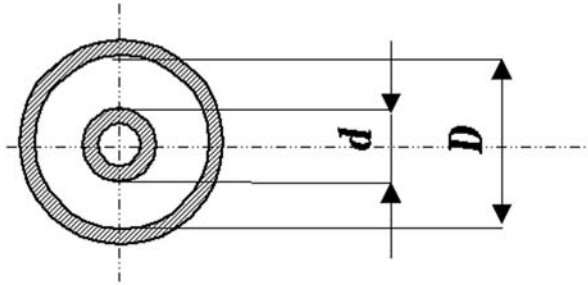


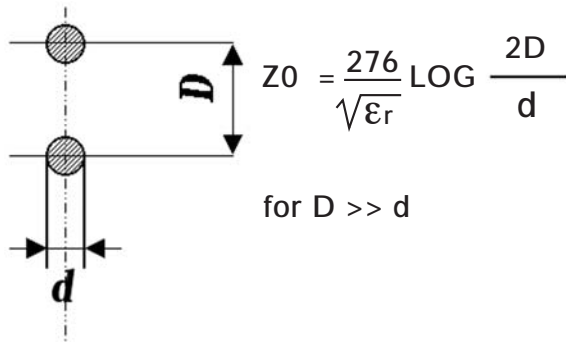
GENERAL PURPOSE DATA AND TABLES

Coaxial cable line impedance:



$$Z_0 = \frac{138}{\sqrt{\epsilon_r}} \text{ LOG } \frac{D}{d}$$

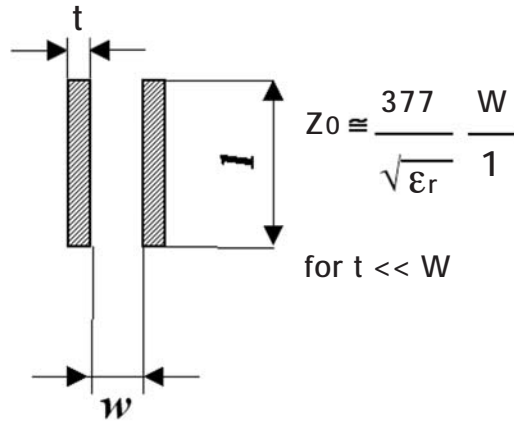
Bifilar line impedance:



$$Z_0 = \frac{276}{\sqrt{\epsilon_r}} \text{ LOG } \frac{2D}{d}$$

for $D \gg d$

Flat



$$Z_0 \cong \frac{377}{\sqrt{\epsilon_r}} \frac{W}{1}$$

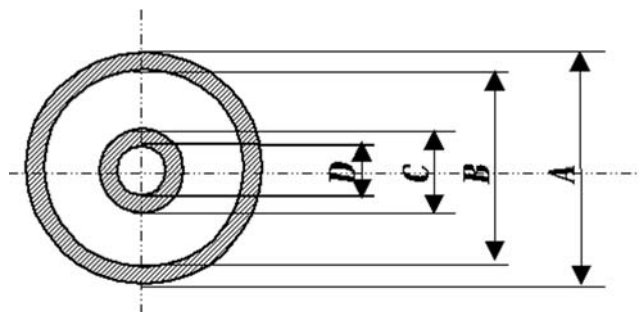
for $t \ll W$

Frequency/air wave - length conversion formula:

$$\lambda = c/f$$

λ = meters ; f = MHz ; $c=300$

Dimensions of 50 ohm coaxial rigid lines / EIA STANDARD



mm.	A		B		C		D	
	Ø	Tol.	Ø	Tol.	Ø	Tol.	Ø	Tol.
7/8"	22.22	±0.06	19.94	±0.06	8.66	±0.05	7.39	±0.05
1 5/8"	41.27	±0.07	38.78	±0.07	16.87	±0.06	14.93	±0.06
3 1/8"	79.4	±0.12	76.88	±0.12	33.4	±0.07	31.26	±0.07
4 1/8"	107	±0.15	104	±0.15	45	±0.1	43	±0.1
6 1/8"	155.57	±0.2	151.9	±0.2	66	±0.1	64	±0.1

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Reflection coefficient table

$$VSWR = \frac{1+r}{1-r}$$

r = Reflection coefficient

$$RETURN LOSS = -20 \text{ Log } r = -10 \text{ Log } r^2$$

r² = Reflected to incident power ratio

VSWR	-20Log r -10Log r ²	r	r ²
∞	0	1.0000	1.0000
17.391	1	0.8913	0.7943
8.724	2	0.8943	0.631
5.848	3	0.7079	0.5012
4.419	4	0.631	0.3981
3.57	5	0.5623	0.3162
3.01	6	0.5012	0.2512
2.615	7	0.4467	0.1995
2.323	8	0.3981	0.1585
2.1	9	0.3548	0.1259
1.925	10	0.3162	0.1
1.785	11	0.2818	0.0794
1.671	12	0.2512	0.0631
1.577	13	0.2239	0.0501
1.499	14	0.1995	0.0398
1.433	15	0.1778	0.316
1.377	16	0.1585	0.0251
1.329	17	0.1413	0.02
1.288	18	0.1259	0.0158
1.253	19	0.1122	0.0126
1.222	20	0.1	0.01
1.196	21	0.0891	0.0079
1.173	22	0.0794	0.0063
1.152	23	0.0708	0.005
1.135	24	0.0631	0.004
1.119	25	0.0562	0.0032
1.106	26	0.0501	0.0025
1.094	27	0.0447	0.002
1.083	28	0.0398	0.0016
1.074	29	0.0355	0.0013
1.065	30	0.0316	0.001
1.058	31	0.0282	0.0008
1.052	32	0.0251	0.0006
1.046	33	0.0224	0.0005
1.041	34	0.02	0.0004
1.036	35	0.0178	0.0003
1.032	36	0.0158	0.0003
1.029	37	0.0141	0.0002
1.025	38	0.0126	0.0006
1.023	39	0.0112	0.0001
1.02	40	0.01	0.0001
1.018	41	0.0089	0.0001
1.016	42	0.0079	0.0001
1.014	43	0.0071	0.0001
1.013	44	0.0063	0
1.011	45	0.0056	0
1.01	46	0.005	0
1.009	47	0.0045	0
1.008	48	0.004	0
1.007	49	0.0035	0
1.006	50	0.0032	0
1.006	51	0.0028	0
1.005	52	0.0025	0
1.004	53	0.0022	0
1.004	54	0.002	0
1.004	55	0.0018	0
1.003	56	0.0016	0
1.003	57	0.0014	0
1.003	58	0.0013	0
1.002	59	0.0011	0
1.002	60	0.001	0

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Ratio (Down)		dB	Ratio (Up)	
Voltage	Power		Voltage	Power
1.0	1.0	0	1.0	1.0
0.989	0.977	0.1	1.012	1.023
0.977	0.955	0.2	1.023	1.047
0.966	0.933	0.3	1.035	1.072
0.955	0.912	0.4	1.047	1.096
0.944	0.891	0.5	1.059	1.122
0.933	0.871	0.6	1.072	1.148
0.923	0.851	0.7	1.084	1.175
0.912	0.832	0.8	1.096	1.202
0.902	0.813	0.9	1.109	1.23
0.891	0.794	1	1.122	1.259
0.871	0.759	1.2	1.148	1.318
0.851	0.724	1.4	1.175	1.38
0.832	0.692	1.6	1.202	1.445
0.813	0.661	1.8	1.23	1.514
0.794	0.631	2	1.259	1.585
0.776	0.603	2.2	1.288	1.66
0.759	0.575	2.4	1.318	1.738
0.741	0.55	2.6	1.349	1.82
0.724	0.525	2.8	1.38	1.905
0.708	0.501	3	1.413	1.995
0.668	0.447	3.5	1.496	2.239
0.631	0.398	4	1.585	2.512
0.596	0.355	4.5	1.679	2.818
0.562	0.316	5	1.778	3.162
0.531	0.282	5.5	1.884	3.548
0.501	0.251	6	1.995	3.981
0.447	0.2	7	2.239	5.012
0.398	0.158	8	2.512	6.31
0.355	0.126	9	2.818	7.943
0.316	0.1	10	3.162	10
0.282	0.079	11	3.548	12.589
0.251	0.063	12	3.981	15.849
0.224	0.05	13	4.467	19.953
0.2	0.04	14	5.012	25.119
0.178	0.032	15	5.623	31.623
0.158	0.025	16	6.31	39.811
0.141	0.02	17	7.079	50.119
0.126	0.016	18	7.943	63.096
0.112	0.013	19	8.913	49.443
0.1	0.01	20	10	100
0.0562	0.003	25	17.8	320
0.0316	0.001	30	31.6	1000
0.0178	0	35	56.2	3200
0.01	0	40	100	10000
0.0056	0	45	178	32000
0.0032	0	50	316	100000
0.001	0	60	1000	1000000
0.0003	0	70	3160	10000000
0.0001	0	80	10000	100000000
0	0	90	31600	1000000000
0	0	100	100000	10000000000

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Conversion table dBm, watt, Volt / 50 ohm

dBm	pW	µV
-90	1	7.071
-89	1.259	7.934
-88	1.585	8.902
-87	1.995	9.988
-86	2.512	11.207
-85	3.162	12.574
-84	3.981	14.109
-83	5.012	15.83
-82	6.31	17.762
-81	7.943	19.929
-80	10	22.361
-79	12.589	25.089
-78	15.849	28.15
-77	19.953	31.585
-76	25.119	35.439
-75	31.623	39.764
-74	39.811	44.615
-73	50.119	50.059
-72	63.096	56.167
-71	79.433	63.021
-70	100	70.711
-69	125.893	79.339
-68	158.489	89.019
-67	199.526	99.881
-66	251.189	112.069
-65	316.228	125.743
-64	398.107	141.086
-63	501.187	158.301
-62	630.957	177.617
-61	794.328	199.29

dBm	µW	mV
-30	1	7.071
-29	1.259	7.934
-28	1.585	8.902
-27	1.995	9.988
-26	2.512	11.207
-25	3.162	12.574
-24	3.981	14.109
-23	5.012	15.83
-22	6.31	17.762
-21	7.943	19.929
-20	10	22.361
-19	12.589	25.089
-18	15.849	28.15
-17	19.953	31.585
-16	25.119	35.439
-15	31.623	39.764
-14	39.811	44.615
-13	50.119	50.059
-12	63.096	56.167
-11	79.433	63.021
-10	100	70.711
-9	125.893	79.339
-8	158.489	89.019
-7	199.526	99.881
-6	251.189	112.069
-5	316.228	125.743
-4	398.107	141.086
-3	501.187	158.301
-2	630.957	177.617
-1	794.328	199.29

dBm	W	V
30	1	7.071
31	1.259	7.934
32	1.585	8.902
33	1.995	9.988
34	2.512	11.207
35	3.162	12.574
36	3.981	14.109
37	5.012	15.83
38	6.31	17.762
39	7.943	19.929
40	10	22.361
41	12.589	25.089
42	15.849	28.15
43	19.953	31.585
44	25.119	35.439
45	31.623	39.764
46	39.811	44.615
47	50.119	50.059
48	63.096	56.167
49	79.433	63.021
50	100	70.711
51	125.893	79.339
52	158.489	89.019
53	199.526	99.881
54	251.189	112.069
55	316.228	125.743
56	398.107	141.086
57	501.187	158.301
58	630.957	177.617
59	794.328	199.29

dBm	nW	µV
-60	1	223.607
-59	1.259	250.891
-58	1.585	281.504
-57	1.995	315.853
-56	2.512	354.393
-55	3.162	397.635
-54	3.981	446.154
-53	5.012	500.593
-52	6.31	561.675
-51	7.943	630.21
-50	10	707.107
-49	12.589	793.387
-48	15.849	890.195
-47	19.953	998.815
-46	25.119	1120.689
-45	31.623	1257.433
-44	39.811	1410.864
-43	50.119	1583.015
-42	63.096	1776.172
-41	79.433	1992.898
-40	100	2236.068
-39	125.893	2508.91
-38	158.489	2815.043
-37	199.526	3158.53
-36	251.189	3543.929
-35	316.228	3976.354
-34	398.107	4461.542
-33	501.187	5005.933
-32	630.957	5616.749
-31	794.328	6302.096

dBm	mW	mV
0	1	223.607
1	1.259	250.891
2	1.585	281.504
3	1.995	315.853
4	2.512	354.393
5	3.162	397.635
6	3.981	446.154
7	5.012	500.593
8	6.31	561.675
9	7.943	630.21
10	10	707.107
11	12.589	793.387
12	15.849	890.195
13	19.953	998.815
14	25.119	1120.689
15	31.623	1257.433
16	39.811	1410.864
17	50.119	1583.015
18	63.096	1776.172
19	79.433	1992.898
20	100	2236.068
21	125.893	2508.91
22	158.489	2815.043
23	199.526	3158.53
24	251.189	3543.929
25	316.228	3976.354
26	398.107	4461.542
27	501.187	5005.933
28	630.957	5616.749
29	794.328	6302.096

dBm	KW	V
60	1	223.607
61	1.259	250.891
62	1.585	281.504
63	1.995	315.853
64	2.512	354.393
65	3.162	397.635
66	3.981	446.154
67	5.012	500.593
68	6.31	561.675
69	7.943	630.21
70	10	707.107
71	12.589	793.387
72	15.849	890.195
73	19.953	998.815
74	25.119	1120.689
75	31.623	1257.433
76	39.811	1410.864
77	50.119	1583.015
78	63.096	1776.172
79	79.433	1992.898
80	100	2236.068
81	125.893	2508.91
82	158.489	2815.043
83	199.526	3158.53
84	251.189	3543.929
85	316.228	3976.354
86	398.107	4461.542
87	501.187	5005.933
88	630.957	5616.749
89	794.328	6302.096
90	1000	7071.068

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Deviation ratios at which the carrier or side-band components have zero amplitude

Order of zero point	Deviat. Ratio		Deviat. Ratio	
	Carrier	1 ST pair side bands	2 ND pair side bands	3 RD pair side bands
1	2.405	3.832	5.136	6.390
2	5.520	7.016	8.417	9.761
3	8.654	10.173	11.620	13.015
4	11.792	13.324	14.796	16.223
5	14.931	16.471	17.960	19.409

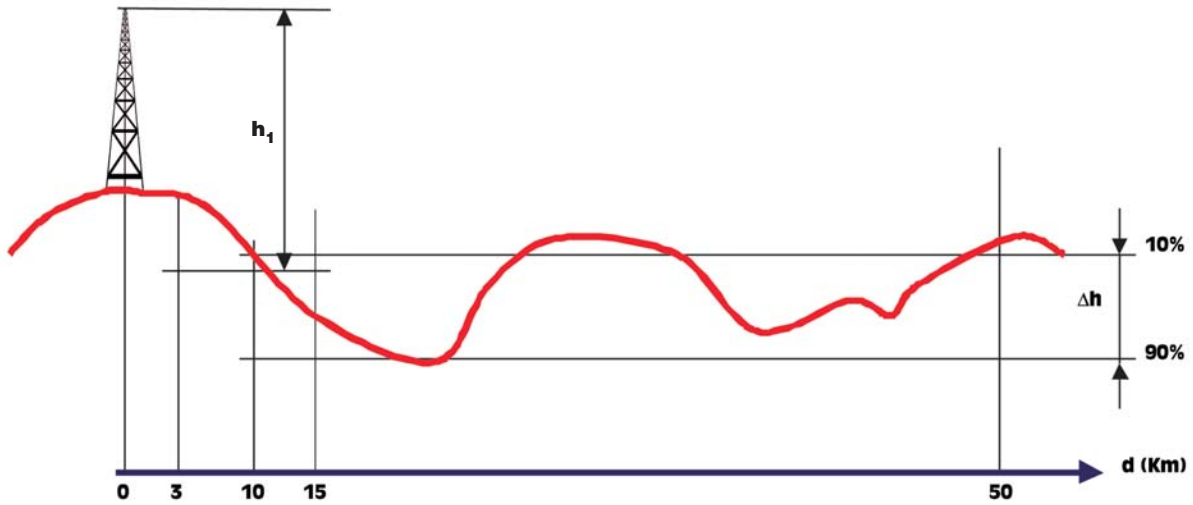
Modulating frequencies corresponding to deviations at which carrier amplitude is reduced to zero

Carrier 1 ST disappearance	Deviat Ratio 2.4048	Carrier 2 ND disappearance	Deviat Ratio 5.5201
Freq. deviation KHz	Modul Frequency Hz	Freq. deviation KHz	Modul Frequency Hz
1	416	5	907
2	831	10	1815
3	1247	15	2718
4	1663	20	3625
5	2079	25	4530
6	2494	30	5430
7	2911	35	6340
8	3326	40	7250
9	3742	45	8160
10	4158	50	9070
15	6237	55	9975
20	8316	60	10880
25	10395	65	11780
30	12480	70	12690
35	14550	75	13590

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PROPAGATION CURVES ON EARTH SURFACE AS PER C.C.I.R. TABLES

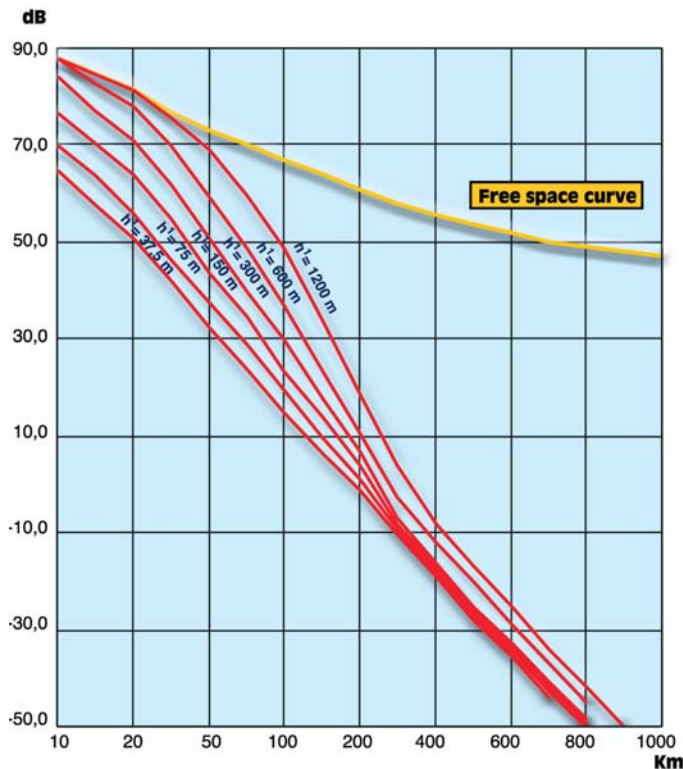
- Rural areas = 48 dB μ V
- Urban areas = 60 dB μ V
- Large towns = 70 dB μ V



h_1 - Equivalent height of the transmitting antenna
(height of the antenna above the average level of the ground between distances of 3 Km and 15 Km from the transmitter).

Δh - Average irregularity factor of the propagation terrain
(difference in the heights exceeded for 10% and 90% of the propagation path in the range 10 Km to 50 Km from the transmitter).

FIELD STRENGTH FOR 1 KW e.r.p.



Frequency: 40 ÷ 250 MHz
 $\Delta h = 50$ m.

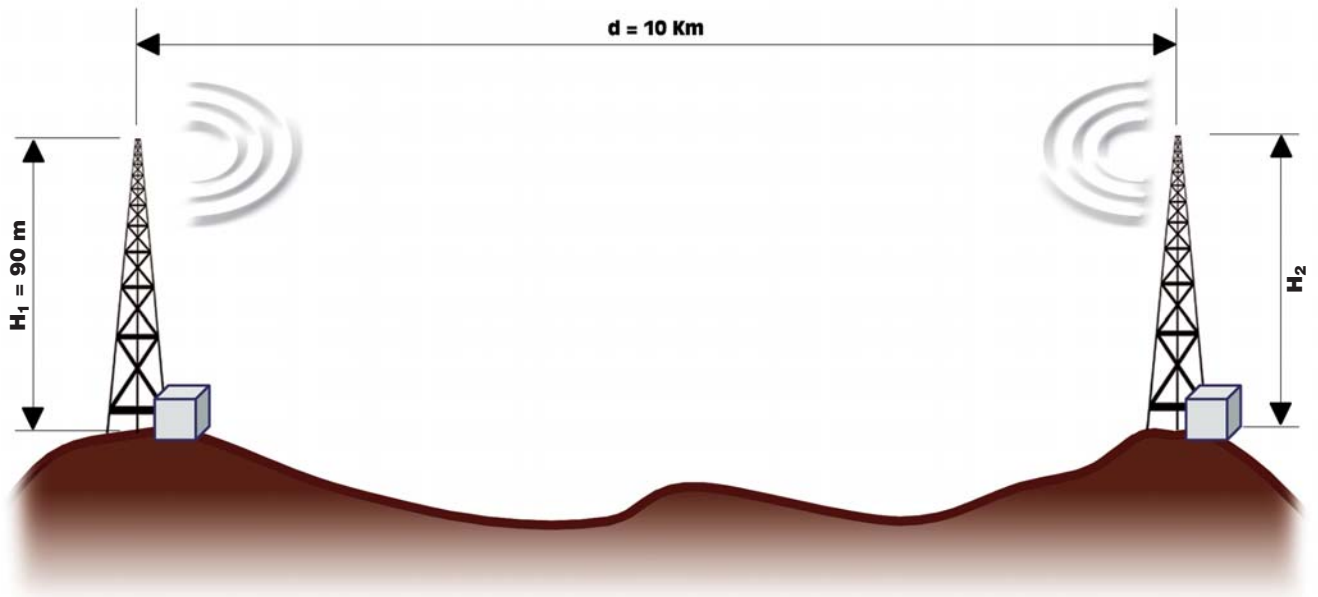
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EXAMPLE OF APPLICABLE CALCULATIONS WITH FORMULAS AND DATA

Project input:

Microwave radio-link between studio and transmitter freq. = 900 MHz.
 d = 10 Km, H₁ = 90 m (Height of transmitting antenna system).
 H₂ = 90 m (Height of receiving antenna system).
 P_t = 5 W 37 dBm (Power of radio-link transmitter).
 P_{rmin} = -47 dBm (Minimum received power) = 1 mV (50 Ohm).
 The feeders are the coaxial cables 1/2" with 100 m. length.

The free-space attenuation is: $\alpha_{dB} = 32.4 + 20 \log 900 + 20 \log 10 = 111.5 \text{ dB}$



Free-space attenuation (dB)

Frequency work (MHz)

Distance (Km)	100	400	800	1000	1200	1400	1800	2000	2400
1	72.4	84.4	90.5	92.4	94	95.3	97.5	98.4	100
2	78.4	90.46	96.5	98.4	100	101.3	103.5	104.4	106
3	81.9	94	100	101.9	103.5	104.9	107	108	109.5
4	84.4	96.5	102.5	104.4	106	107.4	109.5	110.5	112
5	86.4	98.4	104.4	106.4	108	109.3	111.5	112.4	114
6	88	100	106.2	108	109.5	110.9	113	114	115.6
7	89.3	101.3	107.4	109.3	110.9	112.2	114.4	115.3	116.9
8	90.5	102.5	108.5	110.5	112	113.4	115.6	116.5	118
9	91.5	103.5	109.5	111.5	113	114.4	116.6	117.5	119
10	92.4	104.4	110.5	112.4	114	115.3	117.5	118.4	120
15	95.9	108	114	115.9	117.5	118.8	121	121.9	123.5
20	98.4	110.5	116.5	118.4	120	121.3	123.5	124.4	126
25	100.4	112.4	118.4	120.4	121.9	123.3	125.5	126.4	128
30	101.9	114	120	121.9	123.5	124.9	127	128	129.5
35	103.3	115.3	121.3	123.2	124.9	126.2	128.4	129.3	130.9
40	104.4	116.5	122.5	124.4	126	127.4	129.5	130.5	132

$ERP \text{ (dBm)} = P_t \text{ (dBm)} + G_t \text{ (dB)} - A_t \text{ (dB)} > P_{Rmin} + \alpha_{dB} - G_r \text{ (dB)} + A_r \text{ (dB)}$

G_t, G_r = Gain of transmitting and receiving antenna

A_t, A_r = Total attenuation of transmitting and receiving system (Typically they are the attenuations of feeders).

A_t = A_r = 7 dB

Then: G_t = G_r = 21

This gain can be obtained with a 1.8 mt. parabolic antenna.

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TABLES OF CONVERSION FOR MEASUREMENT UNITS

EQUIVALENCE TABLE FOR LENGTH UNIT

Units	yd.	in.	ft.	cm.	m.	km.	stat. mile.	naut. mile.
1 yd	1	36	3	91.44	0.914	—	—	—
1 in	0.028	1	0.083	2.54	0.025	—	—	—
1 ft	0.333	12	1	30.48	0.305	—	—	—
1 cm	0.01	0.39	0.03	1	0.01	—	—	—
1 m	1.094	38.37	3.281	100	1	—	—	0.018
1 km	1094	—	3281	—	—	1	0.621	0.00054
1 stat. mile	1760	—	5280	—	1609	1.609	1	0.869
1 naut. mile	2027	—	6080	—	1852	1.852	1.152	1

in. = Inch; ft. = Foot; yd. = yard; stat. mile = statute mile; naut. mile = nautical mile..

EQUIVALENCE TABLE FOR SQUARE UNIT

Units	sq. yard	sq. inch	sq. foot	cm. ²	m ²	km ²	sq mile	acre	a	ha
1 square yard	1	1296	9	8361	0.8361	—	—	—	—	—
1 square inch	—	1	—	6.452	—	—	—	—	—	—
1 square foot	0.1111	144	1	929	0.0929	—	—	—	—	—
1 cm ²	—	0.155	—	1	0.0001	—	—	—	—	—
1 m ²	1.196	1550	10.76	10000	1	—	—	—	0.01	—
1 km ²	—	—	—	—	—	1	0.3861	247.1	10000	100
1 square mile	—	—	—	—	—	2.59	1	640	—	259
1 acre	4850	—	43640	—	4050	—	0.0016	1	—	—
1 a	119.6	—	1076	—	100	—	—	0.0247	1	0.01
1 ha	—	—	—	—	10000	0.01	0.0039	2.47	100	1

EQUIVALENCE TABLE FOR VOLUME UNIT

Units	cu. yard	cu. inch	cu. foot	cm. ³	dm ³	U.S. gallon	Imp.gallon	Imp. fl. oz.	U.S. fl. oz.	Imp. pint
1 cubic yard	1	46656	27	—	764.6	202	168.2	26909	25853	1345
1 cubic inch	—	1	—	16.39	0.0164	—	—	0.5768	0.5541	0.0288
1 cubic foot	0.0370	1728	1	—	28.32	7.481	6.232	996.6	957.5	49.83
1 cm ³	—	0.061	—	1	0.001	—	—	0.0353	0.0338	—
1 dm ³	—	61.02	0.035	1000	1	0.2642	0.22	35.2	33.81	1.76
1 US. gallon	—	231	0.1337	3785	3.785	1	0.8327	133.2	128	6.662
1 imp. gallon	—	277.4	0.1603	4546	4.546	1.201	1	160	153.7	8
1 imp. fl. oz.	—	1.734	—	28.41	0.0284	—	—	1	0.9607	0.05
US. fl. oz.	—	1.805	—	29.57	0.0296	—	—	1.041	1	0.052
1 imp. pint	—	34.68	0.02	568.2	0.5682	0.1501	0.125	20	19.21	1

EQUIVALENCE TABLE FOR WEIGHT UNIT

Units	Lb.	Oz.	stone	g	kg	ton	U.S. cwt	Brit. cwt	U.S. ton	Brit. ton
1 pound	1	16	0.071	453.6	0.453	—	0.01	0.009	—	—
1 ounce	0.0625	1	0.004	28.35	0.028	—	—	—	—	—
1 stone	14	224	1	6350	6.35	0.0063	0.14	0.125	0.007	0.0063
1 g.	—	0.0353	—	1	0.001	—	—	—	—	—
1 kg.	2.205	35.27	0.157	1000	1	0.001	0.022	0.02	0.0011	0.001
1 ton.	2204.6	35274	157.47	—	1000	1	22.05	19.685	1.1023	0.9842
1 US hundredweight	100	1600	7.143	45359	45.36	0.0454	1	0.8929	0.05	0.0446
1 Brit. hundredweight	112	1792	8	50802	50.8	0.0508	1.12	1	0.056	0.05
1 US. ton	2000	32000	142.9	907190	907.2	0.907	20	17.841	1	0.8929
1 Brit. Ton	2240	35840	160	—	1016	1.016	11.2	20	1.12	1

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CONVERSION TABLE OF INCHES INTO mm

n.	0	1/16	1/8	3/16	1/4	5/16	3/8	7/16	1/2	9/16	5/8	11/16	3/4	13/16	7/8	15/16
0	0.0	1.6	3.2	4.8	6.4	7.9	9.5	11.1	12.7	14.3	15.9	17.5	19.1	20.6	22.2	23.8
1	25.4	27.0	28.6	30.2	31.7	33.3	34.9	36.5	38.1	39.7	41.3	42.9	44.4	46.0	47.6	49.2
2	50.8	52.4	54.0	55.6	57.1	58.7	60.3	61.9	63.5	65.1	66.7	68.3	69.8	71.4	73.0	74.6
3	76.2	77.8	79.4	81.0	82.5	84.4	85.7	87.3	88.9	90.5	92.4	93.7	95.2	96.8	98.4	100.0
4	101.6	103.2	104.8	106.4	108.0	109.5	111.1	112.7	114.3	115.9	117.5	119.1	120.7	122.2	123.8	125.4
5	127.0	128.6	130.2	131.8	133.4	134.9	136.5	138.1	139.7	141.3	142.9	144.5	146.1	147.6	149.2	150.8
6	152.4	154.0	155.6	157.2	158.8	160.3	161.9	163.5	165.1	166.7	168.3	169.9	171.5	173.0	174.6	176.2
7	177.8	179.4	181.0	182.6	184.2	185.7	187.3	188.9	190.5	192.1	193.7	195.3	196.9	198.4	200.0	201.6
8	203.2	204.8	206.4	208.0	209.6	211.1	212.7	214.3	215.9	217.5	219.1	220.7	222.3	223.8	225.4	227.0
9	228.6	230.2	231.8	233.4	235.0	236.5	238.1	239.7	241.3	242.9	244.5	246.1	247.7	249.2	250.8	252.4
10	254.0	255.6	257.2	258.8	260.4	261.9	263.5	265.1	266.7	268.3	269.9	271.5	273.1	274.6	276.2	277.8
11	279.4	281.0	282.6	284.2	285.7	287.3	288.9	290.5	292.1	293.7	295.3	296.9	298.4	300.0	301.6	303.2

CONVERSION TABLE OF cm INTO INCHES

cm	0	1	2	3	4	5	6	7	8	9
0	—	0.3937	0.7874	1.1811	1.5748	1.9685	2.3622	2.7559	3.1496	3.5433
10	3.9370	4.3307	4.7244	5.1181	5.5118	5.9055	6.2992	6.6929	7.0866	7.4803
20	7.8740	8.2677	8.6614	9.0551	9.4488	9.8425	10.2362	10.6299	11.0236	11.4173
30	11.8110	12.2047	12.5984	12.9921	13.3858	13.7795	14.1732	14.5669	14.9606	15.3543
40	15.7480	16.1417	16.5354	16.9291	17.3228	17.7165	18.1103	18.5040	18.8977	19.2914
50	19.6851	20.0788	20.4725	20.8662	21.2599	21.6536	22.0473	22.4410	22.8347	23.2284
60	23.6221	24.0158	24.4095	24.8032	25.1969	25.5906	25.9843	26.3780	26.7717	27.1654
70	27.5591	27.9528	28.3465	28.7402	29.1339	29.5276	29.9213	30.3150	30.7087	31.1024
80	31.4961	31.8898	32.2835	32.6772	33.0709	33.4646	33.8583	34.2520	34.6457	35.0394
90	35.4331	35.8268	36.2205	36.6142	37.0079	37.4016	37.7953	38.1890	38.5827	38.9764
100	39.3701	39.7638	40.1575	40.5512	40.9449	41.3386	41.7323	42.1260	42.5197	42.9134

CONVERSION TABLE OF SQUARE FEET INTO m²

P.q.	0	1	2	3	4	5	6	7	8	9
0	—	0.09290	0.18581	0.27871	0.37161	0.46451	0.55742	0.65032	0.74322	0.83613
10	0.92903	1.02193	1.11483	1.20774	1.30064	1.39354	1.48645	1.57935	1.67225	1.76515
20	1.85806	1.95096	2.04386	2.13677	2.22967	2.32257	2.41547	2.50838	2.60128	2.69418
30	2.78709	2.87999	2.97289	3.06579	3.15870	3.25160	3.34450	3.43741	3.53031	3.62321
40	3.71612	3.80902	3.90192	3.99482	4.08773	4.18063	4.27353	4.36644	4.45934	4.55224
50	4.64514	4.73805	4.83095	4.92385	5.01676	5.10966	5.20256	5.29546	5.38837	5.48127
60	5.57417	5.66708	5.75998	5.85288	5.94578	6.03869	6.13159	6.22449	6.31740	6.41030
70	6.50320	6.59610	6.68901	6.78191	6.87481	6.96772	7.06062	7.15352	7.24642	7.33933
80	7.43223	7.52513	7.61804	7.71094	7.80384	7.89674	7.98965	8.08255	8.17545	8.26836
90	8.36126	8.45416	8.54706	8.63997	8.73287	8.82577	8.91868	9.01158	9.10448	9.19738
100	9.29029	9.38319	9.47609	9.56900	9.66190	9.75480	9.84770	9.94061	10.0335	10.1264

CONVERSION TABLE OF CUBIC YARDS INTO m³

Y.c.	0	1	2	3	4	5	6	7	8	9
0	—	0.76455	1.52911	2.29366	3.05821	3.82276	4.58732	5.35187	6.11642	6.88098
10	7.64553	8.41008	9.17463	9.93919	10.7037	11.4683	12.2338	12.9974	13.7620	14.5265
20	15.2911	16.0556	16.8202	17.5847	18.3493	19.1138	19.8784	20.6429	21.4075	21.1720
30	22.9366	23.7011	24.4657	25.2302	25.9948	26.7594	27.5239	28.2885	29.0530	29.8176
40	30.5831	31.3467	32.1112	32.8758	33.6403	34.4049	35.1694	35.9340	36.6985	37.4631
50	38.2276	38.9922	39.7568	40.5213	41.2859	42.0504	42.8150	43.5795	44.3441	45.1086
60	45.8732	46.6377	47.4023	48.1668	48.9314	49.6959	50.4605	51.2250	51.9896	52.7542
70	53.5187	54.2833	55.0478	55.8124	56.5769	57.3415	58.1060	58.8706	59.6351	60.3997
80	61.1642	61.9288	62.6933	63.4579	64.2224	64.9870	65.7515	66.5161	67.2807	68.0452
90	68.8098	69.5743	70.3389	71.1034	71.8680	72.6325	73.3971	74.1616	74.9262	75.6907
100	76.4553	77.2198	77.9844	78.7489	79.5135	80.2781	81.0426	81.8072	82.5717	83.3363

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CONVERSION TABLE OF CUBIC FEET INTO dm³

P.c.	0	1	2	3	4	5	6	7	8	9
0	—	28.3168	56.6336	84.9504	113.267	141.584	169.901	198.218	226.534	254.851
10	283.168	311.485	339.802	368.118	396.435	424.752	453.069	481.386	509.702	538.019
20	566.336	594.653	622.970	651.286	679.603	707.920	736.237	764.554	792.870	821.187
30	849.504	877.821	906.138	934.454	962.771	991.088	1019.40	1047.72	1076.04	1104.36
40	1132.67	1160.99	1189.31	1217.62	1245.94	1274.26	1302.57	1330.89	1359.21	1387.52
50	1415.84	1444.16	1472.47	1500.79	1529.11	1557.42	1585.74	1614.06	1642.37	1670.69
60	1699.01	1727.32	1755.64	1783.96	1812.28	1840.59	1868.91	1897.23	1925.54	1953.86
70	1982.18	2010.49	2038.81	2067.13	2095.44	2123.76	2152.08	2180.39	2208.71	2237.03
80	2265.34	2293.66	2321.98	2350.29	2378.61	2406.93	2435.24	2463.56	2491.88	2520.20
90	2548.51	2576.83	2605.15	2633.46	2661.78	2690.10	2718.41	2746.73	2775.05	2803.36
100	2831.68	2860.00	2888.31	2916.63	2944.95	2973.26	3001.58	3029.90	3058.21	3086.53

CONVERSION TABLE OF CUBIC FEET INTO dm³

P.c.	0	1	2	3	4	5	6	7	8	9
0	—	28.3168	56.6336	84.9504	113.267	141.584	169.901	198.218	226.534	254.851
10	283.168	311.485	339.802	368.118	396.435	424.752	453.069	481.386	509.702	538.019
20	566.336	594.653	622.970	651.286	679.603	707.920	736.237	764.554	792.870	821.187
30	849.504	877.821	906.138	934.454	962.771	991.088	1019.40	1047.72	1076.04	1104.36
40	1132.67	1160.99	1189.31	1217.62	1245.94	1274.26	1302.57	1330.89	1359.21	1387.52
50	1415.84	1444.16	1472.47	1500.79	1529.11	1557.42	1585.74	1614.06	1642.37	1670.69
60	1699.01	1727.32	1755.64	1783.96	1812.28	1840.59	1868.91	1897.23	1925.54	1953.86
70	1982.18	2010.49	2038.81	2067.13	2095.44	2123.76	2152.08	2180.39	2208.71	2237.03
80	2265.34	2293.66	2321.98	2350.29	2378.61	2406.93	2435.24	2463.56	2491.88	2520.20
90	2548.51	2576.83	2605.15	2633.46	2661.78	2690.10	2718.41	2746.73	2775.05	2803.36
100	2831.68	2860.00	2888.31	2916.63	2944.95	2973.26	3001.58	3029.90	3058.21	3086.53

CONVERSION TABLE OF POUNDS INTO kg

Lbs.	0	1	2	3	4	5	6	7	8	9
0	—	0.4536	0.9072	1.3608	1.8144	2.2680	2.7216	3.1751	3.6287	4.0823
10	4.5359	4.9895	5.4431	5.8967	6.3503	6.8039	7.2575	7.7111	8.1647	8.6183
20	9.0719	9.5254	9.9790	10.4326	10.8862	11.3398	11.7934	12.2470	12.7006	13.1542
30	13.6078	14.0614	14.5150	14.9686	15.4222	15.8757	16.3293	16.7829	17.2365	17.6901
40	18.1437	18.5973	19.0509	19.5045	19.9581	20.4117	20.8653	21.3189	21.7724	22.2260
50	22.6796	23.1332	23.5868	24.0404	24.4940	24.9476	25.4012	25.8548	26.3084	26.7620
60	1699.01	1727.32	1755.64	1783.96	1812.28	1840.59	1868.91	1897.23	1925.54	1953.86
70	1982.18	2010.49	2038.81	2067.13	2095.44	2123.76	2152.08	2180.39	2208.71	2237.03
80	2265.34	2293.66	2321.98	2350.29	2378.61	2406.93	2435.24	2463.56	2491.88	2520.20
90	2548.51	2576.83	2605.15	2633.46	2661.78	2690.10	2718.41	2746.73	2775.05	2803.36
100	2831.68	2860.00	2888.31	2916.63	2944.95	2973.26	3001.58	3029.90	3058.21	3086.53

CONVERSION TABLE OF kg INTO POUNDS

kg	0	1	2	3	4	5	6	7	8	9
0	—	2.205	4.409	6.614	8.818	11.023	13.228	15.432	17.637	19.842
10	22.046	24.251	26.455	28.660	30.865	33.069	35.274	37.479	39.683	41.888
20	44.092	46.297	48.502	50.706	52.911	55.116	57.320	59.525	61.729	63.934
30	66.139	68.343	70.548	72.752	74.957	77.162	79.366	81.571	83.766	85.980
40	88.185	90.389	92.594	94.799	97.003	99.208	101.413	103.617	105.822	108.026
50	110.231	112.436	114.640	116.845	119.050	121.254	123.456	125.663	127.868	130.073
60	132.228	134.482	136.686	138.891	141.096	143.300	145.505	147.710	149.914	152.169
70	154.323	156.528	158.733	160.937	163.142	165.341	167.551	169.756	171.960	174.165
80	176.370	178.574	180.779	182.983	185.188	187.393	189.597	191.802	194.007	196.211
90	198.416	200.620	202.825	205.030	207.234	209.439	211.044	213.848	216.052	218.257
100	220.462	222.667	224.871	227.076	229.281	231.485	233.690	235.894	238.099	240.304

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CONVERSION TABLE OF POUNDS/SQUARE INTO kg/cm²

Lbs. p.q.	0	1	2	3	4	5	6	7	8	9
0	—	0.07031	0.14061	0.21092	0.28123	0.35154	0.42184	0.49215	0.56246	0.63276
10	0.70307	0.77338	0.84369	0.91399	0.98430	1.05461	1.12491	1.19522	1.26553	1.33584
20	1.40614	1.47645	1.54676	1.61706	1.68737	1.75768	1.82799	1.89829	1.96860	2.03891
30	2.10921	2.17952	2.24983	2.32014	2.39044	2.46075	2.53106	2.60136	2.67167	2.74198
40	2.81228	2.88259	2.95290	3.02321	3.09351	3.16382	3.23413	3.30443	3.37474	3.44505
50	3.51535	3.58566	3.65597	3.72628	3.79658	3.86689	3.93720	4.00750	4.07781	4.14812
60	4.21843	4.28873	4.35904	4.42935	4.49965	4.56996	4.64027	4.71058	4.78088	4.85119
70	4.92150	4.99180	5.06211	5.13242	5.20273	5.27303	5.34334	5.41365	5.48395	5.55426
80	5.62457	5.69488	5.76518	5.83549	5.90580	5.97610	6.04641	6.11672	6.18702	6.25733
90	6.32764	6.39795	6.46825	6.53856	6.60887	6.67917	6.74948	6.81979	6.89010	6.96040
100	7.03071	7.10102	7.17132	7.24163	7.31194	7.38225	7.45255	7.52286	7.59317	7.66347

CONVERSION TABLE OF kg/cm² INTO POUNDS/SQUARE

p.q. lbs.	0	1	2	3	4	5	6	7	8	9
0	—	14.223	28.447	42.670	56.893	71.117	85.340	99.563	113.787	128.010
10	142.233	156.456	170.680	184.903	199.126	213.350	227.573	241.796	256.020	270.243
20	284.466	298.690	312.913	327.136	341.360	355.583	369.806	384.030	398.253	412.476
30	426.699	440.923	455.146	469.369	483.593	497.816	512.039	526.263	540.486	554.709
40	568.933	583.156	597.379	611.603	625.826	640.049	654.272	668.496	682.719	696.942
50	711.166	725.389	739.612	753.836	768.059	782.282	796.506	810.729	824.952	839.176
60	853.399	867.622	881.846	896.069	910.292	924.515	938.739	952.962	967.185	981.409
70	995.632	1009.86	1024.08	1038.30	1052.53	1066.75	1080.97	1095.20	1109.42	1123.64
80	1137.87	1152.09	1166.31	1180.54	1194.76	1208.98	1223.21	1237.43	1251.65	1265.88
90	1280.10	1294.32	1308.54	1322.77	1336.99	1351.21	1365.44	1379.66	1393.88	1408.11
100	1422.33	1436.55	1450.78	1465.00	1479.22	1493.45	1507.67	1521.89	1536.12	1550.34

EQUIVALENCE TABLE FOR VELOCITY UNITS

units	cm/s	km/h	miles/h	feet/s	feet/min.	knots
cm/s	1	0.036	0.02237	0.03281	1.9685	0.01943
km/h	27.78	1	0.6214	0.9113	54.68	0.5396
miles/h	44.70	1.609	1	1.467	88	0.8684
feet/s	30.48	1.097	0.6818	1	60	0.5921
feet/min	0.5080	0.01829	0.01136	0.01667	1	0.00987
knots	51.48	1.8532	1.1515	1.6889	101.34	1

EQUIVALENCE TABLE FOR PRESSURE UNITS

units	mbar	bar	atm	at kg/cm ²	mm Hg 0°C Torr	mm of water	Pounds for square inches
mbar	1	10 ⁻³	9.87•10 ⁻⁴	1.02•10 ⁻²	0.75	10.2	1.45•10 ⁻²
bar	103	1	0.987	1.02	750.1	10197	14.5
atm	1013	1.013	1	1.033	760	10332	14.7
at.	980.7	0.981	0.968	1	735.6	10 ⁻⁴	14.22
mm Hg at 0°C Torr	1.3333	1.33•10 ⁻³	0.3•10 ⁻³	1.36•10 ⁻³	1	13.6	1.93•10 ⁻²
mm of water	9.8•10 ⁻²	9.8•10 ⁻⁵	9.68•10 ³	104	7.4•10 ⁻²	1	1.42•10 ⁻³
Pounds for square inch.	68.94	6.9•10 ⁻²	6.8•10 ⁻²	7.03•10 ⁻²	51.7	703.3	1

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