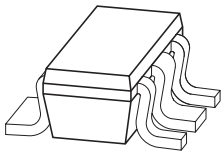
GaAs MMIC

CGY 63

Preliminary Data Sheet

- Broadband Driver Amplifier (800 … 2500 MHz)
- Bluetooth, ISM450, ISM900, ISM2400
- Base Station Driver Amplifier
- Single Voltage Supply: 2.7 to 6 V
- P_{OUT} = 20.0 dBm at V_D = 3.2 V (CW)
- P_{OUT} = 22.0 dBm at V_D = 5.0 V (CW)
- Easy external matching

ESD: **E**lectro**s**tatic **d**ischarge sensitive device, observe handling precautions!



SCT 595

Type	Marking	Ordering Code (taped)	Pin Configuration					Package
			1	2	3	4	5	
CGY 63	Y8s	Q62702-G0115	V_{D2}	GND	V_G	V_{D1}	GND	SCT-595

Maximum Ratings

Parameter	Symbol	max. Value	Unit
Positive supply voltage	V_D	7	V
Supply current	I_D	0.3	A
Maximum input power	$P_{IN, max}$	15	dBm
Channel temperature	T_{Ch}	150	°C
Storage temperature	T_{stg}	– 55 … + 150	°C
Total power dissipation ($T_S \leq 81$ °C) T_S: Temperature at soldering point	P_{tot}	0.6	W
Pulse peak power	P_{Pulse}	1.0	W

Thermal Resistance

Parameter	Symbol	Value	Unit
Channel-soldering point	R_{thChS}	120	K/W

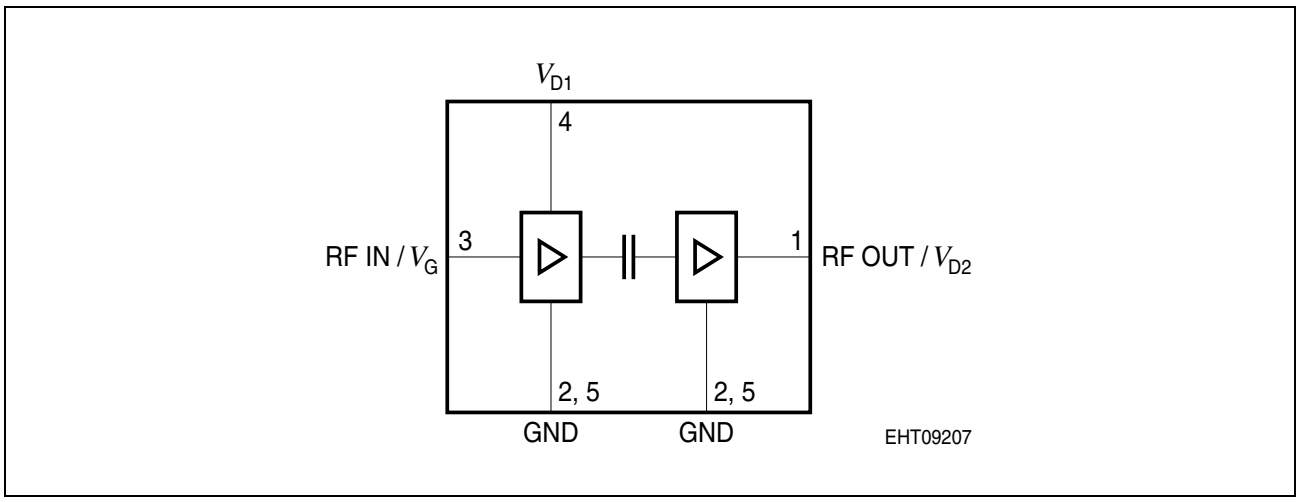


Figure 1 Functional Block Diagram

Pin Configuration

Pin No.	Symbol	Configuration
1	RF OUT/V_{D2}	RF output power/Pos. drain voltage of the 2nd stage
2	GND	RF and DC ground
3	RF IN/V_G	RF input power + Gate voltage (0 V internal)
4	V_{D1}	Pos. drain voltage of the 1st stage
5	GND	RF and DC ground

DC Characteristics

Characteristics		Symbol	Limit Values			Unit	Test Conditions
			min.	typ.	max.		
Drain current	stage 1	I_{DSS1}	–	25	–	mA	V_{D1} = 3 V
	stage 2	I_{DSS2}	–	75	–	mA	V_{D2} = 3 V
Transconductance		G_{FS1}	–	50	–	mS	V_D = 3 V, I_D = 25 mA
		G_{FS2}	–	150	–	mS	V_D = 3 V, I_D = 75 mA
Pinch off voltage		V_P	–	– 1.1	–	V	V_D = 3 V, I_D < 50 µA (all stages)

Electrical Characteristics Broadband Application (f = 0.8 … 2.4 GHz)

T_A = 25 °C, f = 0.8 … 2.5 GHz, Z_S = Z_L = 50 Ω, unless otherwise specified.

Characteristics	Symbol	Limit Values			Unit	Test Conditions
		min.	typ.	max.		
Supply current	I_{DD}	–	90	–	mA	V_D = 3.2 V, P_{IN} = + 3 dBm
Supply current	I_{DD}	–	100	–	mA	V_D = 3.2 V, P_{IN} = – 10 dBm
Gain	G	–	20	–	dB	V_D = 3.2 V, P_{IN} = – 10 dBm
Output power at 1 dB gain compression	$P_{-1\,dB}$	–	19	–	dBm	V_D = 3.2 V
Output Power	P_O	–	20	–	dBm	V_D = 3.2 V, P_{IN} = + 3 dBm
3rd order intercept point two-tone intermodulation test	IP_3	–	29	–	dBm	V_D = 3.2 V, f_1 = 1406 MHz, f_2 = 1410 MHz P_O = – 10 dBm (both carriers)
Overall Power added Efficiency	PAE	–	25	–	%	V_D = 3.2 V, P_{OUT} = $P_{-1\,dB}$
Gain Flatness	ΔG	–	2	–	dB	V_D = 3.2 V, P_{IN} = – 10 dBm 0.8 … 1.9 GHz
Gain Flatness	ΔG	–	1	–	dB	V_D = 3.2 V, P_{IN} = 0 dBm 0.8 … 1.9 GHz
Noise figure	F	–	3.0	–	dB	V_D = 3.2 V
Supply current	I_{DD}	–	95	–	mA	V_D = 5.0 V, P_{IN} = 6 dBm
Supply current	I_{DD}	–	100	–	mA	V_D = 5.0 V, P_{IN} = – 10 dBm
Gain	G	–	20	–	dB	V_D = 5.0 V, P_{IN} = – 10 dBm

Electrical Characteristics Broadband Application (f = 0.8 … 2.4 GHz) (cont'd)
T_A = 25 °C, f = 0.8 … 2.5 GHz, Z_S = Z_L = 50 Ω, unless otherwise specified.

Characteristics	Symbol	Limit Values			Unit	Test Conditions
		min.	typ.	max.		
Output Power	P_O	–	22	–	dBm	V_D = 5.0 V, P_{IN} = 6 dBm
Output power at 1 dB gain compression	$P_{-1\,dB}$	–	21	–	dBm	V_D = 5.0 V
3rd order intercept point two-tone intermodulation test	IP_3	–	31	–	dBm	V_D = 5.0 V f_1 = 1406 MHz, f_2 = 1410 MHz P_O = – 10 dBm (both carriers)
Gain Flatness	ΔG	–	2	–	dB	V_D = 5.0 V, P_{IN} = – 10 dBm 0.8 … 1.9 GHz
Gain Flatness	ΔG	–	1	–	dB	V_D = 5.0 V, P_{IN} = 3 dBm 0.8 … 1.9 GHz
Overall Power added Efficiency	PAE	–	25	–	%	V_D = 5.0 V, P_{IN} = P_{OUT} = $P_{-1\,dB}$
Noise figure	F	–	3.0	–	dB	V_D = 5.0 V
Off Isolation	-S21	–	35	–	dB	V_D = 0 V, P_{IN} = 3 dBm
Harmonics $2f_0$ $3f_0$	– –	– –	t.b.m. t.b.m.	– –	dBc	P_{IN} = + 3 dBm, V_D = 3.0 V
Harmonics $2f_0$ $3f_0$	– –	– –	t.b.m. t.b.m.	– –	dBc	P_{IN} = + 6 dBm, V_D = 5.0 V
Input/Output VSWR	–	–	2 : 1	–	–	V_D = 3.2 V or V_D = 5.0 V

Electrical Characteristics Broadband Application (f = 0.8 … 2.4 GHz) (cont'd)
T_A = 25 °C, f = 0.8 … 2.5 GHz, Z_S = Z_L = 50 Ω, unless otherwise specified.

Characteristics	Symbol	Limit Values			Unit	Test Conditions
		min.	typ.	max.		
Load mismatch Load VSWR = 20:1 for all phase	–	No module damage for 10 s			–	P_{IN} = 3 dBm, $V_D \leq$ 3.0 V, Z_S = 50 Ω
Load mismatch Load VSWR = 20:1 for all phase	–	No module damage for 10 s			–	P_{IN} = 6 dBm, $V_D \leq$ 5 V, Z_S = 50 Ω
Stability Load VSWR = 10:1 for all phase	–	All spurious output more than 70 dB below desired signal level			–	P_{IN} = 3 dBm, V_D = 3.2 V, Z_S = 50 Ω
Stability Load VSWR = 10:1 for all phase	–	All spurious output more than 70 dB below desired signal level			–	P_{IN} = 5 dBm, V_D = 5.0 V, Z_S = 50 Ω

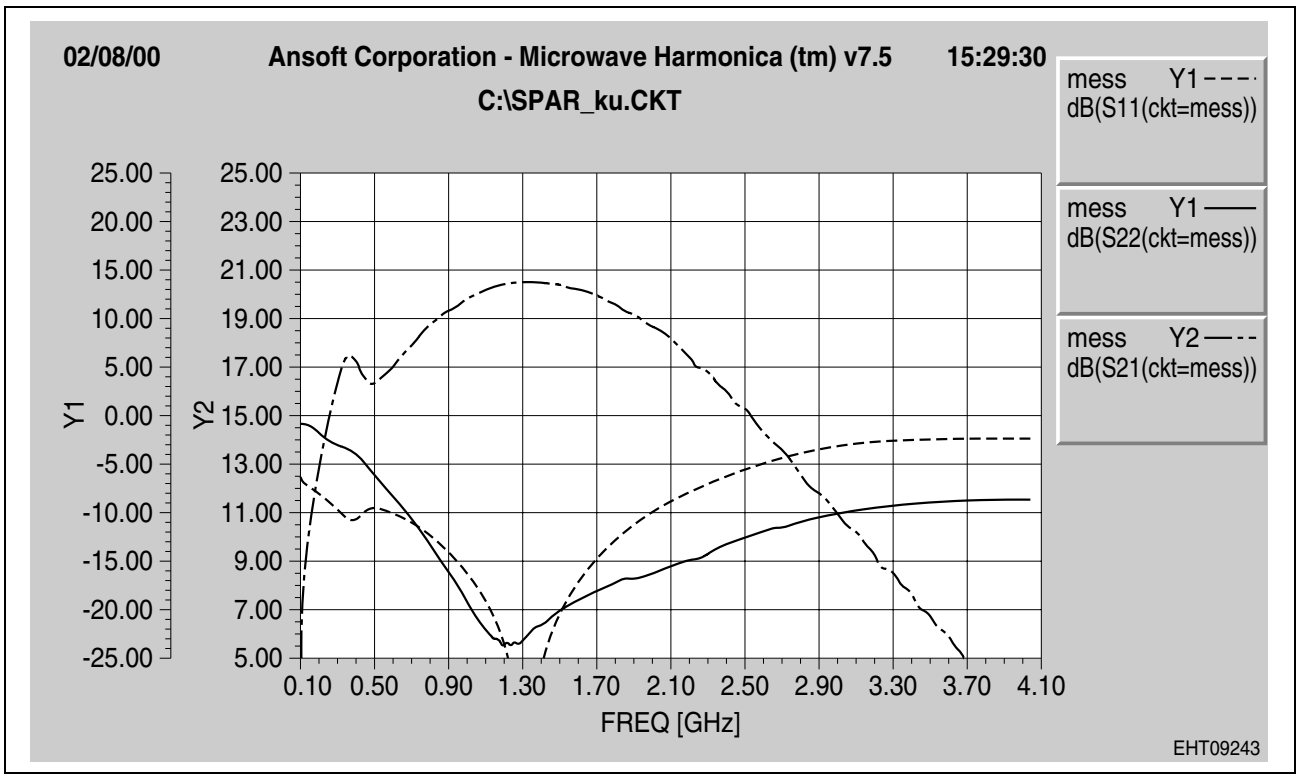


Figure 2 **Broadband Application (f = 0.8 … 2.4 GHz), S-Parameter**, V_D = 3.2 V, P_{IN} = – 10 dBm

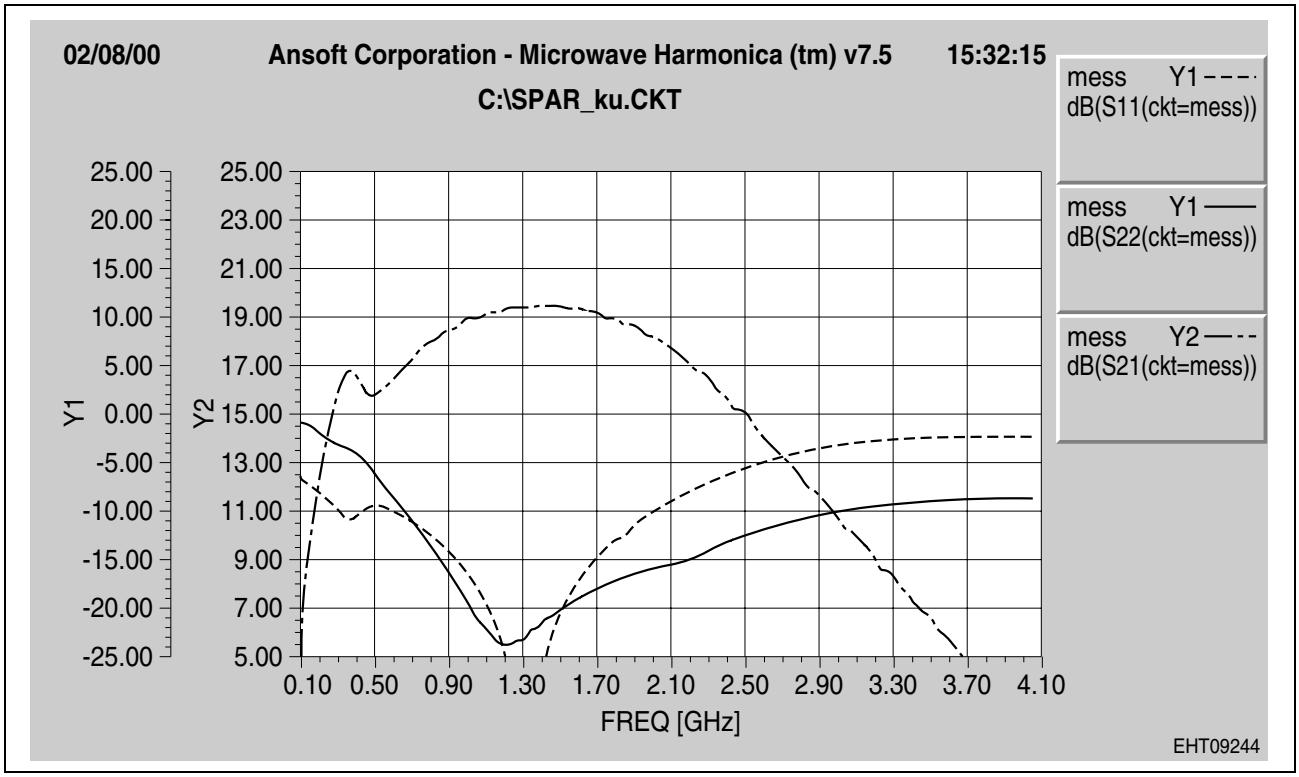


Figure 3 **Broadband Application (f = 0.8 … 2.4 GHz), S-Parameter**, V_D = 3.2 V, P_{IN} = 0 dBm

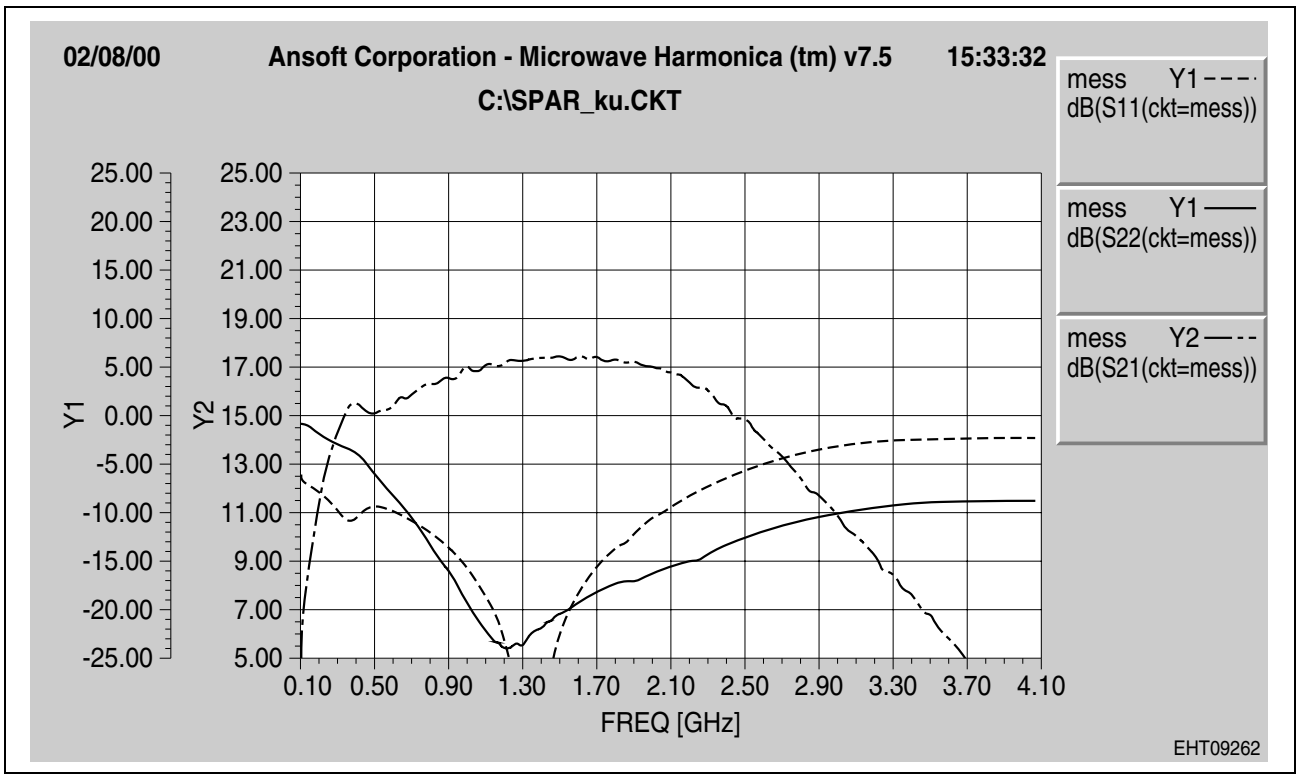


Figure 4 **Broadband Application (f = 0.8 … 2.4 GHz), S-Parameter**, V_D = 3.2 V, P_{IN} = 3 dBm

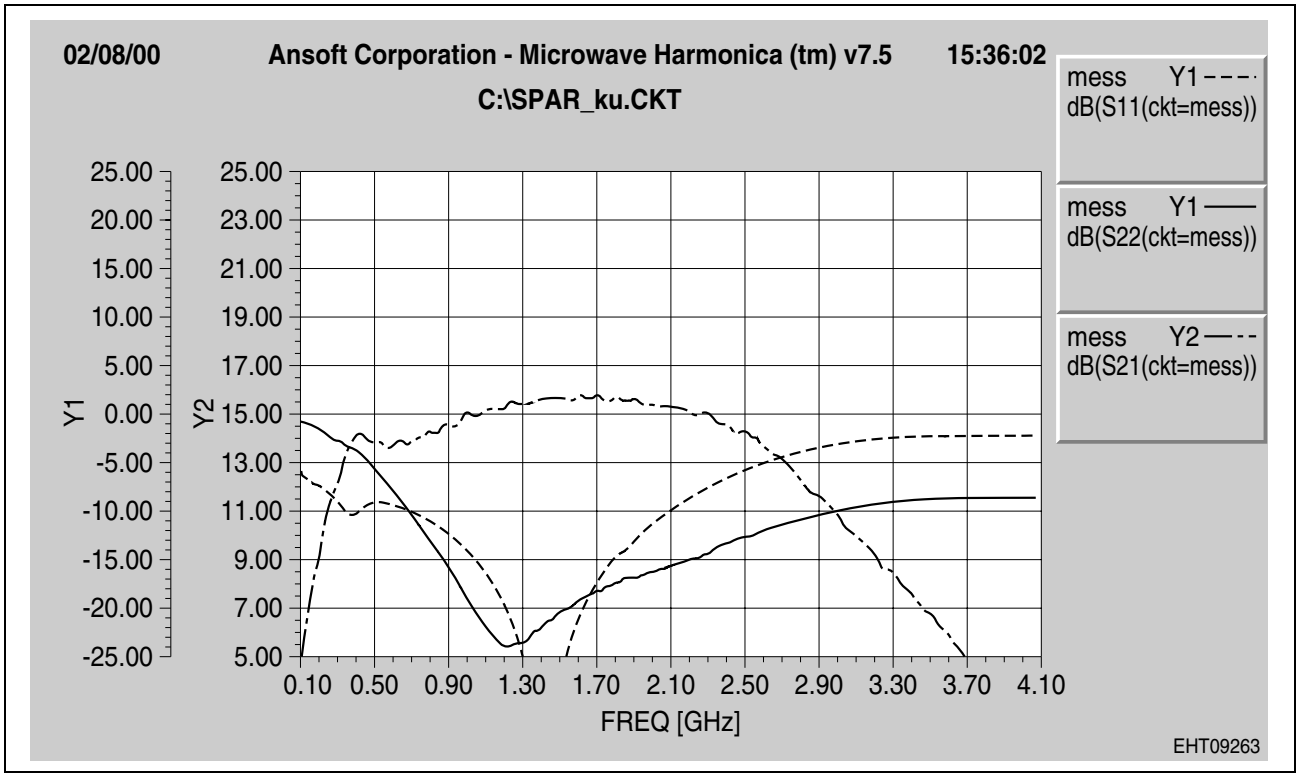


Figure 5 **Broadband Application (f = 0.8 … 2.4 GHz), S-Parameter**, V_D = 3.2 V, P_{IN} = 5 dBm

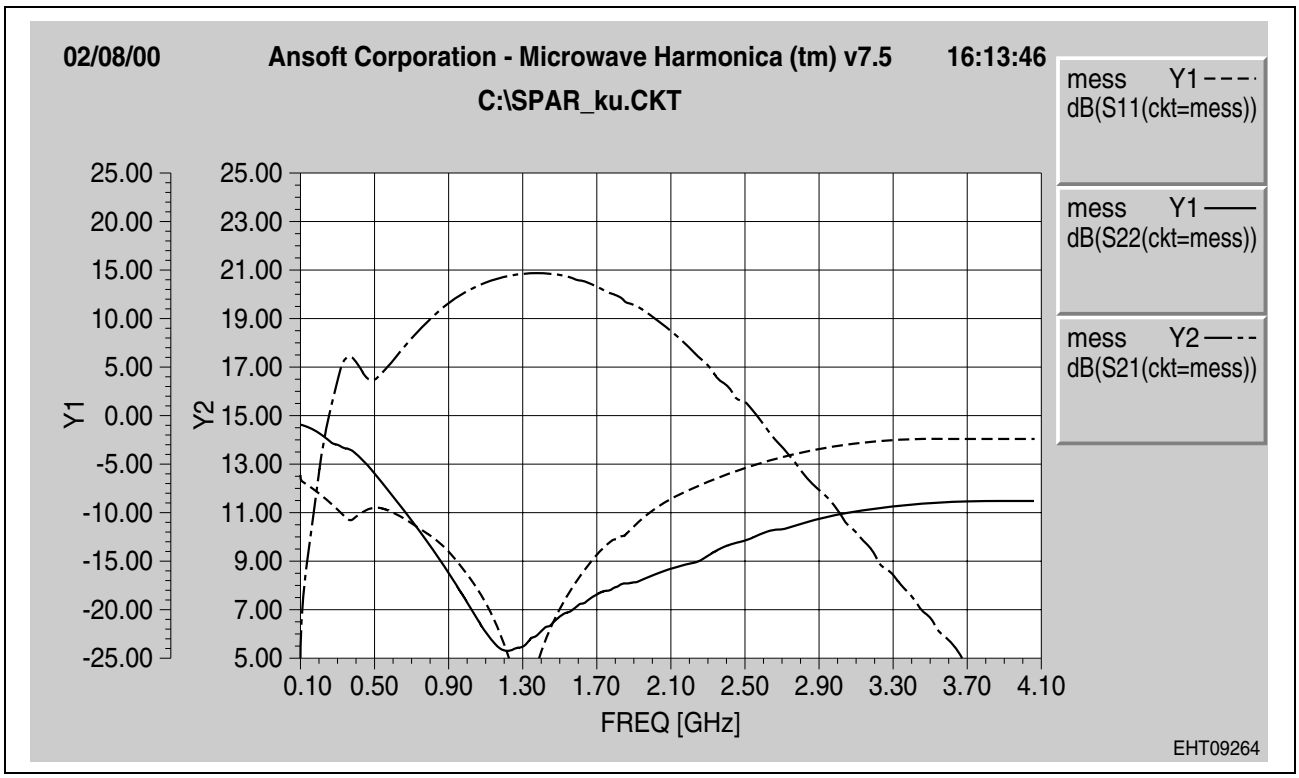


Figure 6 **Broadband Application (f = 0.8 … 2.4 GHz), S-Parameter**, V_D = 5.0 V, P_{IN} = – 10 dBm

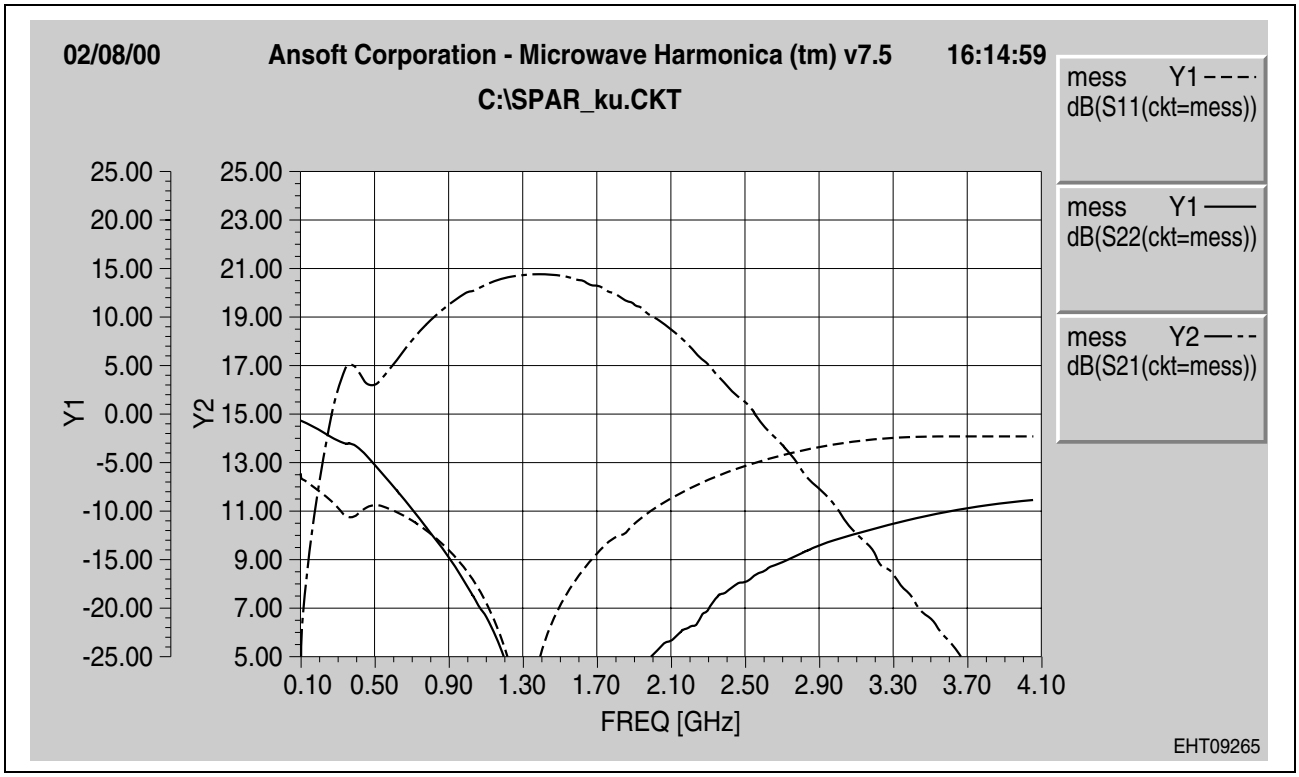


Figure 7 **Broadband Application (f = 0.8 … 2.4 GHz), S-Parameter**, V_D = 5.0 V, P_{IN} = 0 dBm

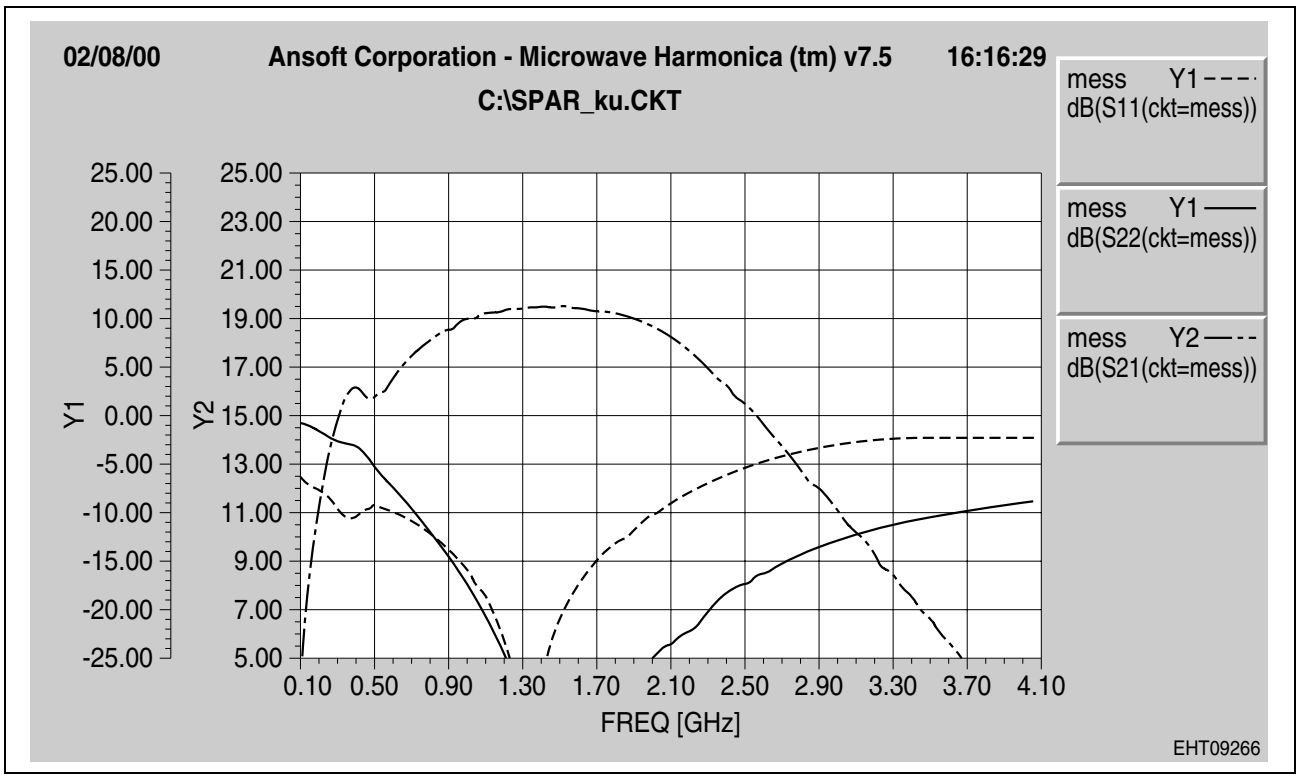


Figure 8 **Broadband Application (f = 0.8 … 2.4 GHz), S-Parameter**, V_D = 5.0 V, P_{IN} = 3 dBm

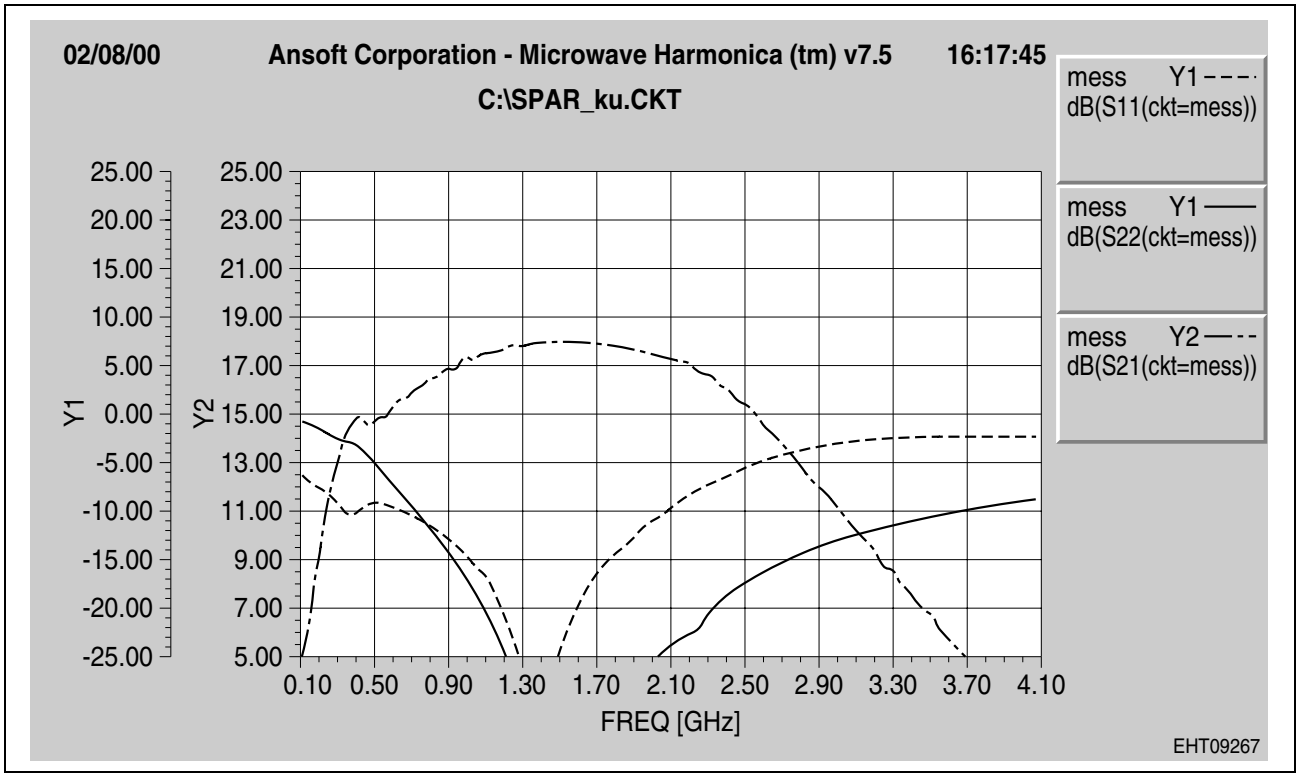
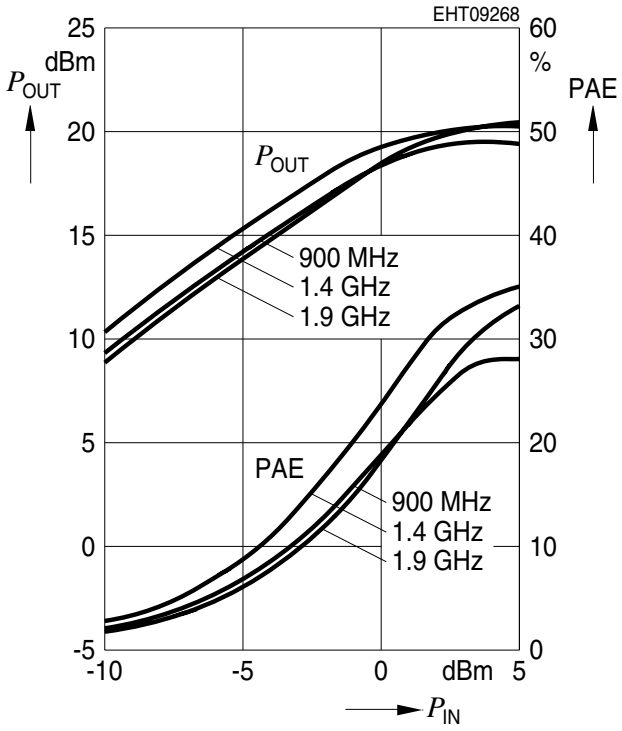
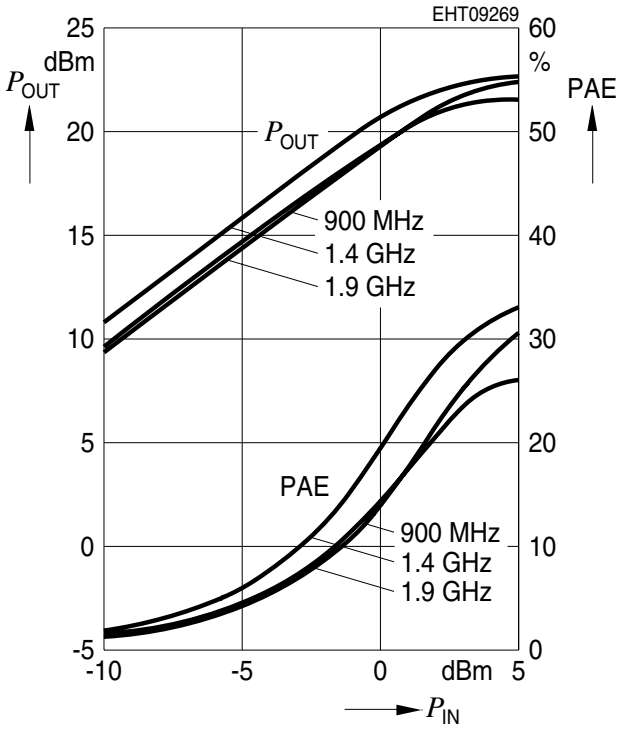


Figure 9 **Broadband Application (f = 0.8 … 2.4 GHz), S-Parameter**, V_D = 5.0 V, P_{IN} = 5 dBm

Broadband Application
(f = 0.8 … 2.4 GHz),
P_{OUT}, PAE = $f(P_{IN})$, V_D = 3.2 V



Broadband Application
(f = 0.8 … 2.4 GHz),
P_{OUT}, PAE = $f(P_{IN})$, V_D = 5.0 V



Broadband Application (f = 0.8 … 2.4 GHz)

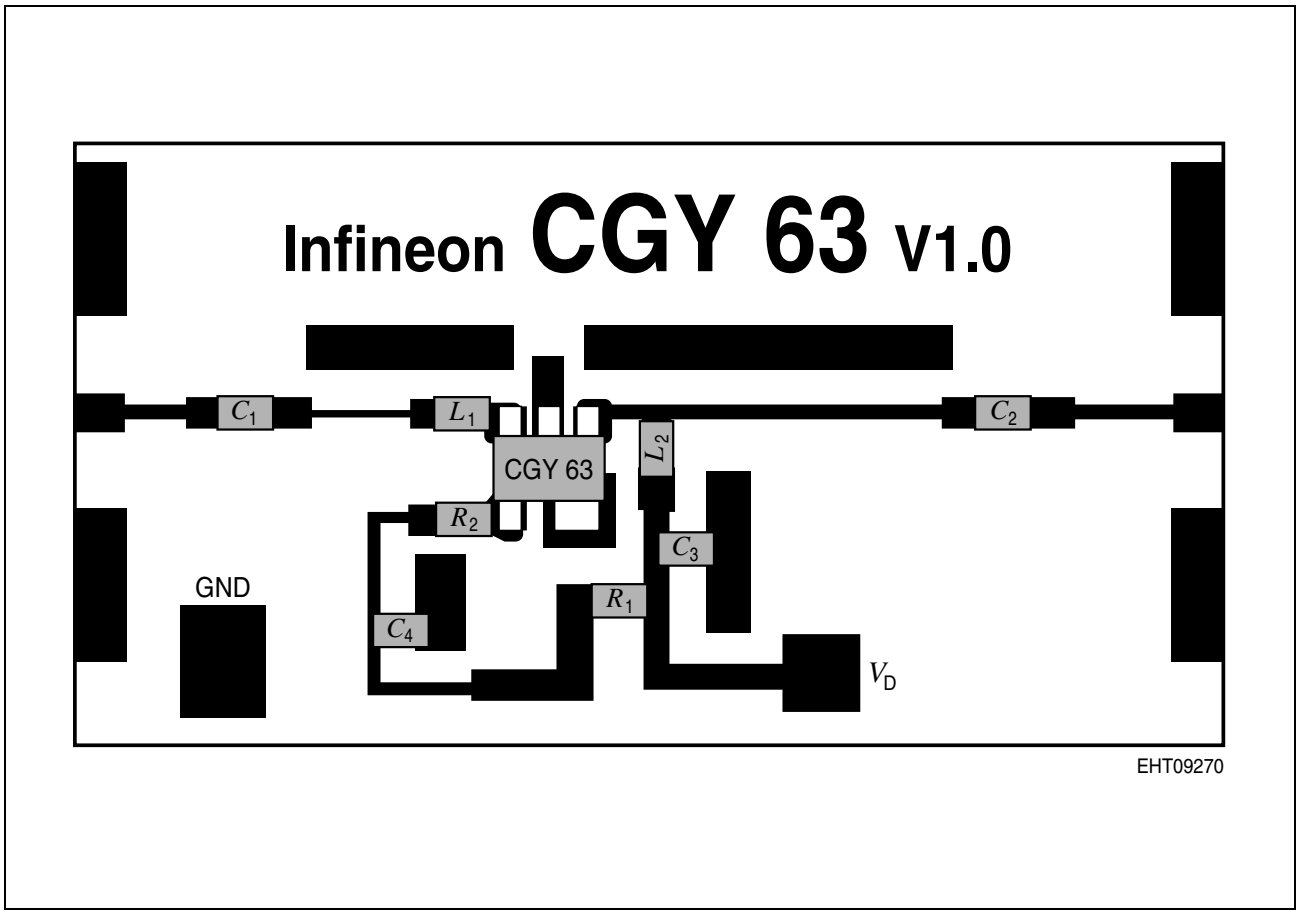


Figure 10 Testboard

Parts List

C_1, C_2, C_3	1 nF
C_4	47 pF
L_1	4.7 nH
L_2	15 nH
R_1	2.7 Ω
R_2	15 Ω

Electrical Characteristics, ISM2400/Bluetooth Application

T_A = 25 °C, f = 900 MHz, Z_S = Z_L = 50 Ω, unless otherwise specified.

Characteristics	Symbol	Limit Values			Unit	Test Conditions
		min.	typ.	max.		
Supply current	I_{DD}	–	100	–	mA	V_D = 3.2 V, P_{IN} = + 0 dBm
Supply current	I_{DD}	–	100	–	mA	V_D = 3.2 V, P_{IN} = – 20 dBm
Gain	G	–	19	–	dB	V_D = 3.2 V, P_{IN} = – 20 dBm
Output power at 1 dB gain compression	$P_{-1\,dB}$	–	19	–	dBm	V_D = 3.2 V
Output power at 3 dB gain compression	$P_{-3\,dB}$	–	20	–	dBm	V_D = 3.2 V
Overall Power added Efficiency	PAE	–	33	–	%	V_D = 3.2 V, P_{IN} = + 4 dBm
Noise figure	F	–	t.b.m.	–	dB	–

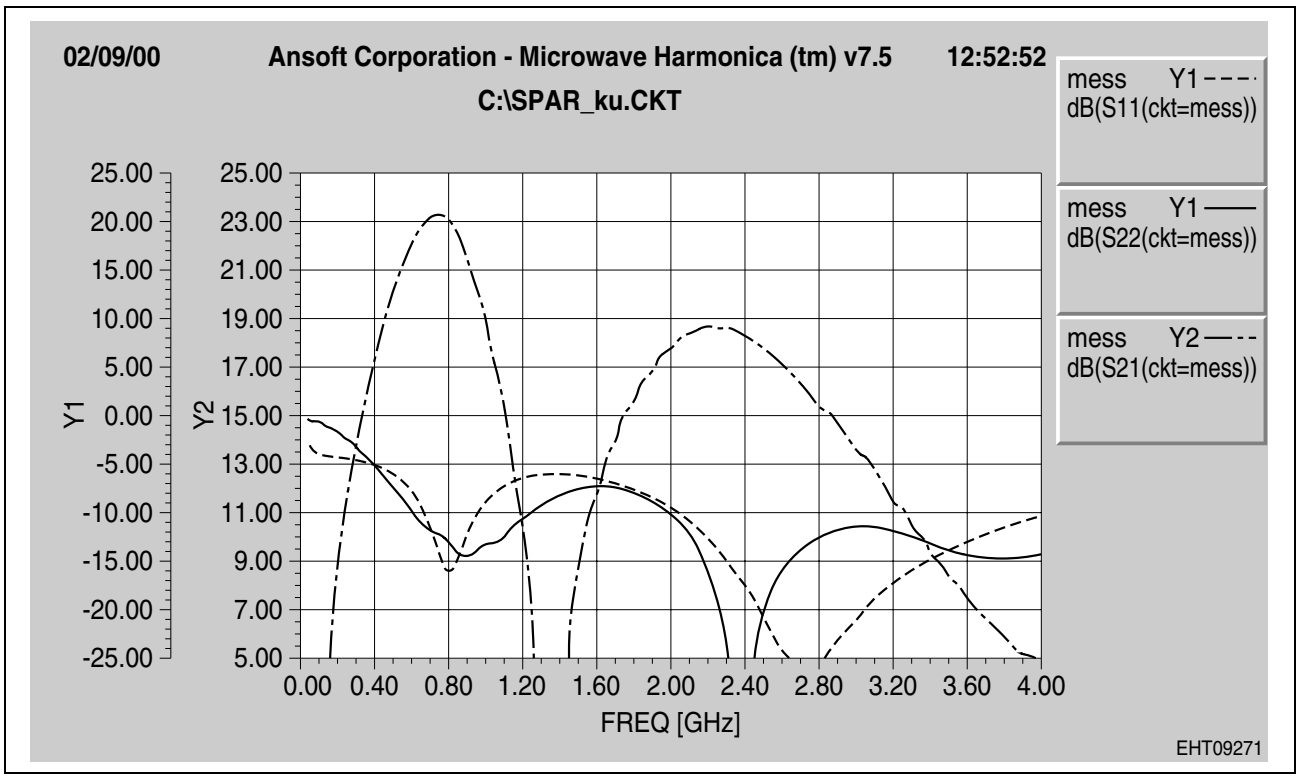


Figure 11 **ISM2400/Bluetooth Application, S-Parameter**, V_D = 3.2 V, P_{IN} = – 10 dBm

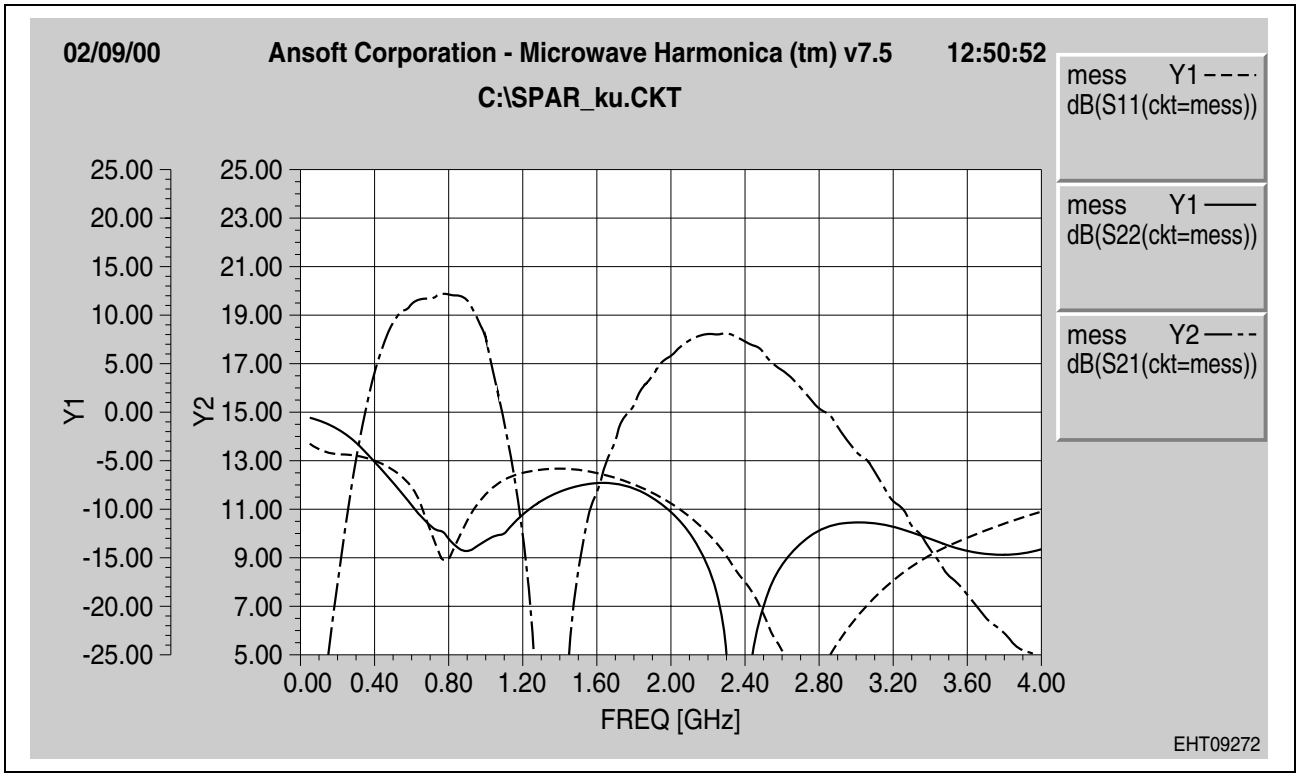


Figure 12 **ISM2400/Bluetooth Application, S-Parameter**, V_D = 3.2 V, P_{IN} = 0 dBm

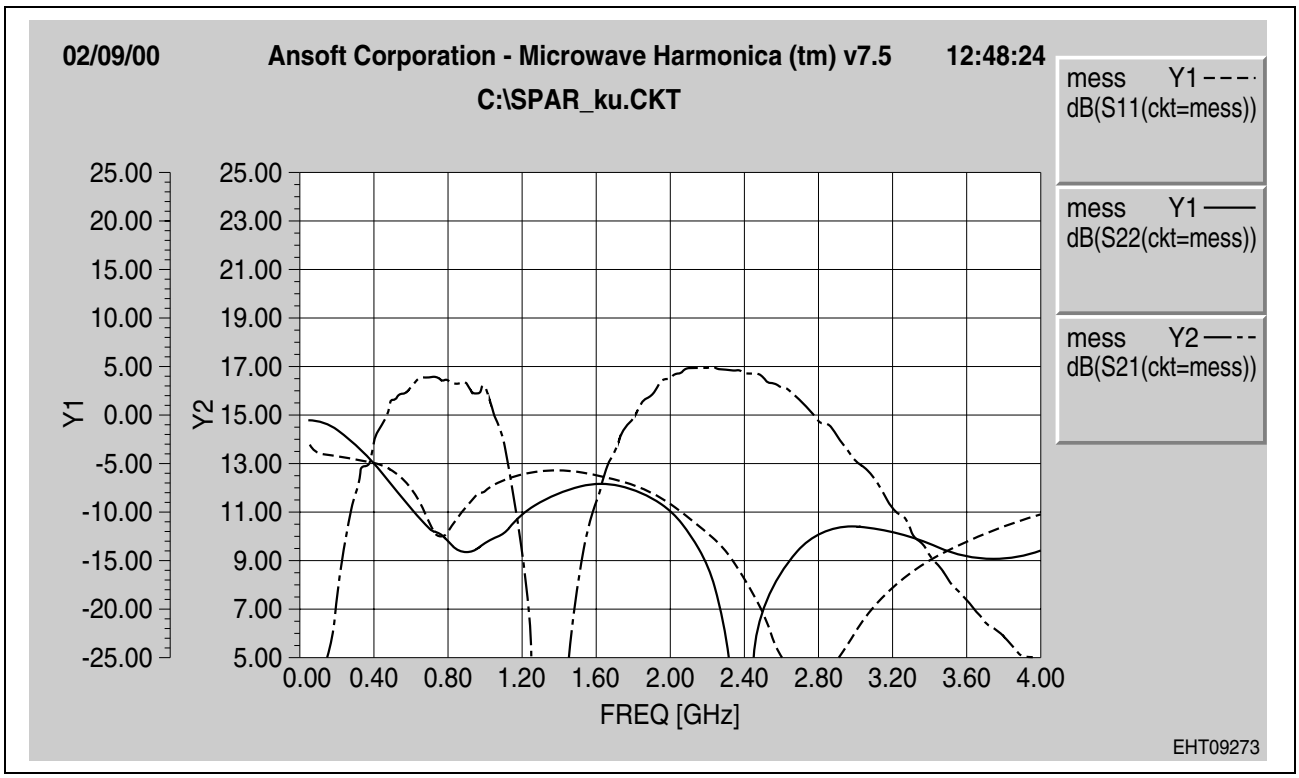
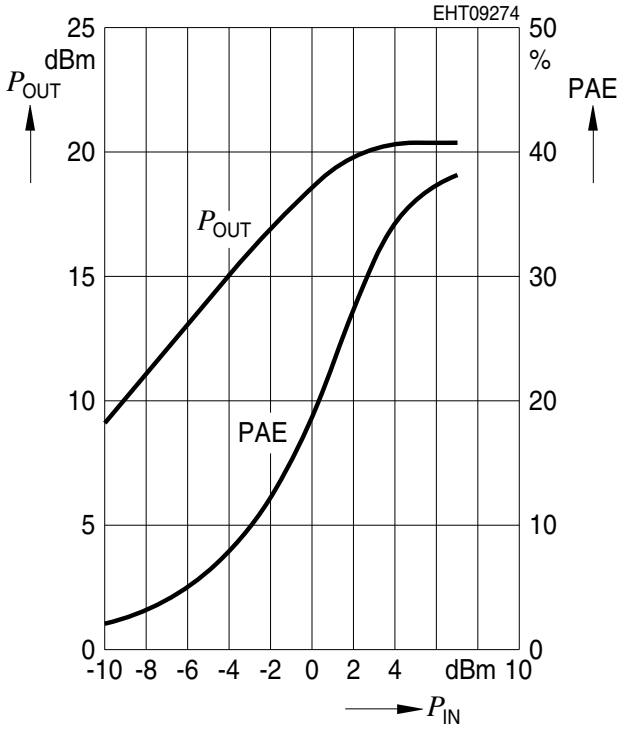


Figure 13 ISM2400/Bluetooth Application, S-Parameter, V_D = 3.2 V, P_{IN} = 3 dBm

Bluetooth Application,

$P_{OUT} = f(P_{IN})$, f = 2.45 GHz, V_D = 3.2 V, I_{DSS} = 130 mA



ISM2400/Bluetooth Application

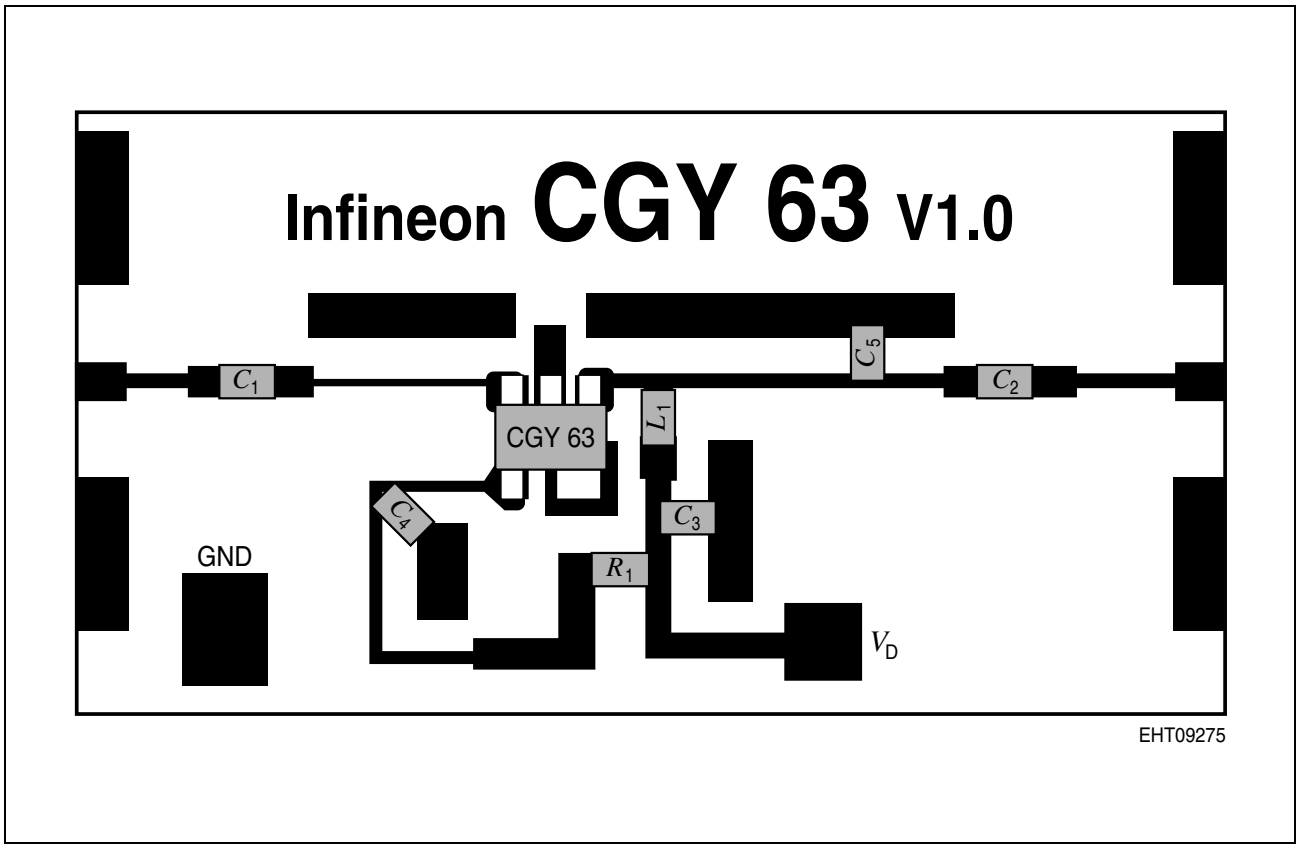


Figure 14 Testboard

Parts List

C_1, C_2, C_3	1 nF
C_4	6.8 pF
C_5	1 pF
L_1	15 nH
R_1	2.7 Ω

Electrical Characteristics, ISM900 Application

T_A = 25 °C, f = 900 MHz, Z_S = Z_L = 50 Ω, unless otherwise specified.

Characteristics	Symbol	Limit Values			Unit	Test Conditions
		min.	typ.	max.		
Supply current	I_{DD}	–	100	–	mA	V_D = 3.2 V, P_{IN} = – 20 dBm
Gain	G	–	25	–	dB	V_D = 3.2 V, P_{IN} = – 20 dBm
Output power at 1 dB gain compression	$P_{-1\,dB}$	–	19	–	dBm	V_D = 3.2 V
Output Power	P_O	–	20	–	dBm	P_{IN} = + 0 dBm
Overall Power added Efficiency	PAE	–	40	–	%	V_D = 3.2 V, P_{IN} = + 0 dBm
Supply current	I_{DD}	–	100	–	mA	V_D = 5.0 V, P_{IN} = – 20 dBm
Gain	G	–	25	–	dB	V_D = 5.0 V, P_{IN} = – 20 dBm
Output Power	P_O	–	22	–	dBm	V_D = 5.0 V, P_{IN} = 3 dBm
Output power at 1dB gain compression	$P_{-1\,dB}$	–	21	–	dBm	V_D = 5.0 V
Overall Power added Efficiency	PAE	–	40	–	%	V_D = 5.0 V, P_{IN} = 3 dBm

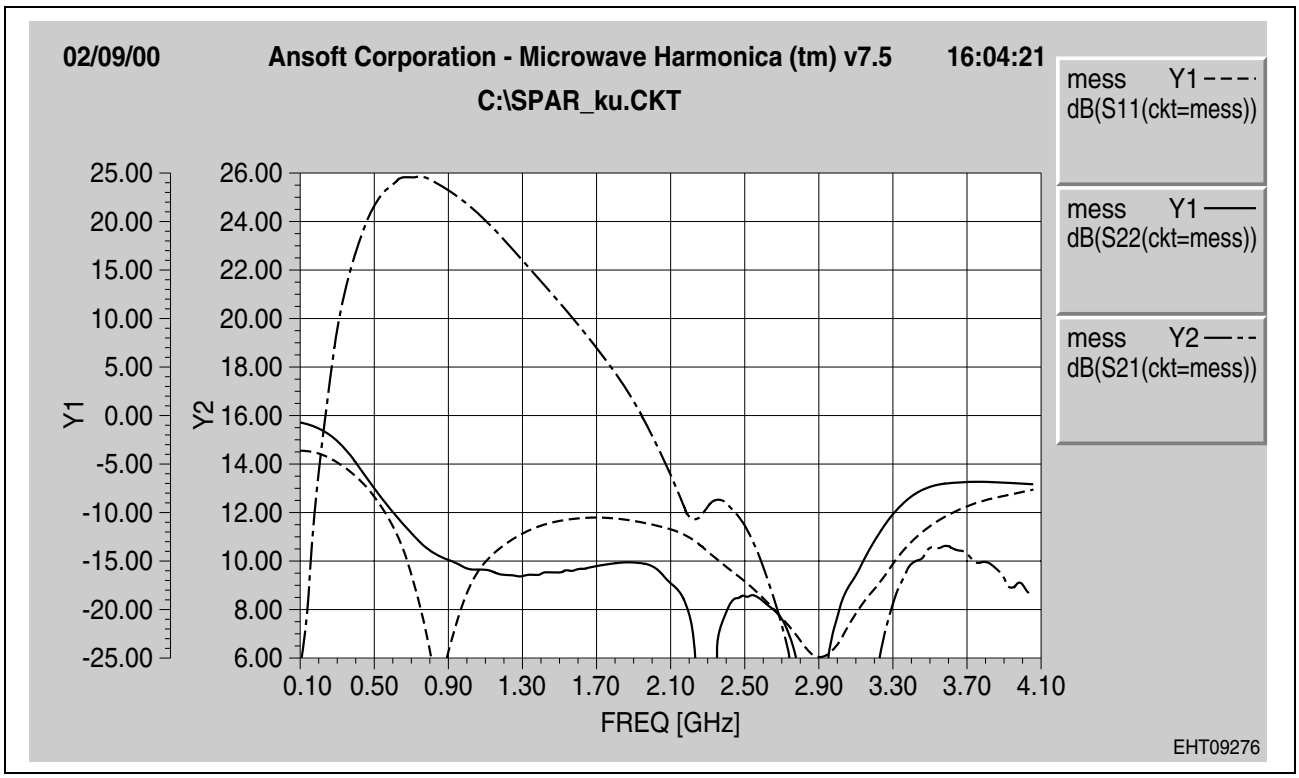


Figure 15 **ISM900 Application**
S-Parameter, V_D = 5.0 V, P_{IN} = – 10 dBm

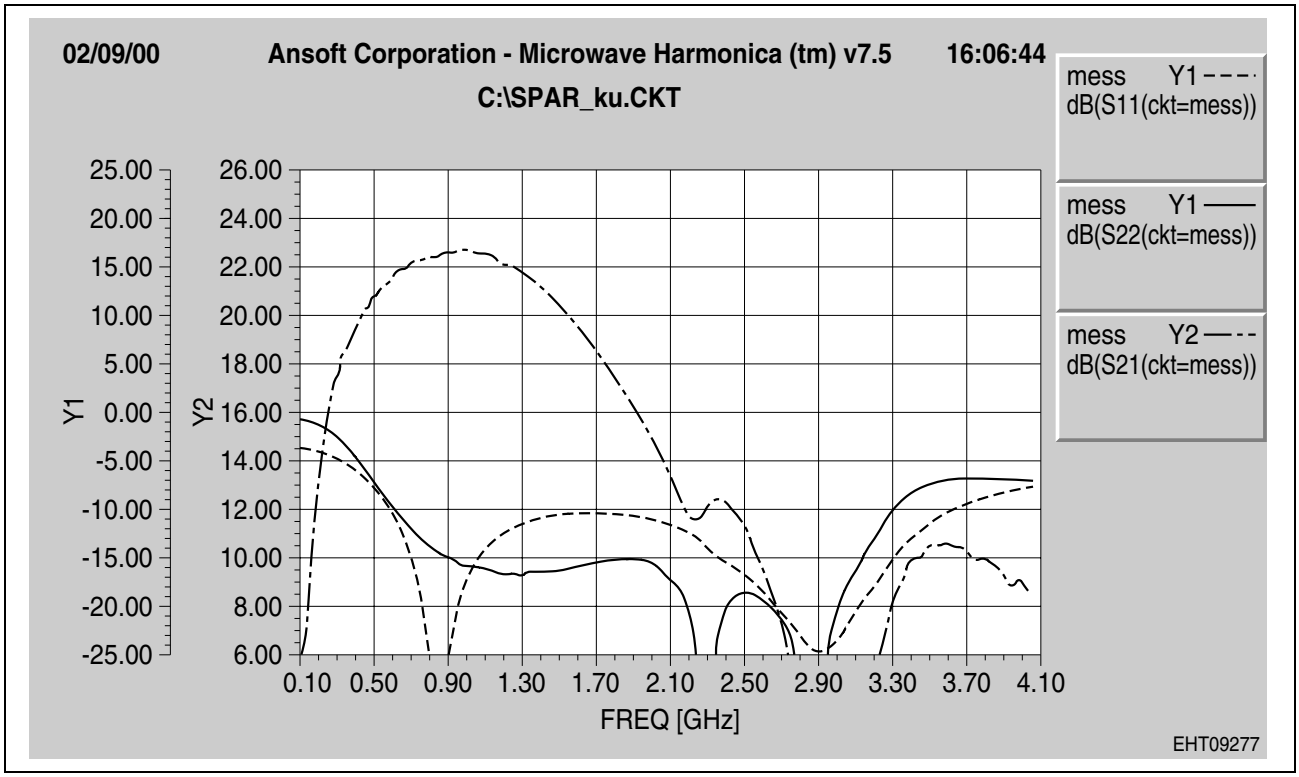


Figure 16 **ISM900 Application**
S-Parameter, V_D = 5.0 V, P_{IN} = 0 dBm

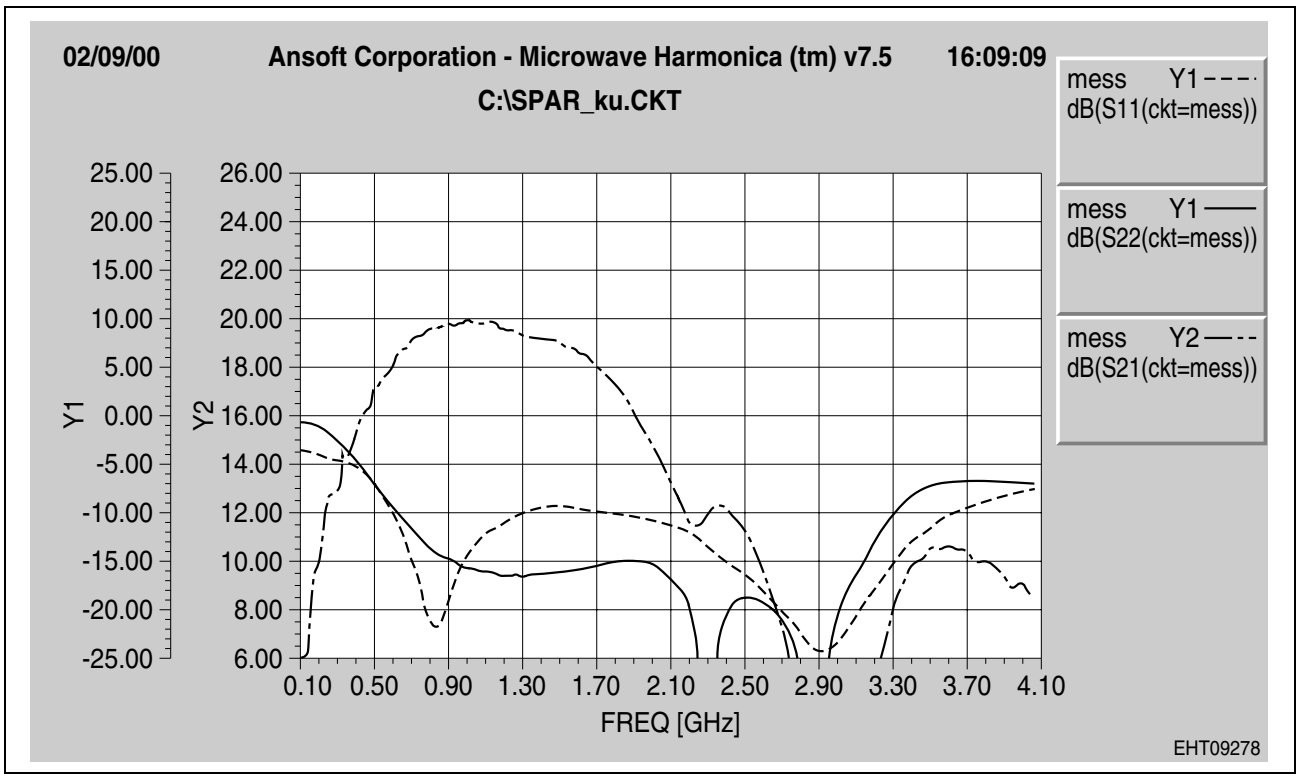


Figure 17 **ISM900 Application**
S-Parameter, V_D = 5.0 V, P_{IN} = 3 dBm

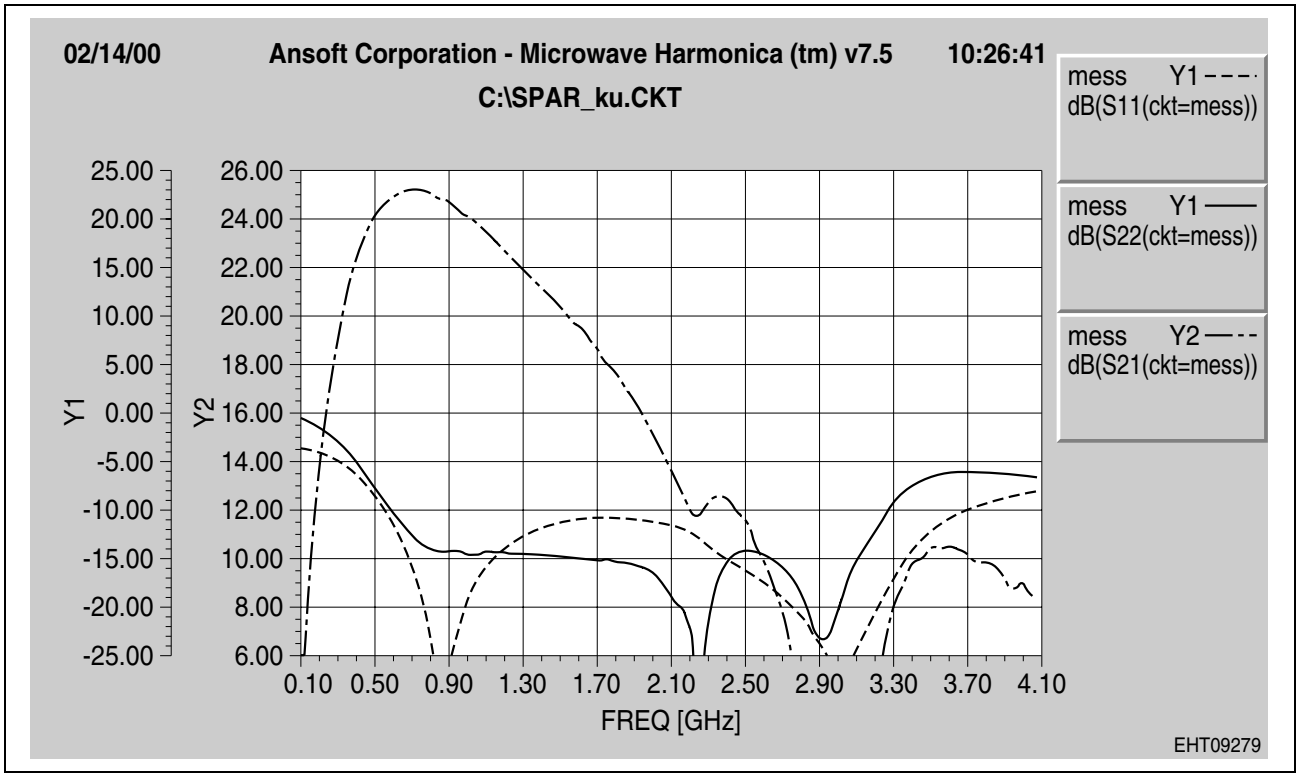


Figure 18 **ISM900 Application**
S-Parameter, V_D = 3.2 V, P_{IN} = – 10 dBm

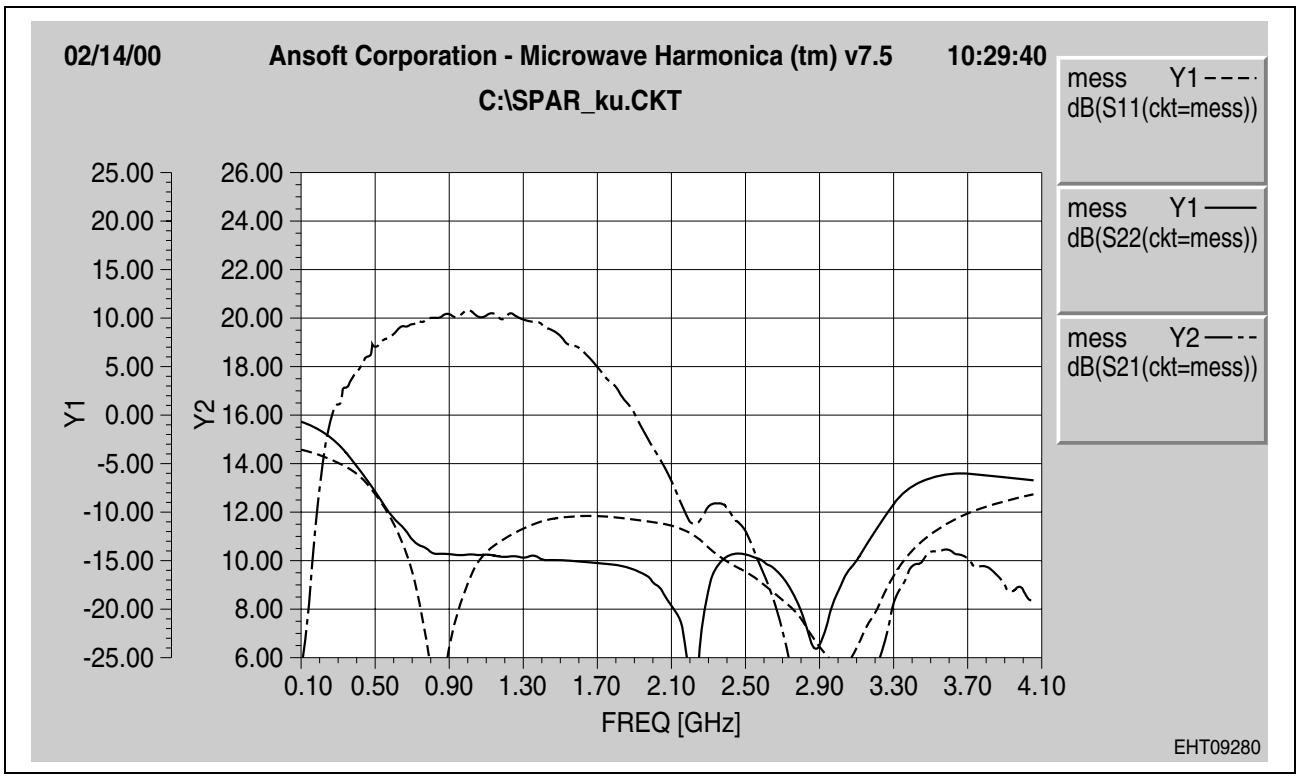


Figure 19 **ISM900 Application**
S-Parameter, V_D = 3.2 V, P_{IN} = 0 dBm

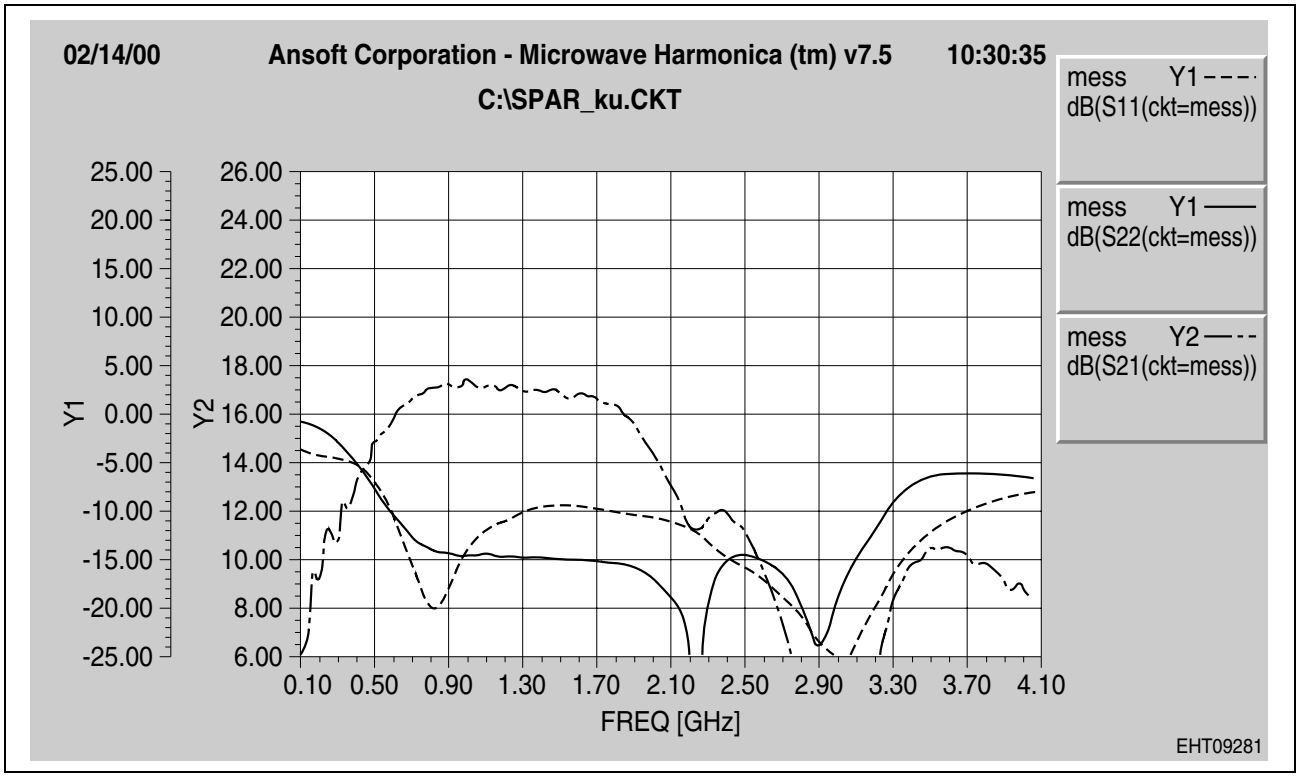
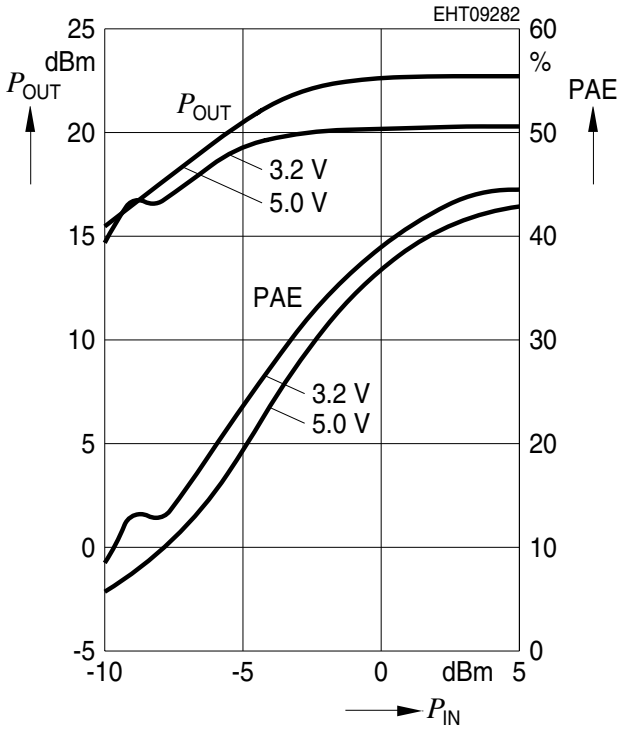


Figure 20 **ISM900 Application**
S-Parameter, V_D = 3.2 V, P_{IN} = 3 dBm

ISM900 Application,

P_{OUT}, PAE = $f(P_{IN})$



ISM900 Application

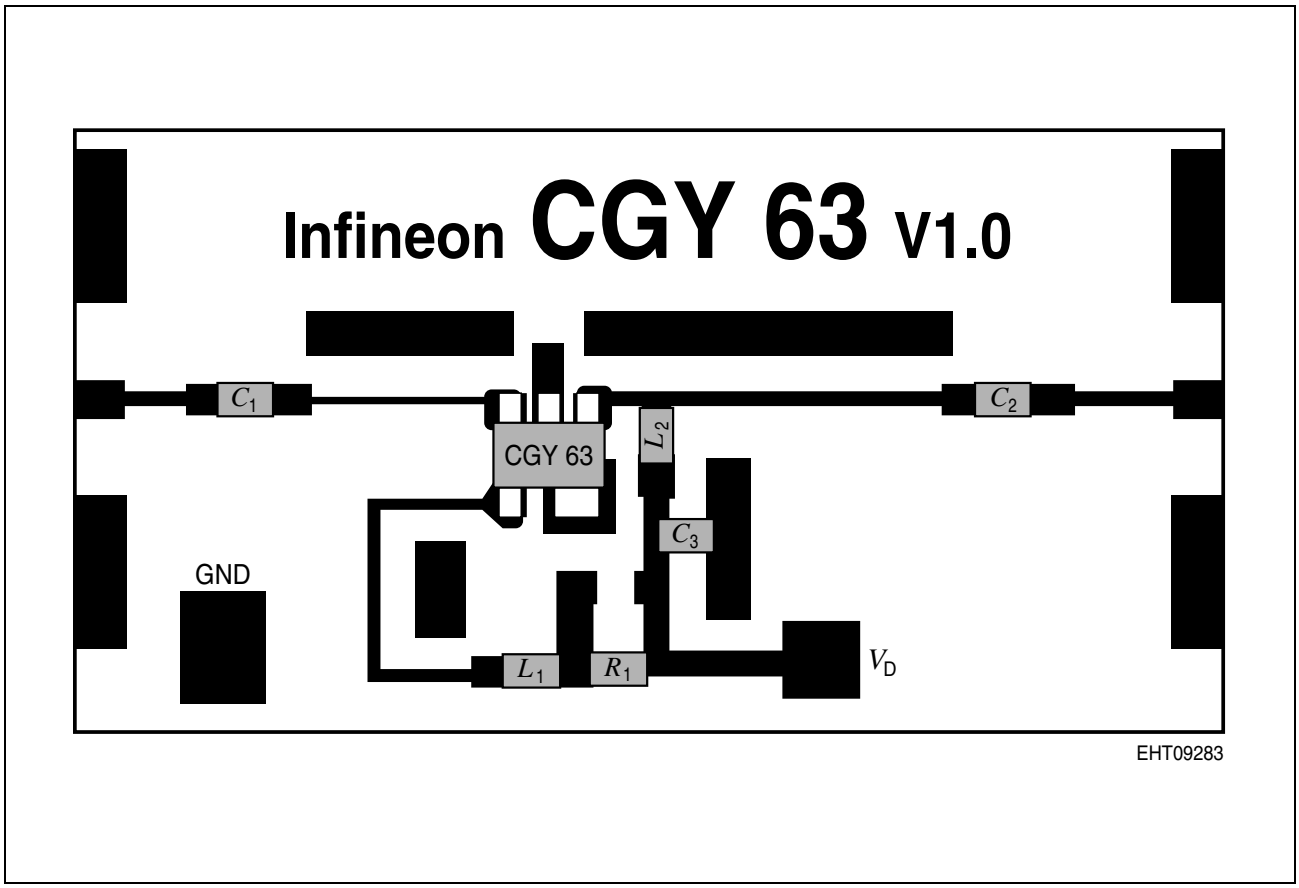


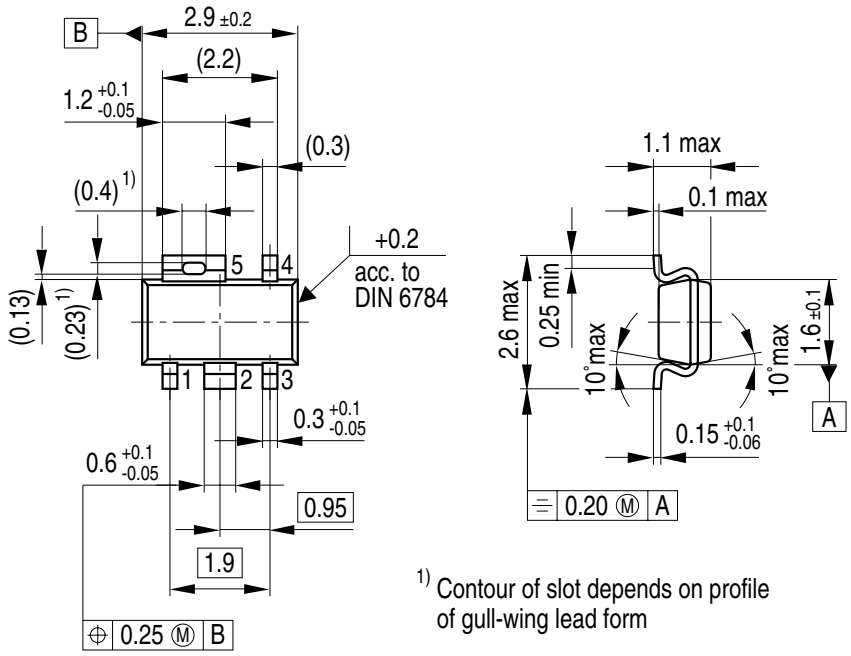
Figure 21 Testboard

Parts List

C_1, C_2, C_3	1 nF
L_1, L_2	15 nH
R_1	2.7 Ω

Package Outlines

SCT-595
(Special Package)



Sorts of Packing
Package outlines for tubes, trays etc. are contained in our Data Book “Package Information”.

SMD = Surface Mounted Device

Dimensions in mm