

Application Note #2

Perform a Field uniformity and TEM mode Verification in RadiMation

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Perform a Field uniformity and TEM mode Verification in RadiMation

According to 61000-4-20 in chapter 5.2 a Field uniformity and TEM mode measurement procedure has to be performed. In this procedure, next to the UFA procedure, it is described that the difference between the primary and secondary component should be verified. And in the following steps it is described how to perform this verification with RadiMation[®].

Test setup

Position the field probe with the Y axis positioned in the field (straight up) on one of the required points of the UFA.



Configure RadiMation

Add and configure field probe drivers

It is important to have 3 device drivers in RadiMation for the same physical field probe, to allow that the field components of the individual X, Y and Z-axis can be measured. Add and configure 3 Field Sensor device drivers in RadiMation which are measuring the 3 different axis.

) Config	juration										
Units	Directories	Device Drivers	Graphs	Database	Language	Measurement settings	Basic standards	Product standards	Enhanced Status Window	Close	e
Device D	Driver Type: Fi	eld sensors								-	
- Availa	able Device Driv	ers									
Descrip	otion						ID	Brand	9		
Radite	q RSS2010I - X	axis						Radit	eq		
Radite	q RSS2010I - Y	axis						Radit	eq		
Radite	q RSS2010I - Z	axis						Radit	eq		
		المراجع ال				A rate		÷	Delete		
		Add				eur Eur		•	Delete		

- Open the driver configuration of each driver and click [Advanced].
- Choose the tab RadiSense and select the applicable axis, X,Y or Z.

Name		Value							<u>O</u> K
Brand		Radite	q						Cancel
Descrip	otion	Radite	q RSS2010	I - X axis					_
Device	driver DLL Version	2021.0	8.31.1257						
Hardw	are Version								Advanced
ID	Raditeq RSS2010I)	×	(Chark
Serial	Communicat	tion	Field	probe		Frequency range	Ok		Ve Check
Softw	RadiCentre	Software	update	RadiSe	nse	User Calibration			Knowledgebase
Type	Direction						Cancel		
	Olsotropic								
	• X-Axis								
	⊖Y-Axis								
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	Filter Setting								
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Cali	Filter Dynamic					~			
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Create a test site in RadiMation

Select the applicable hardware that will be used for immunity tests.

- Signal Generator
- Amplifier
- Coupler
- Antenna
- Forward Power Meter

Add the X-axis fieldprobe as Probe 1, the Y-axis fieldprobe as Probe 2 and the Z-axis fieldprobe as Probe 3.

lest Equipment		TEM Verification			-	Add	Delete]	Close
Devices 1	Devices 2	Field Probes	Pulsed	Cables	Data Logging	Monitoring	Before Action	After Action	Duplicate
Device Type		Descr	iption				ID Bra	and	
Field sensor 1		Radit	eq RSS2010	I - X axis			Ra	diteq	Save
Field sensor 2		Radit	eq RSS2010	I - Y axis			Ra	diteq	
Field sensor 3		Radit	eq RSS2010	I - Z axis			Ra	diteq	
Field sensor 4									
Field sensor 5									
Field sensor 6									
Field sensor 7									
Field sensor 8									
	+ Ad	ld		1	Edit		盲 Remo	ve	

<u>1 Point Calibration</u>

- 1. Close any open EUT files if needed and start a ${\tilde{D}}$ Point Calibration ${\tilde{D}}$.
- 2. Configure the Frequency Range, Step, Level, Method and Distance.
- 3. Click Field Probes^N and select Field Probe 1, 2 and 3. But only apply averaging for the field probe 2. This corresponds to the Y-axis on which the calibration should actually be performed.
- 4. Run Calibration and save the TSF configuration for later use.
- 5. When the calibration is finished, save the Cal file, for example as Point <n>.cal.
- 6. Run the calibration for all other points and use the saved TSF configuration.

Calibrat	tion			-
				Ru
A Q	⊢ ^{Step} — Field Probe Setu	р	×	
	Field Probes		Ok	
	✓ Probe 1 ✓ Probe 2	Average 1 Average 2	Cancel	
	Probe 3	Average 3]	F
c.	Probe 5	Average 5		
	Probe 6	Average 6 Average 7		
-	Probe 8	Average 8		
4	_			
		Test engineer: Administrator	• X	

Open calibration data

When all points are measured the Cal files can be opened and the data can be copied to Excel. In Excel it can be determined if the secondary component does not exceed -6 dB of the primary component.

After opening the cal file, click the icon in front of the Probe $\stackrel{\square}{\uparrow}$ to open the result.

TEM Verification 10 Vm [80MHz - 400MHz].CAL - Radiated Immunity Calibration	- 0 ×		
	Ok		
Settings Description: TEM Verification 10 V/m [80MHz - 400MHz]			
From 80 MHz to 400 MHz with a logarithmic step of 1% Using Forward Power to generate a fixed field of 10 V/m with a tolerance of 0.3 dB	Environment		
Horizontal antenna at 3 m	Note		
Graphs Field Probes	Units		
Image: Signal Generator Power Image: Signal Generator Power			
Reflected Power	<u>G</u> eneral Info		
Average Field Probe 5			
Mid Power Mid Probe 7 Probe 8			
Z Impedance			
Test site Test equipment:			
TEM Verification 👻 🛠			
Test engineer:			
Administrator			
🖸 0 Errors 🗼 0 Warnings 🕕 6 Messages 🏹			
Time - Frequency Event			
10.00.04 DM			
Q Graph: Field Probe 1, Field Probe 2, Field Probe 3			- 0 ×
12:02:34 PM Q Graph: Field Probe 1, Field Probe 2, Field Probe 3 11:52:00 AM Zoom out	<u>/6</u> 6	Graphs	_ 0 ×
12:02:34 PM Q Graph: Field Probe 1, Field Probe 2, Field Probe 3 11:52:00 AM Zoom out 11:52:00 AM Zoom out 11:52:00 AM Table	6 6	Graphs Average Field	- 0 ×
12:02:34 PM Q Graph: Field Probe 1, Field Probe 2, Field Probe 3 11:52:00 AM Zoom out 11:52:00 AM Zoom out 11:50:06 AM Graph 11:50:06 AM Table	極	Graphs Average Field V Field Probe 1 4 Field Probe 2	– • × RadiMation
Image: Second system C Graph: Field Probe 1, Field Probe 2, Field Probe 3 Image: Image: Second system Image: Second system Image: Im	· か	Graphs Average Field Field Probe 1 Field Probe 2 Field Probe 3	– • × RadiMation
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To copy the data to excel, click the button next to the \Box Graphs^D button and paste it in an empty Excel sheet.

UFA Calculation

To calculate the UFA start an $\$ Uniform Field Area Calculation $\$.

- Add all calibration files belonging to the UFA 1.
- Select EN 61000-4-3 2010 Constant field method as calculation method. Choose Calculate. 2.
- 3.
- Save the resulting Cal file which can be used in a immunity test for a substitution test level. 4.



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