
RF 910/915 EMC Pre-selectors

User manual

Mk III

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CONTENTS

1. <u>Introduction</u>	4
2. <u>Description</u>	5
2.1 <i>Description of the Pre-selector unit</i>	5
2.2 <i>Pre-selector unit front panel description</i>	6
2.3 <i>Pre-selector unit rear panel description</i>	7
3. <u>Operation</u>	8
3.1 <i>Setting up the Pre-selector</i>	8
3.2 <i>Manual mode</i>	9
3.3 <i>Auto mode</i>	9
3.4 <i>RF 91x control program</i>	10
3.5 <i>Using the RF91x with the Laplace analysers</i>	10
Appendix A. <u>Specification</u>	11

1. Introduction

The RF 910/915 EMC Pre-selector units are designed to enhance the sensitivity of spectrum analyser-based measurement systems. The units has eight or eleven switchable filter paths providing a high level of out of band signal rejection, this being particularly suited to conducted measurements. There is also a through path, for when no filtering is required.

The RF910 is a band B only selector, covering 150KHz to 30MHz.

The RF915 has both band A and band B capability, covering 10KHz – 30MHz. This makes the RF915 ideal for use with EN55015 and other standards that require measurements down to 10KHz.

For the majority of standards, which do not require band A measurements, the RF910 is entirely adequate.

The Pre-selectors may be used in either Manual mode, via the front panel, or in the Auto mode which allows the Pre-selector to be controlled remotely via USB communications.

If used with the Laplace SA1002 or SA300 analysers, operation becomes completely transparent to the user.

2. Description

This section of the manual describes the RF 910/915 and outlines the necessary setting up procedures for the unit.

2.1 Description of the Pre-selector unit.

The pre-selectors provide a single measurement path, covering the range 10KHz or 150kHz to 30MHz. Table 2.1 shows the frequency coverage for these filter bands. Note that band A filters are not fitted to the RF910.

Path	Pass band (Frequency Range)
Filter band A 1	10KHz – 35KHz
Filter band A 2	35KHz – 80KHz
Filter band A 3	80KHz – 150KHz
Filter band B 1	150kHz - 400kHz
Filter band B 2	400kHz - 1MHz
Filter band B 3	1MHz - 2MHz
Filter band B 4	2MHz - 4MHz
Filter band B 5	4MHz - 7MHz
Filter band B 6	7MHz - 10MHz
Filter band B 7	10MHz - 15MHz
Filter band B 8	15MHz - 30MHz
Through	10KHz - 30MHz

Table 2.1 Frequency range of the Pre-selector paths.

The filter paths exhibit insertion losses of 4 dB and are more suited to conducted measurement environments where high signal levels and/or broadband emissions are likely to be experienced.

Please refer to Appendix A for the associated gain factors for each of these paths.

2.2 Pre-selector unit front panel description.

This section of the manual describes the front panel features of the RF 91x EMC Pre-selector unit. See Figure 2.1.

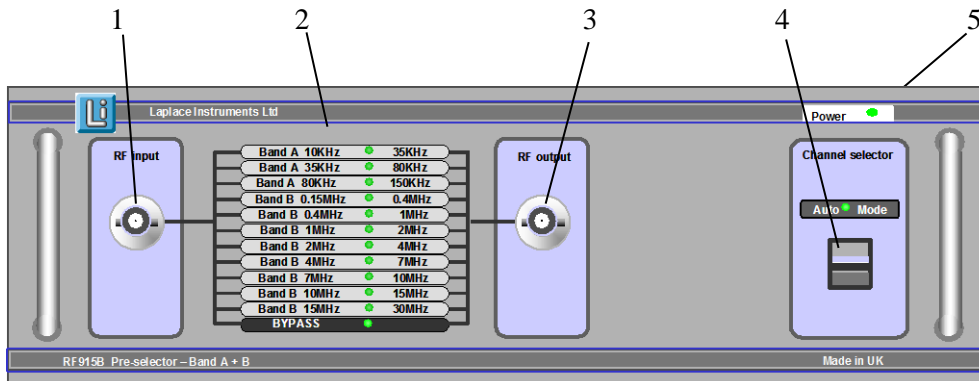


Figure 2.1 Pre-selector front panel schematic.

The features are:-

1. RF signal input for the Pre-selector unit (nominally 50Ω termination).

CAUTION Excessive signal level will cause permanent damage to the unit. See appendix A for specification.

2. LED's. Indicates which filter is currently selected in both Manual and Auto operation. In Auto mode the 'Auto' led will be on. In Manual mode, the 'Auto' mode will be off.
3. RF output from the Pre-selector unit (nominally 50Ω termination).
4. Filter switch. Enables user to select each filter manually or to switch to Auto mode
5. Power indicator.

2.3 Pre-selector unit rear panel description.

This section of the manual describes the rear panel features of the RF 91x Pre-selector unit. See Figure 2.2.

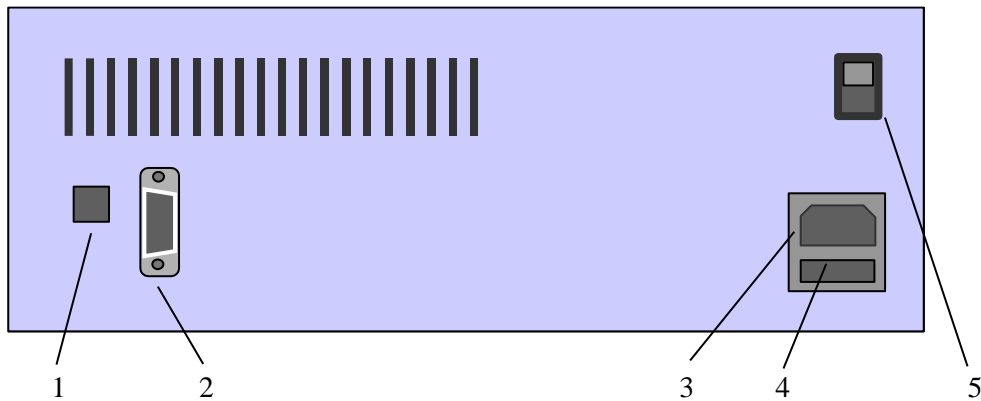


Figure 2.2 Pre-selector rear panel schematic.

The features are:-

1. USB socket.
2. 9-pin serial male socket. Not normally used.
3. Mains input (110v – 240v, 50/60Hz ac)
4. Fuseholder T2A 20mm
5. Power ON/OFF switch.

3. Operation

3.1 Setting up the Pre-selector

The RF 91x Pre-selector package consists of:

- ⇒ RF 91x Instruction Manual
- ⇒ RF 91x Pre-selector unit
- ⇒ Mains power cable
- ⇒ USB cable
- ⇒ BNC – BNC co-ax cable

Please ensure that all the components of the system are present before proceeding. If any parts are found to be missing then please contact your supplier for advice.

Figure 3.1 shows an example test set-up using the Pre-selector in PC controlled (Auto) mode, (see section 3.2 ‘Using the Pre-selector in manual mode’ for more details).

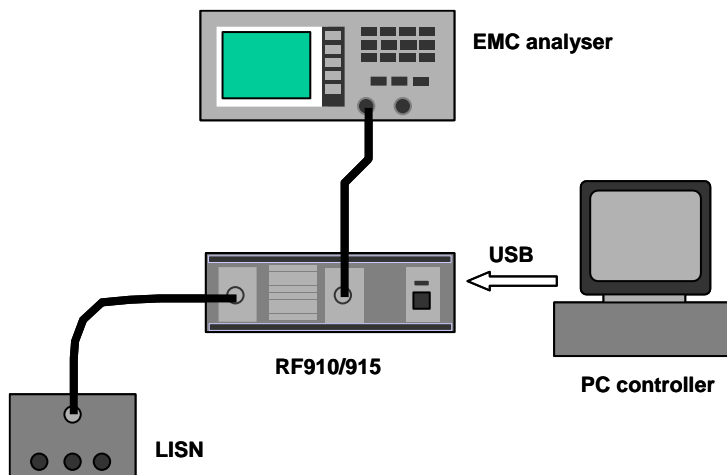


Figure 3.1 Example Test Set-up Using Pre-selector

If the intention is to use the Pre-selector with a Laplace Instruments Spectrum Analyser, then refer to section 3.5 to determine how to configure the system, such that the Pre-selector is remotely controlled when a measurement is performed.

The Pre-selector is powered-up by connecting mains lead to the unit and switching on at the rear panel. The currently selected filter will be indicated by the indicators on the front panel.

3.2 Manual mode

The Pre-selector is in Manual mode when the 'Auto Mode indicator is not illuminated. To switch to manual mode, press and hold the selector switch down for 2-3 seconds. The Auto indicator will go out. If the switch is then pressed again, the selected band will step up or down according to the direction in which the switch is pressed. In this manual state, the unit cannot be controlled via the USB interface.

Remember that when using the Pre-selector in this mode, the insertion loss of the filter or through paths must be compensated for in the measurement. This insertion loss is 4dB in all bands and in through mode.

3.3 Auto mode

To switch to Auto mode, press and hold the selector switch upwards until the green 'Auto' indicator is on. The band selected will be indicated by the green LEDs. The unit will now respond to commands from a PC via the USB interface.

Remember that when using the Pre-selector in this mode, the 4dB insertion loss of the filter or through paths must be compensated for in the measurement.

3.4 RF 91x control program

When using the RF91x with any Laplace analyser and the EMCEngineer software, no separate control program is required.

3.5 RF 91x and the Laplace SA1002/SA3000

Connection

A USB cable (supplied) should be connected between the pre-selector and the controlling PC. This must be running the EMCEngineer software and be controlling the analyser also via USB link.

Operation

The Power ON led should illuminate when the power is switched on.

By default, the RF91x pre-selector will start in Auto mode (the green Auto and the yellow Bypass leds should illuminate).

Run the EMCEngineer software on the PC. The software will automatically detect that the RF91x is connected and will automatically send the appropriate commands via the USB port to switch the RF91x filter bands in synchronism with the analyser scanning.

If you intend to use the system above 30MHz, leave the RF91x USB lead connected, but connect the RF signal direct to the analyser without passing through the RF91x. If switching back to a lower range, the Pre-selector is automatically enabled and it will be seen on the Input menu as ticked, the selection having been made by the software. The correction for insertion loss is automatically applied.

If, at any time, the R91x selector switch is changed from the Auto position, the analyser software will detect the change and show a warning on the screen. The user may opt to continue with the setting or to cancel the sweep and restore the RF91x to the auto mode. This enables the user to select just one band, or to use the through mode if preferred.

Appendix A. Specification.

General Specification:

Power requirements	110 – 240V, 50/60Hz
Max. Power Consumption	10W
Automatic Control	USB
Operating Temperature Range	0 - 40 °C
Dimensions	310 x 260 x 110mm
Weight	3.5kg
Compliance	Complies with:
	EN61010
	EN55022
	EN61326
	EN61000-4-2
	EN61000-4-3
	EN61000-4-4
	EN61000-4-5
	EN61000-4-6
	EN61000-4-11

RF Specification:

Input/Output Impedance	50 Ohm Nominal
Input/Output VSWR	<2:1
Input/Output Connections	BNC
Maximum Signal Input (LF input)	+30dBm
Maximum Input/Output DC Voltage	50VDC
Insertion loss	4dB, ±1dB
Passband Flatness (including gain variation)	< ±2dB
Ultimate Stopband Rejection (150kHz -1GHz)	> 40dB
Noise Figure	< 5dB

NOTE This unit meets the safety requirements for electrical equipment for measurement, control and laboratory use as defined by the European Committee for Electrical Standardisation. The equipment is not intended for use in any other environment and should be used within the limits set out in the above *General Specification*.

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