SAS-2
Comprehensive Stressed Receiver Sensitivity Test

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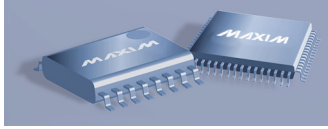
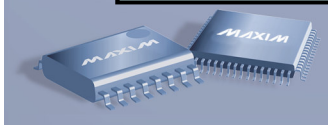
T10/07-380r1



Proposed Link Budget

- From 07-365r0

	[mV$_{pk-pk}$]	[mV$_{rms}$]	[dB]		Comments
V_{P2P} (max)	1200				Tx peak-to-peak output voltage
			6.02	P_{TE}	Tx maximum equalization gain
VMA_T (max)	1000				Tx maximum output amplitude
VMA_T (min)	600				Tx minimum output amplitude
	-299		6.00	P_A (max)	Channel VMA loss
VMA at Output of Channel → VMA_R (min)	301				Rx minimum input amplitude
			15.40	TWDP	Tx waveform and dispersion penalty
Tx Waveform and Channel Dispersion Penalty			3.10	P_{ILD}	Insertion loss deviation
			0.50	P_{UJ}	Uncorrelated jitter
			21.79	P_{ALLOC}	Total allocated dispersion penalty
			2.79	M	Unallocated margin (≥ 0, hopefully)
Theoretical Required VMA Post Equalization → VMA_{SX}	61				Sensitivity adjusted for crosstalk
Near End Cross Talk → σ_X		2.7			Crosstalk (RMS)
			1.96	P_{BT4}	Matched filter vs. Bessel filter
$VMA = Q \cdot (\sigma_1 + \sigma_0)$ VMA_{MFB}	49				Matched filter bound sensitivity
$VMA = 7.03 * (3.4 + 3.4) = 48$ → VMA_S	48				Rx nominal sensitivity
		3.4			Electronics noise and slicer uncertainty
	0				
$Q = \frac{VMA}{\sigma_1 + \sigma_0}$ → Q_0 =	7.03	for BER	1.0E-12		Target signal-to-noise ratio



Proposed Jitter Budget

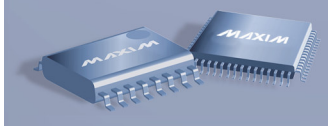
- **From 07-365r0**

Compliant Tx Jitter Contribution
RJ = 140 mUI pk-pk
BUJ = 35 mUI pk-pk

[mUI]

	NC-DDJ (pk-pk)	BUJ (pk-pk)	RJ (pk-pk)	RJ (RMS)	UJ (RMS)	TJ (pk-pk)	*Comments*
TX		35	140	10	**20**		*Tx output jitter*
	316						*Tx waveform and dispersion*
	90						*Insertion loss deviation*
				9			*Crosstalk*
RX							
		200	140	10			*Rx clock and data recovery*
Total	406	235	235	17		876	*Total jitter (≤ 1 UI, hopefully)*
						946	*What if RJ = UJ (e.g. BUJ = 0)?*

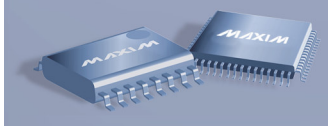
f_s = 6.000 GBd



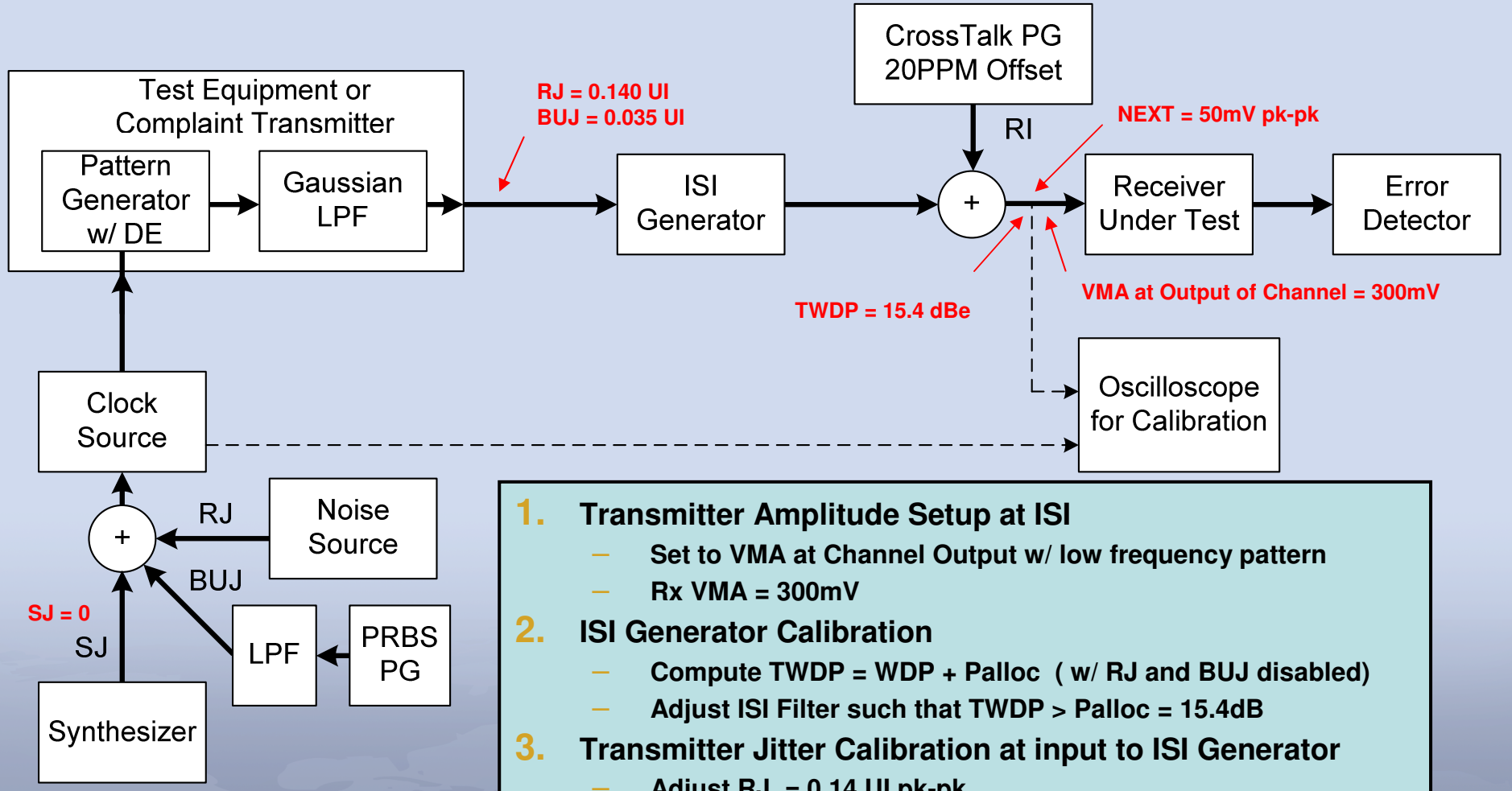
Summary of Specifications from Link Budget

- **Link Budget can be used to setup compliance test**

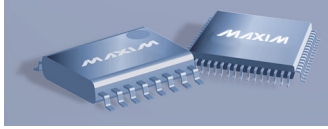
		CR Point	
	Note	Units	
VMA	1	mV	300
BUJ (peak-to-peak)	2	UI	0.035
RJ (peak-to-peak)	2	UI	0.14
RI (peak-to-peak)	3	mV	50
TWDP	4	dBe	15.7
Notes			
1) Voltage Modulation Amplitude is measured at CR after the ISI generator.			
2) Jitter is measured at the input to the ISI generator.			
3) NEXT is calibrated at CR with the the device under test powered down, the test is run will all phy active with normal traffic.			
4) TWDP is the total of Tx waveform and ISI generator induced power penality.			



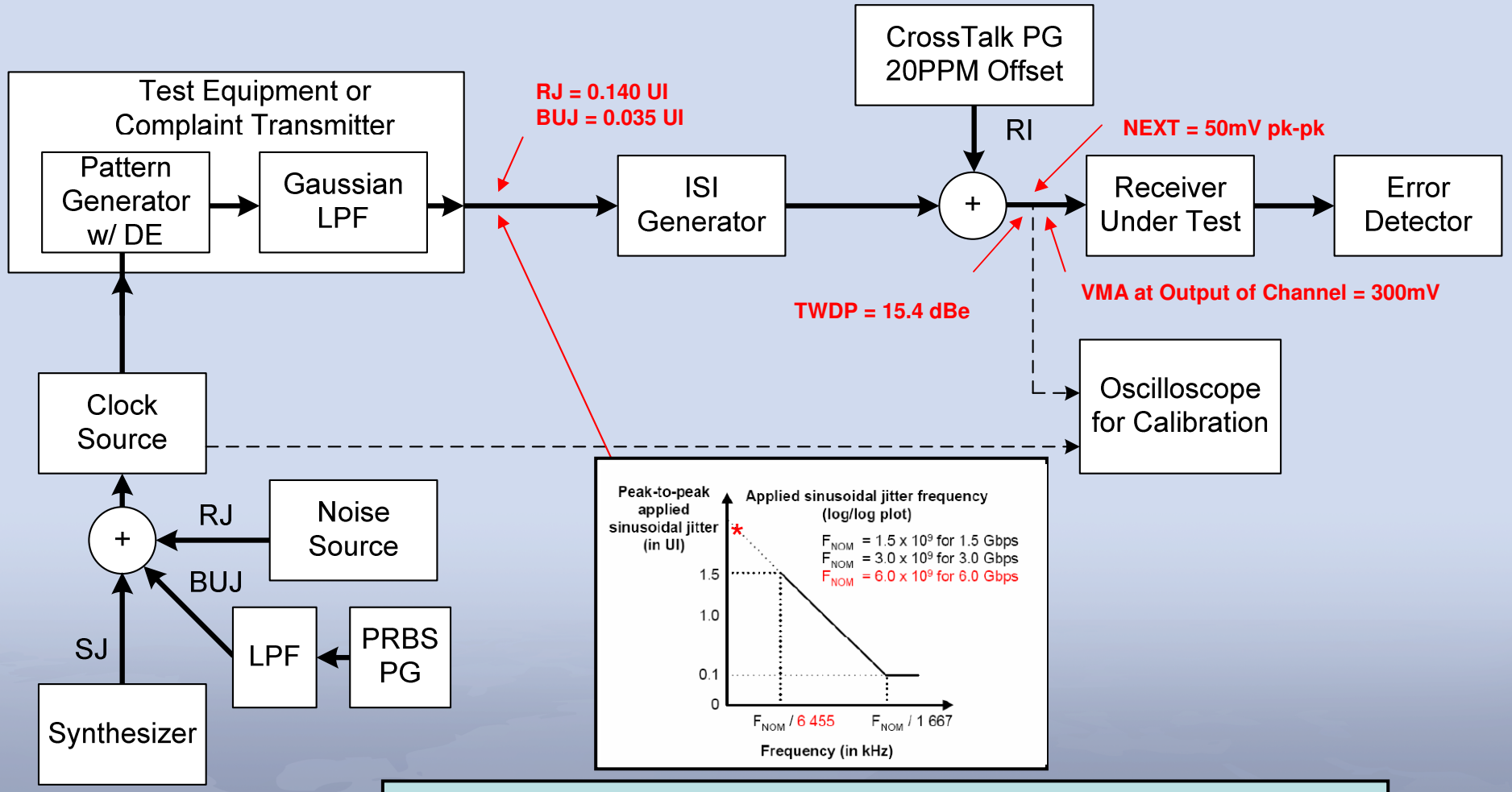
Receiver Comprehensive Sensitivity Test



1. **Transmitter Amplitude Setup at ISI**
   - Set to VMA at Channel Output w/ low frequency pattern
   - Rx VMA = 300mV
2. **ISI Generator Calibration**
   - Compute TWDP = WDP + Palloc (w/ RJ and BUJ disabled)
   - Adjust ISI Filter such that TWDP > Palloc = 15.4dB
3. **Transmitter Jitter Calibration at input to ISI Generator**
   - Adjust RJ = 0.14 UI pk-pk
   - Adjust BUJ = 0.035 UI pk-pk
4. **Crosstalk**
   - Use Bounded Crosstalk Source and Adjust Amplitude to 50mV
5. **Test – Confirm BER < 1e-12**



Receiver Jitter Tolerance Test



1. **Calibrate Test Per Comprehensive Receiver Sensitivity Test**
2. **Sweep SJ per mask Figure 117.**
3. **SSC tolerance test? (*) Test at 30KHz, +/- 2500 PPM, 5000PPM**
4. **Test – Confirm BER < 1e-12**

Summary

- **Overview of a Link Budget Based Comprehensive Receiver Compliance Test Provided.**
- **Calibration Method Reviewed**
- **Jitter Tolerance Test Proposed**