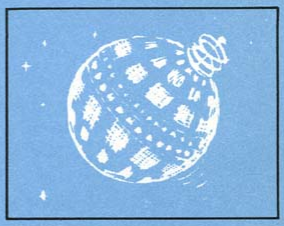
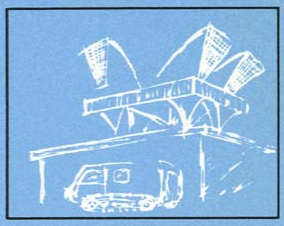
KEEP
Items 2.11.4

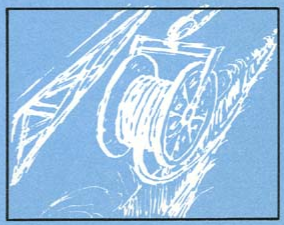
T&R NOTES

Transmission and Radio Notes

Volume 4, No. 1 March 1969







American Telephone & Telegraph Company
Engineering Department

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2.10 Maintenance Test Equipment for All Systems

2.10.1 90A and B Carrier Frequency Test Equipment

A new precision carrier frequency test set has been developed for use in installing and maintaining broadband carrier systems. This test set consists of the 90A carrier frequency oscillator and the 90B frequency selective detector. Initially, covering the frequency range from 10 kHz to 60 MHz, this set can be used to measure loss, noise, cross-talk, intermodulation and tone levels on a wide variety of systems. Work is currently in progress to extend this range to 70 MHz.

These units may be arranged either for portable use or for mounting in a 90C mobile console.

The level, frequency and bandwidth settings may be controlled externally by means of remote switch closures. This feature makes it possible to perform programmed or remotely controlled measurements. Bell Telephone Laboratories is currently developing interface equipment to permit the programming of these units and to provide a printout capability for the 90B.

An E.M., under preparation, will be issued shortly describing this set in greater detail and providing price and availability information.

W. F. Spencer

2.10.1 74A Wideband Power Meter

Bell Telephone Laboratories has completed development of the 74A Wideband Power Meter. Intended as a replacement for the 73A and B Power Meters, it has a bandwidth from DC to 240 MHz and will measure true rms power into 75 ohms at 0 dBm. It is mounted in a portable case.

This set will be required for the occasional calibration of the 90A and B transmission level set and may be used for the calibration of other carrier frequency test equipment. An E.M., under preparation, will be issued shortly describing this set in greater detail and providing price and availability information.

W. F. Spencer

2.11 Mobile Radio Systems

2.11.1 Land Mobile System Coverage, 450 MHz vs. 150 MHz

Increased use of the 450 MHz band currently contemplated in connection with introduction of the MK system frequently brings up questions concerning relative coverage of land mobile channels in this and the 150 MHz band. Answers depend on a number of factors which may differ widely from one case to another, as is made readily evident by the information in BSP 940-200-103. However, a broad view may be gained by considering three points:

(1) Over idealized flat earth, path losses are the same for both bands.

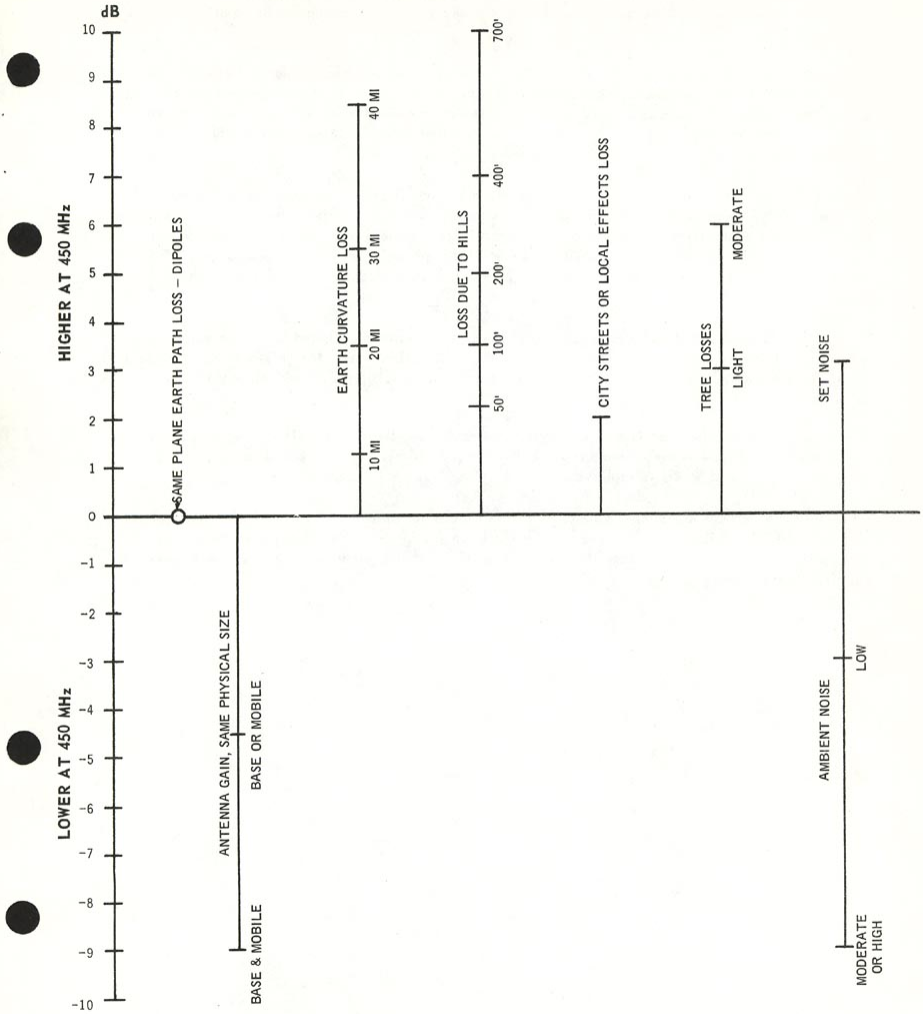
(2) Most real environments cause higher path losses at 450 MHz which act to diminish the relative coverage range.

(3) At 450 MHz, lower ambient electrical noise levels and the availability of larger antenna gains act to increase the relative coverage range.

The manner in which points (2) and (3) offset each other in a particular situation will determine the relative coverage performance. This is diagrammed by the chart below with assignment of some rough dB values. Ed Borden will be glad to discuss any comments.

E. W. Borden

450 MHz VS. 150 MHz
COMPARATIVE COVERAGE DEPENDS ON HOW A VARIETY OF FACTORS ADD UP IN A PARTICULAR CASE



When Sum of dB's Below the Line Equals the Sum Above, Coverages Should be Comparable, for Equal Transmitter Output Power

2.11.1 High Capacity Land Mobile System – Comments to FCC in Docket 18262

On February 3, 1969, A.T.& T. filed its comments in the above Docket, supporting the Commission's proposal to reallocate 75 MHz nationwide in the 900 MHz region for the development of a common carrier high capacity land mobile system. A.T.& T. welcomed the Commission's proposal since it has petitioned on several occasions for additional spectrum for the future growth of common carrier mobile telephone service.

In response to the Commission's proposal, A.T.& T. has proposed to embark upon an intensive, two-phase development and design program. The ultimate objective of the program is the design and installation of operational 900 MHz high capacity land and air-ground systems which make efficient use of the frequency spectrum and are economically viable. It is contemplated that these systems would provide mobile telephone and dispatch service to land, air-borne, and some maritime units.

Phase I of the proposed program would be initiated when there is reasonable assurance that the 75 MHz proposed will be made available to common carriers for high capacity mobile radio service. This phase would include the studies and exploratory development work required to determine the characteristics and feasibility of high capacity mobile systems. As part of this phase, a recommendation to the FCC for the subdivision of the proposed allocation would be formulated. It is planned to complete this phase in 18 months.

Phase II would be undertaken if the results of Phase I justify further work and the Commission concurs with A.T.& T.'s proposals submitted at the end of Phase I. In this phase, the detailed design of the high capacity systems and the equipment required for them would be developed. Field trials would also be included.

It is anticipated that the execution of the entire program (Phase I and Phase II) and the installation of initial operational land systems would require five to seven years. The corresponding interval for air-ground systems would be six to eight years.

BTL and "195" groups are intensifying their efforts for the possible implementation of Phase I of the program. The "195" Marketing Department is actively undertaking a comprehensive customer market survey. This study should determine the magnitude of the market and earmark the conditions which will permit its development.

J. C. Salazar

2.11.2 Bell Companies Apply for MK System Operation on 44 Channels

The Operating Companies' acceptance of the new MK Mobile Telephone System has been very good. As of mid-February, the following cities have applied for FCC Construction Permits for multiple channel MK systems.

Newark, N. J.	3 channels
Hempstead, Long Island, N. Y.	3 channels (conversion)
New York, N. Y.	6 channels (3 conversion)
Philadelphia, Pa.	4 channels
Houston, Tex.	4 channels
St. Louis, Mo.	4 channels
Dallas, Tex.	4 channels
Boston, Mass.	4 channels
Chicago, Ill.	8 channels (six 450 conversion, two 35 conversion)
Indianapolis, Ind.	4 channels

Applications for several other locations are being prepared and expected to be filed later this year.

As of February 7, 1969, FCC Construction Permits have been granted for Newark, Houston and Philadelphia for the number of channels requested. This is good news as it indicates that multiple channel MK applications will be granted by the FCC if the need exists and the request is properly documented. (See EM 904 dated September 23, 1968.) Any locations with large numbers of held orders and/or severely overloaded channels with no additional 150 MHz channels available, should consider adding MK to their service offering.

Further details about MK are contained in EL 112, EL 181 and EM 1146.

R. G. Buck

2.11.4 A.T.& T. Files Comments in Maritime MF-SSB Conversion Docket

On September 12, 1968, the FCC released a Notice of Proposed Rule Making in Docket No. 18307, which proposes converting the maritime radiotelephone services on frequencies below 4 MHz (including Coastal Harbor) to single sideband (SSB) operation. Alaska and the Great Lakes are excluded from this proceeding. Principal rule changes proposed by the FCC for coast stations are as follows.

1. Transmission of double sideband (DSB) emissions will not be permitted after January 1, 1970.

2. SSB transmissions will be permissive until January 1, 1970. After that date, all coast stations must have the capability to use SSB full carrier (A3H), reduced carrier (A3A) and suppressed carrier (A3J) emissions.

3. On the international distress and calling frequency, 2182 kHz, coast stations must be capable of transmitting with DSB (A3) or SSB full carrier (A3H) emissions. After January 1, 1970, these stations will be permitted to transmit only the A3H emission. Also, coast stations must be capable of receiving both A3 and A3H emissions between January 1, 1970 and January 1, 1977. After January 1, 1977, reception of only A3H emission will be required.

4. Revised technical standards are proposed, including reducing transmitter authorized bandwidth from the 3.5 kHz presently authorized, to 3.0 kHz, and establish the SSB coast transmitter power at 800 and 400 watts (peak envelope power) for daytime and nighttime operation, respectively.

5. In addition, after January 1, 1977, except for safety communications and where communications requirements cannot be fulfilled by VHF, medium frequencies will not be available for use in ports and harbors, on lakes or rivers, or for communication involving passage of ships through locks, bridge areas, or Government controlled waterways.

On December 2, 1968, A.T.& T. filed comments in reply to the Commission's Notice of Proposed Rule Making. These comments are described briefly below.

1. It was requested that the January 1, 1970 date for converting coast stations to SSB operation be extended to January 1, 1972. This would provide the necessary time in which to develop, manufacture and install a new Coastal Harbor radio system at Bell System stations.

2. For economic reasons, associated with transmitter design criteria, it was suggested that the existing 3.5 kHz authorized bandwidth be retained for A3A, A3H and A3J emissions.

3. The Commission was requested to exempt Coast Harbor stations presently serving inland water areas from being required to convert to SSB operation if these stations will be required to suspend operations entirely by January 1, 1977

4. It was suggested that the proposed Rules be amended to delete responsibility on the part of public coast station operators, for administering the Commission's requirement that vessels use MF only when beyond VHF range.

5. Several changes in the Commission's proposed Pacific Coast frequency assignments were suggested as requested by two west coast Operating Companies. Additional frequency changes were proposed by A.T.& T. in a letter to the FCC, dated January 31, 1969. These changes were directed at eliminating several potential co-channel and adjacent channel interference problems along the Pacific, Atlantic and Gulf coasts.

P. B. Redding

2.11.5 Air-Ground Radiotelephone Service Reactivated

The FCC, on September 4, 1968, released two documents covering 450 MHz Air-Ground Radiotelephone Service. One, a Memorandum, Opinion and Order, lifts the "freeze" on the present developmental service and allows expansion of the service and the addition of subscribers on a developmental basis. The other document, a Third Notice of Proposed Rule Making, proposes channel splitting of the present air-ground allocation, thus deriving twelve 25 kHz channels plus a new 25 kHz signaling channel. It also proposes sharing of these twelve channels by air-ground and land mobile services. Our final reply comments were filed on February 3, 1969.

Plans are currently being formulated to develop the necessary ground station radio and terminal equipment to permit early geographic expansion of the present service, now being furnished through 10 stations in the U.S. northeast quadrant. Skyphone, a Division of Litton Industries, which recently acquired manufacturing and sales rights of the airborne unit from AC Spark Plug Division of General Motors, is proceeding with the manufacture and sale of airborne equipment to aircraft users throughout the country.

Arrangements have been made to reduce the deviation on the 10 existing ground station transmitters from 15 kHz to 9 kHz on March 24th, and from 9 kHz to 5 kHz on April 21st. Also, on this latter date, ground-to-air signaling will be transferred to the proposed signaling frequency (454.675 kHz). Receiver audio output level will be adjusted on each date to compensate for the deviation reduction.

It is hoped that the proposed Rules will be finalized within the next few months, permitting regularization of the service and allowing us to launch an expansion program on a narrowband basis.

M. C. Fruehauf

2.11.6 150 MHz BELLBOY Clears Another Hurdle

The U.S. Court of Appeals on February 20, 1969 denied Radio Relay Corporation's petition for review of the new FCC Rules covering 150 MHz signaling frequencies. It is expected as a result that the Commission will resume processing 150 MHz signaling Construction Permit applications now on file. Bell Companies have filed such applications for 23 localities while Radio Common Carriers (RCC) have filed at 227 localities and Independent Telephone Companies at 13 localities. Formal petitions for denial have been filed against 18 of the Bell applications. This will probably call for hearings on a case-by-case basis and it appears that it will be some time before the contested applications are processed by the Commission.

Although the outlook is somewhat clouded at the moment, we are hoping that rulings permitting us to move ahead more rapidly will be forthcoming in the near future. We are continuing to assist the Companies in engineering 150 MHz BELLBOY systems. Bell Laboratories development effort and the preparation of Engineering Letters and BSP's covering 150 MHz BELLBOY are proceeding with dispatch and vigor.

M.C. Fruehauf

2.11.6 BELLBOY – System Wide Area Paging (SWAP)

Bell Canada has developed a new approach to BELLBOY called System Wide Area Paging (SWAP). The first installation in London, Ontario, is scheduled to begin service in April 1969. It will initially handle customers in London and Windsor and will later be expanded to include other locations. A central processor computer is used to control up to 30 remote transmitters. The SWAP terminal utilizes a PDP-8 computer and specially-designed trunk circuits.

An incoming call over the switched network is received by the processor which verifies the called number and returns an answer tone. Control signals are sent from the processor to one or more transmitters as determined by the class of service. These signals are sent over DDD or dedicated lines using low speed data sets. A controller associated with each transmitter sends back a verification signal to show that the correct transmitter has been activated and that it is operational.

The use of a stored program call processor makes SWAP a very flexible system. As many as 10,000 subscribers, regardless of location, can be served from one central terminal. The system allows multi-area paging and should make it possible to prove in a remotely controlled transmitter with a relatively small number of subscribers. This system was developed for the market and network operating conditions as they exist in Canada. Further study would be required to adapt it for use in the United States.

E.E. Price

2.11.8 Fastest Telephones on Wheels Go Into Service

On January 16, 1969, the Penn Central Railroad initiated revenue service between New York and Washington, D.C., with the new high speed Metroliner trains. Each of the six cars of the train is equipped with a TOUCH-TONE coin telephone installed in an attractive booth readily accessible to all passengers. See T. & R. NOTES of December 1967 for a more complete technical description of the telephone service.

Initial service started with only one 6-car train completing one round trip each day. On February 10, 1969, another 6-car train equipped with six telephones was placed in service. Sometime in April we anticipate that all 30 telephone-equipped cars will be in service.

The initial traffic results indicate that the customers like the service. Averaged on a 7-day week basis, over 100 calls per day are being completed on the two trains. Each train makes one round trip a day between New York and Washington.

At this time it is too early to predict the future of train telephone service in this country. The present system, designed and installed on an expedited basis, and utilizing dedicated frequencies borrowed from the Government, is a Marketing model. Future planning will require both economic and technical studies to determine the best way to provide similar services.

R. G. Buck

2.13 PICTUREPHONE Service

2.13.1 Planning Information

EL 285 was issued in March 1969 to provide current engineering planning information for PICTUREPHONE Service. PICTUREPHONE service will be a major undertaking in the Bell System requiring interdepartmental coordination on all levels within and between the Operating Companies. The engineering effort will be considerable from customer station sets to intercity facilities and will be a challenge to Transmission Engineers. To assist in your early planning, this article includes excerpts from EL 285 including the sections on the Network Plan and Transmission. However, it is important that this early information be used only for broad planning purposes and that it be used with caution.

Recently a decision was made to offer standard PICTUREPHONE service in and between New York and Pittsburgh with an objective service date of July 1970. The offering, of course, is subject to acceptance by appropriate state and federal regulatory bodies. Although the present commitment contemplates only two cities initially, planning both for this date and beyond must be started now to enable an orderly progression of the service.

As now envisioned, the service will be a vertical extension of telephone service, incorporating the ability to see as well as to talk. Initially, in addition to face-to-face viewing, it is planned to offer limited graphics and document-reading features. Computer access is still under study as a possible initial offering. Wideband data services, along with other future services, such as voice operated video conference systems and high resolution, slow scan station sets, are also under consideration.

In offering these services it is planned to make as much use of existing facilities as possible, together with some new equipment to accommodate the wideband signal. The major basic components will be station sets, customer location switching equipment, associated attendant positions, loop and trunk plant, central office equipment, associated operator positions, and maintenance and test equipment. The service contemplated from these components includes some PBX and Centrex arrangements, as well as individual line arrangements.

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4. GENERAL AND MISCELLANEOUS

4.02 Organization Changes

Radio and Guided Waves Section

The following transfers have been made in the Groups within the Radio and Guided Waves Section.

Effective January 6, Mr. G. W. Hatch moved from the Guided Waves Systems Group to the Microwave Systems Group. He will be working on matters relating to outside suppliers microwave equipment and video transmission channels (intercity and local).

Effective March 16, Mr. J. P. Robertson was appointed Engineering Manager – Microwave Systems, replacing Mr. G. G. Ericson, who has joined the Transmission Section as Engineering Manager – Special Services.

Effective January 16, Mr. C. W. Houchin moved from the Microwave and Guided Wave Systems Group to the Radio Frequency Coordination Group. He will be responsible for FCC matters relating to Bell System mobile radio services including land mobile, air-ground and maritime.

Effective February 12, Mr. E. E. Price joined the Mobile and Special Radio Systems Group. He will be responsible for planning for future mobile systems.

Also effective February 12, Mr. R. G. Buck of the Mobile and Special Radio Systems Group was transferred to the Data Transmission Methods Group of the Data Communications Section.

In connection with the inter-section transfers of Messrs. R. G. Buck and E. E. Price, a change in work assignments has been made in the Mobile and Special Radio Systems Group. Effective February 12, Mr. J. C. Salazar has the responsibility for current mobile telephone and dispatch systems (MJ, MK, H-1, H-2, high speed trains, manual, etc.) and rural radio systems including VHF/UHF point-to-point.

Additions to the Radio and Guided Wave Section were as follows.

Effective January 1, Mr. R.P. Parthum joined the Microwave Systems Group. His primary responsibility is for short haul radio systems – TJ, TL and TM.

Effective January 16, Mr. M. B. Allen joined the Microwave Systems Group. He will be responsible for broadband restoration, order wire systems for microwave and status reporting and control systems.

Effective December 30, Mr. G. F. Bagley joined the Guided Waves Systems Group. He will be concerned with problems in the type "L" multiplex area.

Transmission Section

The following changes in organization have taken place in the Transmission Section since the last issue of TRANSMISSION AND RADIO NOTES.

Effective February 1, Mr. L. K. Winkelman of the Coordination and Protection Group joined the Transmission Studies Group.

Also effective February 1, Mr. J. J. Jetzt of the Transmission Performance Group accepted a position at Bell Telephone Laboratories, Holmdel, N. J.

Effective February 15, Mr. H. T. Uthlaut, Engineering Manager, Special Services, accepted a position as General Staff Coordinator at South Central Bell Telephone Company in Birmingham, Ala. Effective March 16, Mr. G. G. Ericson of the Radio and Guided Waves Section replaced Mr. Uthlaut.

5. TRANSMISSION AND RADIO INFORMATION

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

E.M.'s

E.M. 1023-1 – N2 and N3 Packaged Bay Arrangements – Power Drain Restrictions – E1P and E1R Units

E.M. 1026 – Broadband Terminals – A New Reference Frequency Standard (1S3.16F-32)

E.M. 1033 – Broadband Terminals – L-Type Multiplex Improved Range Alignment Termination for Group Gain Measuring Set (1S3.16F)

E.M. 1042 – Broadband Terminals – LMX-2 – Remote Bay Alarm Reset (1S3.16F-29)

E.M. 1046 – New BSP Sections on Overall Testing of Dial Pulse Signaling Layouts – Description and Background

E.M. 1075 – TD-2 Radio – Revised Information for 61 Type Pad for TD Radio Maintenance

E.M. 1129 – Broadband Terminals – L Type Multiplex – 229B and 229C Amplifier Loss-of-Pilot Alarm Circuit Improvement (1S3.16F-31)

E.M. 1139 – N2 Repeatered Line – New Powering Arrangements

E.M. 1146 – Ordering and Engineering Information for MK Radio Equipment (1S3.9R2-2)

E.M. 1163 – FCC Radio Equipment List – Sept. 11, 1968

E.M. 1164 – Special Services – 1F, 1K, 1L Plug-in Terminating Sets

E.M. 1169 – Automatic Transmission Measuring System (ATMS) – Addition of 104-Type Test Line Line Noise Check

E.M. 1170 – Combined Milliwatt and Balance Test Line – Preliminary Information

E.M. 1172 – Construction or Extension of New Lines – Requirements for Circuit Facility Data Shown in 214 Type FCC Applications (1S5.0-2)

E.M. 1173 – Short Haul Radio – TL-2 and TM-1 Radio Summary (1S3.9U-33)

E.M. 1177 – TD-2 Microwave Radio, Increased Message Channel Capacity on Routes Equipped with Parabolic Antennas (1S3.9G-84)

E.M. 1179 – N2 Carrier – New Channel Modern Units

E.M. 1186 – Broadband Terminals – Primary Frequency Supplies – Verification of Equipment Changes

E.M. 1195 – T1 Carrier Costs

E.M. 1200 – TD-3 Radio – Dry Air Feed to Microwave Bays (1S3.9G2-9)

RADIO AND GUIDED WAVES SECTION

Organization

H.E. WEPPLER – Engineering Director – Radio and Guided Waves (3291)

Miss Barbara Thomas – Secretary (3292)

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 – Guided Wave Systems

Long Haul Carrier (L1, L3, L4, T5, etc.)
Broadband Multiplex Terminals
Submarine Cable Systems
RF Cable Distribution Systems (CATV, etc.)

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.

J.P. Robertson – Engineering Manager – Microwave Systems

Microwave Systems
Wire Line Entrance Links
Control Systems for Broadband Facilities
Video Transmission Systems (Intercity and Local)

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

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

MICROWAVE AND GUIDED WAVE PLANNING GROUP

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

T.G. Cross (Tom) Assistant Engineering Manager (393-2462)

Studies related to introduction of Digital Facilities
Studies of Network Interconnection Problems

O.C. Foster (Tony) Assistant Engineering Manager (393-3044)

Studies of Communication Satellite Systems
Coordination of Space and Terrestrial Systems
CCIR – Space Communications

M.S. Hall (Milton) Assistant Engineering Manager (393-2211)

Studies of Future Coaxial Systems
Studies of Future Analogue and Digital Needs

A.S. May (Al) Assistant Engineering Manager (393-4344)

Studies of Future Radio Relay Systems
Studies of Future Waveguide Systems
CCIR – Radio Relay Systems
Time-Shared Computer Coordination

(Vacant) Assistant Engineering Manager (393-3329)

Studies of Communication Satellite Systems
Studies of Transmission and Reliability Objectives

Miss M.F. Scola (Marilyn) – 393-3752

Maintenance of CCIR Records
Assistance in Engineering Studies
Stenographic

GUIDED WAVE SYSTEMS GROUP

R.T. James (Dick) – Engineering Manager – Guided Wave Systems (393-4497)

G.F.Bagley (George) – Assistant Engineering Manager (393-4366)

LMX (Except Channel Banks)
MMX (Cable and Radio)
Synchronization Problems – Standard Frequency Supply
Digital Multiplex
(secondary responsibility)

T.F. Benewicz (Tom) Assistant Engineering Manager (393-2002)

Spectrum Usage Studies
Digital Systems – T5 Transmission Systems
– Digital Multiplex (Primary Responsibility)
Noise Studies
PICTUREPHONE Transmission Systems – Trial Arrangements
(secondary responsibility)

E.V. O'Connell (Ed) – Assistant Engineering Manager (393-2923)

CATV Transmission Systems – Sub-Channel Systems
Closed Circuit TV (Cable Systems) – Educational and Industrial TV
Bell System Internal TV Applications
PICTUREPHONE Transmission Systems – Trial Arrangements
(primary responsibility)
Digits on TD-2, L4
Sentinel Systems
(secondary responsibility)

W.F. Spencer (Bill) Assistant Engineering Manager (393-4209)

Special Coaxial Systems – Studies and applications
L5 Transmission Systems
Trunk Conditioning
Sentinel Systems (primary responsibility)
L1, L3, L4 Transmission Systems
(secondary responsibility)

J.A. Wood (Jim) – Assistant Engineering Manager (393-2586)

Type J and K Transmission Systems
Type L1, L3, L4 Transmission Systems
Submarine Cable Systems – TASI
– Other Speech Compression Systems
L5 Transmission Systems
(secondary responsibility)

A.J. Haushamer (Al) Engineering Staff Specialist (393-3350)

BSP Activities

Miss E. Parada (Elaine (393-4498)

Maintenance of Group Records
Special dictation
Assistance to Group

RADIO FREQUENCY COORDINATION GROUP

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

C.W. Houchin (West) Assistant Engineering Manager (393-3017)

FCC-Telephone Co. liaison relating to:
land mobile, signaling, air-ground,
maritime, rural radio services
Antenna towers (FCC and FAA)
Frequency allocation planning

B.C. Jamison (Jamie) Assistant Engineering Manager (393-2254)

FCC-Telephone Co. liaison relating to:
interstate facilities (Section 214 of the Comm. Act)
radio frequency coordination
telephone maintenance radio service
experimental radio service
Parts 15 and 18 of rules
Radiation matters
CCIR Administration

R.M. Reid (Dick) Assistant Engineering Manager (393-2180)

FCC-Telephone Co. liaison relating to:
common carrier microwave services
local TV transmission services
interstate facilities (Section 214 of the Comm. Act)
CATV
BSP's on FCC radio application procedures
Mechanization of microwave station records

J.B. Fitch (Jack) Engineering Staff Specialist – BSP Administrator, Radio and Guided Waves (393-2946)

BSP Administration for Radio and Guided Waves Section
BSP's on FCC radio application procedures

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

Managing Editor, TRANSMISSION AND RADIO NOTES
BSP Procedure and Records
Supervision of office procedures

Miss T. Matier (Terry) (393-4448)

Maintenance of FCC Rules and Regulations
Correspondence records
Records of General Letters
Circulation records, TRANSMISSION AND RADIO NOTES

Miss K. Roy (Karen) (393-2394)

Records of Bell System radio and 214 applications filed with the FCC
Bell System radio station records
FCC Docket and Public Notice files

MICROWAVE SYSTEMS GROUP

J.P. Robertson (Jim) – Engineering Manager – Microwave Systems (393-3604)

M.B. Allen (Myron) Assistant Engineering Manager (393-2484)

Order Wire Systems for Microwave
Status Reporting and Control Systems
Broadband Restoration
(secondary responsibility – see items under G. W. Hatch)

J.D. Crawford (Jack) Assistant Engineering Manager (393-2455)

TD-3 Microwave Systems
TH-3 Microwave Systems
3A and 4A FM Terminals
Tropospheric Scatter Systems
(secondary responsibility – see items under R.W. Krieger)

G.W. Hatch (George) Assistant Engineering Manager (393-3770)

Video Transmission Systems (Intercity and Local)
Outside Suppliers Microwave Equipment
TV Pickup and Portable Microwave Equipment
TIDISOUND
(secondary responsibility – see items under M. B. Allen)

W.H. Keller (Bill) Assistant Engineering Manager (393-2120)

Protection Switching Systems
Wire-Line Entrance Links
Radio Master Group Branching and Blocking
Microwave Engineering Practices
(secondary responsibility – see items under R. P. Parthum)

R. W. Krieger (Bob) Assistant Engineering Manager (393-2294)

TD-2 Microwave Systems
TH-1 Microwave Systems
3B FM Terminals
(secondary responsibility – see items under J. D. Crawford)

R.P. Parthum (Bob) Assistant Engineering Manager (393-3315)

TM Microwave Systems
TL Microwave Systems
TJ Microwave Systems
(secondary responsibility – see items under W. H. Keller)

Miss C. Kita (Chris) (393-2286)

Section Clerical Activities
Filing, Typing
Attendance Records

Miss G. White (Gladys) (393-3605)

Maintenance of correspondence
Dictation and typing
Assistance to Group

MOBILE AND SPECIAL RADIO SYSTEMS GROUP

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

E.W. Borden (Ed) Assistant Engineering Manager (393-3860)

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

M.C. Fruehauf (Milt) Assistant Engineering Manager (393-3550)

BELLBOY Personal Signaling Service
Public Air-Ground Systems
Telephone Company Maintenance Systems
Private Mobile Systems for Military and Federal Government

E.E. Price (Ed) Assistant Engineering Manager (393-2517)

Planning for Future Mobile Systems below 1000 MHz including:

High Capacity Systems
"Lineless" Extension

P.B. Redding (Paul) Assistant Engineering Manager (393-2415)

HF Point-to-Point
Maritime Services (High Seas, VHF, Coastal Harbor)
R.T.C.M.
Test Equipment

J.C. Salazar (Joe) Assistant Engineering Manager (393-3029)

Vehicular Mobile Telephone and Dispatch Systems (MJ, MK, Manual, Railroad, H1, H2)
Rural Radio Systems, including VHF/UHF Point-to-Point

P.D. Bodman (Phil) Engineering Staff Specialist (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
B.S.R.S.

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Dictation, typing and filing