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November 19, 2015  
Subject: Antenna Kitting  
Re: FCC ID: PWO460009  
To Whom It May Concern:

The antenna kitting options for model 460009 signal booster were done for 46 Outside Antenna kit options. The order of the attached calculations is as follows:

- |   |                       |                       |
|---|-----------------------|-----------------------|
| Outside Antenna Kit Options:              | 15. Kit 314203-5810   | 12. Kit 314453-5825   |
|   | 16. Kit 311112-17410  | 13. Kit 311203-5820   |
| Mobile                                    | 17. Kit 314203-17410  | 14. Kit 311201-0620   |
| 1. Kit 301152                             | 18. Kit 311101        | 15. Kit 301126        |
| 2. Kit 311106                             | 19. Kit 311156        | 16. Kit 301111-11140  |
| 3. Kit 311703                             |                       | 17. Kit 311201-1120   |
| 4. Kits 311103, 311125,<br>311128, 314202 | Fixed                 | 18. Kit 311129-11110  |
| 5. Kit 311130-5810                        | 1. Kit 314411-40075   | 19. Kit 314453-40075  |
| 6. Kit 311114                             | 2. Kit 314411-5825    | 20. Kit 314473-0640   |
| 7. Kit 311102                             | 3. Kit 314775-0630    | 21. Kit 311141-0620   |
| 8. Kit 311104-5810                        | 4. Kit 301111-0675    | 22. Kit 311124-1180   |
| 9. Kit 311701                             | 5. Kit 301111-5850    | 23. Kit 311141-1120   |
| 10. Kit 311119                            | 6. Kit 311203-40020   | 24. Kit 314473-1175   |
| 11. Kit 311133                            | 7. Kit 311129-400100  | 25. Kit 314475-1175   |
| 12. Kit 311104-17410                      | 8. Kit 311129-5840    | 26. Kit 301111-400170 |
| 13. Kit 301113                            | 9. Kit 311129-0660    | 27. Kit 311124-5830   |
| 14. Kit 311112-5810                       | 10. Kit 311124-0650   |                       |
|   | 11. Kit 311124-400100 |                       |

Sincerely,

Patrick L. Cook  
Senior Research and Development Engineer



## Fixed Outside Antenna Kit Options

FCC ID: PWO460009

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

Uplink Frequency (MHz)	824-849	1850-1915
Uplink Output Power (dBm)	23.79	22.3

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

Antenna Gains (dBi)	7.8	9.1
Coax Loss (dB)	3.6	5.4
Final Gain less Loss (dB)	4.2	3.7
Output Power plus Final Gain (dBm EIRP)	27.99	26.0

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

Antenna Gains (dBi)	7.8	9.1
Coax Loss (dB)	3.2	5.4
Final Gain less Loss (dB)	4.6	3.7
Output Power plus Final Gain (dBm EIRP)	28.4	26.0

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

Antenna Gains (dBi)	7.8	9.1
Coax Loss (dB)	3.4	5.3
Final Gain less Loss (dB)	4.4	3.8
Output Power plus Final Gain (dBm EIRP)	28.19	26.1

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

Antenna Gains (dBi)	10.8	-13.8
Coax Loss (dB)	6.3	9.975
Final Gain less Loss (dB)	4.5	-23.775
Output Power plus Final Gain (dBm EIRP)	28.29	-1.5

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

Antenna Gains (dBi)	10.8	-13.8
Coax Loss (dB)	6.5	10.7
Final Gain less Loss (dB)	4.3	-24.5
Output Power plus Final Gain (dBm EIRP)	28.1	-2.2

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

Antenna Gains (dBi)	0.57	5.09
Coax Loss (dB)	0.7	1.1
Final Gain less Loss (dB)	-0.13	4.0
Output Power plus Final Gain (dBm EIRP)	23.7	26.3

## Fixed Outside Antenna Kit Options

FCC ID: PWO460009

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

Uplink Frequency (MHz)	824-849	1850-1915
Uplink Output Power (dBm)	23.79	22.3

### 7 Yagi Antenna 311129 With 100' LMR 400 311129-400100

Antenna Gains (dBi)	9.64	-11.97
Coax Loss (dB)	4.7	7.1
Final Gain less Loss (dB)	4.9	-19.07
Output Power plus Final Gain (dBm EIRP)	28.7	3.2

### 8 Yagi Antenna 311129 With 40' RG-58 311129-5840

Antenna Gains (dBi)	9.64	-11.97
Coax Loss (dB)	5.2	8.6
Final Gain less Loss (dB)	4.4	-20.6
Output Power plus Final Gain (dBm EIRP)	28.2	1.7

### 9 Yagi Antenna 311129 With 60' RG-6 311129-0660

Antenna Gains (dBi)	9.64	-11.97
Coax Loss (dB)	5.0	8.0
Final Gain less Loss (dB)	4.64	-19.95
Output Power plus Final Gain (dBm EIRP)	28.4	2.4

### 10 Yagi Antenna 311124 With 50' RG-6 311124-0650

Antenna Gains (dBi)	-23.4	10.9
Coax Loss (dB)	4.2	6.7
Final Gain less Loss (dB)	-27.60	4.25
Output Power plus Final Gain (dBm EIRP)	-3.8	26.6

### 11 Yagi Antenna 311124 With 100' LMR 400 311124-400100

Antenna Gains (dBi)	-23.4	10.9
Coax Loss (dB)	4.7	7.1
Final Gain less Loss (dB)	-28.1	3.8
Output Power plus Final Gain (dBm EIRP)	-4.31	26.1

### 12 Panel Antenna With 25' RG-58 314453-5825

Antenna Gains (dBi)	4.4	10.04
Coax Loss (dB)	3.2	5.4
Final Gain less Loss (dB)	1.2	4.6
Output Power plus Final Gain (dBm EIRP)	25.0	26.9



## Fixed Outside Antenna Kit Options

FCC ID: PWO460009

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

Uplink Frequency (MHz)	824-849	1850-1915
Uplink Output Power (dBm)	23.79	22.3

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

Antenna Gains (dBi)	0.57	5.09
Coax Loss (dB)	2.6	4.3
Final Gain less Loss (dB)	-2.03	0.79
Output Power plus Final Gain (dBm EIRP)	21.8	23.1

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

Antenna Gains (dBi)	0.57	5.09
Coax Loss (dB)	1.7	2.7
Final Gain less Loss (dB)	-1.13	2.39
Output Power plus Final Gain (dBm EIRP)	22.7	24.7

### 15 Mini-Mag Antenna With 12.5' RG-174 301126

Antenna Gains (dBi)	-1.4	0.42
Coax Loss (dB)	3.7	4.7
Final Gain less Loss (dB)	-5.1	-4.28
Output Power plus Final Gain (dBm EIRP)	18.7	18.0

### 16 Yagi 301111 With 140' RG-11 301111-11140

Antenna Gains (dBi)	10.8	-14.9
Coax Loss (dB)	6.43	10.94
Final Gain less Loss (dB)	4.37	-25.84
Output Power plus Final Gain (dBm EIRP)	28.2	-3.5

### 17 Omni Directional Antenna 311201 With 20' RG-11 311201-1120

Antenna Gains (dBi)	0.6	5.1
Coax Loss (dB)	0.9	1.6
Final Gain less Loss (dB)	-0.34	3.53
Output Power plus Final Gain (dBm EIRP)	23.5	25.8

### 18 Yagi 311129 With 110' RG-11 311129-11110

Antenna Gains (dBi)	9.6	-12
Coax Loss (dB)	5.0	8.6
Final Gain less Loss (dB)	4.63	-20.57
Output Power plus Final Gain (dBm EIRP)	28.4	1.7

## Fixed Outside Antenna Kit Options

FCC ID: PWO460009

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

Uplink Frequency (MHz)	824-849	1850-1915
Uplink Output Power (dBm)	23.79	22.3

### 19 Panel Antenna With 75' LMR 400 314453-40075

Antenna Gains (dBi)	4.4	10.04
Coax Loss (dB)	3.6	5.4
Final Gain less Loss (dB)	0.8	4.64
Output Power plus Final Gain (dBm EIRP)	24.6	26.9

### 20 Panel Antenna With 40' RG-6 314473-0640

Antenna Gains (dBi)	4.4	10.04
Coax Loss (dB)	3.4	5.3
Final Gain less Loss (dB)	1.0	4.74
Output Power plus Final Gain (dBm EIRP)	24.8	27.0

### 21 Grey Brick w/20' RG-6 311141-0620

Antenna Gains (dBi)	1.2	5.5
Coax Loss (dB)	1.7	2.7
Final Gain less Loss (dB)	-0.5	2.8
Output Power plus Final Gain (dBm EIRP)	23.29	25.1

### 22 Yagi 311124 With 80' RG-11 311124-1180

Antenna Gains (dBi)	-23.4	10.9
Coax Loss (dB)	3.6	6.3
Final Gain less Loss (dB)	-27.00	4.65
Output Power plus Final Gain (dBm EIRP)	-3.2	27.0

### 23 Grey Panel With 20' RG-11 311141-1120

Antenna Gains (dBi)	1.2	5.5
Coax Loss (dB)	1.0	1.6
Final Gain less Loss (dB)	0.25	3.94
Output Power plus Final Gain (dBm EIRP)	24.0	26.2

### 24 Panel Antenna With 75' RG-11 314473-1175

Antenna Gains (dBi)	4.4	10
Coax Loss (dB)	3.4	5.8
Final Gain less Loss (dB)	0.98	4.18
Output Power plus Final Gain (dBm EIRP)	24.8	26.5



## Fixed Outside Antenna Kit Options

FCC ID: PWO460009

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

Uplink Frequency (MHz)	824-849	1850-1915
Uplink Output Power (dBm)	23.79	22.3

### 25 Wide Band Directional Antenna With 75' RG-11 314475-1175

Antenna Gains (dBi)	7.8	9.1
Coax Loss (dB)	3.42	5.9
Final Gain less Loss (dB)	4.38	3.24
Output Power plus Final Gain (dBm EIRP)	28.2	25.5

### 26 Yagi Antenna 301111 With 170' LMR 400 301111-400170

Antenna Gains (dBi)	10.8	-13.8
Coax Loss (dB)	6.3	9.8
Final Gain less Loss (dB)	4.5	-23.6
Output Power plus Final Gain (dBm EIRP)	28.3	-1.3

### 2 Yagi Antenna 311124 With 30' RG-58 311124-5830

Antenna Gains (dBi)	-23.4	10.9
Coax Loss (dB)	3.9	6.4
Final Gain less Loss (dB)	-27.3	4.5
Output Power plus Final Gain (dBm EIRP)	-3.5	26.8

## Mobile Outside Antenna Kit Options

FCC ID: PWO460009

### 1 Slim Low Profile w/10' RG-174 301152

Antenna Gains (dBi)	2.22	-3.11
Coax Loss (dB)	3.0	3.8
Final Gain less Loss (dB)	-0.8	-6.9
Output Power plus Final Gain (dBm EIRP)	23.01	15.4

### 2 Low Profile w/14' RG-58 3111106

Antenna Gains (dBi)	0.5	0.9
Coax Loss (dB)	1.9	3.2
Final Gain less Loss (dB)	-1.4	-2.34
Output Power plus Final Gain (dBm EIRP)	22.43	19.96

## Mobile Outside Antenna Kit Options

FCC ID: PWO460009

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

Uplink Frequency (MHz)	824-849	1850-1915
Uplink Output Power (dBm)	23.79	22.3

### 3 Magnet Mount w/12.5' RG-174 311703

Antenna Gains (dBi)	0.69	1.13
Coax Loss (dB)	3.7	4.7
Final Gain less Loss (dB)	-3.0	-3.6
Output Power plus Final Gain (dBm EIRP)	20.78	18.73

### 4 Magnet Mount w/12.5' RG-174 311125 311128

Antenna Gains (dBi)	1.97	2.51
Coax Loss (dB)	3.7	4.7
Final Gain less Loss (dB)	-1.7	-2.2
Output Power plus Final Gain (dBm EIRP)	22.06	20.1

### 5 Marine Antenna w/10' RG-58 311130-5810

Antenna Gains (dBi)	0.65	3.57
Coax Loss (dB)	1.3	2.1
Final Gain less Loss (dB)	-0.6	1.4
Output Power plus Final Gain (dBm EIRP)	23.1	23.7

### 6 Mini-Glass Mount w/14' RG-58 311114

Antenna Gains (dBi)	-5.39	1.44
Coax Loss (dB)	1.8	3.0
Final Gain less Loss (dB)	-7.2	-1.6
Output Power plus Final Gain (dBm EIRP)	16.6	20.7

### 7 Glass Mount w/14' RG-58 311102

Antenna Gains (dBi)	-0.86	3.39
Coax Loss (dB)	1.8	3.0
Final Gain less Loss (dB)	-2.7	0.4
Output Power plus Final Gain (dBm EIRP)	21.13	22.7

### 8 NMO Antenna w/10' RG-58 311104-5810

Antenna Gains (dBi)	2.48	1.8
Coax Loss (dB)	1.3	2.1
Final Gain less Loss (dB)	1.2	-0.3
Output Power plus Final Gain (dBm EIRP)	24.97	22



## Mobile Outside Antenna Kit Options

FCC ID: PWO460009

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

Uplink Frequency (MHz)	824-849	1850-1915
Uplink Output Power (dBm)	25	25

### 9 Trucker Antenna w/10.5' RG-58 311701

Antenna Gains (dBi)	2.18	2.66
Coax Loss (dB)	1.4	2.3
Final Gain less Loss (dB)	0.8	0.4
Output Power plus Final Gain (dBm EIRP)	24.57	22.7

### 10 Trucker Antenna w/13.5' RG-58 311119

Antenna Gains (dBi)	1.21	3.57
Coax Loss (dB)	1.7	2.9
Final Gain less Loss (dB)	-0.5	0.7
Output Power plus Final Gain (dBm EIRP)	23.3	22.97

### 11 Trucker Antenna w/13.5' RG-58 311133

Antenna Gains (dBi)	1.15	4.22
Coax Loss (dB)	1.7	2.9
Final Gain less Loss (dB)	-0.6	1.3
Output Power plus Final Gain (dBm EIRP)	23.2	23.6

### 12 NMO Antenna 10' RG-174 311104-17410

Antenna Gains (dBi)	2.48	1.8
Coax Loss (dB)	3.0	3.8
Final Gain less Loss (dB)	-0.5	-2.0
Output Power plus Final Gain (dBm EIRP)	23.27	20.3

### 13 Mini-Mag Mount w/12.5' RG-174 301126 301113

Antenna Gains (dBi)	-1.4	0.4
Coax Loss (dB)	3.7	4.7
Final Gain less Loss (dB)	-5.1	-4.3
Output Power plus Final Gain (dBm EIRP)	18.69	18.0

## Mobile Outside Antenna Kit Options

FCC ID: PWO460009

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

Uplink Frequency (MHz)	824-849	1850-1915
Uplink Output Power (dBm)	25	25

### 14 NMO Antenna w/10' RG-58 311112-5810

Antenna Gains (dBi)	2.47	-0.65
Coax Loss (dB)	1.3	2.1
Final Gain less Loss (dB)	1.2	-2.8
Output Power plus Final Gain (dBm EIRP)	24.96	19.55

### 15 NMO Antenna w/10' RG-58 314203-5810

Antenna Gains (dBi)	1.82	0.75
Coax Loss (dB)	1.3	2.1
Final Gain less Loss (dB)	0.5	-1.4
Output Power plus Final Gain (dBm EIRP)	24.3	21.0

### 16 NMO Antenna 10' RG-174 311112-17410

Antenna Gains (dBi)	2.47	-0.65
Coax Loss (dB)	3.0	3.8
Final Gain less Loss (dB)	-0.5	-4.5
Output Power plus Final Gain (dBm EIRP)	23.26	17.85

### 17 NMO Antenna 10' RG-174 314203-17410

Antenna Gains (dBi)	1.82	0.75
Coax Loss (dB)	3.0	3.8
Final Gain less Loss (dB)	-1.2	-3.1
Output Power plus Final Gain (dBm EIRP)	22.6	19.3

### 18 Trucker Antenna w/10.5' RG-58 311101

Antenna Gains (dBi)	1.72	6.12
Coax Loss (dB)	1.4	2.3
Final Gain less Loss (dB)	0.3	3.8
Output Power plus Final Gain (dBm EIRP)	24.1	26.1

### 19 Magnet Mount w/5' RG-174 311156

Antenna Gains (dBi)	2.1	4.7
Coax Loss (dB)	3.8	6.9
Final Gain less Loss (dB)	-1.7	-2.2
Output Power plus Final Gain (dBm EIRP)	22.1	20.1