DEPARTMENT OF COMMERCE

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STANDARD RADIO-FREQUENCY TRANSMISSIONS, JANUARY TO MARCH

The Bureau of Standards transmits, twice a month, radio signals of definitely announced frequencies, for use by the public in standardizing frequency meters (wave meters) and transmitting and receiving apparatus. The signals are transmitted from the bureau station WWV, Washington, D. C., and from station 6XBM, Stanford University, Calif.

The transmissions are by unmodulated continuous-wave radio telegraphy. A complete frequency transmission includes a "general call," a "standard frequency signal," and "announcements." The "general call" is given at the beginning of the eight-minute period and continues for about two minutes. This includes a statement of the frequency. The "standard frequency signal" is a series of very long dashes with the call letters (WWV or 6XBM) intervening. This signal continues for about four minutes. The "announcements" are on the same frequency as the "standard frequency signal" just transmitted and contain a statement of the frequency. An announcement of the next frequency to be transmitted is then given. There is then a four-minute interval while the transmitting set is adjusted for the next frequency.

The signals can be heard and utilized by stations equipped for continuous-wave reception at distances within about 500 to 1,000 miles from the transmitting stations. Information on how to receive and utilize the signals is given in Bureau of Standards Letter Circular No. 171, which may be obtained on application from the Bureau of Standards, Washington, D. C. Even though only a few points are received, persons can obtain as complete a wave-meter calibration as desired by the method of generator harmonics, information on which is given in the letter circular.

The schedule of standard frequency signals from both the Bureau of Standards and Stanford University, during the next three months, is as follows:

Schedule of frequencies in kilocycles

[Approximate wave lengths in meters in parenthesis]

Time (p. m.)[1]	Jan. 5	Jan. 20	Feb. 5	Feb. 20	Mar. 5	Mar. 20	Time (p. m.)[1]	Jan. 5	Jan. 20	Feb. 5	Feb. 20	Mar. 5	Mar. 20
10 to 10.08	1,500 (200)	3,000 (100)	125 (2,400)	300 (1,000)	550 (545)	1,500 (200)	10.48 to 10.56	2,200 (136)	4,400 (68)	166.5 (1,800)	425 (705)	980 (306)	2,200 (136)
10.12 to 10.20	1,650 (182)	3,300 (91)	133 (2,254)	315 (952)	630 (476)	1,650 (182)	11 to 11.08	2,450 (122)	4,900 (61)	205 (1,463)	500 (600)	1,130 (265)	2,450 (122)
10.24 to 10.32	1,800 (167)	3,600 (83)	143 (2,097)	345 (869)	730 (411)	1,800 (167)	11.12 to 11.20	2,700 (111)	5,400 (55)	260 (1,153)	600 (500)	1,300 (231)	2,700 (111)
10.36 to 10.44	2,000 (150)	4,000 (75)	155 (1,934)	375 (800)	850 (353)	2,000 (150)	11.24 to 11.32	3,000 (100)	6,000 (50)	315 (932)	666 (450)	1,500 (200)	3,000 (100)

[1] Eastern standard time for WWV, Washington, D. C.; Pacific standard time for 6XBM, California.

STANDARD FREQUENCY STATIONS

As a result of measurements by the bureau upon the transmitted waves of a limited number of radio transmitting stations, data are given each month on such of these stations as have been found to maintain a sufficiently constant frequency to be useful as frequency standards. There may be many other stations maintaining their frequency just as constant as these, but these are the only ones among those observed. There is, of course, no actual guaranty that the stations named below will maintain [illegible] constancy shown, but the data indic[illegible] the high degree of confidence that c[illegible] be placed in them. The transmitted f[illegible] quencies from these stations can be u[illegible] lized for standardizing frequency mete[illegible] and other apparatus by the procedu[illegible] given in Bureau of Standards Lett[illegible] Circular No. 171, which may be obtaine[illegible] by a person having actual use for [illegible] upon application to the Bureau [illegible] Standards, Department of Commerc[illegible] Washington, D. C.

Station	Owner and location	Assigned frequency (kilocycles)	Period covered by measurements	Number of times measured	Deviations from assigned frequencies noted in measurements	
					Average	Greatest since Nov. 20, 192[illegible]
			Months		*P. ct.*	*P. ct.*
WQL	Radio Corporation of America, Coram Hill, Long Island, N. Y.	17.13	12	79	0.2	0.[illegible]
NSS	United States Navy, Annapolis, Md.	17.50	28	207	.2	.[illegible]
WCI	Radio Corporation of America, Barnegat, N. J.	17.95	10	57	.2	.[illegible]
WGG	Radio Corporation of America, Tuckerton, No. 1, N. J.	18.86	28	217	.2	.[illegible]
WII	Radio Corporation of America, New Brunswick, N. J.	21.80	8	69	.1	.[illegible]
WRT	Do	22.60	7	24	.1	.1
WVA	United States Army, Annapolis, Md.	100	9	101	.2	.4
NAA	United States Army, Arlington, Va.	[1] 113	2	18	.1	.[illegible]
WJR	Jewett Radio & Phonograph Co., Pontiac, Mich.	[2] 580	3	15	.0	.[illegible]
WCX	Detroit Free Press, Detroit, Mich.					
WEAF	American Telephone & Telegraph Co., New York, N. Y.	610	12	87	.0	.[illegible]
WCAP	Chesapeake & Potomac Telephone Co., Washington, D. C.	640	27	120	.1	.[illegible]
WRC	Radio Corporation of America, Washington, D. C.	640	24	107	.1	.[illegible]
WSB	Atlanta Journal, Atlanta, Ga.	700	27	129	.2	.[illegible]
WGY	General Electric Co., Schenectady, N. Y.	790	30	151	.1	.[illegible]
WBZ	Westinghouse Electric & Manufacturing Co., Springfield, Mass.	900	20	66	.1	.2
KDKA	Westinghouse Electric & Manufacturing Co., East Pittsburgh, Pa.	970	27	193	.1	.4

[1] Time signal frequency.
[2] Same transmitting set for both call letters (WJR and WCX).

THE DISTANCE RANGE OF RADIOTELEPHONE BROADCASTING STATIONS

As is well known, the conditions affecting radio transmission are too complex to permit a simple analysis. A direct method of studying such conditions and their variations is the analysis of a large number of similar observations taken by an organized group of observers of receiving conditions. The bureau has made such an investigation, and part of the results are described in a paper just issued, Technologic Paper No. 297, A Statistical Study of Conditions Affecting the Distance Range of Radio Telephone Broadcasting Stations, by C. M. Jansky, jr. This paper describes one year's work on the investigation of conditions affecting distance range of broadcasting stations by the Bureau of Standards with the aid of about 100 voluntary observers. The observations were made for a year in the period 1922–23 on transmitting station KDKA of the Westinghouse Electric &