ITS Outputs in FY 2005

NTIA Publications

J.W. Allen and J. Ratzloff (Eds.), "Proceedings of the International Symposium on Advanced Radio Technologies, March 1-3, 2005," NTIA Special Publication SP-04-418, Mar. 2005.

> A collection of papers presented at the 2005 International Symposium on Advanced Radio Technologies (see p. 78).

M. Cotton, R. Achatz, J. Wepman, and B. Bedford, "Interference potential of ultrawideband signals - Part 1: Procedures to characterize ultrawideband emissions and measure interference susceptibility of C-band satellite digital television receivers," NTIA Report TR-05-419, Feb. 2005.

> In this study, we hypothesize that ultrawideband (UWB) interference potential can be quantified in terms of UWB signal characteristics. To test this hypothesis, a test system was designed and built to inject UWB signals with known characteristics into a C-band satellite digital television receiver and quantitatively measure interference susceptibility via signal quality metrics (e.g., segment error rate, pre-Viterbi bit error rate, and modulation error ratio) taken from various points in the receiver signal processing chain. UWB signals are characterized by the amplitude probability distribution and power spectral density. Characterization measurements done with a vector signal analyzer provide amplitude and phase information to enable extensive post-measurement capability. This report describes the test setup and procedures in detail. Subsequent reports will provide assessment of interference potential for gated Gaussian noise bursts (Part 2) and modern UWB systems (Part 3).

M. Cotton, R. Achatz, J. Wepman, and P. Runkle, "Interference potential of ultrawideband signals - Part 2: Measurement of gated-noise interference to C-band satellite digital television receivers," NTIA Report TR-05-429, Aug. 2005.

> This report demonstrates that digital television (DTV) susceptibility to gated-noise interference cannot be predicted by interference power characteristics alone. It was found that DTV susceptibility is also dependent on temporal characteristics of the interfering signal and the bandwidth of the DTV receiver. A test system was developed to inject interference with known characteristics into a victim receiver and quantitatively measure susceptibility. In this experiment, a C-band satellite DTV victim receiver was exposed to gated-noise interference, whose temporal characteristics are defined by gating parameters such as on-time, fractional on-time, and off-time. The specific gating parameters considered in this report include on-times of 0.01, 0.10, 1.00, and 10.00 μs and fractional on-times of 1.00, 0.50, 0.25, 0.125, and 0.0625. Results showed that DTV susceptibility was strictly dependent on average power of the interfering signal only when off-times were less than the reciprocal bandwidth of the victim receiver. For longer off-times, however, susceptibility was dependent on the temporal characteristics of the interfering signal. Moreover, high correlation was observed between susceptibility and forward error correction performance of the receiver.

R. Dalke and G. Hufford, "Analysis of the Markov character of a general Rayleigh fading channel," NTIA Technical Memorandum TM-05-423, Apr. 2005.

> It has been proposed that first-order Markov channel models can be used to adequately predict the behavior of a mobile "Rayleigh" fading channel and hence improve the reliability of bidirectional mobile communications systems. Previous authors have addressed this question by applying information theory to the amplitude

statistics of a stationary mobile communications channel. The previous work required numerical analysis to show that for a particular covariance function and range of relevant parameters (i.e., Doppler frequency, symbol period), the channel is approximately first-order Markov. In our analysis, both amplitude and phase information are used to obtain analytic expressions which can easily be used to determine if a non-stationary arbitrary Rayleigh channel is necessarily first-order Markov. The analytic results are given in terms of arbitrary covariance functions that can readily be applied to measurements. In particular, our results show that the previously studied mobile channel is not first-order Markov in character.

J.J. Lemmon, "Radiation pattern analysis of a four-element linear array," NTIA Technical Memorandum TM-05-426, Aug. 2005.

The effects of mutual coupling on the radiation pattern of a four-element linear array were investigated. The objective was to improve the angular resolution of the array for direction-of-arrival estimation by compensating for mutual coupling. It is concluded that the effects of mutual coupling on the performance of the array are not significant, and that the angular resolution of the array is consistent with its theoretical radiation pattern in the absence of mutual coupling. However, it is recommended that the array be calibrated to compensate for systematic errors and any (small) mutual coupling effects that are present.

M.H. Pinson and S. Wolf, "In-service video quality metric (IVQM) user's manual," NTIA Handbook HB-05-424, Apr. 2005.

The purpose of this handbook is to provide a user's manual for the in-service video quality metric (IVQM) tool. IVQM performs automated processing of live video signals. This program runs under the Windows XP® operating system on two PCs communicating through an IP connection. IVQM performs image acquisition, temporal registration, other video calibration (spatial registration, spatial scaling, valid region, and gain/level offset), and video quality estimation.

IVQM compares the source video sequence to the destination video sequence (i.e., as output by the video system under test). Each program alternates between video capture and video analysis. Every source/destination video sequence pair is processed through three main steps. First, the sequences are buffered onto a hard drive. Second, the sequences are temporally registered. Third, the video quality of the destination video sequence is estimated. Quality estimates are reported on a scale of zero to one, where zero means that no impairment is visible and one means that the video clip has reached the maximum impairment level. Some video sequences may also be used to estimate other calibration values (spatial registration, spatial scaling, valid region estimation, and gain/level offset). The user has control over how often these other calibration values are calculated.

M.H. Pinson and S. Wolf, "IVQM software," NTIA Software & Data Product SD-05-425, Apr. 2005.

See previous entry for description of the IVQM.

M.H. Pinson and S. Wolf, "Video scaling estimation technique," NTIA Technical Memorandum TM-05-417, Jan. 2005.

Digital video compression algorithms are being deployed that spatially stretch or shrink the video picture. Although small changes in spatial scaling are not usually noticeable to viewers, objective video quality measurement systems may be adversely impacted if the spatial scaling is not corrected. This report describes an algorithm that can be used to automatically measure the amount of spatial scaling present in a video system. This algorithm obtains satisfactory computational complexity by (1) separating the searches for horizontal & vertical scaling factors, (2) using image profiles rather than full images, and (3) using random rather than exhaustive searching techniques.

F.H. Sanders, "Bandwidth dependence of emission spectra of selected pulsed-CW radars," NTIA Technical Memorandum TM-05-431, Aug. 2005.

This technical memorandum describes measurements of the radiated emission spectra of selected maritime radiolocation radar transmitters in multiple bandwidths. The results support published criteria for selection of measurement bandwidths for emission spectra of non-FM pulsed-CW radars. This result complements the radar spectrum engineering criteria (RSEC) measurement procedures described in NTIA Report TR-05-420.

F.H. Sanders, R.L. Hinkle, and B.J. Ramsey, "Measurement procedures for the radar spectrum engineering criteria (RSEC)," NTIA Report TR-05-420, Mar. 2005.

The wide application of radar for various functions makes large demands on the electromagnetic spectrum, and requires the application of effective frequency management for the equipment and systems involved. Requirements for certain equipment characteristics are specified in the NTIA Manual of Regulations and Procedures for Federal Radio Frequency Management to ensure an acceptable degree of electromagnetic compatibility among radar systems, and between such systems and those of other radio services in the frequency spectrum. These standards are called the Radar Spectrum Engineering Criteria (RSEC). This report describes techniques for measuring radar spectrum-related parameters and characteristics for compliance with the RSEC. Measurements for both conventional and advanced radar types are addressed. This report supersedes NTIA Report 84-157 of August 1984.

F.H. Sanders and B.J. Ramsey, "Comparison of radar spectra on varying azimuths relative to the base of the antenna rotary joint," NTIA Technical Memorandum TM-05-430, Aug. 2005.

This technical memorandum describes the results of radiated measurements of the emission spectrum of a maritime radar at varying azimuths relative to the base of the radar transmitter antenna rotary joint. The measurements were performed to address the question of whether the emission spectrum of such a radar might vary as a function of the pointing azimuth of the radar antenna as it rotates due to variation in the joint's voltage standing wave ratio (VSWR) with azimuth. If such variation were to occur, then the radiated spectrum would need to be characterized as a function of azimuth. The measurement results indicate that the emission spectrum of this radar does not vary as a function of transmitter antenna azimuth. It is concluded that this issue is probably not a concern for radar emission measurements in general, and that the radiated spectrum measurement procedures described in NTIA Report TR-05-420 are adequate.

Outside Publications

Articles in Conference Proceedings

J. Randy Hoffman and R.J. Matheson, "RSMS measurement and analysis of LMR channel usage," in "Proceedings of the International Symposium on Advanced Radio Technologies: March 1-3, 2005," J.W. Allen and J. Ratzloff, Eds., NTIA Special Publication SP-05-418, Mar. 2005, pp. 13-19.

The Radio Spectrum Measurement System (RSMS) is used to make a wide range of radio measurements to help manage the federal portion of the radio spectrum. This paper describes a recent set of land mobile radio (LMR) channel occupancy measurements in the Washington, DC, area. These RSMS measurements were made to provide data in support of several projects related to long-term planning of ways to use federal radio bands more efficiently. The measurements were made using new equipment and techniques that digitized spectrum in 5-MHz swaths and processed it to obtain simultaneous signal levels in 400 individual LMR channels. These techniques provided faster measurements than conventional swept-frequency techniques and also allowed enhanced post-processing of the data to remove measurement defects like intermodulation products and impulsive noise.

J.J. Lemmon, "MIMO channel capacity with discrete alphabets," in *Proc. Wireless 2005*, Calgary, Jul. 2005.

Information theory is used to derive expressions for the channel capacity of MIMO communication systems that use discrete sets of input symbols. The results are compared with the classical Shannon capacity that corresponds to a continuous (Gaussian) set of symbols. The relationships between capacity and signal-to-noise ratio, numbers of transmit and receive antennas, and the number of input symbols are discussed. Example results for various channel conditions are presented.

R.J. Matheson, "Flexible spectrum use rights tutorial - ISART 2005," in "Proceedings of the International Symposium on Advanced Radio Technologies: March 1-3, 2005," J.W. Allen and J. Ratzloff, Eds., NTIA Special Publication SP-05-418, Mar. 2005, pp. 157-167.

Although "command and control" spectrum management techniques have provided licenses for many specific services since the early days of radio, such licensing may not easily permit new technologies and new services. This paper describes the necessary principles of flexible use spectrum rights, which may allow a wide variety of spectrum uses in a single general-purpose band. Based on the electrospace description of the radio spectrum, these principles allow general aggregation or division of licensed electrospace regions via secondary markets, providing rules for how regulatory limits change under aggregation or division. These flexible-use principles limit transmitter behaviors that tend to create a more difficult operating environment for receivers, while making receivers responsible for handling any remaining interference. Flexible-use principles could provide a basis for real-world flexible-use frequency bands.

T.J. Riley and T.L. Rusyn, "Using a PCS self-interference model to evaluate the effects of cell damage or failure," in "Proceedings of the International Symposium on Advanced Radio Technologies: March 1-3, 2005," J.W. Allen and J. Ratzloff, Eds., NTIA Special Publication SP-05-418, Mar. 2005, pp. 205-211.

Using a self-interference model developed at the Institute for Telecommunication Sciences (ITS), the effects of system damage, load shifting, and increased traffic on personal communications service (PCS) systems can be studied, allowing emergency service providers to anticipate system availability and the need for supplemental emergency communications equipment. Currently implemented for systems following the ANSI/TIA/EIA 95B standard, this model characterizes the self-interference by producing a multiple-channel multiple-base station air interface signal with a variable number of base stations and channels per base station. The model also includes power control for individual signals, which is an important aspect of the interference level existing in the spectrum. The study of self-interference helps to develop more useful schemes to reduce the interference levels. The change in the aggregate air-interface spectrum is calculated and the resultant signal to interference (C/I) values can be used to determine the change in service quality and the probability of service availability. Any number of scenarios can be developed, depending on the configuration of the system under study and the level of detail desired. Since the model produces a cumulative baseband signal for both the forward and reverse directions, it can be implemented in a real-time hardware channel simulator, or as a component of higher-level software simulation and modeling. Predicted C/I values can be used in software-based network models to anticipate system limitations, traffic bottlenecks, and the probability of overall system failure. The baseband signal produced can be used to generate a simulated traffic signal for the testing and evaluation of commercial equipment. The model is particularly well-suited for independent PCS system evaluation by other Federal agencies, system manufacturers, and service providers.

F. Sanders, "Detection and measurement of radar signals: A tutorial," in "Proceedings of the International Symposium on Advanced Radio Technologies: March 1-3, 2005," J.W. Allen and J. Ratzloff, Eds., NTIA Special Publication SP-05-418, Mar. 2005, pp. 169-181.

> The wide use of radars for various functions makes significant demands on the electromagnetic spectrum. Effective measurement and monitoring of radar emissions is necessary to verify compliance with the legal emission limits specified in the Radar Spectrum Engineering Criteria (RSEC), as set forth by NTIA. Detection and measurement of radar signals is necessary to ensure an acceptable degree of electromagnetic compatibility among radar systems, and between such systems and those of other radio services in the frequency spectrum. This tutorial describes techniques for detecting and measuring radar emissions for compliance with the RSEC and other spectrum management purposes. Techniques for both conventional and advanced radar types are addressed.

F. Sanders, "Technical challenges to spectrum sharing between radars and non-radar (communication) systems," in "Proceedings of the International Symposium on Advanced Radio Technologies: March 1-3, 2005," J.W. Allen and J. Ratzloff, Eds., NTIA Special Publication SP-05-418, Mar. 2005, pp. 21-29.

> To partially satisfy a voracious worldwide appetite for additional spectrum allocations for data and voice communication systems, proposals have been put forth for such systems to share spectrum with radars by operating in bands that have previously been allocated on a primary or co-primary basis for radars alone. Technical justifications for sharing proposals typically include the following claims: Radar systems make little use of existing spectrum allocations, and so there is much radar spectrum available for other uses; radar receiver performance is inherently robust against interference from signals of other services, and therefore radar receivers can operate co-channel with, or at least in the same band as, communication signals; to the extent that interference to radars might occur from non-radar services, it can be limited in principle on some acceptable statistical basis; and finally, if interference to radar receivers due to spectrum sharing in fact is found to be intolerable, it is possible in principle to design and deploy communication systems that will mitigate interference by detecting locally utilized radar frequencies and avoiding operations on those frequencies. All of the above statements contain either technical flaws or implementation challenges that need to be understood by decision makers who must grapple with the radar spectrum sharing issues. This paper discusses the technical challenges of allowing non-radar communication systems to operate in radar spectrum.

S.D. Voran, "A basic experiment on time-varying speech quality," in *Proc. of the 4th International Conference on Measurement of Speech and Audio Quality in Networks (MESAQIN)*, Prague, Czech Republic, Jun. 2005.

> We present a general formulation of a basic open question regarding the perception of time-varying speech quality. We then describe the design, implementation, conduct, and analysis of a practical experiment that addresses a small but fundamental part of that open question. In this experiment, listeners rate the overall speech quality of single sentence stimuli that contain two different levels of nominal speech quality and two transitions between these levels. We present several results including those related to human integration of speech quality and the recency effect. Finally, we discuss these results and suggest potential additional work that might build upon them.

S.D. Voran, "A multiple-description PCM speech coder using structured dual vector quantizers," in *Proc. 2005 IEEE International Conference on Acoustics, Speech, and Signal Processing*, Philadelphia, PA, Mar. 2005.

> We describe a 2-channel multiple-description speech coder based on the ITU-T Recommendation G.711 PCM speech coder. The new coder operates in the PCM code domain in order to exploit the companding gain of PCM. It applies a pair of 2-dimensional structured vector

quantizers to each pair of PCM codes, thus exploiting the correlation between adjacent speech samples. If both quantizer outputs are received, they are combined to generate an approximation to the original pair of PCM codes. If only one quantizer output is received, a coarser approximation is still possible. When using 6 bits/sample/channel (for a total data rate of 96 kbps) the coder provides an equivalent PCM speech quality of 7.3 bits/sample when both channels are working and 6.4 bits/sample when one channel is working.

S.D. Voran, "Multiple-description PCM speech coding by complementary asymmetric vector quantizers," in *Proc. IEEE 2005 Region 5 Conference*, Denver, CO, Apr. 2005.

We describe new 2-channel multiple-description speech coders based on the ITU-T Recommendation G.711 PCM speech coder. The new coders operate in the PCM code domain in order to exploit the companding gain of PCM. They apply pairs of complementary asymmetric 2-dimensional vector quantizers to each pair of PCM codes, thus exploiting the correlation between adjacent speech samples. If both quantizer outputs are received (two channels working), they are combined to generate an approximation to the original pair of PCM codes. If only one quantizer output is received (one channel failed, one channel working), a coarser approximation is still possible. The vector quantizers use rectangular cells, and the aspect ratio of the cells controls the speech-quality trade-off between the two-channel and one-channel cases.

S. Wolf and M.H. Pinson, "Low bandwidth reduced reference video quality monitoring system," in *Proc. First International Workshop on Video Processing and Quality Metrics for Consumer Electronics*, Scottsdale, AZ, Jan. 2005.

This paper presents a new reduced reference (RR) video quality monitoring system that utilizes less than 10 kbits/s of reference information from the source video stream. This new video quality monitoring system utilizes feature extraction techniques similar to those found in the NTIA General Video Quality Model (VQM) that was recently standardized by the American National Standards Institute (ANSI) and the International Telecommunication Union (ITU). Objective to subjective correlation results are presented for 18 subjectively rated data sets that include more than 2500 video clips from a wide range of video scenes and systems. The method is being implemented in a new end-to-end video quality monitoring tool that utilizes the Internet to communicate the low bandwidth features between the source and destination ends.

Journal Articles

C. Dvorak and N. Seitz, "Signalling and interworking challenges for quality of service in the next-generation network," *The Journal of the Communications Network 3*, Part 2, pp. 14-23, Apr.-Jun. 2004.

A key challenge for next-generation networks (NGN) is the standardisation of a quality-of-service (QoS) solution that supports voice telephony and other real-time services with assured quality levels, requiring end-to-end signalling that must work across multiple IP-based networks. This paper summarises representative industry efforts to standardise IP network QoS signalling capabilities for NGN, and identifies one very fundamental area - the standardization of technology-independent IP QoS signalling requirements - where focused industry effort is urgently needed.

P. Papazian, "Basic transmission loss and delay spread measurements for frequencies between 430 and 5750 MHz," *IEEE Transactions on Antennas and Propagation 53*, No. 2, pp. 694-701, Feb. 2005.

Impulse response radiowave propagation measurements from an urban area of Denver, CO, are described. The basic transmission loss and delay spread are used to characterize the mobile communications environment. These metrics are quantified using path loss slope and delay spread statistics. By analyzing the results versus carrier frequency, the relative propagation impairments at 430, 1350, 2260, and 5750 MHz are compared. It was found that the path loss slope increased on average by 11 dB/dec and the median delay spread decreased from 0.7 to 0.3 s over the decade of frequencies measured.

Unpublished Presentations

N. DeMinco, "Antenna factor determination for antennas in the near field of a large radiating aperture," International Union of Radio Science (URSI) Meeting, Boulder, Colorado, Jan. 8, 2005.

J.E. Kub, "LabVIEW with databases automates testing of land mobile radios for public safety," National Instruments Technical Symposium, Colorado School of Mines, Golden, Colorado, Nov. 18, 2004.

R. Matheson, "The radio spectrum," Annual Conference of Women in Cable and Telecommunications (WICT), Broomfield, Colorado, Nov. 11, 2004.

E. Nelson, "Managing intersystem interference between analog and digital two-way radio systems," International Wireless Communications Expo (IWCE), Las Vegas, Nevada, Apr. 2005.

E. Nelson, presentation of proposed P25 Compliance Assessment Program details to the American Council of Independent Laboratories (ACIL), IEEE EMC Society meeting, Chicago, Illinois, Aug. 2005.

T.J. Riley, "Simulation of PCS traffic loading and interference due to cell damage or failure," International Union of Radio Science (URSI) Meeting, Boulder, Colorado, Jan. 5, 2005.

F.H. Sanders, "Factors to consider for intersystem EMC," ITU-R Radar Seminar, Geneva, Sep. 24, 2005.

F.H. Sanders, "Radar emission measurement techniques," 51st Annual Tri-Service Radar Symposium, Monterey, California, Jun. 2005.

S.D. Voran, "Coding and quality of speech and music," Invited Guest Lecture at the University of Northern Colorado, Greeley, Colorado, Apr. 19, 2005.

Conferences Sponsored by ITS

International Symposium on Advanced Radio Technologies (ISART 2005)

The International Symposium on Advanced Radio Technologies (ISART 2005) was held March 1-3, 2005. This symposium explores the current state of the radio art with an eye towards forecasting the use of wireless technology in the future. In order to accomplish this goal, ISART brings together a diverse collection of people from academia, business, and government agencies to discuss the interplay between technological "how-to," the possibilities and restrictions created by regulation and policy, and the economic motivation of the business world. For more information see: http://www.its.bldrdoc.gov/meetings/art/.

ISART attendees mingling in the lobby outside the auditorium (photograph by W.A. Kissick).

Standards Leadership Roles

David J. Atkinson, Technical Coordinator for the development of a Justice and Public Safety XML Data Model and Data Element Dictionary, through the XML sub-committee of the Global Justice Information Sharing Initiative's Infrastructure/ Standards Working Group.

Randall S. Bloomfield, Federal Representative on Project 25/34 Steering Committee; Vice-Chair of the ISSI Task Group (ISSI TG) and Vice-Chair of the P25 Systems Architecture Working Group (PSAWG) (both within the APCO Project 25 Interface Committee); Editor of Project 25 Statement of Requirements (P25 SoR).

Paul M. McKenna, Chair of ITU-R U.S. Study Group 3 (Radiowave Propagation); U.S. Chair of Working Party 3K; Chair of (international) Subgroup 3K-2 to Working Party 3K; Chair of Drafting Group for 3M-3B.

William J. Pomper, Chair of APCO/NASTD/FED Project 25 Encryption Task Group.

Timothy J. Riley, Member of Alliance for Telecommunications Industry Solutions (ATIS) committee WTSC-G3GRA (Wireless Technologies and Systems Committee — Radio Aspects of GSM/3G and Beyond) and issue champion for development of a document addressing interference issues affecting wireless communication systems.

Frank Sanders, Chair of ITU-R Radar Correspondence Group (radar technical spectrum issues); Delegate to ITU-R Working Party 8B (radar spectrum allocation and sharing) and Joint Rapporteur Group 1A-1C-8B (radar spectrum efficiency issues).

Neal B. Seitz, Vice Chair of ITU-T Study Group 13 (Next Generation Networks); Chair of ITU-T Study Group 13 Working Party 4 (OAM and QoS); Vice Chair of ATIS Network Performance, Reliability, and Quality of Service Committee (PRQC).

Bruce R. Ward, Editor for TIA102-BACx, "ISSI measurement methods for voice services," and TIA102-BACx, "ISSI performance recommendations for voice services."

Arthur Webster, Co-chair of Video Quality Experts Group (VQEG); Rapporteur for Question 14/9 (Objective and subjective methods for evaluating perceptual audiovisual quality in multimedia services within the terms of Study Group 9) in ITU-T Study Group 9 (Integrated broadband cable networks and television and sound transmission); Chair of Joint Rapporteur Group on Multimedia Quality Assessment (JRG-MMQA); Chair of ATIS PRQC's Security Task Force. Study Group 9's Liaison Officer for the ITU's Telecommunications for Disaster Relief and Mitigation - Partnership Co-ordination Panel (PCP-TDR).

Representative Technical Contributions

Contributions listed below are a sample of the extensive standards work that ITS does each year.

Audio Quality

- Revision of T1.801.04-1997 (R2002), "Multimedia communications delay, synchronization, and frame rate," ATIS PRQC-2005-064, Apr. 2005 (S.D. Voran, N.B. Seitz).
- "An algorithm for near real-time tracking of time-varying delays in telecommunications speech signals," ATIS PRQC-2005-065, Apr. 2005 (S.D. Voran).
- Proposed Revised Text for ANS T1.801.04, ATIS PRQC-2005-094, Jun. 2005 (N.B. Seitz).
- LB A013 Comment Consideration Report, ATIS PRQC-2005-147, Aug. 2005 (S.D. Voran).
- Text for ANS T1.801.04, ATIS PRQC-2005-148, Aug. 2005 (S.D. Voran).

Emergency Telecommunications Service Projects

- "Availability and restorability aspects of emergency telecommunications service (ETS)," Draft Technical Report, T1A1/2003-210, Oct. 2004 (A. Webster).
- "User plane priority levels for IP networks and services," Draft Technical Report, T1A1/2003-196R3, Nov. 2004, approved as an ATIS Technical Report FY 2005 (A. Webster).
- "Proposed revisions to draft new Recommendation J.pref (formerly J.tdr.1) - Specifications for preferential telecommunications over IPCablecom networks," ITU-T Study Group 9, Jan. 2005 (A. Webster).

- "Service restoration priority levels for IP networks," Initial Text for Draft Technical Report, ATIS PRQC-2005-021, Feb. 2005, report approved FY 2005 (A. Webster).
- "Overview of standards in support of emergency telecommunications service (ETS)," Draft Revision of T1.TR.79-2003, PRQC-2005-105, Jun. 2005 (A. Webster).
- "Reliability and survivability aspects of emergency telecommunications services," ATIS Technical Report, report approved FY 2005 (A. Webster).

High-power Radars and Spectrum Sharing

- Proposed Modification to Radar Emission Spectrum Measurement Bandwidth Limit in Recommendation M.1177-3, ITU-R WP-8B (F. Sanders).
- Proposed Modification to Radar Emission Spectrum Antenna Rotation Procedure in Recommendation M.1177-3, ITU-R WP-8B (F. Sanders).

APCO Project 25

- "Experiment 3 MOS test plan for vocoder technology for Project 25 Phase 2," APCO Project 25 Interface Committee Vocoder Task Group, Denver, CO, Aug. 2005 (D. Atkinson).
- Discussion paper: "Migration considerations and the "interim" FSI standard," Fixed Station Interface Task Group (FSITG) (P25/TR-8), Jun. 2005 (R. Bloomfield).
- Planned future ISSI standardization area: ISSI engineering guidelines, revised draft PSAWG functional description, PSAWG (P25/TR-8), Jun. 2005 (R. Bloomfield).
- Issue E of the Draft Revised Project 25 Statement of Requirements, Project 25 User Needs Subcommittee (P25 UNS), Sep. 2005 (R. Bloomfield).
- Issue J of planned new TIA/ANSI standard: Project 25 ISSI measurement methods for voice services, ISSI TG (P25/TR-8), Oct. 2004 (R. Bloomfield).
- Issue I of planned new TIA/ANSI standard: Project 25 ISSI performance specifications for voice services, ISSI TG (P25/TR-8), Oct. 2004 (R. Bloomfield).

Quality of Service

- "QoS provisions in IEEE 802.11-based wireless LANs," ATIS PRQC-2005-069, Apr. 2005 (N.B. Seitz).
- "Development of an NGN QoS program management plan," ATIS PRQC-2005-117, Jun. 2005 (N.B. Seitz).
- "SIP-based call processing performance in NGNs," ATIS PRQC-2005-143, Aug. 2005 (N.B. Seitz).

Ultrawideband

- "Derivation of the necessary bandwidth (-20 dB bandwidth) and -40 dB bandwidth formulas for CW pulsed modulated waveforms," US Radiocommunications Sector Fact Sheet, Document USJRG05-07 Rev.1, Mar. 2005 (L. Brunson and R. Dalke).

Video Quality

- "Report of JRG-MMQA meetings June and October 2004," ITU-T Study Group 9 (also sent to SG12), Jan. 2005 (A. Webster).