

LABVIEW -TRAINING

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LABVIEW INTRODUCTION

What is Labview

- Labview is a graphical programming language designed and developed by National Instruments. It uses icons in place of text. This language labview is mainly used for test automation and various control applications. It has become more popular among industry due to simple and efficient architecture along with its interface to use C language in the backend.

Labview Features

- Support for RS232,RS485,GPIB,VXI,PXI,plug in DAQ devices
- TCP/IP networking ,ActiveX
bull; One can create executable application, shared libraries for example DLLs
- Easily interface with RF and other hardware using drivers provided by NI
- Interfacing with .net and C languages
- Easy to use GUI based drag and drop programming

Basic Building Blocks

Following are some of the building blocks of labview language.

Front Panel: It contains small programming to provide input, view output and tap intermediate results for the user to view/analyze. It will have all the control and indicators.

Block Diagram : It contains all the code part in the form of icons for various different functionalities. It looks like a flowchart.

LABVIEW APPLICATIONS IN T&M

Application areas of Labview

- **Acquiring Data and Processing Signals**
- **Instrument Control**
- **Automating Test and Validation Systems**
- **Embedded Monitoring and Control Systems**
- **Wireless System Prototyping**

OFFLINE APPLICATIONS

- The applications can analyze or generate the packet or signal vector/matrix. They work either offline or in realtime with RF VSG/VSA.
- The applications are developed for performing conformance tests for RF/PHYSICAL layer validation as well as protocol stack testing.
- The offline analyzer application require signal vector previously acquired or generated using generator application.
- Similarly offline generator application generates the signal vector which can be played with AWG and up converter to emulate real-time signal.

ONLINE APPLICATIONS

- Unlike offline applications, online applications work along with DAQ card. The DAQ card houses AWG and RF up converter as part of RF VSG(Vector Signal Generator) module. The DAQ card also houses RF down converter and digitizer as part of RF Vector Signal Analyzer module.

NI HARDWARE(RFSG/RFSA)

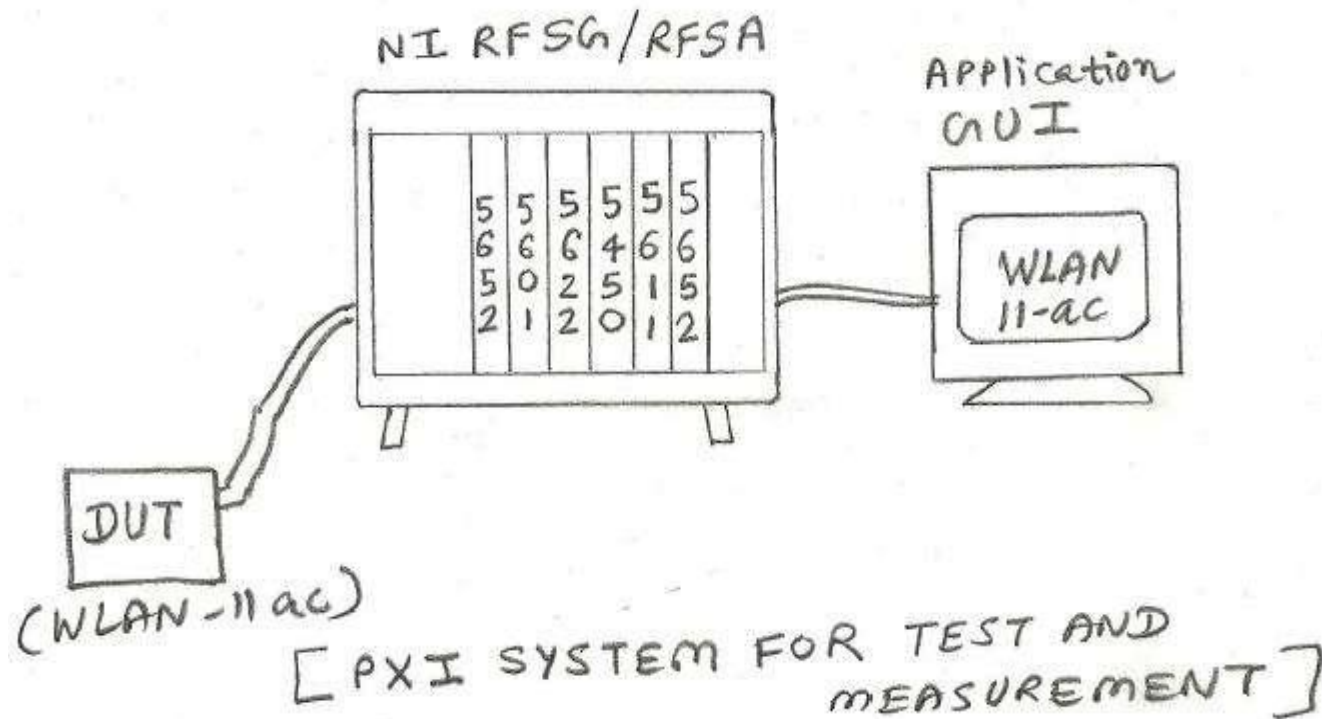


Figure depicts the 11ac application software and 802.11ac compliant DUT interfaced with PXI system. Either DUT can be connected with RF cable or can be tested using dipole antenna based on the specification requirement.

RFSG

- To generate complex modulated signals as per various IEEE standards viz. WLAN, WiMAX, Zigbee the IQ vector of the respective wireless standard is written into the AWG module which generated modulated IF signal at low frequency.
- The same low frequency modulated signal is given as input to the RF up conversion module to produce modulated RF signal.
- The same can be given to test wireless device's receiver functionalities. Various frames are generated as per MAC messages defined in the standard to test functionalities of the standard compliant device.

RFSA

- Similarly to analyse complex modulated signal generated by wireless device can be given as input to the RF VSA part.
- This in turn first converts RF signal to the IF signal using down conversion module.
- This down converted IF signal is digitized to obtain base band IQ signal.
- Various mathematical equations can be applied on this base band IQ signal to measure and plot various parameters such as EVM, channel frequency response, DC offset, frequency offset error, timing symbol error and more.

LABVIEW JOB PROSPECTUS

NI Labview Certifications

- Certified LabVIEW Associate Developer
- Certified LabVIEW Developer
- Certified LabVIEW Architect
- Certified LabVIEW Embedded Systems Developer
- NI Test stand Certification
- Lab Windows/CVI Certification

Visit National Instruments website: www.ni.com

For more information

Skills desired for Labview related job

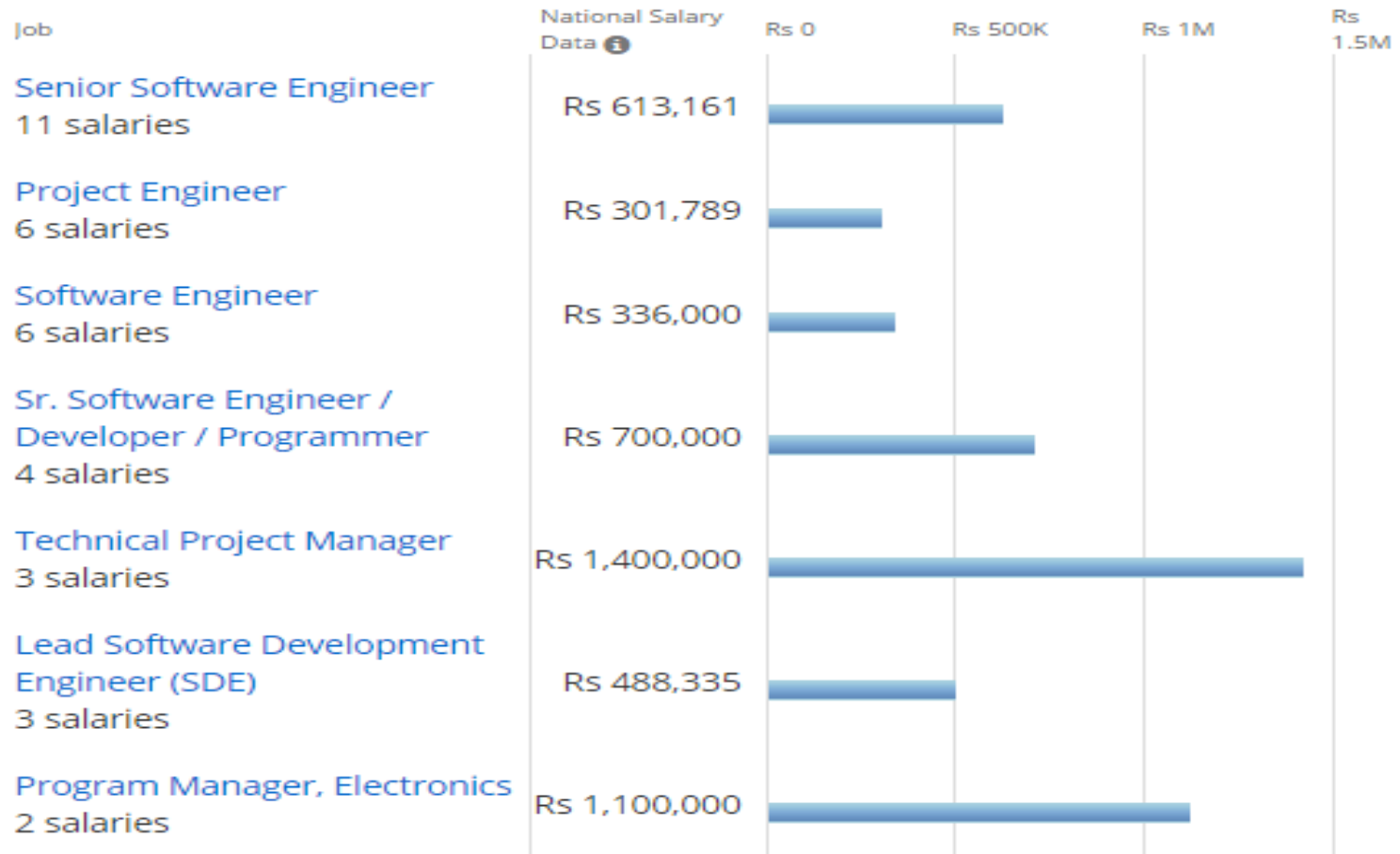
- Knowledge of Production Test Hardware
- Hands on using test tools viz. spectrum analyzer, Network analyzer, oscilloscope, signal generator, vector signal analyzer
- Labview, test stand programming
- Basic knowledge of RF and DSP
- ATE Test System development a plus

Salary slabs in Labview Job

Experience	Payscale
Entry Level	Rs. 178,175 to Rs. 1,753,992
Experienced	Rs 326,000 - Rs 4,705,000

Payscale-Labview Jobs

Skill: Labview Median Salary by Job



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Country: India | Currency: INR | Updated: 24 Oct 2015 | Individuals Reporting: 84

Companies Hiring in Labview T&M

- National Instruments
- Tektronix
- Guzik
- VI Technologies
- Pricol Limited
- Qualcomm
- Schneider Electric
- MaxLinear, Inc.
- Robert Bosch
- Honeywell

Test and Measurement Equipment Vendors

- Keysight Technologies (Formerly known as Agilent Technologies)
- National Instruments (NI)
- Tektronix Inc.
- Anritsu
- Rohde & Schwarz
- Litepoint

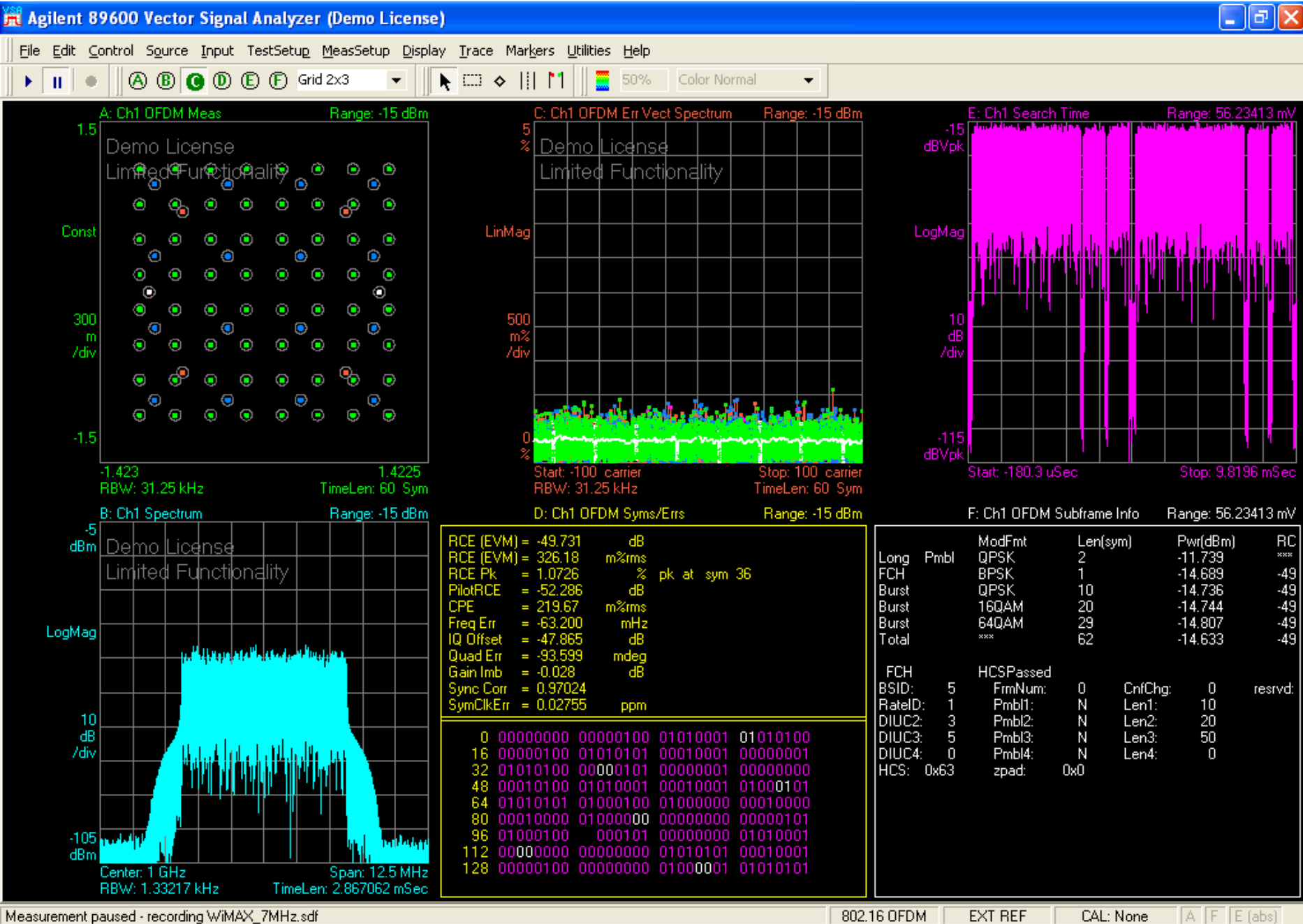
THIRD PARTY APPLICATIONS

16d TDD frame(Base band IQ File)

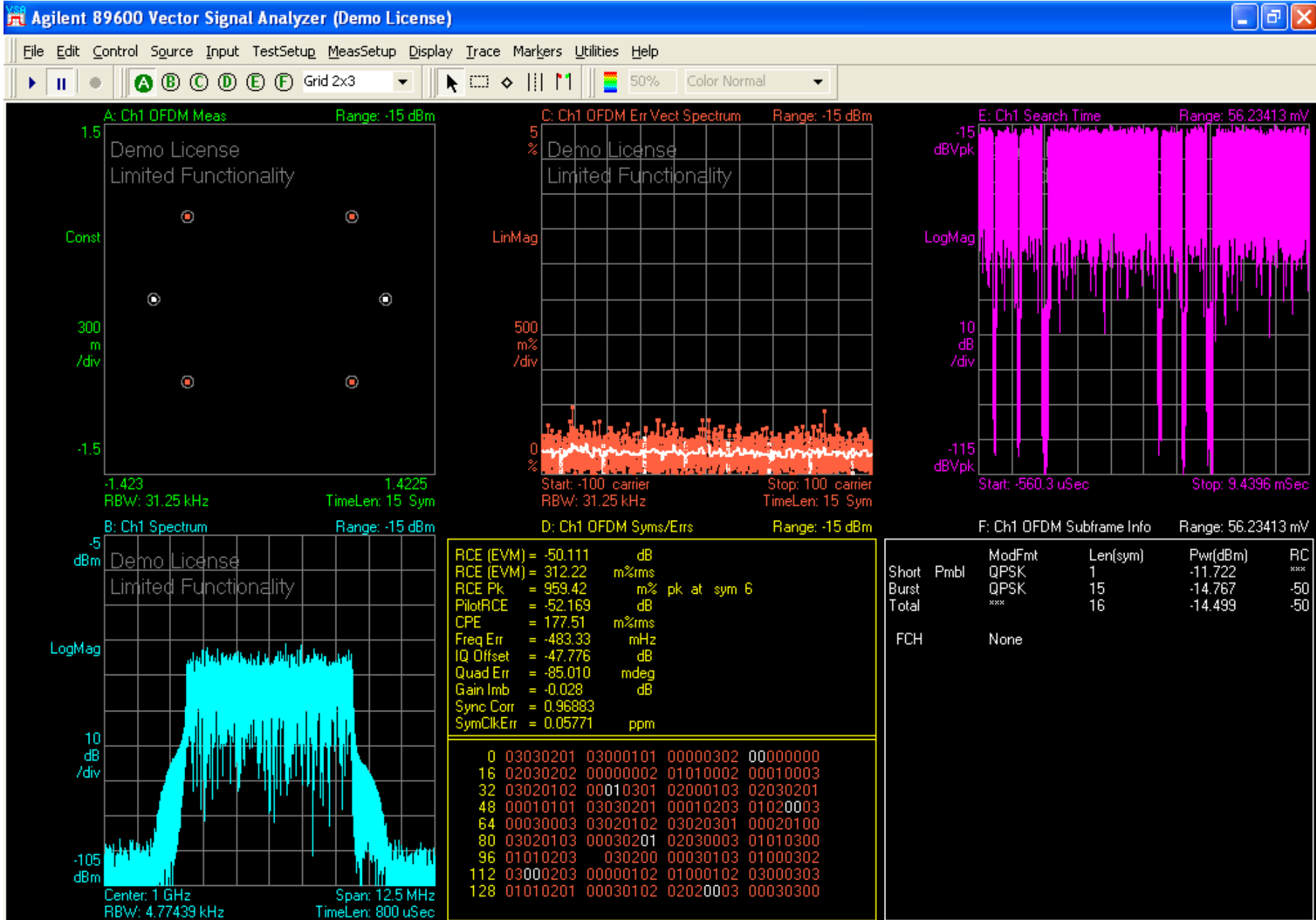
WiMAX_7
MHz.sdf

802.16-2004 Downlink and Uplink sub frames, with a nominal bandwidth of 7 MHz and guard interval 1/4. The downlink sub frame has a Long Preamble, followed by a BPSK FCH symbol, and three data bursts. The first DL burst is 10 symbols of QPSK, the second is 20 symbols of 16QAM, and the third is 50 symbols of 64QAM. The FCH symbol correctly describes these bursts. There are two separate uplink bursts in the uplink sub frame, each with a Short Preamble. The first UL burst has 15 symbols of QPSK. The second has 15 symbols of 64QAM.

Agilent VSA showing demodulation and decoding of 16d IQ file(downlink sub frame)



Uplink Burst 1



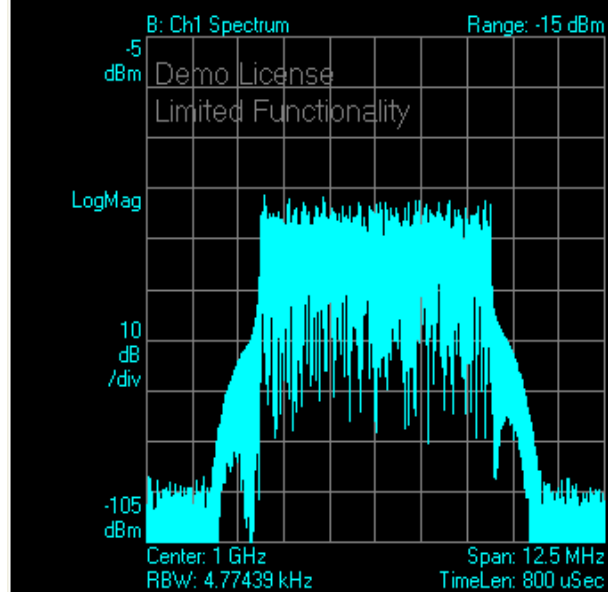
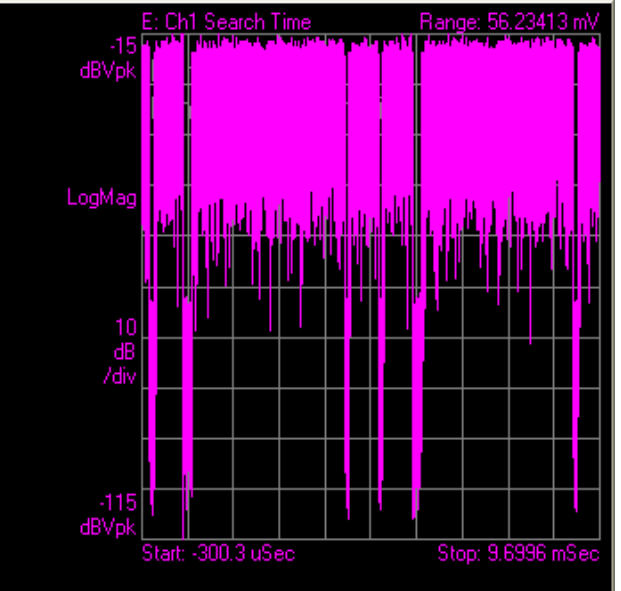
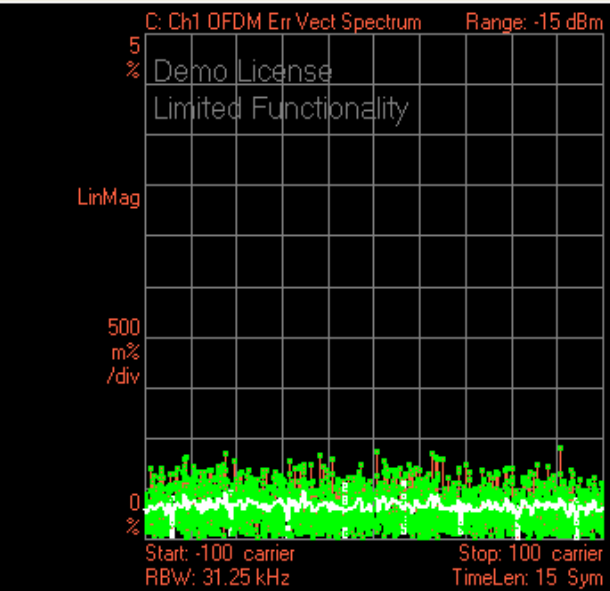
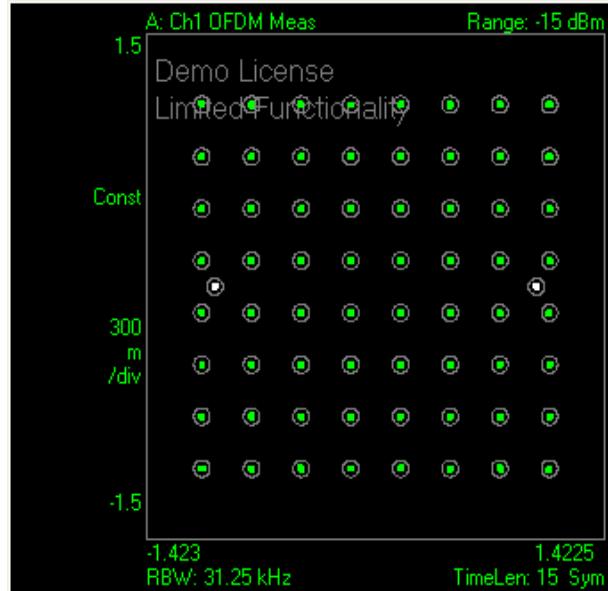
RCE (EVM) =	-50.111	dB
RCE (EVM) =	312.22	m%rms
RCE Pk =	959.42	m% pk at sym 6
PilotRCE =	-52.169	dB
CPE =	177.51	m%rms
Freq Err =	-483.33	mHz
IQ Offset =	-47.776	dB
Quad Err =	-85.010	mdeg
Gain Imb =	-0.028	dB
Sync Corr =	0.96883	
SymClkErr =	0.05771	ppm

0	03030201	03000101	00000302	00000000
16	02030202	00000002	01010002	00010003
32	03020102	00010301	02000103	02030201
48	00010101	03030201	00010203	01020003
64	00030003	03020102	03020301	00020100
80	03020103	00030201	02030003	01010300
96	01010203	030200	00030103	01000302
112	03000203	00000102	01000102	03000303
128	01010201	00030102	02020003	00030300

Short	Pmb1	ModFmt	Len(sym)	Pwr(dBm)	RC
		QPSK	1	-11.722	***
Burst		QPSK	15	-14.767	-50
Total		***	16	-14.499	-50

FCH	None
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Uplink Burst 2



D: Ch1 OFDM Syms/Errs Range: -15 dBm

RCE (EVM) =	-49.578	dB
RCE (EVM) =	331.97	m%rms
RCE Pk =	896.99	m% pk at sym 4
PilotRCE =	-52.469	dB
CPE =	191.53	m%rms
Freq Err =	25.035	mHz
IQ Offset =	-47.873	dB
Quad Err =	-90.829	mdeg
Gain Imb =	-0.027	dB
Sync Corr =	0.96868	
SymClkErr =	0.11127	ppm

0	150F1324	0E2D0333	3A34201C	003C081C
16	1B022B02	17111829	28201F25	06281C37
32	133F0635	3A012E04	1D1C060C	021C3B25
48	1F1B1814	07281D2F	340D2A11	0E3B003B
64	3A393C2C	27373C22	0A2B3311	06052102
80	193A1E28	0C123D01	011E0D04	1D0A143F
96	043D2A34	311D02	361E1A0C	2D292019
112	2800242E	0E3C202F	37073D1B	2A34221B
128	2C1B223E	3008113D	22340027	343D3E2B

F: Ch1 OFDM Subframe Info Range: 56.23413 mV

	ModFmt	Len(sym)	Pwr(dBm)	RC
Short	QPSK	1	-11.724	***
Burst	64QAM	15	-14.714	-49
Total	***	16	-14.453	-49
FCH	None			

THANK YOU