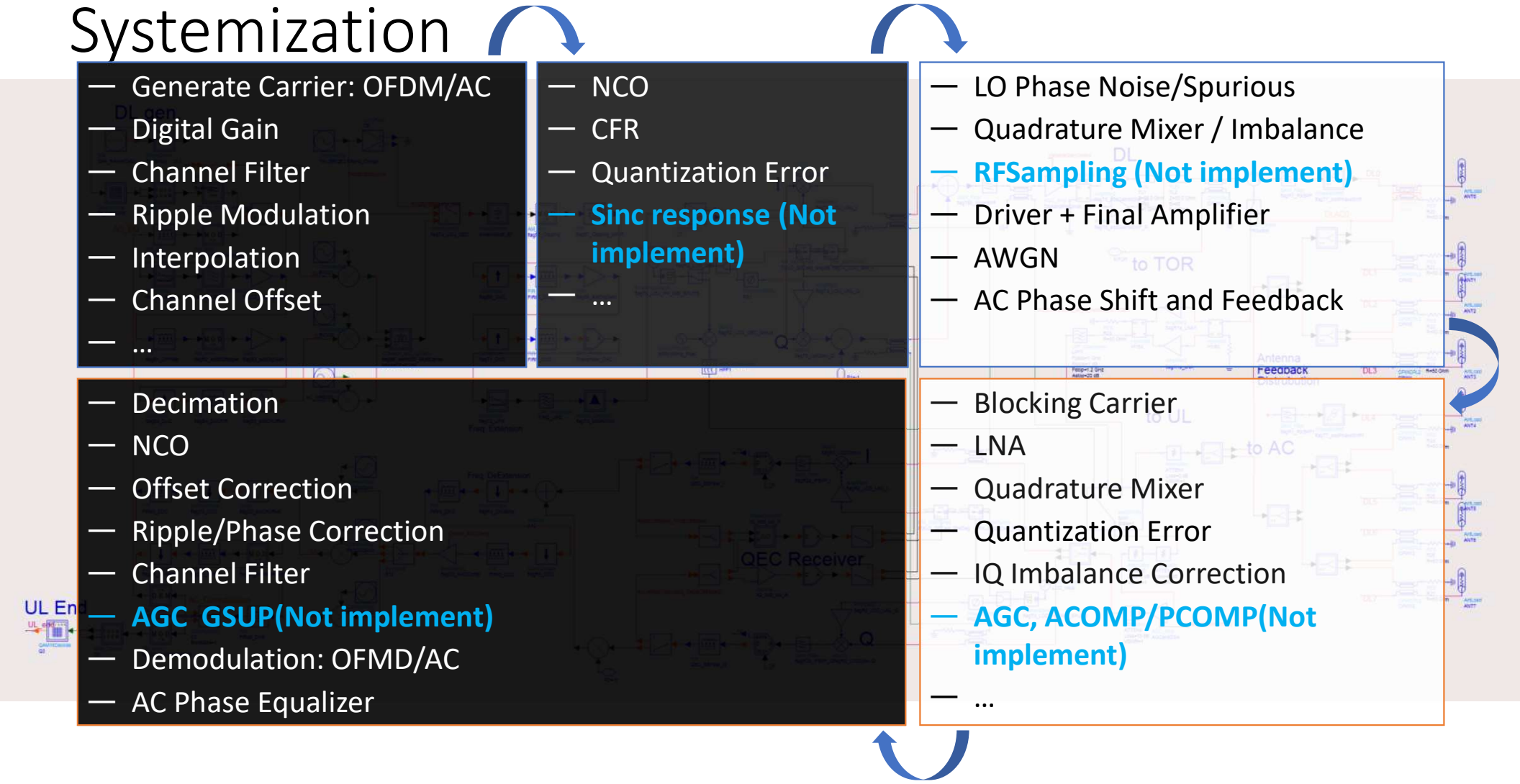
Systemization and Linkbudget by Matlab

Grant

Systemization



- Generate Carrier: OFDM/AC
- Digital Gain
- Channel Filter
- Ripple Modulation
- Interpolation
- Channel Offset
- …

- NCO
- CFR
- Quantization Error
- **Sinc response (Not implement)**
- …

- LO Phase Noise/Spurious
- Quadrature Mixer / Imbalance
- **RFSampling (Not implement)**
- Driver + Final Amplifier
- AWGN
- AC Phase Shift and Feedback

- Decimation
- NCO
- Offset Correction
- Ripple/Phase Correction
- Channel Filter
- **AGC GSUP(Not implement)**
- Demodulation: OFMD/AC
- AC Phase Equalizer

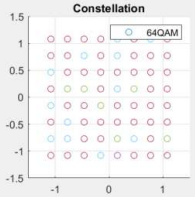
- Blocking Carrier
- LNA
- Quadrature Mixer
- Quantization Error
- IQ Imbalance Correction
- **AGC, ACOMP/PCOMP(Not implement)**
- …

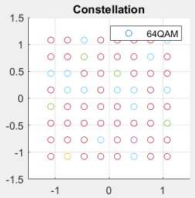
DLAC: DL1+AC+DL2

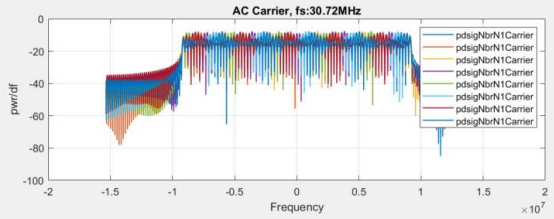
- Generate Carrier: OFDM/AC
- Digital Gain
- Channel Filter
- Ripple Modulation
- Interpolation
- Channel Offset
- …

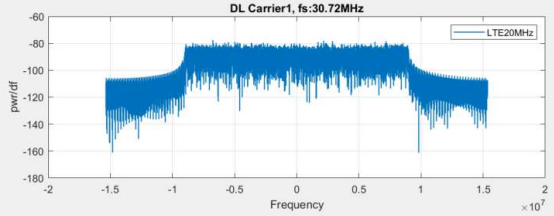
- Decimation
- NCO
- Offset Correction
- Ripple/Phase Correction
- Channel Filter
- **AGC GSUP(Not implement)**
- Demodulation: OFMD/AC
- AC Phase Equalizer

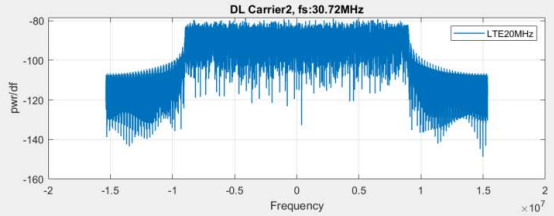
DLAC 20MHz/Carrier











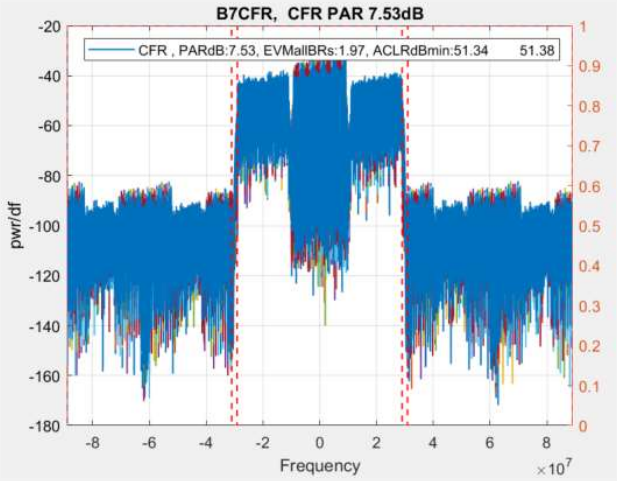
CFR

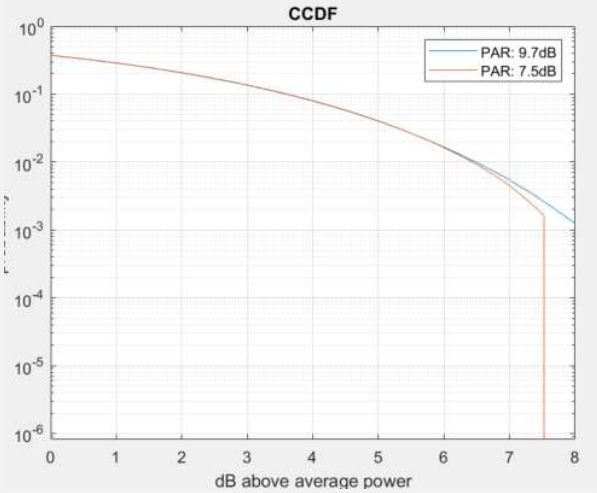
- Generate Carrier: OFDM/AC
- Digital Gain
- Channel Filter
- Ripple Modulation
- Interpolation
- Channel Offset
- …

- NCO
- CFR
- Quant
- **Sinc re… implem…**
- …

- Decimation
- NCO
- Offset Correction
- Ripple/Phase Correction
- Channel Filter
- **AGC GSUP(Not implement)**
- Demodulation: OFMD/AC
- AC Phase Equalizer

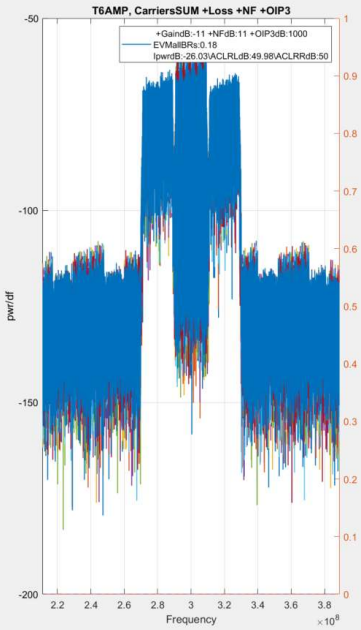
Threshold 7.5dB

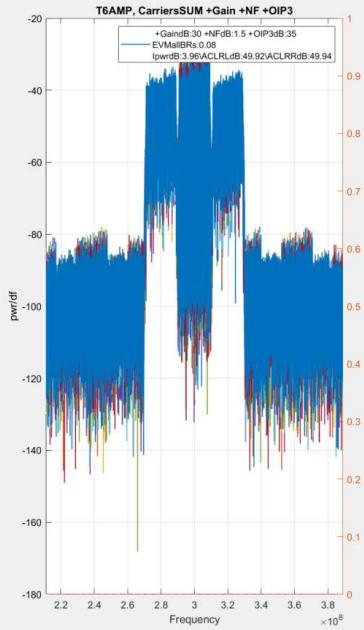


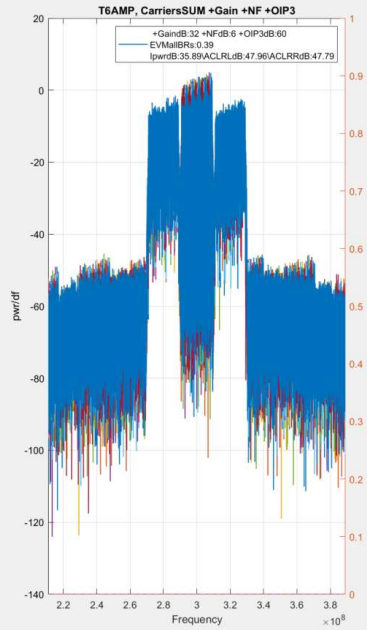


TX Gain Block

3 Stages



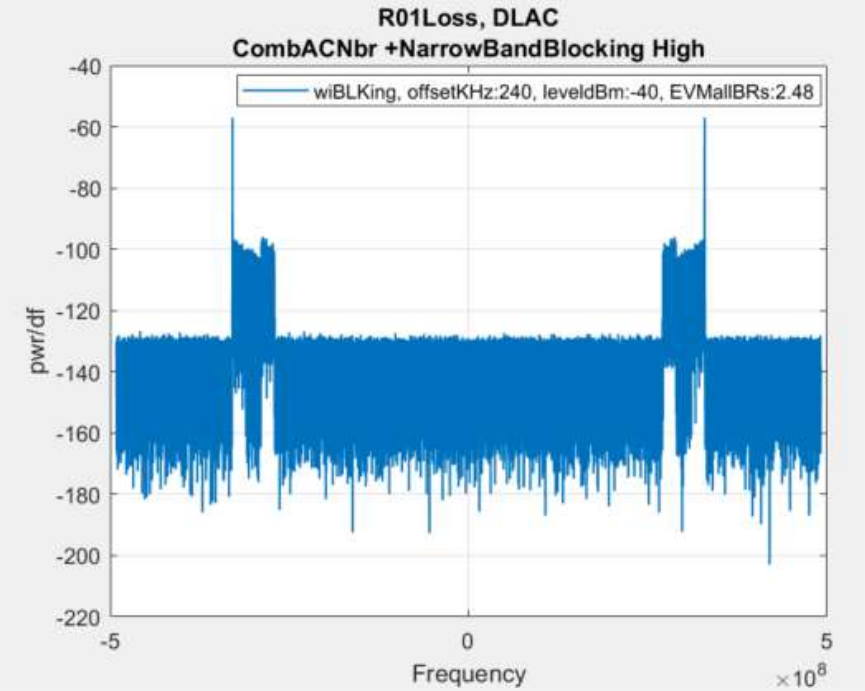




- LO Phase Noise/Spurious
- Quadrature Mixer / Imbalance
- **RFSampling (Not implement)**
- Driver + Final Amplifier
- AWGN
- AC Phase Shift and Feedback

- Blocking Carrier
- LNA
- Quadrature Mixer
- Quantization Error
- IQ Imbalance Correction
- **AGC, ACOMP/PCOMP(Not implement)**
- …

Narrow Band Blocking Right Side



Blocking Carrier

- LO Phase Noise/Spurious
- Quadrature Mixer / Imbalance
- **RFSampling (Not implement)**
- Driver + Final Amplifier
- AWGN
- AC Phase Shift and Feedback

- Blocking Carrier
- LNA
- Quadrature Mixer
- Quantization Error
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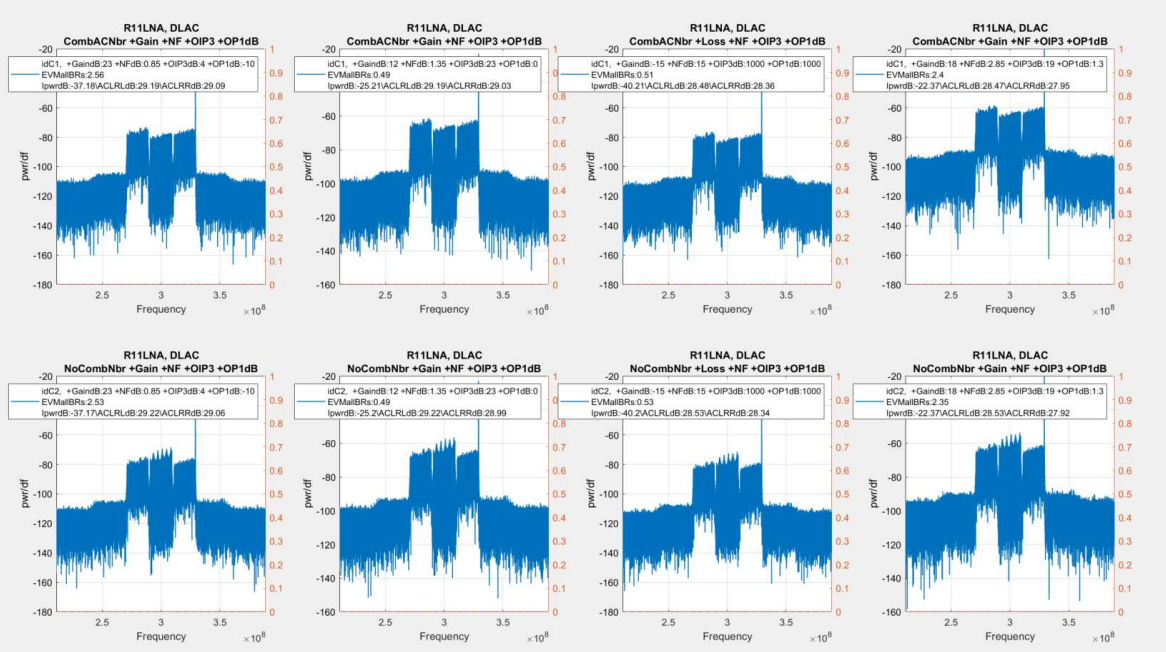
- **AGC, ACOMP/PCOMP(Not implement)**
- …

3 Stages + 1 Stage Atteu.



RX Gain Block

- LO Phase Noise/Spurious
- Quadrature Mixer / Imbalance
- **RFSampling (Not implement)**
- Driver + Final Amplifier
- AWGN
- AC Phase Shift and Feedback

- Blocking Carrier

LNA

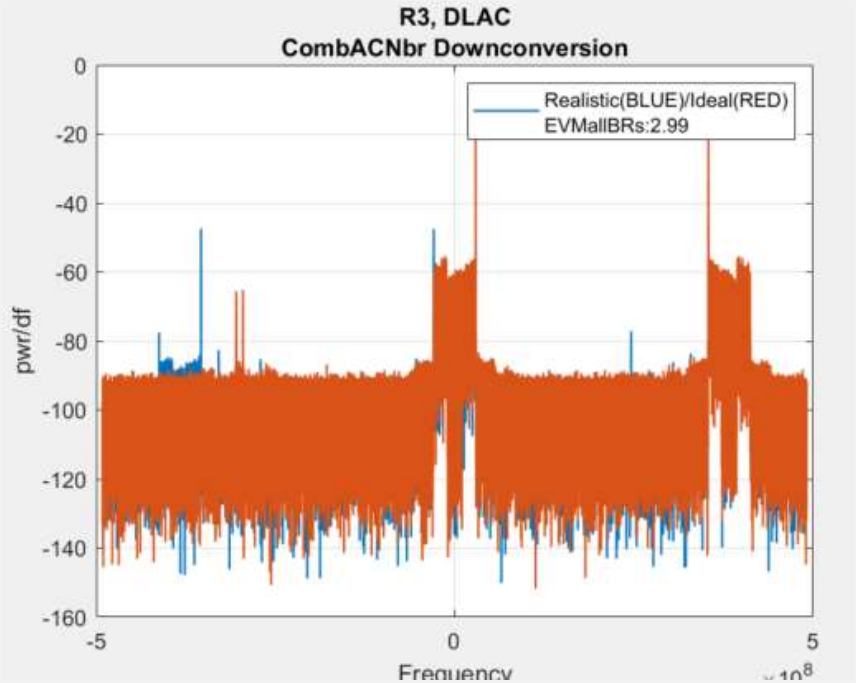
- Quadrature Mixer
- Quantization Error
- IQ Imbalance Correction
- **AGC, ACOMP/PCOMP(Not implement)**
- …

Amp. Imbalance: -0.5dB

Phs. Imbalance: 1deg

IMD3: -60dBc

HD2: -70dBc



Quadrature Mixer

- LO Phase Noise/Spurious
- Quadrature Mixer / Imbalance
- **RFSampling (Not implement)**
- Driver + Final Amplifier
- AWGN
- AC Phase Shift and Feedback

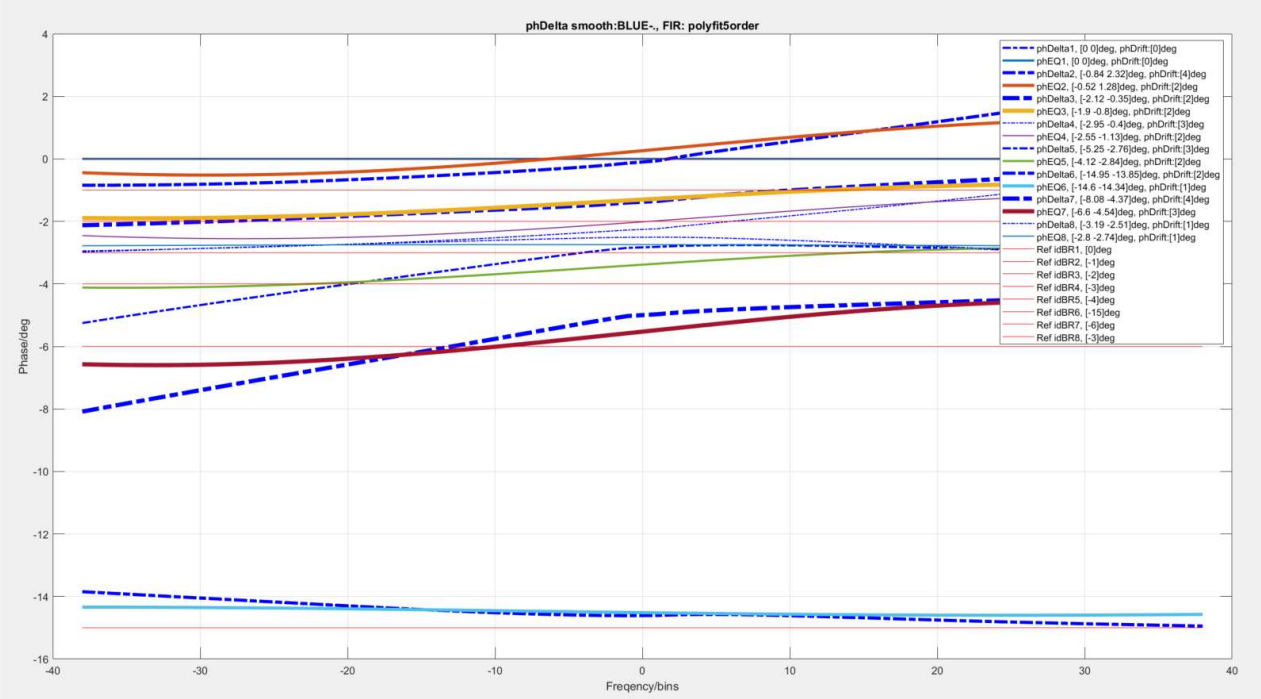
- Blocking Carrier
- LNA
- Quadrature Mixer
- Quantization Error
- IQ Imbalance Correction
- **AGC, ACOMP/PCOMP(Not implement)**
- …

AC Demodulation And Equalizer

- Generate Carrier: OFDM/AC
- Digital Gain
- Channel Filter
- Ripple Modulation
- Interpolation
- Channel Offset
- …

- Decimation
- NCO
- Offset Correction
- Ripple/Phase Correction
- Channel Filter
- **AGC GSUP(Not implem**
- Demodulation: OFMD
- AC Phase Equalizer

Phase Drift and EQ results



EVM List 1

UL Block	Parameters	Sampling freq. (MHz)	EVM_DL1 (%)	EVM_AC (%)	EVM_DL2 (%)
Channel Filter		30.72	0.15	0.44	0.44
Add Ripple	Ripple 4dB	30.72	19.40	21.18	20.80
DUC	X8	245.76	0.43	0.35	0.35
NCO	Sum Carrier	245.76	0.17	0.17	0.18
CFR	Thereshold 7dB	245.76	1.96		
DUC	X2	491.52	0.01		
DUC	X2	983.04	0.07		
Quantization	Vref 1.4, Nbits 12	983.04	0.01		
Up Conversion		983.04	0		
BPF		983.04	0.01		
Gain Stage 1	ACLRdB: 50	983.04	0.18		
Gain Stage 2	ACLRdB: 49	983.04	0.08		
Gain Stage 3	ACLRdB: 47	983.04	0.39		
Gain Stage Final	ACLRdB: 46	983.04	0.14		

EVM List 2

UL Block	Parameters	Sampling freq. (MHz)	EVM_DL1 (%)	EVM_AC (%)	EVM_DL2 (%)
Carrier Couple	Pin -60dBm	983.04	2.47		
Add Blocking	NB 1RB	983.04	2.47		
BPF		983.04	2.47		
Gain Stage 1	NFdB 0.9, OIP3dBm 4	983.04	2.36		
Gain Stage 2	NFdB 12 OIP3dBm 1.4	983.04	0.45		
Attenu. Stage	ILdB 15	983.04	0.27		
Gain Stage 3	NFdB 2.9 OIP3dBm 19	983.04	2.23		
Down Conversion	IMB AmpdB -0.5 IMB Phsdeg 1 IMD3dB -60 HD2dB -70	983.04	2.99		
BPF		983.04	0.02		

EVM List 3

UL Block	Parameters	Sampling freq. (MHz)	EVM_DL1 (%)	EVM_AC (%)	EVM_DL2 (%)
DDC	/4	245.76	0.15		
Quantization	Vref 1.4, Nbits 12	245.76	0.06		
AWGN	NSD/Hz -150	245.76	0.13		
NCO	Spilt Carrier	245.76	NA	NA	NA
DDC	/8	30.72	0.81	0.7	0.7
Ripple Corr.	Refer to WF. Of DL Channel	30.72	3.45	4.37	4.4
Channel Filter		30.72	2.41	1.57	1.62
Demodulation		30.72	3.71	NA	1.64