5. Peak-Average Ratio

5.1. Limit

IC

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4.4, the peak-to-average power ratio (PAPR) of the transmitter shall not exceed 13 dB for more than 0.1% of the time and shall use a signal corresponding to the highest PAPR during periods of continuous transmission.

5.2. Test Procedure

The test follows section 5.2.3.4 of ANSI C63.26-2015.

See instrumentation-specific application literature for further guidance regarding use of the CCDF capability. The following guidelines are offered for performing a CCDF measurement.

a. Set resolution/measurement bandwidth ≥ OBW or specified reference bandwidth.

b. Set the number of counts to a value that stabilizes the measured CCDF curve.

c. Set the measurement interval as follows:

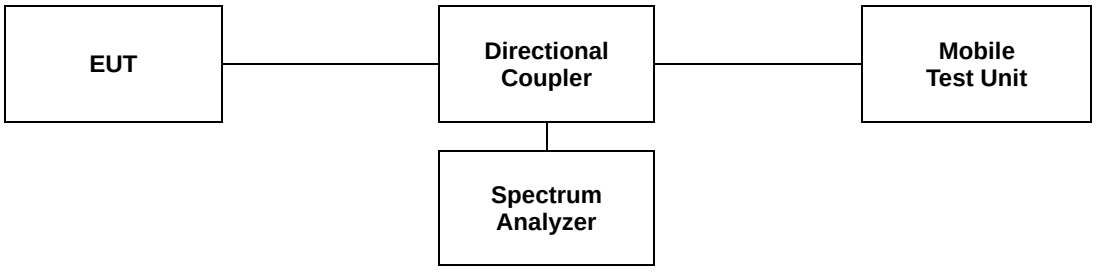
1) For continuous transmissions, set to greater of [10 x (number of points in sweep) x (transmission symbol period)] or 1 ms.

2) For burst transmissions, employ an external trigger that is synchronized with the EUT burst timing sequence, or use the internal burst trigger with a trigger level that allows the burst to stabilize. Set the measurement interval to a time that is less than or equal to the burst duration.

3) If there are several carriers in a single antenna port, the peak power shall be determined for each individual carrier (by disabling the other carriers while measuring the required carrier) and the total peak power calculated from the sum of the individual carrier peak powers.

d. Record the maximum PAPR level associated with a probability of 0.1 %.

e. The peak power level is calculated form the sum of the PAPR value from step d) to the measured average power.



5.3 Test Results

Ambient temperature : (23 ± 1) ℃
Relative humidity : 47 % R.H.

SISO

Band	SCS (㎑)	BW (㎒)	Mode	Frequency (㎒)	PAR (㏈)	
					DFT-S-OFDM	CP-OFDM
41 (FCC)	30	20	64QAM	2 506.02	6.55	8.26
				2 592.99	6.14	7.36
				2 679.99	6.12	7.33
		30	64QAM	2 511.00	6.41	8.09
				2 592.99	6.23	7.62
				2 674.98	6.14	7.57
		40	64QAM	2 516.01	6.29	8.14
				2 592.99	6.20	7.68
				2 670.00	6.12	7.65
		50	64QAM	2 521.02	6.32	8.09
				2 592.99	6.29	7.97
				2 664.99	6.32	7.91
		60	64QAM	2 526.00	6.81	8.20
				2 592.99	6.78	8.20
				2 659.98	6.78	8.26
		80	64QAM	2 536.02	7.13	8.43
				2 592.99	7.13	8.20
				2 649.99	7.13	8.32
		90	64QAM	2 541.00	7.39	8.49
				2 592.99	7.39	8.38
				2 644.98	7.42	8.26
		100	64QAM	2 546.01	7.57	8.67
				2 592.99	7.57	8.58
				2 640.00	7.54	8.58
Band	**SCS (㎑)**	**BW (㎒)**	**Mode**	**Frequency (㎒)**	**PAR (㏈)**	
					DFT-S-OFDM	**CP-OFDM**
41 (IC)	30	20	64QAM	2 510.01	6.52	8.26
				2 595.00	6.17	7.39
				2 679.99	6.12	7.33
		30	64QAM	2 515.02	6.38	8.12
				2 595.00	6.17	7.59
				2 674.98	6.14	7.57
		40	64QAM	2 520.00	6.32	8.06
				2 595.00	6.17	7.74
				2 670.00	6.12	7.65
		50	64QAM	2 525.01	6.35	8.09
				2 595.00	6.38	7.91
				2 664.99	6.32	7.91
		60	64QAM	2 530.02	6.81	8.49
				2 595.00	6.84	8.23
				2 659.98	6.78	8.26
		80	64QAM	2 540.01	7.16	8.43
				2 595.00	7.16	8.32
				2 649.99	7.13	8.32
		90	64QAM	2 545.02	7.45	8.55
				2 595.00	7.42	8.41
				2 644.98	7.42	8.26
		100	64QAM	2 550.00	7.30	8.58
				2 595.00	7.30	8.35
				2 640.00	7.54	8.58

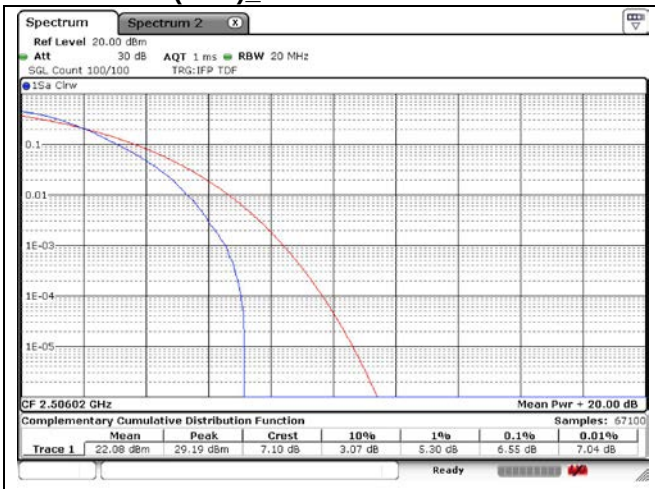
MIMO

Band	SCS (㎑)	BW (㎒)	Mode	Frequency (㎒)	PAR (㏈)	
					CP-OFDM	
					Port 1	Port 2
41 (FCC)	30	20	64QAM	2 506.02	8.09	8.23
				2 592.99	8.03	8.29
				2 679.99	7.71	8.23
		30	64QAM	2 511.00	8.20	8.38
				2 592.99	8.17	8.38
				2 674.98	7.91	8.46
		40	64QAM	2 516.01	8.17	8.58
				2 592.99	8.06	8.78
				2 670.00	7.91	8.61
		50	64QAM	2 521.02	8.46	8.23
				2 592.99	8.32	8.43
				2 664.99	8.23	8.46
		60	64QAM	2 526.00	8.55	8.46
				2 592.99	8.52	8.61
				2 659.98	8.55	8.61
		80	64QAM	2 536.02	8.43	8.35
				2 592.99	8.17	8.32
				2 649.99	8.32	8.32
		90	64QAM	2 541.00	8.72	8.58
				2 592.99	8.55	8.55
				2 644.98	8.46	8.67
		100	64QAM	2 546.01	8.52	8.75
				2 592.99	8.26	8.81
				2 640.00	8.20	8.75

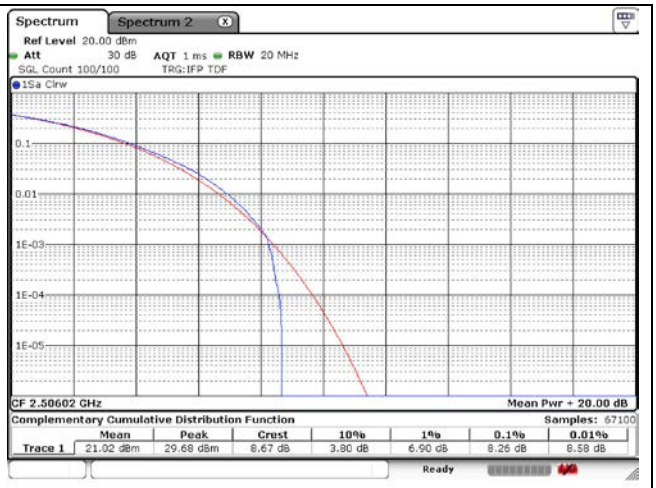
Band	SCS (㎑)	BW (㎒)	Mode	Frequency (㎒)	PAR (㏈)	
					CP-OFDM	
					Port 1	Port 2
41 (IC)	30	20	64QAM	2 510.01	8.14	8.06
				2 595.00	7.86	8.32
				2 679.99	7.71	8.23
		30	64QAM	2 515.02	8.23	8.29
				2 595.00	8.20	8.43
				2 674.98	7.91	8.46
		40	64QAM	2 520.00	8.14	8.52
				2 595.00	8.06	8.61
				2 670.00	7.91	8.61
		50	64QAM	2 525.01	8.46	8.26
				2 595.00	8.41	8.35
				2 664.99	8.23	8.46
		60	64QAM	2 530.02	8.55	8.49
				2 595.00	8.52	8.61
				2 659.98	8.55	8.61
		80	64QAM	2 540.01	8.43	8.32
				2 595.00	8.38	8.32
				2 649.99	8.32	8.32
		90	64QAM	2 545.02	8.81	8.67
				2 595.00	8.58	8.58
				2 644.98	8.46	8.67
		100	64QAM	2 550.00	8.55	8.84
				2 595.00	8.29	8.78
				2 640.00	8.20	8.75

- Test plots

NR band 41 (FCC)_SISO



20 ㎒ Low Channel - Full RB - DFT-S-OFDM



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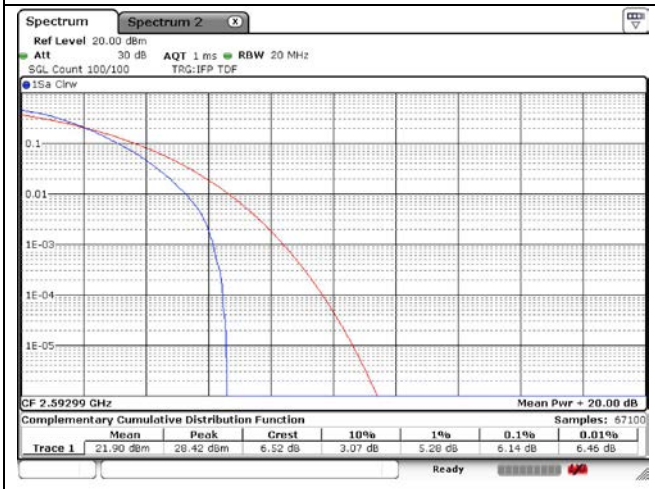
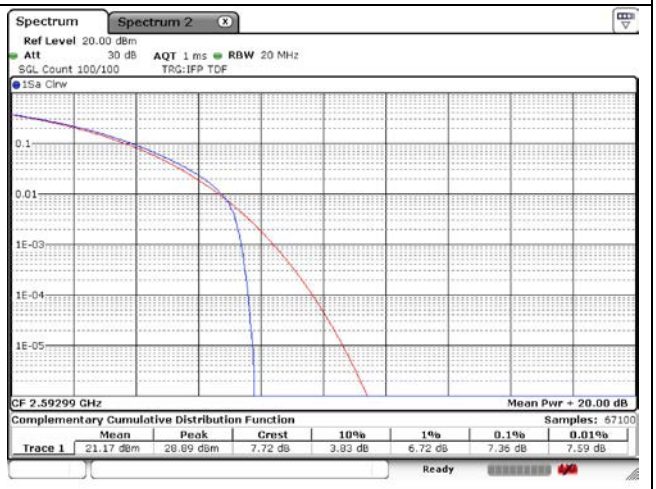


20 ㎒ Middle Channel - Full RB - DFT-S-OFDM



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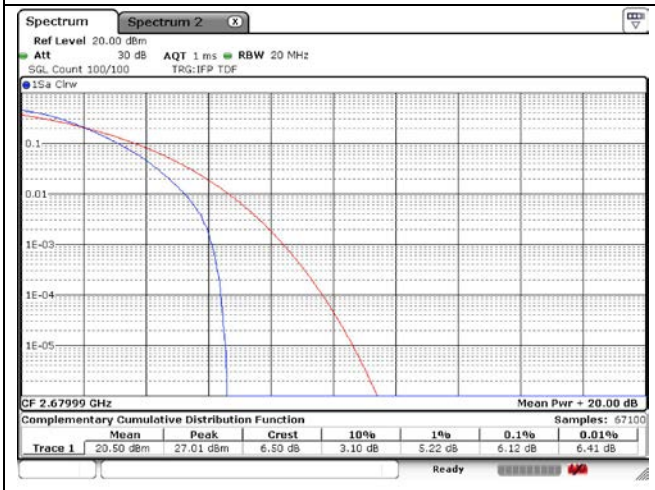

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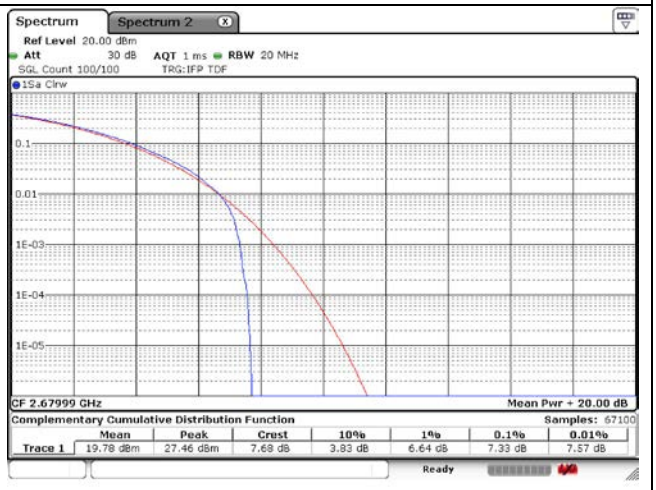

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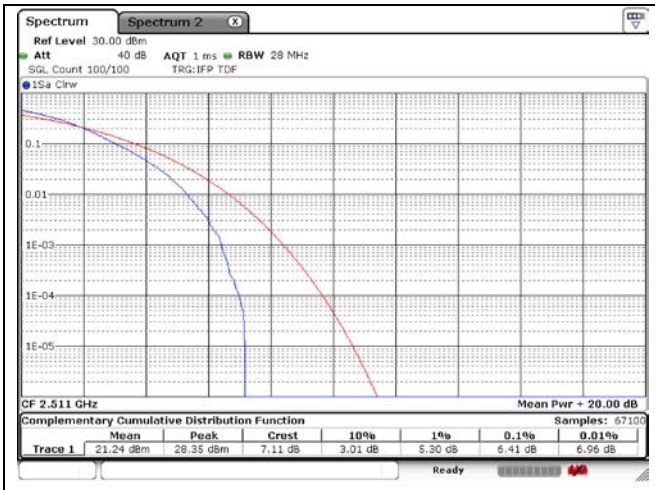
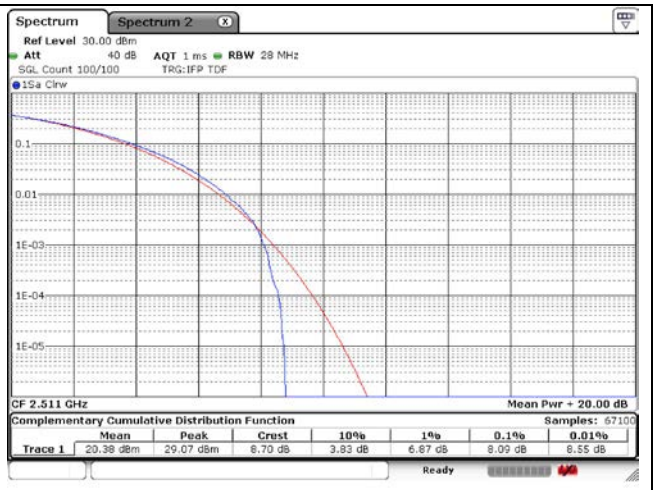


30 ㎒ Low Channel - Full RB - DFT-S-OFDM



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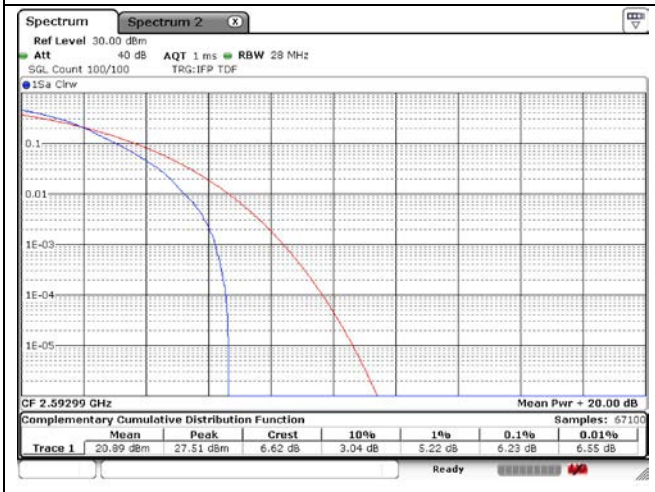

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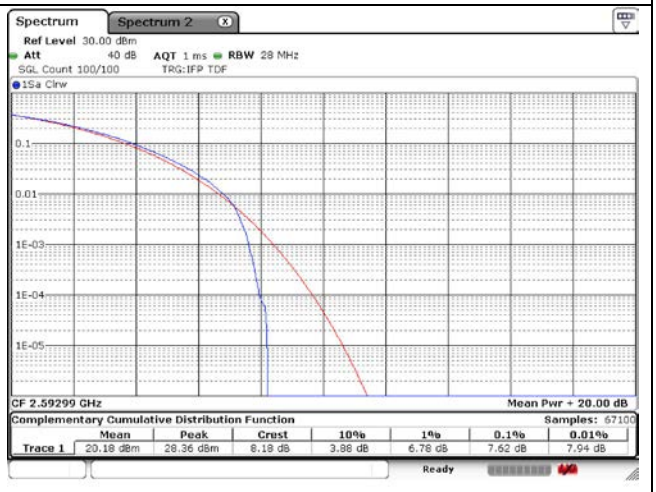

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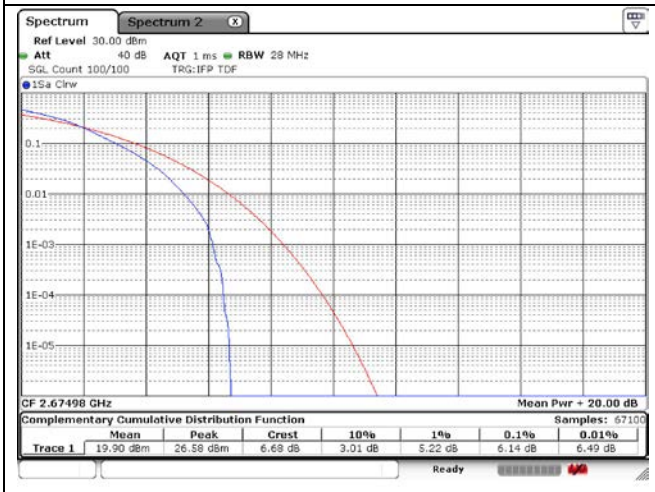

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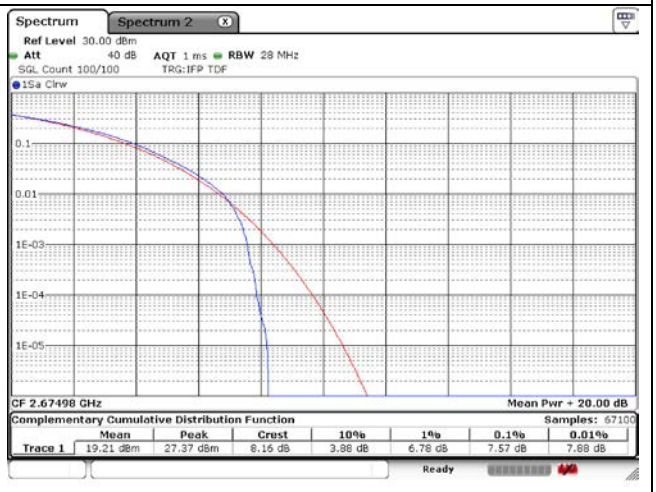

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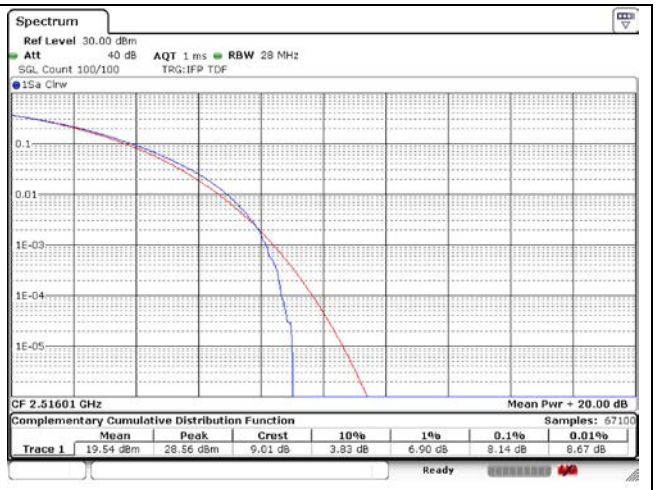
40 ㎒ Low Channel - Full RB - DFT-S-OFDM



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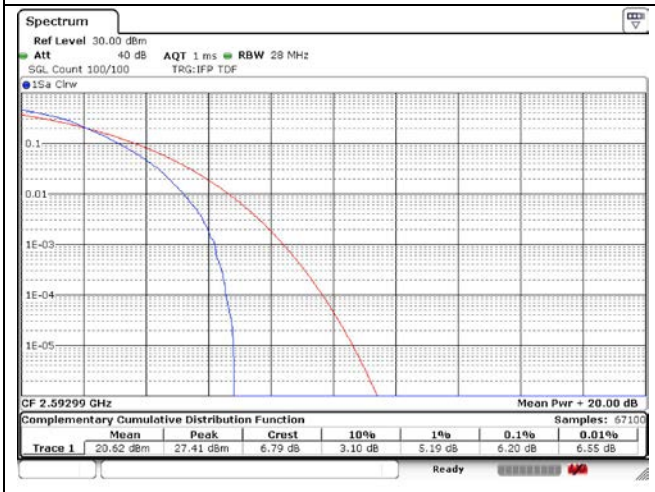

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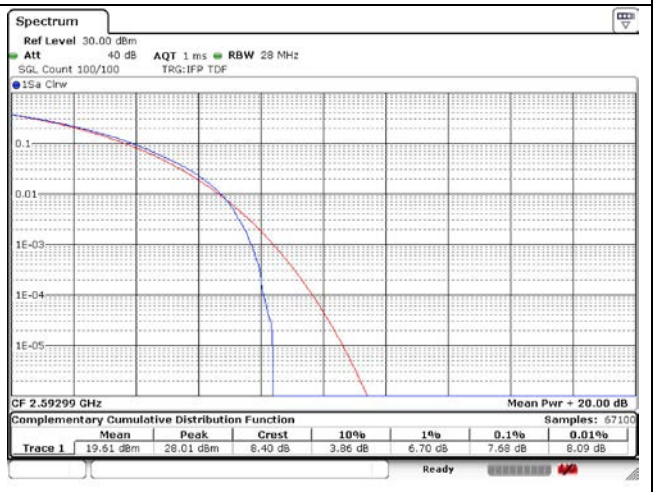

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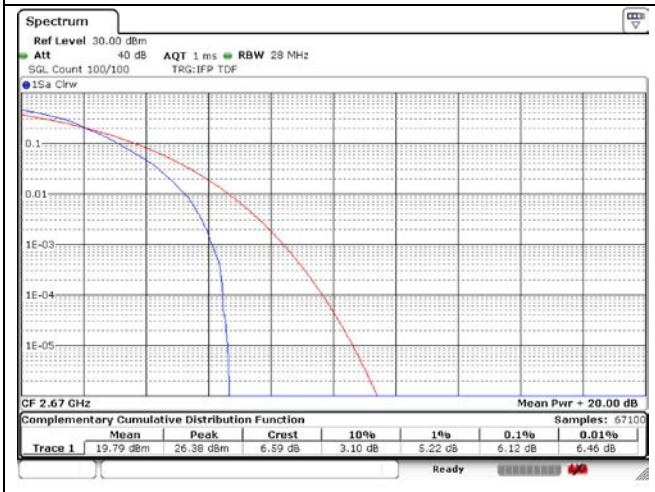

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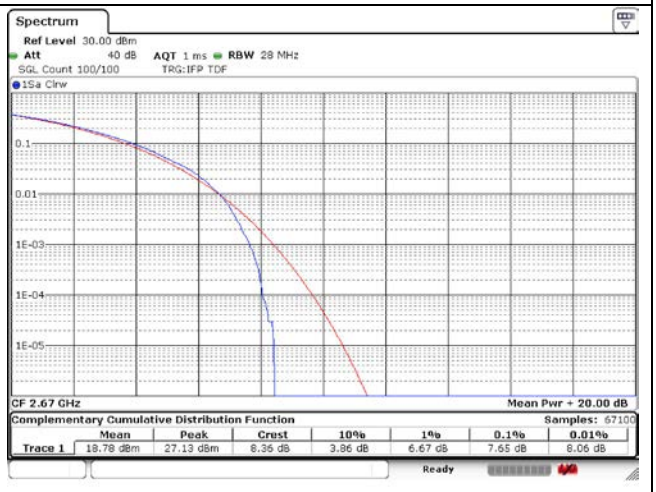

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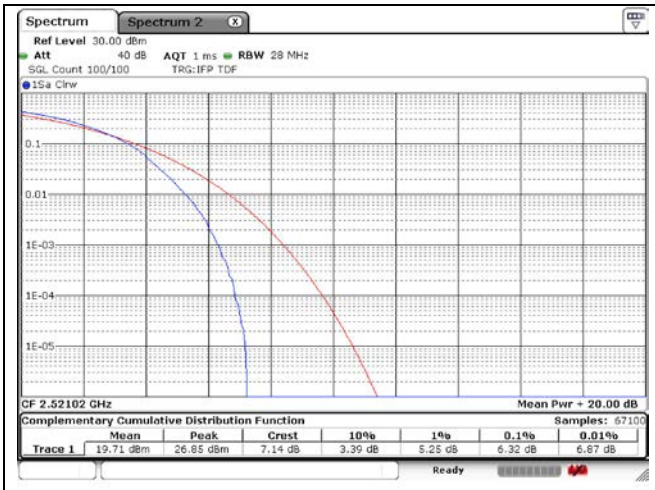

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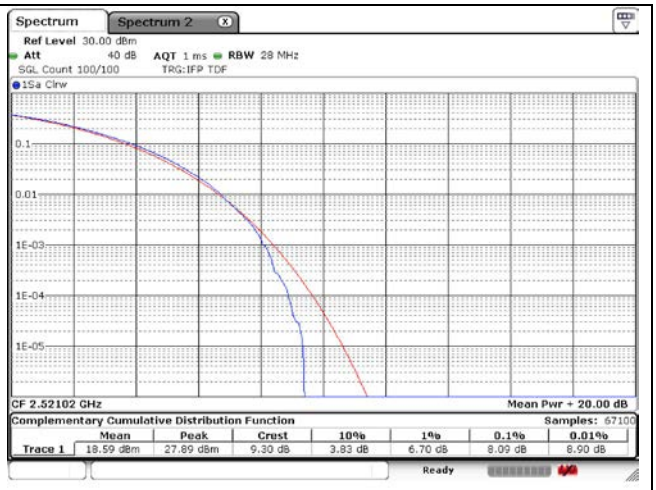

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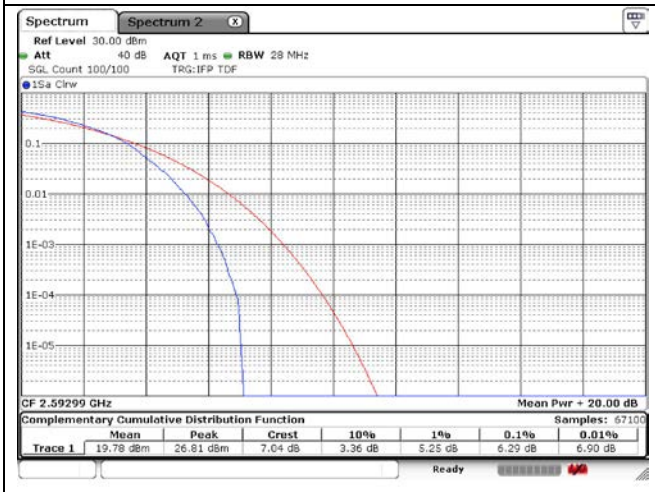

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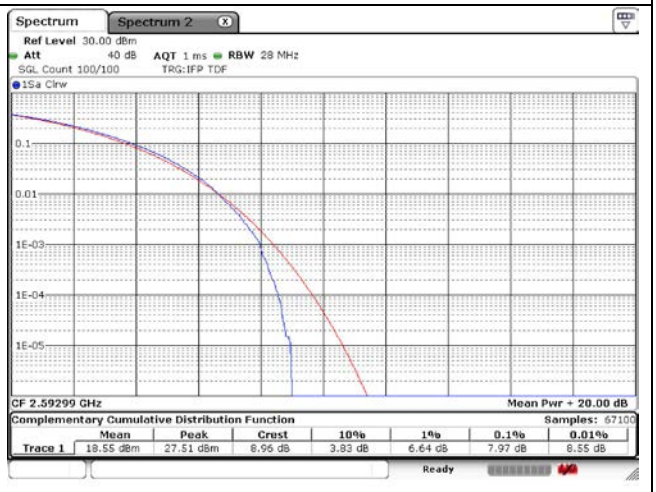

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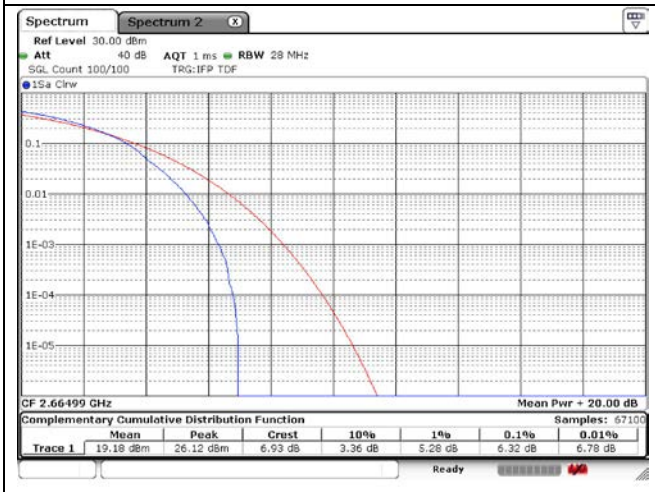

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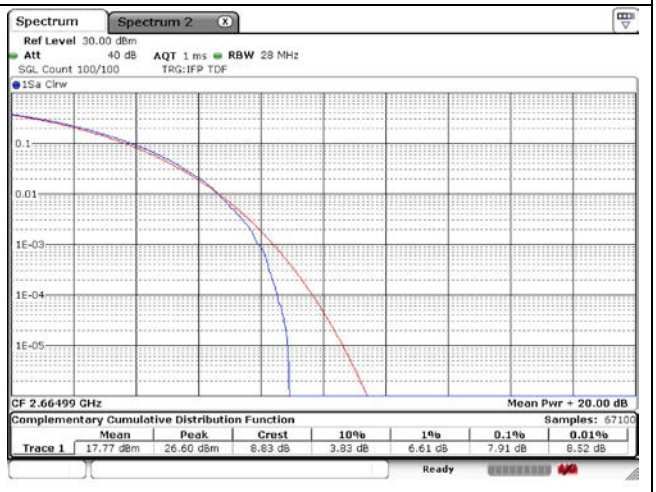

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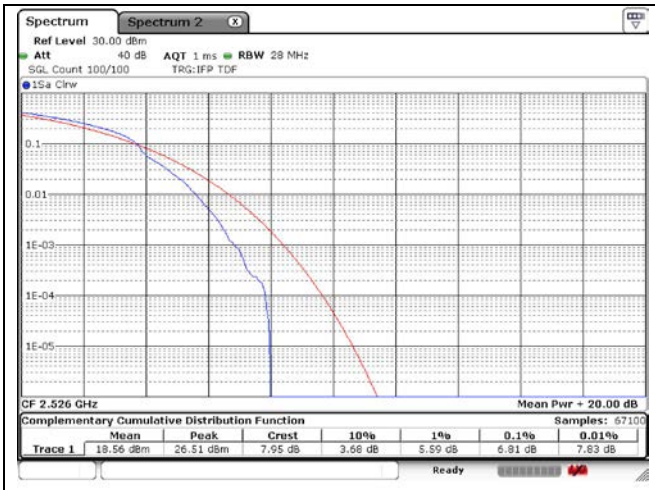

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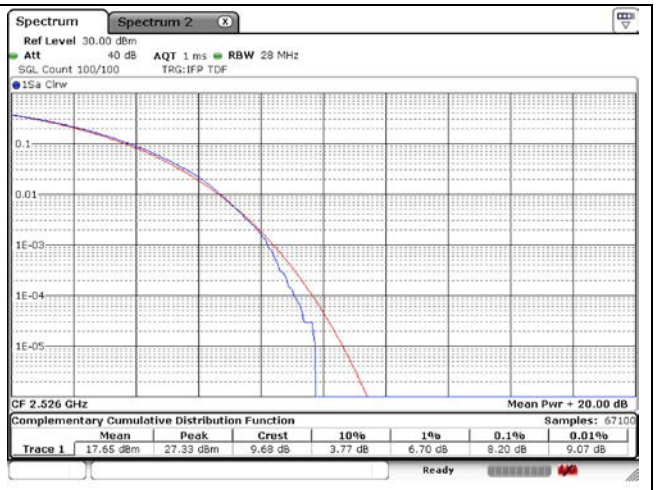

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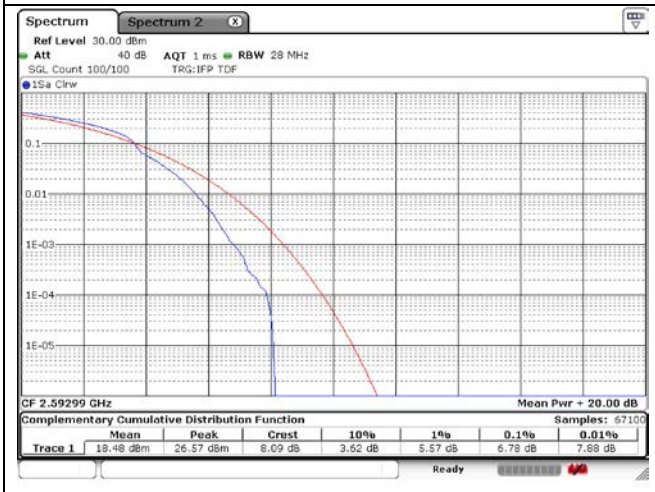

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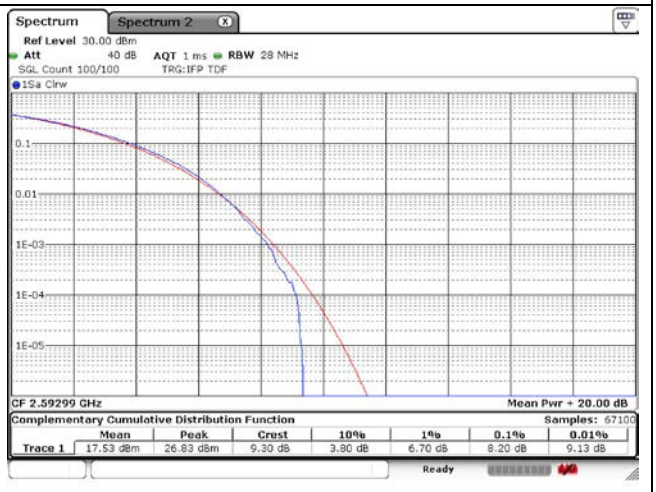

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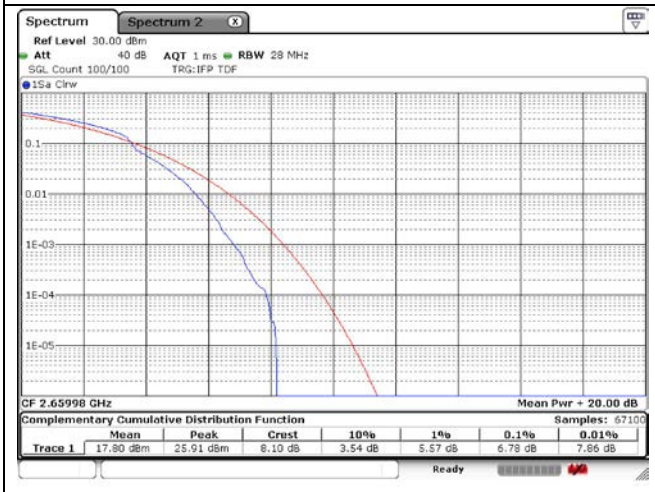

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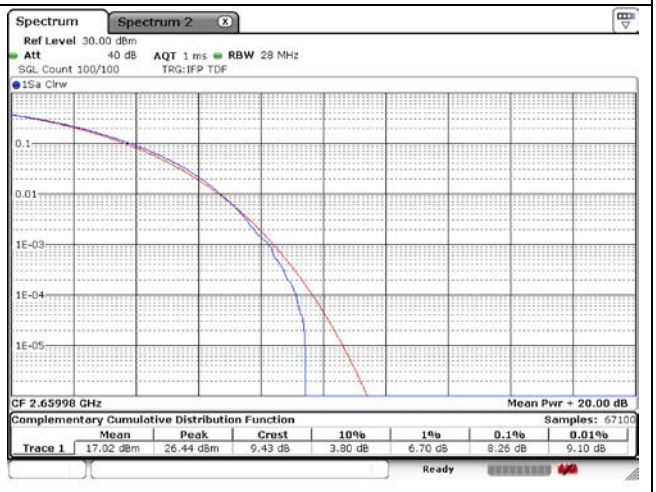

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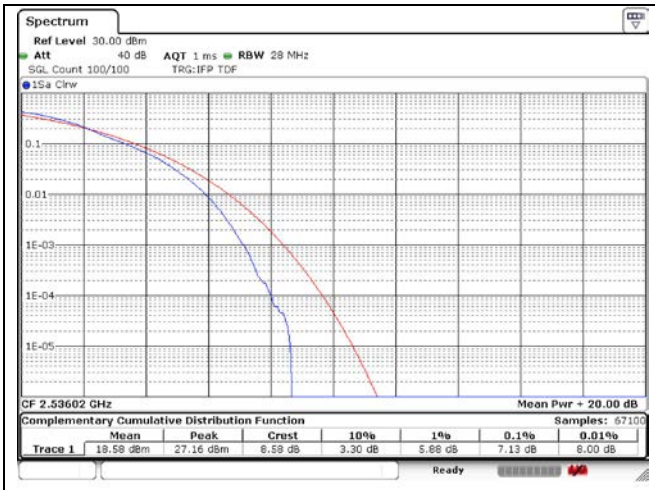

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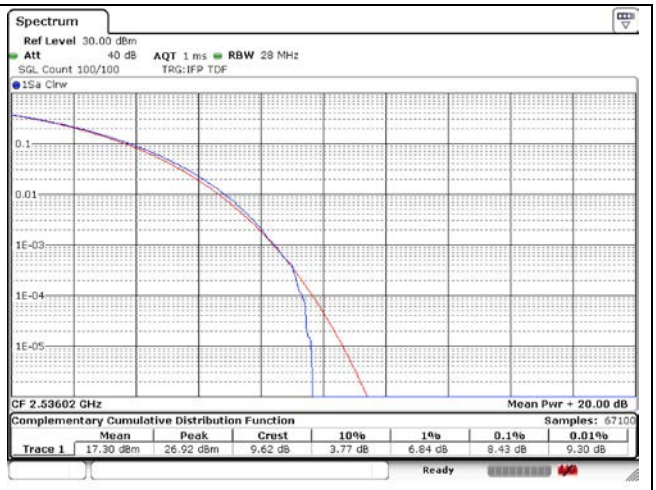
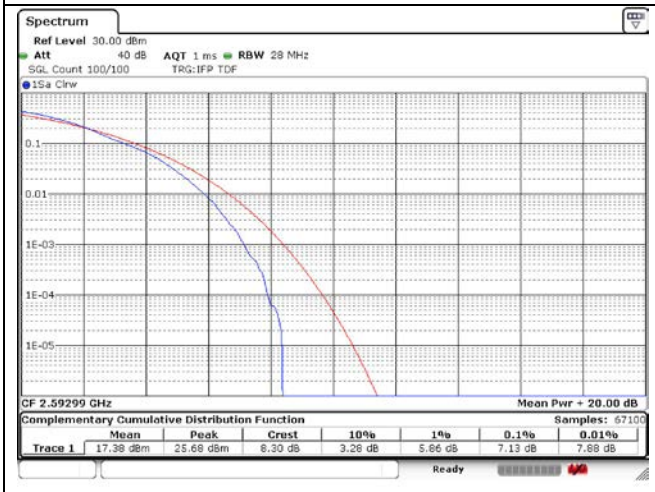
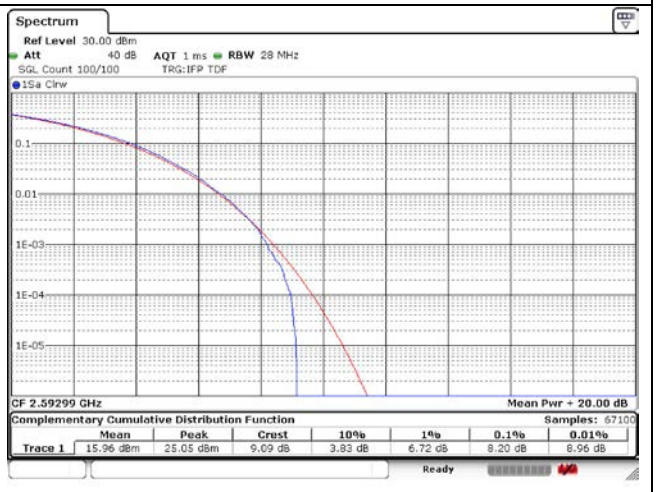


80 ㎒ Low Channel - Full RB - CP-OFDM



80 ㎒ Middle Channel - Full RB - DFT-S-OFDM



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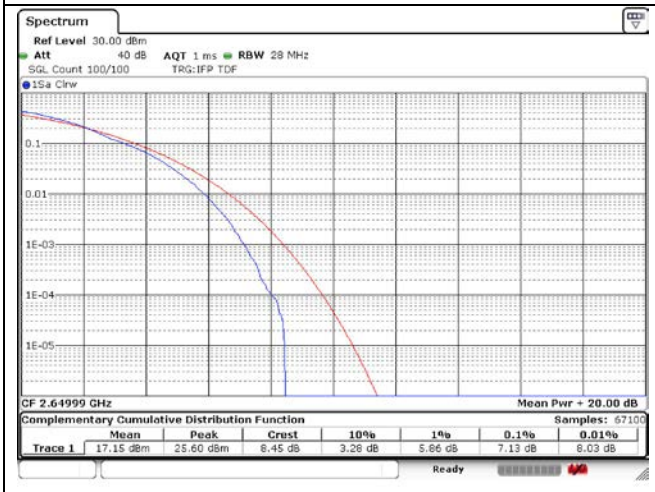
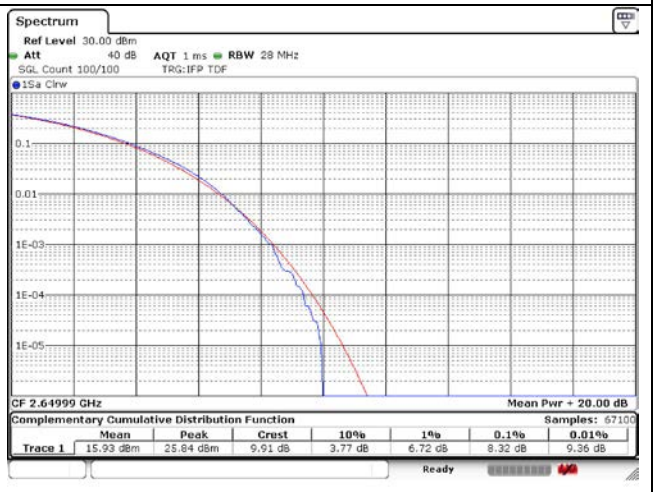


80 ㎒ High Channel - Full RB - DFT-S-OFDM



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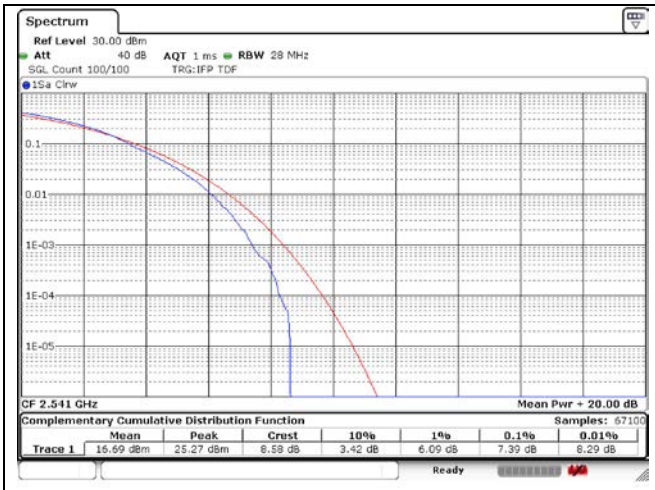
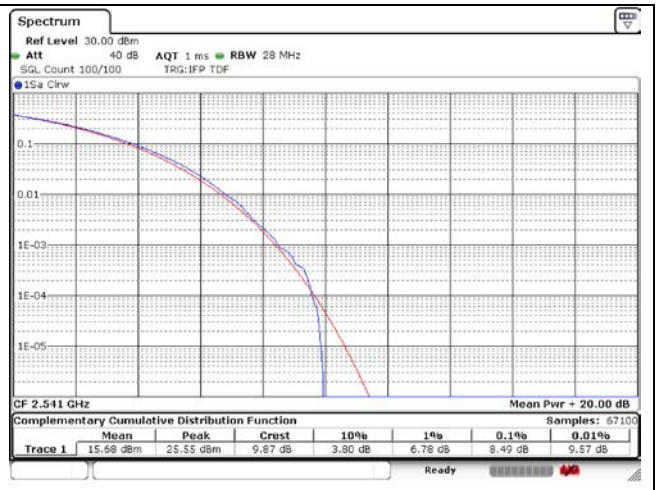
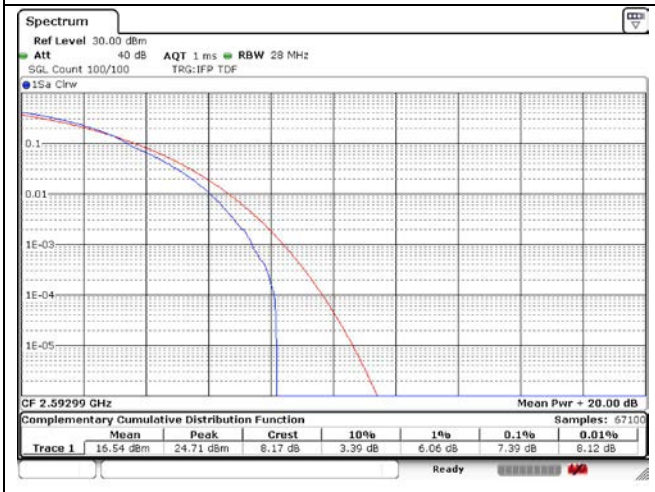


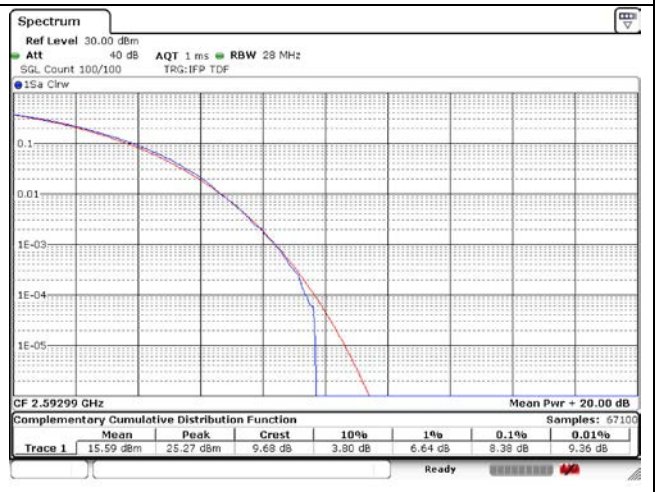
90 ㎒ Low Channel - Full RB - DFT-S-OFDM



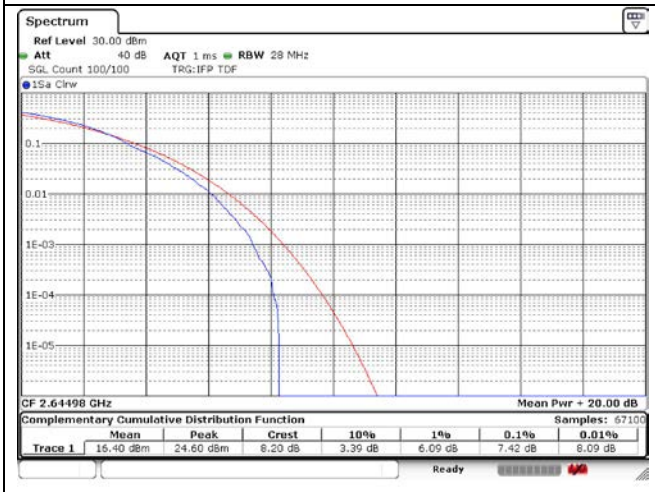
90 ㎒ Low Channel - Full RB - CP-OFDM



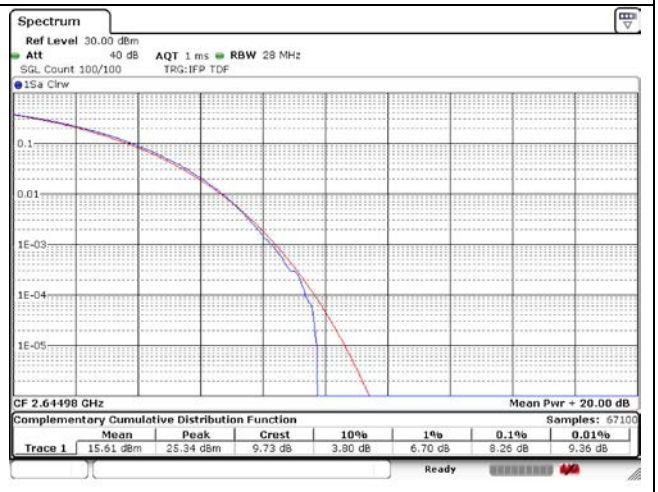
90 ㎒ Middle Channel - Full RB - DFT-S-OFDM



90 ㎒ Middle Channel - Full RB - CP-OFDM

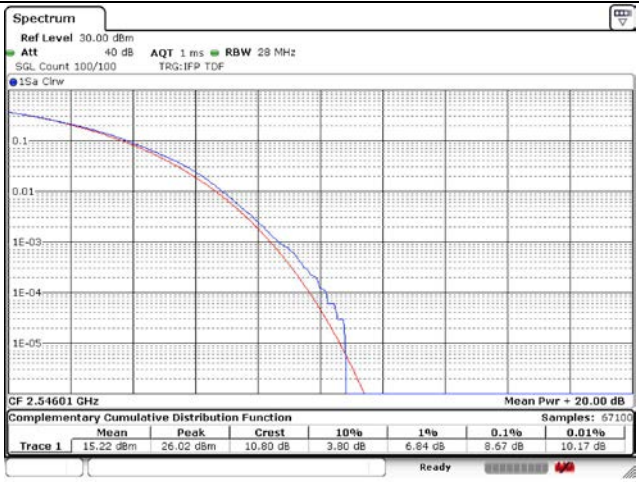


90 ㎒ High Channel - Full RB - DFT-S-OFDM

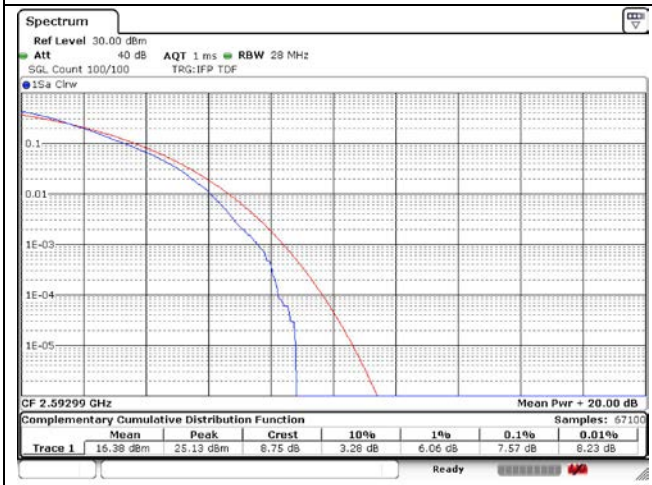


90 ㎒ High Channel - Full RB - CP-OFDM

100 ㎒ Low Channel - Full RB - DFT-S-OFDM



100 ㎒ Low Channel - Full RB - CP-OFDM



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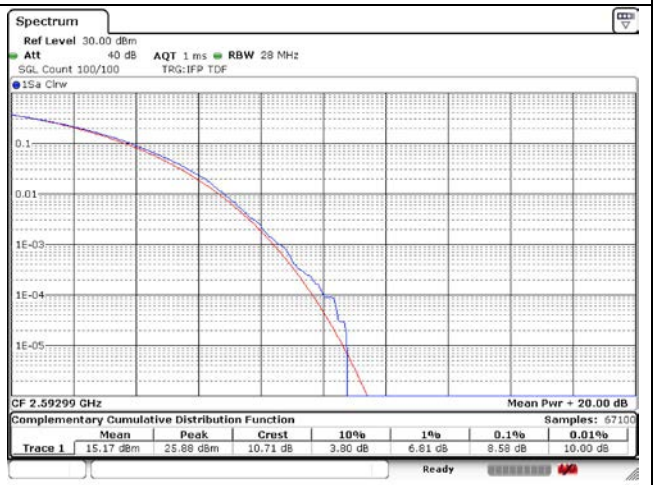
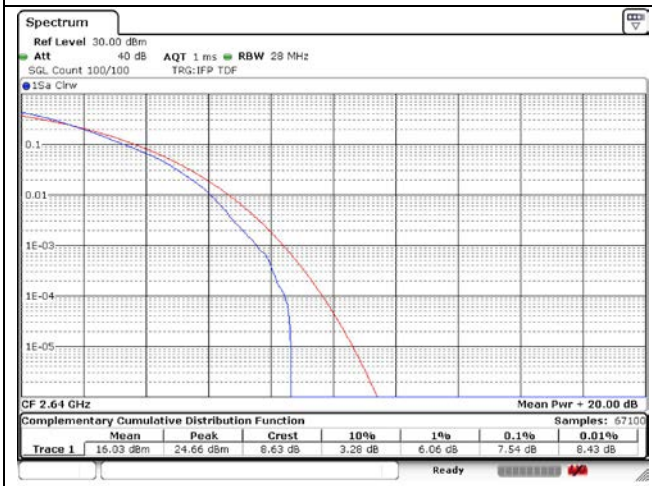
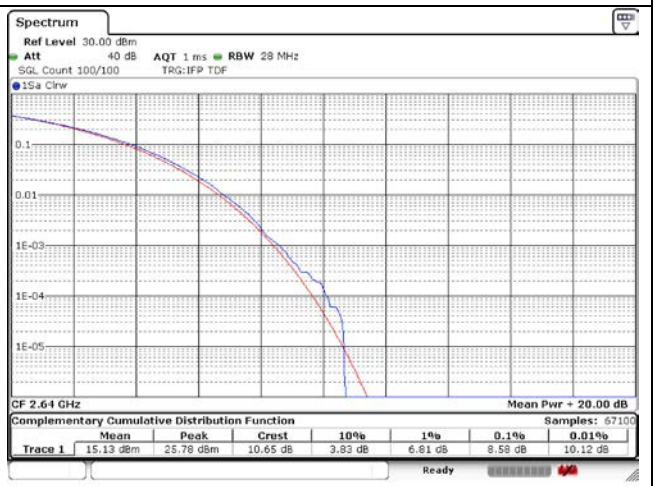


100 ㎒ Middle Channel - Full RB - CP-OFDM

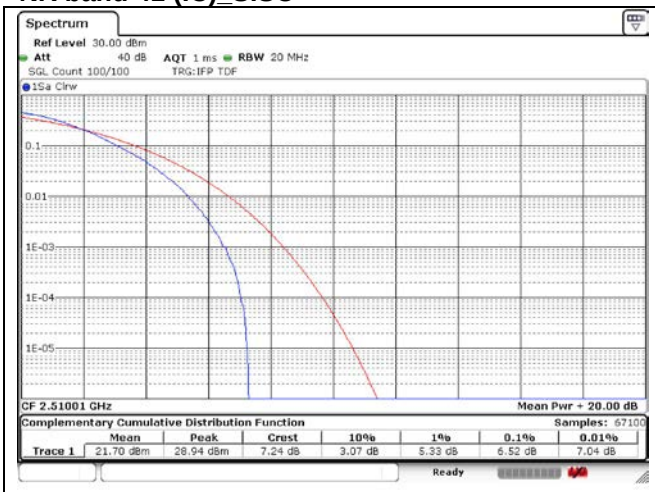


100 ㎒ High Channel - Full RB - DFT-S-OFDM

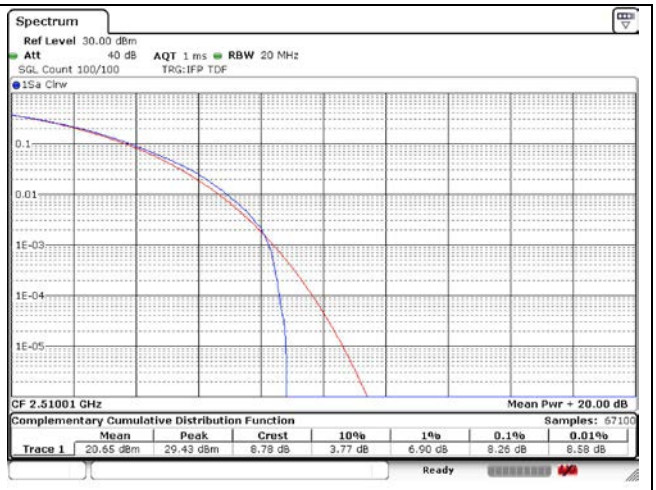


100 ㎒ High Channel - Full RB - CP-OFDM

NR band 41 (IC)_SISO

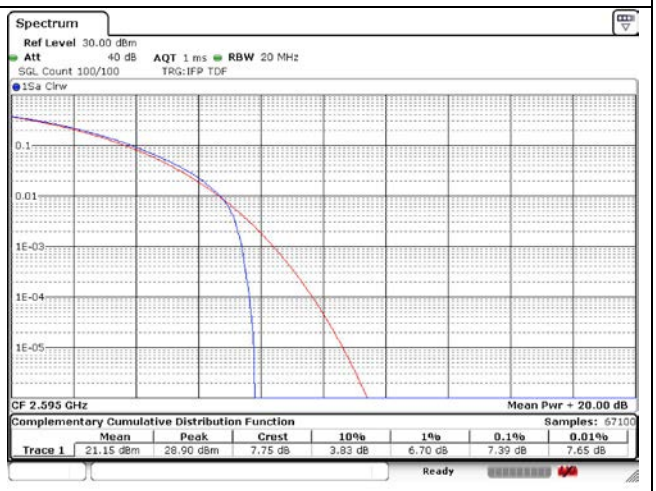


20 ㎒ Low Channel - Full RB - DFT-S-OFDM

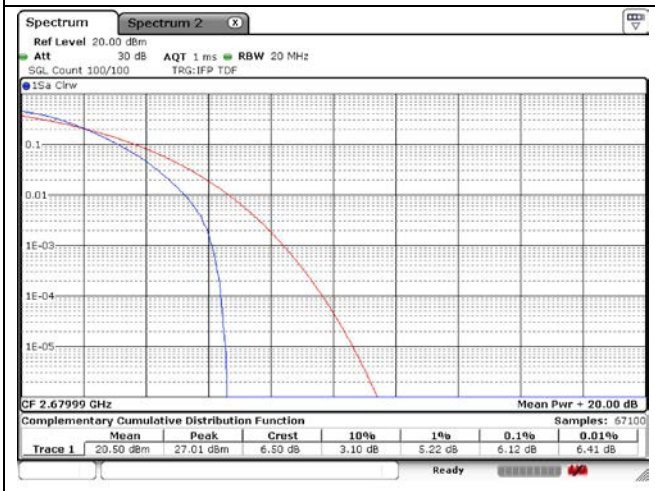


20 ㎒ Low Channel - Full RB - CP-OFDM

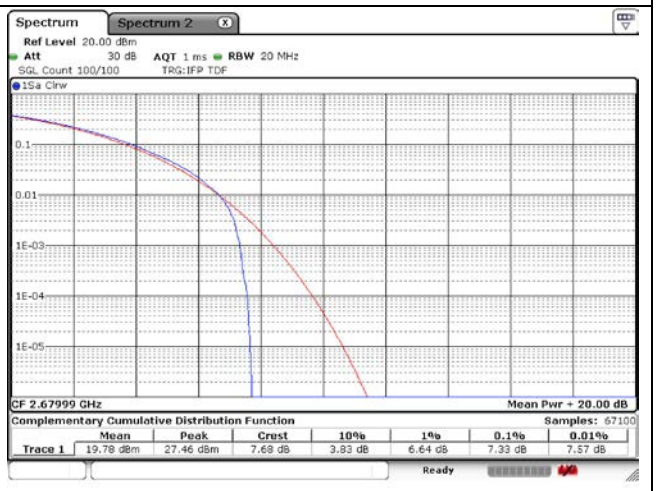
20 ㎒ Middle Channel - Full RB - DFT-S-OFDM



20 ㎒ Middle Channel - Full RB - CP-OFDM



20 ㎒ High Channel - Full RB - DFT-S-OFDM



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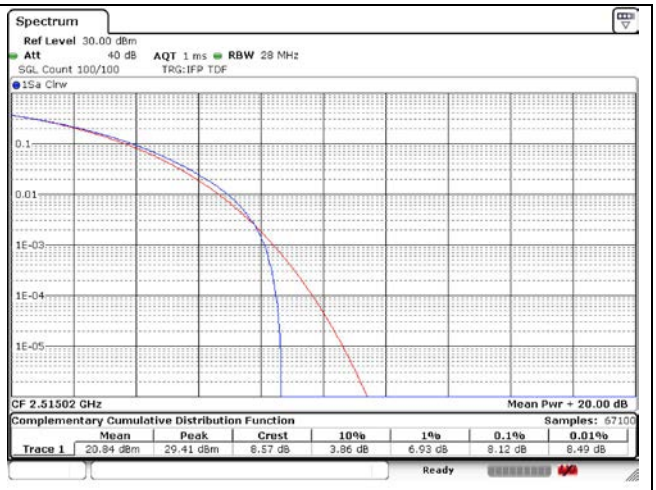
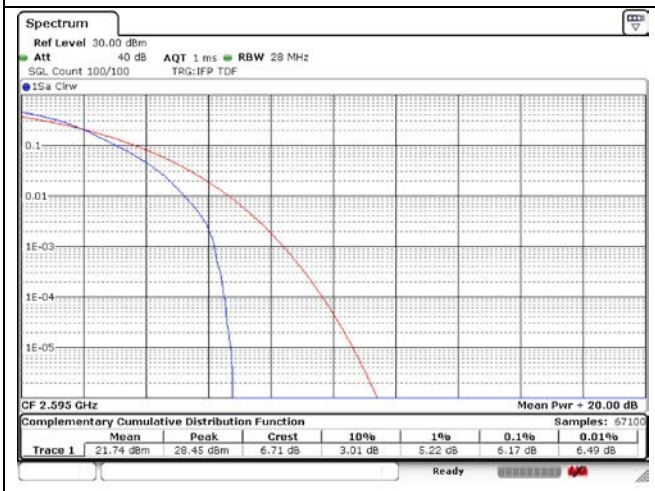
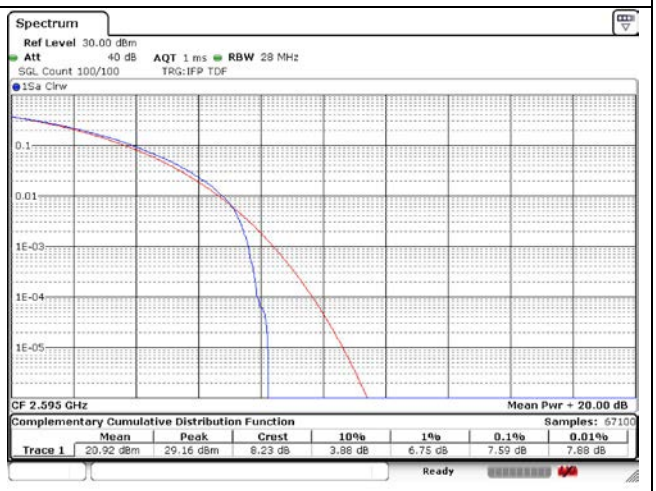
30 ㎒ Low Channel - Full RB - DFT-S-OFDM



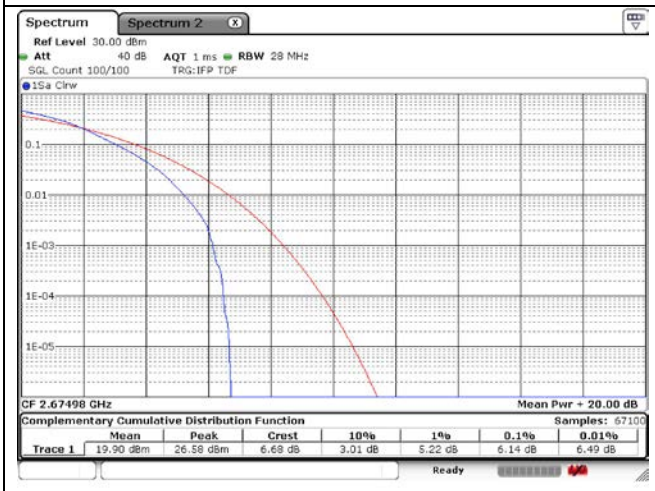
30 ㎒ Low Channel - Full RB - CP-OFDM



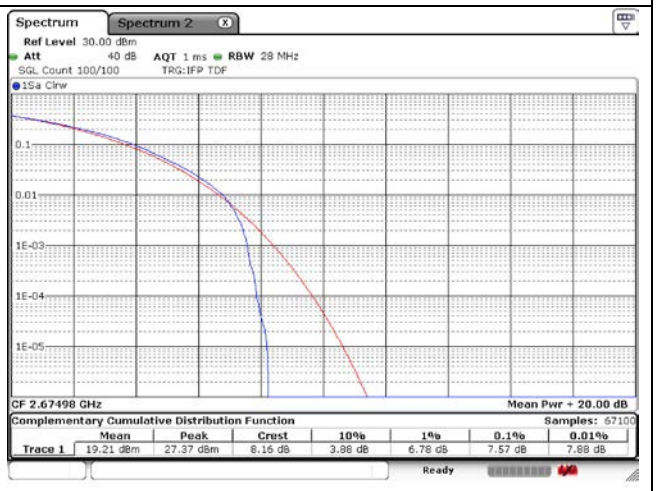
30 ㎒ Middle Channel - Full RB - DFT-S-OFDM



30 ㎒ Middle Channel - Full RB - CP-OFDM

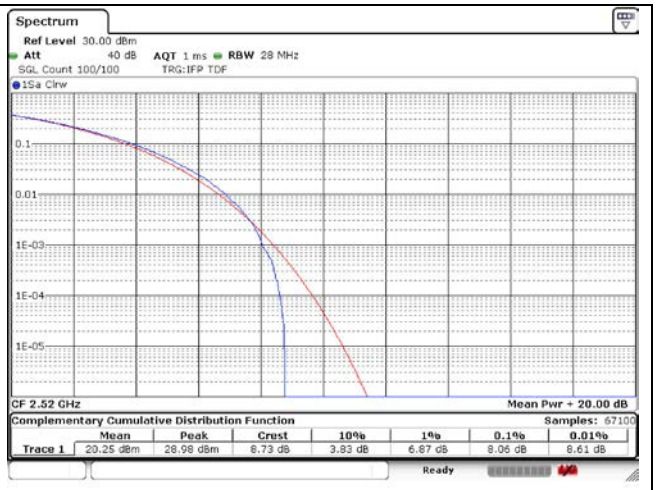


30 ㎒ High Channel - Full RB - DFT-S-OFDM



30 ㎒ High Channel - Full RB - CP-OFDM

40 ㎒ Low Channel - Full RB - DFT-S-OFDM



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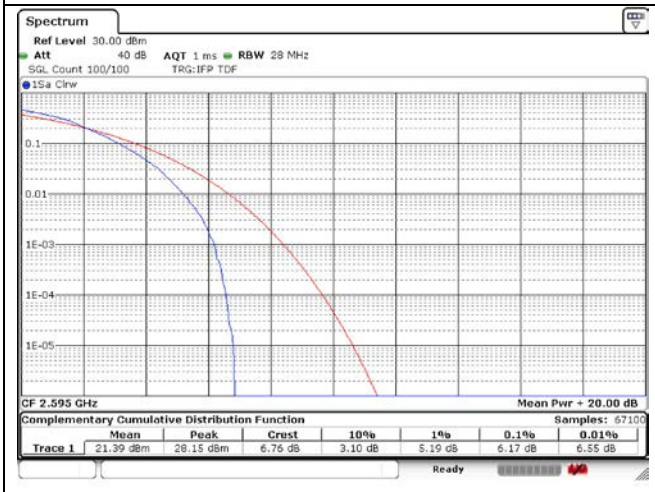

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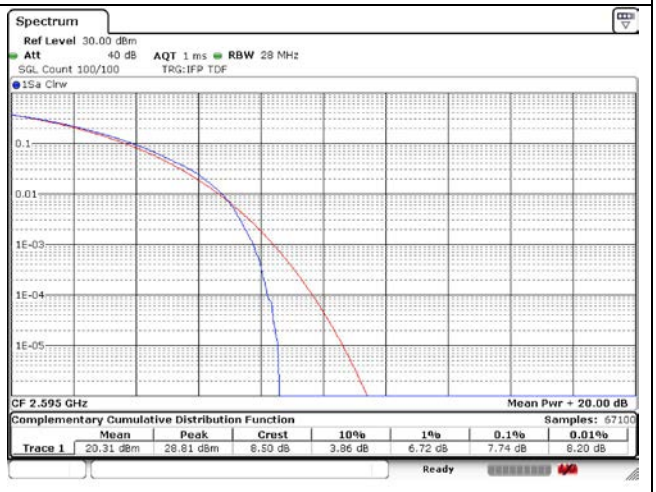
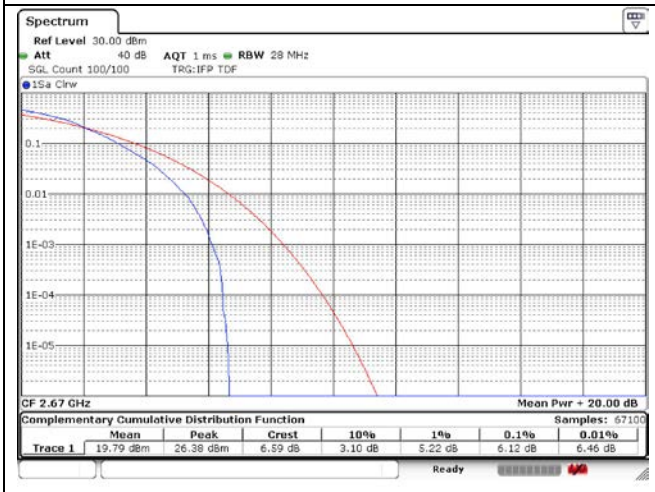
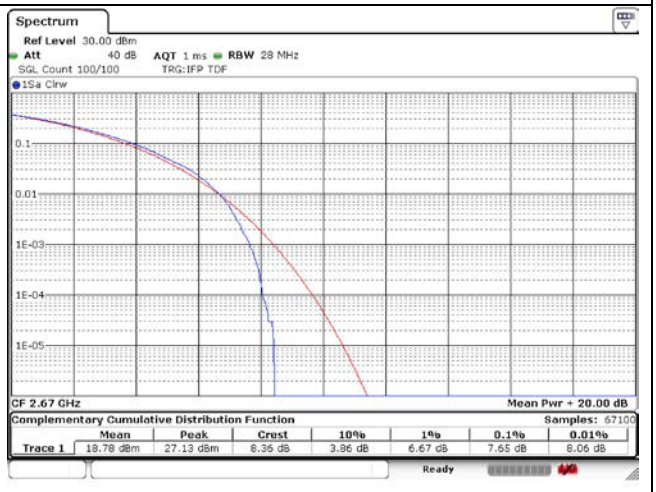


40 ㎒ Middle Channel - Full RB - CP-OFDM



40 ㎒ High Channel - Full RB - DFT-S-OFDM



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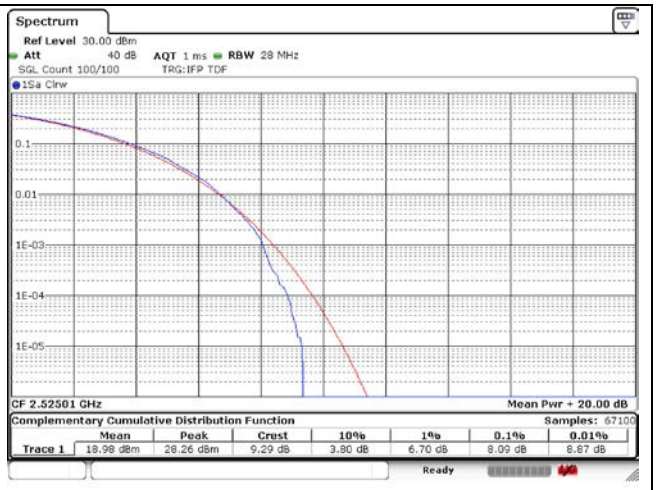
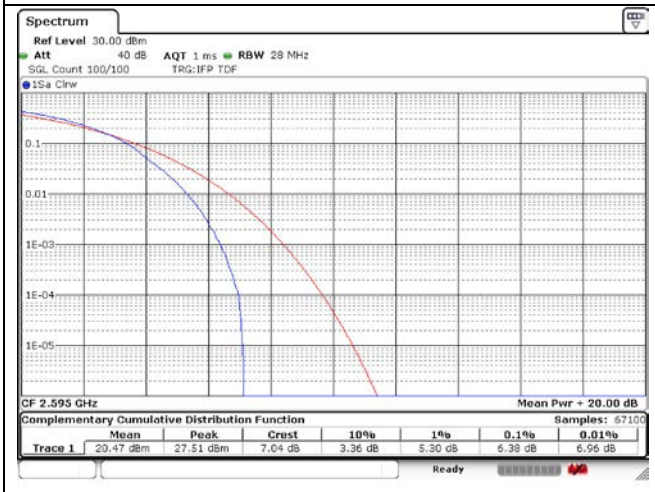
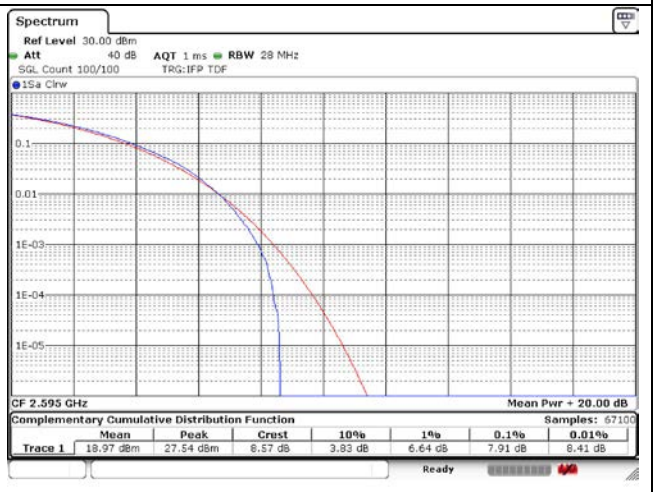
50 ㎒ Low Channel - Full RB - DFT-S-OFDM



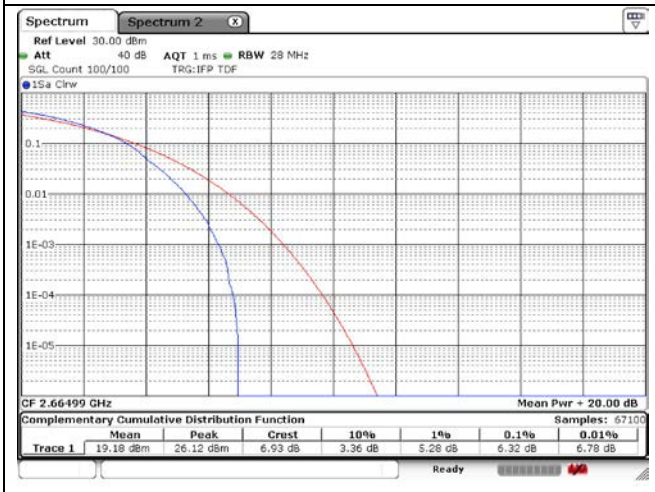
50 ㎒ Low Channel - Full RB - CP-OFDM



50 ㎒ Middle Channel - Full RB - DFT-S-OFDM



50 ㎒ Middle Channel - Full RB - CP-OFDM



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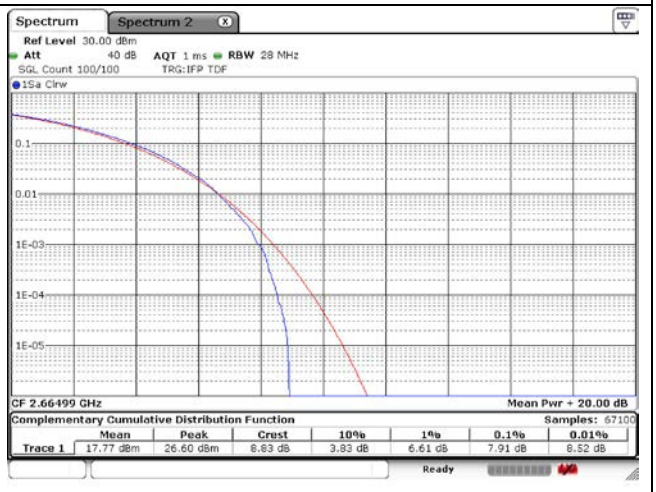
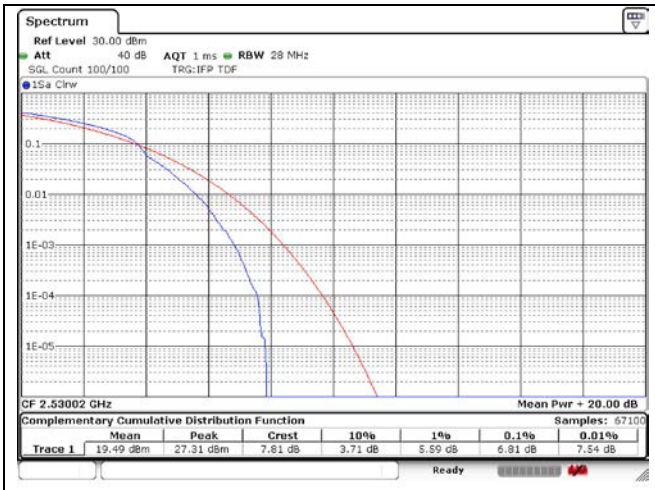
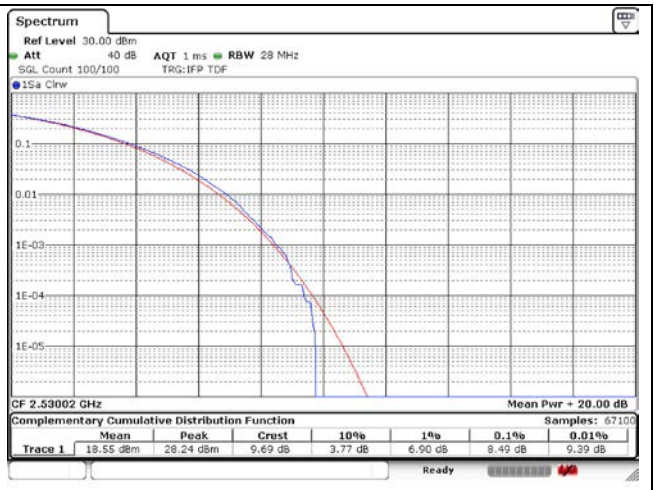


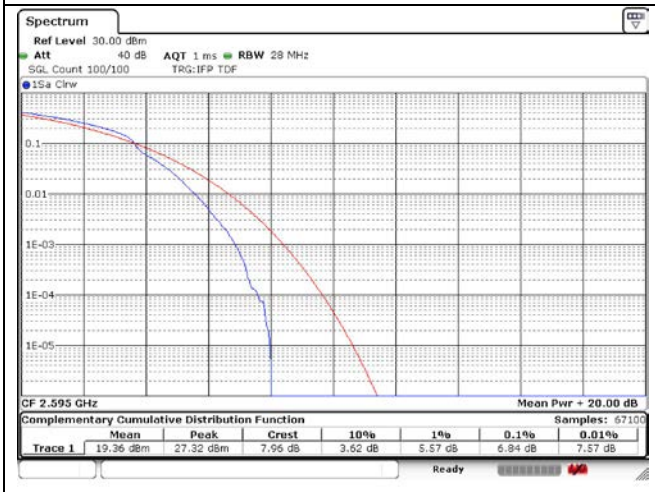
50 ㎒ High Channel - Full RB - CP-OFDM



60 ㎒ Low Channel - Full RB - DFT-S-OFDM



60 ㎒ Low Channel - Full RB - CP-OFDM



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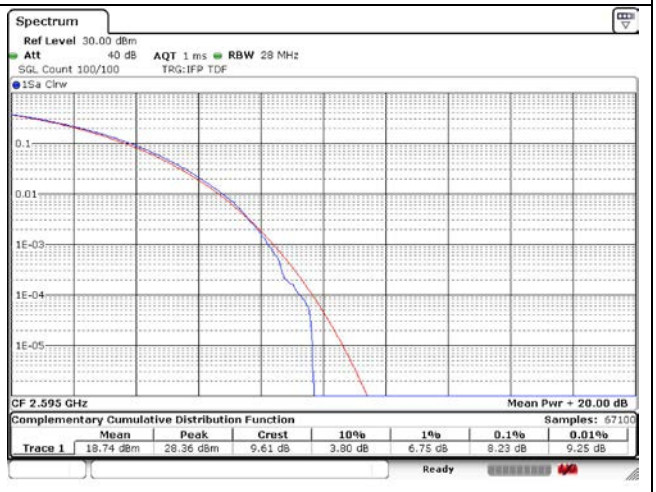

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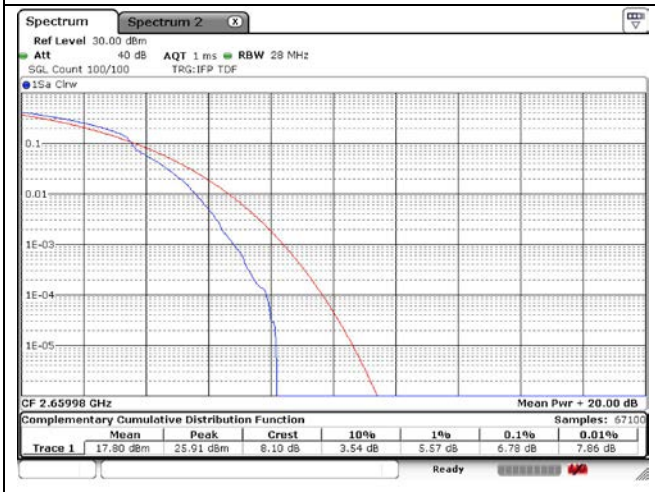
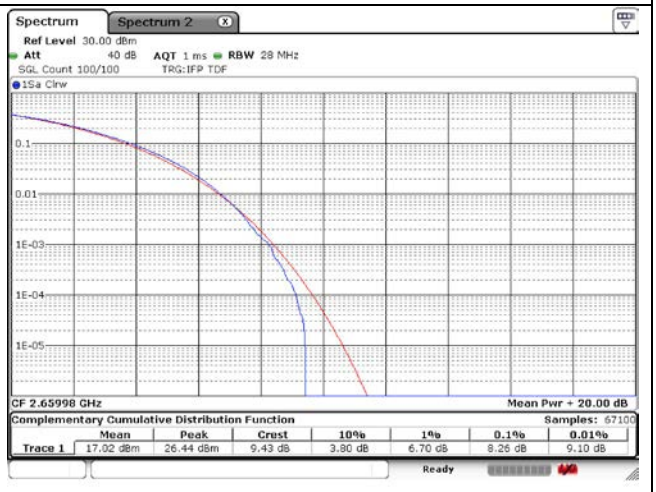
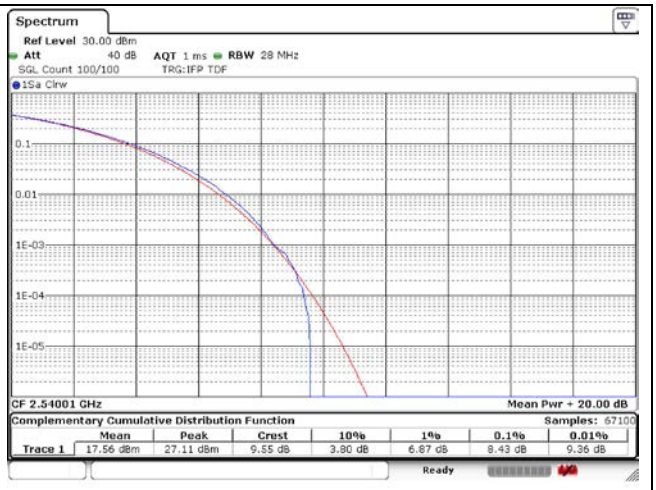


60 ㎒ High Channel - Full RB - DFT-S-OFDM

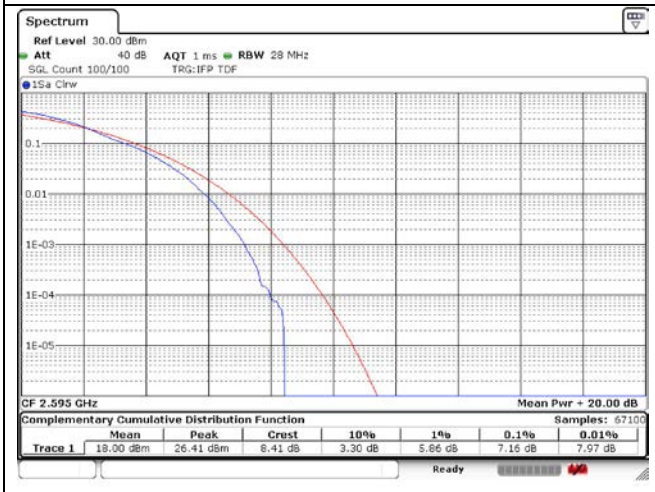


60 ㎒ High Channel - Full RB - CP-OFDM

80 ㎒ Low Channel - Full RB - DFT-S-OFDM



80 ㎒ Low Channel - Full RB - CP-OFDM



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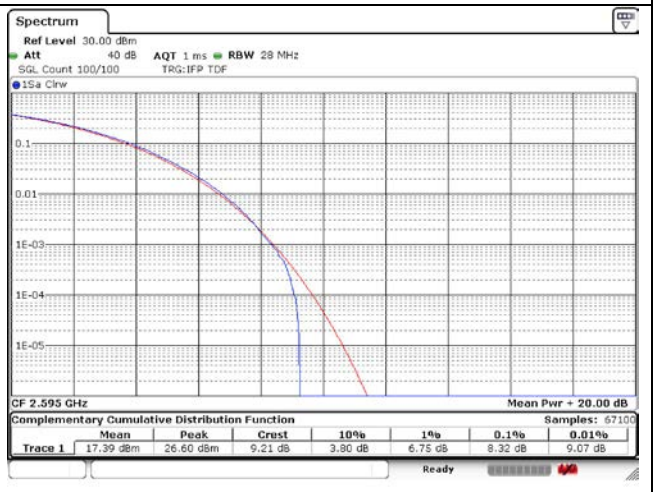

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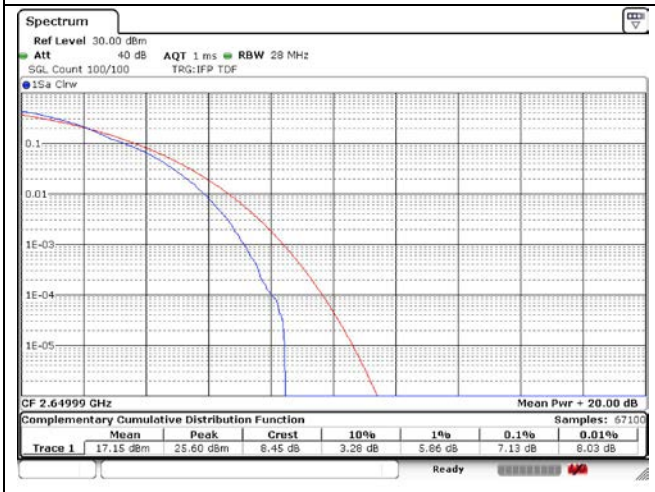
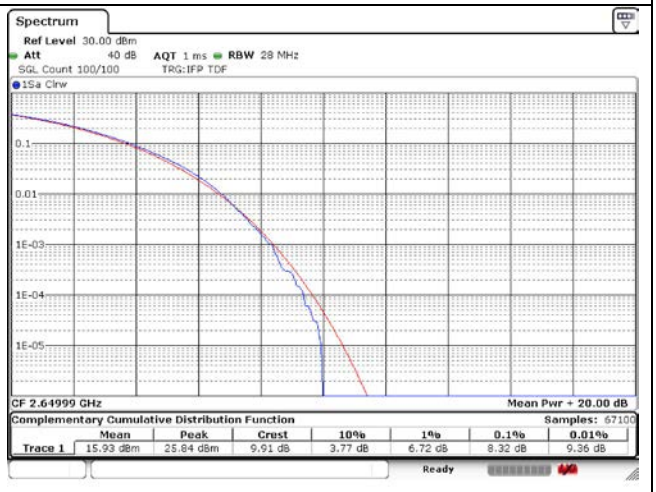
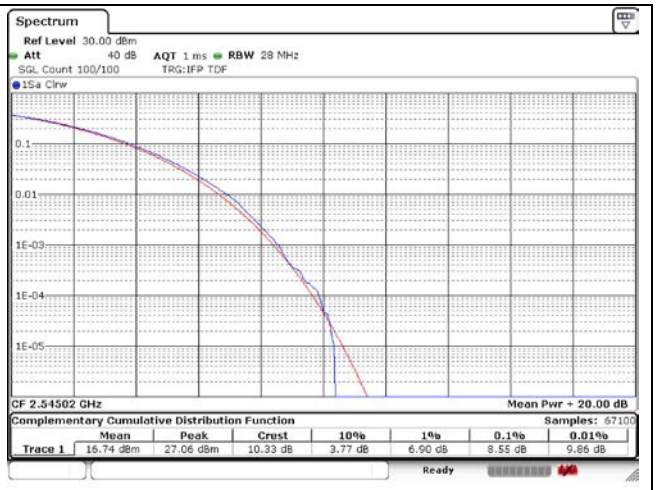


80 ㎒ High Channel - Full RB - DFT-S-OFDM



80 ㎒ High Channel - Full RB - CP-OFDM

90 ㎒ Low Channel - Full RB - DFT-S-OFDM



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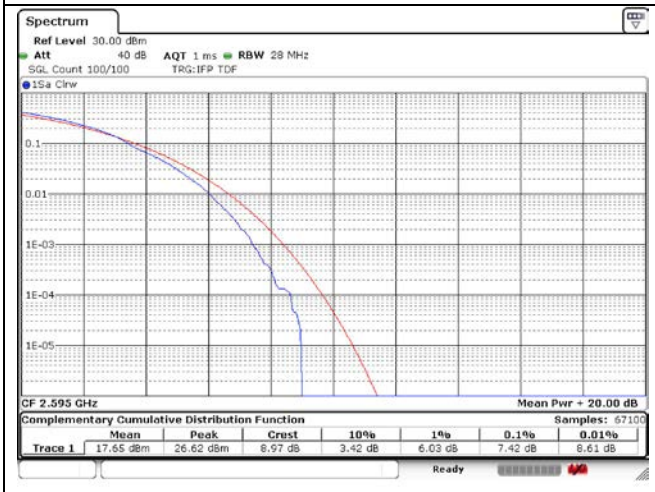
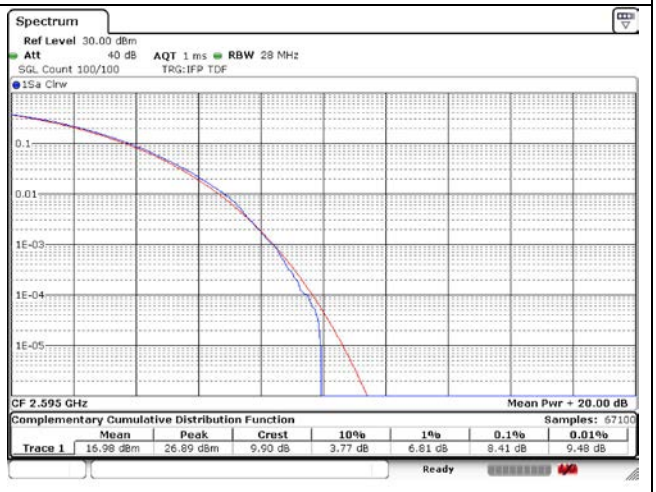
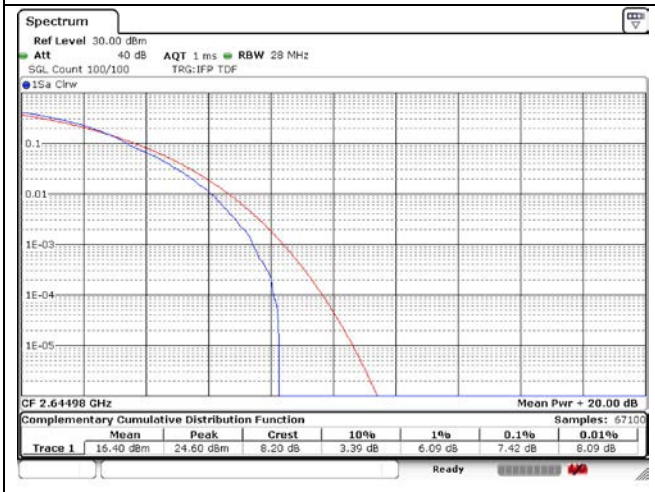


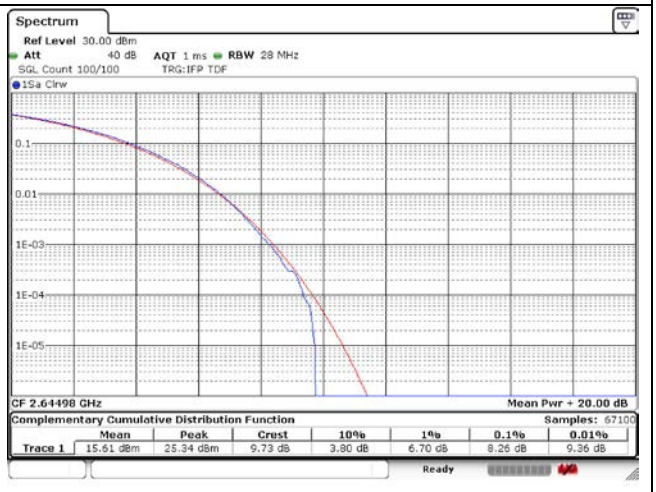
90 ㎒ Middle Channel - Full RB - DFT-S-OFDM



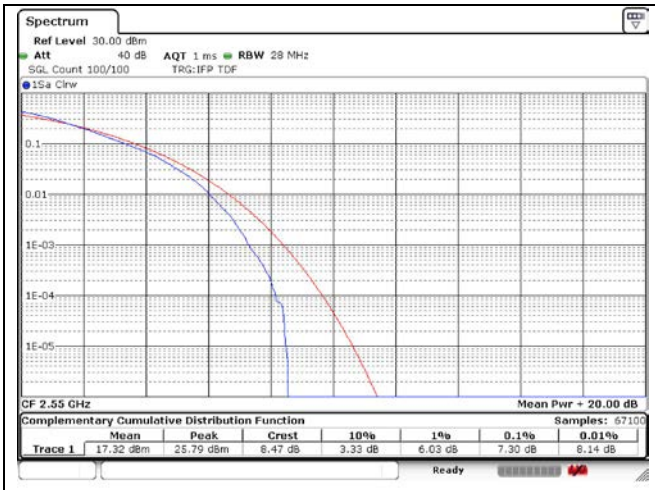
90 ㎒ Middle Channel - Full RB - CP-OFDM



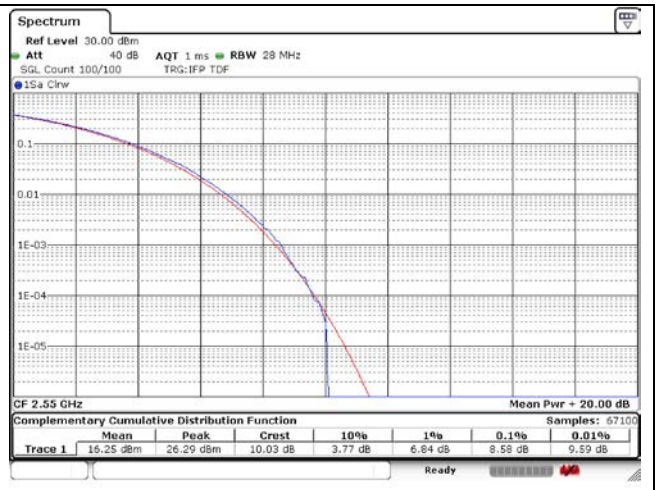
90 ㎒ High Channel - Full RB - DFT-S-OFDM



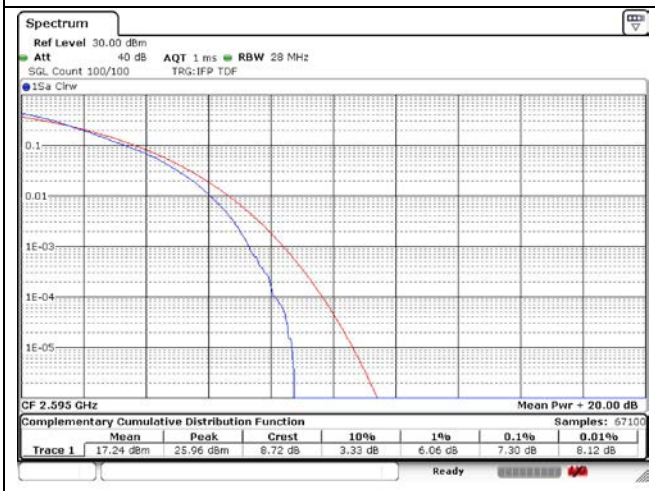
90 ㎒ High Channel - Full RB - CP-OFDM



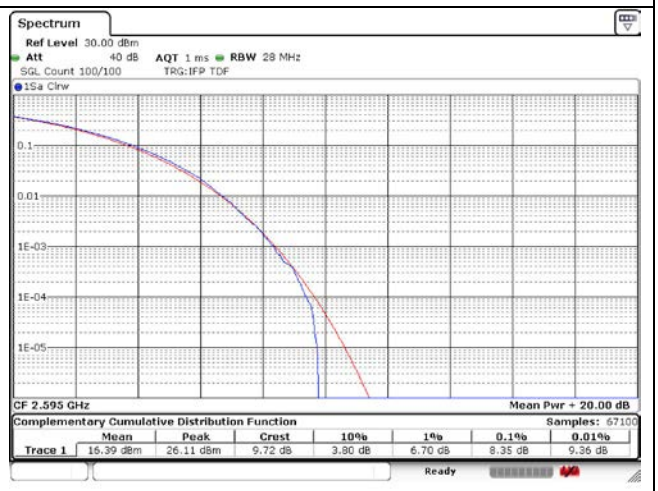
100 ㎒ Low Channel - Full RB - DFT-S-OFDM



100 ㎒ Low Channel - Full RB - CP-OFDM

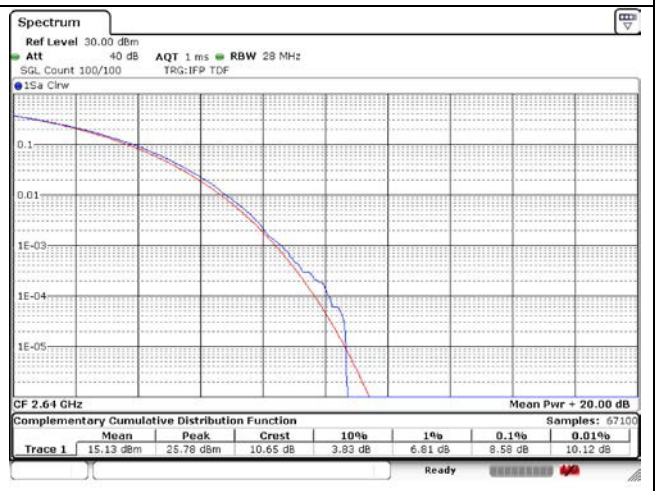


100 ㎒ Middle Channel - Full RB - DFT-S-OFDM



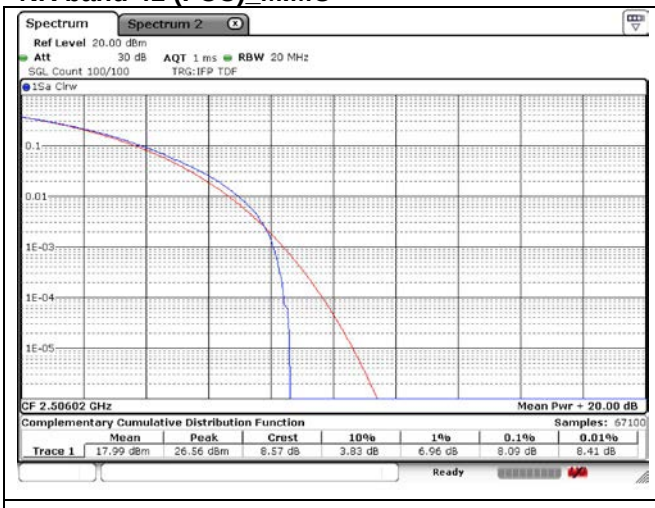
100 ㎒ Middle Channel - Full RB - CP-OFDM

100 ㎒ High Channel - Full RB - DFT-S-OFDM

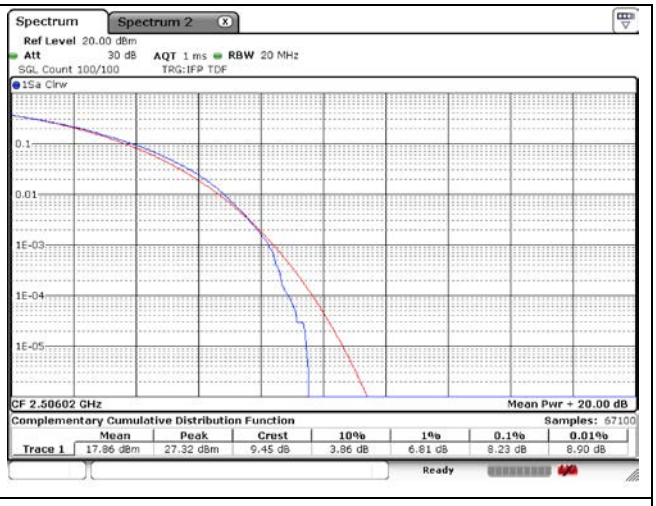


100 ㎒ High Channel - Full RB - CP-OFDM

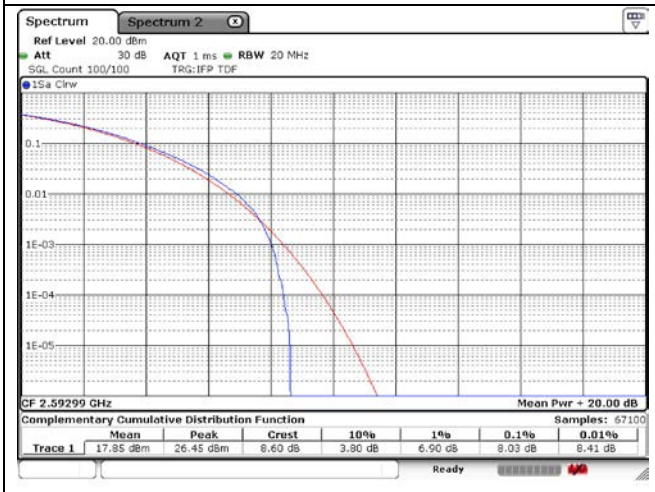
NR band 41 (FCC)_MIMO



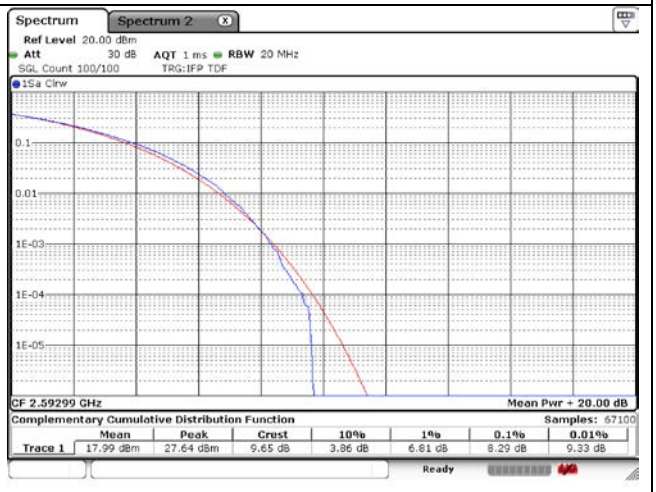
20 ㎒ Low Channel - Full RB - CP-OFDM_Port 1



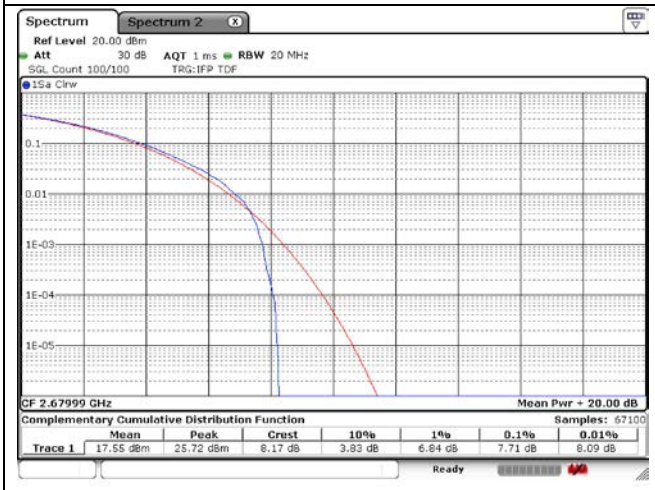
20 ㎒ Low Channel - Full RB - CP-OFDM_Port 2



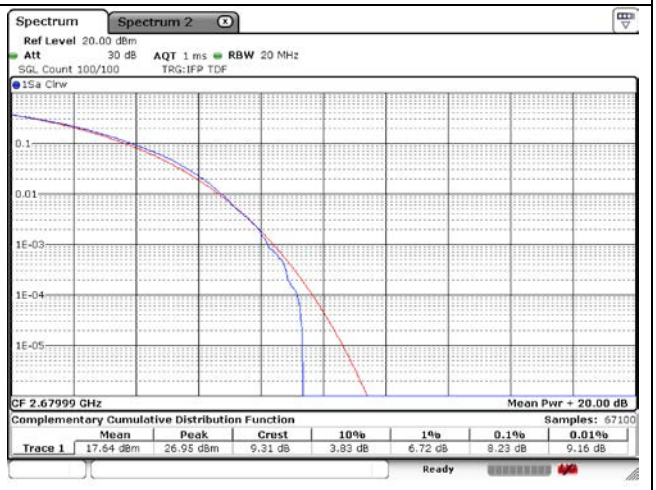
20 ㎒ Middle Channel - Full RB - CP-OFDM_Port 1



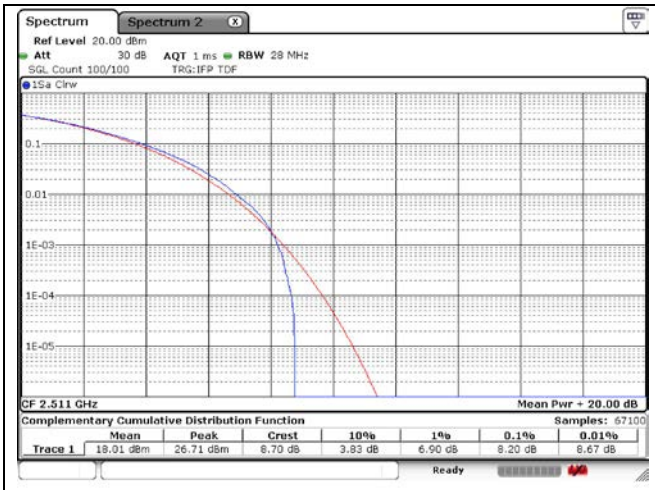
20 ㎒ Middle Channel - Full RB - CP-OFDM_Port 2



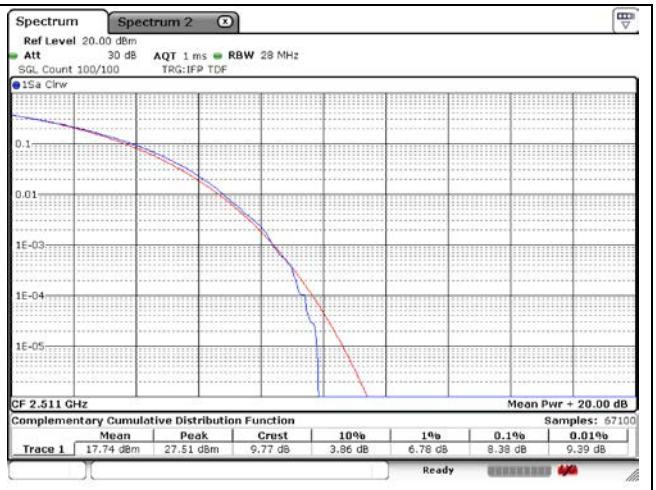
20 ㎒ High Channel - Full RB - CP-OFDM_Port 1



20 ㎒ High Channel - Full RB - CP-OFDM_Port 2



30 ㎒ Low Channel - Full RB - CP-OFDM_Port 1



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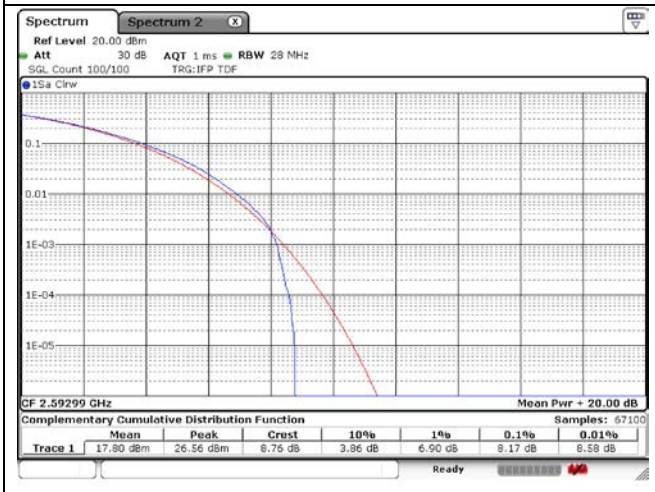
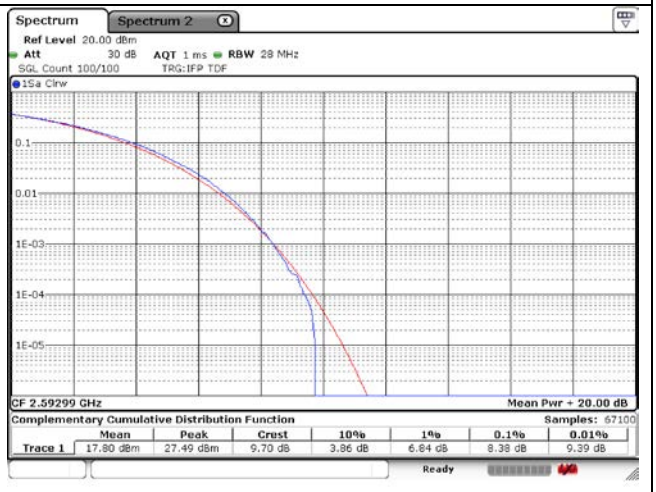


30 ㎒ Middle Channel - Full RB - CP-OFDM_Port 1



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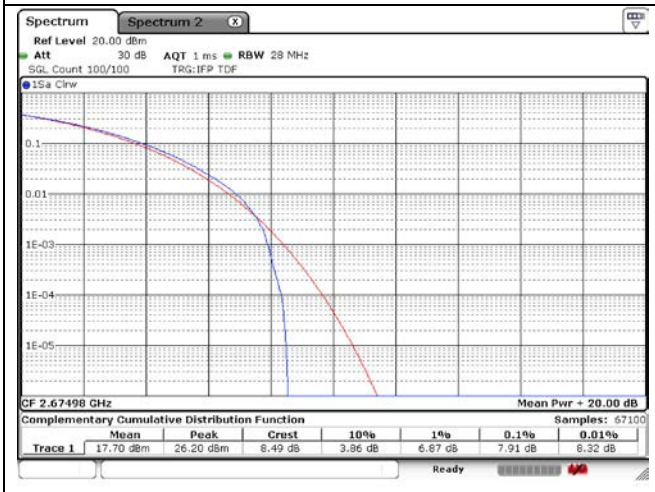
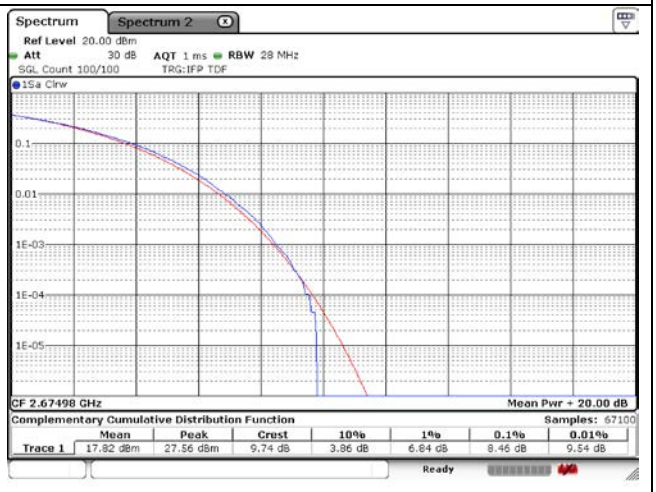
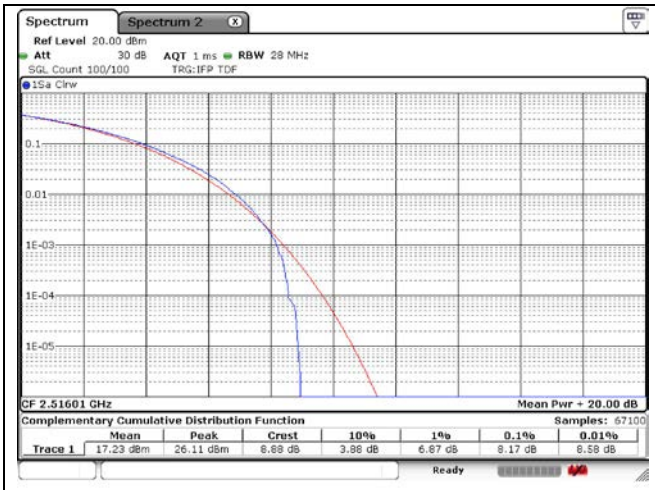


30 ㎒ High Channel - Full RB - CP-OFDM_Port 1



30 ㎒ High Channel - Full RB - CP-OFDM_Port 2



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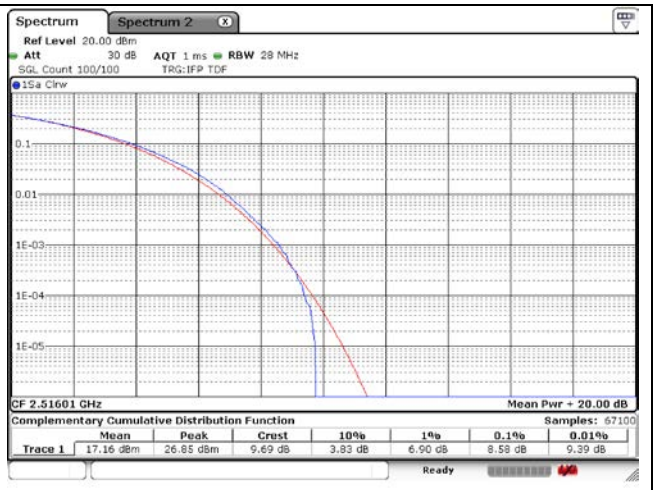
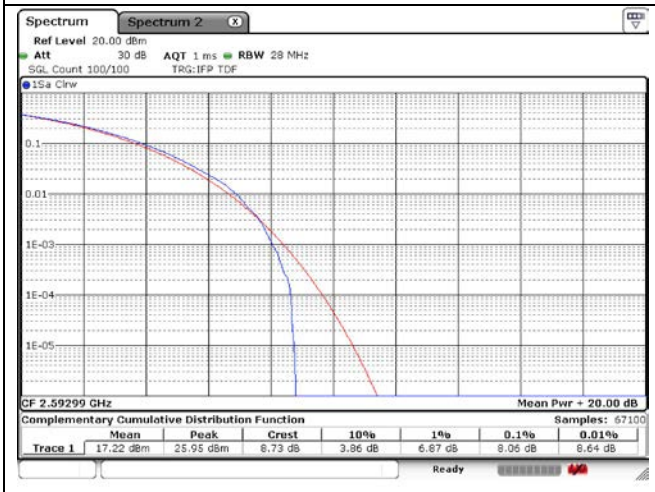


40 ㎒ Low Channel - Full RB - CP-OFDM_Port 2



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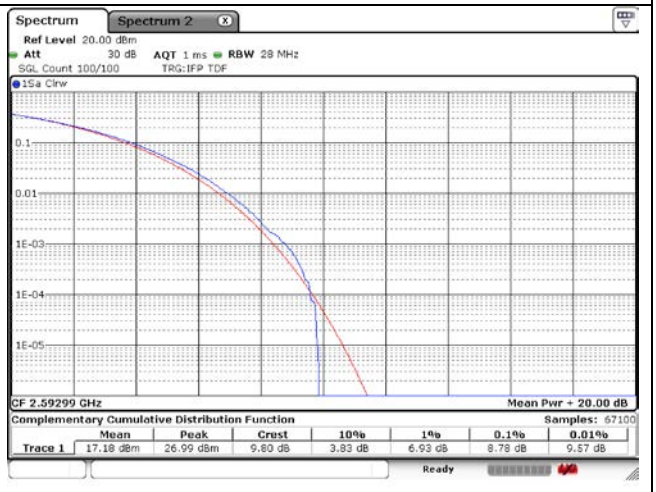

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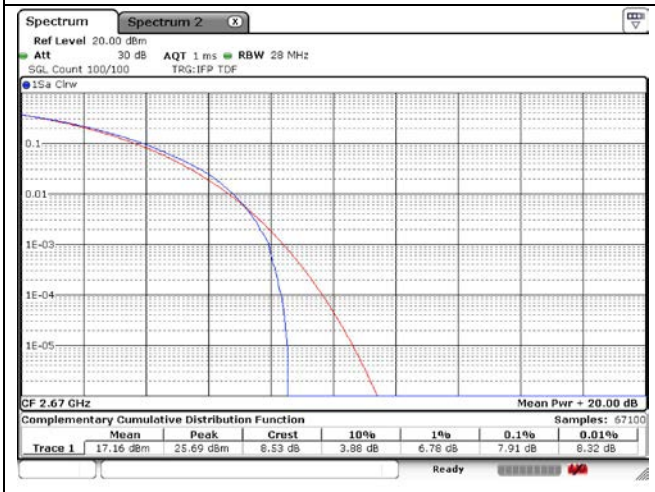
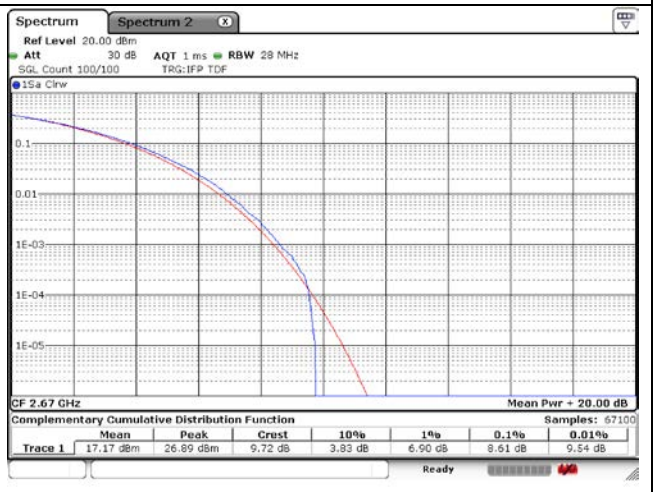


40 ㎒ High Channel - Full RB - CP-OFDM_Port 1



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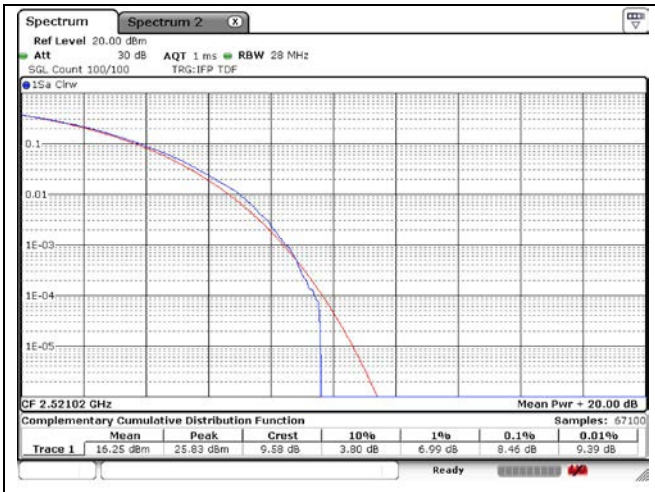
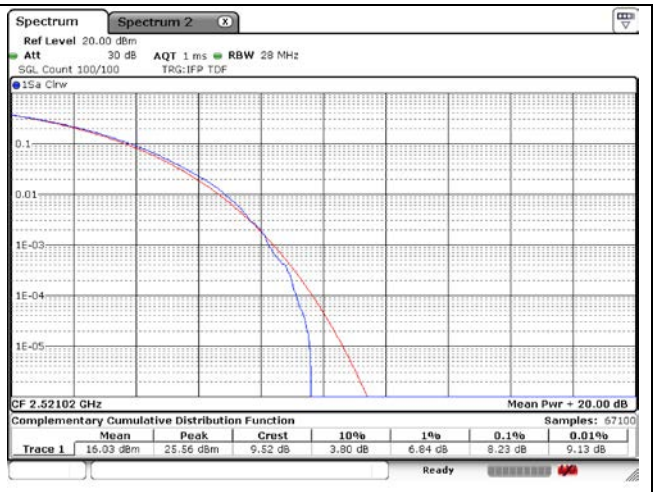


50 ㎒ Low Channel - Full RB - CP-OFDM_Port 1



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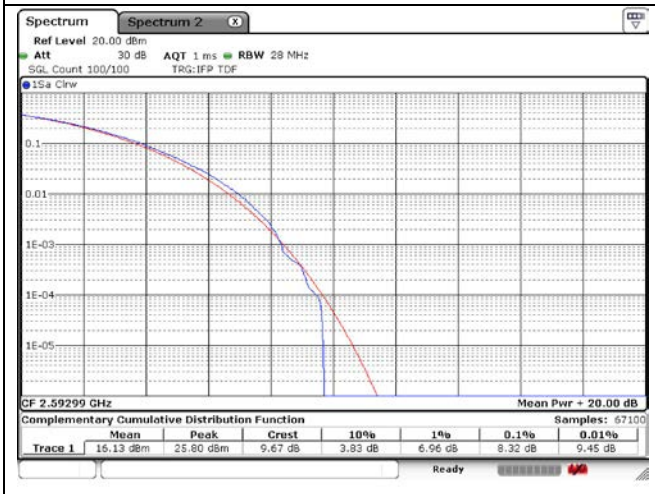
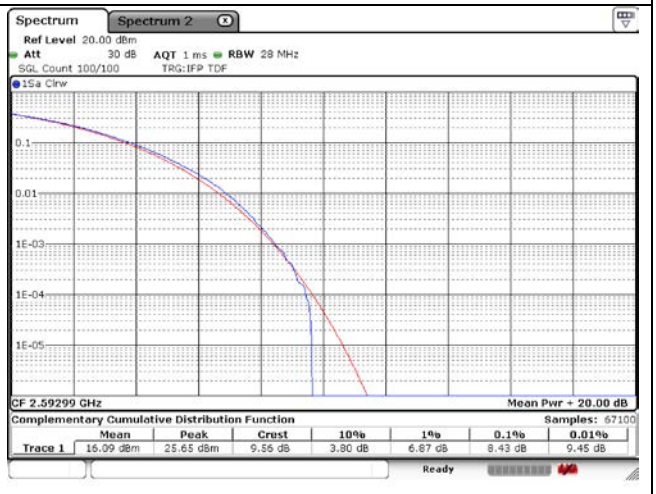


50 ㎒ Middle Channel - Full RB - CP-OFDM_Port 1



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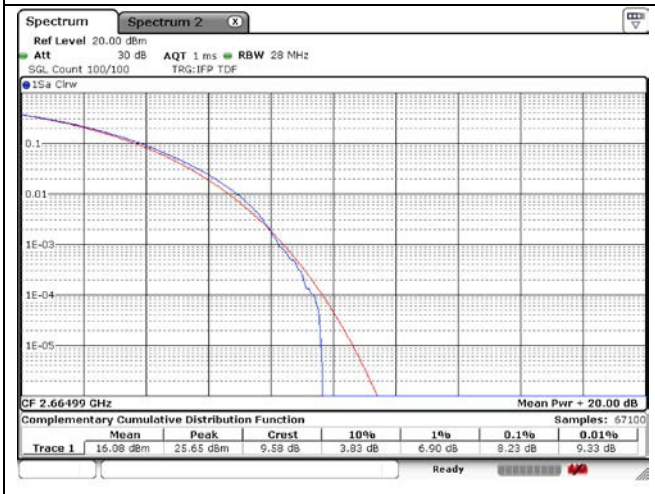

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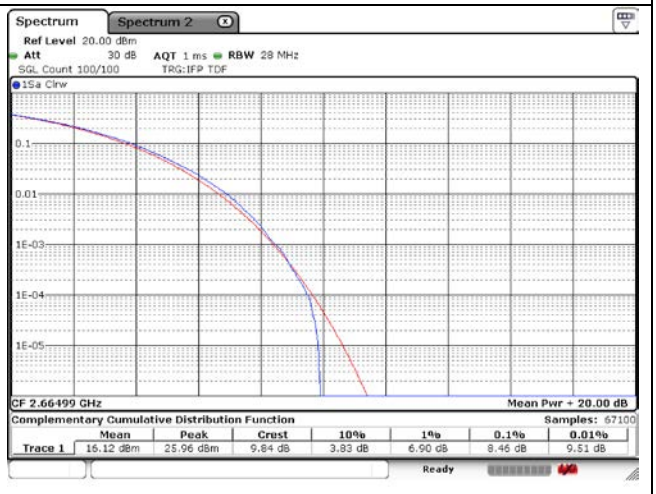

50 ㎒ High Channel - Full RB - CP-OFDM_Port 2