INTERNATIONAL RADIO CONSULTATIVE COMMITTEE

C.C.I.R.

DOCUMENTS OF THE

Xth PLENARY ASSEMBLY

GENEVA, 1963

VOLUME III

FIXED AND MOBILE SERVICES
STANDARD-FREQUENCIES AND TIME-SIGNALS
MONITORING OF EMISSIONS

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FIXED SERVICES	**Recommendations of Section C (Fixed services)**
	Reports of Section C (Fixed services)
	Questions and Study Programmes assigned to Study Group III (Fixed service systems); Opinions and Resolutions of interest to this Study Group; List of documents of the Xth Plenary Assembly concerning Study Group III
MOBILE SERVICES	**Recommendations of Section D (Mobile services)**
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STANDARD-FREQUENCIES AND TIME-SIGNALS	**Recommendations of Section H (Standard-frequencies and time-signals)**
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MONITORING OF EMISSIONS	**Recommendations of Section J (Monitoring of emissions)**
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* This list includes only those Study Programmes which do not derive from Questions. A Study Programme derived from a Question carries the same serial number as this Question, followed by a letter (e.g. S.P. 102A (XII)). It is inserted in the book immediately after the text of the Question from which it is derived.

ARRANGEMENT OF VOLUMES I TO VII OF THE DOCUMENTS OF THE Xth PLENARY ASSEMBLY OF THE C.C.I.R.

(Geneva, 1963)

VOLUME I	Emission. Reception. Vocabulary (Sections A, B, K and Study Groups I, II and XIV).
VOLUME II	Propagation (Section G and Study Groups V and VI).
VOLUME III	Fixed and mobile services. Standard-frequencies and time-signals. International monitoring (Sections C, D, H and J and Study Groups III, XIII, VII and VIII).
VOLUME IV	Radio-relay systems. Space systems and Radioastronomy (Sections F and L and Study Groups IX and IV).
VOLUME V	Sound broadcasting and Television (Section E, Study Groups X, XI and XII and the C.M.T.T.).
VOLUME VI	Resolutions of a general nature. Reports to the Plenary Assembly. List of participants. List of documents in numerical order.
VOLUME VII	Minutes of the Plenary Meetings.

Note 1. – To facilitate references, the pagination in the English and French texts is the same

Note 2. – At the beginning of Volume VI will be found information concerning the Xth Plenary Assembly of the C.C.I.R. and the participation at this meeting, on the presentation of texts (Definitions, origins, numbering, complete lists, etc.), together with general information on the organization of the C.C.I.R.

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RECOMMENDATIONS OF SECTION C: FIXED SERVICES

RECOMMENDATION 75

CLASSIFICATION AND ESSENTIAL CHARACTERISTICS OF FEED-BACK SUPPRESSORS

(Question 31)

The C.C.I.R., (Geneva, 1951)

CONSIDERING

that the feedback suppressors now generally used are of a type, the operation of which is sufficiently independent of the characteristics of those at the opposite end of the circuit;

UNANIMOUSLY RECOMMENDS

that no classification of types nor terminology should be adopted.

Essential characteristics

(§ *(b)* of Question 31)

The essential characteristics of the feedback suppressors, used on radiotelephone circuits in the United Kingdom and in the United States of America for fixed services, are described respectively in Docs. 49 and 51 of Geneva, 1951. These are in substantial accord with the characteristics described in C.C.I.F., 1950–1951, 5th Study Group, Doc. 7, Question 2.

RECOMMENDATION 100

REDUCTION OF OCCUPIED BANDWIDTH AND TRANSMITTER POWER IN RADIOTELEPHONY

(Question 3(III))

The C.C.I.R., (London, 1953)

CONSIDERING

(a) the urgent need for improved use of the radio-frequency spectrum, particularly in the range below 30 Mc/s;

(b) that a very great improvement in the use of the spectrum will arise from the replacement of double-sideband by single-sideband technique (see Recommendation 335, §§ 2.1 and 2.2);

(c) that improvements can be obtained by the use of noise reducers and devices enabling the average percentage of modulation to be maintained at a high level, e. g. peak-clipping devices (see Recommendation 339);

RECOMMENDS

1. that Administrations should, whenever possible, make use of single-sideband systems in preference to double-sideband systems *;

2. that noise reducers should be employed at the receiving terminal of all circuits, where an improvement in signal-to-noise ratio can be obtained **;

3. that devices should be employed at the transmitting terminal of all circuits, to enable the average percentage of modulation to be maintained at a high level (for example, peak-clipping devices). With the use of these devices, adequate precautions must be taken to prevent radiation outside the necessary bandwidth (for example, by the use of an adequate low-pass filter after the device) ***.

RECOMMENDATION 106

VOICE-FREQUENCY TELEGRAPHY ON RADIO CIRCUITS

(Question 43(III))

The C.C.I.R., (London, 1953)

CONSIDERING

(a) that diversity reception is not a common practice on radiotelegraph circuits;

(b) that, when voice-frequency equipment is used on radio circuits at frequencies lower than about 30 Mc/s, the quality of these circuits will, in general, be insufficient if no means of diversity reception is provided;

(c) that, in the presence of fading, space– or frequency–diversity gives comparable improvements in the quality of reception of telegraph signals transmitted over radio channels;

(d) that, for adequate frequency diversity, it appears necessary that the frequencies which are used in combination to obtain this diversity should differ by at least 400 c/s;

(e) that space diversity needs only half the bandwidth and less power for each telegraph channel, as compared with frequency diversity, but usually requires more equipment;

UNANIMOUSLY RECOMMENDS

1. that, when voice-frequency telegraph systems are used on radio circuits at frequencies lower than about 30 Mc/s, diversity reception should be used on the individual voice-frequency channels;

2. that, whenever practicable, space diversity should be used in preference to frequency diversity;

3. that, for frequency diversity, the channel frequencies used in combination should have a separation of at least 400 c/s so that adequate diversity effects may be obtained.

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* Improvement of signal-to-noise ratio, or a reduction in power of at least 9 db, is obtained by the use of single-sideband systems instead of double-sideband systems.

** The improvement, which may be obtained in practice, by the use of a noise reducer is dependent upon the signal-to-noise ratio at the input to the noise reducer (for example, an improvement of the order of 10 db may be obtained on radiotelephone circuits of good commercial quality).

*** The improvement, which may be obtained in practice, is dependent upon the original average percentage modulation of the transmitter. Improvement up to 6 db may be obtained in practice.

RECOMMENDATION 162 *

USE OF DIRECTIONAL ANTENNAE

(Question 3(III) – Study Programme 45)

The C.C.I.R., (London, 1953 – Warsaw, 1956)

CONSIDERING

(a) the urgent need to determine the minimum separation between frequencies of stations operating on adjacent channels, below 30 Mc/s;

(b) that the improvement in the signal-to-noise ratio and signal-to-interference ratio to be obtained by the use of directional receiving antennae is an important means of reducing to a minimum the necessary channel spacing;

(c) that the use of directional transmitting antennae considerably reduces the level of interference by
- providing the necessary field-strength at the receiver with reduced transmitted power,
- reducing the received field-strength at stations situated outside the principal lobe of the transmitting antennae;

(d) that, in addition, the use of a directional antenna can contribute an improvement by reducing echo and multipath effects;

(e) that, highly directional antennae can be constructed, using known techniques;

(f) that, despite the non-homogeneous nature of the transmission medium, it is possible to employ transmitting and receiving antennae with appreciably greater directivity than that of antennae in general use;

(g) that it is not yet possible to give full and precise answers to the questions posed in Study Programme 45, §§ 1.1.9 and 1.2.9.

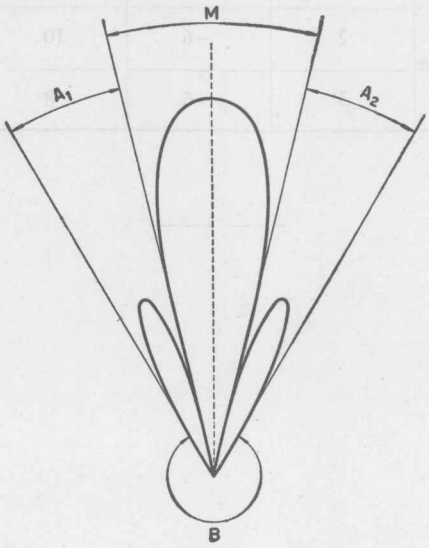

FIGURE 1

* This Recommendation replaces Recommendation 103.

UNANIMOUSLY RECOMMENDS

1. that the characteristics, which might reasonably be expected in practice for rhombic antennae in use at present for point-to-point circuits, should be considered in three main arcs as shown in Fig. 1, i. e.:

   (M) the main arc, including only the main lobe,
   (A) two arcs A_1 and A_2, on either side of the main arc,
   (B) the remaining arc, from the limits of the arcs A_1 and A_2, including the whole of the backward arc.

2. that the gains in the correct azimuthal direction and the gains for the arcs A and B, as shown in the Annex, should be adopted for distances of 3000 to 10 000 km.

ANNEX

Frequency range (Mc/s)	Median value of gain relative to optimum gain for half-wave dipole at the same height (db)			Azimuthal range (degrees)		
	In the correct azimuthal direction	In arc A	In arc B	Half of main arc	Arc $A_1 = A_2$	Half of arc B
4	6	0	−3	30	35	115
6	8	0	−3	25	30	125
8	10	0	−4	20	25	135
11	12	1	−5	15	22	143
15	14	2	−6	10	20	150
22	15	3	−6	8	18	154