

CIVA ET Training

CIVA 2015 Training – ET

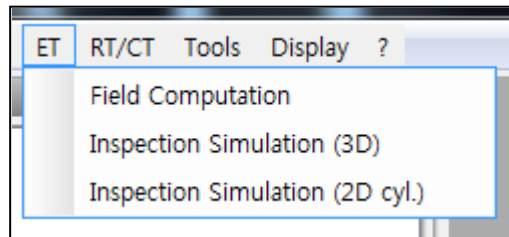


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e-mail : cae@jaewoo.com / Homepage : www.JAEWOO.com

- Field Computation : 탐침으로 부터 생성되는 자계 값 계산
- Inspection Simulation(3D) : 3차원 형상의 결함으로 부터의 탐상 계산
- Inspection Simulation(2D cyl.) : 축대칭 형상에서의 결함의 ET 계산



❖MENU 및 화면 안내

The screenshot shows the CIVA 2015.a software interface. On the left is the 'Civa manager' panel with 'ET-Field Computation~4' and 'Model (edited)'. Below it is the 'Scan explorer' panel. The main area is the 'Model view' showing a 3D model of a component with a probe. A toolbar is located above the model view. A red circle highlights a button in the toolbar, with an arrow pointing to a menu titled 'Inspection Simulation' and 'CIVA ATHENA2D'. Another arrow points from the toolbar to a menu showing '1 view', '2 views', '3 views', and '4 views'. A third arrow points from the toolbar to a menu with 'Scene', 'View', and 'Tools'. A fourth arrow points from a red box at the bottom of the model view to a menu with 'Speci...', 'Pro...', 'Inspecti...', 'Acquisiti...', 'Computation paramet...', 'R...', and 'Probe Respon...'. A fifth arrow points from the toolbar to a text label '화면 정렬, 회전 및 치수 측정'. A sixth arrow points from the red box to a text label '작업 메뉴'. A seventh arrow points from the toolbar to a text label '화면 우클릭시 팝업 메뉴 -거리 계산 -화면 이동 및 정렬 등'.

Inspection Simulation
CIVA ATHENA2D

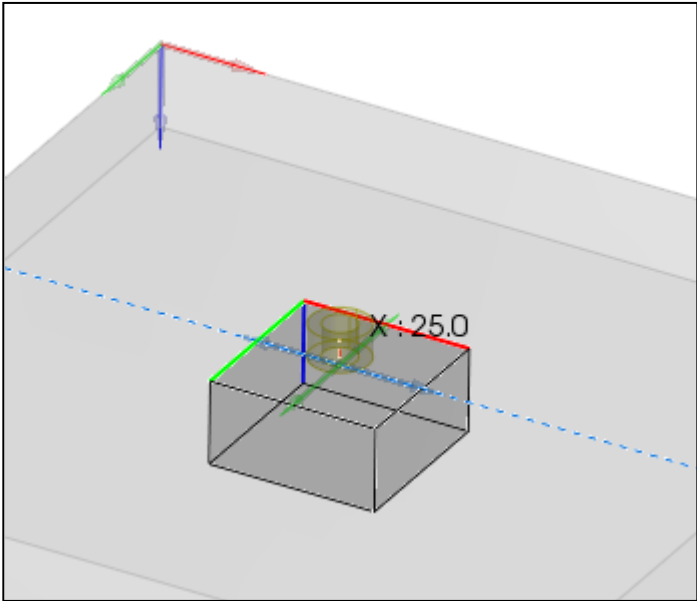
1 view
2 views
3 views
4 views

Scene ▶
View ▶
Tools ▶

화면 정렬, 회전 및 치수 측정

화면 우클릭시 팝업 메뉴
-거리 계산
-화면 이동 및 정렬 등

작업 메뉴



-화면에서의 마우스는

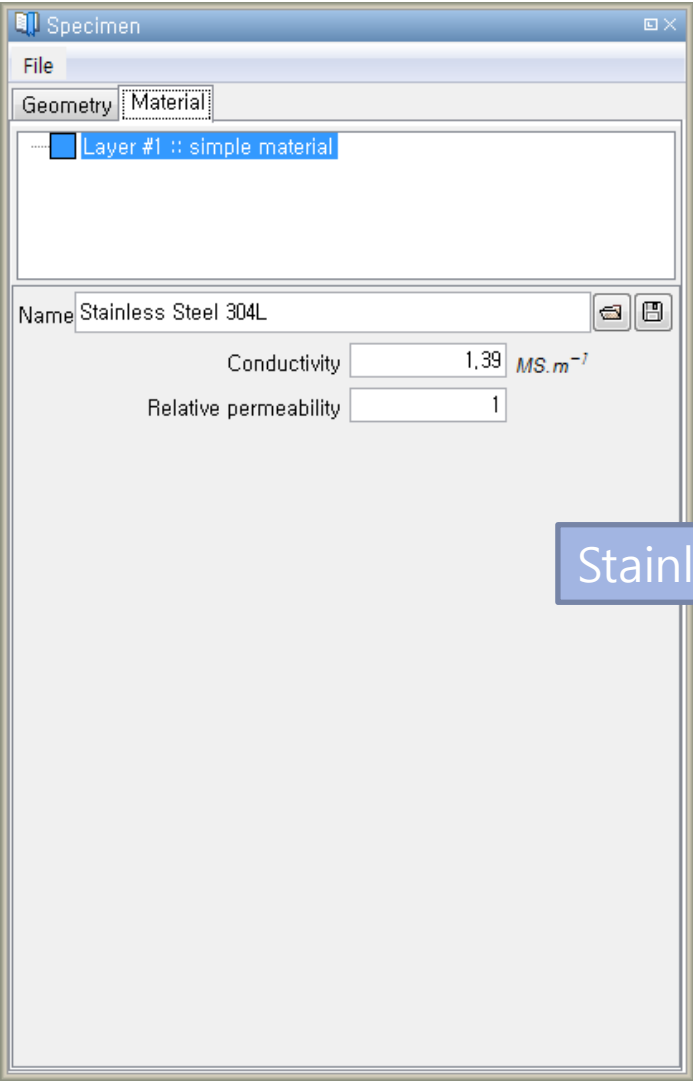
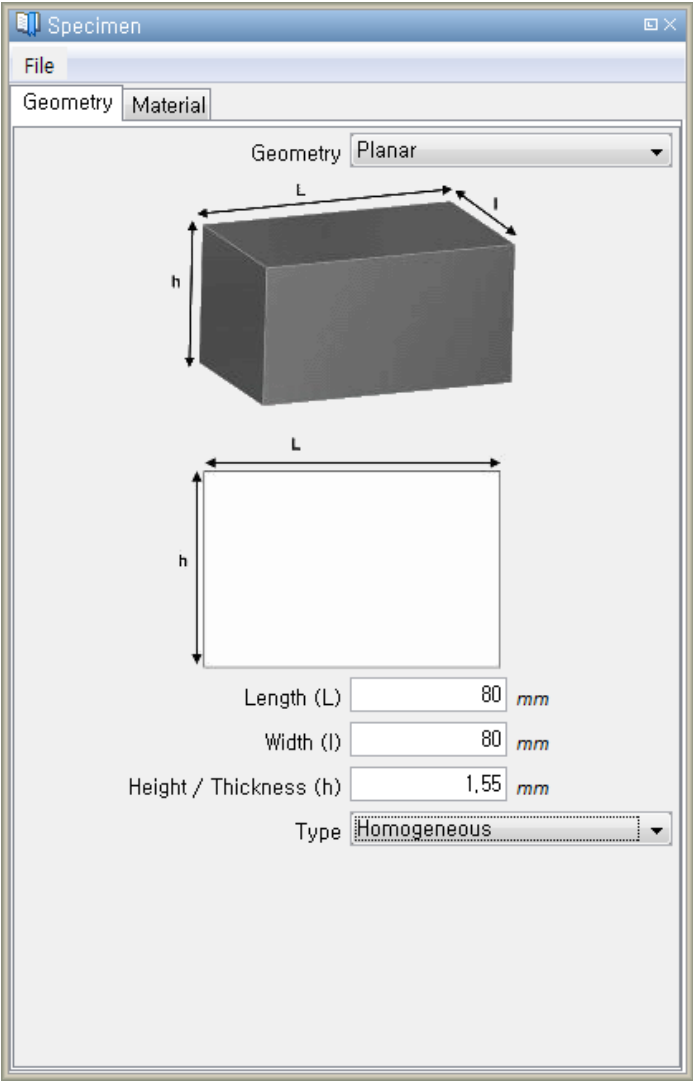
- 1. 좌 클릭 : 화면 이동
- 2. 우 클릭 : 화면 확대(아래), 축소(위)
- 3. 휠 버튼 클릭 : 회전

-Probe 및 Specimen 선택

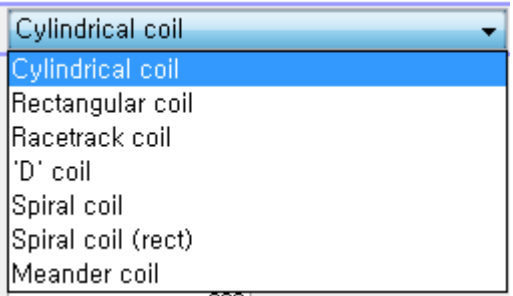
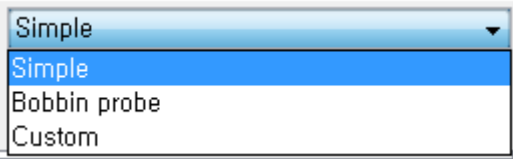
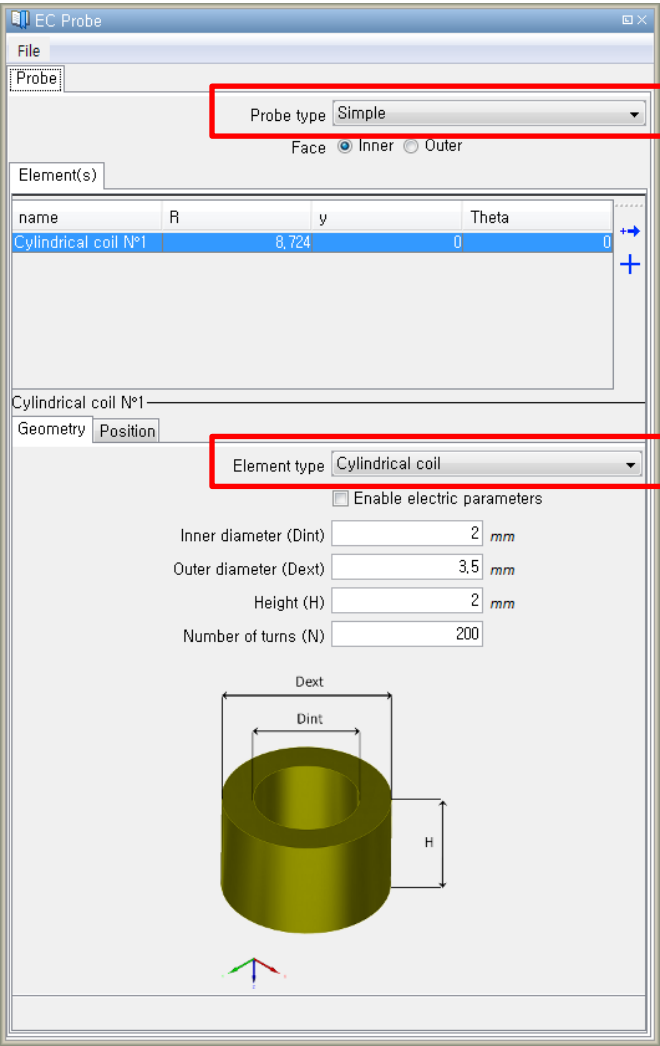
Probe 및 Specimen을 마우스 좌버튼 더블 클릭시 활성화 되며 동시에 x,y,z 축의 화살표가 생성이 됩니다.

생성된 화살표를 이용하여 각 축을 따라 이동 시킬 수 있습니다.

이러한 방법으로 화면에 표현되는 형태의 위치를 변경할 수 있습니다.



Stainless Steel 304L 이용



❖Inspection settings

Inspection settings

Inspection Mode

Inspection systemSingle transducer

ConfigurationPositioningCoupling MediumBottom Medium

Inspection plane

Inspection plane

- Along X direction
- Along Y direction
- Oblique

Scanning direction

Inspection direction

- positive
- negative

Choice of impact point

Choice of impact point1

New specimen origin

X0 mm

Y0 mm

Z0 mm

Inspection settings

Inspection Mode

Inspection systemSingle transducer

ConfigurationPositioningCoupling MediumBottom Medium

Default positioning

New specimen origin

X0 mm

Y0 mm

Z0 mm

Choice of reference point

Choice of reference pointWedge center

Reference point coordinates

Offset X150 mm

Offset Y50 mm

Offset Z-6,074 mm

Reference point in the CIVA reference...

X150 mm

Y50 mm

Z-6,074 mm

Inspection settings

Inspection Mode

Inspection systemSingle transducer

ConfigurationPositioningCoupling MediumBottom Medium

NameMateriau Isotrope

TypeFluid

Density1 g.cm⁻³

Homogeneity typeHomogeneous

Primary wave velocity1483 m.s⁻¹

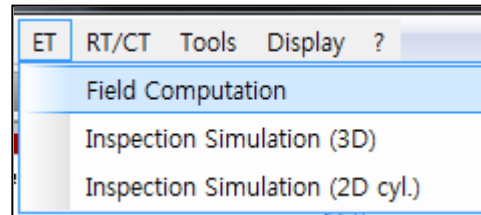
Attenuations & Noise

Options

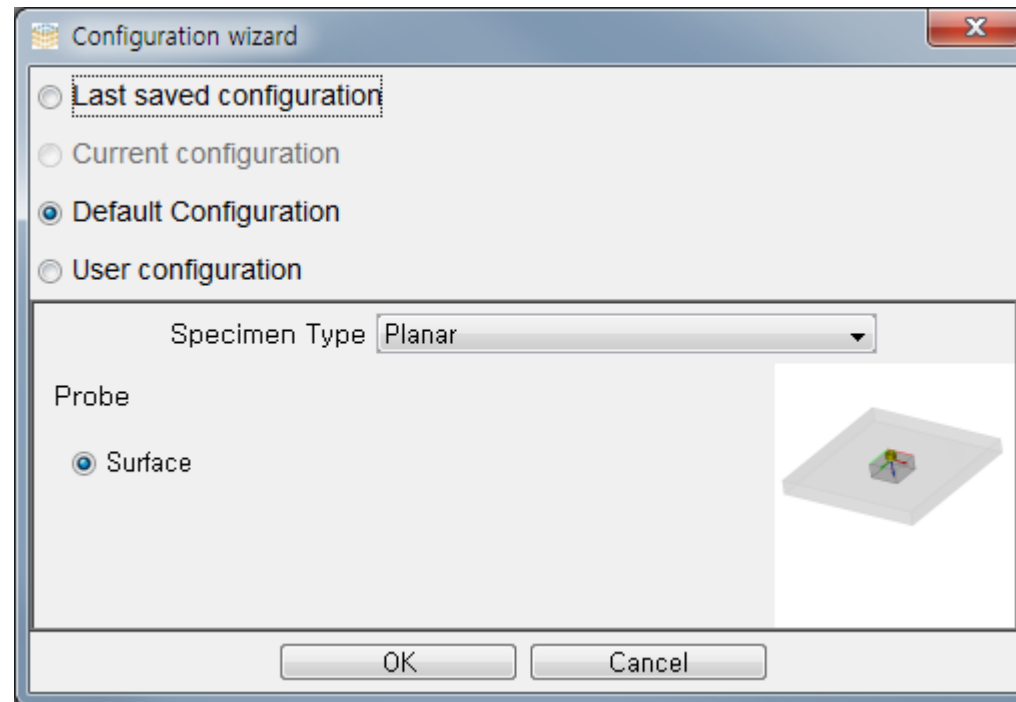
- Flat component inspection

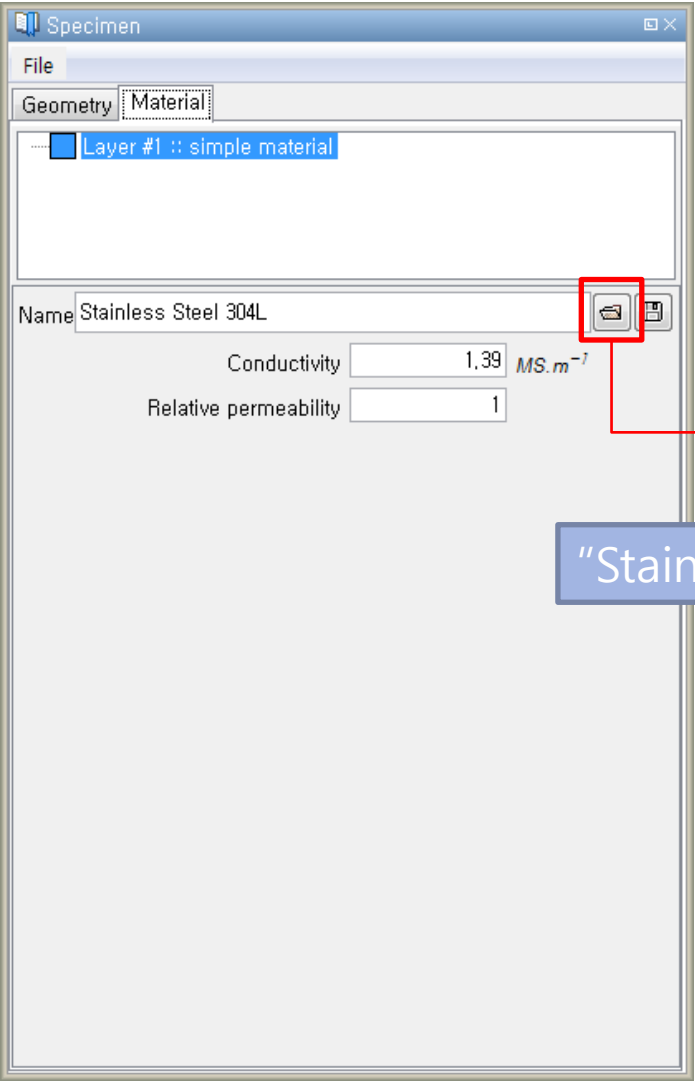
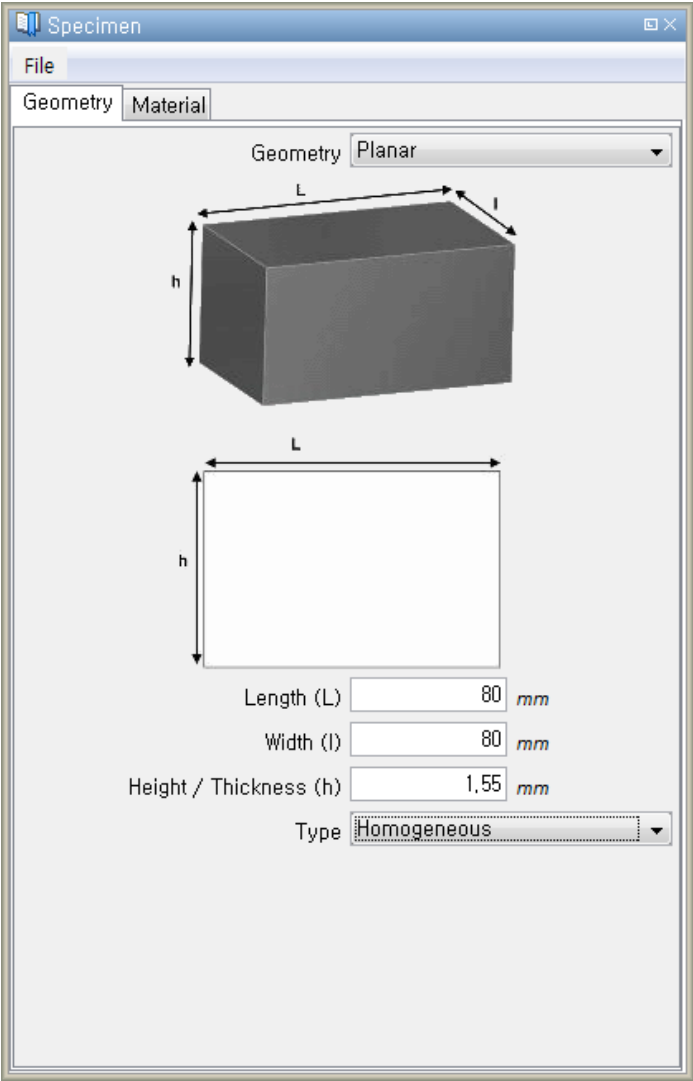
1.1 Impedance diagram calculation

- Field computation 실행



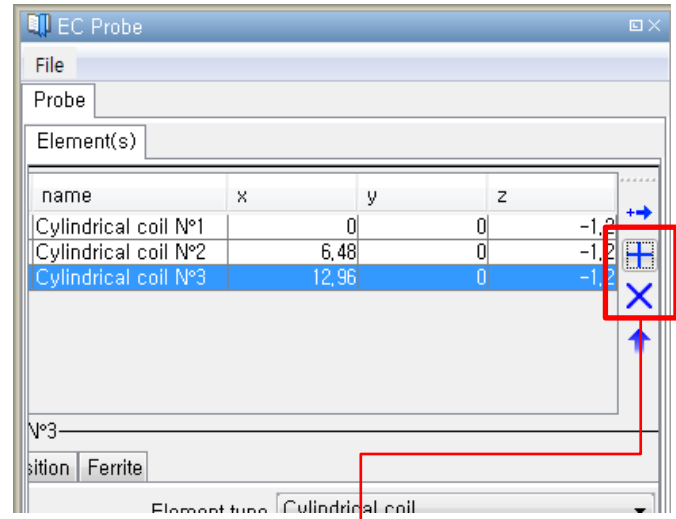
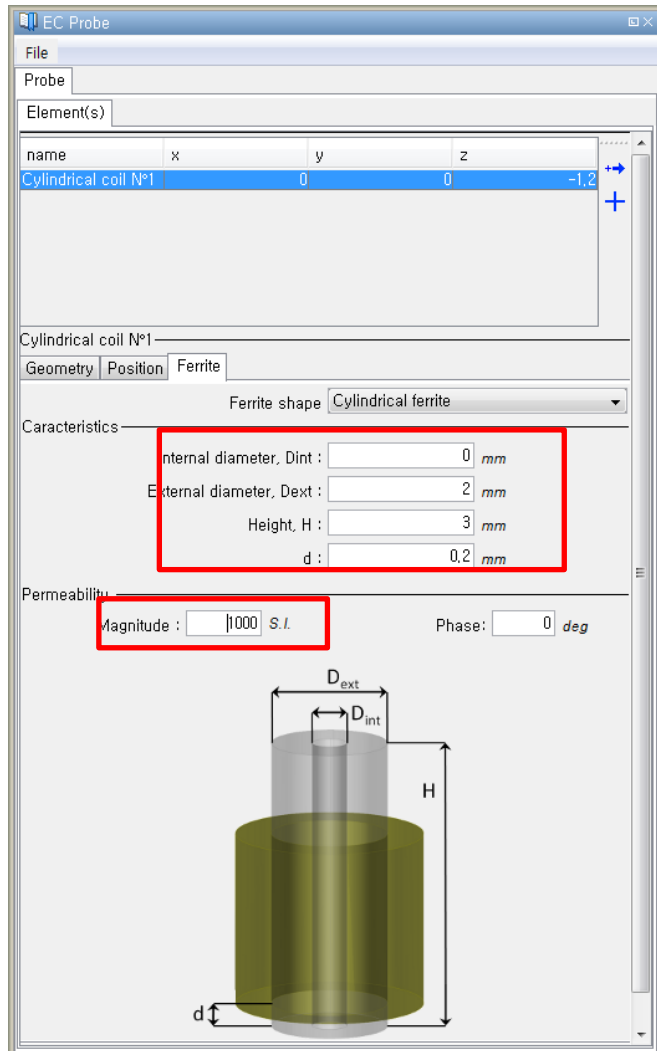
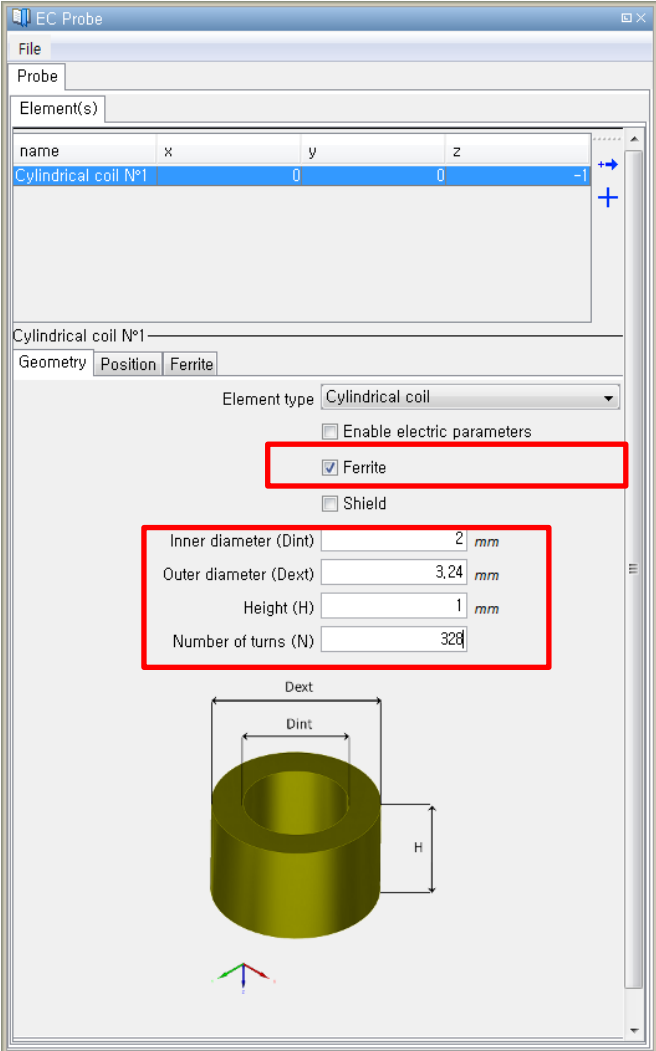
- Configuration wizard





"Stainless Steel 304L" 이용

Probe 생성



Element 추가 및 삭제
(2개 추가로 생성)

EC Probe

File

Probe

Element(s)

Ref	name	x	y	z
	Cylindrical coil N°1	0	0	0.3
	Cylindrical coil N°2	6.48	0	-1.2
	Cylindrical coil N°3	0	0	-1.2

Cylindrical coil N°1

GeometryPositionFerrite

Sensor positioning in the sensor holder frame

PositioningCenterLift-off (e)

X0 mm

Y0 mm

Lift-off-1 mm

Rotation N° 10 deg around the axeY of element's frame

Cylindrical coil N°1

GeometryPositionFerrite

Sensor positioning in the sensor holder frame

PositioningCenterLift-off (e)

X0 mm

Y0 mm

Lift-off0.3 mm

Rotation N° 10 deg around the axeY of element's frame

Cylindrical coil N°2

GeometryPositionFerrite

Sensor positioning in the sensor holder frame

PositioningCenterLift-off (e)

X-2 mm

Y4 mm

Lift-off0.3 mm

Rotation N° 10 deg around the axeY of element's frame

Cylindrical coil N°3

GeometryPositionFerrite

Sensor positioning in the sensor holder frame

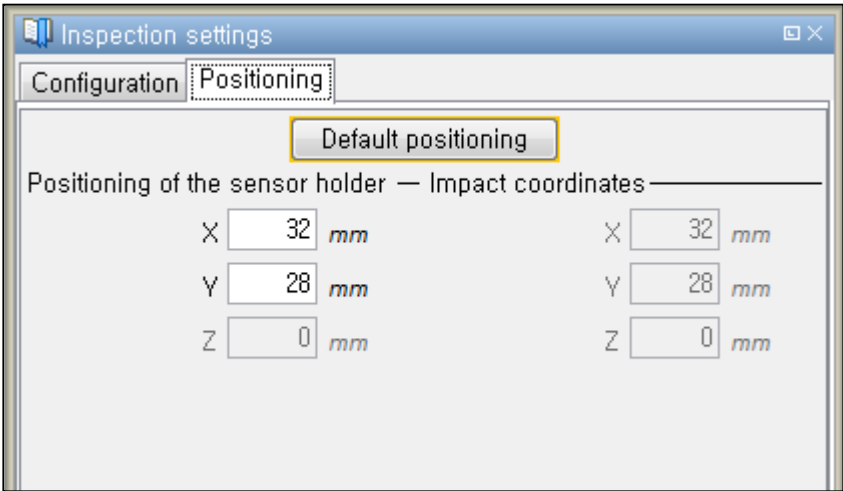
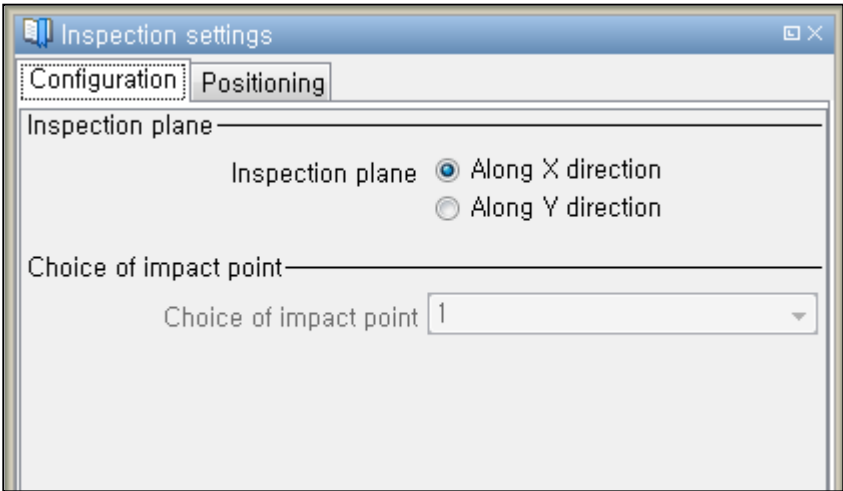
PositioningCenterLift-off (e)

X2 mm

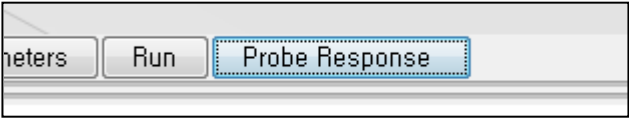
Y4 mm

Lift-off0.3 mm

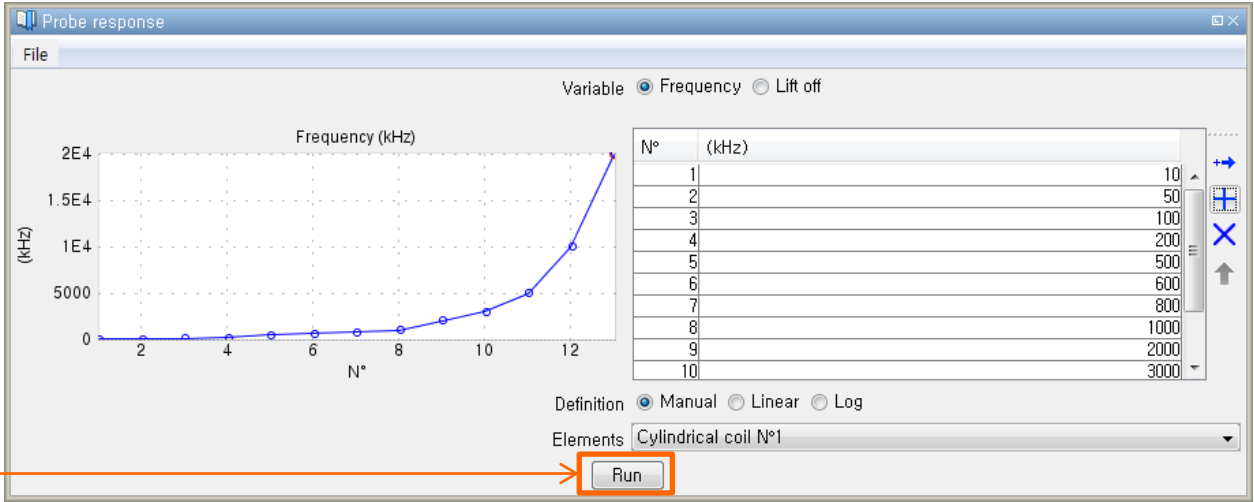
Rotation N° 10 deg around the axeY of element's frame



❖Probe response 계산



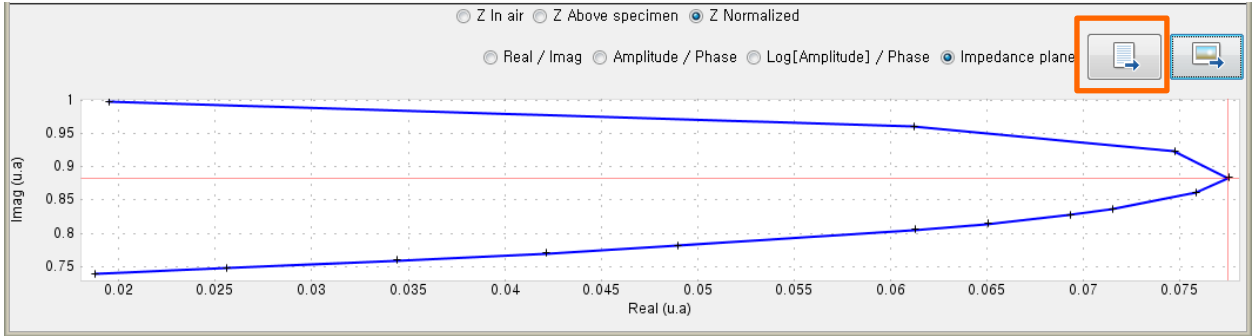
- 우측 하단의 Probe Response 클릭



우측의 14개의 주파수를 입력하고 4번 400kHz를 선택한 후 RUN을 클릭하여 계산 진행

- 우측 + 클 클릭하여 항목을 늘려 1~14까지 10kHz~2000kHz까지 입력합니다.

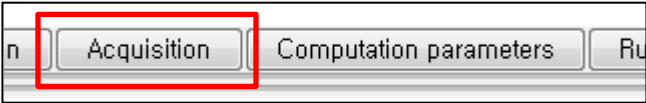
N°	kHz	N°	kHz
1	10	8	800
2	50	9	1000
3	100	10	2000
4	200	11	3000
5	300	12	5000
6	500	13	10000
7	600	14	20000



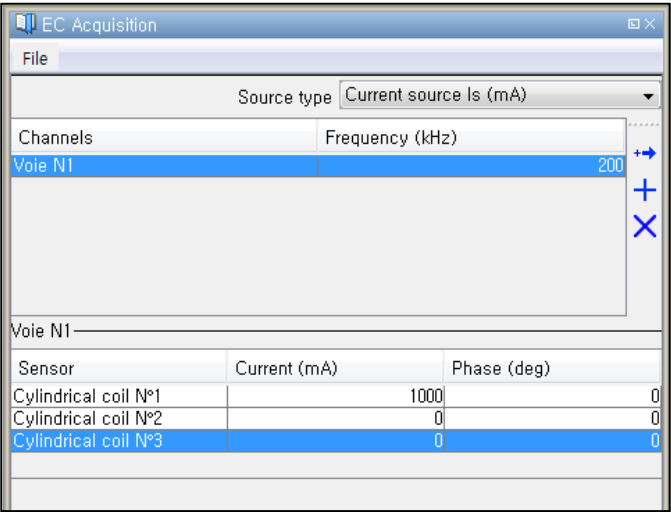
- Txt export를 통하여 계산 결과 확인(임피던스 계산)

N°	Frequency (kHz)	Reale (Ohm)	Yalese (Ohm)	Ztotal (Ohm)	Phase/Total (Deg.)	Reale/Total	Yalese/Total
1	10.0000	0.00000	46.0000	46.0000	-89.9999	0.00000000	0.99999999
2	50.0000	0.00000	230.000	230.000	-89.9999	0.00000000	0.99999999
3	100.000	0.00000	115.000	115.000	-89.9999	0.00000000	0.99999999
4	200.000	0.00000	57.5000	57.5000	-89.9999	0.00000000	0.99999999
5	300.000	0.00000	38.3333	38.3333	-89.9999	0.00000000	0.99999999
6	500.000	0.00000	23.0000	23.0000	-89.9999	0.00000000	0.99999999
7	600.000	0.00000	19.1667	19.1667	-89.9999	0.00000000	0.99999999
8	800.000	0.00000	14.2500	14.2500	-89.9999	0.00000000	0.99999999
9	1000.00	0.00000	11.5000	11.5000	-89.9999	0.00000000	0.99999999
10	2000.00	0.00000	5.75000	5.75000	-89.9999	0.00000000	0.99999999
11	3000.00	0.00000	3.83333	3.83333	-89.9999	0.00000000	0.99999999
12	5000.00	0.00000	2.30000	2.30000	-89.9999	0.00000000	0.99999999
13	10000.0	0.00000	1.15000	1.15000	-89.9999	0.00000000	0.99999999
14	20000.0	0.00000	0.575000	0.575000	-89.9999	0.00000000	0.99999999

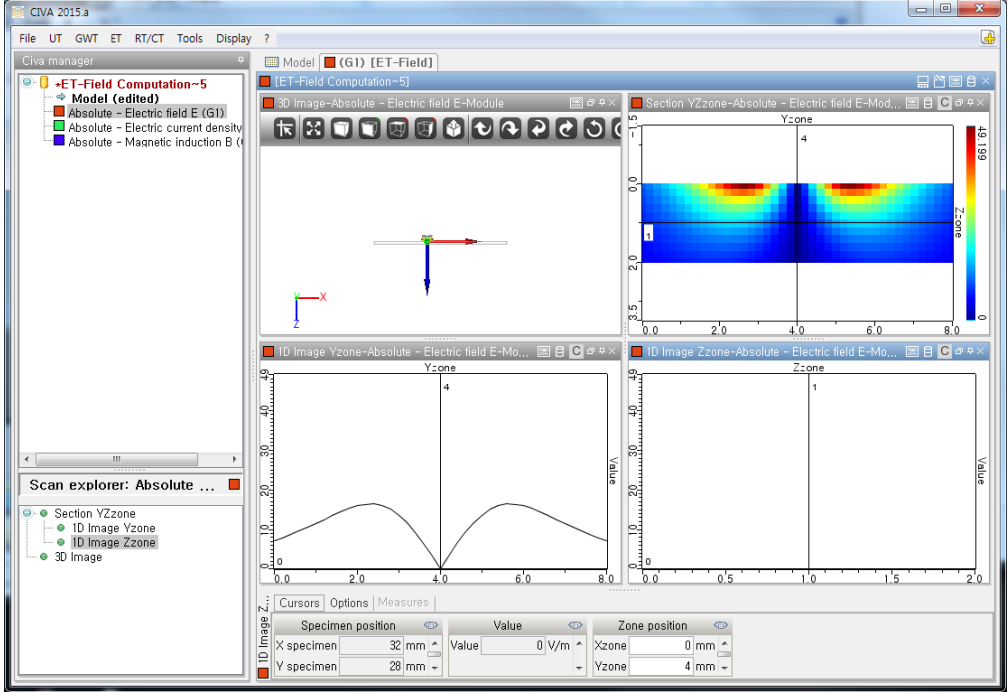
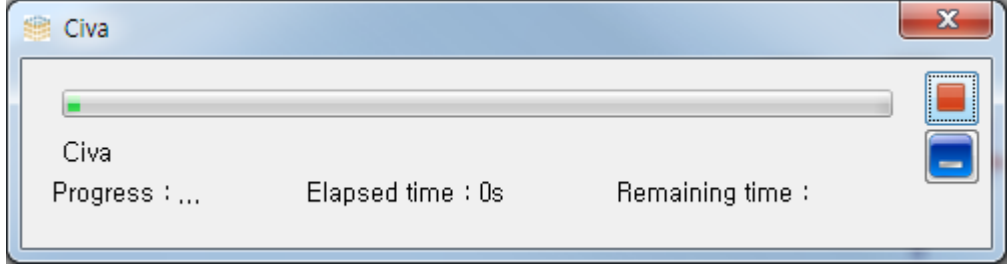
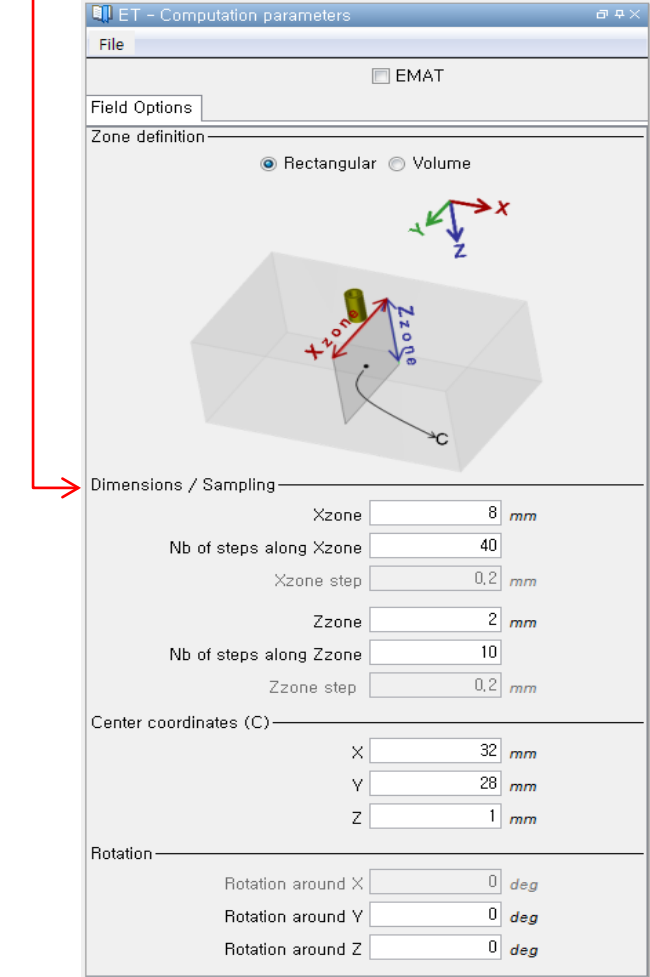
- Flat component inspection
1.2 Field computation



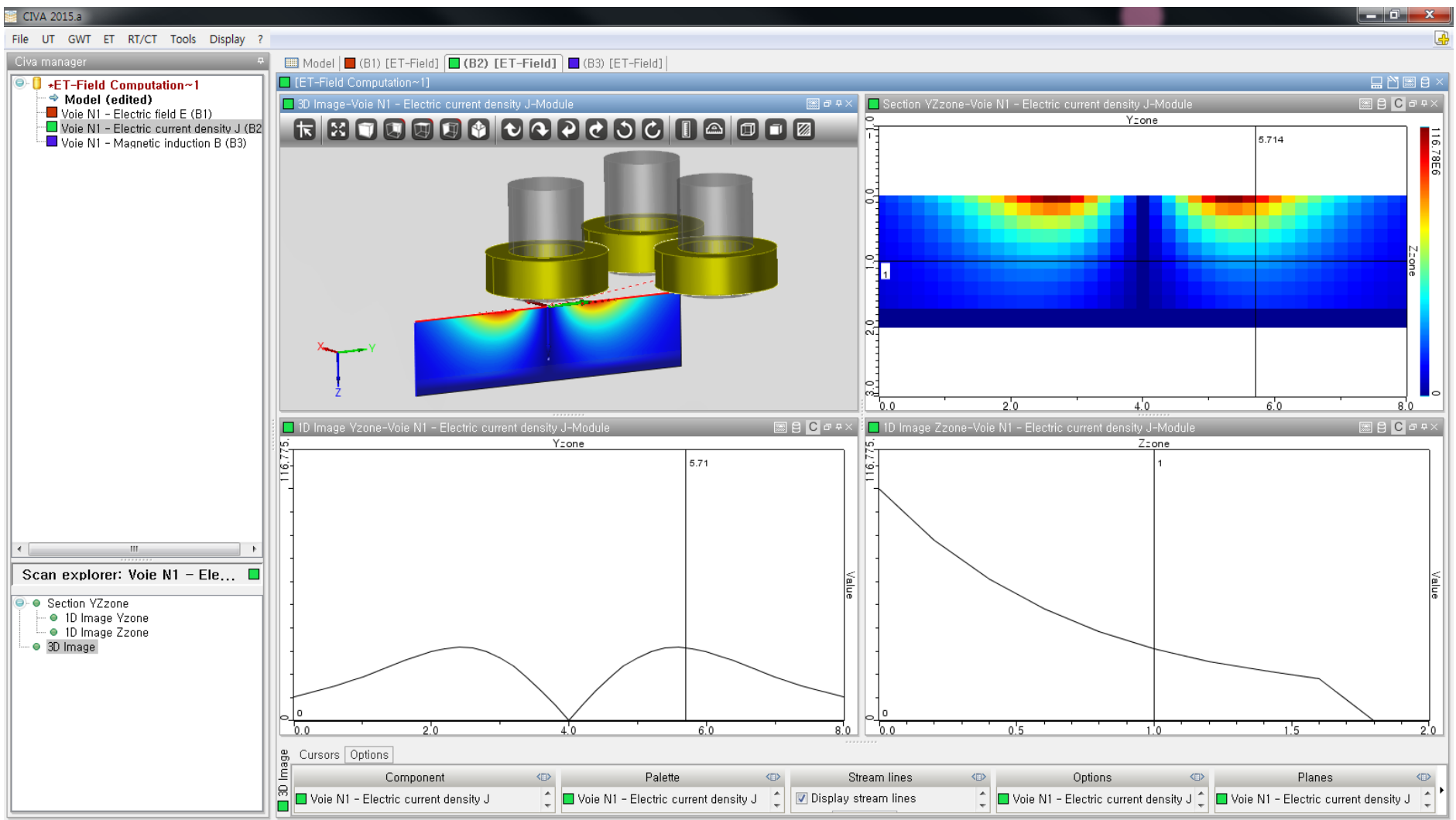
- 우측 하단에 Acquisition, Computation parameters의 계산 영역 지원



❖Computation parameters설정 및 Analysis



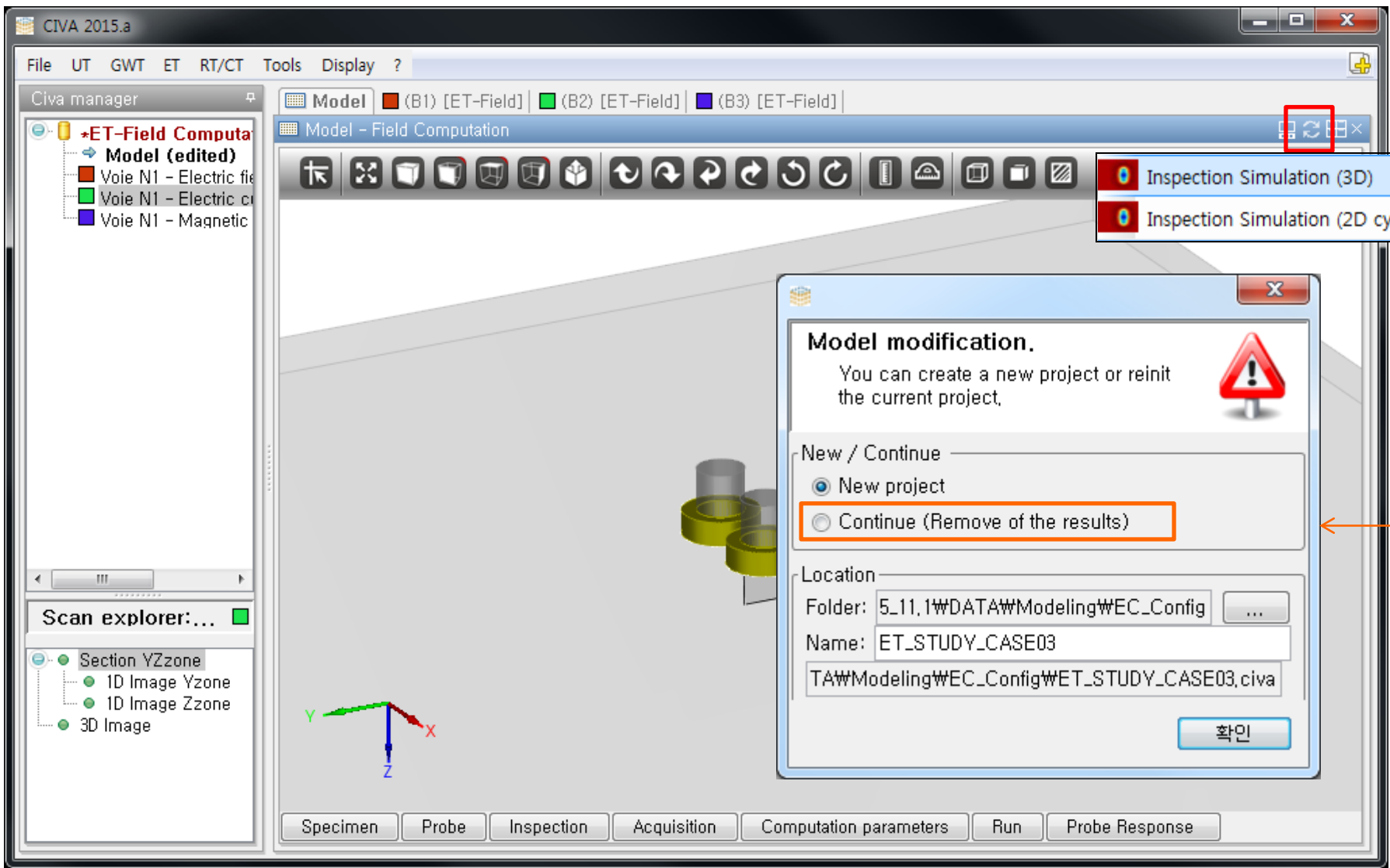
❖Result – Electric current density J



- Flat component inspection

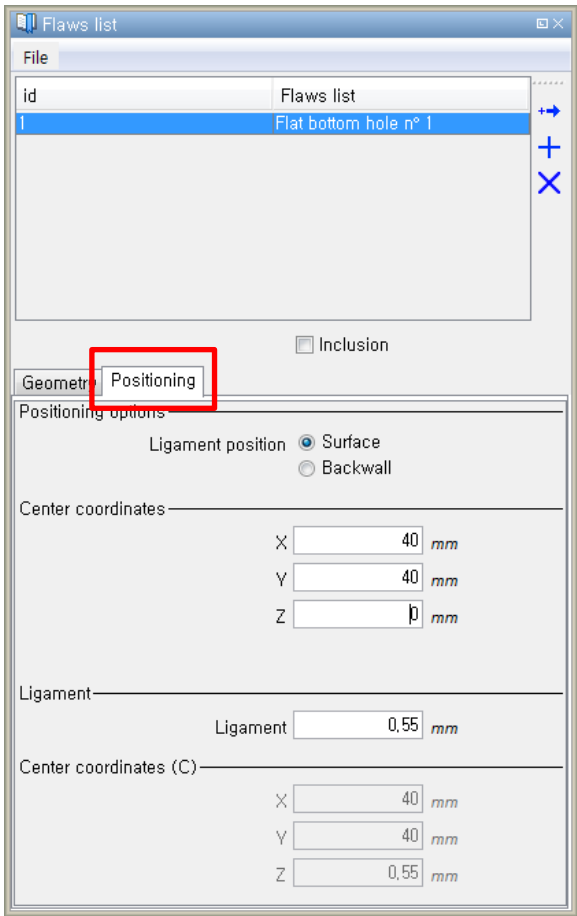
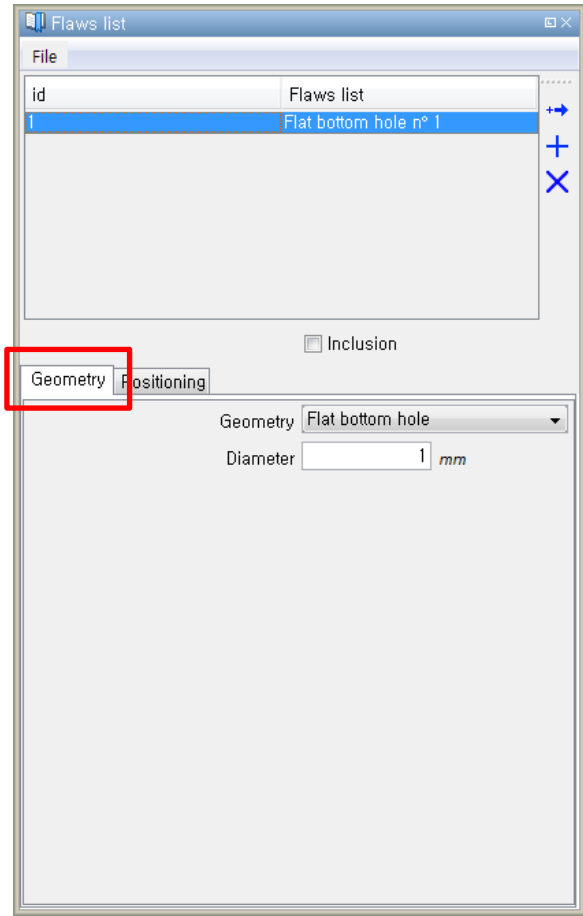
1.3 Inspection Simulation with a calibration hole

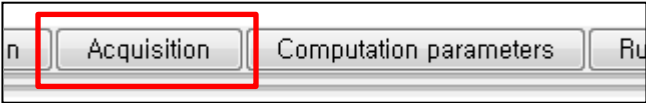
❖Inspection Simulation(3D)로 변경





- 하단에 Flaws가 새로 생겨남





- 센서 변경(N1 – 송신부, N2, N3 – 수신부)

EC Acquisition

File

Source type: Current source Is (mA)

Channels	Frequency (kHz)
Channel_Diff_mode	200

Channel_Diff_mode

Sensor	Current (mA)	Phase (deg)	Reception
Cylindrical coil N°1	1000	0	0
Cylindrical coil N°2	0	0	1
Cylindrical coil N°3	0	0	-1

Inspection settings

Configuration

Positioning

Scanning

Translation along X (mm)

Step0.5mm/deg

Number of steps24

Translation along Y (mm)

Step0.5mm/deg

Number of steps32

Choice of scanning modes

Increment/Scanning reversed☒no☐yes

Increment skip☒raster☐comb

Scanning preview

03691215182124

Scanning 10

08162432

Scanning 20

0165330495660

Scanning0

Center of transducer

Positioning of the sensor holder

X32mm

X32mm

Y28mm

Y28mm

Z0mm

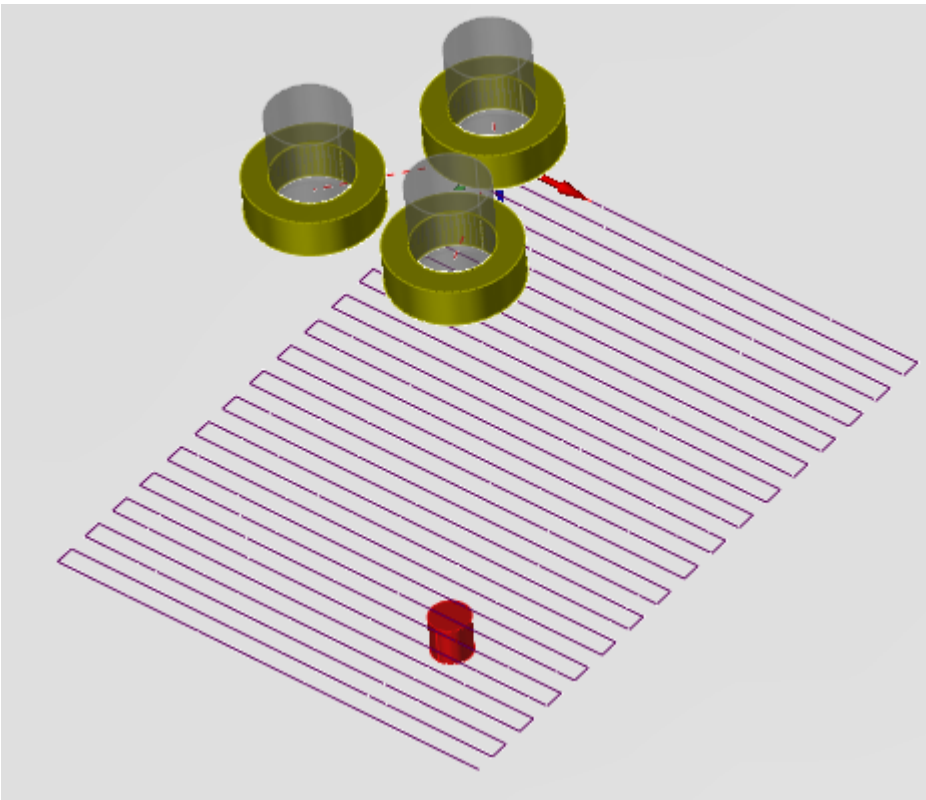
Z0mm

Transducer orientation

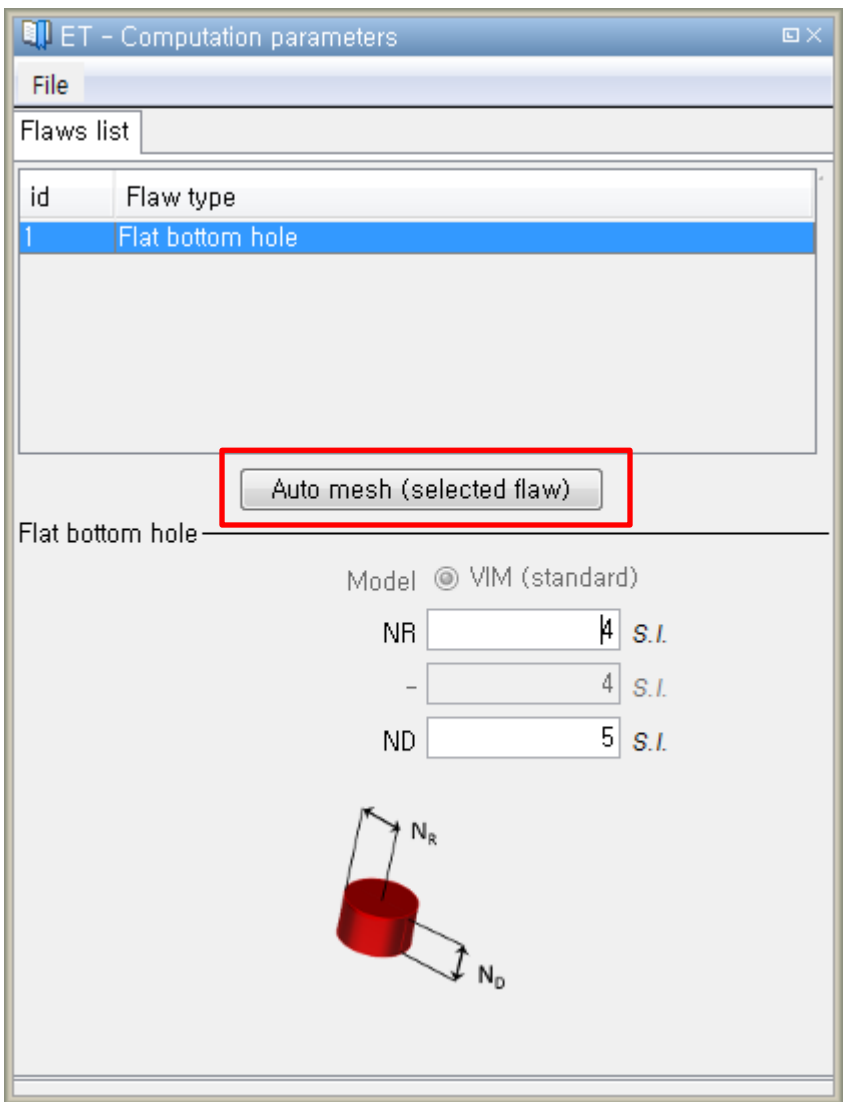
Rotation/Y0deg

Rotation/X-0deg

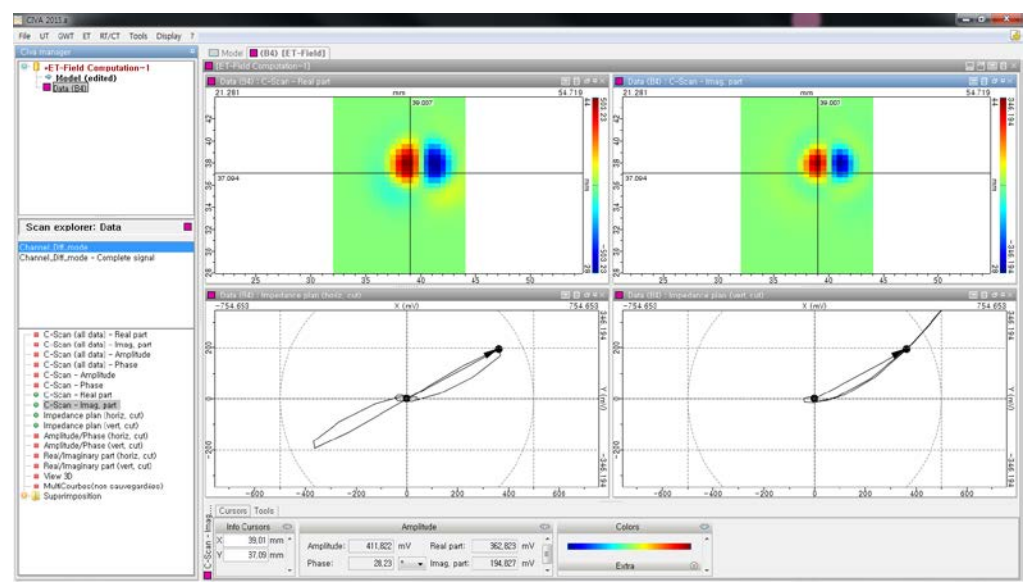
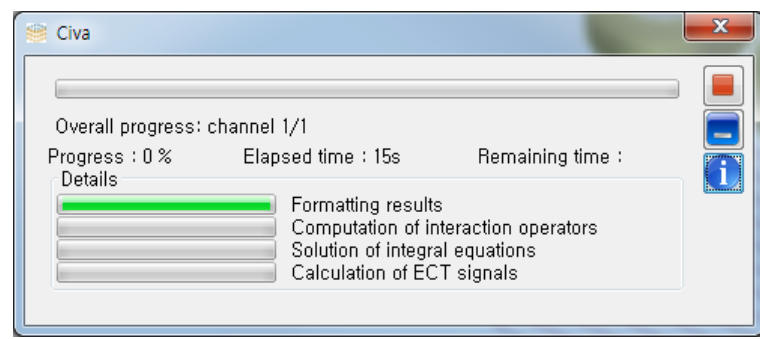
Rotation/Z0deg

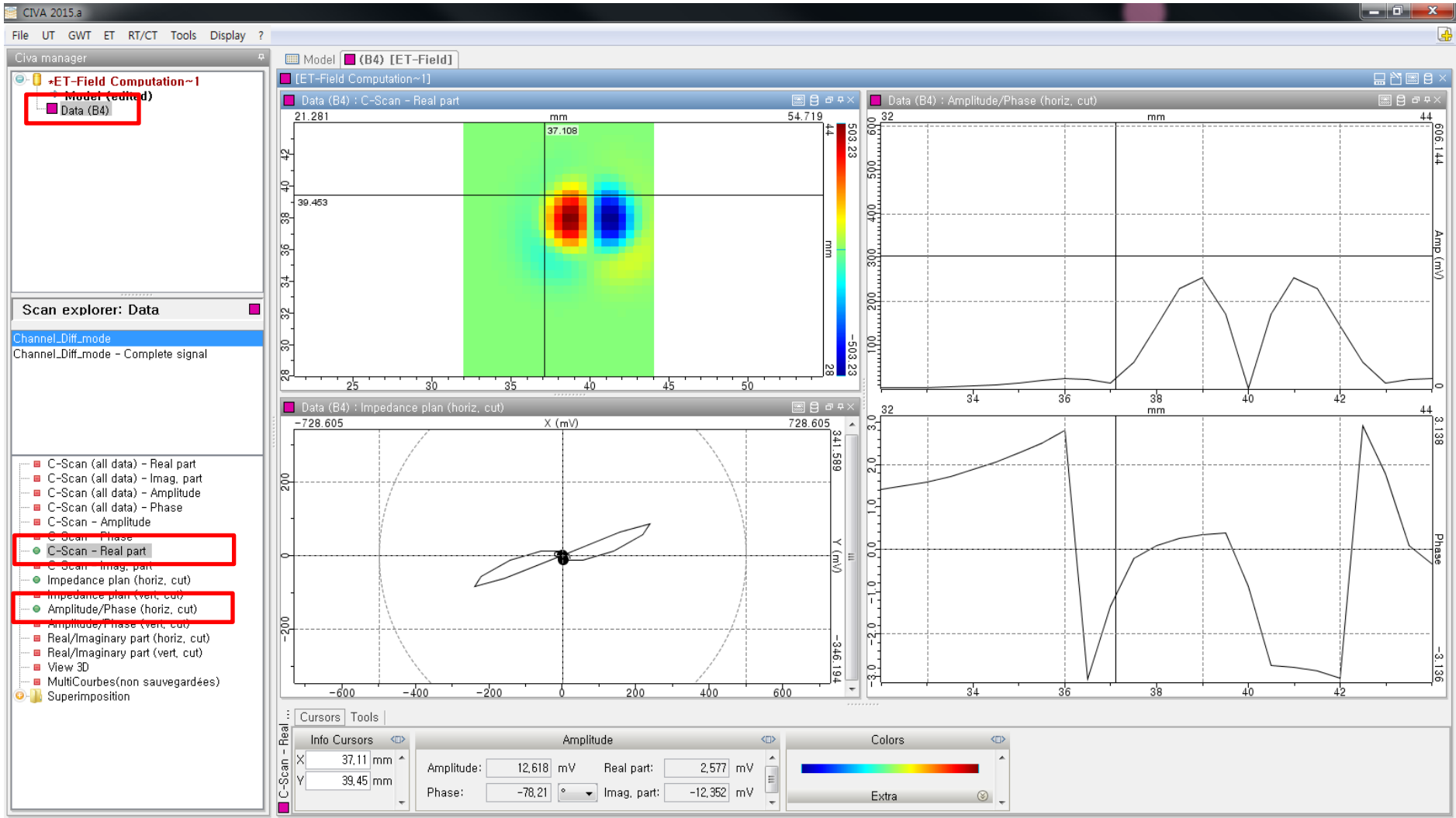


❖Computation parameters 수정 및 Analysis



Run - 해석 진행





Thank You !

대한민국 전기 · 기계

해석설계컨설팅대표회사

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