≪主 題≫

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Ⅰ. 서 론

정보통신 기술은 인터넷 서비스를 비롯한 정보통신 관련 서비스의 꾸준한 출현 및 이용 증대와 함께 멀티미디어화, 지능화, 개인화, 인간화를 향하여 급속히 발전되고 있으며, 이와 같이 발달되는 정보통신 기술은 향후 21세기 정보 사회를 실현시키며 국가 경쟁력을 향상시키는 중심적 역할을 하게 될 것이다. 또한 정보통신 기술의 통합화, 서비스의 고도화 및 다양화에 따라 정보통신 관련 제품간의 상호운용성 확보 측면에서 정보통신 표준화의 필요성이 더욱 강조되고 있다.

이와 같이 정보통신 표준화는 정보통신 기술 발전을 위한 기반 요소의 하나로서 정보통신 기술의 선도 및 시장 선점의 수단으로 까지 등장하고 있다. 이에 주요 선진국을 포함한 세계 각국은 다양한 국제 표준화기구를 통하여 전략적으로 표준화 활동을 강화해 나아가고 있고 유럽 및 미국을 중심으로 지역별 표준화 활동도 강화하고 있으며, 동시에 특정 분야에 대한 사실상의 표준(De Facto Standards)을 신속하게 제정하기 위한 국제 표준화 포럼 및 컨소시움 활동도 활발하게 추진하고 있다.

정보통신 분야의 주요 국제 표준화 기구로는 국제전기통신연합 (ITU : International Telecommunication Union), 국제표준화기구 (ISO : International Organization for Standardization), 국제전기표준회의 (IEC : International Electrotechnical Commission) 및 ISO와 IEC의 합동기술위원회인 ISO/IEC JTC1 (Joint Technical Committee 1) 이 있다. 이들 기구는 표준화의 대상 분야 및 구성 회원들에 따라 그 성격이 다르나, 최근의 급속한 환경 변화에 적절히 대응하기 위하여 내부 조직의 개편과 아울러 각 기구들간의 협력을 강화하고 있다.

이들과 유사한 표준화 활동을 수행하는 대표적 지역 표준화 기구들로는 유럽의 ETSI (European Telecommunications Standards Institute), 북미 지역의 T1 Committee 가 있으며 이들 지역 표준화 기구들은 그들의 표준화 결과를 국제 표준화 기구에 반영함으로써 해당 지역의 정보통신 경쟁력을 제고하고 있다.

또한, 정보통신의 핵심 기술 분야별로 이용자의 요구사항을 보다 용이하게 수용하여 표준을 보다 신속하게 제정할 수 있는 표준화 포럼 (Forum) 이나 컨소시엄을 통하여 표준을 제정하는 사실상의 표준화 활동이 강화되고 있다. 이들은 기술 개발 업체를 중심으로 그 공동이익을 대변하기 위한 표준화 활동으로부터 출발하여 현재는 기존의 국제 표준화 기구와의 협력 등을 통하여 표준화 분야에 강한 영향력을 미치고 있다. 대표적인 표준화 Forum 으로는 ATM 기술의 표준화를 다루는

ATMF (ATM Forum), 인터넷 표준화를 다루는 IETF (Internet Engineering Task Force), 오디오 및 비디오 기술 분야의 표준화를 다루는 DAVIC (Digital Audio-Visual Council) 등이 있다.

본 고에서는 정보통신 표준화 분야에서 핵심적인 역할을 수행하고 있는 대표적인 국제 표준화 기구라 할 수 있는 ITU-T, ITU-R 및 ISO/IEC JTC1, 지역 표준화 기구인 ETSI 및 T1, 국제 표준화 포럼인 ATMF, IETF, DAVIC을 중심으로 그 표준화 활동의 동향 및 주요 현안들에 대하여 살펴보기로 한다.

Ⅱ. 국제 표준화 기구

2.1 ITU-T (ITU - Telecommunication Standardization Sector)

1997년 10월 현재 188 개 회원국을 보유[1]하고 있는 ITU는 UN 산하 기구로서, ITU-T, ITU-R, ITU-D의 3 개 부문으로 나뉘어서 표준화를 진행하고 있으며, 이 중 전기통신 부문의 표준화는 ITU-T를 중심으로 진행되고 있다. ITU-T는 기존의 국제전신전화자문위원회(CCITT)를 확대 개편하여 1992년에 탄생하였으며, (그림 1) [2] 과 같이 세계전기통신표준총회 (WTSC : World Telecommunication Standardization Conference), 전기통신표준화자문반 (TSAG : Telecommunication Standardization Advisory Group) 및 14 개의 연구반 (SG : Study Group)들로 구성된다.

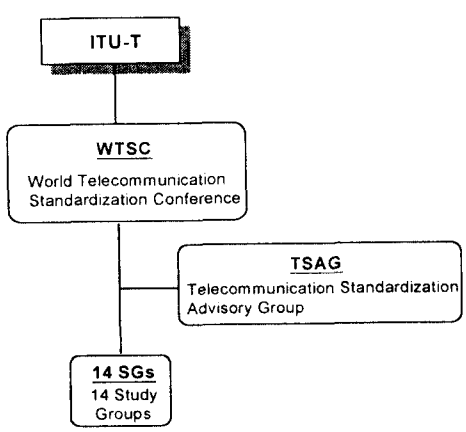

그림 1. ITU-T 의 표준화 조직

WTSC 는 표준의 제.개정 승인, 표준 작업 구조의 개선 및 표준화 연구 과제(Question)의 채택, 표준화 작업 방법 같은 제도적 개선 업무를 수행하는 ITU-T 의 최고 의결 회의로서 통상 매 4년 마다 개최된다.

또한, TSAG 은 표준화 활동의 전략 및 우선순위의 검토, 표준화 작업 계획의 시행 절차 검토, 각 연구 위원회의 작업 가이드라인 제시 및 ITU 내의 타 조직과의 협력 및 조정 수단의 권고 등 자문 역할을 수행하며, 작업 방법 (Working Methods), 작업 계획 (Work Program), 전자적 문서 처리와 출판 (EDH and Publications) 및 ITU-T 전략 연구 (ITU-T Strategy) 등의 3 개 WP (Working Party)로 구성된다.

연구 위원회 조직으로는 1996년 제 2차 WTSC 회의에서 기존의 SG1 (Service Definition) 및 SG14 (Modem and Transmission Techniques for Data, Telegraph and Telematic Service) 를 폐지하고, SG16 (Multimedia Service and System) 을 신설[3]하였으며, TMN (TMN : Telecommunications Management Network) 관련 연구 과제를 SG4로 집중시키고, GII (Global Information Infrastructure) 관련 연구 과제를 SG13으로 집중시킴으로써 변화되는 새로운 기술 환경에 부합하는 표준화 조직을 갖추었다. 이에 따라, 1997 - 2000 회기 동안에 활동할 14 개 연구반 및 주요 연구 테마는 〈표 1〉 과 같다.

ITU-T 표준화 활동에서의 주요 이슈들은 SG4 를 중심으로 하는 통신망 관리 분야, SG11 을 중심으로 하는 B-ISDN 프로토콜 분야 및 차세대 유무선 통합 통신망인 IMT 2000 프로토콜 분야, SG13 을 중심으로 하는 GII 연구 분야, 그리고 신설된 SG16을 중심으로 하는 멀티미디어 관련 서비스 및 시스템 표준화 연구 분야이다. 이들을 포함하여 각 SG 별로 할당된 연구 과제 (Question)[4]는 〈표 2〉와 같다.

표준화 활동의 결과로서 각 연구반별로 제정되는 권고안들은 〈표 3〉과 같은 번호 체계 및 의미를 가지며, 이는 WTSC 결의안 (Resolution) 으로 규정되어 있다 [5].

2.2 ITU-R (ITU Radiocommunication Sector)

ITU-R 은 모든 전파 통신용 주파수 스펙트럼의 합리적이고 공평한 할당을 목표로 주파수의 경제적, 능률적

이용을 도모하기 위한 연구를 수행, 전파통신에 관한 표준 권고를 제정하고 있으며 그 조직[2]은 (그림 2) 와 같다.

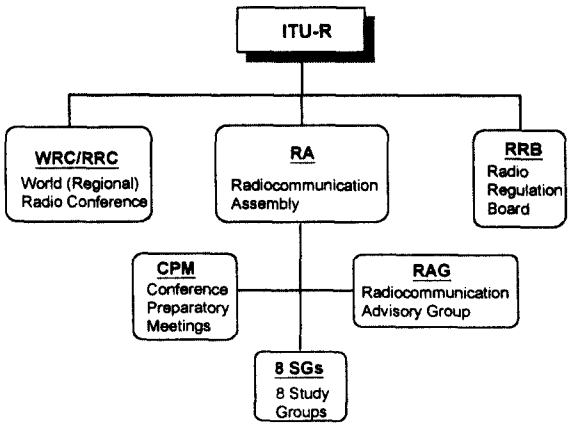

그림 2. ITU-R 의 표준화 조직

전파통신총회 (RA : Radiocommunication Assembly) 는 ITU-R 의 전파통신의 연구과제 수행을 위한 조직 구성, 각 연구반으로의 과제 배정 및 승인, 연구반의 신설 및 폐지 등을 결정하며, 세계 전파통신 회의 (WRC : World Radiocommunication Conference) 는 주파수 할당과 배분 계획을 개정, 보완하고 세계적인 관점에서 전파통신 관련 기술 및 운영 사항을 심의한다. 지역전파통신 회의 (Regional Radiocommunication Conference) 는 지역별 전파통신의 이용에 따르는 이해 관계의 조정 기능을 수행하며, 전반적인 업무의 방향 제시를 위한 전파통신 자문반 (RAG : Radiocommunication Advisory Group) 을 두어 전파통신 분야의 중.장기 소요 제기와 업무 방향을 수립하며 ITU-T 와의 업무 협조 및 조정을 담당한다. 이 밖에 전파 조정국 (Radio Regulation Board) 를 두고 아메리카주, 서유럽 및 동유럽주, 아프리카 및 아시아주 등 5 개 권역별 비 상근직 임원을 두어 주파수 배분에 따른 등록, 기지국-위성간 주파수 이용에 따르는 조정 등의 기능을 수행하도록 하고 있다.

ITU-T 와는 달리 매 2년 동안을 연구 회기로 하고 있는 ITU-R 의 1998 - 1999 년 회기 동안의 연구반 조직 및 주요 연구 내용은 〈표 4〉와 같다. ITU-R의 주요 표준화 이슈는 SG2 에서의 WLAN (Wireless LAN), SG8 에서의 IMT 2000, 이동 전화 및 위성 서비스 분야, SG11 에서의 HDTV 방송 기술 표준화 등이다.

이들 각 연구반별로 할당된 세부 연구 과제들[6]은 〈표 5〉와 같다.

2.3 ISO/IEC JTC1

1987년 ISO (International Standardization Organization) 와 IEC (International Electrotechnical Commission) 가 정보기술 분야의 표준을 공동 제정하기 위하여 설립한 ISO/IEC JTC1 (Joint Technical Committee 1) 은 정보 기술 표준을 제정하는 주관 기관으로서 사용자 요구에 부응하기 위한 표준의 제정과 사용의 극대화, 실질적으로 구현 가능한 표준의 시의 적절한 개발 등을 목표로 한 표준화 활동을 전개하고 있다.

우리 나라를 비롯한 27 개의 P (Participating) 회원국과 33 개국의 O (Observing) 회원국을 갖고 있으며[7], 최근 Re-engineering을 통한 조직의 대대적 개편을 통하여 (그림 3)과 같은 표준화 조직 으로 재편되었다.

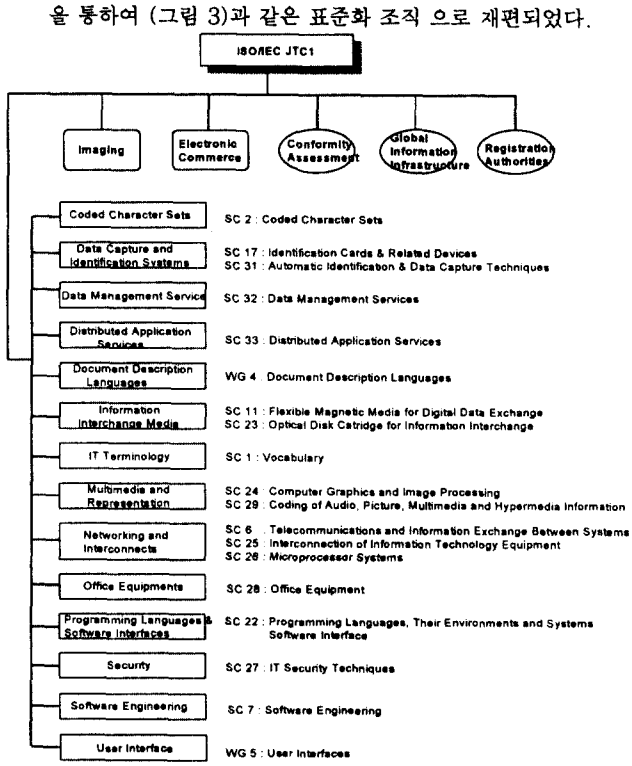

그림 3. ISO/IEC JTC1 의 표준화 조직

JTC1은 (그림 3)과 같이 Imaging 과 전자 상거래 (Electronic Commerce) 분야의 Business Team 을 가지며, 적합성 평가 (Conformity Assessment), GII 및 표준화의 등록 불일치 해결을 위한 등록부 (Registration Authority) 등의 Rapporteur 그룹을 두고 있다.

JTC1 의 최근 조직 및 표준화 분야[8]는 1997년 9월 총회에서 확정된 바, 이는 기존의 SC 14 (Data Element Principle), SC 18 (Document Processing and Related Communication), SC 21 (OSI, Data Management and Open Distributed Processing) 및 SC 30 (Open EDI) 분야를 해체하고, SC 32 (Data Management Services) 및 SC 33 (Distributed Application Services) 분야를 추가한 것을 특징으로 하고 있다.

현재 JTC1에서 진행되는 중요 현안은 GII 표준화에 대한 타 기구와의 협력 및 JTC1 차원의 Roadmap 작성 문제, SC 22 의 JSG (Java Study Group) 에서 논의되고 있는 Java 표준화 등을 들수 있다.

Ⅲ. 지역 표준화 기구

3.1 T1 위원회 (북미 지역)

북미 지역의 표준화 기구인 T1 Committee 는 ANSI (American National Standards Institute) 의 승인과 사무국 업무를 맡고 있는 ATIS (Alliance for Telecommunications Industry Solutions) 의 재정 지원을 받아 표준화 활동을 수행하고 있으며, 1997년 10월 현재 AT&T 를 비롯한 64 개 Voting 회원사, ETRI 미국 사무소를 비롯한 37 개 Observer 사, 그리고 BT (British Telecom) 등 6 개의 해외 Observer 사로 구성되어 있다[9].

1997년 7월 현재 262 건의 승인된 미국 국가 표준을 제정[10] 하였으며, 전통적으로 시장 수요를 토대로 민간 부문이 표준화를 주도하는 상향식 (bottom-up) 형태를 띠고 있는 바, 전술한 ITU-T 에 대하여 북미 지역 국가들 (주로, 미국과 캐나다) 의 입장을 대변하는 지역 표준화 기구로 자리하고 있다.

주 임무는 북미 전기 통신망 일부를 포함하여 미국의 전기 통신망 접속에 관련된 표준과 기술 보고서를 개발하고, 여러 국제 표준화 기구에서 검토 중인 관련 주제에 대한 의견을 작성한다. 사용자 시스템, 사업자, 정보 및 향상된 서비스 제공자의 인터페이스에서 전기 통신망의 상호 접속성과 상호 운용성에 관련된 기능 및 특성 즉, 교환, 신호 방식, 전송, 성능, 운용, 관리 및 유지보수 측면에서의 표준을 개발하고 있다.

T1 위원회의 표준화 활동은 효율화 문제, 국내외 관련 기구와의 상호 협력 체계 구축 및 활용, 기업체와의 협력 등에 초점이 맞추어져 있으며, 자율적인 운영 체계를 기반으로 하는 구체적인 절차에 의해 표준화 활동을 진행하고 있다. T1 위원회는 최근 최신 기술의 중심에 위치하고 있는 ATM (Asynchronous Transfer Mode) Forum, FR (Frame Relay) Forum, IETF (Internet Engineering Task Force), NM (Network Management) Forum, North-American ISDN Forum 등 분야별 포럼 활동과 심도 있는 교류를 통하여 표준화 활동을 추진하고 있다[11].

T1 위원회 산하의 각 기술 소위원회 (TSC : Technical Sub-Committee) 및 작업반 (WG : Working Group) 에서 추진 중인 표준화 분야의 활동 체계는 (그림 4) 와 같다. 즉, 6 개의 TSC와 T1EDH (Electronic Document Handling) 특별 위원회를 두고, 소위원회 산하에 작업반을 두어 정보통신 전분야에 걸쳐 표준화 작업을 수행하고 있으며, ITU/SG의 해당 분야에 각각 참여함으로써 국제 표준화 활동을 수행하고 있다.

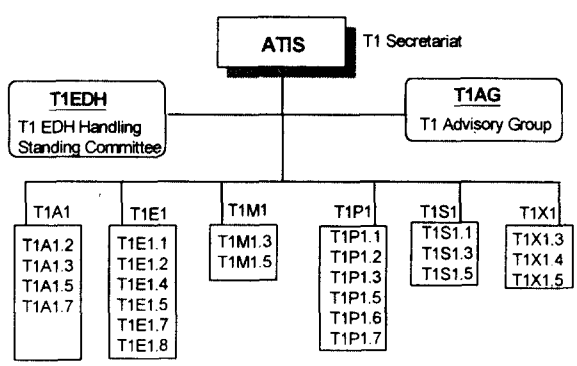

그림 4. T1 Committee 의 조직[12]

최근, T1AG 에서 2000년의 전략 계획을 마련하였는

데, 사용자 요구 (User Needs), 산업계의 요구 (Industry Needs), 기술 진보, 국제 및 지역 표준화 기구들의 동향 등에 따라 선정된 (1) B-ISDN (Broadband-Integrated Services Digital Network), (2)IN (Intelligent Networks), (3) MC (Multimedia Communications), (4) 통신망의 신뢰성 및 생존성 (Reliability/Survivability), (5) NII (National Information Infrastructure), (6) 개인 통신 (Personal Communications), (7) SONET (Synchronous Optical NETwork), (8) SS7 (Signaling System No. 7) 및 상호 접속 (Interconnection), (9) TMN 등을 중점 연구 및 표준화 대상으로 선정하였고[11], T1P1 소위원회에서는 NII 및 GII 를 비롯한 PCS (Personal Communication Services), CDMA (Code Division Multiple Access) 및 TDMA (Time Division Multiple Access) 등 무선 분야의 표준화 활동을 활발하게 전개하고 있다.

각 TSC 별 연구 과제 내용은 <표 6>과 같다.

3.2 ETSI (유럽 지역)

ETSI (European Telecommunications Standards Institute)는 CEPT (European Conference of Post and Telecommunication Administrations) 의 표준화 업무를 1988년에 이관 받아, 유럽 연합의 탄생이래 본격적 표준화 활동을 수행하고 있는 유럽 지역의 실질적 표준화 주도 기구이며 1997년 6월 현재의 조직은 (그림 5)[13] 와 같다.

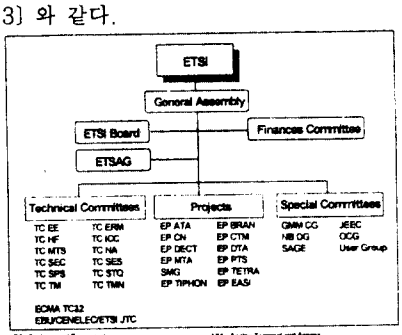

그림 5. ETSI의 조직 및 표준화 분야

ETSI는 전기통신분야 뿐만 아니라 전기통신과 정보기술의 공통 분야, 전기통신과 방송의 공통 분야에서 유럽 통신 표준 (ETS : European Telecommunications Standard) 을 제정하고 있는데, 표준화 추진 결정 과정의 지연을 사전에 방지하고, 보다 신속한 표준화를 위해 25 명으로 구성된 이사회 (Board) 체계로 운영되고 있다. 즉, 이사회의 소수 위원들만을 중심으로 회의를 진행함으로써 신속한 표준 제정이 가능하도록 한다는 데 근본 목적을 두고 있다. ETSI의 회원 현황은 현재 32 개의 유럽 국가에서 총 412 개의 정회원 기관을 보유하고 있으며, 84 개 기관의 Observer, 그리고 26 개 기관의 준회원을 두고 있다[11].

총회 (General Assembly) 는 기존의 기술 총회의 책임 사항에 대한 기능과 ETSI의 관리, 정책, 전략에 대한 결정 등을 관장하는 최고의 권한을 가지며, ETSI의 운영에 관련된 일반 결정 사항 등을 다루고, 기술 위원회 (TC : Technical Committee), ETSI 기술 개발 과제 (ETSI Projects) 및 특별 위원회 (Special Committee) 에 대한 효율적 관리 및 유지 기능을 담당한다.

(그림 5) 와 같이 ETSI 는 TC 를 통하여 12 개 기술 분야에 대한 표준화 활동을 수행하고 있으며, ECMA TC 32 및 EBU/CENELEC/ETSI JTC 를 구성하여 관련 기구와의 표준화 협력 활동을 병행하고 있는데, ECMA TC 32 를 통하여 사설 정보 통신망의 표준화 전략과 총체적 관점을 유지하여 운용 현장에서 필요로 하는 ECMA 표준을 제정하는 기능을 수행한다. EBU/CENELEC/ETSI JTC 에서는 EBU, CENELEC 과 함께 TV, 라디오 및 데이타 등 서비스들이 위성, 케이블 및 지역 기반의 전송 매체를 통하여 방송될 때 이의 세부적인 표준들을 제정하는 역할을 합동으로 수행한다.

ETSI 에서 추진되는 기술 개발 과제는 도시된 바와 같이 CN (Corporative Network) 과제를 비롯한 12 개 이며, 회원 기관의 공동 참여로 진행되고 있고, 현재 중점 추진 과제는 EASI (European ATM Service Interoperability) 를 비롯하여 추가로 지정된 TMN, 그리고 VEMMI (Videotex Man Machine Interface) 과제이다. 이중 VEMMI 과제는 가장 중요시하는 과제로써, 비데오텍스, 멀티미디어 및 하이퍼미디어 정보의

추출 서비스를 위한 보다 진보된 Man-Machine 인터페이스의 개발을 목표로 하고 있다[14].

이 밖에 특정 분야의 전문가들로 구성된 일종의 Task Force 형태와 ECMA 등의 조직과의 협력, 그리고 기구내 상하 조직간 의사 전달 및 조정, 사용자들의 요구사항 청취 및 이의 반영을 주 임무로 하는 특별 위원회를 구성하여 운용 중에 있다.

Ⅳ. 주요 표준화 포럼

4.1 ATMF

ATM 포럼은 1991 년 Northern Telecom 및 Sprint 사 등의 몇몇 회사들이 ATM 사설망을 위한 관련 표준화를 추진하기 위하여 설립되었으며 현재 900 여개의 회원사를 갖고 활발한 표준화 활동을 하고 있다[15].

이사회 (Board of Directors) 산하에 기술 위원회 (Technical Committee), 시장 조사 및 교육 위원회 (Market Awareness and Education Committee), 그리고 사용자 의견 수렴을 담당하는 사용자 원탁 위원회 (User Roundtable Committee) 등의 주요 결정 기능을 두고 있는데, 그 중에서 기술 위원회 (TC) 가 LANE (LAN Emulation) WG 등 15 개 작업 그룹을 주도하고 있다. 현재 쟁점이 되고 있는 기술 분야의 작업 그룹들은 LANE 를 비롯하여 WATM (Wireless ATM), 기가 Bit 인터페이스를 갖는 ATM 물리 계층 작업 그룹, ATM 시그널링, ATM 망 관리, ATM 보안 및 시험 작업 그룹 등이다.

4.2 IETF

인터넷 사용자의 폭증과 함께 이의 표준화 필요성이 제기됨에 따라 1986 년 설립된 IETF 는 표준화 작업의 관리를 위한 IESG (Internet Engineering Steering Group) 과 각 기술 분야별 영역, 그리고 각 영역별 작업 그룹 (WG : Working Group) 들로 나뉘어 표준화 활동을 전개하고 있다.

표준화 영역은 (1) 메시지 표준, 메일 및 디렉토리 관리, 응용 프로토콜 (http, ftp 확장) 분야의 표준화 등을 위한 응용 영역 (Application Area), (2) 케이블 데이타 망을 통한 IP 주소, 점 대 점 프로토콜 확장 분야 등의 표준화를 위한 인터넷 영역 (Internet Area), (3) MBONE (Multicast Backbone) 개발, MIB (Management Information Base) 구성 및 물리적 연결, 원격 망 감시, 로밍 동작 등의 표준화를 추진하고 있는 운용 및 관리 영역 (Operations and Management Area), (4) IP 주소에 의한 라우팅, 멀티캐스팅 등의 분야를 연구, 표준화 하는 라우팅 영역 (Routing Area), (5) Firewall 등 각종 인터넷 보안 문제와 공통 적용 가능한 시험 인증 기술 등을 표준화 하는 보안 영역 (Security Area), (6) 오디오, 비디오 신호의 전달과 이들의 통합 서비스, 실시간 트래픽 측정, 위성을 통한 TCP 등의 표준화를 위한 전달 영역 (Transport Area), (7) 기타 사용자 서비스의 표준화 등을 위한 사용자 서비스 영역 (User Services Area), 그리고 (8) 인터넷 표준화 조직의 표준화 활동의 절차를 다루는 일반 영역 (General Area) 등 8 개 영역별로 나뉘어 표준화 활동을 수행 중이다[16].

이들 영역은 종전의 9 개 영역을 축소한 것으로서, MIB 구성 문제를 주로 다루었던 망 관리 영역 (Network Management Area) 과 운용 요구 영역 (Operations Requirement Area) 을 통합하면서 MIB 를 각 요소 기술별로 구성토록 하여 이들 MIB 의 상호 연동 운용만을 운용 및 관리 영역에서 담당하도록 일원화 한 것을 특징으로 하고 있다.

4.3 DAVIC

통신망의 서비스 영역이 멀티미디어를 기반으로 하는 오디오 및 비디오 전송 요구가 증가하고 나아가 대화형 디지틀 서비스로 발전함에 따라 관련 응용 분야, 기기 및 서비스에 대한 산업계 표준 규격의 작성을 위해 1994년 결성된 DAVIC 은 설립 당시 VOD (Video On Demand) 를 첫 표준화 대상으로 선정한 이래, 관련 서비스의 연동 극대화를 위한 다양한 표준화 활동을 전개하고 있다.

현재, T1, ATMF, OMG (Object Management Group), ISO/IEC MHEG (Multimedia and Hypermedia Expert Group) 등 기존의 국제 표준화 기구와의 협력을 통한 활동이 이루어지고 있으며 6 개의 기술위원회 (TC : Technical Committee) 에 의한 표준화

활동 조직으로 구성되어 있다. 이들 6 개 전문화 기술 위원회는 (1) 디코더 모델 개발 등 정보의 표현을 위한 Information Presentation TC, (2) 서버와 클라이언트 서브시스템을 비롯한 분산 서버의 구조 정립 등을 위한 Sub-system Architecture TC, (3) 서비스 및 서비스 응용 분야의 표준화를 위한 Application TC, (4) 케이블 모뎀 등의 물리적 규격 마련을 위한 Physical Layer TC, (5) 데이타의 스크램블링 및 암호키의 관리를 위한 Security TC, 그리고 (6) 서버들의 상호 접속 및 접속 시나리오 작성을 위한 System Integration TC 등이다.

V. 결 론

최근 WTO 체제의 출범에 따라 정보통신 표준화 활동도 기술력을 토대로 한 개방적이고도 투명한 표준의 제정을 통하여 국제 경쟁력을 제고하고 산업의 발전을 가능하게 하는 방향으로 진행되고 있다. 또한 시장 주도형 표준화 활동이 강화됨으로서 시장 선점을 위한 수단으로서의 표준화 활동이 점차 그 중요도를 더해 가고 있다. 다른 한편으로는, 유무선 및 방송 기술의 통합 및 정보통신 관련 기술의 복잡도 증대로 인하여 보다 효율적이고 체계적으로 표준화 연구를 추진할 필요성이 증대되고 있다.

이에 따라, 앞으로는 단순히 국제 표준을 번역하고 이를 국내 표준으로 채택하던 과거의 하향식 표준화 (Down Stream Standardization)에서 빨리 벗어나, 실 사용자의 시장 욕구를 반영하고 기술 개발의 결과를 토대로 표준화를 추진하는 상향식 표준화 (Up Stream Standardization) 로 전개되어야 하며, 기술 개발과 동시에 표준화가 진행되는 동시 표준화 (Concurrent Standardization) 가 이루어져야 할 것이다.

이러한 최근의 표준화 동향에 발 맞추어, 본 고에서는 국제적으로 표준화를 주도하거나 표준화 정책에 영향력을 갖는 주요 표준화 기구의 현황 및 동향을 개관하였다. 살펴 본 바와 같이 거의 모든 국제 및 지역 표준화 기구들이 변화하는 기술 개발 경쟁 환경하에서 표준화 요구에 부응하기 위한 조직의 재정비, 표준화 과제의 조정과 함께, 동시 표준화를 지향하기 위하여 보다 적극적으로 표준화 활동을 전개하고 있다.

이와 같은 현상은 정보통신 기술 분야의 발전이 시급히 요구되는 우리 나라에 시사하는 바가 자못 크다 할 것이다. 따라서 우리 나라의 정보통신 표준화 주관 기관, 관련 연구 기관 및 관련 기업체는 앞에서 서술한 다양한 국제 표준화 기구에 보다 적극적으로 참여하고 관련 표준화 활동을 보다 강화하여야 할 것인 바, 이는 표준화를 통한 정보통신 분야의 국제 경쟁력 확보가 당면 과제로 대두되고 있는 현실을 감안 할 때 당연한 것이라 할 것이다.

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http://www.atmforum.com/atmforum/about/committee2.html#tech
[16] Active IETF Working Groups,
http://www.ietf.cnri.reston.va.us/html.charters/wg-dir.html

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<표 1> 1997 ~ 2000 연구회기 동안의 ITU-T 연구반 및 주요 연구 테마

연구반	연 구 반 명	주요 연구 테마
SG 2	Network and service operation	- Traffic Engineering, N/B-ISDN Services
SG 3	Tariff and accounting principles including related telecommunications, economic and policy issues	- Development Principles of Charging, Accounting for International and B-ISDN Services
SG 4	TMN and network maintenance	- Network Management and maintenance - Test and Measurement Techniques
SG 5	Protection against electromagnetic environment effects	- Electromagnetic resistibility, Human Safety related to Operating Telecommunication Systems
SG 6	Outside plant	- Optical Fiber Installation - Electrical Power Supply for Outside Plant
SG 7	Data networks and open system communications	- Network Performance and Quality - Interworking for Networks - Data Compression, Testing of Protocols
SG 8	Characteristics of telematic systems	- Facsimile Terminals - Cooperative Document Handling and Services
SG 9	Television and sound transmission	- Transmission of Sound Program - Digital Transmission of HDTV Signal - Networks for VOD Services
SG10	Languages and general software aspects for telecommunication systems	- Maintenance and Support of SDL - Software Platforms and Middlewares
SG11	Signaling requirements and protocols	- SS No. 7 Management - Access Signaling for N/B-ISDN and IMT2000 - New Signaling requirements for Emerging Network
SG12	End-to-end transmission performance of networks and terminals	- Speech/Video Signal Processing - Performance Considerations of Networks and Terminals
SG13	General network aspects	- Network Capabilities for B-ISDN - Transport Network Architecture and Interworking - GII
SG15	Transport networks, systems and equipment	- SDH Equipment and Network Protection - Digital Hierarchy and Interfaces - Reliability and Availability of Optical System
SG16	Multimedia services and systems	- Audiovisual Multimedia Services - Protocols for Multimedia Conferencing - Audio and Wideband Coding - Harmonization of Multimedia Systems

<표 2> 1997 ~ 2000 연구 회기 동안의 ITU-T 연구반 별 연구 과제 (Questions)

과제 번호	과 제　　내 용
1/2	Applications of numbering and addressing plans for fixed and mobile services
2/2	Routing and interworking plans for fixed and mobile networks
3/2	Service quality networks
4/2	Network management
5/2	Network related quality of service aspects of facsimile communication
6/2	Traffic engineering: performance objectives
7/2	Traffic engineering: measurement and modelling
8/2	Traffic engineering: dimensioning and control
9/2	Bureau services
10/2	Management and development of PSTN-based telecommunication services
11/2	New services and service enhancements brought about due to ISDN capabilities
12/2	New services for broadband ISDN(B-ISDN)
13/2	Mobile/personal telephone, telegraph, telematic, data, audiovisual and multimedia services
14/2	Service aspects of international multipoint communication via satellite
15/2	Universal Personal Telecommunication (UPT) service
16/2	Human factors issues in telecommunications affecting multiple services or not related to specific services
17/2	Human factors aspects of voice and non-voice services using public terminals
1/3	Study of economic issues and of the impact of national policies as they relate to the development of telecommunication services and networks
2/3	Reform and development of charging, accounting and settlement principles for the international telephone services
3/3	Development of charging, accounting and settlement principles for international mobile services
4/3	Development of charging and accounting principles in the non-mobile international telecommunication satellite services
5/3	Development of charging and accounting principles in the data and message communication services
6/3	Development of charging and accounting principles for B-ISDN services, telecommunication services of a multimedia nature, including those supported by the ATM or offered in conjunction with global information infrastructures
7/3	Development of charging and accounting principles in the services not covered by other Questions
8/3	Regional costing studies for the development of cost models together with related economic and policy issues
9/3	Terms and definitions for Recommendations dealing with charging and accounting principles
1/4	Terms and definitions
2/4	Designations in the international networks (circuits, group and line links, digital blocks, digital paths, data transmission systems, digital blocks created between DCMEs, virtual containers, multiplex sections etc., and related information)
3/4	Maintenance of switched international circuits including telephone, ISDN and B-ISDN type circuits
4/4	Maintenance of mobile telecommunications systems
5/4	Common channel signaling maintenance
6/4	Assessment of network performance and exchange of information for maintenance purposes
7/4	Fault, performance and configuration management of ISNDs and B-ISDNs
8/4	Maintenance of leased circuits and supporting transmission networks
9/4	Maintenance of digital transport networks
10/4	Test and measurement techniques and equipment for use on transmission equipment
11/4	General aspects of test and measurement techniques and equipments

12/4	Quality assurance for TMN specifications
13/4	TMN principles, architecture and methodology
14/4	OSI system management
15/4	Requirements, integration and management information/models for TMN interfaces
16/4	Requirements for the TMN F interface
17/4	Requirements for the TMN X interface
18/4	Network level management of transmission systems
19/4	Protocols to support operation, administration and maintenance at the F, Q3 and X interfaces
20/4	Protocols for the remote operation of management applications
21/4	Managed object definitions for management of telecommunication services, for network management and for network elements, based on TMN interfaces
1/5	Electromagnetic resistibility of telecommunication equipment
2/5	Protective components and assemblies
3/5	Protection of telecommunications lines and installations against lightning
4/5	Bonding configurations and earthing of telecommunication systems
5/5	Human safety related to operating voltages and currents in telecommunication systems
6/5	Basic principle of emission and immunity requirements for telecommunications
7/5	Generic emission and immunity requirements
8/5	Product family emission and immunity requirements
9/5	Radio frequency effects on telecommunication voice terminals
10/5	Human safety from electromagnetic field exposure
11/5	Telecommunications system unbalance
12/5	Interference produced by power lines and electrified railway lines into telecommunications lines
13/5	Mitigation techniques for telecommunications installations
1/6	Environmental issues for the outside plant
2/6	Fire safety of telecommunication installation
3/6	Amendments and additions to the Manuals
4/6	Copper networks for new services (ISDN, ADSL/HDSL, etc.)
5/6	Optical fibre cable installation
6/6	Optical fibre cable network maintenance
7/6	Optical fibre cable construction
8/6	Performance tests and acceptance criteria for optical fibre cables and associated hardware
9/6	Mirinized terrestrial cables
10/6	Passive optical components
11/6	Electrical power supply for equipment installed in outside plant including customer premises
12/6	Trenchless techniques for the construction of underground infrastructures for telecommunication cables installation
13/6	Access facilities using hybrid fibre/copper networks
1/7	Technical characteristics, classes of service, facilities and categories of access for networks providing data communication
2/7	Network performance and quality of service in data communication networks
3/7	Numbering plan for public data networks
4/7	Routing principles for public data networks
5/7	Principles of management for data networks and for the customer network management service
6/7	Interworking for networks providing data communication
7/7	DTE/DCE interface for packet and frame mode DTEs
8/7	Non-native mode terminal access DTE/DCE interface procedures
9/7	Packet and frame mode signaling between public networks providing data communication

10/7	Lower layer protocol and service mechanisms and features
11/7	Data compression
12/7	Network multicast
13/7	End-to-end multicast
14/7	Message handling systems
15/7	Directory systems
16/7	Message handling services
17/7	Directory services
18/7	X.400 and X.500 conformance testing
19/7	Open systems architecture
20/7	Security services, mechanisms and protocols
21/7	Naming, addressing and registration
22/7	OSI application, presentation and session layers
23/7	Testing of data communication protocols
24/7	Open distributed processing
25/7	Revision of Recommendations
1/8	Facsimile terminals
2/8	Facsimile test charts and test images
3/8	Cooperative document handling
4/8	Document communication services
5/8	Colour for telematic applications
6/8	Common components for image communication
7/8	Coded character sets and control functions for telematic and other ITU-T services
8/8	Communication protocol PCIs for terminal equipment
9/8	User interfaces for terminal equipment and protocols
1/9	Definition of hypothetical reference connection for combined analogue-and-digital and all digital sound-programme transmission
2/9	Digital transmission of sound-programme signals
3/9	Performance of sound-programme transmission using all-digital circuits
4/9	Digital networks carrying sound-programme signals for broadcasting
5/9	Maintenance and alignment of digital sound-programme circuits
6/9	Subjective and objective assessment of sound quality in broadcast transmission circuits
7/9	Methods of measurement, test signals and operational requirements for sound-programme transmission
8/9	Transmission time differences between the sound and vision components of a television signal
9/9	Maintenance and alignment of digital television circuits
10/9	Digital transmission of conventional television and high-definition television signals for contribution
11/9	Digital transmission of conventional and high-definition television signals for primary distribution
12/9	Performance of digital networks carrying television signals for broadcasting
13/9	Transmission of MPEG-compressed television signals on 34-45 Mb/s circuits
14/9	Transmission of enhanced television signals over digital links
15/9	Use of non-homogeneous networks comprising digital and analogue links for the secondary distribution of television
16/9	Digital secondary distribution of conventional and high-definition television
17/9	Multimedia data transmission on non-homogeneous cable transmission systems
18/9	Physical layer of Multichannel Multipoint Distribution Systems (MMDS)
19/9	Use of hybrid links for the secondary distribution of television into the user's premises
20/9	Asymmetric networks for television distribution services such as video on demand
21/9	Laws of addition for impairments associated with all-digital and mixed analogue-and-digital transmission of television signals

22/9	Measurement and control of the quality of service of digital television transmission on contribution and/or distribution networks
23/9	Development of an assessment aid for MPEG-2 codecs
24/9	Requirements and possibilities for interactivity in the secondary distribution of television
25/9	Additional services carried on networks predominantly intended for the secondary distribution of television
26/9	Access systems for interactive services in SMATV networks
27/9	Electronic programme guides
28/9	Conditional access methods and practices for digital cable distribution to the home
29/9	Statistical multiplexing of several programmes on a transmission channel
30/9	Terminology for television and sound transmission
1/10	Description techniques for GII interfaces
2/10	ITU-T object definition language
3/10	Software platforms and middlewares for the telecom domain
4/10	Software quality of telecommunication systems
5/10	Specification of behavior in GDMO
6/10	Maintenance and support of SDL
7/10	Support for fast development of protocol standards using formal methods
8/10	Testing based on formal specifications and validation of formal specifications
9/10	Maintenance of message sequence charts (MSCs) syntax and semantics
10/10	Maintenance and evolution of CHILL
11/10	Graphic GDMO
12/10	Specification of HMI data for a GDMO/ASN.1 object model
13/10	Design principles for Human-Machine Interfaces (HMI) for the management of telecommunications network resources and services
1/11	Signaling and protocol framework for an evolving environment
2/11	Signaling System No. 7 - Management (OMAP)
3/11	Access and network security requirements
4/11	The unified functional methodology for the specification of protocol requirements for services and network capabilities
5/11	Intelligent network capability sets
6/11	New signaling capabilities and requirements for advanced broadband multimedia services
7/11	Signaling, call handling and management requirements for universal personal telecommunications and for use mobility in future public land mobile systems
8/11	Signaling requirements for emerging land mobile and satellite mobile networks
9/11	Signaling requirements for transmission equipment including satellite systems
10/11	Common upper layer protocols to support signaling applications
11/11	Access signaling to support narrow-band and broadband ISDN services and third generation (FPLMTS) mobile networks
12/11	Network signaling for the support of narrow-band ISDN services
13/11	Network signaling for the support of broadband services and third generation land mobile networks (FPLMTS)
14/11	Updating and enhancements of ISDN user-network interface data link layer protocol
15/11	Asynchronous transfer mode adaptation layer for signaling
16/11	Common channel Signaling System No. 7 - Network service part (MTP and SCCP)
17/11	Updating of Q-Series Recommendations
18/11	Reliability aspects of Signaling System No. 7
19/11	Signaling methods used by alternative calling procedures
1/12	Evolution of the programme of work
2/12	Definitions in the fields of telephonometry, speech signal processing, video signal processing, multimedia, terminal equipment and of characteristics of international connections and circuits
3/12	Radio frequency effects on telecommunication voice terminals

4/12	Updating the "Handbook on Telephonometry"
5/12	Efficiency of devices for preventing the occurrence of excessive acoustic pressure by telephone receivers
6/12	Specification and test principles for hands-free terminals, acoustic echo cancellers and speech enhancement devices
7/12	Analysis methods using complex measurement signals
8/12	General aspects in telephone electroacoustic measurement
9/12	Speech transmission characteristics and measurement methods for digital handset and hands-free terminals for both telephone band (300 - 3 400 Hz) and wideband (50 - 7 000 Hz)
10/12	Subjective methods for evaluating audiovisual quality in multimedia services
11/12	Objective methods for evaluating audiovisual quality in multimedia services
12/12	Cordless and mobile terminal audio performance and testing requirements
13/12	Objective measurement of speech quality under conditions of non-linear processing
14/12	Methods and tools for the subjective assessment of digital transmission systems
15/12	In-service non-intrusive assessment of voiceband channel transmission performance
16/12	Transmission planning in the evolving mixed analogue/digital and ISDN networks
17/12	Noise aspects in evolving networks
18/12	Interconnection of private networks with the public ISDN/PSTN
19/12	Transmission performance considerations for networks which are implemented using ATM technology
20/12	Analysis and extension of the E-model
21/12	Echo, transmission time and stability in multicarrier network environments
1/13	New network capabilities for networks other than B-ISDN
2/13	Network capabilities required for the support of B-ISDN based services
3/13	Network capabilities for interactive multimedia services
4/13	ATM layer
5/13	ATM adaptation layer
6/13	OAM and network management in B-ISDN
7/13	B-ISDN resource management
8/13	B-ISDN interworking
9/13	Interworking of 64k ISDNs with other networks
10/13	ISDN Frame Mode Bearer Service (FMBS)
11/13	Enhancement and maintenance of ISDN layer 1 Recommendations
12/13	Access network architecture principles and the interface functional characteristics
13/13	General performance issues
14/13	B-ISDN ATM cell transfer performance
15/13	Availability performance
16/13	Transmission error performance
17/13	Call processing performance
18/13	Network synchronization and time distribution performance
19/13	Transport network architecture and interworking principles
20/13	Support of broadband connectionless data services on B-ISDN
21/13	General coordination of the network aspects for the support of interactive multimedia services
22/13	Use of the satellite transmission medium in the framework of the ISDN
23/13	General network studies
24/13	Global Information Infrastructure (GII)
25/13	GII principles and framework
26/13	Multimedia customer access layer 1 requirements
27/13	Interworking between mobile and other networks

28/13	Vocabulary for general network aspects
29/13	Telecommunications architecture for an evolving environment
1/15	Access network transport
2/15	Characteristics of optical systems in local access networks for transport and distribution
3/15	DCFs for digital leased circuits
4/15	DCFs for subscriber access systems
5/15	Operation and administration aspects of signal processing network equipment
6/15	Circuit multiplication equipment(CME) and ststems(CMS)
7/15	Network echo control and interaction of acoustic echo controllers and network equipment
8/15	Speech, voicedband and audio transmission in ATM/B-ISDN systems
9/15	SDH equipment and network protection/restoration
10/15	ATM equipment
11/15	Digital hierarchy bit rates, interfaces, multiplexing structures and interworking
11/15	Digital hierarchy bit rates, interfaces, multiplexing structures and interworking
12/15	Muldexes and statistical muldexes for telegraphy and data transmission using digital bearer channels
12/15	Characteristics of active and passive optical components and subsystems
13/15	Management functions and services of transmission systems and equipment
14/15	Management of transmission equipment from the element level view
15/15	Characteristics and test methods of optical fibre and cable
16/15	Characteristics of optical systems for inter-office and long distance networks
17/15	Characteristics of active and passive optical components and subsystems
18/15	Characteristics of optical fibre submarine cable systems
19/15	Reliability and availability of optical systems
20/15	Characteristics of optical networking
1/16	Audiovisual/multimedia services
2/16	Interactive Multimedia Information Retrieval Services (MIRS)
3/16	Data protocols for multimedia conferencing
4/16	Modems for switched telephone network and telephone-type leased circuits
5/16	ISDN terminal adapters, and interworking of DTEs on ISDNs with DTEs on other networks
6/16	DTE-DCE interchange circuits
7/16	DTE/DCE protocols
8/16	DCE/DCE protocols
9/16	Text telephony
10/16	Testing
11/16	Circuit-Switched Network (CSN) multimedia systems and terminals
12/16	B-ISDN multimedia systems and terminals
13/16	Packet-switched multimedia systems and terminals
14/16	Common protocols, MCUs and protocols for interworking with H.300-Series terminals
15/16	Advanced video coding
16/16	Harmonization of multimedia systems, applications and services
17/16	AVMMS coordination
18/16	Interaction of high-speech voiceband data systems with signal processing equipment in the public-switched telephone network
19/16	Extension to existing ITU-T speech coding standards at bit rates below 16 kbit/s
20/16	Audio and wideband coding in public telecommunication networks
21/16	Encoding of speech signals at bit rates around 4 kbit/s
22/16	Software and hardware tools for signal processing standardization activities

<표 3> 연구 분야별 권고 번호 체계 및 내용

연구반	권고 번호 체계	연구반	권고 번호 체계
SG2	C/E/F Series, I.120/I.230/I.240/I.250 S Series 의 유지보수	SG9	J/N Series
SG3	C.1(SG2 와 연계), D Series	SG10	Z Series
SG4	M/O Series, G.850 Series, X.700 Series Q.513/Q.810/Q820/Q.940 Series	SG11	Q/U Series
SG5	K Series	SG12	P Series, G.100/G.470 Series
SG6	L Series	SG13	I Series, G.700/G.701/G.703/G.707 (SG15 와 합동) G.800/G.900 Series
SG7	X Series, E.104/E.115(SG 와 연계) F.400/F.500/F.600 Series	SG15	G Series, I.700/Q.500 Series, V.38 R Series 의 유지보수, X50 - X.58
SG8	T Series, F.160/F.300/F.162/F.163/F.180 Series, F.551	SG16	H Series, G.190/G.720/G.ACB/G.WSC Series T Series, F.700 Series, V Series

* SG 별 중복 목록은 관련 상대 SG 의 목록을 제외함.

* 권고 번호의 의미

SG 사용:
- C : General Telecommunication Statistics
- D : General Tariff Principles
- E : Overall Network Operation
- F : Telecommunications other than Telephone
- G : Transmission Systems and Media, Digital Systems and Networks
- H : Audiovisual and Multimedia Systems
- I : ISDN
- J : Transmission of television and sound program and other Multimedia Signals
- K : Protection Against Interference
- L : Construction, Installation and Protection of Cable and other Elements of Outside Plant
- M : Maintenance-International Transmission Systems
- N : International Sound Program and TV Circuit
- O : Specification of Measuring Equipment
- P : Telephone Transmission Quality
- Q : Switching and Signaling
- R : Telegraph Transmission
- S : Telegraph Services Terminal Equipment
- T : Terminal of Telematic Services
- V : Data Communication over the Telephone Network
- X : Data Network and Open System Communication
- Z : Programming Languages

WTSC 사용:
- A : Organization Work of the ITU-T
- B : Means of Expression

<표 4> 1998 ~ 1999 연구 회기 동안의 ITU-R 연구반 및 주요 연구 내용

연구반	연구반 명	주요 연구 내용
SG1	Spectrum management	- Spectrum Planning and Sharing - Engineering of Spectrum Management
SG3	Radiowave propagation	- Point-to Area Propagation - Earth-Space Propagation below 3 GHz
SG4	Fixed-satellite service	- Efficient Orbit/Spectrum Utilization - Satellite News Gathering via Satellite - Feeder Links for Mobile Satellite Service
SG7	Science services	- Space Radio Systems - Radio Astronomy - Standard Frequency and Time from Satellite
SG8	Mobile, radiodetermination, amateur and related satellite services	- Land/Maritime Mobile Services - Wind Profiler Radar - IMT 2000
SG9	Fixed service	- Radio-frequency Channel Arrangements - HF Systems - Sharing with Other Systems

SG 10	Broadcasting service - sound	- Sound Broadcasting - Antennas for Sound Broadcasting - Technical Parameters for HF Broadcasting
SG 11	Broadcasting service - television	- Enhanced HDTV - Digital Television Source Coding - Data Broadcasting - Digital Terrestrial TV Broadcasting

<표 5> 1998 ~ 1999 연구 회기 동안의 ITU-R 연구반 별 연구 과제 (Questions)

C1 : 향후 2년간 WRC 가 요구하는 최우선/긴급 연구 과제 C2 : RRC 등 기타 회의가 요구하는 긴급 연구 과제
S1 : 향후 2 년 이내에 완료하여, RA 에 통보 예정인 긴급 연구과제 S2 : S1 과 같으며 해당 기술 개발을 위해 필요한 중요 과제

과제 번호	과제 내용	상태
22-2/1	Frequency measurements at monitoring stations	S2
26-3/1	Bandwidth measurements at monitoring stations	S2
28-3/1	Direction finding at monitoring stations	S2
29-4/1	Automatic monitoring of the radio-frequency spectrum	S2
32-4/1	Application of monitoring to assist radiocommunications development	S2
34-3/1	Identification of radio stations by manual or automatic means	S2
45-4/1	Techniques and technical criteria for frequency sharing	S2
47/1	Definition of efficiency and utility of spectrum use	S2
54-1/1	Frequency tolerance of transmitters	C2
60-1/1	Spectra and bandwidth of emissions	S2
65/1	Improved methods of exchanging computer programs and data for spectrum management purposes	S1
67/1	Method of measuring the maximum frequency deviation of FM broadcast emissions at monitoring stations	S2
71/1	The use of spread spectrum techniques	S2
80-1/1	Definition of interference and units and methods of measurement	S2
201/1	Spectrum management aspects of short-range communication systems	S2
202/1	Characterization and measurement of various interference sources to digital communication service(according to their interference effect)	S2
203/1	New spectrally efficient techniques and systems	S2
204-1/1	Adaptive systems in the MF/HF bands	S2
205-1/1	Long-term strategies for spectrum utilization	S2
206/1	Strategies for economic approaches to national spectrum management and their financing	S1
207/1	Assessment, for spectrum planning and strategic development, of the benefits arising from the use of the radio spectrum	S1
208/1	Alternative methods of national spectrum management	S1
209/1	Parameters of radio equipment required for spectrum management and the efficient use of the radio spectrum	S1
211/1	Unwanted emissions	C2
212/1	Development of method(s) for the determination of the coordination area around earth stations	C1
213/1	Technical and operating parameters and spectrum requirements for short-range devices	S2
214/1	Monitoring of digital broadcasting signals	S2
215/1	Monitoring of the radio coverage of land mobile networks to verify compliance with a given license	S2
201-1/3	Radiometeorological data required for the planning of terrestrial and space communication systems and space research applications	S2
202/3	Methods for predicting propagation over the surface of the Earth	S2
203-1/3	Propagation data and prediction methods for terrestrial broadcasting and terrestrial mobile services at frequencies above 30 MHz	S2
204-2/3	Propagation data and prediction methods required for terrestrial line-of-sight systems	S2
205-1/3	Propagation data and prediction methods required for trans-horizon systems	S2

206-2/3	Propagation data and prediction methods for fixed and broadcasting-satellite services	S2
207-2/3	Propagation data and prediction methods for satellite mobile and radiodetermination services above about 0.1 GHz	S2
208-1/3	Propagation factors in frequency sharing issues affecting fixed-satellite services and terrestrial services	S2
209/3	Variability and risk parameters in system performance analysis	S2
210/3	Propagation prediction procedure for the land mobile and terrestrial broadcasting services in the frequency range 30 MHz to 3 GHz	S1
211/3	Propagation data and propagation models for the design of short-range wireless personal communication systems and wireless local area networks(WLANs)in the frequency range 300 MHz to 100 GHz	S1
214/3	Radio noise	S2
215-1/3	Sky-wave field strength and circuit performance at frequencies below about 1.7 MHz	S2
217-1/3	Radio system relinbility, variations of ionospheric propagation characteristics and fading at frequencies between about 1.6 and 30 MHz	S2
218-2/3	Ionospheric influences on space systems	S2
222/3	Measurements and databanks	S2
223/3	Prediction of sky-wave propagation conditions, signal intensity and circuit performance at frequencies between about 1.6 and 30 MHz	S2
224-1/3	The prediction of system performance and reliability for digital modulation techniques at HF	S2
225-1/3	The prediction of propagation factors affecting systems using digital modulation techniques at LF and MF	S2
226/3	Ionospheric and tropospheric characteristics along satellite-to-satellite paths	S2
7-3/4	Baseband transmission variability, delay and echoes in systems in the fixed-satellite service	S2
102-2/7	Terrestrial standard-frequency and time-signal dissemination	S2
103-1/7	Techniques for time transfer	S2
110-2/7	Time codes	S2
111-1/7	Signal delays in antennas and other circuits and their calibration for high-accuracy time transfer	S2
117-1/7	Radio links between earth stations and spacecraft by means of geostationary data relay satellites	S2
118-1/7	Factors which affect frequency sharing between data relay satellites systems and systems of other services	S2
129-1/7	Unwanted emissions radiated from and received by stations of the science services	C2
139-2/7	Data transmission systems for earth exploration-satellites systems	S2
141-2/7	Data transmission for meteorological-satellite systems	S2
142-2/7	Earth exploration-satellite and meteorological-satellite data collection and position location systems	C1
143-1/7	Radiocommunications for satellite systems for geodesy and geodynamics	C1
144/7	Radiocommunication systems for the meteorological aids service	C1
145-1/7	Technical factors involved in the protection of radio astronomical observations	S2
146-1/7	Criteria for evaluation of interference to radio astronomy	S2
147/7	Radio astronomy in the vicinity of the L_2 Sun-Earth Lagrangian point	S2
148/7	Radar astronomy	S2
149-1/7	Frequency utilization on the far side of the Moon	S2
150/7	Radiocommunication requirements for systems to search for extraterrestrial intelligence	S2
154-1/7	Possible relocation of frequency assignments to certain space missions from 2 GHz bands to above 20 GHz	C2
201-1/7	Two-way time transfer through communication satellites	S1
202-1/7	Protection criteria and frequency sharing between space VLBI and other space research systems	S2
203-1/7	Characteristics and telecommunications requirements for space VLBI	S2
204-1/7	Sharing of the band 1675-1710 MHz between the mobile-satellite service and the meteorological-satellite and meteorological aids service	C1
205/7	Radio observations of pulsars	S2
206-1/7	Frequency comparisons of remotely located standards at the 10^{-15} level of uncertainty	S2
207-1/7	Time and frequency transfer using digital communication links	S1
211/7	Frequency sharing between the space research service and other services in the 37-38 GHz and 40-40.5 GHz bands	S2
212/7	Frequency sharing between the space research service and other services in the bands near 400 MHz	C1
213/7	Compatibility of active spaceborne sensors and systems in the radionavigation and radiolocation services	C2
214/7	Frequency sharing between earth exploration-satellite systems and systems in the fixed-satellite and	C2

	meteorological-satellite services in the band 8025 - 8400 MHz	
215/7	Frequency sharing between earth exploration-satellite systems (passive), space research systems(passive) and systems in the fixed, mobile and fixed-satellite services in the band 18.6 - 18.8 GHz	C2
216/7	Frequency sharing between earth exploration-satellite systems (passive), space research systems(passive) and systems in the fixed, mobile, fixed-satellite, mobile-satellite, inter-satellite and radiolocation services in the band 50.2 - 65 GHz	C2
217/7	Frequency sharing in the band 401 - 403 MHz between satellite data collection and position location systems for earth exploration and meteorological and systems in the fixed, mobile, space operation and meteorological aids services	C1
218/7	Frequency sharing between active sensor systems in the earth exploration-satellite service and systems operating in other services at around 440 MHz, 1300 MHz, 5300 MHz, 35 GHz and 95 GHz	C2
219/7	Space operation and space research services frequency bands for telecommand links in the range 100 MHz to 1 GHz	C1
220/7	Frequency sharing between earth exploration-satellite systems and systems of the fixed, mobile, inter-satellite and standard frequency and time-signal satellite services operating in the band 25.5 - 27 GHz	C2
221/7	Preferred frequency bands and protection criteria for space research service observations(passive)	S2
222/7	Radio links between earth stations and lunar and planetary missions by means of lunar and planetary data relay satellites	S2
223/7	The role of differential GPS networks in timing applications	S2
225/7	Sharing between inter-satellite service systems in the frequency band 25.25 - 27.5 GHz	S1
226/7	Frequency sharing between the radio astronomy service and other services in bands above 70 GHz	C1
227/7	Percentage of time for which interference harmful to the radio astronomy service can be accepted	C2
228/7	Preferred frequencies for the earth exploration-satellite(passive) and space research(passive) services above 70 GHz and the feasibility of sharing with other services in these bands	C1
5-5/8	The introduction of direct-printing telegraph equipment in the maritime mobile service	S2
7-5/8	Characteristics of equipment for the land mobile service between 25 and 3000 MHz	S2
9-6/8	Digital selective-calling system for future operational requirements of the maritime mobile service	S2
12-4/8	Radio-paging systems	S2
28-2/8	Frequency requirements for shipborne transponders	S2
35-1/8	Efficient use of the radio spectrum by radar stations in the radiodetermination service	S2
36-1/8	Leaky feeder systems in the land mobile service	S2
37-4/8	Systems with improved spectrum efficiency for the land mobile service	S1
39-6/8	International Mobile Telecommunications 2000 (IMT-2000)	S1
40-4/8	Digital transmission in the land mobile service	S1
51-3/8	Automatic determination of location and guidance in the land mobile service	S1
62-2/8	Interference to the aeronautical mobile and aeronautical radionavigation services	S2
67-1/8	Multi-transmitter radio systems using quasi-synchronous (simulcast) transmission in the land mobile service	S2
74-3/8	Public mobile telephone service with aircraft	S2
77-4/8	Adaptation of mobile radiocommunication technology to the needs of developing countries	S1
82-3/8	System concepts of the mobile-satellite services	S2
83-3/8	Efficient use of the radio spectrum and frequency sharing within the mobile-satellite service (MSS)	C2
84-3/8	Use of non-geostationary-satellite orbits in monile-satellite services	C2
85-1/8	Availability of circuits in mobile-satellite services	S2
87-3/8	Transmission characteristics for a mobile-satellite communication system	S2
89-2/8	Compatibility for interworking between the mobile-satellite systems and terrestrial networks including ISDN	S2
90/8	Technical and operatin gcharacteristics of systems providing radiocommunication using satellite techniques for distress and safety operations	S2
91-1/8	Technical and operating characteristics of the radiodetermination-satellite service	S2
93-2/8	Automation of MF,HF and VHF maritime mobile communications	S2
95/8	Sharing between the aeronautical radionavigation service and the mobile service in the band 5000 - 5250 MHz	S2
96-1/8	Improved efficiency in the use of the band 156 - 174 MHz by stations in the maritime mobile service	S2
98/8	Transmission of digital data for the updating of electronic chart display systems (ECDIS)	S2
101-2/8	Digitally encoded speech in the land mobile service	S1
102-1/8	Suitable frequency bands for the operation of wind profiler radars	C2

103/8	Criteria for sharing between the mobile service and the space research, space operation and earth exploration-satellite service space stations in the 2025 - 2110 MHz and 2200 - 2290 MHz bands	C2
104-2/8	Technical and operational considerations for multiservice satellites operating in the frequency bands from about 20 to about 50 GHz	C2
105/8	Criteria for sharing between the fixed service and the mobile, radiodetermination, amateur and related satellite services within the range 1 - 3 GHz	S1
106/8	Criteria for sharing between the broadcasting satellite service (sound) and complementary terrestrial broadcasting and the mobile, radiolocation and amateur services within the range 1 - 3 GHz	C2
107-1/8	Cellular land mobile telecommunication systems	S2
109/8	GMDSS requirements for mobile-satellite systems operating in the bands 1530 - 1544 MHz and 1626.5 - 1645.5 MHz	S2
110/8	Interference to the aeronautical mobile-satellite R service	S2
111/8	Coordination of frequency assignments in bands allocated to the aeronautical mobile-satellite R service	S2
113/8	Technical and operational characteristics of land mobile systems using multichannel access techniques without a central controller	S2
114/8	Technical and operational characteristics of cordless telephones and cordless telecommunication systems	S2
201/8	Frequency sharing between mobile-satellite services and other services	C2
202-1/8	Spurious emissions of radar systems	S2
203/8	Use of the maritime radionavigation band 285 - 325 kHz (283.5 - 315 kHz in Region 1)	S1
204/8	Compatibility of active spaceborne sensors and systems in the radionavigation and radiolocation services	C1
205-1/8	Transport information and control systems (TICS)	S2
206/8	Technical and operational requirements for multimode mobile radio stations	S1
207/8	Procedures for determining the interference coupling mechanism and mitigation options for systems operating in bands adjacent to and in harmonic relationship with radar stations in the radiodetermination service	S1
208/8	Evolution of land mobile systems towards FPLMTS	S1
209/8	Contributions of the mobile and amateur services and associated satellite services to the improvement of disaster communications	S1
210/8	Technical characteristics for mobile earth stations operating with global non-geostationary-satellite systems in the mobile-satellite service (MSS) in the band 1 - 3 GHz	S1
211/8	Interference criteria and calculation methods for the mobile-satellite service (MSS)	S1
212/8	Radio local area networks for mobile applications	S2
213/8	Transmission of data messages on shared private land mobile radio (PMR) channels	S1
214/8	The replanning of bands in the land mobile service	S1
215/8	Frequency bands, technical characteristics, and operational requirements for wireless access local loop systems	S1
216/8	Compatibility of radionavigation and radiolocation services operating in the bands 2900 - 3100 MHz and 5350 - 5650 MHz	S1
217/8	Interference to the radionavigation -satellite service in the ICAO global navigation satellite systems	S1
218/8	Essential technical requirements of mobile earth stations for global and regional geostationary mobile-satellite service systems in the band 1 - 3 GHz	S1
219/8	Technical criteria for spaceborne receivers operating in the radionavigation-satellite service in the space-to-space direction	S1
220/8	Spurious emission limits for stations of the mobile-satellite service	S1
102-3/9	Availability of digital radio-relay systems	S1
107-1/9	Characteristics of radio-relay systems operating in frequency bands above about 17 GHz	S2
108-1/9	Radio-frequency channel arrangements for radio-relay systems operating in frequency bands above about 17 GHz	S2
109-1/9	Methods for frequency sharing between radio-relay systems and systems and systems in the fixed-satellite service	S2
110/9	Antenna radiation diagrams of radio-relay stations for use in sharing studies	S2
111-2/9	Sharing criteria between the broadcasting-satellite service (sound and television) and the fixed service	S1
113-1/9	Frequency sharing between radio-relay systems of the earth exploration-satellite service and the space research service	S2
114-1/9	Maximum e.i.r.p. and e.i.r.p. spectral density for line-of-sight radio-relay transmitters operating in frequency bands shared with the fixed-satellite service	S2
116-1/9	Sharing criteria for protecting the fixed service from systems in the fixed-satellite service in shared frequency bands	S2

118-1/9	Sharing criteria between the mobile-satellite services and the fixed service in the band 1 to 3 GHz	S1
119-1/9	Limitation of unwanted emissions form radio-relay systems	S1
122-1/9	Effects of propagation on the design and operation of radio-relay systems	S2
125-3/9	Point-to-multipoint radio systems	S2
127-2/9	Maximum allowable performance and availability degradations of radio-relay systems due to various sources of interference	S2
133/9	Sharing criteria between the fixed and mobile services in the frequency bands between about 0.5 and 3 GHz	S1
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140-2/9	The use of cellular type mobile technologies in fixed wireless local loop applications	S2
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145/9	Characteristics required for single-sideband and independent-sideband systems used for high-speed data transmission over HF radio circuits	S2
147-1/9	Automatically controlled radio systems and networks in the HF fixed service	S2
159/9	Effects of unwanted emissions from radar systems in the radiodetermination service on systems in the fixed service	S2
160-1/9	Radio-relay systems in a synchronous digital network	S2
161-3/9	Performance limits for bringing into service and maintenance of digital radio-relay systems	S1
163/9	Criteria for frequency sharing between the fixed service and inter-satellite service operating in bands above about 20 GHz	S2
201/9	Protection of radio-relay systems from non-geostationary-satellite feeder links in the fixed-satellite service used by the mobile-satellite service in the shared frequency bands	S2
202/9	Reference radiation patterns of omnidirectional and sectoral antennas in point-to-multipoint systems for use in sharing studies	S1
203/9	Influence of propagation conditions on the bringing into service procedure for digital radio-relay systems	S2
204/9	Radio-frequency signals transport through optical fibres	S2
205/9	Technical and operational implications of using discrete blocks of spectrum by adaptive HF systems	S1
206-1/9	Sharing criteria for radio-relay systems with systems in the fixed-satellite service involving a large number of non-geostationary satellites in the 18.8 to 19.3 GHz and 28.6 to 29.1 GHz bands	S1
207/9	Sharing criteria for radio-relay systems using the same frequency bands with inter-satellite links between non-geostationary satellites in connection with feeder links for the mobile-satellite service	S2
208/9	Necessary planning tols to assist those administrations considering a replanning of their terrestrial fixed networks in the 2 GHz range	S2
209/9	Technical implications of possible definition of the quasi-geostationary robit on the fixed service sharing frequency bands with the fixed-satellite service	C1
210/9	Error performance objectives for digital radio-relay sections operating at or above the primary rate of the digital hierarchy	S1
211/9	Inclusion of radio specific management functions into SDH telecommunication management network (TMN)	S2
212/9	FS systems utilizing relays located at fixed points in the stratosphere serving high-density regions	S1
213/9	Simulation of HF transmission through an ionospheric channel	S1
214/9	Use of adaptive spread spectrum communications in the HF bands by the fixed service	S1
215/9	Development of an annex to Recommendation ITU-R F.1247 to facilitate its application in planning and design of new systems in the FS in the bands 2025 - 2110 MHz and 2200 - 2290 MHz	S1
216/9	System characteristics and sharing criteria for FS operating in frequency bands below 1 GHz	S2
217/9	Feasibility of the FS sharing with the FSS operating on the same frequencies in the range 30 - 52 GHz	S1
218/9	Sharing criteria for stratospheric high density systems in the FS using the same frequency bands with systems in the FSS	S1
219/9	Determination of coordination area related to the FS for earth stations operating with non-GSO in the FSS	S1
55-1/10	Protection ratios in LF, MF and HF broadcasting	S2
56/10	Minimum usable field strength in LF, MF and HF broadcasting	S2
57/10	Sky-wave reception in LF, MF and HF broadcasting	S2
58-1/10	Coverage in LF, MF and HF broadcasting	S2
61-1/10	Single-sideband (SSB) system for broadcasting (HF)	S2
71/10	Transmission of supplementary information with a single transmitter in frequency-modulation sound broadcasting	S1

75/10	Immunity of FM boradcast receivers against interference	S2
76-3/10	Transmitting and receiving antennas at VHF and UHF	S1
78-1/10	Standards for the transmission of several sound signals in one television channel in terrestrial or satellite broadcasting including high-definition and enhanced definition television systems	S1
84-1/10	Sound systems for the hearing impaired	S2
85-2/10	Subjective assessment of sound quality in broadcasting using digital techniques	S2
93-1/10	Characteristics of systems in the broadcasting-satellite service (sound) for individual reception by means of portable and vehicular receivers	C2
105-1/10	Multilingual services in multichannel sound systems	S2
106-1/10	Subjective assessment of sound quality	S2
107/10	Characteristics of terrestrial digital sound-broadcasting systems for reception by vehicular, portable and fixed receivers	S1
201-1/10	Transmitting and receiving antennas at LF and MF	S2
204/10	Frequency sharing issues related to the introduction of the broadcasting-satellite service (sound) in the frequency range 1 - 3 GHz	C2
205-1/10	Evaluating fields from broadcasting transmitting systems operating at frequencies below 30 MHz for assessing exposure to non-ionizing radiation	S2
207/10	Standards for digital audio techniques	S2
208-1/10	Low bit rate audio coding standards	S1
210/10	Objective perceptual quality assessment methods	S1
212/10	Planning procedures for HF broadcasting	C2
213/10	Synchronized transmitters in LF and MF sound broadcasting	S2
214/10	Unified identification label for international exchange of sound recordings	S1
215/10	Recording of sound programmes for international exchange	S2
216/10	Archival of sound programmes in broadcasting	S1
217/10	Digital broadcasting in AM bands	S2
218/10	Broadcasting of film programmes with multichannel sound	S2
219/10	Spectrum management issues related to the introduction of the broadcasting-satellite service (sound) in the frequency range 1 - 3 GHz	S1
35-4/11	Synchronization necessary for the satisfactory reception of sound and piecture signals	S1
47-1/11	Standards for digital high-definition television	S1
49-1/11	Characteristics of television signals radiated in bands above 2 GHz from terrestrial broadcasting transmitters	S2
65-1/11	Interfaces for digital video signals	S1
77-1/11	Conditional-access broadcasting systems	S1
85-1/11	Improved use of the bands allocated to the broadcasting-satellite service(sound and television) in the frequency range 11.7-12.7 GHz	C1
86-1/11	Frequency sharing for the feeder links to a broadcasting satellite (sound and television)	C1
89-1/11	Sharing studies between high-definition television (HDTV)in the broadcasting-satellite service and other services	C1
92-1/11	Digital techniques in the broadcasting-satellite service (sound and television)	S1
93-1/11	Transmitting and receiving antennas for the broadcasting-satellite service (sound and television) and for the associated feeder links	C1
94-1/11	Radiation of unwanted emissions from space stations in the broadcasting satellite service (sound and television)	S1
99-1/11	Telemetry, tracking and command signals and test signals for maintenance testing of broadcasting-satellite radio-frequency characteristics	S2
100-1/11	Satellite broadcasting of high-definition television (HDTV)	C2
101-1/11	Integrated services digital broadcasting (ISDB) in the broadcasting-satellite service (sound and television)	S2
103-1/11	Small format recording of television programmes on magnetic tape for international exchange	S2
119-1/11	The harmonization of standards between broadcast and non-broadcast applications of television	S1
121-1/11	Digital terrestrial television broadcasting	S1
202-11	Synchronization of digital video and audio bit streams in production	S1
203-11	Coding for the broadcasting of digitally-encoded TV signals in terrestrial narrow-band channels	S1
207-2/11	Generic bit rate reduction coding of digital TV signals (SDTV, EDTV and HDTV) for contribution, for primary and secondary distribution, for emission and for related applications	S1
210-2/11	Planning parameters for television broadcasting using digital terrestrial narrow-band channels	S1

213/11	Target digital HDTV standard for use in the development of future systems for the studio and for international programme exchange	S1
214-/11	User requirements for interconnection of digital HDTV studio equipment operating at full or reduced bit rate	S1
217/11	Digital multi-programme television emissions within a satellite transponder	C1
218/11	Technical characteristics of feeder links to broadcasting satellites operating in the 12,17 and 21 GHz bands	C1
220/11	Characteristics of systems on the broadcasting—satellite service (sound and television) for reception by transportable and fixed receivers	S2
221/11	Characteristics of receiving systems in the broadcasting-satellite service (sound and television)	S2
222/11	Satellite orbits and space station technology for the broadcasting-satellite service (sound and television)	S2
223/11	Protection ratios for interference studies and system planning in the broadcasting-satellite service (sound and television)	C1
224-11	Simultaneous transmissions of TV Programmes on BSS and FSS services from a multiservice space station	S1
225/11	Overall coordination of the technical characteristics and associated test methods for the separate parts of the television signal chain	S2
230/11	Acquisition and recovery times in digital television encoding	S2
231/11	Digital HDTV studio interfaces	S1
232/11	Interactive television broadcasting systems	S1
236/11	User requirements for electronic news gathering (ENG)	S1
241/11	Interactive satellite broadcasting systems (television, sound and data)	S1
244/11	Frequency requirements for electronic news gathering	S2
247/11	Access to orbit and spectrum resources for broadcasting-satellite service and fixed satellite service <<direct-to-home>> applications	S2
248/11	Harmonization of methods for delivery of multichannel digital services to the home	S1
249/11	Use of computer technology in television broadcasting applications	S2
250/11	Digital coding for multi-programme television	S2
256/11 AP/10-11S	Determination of protection requirements and criteria that may allow operation of NGSO systems in the frequency bands covered by Appendices 30 and 30A	S2

<표. 6> T1 Committee 의 TSC 및 연구 과제

TSC (Technical Sub-Committee) (연구 분야)	작업반 (WGs)	연구 과제
T1A1 (Performance and Signal Processing)	T1A1.2	Network Survivability Performance
	T1A1.3	Performance of Digital Networks and Services
	T1A1.5	Multimedia Communications Coding and Performance
	T1A1.7	Signal Processing and Network Performance for Voiceband Services
T1E1 (Interfaces, Power and Protection for Networks)	T1E1.1	Physical Interface and Analog Access
	T1E1.2	Wideband Access
	T1E1.4	DSL(Digital Subscriber Line) Access
	T1E1.5	Power Systems
	T1E1.7	Electrical Protection
	T1E1.8	Physical Protection and Design
T1M1 (Internetwork Operations, Administration, Maintenance, and Provisioning)	T1M1.3	Internetwork Operations, Testing, Operations Systems and Protocols
	T1M1.5	OAM&P Architectures, Interfaces and Protocols
T1P1 (Wireless/Mobile Services and Systems)	T1P1.1	Program Management and NII/GII
	T1P1.2	Personal Communications Service Descriptions and Network Architectures
	T1P1.3	Personal Advanced Communications Systems (PACS)
	T1P1.5	PCS 1900
	T1P1.6	CDMA/TDMA
	T1P1.7	Wideband CDMA
T1S1 (Services, Architecture and Signaling)	T1S1.1	ISDN Architecture and Services
	T1S1.3	Common Channel Signaling
	T1S1.5	Broadband ISDN
T1X1 (Digital Hierarchy and Synchronization)	T1X1.3	Synchronization and Tributary Analysis Interface
	T1X1.4	Metallic Hierarchical Interfaces
	T1X1.5	Optical Hierarchical Interfaces