COMPLEMENTARY ACCEPTANCE and DESIGN TEST REPORT (CADTR)

MEASUREMENT OF THE UNWANTED RF EMISSIONS

FOR THE AHV1600

Low Range Radar Altimeter

Prepared by:
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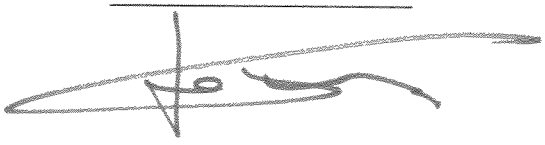
Approved by D.DOS SANTOS

Date 15/04/09



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	62 134 087-279	A4	1/15
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EVOLUTIONS

REV	DESCRIPTION
- -	First issue
- A	
- B	
- C	
- D	
- E	
- F	

Ind.	- -	- A	- B	- C	- D	- E	- F
Date	2009/03/13						
Written by	A. JAMET						
Verified by	JJ.ANDRE						
Approved by	D. DOS SANTOS						
Approved by	C.MICHEL						

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1. SCOPE

1.1 IDENTIFICATION

This document concerns the Complementary Acceptance and Design Test Report (CADTR) of the measurement of the unwanted emissions for the prototype of the AHV1600 Transceiver:

- Commercial P/N : AHV1600-01-01 xx x
- Industrial reference P/N: 61778974xx

Note: the functional indices (xx) are not included in the equipment identification (P/N) to ease document configuration management.

1.2 DOCUMENT OVERVIEW

This document records the results of the measurement of the unwanted emissions and the information's, which were noted during the operation of complementary design tests of the AHV1600 Transceiver prototypes.

The verifications are performed in accordance with the Complementary Acceptance and Design Test Procedure (CADTP [3]).

1.3 APPLICATION FIELD

This document is applied to the prototype of the AHV1600 Transceiver.

2. DOCUMENTS

2.1 APPLICABLES DOCUMENTS

Document Identifier		*Document Title*
[1]	ITU (International Telecommunication Union) Radio Regulations ; Edition 2004	RR5: Table of frequency allocation Appendix 3 (Rev. WRC-03) Tables of maximum permitted power levels for spurious or spurious domain emissions
[2]	E-CFR (Electronics Code of Federal Regulations) ; December 2007	Title 47 : Telecommunications ; Chapter I : Federal Communications Commission ; Part 87 : Aviation Services Subpart D § 87.135 : Bandwidth of emission Subpart D § 87.139 : Emission limitations Subpart E § 87.173: Frequencies Subpart F § 87.187: Frequencies
[3]	CADTP n°62 134 086-206	Complementary Acceptance and Design Test Procedure of the Measurement of the Unwanted RF Emissions for the AHV1600 Transceiver
[4]	Huber+Suhner Data Sheet	Between Series Adapter: 34_MMBX-TNC-50-1/1-2_N

2.2 REFERENCED DOCUMENTS

Document Identifier		*Document Title*
[5]	TCF,QE/MOD_073/--/en	Document template

3. TYPICAL INFORMATIONS

3.1 PROTOTYPE EQUIPMENT IDENTIFICATION

Name	**AHV1600**
Manufacturer name	**THALES**
Manufacturer code	**F0057**
Part Number	61778974AC
Serial Number	00004
Amendment label	-
Date of manufacture	-

3.2 IDENTIFICATION OF APPLICABLE PROCEDURE

Document title	***Identification***	***Edition date***	***Issue***
CADTP	62 134 086-206	2009/03/11	--
CADTR	62 134 087-279	2009/03/13	--

3.3 ACCEPTANCE

	Name	***Date of test***	***Signature***
Operator name	A. JAMET	2009/04/07	
Person in charge of quality			

3.4 COMMENTS

Deviations:

Measurement are done only in the frequency band 9kHz-50GHz because of:

- *Spectrum analyzer frequency band*
- *Characteristics of equipment connector TX and RX (DC-5GHz, cf. [4])*
- *Level of harmonics (harmonics upper the harmonic 2 have a very low level and are embedded in the noise floor)*

Remarks

Measurement upper 50GHz will be not significant

4. PREPARATION OF THE TESTS

4.1 LABORATORY TEST EQUIPMENTS

4.1.1 STANDARD LABORATORY TEST EQUIPMENTS

The standard laboratory test equipments necessary for the progress of the measurement are the following ones:

Name	Manufacturer name	Type	Frequency band	Serial Number	Validity expiration
Spectrum analyzer	Hewlett Packard	8593E	9kHz-22GHz	-	31/09/2009
Spectrum analyzer	Hewlett Packard	8565E	9kHz-50GHz	-	20/05/2009
Power supply	TTI	EL302D	-	-	-
Adapters	-	TNC M – SMA M	DC-18GHZ	-	-
Load	-	50Ω	DC-18GHZ	-	-

Tableau 1 : Standard laboratory test equipments

4.1.2 SPECIAL LABORATORY TEST EQUIPMENTS

Name	Part number	Serial number
“Bte pilotage discrets”	61 491 331AA	00100

4.2 LABORATORY TEST ASSEMBLY

See figure 2 in the Complementary Acceptance and Design Test Procedure (CADTP) [3].

4.3 LABORATORY TEST SET-UP

The set-up of the “Bte pilotage discrets” is in accordance with the Complementary Acceptance and Design Test Procedure (CADTP) [3].

5. TESTS RESULTS

Check	*HTD requirement*	*Result*		*Problem Report*	*ICD requirement*
		PASS	**FAILED**		
Measure of the out-of-band domain emissions	HTD-AUT-0010	☒	☐		ICD-2520
Measure of the Spurious domain emissions	HTD-AUT-0020	☒	☐		ICD-2525

6. MEASURES

The spectrum diagrams of the measures are done in the appendices of this document.

6.1 TEST N°1: MEASUREMENT OF THE OUT OF BAND DOMA IN EMISSIONS

N°	CHECK	EXPECTED RESULT	RESULT
1	Maximum spectrum level in the bandwidth 3900 to 4000MHz	≤ -16dBm	**-67.8dBm**
2	Maximum spectrum level in the bandwidth 4000 to 4100MHz	≤ -6dBm	**-55.9dBm**
3	Maximum spectrum level in the bandwidth 4500 to 4600MHz	≤ -6dBm	**-57.1dBm**
4	Maximum spectrum level in the bandwidth 4600 to 4700MHz	≤ -16dBm	**-68.4dBm**

6.2 TEST N°2: MEASUREMENT OF THE SPURIOUS DOMAIN EMISSIONS

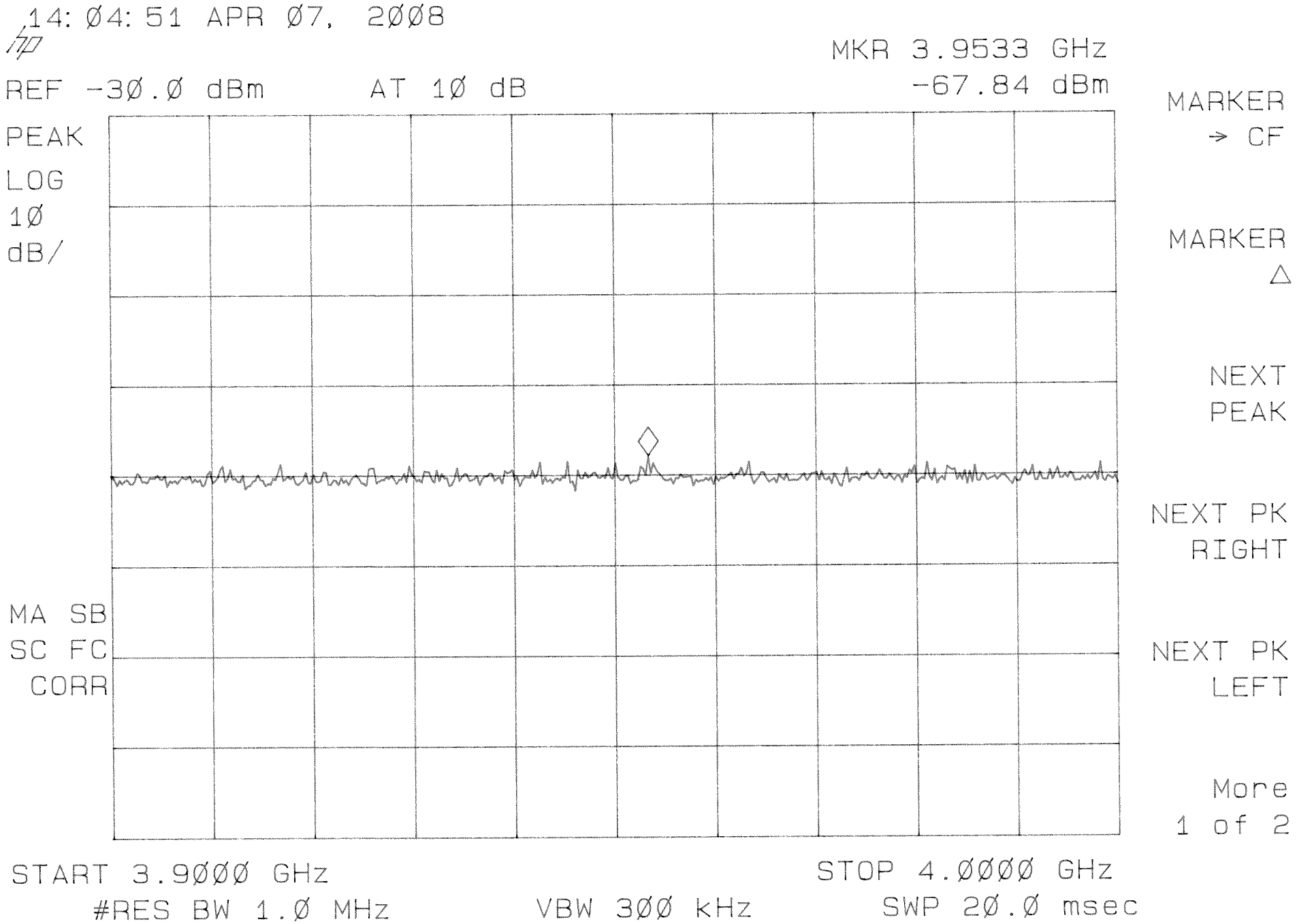
N°	CHECK	EXPECTED RESULT	RESULT
1	Maximum spectrum level in the bandwidth 9kHz to 150kHz	≤ -21dBm	**-69.3dBm**
2	Maximum spectrum level in the bandwidth 150kHz to 30MHz	≤ -21dBm	**-89.3dBm**
3	Maximum spectrum level in the bandwidth 30MHz to 1000MHz	≤ -21dBm	**-78.5dBm**
4	Maximum spectrum level in the bandwidth 1000MHz to 2900MHz	≤ -21dBm	**-57.4dBm**
5	Maximum spectrum level in the bandwidth 2900MHz to 3900MHz	≤ -21dBm	**-64.6dBm**
6	Maximum spectrum level in the bandwidth 4700MHz to 8900MHz	≤ -21dBm	**-39.2dBm**
7	Maximum spectrum level in the bandwidth 8900MHz to 11900MHz	≤ -21dBm	**-58.3dBm**
8	Maximum spectrum level in the bandwidth 11900MHz to 14900MHz	≤ -21dBm	**-45.8dBm**
9	Maximum spectrum level in the bandwidth 14900MHz to 18000MHz	≤ -21dBm	**-46.5dBm**
10	Maximum spectrum level in the bandwidth 18000MHz to 22000MHz	≤ -21dBm	**-47.7dBm**
11	Maximum spectrum level in the bandwidth 22000MHz -> 26000MHz	≤ -21dBm	**-56.8dBm**
12	Maximum spectrum level in the bandwidth 26000MHz -> 30000MHz	≤ -21dBm	**-56.1dBm**
13	Maximum spectrum level in the bandwidth 30000MHz -> 34000MHz	≤ -21dBm	**-52.3dBm**
14	Maximum spectrum level in the bandwidth 34000MHz -> 38000MHz	≤ -21dBm	**-54.3dBm**
15	Maximum spectrum level in the bandwidth 38000MHz -> 42000MHz	≤ -21dBm	**-55dBm**

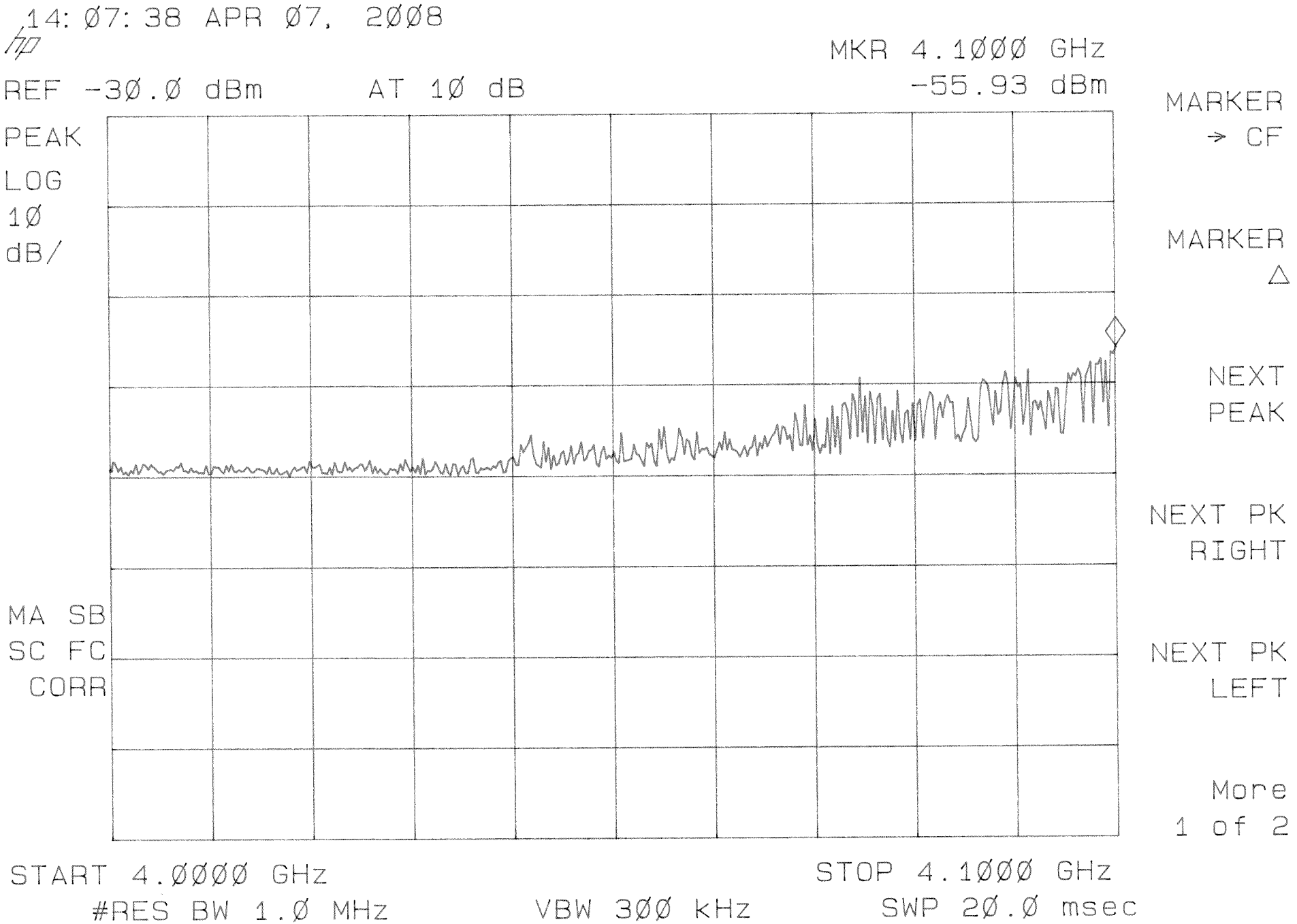
16	Maximum spectrum level in the bandwidth 42000MHz -> 46000MHz	≤ -21dBm	**-53.8dBm**
17	Maximum spectrum level in the bandwidth 46000MHz -> 50000MHz	≤ -21dBm	**-53dBm**
17	Maximum spectrum level in the bandwidth 50000MHz -> 110000MHz	≤ -21dBm	**-**

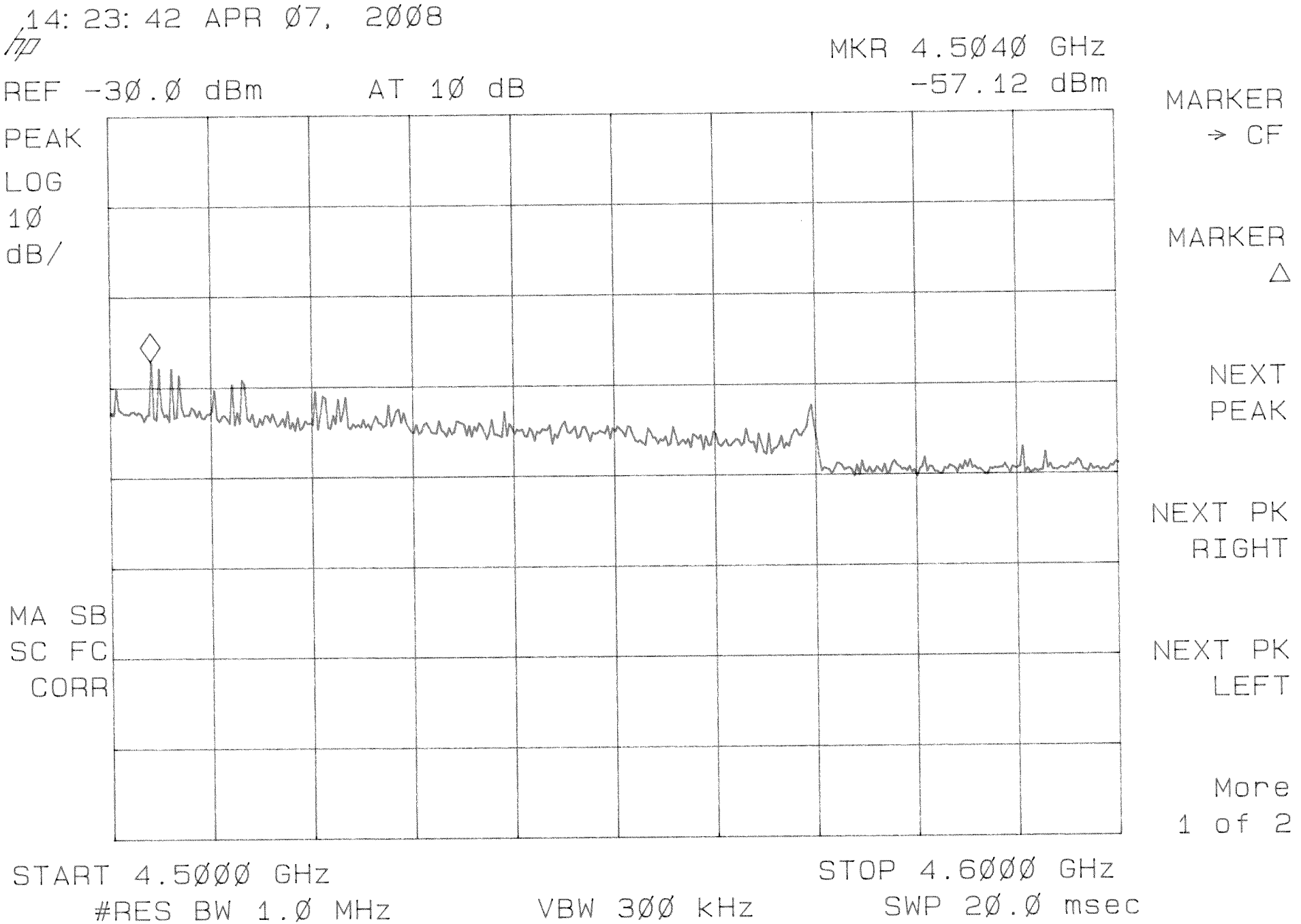
APPENDICES

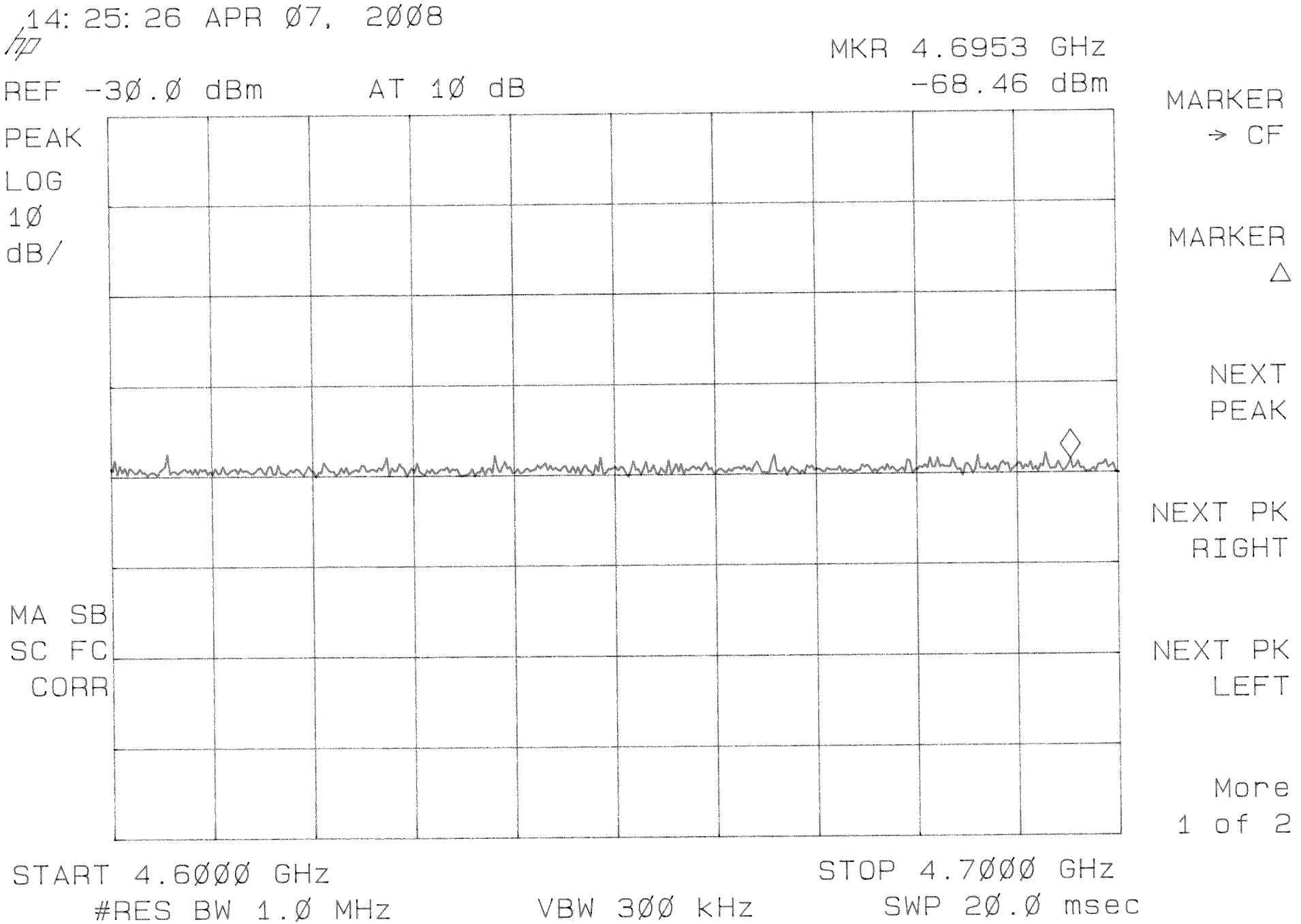
Measures

Out of Band Domain

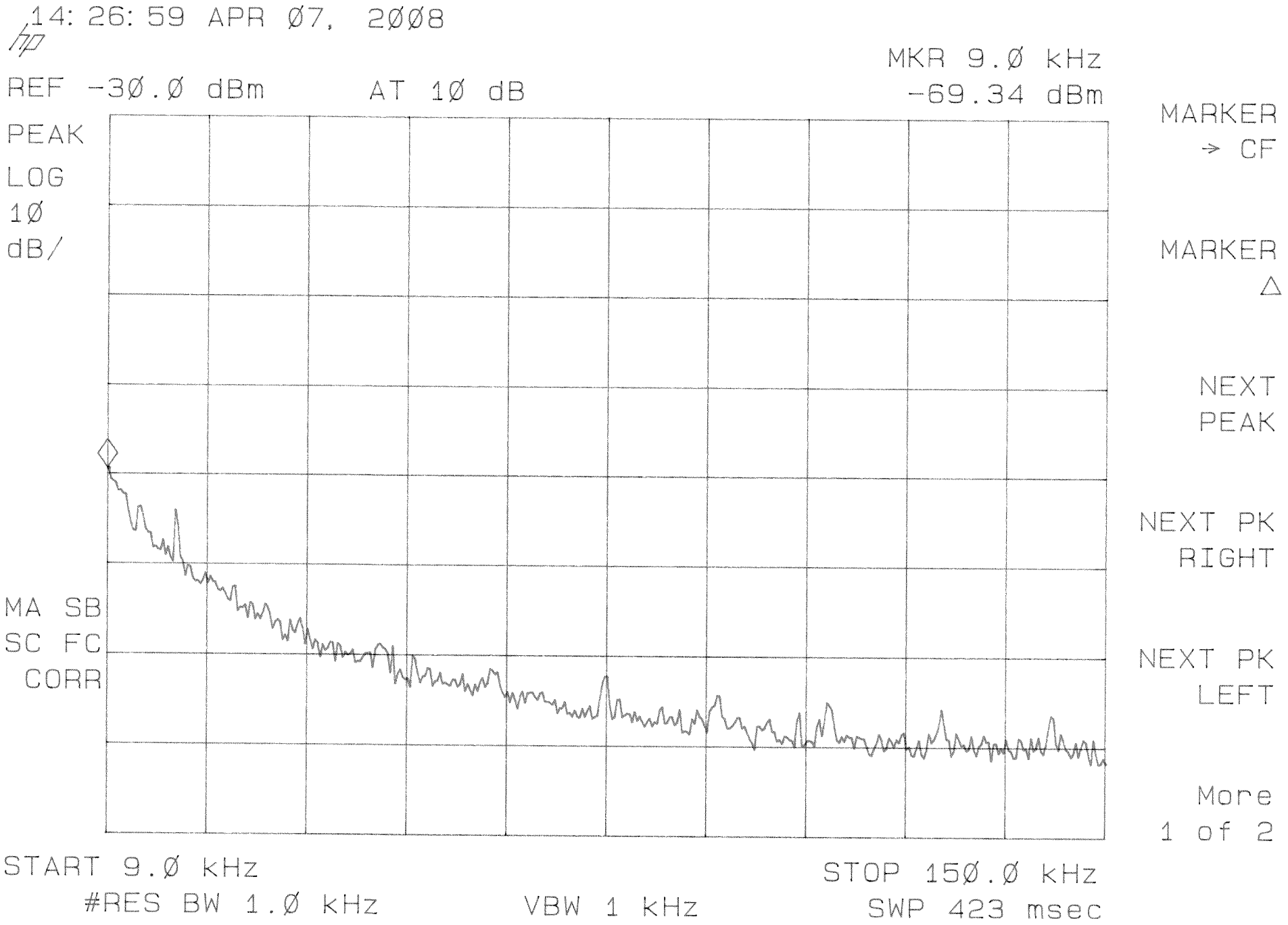

14: Ø4: 51 APR Ø7, 2ØØ8
MKR 3.9533 GHz
-67.84 dBm
REF -3Ø.Ø dBm
AT 1Ø dB
PEAK
LOG
1Ø
dB/
MARKER
→ CF
MARKER
△
NEXT
PEAK
NEXT PK
RIGHT
NEXT PK
LEFT
More
1 of 2
MA SB
SC FC
CORR
START 3.9ØØØ GHz
#RES BW 1.Ø MHz
VBW 3ØØ kHz
STOP 4.ØØØØ GHz
SWP 2Ø.Ø msec

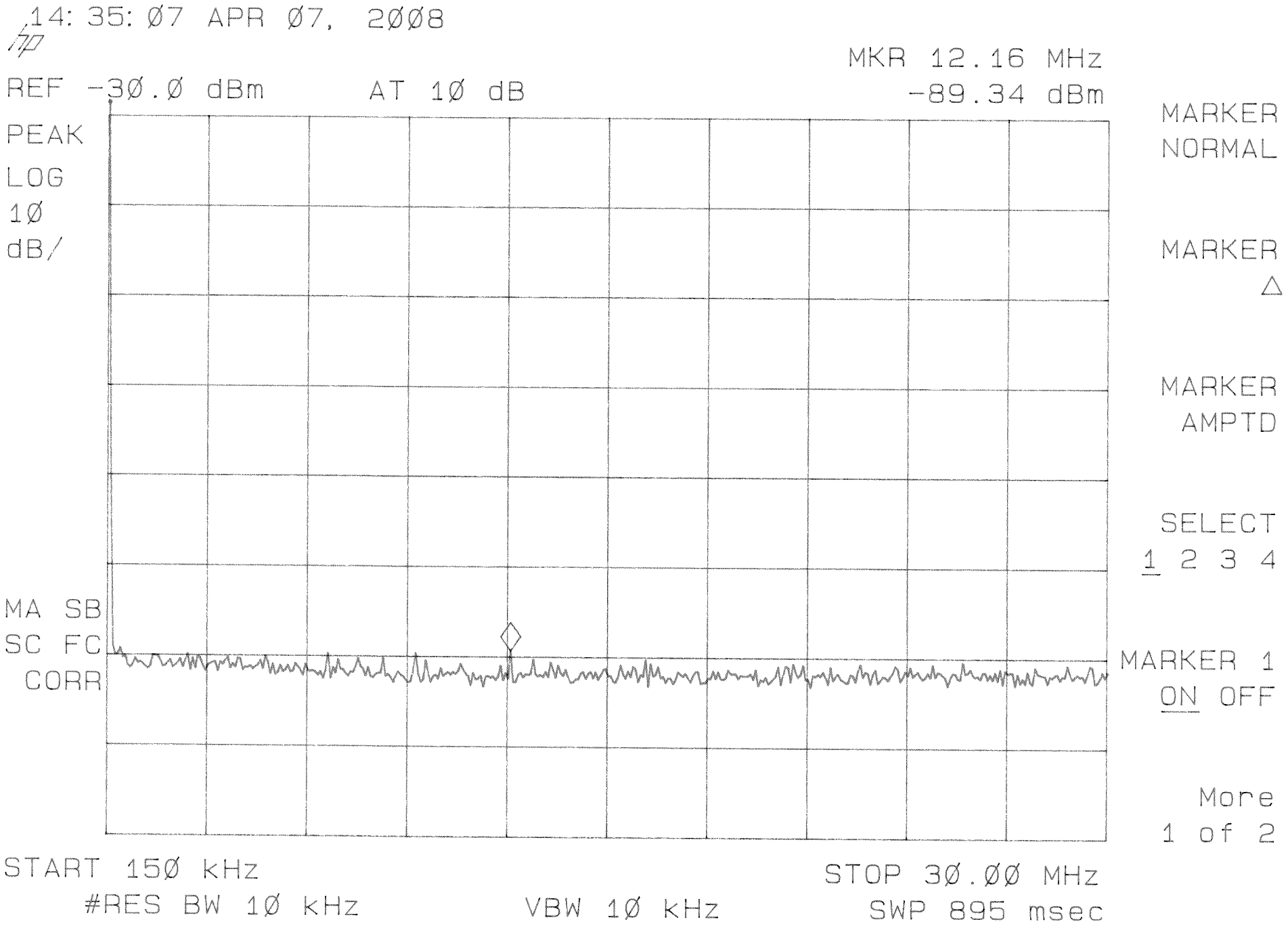

14: Ø7: 38 APR Ø7, 2ØØ8
MKR 4.1ØØØ GHz
REF -3Ø.Ø dBm
AT 1Ø dB
-55.93 dBm
PEAK
LOG
1Ø
dB/
MARKER
→ CF
MARKER
△
NEXT
PEAK
NEXT PK
RIGHT
MA SB
SC FC
CORR
NEXT PK
LEFT
More
1 of 2
START 4.ØØØØ GHz
STOP 4.1ØØØ GHz
#RES BW 1.Ø MHz
VBW 3ØØ kHz
SWP 2Ø.Ø msec

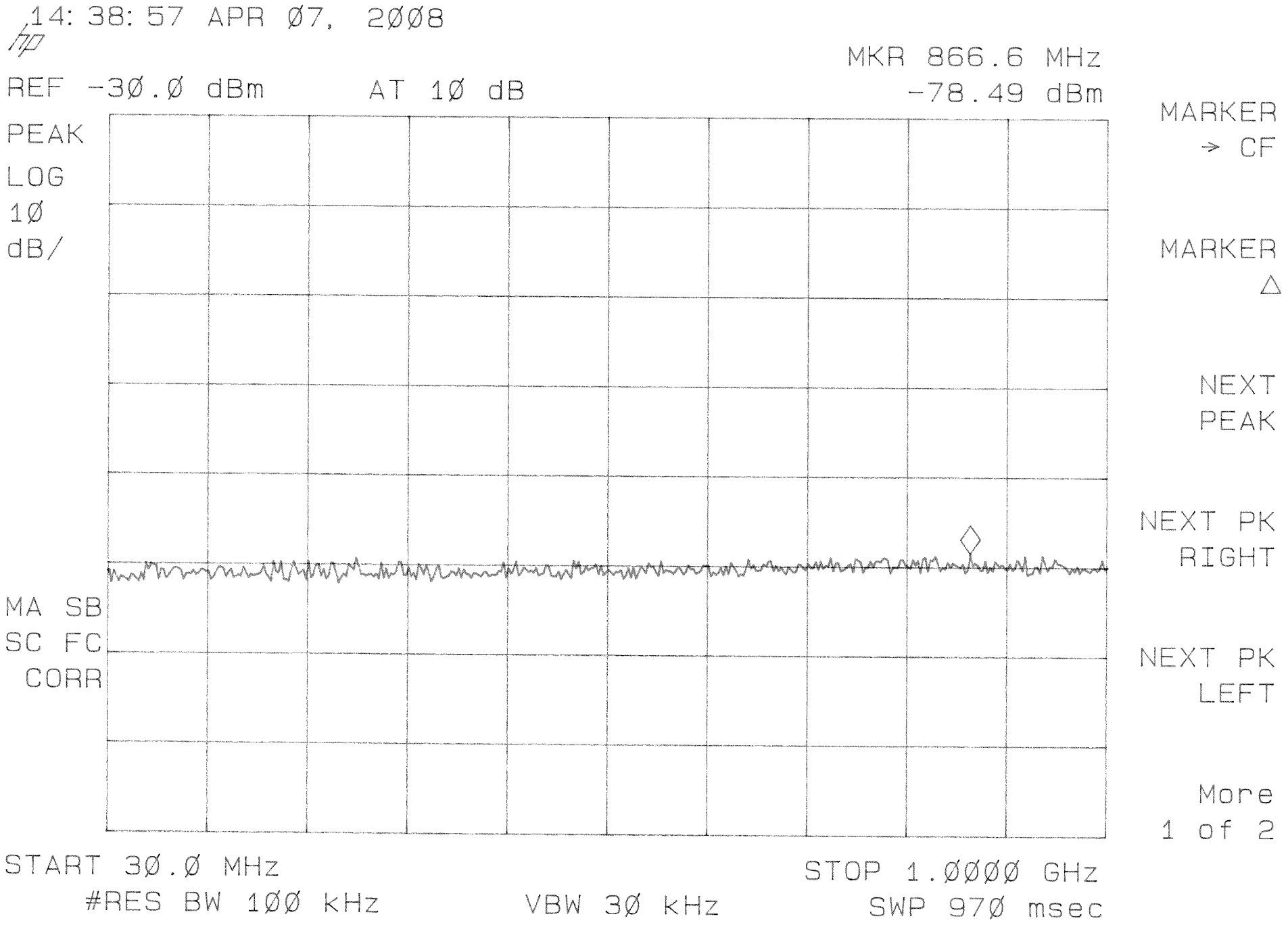

14: 23: 42 APR Ø7, 2ØØ8
MKR 4.5Ø4Ø GHz
-57.12 dBm
REF -3Ø.Ø dBm
AT 1Ø dB
PEAK
LOG
1Ø
dB/
MARKER
→ CF
MARKER
△
NEXT
PEAK
NEXT PK
RIGHT
NEXT PK
LEFT
More
1 of 2
MA SB
SC FC
CORR
START 4.5ØØØ GHz
#RES BW 1.Ø MHz
VBW 3ØØ kHz
STOP 4.6ØØØ GHz
SWP 2Ø.Ø msec

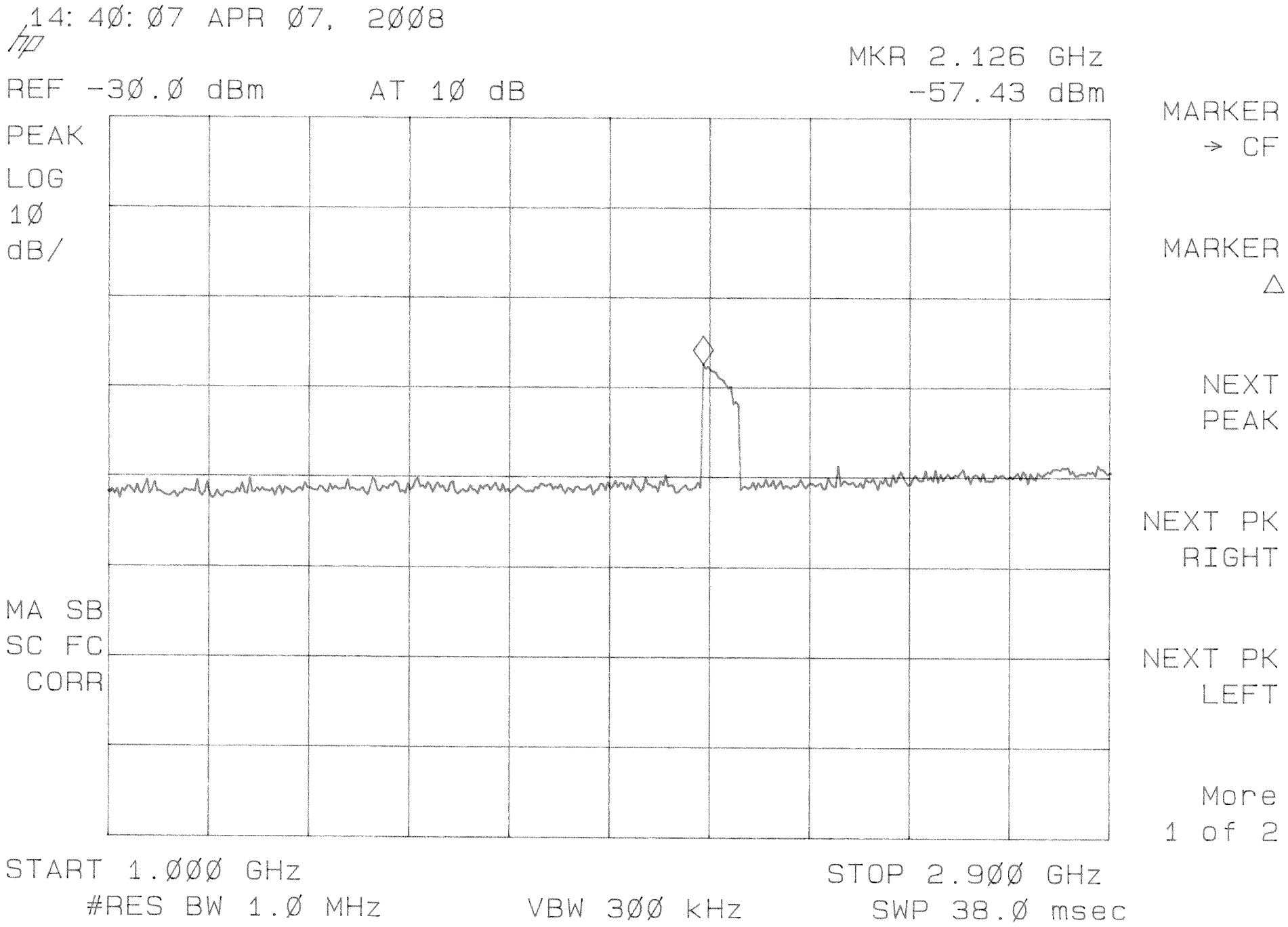

14: 25: 26 APR Ø7, 2ØØ8
MKR 4.6953 GHz
-68.46 dBm
REF -3Ø.Ø dBm
AT 1Ø dB
PEAK
LOG
1Ø
dB/
MARKER
→ CF
MARKER
△
NEXT
PEAK
NEXT PK
RIGHT
NEXT PK
LEFT
More
1 of 2
MA SB
SC FC
CORR
START 4.6ØØØ GHz
#RES BW 1.Ø MHz
VBW 3ØØ kHz
STOP 4.7ØØØ GHz
SWP 2Ø.Ø msec

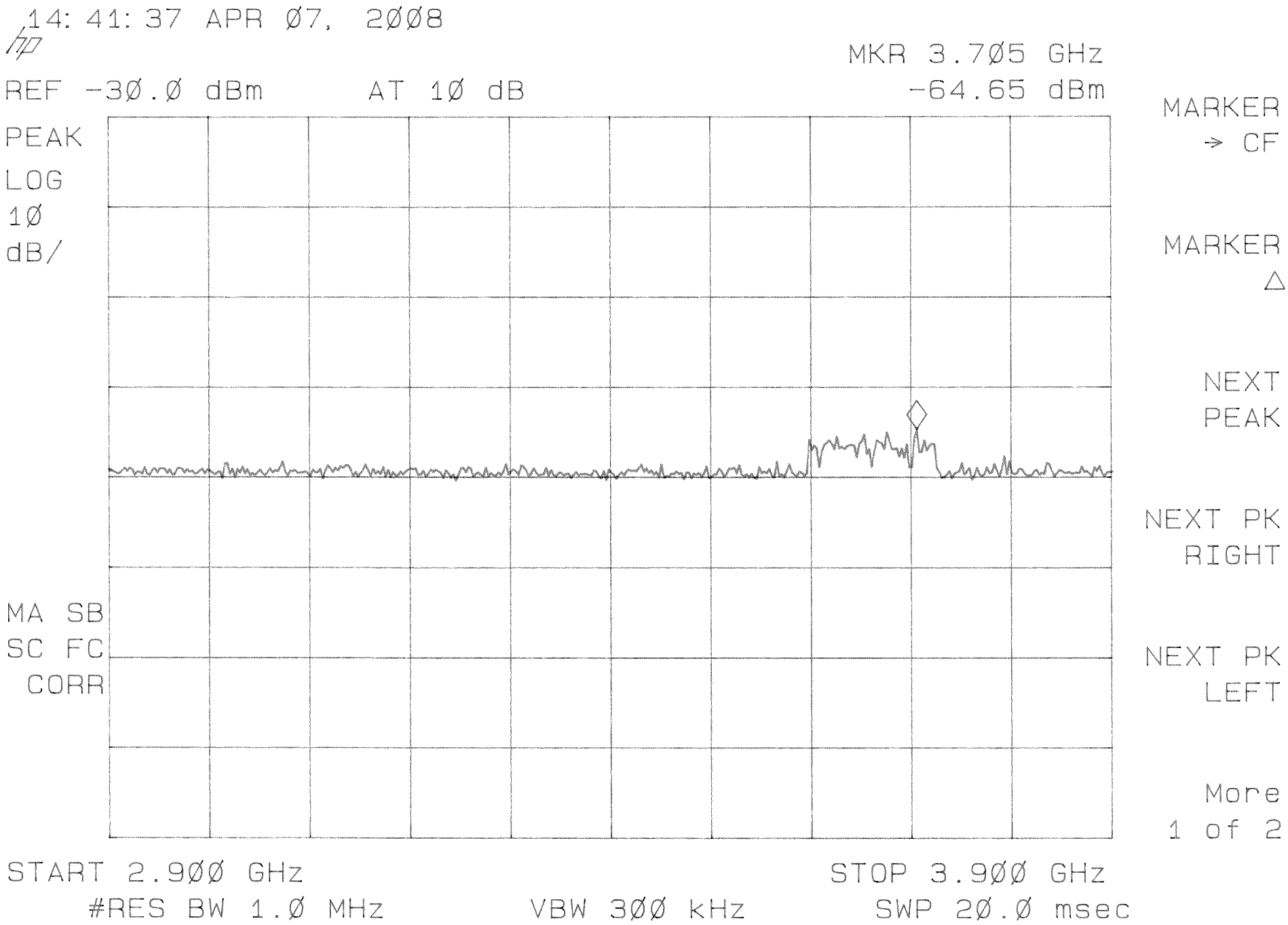
Spurious Emission

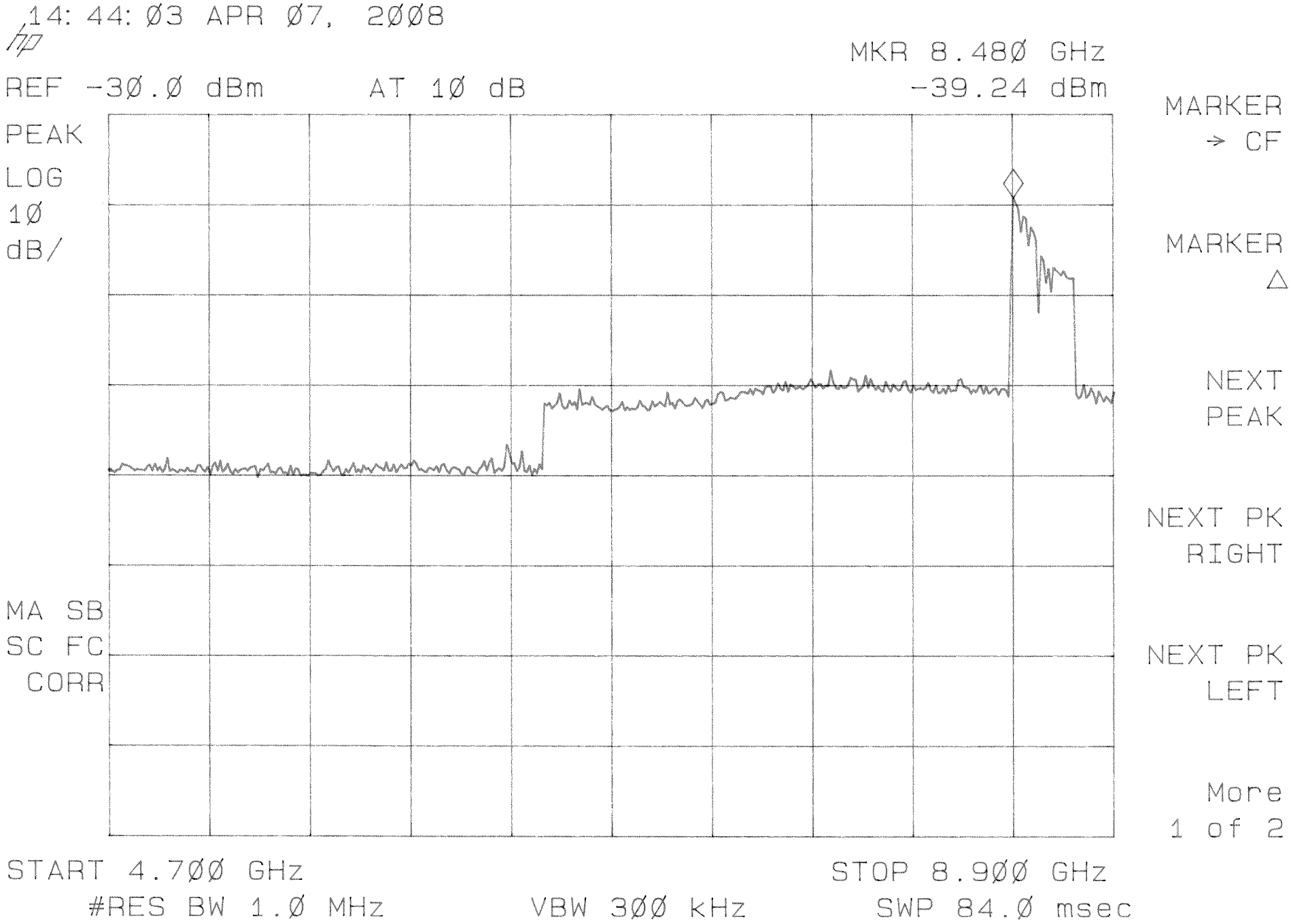

14: 26: 59 APR Ø7, 2ØØ8
MKR 9.Ø kHz
REF -3Ø.Ø dBm
AT 1Ø dB
-69.34 dBm
PEAK
LOG
1Ø
dB/
MARKER
→ CF
MARKER
△
NEXT
PEAK
NEXT PK
RIGHT
MA SB
SC FC
CORR
NEXT PK
LEFT
More
1 of 2
START 9.Ø kHz
STOP 15Ø.Ø kHz
#RES BW 1.Ø kHz
VBW 1 kHz
SWP 423 msec

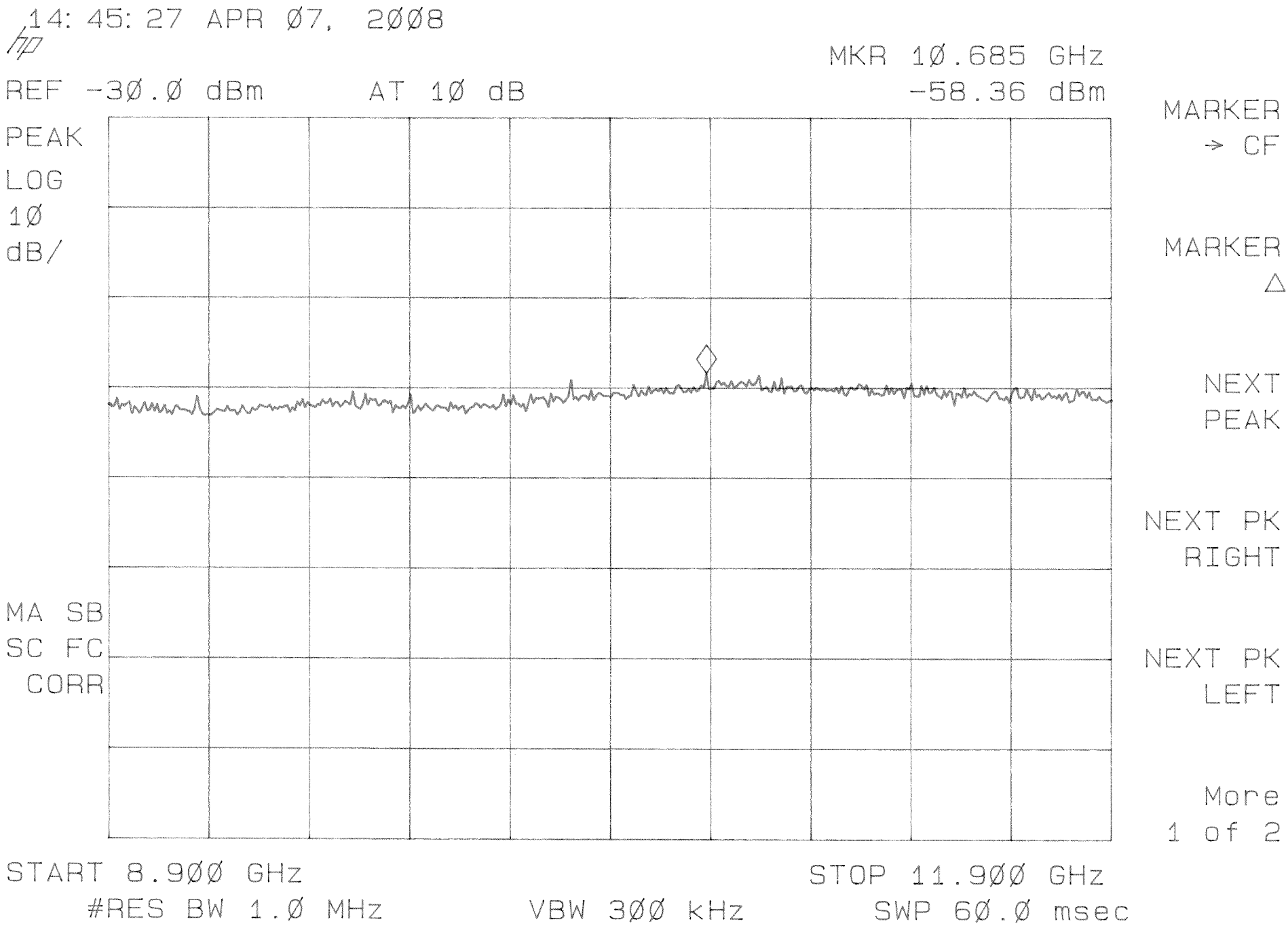

14: 35: Ø7 APR Ø7, 2ØØ8
MKR 12.16 MHz
-89.34 dBm
REF -3Ø.Ø dBm
AT 1Ø dB
PEAK
LOG
1Ø
dB/
MARKER
NORMAL
MARKER
△
MARKER
AMPTD
SELECT
1 2 3 4
MA SB
SC FC
CORR
MARKER 1
ON OFF
More
1 of 2
START 15Ø kHz
#RES BW 1Ø kHz
VBW 1Ø kHz
STOP 3Ø.ØØ MHz
SWP 895 msec

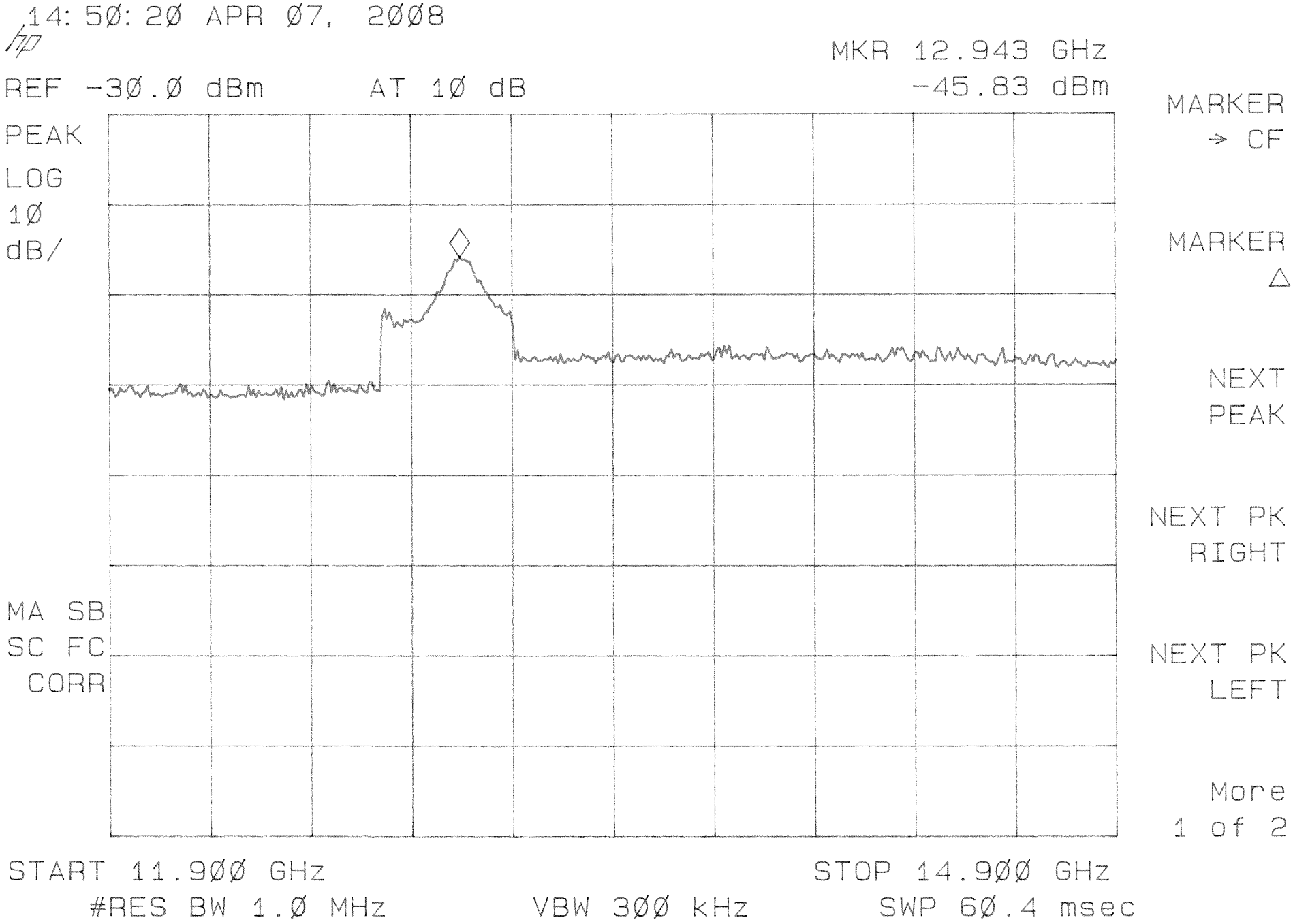

14: 38: 57 APR Ø7, 2ØØ8
MKR 866.6 MHz
REF -3Ø.Ø dBm
AT 1Ø dB
-78.49 dBm
PEAK
LOG
1Ø
dB/
MARKER
→ CF
MARKER
△
NEXT
PEAK
NEXT PK
RIGHT
MA SB
SC FC
CORR
NEXT PK
LEFT
More
1 of 2
START 3Ø.Ø MHz
STOP 1.ØØØØ GHz
#RES BW 1ØØ kHz
VBW 3Ø kHz
SWP 97Ø msec

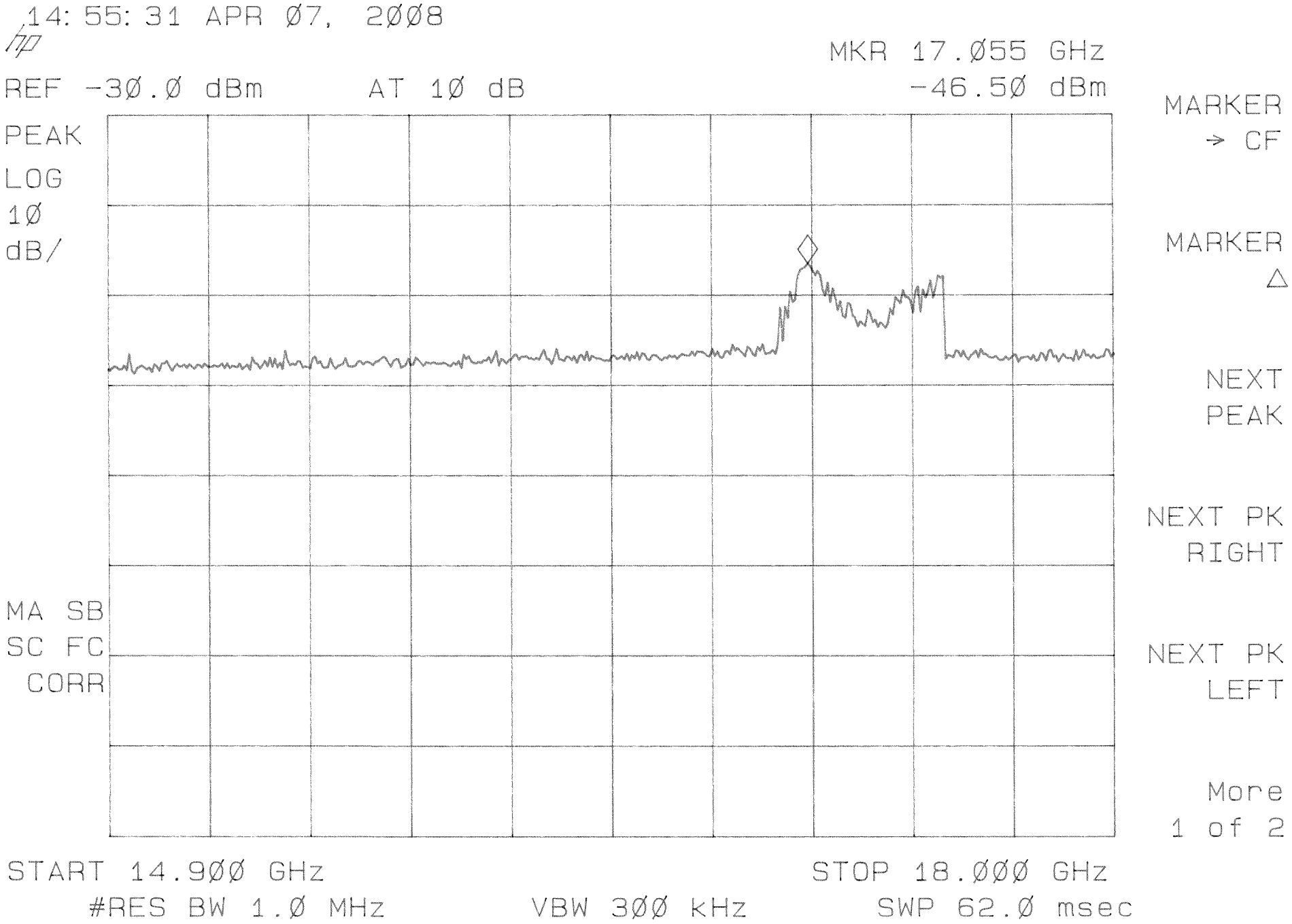

14: 4Ø: Ø7 APR Ø7, 2ØØ8
MKR 2.126 GHz
REF -3Ø.Ø dBm
AT 1Ø dB
-57.43 dBm
PEAK
LOG
1Ø
dB/
MARKER
→ CF
MARKER
△
NEXT
PEAK
NEXT PK
RIGHT
MA SB
SC FC
CORR
NEXT PK
LEFT
More
1 of 2
START 1.ØØØ GHz
STOP 2.9ØØ GHz
#RES BW 1.Ø MHz
VBW 3ØØ kHz
SWP 38.Ø msec

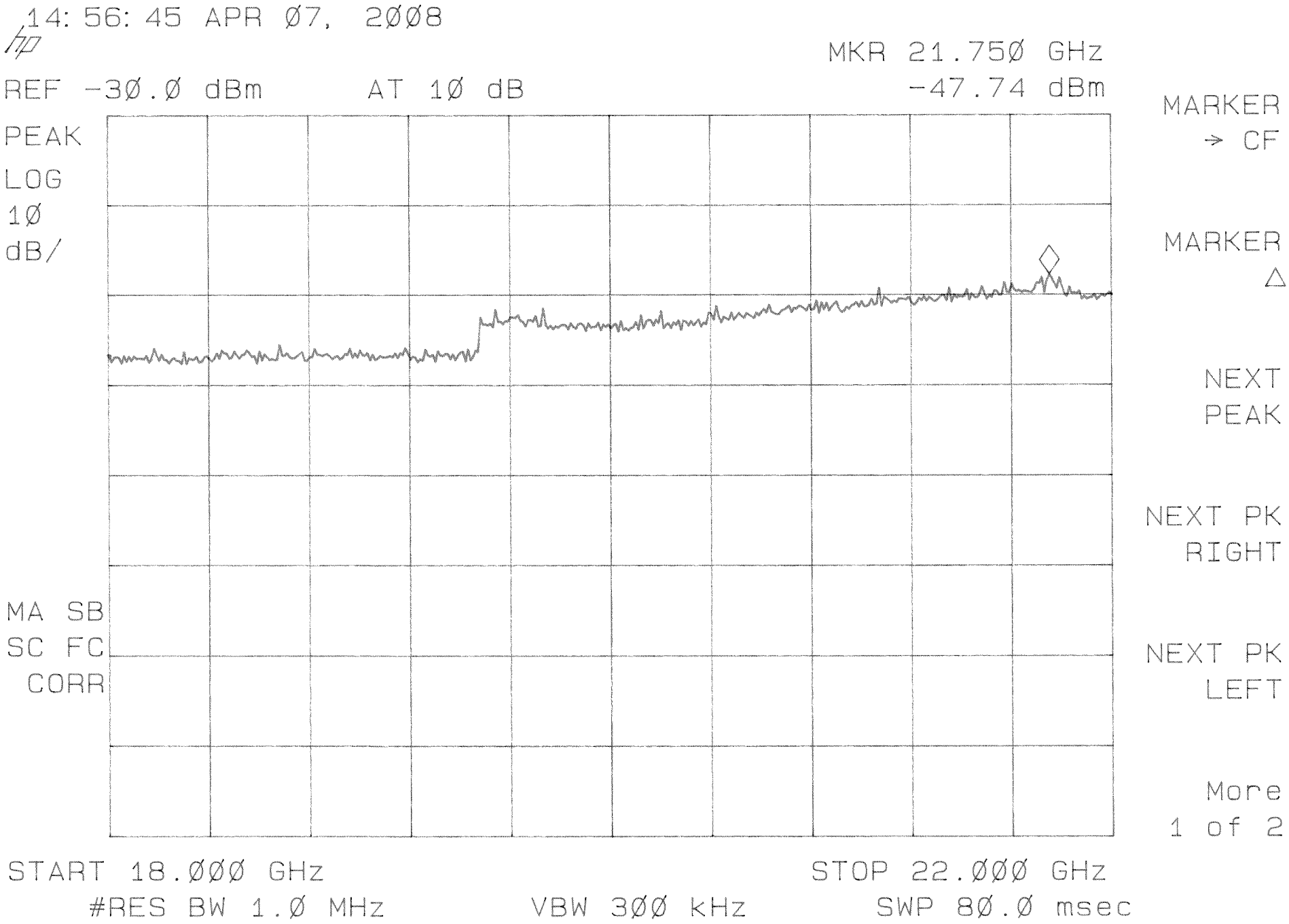

14: 41: 37 APR Ø7, 2ØØ8
MKR 3.7Ø5 GHz
REF -3Ø.Ø dBm
AT 1Ø dB
-64.65 dBm
PEAK
LOG
1Ø
dB/
MARKER
→ CF
MARKER
△
NEXT
PEAK
NEXT PK
RIGHT
MA SB
SC FC
CORR
NEXT PK
LEFT
More
1 of 2
START 2.9ØØ GHz
STOP 3.9ØØ GHz
#RES BW 1.Ø MHz
VBW 3ØØ kHz
SWP 2Ø.Ø msec

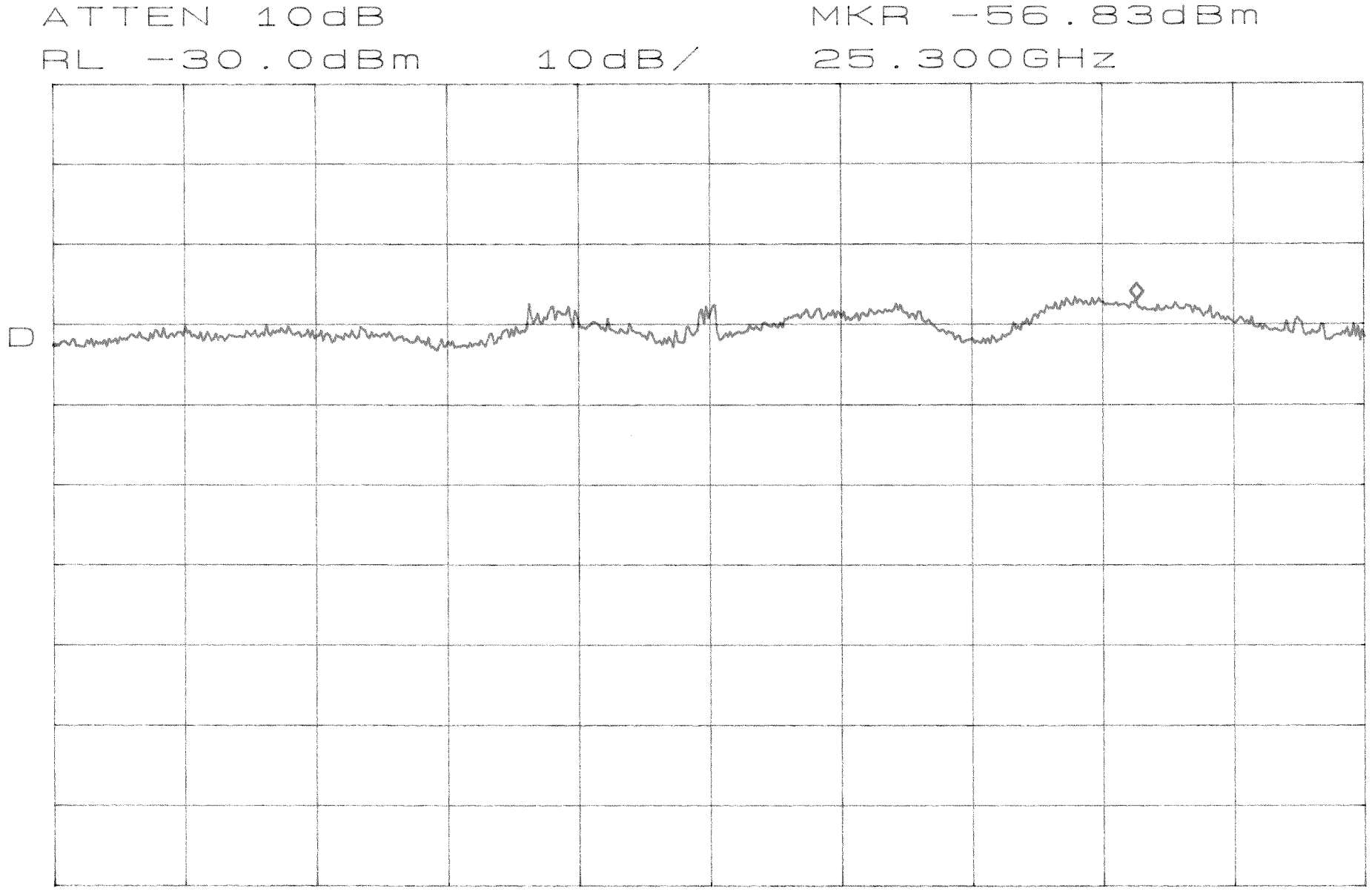

14: 44: Ø3 APR Ø7, 2ØØ8
MKR 8.48Ø GHz
REF -3Ø.Ø dBm
AT 1Ø dB
-39.24 dBm
PEAK
LOG
1Ø
dB/
MARKER
→ CF
MARKER
△
NEXT
PEAK
NEXT PK
RIGHT
MA SB
SC FC
CORR
NEXT PK
LEFT
More
1 of 2
START 4.7ØØ GHz
STOP 8.9ØØ GHz
#RES BW 1.Ø MHz
VBW 3ØØ kHz
SWP 84.Ø msec

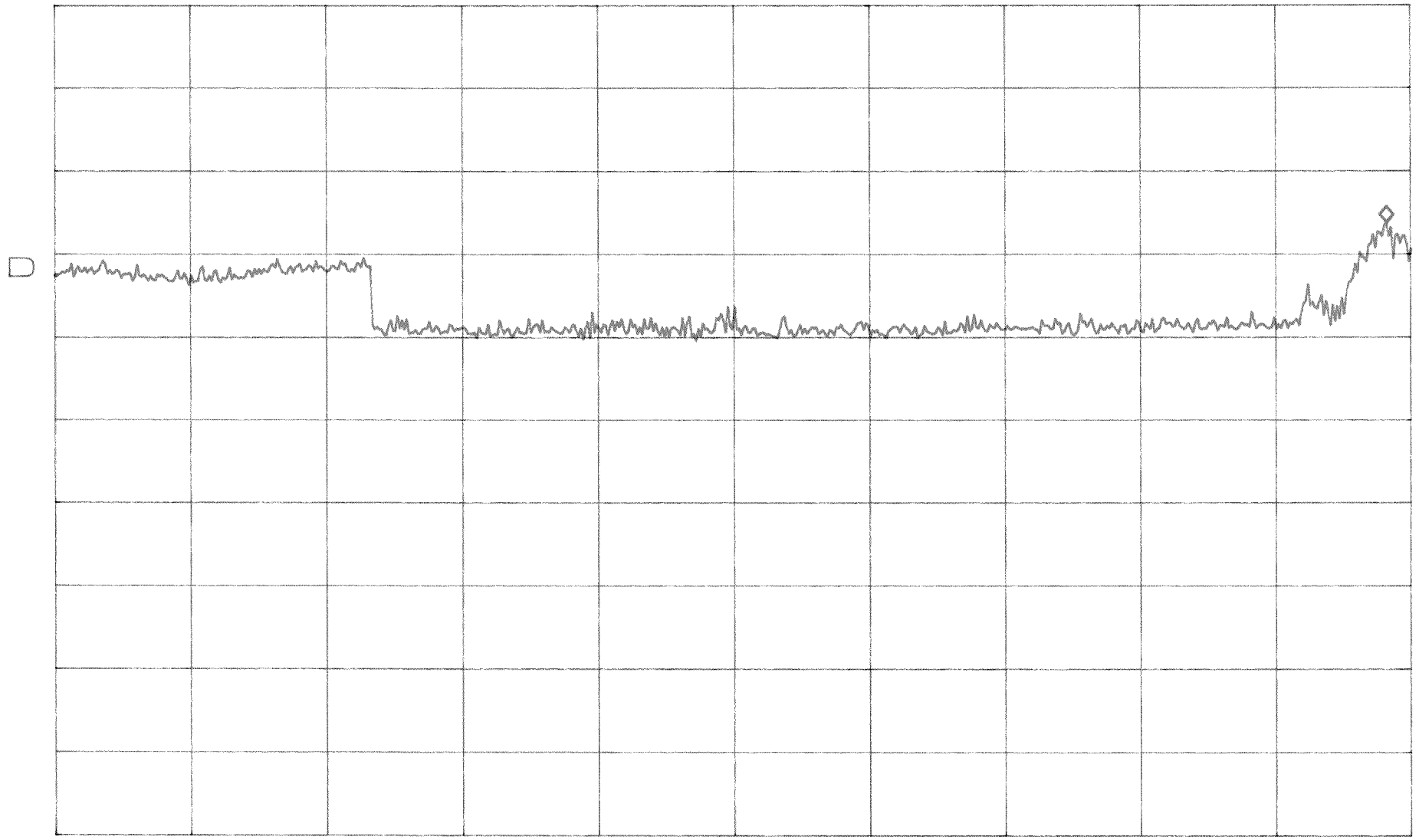

14: 45: 27 APR Ø7, 2ØØ8
MKR 1Ø.685 GHz
REF -3Ø.Ø dBm
AT 1Ø dB
-58.36 dBm
PEAK
LOG
1Ø
dB/
MARKER
→ CF
MARKER
△
NEXT
PEAK
NEXT PK
RIGHT
MA SB
SC FC
CORR
NEXT PK
LEFT
More
1 of 2
START 8.9ØØ GHz
STOP 11.9ØØ GHz
#RES BW 1.Ø MHz
VBW 3ØØ kHz
SWP 6Ø.Ø msec

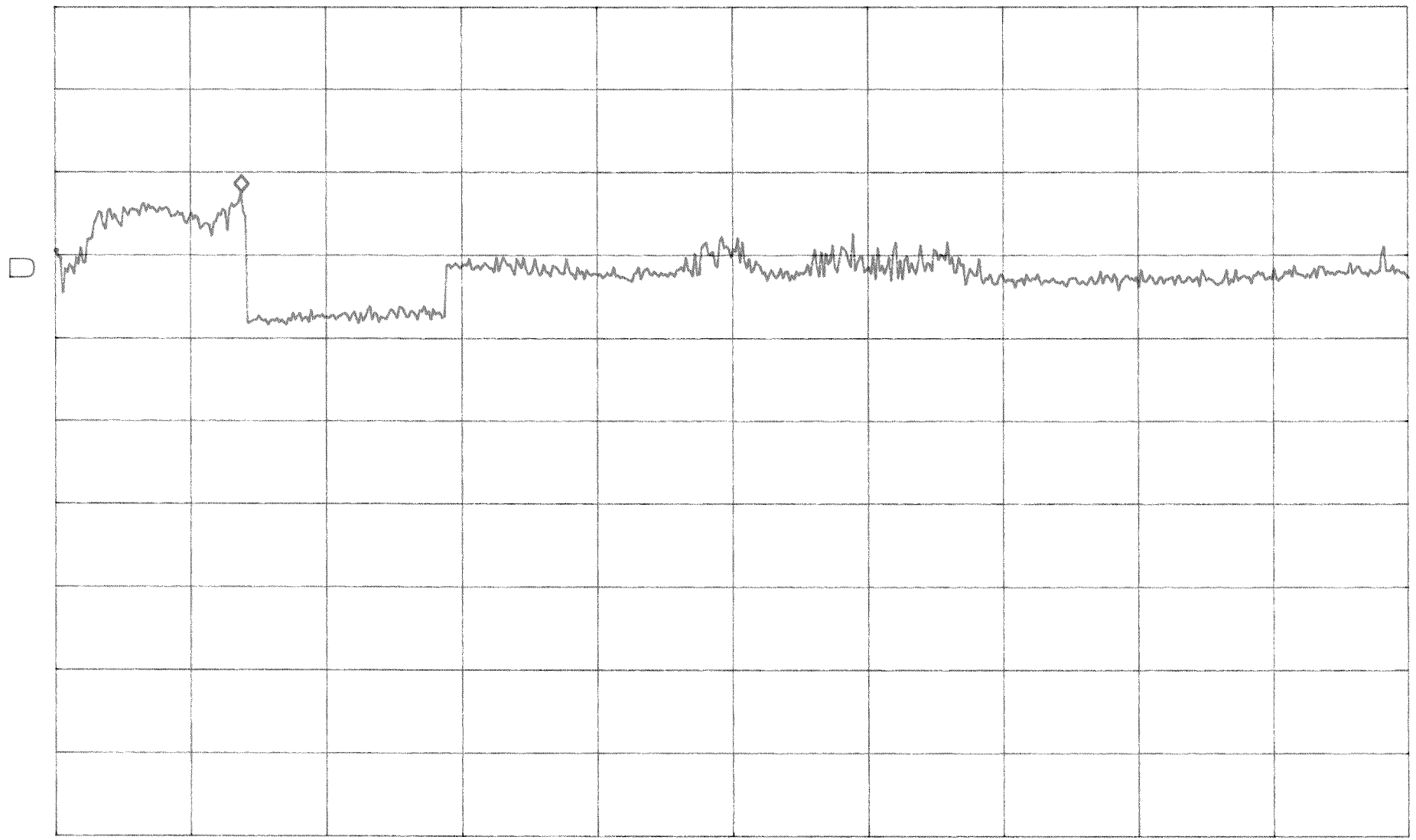

14: 5Ø: 2Ø APR Ø7, 2ØØ8
MKR 12.943 GHz
-45.83 dBm
REF -3Ø.Ø dBm
AT 1Ø dB
PEAK
LOG
1Ø
dB/
MARKER
→ CF
MARKER
△
NEXT
PEAK
NEXT PK
RIGHT
NEXT PK
LEFT
More
1 of 2
MA SB
SC FC
CORR
START 11.9ØØ GHz
STOP 14.9ØØ GHz
#RES BW 1.Ø MHz
VBW 3ØØ kHz
SWP 6Ø.4 msec

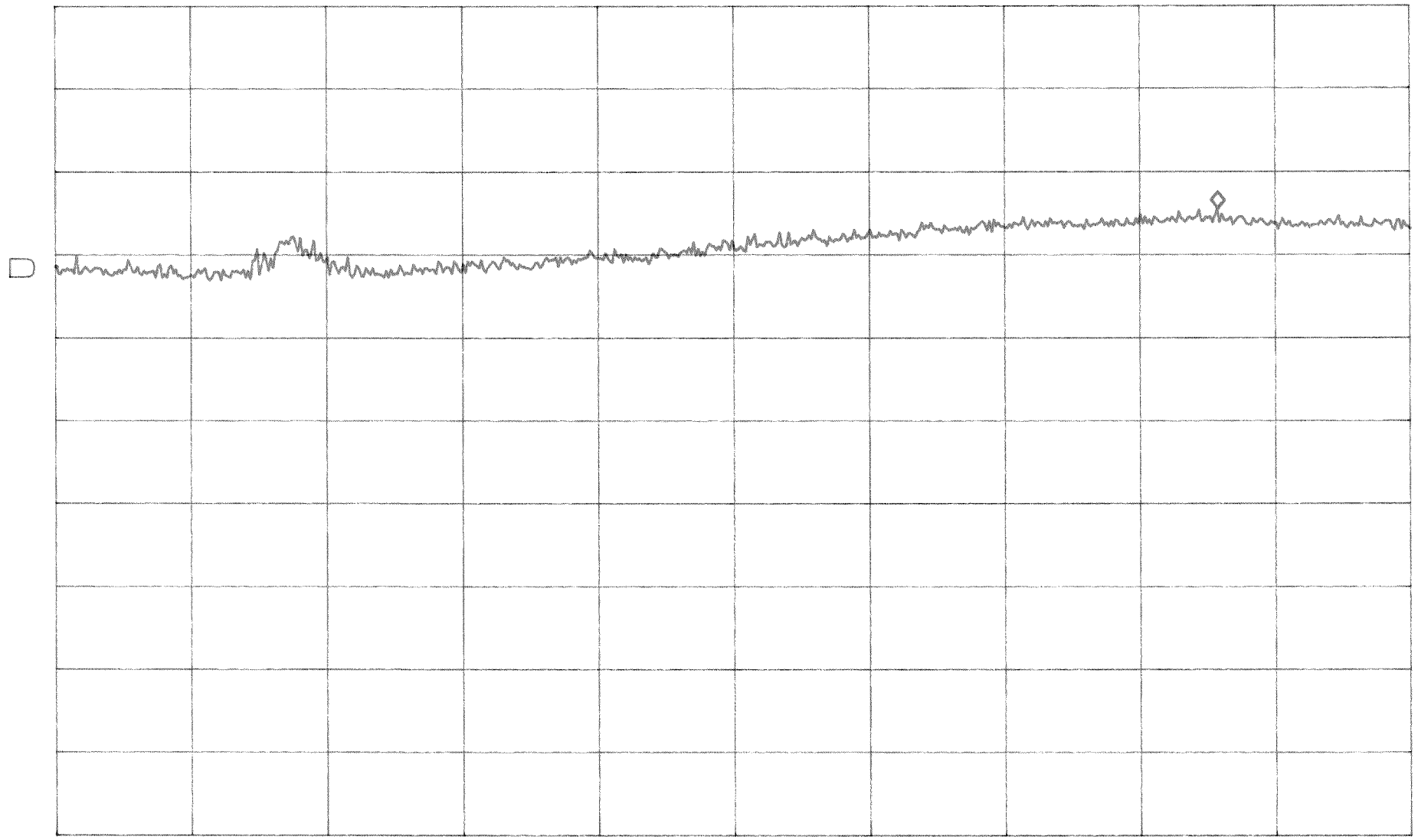

14: 55: 31 APR Ø7, 2ØØ8
MKR 17.Ø55 GHz
-46.5Ø dBm
REF -3Ø.Ø dBm
AT 1Ø dB
PEAK
LOG
1Ø
dB/
MARKER
→ CF
MARKER
△
NEXT
PEAK
NEXT PK
RIGHT
NEXT PK
LEFT
More
1 of 2
MA SB
SC FC
CORR
START 14.9ØØ GHz
STOP 18.ØØØ GHz
#RES BW 1.Ø MHz
VBW 3ØØ kHz
SWP 62.Ø msec

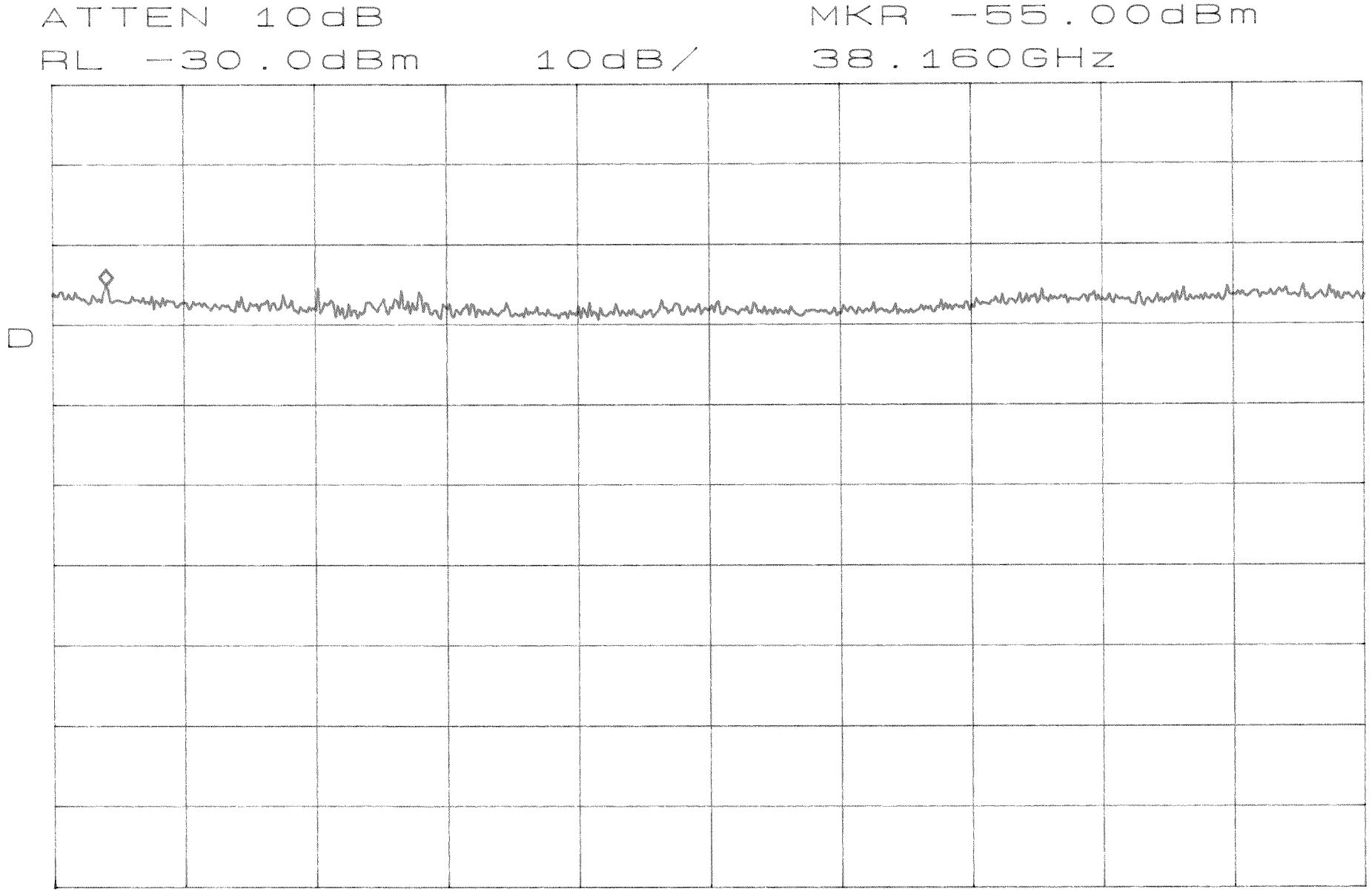

14: 56: 45 APR Ø7, 2ØØ8
MKR 21.75Ø GHz
-47.74 dBm
REF -3Ø.Ø dBm
AT 1Ø dB
PEAK
LOG
1Ø
dB/
MARKER
→ CF
MARKER
△
NEXT
PEAK
NEXT PK
RIGHT
NEXT PK
LEFT
More
1 of 2
MA SB
SC FC
CORR
START 18.ØØØ GHz
STOP 22.ØØØ GHz
#RES BW 1.Ø MHz
VBW 3ØØ kHz
SWP 8Ø.Ø msec

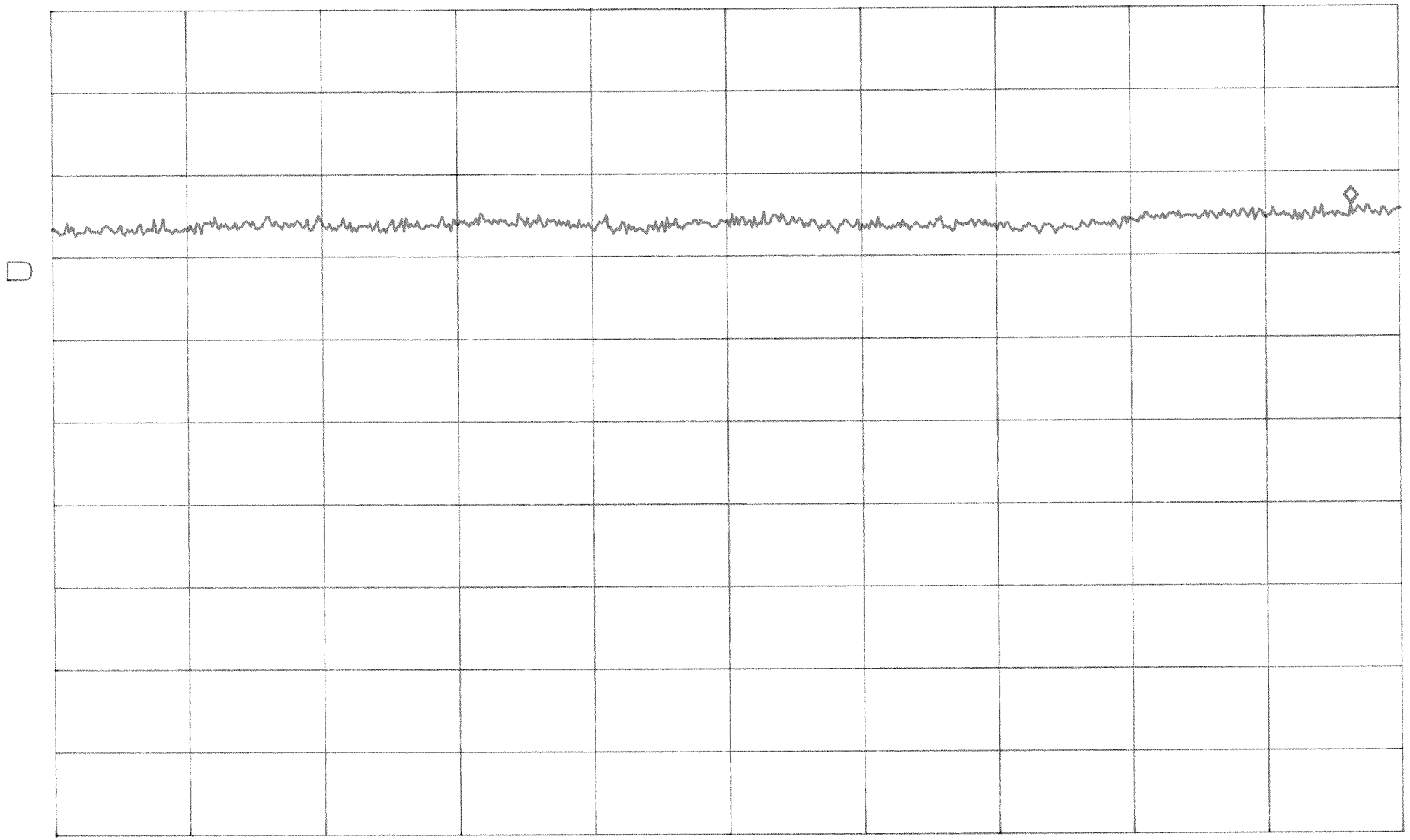

ATTEN 10dB
MKR -56.83dBm
RL -30.0dBm
10dB/
25.300GHz
D
START 22.000GHz
STOP 26.000GHz
*RBW 1.0MHz
VBW 1.0MHz
SWP 80.0ms

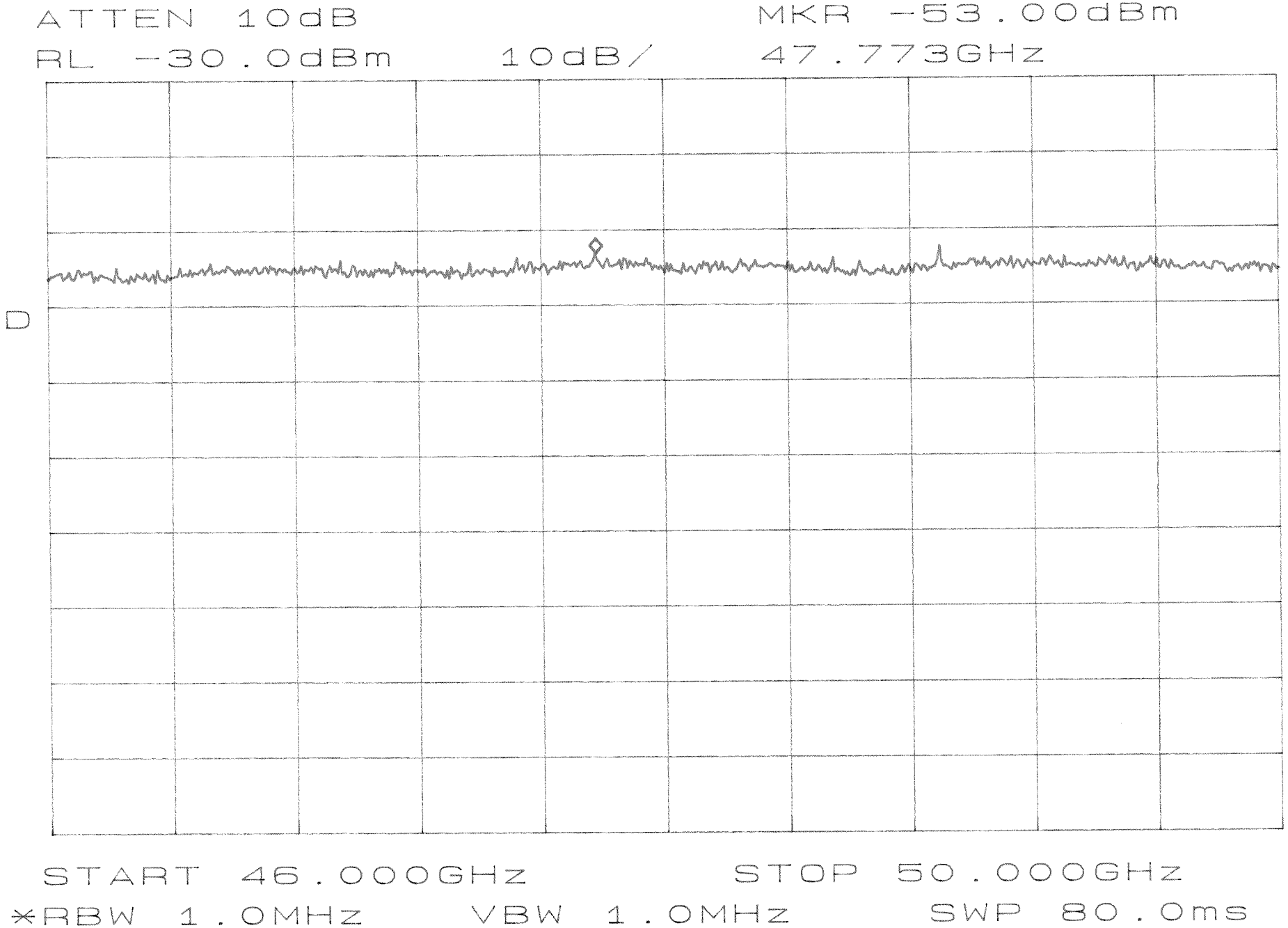

ATTEN 10dB
MKR -56.17dBm
RL -30.0dBm
10dB/
29.927GHz
D
START 26.000GHz
STOP 30.000GHz
*RBW 1.0MHz
VBW 1.0MHz
SWP 80.0ms


ATTEN 10dB
MKR -52.33dBm
RL -30.0dBm
10dB/
30.547GHz
D
START 30.000GHz
STOP 34.000GHz
*RBW 1.0MHz
VBW 1.0MHz
SWP 80.0ms


ATTEN 10dB
MKR -54.33dBm
RL -30.0dBm
10dB/
37.427GHz
D
START 34.000GHz
STOP 38.000GHz
*RBW 1.0MHz
VBW 1.0MHz
SWP 80.0ms


ATTEN 10dB
MKR -55.00dBm
RL -30.0dBm
10dB/
38.160GHz
D
START 38.000GHz
STOP 42.000GHz
*RBW 1.0MHz
VBW 1.0MHz
SWP 80.0ms


ATTEN 10dB
MKR -53.83dBm
RL -30.0dBm
10dB/
45.853GHz
D
START 42.000GHz
STOP 46.000GHz
*RBW 1.0MHz
VBW 1.0MHz
SWP 80.0ms


ATTEN 10dB
MKR -53.00dBm
RL -30.0dBm
10dB/
47.773GHz
D
START 46.000GHz
STOP 50.000GHz
*RBW 1.0MHz
VBW 1.0MHz
SWP 80.0ms