FCC Form 442
Exhibit 1

In reference to Item 4 on the FCC Document
Particulars of Operation:

Frequency	**Power**		**Emission**	**Modulating Signal**	**Necessary Bandwidth (kHz)**
(A)*	(B)*	(C)*	(D)*	(E)*	(F)*	(G)*
824 - 849 MHz	0 dBm	0 dBm	mean/mean	See Exhibit 2	• 19.2 kbs • GMSK modulation • BT=0.5 modulation index	30 kHz
869 - 894 MHz	0 dBm	0 dBm	mean/mean	See Exhibit 2	• 19.2 kbs • GMSK modulation • BT=0.5 modulation index	30 kHz

* - See explanations given in the FCC form 442: "Application for new or modified radio station authorization under part 5 of FCC Rules-experimental radio service (other) than broadcast," section 4.

a) Scope of the research project.

GTE Wireless Products & Services (GTE Wireless) has designed a series of tests intended to assess and demonstrate the capability of the Cellular Digital Packet Data (CDPD) system to run data applications on radio communication links. CDPD is a wireless packet data network service that has been offered to the public for use across the US. CDPD operates over temporarily unused radio channels within the radio spectrum occupied by the Advanced Mobile Phone System (AMPS), commonly known as the cellular telephone service. The planned tests and demonstrations are to be conducted in a laboratory and will employ radio transmissions as part of the CDPD system test-bed.

The testing and demonstration procedure for CDPD will involve full-duplex transmissions between the CDPD mobile data base station (MDBS) and CDPD mobile end stations (M-ES). Stations at both sides will use one channel pair, within the allocated AMPS spectrum (which currently occupies the 824-849 MHz and 869-894 MHz bands). To eliminate any intrusion into the AMPS service outside of the test-building, the CDPD system will transmit a significantly reduced power level in all instances. For numerical details on the extent of interference, refer to the "Interference to the AMPS system" section.

b) Justification for the requested communications facilities.

The tests and demonstrations will be held indoors, and will involve full-duplex transmissions between a CDPD MDBS and its mobile end stations. The communication will be carried over an extremely short distance within building confines (typically 25 ft.), and therefore only very low power levels will be used (0 dB or less). These tests are to be conducted in a laboratory and will measure the effects of the radio medium, impairments on packet delay, packet loss and other critical parameters affecting data applications that run over the radio interface provided by the CDPD system. Because the CDPD actual service mode maintains its link connection over the radio medium, it is necessary to include transmissions as part of the CDPD testing plan in order to do meaningful testing and demonstration of the service.

c) Justification that existing communications facilities are inadequate.

The CDPD wireless packet data network service is commercially available to the public today, however a lab environment is necessary to facilitate the ongoing tests, analyses, experimentation and enhancements of the CDPD service offering. In many cases it is necessary to simulate configuration and operation of the various types of equipment used by our customers, as well as test new products to establish support procedures prior to deployment. The GTE Wireless Data organization will house this test facility that will drive service enhancement initiatives and customer support service activities.

GTE is committed to provide excellent service to our customers, as well as to other carriers' customers who happen to roam into GTE's CDPD systems. In the interest of continuing to provide superior service to all customers GTE intends to construct an in-house testing and demonstration facility capable of testing this packet data system.

GTE Wireless Products and Services, a developer and provider of CDPD services nationwide headquarters in Alpharetta, GA. CDPD service is not commercially available in the Alpharetta, GA area.

d) Interference to AMPS System.

1.) Methods used to reduce co-channel interference.

Each of the tests will be conducted in two phases. The first phase will use a fixed channel for the full-duplex link operation necessary for the test. While it is conceivable that when operating in this fixed channel mode, an indoor AMPS voice user might suffer service disruption, this *worst-case scenario* can happen only if the following two conditions are satisfied:

- The voice user will call from near the test site.
- The voice user will be directed by AMPS to use a channel already selected by GTE Wireless for testing.

Because conflict between CDPD tests and AMPS can occur only when the two conditions are met, the probability of interrupted AMPS service is negligible. To further eliminate that possibility, a spectrum analyzer will be placed at the testing site to monitor the voice activity on the AMPS channels throughout testing. Statistics of AMPS channel use derived by the spectrum analyzer will be used in selecting channel frequencies to avoid the above mentioned conflict.

The second phase of testing will reduce the risk of service disruption much further by activating a device known as an RF Sniffer, already mounted on the MDBS station. The RF Sniffer is a scanning device that can be programmed to continuously monitor the spectrum used by AMPS. Upon detection of radio energy emitted by an external source, the sniffer is programmed to command the MDBS to hop to another AMPS channel, which is temporarily idle. Channel hopping is specified to complete within 40 msec which virtually eliminates the risk of service disruption to AMPS users even within the building. If voice traffic is high and no idle channel can be found, the MDBS shuts off its transmission until CDPD service can be resumed. This describes the normal operation of commercial CDPD services.

2.) Expected signal levels outside and inside the testing site—link budgets.

Tables 1 and 2 in this section detail the link budgets of the AMPS system covering the region of the test site, and the test site transmissions. Note that Table 2 refers to both directions of the full-duplex channel. Table 3 below quantifies the interference caused by the proposed testing to AMPS users outside the testing site. Note that the only in-building AMPS user experiencing greater interference that the outside-building user would need to be in a room adjoining the test lab. The probability of that occurrence is negligible.

Table 1. AMPS Link Budget

1	AMPS EIRP	+40.0	dBm	10 W (see EIA/TIA-553)
2	Propagation loss from AMPS base station to the Lab-site.	-122.7dB	dB	Used [1, eq.(1); 2, eq.(3.54b); 2, fig. 13.14] to compute the propagation loss using the following parameters: f=850 MH D=1.77 km h_t =20m 8 story bldg. h_l = 1.5m
3	Building penetration loss from the building exterior to the Lab site.	-20.0	dB	Used [2, p. 390] to estimate the loss.

Table 2. Lab Link Budget

1	EIRP	-10	dBm	0.1mW
2	Propagation loss from CDPD base station to building walls.	-78.1	dB	Used [2, eq. 4.3-3] λ=.35m d=25m
3	Building penetration loss from the building interior to exterior.	-20.0	dB	Used [2, p. 390] to estimate the loss.

The extent of interference caused by the Lab to AMPS service outside the building is summarized as follows:

1	AMPS	-82.7	dBm	see lines 1 & 2 of Table 1.
2	CDPD Lab	-108.1	dBm	see lines 1 through 3 of Table 2.
3	C/I_{AMPS}	-25.4	dB	Outside building

References

1. Hata, Masaharu, "Empirical Formula for Propagation Loss in Land Mobile Radio Services," IEEE Transactions on Vehicular Technology, VT-29, August 1980, pp. 317-25.
2. Lee, W.C.Y., *Mobile Cellular Telecommunications Systems*, McGraw-Hill, 1989.