

COMPLEMENTARY
ACCEPTANCE and DESIGN TEST PROCEDURE
(CADTP)

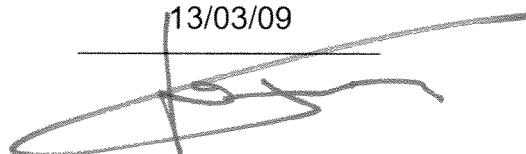
MEASUREMENT
OF THE UNWANTED RF EMISSIONS

FOR THE
AHV1600
Low Range Radar Altimeter

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1. SCOPE

1.1 IDENTIFICATION

This document concerns the Complementary Acceptance and Design Test Procedure (CADTP) 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 describes the means, the methods and the measurements to do in order to assure the conformity of the AHV1600 Transceiver with the international rules (ITU [1] and e-CFR [2]) about unwanted emissions.

The results of this procedure shall be consigned in the Complementary Acceptance and Design Test Report (CADTR) [3].

1.3 APPLICATION FIELD

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

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2. DOCUMENTS

2.1 APPLICABLES DOCUMENTS

<i>Document Identifier</i>	<i>Document Title</i>
[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] CADTR n°62 134 087 - 279	Complementary Acceptance and Design Test Report of the Measurement of the Unwanted RF Emissions for the AHV1600 Transceiver

2.2 REFERENCED DOCUMENTS

<i>Document Identifier</i>	<i>Document Title</i>
[4] TCF,QE/MOD_073/--/en	Document template
[5] ICD n°61 814 659 - 558 issue - B dated 31/03/2009	Interface Control Document

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3. TYPICAL INFORMATIONS

3.1 PROTOTYPE EQUIPMENT IDENTIFICATION

Information about AHV1600 Transceiver will be written in the Complementary Acceptance and Design Test Report (CADTR) [3]:

- Manufacturer name
- Manufacturer code
- Part number
- Serial number
- Amendment label
- Date of manufacture

3.2 IDENTIFICATION OF APPLICABLE PROCEDURE

Information about edition identification of the applicable procedure and report will be written in the Complementary Acceptance and Design Test Report (CADTR) [3]:

- Document title
- Document identification
- Edition date
- Issue

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3.3 ACCEPTANCE

Information about the tests will be written in the Complementary Acceptance and Design Test Report (CADTR) [3]:

- Staff name (operator and person in charge of quality)
- Date of test
- Signature

3.4 COMMENTS

The information's concerning the progress of the acceptance and design tests will be recorded in the Complementary Acceptance and Design Test Report (CADTR) [3]:

- Deviations
- Remarks

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4. TRANSCEIVER CHARACTERISTICS

4.1 POWER AT CONNECTOR TX

The maximum power level of the AHV1600 Transceiver is specified at (refer to ICD document [5]):

- $P_{TXMax}=19dBm=79.4mW$

According to the ITU [1], the AHV1600 Transceiver is classified as a “low-power device radio equipment”.

4.2 FREQUENCY BANDWIDTH

According to the ITU [1] and e-CFR [2], the authorized band for radio altimeters is 4200MHz-4400MHz and is reserved exclusively for radio altimeters.

According to the and e-CFR [2], occupied bandwidth is the width of a frequency band such that, below the lower and above the upper frequency limits, the mean powers emitted are each equal to 0.5 percent of the total mean power of a given emission.

According to the and e-CFR [2], the authorized bandwidth is the maximum occupied bandwidth authorized to be used by a station.

The occupied bandwidth of emissions of the AHV1600 Transceiver is specified at (refer to ICD document [5]):

- $Bw=[4200-4400]MHz$ at a power level of $-4dBm=2.5mW$

4.3 MODULATION CHARACTERISTICS

The modulation of the AHV1600 Transceiver is a linear Frequency Modulation / Continuous Wave (FM/CW) type.

According to the ITU [1], the AHV1600 Transceiver is not classified as a “general type of radar pulse modulation”.

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5. THEORETICAL UNWANTED DOMAIN EMISSIONS

5.1 ITU (INTERNATIONAL TELECOMMUNICATION UNION)

5.1.1 DEFINITION

Spurious emission:

Emission on a frequency or frequencies, which are outside the necessary bandwidth and the level of which may be reduced without affecting the corresponding transmission of information. Spurious emissions include harmonic emissions, parasitic emissions, intermodulation products and frequency conversion products, but exclude out-of-band emissions.

Out-of-band emission:

Emission on a frequency or frequencies immediately outside the necessary bandwidth, which results from the modulation process, but excluding spurious emissions.

Unwanted emissions:

Consist of spurious emissions and out-of-band emissions.

5.1.2 UNWANTED EMISSIONS FREQUENCIES AND LEVELS

Frequency range of measurement:

According to the ITU [1], the frequency range of the measurement of spurious domain emissions is from 9kHz to 110GHz or the second harmonic if higher.

Reference bandwidth of measurement:

The reference bandwidths of the measurement of spurious domain emissions are the following ones with the appropriate resolution bandwidths:

- RBW 1kHz between 9kHz and 150kHz
- RBW 10kHz between 150kHz and 30MHz
- RBW 100kHz between 30MHz and 1GHz
- RBW 1MHz above 1GHz

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Determination of the boundary between the out-of-band and spurious domains:

According to § 4.2 of this document, the Radio Frequency characteristics of the AHV1600 Transceiver are the following ones:

- $f_c=4300\text{MHz}$
- $B_N=200\text{MHz}$

Using the general separation formula of the ITU [1], the out-of-band domain is :

- $1.5 \times B_N + 100 = 1.5 \times 200\text{MHz} + 100\text{MHz} = 400\text{MHz}$ either side of the centre frequency

The spurious domain emission frequencies are equal to the following bandwidths:

- from 9kHz up to 3900MHz
- from 4700Mhz up to 110GHz

Determination of the maximum permitted spurious domain emission power levels:

According to § 4.1 of this document, the RF power characteristics of the AHV1600 Transceiver is the following one:

- $P_{TXMax}=19\text{dBm}=79.4\text{mW}$

Using the general attenuation formula of the ITU [1], the maximum spurious domain emission power level is :

- $A=56+10\log(P)=56+10\log(79.4 \times 10^{-3})=45\text{dBc}$ or 40dBc whichever is less stringent
- 45dBc is more stringent than 40dBc so the 40dBc value is used.

The spurious domain emission power level (converting to an absolute level) must not exceed $-11\text{dBW}-40\text{dBc}=-51\text{dBW}=-21\text{dBm}$ in the reference bandwidth.

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5.2 E-CFR (ELECTRONICS CODE OF FEDERAL REGULATIONS)

5.2.1 EMISSION LIMITATIONS AND LEVEL

According to § 4.2 of this document, the Radio Frequency characteristics of the AHV1600 Transceiver are the following ones:

- $Bw=[4200-4400]\text{MHz}$

According to § 4.1 of this document, the RF power characteristics of the AHV1600 Transceiver is the following one:

- $P_{TXMax}=19\text{dBm}$

According to the e-CFR [2], the mean power of any emission must be attenuated below the mean power of the transmitter as follows:

Frequency	Attenuation	Level
$4000\text{MHz} \leq f_c \leq 4100\text{MHz}$ $4500\text{MHz} \leq f_c \leq 4600\text{MHz}$	25dB below max power	-6dBm
$3900\text{MHz} \leq f_c \leq 4000\text{MHz}$ $4600\text{MHz} \leq f_c \leq 4700\text{MHz}$	35dB below max power	-16dBm
$f_c \leq 3900\text{MHz}$ $f_c \geq 4700\text{MHz}$	40dB below max power	-21dBm

Table 1: Attenuation level versus frequency bandwidth of the AHV1600 Transceiver

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5.3 CONCLUSION

The following figure resumes the combination between ITU rules [1] and e-CFR rules [2].

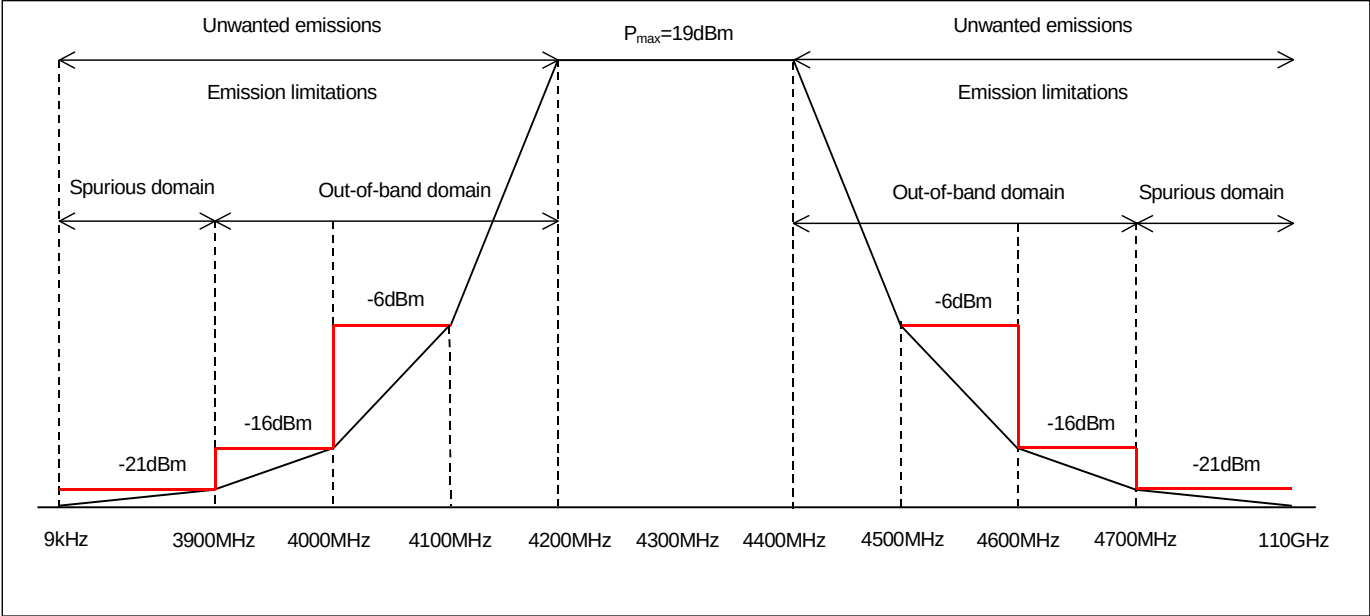


Figure 1: Unwanted emissions / emission limitations of the AHV1600 Transceiver

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6. PREPARATION OF THE TESTS

6.1 LABORATORY TEST EQUIPMENTS

6.1.1 STANDARD LABORATORY TEST EQUIPMENTS

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

Laboratory test equipments	Materiel description
Spectrum analyzer	9kHz-110GHz
Power supply	28V/2A
Adapters	TNC M – SMA M DC
50Ω load	SMA

Table 2: Standard laboratory test equipments

The information about the standard laboratory test equipment's will be recorded in the Complementary Acceptance and Design Test Report (CADTR [3]):

- Name
- Manufacturer name
- Type
- Serial number
- Validity expiration

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6.1.2 SPECIAL LABORATORY TEST EQUIPMENTS

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

- BTE PILOTAGE DISCRETS n°1 491 331 AA
- Or Bench Test P/N 62057140AA

Information about the special laboratory test equipments will be written in the Complementary Acceptance and Design Test Report (CADTR) [3]:

- Name
- Part number
- Serial number

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6.2 LABORATORY TEST ASSEMBLY

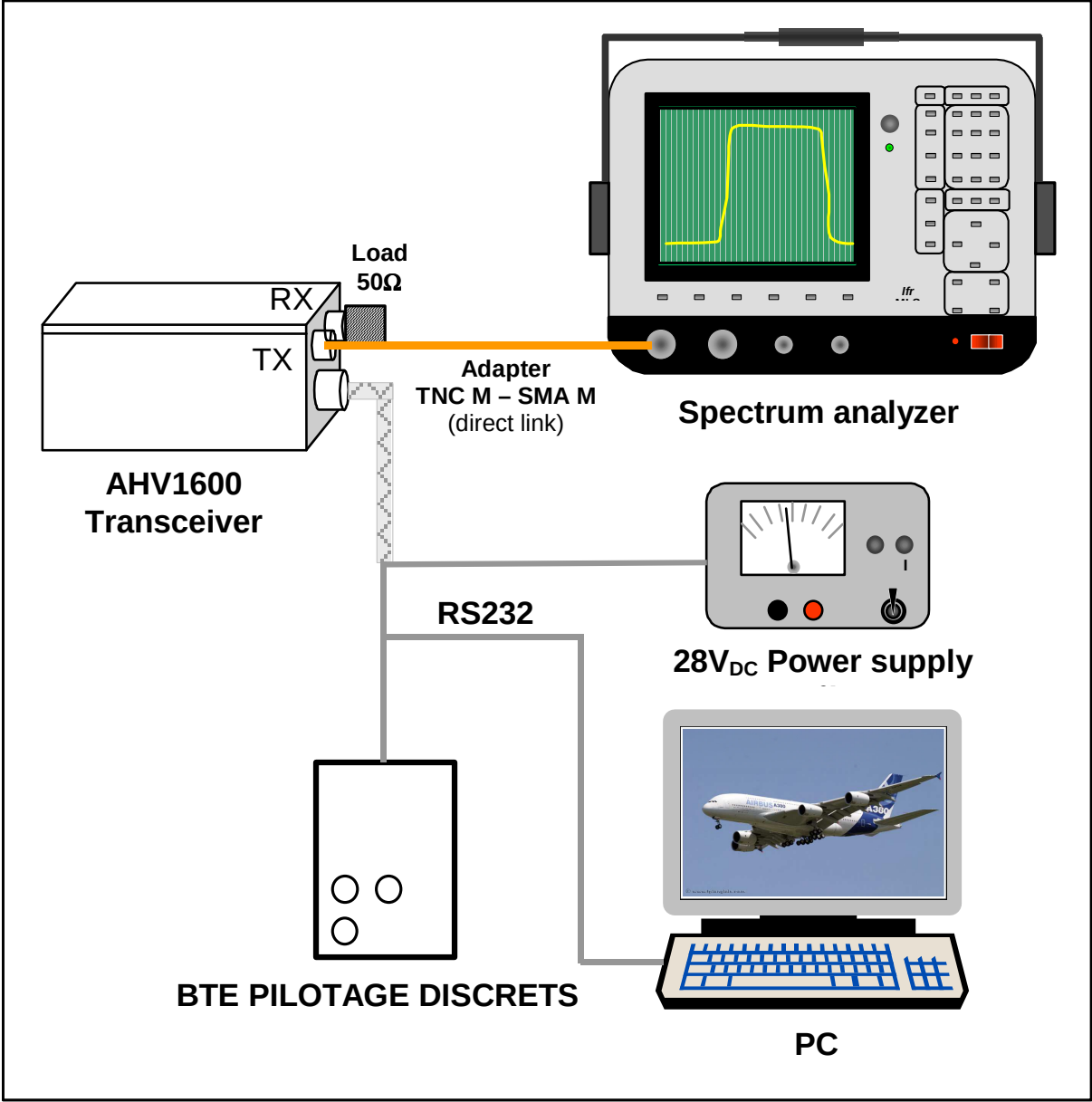


Figure 2: Test assembly

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6.3 LABORATORY TEST SET-UP

The set-up of the “BTE PILOTAGE DISCRETS” consist to set the following switches in the appropriate configuration:

- o TST_INH : Logic state “1”
- o FCT_TEST : Logic state “1”
- o SIL_EMIS : Logic state “0”
- o AID_P : Logic state “1”
- o AID2 : Logic state “1”
- o AID1 : Logic state “1”
- o AID0 : Logic state “0”
- o CTZ_SEL1 : Logic state “1”
- o CTZ_SEL2 : Logic state “1”
- o MAINT : Logic state “0”
- o SDI SEL : Logic state “1”

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7. DESCRIPTION OF THE MEASUREMENTS

7.1 TEST N°1: MEASURE OF THE OUT-OF-BAND DOMAIN EMISSIONS

Objectives:

The objective of this procedure is to check the out-of-band domain emissions at the connector TX of the AHV1600 Transceiver.

Standard & special laboratory test equipments:

Box test; Spectrum analyzer

Setup:

Plug a 50Ω load to the connector RX of the AHV1600 Transceiver

Plug the connector TX of the AHV1600 Transceiver to the spectrum analyzer with a TNC/SMA adapter

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Out-of-band domain emissions at the connector TX of the AHV1600 Transceiver:

- Power on the power supply
- **Measure of out-of-band domain emission in bandwidth 3900MHz → 4000MHz**

Spectrum analyzer set-up:

- PRESET
- START = 3900 MHz
- STOP = 4000 MHz
- DB/DIV = 10 dB
- LEVEL = -30 dBm
- RES BW = 1 MHz
- MAX HOLD

(1) Measure the maximum spectrum level in the bandwidth 3900 to 4000MHz

≤ -16dBm

- **Measure of out-of-band domain emission in bandwidth 4000MHz → 4100MHz**

Spectrum analyzer set-up:

- PRESET
- START = 4000 MHz
- STOP = 4100 MHz
- DB/DIV = 10 dB
- LEVEL = -30 dBm
- RES BW = 1 MHz
- MAX HOLD

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(2) Measure the maximum spectrum level in the bandwidth 4000 to 4100MHz
 $\leq -6\text{dBm}$

- Measure of out-of-band domain emission in bandwidth 4500MHz → 4600MHz

Spectrum analyzer set-up:

- PRESET
- START = 4500 MHz
- STOP = 4600 MHz
- DB/DIV = 10 dB
- LEVEL = -30 dBm
- RES BW = 1 MHz
- MAX HOLD

(3) Measure the maximum spectrum level in the bandwidth 4500 to 4600MHz
 $\leq -6\text{dBm}$

- Measure of out-of-band domain emission in bandwidth 4600MHz → 4700MHz

Spectrum analyzer set-up:

- PRESET
- START = 4600 MHz
- STOP = 4700 MHz
- DB/DIV = 10 dB
- LEVEL = -30 dBm
- RES BW = 1 MHz
- MAX HOLD

(4) Measure the maximum spectrum level in the bandwidth 4600 to 4700MHz
 $\leq -16\text{dBm}$

- Power off the power supply

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7.2 TEST N°2: MEASURE OF THE SPURIOUS DOMAIN EMISSIONS

Objectives:

The objective of this procedure is to check the out-of-band domain emissions at the connector TX of the AHV1600 Transceiver.

Standard & special laboratory test equipments:

Box test; Spectrum analyzer

Setup:

Plug a 50Ω load to the connector RX of the AHV1600 Transceiver

Plug the connector TX of the AHV1600 Transceiver to the spectrum analyzer with a TNC/SMA adapter

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Spurious domain emissions at the connector TX of the AHV1600 Transceiver:

- Power on the power supply
- **Measure of spurious domain emission in bandwidth 9kHz → 150kHz**

Spectrum analyzer set-up:

- PRESET
- START = 9 kHz
- STOP = 150 kHz
- LEVEL = -30 dBm
- RES BW = 1 kHz
- MAX HOLD

(1) Measure the maximum spectrum level in the bandwidth 9kHz to 150kHz

≤ -21dBm

- **Measure of spurious domain emission in bandwidth 150kHz → 30MHz**

Spectrum analyzer set-up:

- CLEAR WRITE
- START = 150 kHz
- STOP = 30 MHz
- RES BW = 10 kHz
- MAX HOLD

(2) Measure the maximum spectrum level in the bandwidth 150kHz to 30MHz

≤ -21dBm

- **Measure of spurious domain emission in bandwidth 30MHz → 1000MHz**

Spectrum analyzer set-up:

- CLEAR WRITE
- START = 30 MHz
- STOP = 1000 MHz
- RES BW = 100 kHz
- MAX HOLD

(3) Measure the maximum spectrum level in the bandwidth 30MHz to 1000MHz

≤ -21dBm

- **Measure of spurious domain emission in bandwidth 1000MHz → 2900MHz**

Spectrum analyzer set-up:

- CLEAR WRITE
- START = 1000 MHz
- STOP = 2900 MHz
- RES BW = 1 MHz
- MAX HOLD

(4) Measure the maximum spectrum level in the bandwidth 1000MHz to 2900MHz

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≤ -21dBm

- Measure of spurious domain emission in bandwidth 2900MHz → 3900MHz

Spectrum analyzer set-up:

- CLEAR WRITE
- START = 2900 MHz
- STOP = 3900 MHz
- RES BW = 1 MHz
- MAX HOLD

(5) Measure the maximum spectrum level in the bandwidth 2900MHz to 3900MHz

≤ -21dBm

- Measure of spurious domain emission in bandwidth 4700MHz → 8900MHz

Spectrum analyzer set-up:

- CLEAR WRITE
- START = 4700 MHz
- STOP = 8900 MHz
- RES BW = 1 MHz
- MAX HOLD

(6) Measure the maximum spectrum level in the bandwidth 4700MHz to 8900MHz

≤ -21dBm

- Measure of spurious domain emission in bandwidth 8900MHz → 11900MHz

Spectrum analyzer set-up:

- CLEAR WRITE
- START = 8900 MHz
- STOP = 11900 MHz
- RES BW = 1 MHz
- MAX HOLD

(7) Measure the maximum spectrum level in the bandwidth 8900MHz to 11900MHz

≤ -21dBm

- Measure of spurious domain emission in bandwidth 11900MHz → 14900MHz

Spectrum analyzer set-up:

- CLEAR WRITE
- START = 11900 MHz
- STOP = 14900 MHz
- RES BW = 1 MHz
- MAX HOLD

(8) Measure the maximum spectrum level in the bandwidth 11900MHz to 14900MHz

≤ -21dBm

- Measure of spurious domain emission in bandwidth 14900MHz → 18000MHz

Spectrum analyzer set-up:

- CLEAR WRITE

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- START = 14900 MHz
- STOP = 18000 MHz
- RES BW = 1 MHz
- MAX HOLD

(9) Measure the maximum spectrum level in the bandwidth 14900MHz to 18000MHz

≤ -21dBm

- Measure of spurious domain emission in bandwidth 18000MHz → 22000MHz

Spectrum analyzer set-up:

- CLEAR WRITE
- START = 18000 MHz
- STOP = 22000 MHz
- RES BW = 1 MHz
- MAX HOLD

(10) Measure the maximum spectrum level in the bandwidth 18000MHz to 22000MHz

≤ -21dBm

- Measure of spurious domain emission in bandwidth 22000MHz → 26000MHz

Spectrum analyzer set-up:

- CLEAR WRITE
- START = 22000 MHz
- STOP = 26000 MHz
- RES BW = 1 MHz
- MAX HOLD

(11) Measure the maximum spectrum level in the bandwidth 22000MHz to 26000MHz

≤ -21dBm

- Measure of spurious domain emission in bandwidth 26000MHz → 30000MHz

Spectrum analyzer set-up:

- CLEAR WRITE
- START = 26000 MHz
- STOP = 30000 MHz
- RES BW = 1 MHz
- MAX HOLD

(12) Measure the maximum spectrum level in the bandwidth 26000MHz to 30000MHz

≤ -21dBm

- Measure of spurious domain emission in bandwidth 30000MHz → 34000MHz

Spectrum analyzer set-up:

- CLEAR WRITE
- START = 30000 MHz
- STOP = 34000 MHz
- RES BW = 1 MHz
- MAX HOLD

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(13) Measure the maximum spectrum level in the bandwidth 30000MHz to 34000MHz
 $\leq -21\text{dBm}$

▪ Measure of spurious domain emission in bandwidth 34000MHz → 38000MHz

Spectrum analyzer set-up:

- CLEAR WRITE
- START = 34000 MHz
- STOP = 38000 MHz
- RES BW = 1 MHz
- MAX HOLD

(14) Measure the maximum spectrum level in the bandwidth 34000MHz to 38000MHz
 $\leq -21\text{dBm}$

▪ Measure of spurious domain emission in bandwidth 38000MHz → 42000MHz

Spectrum analyzer set-up:

- CLEAR WRITE
- START = 38000 MHz
- STOP = 42000 MHz
- RES BW = 1 MHz
- MAX HOLD

(15) Measure the maximum spectrum level in the bandwidth 38000MHz to 42000MHz
 $\leq -21\text{dBm}$

▪ Measure of spurious domain emission in bandwidth 42000MHz → 46000MHz

Spectrum analyzer set-up:

- CLEAR WRITE
- START = 42000 MHz
- STOP = 46000 MHz
- RES BW = 1 MHz
- MAX HOLD

(16) Measure the maximum spectrum level in the bandwidth 42000MHz to 46000MHz
 $\leq -21\text{dBm}$

▪ Measure of spurious domain emission in bandwidth 46000MHz → 50000MHz

Spectrum analyzer set-up:

- CLEAR WRITE
- START = 46000 MHz
- STOP = 50000 MHz
- RES BW = 1 MHz
- MAX HOLD

(17) Measure the maximum spectrum level in the bandwidth 46000MHz to 50000MHz
 $\leq -21\text{dBm}$

▪ Measure of spurious domain emission in bandwidth 50000MHz → 110000MHz

Spectrum analyzer set-up:

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- CLEAR WRITE
- START = 50000 MHz
- STOP = 110000MHz
- RES BW = 1 MHz
- MAX HOLD

(18) Measure the maximum spectrum level in the bandwidth 50000MHz to 110000MHz

≤ -21dBm

- Power off the power supply

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8. LIST OF ACRONYMS

CADTP : Complementary Acceptance and Design Test Procedure

CADTR : Complementary Acceptance and Design Test Result

E-CFR : Electronics Code of Federal Regulations

FM/CW : Frequency Modulation Continuous Wave

ICD : Interface Control Document

ITU : International Telecommunication Union

P/N : Part Number

RF : Radio Frequency

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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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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.

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2. DOCUMENTS

2.1 APPLICABLES DOCUMENTS

<i>Document Identifier</i>	<i>Document Title</i>
[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

<i>Document Identifier</i>	<i>Document Title</i>
[5] TCF,QE/MOD_073/--/en	Document template

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3. TYPICAL INFORMATION

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			

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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

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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].

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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

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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	$\leq -16\text{dBm}$	-67.8dBm
2	Maximum spectrum level in the bandwidth 4000 to 4100MHz	$\leq -6\text{dBm}$	-55.9dBm
3	Maximum spectrum level in the bandwidth 4500 to 4600MHz	$\leq -6\text{dBm}$	-57.1dBm
4	Maximum spectrum level in the bandwidth 4600 to 4700MHz	$\leq -16\text{dBm}$	-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	$\leq -21\text{dBm}$	-69.3dBm
2	Maximum spectrum level in the bandwidth 150kHz to 30MHz	$\leq -21\text{dBm}$	-89.3dBm
3	Maximum spectrum level in the bandwidth 30MHz to 1000MHz	$\leq -21\text{dBm}$	-78.5dBm
4	Maximum spectrum level in the bandwidth 1000MHz to 2900MHz	$\leq -21\text{dBm}$	-57.4dBm
5	Maximum spectrum level in the bandwidth 2900MHz to 3900MHz	$\leq -21\text{dBm}$	-64.6dBm
6	Maximum spectrum level in the bandwidth 4700MHz to 8900MHz	$\leq -21\text{dBm}$	-39.2dBm
7	Maximum spectrum level in the bandwidth 8900MHz to 11900MHz	$\leq -21\text{dBm}$	-58.3dBm
8	Maximum spectrum level in the bandwidth 11900MHz to 14900MHz	$\leq -21\text{dBm}$	-45.8dBm
9	Maximum spectrum level in the bandwidth 14900MHz to 18000MHz	$\leq -21\text{dBm}$	-46.5dBm
10	Maximum spectrum level in the bandwidth 18000MHz to 22000MHz	$\leq -21\text{dBm}$	-47.7dBm
11	Maximum spectrum level in the bandwidth 22000MHz -> 26000MHz	$\leq -21\text{dBm}$	-56.8dBm
12	Maximum spectrum level in the bandwidth 26000MHz -> 30000MHz	$\leq -21\text{dBm}$	-56.1dBm
13	Maximum spectrum level in the bandwidth 30000MHz -> 34000MHz	$\leq -21\text{dBm}$	-52.3dBm
14	Maximum spectrum level in the bandwidth 34000MHz -> 38000MHz	$\leq -21\text{dBm}$	-54.3dBm
15	Maximum spectrum level in the bandwidth 38000MHz -> 42000MHz	$\leq -21\text{dBm}$	-55dBm

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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	-

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APPENDICES

Measures

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Out of Band Domain

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14:04:51 APR 07, 2008

REF -30.0 dBm AT 10 dB MKR 3.9533 GHz
-67.84 dBm

PEAK
LOG
10
dB/

MARKER
→ CF

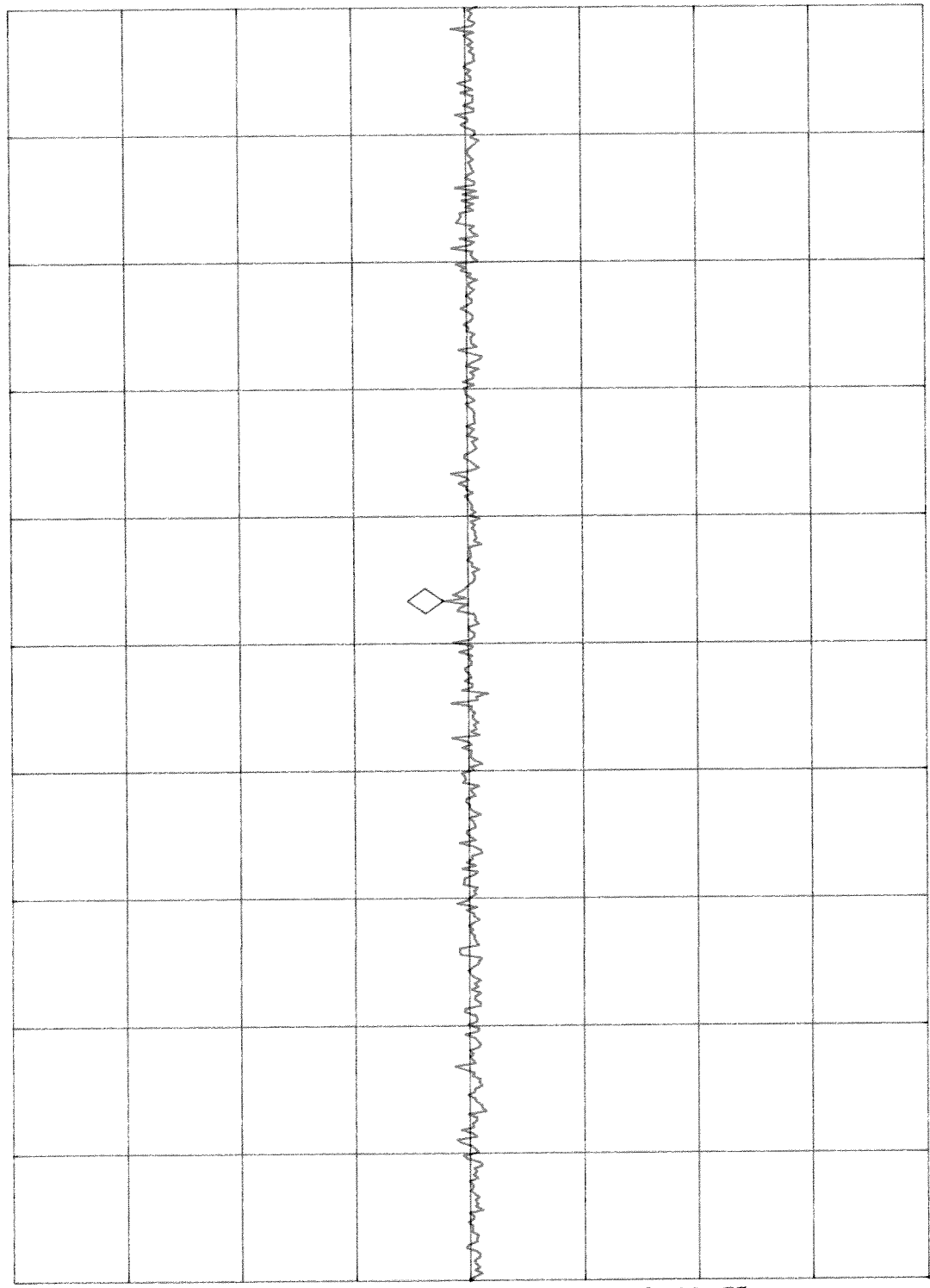
MARKER
Δ

NEXT
PEAK

NEXT PK
RIGHT

NEXT PK
LEFT

More
1 of 2



MA SB
SC FC
CORR

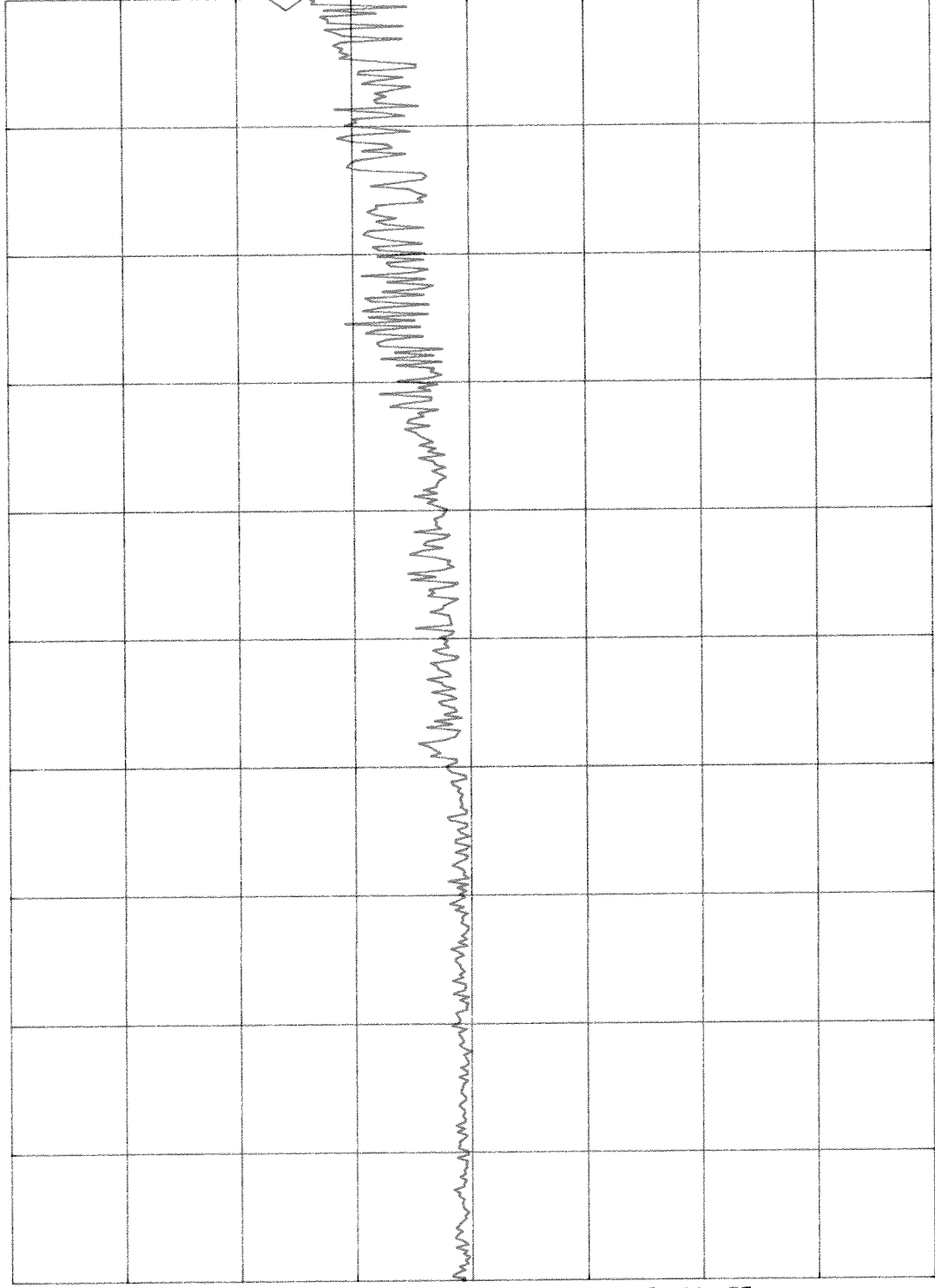
START 3.9000 GHz STOP 4.0000 GHz
#RES BW 1.0 MHz VBW 300 kHz SWP 20.0 msec

14: 07: 38 APR 07, 2008

70
MKR 4.1000 GHz
-55.93 dBm

REF -30.0 dBm AT 10 dB

PEAK
LOG
10
dB/



MARKER
→ CF

MARKER
Δ

NEXT
PEAK

NEXT PK
RIGHT

NEXT PK
LEFT

More
1 of 2

MA SB
SC FC
CORR

START 4.0000 GHz STOP 4.1000 GHz
#RES BW 1.0 MHz VBW 300 kHz SWP 20.0 msec

14: 23: 42 APR 07, 2008

MR 4.5040 GHz
-57.12 dBm

REF -30.0 dBm AT 10 dB

PEAK
LOG
10
dB/

MARKER
→ CF

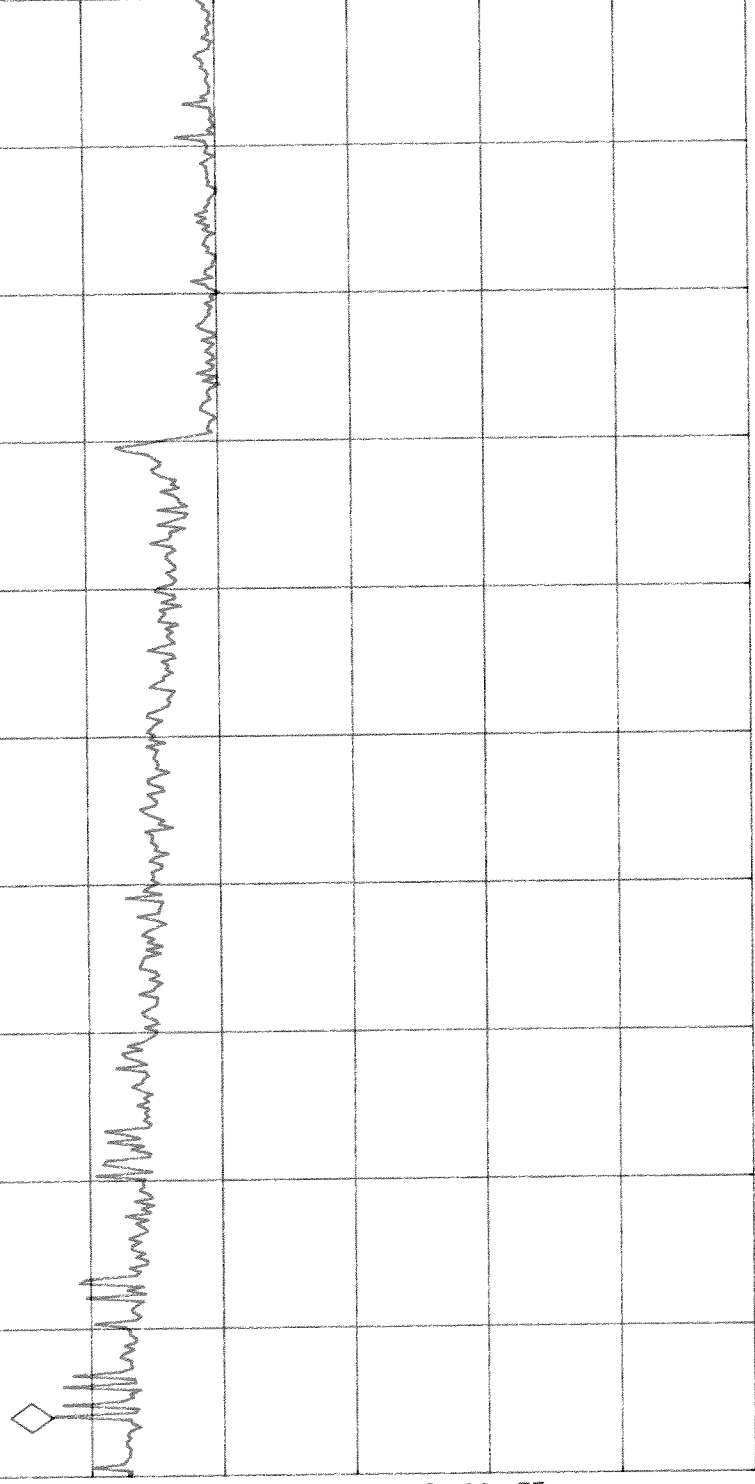
MARKER
Δ

NEXT
PEAK

NEXT PK
RIGHT

NEXT PK
LEFT

More
1 of 2



MA SB
SC FC
CORR

START 4.5000 GHz STOP 4.6000 GHz
#RES BW 1.0 MHz VBW 300 kHz SWP 20.0 msec

14: 25: 26 APR 07, 2008
HP

REF -30.0 dBm

AT 10 dB

MKR 4.6953 GHz
-68.46 dBm

PEAK

LOG

10

dB/

MARKER
→ CF

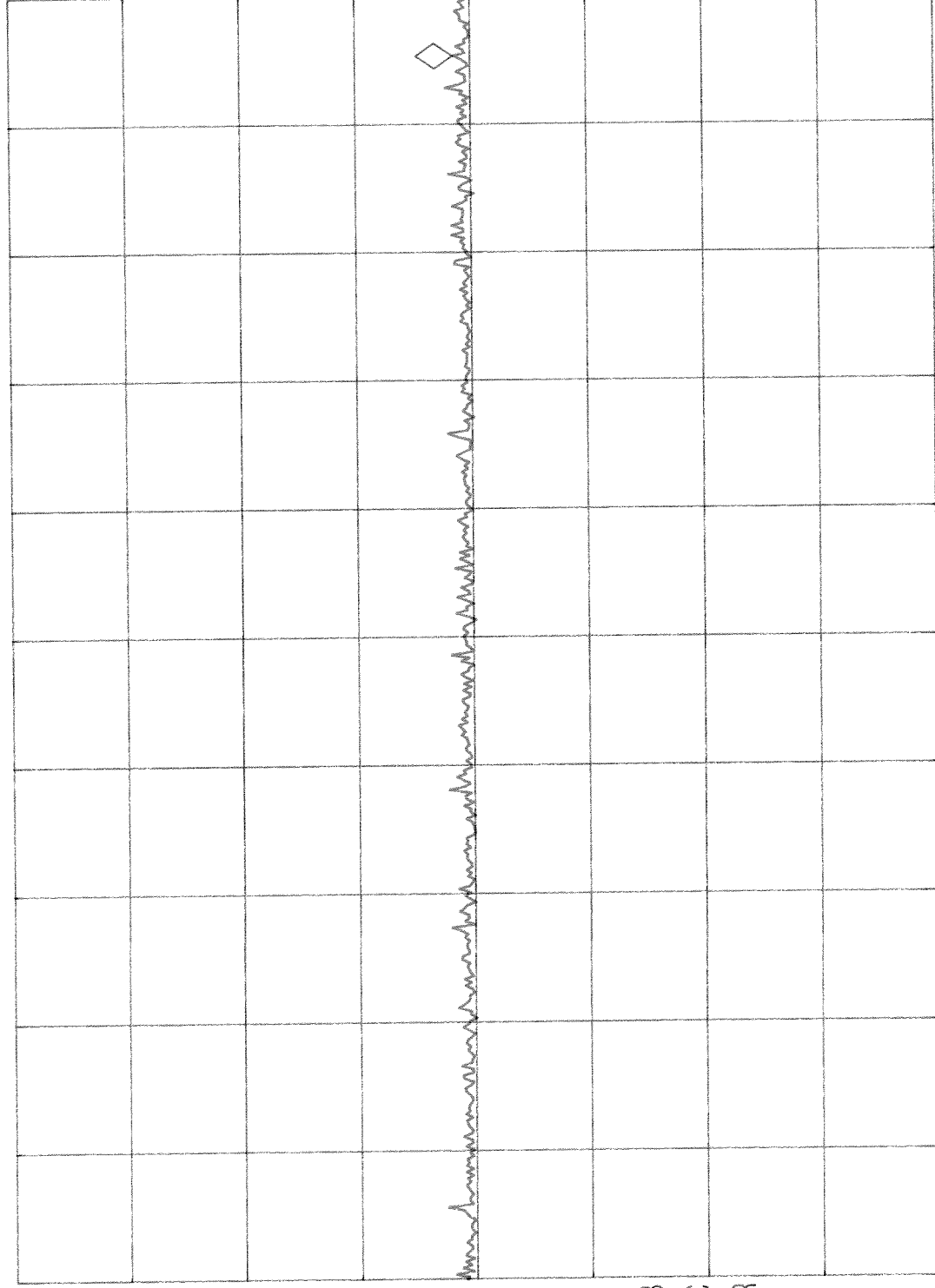
MARKER
Δ

NEXT
PEAK

NEXT PK
RIGHT

NEXT PK
LEFT

More
1 of 2



MA SB
SC FC
CORR

START 4.6000 GHz

#RES BW 1.0 MHz

VBW 300 kHz

STOP 4.7000 GHz

SWP 20.0 msec

Spurious Emission

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14:26:59 APR 07, 2008
HP

REF -30.0 dBm AT 10 dB

MKR 9.0 KHz
-69.34 dBm

PEAK
LOG
10
dB/

MARKER
→ CF

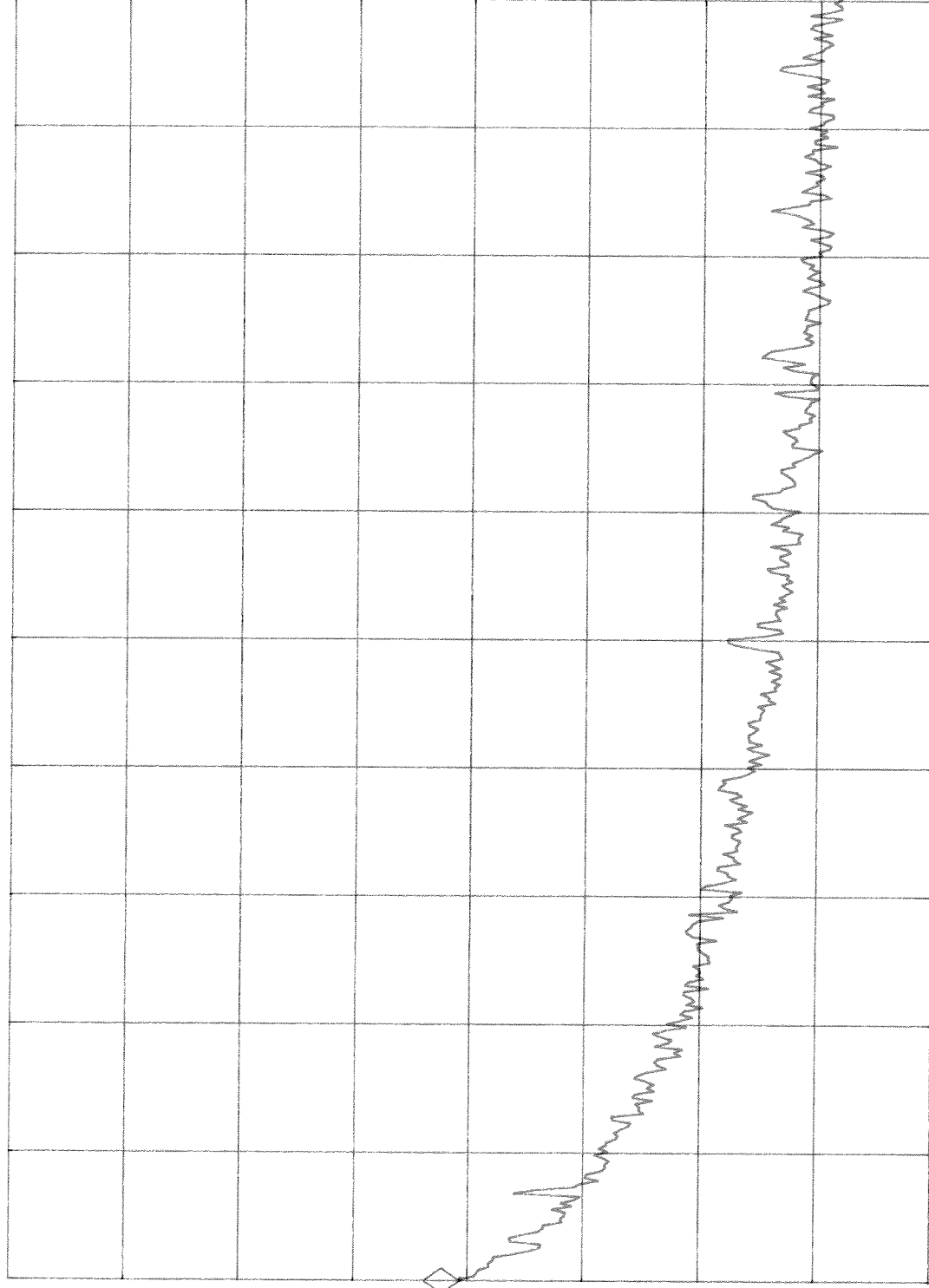
MARKER
Δ

NEXT
PEAK

NEXT PK
RIGHT

NEXT PK
LEFT

More
1 of 2



MA SB
SC FC
CORR

START 9.0 KHz

#RES BW 1.0 KHz

VBW 1 KHz

STOP 15.0 KHz

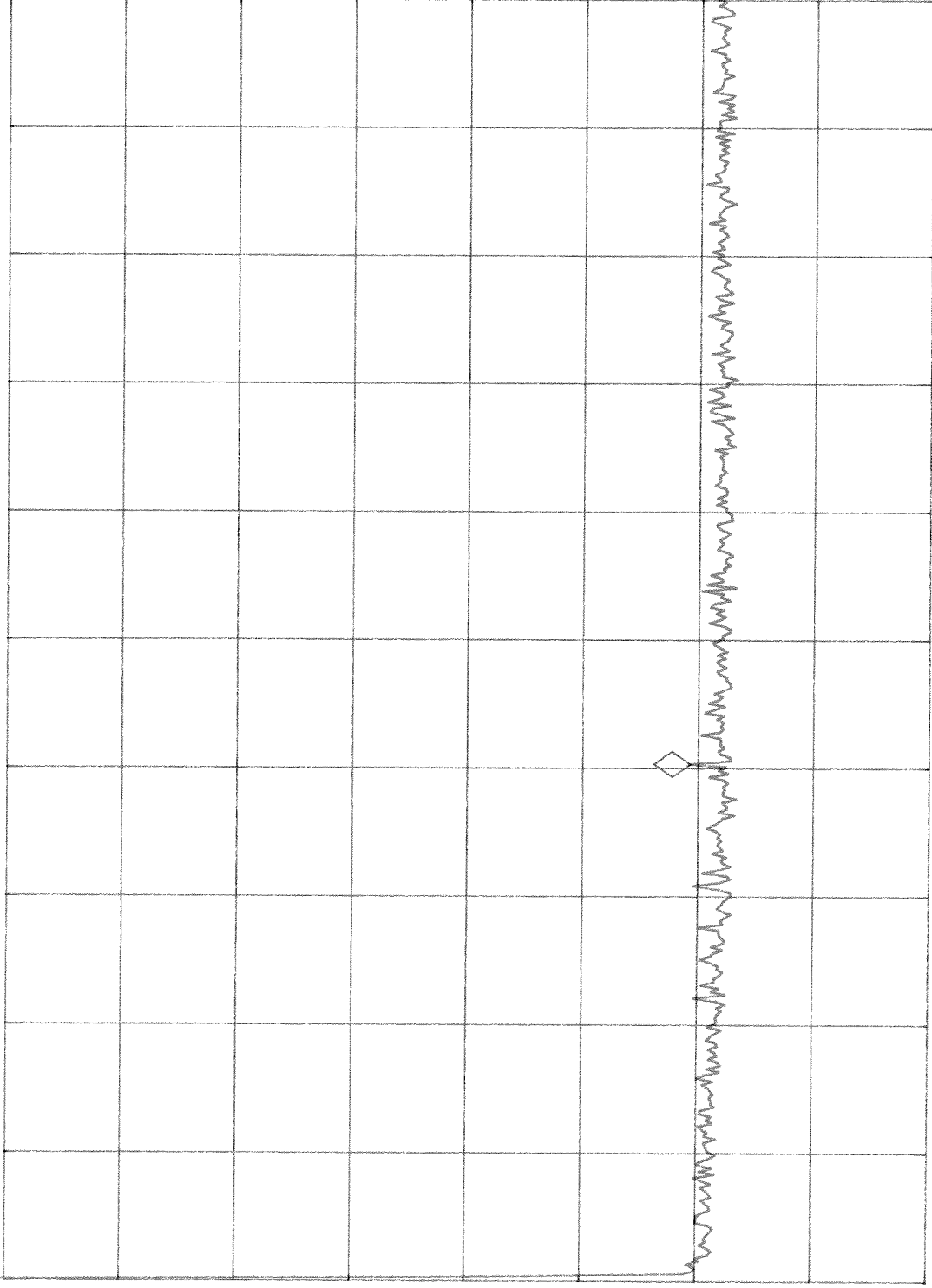
SWP 423 msec

14:35:07 APR 07, 2008

MKR 12.16 MHz
-89.34 dBm

REF -30.0 dBm AT 10 dB

PEAK
LOG
10
dB/



MA SB
SC FC
CORR

MARKER
NORMAL

MARKER
 Δ

MARKER
AMPTD

SELECT
1 2 3 4

MARKER 1
ON OFF

More
1 of 2

START 150 KHZ

#RES BW 10 KHZ

VBW 10 KHZ

STOP 30.00 MHz

SWP 895 msec

14:38:57 APR 07, 2008

MR 866.6 MHz
-78.49 dBm

REF -30.0 dBm AT 10 dB

PEAK
LOG
10
dB/

MARKER
→ CF

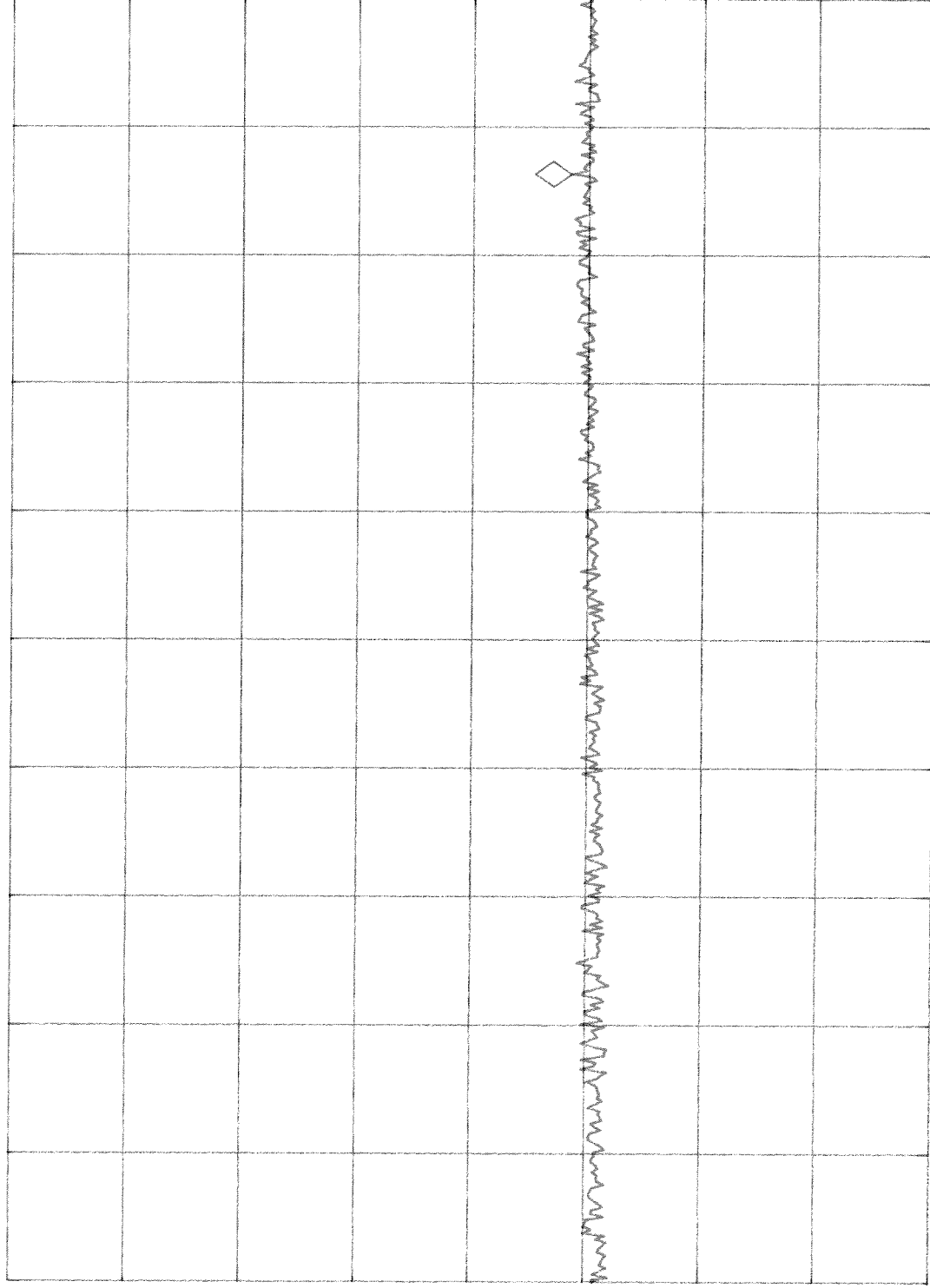
MARKER
Δ

NEXT
PEAK

NEXT PK
RIGHT

NEXT PK
LEFT

More
1 of 2



MA SB
SC FC
CORR

START 30.0 MHz STOP 1.0000 GHz
#RES BW 100 kHz VBW 30 kHz SWP 970 msec

14: 40: 07 APR 07, 2008

MKR 2.126 GHz
-57.43 dBm

REF -30.0 dBm AT 10 dB

PEAK
LOG
10
dB/

MARKER
→ CF

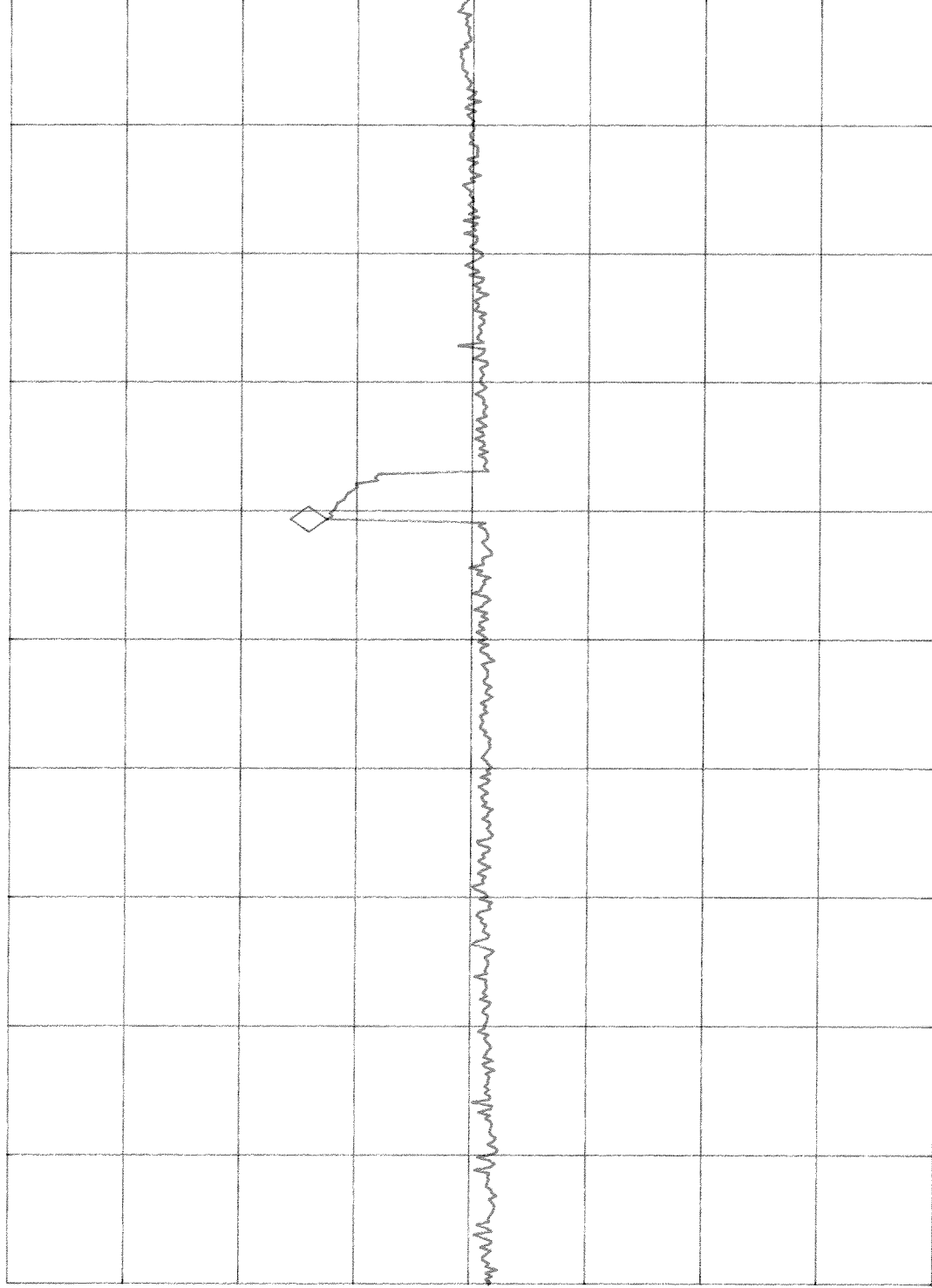
MARKER
Δ

NEXT
PEAK

NEXT PK
RIGHT

NEXT PK
LEFT

More
1 of 2



MA SB
SC FC
CORR

START 1.000 GHz STOP 2.900 GHz
#RES BW 1.0 MHz VBW 300 KHz SWP 38.0 msec

14: 41: 37 APR 07, 2008
hp

MKR 3.705 GHz
-64.65 dBm

REF -30.0 dBm AT 10 dB

PEAK
LOG
10
dB/

MARKER
→ CF

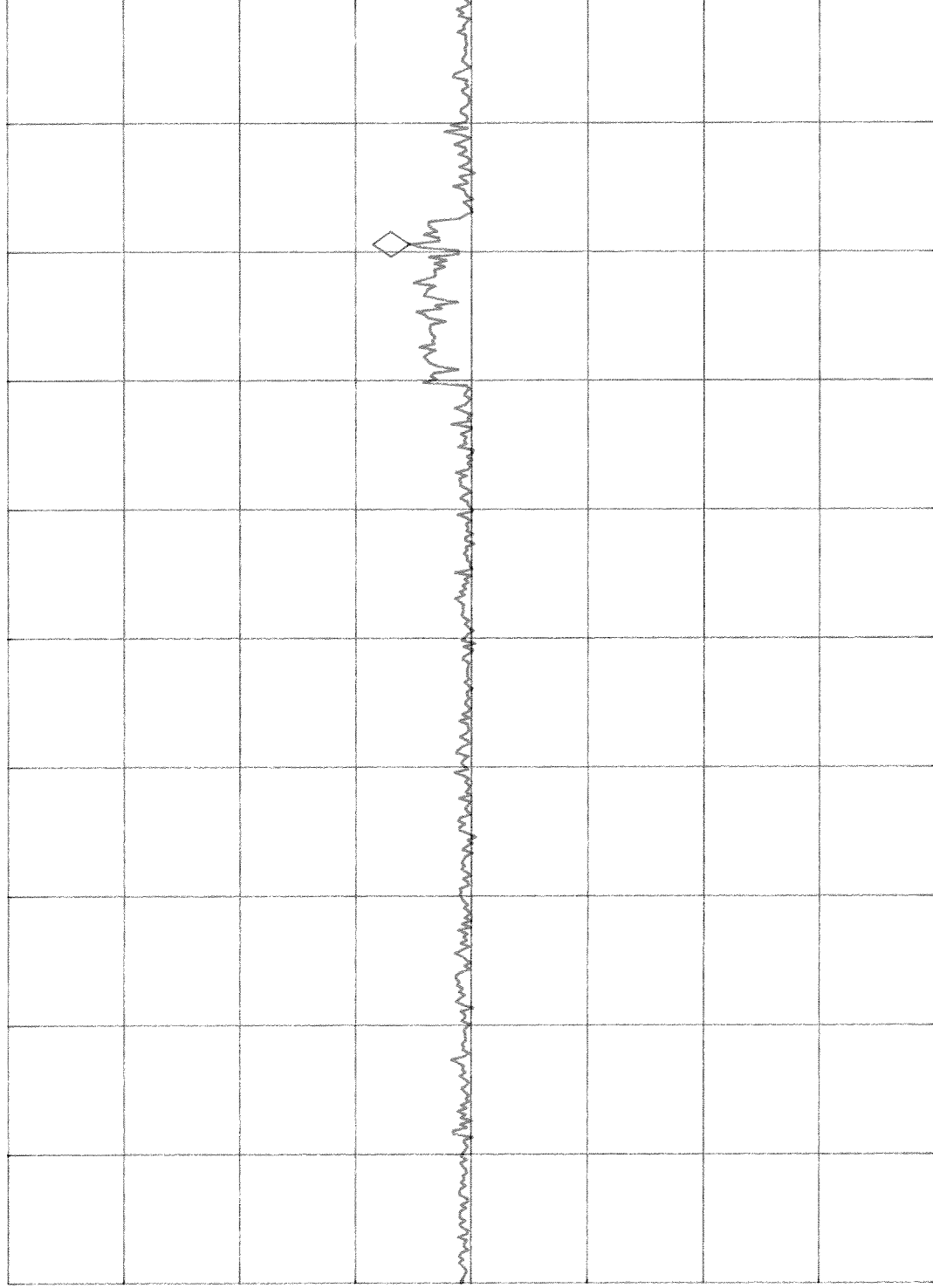
MARKER
Δ

NEXT
PEAK

NEXT PK
RIGHT

NEXT PK
LEFT

More
1 of 2



MA SB
SC FC
CORR

START 2.900 GHz STOP 3.900 GHz
#RES BW 1.0 MHz VBW 300 kHz SWP 20.0 msec

14: 44: 03 APR 07, 2008
hp

REF -30.0 dBm

AT 10 dB

MKR 8.480 GHz
-39.24 dBm

PEAK
LOG
10
dB/

MARKER
→ CF

MARKER
Δ

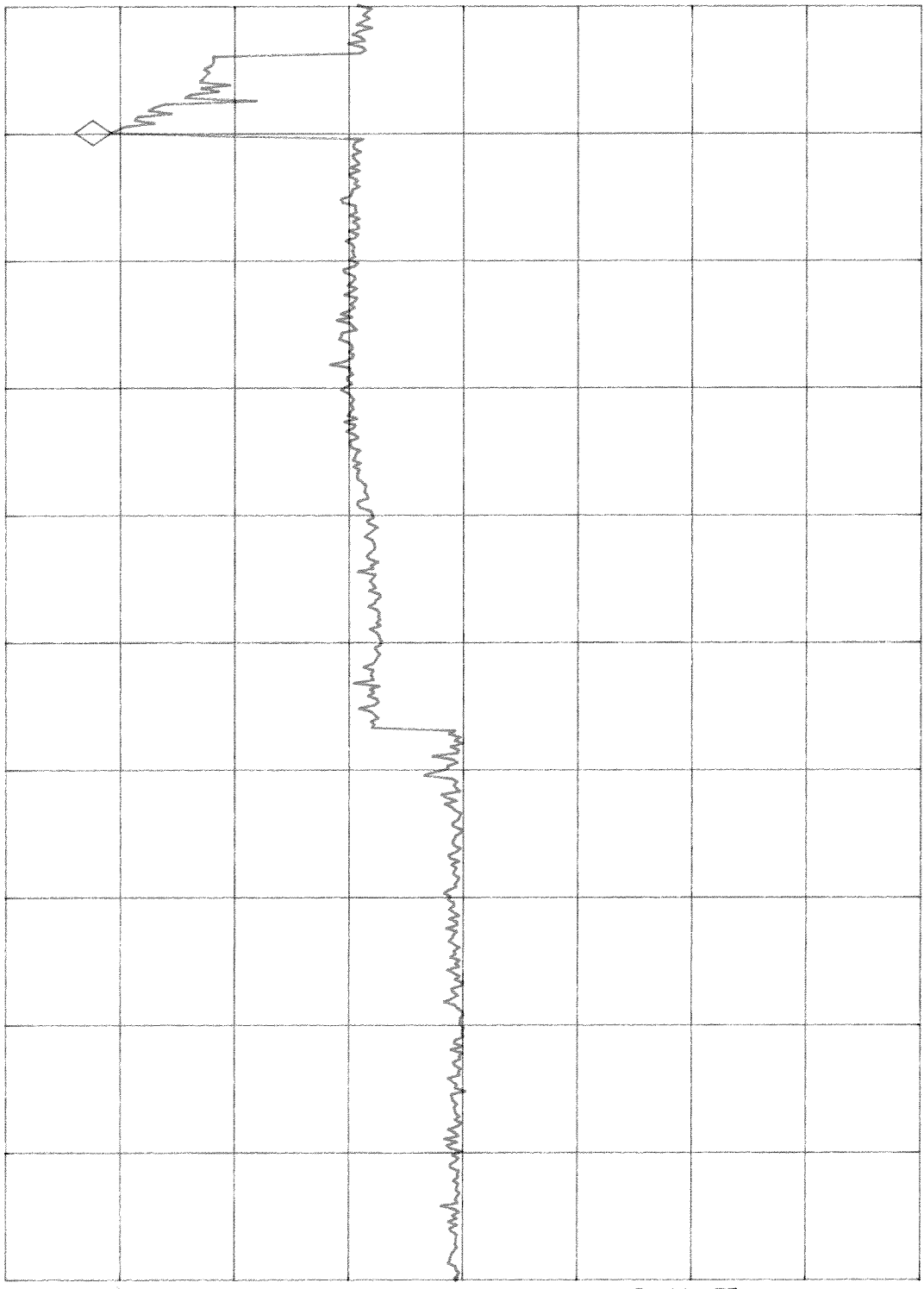
NEXT
PEAK

NEXT PK
RIGHT

NEXT PK
LEFT

More
1 of 2

MA SB
SC FC
CORR



START 4.700 GHz
#RES BW 1.0 MHz
STOP 8.900 GHz
VBW 300 kHz
SWP 84.0 msec

14: 45: 27 APR 07, 2008
hp

REF -30.0 dBm

AT 10 dB

MKR 10.685 GHz
-58.36 dBm

PEAK

LOG

10

dB/

MARKER
→ CF

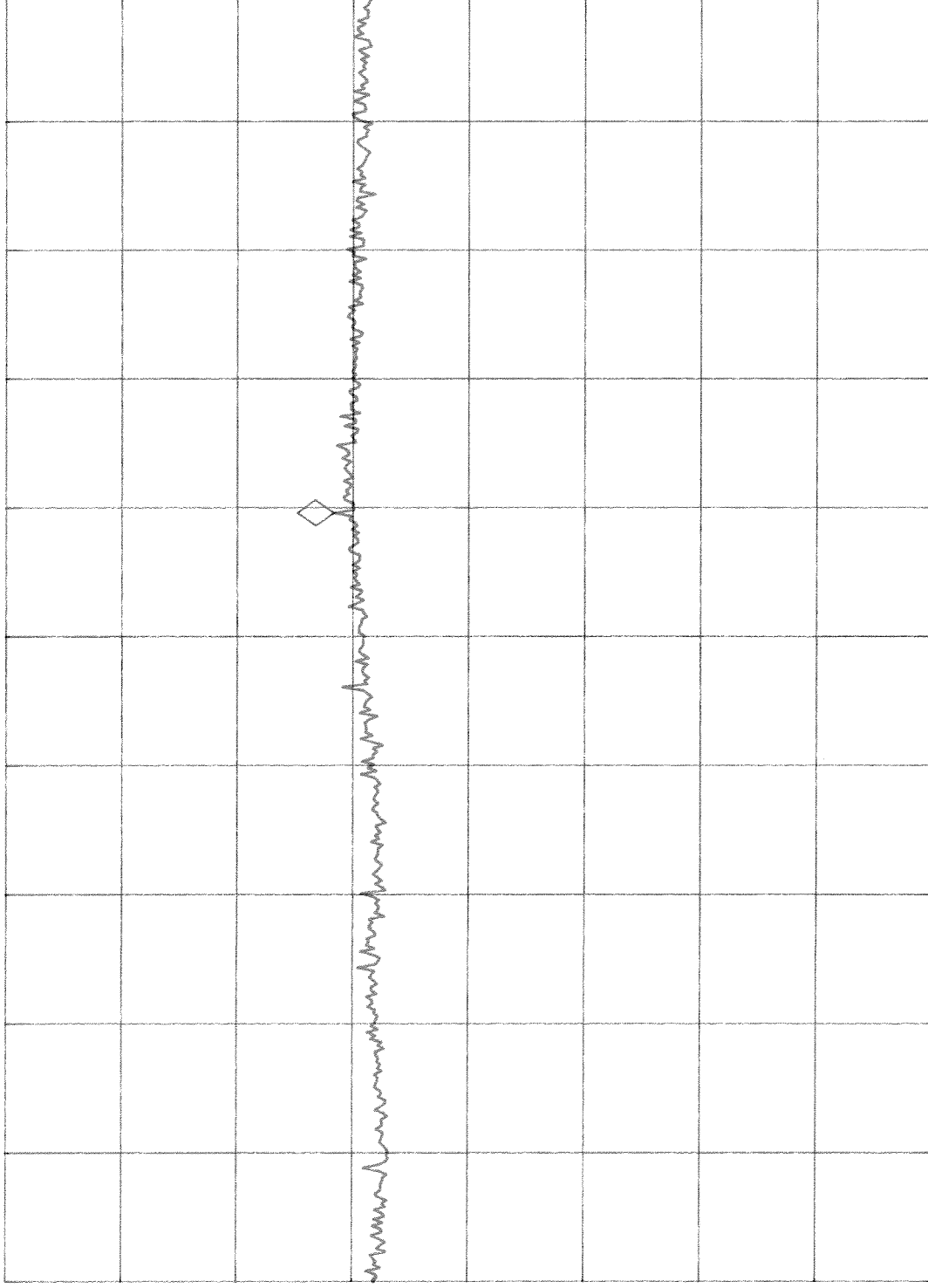
MARKER
Δ

NEXT
PEAK

NEXT PK
RIGHT

NEXT PK
LEFT

More
1 of 2



MA SB
SC FC
CORR

START 8.900 GHz

#RES BW 1.0 MHz

VBW 300 kHz

STOP 11.900 GHz

SWP 60.0 msec

14:50:20 APR 07, 2008
hp

REF -30.0 dBm

AT 10 dB

MKR 12.943 GHz

-45.83 dBm

PEAK

LOG

10

dB/

MARKER
→ CF

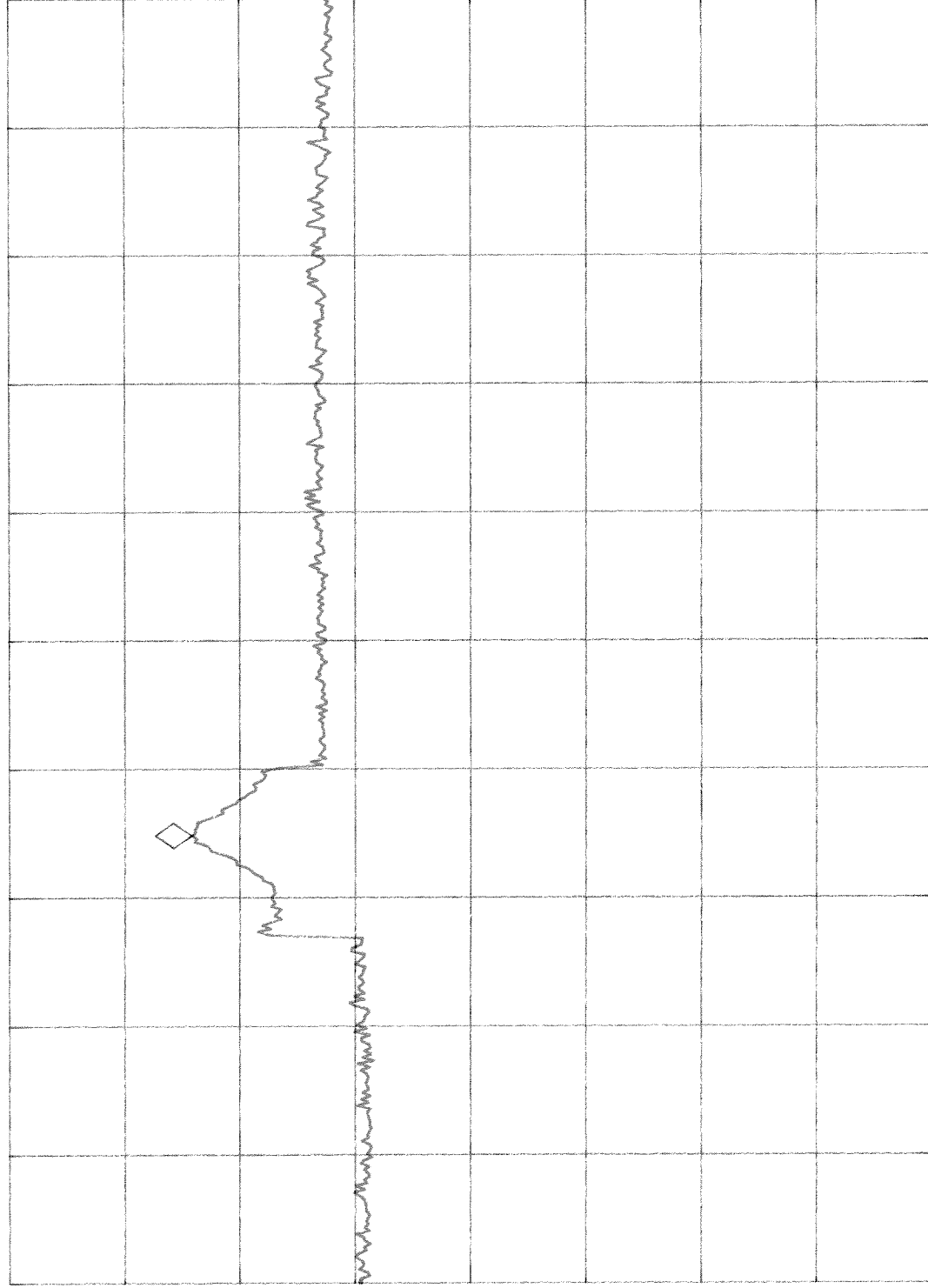
MARKER
△

NEXT
PEAK

NEXT PK
RIGHT

NEXT PK
LEFT

More
1 of 2



MA SB
SC FC
CORR

START 11.900 GHz

#RES BW 1.0 MHz

VBW 300 kHz

STOP 14.900 GHz

SWP 60.4 msec

14:55:31 APR 07, 2008
hp

REF -30.0 dBm

AT 10 dB

MKR 17.055 GHz

-46.50 dBm

PEAK

LOG

10

dB/

MARKER
→ CF

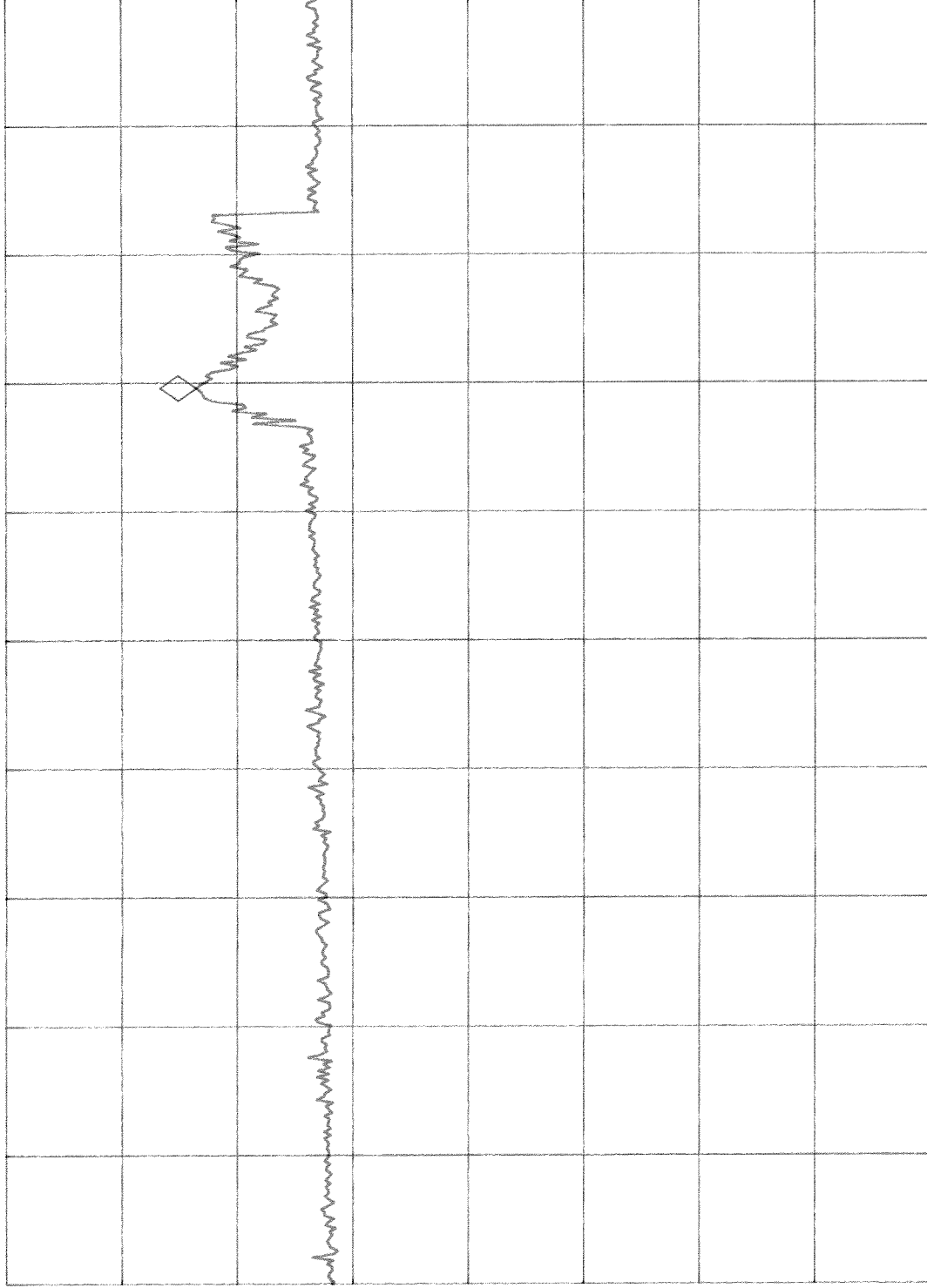
MARKER
△

NEXT
PEAK

NEXT PK
RIGHT

NEXT PK
LEFT

More
1 of 2



MA SB
SC FC
CORR

START 14.900 GHz

#RES BW 1.0 MHz

VBW 300 kHz

STOP 18.000 GHz

SWP 62.0 msec

14:56:45 APR 07, 2008
HP

REF -30.0 dBm AT 10 dB

MKR 21.750 GHz
-47.74 dBm

PEAK
LOG
10
dB/

MARKER
→ CF

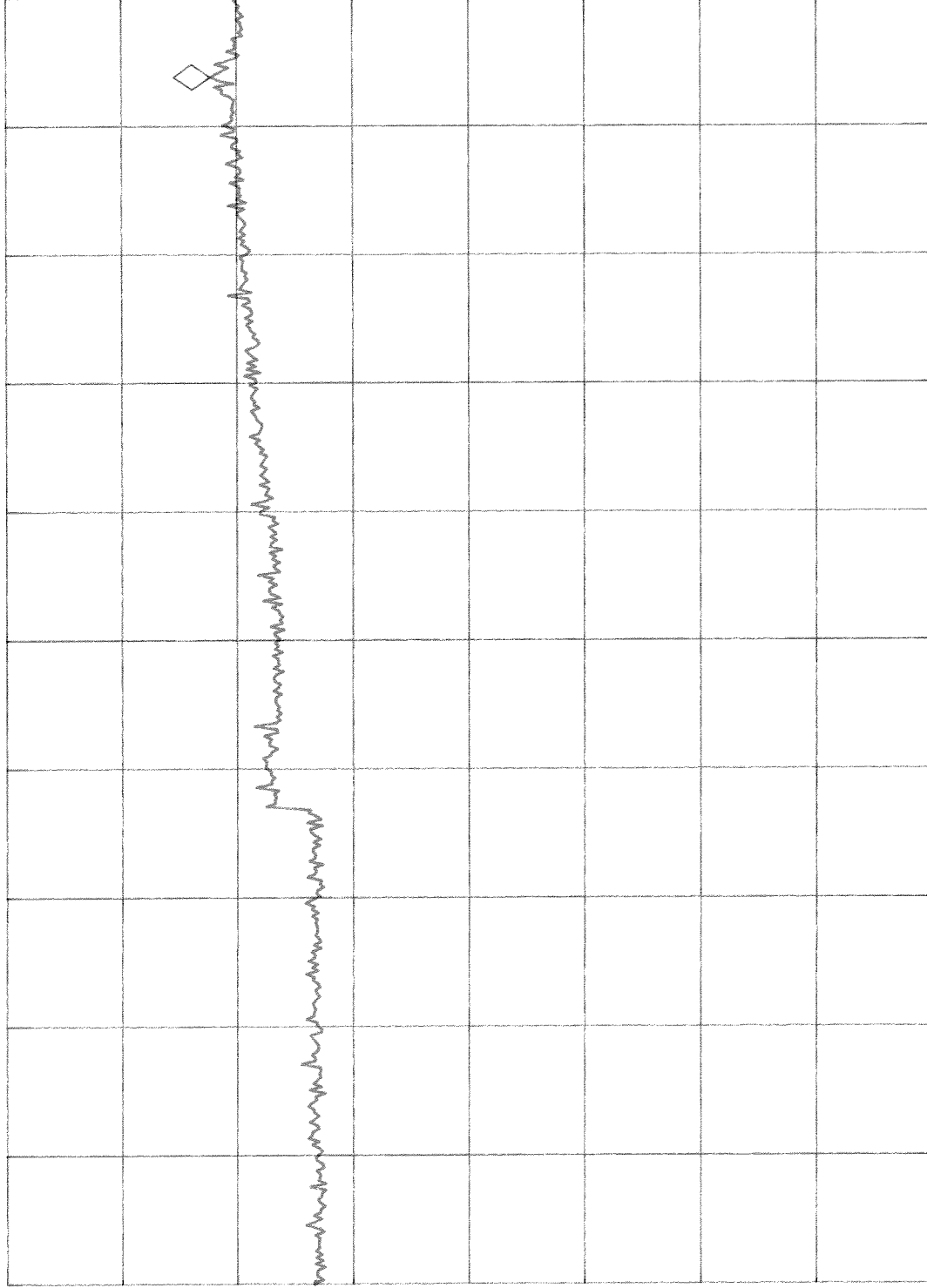
MARKER
△

NEXT
PEAK

NEXT PK
RIGHT

NEXT PK
LEFT

More
1 of 2



MA SB
SC FC
CORR

START 18.000 GHz STOP 22.000 GHz
#RES BW 1.0 MHz VBW 300 kHz SWP 80.0 msec

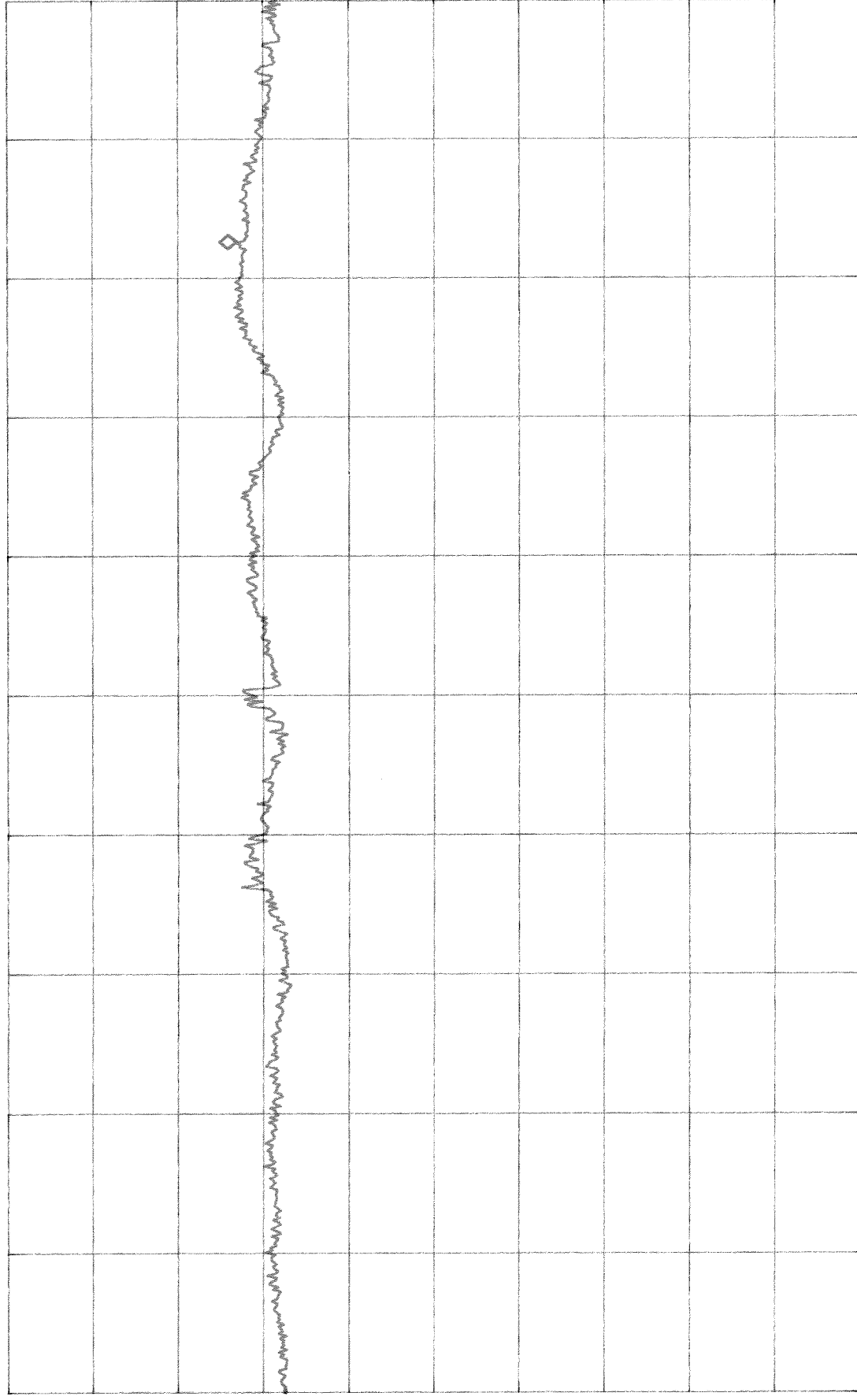
ATTEN 10dB

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

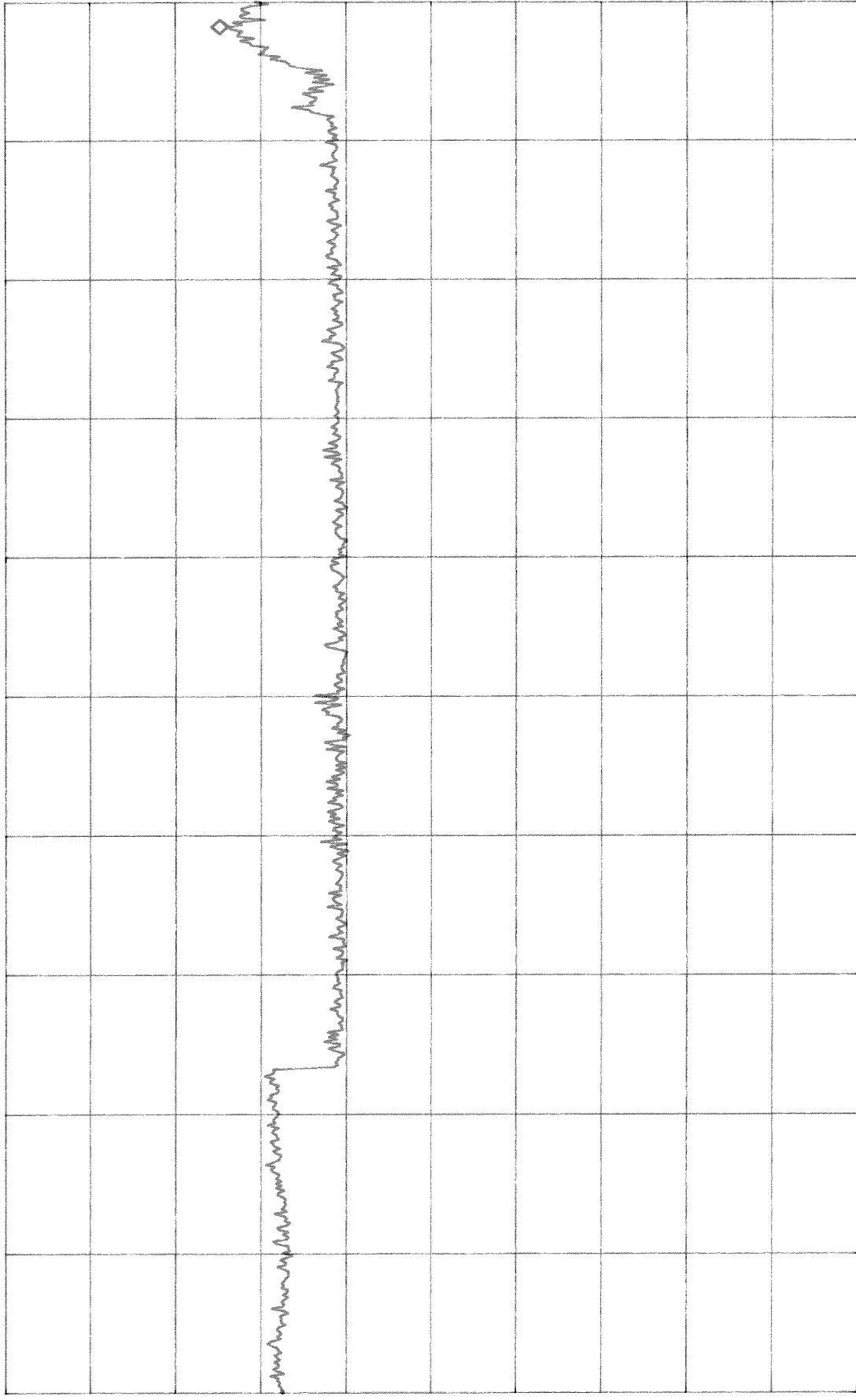
ATTEN 10dB

MKR -56.17dBm

RL -30.0dBm

10dB/

29.927GHz

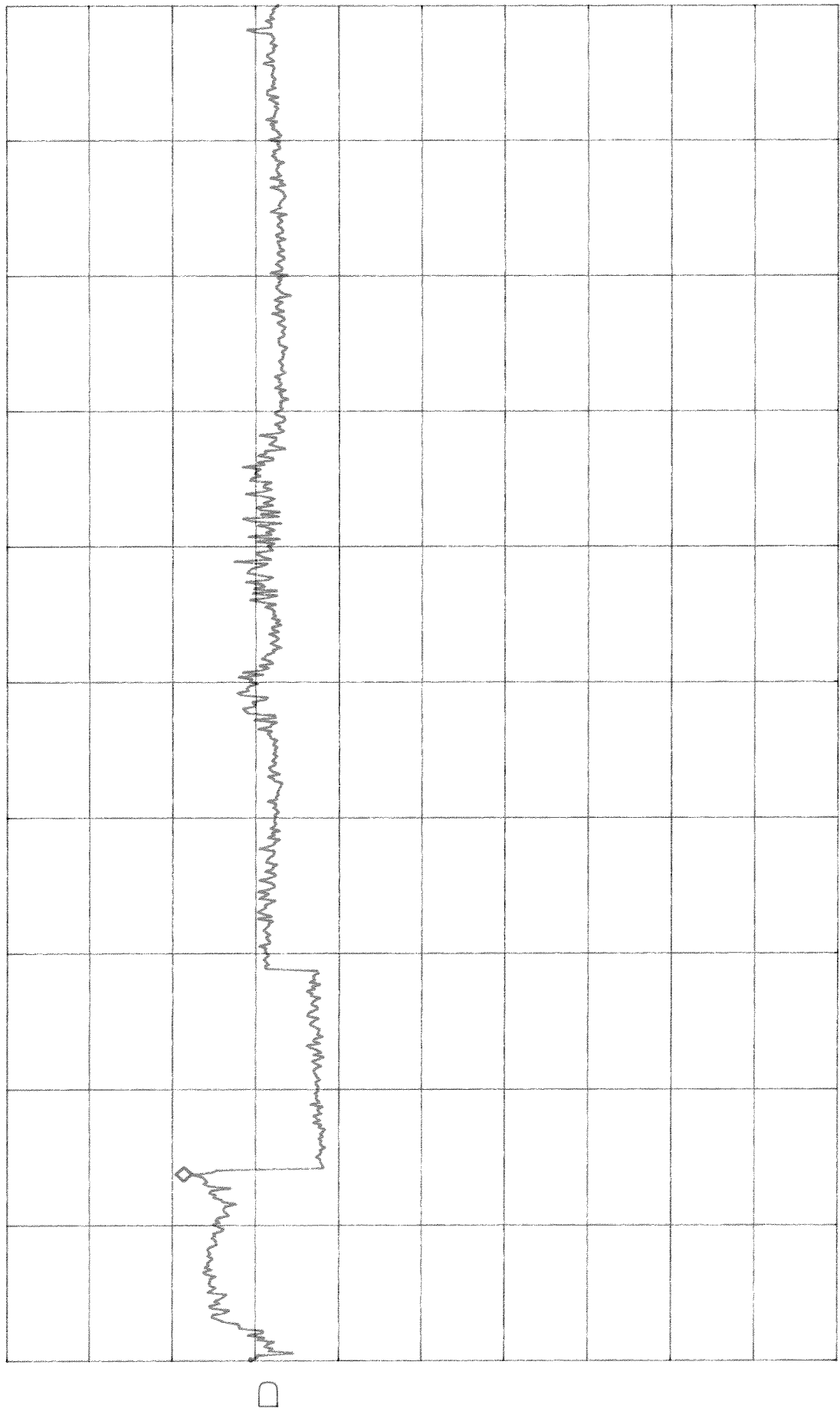


D

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



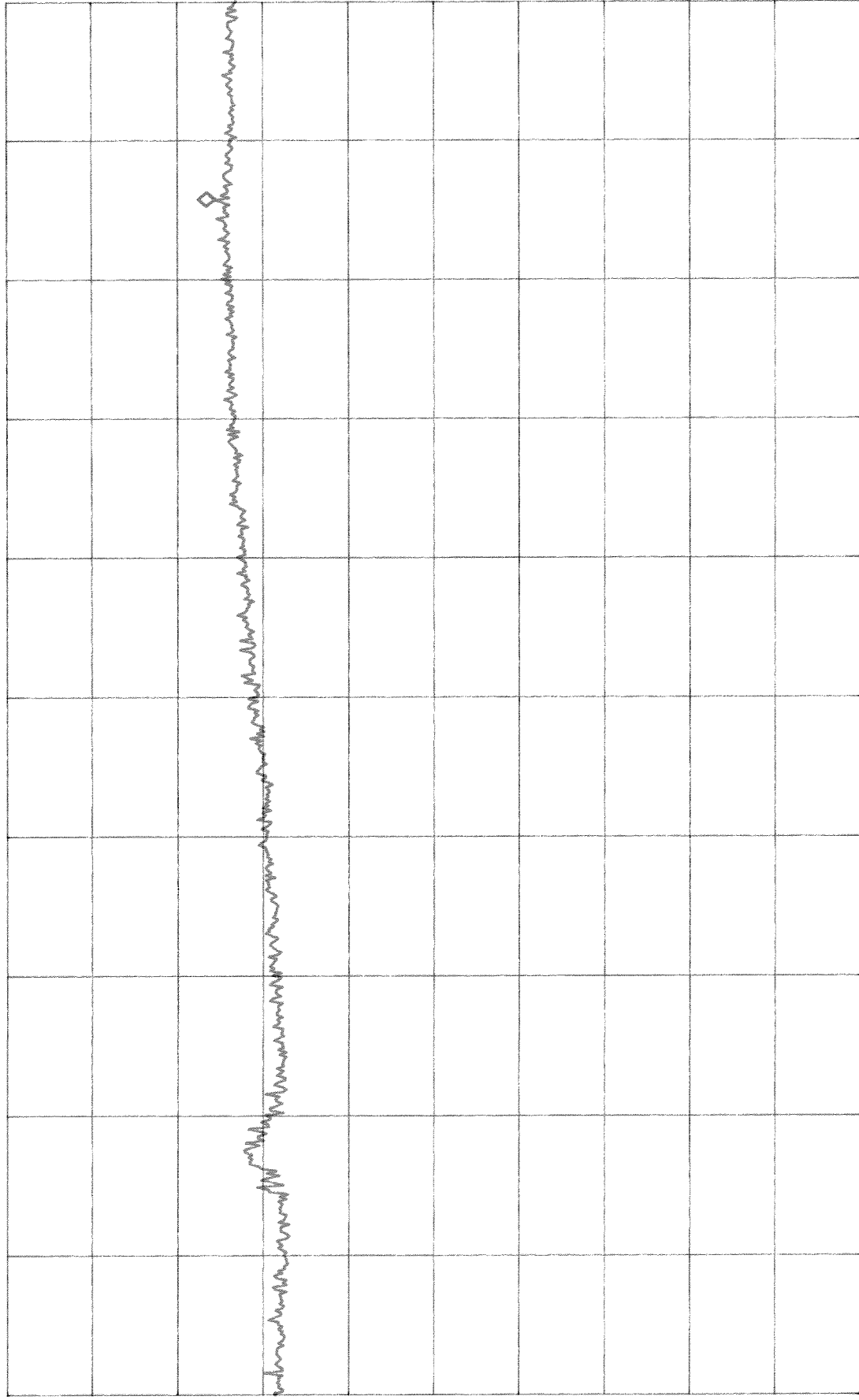
START 30.000GHz STOP 34.000GHz
*RBW 1.0MHz VBW 1.0MHz SWP 80.0ms

ATTEN 10dB

MKR -54.33dBm

RL -30.0dBm

10dB/ 37.427GHz



D

START 34.000GHz STOP 38.000GHz

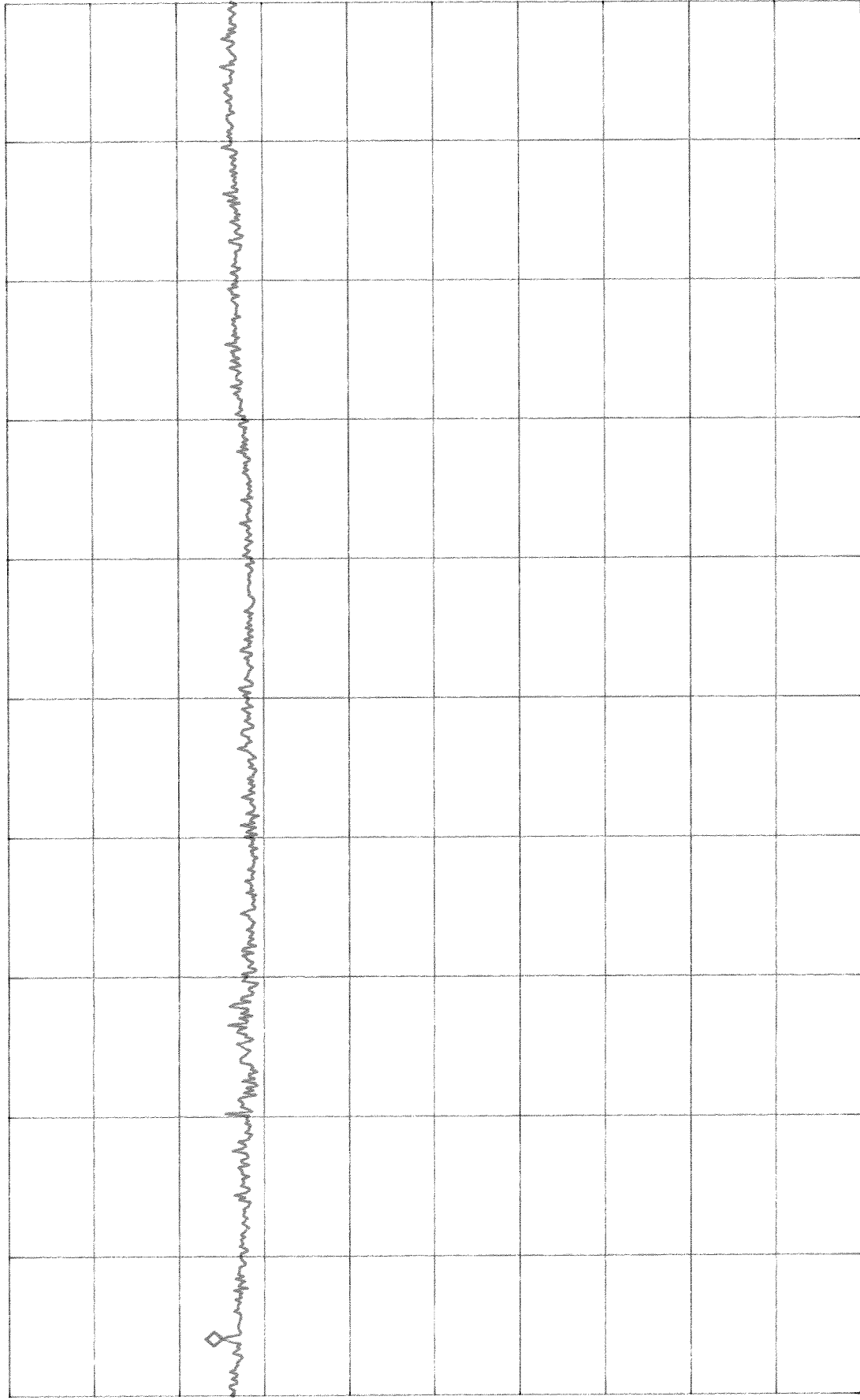
*RBW 1.0MHz VBW 1.0MHz SWP 80.0ms

ATTEN 10dB

MKR -55.00dBm

RL -30.00dBm

10dB/ 38.160GHz

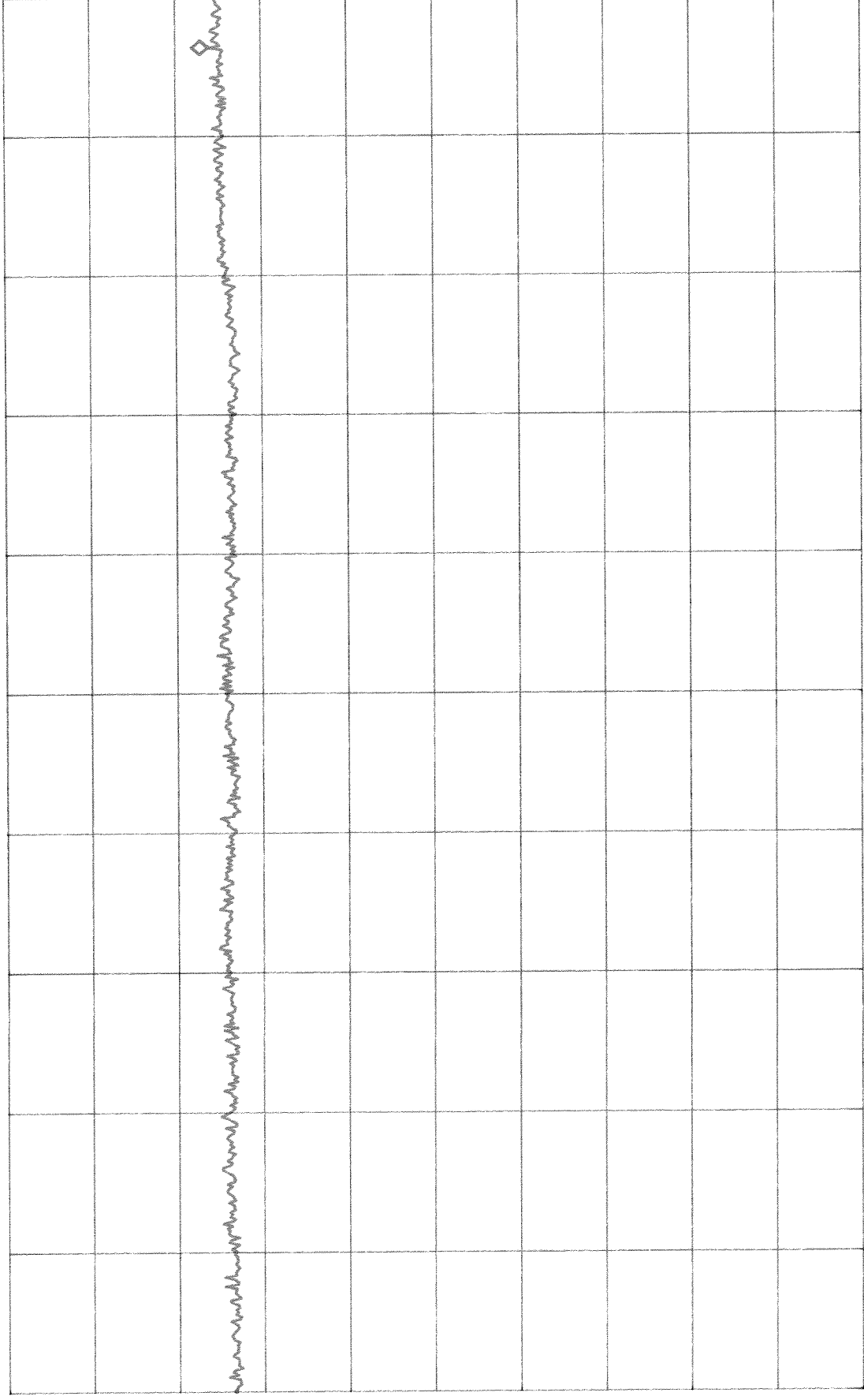


D

START 38.000GHz STOP 42.000GHz

*RBW 1.0MHz VBW 1.0MHz SWP 80.0ms

ATTEN 10dB MKR -53.83dBm
RL -30.0dBm 45.853GHz 10dB/



D

START 42.000GHZ STOP 46.000GHZ
*RBW 1.0MHZ VBW 1.0MHZ SWP 80.0ms

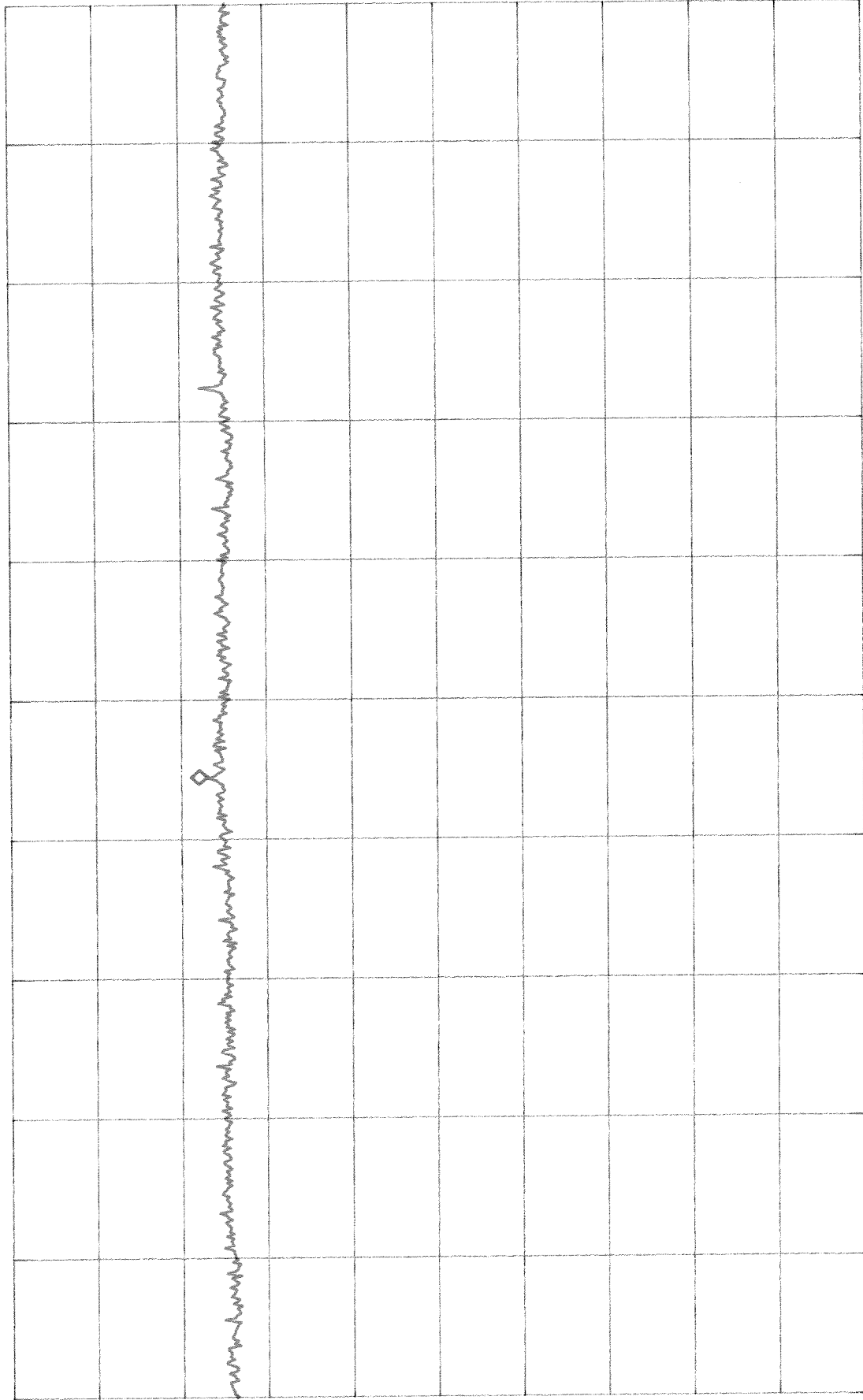
ATTEN 10dB

MKR -53.00dBm

RL -30.00dBm

10dB/

47.773GHz



D

START 46.000GHz

STOP 50.000GHz

*RBW 1.0MHz

VBW 1.0MHz

SWP 80.0ms