

February 23, 2018

Ex Parte

VIA ELECTRONIC FILING

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

Re: *Expanding Flexible Use in Mid-Band Spectrum Between 3.7 and 24 GHz*
GN Docket No. 17-183

Dear Ms. Dortch:

A recent *ex parte* letter filed by a number of technology companies and an accompanying engineering analysis prepared by RKF Engineering Solutions (the “RKF Study”)¹ concludes that “unlicensed services can successfully coexist with the primary services present in the 6 GHz band.”² Intelsat Corporation (“Intelsat”) and SES Americom, Inc. (“SES”), incumbent C-band Fixed Satellite Service (“FSS”) operators, have identified a number of flaws in the RKF Study—flaws that call into question the feasibility of unrestrained sharing in the 6 GHz band between unlicensed services and existing users. The RKF Study should be revised to account for these defects, and then the results should be further analyzed by the Commission and other interested parties before the Commission moves forward with any proposal for the 6 GHz band that contemplates sharing.

First, the RKF Study relies on an unrealistic gain-to-noise temperature (“G/T”) value. In the study, RKF used a G/T of 2 dB/K over the 48 contiguous United States (“CONUS”) in its simulations to assess interference to FSS systems.³ This G/T value is low by a significant margin. The satellites using the Intelsat Epic platform, such as Intelsat-35e, have spot beams with a G/T of up to 15.5 dB/K, making them 13.5 dB more susceptible to external interference than what was assumed in the RKF analysis. RKF’s analysis should be revised to account for such satellites having a substantially higher G/T level in order to provide a more accurate evaluation of the potential impact of sharing between FSS and unlicensed services.

Second, the RKF Study makes several erroneous assumptions regarding the use of radio local area network (“RLAN”) devices. The study assumes that 98% of RLAN devices are used

¹ Letter from Paul Margie, Counsel to Apple, Inc., Broadcom Corp., Facebook, Inc., Hewlett Packard Enterprise, and Microsoft Corp, to Marlene H. Dortch, Secretary, FCC, GN Docket No. 17-183 (filed Jan. 25, 2018) (“Technology Companies *Ex Parte*”); *id.* at Attachment 1, RKF Engineering, Frequency Sharing for Radio Local Area Networks in the 6 GHz Band, (Jan. 2018) (“RKF Study”).

² Technology Companies *Ex Parte* at 1.

³ RKF Study at 37, 39.

indoors and only 2% are used outdoors.⁴ An Electronic Communications Committee (“ECC”) report estimated that outdoor use would be more than twice as prevalent, assuming 94.7% indoor and 5.3% outdoor device use.⁵ The RKF Study should be revised to use the ECC ratio, which is a much more realistic estimate.

The RKF Study also downplayed the extent of RLAN device usage during busy hours. The study assumed that busy hours were 7:00 pm to 11:00 pm local time, resulting in only one busy hour of usage across CONUS of 7:00 to 8:00 pm, and that on average, each person would be using one RLAN device out of the 10 RLAN devices that they own during that assumed busy hour.⁶ This metric misjudges both the duration of use and the number of devices likely to be used. The defined busy hours should be extended by 3-4 hours because there will be at least two additional hours where three time zones are simultaneously experiencing their busy hours and another two hours where two time zones are experiencing their busy hours. Furthermore, the number of busy hour devices in use should be raised to at least 3 (being 30% of the study’s estimated 10 RLANs owned by the average person).⁷

In addition, the RKF Study underestimates the percentage for on-tune active RLAN devices. Table 3-1 of the study estimates that the total number of RLANs is 958 million, of which 394,958 are active on-tune devices, for an on-tune percentage of a mere 0.04% of devices.⁸ In another study regarding RLAN usage in Europe for 5725-5925 MHz, the authors found the percentage of on-tune RLAN devices to be between 0.1% and 2.6% of all devices⁹ – significantly higher than the figure used by RKF. The European study was an extensive effort done in cooperation with several independent European administrations, and parameters used in the study were agreed upon among all CEPT administrations. The 0.04% value used in the RKF Study is extremely low in comparison. Revising the study by using the values developed for the European analysis will better account for RLAN usage and result in a more accurate estimate of the interference potential to satellite receivers.

Third, the RKF Study fails to use an appropriate propagation model. The RKF Study used several propagation models to calculate path loss for RLAN interference to the FSS and to terrestrial services.¹⁰ Instead, the study should use an internationally recognized path loss model appropriate for this frequency range – ITU-R P.452-16 – to account for local clutter loss in combination with free space path loss and building penetration loss, as was assumed in ECC Report 244. The Irregular Terrain Model (ITM) used by RKF does not accurately characterize the interference towards a GSO satellite. By incorrectly assuming additional propagation losses

⁴ *Id.* at 14.

⁵ ECC, *ECC Report 244, Compatibility Studies Related to RLANs in the 5725-5925 MHz Band*, at 66 (Jan. 29, 2016) available at <http://www.erodocdb.dk/Docs/doc98/official/pdf/ECCREP244.PDF> (“ECC Report 244”).

⁶ RKF Study at 15.

⁷ *Id.*

⁸ RKF Study at 12.

⁹ See ECC Report 244 at 80-81.

¹⁰ RKF Study at 31-35.

due to terrain effects, the RKF Study significantly underestimates the interference levels that would be received by satellite receivers.

Finally, the RKF Study mischaracterizes the United States' population density, which skews downward the expected amount of interference from RLANs. The study claims that "approximately 95% of CONUS is either rural or barren, which implies that interference will be predominantly concentrated in urban and suburban areas."¹¹ The study indicates that 90% of the U.S. population lives in 10% of the U.S. land area.¹² However, other analyses have shown that 90% of the population lives in 15.44% of the U.S. land area.¹³ As the study acknowledges, "the deployment of RLANs is assumed to be closely associated with population density,"¹⁴ making it imperative that the study relies on an accurate population density metric.

Taken together, these faulty assumptions serve to minimize the likely effect of RLAN deployment on existing FSS receivers. The *ex parte* gives the overly optimistic—and mistaken—impression that mitigation techniques will not be necessary to accommodate sharing between unlicensed operations and satellite incumbents in the 6 GHz band. The study must be revised and the results analyzed by the Commission and all affected parties before the Commission can move forward with proposed rules for this band.

Respectfully submitted,

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¹¹ RKF Study at 16.

¹² RKF Study at 12, 16.

¹³ Joshua Tauberer's Archived Blog, *50% of the U.S. Population Lives in 1% of the Land Area*, <https://joshdata.wordpress.com/2013/12/23/50-of-the-u-s-population-lives-in-1-of-the-land-area/> (Dec. 23, 2013).

¹⁴ RKF Study at 12.