

10.5 Local Exchange

Installation of a local exchange is planned in accordance with the fundamentals stated in Section 10.1.3 and the traffic calculation result in Section 8.2.3. The occupancy of subscriber line terminals is determined as 95% in principle taking account of facilities for operation and maintenance work.

Power equipment is to be installed together with the corresponding exchange. The power equipment comprises rectifiers, batteries, engine generators and air conditioners.

The installation plan for local exchange is shown in Table III-10-4.

Table III - 10 - 4 Local exchange installation plan (1/17)

ZONE: Multiple exchange area

Exchange	Phase	Main lines	Necessary terminals	Sys.	Terminal	
					Installation	Removal
Gral. Paz 2	1	9,804	10,320	A	0	0
	2	9,804	10,320	A	0	0
	3	0	0	A	0	10,320
Gral. Paz 3	1	4,750	5,000	A	0	0
	2	4,750	5,000	A	0	0
	3	0	0	A	0	5,000
Gral. Paz 4	1	18,246	19,000	D	19,000	0
	2	18,246	19,000	D	0	0
	3	27,800	29,000	D	10,000	0
Gral. Paz 5	1	0	0	-	0	0
	2	0	0	-	0	0
	3	22,400	23,800	D	23,800	0
(Subtotal)	1	32,800	34,320		19,000	0
	2	32,800	34,320		0	0
	3	50,200	52,800		33,800	15,320
Correo 1	1	0	0	A	0	4,000
	2	0	0	-	0	0
	3	0	0	-	0	0
Correo 2	1	9,500	10,000	A	0	0
	2	9,500	10,000	A	0	0
	3	0	0	A	0	10,000
Correo 3	1	16,400	17,000	D	17,000	0
	2	16,400	17,000	D	0	0
	3	39,700	42,000	D	25,000	0
(Subtotal)	1	25,900	27,000		17,000	4,000
	2	25,900	27,000		0	0
	3	39,700	42,000		25,000	10,000
Dorrengo	1	3,891	4,096	D	0	0
	2	10,000	11,000	D	7,000	0
	3	12,900	14,000	D	3,000	0

Table III - 10 - 4 Local exchange installation plan (2/17)

ZONE: Multiple exchange area

Exchange	Phase	Main lines	Necessary terminals	Sys.	Terminal	
					Installation	Removal
Godoy Cruz 1	1	9,880	10,400	A	1,400	0
	2	9,880	10,400	A	0	0
	3	0	0	A	0	10,400
Godoy Cruz 2	1	3,920	5,000	D	5,000	0
	2	15,120	16,000	D	11,000	0
	3	32,500	34,000	D	18,000	0
(Subtotal)	1	13,800	15,400		6,400	0
	2	25,000	26,400		11,000	0
	3	32,500	34,000		18,000	10,400
Hipodromo 1	1	3,800	4,000	A	0	0
	2	3,800	4,000	A	0	0
	3	0	0	A	0	4,000
Hipodromo 2	1	0	0	D	0	0
	2	7,200	7,600	D	7,600	0
	3	13,900	15,000	D	7,400	0
(Subtotal)	1	3,800	4,000		0	0
	2	11,000	11,600		7,600	0
	3	13,900	15,000		7,400	4,000
Las Heras	1	6,810	7,000	D	0	0
	2	20,000	21,000	D	14,000	0
	3	29,000	31,000	D	10,000	0
Loria	1	1,946	2,000	D	0	0
	2	9,000	9,000	D	9,000	0
	3	11,600	12,000	D	3,000	0
Villa Nueva 1	1	5,700	6,000	A	0	0
	2	5,700	6,000	A	0	0
	3	0	0	A	0	6,000
Villa Nueva 2	1	0	0	-	0	0
	2	13,300	15,000	D	15,000	0
	3	28,100	30,000	D	15,000	0
(Subtotal)	1	5,700	6,000		0	0
	2	19,000	21,000		15,000	0
	3	28,100	30,000		15,000	6,000
Zonal total	1	94,647	99,816		42,400	4,000
	2	152,700	161,320		63,600	0
	3	217,900	230,800		115,200	45,720

Table III - 10 - 4 Local exchange installation plan (3/17)

ZONE: Uspallata

<HOST> Exchange	Phase	Main lines	Necessary terminals	Sys.	Terminal	
					Installation	Removal
<General Paz>						
Uspallata	1	60	64	M	0	0
	2	80	85	M	0	0
	3	100	0	S	0	100
Las Cuevas	1	0	0	-	0	0
	2	0	0	-	0	0
	3	100	0	S	0	0
Zonal total	1	60	64		0	0
	2	80	85		0	0
	3	200	0		0	100

Table III - 10 - 4 Local exchange installation plan (4/17)

ZONE: Lavalle

<HOST> Exchange	Phase	Main lines	Necessary terminals	Sys.	Terminal	
					Installation	Removal
<General Paz>						
Lavalle	1	285	300	A	200	0
	2	285	300	A	0	0
	3	480	510	R	510	300
Costa d. Araujo	1	28	30	M	0	0
	2	28	30	M	0	0
	3	130	137	R	137	30
Tres de Mayo	1	0	0	-	0	0
	2	0	0	-	0	0
	3	100	106	R	106	0
Jocoli	1	0	0	-	0	0
	2	0	0	-	0	0
	3	100	106	R	106	0
Nueva California	1	0	0	-	0	0
	2	0	0	-	0	0
	3	100	106	R	106	0
Gustavo Andre	1	0	0	-	0	0
	2	0	0	-	0	0
	3	100	106	R	106	0
El Pastal	1	0	0	-	0	0
	2	0	0	-	0	0
	3	100	106	R	106	0
Zonal total	1	313	330		200	0
	2	313	330		0	0
	3	1,110	1,177		1,177	330

Table III - 10 - 4 Local exchange installation plan (5/17)

ZONE: Rodio de la cruz

<HOST> Exchange	Phase	Main lines	Necessary terminals	Sys.	Terminal	
					Installation	Removal
<RODEO DE LA CRUZ>						
Rodeo d. Cruz	1	760	800	A	0	0
	2	760	800	A	0	0
	3	2,900	3 100	D	3,100	800
La Primavera	1	0	0	-	0	0
	2	0	0	-	0	0
	3	100	106	R	106	0
Col. Segovia	1	0	0	-	0	0
	2	0	0	-	0	0
	3	100	106	R	106	0
Puente d. Hierro	1	0	0	-	0	0
	2	0	0	-	0	0
	3	100	106	R	106	0
Fray L. Beltran	1	190	200	A	0	0
	2	190	200	A	0	0
	3	840	890	R	890	200
Rodeo d. Medio	1	190	200	A	0	0
	2	190	200	A	0	0
	3	1,000	1,100	R	1,100	200
Zonal total	1	1,140	1,200		0	0
	2	1,140	1,200		0	0
	3	5,040	5,408		5,408	1,200

Table III - 10 - 4 Local exchange installation plan (6/17)

ZONE: Maipu

<HOST> Exchange	Phase	Main lines	Necessary terminals	Sys.	Terminal	
					Installation	Removal
<MAIPU>						
Maipu	1	1,900	2,000	A	0	0
	2	9,170	9,700	D	9,700	2,000
	3	11,350	12,000	D	2,300	0
Cruz d. Piedra	1	104	110	M	0	0
	2	0	0	-	0	110
	3	0	0	-	0	0
Zonal total	1	2,004	2,110		0	0
	2	9,170	9,700		9,700	2,110
	3	11,350	12,000		2,300	0

Table III-10-4 Local exchange installation plan (7/17)

ZONE: Lujan de cuyo

<HOST> Exchange	Phase	Main lines	Necessary terminals	Sys.	Terminal	
					Installation	Removal
<LUJAN DE CUYO>						
Lujan d. Cuyo	1	1,900	2,000	A	0	0
	2	6,000	6,400	D	6,400	2,000
	3	7,500	7,900	D	1,500	0
Chacras d. Cor	1	950	1,000	A	0	0
	2	950	1,000	A	0	0
	3	3,200	3,400	R	3,400	1,000
Agrelo	1	28	30	M	0	0
	2	28	30	M	0	0
	3	100	106	R	106	30
Potrerillos	1	28	30	M	0	0
	2	28	30	M	0	0
	3	260	274	R	274	30
Ugarteche	1	0	0	-	0	0
	2	0	0	-	0	0
	3	100	106	R	106	0
Blanco Encalada	1	0	0	-	0	0
	2	60	64	R	106	0
	3	100	106	R	0	0
El Carrizal	1	0	0	-	0	0
	2	0	0	-	0	0
	3	100	106	R	106	0
Zonal total	1	2,906	3,060		0	0
	2	7,066	7,524		6,506	2,000
	3	11,360	11,998		5,492	1,060

Table III-10-4 Local exchange installation plan (8/17)

ZONE: Tunuyan (1/2)

<HOST> Exchange	Phase	Main lines	Necessary terminals	Sys.	Terminal	
					Installation	Removal
<TUNUYAN>						
Tunuyan	1	2,200	2,400	D	2,400	1,400
	2	2,200	2,400	D	0	0
	3	3,400	3,600	D	1,200	0
Zapata	1	0	0	-	0	0
	2	0	0	-	0	0
	3	100	106	R	106	0
San Pablo	1	0	0	-	0	0
	2	0	0	-	0	0
	3	100	106	R	106	0
Eugenio Bustos	1	480	510	R	780	200
	2	480	510	R	0	0
	3	740	780	R	0	0
La Consulta	1	1,500	1,600	R	1,600	300
	2	1,500	1,600	R	0	0
	3	2,390	2,600	R	1,000	0
Campo L. Andes	1	0	0	M	0	220
	2	0	0	-	0	0
	3	0	0	-	0	0
Pareditas	1	28	30	M	0	0
	2	28	30	M	0	0
	3	160	169	R	169	30
Chilecito	1	28	30	M	0	0
	2	28	30	M	0	0
	3	130	137	R	137	30
Vista Flores	1	290	306	R	474	100
	2	290	306	R	0	0
	3	450	474	R	0	0
Tupungato	1	570	600	A	0	0
	2	1,100	1,200	R	1,200	600
	3	1,400	1,500	R	300	0
San Jose	1	0	0	-	0	0
	2	0	0	-	0	0
	3	100	106	R	106	0

Table III - 10 - 4 Local exchange installation plan (9/17)

ZONE: Tunuyan (2/2)

<HOST> Exchange	Phase	Main lines	Necessary terminals	Sys.	Terminal	
					Installation	Removal
<TUNUYAN>						
El Zampal	1	0	0	-	0	0
	2	0	0	-	0	0
	3	100	106	R	106	0
Zonal total	1	5,096	5,476		5,254	2,220
	2	5,626	6,076		1,200	600
	3	9,070	9,684		3,230	60

Table III-10-4 Local exchange installation plan (10/17)

ZONE: San Martin

<HOST> Exchange	Phase	Main lines	Necessary terminals	Sys.	Terminal	
					Installation	Removal
<SAN MARTIN>						
San Martin	1	8,900	9,400	D	9,400	3,500
	2	8,900	9,400	D	0	0
	3	13,700	14,500	D	5,100	0
Junin	1	1,000	1,100	R	1,100	280
	2	1,000	1,100	R	0	0
	3	1,600	1,700	R	600	0
Medrano	1	210	222	R	337	110
	2	210	222	R	0	0
	3	320	337	R	0	0
Reduccion	1	28	30	M	0	0
	2	28	30	M	0	0
	3	60	0	S	0	30
Rodrigues Pena	1	0	0	-	0	0
	2	0	0	-	0	0
	3	100	106	R	106	0
La Dormida	1	290	306	R	474	30
	2	290	306	R	0	0
	3	450	474	R	0	0
Santa Rosa	1	210	222	R	337	30
	2	210	222	R	0	0
	3	320	337	R	0	0
Las Catitas	1	190	200	R	306	30
	2	190	200	R	0	0
	3	290	306	R	0	0
Ing. Giagnoni	1	60	64	R	106	0
	2	60	64	R	0	0
	3	100	106	R	0	0
Alto Verde	1	60	64	R	106	0
	2	60	64	R	0	0
	3	100	106	R	0	0
Zonal total	1	10,948	11,608		12,166	3,980
	2	10,948	11,608		0	0
	3	17,040	17,972		5,806	30

Table III - 10 - 4 Local exchange installation plan (11/17)

ZONE: Rivadavia

<HOST> Exchange	Phase	Main lines	Necessary terminals	Sys.	Terminal	
					Installation	Removal
<RIVADAVIA>						
Rivadavia	1	1,330	1,400	A	0	0
	2	4,000	4,300	D	4,300	1,400
	3	5,000	5,300	D	1,000	0
Philipps	1	0	0	-	0	0
	2	0	0	-	0	0
	3	100	106	R	106	0
Campamentos	1	28	30	M	0	0
	2	28	30	M	0	0
	3	100	106	R	106	30
La Central	1	0	0	-	0	0
	2	0	0	-	0	0
	3	100	106	R	106	0
Zonal total	1	1,358	1,430		0	0
	2	4,028	4,330		4,300	1,400
	3	5,300	5,618		1,318	30

Table III - 10 - 4 Local exchange installation plan (12/17)

ZONE: Palmira

<HOST> Exchange	Phase	Main lines	Necessary terminals	Sys.	Terminal	
					Installation	Removal
<PALMIRA>						
Palmira	1	950	1,000	A	0	0
	2	3,100	3,300	D	3,300	1,000
	3	3,800	4,100	D	800	0
Chapanay	1	28	30	M	0	0
	2	28	30	M	0	0
	3	60	0	S	0	30
Tres Portenas	1	28	30	M	0	0
	2	230	243	R	306	30
	3	290	306	R	0	0
Zonal total	1	1,006	1,060		0	0
	2	3,358	3,573		3,606	1,030
	3	4,150	4,406		800	30

Table III - 10 - 4 Local exchange installation plan (13/17)

ZONE: La Paz

<HOST> Exchange	Phase	Main lines	Necessary terminals	Sys.	Terminal	
					Installation	Removal
<LA PAZ>						
La paz	1	800	850	D	840	290
	2	800	850	D	0	0
	3	1,200	1,300	D	450	0
Desaguadero	1	0	0	-	0	0
	2	0	0	-	0	0
	3	100	106	R	106	0
Zonal total	1	800	850		840	290
	2	800	850		0	0
	3	1,300	1,406		556	0

Table III - 10 - 4 Local exchange installation plan (14/17)

ZONE: San Rafael

<HOST> Exchange	Phase	Main lines	Necessary terminals	Sys.	Terminal	
					Installation	Removal
<SAN RAFAEL>						
San Rafael	1	11,000	12,300	D	12,300	7,500
	2	11,000	12,300	D	0	0
	3	25,400	27,000	D	14,700	0
El Nihuil	1	9	10	A	0	0
	2	9	10	A	0	0
	3	60	0	S	0	10
Goudge	1	9	10	A	0	0
	2	30	0	S	0	10
	3	30	0	S	0	0
La Llave	1	38	40	A	0	0
	2	100	106	R	137	40
	3	130	137	R	0	0
Las Malvinas	1	9	10	A	0	0
	2	9	10	A	0	0
	3	30	0	S	0	10
Monte Coman	1	38	40	A	0	0
	2	200	211	R	379	40
	3	360	379	R	0	0
Rama Caida	1	19	20	A	0	0
	2	19	20	A	0	0
	3	100	106	R	106	20
Canada Seca	1	48	50	A	0	0
	2	150	158	R	200	50
	3	190	200	R	0	0
25 de Mayo	1	28	30	M	0	0
	2	28	30	M	0	0
	3	100	106	R	106	30
Cuadro Benegas	1	0	0	-	0	0
	2	0	0	-	0	0
	3	100	106	R	106	0
Zonal total	1	11,198	12,510		12,300	7,500
	2	11,545	12,845		716	140
	3	26,500	28,034		15,018	70

Table III - 10 - 4 Local exchange installation plan (15/17)

ZONE: Malargue

<HOST> Exchange	Phase	Main lines	Necessary terminals	Sys.	Terminal	
					Installation	Removal
<MALARGUE>						
Malargue	1	760	800	A	0	0
	2	2,000	2,200	D	2,200	800
	3	3,100	3,300	D	1,100	0
El Sosneado	1	0	0	-	0	0
	2	0	0	-	0	0
	3	100	106	R	106	0
El Cachay	1	0	0	-	0	0
	2	0	0	-	0	0
	3	100	106	R	106	0
Zonal total	1	760	800		0	0
	2	2,000	2,200		2,200	800
	3	3,300	3,512		1,312	0

Table III - 10 - 4 Local exchange installation plan (16/17)

ZONE: General Alvear

<HOST> Exchange	Phase	Main lines	Necessary terminals	Sys.	Terminal	
					Installation	Removal
<GENERAL ALVEAR>						
Gral. Alvear	1	4,000	4,300	D	4,300	2,400
	2	4,000	4,300	D	0	0
	3	6,100	6,500	D	2,200	0
Bowen	1	610	650	R	650	100
	2	610	650	R	0	0
	3	940	990	R	340	0
Carmenza	1	19	20	M	0	0
	2	19	20	M	0	0
	3	190	200	R	200	20
Real d. Padre	1	290	306	R	474	100
	2	290	306	R	0	0
	3	450	474	R	0	0
Villa Atuel	1	530	560	R	560	100
	2	530	560	R	0	0
	3	810	860	R	300	0
Jaime Prats	1	80	90	M	0	0
	2	100	106	R	137	100
	3	130	137	R	0	0
Col. Andes	1	0	0	-	0	0
	2	0	0	-	0	0
	3	100	106	R	106	0
La Guevarina	1	0	0	-	0	0
	2	0	0	-	0	0
	3	100	106	R	106	0
La Materrina	1	0	0	-	0	0
	2	0	0	-	0	0
	3	100	106	R	106	0
Las Aguaditas	1	0	0	-	0	0
	2	0	0	-	0	0
	3	100	106	R	106	0
Escandinava	1	0	0	-	0	0
	2	80	85	R	106	0
	3	100	106	R	0	0
Zonal total	1	5,529	5,926		5,984	2,700
	2	5,629	6,027		243	100
	3	9,120	9,691		3,464	20

Table III-10-4 Local exchange installation plan (17/17)

Local exchange total

Exchange	Phase	Main lines	Necessary terminals	Terminal	
				Installation	Removal
Local	1	137,765	146,240	79,144	20,690
	2	214,403	227,668	92,070	8,180
	3	322,740	341,760	161,081	48,650
	Total	-	-	332,296	77,520

Note: Abbreviation A: Automatic, analogue.

D: Automatic, digital.

M: Manual.

R: Automatic, remote.

S: Subscriber line multiplexer or Remote line multiplexer, the necessary terminals of which is included in that of the host exchange.

Host exchange: All exchanges in multiple exchange area are host exchanges except Loria in the phase 1.

Host exchanges other than the multiple exchange area are shown in the mark < >.

10.6 Toll Exchange

Installation of the toll exchange is planned in accordance with the progress of replacement of local exchanges and the traffic calculation result in Section 8.2.2. The occupancy of trunk circuit terminals is determined as 90% taking account of facilities for operation and maintenance work. The installation plan for the toll exchange is shown in Table III-10-5.

Toll switchboards are replaced with new types suitable for the digital toll exchange. The number of the boards is decided based upon experience as no traffic data is obtainable to estimate the traffic in the future.

The toll board traffic is affected by two factors, that is, increase in number of subscribers and growth of the direct distance dialing (DDD) service. The former causes increase in traffic, while the latter decrease in it. The empirical value used here is that estimated from data of areas in Japan with such conditions as telephone density and diffusion of DDD service similar to the province of Mendoza.

The installation plan for the toll switchboard is shown in Table III-10-6.

Table III-10-5 Toll switch installation plan

Exchange	Phase	Working lines	Necessary terminals	Terminal	
				Installation	Removal
CAI Digital	1	1,944	2,200	2,200	0
	2	3,539	4,000	1,800	0
	3	6,301	7,000	3,000	0
CAI Analog	1	1,788	2,000	0	0
	2	1,226	1,400	0	0
	3	0	0	0	2,000
Total	1	3,732	4,200	2,200	0
	2	4,765	5,400	1,800	0
	3	6,301	7,000	3,000	2,000

Table III - 10 - 6 Toll switchboard installation plan

Board	Phase	Toll switchboard	
		Installation	Removal
Toll switchboard	1	10	0
	2	0	14
	3	10	22

10.7 Subscriber Line

The volume of installation work for individual phases of planning is calculated according to the Section 10.1.4. Table III-10-7 shows the calculation result, and Table III-10-8 shows the volume of subscriber lines at the end of each phase of planning.

With regard to the above tables, since no data is available concerning the past replacement process, the above tables indicate estimated values based on the state of equipment at each past year end plus our experience.

As no data is available concerning ENTEL's existing facilities in General Alvear, etc., estimated values are indicated for new construction and replacement works.

Table III - 10 - 7 Installation work on the subscriber lines (1/2)

Central office	Phase 1		Phase 2		Phase 3	
	Installation	Removal*	Installation	Removal*	Installation	Removal*
Multiple exchange area						
General Paz	21,000	6,000	11,000	11,000	22,800	3,600
El Correo	22,200	10,000	5,000	5,000	15,200	
Dorrego	0		6,200		3,200	
Godoy Cruz	8,600	3,300	15,600	3,300	10,700	2,400
Hipodromo	0		7,300		3,200	
Las Heras	0		13,700		9,900	
Loria	0		7,500		2,900	
Villa Nueva	0		17,000	2,700	11,300	1,200
Subtotal	51,800	19,300	83,300	22,000	79,200	7,200
Uspallata	150		0		0	
Subtotal	150	0	0	0	0	0
Lavalle	250		0		250	
Costa de Araujo	0		0		200	50
Tores de Mayo	0		0		150	
Jocoli	0		0		150	
Nueva California	0		0		150	
Gustavo Andre	0		0		150	
El Pastal	0		0		150	
Subtotal	250	0	0	0	1,200	50
Rodeo de la Cruz	150		0		2,350	
La Primavera	0		0		150	
Col. Segovia	0		0		150	
P. de Hierro	0		0		150	
Fray L. Beltran	0		0		800	
Rodeo del Medio	0		0		800	
Subtotal	150	0	0	0	4,400	0
Maipu	0		8,900	1,200	2,400	
Cruz de Piedra	40	40				
Subtotal	40	40	8,900	1,200	2,400	0
Lujan de Cuyo	700	700	4,700	500	1,700	
Chacras de Coria	0		700	700	2,400	
Agrelo	0		0		150	
Potrerillos	0		50	50	350	
Las Cuevas	0		0		150	
Ugarteche	0		0		150	
Blanco Encalada	0		100		50	
El Carrizal	0		0		150	
Subtotal	700	700	5,550	1,250	5,100	0
Tunuyan	1,000		0		1,900	600
Zapata	0		0		150	
San Pablo	0		0		150	
Eugenio Bustos	400		150	150	400	
La Consulta	1,600	300	250	250	1,000	
Campo los Andes						
Pareditas	0		0		200	
Chilecito	0		0		150	
Vista Flores	300		50	50	200	
Tupungato	0		850	350	300	
San Jose	0		0		150	
El Zampal	0		0		150	
Subtotal	3,300	300	1,300	800	4,750	600

*: Estimated value

Table III - 10 - 7 Installation work on the subscriber lines (2/2)

Central office	Phase 1		Phase 2		Phase 3	
	Installation	Removal*	Installation	Removal*	Installation	Removal*
San Martin	7,000	1,300	900	900	5,300	
Junin	700		200	200	700	
Medrano	200	50	0		200	
Reduccion	0		0		50	
Rodriguez Pena	0		0		150	
La Dormida	400		50	50	200	
Santa Rosa	230		70	70	200	
Las Catitas	230		70	70	150	
Ing. Giagnoni	100		0		50	
Alta Verde	100		0		50	
Subtotal	8,960	1,350	1,290	1,290	7,050	0
Rivadavia	500	500	2,950	350	1,250	150
Philipps	0		0		150	
Campamentos	0		0		100	
La Central	0		0		150	
Subtotal	500	500	2,950	350	1,650	150
Palmira	0		2,400		700	
Chapanai	0		0		50	
Tres Portenas	0		300		100	
Subtotal	0	0	2,700	0	850	0
La Paz	550		0		700	200
Desaguadero	0		0		150	
Subtotal	550	0	0	0	850	200
San Rafael	6,400	2,400	1,200	1,200	17,100	1,200
El Nihuil	0		30	30	70	
Gouge	20		30	10	0	
La Llave	0		150	100	50	
Las Malvinas	0		50	50	0	
Monte Coman	0		300	50	250	
Rama Caida	0		50	50	100	
Canada Seca	70	50	180		50	
25 de Mayo	0		0		100	
Cuadro Benegas	0		0		150	
Subtotal	6,490	2,450	1,990	1,490	17,870	1,200
Malargue	0		1,130	130	1,300	
El Sosneado	0		0		150	
El Chapanay	0		0		150	
Subtotal	0	0	1,130	130	1,600	0
General Alvear	1,700		0		2,400	
Bowen	600		0		400	
Carmenza	0		0		270	
Real del Padre	350		0		200	
Villa Atuel	500		0		500	
Jaime Prats	50		0		50	
Colonia Andes	0		0		150	
La Guevarina	0		0		150	
La Materina	0		0		150	
Las Aguaditas	0		0		150	
Escandinava	0		150		0	
Subtotal	3,200	0	150	0	4,420	0
Total	76,090	24,640	109,260	28,510	131,340	9,400

*: Estimated value

Table III - 10 - 8 Subscriber lines terminated to the central office (1/2)

End of the phase

Central office	(1986)	Phase 1	Phase 2	Phase 3
Multiple exchange area				
General Paz	21,100	36,100	36,100	55,300
El Correo	16,300	28,500	28,500	43,700
Dorrego	4,800	4,800	11,000	14,200
Godoy Cruz	9,900	15,200	27,500	35,800
Hipodromo	4,800	4,800	12,100	15,300
Las Heras	8,300	8,300	22,000	31,900
Loria	2,400	2,400	9,900	12,800
Villa Nueva	6,600	6,600	20,900	31,000
Subtotal	74,200	106,700	168,000	240,000
Uspallata		150	150	150
Subtotal	0	150	150	150
Lavalle	200	450	450	700
Costa de Araujo	50	50	50	200
Tores de Mayo		0	0	150
Jocoli		0	0	150
Nueva California		0	0	150
Gustavo Andre		0	0	150
El Pastal		0	0	150
Subtotal	250	500	500	1,650
Rodeo de la Cruz	750	850	850	3,200
La Primavera		0	0	150
Col. Segovia		0	0	150
P. de Hierro		0	0	150
Fray E. Beltran	300	300	300	1,100
Rodeo del Medio	300	300	300	1,100
Subtotal	1,350	1,450	1,450	5,850
Maipu	2,400	2,400	10,100	12,500
Cruz de Piedra	150	150		
Subtotal	2,550	2,550	10,100	12,500
Lujan de Cuyo	2,400	2,400	6,600	8,300
Chacras de Coria	1,200	1,200	1,200	3,600
Agrelo	50	50	50	150
Potreriillos	50	50	50	400
Las Cuevas		0	0	150
Ugarteche		0	0	150
Blanco Encalada		0	100	150
El Carrizal		0	0	150
Subtotal	3,700	3,700	8,000	13,050
Tunuyan	1,500	2,500	2,500	3,800
Zapata		0	0	150
San Pablo		0	0	150
Eugenio Bustos	300	700	700	1,100
La Consulta	400	1,700	1,700	2,700
Canpo los Andes	250			
Pareditas	50	50	50	250
Chilecito	50	50	50	200
Vista Flores	150	450	450	650
Tupungato	800	800	1,300	1,600
San Jose		0	0	150
El Zampal		0	0	150
Subtotal	3,500	6,250	6,750	10,900

Table III-10-8 Subscriber lines terminated to the central office (2/2)

Central office	End of the phase			
	(1986)	Phase 1	Phase 2	Phase 3
San Martin	4,100	9,800	9,800	15,100
Junin	400	1,100	1,100	1,800
Medrano	150	300	300	500
Reduccion	50	50	50	100
Rodriguez Pena		0	0	150
La Dormida	50	450	450	650
Santa Rosa	70	300	300	500
Las Catitas	70	300	300	450
Ing. Giagnoni		100	100	150
Alta Verde		100	100	150
Subtotal	4,890	12,500	12,500	19,550
Rivadavia	1,800	1,800	4,400	5,500
Philipps		0	0	150
Campamentos	50	50	50	150
La Central		0	0	150
Subtotal	1,850	1,850	4,450	5,950
Palmira	1,100	1,100	3,500	4,200
Chapanai	50	50	50	100
Tres Portenas	50	50	350	450
Subtotal	1,200	1,200	3,900	4,750
La Paz	350	900	900	1,400
Desaguadero		0	0	150
Subtotal	350	900	900	1,550
San Rafael	8,100	12,100	12,100	28,000
El Nihuil	30	30	30	100
Gouge	10	30	50	50
La Llave	100	100	150	200
Las Malvinas	50	50	50	50
Monte Coman	50	50	300	550
Rama Caida	50	50	50	150
Canada Seca	50	70	250	300
25 de Mayo	50	50	50	150
Cuadro Benegas		0	0	150
Subtotal	8,490	12,530	13,030	29,700
Malargue	1,200	1,200	2,200	3,500
El Sosneado		0	0	150
El Chapanay		0	0	150
Subtotal	1,200	1,200	2,200	3,800
General Alvear	2,700*	4,400	4,400	6,800
Bowen	110*	700	700	1,100
Carmenza	30*	30	30	300
Real del Padre	110*	450	450	650
Villa Atuel	110*	600	600	1,100
Jaime Prats	110*	150	150	200
Colonia Andes		0	0	150
La Guevarina		0	0	150
La Materina		0	0	150
Las Aguaditas		0	0	150
Escandinava		0	150	150
Subtotal	3,170*	6,330	6,480	10,900
Total	106,700	157,810	238,410	360,300

*: Estimated value

10.8 Junction Circuit

Table III-10-9 shows the installation plan of the junction circuit in Mendoza multiple exchange area.

10.9 Trunk Lines

Existing main trunk lines extend out of Mendoza in the center to the east, west, north and south. Each route is used to its full capacity, and to cope with the future traffic increase due to the increase of subscribers and the automatization of exchange, either a system increase or change of system is required. This is true with other small capacity trunk lines, and they have to be updated when the exchanges become automatic.

Since the digital exchange is to be used to extend existing automatic exchanges and to automatize manual exchanges, it is desirable that the trunk lines required for the abovementioned digital exchanges are entirely digital. Therefore, the existing analogue trunk lines, except those to be reused for television program transmission lines, are superseded by the digital trunk lines.

The following transmission capacities are applied to the trunk lines to meet various capacity requirements:

140Mb/s	(equivalent to 1,920 telephone channels)
34Mb/s	(equivalent to 480 telephone channels)
8Mb/s	(equivalent to 120 telephone channels)
4Mb/s	(equivalent to 60 telephone channels)
2Mb/s	(equivalent to 30 telephone channels)

Since the existing cables are not applicable to the digital transmission system and installing optical fiber cable or other type cable is ruled out on account of economical disadvantages compared to the radio relay system, the digital microwave systems are applied to the new trunk lines.

The simplest and most economical trunk lines configuration within the province would be two main routes consisting of an eastern route between Mendoza and San Martin and a southern route between Mendoza and San Rafael that have heavy traffic and other spur trunk lines which branch off from the main routes.

Site selection is newly necessary for repeater station of new trunk lines, and equipment with anti-fading measures are to be installed at necessary places by reason that the existing large capacity microwave systems face problems of visibility and occurrence of fading in a part of the microwave propagation paths.

Lines to San Luis and San Juan are prepared for the long distance trunk lines for interprovince traffic. However, facilities for such lines up to the province border only are included in the development plan.

The western route toward the border with Chile is a mountain route with a passive reflector installed for every repeater section, and it is difficult to select a new route. Therefore, a small capacity digital transmission systems are newly installed to Las Cuevas along the existing route.

A television program transmission line of analogue microwave system is actually installed together with the trunk line for telephone service. Demand for an increased number of television program transmission lines are covered for the time being with analogue microwave system that will have some capacity to spare after the telephone trunk lines are digitalized. For the year 2000 onward, however, all the lines are digitalized considering the life of the existing analogue microwave system. Such new lines are installed along the telephone trunk lines in order to share the facilities between the two.

A coding system for the long distance transmission of television program by the digital system is presently under study by CMTT of ITU, and it looks as though it will be some time until the standardization is completed. Under the circumstances, here, it is tentatively assumed that the transmission system of 140Mb/s will be applied.

Table III-10-10 shows the trunk line routing plans and Figure III-10-4 shows the configuration of trunk lines.

Table III - 10 - 9 Installation plan of junction circuit in Mendoza multiple exchange area

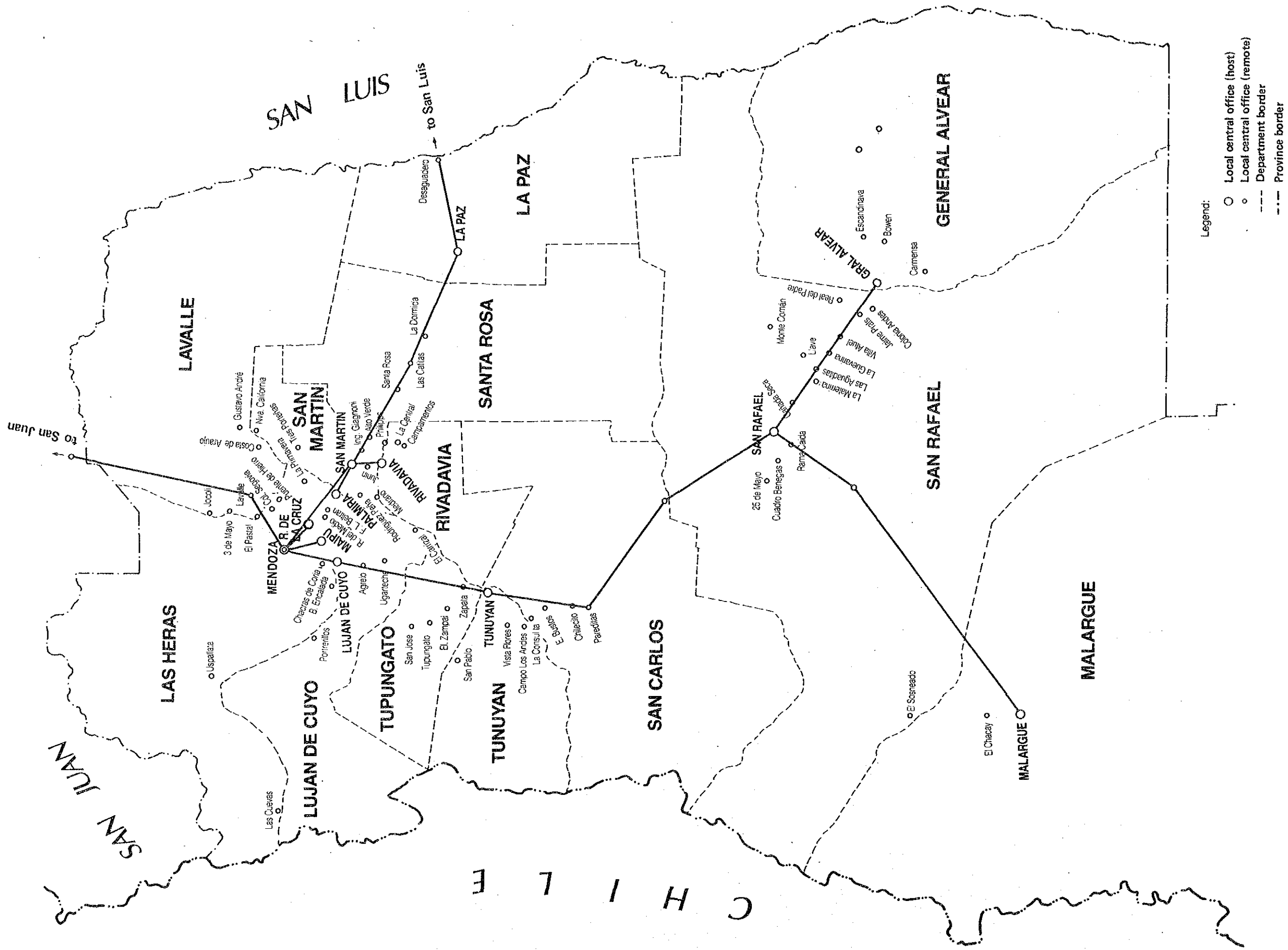
Route	Distance	No. of required 2 Mb/s systems			Systems to be applied	Expansion plan			No. of fiber cable cores
		Phase 1	Phase 2	Phase 3		Phase 1	Phase 2	Phase 3	
GRP-LAH	3 Km	11	26	40	140M fiber	140Mx1			4
GRP-CRR	2 Km	80	128	179	140M fiber	140Mx3			8
GRP-VLN	3 Km	13	62	76	140M, 34M fiber	140Mx1	34Mx1		8
CRR-GDC	4 Km	37	85	101	140M fiber	140Mx2			6
CRR-HPD	7 Km	15	47	46	140M fiber	140Mx1			4
CRR-DOR	3 Km	5	16	17	140M fiber	140Mx1			4
GDC-LRA	5 Km	0	38	39	140M fiber		140Mx1		4

Table III - 10 - 10 installation plan of transmission system

Route name	Distance (km)	Required capacity	System name	Number of RF channels		
				Phase 1	Phase 2	Phase 3
Mendoza toll Ex. Lujan de Cuyo	17.0	2M x 39	E	1 TP		2 TV
Lujan de Cuyo	61.0	2M x 31	E	1 TP		2 TV
Tunuyan	150.0	2M x 25	E	1 TP		2 TV
San Rafael	70.0	2M x 8	D		1 TP	
Malargue	152.0	2M x 5	D			
Mendoza toll Ex. San Martin	40.0	2M x 24	E	1 TP + 2 TV		2 TV
San Martin	140.0	2M x 61	E	1 TP		2 TV
Mendoza toll Ex. San Luis	110.0	2M x 16	D	1 TP		
San Martin	9.5	2M x 6	D		1 TP	
	12.0	2M x 7	D		1 TP	
Mendoza toll Ex. Rodeo de la Cruz	10.0	2M x 6	D			1 TP
Maipu	12.0	2M x 7	D			
Rodeo de la Cruz	8.0	2M x 1	A			1 TP
	14.0	2M x 1	A			1 TP
	11.0	2M x 1	A			1 TP
	7.0	2M x 3	C			1 TP
	12.0	2M x 3	C			1 TP
General Paz	28.5	2M x 8	D			1 TP
	56.0	2M x 1	A			1 TP
Lavalle	10.0	2M x 1	A			1 TP
	7.0	2M x 1	A			1 TP
	18.0	2M x 1	A			1 TP
	19.0	2M x 1	A			1 TP
	26.0	2M x 1	A			1 TP
	27.0	2M x 1	A			1 TP
Palmira	23.5	2M x 1	A		1 TP	
San Martin	46.0	2M x 6	D	1 TP		
	7.0	2M x 4	C	1 TP		
	12.5	2M x 1	A	1 TP		1 TP
	11.0	2M x 1	A			
	7.0	2M x 1	A	1 TP		
	13.5	2M x 1	A	1 TP		
Rivadavia	8.0	2M x 1	A			1 TP
	8.5	2M x 1	A			1 TP
	8.5	2M x 1	A			1 TP
Las Catitas	11.0	2M x 1	A	1 TP		
	14.0	2M x 2	B	1 TP		
	47.0	2M x 3	C	1 TP		
La Paz	37.0	2M x 1	A			1 TP
Lujan de Cuyo	5.0	2M x 13	D			1 TP
	9.0	2M x 1	A			1 TP
	19.0	2M x 1	A			1 TP
	31.0	2M x 1	A			1 TP
	7.0	2M x 2	B		1 TP	
	54.0	2M x 1	F			1 TP
Uspallata	71.0	2M x 1	A			1 TP
Tunuyan	36.0	2M x 1	A			1 TP
	9.5	2M x 1	A			1 TP
	14.5	2M x 2	B	1 TP		
	20.0	2M x 8	D	1 TP		
	23.0	2M x 2	B	1 TP		
	33.5	2M x 1	A			1 TP
	40.5	2M x 1	A			1 TP
	26.0	2M x 4	C		1 TP	
	33.0	2M x 1	A			1 TP
	17.0	2M x 1	A			1 TP
San Rafael	19.5	2M x 1	A			1 TP
	11.5	2M x 1	A			1 TP
	7.5	2M x 1	A			1 TP
	11.0	2M x 1	A		1 TP	
	30.0	2M x 1	A		1 TP	
	41.5	2M x 2	B		1 TP	
General Alvear	17.0	2M x 3	C	1 TP		
	18.0	2M x 1	A			1 TP
	18.5	2M x 1	A			1 TP
	7.5	2M x 1	A			1 TP
	13.0	2M x 1	A			1 TP
	16.5	2M x 2	B			1 TP
	23.5	2M x 3	C			1 TP
	37.0	2M x 1	A			1 TP
	44.5	2M x 1	A			1 TP
	47.0	2M x 1	A			1 TP
Malargue	12.0	2M x 1	A			1 TP
	43.5	2M x 1	A			1 TP

System name

A: 2 Mb/s (30CH) Digital Microwave System D: 34 Mb/s (480CH) Digital Microwave System
 B: 4 Mb/s (60CH) Digital Microwave System E: 140 Mb/s (1920CH) Digital Microwave System
 C: 8 Mb/s (120CH) Digital Microwave System F: 2 Mb/s (30CH) Digital Cable System



Legend:
 ○ Local central office (host)
 ○ Local central office (remote)
 --- Department border
 - - - Province border

Fig. III - 10 - 4 Transmission network configuration (1/2)
 - Main route -

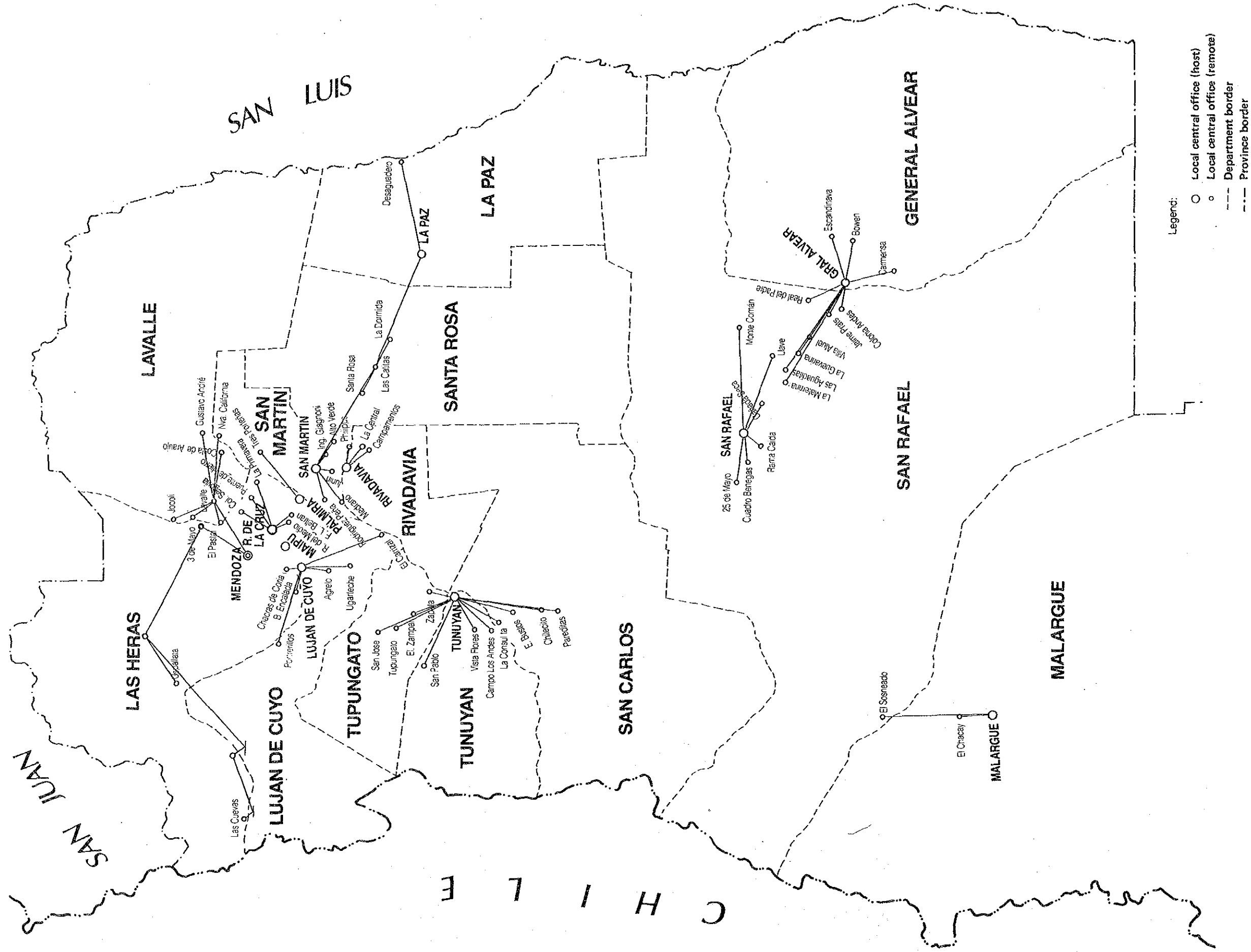


Fig. III - 10 - 4 Transmission network configuration (2/2)

- Spur route -

10.10 Mobile Communications Service

Of the mobile communications service, radio paging service is omitted from the development plan. Therefore, here, equipment necessary for providing land mobile telephone service only is examined.

Two systems are considered for providing the service to the area in question:

- (1) Large zone system with one base station covering the entire Gran Mendoza area.
- (2) Small zone system with several base stations covering the Gran Mendoza area in sections.

Mobile communications service, especially land mobile telephone service and aircraft telephone service, are of national interest and hence must have a uniform system at national level as much as possible. Therefore, the following studies will have to be reviewed when the Government of the Argentine Republic decides on the system.

As frequency for land mobile telephone, 800MHz band is in use worldwide. However, this frequency band has a certain radio propagation problem if it is used for covering the Gran Mendoza area with the large zone system.

The object service area of land mobile telephone service will most likely expand to expressways running out of Mendoza, and the aircraft telephone service will be introduced as the future requirement in the 21st century. In this connection, the large zone system is disadvantageous from the standpoint of system flexibility for the expansion of the land mobile telephone service area and for the installation of aircraft telephone service. Consequently, land mobile telephone service with small zone system is considered for the development plan.

From the lay of the land and situation of the buildings in the Gran Mendoza area, it is possible to establish a 800MHz band radio service zone with the radius of approximately 10km, so that three base stations can cover the Gran Mendoza area as Figure III--10--5 shows.

Four radio waves per each base station would be sufficient to cover the initial demand at the start of service, when calls are equally distributed among the radio service zones covered by the three base stations and the following system design conditions are estimated :

- (1) Calling rate per one subscriber of land mobile telephone service : 0.01 erlang
- (2) Number of subscribers per one base station : 80
- (3) Loss probability of speech channel : 0.03

If one base station would centrally control the total system and the system would be interfaced with the telephone network on Mendoza toll exchange level, the system configuration in the early stage of introduction and the necessary equipment would be as in Figure III-10-6.

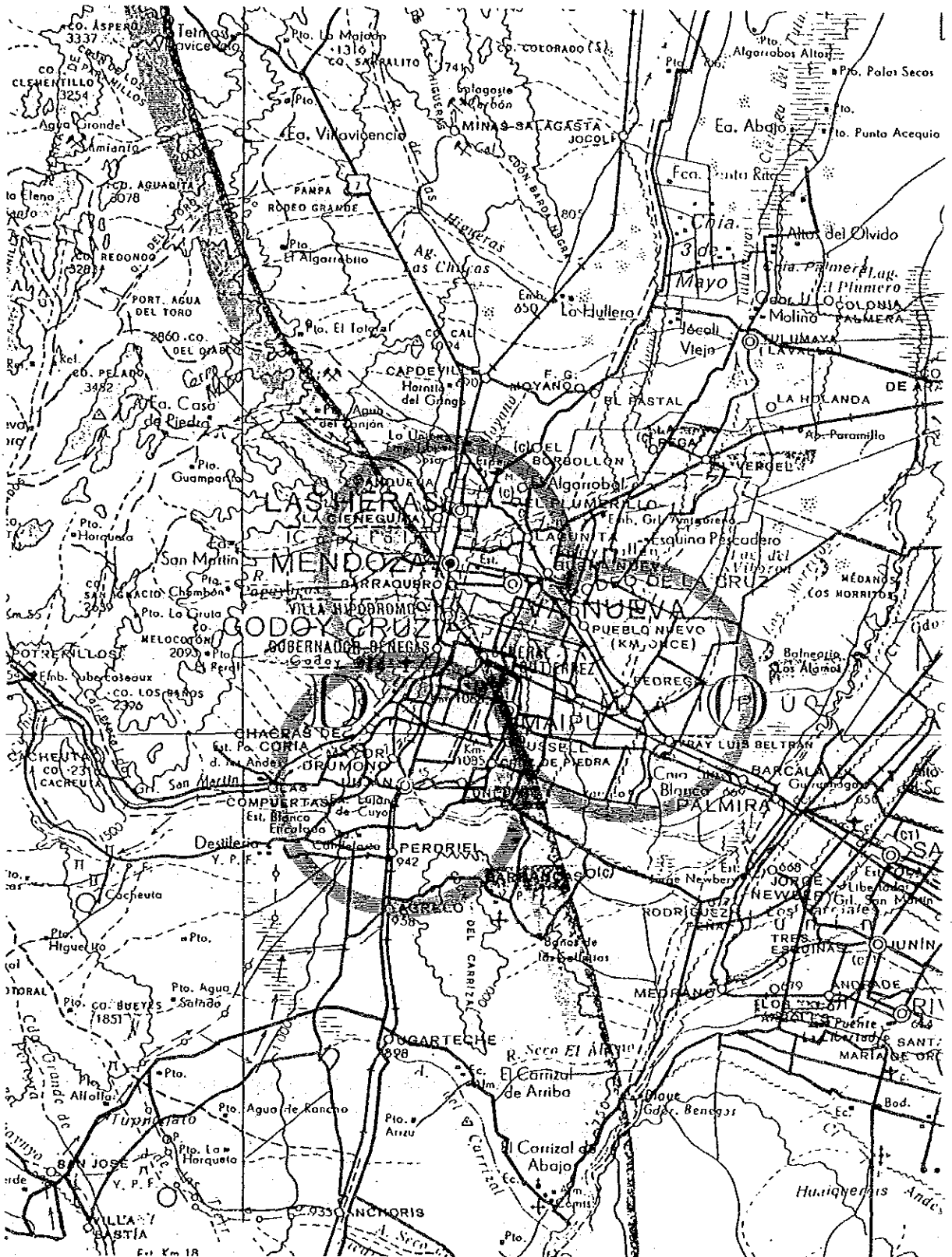
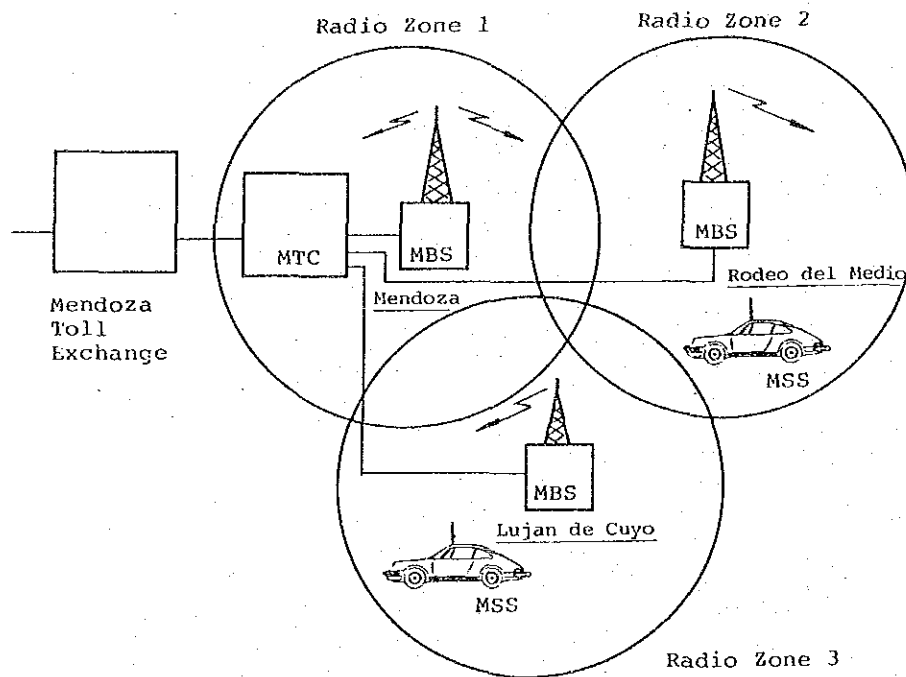


Fig. III - 10 - 5 Location of radio zone for the mobile telephone system in the Gran Mendoza area



MTC: Mobile Telephone Control Equipment
MBS: Mobile Telephone Base Station Equipment
MSS: Mobile Telephone Subscriber Station Unit

Fig. III - 10 - 6 Configuration of the mobile telephone system

10.11 Data Communications and Telegraph

10.11.1 Leased circuit service

The expansion steps of leased circuit service are shown in Figs. III-10-7 through III-10-9.

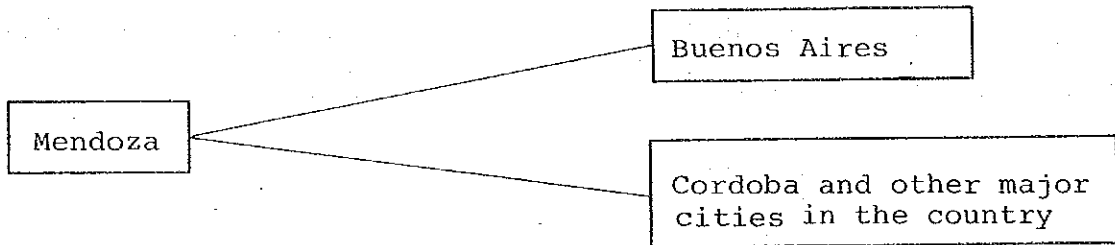


Fig. III - 10 - 7 Expansion of leased circuit service (phase 1)

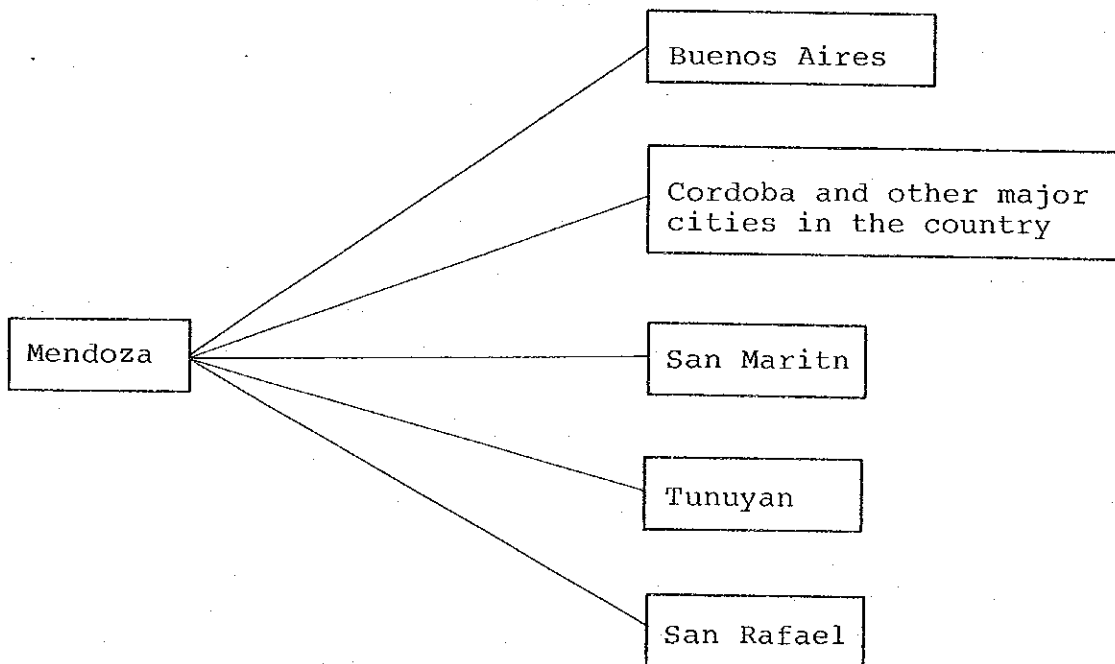


Fig. III - 10 - 8 Expansion of leased circuit service (phase 2)

10.11.2 Packet switching service

Steps in expanding the packet switching service are shown in Figs. III-10-10 through III-10-12.

10.11.3 Telegraph service

Steps in distributing facsimiles to terminal offices to improve the telegraph service are shown in Table III-10-11.

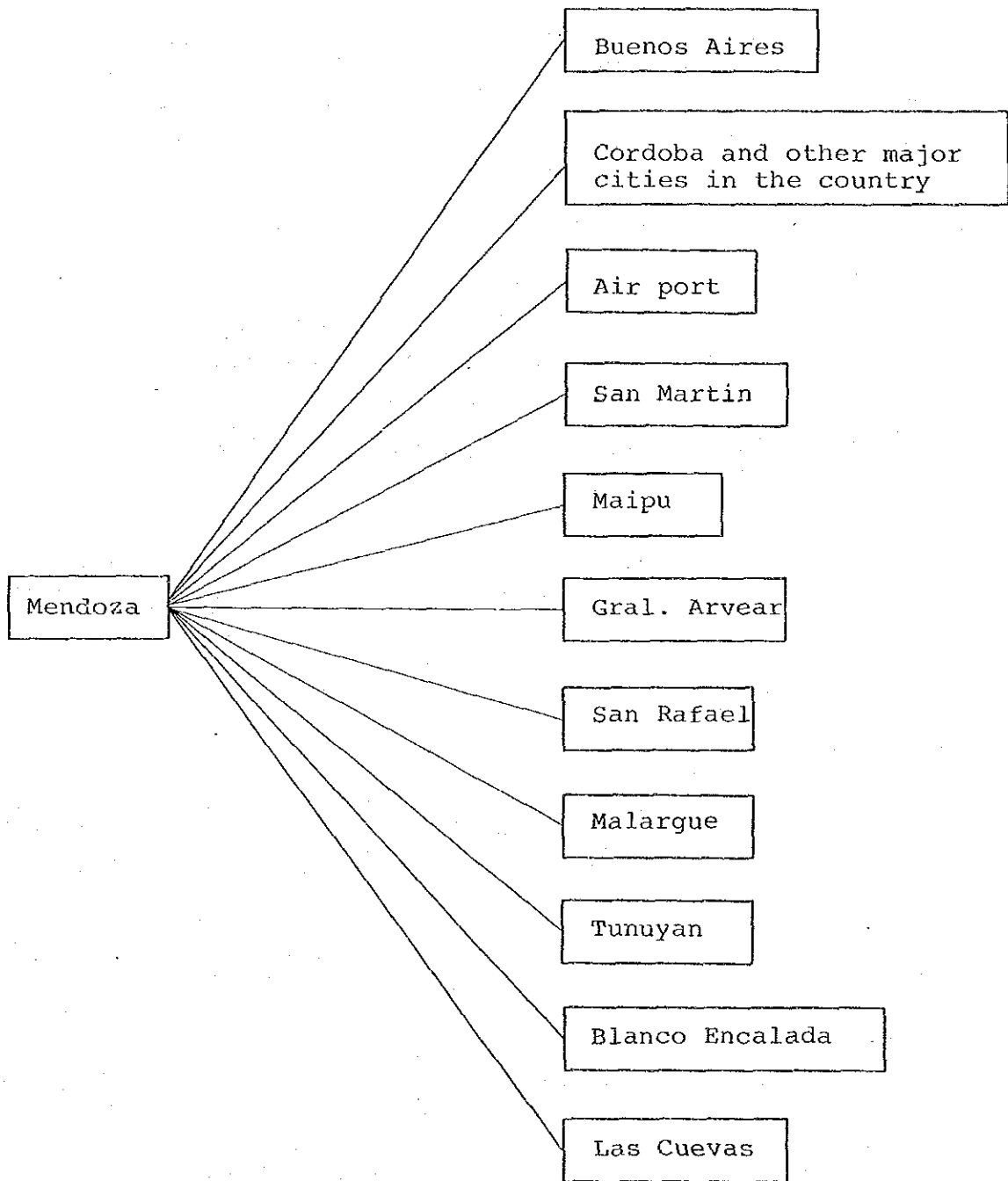
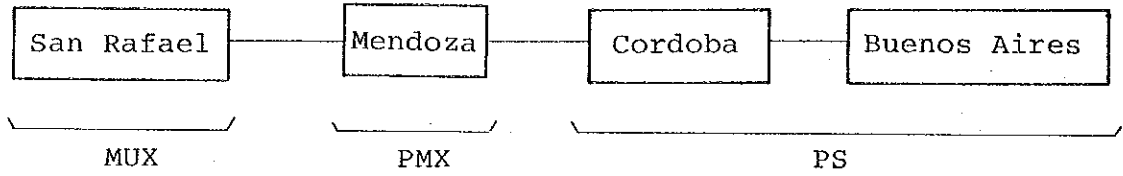


Fig. III - 10 - 9 Expansion of leased circuit service (phase 3)



Legend:

PS ; Packet Switching

PMX; Packet Multiplexer.

MUX; Multiplexer

Fig. III - 10 - 10 Expansion of packet switching service (phase 1)

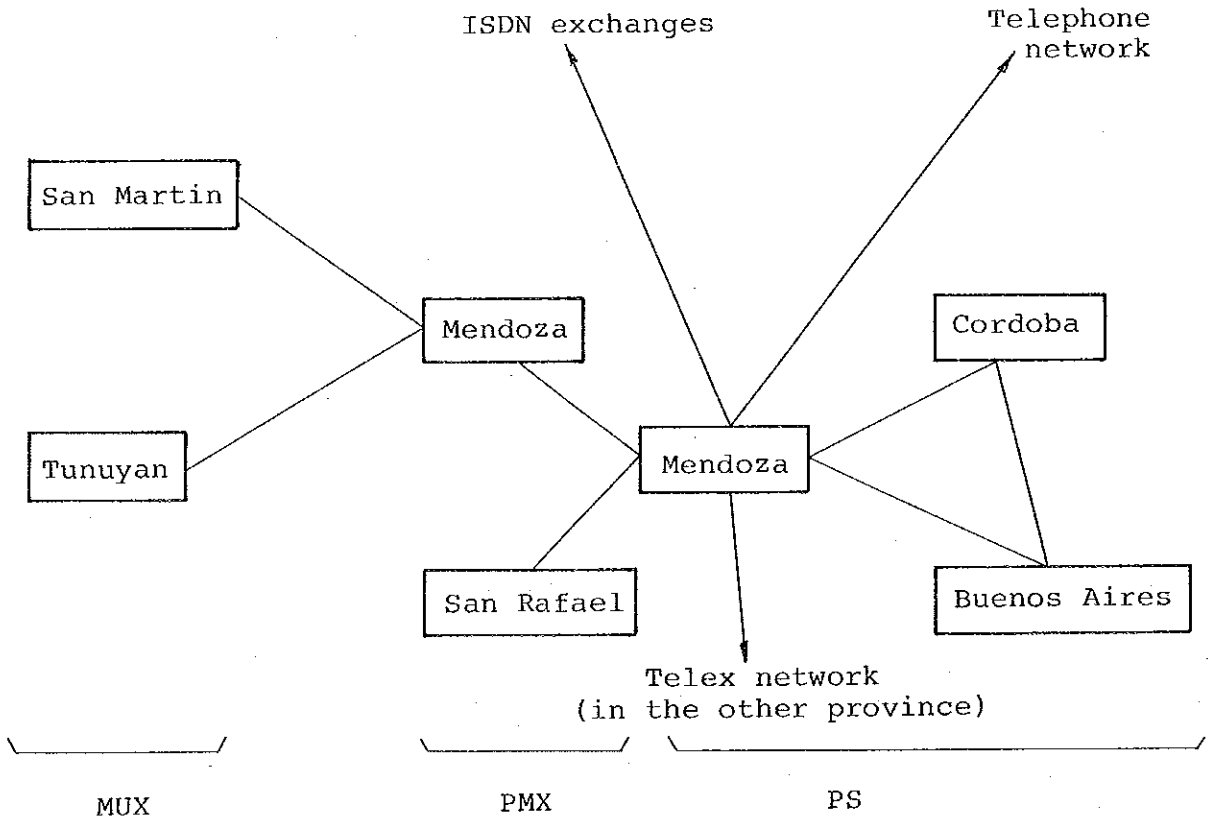


Fig. III - 10 - 11 Expansion of packet switching service (phase 2)

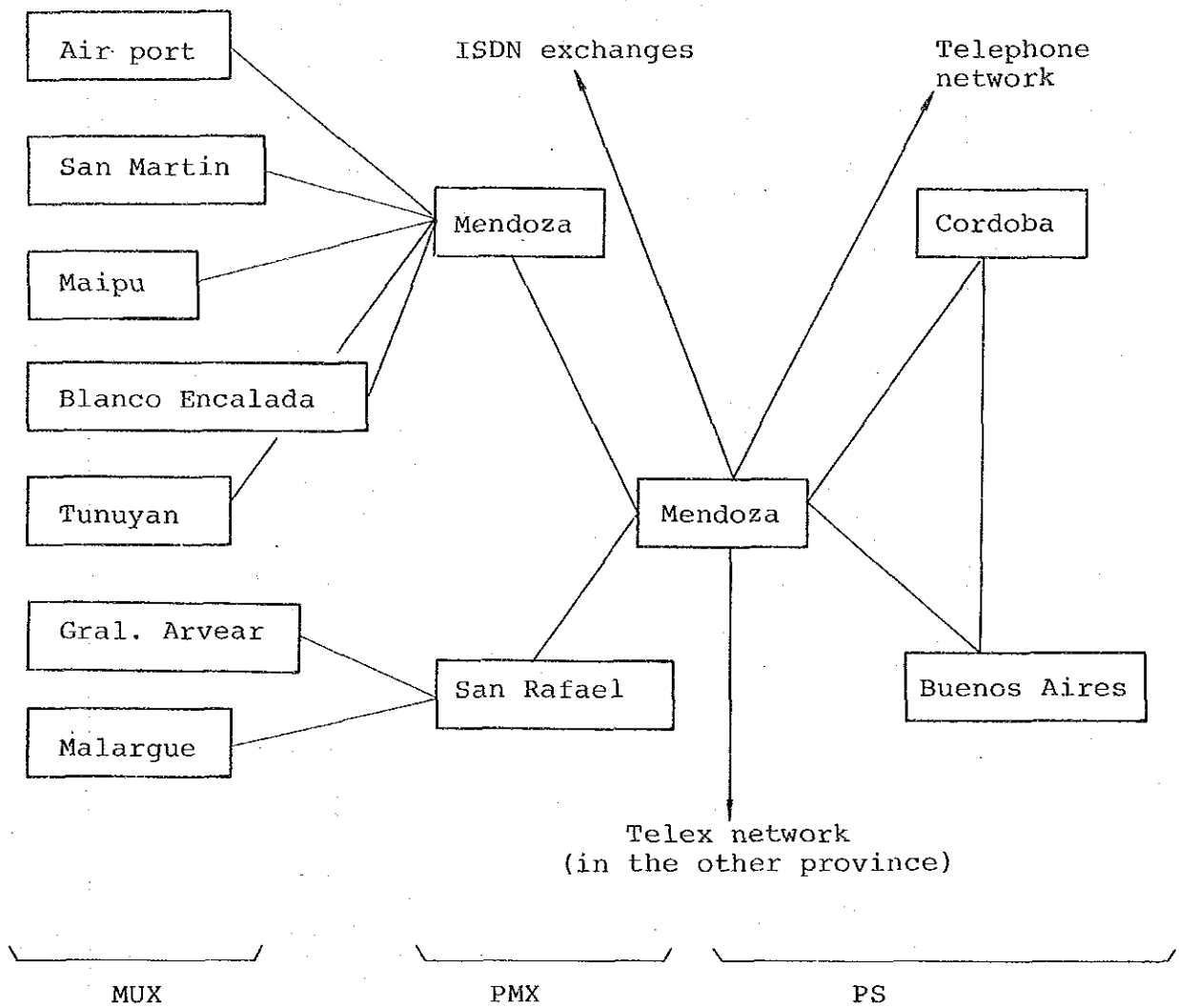


Fig. III - 10 - 12 Expansion of packet switching service (phase 3)

Table III - 10 - 11 Distribution of facsimile for telegraph service (1/3)

No.	Central office name	Introduction phase
1	Mendoza	Phase 1
2	Chacras de Coria	Phase 1
3	Agrelo	Phase 3
4	Blanco Encalada	Phase 2
5	El Carrizal	Phase 3
6	Ugarteche	Phase 3
7	Rodeo de la Cruz	Phase 1
8	Maipu	Phase 1
9	El Pastal	Phase 3
10	La Primavera	Phase 3
11	Col. Segovia	Phase 3
12	Puente de Hierro	Phase 3
13	Potrerrillos	Phase 3
14	Uspallata	Phase 3
15	Las Cuevas	Phase 3
16	Medrano	Phase 1
17	Campamentos	Phase 3
18	Reduccion	Phase 3
19	Chapanay	Phase 3
20	Tres Portenas	Phase 1
21	La Central	Phase 3
22	Philipps	Phase 3
23	Alto Verde	Phase 1
24	Nueva California	Phase 3
25	Rodriguez Pena	Phase 3

Table III - 10 - 11 Distribution of facsimile for telegraph service (2/3)

No.	Central office name	Introduction phase
26	Lavalle	Phase 1
27	Costa de Araujo	Phase 3
28	Gustavo Andre	Phase 3
29	Jocoli	Phase 3
30	Tres de Mayo	Phase 3
31	Santa Rosa	Phase 1
32	La Dormida	Phase 1
33	Las Catitas	Phase 1
34	La Paz	Phase 1
35	Desaguadero	Phase 3
36	Chilecito	Phase 3
37	La Consulta	Phase 1
38	Pareditas	Phase 3
39	Vista Flores	Phase 1
40	San Pablo	sPhase 3
41	Zapata	Phase 3
42	El Zampal	Phase 3
43	San Jose	Phase 3
44	Canada Seca	Phase 1
45	25 de Mayo	Phase 3
46	El Nihuil	Phase 1
47	Gouge	Phase 1
48	La Llave	Phase 1
49	Las Malvinas	Phase 1
50	Rama Caida	Phase 1

Table III - 10 - 11 Distribution of facsimile for telegraph service (3/3)

No.	Central office name	Introduction phase
51	Cuadro Benegas	Phase 3
52	El Chapanay	Phase 3
53	El Sosneado	Phase 3
54	Villa Atuel	Phase 1
55	Gral. Alvear	Phase 1
56	Bowen	Phase 1
57	Carmensa	Phase 3
58	Jaime Prats	Phase 2
59	Col. Andes	Phase 3
60	Escandinaba	Phase 2
61	La Guevarina	Phase 3
62	La Materina	Phase 3
63	Las Aguaditas	Phase 3
64	Malargue	Phase 1

CHAPTER 11 OPERATION, MAINTENANCE SYSTEM AND PERSONNEL PLANNING

11.1 Outside Plant

The business of the outside plant department spans a wide range including the orders for installation or change of services, relocation of plant, repair, inspection, surveillance of other construction work, survey and design of subscriber's plant construction, preparation of plant records, etc. Since much of this work arises sporadically, the workload must be evened out as much as possible to improve business efficiency. Hence the maintenance division should be as centralized as possible. However, extreme centralization of the maintenance division will cause efficiency to drop because of the longer time involved in making round trips to work sites.

Here, by making it a prerequisite for maintenance personnel to reach the work site within one hour and by considering workload, the central maintenance organization and the number of maintenance personnel are determined. These are shown in Tables III-11-1 and III-11-2. Of the maintenance offices, General Alvear will be better maintained with higher efficiency out of San Rafael; however, the development plan has kept the personnel there considering the existing system. The maintenance personnel number indicated in Table III-11-2 does not include those for installation of subscriber stations. (They are included in the construction cost calculated on a turnkey basis.)

Table III-11-1 Central Maintenance organization for outside plant

Center	Area in charge
Mendoza	Gran Mendoza (Mendoza, Godoy Cruz, Guaymallen, Las Heras, Lujan, Maipu), Lavalle
San Martin	Junin, Revadavia, San Martin, Santa Rosa, La Paz
Tunuyan	San Carlos, Tunuyan, Tupungato
San Rafael	Malargue, San Rafael
General Alvear	General Alvear

Table III-11-2 Number of personnel for outside plant

Year	1995	2000	2005
No. of personnel	150	221	324

11.2 Exchange

The personnel for operation and maintenance of telephone exchange are allocated to each host central office with a view to centralizing maintenance and operation work into the host office. It is planned here to allocate engineers and technicians necessary for trouble repair to each host office, due to the fact that the central offices are scattered distant each other in a wide area except Gran Mendoza, though a more integrated system is technically possible in the case of digital exchange. The allocation plan for exchange maintenance personnel is shown in Table III-11-3.

Daily use spare parts are to be kept at each host office but those which are used seldom are to be kept in a concentrated form at one of the host offices in Gran Mendoza considering economy.

Since exchanges to be purchased during this development plan are all digital, and their technology is new to the majority of maintenance personnel of conventional exchanges, training is necessary for them. The training plan for exchange maintenance personnel is shown in Table III-11-4. Apart from this training, it is recommended to carry out another training at site for those who have no chance to receive either the factory training nor the training at site by the instructor dispatched from the manufacturer. This training should be conducted by those who have finished the training by the manufacturer.

Table III-11-3 Allocation plan for exchange maintenance personnel

Area or central office	Phase	Number of host central offices	Personnel		
			Engineer	Technician	Total
Multiple exchange area	1	7	14	42	56
	2	8	16	48	64
	3	8	16	48	64
Other areas	1	11	22	66	88
	2	11	22	66	88
	3	11	22	66	88
Toll office	1	1	2	12	14
	2	1	2	12	14
	3	1	2	12	14
Total	1	19	38	120	158
	2	20	40	126	166
	3	20	40	126	166

Table III - 11 - 4 Training plan for exchange maintenance personnel

	Area or central office	Number of exchanges	Trainees per exch.	(Total)	Phase 1	Phase 2	Phase 3
Factory	Multiple exchange area	8*	2	16	5	5	6
	Other areas	11	3	33	11	11	11
	Toll office	1	3	3	1	1	1
	Total	20	8	52	17	17	18
Site	Multiple exchange area	8	2	16	5	5	6
	Other areas	11	1	22	7	7	8
	Toll office	1	2	2	1	1	0
	Total	20	5	40	13	13	14

* 7 before the inauguration of a new host office of Loria

11.3 Transmission System

The system and equipment to be operated and maintained by the transmission department are the trunk lines within the province, junction circuits in multiple exchange area, equipment for providing rural telephone service, and mobile telephone system. Systems and equipment mentioned above are either installed in the Gran Mendoza area or in various locations throughout the province. Supervision of the operation status should be centralized in Mendoza for unified execution. In view of the time required for going to the site for maintenance and repair, it is necessary to provide maintenance centers in Mendoza and San Rafael. Maintenance tasks are to be carried out according to the instructions from the system supervision center which will be established in Mendoza.

The measuring instrument and spares are to be stored at the two maintenance centers.

Repairs of faults on the subscriber side of rural telephone system are to be primarily carried out by the outside plant department. If equipment usually maintained by the transmission department becomes faulty, the transmission department should send out maintenance persons according to the information from the outside plant department.

Table III-11-5 Allocation plan for transmission system operation and maintenance personnel

Center	Phase	Personnel		
		Engineer	Technician	Total
Mendoza Supervisory Center	1	2	5	7
	2	2	5	7
	3	2	6	8
Mendoza Maintenance Center	1	2	4	6
	2	2	4	6
	3	2	6	8
San Rafael Maintenance Center	1	1	2	3
	2	1	2	3
	3	2	4	6
Total	1	5	11	16
	2	5	11	16
	3	6	16	22

Table III-11-5 shows the number of operation and maintenance personnel required in the transmission department. Since the transmission equipment to be introduced in this plan period uses only digital technologies which are new to most maintenance personnel, they must be well-trained in the required maintenance techniques.

For the equipment to be introduced during this period, two persons will be trained at the factory for each system in each phase. For the mobile telephone system only, training at the factory is to be executed only in phase 3 when the system is to be introduced. For the training to diffuse the new technologies at work sites, those trained at the factory should act as instructors, but supplier's engineers will be dispatched as maintenance assistants to help them.

CHAPTER 12 RATE SYSTEM

12.1 Introduction

This chapter deals with matters that require consideration in determining the rate system for rural telephone and land mobile telephone services which are newly scheduled for introduction.

Since no data was available to examine on rate system and rate level of the conventional telephone service, those two subjects are not discussed in this report.

12.2 Rate Making Principles

Telecommunications service rate is generally determined so as to cover the expenses of service and ordinary operating profit with the income.

First, initial investment cost of equipment necessary for providing services is obtained, and based on the same the sum to be collected as service charges is obtained, which recovers depreciation costs, maintenance costs, operation costs and capital gain.

$$\begin{aligned} \text{Return} &= \text{depreciation costs} \\ &+ \text{maintenance costs} \\ &+ \text{operation costs} \\ &+ \text{capital gain} \end{aligned}$$

Rate shall be determined so that above-mentioned return can be collected with installation charge, basic charge, and call rate.

12.3 Rural Telephone Service

(1) Rate level

Because of the extremely expensive installation cost and maintenance cost per subscriber, and generally smaller traffic except for public telephone service, the rural telephone service would present financial problems if its rate were set up at the same level as conventional telephone service.

Meanwhile, expanding telecommunications services is essential for the development of rural areas, and the introduction and expansion of rural telephone service will be required as governmental policy. In this case, if expenses are all charged to the subscribers of rural telephone service according to the rate making principles as described in the preceding section, it would cause major problems to smooth introduction of rural telephone service. Therefore, special attention must be paid in examining rate system matters.

Generally, the following measures are taken :

- 1) A part of telecommunications service income from urban areas is appropriated to the payment of expenses of rural telephone service in order to lessen the burden on the subscribers of the latter.
- 2) If the above method does not suffice, the government subsidizes the operating entity (if the entity is a private company, corporation tax is reduced, etc.) to lessen its financial burden in helping expand rural telephone service.

(2) Message area

Generally, the rural telephone is accommodated into central offices, however, the rural telephone system covers an extremely wide area. For instance, the coverage of multiple access subscriber radio system reaches as far as 30 to 50km. Therefore, the rate of calls originating or terminating in the rural telephone must be considered in balance with the call rate of telephones inside the cable service area of the same central office that accommodates the rural telephone.

The rural telephone service scheduled for introduction under this development plan will be wholly accommodated in the digital switching system. Therefore, it is technically possible to set up call rates according to the geographical position of individual rural telephone. This idea, however, requires a formidable number of telephone numbers to identify each rate area, and hence is not at all practical. Consequently, considering the equilibrium of call rates between rural telephone and telephones inside the cable service area and the political

viewpoint for the expansion of rural telephone service, it would be realistic to adopt one of the following two methods :

- 1) To divide rural telephone service areas into groups and to charge a uniform call rate within a group.
- 2) To apply the same call rate as the telephones inside the cable service area of the same central office that accommodates the rural telephone.

12.4 Land Mobile Telephone Service

The rate system for the land mobile telephone service may be determined in accordance with the rate making principles as described in Section 12.2. However, in consideration of the future expansion of the coverage, the rate system should be established so that call rates may be charged according to the location of automobiles on call.

CHAPTER 13 MATTERS FOR CONSIDERATION UPON IMPLEMENTATION OF THE DEVELOPMENT PLAN

The main items for consideration in relation to the implementation of this development plan are as follows :

(1) Review of long-term plan

Unlike short-term plans, long-term plans are very likely to meet with changes at their very base, the socioeconomic structure. Also with the development of technology, applicable technology and customers' demand for telecommunications tend to change. Hence, long-term plans should be reviewed at appropriate times.

(2) Relationship with on-going project

As already described, the development plan has been prepared on the premise that there would be no expansion of the telecommunications networks from the time of survey until 1990. If any expansion program is conducted during that period, the development plan will have to be partially amended accordingly.

(3) Expansion and digitalization of interprovincial transmission lines

From the standpoint of maintaining speech quality and economy, expansion and digitalization of the interprovincial transmission lines should be carried out simultaneously with the digitalization of the Mendoza toll exchange. Consultation with organizations concerned would be required on the contents and timing of the expansion and digitalization plan before it is implemented.

Incidentally, the future plan for the existing international microwave route to Chile is a matter of national importance and as such it is not dealt with in the development plan. However, the connection between this plan and the national long-term plan should be studied in the future.

(4) Land mobile telephone service

As already described, forecasted demand for the land mobile telephone during the period of this development plan is extremely small. It is necessary to re-study the demand in the province of Mendoza based on the introduction results in Buenos Aires and other areas in future.

(5) Expansion of data communications service

Data communications service generally diffuses from the capital to the outlying regions. It is therefore necessary for the province of Mendoza to introduce the data communications service in correspondence with its development in Buenos Aires. On the other hand, as previously described, demand trends for this data communications service fluctuate substantially. It is most needed to meet the situation promptly. Specially, digital networks have to be established in line with the digitalization of telephone networks.

PART IV BROADCASTING NETWORK DEVELOPMENT PLAN

CHAPTER 1 POLICIES OF THE DEVELOPMENT PLAN

1.1 Basic Policy

In order to establish the development plan of broadcasting network, it is required to determine the POLICY and PHILOSOPHY (2P) and to make provision for MONEY, MAN and MATERIAL, (3M), with INTELLIGENCE and INFORMATION (2I), in good TIMING (T).

For the end, the plan is required to fullfil the following six factors, 5W and 1H (Why, What, Who, When Where and How) through the process.

Accordingly, in this chapter, explanation is given on the policy and philosophy of broadcasting for the future, based on the present state of broadcasting as in the followings;

- (1) Basic policy on the service of broadcasting programs in the future
- (2) Coordination of the fundamental policies of the Government of Argentina (S. O. C. and COMFER) and development plans
- (3) Policy on the settlement of existing problems
- (4) Future prospect on broadcasting and social tendency

Above items are discussed in the following section.

1.2 Program Plan

As for the future of broadcasting program plan in the province of Mendoza, following policies are taken to formulate the plan..

1) Medium wave broadcasting

In view of the difficulty in changing the MF broadcasting in a large scale, complementary plan is made, and expansion of service in the isolated areas are mainly intended.

2) FM broadcasting

Number of program channels served are expected to four in major cities.

3) Television broadcasting

Number of program channels in major areas is expected to six. The reason is that the increase of total population of the nation is estimated to about 40 millions in 2000's, and the increase of program channels is expected as shown in Fig. IV-1-1 and it is estimated to have the possibility of the establishment of public broadcasting reflecting future economic prosperity in the country.

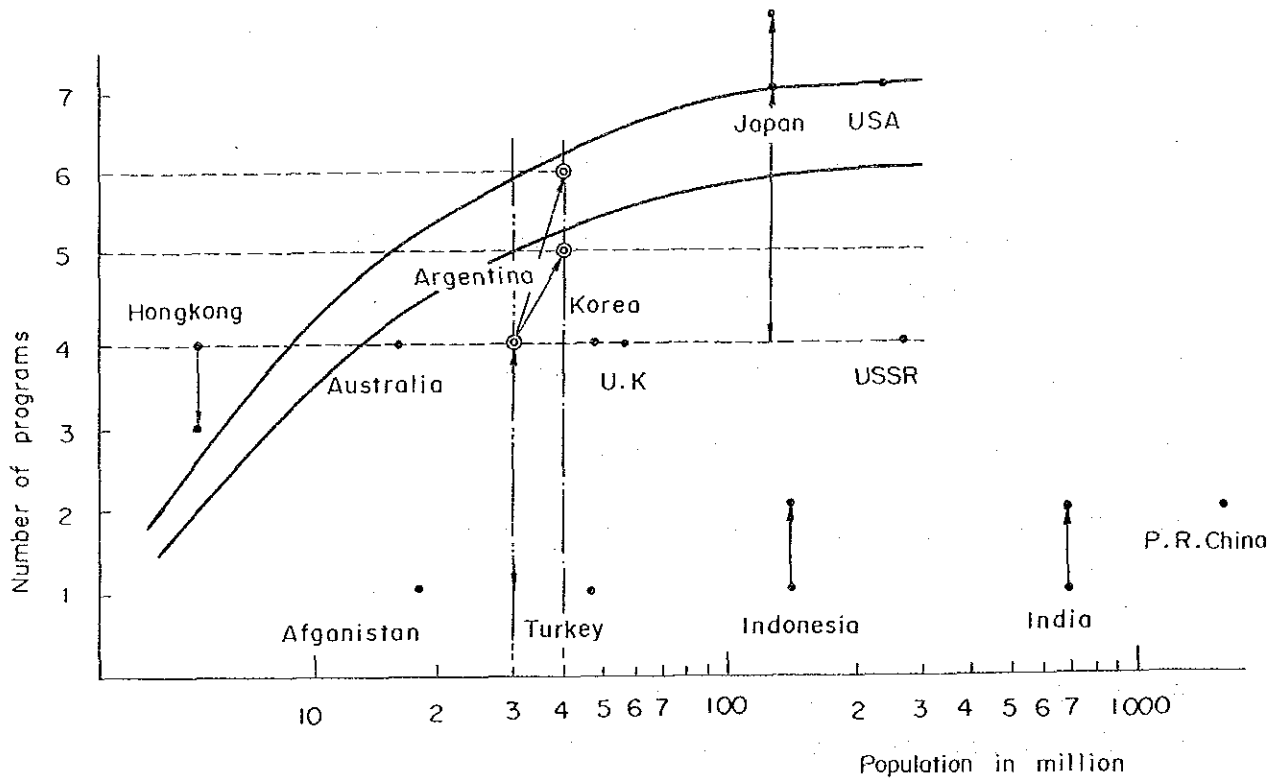


Fig. IV-1-1 Number of TV programs and population

1.3 Basic Policy on the Future of Broadcasting Program Service

In Table IV-1-1, COMFER's future plan for the province of Mendoza is shown. On the other hand, S.O.C. suggested to the study team on the layout of nationwide broadcasting plan and the views of program exchange among the major cities in the country.

As already mentioned, policy on the expansion plan of CH-7 (ATC) network have been declared through the Presidential Notification, it is estimated to come the time to modificate the existing whole plan which was made by COMFER and S.O.C on the allocation of VHF and UHF channels.

Under the background mentioned in above, aiming at the level up of broadcasting in the 2000's, equivalent to that of advanced countries in Europe at present, basic policy of broadcasting is formulated under the following conception.

(1) MF broadcasting

Change of frequency in MF transmitter station is under way following to the IFRB channel plan, however improvement is expected in some areas to modificate transmitting locations to improve the present state of the service and to extend the service in the isolated villages and areas.

(2) FM broadcasting

Expansion of FM broadcasting network which is diffused insufficiently, is planned and it is complementarily used for MF broadcasting beyond its role in some areas.

(3) Television broadcasting

Expansion of national program broadcasting is accelerated in an early stage of the development plan, beside with the mutual extension of commercial activity in Mendoza and San Rafael and the construction/commencement of education/university and public television are intended.

Furthermore, introduction of teletext and bilingual and other new technologies are expected to celebrate the opening of the 21st century.

(4) Program transmission line

Increase and improvement of program transmission lines are planned to enable the upgrading of the program quality of each medium by utilizing the satellite.

(5) Operation and maintenance

Modernization of the operation of broadcasting facilities and the establishment of technical maintenance system are intended to grade up the service.

(6) Staff training

Education and training of employees are aggressively conducted to meet with the modernization and rationalization of business and equipment in the future.

(7) Construction plan

Coordination of annual construction plan is intended and the saving of construction and maintenance cost is taken into consideration, beside with the fostering of domestic electronics industry, and promotion of cooperative construction among all broadcasters is expected.

(8) Finance plan

Cost estimation is made to give the basis of construction plan.

(9) Number of program channel

Number of broadcasting program channels in each area is determined within the financial rationality, and national program service is expanded for the village of more than 100 households as much as possible.

Table IV - 1 - 1 (1/3) Comparison of COMFER, SOC plan and development plan

Place	Medium, Present	COMFER plan, future increase	S.O.C. plan; future increase	Long-term plan, future increase
MENDOZA	TV	2	4	4
	AM	4		
	FM	3	7*	1
	CCTV	1	2	
	CCCA		2	
	ACTV		2	
	CCFM		3	
SAN RAFAEL	TV	1	3	5
	AM	2		1
	FM		2	4
	CCTV	1	3	
	ACTV		3	
	CCFM		3	
NIHUIL	TV	1	2	
	TV	1	3	
	AM	1		
GRL ALVEAR	FM		1	1
	CCTV	1	2	
	ACTV		2	
	CCFM		2	
MALARGUE	TV		1	4
	AM	1		1
	FM		2	2
CO DIAMANTE	TV	3		
CO. HORQUETA	TV	1		4
	FM			3
CO. PAYUN	TV		1	
P.D AGUA etc.	TV			1 or 2
	AM			1
	FM			1
USPALLATA	TV	2	1	2
	AM		1	1
	FM		1	1

Table IV - 1 - 1 (2/3) Comparison of COMFER, SOC plan and development plan

Place	Medium, Present	COMFER plan, future increase	S.O.C. plan, future increase	Long-term plan, future increase
LAS CUEVAS	TV 1 AM FM	2 1 1	2 1	2 or 3 1 1
P.D. INCA	TV FM	1 1	1 1	
P.D. VACAS	TV 1 FM AM		1	3 or 4 1 1
POTRERILLOS	TV FM	3	3	3
UCO (TUPUNGATO)	TV 2 AM FM	1 1 1	1 1	4 1
TUNUYAN	TV FM CCTV CCCA FM	2 1 1 1 1	2 2 1	1
LA PAZ	TV 1 FM AM	2 1 1	2 1	3
SAN MARTIN	AM FM CCTV ACTV	1 1 1 1	1	
JUNIN	FM	1	1	
RIVADAVIA	AM FM	1 1	1	
LAS HERAS	FM CCTV ACTV CCFM	1 1 1 1	1	

Table IV - 1 - 1 (3/3) Comparison of COMFER, SOC plan and development plan

Place	Medium, Present	COMFER plan, future increase	S.O.C. plan, future increase	Long-term plan, future increase
GODOY CRUZ	TV FM CCTV ACTV	1 1 1 1	1	
MAIPU	FM CCTV	1 1	1	
LUJAN DE CUYO	FM CCTV CCCA	1 1 1		
LAVALLE	FM		1	
LUJAN	FM		1	
SANTA ROSA	FM		1	
CACHUETA	TV			2

(10) Introduction of new techniques

New technology is positively introduced and computer and digital technology are introduced to make the improvement of program content and quality, and high fidelity broadcasting is planned for the advance and to establish the basis in the future.

1.4 Coordination of the Government and Development Plans

Concerning the future of nationwide broadcasting in Argentina, both S.O.C. and COMFER are studying definite plan, and in the COMFER's plan, CCTV, CCCA, ACTV and CCFM are included. Three TV channels have been assigned to the major cities and in some peripheral cities such as Maipu, Gody Cruz, Junin etc., assigned each medium as shown in Table IV-1-1 (2/3) and (3/3).

Such are the same for the province of San Luis and San Juan, different from the concept that the broadcasting is given the first priority for the expansion of

media and the complementary limited use of artificial line for CCTV etc., is the second, and it seems to give political attitude to make the marginal opportunity for the activity of enterprises. However, it is not so clear because the above plan is not shown in the time scale, different from the development plan.

On the other hand, as it is determined to expand the nationwide service of CH-7 (ATC) for television broadcasting through the Presidential Notification, increase of only one television channel to the existing service in Mendoza does not meet with the new policy of COMFER.

Accordingly, it might be necessary to clarify the difference and coincidence of COMFER and development plans as in the following paragraph.

1.5 Government and Development Plans

In the development plan, it is expected to serve with four channels (private-3, national-1) in VHF band and two channels (education/university, public) in UHF band in major areas where highly populated cities are placed, and in scarcely populated small villages, service of one or two VHF or UHF TV channels are being expected.

For the purpose, it is necessary to clarify the general characteristics of broadcast program channels. General opinion of the public on the so-called "national program" would be the general broadcasting service which has universality in programming, so it is fitted to any places and is required to distribute the program throughout the country. Generally, rural service is not meet at broadcaster's expense, and the service will become practice at the expense of residents or rural parties, so it should be determined referring to the distribution of households, especially difficulty in program transmission/relay, and demand of residents for public, commercial, education/university broadcasting, etc.

Accordingly, extent of broadcasting service such as how many channels at MF, FM and TV band should be served, have to be determined by the opinion of residents, however it is tentatively considered to serve with one or two TV channels, each one channel for FM and MF, aiming at the minimum service in the isolated areas.

Furthermore, improvement should be made referring to the present state of broadcast equipment and the condition of service, and the expansion of network have to be planned, so the plan is required to coordinate sufficiently with the improvement of present state and the relationships of national broadcasting and so on.

1.5.1 MF

As it is shown in Table IV-1-1, COMFER plan is intending the construction of six stations at Uspallata, Las Cuevas, Tupungato, La Paz, San Martin and Rivadavia, however San Martin and Rivadavia are placed within the service of Mendoza stations, so construction of the two is not included in the development plan. On the other hand, it is planned in the development plan to construct one 25kW station in San Rafael and one 10kW station in Malargue (frequency assigned to Las Cuevas and Uspallata by IFRB is used to these stations respectively) and mini-power transmitters with program receiving equipment and low antenna in height to isolated village which covers several hundred meters in radius to serve simply.

1.5.2 FM

The development plan intends construction of more stations than that of COMFER plan in Mendoza and San Rafael. However, construction in San Martin and the suburbs of Mendoza are not included. And construction of one or two mini-transmitters are considered for more than ten isolated villages.

1.5.3 TV

Expansion and construction of national TV network is given the first priority following to the Presidential Declaration. For the end, construction of main stations at the summit of Co. Arco and Co. Alto (or Co. Negro) in the northern and southern territories respectively, (height of the former two are about 1,700m a.s.l. and Co. Negro 1080m) are expected to serve wide area and the complementary installation of translators is made at the fringe areas to expand the service. And the existing main stations are expected to move to the said

site successively, resulting the abolishment of Gral. Alvear (12ch) and Nihuil (10ch) TV stations.

Furthermore, referring to the difficulty in the maintenance of the stations at Co. Diamante which are serving at VHF band CH-8, CH-11 and CH-13, they are expected to move to Malargue (El Chacay). Concerning the service in the isolated area, multi-hop relay of translator stations are mainly considered, however transmission of program via communication satellite or UHF relay is also considered of which multiplexing of national radio or FM program is expected. Broadcasting of program is made with mini-power transmitter or through CATV. Cooperative construction is considered to use same antenna tower among many stations.

1.5.4 Program transmission line

Terrestrial microwave network and satellite links for use of TV and sound program transmission are constructed according to the construction plan of transmitter stations, together with the construction of VHF-FM program transmission lines (Studio to transmitter link) to send program to the destination.

1.5.5 Local program service

Studio shall be constructed or modified in a small scale to originate and insert local programs such as news, weather forecast, notification of general public matters in the daily program of national broadcasting.

Such kind of TV news exchanging plan among several major cities in the country is under study in S.O.C. and Mendoza is one of the originations selected by them. And the future construction of national broadcasting studio will become necessary, however existing studio at soccer field can be used for a while.

Floor layout of soccer stadium is shown in Fig. IV-1-2.

For the production of simple program, the studio can be used easily with slight modification, although there exists some problems of sound shielding, low ceiling, ventilation etc.

1.5.6 Construction schedule

In order to make reasonable construction plan of broadcasting networks, a tentative schedule is made as shown in Table IV-1-2 for MF, FM and TV.

1.6 Cooperative Construction

In order to save the total construction cost of the development plan, cooperative construction among broadcasters is required. Cost estimation of the development plan is made under the above assumption. Cost saving items by the joint construction are tabulated in Table IV-1-3.

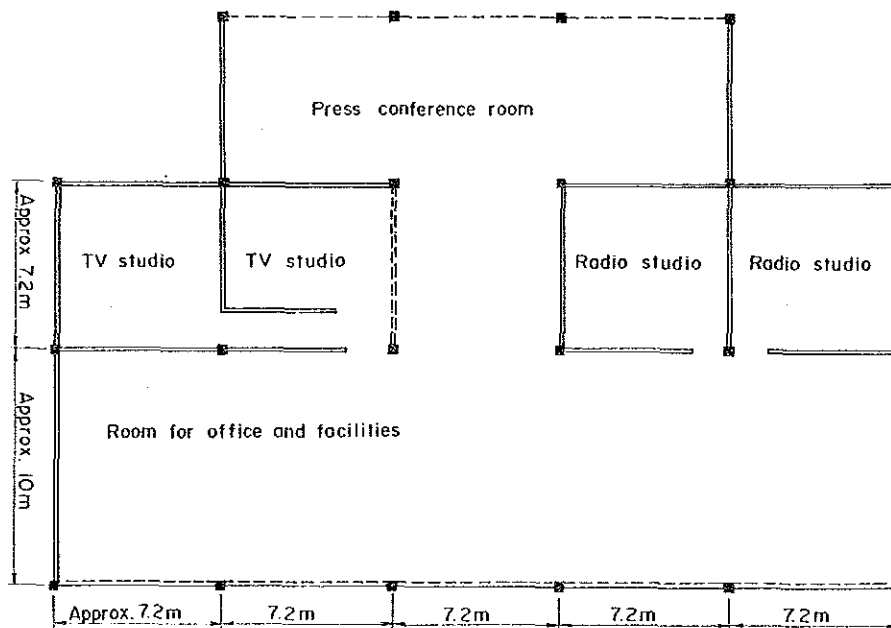


Fig. IV - 1 - 2 Tentative national TV studio at soccer stadium

Table IV - 1 - 2 Expansion plan of broadcasting networks

	88	89	90	91	92	93	94	95	96	97	98	99	00	01	02	03	04	05	Remarks
TV	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	
	Mendoza (N)		Uco		Uspallata		Malarque		Mendoza (E/U)		Teletext	Bilingual		Mini-power stations					
	San Rafael (N)				Malarque		Horqueta		Mendoza (E/U)		Mendoza (P)		San Rafael (P)						
									San Rafael (E/U)										
FM	Mendoza (N)																		
	San Rafael (N)				Malarque		Horqueta												
MF																			
			San Rafael (N)																
																		Mendoza 4 station Replacement	
																		Mini-power stations	
																		Malarque (N)	

Table IV - 1 - 3 Merit of joint construction of stations

Item	Cost saving ratio	remarks
Tower	$(1 + a) / n$	
Site	$(1 + b) / n$	
Access road	$1/n$	
Building	Approx. 20 %	
Power dist. line	$(1 + c) / n$	
Antenna	$(1 + d) / m$	
Engine-gene.	$(1 + e) / p$	
Measuring equip.	$(1 + f) / q$	
Others	$1/n$	
Maintenance Operation		Depend on the way of maintenance, operation
Coverage		Almost same #
Program		Program share is easy

Notes : Coefficient a,b,c,d,e and f will be determined by each broadcasters share.

: Slight difference due to the frequency will be observed, but negligible.

CHAPTER 2 MEDIUM WAVE BROADCASTING

2.1 General

So far the medium wave broadcasting is concerned, present state of the service in the province of Mendoza can be expressed that the formation of network is almost completed except for the scarcely populated areas and the development plan aims at the expansion of the service to complement the unserved areas and to cope with the nighttime reception difficulty.

Presently, the service is covering more than 98% of population and about 63% of the whole area which is regarded somewhat insufficient in some cases, however as the land is widely occupied with desert and mountainous territories, so the service for the car running on the road, isolated villages and the reception difficulty should be taken into account.

Accordingly, following items have been taken into consideration for establishing the development plan.

- 1) Expansion of national medium wave broadcasting
- 2) Slight modification of IFRB plan which is partially considered unreasonable, is asked for changing the location of transmitter stations.
- 3) Distribution of the households in cities and villages and the relationships between population and transmitter power are assumed as shown in Table IV-2-1, and the extension of service in the number of program channels is firstly considered and the special treatment is made for the border territories and other important places exceptionally.
- 4) From the viewpoint of interference free reception, neighbouring channels have to be placed in the long distance as far as possible.
- 5) Mini-power transmitter or cable transmission is considered for the unserved village which has more than 100 households at the least.
- 6) Reception difficulty in the nighttime is covered by the complementary broadcasting in FM.

Table IV - 2 - 1 Tentative service standard for MF broadcasting

Population	More than 500,000	More than 100,000	More than 30,000	More than 10,000	Less than 10,000	Less than 1,000
TX power	25 kW	10 kW	1 kW	250 W	100 W	10 W
Radius of city	15 km	8 km	5 km	2 km	1 km	500 m
Field strength	70 dB	70 dB	65 dB	60 dB	60 dB	50 dB
Number of program	4	4~3	3	3~2	2	2~1

As for the service grade of broadcasting in the isolated area, it must be taken into account the expenditure per household and the difficulty of program transmission same as of TV and FM.

In major cities, three or four programs have been casting, i.e national, provincial/municipal and private broadcasting. Referring to the difficulty in economy in future and social development in the isolated areas, the service might be limited to national and provincial/municipal broadcasting for a while. Estimated reasonable number of the program service at present is shown in Table IV - 2 - 1.

2.2 Construction Plan

Following construction is made, under the schedule shown in Table IV - 2 - 2.

- 1) 10kW transmitter (Libertador) is replaced with new 25kW transmitter.
- 2) National broadcasting in San Rafael is expected to start by asking IFRB for the change of transmitter location which is allocated to Las Cuevas (25kW/1200kHz) at present.
- 3) Same procedure is taken for the construction of Malargue 10kW broadcasting station allocated to Uspallata (10kW/1390kHz) by IFRB.
- 4) Construction of small power station (50W) is planned in Las Cuevas.
- 5) Radio San Rafael, LV4 is expected to change its frequency (25kW/1170kHz to 25kW/620kHz) and the equipment is renewed.

- 6) Construction of mini-power station is planned in isolated areas.
- 7) Antiquated transmitter at Tunuyan (0.25kW/1520kHz) is replaced with new transmitter (1kW/1320kHz).
- 8) Existing old transmitters in Mendoza are replaced with latest ones in the last stage of development plan.

2.2.1 Transmitter

In view of the difficulty in obtaining the spare parts and others, transmitter shall be of the fully semiconductorized ones equipped with arresting devices. High power station is provided with power reduction device.

2.2.2 Antenna

Improvement of feeding system for existing antenna mast is conducted for high power stations in major cities. Dual feeding is considered for Malargue stations, if possible.

2.2.3 Program transmission

VHF 225 MHz band is used for studio to transmitter link.

Program transmission to the isolated area is made via satellite, or FM relay and/or reception of upstream station. Multiplexed radio program on TV signal is sent from Buenos Aires via satellite as shown in Fig. IV-2-1.

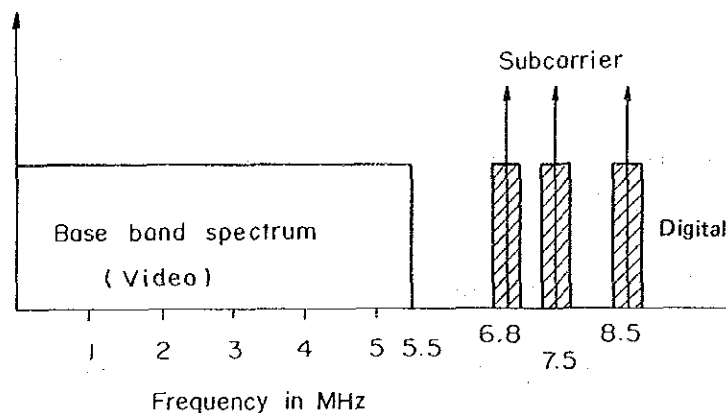


Fig. IV - 2 - 1 Baseband frequency spectrum
(Intelsat - V)

Table IV - 2 - 2 Construction plan of MF station (incl. renewal)

	90	91	92	93	94	95	96	97	98	99	00	01	02	03	04	05
Mendoza												↔ Renewal				
San Rafael (N)					↔ Construction											
San Rafael (M)		↔ Renewal														
Malargue (N)			↔ Construction													
Libertador			↔ Power increase													
Tunuyan									↔ Modificatory							
Las Cuevas									↔ Construction							
Valle Hermoso							↔ Construction									
Punta de Agua									↔ Construction							
Agua Escondida													↔ Construction			
Ranquil Norte														↔ Construction (FM/R)		

2.3 Frequency Allocation Plan

Present frequency allocation plan shall be modified with the new ones indicated in Table IV-2-3. And the agreement of IFRB have to be asked for the change of transmitter location.

Frequency assigned to Malargue is recommended to change from 790kHz to 890kHz to avoid neighbouring channel interference caused between 790kHz and 780kHz. In the west-southern part of the province, Bardas Blancas, Buta Billion and its southern territory are served with FM station at Horqueta, because of the poor propagation from Malargue station.

2.4 Service Area

Expected service area of main station in the daytime and nighttime in San Rafael and Malargue are shown in Fig. IV-2-2 with real and chain lines respectively.

In Fig IV-2-3, MF field strength measured in the city of San Rafael and Malargue in the nighttime is shown.

2.5 Service Standard

Referring to the sensitivity of average receiver shown in Table IV-2-4, field intensity of MF broadcasting in the countryside shall be specified to 50 dB which is lower than that of CCIR. Sound quality of radiated signal will be greatly improved by the completion of digital transmission lines between Mendoza and San Rafael and Malargue, and the introduction of new equipment in studio and transmitter station. Present norms are applied as engineering standard.

Table IV - 2 - 3 Frequency allocation plan (MF)

Place	Call sign	Frequency	Power	Present	Final plan	Class	Remarks
Grl. Alvear	IV 23	800 kHz	5/1	1/0.5		Pr	
Las Cuevas		1200	25/1		move to San Rafael.	N	
Malargue	IV 19	890	25/1.5	1120, 5kW	change	Pub (SIF)	Recommended to change to 890 kHz, ask for CCLIR.
		1390	10/1.5	-----		N	
Mendoza	IV 6	680	25/5		no change	P	
	IV 10	720	25/5		no change	P	
	IV 8	780	25/5	10/5	25/5 increase	Pub (SIF)	
	IRA 6	960	25/5		no change	N	
Rivadavia		1550	1/0.25		to Las Cuevas		
San Martin		1430	5/0.5		to Uspallata		
San Rafael	IV 4	620	25/1	1170 25/5	620 25/5	Pub (SIF)	
	IV 18	830	5/1	1370 0.25		MU.	
		1200	25/1		from Las Cuevas	N	
Tunuyan	IV 24	1320	5/1	1520 0.25	Power increase	P	
Tupungato		1470	10/1			P/N	
Uspallata		1390	10/1.5	1430 1 kW	from San Martin	N	Power decrease
Los Mollos							Interference free frequency is used
Agua Escondida							Satellite reception is applied to some places
Ranquil Norte							
Punta de Agua							

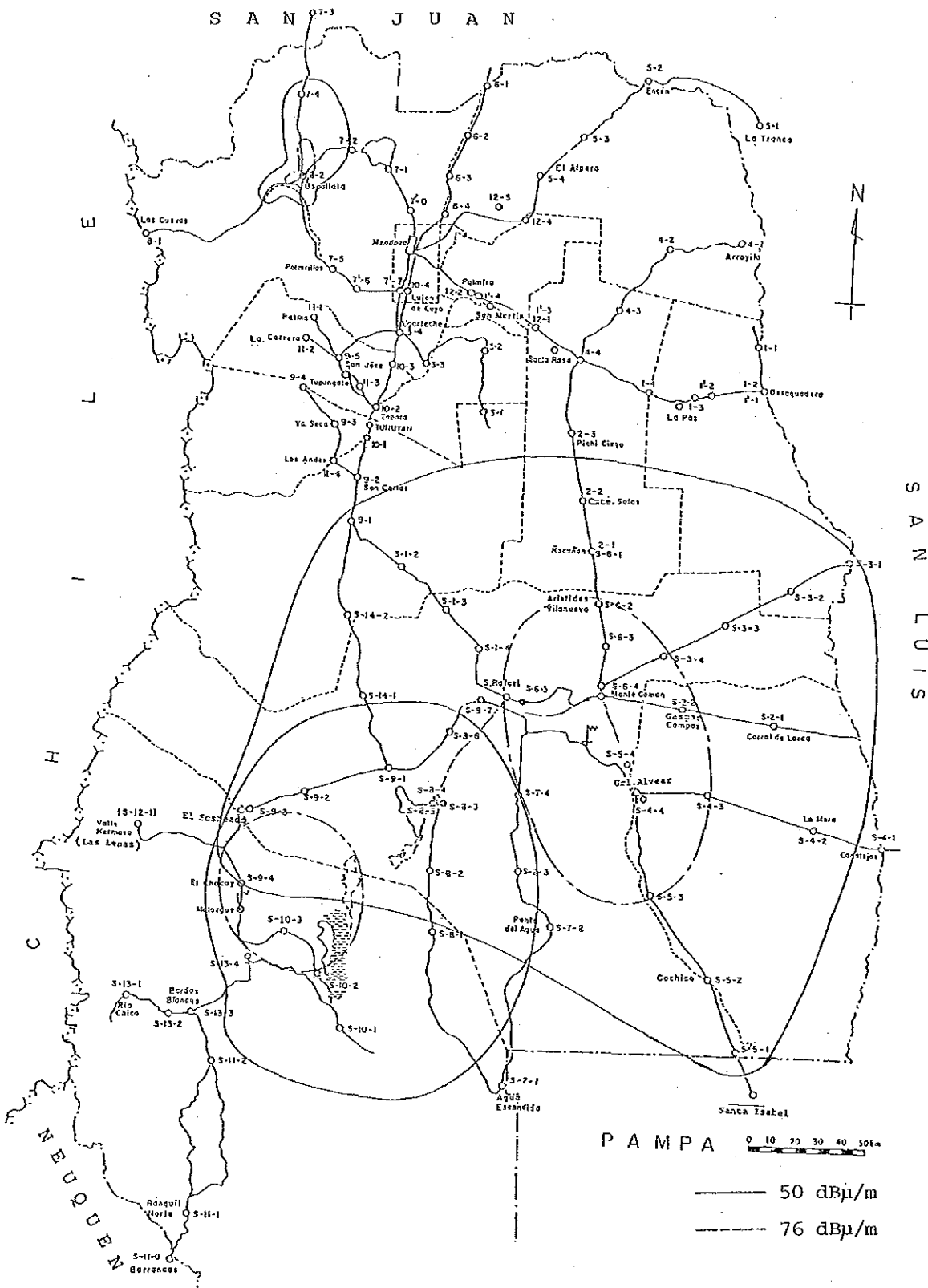
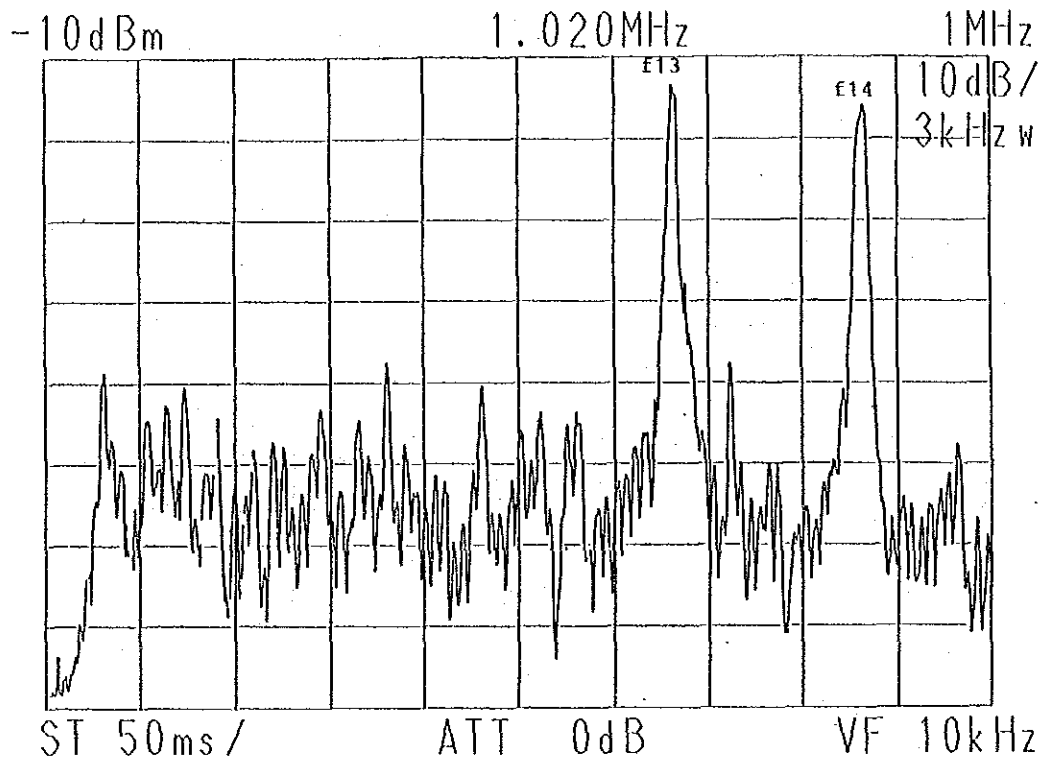
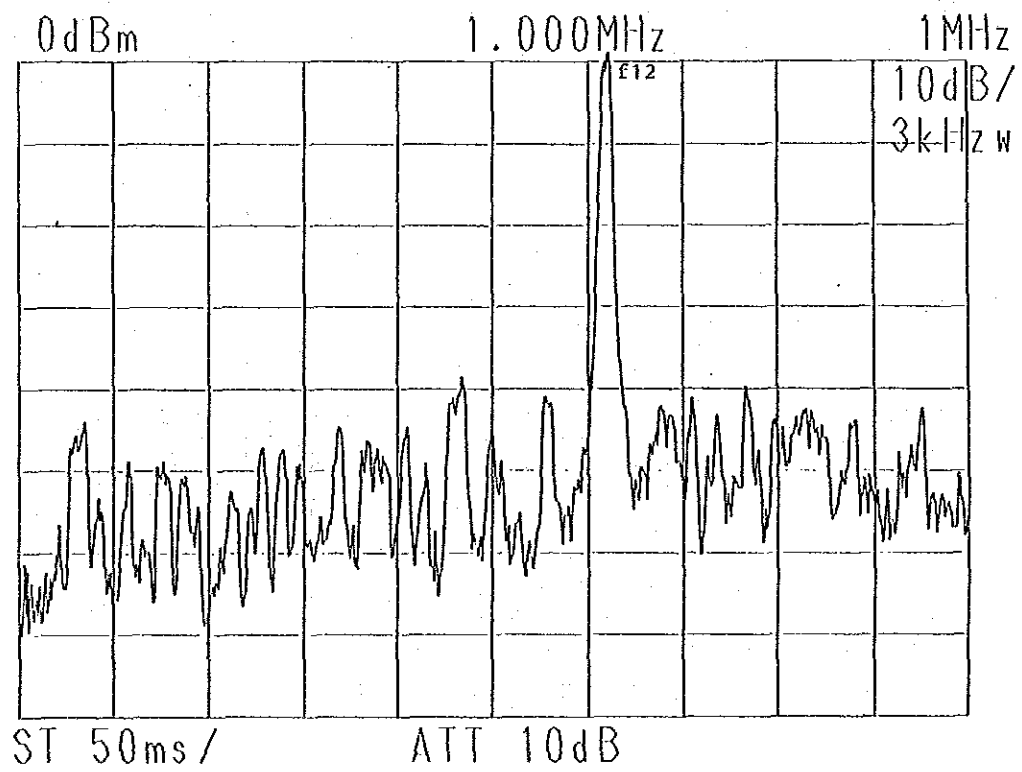


Fig. IV - 2 - 2 Expected service area of main new MF station



Received in San Rafael city



Received in Malargue city

Fig. IV-2-3 Nighttime MF field strength

Table VI - 2 - 4 Average receiver performance

Radio receiver

Item	Performance
1. Noise limiting sensitivity	less than 46 dB ($\mu\text{V/m}$)
2. Output (Max.)	more than 1 watt
3. Selectivity (± 10 kHz)	more than 25 dB
4. Freq. ampl. response (100 kHz) (4 kHz)	within -6 dB within -14 dB
5. Distortion (50 to 100dB $\mu\text{V/m}$)	less than 2.5 %
6. Image interference ratio (1400 kHz)	better than 20 dB
7. Intermediate freq. interference ratio ratio (600kHz)	better than 20 dB
8. AVC response	more than 40 dB

FM receiver

ITEM	Performance
1. Intermediate frequency	10.7 MHz
2. Noise limiting sensitivity(S/N=30 dB)	lower/than 18 dB μ
3. Maximum sensitivity	lower than 14 dB μ
4. Two signal Spurious response Objective value	better than -30 dB better than -50 dB
5. Two signal selectivity (± 200 kHz) (± 400 kHz)	better than -14 dB better than -34 dB
6. Local oscillator frequency	Heterodyne, lower
7. Drift of local frequency	within 10 kHz
8. Separation (100 kz to 10 kHz)	better than 20 dB
9. Spurious radiation(at distance of 30 m)	less than 34 dB μ
10. Amplitude response(50 Hz to 15 kHz)	within ± 2 dB
11. Distortion (50 mW output)	less than 2 %
12. Intermodulation interference (40 Hz to 10 kHz)	less than -30 dB
13. Level difference between L and R (100 Hz to 10 kHz)	within 1.5 dB

CHAPTER 3 FM BROADCASTING

3.1 Construction Plan

Construction plan for FM broadcasting is shown in Table IV-3-1. Main items of the plan are as follows;

- 1) Four FM channels are assigned both in Mendoza and San Rafael, and the location of these stations are expected at Co. Arco and Co. Alto (or Co. Negro) respectively. All transmitter stations are constructed in the same premises with TV transmitter stations to ensure the wide service area at least expense.
- 2) Uspallata and Las Cuevas are served with tandem relay of translator stations via Paramillos relay station.
- 3) For improving the stereophonic reception in Malargue, translator station is also constructed at El Chacay to serve Malargue and relay to Valle Hermoso.
- 4) FM station at Horqueta covers the south-western part of the province where coverage of MF is insufficient even after the construction of 10kW national MF station in Malargue.
- 5) Mini-power stations are built at Punta de Agua, Agua Escondida, Agua del Toro, Ranquil Norte, Valle Hermoso and so on, to serve isolated areas. Considering the future expandability for introducing the new service such as facsimile, Quad, SCA etc., studio modulation is adopted for all main stations in Mendoza and San Rafael.

3.2 Frequency Allocation Plan

In order to assign the reasonable frequency for each station, following policy is applied beside with the relationships among television frequency allocation plan, and the slight modification of present FM frequency allocation plan is made for obtaining satisfactory result.

Table IV - 3 - 1 Construction of FM broadcasting station

NO	Station	National	FM-1	FM-2	FM-3
1	Mendoza	1 kW	1 kW	1 kW	1 kW
2	San Rafael	1 kW	1 kW	1 kW	1 kW
3	Uco	10 W	10 W	10 W	10 W
4	Uspallata	10 W	10 W	10 W	10 W
5	Malargue	10 W	10 W	10 W	10 W
6	La Paz	10 W	10 W	10 W	10 W
7	Horqueta	20 W	20 W	20 W	20 W
8	P.l.Horqueta	CATV	CATV	CATV	CATV
9	Media Luna	"	"	"	"
10	Canalejas	"	"	"	"
11	Cochico	"	"	"	"
12	P.d.Agua	1 W	1 W	1 W	1 W
13	Agua Escondida	1 W	1 W	1 W	1 W
14	Agua del Toro	1 W	1 W	1 W	1 W
15	Ranquil Norte	3 W	3 W	3 W	3 W
16	Rio Chico	1 W	1 W	1 W	1 W
17	Valle Hermoso	1 W	1 W	1 W	1 W
18	Hotel Termas	CATV	CATV	CATV	CATV
19	Las Ouevas	3 W	3 W	3 W	3 W
20	Punta de Vacas	3 W	3 W	3 W	3 W
21	Paramillos	5 W	5 W	5 W	5 W
22	Las Sauces	CATV	CATV	CATV	CATV
23	Arrojito	CATV	CATV	CATV	CATV
24	Desaguaderos	CATV	CATV	CATV	CATV
25	La More	CATV	CATV	CATV	CATV
26	Potrerrillos	1 W	1 W	1 W	1 W
27	Cachueta	1 W	1 W	1 W	1 W
28	Co de Ureta	5 W	5 W	5 W	5 W

3.2.1 Number of programs and frequency for FM broadcasting

Frequency band assigned to FM broadcasting is shown in Table IV-3-2. In order to make maximum use of the frequencies within the bandwidth of 20.2MHz (87.8 to 108 MHz), it is required to allocate the frequency separation of each channel with interval of 200kHz and the bandwidth necessary for transparent transmission of signal would require the bandwidth of 200kHz. All of the main transmitter stations for television and FM are expected to construct within the same premises and there are some possibility in producing mutual beat interference which falls into the pass band of conventional FM and TV receivers.

In order to avoid the possibility of beat interference with given television frequencies and FM frequencies, frequency separation of about 1.6MHz is preferred to locate stations within the same site as shown in Table. IV-3-3.

Table IV-3-2 Frequency channel for FM broadcasting

ch	f (MHz)	ch	f (MHz)	ch	f (MHz)	ch	f (MHz)	ch	f (MHz)	ch	f (MHz)	ch	f (MHz)
1	— *	16	90.9	31	93.9	46	96.9	61	99.9	76	102.9	91	105.9
2	— *	17	91.1	32	94.1	47	97.1	62	100.1	77	103.1	92	106.1
3	— *	18	91.3	33	94.3	48	97.3	63	100.3	78	103.3	93	106.3
4	— *	19	91.5	34	94.5	49	97.5	64	100.5	79	103.5	94	106.5
5	88.7	20	91.7	35	94.7	50	97.7	65	100.7	80	103.7	95	106.7
6	88.9	21	91.9	36	94.9	51	97.9	66	100.9	81	103.9	96	106.9
7	89.1	22	92.1	37	95.1	52	98.1	67	101.0	82	104.1	97	107.1
8	89.3	23	92.3	38	95.3	53	98.3	68	101.3	83	104.3	98	107.3
9	89.5	24	92.5	39	95.5	54	98.5	69	101.5	84	104.5	99	107.5
10	89.7	25	92.7	40	95.7	55	98.7	70	101.7	85	104.7	100	107.7
11	89.9	26	92.9	41	95.9	56	98.9	71	101.9	86	104.9	101	107.9
12	90.1	27	93.1	42	96.1	57	99.1	72	102.1	87	105.1	* For aviation use	
13	90.3	28	93.3	43	96.3	58	99.3	73	102.3	88	105.3		
14	90.5	29	93.5	44	96.5	59	99.5	74	102.5	89	105.5		
15	90.7	30	93.7	45	96.7	60	99.7	75	102.7	90	105.7		

3.2.2 Frequency separation among jointly constructed stations

It has been confirmed that the mutual interferences among many signals, each lower than 90 dB at the input terminal of receiver does not cause serious interference on to the conventional FM receiver, if each frequency separation is more than 800kHz. However as there are variety in the performance of nonlinearity which produce mutual modulation, frequency of each station have to be separated than the above value.

3.2.3 Inhibited FM band to avoid interference to television Band III.

In order to avoid interference of second harmonics of FM which falls into the television broadcasting in band III, there are some limitations in selecting FM channel. However, it does not so seriously deteriorate the picture practically because average receiver provides excellent selectivity and the harmonics generated within the receiver becomes very low if the input level of receiver is set within a reasonable level.

Table IV - 3 - 3 Frequency assignment for FM broadcasting

	FM-1	FM-2	FM-3	FM-4	FM/R
Mendoza	91.9	93.5	95.3	96.9	
San Rafael	97.7	99.3	100.1	102.7	
Malargue	88.7	90.3	92.3	94.5	96.1
Uco	101.9	103.7	105.5	107.1	
Uspallata	102.3	104.1	105.9	107.5	
Horqueta	94.9	96.7	98.3	100.1	101.7
Paramillos	95.5	89.1	90.5	91.5	93.1
Punta de Vacas	97.5	89.7	92.5	100.7	103.5
Las Cuevas	101.5	103.5	104.7	94.1	
La Paz	102.9	104.5	106.3	107.9	
Gral Alvear	98.7 *	100.9 *			
Ranquil Norte	89.5	91.7 *			
Punta de Agua	92.1	90.1 *			
Agua del Toro	91.7	89.9 *			
Agua Escondida	88.9	90.7 *			
Co. Chinchos	89.3	90.9 *			

Notes 1) FM/R means the radio program relay.

2) Frequency assigned with asterisk is not constructed during the development plan

3.2.4 Polarization

In some countries, various kinds of polarization are being used, such as circular, mixed and so on, however horizontal polarization is considered.

3.2.5 Protection ratio for the latent field strength

Broadcasting study team conducted the measurement of the fields strength of FM signals throughout the province and confirmed that the latent field strength of incoming signal from outside of the province is almost rare and negligible.

3.2.6 Interference of FM signal to the existing television channels

In case FM transmitter is installed within television transmitter station, interference onto existing television channel have to be confirmed. Cross modulation, intermodulation and image interference into the off air relay receiver or conventional home use receiver have to be confirmed beforehand. Some of them could be suppressed with r.f. filter and bandpass filter. Interference is estimated referring to the relationships of each frequency and higher harmonics of FM carrier frequency.

3.2.7 Assigned frequency

Apart from the existing frequency allocation plan, study has been conducted on the mutual relationships of carrier frequency radiated from each station to confirm on the possibility of causing beat interference, onto the conventional television receiver and/or off air relay receiver. 4 FM channels have been assigned to Mendoza and San Rafael so as not to give any interference to television and FM channels. In Table IV-3-3, frequency allocation plan of FM broadcasting in the province of Mendoza is shown. Results of the study which is used for the assignment of FM frequency is annexed in the separated reference material.

3.3 Technical Standards

Number of frequency channels in each area is expected maximally to four referring to the present state of FM broadcasting in Mendoza city. Frequency separation of each station in the same place is specified to about 1.6MHz although present separation is about 3.2MHz, considering the constitution of FM transmitter facilities and FM network. Present norms are applied as engineering standard.

3.3.1 Field Strength

Same as in the case of medium wave broadcasting, field strength of FM broadcasting specified to serve audience by CCIR (Rec. 412-3) is higher than the practice and the objective value to serve reasonably in the scarcely populated area is also reported in CCIR.

A tentative objective value for making reasonable service in the province of Mendoza is shown in Fig. IV-3-1 to meet with the population distribution in the countryside.

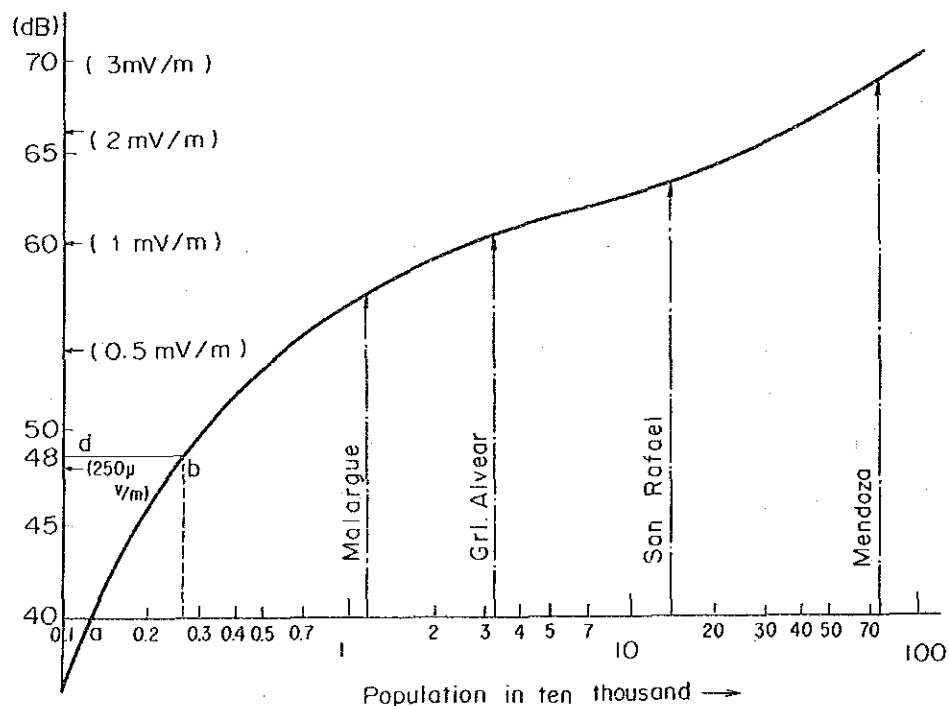


Fig. IV-3-1 Necessary field strength for FM reception

3.3.2 Performance of FM receiver

In Table IV-2-4, standard performance of FM receiver is shown. From the noise limiting sensitivity and noise vs input signal level performance shown in Fig. IV-3-2, it can be agreed to lower the field strength than that of CCIR standards, although there is a problem in the reception of stereophonic broadcasting with enough signal to noise ratio.

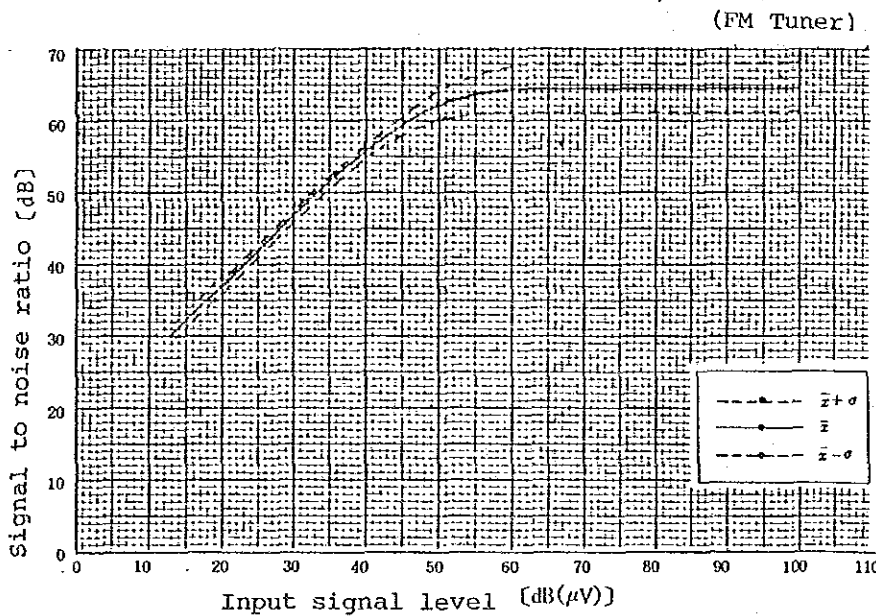


Fig. IV-3-2 Noise limiting sensitivity of average FM receiver

3.3.3 Sound quality.

Argentine standards and norms are applied to the radiated signal to ensure the high fidelity sound transmission through the tandem connection of translator stations as shown in Fig. IV-3-3. and Fig. IV-3-4.

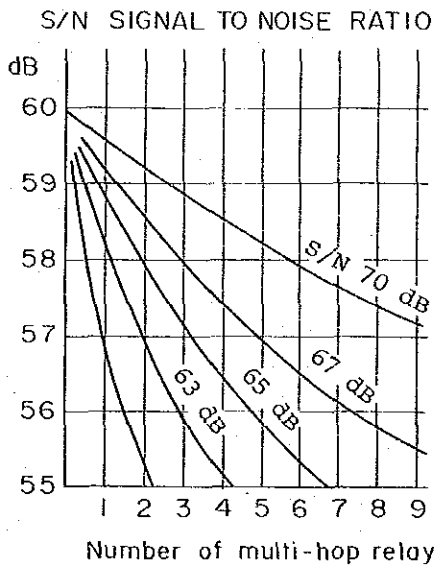
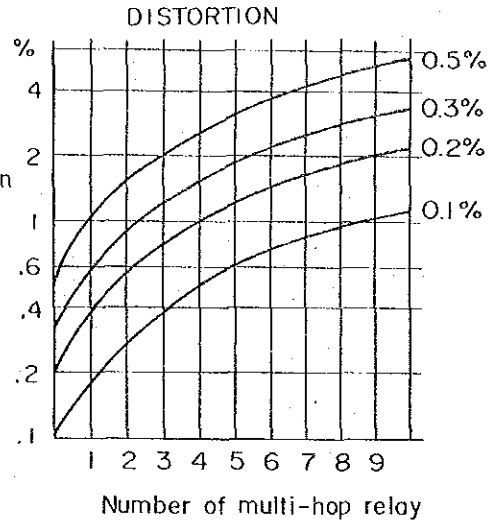
3.3.4 Protection ratio

Minimum separation distance between co-channel FM stations to ensure sufficient protection ratio shall be at least more than the value indicated in Table IV-3-4.

3.4 Expected Service Area

Expected service area of the new main FM stations is shown in Fig. IV-3-5. Population coverage is expected to become more than 98% (above 36 dB/10m) in the province and the above value can be obtained along the main trunk roads to serve the car running on the road.

Degradation of distortion by multi-hop relay



Degradation of S/N by multi-hop relay

Degradation of separation by multi-hop relay

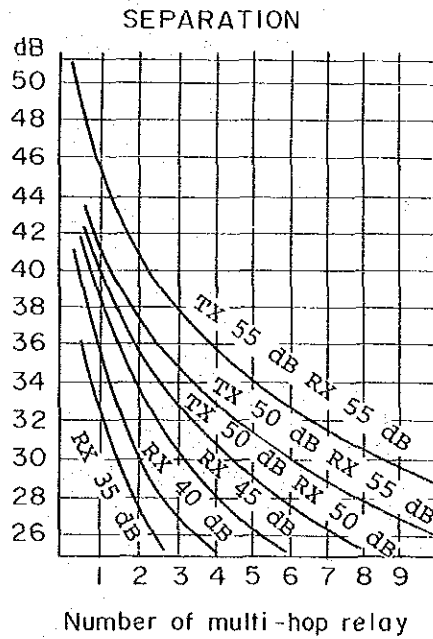


Fig. IV-3-3 Deterioration of sound quality

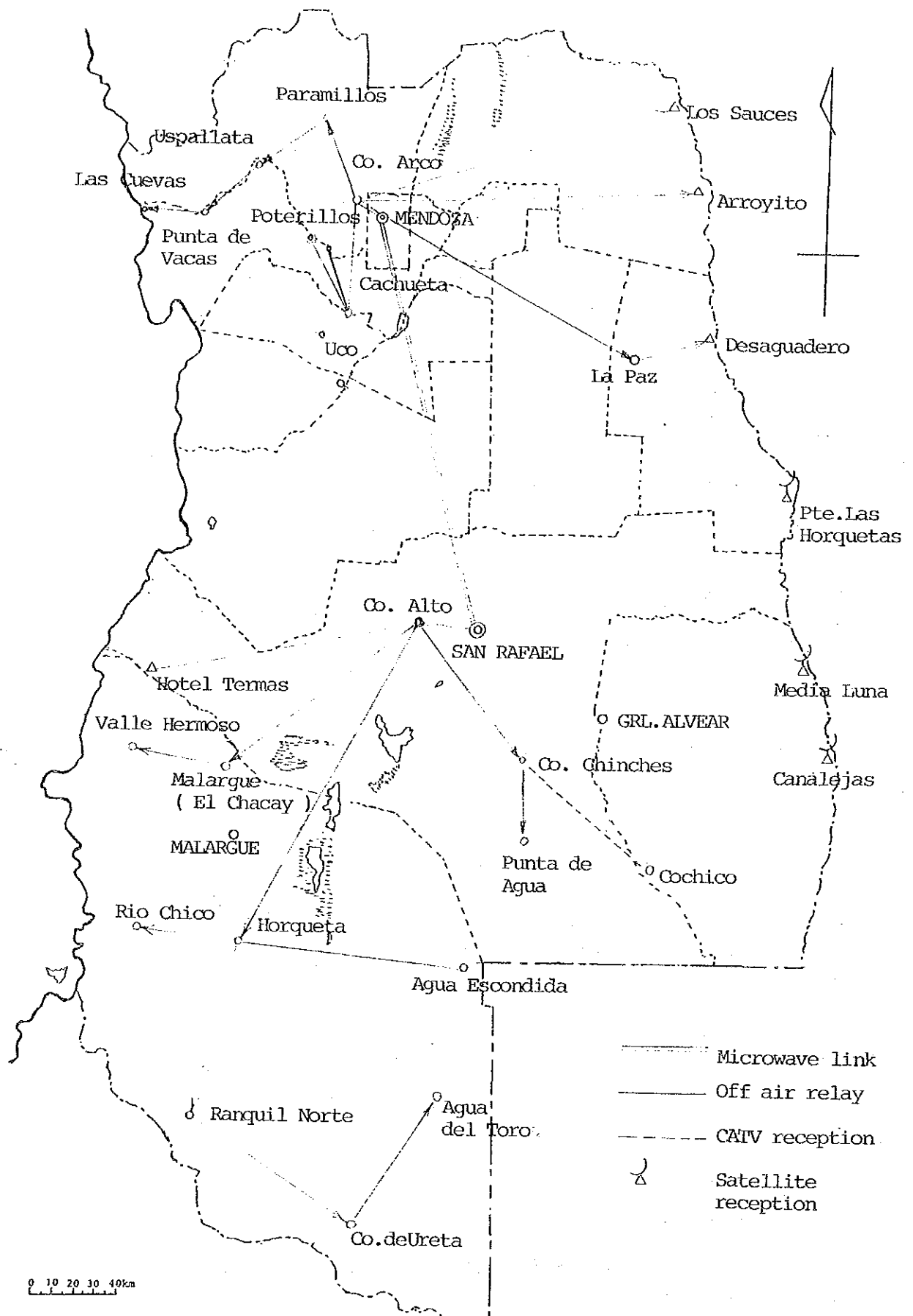


Fig. IV - 3 - 4 TV & FM broadcast network

Table IV - 3 - 4 Minimum separation distance (km)
between co-channel FM stations

Inter-fering Station \ Own Station	10 kW	5 kW	1 kW	0.5 kW	0.3 kW	0.1 kW
10 kW	345					
5 kW	325	320				
1 kW	280	275	260			
0.5 kW	265	260	235	235		
0.3 kW	250	245	220	220	215	
0.1 kW	230	225	225	200	195	190

Note : 1. $H = 300$ m, $K = 4/3$
 2. PROTECTION 54 dB
 (CCIR REC. 412-2)

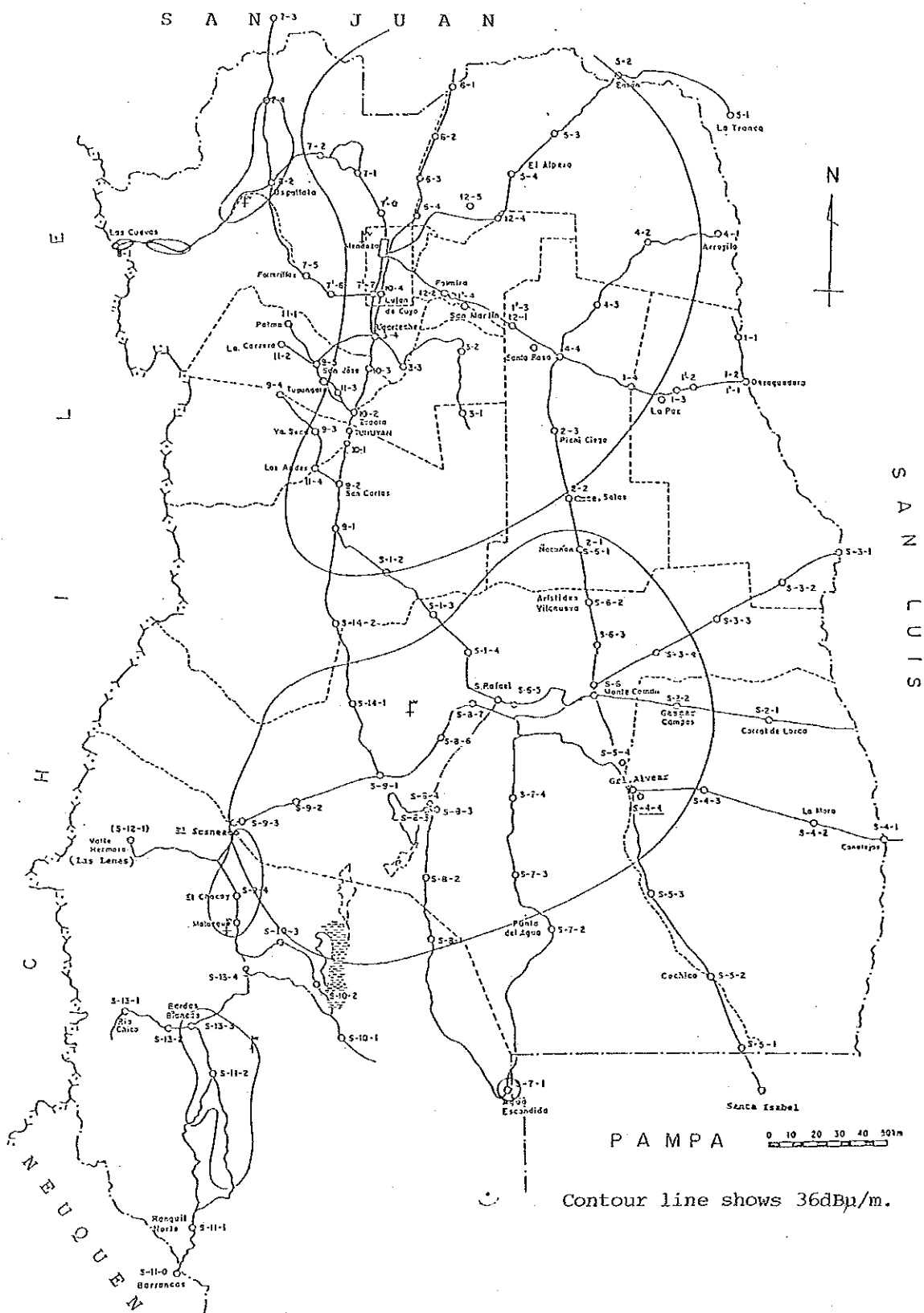


Fig IV - 3 - 5 Expected service area of main new FM station

CHAPTER 4 TELEVISION BROADCASTING

4.1 Construction Plan

Television broadcasting in the province of Mendoza is now under development and the extension of broadcasting network is widely required to serve scarcely populated and isolated areas. The plan aiming at the effective service of transmitter stations is made not only in the major cities but also in the countryside with the variety of programs at the least expenses.

Construction is expected under the following intension and the schedule and sites are shown in Table IV-4-1 and Table IV-4-2 respectively.

- 1) Main stations in Mendoza and San Rafael are expected to construct at Co. Arco and Co. Alto (or Co. Negro) respectively, to cover wide area and cooperative construction of each station is expected to save the total construction and maintenance cost.
- 2) Service is extended to Uspallata and Las Cuevas via Paramillos through off air relay.
- 3) Translator stations are constructed in Malargue, La Paz, Horqueta etc., and the channel 12 at La Paz is expected to change to UHF, considering the possibility of interference of channel 12 coming from San Rafael.
- 4) Mini-power stations are constructed in the isolated areas and off air relay or satellite reception of program is also introduced.
- 5) In order to cope with the future installation for new service such as teletext, multiplexed sound (bilingual and stereo) etc., carrier signal is modulated in the main station only.

4.2 Frequency Allocation Plan

Television channel at VHF and UHF band in Argentina are shown in Table IV-4-3.

Table IV - 4 - 1 Expansion plan of television broadcasting network

	88	89	90	91	92	93	94	95	96	97	98	99	2000	01	02	03	04	05
M E N D O Z A	National	□○△			Uco		Uspallata	Punta de Vacas			Teletext		Bilingual					
	CH-7	△									"		"					
	CH-8	△									"		"					
S A N R A F A E L	CH-8	○△					Uco	Uspallata										
	CH-7				□△					□○△			Uco					
	CH-9			□△			Valle Hermoso	Ranquil Norte				#1-#18						
P	National			□△		⑥	Malargue (7) ⑩ ⑪ ⑫ ⑬	Horquetas			Teletext		Bilingual					
	CH-7																	
	CH-9	○△						Horquetas										
P	CH-6	○△						Horquetas										
	CH-6					□△												
	P										○△							

□ R.O. Stn. ○ Studio △ Tx. Stn.

Table IV-4-2 Construction of television transmitter station

Station	National	CH-7	CH-9	CH-6	E/U	Public
Mendoza	5 kW	5 kW	5 kW	5 kW	10 kW	10 kW
San Rafael	5 kW	5 kW	5 kW	5 kW	10 kW	10 kW
Uco	50 W	Existing	Existing	50 W	200 W	200 W
Uspallata	50 W	Existing	Existing	50 W		
Malargue	50 W	50 W	50 W	50 W		
La Paz	50 W	Existing	50 W	50 W		
Horqueta	50 W	50 W	Existing	50 W		
Pte l.Horquetas	CATV	CATV	CATV	CATV		
Media Luna	CATV	CATV	CATV	CATV		
Canalejas	CATV	CATV	CATV	CATV		
Cochico	1 W	1 W	1 W	1 W		
Punta de Agua	5 W	5 W	5 W	5 W		
Agua Escondida	1 W	1 W	1 W	1 W		
Agua del Toro	1 W					
Ranquil Norte	10 W	10 W	10 W	10 W		
Rio Chico						
Valle Hermoso	5 W	5 W	5 W	5 W		
Hotel Termas	CATV	CATV	CATV	CATV		
Las Cuevas	5 W	Existing	5 W	5 W		
Punta d.Vacas	10 W	Existing	10 W	10 W		
Paramillos	10 W			10 W		
Las Sauces	CATV	CATV	CATV	CATV		
Arrojito	CATV	CATV	CATV	CATV		
Desaguaseros	CATV	CATV	CATV	CATV		
La More	CATV	CATV	CATV	CATV		
Potrerillos	3 W					
Cachueta	1 W					
Co.Chinches	5 W					

Table IV - 4 - 3 (1/2) VHF channels:Argentina

BAND I		BAND III	
ch	MHz	ch	MHz
A-2	55.25/59.75	A-7	175.25/179.75
A-3	61.25/65.75	A-8	181.25/185.75
A-4	67.25/71.75	A-9	187.25/191.75
A-5	77.25/81.75	A-10	193.25/197.75
A-6	83.25/87.75	A-11	199.25/203.75
		A-12	205.25/209.75
		A-13	211.25/215.75

Table IV - 4 - 3 (2/2) UHF channels:Argentina

ch	MHz	ch	MHz	ch	MHz
A-14	471.25/475.75	*1 A-38	615.25/619.75	A-62	759.25/763.75
A-15	47.25/481.75	A-39	621.25/625.75	A-63	765.25/769.75
A-16	483.25/487.75	A-40	627.25/631.75	A-64	771.25/775.75
A-17	489.25/493.75	A-41	633.25/637.75	A-65	777.25/781.75
A-18	495.25/499.75	A-42	639.25/643.75	A-66	783.25/787.75
A-19	501.25/505.75	A-43	645.25/649.75	A-67	789.25/793.75
A-20	507.25/511.75	A-44	651.25/655.75	A-68	795.25/799.75
A-21	513.25/517.75	A-45	657.25/661.75	A-69	801.25/805.75
A-22	519.25/523.75	A-46	663.25/667.75	A-70	807.25/811.75
A-23	525.25/529.75	A-47	669.25/673.75	A-71	813.25/817.75
A-24	531.25/535.75	A-48	675.25/679.75	A-72	819.25/823.75
A-25	537.25/541.75	A-49	681.25/685.75	A-73	825.25/829.75
A-26	543.25/547.75	A-50	687.25/691.75	A-74	831.25/835.75
A-27	549.25/553.75	A-51	693.25/697.75	A-75	837.25/841.75
A-28	555.25/559.75	A-52	699.25/703.75	A-76	843.25/847.75
A-29	561.25/565.75	A-53	705.25/709.75	A-77	849.25/853.75
A-30	567.25/571.75	A-54	711.25/715.75	A-78	855.25/859.75
A-31	573.25/577.75	A-55	717.25/721.75	A-79	861.25/865.75
A-32	579.25/583.75	A-56	723.25/727.75	A-80	867.25/871.75
A-33	585.25/589.75	A-57	729.25/733.75	A-81	873.25/877.75
A-34	591.25/595.75	A-58	735.25/739.75	A-82	879.25/883.75
A-35	597.25/601.75	A-59	741.25/745.75	A-83	885.25/889.75
A-36	603.25/607.75	A-60	747.25/751.75		
A-37	609.25/613.75	A-61	753.25/757.75		

*1 For mobile telephone use

*2 For mobile communication use in some provinces.

From 826 to 848 MHz and 868 to 890 MHz at UHF band is assigned for mobile communication in some provinces. As for the nationwide frequency allocation plan which was shown to the study team, it seems that they are assigned from time to time regardless of the future program channel plan.

Accordingly in the report, relationships among peripheral existing stations in the neighbouring provinces are mostly taken into consideration for establishing the VHF television channel allocation plan referring to the incoming signal strength from neighbouring provinces measured. In the northern and eastern border of the province, some incoming signals have been perceived. Furthermore, as the number of program channels in major cities is not politically determined, assumption is made that the VHF channel is used for national (Buenos Aires, CH-7/ATC) and three private broadcasting, beside with the use of UHF band for public and education/university broadcasting, following the policy of the Government. (COMFER)

Modification of the existing channel plan in the province of Mendoza is made under the following items;

- 1) Frequency channels are grouped as much as possible to meet with the present allocation and future construction.
- 2) Main stations are constructed with FM stations at Co. Arco and Co. Alto (or Co. Negro) (heights of the former two are about 1,700m a.s.l and the latter 1080m) to cover wide area.
- 3) Frequency relationships among neighbouring provinces are carefully taken into account and mutual interferences among TV and FM channels are also taken into consideration.

4.2.1 Frequency allocation plan in the province of Mendoza

The method explained in the separated reference material deals with the fundamental concept of frequency allocation, however in actual case there exist mountains and hills which attenuate the propagation of VHF and UHF signal and there is undulation, height of several tenth meters, which is not indicated on the map. Accordingly, in some cases frequency allocation will be easily planned by the use of shielding effect, and on the contrary, unexpected interference might be appeared which is not calculated in ordinary map study.

One of the examples exists in San Luis. At the east side of the province of San Luis there are mountains and in the border between San Luis and Cordoba, there are train of mountains. And the frequency allocation can be made almost independently from the province of Cordoba and others. In the southern part of San Luis there are pampas and the population is very few and frequency allocation in Mendoza, San Luis and San Juan provinces requires the consideration of mutual relationships only to avoid the interference of radiated signals. Result of the study on the frequency allocation plan in the province is shown in Table IV-4-4. As shown in Fig. IV-4-1. all channels are arranged in the relationships of triangular position.

In the figure, number of frequency channel encircled shows the existing station. Ch-10 in Nihuil and Ch-12 in Gral. Alvear fall into no use, after the completion of the construction of Ch-6 in Co. Alto, and Ch-11 and 13 translators at Co. Diamante will be also abolished when Ch-7 (LV89) and Ch-9 (LV83) start transmission from Co. Alto and Malargue. Frequency channel of these station is omitted in the figure.

Ch-8 translator will cease its transmission when Malargue translator start its operation. Malargue translator is constructed at El Chacay and Ch-12 at La Paz is expected to change from VHF to UHF.

Table IV - 4 - 4 Frequency allocation (1/2)

	National	CH-7	CH-9	CH-6	E/U	Public
Mendoza	11	7	9	2	35	37
San Rafael	12	8	4	6	39	41
Malargue	11	7	13	2	27	29
Uco	10	3	5	13 #	30	23
Uspallata	7	11	13	9	32	25
Punta de Agua	7	9	11	13	-	-
Agua Escondida	6	8	10	12	-	-
Agua del Toro	7	9	11	13	-	-
Ranquil Norte	13	8	10	6	-	-
Horqueta	12	3	9	5	-	-
Las Cuevas	8	2	4	6	-	-
La Paz	22	24	26	28	40	42
Paramillos	44	46	48	50		
	-	-	-	-		
Valle Hermoso	11	7	9	13		
Punta de Vacas	12	3	5	10		

Use of CH-13 is allowed in the case of via Paramillos relay

Table IV -4 -4 Frequency allocation (2/2)

	Co. Alto	Horqueta	Ranquil Norte	C6. de Ureta	Malargue	Agua del Toro	Punto de Agua
National	12	11	10	12	10	10	10
CH-7	8	3	7	8	7	7	7
CH-9	4	9	13	4	13	13	13
CH-6	6	5	2	6	2	2	2
National FM	97.7	94.9	89.5	---	88.7	91.7	92.1
FM-2	99.3	96.7	91.7	---	90.3	---	---
FM-3	100.1	98.3	---	---	92.3	---	---
FM-4	102.7	100.1	---	---	94.5	---	---
FM/R	---	101.7	---	---	96.1	---	---

	Co. Arco	Paramillos	Uspallata	Punta de Vacas	Las Cuevas
National	11	44	7	12	7
CH-7	7	46	11	8	2
CH-9	9	48	13	4	13
CH-6	2	50	9	6	9
National FM	91.9	95.5	102.3	97.5	101.5
Cuyo	93.5	89.1	104.1	89.7	103.5
Nihuil	95.3	90.5	105.9	92.5	104.7
Libertador	96.9	91.5	107.5	100.7	94.1
FM/R	---	93.1	---	103.5	---

Notes: TV, represented in CH
 FM, represented in MHz
 FM/R means Radio Program
 broadcasting in FM band

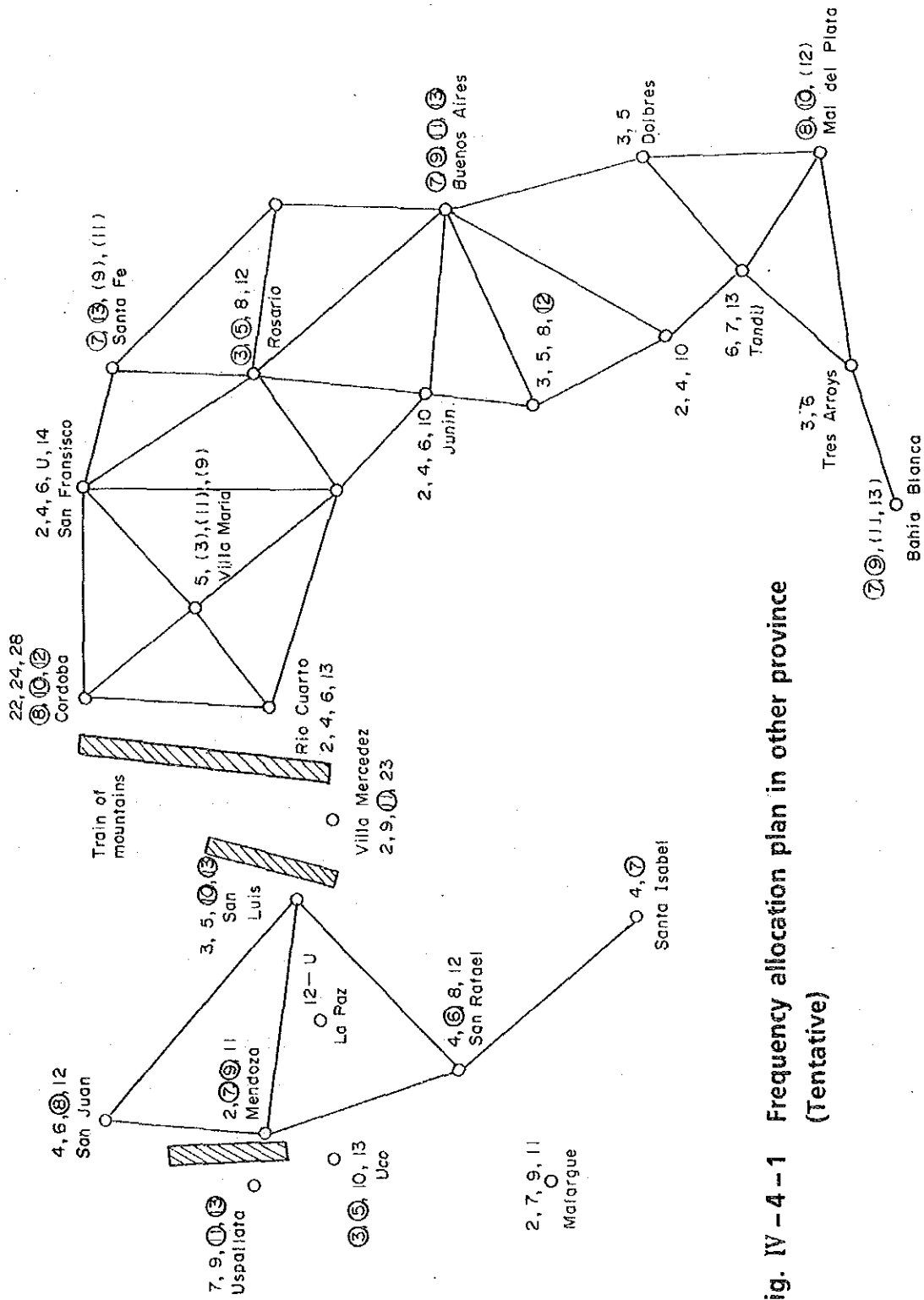


Fig. IV - 4 - 1 Frequency allocation plan in other province (Tentative)

4.2.2 Nation wide frequency allocation plan

Concerning the nationwide frequency allocation plan, it is not included in the scope of this report, however S.O.C asked for the submission of the nationwide plan, so only a tentative plan is shown in Fig. IV-4-1.

Practically, above is made only paying the attention on the limited area of the country, accordingly it is necessary to make further modification referring to the plan in other provinces and practical distribution of field strength of existing station.

Among the frequency channels in UHF, two groups ($4\text{ch} \times 2 = 8$ channels) of them are assigned for the supplementary use of VHF TV broadcasting.

4.3 Expected Service Area

Expected service area of TV broadcasting is shown in Fig. IV-4-2, and the population coverage is expected to about 98%.

4.4 Service Standard

Considering the population distribution and the wide area of the province, field strength of TV broadcasting to serve is lowered than that of CCIR and it is tentatively specified to 42db/10m in this plan under the assumption that high gain receiving antenna is used in the countryside.

As for the deterioration of the picture quality, it is expected to serve better than grade 3 for five grade evaluation, as shown in Fig. IV-4-3.

Argentina's norms are applied as engineering standard except for the above.

Average performance of TV receiver is shown in Table IV-4-5

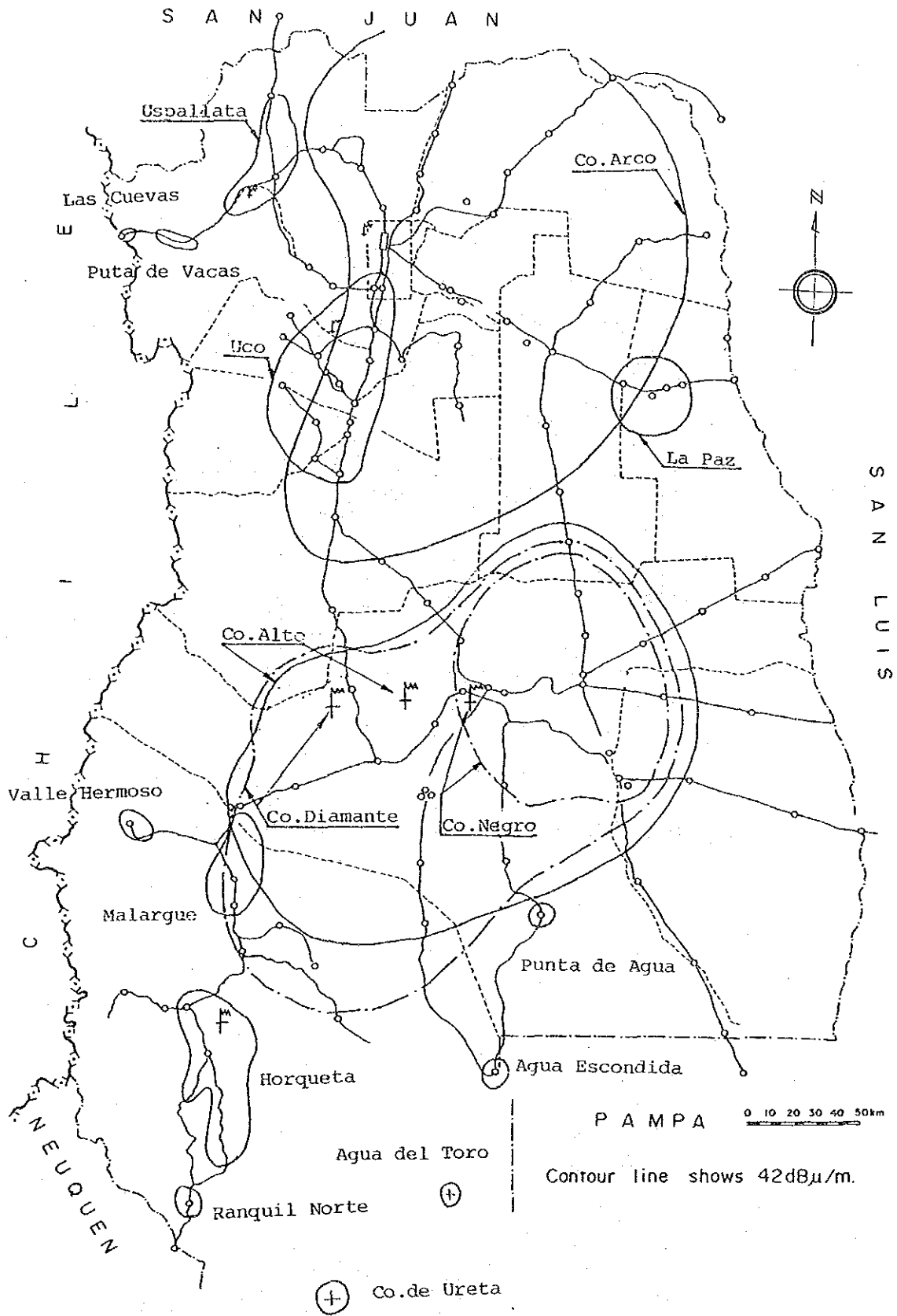


Fig. IV-4-2 Expected service area of main new TV station

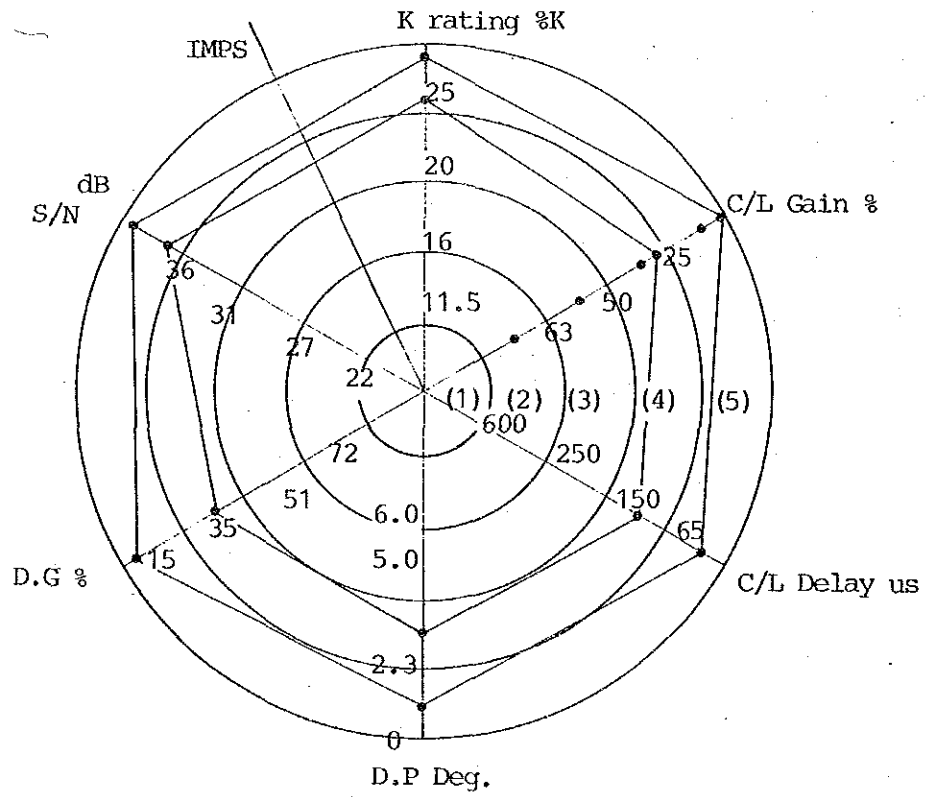


Fig. IV - 4 - 3 Polar representation of picture quality

Table IV - 4 - 5 Average performance of TV receiver

Item	Performance
1. Intermediate frequency Vision Sound	45.75 MHz 41.25 MHz
2. Noise limiting sensitivity VHF UHF	less than 45 dB less than 51.7 dB
3. Attenuation of lower neighbouring channel	more than 33 dB
4. Attenuation of upper neighbouring channel	more than 12 dB
5. Suppression ratio of image interference VHF UHF	more than 60 dB more than 45 dB
6. Suppression ratio of IF interference	more than 60 dB
7. Intermodulation interference $U = 88 \text{ dB}_\mu$	interference shall not be observed.
8. Crossmodulation interference	ditto
9. IF beat interference	ditto
10. Spurious radiation from local oscillator VHF low band VHF high " UHF band	less than 54 dB $_\mu$ less than 64 " less than 65 "
11. Maximum sensitivity VHF UHF	less than 25 dB $_\mu$ less than 29.7 dB $_\mu$
12. S/N of video output for the input level of noise limiting sensitivity plus 20 dB	more than 40 dB
13. S/N of sound output for the input of maximum sensitivity	more than 40 dB