

Commission D (Electronics and Photonics) Activity Report

March 2011-June 2011

June 30, 2011

Tadao Nagatsuma

1) Commission Activities

National reports has been submitted from committee members with 11 selected topics; Metamaterials, Quantum Cascade Lasers, Applications of THz Quantum Cascade Lasers, Nonlinear Optical Waveguide for THz Tomography, Photonic Millimeter-Wave Technology, Plasmonic Device Technology for Emission and Detection of THz Radiation, Integrated Josephson Voltage Standard Technology, High Capacity Optical Fiber Transmission Systems, Radio-on-Fiber Technologies for Heterogeneous Wireless Services, Broadband Access Networks with Wired and Wireless Integration/Convergence, Body Area Network.

2) Domestic activities related to areas covered by Commission D***Technical study group on Microwave Photonics (IEICE):***

1st Meeting: April 28, 2011 at Kikaki-shiko Kakikan (Tokyo), “Future and prospect of Microwave photonics (MWP)”

The MWP technical group was promoted to the permanent group because of its steady activity over 14 years. The first meeting is the memorial one, and six invited papers were presented, which include “Latest trends of MWP technologies” (Prof. Tsukamoto, Osaka University), “RoF system for dual W-CDMA and LTE systems” (Dr. Fuke, NTT Docomo), “The future of cloud computing” (Dr. Matsuzawa, NTT), “Trends in photonic access technologies” (Dr. Yoshimoto, NTT), “Trends of high-speed and high-density silicon photonics devices for photonics-electronics conversion system” (Dr. Nakamura, NEC), and “Business chance extension for BOP through banalisation of wireless infrastructures” (Prof. Nakano, Kwansei Gakuin University).

Industry-academia joint seminar on future prospects of terahertz technology and ultra-broadband communications:

June 27, 2011 at Osaka University

Kinki Bureau of Telecommunications (Ministry of Internal Affairs and Communications) and Japan Terahertz Technology Forum jointly organized a workshop on the above theme. Invited lectures were “Latest trends of terahertz technologies” (Prof. Tani, Fukui University), “Next generation mobile communications” (Dr. Abeta, NTT Docomo), “Summary of study group report

on the applications of terahertz waves to telecommunications” (Prof. Nagatsuma, Osaka University), “Impact of terahertz wireless communications on Life and Green” (Dr. Hosoe, Konica Minolta Tech. Center, and Prof. Kado, Kyoto Institute of Technology), and “Recent trends of high-frequency electronics and research strategy” (Dr. Hosako, NICT).

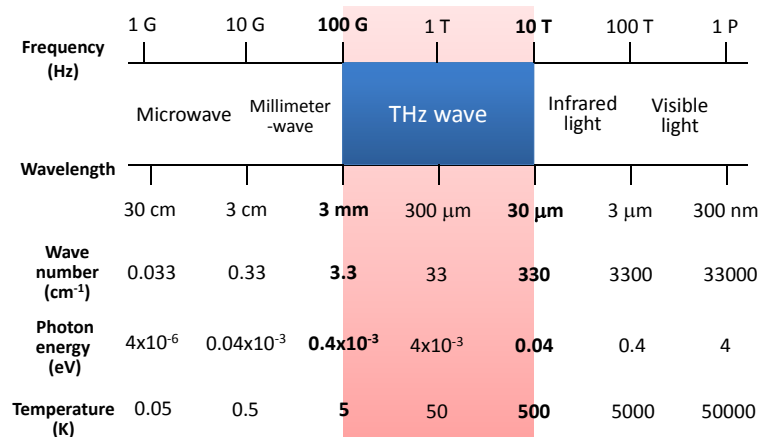


Fig. 1 Definition of THz waves.

3) International activities related to areas covered by Commission D

Asia-Pacific Telecommunity (APT), the Eighteenth APT Standardization Program Forum (ASTAP-18), 23-26 May, 2011, Bangkok, Thailand:

In the Millimeter-wave Communications System (MMCS) Study Group (SG), following issues were discussed; i) Report on 80-GHz high speed data link, ii) Report on terahertz communication systems, iii) Report on RoF MIMO, iv) Report on millimeter-wave RoF.

Table1. Summary of recent activities on wireless communications at over 100 GHz

Frequency	Technology		Bit rate	Application	Affiliation
	Tx	Rx			
120 GHz	Photonics-based	MMIC (direct det.)	10 Gbit/s	6ch HDTV	NTT
120 GHz	MMIC	MMIC (direct det.)	10 Gbit/s	5 km with FEC	NTT
200 GHz	Photonics-based	Disc. comp. (heterodyne det.)	1 Gbit/s	NA	IEMN (France)
220 GHz	MMIC	MMIC	~100 Mbit/s	Digital TV	Fraunhofer IAF
250 GHz	Photonics-based	Disc. comp. (direct det.)	8 Gbit/s	NA	NTT Osaka-U
300-400 GHz	Photonics-based	Disc. comp. (direct det.)	~20 Gbit/s	NA	Osaka-U NTT
300 GHz	Discrete components	Disc. comp. (heterodyne det.)	~100 Mbit/s	Analog / Digital TV	TU Braunschweig
300 GHz	Resonant-Tunneling Diode	Disc. comp. (direct det.)	1.5 Gbit/s	HDTV	Rohm Osaka-U