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## EX PARTE VIA ECFS

September 21, 2015

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

**Re: *Expanding the Economic and Innovation Opportunities of Spectrum through Incentive Auctions, GN Docket No. 12-268, AU Docket No. 14-252.***

Dear Ms. Dortch:

On September 17, 2015, Kevin Hetrick, Brian Benison, Alex Starr and I, representing AT&T, met via teleconference with Blaise Scinto, Janet Young, Simon Banyai, Paul Malmud and Brian Regan of the Wireless Bureau, Paul Murray, Geraldine Matisse and Hugh van Tuyl of the Office of Engineering and Technology and Joyce Bernstein of the Media Bureau to discuss AT&T's First Field Application testing practices (i.e. "market testing") in connection with CTIA's proposal to permit 600 MHz licensees to engage in market testing, notwithstanding the Commission's decision to allow unlicensed and LPTV operators to remain in the 600 MHz band after it is reallocated from broadcast to commercial wireless use until carriers "commence service."<sup>1</sup>

During the teleconference, AT&T responded to questions from the staff about the purpose and scope of AT&T's First Field Application (FFA) testing. Mr. Hetrick, who has supervised such testing at AT&T, explained that FFA testing is part of a process that necessarily takes place before any new hardware or software is introduced into AT&T's network, and is especially important prior to introducing a new spectrum band into the network.

AT&T explained that its FFA process typically follows lab testing by its vendors, then testing in AT&T's own labs, but that testing in a live network environment is essential. When preparing to launch service in a new spectrum band, such field testing requires clear spectrum to insure the true operating environment is evaluated. The FFA program for a new spectrum band consists of three main areas of evaluation—network equipment, software, and devices. The hardware is tested, among other things, to be sure that it is working as designed and is compatible with the existing network facilities operating in other bands. Field testing of

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<sup>1</sup> See Letter from Scott K. Bergmann, Vice President, CTIA to Marlene H. Dortch, Secretary, Federal Communications Commission, *Expanding the Economic and Innovation Opportunities of Spectrum through Incentive Auctions*, GN Docket No. 12-268 (September 9, 2015).

hardware and software will often uncover issues that were not apparent in lab testing. For example, AT&T recently had to ask one of its WCS vendors to make corrections in its software when FFA testing demonstrated that out of band emissions were creating harmful interference. Software testing is especially complex, and includes tests to ensure that the software load is stable, that all features work and that all of the peg counters are operating properly. Device testing includes evaluations of how the devices interoperate with the hardware and software in the new band as well as in the other bands operating on the network, and is evaluated in various morphologies.

The testing incorporates as many different combinations of morphologies (rural, suburban and urban) and network configurations as practicable, to emulate the actual environments found in the network.<sup>2</sup> As an example, AT&T uses two core network equipment vendors, along with other vendors who provide antennae and various other hardware and software components. In AT&T's network there are at least 5 major baseband configurations and at least 9 major radiohead configurations. All possible combinations of these configurations are included in the testing. Initial hardware tests might require a cluster of only 20-30 sites, but device testing, to incorporate multiple morphologies, typically requires a cluster of 50-150 sites. Software testing, which, for a new band also requires that the new hardware and devices are operating in cleared spectrum, typically requires the largest testing areas, as many as 200-300 sites, to cover as many possible combinations of morphology and hardware and software configurations as is practicable to emulate the variations that exist in the nationwide network. Clusters of 200-300 sites might cover as much as 500-1000 square miles, depending on site density.

In the past, when new bands have been introduced, AT&T has used from 2 to 5 testing clusters, selected to cover the combinations of variables found in its network, but also to allow testing in areas that are among the first areas in which AT&T plans to deploy commercial service. In the case of 600 MHz, which would involve both the introduction of a new spectrum band, and perhaps new 5G technology, the need for thorough testing would be even more critical. Moreover, in the 600 MHz band, the Commission plans to allow the use of unlicensed "TV White Spaces" devices and wireless microphones in the duplex gap and guardband, and may assign full power TV broadcasters to the spectrum in the 600 MHz band itself. The necessity of field tests to evaluate the operation of hardware, software and devices in the presence such of co- and adjacent channel impairments will add to the variables that must be evaluated prior to any commercial deployments.

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<sup>2</sup> In particular, for LTE mobility testing in the field, a bigger and contiguous cluster is needed to provide following:

- Ability to test handover and reselection over a larger test route. This improves the reliability of test results.
- Ability to achieve differing morphologies and terrain e.g. with a bigger cluster, it will be possible to get routes with suburban, urban, high way mobility scenarios.

Each of these scenarios present unique network behaviors, and it's important to characterize and document them – particularly for an entirely new band.

This letter is being filed electronically with the Secretary for inclusion in the public record.

Respectfully Submitted,

/s/Michael P. Goggin

cc:

Blaise Scinto – WTB  
Janet Young – WTB  
Simon Banyai – WTB  
Paul Malmud – WTB  
Brian Regan – WTB  
Paul Murray – OET  
Geraldine Matisse – OET  
Hugh Van Tuyl – OET  
Joyce Bernstein – Media Bureau