HLRF Meeting 6/8/06

M.Neubauer
WBS worksheet update for RF
Distribution Costs

Engineering Estimates from worksheets

Industry Quotes

Per Station rolled up estimates

DRAFT	042606 rsl		Eng	gine	Engr	g. Est.					Lear	ning Curve	Paran	neters &	Results	Estimate
HIGH LEVE	L RF WBS ITEM	Quantit	I- F	S-b	Uni	t Mfg t Cost %) (\$)				Materi als Alpha	Labor Alpha	Batch Size/ No. Vendors	Mfg ED&I %	Mfg Profit %	Avg. Mfg Cost Unit 1	Total Acq. Cost (\$K) N Units
							\$	610,932	ре	er statio	n					290,943.99
1.5.1.1.3.1	WR650 WG	41580			\$	537		22,338,337				MEGA			\$ 249	274,259.46 10,548,455.07
1.5.1.1.3.2	Directional Coupler	3150			\$	910			Ш						690	2,173,500.00
1.5.1.1.3.3	Circulator	15120	-		\$	8,000		120,960,000	-			AFT			4000	60,480,000.00
151101		15120			\$	7,634		115,422,352		-0.074	-0.152	in-house	15%	30%	\$ 3,308	50,016,182.98
1.5.1.1.3.4	H-plane Bend	17010	-	-	\$	1,230		20,922,300		0.074	0.074	MEGA	E0/	20%	448	7,620,480.00
151105	E alana Band	17010 10710		-	\$ \$	727	\$,,	+	-0.074	-0.074	in-house MEGA	5%	30%	\$ 354 433.8	6,013,211.30
1.5.1.1.3.5	E-plane Bend	10710	-	-	\$	1,138 727	\$		+	-0.074	-0.074	in-house	5%	30%	\$ 354	4,645,998.00 3,786,096.00
1.5.1.1.3.6	Tee	1260	-	-	\$	1,862			+	-0.074	-0.074	MEGA	3 70	30 %	1345	1,694,700.00
1.5.1.1.5.6	ree	1260 1260		-	φ \$	1,783	Φ	2,346,120	+	-0.074	-0.074	in-house	10%	30%	\$ 867	1,092,281.90
1.5.1.1.3.7	180 degree bend	31500			\$	1,525	\$	48,034,980	+	-0.074	-0.074	III-IIOUSE	10 /6	30 /6	500	15,750,000.00
1.5.1.1.5.7	100 degree bend	31500			\$	727	\$	7,785,136	+	-0.074	-0.074	in-house	5%	30%	\$ 354	11,135,576.47
1.5.1.1.3.8	Flex Waveguide	16380			\$	571	\$		+	-0.014	-0.074	MEGA	370	30 /0	470	7,698,600.00
1.5.1.1.3.9	Slot Hybrids	13860			\$	2,416	\$		+			MEGA			1000	13,860,000.00
	S.S. T.J.E.II.GS	13860	-		\$	2,091	\$	28,978,521	\forall	-0.074	-0.074	in-house	15%	30%	\$ 1,032	14,308,144.67
1.5.1.1.3.10	Hybrid Loads	13860			\$	2,000	\$		\forall			MEGA			1150	15,939,000.00
		13860			\$	2,568	\$	35,592,019	\top	-0.074	-0.152	in-house	10%	30%	\$ 1,143	15,846,493.28
1.5.1.1.3.11	Circulator Load	15120			\$	3,000	\$		\Box			SPA			1500	22,680,000.00
		15120			\$	3,051	-		\Box	-0.074	-0.152	in-house	10%	30%	\$ 1,358	20,537,075.45
1.5.1.1.3.12	3-stub tuner	15120			\$	2,600	\$	39,312,000				MEGA			1350	20,412,000.00
		15120			\$	4,408	\$	66,645,118		-0.074	-0.152	in-house	15%	30%	\$ 1,973	29,835,865.75
	Pressure Adapter				\$	560										-
1.5.1.1.3.14					\$	25										-
1.5.1.1.3.15	Flange Pair				\$	177									\$29.50	-

Example: Circulator Estimate with directional coupler

		QTY	<u>Unit</u>	\$ per			Source			Dimensio	ns	
Ferrites	ferrites unplated	1.4884	in ²	\$	4.94		requisition			max dia	6.5	in
	ferrites plated	1.4884	in ²	\$	5.37		requisition			area	33.2	in ²
	ferrites brazed to plate	0.5		\$	76.00		eng. Est.					
	Light machining	1	hr	\$	76.00		Ŭ					
	ferrites x area plates	1	plate			\$ 456						
						Cost of		C	ım avg əst of N items	LC	alpha	
Material							N=		15120		- Company	\vdash
	three plates of ferrites	3		\$	456	\$1,369						
two plates of magnet material						\$1,825	2x ferrite					
	iron yoke	1	ea	\$	50	\$ 50	eng. Est.					
	waveguide flanges	3	flanges	\$	90	\$ 270	requisition					
	waveguide spool piece	45		\$	10	\$ 450	requisition					
	Type N connector	2	ea	\$	7	\$ 14	requisition					
		N	laterial	Sι	ıb-total	\$3,978		,	,951.31	95%	-0.074	
Labor				ME	D rates							\vdash
	Production Planning	0.5	hrs	\$	90	\$ 45	eng. Est.					
	Plating/Painting			\$	141	\$ 141	eng. Est.					
	Welding/Brazing		hrs	\$	76	\$ 152	eng. Est.					
	Mechanical Assembly		hrs	\$	76	\$ 304	eng. Est.					
	Microwave Testing	4	hrs	\$	76	\$ 304	eng. Est.					
	QC	2	hrs	\$	76	\$ 152	eng. Est.					
	Final Finishing	1	hrs	\$	76	\$ 76	eng. Est.					
			Labo	rsı	ıb-total	\$1,129			261.37	90%	-0.152	
		Total Cost		of Circulator		\$5,106		\$	2,213			
			h ED&I		15%	\$5,872		\$	2,545			
		with Mf			30%	\$7,634		\$	3,308			

Example: Circulator Loads

				Ci	rculat	or	Load						
		QTY	<u>Unit</u>	\$ p	<u>er</u>			Sou	rce		Dimensio	ns	
ferrites unplated		1.4884	in ²	\$	4.94			requ	isition		length	6.5	in
ferrites plated		1.4884	in ²	\$	5.37			requ	isition		width	6.5	
ferrites brazed to plate		0.5	hr	\$	76.00			eng.	Est.		area	42.25	in ²
Light machining		1	hr	\$	76.00								
ferrites x area plates		1	plate			\$	550						
							ost of			Cumulativ e average cost of			
						1st	t item			Nth item			
Material									N=	15120	LC	alpha	
two plates of ferrites			plates			\$	1,099						
waveguide flanges			flanges		90	\$	90		isition				_
waveguide spool piece		7	in		10	\$	70	requ	isition				_
	cast air waveguide fins				200	_							_
water cooling plates				_	500	•	500						_
		N	laterial	Su	b-total	\$	1,759			863.16	95%	-0.074	-
Labor				ME	D rates								
Production Planning		0.1	hrs	\$	89.60	\$	9	ena.	Est.				
Plating/Painting		0.5	hrs	\$ '	140.65	\$	70		Est.				
Welding/Brazing		1	hrs	\$	76.00	\$	76	eng.	Est.				
Mechanical Assembly		0.5	hrs	\$	76.00	\$	38	eng.	Est.				
Microwave Testing		1	hrs	\$	76.00	\$	76	eng.	Est.				
	QC		hrs	\$	76.00	\$	76	eng.	Est.				
	Final Finishing	0.5		\$	76.00	\$	38	eng.	Est.				
			Labo	rsu	b-total	\$	374			86.69	90%	-0.152	-
		Tota	l Cost o	L f Cir	rculator	\$	2,134			\$ 950			
			with ED&I 10%							\$ 1,045			
		with Mf			30%	\$ \$	2,347 3,051			\$ 1,358			