PIM Rack Analyzer
Software Option – Virtual Crossband Filter

IM-R-SWO-VIRTUALFI

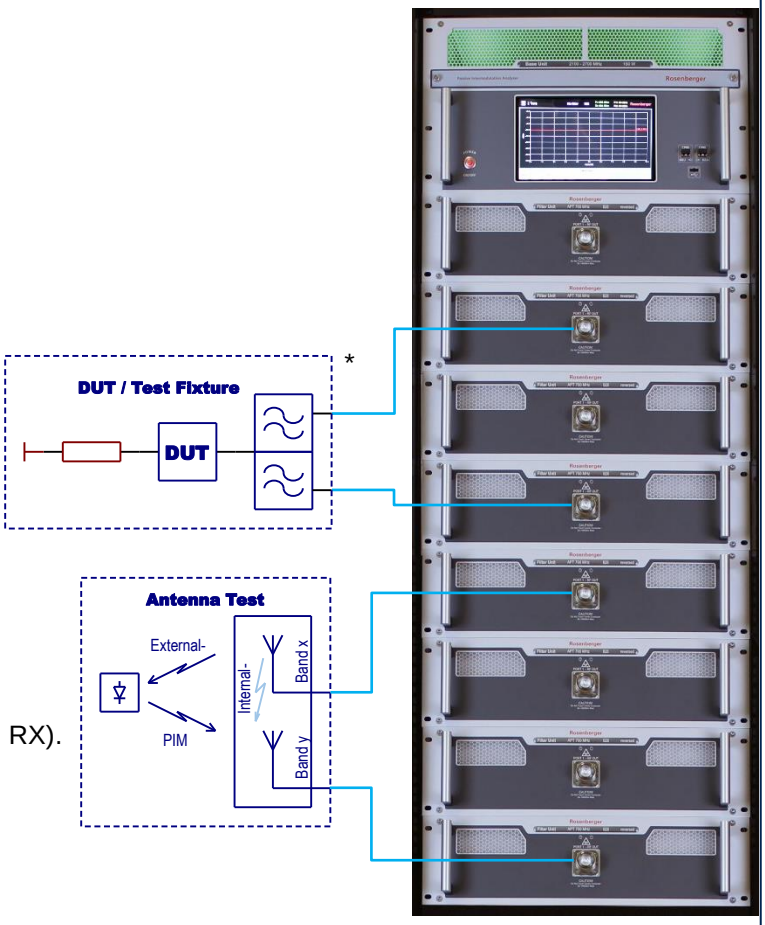
Main Features

Measure Cross Band PIM on various devices
Antennas, Filters, Duplexers, …

Easy configuration

Cost Efficient:
Re-Use of existing standard PIM Filter Units

Versatile:
Combine existing PIM Filter Units to adapt new Cross Band PIM Problems



Principle

The software option allows to create Virtual Cross Band Filters based on existing connected Filter Units.

The new Virtual Cross Band Filter is created combining available signal paths (TX1, TX2 and RX). It derives its frequency limits from the signal paths of the underlying physical Filter Unit.

* Termination of carriers within the test setup is necessary, the receive input is terminated only in Up- and Downlink of respective mobile band.

Configuration Example

Virtual Cross Band Filter — Rosenberger

Pos.	Filter	Tx1	Tx2	Rx	Fwd	Refl
1	**EGSM->PCS**	EGSM 900	EGSM 900	PCS_AWS 1900	EGSM 900	EGSM 900
2	**LTE 600->PCS**	LTE 600	LTE 600	PCS_AWS 1900	LTE 600	LTE 600
3	**AMPS->AWS**	AMPS 850	AMPS 850	PCS_AWS 1900	AMPS 850	AMPS 850
4	NewVirtualCrossBand	...				

Example screenshot for reference only – actual implementation may change.

Problem Setup Detect PIM created by LTE 600 (B71) in PCS 1900 Band (B2)
IM is created from 2x f_1 and 1x f_2, use f_1 and f_2 from LTE600 Filter, measure received PIM signal at PCS AWS 1900 filter.

* The Virtual Filters can also be used via Remote (SCPI) but must be configured locally first.

Possible PIM Scenarios

There are cases where two carriers within one mobile band can create PIM in another Band (1st table), and cases where transmit carriers in two different bands create PIM in a third band (2nd table).

Green: Potentially most interfering IM3 problems, yellow: IM5, orange: IM7, black: common in-band PIM

Cross Band PIM Europe

TX		RX: 700MHz (B28)	RX: 800MHz (B20)	RX: 900MHz (B8)	RX: 2100MHz (B1)
TX	700MHz (B28)		IM3	IM5	
	800MHz (B20)	IM5		IM5	
	900MHz (B8)		IM5		
	1800MHz (B3)				IM3

TX1 / TX2				RX: 700MHz (B28)	RX: 800MHz (B20)	RX: 900MHz (B8)	RX: 1400MHz (B11+21)	RX: 1800MHz (B3)	RX: 2600MHz (B7)
TX1	700MHz (B28)	TX2	800MHz (B20)	IM3	IM3	IM3			
			900MHz (B8)				IM7		IM3
TX1	800MHz (B20)	TX2	900MHz (B8)	IM3			IM7		IM3
TX1	1400MHz (B11+21)	TX2	1800MHz (B3)	IM5	IM5	IM5			
			2100MHz (B1)		IM3	IM3			
TX1	1800MHz (B3)	TX2	2100MHz (B1)	IM7	IM7	IM7	IM3		IM3
TX1	2100MHz (B1)	TX2	2600MHz (B7)	IM7				IM3	

Cross Band PIM US

TX		RX					
		600MHz (B71)	700MHz L (B12+17)	700MHz U (B13+14)	850MHz (B5)	1900MHz (B2)	2300MHz (B30)
TX	600MHz (B71)		IM5			IM3	
	700MHz LU (B12,13,14,17)	IM3			IM5		
	850MHz (B5)			IM7			
	1900MHz (B2+4)						IM3

TX1 / TX2				RX						
				600MHz (B71)	700MHz L (B12+17)	700MHz U (B13+14)	850MHz (B5)	1900MHz (B2)	1900MHz (B2+4)	2300MHz (B30)
TX1	600MHz (B71)	TX2	700MHz LU (B12,13,14,17)				IM3			
TX1	1900MHz (B2)	TX2	1900MHz (B2+4)					IM3	IM3	IM3
			2300MHz (B30)	IM7	IM7	IM7	IM7			
TX1	1900MHz (B2+4)	TX2	2300MHz (B30)	IM7	IM7					

Cross Band PIM Asia

TX		RX		
		850MHz (B5)	900MHz (B8)	2100MHz (B1)
TX	700MHz (B28)	IM3	IM5	
	850MHz (B5)		IM3	
	900MHz (B8)	IM7		
	1800MHz (B3)			IM3
	2100MHz (B1)			

TX1 / TX2				RX				
				700MHz (B28)	850MHz (B5)	900MHz (B8)	1800MHz (B3)	2600MHz (B7)
TX1	700MHz (B28)	TX2	850MHz (B5)	IM3				IM3
			900MHz (B8)					IM3
TX1	850MHz (B5)	TX2	900MHz (B8)	IM5	IM3			
TX1	1800MHz (B3)	TX2	2100MHz (B1)	IM7	IM7	IM7		IM3
TX1	2100MHz (B1)	TX2	2600MHz (B7)	IM7			IM3	

Cross Band PIM Korea

TX		RX: 850MHz (B5)	RX: 900MHz (B8)	RX: 2100MHz (B1)
TX	850MHz (B5)		IM3	
	900MHz (B8)	IM7		
	1800MHz (B3)			IM3

TX1 / TX2				RX: 850MHz (B5)	RX: 900MHz (B8)	RX: 1800MHz (B3)	RX: 2600MHz (B7)
TX1	850MHz (B5)	TX2	900MHz (B8)	IM3			
TX1	1800MHz (B3)	TX2	2100MHz (B1)	IM7	IM7		IM3
TX1	2100MHz (B1)	TX2	2600MHz (B7)			IM3	

Cross Band PIM Japan

TX		RX: 900MHz (B8)	RX: 2100MHz (B1)
TX	700MHz (B28)	IM5	
	1800MHz (B3)		IM3

TX1 / TX2				RX: 700MHz (B28)	RX: 900MHz (B8)	RX: 1400MHz (B11+21)
TX1	700MHz (B28)	TX2	900MHz (B8)			IM7
TX1	1400MHz (B11+21)	TX2	1800MHz (B3)	IM5	IM5	
			2100MHz (B1)		IM3	
TX1	1800MHz (B3)	TX2	2100MHz (B1)	IM7	IM7	IM3

Draft	Date	Approved	Date
Kaindl Benjamin	2020-03-31	Kaindl Benjamin	2020-03-31

Rev.	Engineering change number	Name	Date
a00	20-s002	Kaindl Benjamin	2020-12-03