



Eyal GAL Ltd.

Phone: 972-9-7499100 Fax: 972-9-7493669

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Revision			
REV	ECN	DATE	APP' D
	INIT		
A			
B			
C			
D			
E			
F			
G			

Specification For:

11 GHz Transceiver

REVISION	REV																				
	SHEET	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60
STATUS	REV																				
	SHEET	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
	REV																				
	SHEET	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20

	ENG. APPROVAL	DATE	<i>EYAL GAL LTD.</i>		
	L. Levinson				
	Q.A. APPROVAL	DATE	TITLE: 11 GHz Transceiver		
	M. Cohen		MODEL:6031-00 P/N: 9653603100		
			no. 6031-00	Rev	sheet 1 of 7



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General Description

The following document describes the Electrical, Mechanical and Environmental performance specifications of a Microwave Module. The Module is divided into 3 sub modules:

Driver, Power Amplifier and an LNA, all designed to support a carrier modulated by a high speed digital signal.

The complex modulation applying linear channels with minimum amplitude and phase distortions.

The module is installed in an Out Door Unit (ODU) and receives control signals and voltages from the ODU's IF Module, controller and power supply.

The Frequency coverage needed is 10.4GHz to 11.7GHz



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Electrical Specifications

Power Amplifier

Output Frequency range	10.4÷11.7 GHz	
Output Power	>+22 dBm	VVA attenuation of 0 to 10dB.
RF output IP3 at Output	>+38.5 dBm	Output tones of 19 dBm each(Two Power tones) No degradation of IP3 due to VVA attenuation
Harmonics		At 26dBm output power
2 nd	< -45dBc	
3 rd	< -35dBc	
5th order intermodes	-58dBc	Output tones of 19 dBm each(Two Power tones) No degradation of IP3 due to VVA attenuation
Mute RF output Power	<- 50 dBm for nominal output power	
RF gain	<33dB	Over temp. and frequency with max. VVA attenuation
VVA Dynamic range	>20 dB	User Tx AGC controller performs the VVA control.
Gain control range	0.05 ÷ 4.9 V	
Gain Control sensitivity	>40mV/dB	Over all gain control voltage range
RF gain flatness	0.3 dB for 75 MHz sliding window	
Group delay variations ptp	< 5 nSec	Ripple & slope for a 75 MHz sliding window over the frequency range
NF	<10dB	VVA minimum attenuation
Input VSWR	1.7:1	
RF output VSWR	1.7:1	
RF output Load	1.7:1 @ Diplexer pass band	
Detector output logarithmic voltage range	Min > 50mv @-7dBm output range power. Max < 3800mv @ 24dBm output power.	
Detector sensitivity	> 40mv/dB	Over all voltage range
Detector voltage accuracy	±1.5dB	Over frequency at any output power range Over temperature range
Rejection	<-45dBc	@ <9580 MHz
Rejection	<-80dBc	@ 16.5÷21.2 GHz
Rejection	<-70dBc	@ 25.7÷29.0 GHz



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RECEIVER

RF input Frequency range	10.4 ÷ 11.7 GHz	
Input RF BW	30 MHz	
RF Input range	-80dBm to -24dBm	
Input NF	4dB rmax.	
RF Gain	19.5 ÷ 24dB	
RF Gain flatness	Less then ±0.25dB	for a 30MHz sliding window over the freq. range
RF group delay variations ptp	<5nSec ripple & slope for a 30MHz sliding window over the freq. range	
RF input VSWR	< 1.5:1	
IF output VSWR	< 2.0:1	
RF source VSWR (diplexer port)	< 1.5:1 on pass band ∞ on stop band	



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Channel Isolation

Rx to Tx isolation	An input signal of -15dBm at the Rx RF input will appear at Tx RF output with a power of less than -25dBm
Tx to Rx isolation	An input signal of - 20dBm signal at the Tx input will appear at the Rx output with a power of less than -10dBm
RXRF to TXRF and vies versa isolation	- 70dB

Power and Control

Power Inputs:

Voltage	Current	Ripple
+8.0V /3%	<2.5A	100mV
+12.0V /3%	<1.8A	100 Mv
-12.0V /3%	<400 mA	100 Mv

Control Interface:

name	Description	level
Tx_Det_out	Output of Tx coupler	0.05 ÷ 4. 0 v
Tx_AGC_in	AT2 Input control	0.05 ÷ 4.90 v
Tx power mute	Muting output power	TTL active H
GND	GND Lug	

Environmental:

- Temperature range -35°C to +70°C (Base Plate)
- Humidity 5% to 90%



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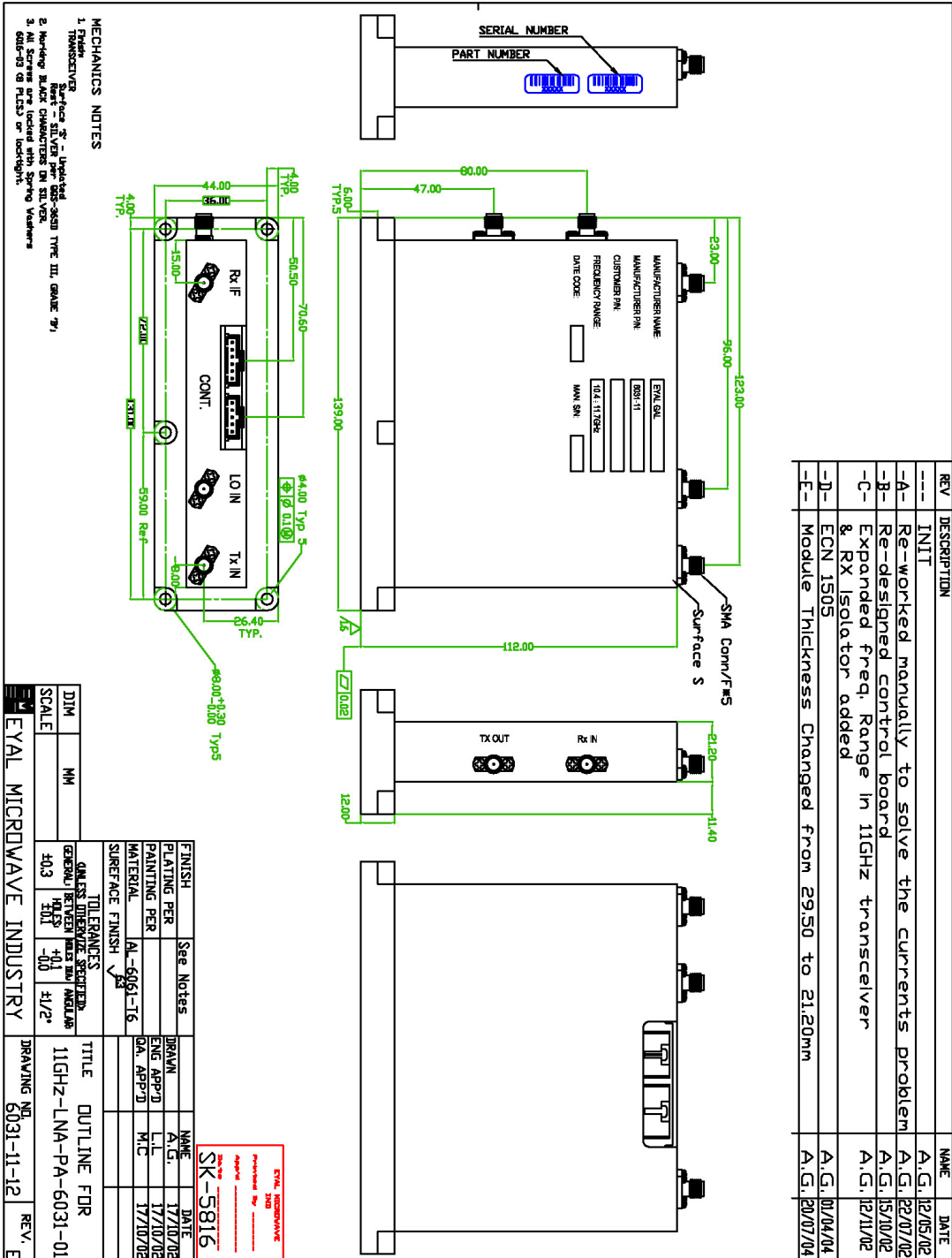
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Outline drawing



REV	DESCRIPTION	NAME	DATE
---	INIT	A.G.	12/05/02
-A-	Re-worked manually to solve the currents problem	A.G.	22/07/02
-B-	Re-designed control board	A.G.	15/10/02
-C-	Expanded freq. Range in 11GHz transceiver & RX Isolator added	A.G.	12/11/02
-D-	ECN 1505	A.G.	10/04/04
-E-	Module Thickness Changed from 29.50 to 21.20mm	A.G.	20/07/04

MECHANICS NOTES

1. Finish:
 Surface 3' - Imprinted
 Rest - SILVER per 603-2620 TYPE III GRADE 7P/
2. Marking:
 Black characters on SILVER
3. Marking:
 Black characters on White

DIM	UNIT	TOLERANCES	TITLE
GENERAL	MM	BETWEEN DIMS AND ANGLES	DUTLINE FOR
FINISH	MM	+0.1	11GHz-LNA-PA-6031-01
SCALE	MM	-0.0	
		±1/2°	

EYAL MICROWAVE INDUSTRY DRAWING NO. 6031-11-12 REV. E

SK-5816
EYAL MICROWAVE
Approved by:
Checked by:
Date: 17/10/02

FINISH	See Notes	NAME	DATE
DRAWN		A.G.	17/10/02
PAINTING PER		L.L.	17/10/02
MATERIAL	AL-6061-T6	M.C.	17/10/02
SURFACE FINISH			