

Current Technologies, LLC  
Experimental License Progress Report #4

Under its experimental license, Current Technologies, LLC ("Current") has been operating its proprietary powerline communications ("PLC") equipment installed on both "low voltage" and "medium voltage" electric power distribution lines. These experimental operations continue to validate the capabilities of PLC technology. Current's proprietary PLC equipment continuously delivers always-on, symmetrical broadband speeds (as high as 4+ Mbps) to virtually all of the existing electrical outlets in the customer premise over the electric utility's low and medium voltage power distribution lines. This PLC equipment forms a communications path that safely bypasses the step-down transformer segregating the low and medium voltage power lines. Installation of Current's PLC equipment causes no disruption or degradation of electric distribution service during installation or operation.

Current's PLC equipment serves more than 100 customers in each of Current's two trial deployment areas, collectively passing more than 700 homes. In sum, Current's PLC equipment complies with all applicable FCC Part 15 emissions requirements. Further, Current has received no interference complaints, nor has any interference been detected, during the experimental operations.

Testing was done at more than 30 representative installation sites pursuant to the specifications of ANSI C63.4-1992 and 47 C.F.R. § 15.31(a). As stated in Current's previous progress reports, several safety considerations preclude Current from taking test measurements at a distance of three meters from the attachment point at which some of its PLC equipment is installed on the electric distribution lines, the distance at which applicable emissions limits are specified.. Accordingly, in certain circumstances where the Commission's rules call for measurements at a distance of three meters, measurements were taken at a distance of 10 meters from the PLC devices and the results were extrapolated in accordance with 47 C.F.R. § 15.31(f). At each test site, measurements were taken on multiple radials from the point of equipment installation.

Current has conducted testing of equipment operating on frequencies both above and below 30 MHz. The results continue to confirm that peak emission levels emanate from the precise point on which Current's PLC equipment is coupled to the electric distribution line and that such emissions dissipate in a monotonically decreasing fashion as the measurement point moves further from the equipment coupling point. Specifically, RF signal strength from Current's low and medium voltage PLC equipment falls off with the inverse square of distance, so that the devices act quantitatively like point source emitters. The commercial versions of this equipment (see below) behave identically to previously tested experimental equipment with respect to RF emissions properties.

Maximum radiated emissions for equipment operating both above and below 30 MHz complied with applicable Part 15 emissions limits and were similar at each of the tested installation sites with no statistically significant variations. All measurements were taken in accordance with the procedures prescribed in 47 CFR § 15.31. Finally, testing of conducted emissions showed a peak measurement of 75.3  $\mu$ V in the 535-1705 KHz band, in compliance with 47 C.F.R. § 15.107(c).

Much of the activity during this reporting period has focused on detailed engineering, testing, and verification of a version of the equipment suitable for high-volume manufacturing and commercial deployment. Current has completed verification testing for its two primary PLC devices (the CT Bridge™ and the CT Backhaul Point™), including both conducted and radiated emissions measurements in both laboratory and field conditions.

Current's on-site field-testing also confirmed that developing appropriate measurement procedures is critical to accurate Part 15 compliance testing for PLC equipment. Certain portions of the frequency band covered by Current's experimental license contain narrowband signals of far greater power than the low level broadband signal used by Current's PLC equipment. Accordingly, repeatable and dependable test results can be obtained only through careful attention to measurement details such as the dynamic range and selectivity of the measurement receiver, placement of the test equipment antenna, and an understanding of – and ability to isolate – the actual signal being tested. Failure to use the correct parameters can produce inaccurate and misleading readings.