Before the

Federal Communications Commission
Washington, DC 20554

In the Matter of	)	
	)	
Establishment of an Interference	)	**ET Docket No. 03-237**
Temperature Metric to Quantify and Manage	)	
Interference and to Expand Available	)	
Unlicensed Operation in Certain Fixed,	)	
Mobile and Satellite Frequency Bands	)	

MOTION TO ACCEPT LATE-FILED SUPPLEMENTAL COMMENTS

The New York City Transit Authority (NYCT) hereby requests that the Commission consider the attached Supplemental Comments concerning spectrum requirements that could be accommodated by the Commission in this proceeding.

The NYCT has been searching for adequate spectrum for low power spread spectrum data communications for a new secure Communications Based Train Control (CBTC) system and a Secure Carborne Closed Circuit Television (SC^3TV) system to enhance safety and reliability of its urban transit operations. Consideration of these additional requirements should assist the Commission in adopting regulations that will serve the public interest.

Respectfully submitted,

By: /s/

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Before the

Federal Communications Commission
Washington, DC 20554

In the Matter of	)	
	)	
Establishment of an Interference Temperature Metric to Quantify and Manage Interference and to Expand Available Unlicensed Operation in Certain Fixed, Mobile and Satellite Frequency Bands	)))))	**ET Docket No. 03-237**

SUPPLEMENTAL COMMENTS

The New York City Transit Authority (NYCT) hereby submits the following Comments to supplement the record in this proceeding as to a critical spectrum need for support of urban train control systems.

Specifically, NYCT needs approximately 50 MHz of licensed spectrum for low power spread spectrum data communications for Communications Based Train Control (CBTC) along its subway routes, which assignment can be secondary to other licensed operations in the band. The band 6,525-6,700 MHz under consideration in this proceeding might be able to satisfy this requirement. In addition, NYCT has a need for licensed spectrum to support Secure Carborne Closed Circuit Television (SC^3TV) at its stations, which could be accommodated by low-power secondary operation either in the band 6,525-6,700 MHz or the band 12.75-13.25 GHz.

Background

NYCT is one of the largest subway and bus operations in the world. It's subway operations include more than 6000 subway cars (the largest fleet in the world), 468

subway stations, 26 subway routes, and more than 700 miles of revenue track. The NYCT subway system operates in tunnels, at grade, and on elevated structures. This critical transportation system carries 4.6 million subway passengers per working day, or a total of 1.4 billion passengers per year.

NYCT, a governmental entity created by the Public Authorities Law of the State of New York, is part of the critical infrastructure of the New York metropolitan area. The majority of business commuters in New York rely on the subway system for all and/or part of their commute. The subway operates 24 hours a day, 7 days a week, and is critical to the New York metropolitan area economy. As an example, in 1980, 11 days without NYCT services cost the public and private sectors of the city an estimated $1.07 billion. The NYCT subway is the primary means of transportation in the metropolitan area. Without public transit, traffic in the central business district would rise to unmanageable levels. The subway is also critical to evacuation in times of emergency. On September 11, 2001, for example, the subway trains were re-routed away from the area of danger in lower Manhattan and successfully moved thousands of people to safety in another borough of the City of New York.

The subway system is a large and complex track network with interconnected and diverging routes and lines. The system has to be flexible to allow for planned and emergency rerouting of trains in the event of emergencies, special events, malfunctions, weather problems, police activities on or near stations, fires and similar matters.

Communications Based Train Control (CBTC)

The existing train control system used at NYCT is based on relay technology that dates to the late 19th century. The length of these electric circuits, called blocks,

determines the minimum spacing between trains, and therefore the capacity of the railroad. Ascertaining accurate train location in the event of an emergency can only be accomplished through voice communications between the command center and tower operators and train operators. NYCT, as are a number of other transit properties in the US and around the world, is planning a transition to Communications Based Train Control (CBTC), which uses a data radio to communicate from trains to wayside control units. Each train contains an onboard computer, transponder-based location system, a data radio system, and connections to onboard control systems for speed and braking control. The wayside units send messages to trains that describe the location of the next limit of movement, and each train sends its location to the wayside controller. Databases that describe the speed limits and characteristics of the route are regularly transmitted from the wayside to each train.

The functions of CBTC are:

- Train Detection with Accurate Location;
- Automatic Train Protection (ATP), which ensures safe train separation and prevents over-speed operation;
- Ensuring safe operation of rail switches (interlocking control);
- Automatic Train Supervision (ATS), which provides regulation of train movements;
- Automatic Train Operation (ATO), which provides automatic control between stations;
- Multiple automatic and manual operating modes to support various operating requirements and operation of the system under a variety of operational and failure conditions.

CTBC is a safety-critical system, and the interference-free operation of the CBTC data radio system is essential to protecting the safety of the public and ensuring uninterrupted operation of this critical transportation network.

There are a number of reasons for transition to this radio-based train control technology. CBTC improves the safety of operations, by ensuring safe train separation, by preventing over-speed operation and by allowing for closer spacing of trains. This will permit more rapid movement of trains and afford greater flexibility in the event of an emergency condition than is the case with the current fixed-block signal technology. CBTC improves the management of emergency situations, since the system has more accurate knowledge of where trains are located, provides enhanced train control, supports automatic update of passenger information systems based on train location, and facilitates greater movement of people away from areas of danger during emergencies. CBTC also enhances rail network system capacity by allowing closer spacing of trains while improving operating safety.

Criticality of Data Radio to CBTC Operation

The primary functions of the CBTC data radio are to:

- Initialize each train with train data and perform system checks prior to train dispatch;
- Deliver Movement Authorities to trains;
- Transmit train location to wayside Zone Controllers;
- Deliver wayside database information to trains, which describes speed zones and route characteristics by route segments;
- Deliver time synchronization messages; and
- Provide communications for diagnostic functions.

The data radio is therefore the critical communications link between the safety computers on the train and those on the wayside.

Interference to the CBTC data radio system would have significant impact on the overall operation of the CBTC system, and, consequently, the manner in which subway car movement would be controlled. For that reason, interference is simply unacceptable. Without detailing the manner in which the system would operate in event of loss of data radio communications, significant negative impacts could result. CBTC provides a significant enhancement to public safety, because (1) CBTC enables faster movement of people away from an area of danger; (2) it assures safe train separation and speed control; and (3) it provides enhanced operational safety compared to the existing signal systems. Reliability of the CBTC radio system is essential.

Need For Licensed Spectrum

For the initial pilot testing of CBTC deployment, NYCT is relying on a radio system operating in the 2.4 GHz unlicensed (ISM) band. The use of unlicensed spectrum is not a long-term option because of potential inference sources in this band, including wireless local area networks, 802.11 (WiFi) hotspots, and numerous other unlicensed devices. While it is using spread spectrum technology to avoid interference, the ever-increasing number and density of these unlicensed devices will inevitably raise the noise floor in the dense New York urban environment and potentially reduce the data capacity of the 2.4 GHz operation. Therefore, operation of CBTC in an unlicensed band is not suitable for large-scale, long-term, deployment in the New York metropolitan area. For the same reasons, the potential for intentional interference or jamming is not acceptable.

CBTC will be part of the New York area critical infrastructure response for public transportation during an incident or natural disaster. In the event of a natural disaster or other major emergency, the subway system would, once again, be called upon to transport the public away from areas of danger. It would also likely be used to transport rescue and support personnel to the vicinity of the emergency site. In addition, NYCT personnel provide support to other first-responders. Naturally, subway workers themselves have first-responder roles in the event of safety incidents on the subway system. For these reasons, the CBTC radio system must be secure against interference, spoofing, and jamming. To achieve these goals, NYCT requests the support of the Commission in allocating spectrum for CBTC that can ensure freedom from interference from other radio users.

NYCT believes that it will be able to demonstrate that it can operate CBTC within the 6 GHz Fixed Satellite Service bands covered by Docket No. 03-237 without interference to primary users in the band. In order to avoid interference to the CBTC system, however, NYCT recommends that at least 50 MHz of this spectrum be designated for licensed systems only, and that unlicensed operations be barred from this licensed subband. This amount of spectrum is necessary to accommodate the planned secure spread spectrum operation.

Secure Carborne Closed Circuit Television (SC^3TV)

In addition to the train control system, NYCT has the need for spectrum to relay video images from the interior of the subway cars and the areas immediately adjacent to the cars while they are in the station. This Secure Carborne Closed Circuit Television (SC^3TV) system will enable police and other emergency personnel to obtain real-time

information about ongoing incidents on the subway. Because this service is initially planned to permit viewing only while the subway cars are in a station, it will not involve tunnel propagation considerations. Hence, SC^3TV can be implemented in either the 6,525-6,700 MHz band or the 12.75-13.25 GHz band. Low power operation secondary to the primary services would also be possible in either of these bands, but the need for security and interference-free operation would require that the spectrum chosen be free of unlicensed operations. The precise amount of spectrum that will be required is the subject of ongoing system design and analysis.

Summary

NYCT, as part of the critical infrastructure for the New York metropolitan area, has an unquestionable need to ensure that its Communications Based Train Control System and Secure Carborne Closed Circuit Television systems will operate free from radio interference. Its transportation mission is driven by public interest, safety, and security considerations. CBTC will increase the capacity and enhance the safety of the subway transportation network by optimizing the safe movement of a growing number of passengers while ensuring speedier movement of people away from areas of danger. SC^3TV will promote safety and security of the public using the transit system. It goes without saying that NYCT's service area faces critical emergency management challenges.

To support these requirements, the CBTC data radio system and the SC^3TV must operate reliably without interference. Dedicated or managed spectrum for CBTC is critical to ensure continuous operation and provide the requisite level of service for fifty years. Similarly, dedicated or managed spectrum is required for SC^3TV to protect the

public. Operation in unlicensed bands is undesirable, since the system would potentially be subject to legal but uncontrollable, localized interference and; the noise floor would rise in unlicensed bands as usage grows. Thus, operation of the CBTC and SC^3TV systems in unlicensed bands is not suitable for the long-term reliability of these safety-critical applications. Currently, there are no spectrum allocations available to NYCT that will support reliable RF performance in the combination of tunnel, at grade, and elevated environments. Therefore, NYCT is seeking to explore use of the bands addressed in Docket No. 03-237 on a non-interference basis with primary users based for CBTC and SC^3TV uses.

Respectfully submitted,

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