

FFT 3100 & 3300 EMI TEST RECEIVERS

Fully digital IF EMI Receivers for measurement of radiated electromagnetic interference from 30MHz to 3GHz



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

FFT 3100 & 3300

EMI TEST RECEIVERS

Based on a PC integrated architecture with WINDOWS 7 Embedded OS, FFT 3100 & 3300 EMI Receivers are ready to operate with advanced software for EMC testing, fitted with pre-selectors that allow excellent dynamic range and precise radiated emission measurements covering the frequency range from 30MHz to 3GHz. 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 3100 & 3300 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 3100 & 3300 EMI Receivers fully comply with CISPR 16-1-1. The response of FFT 3100 & 3300 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 3100 & 3300 EMI Receivers application.

Software enables the operator to set all parameters and set-up FFT 3100 & 3300 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 International, European and Product standards
- ◆ Dwell measurement time
- ◆ Correction factors
- ◆ GTEM 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 IF signal with the advantages of Fast Scan Mode and the possibility to use the equipment in the standard receiver modes (SWEEP and SMART SWEEP).

FILTERS

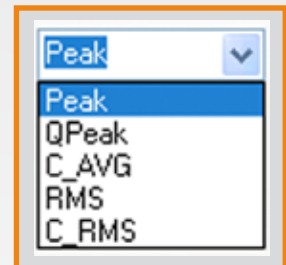
Digital CISPR EMI Filters BW (120kHz and 1MHz) do not need any periodic adjustment and maintenance.

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 IF 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.

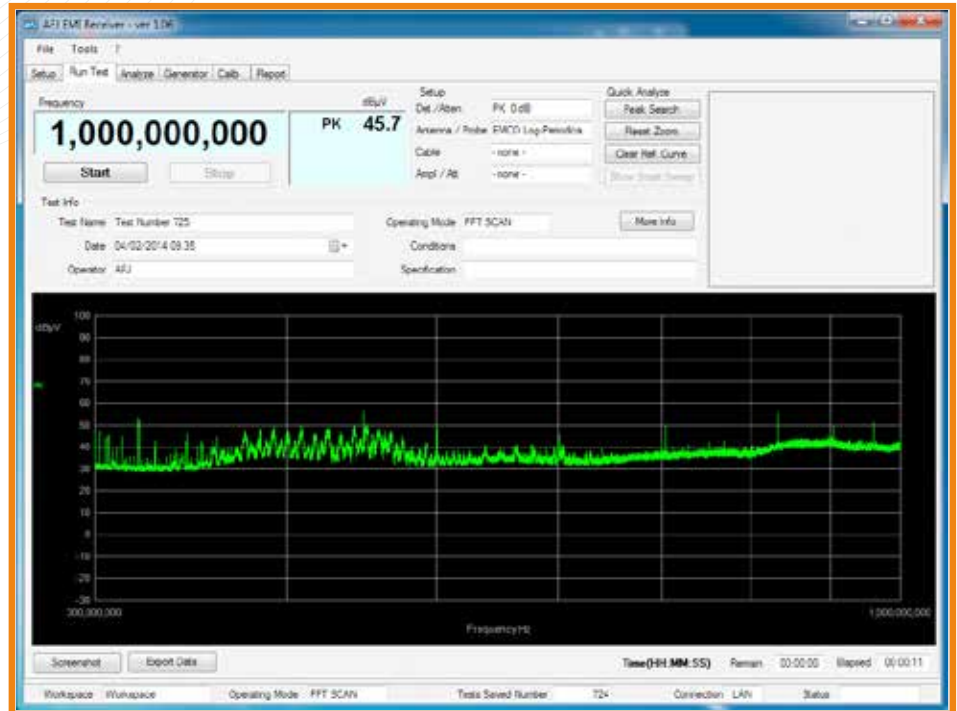


In the Analyze Mode, the bar graph, with current detector value and Max Hold display, shows the results of manual circuit adjustment when DUT cabling is arranged for maximum emission.

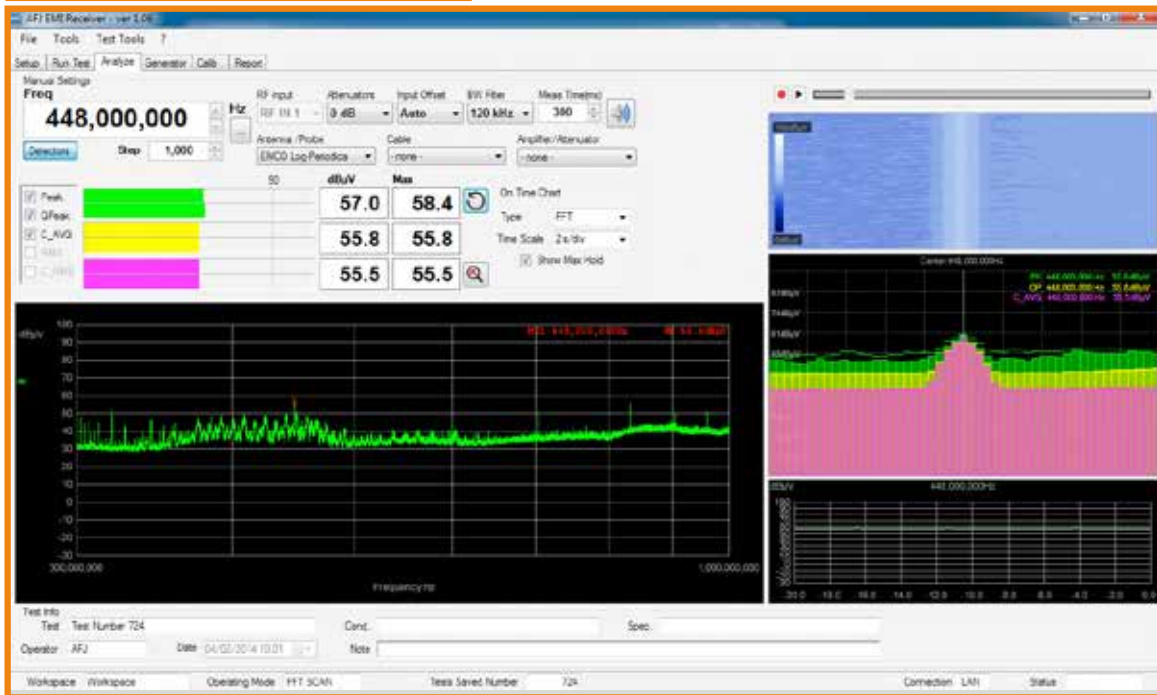
SWEEP WITH FFT SCAN MODE

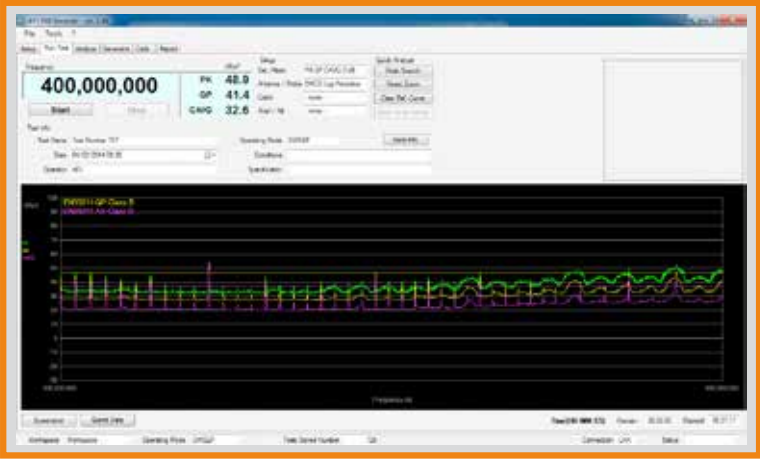
FFT SCAN MODE

Fast Scan Mode with 49 simultaneous parallel detectors increases the measurement speed by a factor 49 compared to the measurement speed of the traditional EMI receivers.



ANALYZE WITH FFT FUNCTION





SWEEP MODE

Fast overview measurements with logarithmic or linear frequency scale with tuning in user defined frequency step with selectable measuring time.

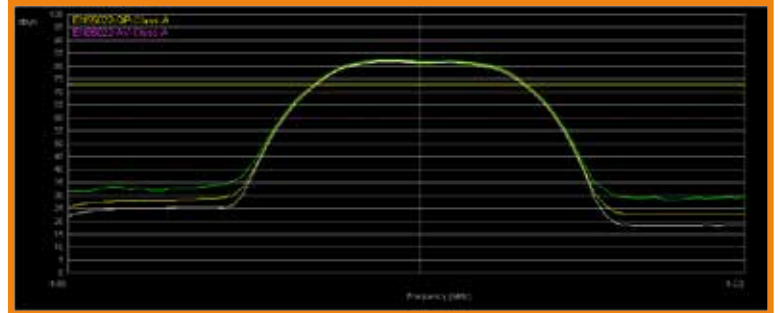
SMART SWEEP

First measurement with one detector (typically Peak) and after peaks searching the final measurement is repeated in these peaks with up to five numerical detectors. Each peak can be check up to 10 points before / after, setting a Limit and a Measuring Time for each selected detector.



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.



GTEM CORRELATION

Software option allows end user to perform radiated emission measurements in GTEM cells and calculate final result through correlation algorithmic using measurement results and GTEM correction factors.



INTEGRATED SIGNAL GENERATOR

CW Generator has to be activated by checking flag RF ON and then choosing the Tracking Mode (in this case a sweep is activated) or Single Frequency Mode.



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.

SHOW SMART SWEEP

To show smart sweep results (sweep and peaks table).

FFT 3100 & 3300 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.

WORKSPACE

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

OPERATING MODE

To enables the selection of the measure conditions under which the FFT 3100 & 3300 Receivers will operate to perform the analysis **SWEEP, PEAK + QPEAK, FILTER, SMART SWEEP, FFT SCAN**.

FREQUENCY TABLE

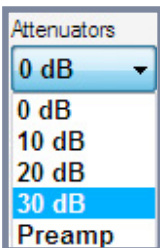
To set the parameters that will affect the selected **OPERATING MODE**.

ANTENNA/PROBE, CABLE, Ampl/Att

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

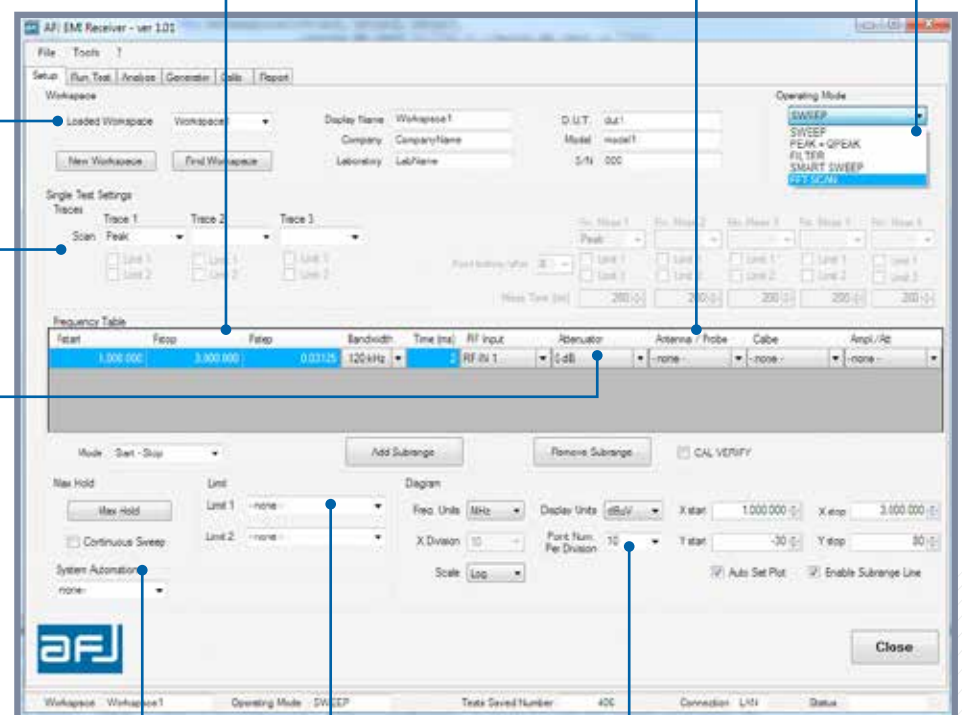
TRACES

Different types of numerical detectors can be selected by the user to define up to three traces at the same time. Smart sweep can be activated and its parameters defined (points before/after, Limit and a Measuring Time for each selected detector).



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.

TECHNICAL SPECIFICATIONS

FFT 3100

FFT 3300

FREQUENCY		
Frequency Range	30MHz±1000MHz	30MHz±3000MHz
Frequency Setting	1Hz	1Hz (30MHz±1000MHz) 10Hz (1000MHz±3000MHz)
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 90min	1ms to 90min
Resolution	1ms (< 60s) 1sec (> 60s)	1ms (< 60s) 1sec (> 60s)
Measurement Time (sweep mode)	1ms to 60s	1ms to 60s
Resolution	1ms	1ms
RESOLUTION BANDWIDTHS		
Digital CISPR EMI Filters BW	120kHz (-6dB Bandwidth)	120kHz (-6dB Bandwidth) 1MHz (-6dB Bandwidth)
PRESELECTION		
Tunable Filters	30MHz to 150MHz 150MHz to 350MHz 350MHz to 700MHz 700MHz to 1000MHz	30MHz to 150MHz 150MHz to 350MHz 350MHz to 700MHz 700MHz to 1000MHz
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	> 60dB
Intermediate Frequency	> 70dB	> 70dB
RF Shielding	3V/m (50 Ω termination)	3V/m (50Ω termination)
Noise Floor	BW 120kHz	BW 120kHz BW 1MHz
<i>50 Ω termination, Input Attenuation 0dB, Preamplifier OFF</i>		
Peak	< 18dBμV	< 18dBμV < 20dBμV
Quasi Peak	< 12dBuV	< 12dBuV
CISPR Average	< 7dBuV	< 7dBuV < 9dBuV
RMS	< 8dBuV	< 8dBuV < 10dBuV
CISPR RMS	< 8dBuV	< 8dBuV < 10dBuV
<i>50 Ω termination, Input Attenuation 0dB, Preamplifier ON</i>		
Peak	< 8dBμV	< 8dBμV
Quasi Peak	< 2dBuV	< 2dBuV
CISPR Average	< 0dBuV	< 0dBuV
RMS	< 0dBuV	< 0dBuV
CISPR RMS	< 0dBuV	< 0dBuV
FFT SCAN MODE		
Dual A/D Converter Resolution	14 bit	14 bit
Sampling Rate	80MHz	80MHz
FFT Span	2MHz	2MHz
Simultaneous detectors in parallel	49	49
FFT Frequency Resolution	31,250kHz	31,250kHz
INPUT & OUTPUT		
RF Input		
Impedance	50Ω	50Ω
Connector(s)	N female (RF 30MHz to 1000MHz)	N female (RF 30MHz to 3000MHz) Optional (RF 30MHz to 3000MHz)
VSWR	<1,5 (RF 30MHz to 1000MHz, Input Attenuation 0dB) <1,2 (RF 30MHz to 1000MHz, Input Attenuation ≥ 10dB)	< 1,5 (RF 30MHz to 1000MHz, Input Attenuation 0dB) < 1,2 (RF 30MHz to 1000MHz, Input Attenuation ≥ 10dB) < 2,6 (RF 1000MHz to 3000MHz, Input Attenuation 0dB) < 1,5 (RF 1000MHz to 3000MHz, Input Attenuation ≥ 10dB)
Input Attenuator	0dB to 30dB in 10dB steps	0dB to 30dB in 10dB steps
Integrated Signal Generator	97dBuV (-10dBm) from 30MHz to 1000MHz	97dBuV (-10dBm) from 30MHz to 3000MHz
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	12,5kg	12,5kg



AFJ INSTRUMENTS SRL
Via F.lli Lorenzetti 6 - 20146 Milan - Italy
Phone +39 02 91434850
sales@afj-instruments.com

苏州安辐捷电子科技有限公司
地址：江苏省昆山市玉山镇新南中路567号1号楼A座1918-1919室 邮编：215300
电话：+86 512 50125796; +86 18994427687
邮件：sales@afj-china.com