



FFT 3010 FFT 3030 EMI Receivers



FULLY FFT DIGITAL EMI RECEIVERS FOR MEASUREMENT OF CONDUCTED ELECTROMAGNETIC INTERFERENCE FROM 9kHz TO 300MHz

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.

FFT 3010 FFT 3030

EMI Receivers

Based on a PC integrated architecture with WINDOWS 10 Embedded OS, FFT 3010 and FFT 3030 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 300MHz. Remote control with an external PC is also possible.

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 3010 and FFT 3030 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 FFT 3010 and FFT 3030 EMI Receivers 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 3010 and FFT3030 EMI Receivers as requested by CISPR 16-1-1 or to tailor them 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 do not need any periodic adjustment and maintenance:

- 200Hz and 9kHz for FFT 3010 EMI Receiver
- 200Hz, 9kHz and 120kHz for FFT 3030 EMI Receiver

FFT 3010 FFT 3030

EMI Receivers



FFT 3030 EMI Receiver

This equipment is ideally 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

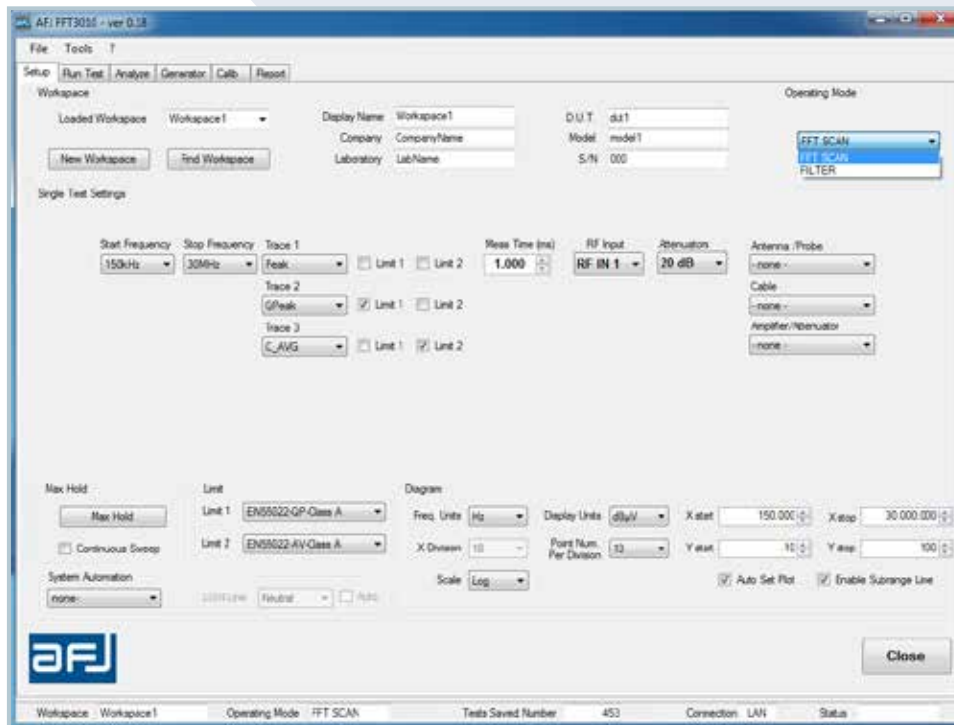
Equipment settings, measurements set-up, tests and measurements, frequency tables, external devices correction factors are automatically saved into powerful data base according to the proper work spaces defined by the operator.

FFT 3010 FFT 3030

EMI Receivers

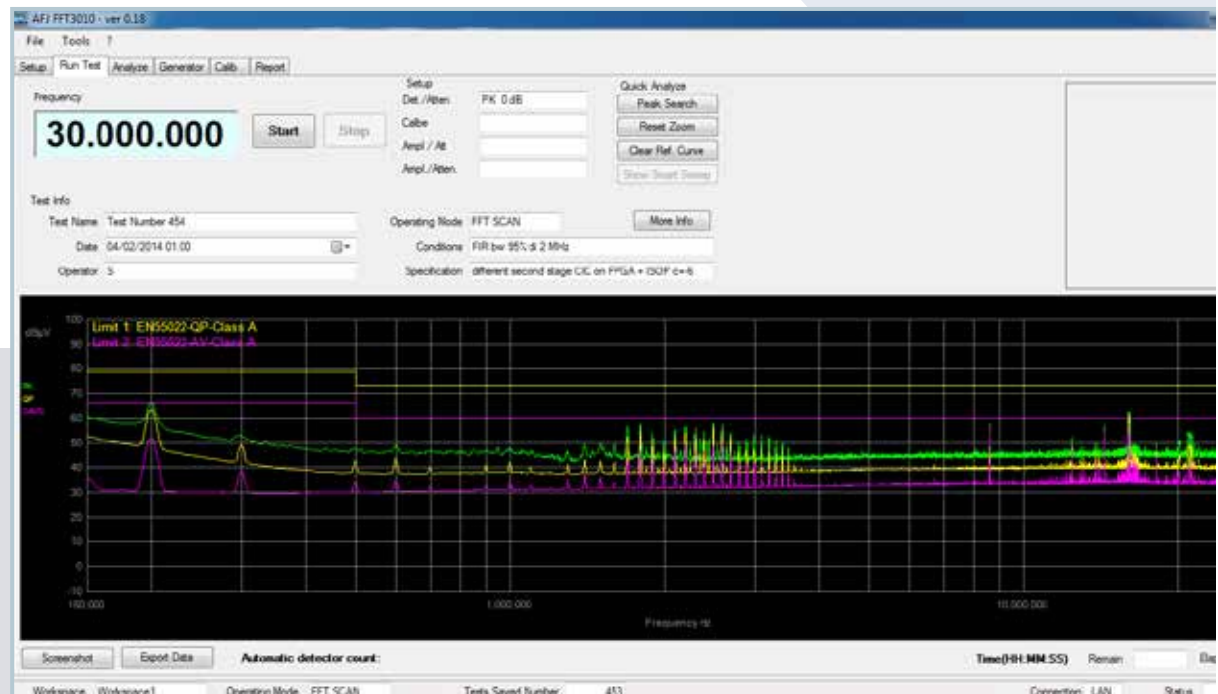
SETUP

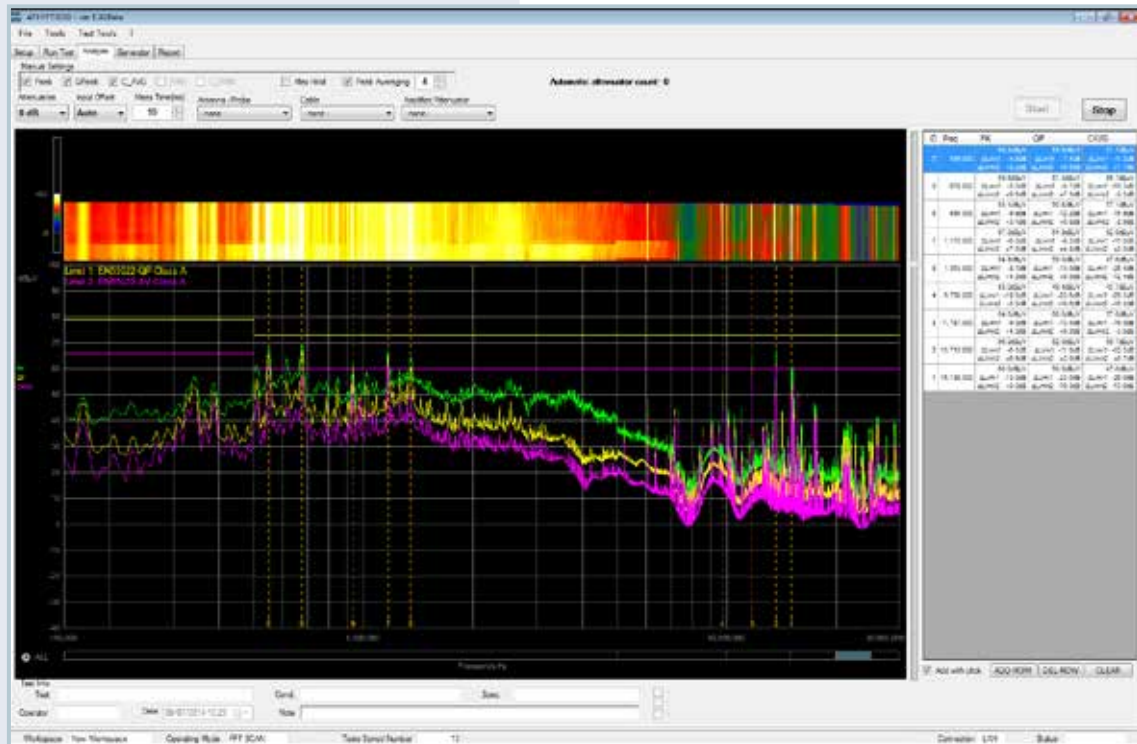
Software settings of all measurement parameters



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 3010

FFT 3030

FREQUENCY

Frequency Range	9kHz-30MHz	9kHz 300MHz
Frequency Setting	1Hz (9kHz-30MHz)	1Hz (9kHz-300MHz)
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
Measurement 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)
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PRESELECTION

Pre-Selector Filters	9 kHz to 150kHz 150 kHz to 5MHz 5MHz to 10MHz	10MHz to 15MHz 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 30MHz 30MHz to 60MHz 60MHz to 140MHz 140MHz to 300MHz
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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
Measurement Accuracy with S/N > 20dB	± 0.8dB (9kHz-30MHz)		± 0.8dB (9kHz-30MHz) ± 1.4dB (30MHz-300MHz)		

FFT SCAN MODE

A/D Converter Resolution	16 bit	16 bit
Sampling Rate	122,88MHz	Variable
FFT Span	141kHz (Full CISPR Band A) 5 MHz (Total 6 bands to cover Full CISPR Band B)	141kHz (Full CISPR Band A) 5 MHz (Total 6 bands to cover Full CISPR Band B) 5 MHz (Total 54 bands to cover Full CISPR Band C)
Full Compliant (1Hz) Sweep Measurement Time	< 18s (Band A + Band B) < 15s (Band B)	< 18s (Band A + Band B) < 15s (Band B) < 150s (Band C)
Simultaneous detectors in parallel	3009 (Band A) 1669 (Band B)	3009 (Band A) 1669 (Band B) 211 (Band C)
FFT Frequency Resolution	46,875 Hz (Band A) 3kHz (Band B)	46,875 Hz (Band A) 3kHz (Band B) 24kHz (Band C)

INPUT & OUTPUT

RF Input	50Ω	50Ω
RF Input Connector	N female (RF 9kHz to 30MHz)	N female (RF 9kHz to 300MHz)
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 (9kHz-30MHz)

GENERAL

Interface	Ethernet 10/100 MB Remotable LAN (LXI Level 0 Protocol)	Ethernet 10/100 MB Remotable LAN (LXI Level 0 Protocol)
Power Supply	110/230Vac ± 10% 50/60Hz	110/230Vac ± 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 (W x H x D)	450 x 135 x 400mm	450 x 135 x 400mm
Weight	16kg	16kg



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