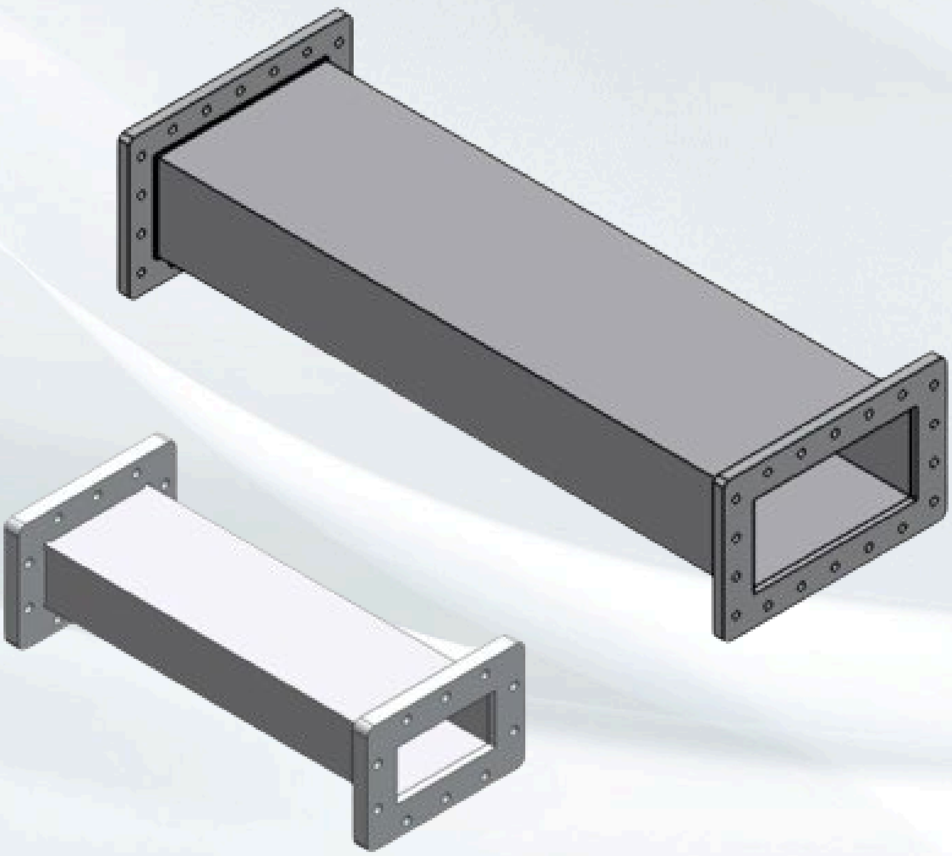
Rigid Waveguide Technical Data



Rigid Waveguide Typical Specifications

Waveguide Size		Cut-off for TE_{10} Mode	Recommended Frequency Range		Attenuation	Avg Power @ 25°C above Amb.	Material Alloy	Inside Dimensions	Outside Dimensions	Wall Thickness
EIA	IEC	(GHz)	(GHz)		dB/100'	(kw)		Inches (mm)	Inches (mm)	Inches (mm)
WR2300	R3	0.257	Min	0.321	0.048	1290	Al	23.00 (584.2)	23.38 (593.8)	.188 (4.8)
			Max	0.489	0.036	1738		11.50 (292.1)	11.88 (301.7)	
WR2100	R4	0.281	Min	0.351	0.056	1017	Al	21.00 (533.4)	21.38 (543.0)	.188 (4.8)
			Max	0.535	0.041	1379		10.50 (266.7)	10.88 (276.3)	
WR1800	R5	0.328	Min	0.410	0.074	658	Al	18.00 (457.2)	18.38 (466.8)	.188 (4.8)
			Max	0.624	0.052	928		9.00 (228.6)	9.38 (238.2)	
WR1500	R6	0.393	Min	0.492	0.096	422	Al	15.00 (381.0)	15.25 (387.4)	.125 (3.2)
			Max	0.749	0.071	572		7.50 (190.5)	7.75 (196.9)	
WR1150	R8	0.513	Min	0.641	0.148	212	Al	11.50 (292.1)	11.75 (298.5)	.125 (3.2)
			Max	0.977	0.109	287		5.75 (146.1)	6.00 (152.4)	
WR975	R9	0.605	Min	0.757	0.197	137	Al	9.75 (247.7)	10.00 (254.0)	.125 (3.2)
			Max	1.153	0.144	186		4.875 (123.8)	5.13 (130.2)	
WR770	R12	0.766	Min	0.958	0.292	74.4	Al	7.70 (195.6)	7.95 (201.9)	.125 (3.2)
			Max	1.460	0.214	101		3.85 (97.8)	4.10 (104.1)	
WR650	R14	0.908	Min	1.135	0.386	48.7	Al/Cu	6.50 (165.1)	6.75 (171.5)	.125 (3.2)
			Max	1.729	0.286	64.9		3.25 (82.6)	3.50 (88.9)	
WR510	R18	1.157	Min	1.446	0.590	26.5	Al/Cu	5.10 (129.5)	5.35 (135.9)	.125 (3.2)
			Max	2.204	0.440	35.0		2.50 (63.5)	2.75 (69.9)	
WR430	R22	1.372	Min	1.716	0.779	17.4	Al/Cu	4.30 (109.2)	4.46 (113.3)	.080 (2.0)
			Max	2.614	0.581	22.8		2.15 (54.6)	2.31 (58.7)	
WR340	R26	1.736	Min	2.170	1.171	9.92	Al/Cu	3.40 (86.4)	3.56 (90.4)	.080 (2.0)
			Max	3.306	0.868	12.9		1.70 (43.2)	1.86 (47.2)	
WR284	R32	2.078	Min	2.597	1.650	6.29	Al/Cu/Br	2.84 (72.1)	3.00 (76.2)	.080 (2.0)
			Max	3.958	1.233	8.04		1.34 (34.0)	1.50 (38.1)	

Notes:

- Cut-off frequency for the TE_{10} Mode corresponds to the wavelength that is equal to 2 times the guide width (a). Energy will not effectively propagate in the waveguide below this frequency.
- The Recommended Frequency Range corresponds to wavelength that is between 1.6 times the guide width and 1.05 times the guide width ($1.25*F_{Cut\text{-}off}$ to $1.9*F_{Cut\text{-}off}$). This range may be extended however attenuation will increase significantly below this frequency range and higher order waveguide modes may start to propagate above it.
- Attenuation is based on 6061-T6 aluminum waveguide with a 63 µin surface finish.
- Average power is based on unpressurized painted aluminum waveguide under free convection cooling with an operating temperature that is 25° C above the ambient temperature. Cooling options should be considered if the waveguide will be operating at higher power levels, please consult the factory.

Rigid Waveguide Typical Specifications

Waveguide Size		Cut-off for TE_{10} Mode	Recommended Frequency Range		Attenuation	Avg Power @ 25°C above Amb.	Material Alloy	Inside Dimensions	Outside Dimensions	Wall Thickness
EIA	IEC	(GHz)	(GHz)		dB/100'	(kw)		Inches (mm)	Inches (mm)	Inches (mm)
WR229	R40	2.577	Min	3.221	2.212	4.25	Al/Cu/Br	2.29 (58.2)	2.42 (61.3)	.063 (1.6)
			Max	4.909	1.691	5.26		1.145 (29.1)	1.27 (32.3)	
WR187	R48	3.152	Min	3.941	3.418	2.60	Al/Cu/Br	1.872 (47.5)	2.00 (50.7)	.063 (1.6)
			Max	6.005	2.604	3.14		.827 (21.0)	.95 (24.2)	
WR159	R58	3.712	Min	4.639	4.173	2.06	Al/Cu/Br	1.59 (40.4)	1.72 (43.6)	.063 (1.6)
			Max	7.070	3.088	2.50		.795 (20.2)	.92 (23.4)	
WR137	R70	4.301	Min	5.377	5.758	1.51	Al/Cu/Br	1.372 (34.8)	1.50 (38.0)	.063 (1.6)
			Max	8.193	4.237	1.78		.622 (15.8)	.75 (19.0)	
WR112	R84	5.260	Min	6.575	8.144	1.12	Al/Cu/Br	1.122 (28.5)	1.25 (31.7)	.063 (1.6)
			Max	10.019	5.948	1.28		.497 (12.6)	.62 (15.8)	
WR102	-	5.786	Min	7.232	8.727	1.05	Al/Cu/Br	1.02 (25.9)	1.15 (29.1)	.063 (1.6)
			Max	11.020	6.286	1.19		.51 (13.0)	.64 (16.1)	
WR90	R100	6.557	Min	8.196	11.695	0.814	Al/Cu/Br	.90 (22.9)	1.00 (25.4)	.050 (1.3)
			Max	12.490	8.420	0.887		.40 (10.2)	.50 (12.7)	
WR75	R120	7.869	Min	9.836	14.384	0.709	Al/Cu/Br	.75 (19.1)	.85 (21.6)	.050 (1.3)
			Max	14.988	10.207	0.755		.375 (9.5)	.48 (12.1)	
WR62	R140	9.488	Min	11.860	19.471	0.604	Al/Cu/Br	.622 (15.8)	.72 (18.3)	.050 (1.3)
			Max	18.072	13.655	0.624		.311 (7.9)	.41 (10.4)	
WR51	R180	11.571	Min	14.464	26.648	0.525	Al/Cu/Br	.51 (13.0)	.61 (15.5)	.050 (1.3)
			Max	22.041	18.554	0.532		.255 (6.5)	.36 (9.0)	
WR42	R220	14.051	Min	17.564	41.283	0.451	Al/Cu/Br	.42 (10.7)	.52 (13.2)	.050 (1.3)
			Max	26.764	29.628	0.452		.17 (4.3)	.27 (6.9)	
WR34	R260	17.357	Min	21.696	50.253	0.418	Al/Cu/Br	.34 (8.6)	.44 (11.2)	.050 (1.3)
			Max	33.061	34.572	0.418		.17 (4.3)	.27 (6.9)	
WR28	R320	21.077	Min	26.346	67.500	0.378	Al/Cu/Br	.28 (7.1)	.38 (9.7)	.050 (1.3)
			Max	40.146	46.516	0.378		.14 (3.6)	.24 (6.1)	

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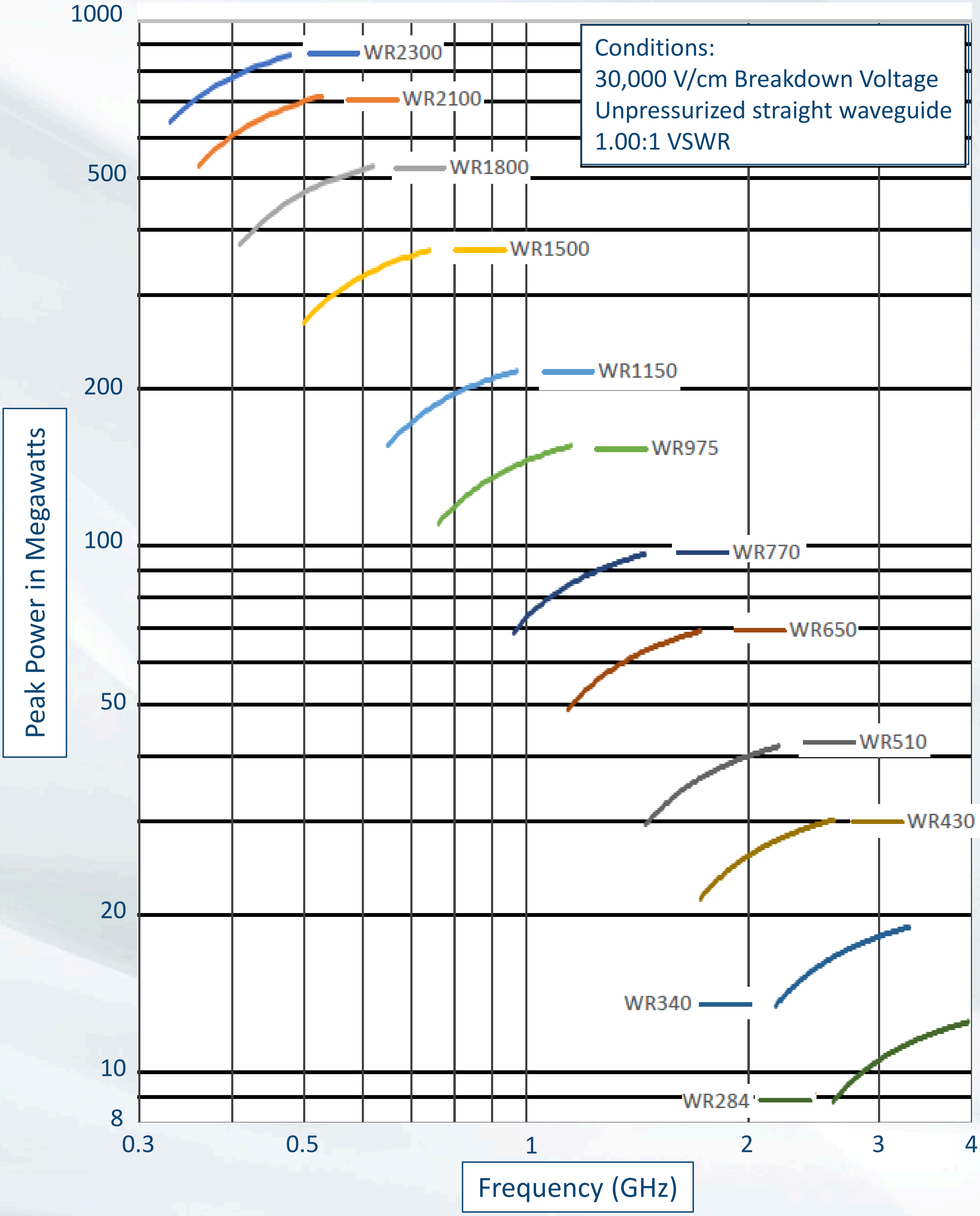
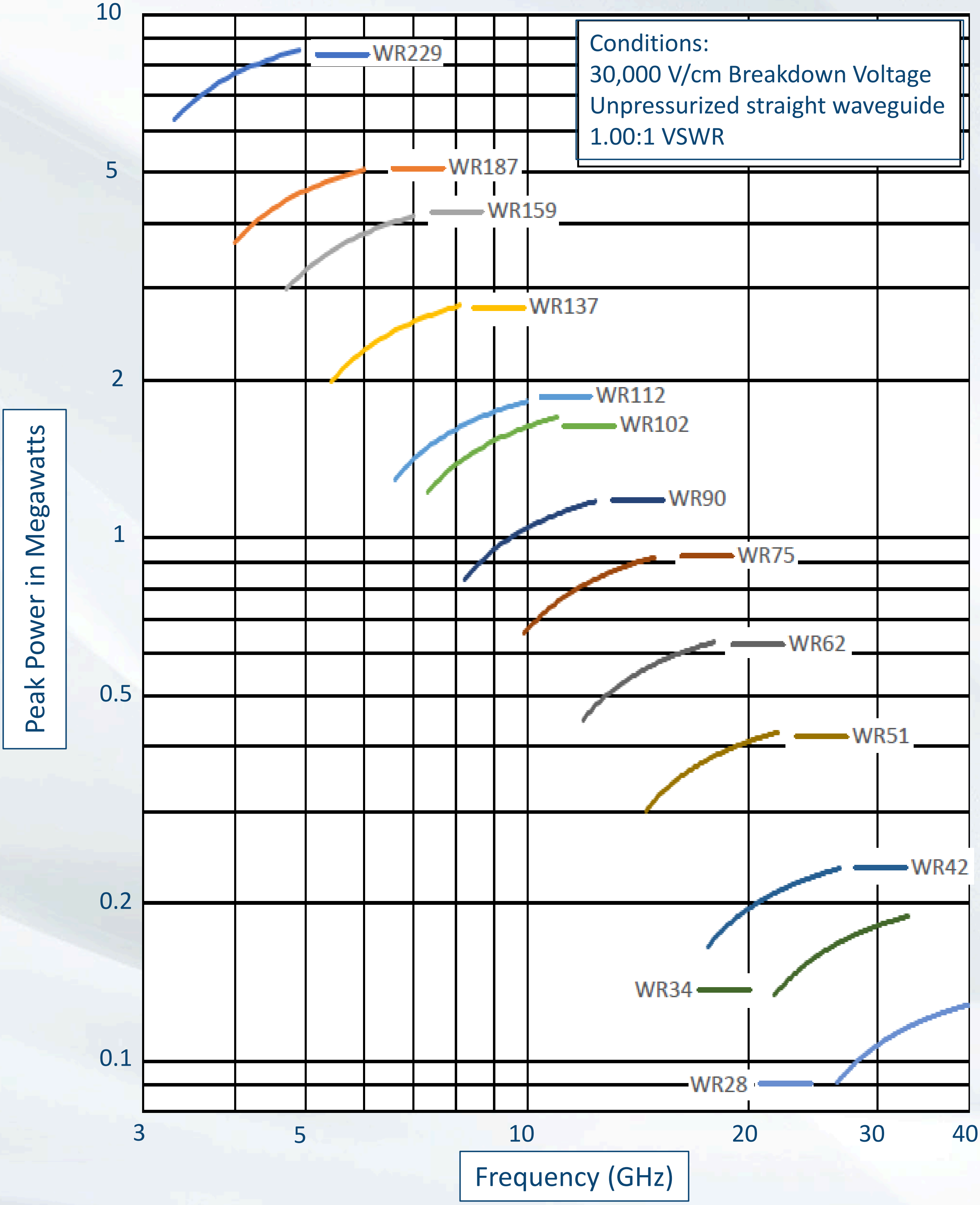
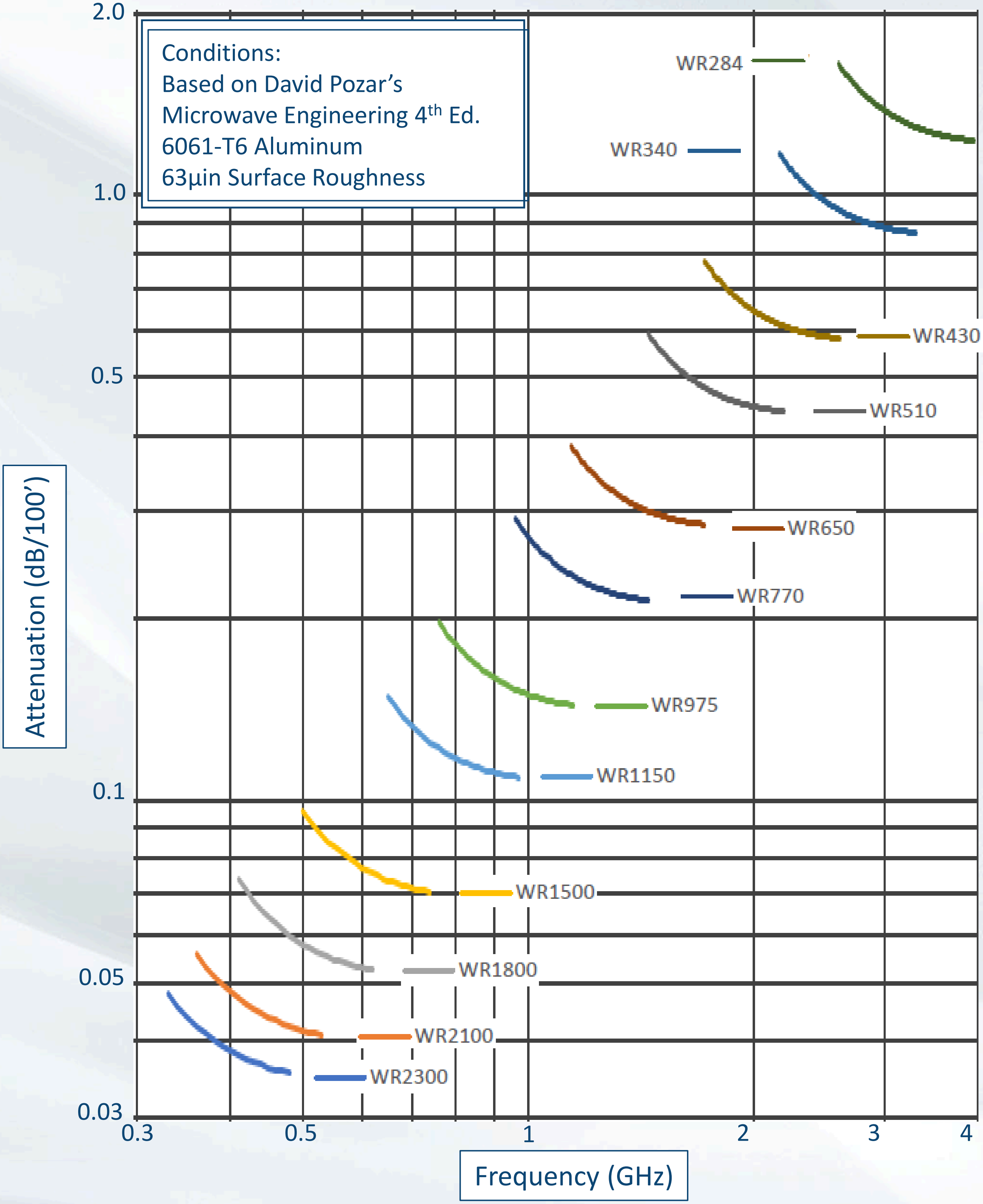
Rectangular Waveguide
Peak Power Handling vs Frequency



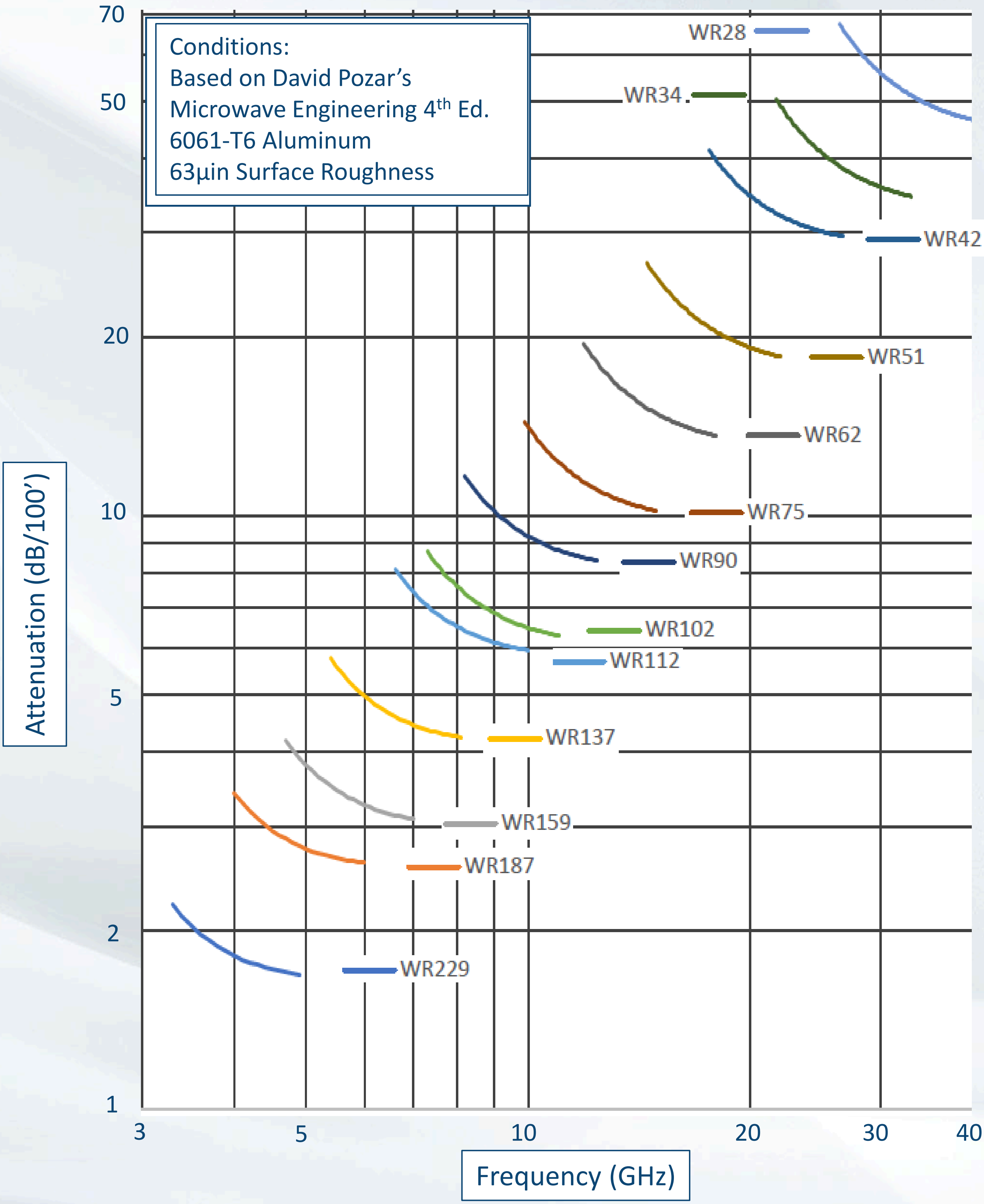
Rectangular Waveguide
Peak Power Handling vs Frequency



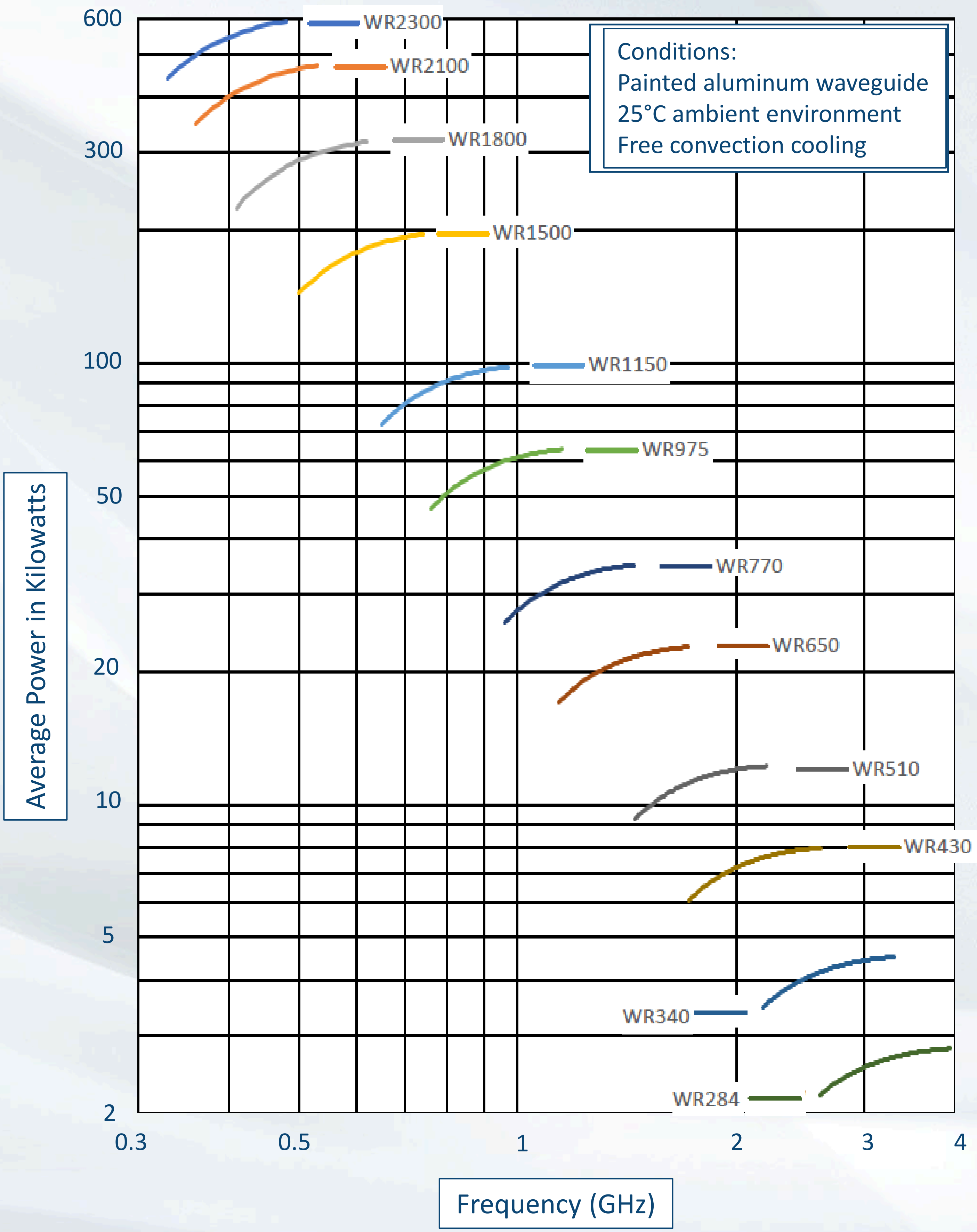
Rectangular Waveguide Attenuation vs Frequency



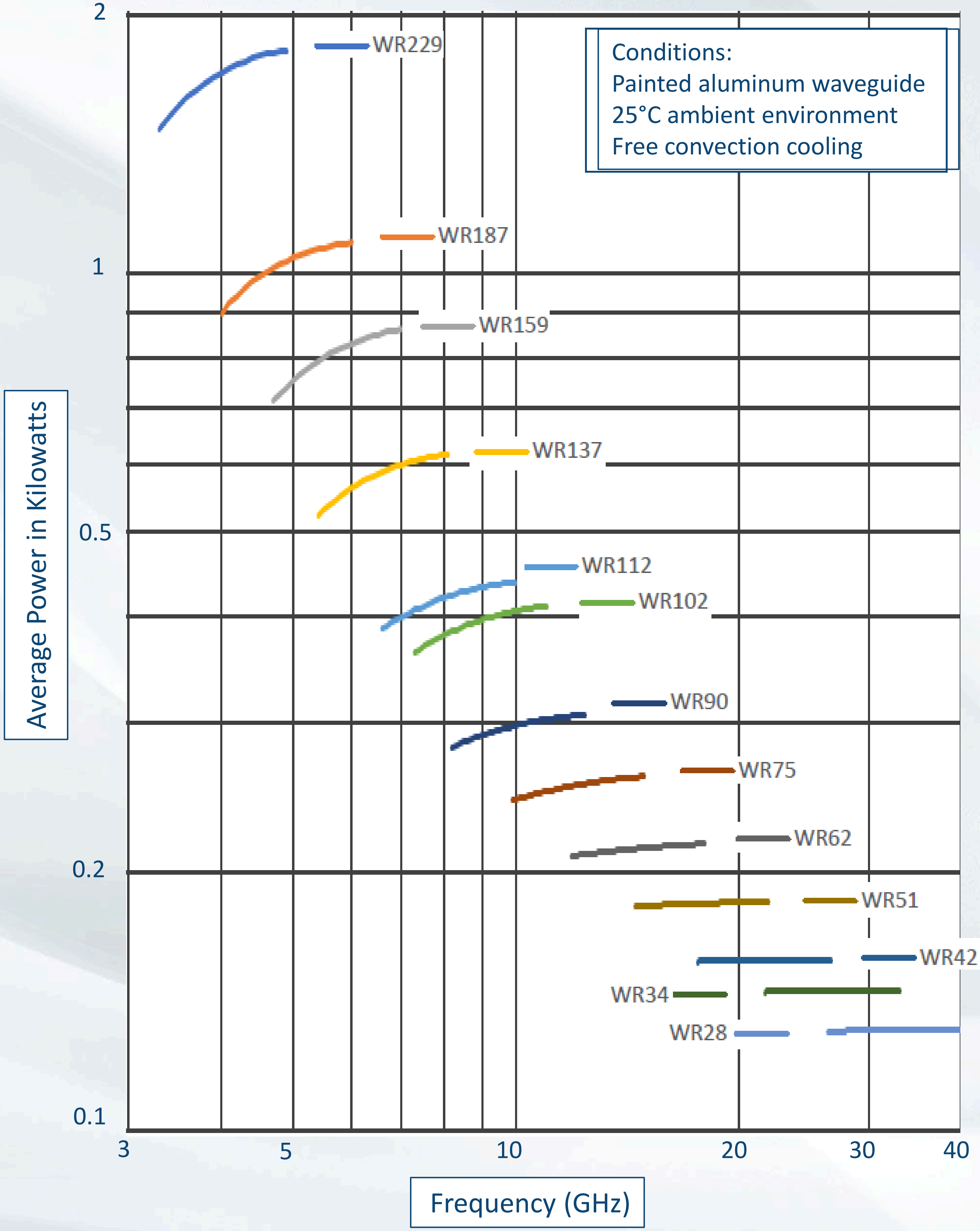
Rectangular Waveguide
Attenuation vs Frequency



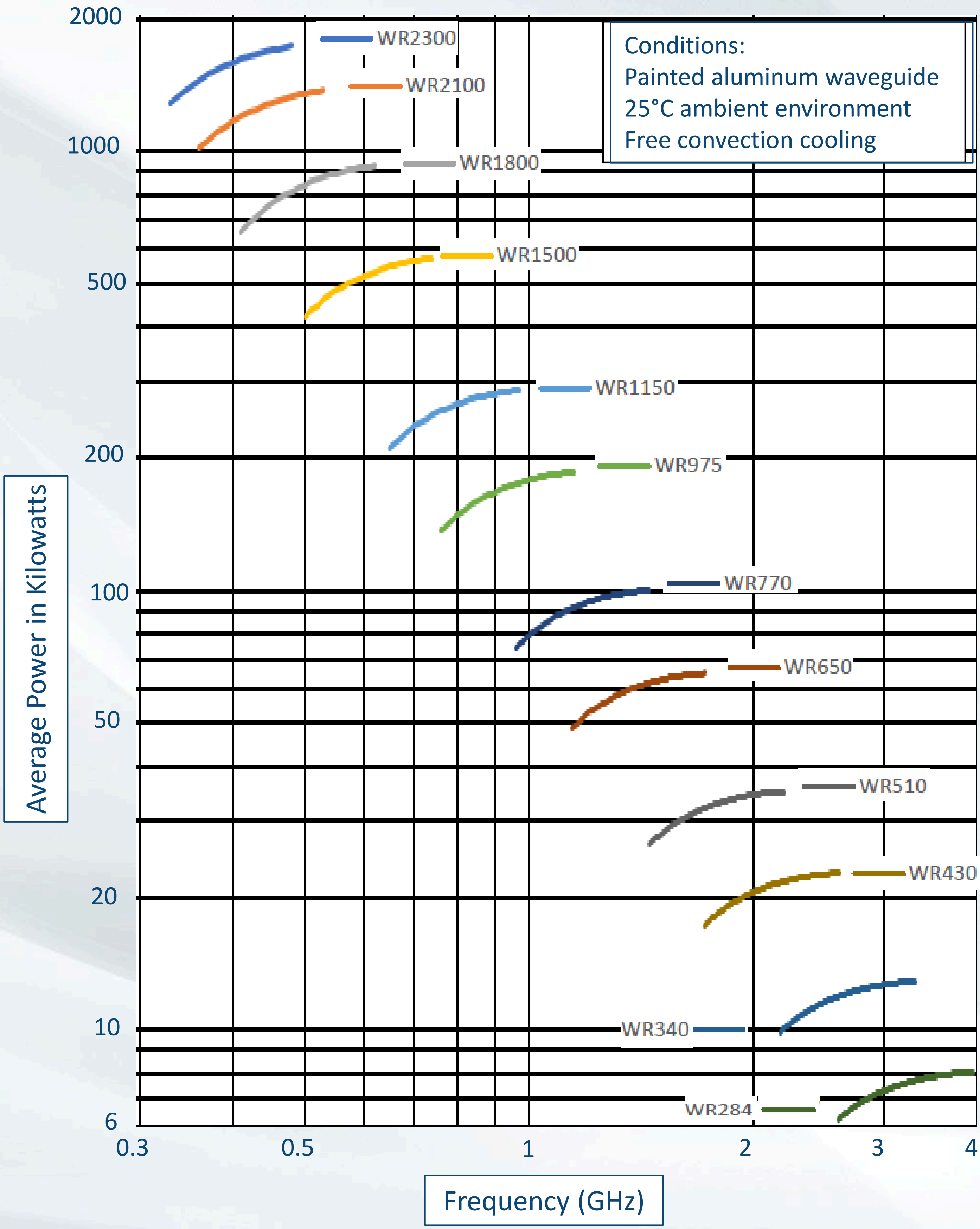
Rectangular Waveguide
Average Power Levels for a 35°C Operating Temperature



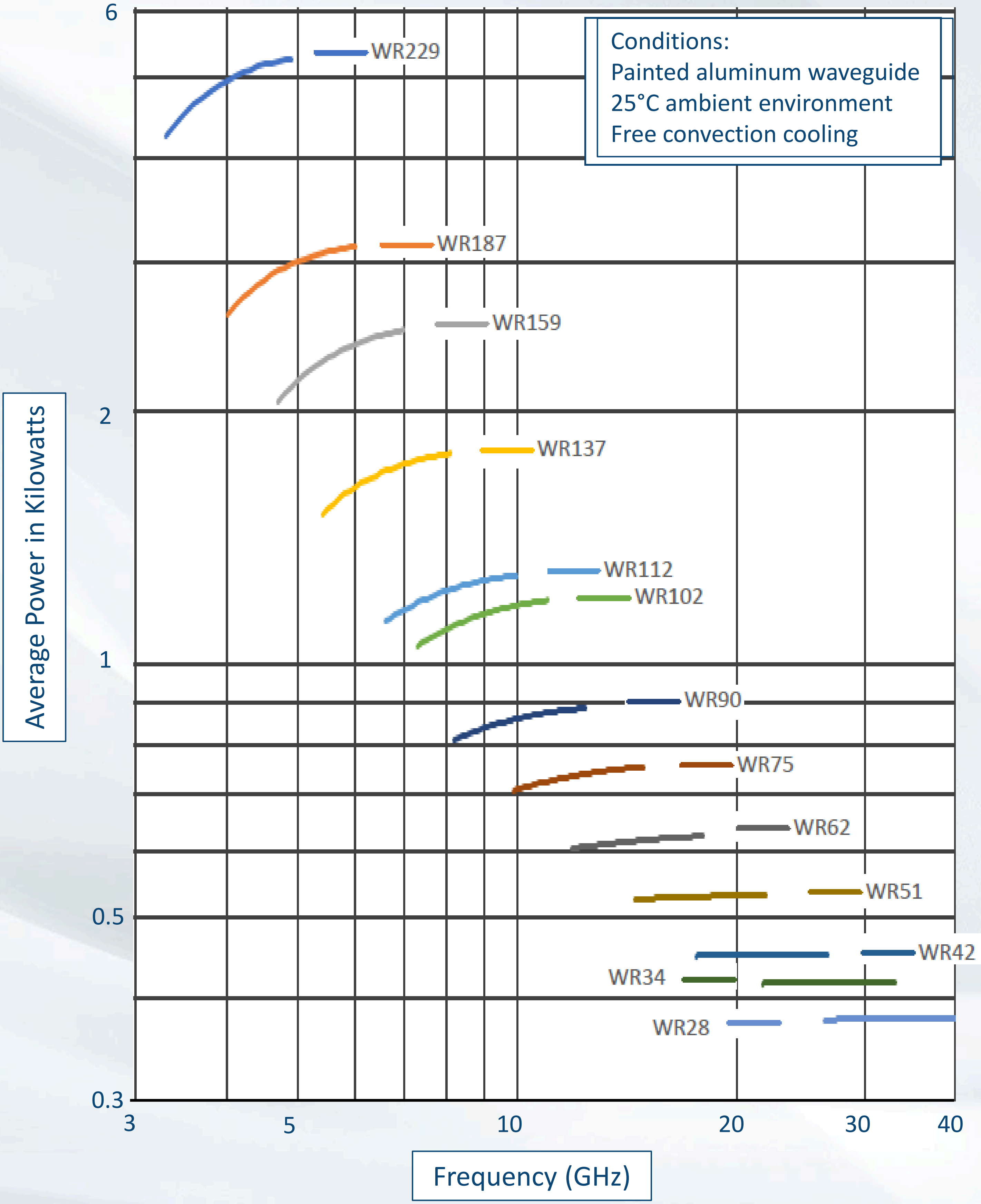
Rectangular Waveguide
Average Power Levels for a 35°C Operating Temperature



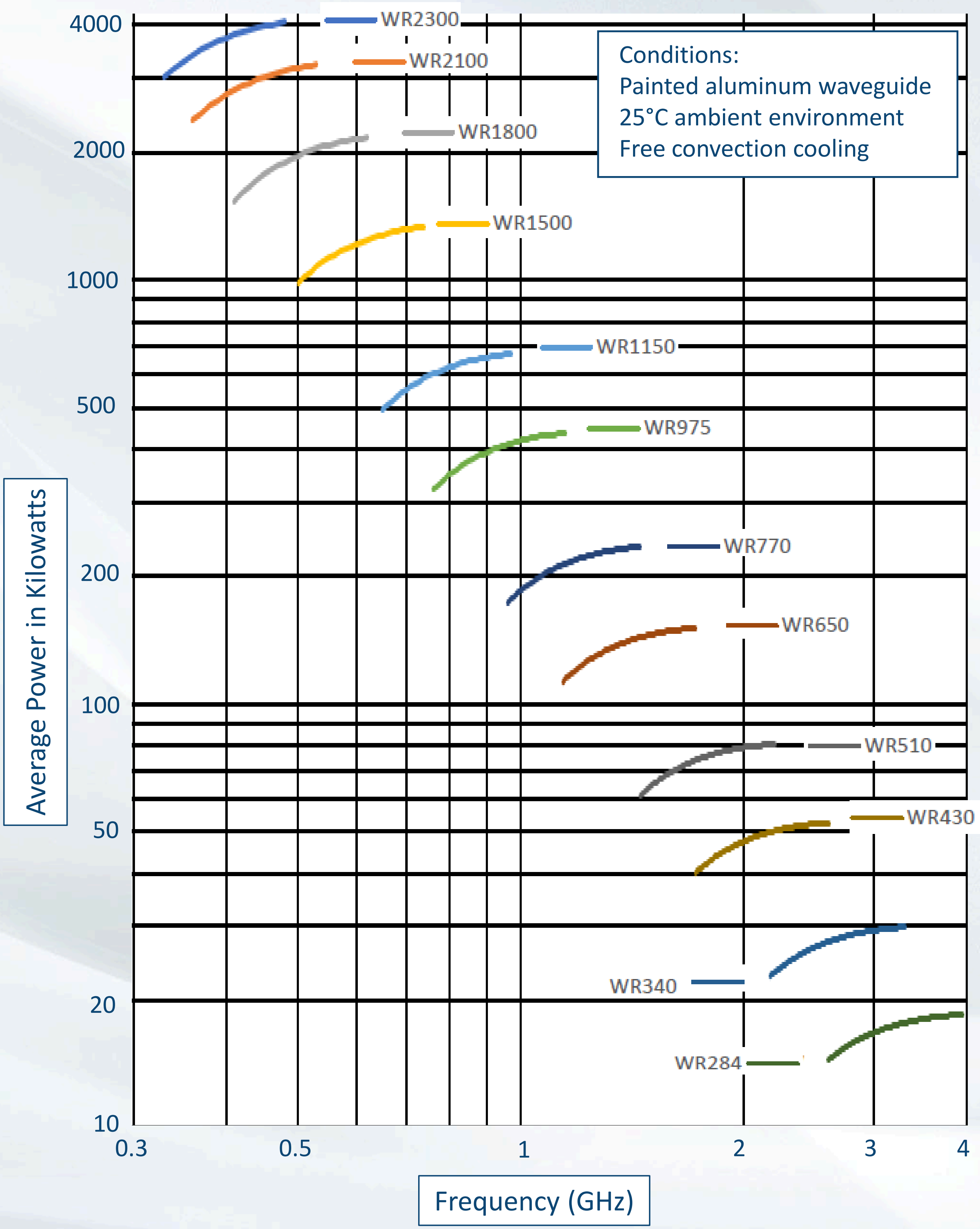
Rectangular Waveguide
Average Power Levels for a 50°C Operating Temperature



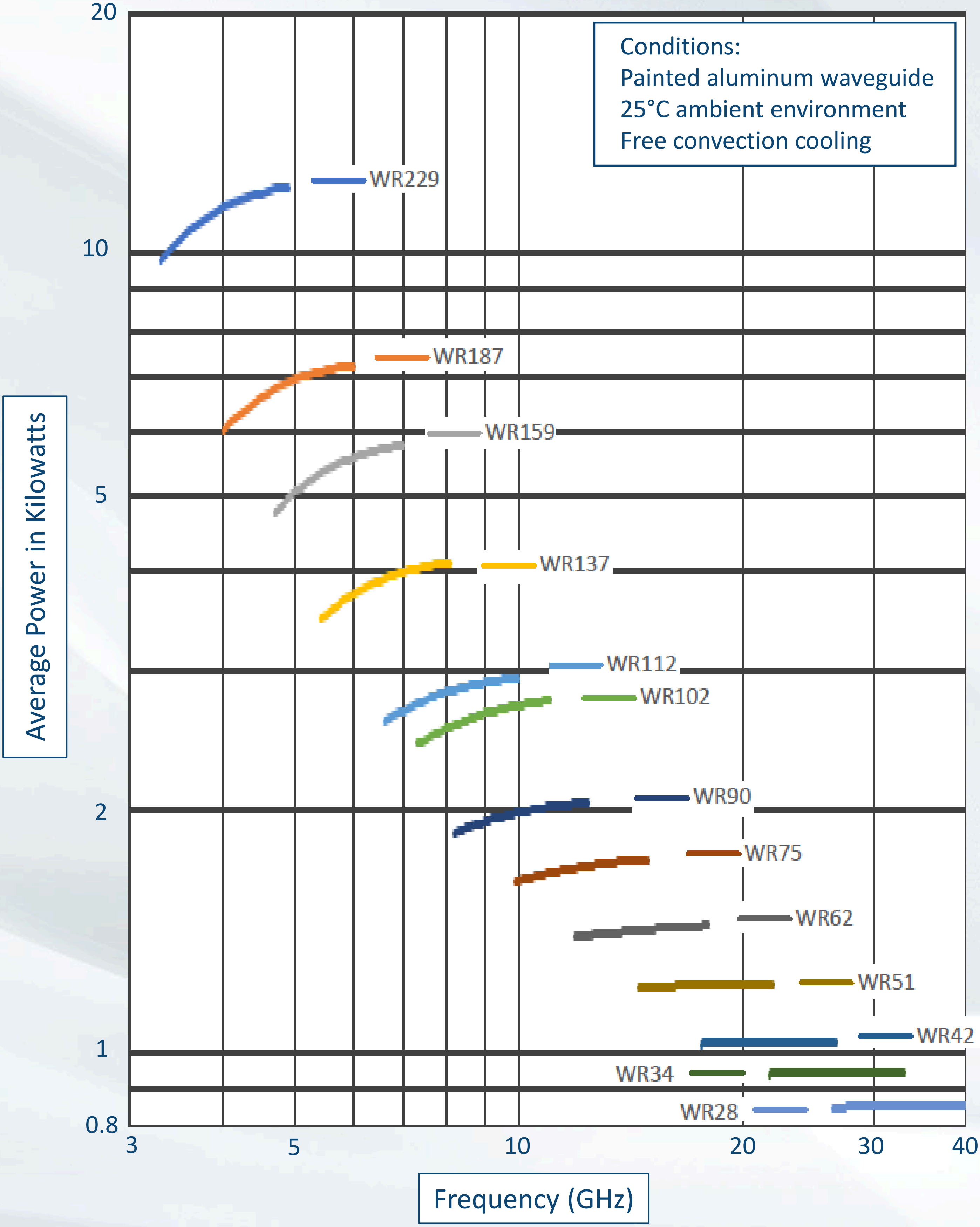
Rectangular Waveguide
Average Power Levels for a 50°C Operating Temperature



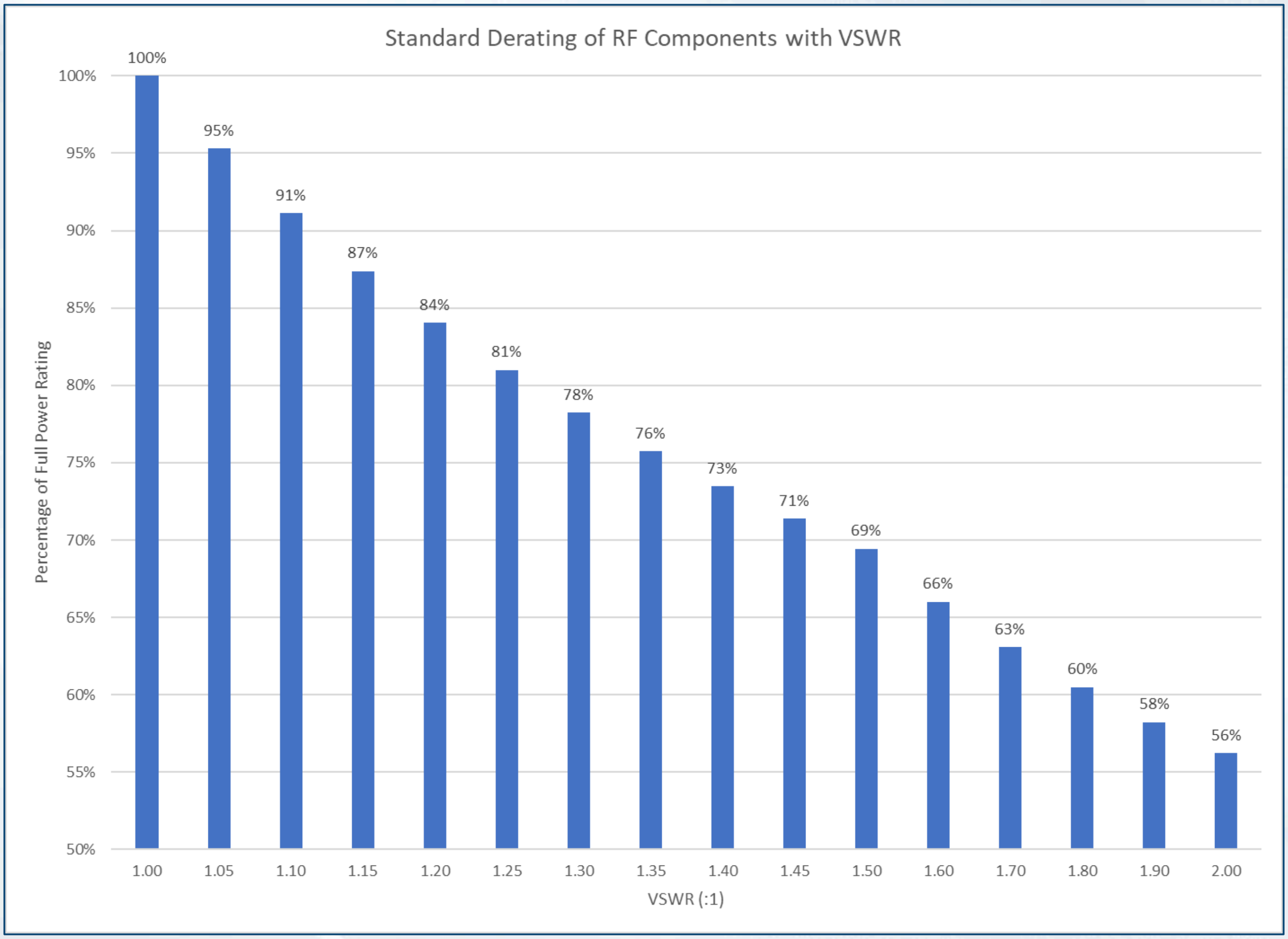
Rectangular Waveguide
Average Power Levels for a 75°C Operating Temperature



Rectangular Waveguide
Average Power Levels for a 75°C Operating Temperature



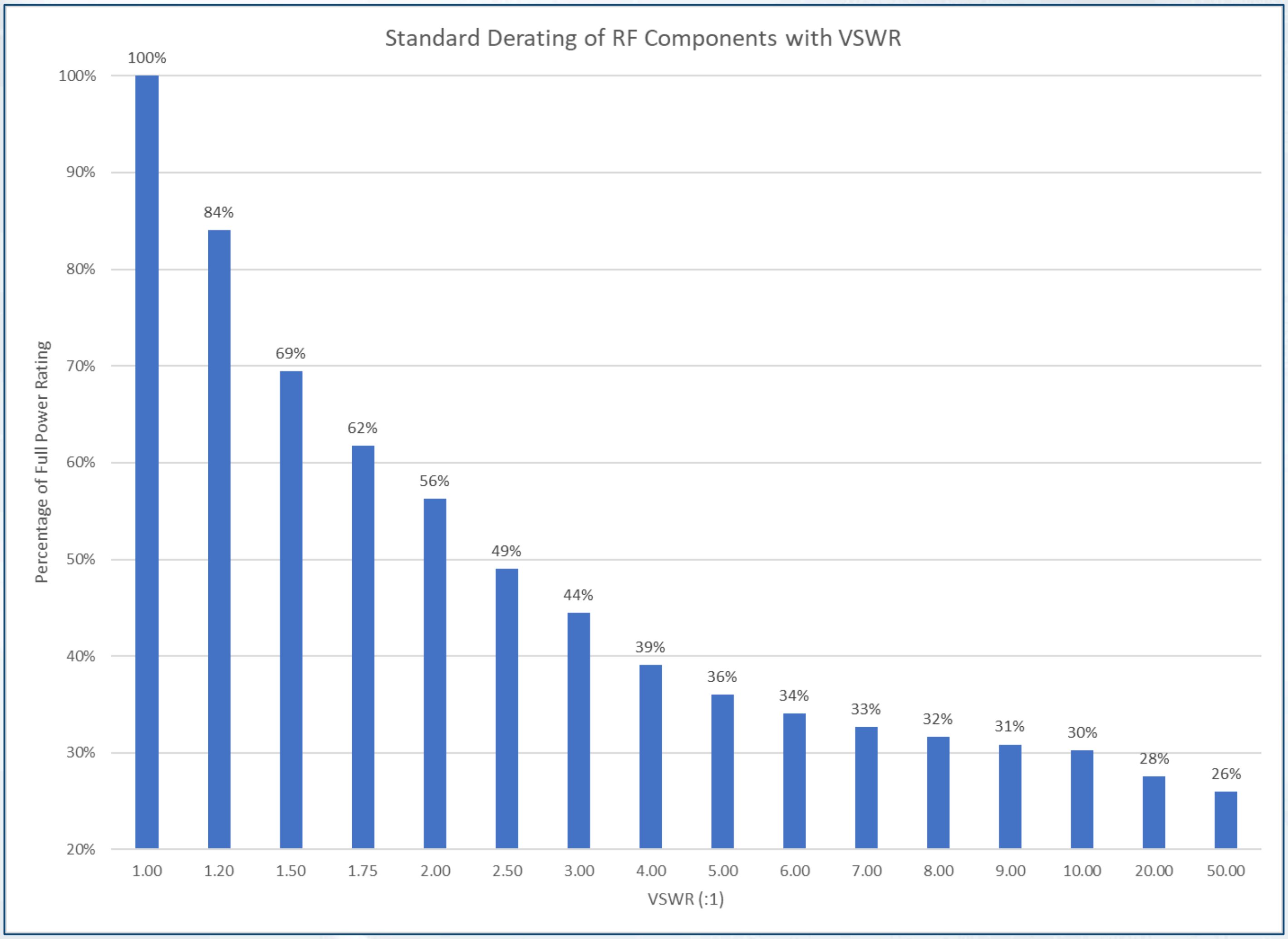
Derating of Components for VSWR (Moderate VSWR levels)



Notes:

- Peak and average power ratings provided are based on operation into a proper terminating load that ensures a low Voltage Standing Wave Ratio (VSWR) within the waveguide.
- The peak power rating will quickly degrade with elevated VSWR levels by a derating factor of $\left[\frac{(VSWR+1)}{2*VSWR}\right]^2$. This is shown above for various VSWR levels. Voltage breakdown and permanent physical damage to the waveguide components will result if this derating factor is not considered.
- The derating factor will also apply to average power ratings creating points of high temperature on the waveguide. Conduction will assist with limiting the impact on the derating of the average power but should still be considered as part of the overall system design.
- Consult the factor for operation of components into high VSWR terminating impedances.

Derating of Components for VSWR (High VSWR levels)



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