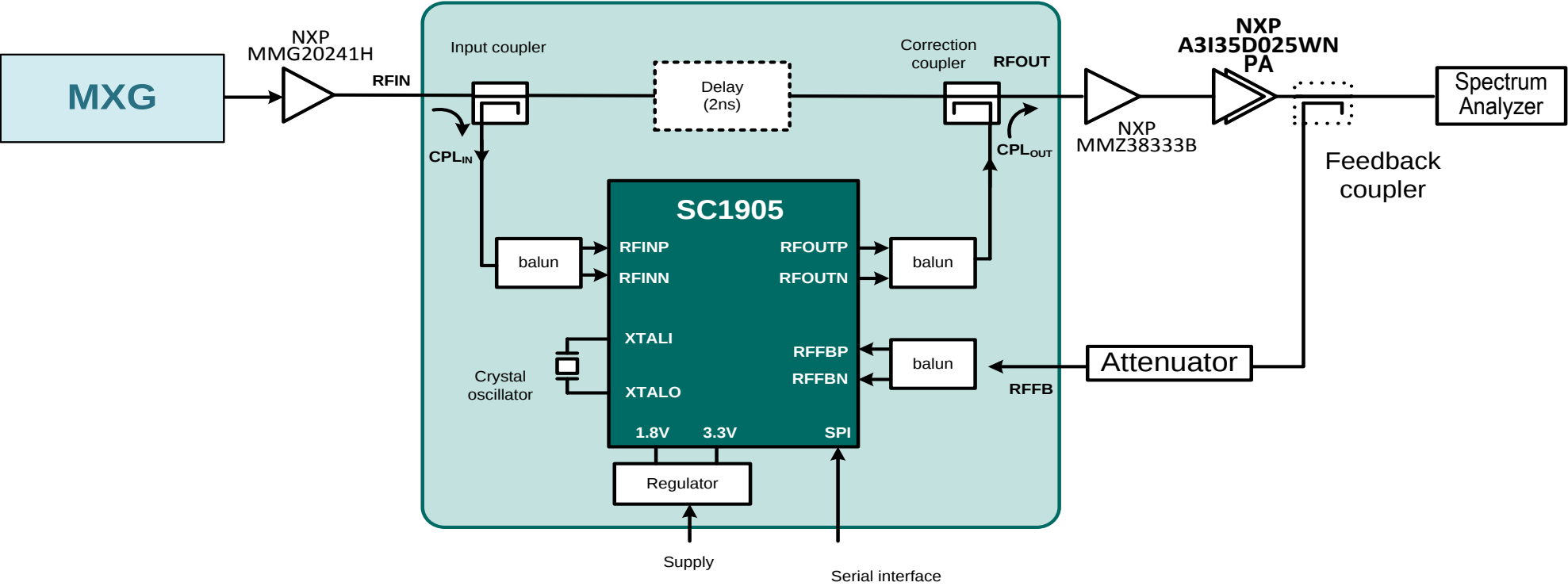


SC1905 100MHz Performance Data at 3.55GHz With NXP A3I35D025WN Doherty PA

Test Set-up with SC1905 and NXP A3I35D025WN at 3.55GHz



SC1905-EVK3400 Test Conditions with NXP Doherty A3I35D025WN

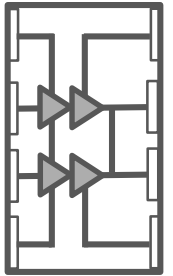
- 100MHz LTE, 5 contiguous 20MHz Carriers (8dB PAR)
- 100MHz LTE, 2 non-contiguous 20MHz 10001 Carriers (8dB PAR)
- Amplifier Data
 - > NXP A3I35D025WN, Doherty, LDMOS
 - > Operating Frequency: 3400-3800 MHz, tuned for 3400-3600MHz
 - > Frequency tested: 3550 MHz
 - > Video Bandwidth: 400MHz
 - > Gain = ~27dB; Psat = P3dB= ~ 45dBm
 - > Vdd=28V
- RFIN Level needs to be higher at 3.5GHz than at other frequencies of operation.
 - Recommendation for all bands (except 3400-3800MHz) is $1 < \text{RFIN AGC (PDET)} < 8$
 - For 3400-3800MHz, recommend using **$7 < \text{RFIN AGC (PDET)} < 14$**

A3I35D025WN

- 28 V LDMOS
- 35 W Peak, 5 W Avg
- 3200-4000 MHz
- >24dB Gain
- >27% efficiency @ 9 dB OBO in Doherty
- Symmetrical Doherty
- TO-270WB low-Rjc plastic package
- 1.7° thermal resistance

Comments:

- Internal baseband termination for wide instantaneous bandwidth applications
- On-chip matching (50 ohm input, DC blocked)
- Integrated quiescent current temperature compensation with enable/disable function
- Designed for predistortion error correction systems



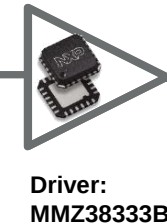
Available Reference Circuits:

3500 MHz

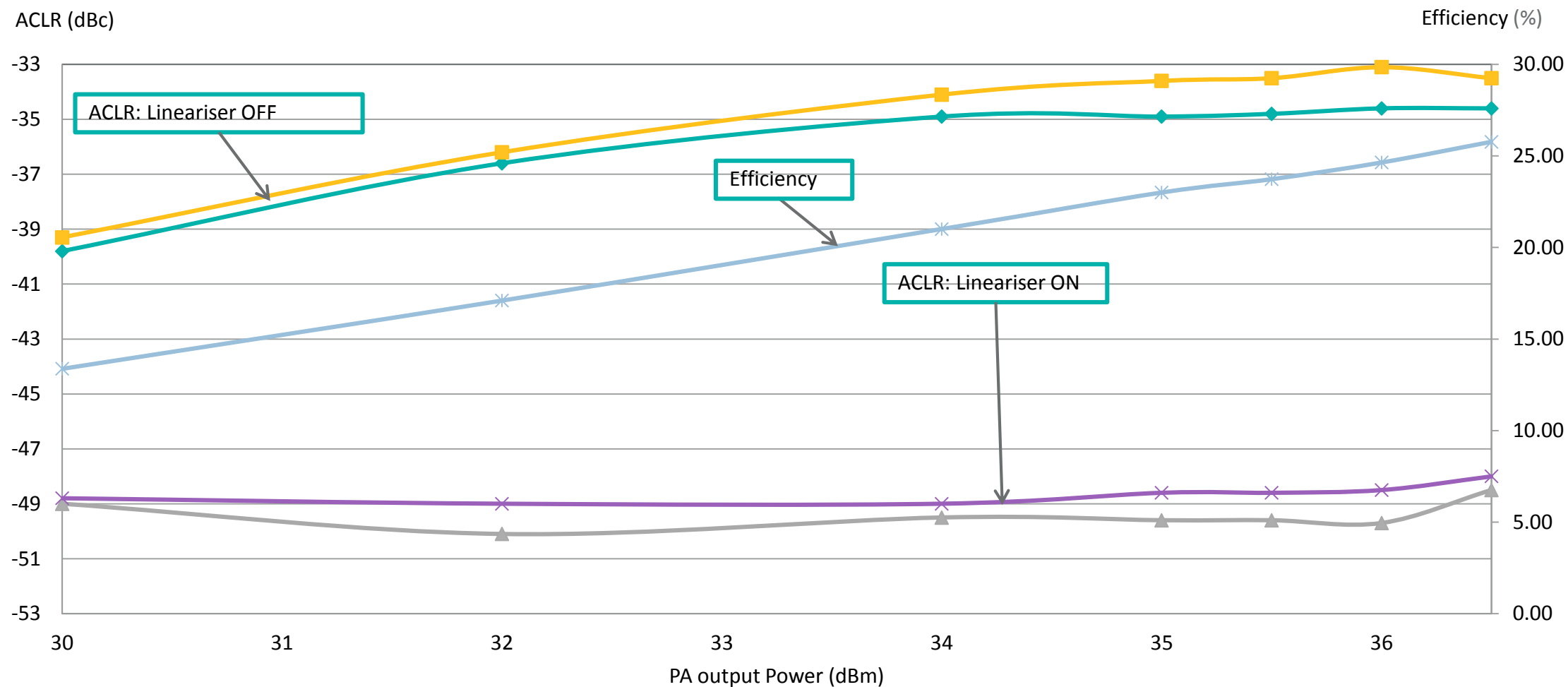
- Typical Single-Carrier W-CDMA Characterization Performance:
 $V_{DD} = 28 \text{ Vdc}$, $I_{DQ1(A+B)} = 72 \text{ mA}$, $I_{DQ2(A+B)} = 260 \text{ mA}$, $P_{out} = 3.4 \text{ W Avg.}$,
Input Signal PAR = 9.9 dB @ 0.01% Probability on CCDF. (1)

Frequency	G _{ps} (dB)	PAE (%)	ACPR (dBc)
3400 MHz	28.5	16.5	-46.5
3500 MHz	28.8	17.0	-46.3
3600 MHz	28.9	17.3	-46.1
3700 MHz	28.7	17.7	-46.4
3800 MHz	28.5	17.9	-46.2

Typical line-up:



ACLR Performance with 5x20MHz (8dB PAR) at 3.55GHz



Contiguous Carrier Configuration 5x20MHz (8dB PAR)

RFPAL Advanced GUI 3.0.1.9

File Help

IC Configuration

Product Version	FW Version	Frequency Range
SC1905-13	6.0.01.00	09 (3300-3800 MHz)
Operation Mode	Min Frequency	Max Frequency
Smooth Adaptation	3400	3600
Duty Cycled Feedback	RFIN AGC(PDET)	RFFB AGC
Off	9.0	4.0

Status

Overall Status	Update Rate
TRACK	0.5 seconds
Center Freq(MHz)	24dBc BW(MHz)
3551	99.0

Reset RFPAL

Error Code	Error Message
0	No error
Warning Code	Warning Message
0	No information
Back-off from Max Power	Using Cal Param #
-0.03	Cal Parameter Set A

RF

	AGC	PMU	+	Offset	=	Power
RFIN Power(dBm)	Warning	-1.14	+	10.00	=	8.86
RFFB Power(dBm)		-9.26	+	0.26	=	-9.00
Average Coeff		19.4				

Board Connected

6.0.01.00

Connected

Customer Controls

ACCP Config FW4.1

Add Firmware Collect Dump File New Log File

USB Adapter NI-CARD

Configure Application

Frequency Range	Min Frequency	Max Frequency
09 (3300-3800 MHz)	3400	3600

Apply Frequency

Available Firmware 6.0.01.00

Load Firmware

Firmware Control

Duty Cycled Feedback	Adaptation State	Correction Enable
Off	Running	FW Control

Operating Mode Functions

Set Cal Param A	Cal Freq
Set Cal Param B	3550
Clear Cal Param	

PMU Functions

Calibrate RFIN PMU	Expected Power
Calibrate RFFB PMU	

Wideband Optimization

Guard Band	2MHz
------------	------

PDET Temp Comp Enabled

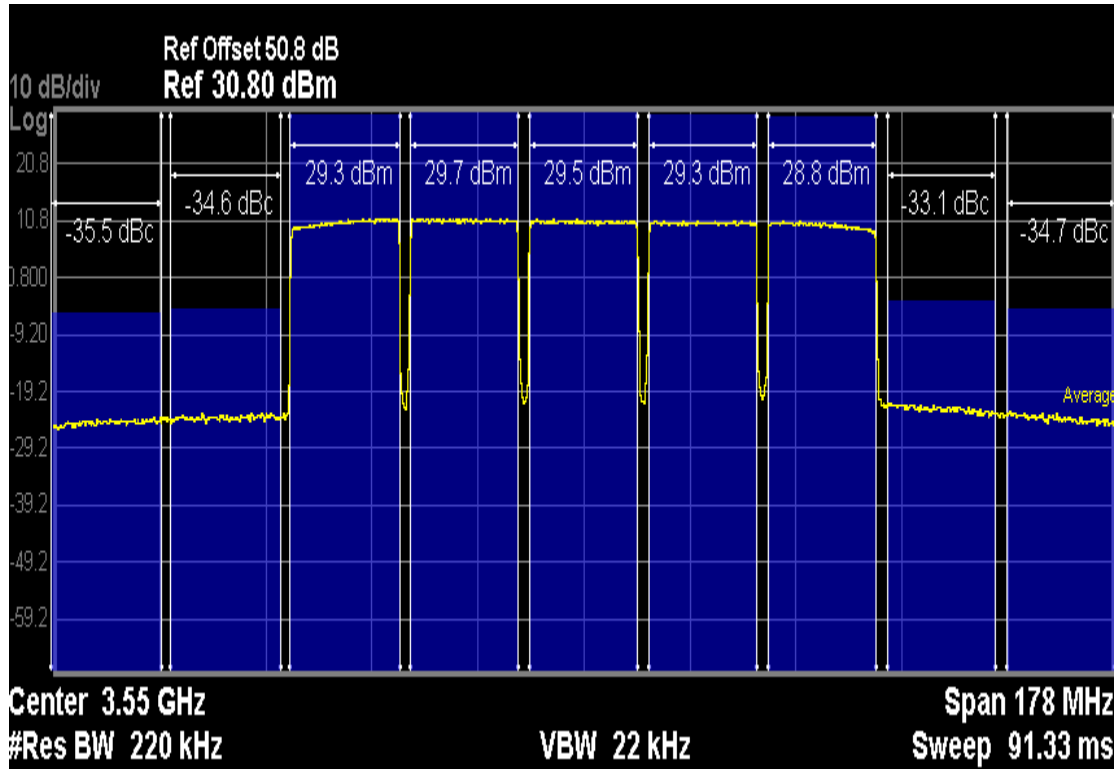
Auto PDET gain Enabled

PDET EEPROM 9

Get Cost Clear Warning

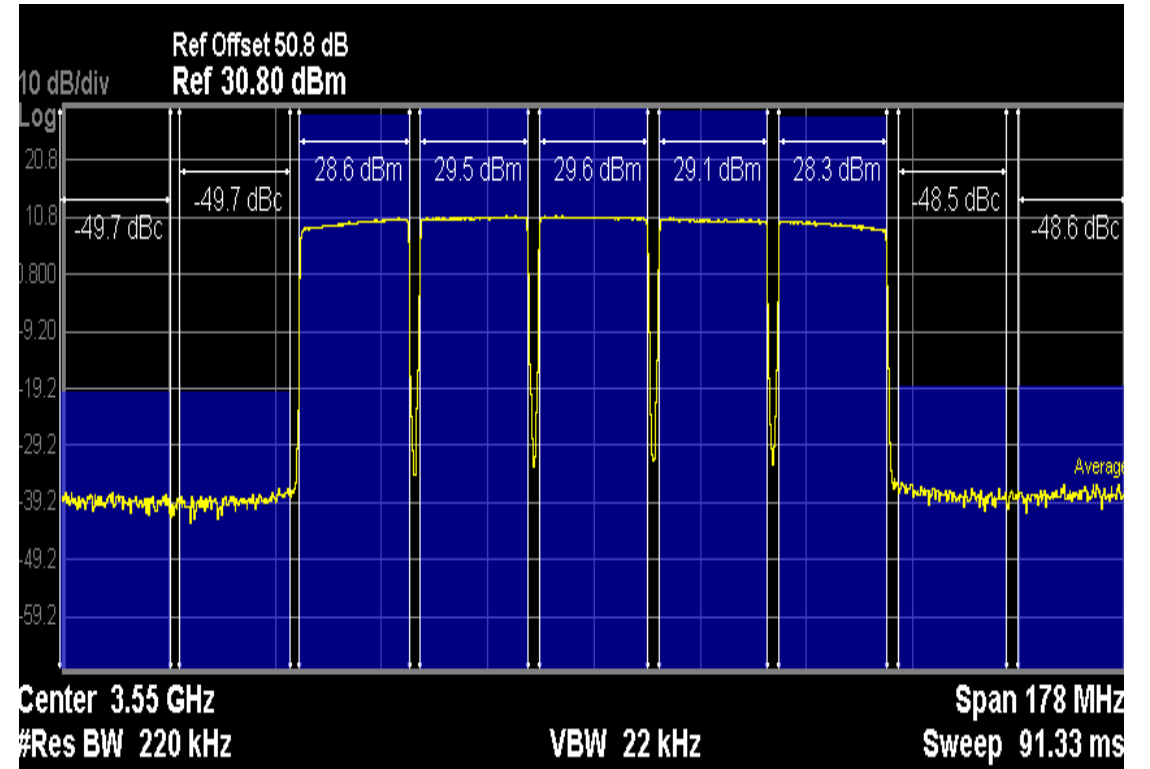
maxim integrated

ACLR Performance with 5x20MHz (8dB PAR) at 3.5GHz 36dBm. Efficiency: 24.5%



SC1905 OFF
-34.6/-33.1dBC

15dB correction



SC1905 ON
-49.7/-48.5dBc

Non-Contiguous Carrier Configuration

The screenshot displays the RFPAL Advanced GUI 3.0.1.9 interface. The 'IC Configuration' section on the left shows 'Product Version' SC1905-13, 'FW Version' 6.0.01.00, and 'Frequency Range' 09 (3300-3800 MHz). The 'Status' section shows 'Overall Status' as TRACK and 'Update Rate' as 0.5 seconds. The 'RF' section shows 'AGC' as Warning, 'PMU' as -3.73, and 'Offset' as 10.00, resulting in a 'Power' of 6.27. The 'Customer Controls' section on the right shows 'ACCP Config' and 'FW4.1' tabs. The 'Configure Application' section shows 'Frequency Range' 09 (3300-3800 MHz), 'Min Frequency' 3550, and 'Max Frequency' 3550. The 'Firmware Control' section shows 'Duty Cycled Feedback' as Off, 'Adaptation State' as Running, and 'Correction Enable' as FW Control. The 'Operating Mode Functions' section shows 'Set Cal Param A' as 3550, 'Set Cal Param B' as empty, and 'Clear Cal Param' as empty. The 'PMU Functions' section shows 'Calibrate RFIN PMU' and 'Calibrate RFFB PMU' buttons. The 'Wideband Optimization' section shows 'Guard Band' as 2MHz. The bottom status bar shows 'Board Connected', '6.0.01.00', and 'Connected'.

RFPAL Advanced GUI 3.0.1.9

File Help

IC Configuration

Product Version: SC1905-13, FW Version: 6.0.01.00, Frequency Range: 09 (3300-3800 MHz)

Operation Mode: Smooth Adaptation, Min Frequency: 3550, Max Frequency: 3550

Duty Cycled Feedback: Off, RFIN AGC(PDET): 9.0, RFFB AGC: 7.0

Status

Overall Status: TRACK, Update Rate: 0.5 seconds

Center Freq(MHz): 3550, 24dBc BW(MHz): 100.0, Reset RFPAL

Error Code: 0, Error Message: No error

Warning Code: 0, Warning Message: No information

Back-off from Max Power: -0.95, Using Cal Param #: Cal Parameter Set A

RF

AGC: Warning, PMU: -3.73, Offset: 10.00, Power: 6.27

RFFB Power(dBm): -11.95, Average Coeff: 20.4

Customer Controls: ACCP Config, FW4.1

Add Firmware, Collect Dump File, New Log File, USB Adapter: NI-CARD

Configure Application

Frequency Range: 09 (3300-3800 MHz), Min Frequency: 3550, Max Frequency: 3550, Apply Frequency

Available Firmware: 6.0.01.00, Load Firmware

Firmware Control

Duty Cycled Feedback: Off, Adaptation State: Running, Correction Enable: FW Control

Operating Mode Functions

Set Cal Param A: 3550, Set Cal Param B, Clear Cal Param

PMU Functions

Calibrate RFIN PMU, Calibrate RFFB PMU, Expected Power

Wideband Optimization

Guard Band: 2MHz

maxim integrated

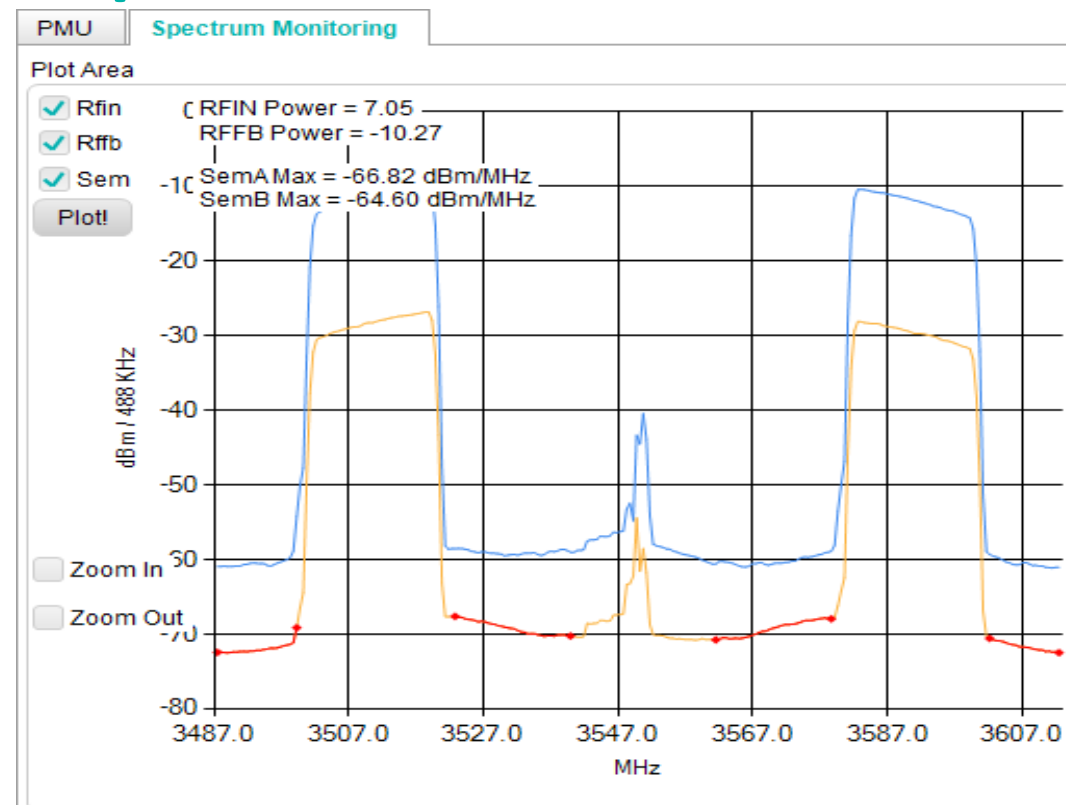
Board Connected, 6.0.01.00, Connected

Required Configuration for Non-contiguous carrier configuration
Min Frequency = Max Frequency

Linearizer Operation Mode 1 to Improve In-Band Correction

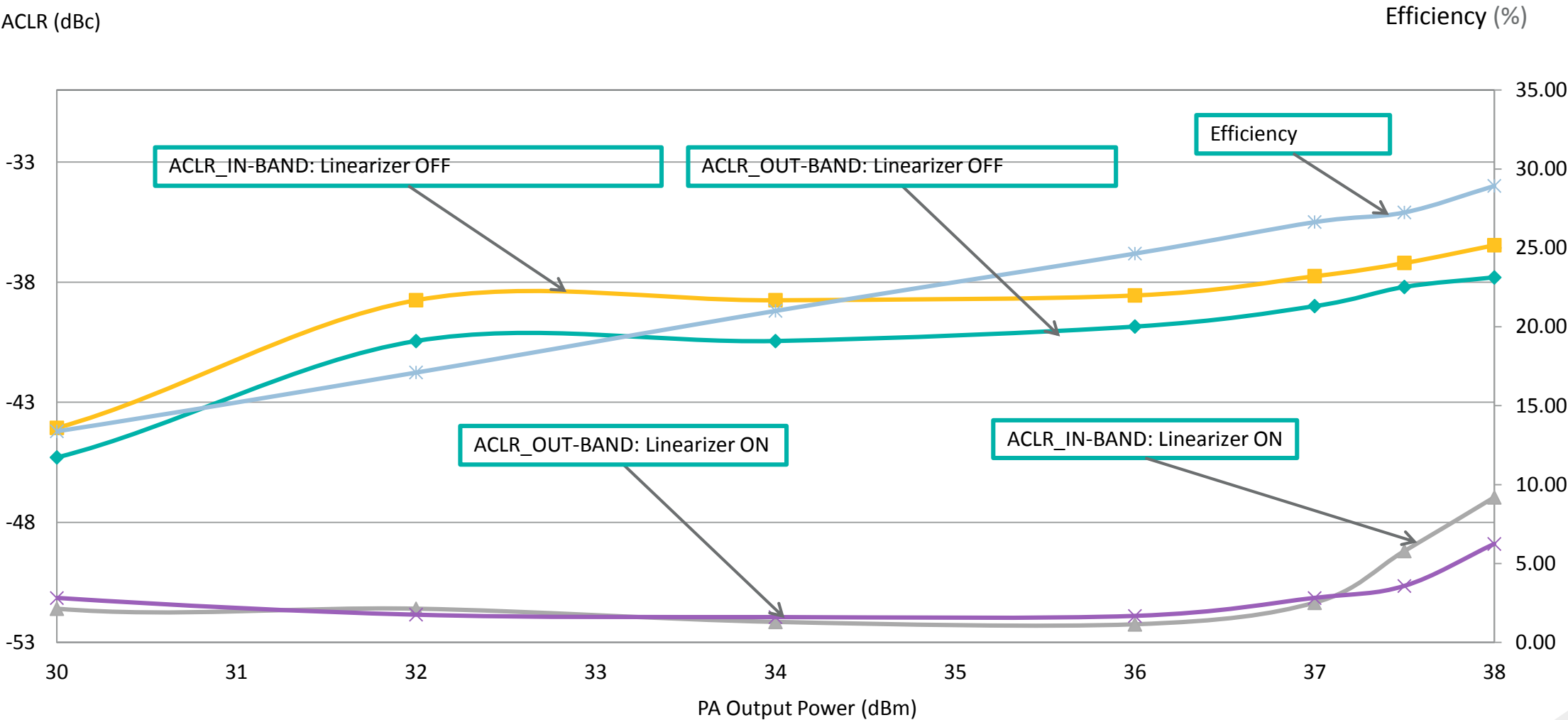
Group	Variable Name	Address	Value
WideBand	NoobWeightFactorUpper	0xFD95	0
WideBand	LowerSemFreqB_MHz	0xFCF0	-79
WideBand	SemMeasBW_MHz	0xFC10	36
WideBand	UpperSemFreqA_MHz	0xFCF1	3
WideBand	UpperSemFreqB_MHz	0xFCF2	-79
WideBand	LowerSemFreqA_MHz	0xFC11	3
WideBand	Linearizer Operation Mode	0xFD5E	1
WideBand	NoobWeightFactorLower	0xFD94	0
WideBand	Customer Definable Guard Bin	0xFC62	3

Wideband Parameters to be configured to define the 4 adaptation zone



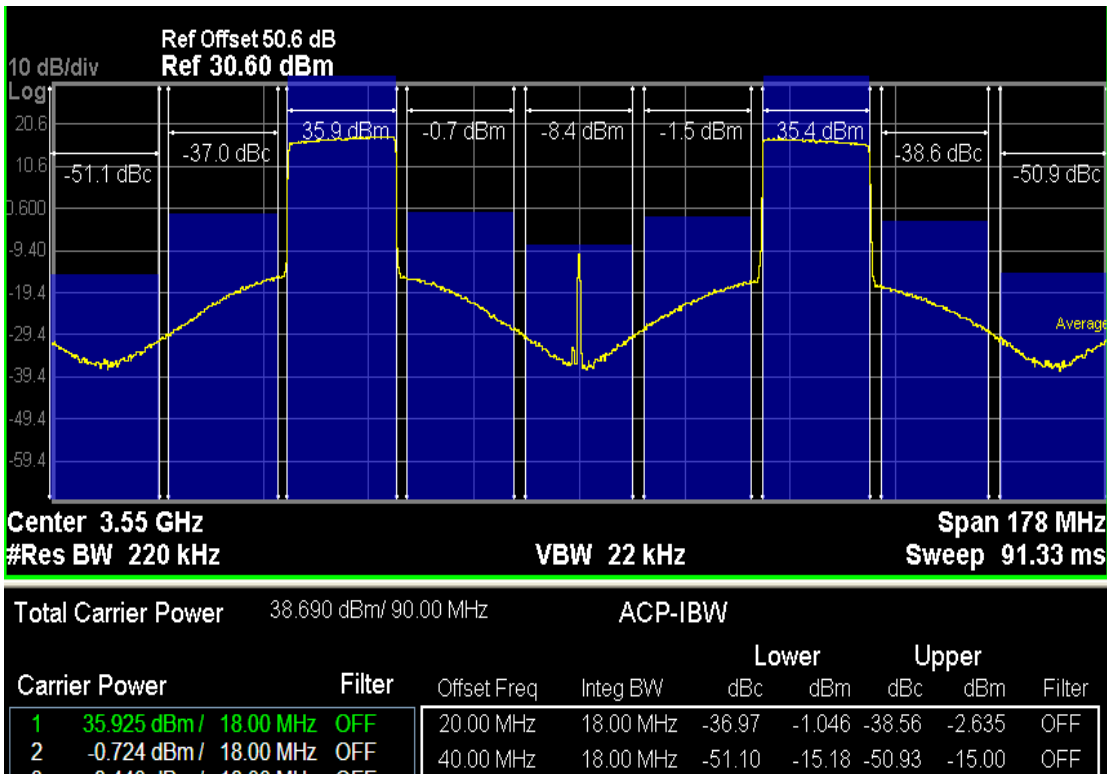
The 4 red zones are defined by the different wideband parameters in the ACCP Config tab of the AdvGUI2.5.10

ACLR Performance with 10001 100MHz (8dB PAR) at 3.55GHz



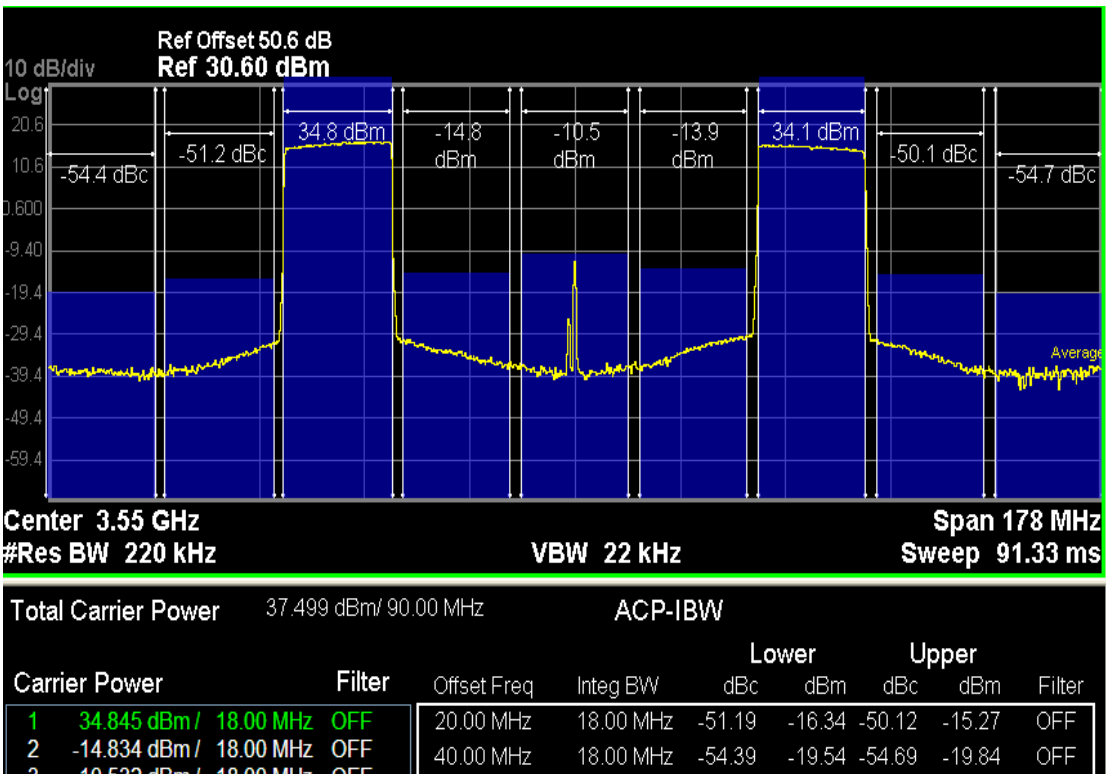
ACLR Performance with 5x20MHz 10001 (~8dB PAR) at 3.55GHz

37.5dBm. Efficiency: 27.25%



SC1905 OFF
Out-of-band IMs
-37/-38.6dBc
In-band IMs
-0.7/-1.5dBm

12-14dB Correction for Out-of-band
and for In-band



SC1905 ON
Out-of-band IMs
-51.2/-50.1dBc
In-band IMs
-14.8/-13.9dBm

