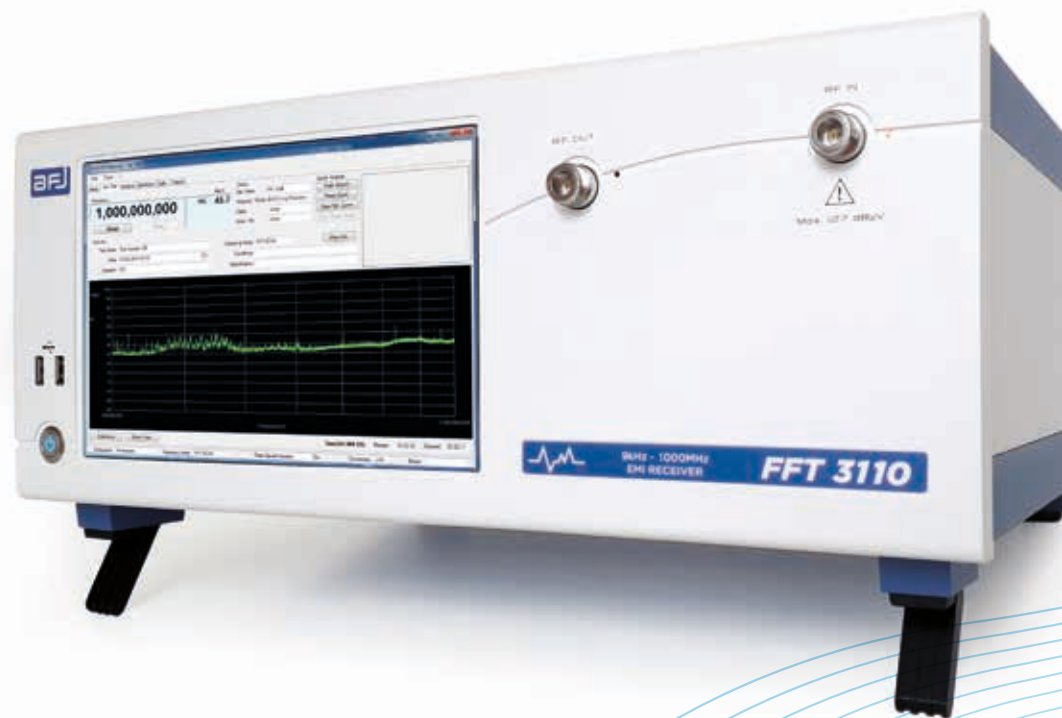




# FFT 3110

## EMI Receiver



### FULLY FFT DIGITAL EMI RECEIVER FOR MEASUREMENT OF CONDUCTED AND RADIATED ELECTROMAGNETIC INTERFERENCE FROM 9kHz TO 1GHz

Compact designed and manufactured compliant to CISPR 16 International Standard, using FFT Scan Mode for fast measurements of conducted and radiated electromagnetic interference in accordance with requirements of EMI International, European and Product standards, pre-selectors and advanced software for EMC testing.

# FFT 3110

## EMI Receiver

Based on a PC integrated architecture with WINDOWS 10 Embedded OS, FFT 3110 EMI Receiver is ready to operate through 10.1" LCD display and advanced software for EMC testing, fitted with pre-selectors that allow excellent dynamic range and precise conducted and radiated emission measurements covering the frequency range from 9kHz to 1GHz.

Measurements to commercial EMI International, European and Product standards, shall be carried out directly by comparing the EMI spectrum with the associated limit lines and switching on the appropriate detectors.

### CISPR COMPLIANCE

FFT 3110 EMI Receiver fully complies with CISPR 16-1-1.

The response of Quasi-Peak Detector in terms of both absolute calibration and relative

calibration lays between the tolerances of CISPR 16-1-1.

The pulse weighting conformity meets down to the minimum value of the Pulse Repetition Frequency (PRF) coming from the DUT, of 1Hz. The FFT Scan Mode is compliant to CISPR 16-3.

Accuracy and reproducibility are key parameters for FFT 3110 EMI Receiver application.



## MAIN FEATURES

- FFT Scan Mode
- Peak, Quasi-Peak, CISPR Average, RMS and CISPR RMS numerical detectors
- Automatic attenuation insertion in case of saturation condition during measurement sweep
- Precise digital overload detector to avoid saturation effects during analyzing function
- Correct pulse weighting to CISPR 16-1-1 from PRF of 1Hz
- High measurement speed
- Fast detection of critical frequencies (dwell time down to 1msec with Peak numerical detector)
- High sensitivity
- Large-signal immunity
- Low measurement uncertainty
- Correction values for attenuator/amplifier, cables loss, coupling networks and antenna factors
- Integrated signal generator
- 10MHz External reference frequency



Software enables the operator to set all parameters and set-up FFT 3110 EMI Receiver as requested by CISPR 16-1-1 or to tailor it according to his specific needs.

Some examples are:

- Frequency range
- Numerical Detectors upgradable by software (Peak, Quasi Peak, CISPR Average, RMS, CISPR RMS and combination of them)
- Limits set by EMI International, European and Product standards
- Dwell measurement time
- Correction factors

### TUNABLE PRE-SELECTION FILTERS

The input bandwidth of the front end is limited by pre-selection filters to reduce the energy at the input stage of the internal tuner to guarantee the wide dynamic range required for quasi-peak detection.



### FFT FUNCTION

Compliant to CISPR 16-3, FFT is applied to the wide-band IF signal with the advantages of Fast Scan Mode.

### FILTERS

Digital CISPR EMI Filters BW (200Hz, 9kHz and 120kHz) do not need any periodic adjustment and maintenance.

# FFT 3110

## EMI Receiver



This equipment is suited for measurement of electromagnetic interference in accordance with the requirements of the following standards:

- CISPR 14-1 (household appliances industry)  $f = 9\text{kHz} \div 300\text{MHz}$
- CISPR 15 (lighting equipment industry)  $f = 9\text{kHz} \div 300\text{MHz}$
- CISPR 25 (automotive industry)  $f = 9\text{kHz} \div 108\text{MHz}$

### DETECTORS

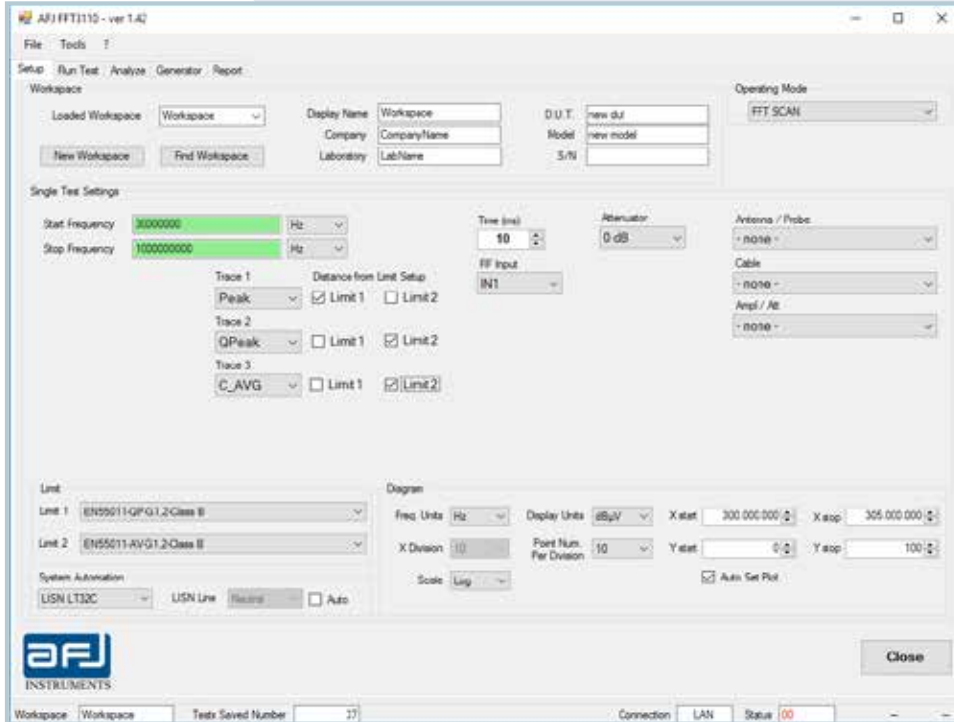
Due to digital technology, five different types of numerical detectors and combinations of them can be selected by the operator: Peak, Quasi-Peak, CISPR Average, RMS and CISPR RMS.

### DATA BASE

Equipment settings, measurements set-up, tests and measurements, frequency tables, external devices correction factors are automatically saved into powerful data base according to the proper work spaces defined by the operator.

# FFT 3110

## EMI Receiver

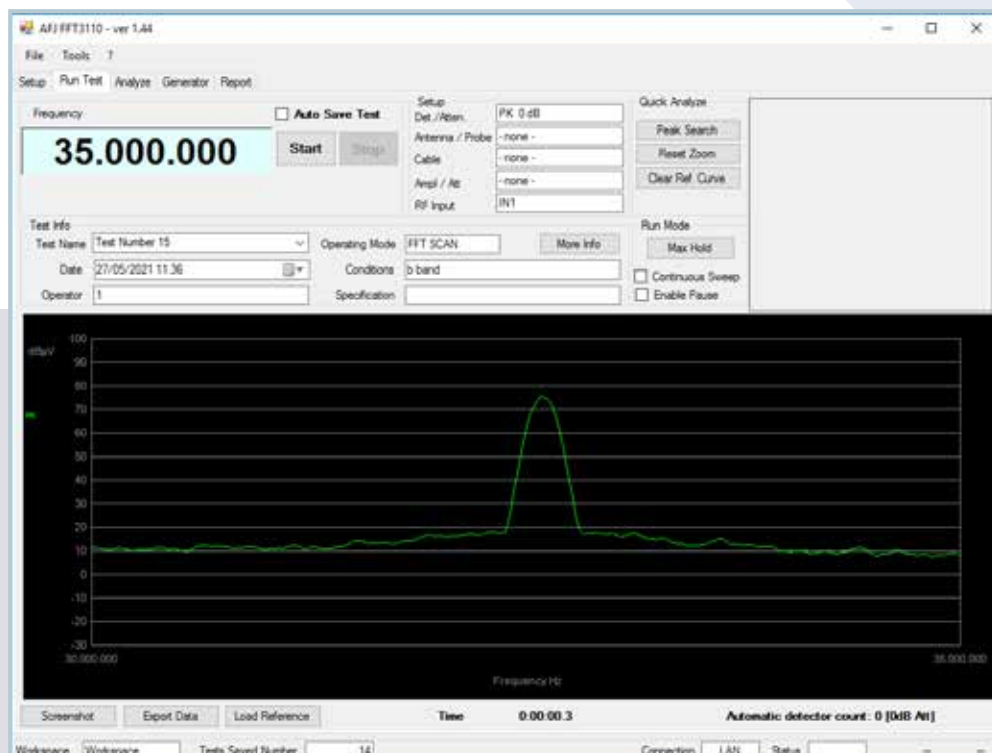


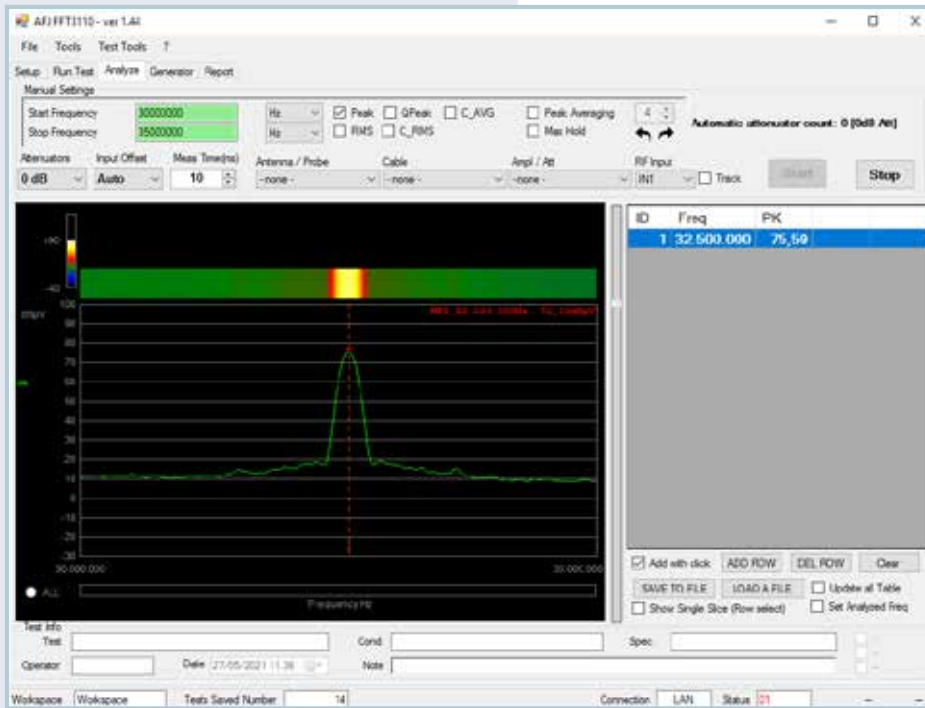
### SETUP

Software settings of all measurement parameters

### RUN TEST

Measurement in FFT SCAN mode



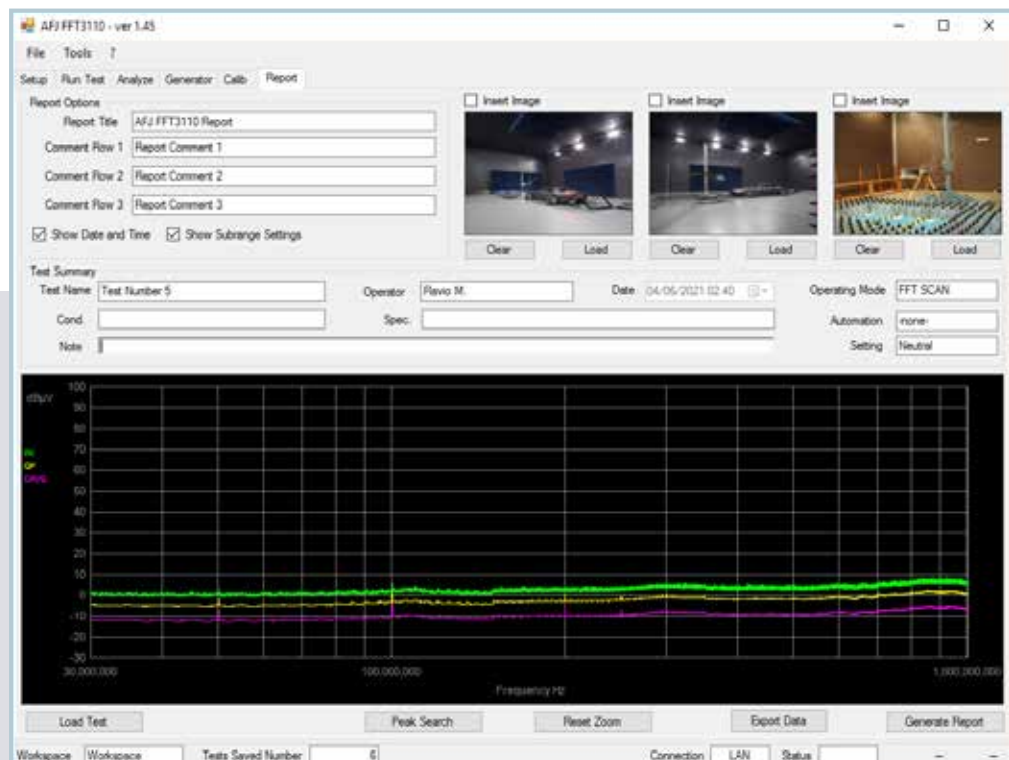


## ANALYZE

Analysis of the measurement result with the possibility to perform a real time acquisition

## REPORT

Creation of test report with all functions that are required for in-house tests to perform EMC diagnostic measurement and to document the test result



## TECHNICAL SPECIFICATIONS

## FFT 3110

### FREQUENCY

Frequency Range	9kHz÷1000MHz
Frequency Setting	1Hz (9kHz÷1000MHz)
Internal Reference Frequency	
Aging per Year	2 x 10 <sup>-6</sup>
Temperature Drift	15 x 10 <sup>-5</sup> (+10 °C to +40 °C)
External Reference Frequency	10MHz
Measurement Time (manual mode)	1ms to 5s
Resolution	1ms
Measurement Time (sweep mode)	1ms to 5s
Resolution	1ms

### RESOLUTION BANDWIDTHS

Digital CISPR EMI Filters BW	200Hz (-6dB Bandwidth)
	9kHz (-6dB Bandwidth)
	120kHz (-6dB Bandwidth)

### PRESELECTION

Pre-Selector Filters	9 kHz to 150kHz	15MHz to 20MHz	140MHz to 350MHz
	150 kHz to 5MHz	20MHz to 30MHz	350MHz to 750MHz
	5MHz to 10MHz	30MHz to 60MHz	750MHz to 1000MHz
	10MHz to 15MHz	60MHz to 140MHz	

### LEVEL

Maximum Input Level	
DC Voltage	50V (AC-coupled)
CW RF Power	+17dBm (Input Attenuation 0dB) +27dBm (Input Attenuation ≥ 10dB)

### Immunity to Interference

Image Frequency	> 50dB
RF Shielding	3V/m (50Ω termination)
Noise Floor	BW 200Hz      BW 9kHz      BW 120kHz
<i>50 Ω termination, Input Attenuation 0dB, Preamplifier OFF</i>	
Peak	< 10dBμV      < 20dBμV      < 18dBμV
Quasi Peak	< 0dBμV      < 15dBμV      < 12dBμV
CISPR Average	< 0dBμV      < 10dBμV      < 7dBμV
RMS	< 0dBμV      < 10dBμV      < 8dBμV
CISPR RMS	< 0dBμV      < 10dBμV      < 8dBμV
<i>50 Ω termination, Input Attenuation 0dB, Preamplifier ON</i>	
Peak	< 0dBμV      < 10dBμV      < 8dBμV
Quasi Peak	< -10dBμV      < 5dBμV      < 2dBμV
CISPR Average	< -10dBμV      < 0dBμV      < 0dBμV
RMS	< -10dBμV      < 0dBμV      < 0dBμV
CISPR RMS	< -10dBμV      < 0dBμV      < 0dBμV
Measurement Accuracy with S/N > 20dB	± 0.8dB (9kHz÷30MHz) ± 1.4dB (30MHz÷1000MHz)

### FFT SCAN MODE

A/D Converter Resolution	16 bit
Sampling Rate	Variable
FFT Span	141kHz (To cover Full CISPR Band A) 5 MHz (Total 6 bands to cover Full CISPR Band B) 5 MHz (Total 54 bands to cover Full Band C) 5 MHz (Total 140 bands to cover Full Band D)
Full Compliant (1Hz) Sweep Measurement Time	< 18s (Band A + Band B)      < 150s (Band C) < 15s (Band B)      < 150s (Band D)
Simultaneous detectors in parallel	3009 (Band A)      211 (Band C) 1669 (Band B)      49 (Band D)
FFT Frequency Resolution	46,875 Hz (Band A)      24kHz (Band C) 3kHz (Band B)      24kHz (Band D)

### INPUT & OUTPUT

RF Input	50Ω
RF Input Connectors	N female (RF 9kHz to 1000MHz)      N female (RF 9kHz to 30MHz) (option)
RF Input VSWR	< 2,0 : 1,0 (Input Attenuation 0dB) < 1,2 : 1,0 (Input Attenuation ≥ 10dB)
RF Input Attenuator	0dB to 30dB in 10dB steps
Integrated Signal Generator	+50 ÷ +90dBμV (9kHz ÷ 110MHz)      +50 ÷ +90dBμV (9kHz ÷ 1000MHz) (option)

### GENERAL

Monitor	10.1" LCD Display
Interface	Ethernet 10/100 MB Removable LAN (LXI Level 0 Protocol)
Power Supply	110/230Vac ± 10% 50/60Hz
Power Consumption	50VA
Operating Temperature	0° to 45°C
Storage Temperature	-20° to 70°C
Size (W x H x D)	450 x 200 x 400mm
Weight	20kg



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