August 22, 1947

RADIO:

Publications by the Staff of the National Bureau of Standards.

<table>
<thead>
<tr>
<th>Contents</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>General information</td>
<td>2</td>
</tr>
<tr>
<td>Addresses of publishers of journals</td>
<td>4</td>
</tr>
<tr>
<td>Radio (general)</td>
<td>5</td>
</tr>
<tr>
<td>Radio waves:</td>
<td></td>
</tr>
<tr>
<td>Radio wave transmission phenomena (general)</td>
<td>6</td>
</tr>
<tr>
<td>Fading</td>
<td>7</td>
</tr>
<tr>
<td>Daily and seasonal variations</td>
<td>8</td>
</tr>
<tr>
<td>Directional variations of radio waves</td>
<td>9</td>
</tr>
<tr>
<td>Solar and cosmic effects on radio wave propagation</td>
<td>9</td>
</tr>
<tr>
<td>Eclipses</td>
<td>12</td>
</tr>
<tr>
<td>Ionosphere</td>
<td>12</td>
</tr>
<tr>
<td>Transmission formulas; distance range</td>
<td>15</td>
</tr>
<tr>
<td>Atmospheric disturbances; strays</td>
<td>16</td>
</tr>
<tr>
<td>Antennas (general)</td>
<td>16</td>
</tr>
<tr>
<td>Radio measurements and standardization:</td>
<td></td>
</tr>
<tr>
<td>Frequency measurements and standards (general)</td>
<td>17</td>
</tr>
<tr>
<td>Piezoelectric frequency standards</td>
<td>18</td>
</tr>
<tr>
<td>Capacity measurement</td>
<td>19</td>
</tr>
<tr>
<td>Measurements of resistance, voltage, etc.</td>
<td>19</td>
</tr>
<tr>
<td>Measurement of field intensity, noise, etc.</td>
<td>20</td>
</tr>
<tr>
<td>Properties of electrical insulating materials</td>
<td>20</td>
</tr>
<tr>
<td>Radio apparatus and equipment</td>
<td></td>
</tr>
<tr>
<td>Radio transmitters and generators</td>
<td>21</td>
</tr>
<tr>
<td>Protective devices</td>
<td>21</td>
</tr>
<tr>
<td>Radio receiving apparatus</td>
<td>21</td>
</tr>
<tr>
<td>Aeronautical applications of radio:</td>
<td>22</td>
</tr>
<tr>
<td>Direction finder systems and equipment</td>
<td>22</td>
</tr>
<tr>
<td>Aeronautical radio beacon systems</td>
<td>24</td>
</tr>
<tr>
<td>Airplane landing aids</td>
<td>26</td>
</tr>
<tr>
<td>Aerological radio sounding</td>
<td>26</td>
</tr>
<tr>
<td>Broadcasting</td>
<td>28</td>
</tr>
<tr>
<td>Standard frequency signals</td>
<td>28</td>
</tr>
</tbody>
</table>

(over)
General Information

Some of the publications in this list have appeared in the regular series of publications of the Bureau, and others in various scientific and technical journals. Unless specifically stated, papers are not obtainable directly from the National Bureau of Standards.

Where the price is stated, the publications can be purchased from the Superintendent of Documents, Government Printing Office, Washington 25, D. C. Remittances should accompany order and should be made either by coupons, obtainable from the Superintendent of Documents in sets of 20 for $1.00 and good until used, or by check or money order payable to him. The prices in this Letter Circular are for delivery by mail to addresses in the United States and its possessions and in certain foreign countries that extend the franking privilege. In the case of all other countries, one-third the cost of the publication should be added to cover postage.

Publications marked "Free" are mimeographed pamphlets obtainable from the National Bureau of Standards without charge.

Publications marked "OB" are out of print, but, in general, may be consulted at technical and public libraries.

For papers in outside scientific or technical journals, the name of the journal or the organization publishing the article is given in abbreviated form, with the volume number (underscored), page, and year of publication, in the order named. The Bureau can not supply copies of these journals, or reprints from them, and it is unable to furnish information as to their availability or price. They, too, can usually be consulted at technical libraries. Inquiries for copies of such papers should be addressed directly to the publisher of the journal at the address given in list below.

This list includes all publications since Jan. 1, 1924, and also the publications earlier than 1924 issued by the Bureau, of which copies are still available.

The Bureau does not maintain a mailing list for distribution of its radio publications as issued. Persons who wish to keep in touch with the Bureau's radio publications should subscribe to the "Technical News Bulletin", a monthly pamphlet giving news on the Bureau's scientific and engineering work and announcements of all new publications. Subscriptions should be sent to Superintendent of Documents, Government Printing Office, Washington 25, D.C. The price is $1.00 a year for subscribers in the United States.

The monthly Journal of Research of the National Bureau of Standards contains the Bureau's Research Papers on all subjects.
Subscriptions should be sent to Superintendent of Documents, Government Printing Office, Washington 25, D.C. The price is $4.50 a year for subscribers in U.S.A.

All publications of the Bureau on all subjects, including those which are out of print, are listed in Circular C24, "Publications of the National Bureau of Standards," and the supplements thereto. The Circular and the set of supplements can be purchased for $1.30, from the Superintendent of Documents. Copies may be consulted at technical and public libraries in the larger cities.

Series letters with serial numbers are used to designate Bureau publications:

S = "Scientific Paper". S1 to S329 are "Reprints" from the "Bulletin of the Bureau of Standards." S330 to S572 were published as "Scientific Papers of the Bureau of Standards". This series was superseded by the "Bureau of Standards Journal of Research" in 1928.


RP = "Research Paper". These are reprints of articles appearing in the "Bureau of Standards Journal of Research" and in the "Journal of Research of the National Bureau of Standards", the latter being the title of this periodical since July 1934 (Volume 13, number 1).

C = "Circular".

H = "Handbook".

M = "Miscellaneous Publication".

LC = "Letter Circular", a mimeographed pamphlet obtainable from the National Bureau of Standards without charge.

The underlined topics used as center-headings below are not the names of publications; they are general subjects given merely for convenience of classification of the various publications. The numbers under these topics are classification numbers according to the decimal classification system, and are not numbers by which any publications are known or ordered. A complete description of the classification system is given in Letter Circular No. 614 "Revised Classification of Radio Subjects used in the NBS (Jan. 11, 1947)."
Addresses of Publishers of Journals

Aeronautical World, 1709 W. 8th St., Los Angeles, Calif.
Annals of the American Academy of Political and Social Science,
3457 Walnut St., Philadelphia, Pa.
Bulletin of the National Research Council, National Academy of Sciences,
Washington, D.C.
Bulletin of the American Meteorological Society, Blue Hills Observatory,
Harvard University, Milton, Mass.
Electrical World, 330 W. 42nd St., New York City.
The Engineering Foundation, 29 West 39th St., New York City.
Engineers and Engineering, 124 W. Polk St., Chicago, Ill.
Horological Institute of America, 421 State Life Bldg.,
Indianapolis 4, Ind.
Jahrbuch der drahtlosen Telegraphie, M. Krayn, Genthiner Strasse, 32,
Berlin, Germany.
Journal of the Aeronautical Sciences, 5341 RCA Bldg., Rockefeller Center,
New York City.
Journal of the Franklin Institute, Franklin Institute of the State of
Journal of the Optical Society of America and Review of Scientific
Instruments, American Institute of Physics, 11 E. 38th Street,
New York City.
Journal of the Washington Academy of Sciences, Washington Academy of
Sciences, Washington, D.C.
Journal of the Western Society of Engineers, 205 W. Wacker Drive,
Chicago, Ill.
Mechanical Engineering, 29 W. 39th Street, New York City.
National Aeronautical Association Review, 1909 Mass. Ave., N.W.,
Washington, D.C.
L'Onde Electrique, La Societe des Amis de la TSF, Paris, France.
Papers of the General Assembly held in Washington, International
Scientific Radio Union; International Scientific Radio Union,
Brussels, Belgium.
Papers of the International Civil Aeronautics Conference, Supt. of
Papers of the Seventeenth Annual Safety Congress, National Safety
Council, Chicago, Ill.
Physical Review, American Institute of Physics, 11 E. 38th St., New York
City.
Proceedings of the Institute of Radio Engineers, 1 E. 79th Street,
New York City.
Proceedings of the National Academy of Sciences, National Academy of
Sciences, Washington, D.C.
Proceedings of the Third Pan-Pacific Science Congress, National Research
Council of Japan, Tokyo, Japan.
QST, American Radio Relay League, W. Hartford, Conn.
Radio, 342 Madison Ave., New York City.
Scientific American, 24 West 40th Street, New York City.
Terrestrial Magnetism & Atmospheric Electricity, Johns Hopkins Press, Baltimore, Md.

Radio (General)

<table>
<thead>
<tr>
<th>Title</th>
<th>Series</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>The principles underlying radio communication. 2nd ed., 1922. Signal Corps Radio Communication Pamphlet No. 40. (Textbook, 619 pages, with 300 illustrations, covering radio principles and practice).</td>
<td></td>
<td>$1.00</td>
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<tr>
<td>Electrical interference with radio reception. (1945).</td>
<td>LC784</td>
<td>Free</td>
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<td>Revised classification of radio subjects used in the NBS (1947).</td>
<td>LC814</td>
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</tr>
<tr>
<td>Sources of radio information. (1947).</td>
<td>LC850</td>
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<td>Radio communication, review for year. J. H. Dellingcr.</td>
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</tr>
</tbody>
</table>

Laws; Regulations


Radio Research


Some contributions of radio to other sciences. J. H. Dellinger, J. Franklin Institute 228, 11-42 (1939).

### Radio Wave Transmission Phenomena (General)

<table>
<thead>
<tr>
<th>Title</th>
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<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Some studies of radio transmission over long paths made on the Byrd Antarctic Expedition. L. V. Berkner. BS J. Research 8, 265-272 (1932)</td>
<td>RP412</td>
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<td>Title</td>
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<tr>
<td>Summary of symposium on correlations of various radio phenomena with solar and terrestrial magnetic and electric activities.</td>
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<tr>
<td>Note on reception of radio broadcast stations at distances exceeding 12,000 km.</td>
<td>L. V. Berkmer. Proc. I.R.E. 20, 1324-1327 (1932).</td>
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<tr>
<td>The role of the ionosphere in radio wave propagation.</td>
<td>J. H. Dellinger, AIEE Trans. 58, 803-822 (1939).</td>
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<td><strong>Fading</strong></td>
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<td>(R113.1)</td>
<td></td>
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</tbody>
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Fading (continued)

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<thead>
<tr>
<th>Title</th>
<th>Series</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Some observations of short-period radio fading.</td>
<td>RP70</td>
<td>OP</td>
</tr>
<tr>
<td>T. Parkinson. BS J. Research 2, 1057-1075 (1929)</td>
<td></td>
<td></td>
</tr>
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<td>Also published in Proc.I.R.E. 17, 1042-1061 (1929).</td>
<td></td>
<td></td>
</tr>
<tr>
<td>A radio method for synchronizing recording apparatus.</td>
<td>RP269</td>
<td>OP</td>
</tr>
<tr>
<td>J. Wash. Acad. Sciences 2, 245-253 (1921). Jahrbuch drahtlosen</td>
<td></td>
<td></td>
</tr>
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<td>Telegrafie 24, 65-70 (1924).</td>
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<td></td>
</tr>
</tbody>
</table>

Daily and Seasonal Variations (RI13,2)


Daily and Seasonal Variations (continued)
(R113.2)

Title                                                                                      Series       Price


Directional Variations of Radio Waves
(R113.3)


Solar and Cosmic Effects on Radio Wave Propagation
(R113.4)


Solar and Cosmic Effects on Radio Wave Propagation (continued) (R113, 4)


The relations between radio and other natural phenomena. L. W. Austin. Proc. of the Third Pan-Pacific Science Congress 2, 1257-1263 (1926).


Note on a comparison of sunspot numbers, terrestrial magnetic activity, and long wave radio signal strength. L. W. Austin. J. Wash. Acad. Sciences 20, 73-74 (1930).


Solar and Cosmic Effects on Radio Wave Propagation (continued)
(R113,4)


Eclipses
(R113,412)

Title


Series Price


Series Price


Series Price


Series Price


Series Price


Series Price


Series Price


Series Price


Series Price

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<thead>
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Ionosphere - continued  
(R113.6)

<table>
<thead>
<tr>
<th>Title</th>
<th>Series</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Recombination and electron attachment in the F layers of the ionosphere, F. L. Mohler, J. Research NBS 25, 507-518 (1940). Also published in Physical. Rev. 57, 1071 of June 1, 1940.</td>
<td>RP1342</td>
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<td>Oblique-incidence radio transmission and the Lorentz polarization term. N. Smith. J. Research NBS 26, 105-116 (1941).</td>
<td>RP1363</td>
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</tr>
</tbody>
</table>
Ionosphere - continued
(R113.6)


High-frequency radio transmission conditions, with predictions for______. Published each month in Proc.I.R.E., September 1937 to Dec. 1941.

Predicted distance ranges for amateur radio communication. Published quarterly in QST from September 1940 to January 1942.

Transmission Formulas: Distance Range
(R113.7. See also R113, R120)


Transmission Formulas; Distance Range - continued

<table>
<thead>
<tr>
<th>Title</th>
<th>Series</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Report of Committee on Radio Propagation Data. J. H. Dellinger,</td>
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</tr>
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<td>Skip distance calculation. N. Smith. QST 21, 47-48 of May (1937).</td>
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<tr>
<td>The relation of radio sky-wave transmission to ionosphere measurements.</td>
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<td></td>
</tr>
</tbody>
</table>

**Atmospheric Disturbances; Strays** (R114)


**Antennas (General)** (R120. See also R325 and R525).


**Radio Measurements and Standardization (General)** (R200)

Radio instruments and measurements. 2nd ed. (1924, reprinted 1937).
Frequency Measurements and Standards (General)  
(R210. See also R555)

<table>
<thead>
<tr>
<th>Title</th>
<th>Series</th>
<th>Price</th>
</tr>
</thead>
</table>
Frequency Measurements and Standards (General) - continued
(R210. See also R555)

<table>
<thead>
<tr>
<th>Title</th>
<th>Series</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>The standard wavemeters of the Bureau of Standards. E. L. Hall.</td>
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<td></td>
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<td>Sibley Jour. of Engineering (Ithaca, N.Y.) 38, 123-126 (1924).</td>
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<tr>
<td>A method of measuring radio frequency by means of a harmonic</td>
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<tr>
<td>International comparisons of frequency standards. J. H. Dellinger</td>
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<tr>
<td>Papers of General Assembly held in Washington, International</td>
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<tr>
<td>Scientific Radio Union, part 1, 18-21 (1927).</td>
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<td>A system for frequency measurements based on a single frequency.</td>
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<td>The accuracy of the primary frequency standard of the Bureau of</td>
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<td>Twelfth Annual Meeting, p. 29 (1931).</td>
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<td>The testing of frequency monitors for the Federal Radio Commission.</td>
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<td>A sensitive frequency meter for the 30 to 340 megacycle range.</td>
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<tr>
<td>E. L. Hall. Electronics 14, p. 37 of May (1941).</td>
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<td></td>
</tr>
</tbody>
</table>

Piezoelectric Frequency Standards
(R214)

Design of a portable temperature-controlled piezo oscillator. V. E.    | RP153  | OP    |
| New piezo oscillations with quartz cylinders cut along the optical    | RP156  | OP    |
| Also published in Proc.I.R.E. 18, 741-761 (1930).                    |        |       |
| Some experimental studies of the vibrations of quartz plates. R.B.     | RP356  | 20c   |
| Wright and D.M. Stuart. BS J. Research 7, 519-553 (1931).             |        |       |
Piezoelectric Frequency Standards - Continued

***Title***

Quartz plate mountings and temperature control for piezo oscillators. V. E. Heaton and E. G. Lapham.
BS J. Research 7, 683-690 (1931).

A 200-kilocycle piezo oscillator. E. G. Lapham.
BS J. Research 11, 59-64 (1933).


Uses and possibilities of piezoelectric oscillators.

Notes on quartz plates, air gap effect, and audio-frequency generation.

The Crystal Clock. V. E. Heaton. The HIA Jnl II, 21-23 (1946).

Capacity Measurement

***Title***


Very-high frequency behavior of radio components. E. L. Hall.
Electronics 17, 114-118 (1944).

Measurements of Resistance, Voltage, etc.

***Title***


Measurements at radio frequency (a differential transformer method).

Measurements of Resistance, Voltage, etc. - cont'd.

Title


Measurement of Field Intensity, Noise, etc.


Properties of Electrical Insulating Materials


Radio Transmitters and Generators

<table>
<thead>
<tr>
<th>Title</th>
<th>Series</th>
<th>Price</th>
</tr>
</thead>
</table>

Protective Devices

<table>
<thead>
<tr>
<th>Title</th>
<th>Series</th>
<th>Price</th>
</tr>
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</table>

Receiving Apparatus (General)

<table>
<thead>
<tr>
<th>Title</th>
<th>Series</th>
<th>Price</th>
</tr>
</thead>
</table>
### Amplifiers (R363)

<table>
<thead>
<tr>
<th>Title</th>
<th>Series</th>
<th>Price</th>
</tr>
</thead>
</table>

### Telephone Receivers (R365.1)


### Inductors (R382)


### Direction Finder Systems and Equipment (R501.1)


### Aeronautic Applications of Radio (General) (R520)

Aeronautic Applications of Radio (General) – Cont’d.


Also published in Proc. I.R.E. 18, 840-861 (1930).


### Airplane Antennas

**Title**


**Series** RP313  
**Price** OP

### Beacon Systems for Aircraft


**Price** S1480 OP

Design of tuned reed course indicators for aircraft radio beacon. F.W. Dunmore. BS J. Research 1, 751-769 (1928).

**Price** RP28 OP

Unidirectional radiobeacon for aircraft. E.Z. Stowell. BS J. Research 1, 1011-1022 (1928).

**Price** RP35 OP


**Price** RP77 OP


**Price** RP154 OP


**Price** RP155 OP


**Price** RP159 OP

Beacon Systems for Aircraft -- cont'd.
(R526.1. See also R520)

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<th>Title</th>
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<tbody>
<tr>
<td>The cause and elimination of night effects in radio range-beacon reception. H. Diamond. BS J. Research 10, 7-34 (1933).</td>
<td>RP513</td>
<td>10c</td>
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<tr>
<td>Phase synchronization in directive antenna arrays with particular application to the radio range beacon. F. G. Kear. BS J. Research 11, 123-139 (1933).</td>
<td>RP581</td>
<td>OP</td>
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<tr>
<td>A method of providing course and quadrant identification with the radio range-beacon system. F. W. Dunmore. BS J. Research 11, 309-325 (1933).</td>
<td>RP593</td>
<td>OP</td>
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<tr>
<td>The aircraft radio beacon. Research Narrative No. 141, The Engineering Foundation, 8, No. 8 (1928).</td>
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Instrument Landing of Aircraft
(R526.2)

Title

A radiobeacon and receiving system for blind landing of aircraft. H. Diamond and F.W. Dunmore. BS J. Research 5, 897-931 (1930);
Also published in Proc. I.R.E. 19, 525-526 (1931).

Performance tests of radio system of landing aids. H. Diamond. BS J. Research 11, 463-490 (1933)


Direction Finders for Aircraft
(R526.3)


Radiometeorographs (radiosondes)
(R553.1)

A method for the investigation of upper-air phenomena and its application to radio meteorography. H. Diamond, W. S. Hinman, Jr., and F. W. Dunmore. J. Research NBS 20, 369-392 (1938);
Also published in Proc. I.R.E. 26, 1235-1265 (1938).

An electric hygrometer and its application to radio meteorography. F. W. Dunmore, J. Research NBS 20, 723-734 (1938);
Radiometerographs (radiosondes) - cont'd
(R553.1)

**Title**  


Series: RP1126  Price: 10c


Series: RP1169  Price: 10c


Series: RP1265  Price: 5c


Series: RP1318  Price: 0P


Series: RP1329  Price: 10c


**Broadcasting**

(R550)


**Standard Frequency Signals**

(R555)

| Technical radio broadcast services, Radio Station WWV Jan. 2, 1947 Mimeo Free |
Standard Frequency Signals - cont’d
(R555)

Title                                                                                                                                                                                                 Series  Price


Radio dissemination of the national standard of frequency.


TECHNICAL RADIO BROADCAST SERVICES

STANDARD RADIO FREQUENCIES
STANDARD TIME INTERVALS
STANDARD MUSICAL PITCH

TIME ANNOUNCEMENTS
STANDARD AUDIO FREQUENCIES
RADIO PROPAGATION NOTICES

MEGACYCLES

BROADCAST, E.S.T.

POWER, KW

MODULATION, Q/S

* 0.1 KW, FOR FIRST 4 WORK DAYS AFTER 1ST SUNDAY OF EACH MONTH

2.5
7:00 PM TO 9:00 AM
CONTINUOUSLY
0.7
1 AND 440

5
7:00 PM TO 7:00 AM
80
1 AND 440

10
7:00 AM TO 7:00 PM
80
1, 440 AND 4000

15
CONTINUOUSLY
90
1, 440 AND 4000

20
CONTINUOUSLY
85*
1, 440 AND 4000

25
CONTINUOUSLY
0.1
1, 440 AND 4000

30
CONTINUOUSLY
0.1
1 AND 440

35
CONTINUOUSLY
0.1
1

* 0.1 KW, FOR FIRST 4 WORK DAYS AFTER 1ST SUNDAY OF EACH MONTH
STATION WWV TIME ANNOUNCEMENTS

THE HOUR ILLUSTRATED IS 1 TO 2 PM, OR 1300 TO 1400 IN 24 HOUR TIME EASTERN STANDARD TIME

FOLLOWED BY VOICE ANNOUNCEMENT

FOLLOWED BY 8 N'S--, OR 6 W'S--

FOLLOWED BY VOICE ANNOUNCEMENT

NUMERALS IN INTERNATIONAL MORSE CODE

SECONDS PULSE (NO PULSE IS TRANSMITTED AT THE BEGINNING OF THE 59th SECOND OF EACH MINUTE)

WWV TIME SIGNALS, DEVIATIONS FROM U.S. NAVAL OBSERVATORY TIME JANUARY TO JUNE 1947