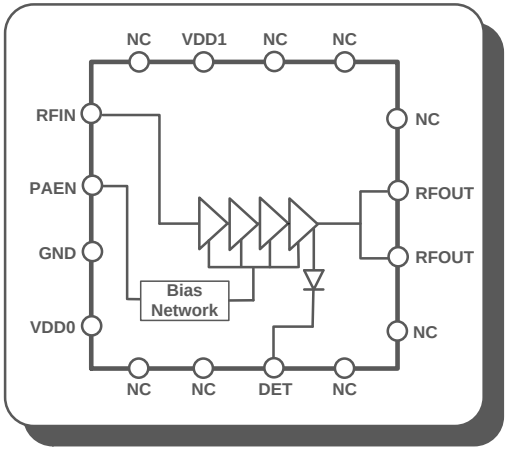
RFX242 Single-Chip/Single Die CMOS 2.4GHz High-Power 802.11ac/n/g/b WLAN Linear Power Amplifier

MP Evaluation Board Test Results Summary & Technical Notes

RFX242 Key Features and Benefits

(3.0x3.0x0.55mm
16L QFN)



RFX242 Differentiating Features

- Highly Integrated PA Solution, Gain=32dB, Eliminates the Need for Pre-driver
- Digital Logic with 1.2V Turn-On Voltage
- No Vref Regulator for Biasing
- Integrated Power Detector for Output Monitoring
- Requires Minimal External Components
- Small, Ultra-Thin 3.0mmx3.0mmx0.55mm 16L QFN Package

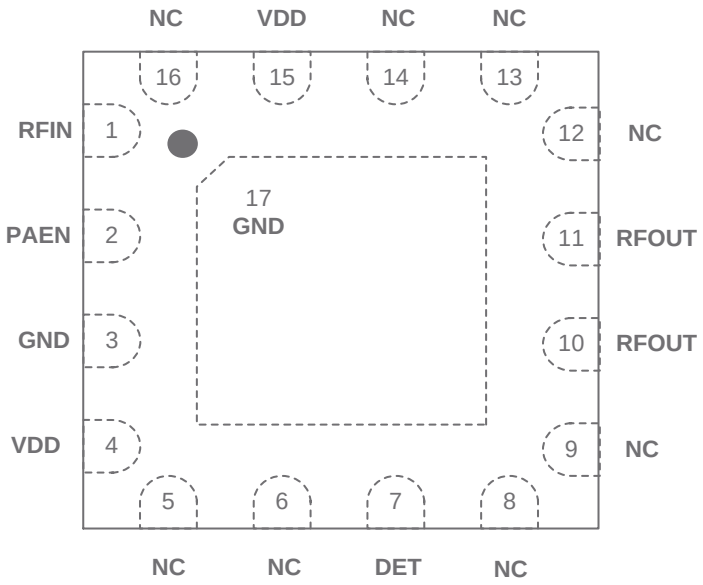
RFX242 APPLICATIONS

- WLAN AP/Router
- LTE/WiFi Router
- Femto Cell
- Outdoor WLAN Hotspot
- Set Top Box/Home Gateway
- Smart Energy/Smart Home
- Other 2.4GHz ISM Platforms

RFX242 Customer Benefits

- Small Form-Factor and Quick Design Cycle
- Simplest Approach for Improving Link Performance
- Very Low BOM Cost and Competitive Price

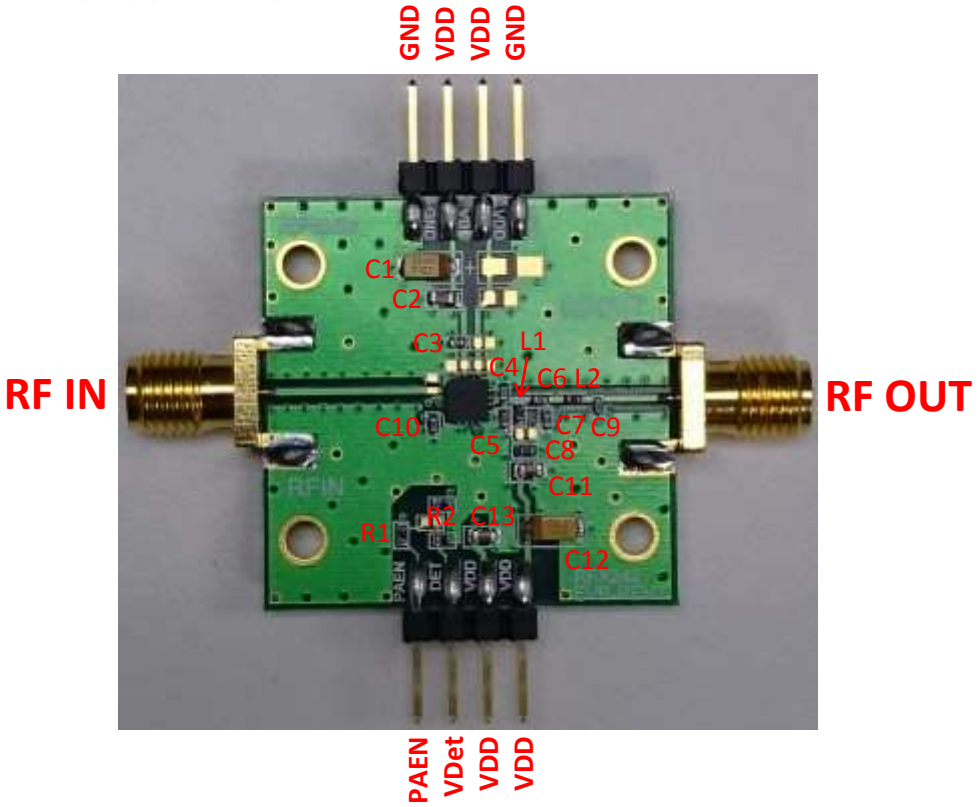
Pin-out and Pin Description



(Top "See-Through" View)

Pin Number	Pin Name	Description
1	RFIN	RF Input Signal to the PA – DC Internally Shorted to GND
2	PAEN	CMOS Logic Control to Enable the PA
3, 17	GND	Ground – Must be Connected to Ground in the Application Circuit
4, 15	VDD	DC Supply Voltage
7	DET	PA Power Detector Voltage Output
5, 6, 8, 9, 12, 13, 14, 16	NC	Not Connected Internally
10, 11	RFOUT	RF Output Signal from the PA

Eval Board and Recommended BOM



Recommended BOM			
Designator	Value	Footprint	Notes
C1, C12	22uF	Case A	Tantalum
C2, C11, C13	2.2uF	0603	X5R/X7R
C3, C8, C10	220pF	0402	X5R/X7R
C4	3.6pF	0402	C0G/NPO
C5	2.0pF	0402	C0G/NPO
C6	15pF	0402	C0G/NPO
C9	1.2pF	0402	C0G/NPO
L1	1.8nH	0402	Johanson
L2	1.5nH	0402	Johanson
R1	1KΩ	0402	
R2	10KΩ	0402	

Evaluation Board Information:

- 4-Layer Stack, 10mil/40mil/10mil
- FR4 with εr=4.5, tan δ = 0.02 (Typ)
- RFIN, RFOUT trace losses are ~0.25dB @ 2.45GHz
- Results in following slides are referenced to device pins with the trace loss de-embedded
- VDD can be powered up in any sequence
- All VDDs should be powered on before applying ctrl signals

DC Bias & Tx/Rx Logic Control:

VDD=5.0V nominal (3.6-5.5V operational)

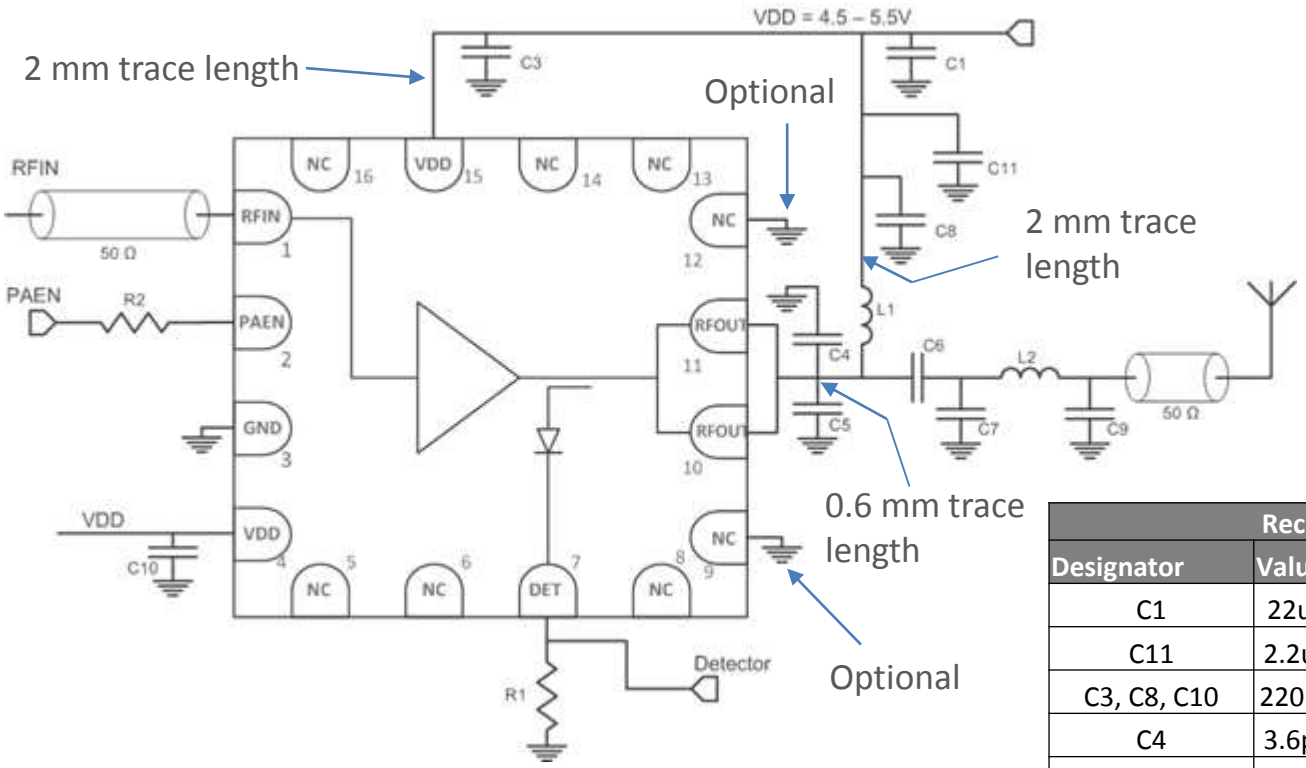
PA Enable:

PAEN=High (>1.2V)

PA Disable:

PAEN=Low (<0.3V)

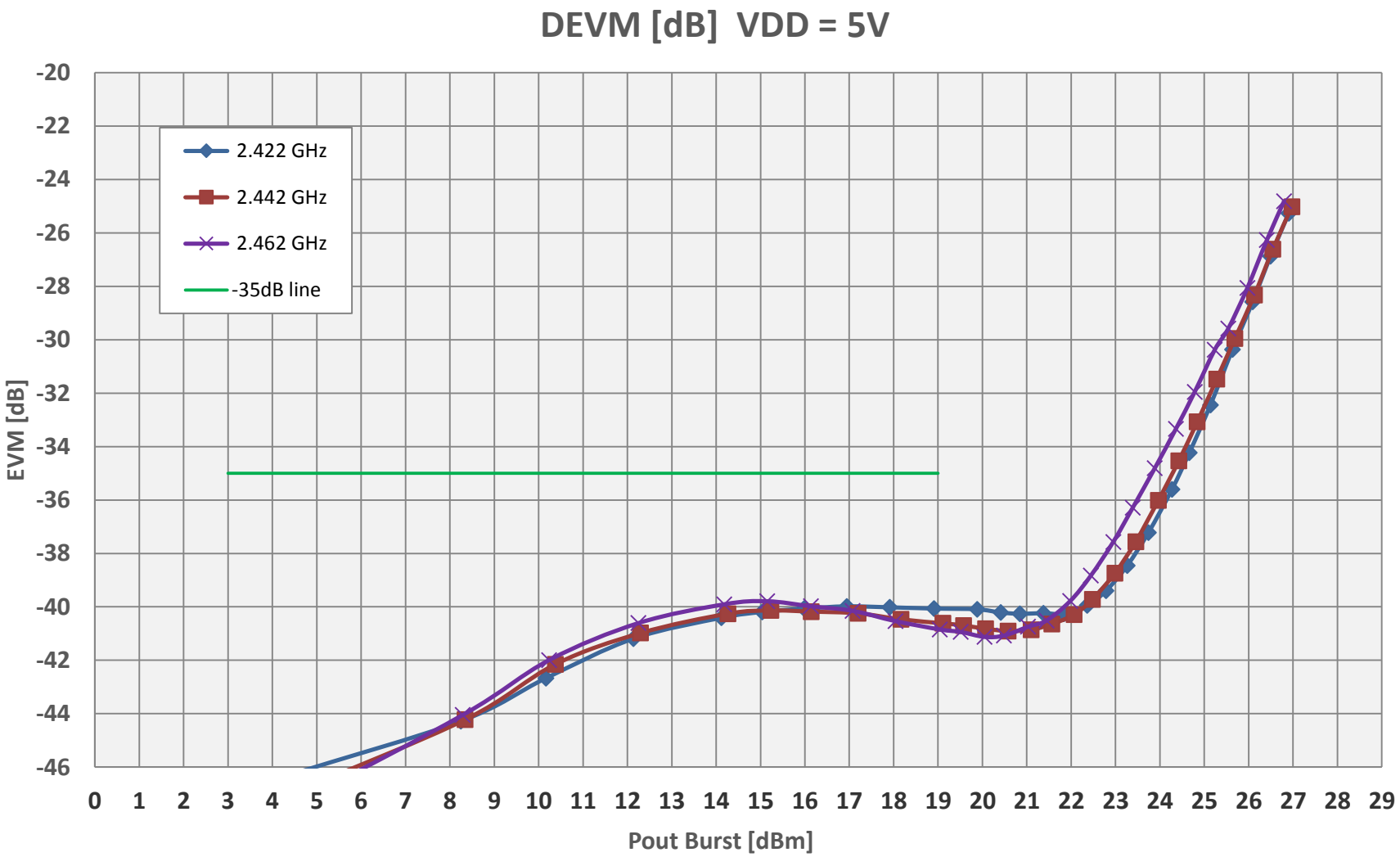
Recommended Schematic and BOM



Recommended BOM				
Designator	Value	Footprint	Notes	Tolerance
C1	22uF	Case A	Tantalum	NA
C11	2.2uF	0603	X5R/X7R	NA
C3, C8, C10	220pF	0402	X5R/X7R	NA
C4	3.6pF	0402	C0G/NPO	± 0.1pF
C5	2.0pF	0402	C0G/NPO	±5%
C6	15pF	0402	C0G/NPO	± 0.1pF
C7	2.4pF	0402	C0G/NPO	± 0.1pF
C9	1.2pF	0402	C0G/NPO	± 0.1pF
L1	1.8 nH	0402	Johanson	± 0.1nH
L2	1.5nH	0402	Johanson	± 0.1nH
R1	10KΩ	0402		±5%
R2	1KΩ	0402		±5%

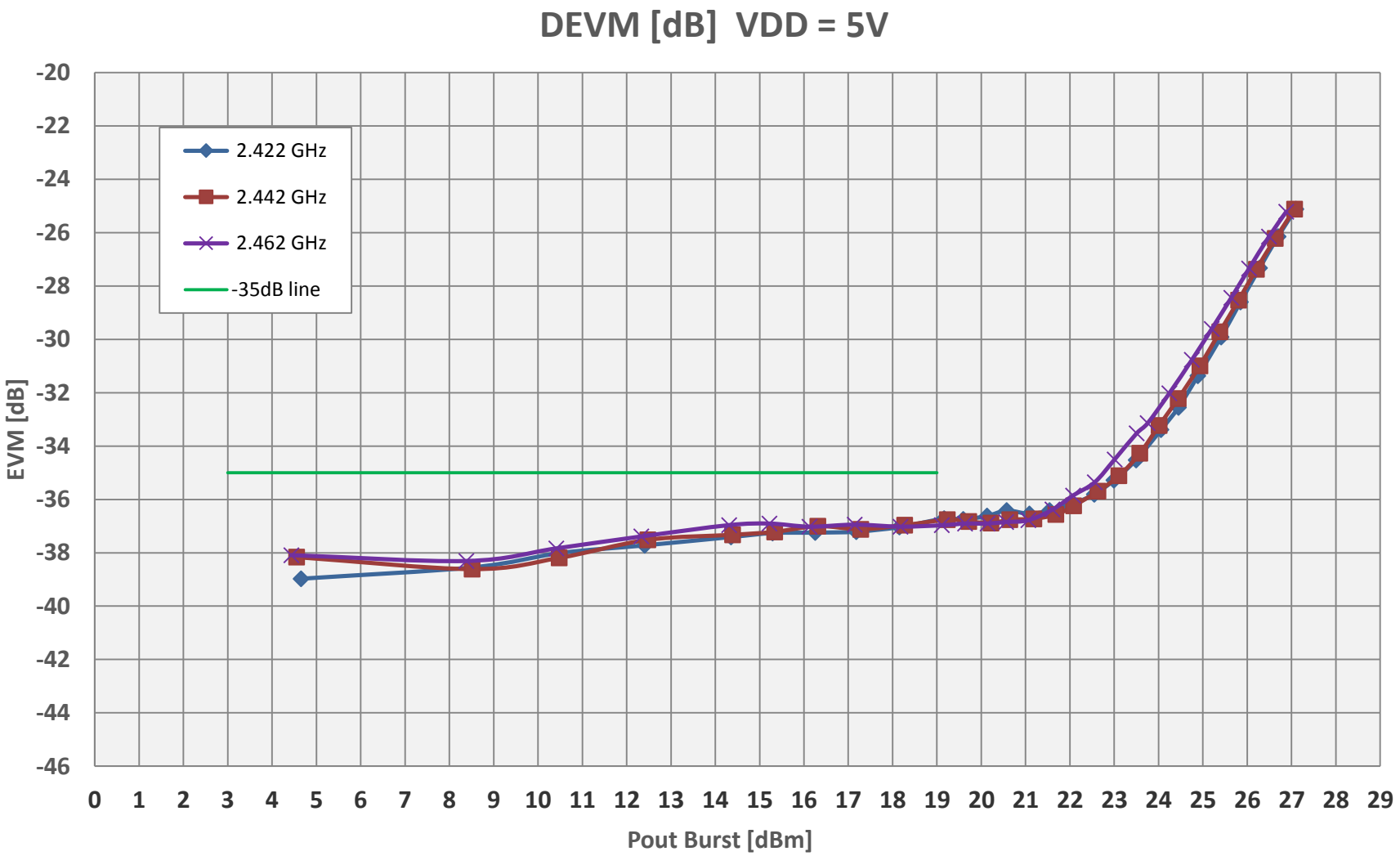
RFX242 Dynamic EVM vs. Output Power

802.11ac MCS9 VHT40, 100 us Burst, 50% Duty Cycle, VDD=5V



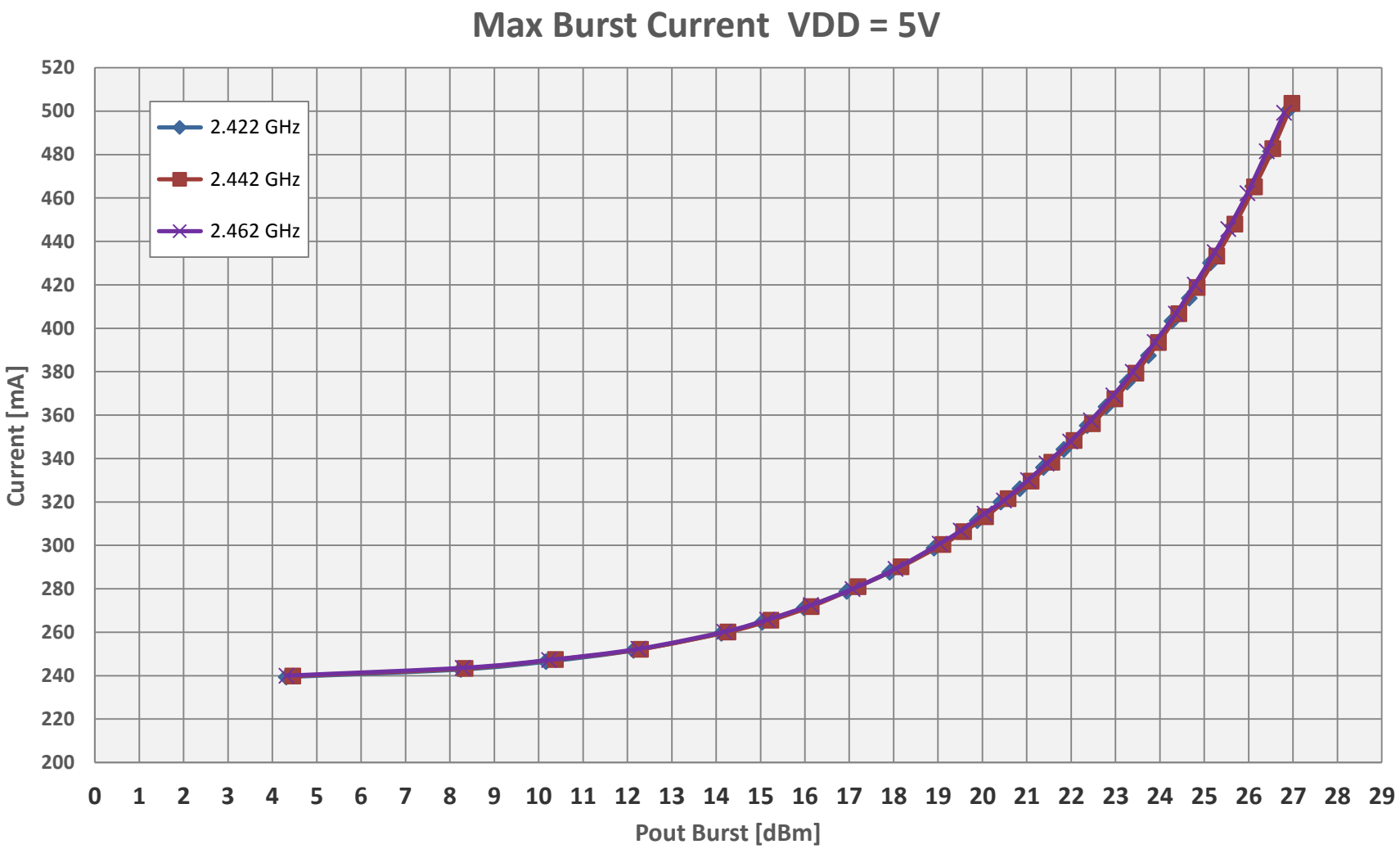
RFX242 Dynamic EVM vs. Output Power

802.11ac MCS9 VHT40, 4 ms Burst, 50% Duty Cycle, VDD=5V



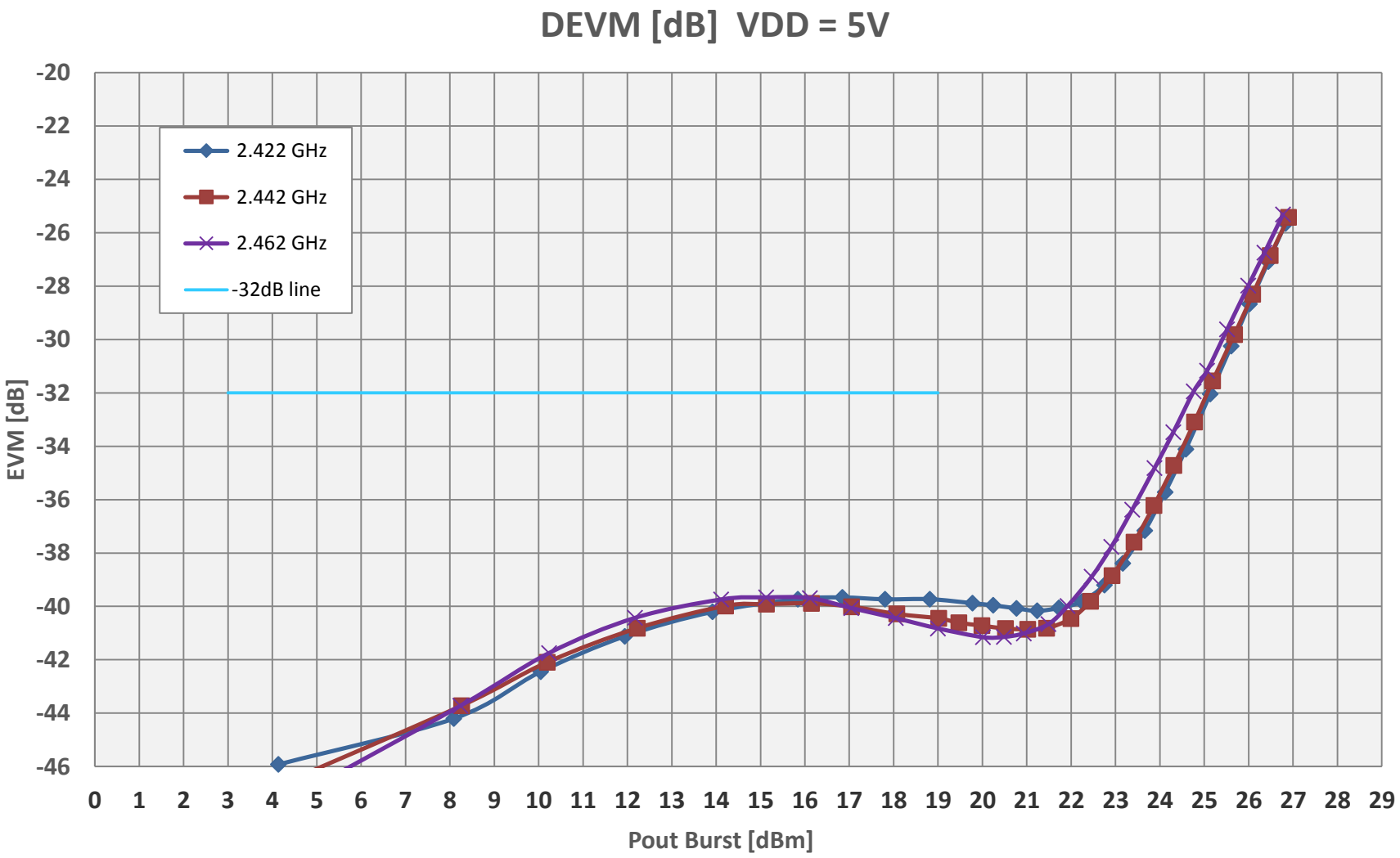
RFX242 Burst Current vs. Output Power

802.11ac MCS9 VHT40, 100 us Burst, 50% Duty Cycle, VDD=5V



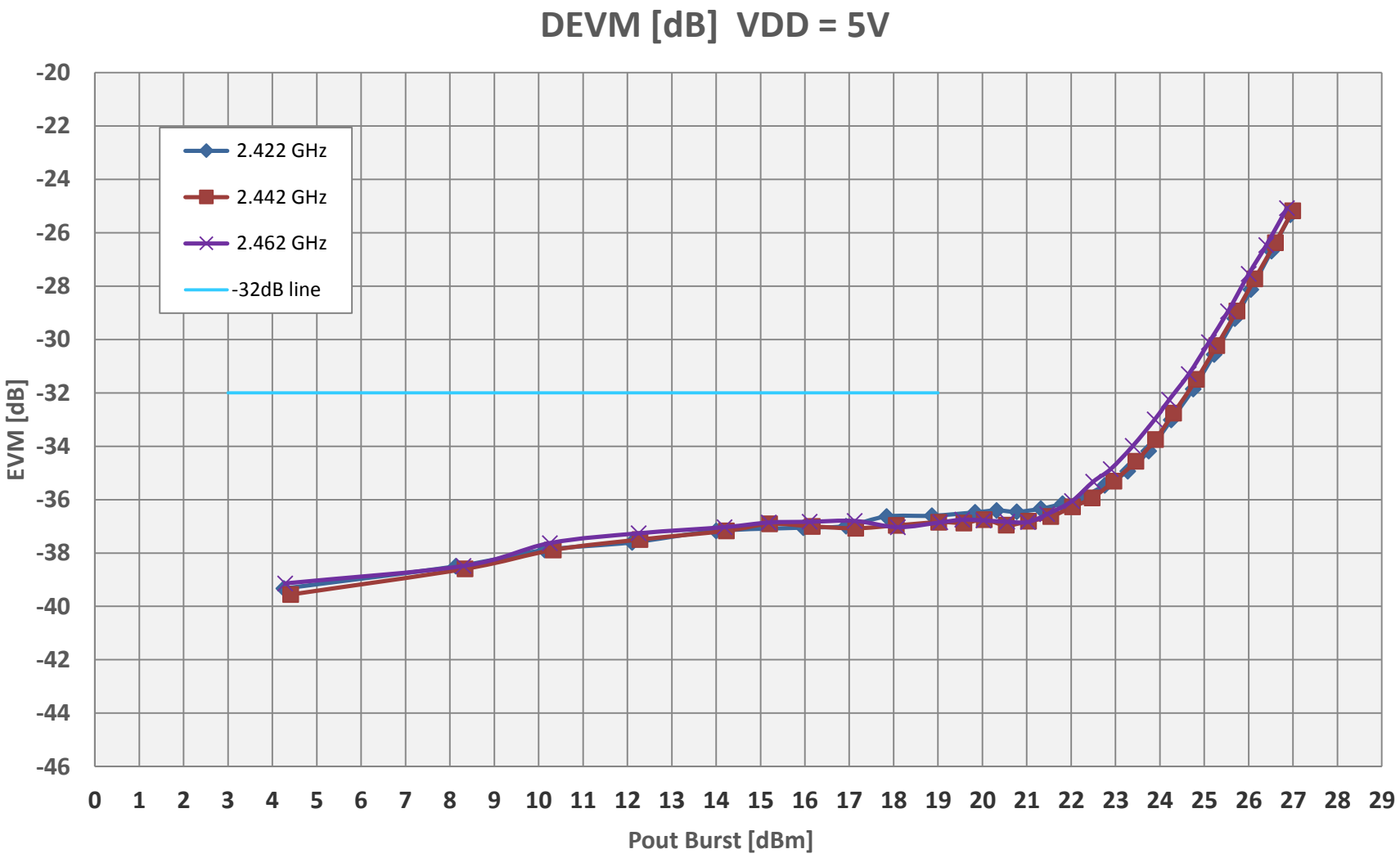
RFX242 Dynamic EVM vs. Output Power

802.11n MCS7 HT40, 100 us Burst, 50% Duty Cycle, VDD=5V



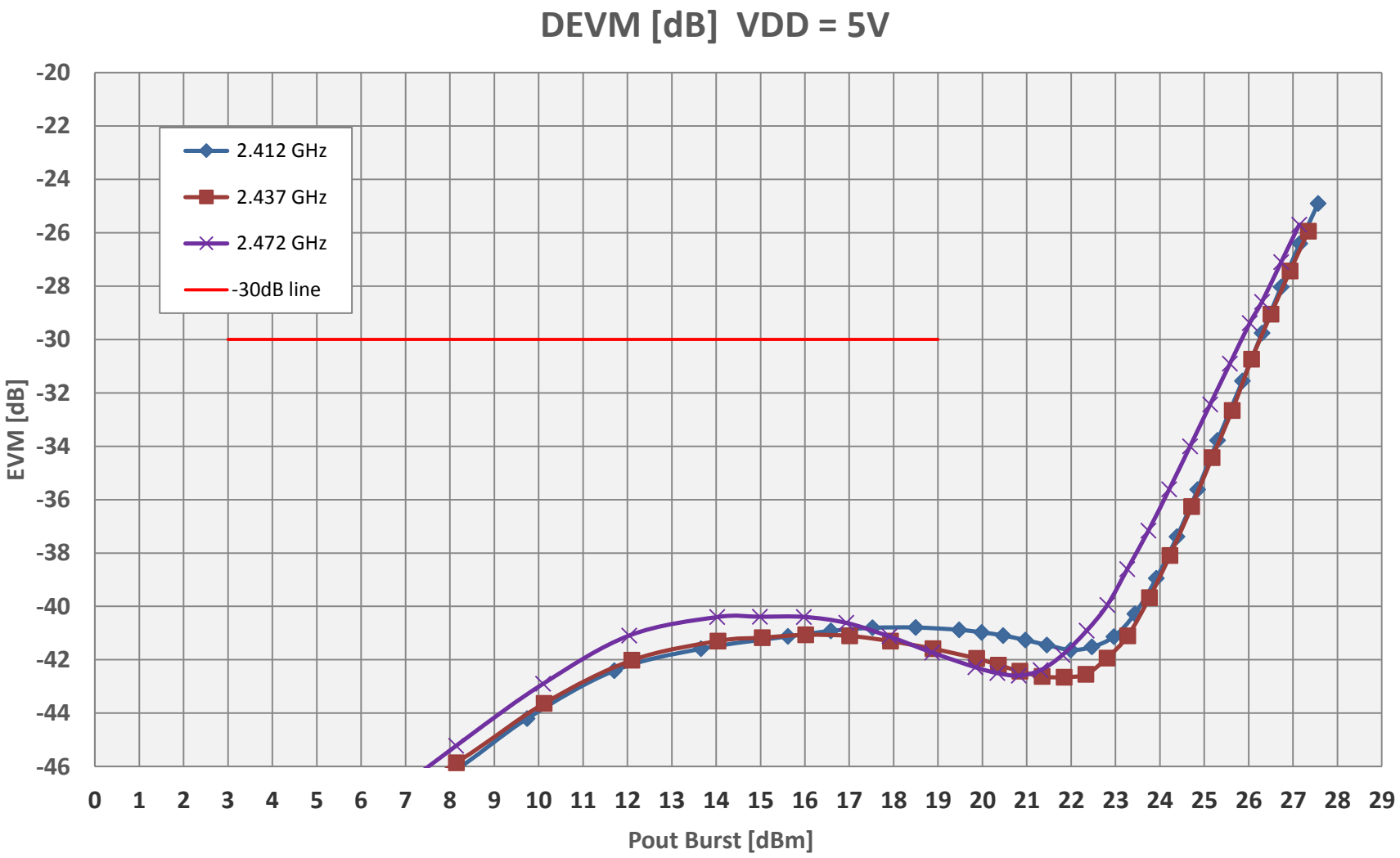
RFX242 Dynamic EVM vs. Output Power

802.11n MCS7 HT40, 100 ms Burst, 50% Duty Cycle, VDD=5V



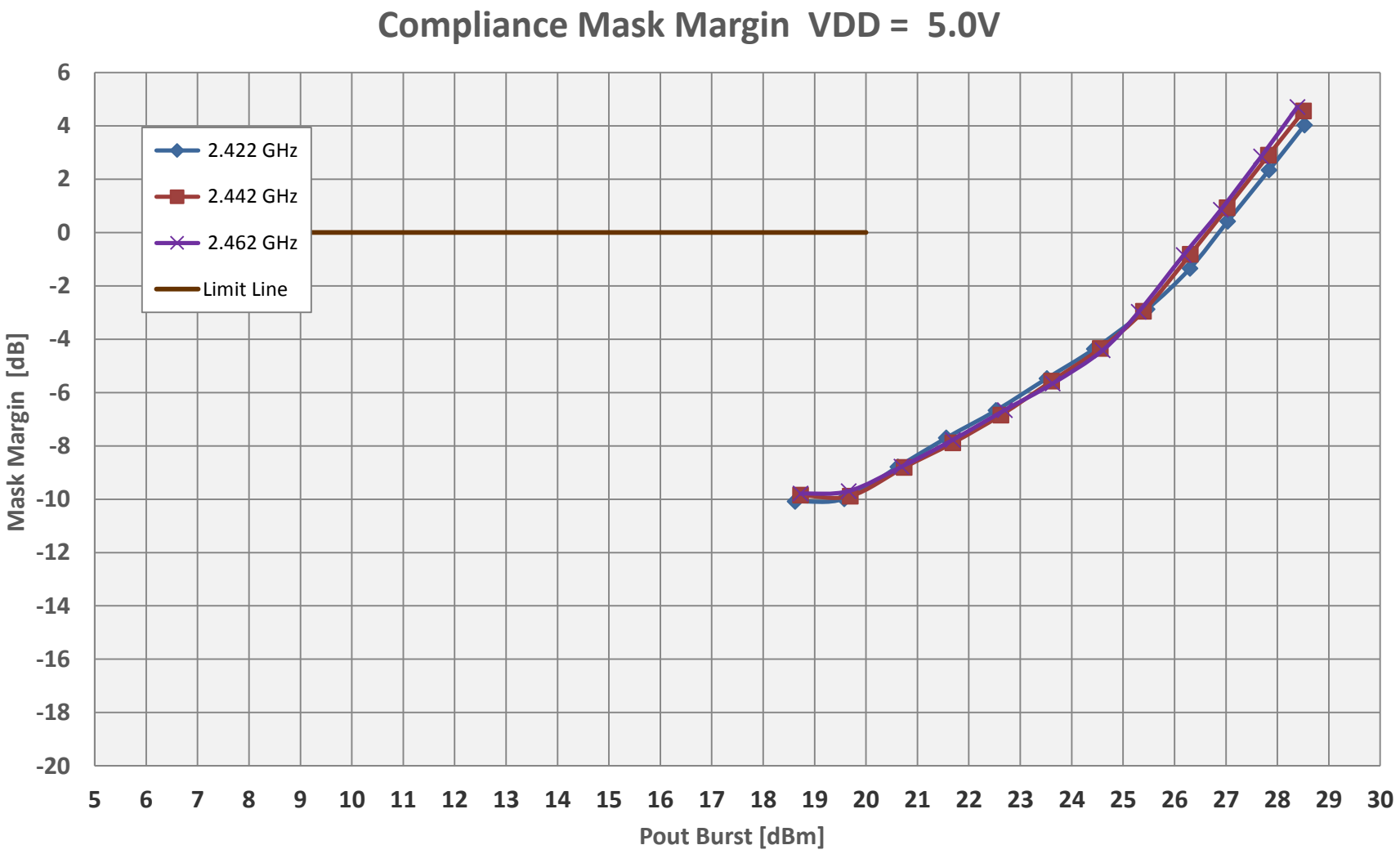
RFX242 Dynamic EVM vs. Output Power

802.11g 64 QAM, 100 us Burst, 50% Duty Cycle, VDD=5V



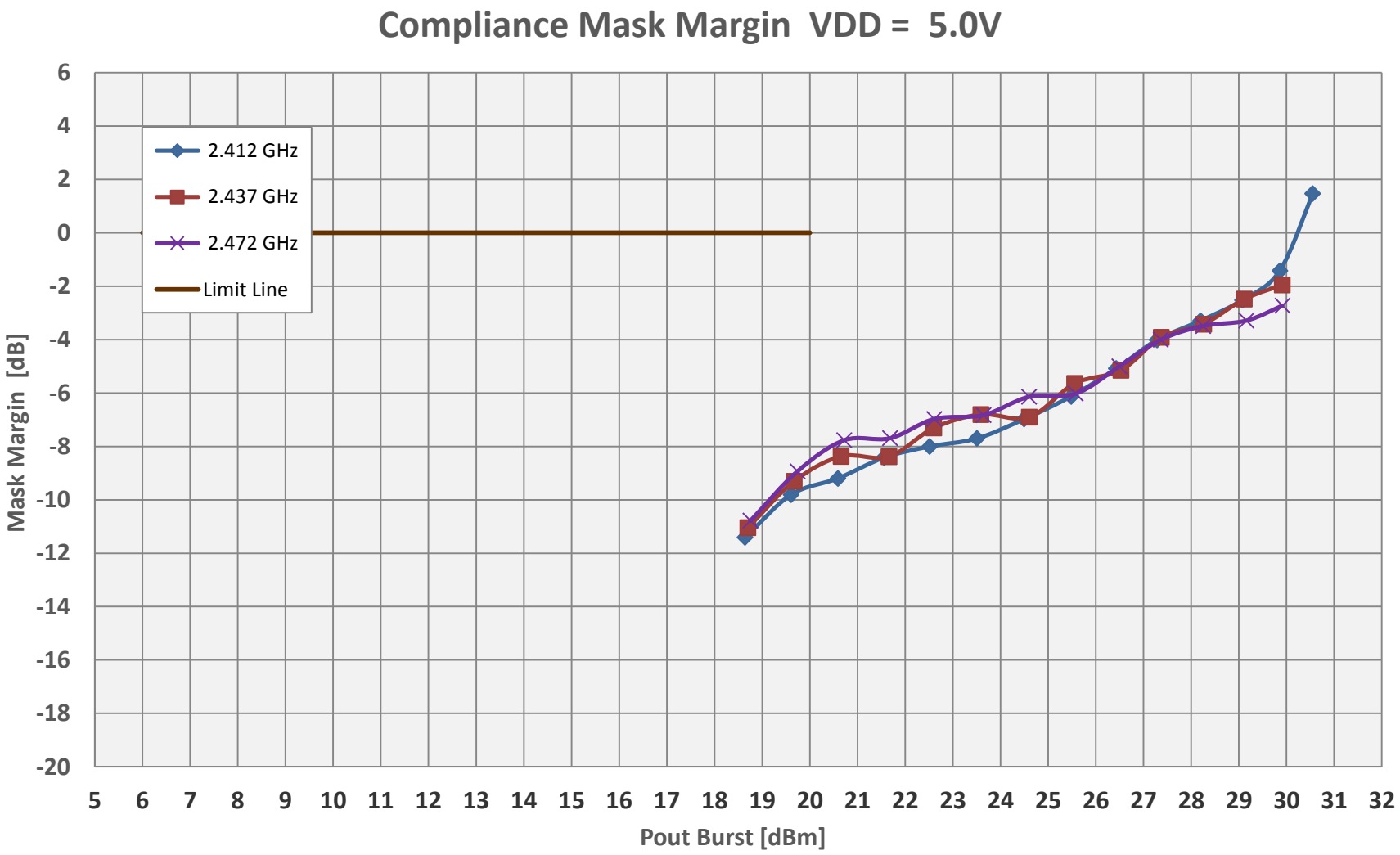
RFX242 Compliance Mask Margin vs. Output Power

802.11n HT40 MCS0 , 100 us Burst, 50% Duty Cycle, VDD=5V



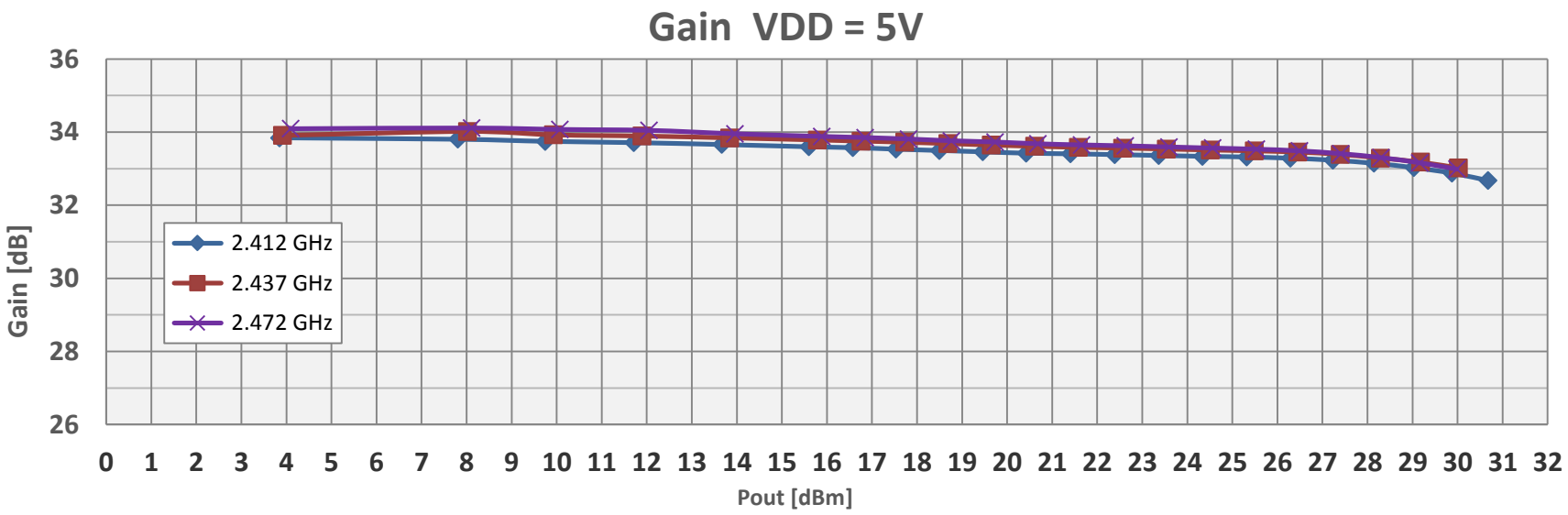
RFX242 Compliance Mask Margin vs. Output Power

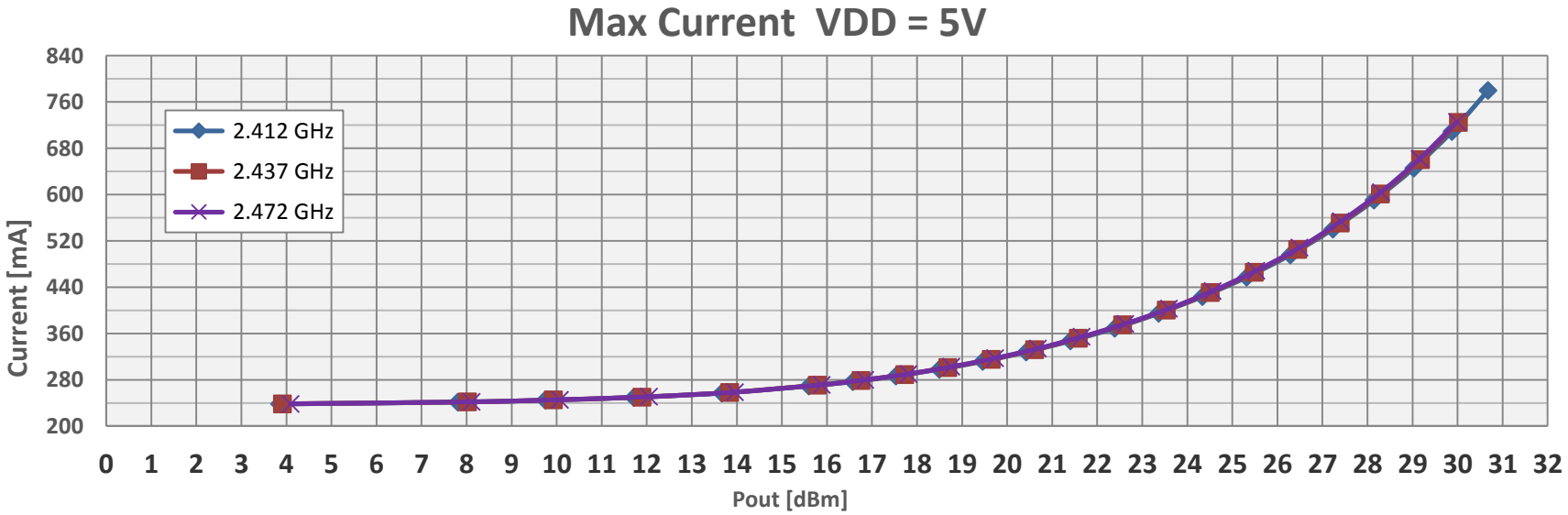
802.11b 1Mbps, 100us Burst, 50% Duty Cycle, VDD=5V



RFX242 Large Signal Gain and Current vs. Output Power

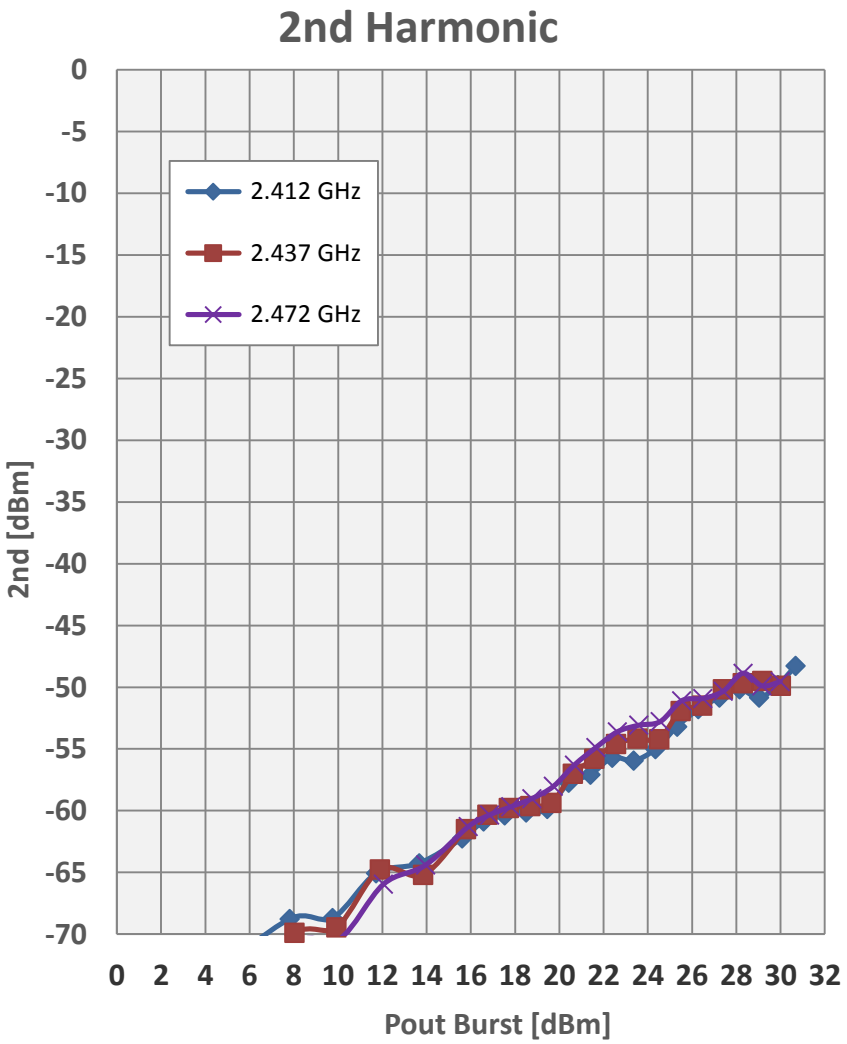
CW Signal, VDD=5V

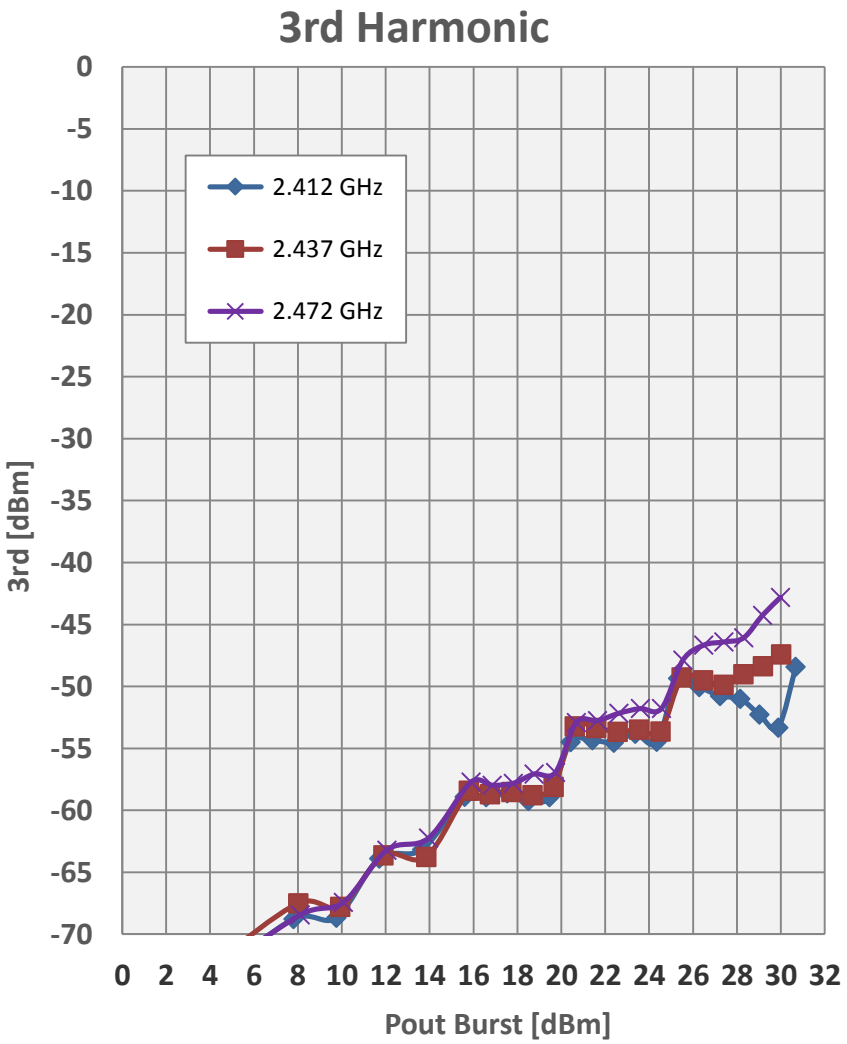




RFX242 Large Signal 2nd and 3rd Harmonics vs. Output Power

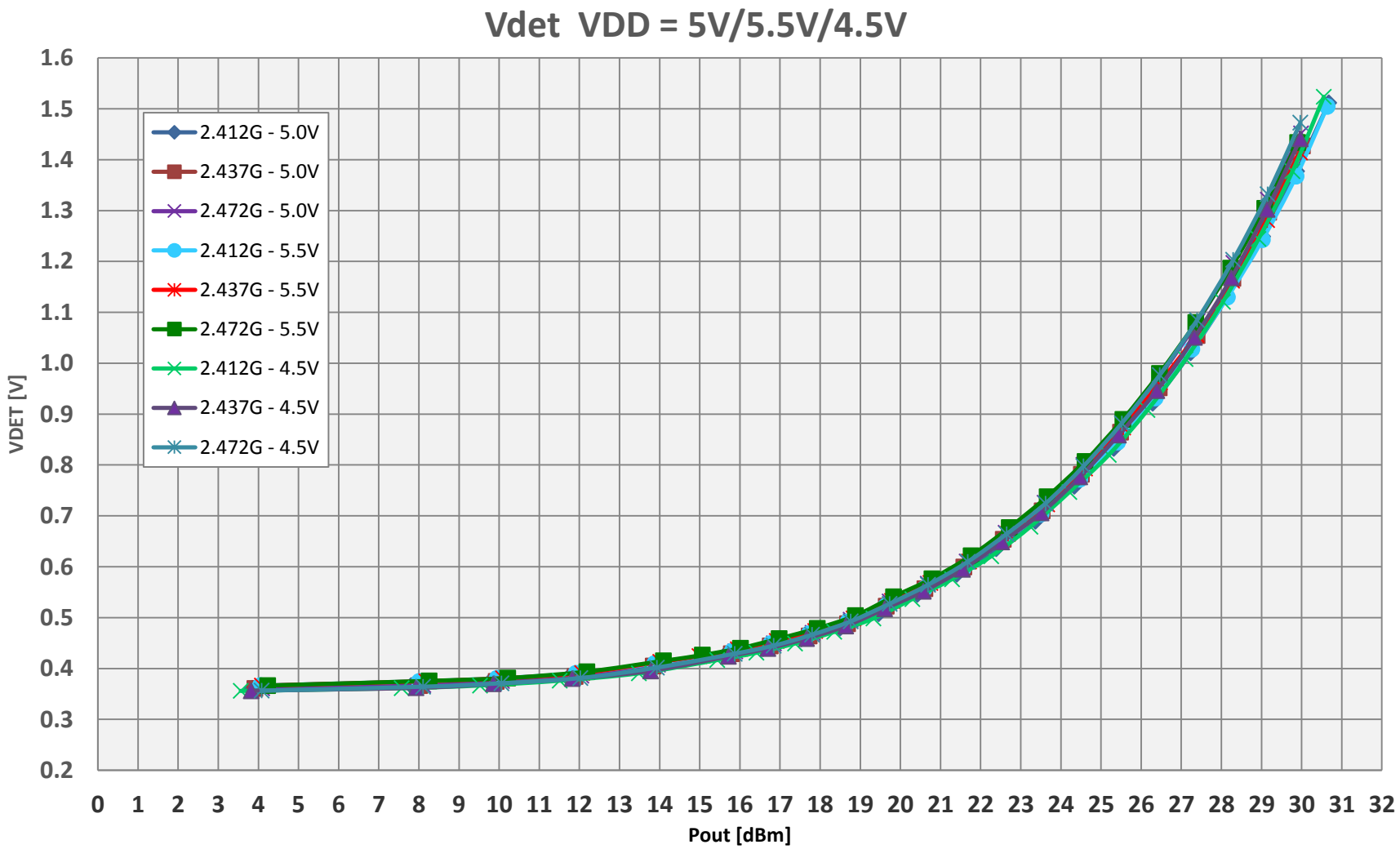
CW Signal, VDD=5V





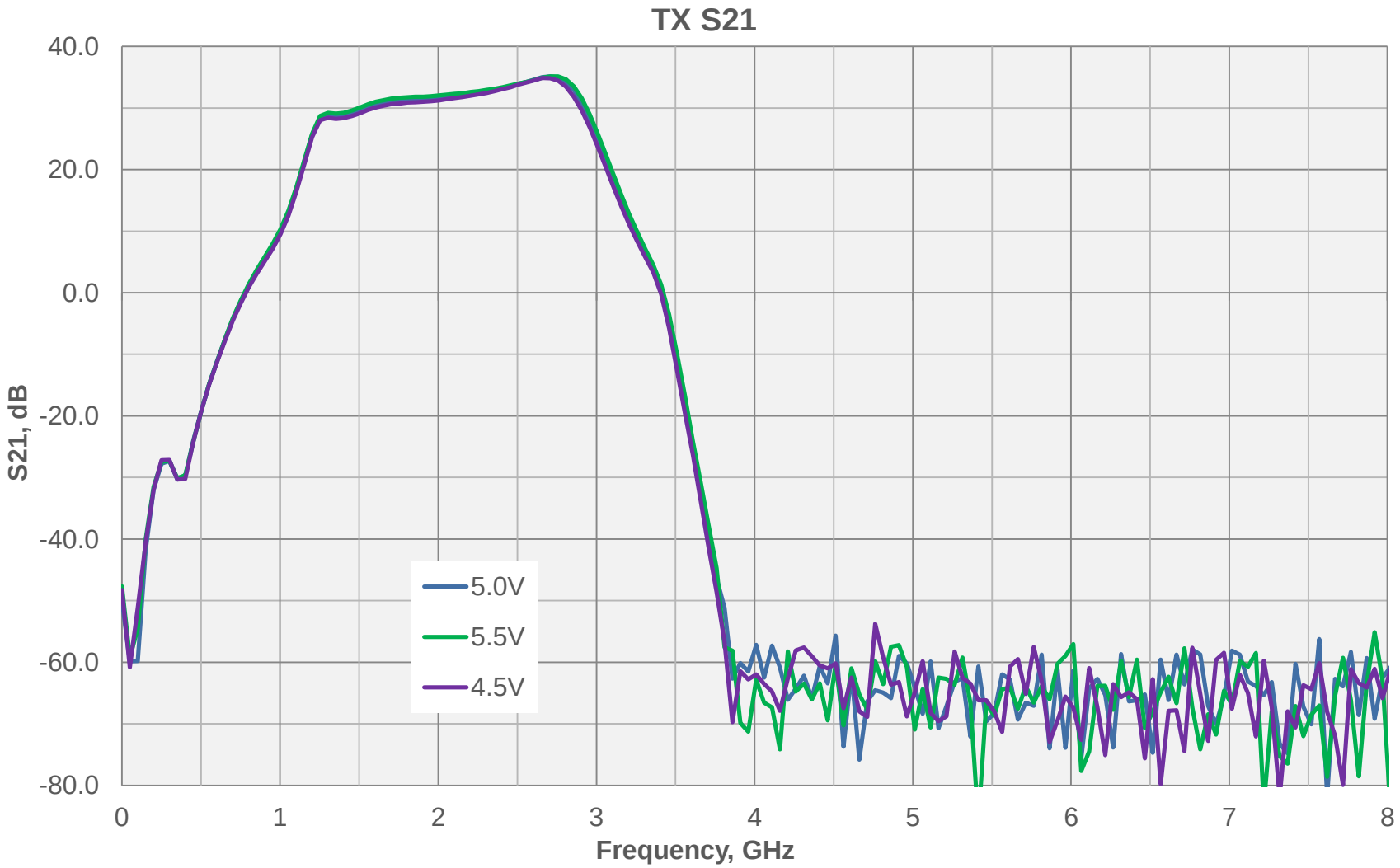
RFX242 Large Signal Detector Voltage vs. Output Power

CW Signal, VDD=4.5V/5V/5.5V



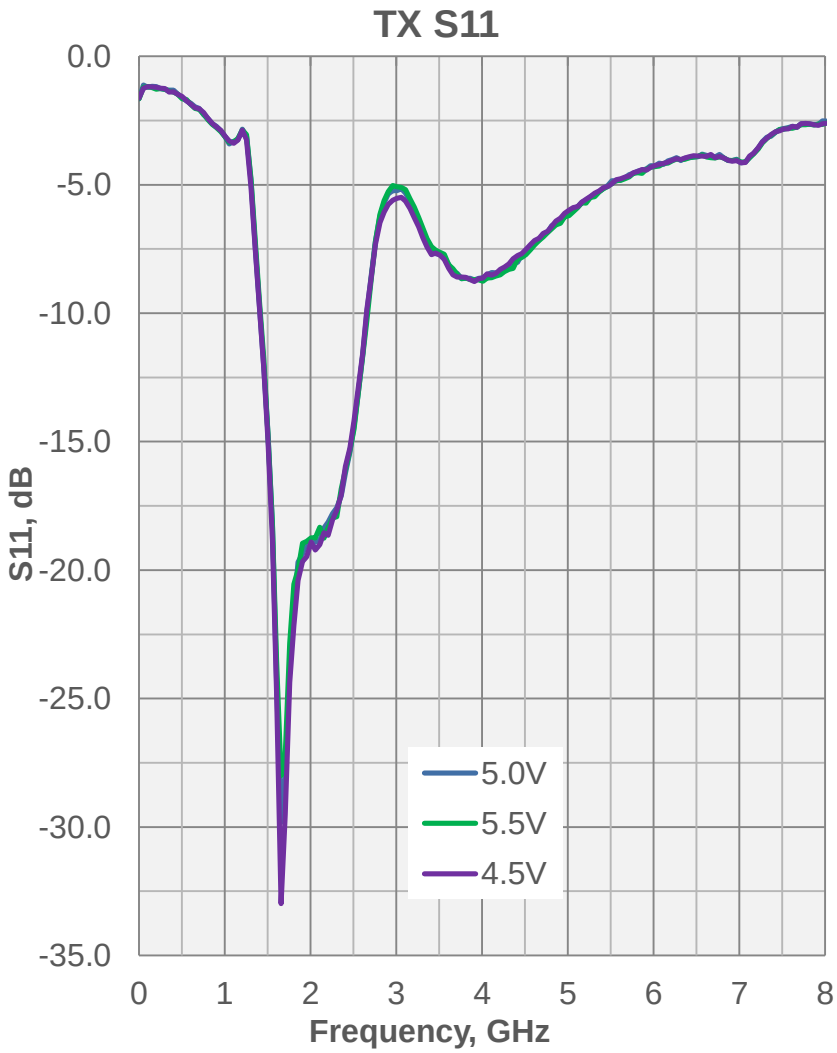
RFX242 TX S21 S-Parameter over Frequency

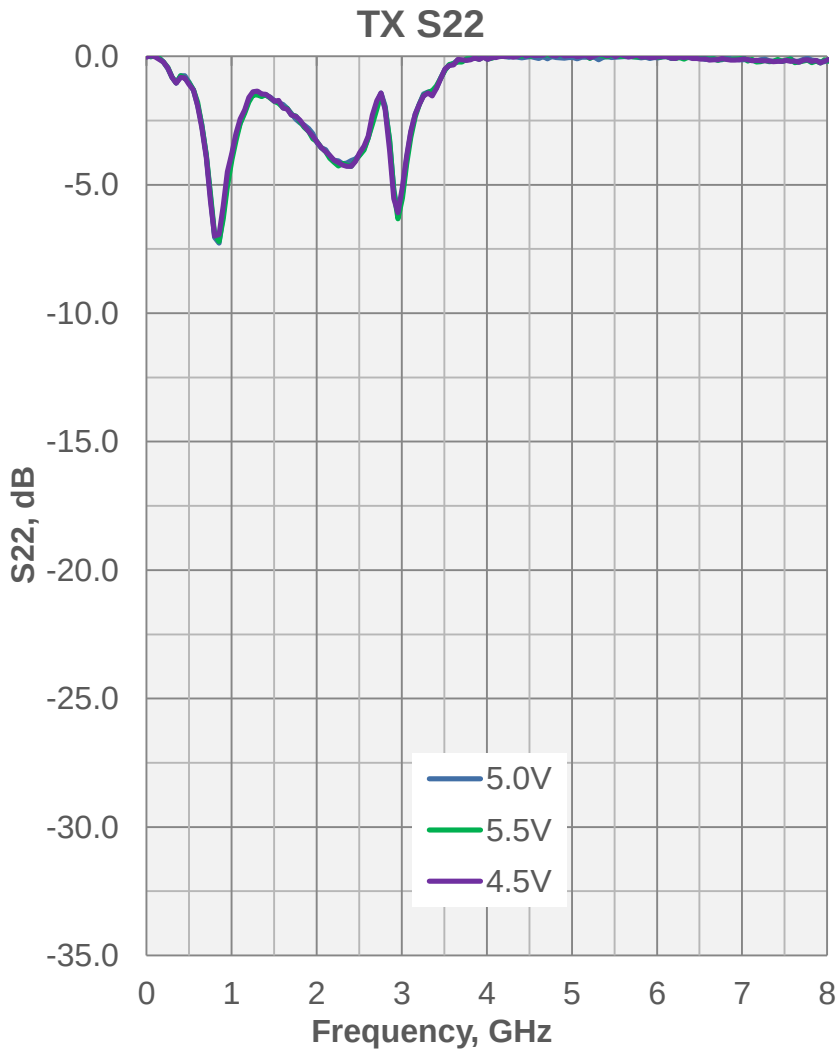
VDD=5.0V, 5.5V, and 4.5V



RFX242 S22/S11 S-Parameter over Frequency

VDD=5.0V, 5.5V, and 4.5V





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