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December 3, 2013

Subject: Antenna Kitting

Re: FCC ID: PWO460007

To Whom It May Concern:

The antenna kitting options for model 460007 signal booster were done for 19 Mobile Outside Antenna kit options, 27 Fixed Outside Antenna kit options, and no Inside Antenna kit options. The Inside Antenna kits are not applicable for model 460007 due to an inside antenna integrated into the Signal Booster. The order of the attached calculations is as follows:

Mobile Outside Antenna Kit Options:

1. Kits 311103, 311125, 311128, 314202
2. Kit 311703
3. Kit 301113, 301126
4. Kit 311101
5. Kit 311701
6. Kit 311119
7. Kit 311133
8. Kit 311104-17410
9. Kit 311112-17410
10. Kit 314203-17410
11. Kit 311130-5810
12. Kit 311114
13. Kit 311102
14. Kit 311104-5810
15. Kit 311112-5810
16. Kit 314203-5810
17. Kit 311104-40015
18. Kit 311112-40015
19. Kit 314203-40015

4. Kit 301111-0675
5. Kit 301111-5850
6. Kit 311124-400100
7. Kit 311124-5840
8. Kit 311124-0660
9. Kit 311129-0650
10. Kit 311129-400100
11. Kit 311203-40020
12. Kit 311203-5820
13. Kit 311201-0620
14. Kit 301126
15. Kit 301111-11140
16. Kit 314453-5825
17. Kit 314453-40075
18. Kit 314473-0640
19. Kit 311141-0620
20. Kit 311129-1180
21. Kit 311201-1120
22. Kit 311124-11110
23. Kit 314475-1175
24. Kit 301111-400170
25. Kit 311141-1120
26. Kit 314473-1175
27. Kit 311129-5830

Fixed Outside Antenna Kit Options:

1. Kit 314411-40075
2. Kit 314411-5825
3. Kit 314775-0630

Sincerely,

A handwritten signature in blue ink, appearing to read 'Patrick L. Cook', is written over a light blue horizontal line.

Patrick L. Cook

Senior Research and Development Engineer



Mobile Outside Antenna Kit Options

FCC ID: PWO 460007

Final Output Power Limited to 30 dBm EIRP in all frequency bands

Uplink Frequency (MHz)	698-716	777-787	824-849	1710-1755	1850-1910
Uplink Output Power (dBm)	24.35	23.09	24.9	22	22.69

1 Magnet Mount w/12.5' RG-174	Kit Numbers: 311103 311125 311128 314202				
Antenna Gains (dBi)	-4.88	0.09	1.97	-6.99	2.51
Coax Loss (dB)	2.8	3.0	3.7	4.5	4.7
Final Gain less Loss (dB)	-7.7	-2.9	-1.7	-11.5	-2.2
Output Power plus Final Gain (dBm EIRP)	16.67	20.18	23.17	10.51	20.5

2 Magnet Mount w/12.5' RG-174	311703				
Antenna Gains (dBi)	-15.07	-4.23	0.69	-1.99	1.13
Coax Loss (dB)	2.8	3.0	3.7	4.5	4.7
Final Gain less Loss (dB)	-17.9	-7.2	-3.0	-6.5	-3.6
Output Power plus Final Gain (dBm EIRP)	6.48	15.86	21.89	15.5	19.12

3 Mini-Mag Mount w/12.5' RG-174	301113	301126			
Antenna Gains (dBi)	-0.36	-2.15	-1.92	1.16	1.85
Coax Loss (dB)	2.8	3	3.7	4.5	4.7
Final Gain less Loss (dB)	-3.2	-5.2	-5.6	-3.3	-2.9
Output Power plus Final Gain (dBm EIRP)	21.19	17.94	19.28	18.66	19.8

4 Trucker Antenna w/10.5' RG-58	311101				
Antenna Gains (dBi)	-4.51	0.4	1.72	-3.62	6.12
Coax Loss (dB)	1.2	1.3	1.4	2.2	2.3
Final Gain less Loss (dB)	-5.7	-0.9	0.3	-5.8	3.8
Output Power plus Final Gain (dBm EIRP)	18.6	22.2	25.2	16.2	26.5

5 Trucker Antenna w/10.5' RG-58	311701				
Antenna Gains (dBi)	-14.11	-0.71	2.18	-0.15	2.66
Coax Loss (dB)	1.2	1.3	1.4	2.2	2.3
Final Gain less Loss (dB)	-15.3	-2.0	0.8	-2.4	0.4
Output Power plus Final Gain (dBm EIRP)	9.04	21.08	25.68	19.65	23.1

6 Trucker Antenna w/13.5' RG-58	311119				
Antenna Gains (dBi)	-1.36	0.36	1.21	-2.3	3.57
Coax Loss (dB)	1.6	1.7	1.7	2.8	2.9
Final Gain less Loss (dB)	-3.0	-1.3	-0.5	-5.1	0.7
Output Power plus Final Gain (dBm EIRP)	21.4	21.75	24.41	16.9	23.36

7 Trucker Antenna w/13.5' RG-58	311133				
Antenna Gains (dBi)	-3.3	0.2	1.15	-4.75	4.22
Coax Loss (dB)	1.6	1.7	1.7	2.8	2.9
Final Gain less Loss (dB)	-4.9	-1.6	-0.6	-7.6	1.3
Output Power plus Final Gain (dBm EIRP)	19.5	21.5	24.4	14.5	24.0

8 NMO Antenna 10' RG-174	311104-17410				
Antenna Gains (dBi)	-4.1	-0.9	2.48	-3.51	1.8
Coax Loss (dB)	2.3	2.4	3.0	3.6	3.8
Final Gain less Loss (dB)	-6.4	-3.3	-0.5	-7.1	-2.0
Output Power plus Final Gain (dBm EIRP)	17.98	19.76	24.38	14.89	20.69

9 NMO Antenna 10' RG-174	311112-17410				
Antenna Gains (dBi)	-3.16	-0.45	2.47	-2.6	-0.65
Coax Loss (dB)	2.3	2.4	3.0	3.6	3.8
Final Gain less Loss (dB)	-5.5	-2.9	-0.5	-6.2	-4.5
Output Power plus Final Gain (dBm EIRP)	18.89	20.24	24.37	15.8	18.24

10 NMO Antenna 10' RG-174	314203-17410				
Antenna Gains (dBi)	-1.57	0.48	1.82	-5.74	0.75
Coax Loss (dB)	2.3	2.4	3.0	3.6	3.8
Final Gain less Loss (dB)	-3.9	-1.9	-1.2	-9.3	-3.1
Output Power plus Final Gain (dBm EIRP)	20.5	21.2	23.7	12.7	19.6



Mobile Outside Antenna Kit Options

FCC ID: PWO 460007

Final Output Power Limited to 30 dBm EIRP in all frequency bands

Uplink Frequency (MHz)	698-716	777-787	824-849	1710-1755	1850-1910
Uplink Output Power (dBm)	24.35	23.09	24.9	22	22.69

11 Marine Antenna w/10' RG-58		311130-5810				
Antenna Gains (dBi)		-1.0	-1.6	0.65	-1.68	3.57
Coax Loss (dB)		1.2	1.2	1.3	2.1	2.1
Final Gain less Loss (dB)		-2.2	-2.9	-0.6	-3.7	1.4
Output Power plus Final Gain (dBm EIRP)		22.2	20.2	24.3	18.3	24.1
12 Mini-Glass Mount w/14' RG-58		311114				
Antenna Gains (dBi)		-7.53	-6.11	-5.39	2.57	1.44
Coax Loss (dB)		1.6	1.7	1.8	2.9	3.0
Final Gain less Loss (dB)		-9.1	-7.8	-7.2	-0.3	-1.6
Output Power plus Final Gain (dBm EIRP)		15.2	15.3	17.7	21.7	21.1
13 Glass Mount w/14' RG-58		311102				
Antenna Gains (dBi)		-3.68	-2.54	-0.86	2.19	3.39
Coax Loss (dB)		1.6	1.7	1.8	2.9	3.0
Final Gain less Loss (dB)		-5.3	-4.2	-2.7	-0.7	0.4
Output Power plus Final Gain (dBm EIRP)		19.07	18.85	22.24	21.29	23.1
14 NMO Antenna w/10' RG-58		311104-5810				
Antenna Gains (dBi)		-4.1	-0.9	2.48	-3.51	1.8
Coax Loss (dB)		1.2	1.2	1.3	2.1	2.1
Final Gain less Loss (dB)		-5.3	-2.1	1.2	-5.6	-0.3
Output Power plus Final Gain (dBm EIRP)		19.08	20.96	26.08	16.39	22.39
15 NMO Antenna w/10' RG-58		311112-5810				
Antenna Gains (dBi)		-3.16	-0.45	2.47	-2.6	-0.65
Coax Loss (dB)		1.2	1.2	1.3	2.1	2.1
Final Gain less Loss (dB)		-4.4	-1.7	1.2	-4.7	-2.8
Output Power plus Final Gain (dBm EIRP)		19.99	21.44	26.07	17.3	19.94
16 NMO Antenna w/10' RG-58		314203-5810				
Antenna Gains (dBi)		-1.57	0.48	1.82	-5.74	0.75
Coax Loss (dB)		1.2	1.2	1.3	2.1	2.1
Final Gain less Loss (dB)		-2.8	-0.7	0.5	-7.8	-1.4
Output Power plus Final Gain (dBm EIRP)		21.6	22.4	25.4	14.2	21.3
17 NMO Antenna w/15' LMR 400		311104-40015				
Antenna Gains (dBi)		-4.1	-0.9	2.48	-3.51	1.8
Coax Loss (dB)		0.8	0.8	0.9	1.1	1.3
Final Gain less Loss (dB)		-4.9	-1.7	1.6	-4.6	0.5
Output Power plus Final Gain (dBm EIRP)		19.48	21.36	26.5	17.39	23.2
18 NMO Antenna w/15' LMR 400		311112-40015				
Antenna Gains (dBi)		-3.16	-0.45	2.47	-2.6	-0.65
Coax Loss (dB)		0.8	0.8	0.9	1.1	1.3
Final Gain less Loss (dB)		-4.0	-1.3	1.6	-3.7	-2.0
Output Power plus Final Gain (dBm EIRP)		20.39	21.84	26.47	18.3	20.74
19 NMO Antenna w/15' LMR 400		314203-40015				
Antenna Gains (dBi)		-1.57	0.48	1.82	-5.74	0.75
Coax Loss (dB)		0.8	0.8	0.9	1.1	1.3
Final Gain less Loss (dB)		-2.4	-0.3	0.9	-6.8	-0.6
Output Power plus Final Gain (dBm EIRP)		22.0	22.8	25.8	15.2	22.1



Fixed Outside Antenna Kit Options

FCC ID: PWO460007

Final Output Power Limited to 30 dBm EIRP in all frequency bands

Uplink Frequency (MHz)	698-716	777-787	824-849	1710-1755	1850-1910
Uplink Output Power (dBm)	24.35	23.09	24.9	22	22.69

1 Wide Band Directional Antenna With 75' LMR 400 314411-40075

Antenna Gains (dBi)	7.3	7.2	7.8	7.9	9.1
Coax Loss (dB)	2.8	3.0	3.6	4.4	5.4
Final Gain less Loss (dB)	4.5	4.2	4.2	3.5	3.7
Output Power plus Final Gain (dBm EIRP)	28.85	27.29	29.1	25.5	26.4

2 Wide Band Directional Antenna With 25' RG-58 314411-5825

Antenna Gains (dBi)	7.3	7.2	7.8	7.9	9.1
Coax Loss (dB)	2.9	3.1	3.2	5.1	5.4
Final Gain less Loss (dB)	4.4	4.1	4.6	2.8	3.7
Output Power plus Final Gain (dBm EIRP)	28.8	27.2	29.5	24.8	26.4

3 Wide Band Directional Antenna With 30' RG-6 314775-0630

Antenna Gains (dBi)	7.3	7.2	7.8	7.9	9.1
Coax Loss (dB)	3.0	3.2	3.4	5.1	5.3
Final Gain less Loss (dB)	4.3	4	4.4	2.8	3.8
Output Power plus Final Gain (dBm EIRP)	28.65	27.1	29.3	24.8	26.5

4 Yagi Antenna 301111 With 75' RG-6 301111-0675

Antenna Gains (dBi)	10.0	10.0	10.8	-6.8	-13.8
Coax Loss (dB)	5.7	6.075	6.3	9.525	9.975
Final Gain less Loss (dB)	4.3	3.925	4.5	-16.325	-23.775
Output Power plus Final Gain (dBm EIRP)	28.65	27.0	29.4	5.7	-1.1

5 Yagi Antenna 301111 With 50' RG-58 301111-5850

Antenna Gains (dBi)	10.0	10.0	10.8	-6.8	-13.8
Coax Loss (dB)	5.8	6.2	6.5	10.3	10.7
Final Gain less Loss (dB)	4.2	3.8	4.3	-17.1	-24.5
Output Power plus Final Gain (dBm EIRP)	28.6	26.9	29.2	4.9	-1.8



Fixed Outside Antenna Kit Options

FCC ID: PWO460007

Final Output Power Limited to 30 dBm EIRP in all frequency bands

Uplink Frequency (MHz)	698-716	777-787	824-849	1710-1755	1850-1910
Uplink Output Power (dBm)	24.35	23.09	24.9	22	22.69

6 Yagi Antenna 311124 With 100' LMR 400 311124-400100

Antenna Gains (dBi)	1.95	7.18	9.64	-6.67	-11.97
Coax Loss (dB)	3.7	3.9	4.7	5.8	7.1
Final Gain less Loss (dB)	-1.75	3.28	4.9	-12.47	-19.07
Output Power plus Final Gain (dBm EIRP)	22.6	26.4	29.8	9.5	3.6

7 Yagi Antenna 311124 With 40' RG-58 311124-5840

Antenna Gains (dBi)	1.95	7.18	9.64	-6.67	-11.97
Coax Loss (dB)	4.6	5.0	5.2	8.2	8.6
Final Gain less Loss (dB)	-2.7	2.2	4.4	-14.9	-20.6
Output Power plus Final Gain (dBm EIRP)	21.7	25.3	29.3	7.1	2.1

8 Yagi Antenna 311124 With 60' RG-6 311124-0660

Antenna Gains (dBi)	1.95	7.18	9.64	-6.67	-11.97
Coax Loss (dB)	4.56	4.86	5.0	7.6	8.0
Final Gain less Loss (dB)	-2.61	2.32	4.64	-14.29	-19.95
Output Power plus Final Gain (dBm EIRP)	21.7	25.4	29.5	7.7	2.7

9 Yagi Antenna 311129 With 50' RG-6 311129-0650

Antenna Gains (dBi)	-18.7	-18.7	-23.4	9.1	10.9
Coax Loss (dB)	3.8	4.05	4.2	6.4	6.7
Final Gain less Loss (dB)	-22.50	-22.75	-27.60	2.75	4.25
Output Power plus Final Gain (dBm EIRP)	1.9	0.3	-2.7	24.8	26.9

10 Yagi Antenna 311129 With 100' LMR 400 311129-400100

Antenna Gains (dBi)	-18.7	-18.7	-23.4	9.1	10.9
Coax Loss (dB)	3.7	3.9	4.7	5.8	7.1
Final Gain less Loss (dB)	-22.4	-22.6	-28.1	3.3	3.8
Output Power plus Final Gain (dBm EIRP)	1.95	0.49	-3.2	25.3	26.49



Fixed Outside Antenna Kit Options

FCC ID: PWO460007

Final Output Power Limited to 30 dBm EIRP in all frequency bands

Uplink Frequency (MHz)	698-716	777-787	824-849	1710-1755	1850-1910
Uplink Output Power (dBm)	24.35	23.09	24.9	22	22.69

11 Omni Directional Antenna (311203) With 20' LMR 400 311203-40020

Antenna Gains (dBi)	-1.5	-0.24	0.57	-2.51	5.09
Coax Loss (dB)	0.7	0.7	0.7	1.1	1.1
Final Gain less Loss (dB)	-2.2	-0.94	-0.13	-3.61	4.0
Output Power plus Final Gain (dBm EIRP)	22.2	22.2	24.8	18.4	26.7

12 Omni Directional Antenna (311203) With 20' RG-58 311203-5820

Antenna Gains (dBi)	-1.5	-0.24	0.57	-2.51	5.09
Coax Loss (dB)	2.3	2.5	2.6	4.1	4.3
Final Gain less Loss (dB)	-3.8	-2.74	-2.03	-6.61	0.79
Output Power plus Final Gain (dBm EIRP)	20.55	20.4	22.9	15.4	23.5

13 Omni Directional Antenna (311201) With 20' RG-6 311201-0620

Antenna Gains (dBi)	-1.5	-0.24	0.57	-2.51	5.09
Coax Loss (dB)	1.5	1.6	1.7	2.5	2.7
Final Gain less Loss (dB)	-3	-1.84	-1.13	-5.01	2.39
Output Power plus Final Gain (dBm EIRP)	21.4	21.3	23.8	17.0	25.1

14 Mini-Mag Antenna With 12.5' RG-174 301126

Antenna Gains (dBi)	-4.88	0.09	1.97	-6.99	6.89
Coax Loss (dB)	2.8	3.0	3.7	4.5	4.7
Final Gain less Loss (dB)	-7.68	-2.91	-1.73	-11.49	2.19
Output Power plus Final Gain (dBm EIRP)	16.7	20.2	23.2	10.5	24.9

15 Yagi 301111 With 140' RG-11 301111-11140

Antenna Gains (dBi)	10	10	10.8	-6.8	-14.9
Coax Loss (dB)	5.76	6.17	6.43	10.36	10.94
Final Gain less Loss (dB)	4.24	3.83	4.37	-17.16	-25.84
Output Power plus Final Gain (dBm EIRP)	28.6	26.9	29.3	4.8	-3.2



Fixed Outside Antenna Kit Options

FCC ID: PWO460007

Final Output Power Limited to 30 dBm EIRP in all frequency bands

Uplink Frequency (MHz)	698-716	777-787	824-849	1710-1755	1850-1910
Uplink Output Power (dBm)	24.35	23.09	24.9	22	22.69

16 Panel Antenna With 25' RG-58 314453-5825

Antenna Gains (dBi)	3.84	3.63	4.4	8.21	10.04
Coax Loss (dB)	2.9	3.1	3.2	5.1	5.4
Final Gain less Loss (dB)	0.9	0.5	1.2	3.1	4.6
Output Power plus Final Gain (dBm EIRP)	25.3	23.6	26.1	25.1	27.3

17 Panel Antenna With 75' LMR 400 314453-40075

Antenna Gains (dBi)	3.84	3.63	4.4	8.21	10.04
Coax Loss (dB)	2.8	3.0	3.6	4.4	5.4
Final Gain less Loss (dB)	1.04	0.63	0.8	3.81	4.64
Output Power plus Final Gain (dBm EIRP)	25.4	23.7	25.7	25.8	27.3

18 Panel Antenna With 40' RG-6 314473-0640

Antenna Gains (dBi)	3.84	3.63	4.4	8.21	10.04
Coax Loss (dB)	3.0	3.2	3.4	5.1	5.3
Final Gain less Loss (dB)	0.84	0.43	1.0	3.11	4.74
Output Power plus Final Gain (dBm EIRP)	25.2	23.5	25.9	25.1	27.4

19 Grey Brick w/20' RG-6 311141-0620

Antenna Gains (dBi)	-2.9	-0.6	1.2	-0.4	5.5
Coax Loss (dB)	1.5	1.6	1.7	2.5	2.7
Final Gain less Loss (dB)	-4.4	-2.2	-0.5	-2.9	2.8
Output Power plus Final Gain (dBm EIRP)	19.95	20.89	24.4	19.1	25.5

20 Yagi 311129 With 80' RG-11 311129-1180

Antenna Gains (dBi)	-18.7	-18.7	-23.4	9.1	10.9
Coax Loss (dB)	3.3	3.5	3.6	5.9	6.3
Final Gain less Loss (dB)	-21.97	-22.20	-27.00	3.18	4.65
Output Power plus Final Gain (dBm EIRP)	2.38	0.89	-2.1	25.2	27.3



Fixed Outside Antenna Kit Options

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Final Output Power Limited to 30 dBm EIRP in all frequency bands

Uplink Frequency (MHz)	698-716	777-787	824-849	1710-1755	1850-1910
Uplink Output Power (dBm)	24.35	23.09	24.9	22	22.69

21 Omni Directional Antenna 311201 With 20' RG-11

311201-1120

Antenna Gains (dBi)	-1.5	-0.2	0.6	-2.5	5.1
Coax Loss (dB)	0.8	0.9	0.9	1.5	1.6
Final Gain less Loss (dB)	-2.32	-1.12	-0.34	-3.99	3.53
Output Power plus Final Gain (dBm EIRP)	22.0	22.0	24.6	18.0	26.2

22 Yagi 311124 With 110' RG-11

311124-11110

Antenna Gains (dBi)	2	7.2	9.6	-6.7	-12
Coax Loss (dB)	4.6	4.8	5.0	8.1	8.6
Final Gain less Loss (dB)	-2.55	2.36	4.63	-14.81	-20.57
Output Power plus Final Gain (dBm EIRP)	21.8	25.5	29.5	7.2	2.1

23 Wide Band Directional Antenna With 75' RG-11

314475-1175

Antenna Gains (dBi)	7.3	7.2	7.8	7.9	9.1
Coax Loss (dB)	3.07	3.3	3.42	5.55	5.9
Final Gain less Loss (dB)	4.23	3.91	4.38	2.35	3.24
Output Power plus Final Gain (dBm EIRP)	28.6	27.0	29.3	24.4	25.9

24 Yagi Antenna 301111 With 170' LMR 400

301111-400170

Antenna Gains (dBi)	10.0	10.0	10.8	-6.8	-13.8
Coax Loss (dB)	5.8	6.1	6.3	9.4	9.8
Final Gain less Loss (dB)	4.2	3.9	4.5	-16.2	-23.6
Output Power plus Final Gain (dBm EIRP)	28.55	27.0	29.4	5.8	-0.9



Fixed Outside Antenna Kit Options

FCC ID: PWO460007

Final Output Power Limited to 30 dBm EIRP in all frequency bands

Uplink Frequency (MHz)	698-716	777-787	824-849	1710-1755	1850-1910
Uplink Output Power (dBm)	24.35	23.09	24.9	22	22.69

25 Grey Panel With 20' RG-11

311141-1120

Antenna Gains (dBi)	-2.9	-0.6	1.2	-0.4	5.5
Coax Loss (dB)	0.9	0.9	1.0	1.5	1.6
Final Gain less Loss (dB)	-3.75	-1.48	0.25	-1.88	3.94
Output Power plus Final Gain (dBm EIRP)	20.6	21.6	25.2	20.1	26.6

26 Panel Antenna With 75' RG-11

314473-1175

Antenna Gains (dBi)	3.8	3.6	4.4	8.2	10
Coax Loss (dB)	3.0	3.3	3.4	5.5	5.8
Final Gain less Loss (dB)	0.77	0.34	0.98	2.66	4.18
Output Power plus Final Gain (dBm EIRP)	25.1	23.4	25.9	24.7	26.9

27 Yagi Antenna 311129 With 30' RG-58

311129-5830

Antenna Gains (dBi)	-18.7	-18.7	-23.4	9.1	10.9
Coax Loss (dB)	3.5	3.7	3.9	6.2	6.4
Final Gain less Loss (dB)	-22.2	-22.4	-27.3	2.9	4.5
Output Power plus Final Gain (dBm EIRP)	2.17	0.7	-2.4	24.9	27.2