



RADIO NOTES

AMERICAN TELEPHONE AND TELEGRAPH COMPANY

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1. PETITION FILED FOR RECONSIDERATION IN ABOVE 890 MC HEARING

On September 8, 1959 A.T.& T. filed with the F.C.C. a petition for reconsideration or rehearing of the Commission's Report and Order in the above 890 mc hearing (RADIO NOTES August 28, 1959).

Important considerations which were submitted as grounds for reconsideration are:

1. Unrestricted licensing of private point-to-point radio systems will have seriously adverse effects on existing and future common carrier communications services and facilities, and on the users of common carrier services.
2. The opinion fails to give due weight to the matter of public interest, convenience and necessity in permitting unrestricted licensing of private point-to-point radio systems.
3. In concluding that there are now adequate frequencies available above 890 mc for both common carriers and private users, the Commission failed to provide for orderly and efficient use of the frequency spectrum and, in particular, failed to take into account the future requirements for satellite communications.

Copies of the A.T.& T. petition will be sent to the Companies with a P.E.L.

2. LAST TDX MICROWAVE EQUIPMENTS TO BE RETIRED

The Long Lines is planning to retire the last of the TDX microwave radio relay equipments.

The TDX system was the original experimental broadband microwave system designed by the Bell Laboratories and manufactured by the Western Electric Company for Bell System trials of intercity microwave service. A TDX system was placed in service November 1947 on the route between New York and Boston providing two broadband channels in each direction of transmission. Experience gained in the design and operation of this system led to improvements which were incorporated in the TD-2 system now in use throughout the United States and Canada. The TDX channels between New York and Boston were replaced with TD-2 channels August 1953 (RADIO NOTES, September 3, 1953). Some of the TDX equipment was subsequently used to provide television service from John Tom Hill repeater station in Connecticut to broadcast stations in Holyoke and Springfield, Massachusetts and New Britain, Connecticut. It is now proposed to replace these television links with TD-2 equipment.

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3. COMMUNICATIONS THROUGH OUTER SPACE

The Bell Laboratories has recently undertaken an experimental program to test microwave communications between distant points by reflecting signals off man-made satellites and the moon. The first phase of this program designated "Project Echo" will be carried out in cooperation with the National Aeronautics and Space Administration (NASA) and the Jet Propulsion Laboratory (JPL) of California Institute of Technology.

Radio transmission studies will be made between the Holmdel, New Jersey Laboratories and a site about 2300 miles away at Goldstone, California, constructed by JPL. Tests will be made using frequency modulated signals on about 960 mc and 2390 mc reflected from a 100-foot diameter aluminized plastic balloon in orbit approximately 1000 miles above the earth. It is planned that the special antennas will be accurately aimed at the satellite by means of predicted orbital information supplied by the Goddard Space Flight Center division of NASA. Current plans include radar and optical tracking to augment these predicted calculations.

It is expected that initially a single 3000 cycle communication channel in each direction of transmission will be established between the two test sites. In addition to demonstrating communications feasibility, detailed propagation studies will be made.

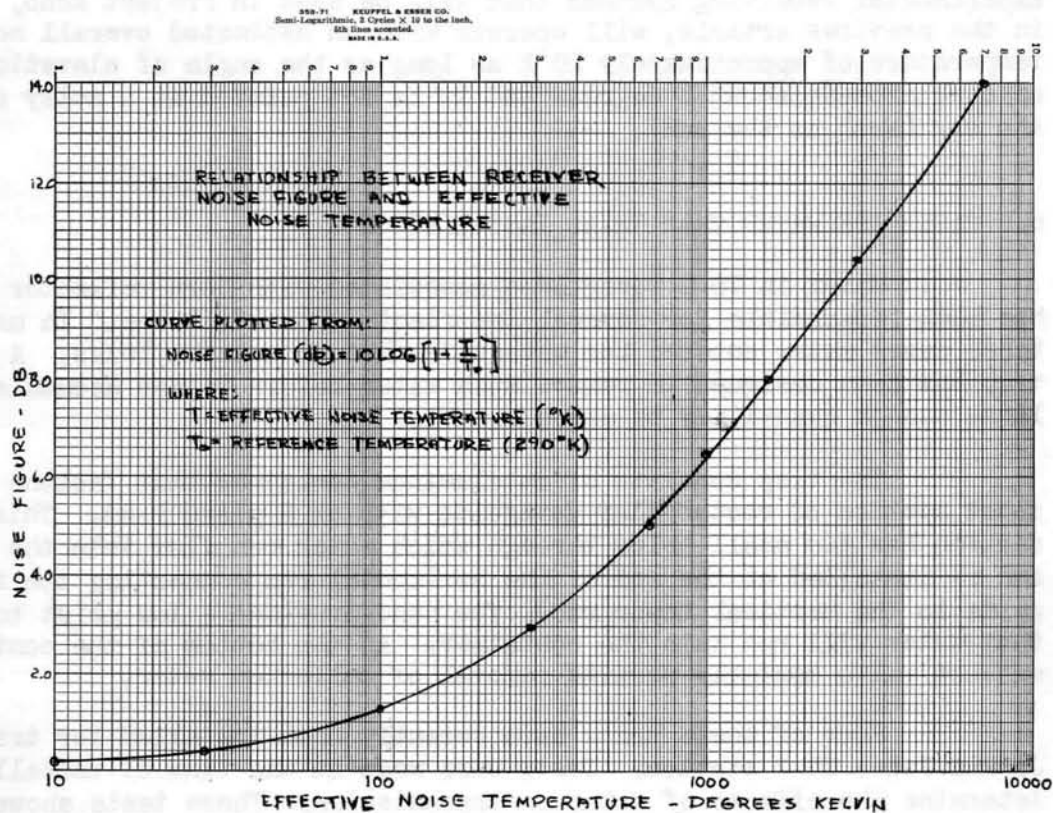
4. TRANSCONTINENTAL GROWTH

To meet the accelerated growth in long haul message circuit requirements, Long Lines is planning the addition of 1000 transcontinental circuits over and above those previously anticipated for service by the end of 1960. To provide the basic line facilities for this large program, microwave radio and L3 cable systems will be utilized.

It is proposed to equip the existing Colesville, New Jersey-Jennerstown, Pennsylvania TD-2 route for TH operation and make the first major use of "interstitial" TD-2 between Jennerstown, St. Louis and Chicago. (RADIO NOTES, August 28, 1959) Additional TD-2 channels between St. Louis and Memphis and a new TD-2 route between Memphis and Jackson, Mississippi is planned. L3 on coaxial cable will provide the basic facilities between Jackson and Los Angeles, but considerable TD-2 rearrangements to clear certain cable sections for message use will be required.

5. NOISE TEMPERATURE

Did you know that a microwave receiver with an effective noise temperature of 7,020 degrees Kelvin is another way of stating that the receiver has a noise figure of 14 db? If the answer to the above question is "yes" then our hats are off to you. For those who may find it difficult to equate receiver noise figure to effective noise temperature, the following curve may be helpful:



Most of the recent technical articles discussing low thermal noise (or Johnson noise) devices such as masers, parametric amplifiers and traveling wave tubes specify noise performance in terms of their effective noise temperatures.* When these devices are used in the input stages of a receiver, the receiver thermal noise may in some cases be negligible and noise from external thermal sources must be considered. Thus, noise sources such as the sky (due to cosmic and atmospheric radiation), the earth and antennas must be accounted for in order to determine the performance of microwave communication systems of the future.

* The figure of merit of low noise devices is most often specified in terms of noise temperature rather than noise figure. Noise figure is a measure of the noise contribution following the input terminals of a receiver and does not account for parameters

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ahead of the input terminals that may be major contributors to the overall system noise level. Also, the measurement of noise figure of a device such as a maser usually results in nothing more than a measurement of the noise figure of the test equipment since maser noise is so low.

As an indication of the magnitude of improvement in noise performance that is anticipated for future receiving systems, one of the experimental receiving systems that will be used in Project Echo, described in the previous article, will operate with an estimated overall noise temperature of approximately 20°K as long as the angle of elevation of the antenna exceeds about 8 degrees and it is not pointed at a noisy source in the sky (such as the sun).

6. WAVEGUIDE WATER TRAP TRIAL INSTALLATION

Water in TD-2 waveguides associated with horn reflector antennas has been responsible for several important system failures. In many of these cases water entered the waveguide through antenna leaks. A water trap has been designed to remove such water before it can accumulate in large enough quantities to cause trouble.

The trap consists of an aluminum container that fastens to a new short section of rectangular waveguide with an E plane bend. This waveguide section has two small holes through which water can flow into the container, and is installed at the end of the horizontal run connecting the flexible guide to the vertical tower run. The bend provides a low point to insure that water will run into the container. At the bottom of the container an exhaust valve assembly permits removal of collected water.

Four of these traps have recently been installed for trial at the Jackie Jones TD-2 station. Tests were made at the time of installation to determine the effects of water on transmission. These tests showed that the trap successfully removed water. Water added slowly to a waveguide was removed with only a negligible effect on the received signal level. When a pint of water was inserted quickly, the signal level dropped very low but recovered in 20 to 30 seconds.

The Long Lines Department plans to install these traps on important routes such as deep sea cable entrance links where alternate facilities are difficult or impossible to obtain in case of failure.

7. VHF EMERGENCY TERMINAL SALE

The Western Electric Company is planning to offer their existing stock of EC and ED transportable emergency VHF radio equipment and accessories on a "fire sale" basis. The sale price will be approximately one-third the figures listed in P.E.L. 5852. The following items are available:

<u>Quantity</u>	<u>Description</u>
10	J-41632-A, 1L Radio Transmitter (Motorola)
10	J-41632-B, 1L Radio Receiver (Motorola)
10	J-41632-F, 1L Radio Transmitter (G.E.)
10	J-41632-G, 1L Radio Receiver (G.E.)
14	J-68355-A, 1L Control Terminal
12	ED-45579-G3 Set of Cables, Tools and Spare Parts
13	KS-15704, 1L Antennas (Corner-Reflector)
8	KS-15705, 1L Portable, Mast (55 feet Aluminum)

This equipment is new and will be shipped in operating condition with crystals and ovens but will not be modified for narrow band operation. Additional details may be obtained by calling Bill Keller at EXeter 3-2120 here at 195.

8. DIRECT OVERSEAS RADIOTELEPHONE TO VIET-NAM

Long Lines in cooperation with the Viet-Nam Posts and Telecommunications organization is planning to offer direct radiotelephone service between Oakland, California and Saigon the Capital of South Viet-Nam. Although the F.C.C. has recently modified the Dixon transmitting station licenses, several weeks will be required to complete all agreements and file appropriate tariffs after which direct service may be commenced. Up to now service to Viet-Nam has been routed via Japan.

9. EIGHTY MILE TD-2 PATH

The Mountain States Company commenced in-service tests September 4 on an 80 mile path between Manzano and White Oaks, New Mexico which is one section of the four hop Albuquerque-Roswell TD-2 system. The 132 circuits of "L" carrier assigned to this system are designed to relieve congested toll facilities in the southeastern part of the state.

This 80 mile section is the longest TD-2 path to be placed in service for message use. A 98 mile path has been in TV service since August, 1956 in Southern California (RADIO NOTES, September 13, 1956). The new long Mountain States section was path tested and found to be good. Although multipath fading is not expected to be severe in this hot and dry climate, continuous signal strength recordings are being made. One month's recording has revealed no severe fading of any type.

Initial line-up of the separate transmitting and receiving 10 foot dish antennas indicated their gain less than advertised; however, installation of "hopstretcher" feeds brought the gain up to calculated. (RADIO NOTES, August 28, 1959)

10. CHATTANOOGA MOBILE TWO-WAY DIALING TRIAL

The first units of Southern Bell's mobile telephone two-way dialing trial (RADIO NOTES, April 20, 1959) were placed in service during the week of August 17, 1959 at Chattanooga, Tennessee to serve both manual and two-way dial customers on JL channel. If the operation proves to be satisfactory and customers accept the changed operation, WJ channel will be converted and a third channel added to give a three-channel system with full access by all units in either direction. This application of trunking principles will greatly improve the grade of service offered mobile users.

In this trial system, each mobile unit must send out an identifying signal corresponding to its own telephone number. At the terminal, this identifying signal is interpreted as an "on" or "off-hook" condition to a subscriber line into a telephone central office. Dial tone from the central office is transmitted to the mobile unit, and the user may dial his call in a normal manner. Dial pulses are carried as two-tone signaling over the radio path and converted back to dial pulses at the terminal. In the initial five company cars participating in this trial, the identification signal is transmitted whenever the mobile user operates a special key on his dial control unit; however, it seems preferable to have this take place automatically. Southern Bell is now arranging to have the manufacturer redesign the mobile applique with this in mind. When new units are received sometime in October, manual mobile customers will be converted to dial to judge performance.

In the meantime, the five company cars will use the dial terminal in order to test out the equipment operation and determine that the basic system is adequate to handle mobile calls without operator assistance.

11. EXTEND PUBLIC AIR-TO-GROUND TRIAL

Applications have been filed with the F.C.C. requesting authorization to continue the Chicago-Detroit public air-to-ground trial and extend the service to include areas around Pittsburgh, Washington and New York. Alternate channel assignments are proposed in order to minimize overlap difficulties and to increase traffic handling capabilities of each ground station. The QM channel (454.95 mc ground station, 459.95 mc aircraft) is proposed for Chicago, Pittsburgh and New York (Newark) and the QX channel (454.90 mc ground station, 459.90 mc aircraft) for Detroit and Washington.

12. TELEPHONE MAINTENANCE RADIO SERVICE STATUS

Additional Companies have established telephone maintenance radio systems since our first report on this service in the January issue of RADIO NOTES. Other Companies are planning such systems for the near future. The following list will bring you up-to-date on this activity:

Company	Location	Frequencies (mc)	No. Base Stas.	No. Mobile Sets
C.&P. Co. of W.Va.	Va., W.Va., Md., Wash.	35.16 *	-	12
Illinois Bell	Chicago, Ill.	451.50, 456.50*	-	8 & 4 TF
		451.40, 456.40+	2	40
Michigan Bell	Michigan	151.985, 158.34*	-	300
		43.160*	-	50
New England Tel.	Goffstown, N.H.	151.985, 158.34*	1	20
	Taunton, Mass.	35.16, 43.16*	1	2
New York Tel.	New York City	451.40, 456.40*	1	100
	Buffalo, N. Y.	451.40, 456.40+	1	100
Northwestern Bell	Fargo, N. D.	151.985*	1	50
Ohio Bell Tel.	No. Royalton, Ohio	451.30, 456.30*	1	100
Southern Bell	Ft. Lauderdale, Fla.	151.985+	1	50
	Territory-So. Bell	151.985, 158.34*	-	100
	Florida	27.275*	-	3 TF
So. New England	New Haven	151.985, 158.34+	1	10

* Authorization Granted

+ Application Filed

TF Temporary Fixed

13. LENKURT 74 PRACTICES

The Pacific Company has recently prepared Bell System Practices covering Lenkurt 74 type microwave equipment used in light route radio applications. This locally prepared practice has the base number R99.180 and covers operating methods, maintenance routines and methods, system tests, and a descriptive section. Considerable effort has gone into the preparation of this practice, and in order to avoid duplication of this effort other Companies planning a similar practice may wish to contact Mr. G. R. White, BSP Coordinator in San Francisco. There are no current plans to provide A.T.& T. Co. Standard practices on the Lenkurt 74 equipment.

14. HIGH SEAS SERVICE EXTENDED

With the inauguration of high seas telephone service to the S. S. Rotterdam effective September 1, the total number of ships offering this service to passengers comes to 60. The Rotterdam, a 38,650-ton vessel of the Holland-America Line, accommodates 1,456 passengers and sailed from Rotterdam for New York on its maiden voyage September 3.

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15. RADIO INFORMATION

The following have been forwarded since the last issue of
RADIO NOTES:

- BSPM 681A -
- BSPM 682 R90.335.01, Issue 1 - TJ Radio System - Over-all System
R90.335.02, Issue 1 - TJ Radio System - Transmitter-Receiver Bay
A301.917, Issue 1 - KS-16153 Dehydrator and Associated
H51.918, Issue 1 Waveguide Alarms
- BSPM 682A -
- BSPM 683 A301.916, Issue 3 - KS-16001 Dehydrator and Associated
H51.346, Waveguide Alarms
- BSPM 683A -
- BSPM 684 R00.010, Issue 12 - Numerical Index and Checking List
R104.050, Issue 2 - One- and Three-Channel Packaged
VHF and UHF Radio Systems for Point-to-Point Applications
AA266.042, Issue 3 - TD-2 Radio - Automatic Switching - IF
Switching Equipment - Toll Systems
AA266.043, Issue 4 - TD Radio - Automatic Switching -
Switching Control Equipment - Toll Systems
Appendix 1
AA266.046, Issue 1 - TD Radio - Automatic and Channel Maintenance
Switching - General Requirements - Toll Systems
AA266.077, Issue 1 - TD-2 Radio - IF Amplitude Equalization -
Toll Systems
- BSPM 684A -
- P.E.L. 6500 KS-15874 List 1 Electron Tube Tester (1S3.7-101)
- P.E.L. 6522 F.C.C. Policy Determinations in Above 890 MC Hearing
(1S4.1-212)
- × P.E.L. 6524 TD-2 Microwave System - Eight and Ten-Foot Parabolic
Antennas (1S3.4-132)

MOBILE TELEPHONE SERVICE

30 - 44 mc
BELL SYSTEM



JULY 1, 1959

MOBILE TELEPHONE SERVICE

152 - 162 mc
BELL SYSTEM



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MOBILE TELEPHONE SERVICE

450 - 460 mc
BELL SYSTEM



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