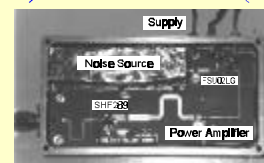


High Power Noise Sources

Noise source	P_{out}	Output Power Flatness	Output Power Control
L($\delta f=1.4\%$)	$\geq 12W$	$\pm 1dB$	$\geq 26dB$
L($\delta f=5.0\%$)	$\geq 5W$	$\pm 1.5dB$	-
S($\delta f=1.0\%$)	$\geq 10W$	$\pm 1dB$	$\geq 20dB$
S($\delta f=5.0\%$)	$\geq 5W$	$\pm 1.5dB$	-
C($\delta f=9\%$)	$\geq 10W$	$\pm 1.5dB$	$\geq 20dB$
GSM/DCS	$\geq 1W$	$\pm 1dB$	-



L(1.2-1.4GHz), S(3-3.5GHz), C(5.3-5.9GHz) - Band Noise Sources (NS)



Miniature, L(1.2-2GHz) Band Noise Source

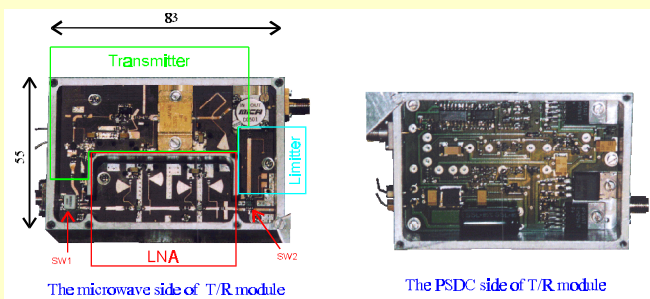
GSM/DCS Noise Source

T/R Modules for APAR

The parameters of the L-band and C-band T/R modules.

Transmitter	L-band	C-band	Receiver	L-band	C-band
output power level	$\geq 100W$	$\geq 4W$	noise coefficient	$\leq 3dB$	$\leq 3dB$
input power level	$1+10mW$	$1+10mW$	gain	29dB	25dB
RF duration	$30\mu s \pm 0.2\mu s$	$30\mu s \pm 0.2\mu s$	receiver isolation	$\geq 45dB$	$\geq 40dB$
repetition frequency	0.6+5kHz	0.6+5kHz	maximum input power	$P_{in,max} = P_{out}$	$P_{in,max} = P_{out}$
phase changes during RF pulse	1°	0.2°	Other parameters		
phase changes between RF pulses	0.15°	0.15°	connectors	SMA 50	SMA 50
trigger	2 μs TTL	2 μs TTL	ambient temperature	$-30 \pm 55^\circ C$	$-30 \pm 55^\circ C$
delay between trigger and RF pulse	$10 \pm 1.5\mu s$	$10 \pm 1.5\mu s$	cost	\$ 400	\$ 300

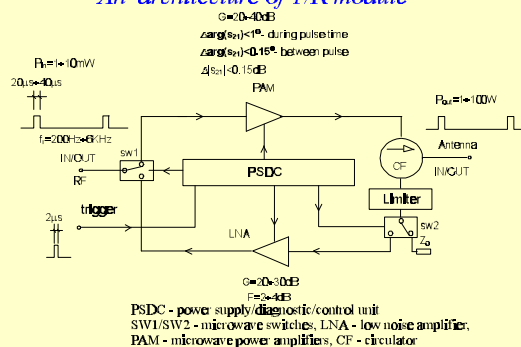
The C-band T/R module



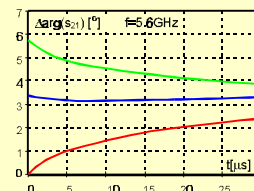
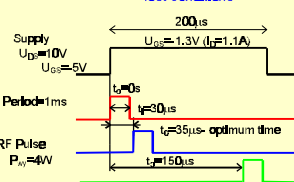
The microwave side of T/R module

The PSDC side of T/R module

An architecture of T/R module

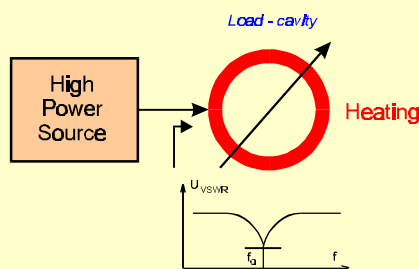


Test conditions

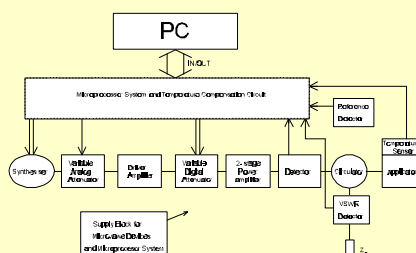


The phase transmittance changes during RF pulse

Precision Heating of Small Volume



The architecture of HPS

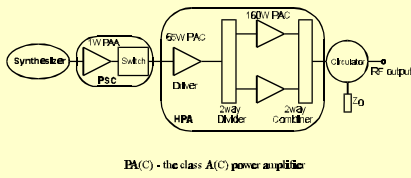


The parameters of the HPA

Band	2.2-2.8GHz
$P_{out}(cw)$	$\geq 120W$
P_{out} control	$\geq 30dB$
long-term stability	10^{-7}
phase noise	-75dBc/Hz (1kHz)
spurious	-60dBc
frequency step	0.27Hz
the setting time	10 μs

300W S-Band Solid-State Transmitter

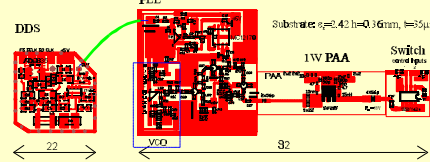
Block diagram of the 300W transmitter



PA(C) - the class A(C) power amplifier

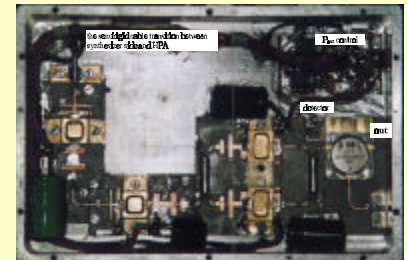
Synthesizer

Pulse Shaping Circuit

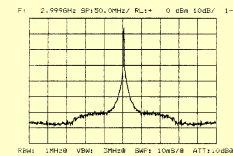
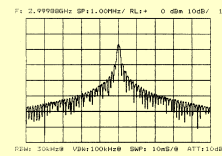
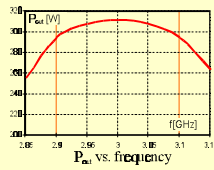
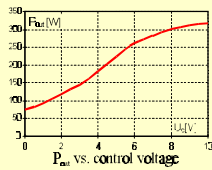


High Power Amplifier

Substrate: RUDR000010 ($\epsilon_r=0.8$, $h=0.63$ mm, $h=35\mu$ m)



Measurement results

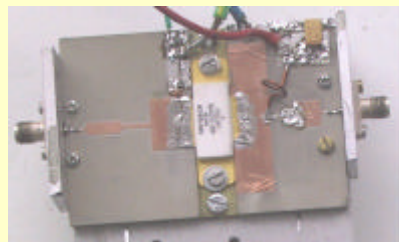


Output signal spectrum (pulse width=7 μ s, duty cycle=1%)

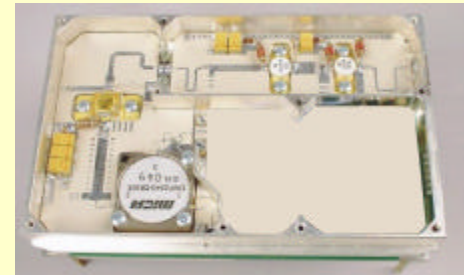
IFF Transmitter

The parameters of the IFF Transmitter

Band	1.01 \pm 1.12GHz
P_{out}	150W/600W
second harmonic	-60dBc
third harmonic	-80dBc
duration	0.5-0.8 μ s
T_{rise} & T_{fall}	\leq 100ns
distance between RF pulses	1 μ s-27 μ s
longest sequence of RF pulses	37 pulses
repetition frequency	\leq 400Hz

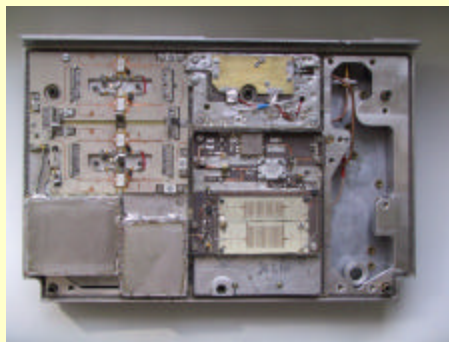


200W LDMOS Amplifier

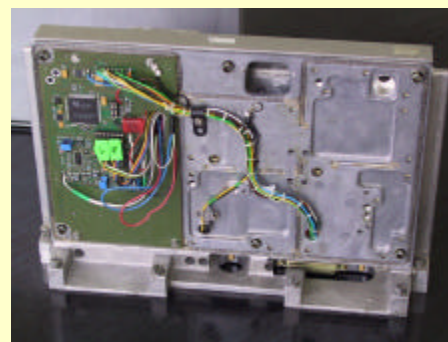


180W IFF Transmitter

25W Octave-Band Microwave Radio Transmitter

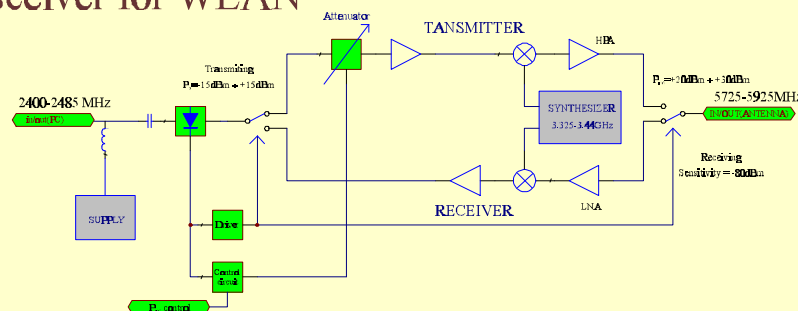


The microwave part



The supply part

L-C Band Transceiver for WLAN



Block diagram of the WLAN transceiver