Integrated Digital Enhanced Network

Mobile Device Investigations Program

Technical Operations Division

DHS - FLETC

*i*DEN

Integrated Digital Enhanced Network Technology or *i*DEN

In 1987 Nextel was formed and began to change the Specialized Mobile Radio (SMR) market.

Originally called Fleet Call, Nextel purchased SMR licenses around the country to form a national network.

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The technology was developed by Motorola who provided trunked radio and cellular telephone.

In 1990 Nextel applied for and received permission from the FCC to create Enhanced Specialized Radio Service (ESMR) in six major markets.

Nextel chose as its air interface TDMA technology.

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Introduced in 1994, *i*DEN combined two-way radio, digital cellular, messages services with acknowledgment and wireless data into a single system.

*i*DEN uses Vector Summed Excited Linear Prediction (VSELP) vocoders, which compresses large segments of voice into smaller packets.

VSELP uses Forward Error Correction so packets do not become corrupted.

The use of VSELP and FEC allows for six audio paths on one RF channel.

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One of the unique feature is the Push-to-Talk or Direct Connect feature.

As of 2003 Direct Connect has been offered nationwide with no roaming.

This dispatch feature is managed by separating talk groups into fleets.

Each subscriber has an ID called the Fleet Member Identifier and identifies a user within a fleet.

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*i*DEN networks work in much the same way and has the same equipment as other cellular networks, but are often identified differently.

The basic structure of an *i*DEN network is as follows:

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Enhanced Base Transceiver System – provides the radio frequency link between the network and the landline (PSTN).

Mobile Data Gateway – the interface between the Internet (WWW) during Data Packet activity.

Dispatch Application Processors – the call managers within the network.

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Metro Packet Switch – a subsystem that connects the Enhanced Base Transceiver System to the Dispatch Application Processor and packet Duplicators.

Mobile Switching Center – GSM based mobile phone system that provides interconnect service.

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Digital Access Cross Connect Switch – connect point for T1/E1 lines between *i*DEN equipment and the external transport facilities.

Base Site Controller – manages the inter-connect between the Enhanced Base Transceiver System and other network devices

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Operations and Maintenance Center – establishes, maintains and collects information about the network for presentation to the system operator.

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*i*DEN has another distinct feature in its service system. The existence of two sets of Home Location Register and Visitor Location Register.

One set operates and maintains information on the digital services provided as in authentication, services allowed, timing and the like.

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The second are referred to as the *i*-HLR and the *i*-VLR. This system keeps track of the Dispatch Call function or Push-to-Talk..

It should be importantly noted that when requesting information about activity conducted on the Call Dispatch side of the network you must be specific and request the proper data.

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In 2004 Sprint and Nextel merged to form Sprint/Nextel.

On 2 November 2005, U.S. telecom carrier Sprint Nextel and four cable companies — Advanced/Newhouse Communications, Comcast, Cox Communications and Time Warner Cable — announced plans for a joint venture.

The partners will conduct joint marketing and work on integrating with each other's back-office systems to enable a "quadruple play" of voice, video, data and high-speed Internet services over cable and wireless devices.

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There is considerable discussions and speculation in the telecom community about the future of *i*DEN.

Because of its network nature Sprint/Nextel agreed to work with cities and others using the radio broadcast frequencies to address interference and other issues.

As of this date these concerns are being addressed and the outcome unclear.