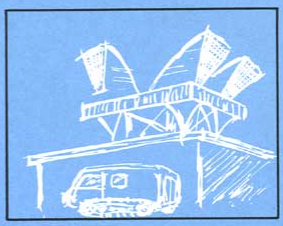
J.T. Stephens
r 1133-B

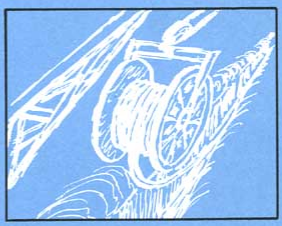
KEEP
A.I. & T. ENGR. "B" Organization Chart

T&R NOTES

Transmission and Radio Notes

Volume 1, No. 4 December 1966





American Telephone & Telegraph Company
Engineering Department

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C2
AUTOMATIC TRANSMISSION MEASURING SYSTEM

More comprehensive engineering letters on major systems and areas of activity are one part of our program to improve our communication with the Companies. These will give, not only information on recently completed work, but projections of future developments and summaries of past letters, all in an effort to provide the Company engineer with a package which will permit him to do his planning with a minimum of difficulty. It is our plan to review these letters before issue with key field groups to insure that they meet the engineer's needs.

With this objective in mind a new planning letter has been issued to bring up to date the information on the Automatic Transmission Measuring System (ATMS) and the associated automatic test frames. A major portion of the work required to prepare this letter was done by Mr. M. Paster of the New Jersey Company who was loaned to the Transmission Section for this purpose. It supplements Mr. Mapes' original planning letter of November 16, 1964.

The ATMS, which was described in PEL 7485, consists essentially of a director at the originating office and a responder at the terminating office. The director is associated with an automatic test frame by which access is provided to the trunks to be tested. The responder is accessed through one or more 105-type test lines. With the ATMS, automatic 2-way transmission loss measurements and noise measurements at both ends of trunks can be made.

The new planning letter includes a number of developments in progress or in the planning stage to provide improved arrangements for manual trunk transmission testing using equipment related to the ATMS development. In addition the new letter contains the latest information on the remote office test line (ROTL). However, due to the many ramifications of testing from a remote office, additional information will be required before the Companies can firm up their plans for this type of testing. We plan to issue another letter as soon as development planning has reached the point to justify such a letter.

As pointed out in the letter, present plans call for the ROTL to be made available only for Class 5 step-by-step and No. 5 crossbar offices, and it will not be able to test switchboard terminated trunks remotely. If your Company expects to have a market for the ROTL in the areas not yet under consideration, please let us know.

C3
SWIFTEC

On November 13, 1964, PEL 7345 introduced a new tool to aid in the design of circuits employing V4 plug-in-type telephone repeaters. This tool, called SWIFTEC (Schematic with inserts for Testing Every Combination) is a set of schematic drawings based on the plug-in idea, as are the V4 repeaters it represents. It consists of thin plastic rectangles, each showing the wiring of a specific V4 repeater shelf, and smaller rectangles, each showing the circuit of a plug-in unit, that fit into blank spaces in the large ones. Any combination of plug-in units that can be set up in a real repeater can thus be set up schematically and studied from transmission and signaling angles.

To assure its continuing benefit to the Companies, we are taking steps to update the SWIFTEC and keep it current with V4 repeater development. The new "components" should be available about mid-1967.

C4

SIGNALING – New Single Frequency System

It is no news to say that type E single frequency signaling has had its problems. As of now they appear to be largely solved, and it is possible to look forward to a new signaling system which will be a major improvement over the E-type.

Development is well along at the Labs on such a new system, which we hope can be introduced in 1968. Although not yet officially named, it is often called the "F-type" for convenience of reference. The The following discussion is given as a matter of advance information, and it should be understood that any particular feature may change, as may the designation "F-type." The general flavor will not change, however.

The new SF system is expected to have the following major features:

- Talk-off disconnects reduced by at least 10 to 1 over E-type
- Transmission loss stability improved by several to 1 over E-type
- Gain-frequency, delay distortion and harmonic distortion improved very substantially, to approximately the equivalent of the A5 channel bank.
- No field adjustments, and only a few factory adjustments.
- Design coordinated with latest central office transmission equipment, permitting fullest use of integrated bay arrangements and minimum cabling.
- Modular mounting arrangements, with a basic unit suitable for E-and-M multifrequency applications (with perhaps some dial-pulse capability included) but with loop converters, pulse correctors and other features in a series of supplementary units. The basic unit will be the same size as an N3 channel unit.
- A separate kind of basic unit for ESS, designed to operate most efficiently in those offices.
- New and improved power supply and signaling tone supply arrangements.
- Increased capability for operation remote from +7 and -16 TLP's where this is required, up to perhaps 3 db of loss at 2600 cps.
- Costs approximately equal to the E-type on a unit for unit basis, but substantially less when savings in cabling, reduced maintenance, less floor space, etc., are considered.

Several of the above features will be achieved by the use of thin-film resistors, with full advantage being taken of the precision and stability which they will provide. There may also be built-in level adjustment pads and other additional features.

The so-called "F-type" signaling system will be announced in the usual way some months from now.

C5

INSERTION LOSS AND ATTENUATION

There has recently been considerable interest shown in "insertion loss" as compared with "attenuation." They are not the same thing, and although sometimes the numerical difference between them is insignificant, it may sometimes be as much as 1 or 2 db. Therefore to use the correct value it is important to distinguish between them.

Attenuation is a measure of the amount by which the current is reduced in each unit of a line terminated at both ends in its characteristic impedance. In other words, the line is, in effect, infinitely long, and there are no reflection or interaction effects.

The insertion loss of a facility is the loss caused by inserting the facility between two terminations such as 900 ohms or 600 ohms. It is determined by the current flowing in the receiving impedance when the line with loss is inserted compared with the current flowing if the line had no loss. Most design work today calls for a value of insertion loss, and in making measurements it is insertion loss which is measured.

If the characteristic impedance of the facility does not match the terminating impedances, there are reflection losses due to the impedance mismatch. In addition, most telephone lines consist of more than one cable gauge, each with a different characteristic impedance. All of these increase the number of impedance mismatches and, therefore, reflection losses. Insertion loss is the sum of all the reflection losses and the total attenuation of the facility. Obviously, if all the impedances are nearly equal, with resulting small reflection losses, the insertion loss will be approximately equal to the attenuation; otherwise attenuation is only one of the factors to be considered.

To satisfy the need for information on this subject, several items have been or are being prepared:

1. An E.L. showing the development of a formula for insertion loss, giving some examples of its use and comparing the resulting insertion loss with attenuation. (Now in preparation.)

2. E.L. 17, dated October 5, 1966, transmitting a recently published book, "Impedance, Insertion Loss and Return Loss," which contains tabulations and graphs of insertion loss for nonloaded and H44 and H88-loaded cables between several terminations and at various frequencies in the voice band. These are for single-gauge 19, 22, 24 and 26 gauge cables.

3. Bell System Practice 304-300-101, "Insertion Loss of Nonloaded Cable Pairs," dated April, 1966, giving curves of the insertion loss of five types of nonloaded facilities between 600-ohm 900-ohm nonreactive terminations at frequencies of 1000 cps and 2300 cps.

4. Bell System Practice 304-300-102, "Length-Resistance-Insertion Loss of Nonloaded High-Capacitance Cable Pairs," including charts from which insertion loss for mixed-gauge nonloaded cables may be read. (Being printed and soon to be issued.)

D1

CATV CABLE TRANSMISSION CHARACTERISTICS

Many requests have been received for transmission information relative to coaxial cables used in CATV Systems. Following is a summary of pertinent information which should be of value to system design engineers:

NOMINAL VALUES OF ELECTRICAL CONSTANTS FOR CATV COAXIAL CABLES AND COAXIAL WIRES

	Attenuation at 70°F dB/100 ft.				
Coaxial	10MHz	50MHz	100MHz	200MHz	216MHz
CA-3049, CA-3050	0.79	1.84	2.63	3.79	3.94
CA-1878, CA-3185	0.23	0.53	0.75	1.06	1.11
CA-3155	0.38	0.89	1.28	1.79	1.86
E&F Coaxial Wire	1.05	2.44	3.50	5.05	5.22
AT-8386	0.31	0.72	1.05	1.54	1.60

Velocity of Propagation at 70°F, 10-200MHz miles per second	
CA-3049, CA-3050	123,000
CA-1878, CA-3185	176,000
CA-3155	152,000
E&F Coaxial Wire	123,000
AT-8386	152,000

	dc Resistance at 70°F, Ohms/100 ft.	
Coaxial	Inner Conductor	Outer Conductor
CA-3049, CA-3050	1.065	0.112
CA-1878, CA-3185	0.102	0.054
CA-3155	0.280	0.207
E&F Coaxial Wire	4.70	0.269
AT-8386	0.185	0.045

	1kHz Capacitance at 70°F	Dielectric
Coaxial	pF100 ft.	Constant
CA-3049, CA-3050	2,000	-
CA-1878, CA-3185	1,430	1.1
CA-3155	1,650	1.5
E&F Coaxial Wire	2,000	2.26
AT-8386	1,650	-

D2
TIDISOUND

TIDISOUND is an acronym for time-diplexed sound. It is a terminal equipment system which combines the audio signal associated with a television program with the video signal, so that both can be transmitted over the normal video channel, and separates the two signals at a receiving point. A program channel is thereby eliminated. The diplexing is accomplished by sampling the audio signal at the horizontal line rate of the video signal (approximately 15,750 Hz), generating 0.5 microsecond pulses from the audio samples, (Pulse Amplitude Modulation) and applying these pulses to a pedestal erected on the front porch of the video signal.

The Laboratories' development of TIDISOUND is nearing completion, and we will soon be able to furnish more definite information on its application. It now appears to have an economic advantage over 5 kHz program circuits for intercity distances, but not for local service.

The first proposed use of TIDISOUND is to provide program channels between San Francisco and the Brewster Flats, Washington, satellite earth station, using laboratory prototype equipment. The present plans are to have these channels in service on December 1, 1966.

E1
PROCESSING INTERVALS FOR APPLICATIONS FILED AT FCC

We at "195" are fully aware of the frustrations the Bell Companies have been experiencing concerning long delays in the processing of common carrier applications filed with the FCC. The long processing intervals are caused by either: (1) the Licensing Branch where incoming applications are recorded, public noticed and jacketed for processing and authorizations issued, or (2) the Mobile Radio or Microwave Branches where applications are processed and approved.

The Licensing Branch of the Common Carrier Bureau has had many problems and a huge backlog since the beginning of the year due to new personnel, handicapped by inexperience, and insufficient staff to keep up with the work load. The FCC gave priority to construction permits, STA's and the issuance of the weekly "public Notice-C," which was all that could be handled by the License Branch. This meant that work on renewal applications and modifications that could be combined with the renewal license was stopped several months ago. The FCC has been trying to better this situation and has recently given the License Branch additional help to concentrate on bringing the backlog up to date. Many of the Bell Companies have not received any license renewals for microwave stations, which expired February 1, 1966. This has caused added concern for Plant personnel who have been trained to post current authorizations at microwave stations.

The overall time interval for processing microwave applications is presently four to five months and for applications in the Domestic Public Land Mobile service, approximately ten months. In view of the current volume of microwave applications being processed, we believe that a four to five month interval is reasonable for planning purposes.

On the other hand, a ten or more month interval is not reasonable for mobile applications, and we have indicated our concern to the FCC staff. The application backlog in the Mobile Radio Branch appears to be of their own making, resulting from microscopic examination of all applications and an unreasonably high number of formal requests involving minor amendments to applications. On November 14, 1966, A.T.& T. Engineering and Regulatory representatives met with the FCC Common Carrier staff to discuss this situation. At this meeting we offered constructive suggestions to the staff that, in our opinion, would help alleviate this backlog. We are hopeful that there will be some improvement in overall processing intervals for mobile applications as a result of this discussion.

In any event, the Bell Companies can also help reduce the processing time by planning construction dates far enough in advance to allow an application to be on file at least four to five months, instead of requesting Special Temporary Authority under 319(d) of the Communications Act or 21.27(b) as soon as applications are filed. These requests delay processing because the applications must be taken out of line and carefully checked by an FCC engineer before a telegram can be sent to the licensee. In addition, processing is also delayed when applications are incorrect or do not comply with the requirements of Part 21 of the FCC Rules, and must be amended.

E2
FCC TYPE ACCEPTANCE CODING OF MOTOROLA DPLM TRANSMITTERS

E.M. 74 forwarded on October 19, 1966 to all Chief Engineers covered a change in the FCC Type Acceptance listing of the Motorola 50 watt base station transmitters used for mobile radio service. As outlined in the E.M., the original CC 3033 listing is replaced by either CC 3067 or CC 3068 and the CC 3033A listing is replaced by either CC 3069 or CC 3070 in order that the coding may indicate whether or not a diplexer is connected to the transmitter output as an integral part of the transmitter equipment.

One of the Companies desires to insert an isolator between the RF output and the built-in diplexer of the CC 3033 transmitter in a number of cases, resulting in an arrangement similar to that shown in Figure 2 of PEM 9414 but which will not meet the Type CC 3033 coding.

Although the FCC might accept a listing of Type CC 3033 modified with a description of the modified arrangement, it is more desirable to recode the radio equipment as Type CC 3068 in FCC applications and show the arrangements connected to the transmitter output in the necessary application sketches. It will be necessary to obtain new equipment nameplates directly from the Motorola Company for properly designating the radio terminals. The same philosophy may be applied in the case of Type CC 3033A equipment. In all cases the actual equipment coding should agree with that shown on FCC authorizations in order to avoid possible FCC citations.

Questions on equipment arrangements may be directed to Bob Buck (212-393-3029) and questions regarding licensing information to Jamie Jamison (212-393-2254).

E3
MECHANIZED MICROWAVE STATION RECORD PROCEDURES

The mechanized microwave station record program originated by the Long Lines Midwestern Area and modified and adopted for the Bell System, has been enthusiastically accepted. The savings in engineering time along with its adaptability to many calculation programs has demonstrated its value.

The procedures required to provide a mechanized Microwave Station Catalog were implemented by a series of conferences with individual representatives from the Operating Companies. This arrangement of direct contact with the individual responsible for the station record allowed a quicker start on the program. However, such an arrangement was only a temporary measure and as such, needed to be replaced by standard procedure.

PEL 7472 described the "Mechanization of Microwave Station Records," listed the standard input forms and provided publishing information

A detailed step-by-step instruction covering the preparation of input information for the computerized record is currently under preparation as BSP Section 940-333-110, Issue 1. It is anticipated that it will be released to the field sometime in the first quarter of 1967. It is expected that the practice will result in better standardization of the records and fewer errors. The practice will supply adequate understandable instructions that will assist the Companies to do the work accurately and more easily. Another advantage of the increased accuracy will be a reduction of interrupted programs which cost valuable computer time, that result from errors in the input data

In the interim, until the practice is published, if you have any questions or need assistance in connection with the microwave station record, please contact V.B. Robinett at "195" on Area Code 212 393-3017.

F1

MACADAM ELECTED PRESIDENT OF IEEE

Walter K. MacAdam, Vice President – Government Communications, A.T.& T. Company, has been elected President of the Institute of Electrical and Electronics Engineers for 1967.

Walt will probably be remembered by Transmission people as A.T.& T. Transmission Engineer from the period March 1956 to July 1959, and Assistant Chief Engineer from October 1959 to April 1960. He has been Vice President – Government Communications since April 1960.

Walt began his telephone career in 1937 as a student engineer. He held engineering and plant assignments in Atlanta, New York and Denver and became superintendent of engineering for the Western Electric Company on the first DEW line project in the arctic in 1953. He later became Area Chief Engineer for the Long Lines Department in White Plains.

IEEE has become the world's largest engineering society since its formation in 1963 by the merger of the American Institute of Electrical Engineers and the Institute of Radio Engineers. Its membership is more than 150,000 with sections located throughout the world and it publishes over 35 journals on electrical engineering. Walt has been affiliated with the AIEE since his days at M.I.T. when he was chairman of a student branch. Since then he has served on numerous technical and administrative committees. Since 1964 he has served as Director of the IEEE and as Vice President for the 1966 term. He was elected to Fellow of the Institute in 1959.

F2

WEPPLER ELECTED FELLOW OF IEEE

H.E. Weppler, Engineering Director – Radio and Guided Waves, has been elected to the grade of Fellow, Institute of Electrical and Electronics Engineers, effective January 1, 1967.

ORGANIZATION CHANGES

Organization charts for both the Transmission and Radio and Guided Waves Section have been included In this issue to help you catch up with the many changes made since the charts were issued with the June TRANSMISSION AND RADIO NOTES.

In addition to the charts, the most recent changes in the two sections are listed below.

Transmission Section

Effective October 17:

R. T. James was transferred to the Radio and Guided Waves Section with the Title of Engineering Manager – Video, and reports to H. E. Weppler. T. F. Benewicz, C. L. Ostrofe, J. J. Schretzmayer, Jr. and Miss E. Parada continue to report to Mr. James.

H. T. Uthlaut's title was changed to Engineering Manager – Special Services. J. F. Mullin and Miss J. M. Benedict, formerly of Mr. James' group were transferred to the new Special Services Group reporting to Mr. Uthlaut.

R. V. Hayes and W. C. Herron were transferred to the Transmission Performance Group.

C. D. Howe was transferred to the new Transmission and Outside Plant Planning Group in the Outside Plant Section.

D. T. Osgood, O. L. Norman and S. T. Douglass were transferred to the Short Haul Transmission Systems Group reporting to N. A. Adams.

Effective December 1, E. M. Hammeke, Equipment Engineer in the Southwestern Bell Telephone Company, has accepted a position as Engineer in the Special Services Group.

Radio and Guided Waves Section

Effective December 1, P. B. Engh, Engineering Manager – Mobile and Special Radio Systems, accepted the position of Secretary, Employees' Benefit Committee of the Southern Counties Area, Pacific Telephone and Telegraph Co., San Diego.

Effective December 15, G. S. Zilis, Special Services Manager, Chicago Area, Illinois Bell Telephone Company, has accepted the position of Engineering Manager – Mobile and Special Radio Systems, replacing Mr. Engh.

Effective November 7, C. W. Houchin, Senior Engineer in the Los Angeles Central Area of the Pacific Telephone and Telegraph Co., joined the Microwave and Guided Wave Systems group.

Effective November 28, G. W. Hatch, Project Engineer, Exchange Transmission on the General Engineering Staff, Denver, of the Mountain States Company joined the Microwave and Guided Wave Systems Group.

AMERICAN TELEPHONE AND TELEGRAPH COMPANY

TRANSMISSION SECTION

ORGANIZATION

F. J. Skinner – Engineering Director – Transmission – 393-3915

Mrs. C. Vitale – Secretary – 393-3916

N. A. Adams – Engineering Manager – Short Haul Transmission Systems

Current system coordination associated with introducing, maintaining and improving signaling systems and exchange and intra-urban transmission systems (including voice frequency, signaling and carrier systems).

(Vacant) – Engineering Manager – Transmission Performance

Planning and current matters related to transmission design, maintenance, and performance of the public message network.

H. T. Uthlaut – Engineering Manager – Special Services

Planning and current matters relating to transmission design, maintenance and performance of voice frequency special services.

F. Woodland, Jr. – Engineering Manager – Coordination and Protection

Planning and current matters relating to electrical coordination and protection. Administration of program for preparation of transmission Bell System Practices.

SHORT HAUL TRANSMISSION SYSTEMS GROUP

N. A. Adams (Norm) – Engineering Manager – Short Haul Transmission Systems (393-3575)

C. D. Donohoe (Dick) (393-2891)

PCM Trunk Carrier Systems
T1, T2

Independent Manufacturers Systems

Carrier Maintenance Centers

Carrier Servicing Centers

Alarm Systems

W. D. Gramley (Tom) (393-3160)

Short Haul Analog Trunk Carrier Systems
N1, O, ON1, ON2, ON/K

Subscriber Line Carrier Systems
Impulse Noise Measurement

Engineering Carrier Systems for Data Transmission

Channelizing Radio Systems

C. M. Pomeroy (Collie) (393-2910)

Short Haul Analog Trunk Carrier Systems
N2, N3

Independent Manufacturers Systems

Short Haul Carrier System Cost Analysis

Missile Base Applications

Carrier Program Channels

J. T. Stephens (Jack) (393-4437)

Signaling Systems
Single Frequency
CX, DX and SX
TOUCH-TONE
Other

Bridge Lifting Devices

Miscellaneous Common Carrier Interconnections

D. T. Osgood (Ozzie) (393-2436)

Transmission Testing Methods

Voice Frequency Testing Arrangements
ATMS and ROTL

General Purpose V.F. Test Equipment

"Red Ball" Program

T. J. Talley (Tom) (393-2313)

Short Haul Voice Frequency Trunk Transmission
Trunk Design
Loading Systems
E and V Repeater Applications
Cable Characteristics
Cable Completion Tests

Artificial Lines

Statistical Methods

L. M. Lee, Mrs. (Louise) (393-3495)

Cable and Open Wire Line Facilities –
Carrier Transmission Data

Transposition Systems
Design Methods
Training

Preparation of Carrier Systems
Information – T1

Analysis of Circuit Data

Assistant in Engineering Studies and
Field Testing

G. W. Kornemann, Jr. (Gus) (393-3822)

Bell System Practices
Short Haul Carrier Systems

A. Salzberg (Art) (393-3927)

Preparation of Signaling Practices

O. L. Norman (Norm) (393-3280)

Bell System Practices
Testboards
Trunk Testing
ATMS

S. T. Douglass (Sam) (393-4022)

Bell System Practices
Transmission and Noise Measuring System

R. B. Santarsiere, Miss (Rosemarie) (393-3576)

Special Dictation and Typing

Assistant in Engineering Studies

Maintenance of Group Records

TRANSMISSION PERFORMANCE GROUP

(Vacant) – Engineering Manager – Transmission Performance (393-3397)

J.A. Harmon (Joe) (393-2671)

Overall Performance Evaluation of Connections, Trunks and Loops

Transmission Service Attitude Measurements

Studies of Subjective Test Results

Overall Transmission Objectives

Transmission Improvement Programs

DDD S.I.C. Liaison

R. V. Hayes (Bob) (393-2859)

Network Transmission Plans (Except Special Services)

Allocation of Objectives for Trunk Design and Maintenance Loop and Station Performance

Independent Company Relations

TSPS

M. Derzai (Matt) (393-3411)

Trunk Transmission Design Methods Noise, Loss and PAR Computations

Trunk Facility Project Liaison

Toll Conferencing

W. C. Herron (Bill) (393-4049)

Loop Design and Maintenance Methods

Transmission Requirements for Stations, Outside Plant and Central Offices

Loop and Station Test Facilities

A. C. Johnson (Arden) (393-4202)

Transmission Performance Index
Overall Plan
Trunk Components
Toll Connection Appraisals

G. A. Faneuff (Gerry) (393-2030)

Transmission Performance Index
Loop Component
Station Component
Local Connection Appraisals

A. R. Dole (Al) (393-3379)

Bell System Practices
Engineering Aspects of Noise Measurement and Control

L. Pappas, Miss (Lilly) (393-2889)

Transmission Results Publication

Transmission Improvement Questionnaire

Statistical Computation and Analysis

C. C. Stretton, Miss (Catherine) (393-2463)

Transmission Performance Index – Program Schedules, Data Analysis and Computation

Noise Computations and Summaries

Bell System Repair Specifications and Red Ball Correspondence

Assistance in Engineering and Administrative Studies and Reviews

L. Podraza, Mrs. (Louise) (393-3398)

Maintenance of Group Records

Typing and Special Dictation

SPECIAL SERVICES GROUP

H. T. Uthlaut, Jr. (Herb) – Engineering Manager – Special Services (393-3073)

E. M. Hammeke (Eldon) (393-4759)

Performance Evaluation Plans
- Switched Services Networks
- Private Line Networks
- Special Services Questionnaire

B.I.S. Special Services Liaison

W. D. Parfitt (Bill) (393-3320)

Switched Special Services and Networks
- Transmission Design and Maintenance (Objectives, Requirements, Methods and Equipment)
  - PBX Facilities
  - FX Tie Lines, Station Off-Premise Lines, etc.
  - PBX Conferencing and Key Equipment
  - CENTREX
  - Announcement Systems
  - Secretarial Service

J. F. Mullin (Jim) (393-2912)

Non-Switched Private Lines and Networks
- Transmission Design and Maintenance (Objectives, Requirements, Methods and Equipment)
  - Audio Program Service and Facilities
  - Wired Music Systems
  - 300 Type Switching Systems

J. M. Benedict, Miss (Jeannette) (393-4380)

Assistance to Engineers in Group

Section Trip Binder Material

R. L. Huxtable, Miss (Ruth) (393-2836)

Transmission Design Studies

Transmission Data Computations

Return Loss and Impedance Calculations

Assistance in Studies

M. H. Carcich, Miss (Mary Ann) (393-3074)

Maintenance of Group Records

Special Dictation and Typing

Assistance to Engineers in Group

COORDINATION AND PROTECTION GROUP

F. Woodland, Jr. (Woody) – Engineering Manager – Coordination and Protection (393-3742)

W. M. Haynes, Jr. (Wes) (393-2821)

Inductive Coordination – Low Frequency Induction, Special Problems

Corrosion and Electrolysis

Noise Influence from Power Lines

Extra High Voltage Power Line Coordination (AC and DC)

Coordination with Electrified Railroads

Central Office Noise Problems

J. F. Katzmaier (John) (393-2604)

Electrical Protection – Lightning and Contact Problems, Higher Voltage Joint Use, Buried Cable Systems

National Electric Code

National Electrical Safety Code

Electromagnetic Pulse Problems

Acoustic Noise Problems

Click Measurements

E. J. Lott (Ed) (393-3369)

Bell System Practices – Corrosion, Inductive Coordination, Protection

W. M. Seufert (Wally) (393-3275)

Administration of Bell System Practices Preparation for Transmission Section

R. H. Foreman, Mrs. (Ruth) (393-3340)

Maintenance of Bell System Practice Files

Assistance on Studies and Practice Preparation

Assistance in Assembling Items for "Transmission and Radio Notes"

C. LaMastra, Miss (Clara) (393-3340)

Maintenance of Bell System Practice Files

Special Dictation and Typing

Assistance on Studies and Practice Preparation

J. Mitchell, Mrs. (Janet) (393-3743)

Maintenance of Group Records

Special Dictation and Typing

Assistance to Engineers of Group on Studies

RADIO AND GUIDED WAVES SECTION

ORGANIZATION

H. E. Weppler – Engineering Director – Radio and Guided Waves – 393-3291

Miss B. Thomas – Secretary – 393-3292

G. G. Ericson – Engineering Manager – Microwave and Guided Wave Systems

Current system coordination on microwave radio and guided wave systems, including broadband multiplex terminals

R. C. Harris – Engineering Manager – Microwave and Guided Wave Planning

Planning for future transmission systems for the long haul network, including microwave radio and satellite systems, and coaxial cable and other guided wave systems.

R. T. James – Engineering Manager – Video Services

Network TV, closed circuit TV and Picturephone

J. B. Keane – Engineering Manager – Radio Frequency Coordination

Frequency allocations and FCC liaison. Also, radio frequency interference and radiation matters, and functions common to the entire section.

G. S. Zilis – Engineering Manager – Mobile and Special Radio Systems

Mobile radio systems, including vehicular, air-ground and hand-carried. Also, maritime service, high frequency overseas radio and VHF/UHF point-to-point systems.

MICROWAVE AND GUIDED WAVE SYSTEMS GROUP

G. G. Ericson (Grant) Engineering Manager – Microwave and Guided Wave Systems (393-3604)

Current system coordination on microwave radio and guided wave systems, including broadband multiplex terminals.

J. D. Crawford (Jack) (393-3315)

TM-1/TL Microwave Systems

TL-1 Microwave Systems

S. C. Fritsch (Steve) (393-3222)

Microwave System Engineering Practices

A. J. Haushamer (Al) (393-3350)

Bell System Practices
Broadband Terminals
Entrance Links
Guided Wave Systems

G. W. Hatch (George) (393-4366)
Microwave Entrance Links
If Entrance Links
Echo Supressors
Microwave Restoration Switching

C. H. Houchin (West) (393-3770)
Outside Suppliers Microwave Equipment
Broadband Application of Microwave

W. H. Keller (Bill) (393-2120)

TJ Microwave Systems

TM-1/TJ Microwave Systems

E. H. Koeper (Ed) (393-2193)

Short Haul Microwave System Practices

J. P. Robertson (Jim) (393-2455)

TH Microwave Systems

TD-3 Microwave Systems

FMT Switching

3A FM Terminal

V. J. Sansevero (Vince) (393-2923)

Broadband Terminals

Channel Banks

Tropospheric Scatter Systems

A. J. Taggi (Al) (393-2294)

TD-2 Microwave Systems

Protection Switching Systems

J. A. Wood (Jim) (393-2586)

Guided Wave Systems – J, K, L1, L3, L4

Emergency Restoration Plans

Repeatered Submarine Cable Systems

TASI

Miss L. V. Meadows (Linda) (393-2286)

Section Clerical Activities

Filing, Dictation, Typing

Attendance Records

Miss J. M. Zimmermann (Joan) (393-3605)

Maintenance of Correspondence Records, Dictation and Typing

Filing, Assistance on Engineering Studies

Systems Data

RADIO FREQUENCY COORDINATION GROUP

J. B. Keane (Jim) Engineering Manager – Radio Frequency Coordination (393-4447)

Frequency allocations and FCC liaison. Also, radio frequency interference and radiation matters and functions common to the entire Section.

J. B. Fitch (Jack) (393-2946)

BSP Coordination for entire Section

Preparation of BSP's on FCC and related matters

B. C. Jamison (Jamie) (393-2254)

FCC-Telephone Company liaison relating to:
- Land Mobile, Rural, BELLBOY Radio Services
- Section 214 of the Communications Act as it relates to extension and supplementation of facilities

FCC liaison relating to microwave system engineering matters

Matters relating to antenna towers (FCC and FAA)

Miss D. J. Livermore (Dorothy) (393-2180)

FCC-Telephone Company liaison relating to:
- Common Carrier Microwave Services
- Telephone Maintenance

Matters relating to Domestic Frequencies and Non-Common Carrier Radio Services

V. B. Robinett (Vic) (393-3017)

FCC-Telephone Company liaison relating to:
- Experimental, Maritime, Air-Ground Radio Services
- Section 214 of the Communications Act as it relates to extension and supplementation of facilities
- Certification and compliance with FCC Rules, Parts 15 and 18

Interference and Coordination

Mechanized station records

Radiation matters

CCIR Administration

Miss A. M. Boyne (Alice) (393-3926)

Managing Editor, Transmission and Radio Notes

BSP and General Letter record files

Preparation of Conference Material

Miss M. Nigro (Madeline) (393-2394)

Records of Bell System Radio and 214 Applications filed with the FCC

Bell System Radio Station Records

Bell System Broadband Map

Mrs. P. Moore (Paula) (393-4448)

Maintenance of FCC Rules and Regulations; FCC Dockets, Public Notices and Correspondence

Records of General Letters

Circulation of Transmission and Radio Notes

MICROWAVE AND GUIDED WAVE PLANNING GROUP

R. C. Harris (Bob) Engineering Manager – Microwave and Guided Wave Planning (393-3751)

Planning for future transmission systems for the long haul network including microwave radio and satellite systems and coaxial cable and other guided wave systems.

O. C. Foster (Tony) (393-3044)

Studies of Communication Satellite Systems

CCIR – Space Communications

A. S. May (Al) (393-4344)

Studies of Future Radio Relay System Needs

CCIR – Radio Relay Systems

J. T. Quealy (John) (393-2462)

Future Facility Requirements

System Costs

A. J. Uhlmann (Al) (393-2611)

Studies of Future Coaxial System Needs

Studies of Proposed Wave Guide Systems

Studies of Future Multiplex (FDM & TDM) Needs

Miss M. F. Scola (Marilyn) (393-2286)

Maintenance of CCIR Records

Assistance in Engineering Studies

Stenographic

VIDEO SERVICES GROUP

R. T. JAMES (Dick) – Engineering Manager – Video Services (393-4497)

T. F. BENEWICZ (Tom) (393-2002)

CATV (Primary responsibility)
Picturephone

C. L. OSTROFE (Charlie) (393-2484)

Network TV
Tidisound
Closed Circuit TV (Industrial, Theatre, Educational)
Subscription TV
CATV (Secondary responsibility)

J. J. SCHRETZMAYER, JR. (Jack) (393-3329)

Bell System Practices – CATV and Television Systems

E. PARADA, MISS (Elaine) (393-4498)

Maintenance of Group Records
Special Dictation
Assistance to Engineers in the Group

MOBILE AND SPECIAL RADIO SYSTEMS GROUP

G. S. Zilis (George) Engineering Manager – Mobile and Special Radio Systems (393-3465)

Radio services below 1000 Mc/s, includes vehicular, air-ground and hand-carried mobile radio systems; maritime service; high frequency overseas radio; and VHF/UHF point-to-point systems.

P. D. Bodman (Phil) (393-2773)

Preparation of Practices on Mobile and Special Radio matters, primarily of an engineering nature. Review of all new and revised mobile and special radio BSP's.

E. W. Borden (Ed) (393-3860)

Mobile Radio Transmission, Propagation, Interference and Antenna Problems

Special Studies

CCIR Study Group XIII

M. C. Fruehauf (Milt) (393-3550)

BELLBOY Personal Signaling Service

Public Air-Ground Systems

Telephone Company Maintenance Systems

Private Mobile Systems for Military and Federal Government

R. G. Buck (Bob) (393-2517)

Vehicular Mobile Telephone Service (MJ, Manual, Railroad, Touch-Tone) VHF/UHF Point-to-Point

J. C. Salazar (Joe) (393-2517)

Planning for all services below 1000 Mc/s, including:

High Capacity Systems; Lineless Extension; Plans for 35 Mc/s; MK System

R. E. Sefton (Dick) (393-2415)

HF Point-to-Point

Maritime Services

R.T.C.M.

Test Equipment

B.S.R.S.

Miss P. Kelly (Pat) (393-3466)

Dictation, typing and filing

G

CORRECTIONS

Our article about High Voltage Direct Current Transmission Lines, which appeared in the last issue of T & R NOTES, rolled off the press with three zeros missing. The last line of the first paragraph should have read:

> It is designed to transmit 1,440,000 kilowatts in either direction with the dc line current being approximately 1,800 amperes.

Also, item G2 in the October T & R NOTES had an error in the equation for antenna main beam intersections with the stationary satellite orbit. The equation should read:

$$\cos A = \cot \left[\text{arc cos } (0.1509 \cos a) - a\right] \tan L.$$

When $a = 0$ this reduces to:

$$\cos A = 0.1527 \tan L.$$

H
TRANSMISSION AND RADIO INFORMATION

The following information has been forwarded since the last issue of TRANSMISSION AND RADIO NOTES

E.M. 34 – 100A Traffic Service Position – Transmission Line-Up

E.M. 48 – Type "N" Carrier Systems – Modification Kits for the Sierra KS-15538 List 5 & List 5A Frequency Selective Voltmeters

E.M. 49 – T1 Carrier – Modification and Repair of Power Supplies

E.M. 53 – Radio Systems – KS-19570 Passive Reflectors

E.M. 54 – Type N1 Repeatered Line – 386-Type Equalizers

E.M. 58 – Bell System Practices – Conversion of AB67 Series to Plant Series Division 877

E.M. 59 – Bell System Practices – Conversion of AB66 Series to Plant Series Division 876

E.M. 74 – Type Acceptance Information for MJ 50 Watt Transmitter

E.M. 80 – KS-16816, L1, L2 Program Equalizers – Circuit Modifications to Improve 15 Kc Equalizing Capabilities

E.M. 90 – VHF Maritime Radiotelephone Service – Voice Calling on Public Correspondence Channel

P.E.M. 9872 – L Carrier Multiplex – 92 Kc/s and 104.08 Kc/s Pilot Supply Modifications J68857P Pilot Insertion Unit Modifications, adjustment Procedures and Maintenance Limits

E.L. 11 – Community Antenna Television Systems – (CATV) KS-19925 Performance Requirement – Cable TV Equipment – Supplementary Information

E.L. 15 – SAGE-AUTOVON – 305 Switching System – Transmission Plan

E.L. 17 – Impedance, Insertion Loss and Return Loss – Exchange Area Cables

E.L. 23 – Trunk Transmission Maintenance Index Plan

Unnumbered Letters to Chief Engineers

9-27-66 – Connection Appraisal Plan – New Observing Set – Planning Information

10-4-66 – Planning: Subscriber Loop Multiplexer