Time Transfer capabilities in a DTM transmission system

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This article describes the enhancement of a commercial network system to include network wide time-transfer capability to meet customer needs for GPS independent timing of broadcast transmitters.

The Dynamic synchronous Transfer Mode (DTM) transmission system is a network technology based on a 8 kHz Time Division Multiplex (TDM) structure, providing the basis for predictable and reliable transport and switching. With the adaptation of various native signals, it has found use in broadcast networks for both contribution and distribution networks.

The Digital Video Broadcasting (DVB) have for it's terrestrial (DVB-T) transmission a Coherent Orthogonal Frequency Division Multiplex (COFDM) signal with guard-band to provide the means of efficient multi-path suppression. Traditional analog transmission requires separate frequencies for nearby transmitters for them not to cause destructive interference. This have also been the initial mode for DVB-T transmissions, but considering that the receivers is unable to distinguish the reflection of a transmitter with the signal from another transmitter, two or more transmitters can form constructive interference given that the transmitters is synchronized to within a few microseconds. This Single Frequency Network (SFN) allows for much more efficient use of the frequency spectrum and also allows for a denser network of transmitters to support the signal quality in difficult regions.

This article describe how the commercial DTM system was enhanced to include a time-transfer capability within the existing product range in order to support GPS-independent transmission network for critical national broadcast networks operating DVB-T SFN transmissions. This enhancement have increased the reliability and robustness of the synchronization, and have been of much use for the customers.