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October 27, 2008

Ex Parte via Electronic Filing

Marlene H. Dortch
Office of the Secretary
Federal Communications Commission
445 12th Street, SW
Washington, D.C. 20554

Re: Ex Parte Communication – Unlicensed Operation in the TV Broadcast Bands (ET Docket No. 04-186); Additional Spectrum for Unlicensed Devices Below 900 MHz and In the 3 GHz Band (ET Docket No. 02-380)

Dear Ms. Dortch:

On October 24, 2008, Phil Gossett, Larry Alder, Doug Garland, and the undersigned, all from Google Inc. (“Google”), met by telephone with Julius Knapp, Chief of the Commission’s Office of Engineering and Technology (“OET”), and Alan Stillwell and Robert Weller from OET. During the course of the discussion, the Google representatives explained further details about our proposal to establish the appropriate power levels for white space devices (WSDs) using channels adjacent to licensed digital television (DTV) signals.

In two previous *ex parte* filings, Google laid out its “unified” approach,¹ based on combining the White Spaces Coalition’s proposal to utilize variable transmit power for WSDs, with Motorola's proposed use of geo-location databases to identify whether and how specific DTV stations would be subject to adjacent channel protection.² This plan provides an optimal mix of protection for DTV signals and usable power limits for WSDs, requiring no real-time calculations. By contrast, a fixed power limit is neither adequate protection for weak DTV signals (near the threshold of visibility), nor

¹ See Ex Parte letter from Richard Whitt, Google Inc., to Marlene Dortch, FCC, ET Docket 04-186, submitted on October 9, 2008; Ex Parte letter from Richard Whitt, Google Inc., to Marlene Dortch, FCC, ET Docket 04-186, submitted on October 14, 2008 (both describing elements of Google’s proposed unified approach to calculating adjacent channel power limits).

² See Reply Comments of Dell Inc., Google Inc., The Hewlett-Packard Co., Intel Corp., Microsoft Corp., and Philips Electronics North America Corp., ET Docket Nos. 04-186, 02-380, submitted on March 2, 2007, at 5-8; Ex Parte of Motorola, ET Docket No. 04-186, submitted on October 18, 2007.

adequately flexible to permit useful power levels (at least 1 Watt, 30 dBm) in many typical urban environments.

In our conversation with OET, we discussed the derivation of the proposed 85dB offset number, which is the WSD adjacent channel power limit relative to DTV received level. That number is based on OET's March 30, 2007 report on DTV interference rejection thresholds.³ Across all eight tested television receivers at D = -68 dBm on Channel 30, the worst of the receivers was susceptible to interference at a level of -37 dBm on the N+1 and N-1 interfering channels. At a distance of 10m, the free-space path loss for Channel 30 is 48 dB. As a result, a WSD operating at that distance will not cause harmful interference to a DTV receiver under the proposed rules. Thus:

$$37 \text{ dB} (- D/U \text{ ratio}) + 48 \text{ dB} (\text{path loss}) = 85 \text{ dB} (\text{proposed offset})$$

Moreover, in order to prevent saturation, Google has proposed a power cap of 100 mW for portable devices, and 1W (4W EIRP) for fixed devices. The OET report includes cases that are well in excess of our proposed caps. Attached herein is a page from the OET report with the relevant data circled for clarity. The upper curve in both figures represents a DTV signal at -28 dBm. With Google's recommended +85 dB offset, the implied uncapped WSD power level would be well above the 4 Watt EIRP limit that is being proposed for fixed devices, so that particular curve would never be used. However, the other measured data from the OET report are consistent with a constant D/U ratio of -37 dB, as Google has proposed, and not with a constant U limit, as in the FCC's proposed fixed 40 mW power limit.

It also is worth noting a pertinent observation from OET's October 15, 2008 report on the performance of prototype white space devices. There OET found that "no interference was observed when the Adaptrum device transmitted on an immediate adjacent channel even with the transmitter on close proximity to the receiver with a roof-top antenna."⁴

Finally, an additional potential constraint on usable power limits is reliance on the Grade B contour as the protected area. Google supports using a statistical model for propagation, such as the one proposed by Motorola.⁵ The WSD would use the worst case (i.e., lowest) transmit power limit from the model for the radius of uncertainty for the geo-located position, according to the database. By contrast, using the Grade B contour would result in few to no usable non-adjacent channels in many major markets. For example, when adding post-transition DTV and LPTV signals to the Grade B contour:

³ FCC/OET Report 07-TR-1003, dated March 30, 2007, Chapter 5, page 5-17, Figure 5-11; http://www.fcc.gov/oet/info/documents/reports/DTV_Interference_Rejection_Thresholds-03-30-07.pdf.

⁴ FCC/OET Report 08-TR-1005, dated October 15, 2008, Executive Summary, at page vii.

⁵ See Ex Parte of Motorola, ET Docket No. 04-186, submitted on October 18, 2007, at Appendix A, page 41.

Number of Non-Adjacent Channels Between 21 and 51, By Market

	Using -85dBm Threshold⁶	Using Grade B Contour
Boston	2	0
Dallas	7	1
New York	1	0
Detroit	2	1

Should you have any questions, please do not hesitate to contact the undersigned.

Respectfully submitted,



Richard S. Whitt, Esq.
Washington Telecom and
Media Counsel
Google Inc.

⁶ Post-transition white space in Channels 21-36 and 38-51. Channels with digital TV signals greater than or equal to -85 dBm are considered occupied, as estimated by www.tvfool.com.

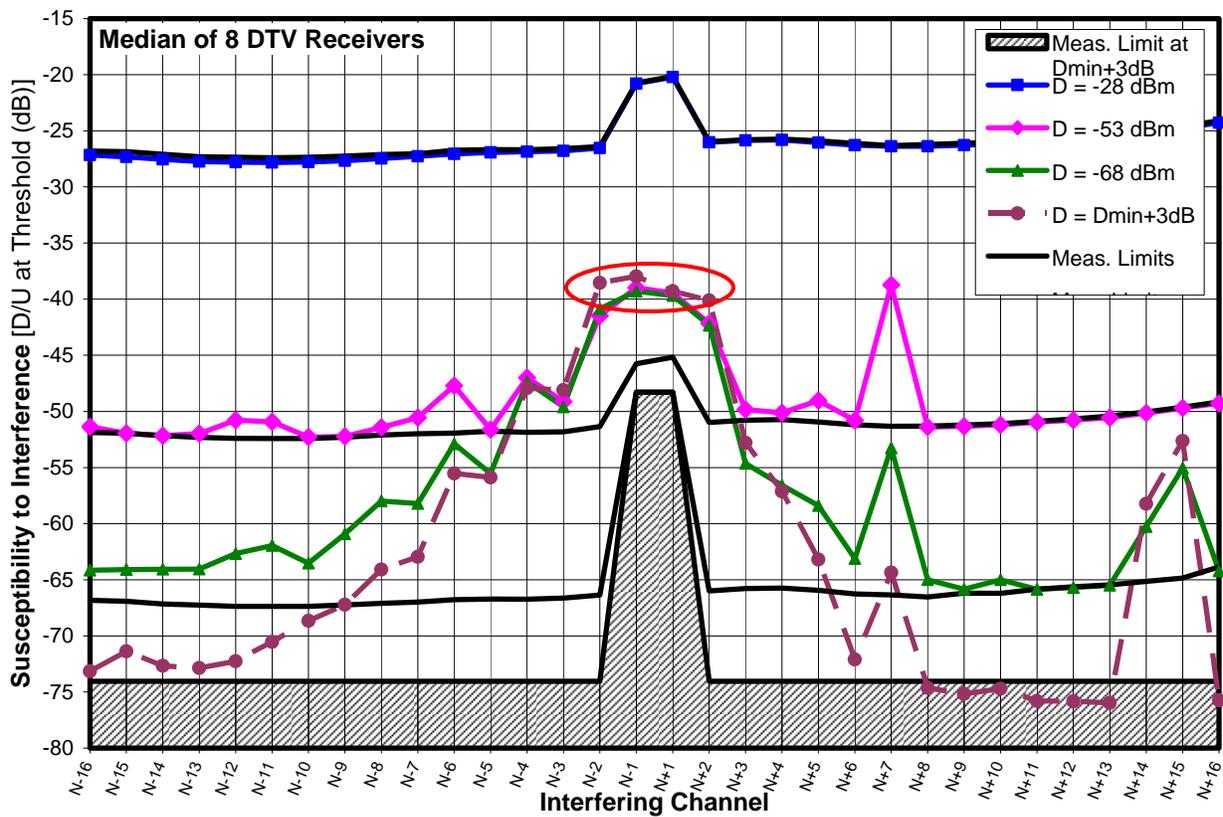


Figure 5-11. Median D/U of 8 receivers at Four Signal Levels on Channel 30

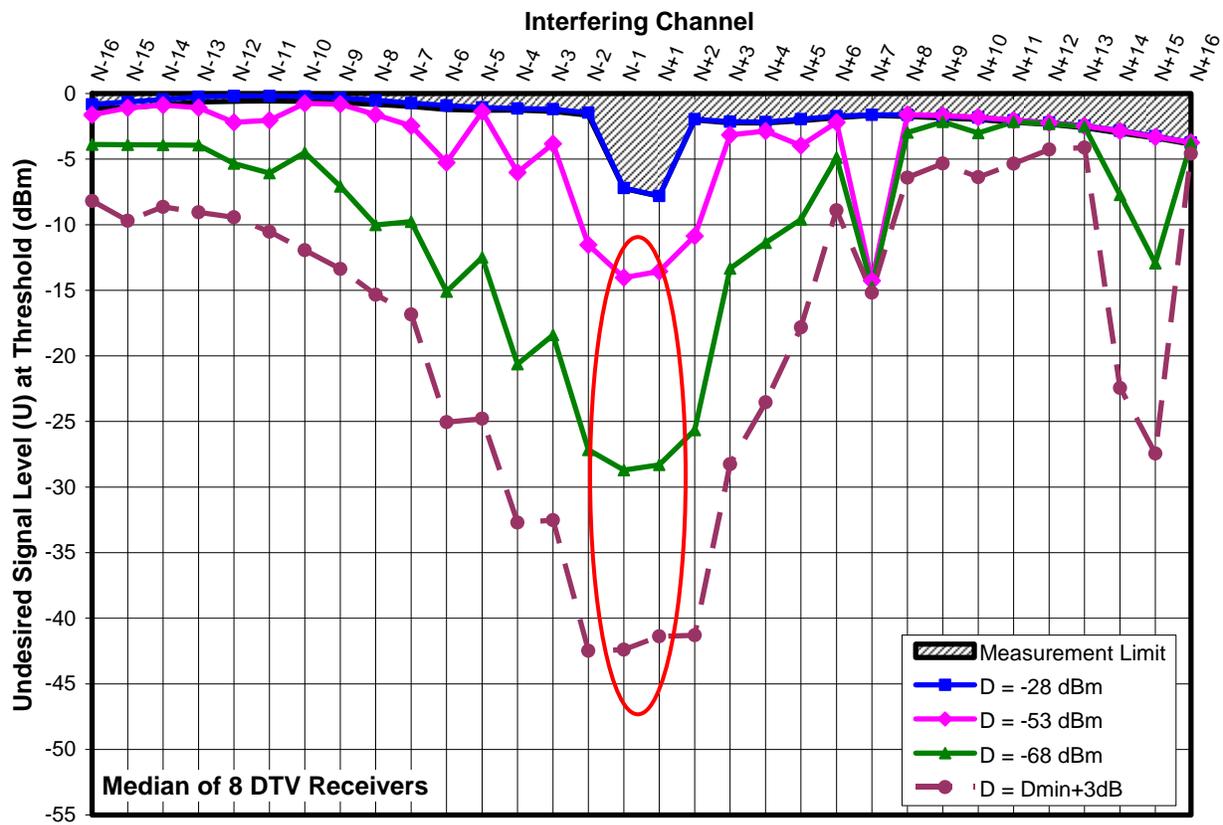


Figure 5-12. Median Threshold U of 8 receivers at Four Signal Levels on Channel 30