

AREA REPEATER COORDINATION COUNCIL (ARCC), INC.

Amateur Radio FM and ATV Repeater and Auxiliary Link Frequency Coordination

EIRP WORKSHEET

1. Determine the transmitter power output (TPO) using an accurate wattmeter. This is the power output of your power amplifier (or exciter, if no power amplifier is used) before any loss-inducing devices.

_____ watts TPO

2. Determine the loss through the antenna system. This includes the power loss of all devices and cables between the transmitter and the antenna. Consult the manufacturers' literature to determine losses as necessary.

_____ dB feedline loss (see table below)

+ _____ dB patch cable losses (see table below)

+ _____ dB duplexer/combiner/filter cavity losses

+ _____ dB other losses

= _____ Total System Losses

3. Determine the antenna gain in decibels referenced to an isotropic radiator (dBi). Most commercial antenna manufacturers, such as Celwave, Decibel Products, Sinclair, and others specify their gain figures in dBd, that is, decibels referenced to a dipole. To convert dBd to dBi, add 2.14 dB. Most amateur antenna manufacturers, such as Diamond, Cushcraft, and Comet specify gain values in dBi, so no conversion is necessary. If the manufacture doesn't specify whether they use dBi or dBd for their gain figures, assume dBi.

_____ dBi Antenna Gain

4. Subtract the total system losses obtained in step 2 from the antenna gain specified in step 3 to yield overall antenna system gain. This value may be negative if the total system losses are greater than the antenna gain.

_____ dB Total System Gain

5. Using a calculator, convert total system gain in decibels to a multiplicative gain factor by dividing by 10, and then taking the antilog (inverse-log) of the result. To take the antilog of a number, on most scientific calculators, press the [INV] key followed by the [LOG] key. Be sure to press [=] after dividing by 10, before taking the antilog.

_____ gain multiplication factor

6. Multiply the TPO noted in step 1 by the gain factor obtained in step 5 to yield EIRP. If you don't have a calculator handy, you can write down the values obtained in steps 1 through 3 in their appropriate places on the coordination form, and the EIRP will be calculated for you.

_____ watts EIRP

Cable Type	29 MHz	52 MHz	146 MHz	222 MHz	440 MHz	900 MHz	1200 MHz
RG-8, RG-213, or RG-214	.90	1.3	2.2	2.8	4.3	7.7	9.3
RG-142/B or RG-400	1.9	2.7	4.4	5.8	8.6	12.6	15.2
RG-223	1.9	2.8	4.5	6.2	9.1	13.9	16.8
Belden 9913, Times 9086	.52	.91	1.5	1.9	2.9	4.2	5.1
1/4" SuperFlex Heliax	.93	1.3	2.2	2.7	3.9	5.7	6.9
1/2" SuperFlex Heliax	.54	.74	1.3	1.6	2.3	3.4	4.1
3/8" Foam Heliax	.54	.77	1.3	1.6	2.3	3.3	4.0
1/2" Foam Heliax	.35	.53	.88	1.1	1.6	2.3	2.8
7/8" Foam Heliax	.18	.26	.44	.58	.83	1.3	1.6
1 1/4" Foam Heliax	.14	.20	.33	.42	.60	.92	1.1
1 5/8" Foam Heliax	.11	.16	.27	.35	.51	.79	.94

Loss values for common feedline and patch cable types in dB per 100 feet assuming low-loss connectors such as type N or BNC