



OAW-AP1451

Antenna Test Report

Date : Mar. 10, 2021

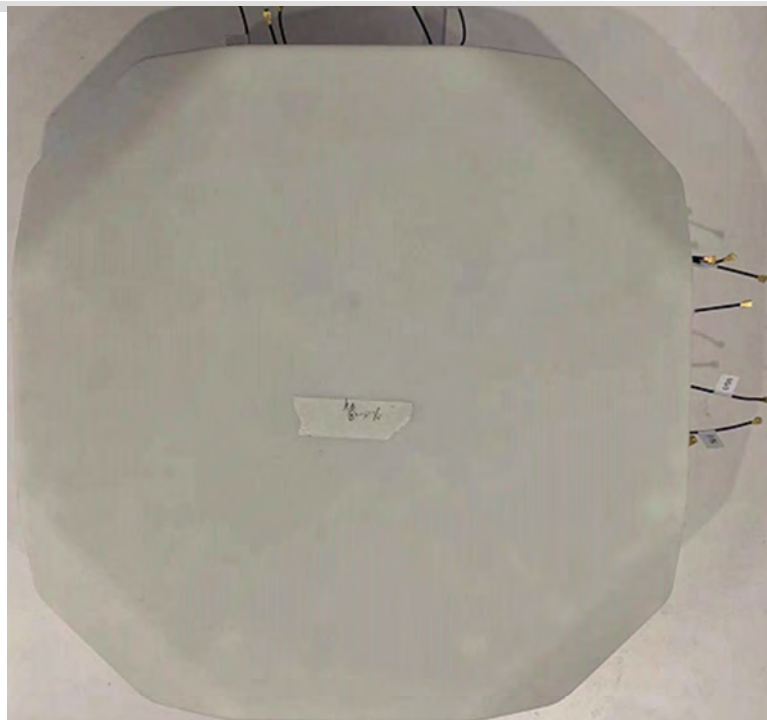
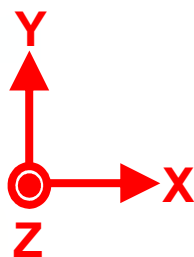
Prepared by : Vangie Wen



Outline

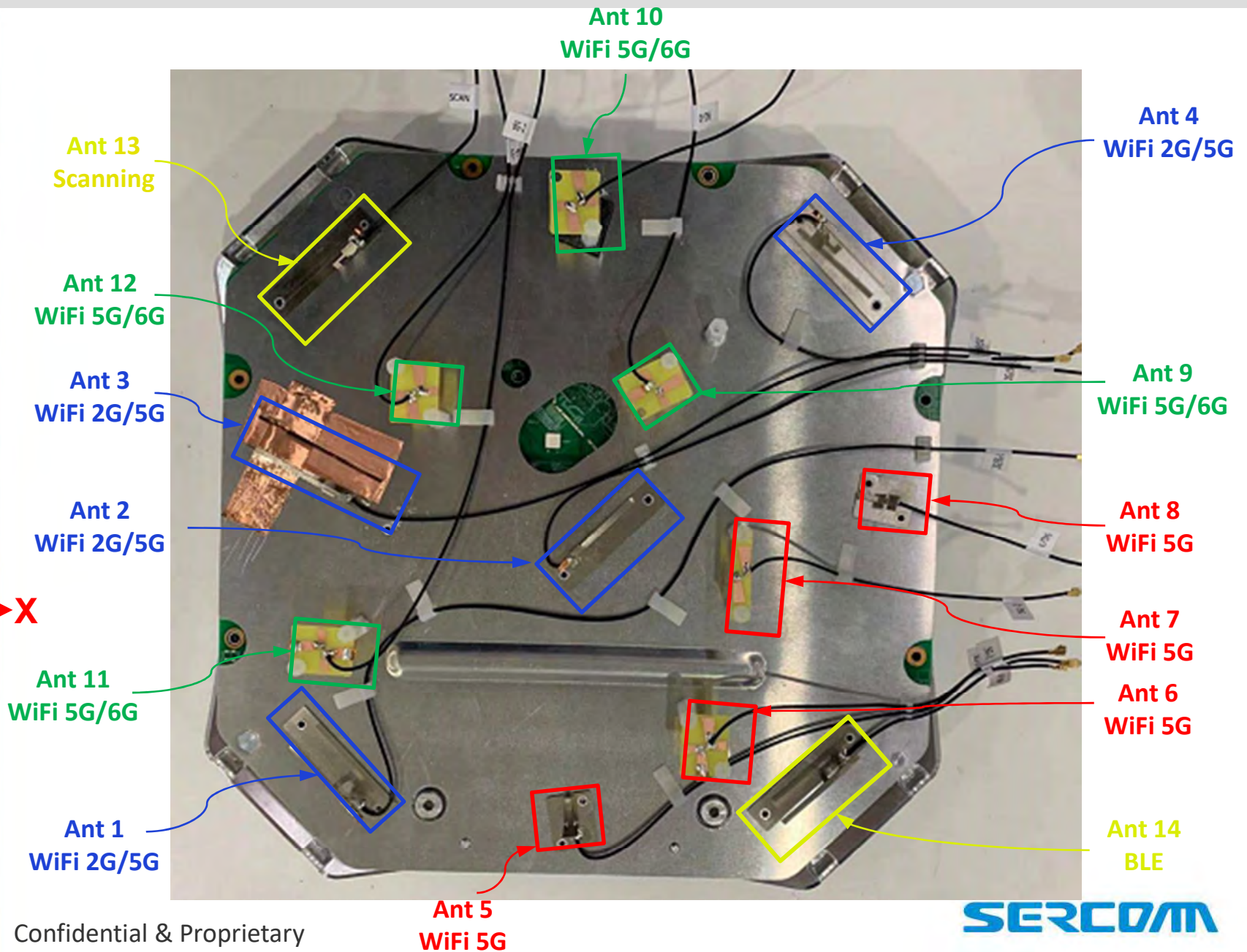
- Antenna Structure & Placement
- Return Loss & Isolation
- Radiation Pattern
- Peak Gain & Efficiency

Antenna Structure & Placement

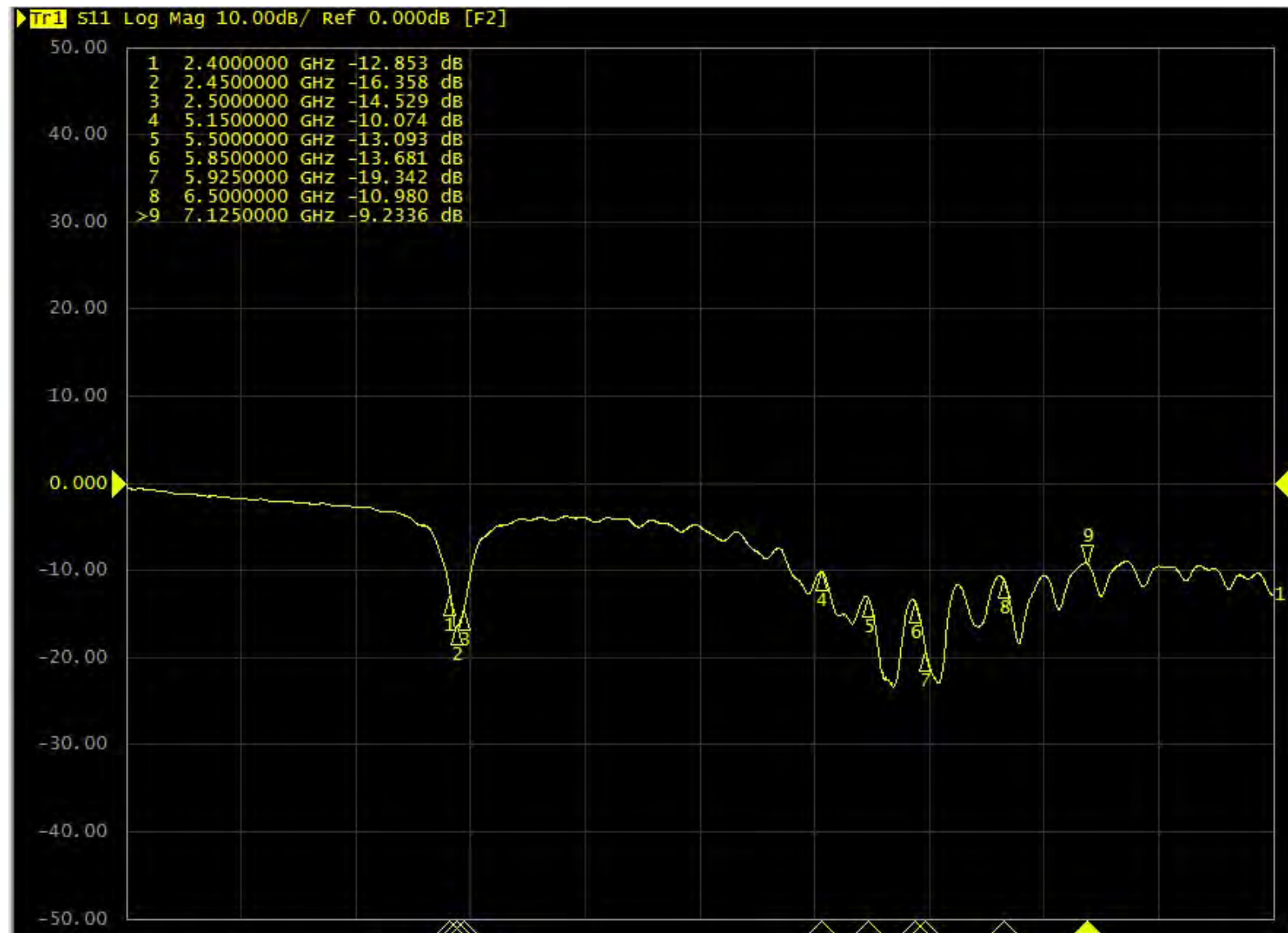


Ant No.	Operating Band	Type	Material	Feeding	Dimension
Ant 1-4	WiFi 2.4G/5G	PIFA	Metal	Cable	45(L) x 11.4(W) x 8.5(H) mm ³
Ant 5, 8	WiFi 5G	PIFA	Metal	Cable	19(L) x 15(W) x 10.8(H) mm ³
Ant 6	WiFi 5G	Dipole	PCB	Cable	20(L) x 15(W) x 0.4(T) mm ³
Ant 7	WiFi 5G	Dipole	PCB	Cable	28(L) x 6.5(W) x 0.4(T) mm ³
Ant 9-12	WiFi 5G/6G	Dipole	PCB	Cable	20(L) x 15(W) x 0.4(T) mm ³
Ant 13	Scanning	Dipole	PCB	Cable	45(L) x 11.4(W) x 8.5(H) mm ³
Ant 14	BLE	Dipole	PCB	Cable	45(L) x 11.4(W) x 8.5(H) mm ³

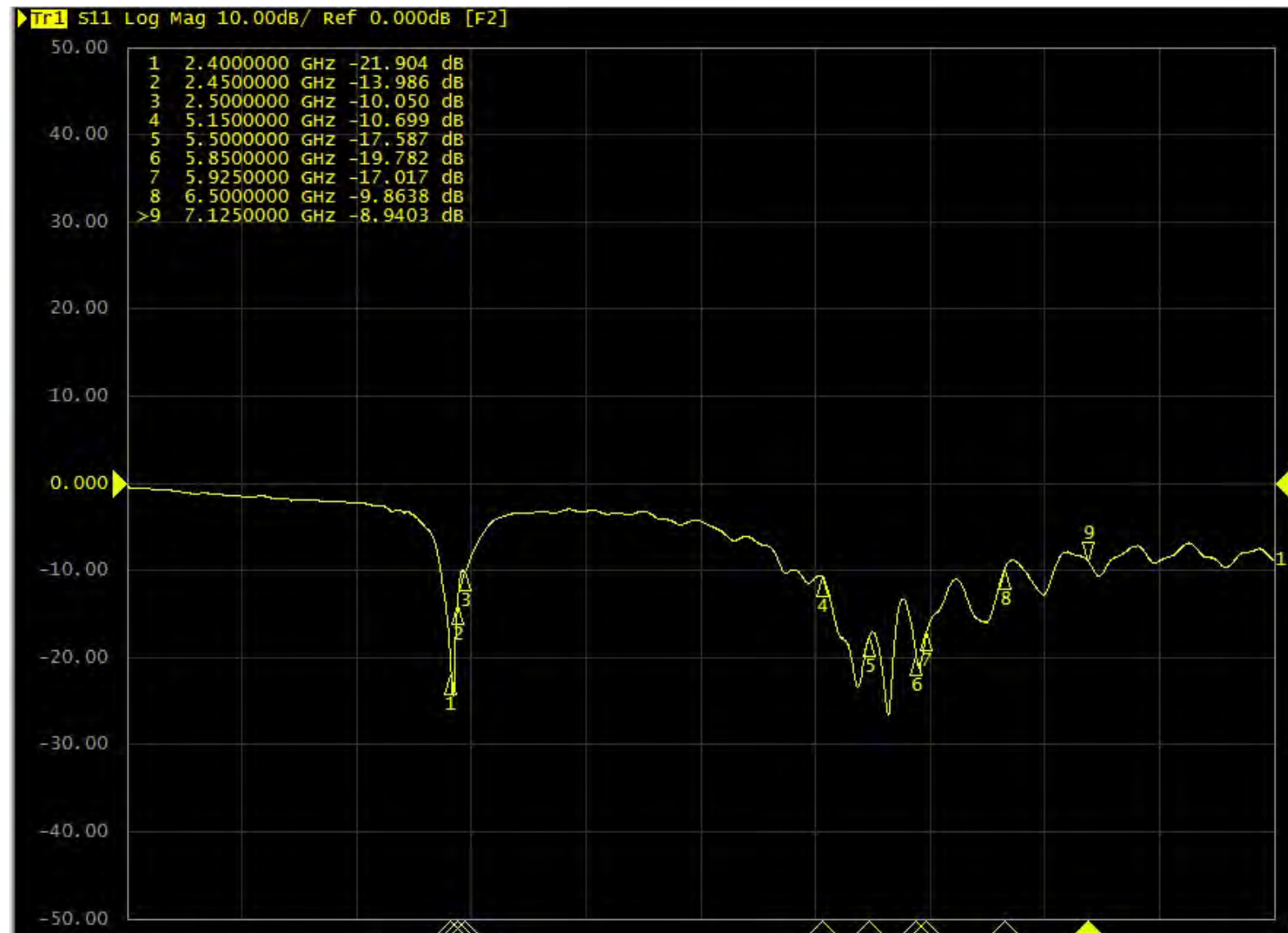
Antenna Structure & Placement



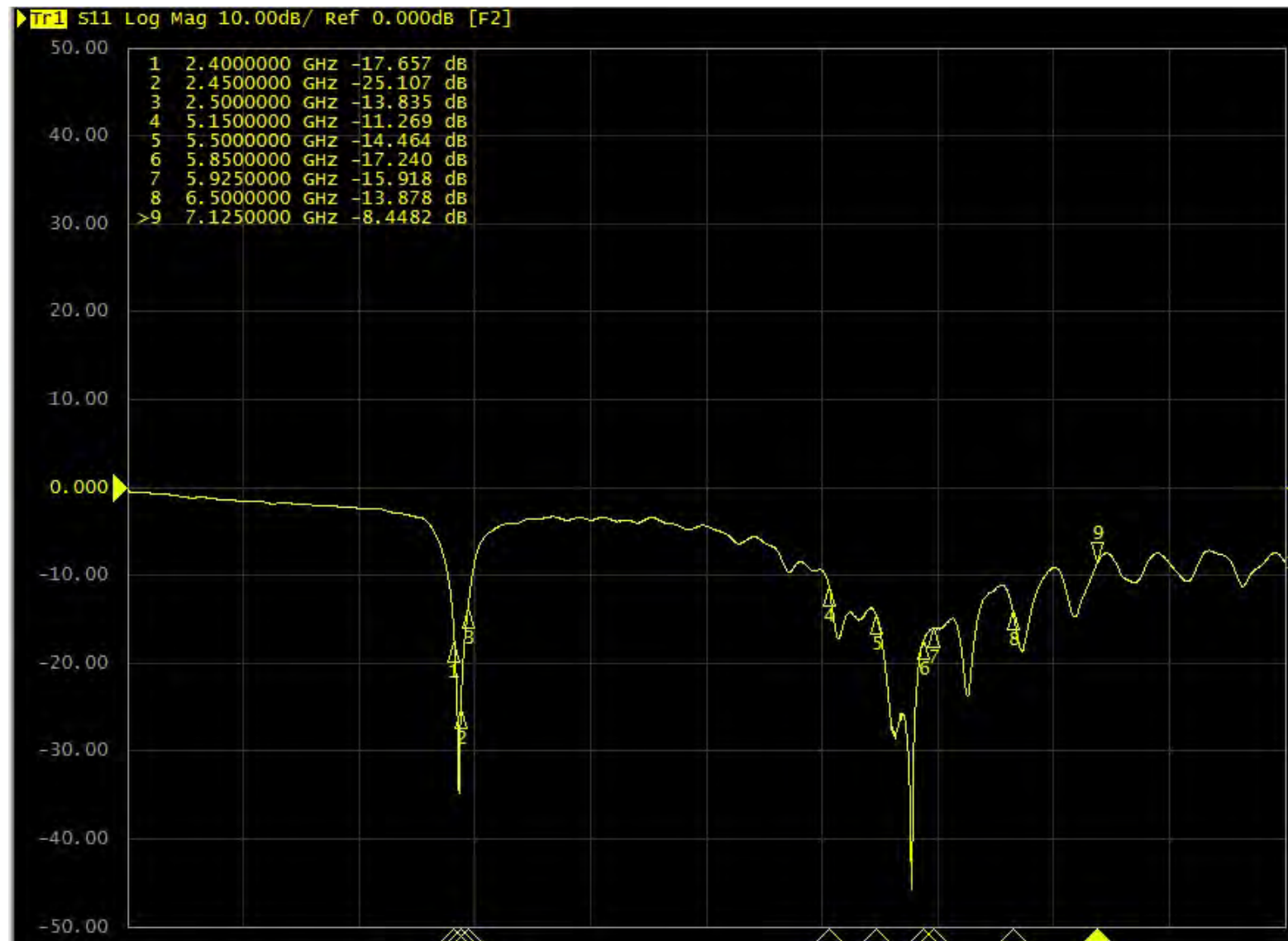
Return Loss – Ant 1



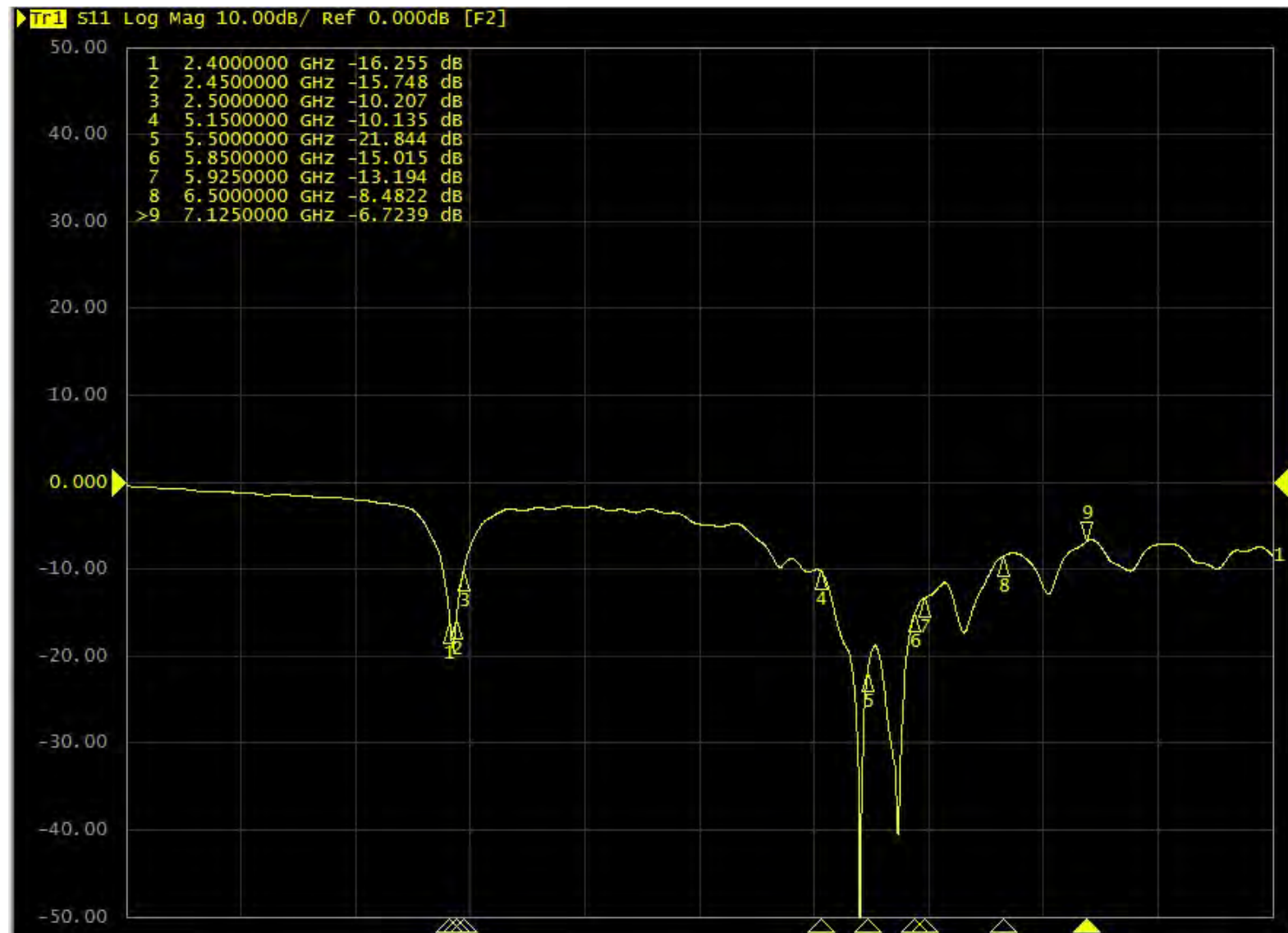
Return Loss – Ant 2



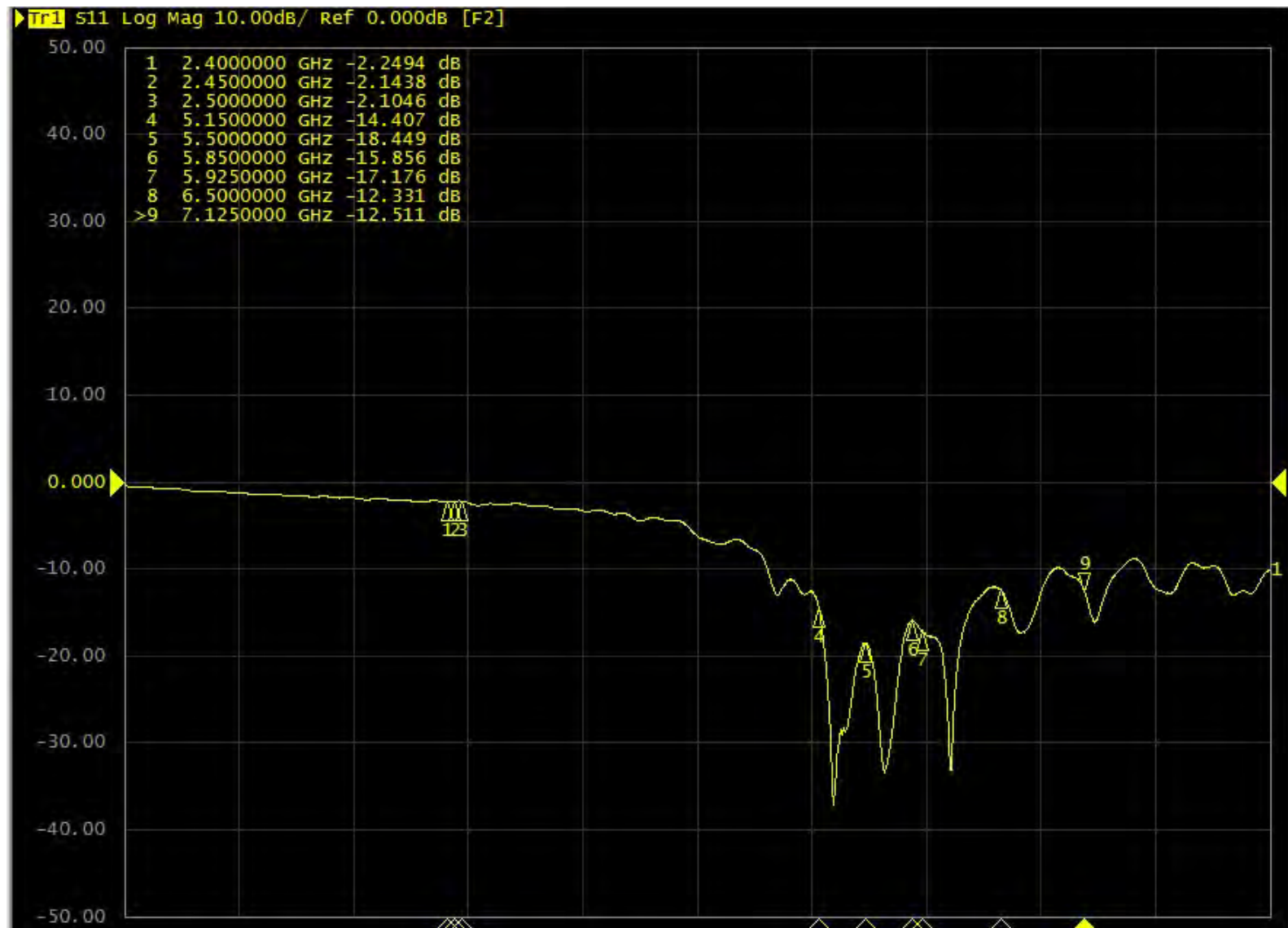
Return Loss – Ant 3



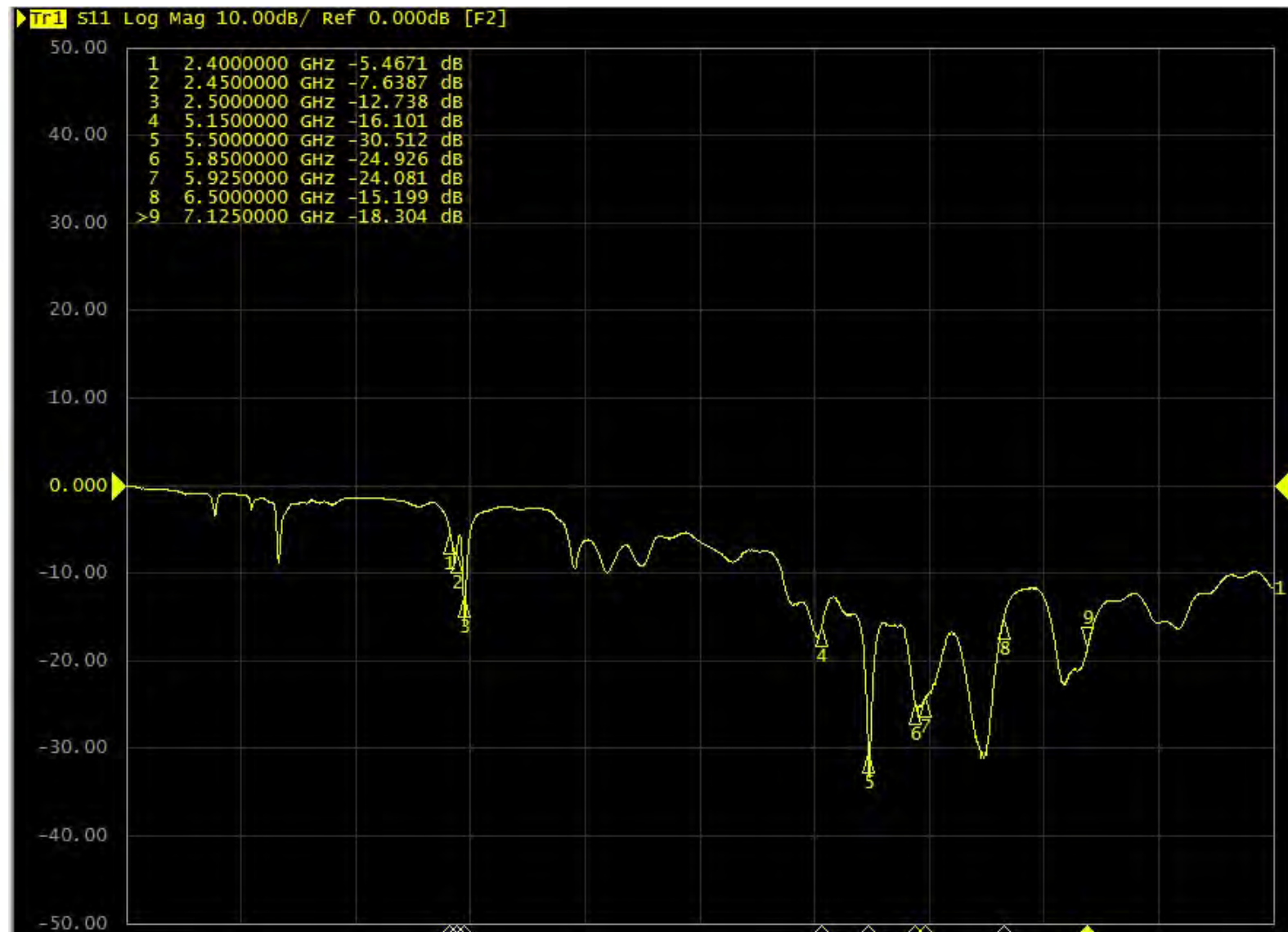
Return Loss – Ant 4



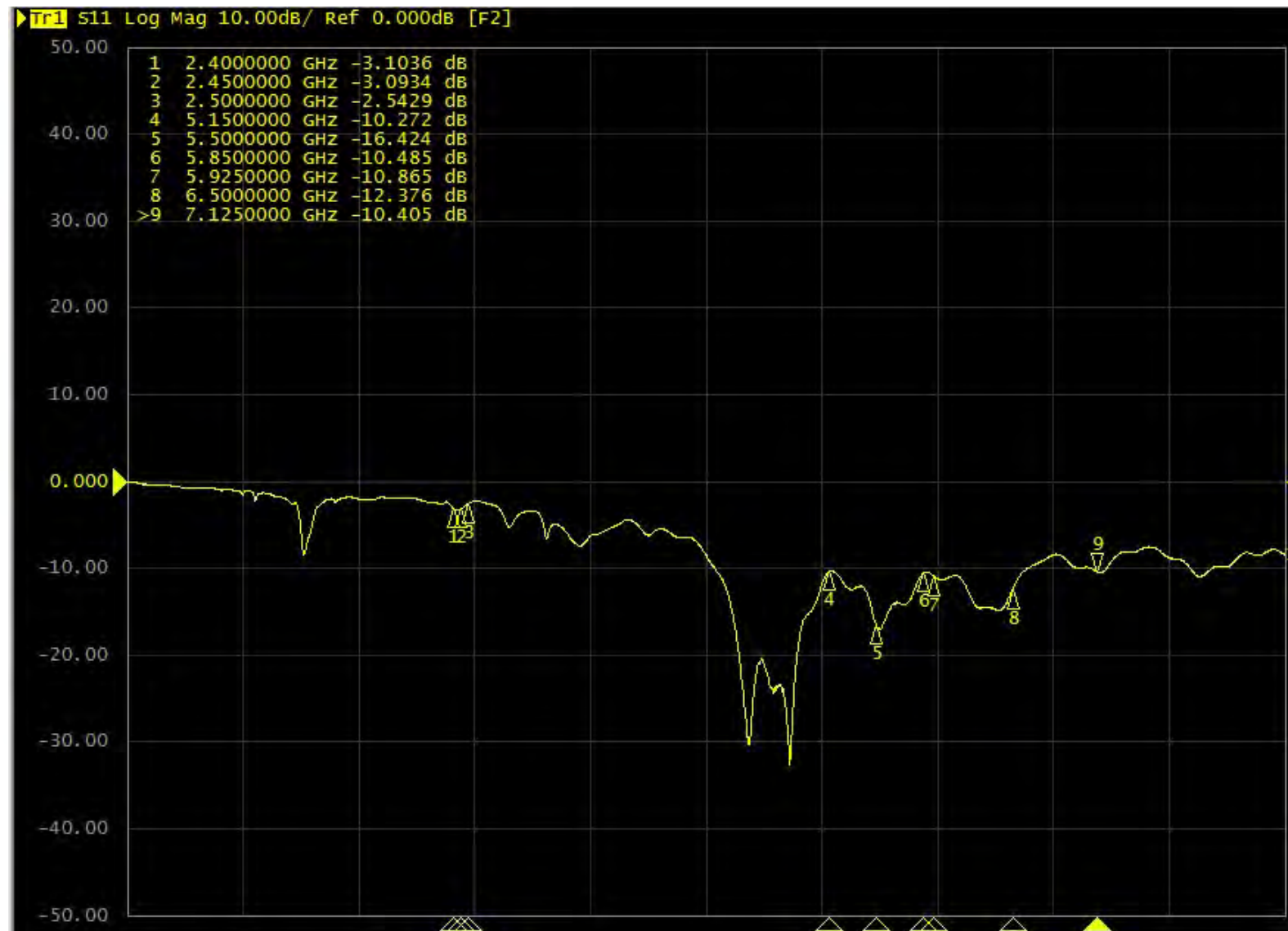
Return Loss – Ant 5



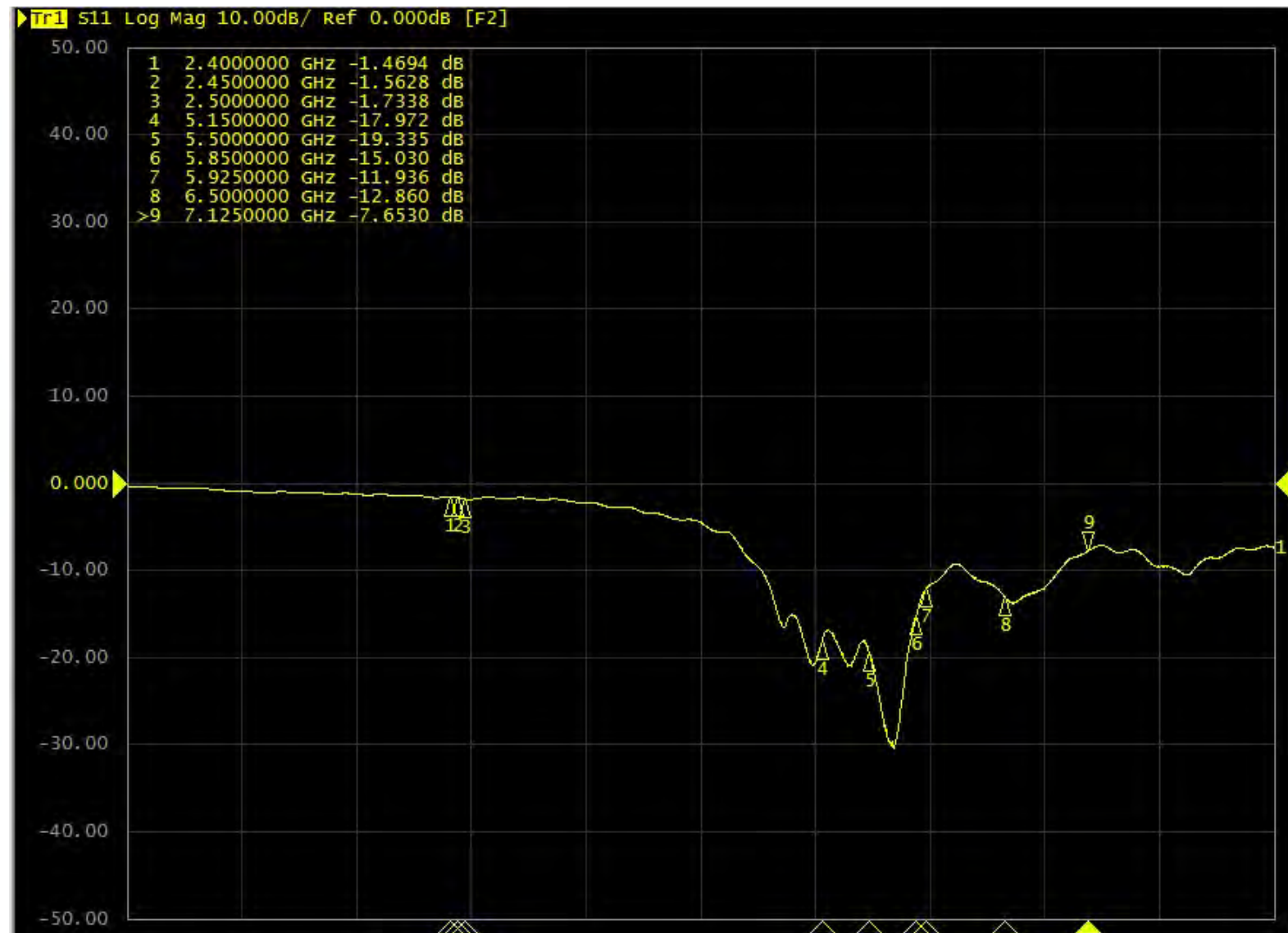
Return Loss – Ant 6



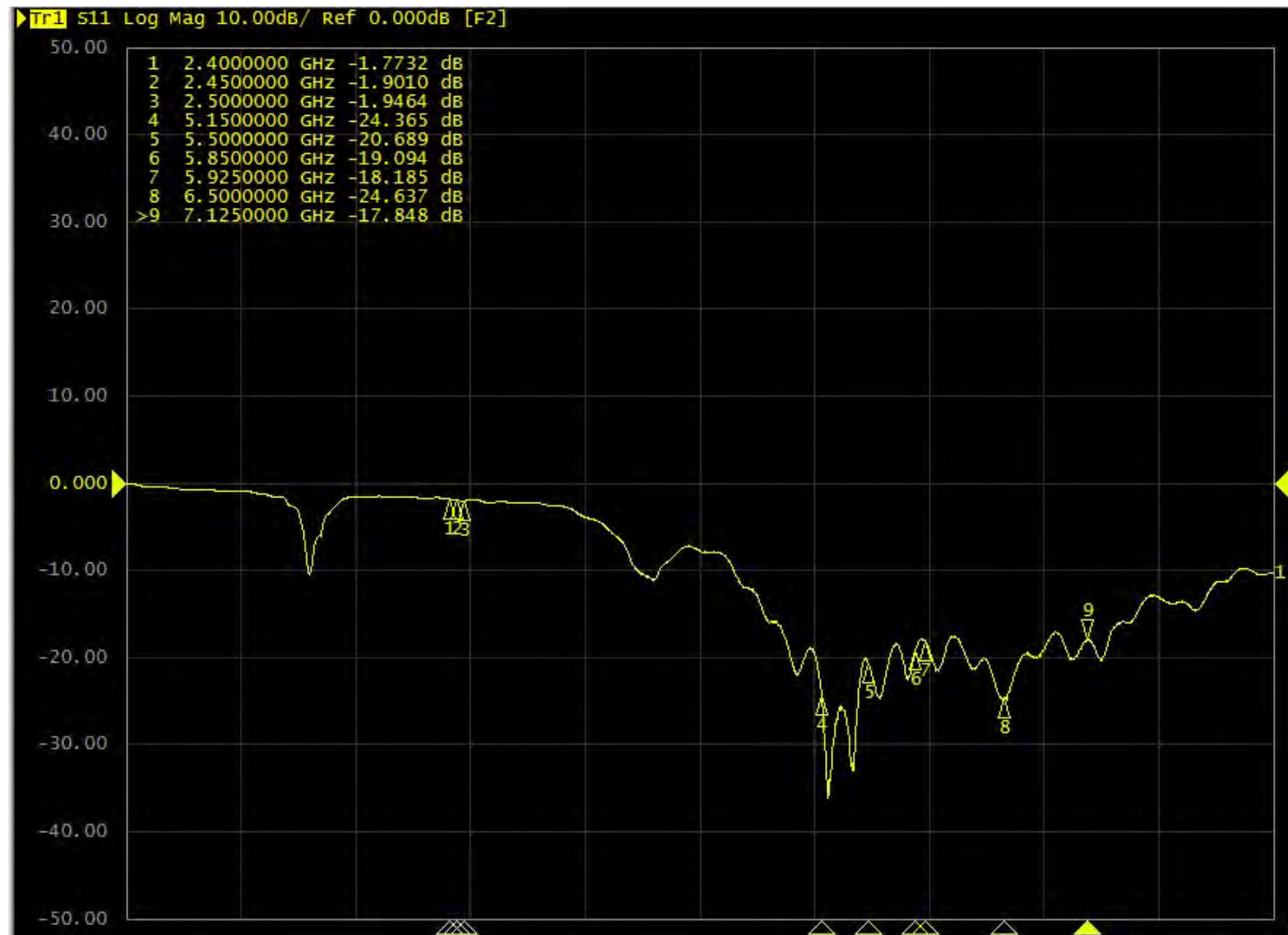
Return Loss – Ant 7



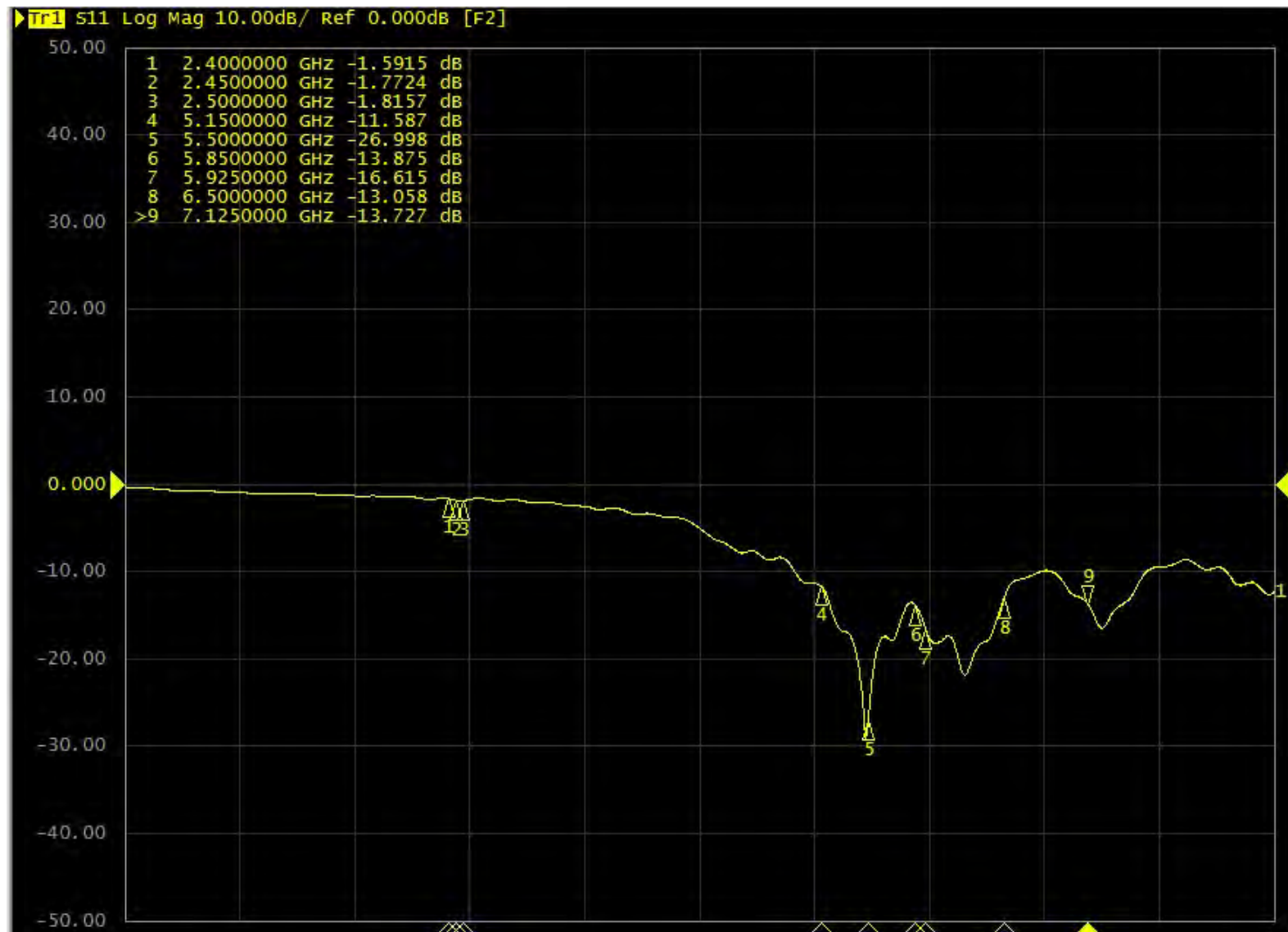
Return Loss – Ant 8



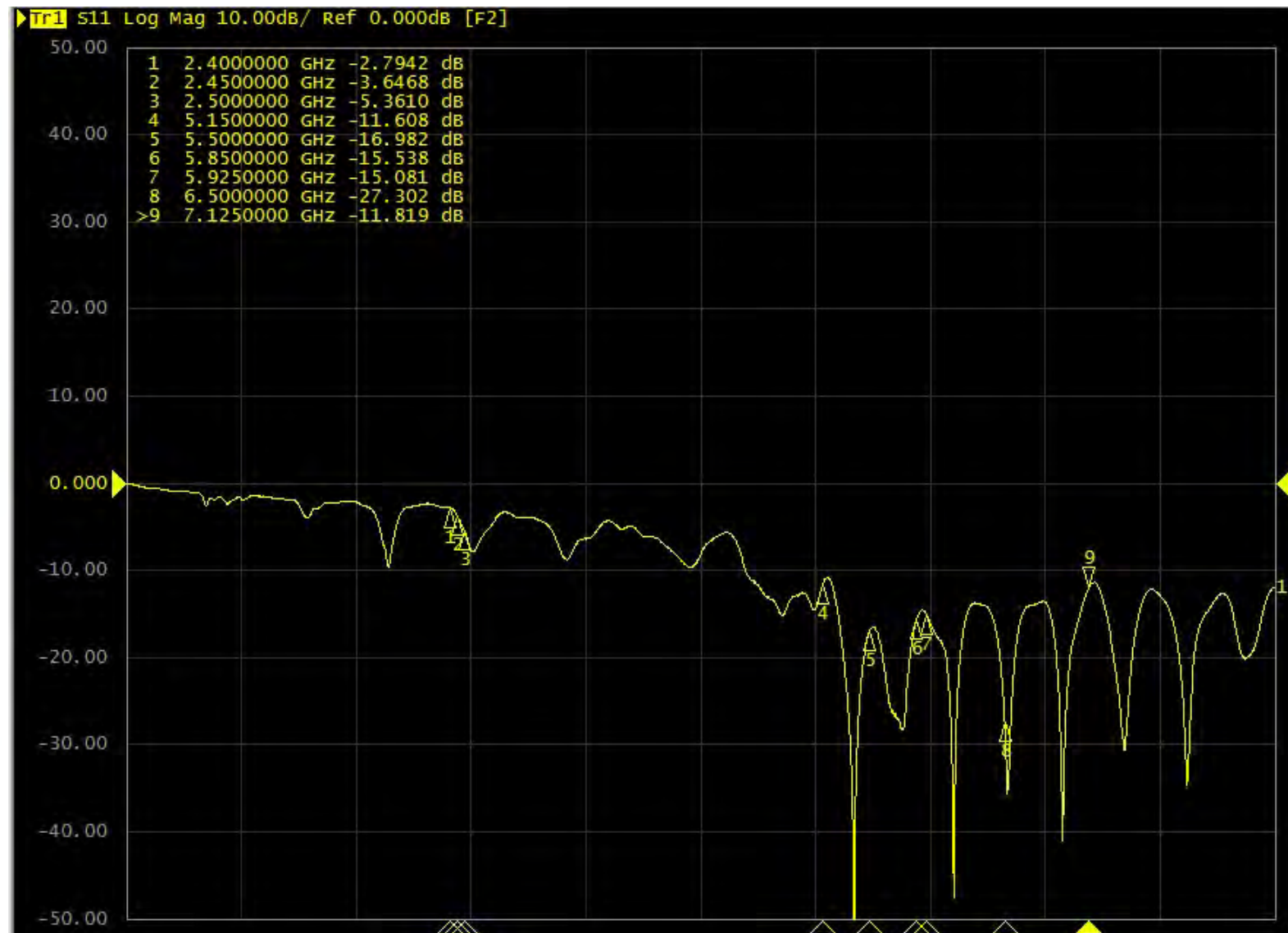
Return Loss – Ant 9



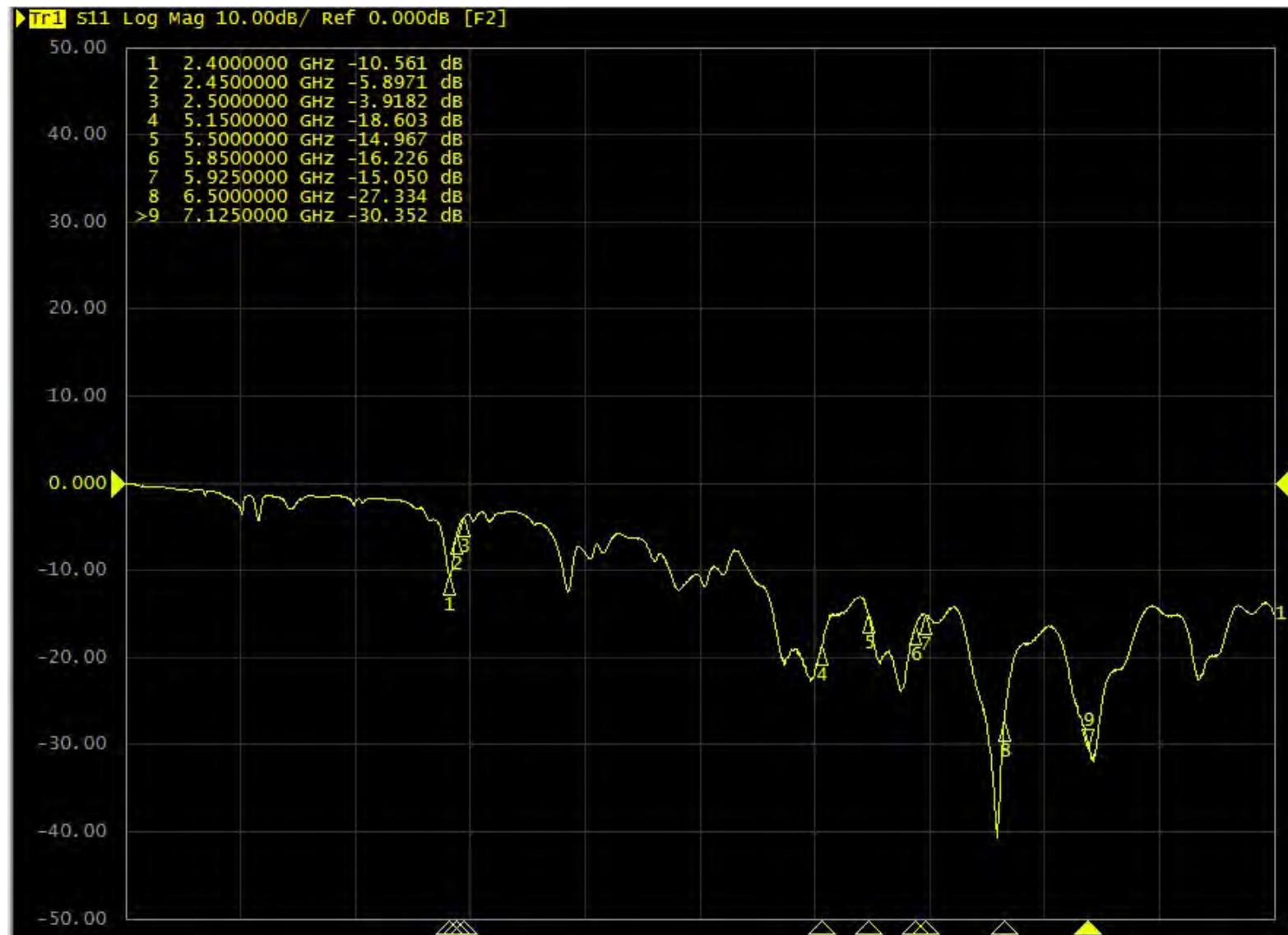
Return Loss – Ant 10



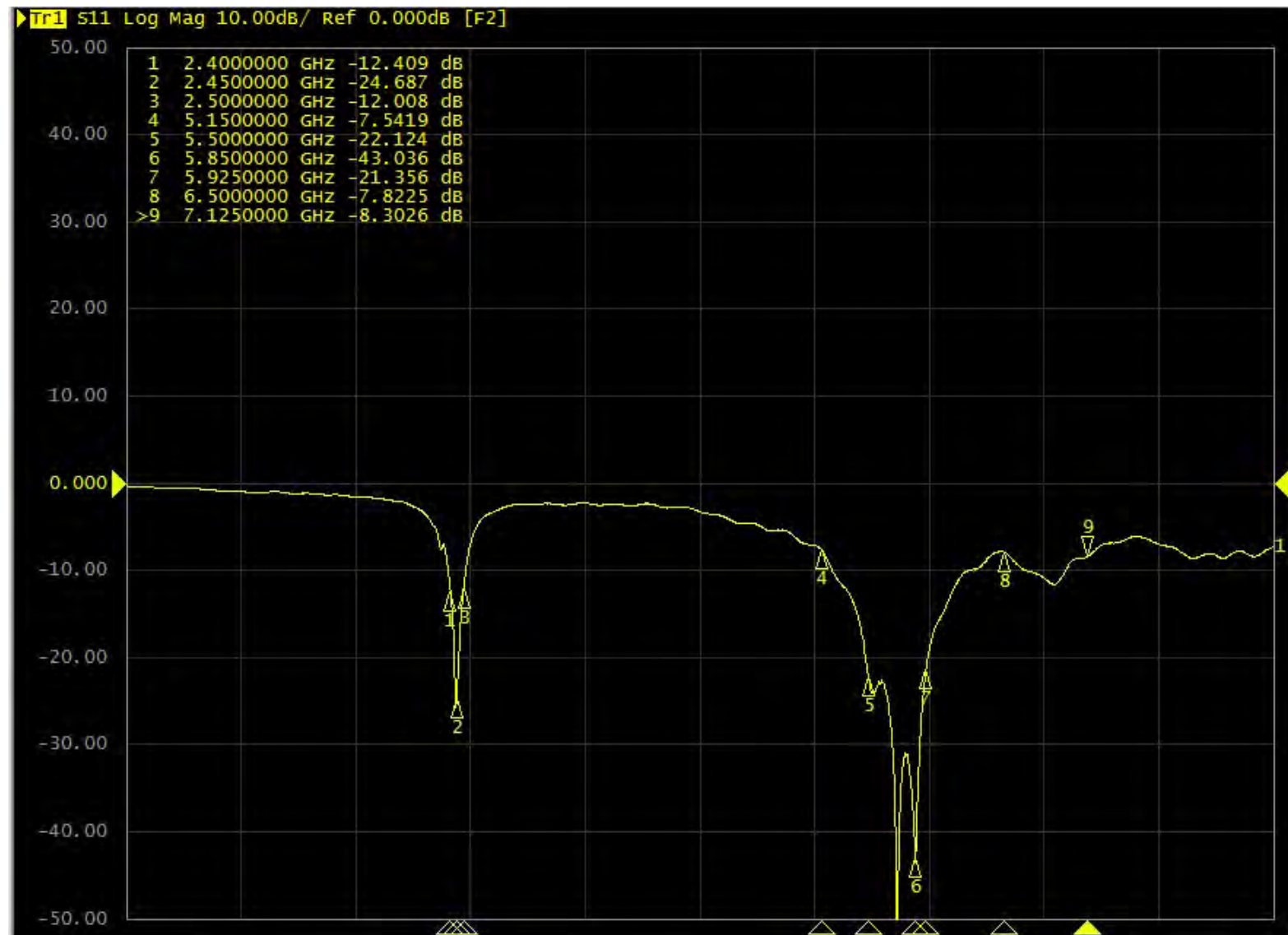
Return Loss – Ant 11



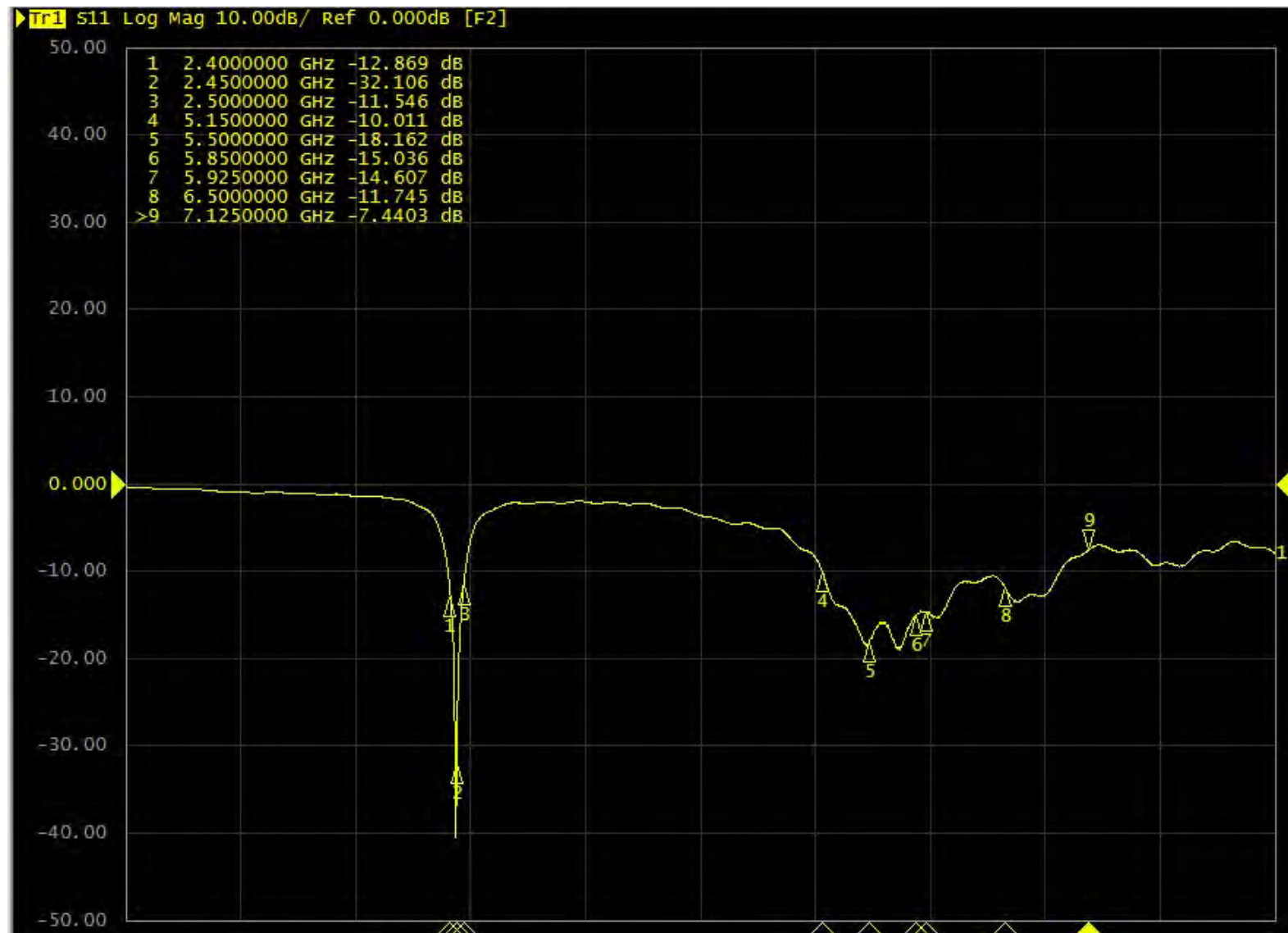
Return Loss – Ant 12



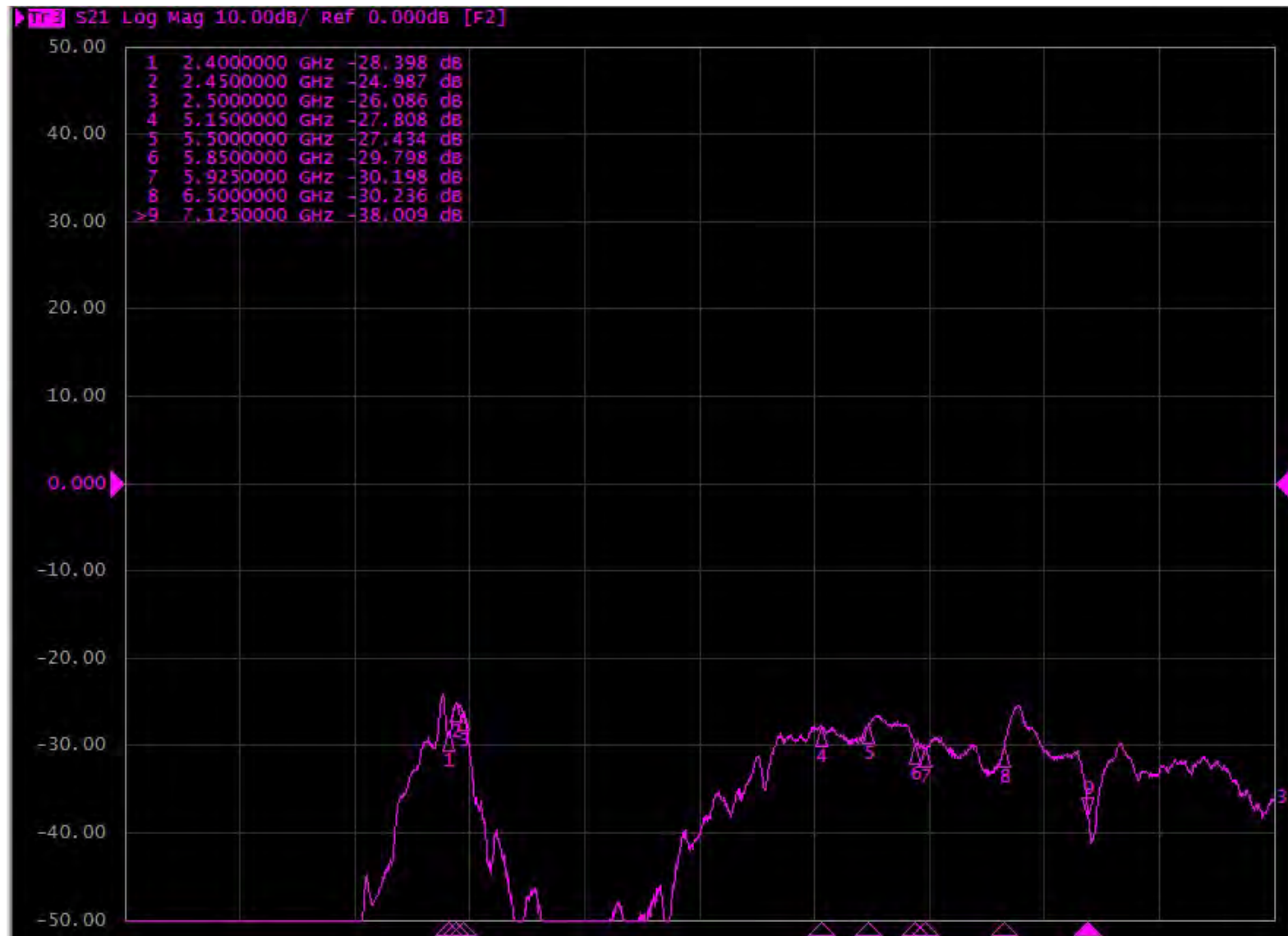
Return Loss – Ant 13



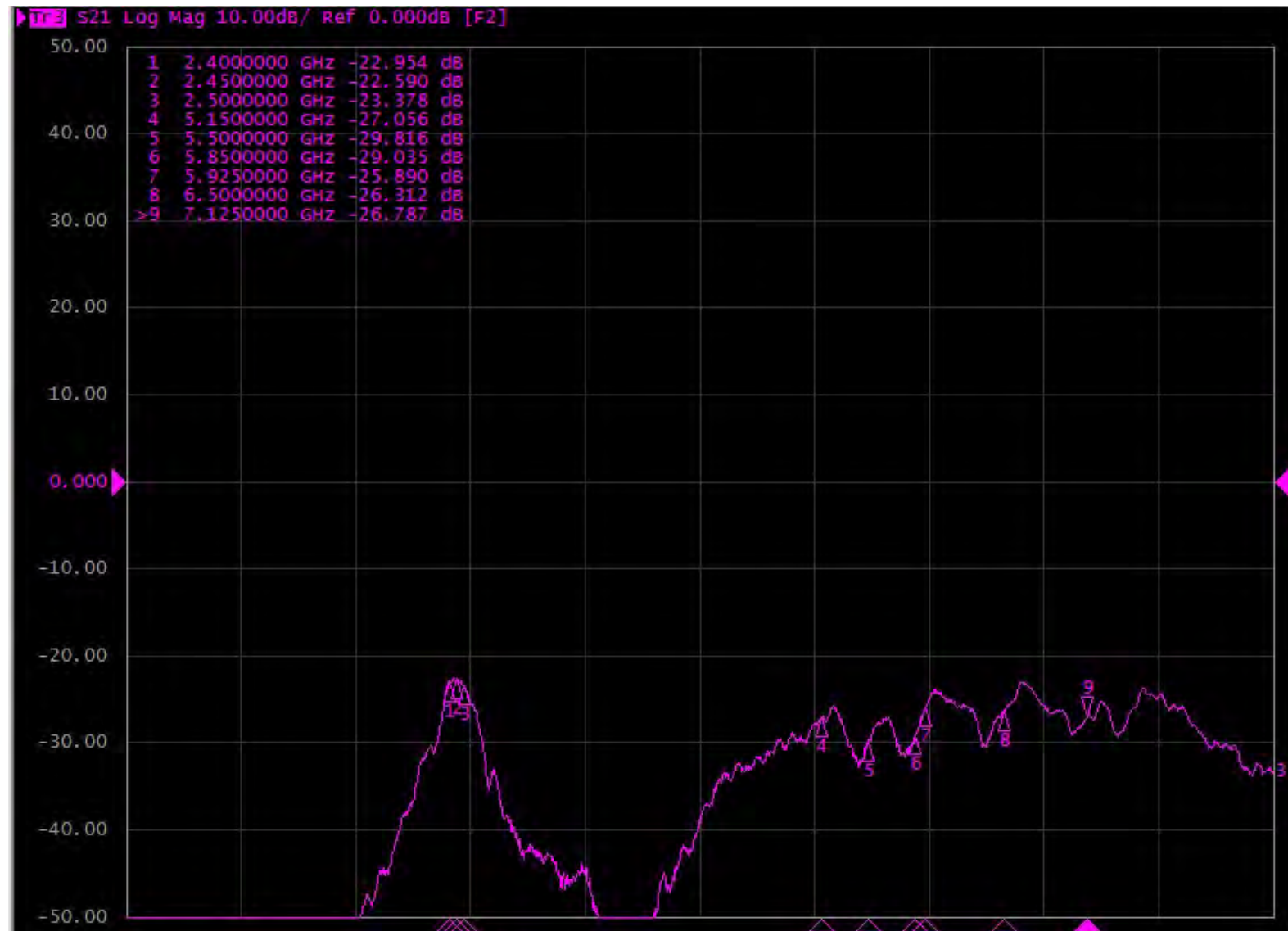
Return Loss – Ant 14



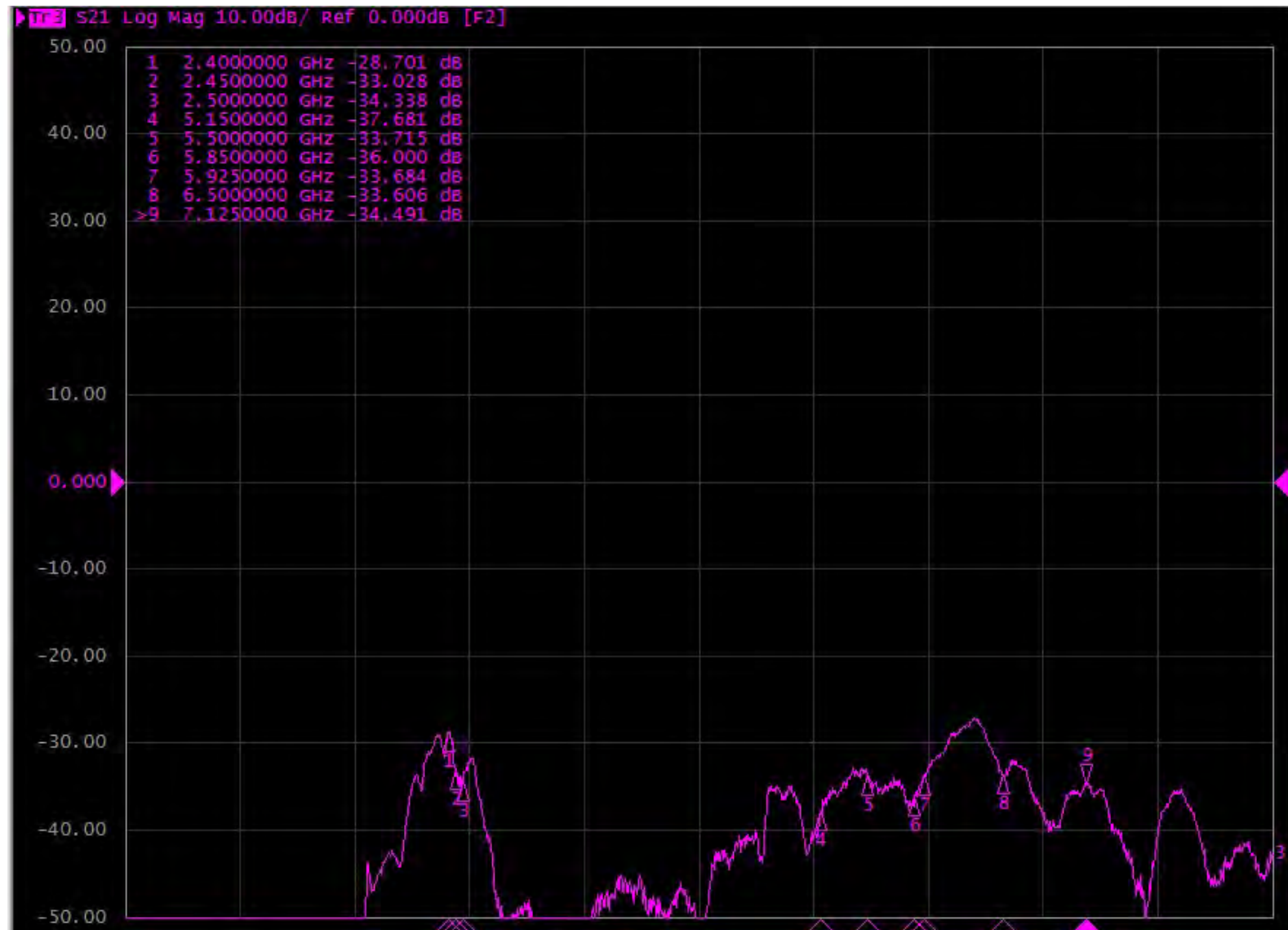
Isolation – Ant 1 & Ant 2



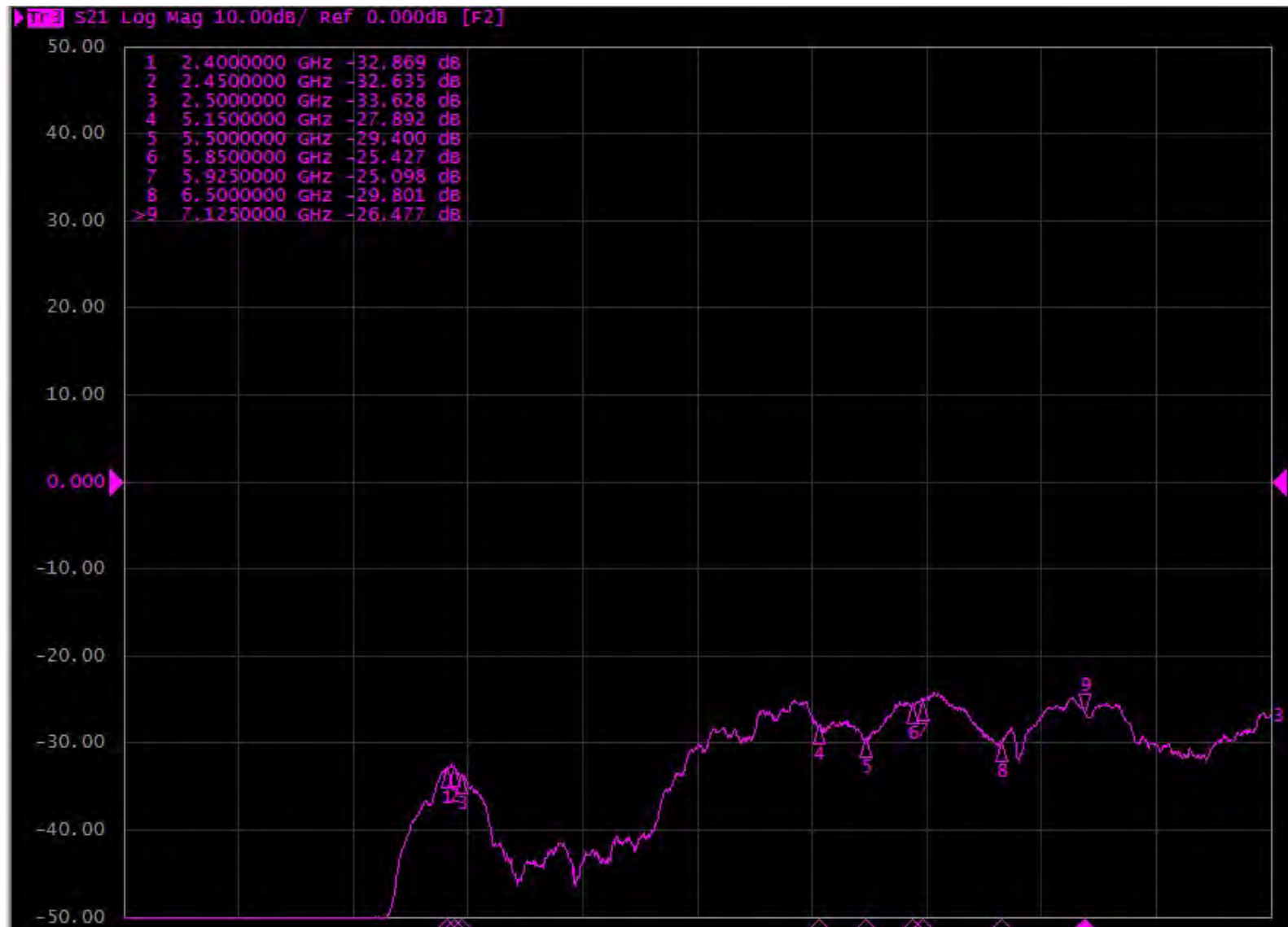
Isolation – Ant 1 & Ant 3



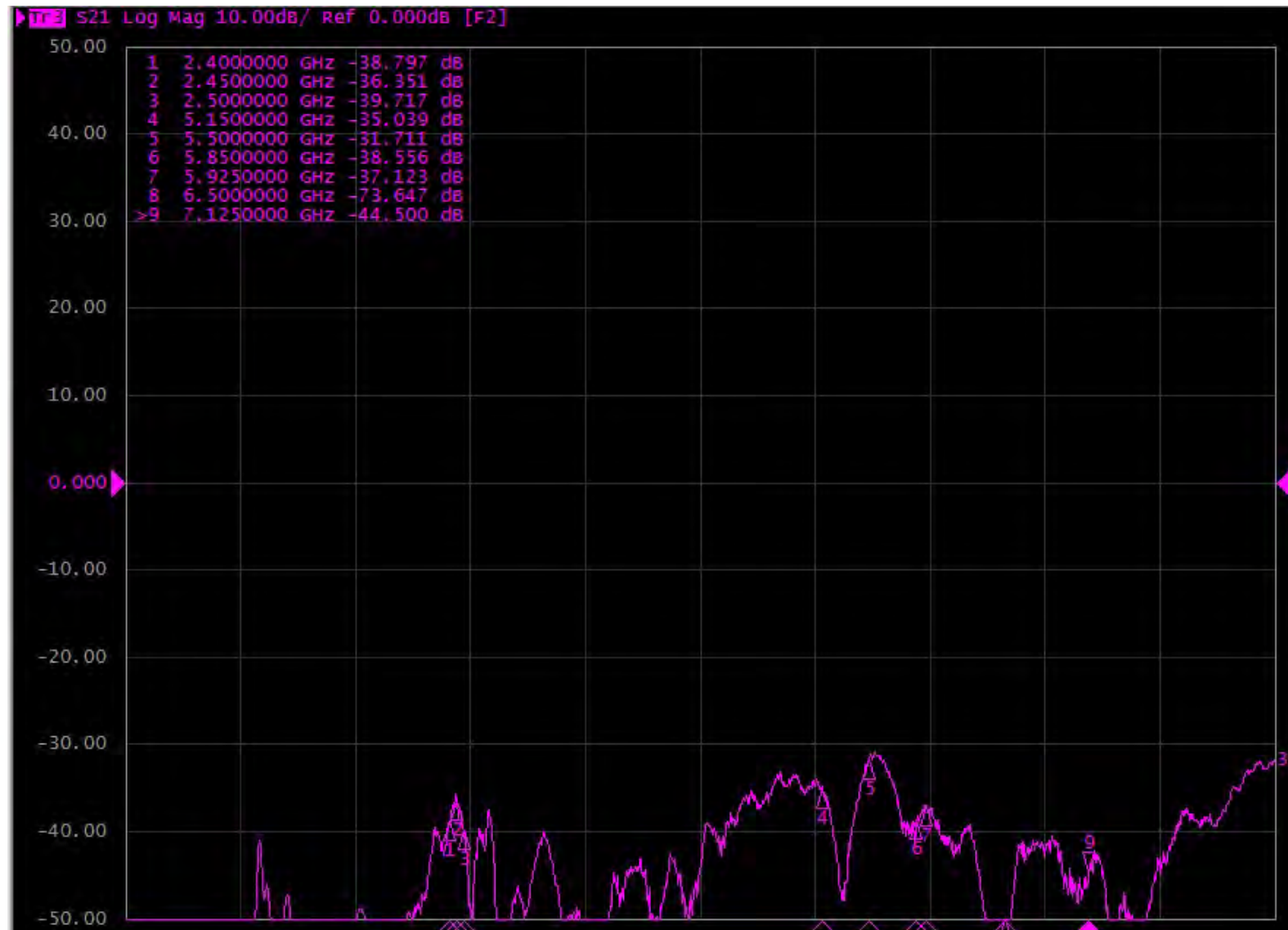
Isolation – Ant 1 & Ant 4



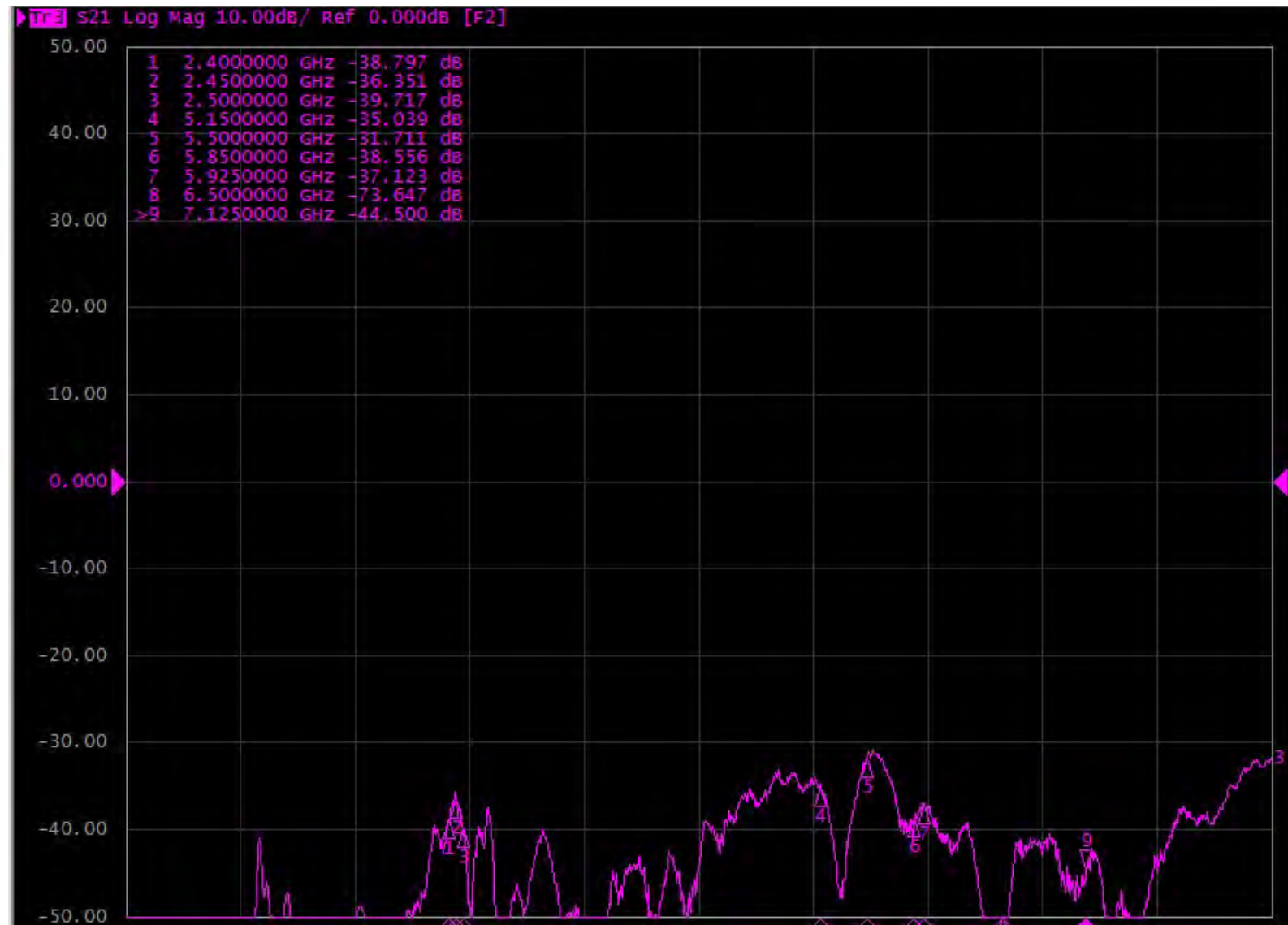
Isolation – Ant 1 & Ant 5



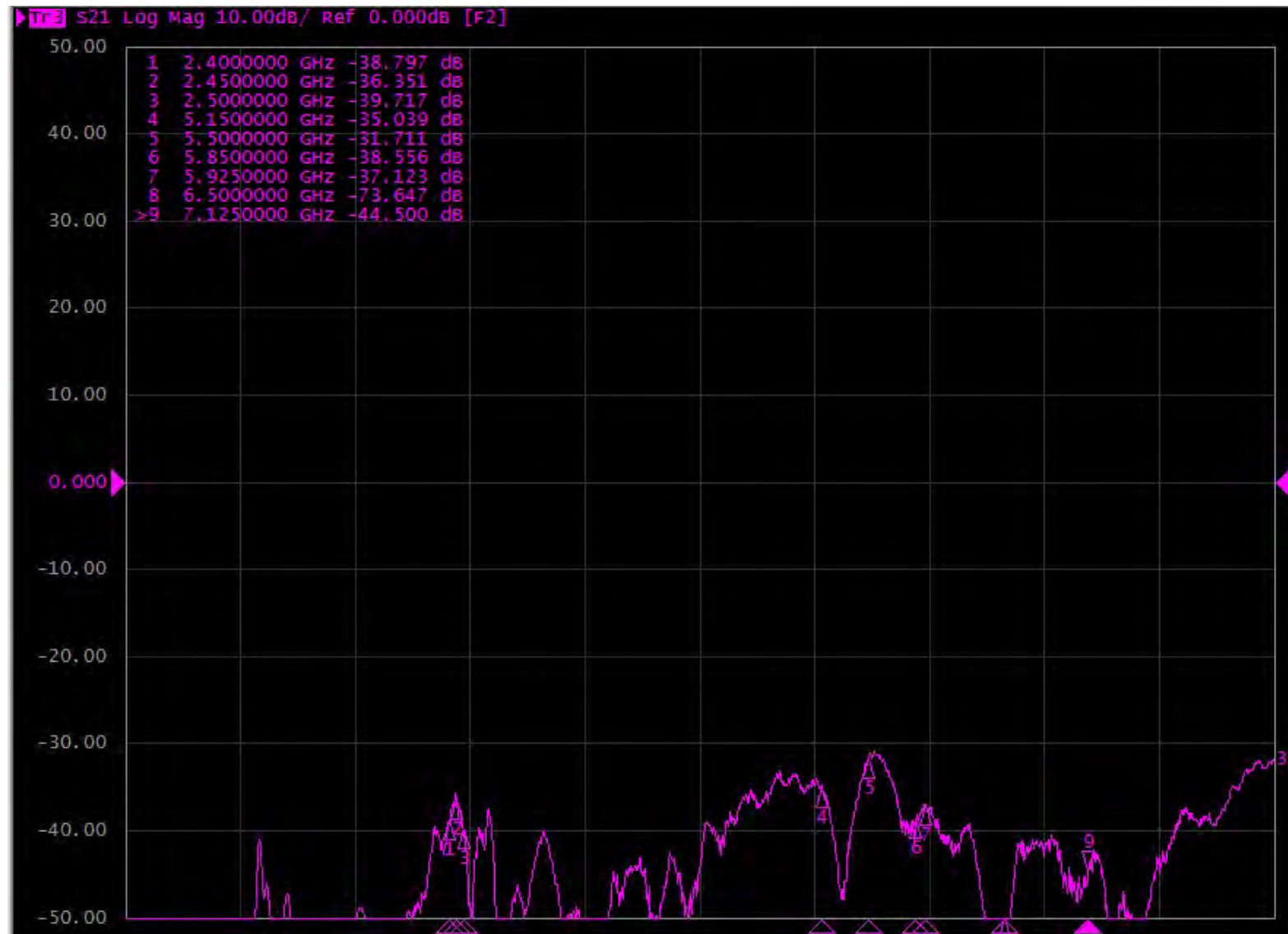
Isolation – Ant 1 & Ant 6



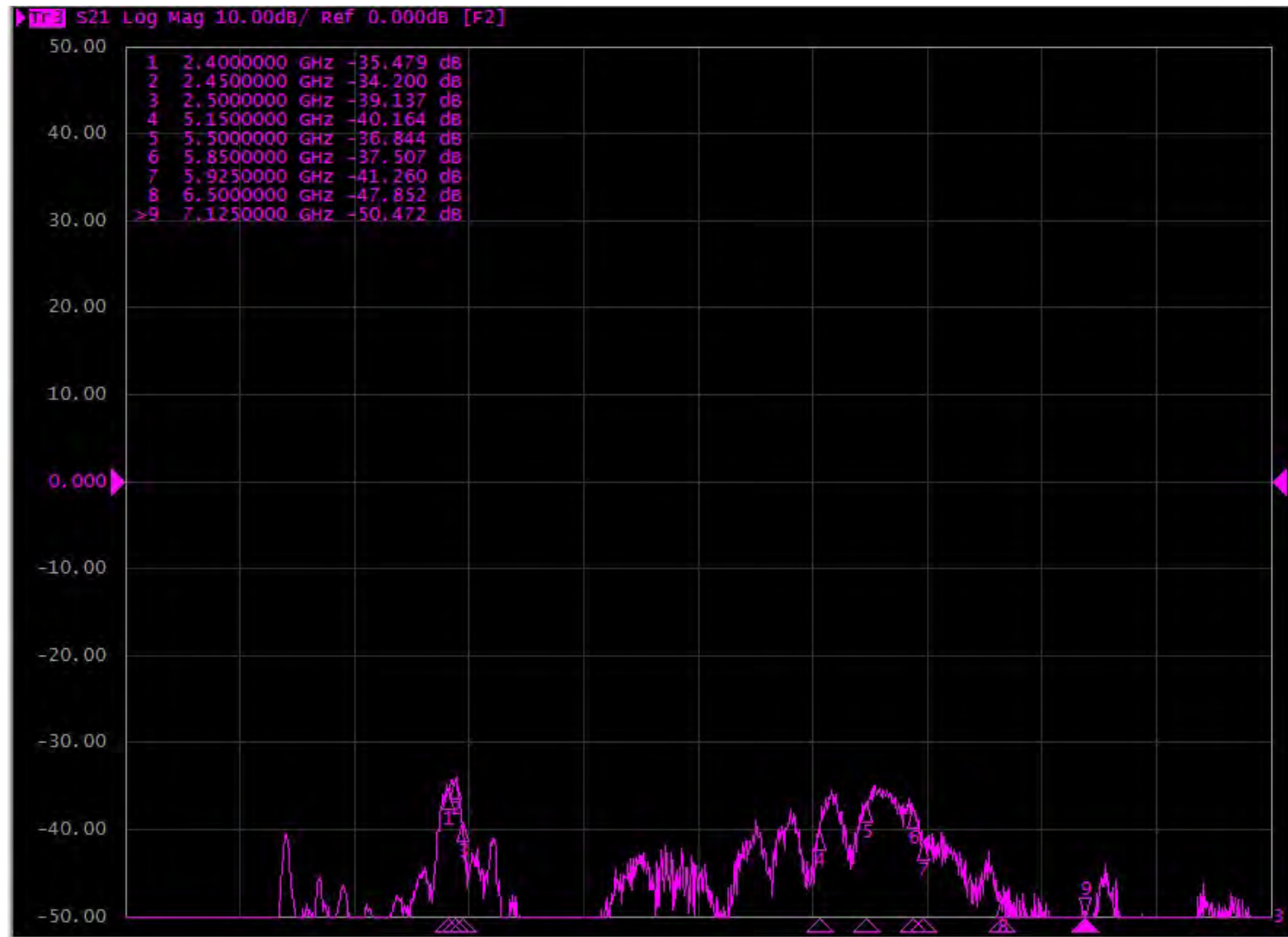
Isolation – Ant 1 & Ant 7



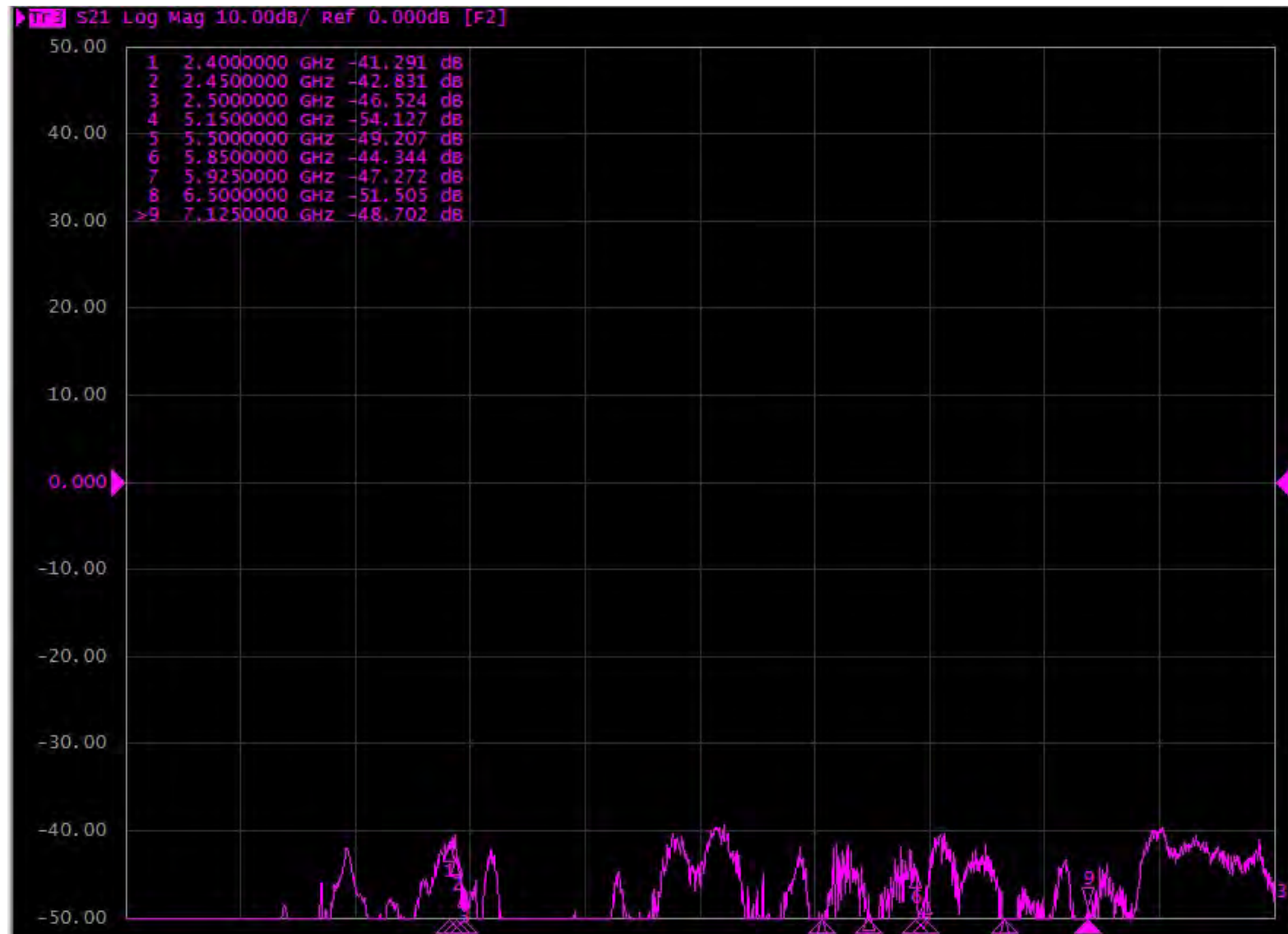
Isolation – Ant 1 & Ant 8



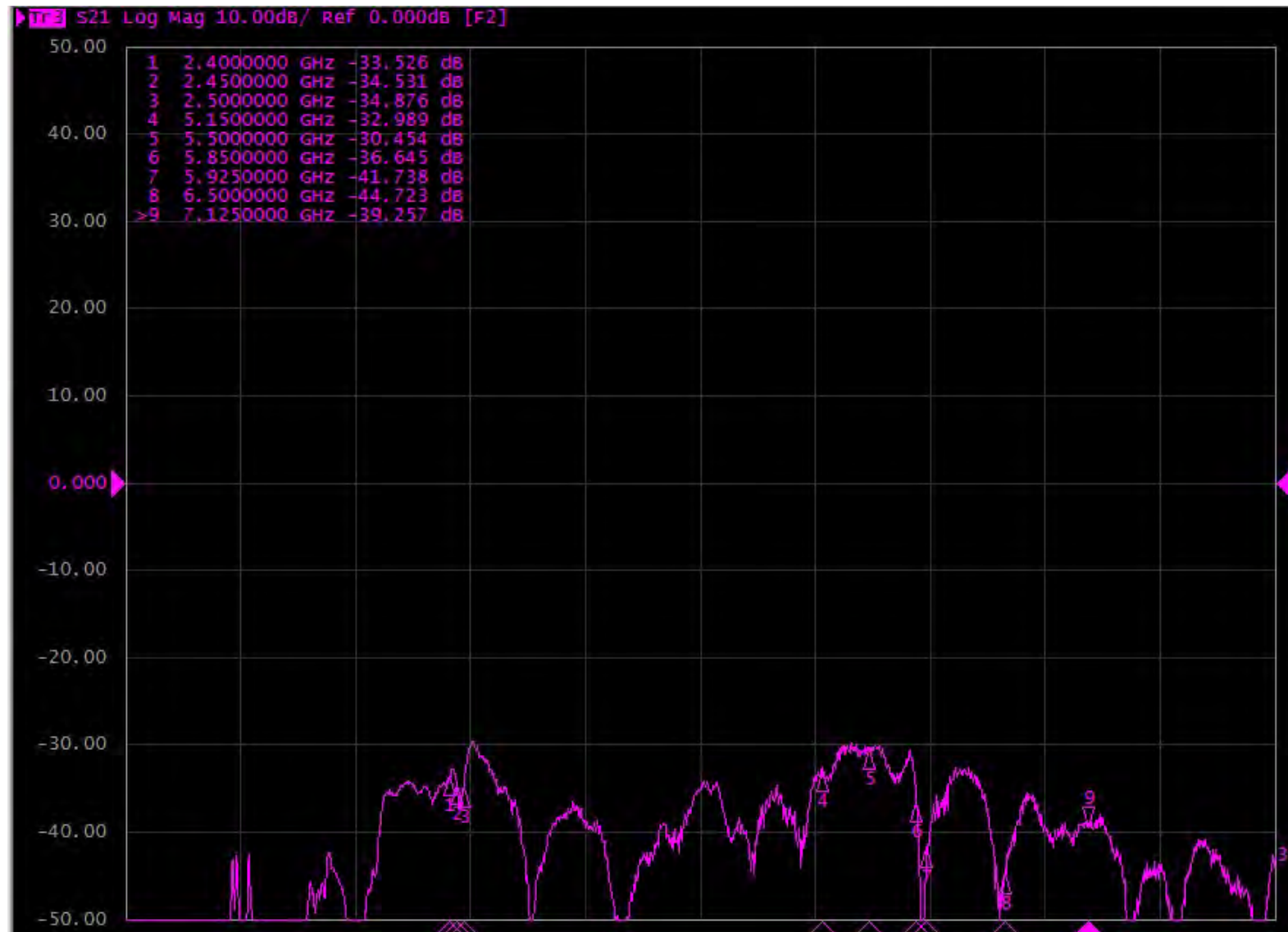
Isolation – Ant 1 & Ant 9



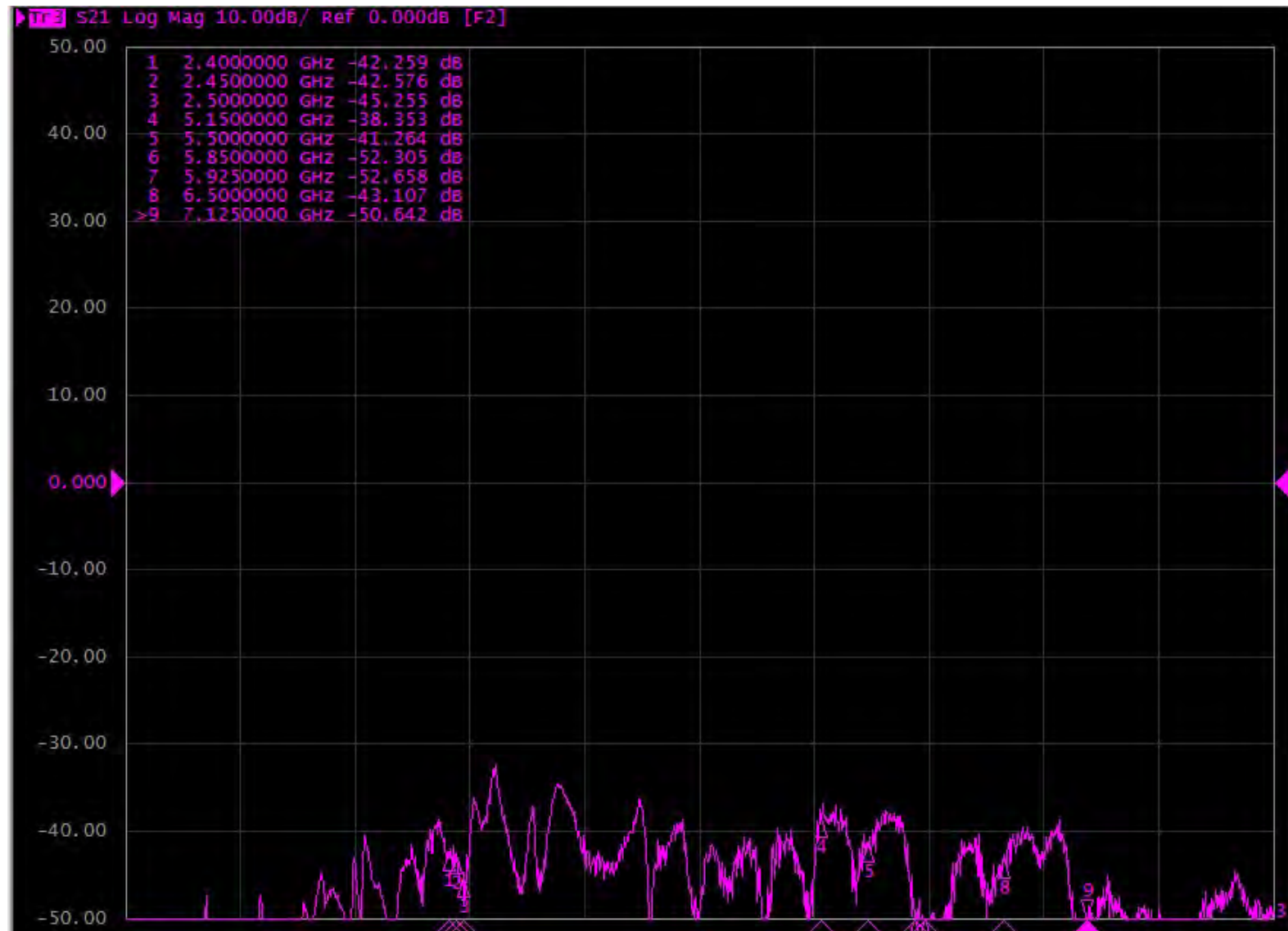
Isolation – Ant 1 & Ant 10



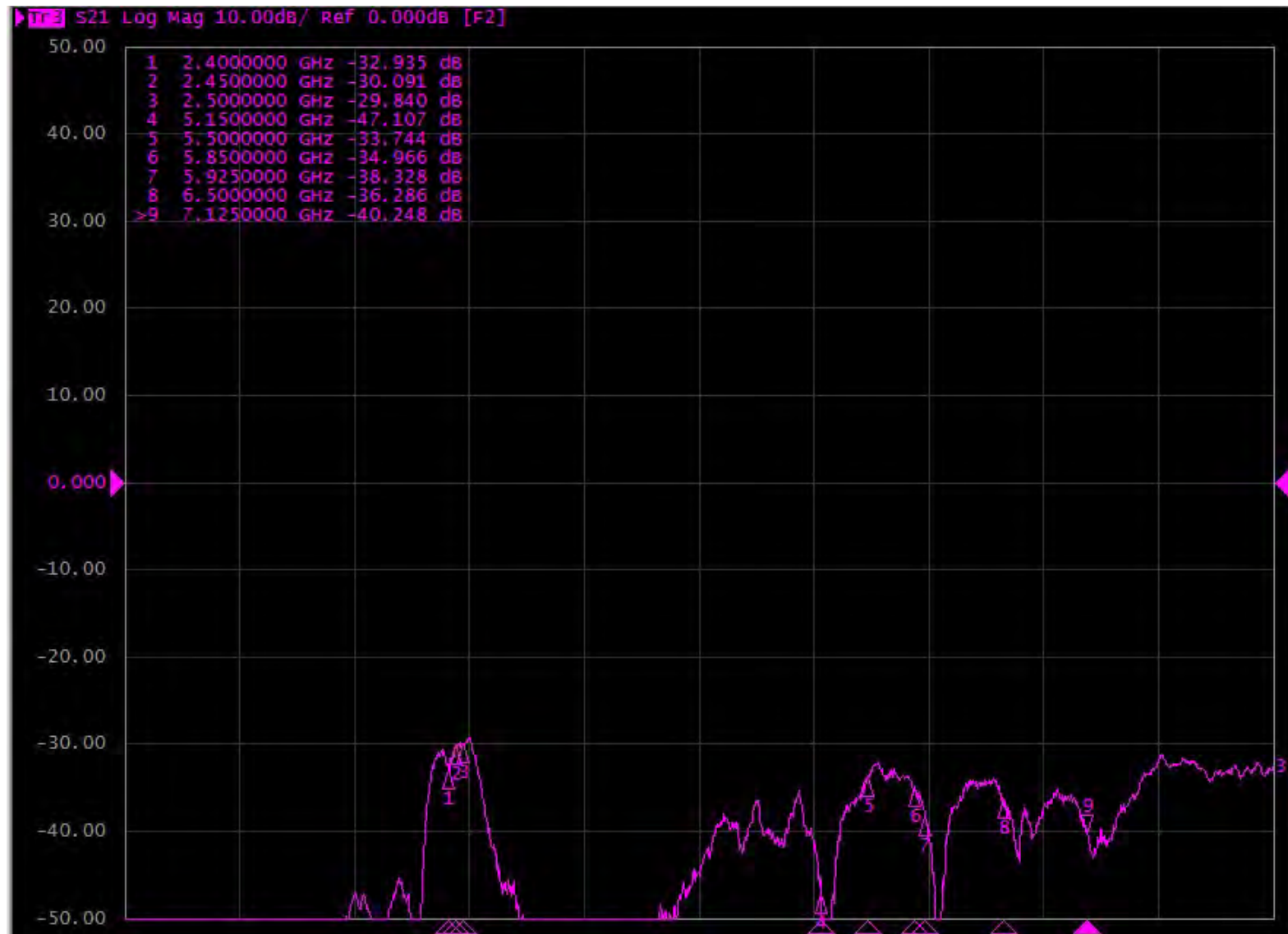
Isolation – Ant 1 & Ant 11



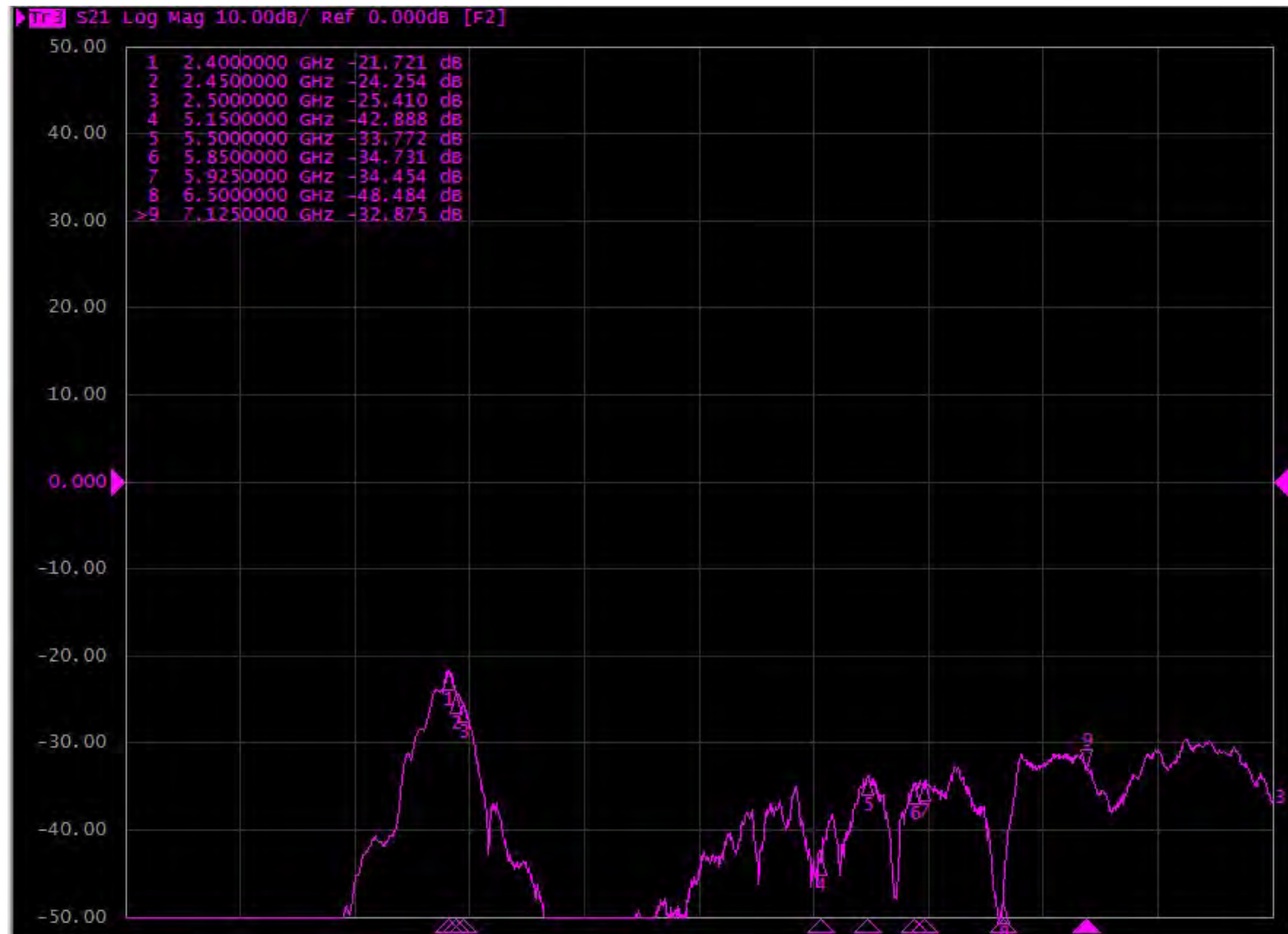
Isolation – Ant 1 & Ant 12



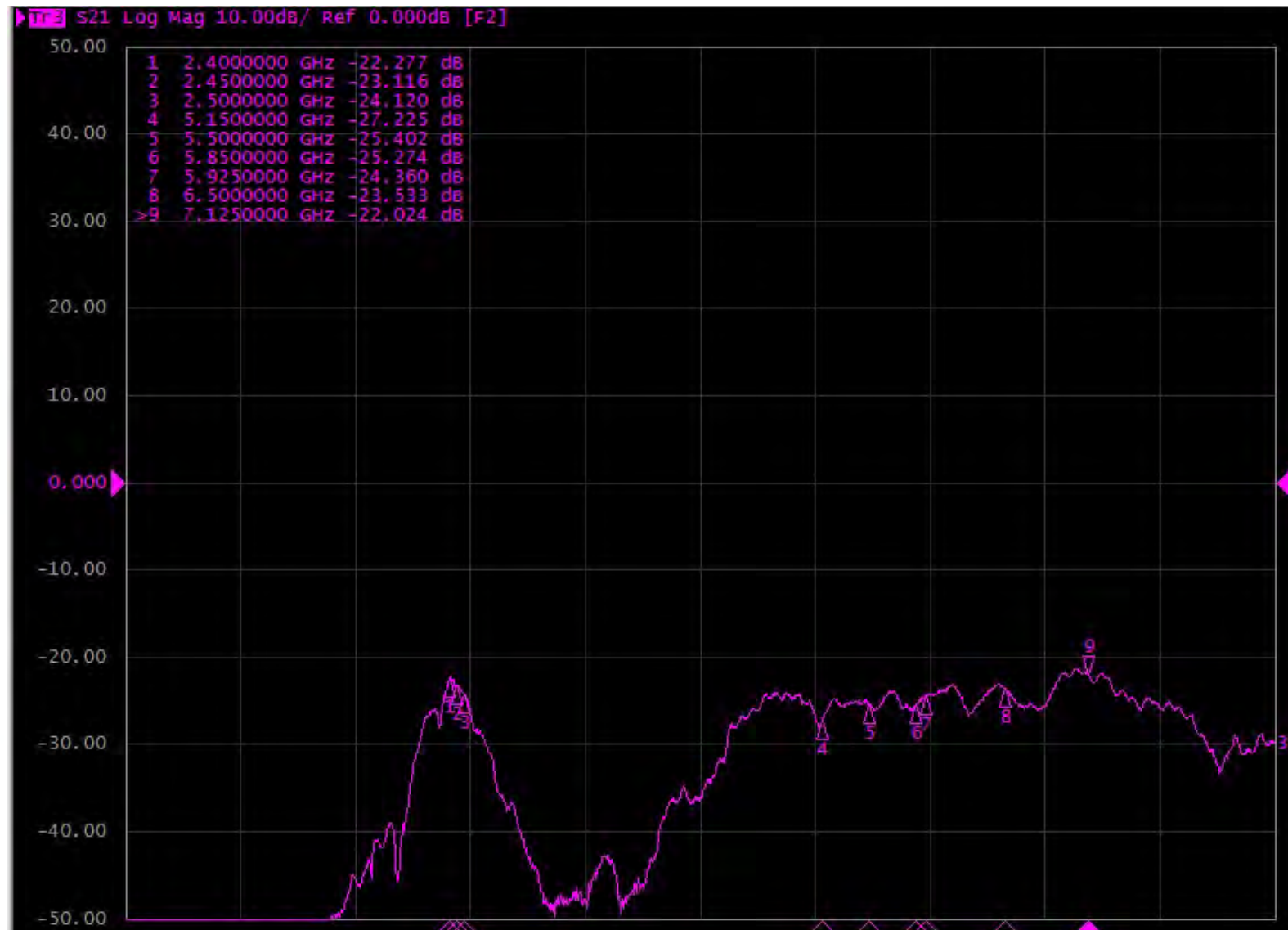
Isolation – Ant 1 & Ant 13



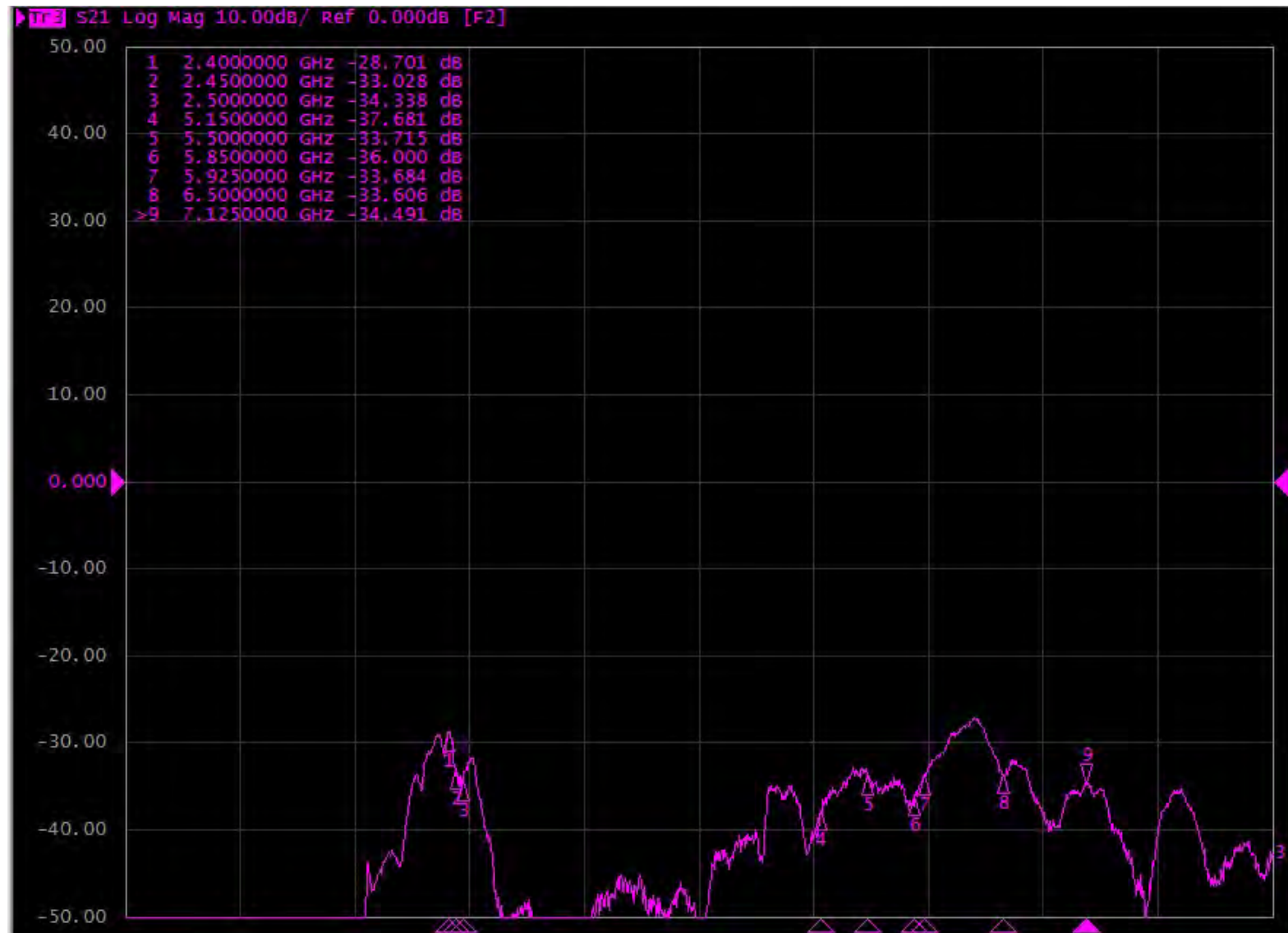
Isolation – Ant 1 & Ant 14



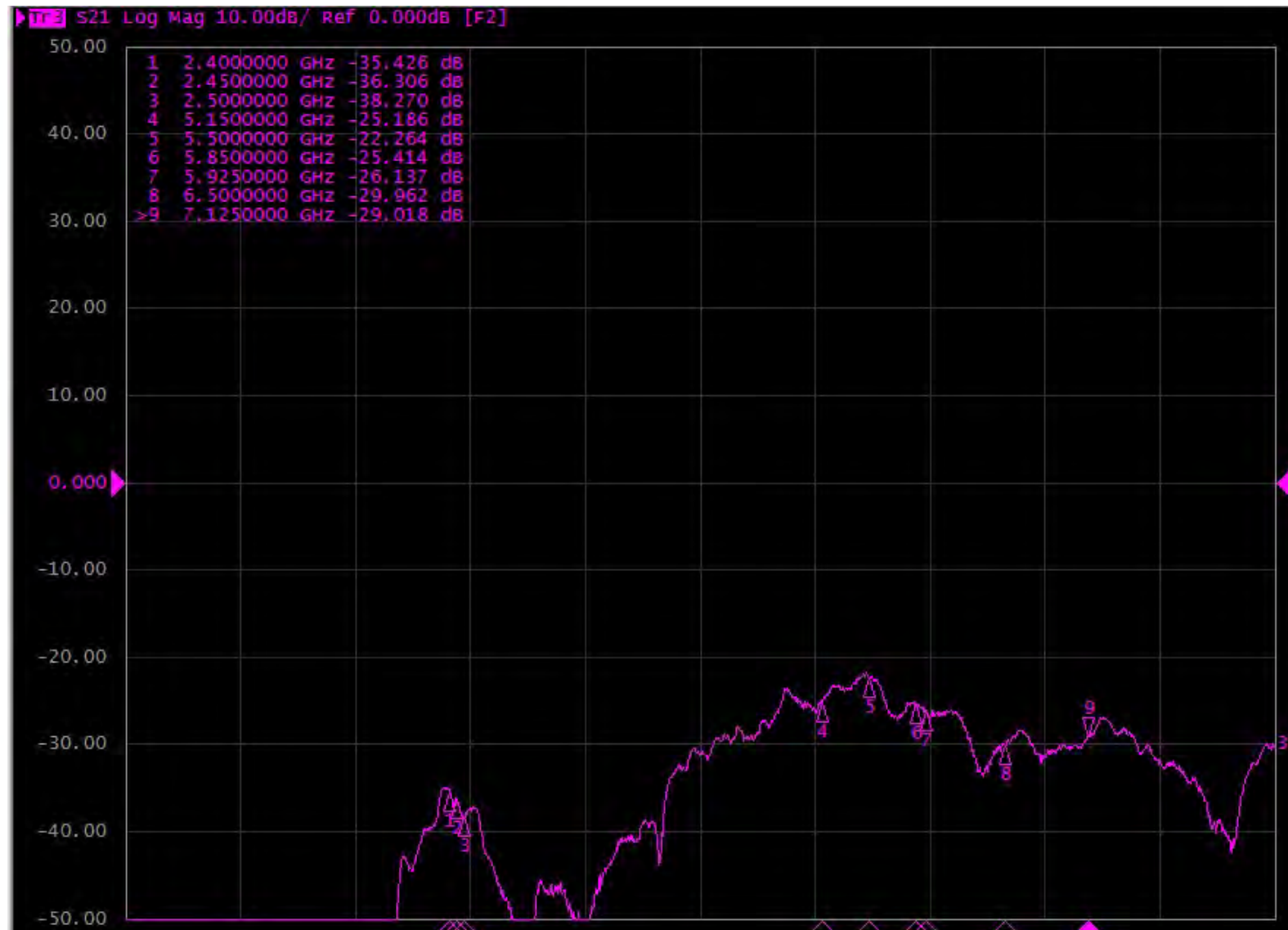
Isolation – Ant 2 & Ant 3



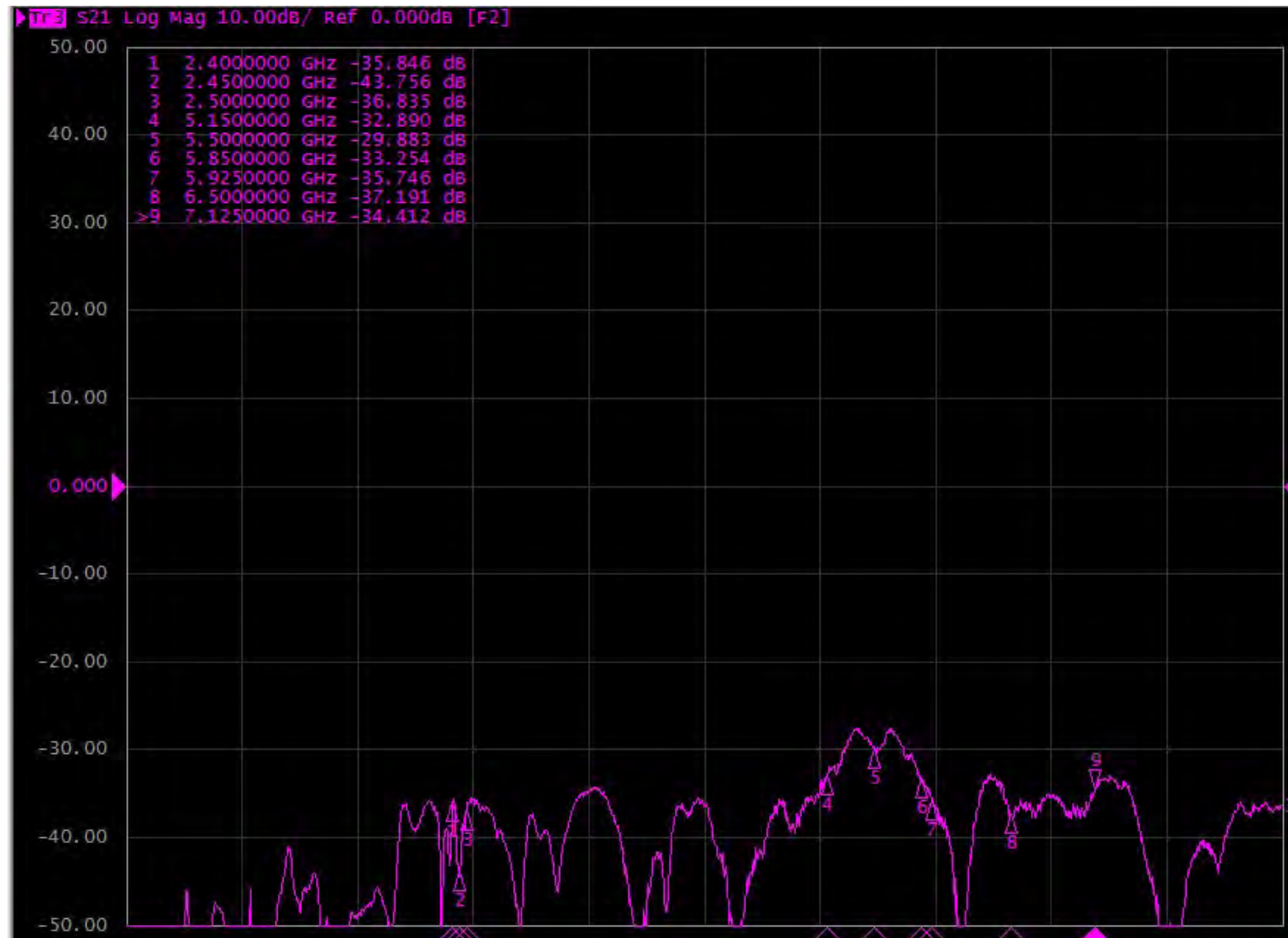
Isolation – Ant 2 & Ant 4



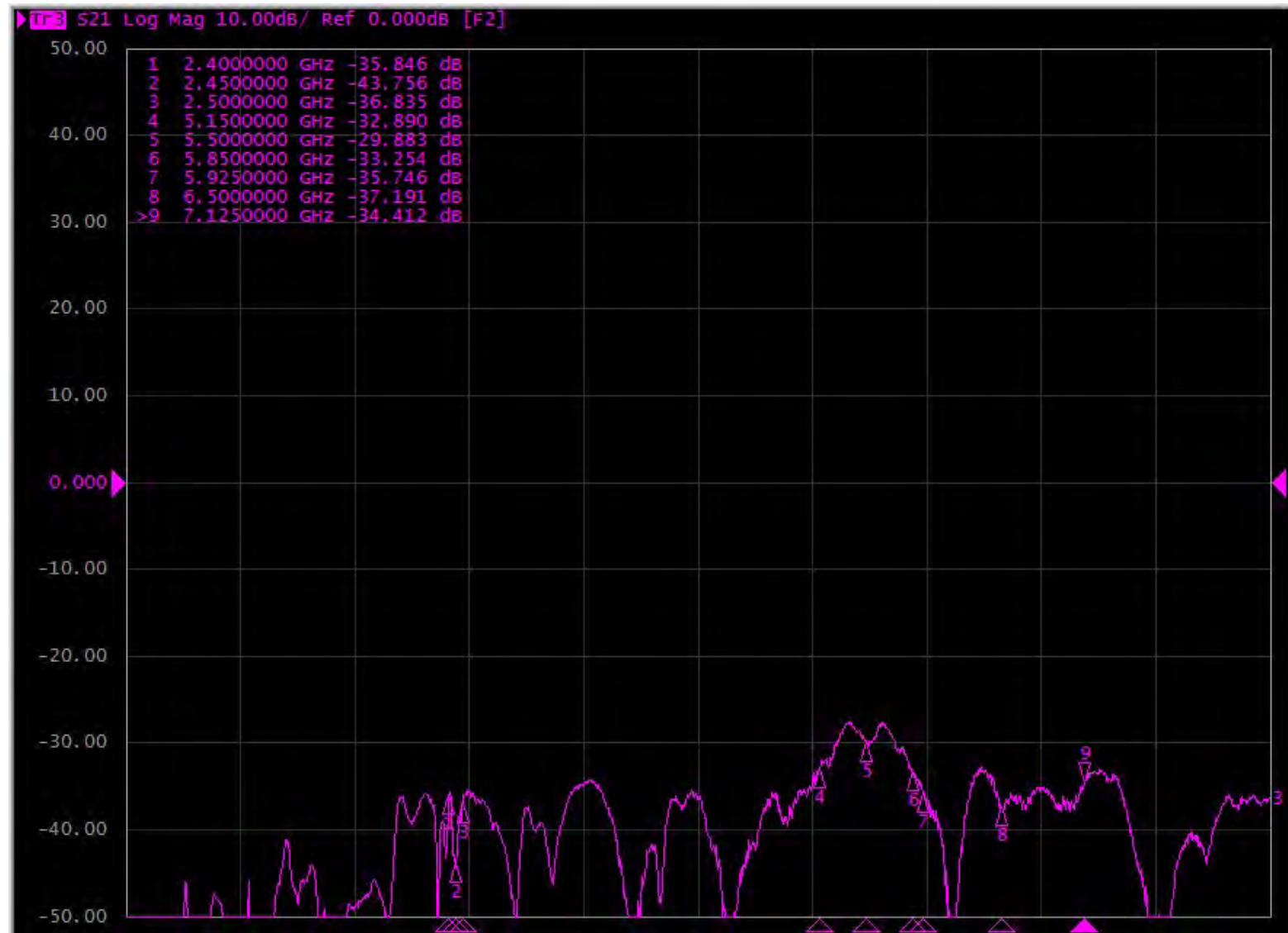
Isolation – Ant 2 & Ant 5



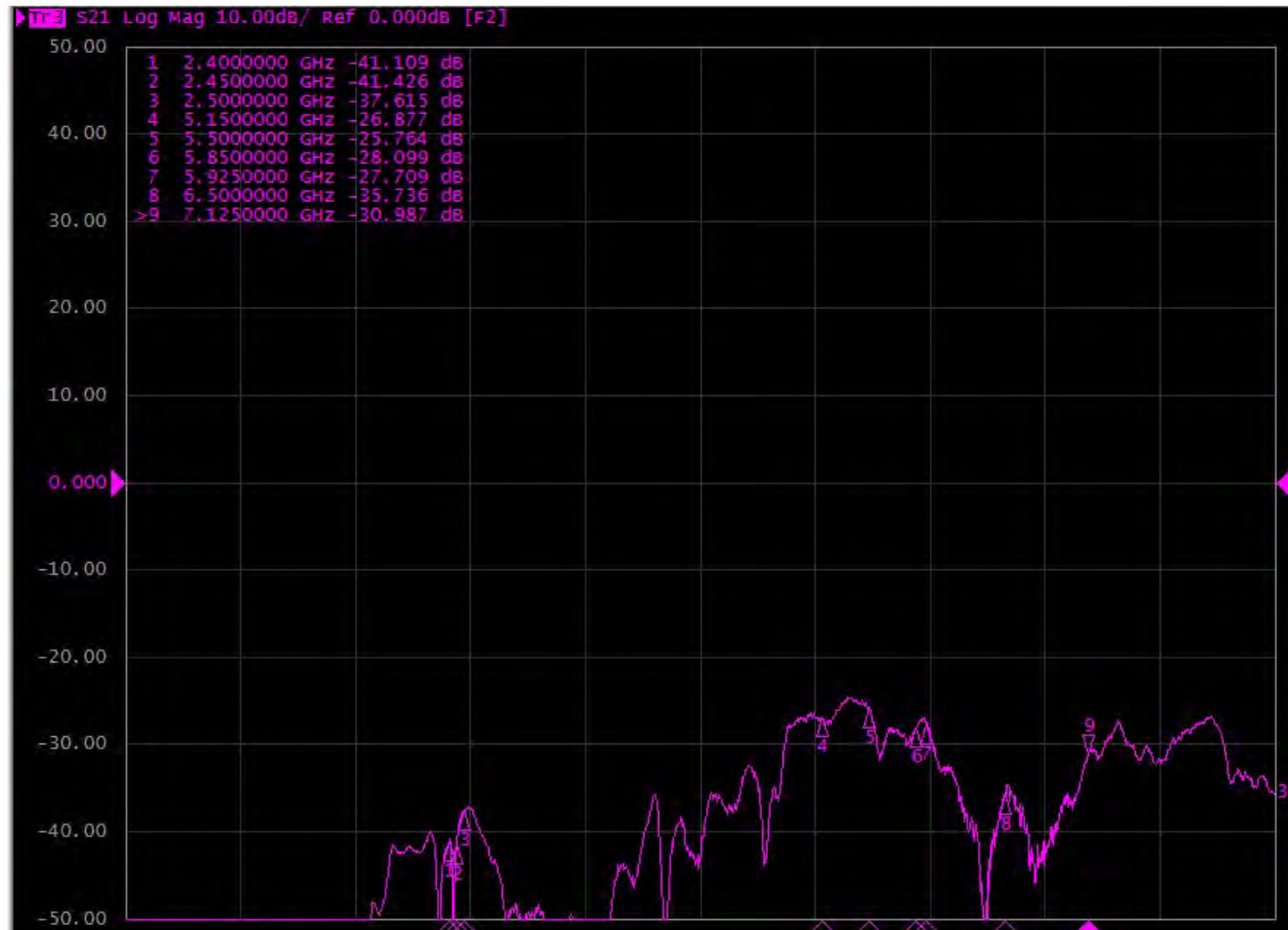
Isolation – Ant 2 & Ant 6



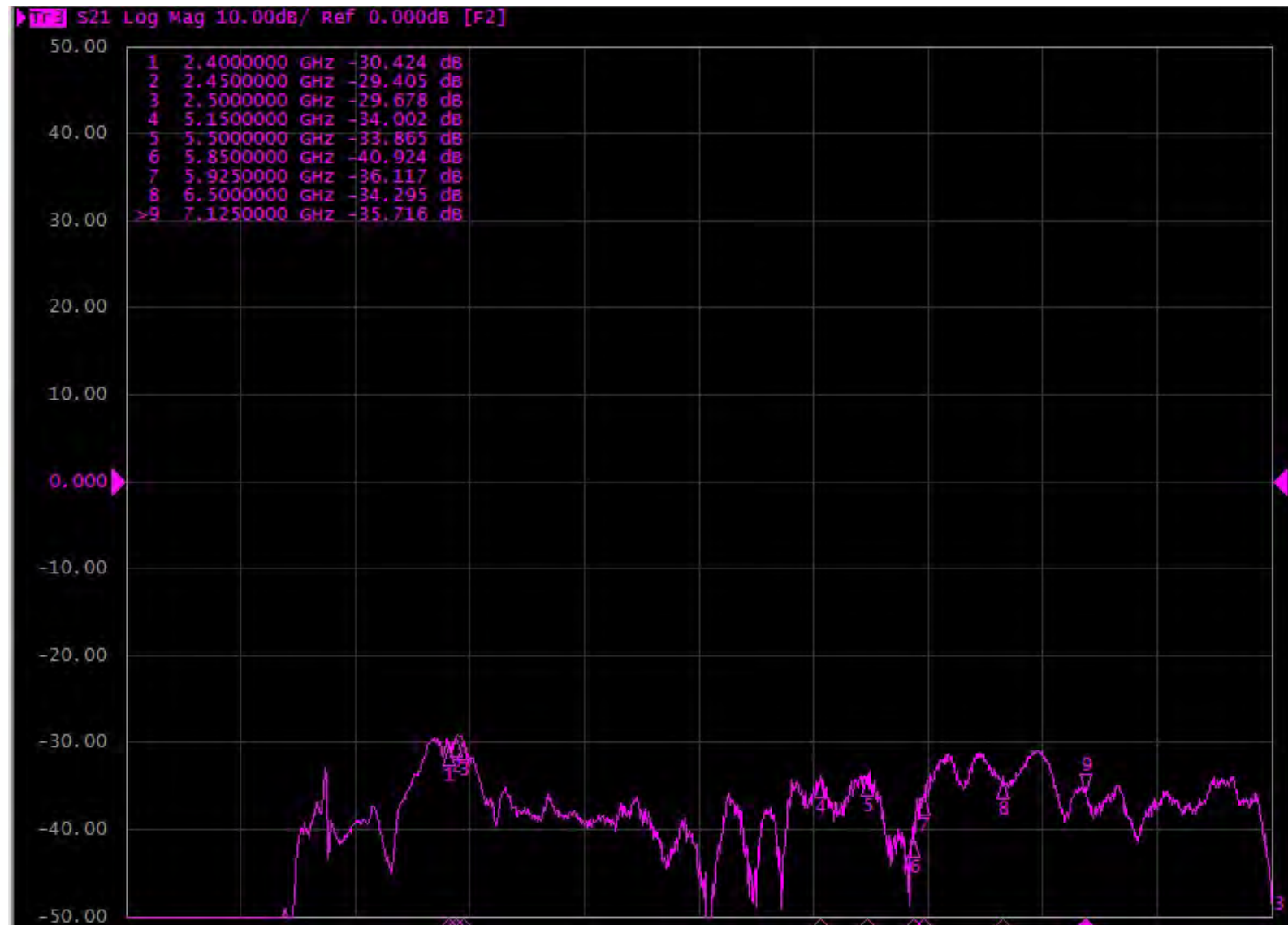
Isolation – Ant 2 & Ant 7



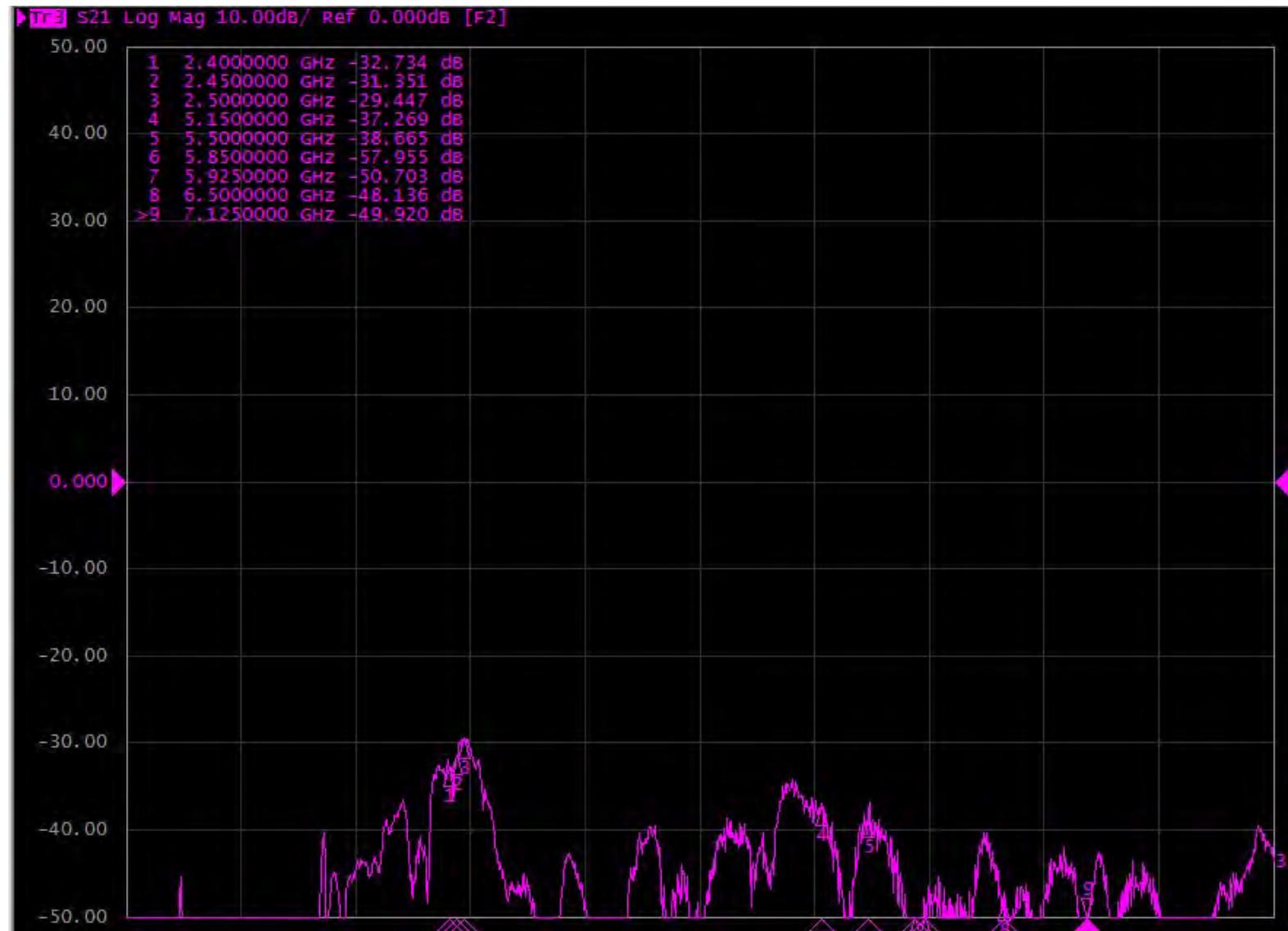
Isolation – Ant 2 & Ant 8



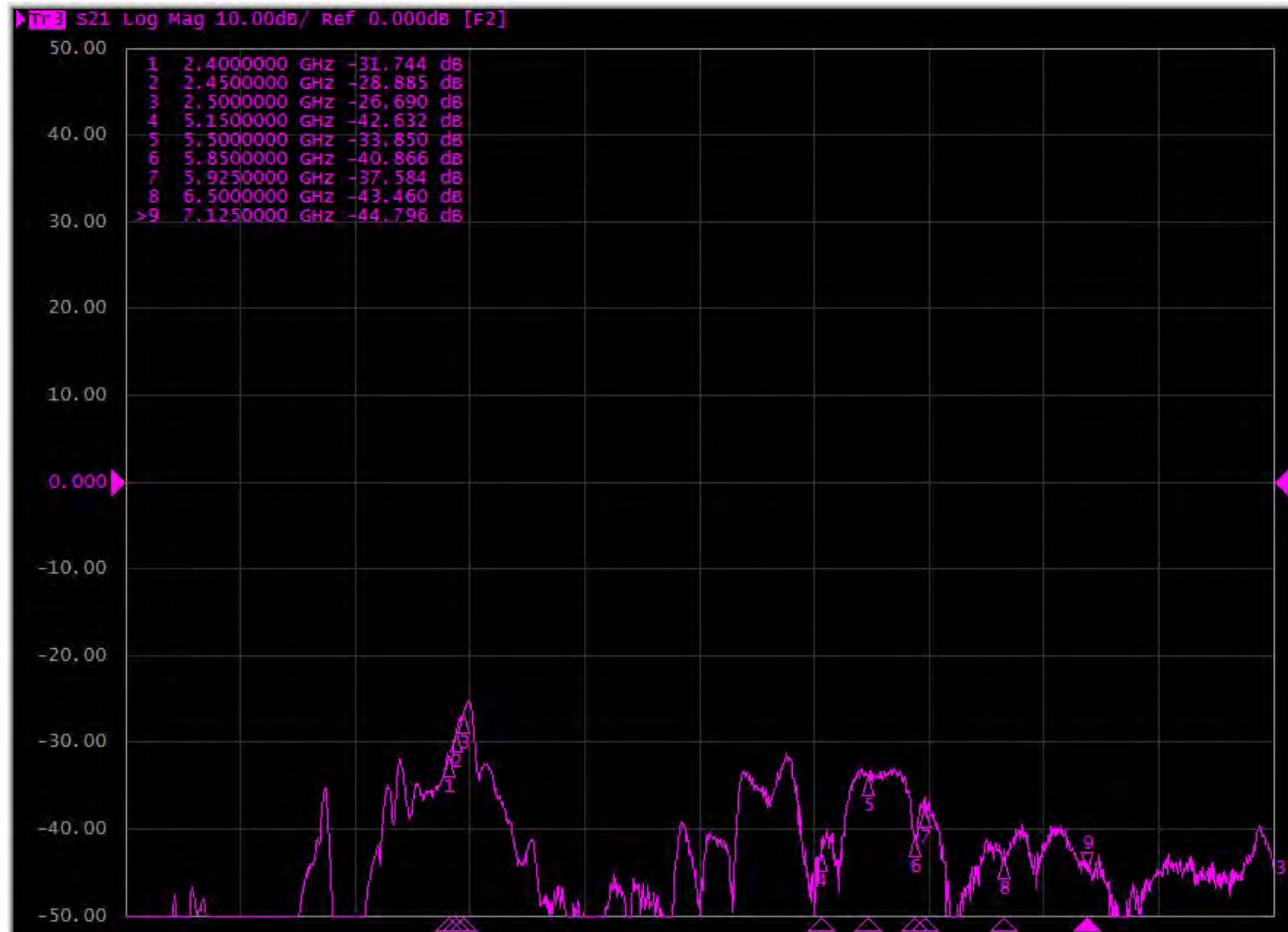
Isolation – Ant 2 & Ant 9



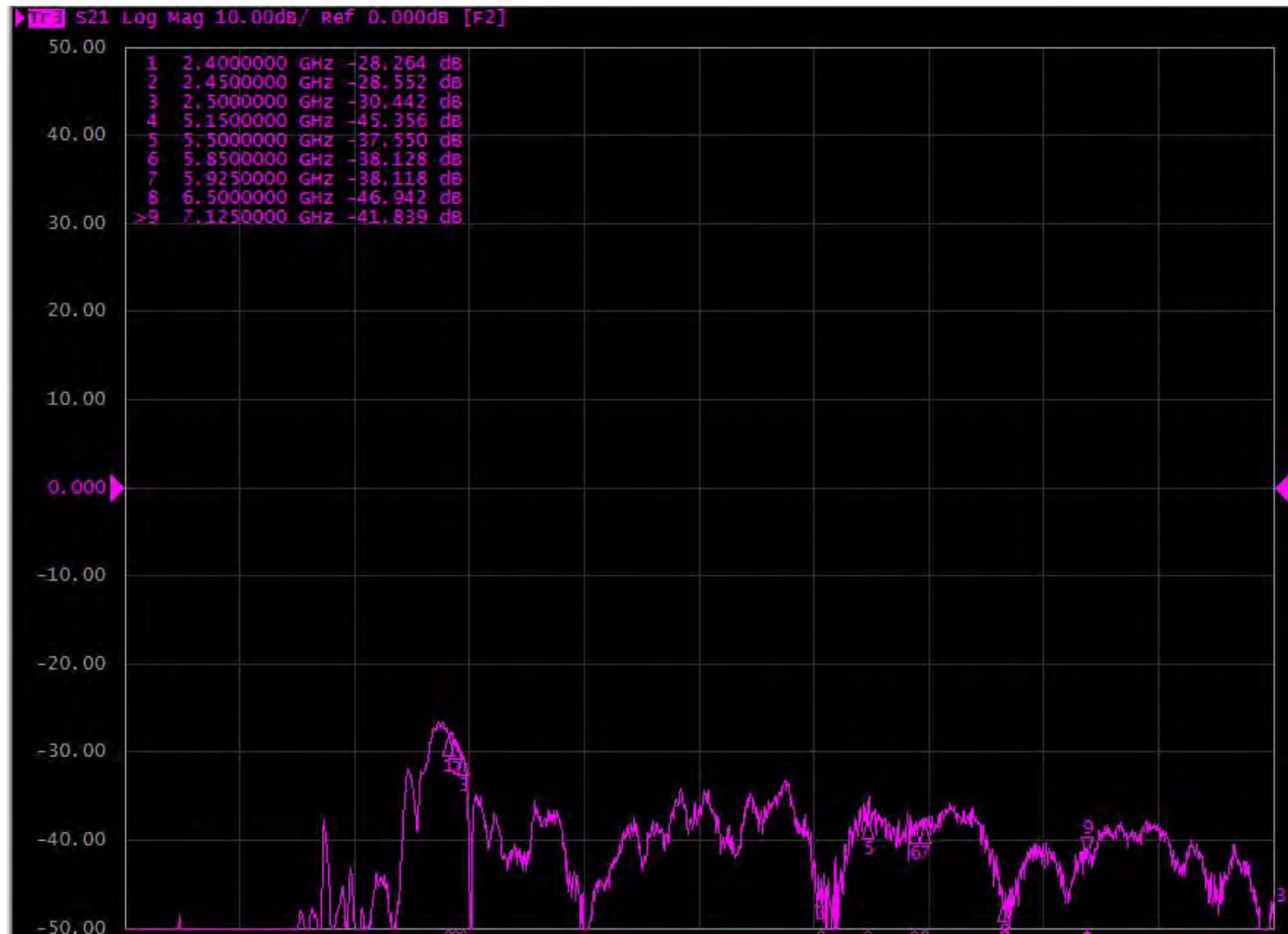
Isolation – Ant 2 & Ant 10



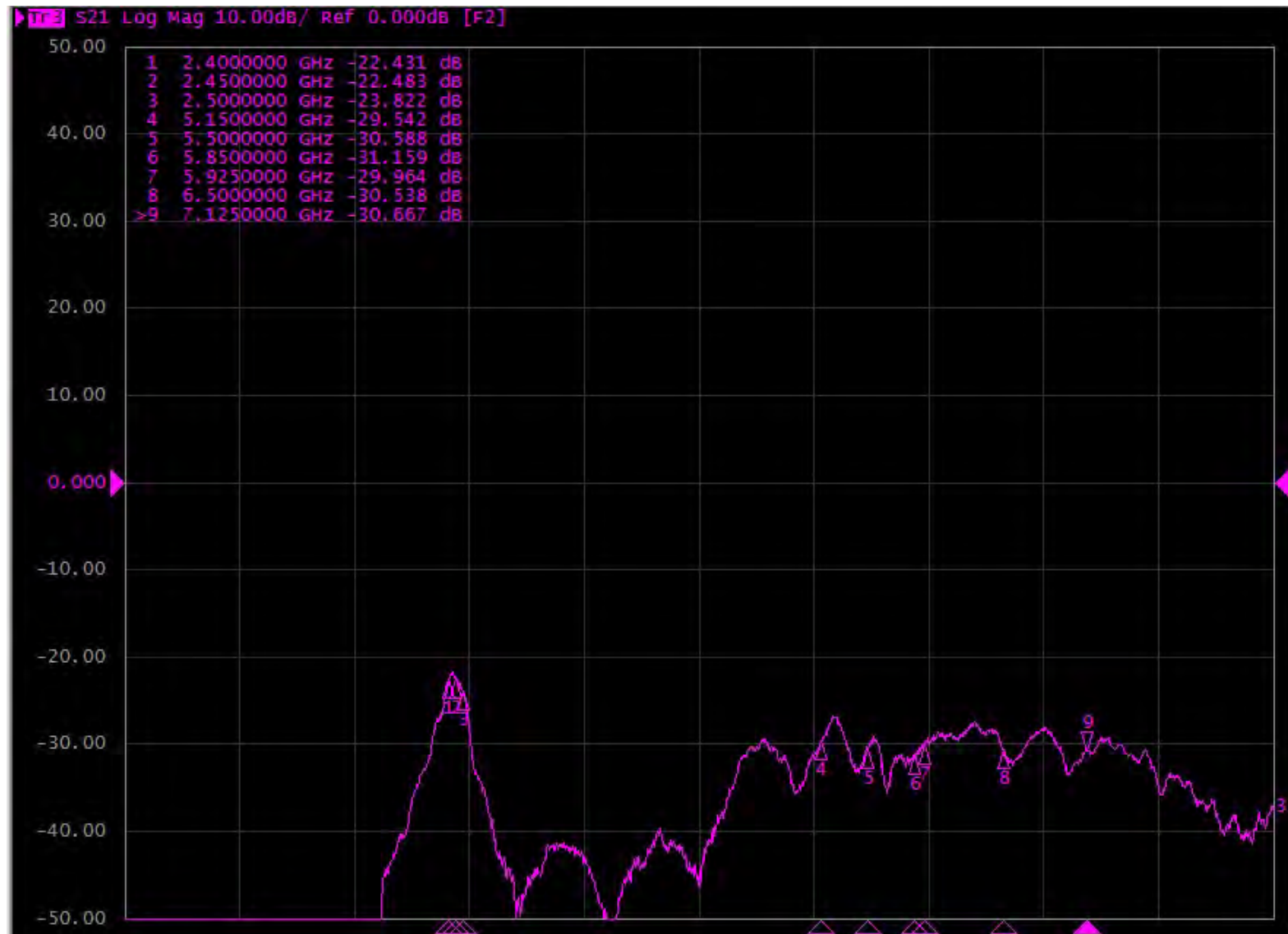
Isolation – Ant 2 & Ant 11



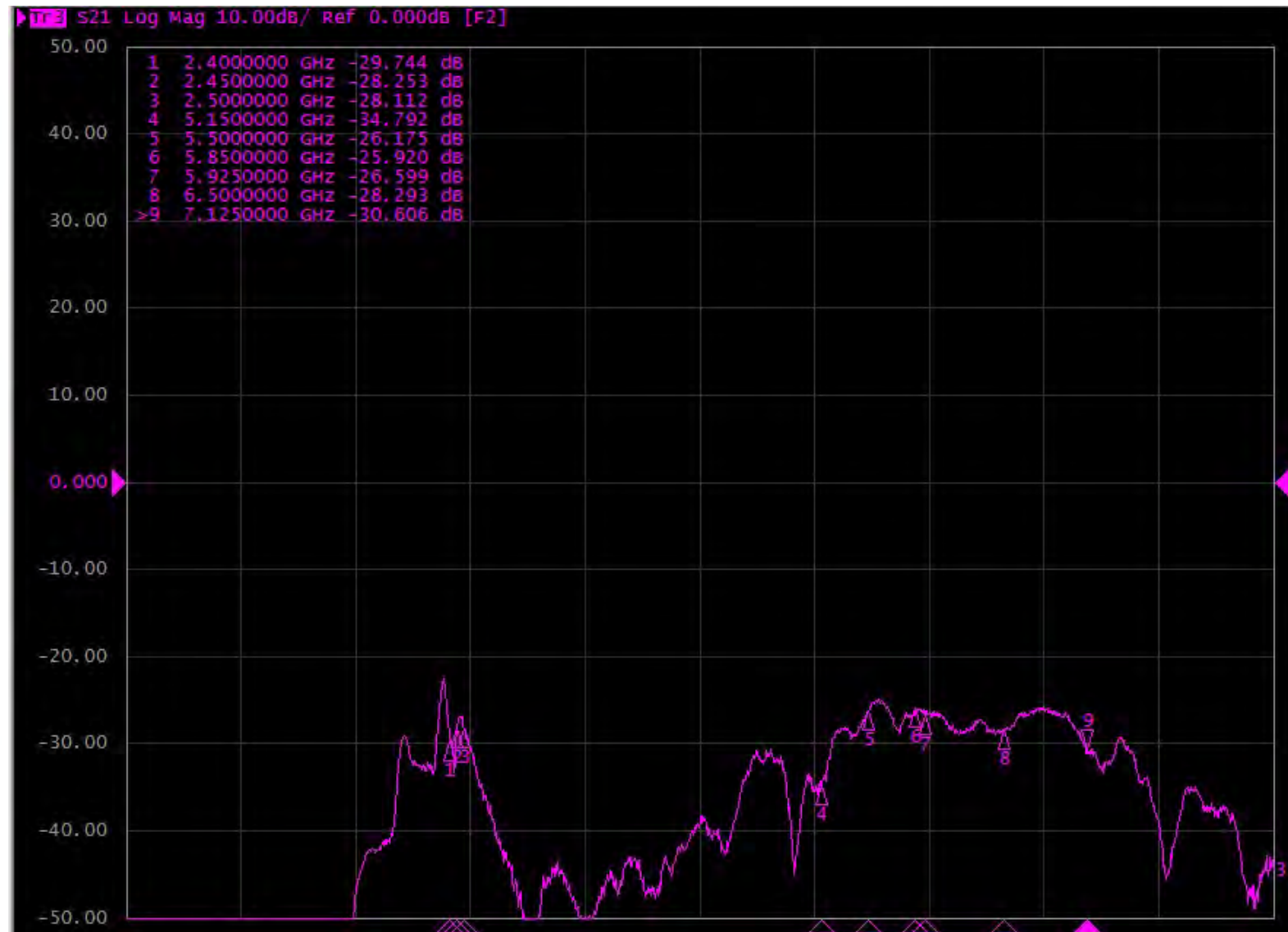
Isolation – Ant 2 & Ant 12



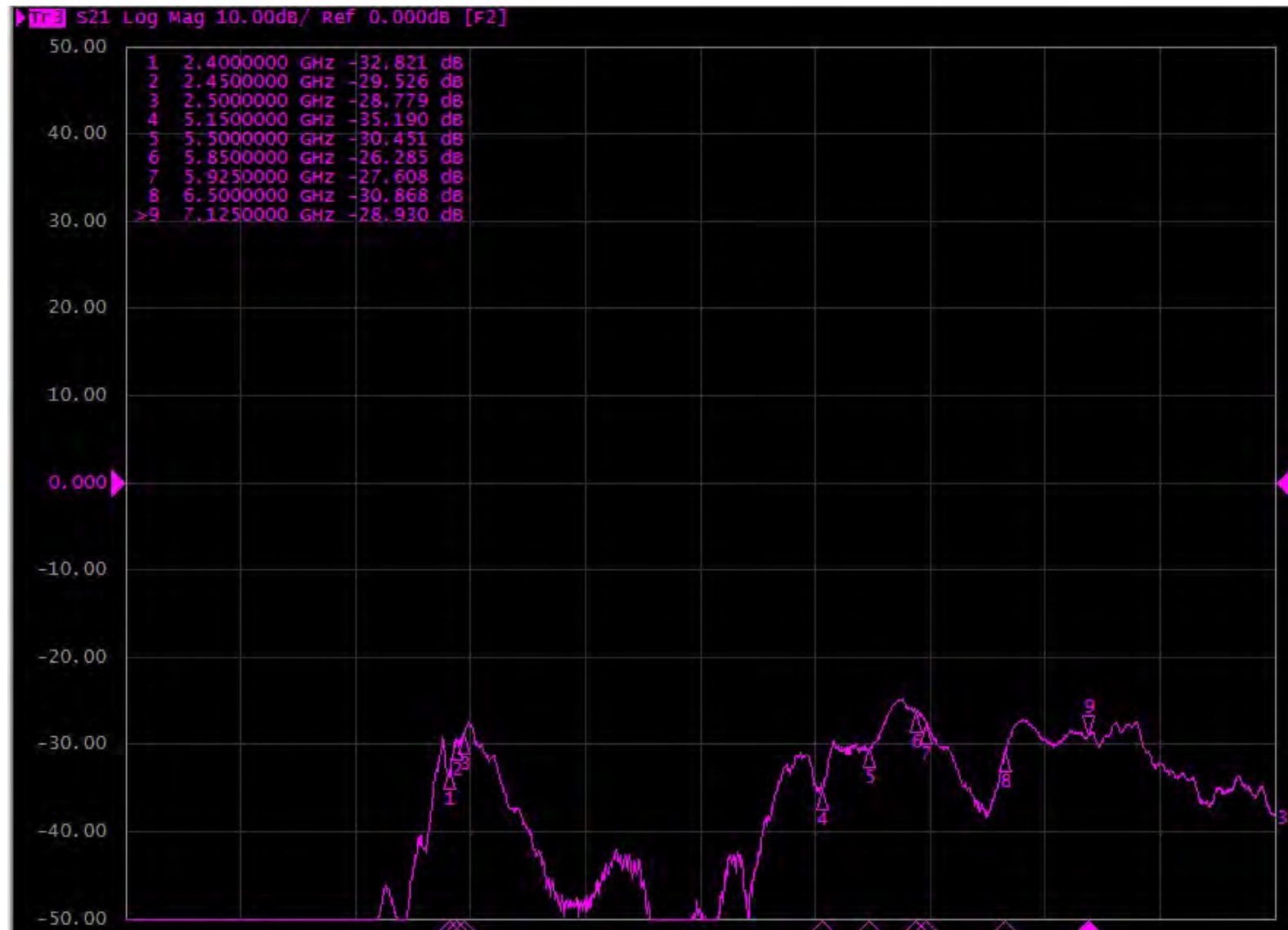
Isolation – Ant 2 & Ant 13



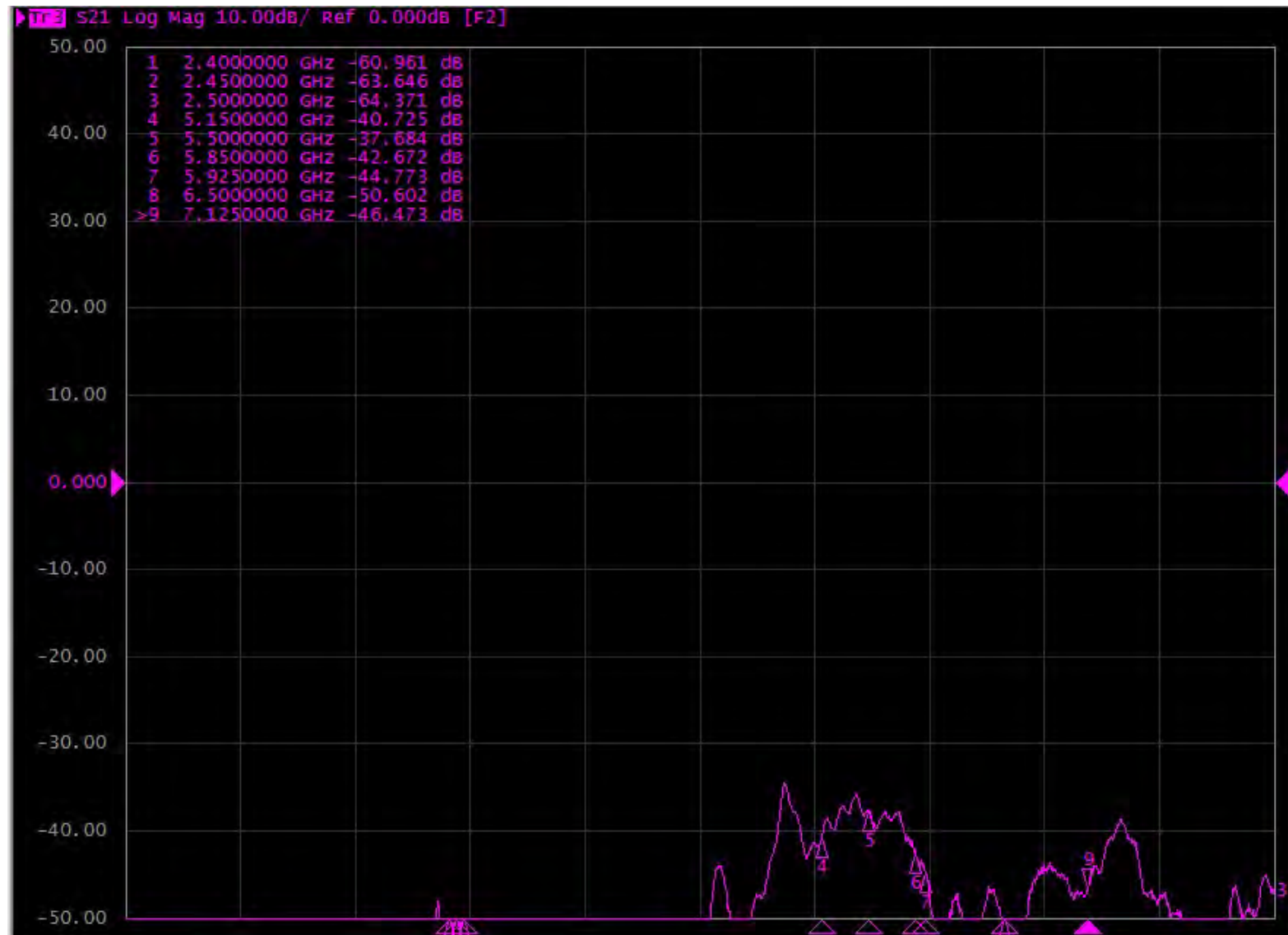
Isolation – Ant 2 & Ant 14



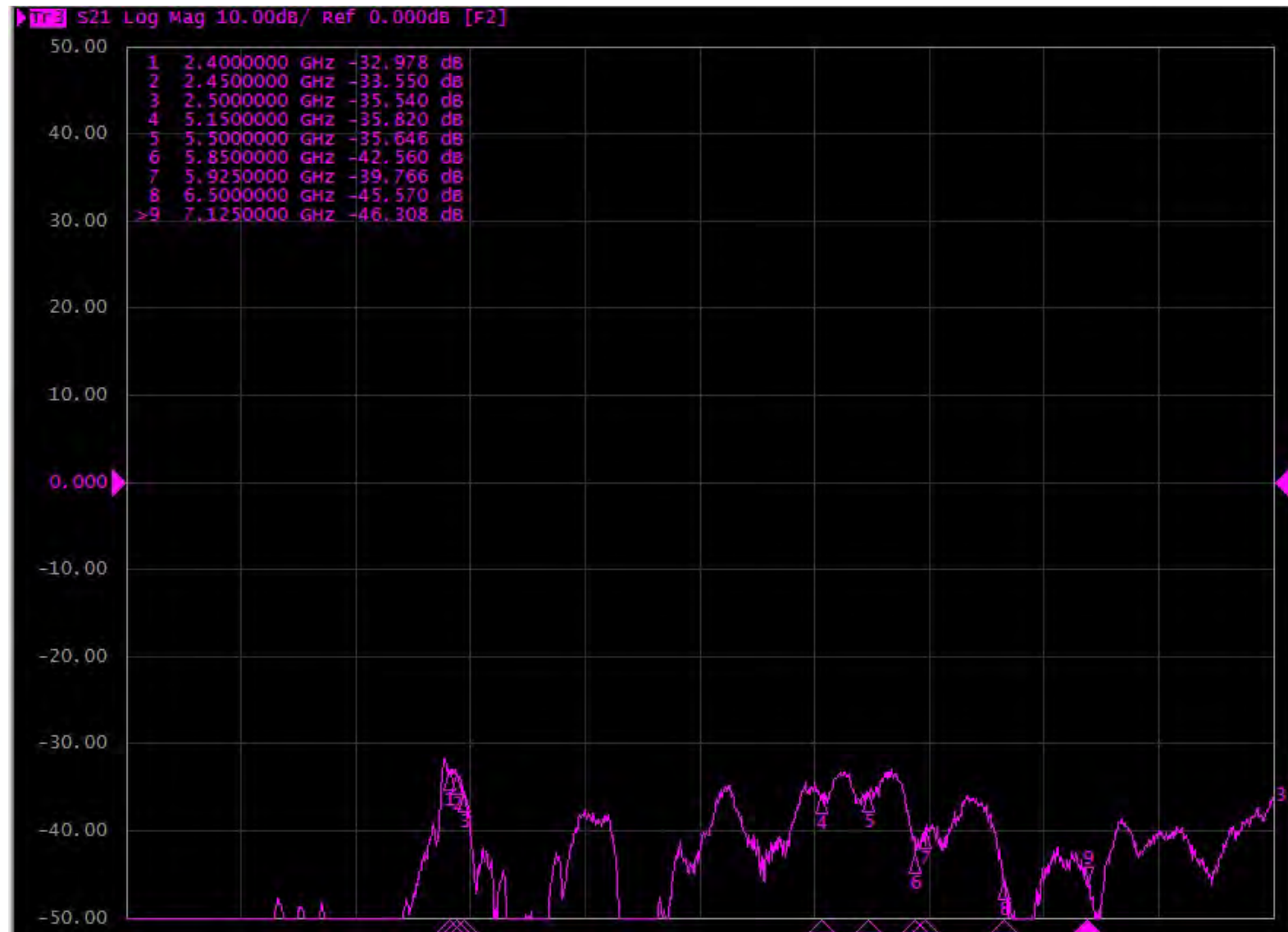
Isolation – Ant 3 & Ant 4



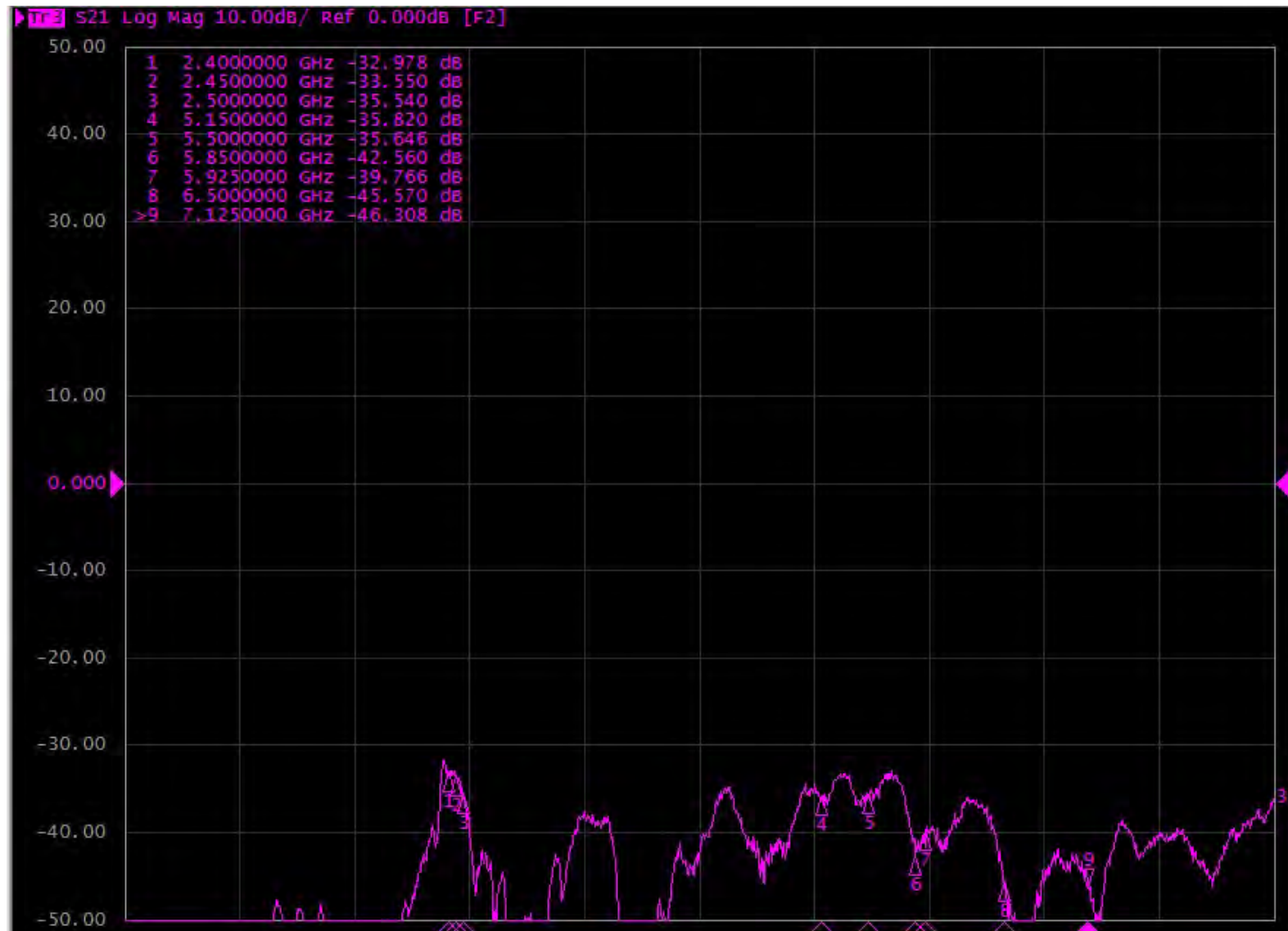
Isolation – Ant 3 & Ant 5



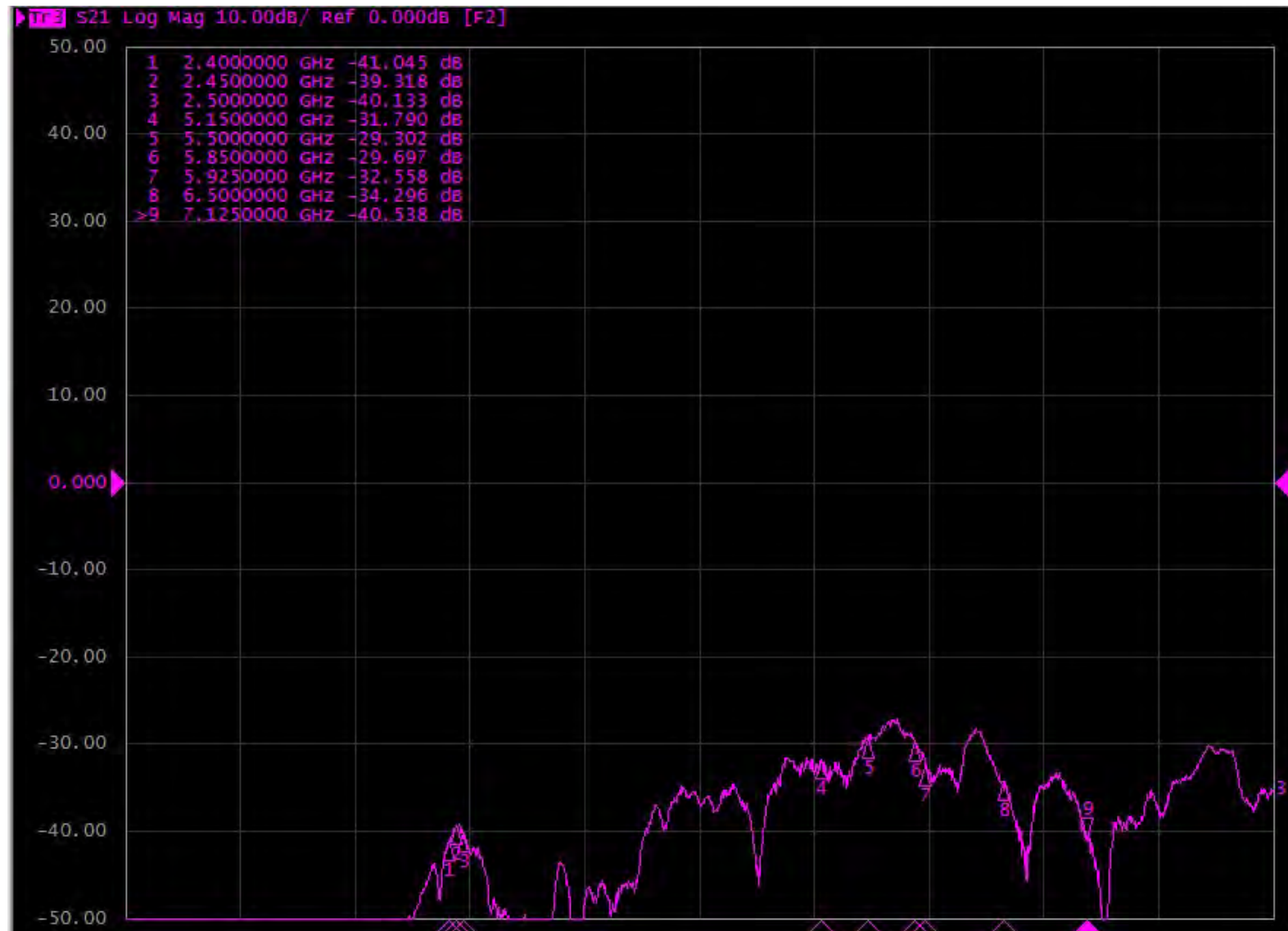
Isolation – Ant 3 & Ant 6



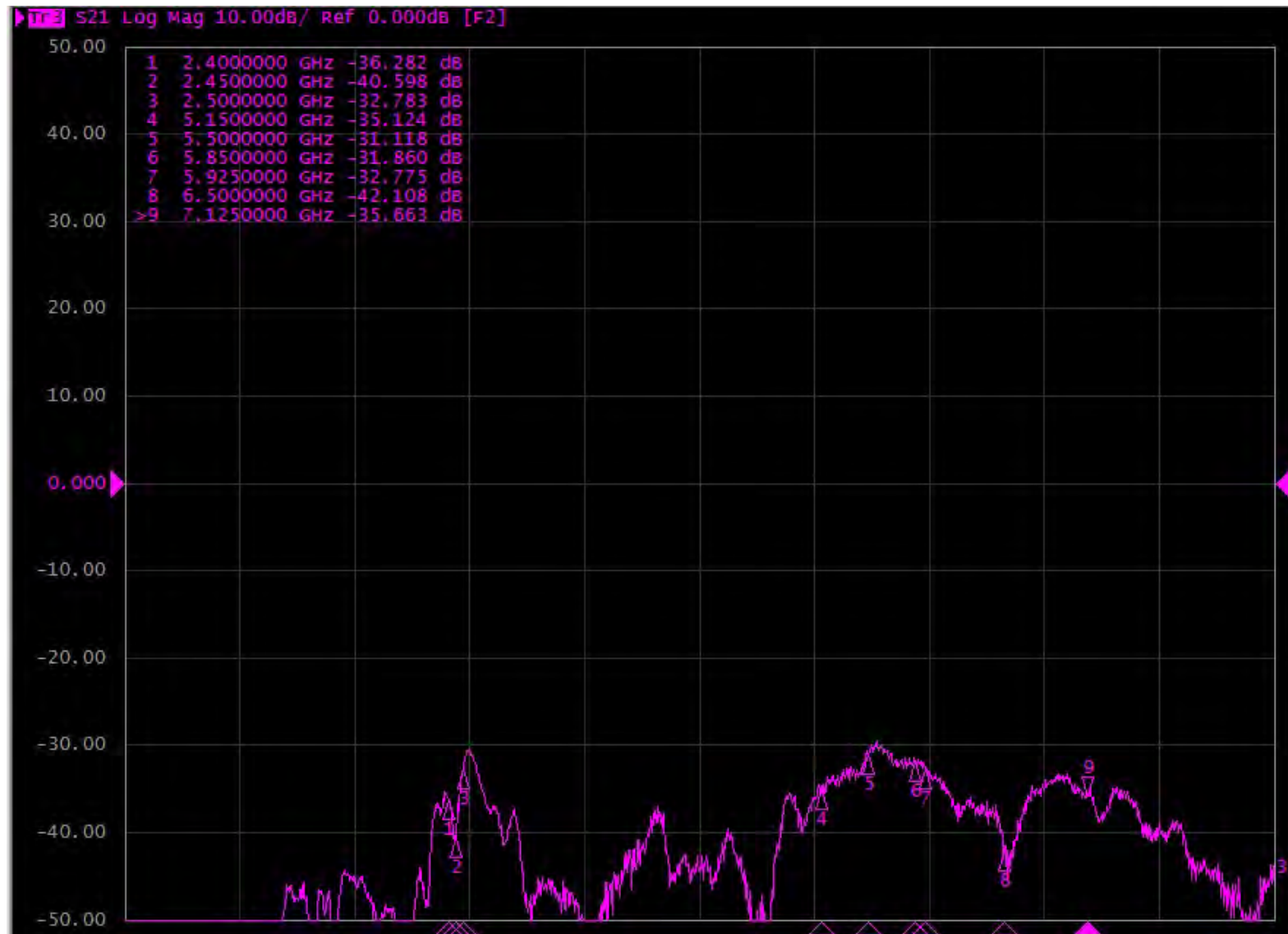
Isolation – Ant 3 & Ant 7



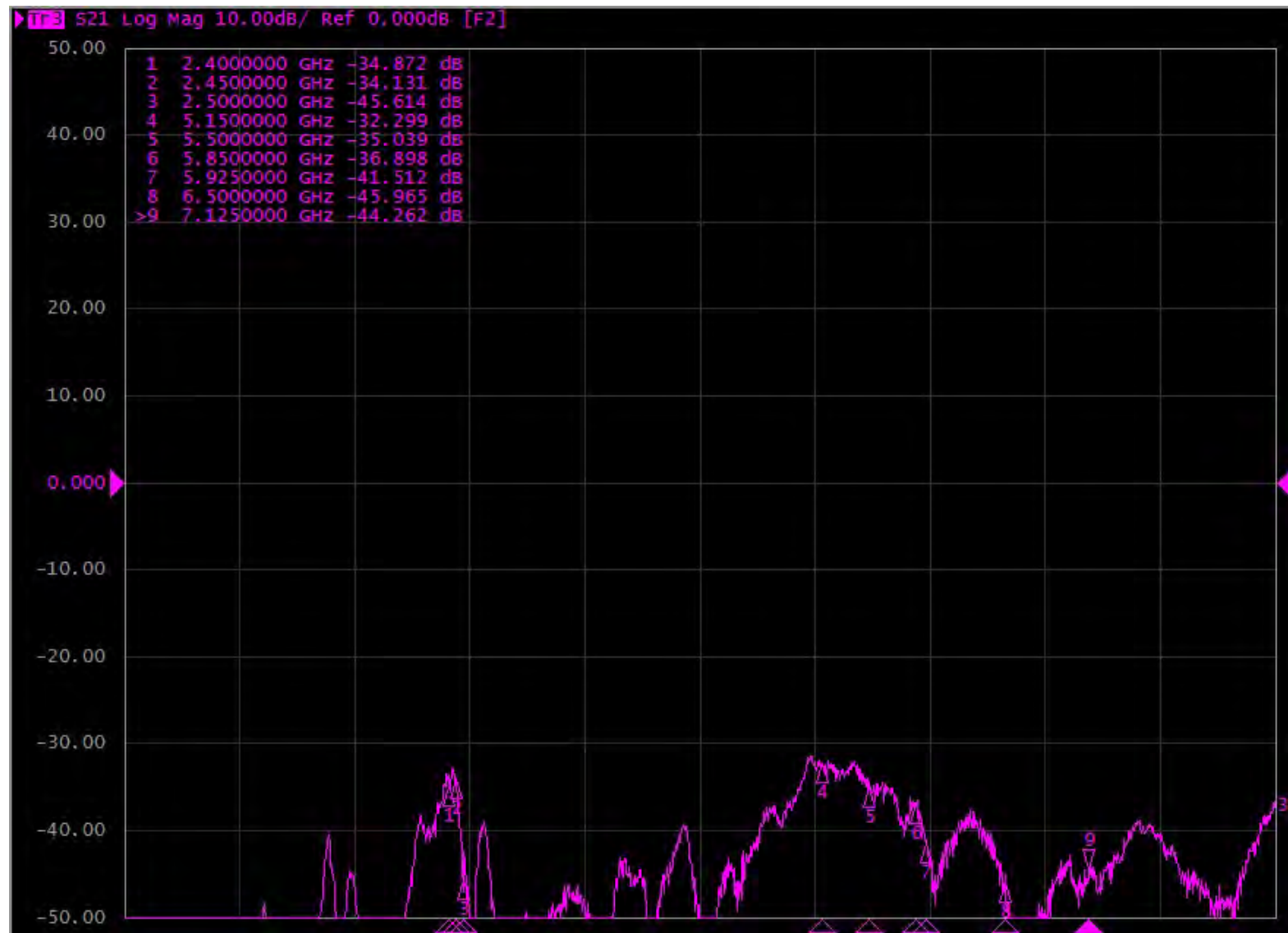
Isolation – Ant 3 & Ant 8



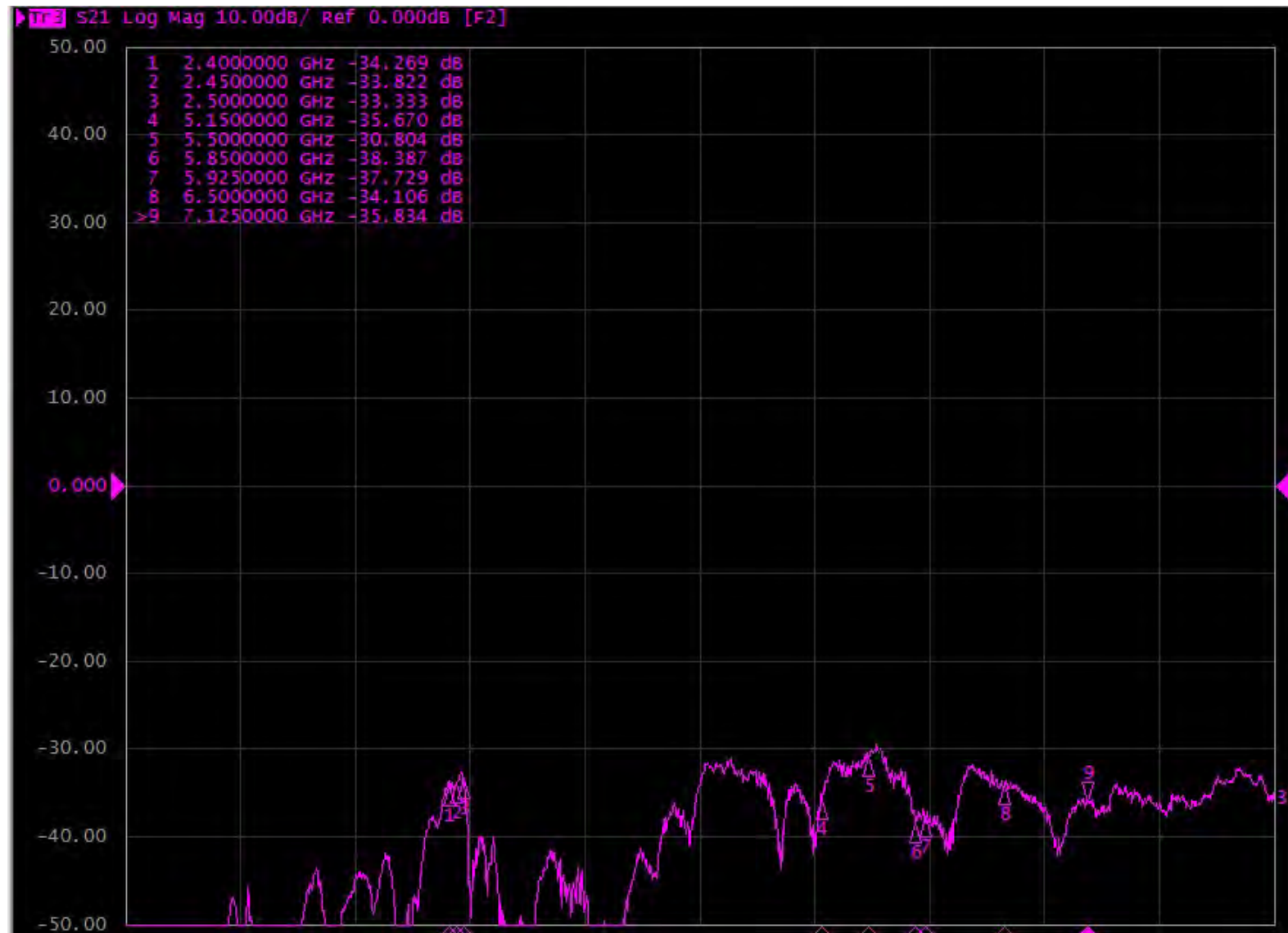
Isolation – Ant 3 & Ant 9



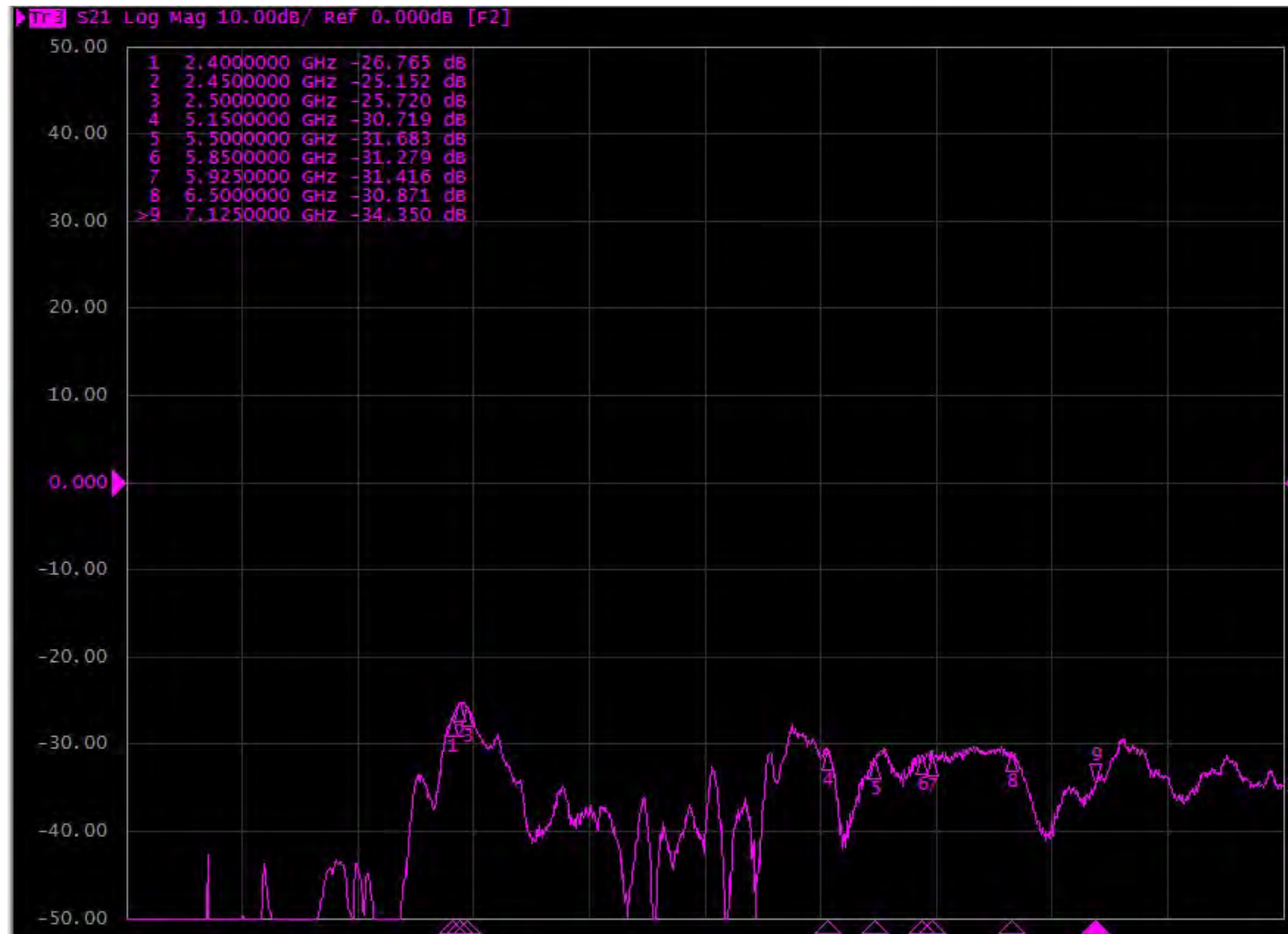
Isolation – Ant 3 & Ant 10



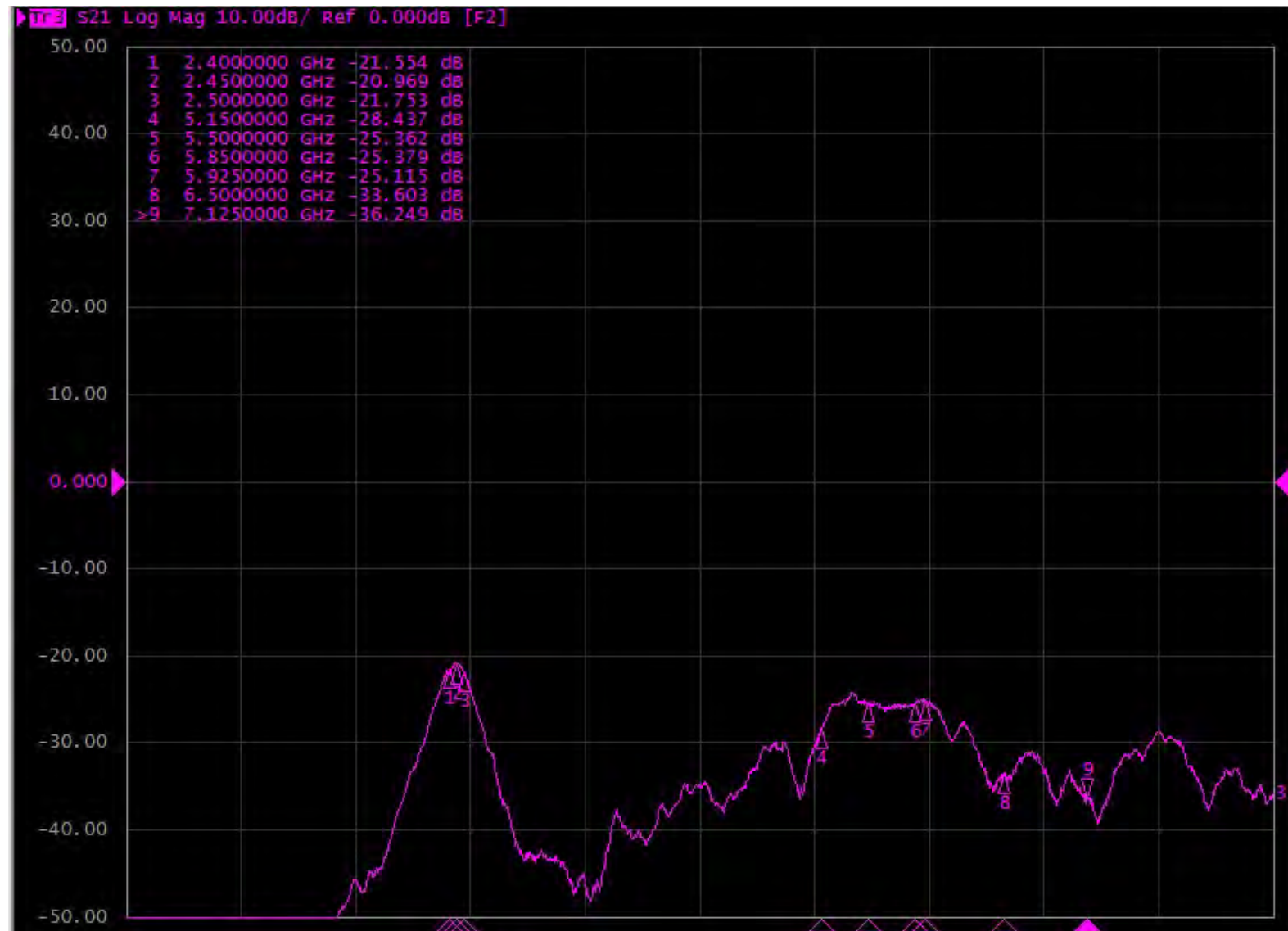
Isolation – Ant 3 & Ant 11



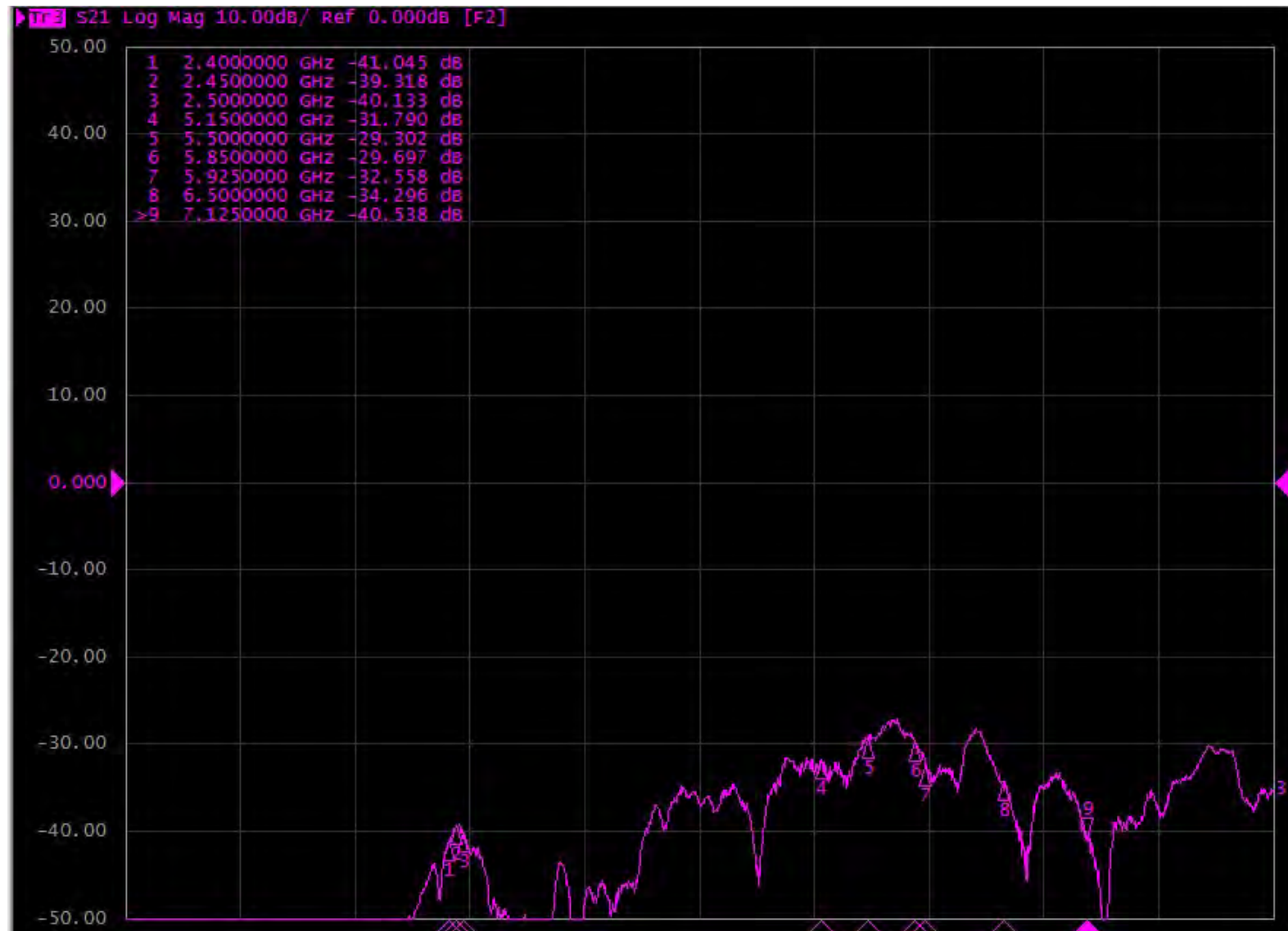
Isolation – Ant 3 & Ant 12



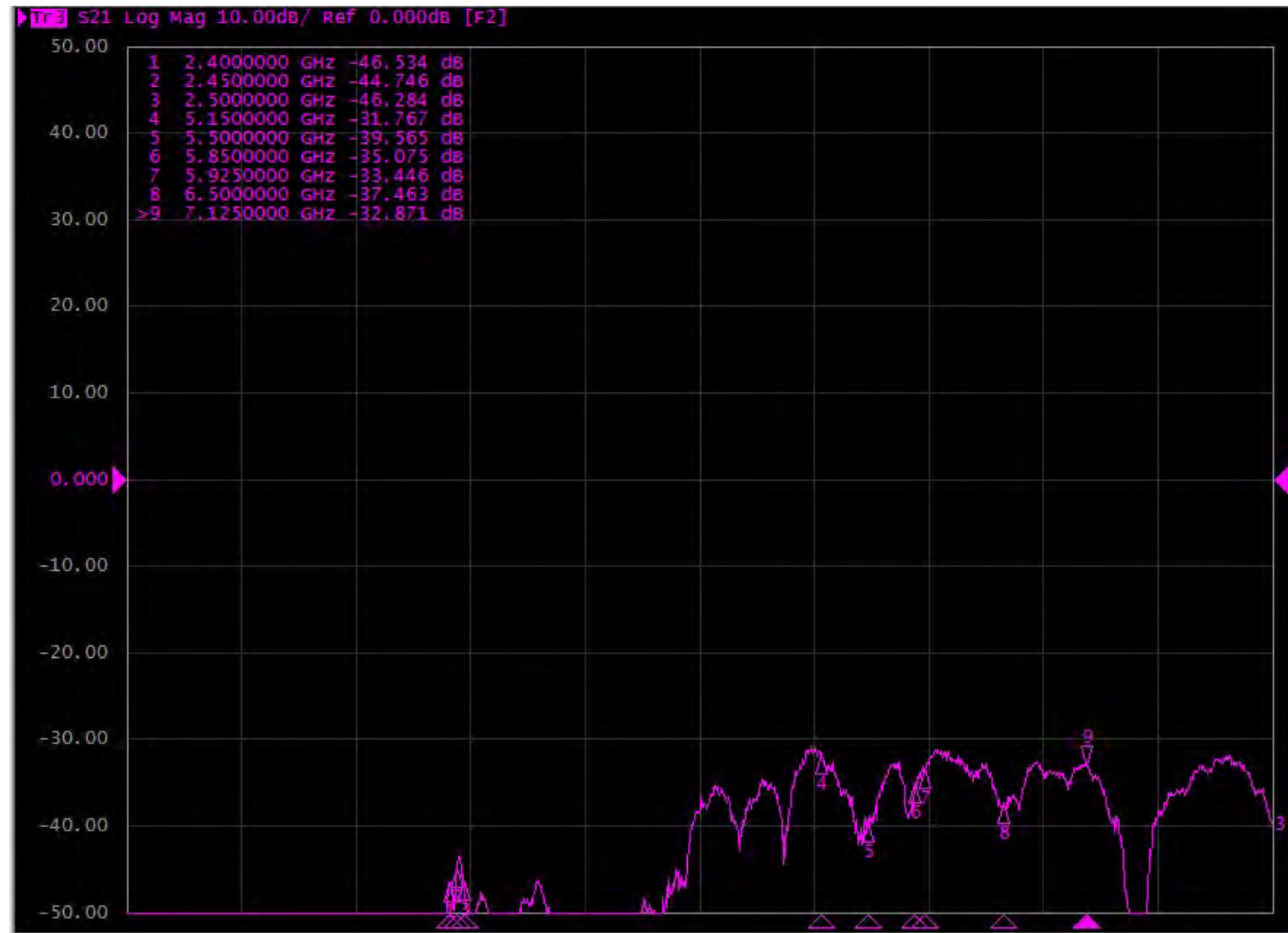
Isolation – Ant 3 & Ant 13



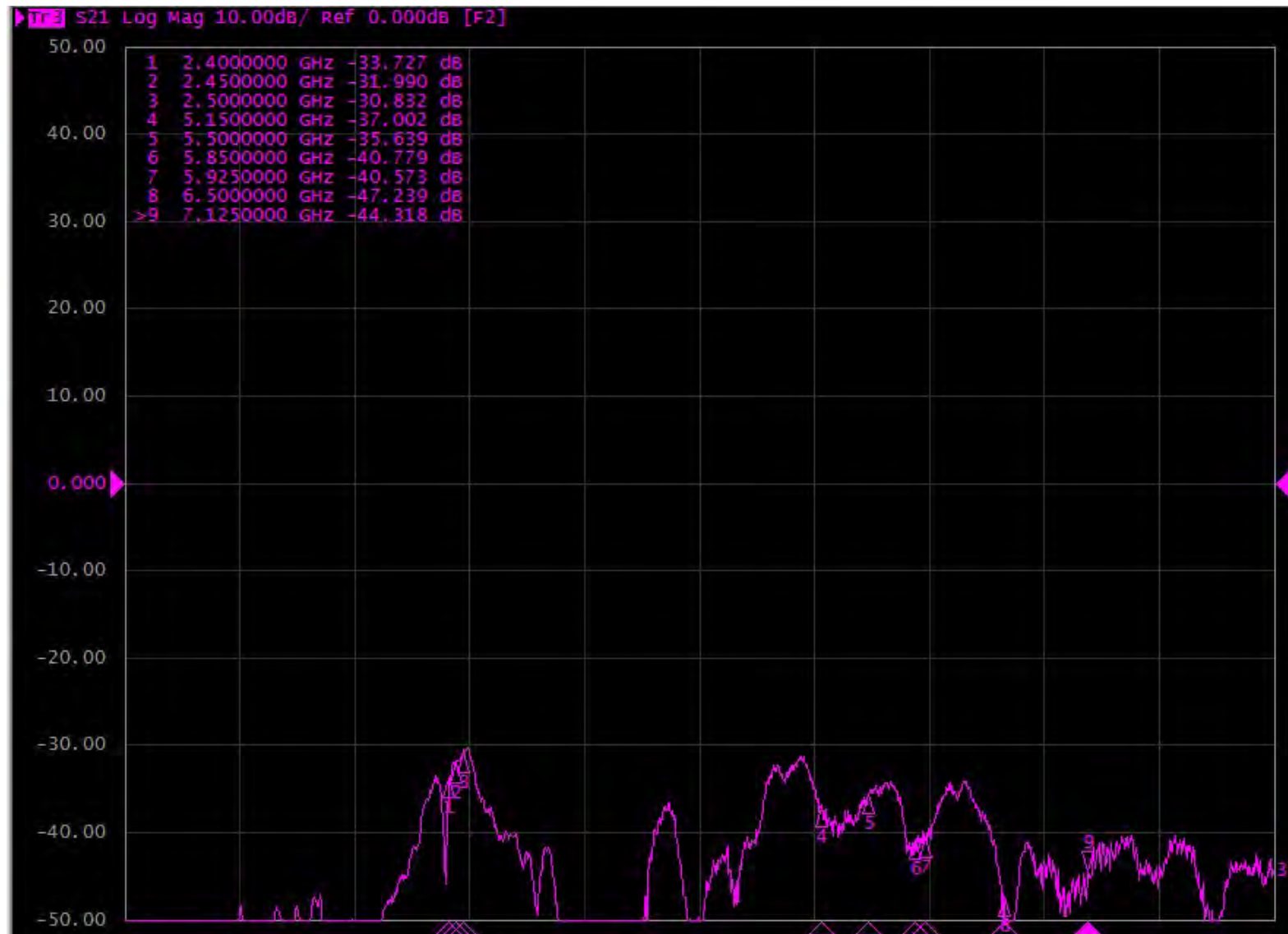
Isolation – Ant 3 & Ant 14



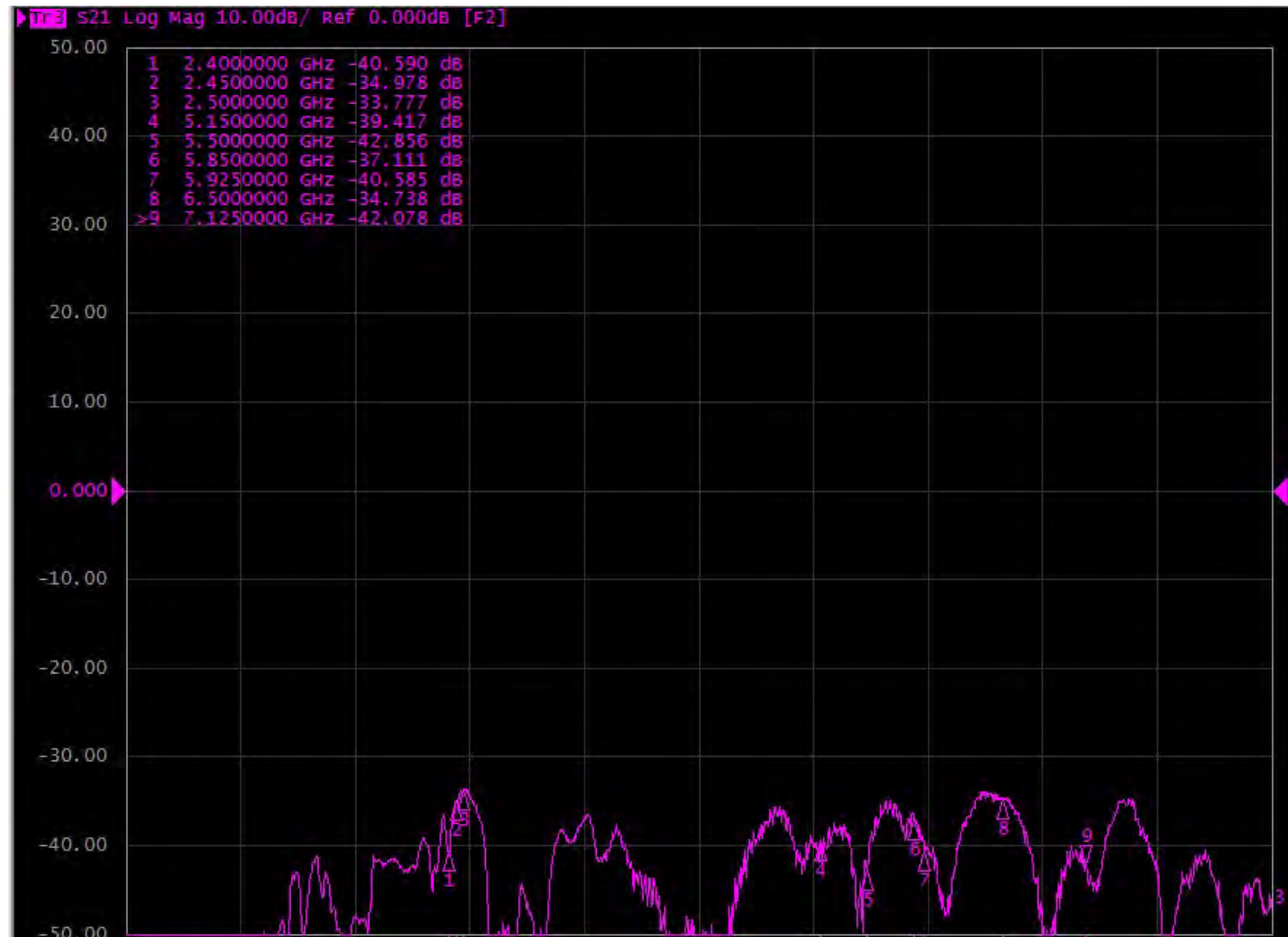
Isolation – Ant 4 & Ant 5



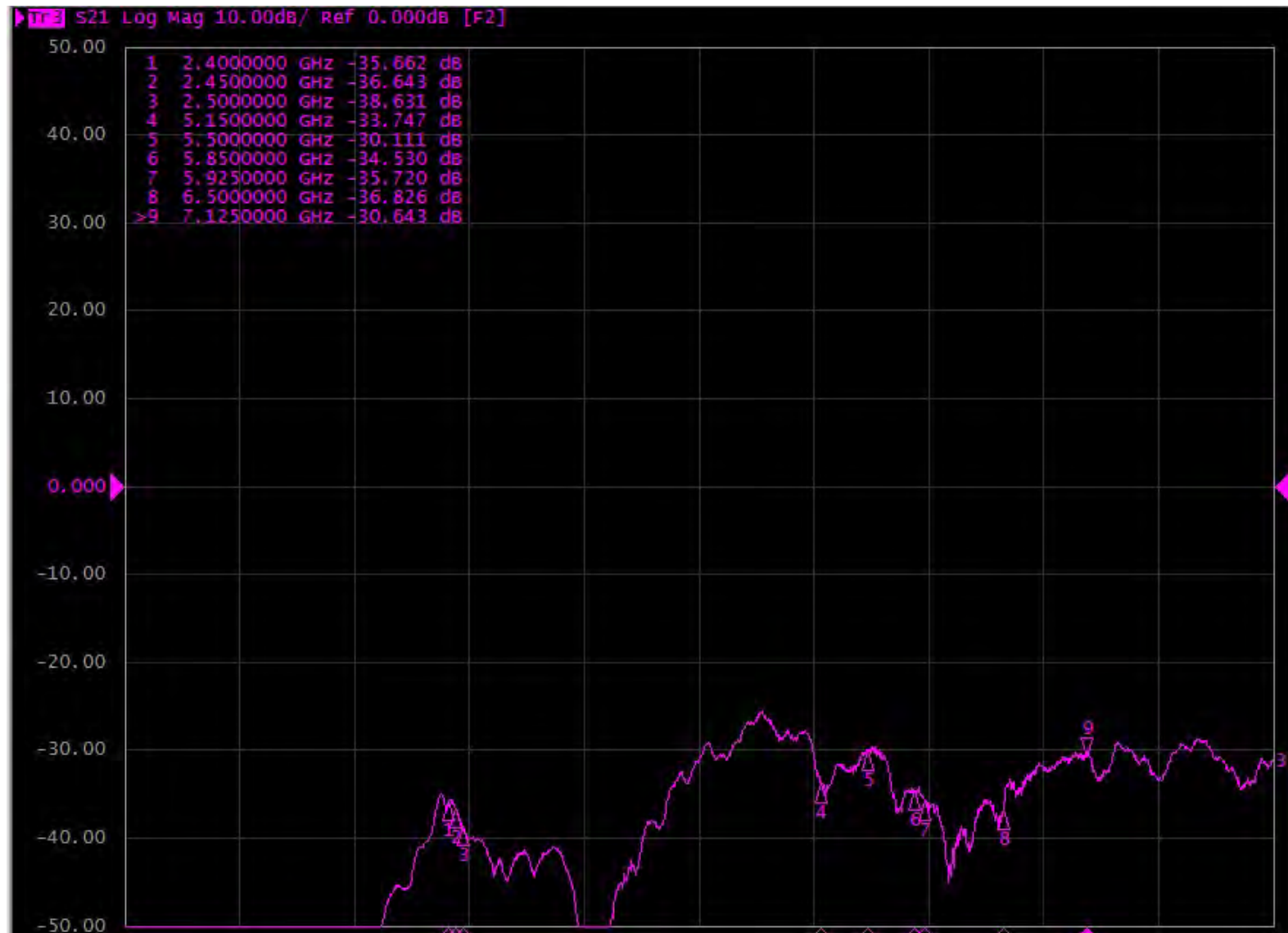
Isolation – Ant 4 & Ant 6



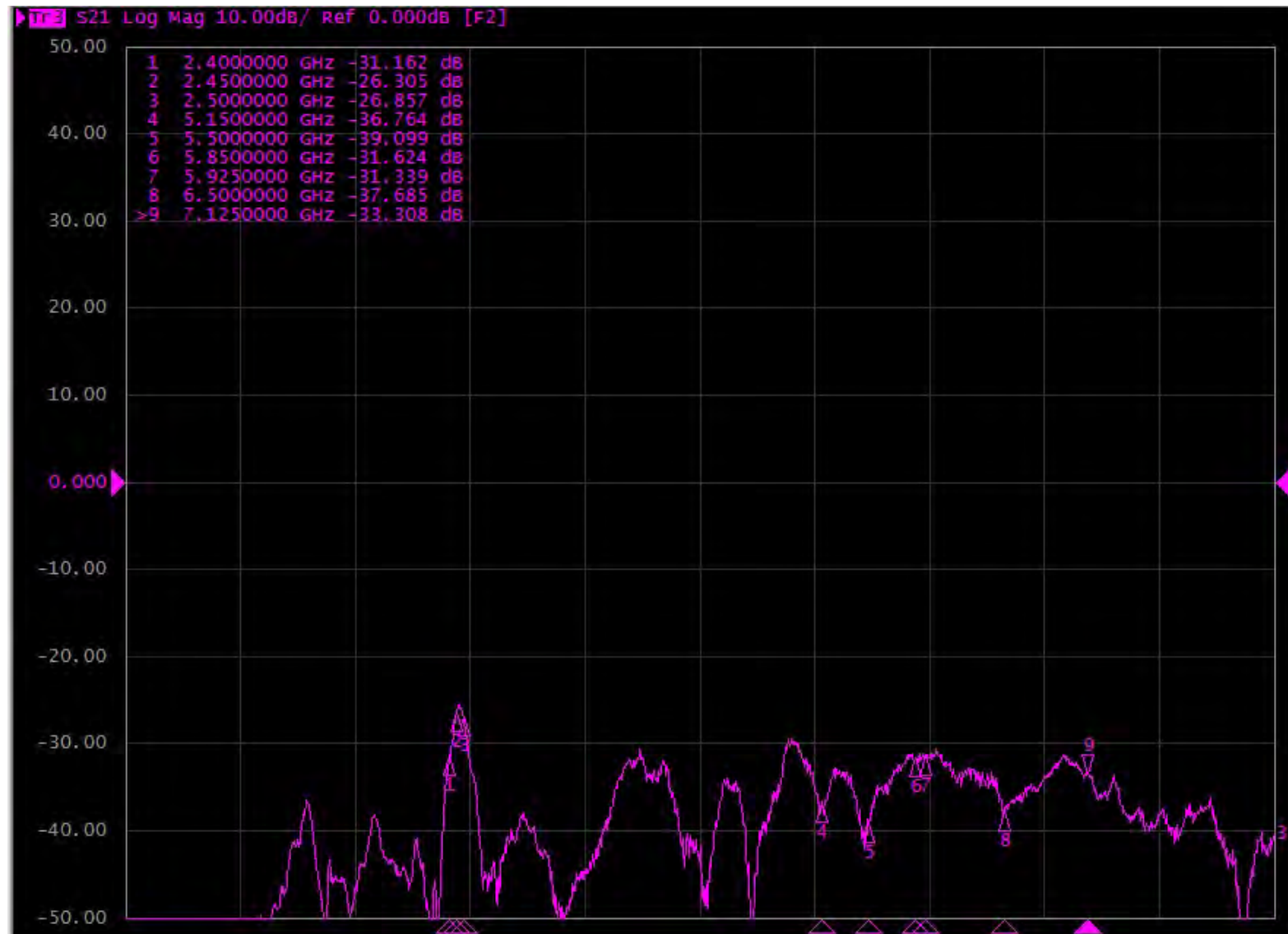
Isolation – Ant 4 & Ant 7



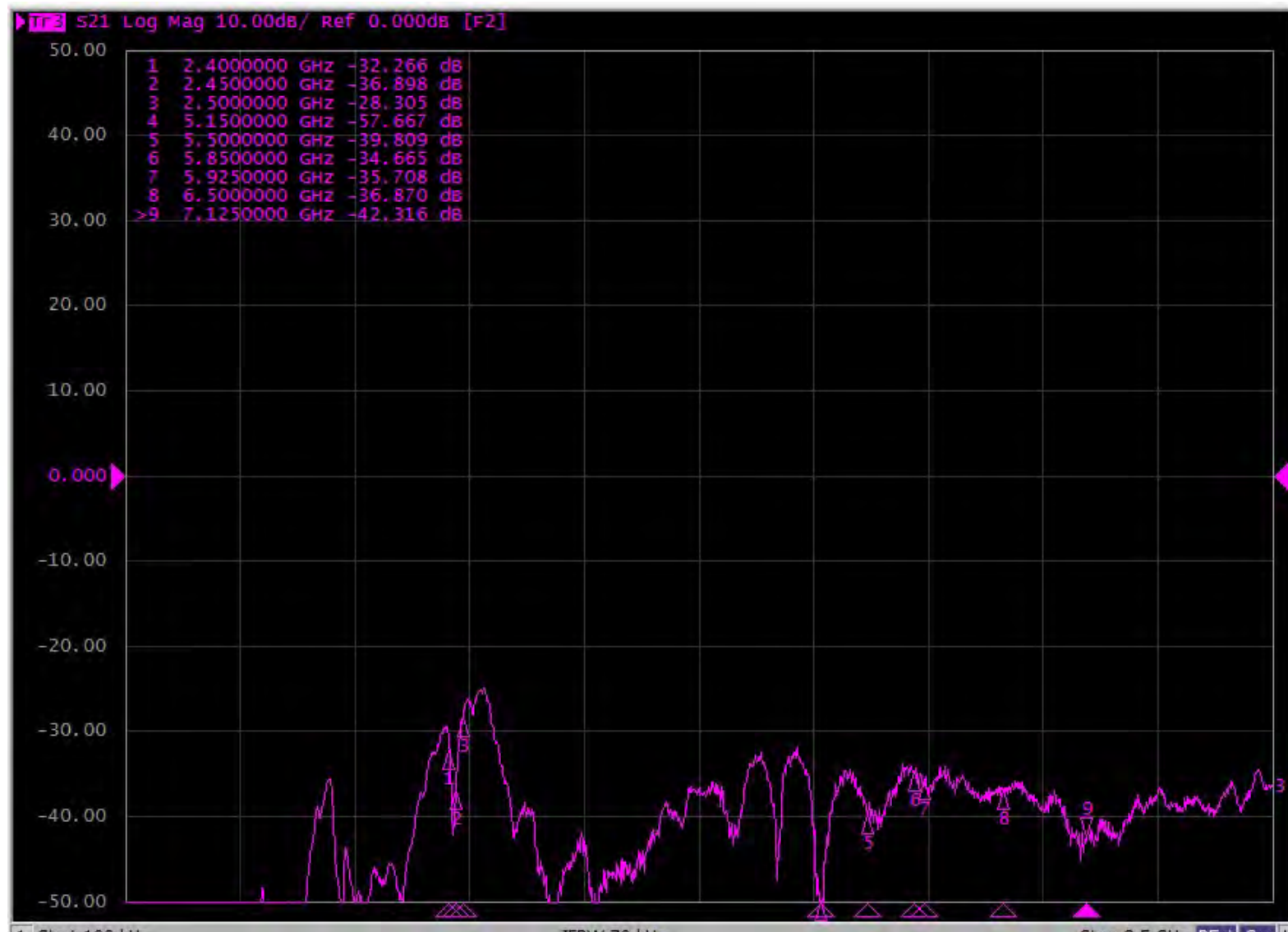
Isolation – Ant 4 & Ant 8



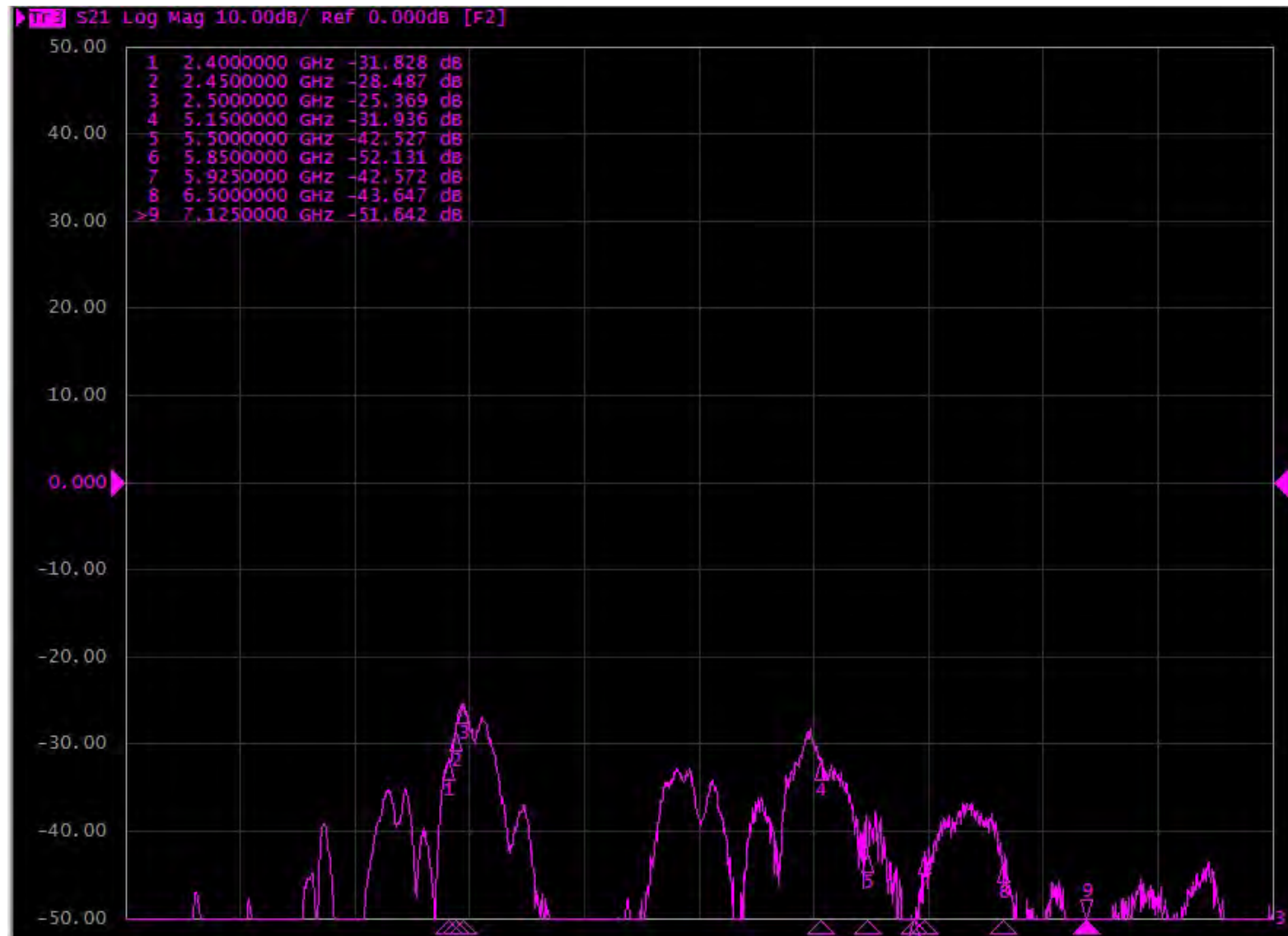
Isolation – Ant 4 & Ant 9



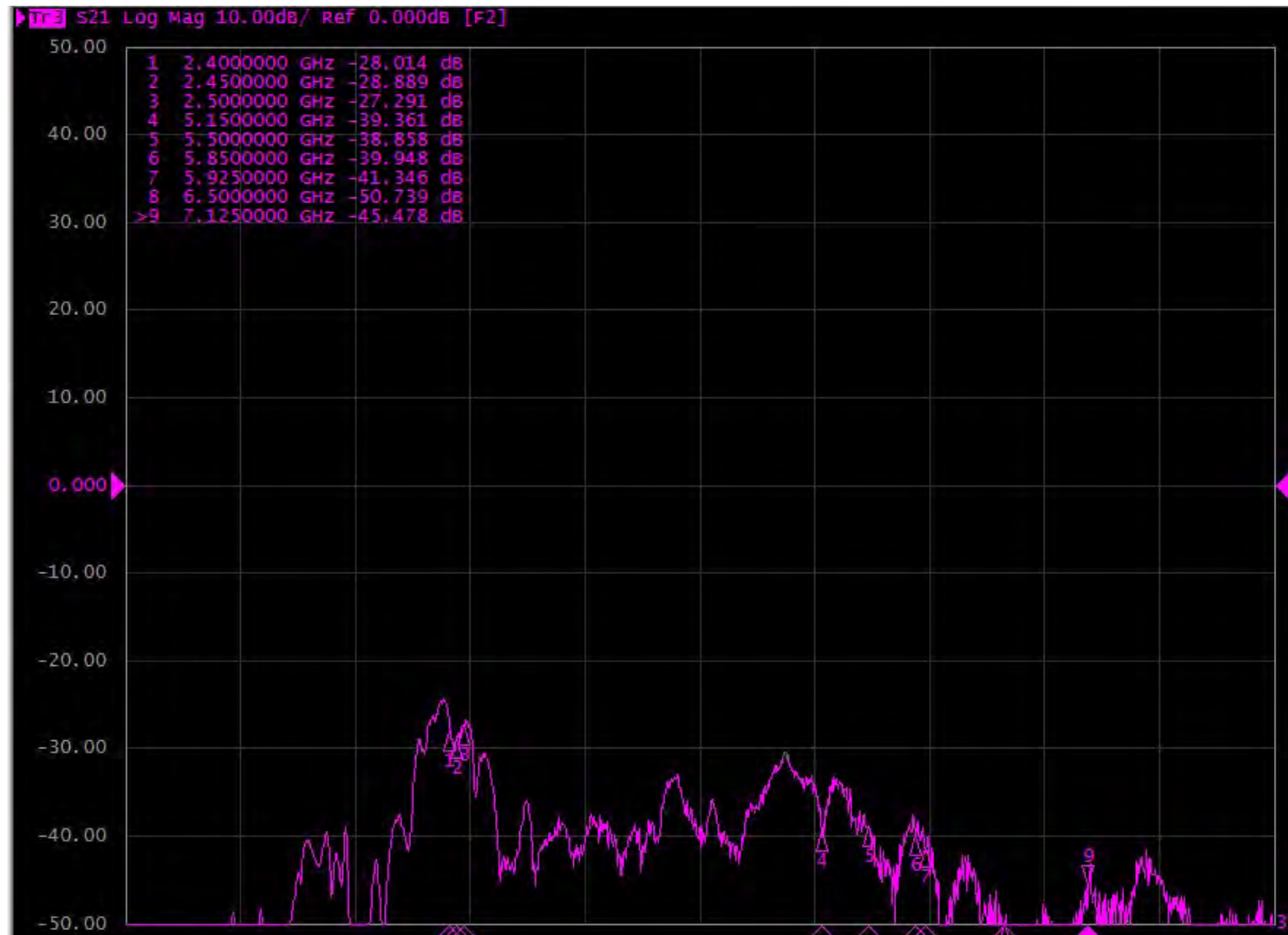
Isolation – Ant 4 & Ant 10



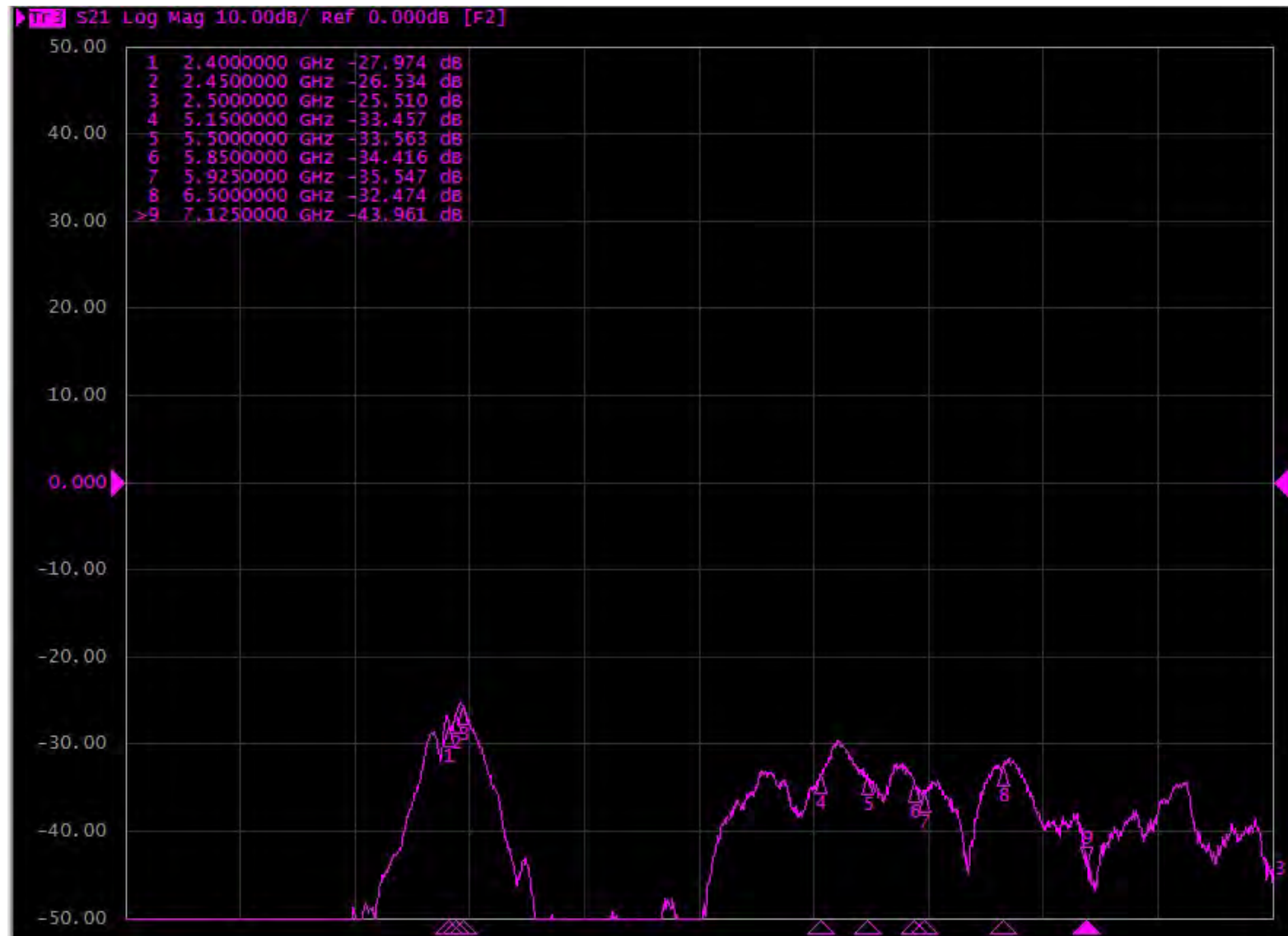
Isolation – Ant 4 & Ant 11



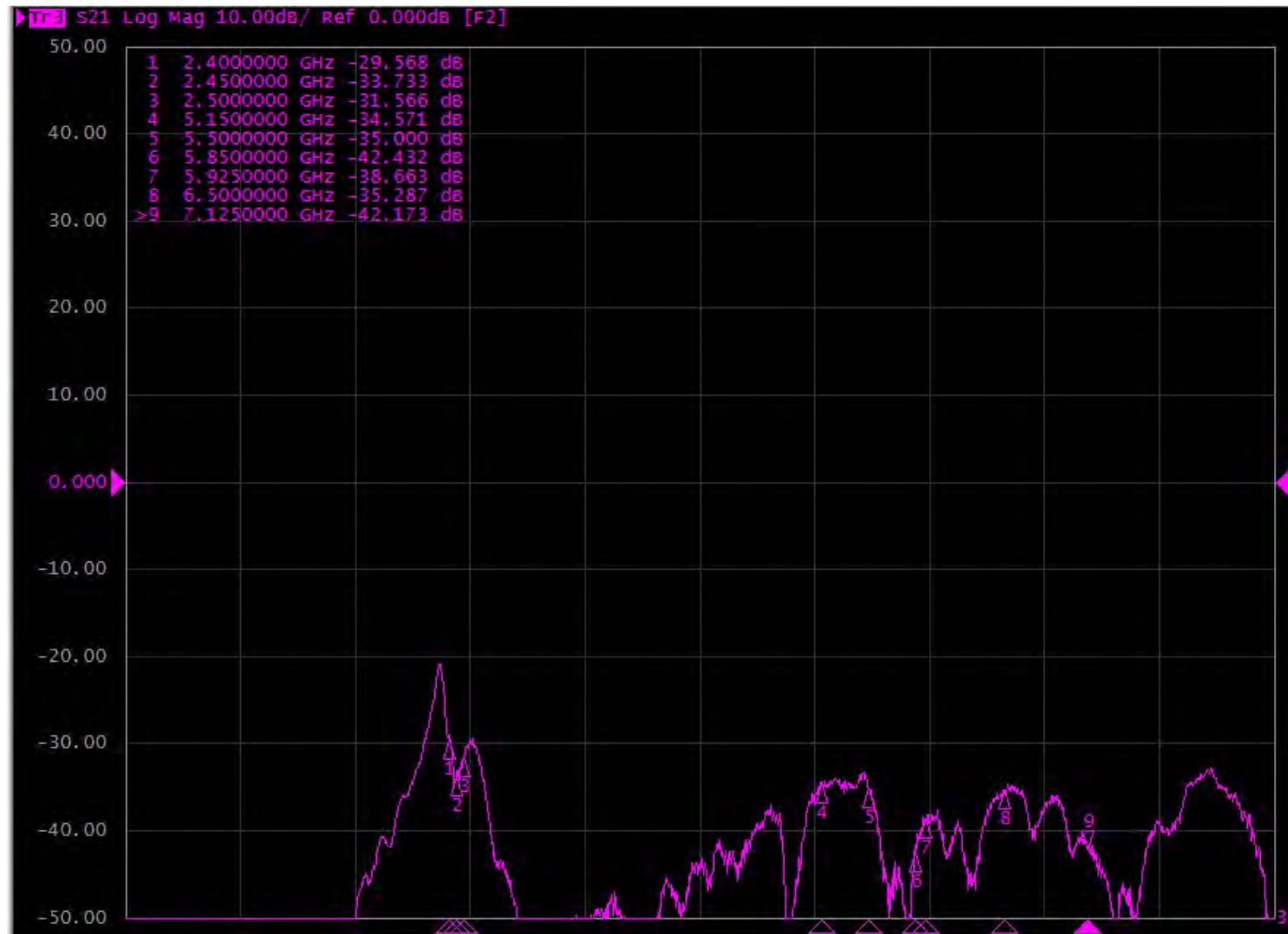
Isolation – Ant 4 & Ant 12



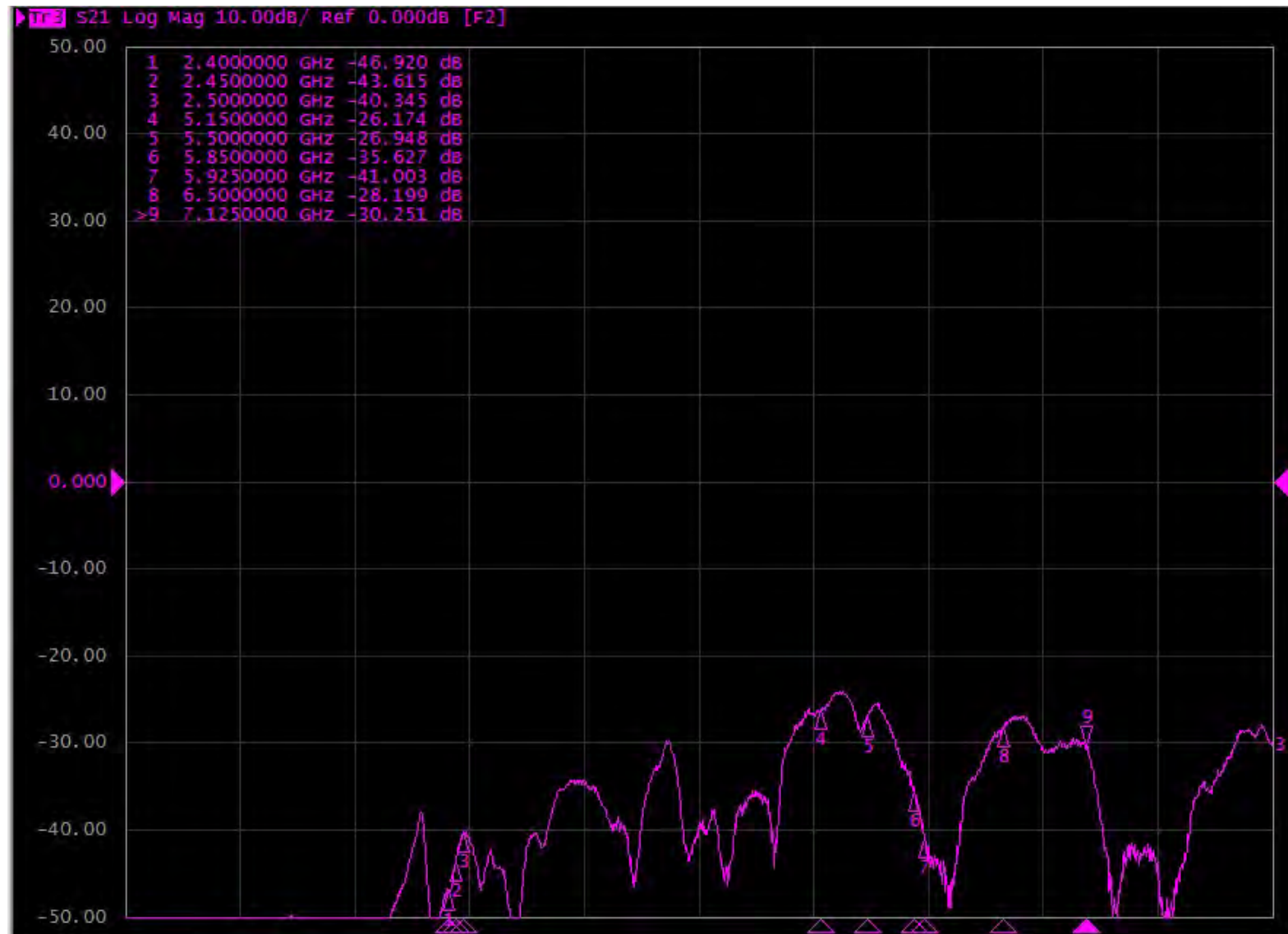
Isolation – Ant 4 & Ant 13



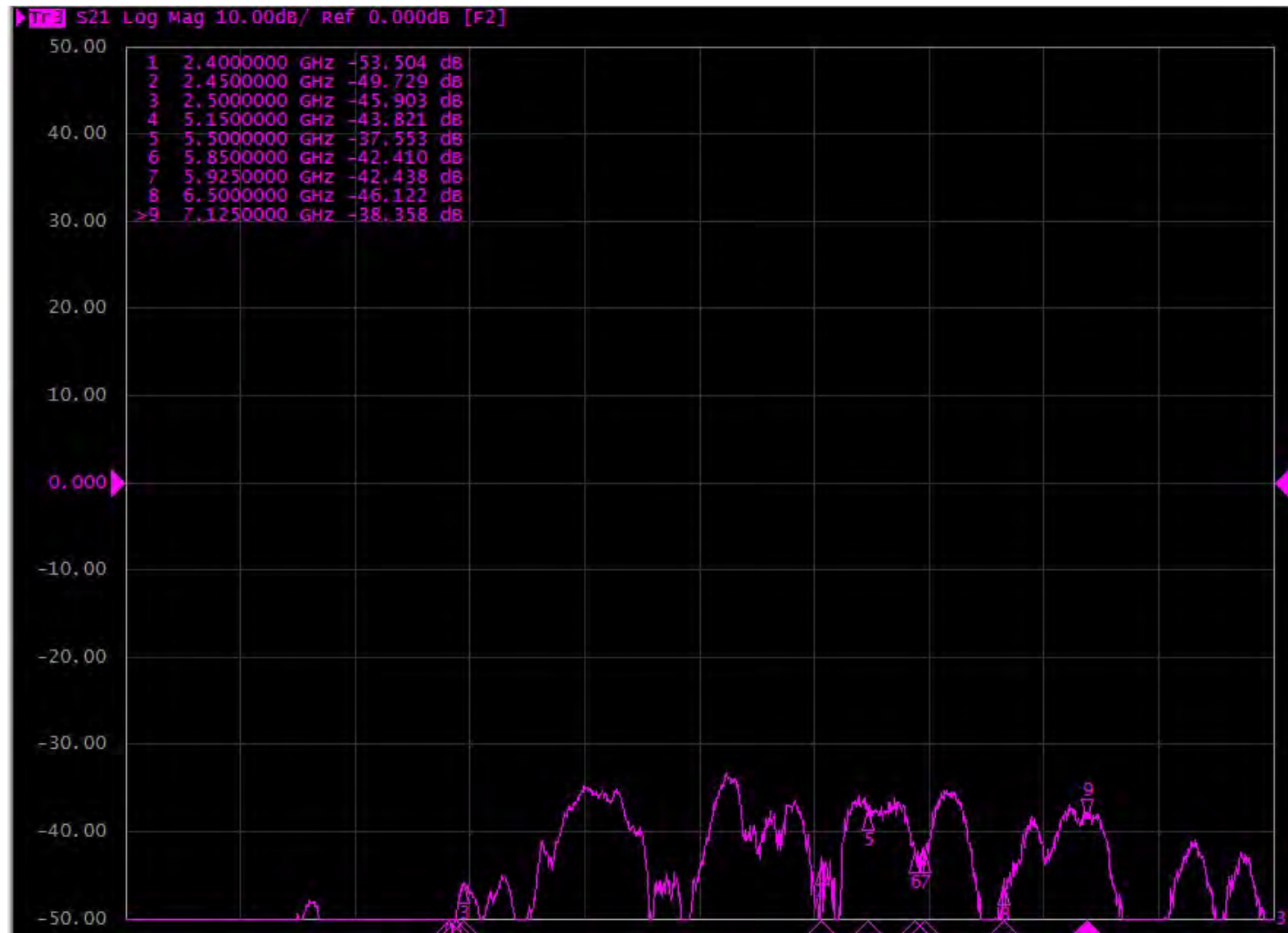
Isolation – Ant 4 & Ant 14



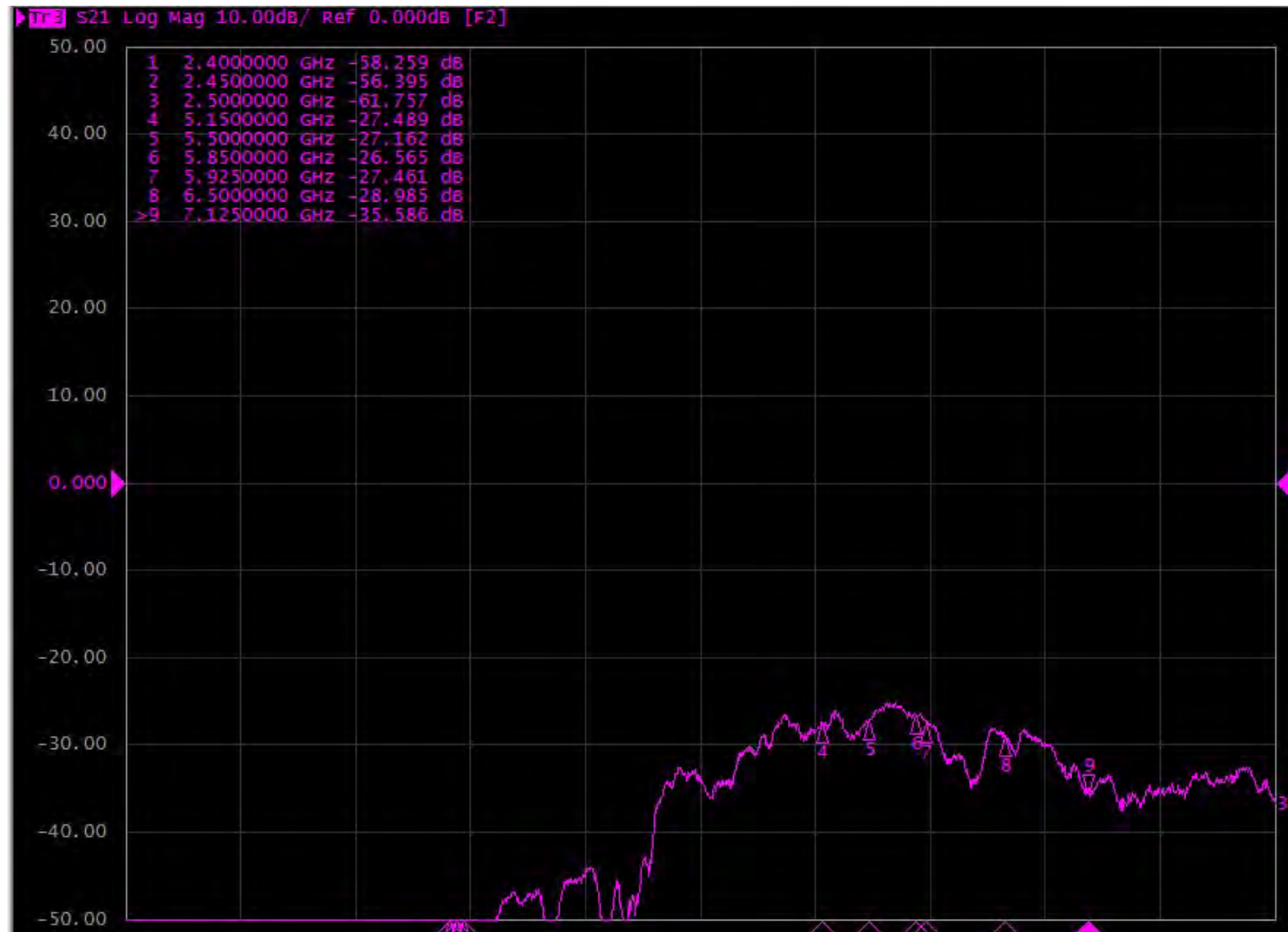
Isolation – Ant 5 & Ant 6



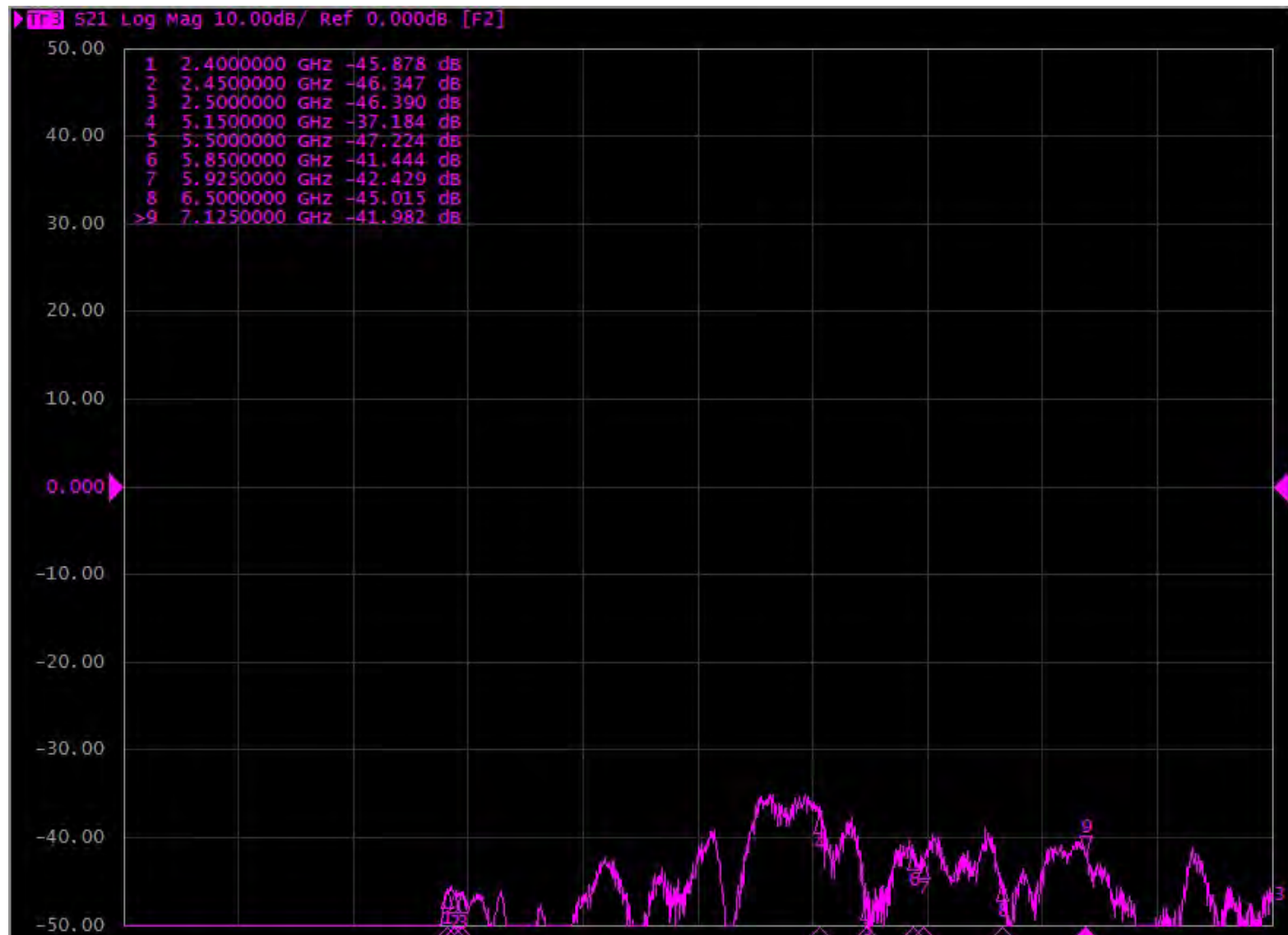
Isolation – Ant 5 & Ant 7



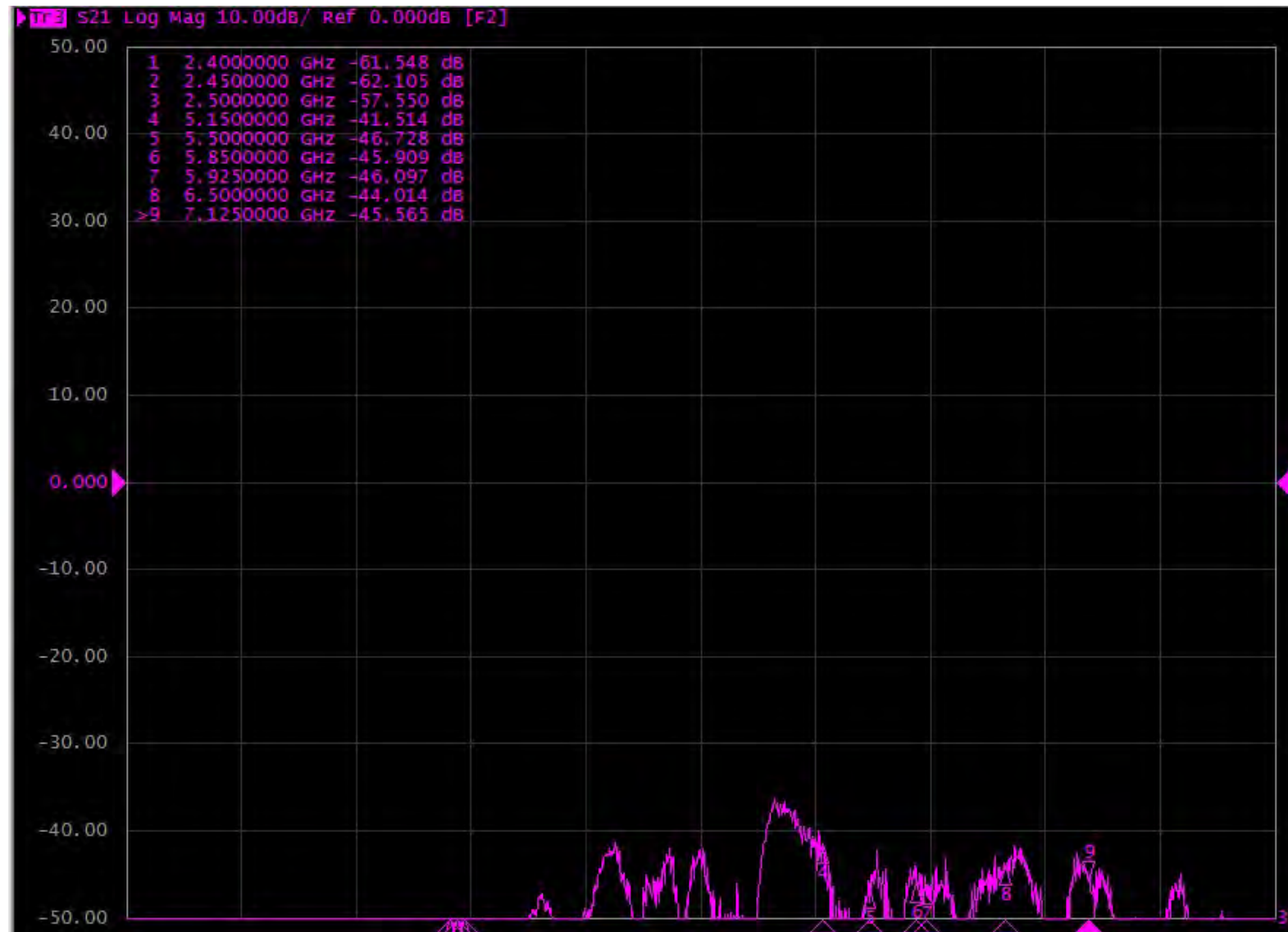
Isolation – Ant 5 & Ant 8



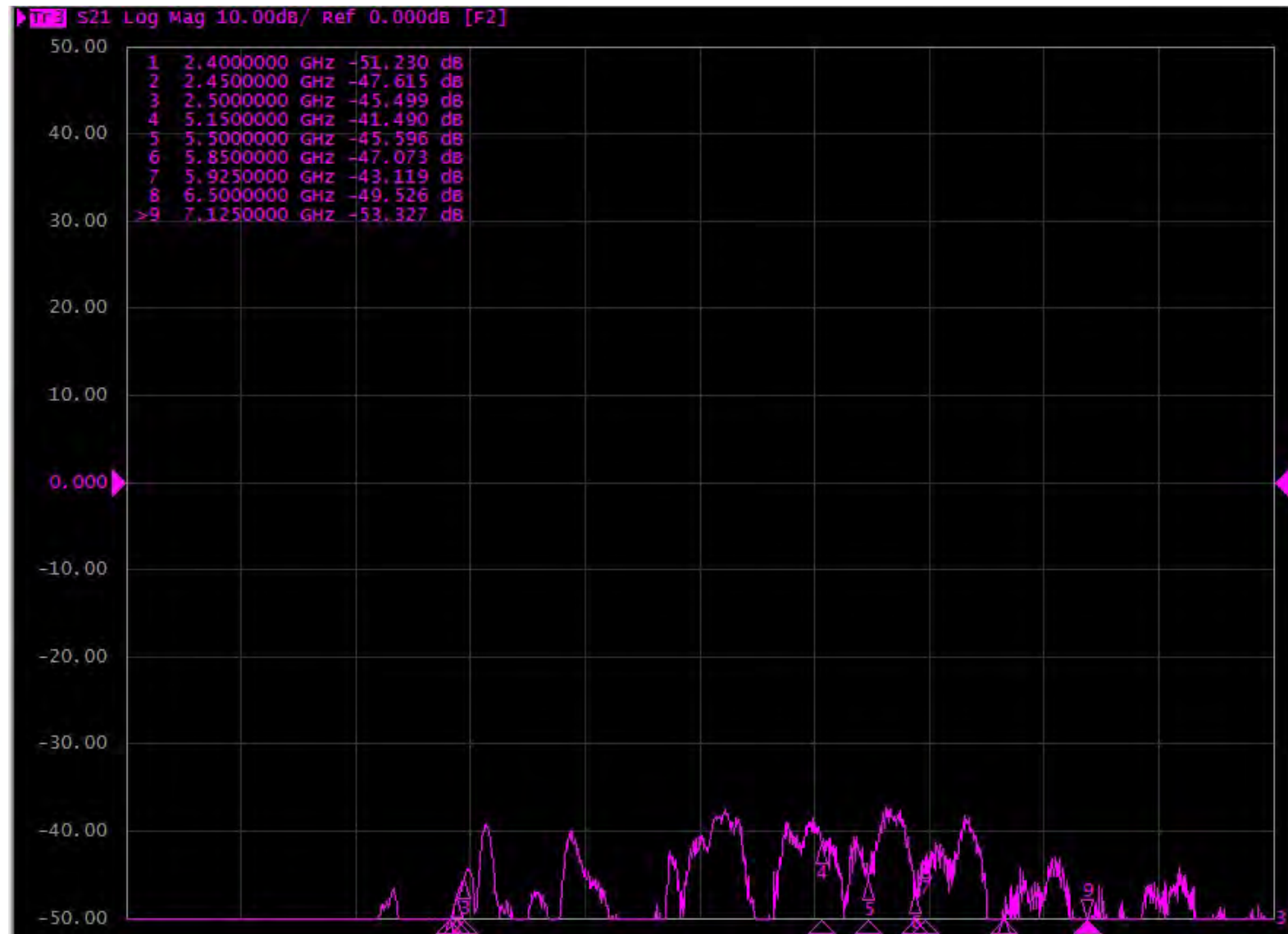
Isolation – Ant 5 & Ant 9



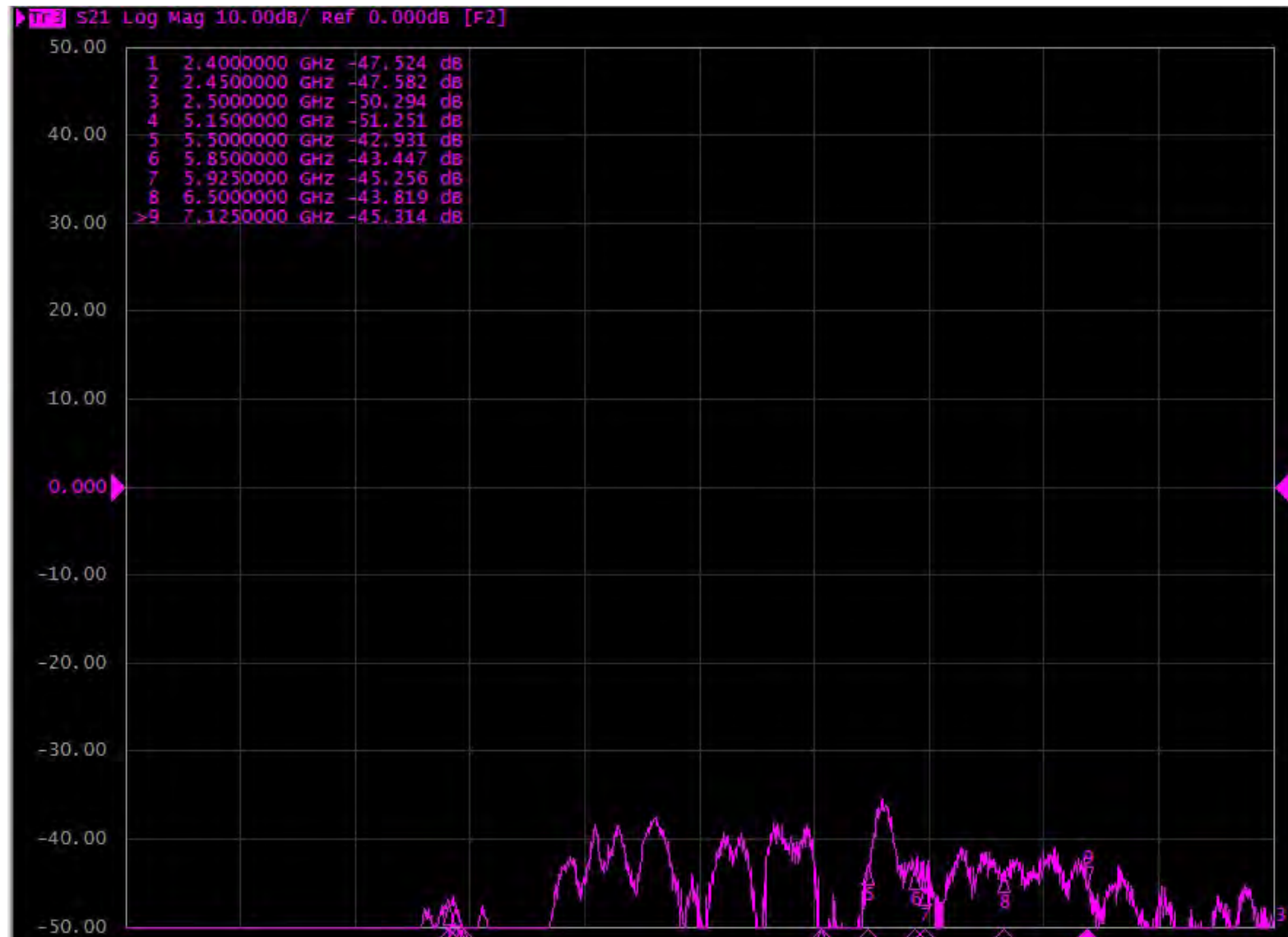
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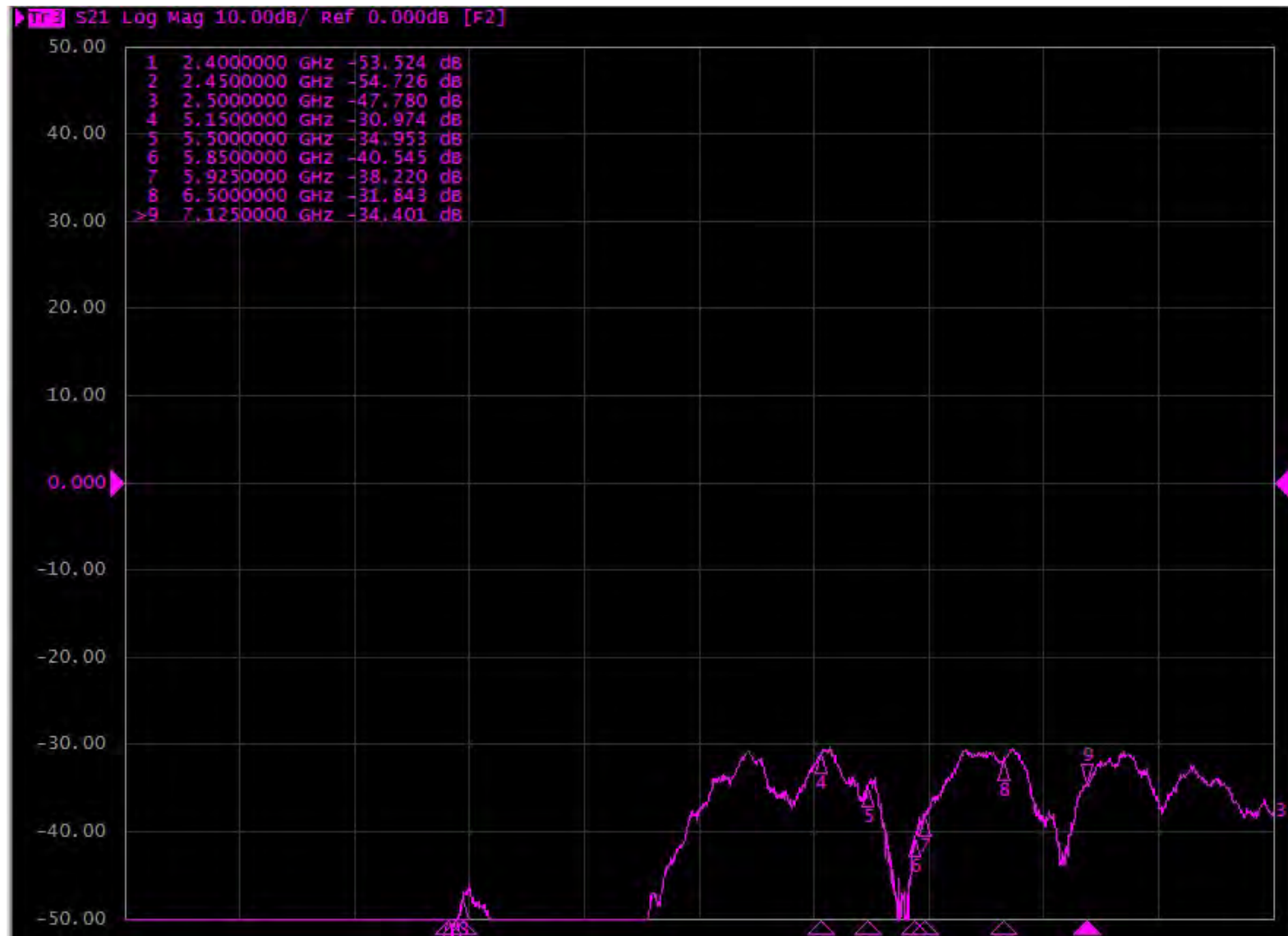
Isolation – Ant 5 & Ant 11



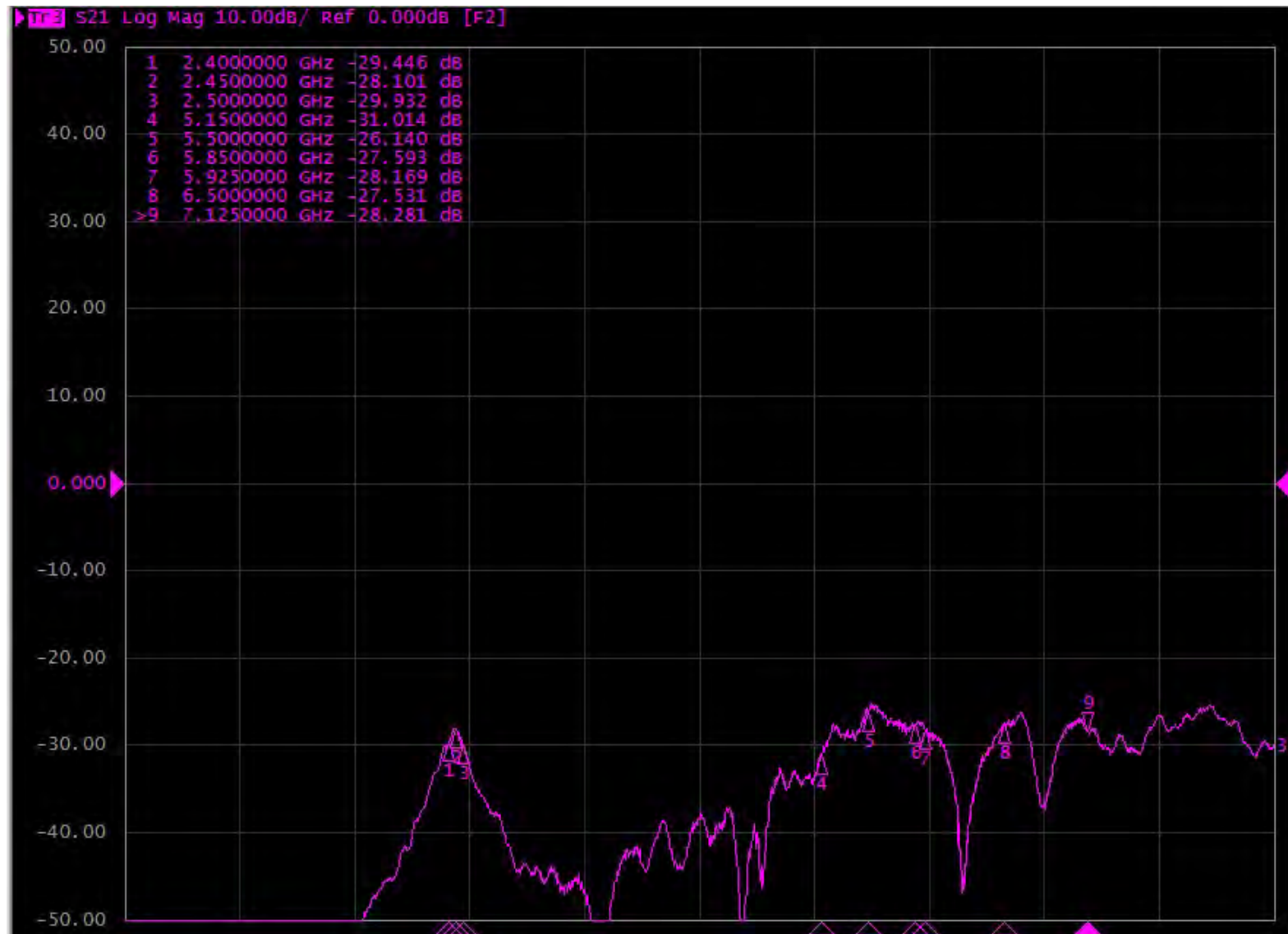
Isolation – Ant 5 & Ant 12



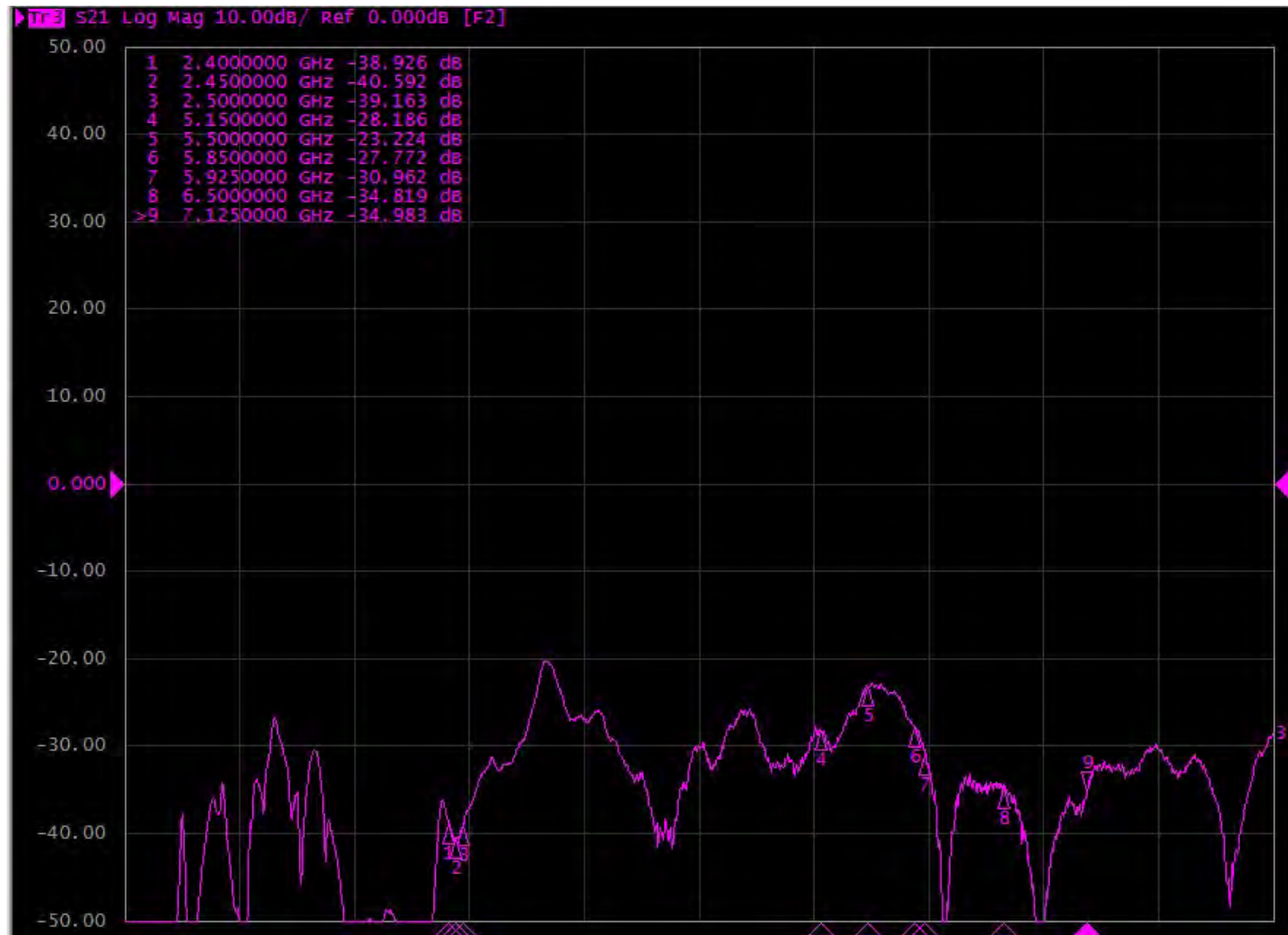
Isolation – Ant 5 & Ant 13



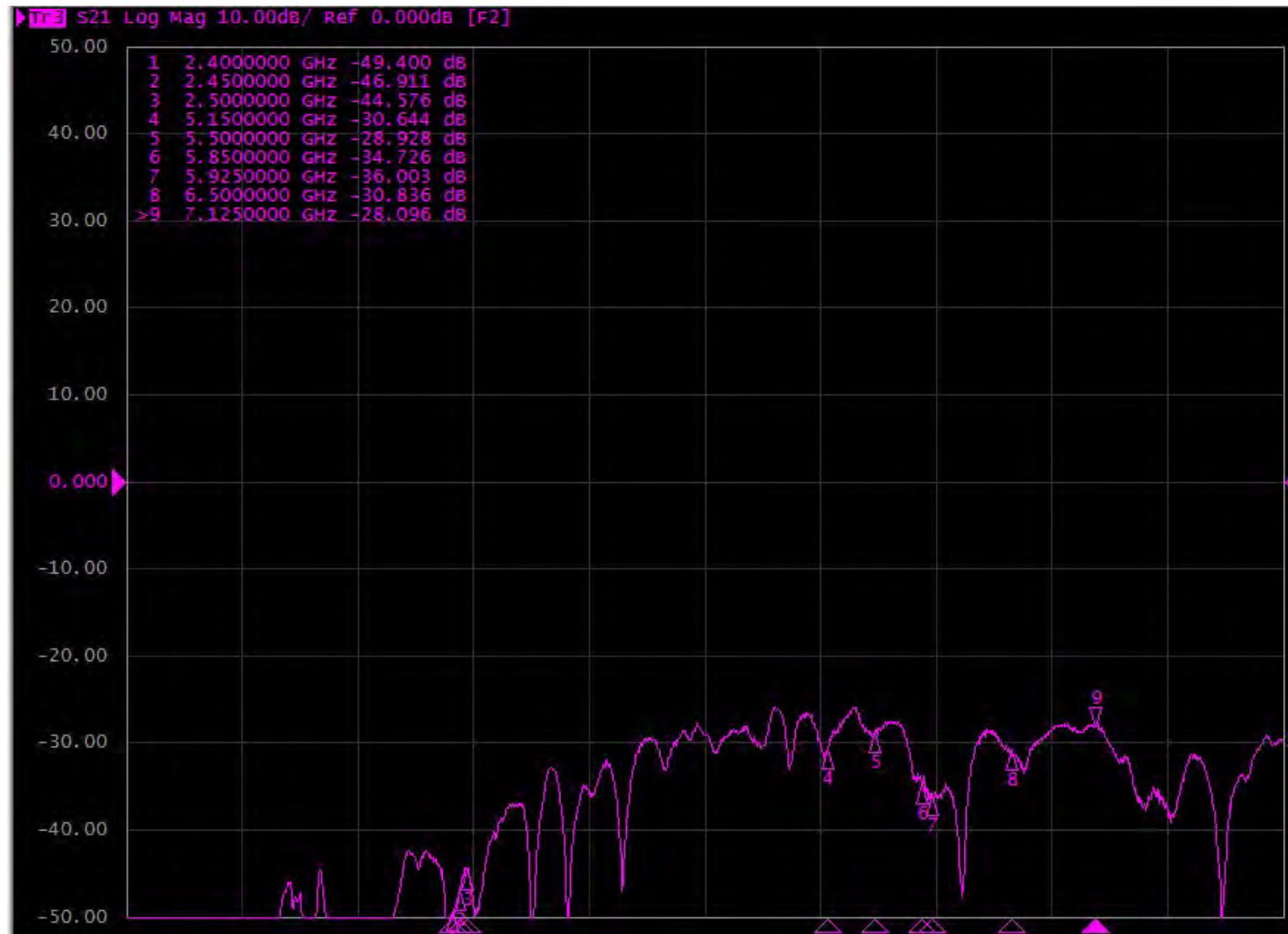
Isolation – Ant 5 & Ant 14



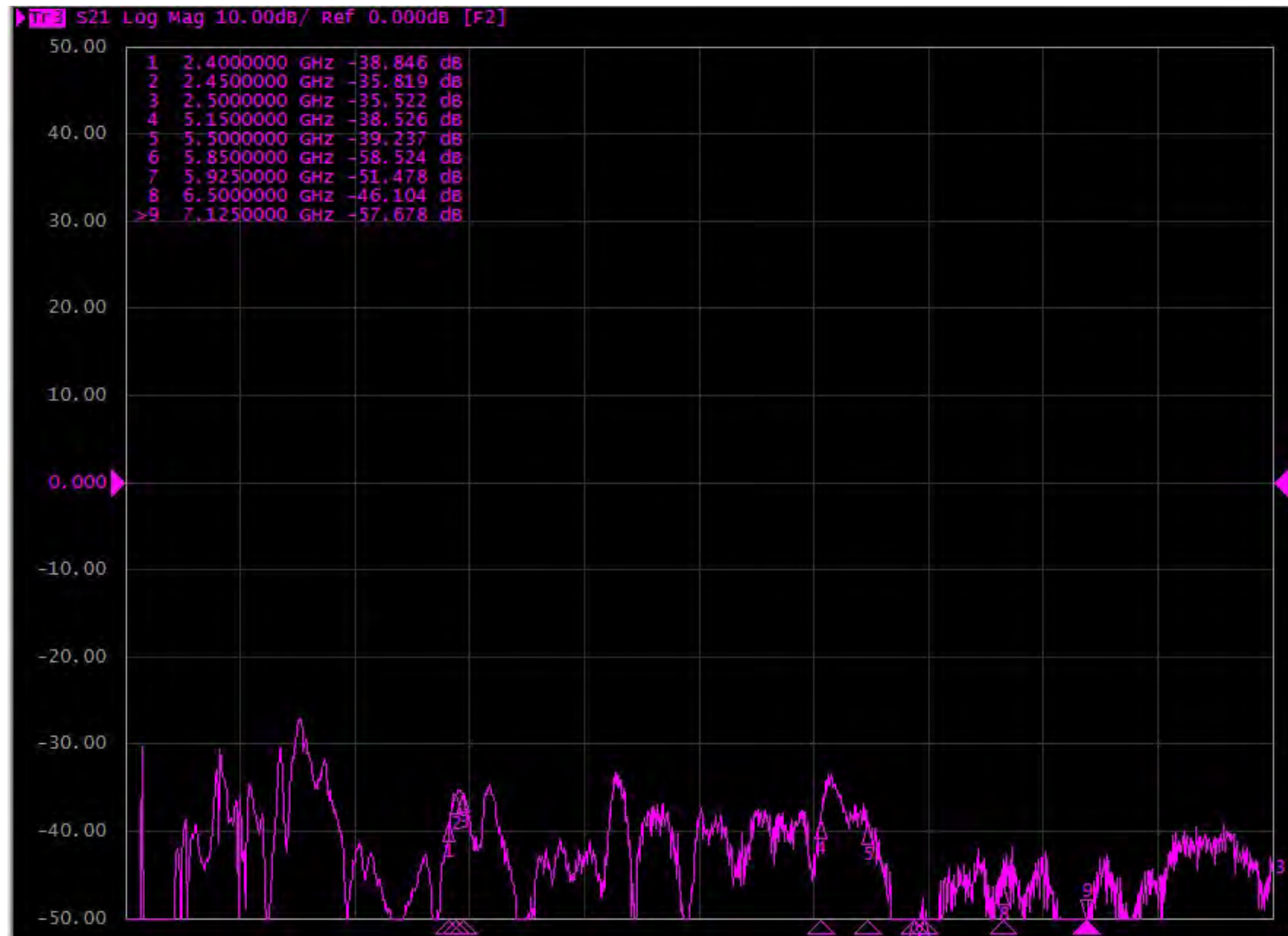
Isolation – Ant 6 & Ant 7



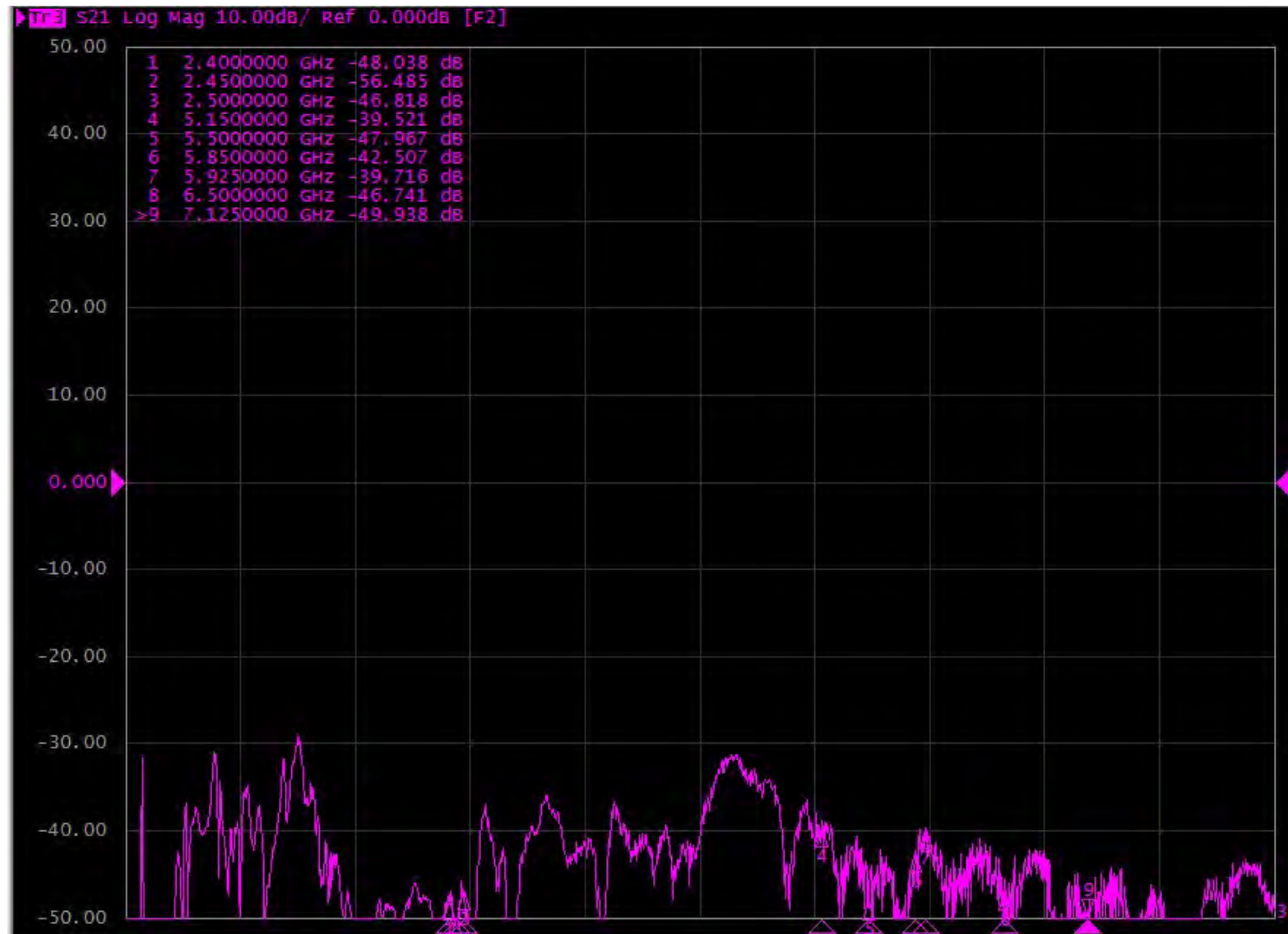
Isolation – Ant 6 & Ant 8



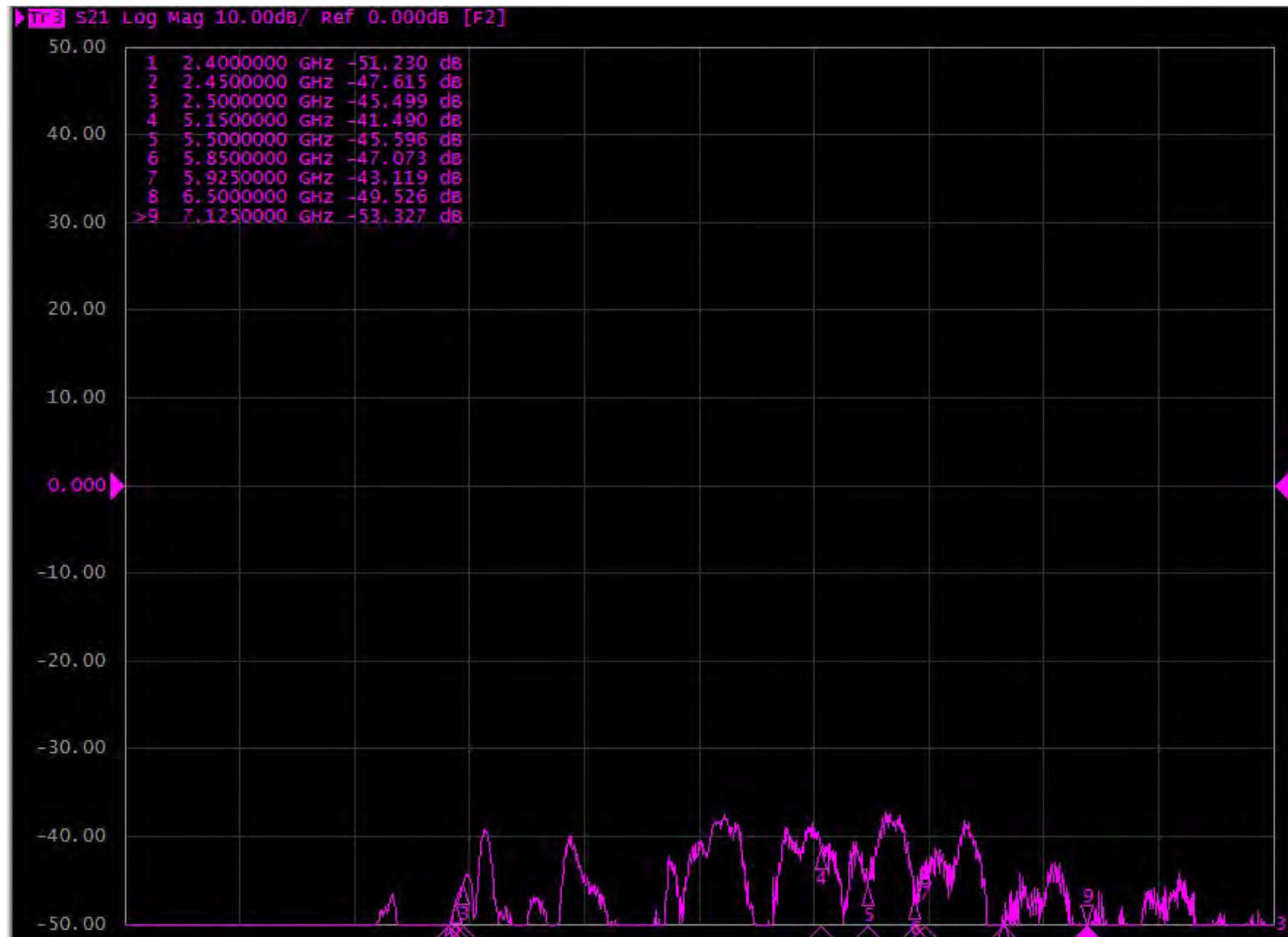
Isolation – Ant 6 & Ant 9



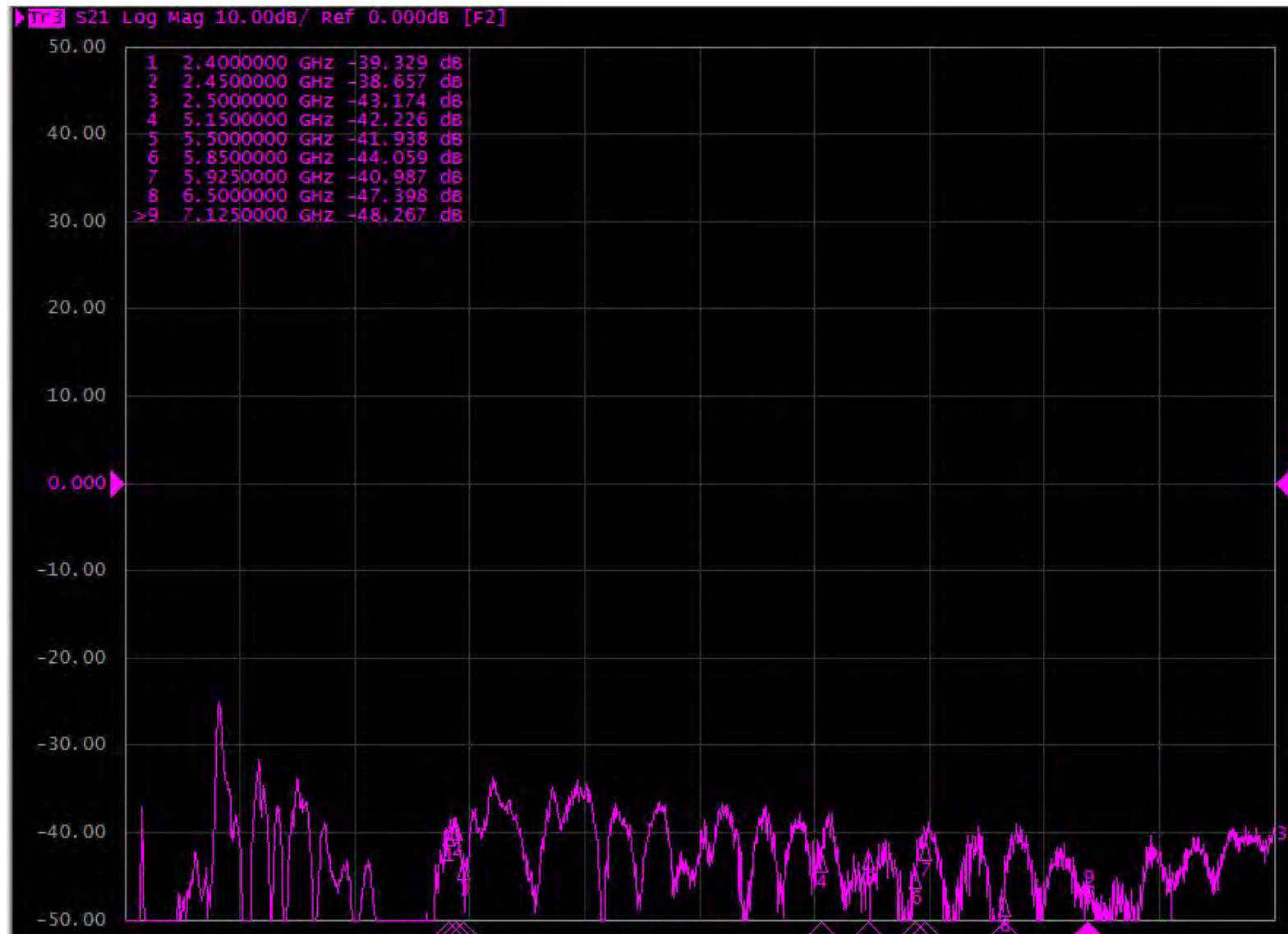
Isolation – Ant 6 & Ant 10



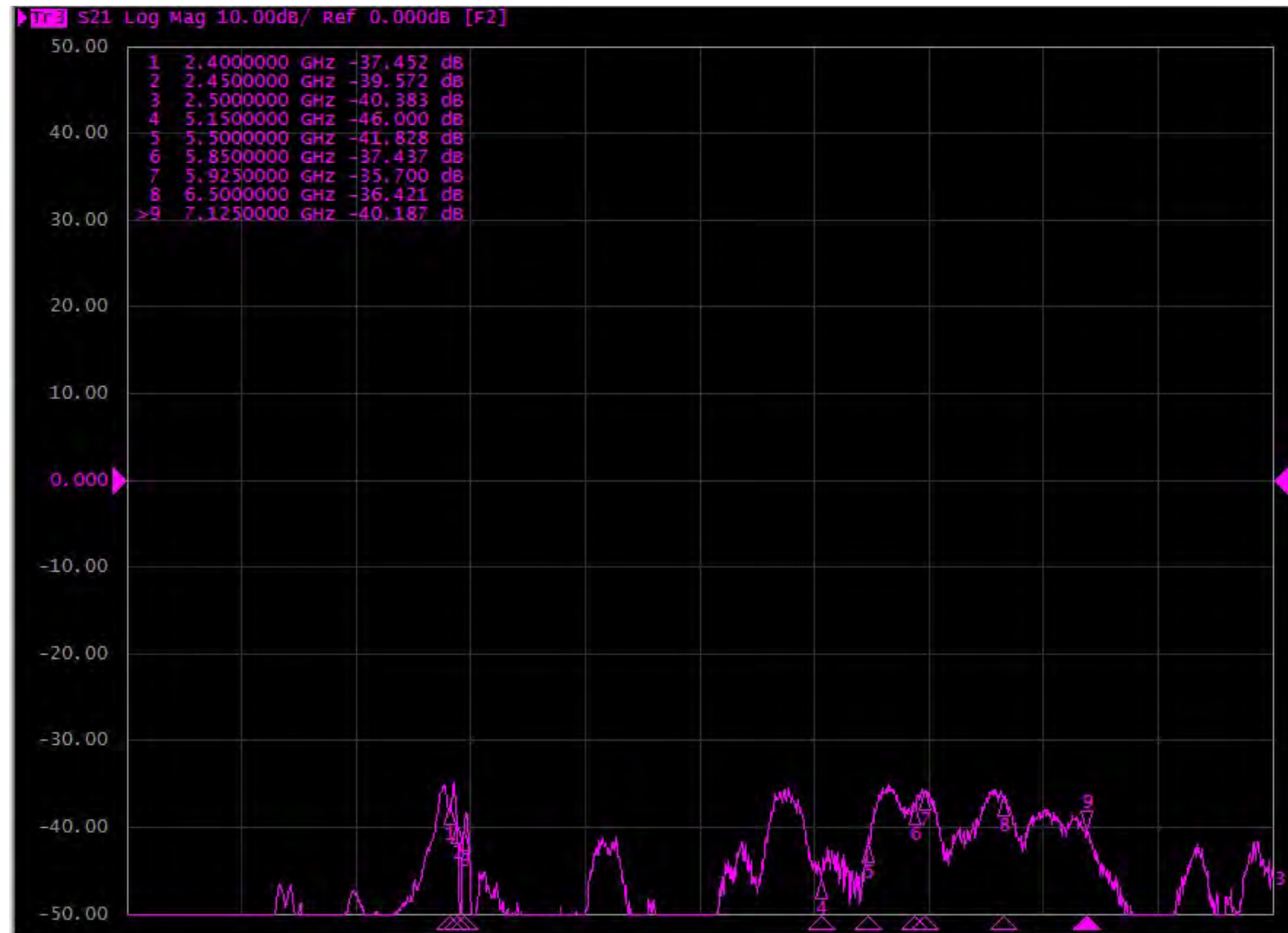
Isolation – Ant 6 & Ant 11



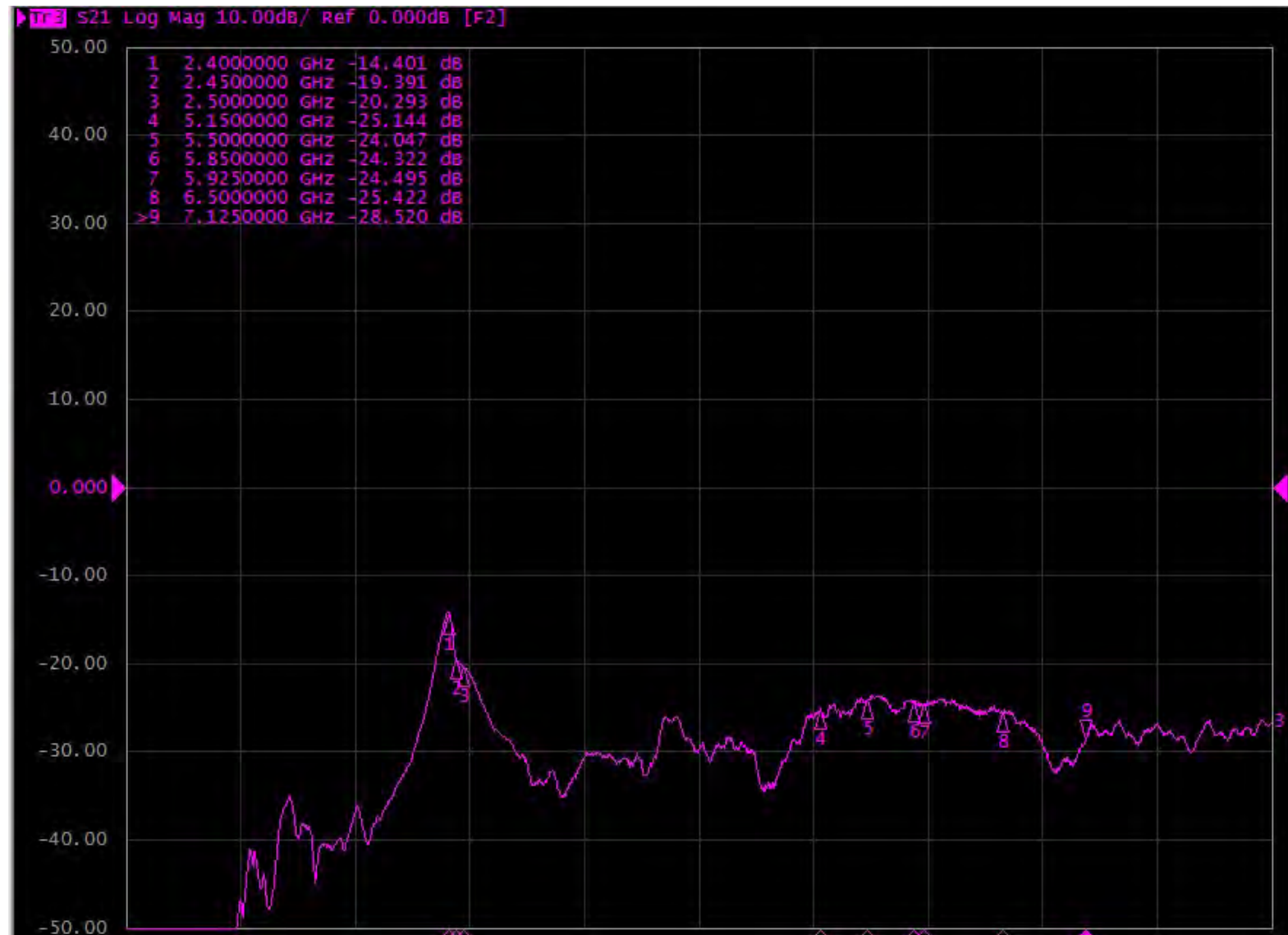
Isolation – Ant 6 & Ant 12



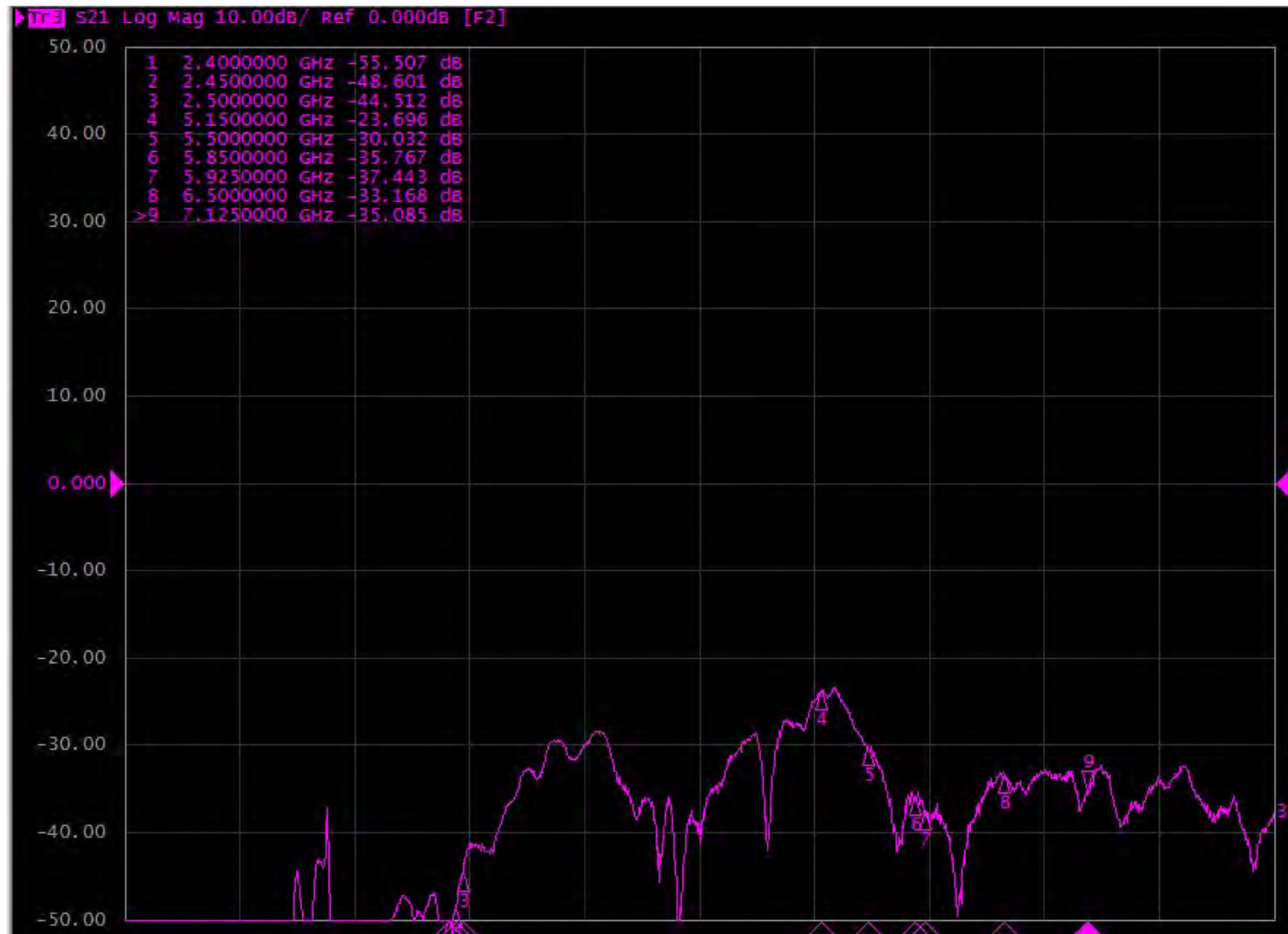
Isolation – Ant 6 & Ant 13



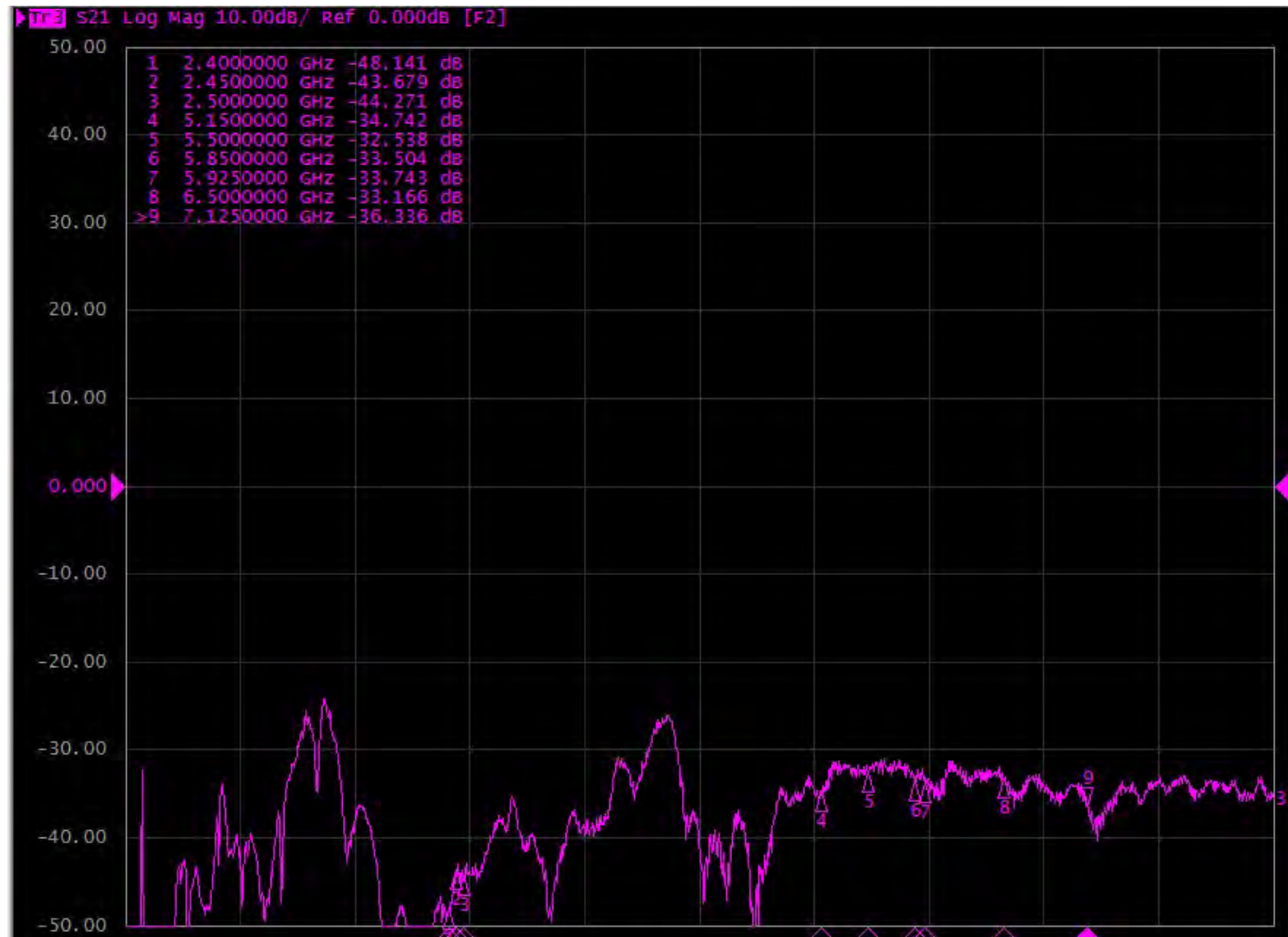
Isolation – Ant 6 & Ant 14



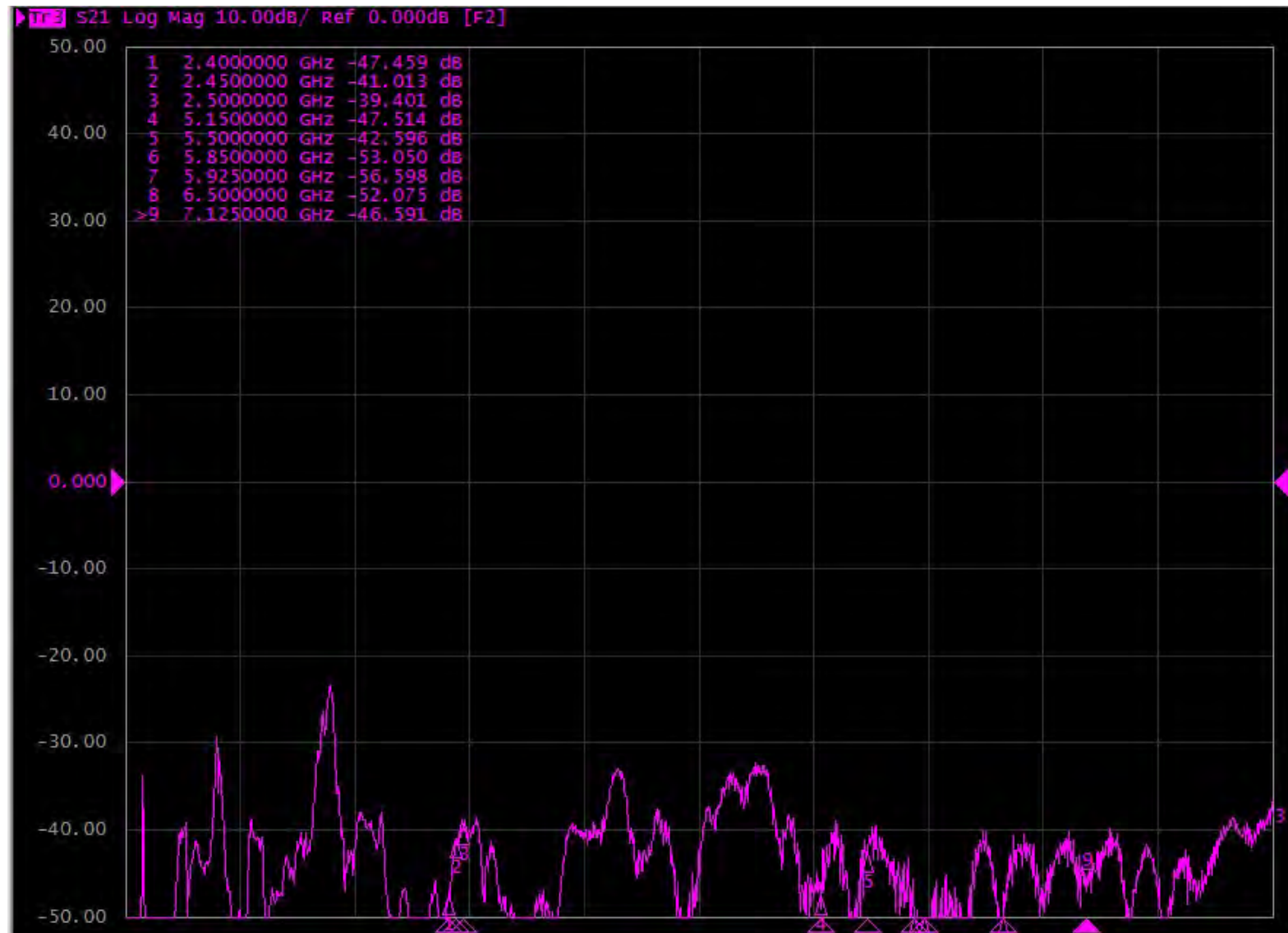
Isolation – Ant 7 & Ant 8



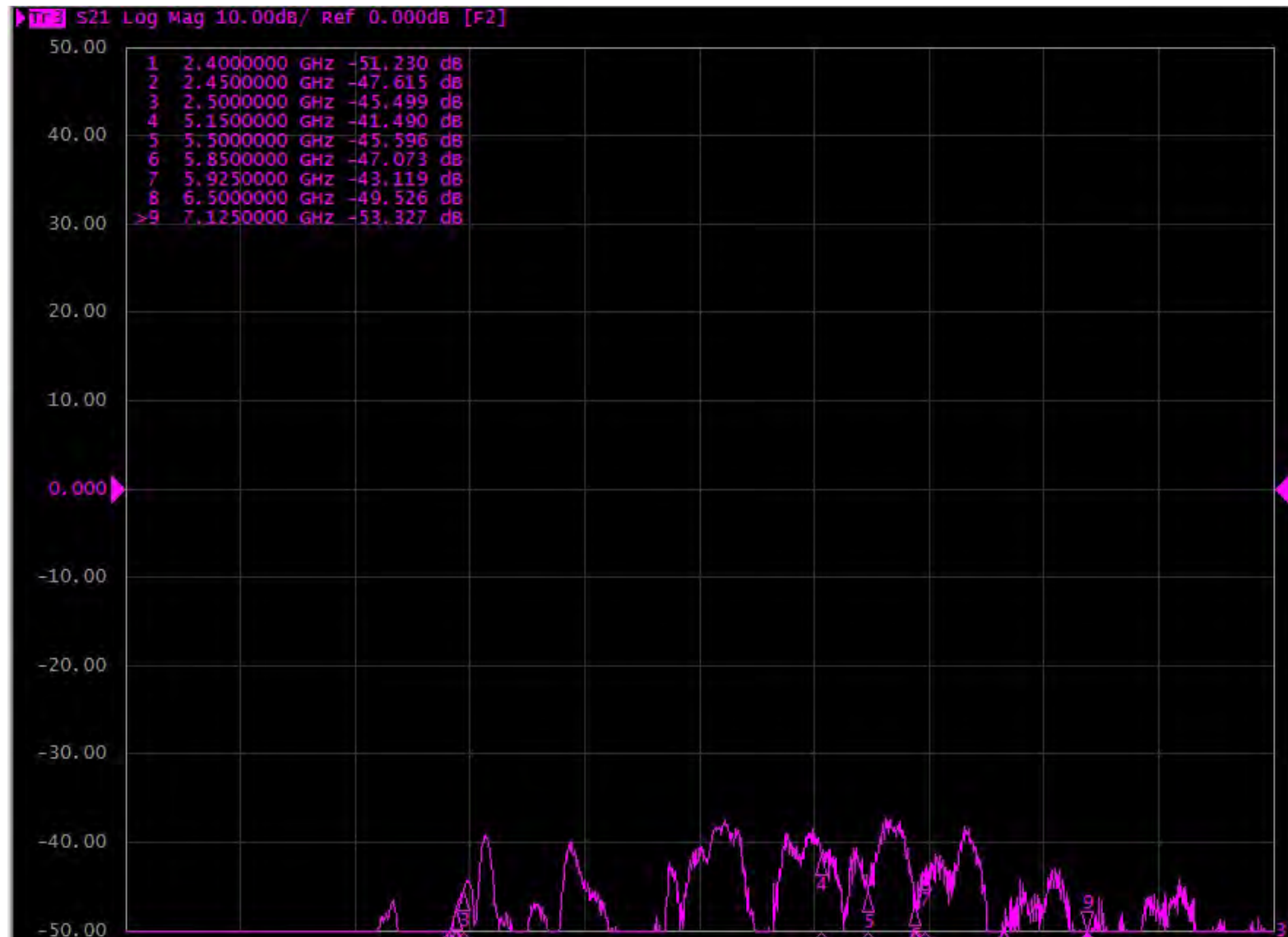
Isolation – Ant 7 & Ant 9



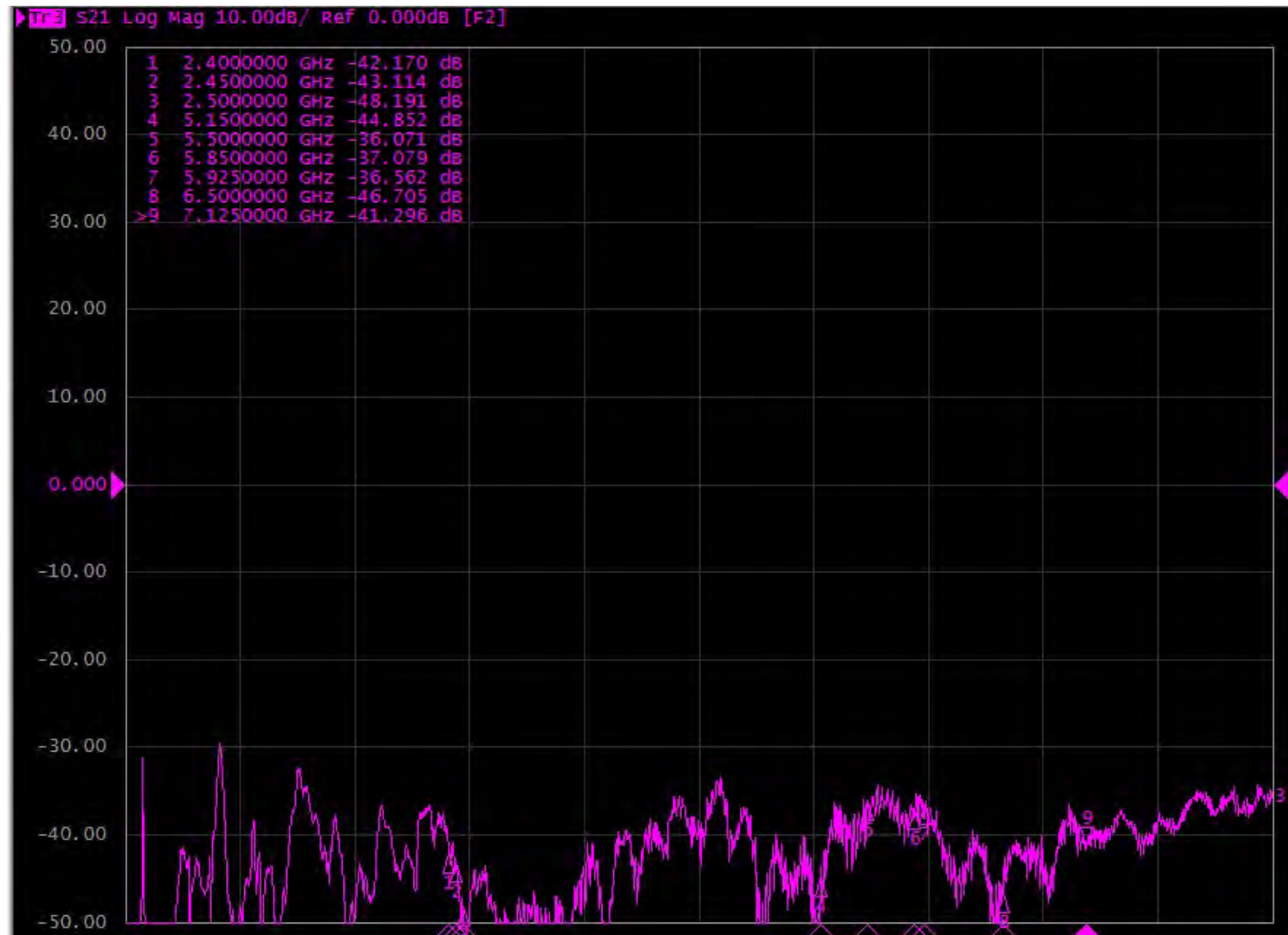
Isolation – Ant 7 & Ant 10



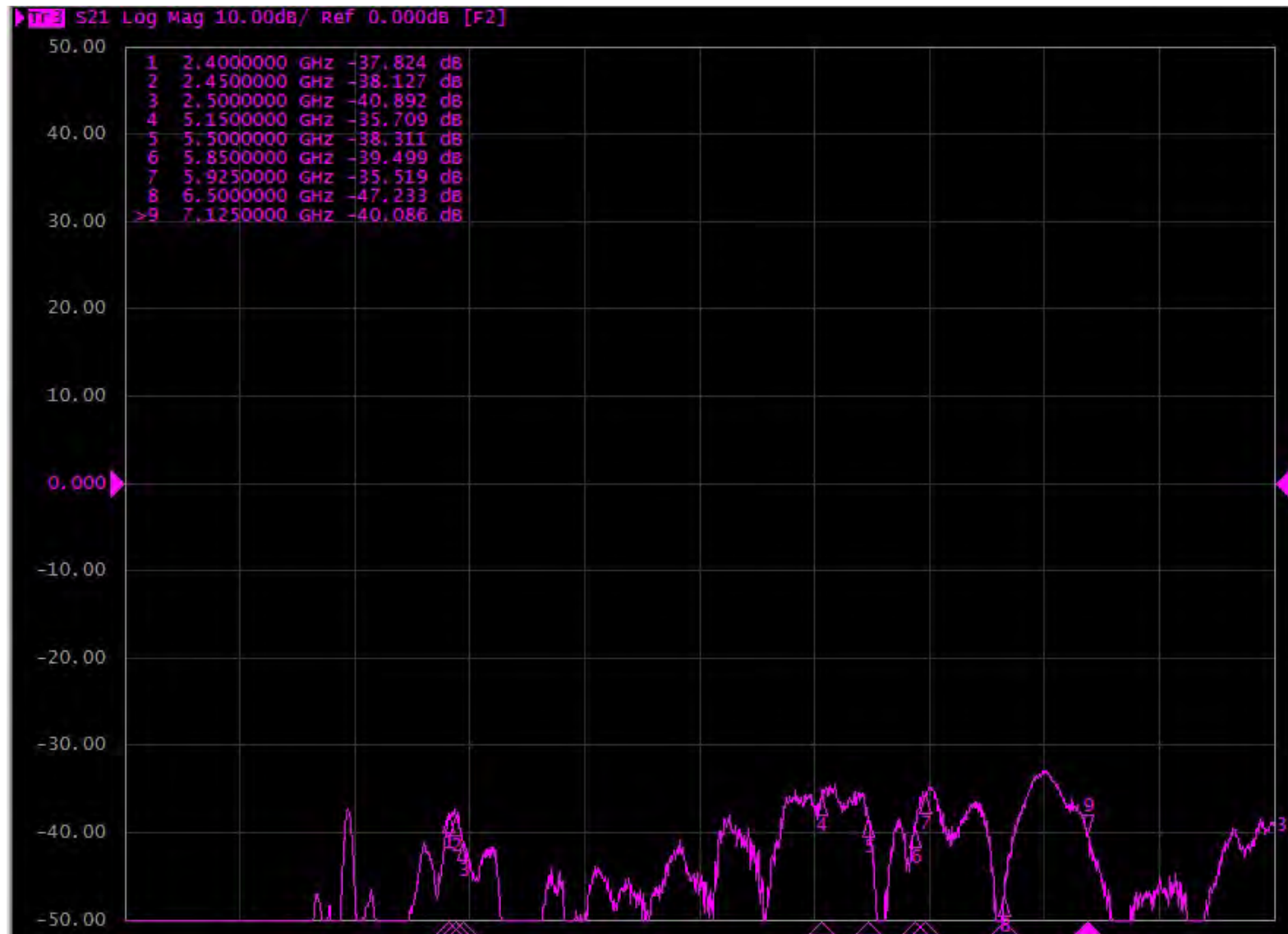
Isolation – Ant 7 & Ant 11



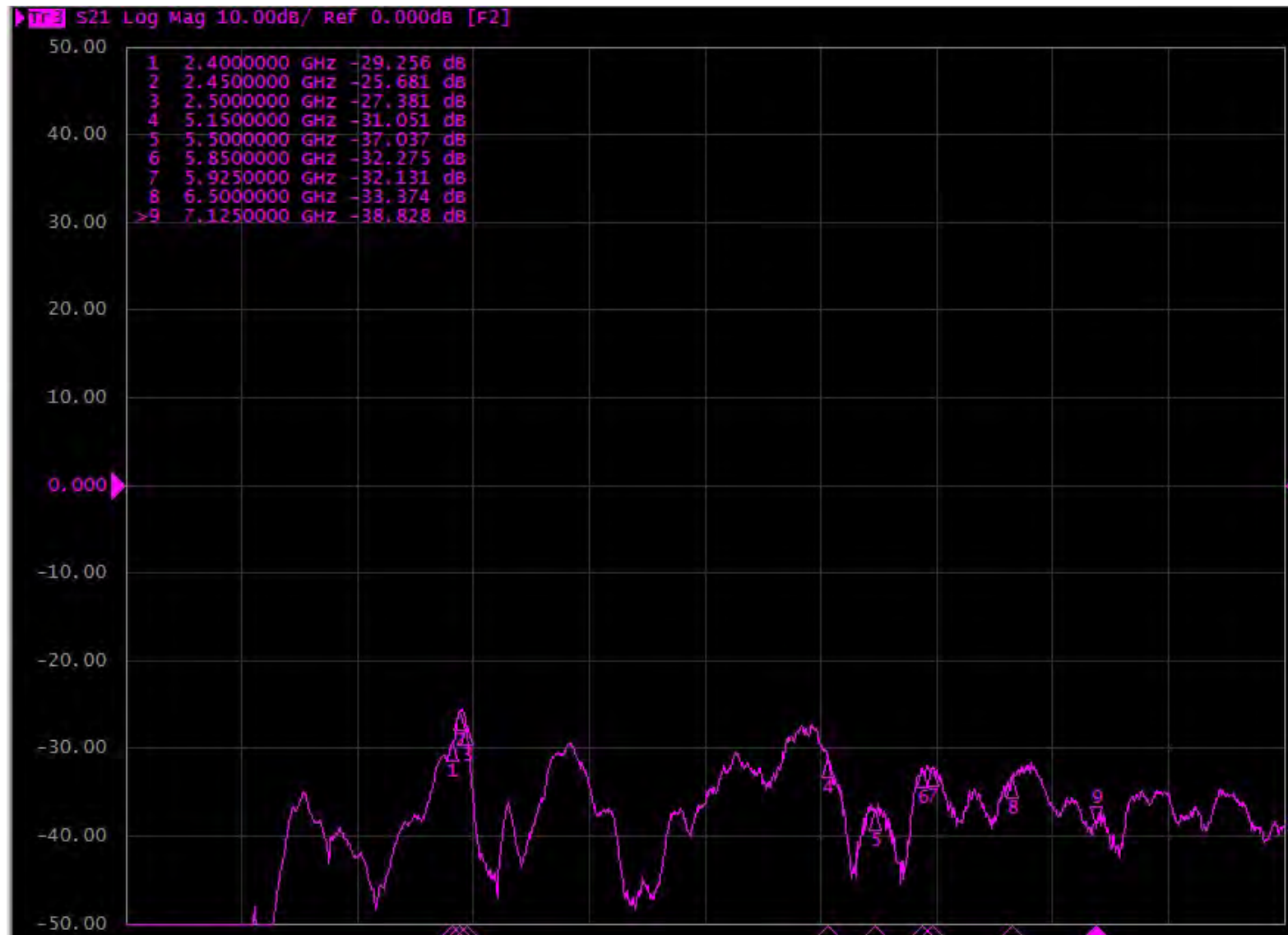
Isolation – Ant 7 & Ant 12



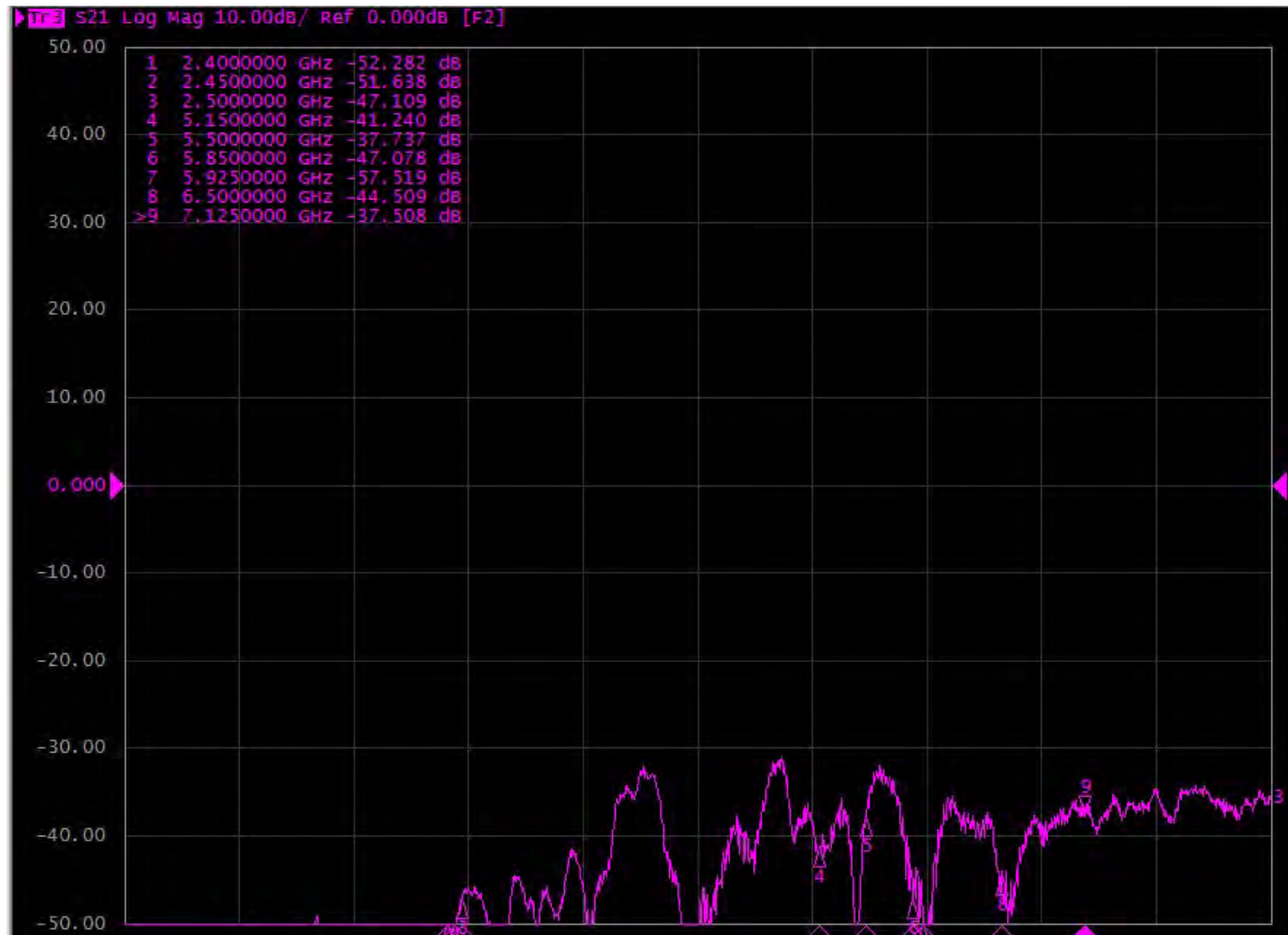
Isolation – Ant 7 & Ant 13



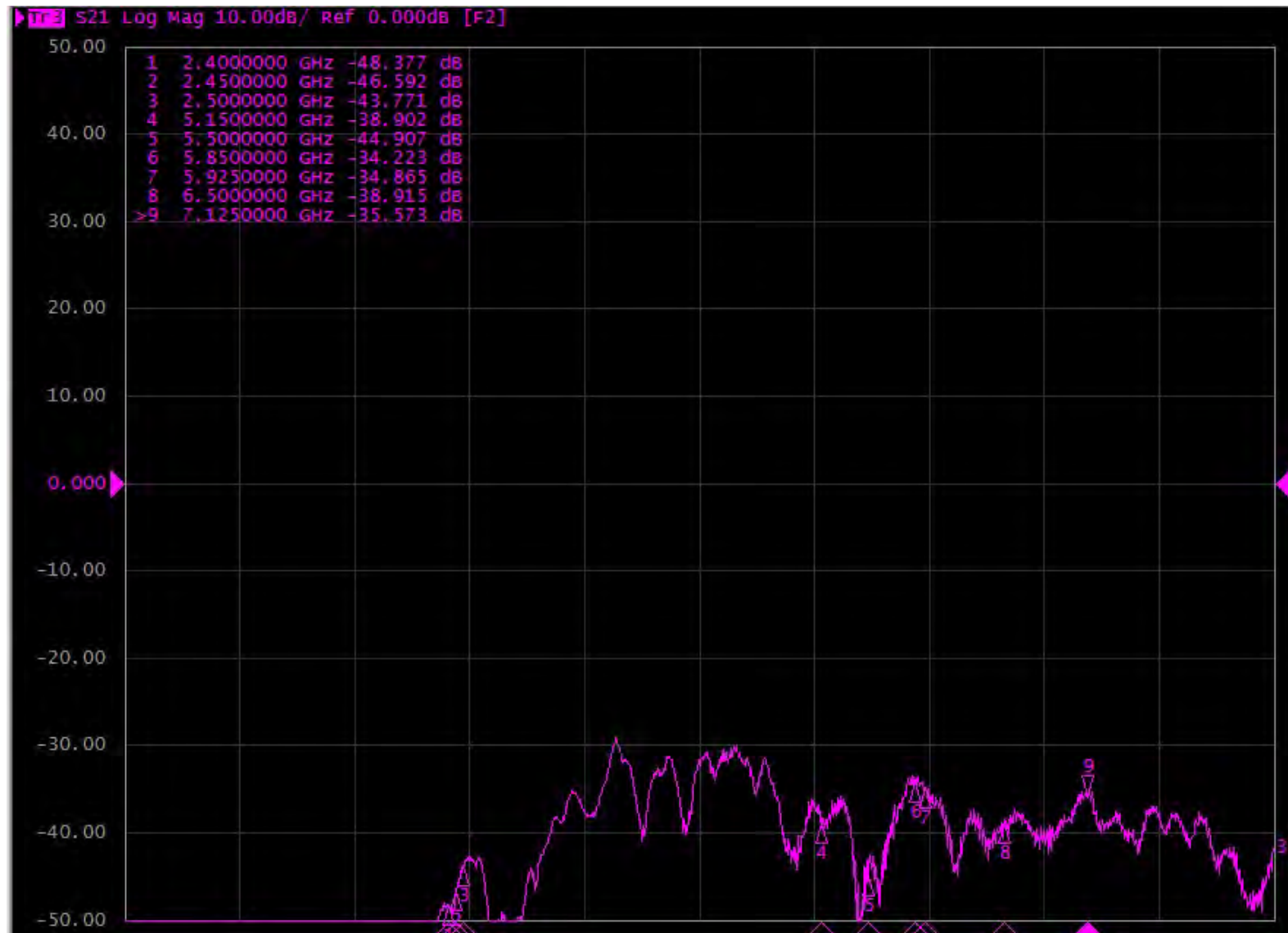
Isolation – Ant 7 & Ant 14



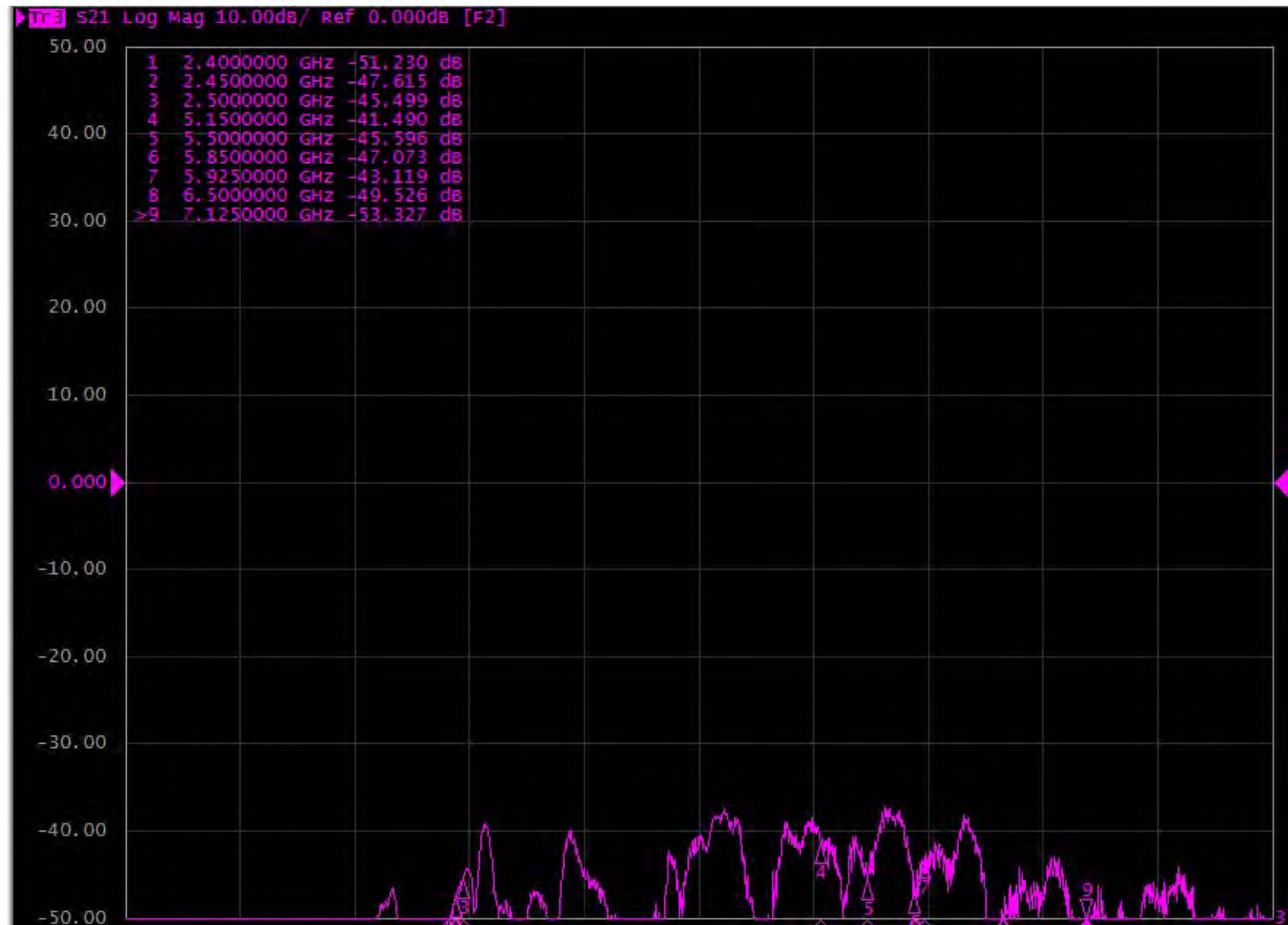
Isolation – Ant 8 & Ant 9



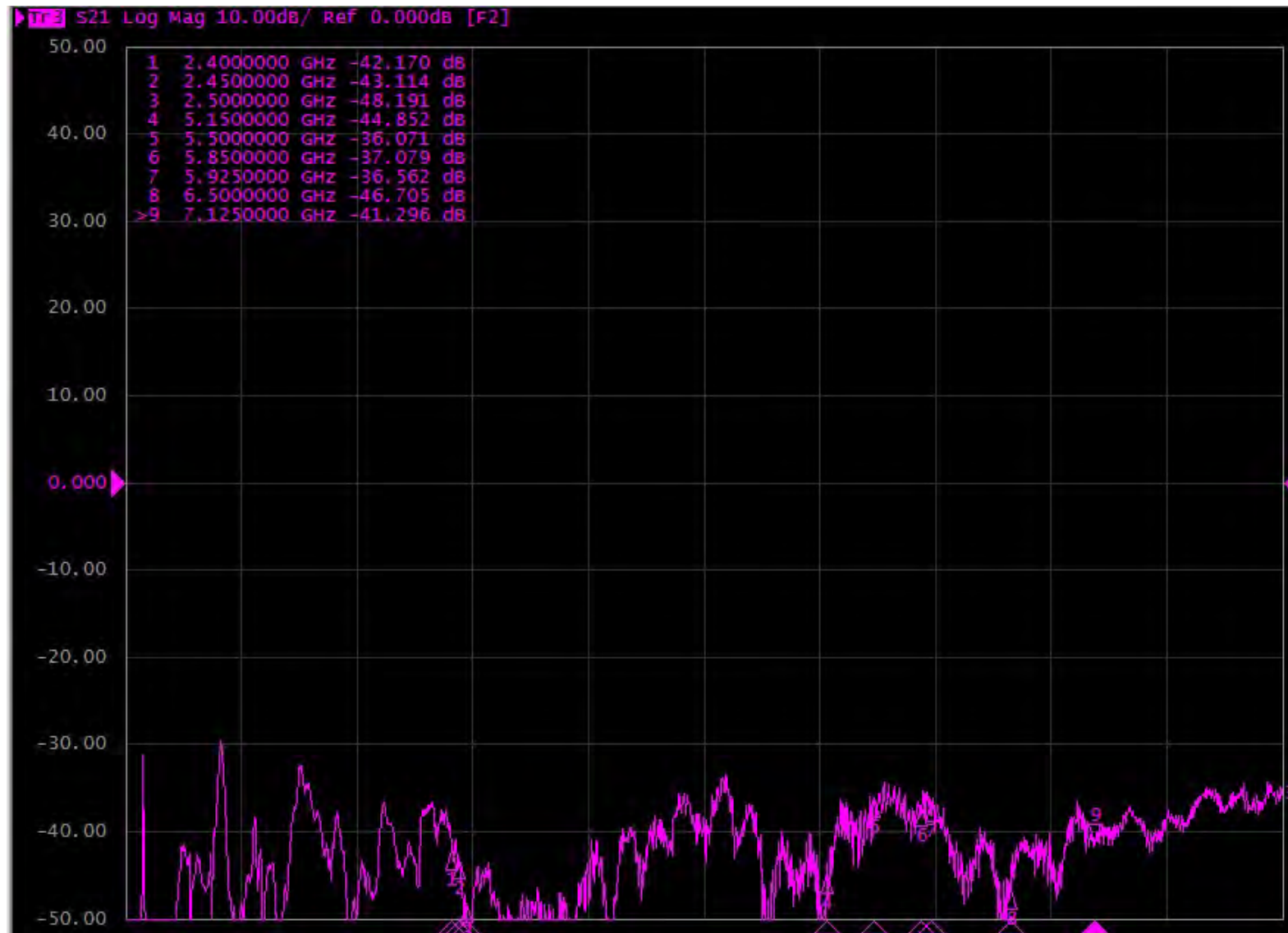
Isolation – Ant 8 & Ant 10



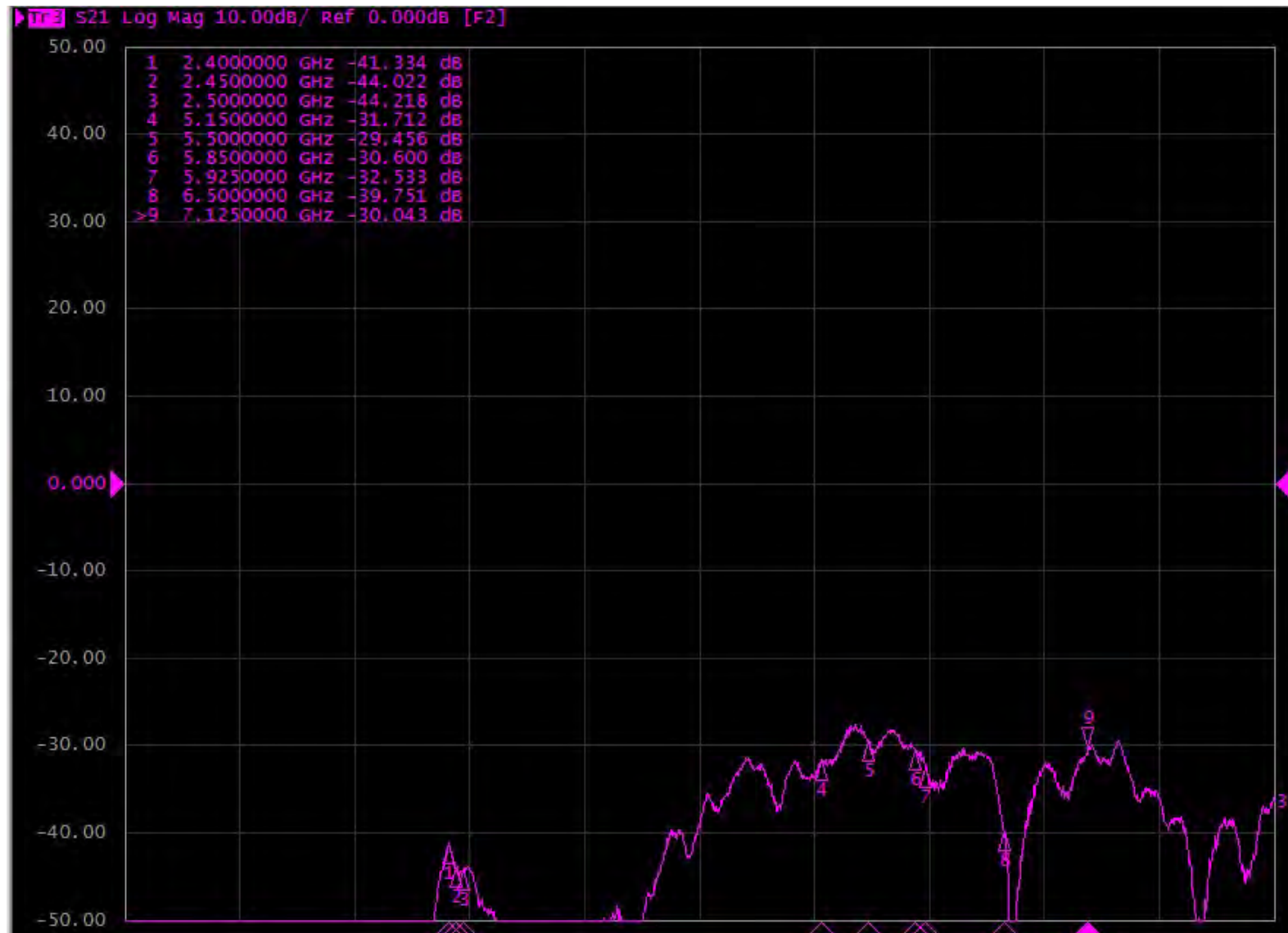
Isolation – Ant 8 & Ant 11



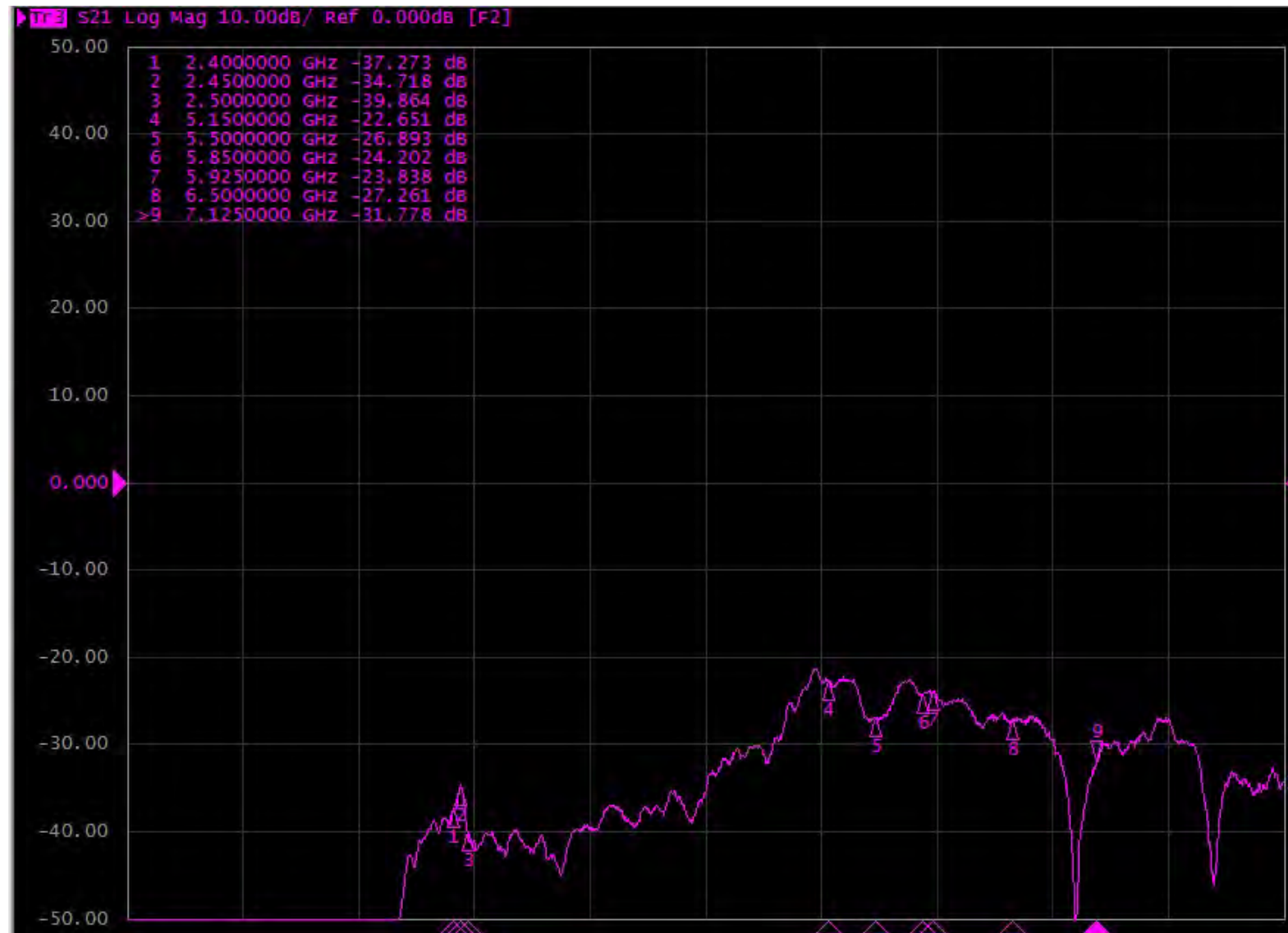
Isolation – Ant 8 & Ant 12



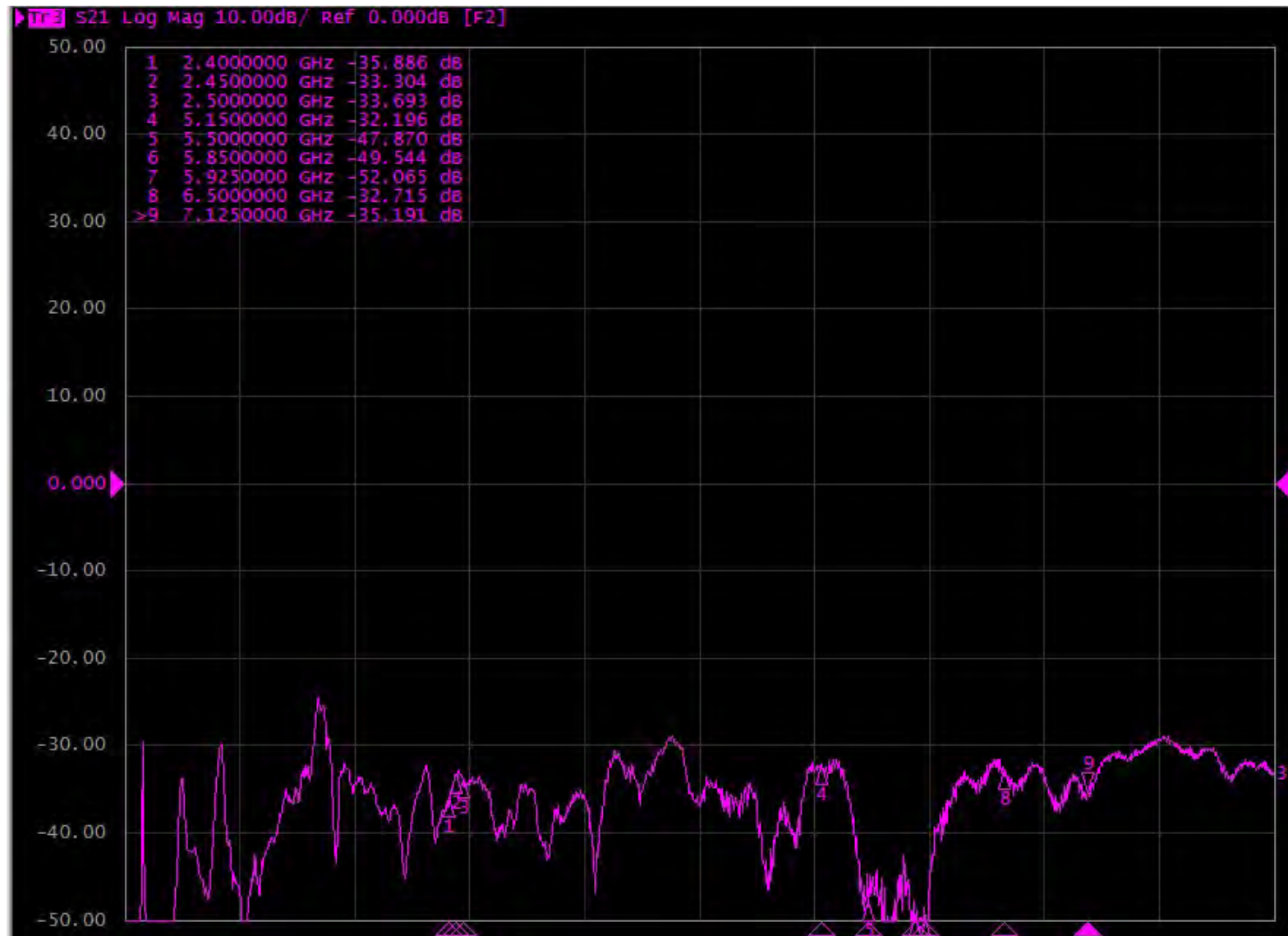
Isolation – Ant 8 & Ant 13



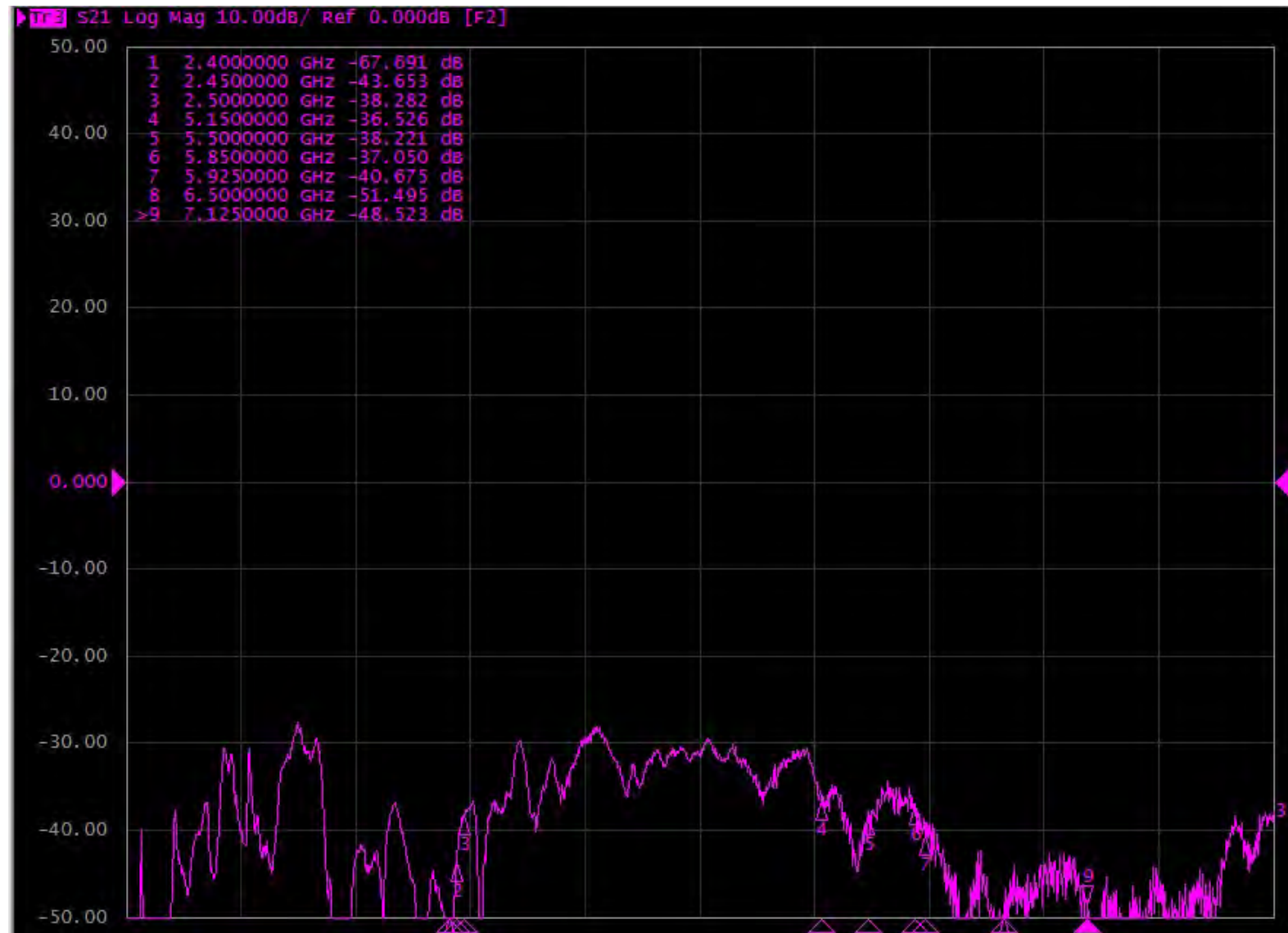
Isolation – Ant 8 & Ant 14



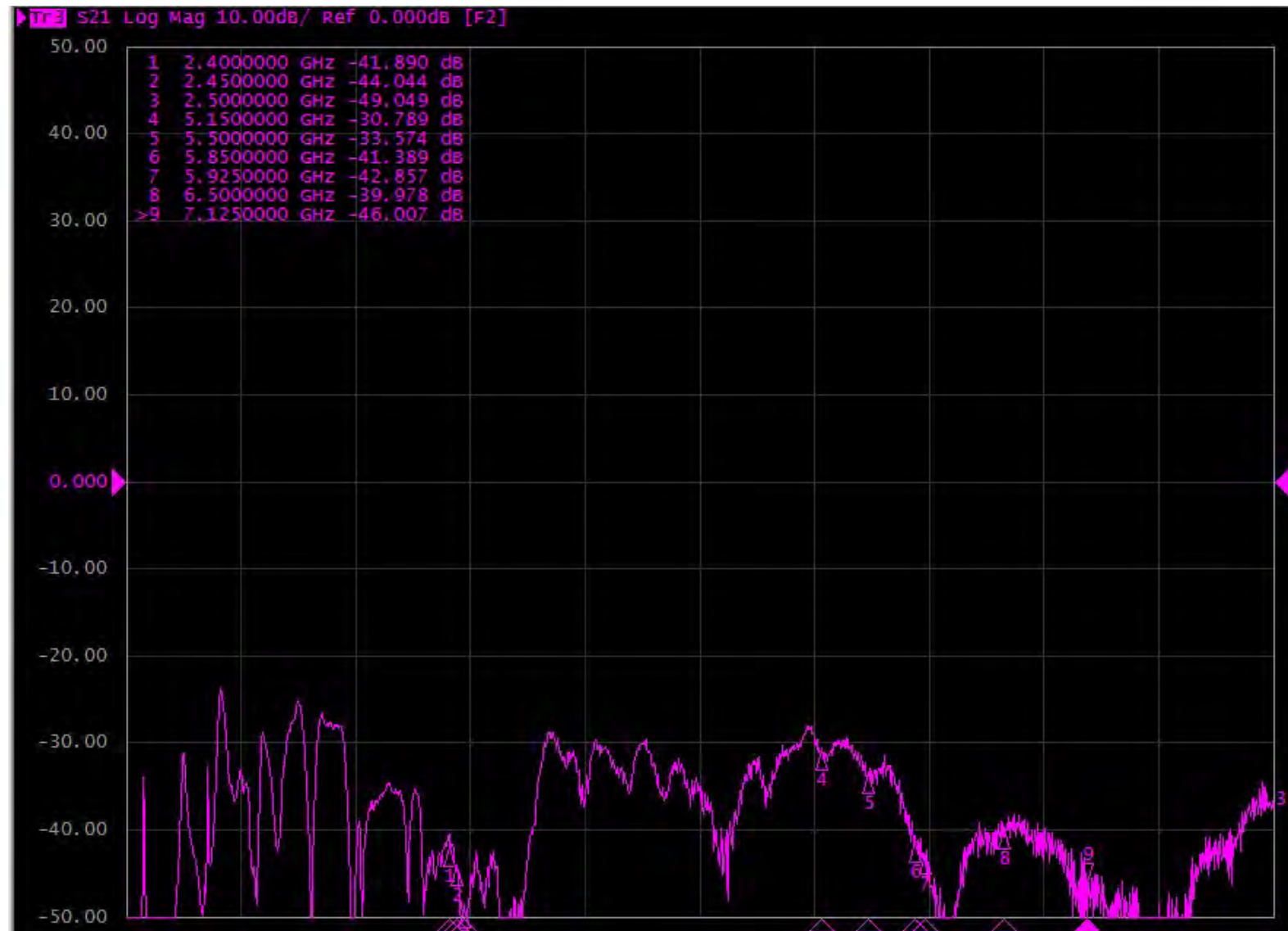
Isolation – Ant 9 & Ant 10



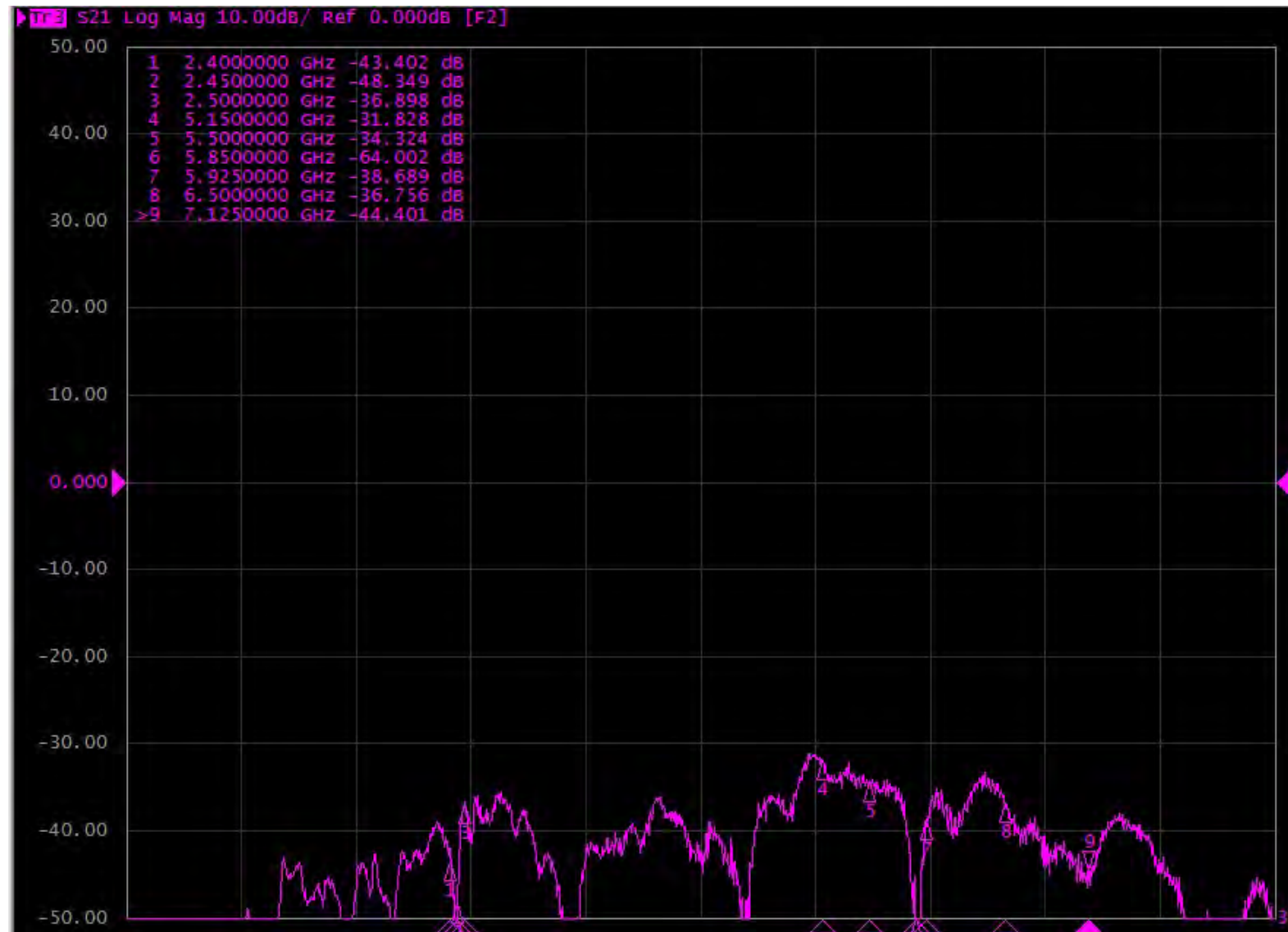
Isolation – Ant 9 & Ant 11



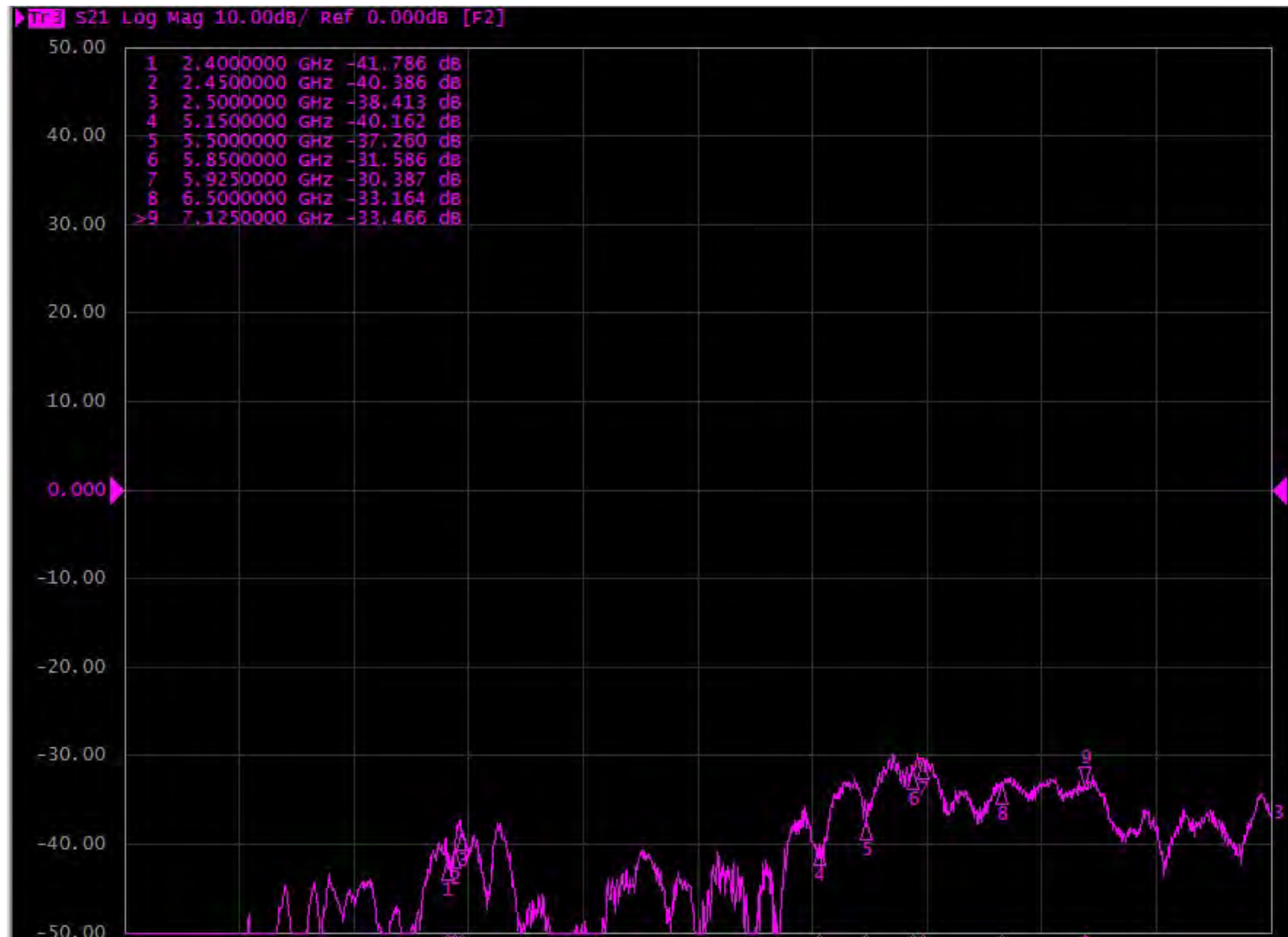
Isolation – Ant 9 & Ant 12



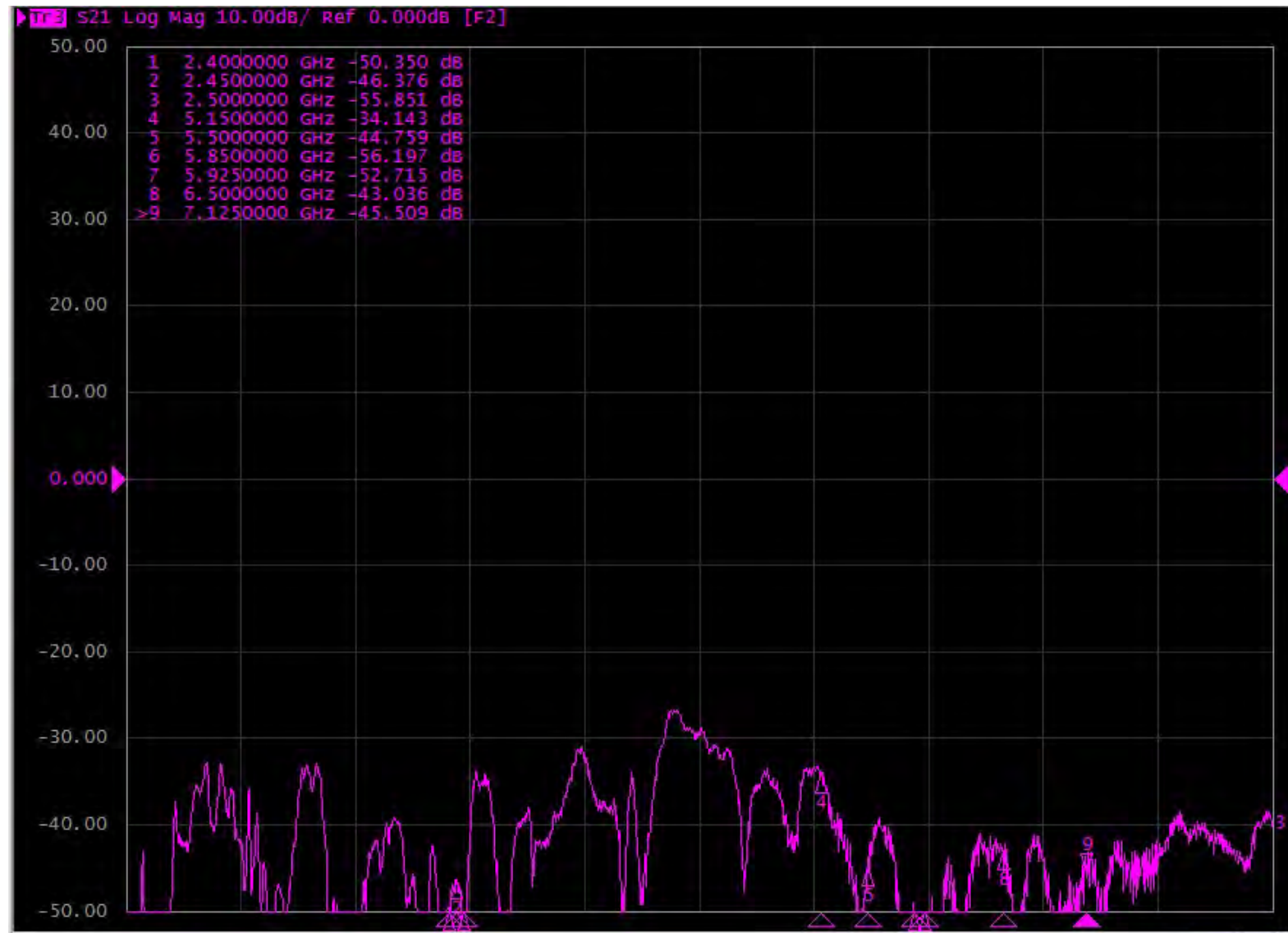
Isolation – Ant 9 & Ant 13



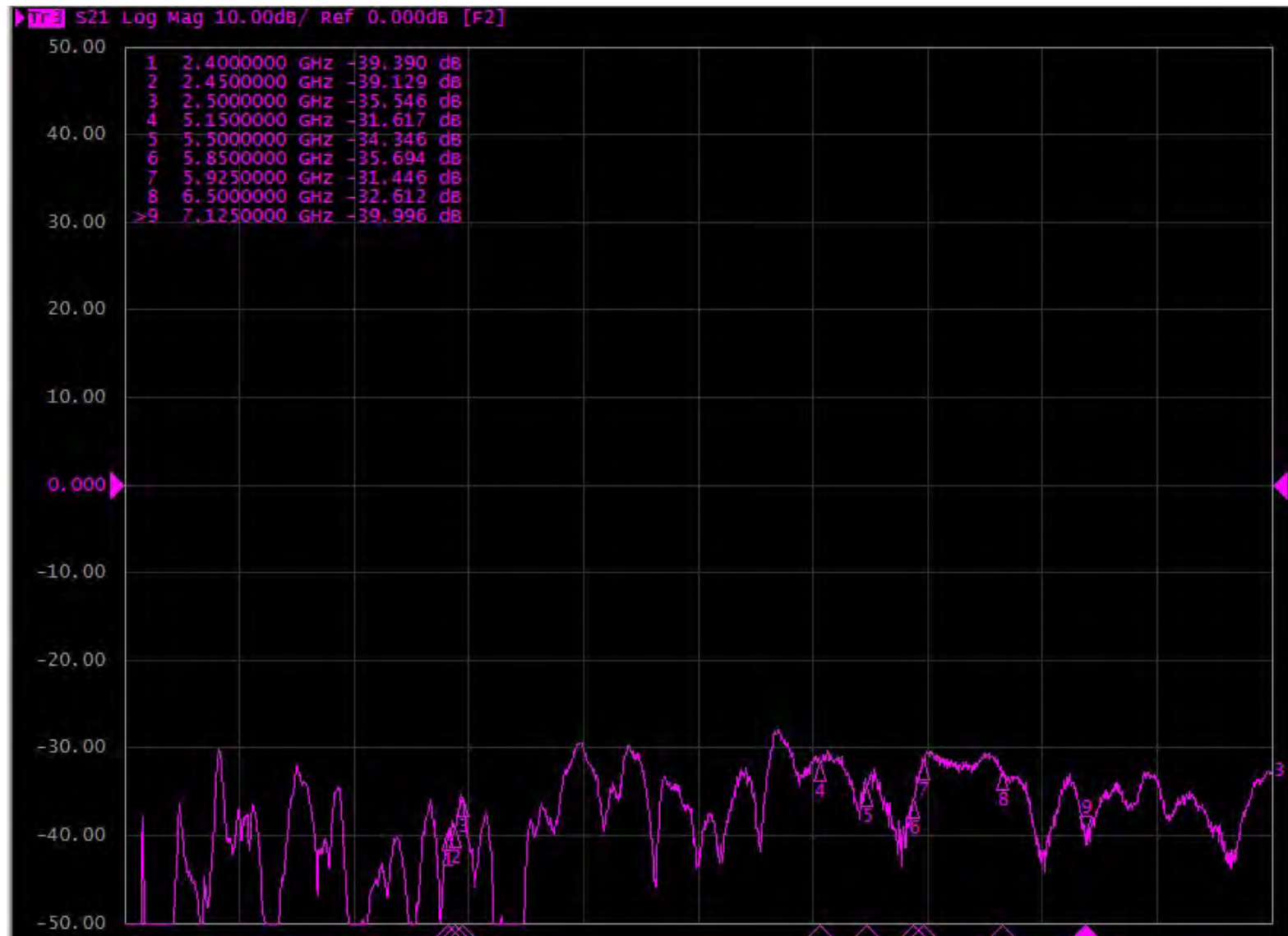
Isolation – Ant 9 & Ant 14



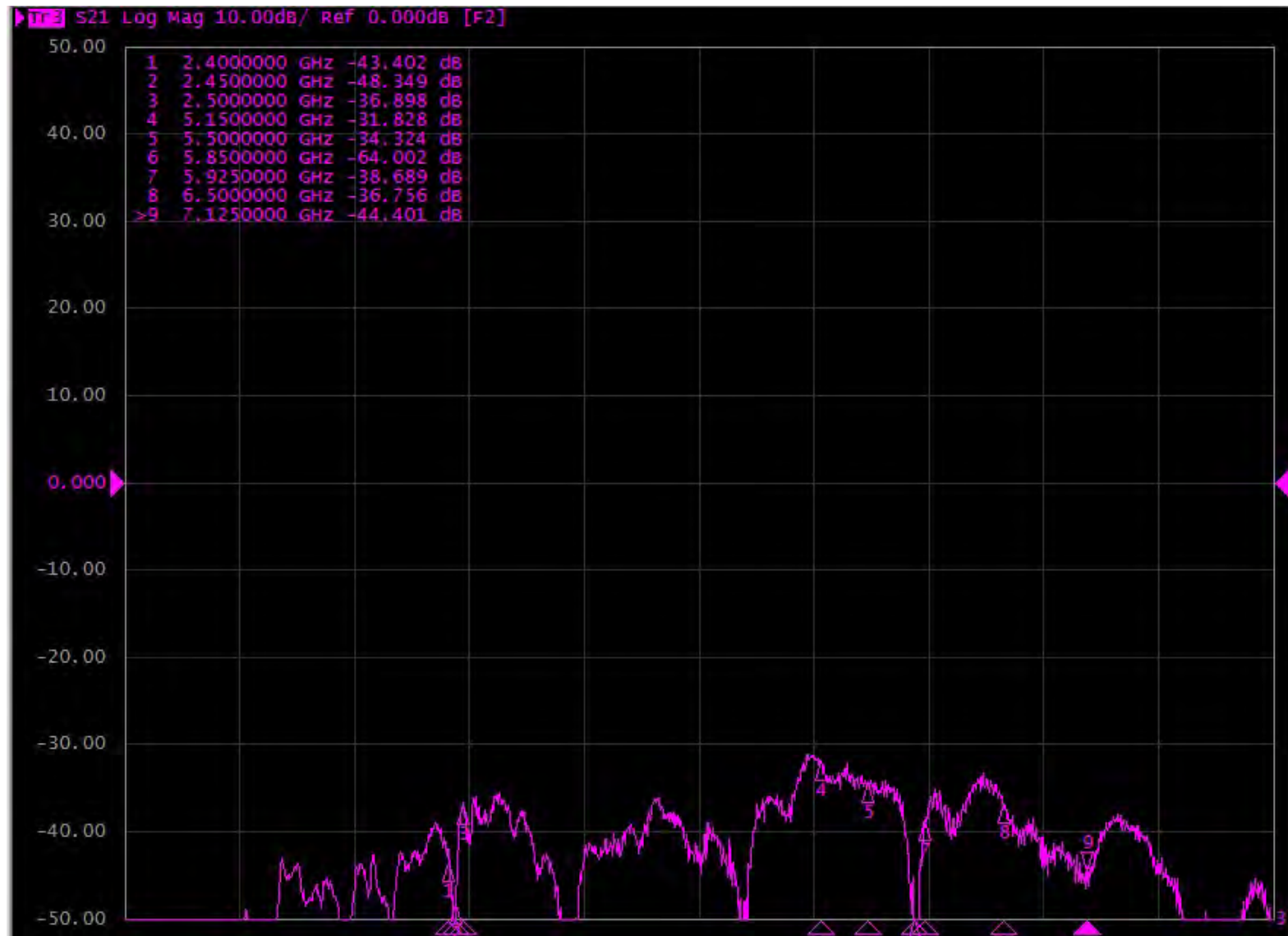
Isolation – Ant 10 & Ant 11



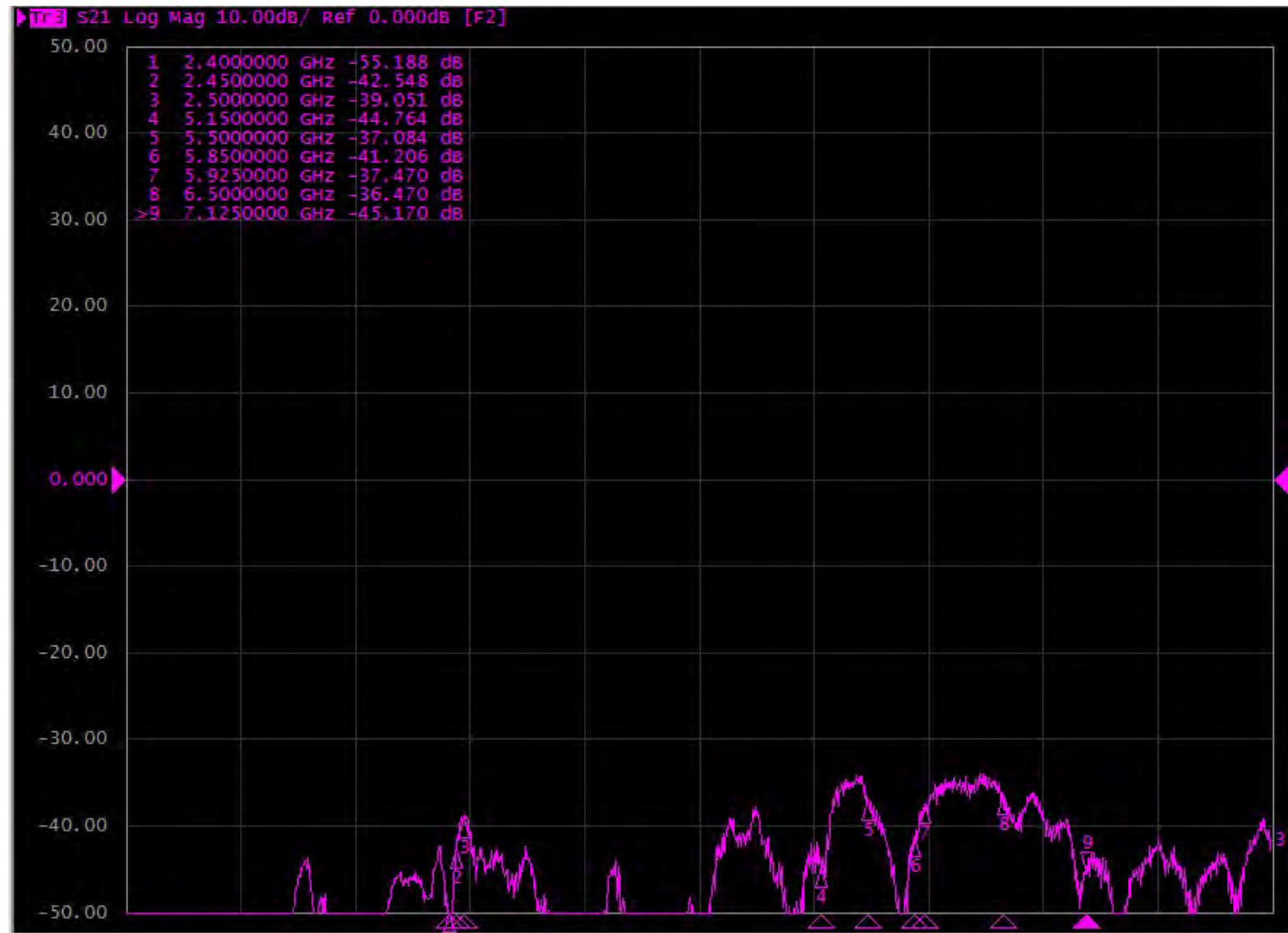
Isolation – Ant 10 & Ant 12



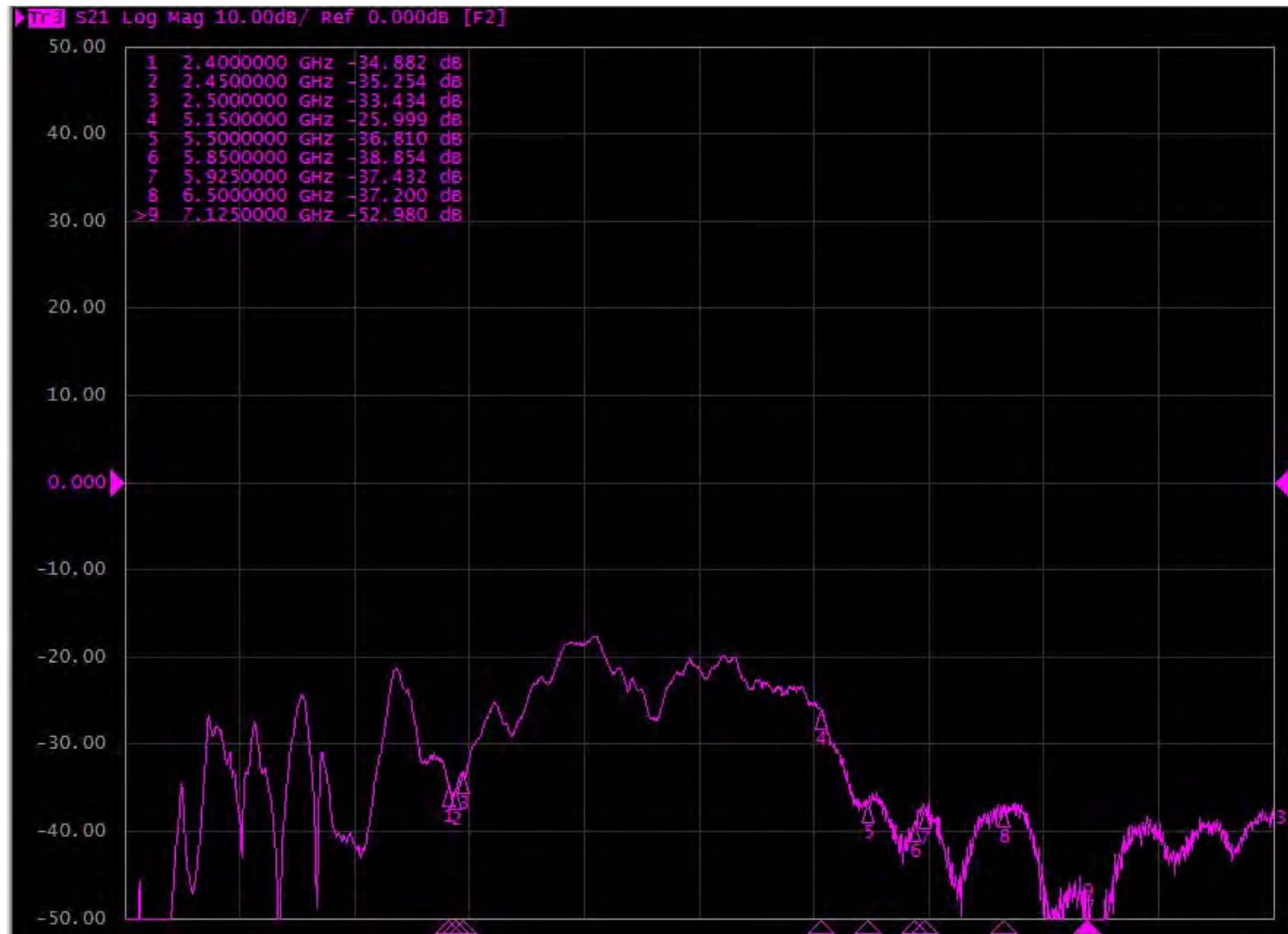
Isolation – Ant 10 & Ant 13



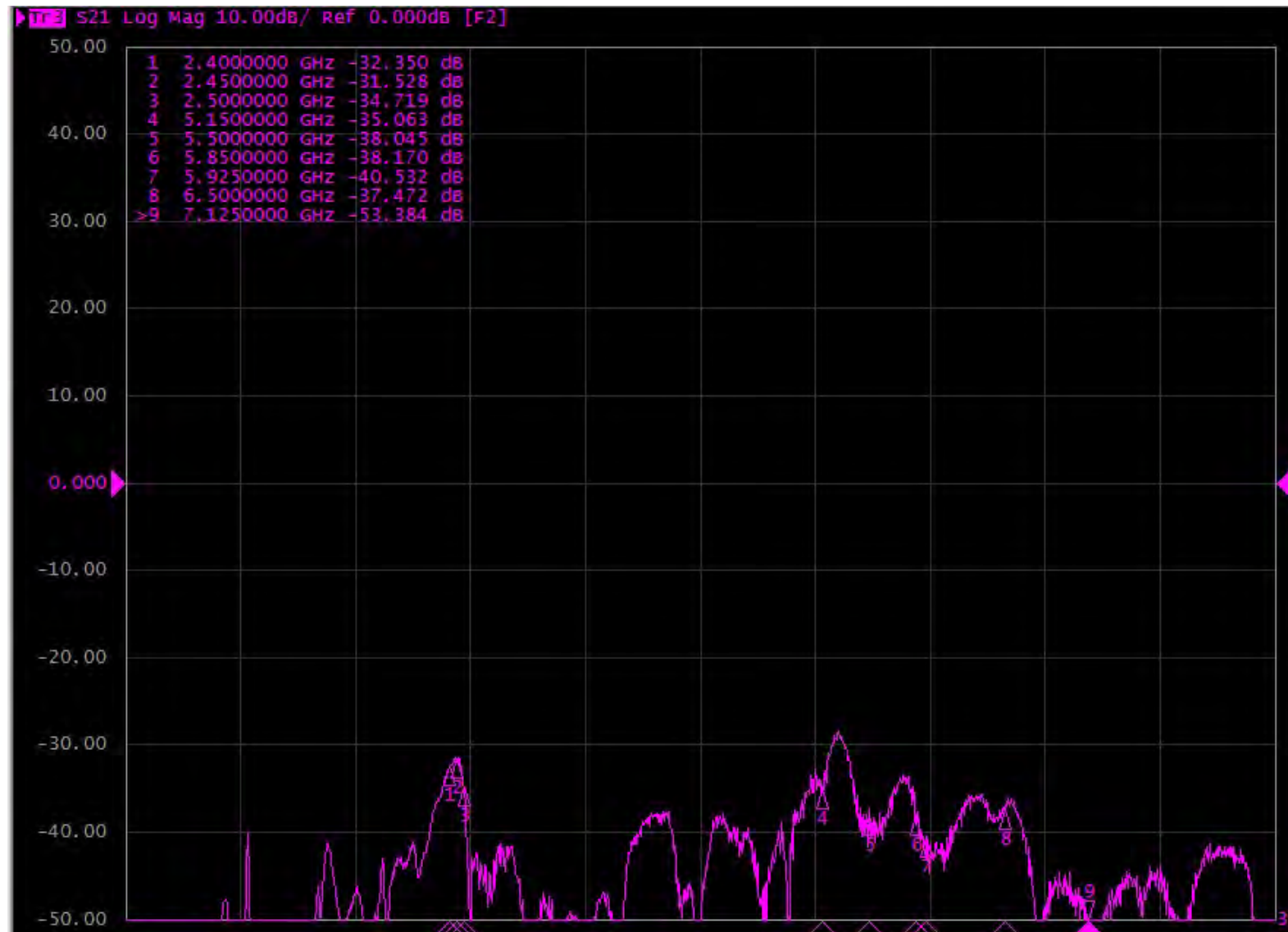
Isolation – Ant 10 & Ant 14



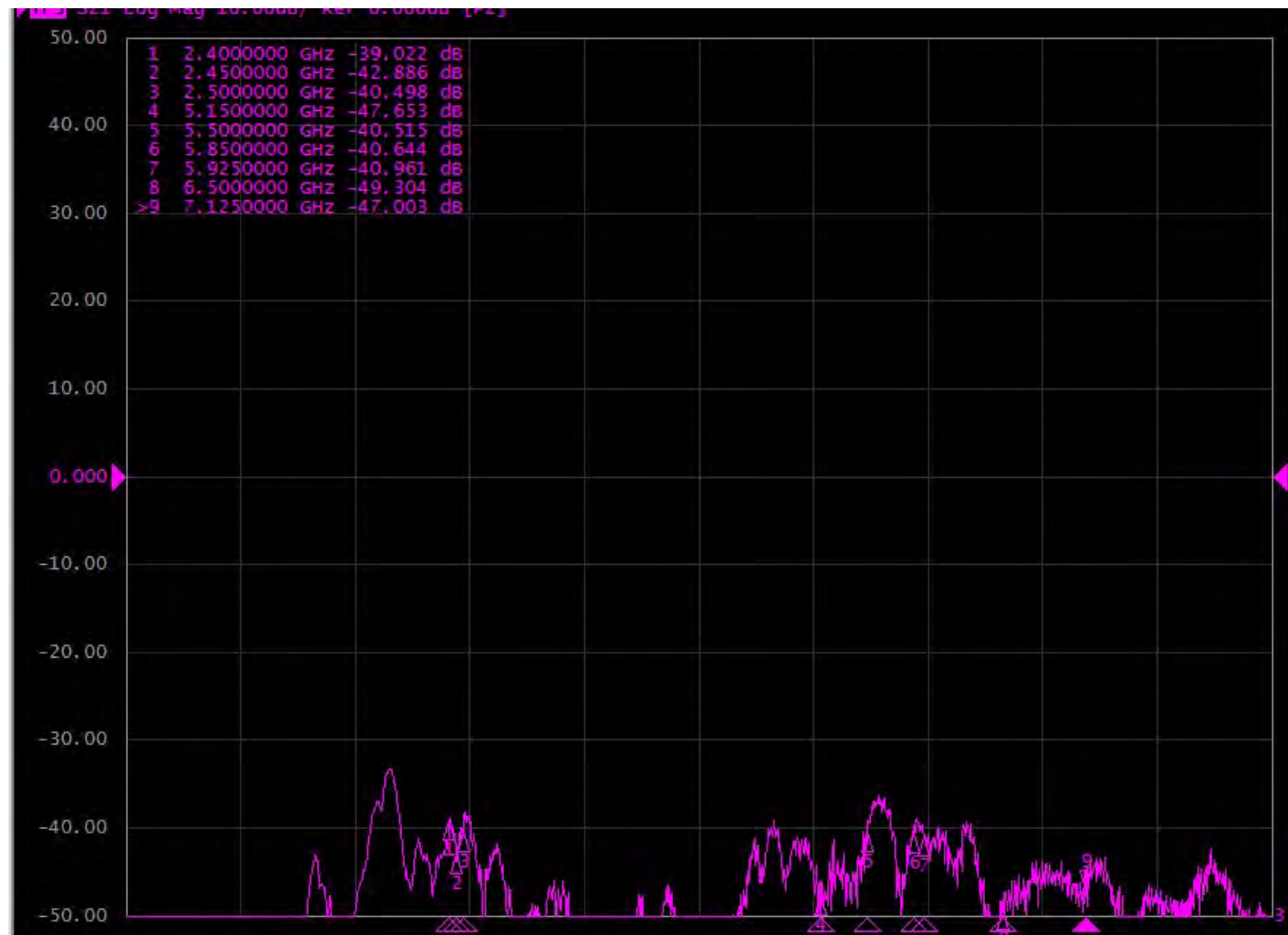
Isolation – Ant 11 & Ant 12



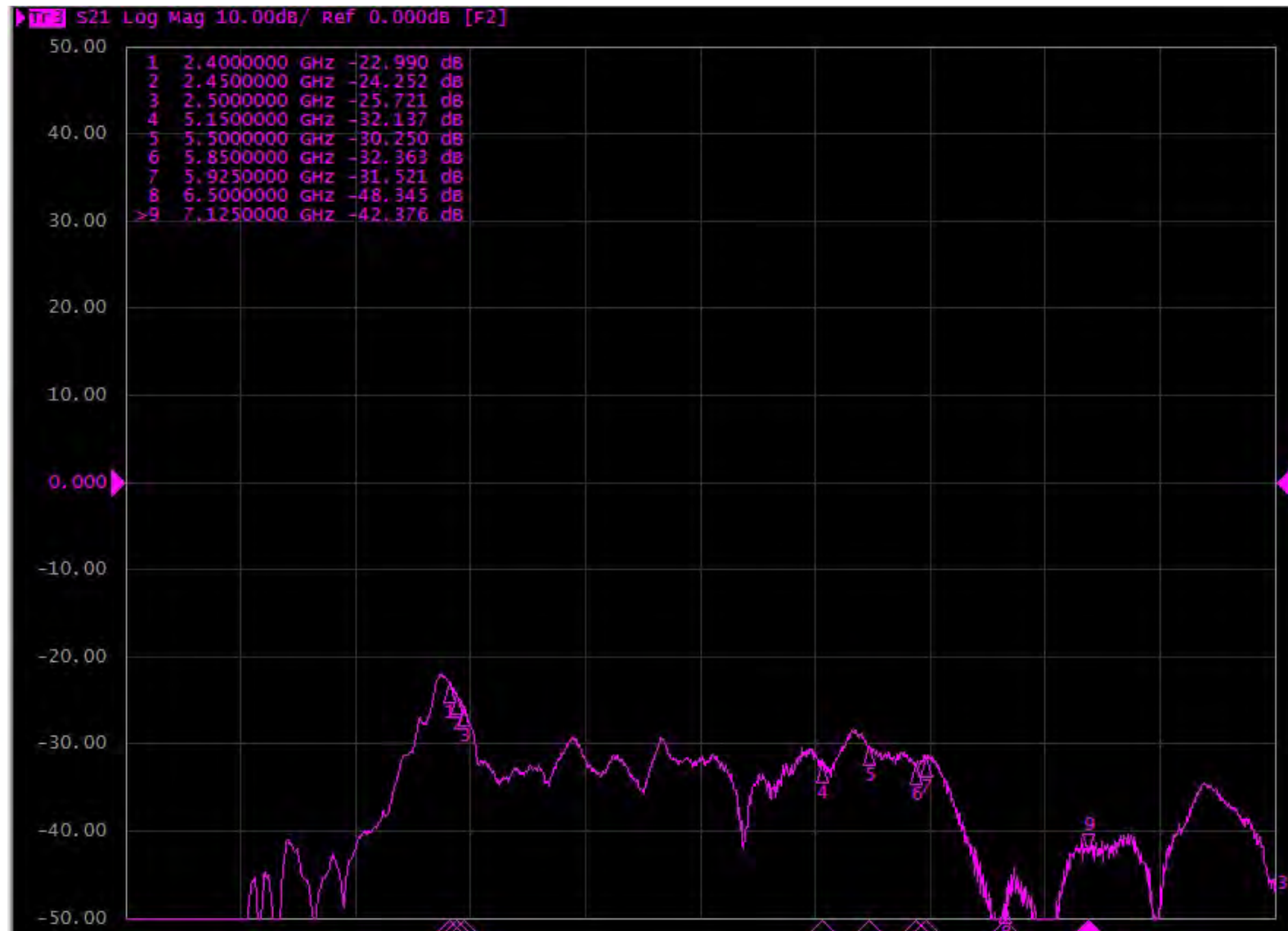
Isolation – Ant 11 & Ant 13



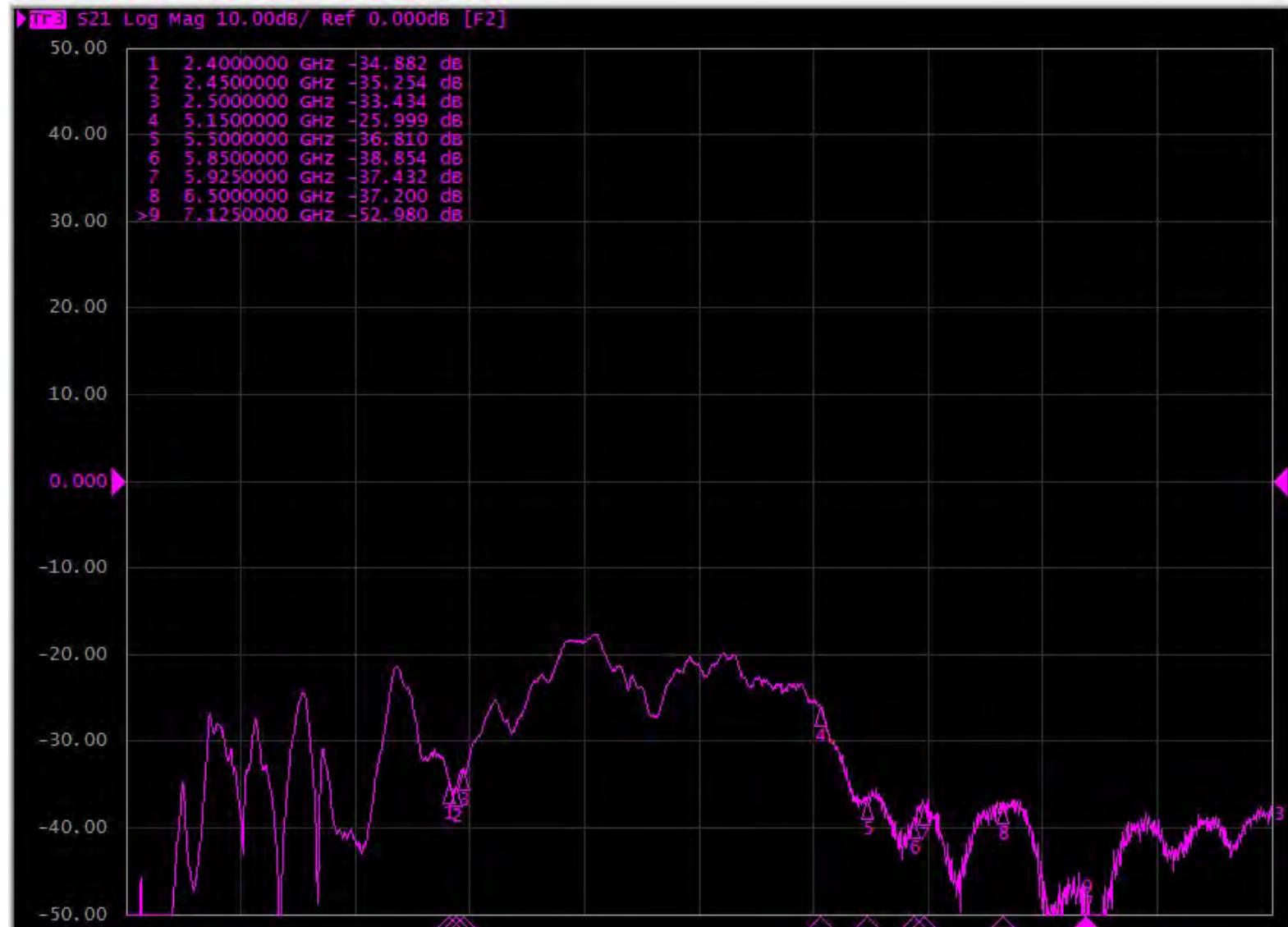
Isolation – Ant 11 & Ant 14



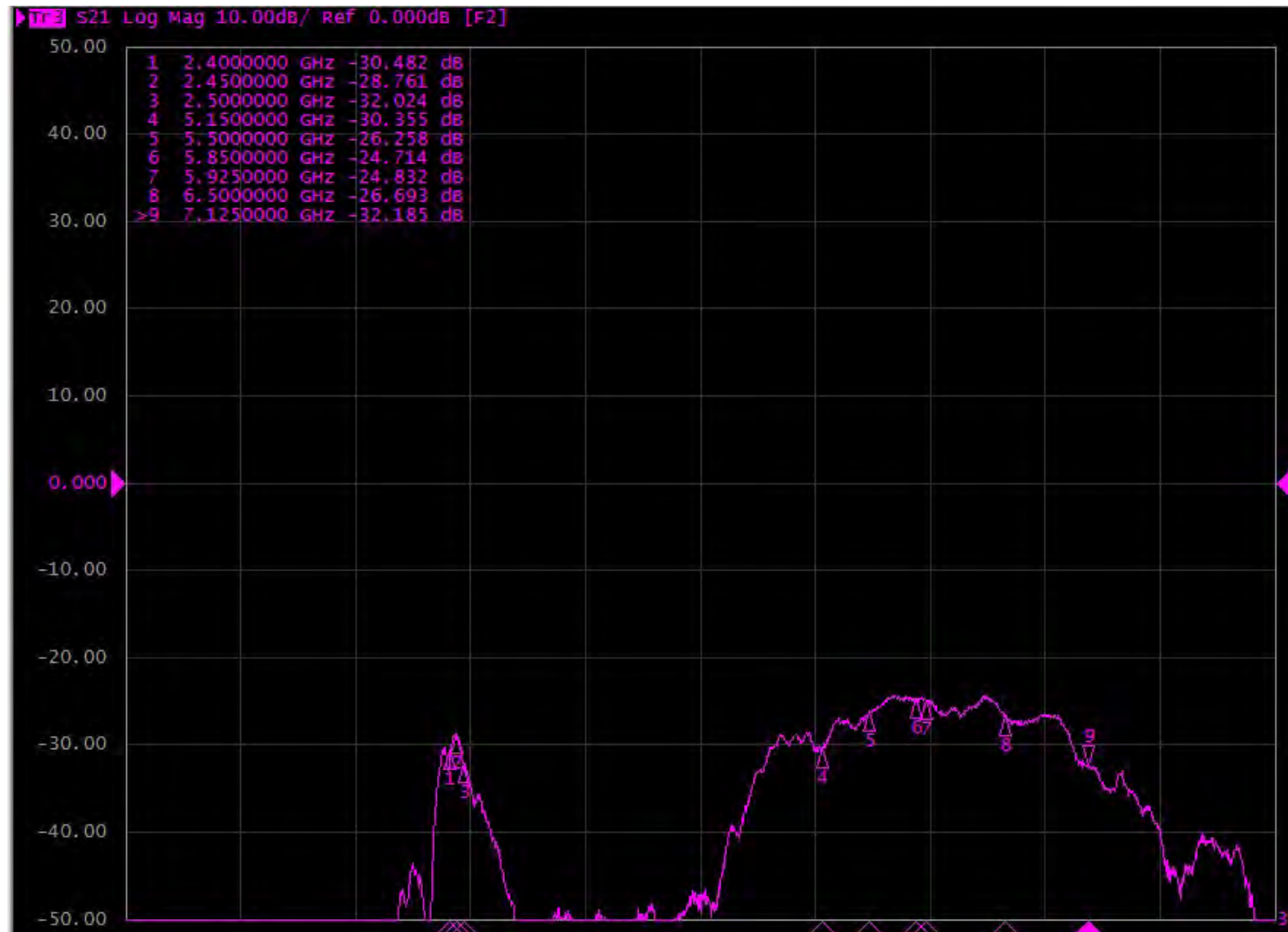
Isolation – Ant 12 & Ant 13



Isolation – Ant 12 & Ant 14

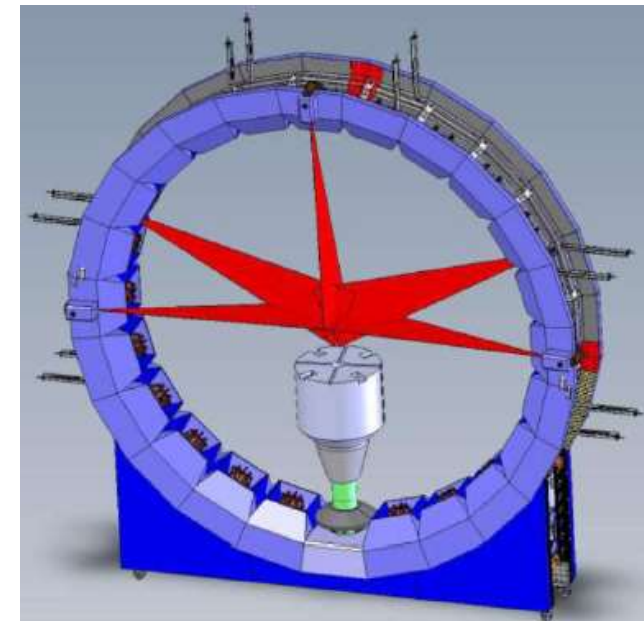
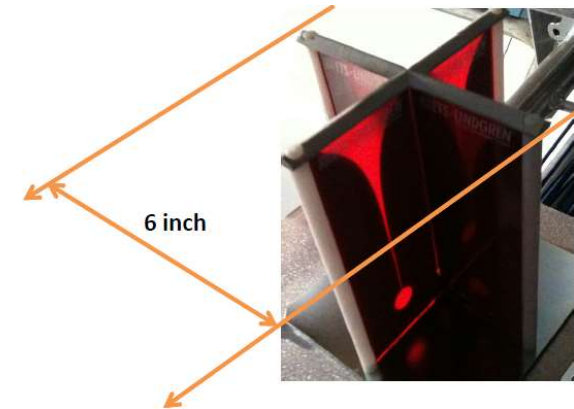
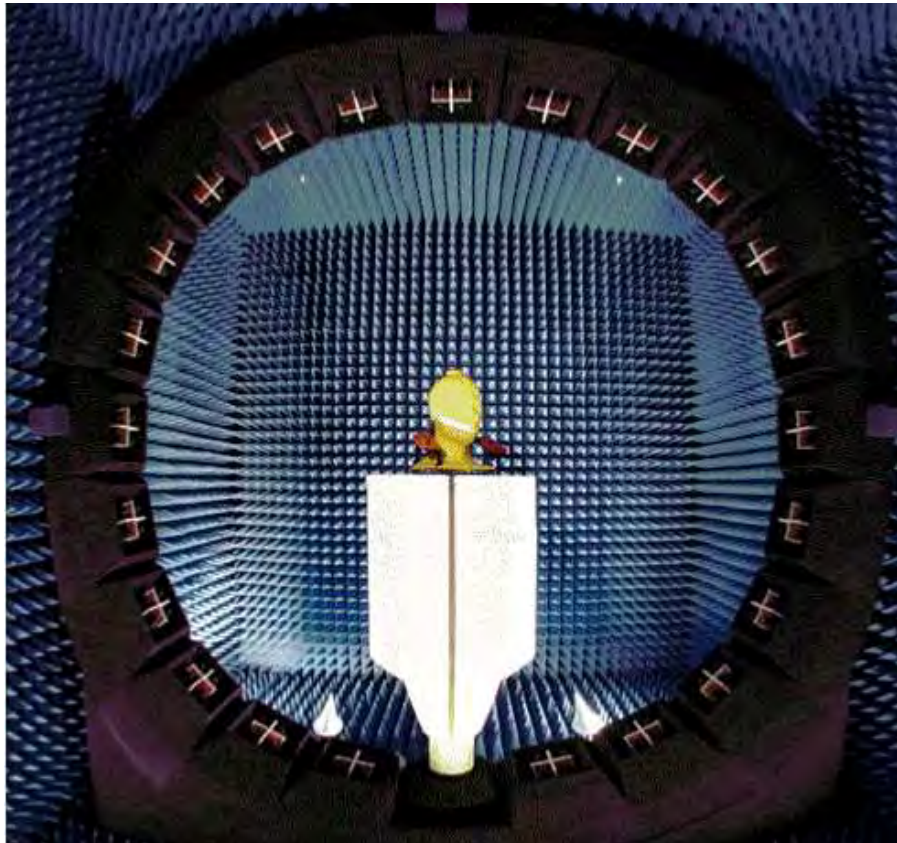


Isolation – Ant 13 & Ant 14



Antenna Measurement Chamber

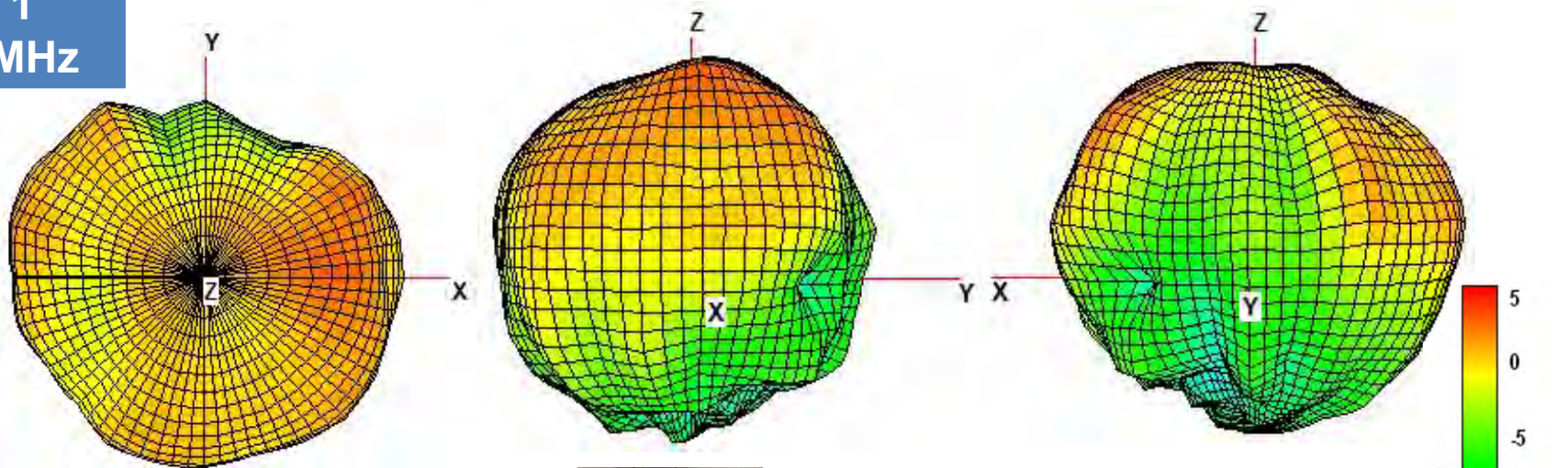
- ETS AMS8923 antenna measurement system
- Interior dimensions : $4.9(L) \times 4.9(W) \times 4.9(H) \text{m}^3$
- Operating band : 600 MHz – 6 GHz
- Support passive test & TRP/TIS test
- Provide graphic data display



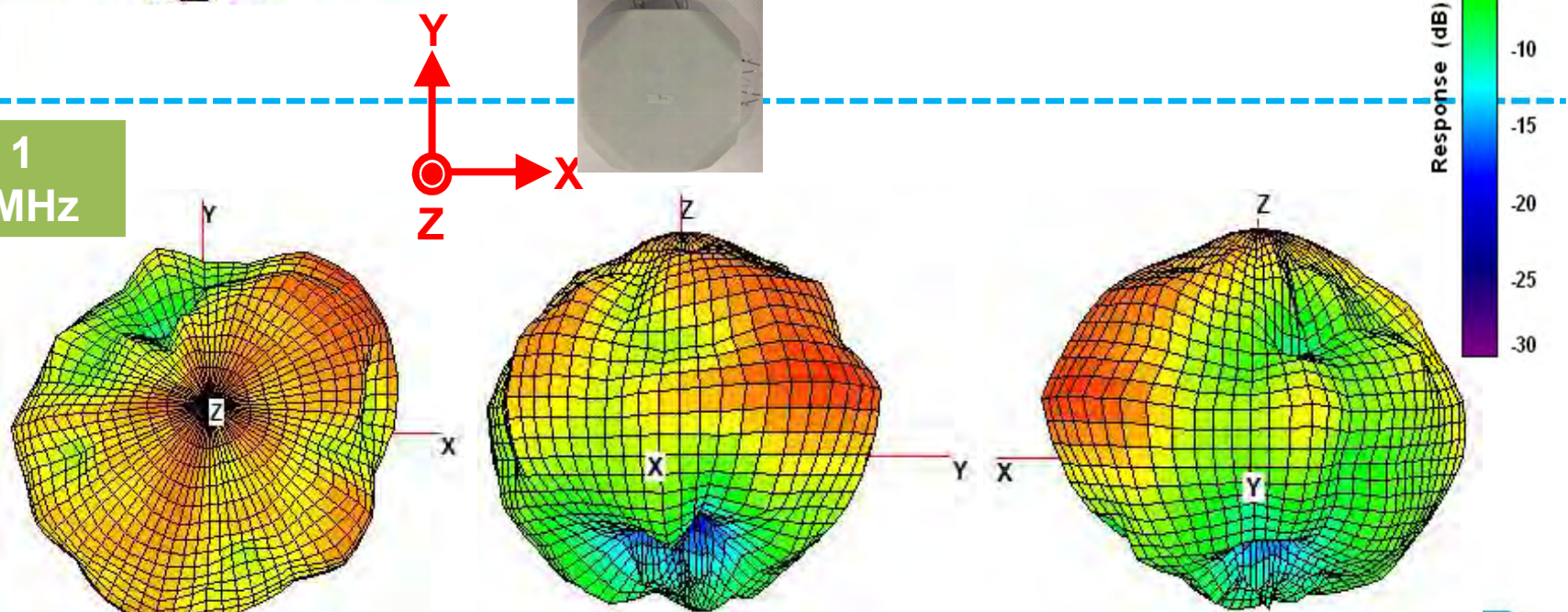
SERCOM

3D Radiation Pattern – Ant 1 WiFi 2G/5G

Ant 1
2450 MHz

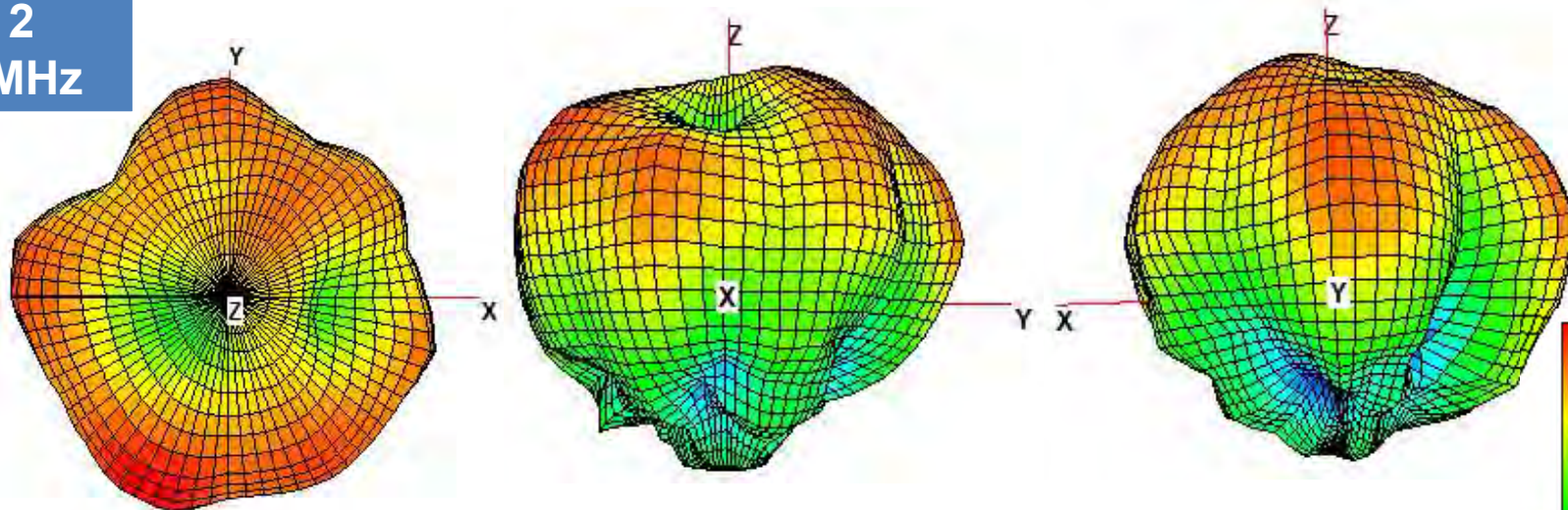


Ant 1
5500 MHz

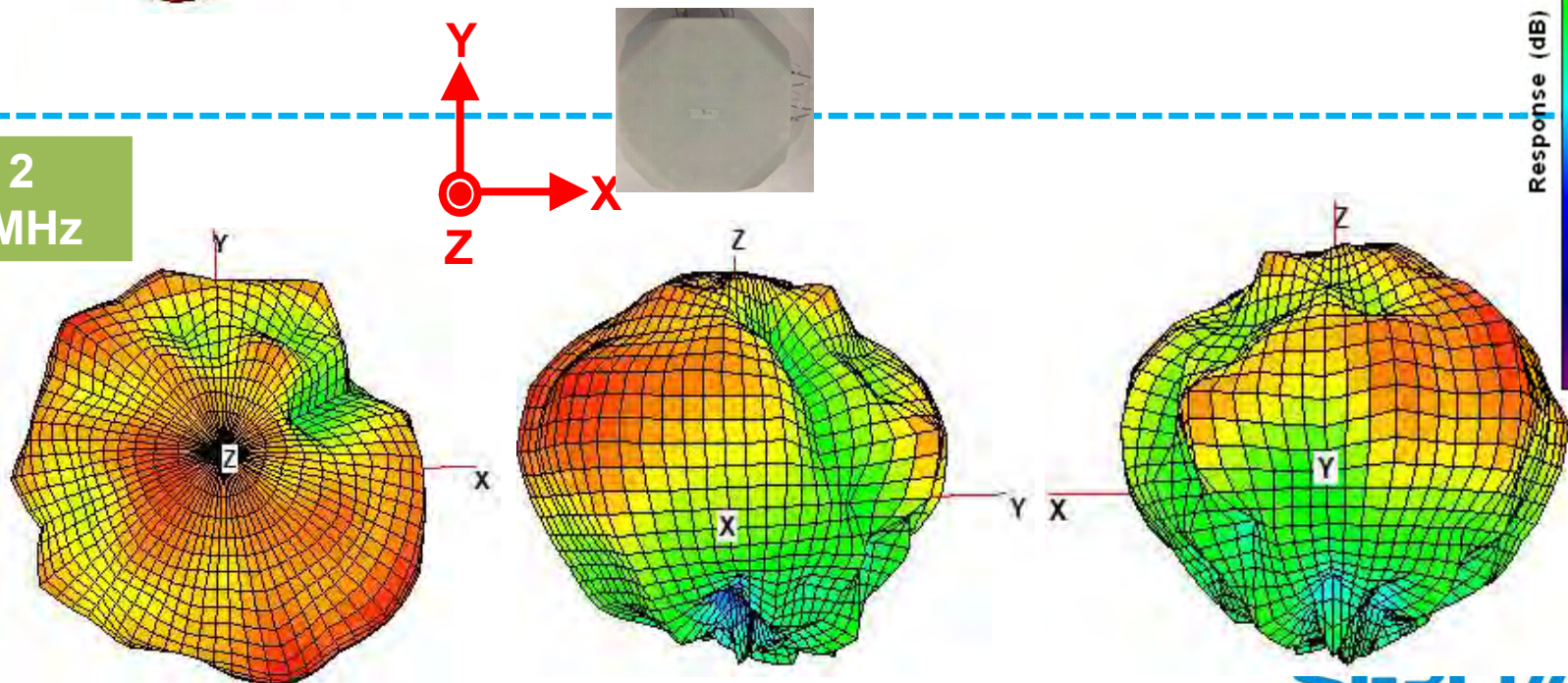


3D Radiation Pattern – Ant 2 WiFi 2G/5G

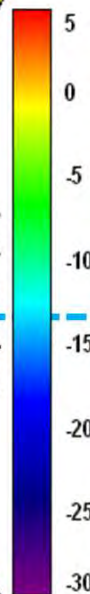
Ant 2
2450 MHz



Ant 2
5500 MHz

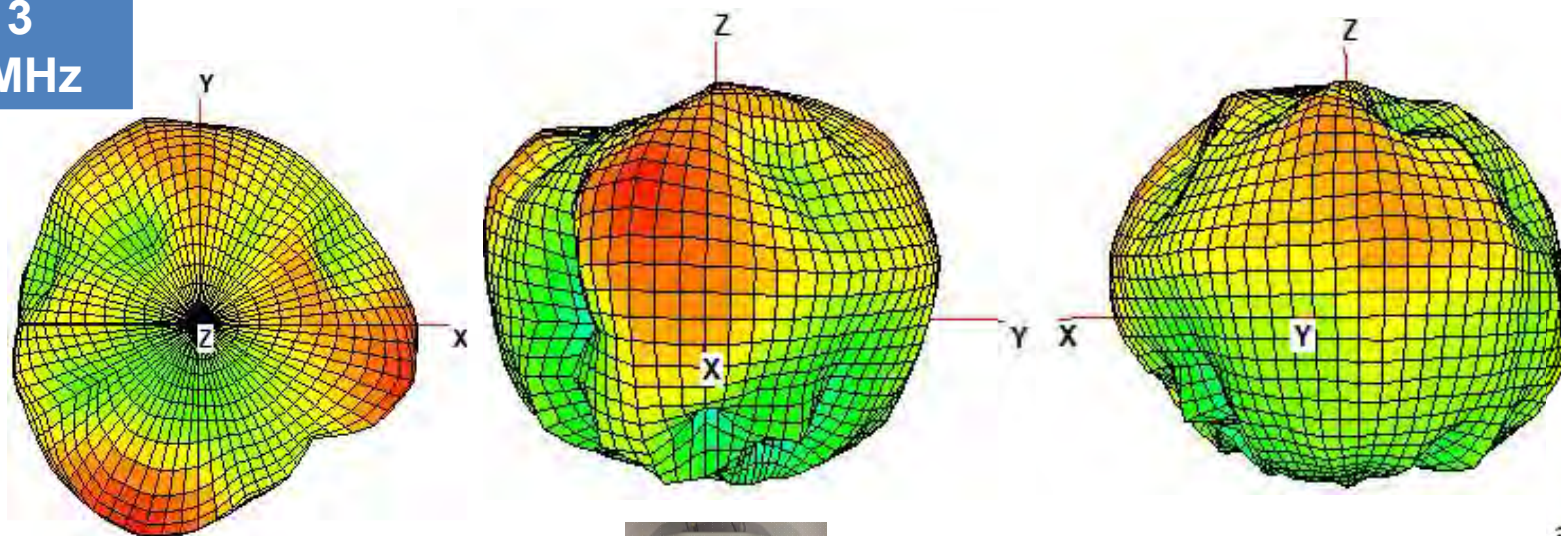


Response (dB)

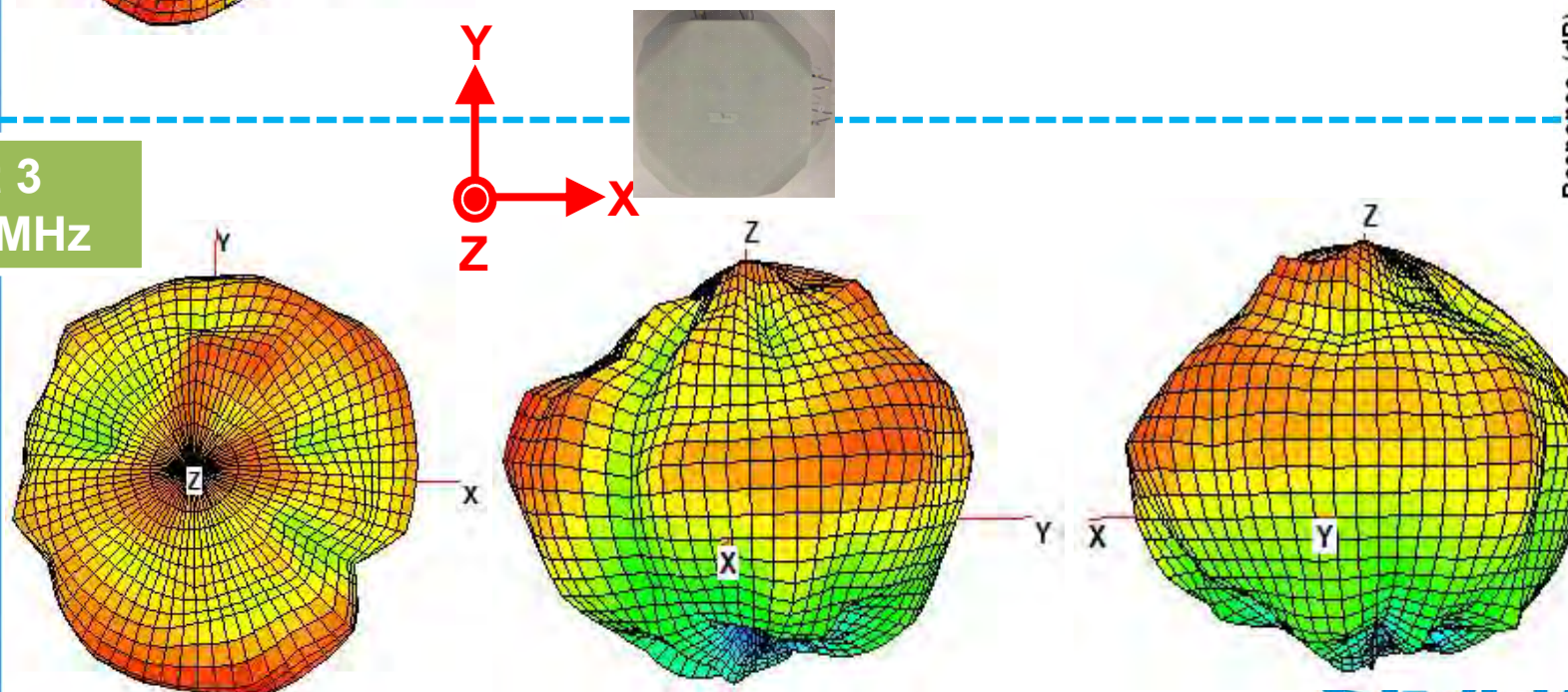


3D Radiation Pattern – Ant 3 WiFi 2G/5G

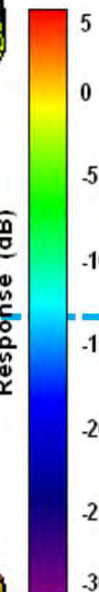
Ant 3
2450 MHz



Ant 3
5500 MHz

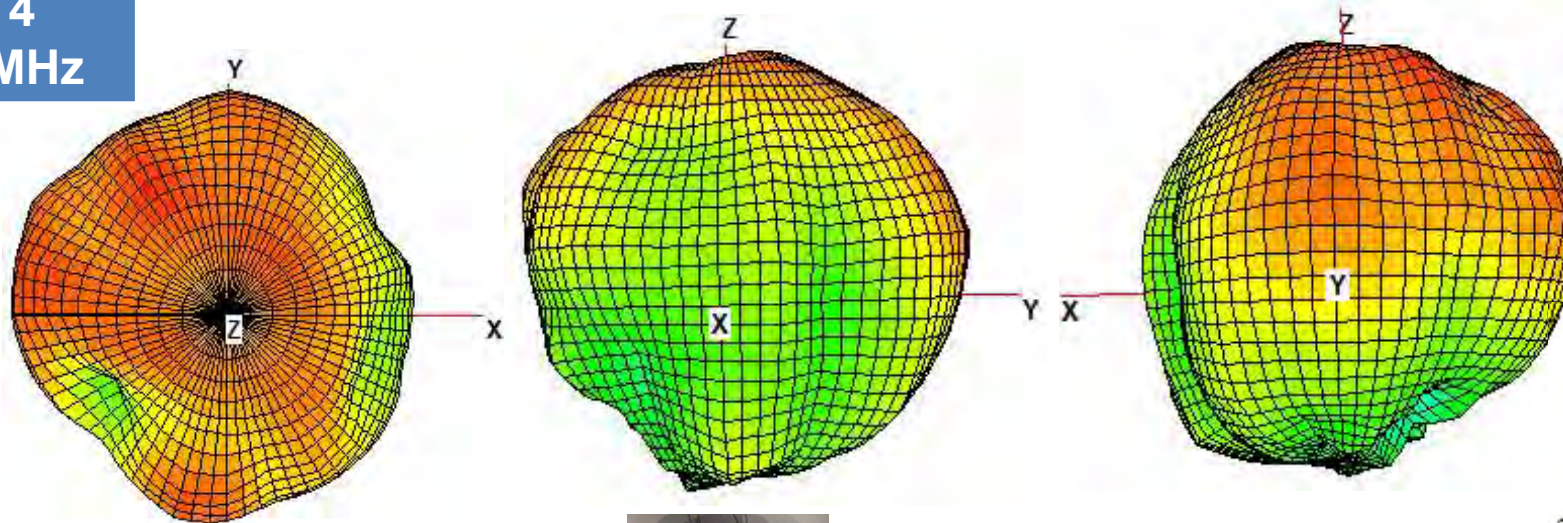


Response (dB)

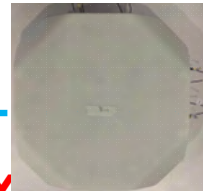
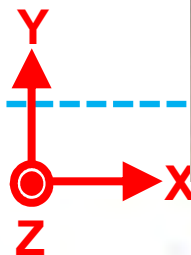
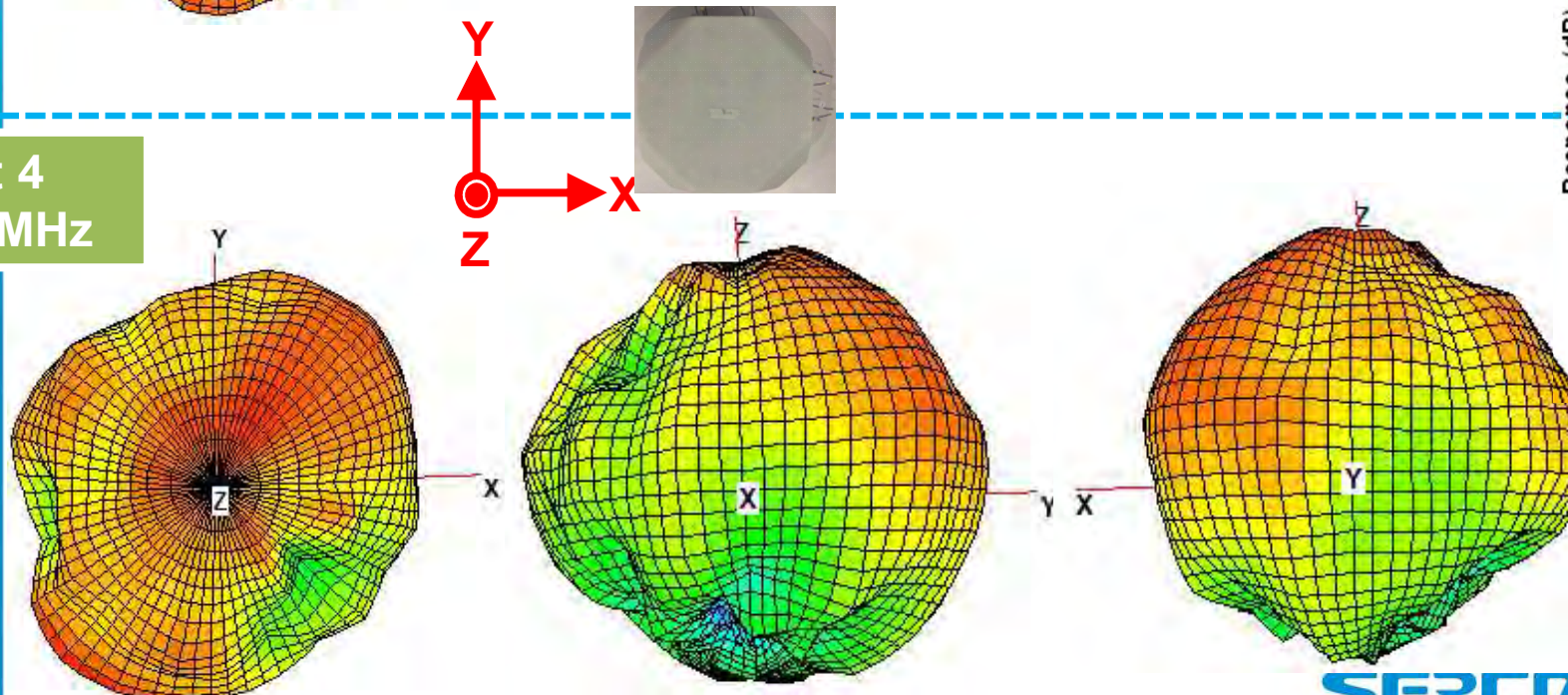


3D Radiation Pattern – Ant 4 WiFi 2G/5G

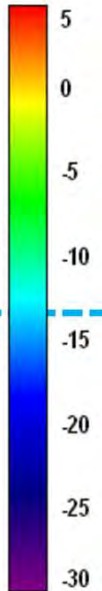
Ant 4
2450 MHz



Ant 4
5500 MHz



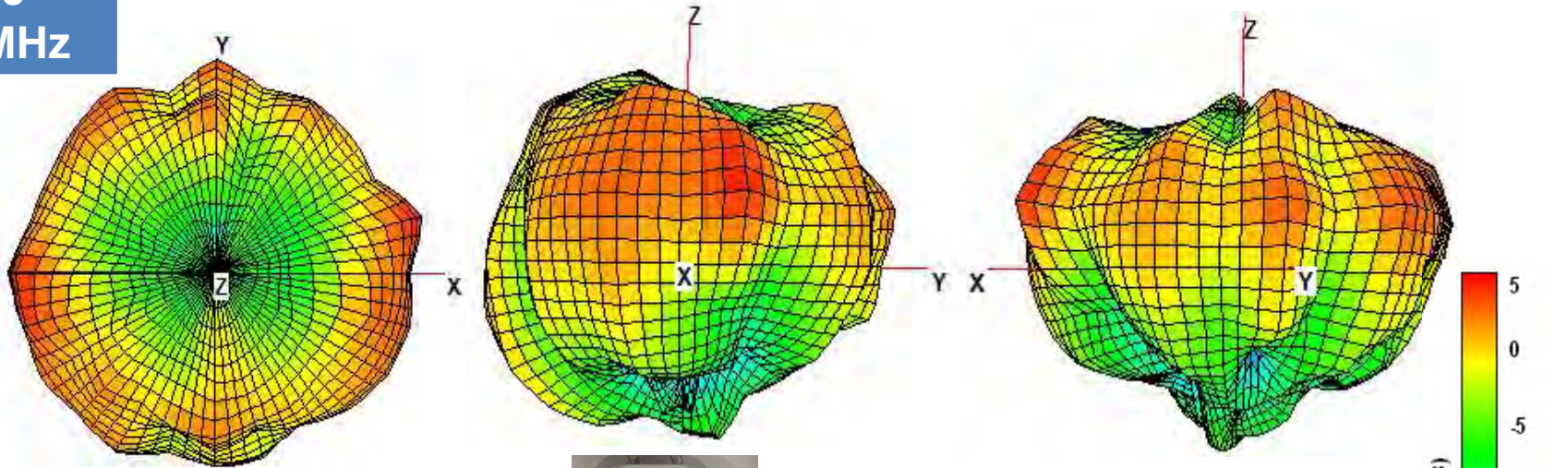
Response (dB)



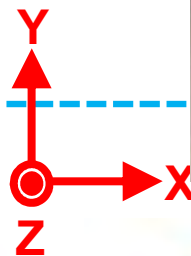
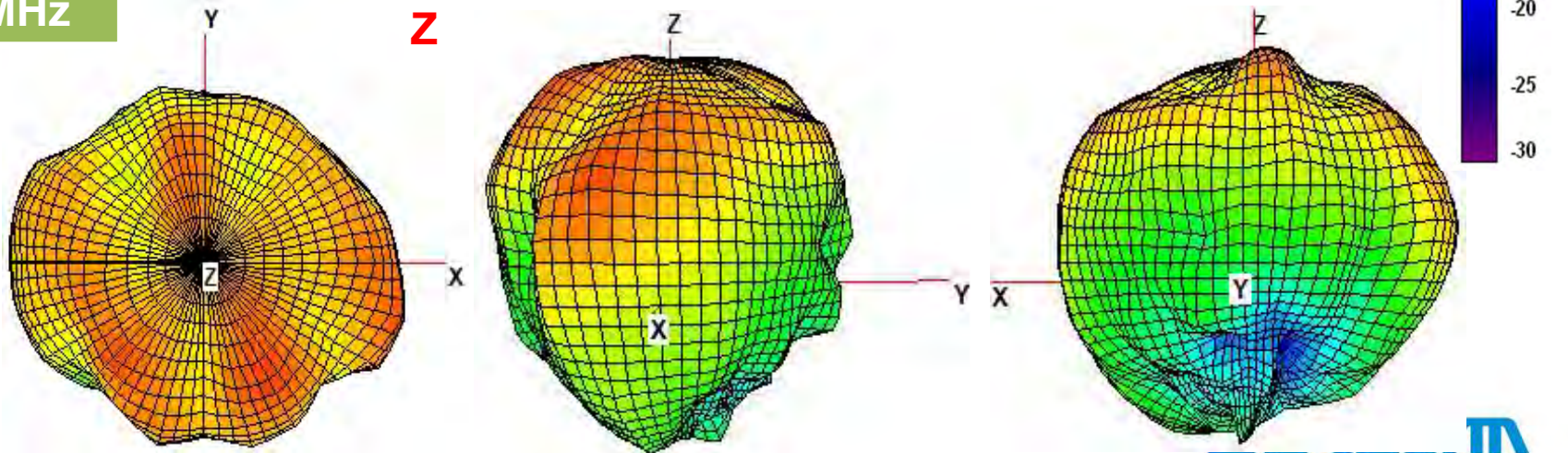
SERCOM

3D Radiation Pattern – Ant 5 & Ant 6 WiFi 5G

**Ant 5
5500 MHz**

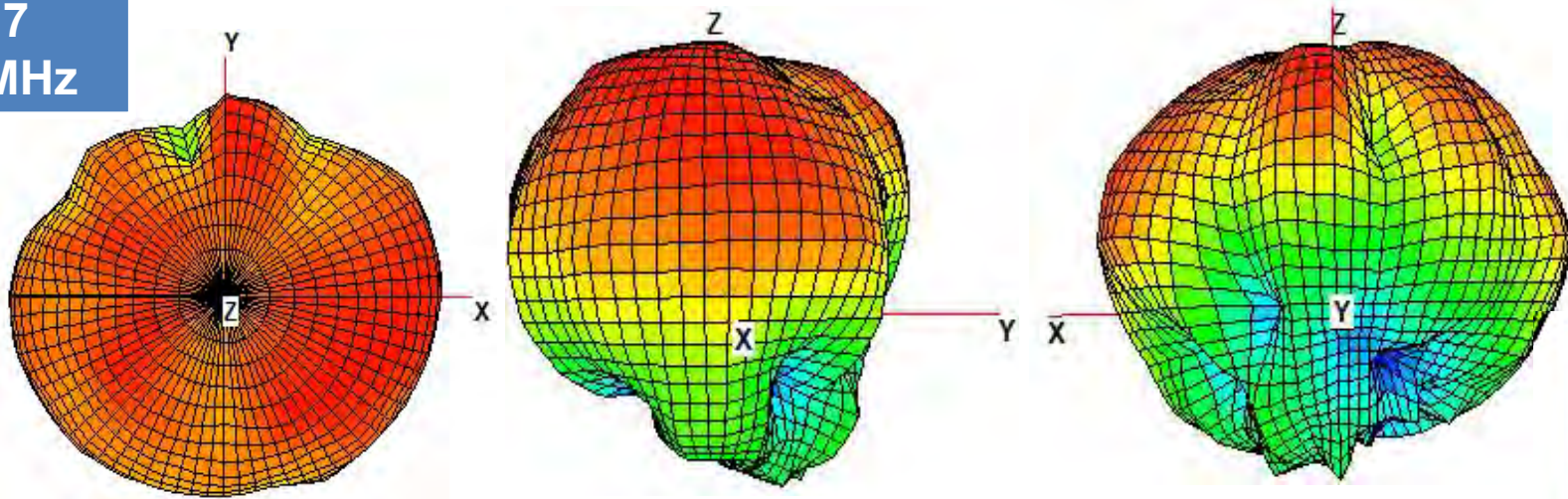


**Ant 6
5500 MHz**

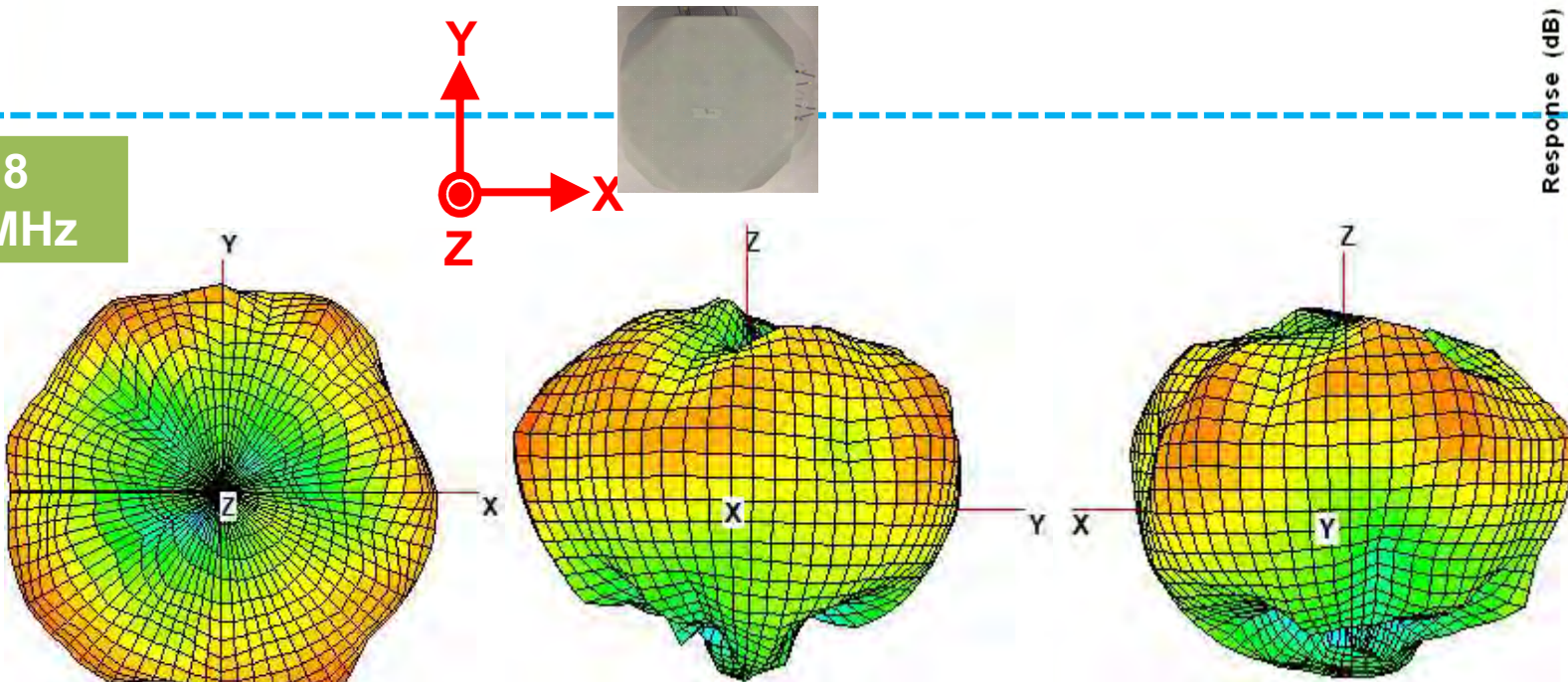


3D Radiation Pattern – Ant 7 & Ant 8 WiFi 5G

Ant 7
5500 MHz



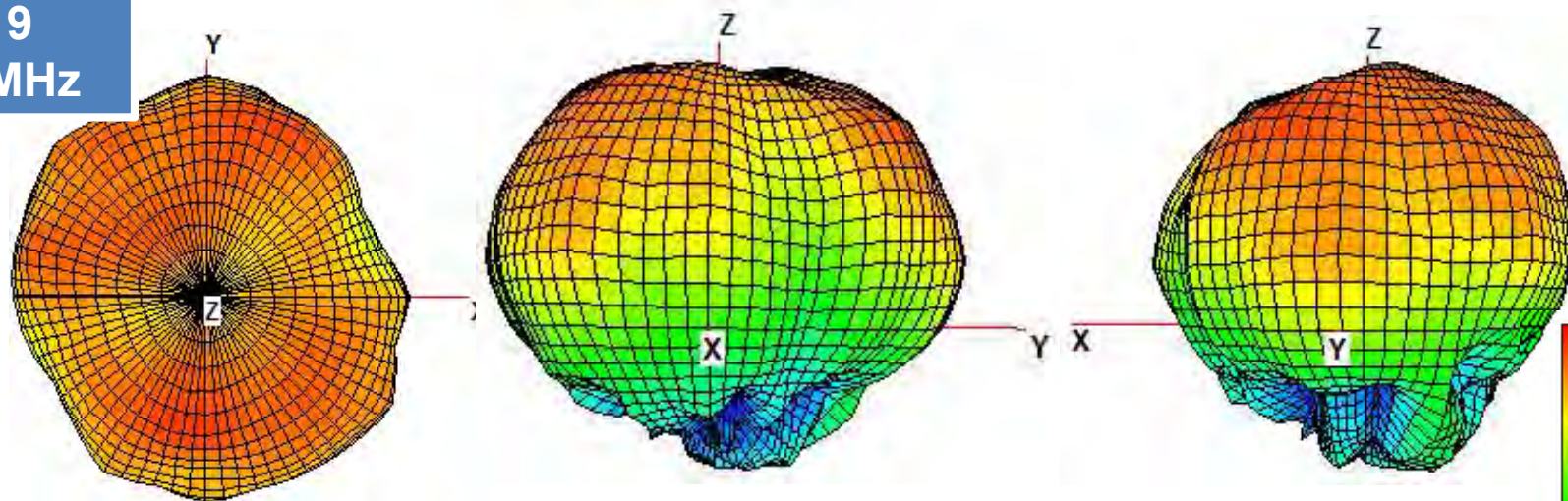
Ant 8
5500 MHz



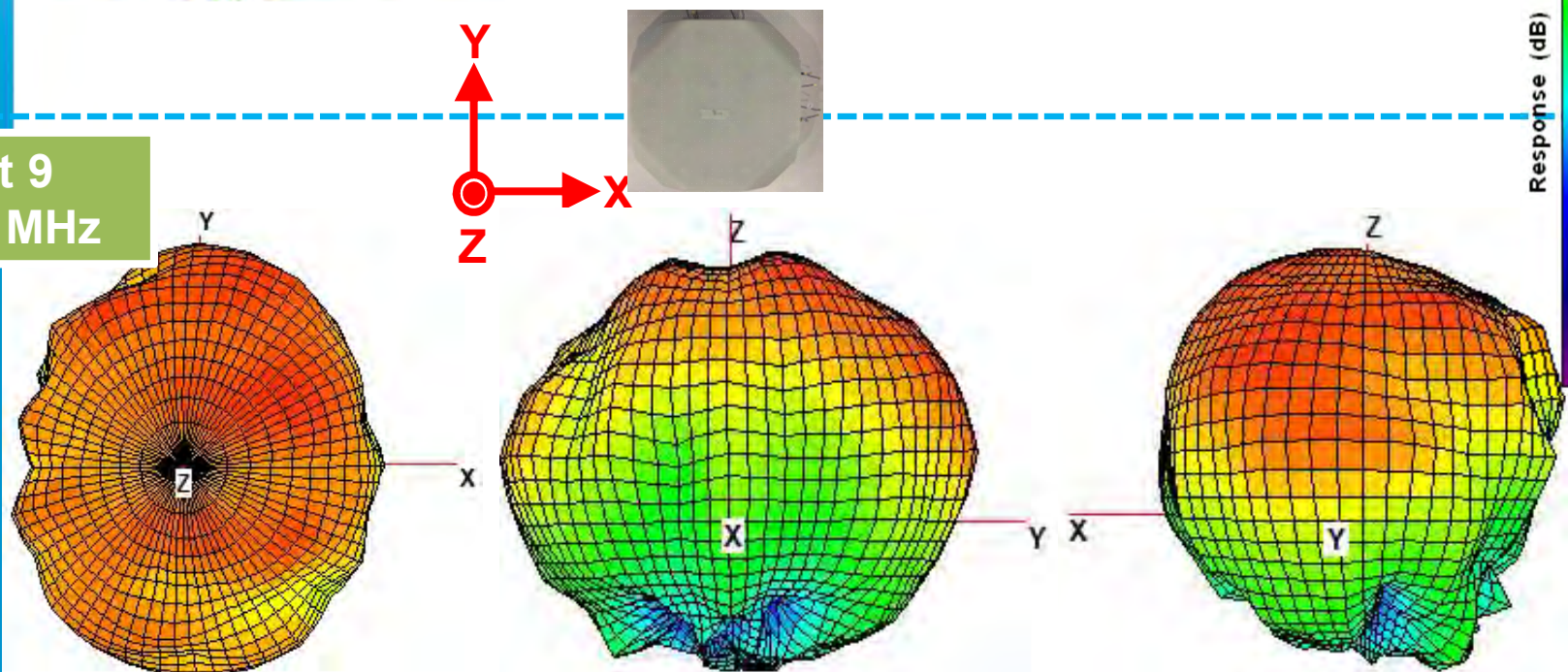
Response (dB)

3D Radiation Pattern – Ant 9 WiFi 5G/6G

Ant 9
5500 MHz

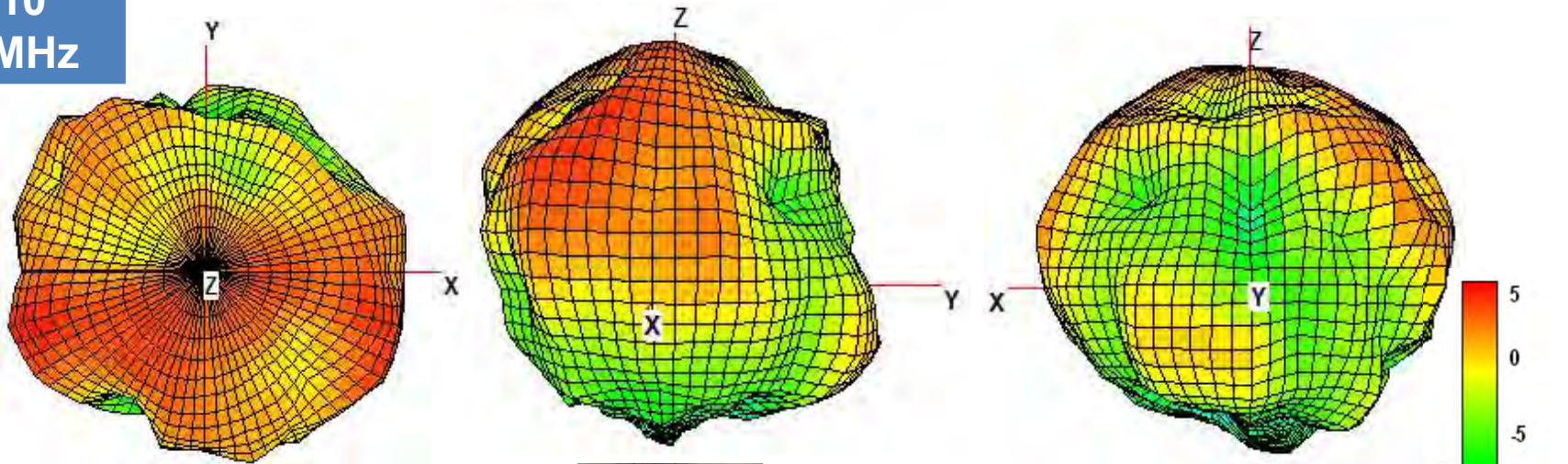


Ant 9
6500 MHz

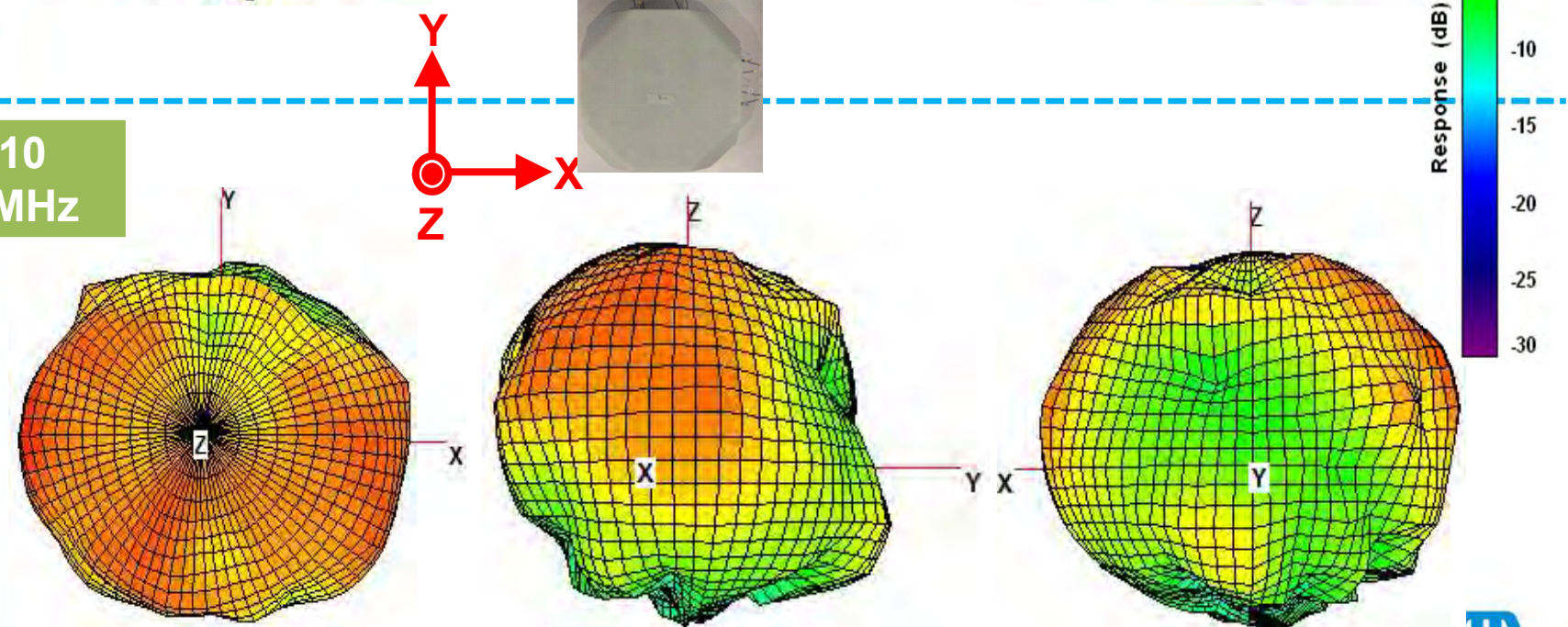


3D Radiation Pattern – Ant 10 WiFi 5G/6G

Ant 10
5500 MHz

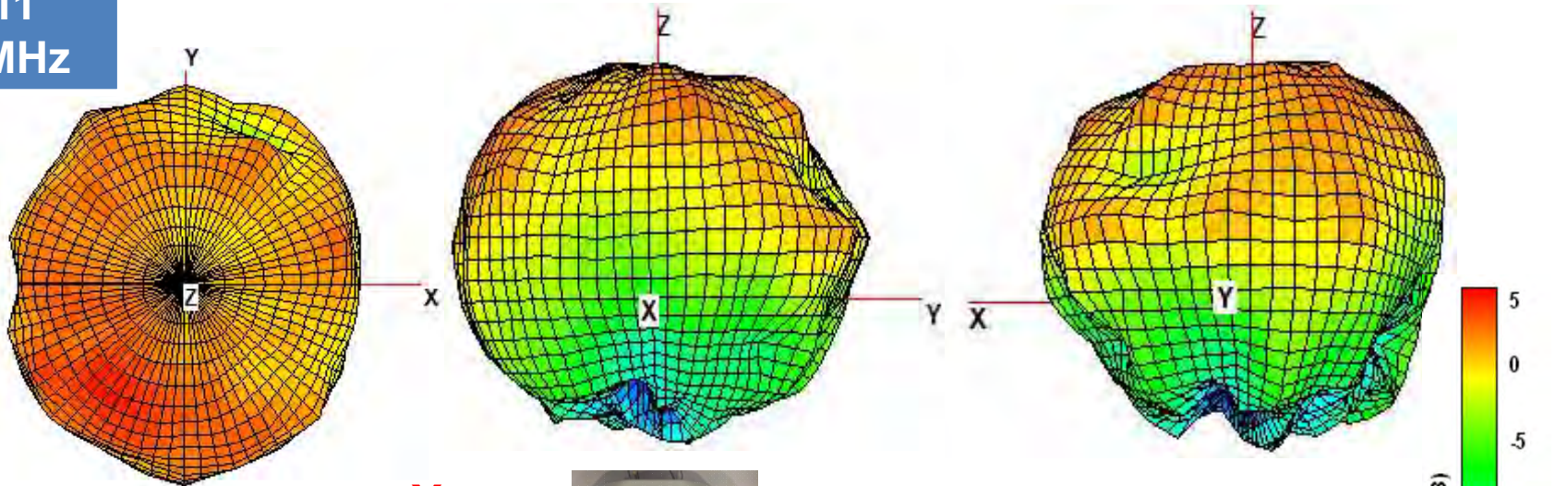


Ant 10
6500 MHz

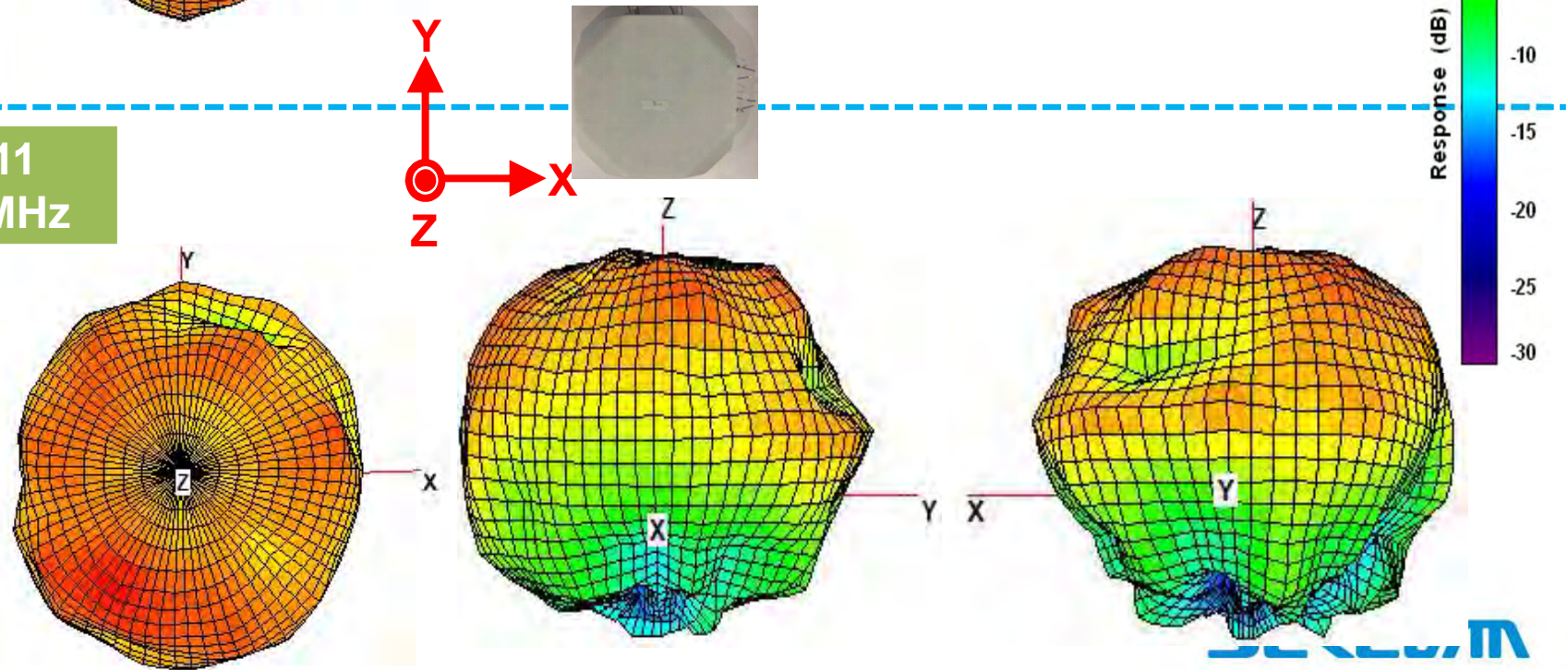


3D Radiation Pattern – Ant 11 WiFi 5G/6G

Ant 11
5500 MHz

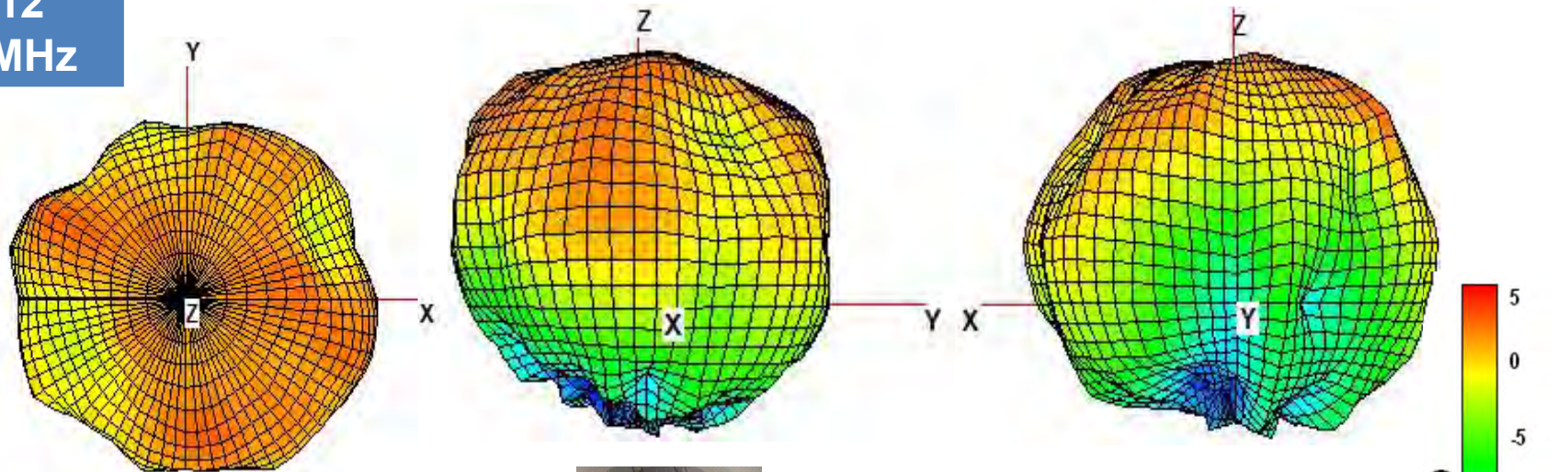


Ant 11
6500 MHz

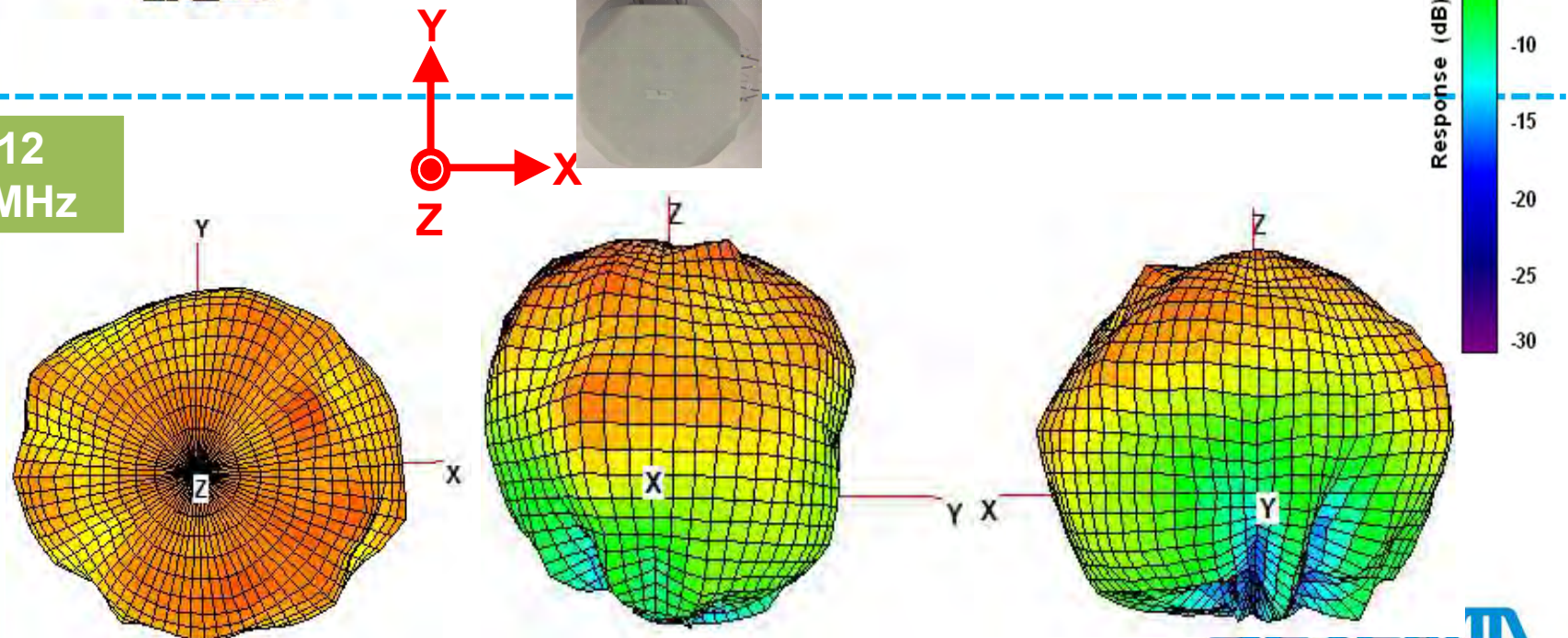


3D Radiation Pattern – Ant 12 WiFi 5G/6G

Ant 12
5500 MHz

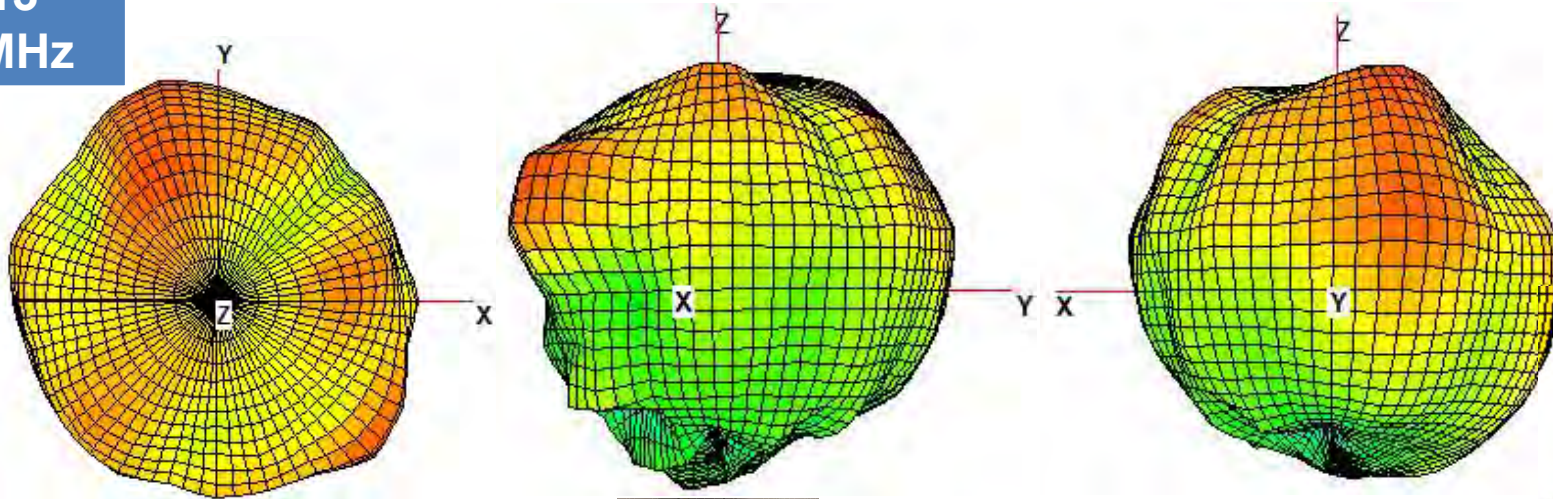


Ant 12
6500 MHz

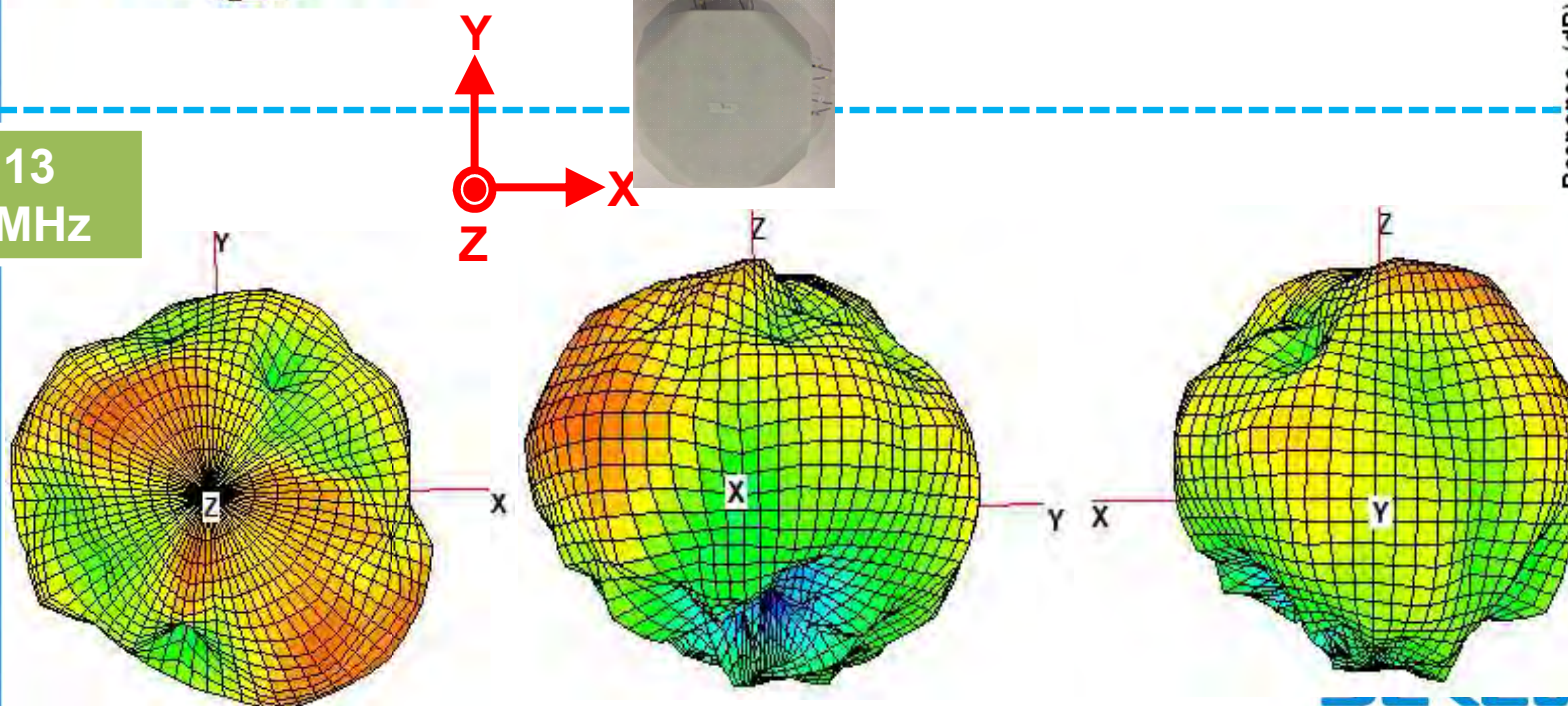


3D Radiation Pattern – Ant 13 Scanning

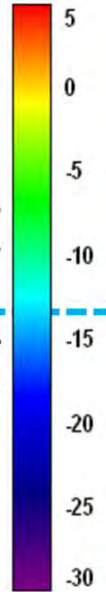
Ant 13
2450 MHz



Ant 13
5500 MHz

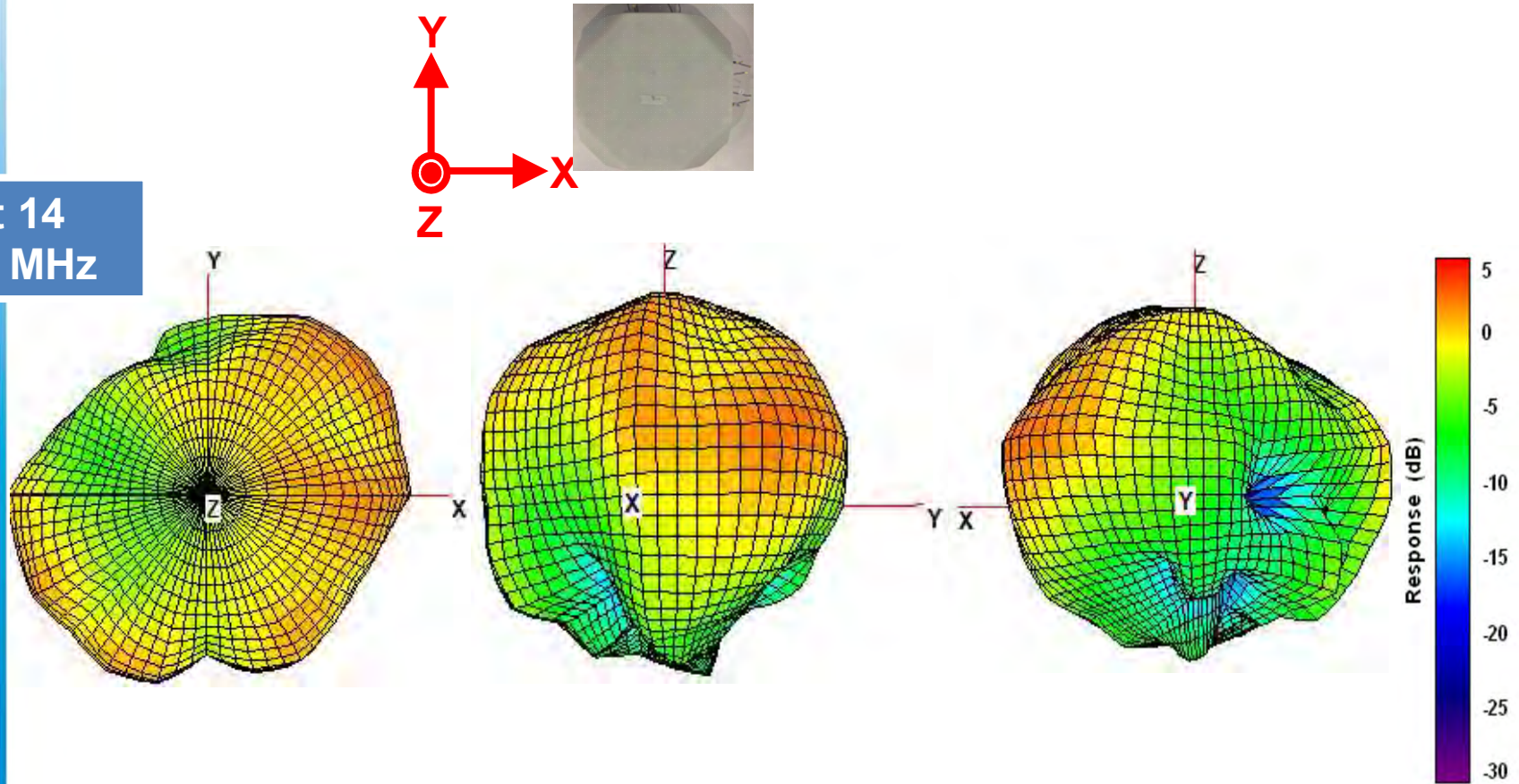


Response (dB)



3D Radiation Pattern – Ant 14 BLE

Ant 14
2450 MHz



Peak Gain & Efficiency

Ant 1 (WiFi 2.4G/5G)		
Freq. (MHz)	Peak Gain (dBi)	Efficiency (%)
2400	3.4	55
2450	3.5	60
2500	3.9	59
5150	3.6	58
5500	3.8	61
5850	3.9	59

Ant 2 (WiFi 2.4G/5G)		
Freq. (MHz)	Peak Gain (dBi)	Efficiency (%)
2400	3.8	66
2450	3.9	68
2500	3.7	64
5150	3.5	66
5500	3.8	67
5850	3.9	68

Ant 3 (WiFi 2.4G/5G)		
Freq. (MHz)	Peak Gain (dBi)	Efficiency (%)
2400	3.6	65
2450	3.9	63
2500	3.8	61
5150	3.7	65
5500	3.8	67
5850	3.9	66

Ant 4 (WiFi 2.4G/5G)		
Freq. (MHz)	Peak Gain (dBi)	Efficiency (%)
2400	3.6	64
2450	3.9	65
2500	3.5	61
5150	3.6	64
5500	3.8	66
5850	3.9	66

Peak Gain & Efficiency

Ant 5 (WiFi 5G)		
Freq. (MHz)	Peak Gain (dBi)	Efficiency (%)
5150	3.7	62
5500	3.9	61
5850	3.7	60

Ant 6 (WiFi 5G)		
Freq. (MHz)	Peak Gain (dBi)	Efficiency (%)
5150	3.5	61
5500	3.9	64
5850	3.7	65

Ant 7 (WiFi 5G)		
Freq. (MHz)	Peak Gain (dBi)	Efficiency (%)
5150	3.7	60
5500	3.9	61
5850	3.7	62

Ant 8 (WiFi 5G)		
Freq. (MHz)	Peak Gain (dBi)	Efficiency (%)
5150	3.8	62
5500	3.9	63
5850	3.7	65

Peak Gain & Efficiency

Ant 9 (WiFi 5G/6G)		
Freq. (MHz)	Peak Gain (dBi)	Efficiency (%)
5150	3.7	61
5500	3.9	67
5850	3.5	66
5925	3.8	68
6500	3.7	65
7125	3.8	66

Ant 10 (WiFi 5G/6G)		
Freq. (MHz)	Peak Gain (dBi)	Efficiency (%)
5150	3.8	62
5500	3.9	64
5850	3.7	61
5925	3.8	63
6500	3.5	62
7125	3.7	62

Ant 11 (WiFi 5G/6G)		
Freq. (MHz)	Peak Gain (dBi)	Efficiency (%)
5150	3.8	62
5500	3.9	64
5850	3.8	64
5925	3.8	63
6500	3.4	61
7125	3.8	64

Ant 12 (WiFi 5G/6G)		
Freq. (MHz)	Peak Gain (dBi)	Efficiency (%)
5150	3.8	62
5500	3.2	62
5850	3.2	65
5925	3.6	68
6500	3.6	65
7125	3.8	63

Peak Gain & Efficiency

Ant 13 Scanning		
Freq. (MHz)	Peak Gain (dBi)	Efficiency (%)
2400	3.0	60
2450	3.5	61
2500	3.0	60
5150	3.9	63
5500	3.9	62
5850	3.8	64

Ant 14 BLE		
Freq. (MHz)	Peak Gain (dBi)	Efficiency (%)
2400	3.1	62
2450	3.5	63
2500	3.2	61

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