Before the

FEDERAL COMMUNICATIONS COMMISSION

Washington, D.C. 20544

In the Matter of:	)	
	)	
Revision of Part 15 of the Commision's Rules to	)	
Permit Unlicensed National Information	)	ET Docket No. 13-49
Infrastructure (U-NII) Devices in the 5GHz Band	)	

COMMENTS OF EXALT COMMUNICATIONS INC.

Exalt Communications, a manufacturer of radio frequency devices that are used for outdoor terrestrial wireless communications, hereby respectfully submits the following comments in response to the Federal Communications Commission's Notice of Proposed Rulemaking (FCC 13-22).

First, we are pleased to see the FCC continuing to focus on spectrum adoption for broadband access and other similar applications. We generally support the adoption of any legislation that creates new spectrum opportunities for wireless connections, especially those that create the opportunity for wide bandwidth and long-range connections. We have selected specific paragraphs where comment is warranted based on our experience.

(Re paragraph 28.) We are somewhat concerned about the consolidation of rules for the U-NII-3 band in that there are specific conditions afforded by the 15.247 regulations that are not included in 15.407. Specific clarifications are provided below.

(Re paragraph 33.) Exalt Communications opposes the proposed changes. It appears that the Commission has drawn the conclusion that higher gain antennas create higher levels of interference. But if the input power into the antenna is the same value, a higher gain antenna has a reduced interference pattern off-axis (azimuth and elevation) and has volumetrically the equivalent interference to neighboring devices with respect to overall spectral density. More importantly, the higher gain antenna promotes spectral re-

use, much in the way that is seen in license bands such as Part 101 6GHz and 11GHz bands which restrict to a minimum antenna size, for this exact purpose.

Exalt Communications proposes that the antenna gain rules that applied to Part 15.247 be used for the new unified rules. We do not see that the interference level of this band is increasing because of high-gain antennas, rather much more due to the general proliferation of devices, and especially omni-directional devices near ground level where high volumes of devices can be found. It can be safely assumed that users of the devices in these bands would not deploy an unnecessarily large antenna simply to over-power other emitters, as the cost of these antennas, and the structural and leasing costs, are very prohibitive. It is our experience that where they are needed, they are used. All of our customers tend to ‘right-size’ their antenna systems to meet the distance requirements of their applications.

If the new rule is put into place, this will considerably hinder both the growth of rural broadband access, but also important infrastructure including power utility and transportation networks, as well as cellular backhaul. In addition, it will have a significantly negative impact on vendors of devices used for these applications, such as ourselves and many of our colleagues in this selective portion of this industry.

Another factor to consider is that when high-gain antennas are used, they are typically mounted at a much higher plane than other links in this band, because they are being used for long-distance links and require higher elevations to achieve line-of-sight long-distance connections. This additional energy is less likely to create interference for the mass of devices that are used for more ‘ground level’ applications.

If the Commission is not willing to consider the unification under the 15.247 rules, then Exalt suggests that a ‘ratio-based’ transmitter power reduction is a potential alternative, similar to the 1-for-3 regulation that applies to the 2.4GHz band under 15.247. Given that 5GHz antennas have significantly narrower beamwidth compared to 2.4GHz, a ratio such as 1-for-6 may be more in keeping with the original intention.

The rule-making proceedings (ET Docket 96-8) should be reviewed. Ultimately these proceedings resulted in a 1-for-3 reduction for 2.4GHz band usage in 15.247 and drew the conclusion that the unlimited EIRP regulation for the 5725-5850MHz band was

in keeping with the standard. There was considerable evidence shown at the time regarding interference profiles comparing the two bands, and it was ultimately decided that some level of EIRP reduction be employed within the 2.4GHz band due to more liberal propagation properties and that directional antennas at 5GHz were sufficient to allow sufficient spectrum re-use. The physics of this argument have not changed over the past 15+ years, and the proposal to make the transmitter power reduction now even more stringent than that which exists at 2.4GHz under 15.247 is not logical.

If a hard limit is seen as necessary, an EIRP limit would be more effective than the proposed 1-for-1 reduction, if any limit is seen as necessary at all. Some devices may not output at the maximum Tx power limit allowed, and this would provide those devices would be allowed equivalent interference profile compared to a 1-for-1 reduction.

We urge the Commission to re-consider this change to the rules and unify the regulations in this regard to the 15.247 regulations. If this will not be considered, then we urge the Commission to consider a similar transmitter power reduction that is a different ratio than 1-for-1, such as 1-for-6, and only applying this limit for antenna configurations which result in an EIRP limit above a certain value, such as +53dBm (as the current 15.407 regulation allows 30dBm Tx power into a 23dBm gain antenna).

Any decision other than to unify to the 15.247 regulations will have a substantial negative impact on our business and other industry companies, and will also substantially reduce the opportunity for low-cost long-reach solutions for rural broadband access. This will put more pressure on Part 101 bands (namely 6GHz), which are already considerably congested and raise costs for implementation significantly.

(Re Paragraph 34.) The proposed change will likely result in a more restrictive tuning range, and/or significantly higher manufacturing costs for more stringent filtering. If the restrictive tuning approach is deployed, then there will be increasing interference potential within the operating band, as more devices will need to be tuned to a more restrictive spectrum. We recognize the intention for reduced interference out-of-band, but there are no specific references indicating that the 15.247 regulations have caused any issues in this regard. We would like this regulation reviewed, and if there are cases where approved equipment has proven to cause issues due to the less restrictive regulations of

15.247, then we would generally support the adoption of the more strict 15.407 regulations. If this evidence does not exist, it seems that the current regulations of 15.247 are sufficient and should be maintained. Changing these regulations could have an impact on rural broadband opportunities, due to more restrictive frequency usage, as mentioned by the likelihood of a more restricted tuning range. It is likely to also have an impact on prices for devices operating in these bands, and thus restricting the usage of these devices for applications such as rural broadband, which will become more expensive to deploy as a result.

If the proposed rule is adopted, there will be an impact in utilizing wider band transmissions (i.e. 40 MHz) for overall peak capacity in this band. Therefore encouraging the use of multiple lower bandwidth devices and reducing the efficiency of band usage. See the appendix at the end of our comments for an illustration of the impact of the proposed changes.

(Re Paragraph 35.) Similar to the comments above in response to paragraph 34, we are not aware of any evidence that the 15.247 rules are causing issues with interference or that the rules are otherwise harmful or detrimental to the use of the spectrum. We would generally consider that the 15.247 rules are sufficient and will cause less issues with product/technology transition and less restrictive to application. The same concerns about cost, impact to business and applications apply to this clause.

(Re Paragraphs 39, 40 & 97) We support the proposal to adjust output power for U-NII-1 for equivalency to U-NII-3, the removal of the indoor restriction to U-NII-1 and the addition of spectrum with the U-NII-4 band.

(Re Paragraph 114.) We urge the commission to consider longer timetables for the transition period. A 12-month cycle is not long enough to plan, schedule, budget and produce new products, along with gaining approvals. It is also would have a serious impact to product development that are already ongoing that are looking to be completed roughly in this timeframe, which would likely be canceled due to the short lifespan created by the changes to the regulations. Changes to products or new products can be a very expensive proposition for the design and testing efforts. This will ultimately depend on the final rule-making. If the 15.247 regulations are not used as the basis for the new

regulations, this would have a serious impact. Any new products designed to the new standards will also likely be intended to replace existing products that already have approvals in numerous countries, causing manufacturers to pay for testing and approvals in many other countries so that our manufacturing efforts can standardize on the new products, even if regulations elsewhere do not change. Based on historical trends, other countries are likely to follow the Commission's changes eventually, and manufacturers need to be prepared for this. The costs are substantial, and the limited period to plan for those costs can have substantial impact to some companies, potentially have significant revenue impact as well as profit (or loss).

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11n 20MHz MASK

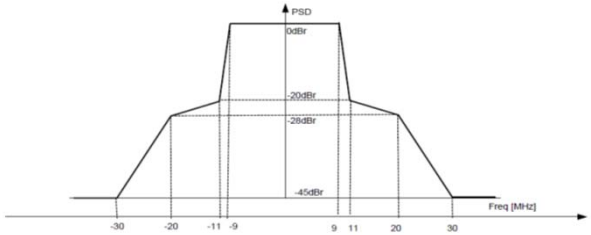

Figure 20-17—Transmit spectral mask for 20 MHz transmission

For 20MHz Channel

xdB Margin: 10

TX Signal CH Power (dBm)	CH (MHz)	% of BW	Signal BW (MHz)	PSD (dBm/MHz)	Out-of-Band noise/distortion for signal with 20MHz or more offset from band edge meeting 11n Mask (30MHz offset point, -45dBr) with xdB margin	**15.407 out of band limit (dBm/MHz) (for > 10MHz from edge)**	**Max antena gain to meet spec for Signal with x margin for 11n Mask (dBi)**	Comment
30	20	85	17	17.7	-37.3	-27	10.3	Need to reduce power for antenna gain > 10dBi already. Well before 23dBi.

xdB Margin: 10

TX Signal CH Power (dBm)	CH (MHz)	% of BW	Signal BW (MHz)	PSD (dBm/MHz)	Out-of-Band noise/distortion for signal with 10MHz offset from band edge meeting 11n Mask (20MHz offset point, -28dBr) with xdB margin	**15.407 out of band limit (dBm/MHz) (for > 10MHz from edge)**	**Max antena gain to meet spec for Signal with x margin for 11n Mask (dBi)**	Comment
30	20	85	17	17.7	-20.3	-27	-6.7	Need to reduce power by a large amount even with 0dBi antenna OR required to add a very expensive channel filter to filter out-of-band emissions to meet band edge requirements.

11n 40MHz MASK

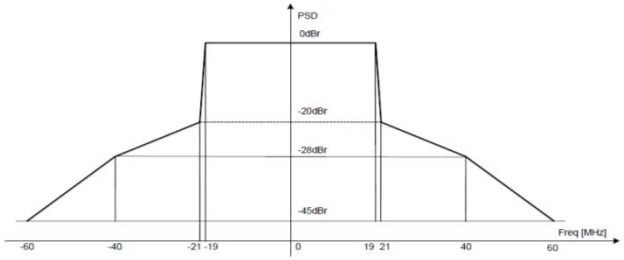

Figure 20-18—Transmit spectral mask for a 40 MHz channel

For 40MHz Channel

xdB Margin: 10

TX Signal CH Power (dBm)	CH (MHz)	% of BW	Signal BW (MHz)	PSD (dBm/MHz)	Out-of-Band noise/distortion for signal with 40MHz or more offset from bandedge meeting 11n Mask (60MHz offset point, -45dBr) with xdB margin	**15.407 out of band limit (dBm/MHz) (for > 10MHz from edge)**	**Max antena gain to meet spec for Signal with x margin for 11n Mask (dBi)**	Comment
30	40	85	34	14.7	-40.3	-27	13.3	Need to reduce power for antenna gain > 10dBi already. Well before 23dBi.

xdB Margin: 10

TX Signal CH Power (dBm)	CH (MHz)	% of BW	Signal BW (MHz)	PSD (dBm/MHz)	Out-of-Band noise/distortion for signal with 20MHz offset from bandedge meeting 11n Mask (40MHz offset point, -28dBr) with xdB margin	**15.407 out of band limit (dBm/MHz) (for > 10MHz from edge)**	**Max antena gain to meet spec for Signal with x margin for 11n Mask (dBi)**	Comment
30	40	85	34	14.7	-23.3	-27	-3.7	Need to reduce power by a large amount even with 0dBi antenna OR required to add a very expensive channel filter to filter out-of-band emissions to meet band edge requirements.