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March 3, 2016

Via Electronic Filing

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

Re: ET Docket No. 13-84, *Reassessment of Federal Communications Commission Radiofrequency Exposure Limits and Policies*
Ex Parte Communication

Dear Ms. Dortch:

On behalf of the Fixed Wireless Communications Coalition (FWCC), pursuant to Section 1.1206(b) of the Commission's Rules, I am electronically filing this notice of an oral *ex parte* communication in the above-referenced docket.

On Wednesday, March 2, 2016, representatives of the FWCC--Larrie Sutliff, Mitchell Lazarus, and the undersigned--met with Julius Knapp, Bruce Romano (by phone), Martin Doczkat, Edwin Mantiply and Bruce Jacobs of the Commission staff. We discussed the points summarized in the attached handout.

Please contact me with any questions.

Respectfully submitted,

Cheng-yi Liu
Counsel for the Fixed Wireless
Communications Coalition

Attachment

cc: Meeting participants

Fletcher, Heald & Hildreth

The Law of Communications

Reassessment of Federal Communications Commission Radiofrequency Exposure Limits and Policies

(ET Docket No. 13-84)

Fixed Wireless Communications Coalition

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March 2, 2016

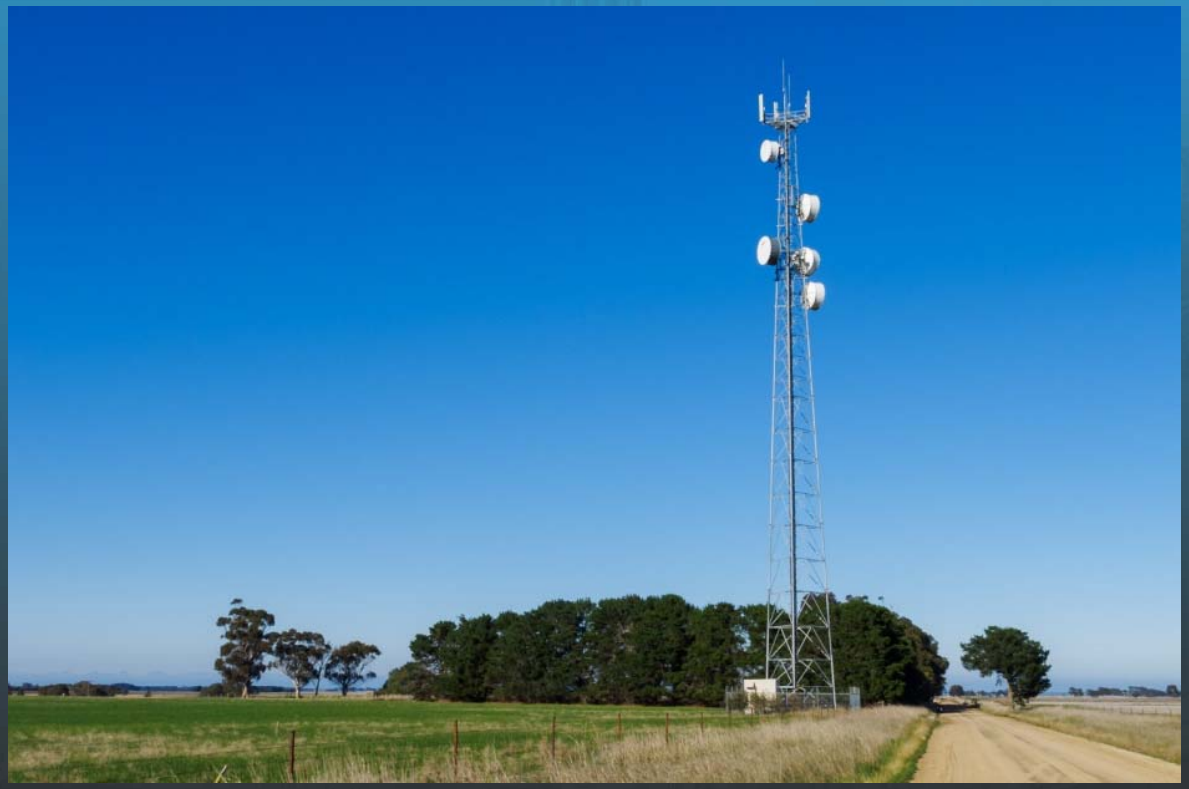
About the FWCC

- A coalition of companies, associations, and individuals interested in terrestrial fixed microwave communications
  - formed in 1998; speaks for the fixed service community
  - active in 60+ FCC proceedings plus NTIA, FAA, GAO, courts
- Membership:
  - microwave equipment manufacturers
  - communications service providers (and associations)
  - fixed microwave engineering / frequency coordinating firms
  - licensees of fixed microwave systems (and associations)
  - major end users (railroads, public utilities, petroleum and pipeline, public safety agencies, cable TV providers) and/or their associations
  - backhaul providers, communications carriers
  - telecommunications attorneys and engineers.

Agenda

- Adopt RF exposure rules that do not require RF evaluation for Part 101 facilities that present no hazard.

Representative Installation



Source: Carl Chapman Photography. With permission.

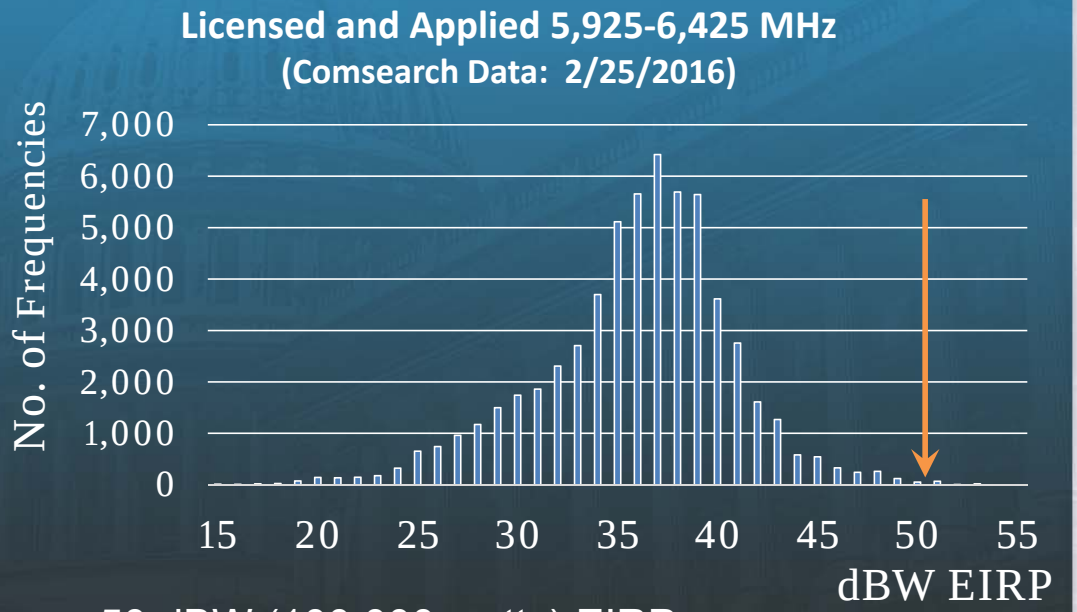
Present Rule

- Part 101 point-to-point links in all bands below 24 GHz are categorically excluded from routine environmental evaluation.

  47 C.F.R. § 1.1307(b)(1) (Table 1)

Worst Case for our Analysis: 6 GHz

- Worst case due to high power (for long links) and lenient antenna standards



  - this analysis assumes 50 dBW (100,000 watts) EIRP – equals or exceeds 99.8% of 6 GHz frequencies.

NPRM Proposal – Single Source (1)

- Single RF source would be exempt from evaluation if:
  - ERP in watts "in any direction" is less than 19.2 R^2
    - where R is distance in meters "in any direction" between antenna and nearest exposure victim

      47 C.F.R. § 1.1307(b)(1)(i) & Table 1 (proposed)

  - evaluation also required if $R < \lambda/2\pi$
  - can always be ignored
    - worst case (at 4 GHz): $\lambda/2\pi$ =1.2 cm
    - R >> 1.2cm

NPRM Proposal – Single Source (2)

- Single RF source would be exempt from evaluation if:

$$P_{ERP} \leq 19.2\ R^2$$

  - convert to EIRP:

$$P_{EIRP} \leq 31.5\ R^2$$

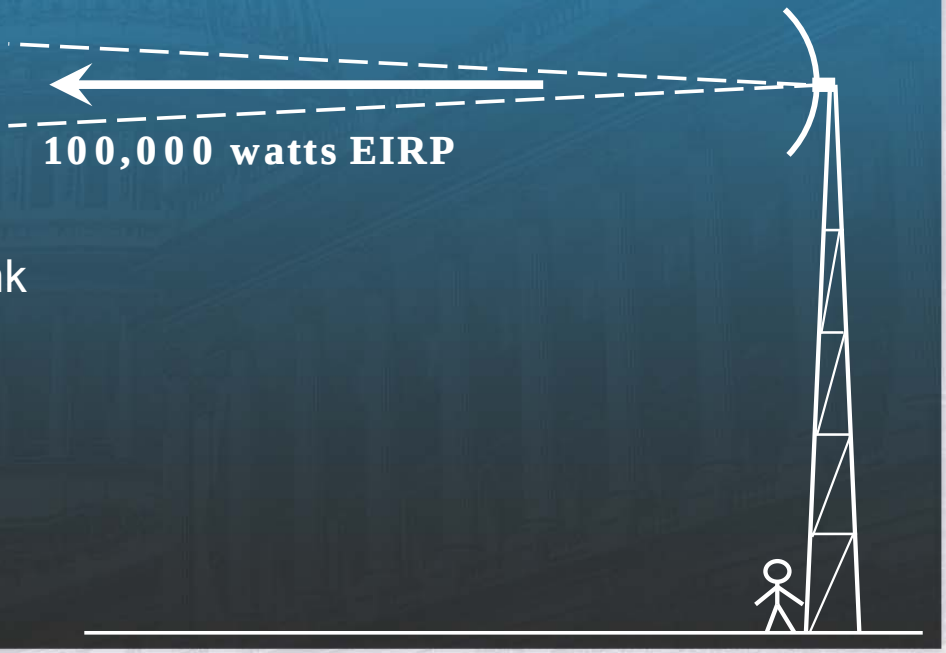
  - solve for R:

$$R \geq \sqrt{\frac{P_{EIRP}}{31.5}}$$

  - for P_{EIRP} = 100,000 watts, R ≥ 56 meters.

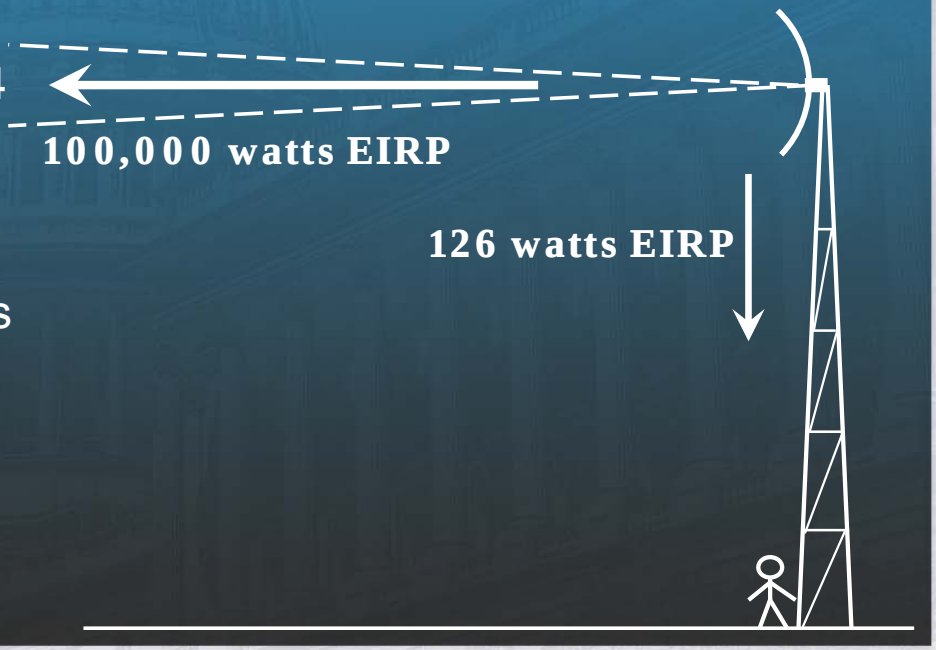
Effect of NPRM Proposal

- At 50 dBW (100,000 watts) EIRP, evaluation would be required if separation is less than 56 meters ***in any direction***
- Rule makes sense only if victim is on antenna axis
  - never happens in practice
  - any obstacle near the axis would make the link inoperable
- Large fraction of fixed microwave links would require evaluation.



Effect of Antenna Standards (§ 101.115)

- Sec. 101.115 requires minimum 29 dB suppression at 90º from antenna axis (for all bands 2 GHz and higher)
  - 29 dB ↔ 794
  - maximum downward emission: 100,000 / 794 = 126 watts EIRP
  - 126 W source requires evaluation if separation distance under 2 meters
  - in practice, separation always over 2 meters
  - rule should allow for antenna standards.



NPRM Proposal – Multiple Sources

- Evaluation required if:

$$\sum_{i=1}^{a} \frac{P_i}{P_{th\,i}} + \frac{\sum_{j=1}^{b} SAR_j}{1.6W/kg} + \sum_{k=1}^{c} \frac{ERP_k}{ERP_{th\,k}} + AEQ \geq 1$$

47 C.F.R. § 1.1307(b)(iv) (proposed)

  - first and second terms apply to separations less than 40 cm
  - fourth term is negligible if:
    - calculation includes all collocated antennas
    - no other significant RF sources within a few tens of meters
- Only third term applies to tower-mounted fixed microwave.

FWCC Proposal – Multiple Sources (1)

- convert 3rd term to EIRP: $\sum_{k=1}^{C} \frac{EIRP_k}{EIRP_{th\,k}} \geq 1$
- replace denominator with threshold from slide 7:

$$\frac{\sum P_{EIRP}}{31.5\,R^2} \geq 1$$

- take antenna pattern into account:

$$\frac{\sum (P_{EIRP} / 794)}{31.5\,R^2} \geq 1$$

- solve for R:

$$R < \sqrt{\frac{\sum P_{EIRP}}{31.5 \times 794}}$$

FWCC Proposal – Multiple Sources (2)

- Near-worst-case example:
  - ten 50 dBW antennas collocated
    - assume all are at height of lowest antenna
  - evaluation should be required only if:

$$R < \sqrt{\frac{10 \times 100{,}000}{31.5 \times 794}} = 6.3 \text{ meters}$$

- *I.e.*, no evaluation should be needed if antennas are 6.3 meters above victim (two building floors).

Request

1. Keep the categorical exclusion for Part 101 below 24 GHz

   or

2. For fixed installations, take into account FCC-mandated antenna patterns when assessing need for evaluation.

Request #2 – Example

- *E.g.*, modify proposed 47 C.F.R. § 1.1307(b)(i):

  […] The ERP, defined as the product of the ~~maximum~~ antenna gain and the maximum delivered time-averaged power summed over all polarizations, shall be used for comparison with the value calculated from the applicable formula in Table 1, where the term "~~maximum~~ antenna gain" is the largest far-field total power gain relative to a dipole less any suppression required by Commission rules in the direction of the nearest point accessible to the public ~~in any direction~~ for all transverse polarization components and the term "delivered maximum time-averaged power" is the largest net power delivered or supplied to the antenna as averaged over any 30 minute time period for fixed sources and as averaged over a period inherent from device transmission characteristics for mobile and portable sources. The term "separation distance," R in Table 1, is defined as the minimum distance ~~in any direction~~ from any part of the radiating structure of a transmitting antenna or antenna array to the nearest point accessible to the public ~~body of a nearby person~~.

Conclusion

- Our requested relief will speed and simplify fixed microwave installations with no added risk of over-limit RF exposure.

Thank you!

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