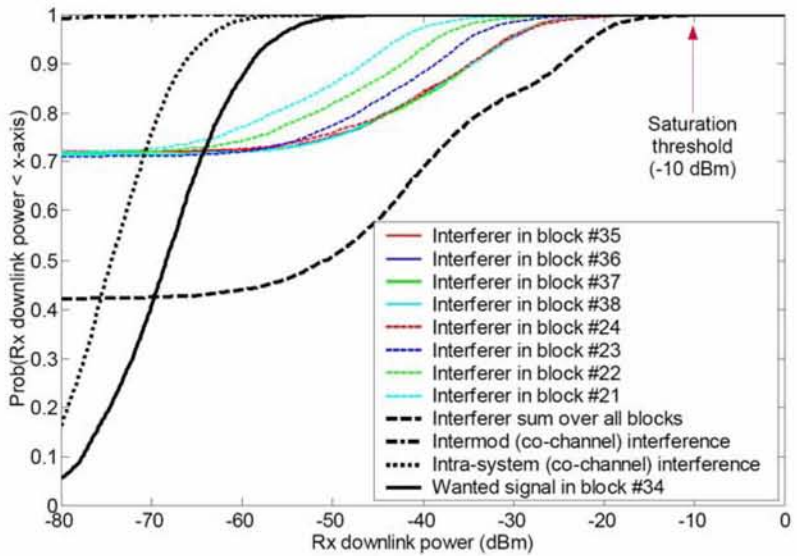
- **Ofcom's view** – We agree that receiver saturation (sometimes referred to as blocking) is not the limiting factor in this instance, and that spectral leakage at the transmitter combined with the filtering response at the receiver are the critical parameters. This has been taken into account in our further analysis described above.

Blocking is not the limiting factor, it is OOBE.

Ofcom Analysis of Receiver Blocking

Determination of Power Limits

Figure 4: Cumulative probability distributions of signal powers received at a FDD terminal station operating in block #34, in an urban macro-cellular FDD scenario, and in the presence of adjacent-channel TDD macro-cells.



3.13 3GPP TS 25.101 specifies that a UTRA-FDD terminal station receiver should be able to apply a linear ACS of 33 dB to a 1st adjacent-channel interferer received at a power level of up to –25 dBm. Measurements commissioned by Ofcom suggest that commercially available UTRA-FDD user equipment in the 2.1 GHz band perform much better than this and can apply an ACS of 33 dB when subjected to a 1st adjacent-channel interferer power of up to –10 dBm or greater[7], i.e., 15 dB better than the 3GPP minimum requirements (see Annex 3). Measurements indicate that even greater interferer power levels can be supported at the 2nd and 3rd adjacent channels. A threshold of –10 dBm is used in our modelling of saturation effects; i.e., if the aggregate received power of the adjacent-channel interferers exceeds this threshold then the terminal station is assumed to suffer from saturation and the downlink throughput is assumed to drop to zero.

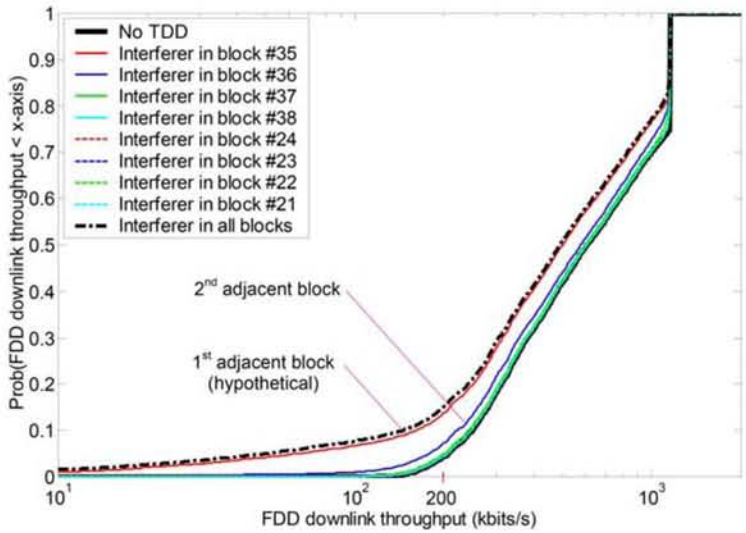
TDD UE Transmit Power	33	dBm	
Body Losses	2	dB	
Propagation Loss	41	dB	@ 1.24 m
FDD UE Received Power	-10	dBm	

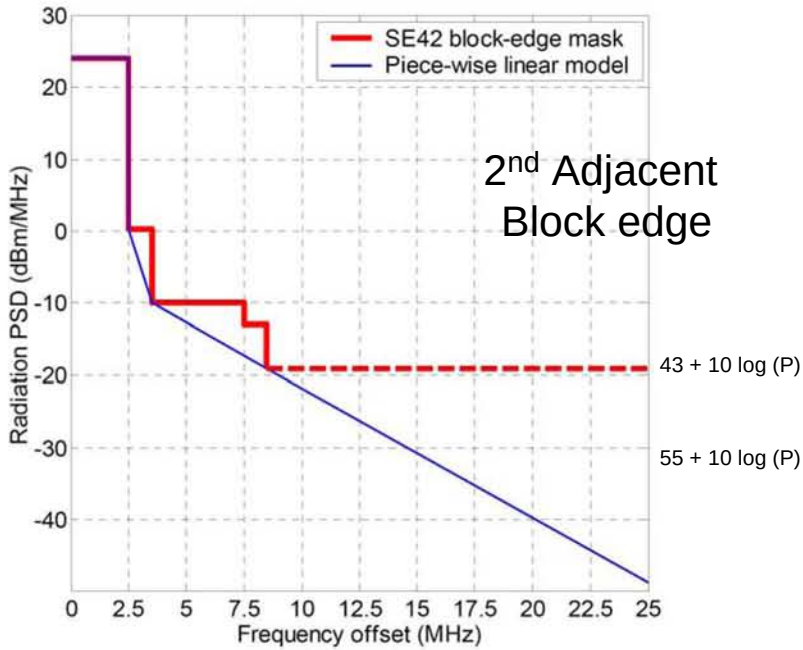
Ofcom analysis indicate -10 dBm is appropriate threshold level for Receiver Overload in probabilistic analysis. This is for hot-spot analysis of 1 TDD user every square meter That indicates that ranges less than 1.24 m is necessary which is highly unlikely

Ofcom Analysis of Interference

Determination of OOBE Limits

Figure 5: Cumulative probability distributions of FDD downlink throughput in block #34, in an urban macro-cellular FDD scenario, and in the presence of adjacent-channel TDD macro-cells.





Ofcom analysis indicate OOBE limits of 43 + 10 log (P) is sufficient for protection of FDD mobile reception from TDD mobile transmissions in probabilistic analysis. This is for hot-spot analysis of 1 TDD user every square meter This indicates that a limit of 43 + 10 log (P) at 2155 MHz would provide sufficient protection.

Comparing the Proposed Technical Rules for TDD

Parameter	Ofcom rule 2500 – 2690 MHz	Ofcom applied to 2155 – 2180 MHz	M2Z's Proposal
Mobile power	31 dBm (Power)	31 dBm (Power)	33 dBm (Power)
Mobile OOBE*	34 + 10 log (P) for (1-5 MHz) 43 + 10 log (P) beyond 5 MHz	34 + 10 log (P) (2160, 2175) 43 + 10 log (P) (2155, 2180)	43 +10 log (P)
Base Station Power (EIRP)	+61 dBm/5 MHz for Inner chnls (not band edge) +25 dBm/5 MHz for lowest and highest (band edge) chnls	+61 dBm/5 MHz (2160-2175) +25 dBm/5 MHz (2155-2160 & 2175-2180)	60 dBm/MHz EIRP
Base Station OOBE*	TDD into FDD Downlink 28 + 10 log (P) for (>1 MHz) FDD into TDD & TDD in to FDD Uplink 28 + 10 log (P) for (1-5 MHz) 69 + 10 log (P) for > 5 MHz	28 + 10 log (P) (2159,2176)	43 + 10 log (P) (2155-2180)
Guard bands	None	None	None

*OOBE limits for Ofcom rules are given as PSD limits for specific frequency offset ranges. For convenience of comparison, we have converted these levels to a formulas familiar to the FCC. The formulas apply only to 4.1 MHz BW emissions being addressed herein

Comparing the Proposed Technical Rules for TDD

Parameter	Ofcom applied to 2155 – 2180 MHz	700 MHz	M2Z's Proposal
Mobile power	31 dBm (Power)	37 dBm (EIRP)	33 dBm (Power)
Mobile OOBE* (per MHz)	34 + 10 log (P) (2160, 2175) 43 + 10 log (P) (2155, 2180)	33 + 10 log (P)	43 +10 log (P)
Base Station Power (EIRP)	+61 dBm/5 MHz (2160-2175) +25 dBm/5 MHz (2155-2160 & 2175-2180)	62 dBm/MHz	60 dBm/MHz
Base Station OOBE*	28 + 10 log (P) (2159,2176)	33 + 10 log (P)	43 + 10 log (P) (2155-2180)
Guard bands	None	None	None

*OOBE limits for Ofcom rules are given as PSD limits for specific frequency offset ranges. For convenience of comparison, we have converted these levels to a formulas familiar to the FCC. The formulas apply only to 4.1 MHz BW emissions being addressed herein

Comparing the Proposed Technical Rules for TDD

Parameter	UMTS* 1900-1920 (TDD)	UMTS* 1920-1980 (TDD or FDD Uplink)	M2Z's Proposal
Mobile power	30 dBm (Power)	33 dBm (Power)	33 dBm (Power)
Mobile OOBE (per MHz)	20 + 10 log (P) (@2.5 MHz) 37 + 10 log (P) (@3.5 MHz) 41 + 10 log (P) (@4.5 MHz)	17 + 10 log (P) (2.5 MHz) 34 + 10 log (P) (3.5 MHz) 38 + 10 log (P) (4.5 MHz)	43 +10 log (P)
Base Station Power (EIRP)	>+43 dBm/5 MHz		60 dBm/MHz
Base Station OOBE**	16 + 10 log (P) (@5 MHz) 28 + 10 log (P) (@5.2 - 6 MHz) 40 + 10 log (P) (>6 MHz)	33 + 10 log (P)	43 + 10 log (P) (2155-2180)
Guard bands	None	None	None

*3GPP 25.101 and 25.102 Standards

*@ a 43 dBm BS Power, will decrease with increased Base Station power