ERICSSON

April 10, 2015

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Ms. Marlene H. Dortch
Secretary
Federal Communications Commission
445 Twelfth Street, S.W.
Washington, DC 20554

Re: Notification of *Ex Parte* Presentation
GN Docket No. 12–354

Dear Ms. Dortch:

Ericsson commends the Federal Communications Commission ("Commission" or "FCC") and the National Telecommunications and Information Administration ("NTIA") for their hard work and commitment to facilitating commercial operations in the 3550-3650/3700 MHz band ("3.5 GHz Band") by sharing between federal incumbents and a new Citizens Broadband Radio Service ("CBRS"). In response to input from the public and federal users, NTIA has taken important steps to make the 3.5 GHz band available for commercial, non-interfering use in a much more extensive area than previously proposed and has laid the groundwork for allowing more prevalent access along the coastlines in a manner that protects federal usage of this band. The Commission now has the opportunity to adopt rules to facilitate meaningful use of the 3.5 GHz band. Ericsson also notes that earlier today we spoke with Brendan Carr in Commissioner Ajit Pai's office concerning the need for technology neutrality in the 3.5 GHz band.

I. NTIA'S REVISED EXCLUSION/PROTECTION ZONES ARE AN IMPORTANT STEP TOWARD A VIABLE 3.5 GHZ BAND

Ericsson supports NTIA's recent filing revising the size of the exclusion zones to protect government systems in the band while enabling the introduction of CBRS operations to more of the country.[1] This will provide the opportunity to access a larger market and will advance commercial use of the 3.5 GHz band.

NTIA updated its models for determining coexistence with ship-borne radar systems by adjusting its technical and deployment parameters for commercial small cell systems, and made improvements in the propagation modeling in urban areas, the use of a terrain dependent

[1] *Ex parte* letter dated March 24, 2015 from Paige Atkins, Associate Administrator, Office of Spectrum Management, NTIA, to Julius P. Knapp, Chief, Office of Engineering and Technology (*NTIA Ex Parte*).

propagation model and area-specific clutter losses, and incorporating attenuation loss for indoor devices. This updated analysis will result in commercial access to significantly larger geographic areas and far smaller coastal exclusion/protection zones. In addition, Ericsson supports NTIA's announcement toward allowing coordinated commercial access within those exclusion/protection zones, through the use of an environmental sensing capability, as discussed below.

While NTIA's revised model for the exclusion/protection zones is focused on small cells, Ericsson also encourages policymakers to consider other potential uses for this spectrum. In particular, Ericsson supports consideration of other use cases including macrocell and backhaul applications. Even as stakeholders move to implement the framework set forth in NTIA's recent filings, policymakers should continue to explore how to optimize the 3.5 GHz band for multiple use cases. In addition, additional studies are needed for fixed satellite service ("FSS") exclusion zones.

II. THE 3.5 GHZ BAND RULES SHOULD BE TECHNOLOGY NEUTRAL

The Commission has sought to make the 3.5 GHz Band an "innovation band" that will "promote a diverse array of network technologies."[2] Central to this vision is a technology neutral policy that embraces multiple technologies including Wi-Fi variants and newly developed air interface technologies such as unlicensed LTE, provided they operate in concert with the Spectrum Access System ("SAS") framework to ensure protection of incumbent operations. Citizens Broadband Service Devices ("CBSDs") should not be required to conform to any specified operational etiquette.

One promising approach, Licensed Assisted Access ("LAA/LTE-U"), would allow an operator to combine other licensed spectrum with CBRS spectrum, using unlicensed technology. LAA/LTE-U uses LTE advanced technology to aggregate spectrum to improve speed and performance.[3] It offers a technology choice for traffic offloading, providing system control, performance, and integration with the licensed carrier's network.

LAA/LTE-U is designed to be a good neighbor with other occupants in the spectrum and is designed not to disadvantage or interfere with Wi-Fi usage of GAA spectrum, but instead cooperates in sharing that spectrum. In this connection, there is no merit to the argument lodged by some that LAA/LTE-U should be barred in the 3.5 GHz band and that only stand-alone

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[2] *Amendment of the Commission's Rules with Regard to Commercial Operations in the 3550-3650 MHz Band*, GN Docket No. 12-354, *Further Notice of Proposed Rulemaking*, 29 FCC Rcd 4273, 4275 ¶ 2 (2014) (*Further Notice*).

[3] *See, e.g.*, Ericsson, *LTE Licensed Assisted Access* at 6 (Jan. 2015), http://www.ericsson.com/res/thecompany/docs/press/media_kits/ericsson-license-assisted-access-laa-january-2015.pdf.

technologies should be allowed.[4] Such a position is not technologically neutral, and would only serve to ban innovative technologies from use by wireless consumers.

A technology neutral approach permitting WiFi, LAA/LTE-U, and other future technologies in this band, moreover, is consistent with Chairman Wheeler's statement that the Commission sees the 3.5 GHz Band "as a potential home for new technologies like LTE-Unlicensed."[5] Wi-Fi no doubt will be a valued use of this spectrum, and should be given the same preference as other technological approaches. The selection of technology should be a market based decision according to its relevance to the associated business models and use cases.

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Further, the availability of LTE products for 3GPP Band 42 and Band 43[6] creates a marketplace baseline and offers an opportunity to bring products to market in a timely manner in a new Band for CBRS frequencies, without the need for an extensive new product development cycle. This will accelerate investment across the entire 3.5 GHz ecosystem.

Ericsson is committed both LAA/LTE-U and to Wi-Fi and their ongoing evolutions. Ericsson supports technology neutrality to promote the very innovation the Commission envisioned in the 3.5 GHz band.

III. REGULATORY FRAMEWORK

The recent *NTIA Ex Parte* contain proposals that go a long way towards addressing some of the uncertainty in the band, protecting federal operations while providing a more viable marketplace for commercial access at 3.5 GHz. Ericsson provides some additional details that should be considered in view of the *NTIA Ex Parte* and the *Further Notice*.

A. Spectrum Access System

By way of background, the Commission here is considering three tiers of operation in the 3.5 GHz band: incumbent operations and two tiers of CBRS or commercial access—licensed Priority Access (Priority Access Licensees or "PALs") and General Authorized Access ("GAA") that is "licensed-by-rule."[7] Unlike truly unlicensed Part 15 users, who use radio spectrum in an uncoordinated and uncontrolled fashion, the GAA users' spectrum usage will be under the control of the Spectrum Access System ("SAS") framework. Citizens Broadband Service

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[4] For example, Google, the National Cable & Telecommunications Association, Federated Wireless, Open Technology Institute, and Public Knowledge have opposed LAA in favor of stand-alone unlicensed usage. *See* Ex Parte Letter dated March 24, 2015 from Scott K. Bergmann, Vice President, Regulatory Affairs, CTIA – The Wireless Association, to Secretary Marlene H. Dortch, at 1 & n.2.

[5] *Further Notice*, 29 FCC Rcd at 4354 (Statement of Chairman Tom Wheeler).

[6] These bands represent 3400-3600 MHz and 3600-3800 MHz, respectively.

[7] *Id.* at 4276, 4290, 4308 ¶¶ 6, 56, 115.

Devices ("CBSDs") will gain access to spectrum either by license rights validated by the SAS under PALS or through permission from the SAS under GAA use.

The SAS should not attempt to manage individual radios directly in managed networks; instead, the SAS should coordinate with the managed networks' operational support systems. This is the approach taken under by the European Telecommunications Standards Institute ("ETSI") and the Third Generation Partnership Project ("3GPP") in the development of Licensed Shared Access ("LSA"), a two-tiered sharing model involving incumbent operations and a single tier of licensed operator. Under LSA, the SAS database relies on the network manager to ensure that the second-level sharing network will not interfere, rather than attempting to control the network's base stations' frequency usage or transmitter output power directly. Ericsson views LSA as a viable steppingstone to more dynamic sharing models. The core role of the SAS should be to manage sharing between incumbents and new commercial users, with responsibility at the managed network level where such operations exist, and to ensure that GAA does not create harmful interference to incumbent operators or PALs.

B. Citizens Broadband Service Device Networks

CBSDs should be considered a single infrastructure node, and it is therefore appropriate for the Commission to define a Citizens Broadband Service Device Network ("CBSDN")—a group of one or more CBSDs and their associated client user equipment.[8] A CBSDN would thus act in concert as a single node and operate in a coordinated fashion over one or more frequency blocks in the CBRS spectrum.

The Commission should permit a CBSDN to implement an optional functional element known as a "controller function" to manage the CBSDN configuration independent of stand-alone SASs. The controller function would interface with the SAS framework, providing information about the frequency blocks authorized for PA or GAA use, and would protect a polygonal area of coverage defined by the license. GAA operation in concert with a PA authorization would be controlled by the controller function. A CBSDN that implements a controller function should not be required to inform the SAS about detailed deployment configurations of CBSDs in the network.

Under this approach, while an SAS might authorize and manage multiple individual CBSDs in its jurisdiction, managed network operators would be trusted to control their networks—CBSDNs—with a controller function, to handle configuration and local authorization of CBSDs in a designated coverage area. This would simplify and reduce the overhead of SAS operation. Detection of radar in the area of coverage can be performed by individual CBSDs,

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[8] This client equipment is known as Wireless Network Equipment ("WNE")—*i.e.*, infrastructure nodes that are client devices controlled by CBSD user equipment over a CBSDN. WNEs typically provide small cell backhaul capability and will be power controlled in the same manner as the CBSD user equipment itself. WNEs may not necessarily be limited to low radiated power and may use directional antenna configurations.

with the controller function validating the detection and in turn informing the SAS framework about the impacted area.

C. Environmental Sensing Capability

As noted above, NTIA has announced a policy that will move from static exclusion zones to geographic protection zones where dynamic spectrum access will be allowed, without causing harmful interference to incumbent federal operations.[9] NTIA recommends that an Environmental Sensing Capability ("ESC") be included as an optional functional element of the regulatory framework to inform an SAS about the presence of incumbent federal operations that need to be protected.[10] Ericsson commends this proposal, which will facilitate more geographically extensive, yet non-interfering, commercial spectrum access.

The NTIA proposal would allow an ESC to be commercially owned and operated by an SAS administrator or a third party servicing SAS administrators, rather than the federal government.[11] Ericsson supports such an approach, but the reference to SAS administrators or third-party servicers should be considered examples of ESC operators, and not a limit on how ESCs could be administered. The Commission should ensure that there is sufficient flexibility regarding commercial ownership and operation of an ESC to permit other business arrangements that make sense. For example, it may be appropriate to integrate an ESC into a CBSDN that has a controller function, or to have an ESC owned and operated through a joint venture of multiple SAS operators.

D. Multiple Use Cases and Phased Implementation

As noted above, the current focus of the proposed implementation is on small cells.[12] Ericsson urges the Commission to refrain from limiting the flexibility of this band and recommends that use cases beyond small cells also be evaluated, including small cell backhaul and macrocell operations. Specifically it would be appropriate to establish informed guidance on distances from impacted zones using nominal values such as 20 W and 18 dBi for a macro, and other suitable values for micro and pico installations. Study of such use cases will allow the Commission, working with NTIA, the flexibility to refine the exclusion zones in the future as a function of effective isotropic radiated power ("EIRP") and height above average terrain ("HAAT").

Ericsson recommends the Commission embrace a phasing of operations of various kinds of deployments. NTIA's current focus on small cells for establishing the exclusion/protection

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[9] *NTIA Ex Parte* at 4.

[10] *Id.* at 2. Under NTIA's proposal, an ESC would be required to enable authorization within coordination zones needed to protect federal radar systems. Operation outside of established coordination zones that protect federal radar operations would not require an ESC. *Id.* at 3-4.

[11] *Id.* at 3.

[12] *See NTIA Ex Parte* at 5.

zones is appropriate, as is its proposal that ESCs be used as a way to facilitate small-cell operations within exclusion/protection zones while protecting federal incumbents. However, it is also important to enable macrocell deployments outside the exclusion/protection zones, in the interior of the country where FSS operation is not impacted. Further stages of the rulemaking process can consider dynamic operation of various kinds of deployments closer to coastal regions.

Respectfully submitted,

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