

SIMES ENGINEERING CO., LTD. (HEAD OFFICE)

บริษัท ไชเมส เอ็นจิเนียริ่ง (สำนักงานใหญ่)

121 Moo 1 Soi Thananiran , Sukhapibal Road , Tambol Bangsrimuang , Ampur Muang , Nonthaburi 11000

121 หมู่ 1 ซอย ธารนิรันดร์ ถนน สุขุมวิท ตำบล บางศรีเมือง อำเภอ เมือง จังหวัด นนทบุรี 11000

เลขประจำตัวผู้เสียภาษีอากร 0125558021330 อัตราร้อยละ 7

Tel. 02-8828968, 019146766, 018228835 FAX 02-4462334 e- mail address: chanvit_cru@yahoo.com

PARTIAL DISCHARGE REPORT

CUSTOMER: AJINOMOTO CO., (THAILAND) LTD.

FACTORY: BIRDY

DATE: AUGUST 8th, 2019



SIMES ENGINEERING CO.,LTD.(Head Office)

บริษัท ไชเมส เอ็นจิเนียริง จำกัด (สำนักงานใหญ่)

121 Moo 1 Soi Thananiran , Sukhapibal Road , Tambol Bangsrimuang , Ampur Muang , Nonthaburi 11000

121 หมู่ 1 ซอย ชะนิรันดร ถนน สุขุมวิท ตำบล บางศรีเมือง อําเภอ เมือง จังหวัด นนทบุรี 11000

เลขประจำตัวผู้เสียภาษีอากร 0125558021330 อัตราร้อยละ 7

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121 Moo 1 Soi Thananiran , Sukhapibal Road , Tambol Bangsrimuang , Ampur Muang , Nonthaburi 11000

121 หมู่ 1 ซอย หนึ่งริรันตร์ ถนน สุขาศิบาล ตำบล บางศรีเมือง อําเภอ เมือง จังหวัด นนทบุรี 11000

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TEST DEVICES PD DETECTOR

1. TEV DETECTOR “EA Technology”



1. PMDT “Power Monitoring & Diagnostic Technology”





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SUMMARY REPORT

จากการตรวจสอบหา PARTIAL DISCHARGE ภายในบริษัท AJINOMOTO CO., (THAILAND) LTD. FACTORY BIRDY เมื่อวันที่ 8 สิงหาคม 2562 ผลการตรวจสอบพบการเกิด PARTIAL DISCHARGE ขึ้นที่ CT,PT ดังนั้นควรขึ้นไปตรวจสอบ DEFACT ที่เกิดขึ้น โดยการปลด HOTLINE CLAMP ก่อนเข้า DISCONNECTING SWITCH ออกเพื่อความปลอดภัยต่อผู้ปฏิบัติงาน หากตรวจสอบแล้วพบการ DEFACT ควรหาแนวทางแก้ไขโดยด่วน หากปล่อยไว้ จะทำให้เกิดการระเบิดและเป็นอันตราย และควรตรวจสอบทุกๆ ปี เพื่อดูแนวโน้มการเปลี่ยนแปลง

SUBSTATION	DISTRIBUTION POLE METERING
VOLTAGE LEVEL	22 kV
POSITION	POLE
PANEL NAME	DROP OUT FUSE
POWER FREQUENCY	50 Hz

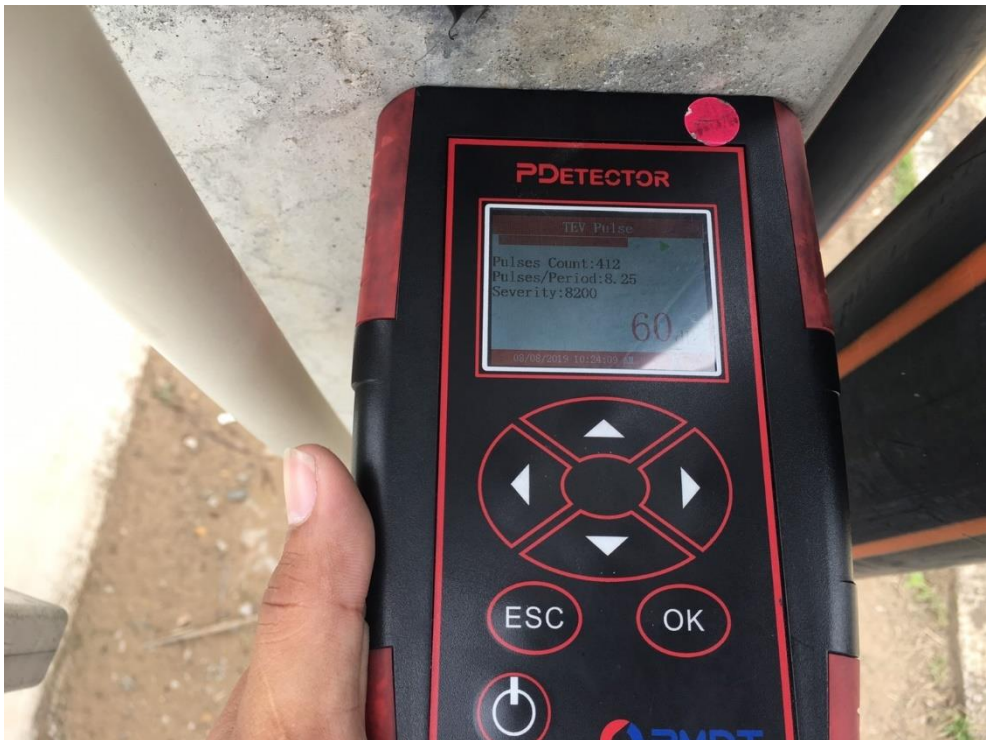
1. PARTIAL DISCHARGE DETECTED METHOD BY TEV MODE

POSITION	YEAR	TEV (dB)	RESULT
POLE	2017	22	Normal
	2018	59	Warning
	2019	60	Critical

SUMMARY REPORT



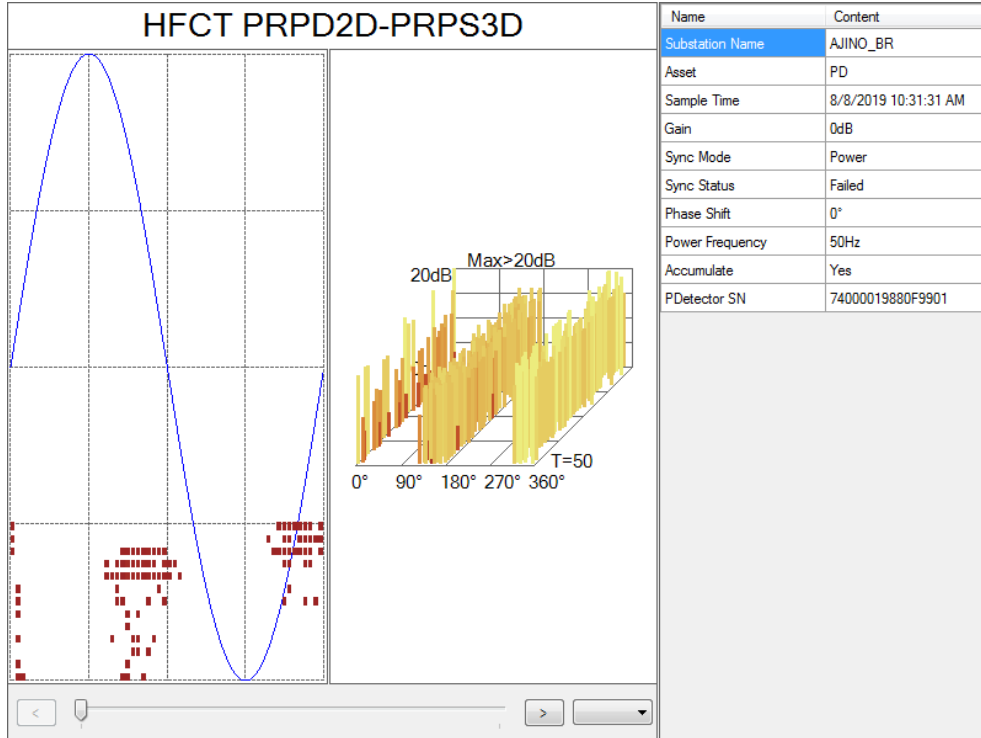
PARTIAL DISCHARGE DETECTED METHOD BY TEV MODE



PARTIAL DISCHARGE DETECTED METHOD BY TEV MODE

SUMMARY REPORT

2. PARTIAL DISCHARGE DETECTED METHOD BY HFCT MODE

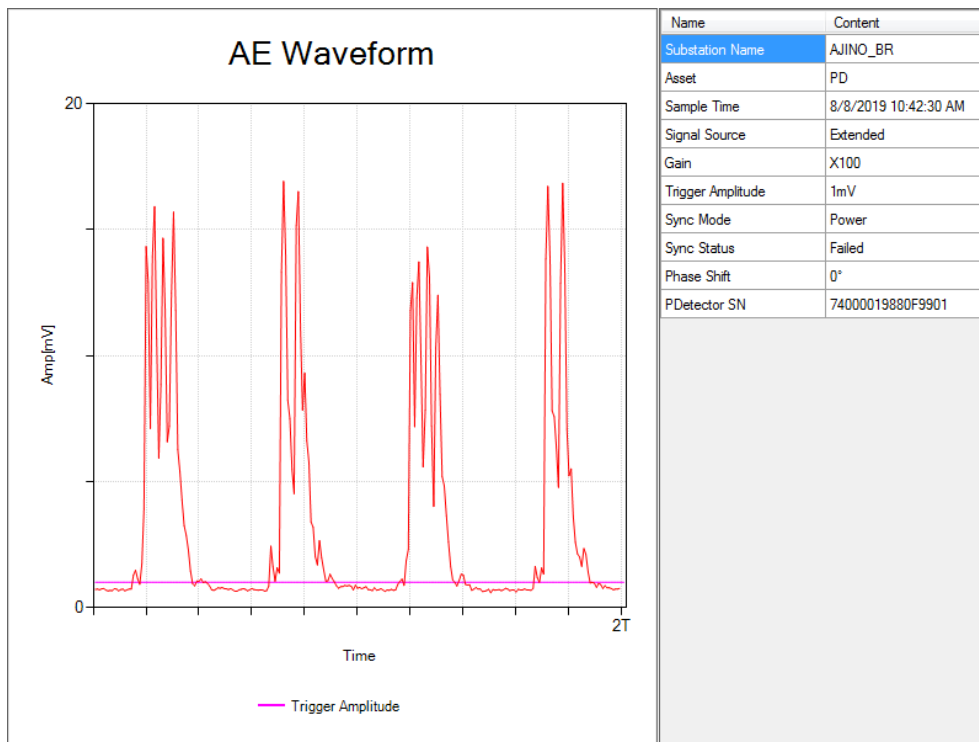


PARTIAL DISCHARGE DETECTED METHOD BY HFCT MODE

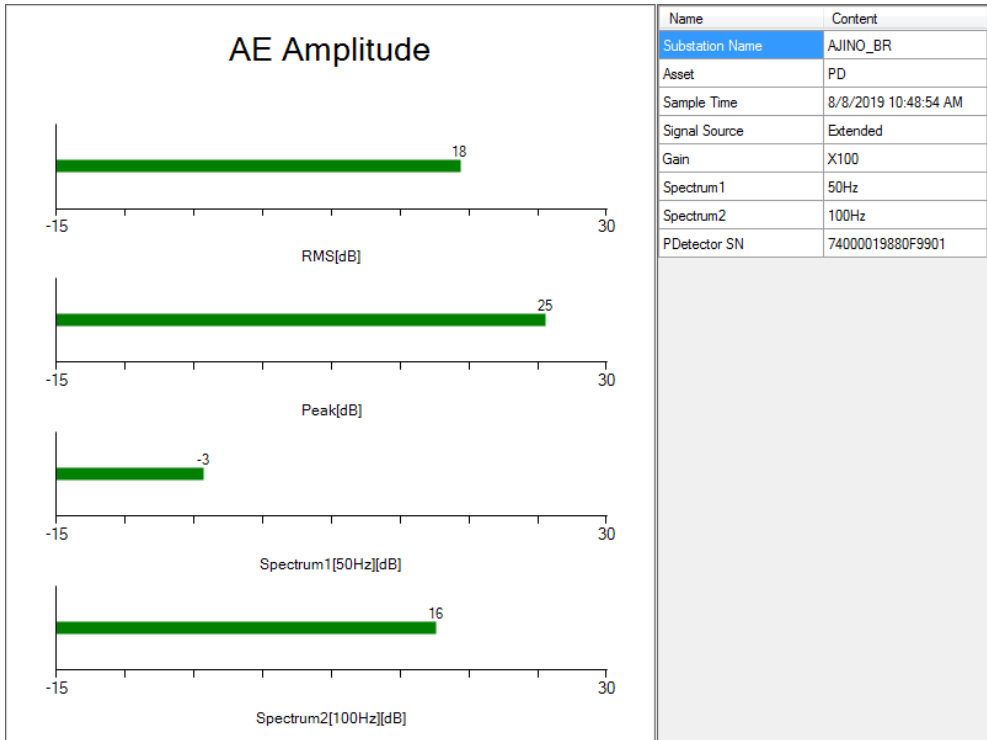
SUMMARY REPORT

3. PARTIAL DISCHARGE DETECTED METHOD BY ULTRADISH MODE

POSITION	YEAR	ULTRADISH MODE (dB)	SHOULD BE
POLE	2018	23	6
	2019	25	



SUMMARY REPORT



PARTIAL DISCHARGE DETECTED METHOD BY ULTRADISH MODE

SUMMARY REPORT



POLE CT PT

PARTIAL DISCHARGE REPORT

DETECTION METHOD BY TEV MODE

PARTIAL DISCHARGE REPORT

ITEM	POSITION	TEV (dB)	EVALUATION
1	POLE		
	DROP OUT FUSE	60 (pulse/cycle 6.88)	Critical
2	SUBSTATION NO.1		
	RMU NO.1	39	Normal
	TR NO.1 2000 kVA	38	Normal
3	SUBSTATION NO.2		
	RMU NO.2	15	Normal
	TR NO.2 2000 kVA	21	Normal
	TR NO.3 2000 kVA	19	Normal
4	SUBSTATION NO.4		
	RMU NO.4	23	Normal
	TR NO.4	28	Normal

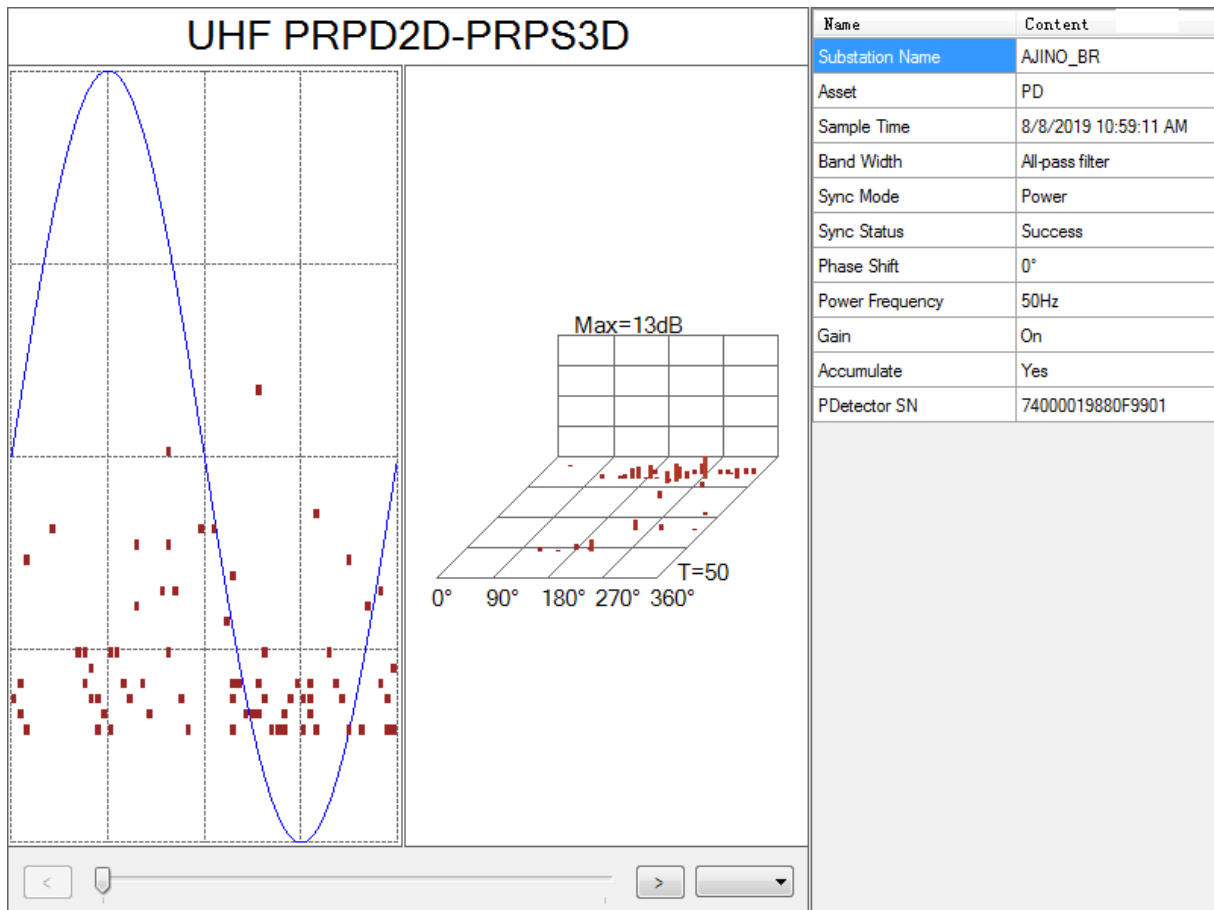
COMMENT	No partial discharge (PD) was found.
EVALUATION	Nomal
SUGGESTION	No action
TESTED AND REPORTED BY	Mr.Tukdanai Pothanak
APPROVED BY	Mr.Chanvit Crukaew

PARTIAL DISCHARGE REPORT

DETECTION METHOD BY UHF MODE

PARTIAL DISCHARGE REPORT

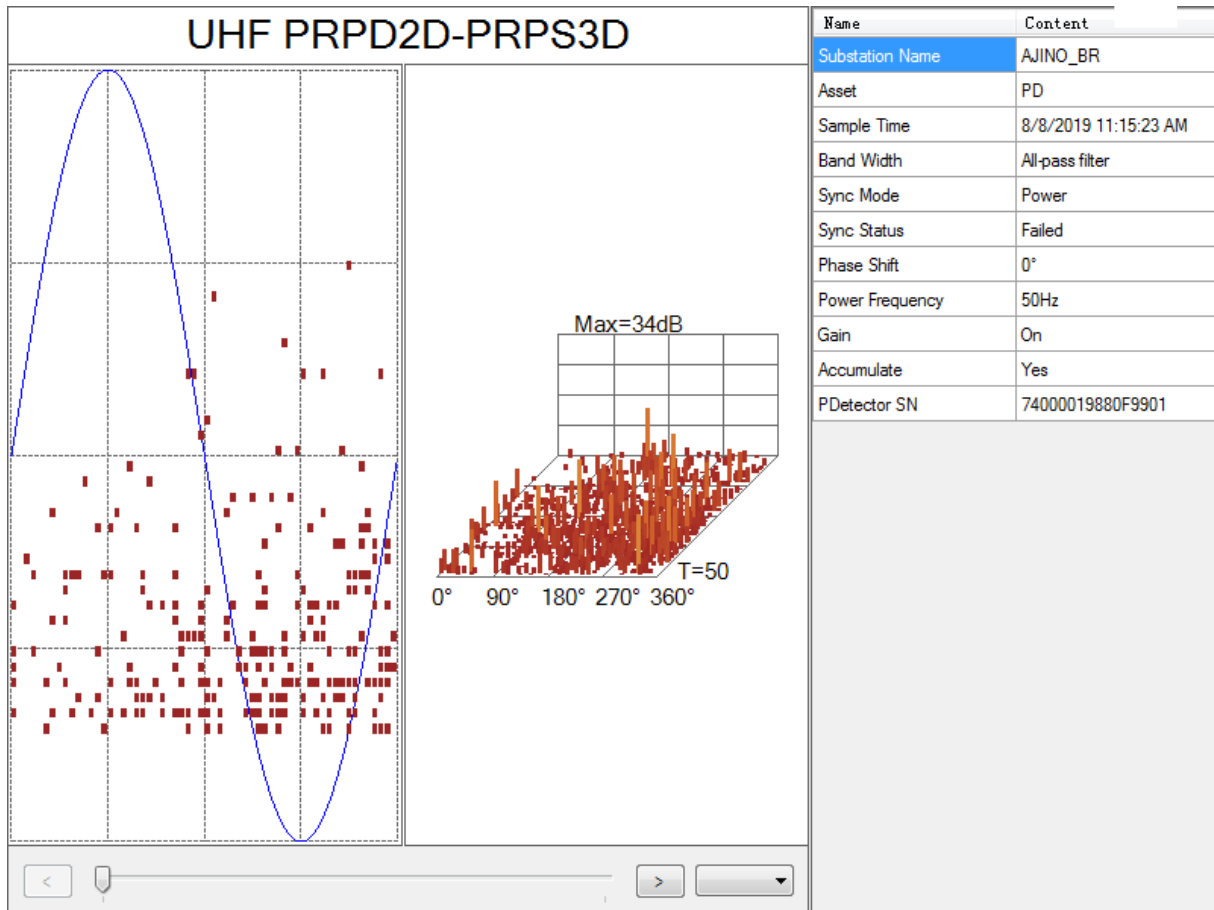
FACTORY	AJINOMOTO CO., (THAILAND) LTD.
SUBSTATION	DISTRIBUTION POLE METERING
VOLTAGE LEVEL	22 kV
POSITION	POLE
PANEL NAME	DROP OUT FUSE
POWER FREQUENCY	50 Hz



COMMENT	No partial discharge (PD) was found.
EVALUATION	Nomal
SUGGESTION	No action
TESTED AND REPORTED BY	Mr.Tukdanai Pothanak
APPROVED BY	Mr.Chanvit Crukaew

PARTIAL DISCHARGE REPORT

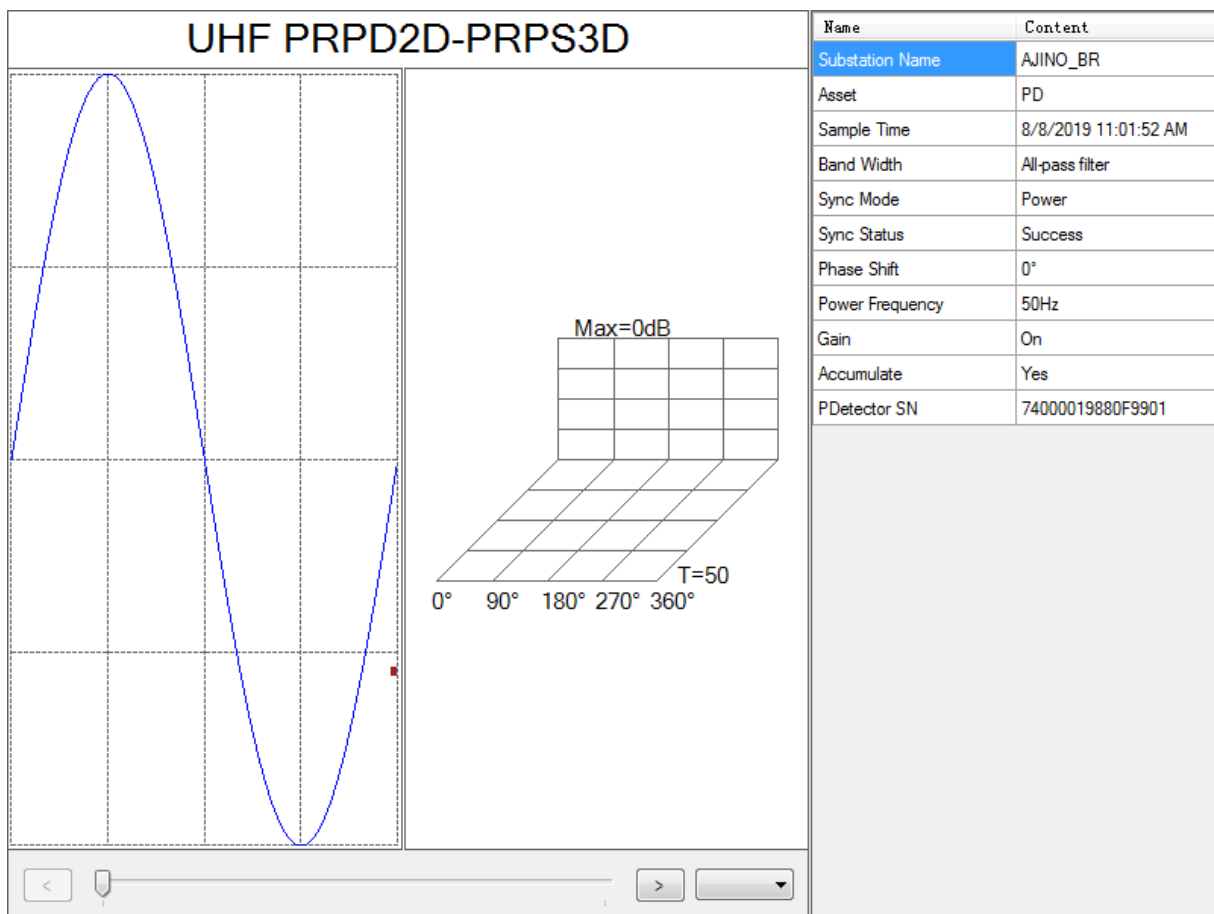
FACTORY	AJINOMOTO CO., (THAILAND) LTD.
SUBSTATION	SUBSTATION NO.1
VOLTAGE LEVEL	22 kV
POSITION	RING MAIN UNIT
PANEL NAME	RMU SUBSTATION NO.1
POWER FREQUENCY	50 Hz



COMMENT	No partial discharge (PD) was found.
EVALUATION	Nomal
SUGGESTION	No action
TESTED AND REPORTED BY	Mr.Tukdanai Pothanak
APPROVED BY	Mr.Chanvit Crukaew

PARTIAL DISCHARGE REPORT

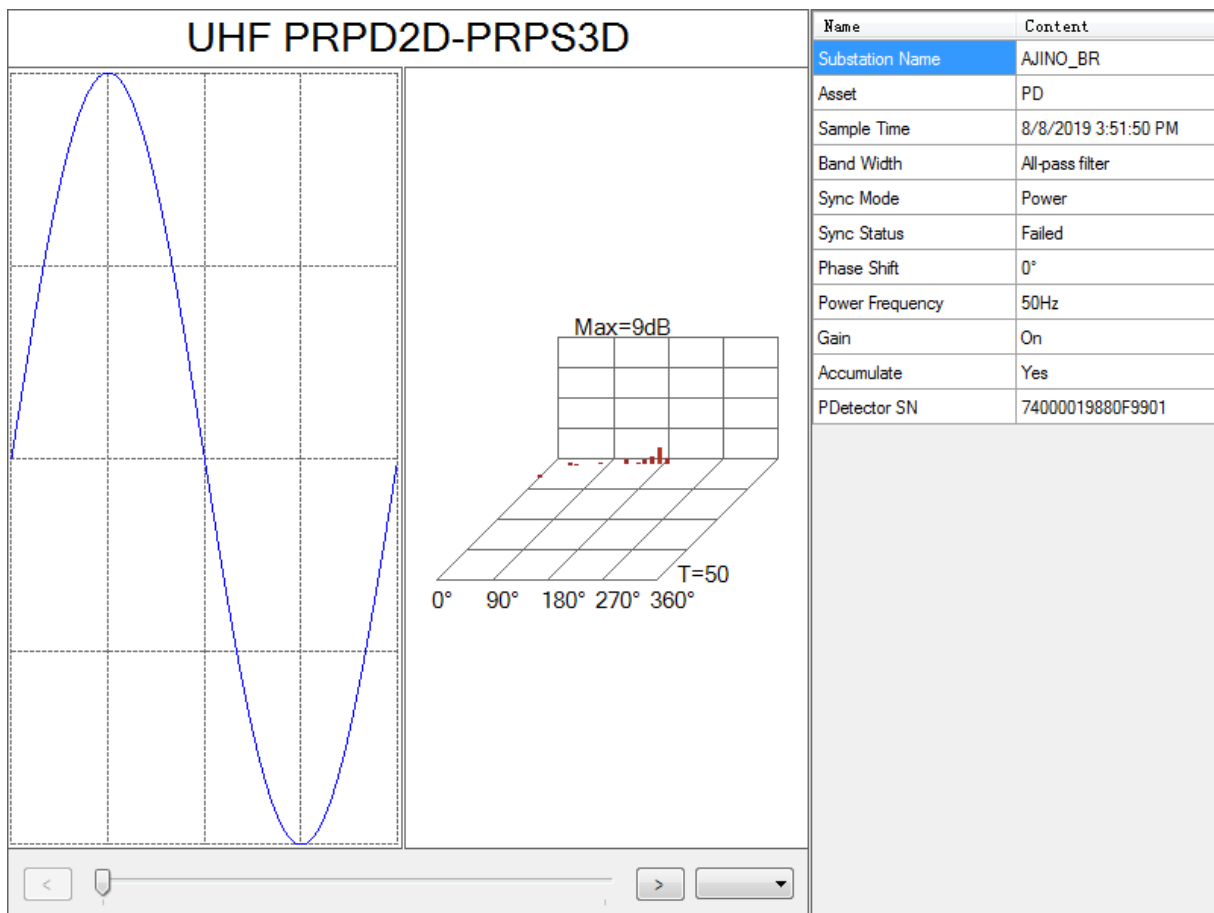
FACTORY	AJINOMOTO CO., (THAILAND) LTD.
SUBSTATION	SUBSTATION NO.1
VOLTAGE LEVEL	22 kV
POSITION	DISTRIBUTION TRANSFORMER
PANEL NAME	TR NO.1 2000 kVA
POWER FREQUENCY	50 Hz



COMMENT	No partial discharge (PD) was found.
EVALUATION	Nomal
SUGGESTION	No action
TESTED AND REPORTED BY	Mr.Tukdanai Pothanak
APPROVED BY	Mr.Chanvit Crukaew

PARTIAL DISCHARGE REPORT

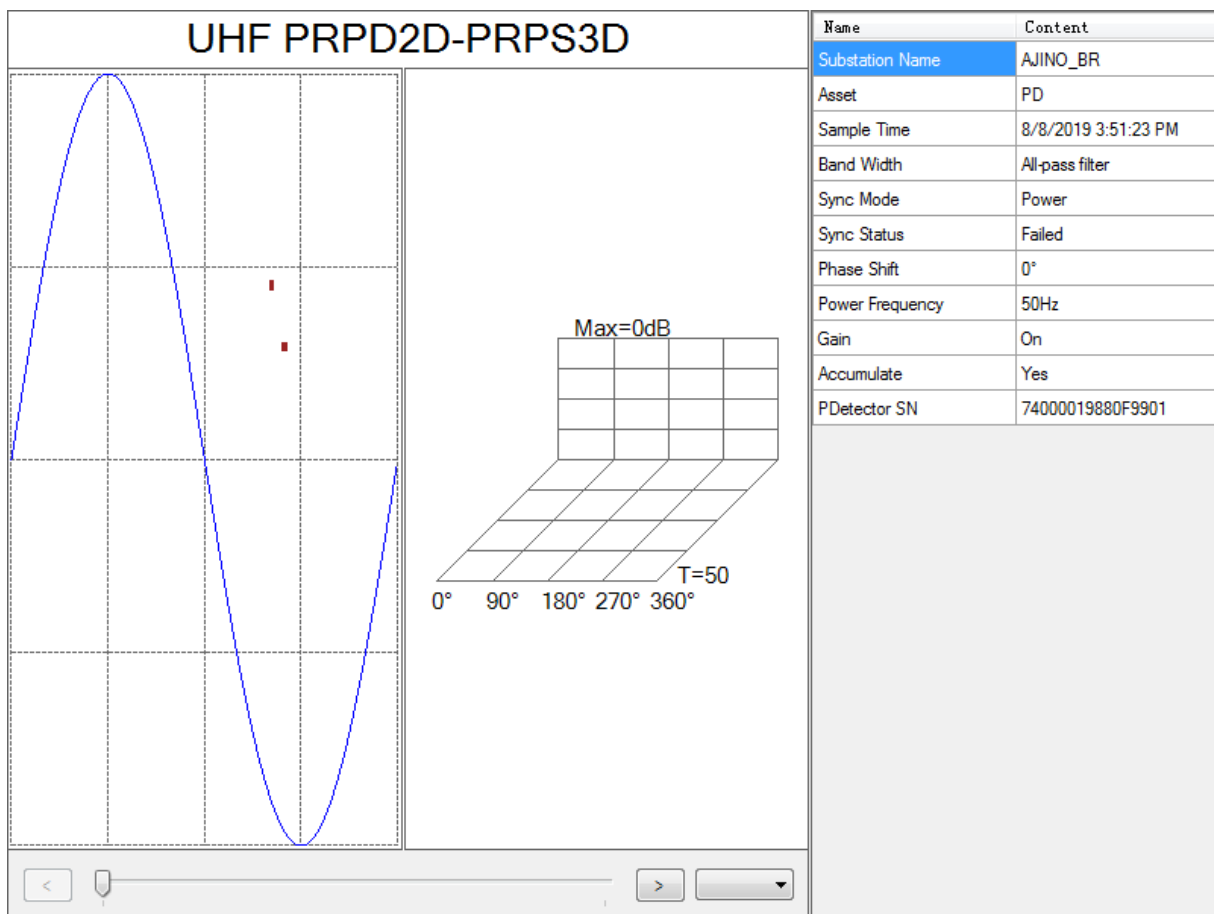
FACTORY	AJINOMOTO CO., (THAILAND) LTD.
SUBSTATION	SUBSTATION NO.2
VOLTAGE LEVEL	22 kV
POSITION	RING MAIN UNIT
PANEL NAME	RMU SUBSTATION NO.2
POWER FREQUENCY	50 Hz



COMMENT	No partial discharge (PD) was found.
EVALUATION	Nomal
SUGGESTION	No action
TESTED AND REPORTED BY	Mr.Tukdanai Pothanak
APPROVED BY	Mr.Chanvit Crukaew

PARTIAL DISCHARGE REPORT

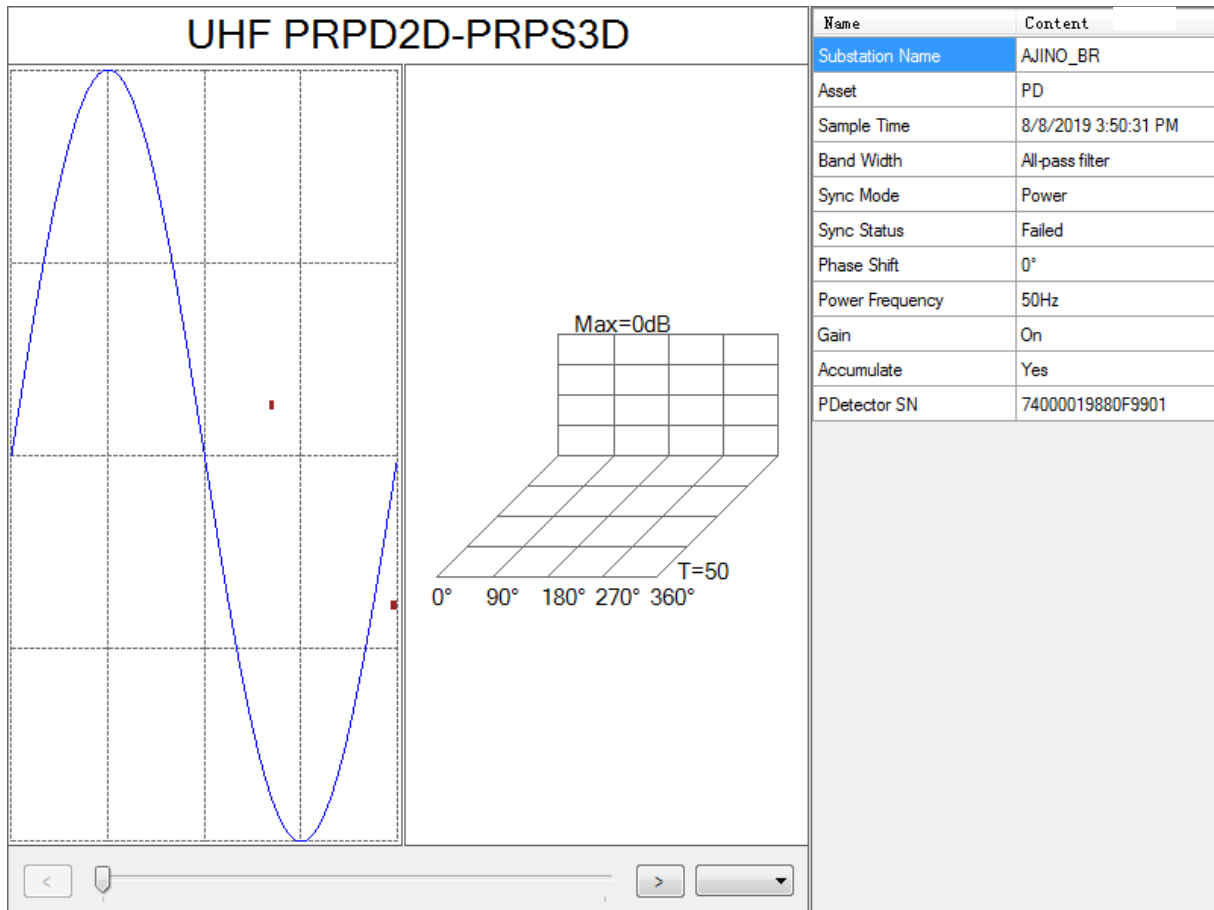
FACTORY	AJINOMOTO CO., (THAILAND) LTD.
SUBSTATION	SUBSTATION NO.2
VOLTAGE LEVEL	22 kV
POSITION	DISTRIBUTION TRANSFORMER
PANEL NAME	TR NO.2 2000 kVA
POWER FREQUENCY	50 Hz



COMMENT	No partial discharge (PD) was found.
EVALUATION	Nomal
SUGGESTION	No action
TESTED AND REPORTED BY	Mr.Tukdanai Pothanak
APPROVED BY	Mr.Chanvit Crukaew

PARTIAL DISCHARGE REPORT

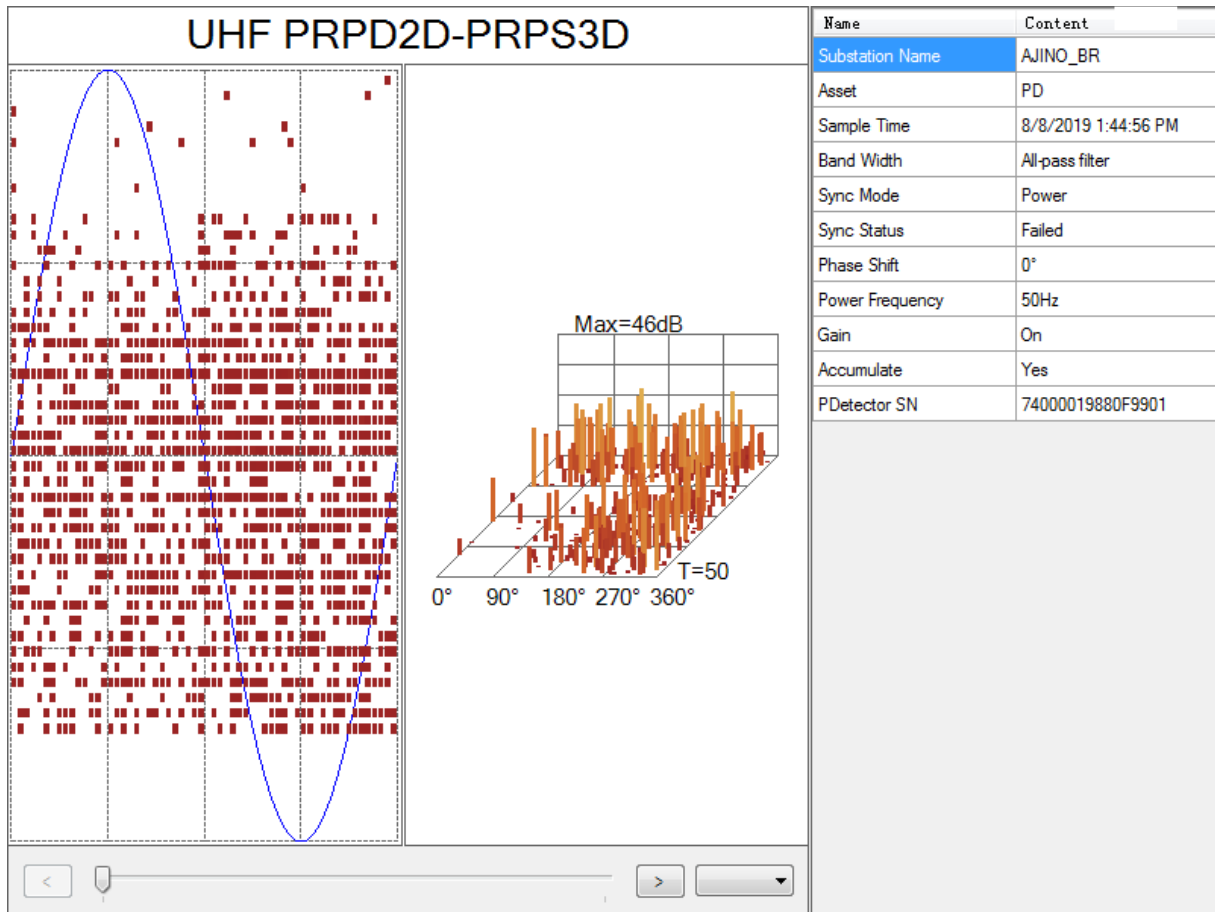
FACTORY	AJINOMOTO CO., (THAILAND) LTD.
SUBSTATION	SUBSTATION NO.3
VOLTAGE LEVEL	22 kV
POSITION	DISTRIBUTION TRANSFORMER
PANEL NAME	TR NO.3 2000 kVA
POWER FREQUENCY	50 Hz



COMMENT	No partial discharge (PD) was found.
EVALUATION	Nomal
SUGGESTION	No action
TESTED AND REPORTED BY	Mr.Tukdanai Pothanak
APPROVED BY	Mr.Chanvit Crukaew

PARTIAL DISCHARGE REPORT

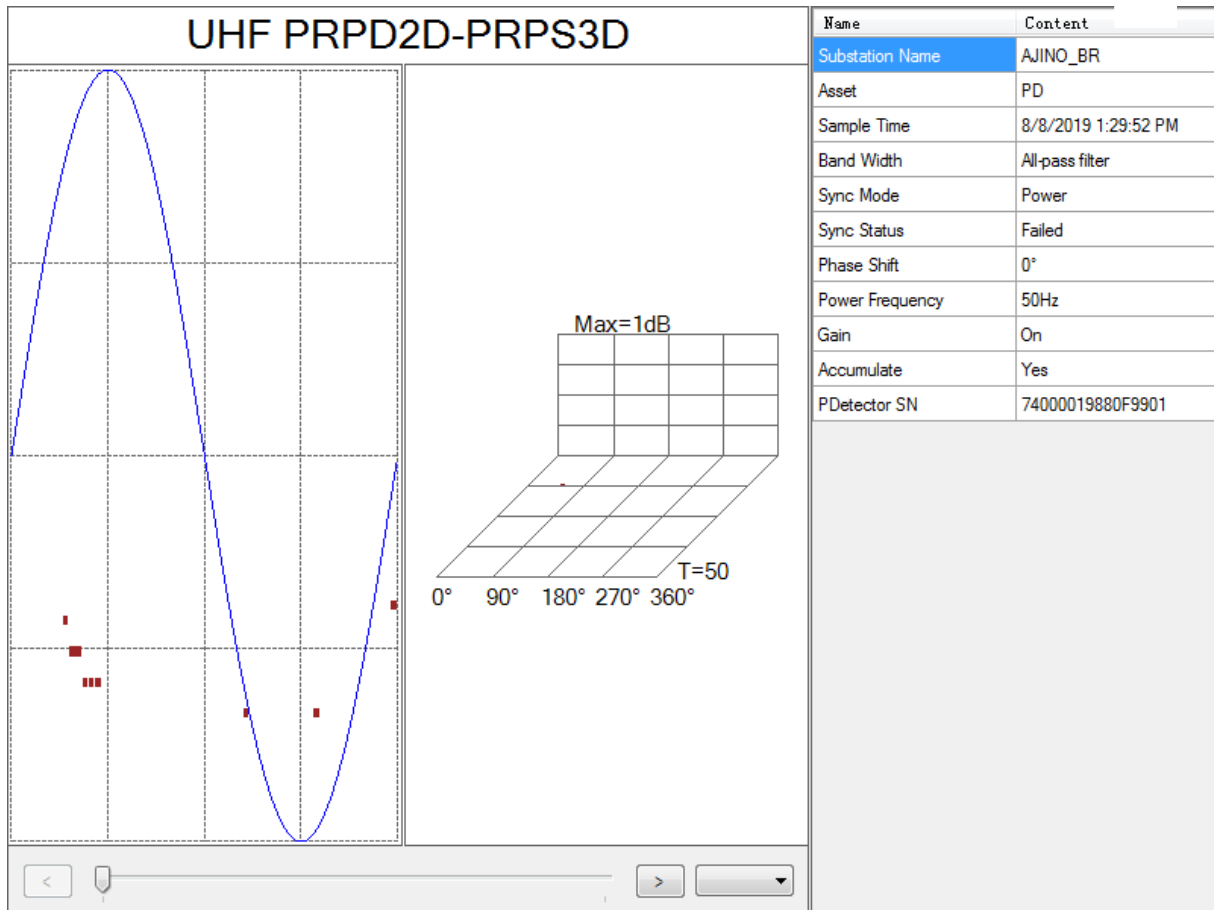
FACTORY	AJINOMOTO CO., (THAILAND) LTD.
SUBSTATION	SUBSTATION NO.4
VOLTAGE LEVEL	22 kV
POSITION	RING MAIN UNIT
PANEL NAME	RMU SUBSTATION NO.4
POWER FREQUENCY	50 Hz



COMMENT	No partial discharge (PD) was found.
EVALUATION	Nomal
SUGGESTION	No action
TESTED AND REPORTED BY	Mr.Tukdanai Pothanak
APPROVED BY	Mr.Chanvit Crukaew

PARTIAL DISCHARGE REPORT

FACTORY	AJINOMOTO CO., (THAILAND) LTD.
SUBSTATION	SUBSTATION NO.4
VOLTAGE LEVEL	22 kV
POSITION	DISTRIBUTION TRANSFORMER
PANEL NAME	TR NO.4
POWER FREQUENCY	50 Hz

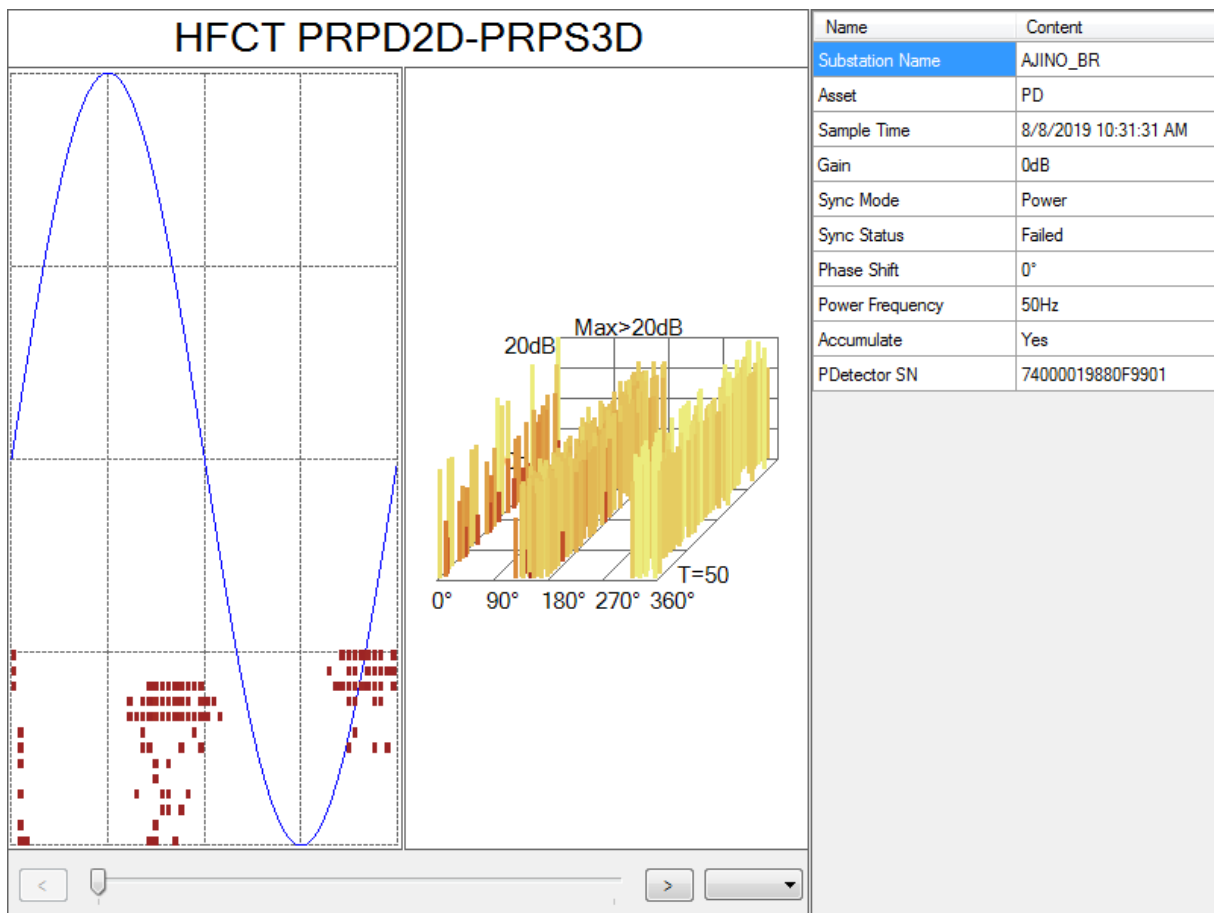


COMMENT	No partial discharge (PD) was found.
EVALUATION	Nomal
SUGGESTION	No action
TESTED AND REPORTED BY	Mr.Tukdanai Pothanak
APPROVED BY	Mr.Chanvit Crukaew

PARTIAL DISCHARGE REPORT
DETECTION METHOD BY HFCT MODE

PARTIAL DISCHARGE REPORT

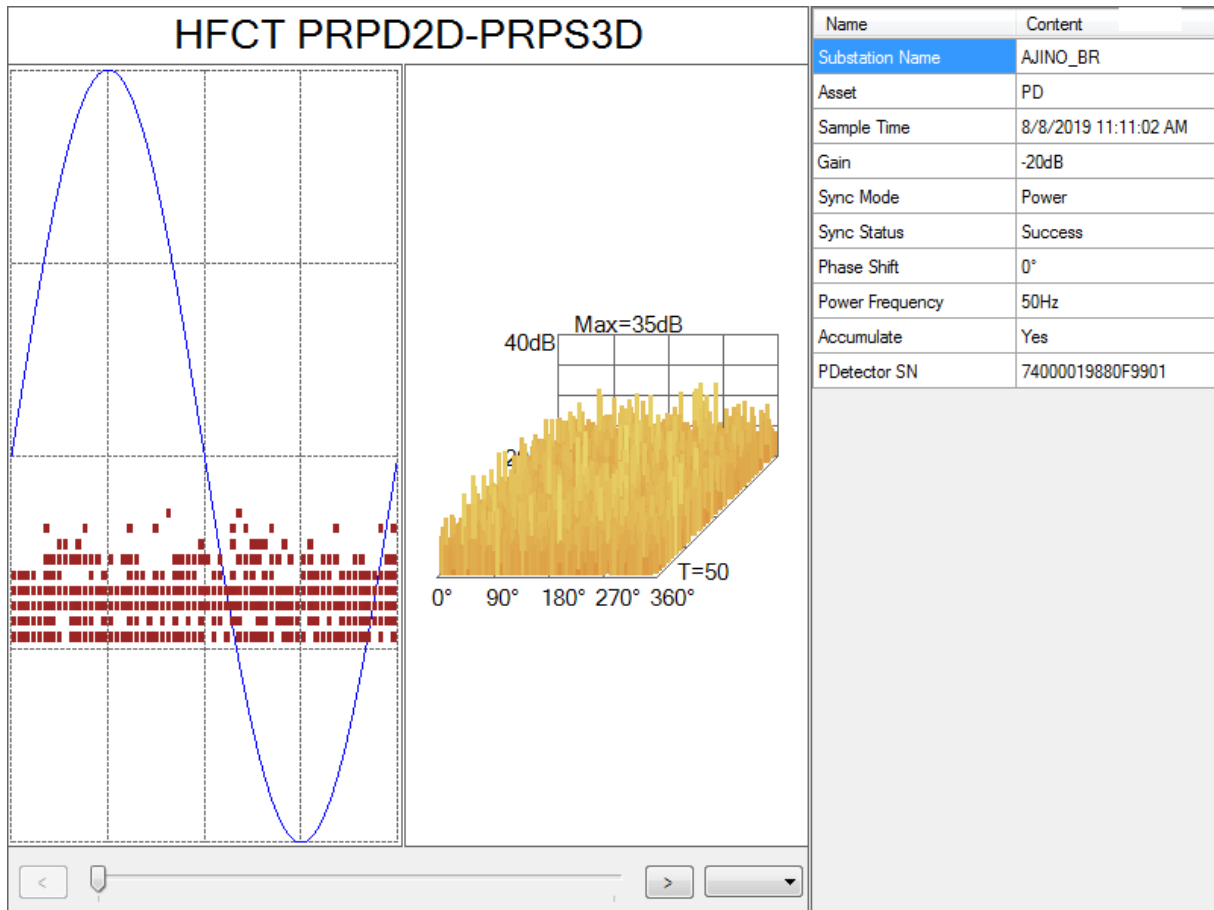
FACTORY	AJINOMOTO CO., (THAILAND) LTD.
SUBSTATION	DISTRIBUTION POLE METERING
VOLTAGE LEVEL	22 kV
POSITION	POLE
PANEL NAME	DROP OUT FUSE
POWER FREQUENCY	50 Hz



COMMENT	partial discharge (PD) was found.
EVALUATION	Warning
SUGGESTION	See in the summery
TESTED AND REPORTED BY	Mr.Tukdanai Pothanak
APPROVED BY	Mr.Chanvit Crukaew

PARTIAL DISCHARGE REPORT

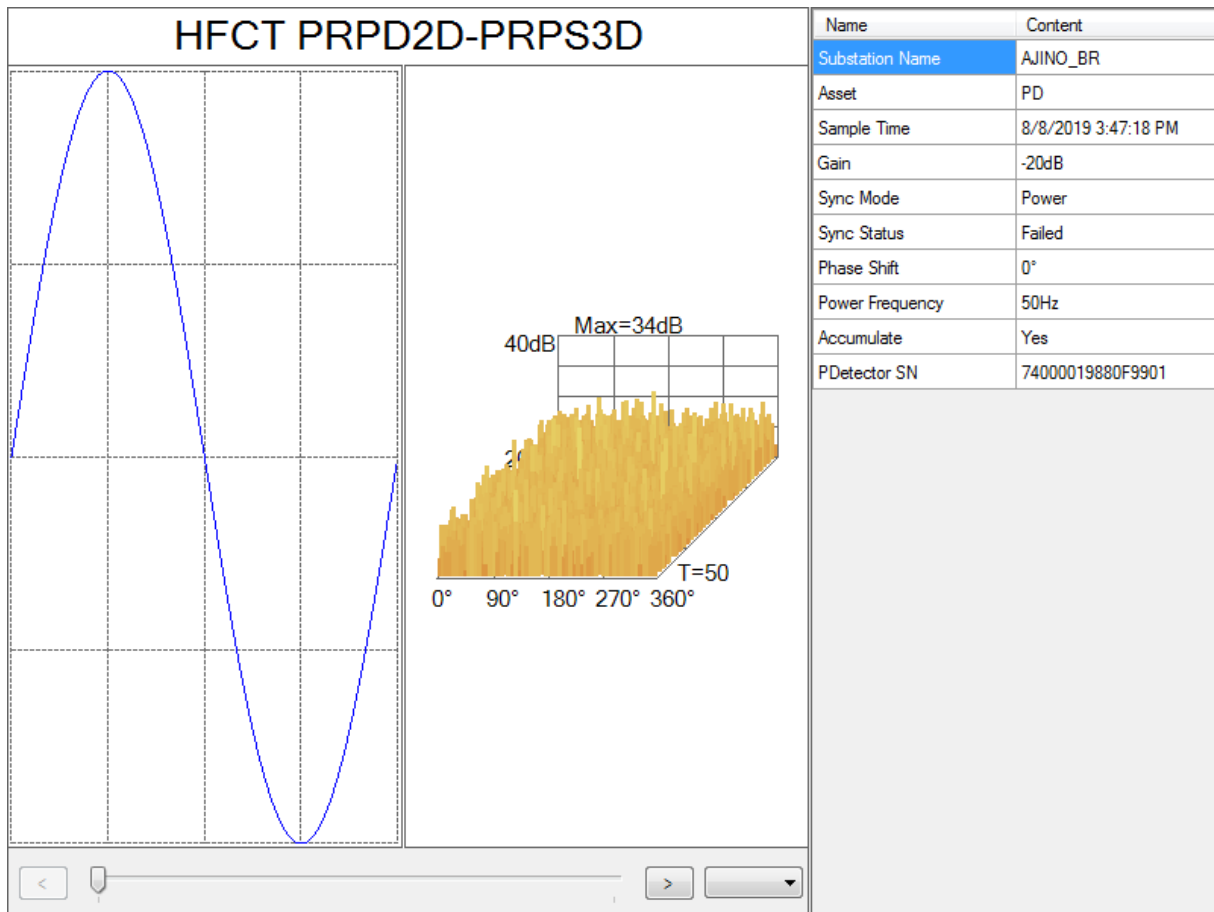
FACTORY	AJINOMOTO CO., (THAILAND) LTD.
SUBSTATION	SUBSTATION NO.1
VOLTAGE LEVEL	22 kV
POSITION	DISTRIBUTION TRANSFORMER
PANEL NAME	TR NO.1 2000 kVA
POWER FREQUENCY	50 Hz



COMMENT	No partial discharge (PD) was found.
EVALUATION	Nomal
SUGGESTION	No action
TESTED AND REPORTED BY	Mr.Tukdanai Pothanak
APPROVED BY	Mr.Chanvit Crukaew

PARTIAL DISCHARGE REPORT

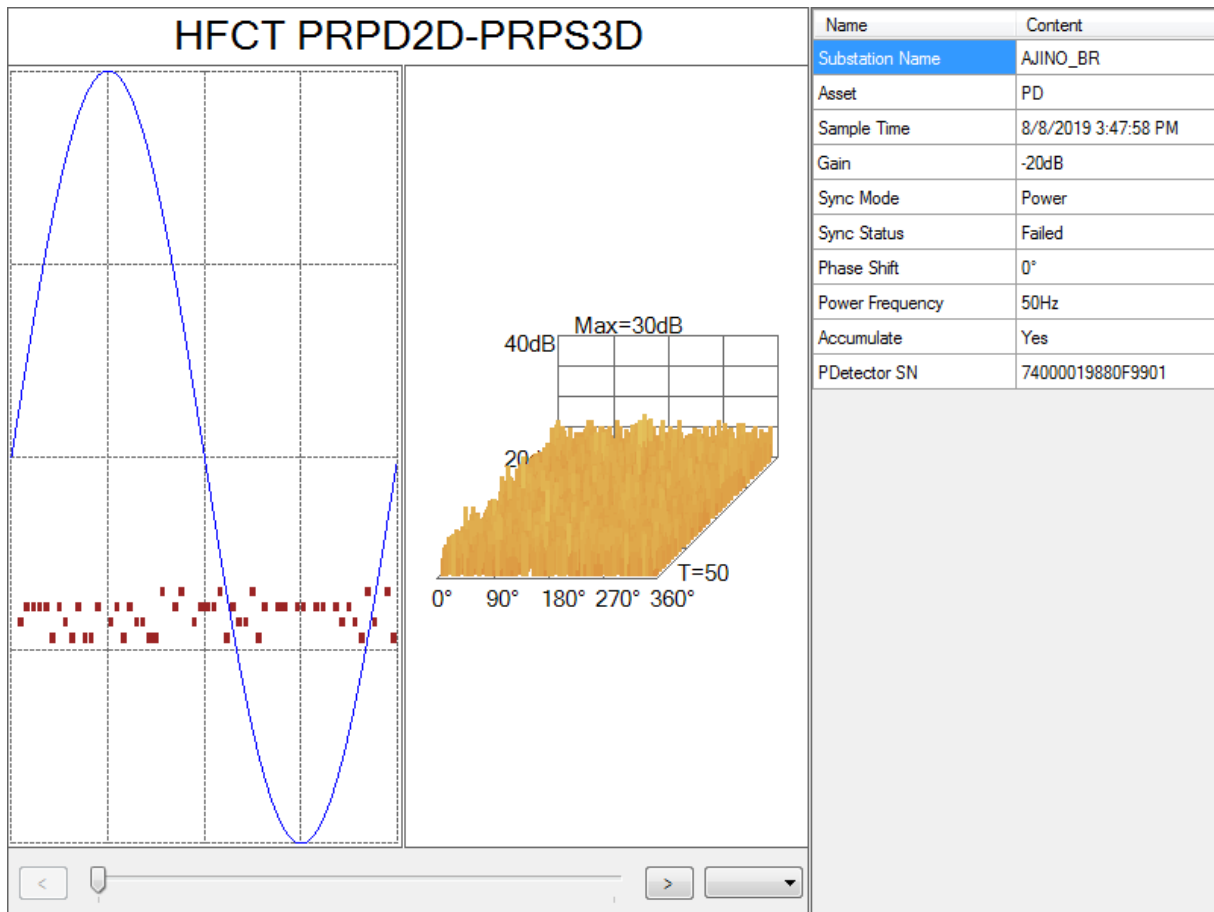
FACTORY	AJINOMOTO CO., (THAILAND) LTD.
SUBSTATION	SUBSTATION NO.2
VOLTAGE LEVEL	22 kV
POSITION	DISTRIBUTION TRANSFORMER
PANEL NAME	TR NO.2 2000 kVA
POWER FREQUENCY	50 Hz



COMMENT	No partial discharge (PD) was found.
EVALUATION	Nomal
SUGGESTION	No action
TESTED AND REPORTED BY	Mr.Tukdanai Pothanak
APPROVED BY	Mr.Chanvit Crukaew

PARTIAL DISCHARGE REPORT

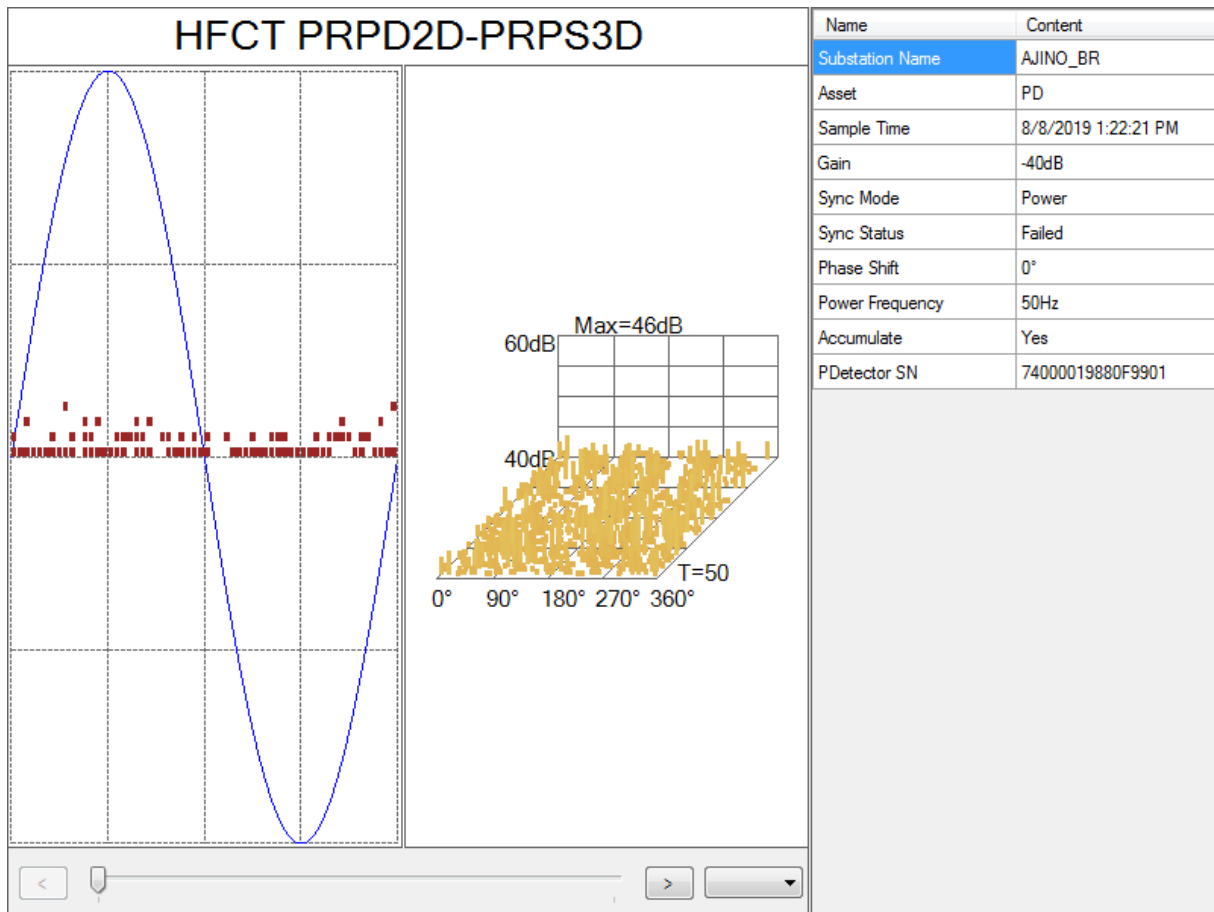
FACTORY	AJINOMOTO CO., (THAILAND) LTD.
SUBSTATION	SUBSTATION NO.3
VOLTAGE LEVEL	22 kV
POSITION	DISTRIBUTION TRANSFORMER
PANEL NAME	TR NO.3 2000 kVA
POWER FREQUENCY	50 Hz



COMMENT	No partial discharge (PD) was found.
EVALUATION	Nomal
SUGGESTION	No action
TESTED AND REPORTED BY	Mr.Tukdanai Pothanak
APPROVED BY	Mr.Chanvit Crukaew

PARTIAL DISCHARGE REPORT

FACTORY	AJINOMOTO CO., (THAILAND) LTD.
SUBSTATION	SUBSTATION NO.4
VOLTAGE LEVEL	22 kV
POSITION	DISTRIBUTION TRANSFORMER
PANEL NAME	TR NO.4
POWER FREQUENCY	50 Hz



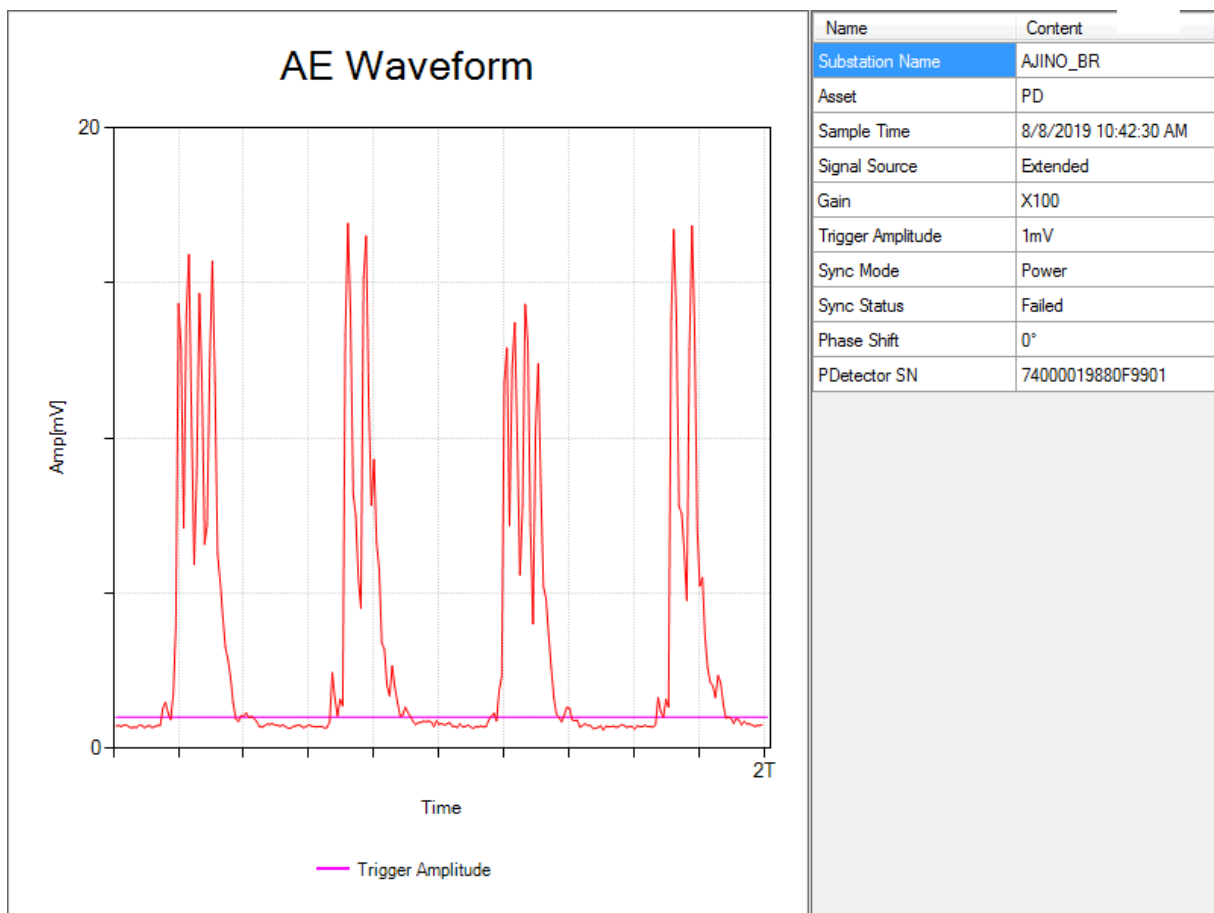
COMMENT	No partial discharge (PD) was found.
EVALUATION	Nomal
SUGGESTION	No action
TESTED AND REPORTED BY	Mr.Tukdanai Pothanak
APPROVED BY	Mr.Chanvit Crukaew

PARTIAL DISCHARGE REPORT

DETECTION METHOD BY ULTRADISH MODE

PARTIAL DISCHARGE REPORT

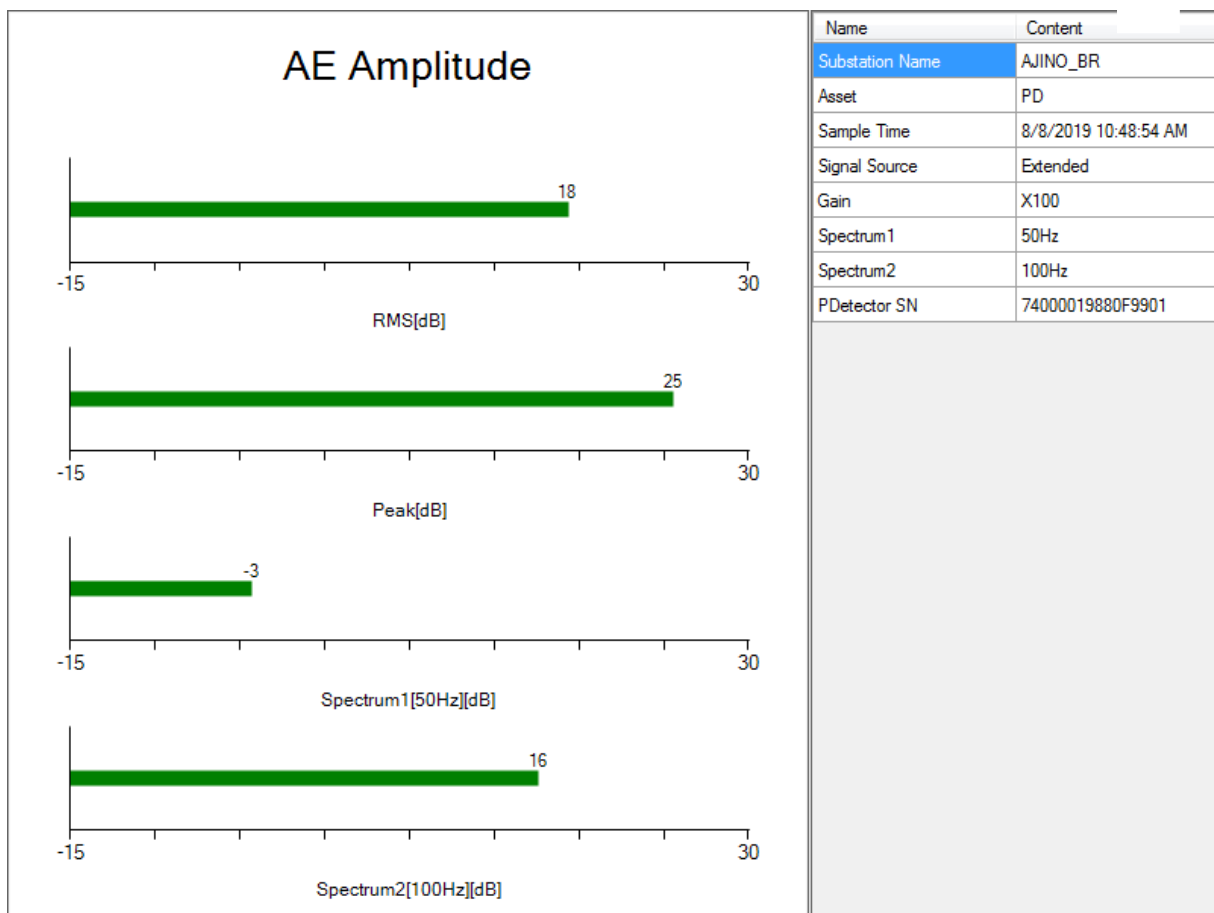
FACTORY	AJINOMOTO CO., (THAILAND) LTD.
SUBSTATION	DISTRIBUTION POLE METERING
VOLTAGE LEVEL	22 kV
POSITION	POLE
PANEL NAME	DROP OUT FUSE
POWER FREQUENCY	50 Hz



COMMENT	partial discharge (PD) was found.
EVALUATION	Warning
SUGGESTION	See in the summery
TESTED AND REPORTED BY	Mr.Tukdanai Pothanak
APPROVED BY	Mr.Chanvit Crukaew

PARTIAL DISCHARGE REPORT

FACTORY	AJINOMOTO CO., (THAILAND) LTD.
SUBSTATION	DISTRIBUTION POLE METERING
VOLTAGE LEVEL	22 kV
POSITION	POLE
PANEL NAME	DROP OUT FUSE
POWER FREQUENCY	50 Hz



COMMENT	partial discharge (PD) was found.
EVALUATION	Warning
SUGGESTION	See in the summery
TESTED AND REPORTED BY	Mr.Tukdanai Pothanak
APPROVED BY	Mr.Chanvit Crukaew

PHOTO REPORT



PHOTO 1 : PARTIAL DISCHARGE INSPECTION BY ULTRADISH MODE



PHOTO 2 : PARTIAL DISCHARGE INSPECTION BY TEV MODE



PHOTO 3 : PARTIAL DISCHARGE INSPECTION BY TEV MODE



PHOTO 4 : PARTIAL DISCHARGE INSPECTION BY UHF MODE



PHOTO 5 : PARTIAL DISCHARGE INSPECTION BY UHF MODE



PHOTO 6 : PARTIAL DISCHARGE INSPECTION BY UHF MODE



PHOTO 7 : PARTIAL DISCHARGE INSPECTION BY HFCT MODE



PHOTO 8 : PARTIAL DISCHARGE INSPECTION BY HFCT MODE

APPENDIX.1

PARTIAL DISCHARGE

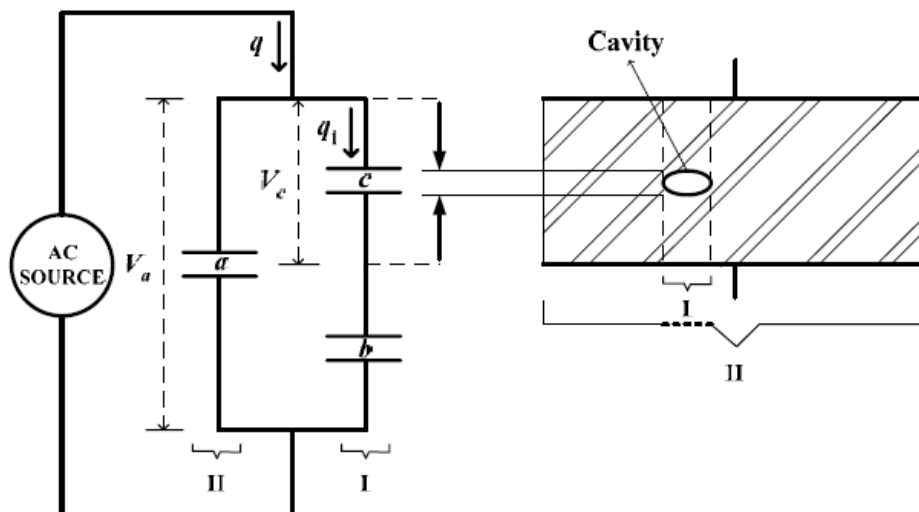
PARTIAL DISCHARGE

PARTIAL DISCHARGE คืออะไร

ระบบไฟฟ้าแรงสูงภายใต้ High Voltage Stress การเกิด Break down ของเนื้อฉนวนเป็นจุดเล็กๆไม่ว่าฉนวนนั้นจะเป็นของเหลวหรือของแข็ง เราเรียกการ Break down นั้นว่า **Partial discharge (PD)**

สาเหตุของการเกิด PARTIAL DISCHARGE

สาเหตุของการเกิด Partial discharge ภายใต้ High voltage stress ปกติจะเริ่มที่มีโพรงอากาศ มีรอยแตกบริเวณที่สัมผัสกันของสายไฟฟ้าที่ไม่มี Shield ground บริเวณที่สัมผัสกันของฉนวน หรือ ฟองอากาศในน้ำมันหม้อแปลง ซึ่งทำให้เกิด Capacitance ขึ้นในบริเวณนั้นเป็นผลให้เกิดศักย์ไฟฟ้าที่ต่างกัน เกิดการ Break down บริเวณนั้นๆจนทำให้ฉนวนชำรุดเสียหายและหมดความเป็นฉนวนลงจนเกิดการ Short circuit



รูปที่ 1 Equivalent circuit of a dielectric with cavity

ผลของการเกิด PARTIAL DISCHARGE

ผลของ Partial discharge ใน High Voltage Equipment จะเป็นการสะสมการชำรุดของเนื้อฉนวนที่ละน้อยในที่สุดจะเป็นการชำรุดและเสื่อมสภาพอย่างถาวร ซึ่งทำให้เกิดปฏิกิริยาทางกล ทางเคมีที่ไม่สามารถทำให้กลับคืนสภาพปกติได้ ซึ่งส่งผลได้ดังนี้

- เกิดแสง Ultraviolet
- เกิด Ultra Sound
- เกิด Ozone
- เกิด GAS ชนิดต่างๆ



รูปที่ 2 ผลของการเกิด Partial discharge ที่สาย Cable



รูปที่ 3 ผลของการเกิด Partial discharge ที่ลู่กถ้วย (Insulator)

APPENDIX.2

DECISION CRITERION

DECISION CRITERION

UHF

Normal	< 30 dB
Warning	30 – 50 dB
Critical	>50 dB

AE Internal/Extended

Normal	< 1 mV
Warning	1-5 mV
Critical	>5 mV

AE Ultrasonic Dish

Normal	< 5 mV
Warning	5-20 mV
Critical	>20 mV

HFCT

Normal	<20 dB
Warning	20-40 dB
Critical	>40 dB

TEV

Normal	<30 dB
Warning	30-60 dB
Critical	>60 dB

APPENDIX.3

FINGER PRINT OF PARTIAL DISCHARGE

FINGER PRINT OF PARTIAL DISCHARGE

1. Finger print of corona discharge

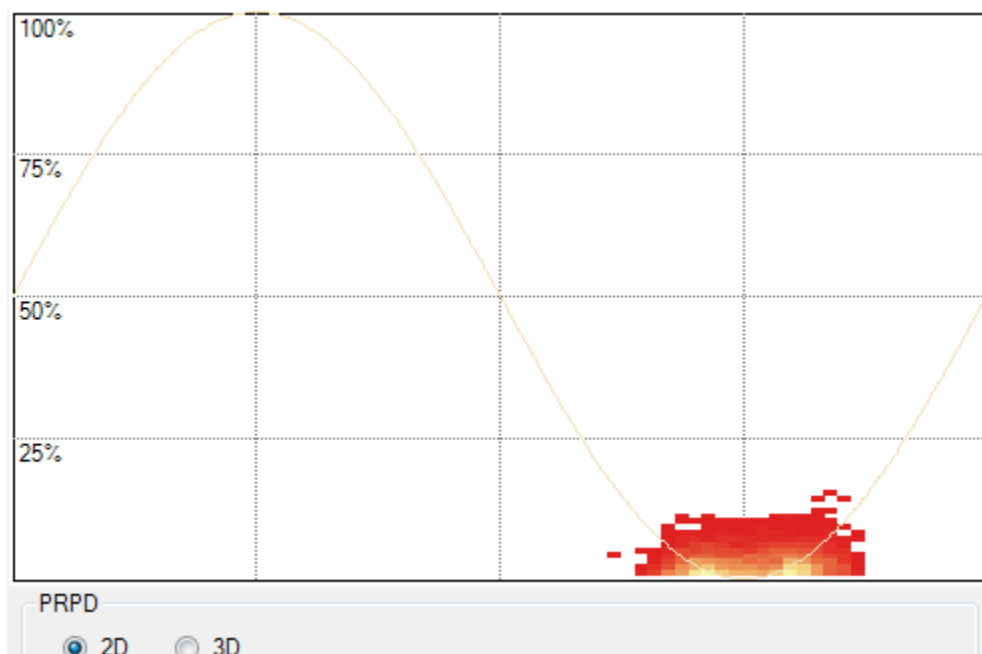
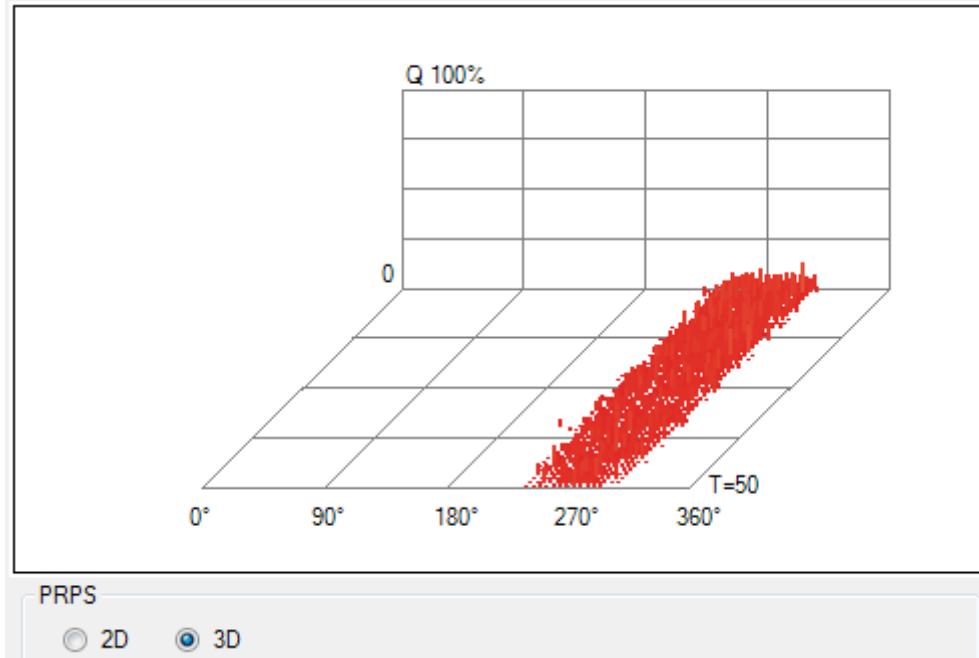


PHOTO.1 CORONA PATTERN 1

FINGER PRINT OF PARTIAL DISCHARGE

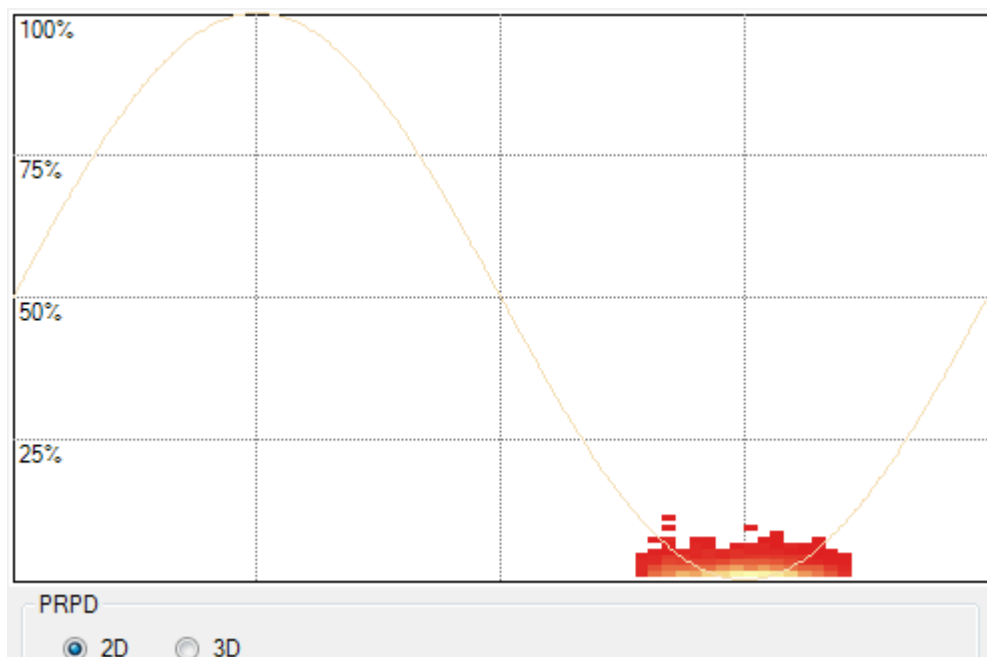
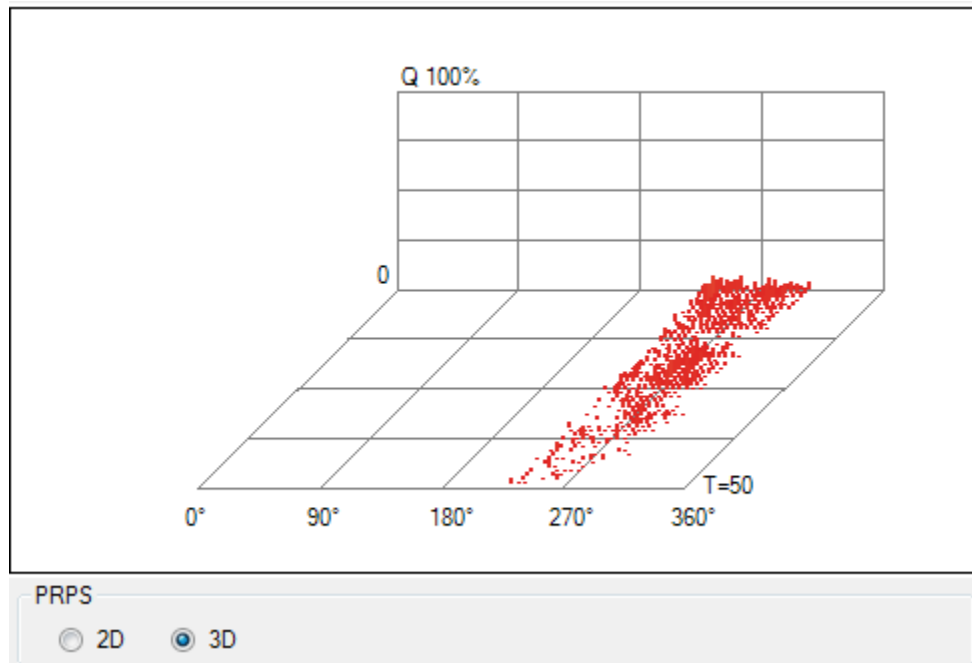


PHOTO.2 CORONA PATTERN 2

FINGER PRINT OF PARTIAL DISCHARGE

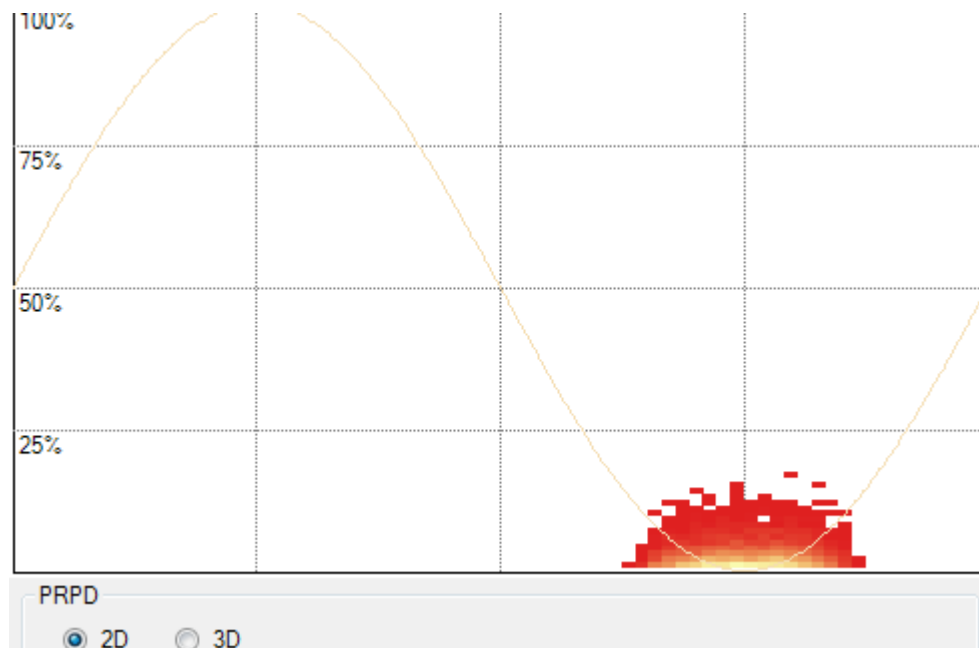
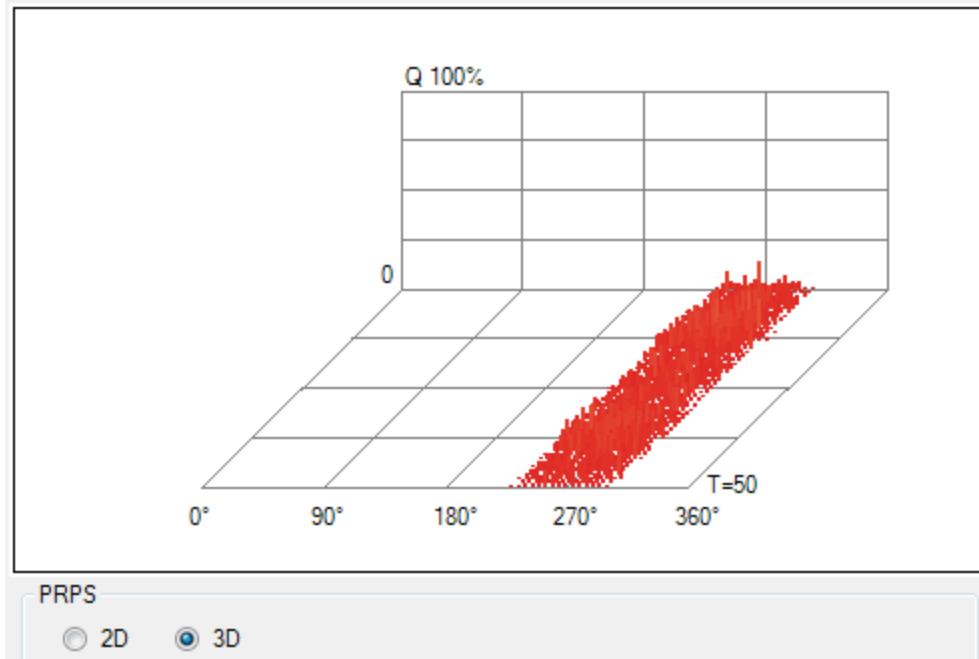


PHOTO.3 CORONA PATTERN 3

FINGER PRINT OF PARTIAL DISCHARGE

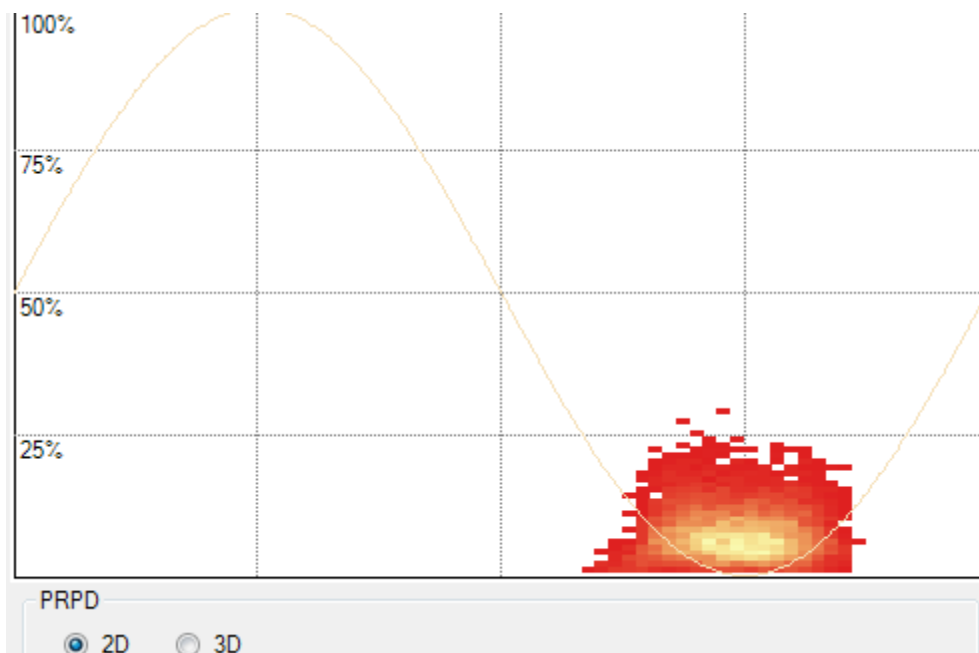
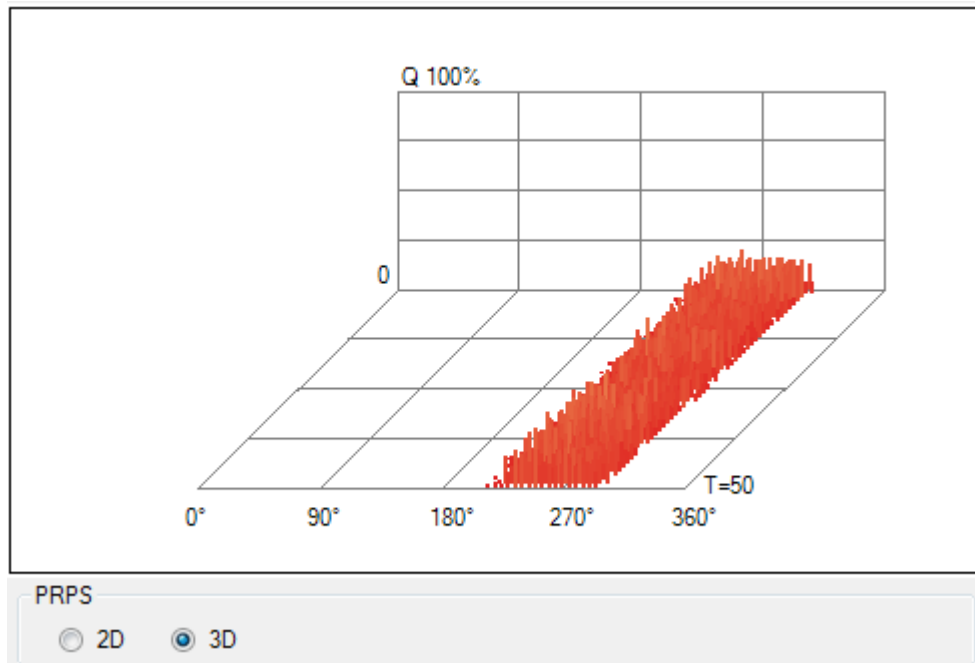


PHOTO.4 CORONA PATTERN 4

FINGER PRINT OF PARTIAL DISCHARGE

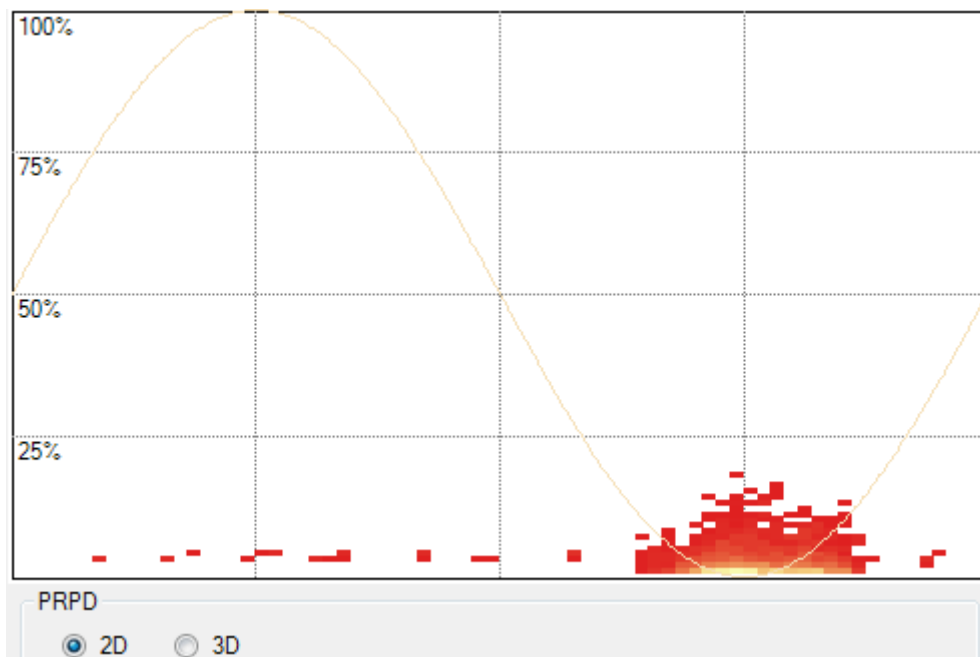
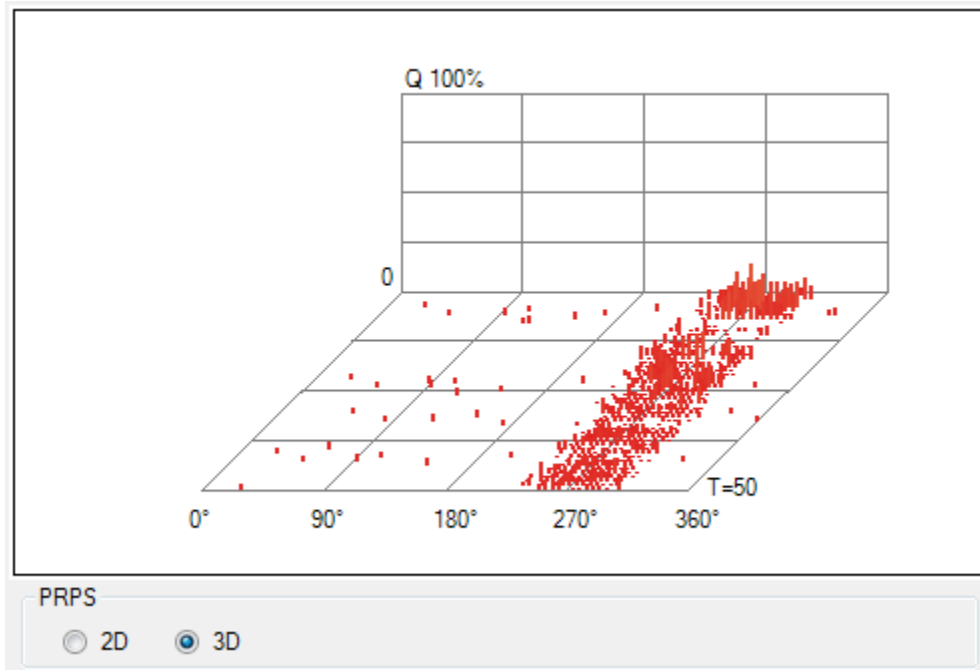


PHOTO.5 CORONA PATTERN 5

FINGER PRINT OF PARTIAL DISCHARGE

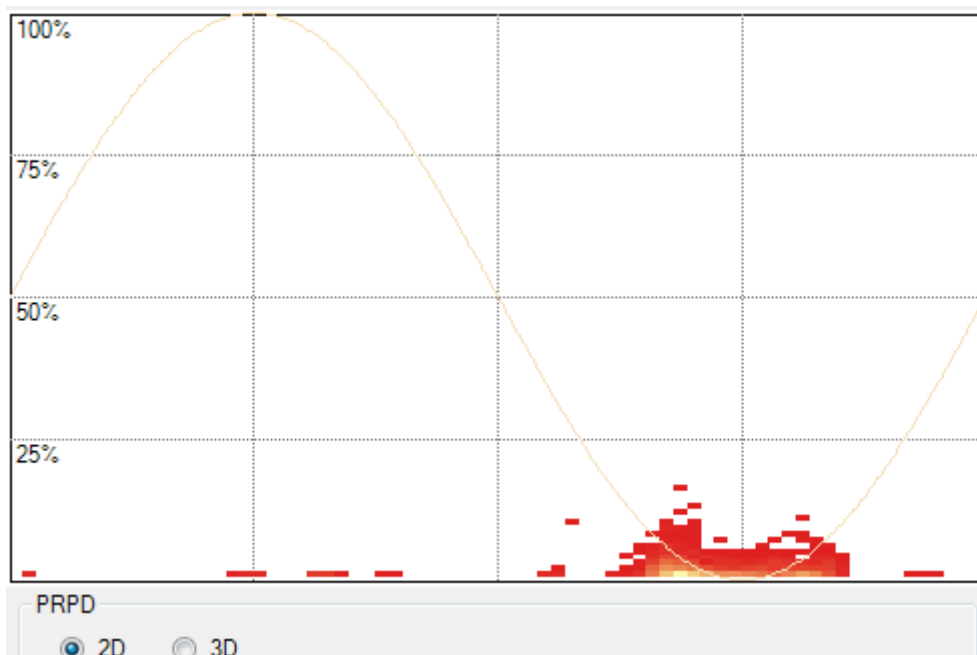
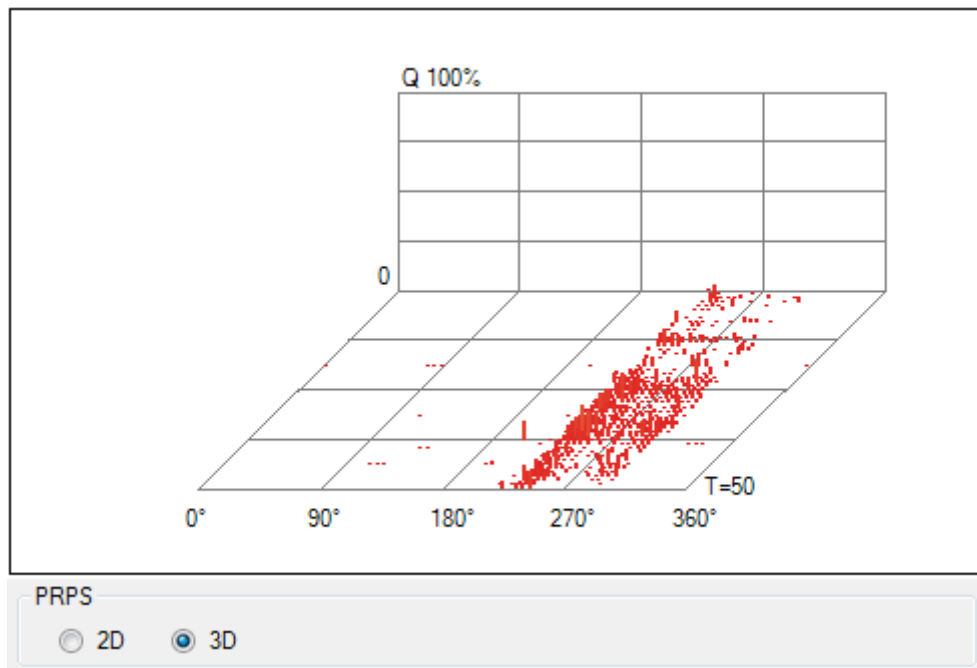


PHOTO.6 CORONA PATTERN 6

FINGER PRINT OF PARTIAL DISCHARGE

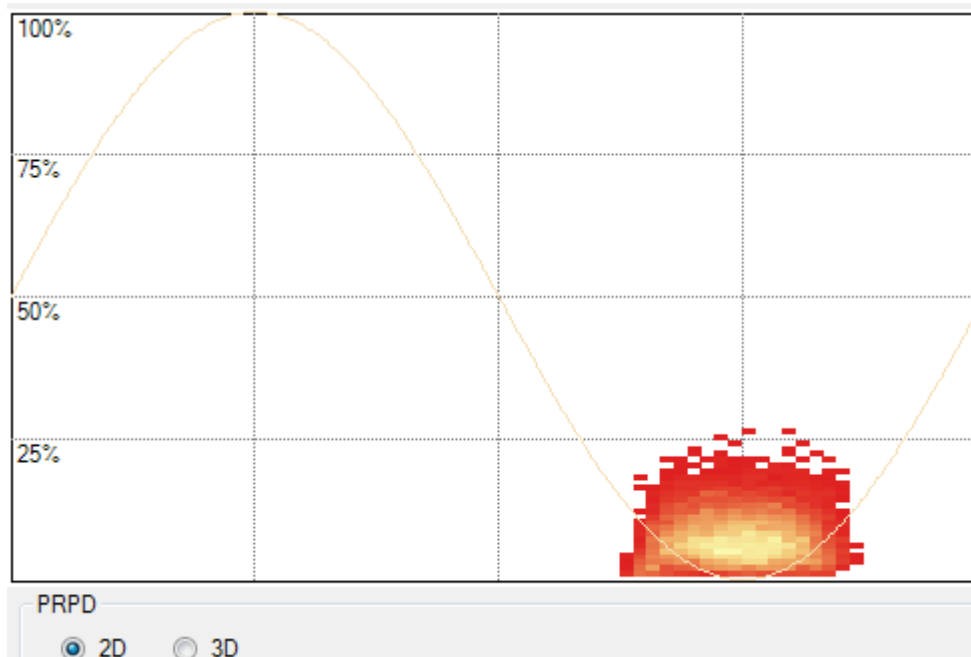
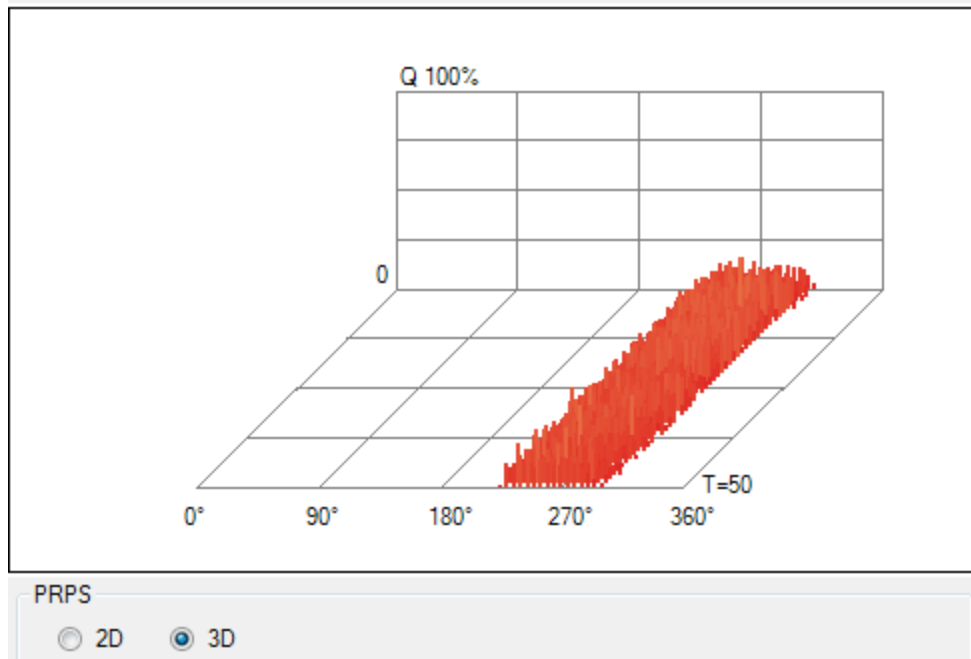


PHOTO.7 CORONA PATTERN 7

FINGER PRINT OF PARTIAL DISCHARGE

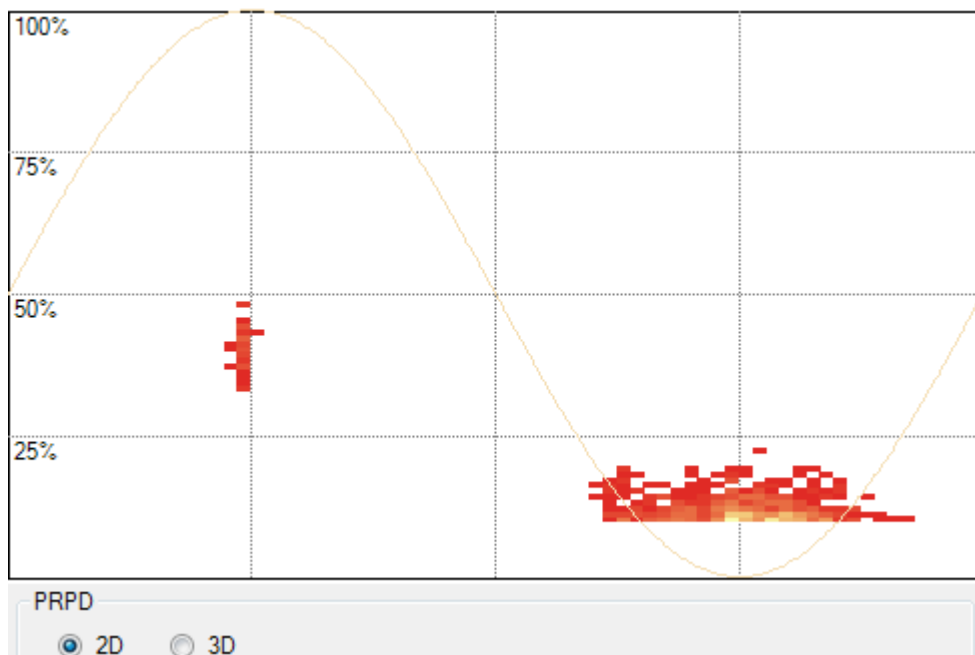
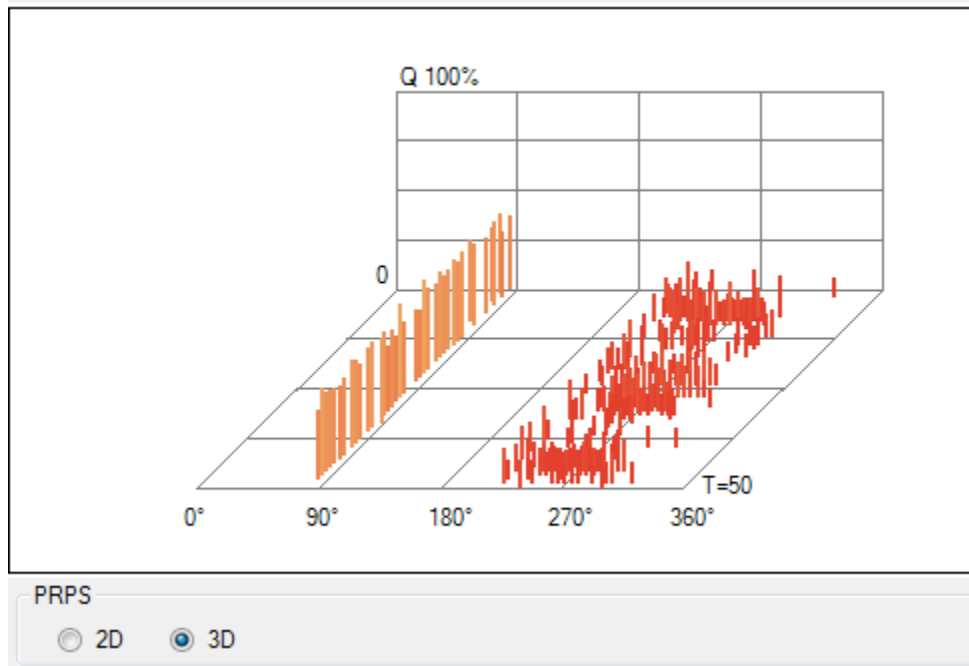


PHOTO.8 CORONA PATTERN 8

FINGER PRINT OF PARTIAL DISCHARGE

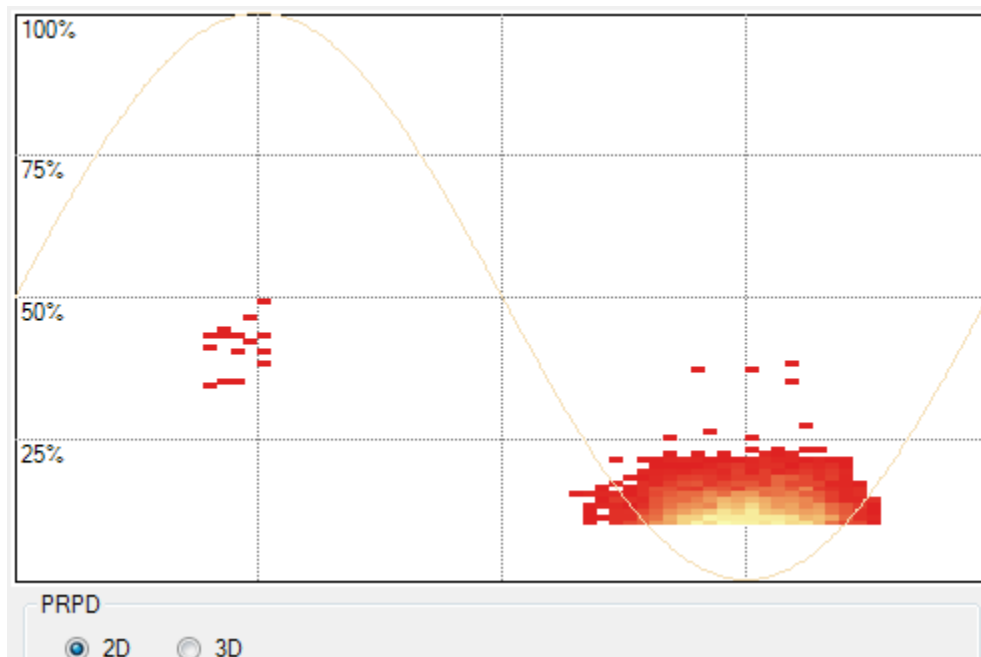
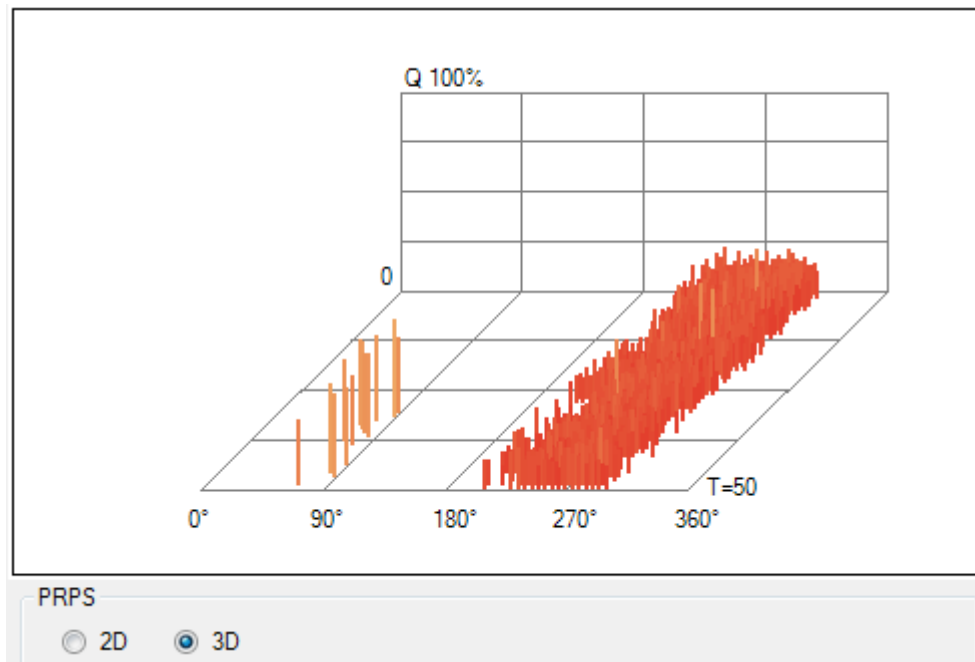


PHOTO.9 CORONA PATTERN 9

FINGER PRINT OF PARTIAL DISCHARGE

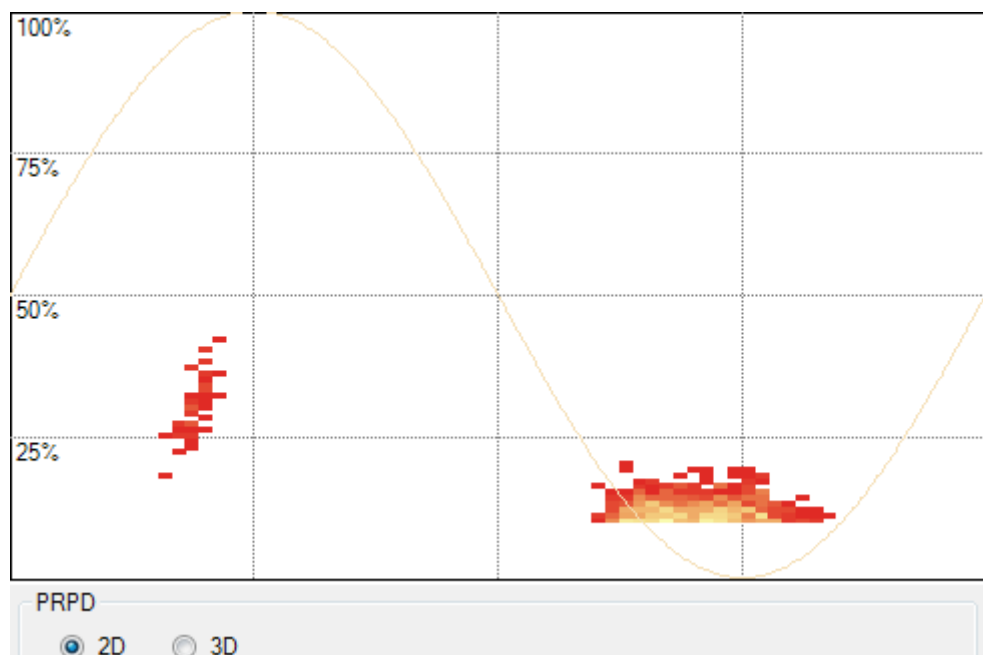
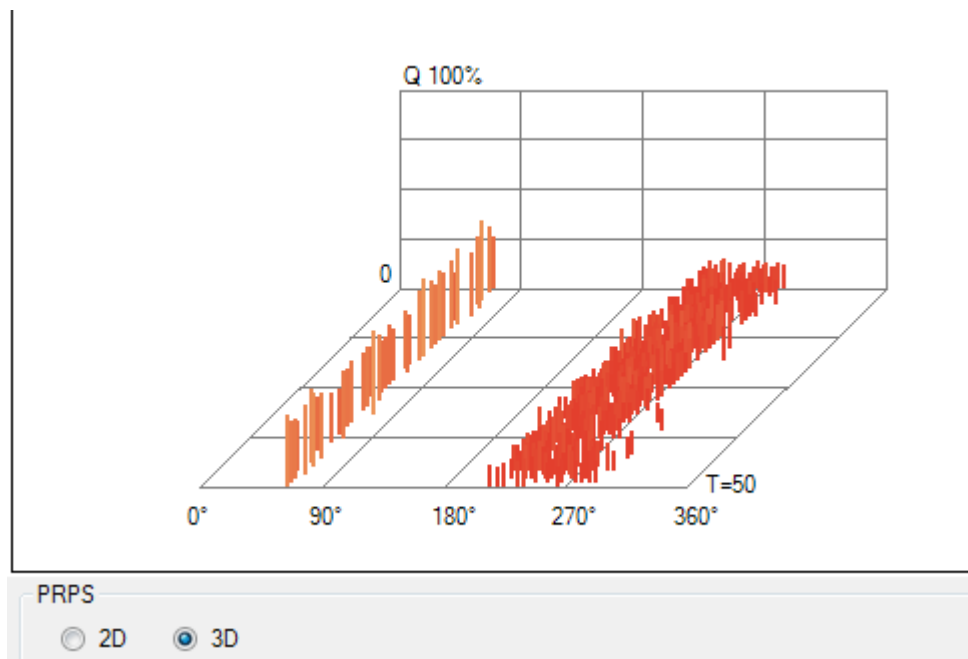


PHOTO.10 CORONA PATTERN 10

FINGER PRINT OF PARTIAL DISCHARGE

1. Finger print of floating electrode

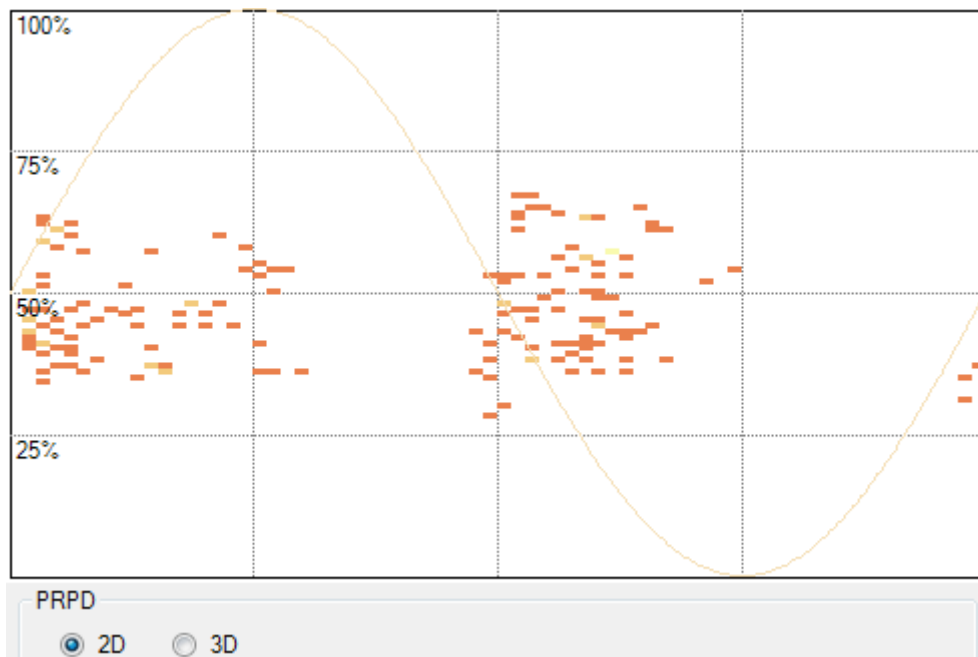
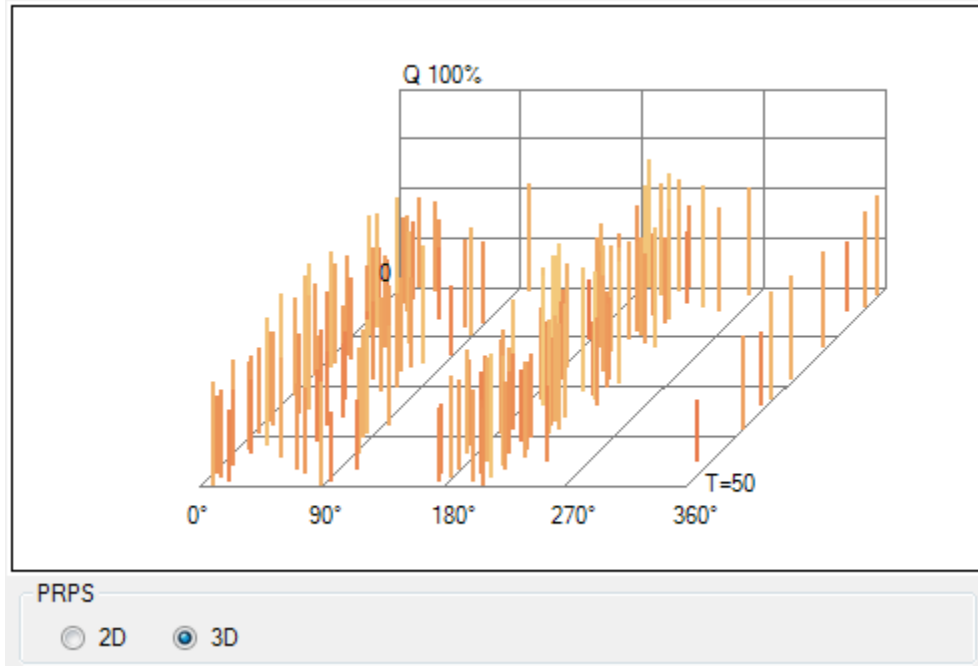


PHOTO.11 FLOATING ELECTRODE PATTERN 1

FINGER PRINT OF PARTIAL DISCHARGE

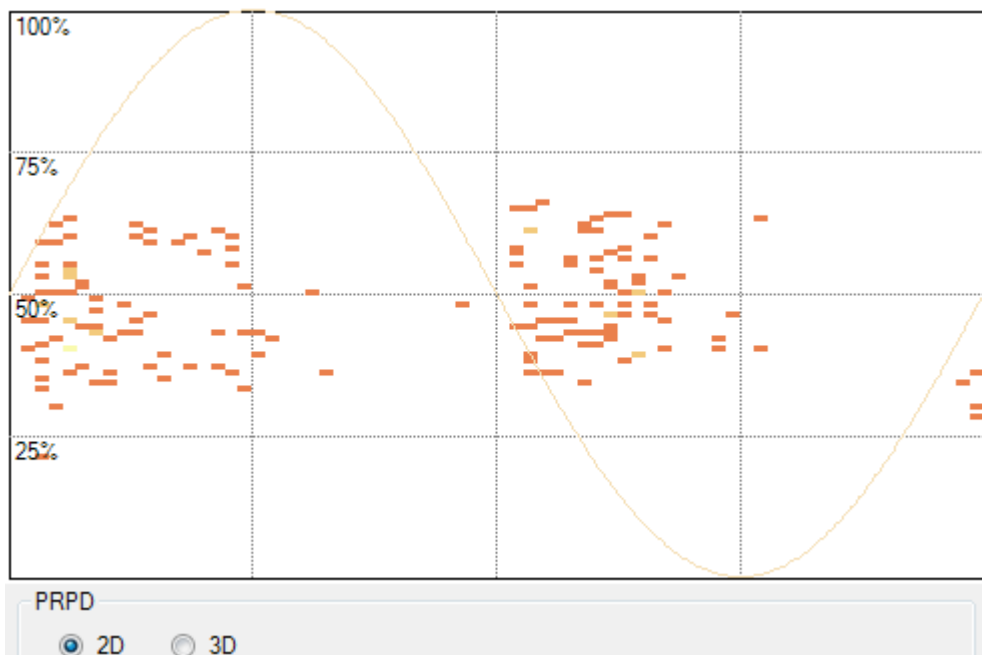
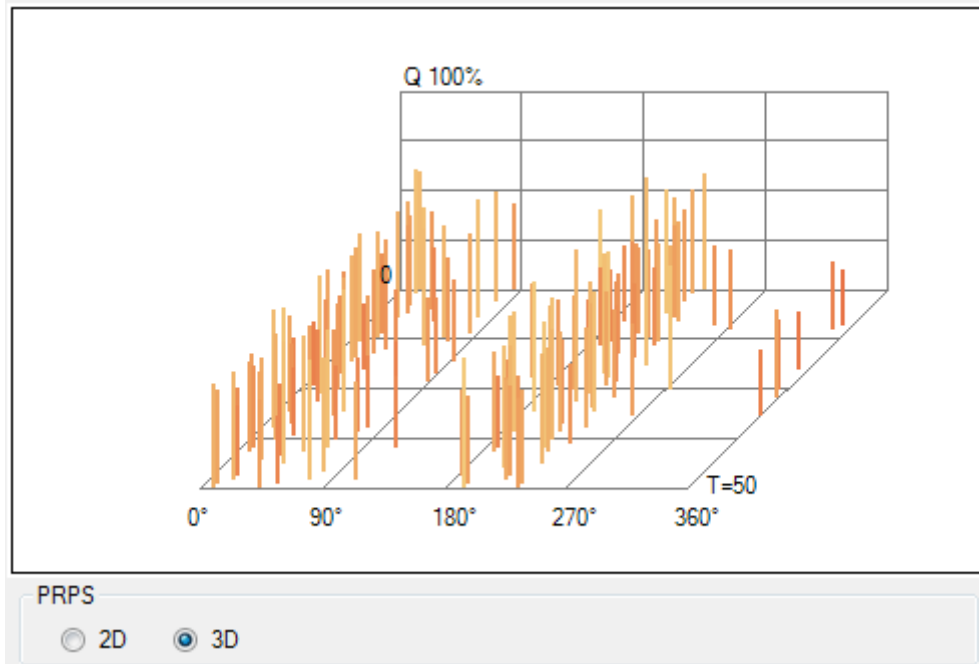


PHOTO.12 FLOATING ELECTRODE PATTERN 2

FINGER PRINT OF PARTIAL DISCHARGE

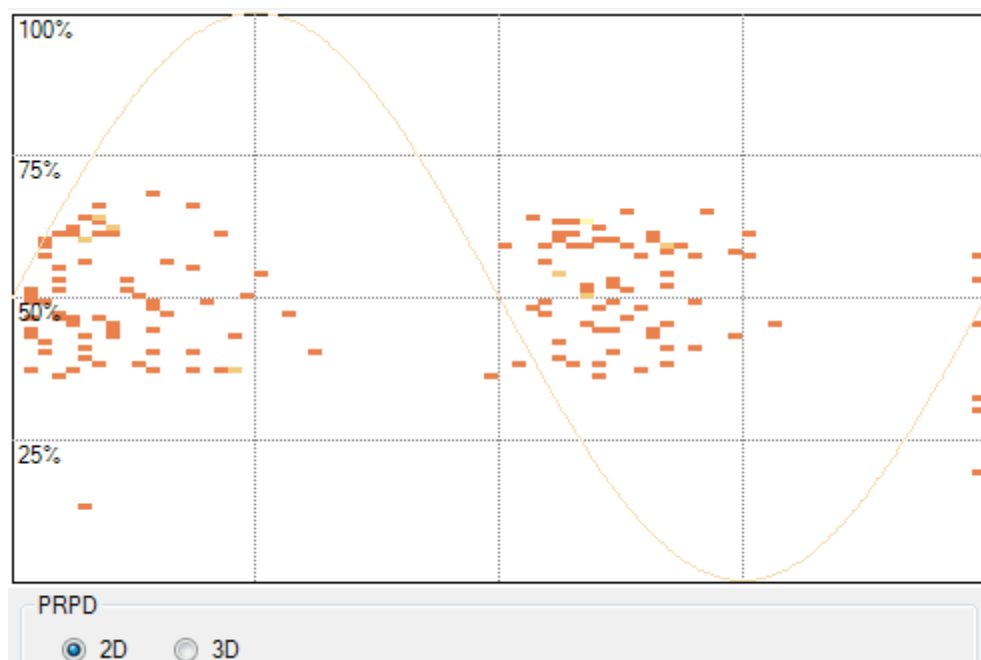
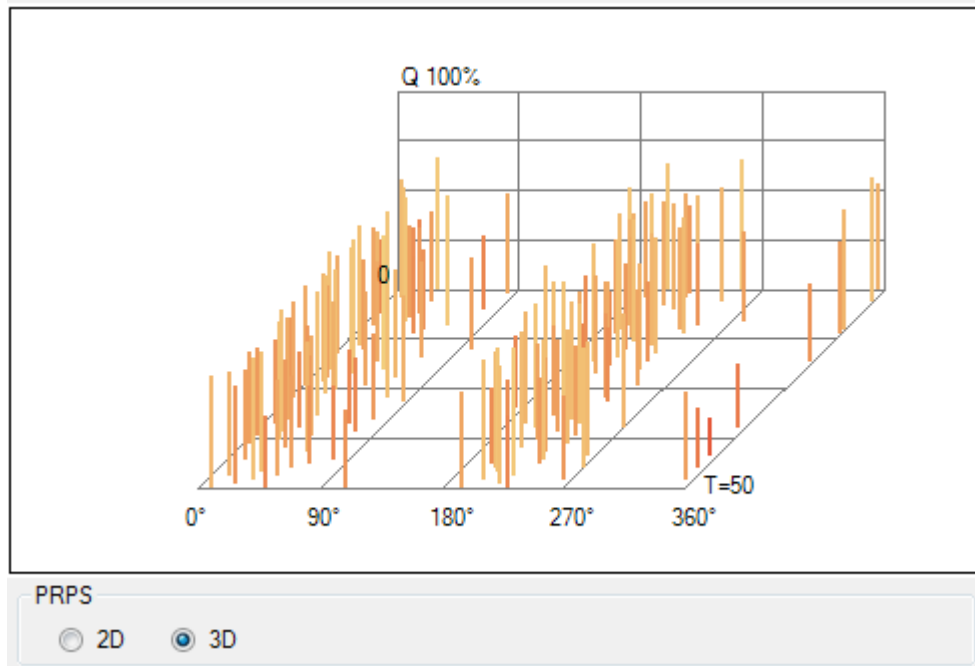


PHOTO.13 FLOATING ELECTRODE PATTERN 3

FINGER PRINT OF PARTIAL DISCHARGE

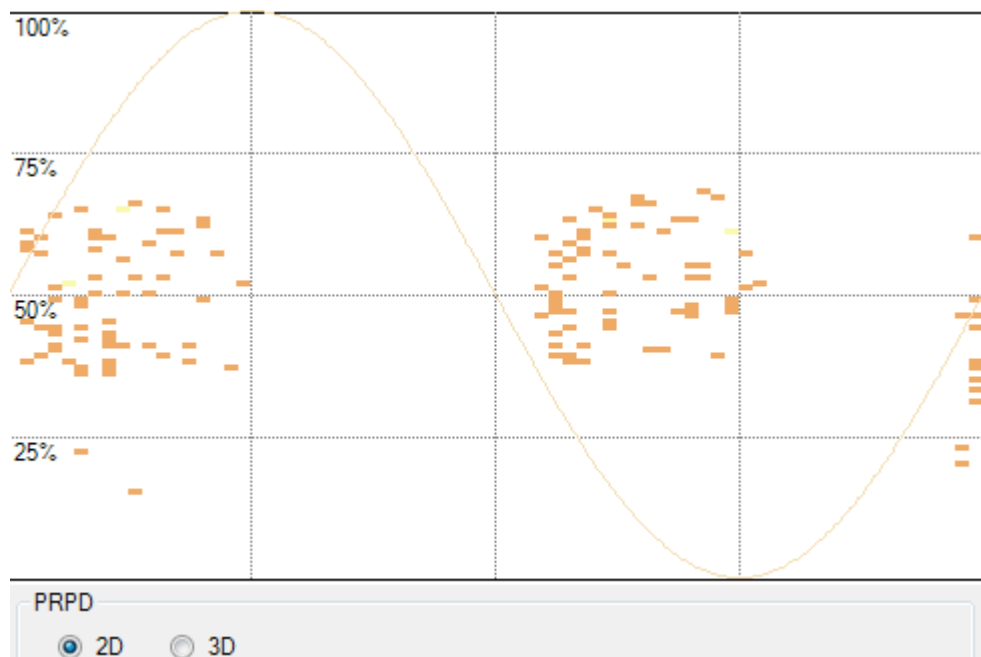
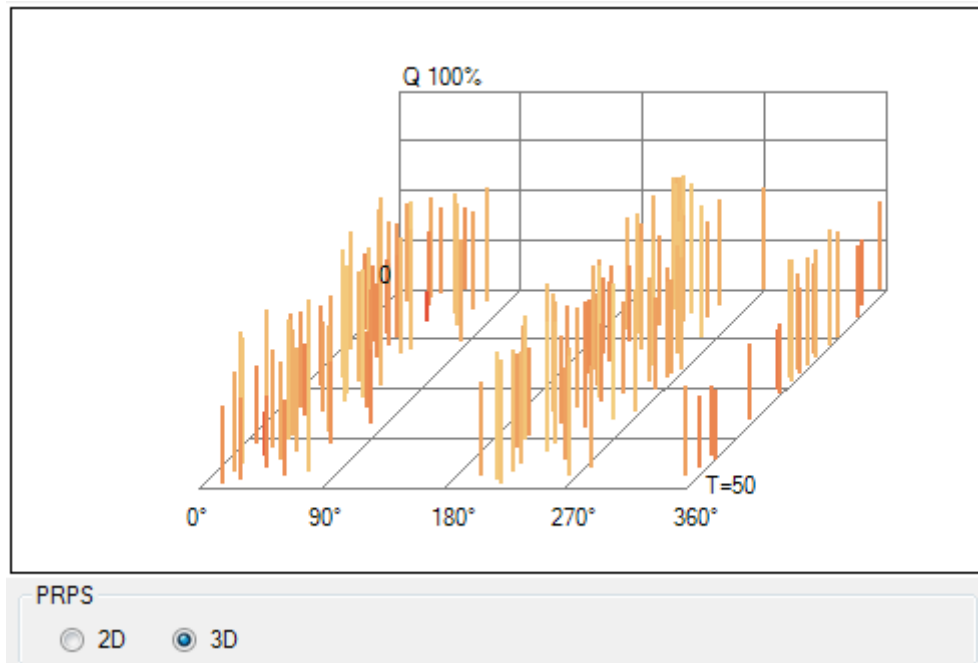


PHOTO.14 FLOATING ELECTRODE PATTERN 4

FINGER PRINT OF PARTIAL DISCHARGE

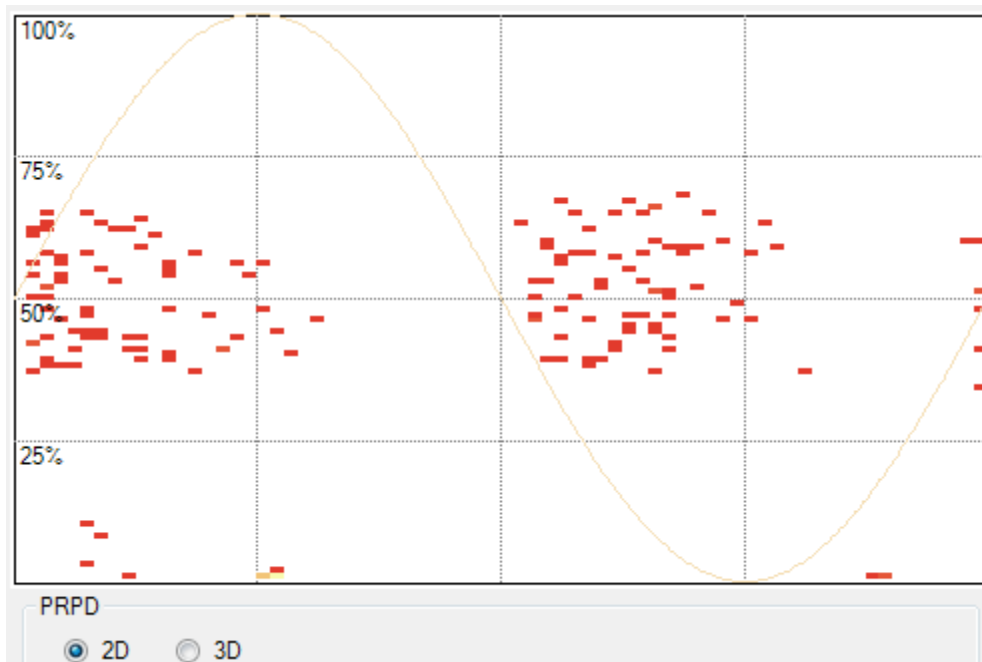
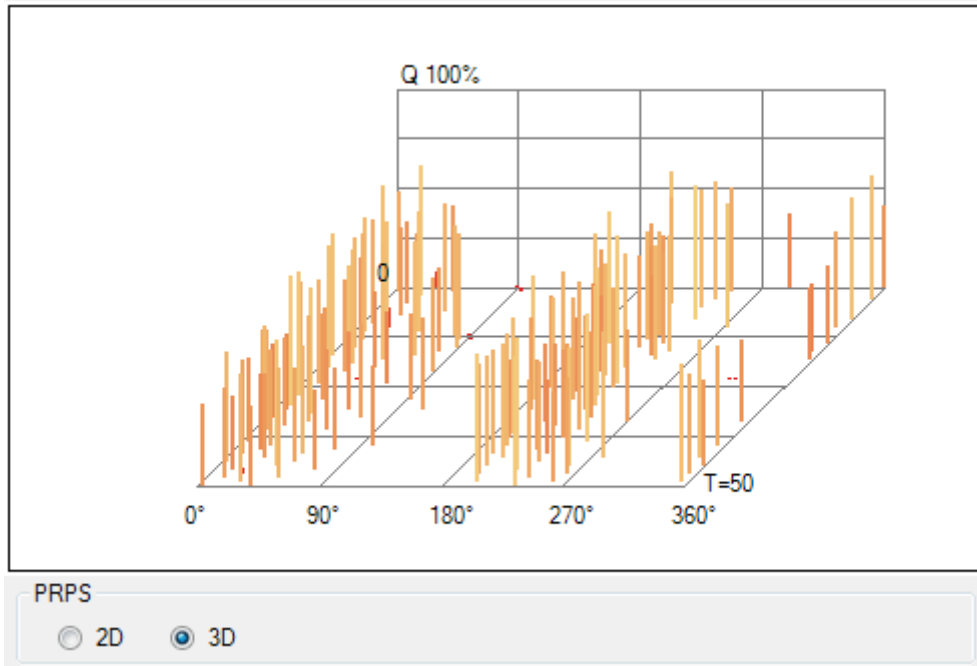


PHOTO.15 FLOATING ELECTRODE PATTERN 5

FINGER PRINT OF PARTIAL DISCHARGE

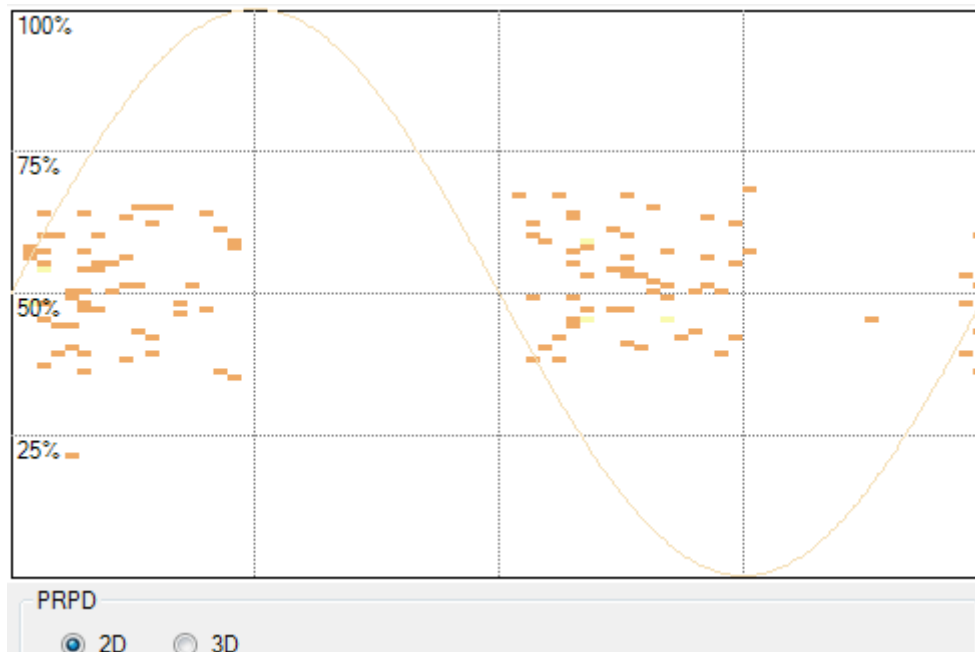
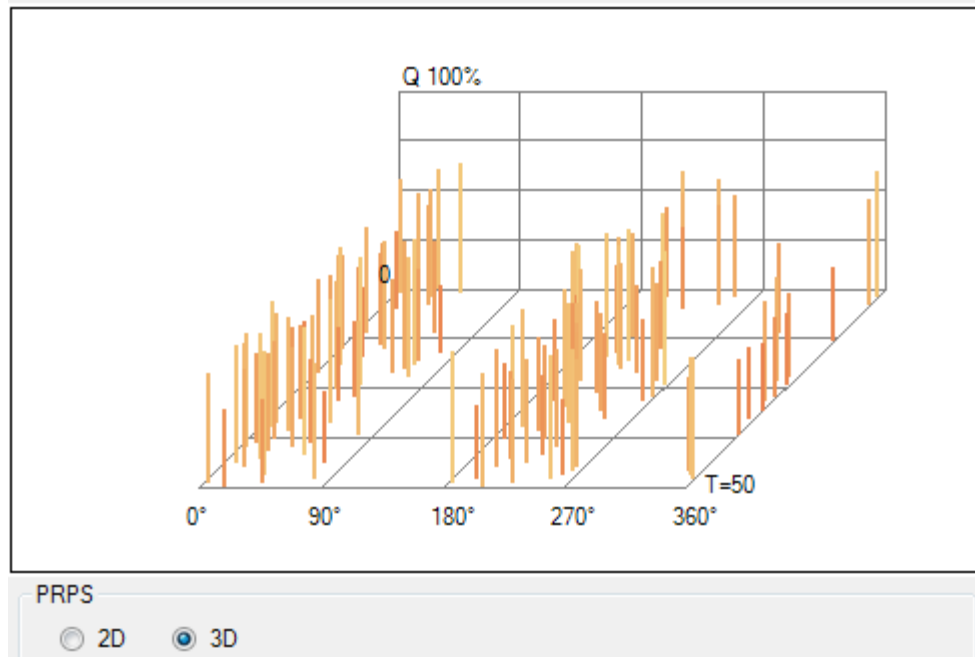


PHOTO.16 FLOATING ELECTRODE PATTERN 6

FINGER PRINT OF PARTIAL DISCHARGE

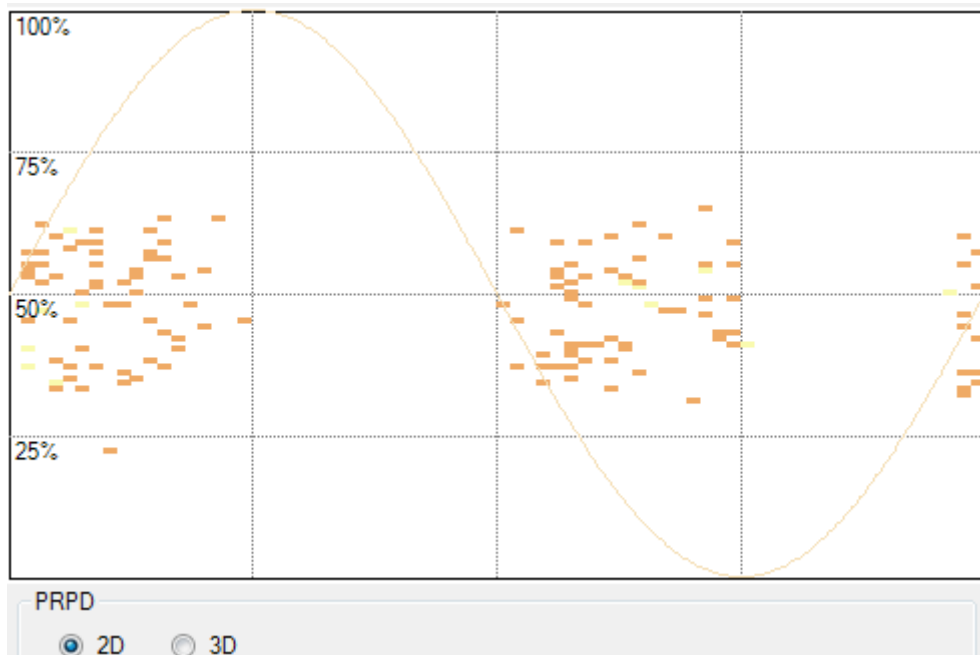
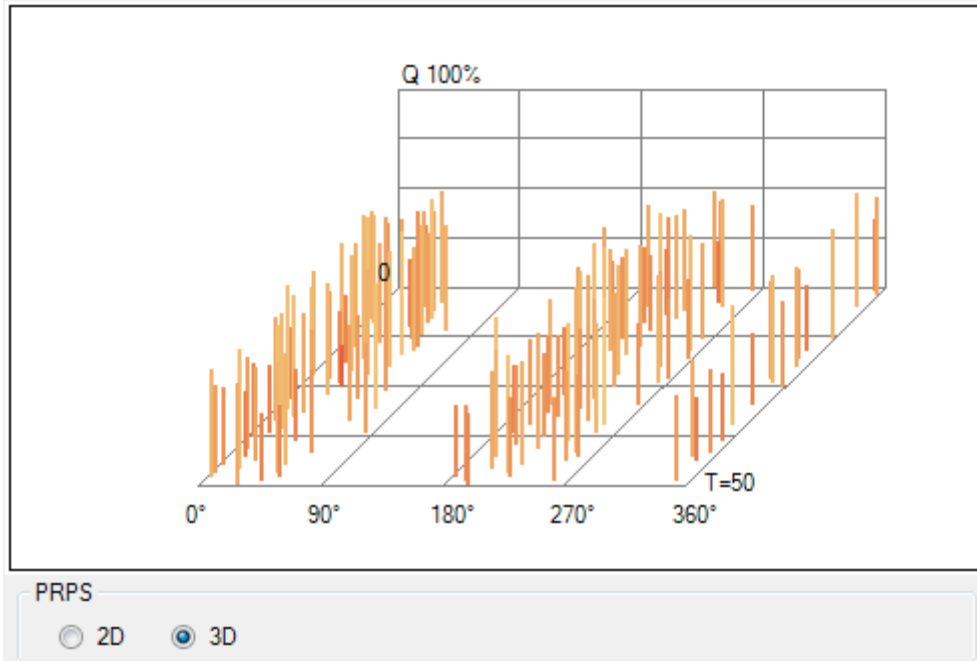


PHOTO.17 FLOATING ELECTRODE PATTERN 7

FINGER PRINT OF PARTIAL DISCHARGE

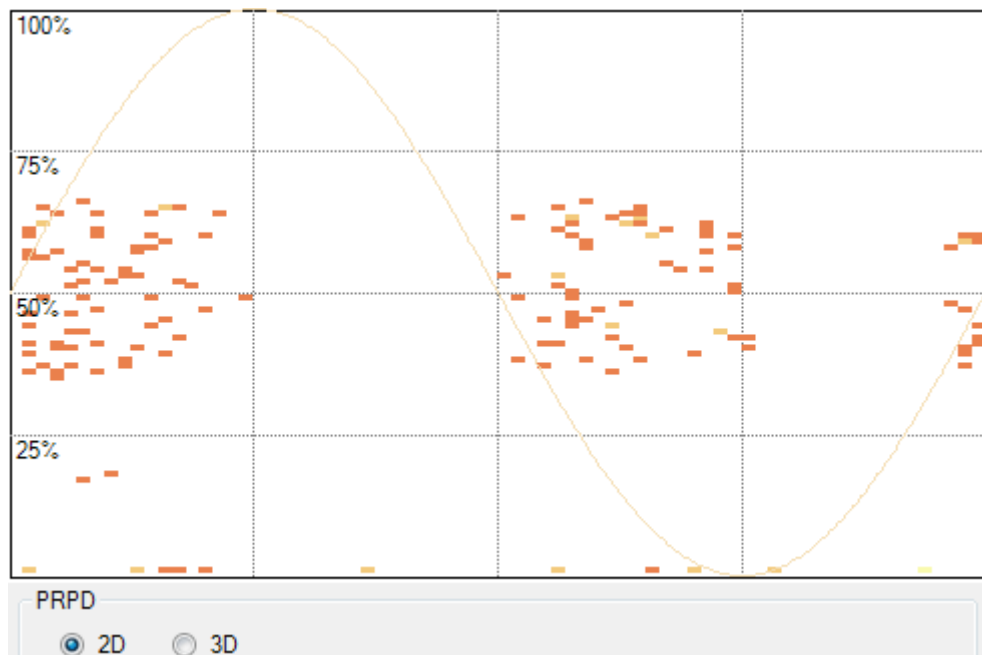
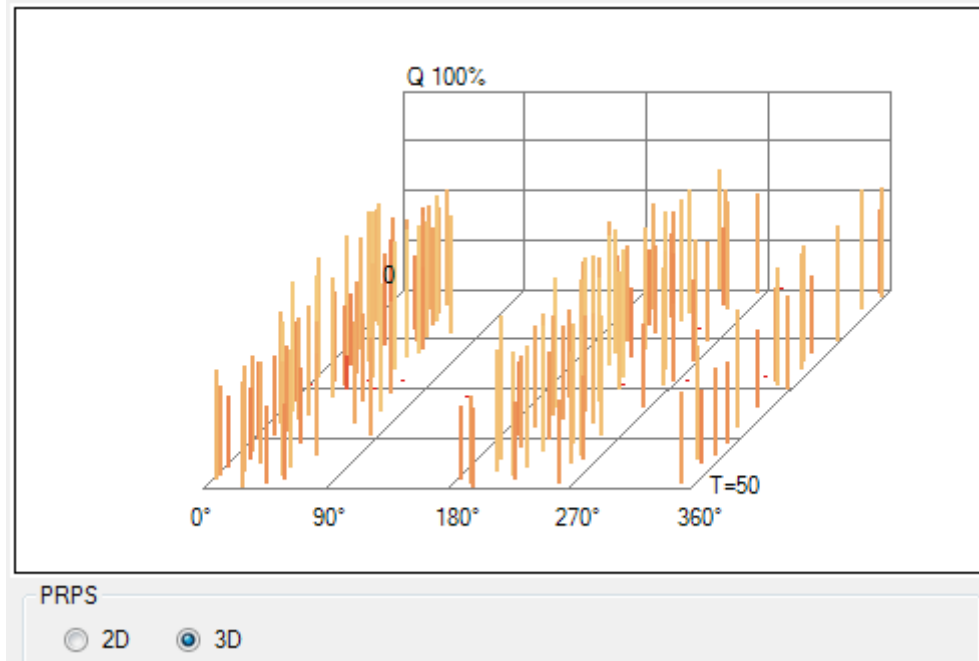


PHOTO.18 FLOATING ELECTRODE PATTERN 8

FINGER PRINT OF PARTIAL DISCHARGE

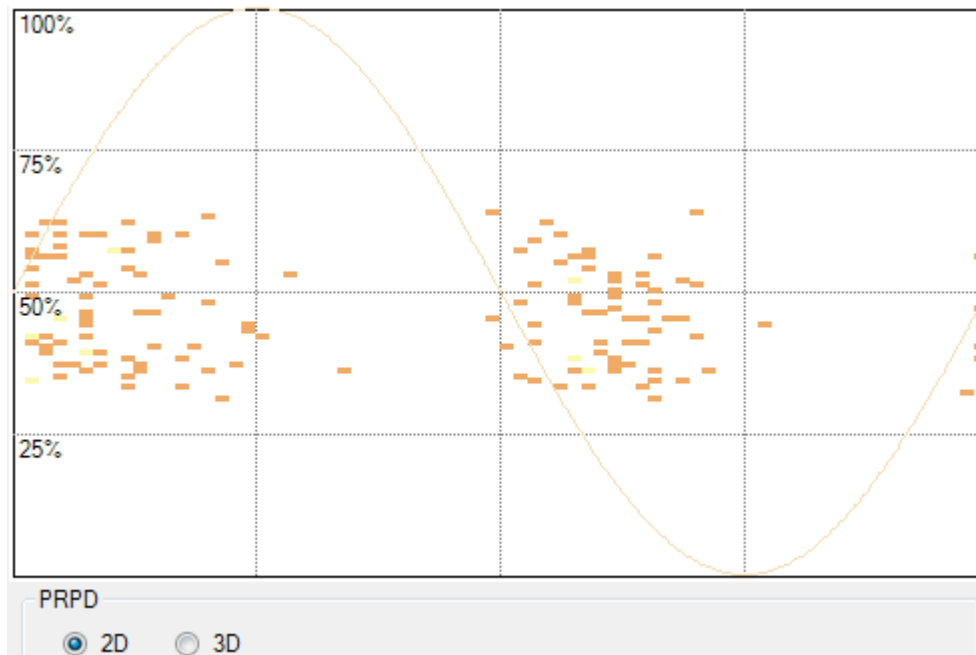
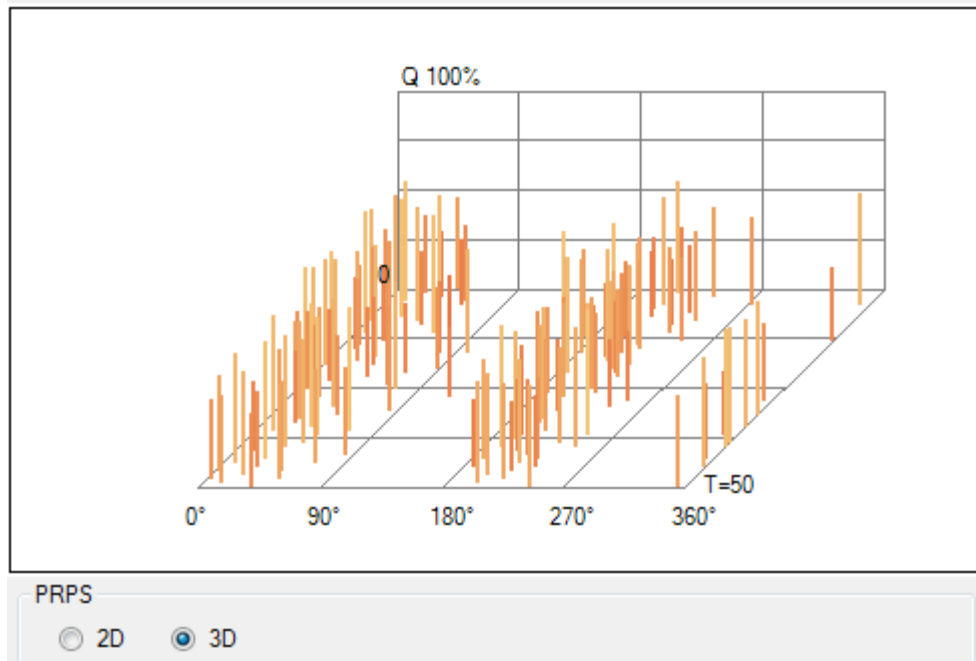


PHOTO.19 FLOATING ELECTRODE PATTERN 9

FINGER PRINT OF PARTIAL DISCHARGE

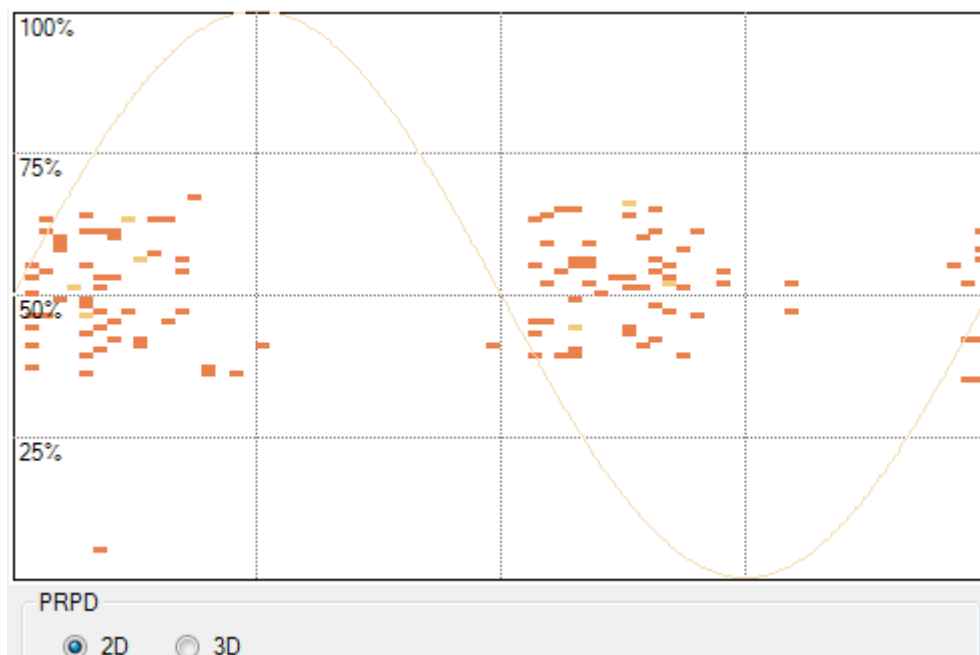
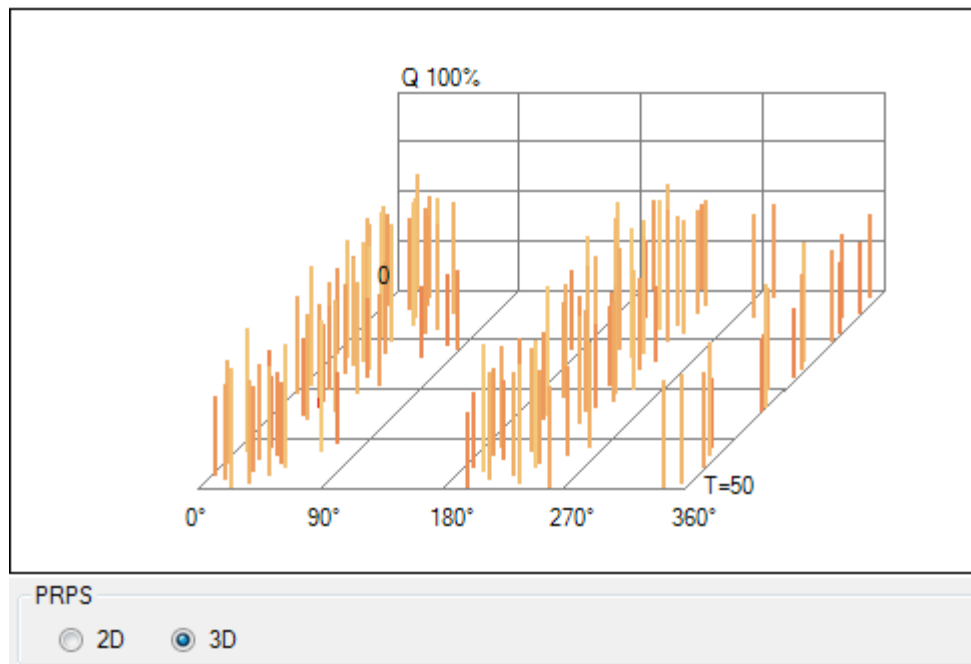


PHOTO.20 FLOATING ELECTRODE PATTERN 10

FINGER PRINT OF PARTIAL DISCHARGE

1. Finger print of particle discharge

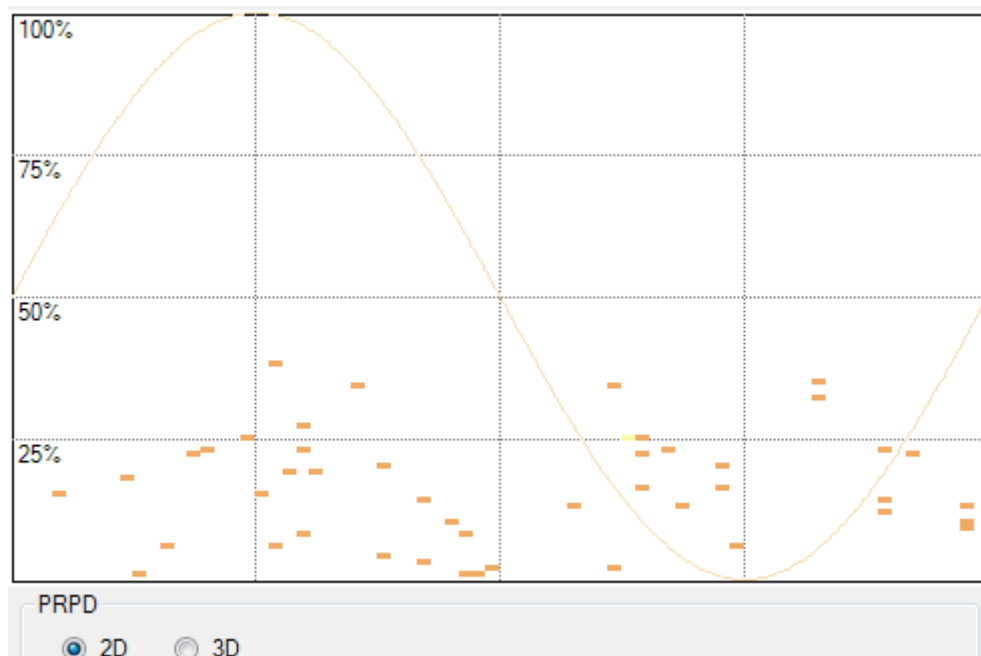
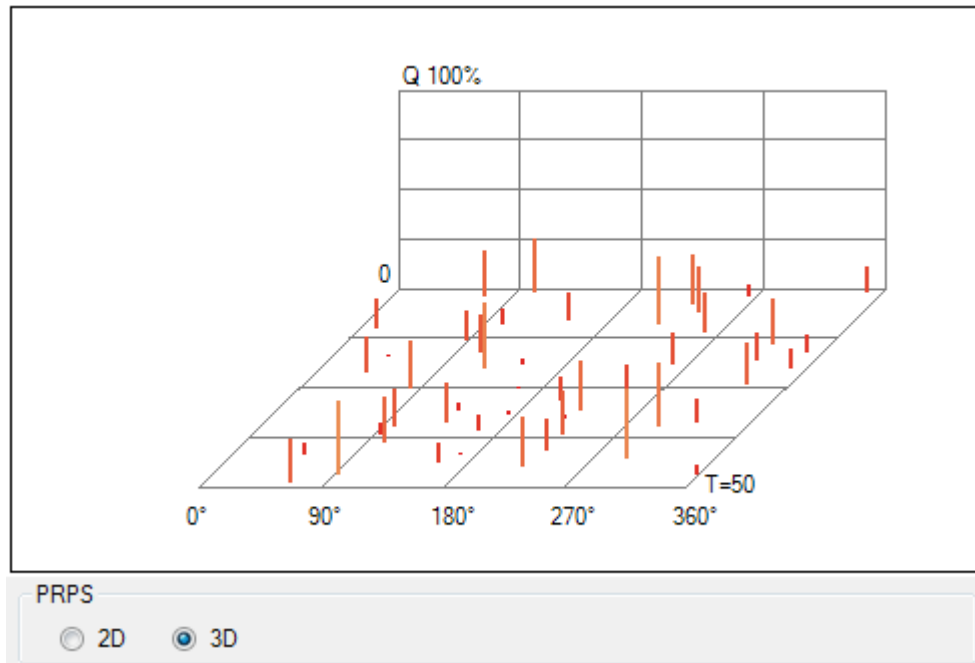


PHOTO.21 PARTICLE DISCHARGE PATTERN 1

FINGER PRINT OF PARTIAL DISCHARGE

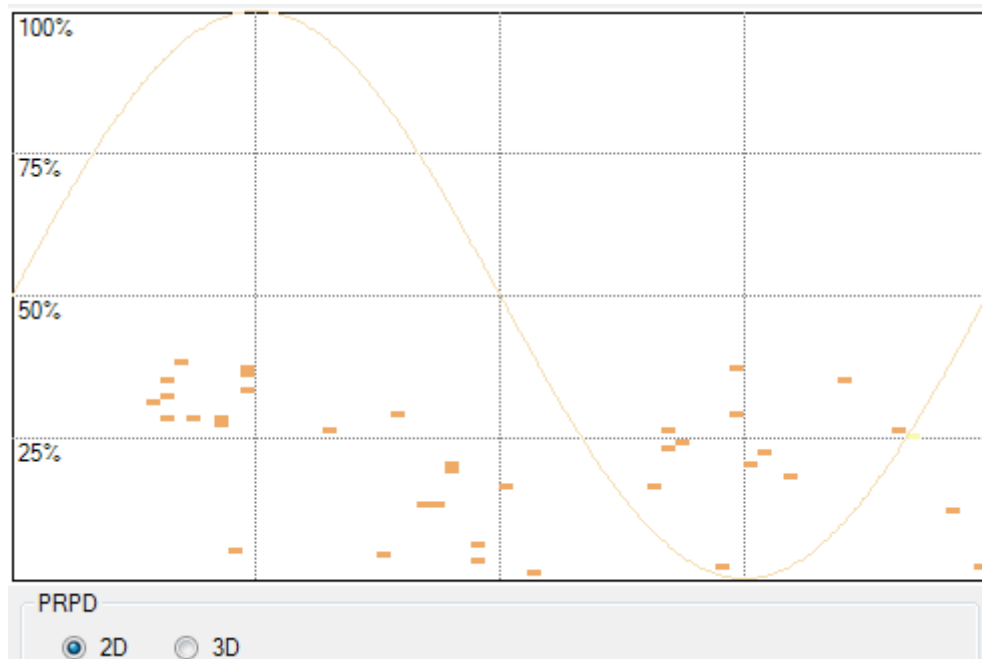
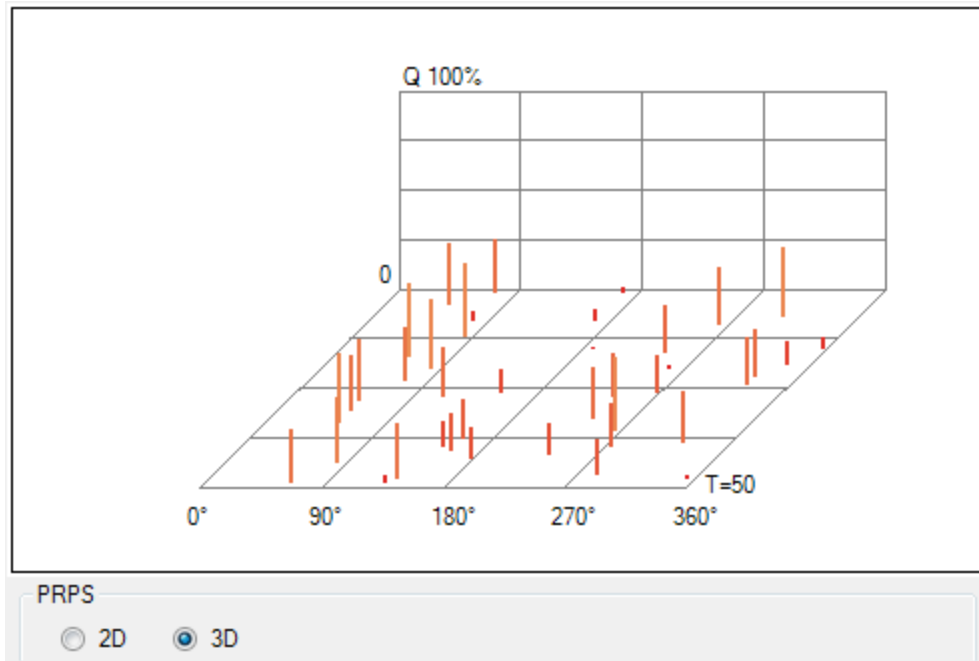


PHOTO.22 PARTICLE DISCHARGE PATTERN 2

FINGER PRINT OF PARTIAL DISCHARGE

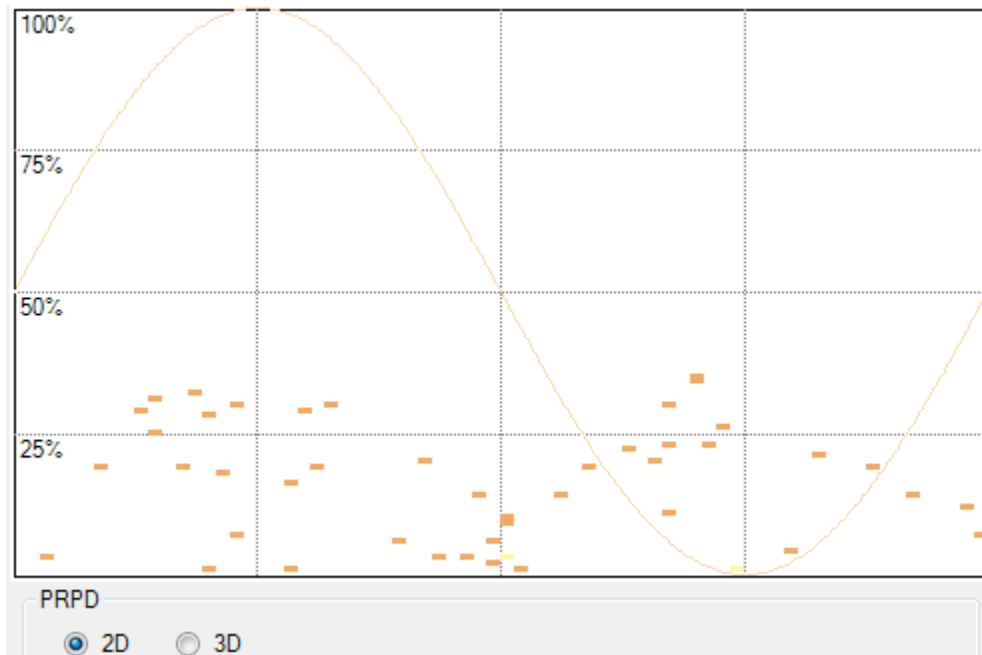
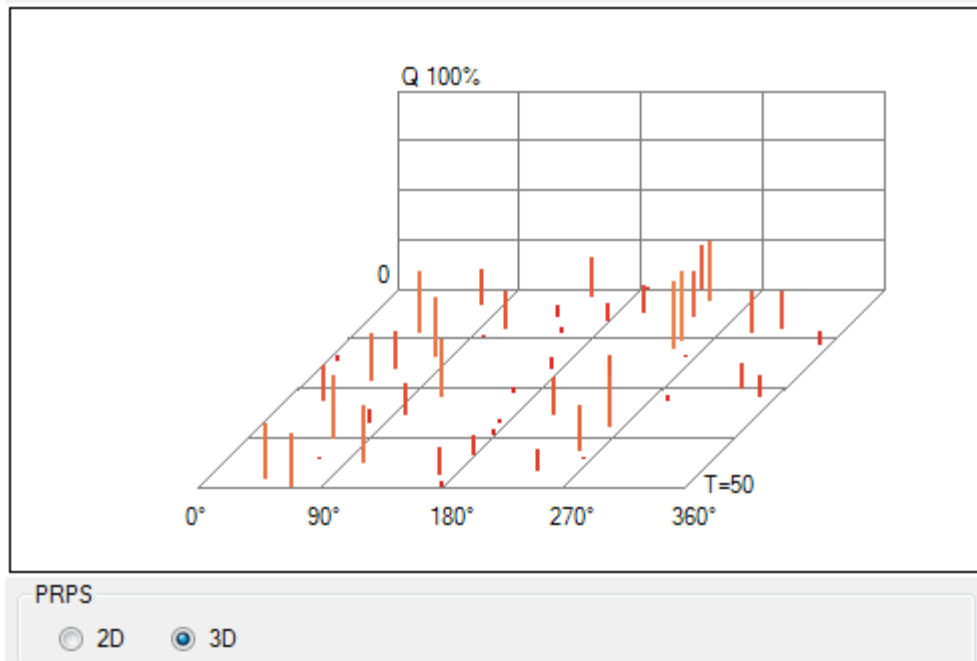


PHOTO.23 PARTICLE DISCHARGE PATTERN 3

FINGER PRINT OF PARTIAL DISCHARGE

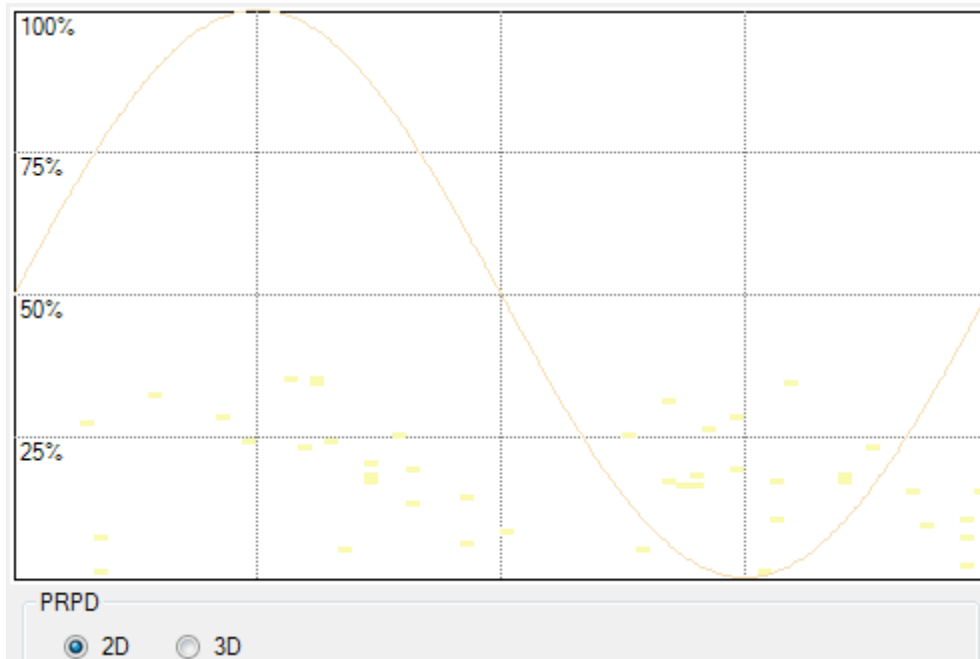
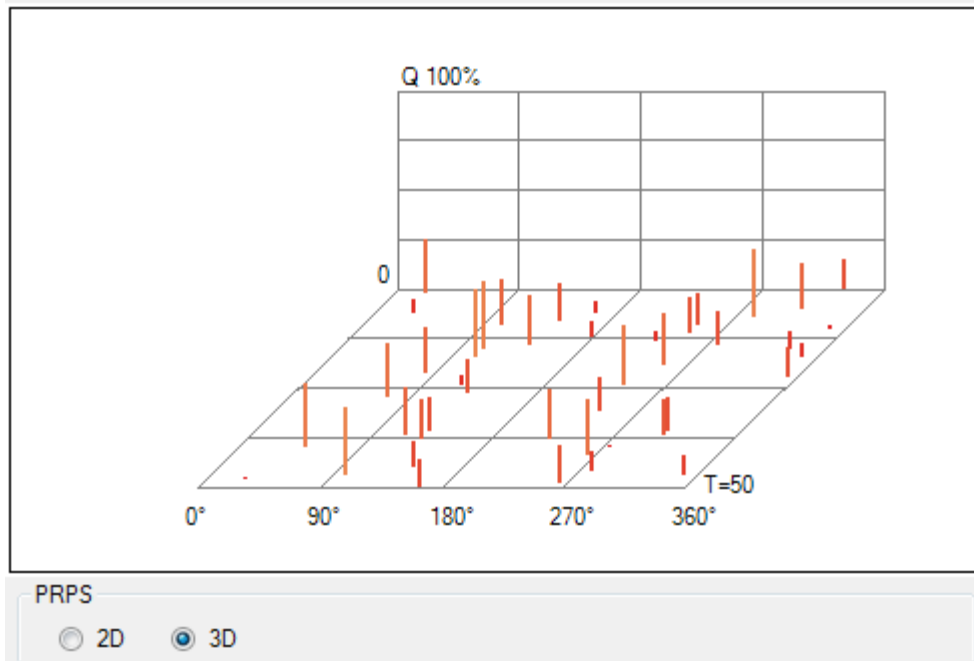


PHOTO.24 PARTICLE DISCHARGE PATTERN 4

FINGER PRINT OF PARTIAL DISCHARGE

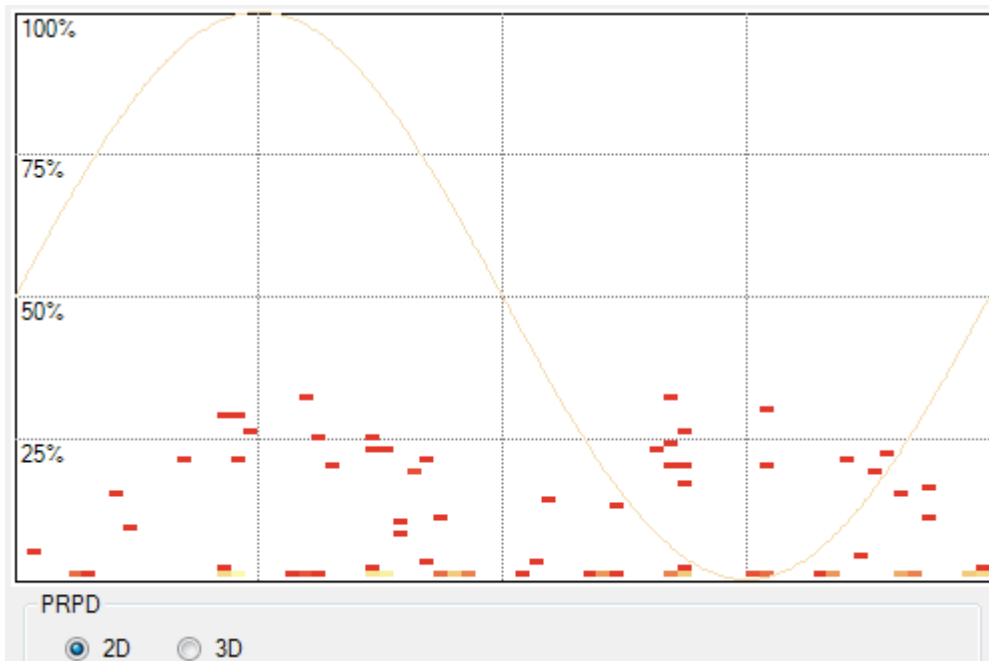
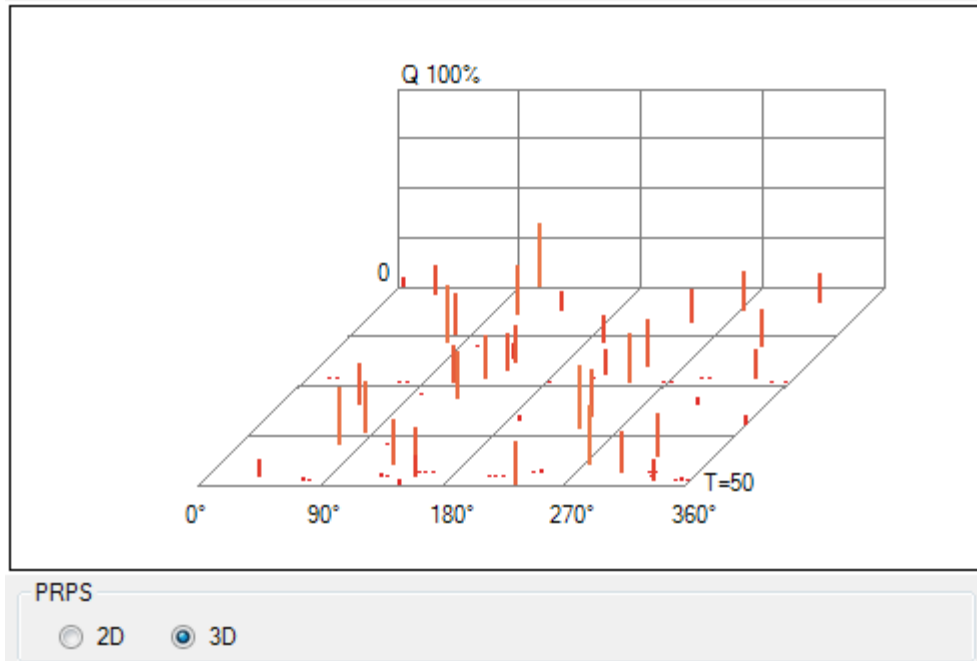


PHOTO.25 PARTICLE DISCHARGE PATTERN 5

FINGER PRINT OF PARTIAL DISCHARGE

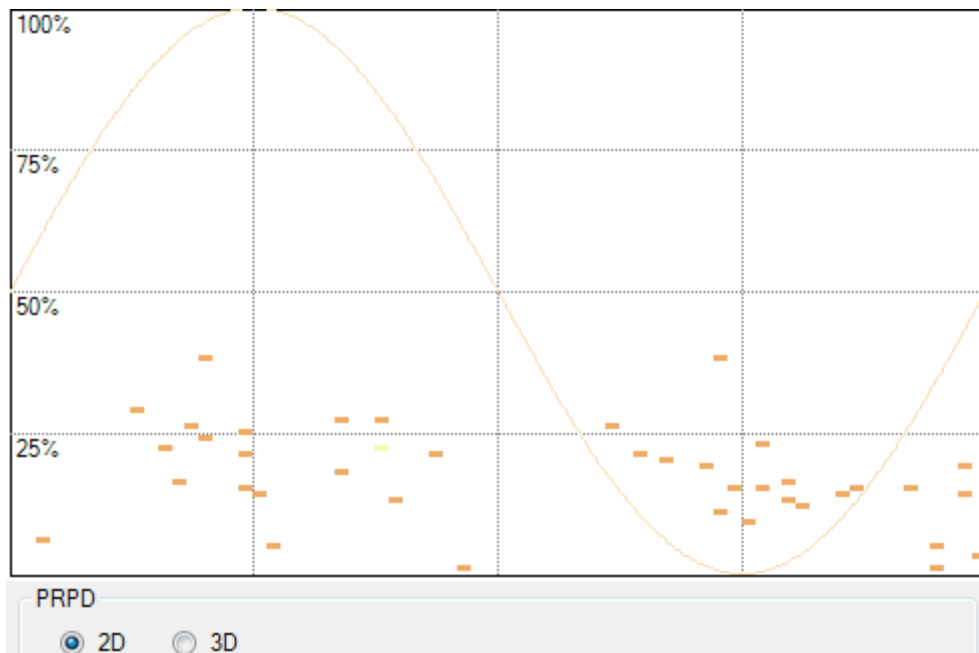
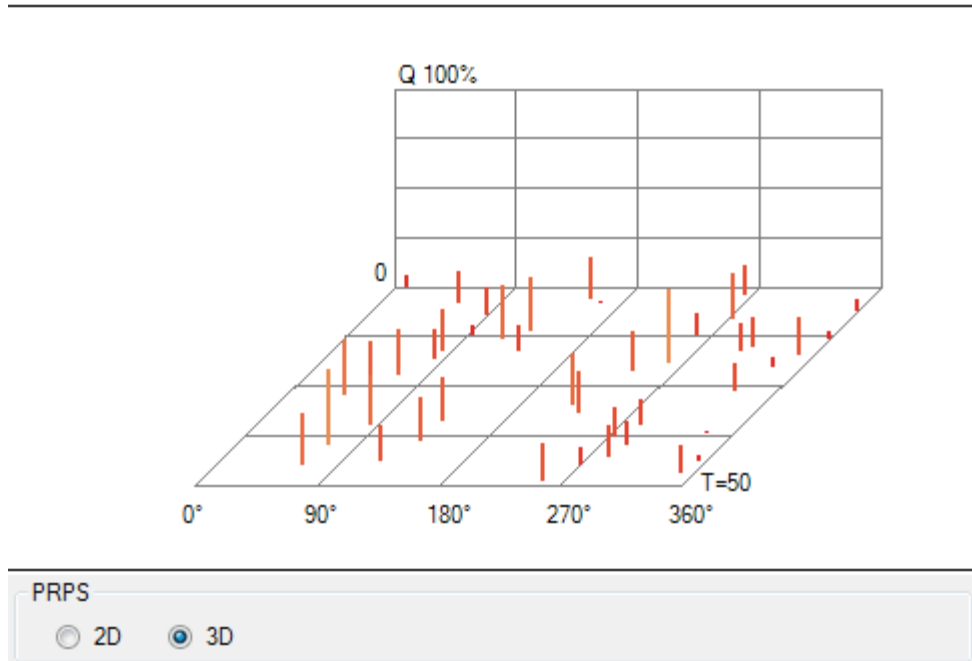


PHOTO.26 PARTICLE DISCHARGE PATTERN 6

FINGER PRINT OF PARTIAL DISCHARGE

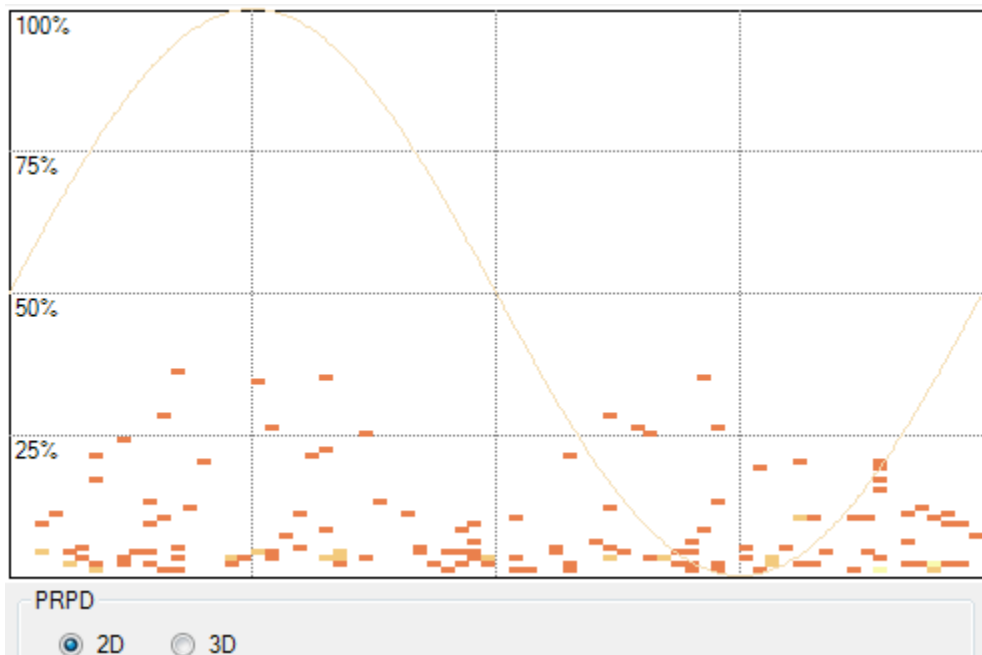
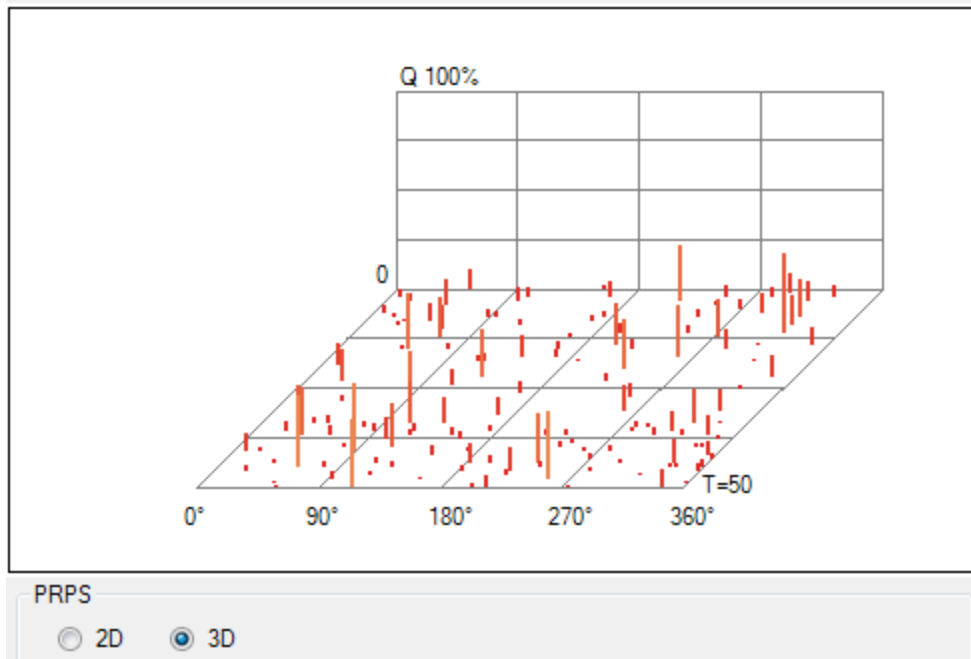


PHOTO.27 PARTICLE DISCHARGE PATTERN 7

FINGER PRINT OF PARTIAL DISCHARGE

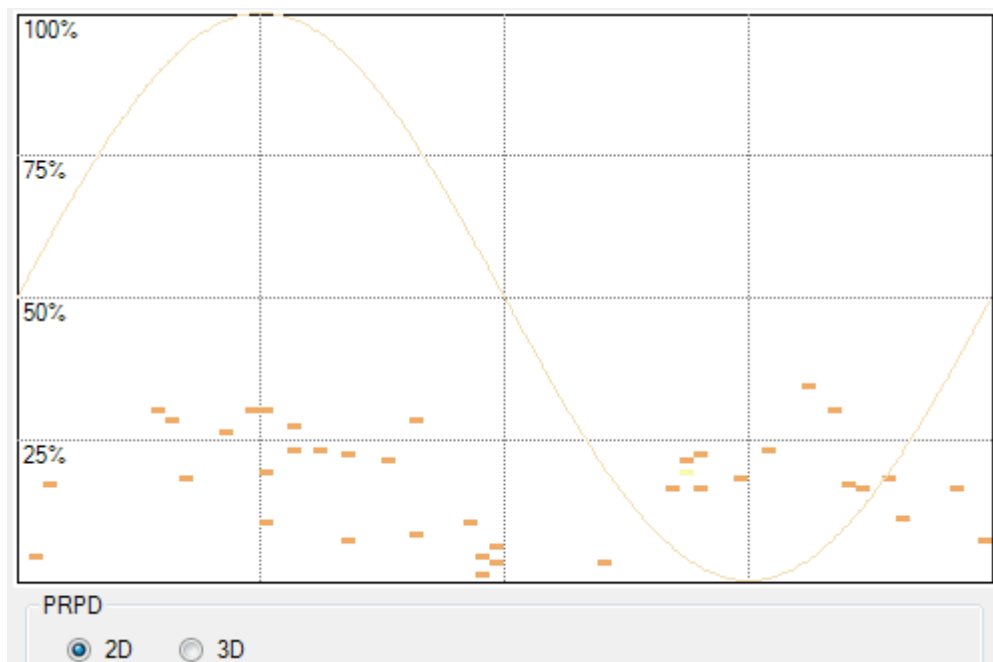
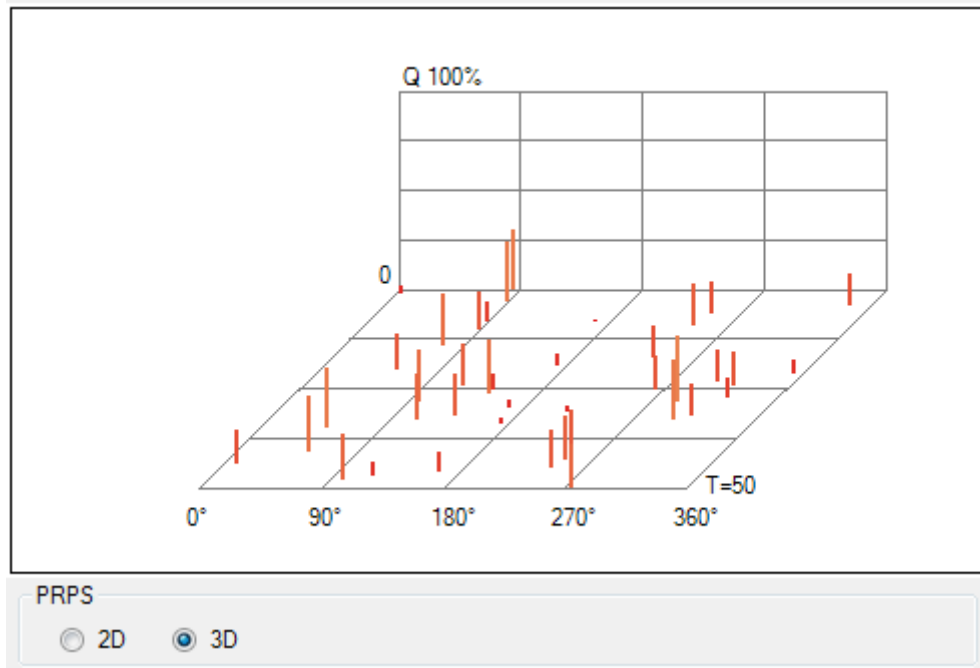


PHOTO.28 PARTICLE DISCHARGE PATTERN 8

FINGER PRINT OF PARTIAL DISCHARGE

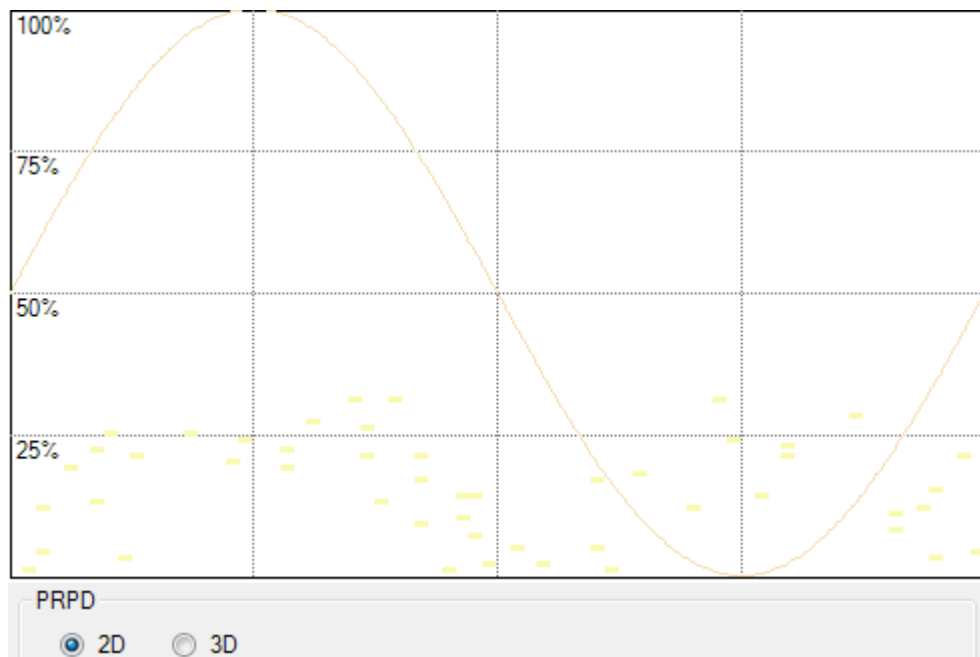
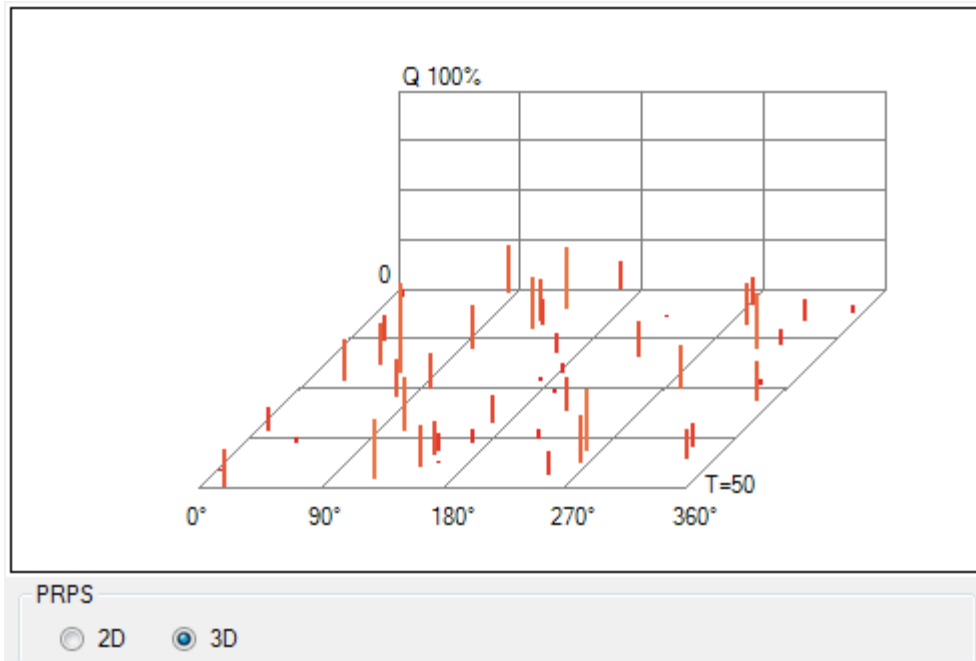


PHOTO.29 PARTICLE DISCHARGE PATTERN 9

FINGER PRINT OF PARTIAL DISCHARGE

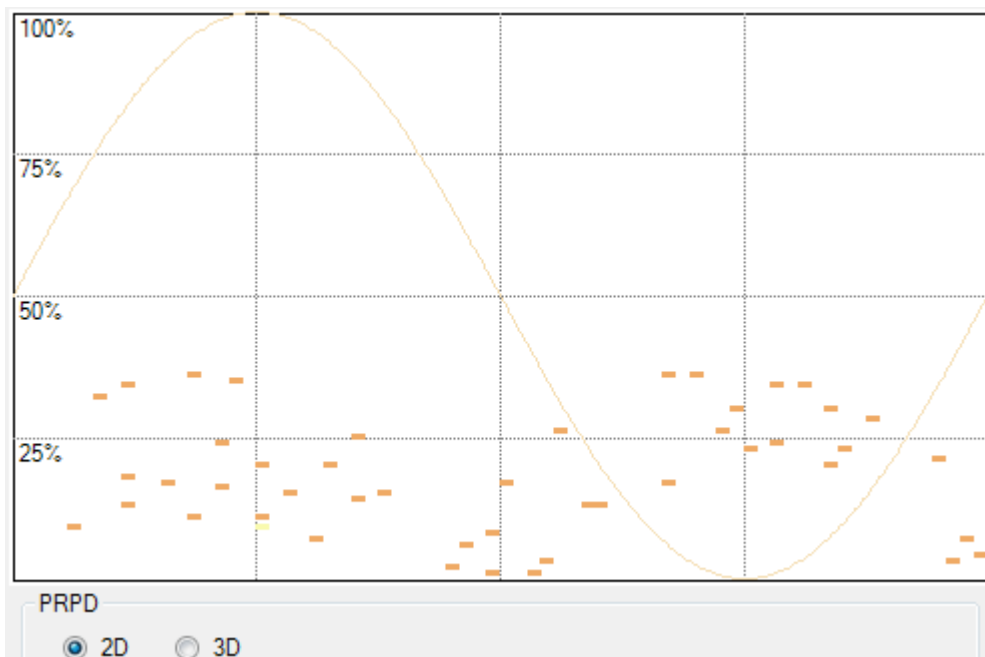
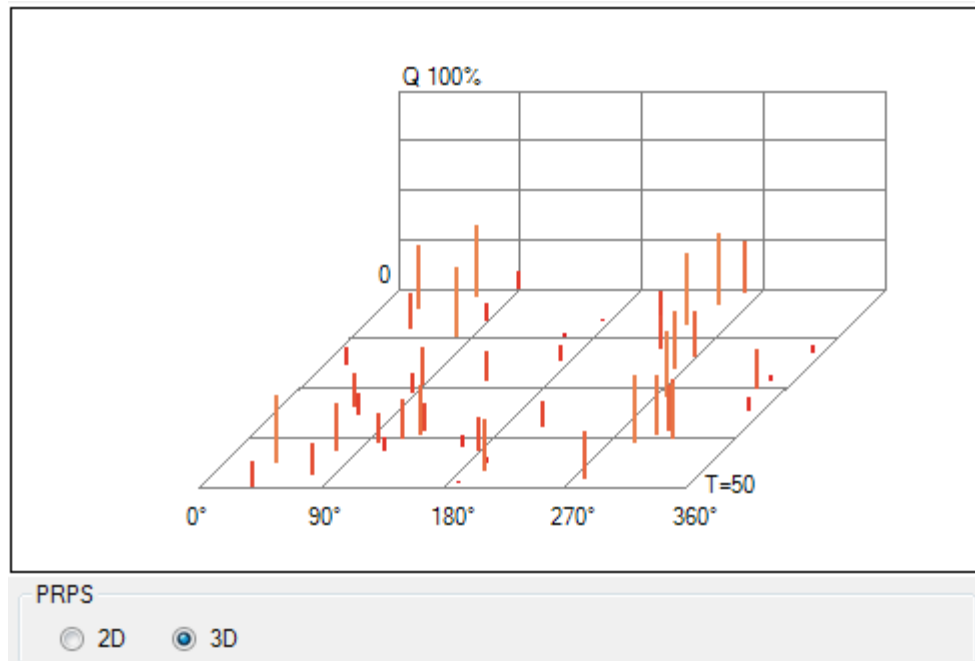


PHOTO.30 PARTICLE DISCHARGE PATTERN 10

FINGER PRINT OF PARTIAL DISCHARGE

2. Finger print of surface discharge

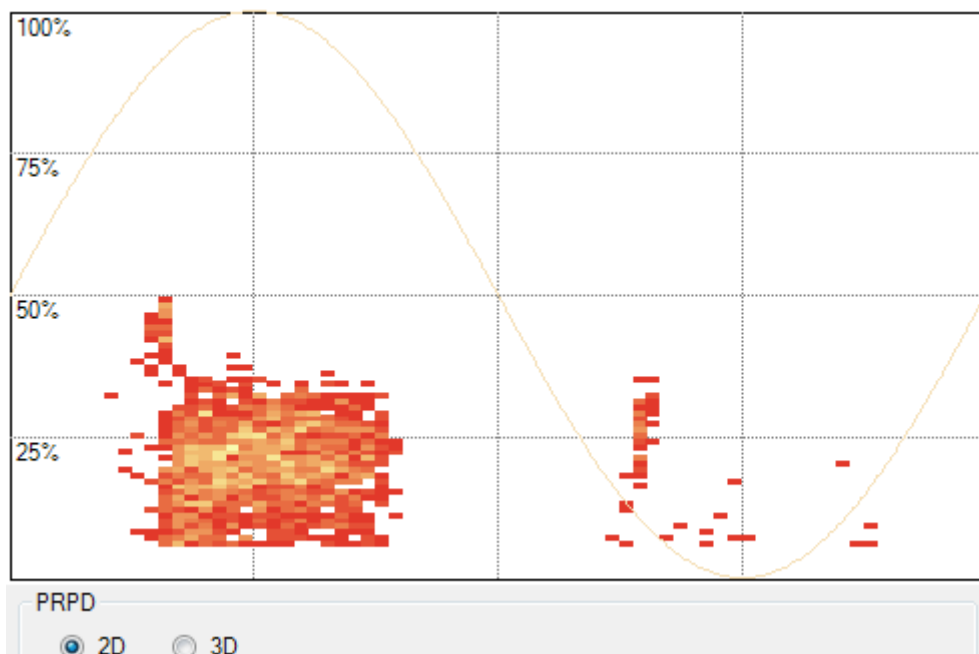
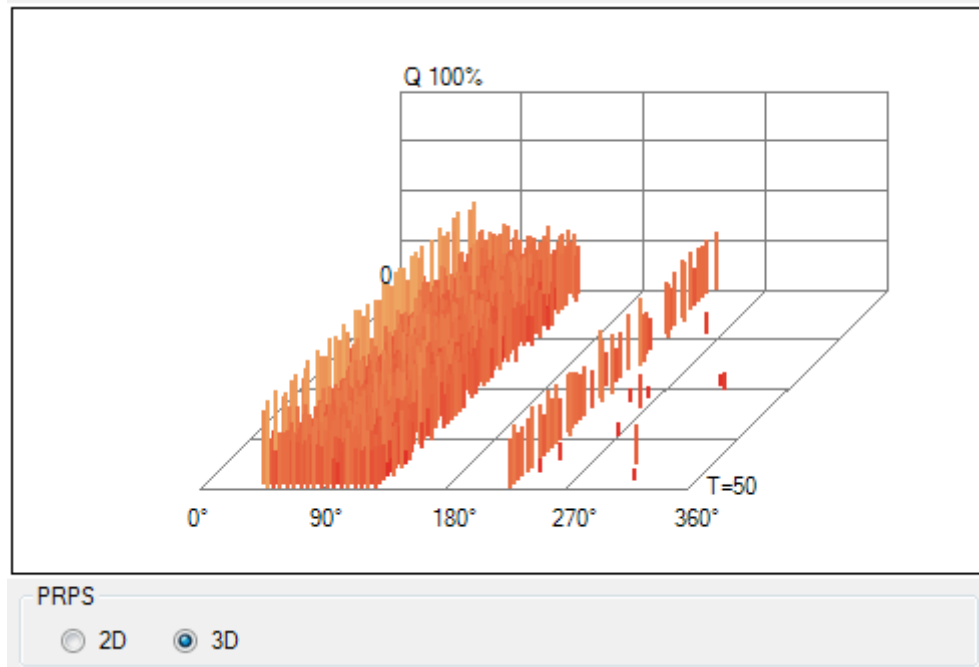


PHOTO.31 SURFACE DISCHARGE PATTERN 1

FINGER PRINT OF PARTIAL DISCHARGE

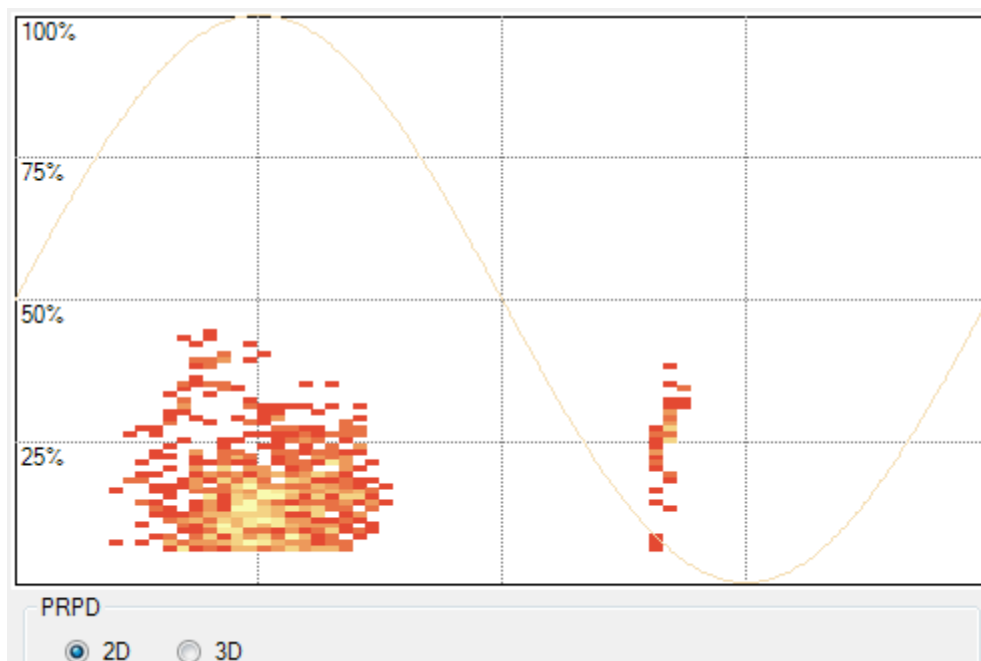
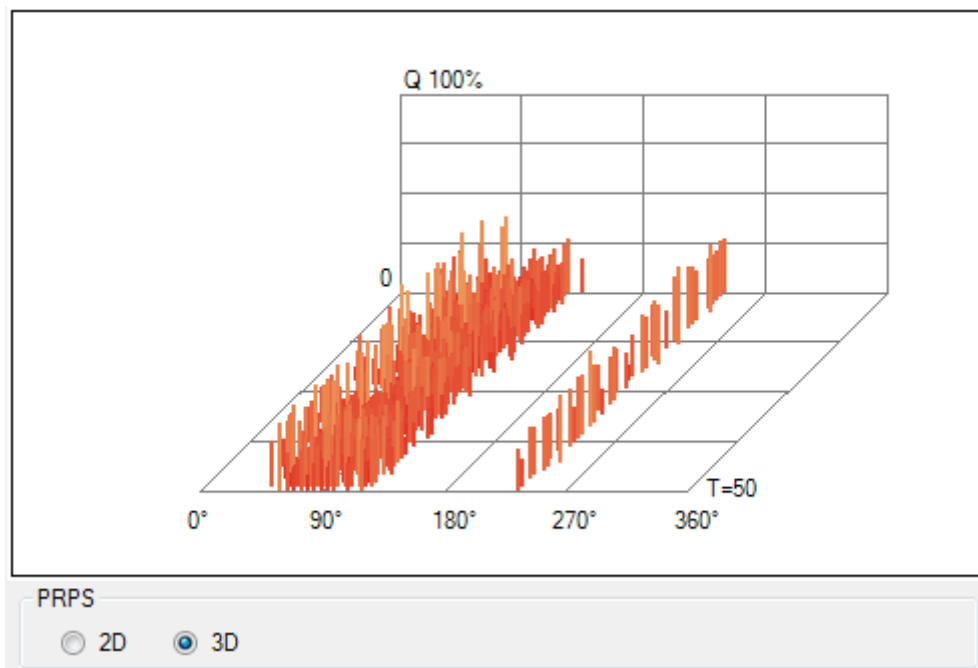


PHOTO.32 SURFACE DISCHARGE PATTERN 2

FINGER PRINT OF PARTIAL DISCHARGE

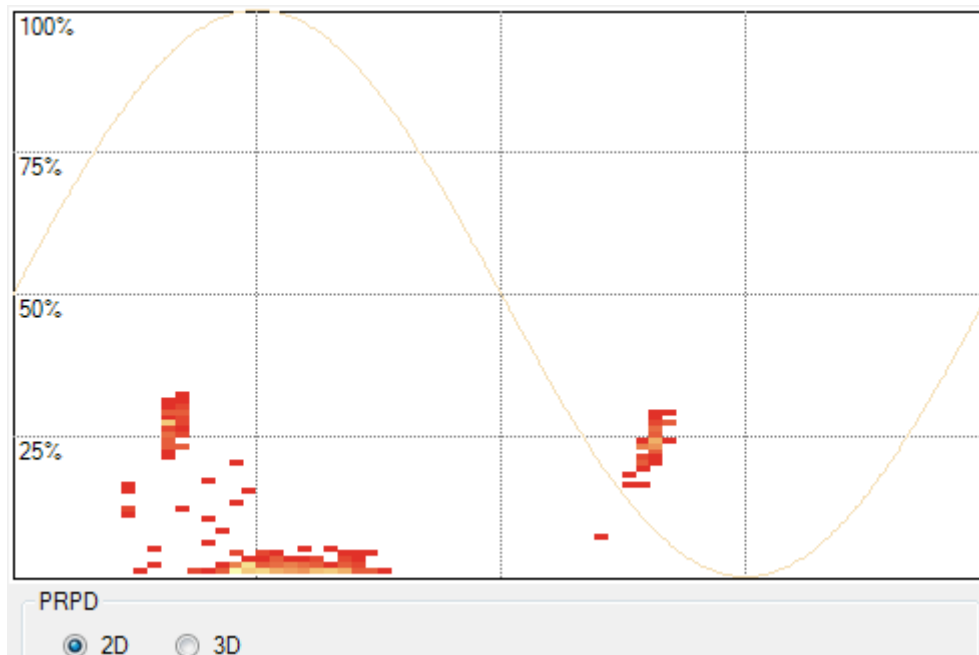
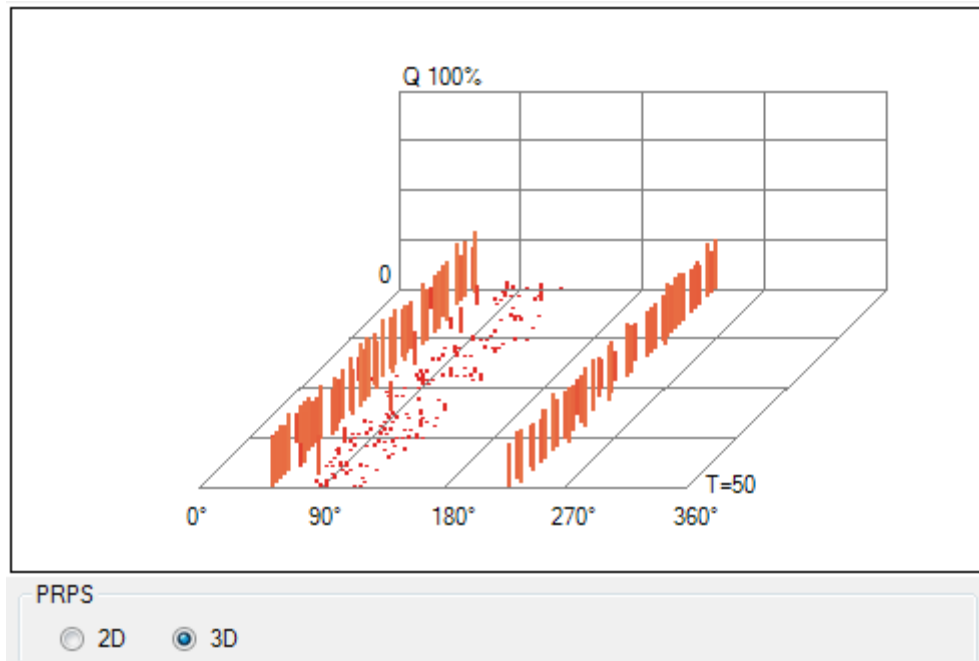


PHOTO.33 SURFACE DISCHARGE PATTERN 3

FINGER PRINT OF PARTIAL DISCHARGE

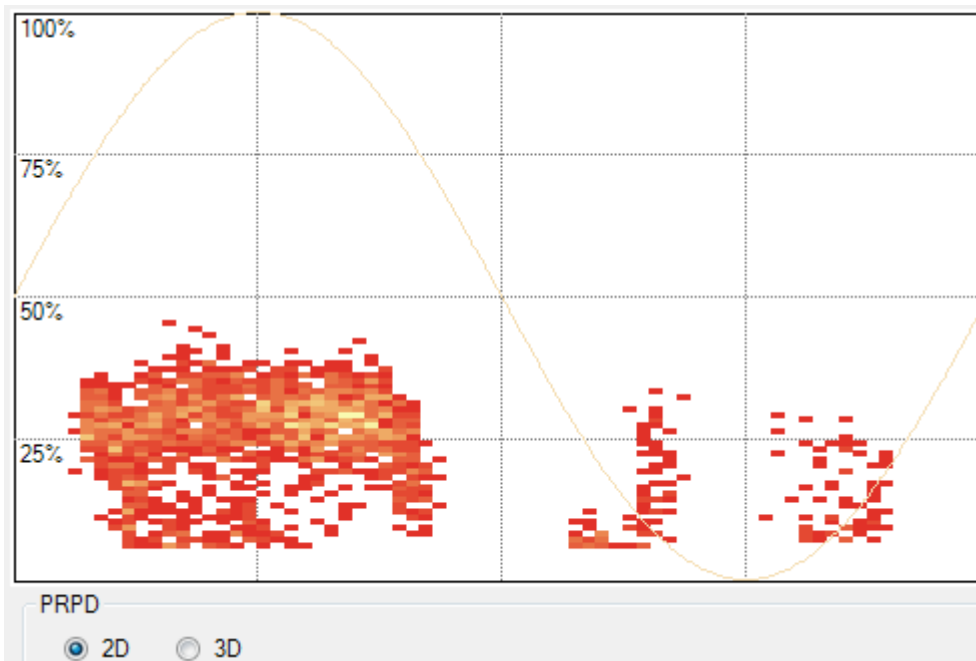
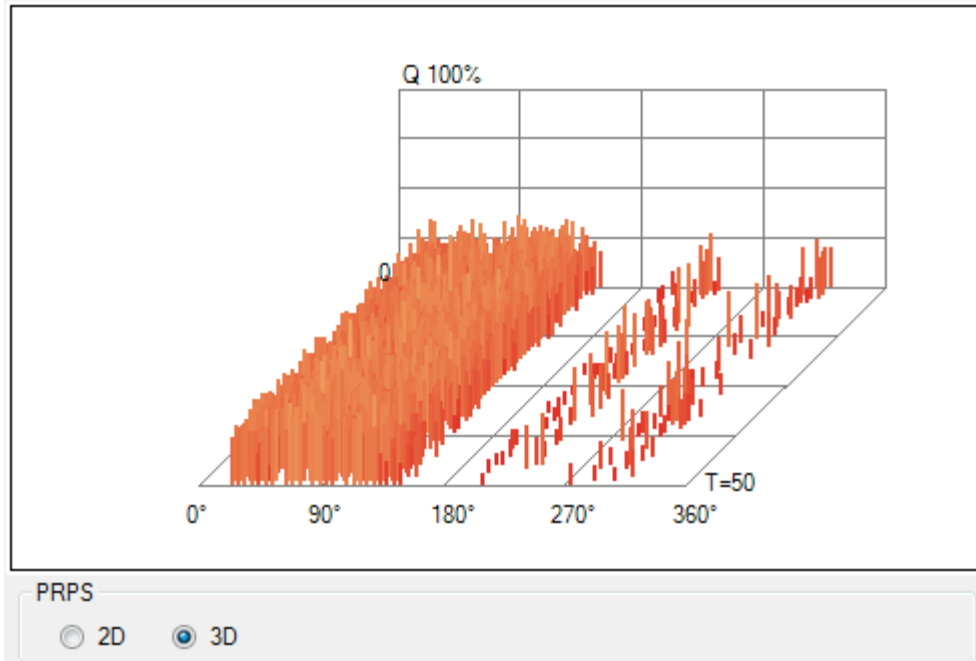


PHOTO.34 SURFACE DISCHARGE PATTERN 4

FINGER PRINT OF PARTIAL DISCHARGE

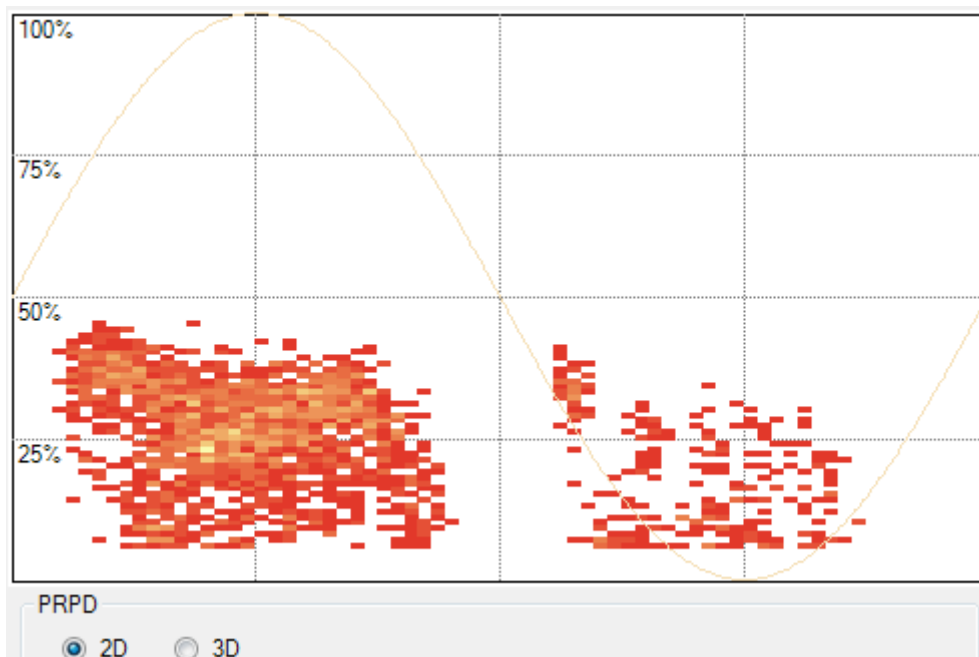
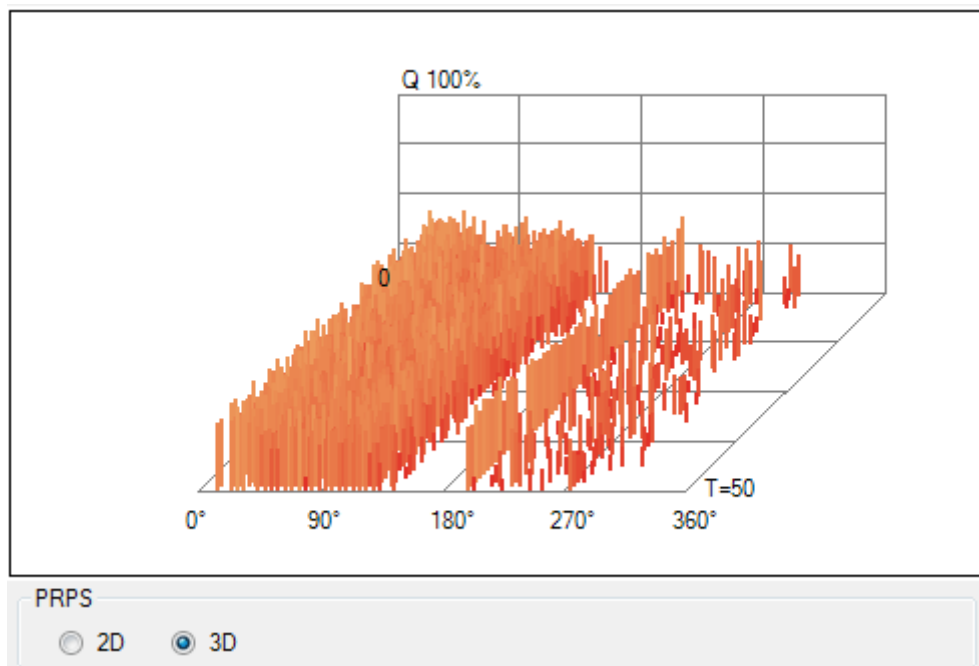


PHOTO.35 SURFACE DISCHARGE PATTERN 5

FINGER PRINT OF PARTIAL DISCHARGE

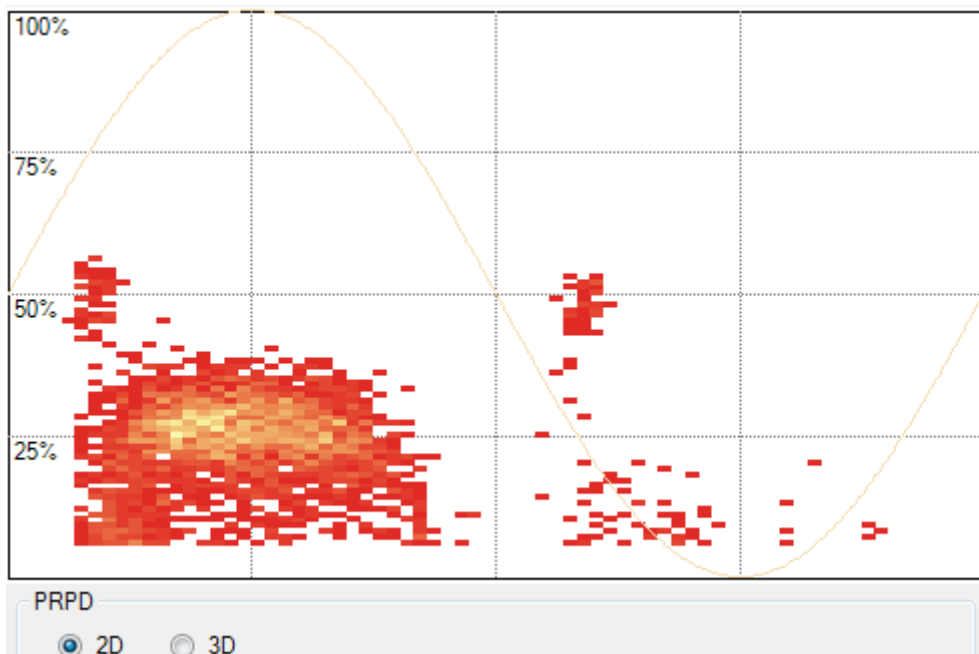
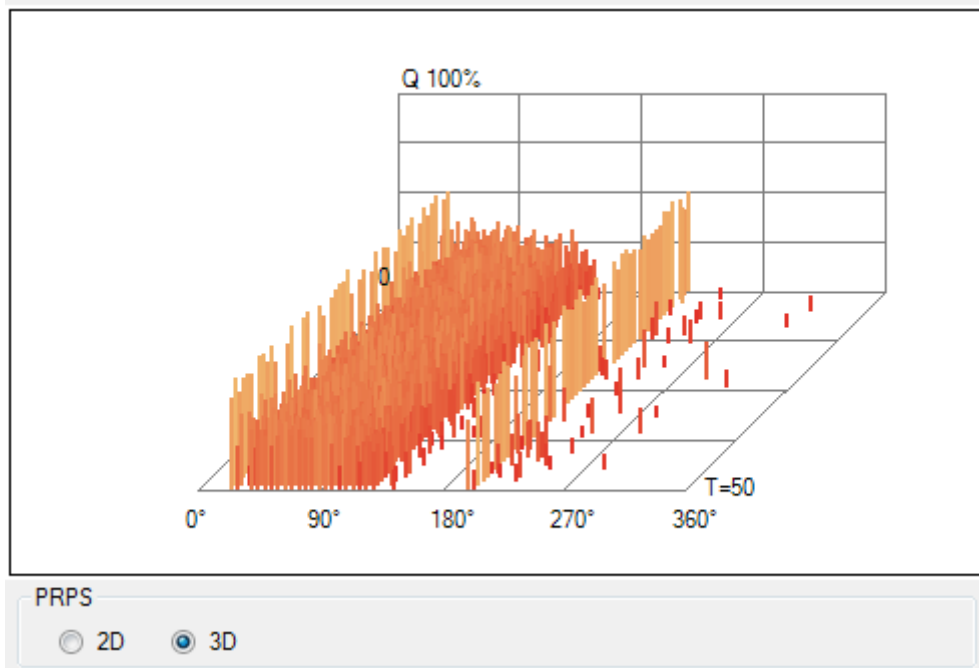


PHOTO.36 SURFACE DISCHARGE PATTERN 6

FINGER PRINT OF PARTIAL DISCHARGE

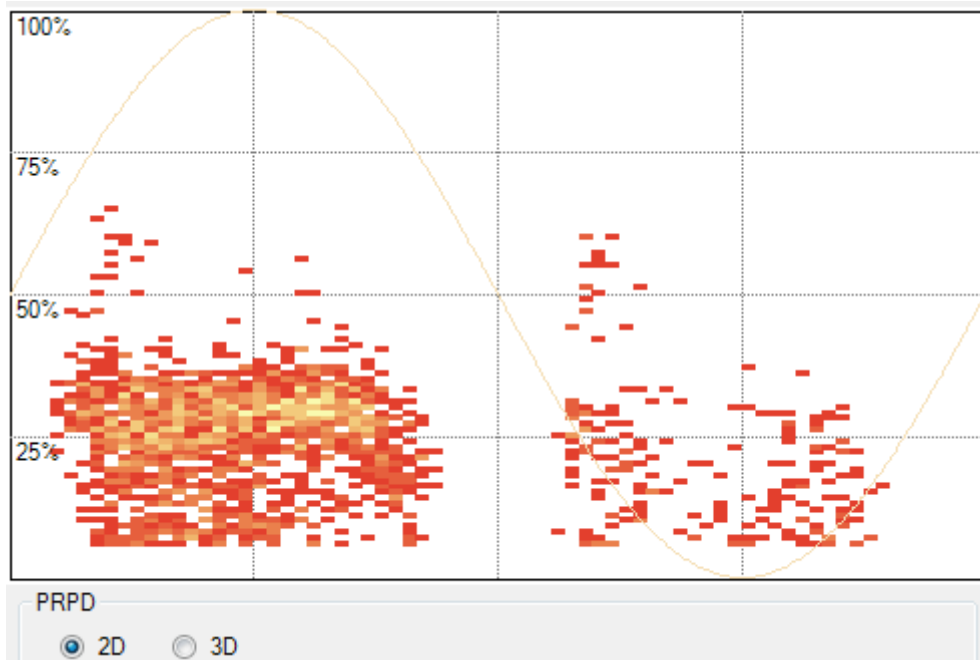
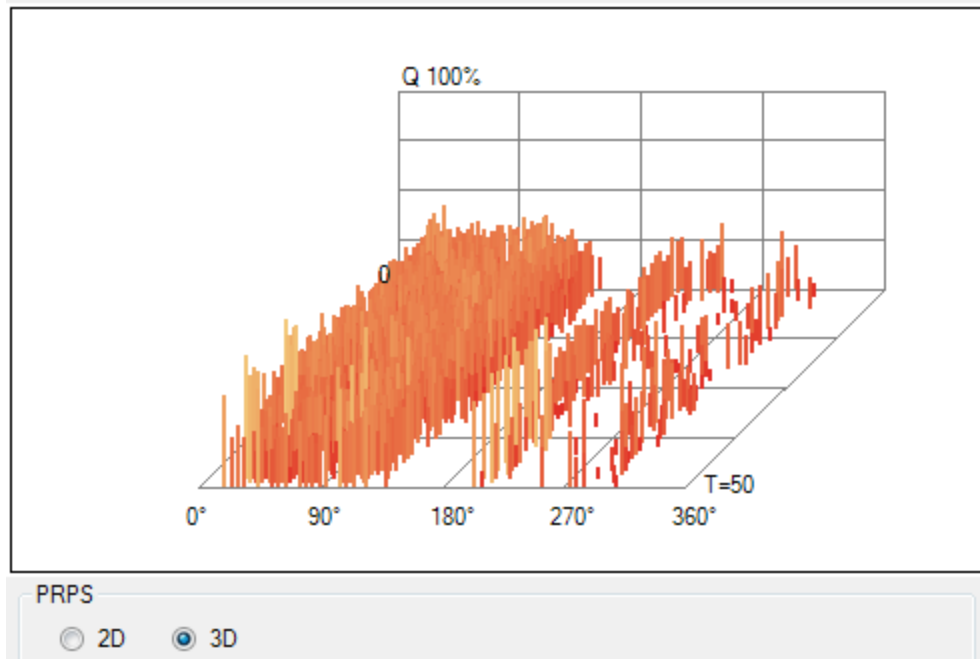


PHOTO.37 SURFACE DISCHARGE PATTERN 7

FINGER PRINT OF PARTIAL DISCHARGE

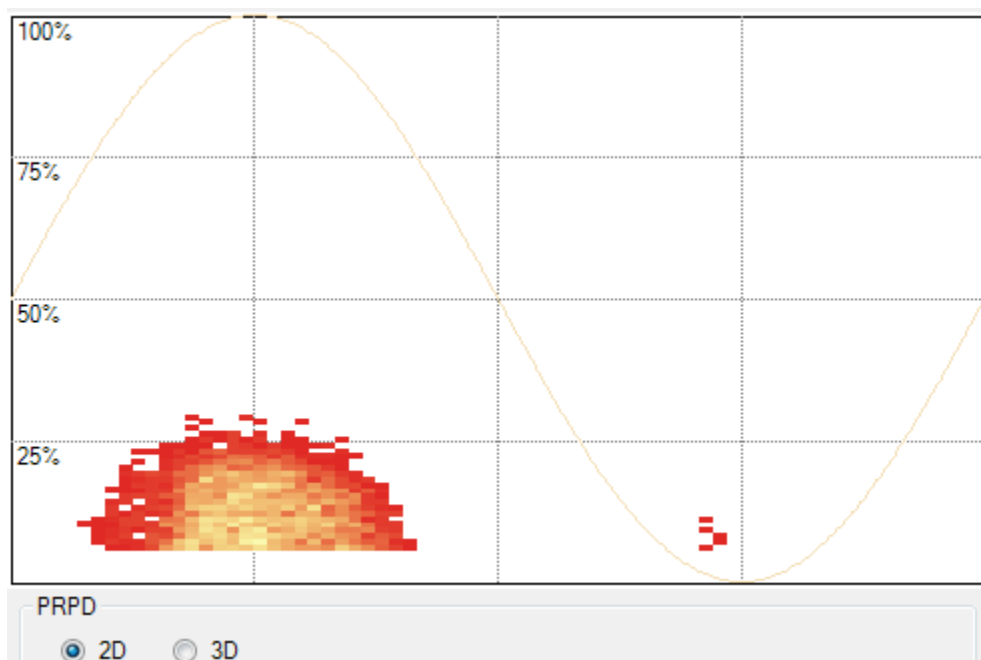
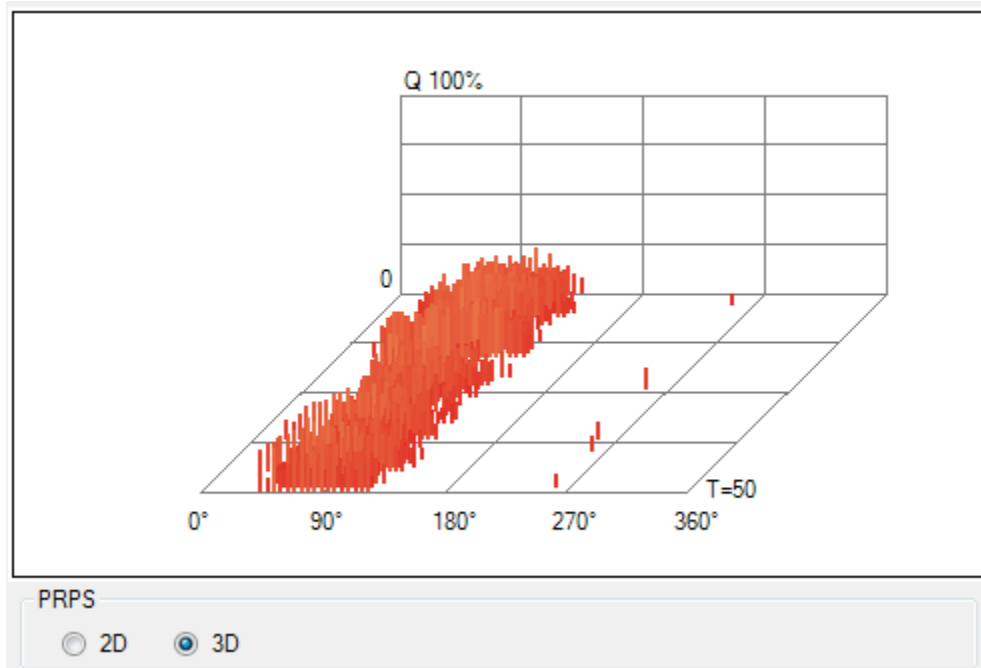


PHOTO.38 SURFACE DISCHARGE PATTERN 8

FINGER PRINT OF PARTIAL DISCHARGE

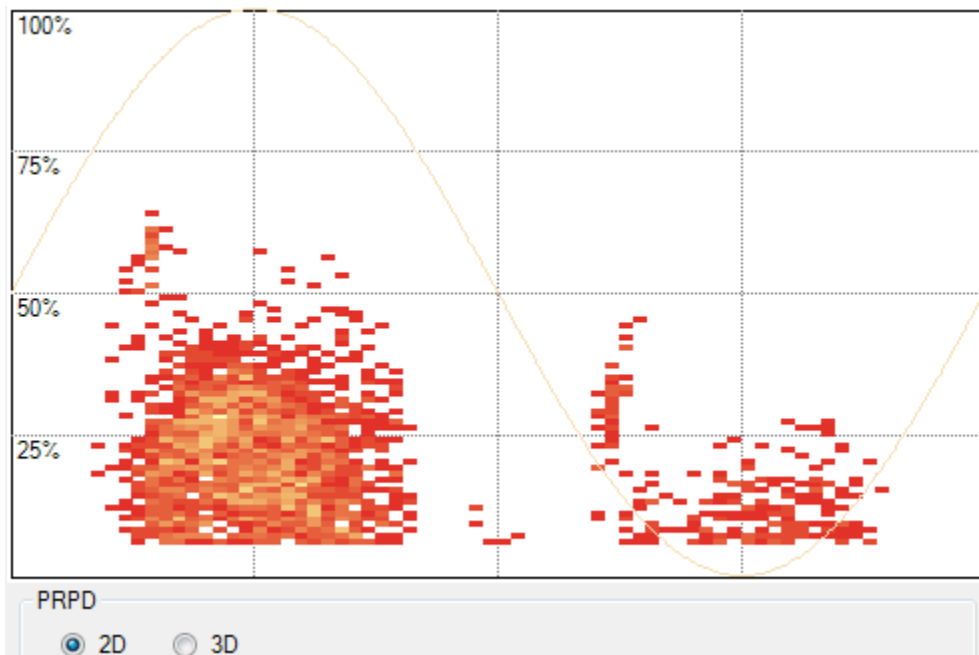
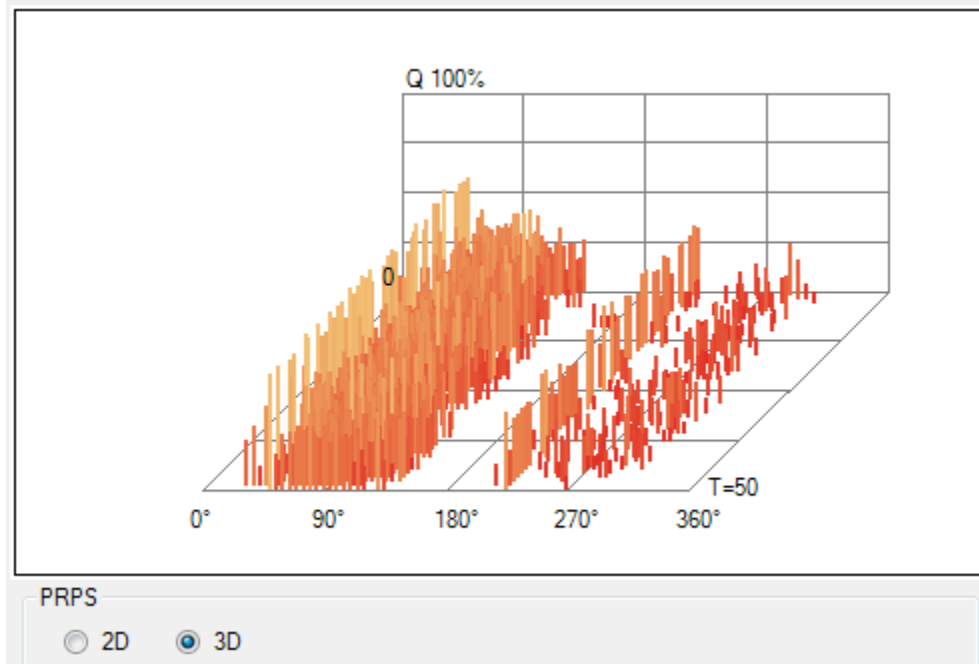


PHOTO.39 SURFACE DISCHARGE PATTERN 9

FINGER PRINT OF PARTIAL DISCHARGE

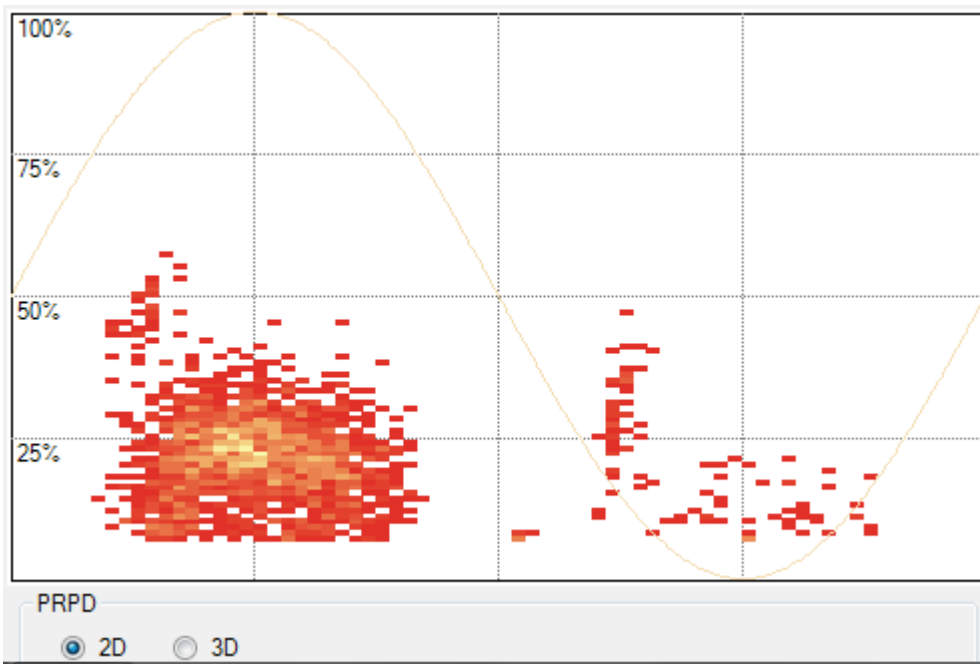
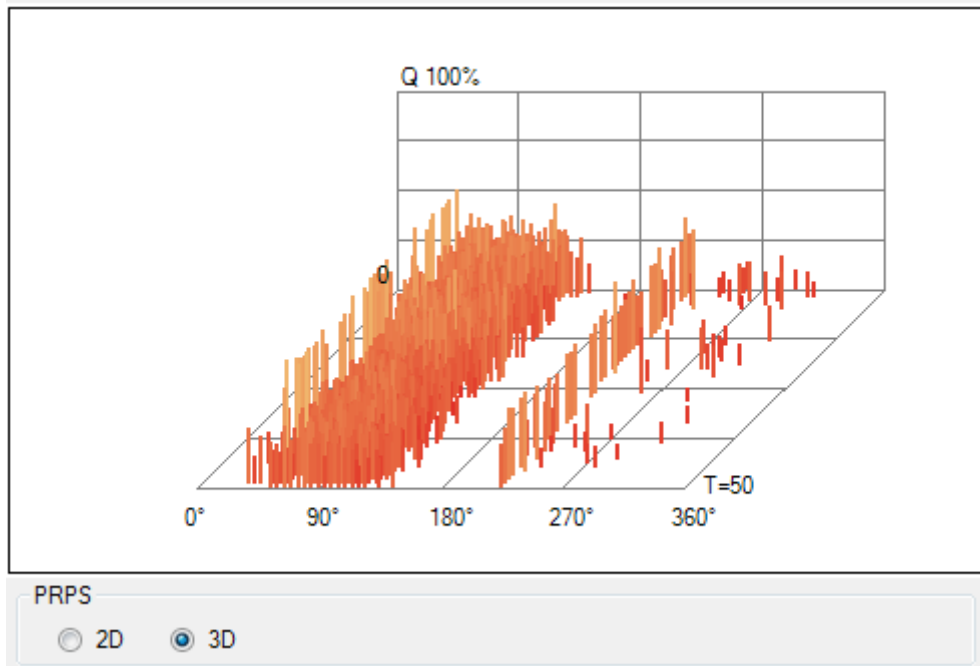


PHOTO.40 SURFACE DISCHARGE PATTERN 10

FINGER PRINT OF PARTIAL DISCHARGE

3. Finger print of internal discharge

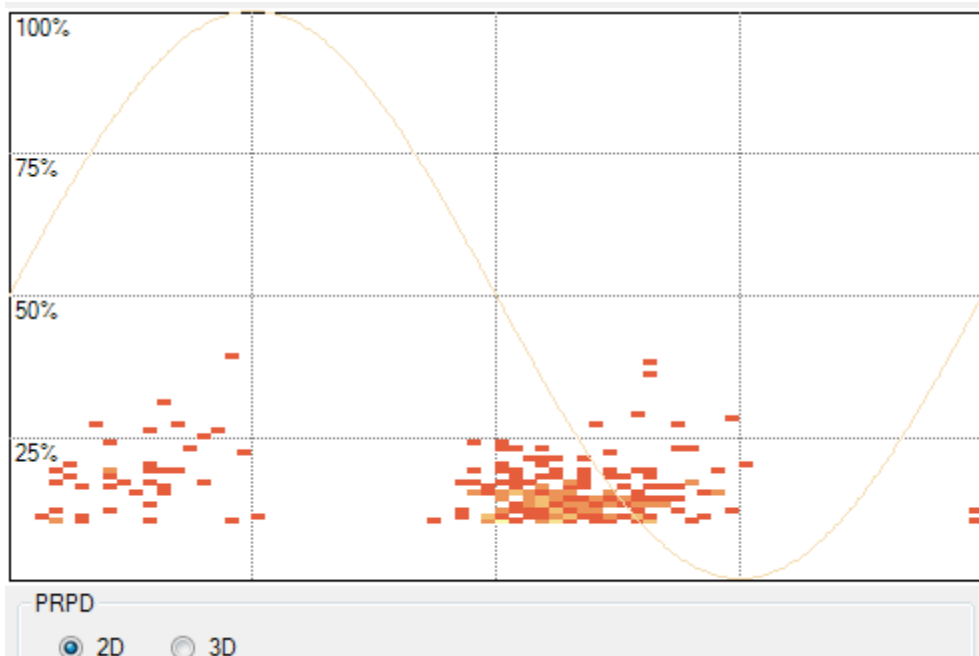
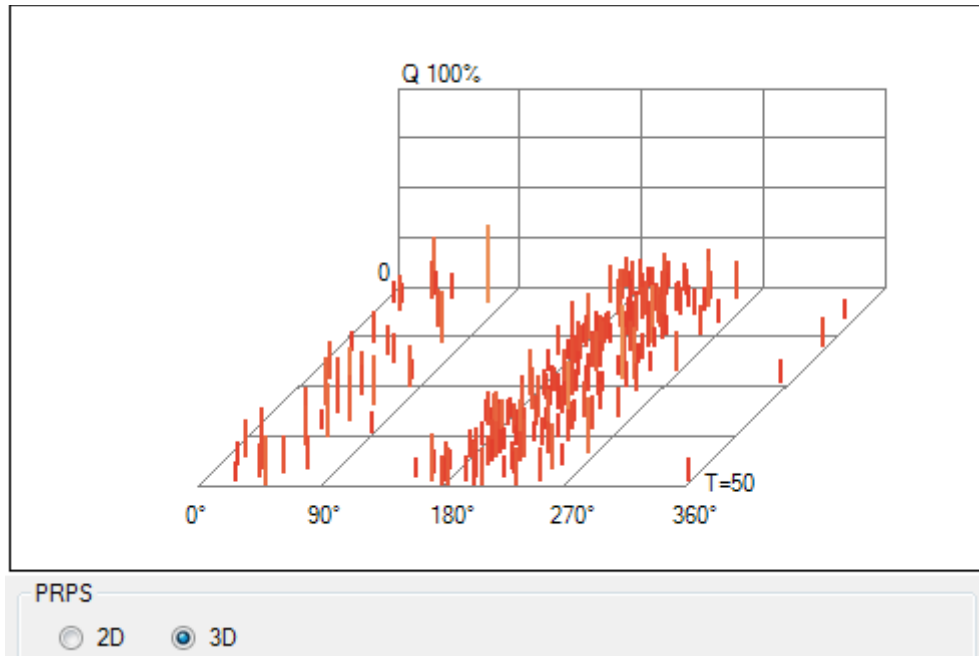


PHOTO.41 VOID OR INTERNAL DISCHARGE PATTERN 1

FINGER PRINT OF PARTIAL DISCHARGE

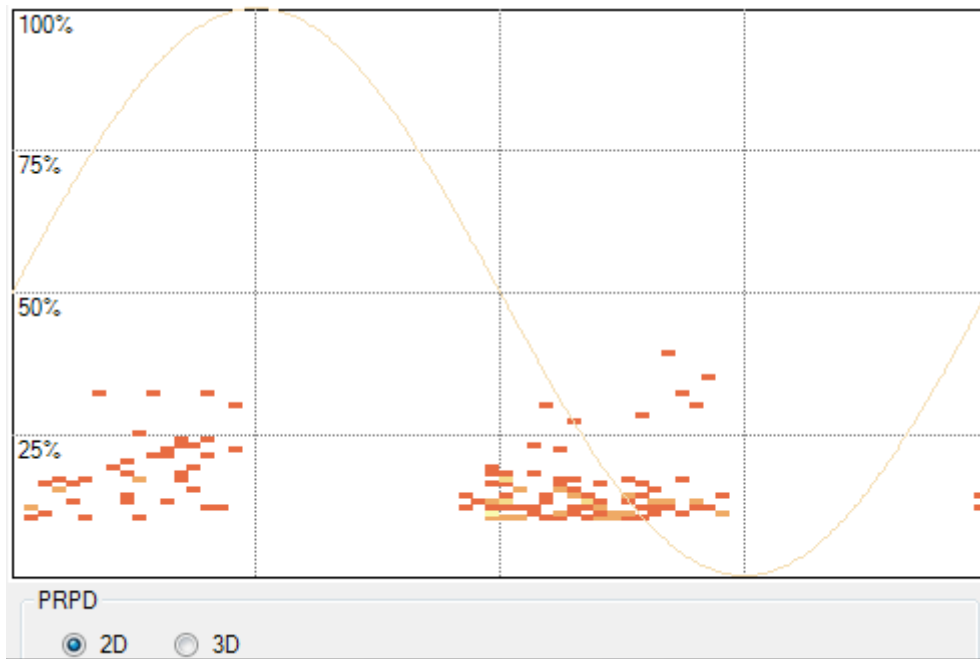
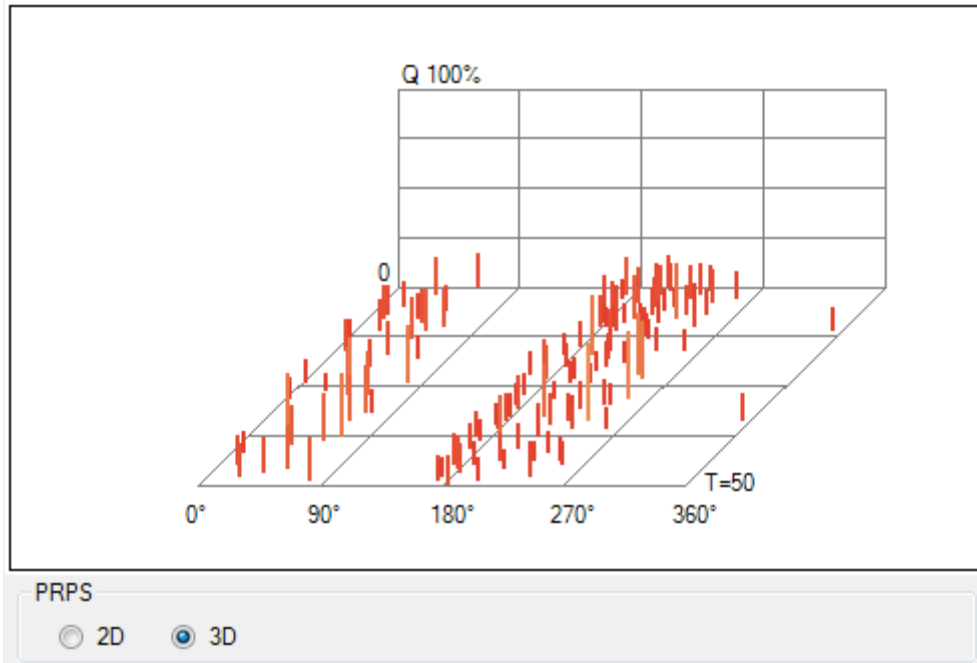


PHOTO.42 VOID OR INTERNAL DISCHARGE PATTERN 2

FINGER PRINT OF PARTIAL DISCHARGE

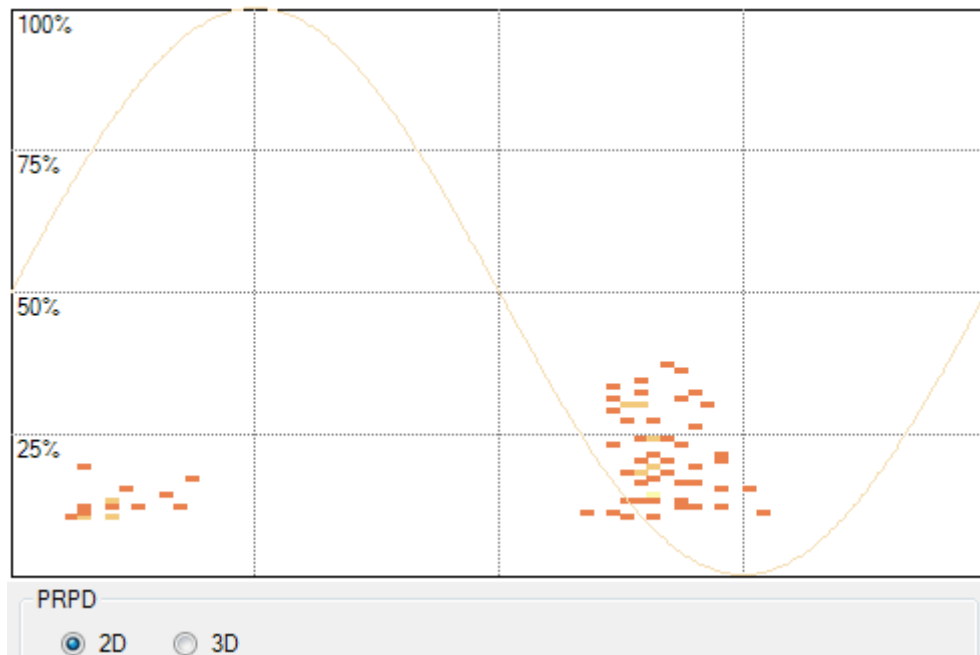
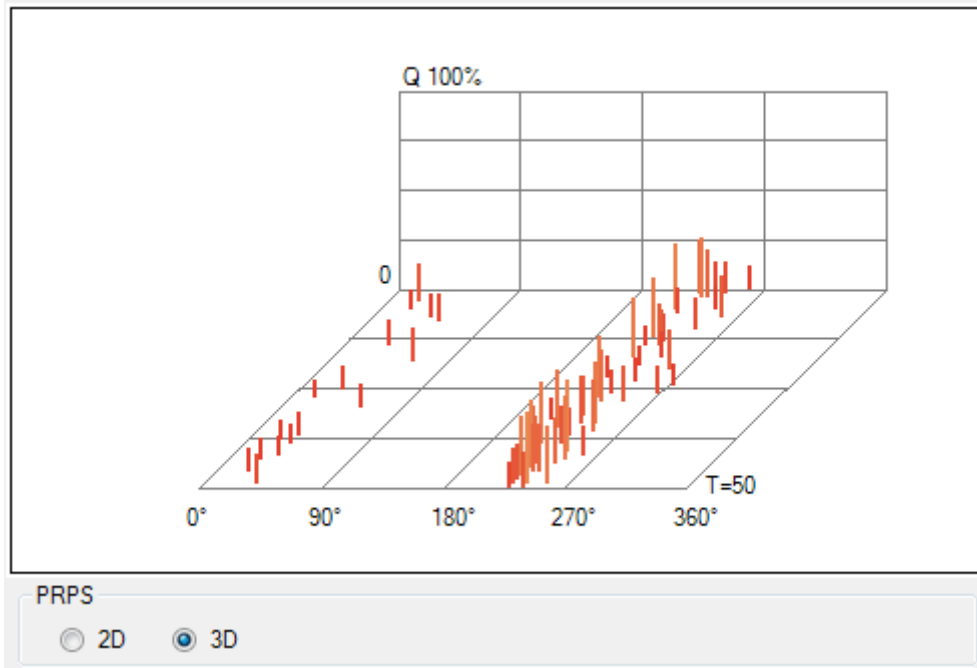


PHOTO.43 VOID OR INTERNAL DISCHARGE PATTERN 3

FINGER PRINT OF PARTIAL DISCHARGE

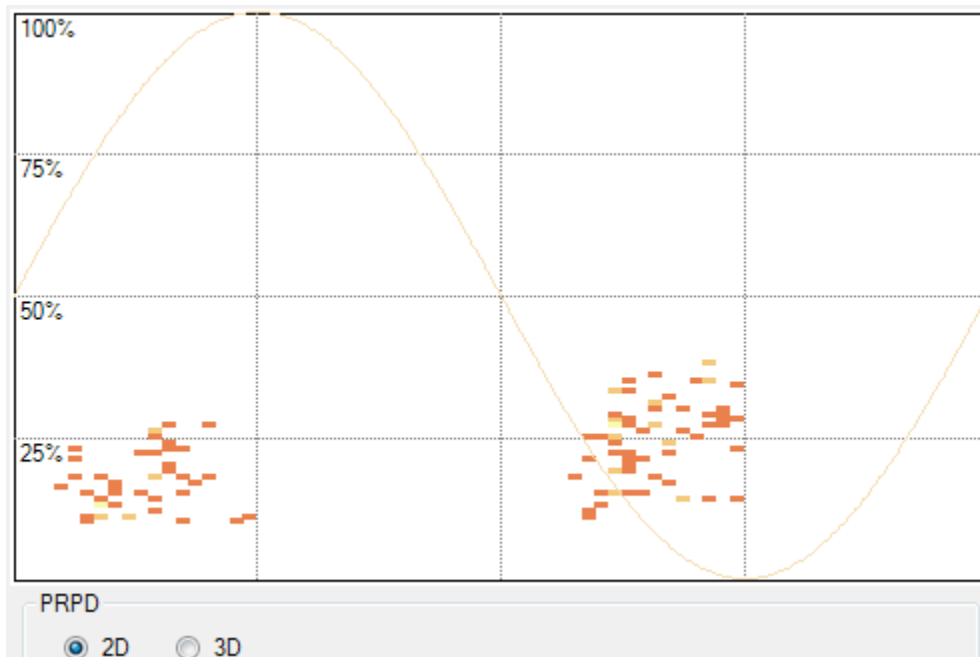
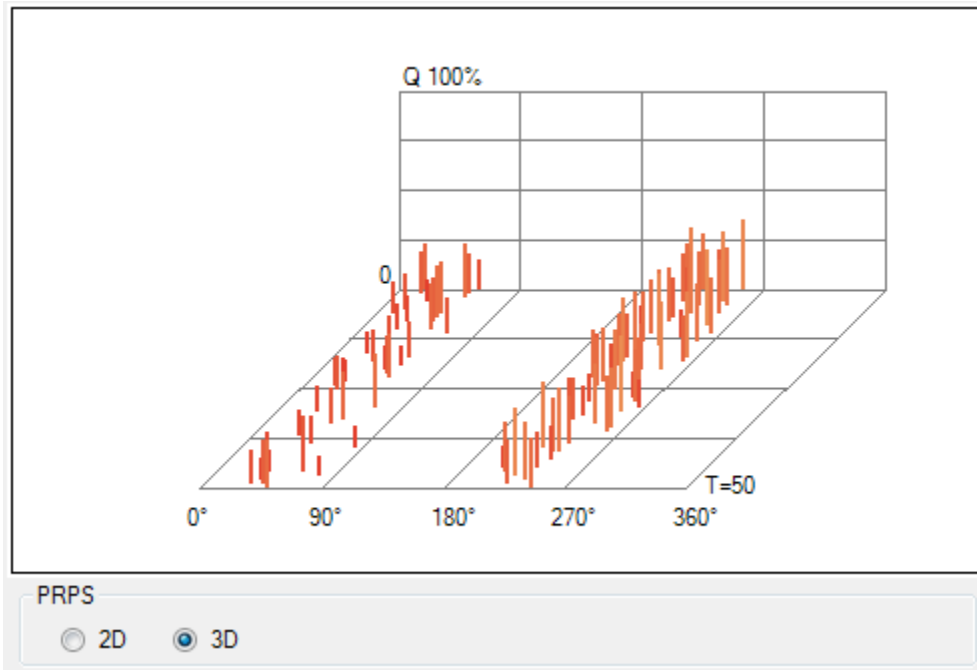


PHOTO.44 VOID OR INTERNAL DISCHARGE PATTERN 4

FINGER PRINT OF PARTIAL DISCHARGE

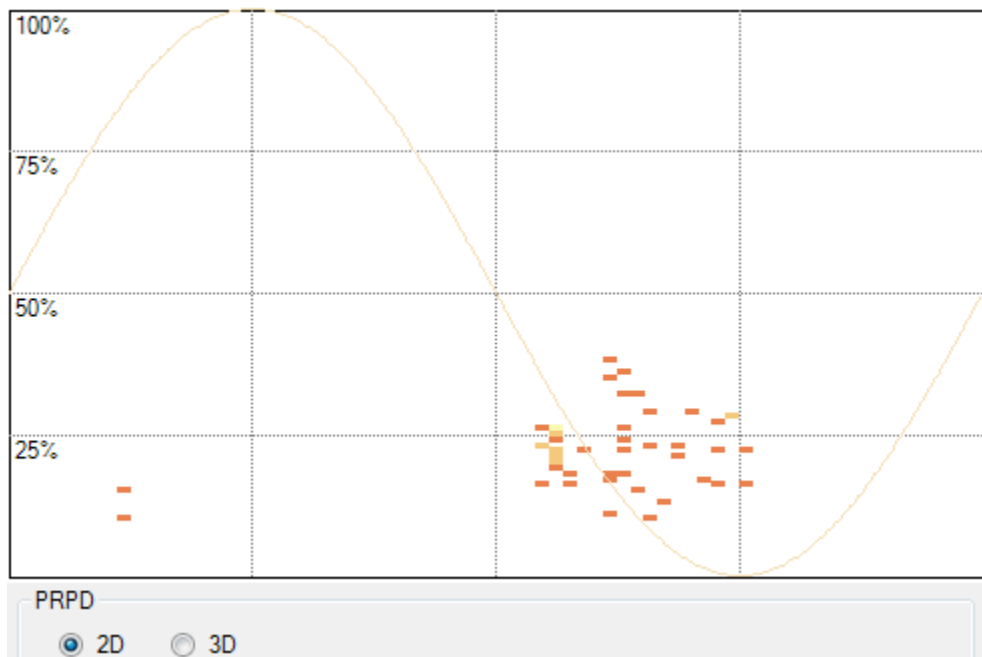
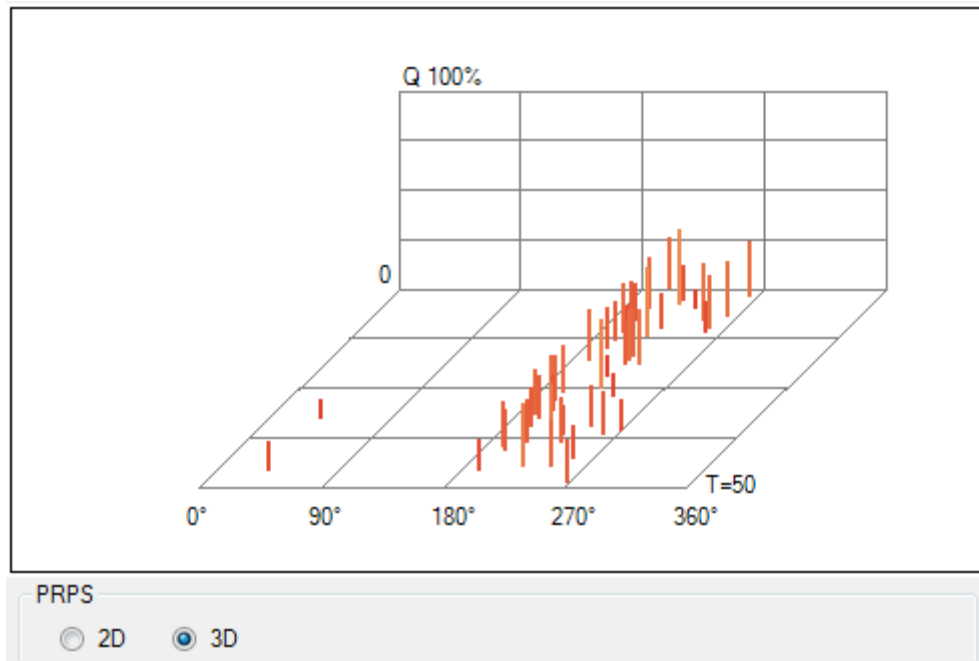


PHOTO.45 VOID OR INTERNAL DISCHARGE PATTERN 5

FINGER PRINT OF PARTIAL DISCHARGE

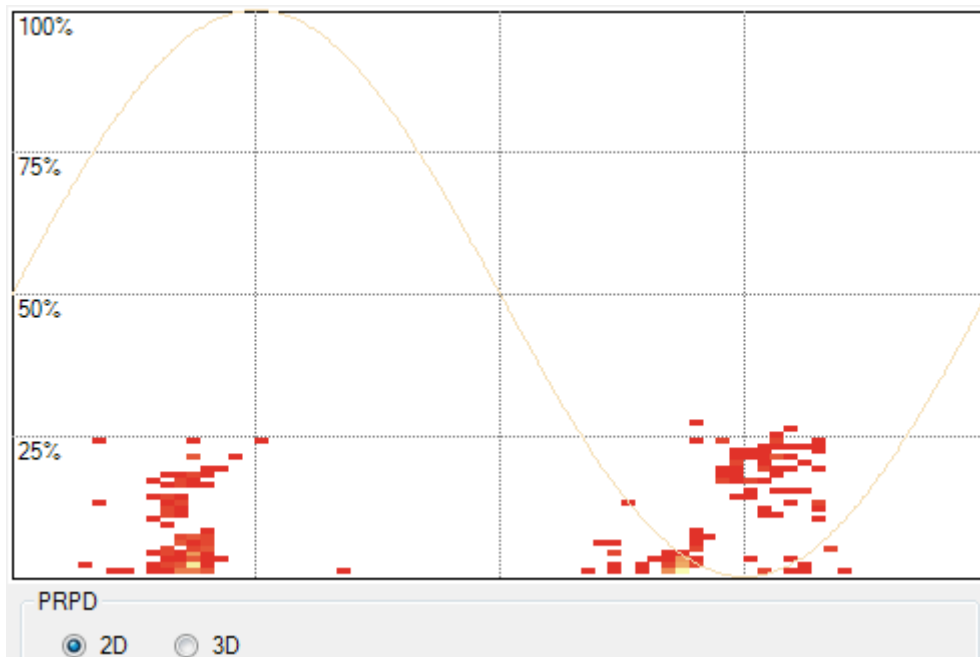
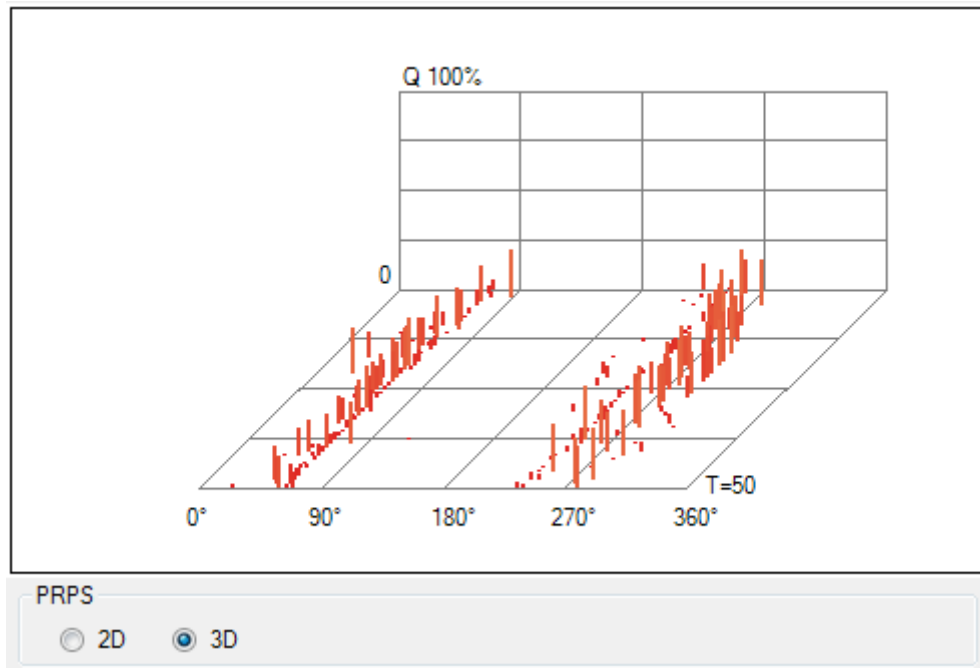


PHOTO.46 VOID OR INTERNAL DISCHARGE PATTERN 6

FINGER PRINT OF PARTIAL DISCHARGE

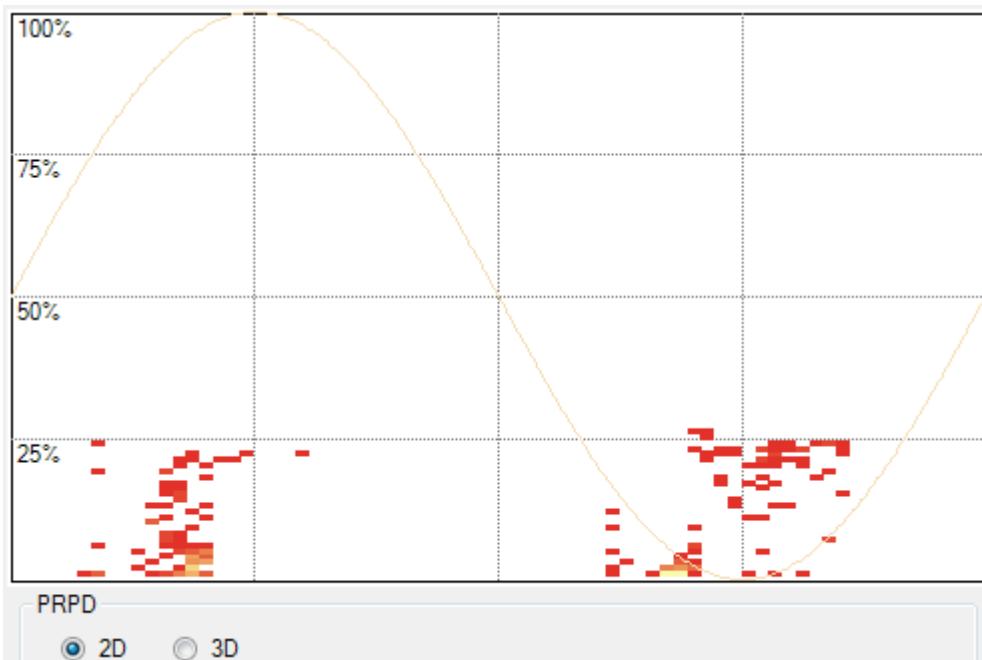
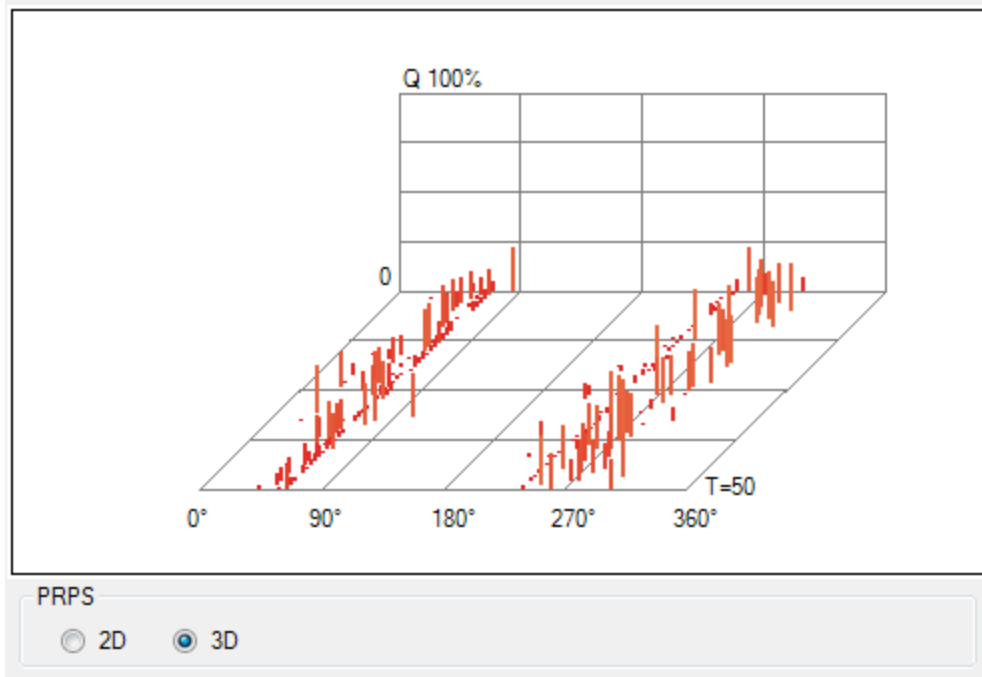


PHOTO.47 VOID OR INTERNAL DISCHARGE PATTERN 7

FINGER PRINT OF PARTIAL DISCHARGE

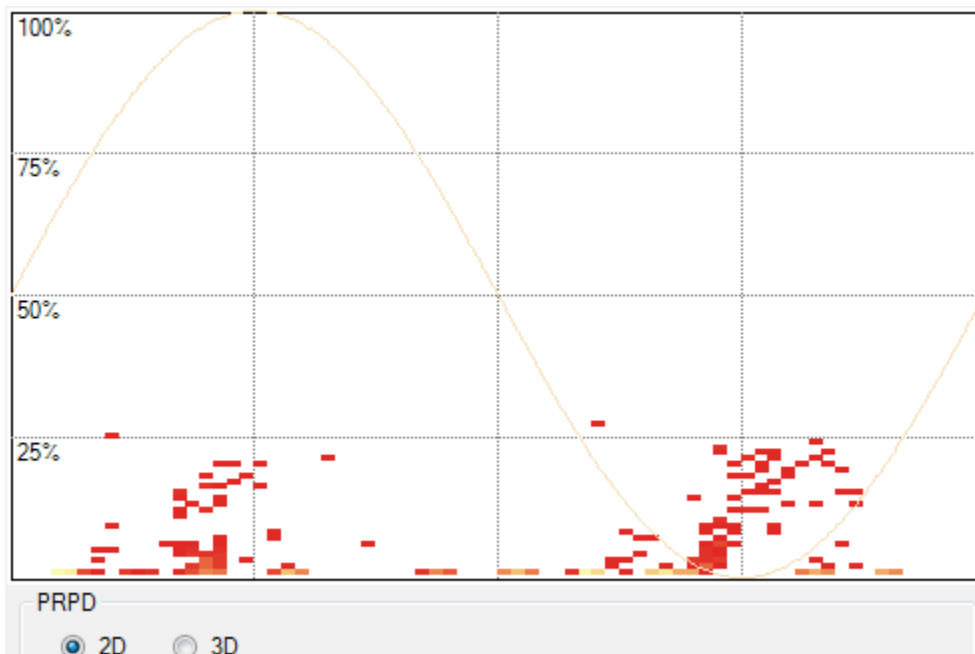
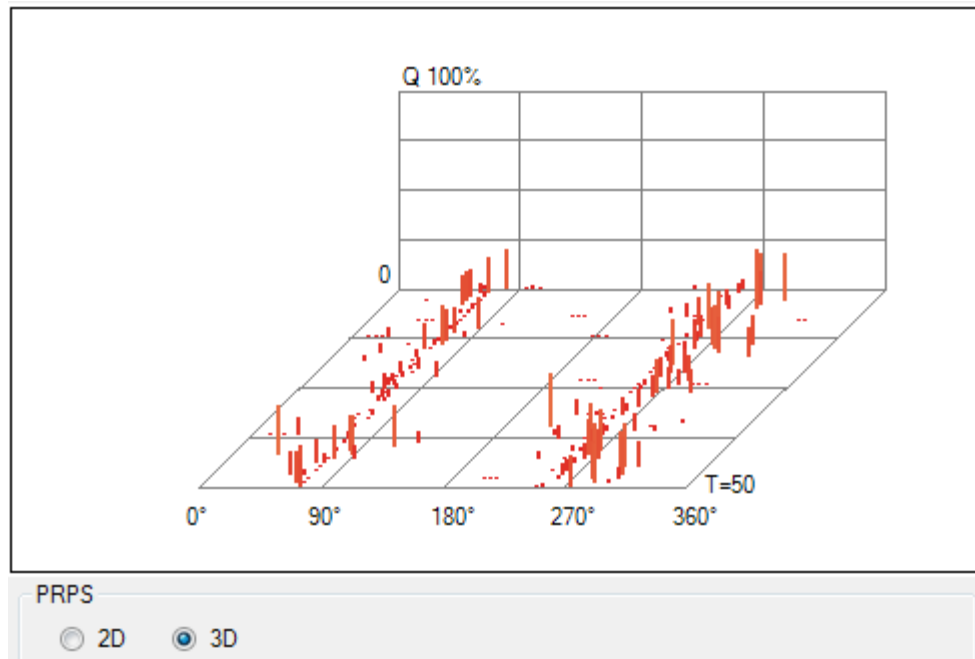


PHOTO.48 VOID OR INTERNAL DISCHARGE PATTERN 8

FINGER PRINT OF PARTIAL DISCHARGE

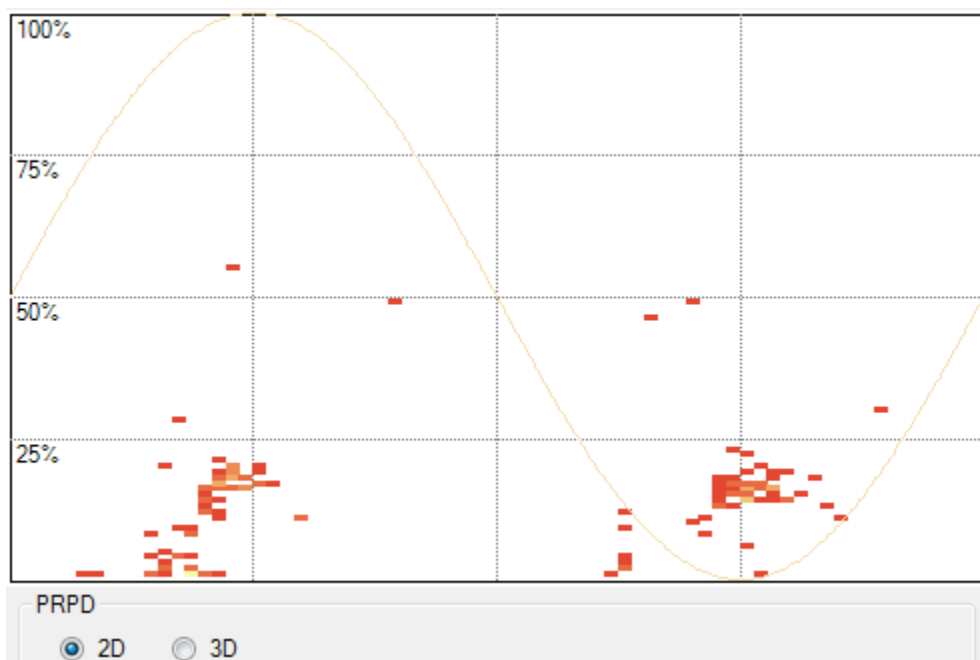
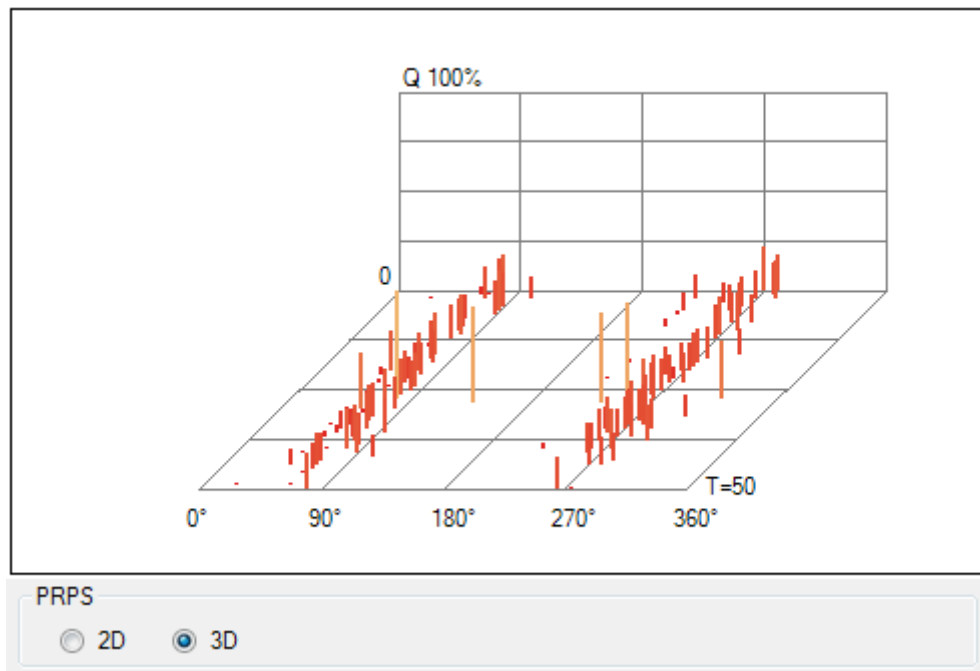


PHOTO.49 VOID OR INTERNAL DISCHARGE PATTERN 9

FINGER PRINT OF PARTIAL DISCHARGE

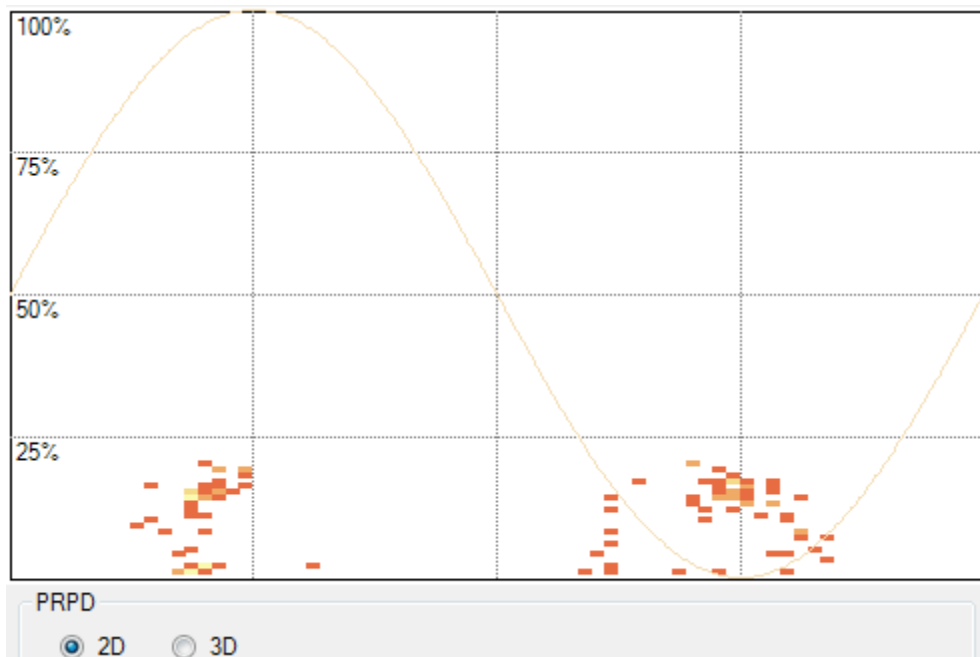
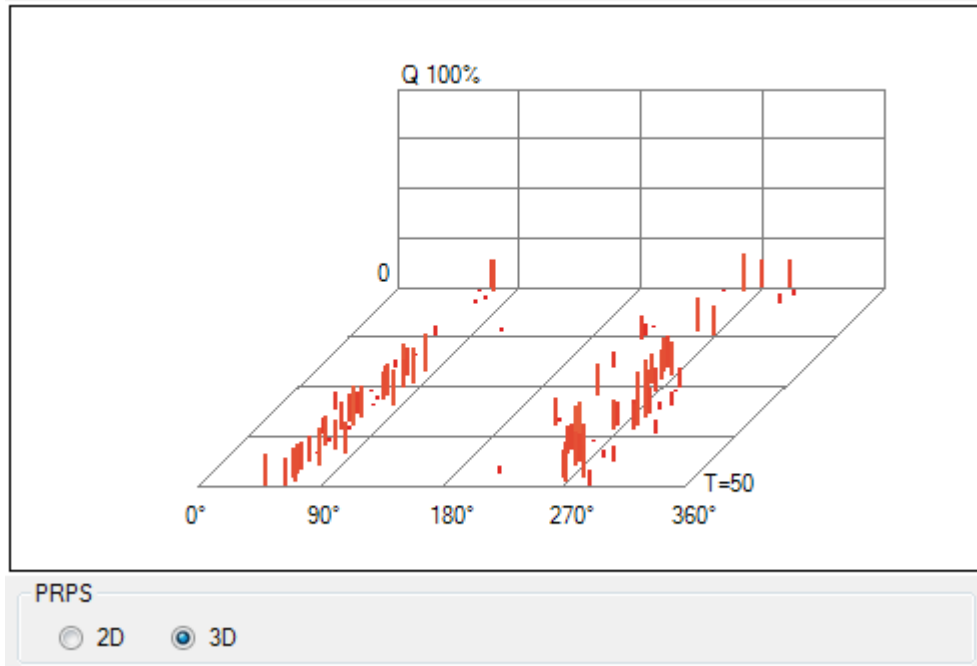


PHOTO.50 VOID OR INTERNAL DISCHARGE PATTERN 10