verizon

1300 I. Street, N.W.
Suite 400 West
Washington, DC 20005

May 19, 2016

Marlene H. Dortch
Secretary
Federal Communications Commission
445 12th Street SW
Washington, DC 20554

Re: Written *Ex Parte* Presentation
GN Dkt. No. 14-177, IB Dkt. Nos. 15-256 & 97-95, RM-11664 &
WT Dkt. No. 10-112

Dear Ms. Dortch:

Together with other terrestrial stakeholders, Verizon has been engaging with the satellite industry to mutually explore a workable satellite-terrestrial coexistence regime in the 28 GHz band. Even as that work continues, it is important to ensure that the record in the *Spectrum Frontiers* proceeding is up-to-date with the latest assessments of technical showings.

To that end, Verizon submits this response to the April 21 ViaSat *ex parte* letter proposing interference protection levels for satellite operations in the 28 GHz band.[1] The ViaSat analysis contains the following overly conservative assumptions that raise questions about the proposed protection levels:

1) The ViaSat analysis assumes an unrealistic, worst-case scenario on several fronts. It only considers two types of terrestrial mobile user terminals ("UTs"), each transmitting at peak power, 100 percent of the time, and only outdoors (see rows 24 and 42 of ViaSat's Excel spreadsheet). UTs, in fact, consist of many different types, which are capable of different peak power levels and indoor (as well as outdoor) operations. Moreover, UTs typically operate with power control, with only UTs at the cell edge operating at or near peak power levels, while those closer to the base station operate at lower power levels. UTs also are highly unlikely to be in use (*i.e.,* transmitting) at all times. Consequently, a diverse mix of UTs, some indoors and some outdoors, operating at different power levels and only a fraction of the time, is a much more realistic terrestrial operating scenario. Together with additional path and clutter losses, this would result in reduced signal strength received at the satellite receiver.

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[1] *See* Letter from John P. Janka and Elizabeth R. Park, Counsel to ViaSat, to Marlene H. Dortch, Secretary, FCC, GN Dkt. No. 14-177 *et al.*, Attachment 1 & Excel Spreadsheet (Aggregate 5G-FCC) (Apr. 21, 2016).

2) In discussing UT density, the ViaSat analysis recognizes that UTs will be spread across urban and rural areas (and assumes one UT per kilometer),[2] but the calculations draw no distinction, for purposes of UT characteristics, between how UTs will operate in urban and rural areas. UTs in urban areas will have different propagation characteristics from those in rural areas (*e.g.,* substantial signal propagation loss from reflections off buildings), and these differences are not recognized at all in the ViaSat analysis. For example, for "spreading loss from mid CONUS" (see row 28 of ViaSat's Excel spreadsheet), ViaSat merely assumes a free-space path loss model for all UTs without differentiation. Such a path loss model, however, assumes no nearby obstacles to cause reflection or diffraction, and thus is completely unrealistic for UTs operating either in urban areas (with, for example, buildings and other man-made infrastructures) or suburban and rural areas (with, for example, trees, vegetation, and natural terrain).

3) ViaSat's assumed "off-axis gain reduction toward GSO" of 6 dB (see rows 26 and 44 of ViaSat's Excel spreadsheet) is much too low, given the beamforming to be used for the return link (*i.e.,* from UTs to base stations) and the relative angle to the satellite.

4) The ViaSat analysis does not account for atmospheric loss of approximately 1 dB or higher.

Verizon is engaged in ongoing discussions with ViaSat to address these and other issues. Two key points that Verizon has put forward are: (i) any potential interference to a satellite receiver will require an extraordinarily large number of UTs transmitting simultaneously toward the satellite receiver; and (ii) the likelihood that such a large number of UTs, using steerable beamforming antenna arrays, would be simultaneously transmitting and pointed at a satellite receiver is very low.[3]

As stakeholders and the Commission work through these issues, it remains important to recognize that satellite use of the 28 GHz band is a secondary allocation to terrestrial services. ViaSat's analysis thus is not only unfounded but its proposal to limit aggregate terrestrial power limits to protect secondary Ka-band satellite systems is extraordinary and unprecedented. The risks and likelihood of harmful interference must be accounted for in this analysis.

Sincerely,

/s/ Gregory M. Romano

Gregory M. Romano
Vice President & Associate General Counsel

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[2] *See id.,* Attachment 1, at 2.

[3] *See Use of Spectrum Bands Above 24 GHz for Mobile Radio Services,* Notice of Proposed Rulemaking, 30 FCC Rcd 11878, ¶ 298 (2015).