# Guide to RF Band Nomenclature

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| | ITU Band Designations | | |
|---|---|---|---|
| Common Usage | Frequency Range | Wavelength Range | Radio Frequency Designation |
| **ELF** | < 30 Hz | > 10 Mm | **E**xtremely **L**ow **F**req |
| **SLF** | 30–300 Hz | 1-10 Mm | **S**uper **L**ow **F**req |
| **ULF** | 300–3000 Hz | 0.1-1 Mm | **U**ltra **L**ow **F**req |
| **VLF** | 3–30 kHz | 10-100 km | **V**ery **L**ow **F**req |
| **LF** | 30–300 kHz | 1-10 km | **L**ow **F**req |
| **MF** | 0.3 – 3 MHz | 0.1-1 km | **M**edium **F**req |
| **HF** | 3–30 MHz | 10-100 m | **H**igh **F**req |
| **VHF** | 30–300 MHz | 1-10 m | **V**ery **H**igh **F**req |
| **UHF** | 0.3 – 3 GHz | 10 cm - 1 m | **U**ltra **H**igh **F**req |
| **micro-waves** | 3–30 GHz | 1 cm - 10 cm | **S**uper **H**igh **F**req |
| **mm-waves** | 30–300 GHz | 1 mm - 1 cm | **E**xtremely **H**igh **F**req |
| **Tera-Hertz** | > 300 GHz | < 1 mm | **T**remendously **H**igh **F**req |

| IEEE Band Designations | | |
|---|---|---|
| Range | Band | Legacy Name |
| 0.3-1 GHz | **UHF** | **U**ltra **H**igh **F**req |
| 1-2 GHz | **L** | **L**ong wave |
| 2-4 GHz | **S** | **S**hort wave |
| 4-8 GHz | **C** | **C**ompromise |
| 8-12 GHz | **X** | Cross (**X**) band |
| 12-18 GHz | **Ku** | **K**urz-**u**nder |
| 18-27 GHz | **K** | **K**urz* |
| 27-40 GHz | **Ka** | **K**urz-**a**bove |
| 40-75 GHz | **V** | **V**ery high |
| 75-100 GHz | **W** | **W** after V |
| 110-300 GHz | **G** | **G**reater |

* "kurz" is German for "short"

////// overlapping or conflicted nomenclature in common use

This chart provides a rough guide to typical RF band nomenclature in engineering. There are numerous standards, some of which conflict in common usage. Originally, most RF bands were designated by wavelength in free space, referenced by decade. For example, low-frequency (or simply LF), refered to any radio wave frequency with a corresponding wavelength between 100 m and 1 km. This practice has been standardized by the International Telecommunications Union (ITU). In the upper UHF, microwave, and millimeter wave region of radio spectrum, however, engineers often use a cryptic lettering system with tangled origins to designate bands -- a practice that has beeen standardized by the Institute for Electronic and Electrical Engineers (IEEE). Even more, the higher-frequency bands are often generically refered to as "microwave", "mm-wave", and "TeraHertz" bands, with usuage often blurring the wavelength decade boundaries. For example, it is common to find engineers refering to the upper UHF band (down to about 1 GHz) as "microwave bands" even though some purists prefer the wavelength decade boundary of 3 GHz. In a similar manner, "mm-wave" spectrum can refer all the way down to 20 GHz (where the wavelength is greater than 1 cm) and "TeraHertz" spectrum can refer all the way down to 300 GHz. Though boundaries may be blurred in common discussion, this usually occurs on the lower side of the wavelength decade boundary, perhaps revealing the aspirational nature of engineers.