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FFT 3010 & 3018 EMI TEST RECEIVERS

Fully FFT digital EMI Receivers for measurement of
conducted electromagnetic interference from 9kHz to 108MHz

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

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FFT 3010 & 3018

EMI TEST RECEIVERS

Based on a PC integrated architecture with WINDOWS 7 Embedded OS, FFT 3010 & 3018 EMI Receivers are 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 108MHz.
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 & 3018 units feature an excellent dynamic range and are, 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 & 3018 EMI Receivers fully comply 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 AFJ FFT 3010 & 3018 EMI Receiver application.

Software enables the operator to set all parameters and set-up FFT 3010 & 3018 EMI Receivers 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

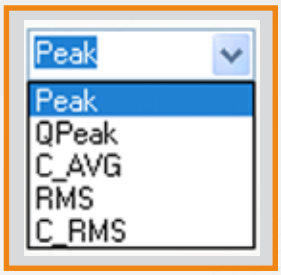
Digital CISPR EMI Filters BW (200Hz, 9kHz and 120kHz) do not need any periodic adjustment and maintenance.

DATA BASE

Receivers 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.

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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 **FFF SCAN, FILTER**.

SINGLE TEST SETTINGS

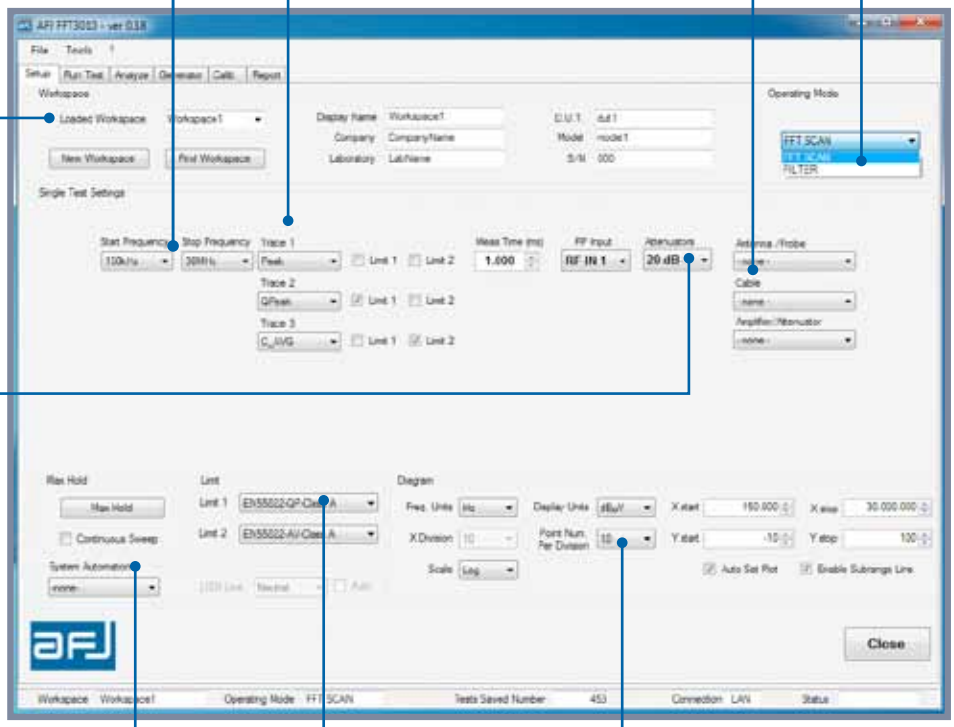
To set the parameters that will affect the FFT SCAN MODE.

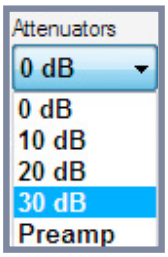
ANTENNA/PROBE, CABLE, Amplifier/Attenuator

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.





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.

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

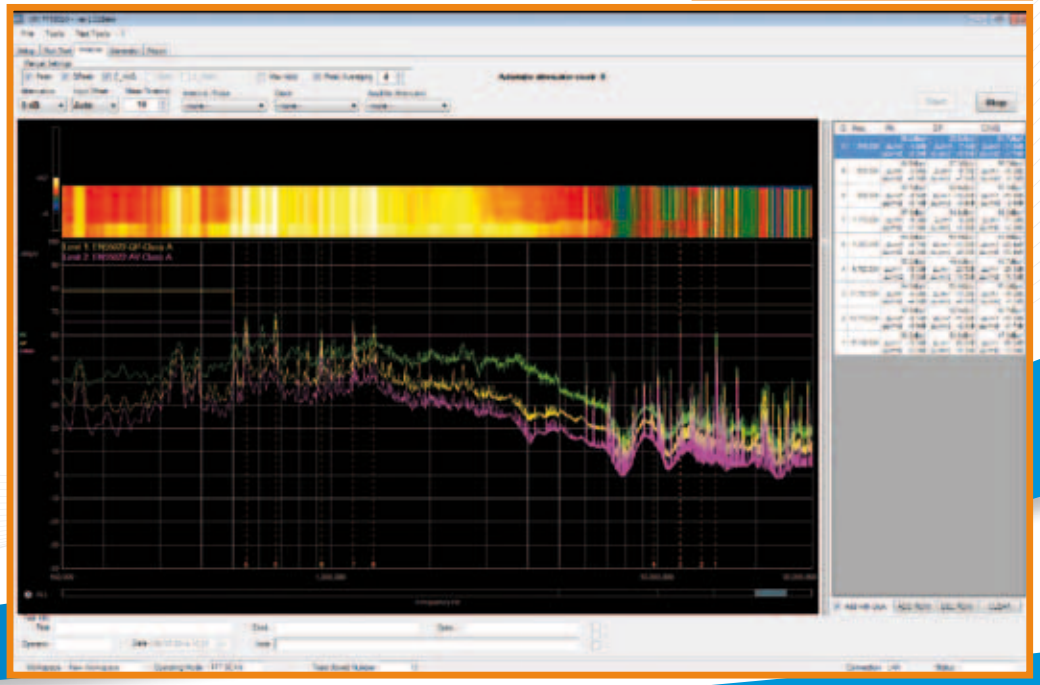
This function requires a text script files to be programmed; this file allows to make an automatic sequence of measurements.

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.
211 simultaneous detectors in parallel from 30 MHz to 108 MHz increase the measurement speed by a factor 211 in that frequency range compared to the measurement speed of the traditional EMI receivers.

FFT SCAN MODE

ANALYZE



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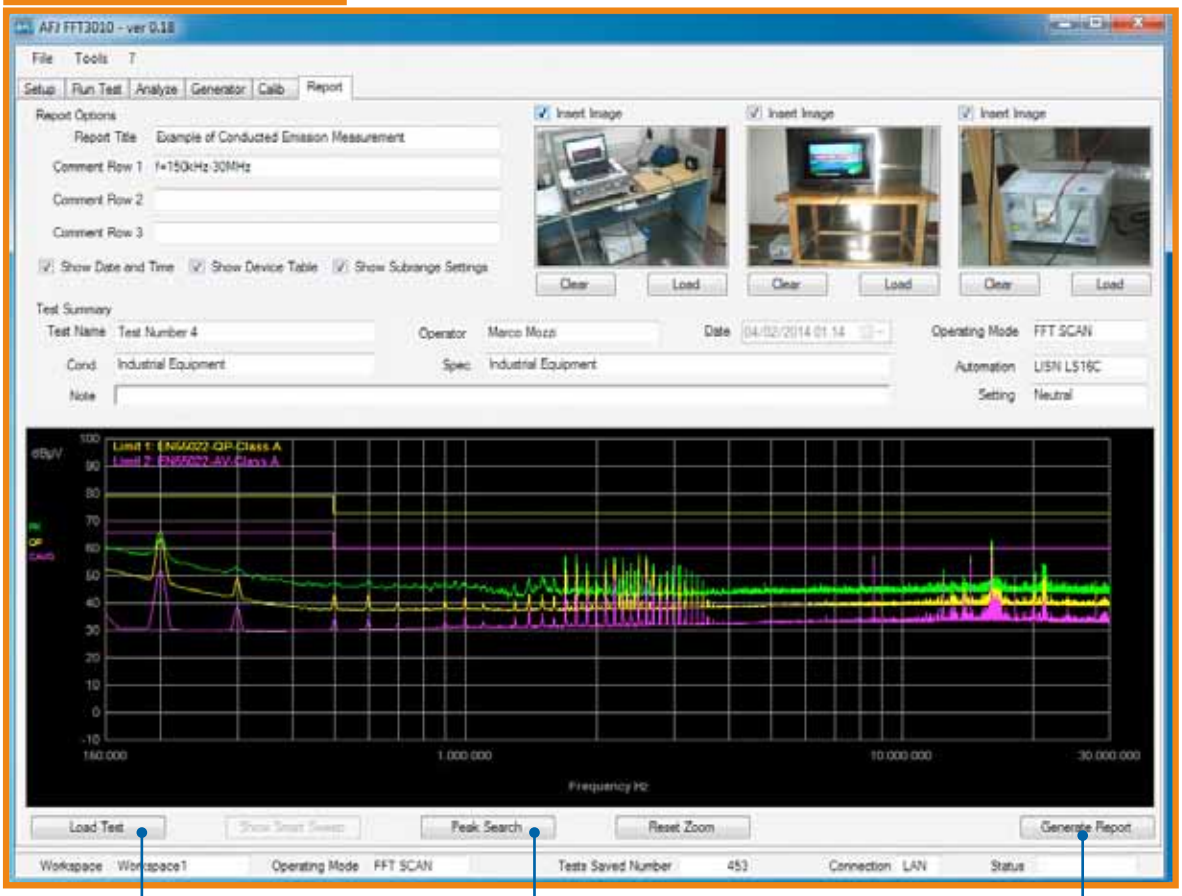
FFT 3010 & 3018 EMI Receivers offer all functions that are required for in-house tests to perform EMC diagnostic measurement as quickly, easily and as accurately as necessary and to document the test results.

The EMC compliance test then will be just a formality.

REPORT



LOAD TEST

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

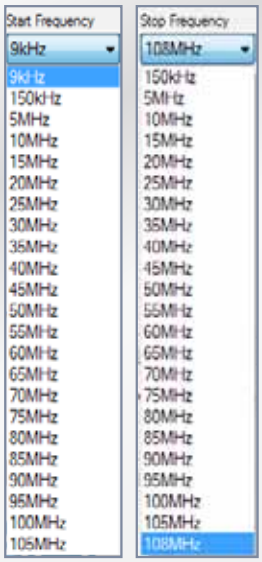
PEAK SEARCH

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.

FREQUENCY SETTINGS



FFT 3018 EMI Receiver is ideal for conducted emission measurements from 9 kHz to 108 MHz according to CISPR 25 Standard.

FFT SCAN MODE

TECHNICAL SPECIFICATION

	FFT 3010	FFT 3018
FREQUENCY		
Frequency Range	9kHz÷30MHz	9kHz÷108MHz
Frequency Setting	1Hz (9kHz÷30MHz)	1Hz (9kHz÷108MHz)
Internal Reference Frequency		
Aging per Year	2 x 10-6	2 x 10-6
Temperature Drift	15 x 10-5 (+10 °C to +40 °C)	15 x 10-5 (+10 °C to +40 °C)
External Reference Frequency	10MHz	10MHz
Measurament Time (manual mode)	1ms to 5s	1ms to 5s
Resolution	1ms	1ms
Measurement Time (sweep mode)	1ms to 5s	1ms to 5s
Resolution	1ms	1ms
RESOLUTION BANDWIDTHS		
Digital CISPR EMI Filters BW	200Hz (-6dB Bandwidth) 9kHz (-6dB Bandwidth)	200Hz (-6dB Bandwidth) 9kHz (-6dB Bandwidth) 120kHz (-6dB Bandwidth)
PRESELECTION		
Pre-Selector Filters	9 kHz to 150kHz 150 kHz to 5MHz 5MHz to 10MHz 10MHz to 20MHz 15MHz to 20MHz 20MHz to 30MHz	9 kHz to 150kHz 150 kHz to 5MHz 5MHz to 10MHz 10MHz to 15MHz 15MHz to 20MHz 20MHz to 55MHz 55MHz to 75MHz 75MHz to 108MHz
LEVEL		
Maximum Input Level		
DC Voltage	50V (AC-coupled)	50V (AC-coupled)
CW RF Power	+17dBm (Input Attenuation 0dB) +27dBm (Input Attenuation ≥ 10dB)	+17dBm (Input Attenuation 0dB) +27dBm (Input Attenuation ≥ 10dB)
Immunity to Interference		
Image Frequency	> 60dB	> 50dB
RF Shielding	3V/m (50Ω termination)	3V/m (50Ω termination)
Noise Floor	BW 200Hz / BW 9kHz	BW 200Hz / BW 9kHz / BW 120kHz
50 Ω termination, Input Attenuation 0dB, Preamplifier OFF		
Peak	< 10dBµV / < 20dBµV	< 10dBµV / < 20dBµV / < 18dBµV
Quasi Peak	< 0dBµV / < 15dBµV	< 0dBµV / < 15dBµV / < 12dBµV
CISPR Average	< 0dBµV / < 10dBµV	< 0dBµV / < 10dBµV / < 7dBµV
RMS	< 0dBµV / < 10dBµV	< 0dBµV / < 10dBµV / < 8dBµV
CISPR RMS	< 0dBµV / < 10dBµV	< 0dBµV / < 10dBµV / < 8dBµV
50 Ω termination, Input Attenuation 0dB, Preamplifier ON		
Peak	< 0dBµV / < 10dBµV	< 0dBµV / < 10dBµV / < 8dBµV
Quasi Peak	< -10dBµV / < 5dBµV	< -10dBµV / < 5dBµV / < 2dBµV
CISPR Average	< -10dBµV / < 0dBµV	< -10dBµV / < 0dBµV / < 0dBµV
RMS	< -10dBµV / < 0dBµV	< -10dBµV / < 0dBµV / < 0dBµV
CISPR RMS	< -10dBµV / < 0dBµV	< -10dBµV / < 0dBµV / < 0dBµV
FFT SCAN MODE		
A/D Converter Resolution	16 bit	16 bit
Sampling Rate	122,88MHz	Variable
FFT Span	141kHz (Full CISPR Band A FFT) 5 MHz (Total 6 bands to cover Full CISPR Band B)	141kHz (Full CISPR Band A FFT) 5 MHz (Total 6 bands to cover Full CISPR Band B) 5 MHz (Total 16 bands to cover Band 30MHz÷108MHz)
Full Compliant (1Hz) Sweep Measurement Time	< 18s (Band A + Band B) < 15s (Band B)	< 18s (Band A + Band B) < 15s (Band B) < 40s (30MHz÷108MHz)
Simultaneous detectors in parallel	3009 (Band A) 1669 (Band B)	3009 (Band A) 1669 (Band B) 211 (30MHz÷108MHz)
FFT Frequency Resolution	46,875 Hz (Band A) 3kHz (Band B)	46,875 Hz (Band A) 3kHz (Band B) 24kHz (30MHz÷108MHz)
INPUT & OUTPUT		
RF Input	50Ω	50Ω
RF Input Connector(s)	N female (RF 9kHz to 30MHz)	N female (RF 9kHz to 108MHz)
RF Input VSWR	< 2,0 : 1,0 (Input Attenuation 0dB) < 1,2 : 1,0 (Input Attenuation ≥ 10dB)	< 2,0 : 1,0 (Input Attenuation 0dB) < 1,2 : 1,0 (Input Attenuation ≥ 10dB)
RF Input Attenuator	0dB to 30dB in 10dB steps	0dB to 30dB in 10dB steps
Integrated Signal Generator	+50 ÷ +90dBµV	+50 ÷ +90dBµV
GENERAL		
Interface	Ethernet 10/100 MB Remotable LAN (LXI Level 0 Protocol)	Ethernet 10/100 MB Remotable LAN (LXI Level 0 Protocol)
Power Supply	230Vac ± 10% 50-60Hz	230Vac ± 10% 50-60Hz
Power Consumption	50VA	50VA
Operating Temperature	0° to 45°C	0° to 45°C
Storage Temperature	-20° to 70°C	-20° to 70°C
Size (WxHxD)	450 x 135 x 436mm	450 x 135 x 436mm
Weight	12kg	12kg

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Subject to change without notice.