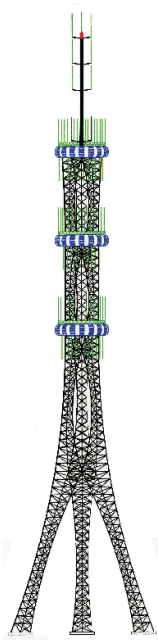


BATTERY SYSTEM TESTING
FOR
RADIO WORKS
R.F.
CONSULTING
JUNE, 2009

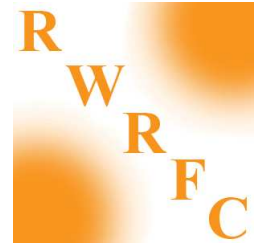


Gary A. Minker
Radio Works, R. F. Consulting
7225 Catalina Isle Drive
Lake Worth, Florida 33467
Office 561 969-9245
Fax Call to Request
E-mail Gary@Radioworksrfconsulting.com

Radio Works R.F. Consulting

June 10, 2009

Radio Works R.F. Consulting
7225 Catalina Isle Drive
Lake Worth, Florida 33467



561-969-9245

Dear Gary,

Thank you for the opportunity to assist you with the testing of your in office UPS system. This system utilizes a string of ten, 12 volt batteries to product 120 volts for the unit to operate on. We began the testing with in depth data gathering which consists of the name of the customer, the address, the location and type of battery string and charger information.

Once this is gathered, testing of the string continues with ascertainment of the typical load on the system, charging voltages, AC ripple, float voltage and a number of other factors. We then started the Impedance Testing of each individual battery along with each interconnecting strap. This testing is performed while the string is still in service and on a float charge. Graphs and tabular data are derived, stored and assess in this report.

For small string testing, typically 10 batteries or less, and under 50 Ampere Hour Capacity, a charge of \$250.00 is used. For mid level size systems of 12 batteries or more, with a 60 Ampere Hour Capacity, a charge of \$500.00 is used. For large scale systems where there are more than 12 cells and a 100 Ampere Hour Capacity, a \$750.00 charge is used.

Specialty diagnostics, load banking or other invasive and non-invasive testing is invoiced per application typically not to exceed \$1,000.00 total dollars. Charges over \$1,000.00 are discussed for each application prior to the beginning of a job appointment in the plan of testing and scope of work. Our IBEX Pro testing system insures quality results and a user friendly report with substantial graphs and other printed documentation. Examples of these works are included here. We think you will agree that these reports contain much more data than you may have been given before today. Each report is typically over 14 pages.

If you have any questions about our services, please feel free to call our office and visit our web site as Radio Works is a full service broadcast Engineering company.

Thank you very much,
We look forward to hearing from you soon

Gary A. Minker
Gary A. Minker

*Radio Works R.F. Consulting 7225 Catalina Isle Drive Lake Worth, Florida 33467
Office (561) 969-9245 Fax Call to Request Email Gary@Radioworksrfconsulting.com*

TESTING OF
OFFICE UPS SYSTEM
COLOR GRAPHS
AND
CUSTOM Excel
SPREAD SHEETS

CUSTOMER INFORMATION

NAME Radio Works R.F. Consulting	DATE 10-Jun-09	BATTERY IDENTIFICATION NAME test cell	CHARGER MANUFACTURER none
CONTACT NAME Gary Minker	PERSONS ATTENDING None	BATTERY TYPE IF KNOWN Yuasa	CHARGER MODEL NUMBER none
ADDRESS 7225 Catalina Isle Drive		MODEL NUMBER None	
UNIT LOCATION Main Office		NUMBER OF POSTS 2	
CITY Lake Worth		CELL VOLTAGE NOMINAL 12.6	
STATE Florida		STRING VOLTAGE 120	
ZIP CODE 33467		ROOM TEMPRATURE 73.2	
		STACK TEMPRATURE 75.1	
CHARGE FLOAT VOLT READING None	CURENT OF LOAD DRAW none	CURRENT OF LOAD none	

DATA INCREMENT FORMAT
ON TEST DEVICE
(PRINT OUT STEPS
BELOW)

BATTERY LOCATION CELL NUMBER	BATTERY BANK 1	BATTERY BANK 2
---------------------------------	----------------	----------------

POWER STRAP TO CELL 1 -1		
POWER STRAP TO CELL 1 -2		
POWER STRAP TO CELL 1 -3		
STRING RIPPLE RMS	zero	

CELL 1		
CELL 1-2 STRAP – 1		
CELL 1-2 STRAP – 2		
CELL 1-2 STRAP – 3		
RIPPLE RMS		

CELL 2		
CELL 2-3 STRAP – 1		
CELL 2-3 STRAP – 2		
CELL 2-3 STRAP – 3		
RIPPLE RMS		

CELL 3		
CELL 3-4 STRAP – 1		
CELL 3-4 STRAP – 2		
CELL 3-4 STRAP – 3		
RIPPLE RMS		

CELL 4		
CELL 4-5 STRAP – 1		
CELL 4-5 STRAP – 2		
CELL 4-5 STRAP – 3		
RIPPLE RMS		

CELL 5
CELL 5-6 STRAP – 1
CELL 5-6 STRAP – 2
CELL 5-6 STRAP – 3
RIPPLE RMS

CELL 6
CELL 6-7 STRAP – 1
CELL 6-7 STRAP – 2
CELL 6-7 STRAP – 3
RIPPLE RMS

CELL 7
CELL 7-8 STRAP – 1
CELL 7-8 STRAP – 2
CELL 7-8 STRAP – 3
RIPPLE RMS

CELL 8
CELL 8-9 STRAP – 1
CELL 8-9 STRAP – 2
CELL 8-9 STRAP – 3
RIPPLE RMS

CELL 9
CELL 9-10 STRAP – 1
CELL 9-10 STRAP – 2
CELL 9-10 STRAP – 3
RIPPLE RMS

CELL 10
CELL 10-11 STRAP – 1
CELL 10-11 STRAP – 2
CELL 10-11 STRAP – 3
RIPPLE RMS

CELL 11
CELL 11-12 STRAP – 1
CELL 11-12 STRAP – 2
CELL 11-12 STRAP – 3
RIPPLE RMS

CELL 12
CELL 12-POWER STRAP - 1
CELL 12 POWER STRAP - 2
CELL 12 POWER STRAP - 3
RIPPLE RMS

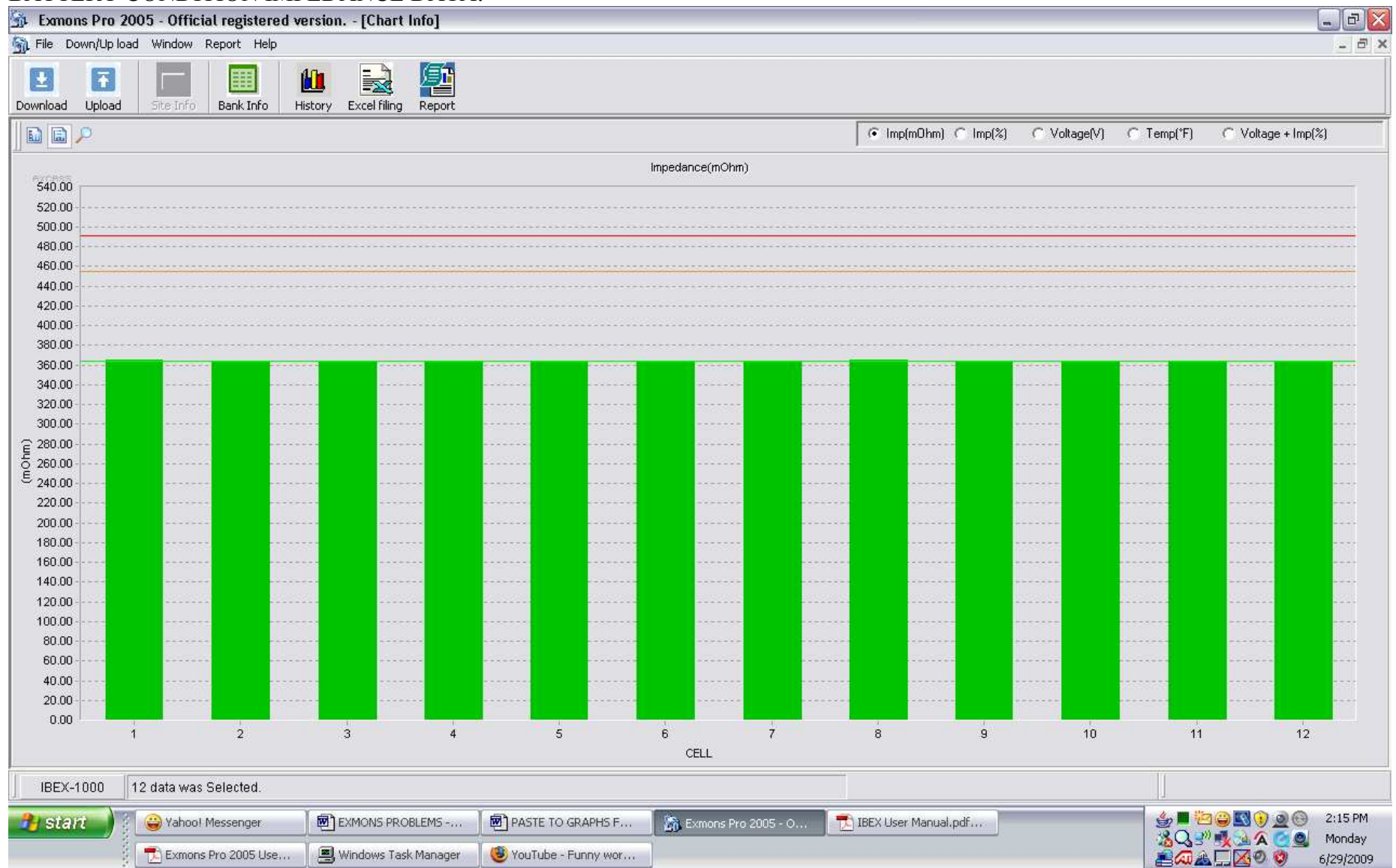
SPECIAL CABLE LOCATIONS

SPECIAL TESTING NOTES

	Site	B a n k	Cell	Voltage(V)	Imp(mOhm)	Imp(%)	Temp(°F)	Status
6/29/2009	DEMO BANK 11D	BANK_01	1	13.03	364.721	100.2	73.4	Normal
6/29/2009	DEMO BANK 11D	BANK_01	2	13.03	364.326	100.09	73.4	Normal
6/29/2009	DEMO BANK 11D	BANK_01	3	13.03	364.032	100.01	73.4	Normal
6/29/2009	DEMO BANK 11D	BANK_01	4	13.03	363.948	99.99	73.4	Normal
6/29/2009	DEMO BANK 11D	BANK_01	5	13.03	363.99	100	73.4	Normal
6/29/2009	DEMO BANK 11D	BANK_01	6	13.03	363.905	99.97	73.4	Normal
6/29/2009	DEMO BANK 11D	BANK_01	7	13.03	364.111	100.03	73.4	Normal
6/29/2009	DEMO BANK 11D	BANK_01	8	13.03	365.014	100.28	73.4	Normal
6/29/2009	DEMO BANK 11D	BANK_01	9	13.03	363.408	99.84	73.4	Normal
6/29/2009	DEMO BANK 11D	BANK_01	10	13.03	363.373	99.83	73.4	Normal
6/29/2009	DEMO BANK 11D	BANK_01	11	13.03	362.421	99.57	73.4	Normal
6/29/2009	DEMO BANK 11D	BANK_01	12	13.03	362.406	99.56	73.4	Normal

BATTERY DATA:

BATTERY CONDITION IMPEDANCE DATA:



BATTERY CONDITION IMPEDANCE DATA:

Exmons Pro 2005 - Official registered version. - [Bank Info]

File Down/Up load Window Report Help

Download Upload Site Info Bank Info History Excel filling Report

Site Name: DEMO BANK 11D
 Bank Name: BANK_01
 Del Measured Date: 6/29/2009
 Ref. Impedance(mOhm): 364
 Warning Value(%): 125
 Fail Value(%): 135
 Over Voltage(V): 13.4
 Under Voltage(V): 12.8
 Over Temperature(°F): 78.8

Cell	Voltage(V)	Imp(mOhm)	Imp(%)	Temp(°F)	Status
1	13.03	364.721	100.20	73.4	Normal
2	13.03	364.326	100.09	73.4	Normal
3	13.03	364.032	100.01	73.4	Normal
4	13.03	363.948	99.99	73.4	Normal
5	13.03	363.99	100.00	73.4	Normal
6	13.03	363.905	99.97	73.4	Normal
7	13.03	364.111	100.03	73.4	Normal
8	13.03	365.014	100.28	73.4	Normal
9	13.03	363.408	99.84	73.4	Normal
10	13.03	363.373	99.83	73.4	Normal
11	13.03	362.421	99.57	73.4	Normal
12	13.03	362.406	99.56	73.4	Normal

IBEX-1000 12 data was Selected.

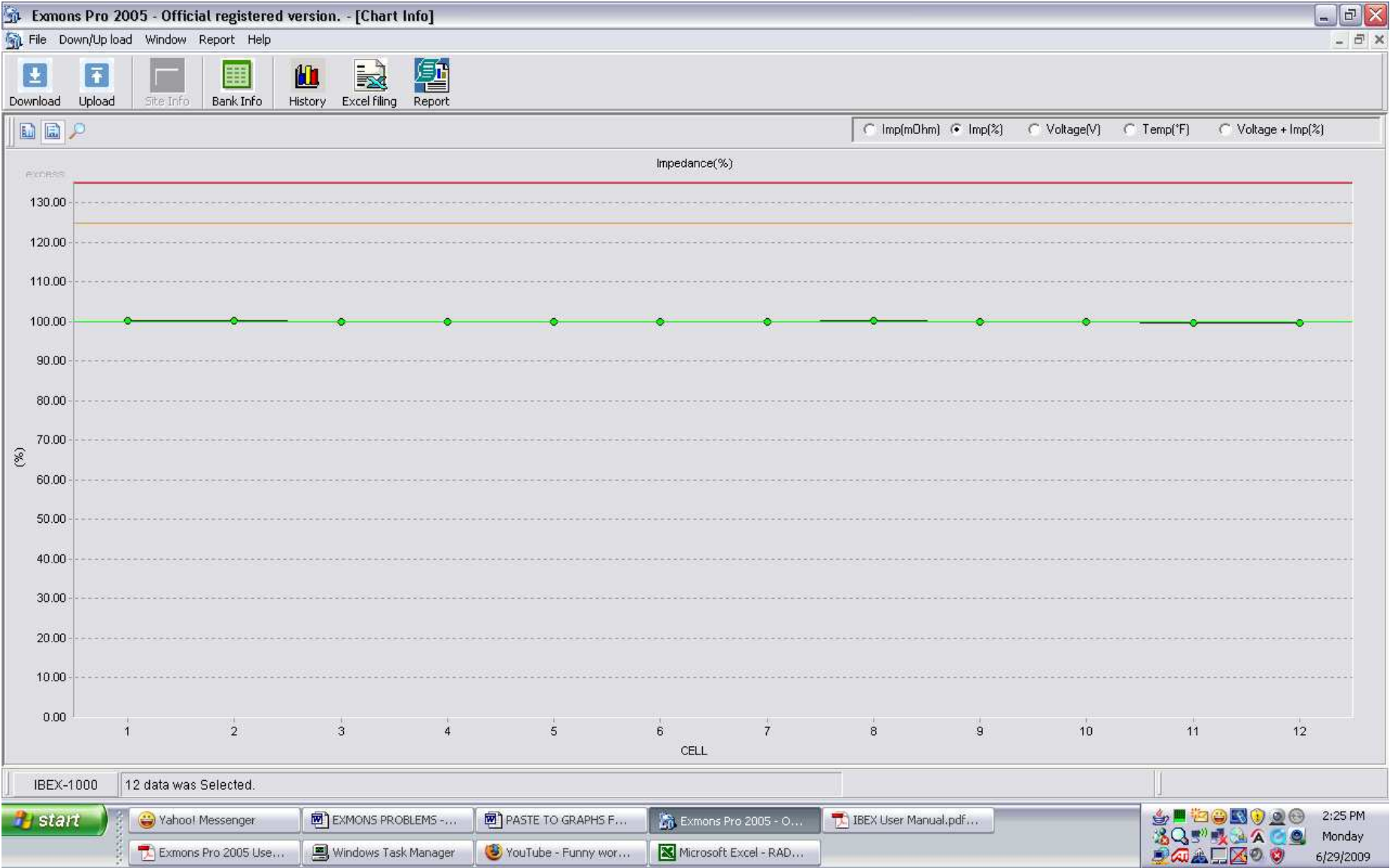
start Yahoo! Messenger EXMONS PROBLEMS -... Exmons Pro 2005 - O... IBEX User Manual.pdf... Exmons Pro 2005 Use... Windows Task Manager YouTube - Funny wor...

2:06 PM Monday 6/29/2009

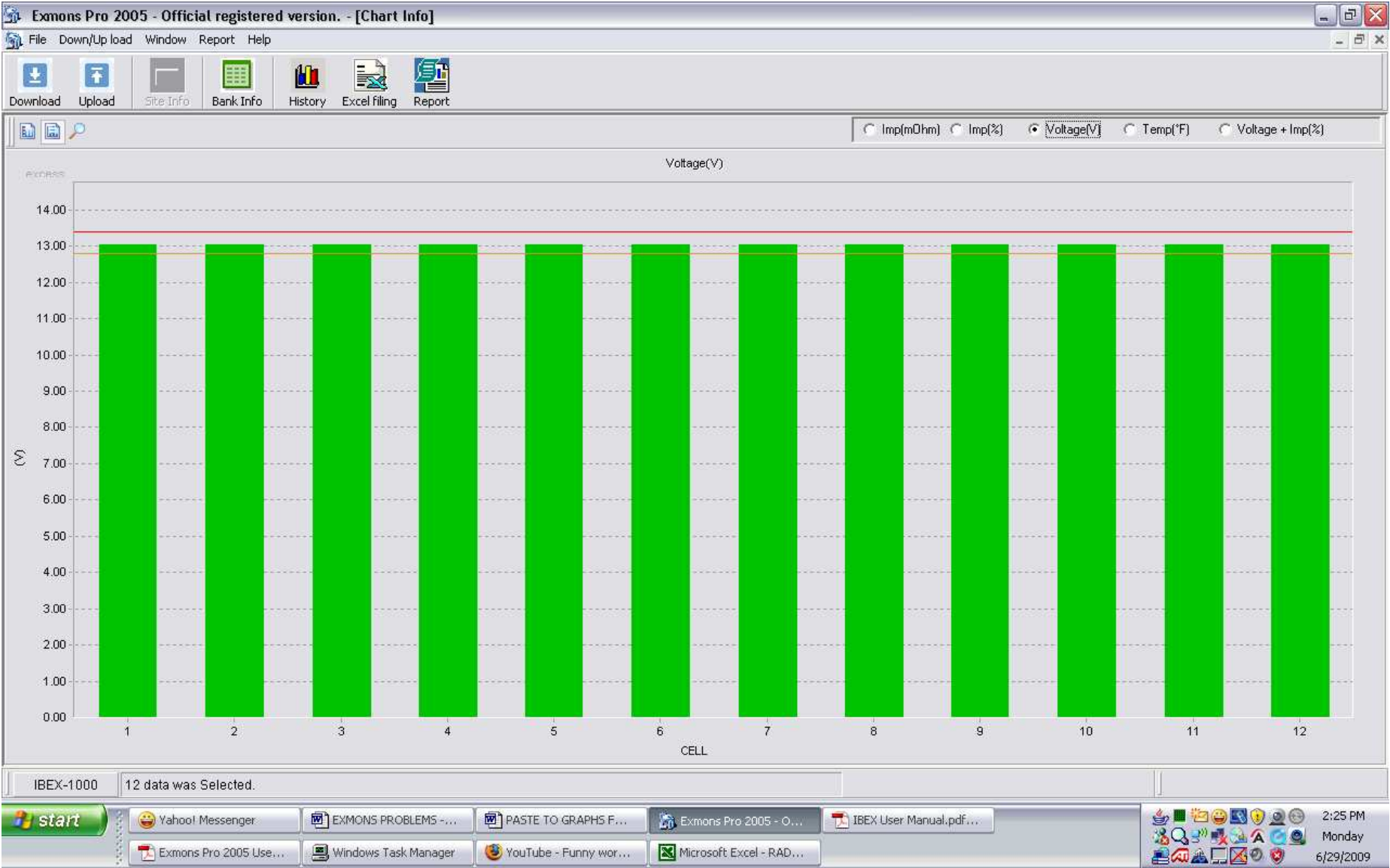
BATTERY CONDITION TABULATED DATA:

Date	Site	Bank	Cell	Voltage(V)		Imp(mOhm)	Imp(%)	Temp(°F)	Status
6/29/2009	DEMO BANK 11D	BANK_01	1	13.03		364.721	100.2	73.4	Normal
6/29/2009	DEMO BANK 11D	BANK_01	2	13.03		364.326	100.09	73.4	Normal
6/29/2009	DEMO BANK 11D	BANK_01	3	13.03		364.032	100.01	73.4	Normal
6/29/2009	DEMO BANK 11D	BANK_01	4	13.03		363.948	99.99	73.4	Normal
6/29/2009	DEMO BANK 11D	BANK_01	5	13.03		363.99	100	73.4	Normal
6/29/2009	DEMO BANK 11D	BANK_01	6	13.03		363.905	99.97	73.4	Normal
6/29/2009	DEMO BANK 11D	BANK_01	7	13.03		364.111	100.03	73.4	Normal
6/29/2009	DEMO BANK 11D	BANK_01	8	13.03		365.014	100.28	73.4	Normal
6/29/2009	DEMO BANK 11D	BANK_01	9	13.03		363.408	99.84	73.4	Normal
6/29/2009	DEMO BANK 11D	BANK_01	10	13.03		363.373	99.83	73.4	Normal
6/29/2009	DEMO BANK 11D	BANK_01	11	13.03		362.421	99.57	73.4	Normal
6/29/2009	DEMO BANK 11D	BANK_01	12	13.03		362.406	99.56	73.4	Normal

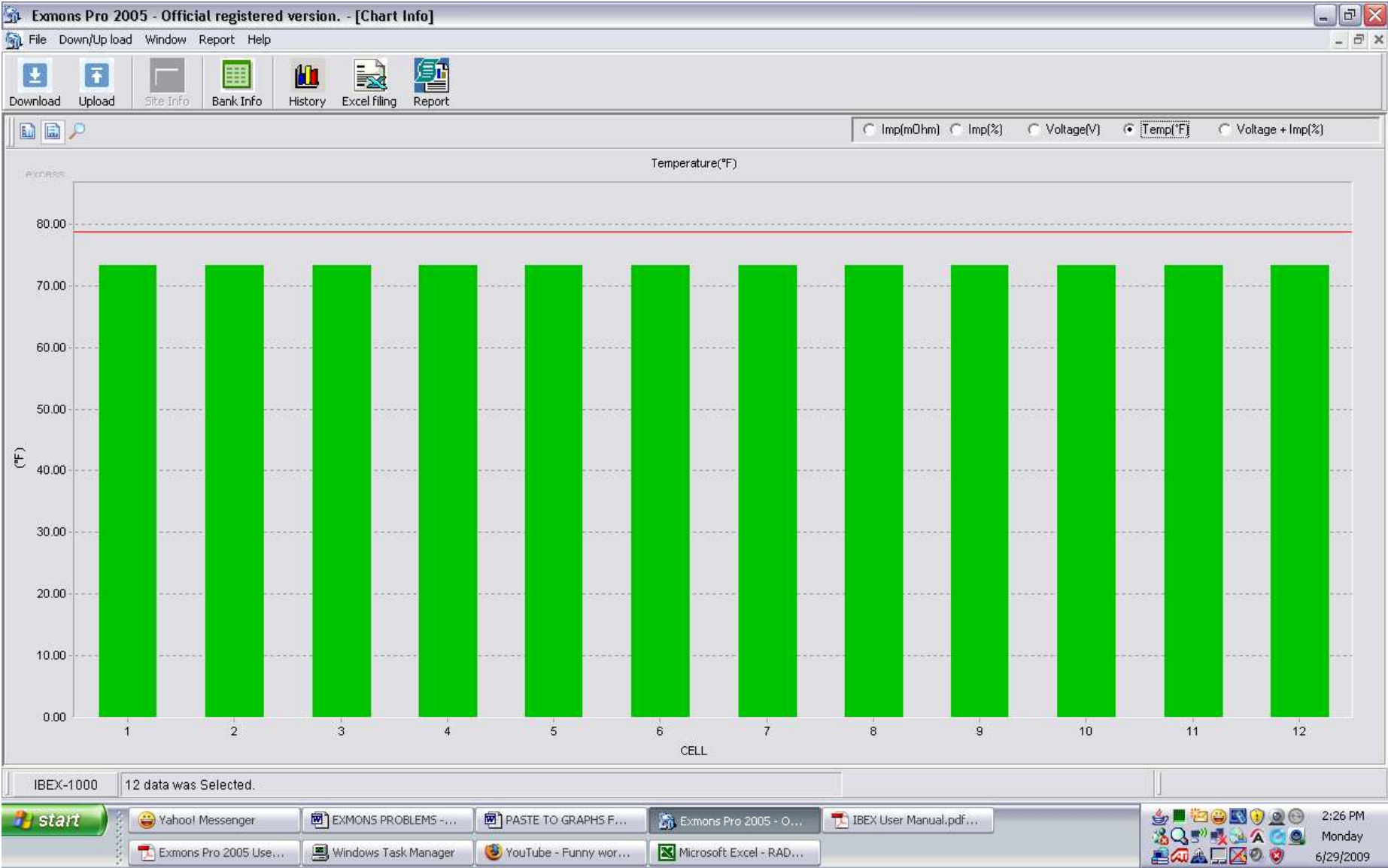
BATTERY CONDITION PERCENTAGE DEVIATION FROM BANK AVERAGE:



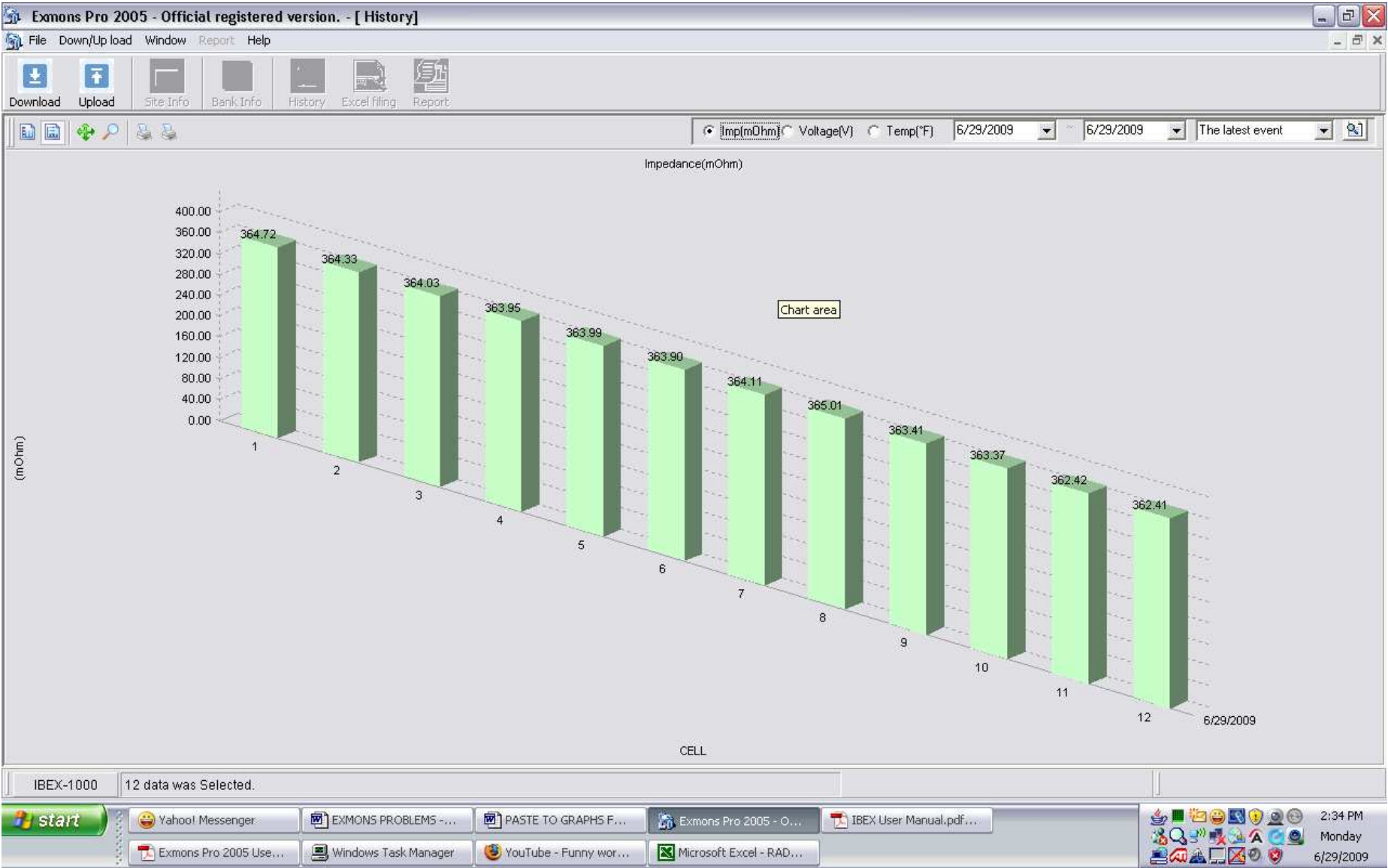
BATTERY CONDITION VOLTAGE DATA:



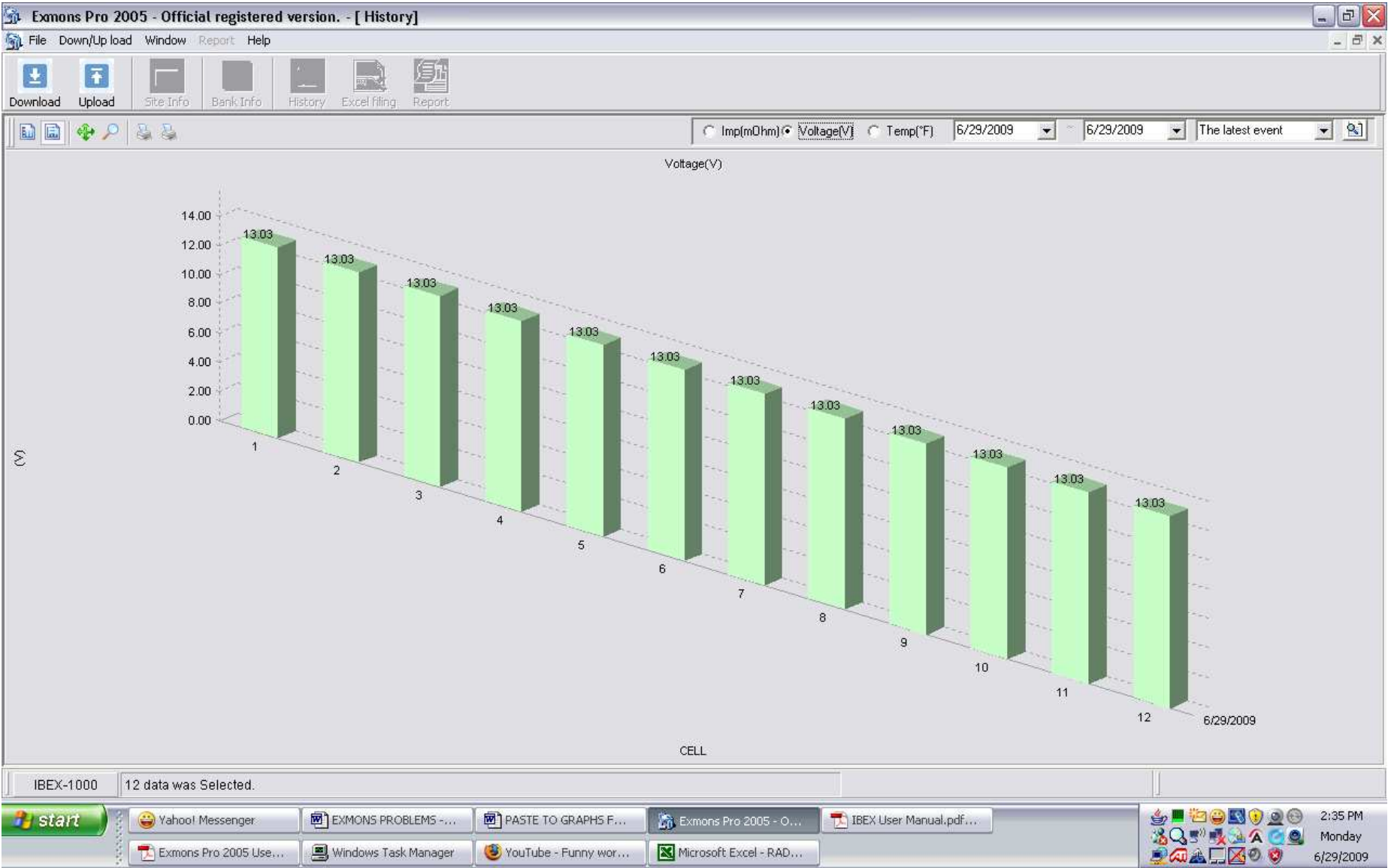
BATTERY CONDITION TEMPERATURE DATA:



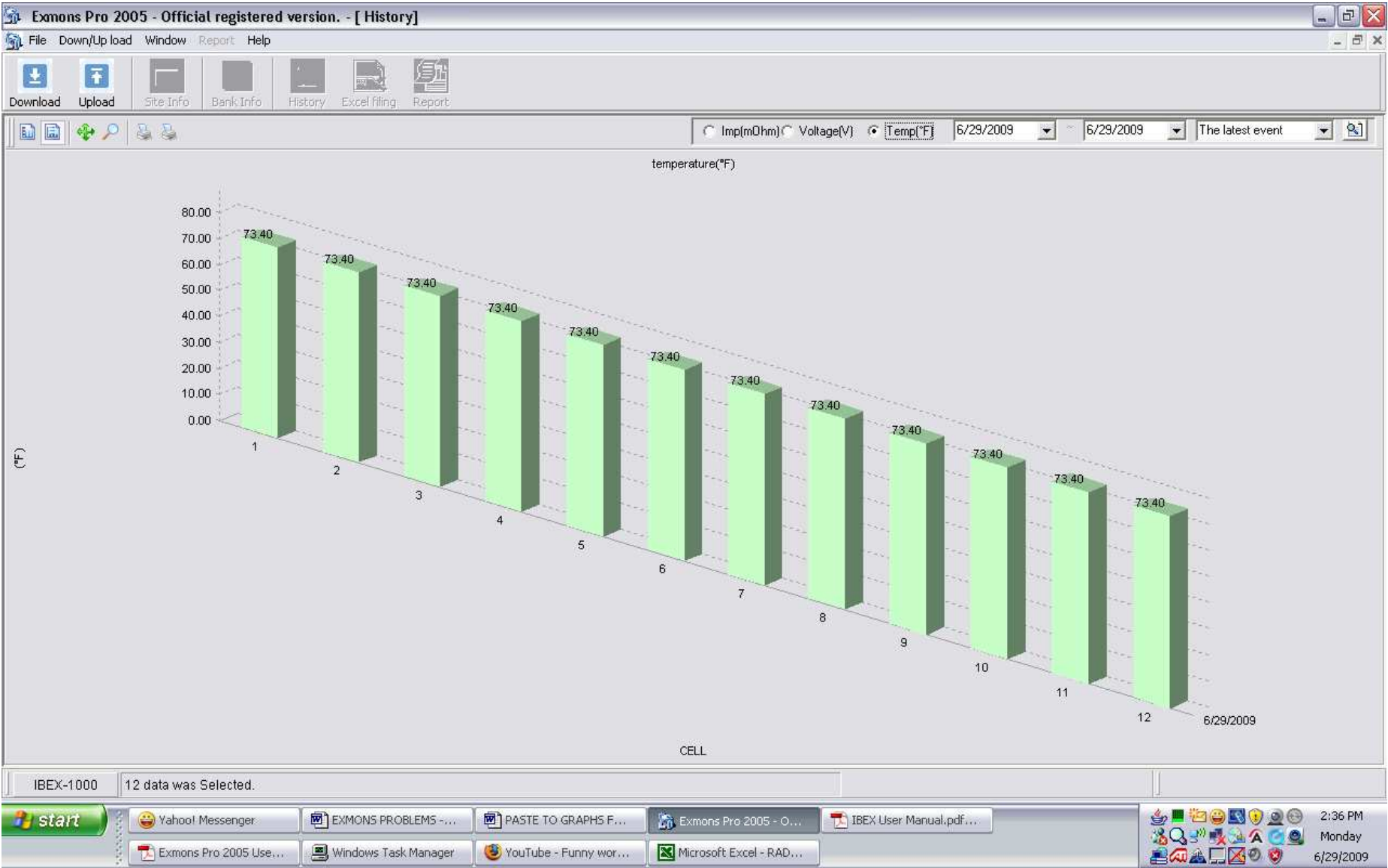
BATTERY CONDITION WATER FALL IMPEDANCE ACCUMULATED COMPARISON:



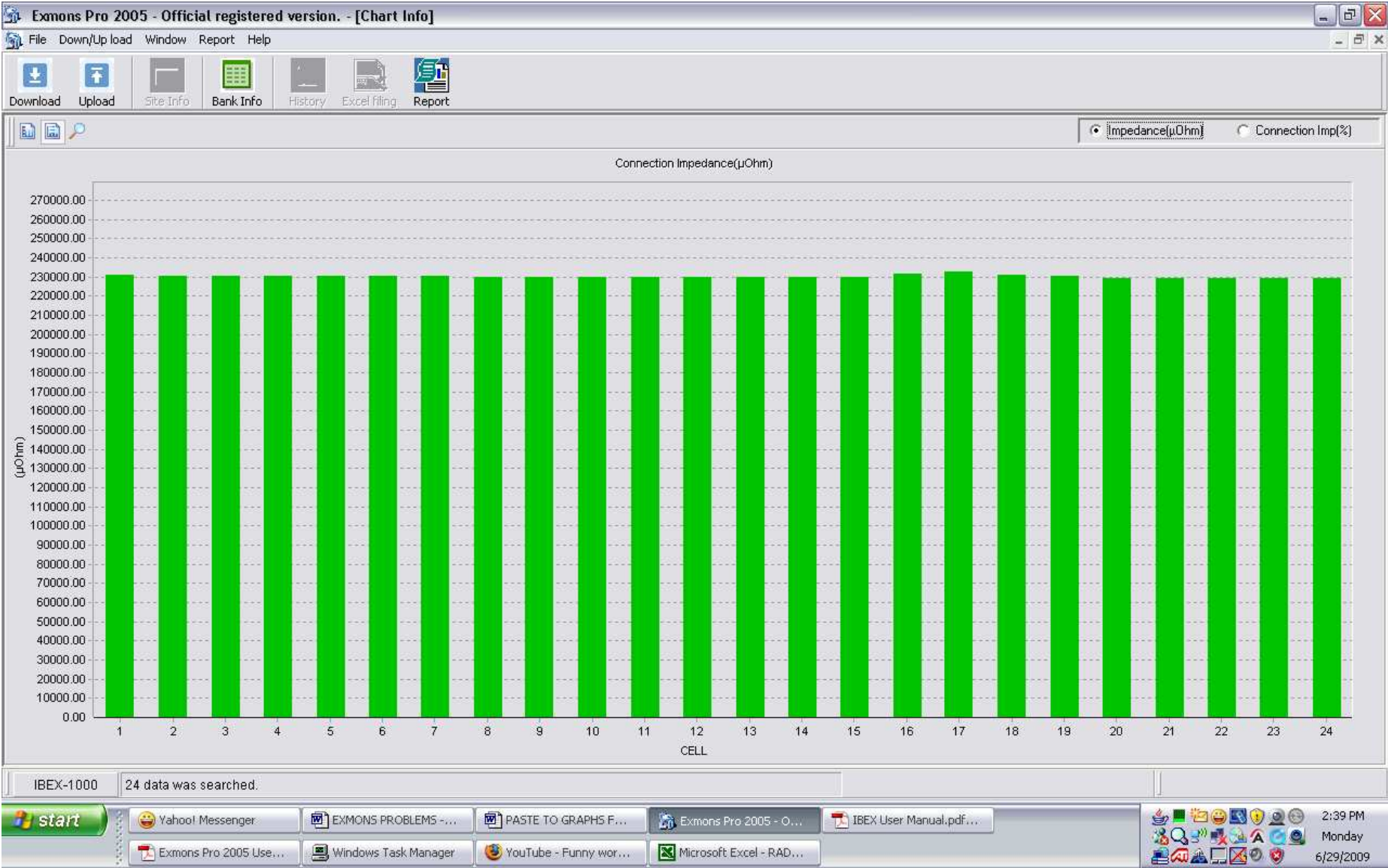
BATTERY CONDITION WATER FALL VOLTAGE ACCUMULATED COMPARISON:



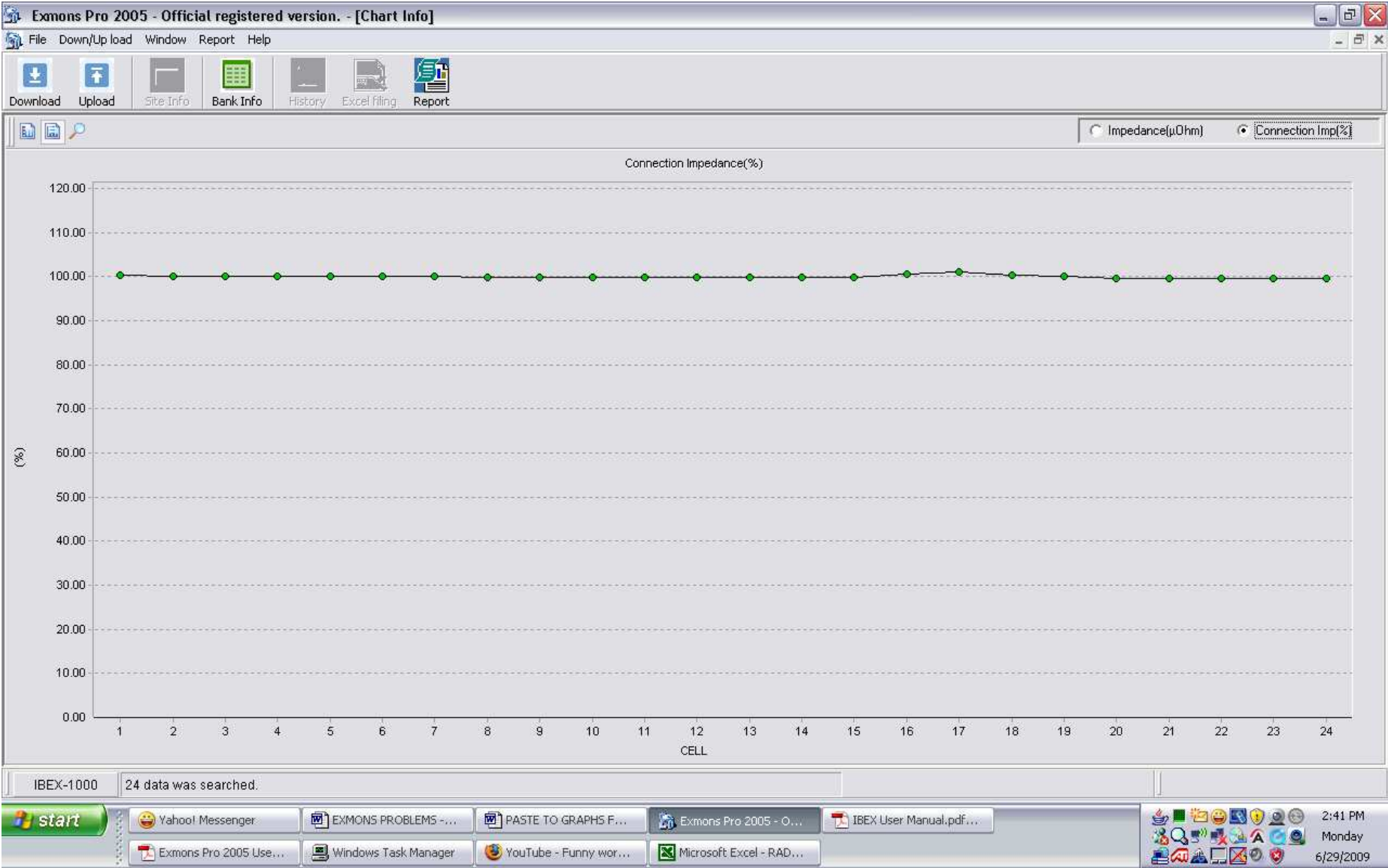
BATTERY CONDITION WATER FALL TEMPERATURE ACCUMULATED COMPARISON:



STRAPS DATA:
STRAP CONDITION IMPEDANCE DATA:



STRAP CONDITION IMPEDANCE PERCENTAGE DEVIATION FROM AVERAGE:



STRAP CONDITION TABULAR DATA:

Exmons Pro 2005 - Official registered version. - [Bank Info]

File Down/Up load Window Report Help

Download Upload Site Info Bank Info History Excel filing Report

Site Name: STRAT1
 Bank Name: BANK_05
 Measured Date: 6/28/2009
 Avg Connection Impedance(μ Ohm): 230080.1

Cell	Connection Imp(μ Ohm)	Connection Imp(%)
1	230758.4	100.29
2	230600.3	100.23
3	230447.8	100.16
4	230417.6	100.15
5	230291.8	100.09
6	230255.4	100.08
7	230183.4	100.04
8	230015.5	99.97
9	229927.8	99.93
10	229885.4	99.92
11	229780.9	99.87
12	229717	99.84
13	229727.3	99.85
14	229661.6	99.82
15	229581.7	99.78
16	231528.4	100.63
17	232515.8	101.06
18	230780.3	100.30
19	230072	100.00
20	229291.8	99.66
21	229196	99.62
22	229169.2	99.60
23	229122.1	99.58
24	228995.9	99.53

IBEX-1000 24 data was searched.

start Yahoo! Messenger EXMONS PROBLEMS -... PASTE TO GRAPHS F... Exmons Pro 2005 - O... IBEX User Manual.pdf...
 Exmons Pro 2005 Use... Windows Task Manager YouTube - Funny wor... Microsoft Excel - RAD...

2:42 PM
 Monday
 6/29/2009