

1.0 LTE CONDUCTED OUTPUT POWER

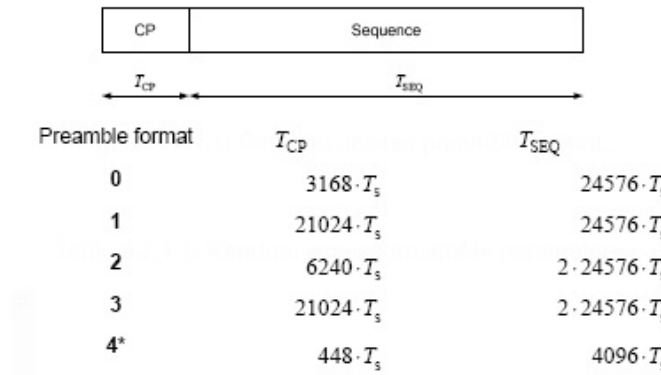
The **Samsung LTE USB Modem FCC ID: A3LSLCU100** was connected to a Rohde and Schwarz Vector Signal Generator (Model: E8267C) and a Rohde and Schwarz spectrum analyzer (Model: FSQ 26) through the Receive and Transmit antenna ports of the device, respectively. The vector signal generator was used to generate a downlink signal for use with the EUT. Once the waveform was generated, the EUT uplink power was measured using the Complementary Cumulative Distribution Function (CCDF) of the spectrum analyzer. The modulation of the uplink waveform was determined by software installed on a computer and the conducted powers were measured for all possible resource block sizes, resource block offsets, and MCS level (i.e. coding rate) values.

PUCCH Format	Modulation	Maximum Average Power [dBm]	Maximum Peak Power [dBm]	Peak-Average Ratio [dB]
1	N/A	22.19	26.00	3.81
1a	BPSK	22.34	26.07	3.73
1b	QPSK	22.06	25.86	3.80
2	QPSK	22.06	25.79	3.73
2a	QPSK-BPSK	22.09	25.79	3.70
2b	QPSK-QPSK	22.14	25.86	3.72

Table 1. LTE Conducted Output Power for Physical Uplink Control Channels (PUCCH)

Resource Block Size	Resource Block Offset	Measured Average Power [dBm]	Norm. Factor [dB]	True Average Power [dBm]	Maximum Peak Power [dBm]	Peak-Average Ratio [dB]
4	1	10.61	11.46	22.07	25.01	2.94
	24	11.94	11.46	23.40	26.70	3.30
	46	11.46	11.46	22.92	26.28	3.36
24	1	11.24	11.46	22.70	25.72	3.02
	14	11.72	11.46	23.18	26.21	3.03
	26	11.77	11.46	23.23	25.93	2.70
48	1	11.45	11.46	22.91	25.51	2.60

Table 2. LTE Conducted Output Power for Sounding Reference Signal (SRS) Mode



From the chart above, the normalization factor can be calculated based on the ratio of the radio frame length ($307200T_s$ in all cases) to the pulse duration ($T_{CP} + T_{SEQ}$ for each preamble format).

Preamble Format	Radio Frame Length	Pulse Duration	Normalization Factor [dB]
0	$307200T_s$	$27744T_s$	10.4425
1	$307200T_s$	$45600T_s$	8.2846
2	$307200T_s$	$55392T_s$	7.4397
3	$307200T_s$	$70176T_s$	6.4123

PRACH Configuration Index	Resource Block Offset	Measured Average Power [dBm]	Norm. Factor [dB]	True Average Power [dBm]	Maximum Peak Power [dBm]	Peak-Average Ratio [dB]
3	4	10.50	10.44	20.94	24.73	3.79
	21	12.14	10.44	22.58	26.07	3.49
	40	11.58	10.44	22.02	26.49	4.47
19	4	12.18	8.28	20.46	26.49	6.03
	21	14.06	8.28	22.34	26.00	3.66
	40	13.51	8.28	21.79	26.49	4.70
35	4	13.02	7.44	20.46	24.66	4.20
	21	13.84	7.44	21.28	26.00	4.72
	40	13.63	7.44	21.07	26.42	5.35
51	4	14.07	6.41	20.48	26.42	5.94
	21	15.37	6.41	21.78	25.86	4.08
	40	14.94	6.41	21.35	26.35	5.00

Table 3. LTE Conducted Output Power for Physical Random Access Channels (PRACH)

	MCS Level	Resource Block Offset	Maximum Average Power [dBm]	Maximum Peak Power [dBm]	Peak-Average Power Ratio [dB]
Resource Block 1	0	2	21.85	27.03	5.03
		24	23.36	27.73	4.36
		47	23.17	27.80	4.46
	5	2	21.81	27.03	5.06
		24	23.30	27.59	4.26
		47	23.16	27.80	4.49
	10	2	21.78	26.96	5.06
		24	23.33	27.52	4.17
		47	23.16	27.80	4.52
	11	2	21.88	27.45	5.38
		24	23.34	28.16	4.68
		47	23.23	28.16	4.81
	15	2	21.88	26.82	4.78
		24	23.34	27.66	4.29
		47	23.25	27.66	4.26
	20	2	21.83	26.82	4.87
		24	23.27	27.52	4.23
		47	23.17	27.66	4.36
Resource Block 12	0	0	21.98	27.47	5.35
		20	23.20	28.18	4.78
		38	23.16	28.25	4.94
	5	0	21.95	27.68	5.48
		20	23.21	28.18	4.84
		38	23.14	28.32	4.90
	10	0	21.92	27.68	5.51
		20	23.19	28.10	4.81
		38	23.15	28.25	4.87
	11	0	21.85	28.10	5.90
		20	23.10	28.32	5.06
		38	23.05	28.53	5.22
	15	0	21.84	27.75	5.74
		20	23.08	28.32	5.13
		38	23.07	28.67	5.29
	20	0	21.93	27.68	5.67
		20	23.19	28.25	4.94
		38	23.14	28.46	5.10

Table 4. LTE Conducted Output Power for Physical Uplink Shared Channels (PUSCH)

	MCS Level	Resource Block Offset	Maximum Average Power [dBm]	Maximum Peak Power [dBm]	Peak-Average Power Ratio [dB]
Resource Block 20	0	0	22.52	28.03	5.26
		12	23.66	28.53	4.68
		30	23.76	28.67	4.71
	5	0	22.91	28.53	5.26
		12	23.54	28.46	4.74
		30	23.73	28.67	4.65
	10	0	22.87	28.03	4.97
		12	23.57	28.32	4.62
		30	23.73	28.74	4.62
	11	0	22.80	28.67	5.54
		12	22.81	28.67	5.54
		30	22.82	28.67	5.54
	15	0	22.60	28.81	5.80
		12	23.45	29.09	5.38
		30	23.52	29.23	5.32
	20	0	22.58	28.46	5.71
		12	23.25	28.74	5.29
		30	23.37	29.02	5.32
Resource Block 50	0	0	23.04	28.88	5.29
	5	0	23.01	28.46	5.16
	10	0	23.00	28.60	5.16
	11	0	22.91	29.23	5.90
	15	0	22.94	29.02	5.74
	20	0	22.87	29.37	5.80

Table 4. LTE Conducted Output Power for Physical Uplink Shared Channels (PUSCH)