



KCT8226D Application Note

Nov. 2019

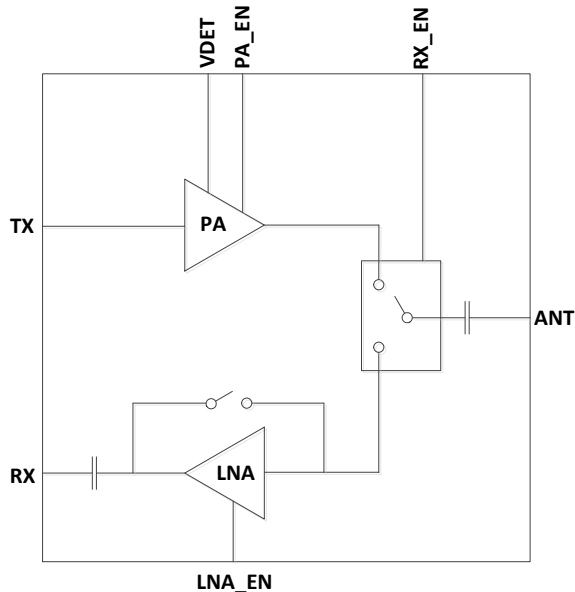


康希通信科技（上海）有限公司
Kangxi Communication Technologies (Shanghai) Co., Ltd.



KCT8226D 2.4GHz High-Power WLAN 802.11ac RFIC

Functional Block Diagram



Applications

- 802.11b/g/n/ac set-top boxes, networking, and personal computer systems
- PC cards, PCMCIA cards, mini-cards, and half mini-cards
- WLAN enabled wireless video systems

Product Overview

- Fully integrated RF Front-End IC
- PA + LNA + Bypass + T/R Switch
- IEEE 802.11b/g/n/ac WLAN System
- 2.4~2.5GHz Operation

Features

- Integrated high performance 2.4GHz PA, LNA with bypass, and T/R switch
- Fully-matched input and output
- Integrated power detector
- Output power: +21.5dBm @ DEVM=-35dB, HT40/MCS9
- Output power: +22.5dBm @ DEVM=-30dB, HT20/MCS7
- Transmit gain: 27.5dB
- Receive gain: 16.5dB
- High performance SP3T switch to support WiFi/Bluetooth functions
- ESD protection circuitry on all PINs
- Minimal External Components Required
- Small package: QFN 16-pin, 3×3×0.55mm (MSL3, 260°C per JEDEC J-STD-020)

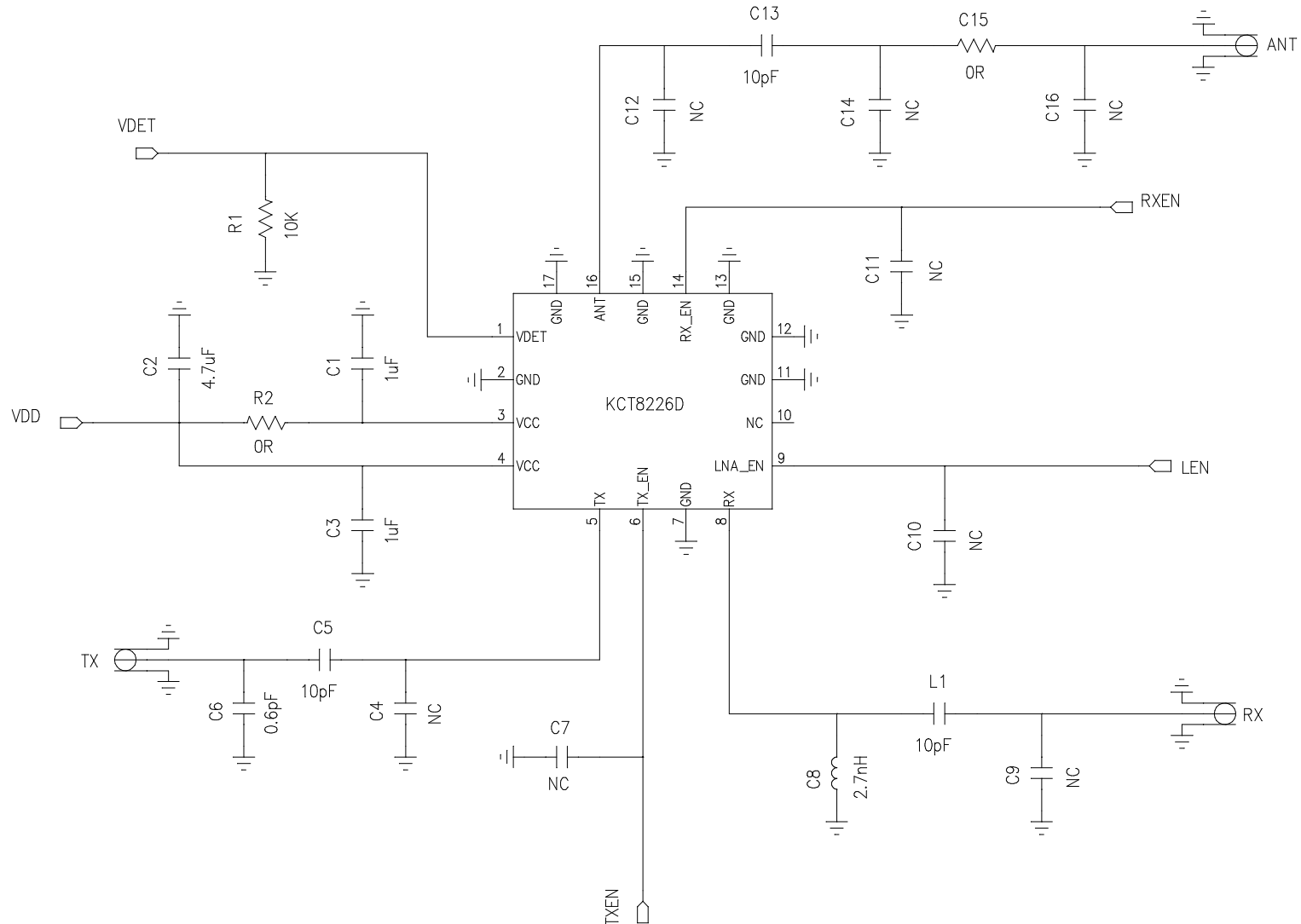


KCT8226D Pin Description

Pin Number	Pin Name	Description
1	VDET	Detector Output Voltage
3, 4	VCC	PA Supply Voltage
5	TX	RF Input Port from the Transceiver; DC shorted to GND
6	TX_EN	Input to Control TX Enable
2, 7, 11, 12, 13, 15	GND	Ground – Must be connected to Ground in the Application Circuit
8	RX	RF Output Port from the LNA or Bypass
9	LNA_EN	Input to Control LNA Enable or Bypass Mode
10	NC	Internally Not Connected
14	RX_EN	Input to Control RX Enable
16	ANT	Antenna – RF Signal from the PA or RF Signal Applied to the LNA; DC shorted to GND

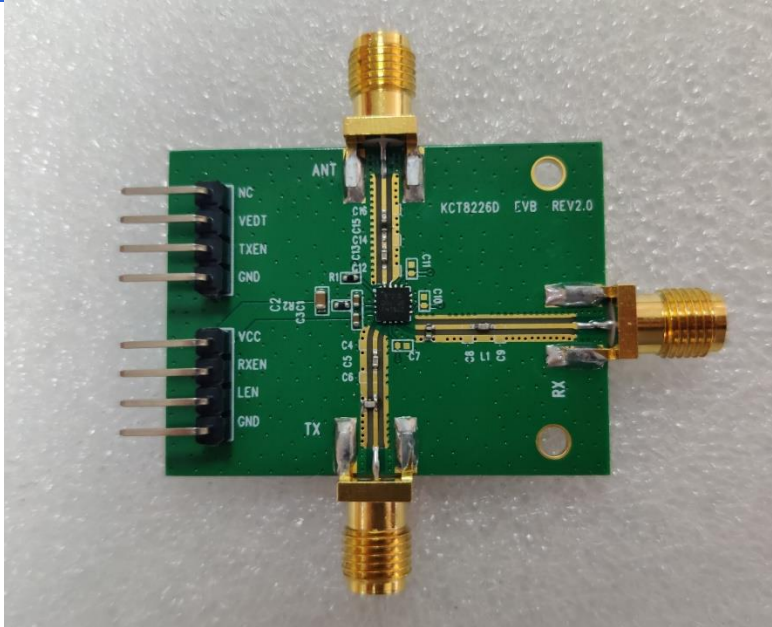


Recommended Application Schematic and BOM





KCT8226D Evaluation Board



Evaluation Board Information:

- 4-layer stack, 10mil/20mil/10mil
- FR4 with $\epsilon_r=3.9$, $\tan\delta=0.02$ (Type) at 2.4GHz
- TX, RX, and ANT Trace Losses are **0.3dB@2.4GHz~2.5GHz**
- VDD Nominal is +5V

Recommended BOM

Designator	Value	Footprint	Notes
C6	0.6PF	0402	X5R/X7R
L1,C5,C13	10PF	0402	X5R/X7R
C1,C3	1 μ F	0402	X5R/X7R
C2	4.7 μ F	0603	X5R/X7R
R2,C15	0ohm	0402	ROHM
R1	10K	0402	Det. load
C8	2.7nH	0402	LQG15HS

Control Logic Table

TX_EN	RX_EN	LNA_EN	Mode of Operation
1	0	0	WLAN Transmit
0	1	1	WLAN Receive LNA
0	1	0	WLAN Receive Bypass
0	0	0	Shutdown

Note: "1" denotes high voltage state (> 1.8V)

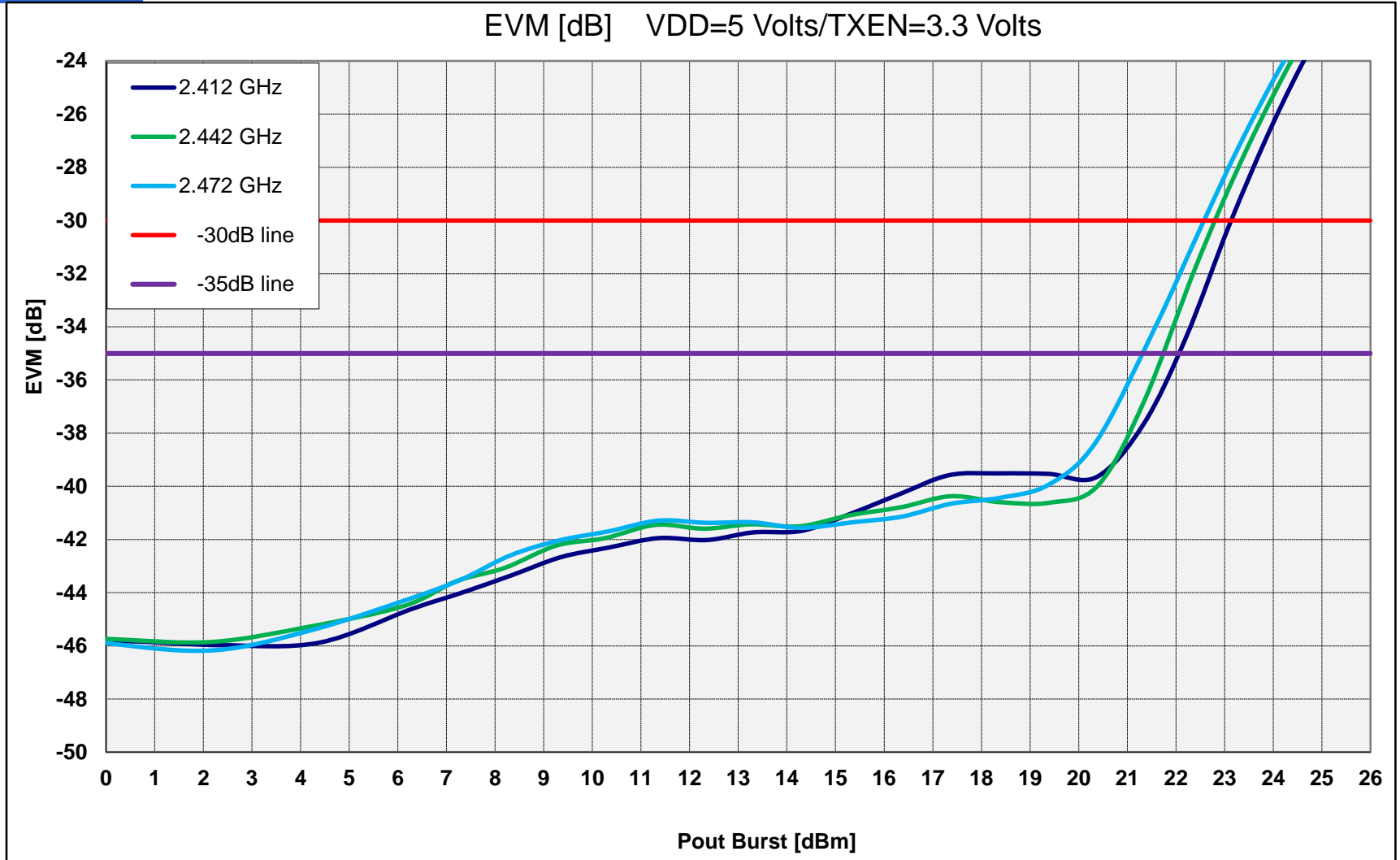
"0" denotes low voltage state (<0.4V) at Control Pins

"X" denotes the don't care state

1K Ω – 10K Ω series resistor may be required for each control line

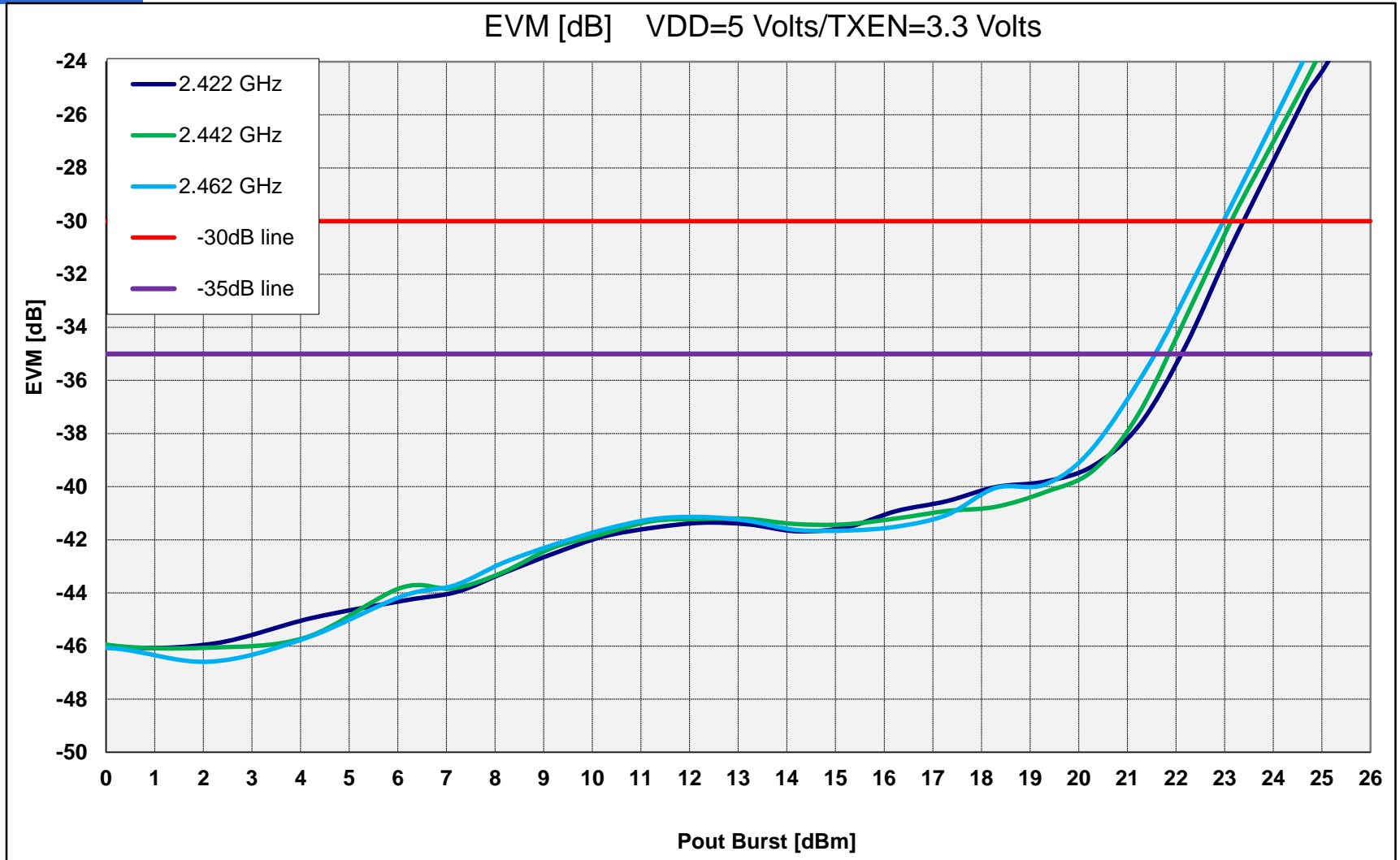


KCT8226D Dynamic EVM_HT20_MCS7, VDD=5V



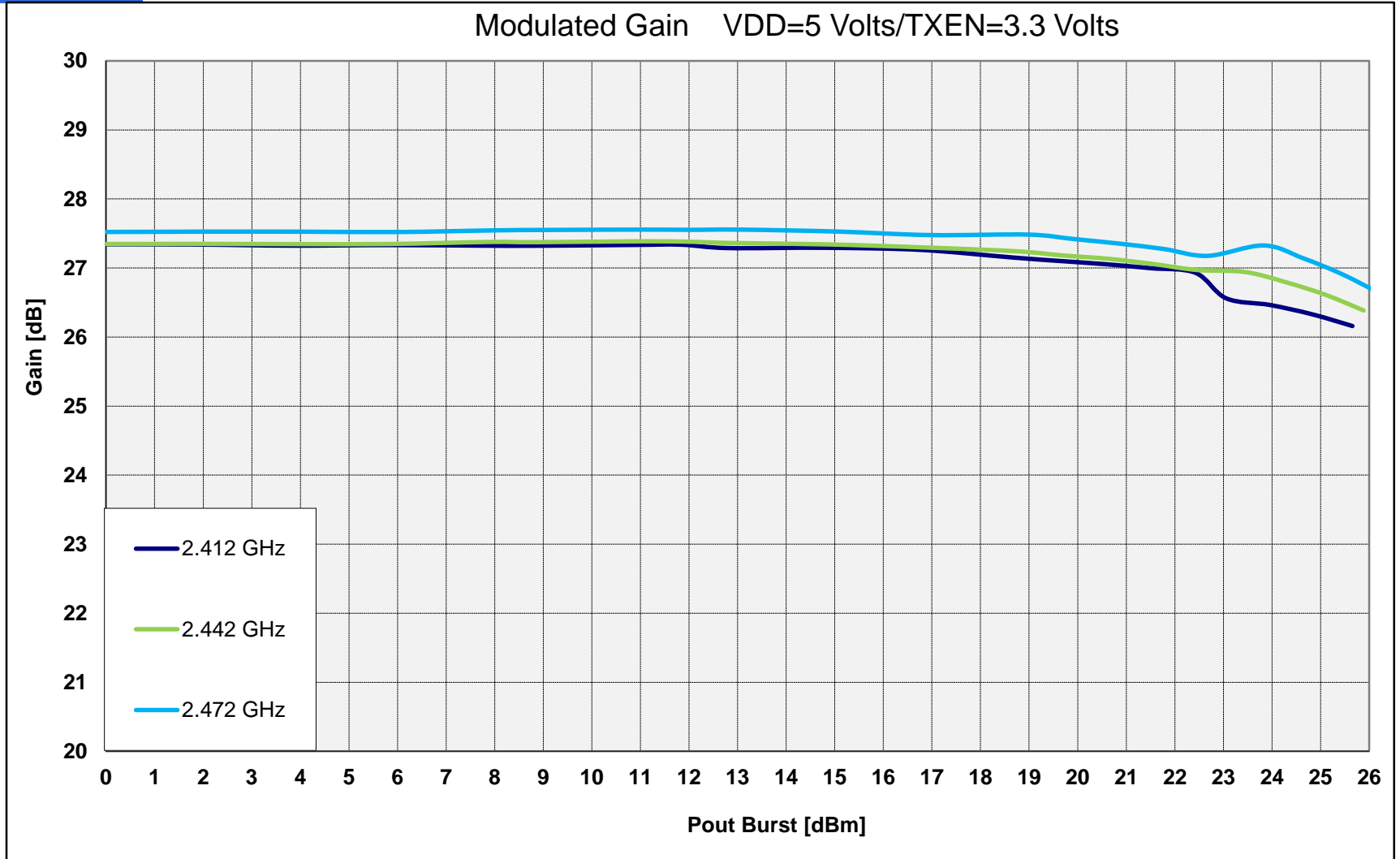


KCT8226D Dynamic EVM_HT40_MCS9, VDD=5V



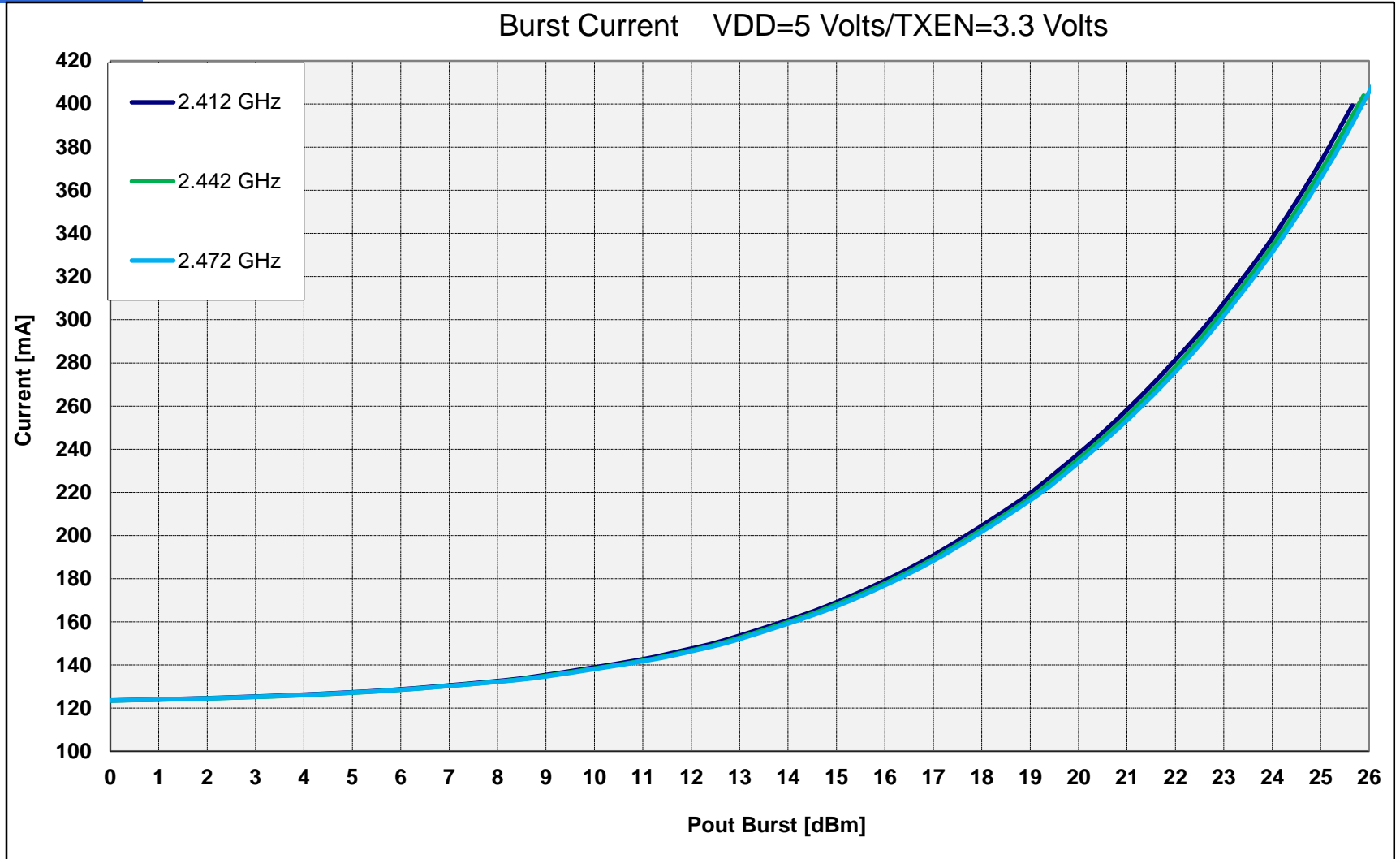


KCT8226D TX 11b_1Mbps Signal Gain, VDD=5V



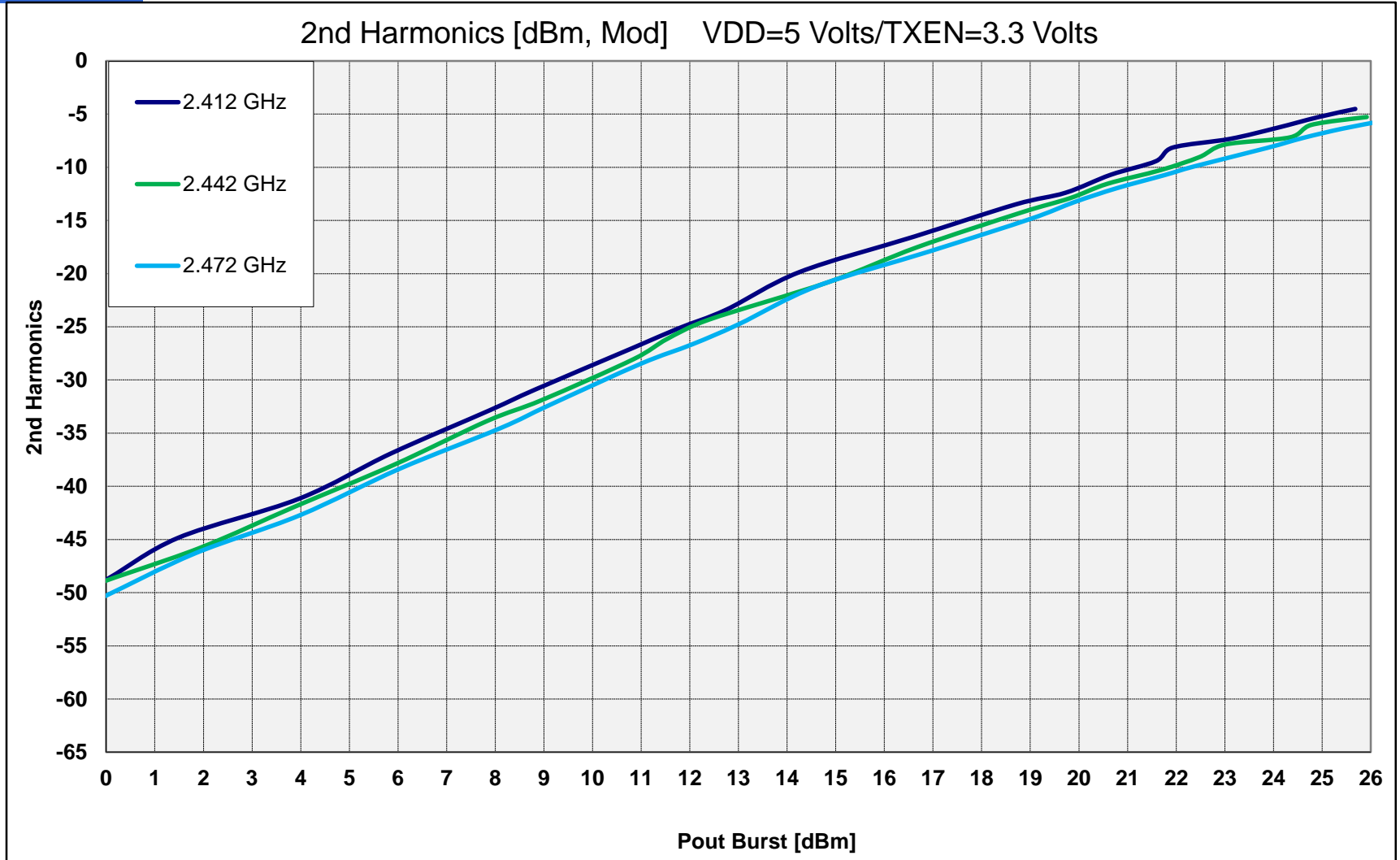


KCT8226D TX 11b_1Mbps Signal Current, VDD=5V



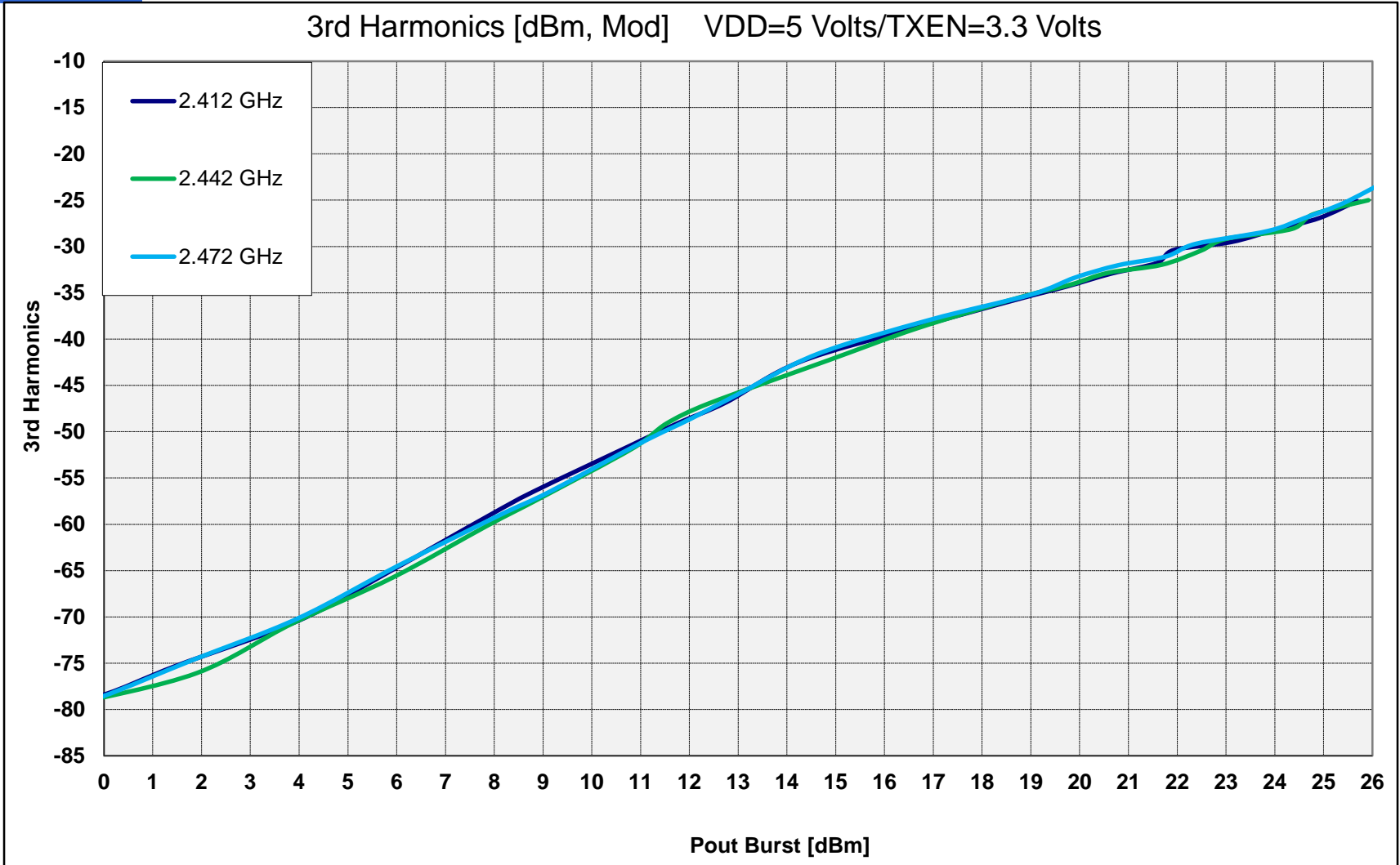


KCT8226D TX 2nd Harmonics, 11b_1Mbps Signal, VDD=5V



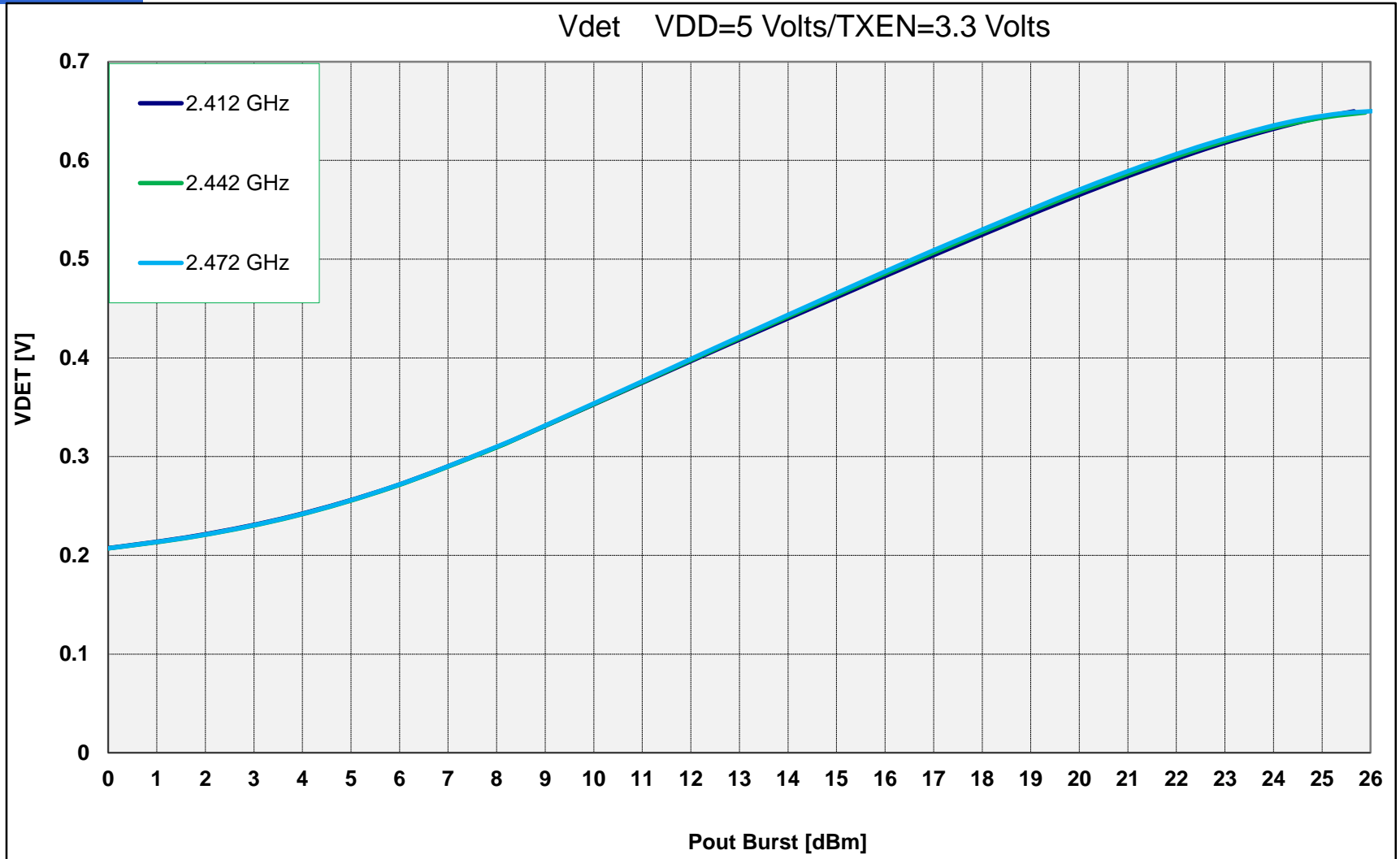


KCT8226D TX 3rd Harmonics, 11b_1Mbps Signal, VDD=5V



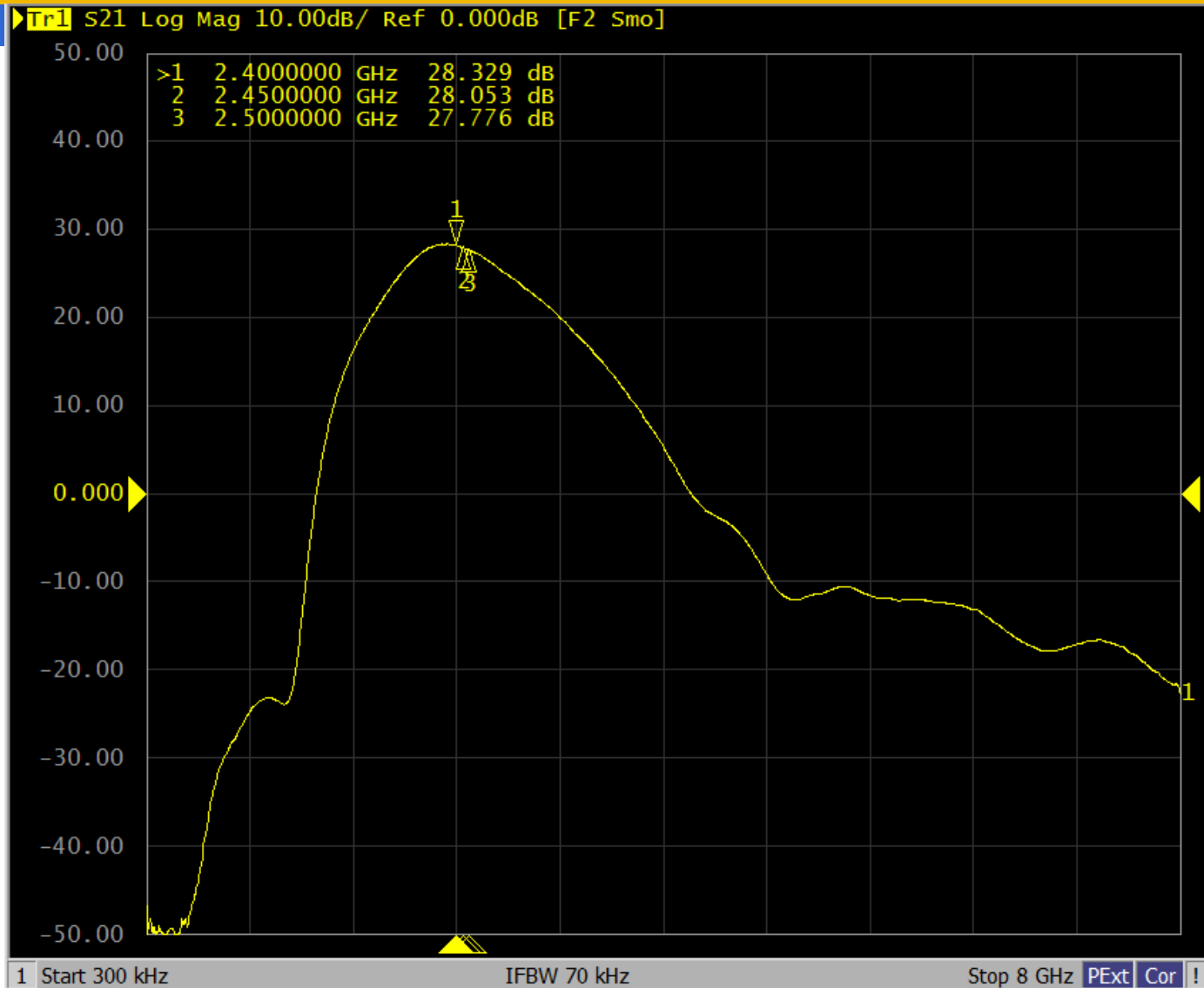


KCT8226D Detector Voltage, VDD=5V



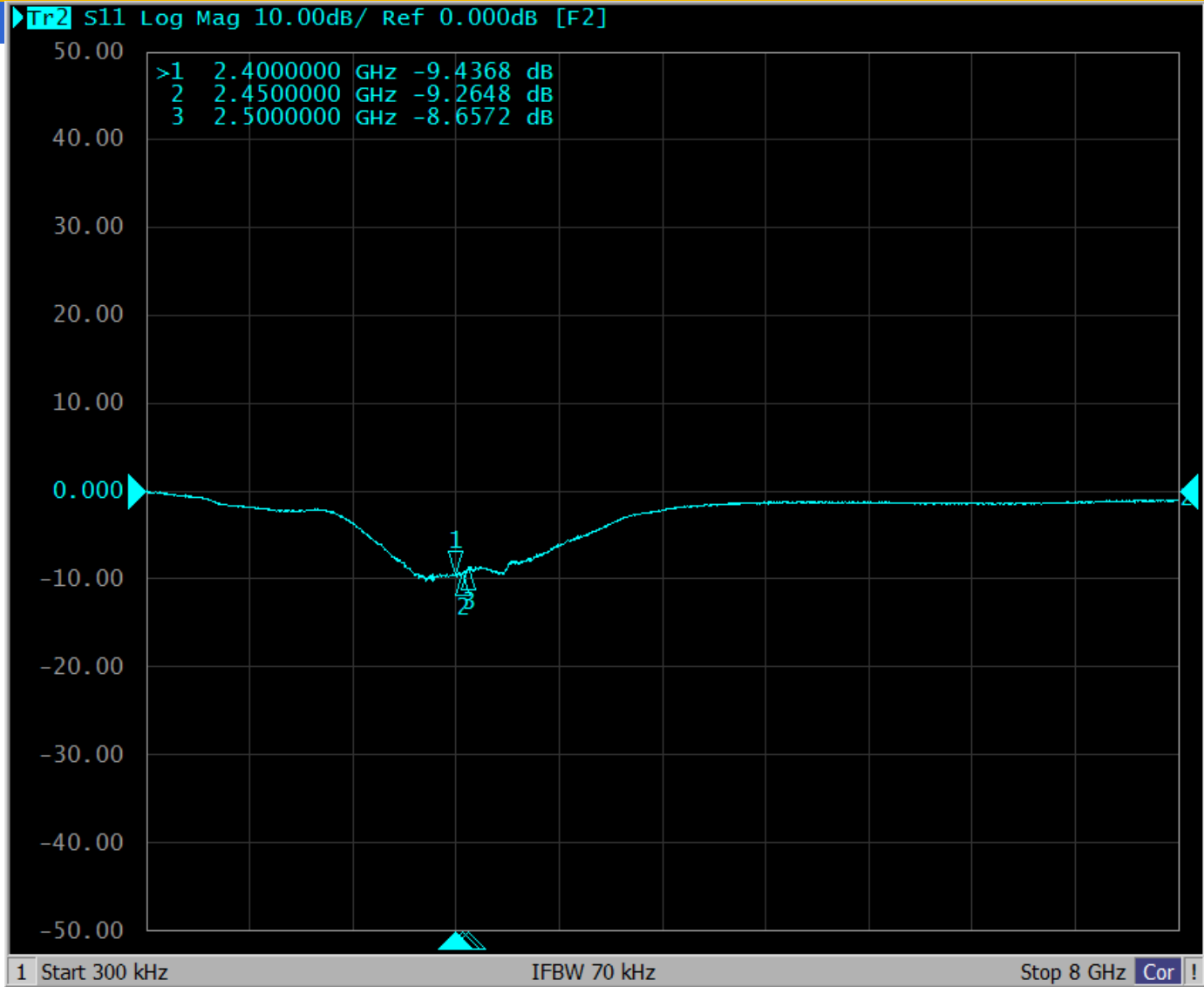


KCT8226D TX S21, VDD=5V



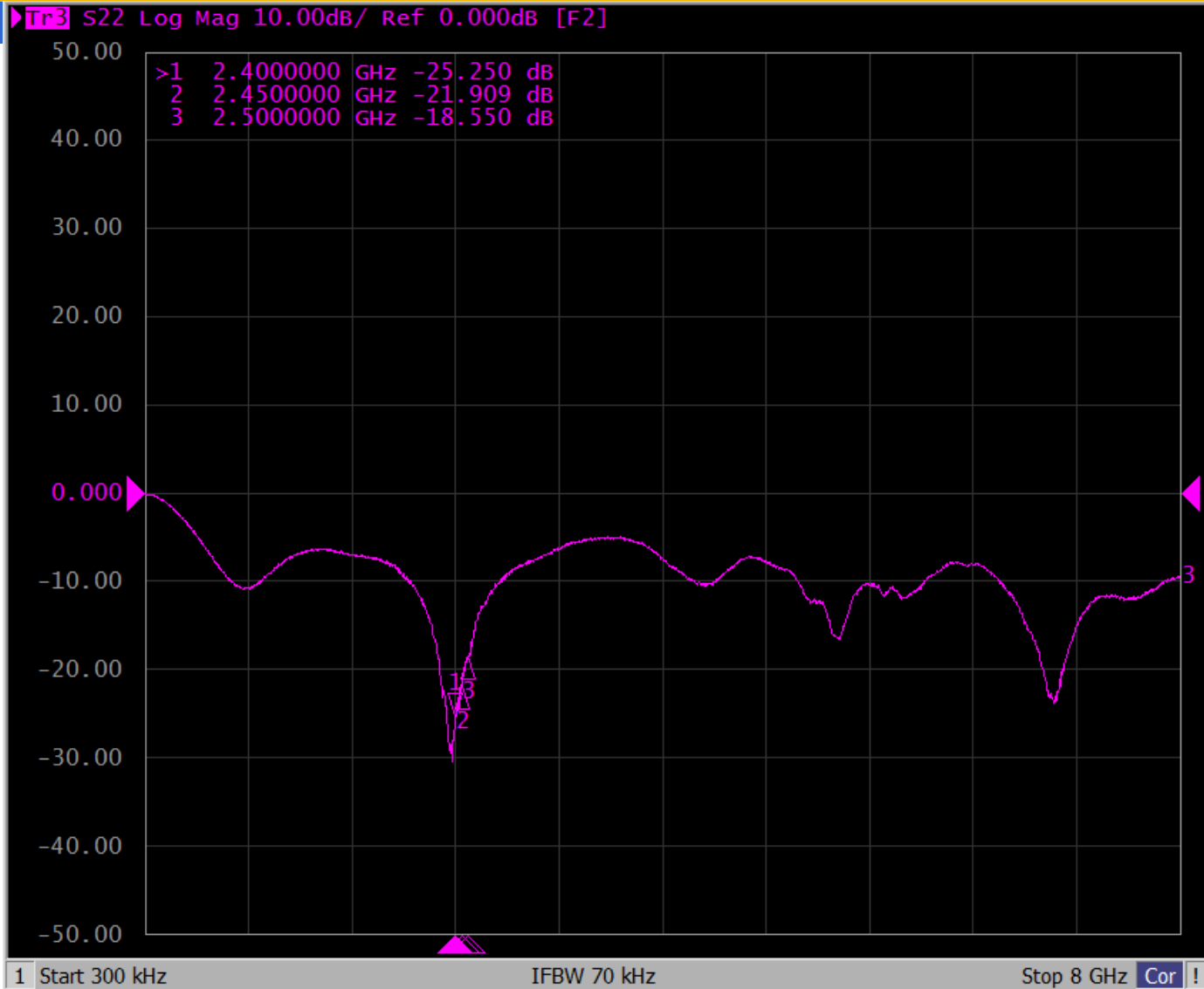


KCT8226D TX S11, VDD=5V



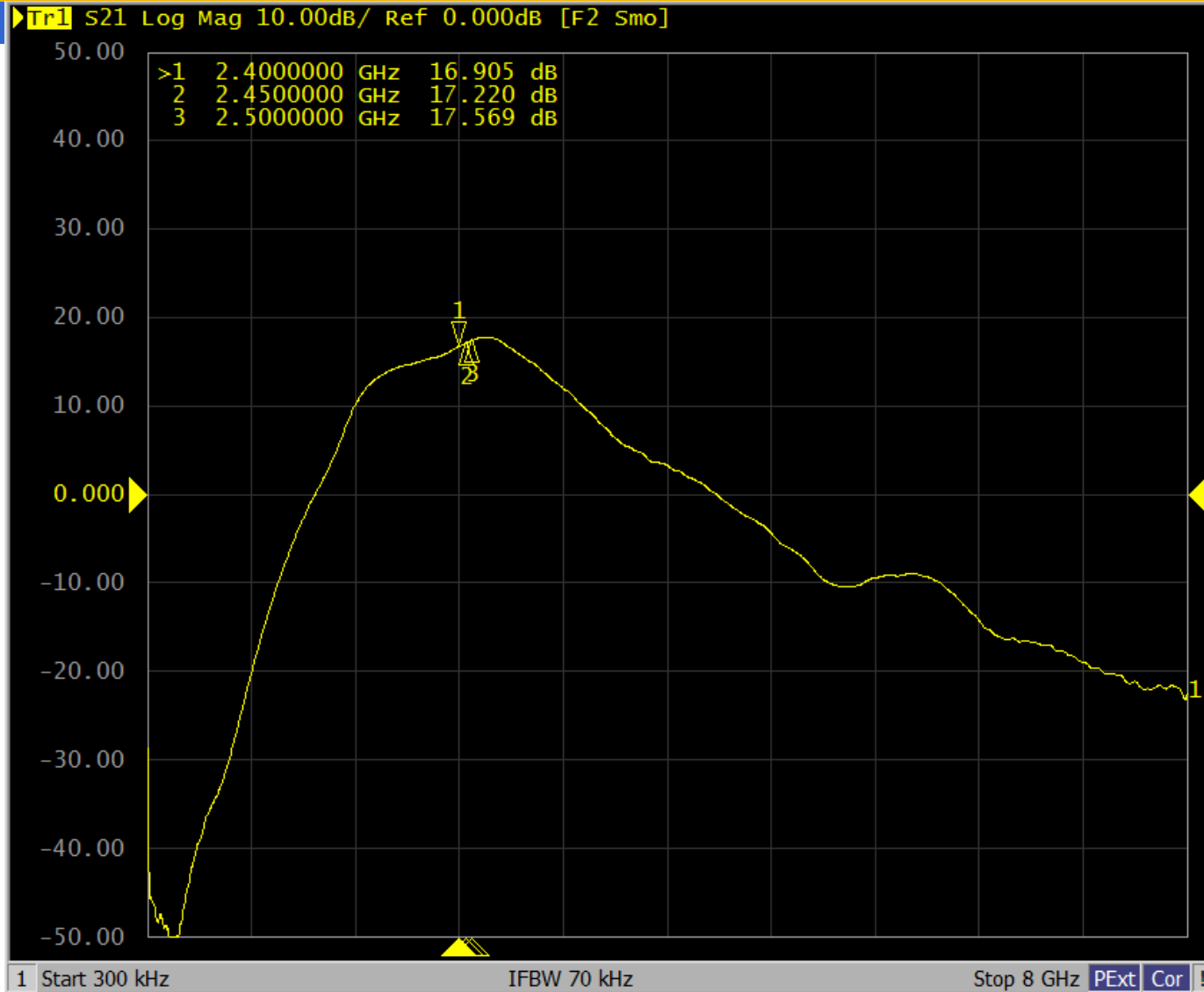


KCT8226D TX S22, VDD=5V



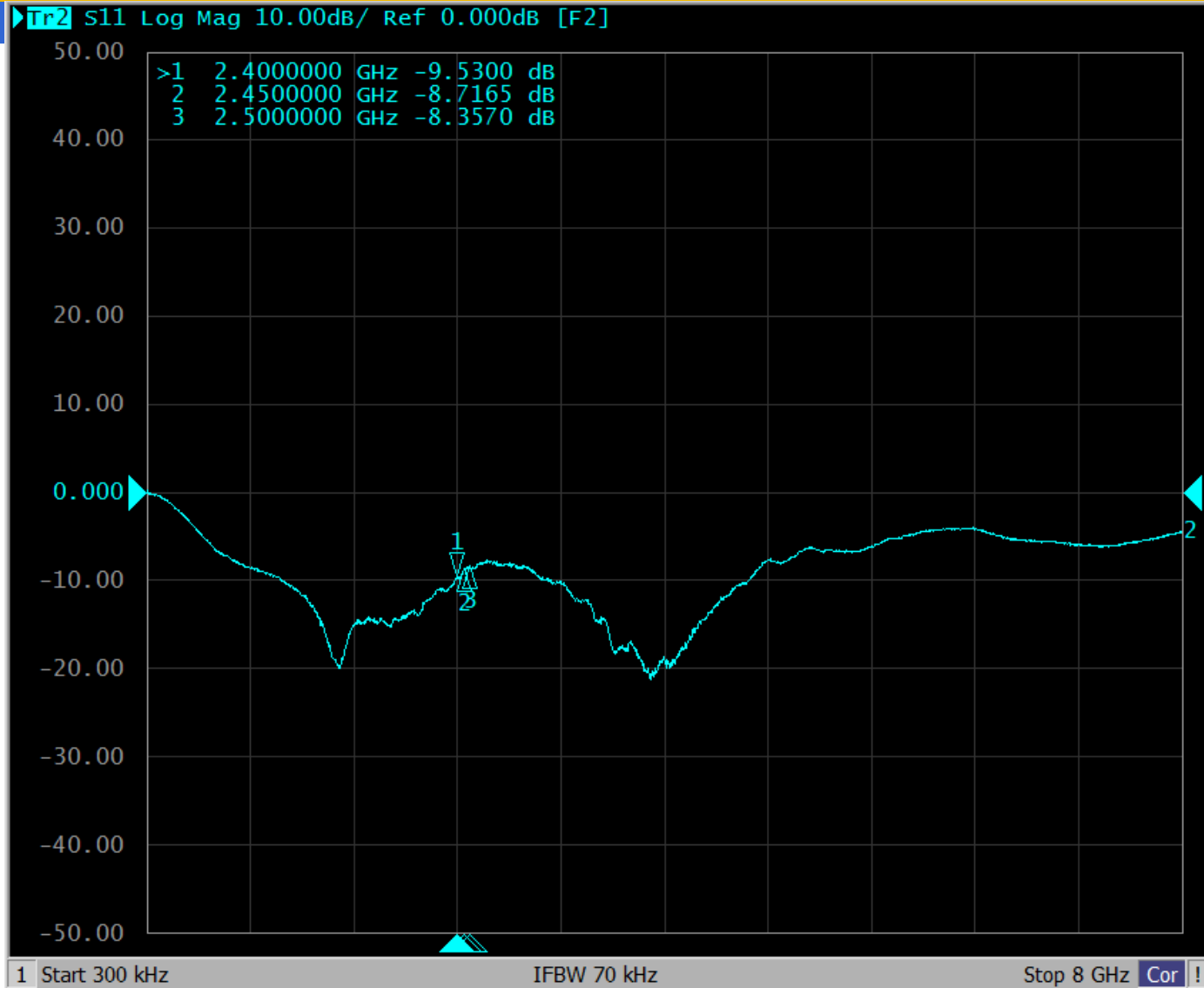


KCT8226D RX S21, VDD=5V



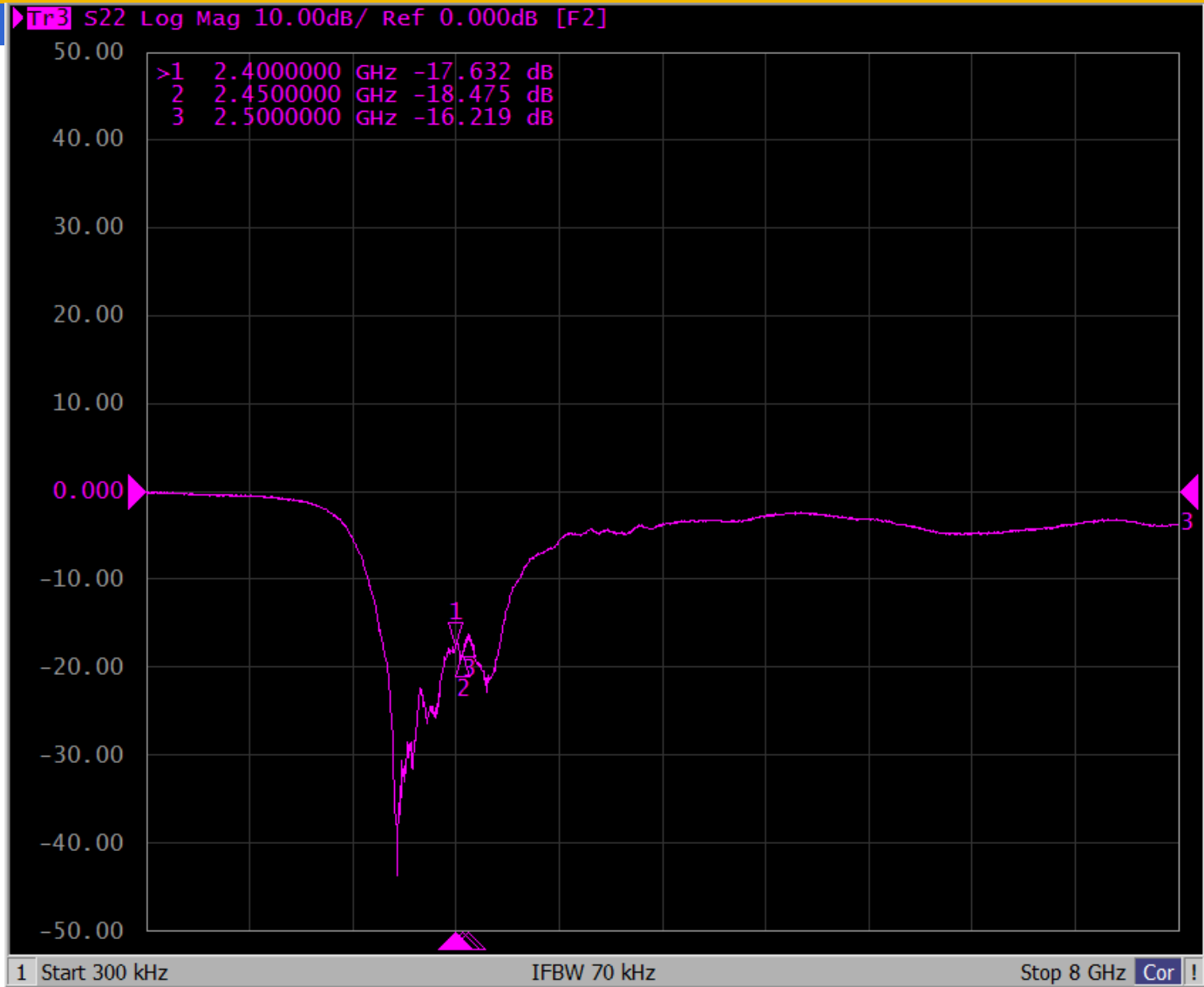


KCT8226D RX S11, VDD=5V



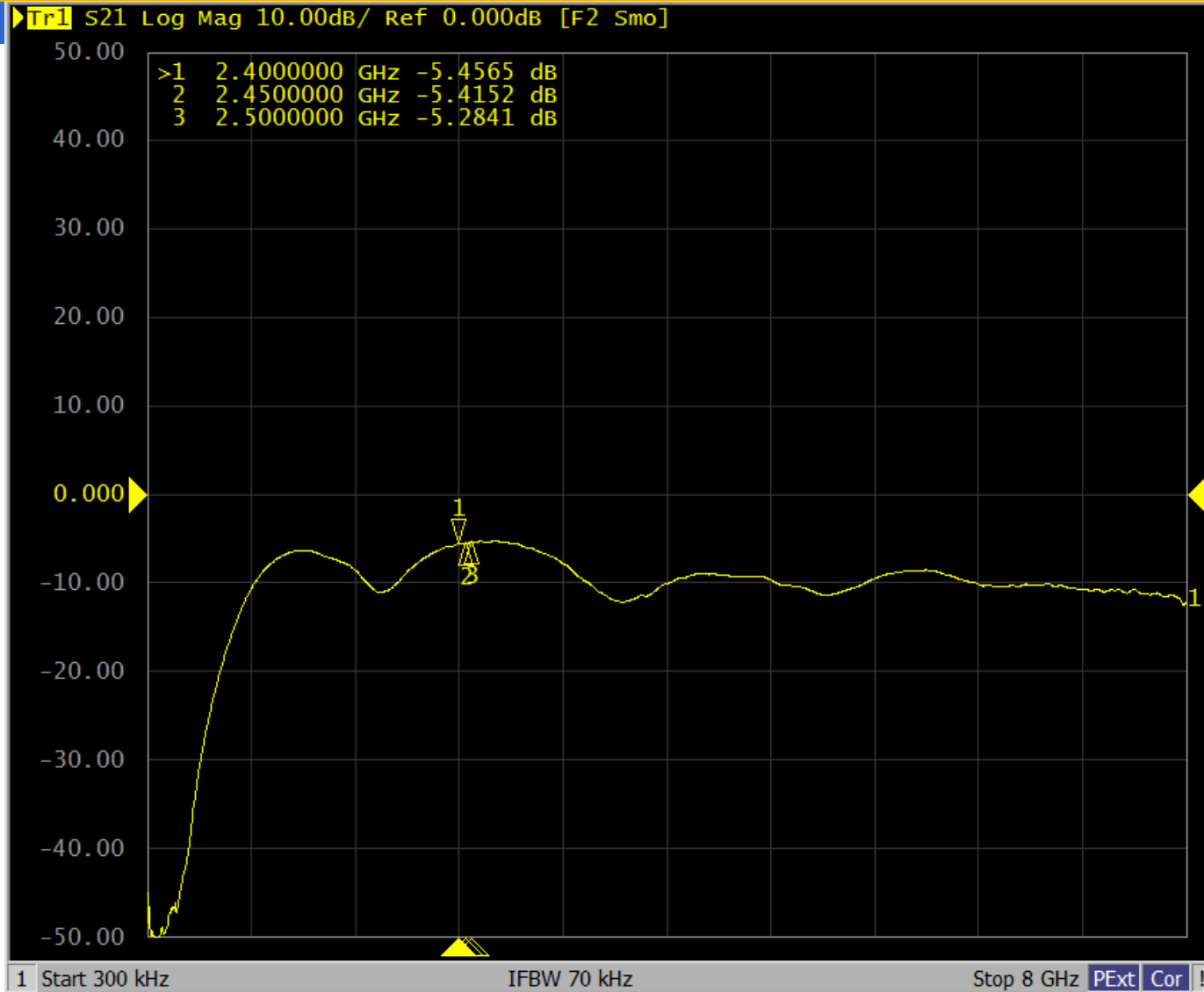


KCT8226D RX S22, VDD=5V



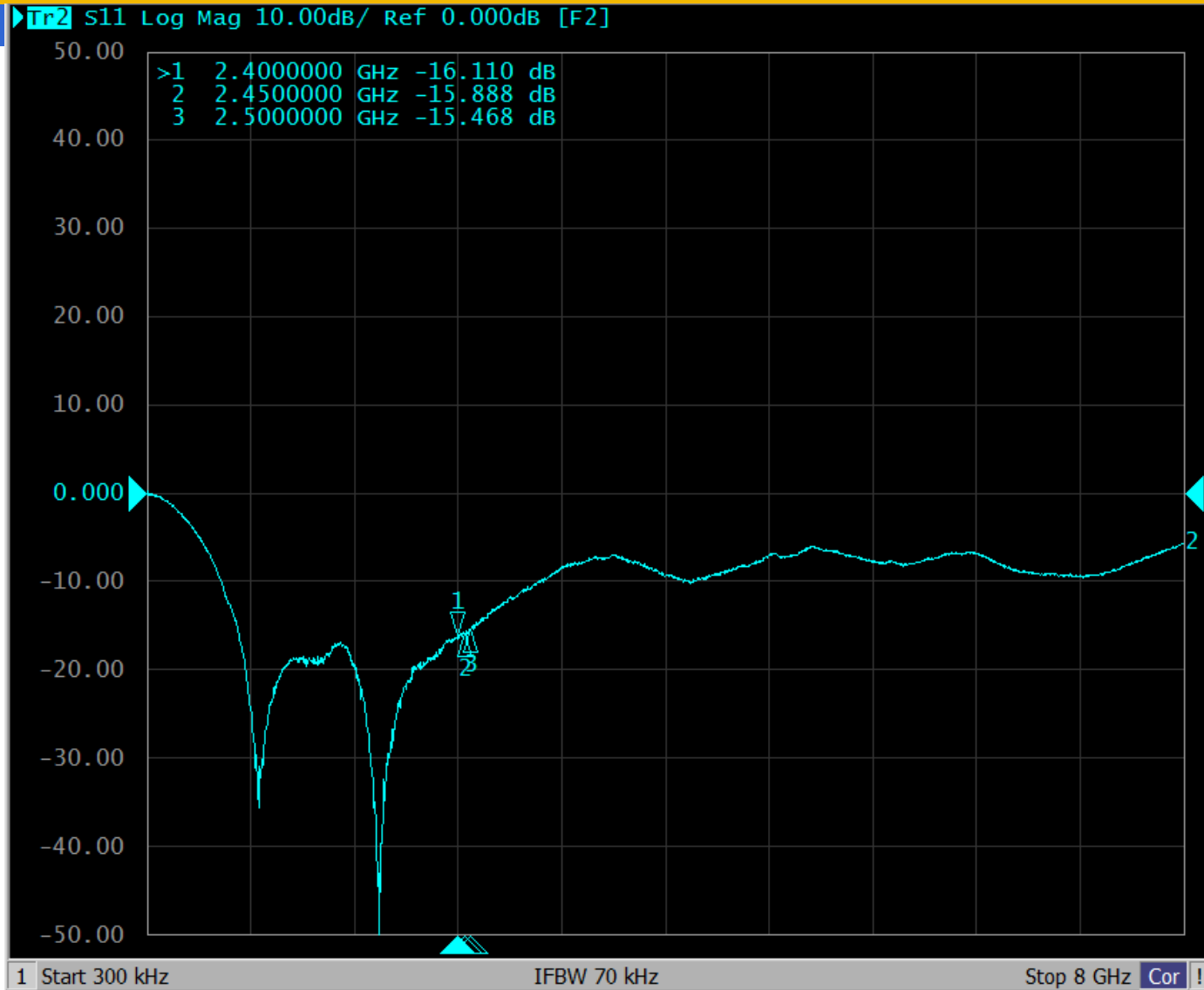


KCT8226D Bypass S21, VDD=5V



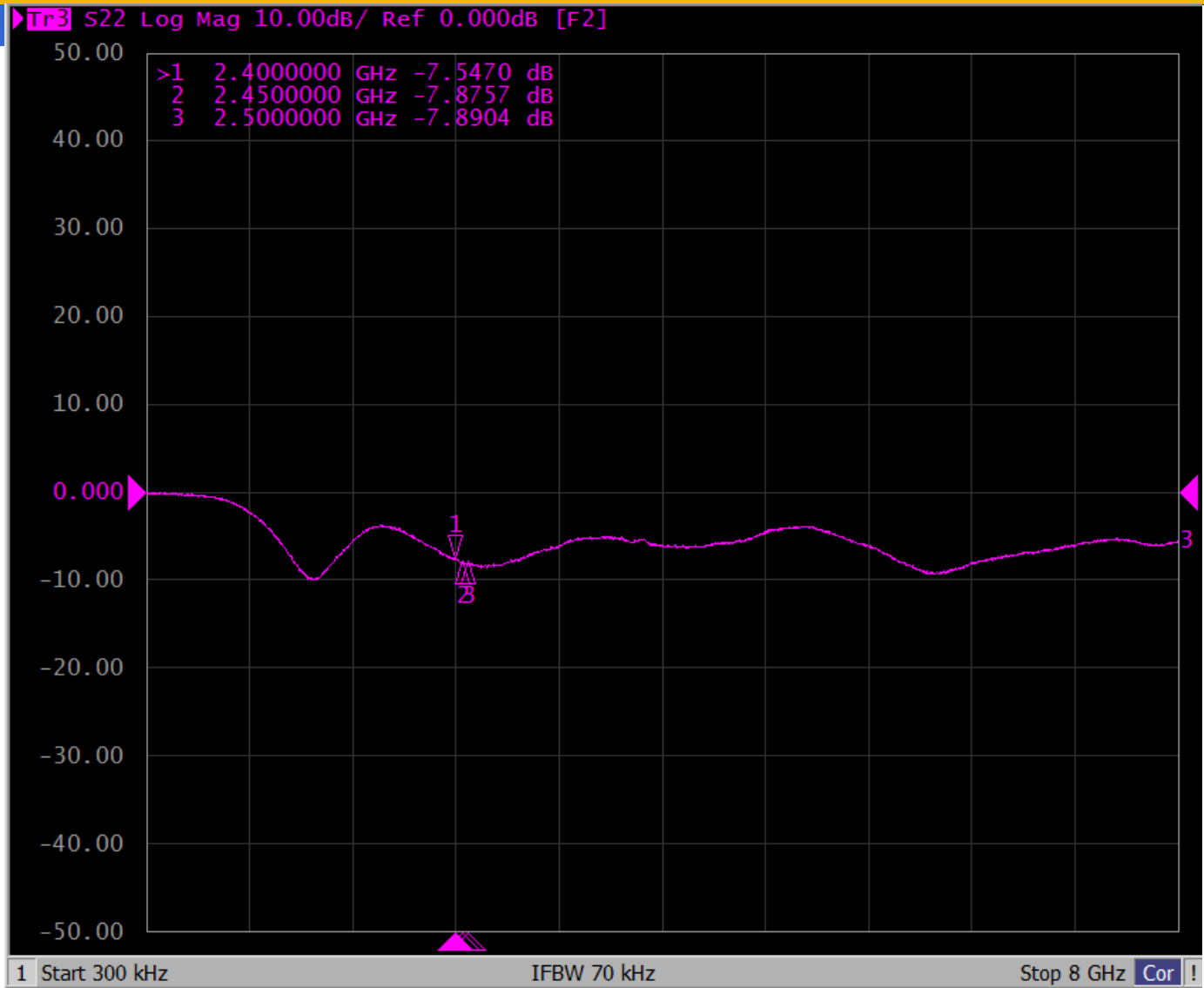


KCT8226D Bypass S11, VDD=5V



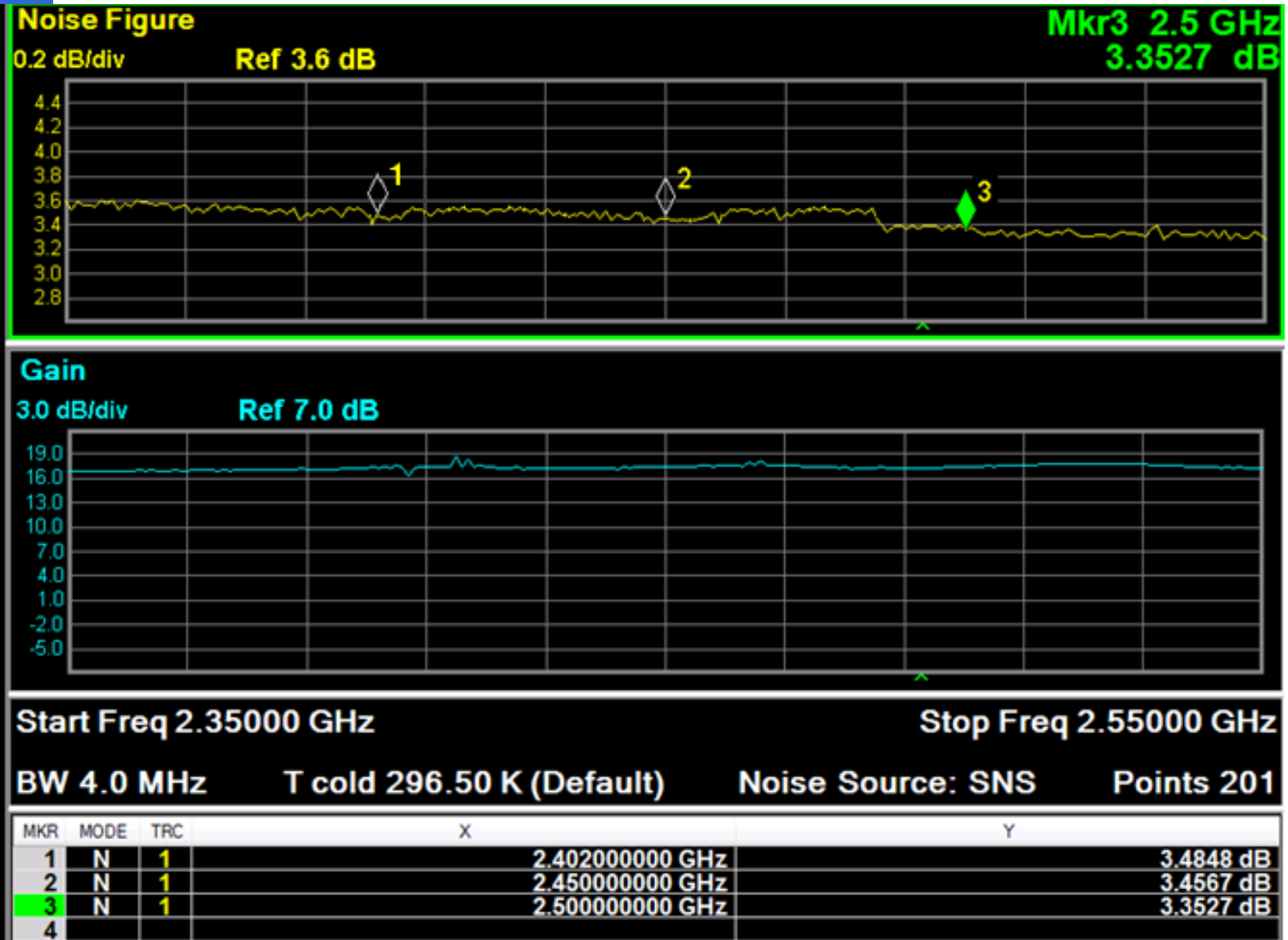


KCT8226D Bypass S22, VDD=5V





KCT8226D RX Noise Figure, VDD=5V





KCT8226D ESD Test Report - HBM



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Version: A1

<http://www.giga-force.com>

Report No. : GIGA20190722-006H

2.5 APPENDIX (RAW DATA)

HBM test								
ALL Other pins to GND(±),500V~Fail,step:500V								
Group	Pin	Pin Name	#1		#2		#3	
			Zap Level	Criteria	Zap Level	Criteria	Zap Level	Criteria
VDET	1	VDET	500 V	PASS	500 V	PASS	500 V	PASS
VCC_PIN3	3	VCC_PIN3	1000 V	PASS	1000 V	PASS	1000 V	PASS
VCC_PIN4	4	VCC_PIN4	1000 V	PASS	1000 V	PASS	1000 V	PASS
TX	5	TX	1000 V	PASS	1000 V	PASS	1000 V	PASS
TXEN	6	TXEN	1000 V	PASS	1000 V	PASS	1000 V	PASS
RX	8	RX	1000 V	PASS	1000 V	PASS	1000 V	PASS
LNAEN	9	LNAEN	1000 V	PASS	1000 V	PASS	1000 V	PASS
RXEN	14	RXEN	1000 V	PASS	1000 V	PASS	1000 V	PASS
ANT	16	ANT	1000 V	PASS	1000 V	PASS	1000 V	PASS
GND	17	GND	CT Only	PASS	CT Only	PASS	CT Only	PASS
GND	2	GND	CT Only	PASS	CT Only	PASS	CT Only	PASS
GND	7	GND	CT Only	PASS	CT Only	PASS	CT Only	PASS
GND	12	GND	CT Only	PASS	CT Only	PASS	CT Only	PASS



KCT8226D ESD Test Report - CDM



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Version: A1

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Report No. : GIGA20190722-006C

2.5 APPENDIX (RAW DATA)

Group	Pin	Pin Name	CDM test					
			#C1		#C2		#C3	
			Zap Level	Criteria	Zap Level	Criteria	Zap Level	Criteria
VDET	1	VDET	2000 V	Passed	2000 V	Passed	2000 V	Passed
GND	2	GND	2000 V	Passed	2000 V	Passed	2000 V	Passed
VCC_PIN3	3	VCC_PIN3	2000 V	Passed	2000 V	Passed	2000 V	Passed
VCC_PIN4	4	VCC_PIN4	2000 V	Passed	2000 V	Passed	2000 V	Passed
GND	2	GND	2000 V	Passed	2000 V	Passed	2000 V	Passed
TX	5	TX	2000 V	Passed	2000 V	Passed	2000 V	Passed
TXEN	6	TXEN	2000 V	Passed	2000 V	Passed	2000 V	Passed
GND	7	GND	2000 V	Passed	2000 V	Passed	2000 V	Passed
RX	8	RX	2000 V	Passed	2000 V	Passed	2000 V	Passed
LNAEN	9	LNAEN	2000 V	Passed	2000 V	Passed	2000 V	Passed
GND	12	GND	2000 V	Passed	2000 V	Passed	2000 V	Passed
RXEN	14	RXEN	2000 V	Passed	2000 V	Passed	2000 V	Passed
ANT	16	ANT	2000 V	Passed	2000 V	Passed	2000 V	Passed
GND	17	GND	2000 V	Passed	2000 V	Passed	2000 V	Passed



KCT8226D ESD Test Report - MM



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Version: A1

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Report No. : GIGA20190722-006M

2.5 APPENDIX (RAW DATA)

MM test								
ALL Other pins to GND(±),50V~Fail,step:50V								
Group	Pin	Pin Name	#M1		#M2		#M3	
			Zap Level	Criteria	Zap Level	Criteria	Zap Level	Criteria
VDET	1	VDET	50 V	PASS	50 V	PASS	50 V	PASS
VCC_PIN3	3	VCC_PIN3	50 V	PASS	50 V	PASS	50 V	PASS
VCC_PIN4	4	VCC_PIN4	100 V	PASS	100 V	PASS	100 V	PASS
TX	5	TX	100 V	PASS	100 V	PASS	100 V	PASS
TXEN	6	TXEN	100 V	PASS	100 V	PASS	100 V	PASS
RX	8	RX	100 V	PASS	100 V	PASS	100 V	PASS
LNAEN	9	LNAEN	100 V	PASS	100 V	PASS	100 V	PASS
RXEN	14	RXEN	100 V	PASS	100 V	PASS	100 V	PASS
ANT	16	ANT	100 V	PASS	100 V	PASS	100 V	PASS
GND	17	GND	CT Only	PASS	CT Only	PASS	CT Only	PASS
GND	2	GND	CT Only	PASS	CT Only	PASS	CT Only	PASS
GND	12	GND	CT Only	PASS	CT Only	PASS	CT Only	PASS
GND	7	GND	CT Only	PASS	CT Only	PASS	CT Only	PASS