

TECH NOTE

What Happens if...?

A Study of the Redundancy Capabilities of the Ecreso FM 5kW Transmitter

Includes Expected RF Output Recovery Power Table



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A Study of the Redundancy Capabilities of the Ecreso FM 5kW Transmitter

The ECRESO FM 5kW offers a truly disruptive approach to high power FM transmission. Its innovative design philosophy delivers a system that is "as solid as a 1+1"; reaching a whole new level of reliability, redundancy and savings.

This document aims to show how the system performs in the event of various types of failures and the power output which you can still expect when deploying the transmitter with built-in 1+1 redundancy.

For a better understanding of this innovative redundancy approach, we strongly recommend reading the previous Tech Note "How Intelligent Transmitter Design Can Deliver 1+1 Levels of Performance"



Available versions of the Ecreso FM 5kW

Before beginning the analysis, it is necessary to define the three systems which are compared in the table that follows.

Ecreso FM 5 kW - Standard Version

This system is supplied with:

- 1 triple phase breaker
- 3 hot swappable 3500W power supplies
- 3 hot swappable 2kW (max 2300W) amplifiers
- 1 FM exciter
- 2 fans (1 inlet / 1 outlet)
- 1 fan power supply

Ecreso FM 5 kW - Redundant version "As Solid As 1+1"

This system is supplied with:

- 1 triple phase breaker
- 3 hot swappable 3500W power supplies
- 3 hot swappable 2kW (max 2300W) amplifiers
- 2 FM exciters
- 4 fans (2 inlet / 2 outlet)
- 2 fan power supplies

Ecreso FM 5 kW - Redundant version "As Solid As 1+1" + 1 additional PSU

This system is supplied with:

- 1 triple phase breaker
- 4 hot swappable 3500W power supplies
- 3 hot swappable 2kW (max 2300W) amplifiers
- 2 FM exciters
- 4 fans (2 inlet / 2 outlet)
- 2 fan power supplies

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RF Output Recovery Scenarios

The following tables provide the typical RF output power values that can be expected, in different scenarios concerning the loss of various components.

We can see that the Standard version will continue to broadcast at 5kW even when a power supply, MOSFET, fan or control unit is affected. The built-in redundancy provided by both the ECRESO FM 5kW "As Solid as a 1+1" systems ensures that they continue to broadcast at full power in ALL cases of loss or failure of any of the main components listed.

All values listed have been observed following a short recovery time. For example, in the case of a Mosfet loss, a short time is required to increase power on the other modules.

Moreover, the transmitter keeps operating indefinitely at the indicated power level.

| | Egreso FM 5 kW Standard Version | Egreso FM 5 kW "As Solid As 1+1" | Egreso FM 5 kW "As Solid As 1+1" + 1 Additional PSU |
|---------------|------------------------------------|-------------------------------------|---|
| Recovery case | TF01205-TT01 TF01205-RT01 | TF01205-TT03 TF01205-RT03 | TF01205-TT03 TF01205-RT03 |
| Nominal | 5 000 W | 5 000 W | 5 000 W |
| Control Unit | 5 000 W | 5 000 W | 5 000 W |
| 1 PSU | ≈ 5 000 W | ≈ 5 000 W | 5 000 W |
| 1 Mosfet | ≈ 5 000 W | ≈ 5 000 W | ≈ 5 000 W |
| 1 Fan | ≈ 5 000 W | ≈ 5 000 W | ≈ 5 000 W |
| Fan PSU | 0 W | 5 000 W | 5 000 W |
| Exciter | 0 W | 5 000 W | 5 000 W |

Typical output power observed in standard operating conditions, 98MHz, 25°C

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Combination of Several Failures

The Ecreso FM 5kW has been designed with separate, robust modules to avoid domino effects. While the probability of several failures occurring at the same time is very low, we still need to have confidence in the performance of our FM transmitter, should the worst happen. The following table provides the typical output power in those very extreme cases.

The table even looks at some highly unlikely scenarios where failures from different stages are combined or there are large multiples failures at once. This may be of practical use perhaps only to the most unlucky of broadcasters but serves as a useful illustration of the robustness of the Ecreso FM 5kW to the vast majority.

Note that in several of the cases listed below, the performance and output of the Ecreso FM 5kW even surpasses that which you would expect from a traditional 1+1 transmitter.

| | Ecreso FM 5 kW Standard Version | Ecreso FM 5 kW "As Solid As 1+1" | Ecreso FM 5 kW "As Solid As 1+1" + 1 Additional PSU |
|-----------------------------|------------------------------------|-------------------------------------|---|
| Recovery case | TF01205-TT01 TF01205-RT01 | TF01205-TT03 TF01205-RT03 | TF01205-TT03 TF01205-RT03 |
| 2 Fans | 0 W | 5 000 W | 5 000 W |
| 2 PSU | 1 500 W | 1 500 W | ≈ 5 000 W |
| Exciter & 2 PSU | 0 W | 1 500 W | ≈ 5 000 W |
| 1 Fan & 1 PSU | ≈ 5 000 W | ≈ 5 000 W | ≈ 5 000 W |
| Exciter & 1 PSU | 0 W | ≈ 5 000 W | ≈ 5 000 W |
| 1 PSU & 1 Fan PSU | 0 W | ≈ 5 000 W | ≈ 5 000 W |
| 3 PSU | 0 W | 0 W | 1 500 W |
| 1 PSU & 1 Amplifier | 3 100 W | 3 100 W | 3 100 W |
| 1 PSU & 1 Amplifier & 1 Fan | 0 W | 3 100 W | 3 100 W |
| 1 Amplifier | 3 100 W | 3 100 W | 3 100 W |
| Exciter & 1 Amplifier | 0 W | 3 100 W | 3 100 W |
| 1 Amplifier & 1 Fan PSU | 0 W | 3 100 W | 3 100 W |
| 2 PSU & 1 Amplifier | 1 200 W | 1 200 W | 3 150 W |
| 2 Amplifiers | 800 W | 800 W | 800 W |
| Exciter & 2 Amplifiers | 0 W | 800 W | 800 W |

Typical output power observed in standard operating conditions, 98MHz, 25°C



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