Newsletter ARIB SEASON

Winter

January 2016

Event

Start of the study on the telecommunications promotion in medical institutions

The first meeting of the "Telecommunications Promotion Committee in medical institutions" which had been set up under the "Electromagnetic Compatibility Conference Japan (*1)" had been held on 14 September 2015 attended by Ministry of Internal Affairs and Communications, “Ministry of Health, Labour and Welfare”, medical personnel, academics, equipment manufacturers, telecom operators, etc.

In the Committee, in order to promote proper use of radio waves in the medical institutions, it had decided to study the following items.

(1) Improvement measures of radio wave environment in medical institutions
(2) Enhancement measures of management system of the radio wave environment in medical institutions
(3) Promotion measures to introduce advanced medical ICT systems.

The first meeting of the Telecommunications Promotion Committee in medical institutions

Reports of these studies and guidance for realizing appropriate radio wave use in medical institutions will be put together by March 2016 and notified to the medical institutions.

*1 Consultative organization to discuss measures to prevent and remove obstacles to electronic devices by radio waves. It is composed of academics, relevant ministries, relevant agencies and industry organizations. The secretariat of it is served by ARIB.

The 5th Study Group on Radio utilization system for robots

The 5th Study Group on Radio utilization system for robots had been held on 16 September 2015 in ARIB office.

This time, from the ad hoc WG in which the frequency sharing study with existing wireless system have been performed, the interim report of the following items was conducted.

(1) Study method of frequency sharing
(2) Overview of the existing wireless system
(3) Frequency sharing study situation (required separation distance by the desk study and technical issues, etc.)

Furthermore, from the Ministry of Internal Affairs and Communications, study situation related to the radio utilization system for robots in the Information and Communications Technology Subcommittee of the Information and Communications Council etc. had been reported.

The 5th Study Group on Radio utilization system for robots

In the Study Group, it had been decided to summarize the results on frequency sharing study of 2.4GHz band and 5.7GHz band and the technical conditions of radio equipment by around October.

Study results of this Study Group will be proposed in turn to the land radio communication committee of the Information and Communications Council. In addition, the study results of the Ministry of Internal Affairs and Communications, also appropriately, will be shared in this Study Group.

22nd ITS World Congress Bordeaux 2015

The 22nd ITS World Congress was held from 5 to 9 October 2015 in Bordeaux, France which was registered as a World Cultural Heritage Site by UNESCO in 2007, under the theme of "TOWARDS INTELLIGENT MOBILITY - Better use of space".

The main venue of the Congress was "Congre et Expositions de Bordeaux" which was about 30 minutes away from the city center by the tram.

Place de la Bourse (Bordeaux)

< ITS World Congress Bordeaux 2015 Outline>

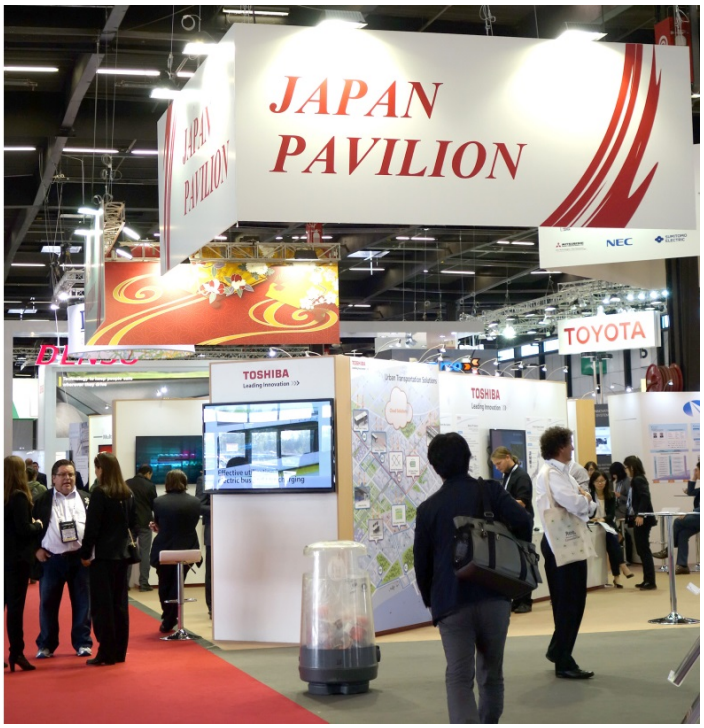
- Participants : 12,249 people
  (Mr. Matsui, Representative Director and two other people participated from ARIB)
- Conference registrants : 3,871 people
- Sessions : 257 sessions
- Exhibitors organizations : 433 organizations
- Participating countries : 102 countries

During the ITS World Congress session, the ARIB standard STD-T109 (700MHz band Intelligent Transport Systems) had been recommended as ITU-R M.2084 along with the standards of Europe, the United States and South Korea, and officially issued.

This news was introduced in the session ES07 and SIS54, and the world's first commercial vehicles equipped with the 700MHz band Intelligent Transport Systems' in-vehicle device were exhibited by Japanese car manufacturer.

Along with the 79GHz band high resolution radar, advancement of Japanese ITS technology and efforts of ARIB had been able to appeal in the world.

In addition, organized by ITS Info-communications Forum of Japan which secretariat was served by ARIB, Vehicle Safety Communications meeting had been held attended by 18 key persons from Europe, the United State and Japan, and exchange of views had been carried out actively.



Japan pavilion

Exhibition panel of ITS Info-communications Forum of Japan

CEATEC JAPAN 2015

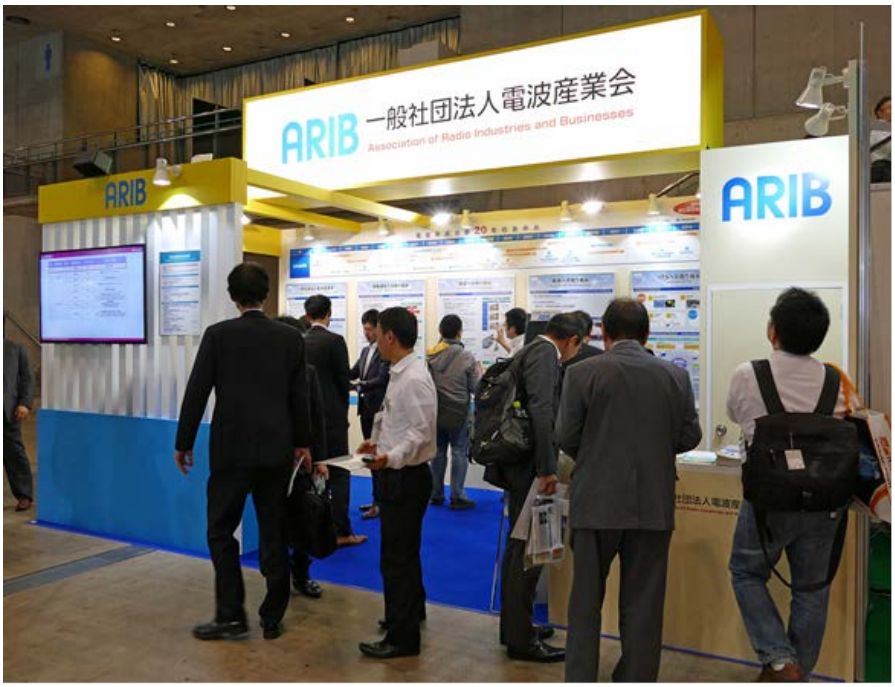
From 7 to 10 October 2015, CEATEC JAPAN 2015 was held at Makuhari Messe, Chiba prefecture near Tokyo. ARIB set up a booth at Life & Society Stage and introduced ARIB activities.

CEATEC : Combined Exhibition of Advanced Technologies

This event has a high degree of attention as a state-of-the-art ICT & Electronics comprehensive exhibition in Japan. In 2015, 531 companies and organizations exhibited and about 1000 people had come to ARIB booth.

In the ARIB booth, following contents were exhibited and introduced.

(1) Overview of ARIB
(2) ARIB's research, development and international cooperation activities
(3) "20 years history of radio industry" since foundation of ARIB
(4) Technologies and systems which won the 26th Radio Achievement Award



ARIB booth in CEATEC JAPAN 2015

In addition, ARIB had a technical seminar entitled "Trends in new technology standardization in the field of communication and broadcasting" at the International Convention Center of Makuhari Messe on 7 October, and over 100 people attended the seminar.

ARIB seminar in CEATEC JAPAN 2015

The International Workshop on the Fifth Generation Mobile Communications Systems (5G)-2015

The International Workshop on the Fifth Generation Mobile Communications Systems (5G)-2015 was held as part of the programming at CEATEC Japan 2015 at the International Conference Hall of Makuhari Messe in Chiba, Japan, on 8 October 2015. The workshop was organized by Ministry of International Affairs and Communications (MIC) and co-organized by International Telecommunication Union (ITU) and the Fifth Generation Mobile Communications Promotion Forum (5GMF).

The International Workshop on the Fifth Generation Mobile Communications Systems (5G)-2015

Mr. Toru Fukuoka, Director-General of Telecommunications Bureau, MIC, and Mr. Colin Langtry, Chief of Study Group Department, ITU-R, opened the workshop with their individual welcome addresses. Professor Emeritus Susumu Yoshida, Chairman of the 5G Workshop-2015 Organizing Committee, then gave a keynote speech. His speech was followed by a series of individual presentations and a panel discussion.

Representatives of international standards organizations and national organizations gave the following individual presentations on the current state of research and development about 5G systems around the world.

Speaker	Title
Dr. Håkan Ohlsén Vice Chairman, ITU-R Working Party 5D 	“Update on ITU-R Work on IMT-2020 for 5G”
Mr. Chris Pearson Chairman, 4G Americas (USA) 	“4G Americas’ Vision on 5G for the Americas”
Dr. Werner Mohr Chair of the Board of 5G Infrastructure Association (Europe) 	“5G PPP – The European 5G Research Program”

Speaker	Title
Ms. Zhiqin Wang Vice Chairperson, IMT-2020 (5G) Promotion Group (China) 	“5G Research Status in China”
Prof. Youngnam Han Chair, Steering Committee, 5G Forum (South Korea) 	“Roadmap for 5G”
Prof. Hiroyuki Morikawa Chairman of 5GMF Strategy & Planning Committee (Japan) 	“5GMF activities for 2020 and beyond in Japan”

Presentation title of each speaker

The panel discussion consisted of Dr. Håkan Ohlsén, Dr. Werner Mohr, Ms. Zhiqin Wang, Prof. Youngnam Han, as well as Prof. Seiichi Sampei, Chairman of the Technical Committee, 5GMF, and Dr. Ryutaro Kawamura, Acting Chairman of the Network Architecture Committee, 5GMF. Led by the panel moderator, Mr. Waichi Sekiguchi of Nikkei Inc., the panelists discussed about the various processes needed as the world moves forward towards implementing a working 5G system (e.g. Verification Trials) as well as how firms could collaborate with those outside of the mobile communications industry to enhance interest in 5G among mobile users.

Panel discussion

The 18th meeting of Study Group for New Technology for the Next generation Broadcasting System

The 18th meeting of Study Group for New Technology for the Next generation Broadcasting System was held on 9 October 2015, and a lecture on "research and development trend of the next-generation terrestrial broadcast" by Mr. Kenichi Tuchida of NHK Science and Technical Research Laboratories was held. In this meeting, termination of this Study Group was determined.

At the year of 2008 in which Study Group was established, the digital broadcasting that was started by BS digital broadcasting of 2000 and terrestrial digital broadcasting of 2003, have spread steadily and the full-fledged digital broadcasting era was reached.

In such a situation, a new study for the development of next-generation broadcasting services, such as broadcasting with the aim of high sense of presence and merging of communication and broadcasting had been discussed actively. ARIB established Study Group for New Technology for the Next generation Broadcasting System in 2008.

In the first phase (2008 to 2011), technology related to IPTV, technology relates to a high presence broadcasting such as three-dimensional television, technology in the new broadcasting using the meta-data and in the second phase (2010 to 2014), technology for the future 3DTV, new services for hybrid broadcast broadband systems, digital transmission technology of the next generation broadcasting, the SG established new working groups respectively and conducted survey research activities.

Reports summarized by the Study Group

Since a lot of research theme has already been made practical use in broadcasting services, the Study Group determined to play its role and decided to terminate the activities.

The 3rd Study Group Meeting on Private wireless communication
- Shared use of private wireless communication system -

The Study Group on Private wireless communication was established on April 2015 in order to provide a place to investigate technologies and usage trends of the private wireless communication, domestic and worldwide, and study the enhancement of Private wireless communication.

On 16 October 2015, the 3rd study group meeting was held under the theme of "shared use of private wireless communication system" attended by more than 80 people.

In the 3rd study group meeting, following presentations had been carried out.

(1) " Trend of digitization on mobile radio system for business use " by the Ministry of Internal Affairs and Communications
(2) " Shared use of the prefectural and municipal disaster prevention administrative radio " by Shizuoka Prefectural Government
(3) " Shared use of MCA radio system " by The MRC Foundation
(4) " Shared use of Business transceiver service " by NTT DOCOMO
(5) " Shared use of IP wireless service " by SoftBank

After the presentation, lively free discussion about the needs and countermeasures of the shared use of private wireless communication systems in the fields of public and general use had been carried out.

The 3rd Study Group on Private wireless communication

Private 5G promotion organizations of Europe, US, China, South Korea and Japan signed a memorandum of understanding on "Global 5G Events"

On 20 October 2015, the workshop named "5G Workshop between Regional initiatives" was held in Lisbon, Portugal as part of one of the European largest ICT event "ICT 2015 - Innovate, Connect, Transform" (held on 20 to 22 October 2015).

In the Workshop, participants from the following governmental and private 5G promotion organizations had gathered under one roof and exchanged information and opinions from the viewpoint of standardization and frequency band in order to realize and generalize 5G earlier.

Japan	・Ministry of Internal Affairs and Communications ・The Fifth Generation Mobile Communications Promotion Forum (5GMF)
Europe	・European Commission ・The 5G Infrastructure Public Private Partnership (5G PPP)
US	・Federal Communications Commission (FCC) ・4G Americas
China	・Ministry of Industry and Information Technology ・IMT-2020 (5G) Promotion Group
South Korea	・Ministry of Science, ICT and Future Planning ・5G Forum

From Japan, Mr. Yuji Nakamura (Director of New-Generation Mobile Communications Office, Land Mobile Communications Division, Ministry of Internal Affairs and Communications), Dr. Kohei Satoh (Secretary General of 5GMF and Executive Manager on Standardization of ARIB) and Mr. Takehiro Nakamura (Acting Chairman of Strategy & Planning Committee, 5GMF) had made presentations about situation and future trends of 5G in Japan and carried out lively exchange of information and opinions with attendees from foreign countries in the panel discussion.

In this workshop, five private 5G promotion organization had agreed to hold "Global 5G events" twice a year in turn and signed a memorandum of understanding between each other.

Commemorative photo after the announcement of the Memorandum

Meeting with Brazilian Society of Television Engineering (SET)

ARIB invited Olympio Franco, President, and Fernando Bittencourt, Vice President of the Brazilian Society of Television Engineering (SET) on 17 November 2015. A meeting for opinion exchange was held with members of the Digital Broadcasting Experts Group (DiBEG) and officials of the Ministry of Internal Affairs and Communications.

Franco, president of SET, highly appreciated the support of DiBEG on ISDB-T adopted in Brazil, and remarked that it was very meaningful to exchange opinions among experts of both countries for further strengthening cooperation in the future.

Subsequently, they exchanged views and opinions among the participants about cooperation of both countries for the international permeation of ISDB-T, vision on the next generation of TV broadcasting, such as 4K / 8K and Integrated broadcast-broadband (IBB) systems, as well as the interference issue of digital terrestrial service and mobile communication systems.

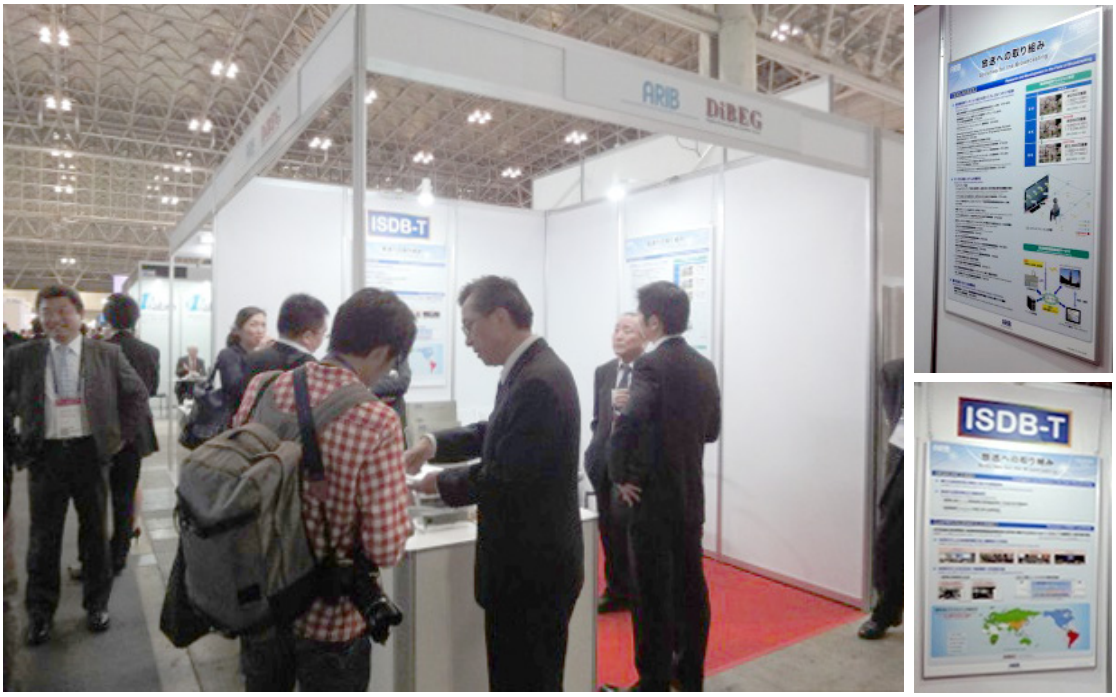
Also, next year will be the 10th anniversary of adoption of ISDB-T in Brazil, and the analog switch-off (ASO) wave will be pushed forward, in which they mutually confirmed to maintain close exchange of opinions towards further development of ISDB-T in the both countries.

Opinion exchange with SET

ARIB/DiBEG booth in InterBEE2015

InterBEE2015 was held in Makuhari Messe from 18 to 20 November 2015. ARIB performed public relations by providing a booth. In InterBEE2015, 996 companies exhibited, and the registered visitors were 35,646.

The international expansion of IBDB-T by the standardization of trends in the field of Digital Broadcasting Experts Group (DiBEG) was introduced on the panel in our booth,



ARIB/DiBEG booth and Panels in InterBEE2015

Lectures by the representatives of the Brazilian Society of Television Engineering (SET)

Brazil decided to adopt the ISDB-T standard in 2006, heloped by the activities of the international promotion by DiBEG, and they began digital terrestrial service in 2007. Thereafter SET and ARIB / DiBEG have been in close cooperation.

Recently, in a special forum at the InterBEE2015, SET representatives lectured on the trends of the digital broadcasting ahead of the Olympic Games in Rio de Janeiro in 2016, DiBEG will continue its support and cooperation toward SET for successful digital TV coverage of the Rio Olympic Games.

Special forum by the SET attended by full capacity of audience

The 6th Study Group on Radio utilization system for robots
- Approved final report of ad hoc WG and decided the future action plan -

The 6th Study Group on Radio utilization system for robots had been held on 2 December 2015 in ARIB office.

This time, from ad hoc WG performing frequency sharing study with existing wireless system (candidate frequency band：2.4GHz and 5.7GHz), final report on the study result of frequency sharing conditions and draft of technical conditions had been performed.

Furthermore, from the Ministry of Internal Affairs and Communications, report on the study situation of 169MHz band telemeter/telecontrol radio utilization system for robots had been performed.

In the Study Group, following action plan had been approved.

(1) Propose the WG study results to the robot working group of the land radio communication committee, Ministry of Internal Affairs and Communications

(2) Perform the study on plan of operational arrangement between systems and carry out the summarization of entire report by around May 2016.

The 6th Study Group on Radio utilization system for robots

Monthly seminars on radio wave use

No.134	23 October 2015
Title	Activities on 5G and Beyond in Europe
Speaker	Dr. Hendric Berndt Former Chief Technology Officer & Chief Science Officer and Senior Vice-President of DOCOMO's Communications Laboratories in Europe
Summary	The seminar covered the research and development trend of 5G in Europe such as new European Technology Platform of communication network and service in Horizon2020, 5G test bed, cooperation activities of Europe and Japan, etc.
No.135	2 December 2015
Title	Study situation of Licensed Assisted Access - LTE (LAA-LTE)
Lecture theme and Speaker	(1) " Trend of LAA Standardization in 3GPP" Satoshi Nagata, NTT DOCOMO, INC. (2) "Technology of unlicensed bandwidth utilization in 3GPP (LAA、LTE-WLAN Aggregation)" Masaaki Obara, KDDI Corporation (3) "Licensed Assisted Access -Evolving the Network" Yoshio Honda, Ericsson Japan (4) "LAA-Overview" Masakazu Shirota, Qualcomm Japan
Summary	The seminar covered the study situation of LAA in 3GPP, the study situation of frequency band sharing with existing systems such as wireless LAN and the stance against commercialization in foreign countries.
No.136	22 December 2015
Title	Overview of 2015 World Radiocommunication Conference (WRC-15) Result
Speaker	Mr. Takao Nitta Director of International Frequency Policy Office, Ministry of Internal Affairs and Communications
Summary	The seminar covered the overview of results in 2015 World Radiocommunication Conference (WRC-15) held on 2 to 27 November 2015 in Geneva, Switzerland.

Standards

DIGITAL MOBILE TELECOMMUNICATION SYSTEM FOR LOCAL GOVERNMENT (SCPC/4FSK)

(STD-T116 Ver.1.0)

This standard specifies narrow-band wireless digital mobile communication system using 4-level phase-shift keying as a 260MHz-band business-use mobile communication system

Time Code Format in the Interface for UHDTV Production Systems

(STD-B68 Ver.1.0)

This standard specifies data structure and multiplexing method of timecode transmission at the interface of studio equipment for the super high definition television (UHDTV) signal.

In ARIB, in order to meet globalization, Standards and Technical Reports are being translated to English sequentially according to the priority.

By the end of September 2015, translations of Standards and Technical Report listed below had been completed. PDF files of these documents will be sequentially published in the ARIB web site.

[Field of Telecommunication]

STD-T48	Ver.2.1	MILLIMETER-WAVE RADAR EQUIPMENT FOR SPECIFIED LOW POWER RADIO STATION
STD-T91	Ver.2.0	UWB (ULTRA- WIDEBAND) RADIO SYSTEMS
STD-T106	Ver.1.0	920MHz-BAND RFID EQUIPMENT FOR PREMISES RADIO STATION
STD-T107	Ver.1.0	920MHz-BAND RFID EQUIPMENT FOR SPECIFIED LOW POWER RADIO STATION
STD-T112	Ver.1.4	SPECIFIED RADIO MICROPHONE FOR LAND MOBILE RADIO STATION (TV WHITE SPACE BAND, EXCLUSIVE BAND, 1.2GHz BAND)

[Field of Broadcasting]

STD-B44	Ver.2.0	TRANSMISSION SYSTEM FOR ADVANCED WIDE BAND DIGITAL SATELLITE BROADCASTING
STD-B62	Ver.1.2	MULTIMEDIA CODING SPECIFICATION FOR DIGITAL BROADCASTING (SECOND GENERATION)
TR-B33	Ver.2.3	OPERATIONAL GUIDELINES FOR TERRESTRIAL MOBILE MULTIMEDIA BROADCASTING BY TRANSMISSION SYSTEM BASED ON CONNECTED SEGMENTS FOR VHF-HIGH BAND

Study for Telecommunication System

1. Radio utilization system for robots

Study Group on Radio utilization system for robots was established in November 2014 in order to grasp a wireless communication needs for robots, consider technical conditions of telecommunication system and possibility of frequency sharing with other systems and summarize the measures assisting smooth introduction of robots in various fields based on the current status and utilization trend of disaster and industrial robots.

The 6th Study Group meeting had been held on 2 December 2015 in ARIB office.

This time, from ad hoc WG performing frequency sharing study with existing wireless system (candidate frequency band：2.4GHz and 5.7GHz), final report on the study result of frequency sharing conditions and draft of technical conditions had been performed.

2. Private Wireless Communication

Study Group on Private Wireless Communication was established in April 2015 in order to provide major players in private wireless communication field (governments, manufacturers and users) with a place of gathering, investigate technologies and user trends in Japan and oversees and consider sophistication of private wireless communication.

The 2nd Study Group meeting was held on 23 July 2015.

In the meeting, presentations had been carried out by the Ministry of Internal Affairs and Communications, "the Ministry of Land, Infrastructure and Transport", Tokyo metropolitan government, Tokyo Electric Power, Safety communication working group of Japan Gas Association and Nippon Television Network under the theme of "current situation and problems of public private wireless communication". Exchange of views on service function, configuration, operation management and problems of current private wireless communication had been carried out actively.

In the next three years until March 2018, this Study Group will be held four times a year.

R&D for Telecommunication System

1. Wireless LAN System

Wireless LAN System Development Group is aiming to conduct research and development for reliability improvement, sophistication of wireless LAN system and standardization.

The 21st meeting was held on 19 August 2015.

The progress of the study on the "Up Link traffic surge in Station overcrowded deployment environment" has been reported from the ad hoc Gr. Study and analysis of the way for survey and measurement will be continued.

2. Advanced Wireless Communications Study Committee

The Advanced Wireless Communications Study Committee (ADWICS) was established in ARIB on 1 April 2006. Cooperating with other related international/domestic bodies, the Committee conducts technical studies on Advanced Wireless Communications Systems and contributes to their international standardization in the following four subcommittees and one AdHoc.

- ・Mobile Partnership Subcommittee
- ・Standardization Subcommittee
- ・Broadband Wireless Access Subcommittee
- ・Mobile Commerce Subcommittee
- ・2020 and Beyond AdHoc

(1) Mobile partnership subcommittee

This Subcommittee contributes to the international standardization of IMT and M2M and the transposition to standards in Japan through the contribution and the participation in 3GPP, 3GPP2 and oneM2M.

On 30 September 2015, revised drafts of following ARIB Standards and Technical Report were proposed to the Standard Assembly and approved.

- · ARIB STD-T63 IMT-2000 DS-CDMA and TDD-CDMA System
- · ARIB TR-T12 IMT-2000 DS-CDMA and TDD-CDMA System
- · ARIB STD-T104 LTE-Advanced System ARIB STANDARD

(2) Standardization Subcommittee

This Subcommittee conducts technical study on IMT-Advanced and Future IMT

service and promotes its standardization through the contributions to ITU and other activities.

The 14th meeting of the subcommittee was held 6 August 2015. During the meeting, results of the 22nd meeting of the ITU-R Working Party 5D (WP5D) (10 - 18 June 2015: San Diego, U.S.A.) were reported and action policy and draft contributions for the 23rd WP5D meeting were discussed.

(3) Mobile-Commerce Subcommittee

This Subcommittee conducts technical studies on Mobile Commerce and promotes its standardization. In this Subcommittee, technical expert committee and propulsion expert committee have been set up.

The 50th and 51st technical expert committee meetings were held on 28 August and 18 September 2015. During the meetings, the following subjects on promotion and improvement of mobile public key infrastructure (PKI) were discussed.

・Access to e-government, etc. from a mobile phone
・Methods for mounting a public personal authentication certificate to a mobile phone

The propulsion expert subcommittee dealt with the following:.

・Development of voucher profile using NFC
・Overseas inspection and NFC related market research
・Held study group meeting on mobile commerce

Study for Broadcasting System

Quality Evaluation Method for Broadcasting

(1) Evaluation Sequence

With a view to providing reference video image (4K・8K) for UHDTV, the issues were discussed in cooperation with the Institute of Image Information and Television Engineers (ITE). As a first step, a suitable material as UHDTV standard video image will be selected from the existing full resolution 8K material, and distributed them. And as a second stage, creation of the new video for standard video image is preparing.

(2) Sound Quality Evaluation

As for the subjective quality evaluation methods of the advanced sound systems, revised draft of ITU-R Recommendation BS.1116 to append a note on the

measurement error due to the installation direction of the measurement microphone at the sound adjustment is approved. As the next step, the specific sound adjustment method for reducing measurement error was studied, and creating a new report is under discussing.

R&D for Broadcasting System

1 Digital Broadcasting Systems

Amendments of ARIB standards were deliberated. Following revised ARIB standards were deliberated.

1. ARIB STD-B10 (Service Information for Digital Broadcasting System) V5.6
2. ARIB STD-B32 (Video Coding, Audio Coding and Multiplexing Specifications for Digital Broadcasting) V3.4
3. ARIB STD-B46 (Transmission System for Terrestrial Mobile Multimedia Broadcasting based on Connected Segment Transmission) V2.2
4. ARIB STD-B53 (Receiver for Terrestrial Mobile Multimedia Broadcasting Based on Connected Segment Transmission) V2.3
5. ARIB STD-B60 (MMT Based Media Transport Scheme in Digital Broadcasting Systems) V1.4
6. ARIB STD-B63 (Receiver for Advanced Wide Band Digital Satellite Broadcasting) V1.3

The Standard Assembly has approved the above six revised standards.

(1) Multiplexing Technology

Each revision of ARIB STD-B10 V5.6, ARIB STD-B32 V3.4 and ARIB STD-B60 V1.4 were drafted.

In ARIB STD-B10, PID (Packet Identifier) and the allocation of descriptor tag value based on notification of the Ministry of Internal Affairs and Communications and standard of the Japan CATV Technology Association regarding advanced scheme of CATV were added.
In ARIB STD-B32, "bridged frame" as the packet type to be transmitted in the ULE(Unidirectional Lightweight Encapsulation) packet was added.
In ARIB STD-B60, in response to study request from the Next Generation Television and Broadcasting Promotion Forum (NexTV-F) that is considering operational guidelines, a leap second indicator to the descriptor was added and the control information for the application transmission scheme was modified.

In addition, introduction of high dynamic range (HDR) video system to UHDTV is being studied, and revision of the ARIB STD-B10 and ARIB STD-B60 are being discussed.

(2) Video Coding Technology

Introduction of high dynamic range (HDR) video system to UHDTV is studied, and revision of the ARIB STD-B32 is discussed.

(3) Data Coding Technology

In response to study request on leap second from the Next Generation Television and Broadcasting Promotion Forum (NexTV-F), revision of the ARIB STD-B60 that defines transmission of subtitles using MMT and the ARIB STD-B24 that defines data transmission using the TS were discussed.

Revision of the ARIB STD-B60 has drafted in conjunction with Multiplexing Technology Working Group. Revision of the ARIB STD-B24 was decided to propose to The Standard Assembly after next.

(4) Data Broadcasting

ARIB STD-B24 (Data Coding and Transmission Specification for Digital Broadcasting) was discussed to add the external application control descriptor and the recording and playback-related descriptors to the application control scheme.

The English translated version of ARIB STD-B62 1.2 (Multimedia Coding Specification for Digital Broadcasting <2nd Generation>) was reviewed.

(5) Access control technology / Rights protection

ARIB STD-B61 (Conditional Access System <2nd Generation> and CAS Program Download System Specifications for Digital Broadcasting) is studied to add the provisions of the CAS IC chip to be applied to UHDTV.

Revised ARIB STD-B61 will be proposed to the next Standard Assembly.

(6) Receiver for Digital Broadcasting

In response to the revision of the Ministry of Internal Affairs and Communications notification, the amendment to add a reception center frequency to "Receiver for Terrestrial Mobile Multimedia Broadcasting Based on Connected Segment Transmission to be applied to V-Low" of ARIB STD-B53 was discussed .

*V-Low : Terrestrial Mobile Multimedia Broadcasting by Transmission System Based on Connected Segments for VHF-Low Band

The downloading supplemental provisions of the receiver common data of ARIB STD-B63 were discussed to add the provisions of the data structure of a still image logo data and the provisions for updating of data.

Intermodulation of the optical transmitter, image rejection ratio of the converter and local oscillator leakage level of the converter, which should be defined in ARIBSTD-B63, were studied and evaluation experiments were conducted.

(7) Terrestrial Broadcasting Transmission System

In response to the revision of the Ministry of Internal Affairs and Communications Notification, if there is interference or a possibility of interference at the frequency of the V-Low multimedia broadcasting, ARIB STD-B46 was discussed to add a frequency that can be used in order to avoid them.

2 Program Production Systems

(1) Video Program Production Systems

The color gamut inclusion rate calculation method (technical report) for the display of UHDTV program production was proposed and discussed. Draft of technical report will continue to further study.

Furthermore, consideration of the signal level such as tickers and subtitles in HDR broadcasting, requested from the video coding WG, was exchanged opinions.

(2) Sound Program Production Systems

1. Extension of loudness measurement method

   Substantially along the Japanese proposal, collateral of fully compatible less than 5.1ch has been agreed and expected to be recommended in ITU-R meeting. In response to this, the revision of TR-B32, Operational Guidelines for Loudness of Digital Television Programs, will be proposed to the next Standard Assembly.

2. Study items on the ITU-R SG6

   For major issues in ITU-R SG6 block meeting, took place in July, there was a cooperation request from the international broadcasting standardization WG, the following items of the deal policy were discussed.

   - Audio metadata and audio file format
   - Signaling requirements of compliant of Loudness
   - Sound program distribution and playback adapted to the transmission system for sound program contribution
   - specification modification of channel-based advanced sound system

(3) Interface between Program Production Equipment

The discussion about the time code format of Interface between UHDTV studio equipment had done.

The creation of guideline for interconnection of camera and lens for UHDTV (Technical Report) is being studied. Between camera manufacturers and lens maker of 4K・8K, they held a workshop aimed at formulating guidelines, and discussed base on that results.

Drafted ARIB Technical Report will be proposed to the Standard Assembly after next.

(4) Digital Closed caption Production

The conversion from digital subtitles to ARIB-TTML subtitles (recommended) was proceeded to discuss.

The details of various items related to the conversion to the ARIB-TTML (target, display position, character coding, character size, display partition, format, exchange system) are being discussed. Drafted ARIB Guideline will be proposed to the Standard Assembly after next.

(5) Program Material File Format

Since 4K・8K road map has been clear, whether there is a theme to be discussed in this working group with respect to the 4K program file format and heard the opinions of each member. After organizing gathered opinions, WG will proceed to discuss and standardized.

3 Transmission of Television Program Contribution

(1) SNG Transmission System

Experiment policies and experimental items were studied with a view to revision of adding a DVB-S2X standard to ARIB STD-B26 (HDTV digital SNG transmission systems).

Since the results of development status of the modulator-demodulator, the prospect of satellite communication experiments will be later next spring, so that WG will consider whether translator folded confirmation test can be done by using the modulator only at an early stage. In addition, a study about the feasibility of experimental items will be discussed.