



Preliminary Specifications

FUNCTIONAL BLOCKS

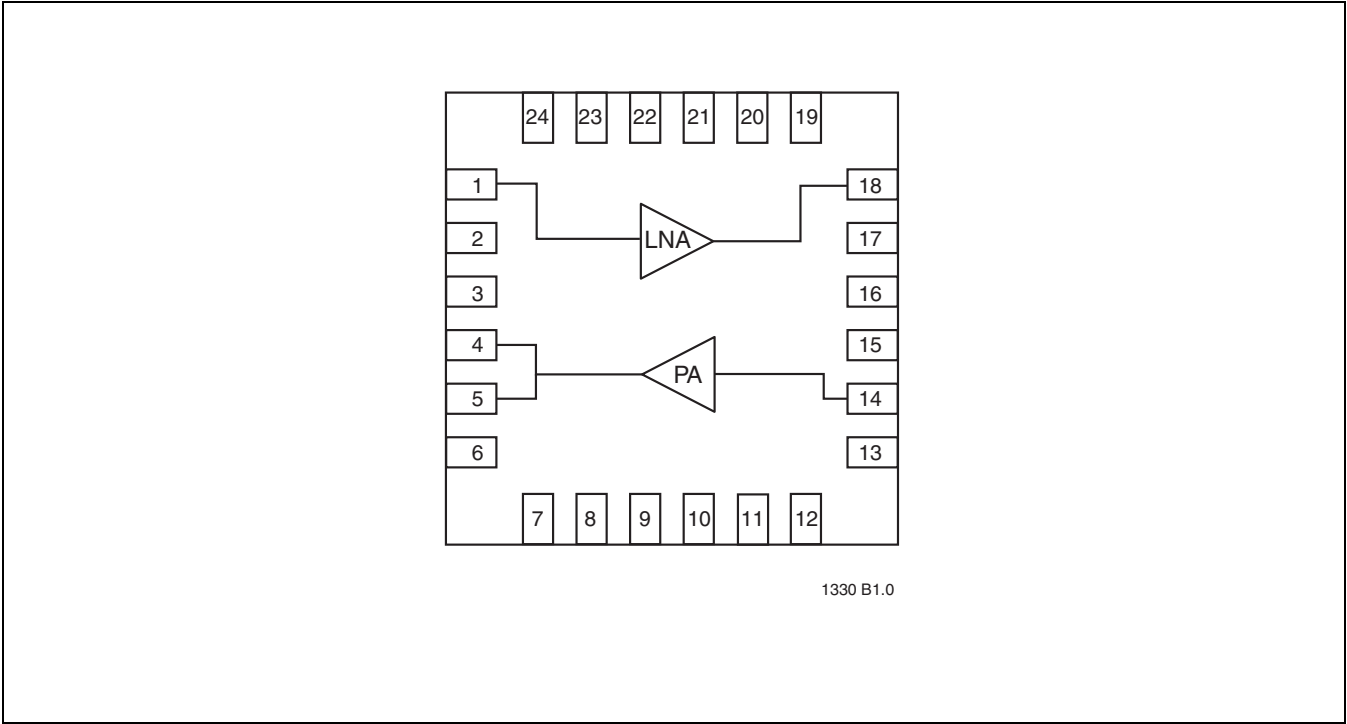


FIGURE 1: Functional Block Diagram

PIN ASSIGNMENTS

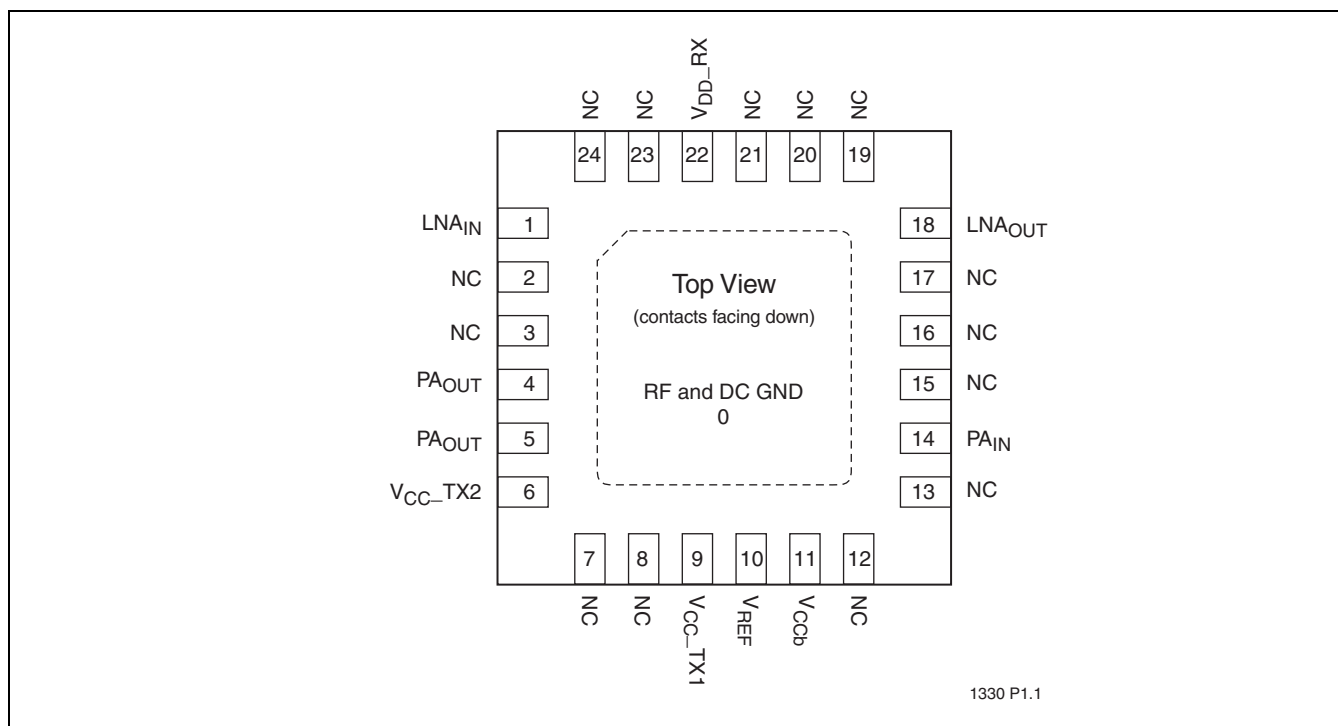


FIGURE 2: Pin Assignments for 24-contact WQFN



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PIN DESCRIPTIONS

TABLE 1: Pin Description

Symbol	Pin No.	Pin Name	Type ¹	Function
LNA _{IN}	1		I	LNA RF Input
NC	2	No Connection		Unconnected pin
NC	3	No Connection		Unconnected pin
PA _{OUT}	4		O	PA RF output
PA _{OUT}	5		O	PA RF output
V _{CC_TX2}	6	Power Supply	PWR	PA power supply, 2 nd stage
NC	7	No Connection		Unconnected pin
NC	8	No Connection		Unconnected pin
V _{CC_TX1}	9	Power Supply	PWR	PA power supply, 1 st stage
V _{REF}	10		PWR	PA-enable and current control
V _{CCb}	11	Power Supply	PWR	PA power supply, bias circuit
NC	12	No Connection		Unconnected pin
NC	13	No Connection		Unconnected pin
PA _{IN}	14		I	PA RF input
NC	15	No Connection		Unconnected pin
NC	16	No Connection		Unconnected pin
NC	17	No Connection		Unconnected pin
LNA _{OUT}	18		O	LNA RF Output
NC	19	No Connection		Unconnected pin
NC	20	No Connection		Unconnected pin
NC	21	No Connection		Unconnected pin
V _{DD_RX}	22	Power Supply	PWR	LNA power supply
NC	23	No Connection		Unconnected pin
NC	24	No Connection		Unconnected pin

1. I=Input, O=Output

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ELECTRICAL SPECIFICATIONS

The AC and DC specifications for the power amplifier interface signals. Refer to Table 2 for the DC voltage and current specifications. Refer to Figures 3 through 14 for the RF performance.

Absolute Maximum Stress Ratings (Applied conditions greater than those listed under “Absolute Maximum Stress Ratings” may cause permanent damage to the device. This is a stress rating only and functional operation of the device at these conditions or conditions greater than those defined in the operational sections of this data sheet is not implied. Exposure to absolute maximum stress rating conditions may affect device reliability.)

Input power to pins 1 (LNA)	0 dBm
Input power to pins 14 (PA)	-5 dBm
Average output power pins 4 and 5 (P_{OUT}) ¹	24 dBm
Average output power pin 18 (P_{OUT}) ¹	9 dBm
Supply Voltage at pins 6, 9, and 11 (V_{CC})	-0.3V to +3.5V
Supply Voltage at pin 22 (V_{DD})	-0.3V to +4.6V
Reference voltage to pin 10 (V_{REF})	-0.3V to +3.6V
DC supply current to pin 10 (I_{DD})	14 mA
DC supply current to pin 6, 9, and 11 (I_{CC})	300 mA
Operating Temperature (T_A)	-40°C to +85°C
Storage Temperature (T_{STG})	-40°C to +120°C
Maximum Junction Temperature (T_J)	+150°C
Surface Mount Solder Reflow Temperature	260°C for 10 seconds

1. Never measure with CW source. Pulsed single-tone source with <50% duty cycle is recommended. Exceeding the maximum rating of average output power could cause permanent damage to the device.

Operating Range

Range	Ambient Temp	V_{CC}/V_{DD}
Commercial	-0 to 80°C	2.9–3.5V

TABLE 2: DC Electrical Characteristics

Symbol	Parameter	Min.	Typ	Max.	Unit
V_{CC}	Supply Voltage at pins 6, 9, 11, and 22		3.3	4.2	V
I_{CC}	Supply Current at pin 22		10		mA
	for 802.11g, 22 dBm at pins 6, 9, and 11		210		mA
	for 802.11b, 23.5 dBm at pins 6, 9, and 11		260		mA
I_{CQ}	Idle current for 802.11g to meet EVM<4% @ 20 dBm		75		mA
I_{OFF}	Shut down current		2.5		μA
V_{REF} ¹	Reference Voltage at pin10 with $R_{REG} = 0\Omega$ resistor		2.7		V
	Reference Voltage at pin 10 with $R_{REG} = 120\Omega$ resistor	2.7	2.9	3.1	V
	Reference Voltage at pin 10 with $R_{REG} = 220\Omega$ resistor	2.9	3.1	3.3	V

1. V_{REF} and V_{REG} are defined in Figure 15. Three combinations of resistor values and applied voltages of V_{REG} are suggested in Table 2.

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TABLE 3: AC Electrical Characteristics for RX Chain

Symbol	Parameter	Min.	Typ	Max.	Unit
F _{L-U}	Frequency range	2400		2550	MHz
G	Small signal gain	10	12		dB
NF	Noise Figure		1.45		dB
IIP3	2.4–2.55 GHz		3		dBm

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TABLE 4: AC Electrical Characteristics for TX Chain

Symbol	Parameter	Min.	Typ	Max.	Unit
F _{L-U}	Frequency range	2400		2485	MHz
P _{OUT}	Output power				
	@ PIN = -6 dBm 11b signals	23			dBm
	@ PIN = -9 dBm 11g signals	20			dBm
G	Small signal gain	28	29	33	dB
G _{VAR1}	Gain variation over band (2400~2485 MHz)			±0.5	dB
G _{VAR2}	Gain ripple over channel (20 MHz)		0.2		dB
ACPR	Meet 11b spectrum mask	23			dBm
	Meet 11g OFDM 54 Mbps spectrum mask	22			dBm
Added EVM	@ 20 dBm output with 11g OFDM 54 Mbps signal		4		%
2f, 3f, 4f, 5f	Harmonics at 22 dBm, without external filters			-40	dBc

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TYPICAL PERFORMANCE CHARACTERISTICS

Test Conditions: $V_{DD} = 3.0V$, $T_A = 25^{\circ}C$, unless otherwise specified

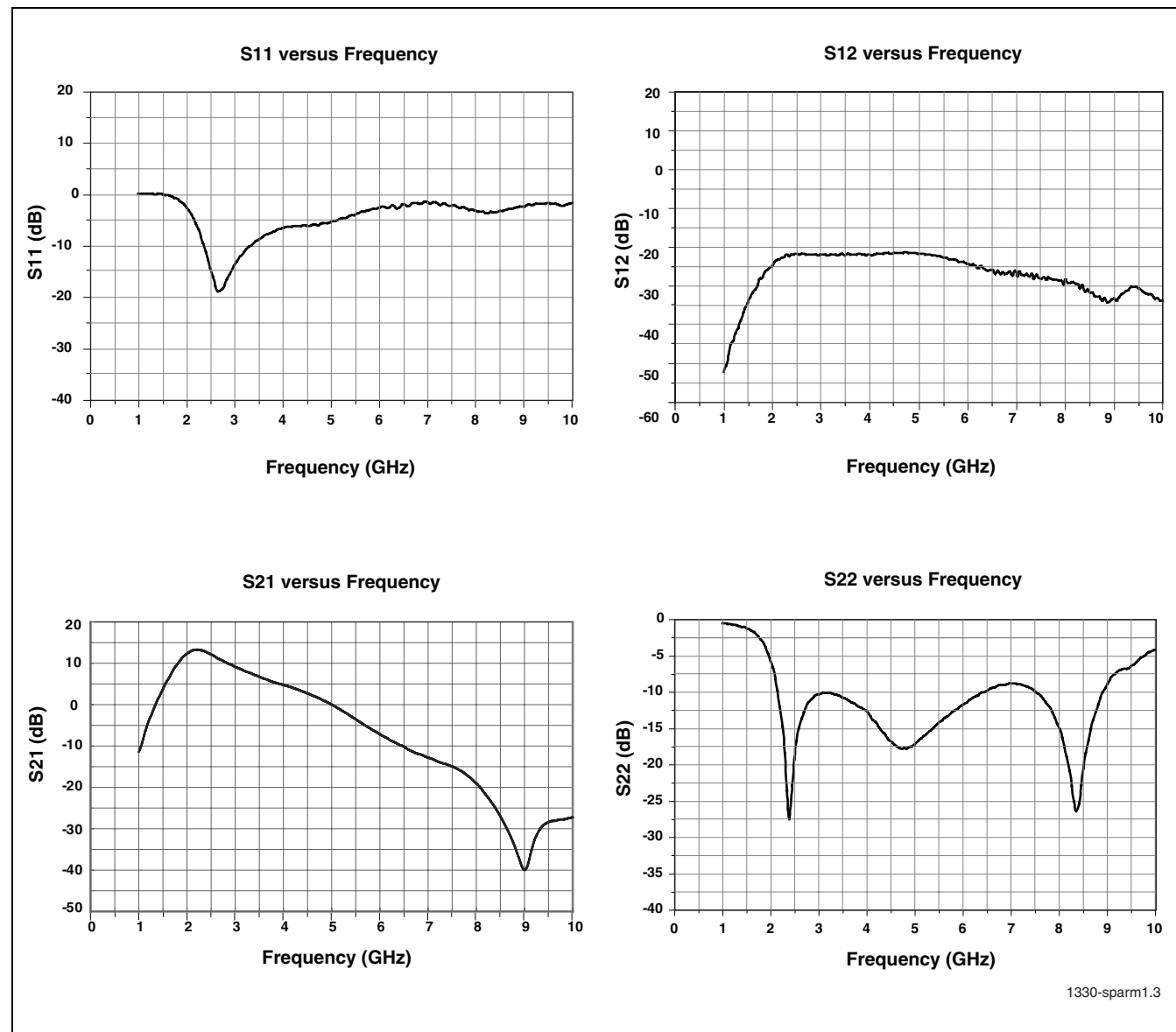


FIGURE 3: S-Parameters, RX Chain



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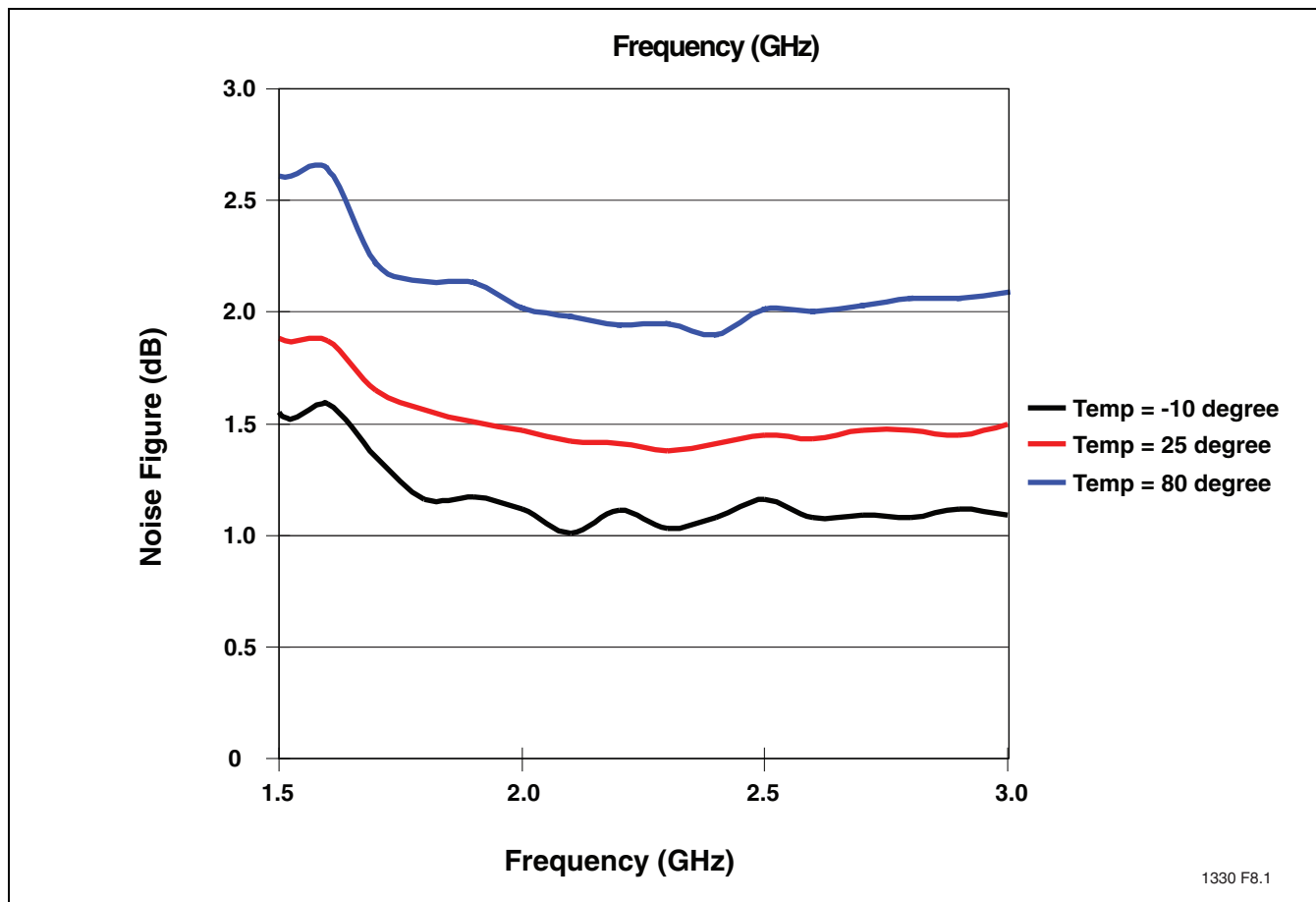


FIGURE 4: Noise Figure versus Frequency, RX Chain

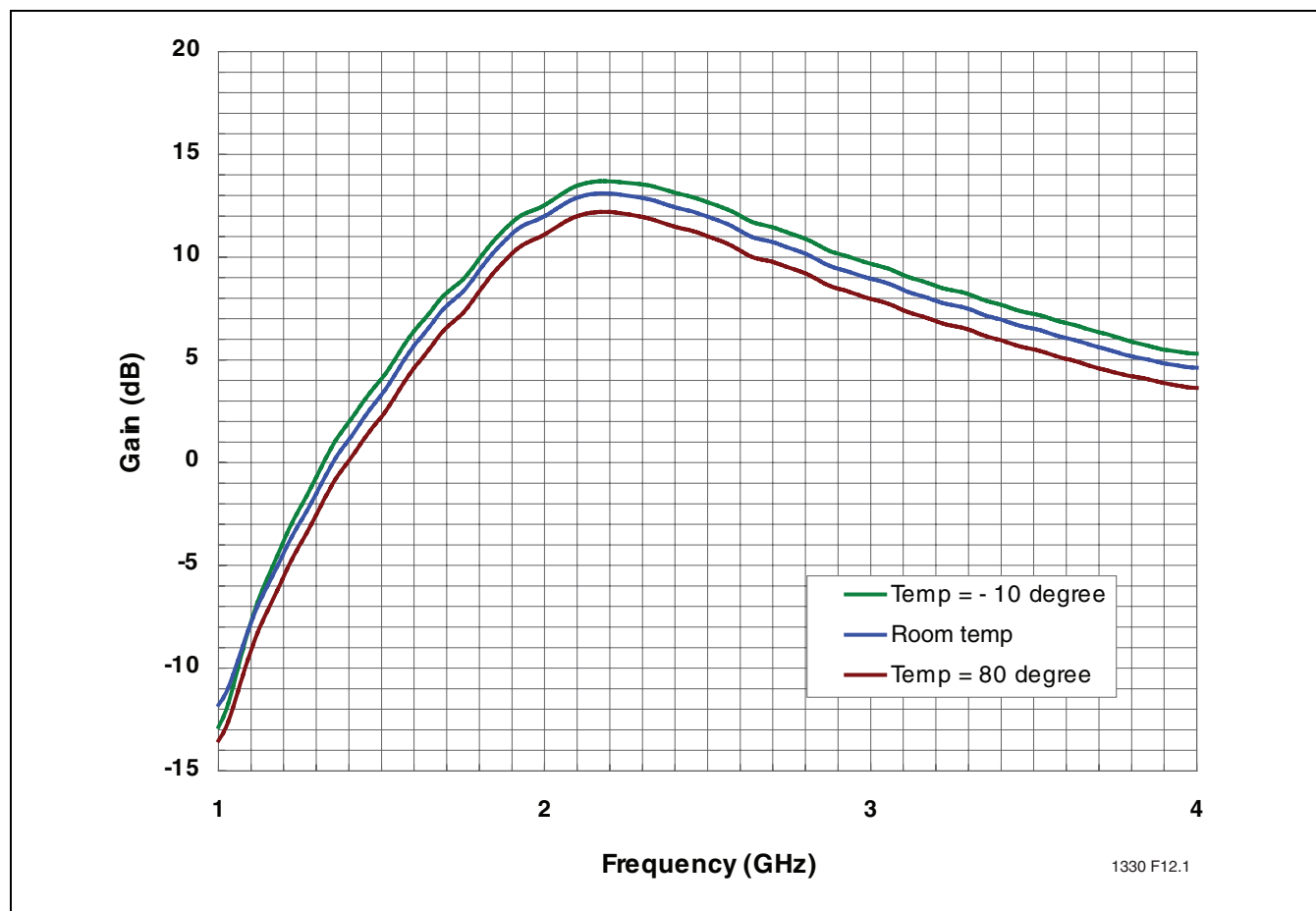


FIGURE 5: Frequency Response of Gain (S21) over three Temperatures

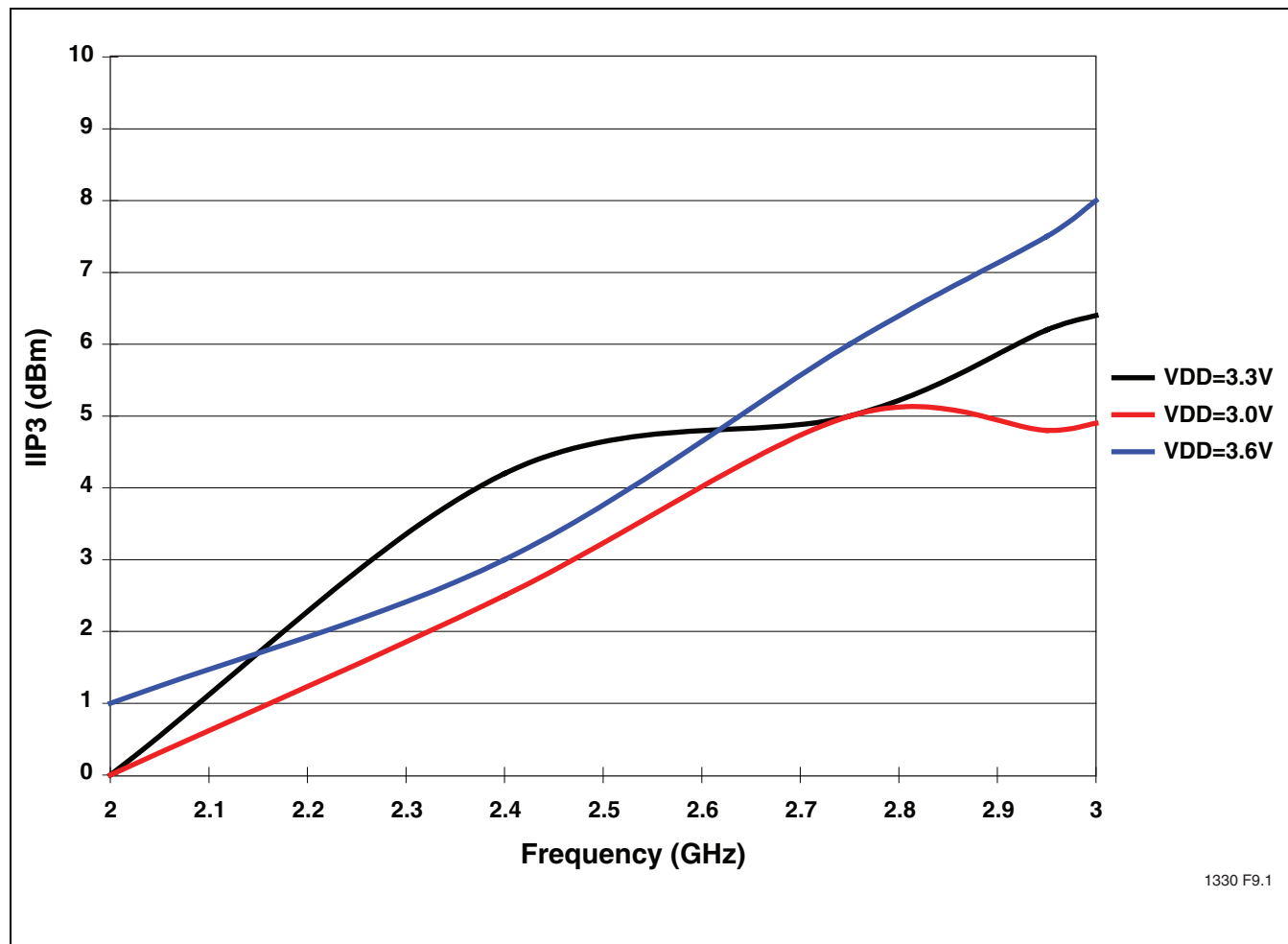


FIGURE 6: Input IP3 versus Frequency, RX Chain

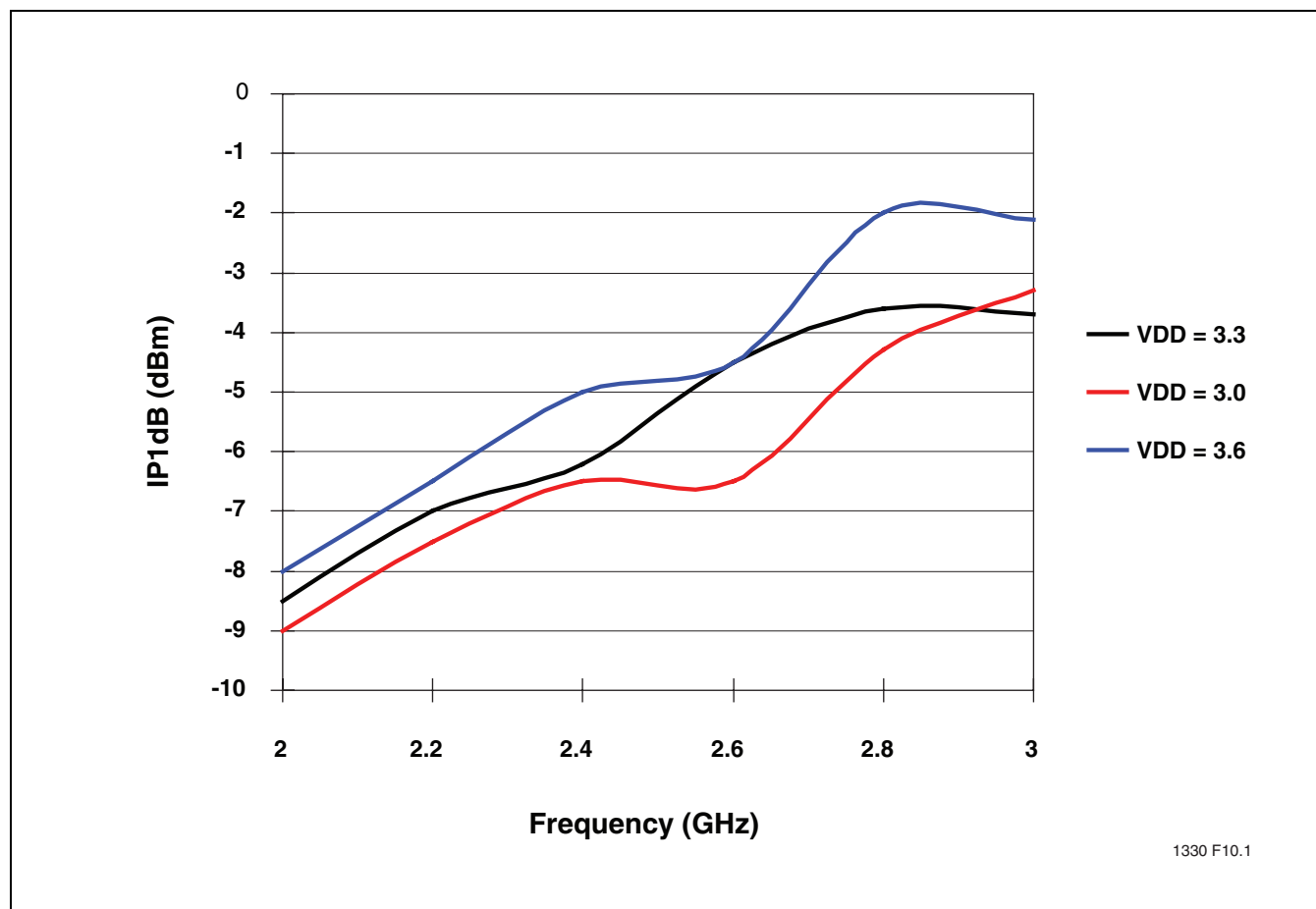


FIGURE 7: Input P1dB versus Frequency, RX Chain



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Test Conditions: $V_{CC} = 3.3V$, $T_A = 25^\circ C$, unless otherwise specified

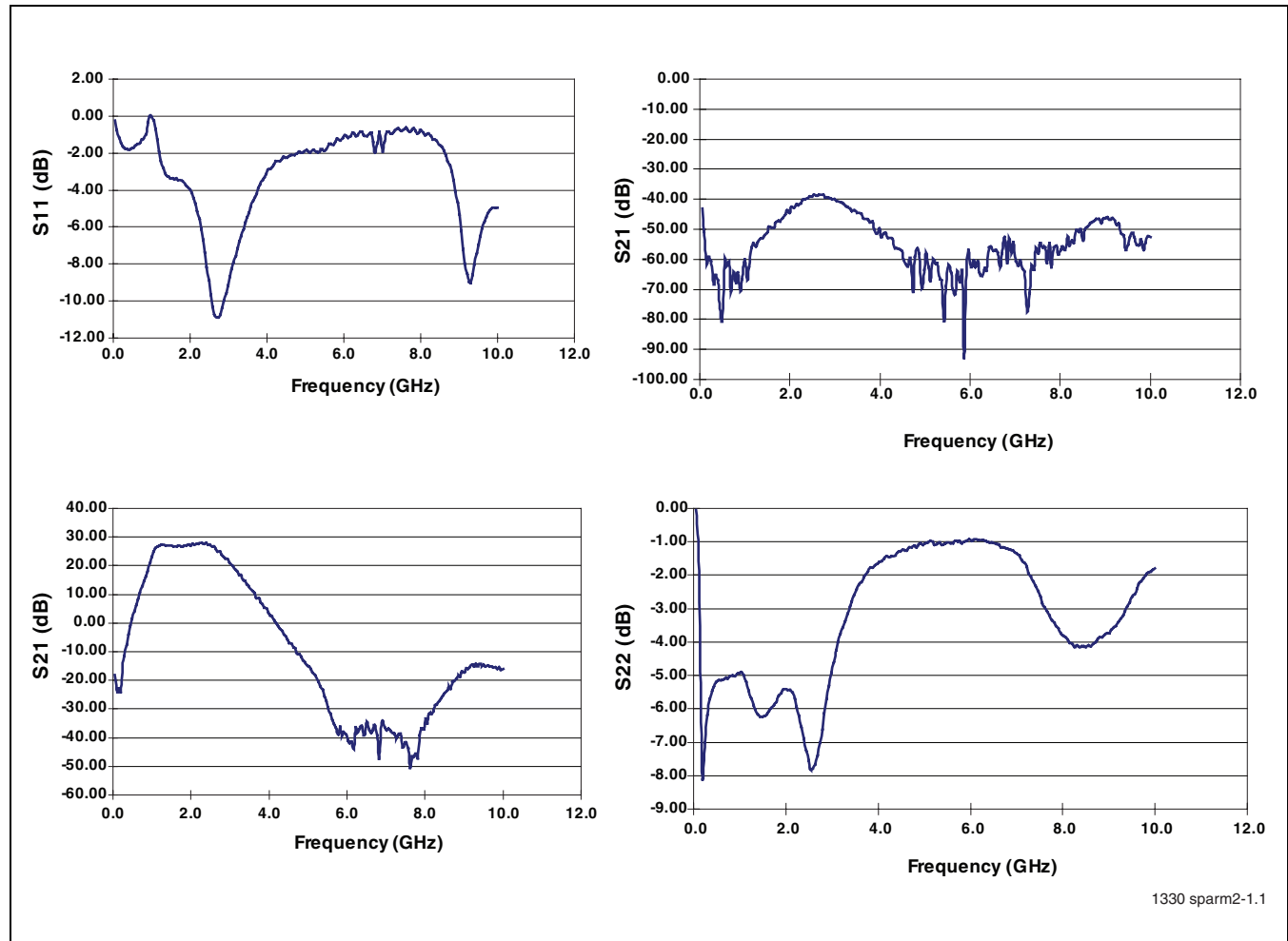


FIGURE 8: S-Parameters, TX Chain

TYPICAL PERFORMANCE CHARACTERISTICS

Test Conditions: $f = 2.447$ GHz, $V_{CC} = 3.3$ V, $V_{REF} = 2.85$ V at Room Temperature $I_{CQ} = 70$ mA

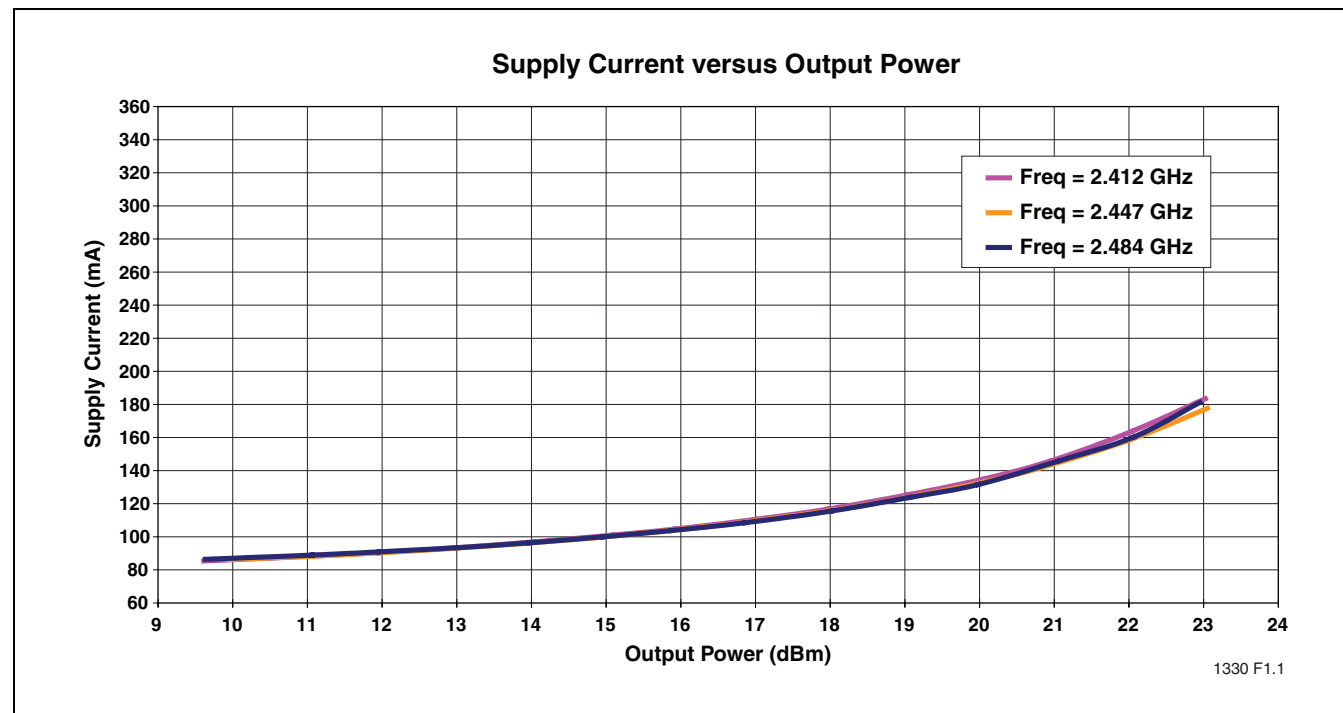


FIGURE 9: Supply Current versus Output Power

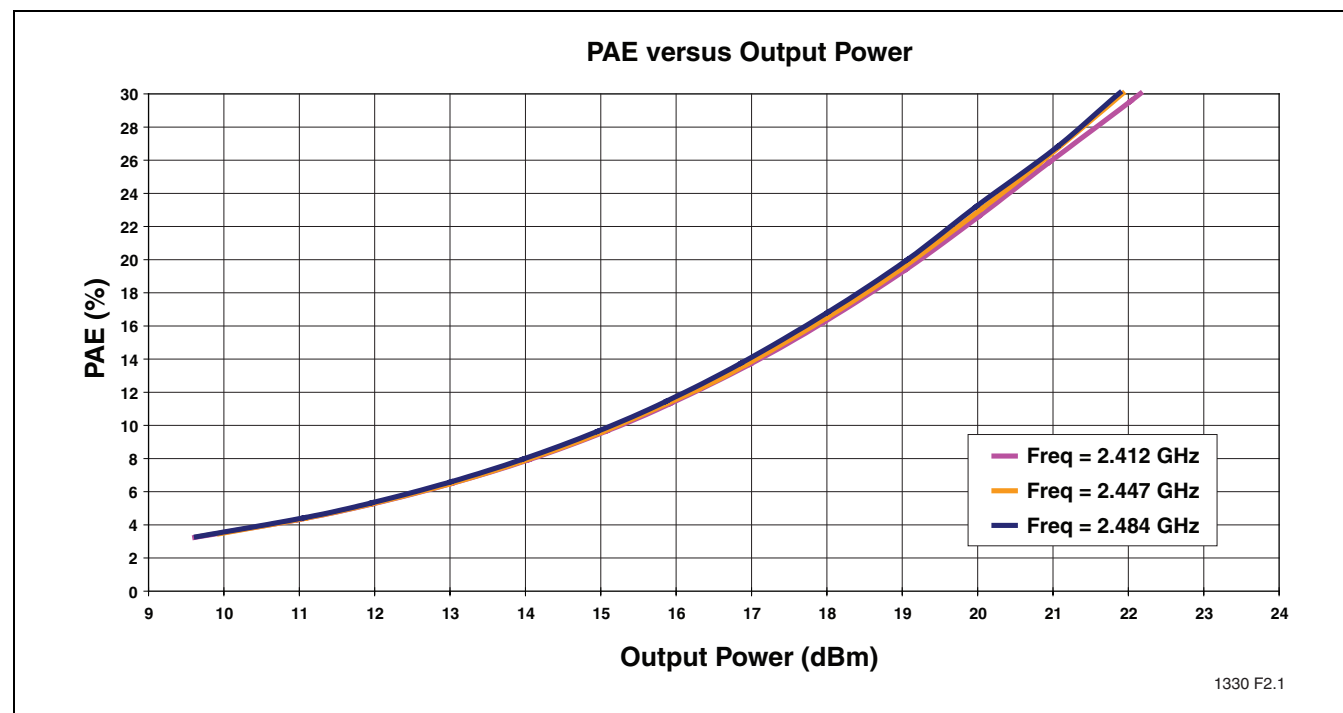


FIGURE 10: Power Added Efficiency (PAE) versus Output Power

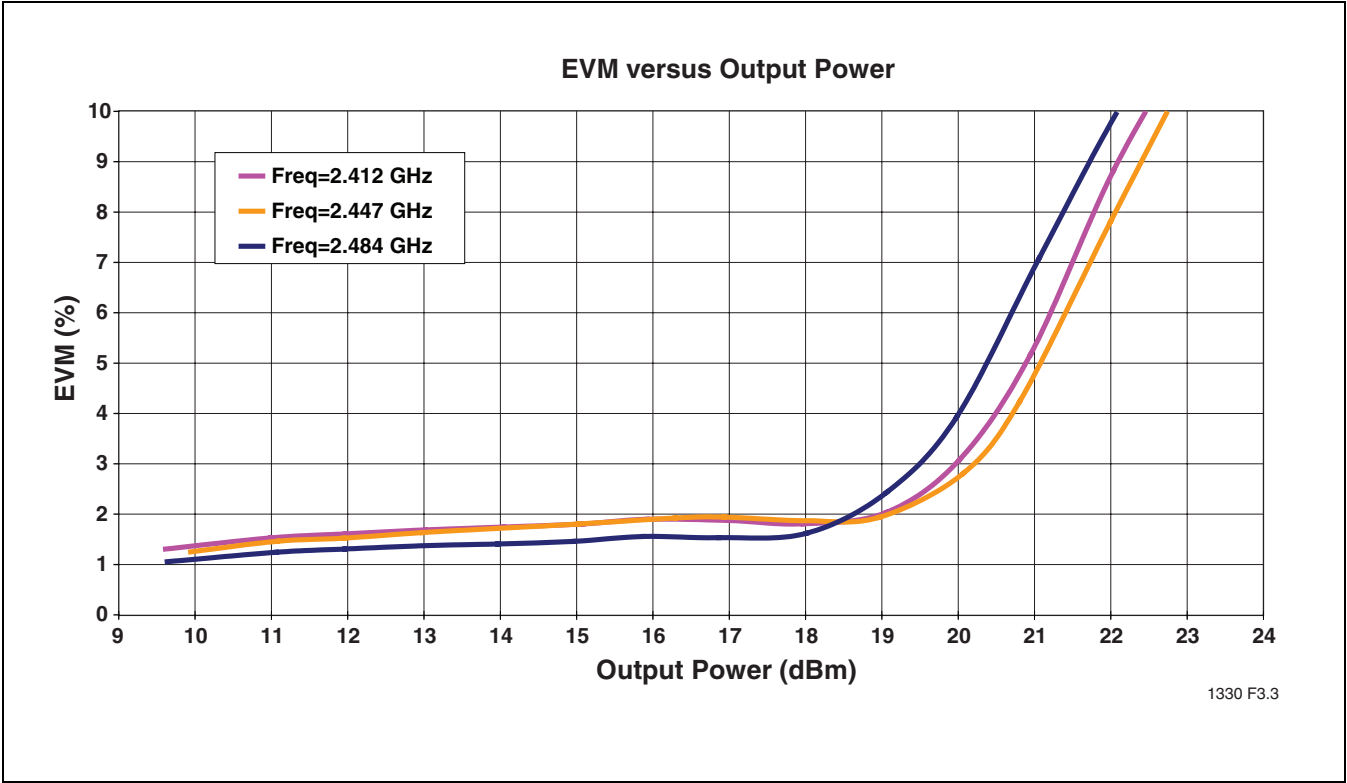


FIGURE 11: EVM versus Output Power

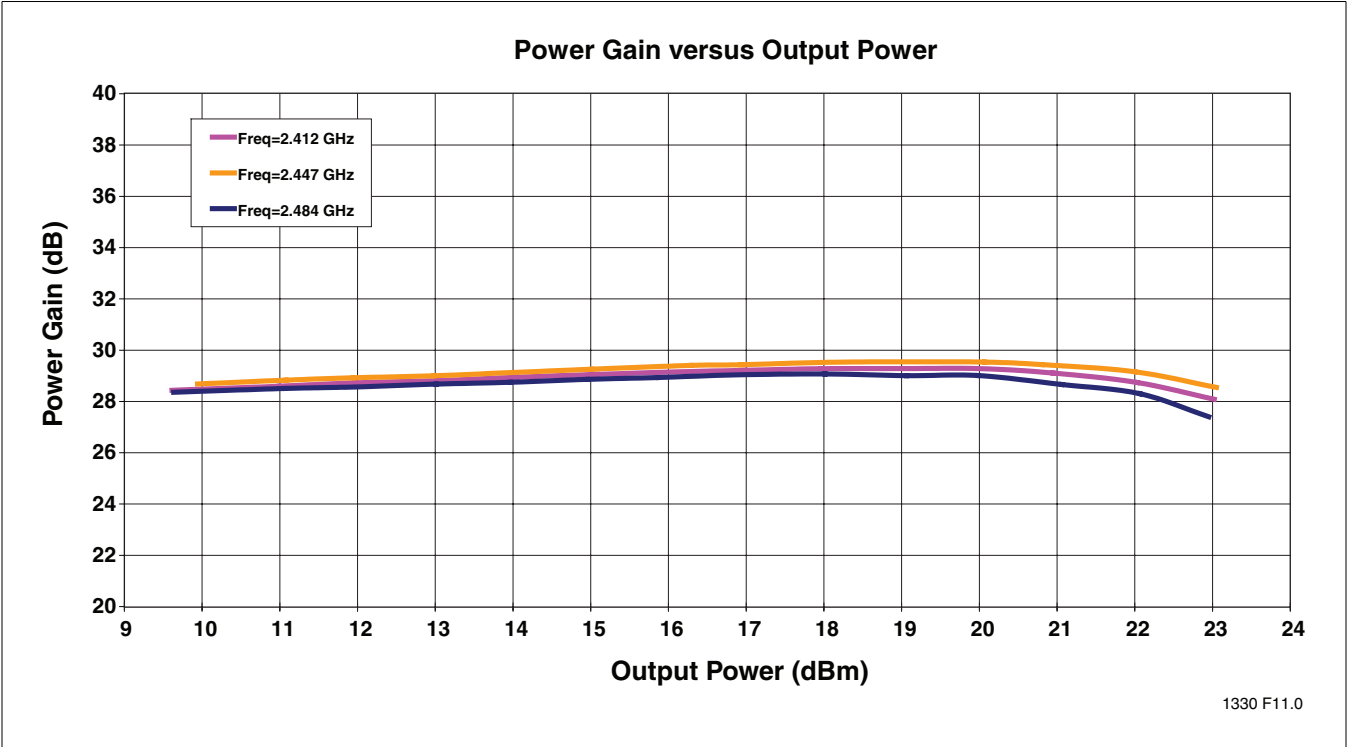


FIGURE 12: Power Gain versus Output Power

TEST CONDITIONS: $V_{CC} = 3.3V$, $T_A = 25^\circ C$, 54 MBPS 802.11G OFDM SIGNAL

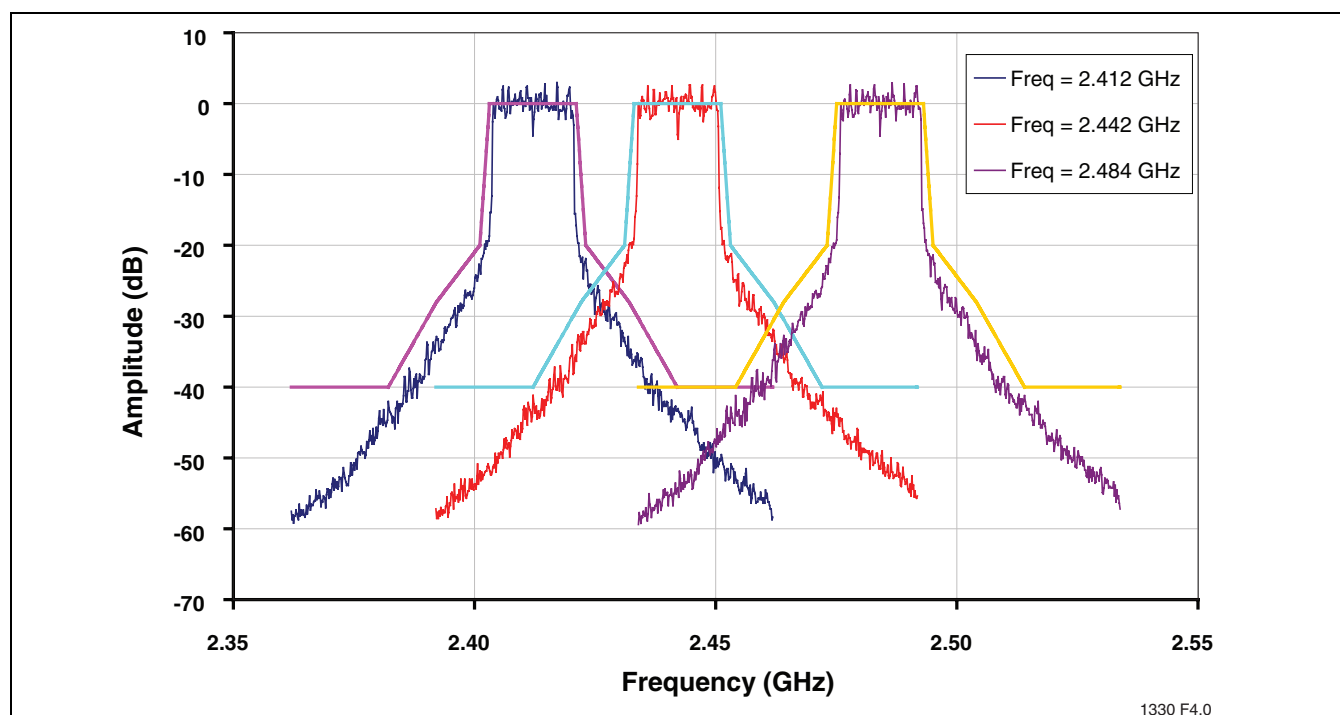


FIGURE 13: 802.11g Spectrum Mask at 23 dBm

Test Conditions: $V_{CC} = 3.3V$, $T_A = 25^\circ C$, 1 Mbps 802.11b signal

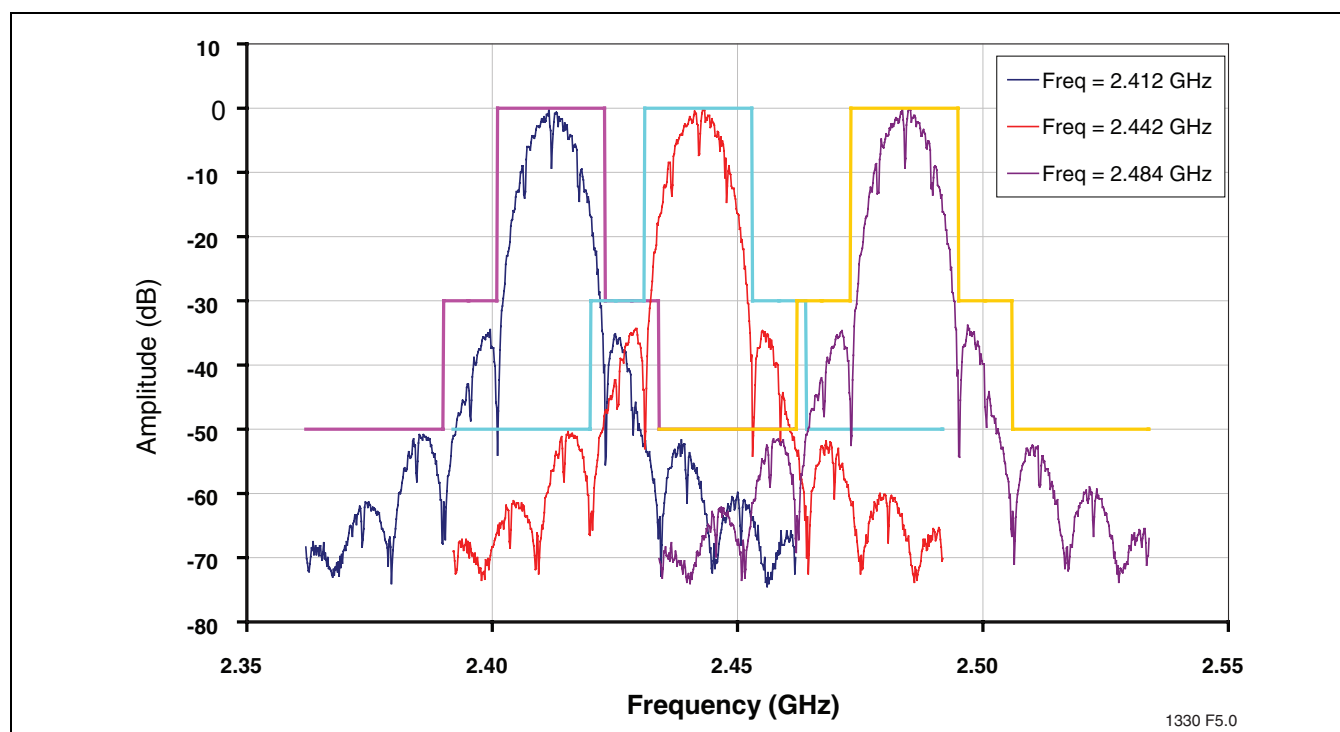
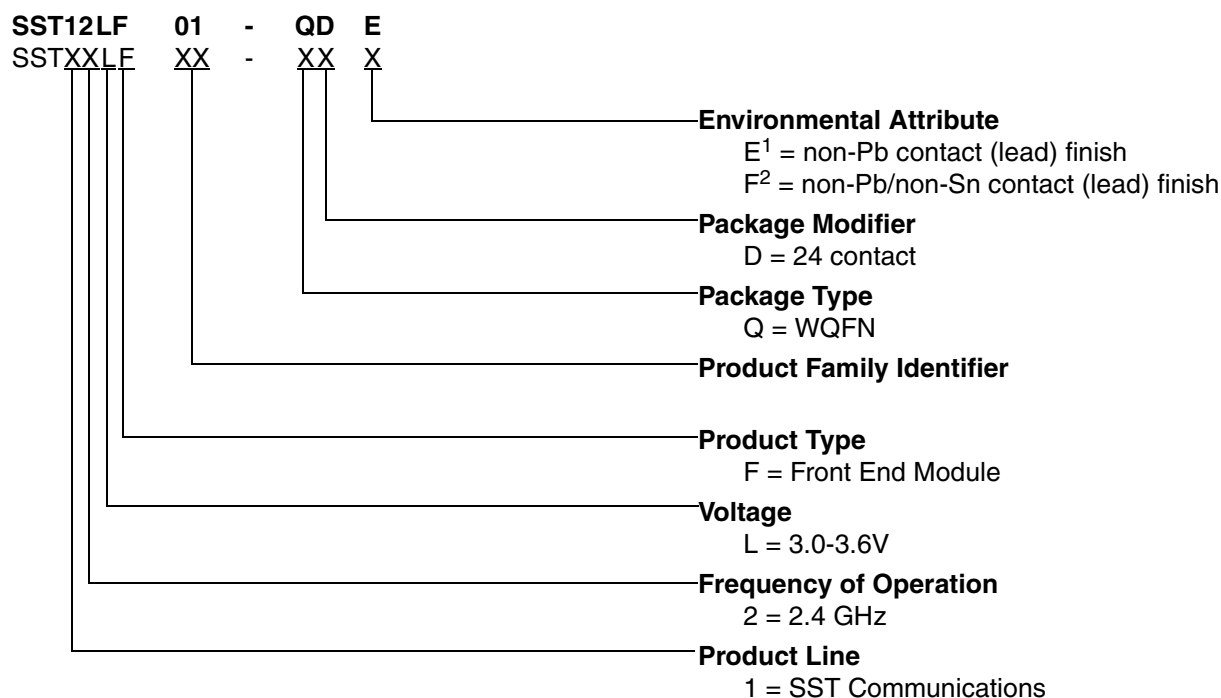


FIGURE 14: 802.11b Spectrum Mask at 23 dBm



PRODUCT ORDERING INFORMATION



-
1. Environmental suffix "E" denotes non-Pb solder.
SST non-Pb solder devices are "RoHS Compliant".
 2. Environmental suffix "F" denotes non-Pb/non-Sn solder.
SST non-Pb/non-Sn solder devices are "RoHS Compliant".

Valid combinations for SST12LF01

SST12LF01-QDE SST12LF01-QDF

SST12LF01 Evaluation Kits

SST12LF01-QDE-K SST12LF01-QDF-K

Note: Valid combinations are those products in mass production or will be in mass production. Consult your SST sales representative to confirm availability of valid combinations and to determine availability of new combinations.



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PACKAGING DIAGRAMS

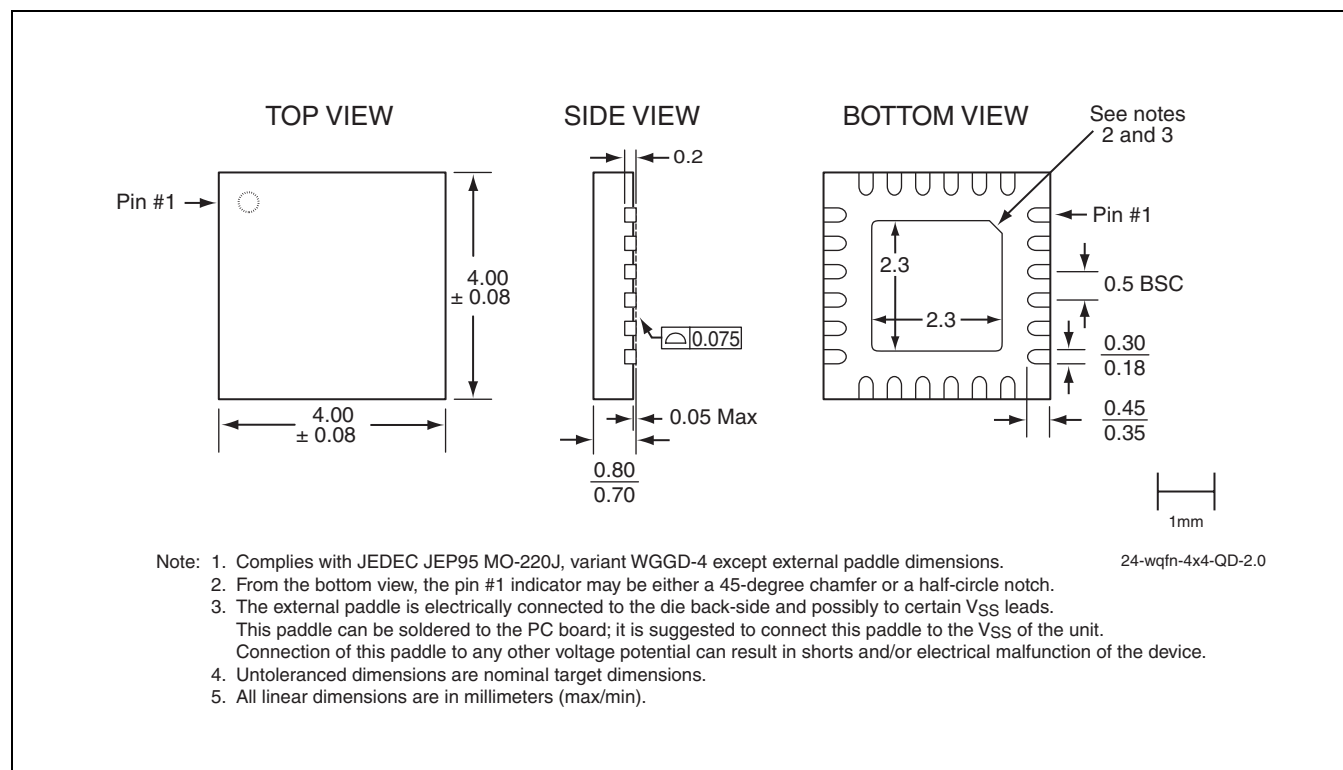


FIGURE 16: 24-contact Very-very-thin Quad Flat No-lead (WQFN)
SST Package Code: QD

2.4 GHz Front-End Module

SST12LF01



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TABLE 5: Revision History

Revision	Description	Date
00	<ul style="list-style-type: none">Initial release of data sheet	Sep 2006
01	<ul style="list-style-type: none">Updated pins 9 and 11 in Figure 2 on page 3Updated pin 6, 9, and 11 in Table 1 on page 4Updated Figure 11 on page 14Updated Figure 15 on page 16	Jan 2007
02	<ul style="list-style-type: none">Updated "Product Ordering Information" on page 17	Sep 2007
03	<ul style="list-style-type: none">Revised Product Description on page 1Changed signal gain value 14 dB globallyChanged low-noise figure to 1.45 dB globallyEdited high temperature stability feature, page 1Change low idle current to 75 mA, page 1Edited Table 2, DC Electrical Characteristics; Table 3, AC Electrical Characteristics RX Chain; Table 4, AC Electrical Characteristics TX ChainReplaced Figures 3 through 11 with up-to-date graphs on pages 7 through 13Added Figure 5 on page 8Added Figure 12 on page 14Edited Figure 15 on page 16	Jun 2008
04	<ul style="list-style-type: none">Revised RX chain gain value from 14 to 12 in "Features:" and "Product Description" on page 1 and Table 3 on page 6.Updated Figures 3 and 5.	Nov 2008
05	<ul style="list-style-type: none">Updated "Contact Information" on page 20	Feb 2009



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