AlfA Multimedia Broadcast www.alfabroadcast.com info@alfabroadcast.com USA.
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RF Labs Test Report for Broadcast Transmitter

Select a calculator tab at the bottom of this page for assistance with your radio frequency (RF) needs.

Calculators available include Power, VSWR & Return Loss, Frequency & Wavelength,

Attenuation, Directivity, Cable Loss, Masking Effect and Metric Conversions.

สถานีวิทยุชุมชน ความถี่ 99.750 Mhz

สำนักงานเทศบาลเมืองสิงหนคร
ถนน สงขลา-ระโนด

ผลทดสอบนี้ดำเนินการกับเสาอากาศมาตราฐาน Circular ยี่ห้อ Jampo USA.
สถานีทดสอบ ทุ่งสีกัน กรุงเทพฯ และ สถานีเขาพระงาม จ. ลพบุรี

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VSWR & Return Loss Calculator

Enter forward and reflected power or match to determine equivalent values.

RF Power Amp AmM350D ทดสอบที่ความถี่ 99.750 MHz

Enter	Forward Power	350.00	Watts	**Enter**	1.150	VSWR	1
Enter	Reflected Power	2.20	Watts	=	1.150	VSWR	
Calculates	VSWR	1.17		=	-23.127	Return Loss (dB)	
Calculates	Return Loss	-22.02	dB	=	99.513	Match Efficiency (%)	
Calculates	Match Efficiency	99.37	%	=	0.070	Rho	
Calculates	Rho	0.08					
Antenna	4 Bay Circular	3dBi Gain					

Enter	Power FWD	350.00	Watts	*VSWR = Voltage Standing Wave Ratio*
Calculates	Power FWD	55.44	dBm	*Pf = Forward Power (Watts)*
				Pr = Reflected Power (Watts)
Enter	Power REF	33.43	dBm	*VSWR = [1+Sqrt(Pr / Pf)] / [1-Sqrt(Pr / Pf)]*
Calculates	Power	2.20	Watts	*Return Loss (dB) = 10 x Log (Pr / Pf)*
				Match Efficiency (%) = 100% x (1 - Pr / Pf)
Power (dBm) = 10 x Log [Power (Watts)] + 30 dB				*Rho = Sqrt (Pr / Pf)*

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Frequency & Wavelength Calculator

Enter frequency or wavelength and select units to determine equivalent values.

Enter	150.000	Megahertz (MHz)	2
Frequency =	150,000.000	Kilohertz (kHz)	
Frequency =	150.000	Megahertz (MHz)	
Frequency =	0.150	Gigahertz (GHz)	
Wavelength =	2.000	Meters (m)	
Wavelength =	200.000	Centimeters (cm)	
Wavelength =	6.562	Feet (ft)	
Wavelength =	78.740	Inches (in)	

1 MHz = 1,000 kHz 1 GHz = 1,000 MHz

Wavelength (Meters) = 300 / Frequency (MHz)

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Attenuation Calculator

Enter power or attenuation to determine values.

System Power Gain & Loss

Enter	Input Power	4.60	Watts
Enter	Output Power	350.00	Watts
Calculates	Input Power	36.63	dBm
Calculates	Output Power	55.44	dBm
Calculates	Attenuation	-18.81	dB

RF Output to Transmission Line

Enter	Power	350.00	Watts
Calculates	Power	55.44	dBm

Antenna System Gain

Enter	Power	3.50	dBm
Calculates	Power	0.00	Watts

Excitor System Gain & Loss

Enter	Input Power	4.60	Watts
Enter	Attenuation	0.50	dB
Calculates	Input Power	36.63	dBm
Calculates	Output Power	36.13	dBm
Calculates	Output Power	4.10	Watts

Transmission Power Max.

Enter	Output Power	350.00	Watts
Enter	Attenuation	3.50	dB
Calculates	Output Power	55.44	dBm
Calculates	Input Power	58.94	dBm
Calculates	Input Power	783.55	Watts

Output Power (dBm) = Input Power (dBm) - Attenuation (dB)

Power (dBm) = 10 x Log [Power (Watts)] + 30 dB

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Directivity Error Calculator

Enter directivity, forward power and reflected power to determine directivity errors.

Enter	Directivity of Coupler	22.000	dB	*Directivity is a measure of the ability of a*
Enter	Forward Power	350.000	Watts	*directional coupler to discern between the*
Enter	Reflected Power	6.800	Watts	*forward and reflected traveling wave in a*
Calculates	Forward Power Minimum	342.293	Watts	*transmission system.*
Calculates	Forward Power Maximum	357.793	Watts	
				Power meters, antenna monitors
Calculates	Forward Power Min Error	-2.202	%	*and*
Calculates	Forward Power Max Error	2.227	%	*analyzers are coupler based test*
Calculates	Reflected Power Minimum	1.258	Watts	*equipment which are used to measure*
Calculates	Reflected Power Maximum	16.759	Watts	*forward and reflected power as well as*
Calculates	Reflected Power Min Error	-81.499	%	*VSWR and return loss.*
Calculates	Reflected Power Max Error	146.451	%	
Calculates	VSWR Minimum	1.126		*Directivity errors result in measurements*
Calculates	VSWR	1.324		*which may vary between maximum and*
Calculates	VSWR Maximum	1.568		*minimum values.*
Calculates	Return Loss Minimum	-24.539	dB	
Calculates	Return Loss	-17.116	dB	
Calculates	Return Loss Maximum	-13.102	dB	

The following is a step-by-step procedure to calculate the results which are displayed above:

Given	Directivity of Coupler	22.000	dB	*Dir = Directivity of Coupler*
Given	Forward Power	350.000	Watts	*Pf = Forward Power*
Given	Reflected Power	6.800	Watts	*Pr = Reflected Power*
Calculates	Directivity Power Ratio	158		*Directivity Power Ratio = 10 ^ (Dir / 10)*

Calculates	Directivity Forward Power	0.043	Watts	*Pfd = Pr / Directivity Power Ratio*
Calculates	Directivity Reflected Power	2.208	Watts	*Prd = Pf / Directivity Power Ratio*
Calculates	Forward Voltage	132.288	Volts	*Vf = Sqrt (Pf x 50 Ohms)*
Calculates	Reflected Voltage	18.439	Volts	*Vr = Sqrt (Pr x 50 Ohms)*
Calculates	Directivity Forward Voltage	1.465	Volts	*Vfd = Sqrt (Pfd x 50 Ohms)*
Calculates	Directivity Reflected Voltage	10.508	Volts	*Vrd = Sqrt (Prd x 50 Ohms)*
Note, voltage vectors add when in phase or subtract when 180 degrees out of phase with each other				
Calculates	Forward Voltage Minimum	130.823	Volts	*Vf (Min) = Vf - Vfd*
Calculates	Forward Voltage Maximum	133.752	Volts	*Vf (Max) = Vf + Vfd*
Calculates	Reflected Voltage Minimum	7.931	Volts	*Vr (Min) = Vr - Vrd (or 0 if Vrd > Vr)*
Calculates	Reflected Voltage Maximum	28.947	Volts	*Vr (Max) = Vr + Vrd*
Calculates	Forward Power Minimum	342.293	Watts	*Pf (Min) = (Vf (Min) ^ 2) / 50 Ohms*
Calculates	Forward Power Min Error	-2.202	%	*Error = 100% x (Pf (Min) - Pf) / Pf*
Calculates	Forward Power Maximum	357.793	Watts	*Pf (Max) = (Vf (Max) ^ 2) / 50 Ohms*
Calculates	Forward Power Max Error	2.227	%	*Error = 100% x (Pf (Max) - Pf) / Pf*
Calculates	Reflected Power Minimum	1.258	Watts	*Pr (Min) = (Vr (Min) ^ 2) / 50 Ohms*
Calculates	Reflected Power Min Error	-81.499	%	*Error = 100% x (Pr (Min) - Pr) / Pr*
Calculates	Reflected Power Maximum	16.759	Watts	*Pr (Max) = (Vr (Max) ^ 2) / 50 Ohms*
Calculates	Reflected Power Max Error	146.451	%	*Error = 100% x (Pr (Max) - Pr) / Pr*
Calculates	Rho Minimum	0.059		*Rho (Min) = Sqrt (Pr (Min) / Pf (Max))*
Calculates	Rho	0.139		*Rho = Sqrt (Pr / Pf)*
Calculates	Rho Maximum	0.221		*Rho (Max) = Sqrt (Pr (Max) / Pf (Min))*
Calculates	VSWR Minimum	1.126		*VSWR (Min) = (1 + Rho (Min)) / (1 - Rho (M*
Calculates	VSWR	1.324		*VSWR = (1 + Rho) / (1 - Rho)*
Calculates	VSWR Maximum	1.568		*VSWR (Max) = (1 + Rho (Max)) / (1 - Rho (Max))*
Calculates	Return Loss Minimum	-24.539	dB	*Return Loss (Min) = 10 x Log (Pr (Min) / Pf (Max))*
Calculates	Return Loss	-17.116	dB	*Return Loss = 10 x Log (Pr / Pf)*
Calculates	Return Loss Maximum	-13.102	dB	*Return Loss (Max) = 10 x Log (Pr (Max) / P (Min))*

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Cable Loss Calculator

Enter cable, jumper, connector and other loss parameters to determine transmission cable system insertion loss.

Cable loss is the total insertion loss of your transmission cable system.
This typically includes insertion loss of the transmission cable, jumper cables, connectors and lightning protection.
Loss of other components (e.g. VSWR/power monitor, duplexer, combiner or filter) may also come into play.

Enter	Cable Loss/100 m or ft	1.13	dB	*Loss per 100 Meters or Feet at Frequency*
Enter	Cable Length (m or ft)	65.00	m or ft	*Length in Meters or Feet*
Calculates	Cable Loss	0.73	dB	*Transmission Cable Insertion Loss*
Enter	Top Jumper Loss/100 m or ft	3.23	dB	*Loss per 100 Meters or Feet at Frequency*
Enter	Top Jumper Length (m or ft)	10.00	m or ft	*Length in Meters or Feet*
Calculates	Top Jumper Loss	0.32	dB	*Top/Antenna Jumper Cable Insertion Loss*
Enter	Bottom Jumper Loss/100 m or ft	3.23	dB	*Loss per 100 Meters or Feet at Frequency*
Enter	Bottom Jumper Length (m or ft)	20.00	m or ft	*Length in Meters or Feet*
Calculates	Bottom Jumper Loss	0.65	dB	*Bottom/Tx Jumper Cable Insertion Loss*
Enter	Loss per Connector	0.05	dB	*Connector Insertion Loss*
Enter	Number of Connectors	8		*Two Connectors per Pair*
Calculates	Connector Loss	0.40	dB	*Connector Insertion Loss*
Enter	Lightning Protection Loss	0.10	dB	*Lightning Protection Insertion Loss*
Enter	VSWR/Power Monitor Loss	0.00	dB	*VSWR/Power Monitor Insertion Loss*
Enter	Other Component Loss	0.00	dB	*Loss of Combiner, Duplexer, Filter, etc.*
Calculates	Total Cable System Loss	2.20	dB	*Transmission Cable System Insertion Loss*

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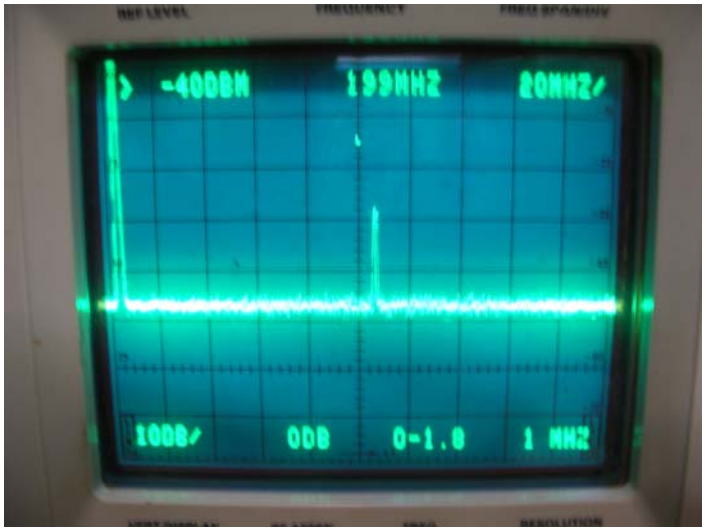
Masking Effect Calculator

Enter cable loss and match or forward and reflected power to determine the masking effect.

Enter	Cable Insertion Loss	2.20	dB	*Antenna measurements taken*
Enter	VSWR at Transmitter	1.35		*at the transmitter end of the cable*
Calculates	VSWR of Antenna	1.66		*will be masked by the cable loss.*
Enter	Cable Insertion Loss	0.73	dB	*CL = Cable Insertion Loss*
Enter	Return Loss at Transmitter	-14.00	dB	*RLt = Return Loss at Transmitter*
Calculates	Return Loss of Antenna	-12.54	dB	*RLa = Return Loss of Antenna = RLt - (2 x CL)*
Enter	Cable Insertion Loss	2.00	dB	*CL = Cable Insertion Loss*
Enter	Forward Power at Transmitter	350.00	Watts	*Pft = Forward Power at Transmitter*
Enter	Reflected Power at Transmitter	2.25	Watts	*Prt = Reflected Power at Transmitter*
Calculates	Rho at Transmitter	0.08		*Rhot = Sqrt (Prt / Pft)*
Calculates	VSWR at Transmitter	1.17		*VSWRt = (1 + Rhot) / (1 - Rhot)*
Calculates	Return Loss at Transmitter	-21.92	dB	*RLt = 10 x Log (Prt / Pft)*
Calculates	Forward Power at Transmitter	55.44	dBm	*Pft (dBm) = 10 x Log (Pft (Watts)) + 30 dB*
Calculates	Forward Power at Antenna	53.44	dBm	*Pfa (dBm) = Pft (dBm) + CL*
Calculates	Reflected Power at Transmitter	33.52	dBm	*Prt (dBm) = 10 x Log (Prt (Watts)) + 30 dB*
Calculates	Reflected Power at Antenna	35.52	dBm	*Pra (dBm) = Prt (dBm) - CL*
Calculates	Forward Power at Antenna	220.84	Watts	*Pfa (Watts) = 10 ^ ((Pfa (dBm) - 30) / 10)*

Calculates	Reflected Power at Antenna	3.57	Watts	*Pra (Watts) = 10 ^ ((Pra (dBm) - 30) / 10)*
Calculates	Rho of Antenna	0.13		*Rhoa = Rho of Antenna = Sqrt (Pra / Pfa)*
Calculates	VSWR of Antenna	1.29		*VSWRa = (1 + Rhoa) / (1 - Rhoa)*
Calculates	Return Loss of Antenna	-17.92	dB	*RLa = 10 x Log (Pra / Pfa)*

Actual Jampo Antenna and Tower



On-Air 2nd Harmonics measuring better – 68dBc @ 350watt

International Telecommunication Union

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Award Certificate

AlfaThai Model FM350D

Test and Comply to CCIR/FCC part 47 CFR section 73.211 commercial and education FM Transmitter. The system use for analog and digital FM radio broadcast services class B1.

The station has been test and operated at 99.750Mhz

Pcs-Electronics
Solvenia

Daniel GOURISSE

AmB Inc, USA
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