

MPE Calculations for a fixed consumer booster.

■ model F20E-CP (p1470016) booster:

- 800 MHz band:
 1. Fixed Outside Antenna: UNI-367
 2. Inside Antenna: UNI-363
- 1900 MHz band:
 1. Fixed Outside Antenna: UNI-367
 2. Inside Antenna: UNI-363
- Calculate Power Density
 - a. Calculated Power Density = $1000 \cdot \text{EIRP (Watts)} / (4 \cdot \pi \cdot (\text{Distance from Antenna (cm)}^2))$
 - b. Calculated Power Density (S) = $\text{Output Power (P)} \cdot \text{Antenna Gain (G)} / (4 \cdot \pi \cdot (\text{Distance from Antenna (r)}^2))$
 - c. $S = P \cdot G / (4 \cdot \pi \cdot r^2)$
 - i. S = Calculated Power Density
 - ii. G = Numeric antenna gain
 1. Add the Antenna gain (dBi) + Cable Loss (dB) and convert to a numeric value, this information should come from the antenna kitting information and if multiple antenna kits are provided, the worst case values need to be used.
 2. $G = \text{POWER}(10, (\text{Ant Gain} + \text{Cable loss}) / 10)$
 - iii. P = Conducted Output Power in mw
 - iv. r = Distance from antenna in cm

Uplink Band	Uplink Frequency	Sig Gen Power	Output Power	Gain
	MHz	dBm	dBm	dB
824 - 849 MHz Pulsed CW	841.50	-40.0	21.1	61.1
824 - 849 MHz AWGN	841.50	-41.0	19.9	60.9
1850 - 1910 MHz Pulsed CW	1888.93	-47.4	21.5	68.9
1850 - 1910 MHz AWGN	1888.93	-50.9	19.4	70.3

Downlink Band	Downlink Frequency	Sig Gen Power	Output Power	Gain
	MHz	dBm	dBm	dB
869 - 894 MHz Pulsed CW	879.69	-65.8	-2.0	63.8
869 - 894 MHz AWGN	879.69	-69.2	-6.1	63.1
1930 - 1990 MHz Pulsed CW	1970.09	-70.0	-0.3	69.7
1930 - 1990 MHz AWGN	1970.09	-70.9	-1.6	69.3

Outside Antenna kit Options:

Uplink Frequency(MHz)	824-849	1850-1910
Uplink Output Power(dBm)	21.1	21.5

1. Yagi 11dbi UNI-367 with 30' 5D N male

Antenna Gain (dBi)	10	11
Coax Cable Loss (dB)	1.7	2.7
Final Gain Less Loss (dB)	8.3	8.3
Final Output Power (dBm EIRP)	29.4	29.8

2. Yagi 11dbi UNI-367 with 50' 400 N male

Antenna Gain (dBi)	10	11
Coax Cable Loss (dB)	2	3
Final Gain Less Loss (dB)	8	8
Final Output Power (dBm EIRP)	29.1	29.5

3. Yagi 11dbi UNI-367 with 50' 5D N male

Antenna Gain (dBi)	10	11
Coax Cable Loss (dB)	2.8	3.8
Final Gain Less Loss (dB)	7.2	7.2
Final Output Power (dBm EIRP)	28.3	28.7

4. Yagi 11dbi UNI-367 with 75' 400 N male

Antenna Gain (dBi)	10	11
Coax Cable Loss (dB)	3	5
Final Gain Less Loss (dB)	7	6
Final Output Power (dBm EIRP)	28.1	27.5

5. Yagi 11dbi UNI-367 with 100' 400 N male

Antenna Gain (dBi)	10	11
Coax Cable Loss (dB)	3.9	6.2
Final Gain Less Loss (dB)	6.1	4.8
Final Output Power (dBm EIRP)	27.2	26.3

6. Yagi 11dbi UNI-367 with 75' 5D N male

Antenna Gain (dBi)	10	11
Coax Cable Loss (dB)	4.2	5.7
Final Gain Less Loss (dB)	5.8	5.3
Final Output Power (dBm EIRP)	26.9	26.8

7. Yagi 11dbi UNI-367 with 100' 5D N male

Antenna Gain (dBi)	10	11
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Coax Cable Loss (dB)	5	8
Final Gain Less Loss (dB)	5	3
Final Output Power (dBm EIRP)	26.1	24.5

8. Panel 10dbi UNI-363 with 30' 5D N male

Antenna Gain (dBi)	6.5	9.4
Coax Cable Loss (dB)	1.1	1.6
Final Gain Less Loss (dB)	5.4	7.8
Final Output Power (dBm EIRP)	26.5	29.3

9. Panel 10dbi UNI-363 with 30' 5D N male

Antenna Gain (dBi)	6.5	9.4
Coax Cable Loss (dB)	1.7	2.7
Final Gain Less Loss (dB)	4.8	6.7
Final Output Power (dBm EIRP)	25.9	28.2

10. Panel 10dbi UNI-363 with 50' 400 N male

Antenna Gain (dBi)	6.5	9.4
Coax Cable Loss (dB)	2	3
Final Gain Less Loss (dB)	4.5	6.4
Final Output Power (dBm EIRP)	25.6	27.9

11. Panel 10dbi UNI-363 with 50' 5D N male

Antenna Gain (dBi)	6.5	9.4
Coax Cable Loss (dB)	2.8	3.8
Final Gain Less Loss (dB)	3.7	5.6
Final Output Power (dBm EIRP)	24.8	27.1

12. Panel 10dbi UNI-363 with 75' 400 N male

Antenna Gain (dBi)	6.5	9.4
Coax Cable Loss (dB)	3	5
Final Gain Less Loss (dB)	3.5	4.4
Final Output Power (dBm EIRP)	24.6	25.9

13. Panel 10dbi UNI-363 with 100' 400 N male

Antenna Gain (dBi)	6.5	9.4
Coax Cable Loss (dB)	3.9	6.2
Final Gain Less Loss (dB)	2.6	3.2
Final Output Power (dBm EIRP)	23.7	24.7

14. Panel 10dbi UNI-363 with 75' 5D N male

Antenna Gain (dBi)	6.5	9.4
Coax Cable Loss (dB)	4.2	5.7
Final Gain Less Loss (dB)	2.3	3.7
Final Output Power (dBm EIRP)	23.4	25.2

15. Panel 10dbi UNI-363 with 100' 5D N male

Antenna Gain (dBi)	6.5	9.4
Coax Cable Loss (dB)	5	8
Final Gain Less Loss (dB)	1.5	1.4
Final Output Power (dBm EIRP)	22.6	22.9

16. Yagi 9db UNI-366 with 30' 5D N male

Antenna Gain (dBi)	8	9.5
Coax Cable Loss (dB)	1.1	1.6
Final Gain Less Loss (dB)	6.9	7.9
Final Output Power (dBm EIRP)	28	29.4

17. Yagi 9db UNI-366 with 30' 5D N male

Antenna Gain (dBi)	8	9.5
Coax Cable Loss (dB)	1.7	2.7
Final Gain Less Loss (dB)	6.3	6.8
Final Output Power (dBm EIRP)	27.4	28.3

18. Yagi 9db UNI-366 with 50' 400 N male

Antenna Gain (dBi)	8	9.5
Coax Cable Loss (dB)	2	3
Final Gain Less Loss (dB)	6	6.5
Final Output Power (dBm EIRP)	27.1	28

19. Yagi 9db UNI-366 with 50' 5D N male

Antenna Gain (dBi)	8	9.5
Coax Cable Loss (dB)	2.8	3.8
Final Gain Less Loss (dB)	5.2	5.7
Final Output Power (dBm EIRP)	26.3	27.2

20. Yagi 9db UNI-366 with 75' 400 N male

Antenna Gain (dBi)	8	9.5
Coax Cable Loss (dB)	3	5
Final Gain Less Loss (dB)	5	4.5
Final Output Power (dBm EIRP)	26.1	26

21. Yagi 9db UNI-366 with 100' 400 N male

Antenna Gain (dBi)	8	9.5
Coax Cable Loss (dB)	3.9	6.2
Final Gain Less Loss (dB)	4.1	3.3
Final Output Power (dBm EIRP)	25.2	24.8

22. Yagi 9db UNI-366 with 75' 5D N male

Antenna Gain (dBi)	8	9.5
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Coax Cable Loss (dB)	4.2	5.7
Final Gain Less Loss (dB)	3.8	3.8
Final Output Power (dBm EIRP)	24.9	25.3

23. Yagi 9db UNI-366 with 100' 5D N male

Antenna Gain (dBi)	8	9.5
Coax Cable Loss (dB)	5	8
Final Gain Less Loss (dB)	3	1.5
Final Output Power (dBm EIRP)	24.1	23

24. Omni 5dbi with 30' 5D N male

Antenna Gain (dBi)	5	5
Coax Cable Loss (dB)	1.1	1.6
Final Gain Less Loss (dB)	3.9	3.4
Final Output Power (dBm EIRP)	25	24.9

25. Omni 5dbi with 30' 5D N male

Antenna Gain (dBi)	5	5
Coax Cable Loss (dB)	1.7	2.7
Final Gain Less Loss (dB)	3.3	2.3
Final Output Power (dBm EIRP)	24.4	23.8

26. Omni 5dbi with 50' 400 N male

Antenna Gain (dBi)	5	5
Coax Cable Loss (dB)	2	3
Final Gain Less Loss (dB)	3	2
Final Output Power (dBm EIRP)	24.1	23.5

27. Omni 5dbi with 50' 5D N male

Antenna Gain (dBi)	5	5
Coax Cable Loss (dB)	2.8	3.8
Final Gain Less Loss (dB)	2.2	1.2
Final Output Power (dBm EIRP)	23.3	22.7

28. Omni 5dbi with 75' 400 N male

Antenna Gain (dBi)	5	5
Coax Cable Loss (dB)	3	5
Final Gain Less Loss (dB)	2	0
Final Output Power (dBm EIRP)	23.1	21.5

29. Omni 5dbi with 100' 400 N male

Antenna Gain (dBi)	5	5
Coax Cable Loss (dB)	3.9	6.2
Final Gain Less Loss (dB)	1.1	-1.2
Final Output Power (dBm EIRP)	22.2	20.3

30. Omni 5dbi with 75' 5D N male

Antenna Gain (dBi)	5	5
Coax Cable Loss (dB)	4.2	5.7
Final Gain Less Loss (dB)	0.8	-0.7
Final Output Power (dBm EIRP)	21.9	20.8

31. Omni 5dbi with 100' 5D N male

Antenna Gain (dBi)	5	5
Coax Cable Loss (dB)	5	8
Final Gain Less Loss (dB)	0	-3
Final Output Power (dBm EIRP)	21.1	18.5

Inside Antenna kit Options:

Uplink Frequency(MHz)	824-869	1850-1910
Measured Uplink Gain(dB)	61.1	70.5
MSCL Minimum (dB)	30.2	36.8
6' Separation Distance Path Loss (dB)	36.16	43.21
Polarity Loss (dB)	3	3
Max Antenna Gain with Coax Loss (dB)	8.96	9.41

1. Whip 5dbi SIG-373

Antenna Gain (dBi)	5	5
Coax Cable Loss (dB)	0	0
Final Gain Less Loss (dB)	5	5
Margin (dB)	-3.96	-4.41

2. Panel 10dbi UNI-363 with 3' 5D N Male

Antenna Gain (dBi)	8	9.5
Coax Cable Loss (dB)	0.2	0.3
Final Gain Less Loss (dB)	7.8	9.2
Margin (dB)	-1.16	-0.21

3. Panel 10dbi UNI-363 with 15' 5D N male

Antenna Gain (dBi)	8	9.5
Coax Cable Loss (dB)	1.1	1.6
Final Gain Less Loss (dB)	6.9	7.9
Margin (dB)	-2.06	-1.51

4. Panel 10dbi UNI-363 with 30' 400 N male

Antenna Gain (dBi)	8	9.5
Coax Cable Loss (dB)	1.1	1.8
Final Gain Less Loss (dB)	6.9	7.7
Margin (dB)	-2.06	-1.71

5. Panel 10dbi UNI-363 with 50' 5D N male

Antenna Gain (dBi)	8	9.5
Coax Cable Loss (dB)	1.7	2.7
Final Gain Less Loss (dB)	6.3	6.8
Margin (dB)	-2.66	-2.61

6. Panel 10dbi UNI-363 with 75' 5D N male

Antenna Gain (dBi)	8	9.5
Coax Cable Loss (dB)	2	3
Final Gain Less Loss (dB)	6	6.5
Margin (dB)	-2.96	-2.91

7. Panel 10dbi UNI-363 with 75' 5D N male:1 Panel Antenna a 75 Ohm 2-Way Splitter

Antenna Gain (dBi)	8	9.5
Splitter/Coax Loss (dB)	5.2	6.2
Final Gain Less Splitter/Coax Loss (dB)	2.8	3.3
Margin (dB)	-6.16	-6.11

8. Panel 10dbi UNI-363 with 75' 5D N male:2 Panel Antenna a 75 Ohm 3-Way Splitter

Antenna Gain (dBi)	8	9.5
Splitter/Coax Loss (dB)	5.2	6.2
Final Gain Less Splitter/Coax Loss (dB)	2.8	3.3
Margin (dB)	-6.16	-6.11

9. Panel 10dbi UNI-363 with 75' 5D N male:3 Panel Antenna three 75 Ohm 2-Way Splitter

Antenna Gain (dBi)	8	9.5
Splitter/Coax Loss (dB)	5.2	6.2
Final Gain Less Splitter/Coax Loss (dB)	2.8	3.3
Margin (dB)	-6.16	-6.11

10. Panel 10dbi UNI-363 with 75' 5D N male:1 Panel Antenna a 50 Ohm 2-Way Splitter

Antenna Gain (dBi)	8	9.5
Splitter/Coax Loss (dB)	5.2	6.2
Final Gain Less Splitter/Coax Loss (dB)	2.8	3.3
Margin (dB)	-6.16	-6.11

11. Panel 10dbi UNI-363 with 75' 5D N male:2 Panel Antenna a 50 Ohm 3-Way Splitter

Antenna Gain (dBi)	8	9.5
Splitter/Coax Loss (dB)	5.2	6.2
Final Gain Less Splitter/Coax Loss (dB)	2.8	3.3
Margin (dB)	-6.16	-6.11

12. Panel 10dbi UNI-363 with 75' 5D N male:3 Panel Antenna three 50 Ohm 2-Way Splitter

Antenna Gain (dBi)	8	9.5
Splitter/Coax Loss (dB)	5.2	6.2
Final Gain Less Splitter/Coax Loss (dB)	2.8	3.3
Margin (dB)	-6.16	-6.11

13. Panel 10dbi UNI-363 with 100' 5D N male

Antenna Gain (dBi)	8	9.5
Coax Cable Loss (dB)	2.8	3.8
Final Gain Less Loss (dB)	5.2	5.7
Margin (dB)	-3.76	-3.71

14. Panel 10dbi UNI-363 with 30' 400 N male

Antenna Gain (dBi)	8	9.5
Coax Cable Loss (dB)	3	5
Final Gain Less Loss (dB)	5	4.5
Margin (dB)	-3.96	-4.91

15. Panel 10dbi UNI-363 with 50' 400 N male

Antenna Gain (dBi)	8	9.5
Coax Cable Loss (dB)	3.9	6.2
Final Gain Less Loss (dB)	4.1	3.3
Margin (dB)	-4.86	-6.11

16. Panel 10dbi UNI-363 with 75' 400 N male

Antenna Gain (dBi)	8	9.5
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Coax Cable Loss (dB)	4.2	5.7
Final Gain Less Loss (dB)	3.8	3.8
Margin (dB)	-5.16	-5.61

17. UNI-372 with 3' 5D N Male

Antenna Gain (dBi)	3	3
Coax Cable Loss (dB)	0.2	0.3
Final Gain Less Loss (dB)	2.8	2.7
Margin (dB)	-6.16	-6.71

18. UNI-372 with 15' 5D N male

Antenna Gain (dBi)	3	3
Coax Cable Loss (dB)	1.1	1.6
Final Gain Less Loss (dB)	1.9	1.4
Margin (dB)	-7.06	-8.01

19. UNI-372 with 30' 400 N male

Antenna Gain (dBi)	3	3
Coax Cable Loss (dB)	1.1	1.8
Final Gain Less Loss (dB)	1.9	1.2
Margin (dB)	-7.06	-8.21

20. UNI-372 with 50' 5D N male

Antenna Gain (dBi)	3	3
Coax Cable Loss (dB)	1.7	2.7
Final Gain Less Loss (dB)	1.3	0.3
Margin (dB)	-7.66	-9.11

21. UNI-372 with 75' 5D N male

Antenna Gain (dBi)	3	3
Coax Cable Loss (dB)	2	3
Final Gain Less Loss (dB)	1	0
Margin (dB)	-7.96	-9.41

22. UNI-372 with 100' 5D N male

Antenna Gain (dBi)	3	3
Coax Cable Loss (dB)	2.8	3.8
Final Gain Less Loss (dB)	0.2	-0.8
Margin (dB)	-8.76	-10.21

23. UNI-372 with 30' 400 N male

Antenna Gain (dBi)	3	3
Coax Cable Loss (dB)	3	5
Final Gain Less Loss (dB)	0	-2
Margin (dB)	-8.96	-11.41

24. UNI-372 with 50' 400 N male

Antenna Gain (dBi)	3	3
Coax Cable Loss (dB)	3.9	6.2
Final Gain Less Loss (dB)	-0.9	-3.2
Margin (dB)	-9.86	-12.61

25. UNI-372 with 75' 400 N male

Antenna Gain (dBi)	3	3
Coax Cable Loss (dB)	4.2	5.7
Final Gain Less Loss (dB)	-1.2	-2.7
Margin (dB)	-10.16	-12.11

26. UNI-372 with 100' 400 N male

Antenna Gain (dBi)	3	3
Coax Cable Loss (dB)	5	8
Final Gain Less Coax /Splitter Loss(dB)	-2	-5
Margin (dB)	-10.96	-14.41