

RECOMMENDATION ITU-R M.824-3*

Technical parameters of radar beacons (racons)

(1992-1994-1995-2007)

Scope

Radar beacons are in common use in the maritime radionavigation service and in limited use in the aeronautical radionavigation service. This Recommendation sets out the technical parameters for:

- a general purpose maritime radar beacon,
- an aeronautical fixed-frequency radar beacon.

The ITU Radiocommunication Assembly,

considering

- a) that shipborne radars in the maritime radionavigation service operate in the bands 2 900-3 100 MHz and 9 300-9 500 MHz;
- b) that aeronautical mobile radars operate in the band 9 300-9 500 MHz;
- c) that maritime radar beacons (maritime racons) operate in the frequency bands 2 900-3 100 MHz and 9 300-9 500 MHz;
- d) that the use of fixed-frequency racons is not permitted in the band 9 320-9 500 MHz;
- e) that the use of the band 9 300-9 500 MHz by the aeronautical radionavigation service is limited to airborne weather radars and ground-based radars. In addition, ground-based fixed-frequency radar beacons in the aeronautical radionavigation service are permitted in the band 9 300-9 320 MHz on condition that harmful interference is not caused to the maritime radionavigation service. In the band 9 300-9 500 MHz, ground-based radars used for meteorological purposes have priority over other radiolocation devices,

recommends

- 1** that the technical parameters for general purpose maritime radar beacons, and general purpose ground based aeronautical fixed-frequency radar beacons should be in accordance with Annexes 1 and 2, respectively.

* This Recommendation should be brought to the attention of the International Civil Aviation Organization (ICAO), the International Maritime Organization (IMO), the World Meteorological Organization (WMO) and the International Association of Lighthouse Authorities (IALA).

Annex 1

Technical parameters for a general purpose maritime radar beacon (racon)

Item	Parameters	Specifications
1. Antenna	Polarization	In the 3 GHz band, suitable for responding to radars using horizontal polarization and to radars using vertical polarization In the 9 GHz band, suitable for responding to radars using horizontal polarization
2. Receiver	Frequency band Recovery period Primary radar pulse length gating	2 900-3 100 MHz and/or 9 300 to 9 500 MHz $\leq 100 \mu\text{s}$ after end of response $\geq 0.05 \mu\text{s}$ $\leq 2 \mu\text{s}$
3. Transmitter	Frequency	Transmission should occur: <ul style="list-style-type: none"> – either on the frequency of the interrogating signal with a frequency matching accuracy of ± 3.5 MHz for interrogating pulses with a duration of less than 200 ns, or, with a frequency matching accuracy of ± 1.5 MHz for pulses with a duration equal to or more than 200 ns – or by a series of sweeps covering the entire frequency band of the receiver in which the signal was received. Where the transmission consists of a series of sweeps, the form of the sweep shall be sawtooth and should have a slew rate of between 60 s and 120 s per 200 MHz
4. Response	Delay after receipt of interrogation Form of identification Duration	Normally not more than 0.7 μs Identification coding should normally be in the form of a Morse letter. The identification coding used should be as described in appropriate navigational publications The identification coding should comprise the full length of the radar beacon response and, where a Morse letter is used, the response should be divided with a ratio of one dash equal to three dots and one dot equal to one space. The coding should normally commence with a dash The duration of the response should be approximately 20% of the maximum range requirement of the particular radar beacon, or should not exceed five miles, whichever is the lower value. In certain cases, the duration of the response may be adjusted to suit the operational requirements for the particular radar beacon (see Note 1)

NOTE 1 – Characteristics for antenna gain, receiver sensitivity, transmitter power, racon response duration, frequency agile racon on/off time, and side-lobe suppression should be determined by administrations.

Annex 2**Technical parameters for a general purpose ground-based
aeronautical fixed-frequency radar beacon***Transmitter:*

Frequency:	9 310 MHz
Necessary bandwidth (allowing for frequency tolerance of ± 3 MHz):	12 MHz
Power (measured at antenna terminals):	50 W
Form of identification:	15 digital codes
Overall length of transmission:	15.5 μ s

Receiver:

Passband:	9 370 to 9 380 MHz
Sensitivity:	-55 dBm
Maximum blocking period:	25 μ s
Pulse length discrimination:	2.35 ± 0.3 μ s
Fixed delay in response:	4.7 ± 0.1 μ s

Antenna:

Gain:	0 dB minimum
Beamwidth:	Azimuth: 360° Elevation: 30°
Polarization:	Horizontal
