



October 22, 2019

VIA ELECTRONIC FILING

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

Re: *Ex Parte Presentation, Unlicensed Use of the 6 GHz Band*, ET Docket No. 18-295
Expanding Flexible Use in Mid-Band Spectrum Between 3.7 and 24 GHz, GN Docket No. 17-183

Dear Ms. Dortch,

On October 18, 2019, Scott Bergmann and Jennifer Oberhausen of CTIA, together with Adam Krinsky and Mark Settle of Wilkinson Barker Knauer, LLP, met with Aaron Goldberger of the Office of Chairman Ajit Pai, and the CTIA representatives spoke separately by phone with Erin McGrath of the Office of Commissioner Michael O’Rielly, to discuss the need for positive control of all unlicensed operations in the 6 GHz band and to point out that the recent technical filings by RLAN stakeholders do not prove otherwise.

CTIA supports unlicensed operations in a portion of the 6 GHz band, but only with a rigorous interference protection framework that provides for positive control of all unlicensed devices. Positive control via Automatic Frequency Coordination (“AFC”) is necessary to prevent interference and to resolve interference when it does occur, regardless of unlicensed device location or power level. During the meetings, the participants discussed the attached presentation, which identifies unreasonable assumptions, unsuitable methodologies, and unsupported conclusions in the RLAN technical filings submitted since the public comment period closed. In short, RLAN stakeholders have not shown that low power indoor devices or very low power indoor/outdoor devices will operate without interfering with incumbent primary 6 GHz licensed operations absent AFC control.

While these meetings focused on issues related to unlicensed use in the band, CTIA reiterates its support for licensing the upper portion of the 6 GHz band for flexible-use services and relocating incumbent FS operations from that portion of the band to spectrum above 7.125 GHz or other comparable facilities.

Pursuant to Section 1.1206 of the Commission’s rules, this notice is being filed in ECFS and provided to the Commission meeting attendees. Please do not hesitate to contact the undersigned with any questions.



Sincerely,

/s/ Jennifer L. Oberhausen

Jennifer L. Oberhausen
Director, Regulatory Affairs

Attachment

cc: Aaron Goldberger
Erin McGrath



6 GHz Technical Filings



01

All 6 GHz Band Unlicensed
Operations Must Be Under AFC
Positive Control

The FCC Should Require Positive Control for All Unlicensed Operations in the 6 GHz Band



- **CTIA supports unlicensed operations** in a portion of the 6 GHz band, but only with a **rigorous interference protection** framework that provides for **positive control**
- Positive control via the AFC – **regardless of unlicensed device location or power level** – is critical to prevent interference and resolve interference that does occur
- Unlicensed proponents have not shown that low power indoor devices or very low power indoor/outdoor devices can operate without interfering with incumbent **primary 6 GHz licensed operations** absent positive AFC control

The Unlicensed Proponent Filings Do Not Justify AFC-Free Unlicensed Operations

Unreasonable Assumptions, Unsuitable Methodology, Unsupported Conclusions

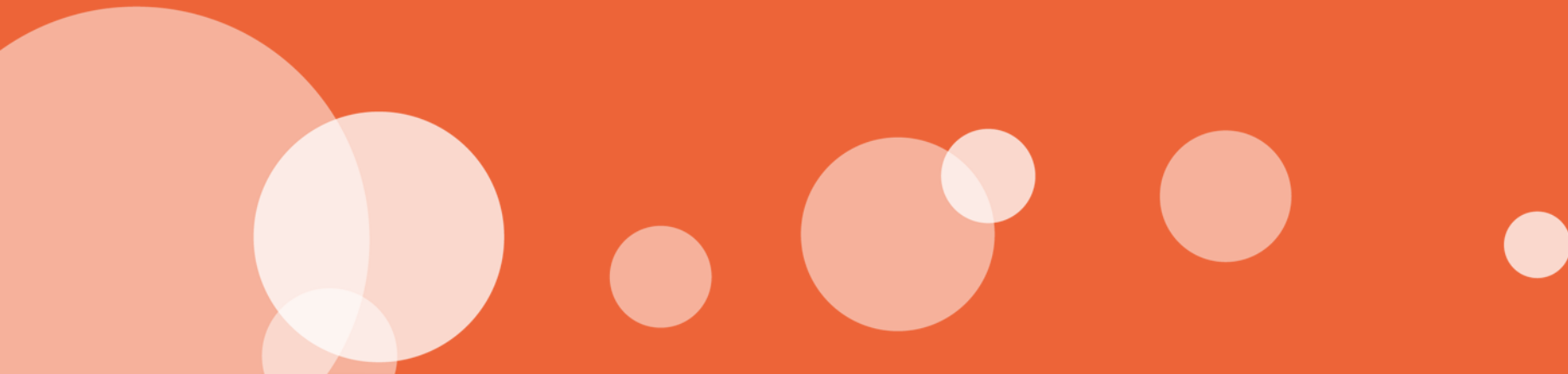
The unlicensed stakeholders attempt to justify **Very Low Power (VLP)** and **Low Power Indoor (LPI)** unlicensed operations free of AFC control, but the **studies contain multiple technical deficiencies**

Specifically, unlicensed stakeholders have submitted 6 technical filings since the reply comment window closed (in addition to ECC Report 302 in the record):

- RKF Further Analysis (June 24, 2019)
- Very Low Power Portable Study (July 2, 2019)
- Los Angeles Dept. of Water and Power (“LADWP”) Case Study (July 5, 2019)
- High-Rise Building Study (July 31, 2019)
- Duty Cycle and Simulation Study (August 22, 2019)
- FS/Wi-Fi Coexistence Testing Study (August 23, 2019)

02

Unlicensed Devices Must Protect
All Primary Incumbent Operations



Misguided Approaches in the Unlicensed Studies Fall into Four General Categories



1. Studies that rely on **typical RLAN or FS operations** to show non-interference leave **1000s of incumbent links** exposed and vulnerable to interference
2. Studies that use **median** FS parameters do not address **50%** of incumbent links
3. Studies cannot rely unlicensed entrants **seizing the fade margin** that incumbents have built into their FS links
4. Studies cannot **pick and choose protection criteria** and then rely on hand-waving claims that interference will not occur

Unlicensed Proponents Cannot Rely on “Typical” Characteristics to Assert Non-Interference

RKF Further Analysis Study

The study refers more than **8 times** to **typical** characteristics of RLANs or FS links

Supposed low probability events are significant when considering the number of links in the 6 GHz band

- For example, the study shows that only 0.209% of cases studied would result in an I/N greater than -6 dB, but that equates to nearly **2,000 scenarios** where the interference criteria are exceeded

The study ignores real world scenarios, where RLANs will in fact:

- Operate in the mainbeam of the FS antenna
- Transmit in the sidelobes of the FS antenna while located very close to the FS receiver
- Transmit from unauthorized outdoor locations
- Operate indoors with very low building entry loss
- Operate with low path loss values that are statistically in the tail of the path loss PDF

Unlicensed Proponents Cannot Use “Median” Fact Patterns to Show Non-Interference

High-Rise Building Study

For example, the study claims that the interference risk of low power devices in high-rise buildings is low in part because the **median distance** from an FS receiver to a building protrusion is 11 km

Any non-interference showing that asserts sufficient protection at the **median** fails to show that **50%** of links will be sufficiently protected

The study also states that for **2.7%** of paths, the -6 dB I/N is exceeded after considering **typical** Low Power Indoor losses – this percentage will rise when considering **actual losses** as opposed to typical losses

Unlicensed Operations Cannot Exploit FS Fade Margin as a Mitigation Tool

FS/Wi-Fi Coexistence Testing Study

The study claims that FS receivers will not experience harmful interference even when I/N levels are significantly above -6 dB because most FS links have 40-50 dB of additional margin that unlicensed operations can rely on

FS operators design systems and invest in networks with enough **additional margin to account for instances of fading** – not the possibility of unlicensed operations

If an RLAN device consumes part of the fade margin, either the **link range** or the **link availability** will necessarily **decrease**

FS operators pay for any fade margin that exists for any FS link, and unlicensed operators must bear the cost of ensuring non-interference

Unlicensed Proponents Cannot Apply Multiple Protection Criteria, Exploit Fade Margin, and then Suggest Other Conditions Will Prevent Remaining Interference

RKF Further Analysis, Very Low Power Portable Study, LADWP Case Study, High-Rise Building Study, FS/Wi-Fi Coexistence Testing Study, Duty Cycle and Simulation Study

The studies show that unlicensed operations will **often exceed a -6 dB I/N**, and then flip to applying a C/N protection criteria

Applying the C/N criteria would **exploit fade margin** from FS links

Further, in the LADWP study, the analysis shows that some links will experience **interference even after applying C/N criteria**

Unlicensed stakeholders dismiss this interference by pointing to the affected FS links' diversity antennas or the barren areas surrounding them, but they fail to show that this "mitigation" approach is applicable across-the-board to tens of thousands of FS links

03

Unsuitable RLAN Study
Approaches Must Be Addressed

The RLAN Studies Contain Multiple Unsuitable Approaches That Undermine the Conclusions



1. **Polarization mismatch** is not a constant factor in all RLAN scenarios
2. The **WINNER II propagation model** is not appropriate for interference prediction, nor is it validated above 6 GHz
3. **Building Entry Loss** (BEL) is statistical in nature and cannot be considered as a single value in all instances
4. Given the magnitude of expected RLAN deployment, **aggregate** and **high duty-cycle** impacts must be addressed

Unlicensed Studies Cannot Rely on Polarization Mismatch

RKF Further Analysis, Very Low Power Portable Study, LADWP Case Study
High-Rise Building Study, Duty Cycle and Simulation Study

5 studies rely on **polarization mismatch** to reduce interference by an average of 3 dB

But polarization discrimination is predictable **only for systems that can guarantee antenna placement and orientation**

Many RLAN antennas are **hinged** and cannot be guaranteed to be in any specific orientation

Further polarization is only predictable within the **main beam** of the antenna, not for **side lobe** or **back lobe** interference



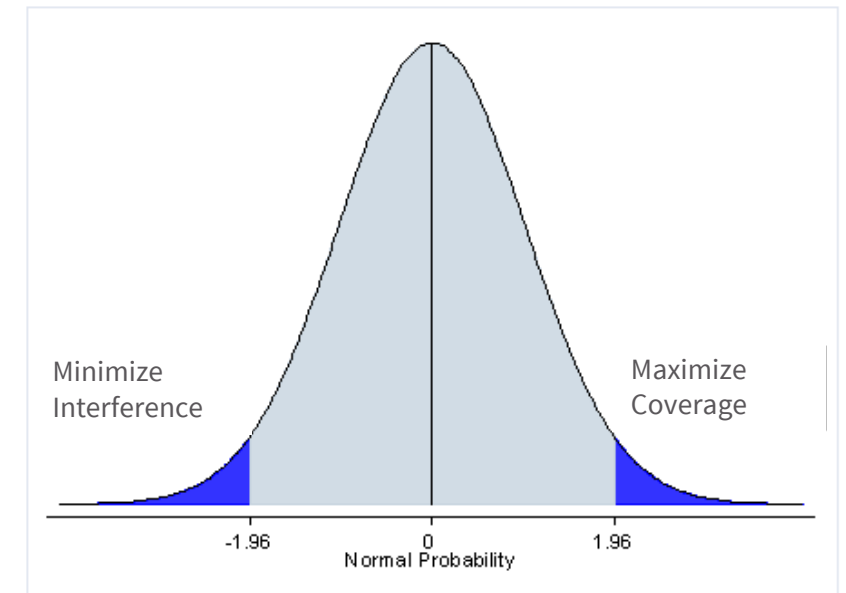
WINNER II Is Not an Appropriate Model for Predicting Interference

RKF Further Analysis , Very Low Power Portable Study, LADWP Case Study

WINNER II is designed to **enhance mobile coverage** by predicting losses that are greater than the mean, thus ensuring the signal is adequate for reception by mobile devices

Thus, WINNER II will **underpredict interference** from RLANs with small propagation losses that are statistically in the tail of the path loss probability distribution function

Further, WINNER II is only validated for use between 2 GHz and 6 GHz, not in the 6 GHz band



Unlicensed Studies Cannot Apply a Single Value to Building Entry Loss (BEL)

LADWP Case Study, High-Rise Building Study, Duty Cycle and Simulation Study

Three studies apply a single level of BEL to demonstrate that indoor untethered devices won't cause interference

BEL is a **VERY statistical parameter**, which varies from no loss to very high loss depending on building materials

ITU-R Rec. P.2109-0 on BEL requires sharing studies to use the **full distribution**, not a single level of loss

Using a single level of BEL **discounts scenarios** where BEL is very low – and thus, a **higher likelihood for interference**



Unlicensed Stakeholders Must Address Aggregate Interference Risks

High-Rise Building Study

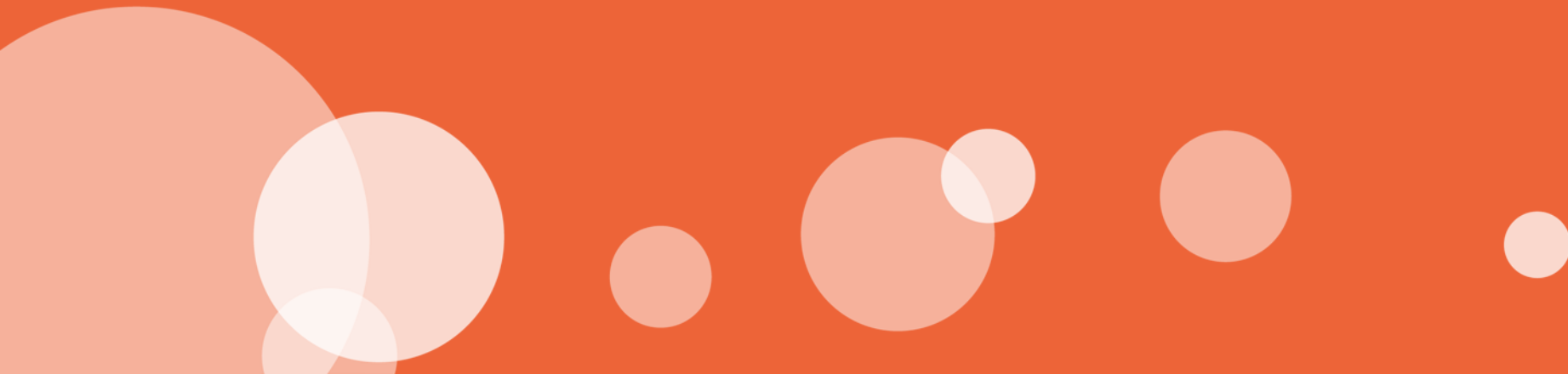
Only one of the six studies calculates **aggregate interference** from RLAN devices – a problem in and of itself – and even that study fails to make technical sense

The study concludes that the aggregate impact from multiple RLAN devices will be less than the impact from a single RLAN device – this is **not technically feasible**

Relatedly, the aggregate of RLAN emissions will be high duty-cycle in nature, and the Duty Cycle and Simulation Study shows that at higher I/N levels, high duty-cycle operations will create more interference than low duty-cycle operations

04

Unsupported Conclusions



Unsuitable Methodologies and Unreasonable Assumptions Lead to Unsupported Conclusions



Multiple unlicensed studies rely on the misguided approaches highlighted here above to mitigate interference

The studies ultimately conclude that low power, indoor devices need not be under the control of the AFC

For example, in the LADWP Case Study:

- The protection criteria is exceeded in over **25 percent** of the links after performing the first analysis
- After applying a second and different analysis to those links, **10 percent of the links remain problematic**

All Unlicensed Devices Must Be Under AFC Positive Control

Recent Experience in the 5 GHz Band Demonstrates the Need for Positive Control in 6 GHz

Some operators have turned off Dynamic Frequency Selection in U-NII devices in the 5 GHz band, causing interference to government incumbents

- The FCC issued 3 NALs in August 2019 and interference remains ongoing today

The same concerns exist in the 6 GHz band and on a larger scale

- 5 GHz – 47 weather radar locations
- 6 GHz – tens of thousands of FS links

The risk of interference is even greater at 6 GHz, where operators wouldn't need to manipulate equipment, just operate it outdoors

The only way to prevent these improper operations or address them when they occur is to require AFC positive control for all unlicensed operations

The 57-71 GHz Band Is Available for Very Low Power Operations Without AFC Control

Unlicensed stakeholders have explained that VLP devices in the 6 GHz band would be used for short-range, high-throughput communications

The 57-71 GHz band is a 14 GHz swath of spectrum that is ideal for short-range, very low power use cases – without AFC control

RLAN interests have not justified why they are focused on 6 GHz for VLP, rather than the 57-71 GHz band which is already available

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