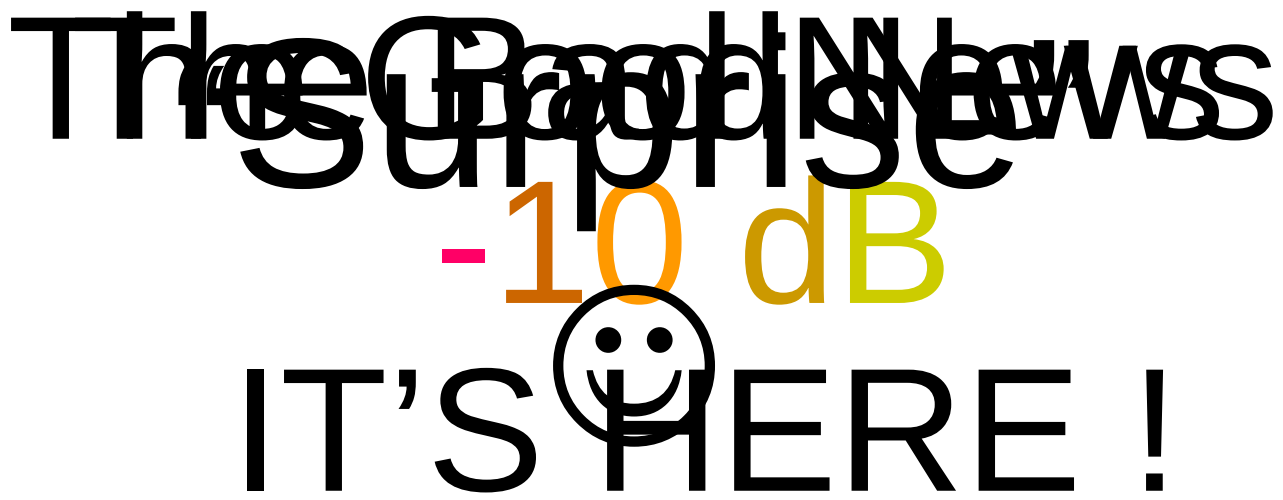
THE Broadcaster's Clinic



Bob Surette

Tuesday October 26, 2010

Mt. Mansfield, VT
October 10, 2006

Mt. Mansfield, VT
Next Morning

0 dBm = ?

dBm

1 milliwatt

dull

Boring

monotonous

So pay attention

IBOC Today -20 dB injection

Single Station
What do you do if you have;

Low Level Combined
Digital/Analog Transmitter

Check with the transmitter manufacture
Maybe you can up-grade the transmitter or just buy new!

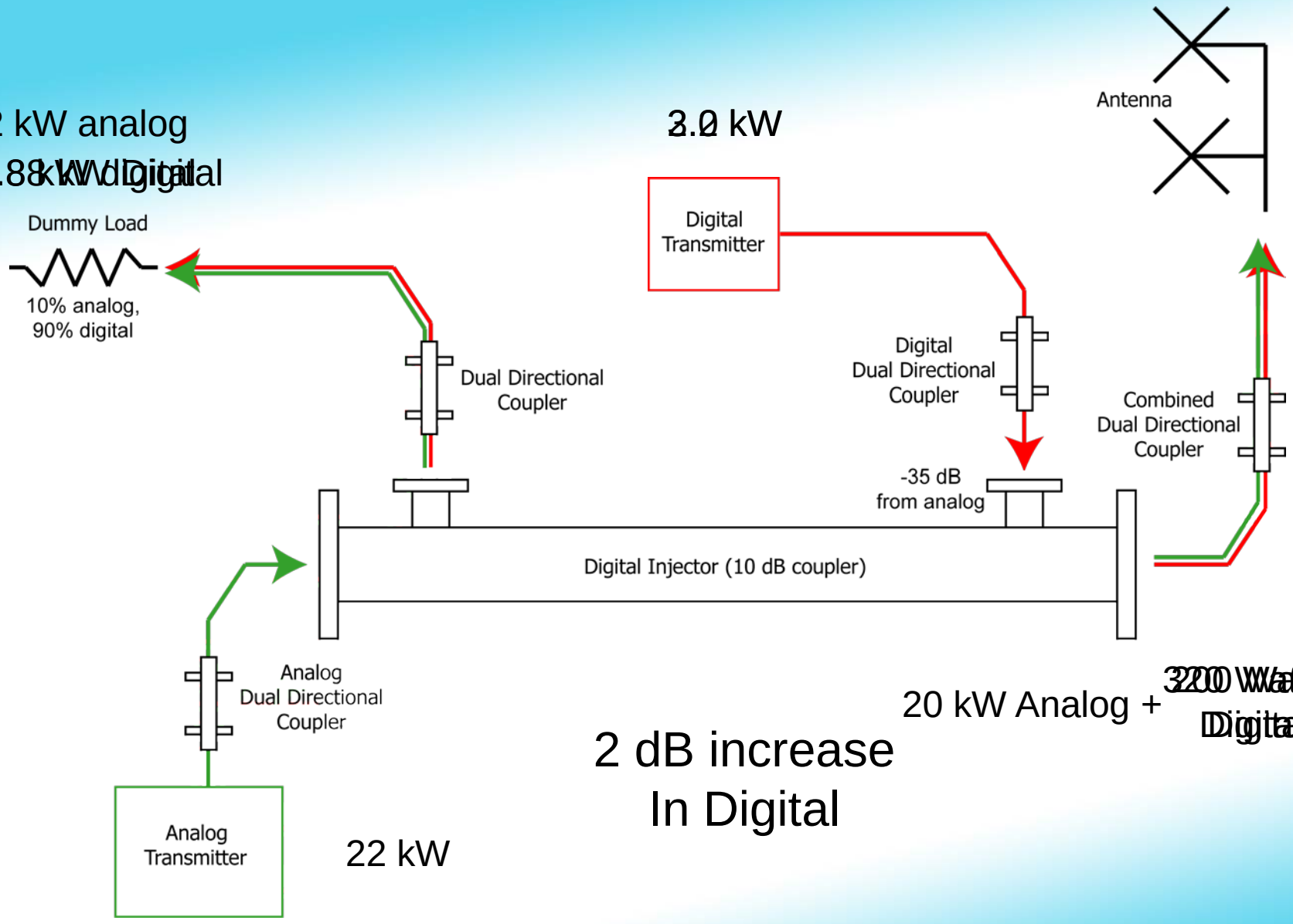
Transmitter guy ☺

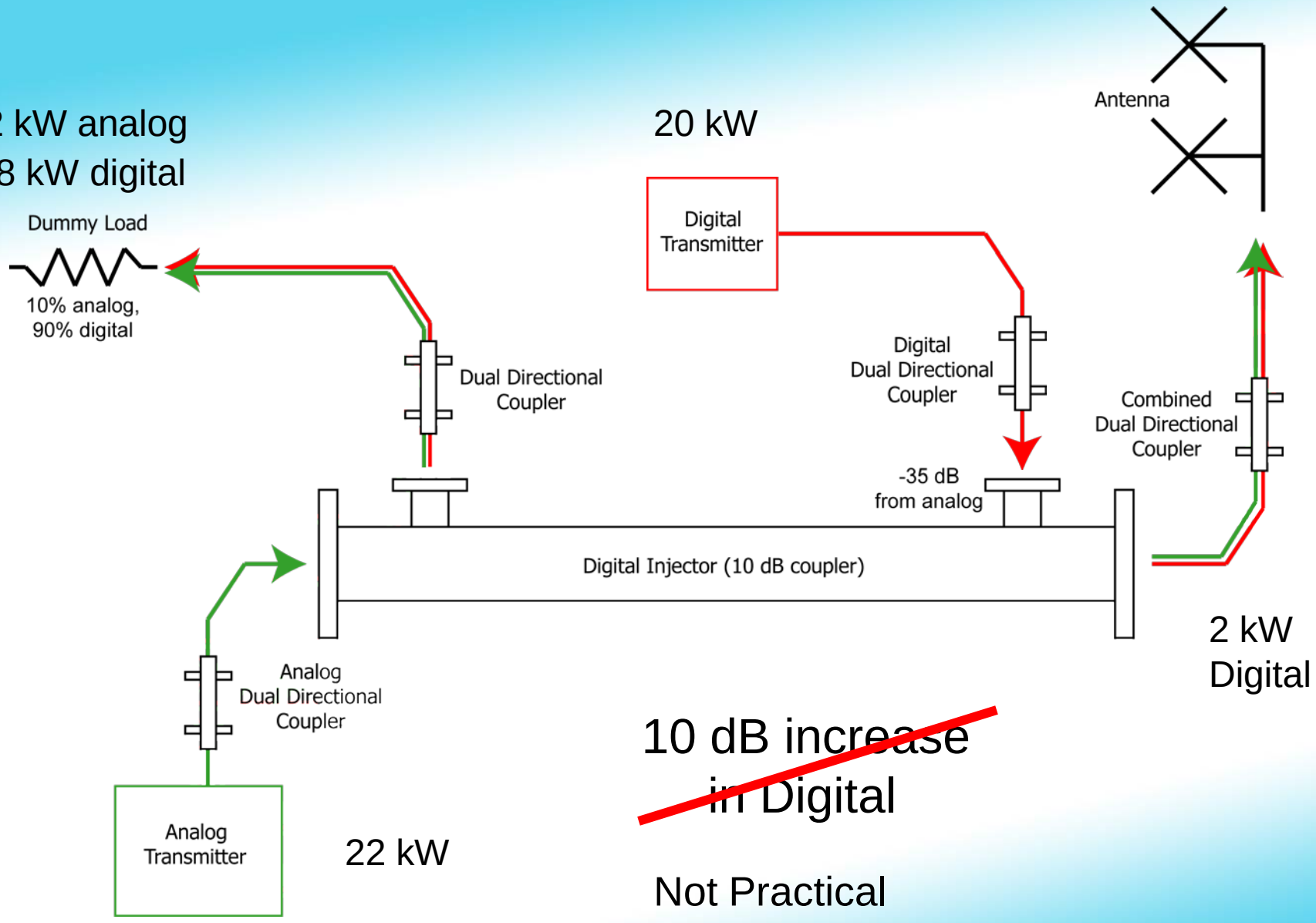
Check with antenna manufacture about new average and peak power levels

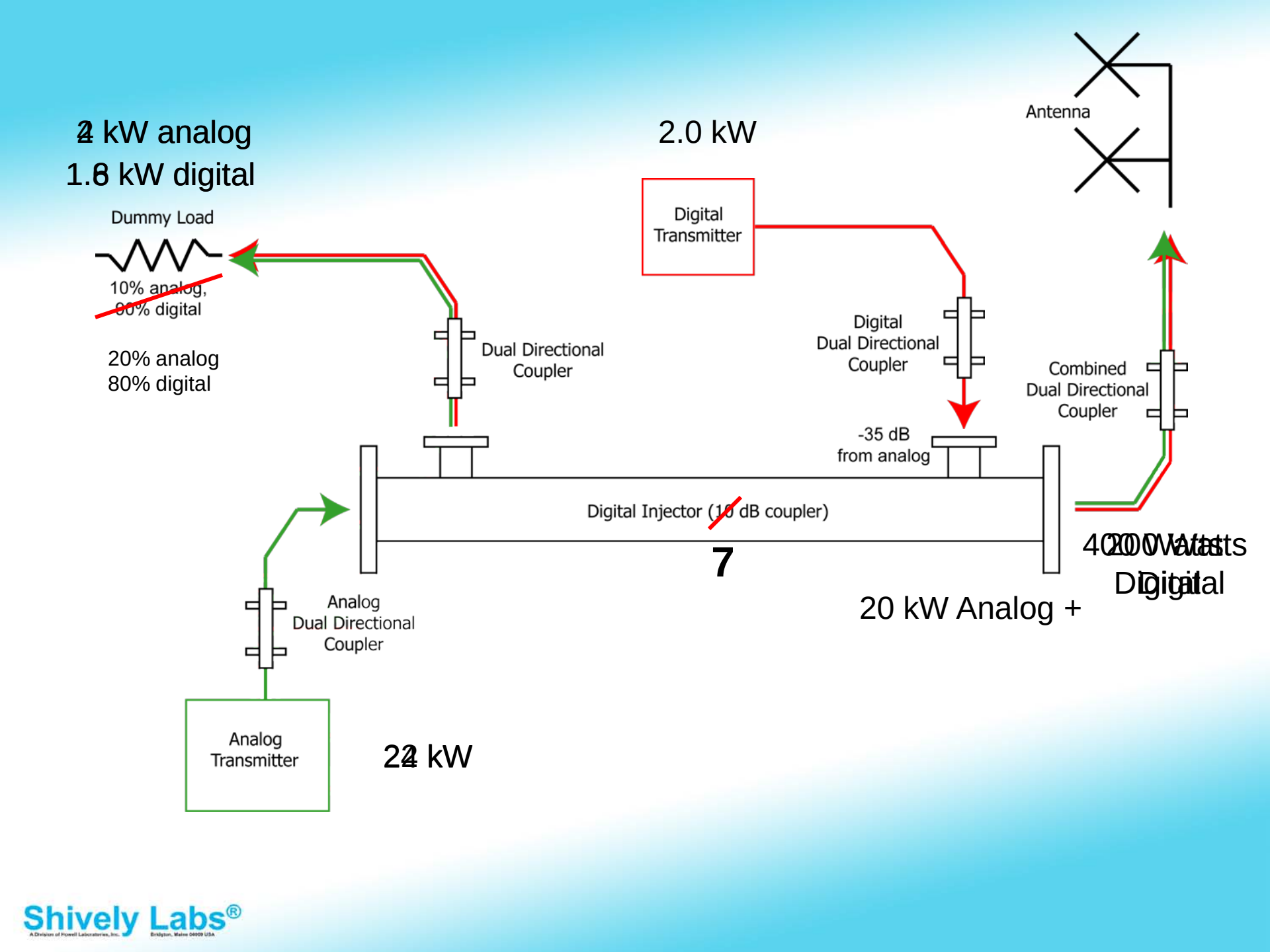
High-Level Combining
Separate Analog and Digital Transmitters

-10 dB injector

marginal at best for small increases of 1 or 2 dB


2 kW analog
2.88 kW Digital
3.0 kW
Antenna
Dummy Load
10% analog,
90% digital
Digital
Transmitter
Dual Directional
Coupler
Digital
Dual Directional
Coupler
Combined
Dual Directional
Coupler
-35 dB
from analog
Digital Injector (10 dB coupler)
Analog
Dual Directional
Coupler
20 kW Analog +
320 Watts
Digital
2 dB increase
In Digital
Analog
Transmitter
22 kW


2 kW analog
18 kW digital
20 kW
Antenna
Dummy Load
10% analog,
90% digital
Digital
Transmitter
Dual Directional
Coupler
Digital
Dual Directional
Coupler
Combined
Dual Directional
Coupler
-35 dB
from analog
Digital Injector (10 dB coupler)
2 kW
Digital
Analog
Dual Directional
Coupler
Analog
Transmitter
22 kW
10 dB increase
in Digital
Not Practical

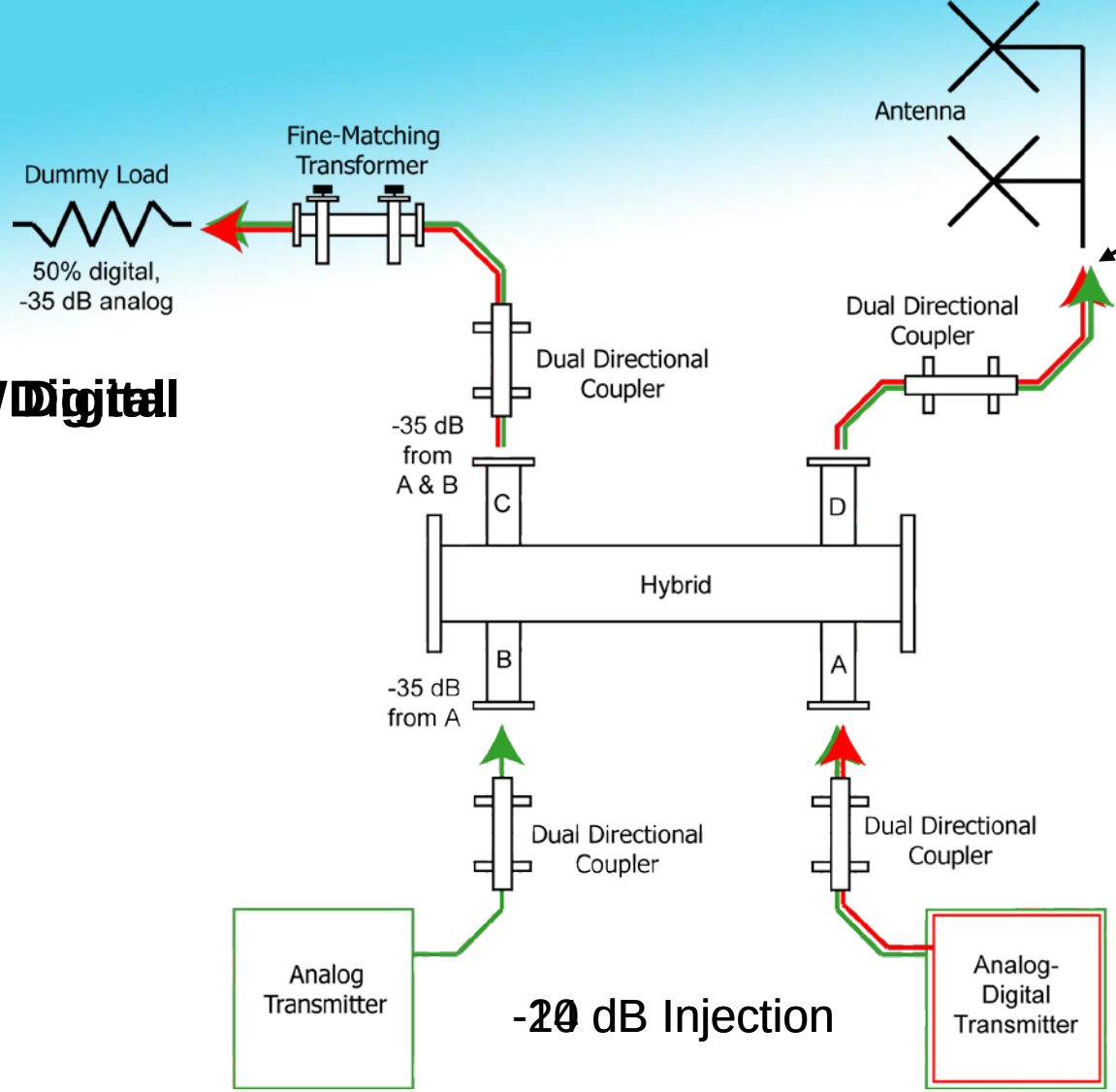


Shively Labs®

IBOC Today -20 dB injection

Single Station
What do you do if you have;

Mid-Level Combining



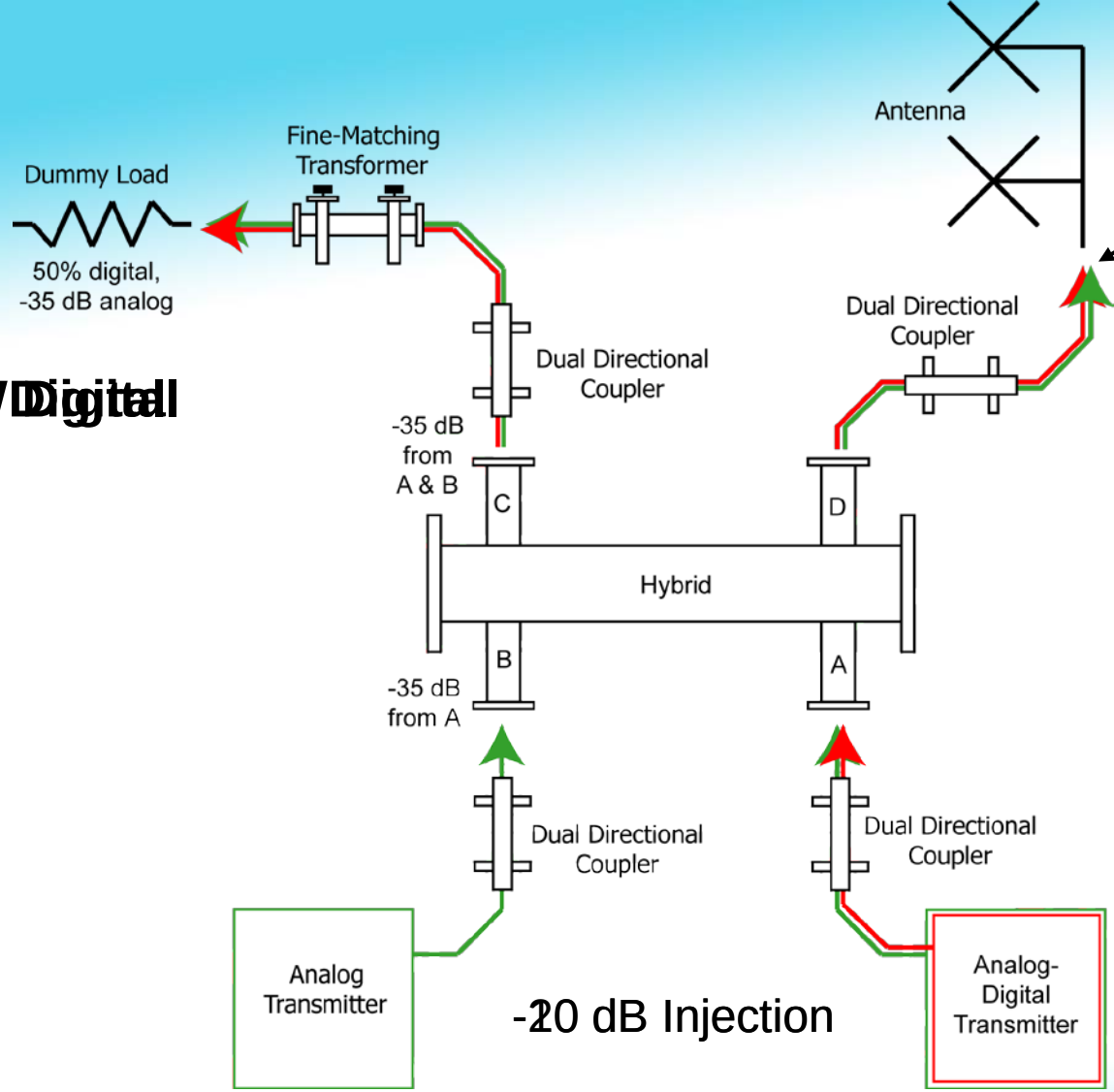
40 kW Analog

1600 W Digital

20 kW

20 kW Analog

3200 W Digital



40 kW Analog

40000 W Digital

40000 W Digital

40 kW Analog

20 kW

20 kW Analog

8000 W Digital

8000 W Digital

Shively Labs®

IBOC Today -20 dB injection

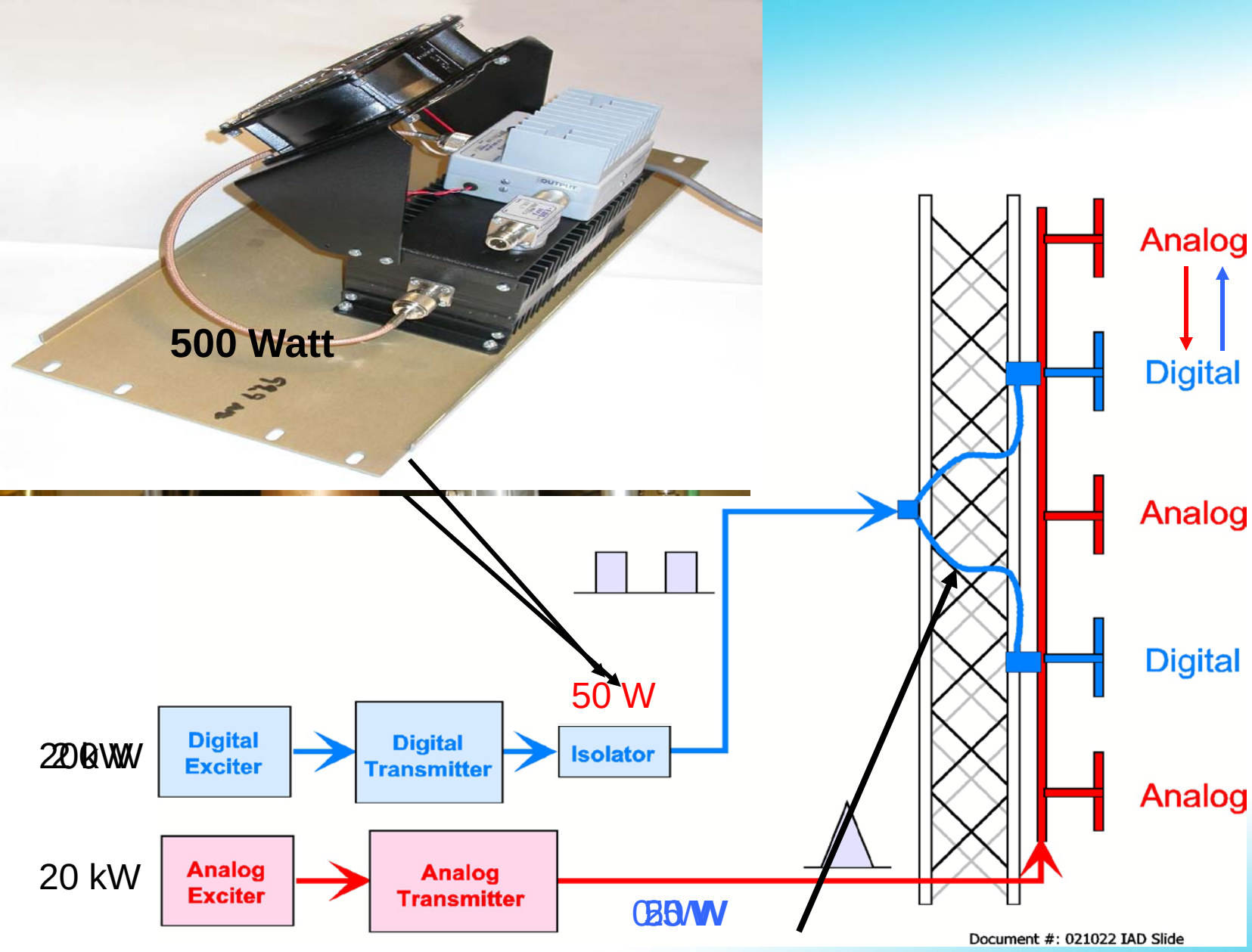
IBOC Today -20 dB injection

Single Station

What do you do if you have;

Separate Analog and Digital Transmitters

Inter-leaved Antenna System



Input Cables

IBOC Today -20 dB injection

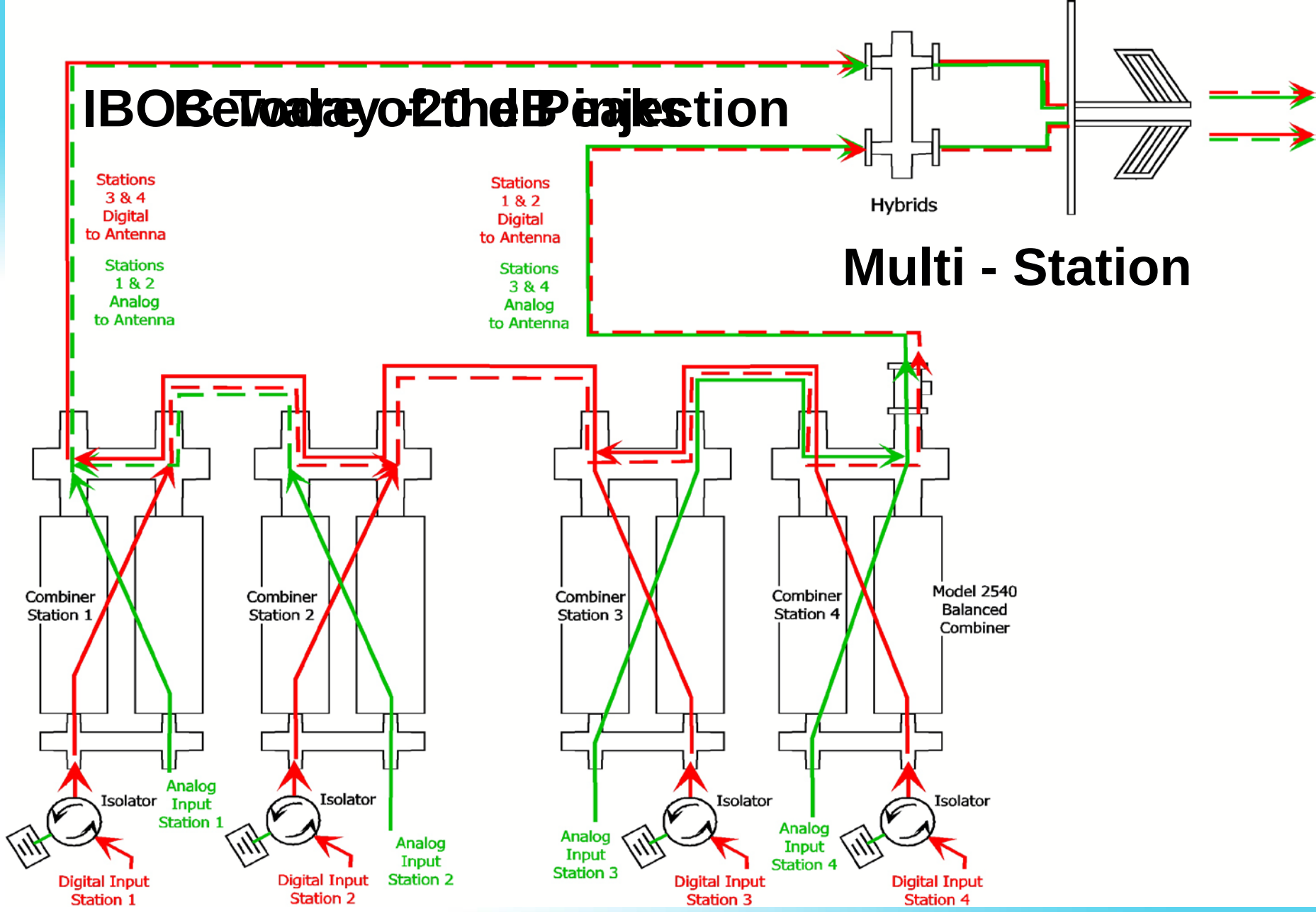
Single Station

What do you do if you have;

Separate Analog and Digital Transmitters

Interleaved Antenna Systems

Dual input Antenna



Dual input Antenna

Shively Labs®

IBOC Today -20 dB injection

Single Station

What do you do if you have;

Separate Analog and Digital Transmitters

Interleaved Antenna Systems

Dual input Antenna

Separate Antennas

Peak Power Calculation

$$\left(\sqrt{T^1} + \sqrt{T^2} + \sqrt{T^3} + \sqrt{T^n}\right)^2$$

$$\left(\sqrt{30} + \sqrt{30} + \sqrt{30} + \sqrt{30}\right)^2$$

$$\left(4\sqrt{30}\right)^2$$

$\left(16 \text{ X } 30 = 480 \text{ KW Peak}\right)^2$

= 960 kW Peak

20 dB Injection

Average Digital

$$\left(\sqrt{30} + \sqrt{0.3} + \sqrt{30} + \sqrt{0.3}\right)^2 = 142 \text{ KW}$$

4 X Average

=

Peak Digital

$$\left(\sqrt{30} + \sqrt{1.2} + \sqrt{30} + \sqrt{1.2}\right)^2 = 173 \text{ KW}$$

10 dB Injection Peak Digital

$$\left(\sqrt{30} + \sqrt{12} + \sqrt{30} + \sqrt{12}\right)^2 = 320 \text{ KW}$$

-20 Injection with 4 X 30 kW Transmitters

4 X 300 for Digital Peak

$$\left(\sqrt{30\,kW} + \sqrt{30\,kW} + \sqrt{30\,kW} + \sqrt{30\,kW} + \sqrt{1200} + \sqrt{1200} + \sqrt{1200} + \sqrt{1200}\right)^2 = 700\,kW$$

-10 Injection

$$\left(\sqrt{30\,kW} + \sqrt{30\,kW} + \sqrt{30\,kW} + \sqrt{30\,kW} + \sqrt{12000} + \sqrt{12000} + \sqrt{12000} + \sqrt{12000}\right)^2 = 1300\,kW$$

X 2 = 2600 kW Peak

Peak Power Rating of 6 1/8 Transmission Line ?

1500 kW

THE Broadcaster's Clinic

Thanks you

Questions

Bob Surette

Tuesday October 26, 2010