



RECORD OF LIGHTNING IMPULSE TESTS

Record No. : 10001-000-HV-09-023
Customer : A-1 Electricals, Gujarat, India.
Object : Bus Bar Joint impulse testing with Ring Main Unit.
Joint Manufactured By : A-1 ELECTRICALS , RAJKOT, INDIA
Specification : As per IEC 60060
Date of Test : 10th NOV.2009

TEST PROGRAMME:

The Program was specified as follows:

Lightning impulse tests, according to IEC 60060 -1 & Client Spec.

The Program was specified by the client and was as follows:

Lightning impulse tests as 15 -ve 100% full waves followed by 15 +ve 100% full waves by each phases.

- 15 X 100% full Waves (-95 kVp)
- 15 X 100% Full Waves (+95kVp)

SUMMARY AND CONCLUSION :

The results obtained relate only to the work ordered and to the material tested.
The tests were passed in 15 times -Ve impulse (-95kVp) 15 times +Ve impulse 95kVp.

Witnessed By A 1 Electrical & Lucy Engrs

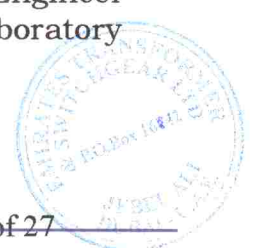
Mr. N.J.GANDHI
(A 1 Electricals, Rajkot, India)

Mr. NIDISH . R
(Lucy Switchgear FZE, Dubai)

Mr. BAPTIST
(Mostafa Bin Abdullatif Group llc, Dubai)

Tested By:

M.P. Saravanan
Testing Engineer
ETS High Voltage Laboratory





10001.000-HVL 09-023

DESCRIPTION AND RESULTS OF THE TESTS:

LIGHTNING IMPULSE TESTS

The 15KV RMU was subjected to a lightning impulse tests in accordance with IEC's and client specification. The applied test voltage amounted to 95kV (peak value).

Test Sequence: (Positive Impulse)

- One reduced full wave, (+50 kVp)
- 15 X 100% full waves (+95 kVp)

Test Sequence: (Negative Impulse)

- One reduced full wave, (-50 kVp)
- 15 X 100% full waves (-95 kVp)

The test voltage was measured by means of a calibrated standard lightning impulse measuring system consisting of a voltage divider and a peak voltmeter/oscillograph. Condition of RMU are shown in the photograph

The recorded impulse voltage oscillograms are presented in pages 3 to 26. The applied voltage is shown. The differences between voltage transients were checked against the first reduced application visually as well as using digital circuitry. No significant differences could be observed.

RESULTS OF THE LIGHTNING IMPULSE TEST

Conditions of the test object (Tested at HV winding)

Phase under test	Terminal earthed direct	Voltage (kVp)	Wave shape (us)	Figure	Remarks
R	Y, B & Tank	-95.0 +95.0	T1 = 1.061 T2 = 49.96	01 to 15 16 to 30	100% Full wave 100% Full wave
Y	R, B & Tank	-95.0 +95.0	T1 = 1.099 T2 = 49.96	01 to 15 16 to 29 35	100% Full wave 100% Full wave
B	R, Y & Tank	-95.0 +95.0	T1 = 1.056 T2 = 49.95	01 to 15 16 to 30	100% Full wave 100% Full wave



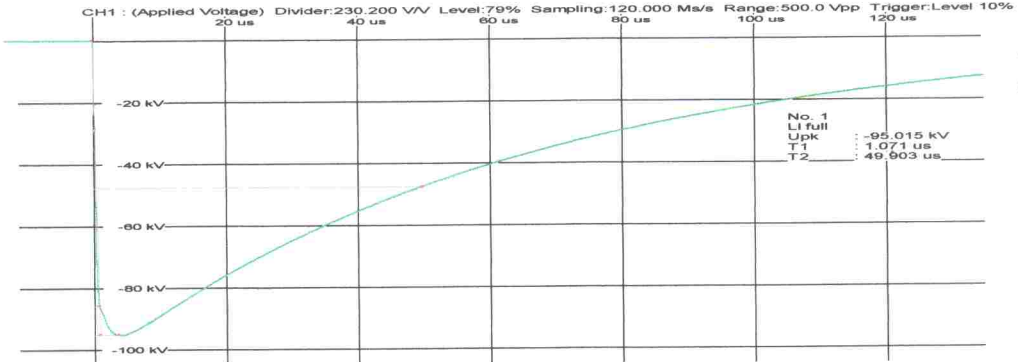
ETS

Test Information

Test manager MPS
Object RMU
Inspector Lucy & A1 Elec. Engr
Connection Rph

15KV RMU - RPH

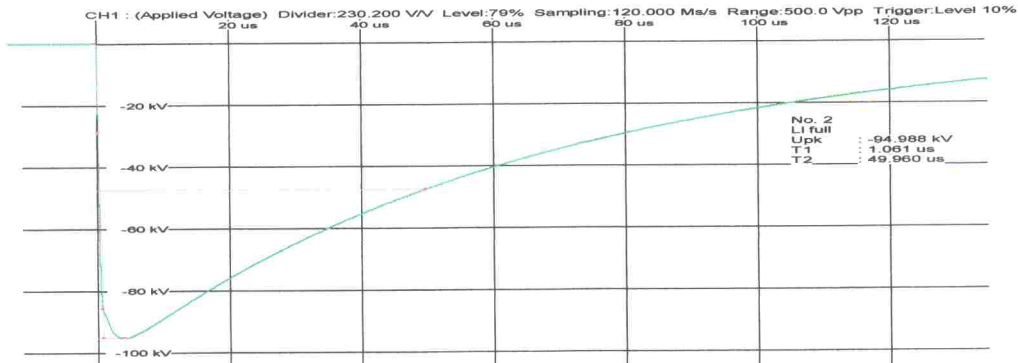
No. 1
LI full
Upk: -95.015 kV
T1 : 1.071 us
T2 : 49.903 us



26772
10/11/2009 09:58:16
CH1 Applied Voltage

15KV RMU - RPH

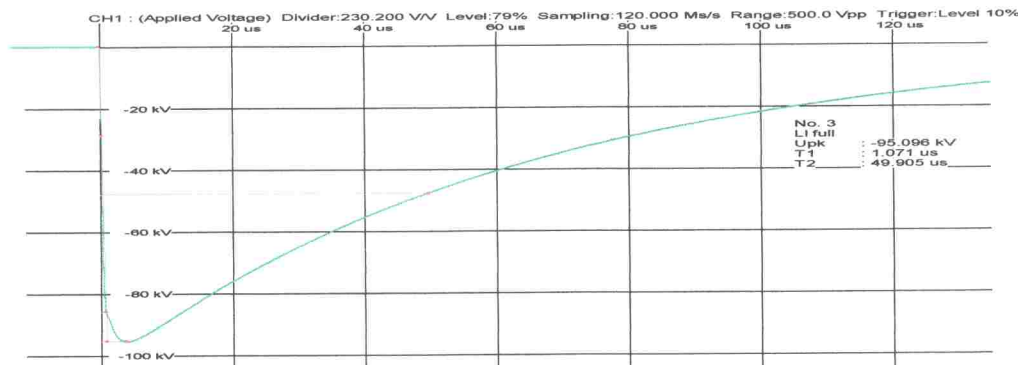
No. 2
LI full
Upk: -94.988 kV
T1 : 1.061 us
T2 : 49.960 us



26773
10/11/2009 09:59:07
CH1 Applied Voltage

15KV RMU - RPH

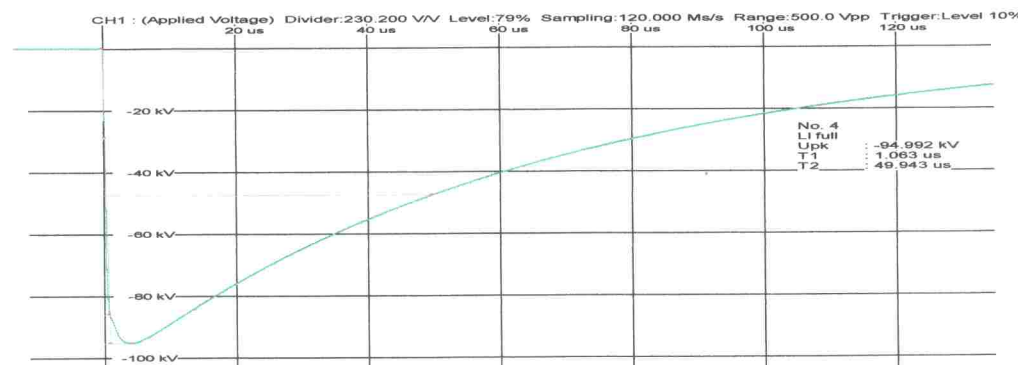
No. 3
LI full
Upk: -95.096 kV
T1 : 1.071 us
T2 : 49.905 us



26774
10/11/2009 10:00:10
CH1 Applied Voltage

15KV RMU - RPH

No. 4
LI full
Upk: -94.992 kV
T1 : 1.063 us
T2 : 49.943 us



26775
10/11/2009 10:01:10
CH1 Applied Voltage



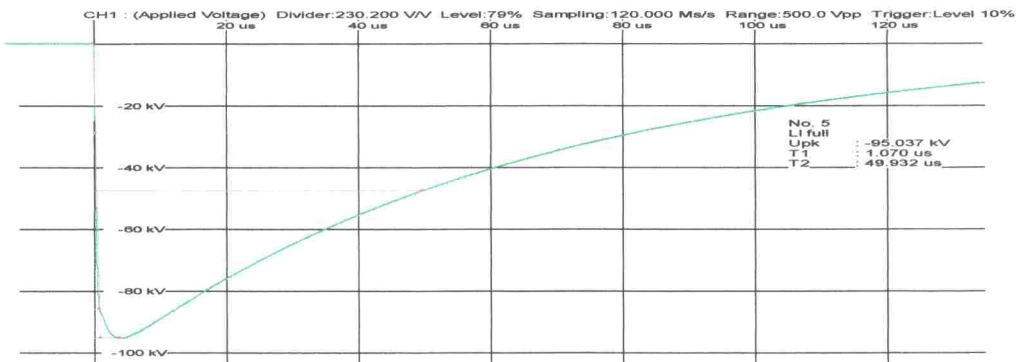
ETS

Test Information

Test manager MPS
Object RMU
Inspector Lucy & A1 Elec. Engr
Connection Rph

15KV RMU - RPH

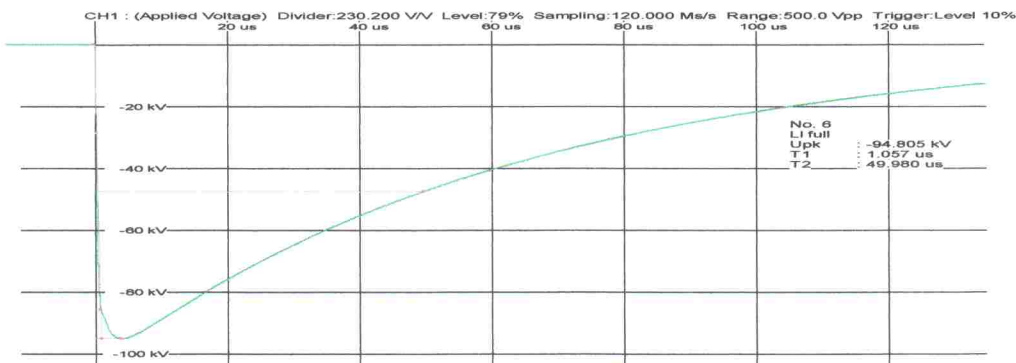
No. 5
LI full
Upk: -95.037 kV
T1 : 1.070 us
T2 : 49.932 us



26776
10/11/2009 10:02:11
CH1 Applied Voltage

15KV RMU - RPH

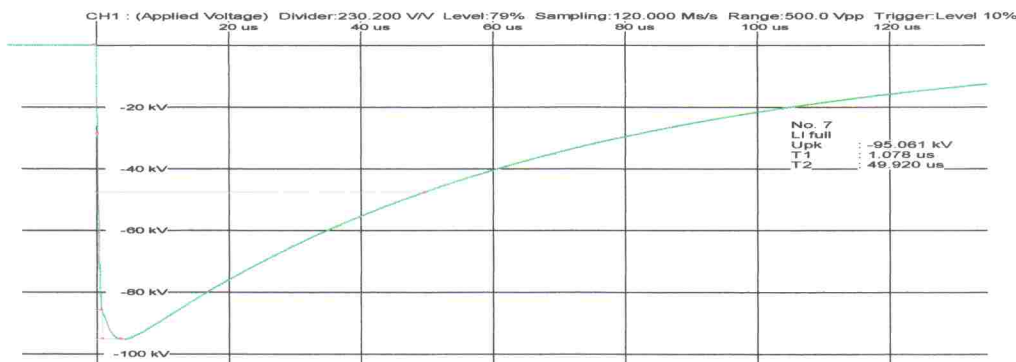
No. 6
LI full
Upk: -94.805 kV
T1 : 1.057 us
T2 : 49.980 us



26777
10/11/2009 10:03:11
CH1 Applied Voltage

15KV RMU - RPH

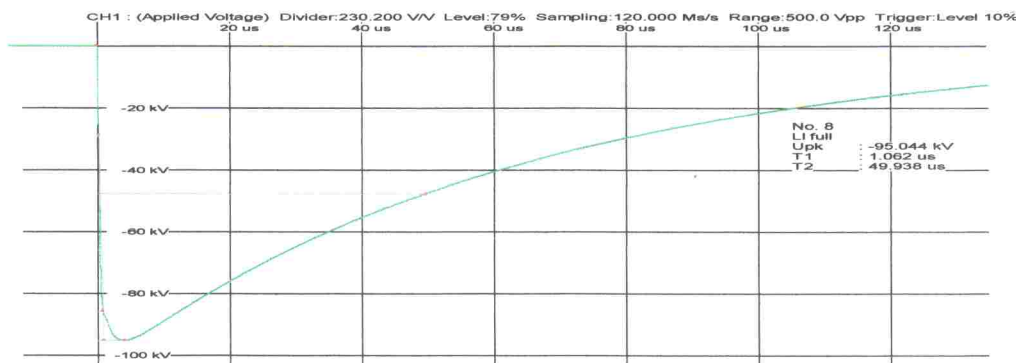
No. 7
LI full
Upk: -95.061 kV
T1 : 1.078 us
T2 : 49.920 us



26778
10/11/2009 10:04:12
CH1 Applied Voltage

15KV RMU - RPH

No. 8
LI full
Upk: -95.044 kV
T1 : 1.062 us
T2 : 49.938 us



26779
10/11/2009 10:05:18
CH1 Applied Voltage



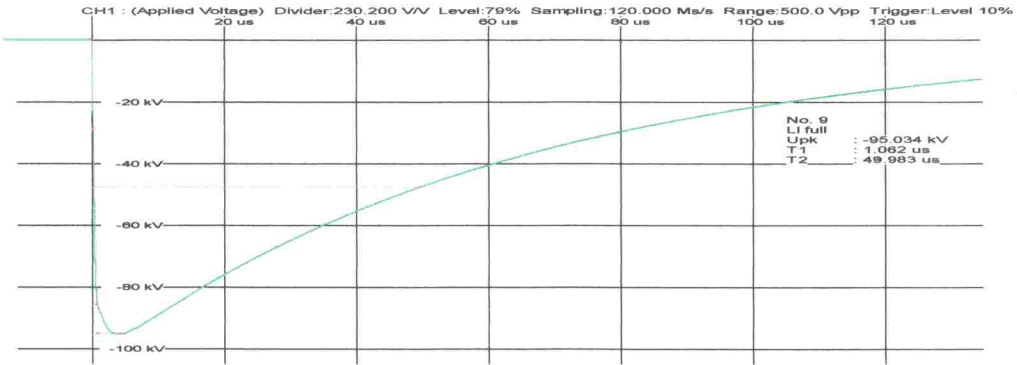
ETS

Test Information

Test manager MPS
Object RMU
Inspector Lucy & A1 Elec. Engr
Connection Rph

15KV RMU - RPH

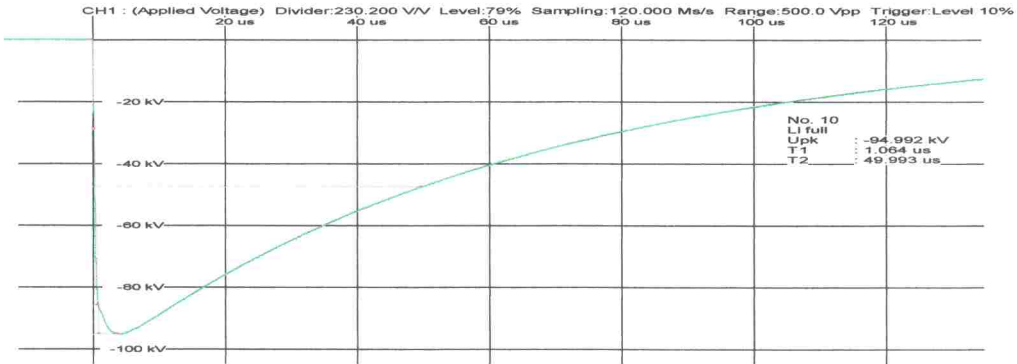
No. 9
LI full
Upk: -95.034 kV
T1 : 1.062 us
T2 : 49.983 us



26780
10/11/2009 10:06:13
CH1 Applied Voltage

15KV RMU - RPH

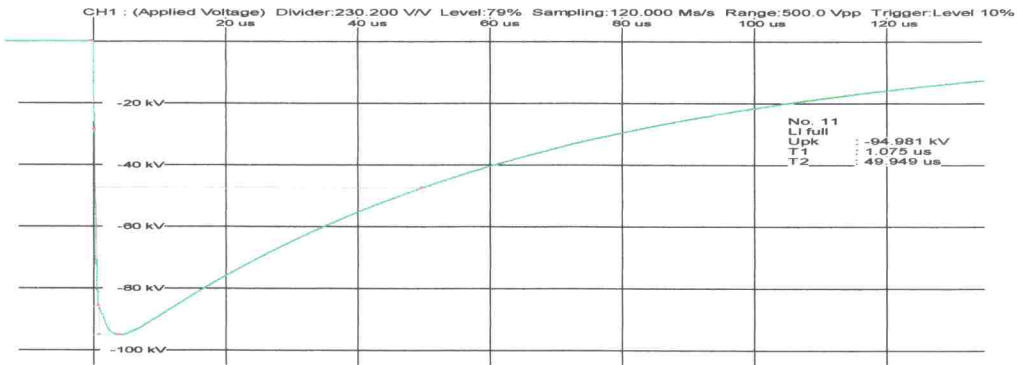
No. 10
LI full
Upk: -94.992 kV
T1 : 1.064 us
T2 : 49.993 us



26781
10/11/2009 10:07:11
CH1 Applied Voltage

15KV RMU - RPH

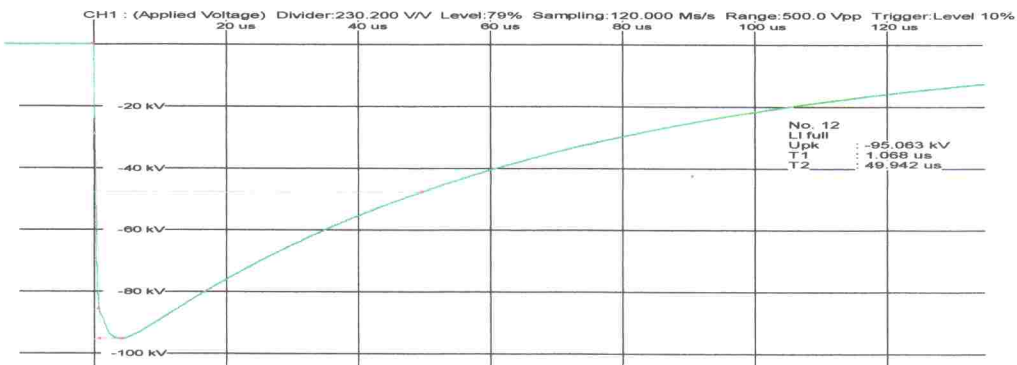
No. 11
LI full
Upk: -94.981 kV
T1 : 1.075 us
T2 : 49.949 us



26782
10/11/2009 10:07:58
CH1 Applied Voltage

15KV RMU - RPH

No. 12
LI full
Upk: -95.063 kV
T1 : 1.068 us
T2 : 49.942 us



26783
10/11/2009 10:08:47
CH1 Applied Voltage



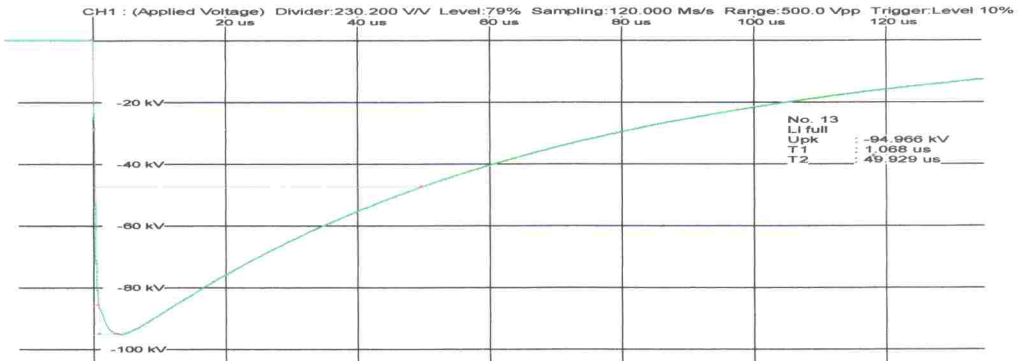
ETS

Test Information

Test manager MPS
Object RMU
Inspector Lucy & A1 Elec. Engr
Connection Rph

15KV RMU - RPH

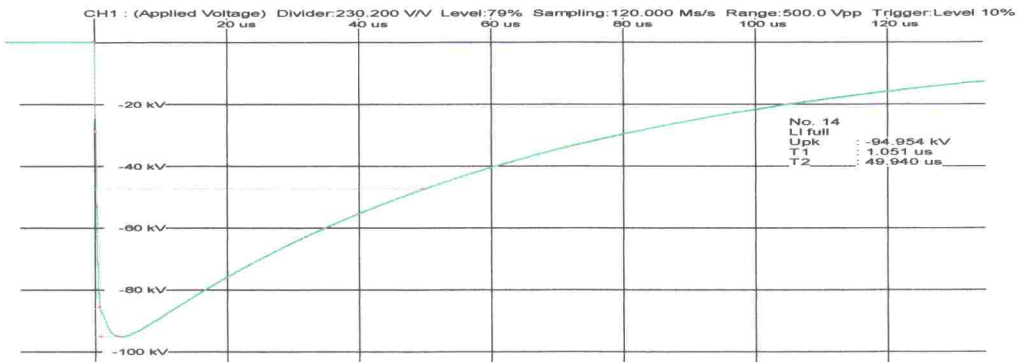
No. 13
LI full
Upk: -94.966 kV
T1 : 1.068 us
T2 : 49.929 us



26784
10/11/2009 10:09:37
CH1 Applied Voltage

15KV RMU - RPH

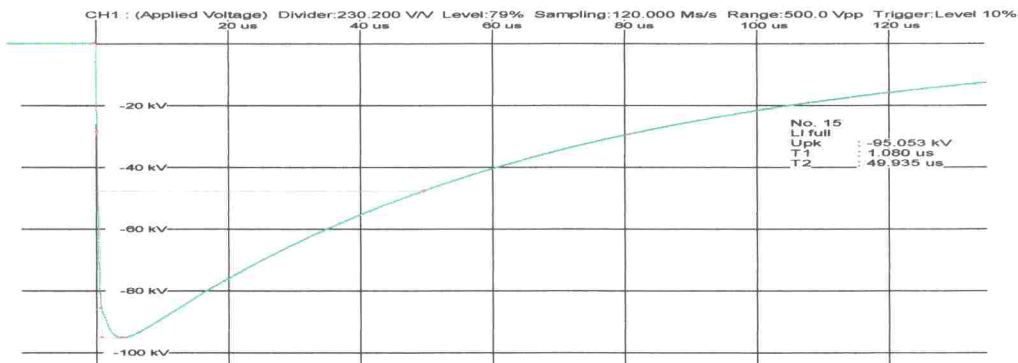
No. 14
LI full
Upk: -94.954 kV
T1 : 1.051 us
T2 : 49.940 us



26785
10/11/2009 10:10:29
CH1 Applied Voltage

15KV RMU - RPH

No. 15
LI full
Upk: -95.053 kV
T1 : 1.080 us
T2 : 49.935 us



26786
10/11/2009 10:11:18
CH1 Applied Voltage



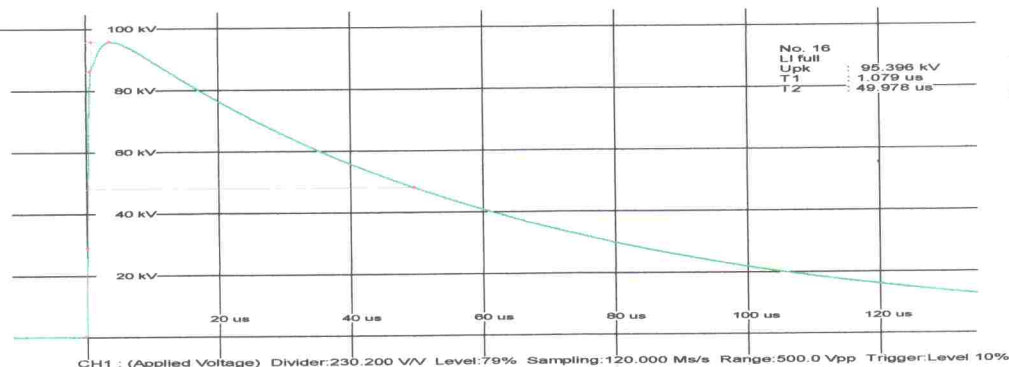
ETS

Test Information

Test manager MPS
Object RMU
Inspector Lucy & A1 Elec. Engr
Connection Rph

15KV RMU - RPH

No. 16
LI full
Upk: 95.396 kV
T1 : 1.079 us
T2 : 49.978 us



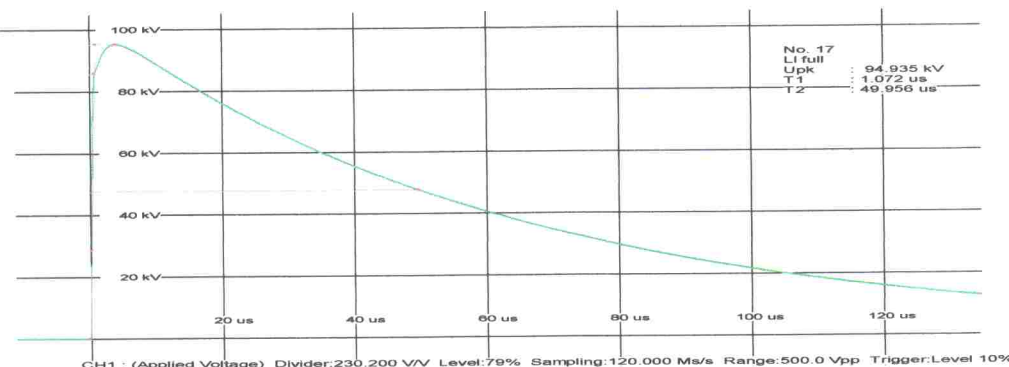
26788

10/11/2009 10:13:53

CH1 Applied Voltage

15KV RMU - RPH

No. 17
LI full
Upk: 94.935 kV
T1 : 1.072 us
T2 : 49.956 us



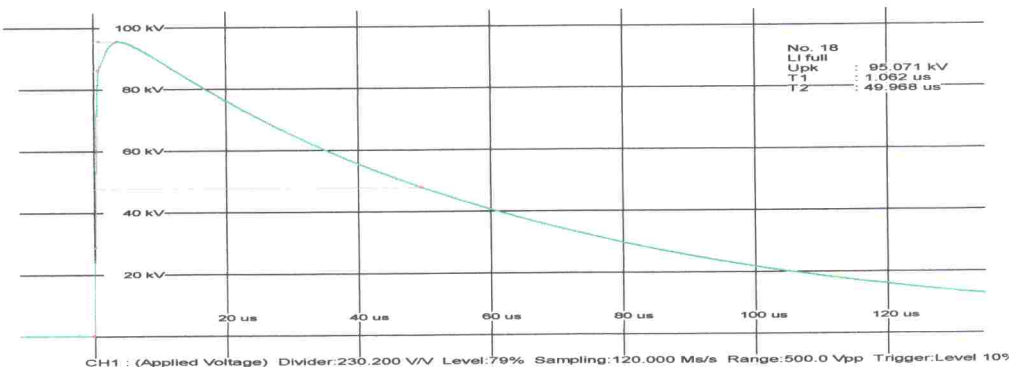
26789

10/11/2009 10:14:42

CH1 Applied Voltage

15KV RMU - RPH

No. 18
LI full
Upk: 95.071 kV
T1 : 1.062 us
T2 : 49.968 us



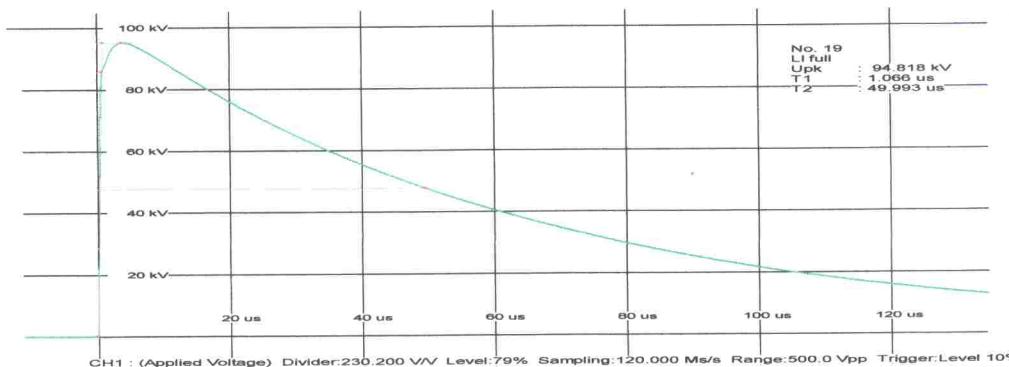
26790

10/11/2009 10:15:33

CH1 Applied Voltage

15KV RMU - RPH

No. 19
LI full
Upk: 94.818 kV
T1 : 1.066 us
T2 : 49.993 us



26791

10/11/2009 10:16:24

CH1 Applied Voltage



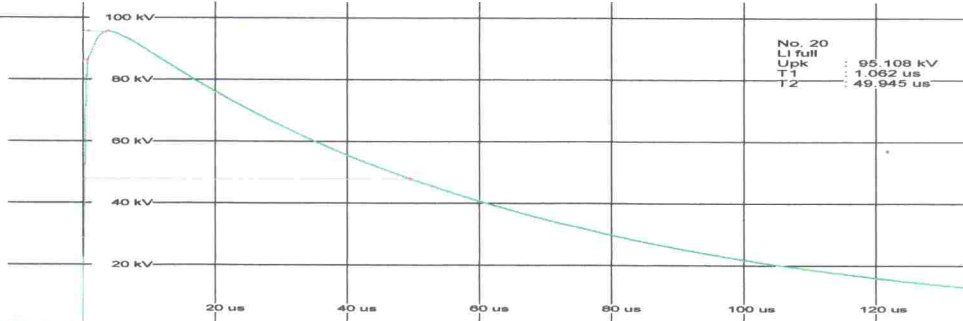
ETS

Test Information

Test manager MPS
Object RMU
Inspector Lucy & A1 Elec. Engr
Connection Rph

15KV RMU - RPH

No. 20
LI full
Upk: 95.108 kV
T1 : 1.062 us
T2 : 49.945 us



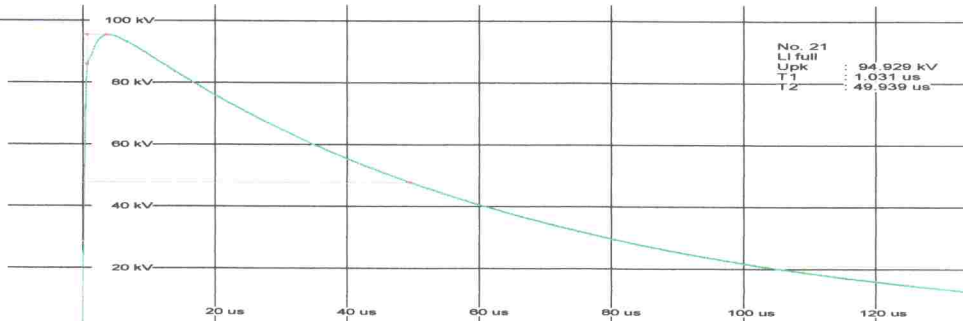
CH1 : (Applied Voltage) Divider:230.200 V/V Level:79% Sampling:120.000 Ms/s Range:500.0 Vpp Trigger:Level 10%

26792

10/11/2009 10:17:07
CH1 Applied Voltage

15KV RMU - RPH

No. 21
LI full
Upk: 94.929 kV
T1 : 1.031 us
T2 : 49.939 us



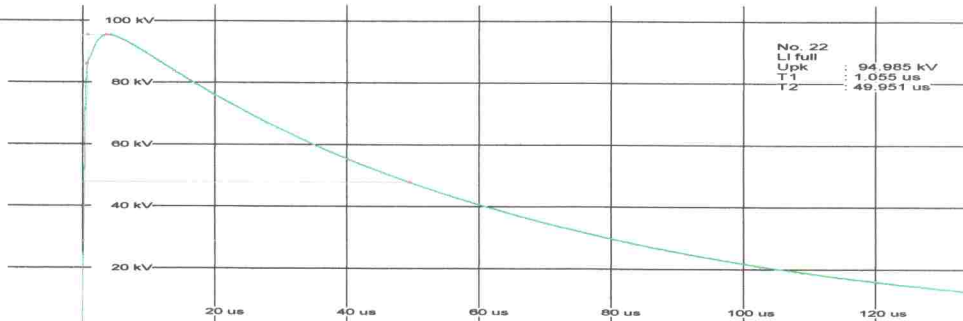
CH1 : (Applied Voltage) Divider:230.200 V/V Level:79% Sampling:120.000 Ms/s Range:500.0 Vpp Trigger:Level 10%

26793

10/11/2009 10:17:57
CH1 Applied Voltage

15KV RMU - RPH

No. 22
LI full
Upk: 94.985 kV
T1 : 1.055 us
T2 : 49.951 us



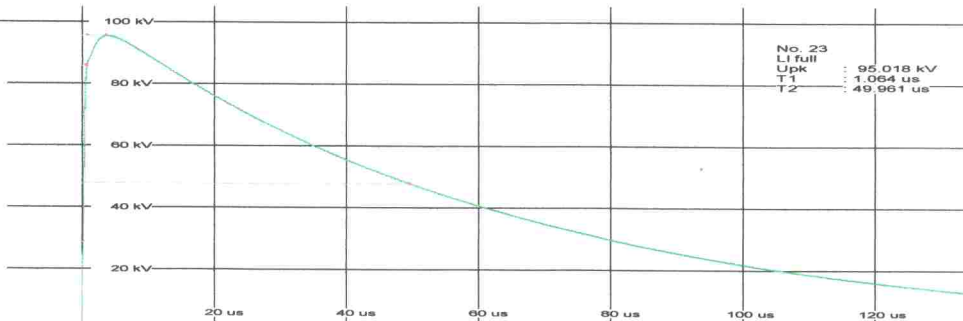
CH1 : (Applied Voltage) Divider:230.200 V/V Level:79% Sampling:120.000 Ms/s Range:500.0 Vpp Trigger:Level 10%

26794

10/11/2009 10:18:45
CH1 Applied Voltage

15KV RMU - RPH

No. 23
LI full
Upk: 95.018 kV
T1 : 1.064 us
T2 : 49.961 us



CH1 : (Applied Voltage) Divider:230.200 V/V Level:79% Sampling:120.000 Ms/s Range:500.0 Vpp Trigger:Level 10%

26795

10/11/2009 10:19:34
CH1 Applied Voltage



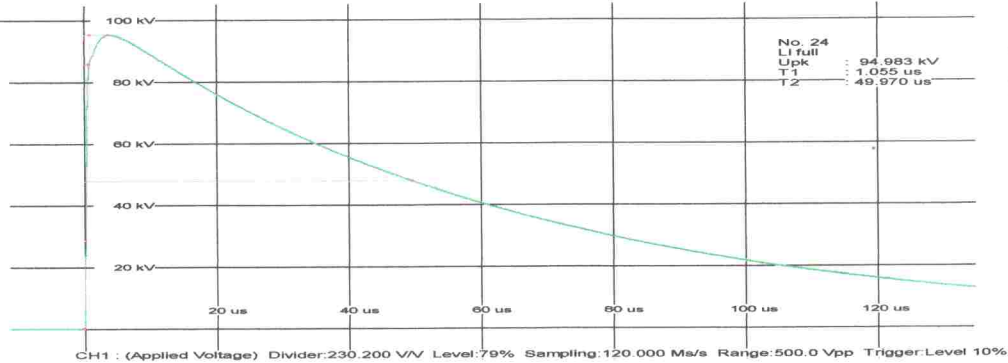
ETS

Test Information

Test manager MPS
Object RMU
Inspector Lucy & A1 Elec. Engr
Connection Rph

15KV RMU - RPH

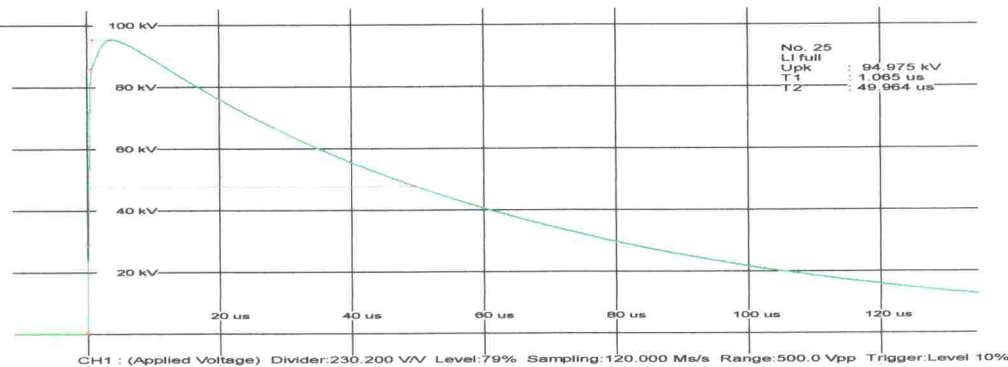
No. 24
LI full
Upk: 94.983 kV
T1 : 1.055 us
T2 : 49.970 us



26796
10/11/2009 10:20:22
CH1 Applied Voltage

15KV RMU - RPH

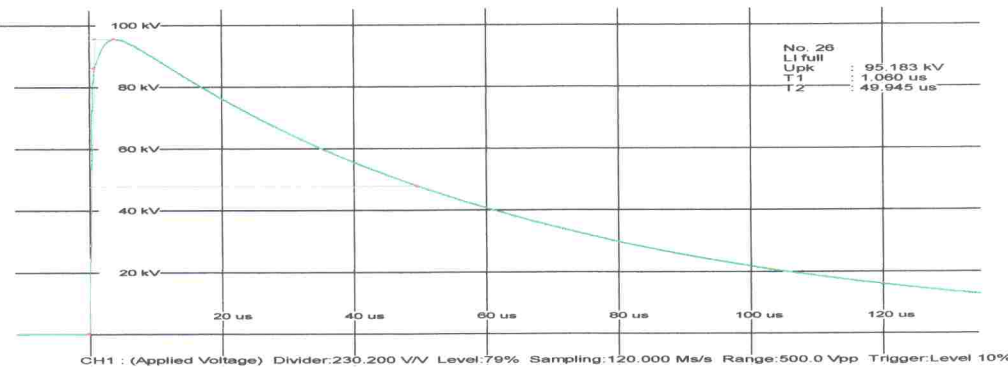
No. 25
LI full
Upk: 94.975 kV
T1 : 1.065 us
T2 : 49.964 us



26797
10/11/2009 10:21:11
CH1 Applied Voltage

15KV RMU - RPH

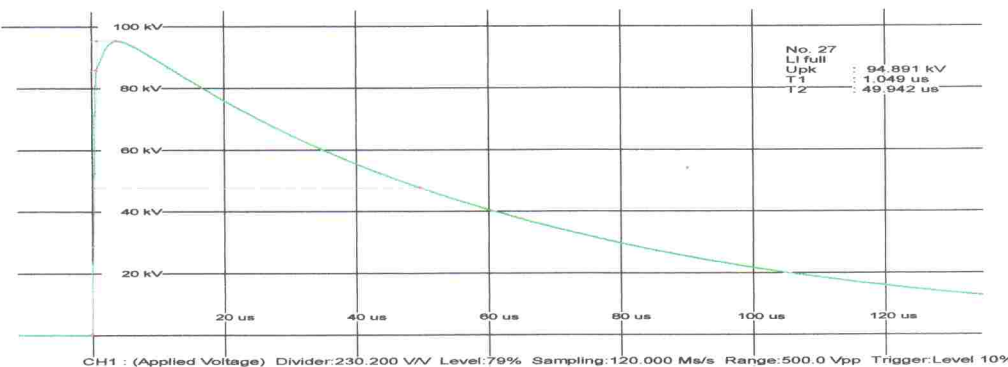
No. 26
LI full
Upk: 95.183 kV
T1 : 1.060 us
T2 : 49.945 us



26798
10/11/2009 10:22:02
CH1 Applied Voltage

15KV RMU - RPH

No. 27
LI full
Upk: 94.891 kV
T1 : 1.049 us
T2 : 49.942 us



26799
10/11/2009 10:22:57
CH1 Applied Voltage



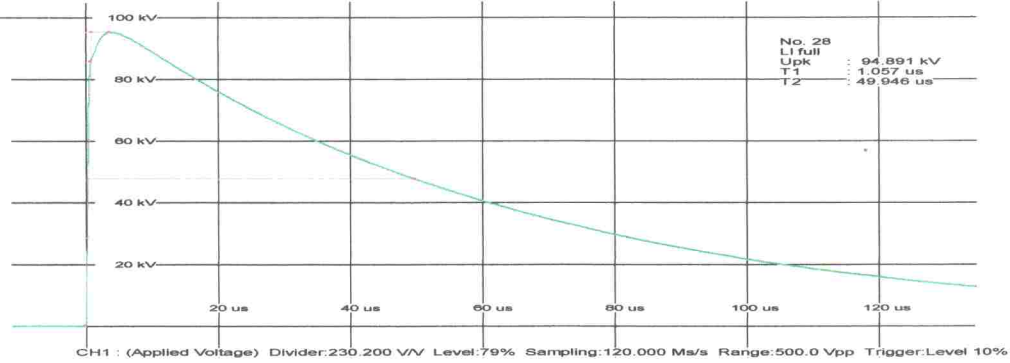
ETS

Test Information

Test manager MPS
Object RMU
Inspector Lucy & A1 Elec. Engr
Connection Rph

15KV RMU - RPH

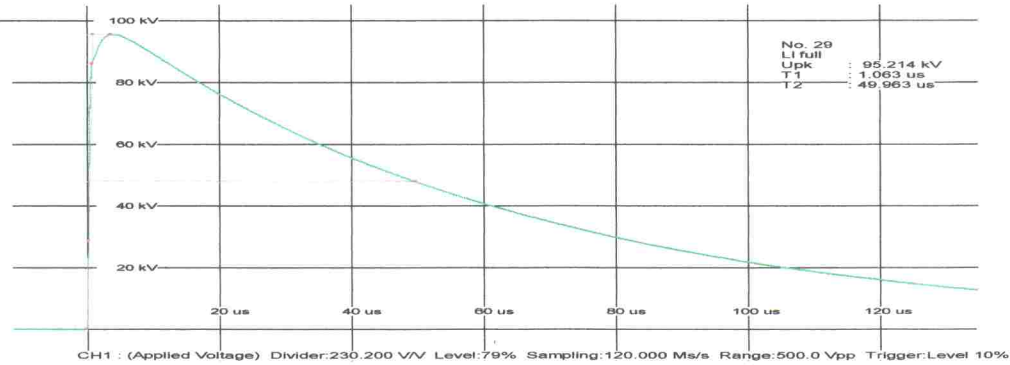
No. 28
LI full
Upk: 94.891 kV
T1 : 1.057 us
T2 : 49.946 us



#26800
10/11/2009 10:23:48
CH1 Applied Voltage

15KV RMU - RPH

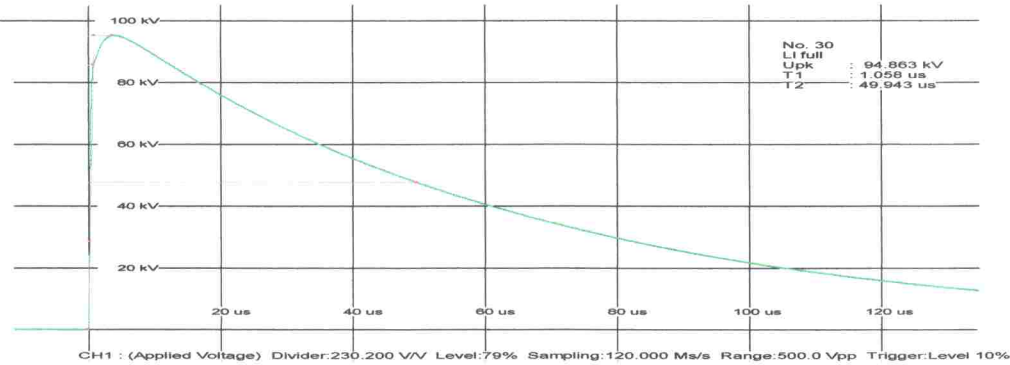
No. 29
LI full
Upk: 95.214 kV
T1 : 1.063 us
T2 : 49.963 us



#26801
10/11/2009 10:24:30
CH1 Applied Voltage

15KV RMU - RPH

No. 30
LI full
Upk: 94.863 kV
T1 : 1.058 us
T2 : 49.943 us



#26802
10/11/2009 10:25:13
CH1 Applied Voltage



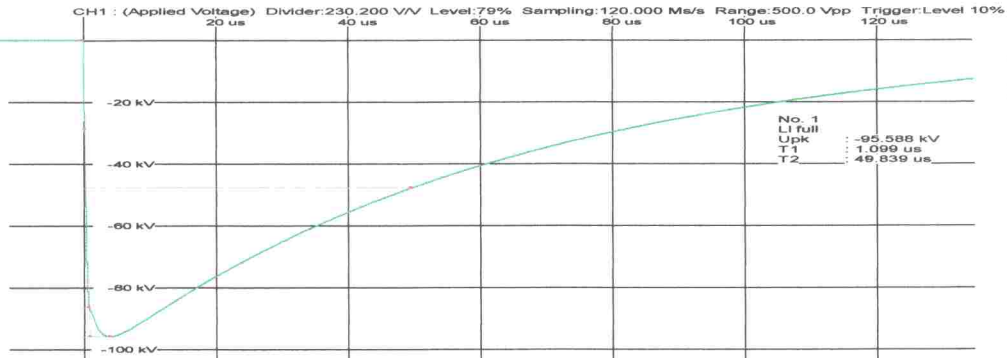
ETS

Test Information

Test manager MPS
Object RMU
Inspector Lucy & A1 Elec. Engr
Connection Yph

15KV RMU - YPH

No. 1
LI full
Upk: -95.588 kV
T1 : 1.099 us
T2 : 49.839 us



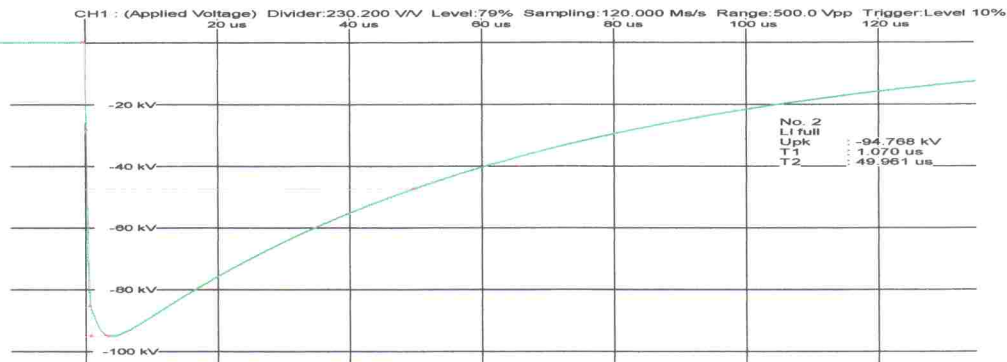
26804

10/11/2009 11:02:14

CH1 Applied Voltage

15KV RMU - YPH

No. 2
LI full
Upk: -94.768 kV
T1 : 1.070 us
T2 : 49.961 us



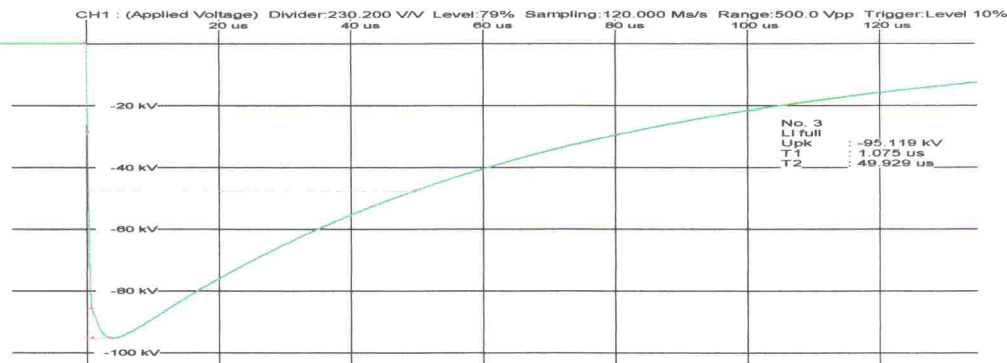
26805

10/11/2009 11:03:00

CH1 Applied Voltage

15KV RMU - YPH

No. 3
LI full
Upk: -95.119 kV
T1 : 1.075 us
T2 : 49.929 us



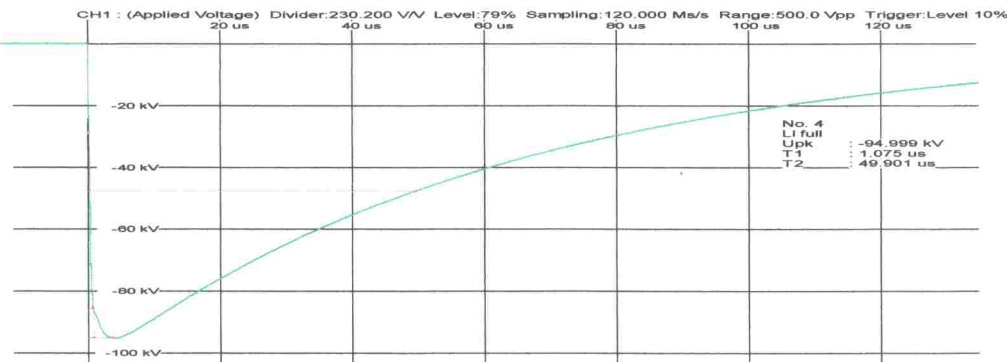
26806

10/11/2009 11:03:47

CH1 Applied Voltage

15KV RMU - YPH

No. 4
LI full
Upk: -94.999 kV
T1 : 1.075 us
T2 : 49.901 us



26807

10/11/2009 11:04:34

CH1 Applied Voltage



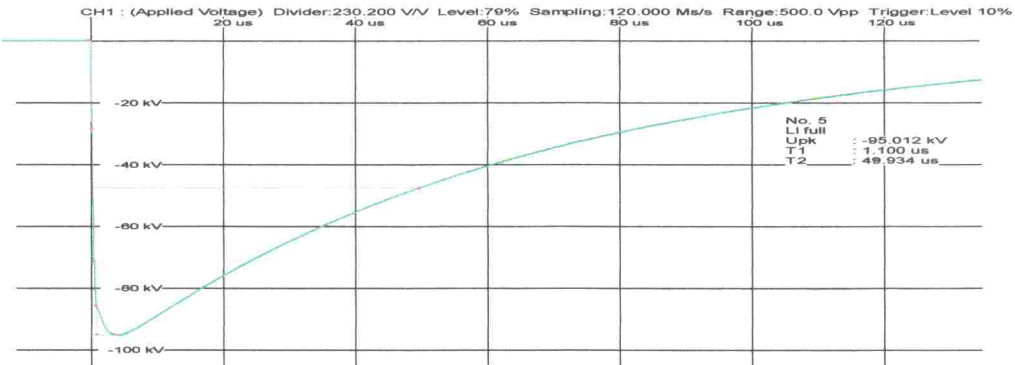
ETS

Test Information

Test manager MPS
Object RMU
Inspector Lucy & A1 Elec. Engr
Connection Yph

15KV RMU - YPH

No. 5
LI full
Upk: -95.012 kV
T1 : 1.100 us
T2 : 49.934 us

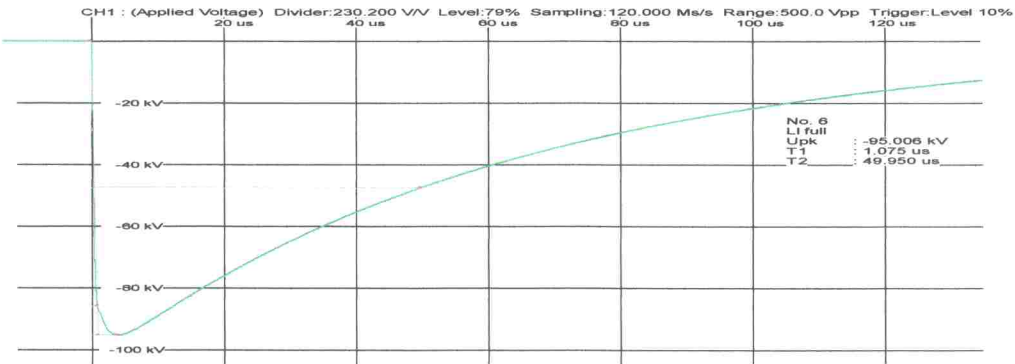


26808

10/11/2009 11:05:17
CH1 Applied Voltage

15KV RMU - YPH

No. 6
LI full
Upk: -95.006 kV
T1 : 1.075 us
T2 : 49.950 us

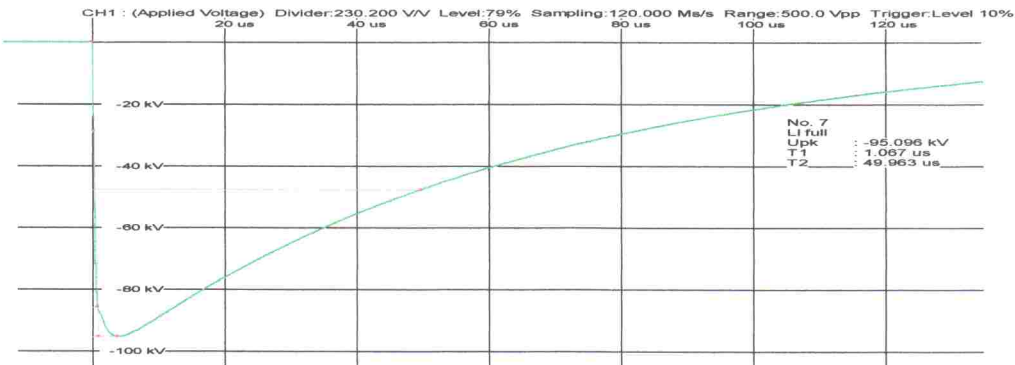


26809

10/11/2009 11:06:01
CH1 Applied Voltage

15KV RMU - YPH

No. 7
LI full
Upk: -95.096 kV
T1 : 1.067 us
T2 : 49.963 us

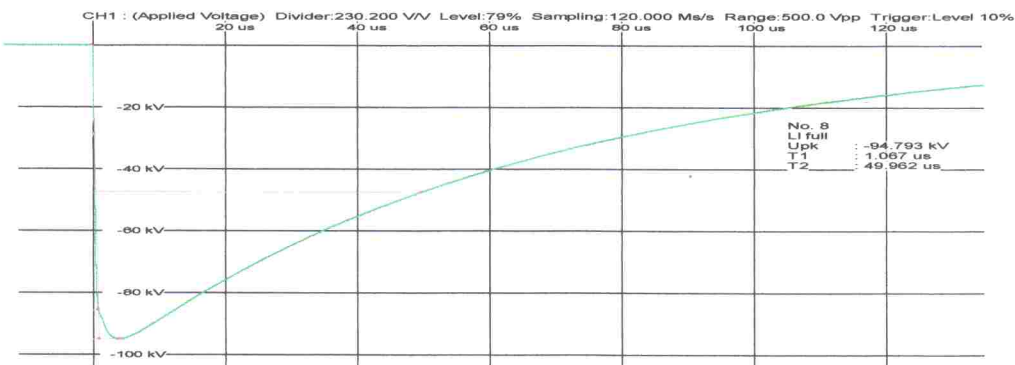


26810

10/11/2009 11:06:48
CH1 Applied Voltage

15KV RMU - YPH

No. 8
LI full
Upk: -94.793 kV
T1 : 1.067 us
T2 : 49.962 us



26811

10/11/2009 11:07:34
CH1 Applied Voltage



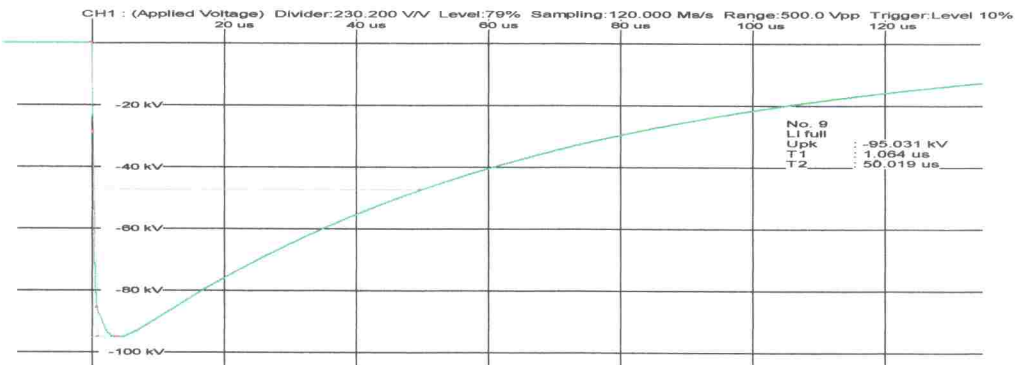
ETS

Test Information

Test manager MPS
Object RMU
Inspector Lucy & A1 Elec. Engr
Connection Yph

15KV RMU - YPH

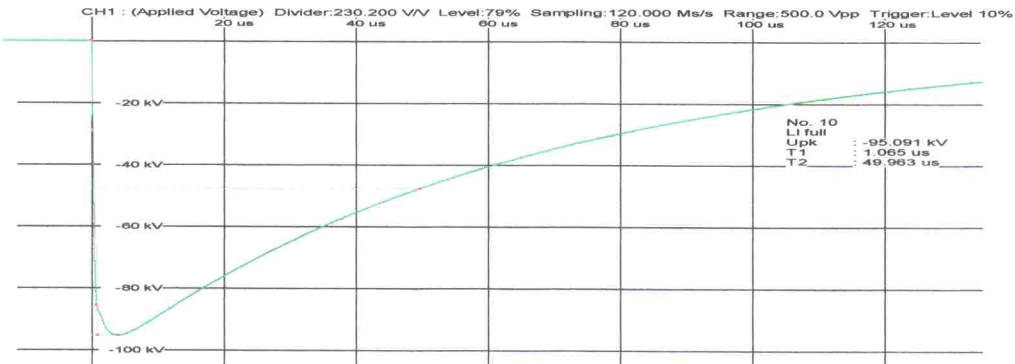
No. 9
LI full
Upk: -95.031 kV
T1 : 1.064 us
T2 : 50.019 us



#26812
10/11/2009 11:08:20
CH1 Applied Voltage

15KV RMU - YPH

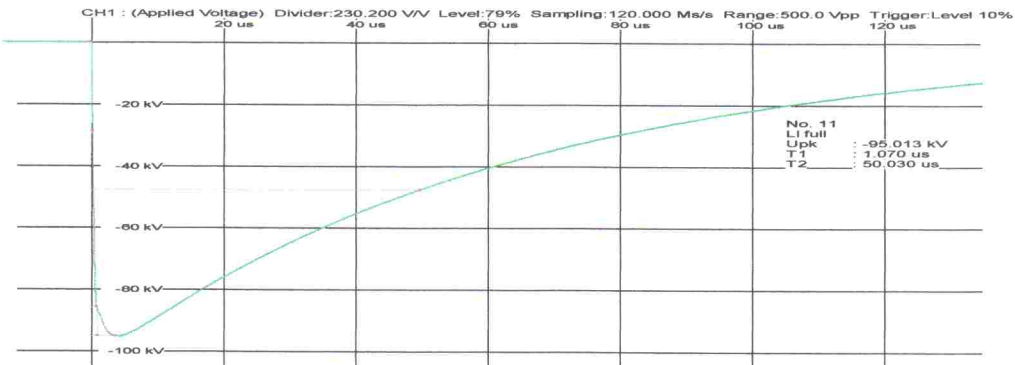
No. 10
LI full
Upk: -95.091 kV
T1 : 1.065 us
T2 : 49.963 us



#26813
10/11/2009 11:09:08
CH1 Applied Voltage

15KV RMU - YPH

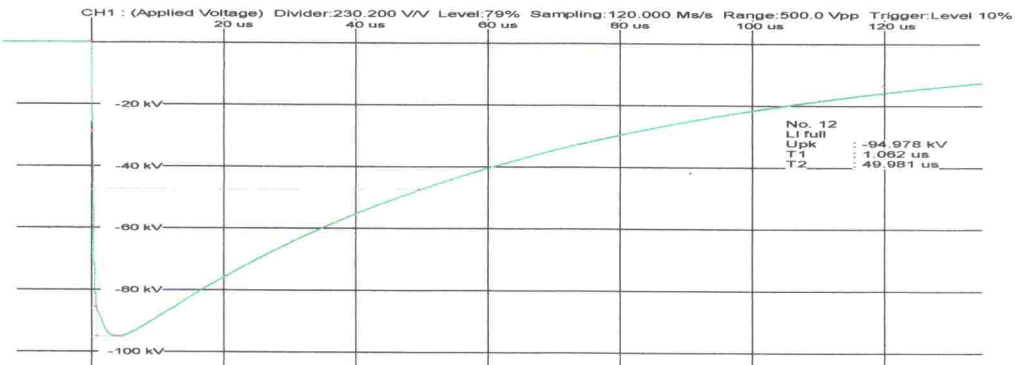
No. 11
LI full
Upk: -95.013 kV
T1 : 1.070 us
T2 : 50.030 us



#26814
10/11/2009 11:10:04
CH1 Applied Voltage

15KV RMU - YPH

No. 12
LI full
Upk: -94.978 kV
T1 : 1.062 us
T2 : 49.981 us



#26815
10/11/2009 11:10:48
CH1 Applied Voltage



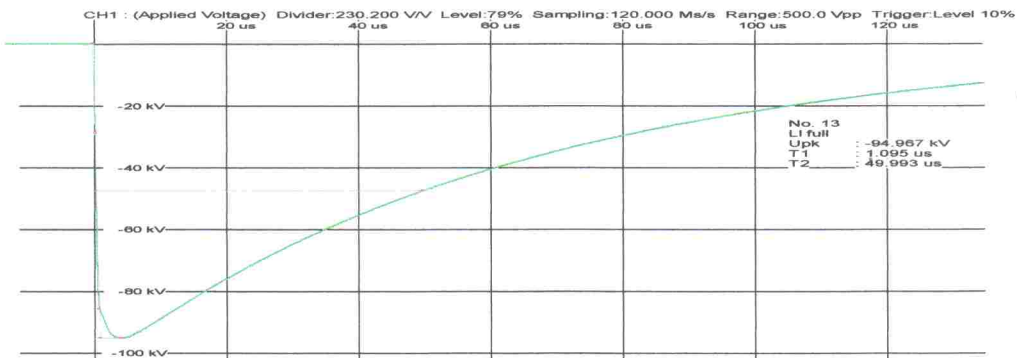
ETS

Test Information

Test manager MPS
Object RMU
Inspector Lucy & A1 Elec. Engr
Connection Yph

15KV RMU - YPH

No. 13
LI full
Upk: -94.967 kV
T1 : 1.095 us
T2 : 49.993 us



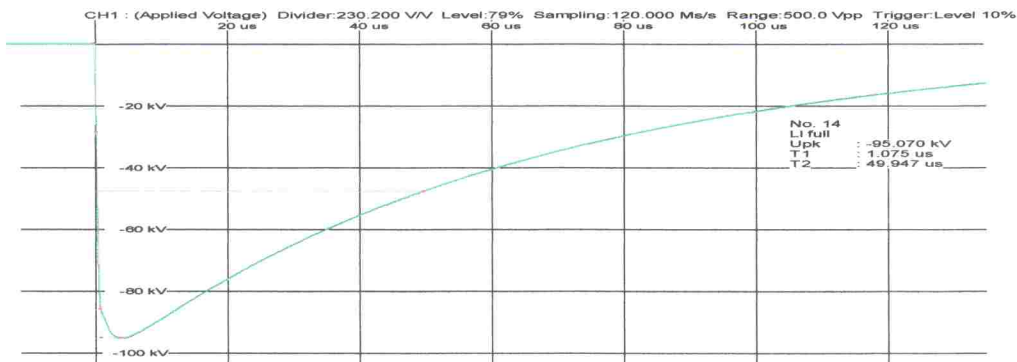
26816

10/11/2009 11:11:35

CH1 Applied Voltage

15KV RMU - YPH

No. 14
LI full
Upk: -95.070 kV
T1 : 1.075 us
T2 : 49.947 us



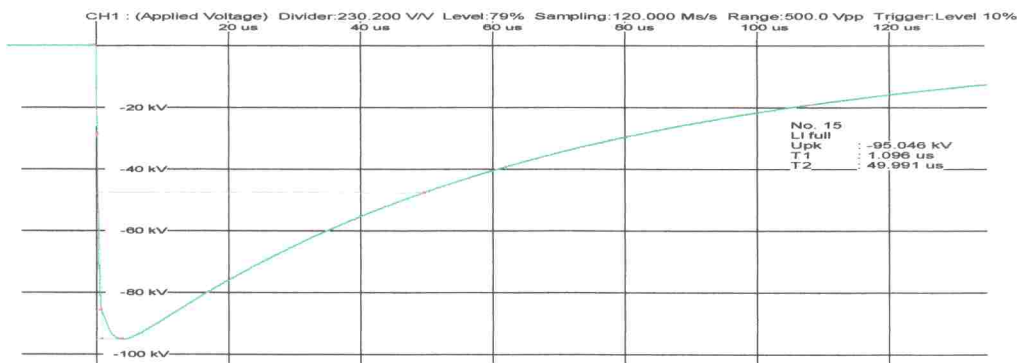
26817

10/11/2009 11:12:23

CH1 Applied Voltage

15KV RMU - YPH

No. 15
LI full
Upk: -95.046 kV
T1 : 1.096 us
T2 : 49.991 us



26818

10/11/2009 11:13:06

CH1 Applied Voltage



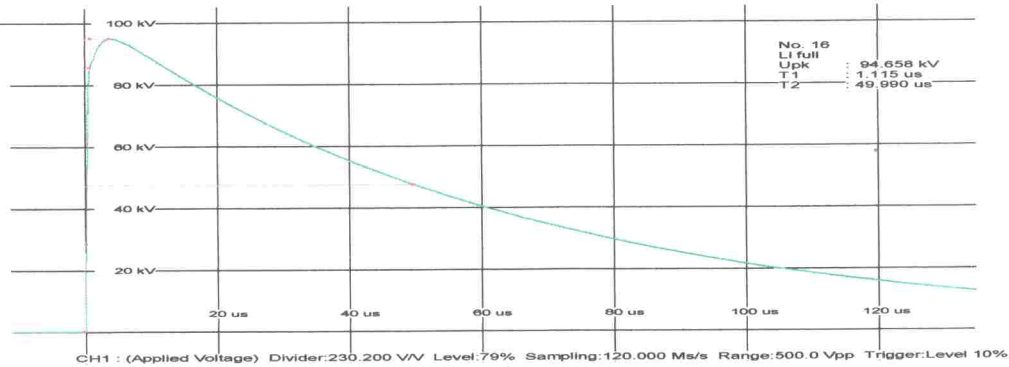
ETS

Test Information

Test manager MPS
Object RMU
Inspector Lucy & A1 Elec. Engr
Connection Yph

15KV RMU - YPH

No. 16
LI full
Upk: 94.658 kV
T1 : 1.115 us
T2 : 49.990 us

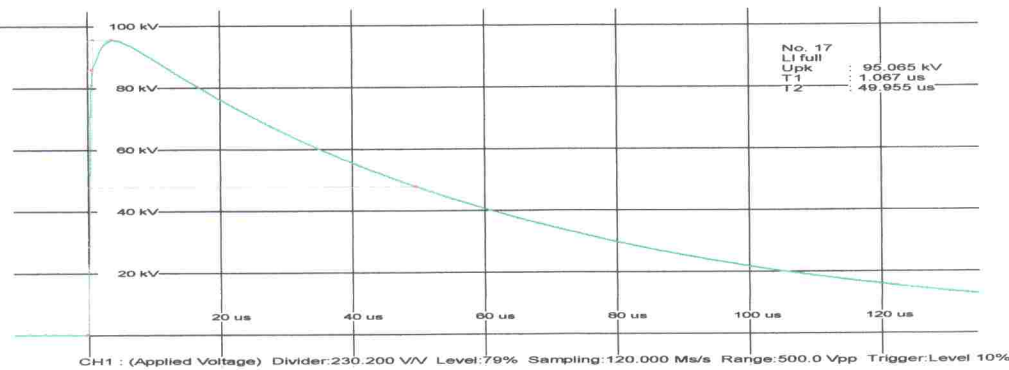


26820

10/11/2009 11:15:21
CH1 Applied Voltage

15KV RMU - YPH

No. 17
LI full
Upk: 95.065 kV
T1 : 1.067 us
T2 : 49.955 us

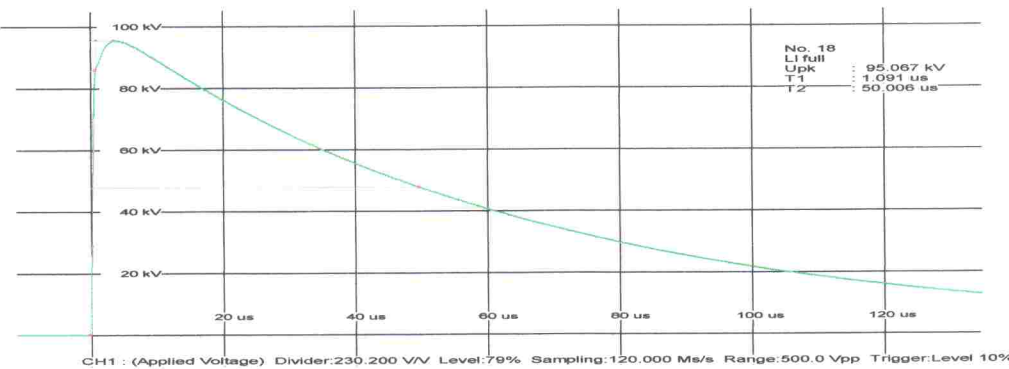


26821

10/11/2009 11:16:07
CH1 Applied Voltage

15KV RMU - YPH

No. 18
LI full
Upk: 95.067 kV
T1 : 1.091 us
T2 : 50.006 us

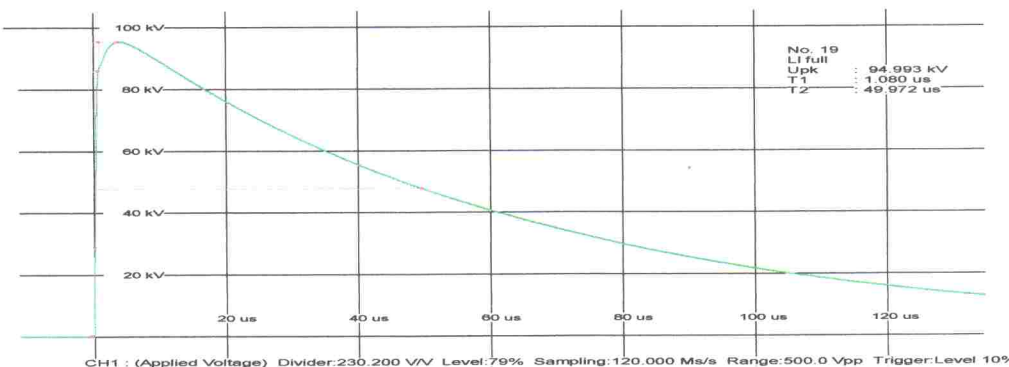


26822

10/11/2009 11:17:00
CH1 Applied Voltage

15KV RMU - YPH

No. 19
LI full
Upk: 94.993 kV
T1 : 1.080 us
T2 : 49.972 us



26823

10/11/2009 11:17:46
CH1 Applied Voltage



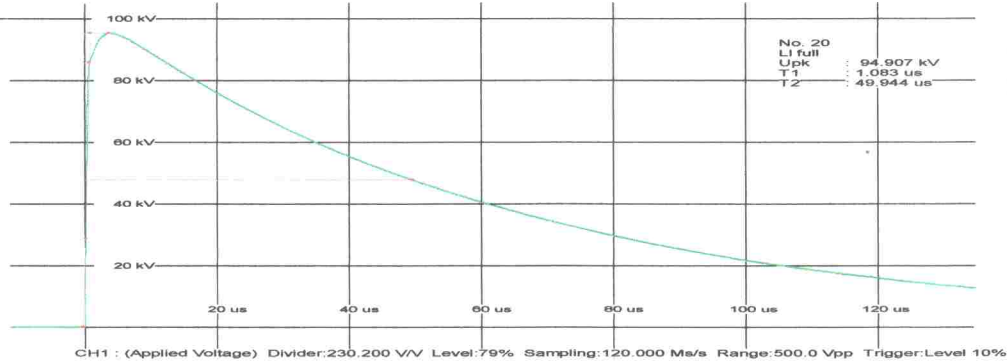
ETS

Test Information

Test manager MPS
Object RMU
Inspector Lucy & A1 Elec. Engr
Connection Yph

15KV RMU - YPH

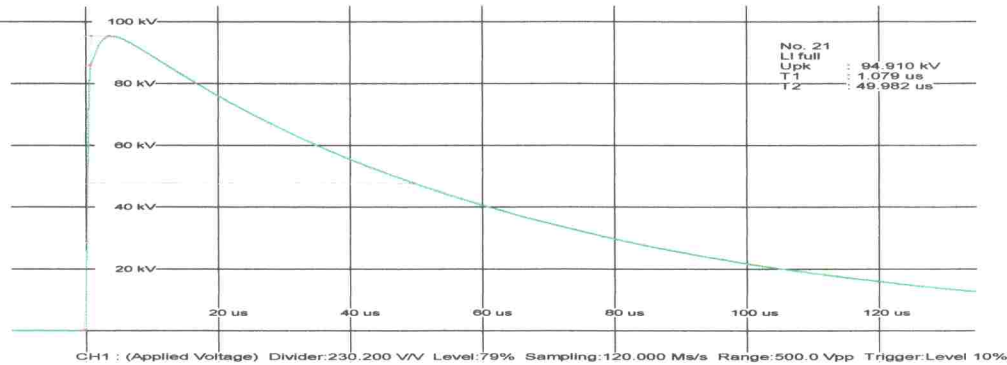
No. 20
LI full
Upk: 94.907 kV
T1 : 1.083 us
T2 : 49.944 us



#26824
10/11/2009 11:18:32
CH1 Applied Voltage

15KV RMU - YPH

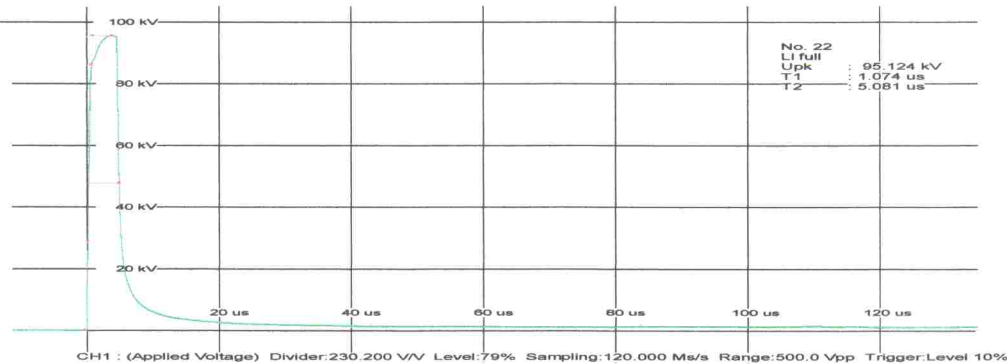
No. 21
LI full
Upk: 94.910 kV
T1 : 1.079 us
T2 : 49.982 us



#26825
10/11/2009 11:19:19
CH1 Applied Voltage

15KV RMU - YPH

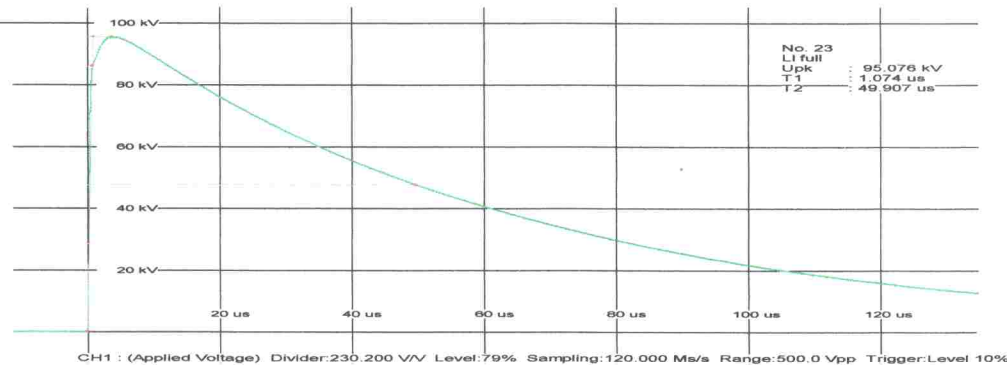
No. 22
LI full
Upk: 95.124 kV
T1 : 1.074 us
T2 : 5.081 us



#26826
10/11/2009 11:20:05
CH1 Applied Voltage

15KV RMU - YPH

No. 23
LI full
Upk: 95.076 kV
T1 : 1.074 us
T2 : 49.907 us



#26830
10/11/2009 11:28:19
CH1 Applied Voltage



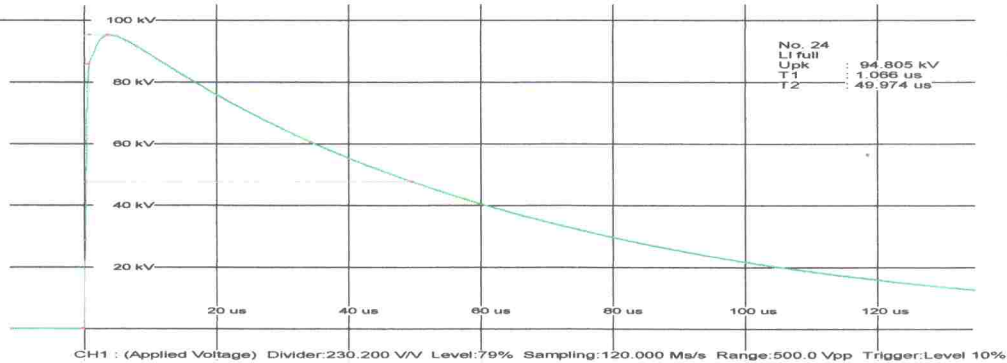
ETS

Test Information

Test manager MPS
Object RMU
Inspector Lucy & A1 Elec. Engr
Connection Yph

15KV RMU - YPH

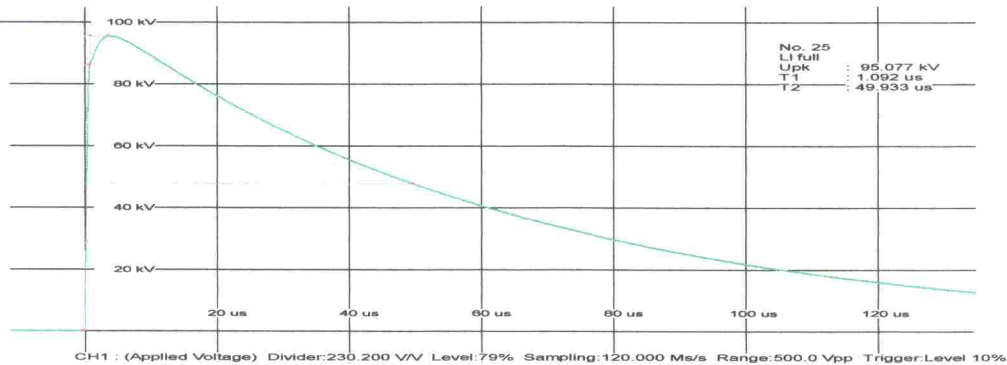
No. 24
LI full
Upk: 94.805 kV
T1 : 1.066 us
T2 : 49.974 us



#26831
10/11/2009 11:29:09
CH1 Applied Voltage

15KV RMU - YPH

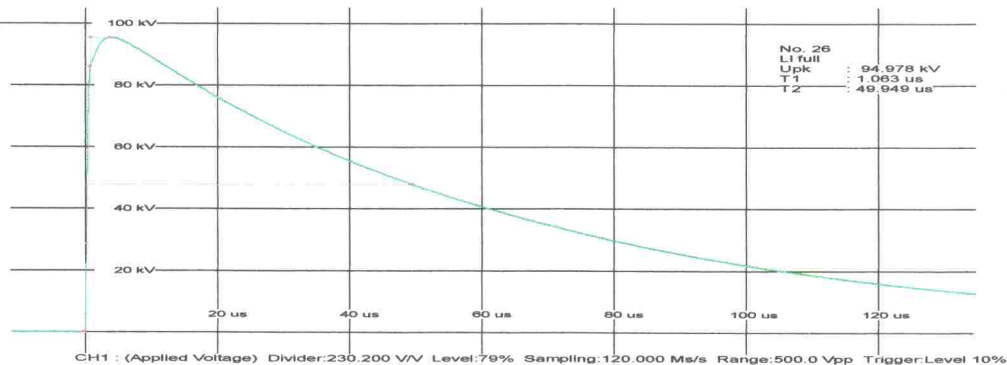
No. 25
LI full
Upk: 95.077 kV
T1 : 1.092 us
T2 : 49.933 us



#26832
10/11/2009 11:29:58
CH1 Applied Voltage

15KV RMU - YPH

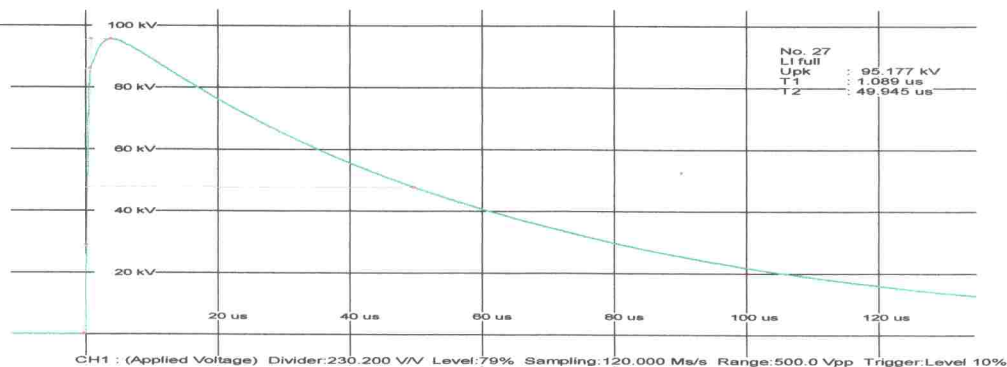
No. 26
LI full
Upk: 94.978 kV
T1 : 1.063 us
T2 : 49.949 us



#26833
10/11/2009 11:30:43
CH1 Applied Voltage

15KV RMU - YPH

No. 27
LI full
Upk: 95.177 kV
T1 : 1.089 us
T2 : 49.945 us



#26834
10/11/2009 11:31:30
CH1 Applied Voltage



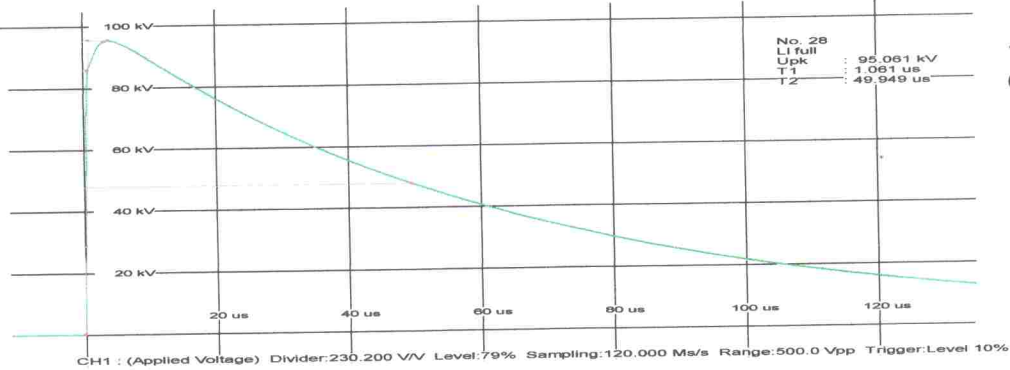
ETS

Test Information

Test manager MPS
Object RMU
Inspector Lucy & A1 Elec. Engr
Connection Yph

15KV RMU - YPH

No. 28
LI full
Upk: 95.061 kV
T1 : 1.061 us
T2 : 49.949 us

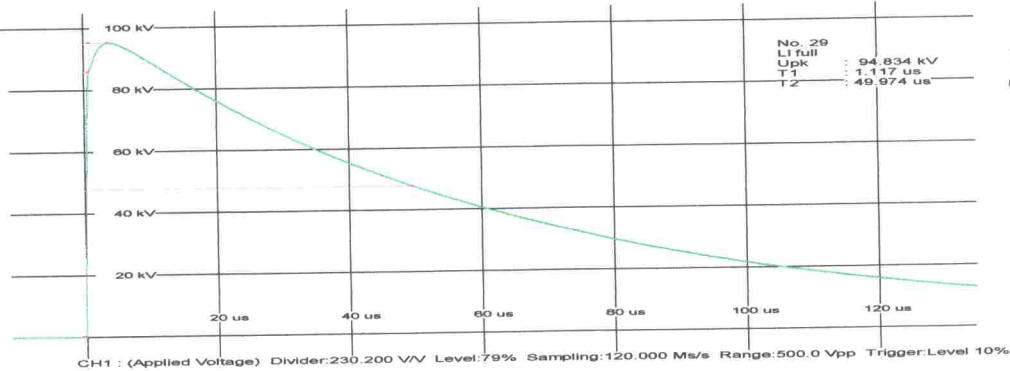


26835

10/11/2009 11:32:18
CH1 Applied Voltage

15KV RMU - YPH

No. 29
LI full
Upk: 94.834 kV
T1 : 1.117 us
T2 : 49.974 us

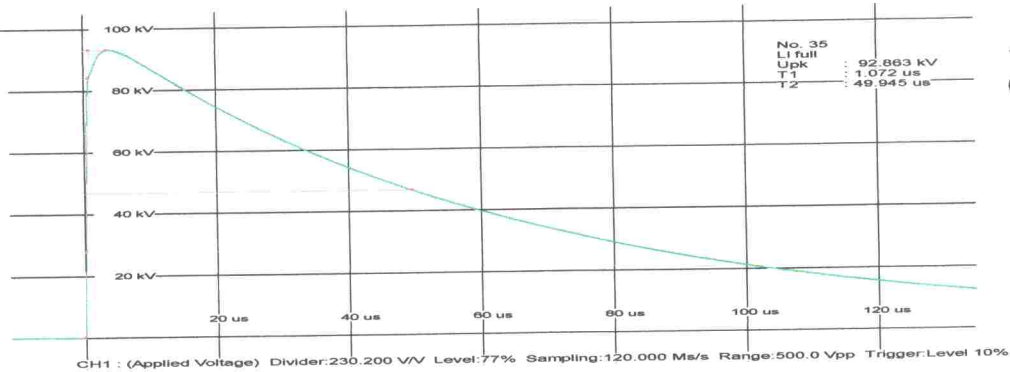


26836

10/11/2009 11:33:05
CH1 Applied Voltage

15KV RMU - YPH

No. 35
LI full
Upk: 92.863 kV
T1 : 1.072 us
T2 : 49.945 us



26844

10/11/2009 11:44:27
CH1 Applied Voltage



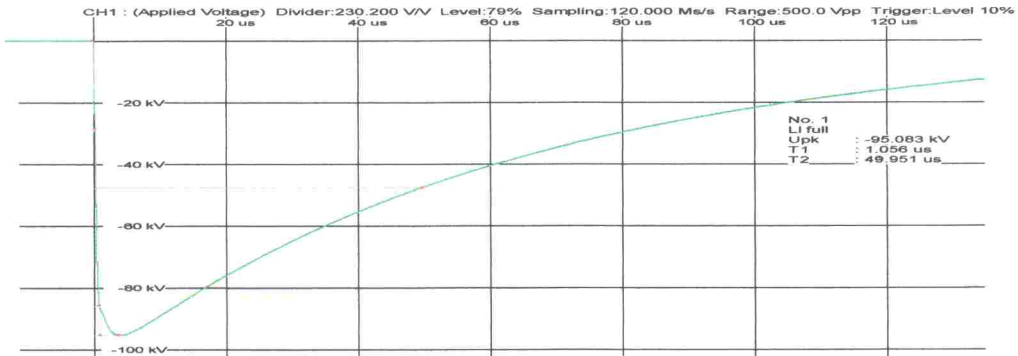
ETS

Test Information

Test manager MPS
Object RMU
Inspector Lucy & A1 Elec. Engr
Connection Bph

15KV RMU - BPH

No. 1
LI full
Upk: -95.083 kV
T1 : 1.056 us
T2 : 49.951 us

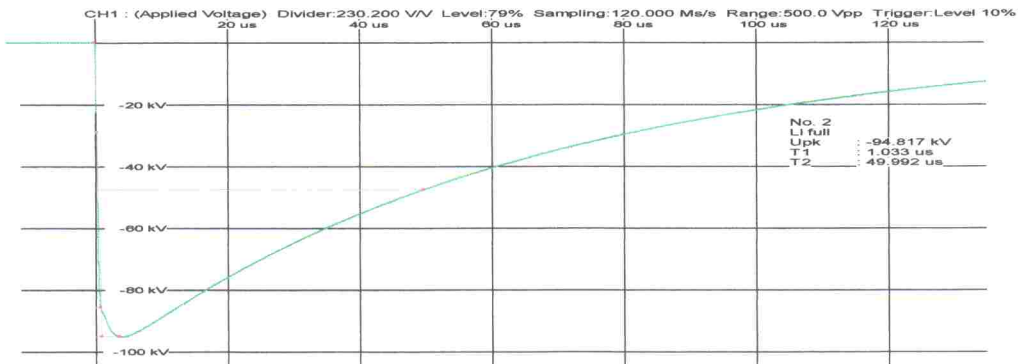


26847

10/11/2009 11:53:42
CH1 Applied Voltage

15KV RMU - BPH

No. 2
LI full
Upk: -94.817 kV
T1 : 1.033 us
T2 : 49.992 us

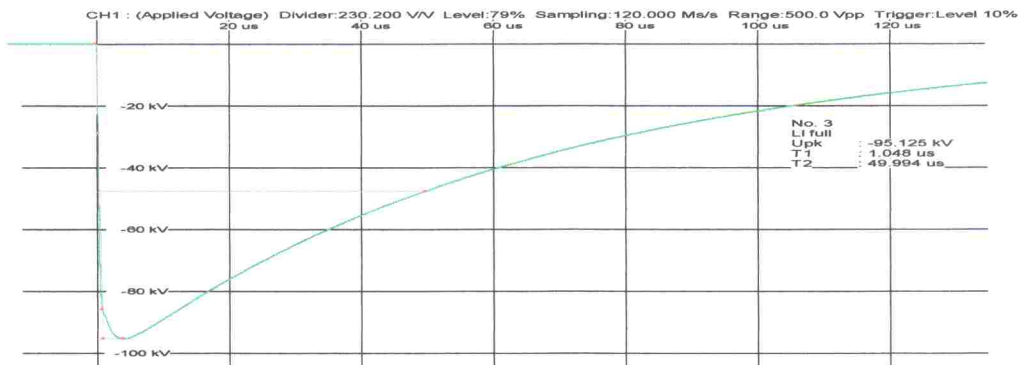


26848

10/11/2009 11:54:30
CH1 Applied Voltage

15KV RMU - BPH

No. 3
LI full
Upk: -95.125 kV
T1 : 1.048 us
T2 : 49.994 us

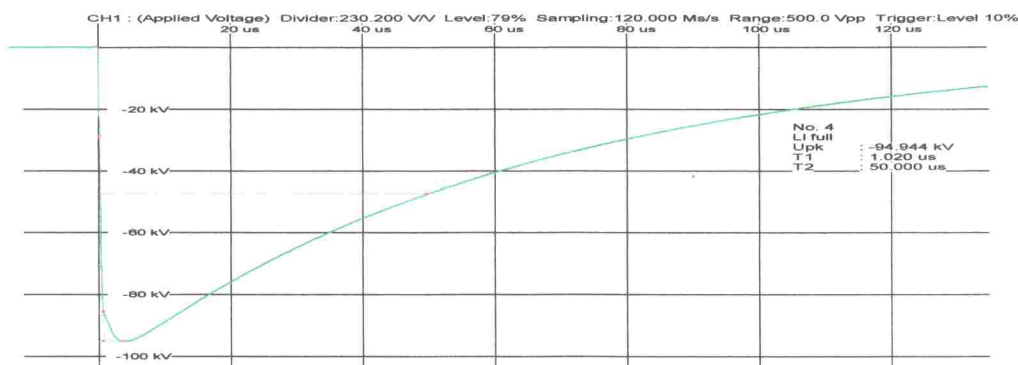


26849

10/11/2009 11:55:18
CH1 Applied Voltage

15KV RMU - BPH

No. 4
LI full
Upk: -94.944 kV
T1 : 1.020 us
T2 : 50.000 us



26850

10/11/2009 11:56:02
CH1 Applied Voltage



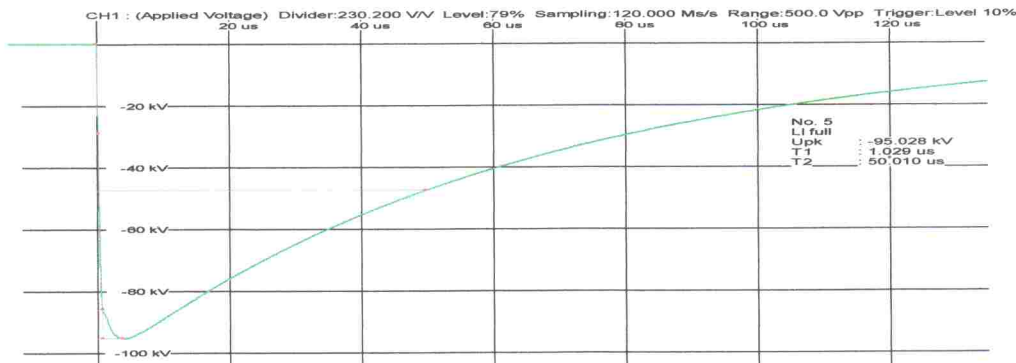
ETS

Test Information

Test manager MPS
Object RMU
Inspector Lucy & A1 Elec. Engr
Connection Bph

15KV RMU - BPH

No. 5
LI full
Upk: -95.028 kV
T1 : 1.029 us
T2 : 50.010 us



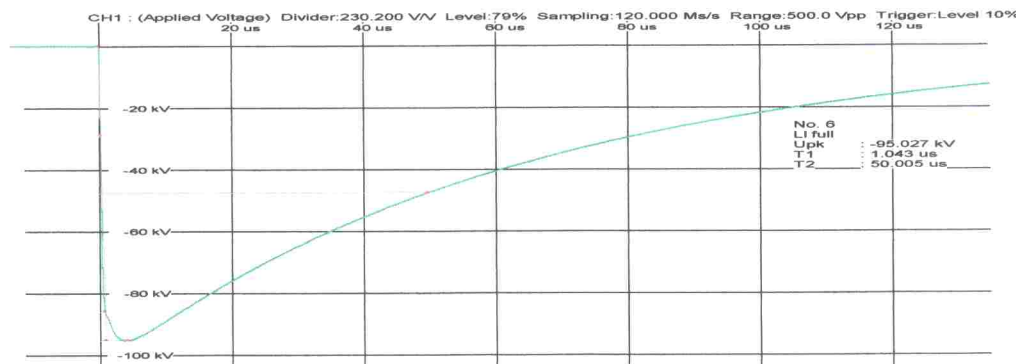
26851

10/11/2009 11:56:49

CH1 Applied Voltage

15KV RMU - BPH

No. 6
LI full
Upk: -95.027 kV
T1 : 1.043 us
T2 : 50.005 us



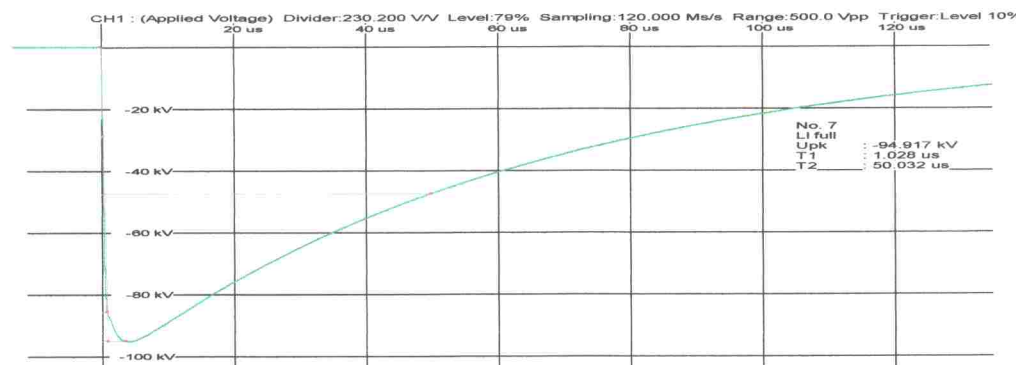
26852

10/11/2009 11:57:35

CH1 Applied Voltage

15KV RMU - BPH

No. 7
LI full
Upk: -94.917 kV
T1 : 1.028 us
T2 : 50.032 us



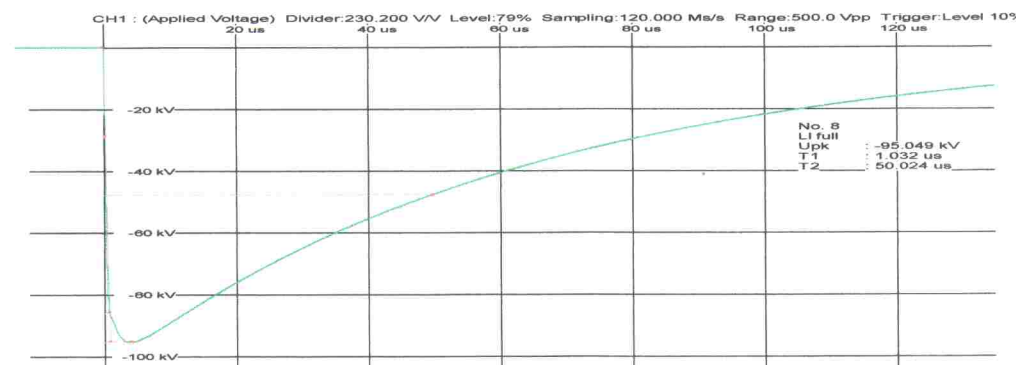
26853

10/11/2009 11:58:22

CH1 Applied Voltage

15KV RMU - BPH

No. 8
LI full
Upk: -95.049 kV
T1 : 1.032 us
T2 : 50.024 us



26854

10/11/2009 11:59:13

CH1 Applied Voltage



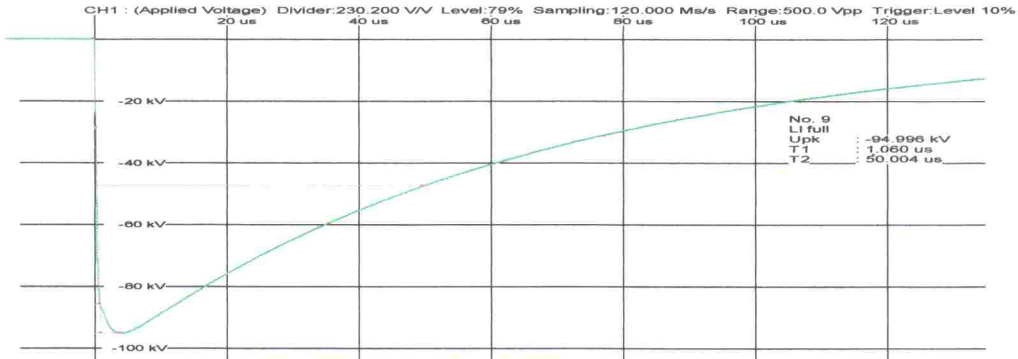
ETS

Test Information

Test manager MPS
Object RMU
Inspector Lucy & A1 Elec. Engr
Connection Bph

15KV RMU - BPH

No. 9
LI full
Upk: -94.996 kV
T1 : 1.060 us
T2 : 50.004 us

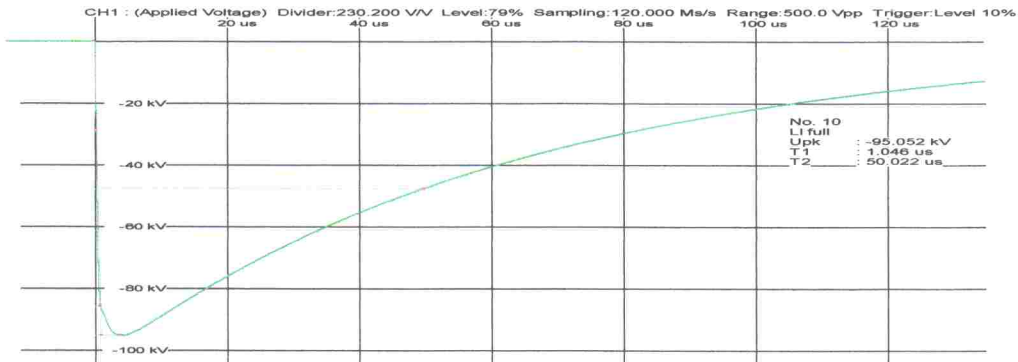


26855

10/11/2009 11:59:58
CH1 Applied Voltage

15KV RMU - BPH

No. 10
LI full
Upk: -95.052 kV
T1 : 1.046 us
T2 : 50.022 us

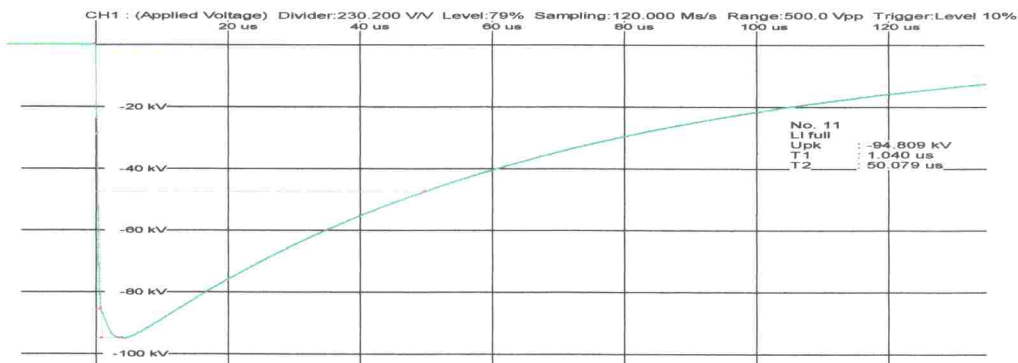


26856

10/11/2009 12:00:49
CH1 Applied Voltage

15KV RMU - BPH

No. 11
LI full
Upk: -94.809 kV
T1 : 1.040 us
T2 : 50.079 us

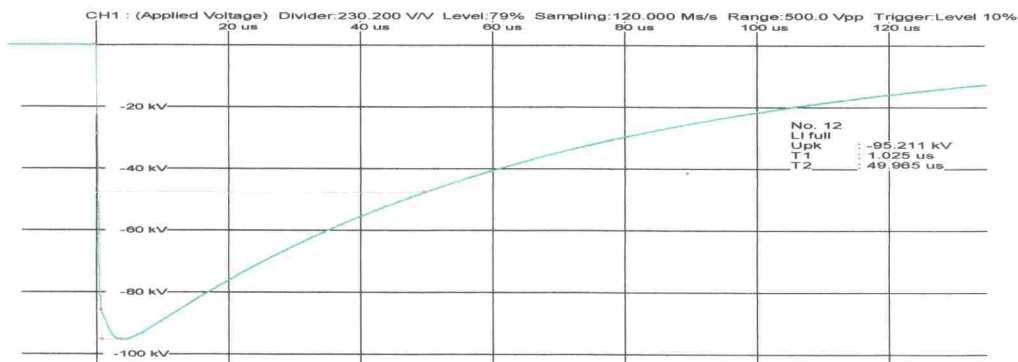


26857

10/11/2009 12:01:29
CH1 Applied Voltage

15KV RMU - BPH

No. 12
LI full
Upk: -95.211 kV
T1 : 1.025 us
T2 : 49.965 us



26858

10/11/2009 12:02:10
CH1 Applied Voltage



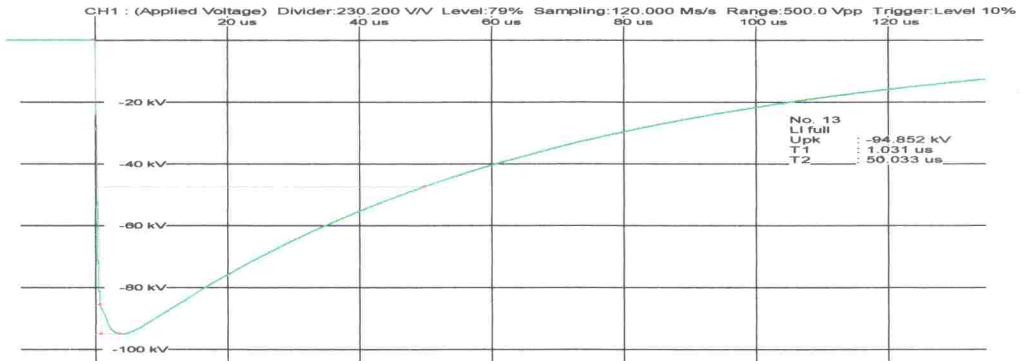
ETS

Test Information

Test manager MPS
Object RMU
Inspector Lucy & A1 Elec. Engr
Connection Bph

15KV RMU - BPH

No. 13
LI full
Upk: -94.852 kV
T1 : 1.031 us
T2 : 50.033 us

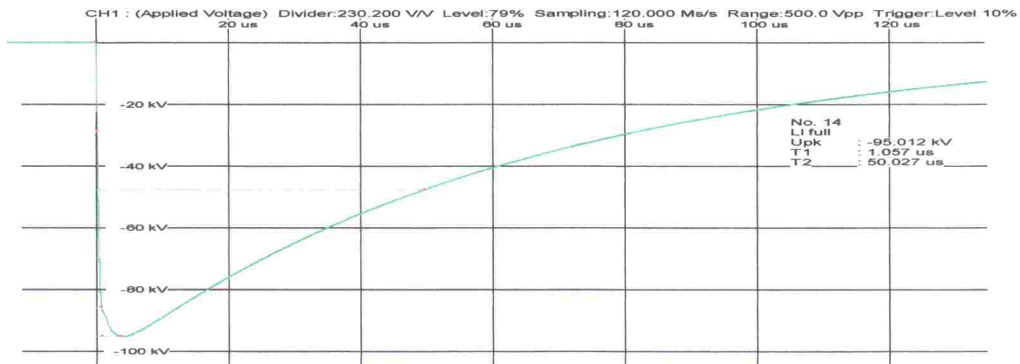


26859

10/11/2009 12:02:55
CH1 Applied Voltage

15KV RMU - BPH

No. 14
LI full
Upk: -95.012 kV
T1 : 1.057 us
T2 : 50.027 us

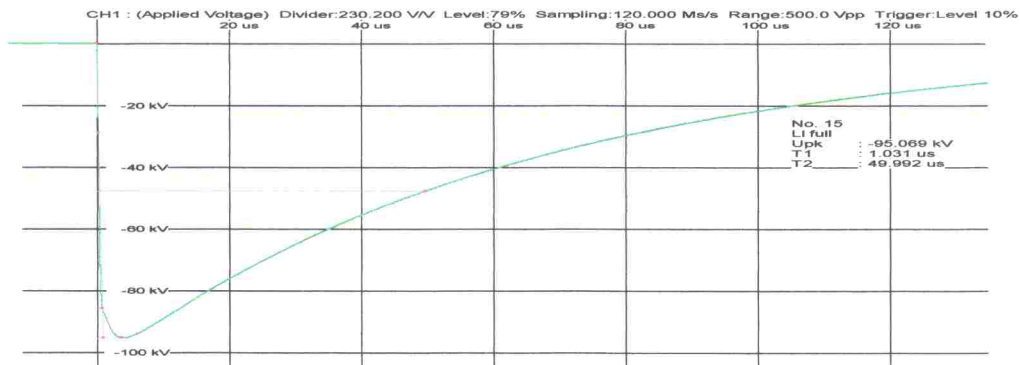


26860

10/11/2009 12:03:40
CH1 Applied Voltage

15KV RMU - BPH

No. 15
LI full
Upk: -95.069 kV
T1 : 1.031 us
T2 : 49.992 us



26861

10/11/2009 12:04:23
CH1 Applied Voltage



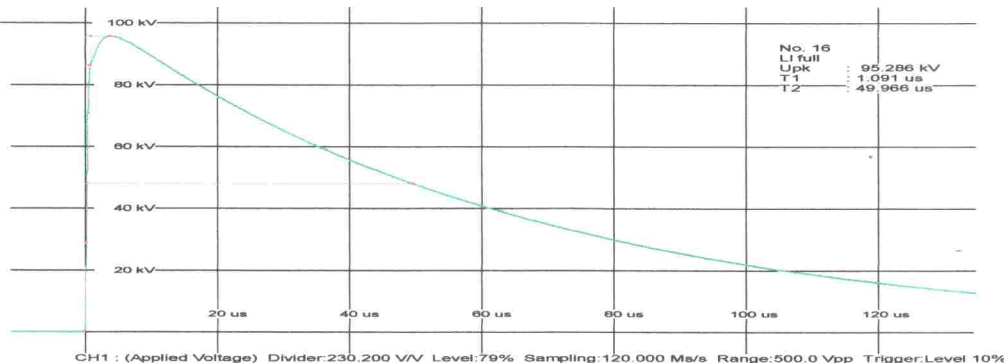
ETS

Test Information

Test manager MPS
Object RMU
Inspector Lucy & A1 Elec. Engr
Connection Bph

15KV RMU - BPH

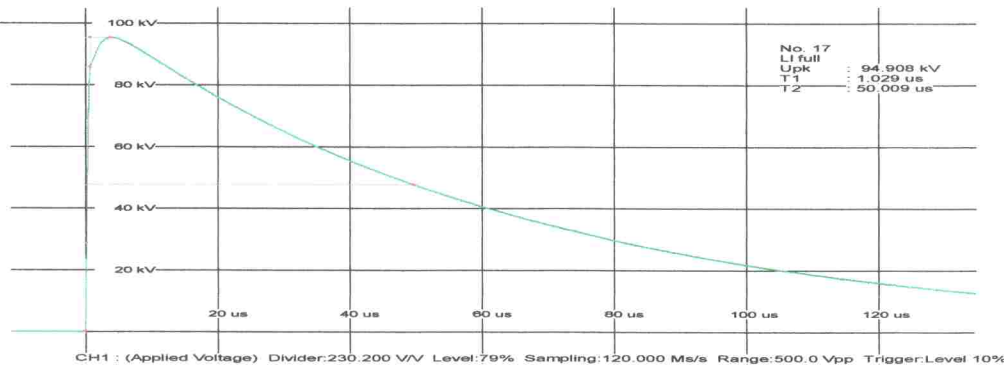
No. 16
LI full
Upk: 95.286 kV
T1 : 1.091 us
T2 : 49.966 us



26863
10/11/2009 12:07:04
CH1 Applied Voltage

15KV RMU - BPH

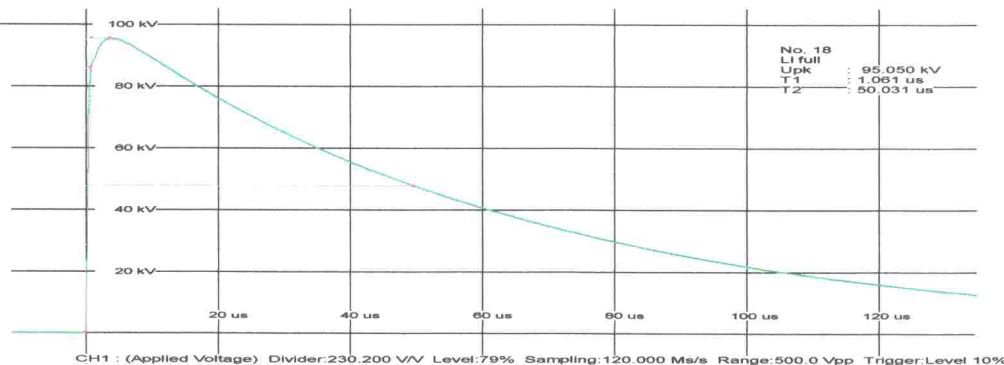
No. 17
LI full
Upk: 94.908 kV
T1 : 1.029 us
T2 : 50.009 us



26864
10/11/2009 12:07:53
CH1 Applied Voltage

15KV RMU - BPH

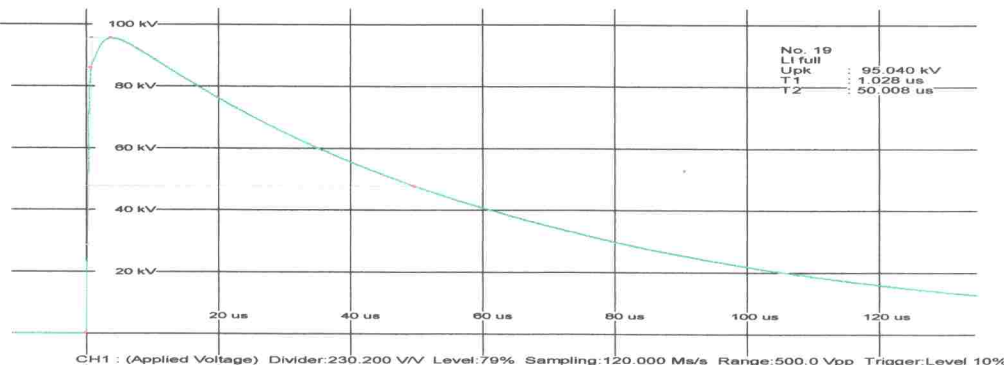
No. 18
LI full
Upk: 95.050 kV
T1 : 1.061 us
T2 : 50.031 us



26865
10/11/2009 12:08:43
CH1 Applied Voltage

15KV RMU - BPH

No. 19
LI full
Upk: 95.040 kV
T1 : 1.028 us
T2 : 50.008 us



26866
10/11/2009 12:09:31
CH1 Applied Voltage



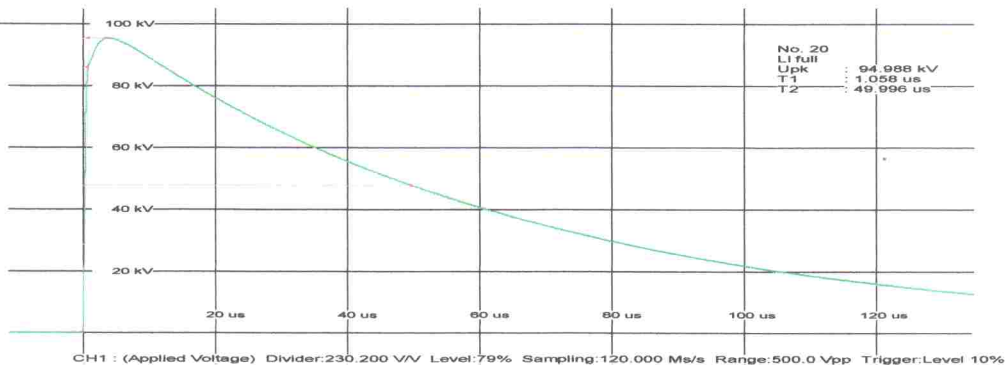
ETS

Test Information

Test manager MPS
Object RMU
Inspector Lucy & A1 Elec. Engr
Connection Bph

15KV RMU - BPH

No. 20
LI full
Upk: 94.988 kV
T1 : 1.058 us
T2 : 49.996 us

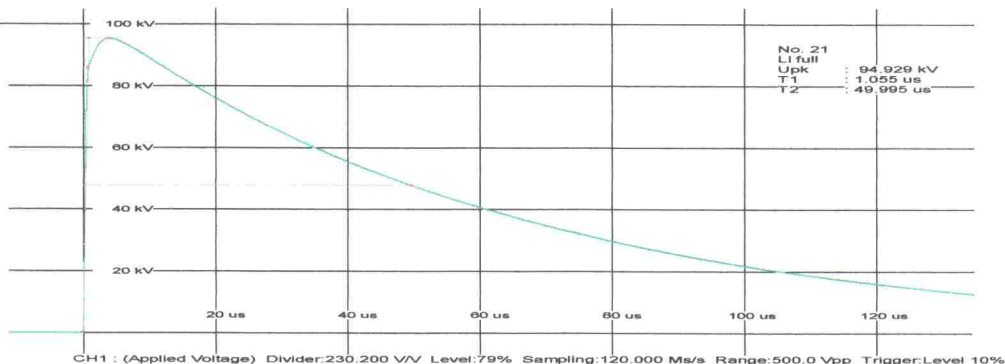


26867

10/11/2009 12:10:21
CH1 Applied Voltage

15KV RMU - BPH

No. 21
LI full
Upk: 94.929 kV
T1 : 1.055 us
T2 : 49.995 us

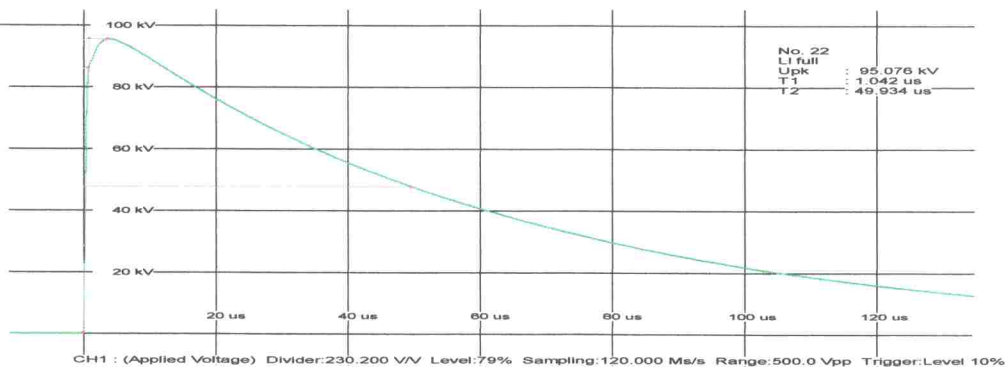


26868

10/11/2009 12:11:07
CH1 Applied Voltage

15KV RMU - BPH

No. 22
LI full
Upk: 95.076 kV
T1 : 1.042 us
T2 : 49.934 us

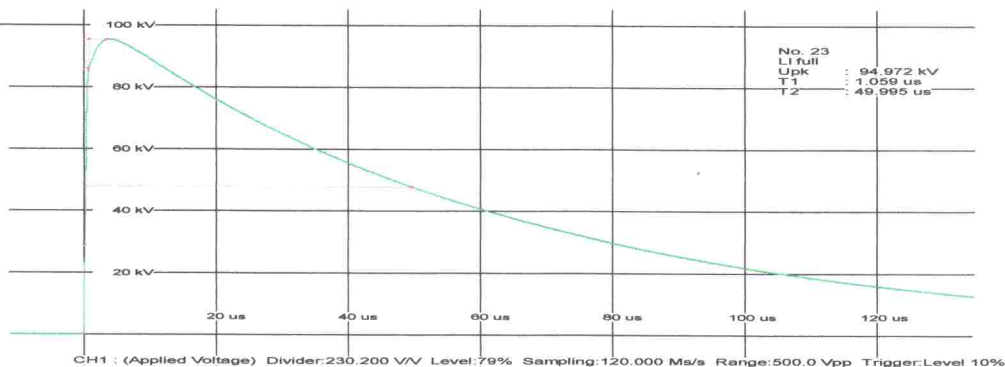


26869

10/11/2009 12:11:51
CH1 Applied Voltage

15KV RMU - BPH

No. 23
LI full
Upk: 94.972 kV
T1 : 1.059 us
T2 : 49.995 us



26870

10/11/2009 12:12:35
CH1 Applied Voltage



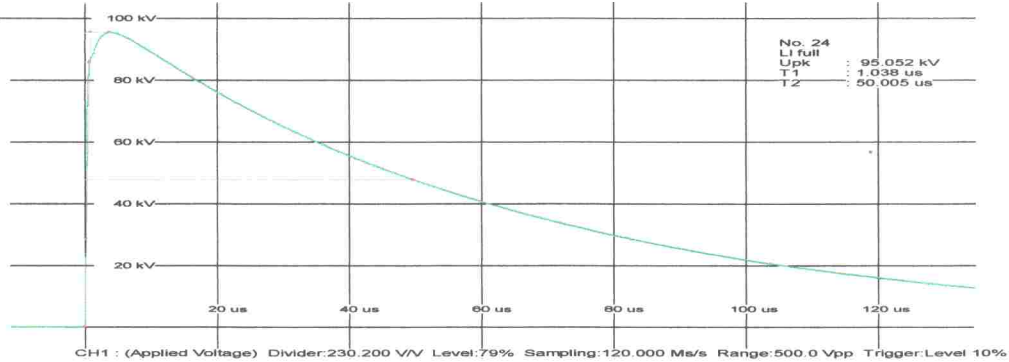
ETS

Test Information

Test manager MPS
Object RMU
Inspector Lucy & A1 Elec. Engr
Connection Bph

15KV RMU - BPH

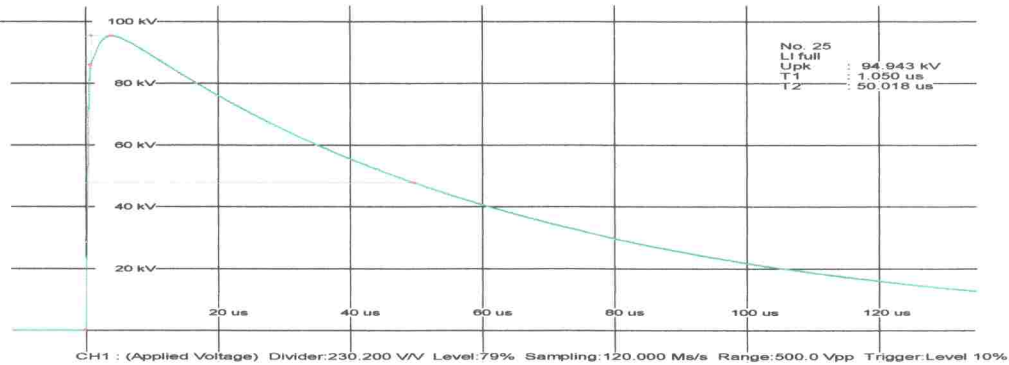
No. 24
LI full
Upk: 95.052 kV
T1 : 1.038 us
T2 : 50.005 us



26871
10/11/2009 12:13:19
CH1 Applied Voltage

15KV RMU - BPH

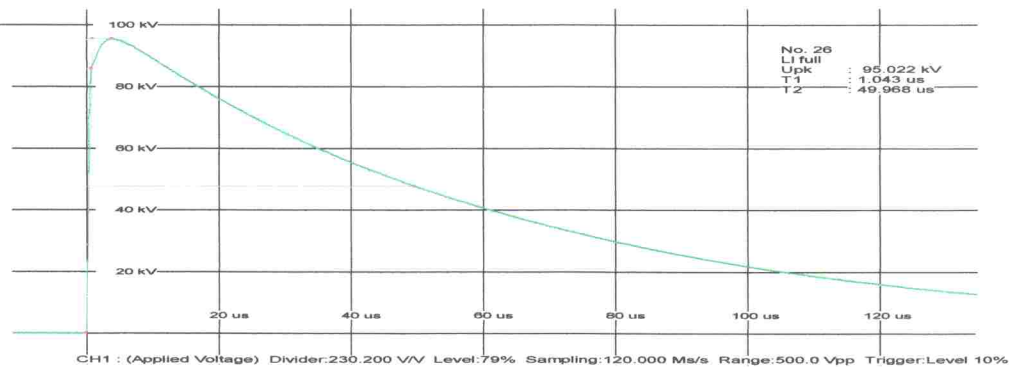
No. 25
LI full
Upk: 94.943 kV
T1 : 1.050 us
T2 : 50.018 us



26872
10/11/2009 12:14:03
CH1 Applied Voltage

15KV RMU - BPH

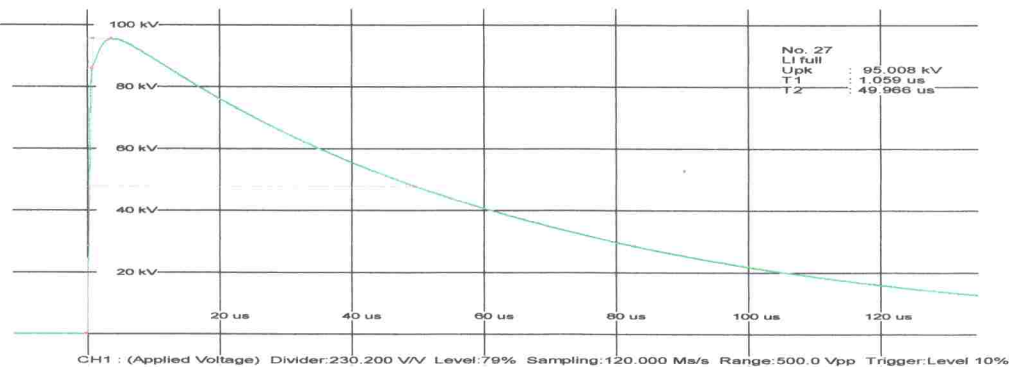
No. 26
LI full
Upk: 95.022 kV
T1 : 1.043 us
T2 : 49.968 us



26873
10/11/2009 12:14:50
CH1 Applied Voltage

15KV RMU - BPH

No. 27
LI full
Upk: 95.008 kV
T1 : 1.059 us
T2 : 49.966 us



26874
10/11/2009 12:15:34
CH1 Applied Voltage



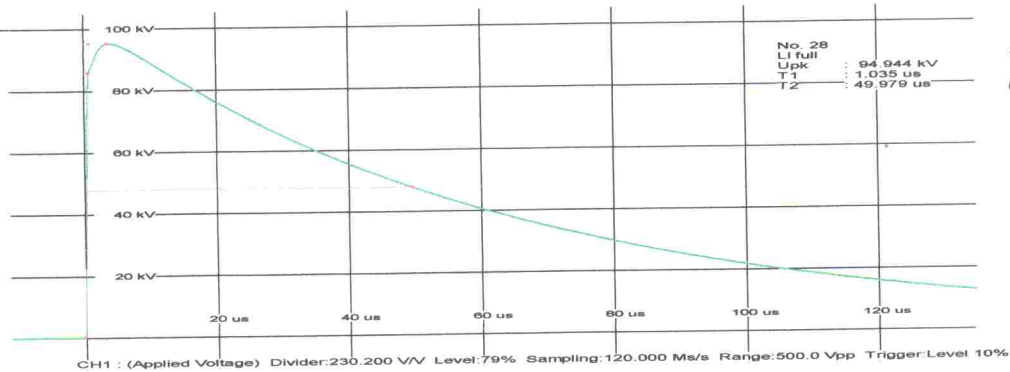
ETS

Test Information

Test manager MPS
Object RMU
Inspector Lucy & A1 Elec. Engr
Connection Bph

15KV RMU - BPH

No. 28
LI full
Upk: 94.944 kV
T1 : 1.035 us
T2 : 49.979 us

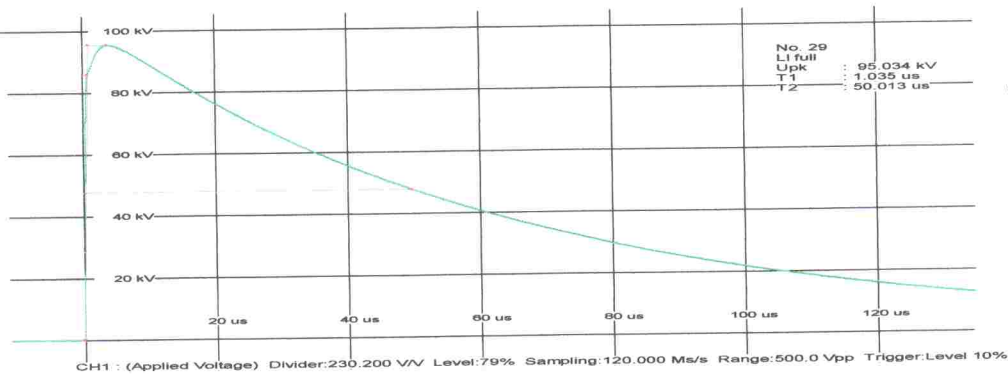


26875

10/11/2009 12:16:26
CH1 Applied Voltage

15KV RMU - BPH

No. 29
LI full
Upk: 95.034 kV
T1 : 1.035 us
T2 : 50.013 us

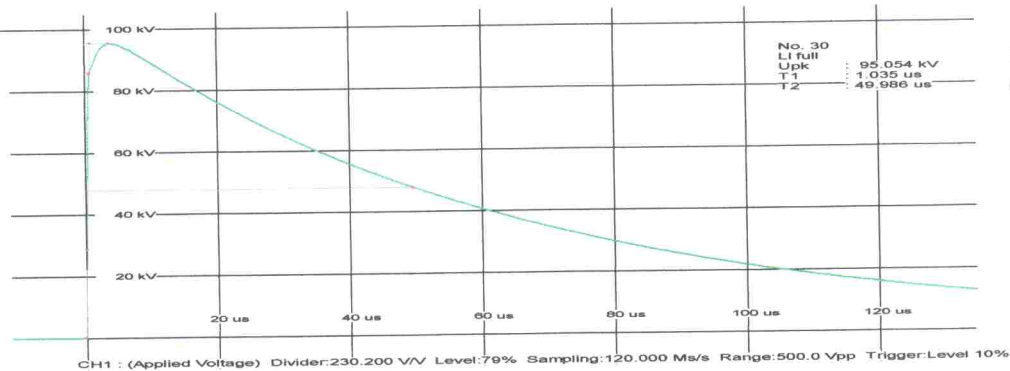


26876

10/11/2009 12:17:10
CH1 Applied Voltage

15KV RMU - BPH

No. 30
LI full
Upk: 95.054 kV
T1 : 1.035 us
T2 : 49.986 us



26877

10/11/2009 12:17:52
CH1 Applied Voltage





Emirates Transformer & Switchgear Ltd., JebelAli, Dubai, UAE

10001.000-HVL 09-023

The measurement uncertainties in the results presented are as specified below unless otherwise indicated.

Measurement	Error / Uncertainty
Lightning Impulse tests	Peak value : uncertainty $\pm 1.1\%$ Time parameters: T1 : error -9.89% with uncertainty of $\pm 2.3\%$ T2 : error -9.31% with uncertainty of $\pm 2.4\%$ With a confidence level not less than 95%
Capacitance measurement Tan δ measurement	0.2% Range $\pm 4\text{PF}$ $\pm 2\%$ of reading $\pm 1\% \text{F.S.}$
Measurement of losses in Watt meter	0.25% + 0.1% Range
Measurement of insulation resistance	$\leq 10\%$
Measurement of dc resistance	0.1% all ranges except 0.2% at $1\text{m}\Omega$.
Calibration of current transformers	0.2 class
Calibration of voltage transformers	0.5 class
Sound level measurement	Type 1 meter as per IEC 651 and ANSI S1.4.1971
Measurement of voltage ratio	0.1% ± 1 digit

