

DSI 600 Series

EMI TEST Measurement Receiver System



DSI 600 Series EMI Test Measurement Receiver System

The DSI 600 EMI Test Measurement Receiver System is a step into the future of fully compliant test capabilities integrated into a powerful receiver technology coupled with the computational strength of the on board computer which facilitates high speed data acquisition, an enhanced spectral display module, and SCPI interoperability interface all complemented by DSII's EMIT software. IF/RF spectrum analysis & time domain capabilities provide an all-in-one multi-functional resource rapidly and accurately providing consolidated concise test results and reports.

FEATURES :

- Frequency Ranges of Operation
... to 2, 27 & 40 GHz
- 3 Modes of Operation EMI Receiver, Spectrum Analyzer or remotely controlled system
- Receiver Measurement Accuracy
... state-of-the-art receiver technology
- EMIT Test Suites
... fully compliant to CISPR 16-1, FCC, ANSI, DO-160, EN, MIL-STD 461
- Multiple detection modes
... peak, quasi peak, average, RMS
- Powerful Embedded PC
... processor to handle complex embedded algorithms
- Display
... integrated 8.5" TFT color screen
- GUI
... intuitive user-friendly interface
- Test Preparation / Report Generation
... powerful integrated test plan module annotated results files/graphs for export
- AC & DC Powered



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RECEIVER OPERATION :

The 600 Series maybe operated in any one of three modes; SpecAn mode, System mode and Remote mode.
SpecAn Mode

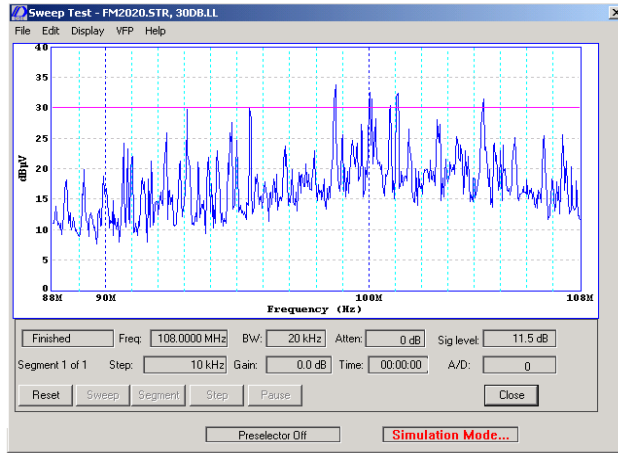
The 600 Series unit provides the user with a compact and versatile spectrum analyzer capability, in the SpecAn mode. In the Spectrum Analysis mode the Receiver is transformed into a free running analyzer. This introductory platform has the capability to perform the basic functions of: setting to a center frequency, adjusting gain, attenuation, frequency span and bandwidth parameters.



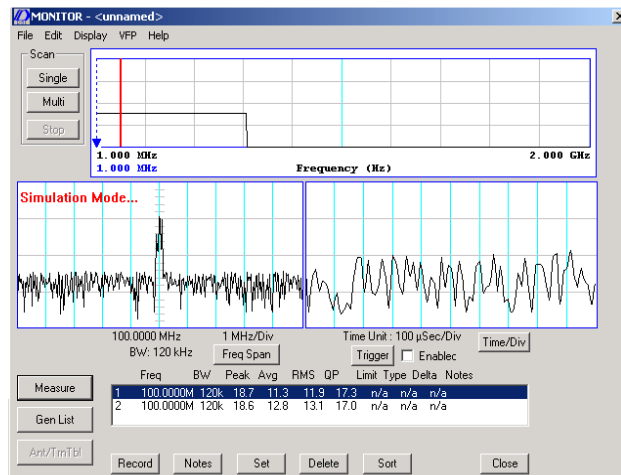
Two on screen markers and delta markers are presented clearly with the dB levels being refreshed on each scan. In Spectrum Analysis mode the users interface is facilitated via the front panel keyboard, up/down buttons and rotary dial, allowing for the selection and entry of desired parameters. Limit lines can be called up and displayed on the screen, a "Save current set-up display" along with any limit lines configured allows saving the desired screen to a file. As well a "Recall" feature allows for recalling previously saved information. The ability to incorporate correction files either for transducers or as composite files is possible seamless to continuous up-dating on each scan.

System Mode

Here the focus is on Turn-Key Emissions testing. It is in the System Mode that the 600 series excels as an exceptional RF measurement device while exhibiting excellent sensitivity and accuracy. The Receiver combines flexible signal collection, storage, retrieval, editing and reporting capabilities. The System mode offers fully automated testing via standard scripted application specific software modules or the user can define test parameters and limits as desired. Versatile detection is provided by means of standard Simultaneous Peak, Quasi-Peak, Average & RMS measurements. An extension capability in the form of a frequency and time domain screen is available for mitigation work. An integrated list generation feature allows for easy access to files on demand, minimizing test times. Auto-ranging of gain and attenuation under computer control during sweep tests to maximize resolution of signal is possible, likewise this feature can be modified by the operator to establish minimum values and reduce the time to complete



tests. The sweep test storage capability allows the user to enter and store for future use, any of a number of frequency sweep tests, each containing up to twenty segments. The software directory structure is also available to be modified by the operator to enable storing of groups of tests together in the same folder, other test results may also be handled in the same fashion. Automatic transducer switching occurs during sweep tests, which allows for transducer selection and manipulation. Any number of transducers may be contained in the transducer file. Up to twenty correction files can be applied to a single transducer and are applied automatically during the test for the transducer selected. Transducers are selected at the appropriate test segment by prompting operator intervention. A Paused Sweep Mode allows for the operator to assume control during a sweep test for a closer examination of specific frequencies of interest. The sweep test may be continued at any time with no loss of information. While the test has been paused, the following sub-modes are available, the local mode is where the operator has local control of the receiver parameters, such as gain, attenuation, bandwidth, etc, an Interactive mode, whereby the computer is still controlling the receiver, but the operator has a manual over ride to control parameters via the screen and may sweep up, down or dwell at any desired frequency point to examine signal strength vs. time or operating mode.



With the appropriate source the unit is able to be self-calibrated to performance specifications, negating the need to have the tool sent out for service. The DSI 600 Series EMI Test Tool is optimized for efficient user operation by way of a user-friendly interface and complementary analog control(s) of fine adjustments from the front panel controls. High-resolution graphics are presented on the monitor displaying the vital Frequency, Attenuation, Bandwidth, Gain, and Correction functions in alphanumeric form. The 600 Series unit brings with it the time tested interactive software for efficient application specific test sequencing and report generation. Available are standard test suites addressing the commonly used MIL STD 461, FCC and CISPR type solutions amongst others. Intuitive set-up procedures allow for reduced dependency on manuals and handbooks, minimizing on set-up time and maximizing on test time. Simple procedures for creating, editing and storing Receiver data and tests create an environment for easy operation. GPIB drivers are available for a variety of devices and correction factors for transducers in your test set-up are easily inserted into the test program. Also available are interface drivers for antenna masts and turntables.



Displays of sweep measurements are presented in log or linear frequency scales. Graphing of test results may be selected by the operator or left into auto scale where the Receiver will fit the scale to the results. After storing the sweep results the graph can be re-scaled and re-plotted to show any portion of the result on any scale selected by the operator. Sweep test result files can be stored and recalled anytime during testing or report generation purpose. The data may be re-scaled or cropped to a specific area and displayed with or without limit-lines for report output to a file or printer. Graphs may also be stored as a bitmap file for later export to a word processor document.

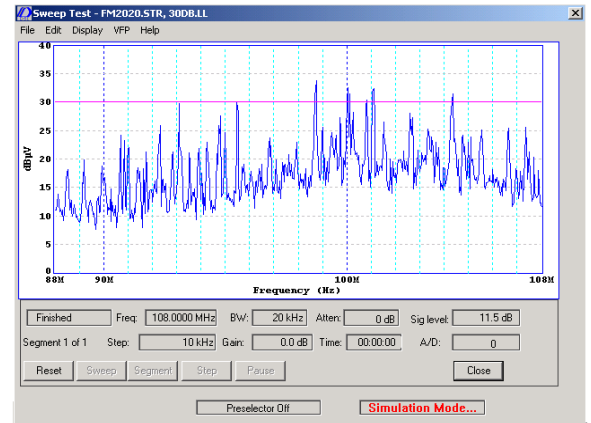
Remote Mode

A new characteristic added to the traditional family of EMI test solutions is the ability to access the DSII 600 instrument for ATE implementation. Using the industry standard SCPI programming language allows the designer to have consistency with both horizontal and vertical integration, minimizing the ATE configuration time. Well-defined response formats reduce the time to program, reducing the programming effort to interpret data and status information, enhancing ATE Receiver interchangeability. At the programmer's disposal is a state-of-the-art super heterodyne receiver, which operates 20Hz to 2, 27 or 40GHz depending on the configuration selected. The IF frequencies of the instrument are at 21.4MHz., 550 MHz and 1450 MHz with IF bandwidths from 10Hz to 1 MHz. The frequency stability of the instrument is maintained by an oven-controlled oscillator at 0.05ppm with an aging factor of 1ppm per year. Excellent low noise figures are exhibited by the platform, normally at 10dB. The noise floor of the instrument in a 200 Hz BW is typically at -37dB/uV or at 9kHz typically at -17dB/uV. There is 80dB rejection over the entire frequency range of the Receiver.

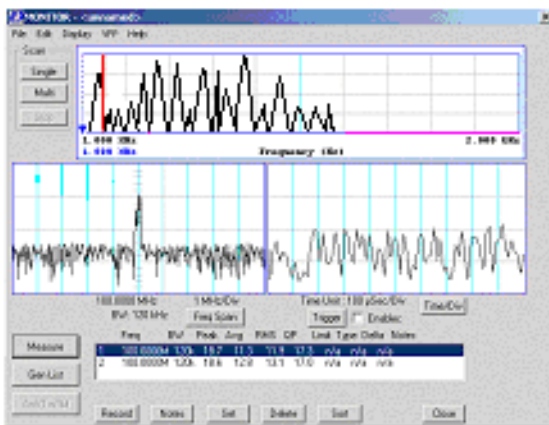
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SYSTEM DISPLAYS :

Sweep Testing mode permits precision measurements with controlled and repeatable conditions. Test parameters are created with the test generator from previously run tests or prepared on the spot by the user. Limit lines can be created, recalled and displayed. The appearance of the screen may be tailored to the users preference. While the automatic scaling feature insures display of all data, the user can intervene and set plot parameters as the test proceeds.



Sweep Screen



Monitor Screen

Frequency and time domain displays replicate the functions of a spectrum analyzer and an oscilloscope, permitting rapid scanning of the environment precise viewing of a span surrounding the tuned frequency, and simultaneous time-domain display of the detected signal. The major elements of this display are:

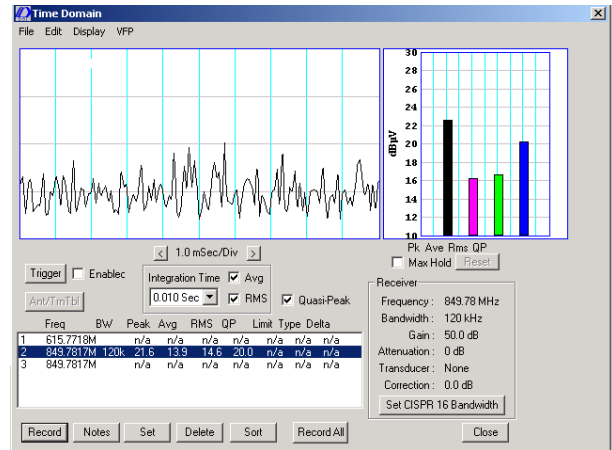
Data Log: shown at the bottom center of the screen may be imported from an automatically generated file or entries made by double clicking on points on the fast sweep. Each entry contains receiver, sensor, mast and turntable settings for the measurement taken at that frequency.

Fast Scan Display: This panel shown on the top center of the screen displays a fast scan of any selected frequency range. The panel may display one scan or continuously repeated scans.

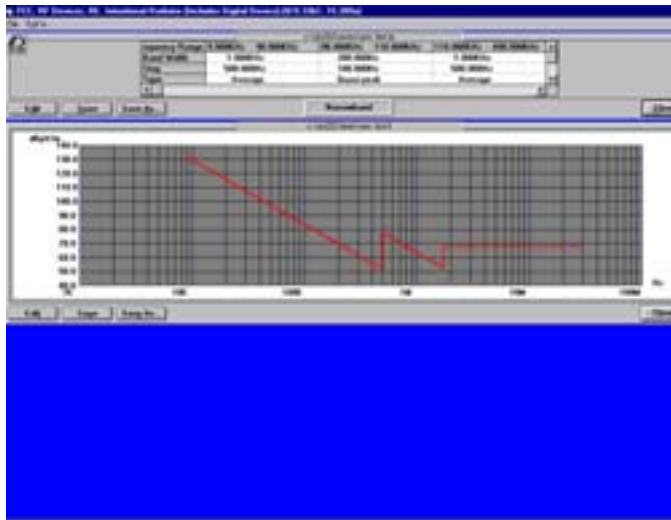
Spectral Display: The left center panel shows the frequency spectrum in the vicinity of the tuned frequency, with a span selected by the operator.

Time Domain Display: Right center panel shows an oscilloscope type display of detector signal. Variable time-base and trigger controls are available.

This display is activated by selecting Measure on the Monitor screen it permits selection of any combination of Quasi Peak, Average, RMS detectors for measurement, display and recording. The measurements are displayed and recorded in units determined by the transducer definition. Limit lines may also be shown and the display will automatically re-scale when signals levels change to maintain maximum resolution.



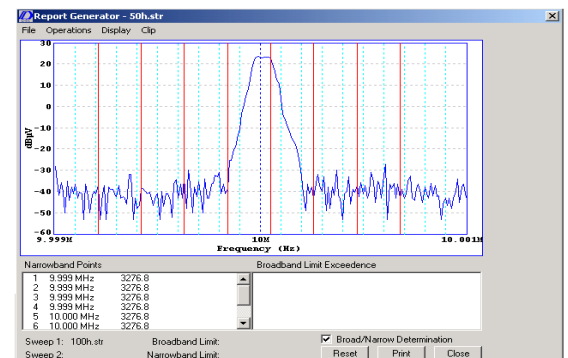
Time Domain Processing



Test Generation

Creation of a test involves specification of frequency range, sensor(s), bandwidth(s), step size, number of samples/step etc. Limits must be applied to a standard test and often custom parameters are introduced. The operator may select CISPR, FCC, ANSI, DO-160, EN, MIL-STD or user defined tests will be prompted to enter information regarding the unit tested and conditions of the test.

Flexible report generation tools needed to create quality documentation and data are standard. Previously stored test data may be recalled, scaled, printed, plotted or saved. Multiple curves may be super imposed, with limit lines separately selected. Results of two tests can be compared to show differences. Plot appearance can be changed to tailor the characteristics of the plots and portions of the graph may be captured to the Windows clipboard for inclusions in documents. The automatic Broadband-Narrowband Determination feature characterizes the plot and generates exceedance lists. Formal and informal reports options yield professional Print-outs. In addition, graphical reports, parameter summaries, data log files, limit line exceedances, and narrowband lists can be printed and stored.



Report Generation

Specifications

RECEIVER

Frequency Range: Model: 600-2 20 Hz to 2GHz
 600-27 20 Hz to 27GHz
 600-40 20 Hz to 40 GHz

Measurement Accuracy: ± 2 db for SNR > 10 dB

Sensitivity S / N = 0dB in a 1kHz BW
 -132 dBm 20 Hz to 20 kHz
 -135 dBm 20 kHz to 600 MHz
 -132 dBm 600 MHz to 12 GHz
 -130 dBm 12 GHz to 27 GHz
 -124 dBm 27 GHz to 40 GHz

RF Section

Autoranging 70 dB Attenuation and 50 dB Gain
 Attenuation: 0-70 dB in 10 dB steps

IF Frequencies: 21.4 MHz, 550MHz, 1450MHz

IF Bandwidths: 17 bandwidths from 10Hz to 15Mhz

Hz	Hz	kHz	kHz	kHz	MHz	MHz
10	100	1	10	100	1	15
20	200	3	30	120	3	
50	500	9			10	

Noise Figure
 <12dB - 20Hz to 20 kHz
 < 9dB - 20 kHz to 600 MHz
 <12dB - 600 MHz to 12 GHz
 <14dB - 12 GHz to 27 GHz
 <27dB - 27 GHz to 40 GHz

Detectors

Peak, Quasi Peak, Average, RMS
 IF Impulse Response Overshoot less than 2% for BW <
 RF Connector: Type N, 50 Ohms
 IF Frequencies 21.4 MHz, 550 MHz, 1450 MHz
 Input Characteristics VSWR: Better than 2:1
 Impedance: 50 Ohms nominal
 Max RF Input: 1 watt average CW
 LO Leakage: Less than -90 dBm
 0 dBm

3rd order intercept

Spur Free Dynamic Range Better than 60 dB

Residual Responses (Terminated Input) Less than -120 dBm

IF Output level At least 10dBm into 50Ohms

Band Selection Automatic

IF Shape Factors: Better than 4:1 (60 to 6dB)

Band Frequency Ranges:

Band: 1 20 Hz to 150 kHz
 Band: 2 150 kHz to 15 MHz
 Band: 3 15 MHz to 1 GHz
 Band: 4 1 GHz to 2 GHz
 Band: 5 2 GHz to 27 GHz
 Band: 6 27 GHz to 40 GHz

Tuning Resolution 0.1Hz

Receiver Frequency : Stability ± 1 ppm \ yr, 0 to 60° C

Aging ± 1 ppm \ yr

VIDEO / AUDIO

Video Log Dynamic Range At Least 70dB

Video Outputs 0 to 3 Volts (50 Ohms)

Video Bandwidth Not less than 1/2 bandwidth

Audio >1 Vms (8 Ohms), flat 20Hz -250kHz

POWER

AC:

Line Voltage: 90-260 VAC

Power Dissipation: 120 Watts

Frequency: 47-63 Hz

DC: 24 VDC $\pm 5\%$



Specifications

SPECTRUM ANALYZER

Frequency Range	Model: 600-2	20 Hz to 2GHz				
	600-27	20 Hz to 27GHz				
	600-40	20 Hz to 40 GHz				
Display Frequency Accuracy	0.1 Hz					
Marker Frequency Accuracy	0.1 Hz					
Resolution Bandwidth	6dB at the following IF Bandwidths					
	Hz	Hz	kHz	kHz	kHz	MHz
	10	100	1	10	100	1
	20	200	3	30	120	
	50	500	9			
Total Level Accuracy	± 2dB					
Spurious Response	-118 dBm					
Sweep Time	Setting Range: 30ms to 1000s					
Sweep Mode	Continuous, single					
Time domain sweep mode	F ≤ 1kHz					
Number of data points	1 data point per step					
Detection Modes	Peak	Quasi Peak	Average	RMS		

CONNECTORS AND CONTROLS

Rear Panel:

Mouse
 Keyboard
 External Monitor
 IEEE
 USB
 Ethernet
 Serial Port
 24 DC Input
 120/240 AC Input
 IF - BNC
 Signal Monitor -BNC
 IF out -BNC

SOFTWARE:

Operating System, Environment:
 Application:

TEST PLAN GENERATION:

ENVIRONMENTAL / MECHANICAL:

Weight: 40 Lbs
 Mounting: Rack mount

WARRANTY:

Front Panel:

Input Connector
 Planar Crown 3.5 mm Female (Frequency between 250K to 27GHz)
 Type N Female (Frequency DC to 2GHz)
 BNC Female – Video Out
 Earphone- Audio 2 up/down bush buttons for volume control
 Multi Function Tuning knobs and up/down push buttons
 Selected: Gain, Attenuation, Frequency, Span and Bandwidth

Windows
 DSII EMIT, SCPI, IEEE programmable

Optimized Test Set-ups: FCC, MIL-STD DO-160, EN user defined

Cooling: Built in low velocity fan
 Temperature Range: +10C to 40C
 Storage conditions: -20C to +50C
 Humidity Range: 0 to 80 % RH

1 year warranty with calibration



“ Detection with Direction “

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