

FFT 3010 EMI TEST RECEIVER

Fully FFT digital EMI Receiver for measurement of conducted electromagnetic interference from 9kHz to 30MHz



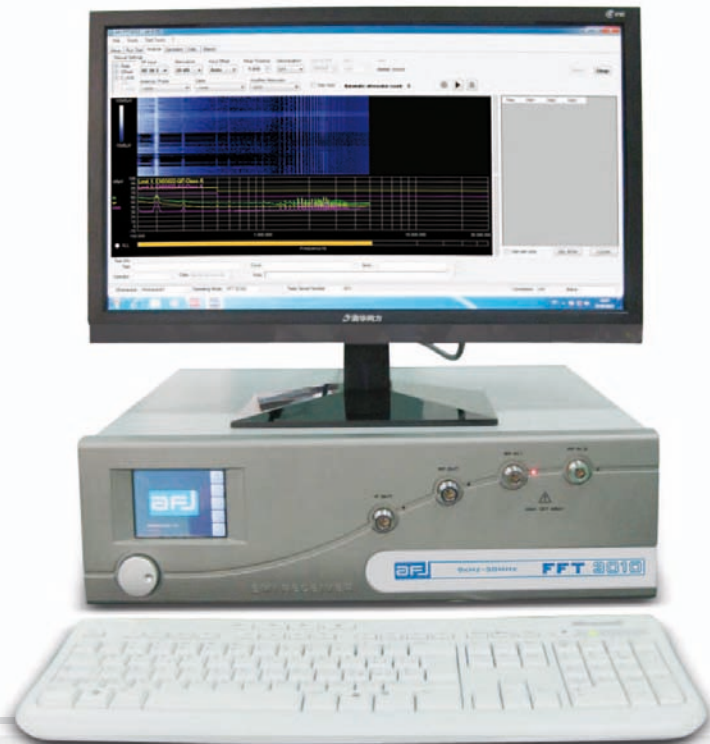
Compact designed and manufactured compliant to CISPR 16 International Standard, using FFT Scan Mode for fast measurements of conducted electromagnetic interference in accordance with requirements of EMI International, European and Product standards, pre-selectors and advanced software for EMC testing.

**Easy
EMC**

FFT 3010 EMI TEST RECEIVER

Based on a PC integrated architecture with WINDOWS 7 Embedded OS, FFT 3010 EMI Receiver is ready to operate with advanced software for EMC testing, fitted with pre-selectors that allow excellent dynamic range and precise conducted emission measurements covering the frequency range from 9kHz to 30MHz.

Remote control with an external PC is also possible.



Optimized easy-to-use EMI measurement concept.

Fitted with the internal pre-selector/preamplifier AFJ FFT 3010 unit features an excellent dynamic range and is, therefore, able to perform precise EMC tests.

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.

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 and fast detection of critical frequencies (dwell time down to 1msec)
- ◆ High sensitivity
- ◆ Large-signal immunity
- ◆ Low measurement uncertainty
- ◆ High measurement speed
- ◆ Correction values for cables loss, attenuator/amplifier, coupling networks, GTEM correction and antenna factors
- ◆ Integrated signal generator
- ◆ 10MHz External reference frequency
- ◆ Software option for AM / FM / WBFM digital demodulations

CISPR COMPLIANCE

FFT 3010 EMI Receiver fully complies with CISPR 16-1-1.

The response of FFT 3010 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 AFJ FFT 3010 EMI Receiver application.

Software enables the operator to set all parameters and set-up FFT 3010 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 International, European and other 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 wideband signal with the advantages of Fast Scan Mode.

FILTERS

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

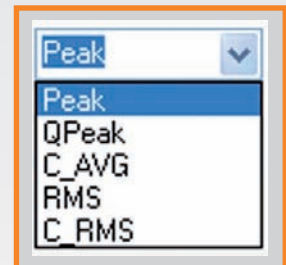
DATA BASE

Receiver 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 user.

DETECTORS

Due to digital technology, five different types of numerical detectors (upgradable by software) and combinations of them can be selected by the user.

In addition to that, each detector type can be associated with a selectable timing, corresponding to the endurance of the measurement aperture gate.

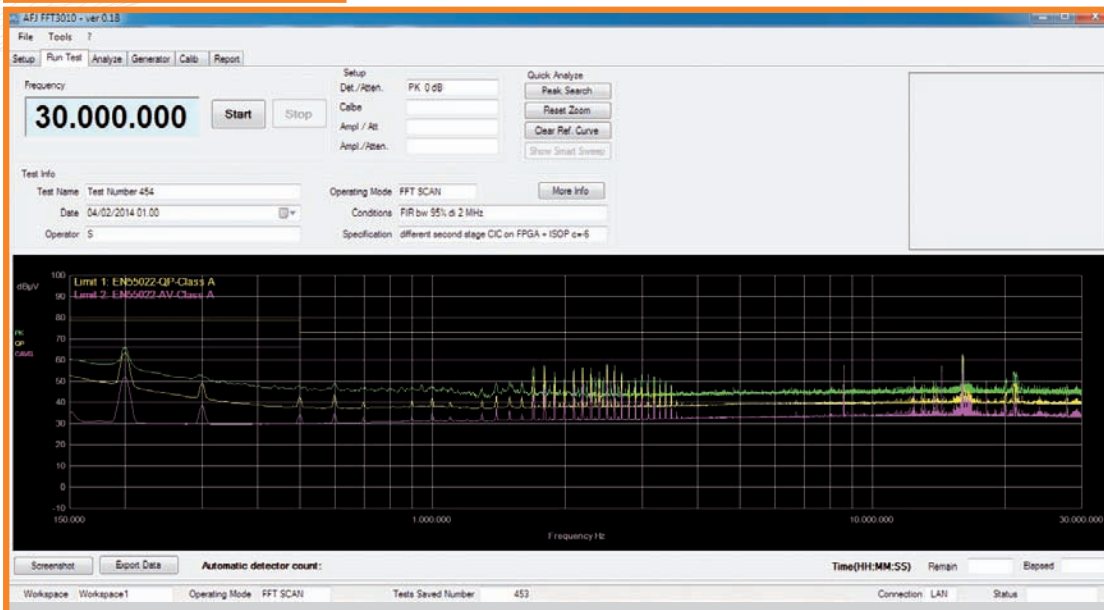


In the Analyze Mode, the bar graph, with current detector value and Max Hold display, shows the results of manual circuit adjustment when DUT cabling is arranged for maximum emission.

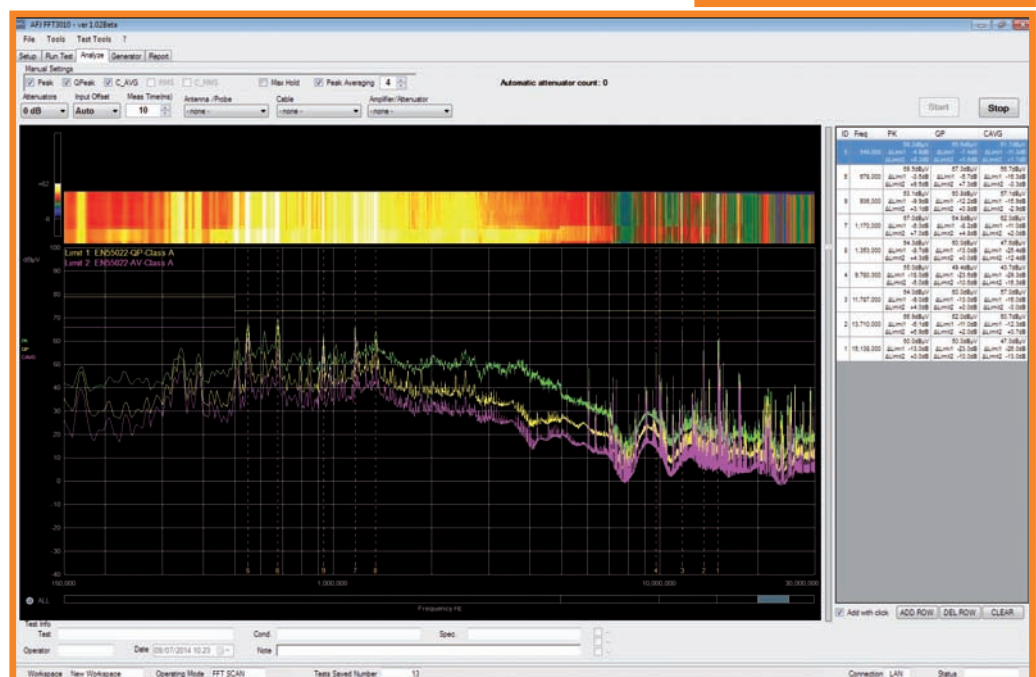
FFT SCAN MODE

Fast Scan Mode with 3009 simultaneous detectors in parallel in Band A and 1669 simultaneous detectors in parallel in Band B increases the measurement speed by a factor 3009 in Band A and 1669 in Band B compared to the measurement speed of the traditional EMI receivers.

FFT SCAN MODE

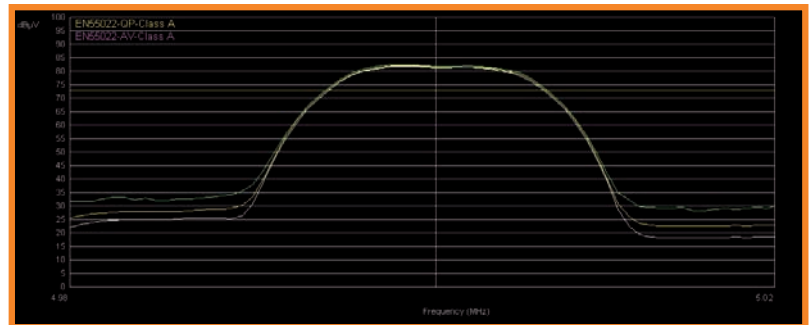


ANALYZE

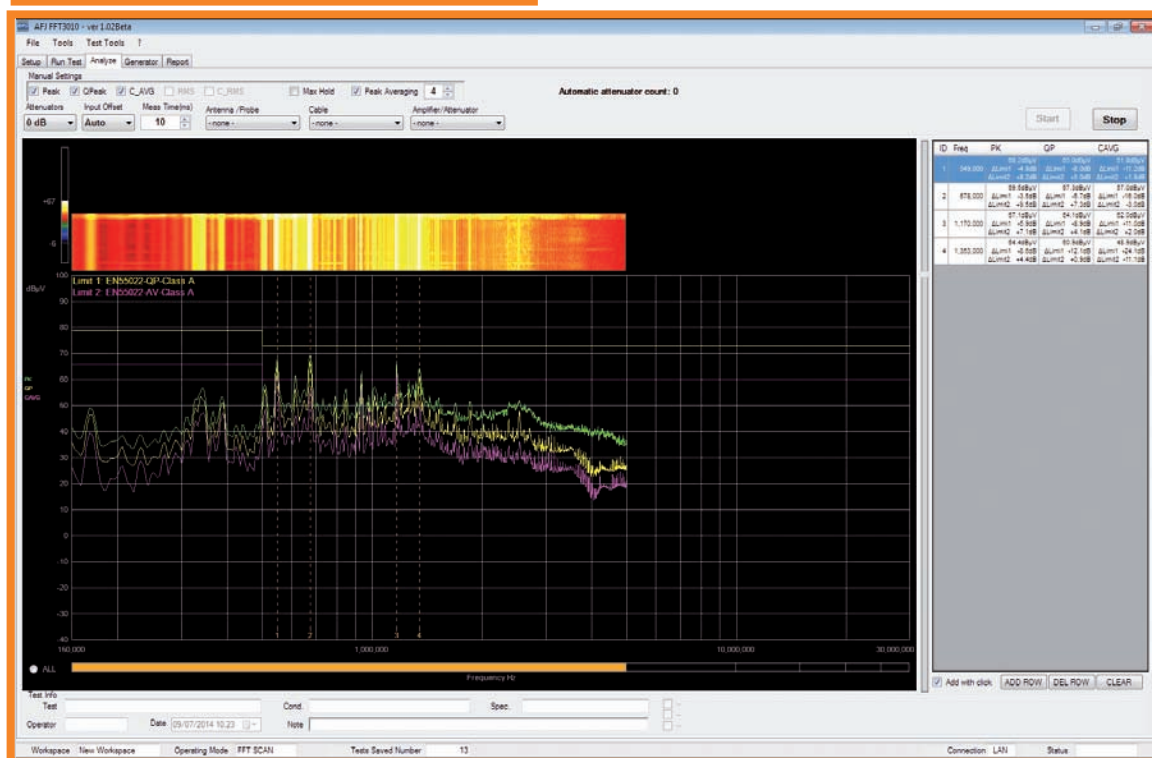


ZOOM MODE

Performs a zooming operation on the diagram part that is selected pushing shift button of the keyboard and left key of the mouse at the same time. The new diagram can be checked with all ANALYZE MODE functions.



ANALYZE WITH SINGLE FFT BAND



INTEGRATED SIGNAL GENERATOR

CW Generator has to be activated by checking flag RF ON after setting the frequency and the amplitude.

CW Generator

Frequency

 Hz

Amplitude

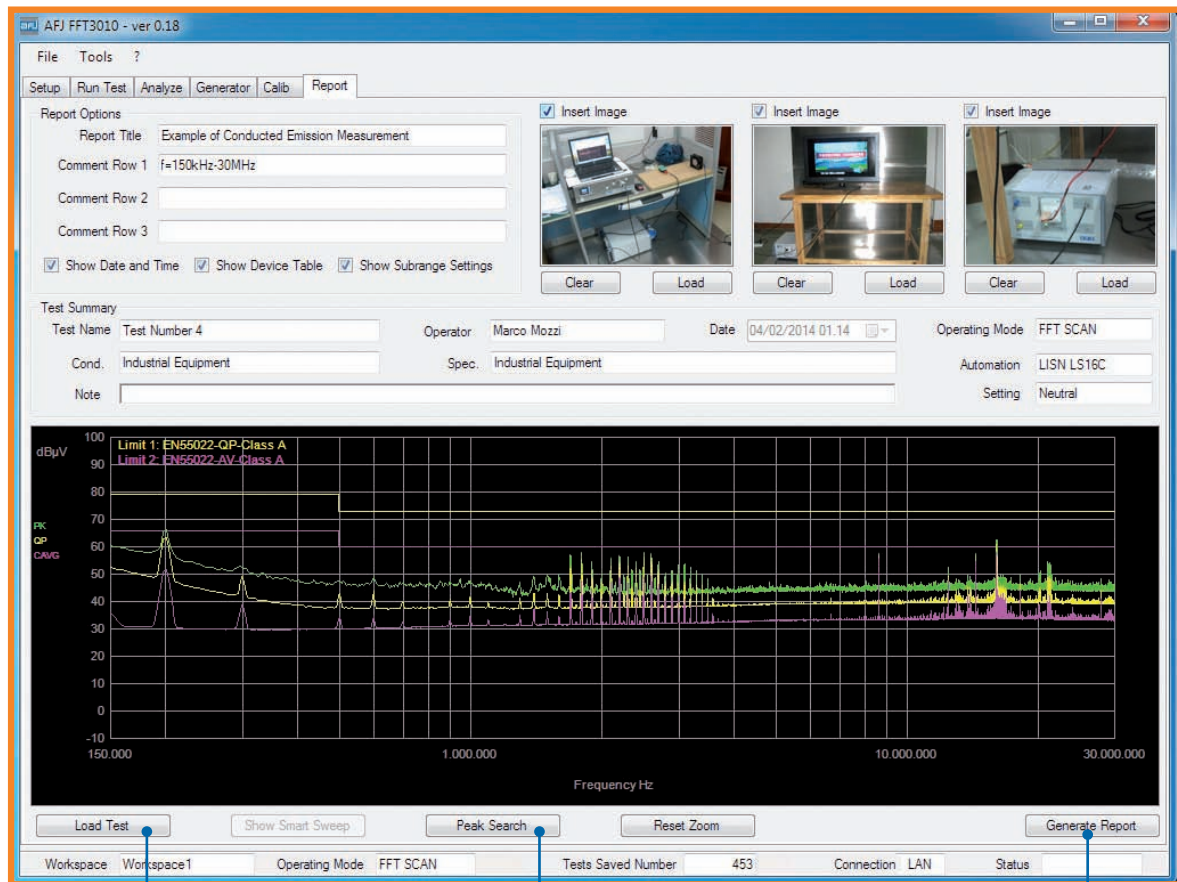
 dBμV

Step

☒ RF ON

FFT 3010 EMI Receiver offers all functions that are required for in-house tests to perform EMC diagnostic measurement as quickly, easily and as accurately as necessary and to document the test results.

The EMC compliance test then will be just a formality.



LOAD TEST

To load old tests and measurements and set all the necessary parameters and information for the test report.

PEAK SEARCH

To search the peaks to insert into the test report.

GENERATE REPORT

To create the test report according to the information set by the user.

SINGLE TEST SETTINGS

To set the parameters that will affect the FFT SCAN MODE.

Start Frequency: 9kHz
Stop Frequency: 30MHz
Trace 1: Peak
Trace 2: QPeak
Trace 3: C_AVG, RMS, C_RMS

TRACES

Different types of numerical detectors can be selected by the user to define up to three traces at the same time.

OPERATING MODE

To enables the selection of the measure conditions under which the FFT 3010 Receiver will operate to perform the analysis **FFT SCAN**, **FILTER**.

ANTENNA/PROBE, CABLE, Amplifier/Attenuator

To set Antenna/Probe correction factors, Cabling calibration files and additional device files (Amplifier and Attenuator).

WORKSPACE

To define and set all data base work space parameters where all data and results will be automatically saved.

Attenuators: 0 dB, 10 dB, 20 dB, 30 dB, Preamp

ATTENUATION SETTINGS

To set the minimum level of internal attenuation of the receiver to have the better dynamic range during measurement, with possibility to insert +10dB internal Preamplifier. In case of saturation condition, automatic attenuation insertion is used. All changes in this section, automatically affect the correction by a consistent extent.

AFJ FFT3010 - ver 0.18
File Tools ?
Setup Run Test Analyze Generator Calib Report
Workspace: Loaded Workspace Workspace1
Display Name: Workspace1
Company: CompanyName
Laboratory: LabName
D.U.T.: dut1
Model: model1
S/N: 000
Operating Mode: FFT SCAN
Single Test Settings: Start Frequency: 150kHz, Stop Frequency: 30MHz, Trace 1: Peak, Trace 2: QPeak, Trace 3: C_AVG
Meas Time (ms): 1.000
RF Input: RF IN 1
Attenuators: 20 dB
Antenna/Probe: none
Cable: none
Amplifier/Attenuator: none
Max Hold: Max Hold
Limit: Limit 1: EN55022-QP-Class A, Limit 2: EN55022-AV-Class A
Diagram: Freq Units: Hz, Display Units: dBuV, X start: 150.000, X stop: 30.000.000, Y start: -10, Y stop: 100
System Automation: none
LISN Line: Neutral
Scale: Log
Auto Set Plot: [x]
Enable Subrange Line: [x]
Close

LIMIT

To recall of all possible **LIMIT** files that can be built using the **EDIT LIMIT** function.

DIAGRAM

To set all necessary parameters for diagram settings.

SYSTEM AUTOMATION

This function requires a text script files to be programmed; this file allows to make an automatic sequence of measurements.

TECHNICAL SPECIFICATION

FFT 3010

FREQUENCY	
Frequency Range	9kHz÷30MHz
Frequency Setting	1Hz (9kHz÷30MHz)
Internal Reference Frequency	
Aging per Year	2 x 10 ⁻⁶
Temperature Drift	15 x 10 ⁻⁵ (+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)
PRESELECTION	
Tunable Filters	9 kHz to 150kHz 150 kHz to 5MHz 5MHz to 10MHz 10MHz to 20MHz 20MHz to 30MHz
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	> 60dB
RF Shielding	3V/m (50Ω termination)
Noise Floor	BW 200Hz BW 9kHz
50 Ω termination, Input Attenuation 0dB, Preamplifier OFF	
Peak	< 10dBμV < 20dBμV
Quasi Peak	< 0dBμV < 15dBμV
CISPR Average	< 0dBμV < 10dBμV
RMS	< 0dBμV < 10dBμV
CISPR RMS	< 0dBμV < 10dBμV
50 Ω termination, Input Attenuation 0dB, Preamplifier ON	
Peak	< 0dBμV < 10dBμV
Quasi Peak	< -10dBμV < 5dBμV
CISPR Average	< -10dBμV < 0dBμV
RMS	< -10dBμV < 0dBμV
CISPR RMS	< -10dBμV < 0dBμV
FFT SCAN MODE	
A/D Converter Resolution	16 bit
Sampling Rate	122,88MHz
FFT Span	141kHz (Full CISPR Band A FFT) 5MHz (Total 6 bands to cover Full CISPR Band B FFT)
Full Compliant (1Hz) Sweep Measurement Time	< 18s (Band A + Band B) < 15s (Band B)
Simultaneous detectors in parallel	3009 (Band A) 1669 (Band B)
FFT Frequency Resolution	46,875 Hz (Band A) 3kHz (Band B)
INPUT & OUTPUT	
RF Input	
Impedance	50Ω
Connector(s)	N female (RF 9kHz to 30MHz)
VSWR	2,0 to 1,0 (Input Attenuation 0dB) 1,2 to 1,0 (Input Attenuation ≥ 10dB)
Input Attenuator	0dB to 30dB in 10dB steps
Integrated Signal Generator	+50 ÷ +90dBμV
GENERAL	
Interface	Ethernet 10/100 MB Remotable LAN (LXI Level 0 Protocol)
Power Supply	230Vac ± 10% 50-60Hz
Power Consumption	50VA
Operating Temperature	0° to 45°C
Storage Temperature	-20° to 70°C
Size (WxHxD)	450 x 135 x 436mm
Weight	12kg



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