



Typical Characteristics For PIQ-2G18G-360-16-CD-1 (Prototype)

PMI MODEL PIQ-2G18G-360-16-CD-1 IS A 2.0 TO 18.0 GHz HIGH PERFORMANCE I/Q VECTOR MODULATOR WITH 2 X 12 BIT MONOTONIC TTL COMPATIBLE CHANNELS (I AND Q). THIS MODEL OFFERS A FULL 360 DEGREES OF PHASE SHIFT WITH A MINIMUM OF 16 dB OF AMPLITUDE CONTROL.



For illustration purposes not actual picture

December 8, 2015
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Phase State Legend

Phase 1 (11.25 °)	Phase 2 (22.5 °)	Phase 3 (33.75 °)	Phase 4 (45 °)
Phase 5 (56.25 °)	Phase 6 (67.5 °)	Phase 7 (78.75 °)	Phase 8 (90 °)
Phase 9 (101.25 °)	Phase 10 (112.5 °)	Phase 11 (123.75 °)	Phase 12 (135 °)
Phase 13 (146.25 °)	Phase 14 (157.5 °)	Phase 15 (168.75 °)	Phase 16 (180 °)
Phase 17 (191.25 °)	Phase 18 (202.5 °)	Phase 19 (213.75 °)	Phase 20 (225 °)
Phase 21 (236.25 °)	Phase 22 (247.5 °)	Phase 23 (258.75 °)	Phase 24 (270 °)
Phase 25 (281.25 °)	Phase 26 (292.5 °)	Phase 27 (303.75 °)	Phase 28 (315 °)
Phase 29 (326.25 °)	Phase 30 (337.5 °)	Phase 31 (348.75 °)	Phase 32 (360 °)

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Product Feature (Page 1 of 2)

DESCRIPTION

PMI MODEL: PIQ-2G18G-360-16-CD-1 IS A 2.0 TO 18.0 GHz HIGH PERFORMANCE I/Q VECTOR MODULATOR WITH 2 X 12 BIT MONOTONIC TTL COMPATIBLE CHANNELS (I AND Q). THIS MODEL OFFERS A FULL 360 DEGREES OF PHASE SHIFT WITH A MINIMUM OF 16 dB OF AMPLITUDE CONTROL.

SPECIFICATIONS

- * FREQUENCY RANGE: 2.0 TO 18.0 GHz
- * DYNAMIC RANGE: 16 dB & 360°
- * RF INPUT POWER: +10 dBm CW, 1.0 WATT MAX
- * INSERTION LOSS: 16.0 dB MAX
- * VSWR: 2.2:1 MAX (50 OHM SYSTEM)
- * ATTENUATION VS FREQUENCY: ±3.5 dB TYP
- * PHASE VS FREQUENCY: ±20.0° TYP
- * CONTROL LOGIC: 2X12 BITS (I&Q), TTL COMPATIBLE
- * CONTROL SLOPES: LINEAR
- * SWITCHING SPEED: 500 ns MAX
- * POWER SUPPLY: ±12V TO ±15V @ ±100mA MAX
- * RF CONNECTORS: SMA FEMALE INPUT AND OUTPUT
- * POWER/LOGIC CONNECTIONS: DC-37P, SUB MINIATURE D MULTI-PIN
- * SIZE: 4.25" X 3.50" X 1.00"
- * FINISH: NICKEL PLATED

ENVIRONMENTAL RATINGS

- * TEMPERATURE: -10 °C TO +60 °C (OPERATING)
-65 °C TO +125 °C (STORAGE)
- * HUMIDITY: MIL-STD-202F, METHOD 103B COND. B
- * SHOCK: MIL-STD-202F, METHOD 213B COND. B
- * VIBRATION: MIL-STD-202F, METHOD 204D COND. B
- * ALTITUDE: MIL-STD-202F, METHOD 105C COND. B
- * TEMPERATURE CYCLE: MIL-STD-202F, METHOD 107D COND. A

NOTE: SPECIFICATIONS WILL VARY OVER OPERATING TEMPERATURE
NOTE: THE ABOVE SPECIFICATIONS ARE SUBJECT TO CHANGE OR REVISION

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REVISIONS				
ZONE	REV	DESCRIPTION	DATE	APPROVED
	1	ORIGINAL RELEASE	12/8/16	

37-PIN CONNECTOR PIN-OUT

PIN	FUNCTION	PIN	FUNCTION
1	I-5	20	I-4
2	I-6	21	I-7
3	I-8	22	I-3
4	I-9	23	I-2
5	I-10	24	I-1
6	I-11	25	I-12 (LSB)
7	NC	26	NC
8	+12V TO +15V	27	NC
9	GND	28	GND
10	GND	29	NC
11	-12V TO -15V	30	NC
12	Q-3	31	NC
13	Q-2	32	Q-4
14	Q-1 (LSB)	33	NC
15	Q-5	34	NC
16	Q-6	35	Q-12
17	Q-7	36	Q-11
18	Q-8	37	Q-10
19	Q-9		

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ISO 9001 CERTIFIED



APPROVALS		DATE		TITLE	
DRAWN		DATE		PRODUCT FEATURE	
CHECKED		DATE		PIQ-2G18G-360-16-CD-1	
ISSUED		DATE		REV.	
SIZE		FSOM NO.		DWG NO.	
A		05XQ0		27025300	
SCALE		N:S		SHEET	
				1 OF 2	

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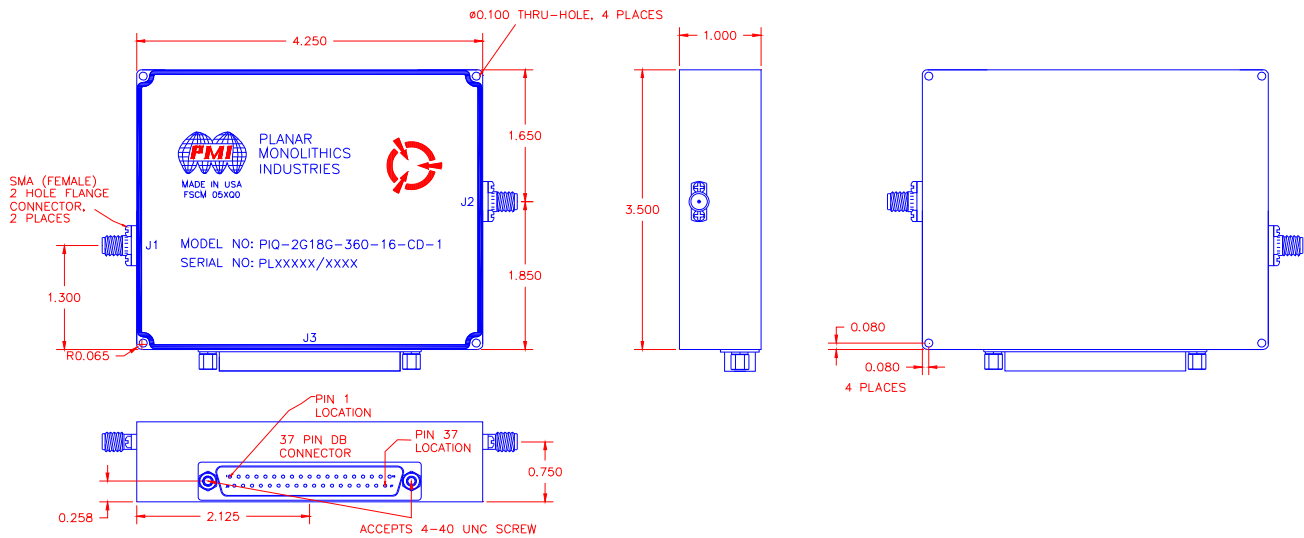


Typical Characteristics For PIQ-2G18G-360-16-CD-1 (Prototype)

Product Feature (Page 2 of 2)

MECHANICAL OUTLINE

REVISIONS				
ZONE	REV	DESCRIPTION	DATE	APPROVED
	1	ORIGINAL RELEASE	12/8/16	



NOTE: SPECIFICATIONS WILL VARY OVER OPERATING TEMPERATURE
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ALL DIMENSIONS ARE IN INCHES
TOLERANCES:
X.XX ±0.020
X.XXX ±0.010

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DRAWN		DATE		PRODUCT FEATURE	
CHECKED		DATE		PIQ-2G18G-360-16-CD-1	
ISSUED		DATE			
SIZE		FSCM NO.		DWG NO.	
A		05XQ0		27025300	
SCALE		N:S		SHEET	
				2 OF 2	



Typical Characteristics For PIQ-2G18G-360-16-CD-1 (Prototype)

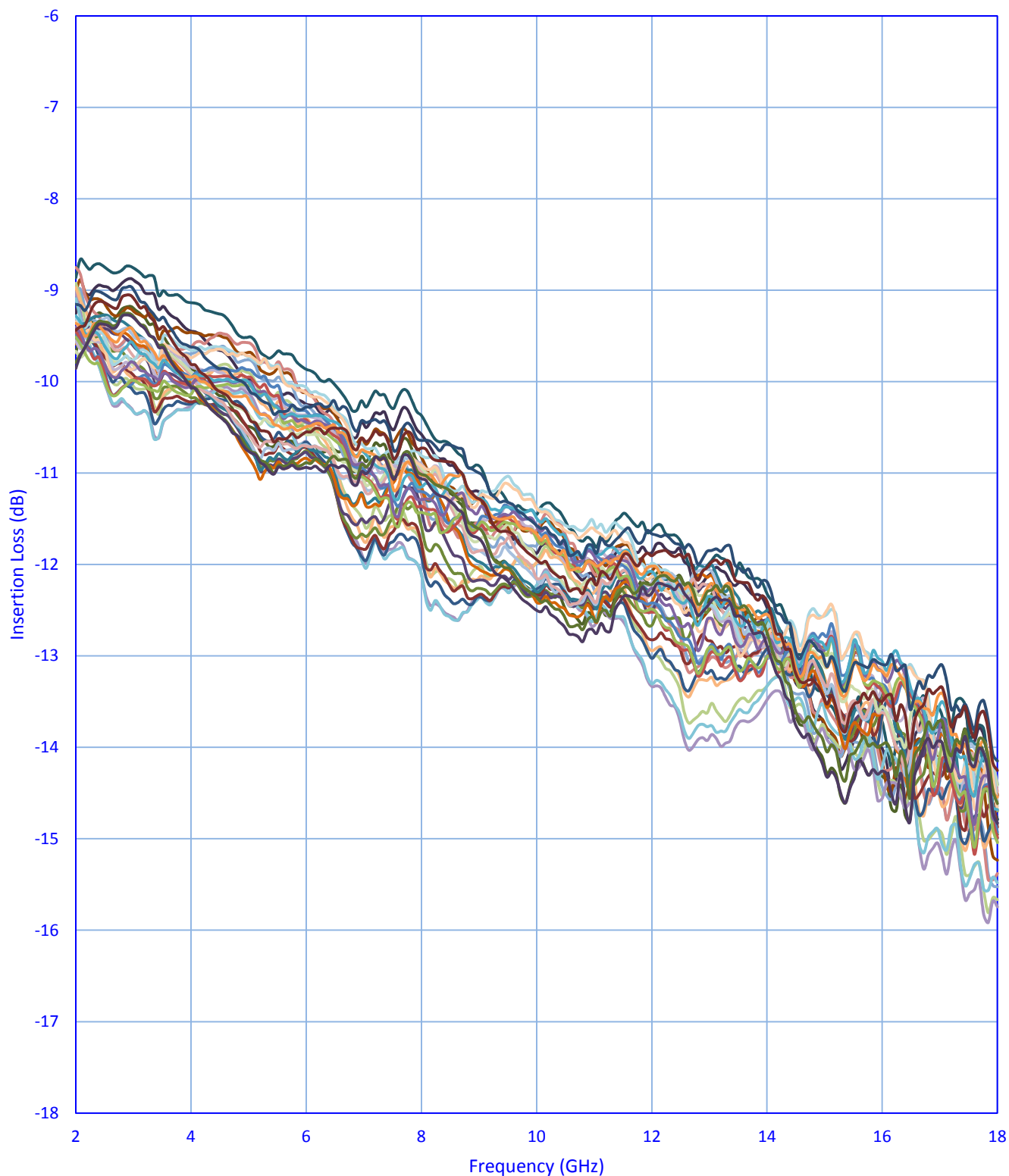
Summary Data

TEST ITEM NO	PARAMETERS	SPECIFIED VALUE	TEST RESULTS	QA QC
1	Frequency Range	2.0 GHz to 18.0 GHz	2.0 GHz to 18.0 GHz	
2	Phase Range	360°	360°	
3	Dynamic Range	16 dB	16 dB	
4	Insertion Loss	16 dB MAX	15.92 dB	
5	VSWR	2.2:1 MAX	1.96:1	
6	Attenuation vs. Frequency	±3.5 dB TYP.	±1.17 dB @ 0 dB Attenuation ±1.13 dB @ 8 dB Attenuation ±2.72 dB @ 16 dB Attenuation	
7	Phase vs. Frequency (Flatness)	±20.0° TYP.	±8.28° @ 0 dB Attenuation ±10.63° @ 8 dB Attenuation ±19.92° @ 16 dB Attenuation	
8	Control Logic	2 x 12 BITS (I and Q) TTL compatible.	Verified	
9	Control Slopes	Linear	Verified	
10	Switching Speed	500 nSec MAX.	490nSec	
11	Power Supply	+12 to +15V @ 100 mA -12 to -15V @ 100 mA	+15 @ 95 mA -15 @ 78 mA	



Typical Characteristics For PIQ-2G18G-360-16-CD-1 (Prototype)

Insertion Loss Vs. Frequency



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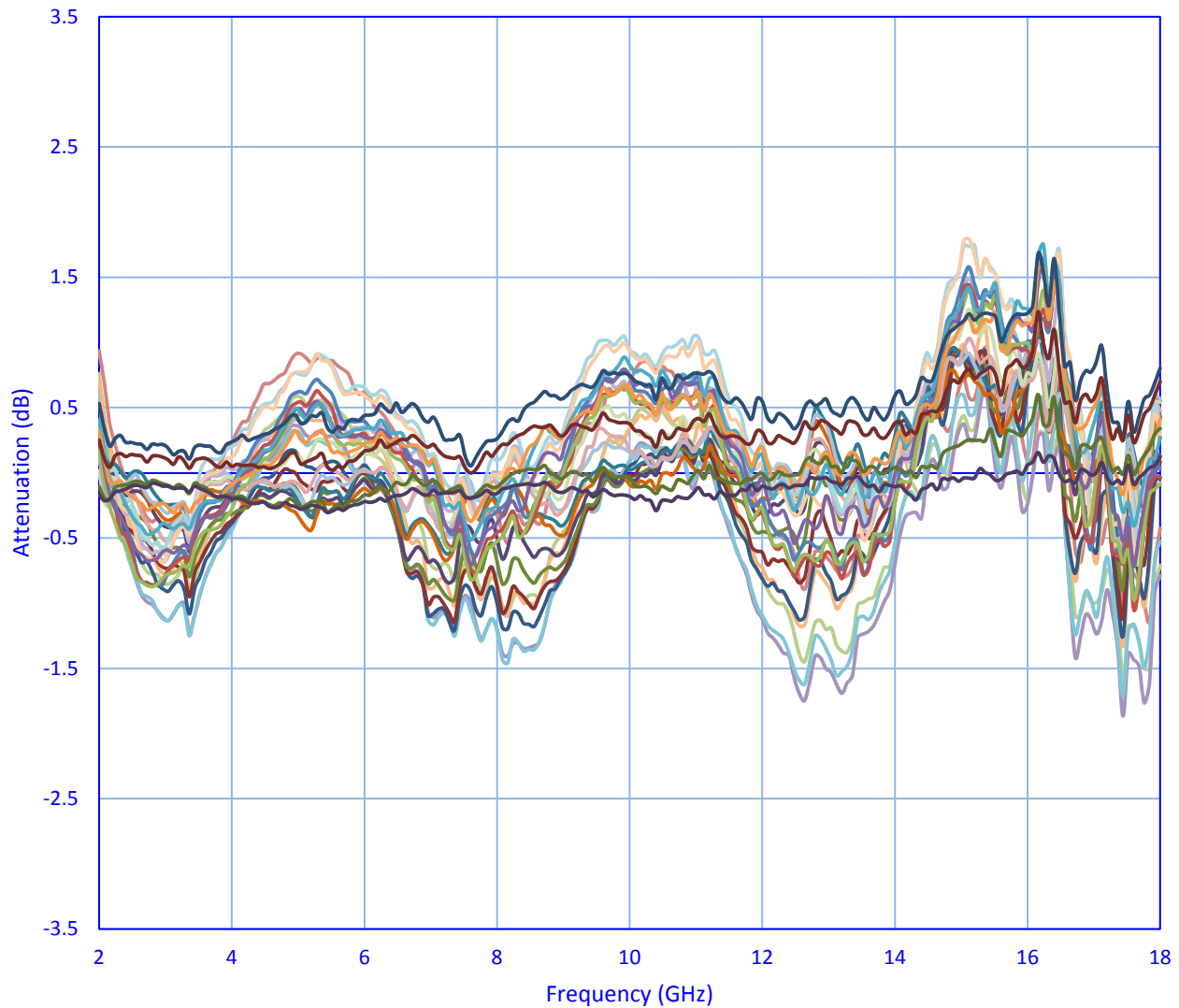
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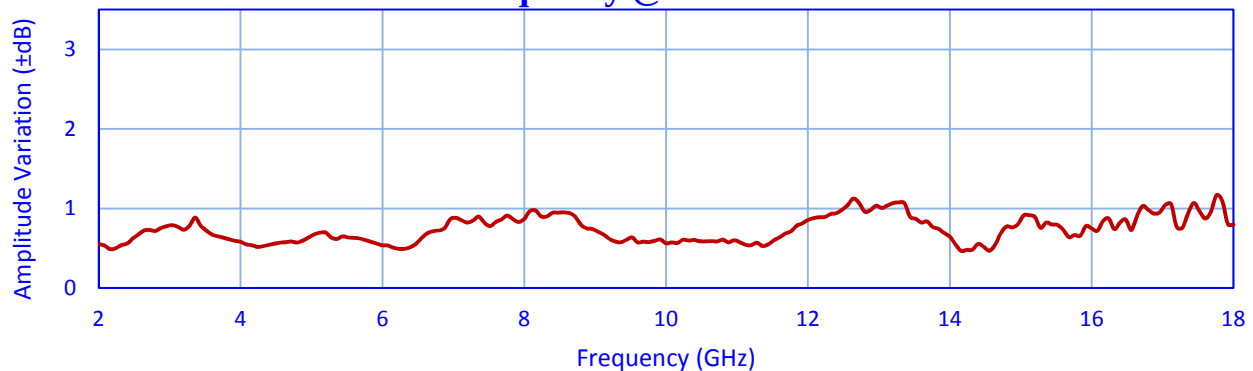


Typical Characteristics For PIQ-2G18G-360-16-CD-1 (Prototype)

Attenuation Vs. Frequency @ 0 dB Attenuation



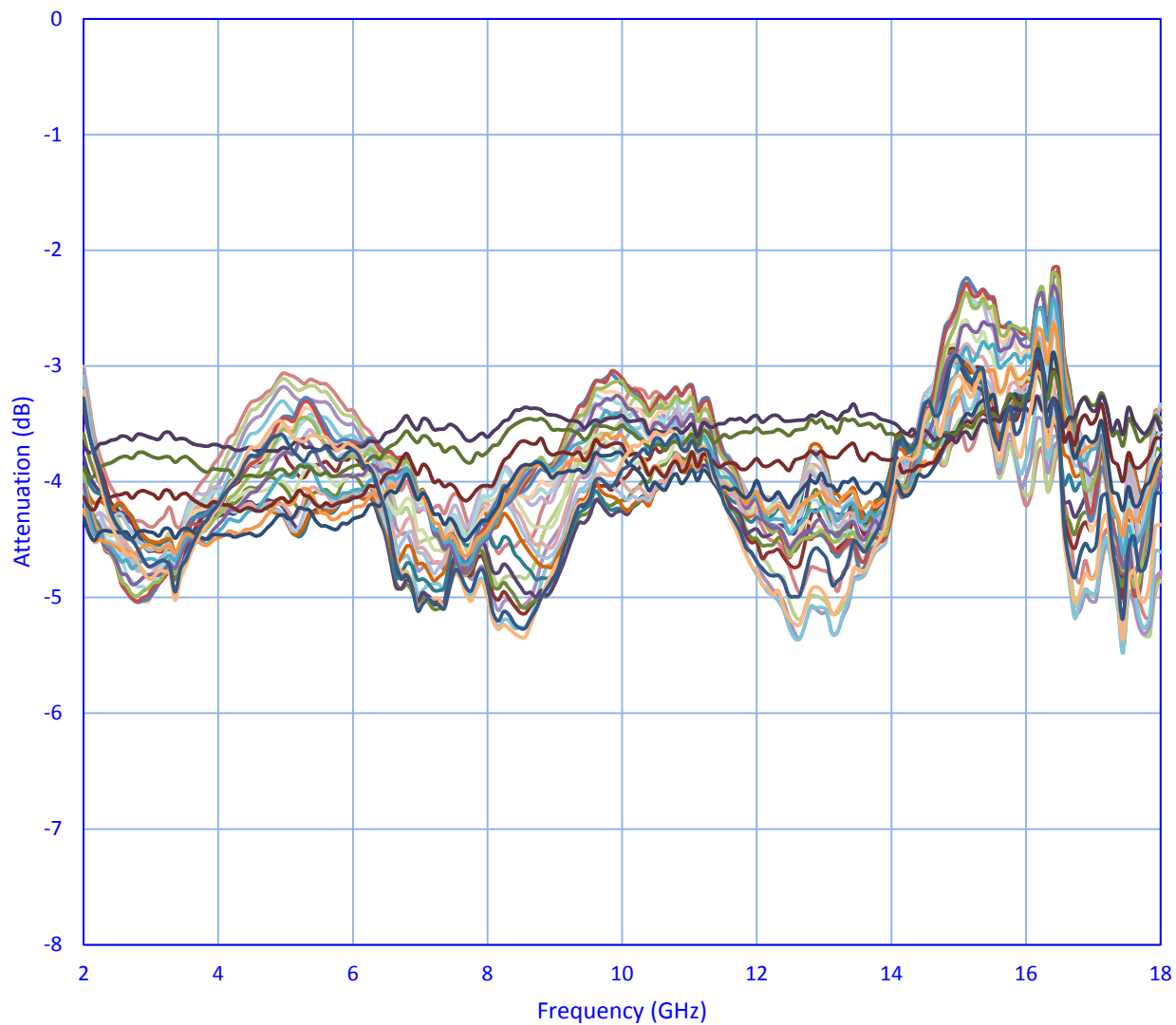
Maximum Amplitude Variation From Center
Vs. Frequency @ 0 dB Attenuation



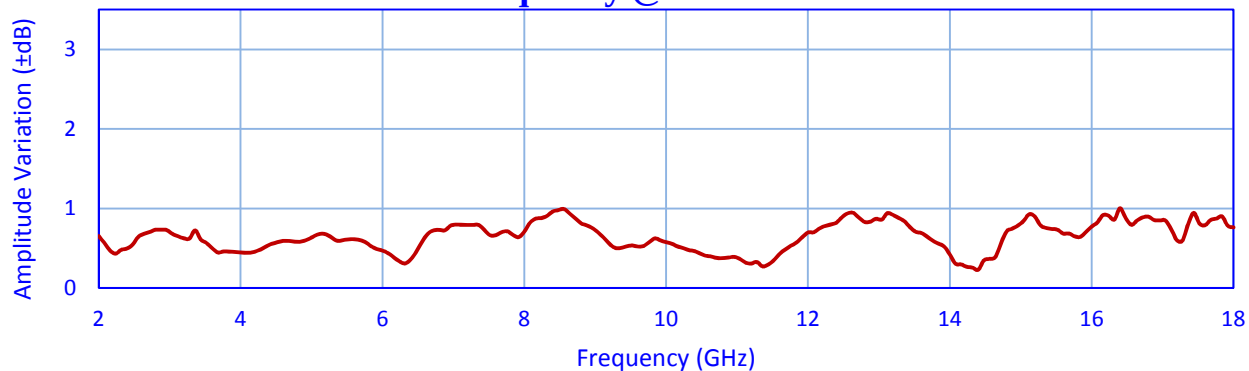


Typical Characteristics For PIQ-2G18G-360-16-CD-1 (Prototype)

Attenuation Vs. Frequency @ 4 dB Attenuation



Maximum Amplitude Variation From Center Vs. Frequency @ 4 dB Attenuation



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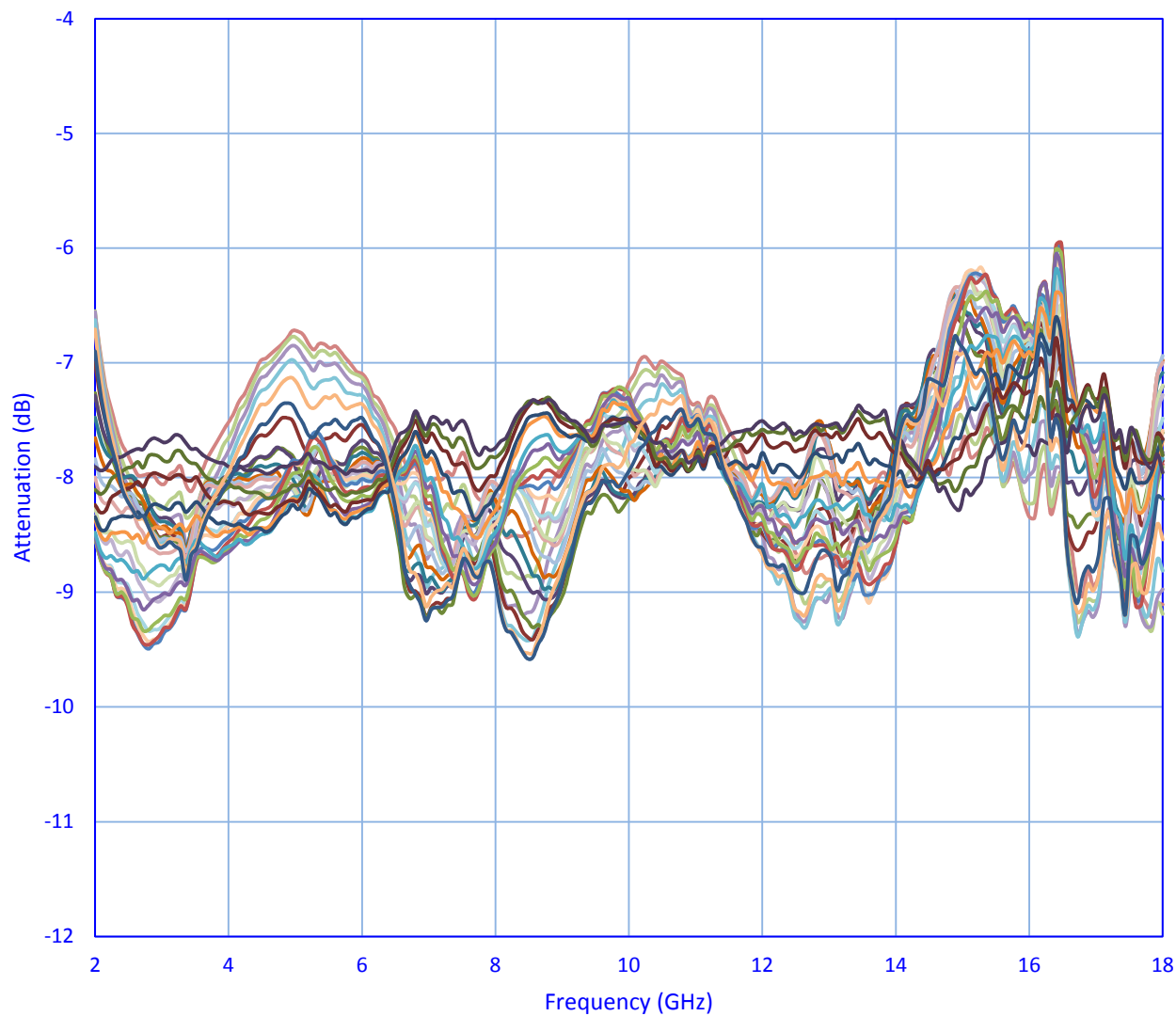
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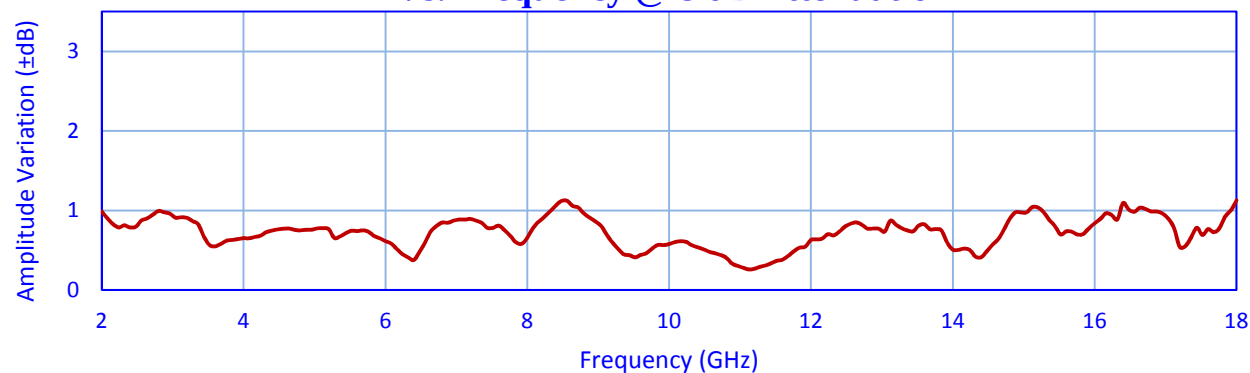


Typical Characteristics For PIQ-2G18G-360-16-CD-1 (Prototype)

Attenuation Vs. Frequency @ 8 dB Attenuation



Maximum Amplitude Variation From Center Vs. Frequency @ 8 dB Attenuation



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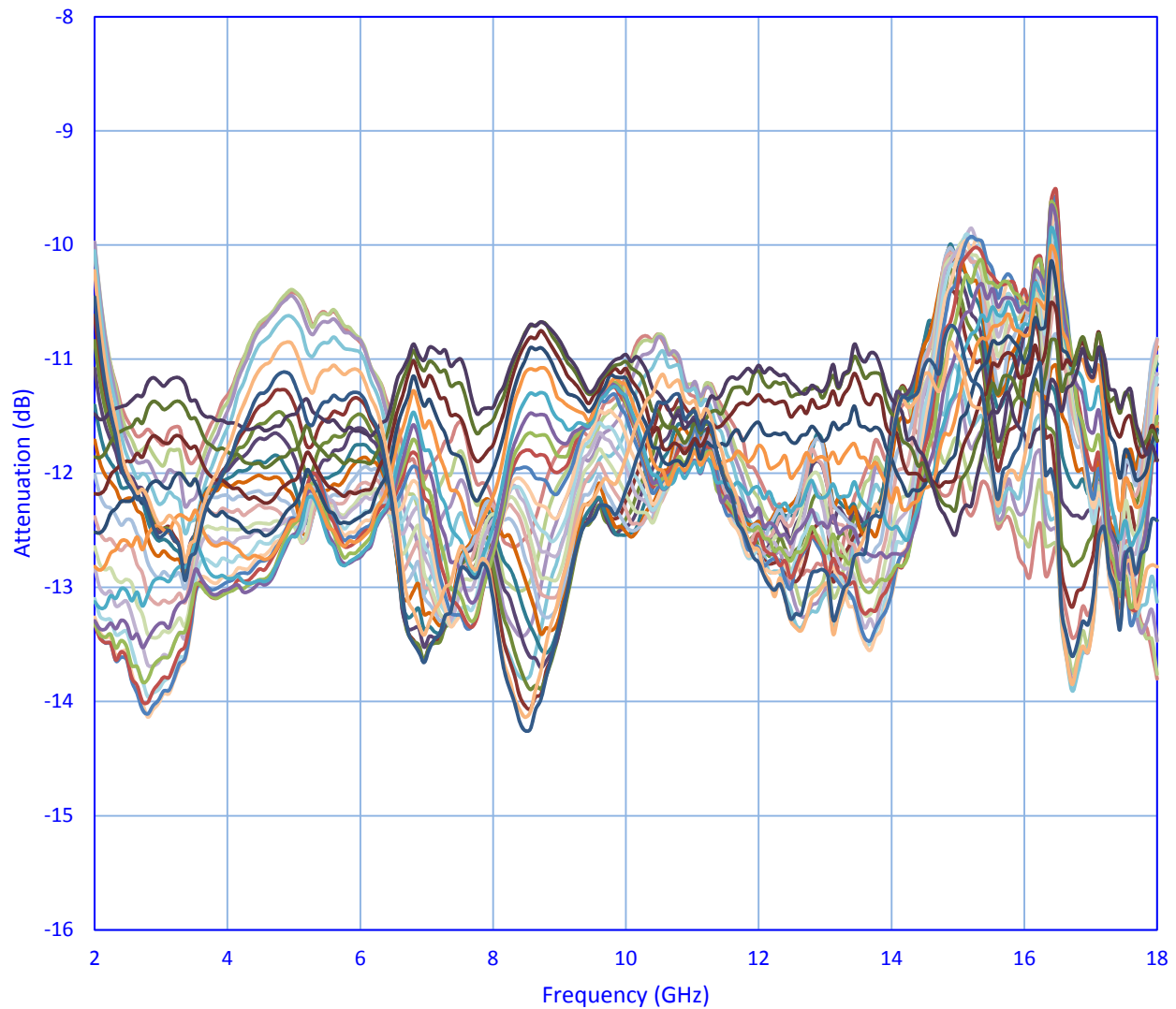
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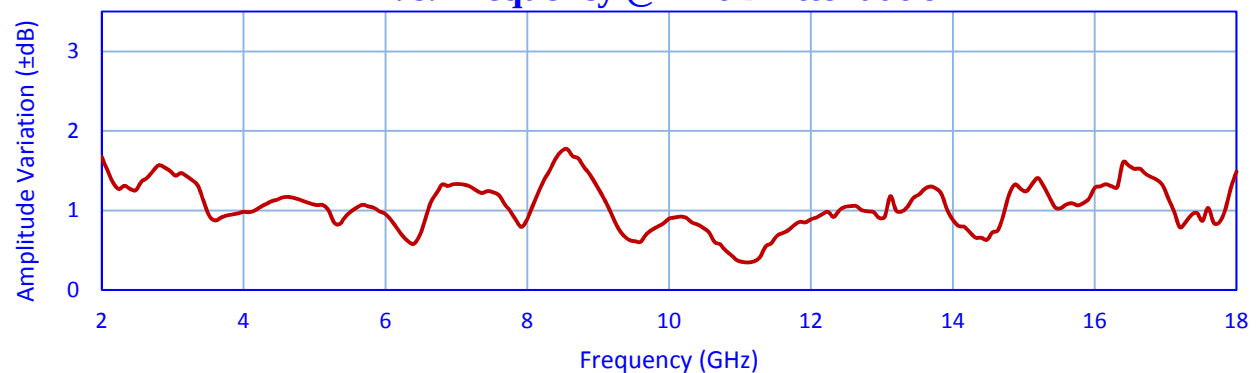


Typical Characteristics For PIQ-2G18G-360-16-CD-1 (Prototype)

Attenuation Vs. Frequency @ 12 dB Attenuation



Maximum Amplitude Variation From Center Vs. Frequency @ 12 dB Attenuation



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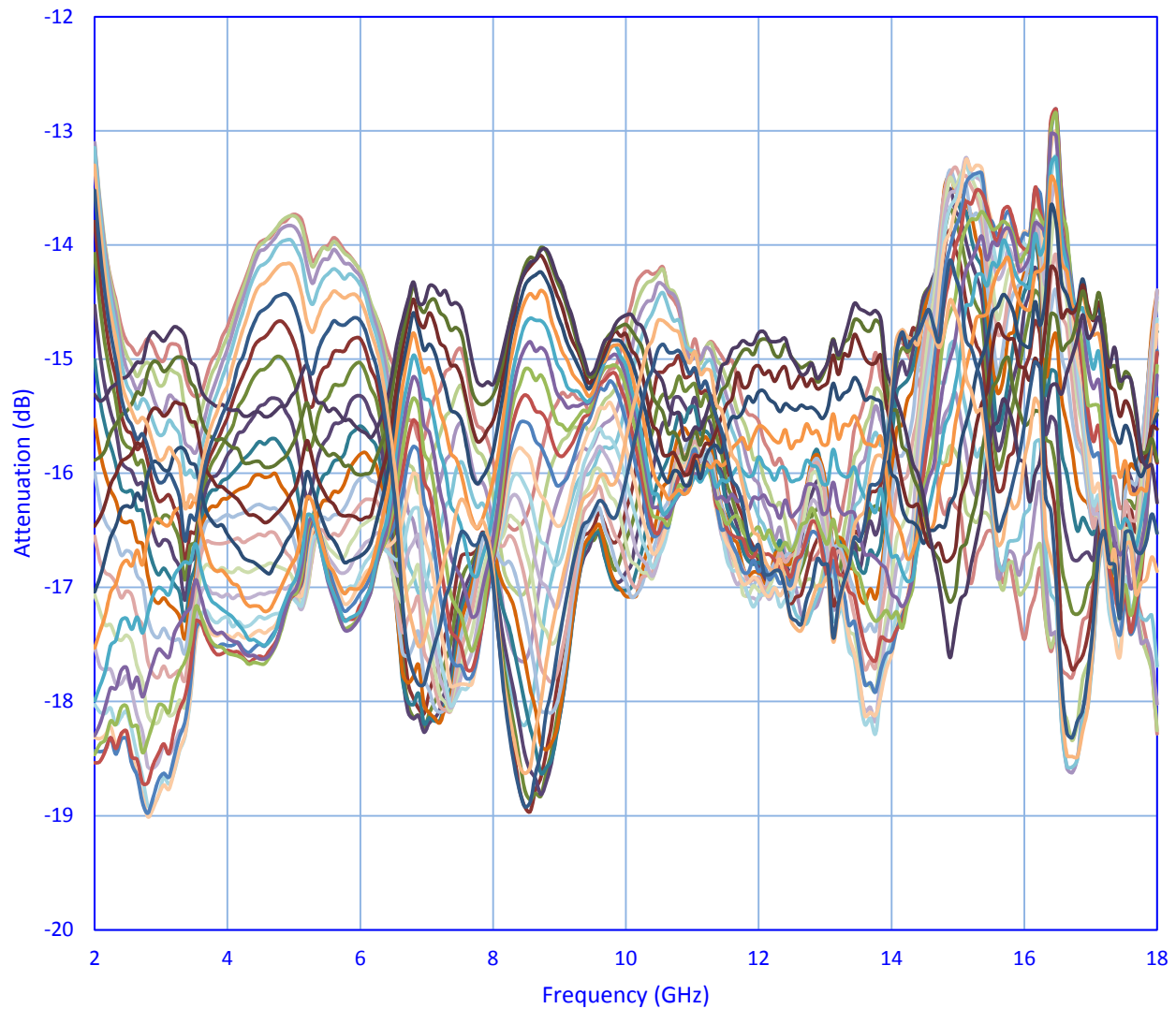
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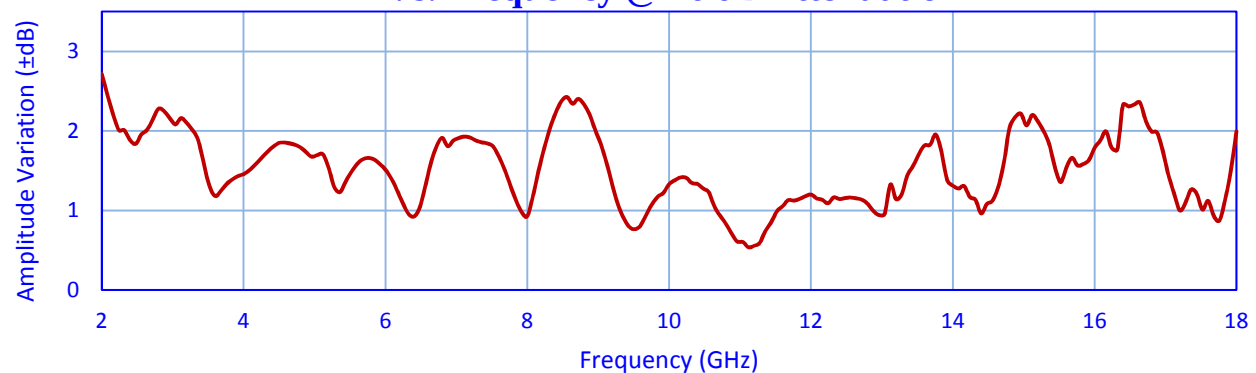


Typical Characteristics For PIQ-2G18G-360-16-CD-1 (Prototype)

Attenuation Vs. Frequency @ 16 dB Attenuation



Maximum Amplitude Variation From Center Vs. Frequency @ 16 dB Attenuation



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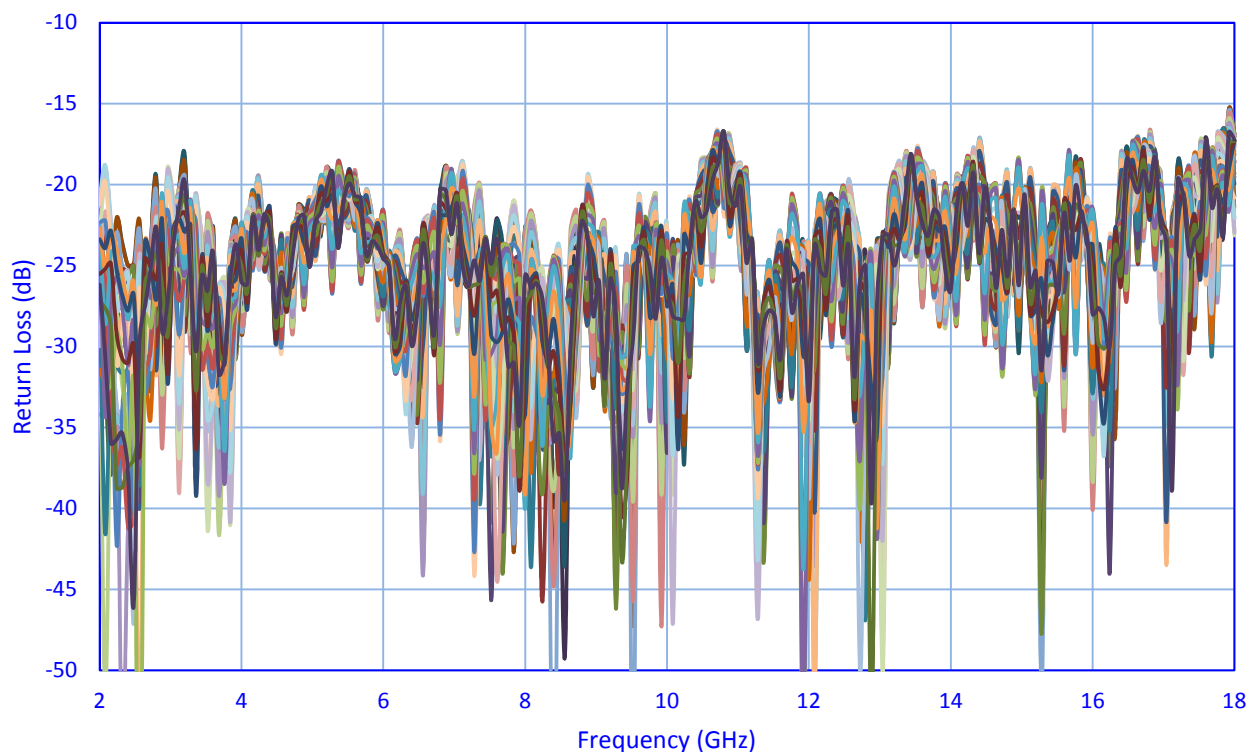
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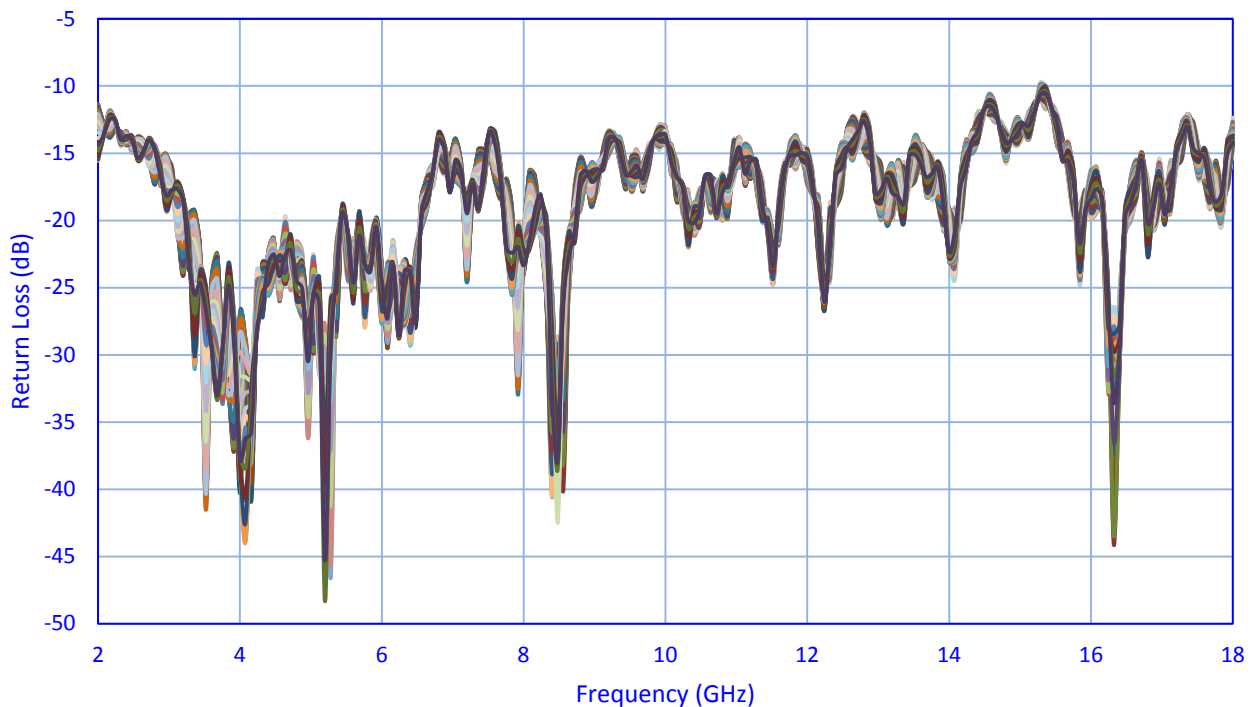


Typical Characteristics For PIQ-2G18G-360-16-CD-1 (Prototype)

Input Return Loss Vs. Frequency @ 0 dB Attenuation



Output Return Loss Vs. Frequency @ 0 dB Attenuation



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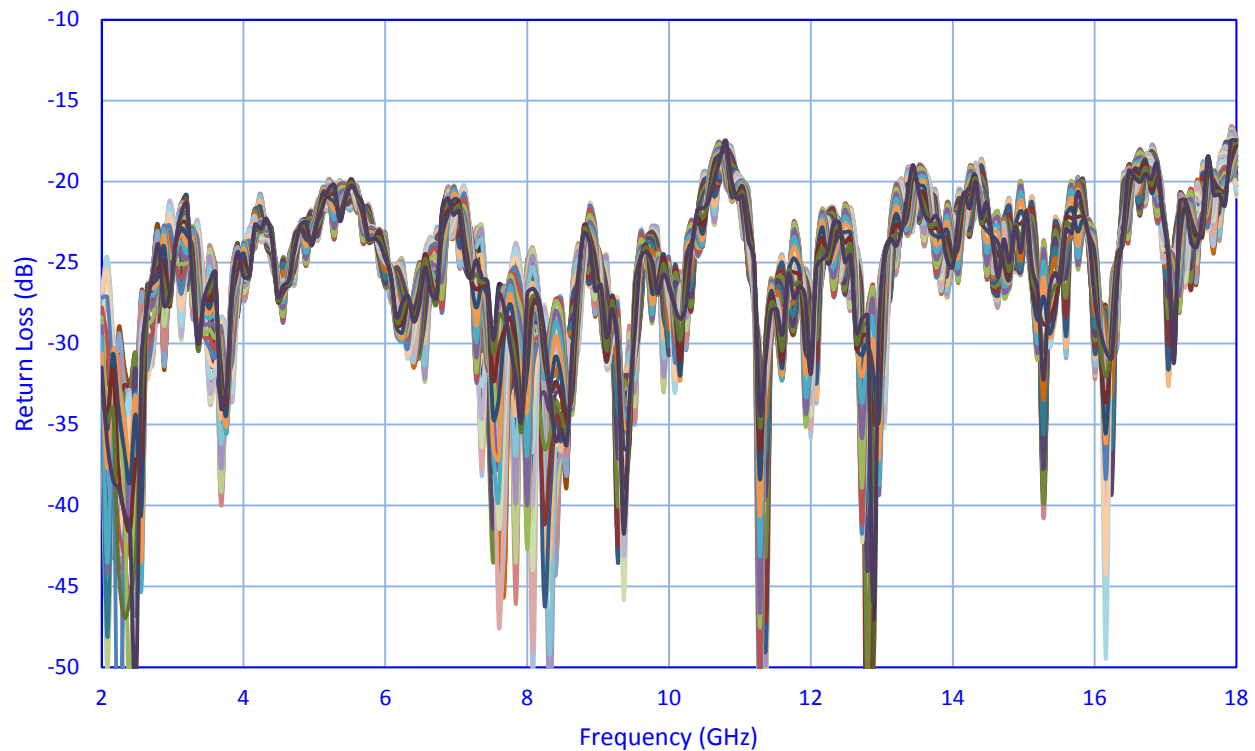
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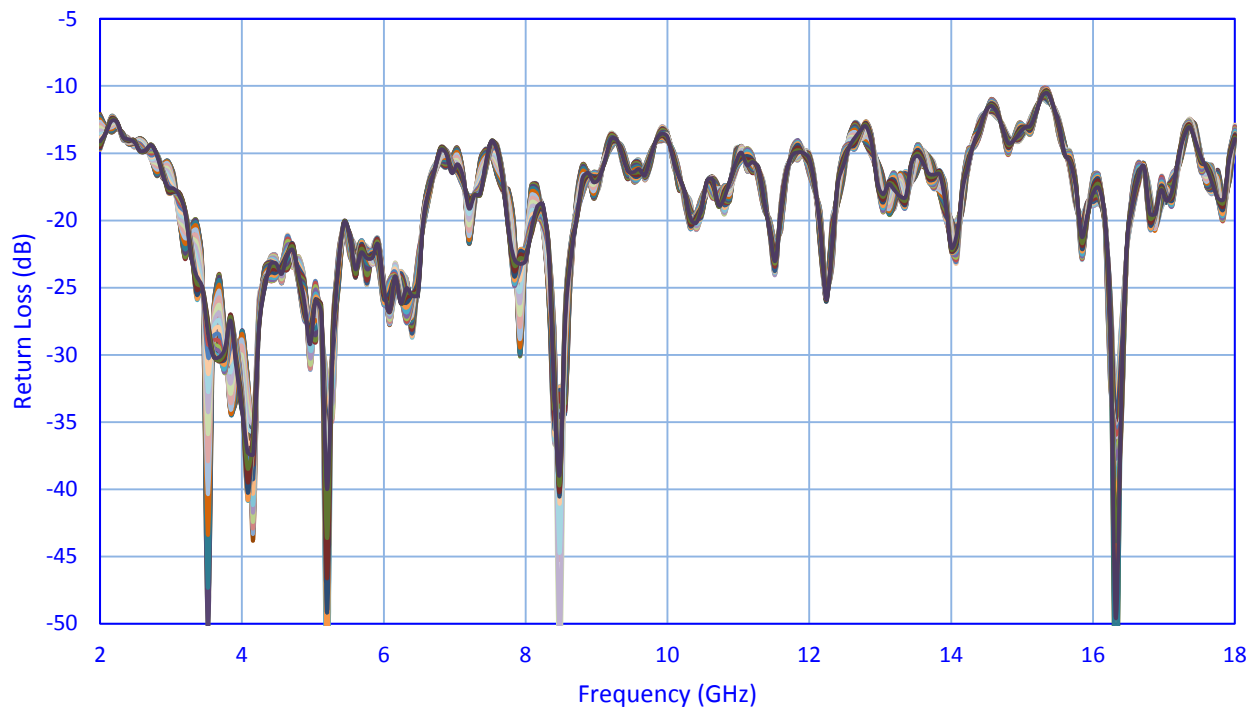


Typical Characteristics For PIQ-2G18G-360-16-CD-1 (Prototype)

Input Return Loss Vs. Frequency @ 4 dB Attenuation



Output Return Loss Vs. Frequency @ 4 dB Attenuation



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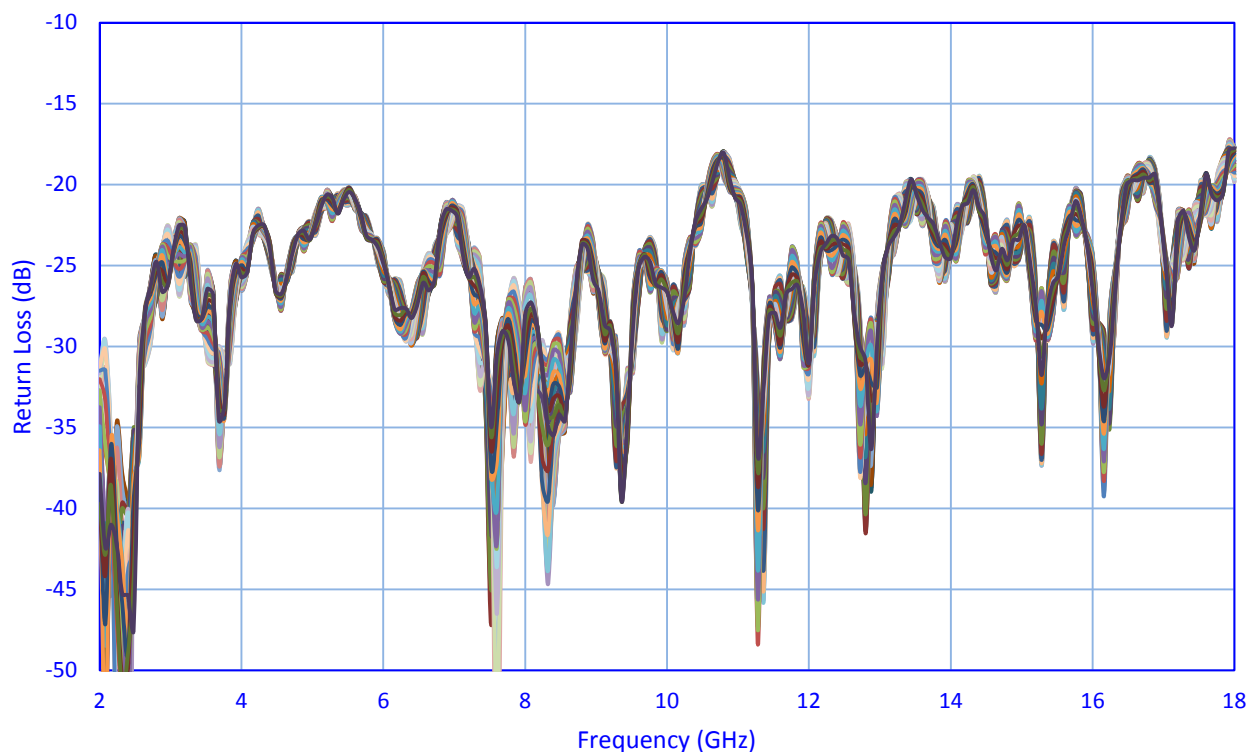
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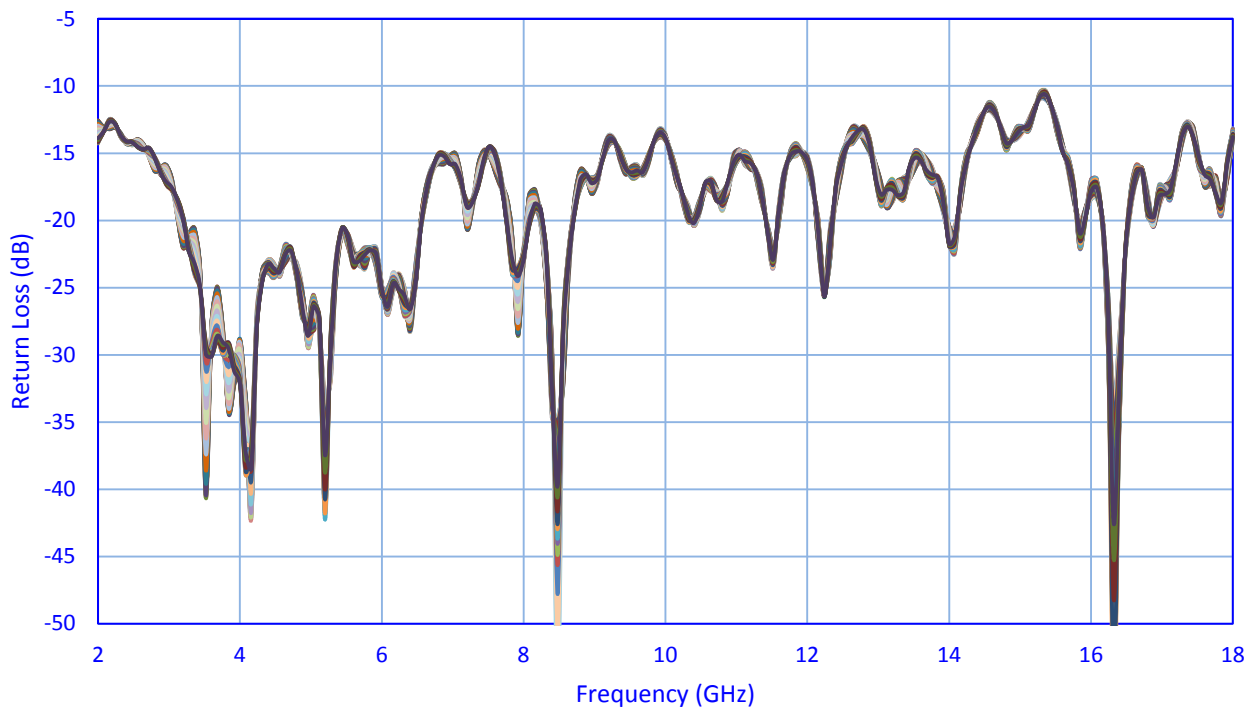


Typical Characteristics For PIQ-2G18G-360-16-CD-1 (Prototype)

Input Return Loss Vs. Frequency @ 8 dB Attenuation



Output Return Loss Vs. Frequency @ 8 dB Attenuation



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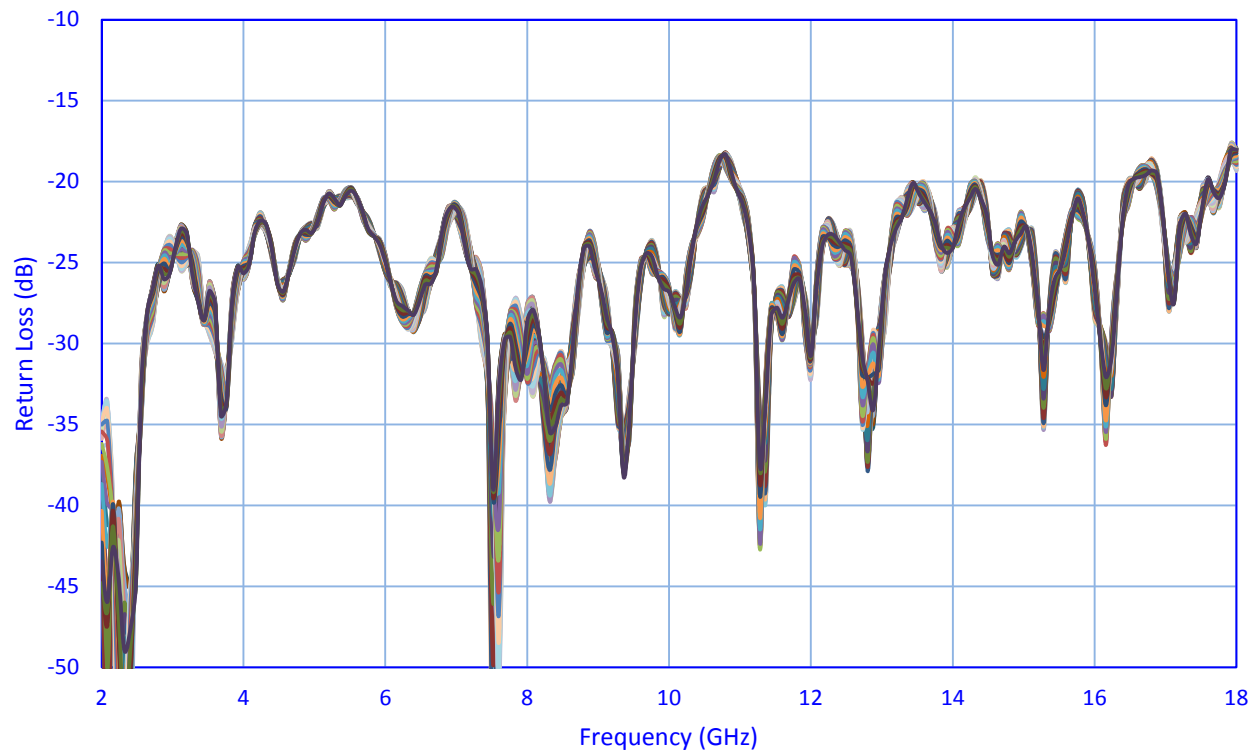
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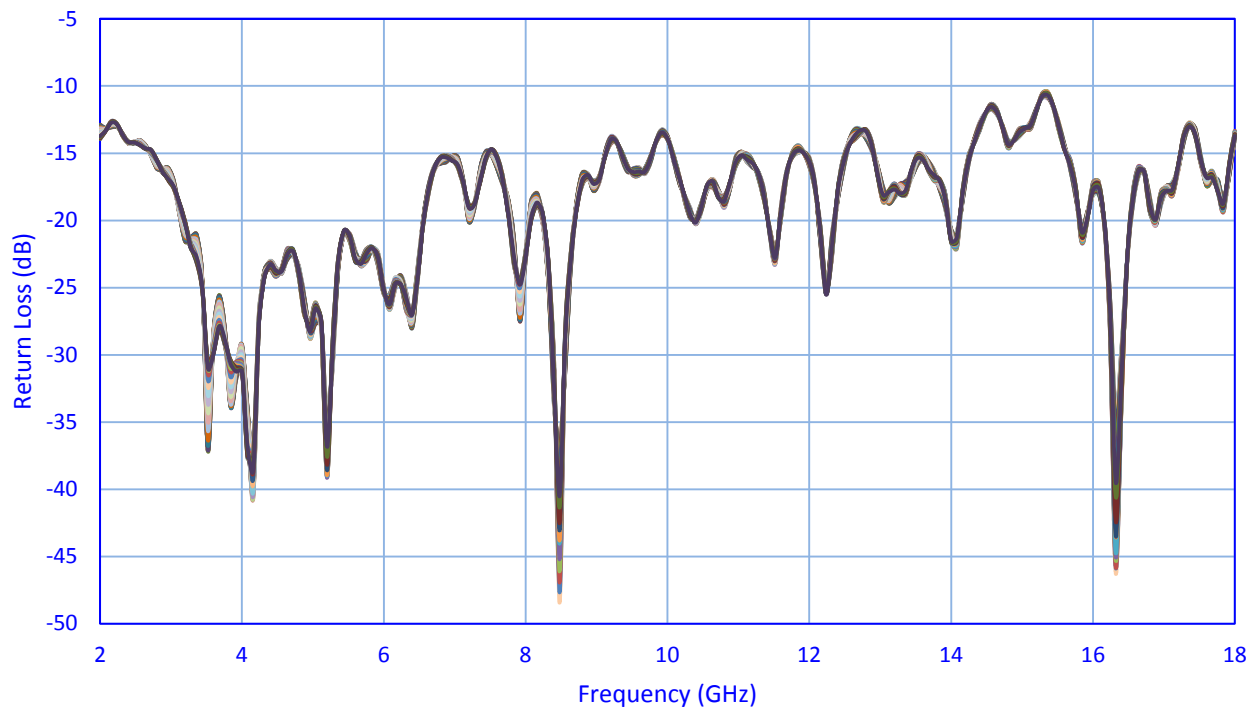


Typical Characteristics For PIQ-2G18G-360-16-CD-1 (Prototype)

Input Return Loss Vs. Frequency @ 12 dB Attenuation



Output Return Loss Vs. Frequency @ 12 dB Attenuation



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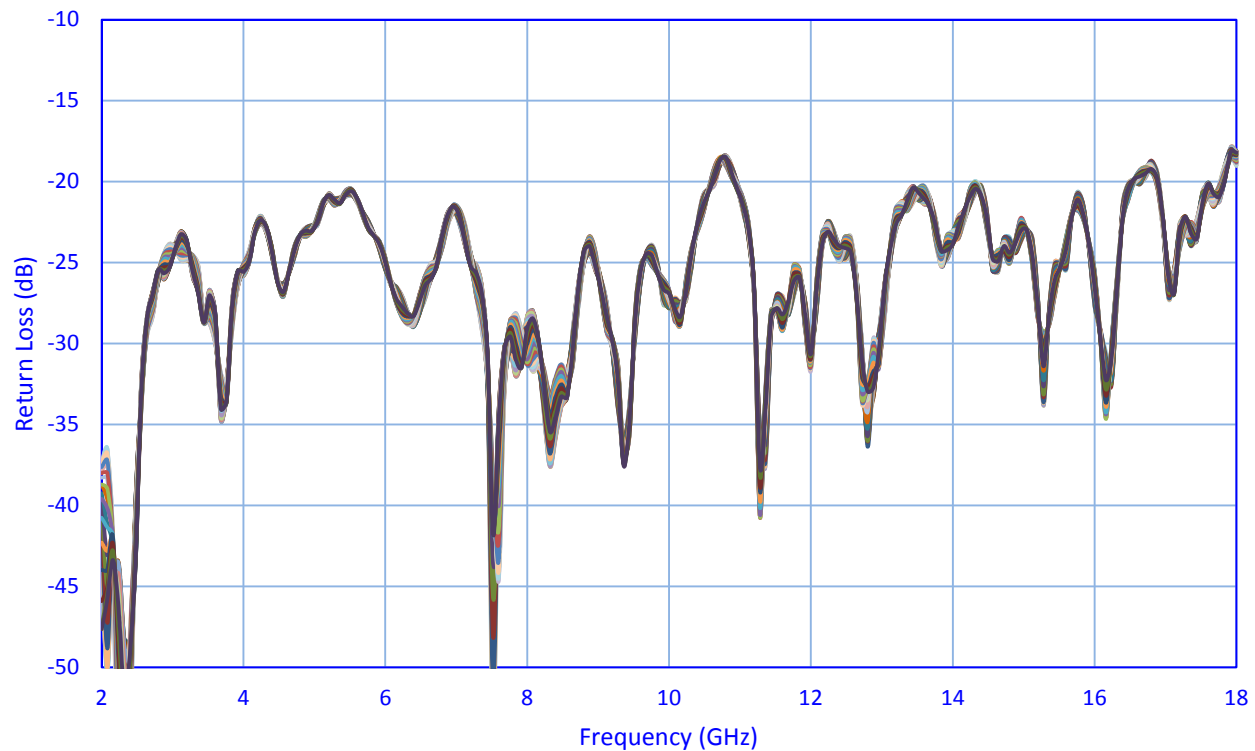
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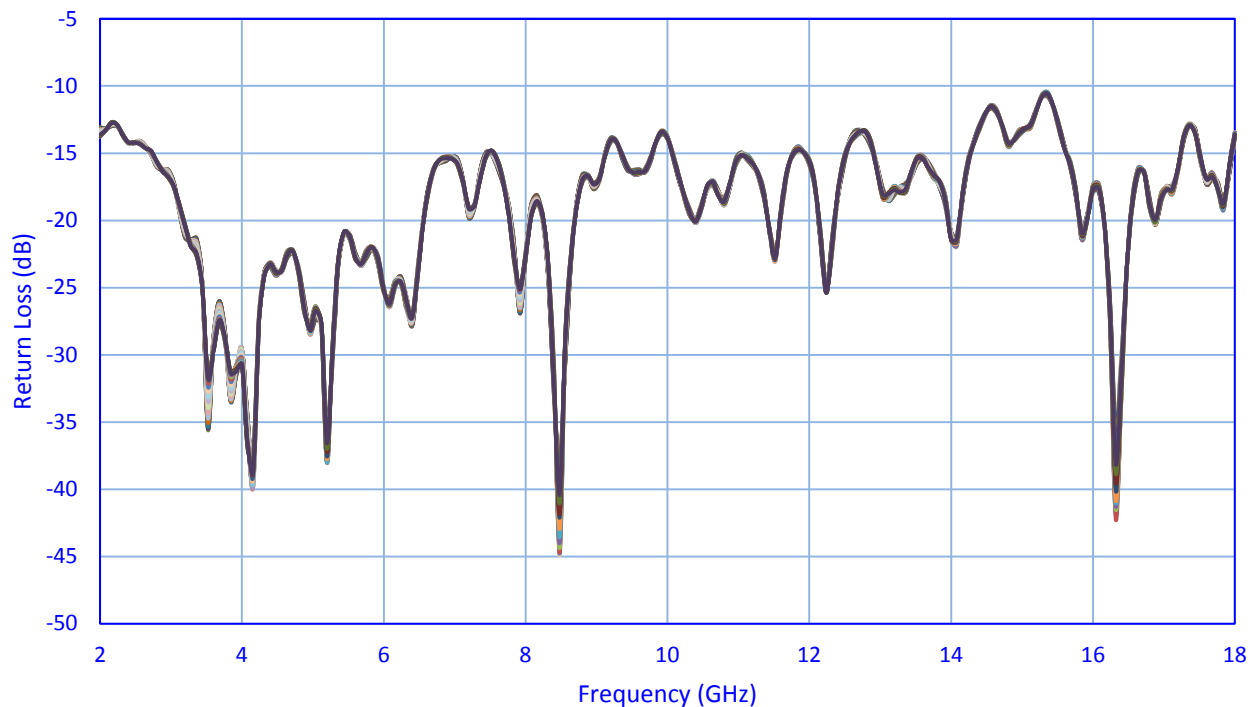


Typical Characteristics For PIQ-2G18G-360-16-CD-1 (Prototype)

Input Return Loss Vs. Frequency @ 16 dB Attenuation



Output Return Loss Vs. Frequency @ 16 dB Attenuation



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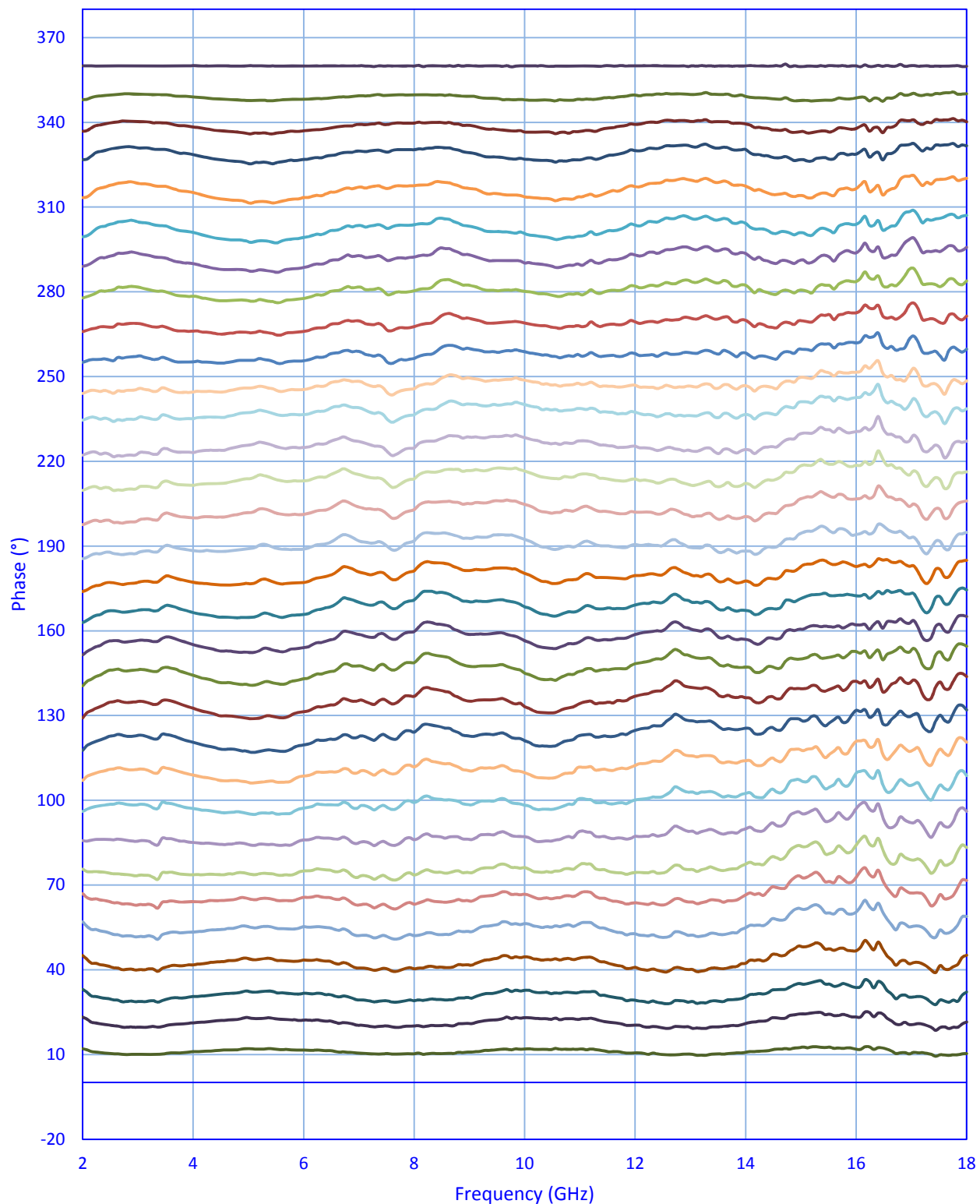
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Typical Characteristics For PIQ-2G18G-360-16-CD-1 (Prototype)

Phase @ 0 dB Attenuation



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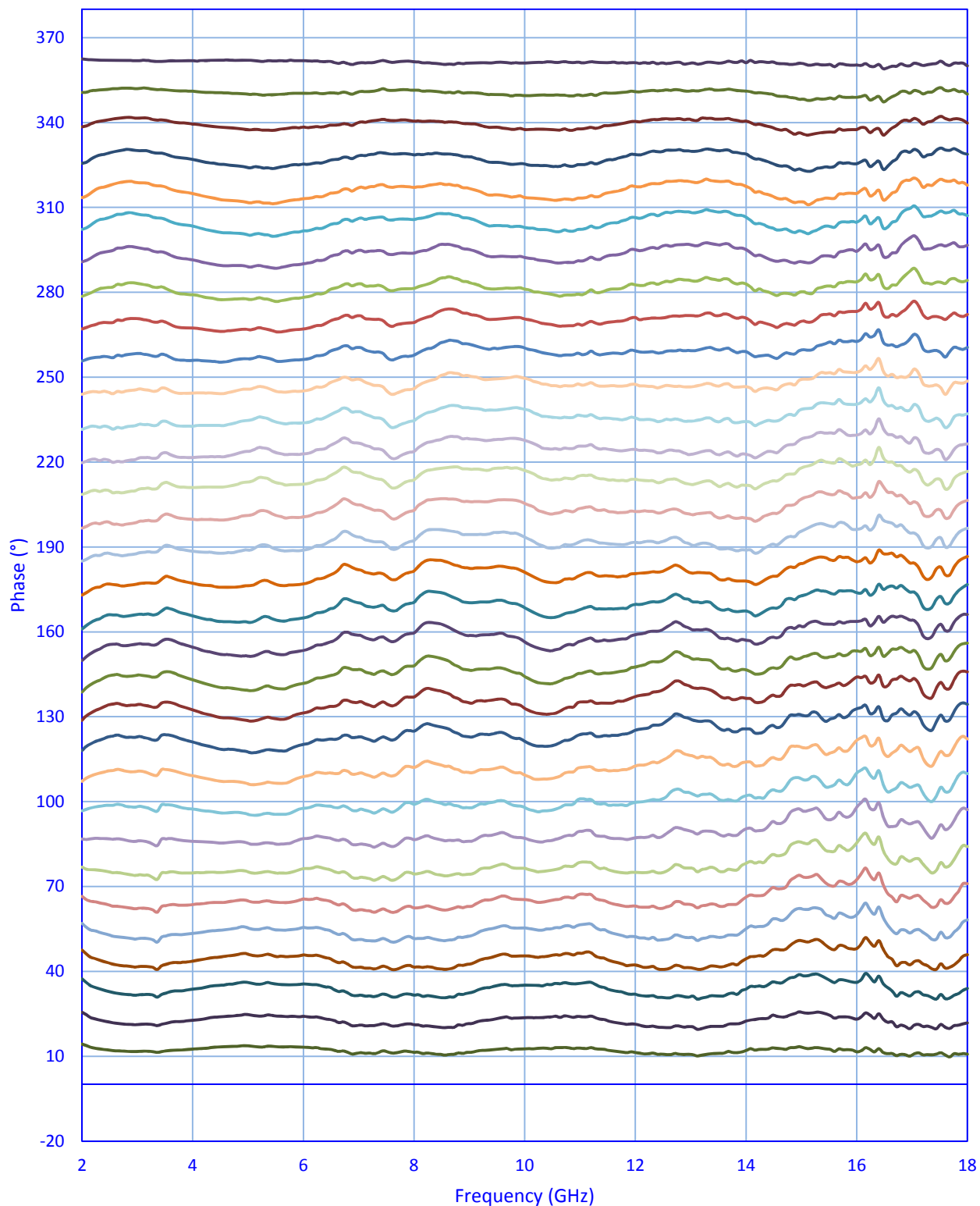
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Typical Characteristics For PIQ-2G18G-360-16-CD-1 (Prototype)

Phase @ 4 dB Attenuation



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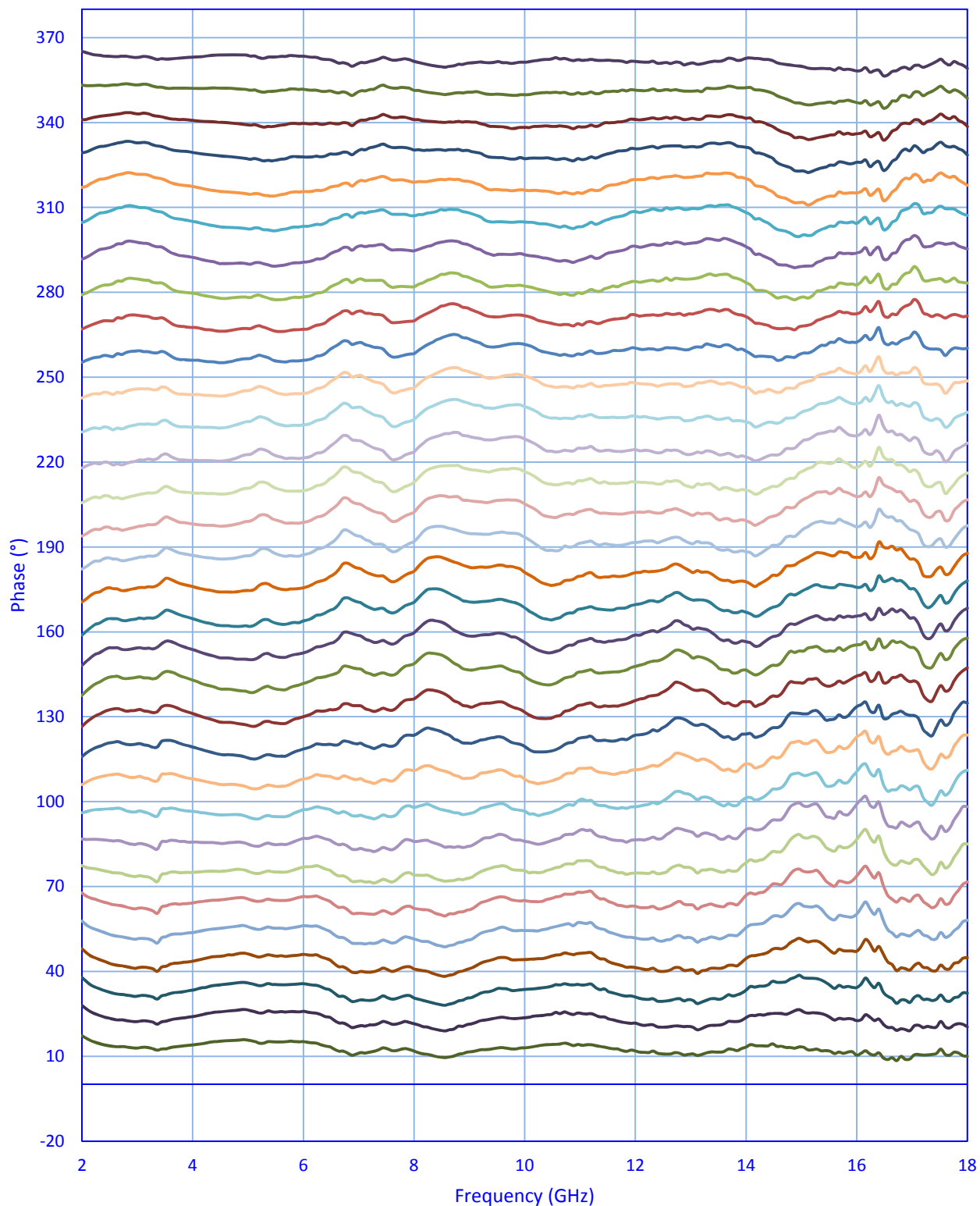
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Typical Characteristics For PIQ-2G18G-360-16-CD-1 (Prototype)

Phase @ 8 dB Attenuation



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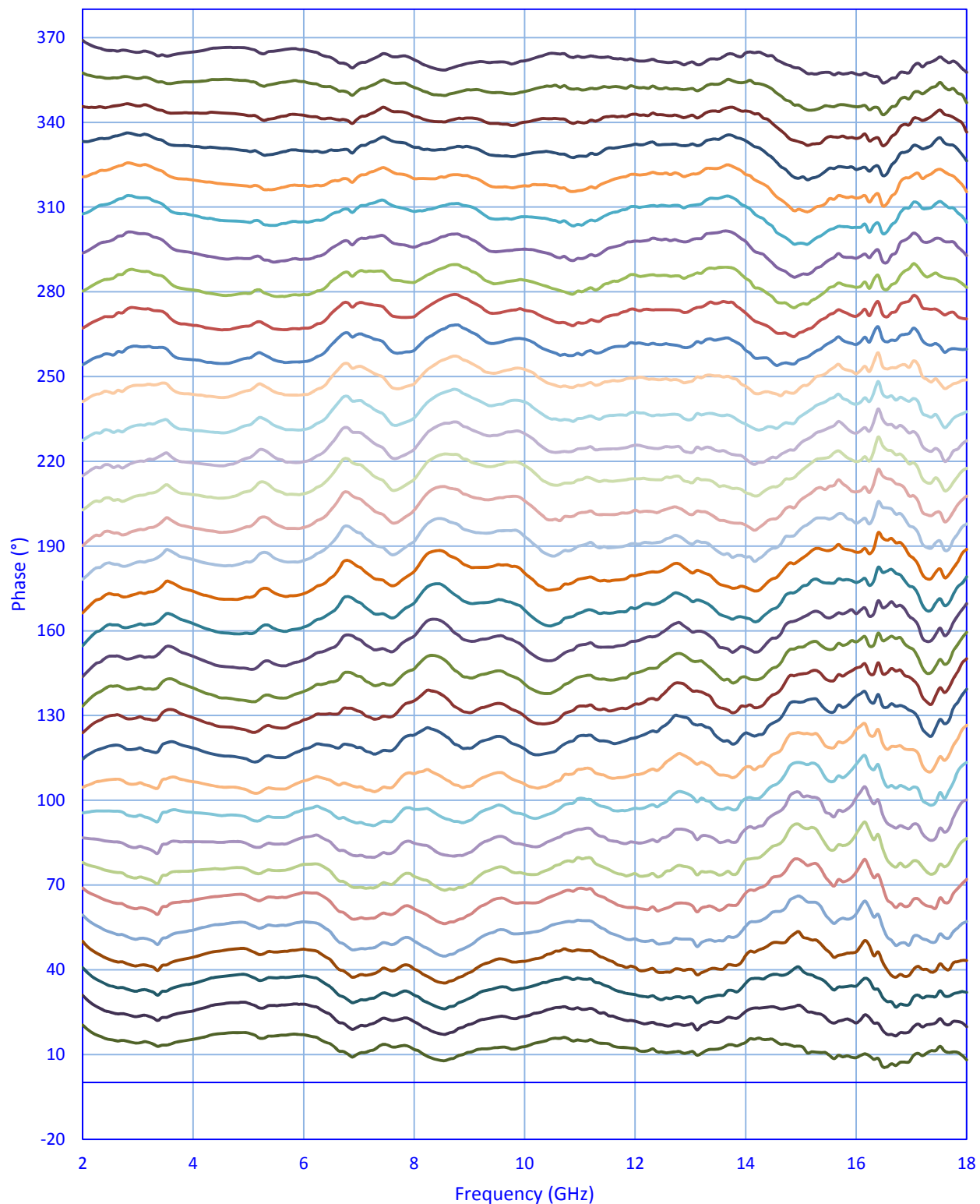
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Phase @ 12 dB Attenuation



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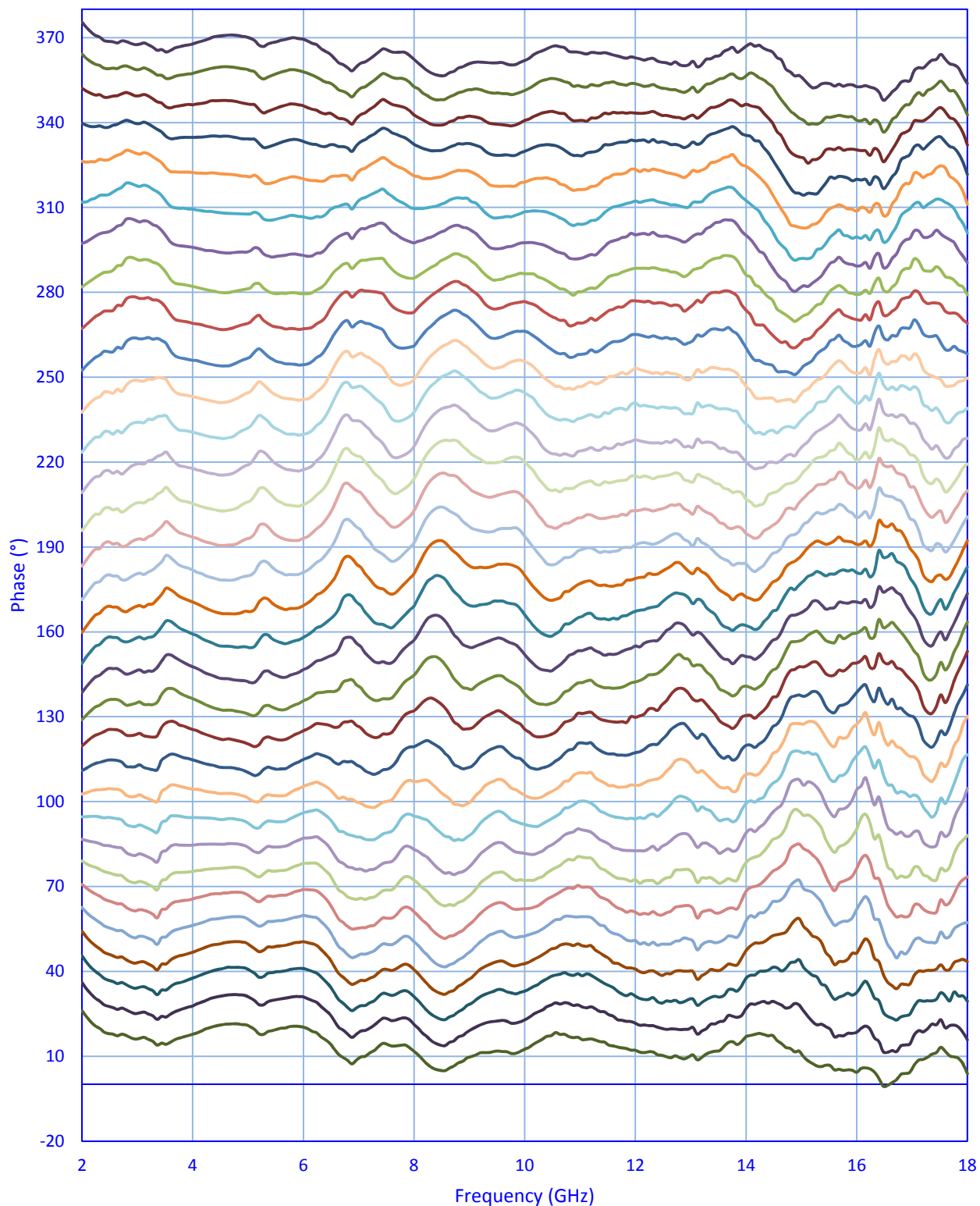
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Typical Characteristics For PIQ-2G18G-360-16-CD-1 (Prototype)

Phase @ 16 dB Attenuation



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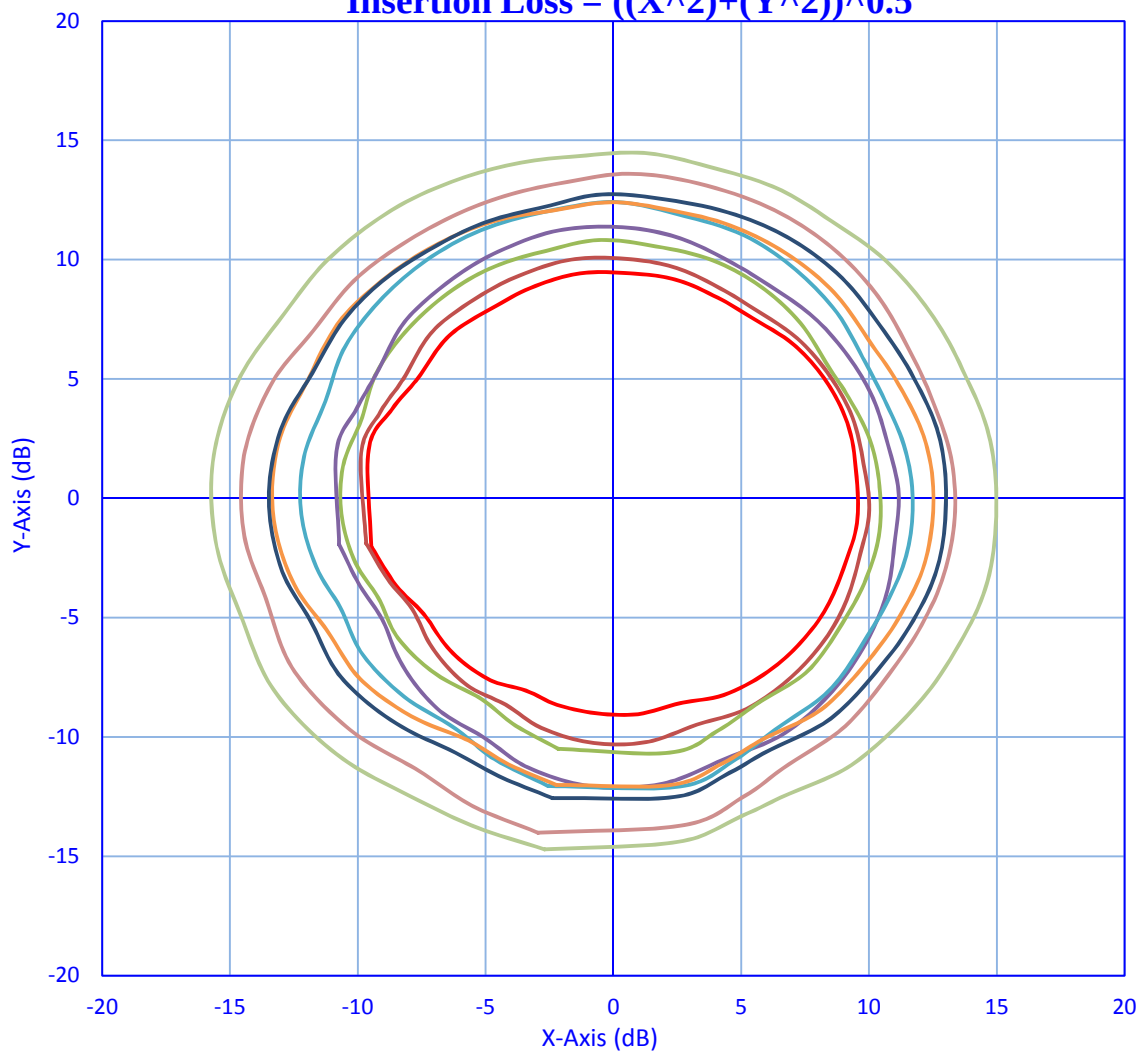
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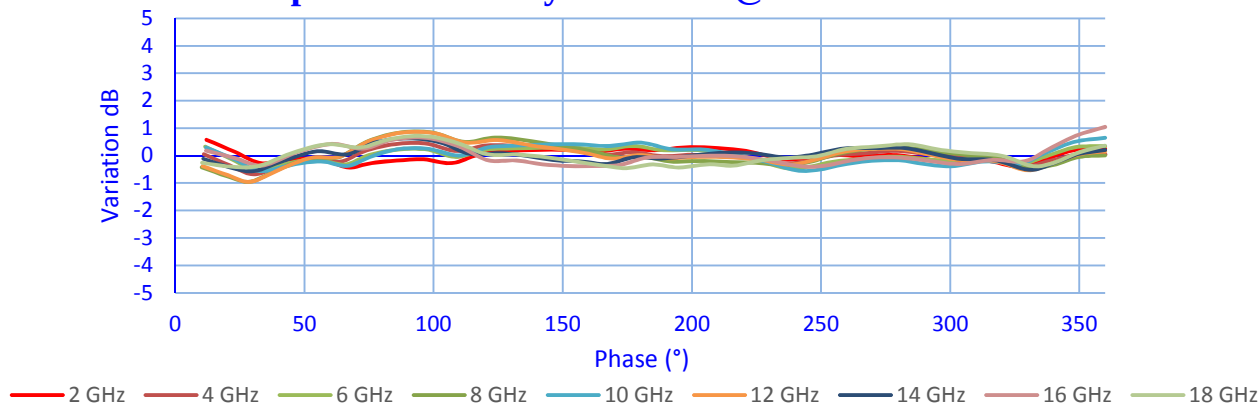
Typical Characteristics For PIQ-2G18G-360-16-CD-1 (Prototype)

Insertion Loss Vs. Phase @ 0 dB Attenuation

$$\text{Insertion Loss} = ((X^2) + (Y^2))^{0.5}$$



Amplitude Linearity Vs. Phase @ 0 dB Attenuation



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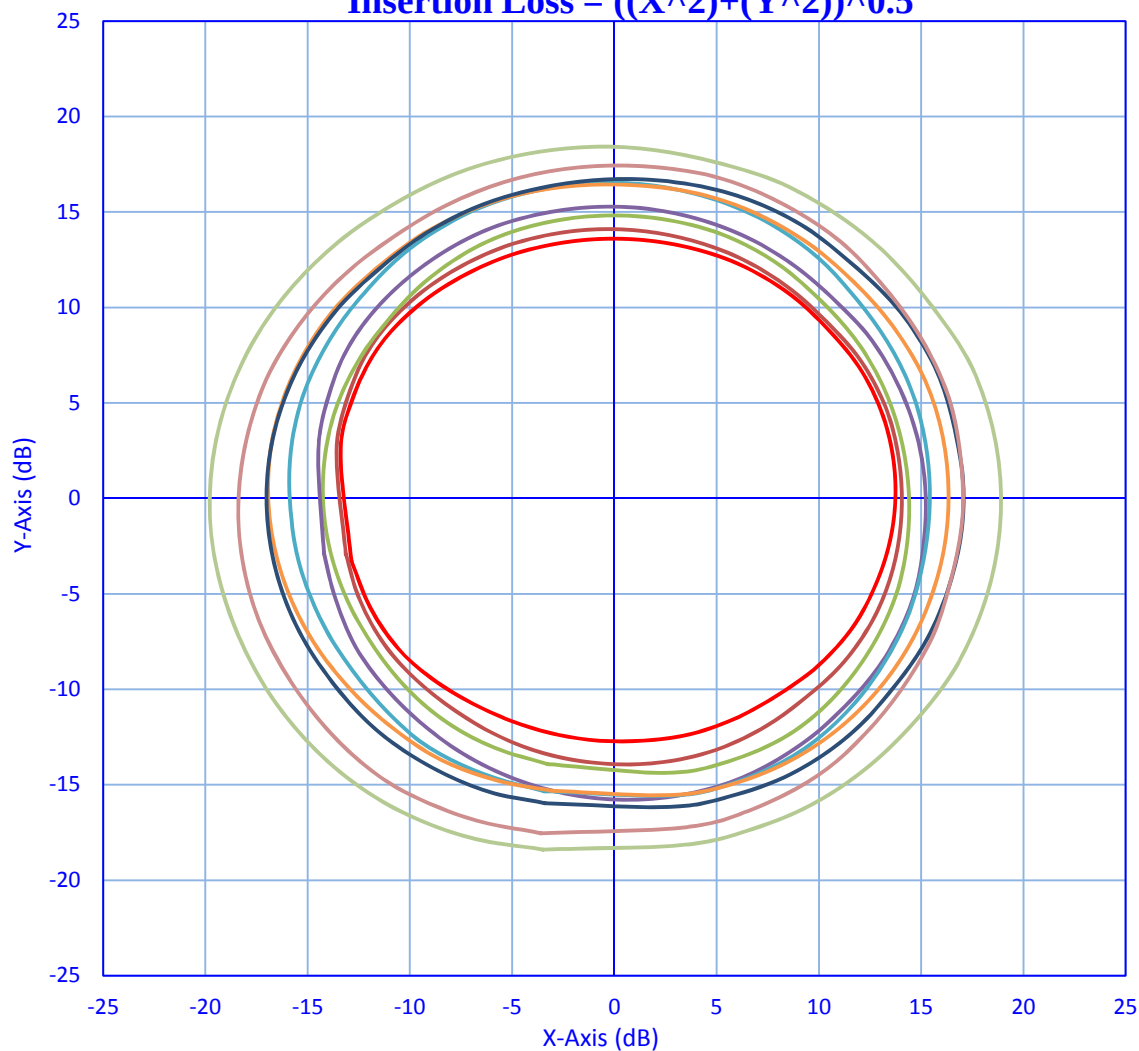
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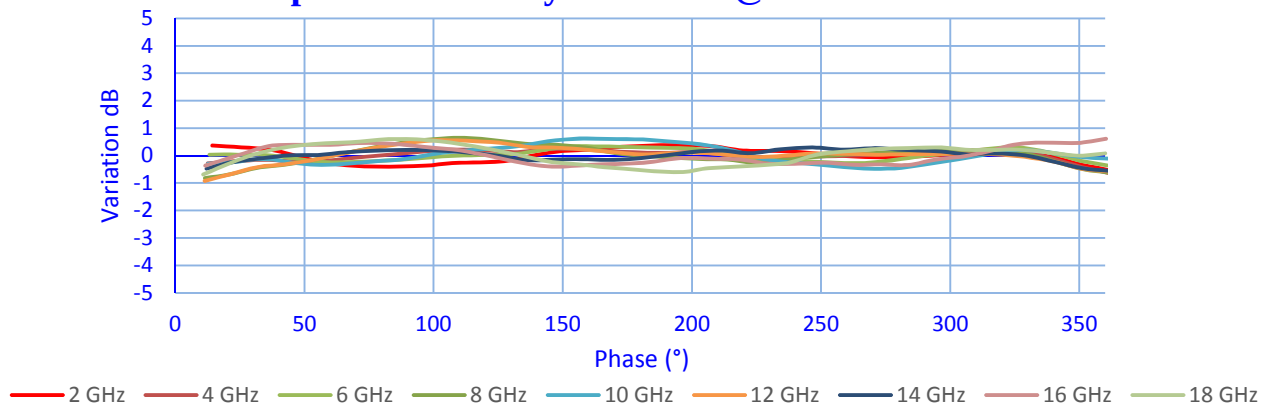
Typical Characteristics **For** **PIQ-2G18G-360-16-CD-1 (Prototype)**

Insertion Loss Vs. Phase @ 4 dB Attenuation

$$\text{Insertion Loss} = ((X^2) + (Y^2))^{0.5}$$



Amplitude Linearity Vs. Phase @ 4 dB Attenuation



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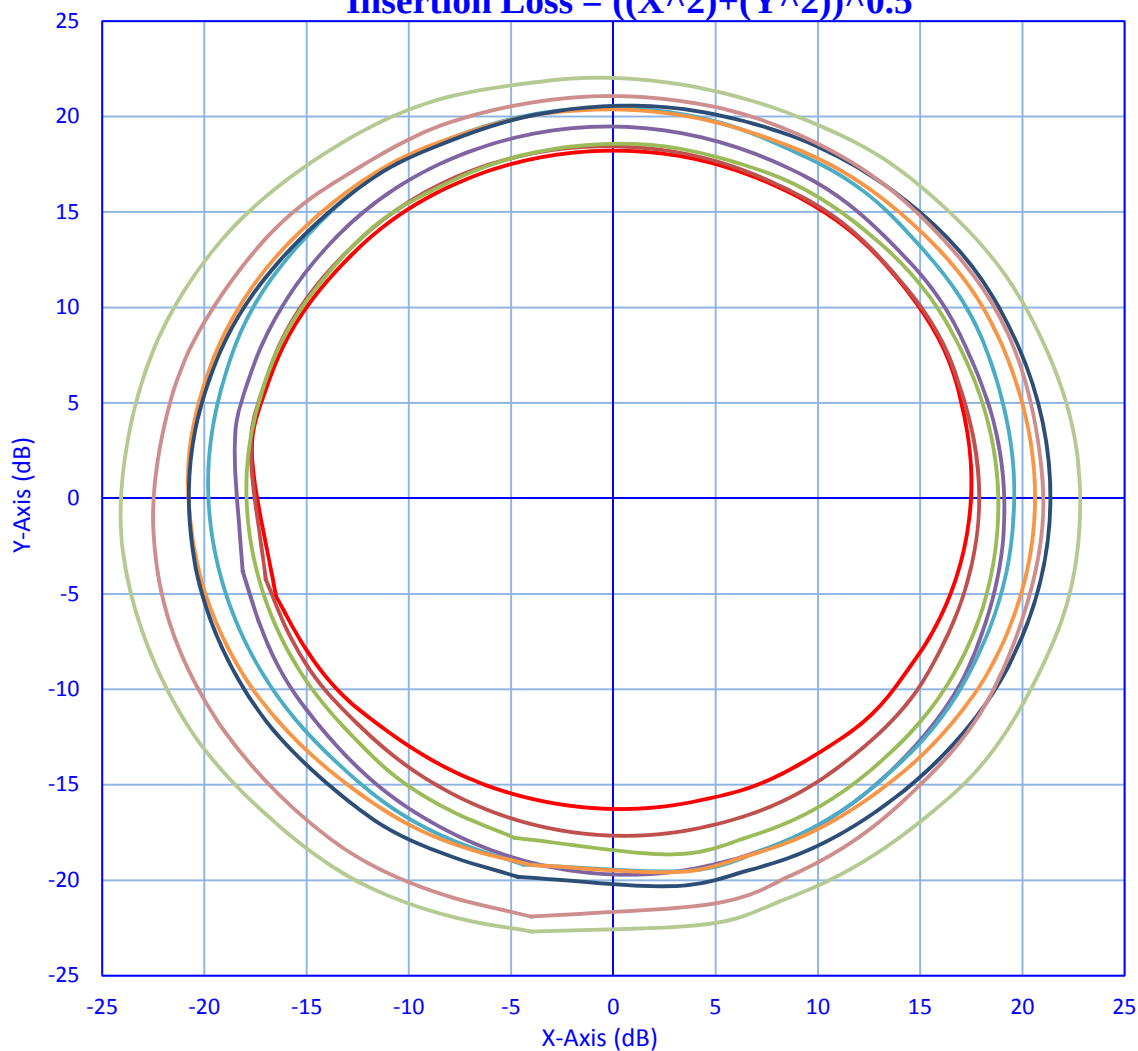
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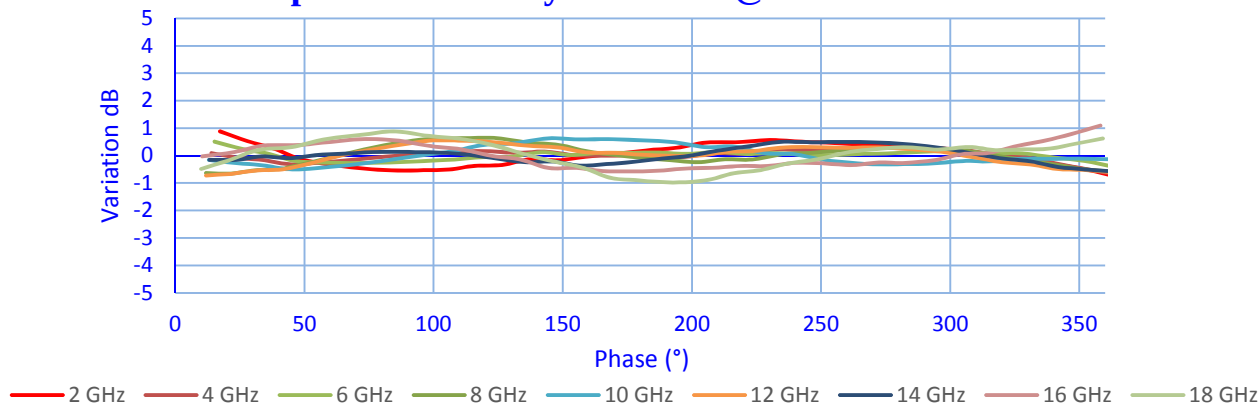
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Insertion Loss Vs. Phase @ 8 dB Attenuation

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Amplitude Linearity Vs. Phase @ 8 dB Attenuation



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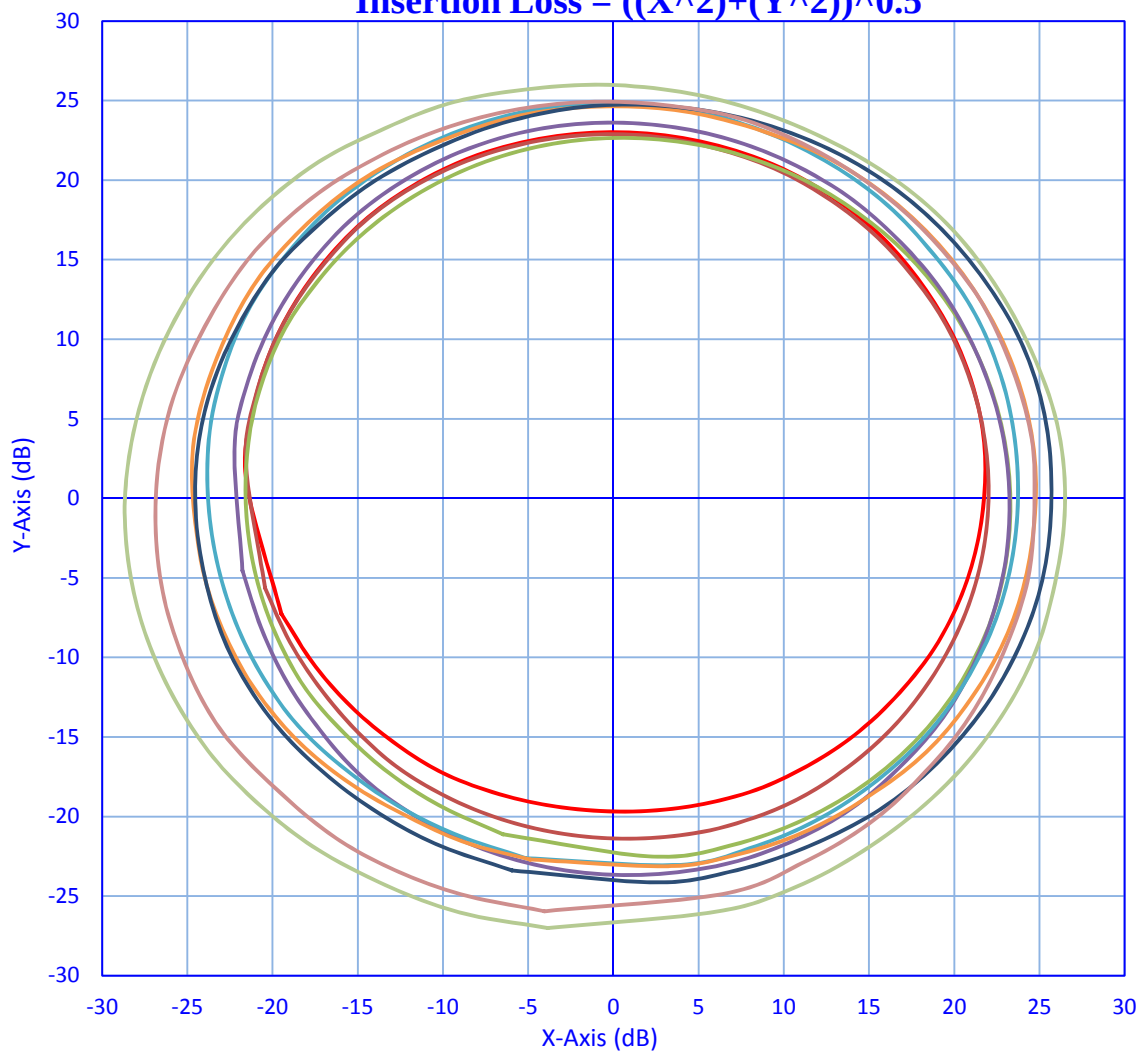
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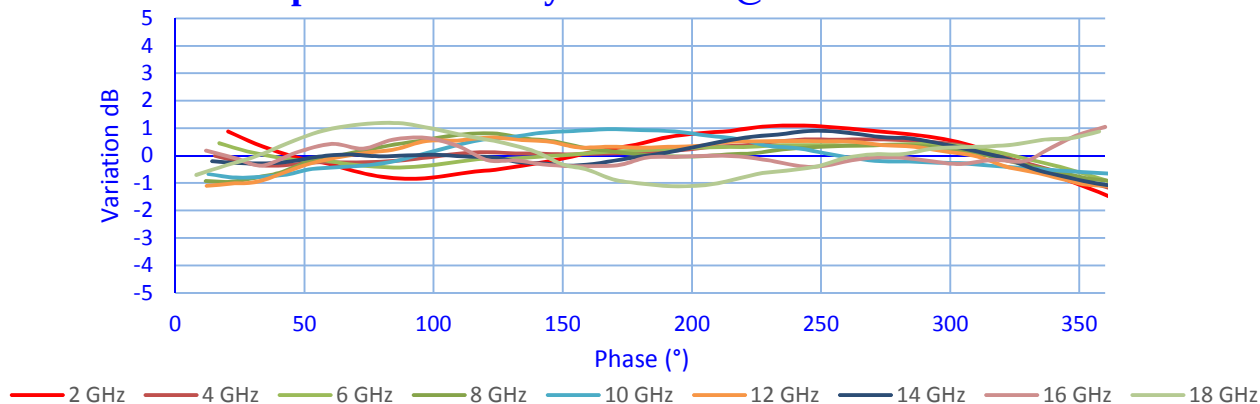
Typical Characteristics For PIQ-2G18G-360-16-CD-1 (Prototype)

Insertion Loss Vs. Phase @ 12 dB Attenuation

$$\text{Insertion Loss} = ((X^2) + (Y^2))^{0.5}$$



Amplitude Linearity Vs. Phase @ 12 dB Attenuation



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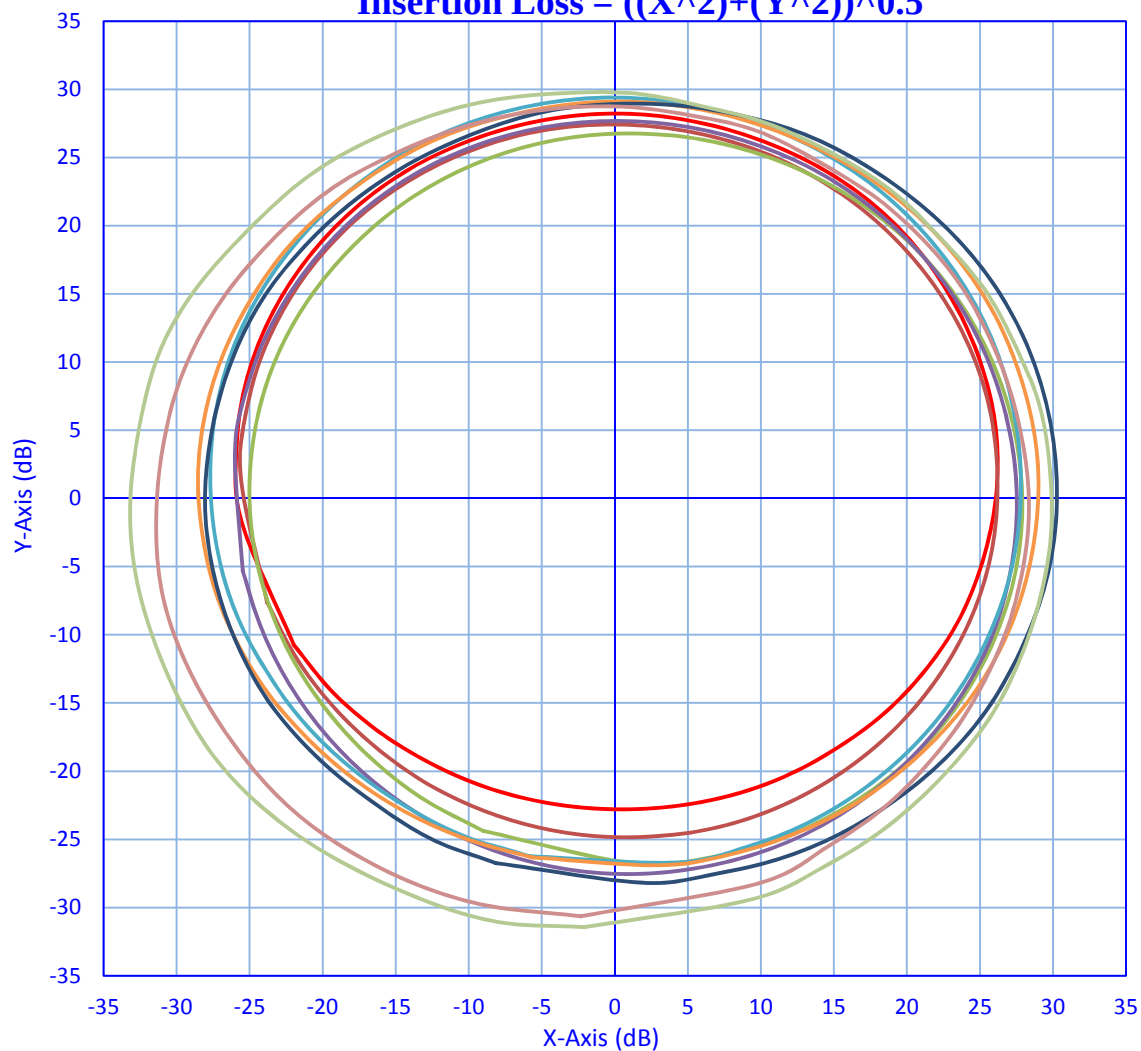
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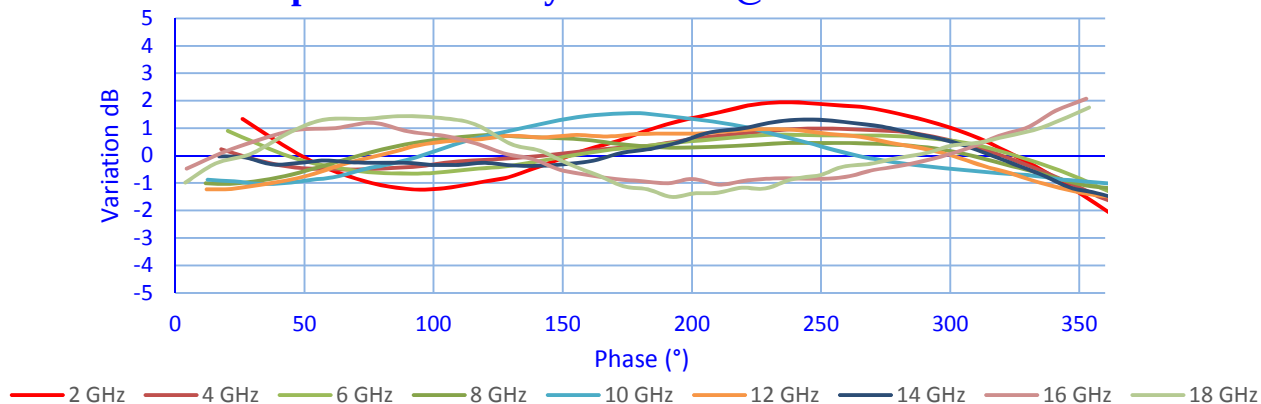
Typical Characteristics **For** **PIQ-2G18G-360-16-CD-1 (Prototype)**

Insertion Loss Vs. Phase @ 16 dB Attenuation

$$\text{Insertion Loss} = ((X^2) + (Y^2))^{0.5}$$



Amplitude Linearity Vs. Phase @ 16 dB Attenuation



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