

IEEE Standard Letter Designations for Radar-Frequency Bands

IEEE Aerospace and Electronic Systems Society

Developed by the
Radar Systems Panel

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(Revision of IEEE Std 521-2002)

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Radar Systems Panel
of the
IEEE Aerospace and Electronic Systems Society

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IEEE-SA Standards Board

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Abstract: Letter terms in common usage are related to the frequency ranges that they represent in this standard.

Keywords: frequency, IEEE 521™ letter band, radar

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Introduction

This introduction is not part of IEEE 521-2019, IEEE Standard Letter Designations for Radar-Frequency Bands

The Standard Letter Designations for Radar-Frequency Bands was first issued in 1976, and was written to remove the confusion that developed from the misapplication to radar of letter band designations of other microwave frequency users. This standard relates the letter terms in common usage to the frequency ranges that they represent. The 1984 revision defined the application *V* and *W* to a portion of the millimeter wave region while retaining the previous letter designators for frequencies below the millimeter wave region. The 2002 revision included a change in the definition of millimeter wave frequencies to conform to the ITU designation, and revised the notes to [Table 1](#). This revision keeps the same letter band designations, but adds a “THz” band in recognition of the growing development of echolocation systems and associated technology in the region 300 GHz to 1000 GHz. [Table 1](#) has been modified accordingly and updated to conform to the latest ITU (2016) designations.

The Standard Letter Designations for Radar-Frequency Bands issued in 1976 and revised in 1984 and 2002 listed the specific frequency ranges for radar only for ITU Region 2 in [Table 1](#). [Table 1](#) was modified for international application by including ITU Regions 1 and 3, in addition to ITU Region 2. In this 2019 revision, the notes to [Table 1](#) have been updated to conform with the latest (2016) ITU designations.

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IEEE Standard Letter Designations for Radar-Frequency Bands

1. Scope

Since World War II, radar systems engineers have used band letter designations as a short notation for describing the frequency band of operation. This usage has continued throughout the years and is now an accepted practice of radar engineers. Radar-frequency letter designations are used for the following reasons:

- They provide a convenient method for describing the band in which the radar operates without the need for awkwardly stating the frequency limits in numerical terms. For example, it is more convenient to say an “L-band radar” than a “1215 MHz-1400 MHz radar.” This is especially important in titles of published papers on radar, in advertising of radar systems and components, or in any other situation where a short notation is desired.
- In military radar systems, the exact frequency of operation cannot usually be disclosed, but it is permissible in many cases to describe the band in which it operates. The letter designations permit this.
- Each radar-frequency band has its own particular characteristics. Thus, an X-band radar will be different from an S-band radar. The letter designations are often used in this manner to indicate the particular nature of the radar, as it is influenced by its frequency. There are vast differences in characteristics, applications, and environmental constraints that distinguish radars in the different bands. It is the need to communicate concisely the whole set of characteristics that are shared by S-band radar, as distinguished from L-band radar, C-band radar, and the others, which requires the established usage of letter designations.

2. Usage

The nomenclature of [Table 1](#) shall be followed when letter designations are used to describe the frequency of radar operation. When appropriate, it is suggested that the specific International Telecommunications Union (ITU) radio-communication numerical band limits be inserted parenthetically; for example, VHF (216 MHz through 225 MHz) in Region 2 or L-band (1.215 GHz through 1.4 GHz).

3. Relation to other nomenclature

The radar letter designations are consistent with the recommended nomenclature of the ITU, as shown in [Table 2](#). Note that the high frequency (HF) and the very high frequency (VHF) definitions are identical in the two systems. The essence of the radar nomenclature is to subdivide the existing ITU bands in accordance with radar practice, without conflict or ambiguity.