

APPLICANT: ACROWAVE SYSTEMS CO., LTD.

FCC ID: PE6AWL-1100P

TABLE OF CONTENTS

TEST REPORT CONTAINING:

PAGE 1.....	TEST EQUIPMENT LIST & TEST PROCEDURE
PAGE 2.....	TEST PROCEDURES CONTD.
PAGE 3.....	PRODUCT DESCRIPTION
PAGE 4.....	POWERLINE CONDUCTED INTERFERENCE DATA
PAGE 5A-5B.....	POWERLINE CONDUCTED PLOTS
PAGE 6.....	6.0dB BANDWIDTH & POWER OUTPUT
PAGE 7.....	6.0dB BANDWIDTH PLOT
PAGE 8.....	METHOD OF MEASURING RF CONDUCTED SPURIOUS EMISSIONS & SPURIOUS EMISSIONS AT ANTENNA TERMINALS
PAGE 9.....	RADIATION INTERFERENCE TEST DATA
PAGE 10.....	METHOD OF MEASURING RADIATION INTERFERENCE
PAGE 11.....	RADIATED SPURIOUS EMISSIONS INTO ADJACENT RESTRICTED BAND
PAGE 12.....	BANDEDGE PLOT
PAGE 13.....	POWER SPECTRAL DENSITY AND PROCESSING GAIN
PAGE 14A-14C.....	POWER SPECTRAL DENSITY PLOT

EXHIBIT ATTACHMENTS:

EXHIBIT 1.....	FCC ID LABEL SAMPLE
EXHIBIT 2.....	SKETCH OF FCC ID LABEL LOCATION
EXHIBIT 3A.....	FRONT & REAR VIEW EXTERNAL PHOTOS
EXHIBIT 3B-C.....	COMPONENT SIDE & SOLDER SIDE INTERNAL PHOTOS
EXHIBIT 4.....	BLOCK DIAGRAM
EXHIBIT 5A-5E.....	SCHEMATICS
EXHIBIT 6A-6F.....	CIRCUIT DESCRIPTION
EXHIBIT 7A-7F.....	PROCESSING GAIN TEST METHODS
EXHIBIT 8A-8C.....	PROCESSING GAIN DATA
EXHIBIT 9.....	INSTRUCTION MANUAL
EXHIBIT 10-11.....	TEST SET UP PHOTO - RADIATED
EXHIBIT 12.....	TEST SET UP PHOTO - POWERLINE

APPLICANT: ACROWAVE SYSTEMS CO., LTD.

FCC ID: PE6AWL-1100P

REPORT #: T:\CUS\A\ACRO\18U1\18U1RPT.DOC

TABLE OF CONTENTS LIST

TEST EQUIPMENT LIST

1. X Spectrum Analyzer: HP 8566B-Opt 462, S/N 3138A07786, w/
preselector HP 85685A, S/N 3221A01400, Quasi-Peak Adapter
HP 85650A, S/N 3303A01690 & Preamplifier HP 8449B-OPT H02,
S/N 3008A00372 Cal. 1/19/01
2. X Biconnical Antenna: Eaton Model 94455-1, S/N 1057, Cal 3/15/00
3. Biconnical Antenna: Electro-Metrics Model BIA-25, S/N 1171
Cal. 3/16/01
4. X Log-Periodic Antenna: Electro-Metrics Model EM-6950, S/N 632
Cal. 3/15/00
5. Log-Periodic Antenna: Electro-Metrics Model LPA-30, S/N 409
Cal. 3/15/00
6. X Double-Ridged Horn Antenna: Electro-Metrics Model RGA-180,
1-18 GHz, S/N 2319
7. 18-26.3GHz Systron Donner Standard Gain Horn #DBE-520-20
8. Horn 40-60GHz: ATM Part #19-443-6R
9. Line Impedance Stabilization Network: Electro-Metrics Model
ANS-25/2, S/N 2604 Cal. 2/9/00
10. Temperature Chamber: Tenney Engineering Model TTRC, S/N 11717-7
Cal. 1/21/01
11. Frequency Counter: HP Model 5385A, S/N 3242A07460 Cal 11/20/00
12. Peak Power Meter: HP Model 8900C, S/N 2131A00545, Cal. 1/26/01
13. X Open Area Test Site #1-3meters Cal. 12/22/99
14. Signal Generator: HP 8640B, S/N 2308A21464 Cal. 11/21/00
15. Signal Generator: HP 8614A, S/N 2015A07428
16. Passive Loop Antenna: EMC0 Model 6512, 9KHz to 30MHz, S/N
9706-1211 Cal. 6/10/00
17. Dipole Antenna Kit: Electro-Metrics Model TDA-30/1-4, S/N 153
Cal. 11/24/00
18. AC Voltmeter: HP Model 400FL, S/N 2213A14499 Cal. 2/1/01
19. Digital Multimeter: Fluke Model 8012A, S/N 4810047 Cal 9/21/99
20. Digital Multimeter: Fluke Model 77, S/N 43850817 Cal 11/16/00
21. Oscilloscope: Tektronix Model 2230, S/N 300572 Cal 2/1/01

TEST PROCEDURE

GENERAL: This report shall NOT be reproduced except in full without the written approval of TIMCO ENGINEERING, INC. Shielded interface cables were used in all cases except for cables connecting to the telephone line and the power cords. A test program was run which simulated a normal data transmission on a network.

POWER LINE CONDUCTED INTERFERENCE: The procedure used was ANSI STANDARD C63.4-1992 using a 50uH LISN. Both lines were observed with the UUT transmitting. The bandwidth of the spectrum analyzer was 10kHz with an appropriate sweep speed. The ambient temperature of the UUT was 77oF with a humidity of 53%.

APPLICANT: ACROWAVE SYSTEMS CO., LTD.
FCCID: PE6AWL-1100P
REPORT #: T:\CUS\A\ACRO\18U1\18U1RPT.DOC
PAGE #: 1

TEST PROCEDURES CONTINUED

BANDWIDTH 6.0dB: The measurements were made with the spectrum analyzer's resolution bandwidth(RBW)=1.0MHz and the video bandwidth(VBW)=3.0MHz and the span set as shown on Page 7A.

POWER OUTPUT: The RF power output was measured at the antenna feed point using a peak power meter.

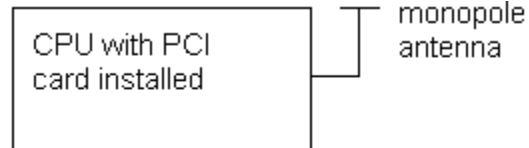
ANTENNA CONDUCTED EMISSIONS: The RBW=100KHz, VBW=300KHz and the span set to 10.0MHz and the spectrum was scanned from 30MHz to the 10th Harmonic of the fundamental. Above 1.0GHz the resolution bandwidth was 1.0MHz and the VBW = 3.0MHz and the span to 50MHz.

RADIATION INTERFERENCE: The test procedure used was ANSI STANDARD C63.4-1992 using a HEWLETT PACKARD spectrum analyzer with a pre-selector. The bandwidth(RBW) of the spectrum analyzer was 100kHz up to 1GHz and 1.0MHz above 1GHz with an appropriate sweep speed. The VBW above 1.0GHz was = 3.0MHz. The analyzer was calibrated in dB above a microvolt at the output of the antenna. The ambient temperature of the UUT was 77oF with a humidity of 53%.

APPLICANT: ACROWAVE SYSTEMS CO., LTD.
FCCID: PE6AWL-1100P
REPORT #: T:\CUS\A\ACRO\18U1\18U1RPT.DOC
PAGE #: 2

PRODUCT DESCRIPTION:

This device is a wireless LAN adapter card that provides wireless connection between computers.



FREQUENCY RANGE: 2.4-2.4835 GHz

SUPPORT BIT RATES: 11 Mbps CCK, 5.5 Mbps CCK, 2 Mbps DQPSK,
1 mPBS dbps

SPREADING: DSSS (Direct Sequence Spread Spectrum)

CHIP RATE: 11 Mcps

ANTENNA: External 2 dBi Antenna with SMA connector

MEDIA ACCESS
PROTOCOL: CSMA/CA (Collision Avoidance) with ACK

APPLICANT: ACROWAVE SYSTEMS CO., LTD.
FCCID: PE6AWL-1100P
REPORT #: T:\CUS\A\ACRO\18U1\18U1RPT.DOC
PAGE #: 3

APPLICANT: ACROWAVE SYSTEMS CO., LTD.
FCC ID: PE6AWL-1100P
NAME OF TEST: POWER LINE CONDUCTED INTERFERENCE
RULES PART NUMBER: 15.107(a)
REQUIREMENTS: .45 - 30 MHz 250 uV OR 47.96 dBuV
TEST PROCEDURE: ANSI STANDARD C63.4-1992. The spectrum
was scanned from .45 to 30 MHz.

TEST DATA:

THE HIGHEST EMISSION READ FOR LINE 1 WAS 35.1uv @ 8.01MHz.

THE HIGHEST EMISSION READ FOR LINE 2 WAS 28.5uv @ 8.55MHz.

THE GRAPHS IN THE NEXT TWO PAGES REPRESENT THE EMISSIONS TAKEN FOR
THIS DEVICE.

TEST RESULTS: Both lines were observed. The measurements indicate
that the unit DOES appear to meet the FCC requirements for this class
of equipment.

APPLICANT: ACROWAVE SYSTEMS CO., LTD.
FCCID: PE6AWL-1100P
REPORT #: T:\CUS\A\ACRO\18U1\18U1RPT.DOC
PAGE #: 4

hp

REF 7.00 mV

ATTEN 10 dB + 10 dB

MKR 8.01 MHz

35.1 μ V

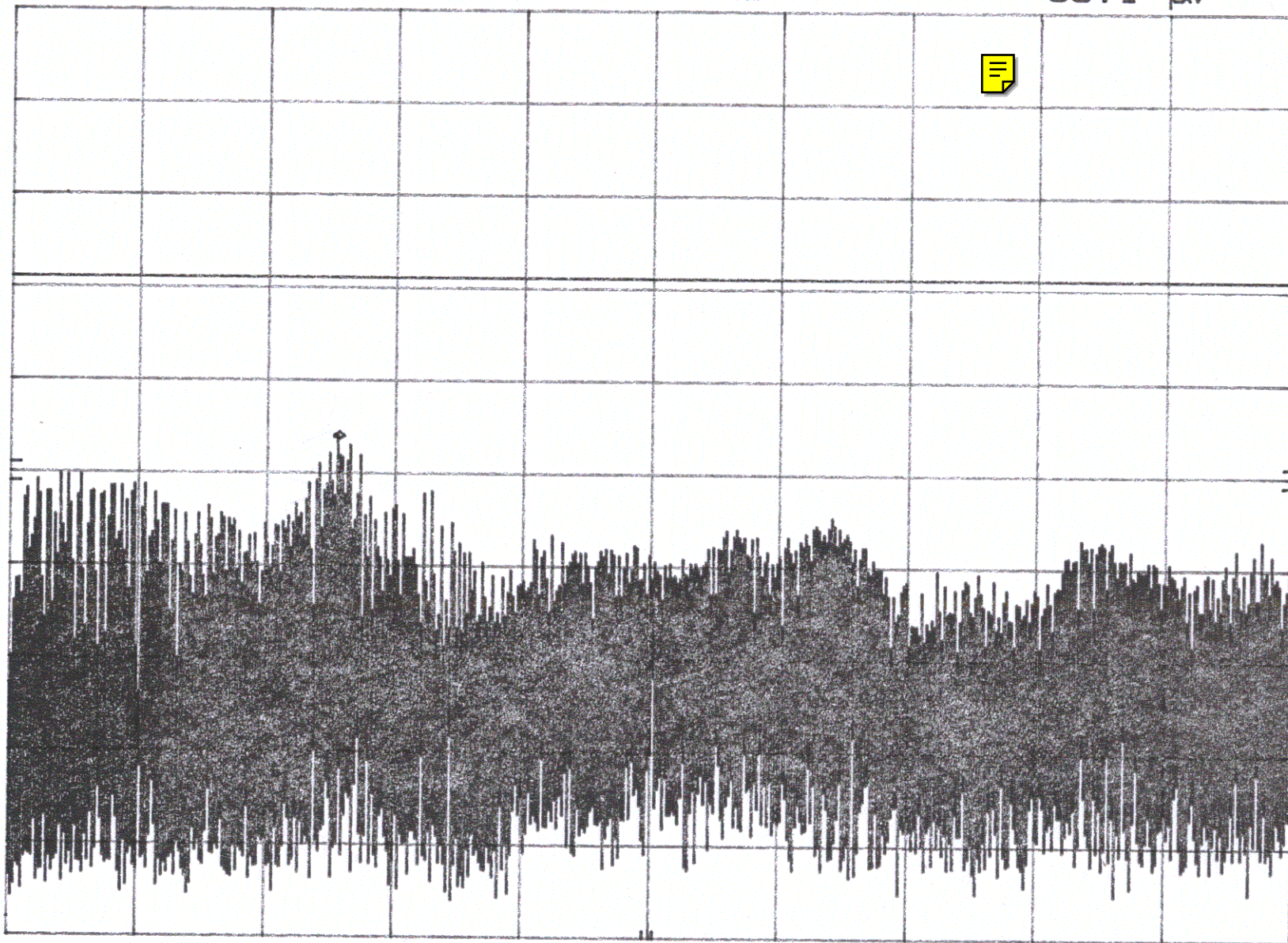
10 dB/

OFFSET

-10.0
dB

DL

251
 μ V



START 450 kHz

RES BW 10 kHz (i)

VBW 10 kHz

STOP 30.0 MHz

SWP 2.30 sec

hp

REF 7.00 mV

ATTEN 10 dB + 10 dB

MKR 8.55 MHz

28.5 μ V

10 dB/

OFFSET

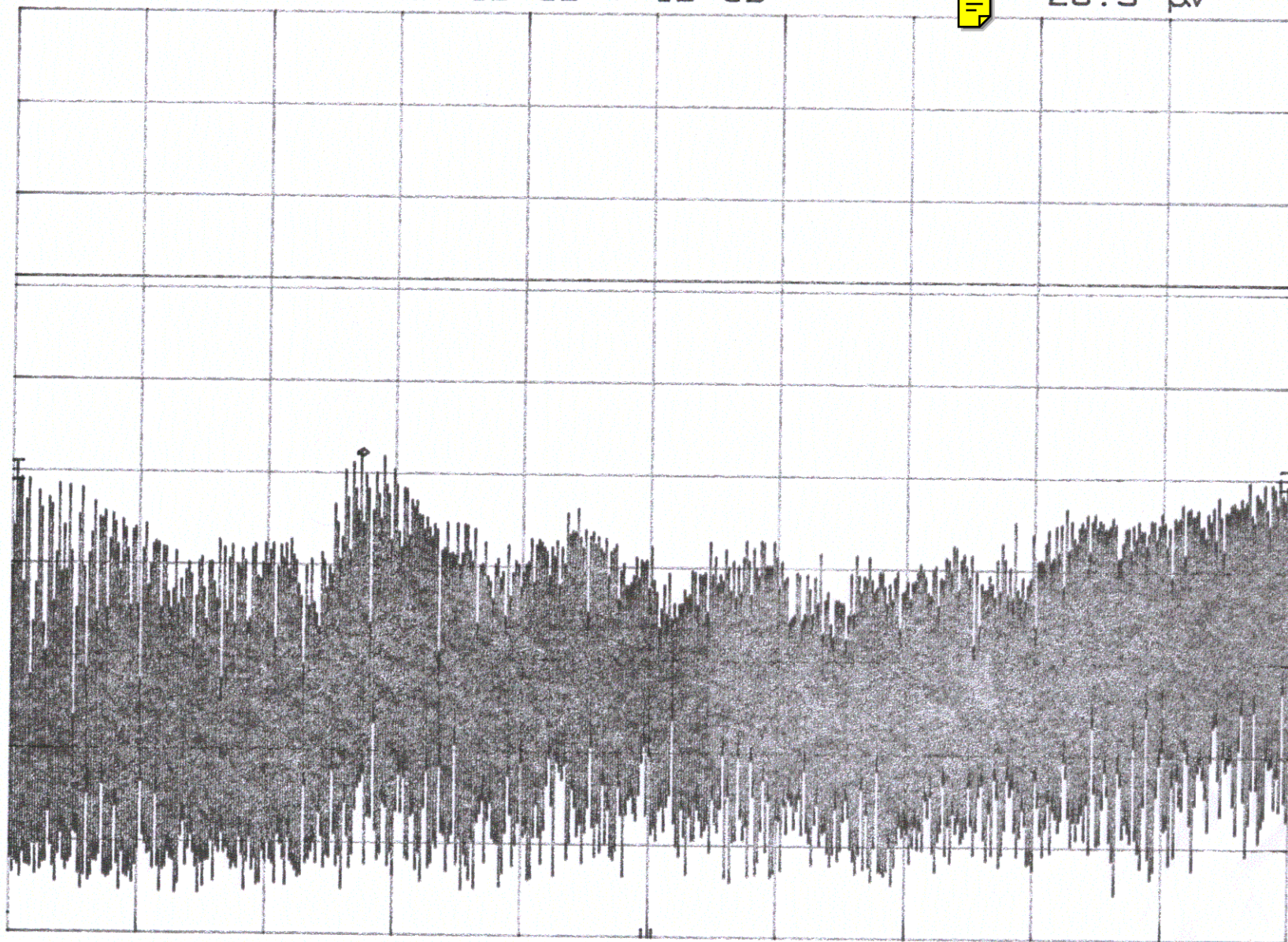
-10.0

dB

DL

251

μ V



START 450 kHz

RES BW 10 kHz (i)

VBW 10 kHz

STOP 30.0 MHz

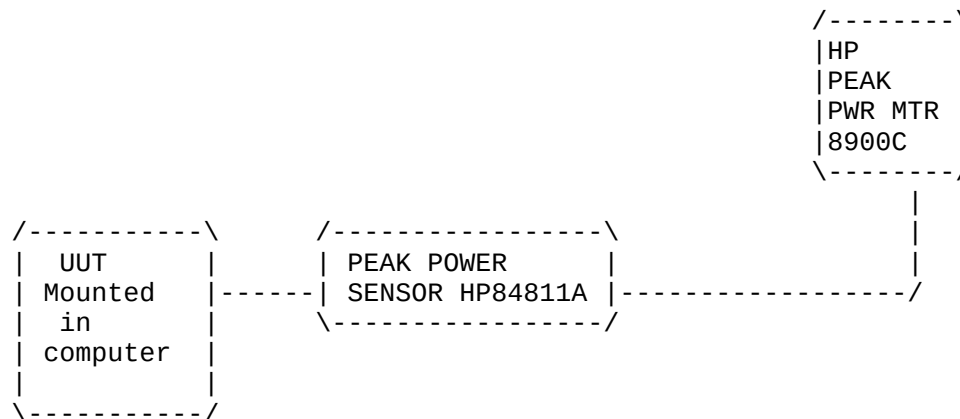
SWP 2.30 sec

APPLICANT: ACROWAVE SYSTEMS CO., LTD.
FCC ID: PE6AWL-1100P
NAME OF TEST: 6.0dB BANDWIDTH
RULES PART NUMBER: 15.247(a)(2)
REQUIREMENTS: The 6.0dB bandwidth must be greater than 500KHz.
MEASUREMENT: The 6.0dB bandwidth measured @ 2467.00MHz was 12.46MHz.
MEASUREMENT DATA: See plots on the next page.

NAME OF TEST: POWER OUTPUT
RULES PART NUMBER: 15.247(b) 1.0Watt or +30dBm

MEASUREMENT: 40 mWATTS @ 2437.00 MHz
32 mWATTS @ 2467.00 MHz

15.247(c) Method of Measuring RF Power output:
The Peak power Sensor was connected
in place of the antenna.



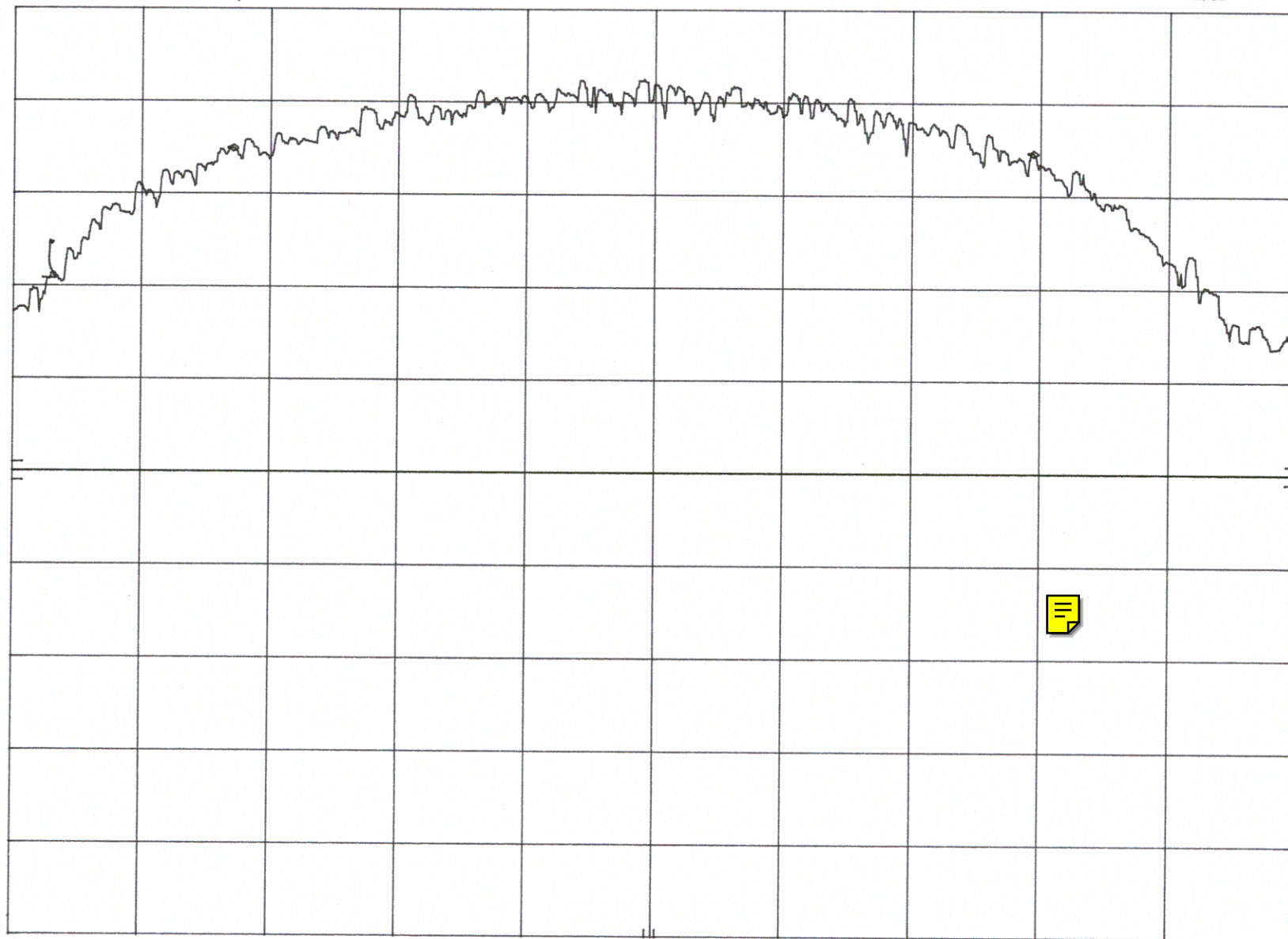
hp

REF 97.0 dB μ V ATTEN 0 dB + 20 dB

MKR Δ -12.46 MHz
0.30 dB

10 dB/

DL
47.0
dB μ V

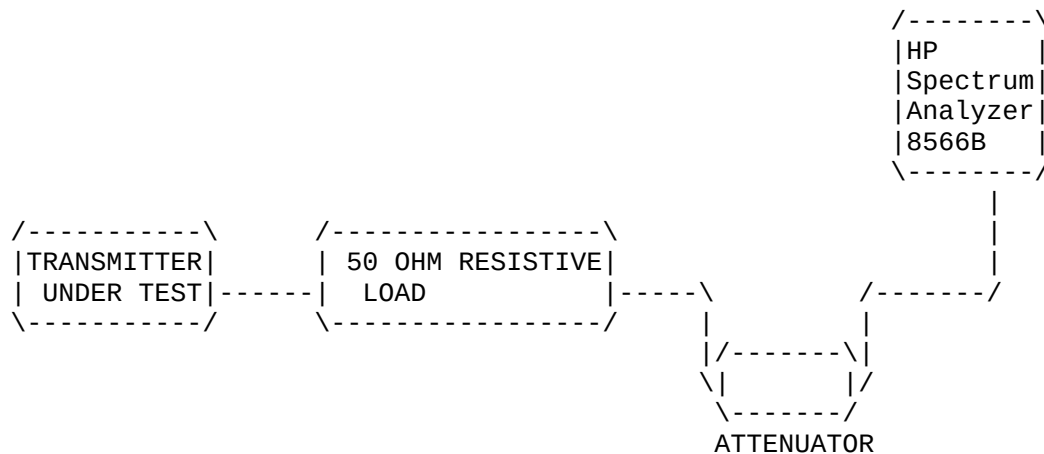


CENTER 2.467 6 GHz

RES BW 100 kHz (i) VBW 300 kHz

SPAN 20.0 MHz
SWP 20.0 msec

15.247(c) Method of Measuring RF Conducted Spurious Emissions



NAME OF TEST: SPURIOUS EMISSIONS AT ANTENNA TERMINALS

REQUIREMENTS: Emissions must be at least 20dB down from the highest emission level within the authorized band as measured with a 1 MHz RBW.

EMISSION FREQUENCY MHz	dB BELOW CARRIER
2418.0	00.0
4836.0	75.8
7254.0	100.0
9672.0	89.4
12090.0	95.8
2437.0	00.0
4874.0	88.4
7311.0	91.9
9748.0	90.7
12185.0	99.2
2467.0	00.0
4934.0	79.0
7401.0	70.7
9868.0	91.0
12335.0	98.4

NOTE: THE SPECTRUM WAS SCANNED TO THE TENTH HARMONIC.

APPLICANT: ACROWAVE SYSTEMS CO., LTD.
 FCCID: PE6AWL-1100P
 REPORT #: T:\CUS\A\ACRO\18U1\18U1RPT.DOC
 PAGE #: 8

15.247(c), 15.205 & 15.209(b) Field_strength_of_spurious_emissions:

REQUIREMENTS:

FIELD STRENGTH of Fundamental:	FIELD STRENGTH of Harmonics	15.209 30 - 88 MHz 88 -216 MHz 216 -960 MHz ABOVE 960 MHz	40 dBuV/m @3M 43.5 46.0 54.0
2.4-2.4835 GHz 127.38 dBuV/m @3m			

REQUIREMENTS: Emissions that fall in the restricted bands (15.205) must be less than 54dBuV/m otherwise the spurious and harmonics must be attenuated by at least 20dB.

TEST DATA:

EMISSION FREQUENCY MHz	METER READING @ 3m dBuV	COAX LOSS dB	ACF dB	FIELD STRENGTH dBuV/m	FCC. LIMIT dB	MARGIN dB	ANT.
2417.70	73.70	1.09	29.04	103.84	127.38	23.54	V
4835.40	6.70	1.46	33.94	42.10	54.00	11.90	V
2441.90	73.30	1.10	29.10	103.50	127.38	23.88	V
4883.80	1.20	1.46	33.99	36.66	54.00	17.34	H
2471.90	72.60	1.10	29.18	102.88	127.38	24.50	V

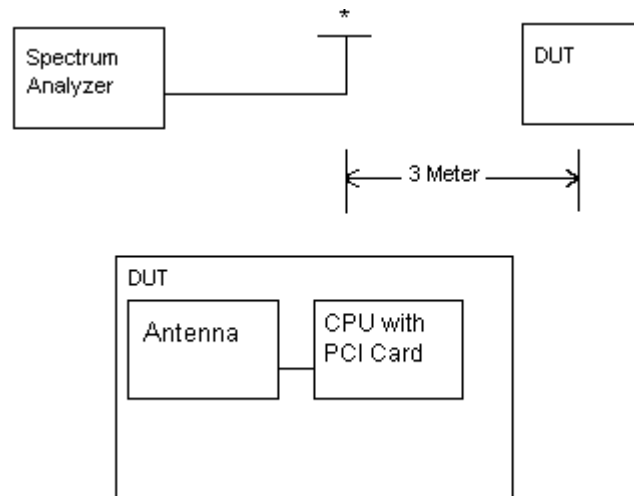
METHOD OF MEASUREMENT: The procedure used was ANSI STANDARD C63.4-1992 & the Guidance on Measurements for Direct Sequence Spread Spectrum Systems. Measurements were made at the open field test site of TIMCO ENGINEERING INC. located at 849 N.W. State Road, Newberry, FL 32669.

APPLICANT: ACROWAVE SYSTEMS CO., LTD.
FCCID: PE6AWL-1100P
REPORT #: T:\CUS\A\ACRO\18U1\18U1RPT.DOC
PAGE #: 9

2.993(a)(b)

2.993(a)(b) Continued Field_strength_of_spurious_emissions:

Method of Measuring Radiated Spurious Emissions



* Tuned, Calibrated Antenna which may be raised from 1-4 Meters above ground and changed in polarization.

Equipment placed 80 cm above ground on a rotatable platform.

APPLICANT: ACROWAVE SYSTEMS CO., LTD.
FCCID: PE6AWL-1100P
REPORT #: T:\CUS\A\ACRO\18U1\18U1RPT.DOC
PAGE #: 10

APPLICANT: ACROWAVE SYSTEMS CO., LTD.

FCC ID: PE6AWL-1100P

NAME OF TEST: RADIATED SPURIOUS EMISSIONS INTO ADJACENT
RESTRICTED BAND

REQUIREMENTS: Emissions that fall in the restricted bands
(15.205). These emissions must be less than
or equal to 500 uV/m (54 dBuV/m).

TEST PROCEDURE: An in band field strength measurement of the
fundamental emissions using the RBW and
detector function required by C63.4-2000 and
FCC rules. The procedure was repeated with
an average detector and a plot made. The
calculated field strength in the adjacent
restricted band is presented below.

-102.60 dBm - from Plot
+ 29.21 dB - ACF
+ 1.1 dB - Coax Loss

- 72.99 dBm
+107.00

34.71 dBuV

APPLICANT: ACROWAVE SYSTEMS CO., LTD.
FCCID: PE6AWL-1100P
REPORT #: T:\CUS\A\ACRO\18U1\18U1RPT.DOC
PAGE #: 11

hp

REF -45.0 dBm

ATTEN 0 dB

+0 dB

MKR 2.483 52 GHz

-102.60 dBm



10 dB/

OFFSET

-35.0

dB

DL

-95.0

dBm

MARKER

2.483 52 GHz

-102.60 dBm



START 2.458 0 GHz

RES BW 1 MHz (i)

VBW 10 Hz

STOP 2.487 7 GHz

SWP 14.3 sec

APPLICANT: ACROWAVE SYSTEMS CO., LTD.

FCC ID: PE6AWL-1100P

NAME OF TEST: POWER SPECTRAL DENSITY

RULES PART NUMBER: 15.247(d)

REQUIREMENTS: The peak level measured must be no greater than +8.0dBm.

DATA: The plots are on the following pages as exhibits # 14A-14C.

	The level at 2438.03 MHz .	2417.44 MHz	2472.48 MHz
From Plot:	- 75.8 dBm	-73.20 dBm	-74.00 dBm
	+ 20.0 dB ATT	+20.00 dB ATT	+20.00 dB ATT
	+ 35.0 CF	+35.00 CF	+35.00 CF
Calculation:	- 20.8 dBm	-18.20 dBm	-19.00 dBm

NAME OF TEST: PROCESSING GAIN

RULES PART NUMBER: 15.247(e)

REQUIREMENTS:

DATA: The processing gain information supplied by the manufacturer is 10.0dB.

See Exhibits 7A-7F and 8A-8C for processing gain test methods and data.

APPLICANT: ACROWAVE SYSTEMS CO., LTD.

FCCID: PE6AWL-1100P

REPORT #: T:\CUS\A\ACRO\18U1\18U1RPT.DOC

PAGE #: 13

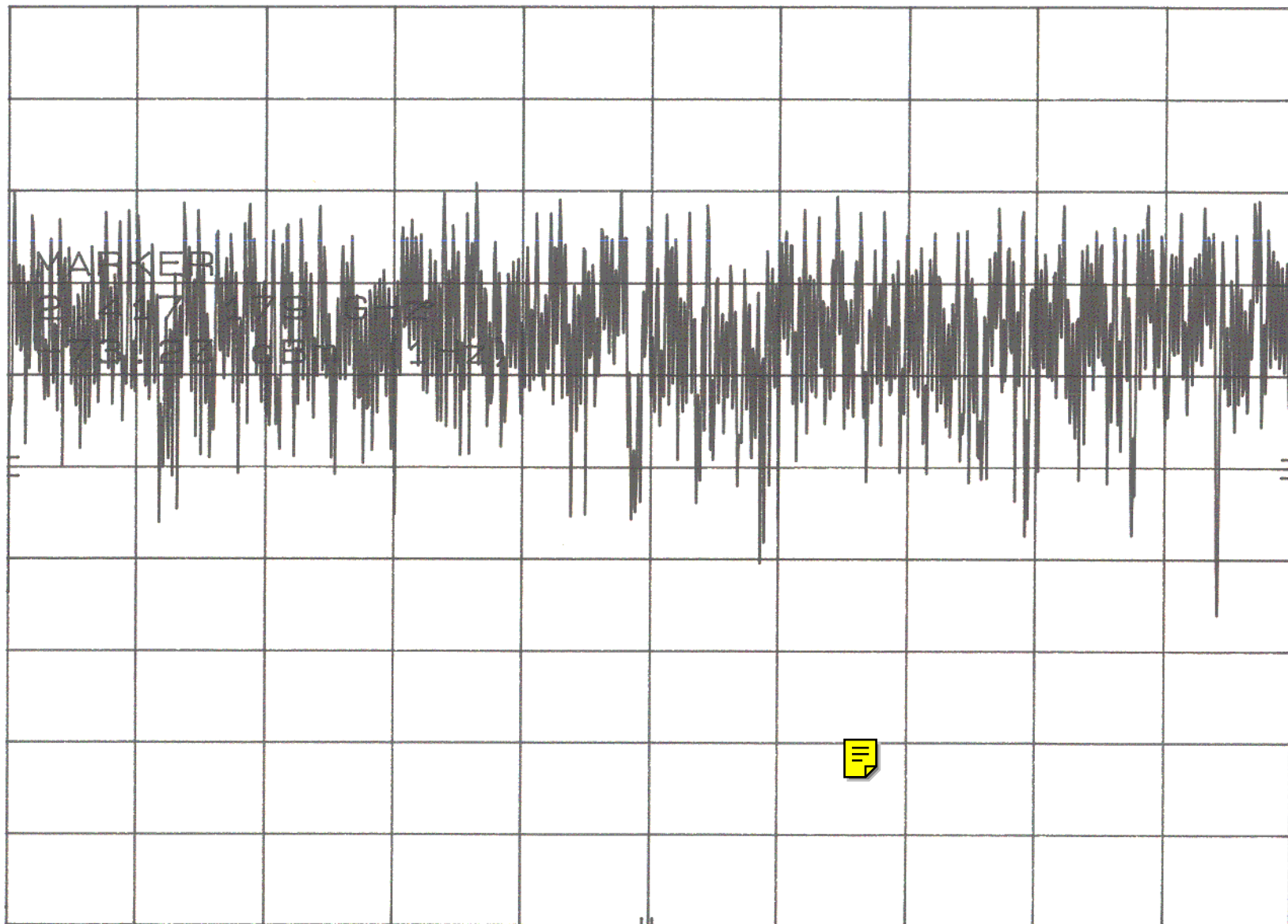
hp

REF -10.0 dBm ATTEN 0 dB + 20 dB

MKR 2.417 179 GHz
-73.20 dBm (1Hz)

10 dB/

SAMPLE



CENTER 2.417 44 GHz

RES BW 3 kHz (1)

VBW 10 kHz

SPAN 1.50 MHz

SWP 500 sec

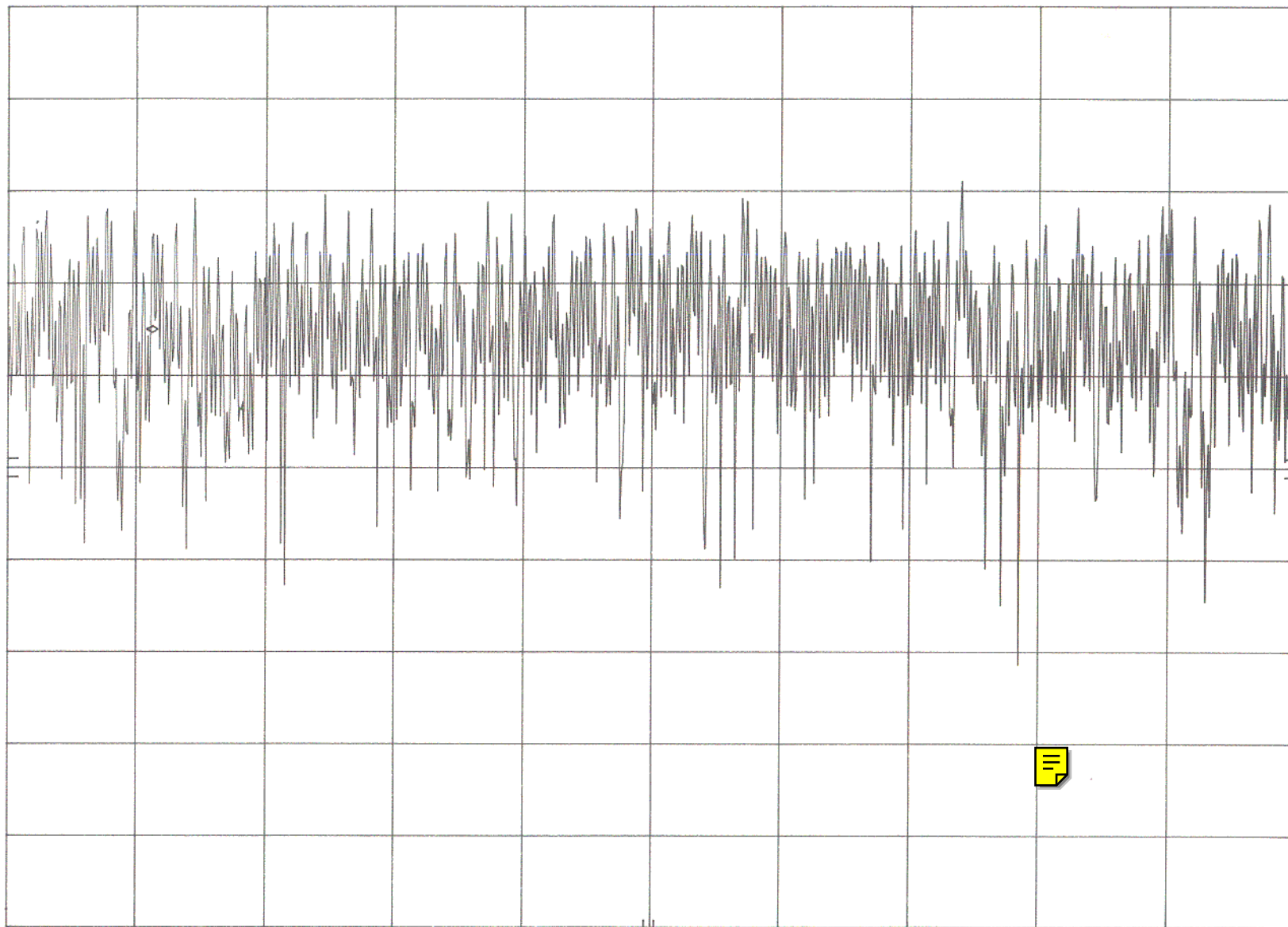
hp

REF -10.0 dBm ATTN 0 dB + 20 dB

MKR 2.437 458 GHz
-75.80 dBm (1Hz)

10 dB/

SAMPLE



CENTER 2.438 03 GHz

RES BW 3 kHz (i)

VBW 300 kHz

SPAN 1.50 MHz

SWP 500 sec

hp

REF -10.0 dBm

ATTEN 0 dB + 20 dB

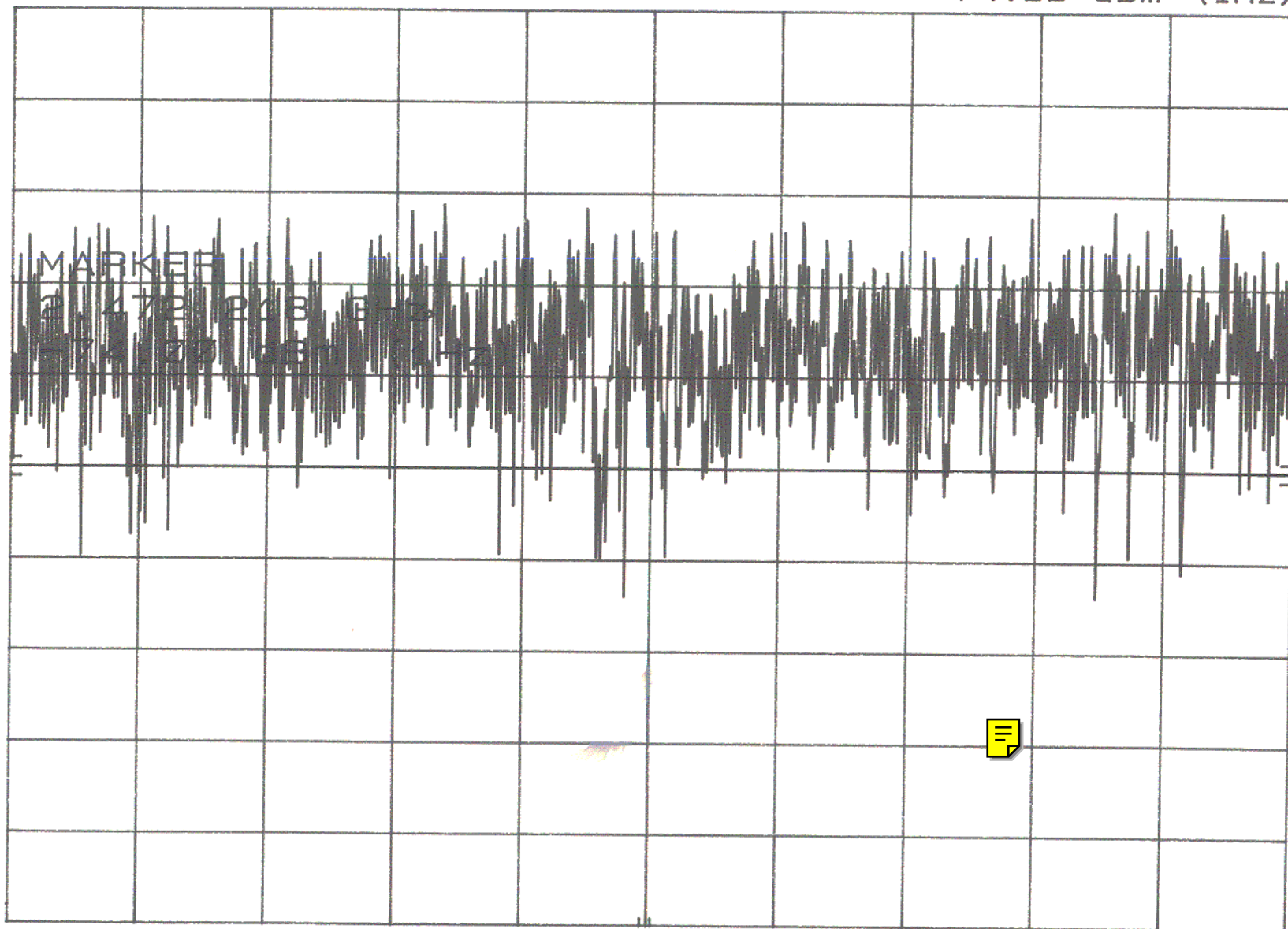
MKR 2.472 218 GHz

-74.00 dBm (1Hz)

10 dB/

SAMPLE

DL
-60.0
dBm



CENTER 2.472 48 GHz

RES BW 3 kHz (i)

VBW 10 kHz

SPAN 1.50 MHz

SWP 500 sec