



Appendix A

Transmitter Output Power

According to FCC Part 2.1046 & 27.50



Conducted Power of Transmitter

Table 1 Measurement Results(LTE) BAND 4

RF Output Power(Conducted) BAND 4				
Test Mode	TN/VN			
	Modulation	RB	Measured (dBm)	Limit (dBm)
Channel (B) 1.4MHz(BW)	QPSK	1RB#0	21.89	26.64
		1RB#max	21.91	26.64
		3RB#2	21.89	26.64
		Full	20.86	26.64
	16QAM	1RB#0	21.07	26.64
		1RB#max	20.98	26.64
		3RB#2	21.05	26.64
		Full	20.19	26.64
Channel (B) 3MHz(BW)	QPSK	1RB#0	22.04	26.64
		1RB#max	22.01	26.64
		8RB#4	21.04	26.64
		Full	20.98	26.64
	16QAM	1RB#0	21.09	26.64
		1RB#max	21.11	26.64
		8RB#4	20.21	26.64
		Full	20.06	26.64
Channel (B) 5MHz(BW)	QPSK	1RB#0	22.16	26.64
		1RB#max	22.11	26.64
		12RB#6	21.02	26.64
		Full	21.05	26.64
	16QAM	1RB#0	21.24	26.64
		1RB#max	21.09	26.64
		12RB#6	19.97	26.64
		Full	20.22	26.64
Channel (B) 10MHz(BW)	QPSK	1RB#0	22.08	26.64
		1RB#max	22.17	26.64
		25RB#6	21.01	26.64
		Full	21.14	26.64
	16QAM	1RB#0	21.05	26.64
		1RB#max	21.19	26.64



		25RB#13	20.13	26.64
		Full	20.23	26.64
Channel (B) 20MHz(BW)	QPSK	1RB#0	22.07	26.64
		1RB#max	22.21	26.64
		50RB#13	21.18	26.64
		Full	21.24	26.64
	16QAM	1RB#0	21.59	26.64
		1RB#max	21.75	26.64
		50RB#25	20.02	26.64
		Full	20.21	26.64
Channel (M) 1.4MHz(BW)	QPSK	1RB#0	22.09	26.64
		1RB#max	22.12	26.64
		3RB#2	22.04	26.64
		Full	21.08	26.64
	16QAM	1RB#0	20.78	26.64
		1RB#max	20.75	26.64
		3RB#2	21.11	26.64
		Full	20.28	26.64
Channel (M) 3MHz(BW)	QPSK	1RB#0	22.16	26.64
		1RB#max	22.12	26.64
		8RB#4	21.11	26.64
		Full	21.13	26.64
	16QAM	1RB#0	21.24	26.64
		1RB#max	21.25	26.64
		8RB#4	20.37	26.64
		Full	20.21	26.64
Channel (M) 5MHz(BW)	QPSK	1RB#0	22.28	26.64
		1RB#max	22.31	26.64
		12RB#6	21.12	26.64
		Full	21.14	26.64
	16QAM	1RB#0	21.38	26.64
		1RB#max	21.34	26.64
		12RB#6	20.15	26.64
		Full	20.58	26.64
Channel (M)	QPSK	1RB#0	22.23	26.64
		1RB#max	22.12	26.64
		25RB#13	21.16	26.64
		Full	21.21	26.64



10MHz(BW)	16QAM	1RB#0	21.26	26.64
		1RB#max	21.17	26.64
		25RB#13	20.29	26.64
		Full	20.38	26.64
Channel (M) 20MHz(BW)	QPSK	1RB#0	22.12	26.64
		1RB#max	22.13	26.64
		50RB#25	21.21	26.64
		Full	21.67	26.64
	16QAM	1RB#0	21.72	26.64
		1RB#max	21.66	26.64
		50RB#25	20.18	26.64
		Full	20.3	26.64
Channel (T) 1.4MHz(BW)	QPSK	1RB#0	22.06	26.64
		1RB#max	22.02	26.64
		3RB#25	21.98	26.64
		Full	21.02	26.64
	16QAM	1RB#0	20.75	26.64
		1RB#max	20.68	26.64
		3RB#2	21.18	26.64
		Full	20.26	26.64
Channel (T) 3MHz(BW)	QPSK	1RB#0	22.21	26.64
		1RB#max	22.14	26.64
		8RB#4	21.13	26.64
		Full	21.09	26.64
	16QAM	1RB#0	21.23	26.64
		1RB#max	21.29	26.64
		8RB#4	20.37	26.64
		Full	20.25	26.64
Channel (T) 5MHz(BW)	QPSK	1RB#0	22.21	26.64
		1RB#max	22.31	26.64
		12RB#6	21.13	26.64
		Full	21.23	26.64
	16QAM	1RB#0	21.33	26.64
		1RB#max	21.24	26.64
		12RB#6	20.13	26.64
		Full	20.57	26.64
	QPSK	1RB#0	22.18	26.64
		1RB#max	22.19	26.64



Channel (T) 10MHz(BW)		25RB#13	21.04	26.64
		Full	21.23	26.64
	16QAM	1RB#0	21.18	26.64
		1RB#max	21.22	26.64
		25RB#13	20.15	26.64
		Full	20.21	26.64
Channel (T) 20MHz(BW)	QPSK	1RB#0	22.13	26.64
		1RB#max	22.24	26.64
		50RB#25	21.13	26.64
		Full	21.14	26.64
	16QAM	1RB#0	21.34	26.64
		1RB#max	21.42	26.64
		50RB#25	20.18	26.64
		Full	20.16	26.64

Table 2 Measurement Results (LTE) BAND 17

RF Output Power(Conducted) BAND 17				
Test Mode	TN/VN			
	Modulation	RB	Measured (dBm)	Limit (dBm)
Channel (B) 5MHz(BW)	QPSK	1RB#0	22.23	35.43
		1RB#max	22.17	35.43
		12RB#6	20.93	35.43
		Full	20.80	35.43
	16QAM	1RB#0	21.25	35.43
		1RB#max	21.29	35.43
		12RB#6	19.76	35.43
		Full	20.11	35.43
Channel (B) 10MHz(BW)	QPSK	1RB#0	21.93	35.43
		1RB#max	21.88	35.43
		25RB#13	21.03	35.43
		Full	20.97	35.43
	16QAM	1RB#0	20.63	35.43
		1RB#max	20.52	35.43
		25RB#13	20.05	35.43
		Full	20.08	35.43
		1RB#0	22.21	35.43



Channel (M) 5MHz(BW)	QPSK	1RB#max	21.92	35.43
		12RB#6	21.02	35.43
		Full	20.93	35.43
	16QAM	1RB#0	20.77	35.43
		1RB#max	20.74	35.43
		12RB#6	19.84	35.43
		Full	20.22	35.43
Channel (M) 10MHz(BW)	QPSK	1RB#0	22.14	35.43
		1RB#max	21.91	35.43
		25RB#13	20.86	35.43
		Full	20.82	35.43
	16QAM	1RB#0	20.72	35.43
		1RB#max	20.57	35.43
		25RB#13	19.91	35.43
Full	19.98	35.43		
Channel (T) 5MHz(BW)	QPSK	1RB#0	22.03	35.43
		1RB#max	21.49	35.43
		12RB#6	20.83	35.43
		Full	20.88	35.43
	16QAM	1RB#0	21.22	35.43
		1RB#max	20.62	35.43
		12RB#6	19.78	35.43
Full	20.19	35.43		
Channel (T) 10MHz(BW)	QPSK	1RB#0	22.02	35.43
		1RB#max	21.62	35.43
		25RB#13	20.82	35.43
		Full	20.74	35.43
	16QAM	1RB#0	20.72	35.43
		1RB#max	20.34	35.43
		25RB#13	19.93	35.43
Full	19.91	35.43		



Effective Isotropic Radiated Power of Transmitter (EIRP)

Table 3 Substitution Results (LTE) BAND 4

Substitution Results (LTE)Test Mode			Meas. Level [dBm]	Substitution Antenna Type	SGP[dBm]	Substitution Gain [dBi]	Cable Loss [dB]	Substitution Level (EIRP) [dBm]	FCC limit [dBm]	Result
Channel	Modulation	RB								
Channel (B) 1.4MHz(BW)	QPSK	1 RB/#0	25.25	Horn Ant.	21.72	4.5	1	25.22	30	Pass
		1 RB/#max	25.27	Horn Ant.	21.73	4.5	1	25.23	30	Pass
		Full	24.22	Horn Ant.	20.77	4.5	1	24.27	30	Pass
	16QAM	1 RB/#0	24.43	Horn Ant.	20.93	4.5	1	24.43	30	Pass
		1 RB/#max	24.34	Horn Ant.	20.81	4.5	1	24.31	30	Pass
		Full	23.55	Horn Ant.	20.02	4.5	1	23.52	30	Pass
Channel (B) 3MHz(BW)	QPSK	1 RB/#0	25.4	Horn Ant.	21.91	4.5	1	25.41	30	Pass
		1 RB/#max	25.37	Horn Ant.	21.87	4.5	1	25.37	30	Pass
		Full	24.34	Horn Ant.	20.82	4.5	1	24.32	30	Pass
	16QAM	1 RB/#0	24.45	Horn Ant.	20.94	4.5	1	24.44	30	Pass
		1 RB/#max	24.47	Horn Ant.	20.92	4.5	1	24.42	30	Pass
		Full	23.42	Horn Ant.	19.98	4.5	1	23.48	30	Pass
Channel (B) 5MHz(BW)	QPSK	1 RB/#0	25.52	Horn Ant.	22.09	4.5	1	25.59	30	Pass
		1 RB/#max	25.47	Horn Ant.	21.91	4.5	1	25.41	30	Pass
		Full	24.41	Horn Ant.	20.81	4.5	1	24.31	30	Pass



	16QAM	1 RB/#0	24.6	Horn Ant.	21.19	4.5	1	24.69	30	Pass
		1 RB/#max	24.45	Horn Ant.	20.85	4.5	1	24.35	30	Pass
		Full	23.58	Horn Ant.	20.02	4.5	1	23.52	30	Pass
Channel (B) 10MHz(BW)	QPSK	1 RB/#0	25.44	Horn Ant.	21.98	4.5	1	25.48	30	Pass
		1 RB/#max	25.53	Horn Ant.	22.05	4.5	1	25.55	30	Pass
		Full	24.5	Horn Ant.	21.02	4.5	1	24.52	30	Pass
	16QAM	1 RB/#0	24.41	Horn Ant.	20.95	4.5	1	24.45	30	Pass
		1 RB/#max	24.55	Horn Ant.	21.02	4.5	1	24.52	30	Pass
		Full	23.59	Horn Ant.	20.02	4.5	1	23.52	30	Pass
Channel (B) 20MHz(BW)	QPSK	1 RB/#0	25.43	Horn Ant.	21.92	4.5	1	25.42	30	Pass
		1 RB/#max	25.57	Horn Ant.	22.07	4.5	1	25.57	30	Pass
		Full	24.6	Horn Ant.	21.12	4.5	1	24.62	30	Pass
	16QAM	1 RB/#0	24.95	Horn Ant.	21.42	4.5	1	24.92	30	Pass
		1 RB/#max	25.11	Horn Ant.	21.67	4.5	1	25.17	30	Pass
		Full	23.57	Horn Ant.	20.04	4.5	1	23.54	30	Pass
Channel (M) 1.4MHz(BW)	QPSK	1 RB/#0	25.45	Horn Ant.	21.92	4.5	1	25.42	30	Pass
		1 RB/#max	25.48	Horn Ant.	21.92	4.5	1	25.42	30	Pass
		Full	24.44	Horn Ant.	20.91	4.5	1	24.41	30	Pass
	16QAM	1 RB/#0	24.14	Horn Ant.	20.61	4.5	1	24.11	30	Pass



		1 RB/#max	24.11	Horn Ant.	20.63	4.5	1	24.13	30	Pass
		Full	23.64	Horn Ant.	20.12	4.5	1	23.62	30	Pass
Channel (M) 3MHz(BW)	QPSK	1 RB/#0	25.52	Horn Ant.	22.01	4.5	1	25.51	30	Pass
		1 RB/#max	25.48	Horn Ant.	21.98	4.5	1	25.48	30	Pass
		Full	24.49	Horn Ant.	20.92	4.5	1	24.42	30	Pass
	16QAM	1 RB/#0	24.6	Horn Ant.	21.11	4.5	1	24.61	30	Pass
		1 RB/#max	24.61	Horn Ant.	21.13	4.5	1	24.63	30	Pass
		Full	23.57	Horn Ant.	20.03	4.5	1	23.53	30	Pass
Channel (M) 5MHz(BW)	QPSK	1 RB/#0	25.64	Horn Ant.	22.14	4.5	1	25.64	30	Pass
		1 RB/#max	25.67	Horn Ant.	22.17	4.5	1	25.67	30	Pass
		Full	24.5	Horn Ant.	21.02	4.5	1	24.52	30	Pass
	16QAM	1 RB/#0	24.74	Horn Ant.	21.22	4.5	1	24.72	30	Pass
		1 RB/#max	24.7	Horn Ant.	21.22	4.5	1	24.72	30	Pass
		Full	23.94	Horn Ant.	20.34	4.5	1	23.84	30	Pass
Channel (M) 10MHz(BW)	QPSK	1 RB/#0	25.59	Horn Ant.	22.04	4.5	1	25.54	30	Pass
		1 RB/#max	25.48	Horn Ant.	21.93	4.5	1	25.43	30	Pass
		Full	24.57	Horn Ant.	21.03	4.5	1	24.53	30	Pass
	16QAM	1 RB/#0	24.62	Horn Ant.	21.17	4.5	1	24.67	30	Pass
		1 RB/#max	24.53	Horn Ant.	21.03	4.5	1	24.53	30	Pass



		Full	23.74	Horn Ant.	20.29	4.5	1	23.79	30	Pass
Channel (M) 20MHz(BW)	QPSK	1 RB/#0	25.48	Horn Ant.	21.91	4.5	1	25.41	30	Pass
		1 RB/#max	25.49	Horn Ant.	21.91	4.5	1	25.41	30	Pass
		Full	25.03	Horn Ant.	21.63	4.5	1	25.13	30	Pass
	16QAM	1 RB/#0	25.08	Horn Ant.	21.68	4.5	1	25.18	30	Pass
		1 RB/#max	25.02	Horn Ant.	21.54	4.5	1	25.04	30	Pass
		Full	23.66	Horn Ant.	20.06	4.5	1	23.56	30	Pass
Channel (T) 1.4MHz(BW)	QPSK	1 RB/#0	25.42	Horn Ant.	21.52	4.8	1	25.32	30	Pass
		1 RB/#max	25.38	Horn Ant.	21.52	4.8	1	25.32	30	Pass
		Full	24.38	Horn Ant.	20.58	4.8	1	24.38	30	Pass
	16QAM	1 RB/#0	24.11	Horn Ant.	20.33	4.8	1	24.13	30	Pass
		1 RB/#max	24.04	Horn Ant.	20.26	4.8	1	24.06	30	Pass
		Full	23.62	Horn Ant.	19.82	4.8	1	23.62	30	Pass
Channel (T) 3MHz(BW)	QPSK	1 RB/#0	25.57	Horn Ant.	21.72	4.8	1	25.52	30	Pass
		1 RB/#max	25.5	Horn Ant.	21.71	4.8	1	25.51	30	Pass
		Full	24.45	Horn Ant.	20.65	4.8	1	24.45	30	Pass
	16QAM	1 RB/#0	24.59	Horn Ant.	20.73	4.8	1	24.53	30	Pass
		1 RB/#max	24.65	Horn Ant.	20.83	4.8	1	24.63	30	Pass
		Full	23.61	Horn Ant.	19.87	4.8	1	23.67	30	Pass



Channel (T) 5MHz(B W)	QPSK	1 RB/#0	25.57	Horn Ant.	21.73	4.8	1	25.53	30	Pass
		1 RB/#max	25.67	Horn Ant.	21.82	4.8	1	25.62	30	Pass
		Full	24.59	Horn Ant.	20.72	4.8	1	24.52	30	Pass
	16QAM	1 RB/#0	24.69	Horn Ant.	20.82	4.8	1	24.62	30	Pass
		1 RB/#max	24.6	Horn Ant.	20.82	4.8	1	24.62	30	Pass
		Full	23.93	Horn Ant.	20.13	4.8	1	23.93	30	Pass
Channel (T) 10MHz(B W)	QPSK	1 RB/#0	25.54	Horn Ant.	21.72	4.8	1	25.52	30	Pass
		1 RB/#max	25.55	Horn Ant.	21.72	4.8	1	25.52	30	Pass
		Full	24.59	Horn Ant.	20.72	4.8	1	24.52	30	Pass
	16QAM	1 RB/#0	24.54	Horn Ant.	20.74	4.8	1	24.54	30	Pass
		1 RB/#max	24.58	Horn Ant.	20.78	4.8	1	24.58	30	Pass
		Full	23.57	Horn Ant.	19.77	4.8	1	23.57	30	Pass
Channel (T) 20MHz(B W)	QPSK	1 RB/#0	25.49	Horn Ant.	21.63	4.8	1	25.43	30	Pass
		1 RB/#max	25.6	Horn Ant.	21.82	4.8	1	25.62	30	Pass
		Full	24.5	Horn Ant.	20.7	4.8	1	24.5	30	Pass
	16QAM	1 RB/#0	24.7	Horn Ant.	20.87	4.8	1	24.67	30	Pass
		1 RB/#max	24.78	Horn Ant.	20.92	4.8	1	24.72	30	Pass
		Full	23.52	Horn Ant.	19.76	4.8	1	23.56	30	Pass

Note: a, For getting the EIRP (Efficient Isotropic Radiated Power) in substitution method, the following formula should take to calculate it,



$$\text{EIRP [dBm]} = \text{SGP [dBm]} - \text{Cable Loss [dB]} + \text{Gain [dBi]}$$

b, SGP=Signal Generator Level



Effective Radiated Power of Transmitter (ERP)

Table 4 Substitution Results (LTE) BAND 17

Substitution Results (LTE)Test Mode			Meas. Level [dBm]	Substitution Antenna Type	SGP [dBm]	Substitution Gain [dBd]	Cable Loss [dB]	Substitution Level (ERP) [dBm]	FCC limit [dBm]	Result
Channel	Modulation	RB								
Channel (B) 5MHz(BW)	QPSK	1 RB/#0	21.56	Dipole Ant.	24.88	-2.75	0.6	21.53	34.76	Pass
		1 RB/#max	21.5	Dipole Ant.	24.89	-2.75	0.6	21.54	34.76	Pass
		Full	20.13	Dipole Ant.	23.47	-2.75	0.6	20.12	34.76	Pass
	16QAM	1 RB/#0	20.58	Dipole Ant.	23.87	-2.75	0.6	20.52	34.76	Pass
		1 RB/#max	20.62	Dipole Ant.	24.01	-2.75	0.6	20.66	34.76	Pass
		Full	19.44	Dipole Ant.	22.78	-2.75	0.6	19.43	34.76	Pass
Channel (B) 10MHz(BW)	QPSK	1 RB/#0	21.26	Dipole Ant.	24.61	-2.75	0.6	21.26	34.76	Pass
		1 RB/#max	21.21	Dipole Ant.	24.57	-2.75	0.6	21.22	34.76	Pass
		Full	20.3	Dipole Ant.	23.67	-2.75	0.6	20.32	34.76	Pass
	16QAM	1 RB/#0	19.96	Dipole Ant.	23.27	-2.75	0.6	19.92	34.76	Pass
		1 RB/#max	19.85	Dipole Ant.	23.18	-2.75	0.6	19.83	34.76	Pass
		Full	19.41	Dipole Ant.	22.80	-2.75	0.6	19.45	34.76	Pass
Channel (M) 5MHz(BW)	QPSK	1 RB/#0	21.54	Dipole Ant.	25.01	-2.87	0.6	21.54	34.76	Pass
		1 RB/#max	21.25	Dipole Ant.	24.70	-2.87	0.6	21.23	34.76	Pass
		Full	20.26	Dipole	23.73	-2.87	0.6	20.26	34.76	Pass



				Ant.						
	16QAM	1 RB/#0	20.1	Dipole Ant.	23.59	-2.87	0.6	20.12	34.76	Pass
		1 RB/#max	20.07	Dipole Ant.	23.50	-2.87	0.6	20.03	34.76	Pass
		Full	19.55	Dipole Ant.	23.01	-2.87	0.6	19.54	34.76	Pass
Channel (M) 10MHz(BW)	QPSK	1 RB/#0	21.47	Dipole Ant.	24.90	-2.87	0.6	21.43	34.76	Pass
		1 RB/#max	21.24	Dipole Ant.	24.71	-2.87	0.6	21.24	34.76	Pass
		Full	20.15	Dipole Ant.	23.59	-2.87	0.6	20.12	34.76	Pass
	16QAM	1 RB/#0	20.05	Dipole Ant.	23.49	-2.87	0.6	20.02	34.76	Pass
		1 RB/#max	19.9	Dipole Ant.	23.37	-2.87	0.6	19.9	34.76	Pass
		Full	19.31	Dipole Ant.	22.78	-2.87	0.6	19.31	34.76	Pass
Channel (T) 5MHz(BW)	QPSK	1 RB/#0	21.36	Dipole Ant.	24.77	-2.85	0.6	21.32	34.76	Pass
		1 RB/#max	20.82	Dipole Ant.	24.31	-2.85	0.6	20.86	34.76	Pass
		Full	20.21	Dipole Ant.	23.56	-2.85	0.6	20.11	34.76	Pass
	16QAM	1 RB/#0	20.55	Dipole Ant.	23.96	-2.85	0.6	20.51	34.76	Pass
		1 RB/#max	19.95	Dipole Ant.	23.40	-2.85	0.6	19.95	34.76	Pass
		Full	19.52	Dipole Ant.	23.00	-2.85	0.6	19.55	34.76	Pass
Channel (T) 10MHz(BW)	QPSK	1 RB/#0	21.35	Dipole Ant.	24.77	-2.85	0.6	21.32	34.76	Pass
		1 RB/#max	20.95	Dipole Ant.	24.37	-2.85	0.6	20.92	34.76	Pass
		Full	20.07	Dipole Ant.	23.47	-2.85	0.6	20.02	34.76	Pass
	16QAM	1 RB/#0	20.05	Dipole	23.60	-2.85	0.6	20.15	34.76	Pass



				Ant.						
		1 RB/#max	19.67	Dipole Ant.	23.07	-2.85	0.6	19.62	34.76	Pass
		Full	19.24	Dipole Ant.	22.66	-2.85	0.6	19.21	34.76	Pass

Note: a, For getting the ERP (Efficient Radiated Power) in substitution method, the following formula should take to calculate it,

$$ERP [dBm] = SGP [dBm] - Cable Loss [dB] + Gain [dBd]$$

b, SGP=Signal Generator Level