Recent Activities of PLT Project Team in CISPR

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Abstract

PLT (power line telecommunication) using signals in the range from 2 to 30 MHz provides broadband communication over power lines. However, some radio communication services could be affected by electromagnetic disturbances radiated from power lines used for PLT because power lines were not designed for high-frequency signal transmission. Therefore, a method of measuring disturbances emitted from PLT systems and numerical limits on such disturbances have been discussed in the PLT project team (PLT-PT) of CISPR (International Special Committee on Radio Interference). This article describes recent activities of the PLT-PT.

1. What is PLT?

Power line telecommunication (PLT) uses high-frequency signals transmitted over power lines to provide broadband communication for access networks and home networks. The frequency band of the signal is from 2 to 30 MHz and the maximum transmission rate is 200 Mbit/s. PLT has an advantage over other telecommunication systems using metallic lines in terms of setup cost because it uses power lines that are already in place. However, the frequency band of the signals overlaps with the channel frequency of amateur radio, broadcast radio, etc., which could be affected by electromagnetic disturbances radiated from PLT systems. Although methods of measuring such disturbances on telecommunication lines and numerical limits on disturbances have been specified in CISPR (International Special Committee on Radio Interference) standards, power lines are electrically unbalanced, so disturbances are radiated more easily from them than from telecommunication lines. Therefore, PLT disturbance measurement methods and limits are being discussed in CISPR's power line telecommunication project team (PLT-PT).

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2. History of PLT-PT

The first project team was established in 1999 and discussion began at once. However, the draft international standard was rejected by the voting because typical electrical characteristics of the electrical installations in different regions were not sufficiently considered in it. Since the standard was not published after five years of discussion, the project team was disbanded according to the rules of the IEC (International Electrotechnical Commission). The proposal to restart discussions under a new project team was approved at the Shanghai meeting in 2004. The current project team had its first meeting in San Juan, Puerto Rico, in June 2005. Since then, there have been four meetings up to and including the Paris meeting in May 2006.

The organization of CISPR is shown in **Fig. 1**. Standardization of measurement methods and limits for disturbances from information technology equipment such as personal computers, telecommunication equipment, and audio-visual equipment is the scope of sub-committee I (SC-I) and CISPR22 has been published. The standard for PLT is published as an amendment to CISPR22.

3. Work plan of PLT-PT

The latest work plan of the PLT-PT, which was revised and agreed in the Paris meeting this May, is

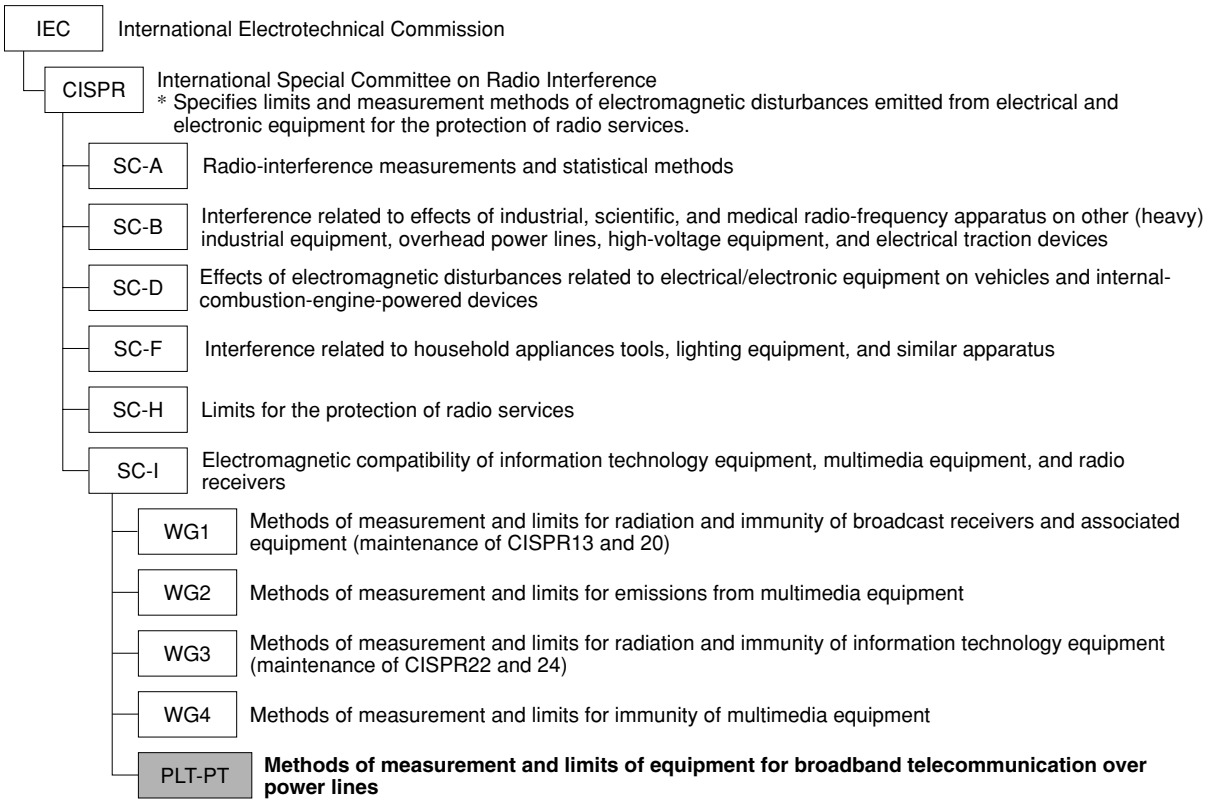


Fig. 1. Organization of CISPR.

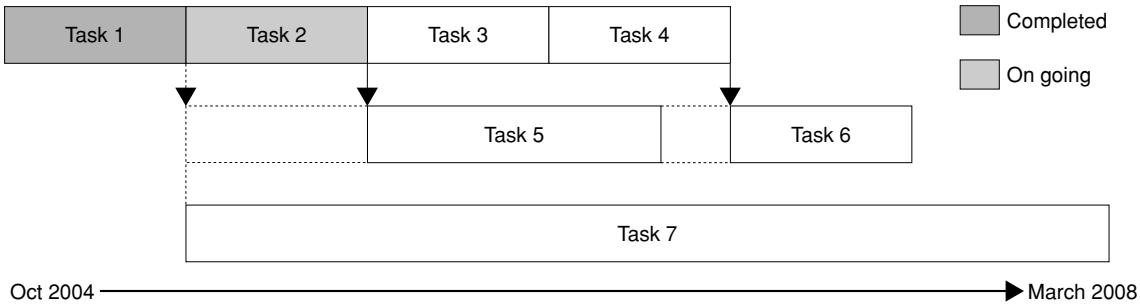
shown in **Fig. 2**. The target date for publishing the standard is the end of March 2008. Items to be investigated are divided into seven tasks. Consensus among different countries is being obtained task by task, and some tasks are being discussed in parallel to reduce the total time until the standard is published.

There are three typical electrical installations in use in Europe, USA, and Japan. In task 1, the characteristics of each typical electrical installation intended to be connected to PLT equipment are being investigated. The equipment and services that could be affected by the PLT signal are listed in task 2 for each installation in task 1. The coupling paths of the disturbances to the equipment and the services shown in **Fig. 3** are also being investigated in task 2. The level of protection currently provided by CISPR22 for the equipment and services listed in task 2 are being assessed in task 3. Radiated and conducted limits for the disturbances of each typical part of electrical installation when PLT is operating are assigned to task 4. Measurement methods and limits for compliance tests in laboratories are being developed in tasks 5 and 6. Finally, the number of limits will hopefully be reduced by regrouping the typical PLT installations in task 7. If possible, the same limits will be specified for the three different typical electrical installations. Task 5 is being discussed in parallel with task 3, and task 7 is being discussed in parallel with tasks 3–6.

A document for comments, including the results of task 1, was produced in the Brussels meeting this January and it was circulated to the National Committees (NCs) registered in SC-I. Comments from the NCs were collected and discussed one by one at the Paris meeting and the section of the document on typical electrical installation was categorized into 18 classes. Thus, task 1 was completed. Task 2 is now in progress.

4. Activities of Japanese National Committee

The Japanese NC contributed some documents related to the configuration of electrical installations in Japan for task 1 and a list of equipment and services that could be affected by PLT signals for task 2. It also made the first proposal for a method of measuring radiated and conducted disturbances emitted from PLT equipment and presented measurements of electrical characteristics e.g., impedance, transmission loss, and longitudinal conversion loss (LCL) of



Task 1: Describe typical electrical installations where it is intended to connect PLT equipment.

Task 2: For each typical part of electrical installations described in Task 1, identify the potential disturbed services/equipment.

Task 3: For each service/equipment type listed in Task 2, assess the level of protection currently provided by CISPR22.

Task 4: Set radiated and conducted limits for emissions of each typical part of electrical installation when PLT is operating i.e., a part of PLT installation.

Task 5: For each typical part of PLT installation, develop a measuring method for testing PLT equipment in the laboratory that predicts emission after installation.

Task 6: For each typical part of PLT installation, set limits for the laboratory tests of PLT equipment.

Task 7: Regroup the typical PLT parts into a smaller number of classes.

Fig. 2. Work plan overview.

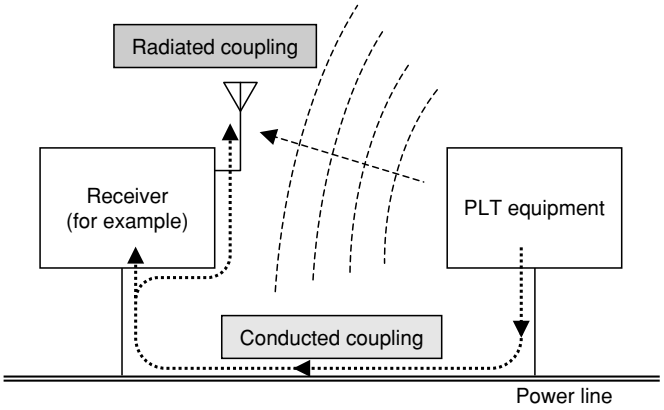


Fig. 3. Coupling paths of disturbances.

power lines, which are necessary to develop a disturbance measuring method.

5. Conclusion

Recent activities of the PLT-PT in CISPR were summarized. Regarding the progress of the work plan, it is currently expected to be difficult to publish the standard for PLT equipment on schedule by the end of March 2008. However, field trials of PLT have been performed to enable the start of PLT services in Europe and USA. The Japanese authorities will specify disturbance measurement methods and limits and revise the radio regulations to permit the use of PLT equipment within Japan by the end of 2006. Discussions in the PLT-PT will be accelerated in response to conditions around the world.

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He received the B.E. degree in communication engineering from the University of Electro-Communications, Tokyo, in 1990. Since joining NTT in 1990, he has been researching electromagnetic compatibility (EMC) of broadband communication such as wireless LANs, DSL (digital subscriber line), and PLT.