

## **Globalstar Completes Successful TLPS Demonstration at the FCC**

### **TLPS Successfully Co-Exists with Unlicensed Services and Provides Substantial Increase in Network Throughput Capacity**

At a February 2015 meeting with the Federal Communications Commission (FCC), Globalstar offered to demonstrate that the deployment of its Terrestrial Low Power Service (TLPS) can successfully coexist with unlicensed services. This demonstration was conducted under the close observation of the FCC's Office of Engineering and Technology at the FCC Technology Experience Center on March 6, 9 and 10, 2015.

During the Wi-Fi portion of the demonstration, Globalstar's team executed four scenarios, described further below. These scenarios showed the following:

- TLPS operations on Channel 14 have no negative impact on Wi-Fi operations within the public Wi-Fi Channels in the ISM band.
- TLPS increased aggregate network capacity by approximately 40% even in the quiet RF environment present at the FCC Technology Experience Center.
- In one extreme scenario of three fully loaded Channel 14 access points and one Channel 11 access point, there was no negative impact to Channel 11 operations.
- TLPS had no impact on the functionality of Bluetooth-enabled devices including heart monitors, computer mouses and wireless speakers with fully loaded access points operating on Channels 1, 6, 11 and 14.

The four scenarios conducted by Globalstar were as follows:

#### **Scenario 1**

To establish a baseline for the performance of the public Wi-Fi channels within the environment of the FCC's Technology Experience Center, Globalstar's team used three access points each running on one Wi-Fi channel (Channel 1, 6 and 11), and connected four client devices to each of the three access points for a total of twelve client devices. The throughput was measured by running Channels 1, 6 and 11 separately, and then running all three channels simultaneously.

This scenario confirmed the baseline throughput levels for each channel for the other three scenarios.

#### **Scenario 2**

To examine whether TLPS has a negative impact on Wi-Fi and whether end users would have access to an overall increase in network capacity, Globalstar's team ran a second scenario with four access points each running on one (Channel 1, 6, 11 and 14) and connected three client devices to each of the four access points, maintaining the same number of client devices as used in Scenario 1. The throughput was measured by running 1, 6, 11 and 14 separately, and then running all four channels simultaneously.

This scenario confirmed that all consumers would be made better off due to TLPS operating on an additional operating channel. Indeed, the demonstration showed that aggregate capacity of the 4-channel network increased approximately 40% even in the quiet RF environment. Not only did the three clients that moved to Channel 14 receive a substantial increase in throughput capacity, but the nine clients remaining on Channels 1, 6 and 11 received a similar benefit as well.

### **Scenario 3**

In a third scenario, the Globalstar team demonstrated the results of adding a fourth access point configured to operate on a public Wi-Fi channel (Channel 6) if TLPS were not available. This scenario was to show how much incremental capacity the network would receive by adding a fourth public Wi-Fi access point. Three client devices were connected to each of four access points – one operating on Channel 1, one on Channel 11, and two on Channel 6. The throughput was measured by running 1, 6, 11 and 6 separately, and then running all four channels simultaneously.

This scenario confirmed that adding a second access point operating on Channel 6 did not increase the aggregate throughput of the network (i.e., consumers received no benefit from the addition of the fourth public Wi-Fi access point).

### **Scenario 4**

In order to further show that proposed TLPS operations on Channel 14 would have no negative impact on neighboring Wi-Fi operations on Channel 11, Globalstar's team executed a fourth scenario in which it configured one access point to operate on Channel 11 and the other three access points to operate on Channel 14. Three clients were connected to each of the four access points and the throughput was measured over each of the four access points individually and then the access points were operated simultaneously.

This scenario confirmed that even in the extreme scenario of multiple TLPS access points operating in close proximity to Channel 11, no impact on Channel 11 was observed.

The Globalstar team included:

- AT4 wireless ([www.at4wireless.com](http://www.at4wireless.com)), the world's leading laboratory in testing and certification services. Its laboratories are ISO17025 accredited, performing laboratory and field testing services for certification bodies (i.e. FCC, CE, PTCRB, GCF, Wi-Fi Alliance, etc.). AT4 wireless also performs product acceptance, network acceptance and performance testing for Tier 1 operators (e.g., Telefonica, O2, NT Docomo, AT&T, Vodafone, Sprint, Time Warner Cable, T-Mobile, Cablevision and Comcast).
- Roberson & Associates, LLC ([www.robersonandassociates.com](http://www.robersonandassociates.com)), a technology and management consulting company serving government and commercial customers that provides services in the areas of RF spectrum management, RF measurements and analysis, strategy development, and technology management.

- Jarvinian ([www.jarvinian.com](http://www.jarvinian.com)) provides RF spectrum advisory services and is a recognized expert in RF engineering. Founder and managing director John Dooley has developed regulatory and technological solutions for the reformation of previously unusable RF spectrum.

Globalstar has filed an ex parte notice with the FCC regarding the demonstration, a copy of which along with additional information regarding the demonstration and its results can be found at [www.globalstar.com/tlps](http://www.globalstar.com/tlps).

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