

T & R NOTES



Transmission and Radio Notes

Volume 1, No. 1

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American Telephone & Telegraph Company
Engineering Department

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TRANSMISSION AND RADIO NOTES

The publication RADIO NOTES has been replaced by TRANSMISSION AND RADIO NOTES which will come to you regularly in the future on a bi-monthly basis. The new publication plans to cover both radio and transmission matters and to include both news items and items of a more technical nature.

Miss Hayes of Mr. Keenan's organization in the Radio and Guided Wave Section, who has been editor of RADIO NOTES, will be editor of the new combined TRANSMISSION AND RADIO NOTES. Mrs. Hance, also of Mr. Keenan's organization, will take care of the mailing list. Mrs. Foreman of Mr. Woodland's Group in the Transmission Section will assist in collecting transmission items and integrating the Transmission Section mailing list with the Radio and Guided Wave Section list.

In the forthcoming issues of TRANSMISSION AND RADIO NOTES we hope to provide more detailed back-up information on the progress of various projects, and the reasons for many of the decisions that are made. It is our hope that by furnishing this additional detailed information you will have a better picture of what is going on in our field in the Bell System.

The reasons for the combining of items from the two sections is a reorganization in the Engineering "B" Division which was made effective April 14, 1966. The purpose of the reorganization was to place particular emphasis on forward planning in all areas and to give increased attention to the development and engineering of exchange area facilities. Groups to concentrate on planning work were formed and, in addition, some of the present functions of the Transmission Section were transferred to other sections.

At the same time, the responsibility for guided wave transmission systems, including coaxial cable, submarine cable and future waveguide systems, and broadband multiplex terminals, were included in the new Radio and Guided Waves Section. This will facilitate joint planning and Engineering of all systems for longhaul transmission.

Attached are complete charts to show the new organization.

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MORE IMPROVEMENTS - FOR A REAL WORK HORSE

During recent years a large amount of effort has been directed towards improvement in the N1 Carrier equipment. This effort has been necessary to permit the upgrading of N Carrier to meet current high quality facility standards. Although N1 has now been succeeded by the more modern transistorized N2 system, it still constitutes 40 per cent of all physical carrier channels in the Bell System. Of the approximately 650,000 channels in the plant at the end of 1965, 50 per cent have been installed in the last five years. Because of the very large investment in N1, we have continued our updating program and will soon release information on channel unit and terminal modifications.

Briefly, the channel unit changes result in:

1. Improvement in compressor high frequency response which has been made less dependent upon tube aging.
2. Reduction of high end peaking in the VF response of channels without signaling.
3. Reduction of effects of trunk circuit transients.
4. Reduction of effects of VF longitudinal impulse noise.
5. Elimination of television interference which may generate from N1 channels.
6. Reduction of a possible source of noise from the regulator diode.

7. Reduction of modulator carrier leak to provide improved on-line stability.
8. Reduction of 3700 cps crosstalk coupling between channel units with signaling and SP channel units.
9. Improvement in on-line stability between on-hook and off-hook conditions and,
10. Improved contact life for the signaling relay.

The terminal changes result in:

1. A reduction in crosstalk and an improvement in noise performance by increasing the size of the internal .130 volt filter capacitor.
2. Improved operational performance by changing the size of the main filament fuse in J88703AT or AN bays to eliminate a hazardous condition should an accidental ground occur, and
3. Eliminating a possible service failure by replacing the wiring associated with power-fed resistors which has seriously deteriorated because of high temperatures.

On a system as important and widely used as Ni Carrier, we will continue to examine the need for improvements arising out of field experience. However, our plans are to screen any new proposed modifications very carefully. One such item is currently under investigation. A source of impulse noise has been found to originate in the transmitting side of some J88703A terminals. Should this investigation disclose that a modification is required, we will make every attempt to have information available prior to the start of the modification program.

An engineering letter providing information for all of the available modifications is in preparation and will be released in the Third Quarter.

Just in case you missed it, PEL 7189, PEM 0910 and PEM 0388 provide information for modification of D and DN Carriers.

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HEAVILY LOADED SHORT-HAUL RADIO SYSTEMS

PEL 7411 dated April 9, 1965 described in detail work being done to improve the 680 circuit load performance of short-haul radio systems. We are currently preparing a similar letter to update this information and describe our plans for future action. Most of the items shown in PEL 7411 have subsequently been covered by general letters, DSP changes and standard drawing changes. The more important items not covered in current correspondence are:

1. Linearity Test Set - A new linearity test set is being developed for TL/TB radio systems which is required to maintain heavily loaded systems. The new test set will apply two equal level tones to the radio transmitter, and the sum and difference second order modulation products will be measured at the receiver. The low frequency difference product will be used to adjust linearity, and the high frequency sum product will be an indication of delay. The new test set will be inexpensive and simple making it well suited to routine maintenance. This test will permit routine linearity adjustment in agreement with the adjustment had it been made using noise load techniques. The exact schedule on this item is not known at this time, but we are working towards making it available before the end of this year.
2. Bell System Practices - (a) Practices in the Plant and Engineering Series are being prepared specifically for heavily loaded short haul radio centers. These practices are intended for initial system alignment and for analyzing future trouble conditions. These tests utilize some of the more expensive noise load test equipment, delay test sets, and other transmission measurement sets available at specific maintenance centers rather than at every maintenance location. These practices are in the final editing process and should be available for field use in July.

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The Original.**

procedures for Jervoid Sealine equipment, including line and distribution amplifiers, power supply equipment, equalizers, etc. Included will be AR26-605-20 covering the design aspects of 34 to 256 or RF Cable Systems. Also included are 13 Practices on outside plant engineering covering coaxial cable plating, conventions, systems, electrical characteristics, etc.

3. Advance copies of these new Practices will be sent by June 1 to key people in the Associated Companies who are experiencing the most problems in CATV. After three people have had a chance to review the new Practices, a team of A.T. & T. people will be sent out to discuss any remaining technical problems.
4. A CATV course for Engineers is being organized by A.T. & T. and the Bell Laboratories. It will cover transmission equipment and outside plant matters and will last about one week. We expect to hold several sessions extending over the next several months.

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STATUS OF THE MJ MOBILE RADIO SYSTEM DEVELOPMENT

As covered in previously issued POF's and PEL's, the basic equipment necessary to implement an MJ mobile radio system has been developed and is available. Certain peripheral equipment is in various stages of completion as follows:

1. Carrier Applique Units

The Bell Laboratories have recently completed development of standard MJ mobile radio system carrier applique units. These units permit use of carrier facilities between an MJ control terminal and associated radio equipment. The units will be built by the Western Electric Company with initial availability in the fourth quarter of 1966. Refer to POF 9761 issued April 28, 1966 for additional details.

2. MJ System Touch-Tone Dialing

Initial Bell Laboratories evaluation of radio path suitability for the transmission of mobile touch-tone dialing looks quite promising. It appears that timed bursts of touch-tone frequencies can be successfully transmitted over the 150 Mc/s mobile channels. When testing is completed an overall decision will be made as to whether mobile touch-tone dialing should be developed. We will keep you informed as the work progresses.

3. MJ Mobile Rear Seat Extension

The Bell Laboratories is developing a rear seat extension for MJ mobile installations. This extension is presently viewed as a trailer handset with a modified boom. "Busy" and "Transmitter on" lights will be included. A major problem remaining to be solved is surprisingly a mechanical one - the holding arrangement for the handset. The schedule calls for completion of the development by the end of this year.

The Bell Laboratories have stated they expect to complete writing of all BSP's for MJ equipment now available within six months. SD and CD sheets for this equipment will be complete by August, 1966. The people concerned with early MJ systems were hampered by lack of some of this documentation. It is to their credit that systems were built and put into service.

As in the case with most new systems, we have had our share of mis-equipment "bugs." It should be noted that ES specification equipment difficulties due to design should be reported and handled via standard engineering complaint routine.

AUTOMATIC TRANSMISSION TESTING WITH ATMS

REL 7485 was recently sent to the companies describing the ATMS (Automatic Transmission Measuring System). As indicated in that letter, orders for the ATMS Director and Responder may be placed now. The ATMS Director needs a test frame, of course, to select the trunk to be measured and to process the data. The first test frame which will be available for the ATMS is the APTT (Automatic Outgoing Trunk Test Frame) for toll connecting trunks in No. 4-type crossbar. REL 7521 announced this frame and indicated that orders can now be placed. However, we have been advised that production of the 33-type teletypewriter used with this frame will be delayed until after January 1, 1967. This teletypewriter is required for the operation of the ATMS and Test Frame.

The next test frame to be available for ATMS is the APTT (Automatic Progression Trunk Test Frame) for No. 5 crossbar. We expect deliveries to start late in December, 1966. The APTT (Automatic Outgoing Trunk Test Frame) for stop-by-stop will start to ship sometime in the third quarter of 1967, but it will not have the necessary features for manual transmission measurements initially. The manual features, which will probably be available early in 1968, will be optional and may be added to existing APTT test frames.

1E5-type test lines which are required for the ATMS responder will be ready for shipment around the middle of 1966. These will be available for all types of electro-mechanical switching offices.

The Laboratories are working on test frames for ATMS application to No. 4-type interoff and to crossbar tandem and No. 1 crossbar. The present view is that the frames for No. 4 will ship late in 1967 while the others will probably be ready sometime in 1968 or early 1969. The frames for No. 4 and crossbar tandem are expected to be controlled by IBM cards rather than teletype tape.

Development work on the HDTL (Remote Office Test Line) has been delayed so that the first shipments for stop-by-stop will not take place until around the middle of 1967. No estimate can be made at this time on the HDTL for No. 5 crossbar.

BSP Section 100-254-100, describing the ATMS Director and Responder, has been printed and should be in the field shortly.

A general letter is being prepared to bring up to date some of the items originally covered in the planning letter of November 16, 1964 and to discuss certain other matters regarding the application of ATMS, tape preparation and analysis of the data. It is planned that this letter will be sent out in the third quarter of 1966.

The ATMS (Automatic Transmission Measuring System) trial at Norristown, Pennsylvania has entered its third phase. The first two phases were concerned primarily with the operation of the equipment, clearing up "bugs" in the design and finding out whether it was suitably arranged for operation by plant people. Norristown is a No. 5 crossbar office which switches local, tandem and toll traffic and is equipped with an APTT (Automatic Progression Trunk Test Frame) which has been modified to work with ATMS.

One of the purposes of the trial is to test the practicability of centralized and mechanized tape preparation. Punched cards are prepared in Philadelphia containing the necessary information for control of the ATMS-APTIT plus information which permits the cards to be sorted in various ways. The cards are then sorted and run through a card-to-tape converter. Control tapes thus produced are sent to Norristown. A proposal for tape preparation procedure, based on the results of this trial, is expected to be included in the general letter referred to above.

Another purpose of this phase of the trial is to determine what benefits can be derived from testing trunks in certain sequences. One of the methods being used is to arrange the trunks by facilities. For example, all of the trunks on the N Carrier System leaving the Norristown office are grouped together regardless of the ultimate destinations of the trunks themselves. The objective is to see whether loss and noise troubles common to a facility group can be identified directly by examining the printout from the ATMS.

AMERICAN TELEPHONE AND TELEGRAPH COMPANY
TRANSMISSION SECTION
ORGANIZATION

K.R. Vallantine - Engineering Director - Transmission - 393-3933

Mrs. C Vitale - Secretary - 393-3936

K.A. Adams - Engineering Manager - Short Haul Transmission Systems

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

R.T. James - Engineering Manager - Video and Special Services

Planning and current transmission matters, including maintenance, related to video, PICTUREPHONE and voice type special services.

F.J. Skinner - Engineering Manager - Transmission Performance

Planning and current matters related to transmission maintenance and performance of message network.

R.T. Uhlhart - Engineering Manager - Transmission Planning

Planning required to meet present and future needs of the System for exchange and interurban transmission systems (including voice frequency and carrier systems). Transmission design objectives for voice type services.

F. Woodhead, Jr. - Engineering Manager - Coordination and Protection

Electrical coordination and protection. Also supervision of HSP preparation.

SHORT HAUL TRANSMISSION SYSTEMS GROUP

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

C.D. Donohoe (Dick) (393-2884)

PC20 Trunk Carrier Systems

T1, T2

Subscriber Line Carrier Systems

P1

Independent Manufacturers Systems

Carrier Maintenance Centers

Carrier Servicing Centers

Alarm Systems

W.B. Gantley (Tom) (393-2380)

Short Haul Analog Trunk Carrier Systems

NO, O, ON1, ON2, ON/K

Impulse Noise Measurement

Engineering Carrier Systems for Data
Transmission

Channelizing Radio Systems

B.W. Neumann (Bob) (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 Inter-connections

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

Short Haul Voice Frequency Trunk Transmission

Trunk Design

Loading Systems

E and V Repeaters

Cable Characteristics

Cable Completion Tests

Artificial Lines

Station Equipment

Statistical Methods

L.M. Lee, Mrs. (Louise) (393-3465)

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. Kozemann, Jr. (Gus) (393-3822)

Bell System Practices

Short Haul Carrier Systems

A. Salasberg (Art) (393-3927)

Preparation of Signaling Practices

E.B. Santavirta, Miss (Rosemarie) (393-3576)

Special Dictation and Typing

Assistant in Engineering Studies

Maintenance of Group Records

VIDEO AND SPECIAL SERVICES GROUP

B.T. James (Dick) - Engineering Manager - Video and Special Services (300-4187)

James E. Maguire (NT)
John Cameron, Jr. (AJ) (300-3912)

Special Voice Services
Military Networks (AUTOWON, etc.)
Private Lines (Non-switched)
Announcement Systems
Toll Conferencing

Program Services
Wired Music Systems

T.F. Benewick (Tom) (300-2002)
CATV (Primary responsibility)
Picturephone

C.L. Oswald (Charlie) (300-3484)
Network TV
Closed Circuit TV (Industrial, Theatre,

Educational)
Subscription TV
CATV (Secondary responsibility)

J.J. Schretzmayer, Jr. (Jack) (300-3120)
Bell System Positions - Special Voice
Services and Television Systems

J.M. Benedict, Miss (Jeanette) (300-4360)
General Assistance to Engineers in the Group

E. Parada, Miss (Elaine) (300-4480)
Maintenance of Group Records and
Organization Charts
Special Division
Assistance to Engineers in the Group

TRANSMISSION PERFORMANCE GROUP

F. J. Skinner (Ferd) - Engineering Manager - Transmission Performance (393-3487)

M. Dorval (Mick) (393-3411)

Message Circuit Noise -
Engineering Objectives
Maintenance Requirements
Measuring Techniques
Surveys
Control Measures
Acoustic Noise

G. A. Farnell (Geary) (393-3838)

Maintenance of Subscriber Loop Transmission
Equipment, Methods
Local Connection Appraisal Plan
Exchange Transmission Rating

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

Transmission Service Index - Results,
Special Studies
Transmission Studies
DDD SEC Liaison

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

Development Program for New Transmission
Service Index
Toll Connection Appraisal Plan

D. T. Dagood (Doris) (393-3436)

DDD Trunk Transmission Testing
Installed, Toll Connecting, Local PBX
Transmission Testing Arrangements
General Purpose Test Equipment -
Modifications, Maintenance, Repair,
"Red Ball" Program

G. L. Norman (Norm) (393-4268)

Bell System Practices - Transmission
Maintenance (Internal Trunks, Testboards,
Automatic Testing Systems)

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

Bell System Practices - Transmission
Maintenance (Transmission and Noise
Measuring System)

(Vacant) (393-3378)

Bell System Practices - Noise Investigation,
and Mitigation

C. C. Strouton, Miss (Catherine) (393-3463)

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. Pappas, Miss (Lilly) (393-2880)

"Transmission Results" Booklet
Statistical Computation and Analysis
Assistance in Engineering Studies

A. M. Gilliam, Mrs. (Adriana) (393-3598)

Maintenance of Group Records
Typing and Special Dictation

TRANSMISSION PLANNING GROUP

H.T. Wilson, Jr. (Herk) - Engineering Manager - Transmission Planning (393-3073)

R.C. Bacon (BIB) (393-4649)

Customer Loop Transmission Planning
 Loop Design Methods and Objectives
 Unilage Planning
 Future Station Equipment Requirements
 Electro-Acoustic Rating System

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

Transmission Design Studies
 Trunk Plant Analysis
 Transmission Data Computations
 Return Loss and Impedance Calculations
 Assistance in Planning Studies

L.L. Johnson (Low) (393-3130)

Switched Private Line Transmission Planning
 Design Methods and Objectives:
 Switched Services Networks
 PBX Facilities
 Foreign Exchange Lines
 Secretarial Service
 Special Services Questionnaire

C. W. Harnett

(Vacant) (393-)

Short Haul Carrier Transmission Planning

Trunk Carrier Systems
 Subscriber Carrier Systems
 Second Line Carrier Systems
 Consolidated VF Systems
 New uses for Short Haul Carrier

(Vacant) *Russ V Harris (HRT)* (393-2836)

Trunk Network Planning
 Message Trunk Design Objectives
 - Direct
 - Tandem and Inter-tandem
 - Intercol
 Distance Dialing Switching Plan
 Metropolitan Area Switching Plan
 Toll Office Balance - Objectives
 Independent Company Transmission Methods

(Vacant) (393-)

Transmission Program Studies
 Loop Plant Studies
 Special Service Program Studies
 Assistance in Planning Studies

(Vacant) (393-)

Special Services Planning
 CENTRES
 PBX Conferencing
 Key Telephone Systems
 Transmission Planning - New Services
 Custom Calling Services
 Traffic Service Position System (TSPS)
 Transmission Improvement Program (TIP)
 Questionnaire
 M.B. Carrick, Miss (Mary Ann) (393-3874)
 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 (293-3742)

J.M. Richard, Miss (Gert) (293-3743)

Maintenance of Group Records
Special Dictation
Assistance to Engineers of Group on Studies

W.H. Baynes, Jr. (Wes) (293-3821)

Inductive Coordination - Low Frequency
Induction, Special Problems
Corrosion and Electrolysis
Noise Influence from Power Lines
Extra High Voltage Power Lines
Coordination (AC and DC)
Coordination with Electrified Railroads

J.F. Katzmaier (John) (293-2650)

Electrical Protection - Lightning and
Contact Problems, Higher Voltage Joint
Use, Buried Cable Systems
National Electric Code
National Electrical Safety Code

Electromagnetic Pulse Problems

E.J. Lott (Ed) (293-2868)

Bell System Practices - Corrosion,
Inductive Coordination, Protection

W.H. Sealer (Wally) (293-3275)

Administration of Bell System Practices
Preparation for Transmission Section

R.H. Foreman, Mrs. (Bub) (293-3340)

Maintenance of Bell System Practice Files
Assistance on Studies and Practice Preparation
Assistance in Assembling Items for "Transmission and Radio News"

L.B. Babco, Miss (Louise) (293-3340)

Maintenance of Bell System Practice Files
Special Dictation and Typing
Assistance on Studies and Practice Preparation

RADIO AND GUIDED WAVES SECTION

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Miss B. Thomas - Secretary - 399-3291

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

G.G. Erison - 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.

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.

MOBILE AND SPECIAL RADIO SYSTEMS GROUP

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Mobile and Special Radio Systems (393-3465)

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

P. D. Hutman (Tech) (393-2773)

Preparation of Practices on Mobile and
Special Radio matters, primarily of an engi-
neering nature. Review of all new and revised
mobile and special radio SSP's.

E. R. Burden (EO) (393-3385)

Mobile Radio Transmission, Propagation,
Interference and Antenna Problems
Special Studies
CCIR Study Group XIII

M. C. Fritchard (Milit) (393-3555)

BELLBOW Personal Signaling Service
Public Air-Ground Systems
Telephone Company Maintenance Systems

Private Mobile Systems for Military and
Federal Government

Vacant (393-3517 - Temporary)

Vehicular Mobile Telephone Service (M),
Marine, Railroad, Tract-Truck VHF/UHF
Point-to-Point

J. C. Schaefer (Gen) (393-3547)

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

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

R. E. Sofian (Dist) (393-3615)

HF Point-to-Point
Maritime Services
R.T.C.35
Test Equipment
R.S.R.S.

Miss L. T. Mazzione (Admin) (393-3485)

Dictation, typing and filing

MICROWAVE AND GUIDED WAVE SYSTEMS GROUP

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Microwave and Guided Wave Systems (300-3004)

Current system coordination on microwave radio
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J.D. Crawford (Jack) (300-3315)

TM-1/TL Microwave Systems
TL-1 Microwave Systems

S.C. Fritsch (Steve) (300-3222)

Microwave System Engineering Practices

A.J. Hankamer (Al) (300-3350)

Dell System Practices
Broadband Terminals
Entrance Links
Guided Wave Systems

W.H. Keller (Bill) (300-3170)

TJ Microwave Systems
TM-1/TJ Microwave Systems

E.H. Kasper (Ed) (300-3191)

Short Haul Microwave System Practices

R.C. Olson (Howard) (300-3170)

Outside Suppliers Microwave Equipment
Broadband Application of Microwave

J.P. Robertson (Jim) (300-2655)

TH Microwave Systems
TD-3 Microwave Systems
FMT Switching
3A FM Terminal

V.J. Sammons (Vince) (300-2910)

Broadband Terminals
Microwave Entrance Links
Channel Banks
Tropospheric Scatter Systems
RF Entrance Links

A.J. Taggi (Al) (300-3294)

TD-3 Microwave Systems
Protection Switching Systems

J.A. Wood (Jim) (300-3580)

Guided Wave Systems - J, K, L-1, L-3, L-4
Emergency Restoration Plans
Engineered Submarine Cable Systems
TASI
Echo Suppressors

Ms. S.H. Handberg (Shirley) (300-3752)

Section Clerical Activities
Filing, Dictation, Typing

Miss J.H. Zimmerman (Joan) (300-3608)

Maintenance of Correspondence Records,
Dictation and Typing
Filing, Assistance on Engineering Studies
Systems Data

MICROWAVE AND GUIDED WAVE PLANNING GROUP

R.C. Harris (Bob) Engineering Manager -
Microwave and Guided Wave Planning (388-0751)

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

G.C. Foster (Tony) (388-3844)
Studies of Communication Satellite Systems
CCIB - Space Communications

A.S. May (Al) (388-4844)
Studies of Future Radio Relay System Needs
CCIB - Radio Relay Systems

J.T. Quady (John) (388-2462)
Future Facility Requirements
System Costs

A.J. Thomson (Al) (388-2621)
Studies of Future Coaxial System Needs
Studies of Proposed Wave Guide Systems
Studies of Future Multiplex (FDM & TDM) Needs

Helen M.F. Soles (Marilyn) (388-3286)
Maintenance of CCIB Records
Assistance in Engineering Studies
Stereographic

RADIO FREQUENCY COORDINATION GROUP

J.B. Keane (Jim) Engineering Manager - Radio Frequency Coordination (385-4447)

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

J.B. Fitch (Jack) (385-3946)

ISF Coordination for entire Section
Preparation of ISF's on FCC and related matters

B.C. Justice (Janis) (385-2254)

FCC-Telephone Company liaison relating to:
- Land Mobile, Rural, BELLBOE 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.L. Livermore (Dorethy) (385-2189)

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. Robinson (Vic) (385-3877)

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. Boyce (Alice) (385-4826)

Managing Editor, Transmission and Radio Notes
ISF and General Letter record files
Preparation of Conference Material

Miss H. Nigro (Madeline) (385-2394)

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

Bell System Radio Station Records

Bell System Broadband Map

Ms. P. Moore (Paula) (385-4448)

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

Records of General Letters

Circulation of Transmission and Radio Notes