

ETSI TS 100 220-1 V1.1.1 (1999-10)

Technical Specification

Electromagnetic compatibility and Radio spectrum Matters (ERM); Short Range Devices (SRDs); Measurement Specification for Wideband Transmitter Stability



Reference

DTS/ERM-RP08-220-1 (21c90icr.PDF)

Keywords

radio, testing, SRD

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Foreword

This Technical Specification (TS) has been produced by ETSI Technical Committee Electromagnetic compatibility and Radio spectrum Matters (ERM).

1 Scope

The present document covers the measurement specification for transmitter wideband stability and refers to the EN 300 220-1 [1].

The frequency error parts of the EN 300 220-1 [1] subclause 8.1 Frequency Error and subclause 8.6 Range of Modulation Bandwidth in particular the subclause 8.6.3 Limits, shall be replaced by the present document.

The conditions for the measurements of the frequency error as defined in the clause 5, Test Conditions, Power Sources and ambient temperatures shall be maintained for the present document.

This is an interim solution for Conformity Assessment purpose until the EN 300 220-1 [1] is revised with regard to this technical specification as well as to comply with the EU Directive 99/5.

It is to note that the technical Parameters of the present document have been aligned with the recently issued CEPT/ERC/REC 70-03 [2] issue June 7th 1999.

2 References

The following documents contain provisions which, through reference in this text, constitute provisions of the present document.

- References are either specific (identified by date of publication, edition number, version number, etc.) or non-specific.
- For a specific reference, subsequent revisions do not apply.
- For a non-specific reference, the latest version applies.
- A non-specific reference to an ETS shall also be taken to refer to later versions published as an EN with the same number.

[1] EN 300 220-1: "Electromagnetic compatibility and Radio spectrum Matters (ERM); Short range devices; Technical characteristics and test methods for radio equipment to be used in the 25 MHz to 1 000 MHz frequency range with power levels ranging up to 500 mW; Part 1: Parameters intended for regulatory purposes".

[2] CEPT/ERC/REC 70-03: "Relating to the use of Short Range Devices (SRD)".

3 Definitions

For the purposes of the present document, the terms and definitions given in EN 300 220-1 [1] apply.

4 Methods of measurement and limits for transmitter parameters

Where the transmitter is designed with an adjustable carrier power, then all transmitter parameters shall be measured using the highest power level, as declared by the applicant. The equipment shall then be set to the lowest carrier power setting, as declared by the applicant, and the measurements for spurious emissions shall be repeated (see subclause 8.7 of EN 300 220-1 [1]).

When making transmitter tests on equipment designed for intermittent operation, the duty cycle of the transmitter, as declared by the applicant on the application form, shall not normally be exceeded. However if it is necessary to exceed the duty cycle for the purpose of testing this is permissible as long as the RF parameter of the transmitter not degraded or compromised. The actual duty cycle used shall be stated on the test report form.

If the equipment is supplied with both a permanent external 50 Ω RF connector and a dedicated or integral antenna, then full tests shall be carried out using the external connector.

In addition the following tests shall be carried out with the dedicated or integral antenna:

- effective radiated power (radiated), (see subclause 8.3 of the main standard EN 300 220-1 [1]);
- spurious emissions (see subclause 8.7 of the main standard EN 300 220-1 [1]).

For wideband equipment, the frequency and drift under extreme conditions shall be measured as defined in subclause 2.1. In addition, the adjacent band or subbands spurious emission measurement shall be made as defined in subclause 8.7 of the main standard EN 300 220-1 [1].

4.1 Frequency error

This measurement shall be made if the equipment is capable of producing an unmodulated carrier. If the equipment is not capable of producing an unmodulated carrier, then the adjacent channel power (see subclause 8.5, of the main standard EN 300 220-1 [1]) shall also be measured under extreme test conditions (see subclause 5.4 of the main standard EN 300 220-1 [1]) and the limits in subclause 8.5.3 of the main standard EN 300 220-1 [1] shall be met.

4.1.1 Definition

4.1.1.1 Wideband systems

The frequency error, also known as frequency drift, is the difference between the nominal frequency as measured on the devices under test and under normal test conditions (see subclause 5.3 of the main standard EN 300 220-1 [1]) and the frequency under extreme conditions (see subclause 5.4 of the main standard EN 300 220-1 [1]).

4.1.2 Method of measurement

The carrier frequency shall be measured (in the absence of modulation) with the transmitter connected to an artificial antenna. A transmitter without a 50 Ω output connector may be placed in the test fixture (see subclause 6.3 of the main standard EN 300 220-1 [1]) connected to an artificial antenna. The measurement shall be made under normal test conditions (see subclause 5.3 of the main standard EN 300 220-1 [1]) and extreme test conditions (see subclause 5.4 of the main standard EN 300 220-1 [1]), (extreme temperature and supply voltage simultaneously).

The frequency error measurement for devices operating as wideband and where the modulation cannot be switched off, is determined in the following steps:

- under normal conditions the reference frequency f is measured and recorded;
- under all extreme conditions according to subclause 5.4 the frequency f_e is measured and recorded.

The absolute value of $(f_e - f)$ is the drift. The limit of 100 ppm is relative to the maximum frequency of the assigned band.

Where:

- f = the frequency measured under normal conditions;
- f_e = the maximum frequency under extreme conditions.

The frequencies f , f_e can be determined by a spectrum analyzer which is put in 'max hold' position and with the device modulated or unmodulated. A reference point f_{ref} for f and f_e can be used and either set on the slope or determined from the averaging of the two 3 dB frequency points. The 3 dB reference point f_{ref} is to determine by $(f_{max} - f_{min}) / 2$, where the f_{max} , f_{min} are the frequencies corresponding to 3 dB frequencies.

4.1.3 Limits

The frequency error for narrowband and wideband equipment shall not exceed the values given in table 1 under normal, extreme or any intermediate set of conditions (as defined in the EN 300 220-1 [1]).

Table 1

Frequency Separation (kHz)	Frequency error limit (kHz for narrowband or ppm for wideband)				
	< 47 MHz	47 to 137 MHz	> 137 to 300 MHz	> 300 to 500 MHz	> 500 to 1 000 MHz
Narrowband 10/12,5	±0,60	±1	±1(b), ±1,50(m) ±2(p)	±1(b), ±1,50(m) ±2,5(p)	No value specified
Narrowband 20/25	±0,60	±1,35	±2	±2(mb), ±2,50(p)	±2,50(mb), ±3(p)
Wideband	-	-	-	±100 ppm	±100 ppm

NOTE: b = fixed station (base), m = mobile station, p = portable station.

History

Document history		
V1.1.1	October 1999	Publication