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March 19, 2014

Subject: Antenna Kitting

Re: FCC ID: PWO460002

To Whom It May Concern:

The antenna kitting options for model 460002 signal booster were done for 18 Outside Antenna kit options and 2 Inside Antenna kit options. The order of the attached calculations is as follows:

Outside Antenna Kit Options:

1. Kit Numbers 311103, 311125, 311128, 314202: Magnet Mount Antennas with 12.5' RG-174
2. Kit Numbers 311113, 311126: Mini-Magnet Mount Antennas with 12.5' RG-174
3. Kit Number 311101: Trucker Antenna with 10.5' RG-58
4. Kit Number 311701: Trucker Antenna with 10.5' RG-58
5. Kit Number 311119: Trucker Antenna with 13.5' RG-58
6. Kit Number 311133: Trucker Antenna with 13.5' RG-58
7. Kit Number 311104-17410: NMO Antenna with 10' RG-174
8. Kit Number 311112-17410: NMO Antenna with 10' RG-174
9. Kit Number 314203-17410: NMO Antenna with 10' RG-174
10. Kit Number 311104-5810: NMO Antenna with 10' RG-58
11. Kit Number 311112-5810: NMO Antenna with 10' RG-58
12. Kit Number 314203-5810: NMO Antenna with 10' RG-58
13. Kit Number 311104-40015: NMO Antenna with 15' LMR 400
14. Kit Number 311104-40015: NMO Antenna with 15' LMR 400
15. Kit Number 311104-40015: NMO Antenna with 15' LMR 400
16. Kit Number 311130-5810: Marine Antenna with 10' RG-58
17. Kit Number 311114: Mini-Glass Mount Antenna with 14' RG-58
18. Kit Number 311102: Glass Mount Antenna with 14' RG-58

Inside Antenna Kit Options:

1. Kit Number 301127: Slim Low Profile Antenna with 10' RG-174
2. Kit Number 311106: Low Profile Antenna with 14' RG-58

Sincerely,

A handwritten signature in black ink, appearing to read 'Patrick L. Cook'.

Patrick L. Cook

Senior Research and Development Engineer



Mobile Outside Antenna Kit Options

FCC ID: 460002

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

Uplink Frequency (MHz)	824-849	1850-1910
Uplink Output Power (dBm)	23.4	23.4

1 Magnet Mount w/12.5' RG-174

Antenna Gains (dBi)	1.97	2.51
Coax Loss (dB)	3.7	4.7
Final Gain less Loss (dB)	-1.73	-2.19
Output Power plus Final Gain (dBm EIRP)	21.67	21.2

Kit Numbers: 311103, 311125, 311128, 314202

2 Mini-Mag Mount w/12.5' RG-174

Antenna Gains (dBi)	-1.92	1.85
Coax Loss (dB)	3.7	4.7
Final Gain less Loss (dB)	-5.62	-2.85
Output Power plus Final Gain (dBm EIRP)	17.78	20.6

Kit Numbers: 311113, 311126

3 Trucker Antenna w/10.5' RG-58

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)	23.7	27.2

Kit Number: 311101

4 Trucker Antenna w/10.5' RG-58

Antenna Gains (dBi)	2.18	2.66
Coax Loss (dB)	1.4	2.3
Final Gain less Loss (dB)	0.78	0.36
Output Power plus Final Gain (dBm EIRP)	24.18	23.8

Kit Number: 311701

5 Trucker Antenna w/13.5' RG-58

Antenna Gains (dBi)	1.21	3.57
Coax Loss (dB)	1.7	2.9
Final Gain less Loss (dB)	-0.49	0.67
Output Power plus Final Gain (dBm EIRP)	22.91	24.07

Kit Number: 311119

6 Trucker Antenna w/13.5' RG-58

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)	22.9	24.7

Kit Number: 311133

7 NMO Antenna 10' RG-174

Antenna Gains (dBi)	2.48	1.8
Coax Loss (dB)	3.0	3.8
Final Gain less Loss (dB)	-0.52	-2
Output Power plus Final Gain (dBm EIRP)	22.88	21.4

Kit Number: 311104-17410

8 NMO Antenna 10' RG-174

Antenna Gains (dBi)	2.47	-0.65
Coax Loss (dB)	3.0	3.8
Final Gain less Loss (dB)	-0.53	-4.45
Output Power plus Final Gain (dBm EIRP)	22.87	18.95

Kit Number: 311112-17410

9 NMO Antenna 10' RG-174

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)	22.2	20.4

Kit Number: 314203-17410

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

Uplink Frequency (MHz)	824-849	1850-1910
Uplink Output Power (dBm)	23.4	23.4

10 NMO Antenna w/10' RG-58

Antenna Gains (dBi)	2.48	1.8
Coax Loss (dB)	1.3	2.1
Final Gain less Loss (dB)	1.18	-0.3
Output Power plus Final Gain (dBm EIRP)	24.58	23.1

Kit Number: 311104-5810

11 NMO Antenna w/10' RG-58

Antenna Gains (dBi)	2.47	-0.65
Coax Loss (dB)	1.3	2.1
Final Gain less Loss (dB)	1.17	-2.75
Output Power plus Final Gain (dBm EIRP)	24.57	20.65

Kit Number: 311112-5810

12 NMO Antenna w/10' RG-58

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)	23.9	22.1

Kit Number: 314203-5810

13 NMO Antenna w/15' LMR 400

Antenna Gains (dBi)	2.48	1.8
Coax Loss (dB)	0.9	1.3
Final Gain less Loss (dB)	1.6	0.5
Output Power plus Final Gain (dBm EIRP)	25.0	23.9

Kit Number 311104-40015

14 NMO Antenna w/15' LMR 400

Antenna Gains (dBi)	2.47	-0.65
Coax Loss (dB)	0.9	1.3
Final Gain less Loss (dB)	1.57	-1.95
Output Power plus Final Gain (dBm EIRP)	24.97	21.45

Kit Number 311112-40015

15 NMO Antenna w/15' LMR 400

Antenna Gains (dBi)	1.82	0.75
Coax Loss (dB)	0.9	1.3
Final Gain less Loss (dB)	0.9	-0.6
Output Power plus Final Gain (dBm EIRP)	0.9	-0.6

Kit Number 314203-40015

16 Marine Antenna w/10' RG-58

Antenna Gains (dBi)	0.65	3.57
Coax Loss (dB)	1.3	2.1
Final Gain less Loss (dB)	-0.64	1.43
Output Power plus Final Gain (dBm EIRP)	22.8	24.8

Kit Number: 311130-5810

17 Mini-Glass Mount w/14' RG-58

Antenna Gains (dBi)	-5.39	1.44
Coax Loss (dB)	1.8	3.0
Final Gain less Loss (dB)	-7.19	-1.56
Output Power plus Final Gain (dBm EIRP)	16.2	21.8

Kit Number: 311114

18 Glass Mount w/14' RG-58

Antenna Gains (dBi)	-0.86	3.39
Coax Loss (dB)	1.8	3.0
Final Gain less Loss (dB)	-2.66	0.39
Output Power plus Final Gain (dBm EIRP)	20.74	23.8

Kit Number: 311102



FCC ID: PWO460003

Uplink Frequency Band (MHz)	824-849	1850-1910
Measured Uplink Gain (dB)	46.00	42.60
Measured RSSI Shutoff (dBm/MHz)	-55.60	-47.70
MSCL Minimum (dB)	24.40	28.90
1.5' Separation Distance Path Loss (dB)	24.12	31.15
Polarity Loss (dB)	3.0	3.0
Max Antenna Gain Less Cable Loss (dB)	2.72	5.25

1 Inside Antenna Kit 301152: Slim Low Profile with 10' RG-174

Antenna Gain Less Cable Loss (dB)	-2.0	-2.1
	okay	okay
	-4.72	-7.35

2 Inside Antenna Kit 311106: Low Profile with 14' RG-58

Antenna Gain Less Cable Loss (dB)	-2.0	-2.1
	okay	okay
	-4.72	-7.35

$MSCL \leq Gain + 34 + RSSI$

$Ant\ Gain - Loss \leq Path\ loss\ @\ Freq.\ +\ Polarity\ loss - MSCL - Measured\ Pout$