International Telecommunication Union

ITU-R
Radiocommunication Sector of ITU

Recommendation ITU-R V.665-3
(08/2015)

Traffic intensity unit

V Series
Vocabulary and related subjects

Foreword

The role of the Radiocommunication Sector is to ensure the rational, equitable, efficient and economical use of the radio-frequency spectrum by all radiocommunication services, including satellite services, and carry out studies without limit of frequency range on the basis of which Recommendations are adopted.

The regulatory and policy functions of the Radiocommunication Sector are performed by World and Regional Radiocommunication Conferences and Radiocommunication Assemblies supported by Study Groups.

Policy on Intellectual Property Right (IPR)

ITU-R policy on IPR is described in the Common Patent Policy for ITU-T/ITU-R/ISO/IEC referenced in Annex 1 of Resolution ITU-R 1. Forms to be used for the submission of patent statements and licensing declarations by patent holders are available from http://www.itu.int/ITU-R/go/patents/en where the Guidelines for Implementation of the Common Patent Policy for ITU-T/ITU-R/ISO/IEC and the ITU-R patent information database can also be found.

Series of ITU-R Recommendations

(Also available online at http://www.itu.int/publ/R-REC/en)

Series	Title
BO	Satellite delivery
BR	Recording for production, archival and play-out; film for television
BS	Broadcasting service (sound)
BT	Broadcasting service (television)
F	Fixed service
M	Mobile, radiodetermination, amateur and related satellite services
P	Radiowave propagation
RA	Radio astronomy
RS	Remote sensing systems
S	Fixed-satellite service
SA	Space applications and meteorology
SF	Frequency sharing and coordination between fixed-satellite and fixed service systems
SM	Spectrum management
SNG	Satellite news gathering
TF	Time signals and frequency standards emissions
V	**Vocabulary and related subjects**

Note: *This ITU-R Recommendation was approved in English under the procedure detailed in Resolution ITU-R 1.*

RECOMMENDATION ITU-R V.665-3

Traffic intensity unit

(1986-1990-2000-2015)

Scope

This Recommendation defines the variable "traffic intensity" and the unit used: the erlang (E).

Keywords

Traffic intensity, erlang

Related ITU Recommendations

Recommendation ITU-R V.430-4 Use of the international system of units (SI)

Recommendation ITU-R V.431-8 Nomenclature of the frequency and wavelength bands used in telecommunications

Recommendation ITU-R V.573-6 Radiocommunication vocabulary

Recommendation ITU-R V.574-5 Use of the decibel and the neper in telecommunications

The ITU Radiocommunication Assembly,

considering

a) that in ITU-T texts concerning telephone operations and tariffs and in ITU-R texts concerning radiotelephone transmissions (e.g. telephone radio-relay systems and the maritime mobile service radiotelephony), the quantity "traffic intensity" is used together with the unit in which it is expressed. With progress in telecommunications, increasing use will be made of this term and this unit;

b) that the variable "traffic intensity" and its unit "erlang" are defined in Recommendation ITU-T E.600 and reproduced below,

recommends

1 that for telecommunication purposes, the following definitions should be used:

traffic intensity: The instantaneous traffic intensity in a pool of resources[1] is the number of busy resources at a given instant of time.

NOTE 1 – Statistical moments may be calculated for a given period of time, for instance the mean traffic intensity $\overline{A}(t_1, t_2)$ is related to the instantaneous traffic intensity $A(t)$ as:

$$\overline{A}(t_1, t_2) = \frac{1}{t_2 - t_1} \int_{t_1}^{t_2} A(t) \, \mathrm{d}t$$

In applications, the term traffic intensity usually has this meaning of mean traffic intensity.

NOTE 2 – Traffic intensity is equivalent to the product of arrival rate and mean holding time.

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[1] The term "resource" means any physically or conceptually identifiable entity, whose use and state at any time can be unambiguously determined, for example, a telecommunication circuit, a switching equipment, a subscriber line or a radio channel.

NOTE 3 – The unit usually used for traffic intensity is the erlang (symbol: E).

erlang: Unit of traffic intensity (symbol: E). 1 erlang is the traffic intensity in a pool of resources when just one of the resources is busy.

NOTE – The name "erlang" was given to the traffic unit in 1946 by the CCIF, in honour of the Danish mathematician, A. K. Erlang (1878-1929), who was the founder of traffic theory in telephony.