BIBLIOGRAPHY OF THE ELECTROMAGNETICS DIVISION

June 30, 1972 to June 30, 1973

Compiled by Margaret L. Woolley

Electromagnetics Division Institute for Basic Standards National Bureau of Standards Boulder, Colorado 80302

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INTRODUCTION

This bibliography lists the publications of the NBS Electromagnetics Division between June 30, 1972 and June 30, 1973. Documents accepted for publication but not yet published are also listed. All the documents identified in the 1972 bibliography (June 30, 1971 to June 30, 1972) as "to be published" have now been published and are included in this report.

Although NBS Reports, Memoranda for the Record and other informal documents are included, it must be understood that these are not formal publications and are considered "unpublished", and therefore not generally available for distribution.

The documents in this bibliography can be categorized as follows:

NES Monographs	3
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Journal Publications	42
NBS Reports and other reports to Sponsors (unpublished)	24
Memoranda for The Record (unpublished)	2

Publications of the Electromagnetics Division (Originally named the Radio Standards Engineering Division) from 1956 to June 30, 1972 are listed in NBS Reports (unpublished) of 1969, 1970, 1971 and 1972 and are on file at the Electromagnetics Metrology Information Center of the Electromagnetics Division.

Voltage & Current

The Six-Port Coupler: A New Approach to Measuring Voltage, Current, Power, Impedance, and Phase Hoer, Cletus A.

IEEE Trans. Instrumentation & Measurement Nov. 1972, Vol. IM-21, No. 4, 466-470

Self-Calibration of Complex Ratio Measuring System Allred, C. M. and C. H. Manney Proceedings of IMEKO, Dresden, Germany June 17-23, 1973 (To be published)

2-Port $\lambda G/4$ Waveguide Standard of Voltage Standing-Wave Ratio Beatty, R. W.

Electronics Letters
Jan. 25, 1973, Vol. 9, No. 2, 24-26

Invariance of the Cross Ratio Applied to Microwave Network Analysis

Beatty, R. W.

NBS Technical Note 623 Sept. 1972, 26 pages

Comments on "Errors in $S_{1\,1}$ Measurements Due to the Residual Standing-Wave Ratio of the Measuring Equipment"

Beatty, R. W. and G. E. Schafer IEEE Trans. Microwave Theory & Techniques May 1973, Vol. MTT-21, No. 5, 364

The Measurement of Lumped Parameter Impedance; A Metrology Guide

Jones, R. N.

NBS Monograph (To be published)

Discontinuity Capacitance of a Coaxial Line Terminated in a Circular Waveguide: Part II -- Lower Bound Solution Risley, Edward W., Jr.

IEEE Trans. Microwave Theory & Techniques Aug. 1973, Vol. MTT-21, No. 8, 564-566

Application of an Arbitrary 6-Port Junction to Power-Measurement Problems

Engen, Glenn F. and Cletus A. Hoer IEEE Trans. Instrumentation & Measurement Nov. 1972, Vol. IM-21, No. 4, 470-474

Theory of UHF and Microwave Measurements Using the Power Equation Concept

Engen, Glenn F.

Technical Note 637 April 1973, 68 pages

An Experimental Demonstration of the Insensitivity of 'Power Equation' Methods to Connector Imperfections Engen, G. F.

Proc. 1971 European Microwave Conf. (Stockholm, Sweden) 1971, bl/5 l pp.

NBS Millimeter Wave Power Standards

Harvey, Morris E.

1972 IEEE GMTT International Microwave Symposium Digest May 1972, 22-23

Autocorrelation and Power Measurement with Pyroelectric and Dielectric Bolometers

Lawton, R. A.

IEEE Trans. Instrumentation & Measurement
(To be published)

Precision 30 MHz, 10 dB, Waveguide Below Cutoff Step Attenuator NBS Model SA/l
Adair, Robert T.
NBS Report (Unpublished)
July 1972, 33 pages

- 30 MHz Attenuation Measurement System Adair, Robert T. and Clarence C. Cook NBS Report (Unpublished) August 1972, 53 pages
- 30 MHz, Dual Channel, Attenuation Measurement System Adair, Robert T. and Clarence C. Cook

 NBS Report (Unpublished)

 October 1972, 61 pages
- A New Technique for RF Measurements Using Superconductors Kamper, R. A., M. B. Simmonds, R. T. Adair and C. A. Hoer Proceedings IEEE Jan. 1973, Vol. 61, No. 1, 121-122
- Quantum Mechanical Measurement of RF Attenuation
 Kamper, R. A., M. B. Simmonds, R. T. Adair
 and C. A. Hoer
 Proc. of the 1972 Applied Superconductivity Conf.
 Annapolis, Maryland
 May 1-3, 1972, 5 pages
- $\label{eq:millimeter} \begin{array}{ll} \mbox{Millimeter Attenuation and Reflection Coefficient Measurement} \\ \mbox{System} \end{array}$

Yates, B. C. and W. Larson NBS Technical Note 619 July 1972, 175 pages Measurement of Noise Performance Factors

Arthur, M. G.

1973 IEEE GMTT International Microwave Symposium (University of Colorado, Boulder, Colorado)
June 4-6, 1973, 226

The Measurement of Noise Performance Factors; A Metrology Guide

Arthur, M. G.

NBS Monograph (To be published)

Spectrum Measurements of Electromagnetic-Noise in Coal Mines

Bensema, W. D. and John W. Adams 1973 International IEEE/G-AP Symposium Digest and USNC/URSI Meeting (Abstract Only) (To be published)

Coal Mine Magnetic-Field Noise Measurements Bensema, W. D.

First West Va. Univ. Conf. on Coal Mines Electrotechnology Proceedings Aug. 2, 1972, 12 pages

An Automated Precision Noise Figure Measurement System at 60 GHz

Boyle, D. R., F. R. Clague, G. R. Reeve, D. F. Wait and M. Kanda

IEEE Trans. Instrumentation & Measurement Nov. 1972, Vol. IM-21, No. 4, 543-549

A Reference Noise Standard for Millimeter Waves Daywitt, W. C.

1973 IEEE GMTT International Microwave Symposium (University of Colorado, Boulder, Colorado June 4-6, 1973, 149-150

Spectral Density Analysis: Frequency Domain Measurements of Signal Stability

Halford, D., J. H. Shoaf and A. S. Risley
Invited talk at the 27th Annual Symposium on Frequency
Control, Atlantic City, N. J.
June 12-14, 1973

Noise (cont.)

Amplitude Statistics of Electromagnetic Noise in Coal Mines

Kanda, M. and J. W. Adams
 1973 International IEEE/URSI Symposium Digest and
 USNC/URSI Meeting (Abstract & Summary)
 (To be published)

Frequency Stability Specification and Measurement: High Frequency and Microwave Signals

Shoaf, J. H., D. Halford and A. S. Risley
NBS Technical Note 632
(Supt. of Documents, U.S. GPO, Washington, D.C. 20402,
SD Catalog No. Cl3.46:632)
Jan. 1973, 70 pages (65 cents)

Measurement of Amplifier Noise
Wait, D. F.
Microwave Journal

Jan. 1973, Vol. 16, No. 1, 25-29

Measurement of Laser Pulse Dispersion in Glass Fiber Optical Waveguides

Andrews, James R.

Memorandum For The Record (Unpublished) July 25, 1972, 55 pages

Inexpensive Laser Diode Pulse Generator for Optical Waveguide Studies

Andrews, James R.

Review of Scientific Instruments (To be published)

Random Sampling Oscilloscope Time Base Andrews, James R.

NBSIR 73-309 (To be published)

Coaxial-Line Pulse-Response Error Due to a Planar Skin-Effect Approximation

Holt, Donald R. and Norris S. Nahman IEEE Trans. Instrumentation & Measurement Nov. 1972, Vol. IM-21, No. 4, 515-519

Pyroelectric Baseband Pulse Autocorrelator Lawton, Robert A. and N. S. Nahman NBS Report (Unpublished) Oct. 1972, 69 pages

A Note on the Transition (Rise) Time Versus Line Length in Coaxial Cables

Nahman, Norris S.

IEEE Trans. Circuit Theory
Mar. 1973, Vol. CT-20, No. 2, 165-167

Transient Analysis of Coaxial Cables Using the Skin Effect Approximation $A+B\sqrt{s}$

Nahman, Norris S. and Donald R. Holt IEEE Trans. Circuit Theory Sept. 1972, Vol. 19, No. 5, 443-451

A Zero to $-100~\mathrm{dBm}$ Digital Pulse Power Meter for L Band Avionics Test Set Calibration

Ondrejka, Arthur R. and Paul A. Hudson NBS Report (Unpublished) August 1972, 49 pages

Field Strength, Antenna Gain, Etc.

A Least-Squares Boundary Residual Method for the Numerical Solution of Scattering Problems

Davies, J. Brian

IEEE Trans. Microwave Theory & Techniques Feb. 1973, Vol. MTT-21, No. 2, 99-104

Observations on Energy Deposition in Primates From Electromagnetic Fields

Frazer, J. and A. Gass (USAF School of Aerospace Medicine) and H. E. Bussey

Fall URSI Meeting, Williamsburg, VA Dec. 12-15, 1972 (To be published)

Development and Construction of an Electromagnetic Near-Field Synthesizer For The HF Band

Greene, F. M. and J. W. Frazer (USAF School of Aerospace Medicine)

USNC/URSI Meeting, Boulder, Colorado Aug. 21-24, 1973 (To be published)

Scattering-Matrix Description and Near-Field Measurements of Electro-Acoustic Transducers

Kerns, David M.

NBS Report (Unpublished) July 1972, 48 pages

Study of Measurements of Antenna-Radiometer Parameters Final Report on Phase 1: Evaluation of Antenna Loss and Beam Efficiency Measurements and Radiometer Calibrations for the S-193 and S-194 Skylab Systems

Newell, A. C., P. F. Wacker, D. F. Wait, W. C. Daywitt and R. C. Baird

NBSIR 73-314

May 1973, 114 pages

Accurate Measurement of Antenna Gain and Polarization at Reduced Distances by an Extrapolation Technique

Newell, Allen C., Ramon C. Baird and Paul F. Wacker IEEE Trans. Antennas & Propagation July 1973, Vol. AP-21, No. 4, 418-431

Electromagnetic Scattering by a Thin Wire With Continuous Impedance Loading -- Part I: Frequency Domain Analysis Tong, Tommy C.

NBSIR 73-310

Dec. 1972, 23 pages

Frequency & Time Domain Analysis

Letter to the Editor: High-Order Single-Step Frequency Multiplication
Halford, D.
Physics Today
(To be published)

Random Sampling Oscilloscope for the Observation of Mercury Switch Closure Transition
Andrews, James R.
IEEE Trans. Instrumentation & Measurement

IEEE Trans. Instrumentation & Measurement (To be published)

NILECJ Standard for Fixed and Base Station FM Receivers Arthur, M. G., L. F. Saulsbery, W. W. Scott, Jr. and J. F. Shafer
Report to Sponsor, the Law Enforcement

Report to Sponsor, the Law Enforcement Standards Laboratory (To be published)

NILECJ Standard for Mobile FM Receivers
Arthur, M. G., L. F. Saulsbery, W. W. Scott, Jr. and
J. F. Shafer
Report to Sponsor, the Law Enforcement
Standards Laboratory
(To be published)

NILECJ Standard for Personal/Portable FM Receivers
Arthur, M. G., L. F. Saulsbery, W. W. Scott, Jr. and
J. F. Shafer
Report to Sponsor, the Law Enforcement
Standards Laboratory
(To be published)

Theory and Application of a 6-Port Coupler (Final Report)
Hoer, Cletus A.

NBS Report (Unpublished)
August 1972, 69 pages

Single Strand Model Computer Programs for the Transmission Line Properties of The Mooring Line Data Line Holt, D. R. and N. S. Nahman NBSIR 73-305 April 1973, 59 pages

NILECJ Standard for Batteries
Jesch, Ramon L. and Winston W. Scott, Jr.
Report to Sponsor, the Law Enforcement
Standards Laboratory
(To be published)

An Evaluation of Available Stray Energy Monitors for Electroexplosive Device (EED) Safety Qualification Melquist, D. G., A. R. Ondrejka and P. A. Hudson Proc. IEEE Symposium on Electromagnetic Compatibility (To be published)

Miniature Superconductive Coaxial Transmission Lines Nahman, Norris S.

Proceedings IEEE

Jan. 1973, Vol. 61, No. 1, 76-79

Power Stabilization of a Klystron Oscillator Using Resonator Voltage Control

Ruspa, Guido F.
NBS Report (Unpublished)
July 1972, 84 pages

A Precision Hydromechanical Displacement Micropositioner Sapp, Alvin E. and Clarence C. Cook Review Scientific Instruments May 1973, Vol. 44, No. 5, 564-566

A New Go, No-Go Type Stray Energy Monitor Device for EED Safety Qualification

Werner, P. E., P. A. Hudson, A. R. Ondrejka and D. G. Melquist Proc. IEEE Symposium on Electromagnetic Compatibility (To be published)

Signal Detection Systems
Yates, B. C. and G. J. Counas
NBS Report (Unpublished)
Sept. 1972, 57 pages

Miscellaneous

Application of Waveguide and Circuit Theory to the Development of Accurate Microwave Measurement Methods and Standards Beatty, R. W.

NBS Monograph (To be published)

Optical Communications - in the 70's and Beyond - A Preliminary Survey

Bloom, Louis R.

Report to the National Science Foundation under Contract H-1221
June 1973, Vol. II, 118-129

Appliance and Apparatus Efficiency Bloom, Louis R.

Final Report Ad Hoc Committee to the Interdepartmental Fuel and Energy Committee of the State of New York (Electrical Subcommittee Report) June 25, 1973, 11-137

Mass Quantity Gauging by RF Mode Analysis
Collier, R. S., D. Ellerbruch, J. E. Cruz, R. W. Stokes,
P. E. Luft, R. G. Person and A. E. Hiester
NBSIR 73-318
June 1973, 185 pages

Test Plan and Test Procedures for the National Data Buoy Project Mooring Line Data Line Ellerbruch, Doyle A.

NBS Report (Unpublished)
May 1972, 59 pages

Application of Measurements of Electromagnetic Phenomena to Oceanography

Ellerbruch, D. A.

UJNR/MEC Record (Symp. Record of U.S.-Japan UJNR Joint Symp. on Marine Electronics (To be published)

Calibration of an Arbitrary Six-Port Junction for Measurement of Active and Passive Circuit Parameters
Engen, Glenn F.

IEEE Trans. Instrumentation & Measurement (To be published)

Fast Fourier Transform Implementation for the Calculation of Network Frequency Domain Transfer Functions from Time Domain Waveforms

Gans, William L. and N. S. Nahman NBSIR 73-303 Dec. 1972, 49 pages

Single Strand Model Computer Programs for the Transmission Line Properties of The Mooring Line Data Line

Holt, D. R. And N. S. Nahman

NBSIR 73-305

April 1973, 59 pages

Tables and Graphs of the Stable Probability Density Functions

Holt, D. R. and E. L. Crow Journal of Res. Sec. B. (To be published)

Glossary of Standard Terms and Definitions for Law Enforcement Communications

Jickling R. M. and R. E. Nelson

Report to Sponsor: Law Enforcement Standards Laboratory, NILECJ (To be published)

Bibliography of Physics and Engineering Applications of Ultrasound

Metzker, Robert F.

NBS Report, (Unpublished) September 1972, 97 pages

Bibliography of Diagnostic and Therapeutic Applications of Ultrasound

Metzker, Robert F.

NBS Report, (Unpublished) September 1972, 149 pages

Bibliography of Biological Effects of Ultrasound Metzker, Robert F.

NBS Report, (Unpublished) September 1972, 38 pages Bibliography of Animal Applications of Ultrasound Metzker, Robert F.

NBS Report, (Unpublished) September 1972, 17 pages

Bibliography of Ultrasonic Transducer Design and Evaluation Metzker, Robert F.

NBS Report, (Unpublished) September 1972, 34 pages

Bibliography of Industrial and Chemical Applications of Ultrasound

Metzker, Robert F.

NBS Report, (Unpublished) September 1972, 28 pages

The Quantification of Thoracic Fluid Volume by Means of Impedance Plethysmography

Moffitt, Lee Ray and N. S. Nahman Memorandum For The Record (Unpublished) Jan. 1973, 116 pages

Communication Channel Simulation and Propagation Effects: 0.225 to 40.0 GHz(A Bibliography)
Rumfelt, Anne Y.

NBSIR 73-313 June 1973, 70 pages

Relevancy of Measurements by a Systems Approach Sangster, Raymond C. Joint Measurement Conference Proceedings Boulder, Colorado

June 21-23, 1972, 31-38

Lord Kelvin on Atoms as Fundamental Natural Standards (for Base Units)

Snyder, Wilbert F.

IEEE Trans. Instrumentation & Measurement Mar. 1973, Vol. IM-22, No. 1, 99

Chapter 2: Standards

Chapter 3: Basic Electronic Standards

Snyder, Wilbert F.

Basic Electronic Instrument Handbook (Clyde F. Coombs, Jr., Editor-in-Chief) McGraw-Hill Book Company

1972, 2-1 thru 2-16, 3-2 thru 3-64

Miscellaneous (cont.)

Photoanodic Engraving as a Means of Making a Relief Hologram on Photoconductor Surfaces
Wei, David T. Y. and Louis R. Bloom
Applied Optics
Jan. 1973, Vol. 12, No. 1, 150-152

Quartz Optical Waveguide by Ion Implantation Wei, David T. Y., William W. Lee and Louis R. Bloom Applied Physics Letters Jan. 1973, Vol. 22, No. 1, 5-7

Bibliography of the Electromagnetics Division Woolley, Margaret L.

NBS Report, (Unpublished)
June 1972, 16 pages

Chapter 4: Accuracy and Precision
Zapf, Thomas L.
Basic Electronic Instrument Handbook
(Clyde F. Coombs, Jr., Editor-in-Chief)
McGraw-Hill Book Company
1972, 4-1 thru 4-20

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FORM NBS-114A (1-71)				
U.S. DEPT. OF COMM. BIBLIOGRAPHIC DATA	1. PUBLICATION OR REPORT NO. NBSIR 73-320	2. Gov't Accession No.	3. Recipient	's Accession No.
SHEET 4. TITLE AND SUBTITLE	MBSIR /3-320		5. Publicati	on Date
Bibliography of	the Electromagnetics Div	ision	6. Performing	g Organization Code
7. AUTHOR(S) Margare	et L. Woolley			g Organization
9. PERFORMING ORGANIZATION NAME AND ADDRESS			10. Project/ 2729]	Task/Work Unit No.
NATIONAL BUREAU OF STANDARDS , Boulder , Labs . DEPARTMENT OF COMMERCE Boulder , Colorado 80302			11. Contract/Grant No.	
12. Sponsoring Organization	Name and Address		13. Type of Covered	Report & Period
Same as	s Item 9.		14. Sponsorin	ng Agency Code
15. SUPPLEMENTARY NOTE	ES .		<u> </u>	
16 ARCTRACT (A 200-word	or less factual summary of most significant	information. If documen	nt includes a	oionificant
17. KEY WORDS (Alphabetic	n June 30, 1972 and June			
Antenna paramete	ers; attenuation; current impedance; and waveguide	; electromagn	netic mea	asurements;
18. AVAILABILITY STATEM	1ENT	19. SECURITY		21. NO. OF PAGES
X UNLIMITED.				
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FOR OFFICIAL TO NTIS.	. DISTRIBUTION. DO NOT RELEASE	UNCL ASS 20. SECURIT (THIS PA	Y CLASS	18 22. Price

