

TELECOMMUNICATION: INTER-AMERICAN RADIOCOMMUNICATIONS (ARRANGEMENT)

*Arrangement signed at Havana December 13, 1937, with annex
Notification of approval by the United States communicated to the
Government of Cuba July 18, 1938*

Entered into force July 1, 1938; for the United States July 18, 1938

Modified by Cairo, 1938, revision¹

*Replaced by agreement of January 26, 1940,² as between contracting
parties to the later agreement*

54 Stat. 2514; Executive Agreement Series 200

INTER-AMERICAN ARRANGEMENT CONCERNING RADIOCOMMUNICATIONS

SECTION 1. INTRODUCTION

The delegates of the American Governments listed below; assembled in conference in Habana, Republic of Cuba, from November 1 to December 13th, 1937, hereby make the following Administrative Arrangement, which shall become effective on July 1, 1938 in those countries where it shall have been approved by the respective Governments, which approval shall be communicated to the Department of State of the Government of Cuba.

Countries

Argentine Republic	Guatemala
Brazil	Haiti
Canada	Mexico
Colombia	Nicaragua
Cuba	Panama
Chile	Peru
Dominican Republic	Uruguay
United States of America	Venezuela

If any state desires to terminate this arrangement in whole or in part, it may do so by written notice to the Government of Cuba, giving the reasons therefor, one year prior to the date on which it desires to effect this termination. The Government of Cuba shall communicate such notification to the other States concerned.

¹ 54 Stat. 1417; TS 948.

² 55 Stat. 1482; EAS 231.

SECTION 2. TABLES OF ALLOCATION

TABLE I

FREQUENCY ALLOCATION FOR VARIOUS SERVICES IN THE AMERICAN CONTINENT 10-550 Kc/s.

10-100	Fixed.
100-110	(a) Fixed. (b) Mobile.
110-125	Mobile.
125-150	Maritime mobile (open to public correspondence exclusively).
150-160	Mobile.
160-200	(a) Fixed. (b) Mobile. (c) Aeronautical.
200-285	Aeronautical and mobile excepting commercial ship stations.
285-315	Radio beacon, Maritime priority.
315-320	Aeronautical.
320-325	(a) Aeronautical. (b) Mobile not open to public correspondence.
325-345	Aeronautical.
345-365	(a) Aeronautical. (b) Mobile not open to public correspondence.
365-385	(a) Radio direction finding. (b) Mobile, provided it does not interfere with the radio direction finding. Coast station using B waves excluded.
385-400	Mobile and aeronautical, Maritime priority, it being understood that the priority refers to existing services.
400-460	Mobile.
460-485	Mobile A-1 and A-2 only.
485-515	Mobile (distress, calling, etc.).
515-550	Services not open to public correspondence A-1 and A-2 only.

Note:

1. The band of frequencies between 200 and 400 Kc/s. is reserved in the Americas for aids to air navigation and for the transmission of weather and other safety information to aircraft in flight, subject only to existing priorities of marine services within this band.

2. When due to adverse atmospheric conditions or other technical reasons it is not possible to employ frequencies between 200 and 400 Kc/s. for the services above mentioned, other suitable frequencies may be utilized provided that all the countries of America are advised of the frequencies selected.

TABLE II

ALLOCATION OF FREQUENCIES 550-1600 Kc/s.

550-1600 Kc/s Broadcasting

TABLE III

GENERAL FREQUENCY ALLOCATION TO VARIOUS SERVICES 1600-4000 Kc/s			
Frequency	North American Zone	Central Zone	South American Zone
1600-1750	Fixed and Mobile. (Primarily police)	Fixed and Mobile including Aviation.	Fixed and Mobile including Aviation.
1750-2050	Amateur.	Amateur.	Amateur.
2050-2100	Fixed and Mobile.	Fixed and Mobile.	Fixed and Mobile.
2100-2200	Mobile (Primarily Ship Stations).	Mobile (Primarily Ship Stations).	Mobile (Primarily Ship Stations).
2200-2300	Fixed and Mobile.	Fixed and Mobile.	Fixed and Mobile.
2300-2395	Mobile (Primarily Police)	Mobile (Primarily Police). (1)	Mobile and Broadcasting.
2395-2400	General Experimental.	General Experimental.	Mobile and Broadcasting.
2400-2500	Mobile (Primarily Police)	Mobile (Primarily Police)	Mobile and Broadcasting.
2500-2600	Mobile (Primarily Coast Stations)	Mobile (Primarily Coast Stations)	Mobile (Primarily Coast Stations)
2600-2735	Aeronautical and Mobile.	Aeronautical and Mobile.	Aeronautical and Mobile.
2735-2740	Mobile (Primarily Intership. Assignable frequency 2738 Kc/s);	Mobile (Primarily Intership. Assignable frequency 2738 Kc/s).	Mobile (Primarily Intership. Assignable frequency 2738 Kc/s).
2740-2850	Fixed and Mobile.	Fixed and Mobile.	Fixed and Mobile.
2850-3000	Aeronautical and Mobile.	Aeronautical and Mobile.	Aeronautical and Mobile.
3000-3065	Fixed and Mobile.	Fixed and Mobile.	Fixed and Mobile.
3065-3100	Aeronautical.	Aeronautical.	Aeronautical.
3100-3110	Mobile (Primarily Aircraft Calling Frequency 3105 Kc/s)	Mobile (Primarily Aircraft Calling Frequency 3105 Kc/s)	Mobile (Primarily Aircraft Calling Frequency 3105 Kc/s)
3110-3150	Mobile	Mobile	Mobile
3150-3265	Fixed and Mobile (Primarily Aeronautical).	Fixed and Mobile (Primarily Aeronautical).	Fixed and Mobile (Primarily Aeronautical).
3265-3320	Fixed	Fixed	Fixed
3320-3440	Fixed and Mobile	Fixed and Mobile	Fixed and Mobile
3440-3485	Fixed and Mobile (Primarily Aeronautical)	Fixed and Mobile (Primarily Aeronautical)	Fixed and Mobile (Primarily Aeronautical).
3485-3500	General Experimental.	General Experimental.	General Experimental.
3500-4000	Amateur.	Amateur.	Amateur.

NOTE:

(1) The countries in the central zone situated to the north of Colombia shall be permitted to set aside the frequency band of 2300 to 2350 Kc/s. for broadcasting service in each of these countries, pursuant to an agreement whereby they are to use not more than two frequencies per country within this band separated from one another with proper power and directional antennae limitations. The use of such frequencies by these countries must not cause interference to other services in the Northern and Southern zones using such frequencies at the present time.

TABLE IV³
 GENERAL FREQUENCY ALLOCATION TO VARIOUS SERVICES 4000–25000 Kc/s.
 (See special note below)

Frequency (Kc/s)	Service
4000– 5500	Fixed and Mobile (1)
5500– 5570	Maritime Mobile
5570– 5700	Aeronautical
5700– 5900	Fixed
5900– 6000	Fixed (2)
6000– 6150	Broadcasting (3)
6150– 6675	Mobile (International air calling frequency 6210 Kc/s)
6675– 7000	Fixed
7000– 7300	Amateur
7300– 8200	Fixed
8200– 8550	Mobile
8550– 8900	Fixed and Mobile
8900– 9500	Fixed
9500– 9600	Broadcasting (3)
9600– 9700	Fixed (2)
9700–11000	Fixed
11000–11400	Mobile
11400–11700	Fixed
11700–11900	Broadcasting (3)
11900–12300	Fixed
12300–12825	Mobile
12825–13350	Fixed and Mobile
13350–14000	Fixed
14000–14400	Amateur
14400–15100	Fixed
15100–15350	Broadcasting (3)
15350–16400	Fixed
16400–17100	Mobile
17100–17750	Fixed and Mobile
17750–17800	Broadcasting (3)
17800–21450	Fixed
21450–21550	Broadcasting (3)
21550–22300	Mobile
22300–24600	Fixed and Mobile
24600–25000	Mobile

NOTES

(1) 4500–5200 Kc/s.

The high contracting parties each agree to make a special study of this band of frequencies with a view to solving the problem of national broadcasting in those countries within the central zone located to the south of Panama.

This study should be presented to the Cairo Conference for consideration and should be accompanied by pertinent recommendations based on the following considerations:

a. The use of directional antennas by broadcasting stations to avoid interference to services carried on in other regions.

b. Determination of the maximum night power for broadcasting stations within this band of frequencies.

c. The maximum total width of the broadcast band within the frequency range 4500–5200 Kc/s. should be not greater than 300 Kc/s.

³ Modified by Cairo, 1938, revision (54 Stat. 1417; TS 948).

(2) 5900-6000 and 9600-9700 Kc/s.

The proposals of Brazil to assign the frequency bands 5900 to 6000 Kc/s. and 9600 to 9700 Kc/s. to broadcasting shall be studied prior to the Cairo Conference in accordance with Note 3 below.

(3) 6000-25000 Kc/s.

In considering the needs of the broadcasting service in the frequency band 6000-25000 Kc/s. the Inter-American Radio Conference agrees to apply the following principles in the study of this problem and to make recommendations based thereon to the Cairo Radio Conference:

1. Strict adherence to the provisions of paragraph 19, Article 7, of the General Radio Regulations annexed to the Madrid Telecommunication Convention, 1932, which states as follows:

"It is recognized that the frequencies between 6000 and 30000 Kc/s (50 and 10 m) are very efficient for long-distance communications. The administrations shall make the greatest possible effort to reserve the frequencies of this band for this purpose, except when their use for short- or medium-distance communication is not likely to interfere with long-distance communications".

2. Broadcast channels shall be assigned primarily for international long-distance communications and secondarily for long-distance national services, particularly between points not served by wire lines. In every case the frequency should be optimum for the distance involved.

3. Stations operating within the present allocated broadcast bands, and in derogation thereof, for the purpose of rendering local service, should be moved to lower frequency standard broadcast bands below 6000 Kc/s.

4. It would be unwise to extend the present high frequency broadcast bands until positive assurance is given by all nations that there will be strict adherence to any table of allocation of frequencies to services that may be adopted at the Cairo radio conference. In this connection attention is invited to the fact that an examination of the records discloses that frequencies throughout the high frequency radio spectrum are being used by many broadcast, telephone and telegraph stations in derogation of the provisions of the Madrid Radio Regulations.

5. Following good engineering practice in rendering good broadcast service, it is agreed that:

(a) Not less than 5 kw power shall be used for international broadcast service.

(b) Directional antennas shall be used wherever practicable to provide good service to specified countries or regions depending upon the time of day, the listening hours of the receiving public, the particular frequency in use, etcetera.

(c) Bands shall be subdivided so as to give priority to different classes of broadcasting stations, depending upon the adequacy of power and quality of emissions from the standpoint of good engineering practice.

6. The shared use, on an engineering basis, of high frequency broadcast channels between countries throughout the world promises some relief in the present high frequency broadcast bands.

7. Existing services operating within the present authorized bands shall not be displaced therefrom unless suitable replacement frequencies are provided; therefore, it is important that the recommendations to Cairo contain specific recommendations on this subject.

8. In view of their dependence upon radio as a means for carrying on communication and for the protection of life and property, mobile services shall be given first consideration in any alteration of the present authorized bands.

9. Recommendations for additional broadcast frequencies which may be found necessary shall be based upon extensions of the present broadcast bands rather than upon the creation of any new bands.

Special Note

The action taken at Cairo with respect to the recommendations to be submitted in compliance with notes (1), (2) and (3) shall automatically modify the allocation to services in Table IV above.

TABLE V

GENERAL FREQUENCY ALLOCATION TO VARIOUS SERVICES 25.000-30.000 Kc/s.

25,000-25,600	Broadcasting ¹
25,600-26,600	Broadcasting
26,600-27,000	Broadcasting ¹
27,000-28,000	(a) Fixed (b) Mobile ¹
28,000-30,000	Amateur

¹ Available for this service under the provisions of Article 7, Paragraph 1 of the General Radio Regulations Annexed to the International Telecommunication Convention, Madrid, 1932, provided no interference is caused to the international service to which this band of frequencies is allocated under the Madrid Radio Regulations.

TABLE VI

FREQUENCIES BETWEEN 30,000 AND 300,000 Kc/s.

This table is accepted as a guide to planning, research, and the experimental use of frequencies.

Each country shall, when interference might develop between countries or when agreement is desirable between countries, notify the other American countries concerned of the contemplated location, power, frequency and type of service of any station or stations to be operated in the band of frequencies higher than 30 mc to the end that mutual agreement and development may be realized.

Frequency	North American Zone	Central Zone	South American Zone
30,000-41,000	Fixed and Mobile	Fixed and Mobile	Fixed and Mobile
41,000-44,000	Broadcasting	Broadcasting	Broadcasting
44,000-56,000	Television	Television	Television
56,000-60,000	Amateur	Amateur	Amateur
60,000-66,000	Fixed and Mobile	Fixed and Mobile	Fixed and Mobile
66,000-72,000	Television	Television	Television
72,000-78,000	Fixed and Mobile (Aviation Marker beacons)	Fixed and Mobile (Aviation Marker beacons)	Fixed and Mobile (Aviation Marker beacons)
78,000-90,000	Television	Television	Television
90,000-96,000	Fixed and Mobile (Including Aviation Blind Landing Sys- tems)	Fixed and Mobile (Including Aviation Blind Landing Sys- tems)	Fixed and Mobile (Including Aviation Blind Landing Sys- tems)
96,000-108,000	Television	Television	Television
108,000-112,000	Fixed and Mobile (Including Aviation Blind Landing and localizer beacons)	Fixed and Mobile (Including Aviation Blind Landing and localizer beacons)	Fixed and Mobile (Including Aviation Blind Landing and localizer beacons)
112,000-118,000	Amateur	Amateur	Amateur
118,000-123,000	Fixed and Mobile	Fixed and Mobile	Fixed and Mobile
123,000-126,000	Aeronautical Radio Range Beacons	Aeronautical Radio Range Beacons	Aeronautical Radio Range Beacons
126,000-132,000	Aeronautical (Airport Traffic Control)	Aeronautical (Airport Traffic Control)	Aeronautical (Airport Traffic Control)
132,000-156,000	Fixed and Mobile	Fixed and Mobile	Fixed and Mobile
156,000-168,000	Broadcasting (Tele- vision)	Broadcasting (Tele- vision)	Broadcasting (Tele- vision)
168,000-180,000	Fixed and Mobile	Fixed and Mobile	Fixed and Mobile
180,000-192,000	Broadcasting (Tele- vision)	Broadcasting (Tele- vision)	Broadcasting (Tele- vision)

TABLE VI—Continued
 FREQUENCIES BETWEEN 30,000 AND 300,000 Kc/s—Continued

Frequency	North American Zone	Central Zone	South American Zone
192,000-204,000	Fixed and Mobile	Fixed and Mobile	Fixed and Mobile
204,000-216,000	Broadcasting (Television)	Broadcasting (Television)	Broadcasting (Television)
216,000-224,000	Fixed and Mobile	Fixed and Mobile	Fixed and Mobile
224,000-230,000	Amateur	Amateur	Amateur
230,000-234,000	Fixed and Mobile	Fixed and Mobile	Fixed and Mobile
234,000-246,000	Broadcasting (Television)	Broadcasting (Television)	Broadcasting (Television)
246,000-258,000	Fixed and Mobile	Fixed and Mobile	Fixed and Mobile
258,000-270,000	Broadcasting (Television)	Broadcasting (Television)	Broadcasting (Television)
270,000-282,000	Fixed and Mobile	Fixed and Mobile	Fixed and Mobile
282,000-294,000	Broadcasting (Television)	Broadcasting (Television)	Broadcasting (Television)
294,000-300,000	Fixed and Mobile	Fixed and Mobile	Fixed and Mobile

SECTION 3. ASSIGNABLE FREQUENCIES BASED ON RADIOTELEGRAPH EMISSIONS

In general, in the frequency range 1600-4000 Kc/s, the frequencies assigned shall be integral multiples of 4 Kc/s from 1600 to 3000 Kc/s and integral multiples of 5 Kc/s from 3000 to 4000 Kc/s. Communication channels wider than 4 Kc/s or 5 Kc/s may be assigned where the authorized band width of the emission requires the use of such wider channels. For example, two adjoining telegraph channels may be assigned for telephony, in which case the frequency assigned to a station should be the mid-frequency of such channels. The frequencies to be assigned to stations are given in the Table below. Departure from these assignments may be made in order to make more efficient use of the frequency space available.

The following Table indicates the assignments frequencies.

1600	1684	1768	1852	1936	2020
1604	1688	1772	1856	1940	2024
1608	1692	1776	1860	1944	2028
1612	1696	1780	1864	1948	2032
1616	1700	1784	1868	1952	2036
1620	1704	1788	1872	1956	2040
1624	1708	1792	1876	1960	2044
1628	1712	1796	1880	1964	2048
1632	1716	1800	1884	1968	2052
1636	1720	1804	1888	1972	2056
1640	1724	1808	1892	1976	2060
1644	1728	1812	1896	1980	2064
1648	1732	1816	1900	1984	2068
1652	1736	1820	1904	1988	2072
1656	1740	1824	1908	1992	2076
1660	1744	1828	1912	1996	2080
1664	1748	1832	1916	2000	2084
1668	1752	1836	1920	2004	2088
1672	1756	1840	1924	2008	2092
1676	1760	1844	1928	2012	2096
1680	1764	1848	1932	2016	2100

2104	2324	2544	2764	2984	3255
2108	2328	2548	2768	2988	3260
2112	2332	2552	2772	2992	3265
2116	2336	2556	2776	2996	3270
2120	2340	2560	2780	3000	3275
2124	2344	2564	2784	3005	3280
2128	2348	2568	2788	3010	3285
2132	2352	2572	2792	3015	3290
2136	2356	2576	2796	3020	3295
2140	2360	2580	2800	3025	3300
2144	2364	2584	2804	3030	3305
2148	2368	2588	2808	3035	3310
2152	2372	2592	2812	3040	3315
2156	2376	2596	2816	3045	3320
2160	2380	2600	2820	3050	3325
2164	2384	2604	2824	3055	3330
2168	2388	2608	2828	3060	3335
2172	2392	2612	2832	3065	3340
2176	2396	2616	2836	3070	3345
2180	2400	2620	2840	3075	3350
2184	2404	2624	2844	3080	3355
2188	2408	2628	2848	3085	3360
2192	2412	2632	2852	3090	3365
2196	2416	2636	2856	3095	3370
2200	2420	2640	2860	3100	3375
2204	2424	2644	2864	3105	3380
2208	2428	2648	2868	3110	3385
2212	2432	2652	2872	3115	3390
2216	2436	2656	2876	3120	3395
2220	2440	2660	2880	3125	3400
2224	2444	2664	2884	3130	3405
2228	2448	2668	2888	3135	3410
2232	2452	2672	2892	3140	3415
2236	2456	2676	2896	3145	3420
2240	2460	2680	2900	3150	3425
2244	2464	2684	2904	3155	3430
2248	2468	2688	2908	3160	3435
2252	2472	2692	2912	3165	3440
2256	2476	2696	2916	3170	3445
2260	2480	2700	2920	3175	3450
2264	2484	2704	2924	3180	3455
2268	2488	2708	2928	3185	3460
2272	2492	2712	2932	3190	3465
2276	2496	2716	2936	3195	3470
2280	2500	2720	2940	3200	3475
2284	2504	2724	2944	3205	3480
2288	2508	2728	2948	3210	3485
2292	2512	2732	2952	3215	3490
2296	2516	2736	2956	3220	3495
2300	2520	2740	2960	3225	3500
2304	2524	2744	2964	3230	to
2308	2528	2748	2968	3235	4000
2312	2532	2752	2972	3240	Amateur
2316	2536	2756	2976	3245	
2320	2540	2760	2980	3250	

SECTION 4. TOLERANCES AND SPURIOUS EMISSIONS

I

TABLE OF FREQUENCY TOLERANCES AND OF INSTABILITIES

The Inter-American Radio Conference,
Considering:

- a) that technical progress since the preparation of the Table given in Appendix 1 of the Madrid General Radio Regulations permits an appreciable reduction of the figures therein given for tolerances and instabilities;
- b) that, although the tolerances and instabilities applicable according to the Madrid General Regulations should continue to be applied for present transmitters, transmitters constructed after the date given in the Table below should be held to more severe requirements;
- c) that it is desirable to have supplementary data for the tolerances and instabilities that can be applied in current practice, particularly on frequencies higher than 23000 Kc/s., which may become the subject of international regulations;

Agrees to accept:

- (1) that technical progress in the matter of frequency stabilization is such that all stations may keep themselves within the limits of tolerance and instabilities specified in the Table below and assist in reducing interference caused by frequency variations;
- (2) that the Table below should be substituted for that given in Appendix 1 of the Madrid General Regulations;
- (3) that the question of improving tolerance and stability conditions should be kept on the Agenda and extended to higher frequencies than those appearing in the following table within the limits of regulations to be adopted by the Cairo Conference;

REVISED TABLE OF FREQUENCY TOLERANCE AND INSTABILITIES

- (1) frequency tolerance is the maximum permissible separation between the frequency assigned to a station and the real transmission frequency.
- (2) this separation results from the combination of three errors;
 - (a) error of the radio frequency meter or of the frequency indicator used;
 - (b) error made during the adjustment of the transmitter;
 - (c) slow variations of the transmitter frequency.
- (3) in frequency tolerance no account is taken of modulation.
- (4) frequency instability is the maximum permissible separation resulting only from the error contemplated in (c) above.

TABLE OF FREQUENCY TOLERANCES AND INSTABILITIES ⁴

<i>Frequency bands</i>	<i>Tolerances</i>		<i>Instabilities</i>	
	Transmitters now in service and until January 1, 1942, after which they shall comply with tolerances in columns 2 and 4, respectively	New transmitters installed from Jan. 1/39	Transmitters now in service and until January 1, 1942, after which they shall comply with tolerance in columns 2 and 4, respectively	New transmitters installed from Jan. 1/39
A. From 10 to 550 Kc.				
a) Fixed stations	0.1%	0.05%		
b) Land stations	0.1%	0.1%		
c) Mobile stations using indicated frequencies (1)	0.5%	0.1%		
d) Mobile stations using any frequency within the band			0.5%	0.1%
e) Broadcasting	50 cycles	20 cycles		
B. From 550 to 1600 kc/s.				
a) Broadcasting stations	50 cycles	20 cycles		
C. From 1600 to 6000 kc/s.				
a) Fixed stations	0.03%	0.01%		
b) Land stations	0.04%	0.02%		
c) Mobile stations using indicated frequencies				
I. 1500 to 3500 kc/s	0.1%	0.1%		
II. 3500 to 6000 kc/s	0.1%	0.05%		
d) Mobile stations using any frequency within the band				
I. 1500 to 3500 kc/s			0.1%	0.07%
II. 3500 to 6000 kc/s			0.1%	0.05%
D. From 6000 to 30000 kc/s.				
a) Fixed stations	0.02%	0.01%		
b) Land stations	0.04%	0.02%		
c) Mobile stations using indicated frequency	0.1%	0.05%		
d) Mobile stations using any frequency within the band			0.05%	0.02%
e) Broadcasting stations	0.01%	0.005%		

(1) It is recognized that there is in this service a great number of spark transmitters and simple auto-oscillator transmitters which cannot meet this requirement.

- NOTES: 1. The administrations will endeavour to take advantage of the progress of the art in order gradually to reduce the frequency tolerances and limits of instabilities.
 2. It is understood that ship stations operating within shared bands must conform to the tolerances applicable to land stations and should comply with article 7, Paragraph 117, of the Madrid General Radio Regulations.
 3. The aforementioned material was approved in accordance with Bucharest C.C.I.R. Opinion No. 93 with modifications under headings in columns 1 and 3.

⁴ Modified by Cairo, 1938, revision (54 Stat. 1417: TS 948).

II

PREVENTION OF SPURIOUS RADIATION

The participating Governments agree to require stations under their jurisdiction to use transmitters which are as free as practicable from all spurious emissions.

These radiations should not be of sufficient intensity to cause interference on receiving sets of modern design which are tuned outside the frequency band of emission required for the type of emission employed. In the case of type A-3 emission (radiotelephony), the transmitter should not be modulated in excess of its modulation capability to the extent that interfering spurious radiations occur and in the case of amplitude modulation the operation percentage of modulation should not be less than 75 per cent on peaks of frequent recurrence. Adequate means should be employed to insure that the transmitter is not modulated in excess of its modulation capability.

A spurious radiation is any radiation from a transmitter which is outside the frequency band of emission normal for the type of transmission employed including any harmonic modulation products, key clicks, parasitic oscillations or other transient effects.

SECTION 5. NON USE OF 333 Kc/s. AS AIR CALLING FREQUENCY

Referring to Article 7, Paragraph 11 of the Madrid Radiocommunications the frequency 333 kc/s. is not to be used as an international Air Calling frequency in the American Continent, except in special cases in connection with transatlantic flights.

SECTION 6. USE OF 500 Kc/s.

Referring to Article 19, Section I, Paragraph 6-a of the Madrid Radio Regulations, the entire American Continent, except for Hudson Bay and Regions North thereof, shall be considered a region of heavy traffic within the meaning of said Article, therefore, except for Hudson Bay and Regions North thereof, traffic on 500 kc/s. shall be limited to the transmission of distress traffic, urgent and safety messages, signals and single short radio telegrams.

SECTION 7. DEFINITIONS ⁵

DEFINITION OF TERMS

The definitions of terms which appear as numbers (1) to (42) inclusive of Section XII of Resolution No. 6 of the Final Act of the March 1937 Conference of Habana, are approved with the reservation that any changes which may result from the International Radio Conference of Cairo 1938, with respect to the wording of these definitions shall automatically supersede the present wording.

⁵ Modified by Cairo, 1938, revision (54 Stat. 1417; TS 948).

(1) TELECOMMUNICATION:

Any telegraph or telephone communication of signs, signals, writing, images and sounds of any nature, by wire, radio, or other systems or processes of electrical or visual (semaphore) signalling.

(2) RADIOCOMMUNICATION:

Any telecommunication by means of Hertzian waves.

(3) RADIOTELEGRAM:

Telegram originating in or destined to a mobile station, transmitted on all or part of its route over the radio channels of the mobile service.

(4) PUBLIC CORRESPONDENCE:

Any telecommunication which the offices and stations, by reason of their being at the disposal of the public, must accept for transmission.

(5) PRIVATE OPERATING:

Any individual, company or corporation, other than a government institution or agency, which is recognized by the government concerned and which operates telecommunication installations for the purpose of exchanging public correspondence.

(6) ADMINISTRATION:

A government administration.

(7) INTERNATIONAL SERVICE:

A telecommunication service between offices or stations under the jurisdiction of different countries, or between stations of the mobile service, except when the latter are of the same nationality and are within the limits of the country to which they belong. An internal or national telecommunication service which is likely to cause interference with other services beyond the limits of the country in which it operates, shall be considered as international service from the standpoint of interference.

(8) LIMITED SERVICE:

A service which can be used only by specified persons or for special purposes.

(9) MOBILE SERVICE:

A radiocommunication service carried on between mobile and land stations and by mobile stations communicating among themselves, special services being excluded.

(10) FIXED STATION:

A station not capable of being moved, and communicating by radio with one or more stations similarly established.

(11) LAND STATION:

A station not capable of being moved, carrying on a mobile service.

(12) COAST STATION:

A land station carrying on a service with ship stations. This may be fixed station used also for communication with ship stations; in this case, it shall be considered as a coast station only for the duration of its service with ship stations.

(13) AERONAUTICAL STATION:

A land station carrying on a service with aircraft stations. This may be a fixed station also for communication with aircraft stations; in this case, it shall be considered as an aeronautical station only for the duration of its service with aircraft stations.

(14) MOBILE STATION:

A station capable of being moved and which ordinarily does move.

(15) ON BOARD STATION:

A station on board either of a ship which is not permanently moored, or an aircraft.

(16) SHIP STATION:

A station on board a ship which is not permanently moored.

(17) AIRCRAFT STATION:

A station on board any aerial vehicle.

(18) RADIOBEACON STATION:

A special station the emissions of which are intended to enable an on-board station to determine its bearing or a direction with reference to the radiobeacon station, and in some cases also the distance which separates it from the latter.

(19) RADIODIRECTION-FINDING STATION:

A station equipped with special apparatus for determining the direction of the emissions of other stations.

(20) TELEPHONE BROADCASTING STATION:

A station carrying on a telephone broadcasting service.

(21) TELEVISION BROADCASTING STATION:

A station licensed for the transmission of transient visual images of moving or fixed objects, for simultaneous reception and reproduction.

(22) AMATEUR STATION:

A station used by an amateur, that is, by a duly authorized person interested in radio technique solely with a personal aim and without pecuniary interest.

(23) PRIVATE EXPERIMENTAL STATION:

A private station for experiments looking to the development of radio technique or science.

(24) PRIVATE RADIO STATION:

A private station, not open to public correspondence, which is authorized solely to exchange with other private radio stations communications concerning the private business of the license holder or holders.

(25) FREQUENCY ASSIGNED TO A STATION:

The frequency assigned to a station is the frequency occupying the center of the frequency band in which the station is authorized to work. In general this frequency is that of the carrier wave.

(26) FREQUENCY BAND OF AN EMISSION:

The frequency band of an emission is the frequency band actually occupied by the emission for the type of transmission and for the signaling speed used.

(27) FREQUENCY TOLERANCE:

The frequency tolerance is the maximum permissible separation between the frequency assigned to a station and the actual frequency of emission.

(28) POWER OF A RADIO TRANSMITTER:

The power of a radio transmitter is the power supplied to the antenna.

In the case of a modulated-wave transmitter, the power in the antenna shall be represented by two numbers, one indicating the power of the carrier supplied to the antenna and the other the actual maximum rate of modulation used.

(29) AERONAUTICAL SERVICE:

A radio service carried on between aircraft stations and land stations, and by aircraft stations communicating among themselves. This term shall also apply to fixed and special radio services intended to insure the safety of aerial navigation.

(30) FIXED SERVICE:

A service carrying on radio communication of any kind between fixed points excluding broadcasting services and special services.

(31) SPECIAL SERVICE:

A telecommunication service carried on especially for the needs of a specific service of general interest and not open to public correspondence, such as: a service of radiobeacons, radio direction finding, time signals, regular meteorological bulletins, notices to navigators, press messages addressed to all, medical notices, medical consultations, standard frequencies, emissions for scientific purposes, etc.

(32) TELEPHONE BROADCASTING SERVICE:

A service carrying on the broadcasting of radiotelephone emissions primarily intended to be received by the general public.

(33) VISUAL BROADCASTING SERVICE:

A service carrying on the broadcasting of visual images, either fixed or moving, intended to be received by the general public primarily.

(34) AMATEUR SERVICE:

A radio service carried on between amateur stations.

(35) AIR MOBILE SERVICE:

A radio service carried on between aircraft carriers and by aircraft stations communicating among themselves.

(36) GENERAL EXPERIMENTAL SERVICE:

A radio service carried on by experimental stations engaged in research or development in the radio art.

(37) POLICE SERVICE:

The radio service carried on by provincial, state, or municipal police authorities for emergency services principally with mobile police units.

(38) CHANNELS:

The term "channels" means the portion of the radio spectrum of a width sufficient to permit of its use by a radio station for communication purposes; it comprises the following three elements, all defined below:

- 1) the "frequency band of emissions".
- 2) twice the specified "frequency tolerance".
- 3) the "interference guard bands", if required.

(39) FREQUENCY BAND OF EMISSION:

The term frequency band of emission, means that the frequency band of an emission is the frequency band actually occupied by this emission for the type of transmission and for the signalling speed used.

(40) INTERFERENCE GUARD BANDS:

The term "interference guard bands" means the frequency bands additional, to the frequency band of emission and frequency tolerance, which may

be allowed in order that there shall be no interference between stations having adjacent frequency assignments. In general this provision is dependent upon receiver selectivity and transmitter characteristics.

(41) PRIMARILY:

The term "primarily" used in connection with certain bands in the allocation table of this agreement means that as duly authorized installations of the primary services are undertaken, they will have preference on the available channels in that particular band.

The assignment of channels to other services in the general allocation for each of these bands will be carried out in such a manner as to prevent undue interference with existing stations of the primary service.

(42) FACSIMILE BROADCAST STATION:

A station licensed to transmit images of still objects for record reception by the general public.

SECTION 8. AMATEURS

The following provisions concerning amateurs were unanimously agreed upon in addition to the allocation tables:

1. That the band from 1750 to 2050 kc. be allocated for A-1 and A-3 emissions.

2. That, after a study of the recommendations issued by the Radio Conference at Buenos Aires, (revised at Rio de Janeiro, 1937) *e*) and *f*) of Recommendation number 10, they have agreed to amend them, without altering the spirit thereof, substituting in their stead, the following:

e) That the Administrations should point out the convenience that amateurs use the bands from 1750 to 2050 and 3500 to 4000 Kc/s preferably for short distance communication.

f) That the Administrations recommend that the bands from 7000 to 7300 Kc/s and 14000 to 14400 Kc/s should not be used for short distance communications between amateur stations.

3. That frequencies included between 3500 to 4000, 7000 to 7300 and 14000 to 14400 be available for allocation in accordance with the following table:

3500 to 3800 Kc/s.	for A-1 only.
3800 to 4000 Kc/s.	for A-1 and A-3.
7000 to 7050 Kc/s.	for A-1 only.
7050 to 7150 Kc/s.	for A-1 and A-3.
	(A-3 for Latin-America only).
7150 to 7300 Kc/s.	for A-1 only.
14000 to 14100 Kc/s.	for A-1 only.
14100 to 14300 Kc/s.	for A-1 and A-3.
14300 to 14400 Kc/s.	for A-1 only.

Emission type A-1 may be used in the entire frequency band comprised between 14000 and 14400 Kc/s. The Latin-American countries, Canada and Newfoundland may use type A-3 in the frequencies com-

prised between 14100 and 14300 Kc/s. The United States will operate with emission type A-3 on frequencies 14150 to 14250 Kc/s., at least until December 31, 1939.

4. The bands from

1750 to 2050 Kc/s.
3500 to 4000 Kc/s.
7000 to 7300 Kc/s.
14000 to 14400 Kc/s.
28000 to 30000 Kc/s.
56000 to 60000 Kc/s.

shall be amateur bands.

5. In order to make a better use of the 14 megacycle band insofar as radiotelephone communication is concerned, and to avoid at the same time any undue congestion which may be caused by the operation of beginners not familiar with the use of high frequencies, it is recommended that an adequate probationary period in which to acquire the necessary experience, as well as a technical and practical test, be required before an amateur will be granted a license to operate on the 14 megacycle band for radiotelephony.

6. The amateurs bands lately assigned shall not be used for any type of broadcasting fixed or mobile service.

SECTION 9. AMATEUR THIRD PARTY MESSAGES

Whereas the General Radio Regulations annexed to the International Telecommunication Convention of Madrid provide that unless modified by special arrangements between interested countries amateur stations are forbidden to transmit international communications emanating from third persons; and

Whereas it is apparent that the community of interest of the peoples of all the Americas would be fostered by encouraging the exchange, by amateur stations, without charge, of friendly messages emanating from our citizens.

Be it resolved, by the Inter-American Radio Conference, that:

In the interest of close and friendly contacts between the peoples of the Americas, the administrations of the contracting countries whose internal legislation permits it agree that amateur radio stations in their respective countries and possessions may internationally exchange messages emanating from third parties; provided, however, that such messages shall be of a character that would not normally be sent by any other existing means of electrical communication and on which no compensation may be directly or indirectly paid.

SECTION 10. INTERNATIONAL POLICE RADIO

1. Realizing the advantage to be gained by coordinating international police communications, all countries parties to this agreement are encouraged to authorize police radiotelegraph stations in close proximity to the boundaries

of contiguous countries for the transmission of emergency information regarding law enforcement matters. In general, only important police messages are to be handled, such as that which would lose its value due to slowness and time limitations of other communication methods.

2. Stations engaged in international police communication service shall normally use the facilities provided for national police service; provided (a) that police frequencies used primarily for radiotelephone communication with mobile police units shall not be used for radiotelegraph communication, (b) that stations of different countries in close proximity to the boundary between countries may be authorized by their administrations to exchange point to point radiotelephone communication, and (c) that initially the following frequencies be used for both national and international police radiotelegraph communication:

2804 Kc/s calling	5195 Kc/s day only calling
2808 Kc/s working	5135 Kc/s day only working
2812 Kc/s working	5140 Kc/s day only working.

3. Notifications concerning the particulars of stations engaged in international police service shall be forwarded to the Bureau of the International Telecommunication Union, Berne, Switzerland, in order that all stations desiring to inter-communicate may be kept informed of the details concerning individual operation.

4. In order to insure uniformity in the handling of messages, the following operating procedure shall be followed:

(a) This service shall, in general, conform with the provisions of Article 16 of the General Radio Regulations annexed to the International Telecommunications Convention, Madrid, 1932.

(b) Full use shall be made of the list of abbreviations appearing in Appendix 9 to the General Radio Regulations annexed to the International Telecommunications Convention, Madrid, 1932. Plain language shall not be used if an abbreviation will suffice. Service indications are as follows: P—Priority, for messages which are to be sent immediately regardless of the number of other messages on file. No service indication, messages that are to be transmitted in the order of receipt.

(c) The message shall contain the preamble, text, and signature, as follows:

(1) *Preamble*: The preamble of the message shall consist of the following: The serial number preceded by the letters NR; service indications as appropriate; check (this is the group count according to standard cable count system, the letters "CK" followed by numerals indicating the number of words contained in the text of the message); office and country of origin (not abbreviated); day of month and month; hour of filing; address.

(2) *Text*: The text may be in either plain language or code.

(3) *Signature*: The signature shall include the name and title of the person originating the message.

SECTION 11. RADIO AIDS TO AIR NAVIGATION

STANDARDS OF FIELD STRENGTH AND INTERFERENCE RATIOS

1. WHEREAS the Inter-American Radio Conference has carefully considered the various resolutions of the September 1937 Inter-American Technical Aviation Conference of Lima, and in particular resolutions XIV, XVII and XVIII which were referred to this Conference and

2. Considering

a) the great importance of radio aids to air navigation, the phenomenal growth of air traffic and the further expansion which will certainly take place in the future;

b) the exacting requirements of such radio aids to air navigation with respect to stability of emissions as affected by multiple path transmission which can be minimized to the greatest extent by selection of frequencies least subject to sky wave effects;

c) the extremely limited range of frequencies which possess the necessary propagation characteristics as mentioned in (b) above;

d) the absolute dependence of aircraft in flight upon radio for navigational guidance and communication;

e) the vast number of aircraft throughout the world that now use, and must continue to share the limited number of frequencies suitable for aids to air navigation, therefore making the strictest economy of use necessary in order that all may be accommodated with a minimum of interference;

f) the standardization which therefore seems desirable in order to facilitate international flying by coordination, and, as far as possible, standardization of equipment and operating procedure;

g) that it is possible for a single ground station such for instance as the radio range beacon to simultaneously give navigational guidance to a practically unlimited number of aircraft;

h) the grave responsibility of radio aids to air navigation for rendering reliable service to aircraft which, under certain circumstances, may be entirely dependent for their safety upon uninterrupted reception of satisfactory navigational signal; and

i) the short period of time that has been available for engineering study since the September 1937 Inter-American Technical Aviation Conference at Lima;

3. The Inter-American Radio Conference resolves:

a) That in accordance with the recommendations of the Lima Convention the countries participating in this conference should prepare and exchange not later than June 1, 1938 all pertinent data which may be of value in the drafting of the following tables which may serve as a guide in connection with the application of the engineering principles herein set forth.

Table I listing various types of radio aids to air navigation which have been approved for service operation;

Table II establishing minimum signal intensities required for satisfactory reception of the various types of radio aids to air navigation, such data to be used as a basis for determination of normal service areas;

Table III establishing permissible values of interfering signal strength for the various types of radio aids to air navigation expressed in ratios of desired to undesired signal at the minimum service signal contour (a) on the same frequency, (b) 3 kc/s removed in frequency, and (c) 6 kc/s removed in frequency.

b) that radio aids to air navigation, especially those which are of a one-way or broadcast nature, such as radiobeacons, should be expected to maintain the highest possible standards of reliability, stability, and quality of emissions;

c) that in the interests of economy of frequencies the limited number of channels suitable for the use of radio air navigational aids should be assigned with the closest practicable separation, considering the type of service and class of emission, and that, as far as possible, all nations should reserve the same bands for similar types of service in order to simplify receiver design and through standardization extend the geographical limits of usefulness;

d) that the sharing of frequencies to provide facilities within the authorized bands might be arranged by regional agreement between the countries within whose borders lie portions of the interference area of existing stations as determined by the table of interference ratios and service signals;

e) that the power radiated by radio aids to air navigation in the authorized frequency bands should ordinarily be confined to a value consistent with the normal required signal intensity within the area in which it is desired to render service in order that interference beyond the service area may be reduced to a minimum.

NOTE: See additional material submitted by the U.S.A. for informative purposes, annexed.

SECTION 12. SUPPRESSION OF INTERFERENCE CAUSED BY ELECTRICAL APPARATUS

1. Diathermy apparatus, induction field heaters, carrier call systems, and similar non-radio apparatus which use radio frequency currents as an essential to their operation, may be a serious source of interference to radio communications.

2. The use of such apparatus has an important place in therapeutics, surgery, industry, etc.

3. The radiation of radio energy is not essential to the proper functioning of the apparatus and can be prevented or controlled without impairing the usefulness of the apparatus for its intended purpose.

4. The radiation takes place generally from the output circuit, internal circuits or power supply connection, all of which are essential elements.

5. The extent of the radiation depends upon the operating frequency or frequencies, power, and the design, installation and operation of the apparatus.

6. The radiation through the power supply connection can be prevented by means of the proper line filter. Radiation from the internal circuits can be prevented by means of suitable metallic cases. The radiation from the output circuits can be reduced to a level so as not to cause interference to radio communications by means of suitable metallic shielding, if the shielding encloses the entire apparatus and is of sufficient dimensions that large eddy currents are not produced in the shield.

7. In many cases it may not be practicable to employ the required shielding.

8. The frequencies used for such apparatus may be any frequency in the useful radio spectrum. However, many modern diathermy units (which cause most long-distance radio interference) operate on frequencies from approximately 10,000 to 20,000 kilocycles. Operations on other frequencies mainly cause interference to local or moderate distance reception.

9. In cases where it is not practicable to shield the entire apparatus to control the radiation, then the only means of operating machines without causing interference would be to use frequencies which are not assigned to any radio services.

10. The usual diathermy machine is essentially a radio transmitter of the self-excited oscillating type and generally uses self-rectifying plate power supply. Due to the inherent instability of the oscillator circuits, the wide variation in voltage during a plate supply cycle, and the different uses to which the output circuit is subject, the operating frequency varies during normal operation over very wide bands, possibly one or two megacycles, when operating on a frequency of approximately 15 megacycles.

11. All diathermy machines designed for the same service could operate on the same frequency without impairing their usefulness, since their operation is not affected by radiation from other machines. To operate on a fixed frequency would require additional apparatus and cost in that automatic frequency control would be required—to maintain the operating frequency within at least $\frac{1}{20}$ percent to be effective. At 15 megacycles this would require a band width of 15 kilocycles, or virtually one communication channel.

12. From the best information available diathermy operation should be restricted until the art advances to the point where apparatus may be designed to completely suppress interfering radiations, to three frequencies, namely, approximately 12 megacycles, 25 megacycles, and 50 megacycles.

13. Such apparatus as carrier call systems and certain types of induction furnaces and similar apparatus using medium or low frequencies should be

required to restrict the generation of harmonics and make the necessary test to determine that radiation of signal does not result beyond a prescribed level.

14. Each subscribing country should make the necessary regulations to require the complete shielding or operation on designated frequencies of all non-radio apparatus which generate radio frequency electric energy as an essential to its operation but does not engage in radio communication.

15. There is annexed hereto a report on "Radio Interference from Electro Therapeutic Apparatus" presented by Canada which is to be considered part of the material adopted on this subject.

NOTE: See "Radio Interference from Electro Therapeutic Apparatus" report presented by Canada, contained in document C.I.R./Doc. 43.

In witness whereof, the respective Delegates have signed various copies of this instrument in Spanish, English, Portuguese and French, to be deposited in the archives of the Government of Cuba, which shall forward an authenticated copy thereof in each language to the other contracting Governments.

Done in the city of Havana, Republic of Cuba, on the 13th day of December, 1937.

Argentine Republic:

Brazil:

JOSÉ ROBERTO DE MACEDO-SOARES

Canada:

LAURENT BEAUDRY
C. P. EDWARDS

Colombia:

JORGE SOTO DEL CORRAL
RICARDO GUTIÉRREZ LEE Y RIVERO

Cuba:

WIFREDO ALBANÉS Y PEÑA
ANDRÉS ASENSIO Y CARRASCO
NICOLÁS GONZÁLEZ DE MENDOZA Y
DE LA TORRE
ALFONSO HERNANDEZ CATÁ Y GALT

Chile:

EMILIO EDWARDS BELLO

Dominican Republic:

ROBERTO DESPRADEL
MÁXIMO LOVATÓN P.

United States of America:

T. A. M. CRAVEN

Guatemala:

ARTURO CÓBAR L

Haiti:

JUSTIN BARAU

Mexico:

IGNACIO GALINDO
SALVADOR TAYABAS
FERNANDO SÁNCHEZ AYALA
RUBÉN FUENTES

Nicaragua:

GUILLERMO ARGUEDAS

Panama:

ERNESTO M. FÁBREGA

Peru:

CARLOS A. TUDELA

Uruguay:

CÉSAR GORRI

Venezuela:

ALBERTO SMITH

ANNEX

ADDITIONAL DOCUMENT FOR INFORMATION PURPOSES

In accordance with the suggestion made for an interchange of technical information, the Inter-American Radio Conference takes into consideration the following points, which shall be presented at the appropriate time by the Government of the United States of America, to all the American countries.

1. Lists of all aeronautical stations in the United States operated by the Department of Commerce, Bureau of Air Commerce. This list will give the following information concerning each station:

Location and type of station.

Bearings of all range beacon courses.

Call letters.

Operating frequency in kilocycles.

Station identification signals.

Bearing and distance to nearest landing field, including exact elevation of such field above sea level.

Schedule of radiotelephone broadcasts of weather information and notices to airmen.

2. Maps on which are plotted locations and range courses of all directional guidance, weather broadcast, and marker beacon stations.

3. Maps of the Department of Commerce aeronautical ground communication system of teletypewriter and radio point-to-point stations.

4. Maps of designated Federal Air mail routes of the United States.

5. Tables and graphic interpretations thereof showing normal service area and normal interference area of each type of directional guidance stations. These tables will be based on an assumption of definite values of minimum service signal and maximum interference ratios and will be corrected for variations in transmitting antenna efficiency to all frequencies between 200 and 400 kc.

6. Attenuation curves based on measurements of existing range beacon stations, showing variation of sky wave intensity with frequency and distance and indicated maximum and minimum ground attenuation as experienced in widely different parts of the continental United States.

7. Detailed performance specifications of various types of aeronautical radio aids developed by the United States Bureau of Air Commerce and approved for service operation.