Southern Telecom, Inc.
Power Line Communications/
Broadband Over Powerline
Experimental License WC2XZG
Confirmation No. EL12333
File No. 0126-EX-PL-2002

Fourth Six Month Report
August 27, 2004

Southern Telecom, Inc. ("STI") respectfully submits its fourth six month report pursuant to its Experimental License WC2XZG, File No. 0126-EX-PL-2002, for broadband over powerline ("BPL"), granted on August 29, 2002.

I. Description of Test Installations and Procedures

Equipment selected for testing:

During the last six month period, STI, through an independent contractor, performed limited testing of equipment from two of its principal vendors, Amperion, Inc. (Amperion) and Main.Net Communications, Ltd. (Main.net).

The Main.net equipment uses Time Domain Multiplexing (TDM) to allocate upstream and downstream bandwidth. Two Main.net nodes were tested. The first point was the injection point where the BPL network was connected to the backhaul network transformer "A". To generate traffic originating at the injection point node, a laptop was connected to this node and a large file (50 megabytes) with an all 0 format was downloaded from a web server at the head-end located at an affiliate of STI's headquarters, within the vicinity of downtown Birmingham. The second point where testing was performed was at one of the repeaters installed on transformer "B". To generate traffic at the repeater, a laptop was connected to the repeater using the repeater's Ethernet port and file transfer protocol was used to upload the same large file from the laptop to the web server at the head-end.

The Amperion equipment uses Frequency Domain Multiplexing (FDM) to allocate portions of spectrum dedicated to upstream and downstream bandwidth. The current topology of the Amperion network is similar to a chain with individual nodes making up "links" along the path. To generate traffic, a bandwidth measurement tool called Netperf was used.[1] During testing, Netperf sessions were started at both ends of the network and left running for extended durations. Each node along the network "chain" was, in this situation, passing significant amounts of traffic in both the upstream and downstream directions.

[1] Netperf measures the bandwidth between two nodes of the network by generating a continuous stream of traffic which is sent as quickly as possible.

Status of test installation(s):

STI's testing to date remains somewhat limited. STI and two of its principal vendors, Main.net and Amperion, temporarily installed certain BPL equipment in the vicinity of Birmingham, Alabama. Testing is ongoing.

STI is in the early stages of a second trial system located in the vicinity of metro-Atlanta, Georgia (Rome). This system is integrated into STI's current BPL trial network using a combination of a wireless backhaul connection and a T-1 line. Initial testing has been limited to the home of a single employee of an STI affiliate. Assuming the successful outcome of this initial installation and subsequent testing, STI expects to invite customers passed by this network to participate in the trial. As a result, STI will be in a position to gain additional customer feedback related to the system's performance.

As part of the Georgia trials, STI and Main.net installed equipment which employs spread spectrum technology. Main.net has indicated that its spread spectrum technology has completed all required testing and has obtained the necessary approvals/authorizations to be deployed without an experimental license of its own. In an effort to ensure compliance with Part 15 and the parameters of STI's experimental license, STI performed independent testing of Main.net's technology. Amperion's technology was also tested.

II. Description of Tests

As set forth in the STI application, the purpose of testing is two-fold: (1) testing for customer acceptability and (2) testing for FCC compliance.

Customer Acceptability Testing

The customer acceptability testing will seek to determine: 1) the acceptability of the BPL equipment to STI as a potential customer of Main.net and Amperion; and, 2) the acceptability of the equipment and service to the end users as potential BPL customers of STI.

STI Customer Acceptability Testing

STI is testing the BPL equipment for electrical safety, installation, performance, and cost issues. STI is also testing the reliability and performance of the network, the ease of management of the network, and the amount of technical support required by end users.

Participants in the trial will be asked to enter into a trial agreement that covers acceptable use, protects the confidentiality of vendor equipment, and makes it clear that this is a trial that may end at any time. While an agreement will be in place between STI and its customers, the latter will not be asked to pay for the service.

FCC Compliance Testing

STI engaged the services of an independent compliance testing firm accepted by the FCC as a facility available to do measurement work for others on a contract basis (Registration # 90902). This firm conducted compliance testing on the Main.net and Amperion BPL equipment.

Interference Complaints

STI has not received any complaints of harmful (or non-harmful) interference from test participants or third parties (licensed or unlicensed) during the tests. Likewise, thus far in the testing, neither STI nor the independent compliance testing firm contracted by it has identified any such harmful interference pursuant to their respective tests.

Vendor FCC Compliance Testing

STI continues to be in contact with its vendors, Amperion and Main.net, whose equipment is the subject of ongoing FCC compliance testing. This contact includes, among other things, scheduled status meetings and the submission/review of related reports.

Radiated Emissions Testing

As noted elsewhere in this six month report, STI employed the services of an independent compliance testing firm with regard to its radiated emissions testing. The test results are summarized as follows:

1. Test Site A
(Underground Power Line)

Emission Frequency (MHz)	Test Detector	Antenna position or Axis reference to unit	Position of antenna (deg)	Antenna to unit distance (m)	Analyzer Reading (dBuV)	Site Correction Factor (dB/m)	Emission Level (dBuV/m)	Limit (dBuV/m) 3 meters	Margin (dB)
3.520	P	X	0	3	40.9	19.7	60.6	69.5	-8.9
3.520	QP	X	0	3	34.6	19.7	54.3	69.5	-15.2
3.520	P	Y	90	3	41.6	19.7	61.3	69.5	-8.2
3.520	QP	Y	90	3	34.4	19.7	54.1	69.5	-15.4
3.520	P	X	180	3	43.7	19.7	63.4	69.5	-6.1
3.520	QP	X	180	3	35.1	19.7	54.8	69.5	-15.0
3.520	P	X	270	3	40.8	19.7	60.5	69.5	-9.0
3.520	QP	X	270	3	29.9	19.7	49.6	69.5	-19.9

Notes:

EUT was scanned from 150 kHz to 2000 MHz.

All emissions above 30 MHz were found to have
amplitudes attenuated by more than 20 dB below the FCC limit.

P=Peak, QP=Quasi-Peak

2. Test Site B

(Overhead Power Line)

Emission Frequency (MHz)	Test Detector	Antenna position or Axis reference to unit	Position of antenna	Antenna to unit distance (m)	Analyzer Reading (dBuV)	Site Correction Factor (dB/m)	Emission Level (dBuV/m)	Limit (dBuV/m) 7.2 meters	Margin (dB)
29.420	P	Parallel	1**	7.2	38.7	21.0	59.7	54.3	+5.4
29.420	QP	Parallel	1**	7.2	31.9	21.0	52.9	54.3	-1.4
30.200	P	Parallel	1**	7.2	20.3	17.0	60.5	32.4	+28.1
30.200	QP	Parallel	1**	7.2	38.0	17.0	55.0	32.4	+22.6
30.800	P	Parallel	2**	7.2	45.4	17.1	62.5	32.4	+30.1
30.800	QP	Parallel	2**	7.2	35.1	17.1	52.2	32.2	+20.0

Notes:

1** Maximum was found with antenna placed just underneath coupler #2 on utility pole 8117 with active BPL.

2** Maximum was found with antenna placed just underneath coupler #2 on utility pole # 8117 and injector modem on utility pole #RC 409 active.

EUT was scanned from 150 kHz to 2000 MHz. The BPL modem operating frequencies were configured as follows: Customer Premise Equipment CPE Up- stream = 14.0 MHz-/+1.25MHz Customer Premise Equipment (CPE) Down-stream = 18.8 MHz-/+1.875MHz Head End (HE) Up-stream = 23.8 MHz-/+1.25MHz Head End (HE) Down-stream = 27.8 MHz-/+1.875MHz

All emissions above 30 MHz were found to have amplitudes attenuated by more than 20 dB below the FCC limit.

P=Peak, QP=Quasi-Peak

3. Test Site C

(Underground Power Line)

Emission Frequency (MHz)	Test Detector	Antenna position or Axis reference to unit	Position of antenna (deg)	Antenna to unit distance (m)	Analyzer Reading (dBuV)	Site Correction Factor (dB/m)	Emission Level (dBuV/m)	Limit (dBuV/m) 3 meters	Margin (dB)
14.126	P	Y	0	3	25.6	19.5	45.1	69.5	-24.4
18.961	P	Y	0	3	23.6	21.0	44.6	69.5	-24.9
27.230	P	Y	0	3	33.1	21.9	55.0	69.5	-14.5
27.230	QP	Y	0	3	31.3	21.9	53.2	69.5	-16.3
14.028	P	Z	90	3	31.1	20.3	51.4	69.5	-18.1
27.295	P	Z	90	3	35.1	21.9	56.8	69.5	-12.7

Notes:

EUT was scanned from 150 kHz to 1,000 MHz. All emissions above 30 MHz were found to have amplitudes attenuated by more than 20dB below the FCC limit.

P=Peak, QP=Quasi-Peak

4. Test Site D

(Overhead Power Line)

Emission Frequency (MHz)	Test Detector	Antenna position or Axis reference to unit	Position of antenna	Antenna to unit distance (m)	Analyzer Reading (dBuV)	Site Correction Factor (dB/m)	Emission Level (dBuV/m)	Limit (dBuV/m) 7.2 meters	Margin (dB)
12.500	P	Parallel	1**	6.7	49.7	18.3	68.0	55.6	+12.4
12.500	QP	Parallel	1**	6.7	33.0	18.3	52.9	55.6	-2.7

Notes:

EUT was scanned from 150 kHz to 1,000 MHz. All emissions above 30 MHz were found to have amplitudes attenuated by more than 20 dB below the FCC limit.

P=Peak, QP=Quasi-Peak

5. Observations:

The Test Site locations A, C and D comply with FCC Part 15 class B limits for Broadband Power Line modems. At Test Site location B, operation outside Part 15 class B limits above 30 MHz was noted. The BPL equipment was configured to operate at the following parameters:

Customer Premise Equipment CPE Up- stream = 14.0 MHz-/+1.25MHz
Customer Premise Equipment (CPE) Down-stream = 18.8 MHz-/+1.875MHz
Head End (HE) Up-stream = 23.8 MHz-/+1.25MHz
Head End (HE) Down-stream = 27.8 MHz-/+1.875MHz

With the BPL modem down stream carrier configured to operate between 25.925 MHz and 26.675 MHz, the carrier modulated OFDM envelope bleeds over the FCC's 30 MHz frequency range with stricter limit. This configuration resulted in non compliance at 30.8 MHz.

To ensure compliance with the FCC's emission rules, the manufacturer lowered the power level of the device. Frequencies were, and continue to be modified and monitored.