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STN	**Radarové snímače sledovania letovej prevádzky Sekundárny prehľadový radar (SSR) Harmonizovaná norma pre prístup k rádiovému spektru Časť 2: Monitor vzdialeného poľa (FFM)**	**STN EN 303 363-2 V1.1.1** 87 3363

Air Traffic Control Surveillance Radar Sensors; Secondary Surveillance Radar (SSR); Harmonised Standard for access to radio spectrum; Part 2: Far Field Monitor (FFM)

Táto norma obsahuje anglickú verziu európskej normy.
This standard includes the English version of the European Standard.

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Contents

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Foreword

This Harmonised European Standard (EN) has been produced by ETSI Technical Committee Electromagnetic compatibility and Radio spectrum Matters (ERM).

The present document has been prepared under the Commission's standardisation request C(2015) 5376 final [i.2] to provide one voluntary means of conforming to the essential requirements of Directive 2014/53/EU on the harmonisation of the laws of the Member States relating to the making available on the market of radio equipment and repealing Directive 1999/5/EC [i.1].

Once the present document is cited in the Official Journal of the European Union under that Directive, compliance with the normative clauses of the present document given in Table A.1 confers, within the limits of the scope of the present document, a presumption of conformity with the corresponding essential requirements of that Directive, and associated EFTA regulations.

The present document is part 2 of a multi-part deliverable covering ATC Secondary Surveillance Radar systems for civil air navigation operating in the frequencies 1 030 MHz and 1 090 MHz, as identified below:

Part 1: "SSR Interrogator";

Part 2: "Far Field Monitor (FFM)".

National transposition dates	
Date of adoption of this EN:	26 September 2023
Date of latest announcement of this EN (doa):	31 December 2023
Date of latest publication of new National Standard or endorsement of this EN (dop/e):	30 June 2024
Date of withdrawal of any conflicting National Standard (dow):	30 June 2025

Modal verbs terminology

In the present document "**shall**", "**shall not**", "**should**", "**should not**", "**may**", "**need not**", "**will**", "**will not**", "**can**" and "**cannot**" are to be interpreted as described in clause 3.2 of the ETSI Drafting Rules (Verbal forms for the expression of provisions).

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Introduction

The SSR system provides ground-based surveillance of transponder fitted aircraft and, in addition, may allow data link communication between ground stations and aircraft, where both are fitted with appropriate equipment.

Secondary Radar surveillance is exploited through two essential elements: the SSR interrogator, normally ground-based, and the aircraft SSR transponder.

The Far Field Monitor (FFM) is a ground-installed device that is intended to monitor the uplink and/or downlink performance of a Mode S interrogator system from a site located at a suitable distance from the radar interrogator (far field).

By its fixed location, the Far Field Monitor provides a fixed geo-referenced position with respect to which the SSR interrogator can keep aligned its azimuthal reference with the geographical north.

While a Far Field Monitor has many characteristics in common with a Mode S transponder, there are a number of important differences required to allow monitoring and to ensure that FFM will not impact Air Traffic safety and have only minimal impact on Radio Frequency Interference and SSR channel Loading.

An FFM interrogated by the SSR radar in Mode A, C, S and intermode formats, replies with matching Mode A, C, S reply. The replies are evaluated by the SSR interrogator to ensure correct operation. In addition, the replies may contain data about certain interrogation parameters as seen by the monitor.

As far as Mode S is concerned, it is assumed that the FFM can process interrogations in uplink format UF11, UF4 and UF5 and can transmit the corresponding replies in downlink format DF11, DF4, DF20, DF5 and DF21.

As far as Intermode is concerned, it is assumed that the FFM having Mode-S capabilities will only reply to intermode interrogations of type Mode A only all-call and Mode C only all-call. As far as intermode interrogations of type Mode A/C/S all-call are concerned, the FFM will not reply to them. Table 1 sums up the FFM capabilities.

Table 1: FFM capabilities

Mode	Interrogation processing	Reply Transmission
Mode A	Yes	Yes
Mode C	Yes	Yes
Mode S	Yes for at least UF11, UF4 and UF5 interrogations	Yes for at least DF11, DF4, DF20, DF5 and DF21 replies
Intermode	Yes	No in case of Mode A/C/S all interrogations (long P4)

1 Scope

The present document specifies technical characteristics and methods of measurements for the following equipment used in ground-based ATC Secondary Surveillance Radar systems for civil air navigation:

Far Field Monitors (FFM) operating on the frequencies as indicated in Table 2.

Table 2: FFM operating frequencies

Mode	Operating frequencies
FFM Receive	1 030 MHz
FFM Transmit	1 090 MHz

NOTE: The relationship between the present document and essential requirements of article 3.2 of Directive 2014/53/EU [i.1] is given in Annex A.

2 References

2.1 Normative references

References are either specific (identified by date of publication and/or edition number or version number) or non-specific. For specific references, only the cited version applies. For non-specific references, the latest version of the referenced document (including any amendments) applies.

Referenced documents which are not found to be publicly available in the expected location might be found at https://docbox.etsi.org/Reference/.

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The following referenced documents are necessary for the application of the present document.

Not applicable.

2.2 Informative references

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The following referenced documents are not necessary for the application of the present document but they assist the user with regard to a particular subject area.

[i.1] Directive 2014/53/EU of the European Parliament and of the Council of 16 April 2014 on the harmonisation of the laws of the Member States relating to the making available on the market of radio equipment and repealing Directive 1999/5/EC.

[i.2] Commission Implementing Decision C(2015) 5376 final of 4.8.2015 on a standardisation request to the European Committee for Electrotechnical Standardisation and to the European Telecommunications Standards Institute as regards radio equipment in support of Directive 2014/53/EU of the European Parliament and of the Council.

[i.3] ETSI EG 203 336: "Guide for the selection of technical parameters for the production of Harmonised Standards covering article 3.1(b) and article 3.2 of Directive 2014/53/EU".

[i.4] ICAO Annex 10, Volume IV: "Surveillance Radar and Collision Avoidance Systems", 5th edition, July 2014 including amendments up to amendment 91 dated 22-03-2021.

[i.5] ERC Recommendation 74-01 (2019): "Unwanted emissions in spurious domain".

[i.6] ITU-R Radio Regulations (2020).

[i.7] Eurocontrol Specification for European Mode S Station (EMS) (EUROCONTROL-SPEC-189) Ver 4.0, September 2021.

[i.8] EUROCAE ED-73F: "Minimum Operational Performance Specification for Secondary Surveillance Radar Mode S Transponders", December 2020.

[i.9] ICAO Annex 10, Volume III: "Communication Systems", 2nd Edition, 2007.