# RADIO NOTES

AMERICAN TELEPHONE AND TELEGRAPH COMPANY

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Attached – Map of Bell System Overseas Telephone Service
Map of Western Union Radio Relay Expansion Program

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**1**

## FCC AUTHORIZES A.T.& T. EXPERIMENTAL SPACE COMMUNICATIONS SYSTEM

On January 18, the FCC granted the A.T.& T. Company authorization to establish an Experimental Space Communications System employing active satellites. The system will be used to conduct experimental tests between a ground station to be located at Holmdel, New Jersey and locations in the United Kingdom and Western Europe.

The FCC authorization specifies the use of common carrier frequencies in the TD-2 and TH bands for the experimental operation to replace the bands 6425-6525 mc and 6775-6875 mc which were requested in our application. The frequency band 6325-6425 mc will be used for transmission from the ground station to the satellite and the frequency band 4100-4200 mc from the repeater in the satellite. The Commission feels that coordination can be more easily accomplished between two common carrier systems, the space system and common carrier terrestrial systems, than between the space system and operational fixed terrestrial systems.

Because of the urgency which has been placed on the space communications experiments due to rapid developments in this field by other countries, and the delays threatened by the opposition to our proposal to share frequencies with operational fixed services, we plan to proceed with the experimental operation in the common carrier bands proposed by the Commission. We have previously advised the Commission that there is not sufficient bandwidth available in existing common carrier allocations to care for the foreseeable frequency requirements for space communications. Furthermore, it would be an unreasonable burden on the public that all space systems be in common carrier bands because of the constraints thereby placed on the economic use of domestic common carrier microwave systems. However, we feel that a portion of the space communications needs can be provided in this way. At some future date it will probably be necessary to seek shared use of operational fixed or other frequency bands in order to provide sufficient frequencies to meet the ultimate requirements for space communications.

In view of the change in frequencies, the Commission also denied the A.T.& T. petition which had been filed requesting rule changes to allocate the band 6425-6925 mc for International Fixed commercial service.

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**2**

## P.E.L. ON A-C SPARK PLUG MOBILE RADIO SET

Last summer about fifty pre-production models of the new A-C Spark Plug VHF mobile set went into service in customer cars for an extended field trial (See Radio Notes, December 21, 1959 and June 29, 1960.) The results have been good.

Also, as a result of the trial, several minor but worthwhile changes have been made. Reports from the Companies participating in the trial indicate generally lower trouble incidence and a substantial reduction in installation time. Plug and jack cabling and reduced size and weight facilitate handling and installation. These features plus the price should make for significant savings in the installed cost of mobile sets.

As a result of these evaluations, a P.E.L. has been prepared covering the suitability of the A-C set for mobile telephone service. Technical information, FCC licensing data, pricing and delivery and ordering information are covered. The set is wired for four channels as a standard item but may be ordered equipped with crystals for one, two, three or four channels. It comes complete with built-in selector and a four-channel push button control head (see photograph). A private system adaptation of the set is being developed by A-C which might be useful in the telephone maintenance service. This will be covered in a separate P.E.L. to be issued later.

## 3

## TL RADIO "TURN KEY" SYSTEM

The Mountain States Company recently requested Western Electric to submit a "turn key" proposal on a new 200-mile microwave route between Denver and Cheyenne Wells, Colorado.

"Turn key" is a term which has come into use recently to describe projects where the manufacturer provides a complete or nearly complete system rather than specific pieces of equipment. The term derives from the fact that if a system is complete, the user can put it into service with very little further work as soon as keys to buildings, equipment, etc., are turned over to him.

The Colorado proposal included preparing the radio sites for construction, access roads, furnishing and installing towers and buildings, engineering, furnishing and installing radio and carrier equipment, and final test of entire system. Not included were path testing, site selection and furnishing of primary power. Estimates were submitted based on either TJ or TL radio for this route. Equipment of other manufacturers was considered also.

TL radio met its first test of competition for this job and has been accepted. The new route will include 10 hops of frequency diversity TL radio for service in mid-1962. Initially 48 channels of ON-2 carrier will be provided with dropping at two intermediate points.

## 4

## W.E. INSPECTION OF BELLBOY RECEIVERS AT STROMBERG-CARLSON PLANT

Some of the Companies providing 35 mc BELLBOY service have reported difficulty in obtaining good quality pocket receivers from Stromberg-Carlson. As a result, Western Electric has introduced inspection of new and repaired receivers at the factory beginning in November. Also, Stromberg-Carlson is now applying a quality assurance program.

In addition, differences existing in the testing procedures and objectives used by Stromberg-Carlson and the Companies have been resolved. Stromberg-Carlson now is using the same testing procedures as those specified in Bell System Practices.

We feel these measures should greatly improve the quality of production and repair of BELLBOY receivers.

## 5

## MORE WATER IN WAVEGUIDES

In recent weeks, four cases of TD-2 system failure have occurred as a result of water condensation in waveguides. In two of the four cases the dehydrators failed to recycle because of trouble in the timing controls or the humidity sensing apparatus. Also there was a possible simultaneous failure of the humidity alarm circuit. In some cases it appears that proper attention has not been given to routine maintenance of the humidity sensing circuits.

When the dehydrator fails to recycle, the air continues to be drawn through a desiccant tank that has become saturated with moisture. Moist air is then introduced into the cooler outdoor waveguides where it condenses. The moisture usually collects at a low point in the waveguide just outside the building, where even a small amount of water can cause enough attenuation to interrupt the signal. In one of the recent cases, both transmitting and receiving waveguides were affected.

## 6

## TJ BLOWER TROUBLE

Michigan Bell recently reported that they have added a new item to their routine maintenance of TJ radio systems. They now annually clean out the squirrel-cage blower used to cool the transmitting 445A Klystron. Somehow, not yet explained, small bugs, together with sufficient dust of proper consistency, effectively clog the space between the blades in the blower's squirrel cage. Gradually the amount of air passing through the blower is decreased to the danger point. Fatalities to date include at least two klystrons. In one case the flange melted off of the cavity.

So, take heed. Look at your blowers.

## 7

## FOREST FIRE

About 15,000 square miles of western Nevada is furnished commercial power generated in California and supplied via several transmission lines all converging in the Donner Pass area. These lines, supported by wood poles, were severely damaged during the recent (August) Donner Summit forest fire. The resulting 27-hour blackout required a major effort on the part of the Bell of Nevada plant people to maintain uninterrupted telephone service.

Ten central offices were supplied emergency power including large offices such as Reno and the state capital, Carson City. Thirteen microwave stations were supplied power using their permanently installed emergency engine-alternators. A considerable number of J, K and N stations required emergency power during this extended outage of commercial power.

Generator sets were moved to and from many points to provide the emergency layout. These sets were transported a total of 3,446 miles. A special mobile telephone service for the United Forest Service was also provided on a 24-hour basis for several days.

## 8

## ROAMING HABITS OF MOBILE CUSTOMERS

Efforts to find better schemes for operating general mobile telephone service invariably bring up the question of customer roaming habits. The necessity for providing roaming privileges controls much of the system planning in multi-station service areas and wherever two-way dial or multi-channel access is to be considered.

Merchandising people in the Illinois Company are conducting a survey using both personal interviews and observations at the switchboard to evaluate the roaming needs of their customers in the Chicago and Suburban areas. The information is being recorded on punched cards which will permit a very comprehensive analysis.

One immediate objective is to help determine assignment patterns to be used for loading new channels soon to be operating in five towns surrounding Chicago. However, it is hoped that further analysis of the data will shed considerable light on the general problem of how we deal with roaming requirements in and around large metropolitan areas.

## 9

## WESTERN UNION TRANSCONTINENTAL MICROWAVE SYSTEM

The Western Union Telegraph Company is proceeding with the selection of sites for their new transcontinental microwave system. The attached map shows the approximate route the system will follow. This map is more up-to-date and more complete than the previous one published in Radio Notes of May 24, 1960. There have been some changes in schedules. The transcontinental section is now scheduled for completion in the second quarter of 1962, and the Kansas City-Dallas section is expected to go into service by December, 1961.

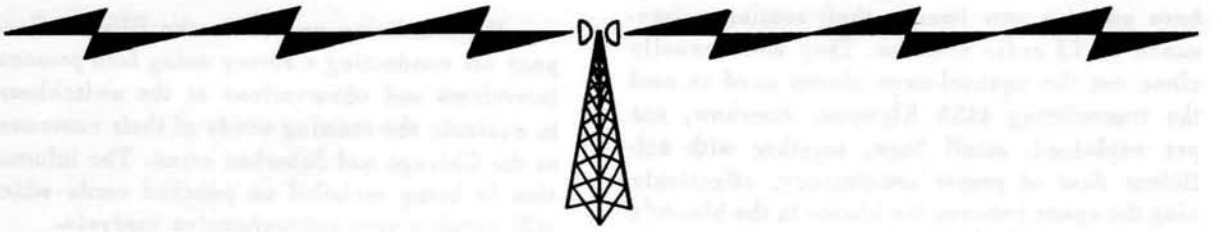
## 10

## ORGANIZATION CHANGE

Effective January 1, 1961, Bob Kiesling of the Special Projects Radio Group transferred to the Transmission Engineering Section where he will work on carrier systems. Jack Crawford takes over the TL radio system job which Bob Kiesling formerly handled.

Starting with this issue, Alice Boyne of the Mobile Radio Group becomes the editor of Radio Notes. We wish to encourage all of you to send us short articles on any radio items which you think are of interest to others. (Pictures, of

course, are always welcome.) Please send your articles to Alice in Room 1710, or call her on 212 – EX 3 – 3926. Frances Arnone will handle distribution of Radio Notes in place of Elaine Vreeland. For changes in the mailing list or extra copies, call Fran on 212 – EX 3 – 3466.



## 11

## RADIO INFORMATION

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

| | | | |
|---|---|---|---|
| BSPM 746 | AA636.766, | Issue 1 – | Performance Requirements – TJ Radio Wire-Line Entrance Link Per SD-50006-01 – For Cable Lengths between 2400 Feet and 7.9 Miles – Toll Systems |
| | AA266.018, | Issue 7 – | G2 Control Terminal and Associated Equipment – Radio Telephone – Toll Systems |
| BSPM 747 | 318-500-100, | Issue 1 – | Coaxial Cable Television Transmission Systems RF Type – General Description |
| | AB46.311B, | Issue 1 – | 311B Electron Tube Data Sheet |
| BSPM 747A | – | | |
| BSPM 748 | – | | |
| BSPM 749 | E37.429.04, | Issue 2 – | Television – 38A Transmission Measuring Set (J64038A) – Check of 0.5 DB Scale |
| BSPM 749A | – | | |
| BSPM 750 | Appendix 2 | | |
| | AA266.067, | Issue 1 – | TH Radio System – General Requirements – Toll Systems |
| | AA266.082, | Issue 1 – | TH Radio – Automatic Protection Switching Equipment – Panels, Mounting, and Plug-In Units – Toll Systems |
| | AA268.546, | Issue 2 – | Toll Systems – Transmission Measuring 9A Video Distortion Meter – Low Frequency for Use with TV Video Circuits |
| BSPM 750A | – | | |

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|---|---|
| BSPM 750B | 357-000-000, Issue 3 – Numerical Index – Division 357 – Wire Line Entrance Links for Interconnection of Radio and Carrier Telephone Systems |
| P.E.L. 6713 | Television – 9A Distortion Meter – (J64009A) Alternate Mounting Arrangements |
| P.E.L. 6780 | TJ Radio – Connecting Links (1S3.9J-18) |
| P.E.M. 7441 | TJ Radio System – Class "B" Changes (1S3.9J-17) |
| P.E.M. 7447 | Mobile Telephone Service – Scantlin Transistorized Selector – Price Information (1S3.6-81) |
| P.E.M. 7448 | Mobile Radio Systems – Time-out Relay Protection for ERCO UHF Transmitters at SAC Bases (1S2.11F-3) |
| P.E.M. 7461 | Mobile Telephone Service – Variable Power Test Transmitters (1S3.1-99) |

Unnumbered Letters to Plant Supervisors

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|---|---|
| 11-25-60 | Mobile Service Trouble Summary |
| 12-5-60 | Mobile Radio Cost Results Summary |

Unnumbered Letter to Traffic Managers

| | |
|---|---|
| 12-6-60 | Mobile Telephone Service – Requests for Special Mobile Telephone Numbers (File No. 3B5.9) |

Unnumbered Letter to General Commercial Managers

| | |
|---|---|
| 11-30-60 | Alternate Use of Telephone Company Instruments with Customer-Provided Private Mobile Radio-telephone Systems |

Unnumbered Letter to Operating Vice Presidents and General Managers

| | |
|---|---|
| 11-30-60 | Explanatory Statement: Alternate Use of Telephone Company Instruments with Customer-Provided Private Mobile Radiotelephone Systems |

# WESTERN UNION RADIO BEAM EXPANSION PROGRAM
## SYSTEM LAYOUT MESSAGE SERVICE

SEATTLE
SPOKANE
PORTLAND
To Seattle
McCLELLAN AFB
V1
SAN FRANCISCO
T21
J20
A2
SUNNYVALE
J3
J21
J4
T3
SALT LAKE CITY
J5
DENVER
T4
J32
COLORADO SPRINGS
To Albuquerque
VANDENBURG
A1
J2
J1
LOS ANGELES
T1
B1
V5
NORTON AFB
To Dallas
ALBUQUERQUE
PHOENIX
EL PASO
MINNEAPOLIS
ST. PAUL
OFFUTT AFB
C
OTTUMWA
A3
J6
T5
KANSAS CITY
J9
T6
ST. LOUIS
TINKER AFB
V2
J30
To Los Angeles
J29
To Atlanta
T22
DALLAS
SHREVEPORT
HOUSTON
ALTERNATE T19 ARRANGEMENT
T19
J35
T8
CHICAGO
T12
J35
DETROIT
T19
T8
TOLEDO
T9
CLEVELAND
J27
T20
BUFFALO
T10
SYRACUSE
J15
J33
J36
T18
NEW YORK
T17
PHILADELPHIA
BALTIMORE
T16
T15
WASHINGTON D.C.
PITTSBURGH
T14
GENTILE AFB
V3
J34
T13
CINCINNATI
J26
J23
V4
ANDREWS AFB
J37
RICHMOND
To Atlanta
NEW BOSTON
A4
J17
J16
B2
T11
BOSTON
MEMPHIS
ATLANTA
JACKSONVILLE
ALTERNATE T14 ARRANGEMENT
T14
J31
J23
ST. PETERSBURG
MIAMI

SYMBOLS

- TERMINAL
- PROPOSED TERMINAL
- JUNCTION
- MANNED JUNCTION (MONITORING & SWITCHING POINT)
- PROPOSED JUNCTION
- SUPPLEMENTARY MONITORING POINT
- * INITIAL INSTALLATION WILL BE 240 V.B.
- 600 VB. 6KMC PHASE I & II ROUTES
- 600 VB. 6KMC PHASE III
- 600 VB. TENATIVE 6 KMC FUTURE CONNECTION
- 600 VB. 4 KMC PHASE III
- 600 VB. TENATIVE 4 KMC FUTURE CONNECTION
- 240 VB. 4 KMC
- 240 VB. TENATIVE 4 KMC FUTURE CONNECTION
- BURIED CABLE