



Data Sheet

Band1&Band3 Quadplexer

SPT1G84AFA2

7th Nov 2022
Preliminary

Description:

The Spectron SPT1G84AFA2 is a quadplexer that combines Band 1 and Band 3 duplexers into a single miniature package, which can be used on Smartphones, tablets, and other communication devices.

The SPT1G84AFA2 provides +30dBm power handling, and high isolation between bands enables carrier aggregation.

The design and manufacturing of the SPT1G84AFA2 exploit Spectron's exclusive PSAW technology to deliver competitive performance against the state-of-the-art.

The SPT1G84AFA2 is compatible with high-volume, lead-free SMT soldering processes.

Features:

- Single-Ended Input and Output
- Terminating Impedance: 50 Ω
- Compact miniature size
 - 2.5 mm \times 2.0 mm footprint
 - 0.785 mm max-height
- Environmental
 - RoHS 6 Compliant

Specifications:

- Performance specified from -30°C to +85°C
- In-band insertion loss:
 - Band1 Duplexer Tx: 2.0 dB (Typ.)
 - Band1 Duplexer Rx: 2.1 dB (Typ.)
 - Band3 Duplexer Tx: 2.9 dB (Typ.)
 - Band3 Duplexer Rx: 2.5 dB (Typ.)
- High out-of-band rejection and isolation
 - Enables carrier aggregation

Applications:

- Smartphones
- Tablets
- Other communication devices

Electrical Specifications

Table 1 Electrical Specifications: Band1 Tx to Ant

Band1 Tx to Ant			Specification		
Parameter	Condition [MHz]	Unit	Minimum ¹	Typical ²	Maximum ¹
Insertion Loss	1920.00 - 1980.00	dB	-	2.0	2.4
Inband Ripple	1920.00 - 1980.00	dB	-	0.7	
VSWR of Tx Port	1920.00 - 1980.00	-	-	1.4	2.0
VSWR of Ant Port	1920.00 - 1980.00	-	-	1.3	2.0
Absolute Attenuation	10.00 .00 - 1574.00	dB	30	43	-
	1475.00 - 1511.00	dB	40	43	-
	1559.00 - 1608.00	dB	40	43	-
	1607.00 - 1710.00	dB	33	42	-
	1710.00 - 1785.00	dB	33	41	-
	2110.00 - 2170.00	dB	48	54	-
	1805.00 - 1880.00	dB	45	50	-
	2010.00 - 2025.00	dB	17	22	-
	2400.00 - 2500.00	dB	40	50	
	2500.00 - 2690.00	dB	45	48	
	3640.00 - 3960.00	dB		33.1	
	4900.00 - 5740.00	dB	20	23.5	
5740.00 - 5950.00	dB	25	25		

Table 2 Electrical Specifications: Band1 Ant to Rx

Band1 Ant to Rx			Specification		
Parameter	Condition [MHz]	Unit	Minimum ¹	Typical ²	Maximum ¹
Insertion Loss	2110.00 - 2170.00	dB	-	2.1	2.5
Inband Ripple	2110.00 - 2170.00	dB	-	0.3	
VSWR of Rx Port	2110.00 - 2170.00	-	-	1.6	2.0
VSWR of Ant Port	2110.00 - 2170.00	-	-	1.6	2.0
Absolute Attenuation	10.00 - 1920.00	dB	37	47	-
	718.00 - 748.00	dB	50	57.5	-
	814.00 - 915.00	dB	40	54.5	-
	1427.00 - 1447.00	dB	40	48.5	-
	1448.00 - 1463.00	dB	45	48	-
	1710.20 - 1784.80	dB	48	56	-
	1920.00 - 1980.00	dB	48	57	-
	1710.00 - 1785.00	dB	48	53	-
	1980.00 - 2015.00	dB	15	40	
	2015.00 - 2050.00	dB	30	38	
	2050.00 - 2075.00	dB	10	15	
	2255.00 - 2690.00	dB	40	47	
	4220.00 - 4340.00	dB	23	46	

	4900.00 - 5900.00	dB		47	
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Table 3 Electrical Specifications: Band3 Tx to Ant

Band3 Tx to Ant			Specification		
Parameter	Condition [MHz]	Unit	Minimum ¹	Typical ²	Maximum ¹
Insertion Loss	1710.00 - 1785.00	dB	-	2.9	3.5
Inband Ripple	1710.00 - 1785.00	dB	-	1.5	
VSWR of Rx Port	1710.00 - 1805.00	-	-	1.5	2.0
VSWR of Ant Port	1710.00 - 1805.00	-	-	1.5	2.0
Absolute Attenuation	1.00 - 1565.00	dB	23	30	-
	1559.00 - 1607.00	dB	42	43	-
	1805.00 - 1880.00	dB	45	53	-
	2110.00 - 2170.00	dB	45	52	-
	2400.00 - 2690.00	dB	33	43	-
	3420.00 - 3570.00	dB	28	29	-
	4900.00 - 5950.00	dB	28	29	-
	5130.00 - 5355.00	dB		33	-

Table 4 Electrical Specifications: Band3 Ant to Rx

Band1 Ant to Rx			Specification		
Parameter	Condition [MHz]	Unit	Minimum ¹	Typical ²	Maximum ¹
Insertion Loss	1805.00 - 1880.00	dB	-	2.9	3.5
Inband Ripple	1805.00 - 1880.00	dB	-	1.5	
VSWR of Rx Port	1805.00 - 1880.00	-	-	1.5	2.0
VSWR of Ant Port	1805.00 - 1880.00	-	-	1.5	2.0
Absolute Attenuation	1.00 - 1710.00	dB	35	43	-
	1710.00 - 1785	dB	45	53	-
	1920.00 - 1980.00	dB	40	55	-
	1980.00 - 2400.00	dB	35	47	-
	2400.00 - 2500.00	dB		49	-
	2500.00 - 2570.00	dB		47	-
	2570.00 - 3515.00	dB	38	40	-
	3515.00 - 3665.00	dB	38	40	-
	3610.00 - 3760.00	dB		40	
	3760.00 - 4900.00	dB	30	42	
	4900.00 - 5950.00	dB	30	34	

Table 4 Electrical Specifications: Isolation

Isolation			Specification		
Parameter	Condition [MHz]	Unit	Minimum ¹	Typical ²	Maximum ¹
Isolation Band1	1920.00 - 1980.00	dB	53	54	-
	2110.00 - 2170.00	dB	55	57	-
Isolation Band3	1710.00 - 1782.00	dB	49	53	-

	1782.00 – 1785.00	dB		55	-
	1805.00 – 1880.00	dB	55	63	-
Isolation Band1 Tx to Band3 Rx	1805.00 – 1880.00	dB	30	50	-
	1920.00 - 1980.00	dB	30	55	-
Isolation Band3 Tx to Band1 Rx	1710.00 - 1785.00	dB	30	54	-
	2110.00 - 2170.00	dB	30	57	-

1. Min/Max specifications are guaranteed over the indicated temperature range (unless otherwise noted).
2. Typical values are based on average measurements at + 25 °C

Figure 1 Electrical Characteristics: Insertion loss, B1 Tx to Ant.

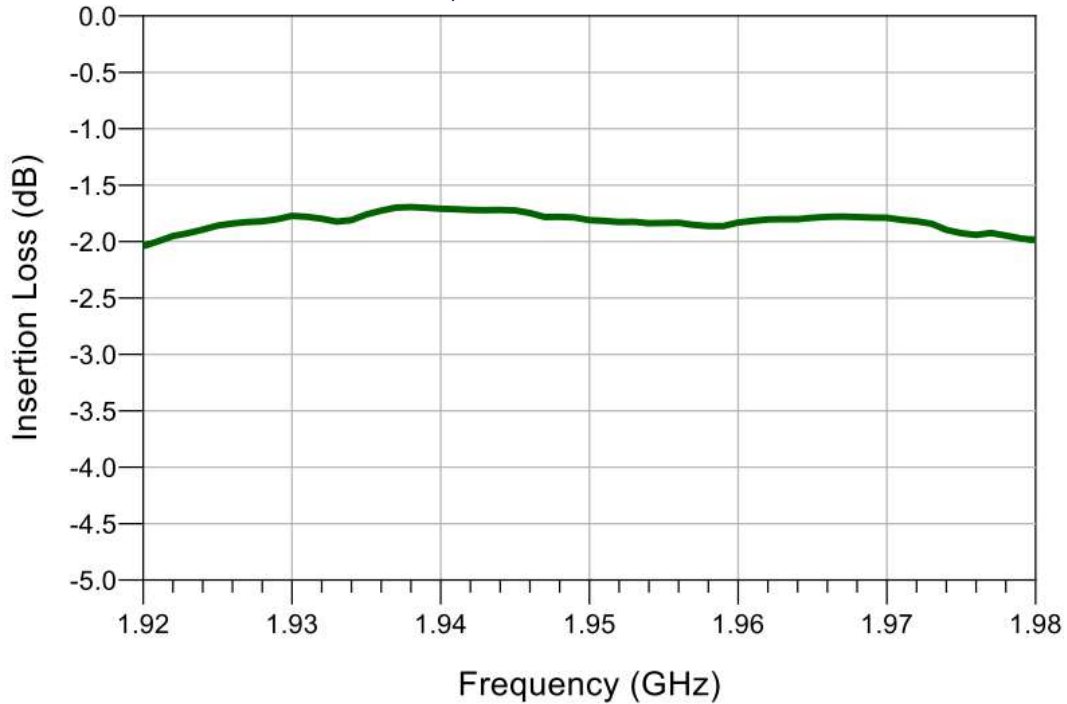


Figure 2 Electrical Characteristics: Insertion loss, B1 Ant to Rx.

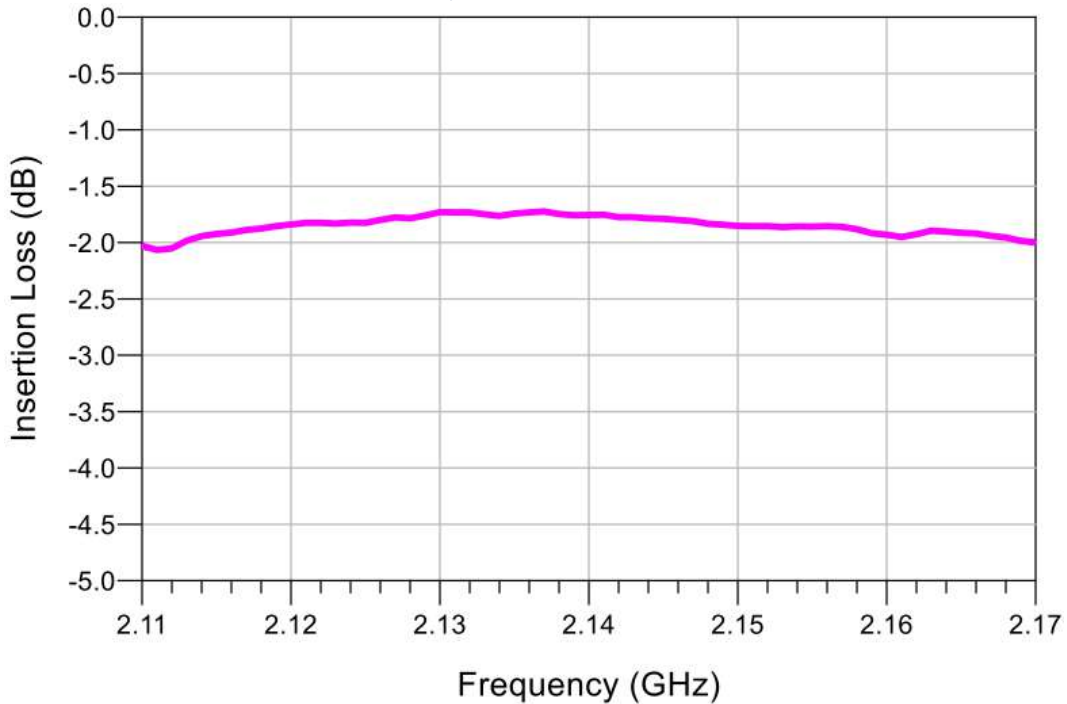


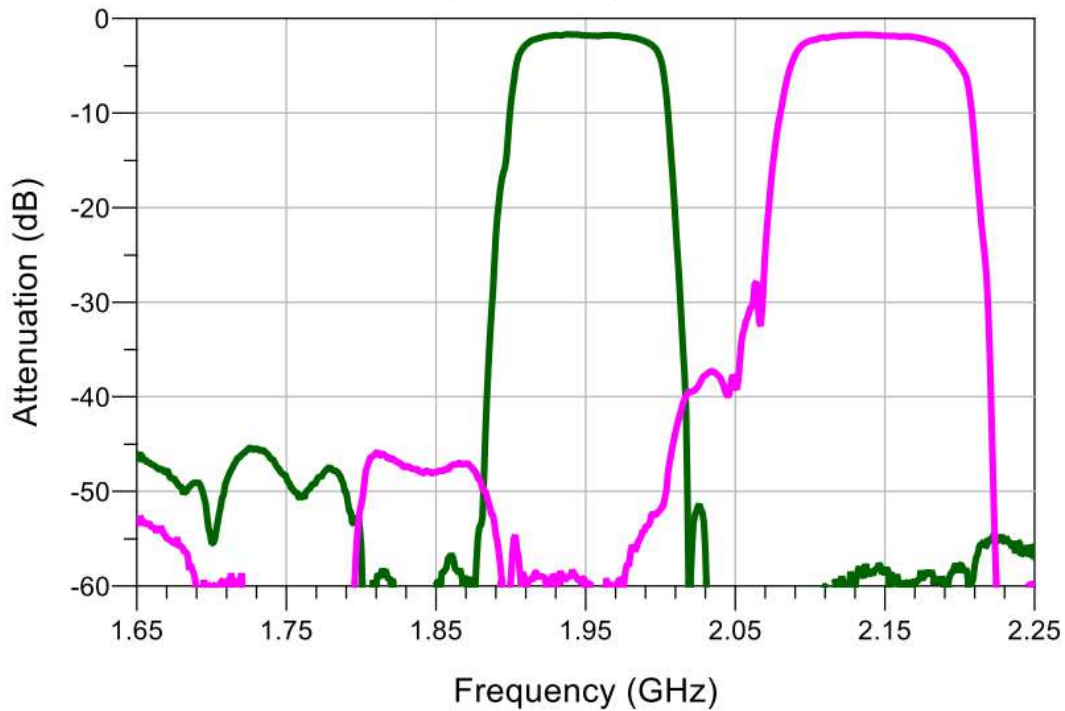
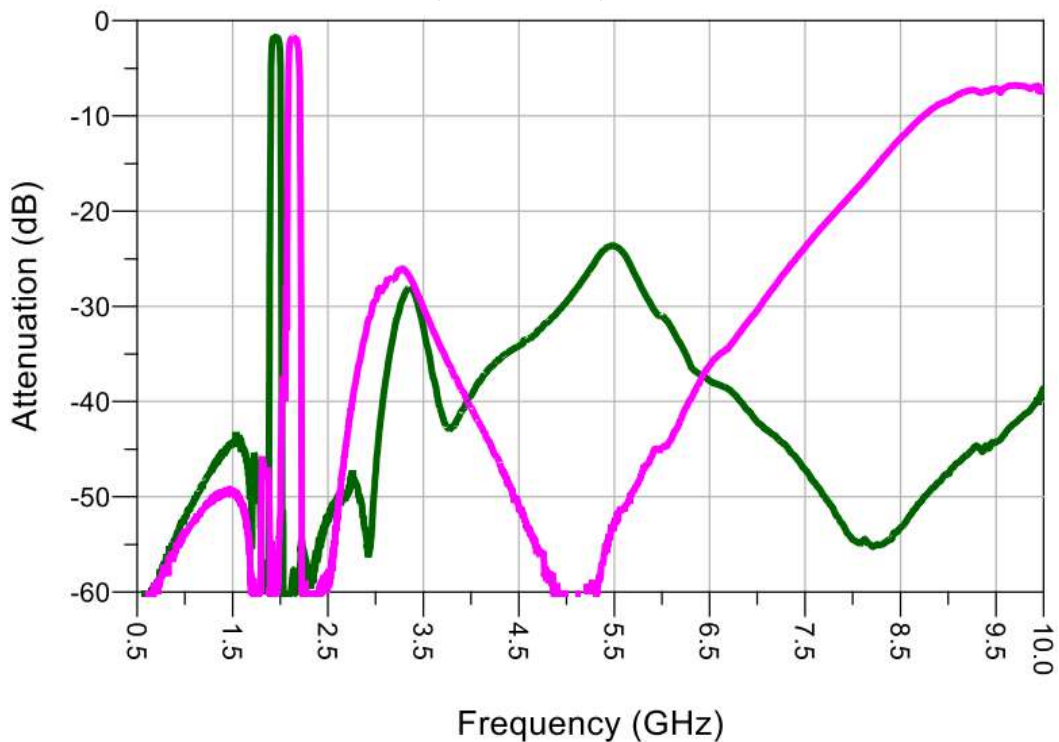
Figure 3 Electrical Characteristics: Insertion loss, B1 TX to Ant, B1 Ant to Rx.**Figure 4** Electrical Characteristics: Attenuation, B1 TX to Ant, B1 Ant to Rx.

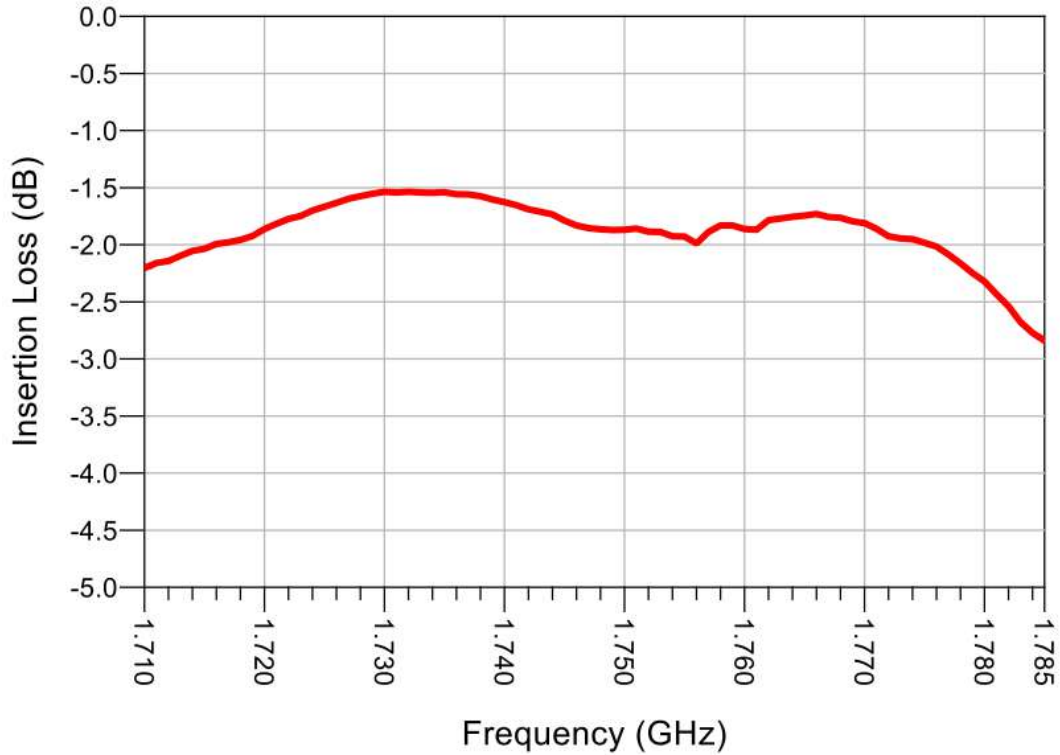
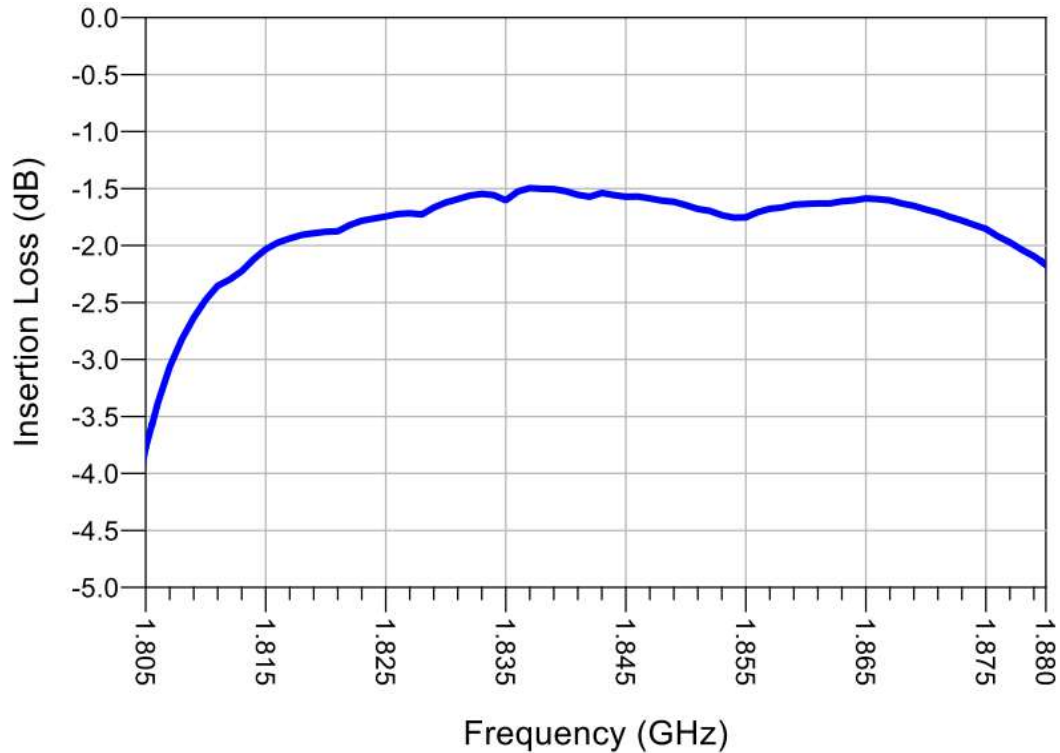
Figure 5 Electrical Characteristics: Insertion loss, B3 Tx to Ant.**Figure 6** Electrical Characteristics: Insertion loss, B3 Ant to Rx.

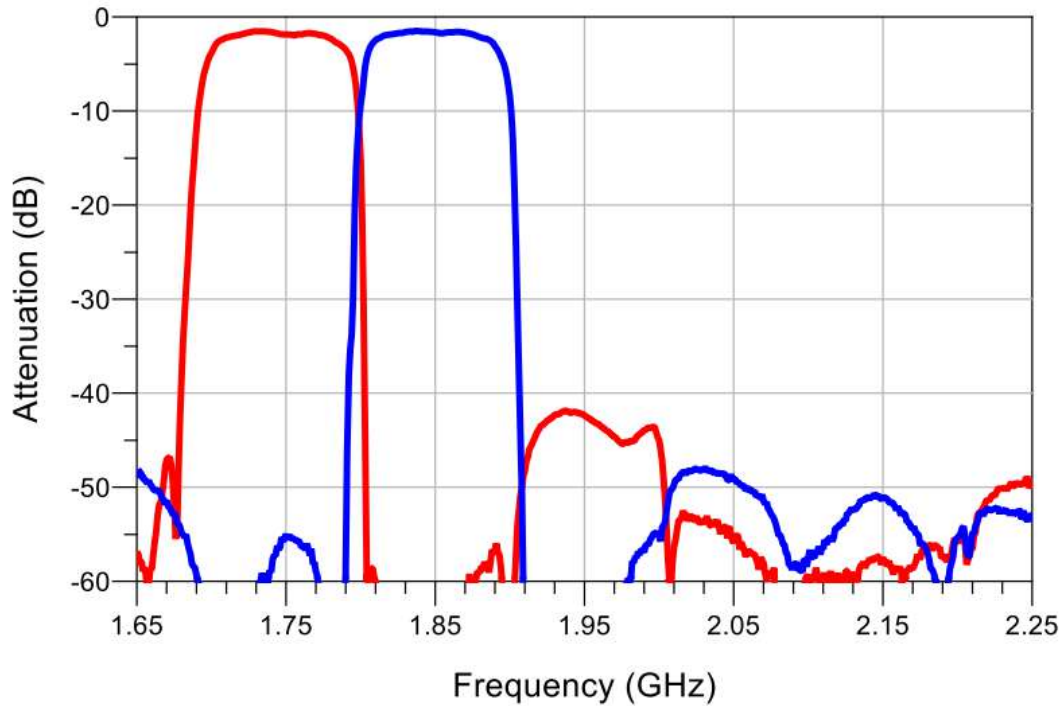
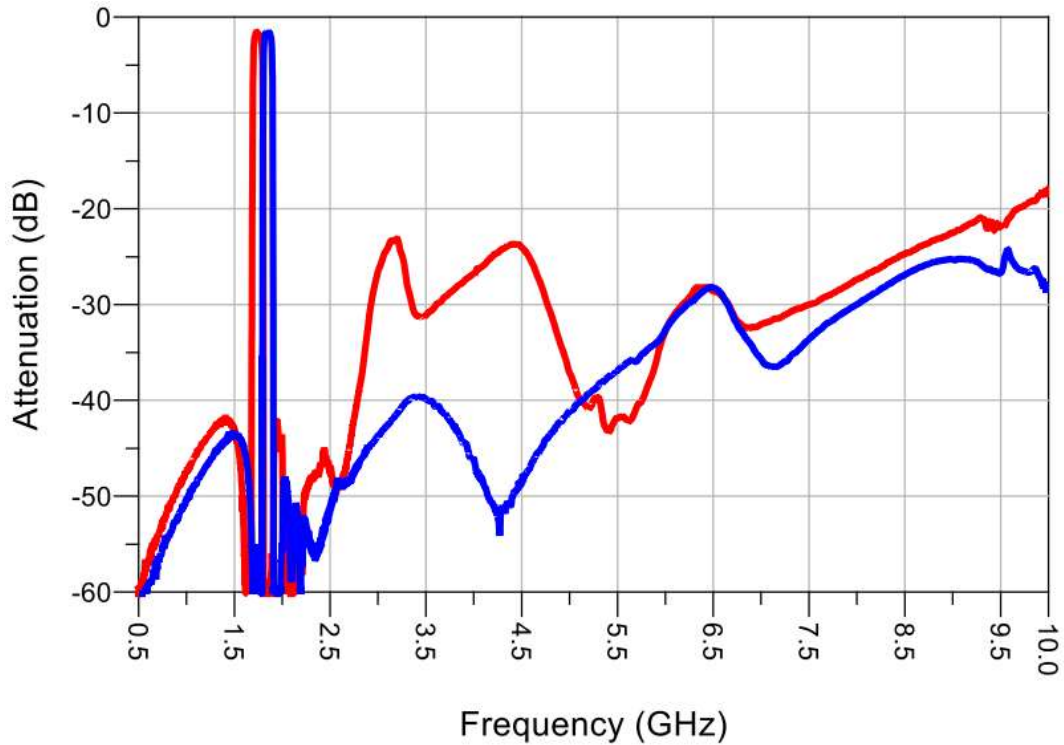
Figure 7 Electrical Characteristics: Insertion loss, B3 TX to Ant, B3 Ant to Rx.**Figure 8** Electrical Characteristics: Attenuation, B1 TX to Ant, B1 Ant to Rx.

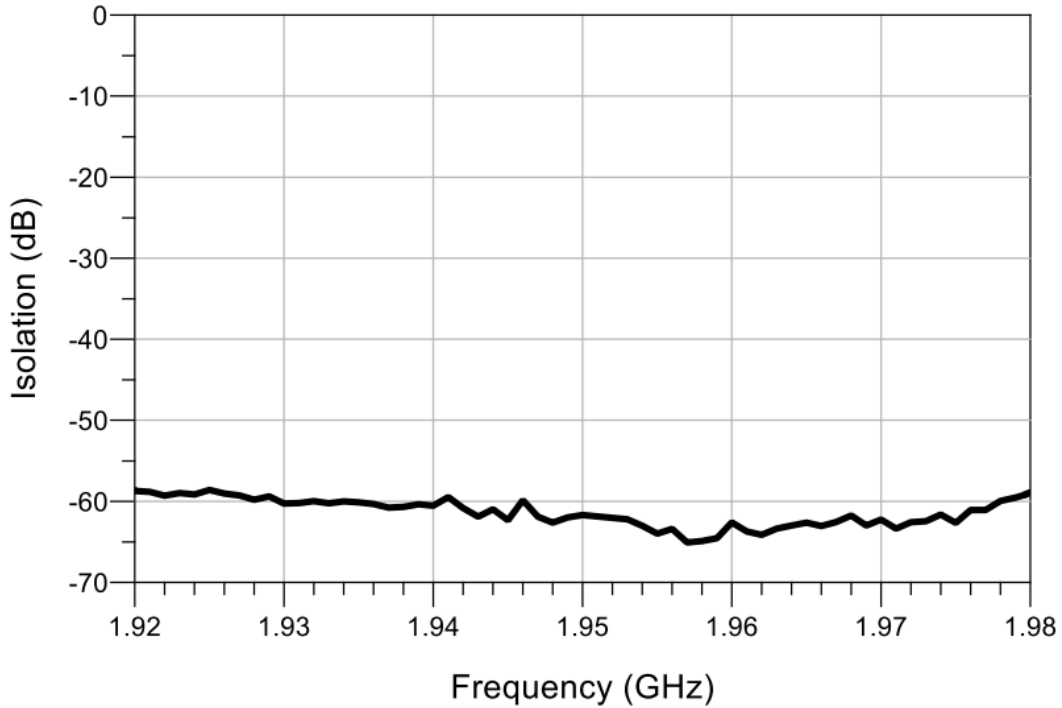
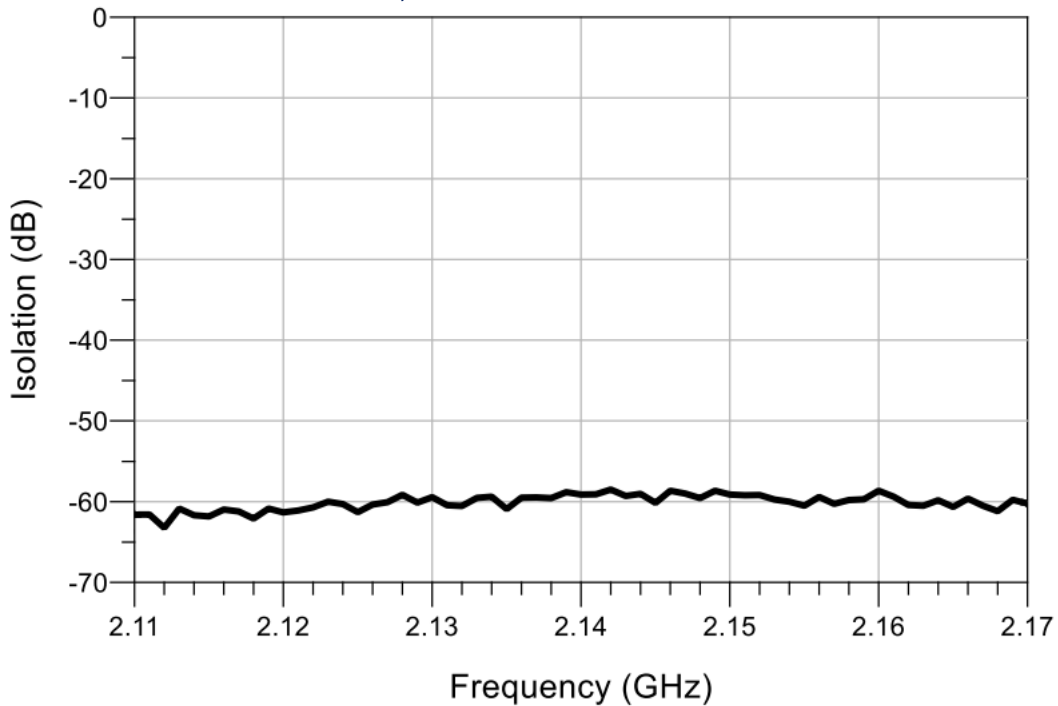
Figure 9 Electrical Characteristics: Isolation, B1 Tx to Rx.**Figure 10** Electrical Characteristics: Isolation, B1 Tx to Rx.

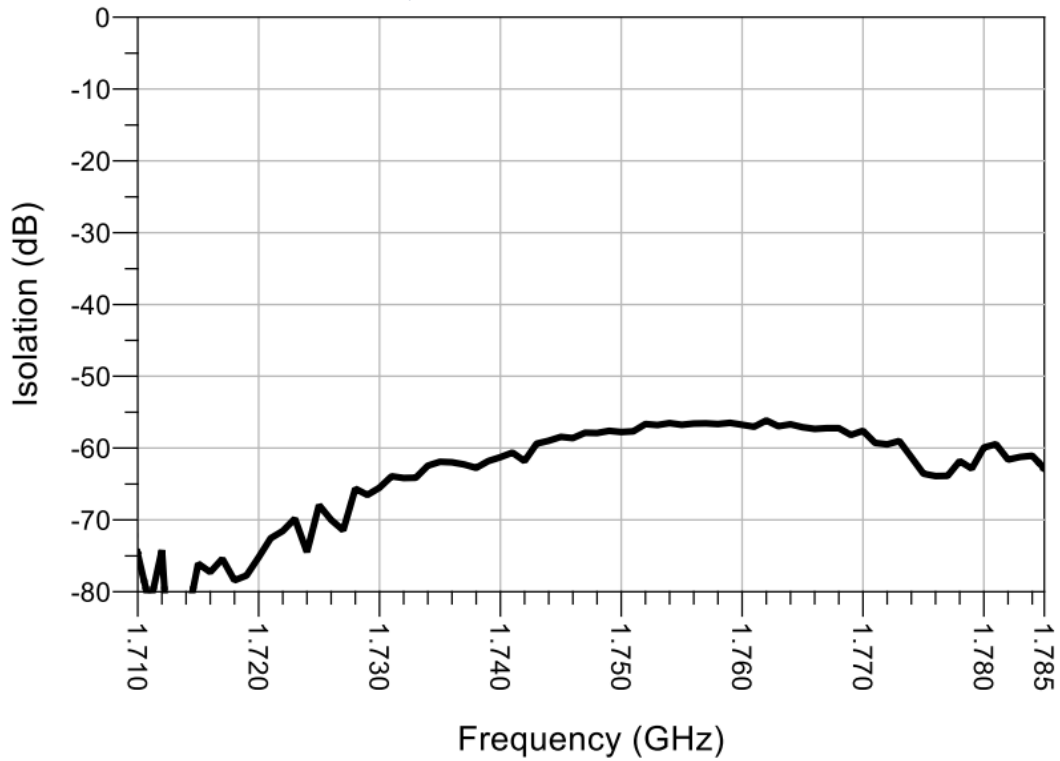
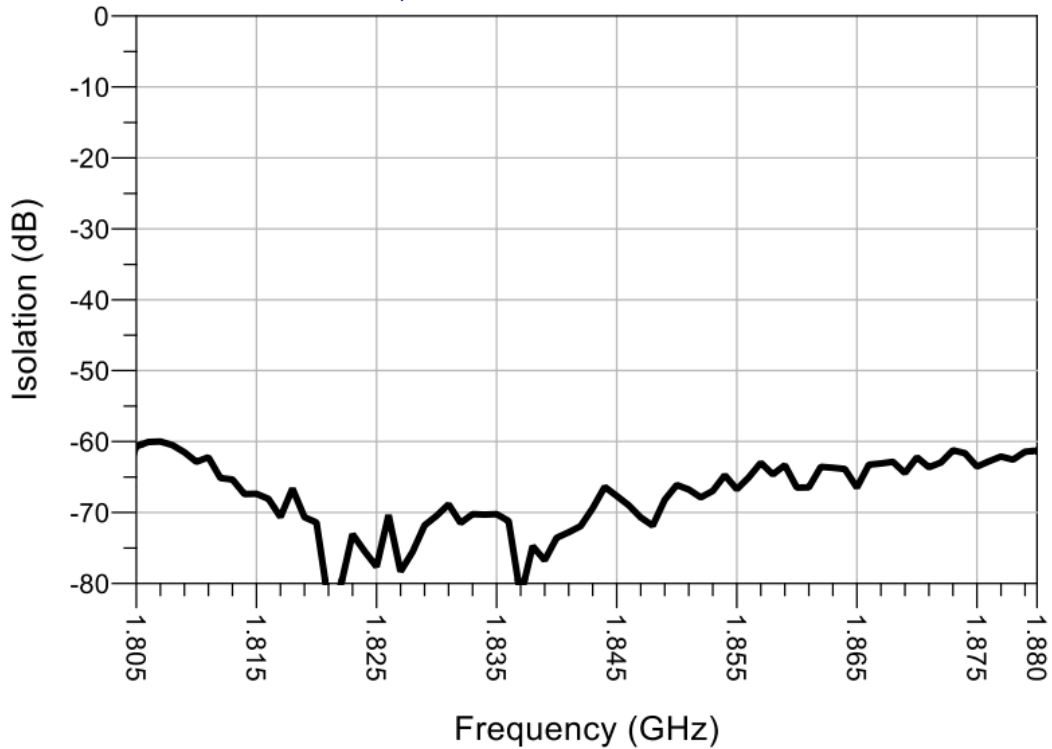
Figure 11 Electrical Characteristics: Isolation, B3 Tx to Rx.**Figure 12** Electrical Characteristics: Isolation, B3 Tx to Rx.

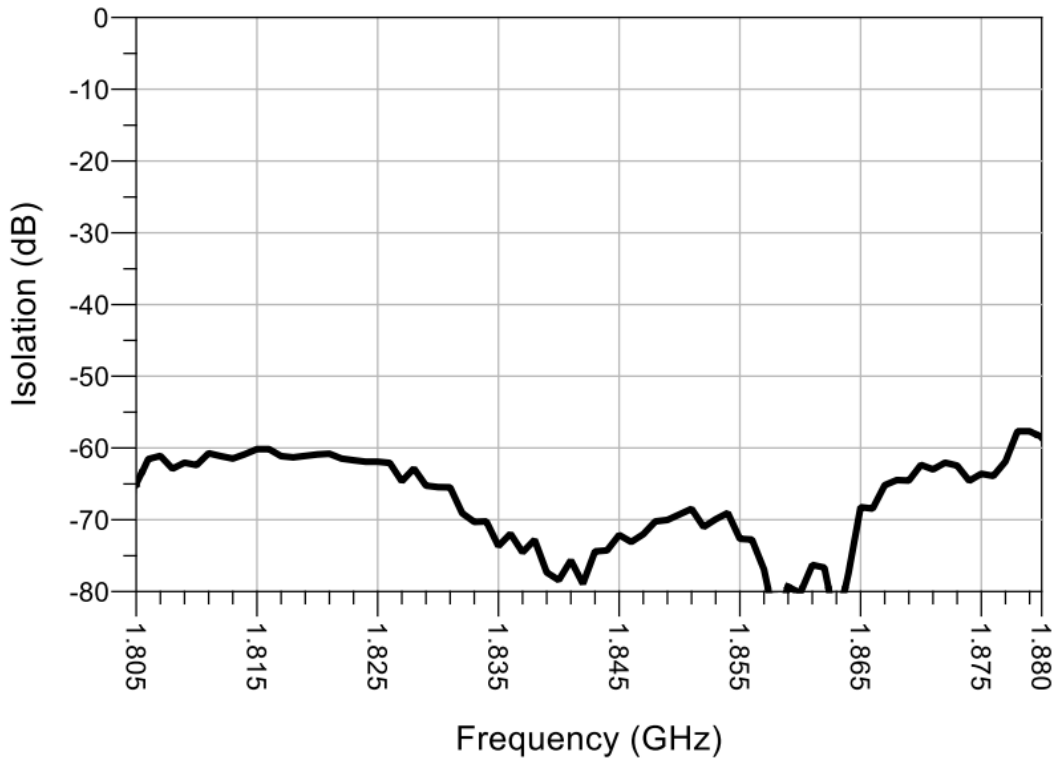
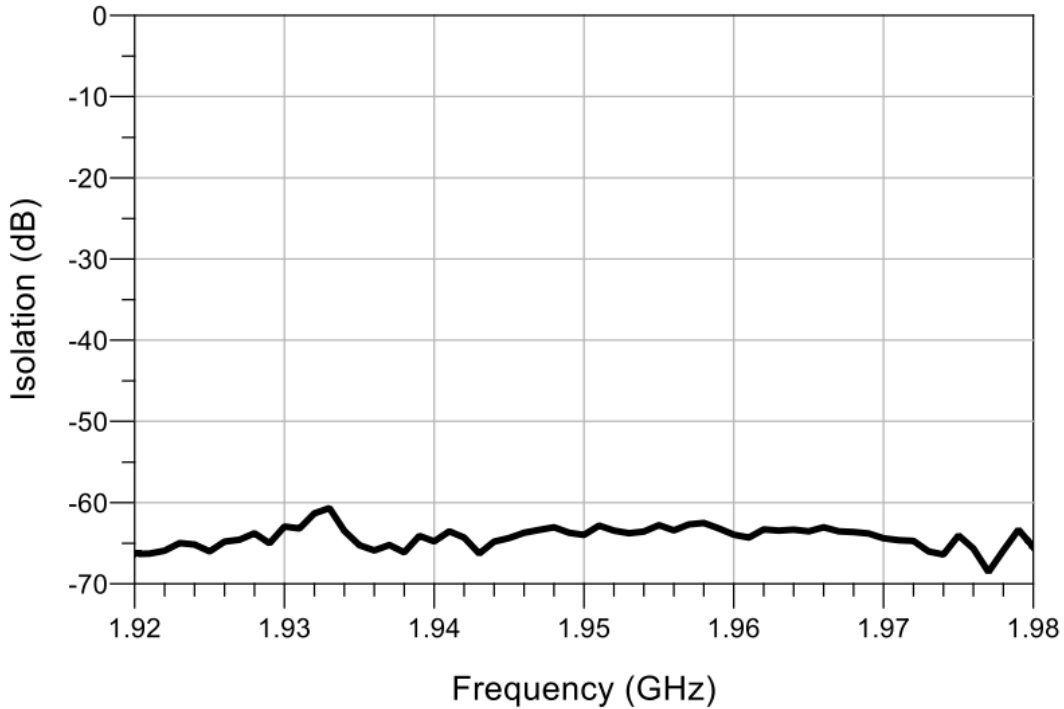
Figure 13 Electrical Characteristics: Isolation, B1 Tx to B3 Rx.**Figure 14** Electrical Characteristics: Isolation, B1 Tx to B3 Rx.

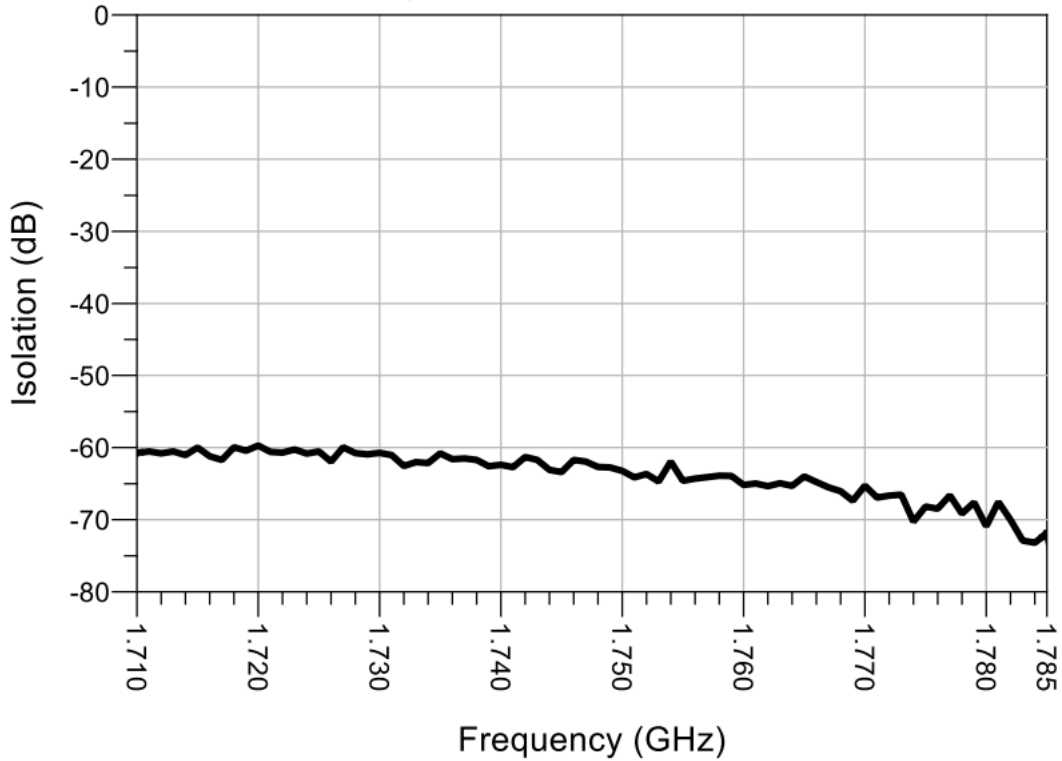
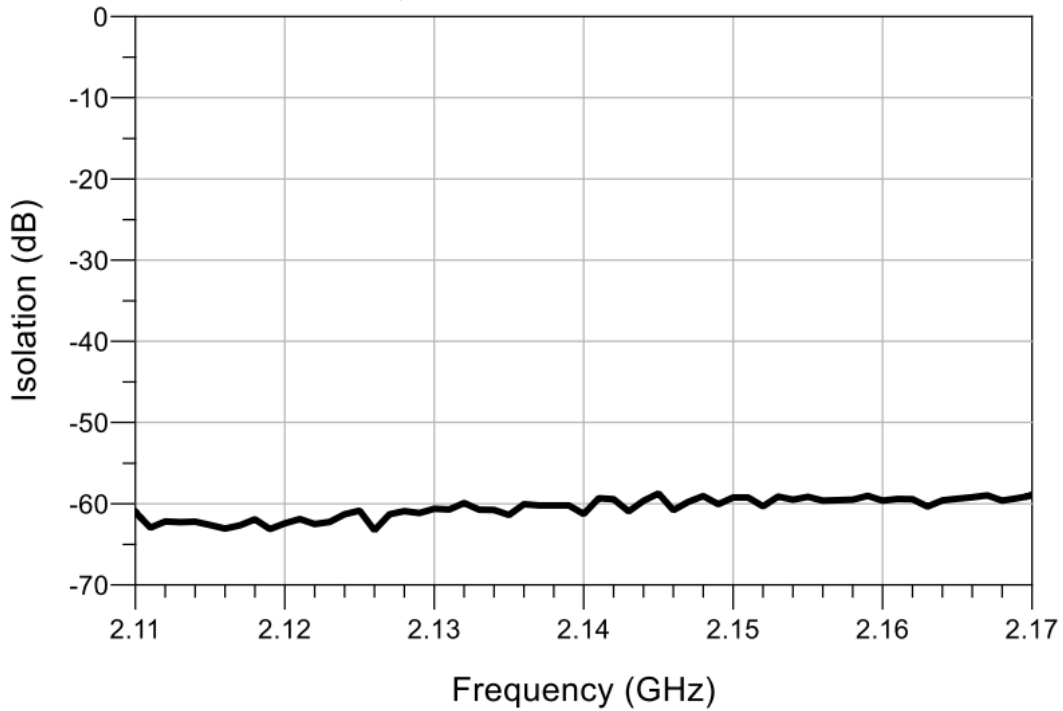
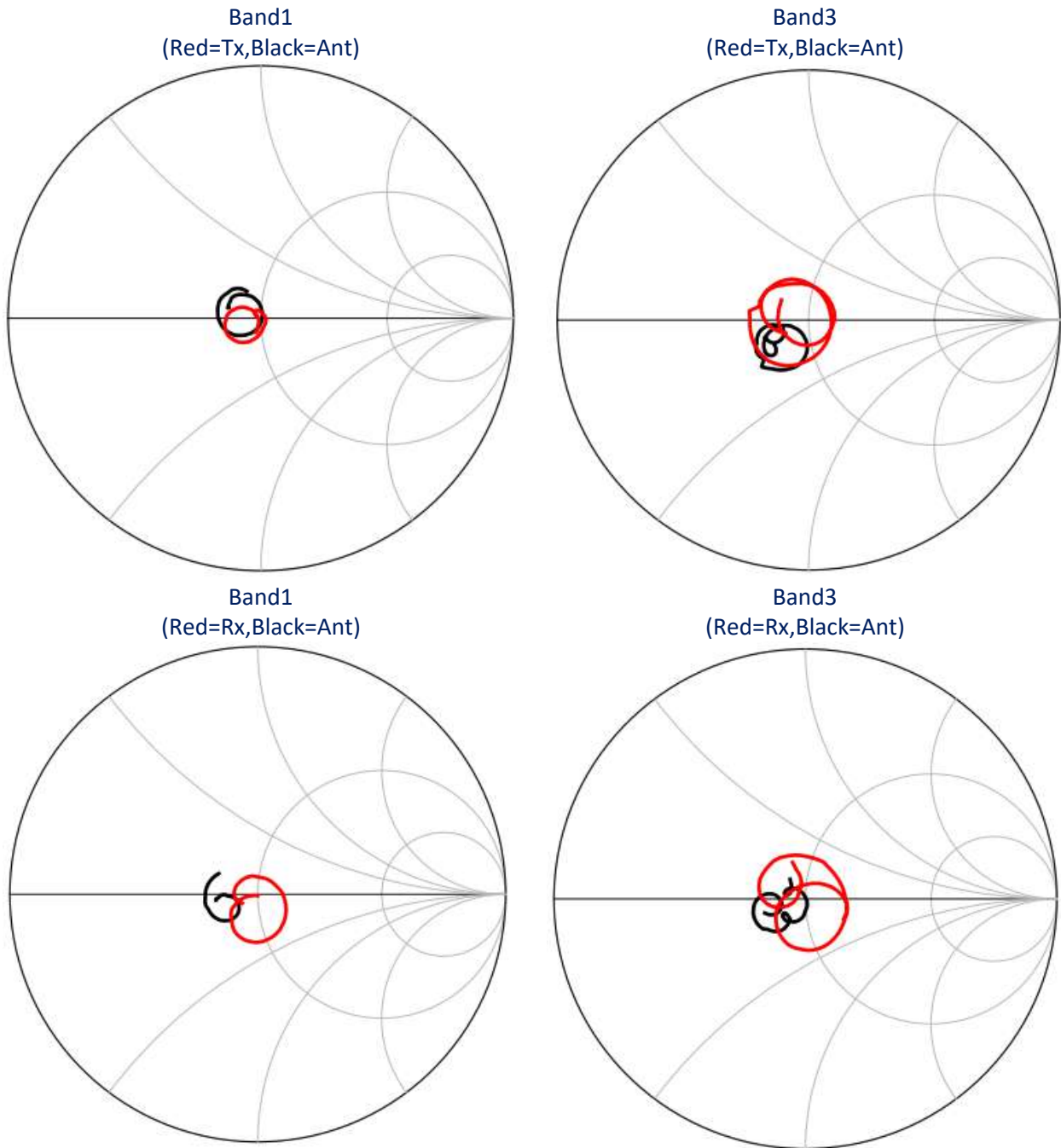
Figure 15 Electrical Characteristics: Isolation, B3 Tx to B1 Rx.**Figure 16** Electrical Characteristics: Isolation, B3 Tx to B1 Rx.

Figure 7 Smith Chart.

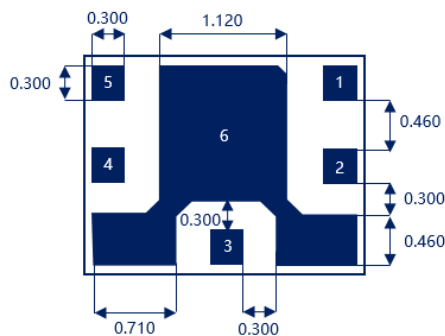
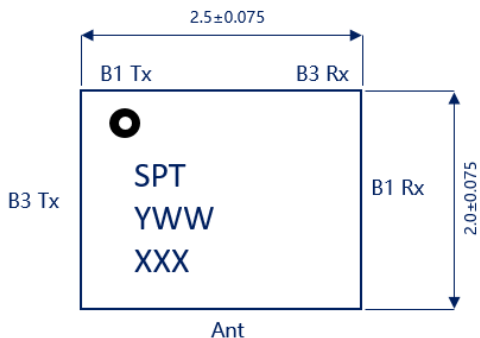


Package & Dimensions^{1,2}

Top View

Side View

Bottom View

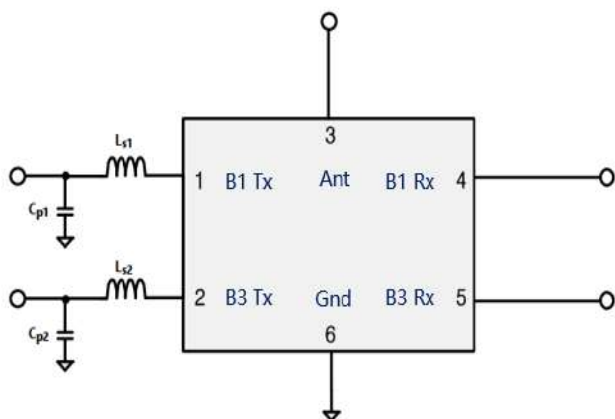


Marking Description	
SPT	SPT
SPT	Spectron Special Character
Y	Year Code
WW	Work Week
XXX	Lot Number

Pin Configuration	
1	B1 Tx
2	B3 Tx
3	Antenna
4	B1 Rx
5	B3 Rx
6	Gnd

1. All dimensions are in millimeters. Angles are in degrees.
2. Tolerance: X.XXX±0.025mm

Matching



Port	Matching Component ¹
Port 1	Ls1: 2.0 nH
	Cp1 : 0.4pF
Port 2	Ls2: 1.8 nH
	Cp2: No stuff

1. Matching component values shown are recommended based on the Spectron evaluation board. Value adjustment may be required on the end-users circuit boards for the selected component manufacturer and PCB material.

Maximum Ratings¹

Parameter	Unit	Value
Storage temperature	°C	-65 to +125
Maximum RF Input Power to Tx Ports	dBm	+30
Maximum DC Voltage, Pin 1 (Ant) to GND (Note 4)	VDC	0
Maximum DC Voltage, Pins 2, 3, 4, 5 to GND (Note 5)	VDC	+5

Maximum Recommended Operating Conditions²

Parameter	Unit	Value
Operating temperature, Tc (Note 3), Tx Power ≤ +29 dBm	°C	-40 to +100
Operating temperature, Tc (Note 3), Tx Power ≤ +30 dBm	°C	-30 to +85

1. Operation in excess of any one of these conditions may result in permanent damage to the device.
2. The device will function over the recommended range without degradation in reliability or permanent change in performance but is not guaranteed to meet electrical specifications.
3. TC is defined as case temperature, the temperature of the underside of the duplexer where it makes contact with the circuit board.

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