

Power Amplifier/ Front-End Module Test Solution



Overview

zSeries PA/FEM is a fully-integrated hardware and software test solution combining 7.2 GHz VSG/VSA for accurate characterization and testing of the existing and the next gen Wi-Fi standard 802.11ax (Wi-Fi 6) PA/FEM's. Covering measurement bandwidths of up to 1 GHz useful for digital pre distortion testing, the FEM solution guarantees low noise and distortion necessary for validating the high efficiency 1024QAM devices. Meeting the exponential rise in the number of Wi-Fi capable devices in the market, the zSeries offers reduced time-to-test from weeks to hours or days.

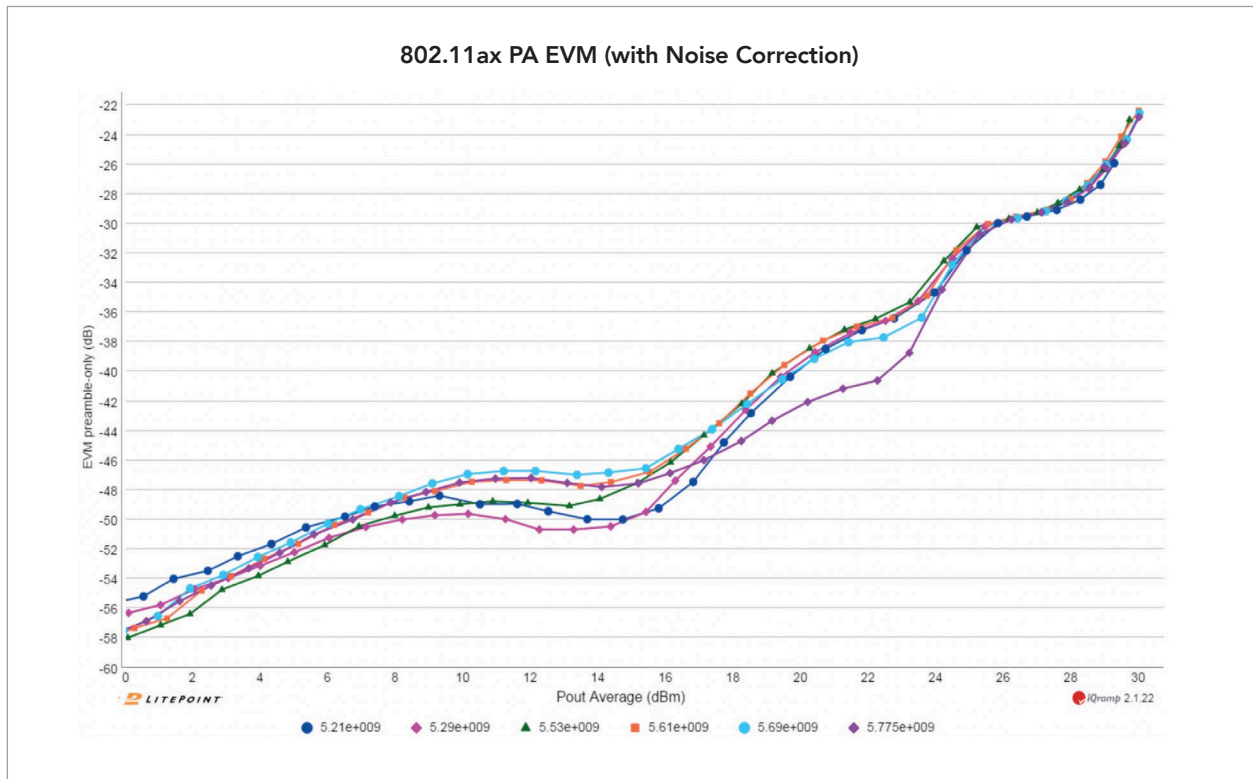
Advantages

- Lab-in-a-Box configuration
- Seamless hardware and software enhancements using a modular PXIe platform
- Reduce time-to-test from weeks to hours or days
- Test apps to setup complex tests for PA/FEM characterization and design verification without code



Advanced software integration tools and support

- Graphical User Interfaces (GUI) for real-time 'bench-top' interactive operation for RF designers and field application engineers
- Support for C/C++, LabVIEW™, Matlab, TCL and Python programming environments with example code and projects
- Digital Pre-Distortion (DPD) software tests the improvements in spectral mask and EVM with DPD in-circuit
- Comprehensive measurements including Dynamic EVM, ACLR, Spectral Mask, PAE, Gain, etc.



Key Specifications

- Best-in-industry residual EVM performance: <-50 dB, required for 802.11ax PA/FEM tests
- Supports 1 GHz wide instantaneous bandwidth for testing
- 20 GHz spectrum analyzer extension for Harmonic & Spurious emission testing
- Advanced testing including Noise Reduction and Envelope Tracking

Test Capabilities

- Multi band support 2.4GHz, 5GHz, U-NII-4/5/6/7/8 with comprehensive range of operation from 250 MHz – 7.2 GHz
- All Wi-Fi standards: 802.11 a/b/g/j/n/p/ac/af/ah/ax
- All Modulation Bandwidths: 160 MHz, 80 MHz, 40 MHz & 20 MHz
- All Modulation Coding Schemes (MCS) and Bit Rates: BPSK to 1024 QAM
- Ideal for MIMO applications (up to 8x8 true MIMO in a single zSeries 18-slot chassis)
- MIMO Streams: X2 to X8

Configurations

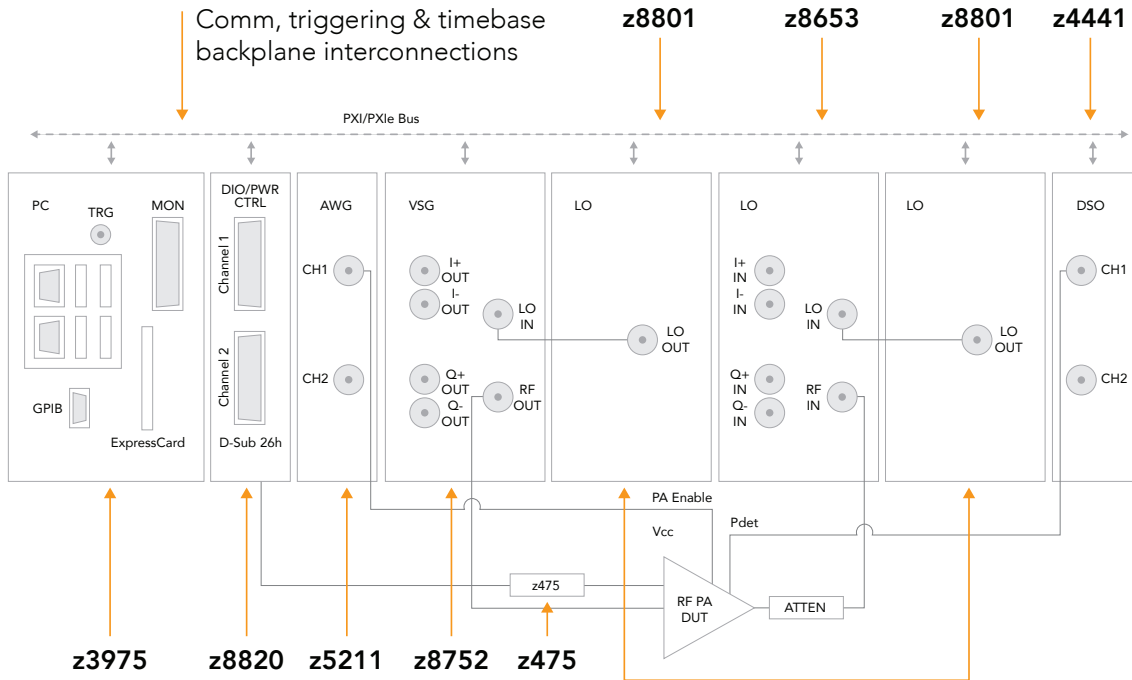


9-slot PA/FEM



18-slot PA/FEM

zSeries PA/FEM DVT



Core Modules

- z8752 Vector Signal Generator
- z8655 Wideband Vector Signal Analyzer
- z8817 Front End Module
- zSeries 9-slot or 18-slot chassis
- z3975/ z3985 Embedded Controller (Intel® Core™ i5/i7 processor)
- z8820 DC Power & Digital IO Controller
- z475 Remote DC Power supply
- z8801 Local Oscillator
- z4441 Digitizer/Oscilloscope
- z5211 Arbitrary Waveform Generator



z8655 Vector Signal Analyzer



z8752 Vector Signal Generator



z8817 Front End Module

Software

- zSignal WLAN
(a/b/g/j/n/p/ac/af/ah/ax)
- zSignal Cellular (2G/3G/4G)
- IQfact+
- IQramp
- zScript
- Support for C/C++, LabVIEW™, Matlab, TCL and Python programming environments
- * All software included



zSignal Cellular

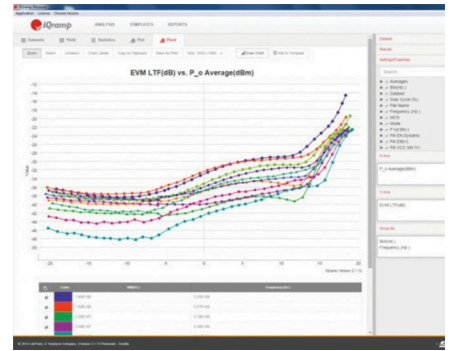


zSignal WLAN

NAME	STATUS	LOWER_LIMIT	VALUE	UPPER_LIMIT	RESULT
8WIFI_1T1AC_80211n_TX_VERYFL_EVM_S212_MCS20_C800_80	FRBSL_ERROR_PPM_Avg_S1	2.88			Pass
8WIFI_1T1AC_80211n_TX_VERYFL_EVM_S212_MCS20_C800_80	FRBSL_ERROR_PPM_Avg_S2	2.85			Pass
8WIFI_1T1AC_80211n_TX_VERYFL_EVM_S212_MCS20_C800_80	FRBSL_ERROR_PPM_Avg_S3	2.86			Pass
8WIFI_1T1AC_80211n_TX_VERYFL_EVM_S212_MCS20_C800_80	FRBSL_ERROR_PPM_Avg_S4	2.76			Pass
8WIFI_1T1AC_80211n_TX_VERYFL_EVM_S212_MCS20_C800_80	FRBSL_ERROR_PPM_Avg_S5	0.87			Pass
8WIFI_1T1AC_80211n_TX_VERYFL_EVM_S212_MCS20_C800_80	FRBSL_ERROR_PPM_Avg_S6	0.84			Pass
8WIFI_1T1AC_80211n_TX_VERYFL_EVM_S212_MCS20_C800_80	FRBSL_ERROR_PPM_Avg_S7	0.82			Pass
8WIFI_1T1AC_80211n_TX_VERYFL_EVM_S212_MCS20_C800_80	FRBSL_ERROR_PPM_Avg_S8	11.11			Pass
8WIFI_1T1AC_80211n_TX_VERYFL_EVM_S212_MCS20_C800_80	FRBSL_ERROR_PPM_Avg_S9	11.20			Pass
8WIFI_1T1AC_80211n_TX_VERYFL_EVM_S212_MCS20_C800_80	FRBSL_ERROR_PPM_Avg_S10	11.20			Pass
8WIFI_1T1AC_80211n_TX_VERYFL_EVM_S212_MCS20_C800_80	FRBSL_ERROR_PPM_Avg_S11	11.01			Pass
8WIFI_1T1AC_80211n_TX_VERYFL_EVM_S212_MCS20_C800_80	FRBSL_ERROR_PPM_Avg_S12	11.19			Pass
8WIFI_1T1AC_80211n_TX_VERYFL_EVM_S212_MCS20_C800_80	FRBSL_ERROR_PPM_Avg_S13	11.20			Pass
8WIFI_1T1AC_80211n_TX_VERYFL_EVM_S212_MCS20_C800_80	FRBSL_ERROR_PPM_Avg_S14	11.20			Pass
8WIFI_1T1AC_80211n_TX_VERYFL_EVM_S212_MCS20_C800_80	FRBSL_ERROR_PPM_Avg_S15	11.19			Pass
8WIFI_1T1AC_80211n_TX_VERYFL_EVM_S212_MCS20_C800_80	FRBSL_ERROR_PPM_Avg_S16	11.19			Pass

IQfact+

- Software provides turnkey calibration and verification solutions for key wireless chipsets
- Growing library of over 350 chipsets



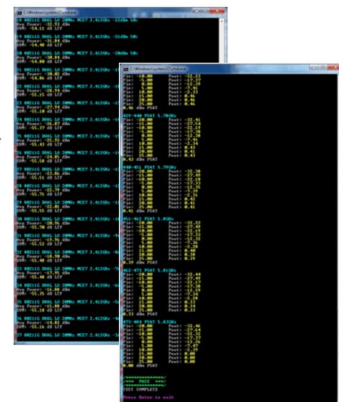
IQramp

- Data analysis toolset
- Report data for EVM, ACLR, Gain, PAE, Icc, IMD, etc instantly

Overall Test Conditions			
Temperature	25	-20	85 85
Soak Time	300		
VCC	3.3		
PAE V	2.95		
PAE Start Delta	4.00E-07		
PAE Stop Delta	3.00E-07		
PAE Duty Cycle	50	20	
EMV V	2.95		
Header Only	1		
Full Packet	1		
LD DXT	1		
Power up before RF applied			
Power held after RF off			

First Test Subset			
Standard	80211n		
Mode	TX		
Enable	1		1 = do this test subset
BW	20		Analyzer bandwidth
Freq	5.18	5.5	5.85
			Channel frequency
EVM MCS	0	7	8
			Modulation selection
Masked MCS	0	7	
TX99 ICC MCS	0	7	
Pwr	-20	-5	1
			Input power: lo, hi, step

Second Test Subset			
Standard	80211ac		
Mode	TX		
Enable	1		
BW	20		
Freq	5.21	5.53	5.775
EVM MCS	0	7	8
Masked MCS	0	7	8
TX99 ICC MCS	0	7	8
Pwr	-20	-5	1



zScript

zScript allows you to setup a test run in minutes. Multiple test conditions can be inputted directly into the script. All results are printed into a CSV file.

zSeries PA/FEM Test Solution Specification Summary

VSA/VSG	Value
RF Frequency	250 MHz to 7.2 GHz
VSA RF Input Level Range	+30 dBm to Noise Floor
VSA Analysis Bandwidth	1 GHz
VSG RF Output Level Range	+27 dBm to -105 dBm
Spectrum Analyzer	Value
RF Frequency	250 MHz to 20 GHz
SMU	Value
DC Power	+10 V@ 3A
Current Measurement	Down to 10pA
Channels	1 or 4
I/O	Levels
Voltage/Current	-2 V to +6 V/ 25 mA
Clock rate	200 MHz
Serial interface support	MIPI RFFE, SPI, others