



TEST REPORT
ON
9 TO 11 GHz
PHASE SHIFTER

PMI MODEL No:
PS-360-DC-1 OPTION 911

Serial Number: PM805102

DESIGNED
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MAY 25, 2008

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ISO9001 : 2000 CERTIFIED



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PHASE SHIFTER

KEY FEATURES:

- Flat Response
- 360° Phase Shift
- High Speed
- Lower Insertion Loss
- Small Size – 1.75" x 2.36" x 0.5" with Connectors
- Low Power Consumption



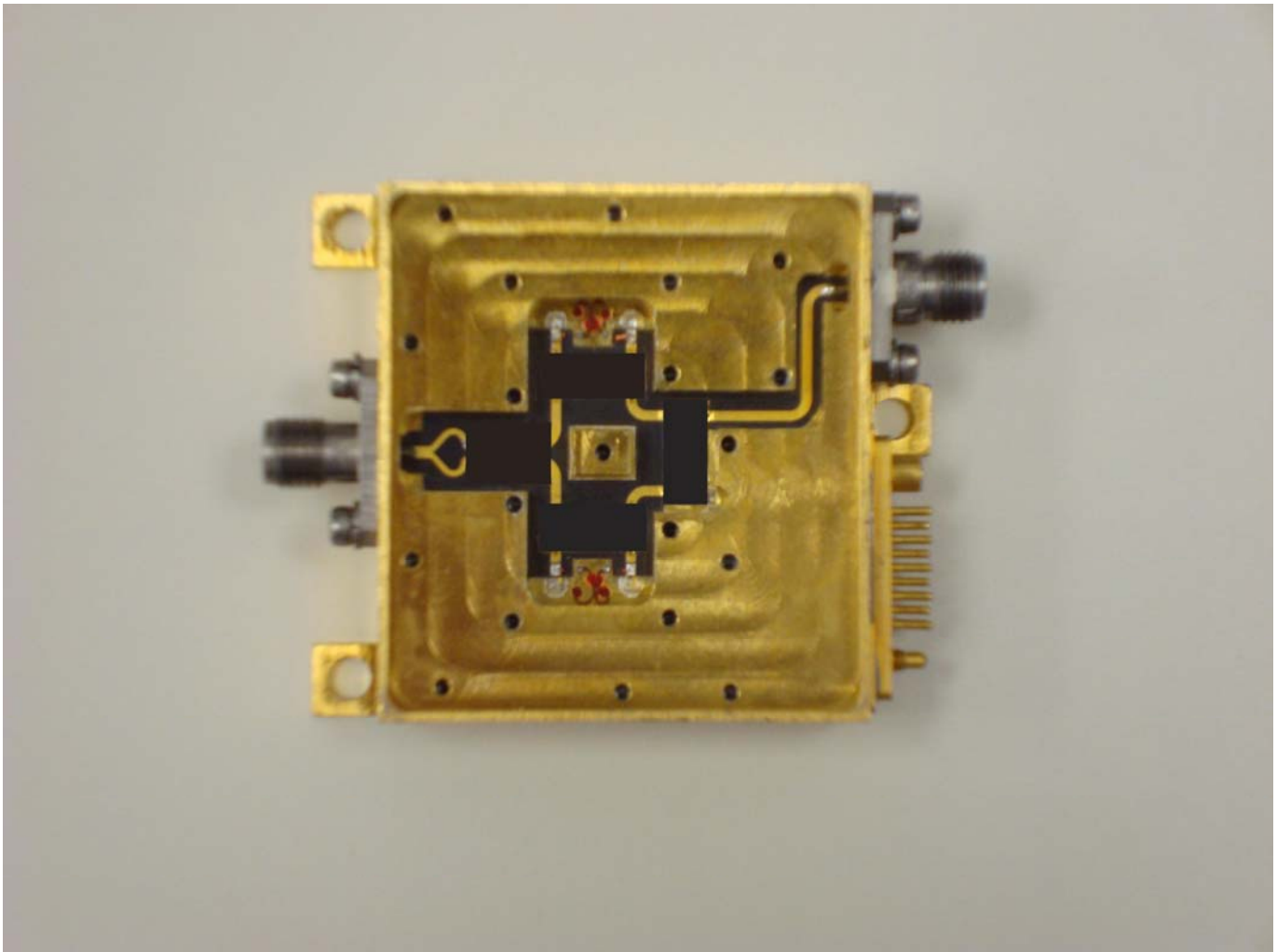
SPECIFICATIONS:

■ FREQUENCY RANGE	9 TO 11 GHz
■ INSERTION LOSS	12 dB Maximum, Typically 10 dB Maximum
■ VSWR INPUT/OUTPUT	2.0:1 Maximum
■ PHASE ERROR	<10° Absolute Error Typical
■ TRANSLATION RATE	500 KHz (4 Most Significant Bits)
■ CARRIER SUPPRESSION	> 20 dBc Typical
■ SIDEBAND SUPPRESSION	> 15 dBc Typical
■ PM/AM	±2 dB Max.
■ DC POWER	+12 VOLTS@250mA (Max.), -12 VOLTS@20mA(Max.)



ENVIRONMENTAL RATINGS:

Temperature:	-55 °C to +85 °C Operating
	-65 °C to +125 °C Non-Operating
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





PRODUCT FEATURE

DESCRIPTION

PMI MODEL NO.: PS-360-DC-1 OPTIONS: 911 IS AN 8-BIT DIGITAL CONTROLLED PHASE SHIFTER OPERATING FROM THE 9 TO 11 GHz FREQUENCY RANGE. THE PHASE SHIFTER HAS A 360° RANGE AND IS HIGH SPEED.

SPECIFICATIONS

- FREQUENCY RANGE: 9 TO 11 GHz MINIMUM
- INSERTION LOSS: 12.0 dB MAXIMUM, 10 dB TYPICAL
- VSWR: 2.0:1 MAXIMUM
- ACCURACY (MAXIMUM): ±12° MAXIMUM
- PW/AM (MAXIMUM): ±2 dB TYPICAL
- TRANSLATION RATE: 0 TO 500 kHz MINIMUM
- CARRIER SUPPRESSION: MAIN BAND: >20 dB TYPICAL
- SIDE BAND SUPPRESSION: MAIN BAND: >20 dB TYPICAL

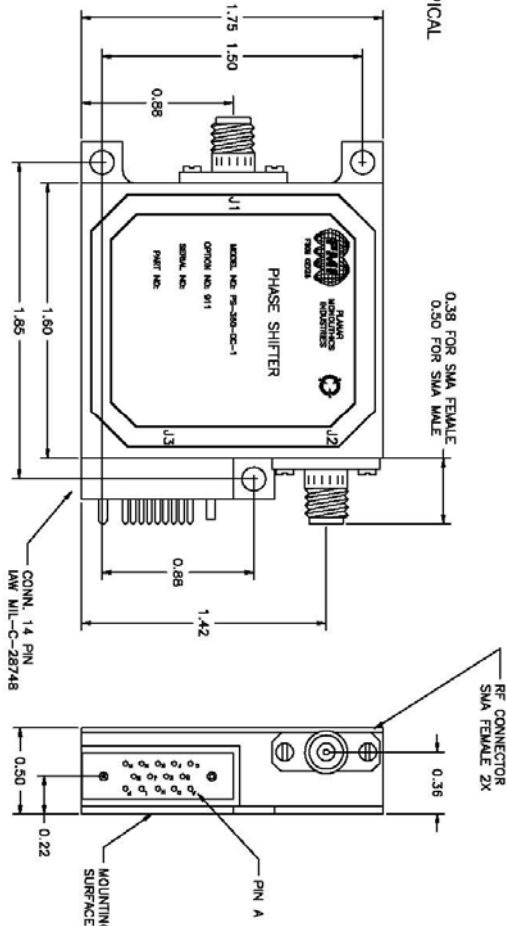
PERFORMANCE CHARACTERISTICS	
PHASE SHIFT	POWER HANDLING CAPABILITY
RANGE: 360° IN 256 STEPS	WITHOUT DEGRADATION: +13 dBm
CONTROL INPUT: 8 BIT TTL	POWER SUPPLY REQUIREMENTS
SWITCHING SPEED: 500 nS MAX	10° OF FINAL PHASE VALUE: >20 dBc (yp. (9-11 GHz)
HARMONICS: >20 dBc (yp. (9-11 GHz)	>20 dBc (yp. (9-11 GHz)
	-12V ± 5%, 20 mA

OPTIONS:

- 618: OPTIMIZED FOR 6 TO 18 GHz
- 792BA: CUSTOMER SPECIFICATIONS

ENVIRONMENTAL RATINGS:

- TEMPERATURE: -55°C TO +85°C (OPERATING)
-65°C TO +125°C (STORAGE)
 - HUMIDITY: MIL-STD-202G, METHOD 103B COND. B (96 HRS AT 95%)
 - SHOCK: MIL-STD-202G, METHOD 2138 COND. B (75 G, 6 MSEC)
 - VIBRATION: MIL-STD-202G, METHOD 204D COND. B (0.06" DOUBLE AMPLITUDE OR 15G, WHICHEVER IS LESS)
 - ALTITUDE: MIL-STD-202G, METHOD 105C COND. B (50,000 FT.)
 - TEMPERATURE CYCLE: MIL-STD-202G, METHOD 107D COND. A
- NOTE: SPECIFICATIONS WILL VARY OVER OPERATING TEMPERATURE
 NOTE: THE ABOVE SPECIFICATIONS ARE SUBJECT TO CHANGE OR REVISION



PMI	FUNCTION
A	GROUND
B	N/C
C	-12V
D	1.4" (35.3)
E	5.2
F	22.5
G	11.5
H	1.02
I	1.87" (47.5)
J	+12 V
K	45
L	50
M	50
N	50
P	50
R	N/C

REV.	DESCRIPTION	DATE	APPROVED
1	ORIGINAL RELEASE	05/15/08	
A	SEE ECN #08-006	05/15/08	

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 ISO 9001:2000 CERTIFIED

APPROVALS

DATE

5-15/08

TITLE

PRODUCT FEATURE

PS-360-DC-1

OPTION: 911

SIZE FROM NO.

SIZE TO NO.

9 TO 11 GHz DIGITAL CONTROLLED PHASE SHIFTER

SIZE FROM NO.

A 02XZ8

PMI NO.

100-7735-001

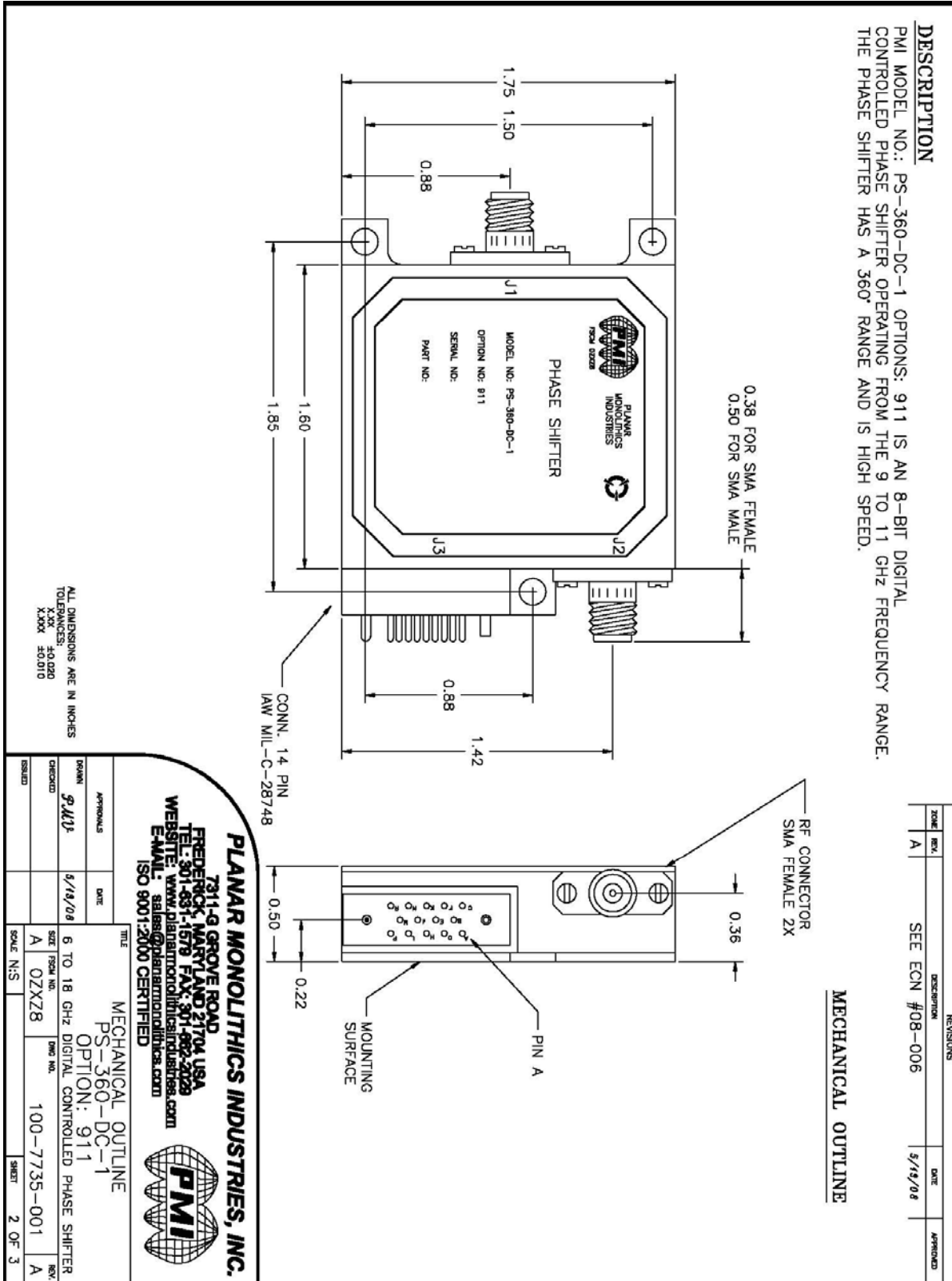
REV.

A

SHEET 1 OF 3

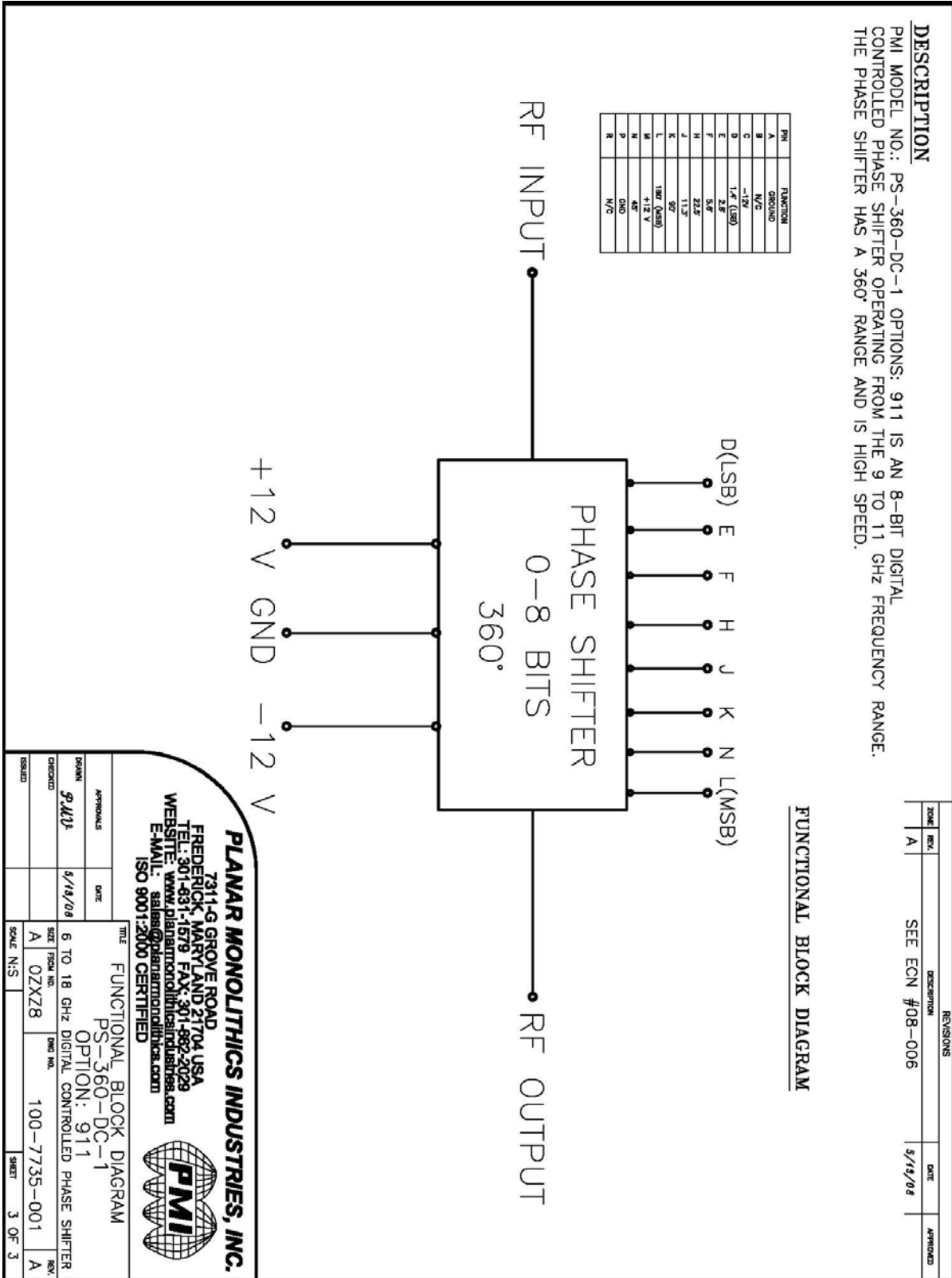


OUTLINE DRAWING





FUNCTIONAL SCHEMATIC

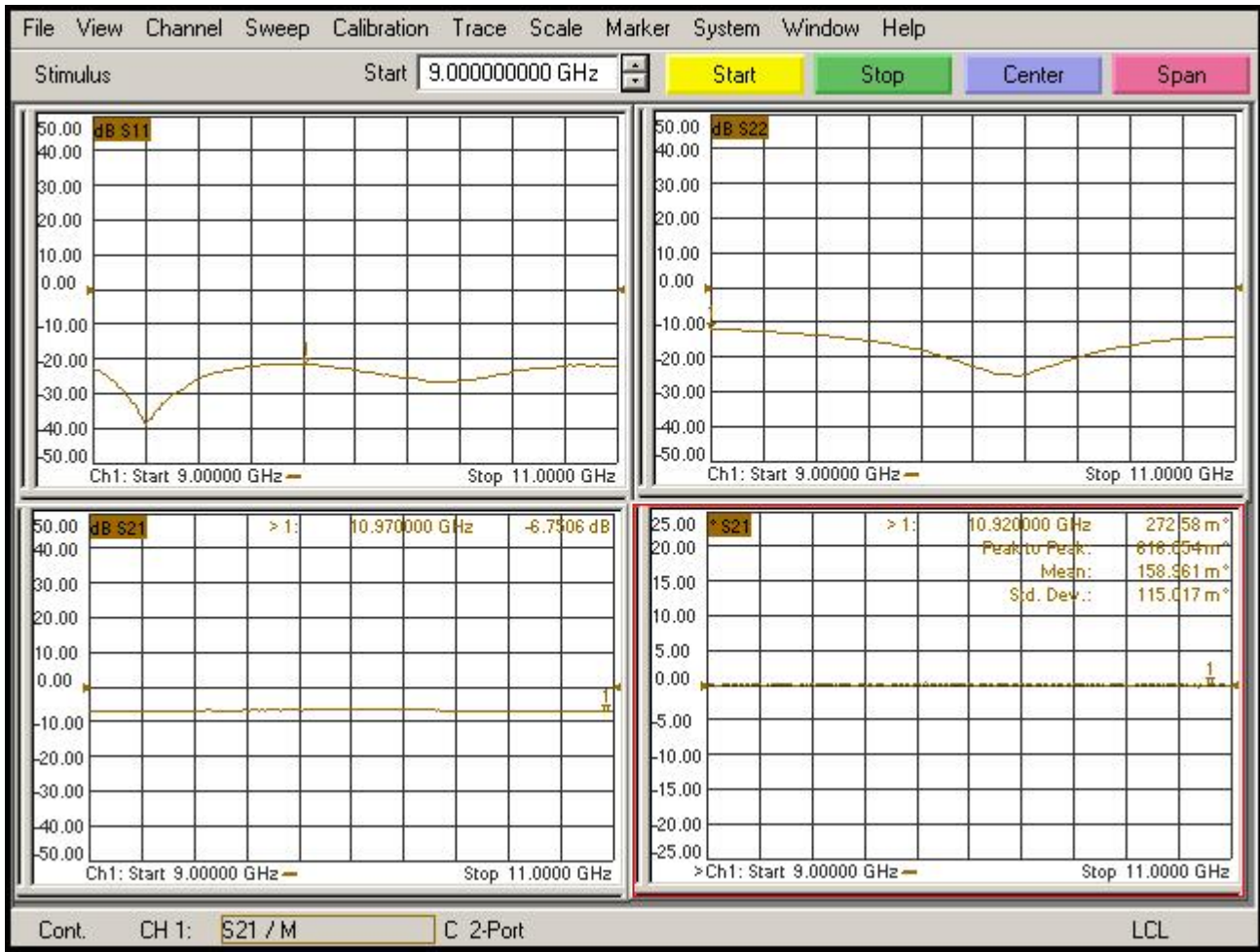




S PARAMETERS@0°

S11

S22



S21(dB)

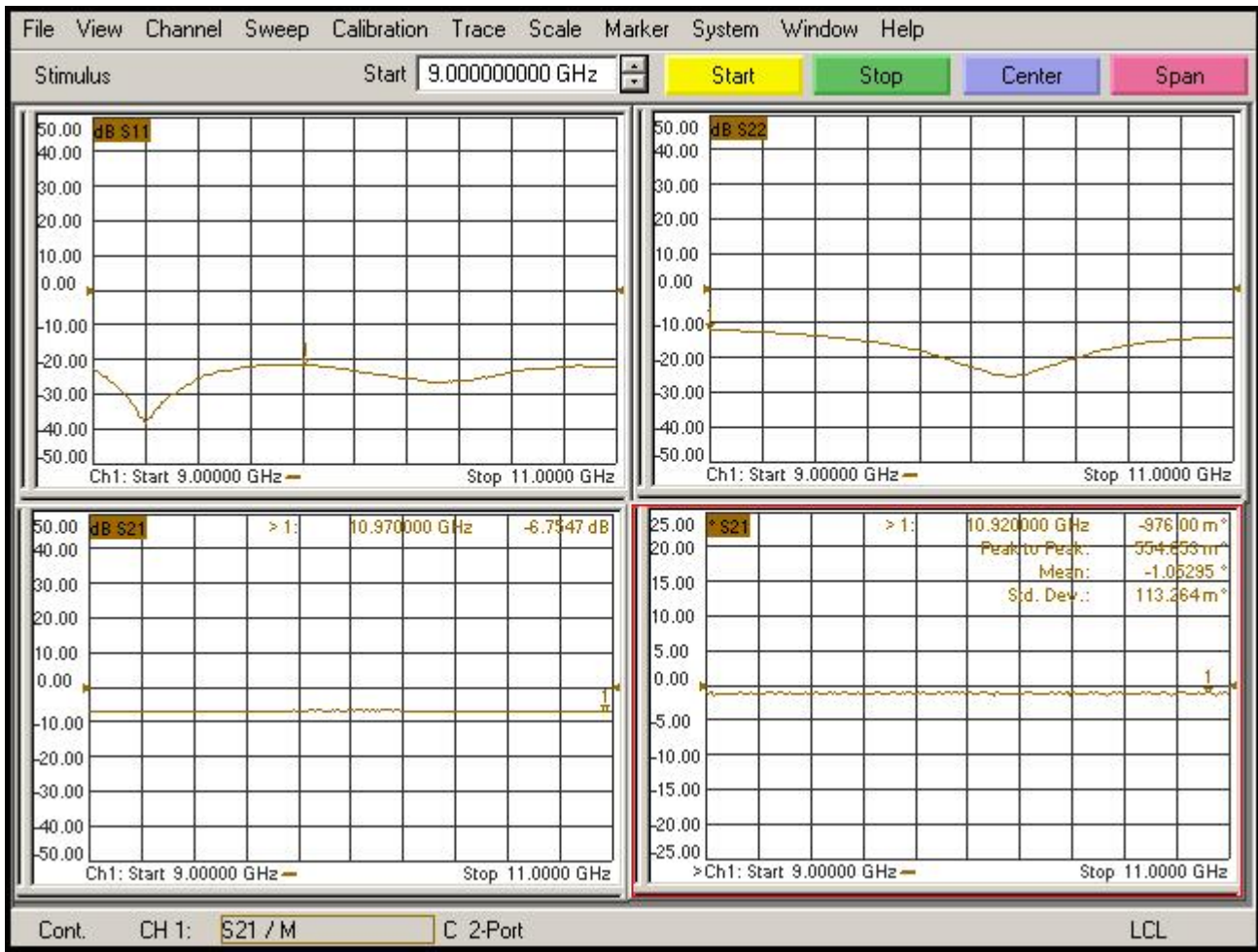
S21°



S PARAMETERS@1.4°

S11

S22



S21(dB)

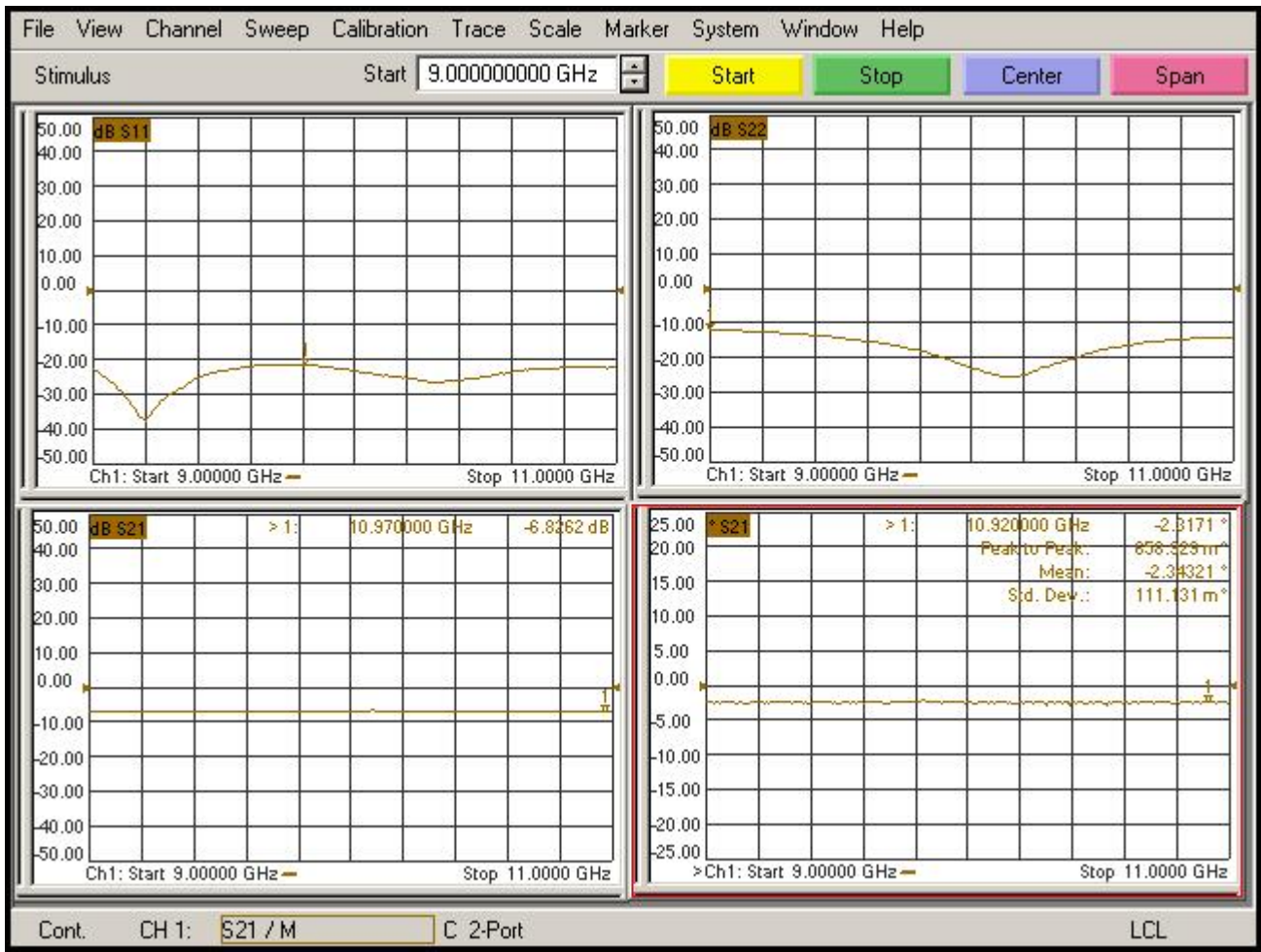
S21°



S PARAMETERS@2.8°

S11

S22



S21(dB)

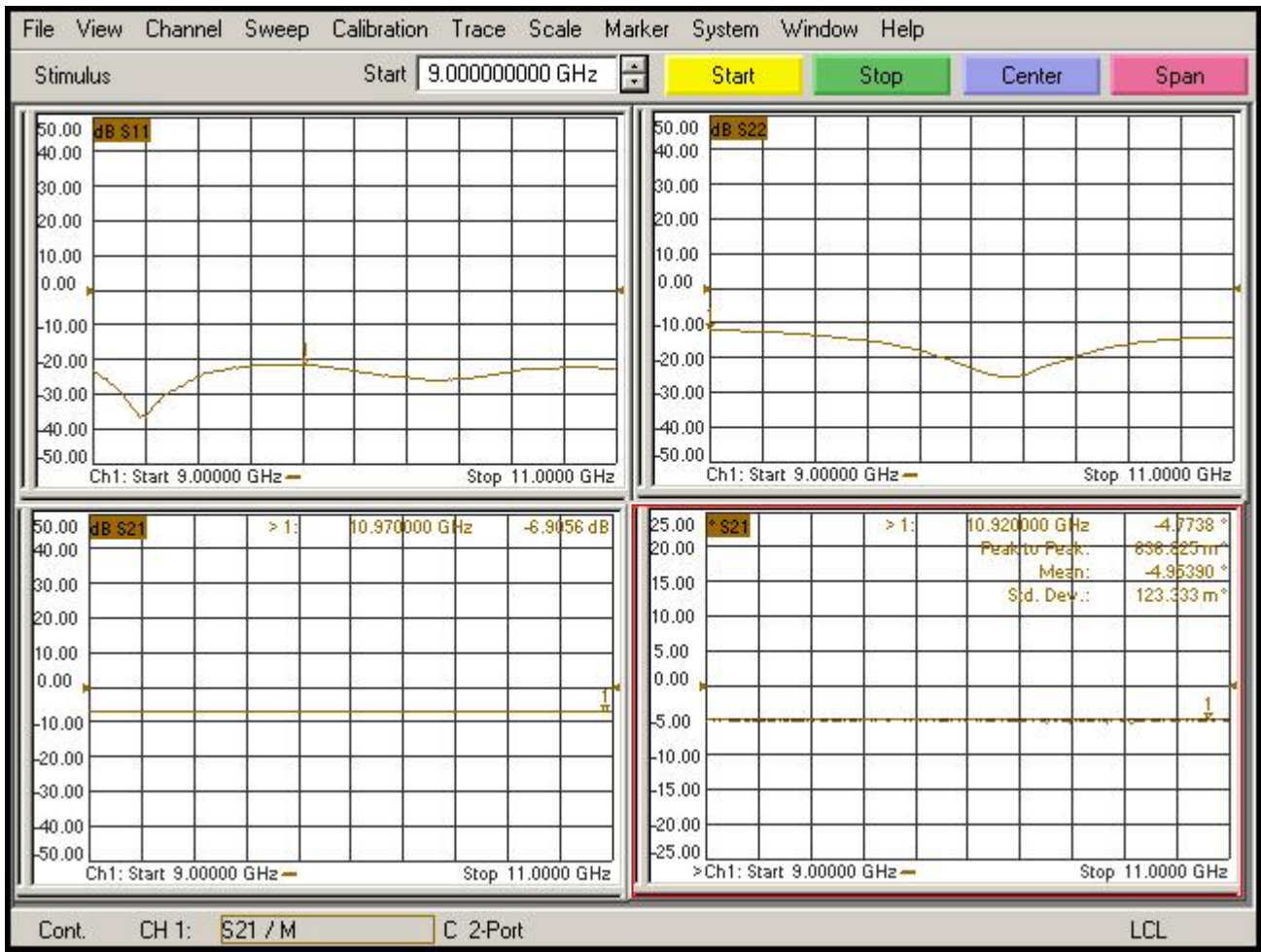
S21°



S PARAMETERS@5.6°

S11

S22



S21(dB)

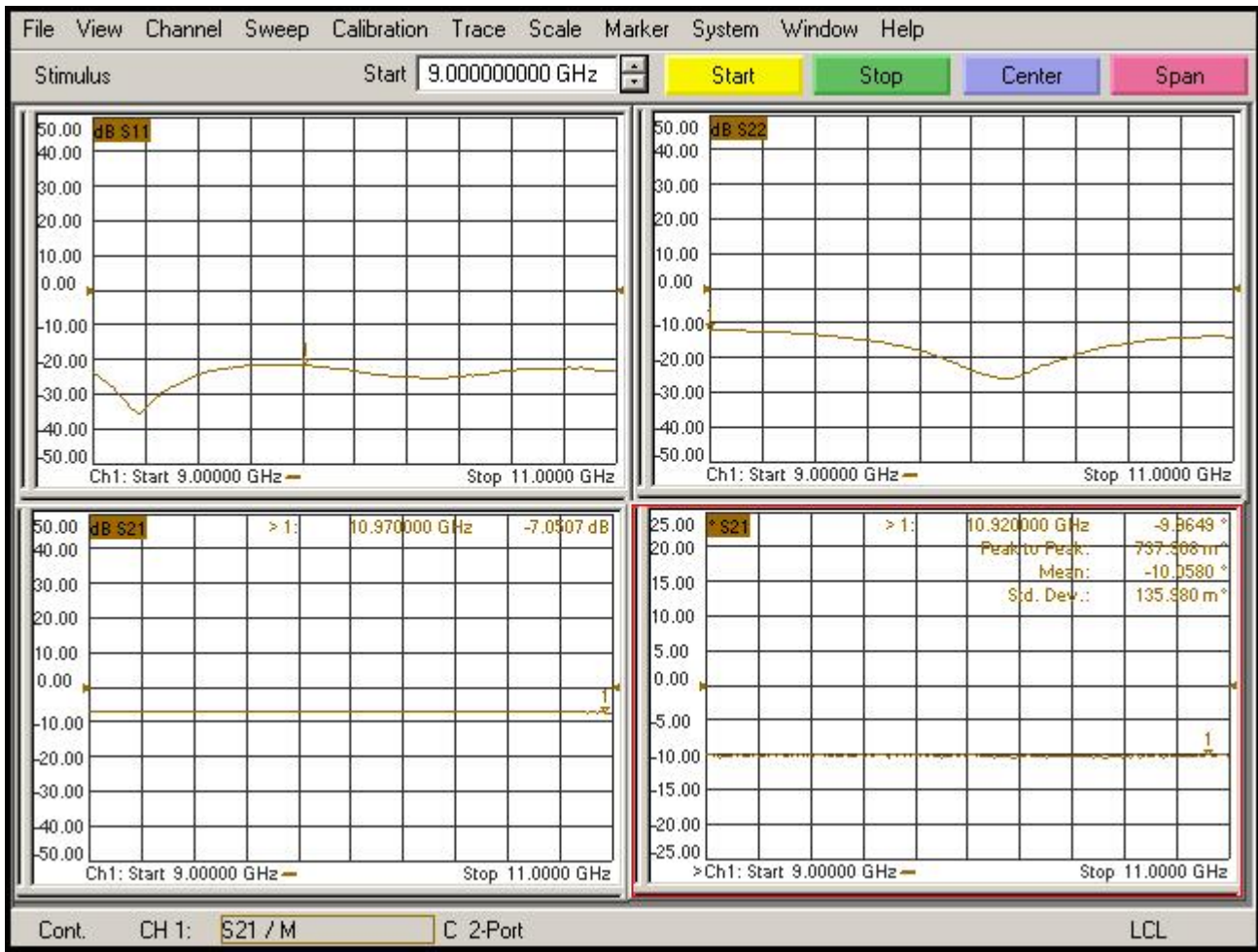
S21°



S PARAMETERS@11.25°

S11

S22



S21(dB)

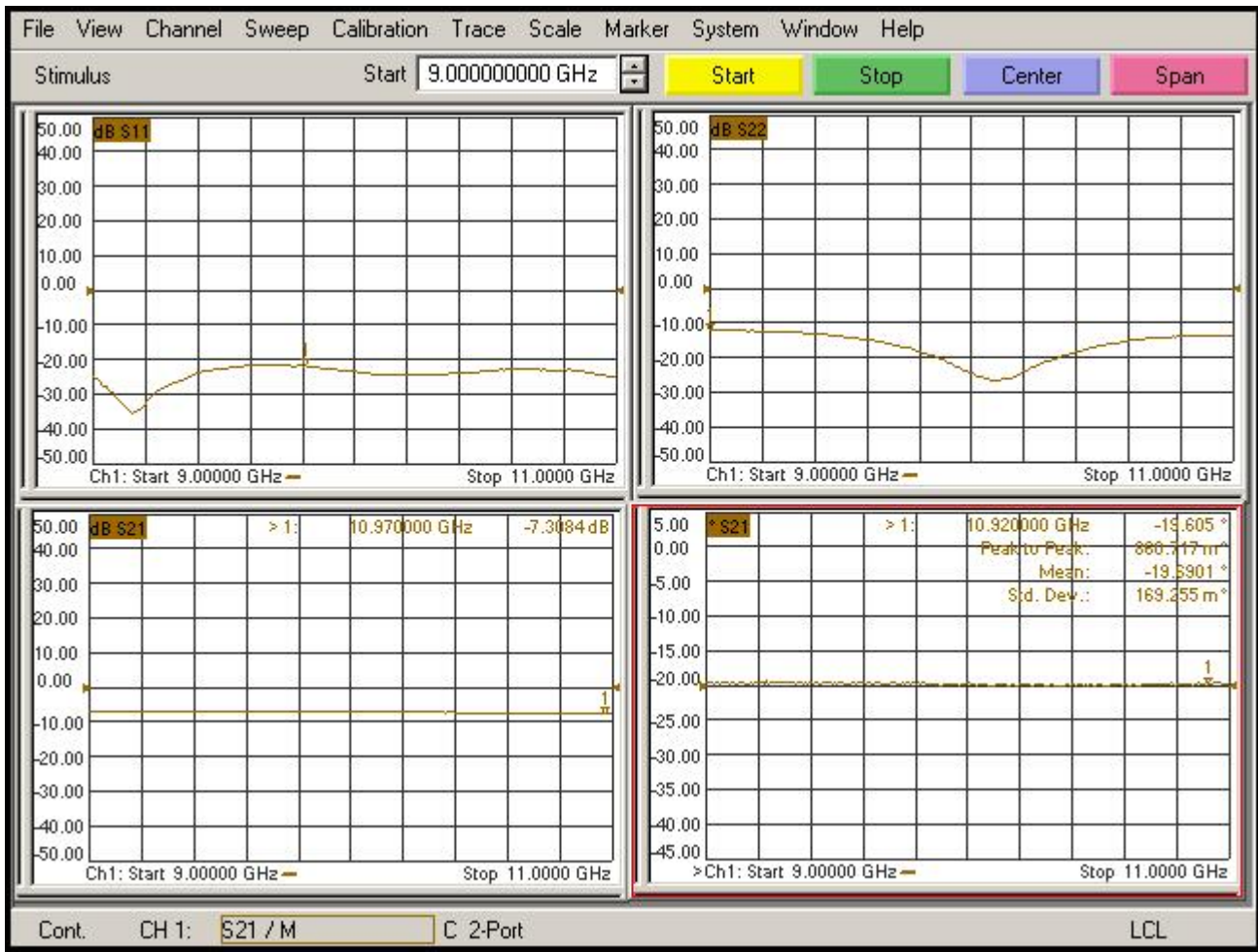
S21°



S PARAMETERS@ 22.5°

S11

S22



S21(dB)

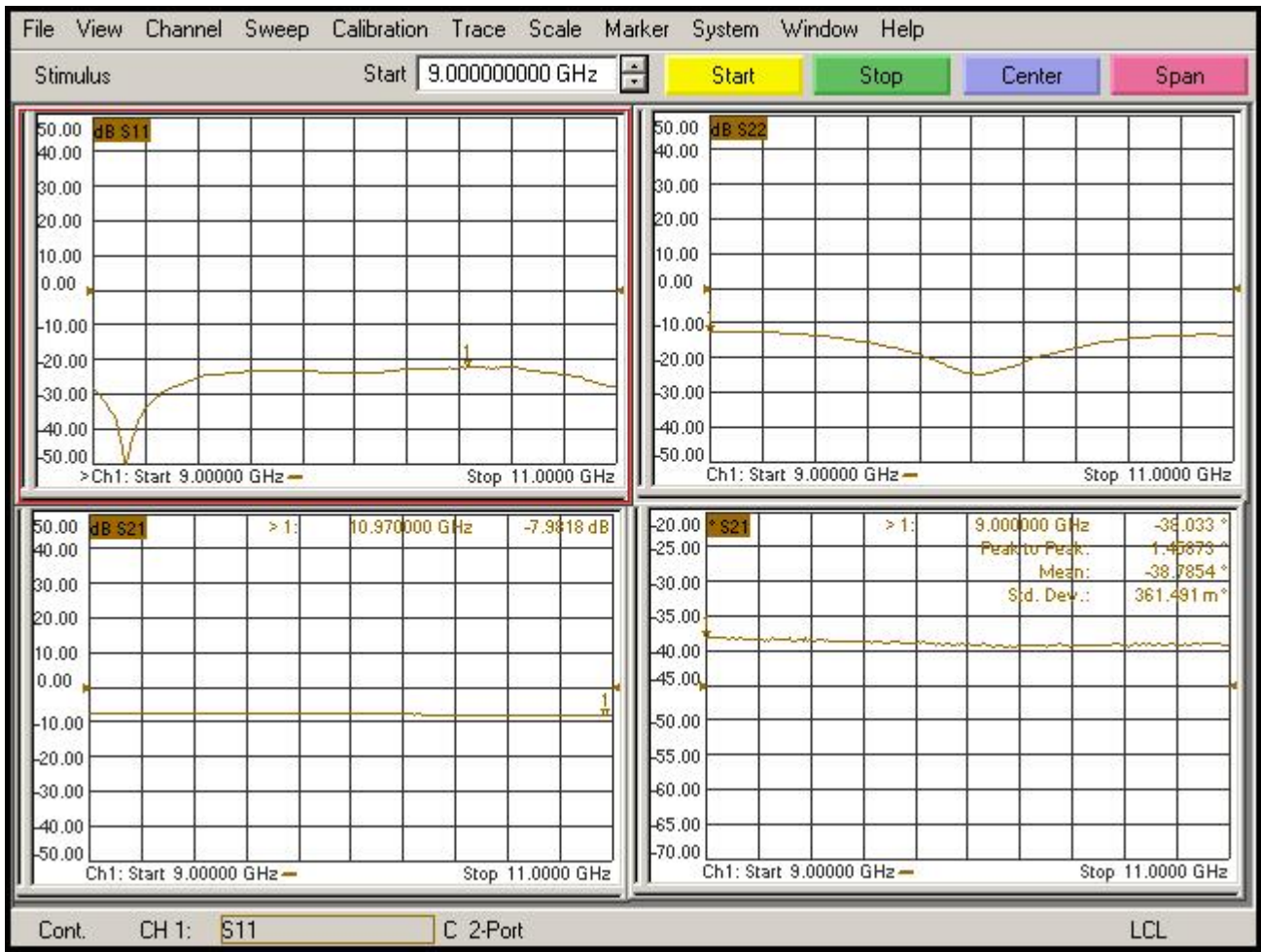
S21°



S PARAMETERS@ 45°

S11

S22



S21(dB)

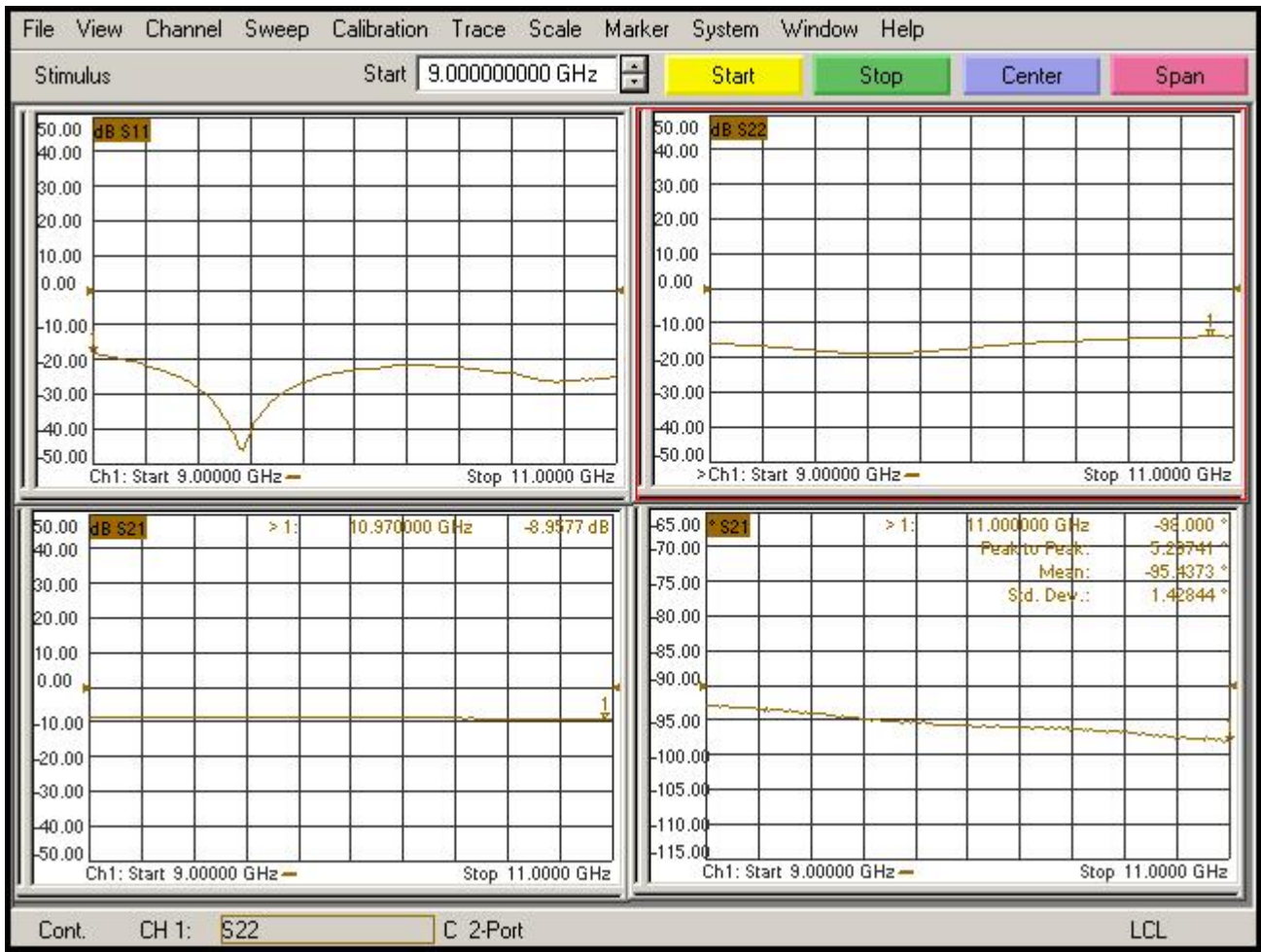
S21°



S PARAMETERS@ 90°

S11

S22



S21(dB)

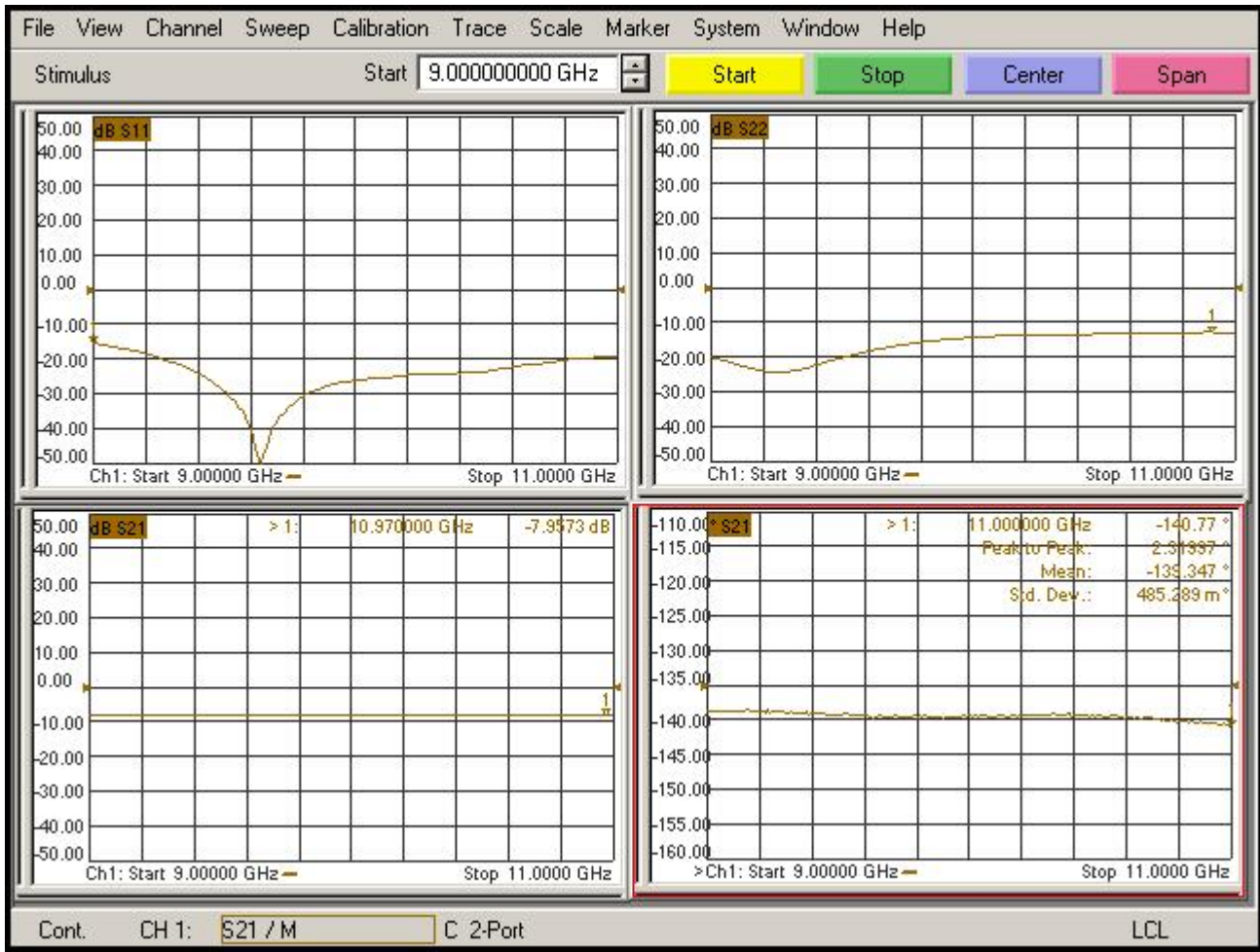
S21°



S PARAMETERS@ 135°

S11

S22



S21(dB)

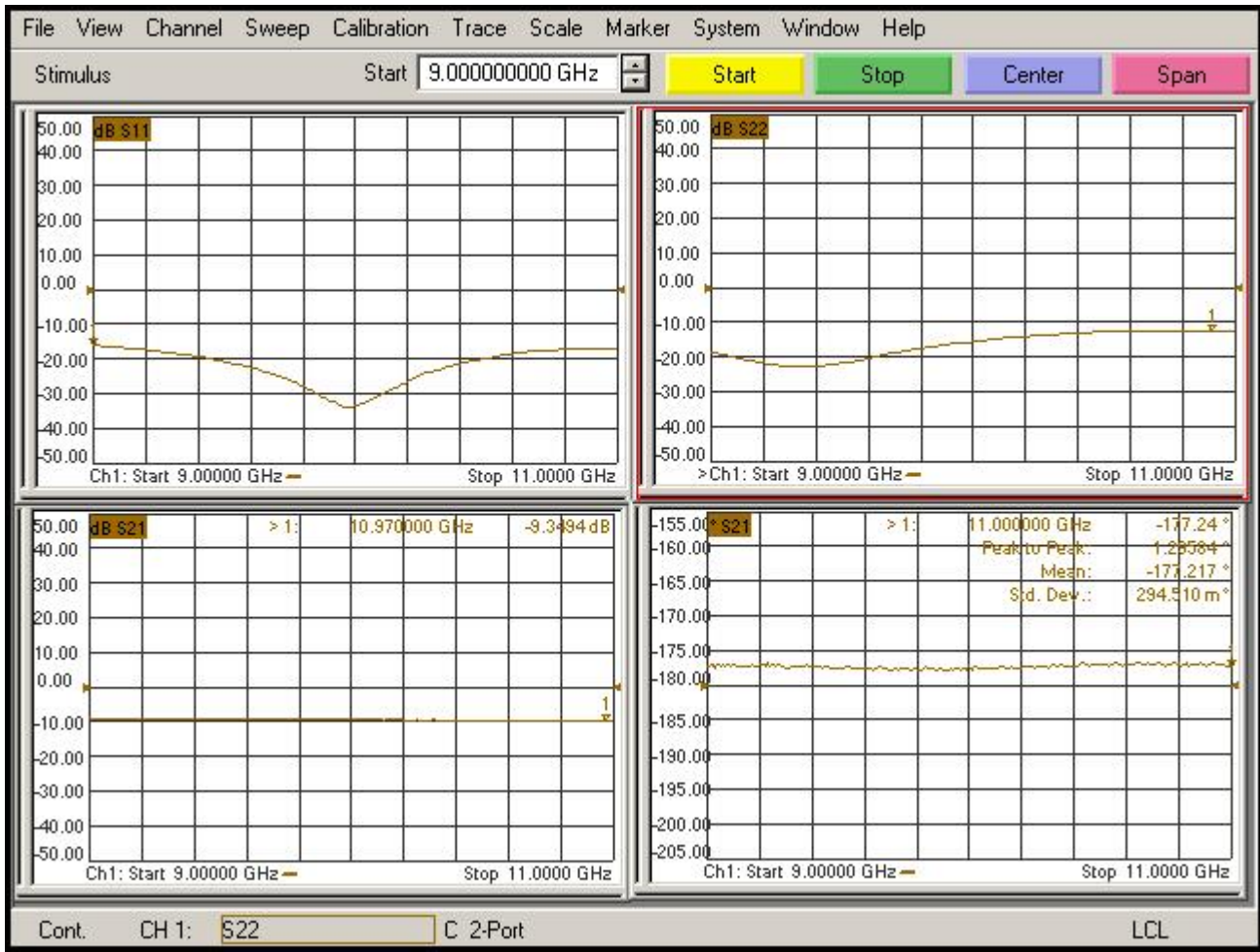
S21°



S PARAMETERS@ 180°

S11

S22



S21(dB)

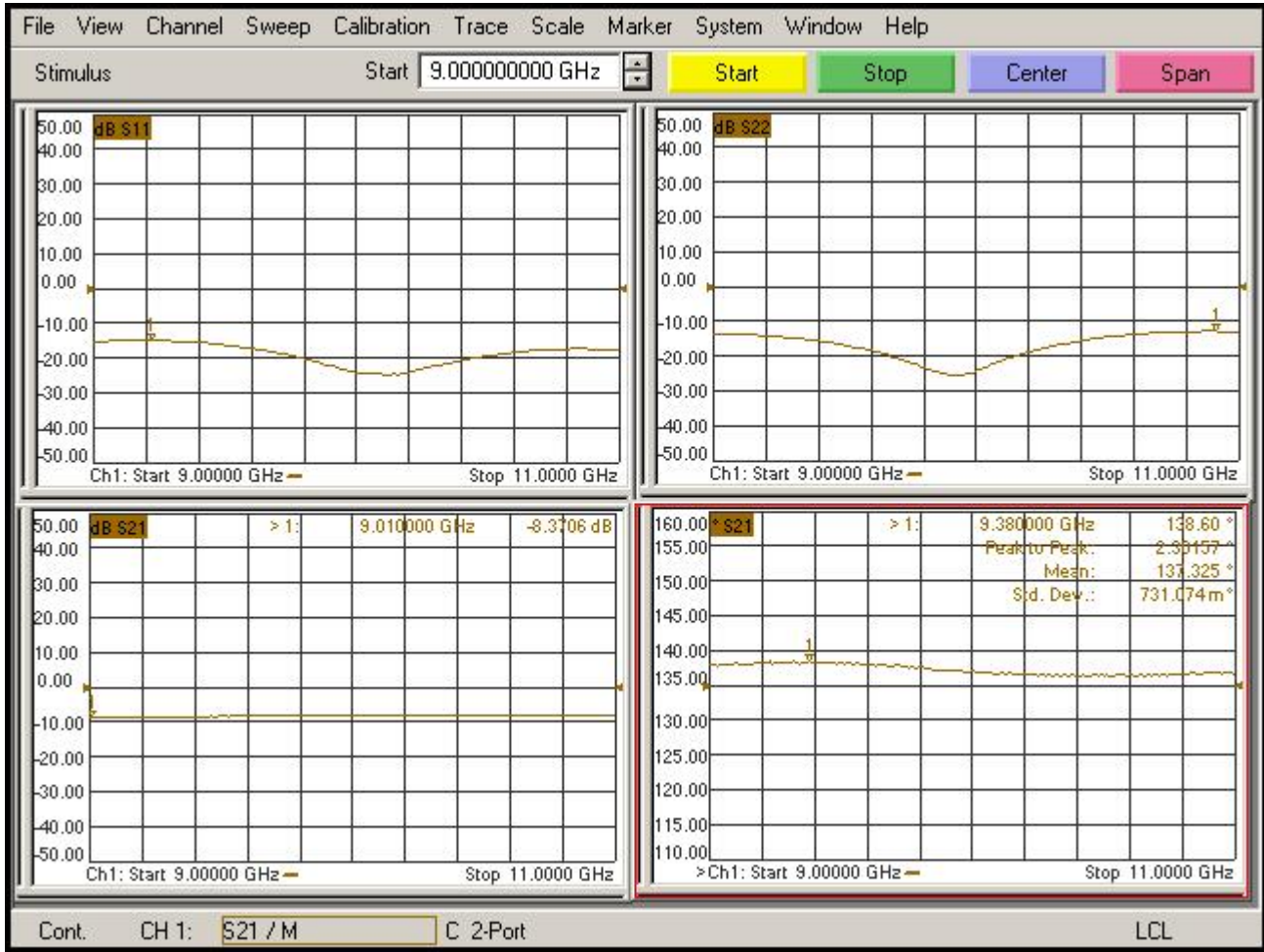
S21°



S PARAMETERS@ 225°

S11

S22



S21(dB)

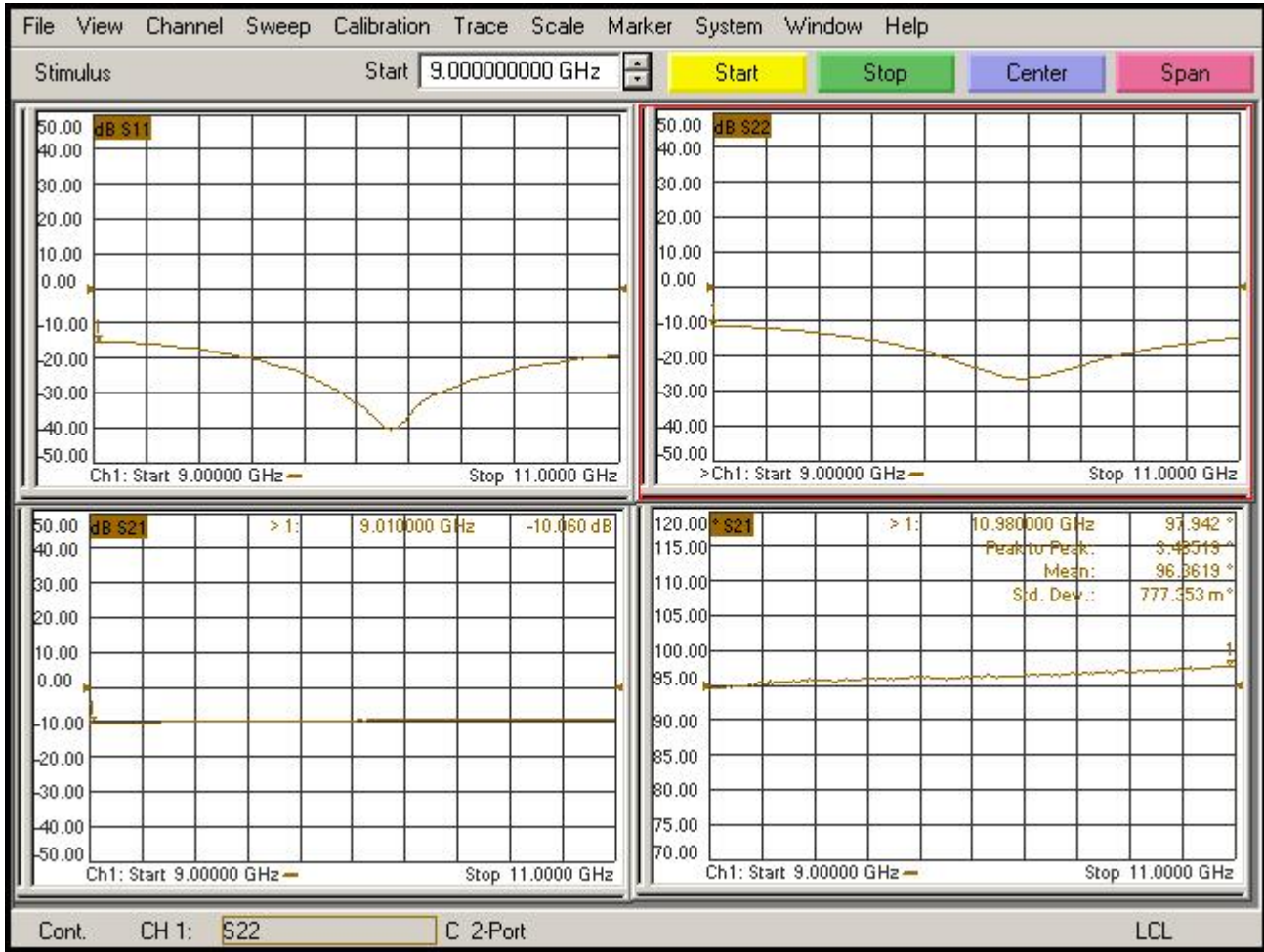
S21°



S PARAMETERS@ 270°

S11

S22



S21(dB)

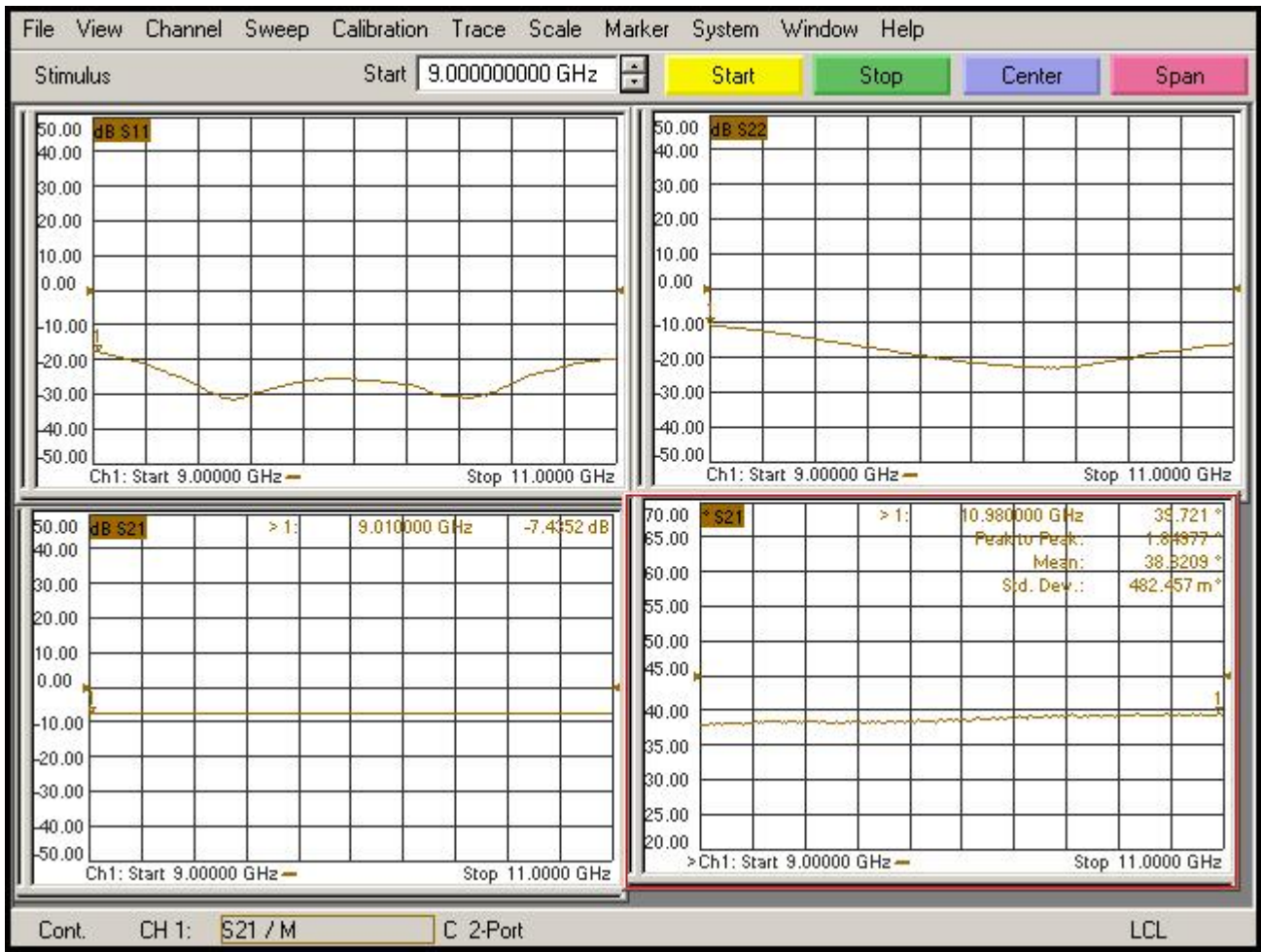
S21°



S PARAMETERS@ 315°

S11

S22



S21(dB)

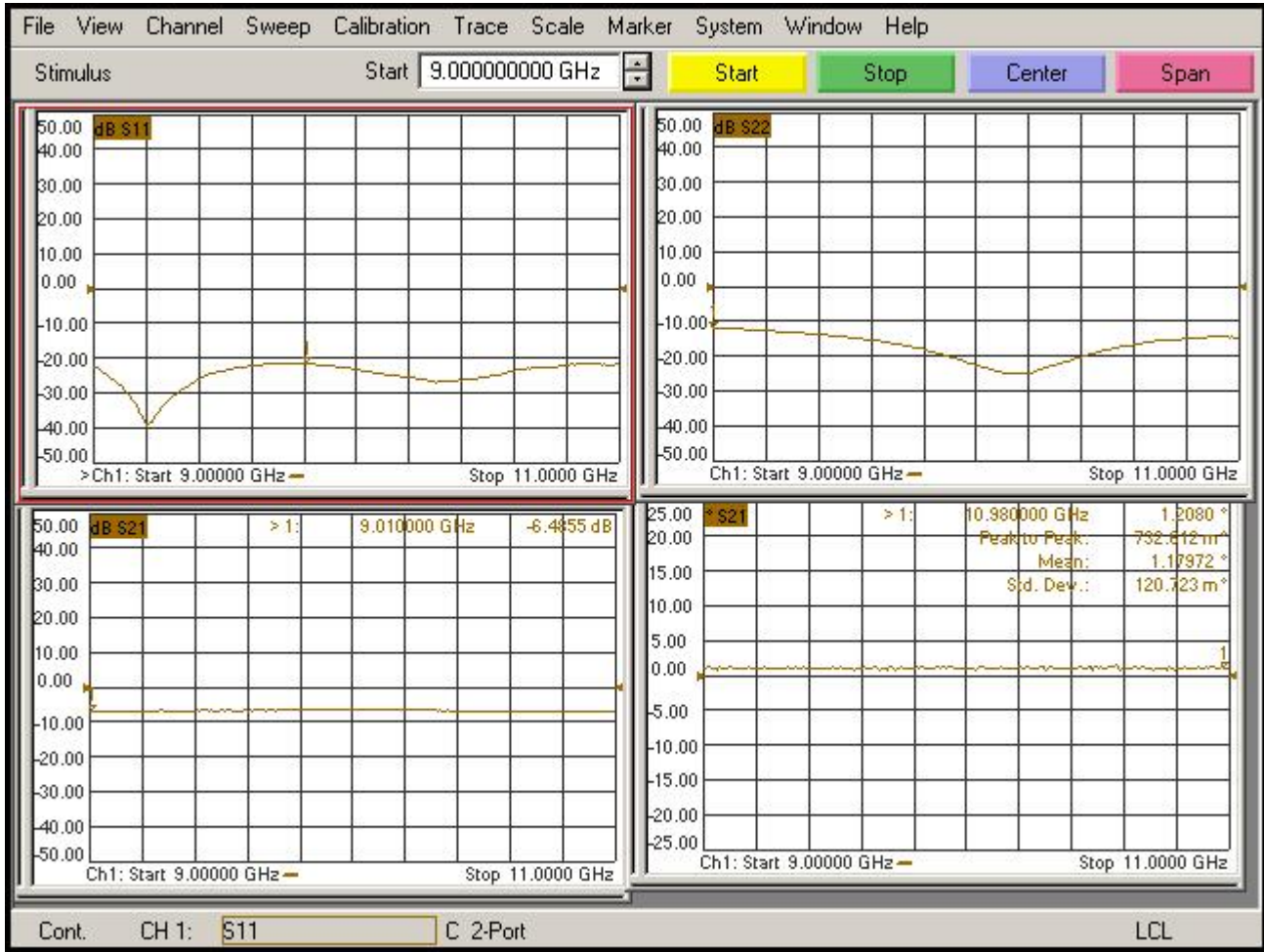
S21°



S PARAMETERS@ 358.6°

S11

S22



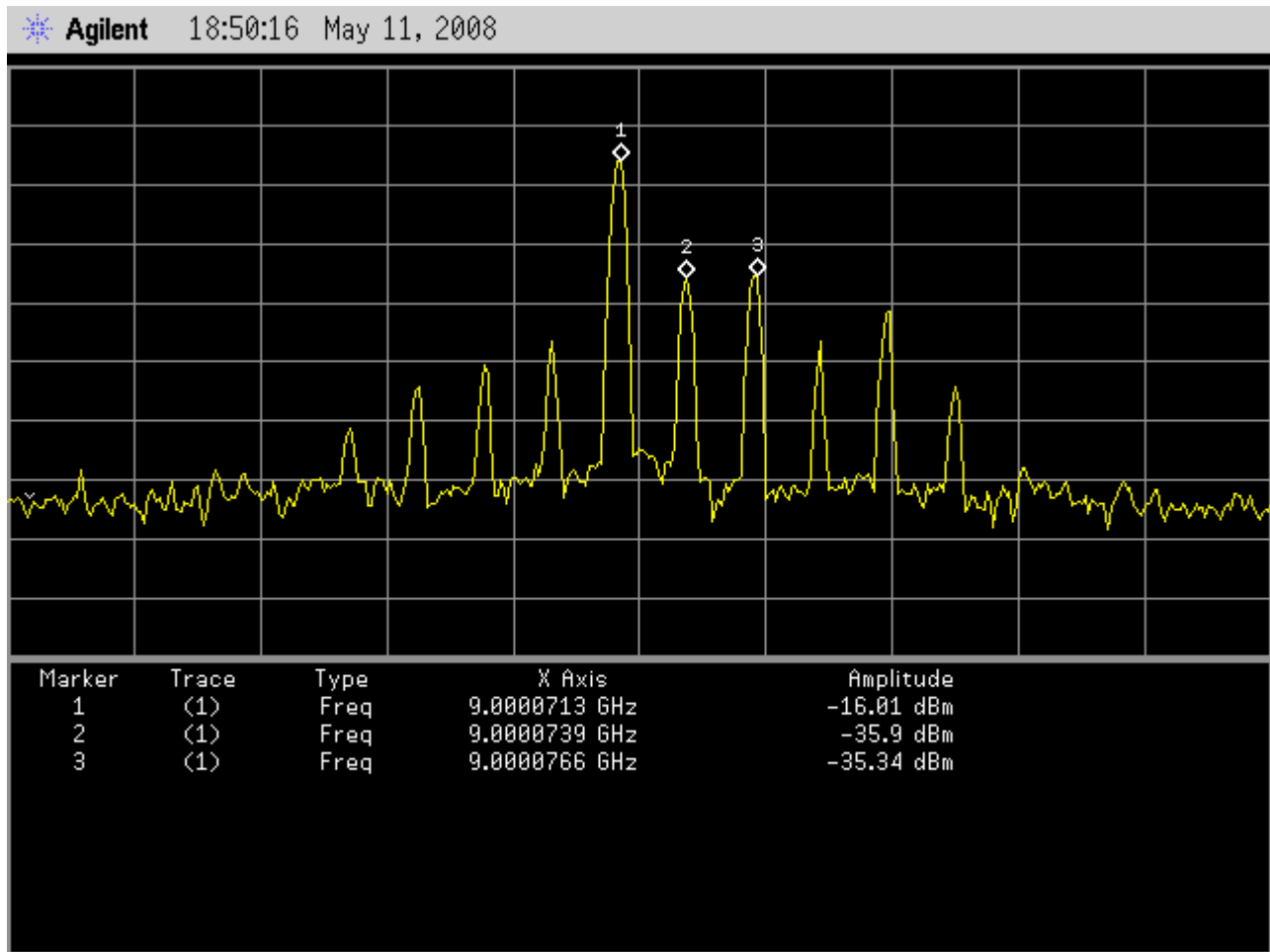
S21(dB)

S21°



CARRIER & SIDEBAND SUPPRESSION @ 9 GHZ

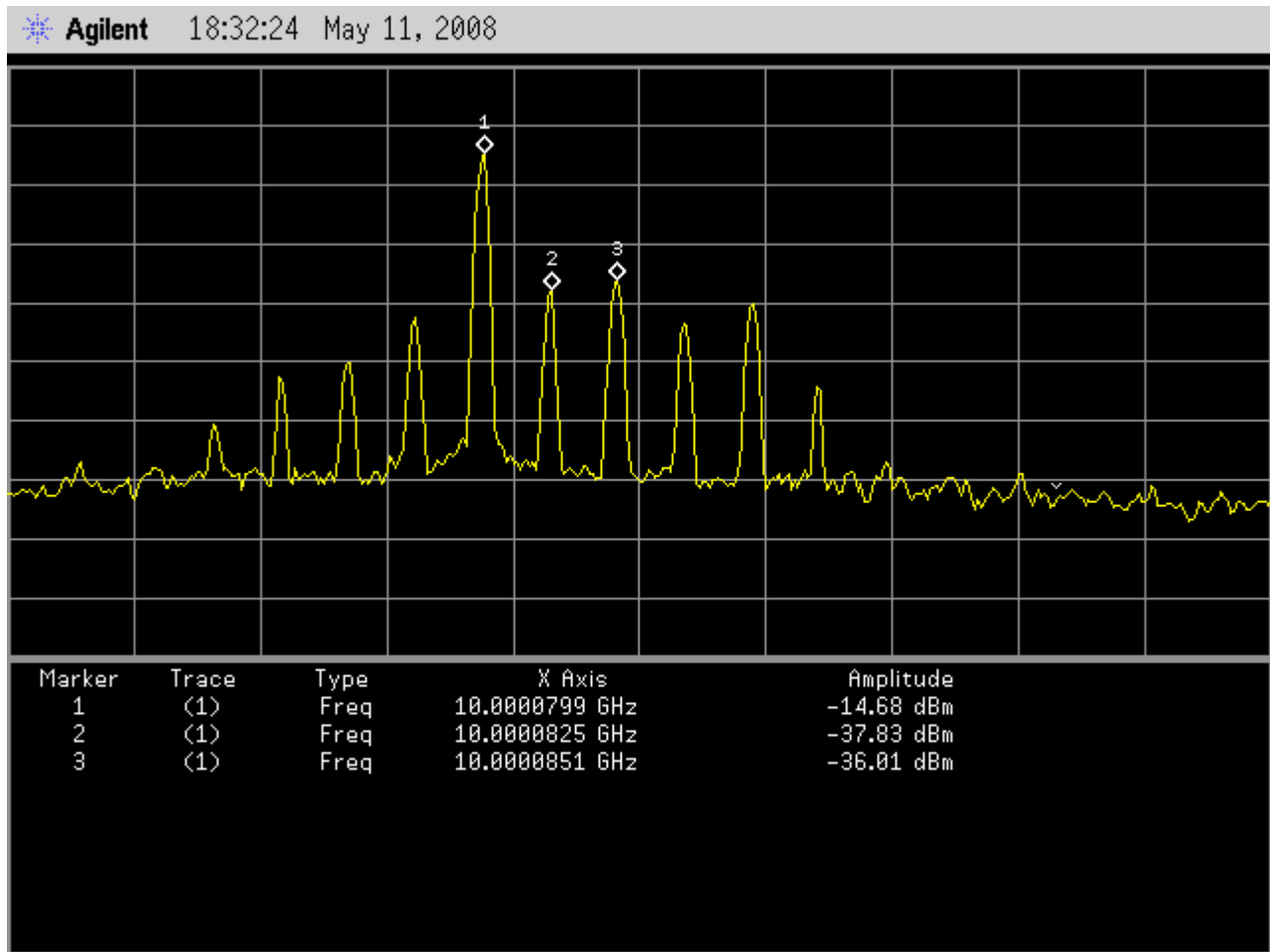
2.5 KHz TRANSLATION





CARRIER & SIDEBAND SUPPRESSION @ 10 GHZ

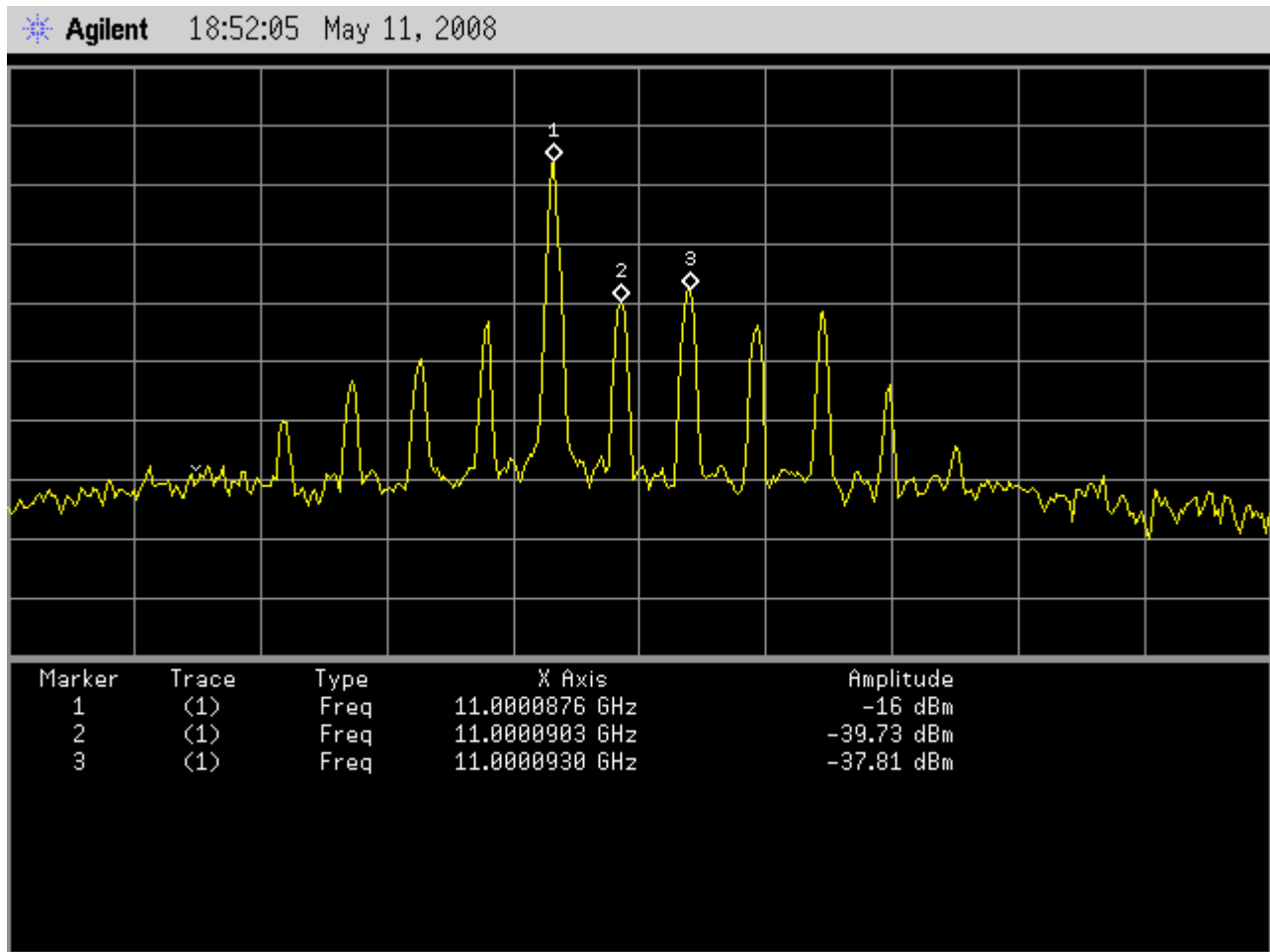
2.5 KHz TRANSLATION





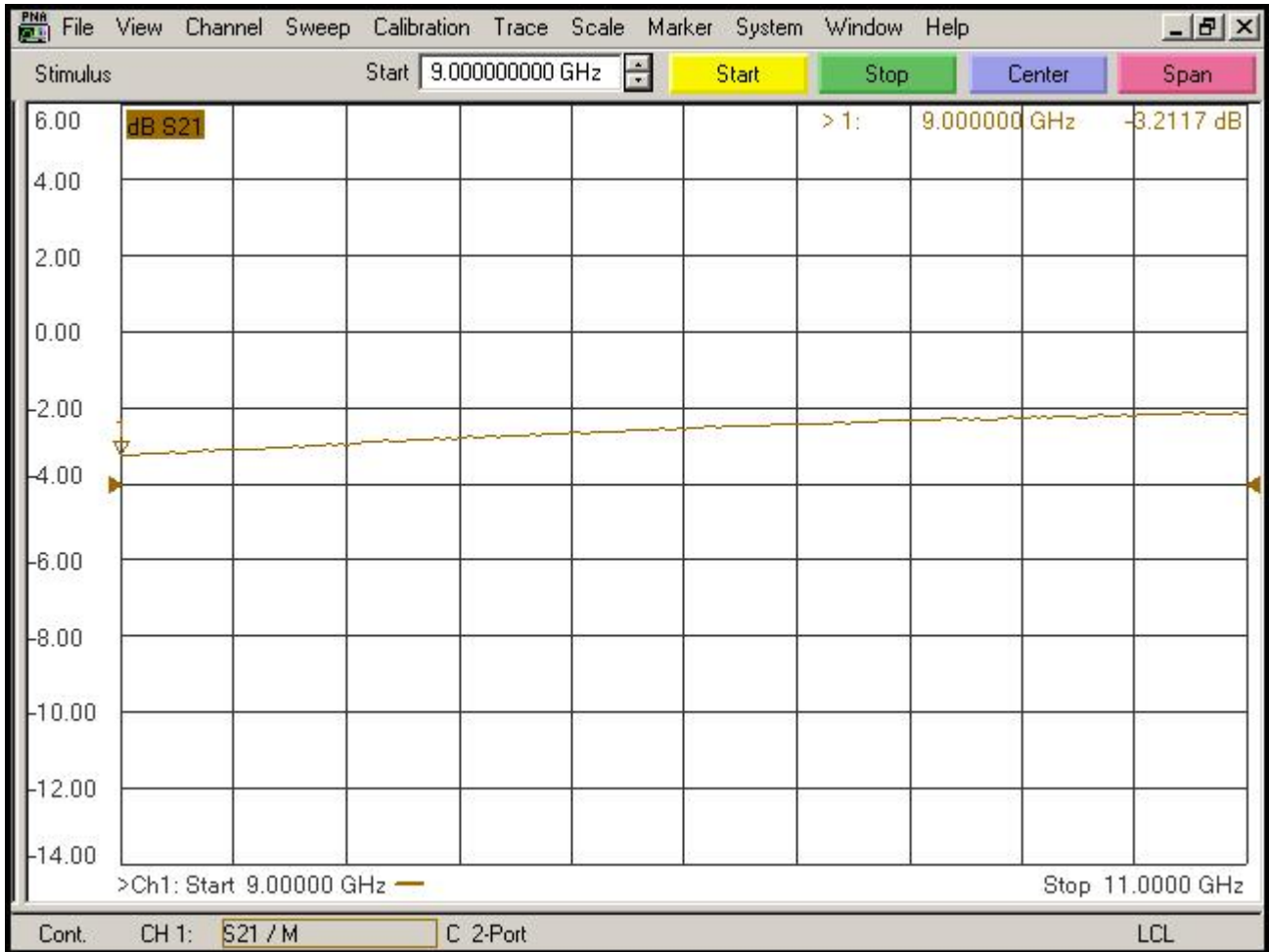
CARRIER & SIDEBAND SUPPRESSION @ 11 GHZ

2.5 KHz TRANSLATION





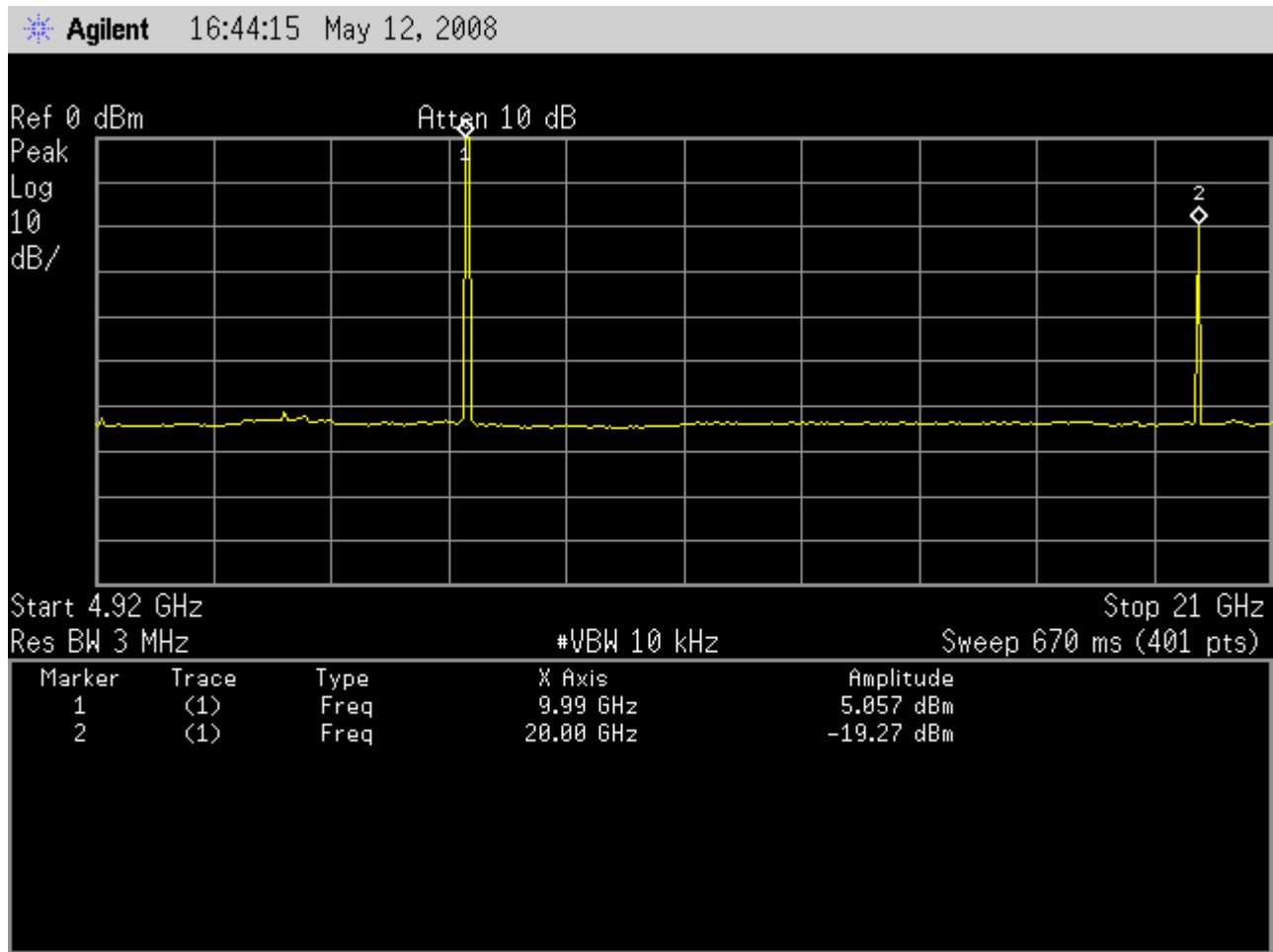
PM TO AM – WORST CASE





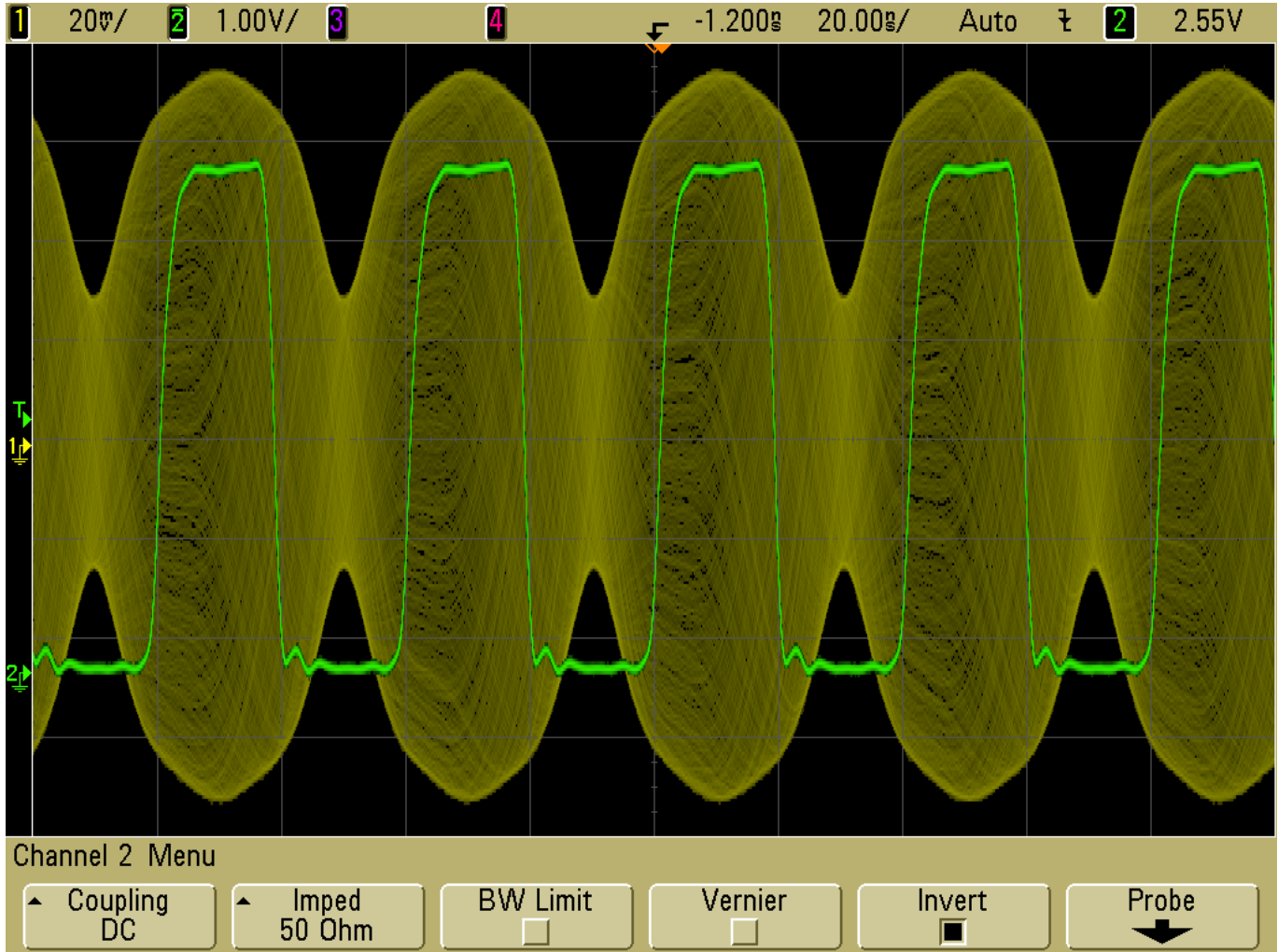
HARMONICS @ 10 GHz

+15dBm INPUT





Speed Data – 0 to 180° Phase Shift





FORM: 023-PS-DTA



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**SUMMARY TEST DATA ON
 PHASE SHIFTER**

CUSTOMER: _____ JOB NO: _____
 MODEL NO: PS-360-DC-1 TESTED BY: B. Baker
 OPTION NO: 911 FREQUENCY: 9-11GHz
 SERIAL NO: PM805102 DATE: 05/13/08

TEST ITEM NO:	PARAMETERS	SPECIFIED VALUE	MEASURED VALUE	REMARKS QA/QC
1	VSWR INPUT	2.0:1 MAXIMUM	2.0:1MAX.	
2	VSWR OUTPUT	2.0:1 MAXIMUM	2.0:1MAX.	
3	INSERTION LOSS	12 dB MAXIMUM	10 dB MAX.	
4	PHASE ERROR	± 12° MAXIMUM	9° MAX.	
5	HARMONICS	- 15 dBc MAXIMUM	- 15 dBc MAX.	
6	CARRIER SUPPRESSION	- 18 dBc MAXIMUM	- 19 dBc MAX.	
7	SIDEBAND SUPPRESSION	- 18 dBc MAXIMUM	- 19 dBc MAX.	
12	TRANSLATION RATE (4 MOST SIG. BITS)	500 KHz MINIMUM	500 KHz MIN.	
13	CURRENT DRAW @ + 12 VOLTS	275 mA MAXIMUM	240 mA MAX.	
14	CURRENT DRAW @ - 12 VOLTS	20 mA MAXIMUM	10 mA MAX.	

PRODUCTION MANAGER APPROVAL: _____ DATED: _____

QA / QC APPROVAL: _____ DATED: _____