EMISSIONS TEST REPORT FOR A LOW POWER TRANSMITTER

I. GENERAL INFORMATION

Requirement: Federal Communications Commissions
Test Requirements: 15.205, 15.207, 15.209, 15.247

Applicant: Invensys Metering Systems

FCC ID: **KCHMXU510**

II. DESCRIPTION OF EQUIPMENT UNDER TEST (EUT)

The Invensys FCC ID: **KCHMXU510** is a digital transmission system (DTS) operating under the requirements in FCC Part 15. The product is used in a utility meter system for transmitting meter readings to a receiver unit owned by the utility. The product has an ASH receiver tuned to the utility licensed transmitter operating in the 952-956 MHz band. The licensed transmitter sends the transmit command to the MXU 510

The LCM operates in the U.S. ISM band between 902 and 928 MHz.

Transmitter Specification

TX Power	22.6 dBm measured
Frequency of operation	903.8-926.2 MHz
Data Rate	15.625 kpbs in 72ms burst
6 dB bandwidth	1.18 MHz
Power source	internal lithium thionyl chloride battery
6 dB bandwidth	1.18 MHz

III. TEST LOCATION

All tests were performed at:

Compliance Certification Services
561F Monterey Road
Morgan Hill, CA 95037

T.N. Cokenias 8 December 2002
EMC Consultant/Agent for Invensys

15.203 Antenna connector requirement

The antenna is permanently attached to the product. For antenna conducted tests, a unit was modified by disconnecting the printed circuit antenna and replacing it with a 50 ohm coaxial cable connection terminated at one end with an SMA connector.

15.204 Antenna description

The meter transceiver uses a printed circuit folded dipole antenna:

Antenna description	Gain
printed ckt antenna	2.2 dBi

TEST DATA and TEST PROCEDURES - CCS Laboratory

Radiated Emissions
Test Requirement: 15.205, 15.247

Out of Band Measurements
Test Requirement: 15.247

Measurement Equipment Used:

HP 8564 Spectrum Analyzer, 1 - 9.5 GHz
Miteq NSP2600-44 Microwave pre-amplifier, 1-26.5 GHz
EMCO 3115 Double Ridged Horn antenna, 1 - 18 GHz

Radiated emissions generated by the transmitter portion of the EUT were measured.

1. The EUT was placed on a wooden table resting on a turntable on the open air test site. Several utility meters were connected to the appropriate ports as typical loads.

The search antenna was placed 3m from the EUT. The EUT antenna was mounted vertically as per normal installation.

2. The turntable was slowly rotated to locate the direction of maximum emission at each emission falling in the restricted bands of 15.205.

3. Radiated emissions were investigated for a LOW channel, a MID channel, and HIGH channel. Emissions were investigated to the 10^{th} harmonic.

4. Once maximum direction was determined, the search antenna was raised and lowered in both vertical and horizontal polarizations. The maximum readings so obtained are recorded in the data listed below.

Test Results: Worst case results are presented. Refer to data sheets in separate attachments. Restricted band emissions meet 54 dBuV/m. Other undesired emissions from the transmitter meet the -20 dBc requirement in 15.247(c).

11/11/02 **FCC Measurement**

Compliance Certification Services, Morgan Hill Open Field Site

Test Engr: Thanh Nguyen
Project #:
Company: Invensys Metering Systems
EUT Descrip.: 902-928 MHz DSSS Automatic Meter Reading system
EUT M/N: FCC ID: KCHMXU510
Test Target: 15.247, 15.205, 15.209

Equipment for 1-22 GHz:
HP8566B Analyzer
HP 8449 Pe-amp
EMCO 3115 Antenna
Cable: 13.0 feet

Equipment for 22 - 58 GHz:
HP8566B Analyzer
HP 11975A Amplifier (LO)
HP 11970K External mixer/antenna
Cable: IF Only (321 MHz)

Peak Measurements:
1 MHz Resolution Bandwidth
1MHz Video Bandwidth

Average Measurements:
1MHz Resolution Bandwidth
10Hz Video Bandwidth

f GHz	Dist feet	Read Pk dBuV	Read Avg. dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	HPF	Peak dBuV/m	Avg dBuV/m	Pk Lim dBuV/m	Avg Lim dBuV/m	Pk Mar dB	Avg Mar dB	Notes
0.903	3.3	94.1	11.2	#N/A	1.9	0.0	-9.5	0.0	#N/A	#N/A	74.0	54.0	#N/A	#N/A	V
1.806	3.3	54.8	45.3	27.0	2.9	0.0	-9.5	0.0	75.3	65.8	74.0	54.0	1.3	11.8	H
1.806	3.3	55.3	8.7	27.0	2.9	0.0	-9.5	0.0	75.8	29.2	74.0	54.0	1.8	-24.8	V
2.710	3.3	58.5	49.7	29.9	3.5	-36.0	-9.5	1.0	47.4	38.6	74.0	54.0	-26.6	-15.4	H
2.710	3.3	58.3	51.5	29.9	3.5	-36.0	-9.5	1.0	47.2	40.4	74.0	54.0	-26.8	-13.6	V
3.615	3.3	52.2	40.5	32.5	4.1	-35.3	-9.5	1.0	45.0	33.3	74.0	54.0	-29.0	-20.7	V
3.615	3.3	53.8	42.8	32.5	4.1	-35.3	-9.5	1.0	46.6	35.6	74.0	54.0	-27.4	-18.4	H
4.520	3.3	54.5	45.2	33.0	4.8	-34.6	-9.5	1.0	49.1	39.8	74.0	54.0	-24.9	-14.2	H
4.520	3.3	53.5	43.0	33.0	4.8	-34.6	-9.5	1.0	48.1	37.6	74.0	54.0	-25.9	-16.4	V
5.423	3.3	52.5	41.5	35.2	5.3	-34.4	-9.5	1.0	50.1	39.1	74.0	54.0	-23.9	-14.9	V
5.423	3.3	52.0	40.5	35.2	5.3	-34.4	-9.5	1.0	49.6	38.1	74.0	54.0	-24.4	-15.9	H
6.326	3.3	54.0	42.5	35.5	5.9	-34.5	-9.5	1.0	52.4	40.9	74.0	54.0	-21.6	-13.1	H
6.326	3.3	57.0	50.7	35.5	5.9	-34.5	-9.5	1.0	55.4	49.1	74.0	54.0	-18.6	-4.9	V
7.230	3.3	55.5	44.2	37.0	6.3	-34.6	-9.5	1.0	55.7	44.4	74.0	54.0	-18.3	-9.6	V
7.230	3.3	55.5	46.7	37.0	6.3	-34.7	-9.5	1.0	55.5	46.7	74.0	54.0	-18.5	-7.3	H
8.134	3.3	53.8	41.8	37.7	6.7	-34.7	-9.5	1.0	55.0	43.1	74.0	54.0	-19.0	-10.9	H
8.134	3.3	53.3	42.0	37.7	6.7	-34.7	-9.5	1.0	54.5	43.2	74.0	54.0	-19.5	-10.8	V
9.038	3.3	53.2	41.7	38.4	7.1	-34.9	-9.5	1.0	55.3	43.8	74.0	54.0	-18.7	-10.2	V
9.038	3.3	54.7	43.5	38.4	7.1	-34.9	-9.5	1.0	56.8	45.6	74.0	54.0	-17.2	-8.4	H

Dist	Distance to Antenna	D Corr	Distance Correct to 3 meters		Pk Lim	Peak Field Strength Limit	
Read	Analyzer Reading	Avg	Average Field Strength @ 3 m		Avg Mar	Margin vs. Average Limit	
AF	Antenna Factor	Peak	Calculated Peak Field Strength		Pk Mar	Margin vs. Peak Limit	
CL	Cable Loss	HPF	High Pass Filter				

11/11/02 **FCC Measurement**

Compliance Certification Services, Morgan Hill Open Field Site

Test Engr: Thanh Nguyen
Project #:
Company: Invensys Metering Systems
EUT Descrip.: 902-928 MHz DSSS Automatic Meter Reading System
EUT M/N: FCC ID: KCHMX510
Test Target: 15.247, 15.205, 15.209

Equipment for 1-22 GHz:
HP8566B Analyzer
HP8449 Pre- amp
EMCO 3115 Antenna
Cable: 13.0 feet

Equipment for 22 - 58 GHz:
HP8566B Analyzer
HP 11975A Amplifier (LO)
HP 11970K External mixer/antenna
Cable: IF Only (321 MHz)

Peak Measurements:
1 MHz Resolution Bandwidth
1MHz Video Bandwidth

Average Measurements:
1MHz Resolution Bandwidth
10Hz Video Bandwidth

f GHz	Dist feet	Read Pk dBuV	Read Avg. dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	HPF	Peak dBuV/m	Avg dBuV/m	Pk Lim dBuV/m	Avg Lim dBuV/m	Pk Mar dB	Avg Mar dB	Notes
0.915	8.4	95.0		#N/A	1.9	#N/A	-1.4	0.0	#N/A		74.0	54.0	#N/A		V
1.830	3.3	80.0	79.5	27.2	2.9	-37.1	-9.5	1.0	64.5	64.0	74.0	54.0	-9.5	10.0	V
1.830	3.3	79.3	78.8	27.2	2.9	-37.1	-9.5	1.0	63.8	63.3	74.0	54.0	-10.2	9.3	H
2.745	3.3	54.5	50.7	30.0	3.5	-36.0	-9.5	1.0	43.5	39.7	74.0	54.0	-30.5	-14.3	H
2.745	3.3	51.3	47.7	30.0	3.5	-36.0	-9.5	1.0	40.3	36.7	74.0	54.0	-33.7	-17.3	V
3.660	3.3	47.5	42.7	32.6	4.2	-35.3	-9.5	1.0	40.4	35.6	74.0	54.0	-33.6	-18.4	V
3.660	3.3	49.5	44.6	32.6	4.2	-35.3	-9.5	1.0	42.4	37.5	74.0	54.0	-31.6	-16.5	H
4.575	3.3	48.4	38.2	33.1	4.8	-34.7	-9.5	1.0	43.1	32.9	74.0	54.0	-30.9	-21.1	H
4.575	3.3	47.3	40.1	33.1	4.8	-34.7	-9.5	1.0	42.0	34.8	74.0	54.0	-32.0	-19.2	V
5.490	3.3	44.6	36.2	35.3	5.4	-34.5	-9.5	1.0	42.3	33.9	74.0	54.0	-31.7	-20.1	H
5.490	3.3	46.5	39.5	35.3	5.4	-34.5	-9.5	1.0	44.2	37.2	74.0	54.0	-29.8	-16.8	V
6.405	3.3	51.9	44.8	35.5	5.9	-34.5	-9.5	1.0	50.3	43.2	74.0	54.0	-23.7	-10.8	V
6.405	3.3	57.7	52.7	35.5	5.9	-34.5	-9.5	1.0	56.1	51.1	74.0	54.0	-17.9	-2.9	H
7.320	3.3	49.2	39.8	37.1	6.3	-34.6	-9.5	1.0	49.6	40.2	74.0	54.0	-24.4	-13.8	H
7.320	3.3	47.6	38.9	37.1	6.3	-34.6	-9.5	1.0	48.0	39.3	74.0	54.0	-26.0	-14.7	V
8.235	3.3	47.2	35.9	37.8	6.7	-34.8	-9.5	1.0	48.5	37.2	74.0	54.0	-25.5	-16.8	V
8.235	3.3	46.2	35.5	37.8	6.7	-34.8	-9.5	1.0	47.5	36.8	74.0	54.0	-26.5	-17.2	H
9.150	3.3	51.5	45.4	38.4	7.2	-34.9	-9.5	1.0	53.7	47.6	74.0	54.0	-20.3	-6.4	H
9.150	3.3	50.0	36.4	38.4	7.2	-34.9	-9.5	1.0	52.2	38.6	74.0	54.0	-21.8	-15.4	V

f	Measurement Frequency	Amp	Preamp Gain	Avg Lim	Average Field Strength Limit
Dist	Distance to Antenna	D Corr	Distance Correct to 3 meters	Pk Lim	Peak Field Strength Limit
Read	Analyzer Reading	Avg	Average Field Strength @ 3 m	Avg Mar	Margin vs. Average Limit
AF	Antenna Factor	Peak	Calculated Peak Field Strength	Pk Mar	Margin vs. Peak Limit
CL	Cable Loss	HPF	High Pass Filter		

11/11/02 **FCC Measurement**

Compliance Certification Services, Morgan Hill Open Field Site

Test Engr: Thanh Nguyen
Project #:
Company: Invensys Metering Systems
EUT Descrip.: 902-928 MHz DSSS Automatic Meter Reading System
EUT M/N: FCC ID: KCHMXU510
Test Target: 15.247, 15.205, 15.209

Equipment for 1-22 GHz:
HP8566B Analyzer
Miteq NSP2600-44 Preamp
EMCO 3115 Antenna
Cable: 13.0 feet

Equipment for 22 - 58 GHz:
HP8566B Analyzer
HP 11975A Amplifier (LO)
HP 11970K External mixer/antenna
Cable: IF Only (321 MHz)

Peak Measurements:
1 MHz Resolution Bandwidth
1MHz Video Bandwidth

Average Measurements:
1MHz Resolution Bandwidth
10Hz Video Bandwidth

f GHz	Dist feet	Read Pk dBuV	Read Avg. dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	HPF	Peak dBuV/m	Avg dBuV/m	Pk Lim dBuV/m	Avg Lim dBuV/m	Pk Mar dB	Avg Mar dB	Notes
0.926	8.4	95.2		#N/A	2.0	0.0	-1.4	0.0	#N/A		74.0	54.0	#N/A		V
1.852	3.3	78.0	78.0	27.4	3.0	-37.0	-9.5	1.0	62.8	62.8	74.0	54.0	-11.2	8.8	V
2.778	3.3	51.7	45.7	30.2	3.5	-36.0	-9.5	1.0	40.9	34.9	74.0	54.0	-33.1	-19.1	V
2.778	3.3	50.6	44.8	30.2	3.5	-36.0	-9.5	1.0	39.8	34.0	74.0	54.0	-34.2	-20.0	H
3.704	3.3	49.4	43.3	32.6	4.2	-35.3	-9.5	1.0	42.5	36.4	74.0	54.0	-31.5	-17.6	H
3.704	3.3	46.5	40.0	32.6	4.2	-35.3	-9.5	1.0	39.6	33.1	74.0	54.0	-34.4	-20.9	V
4.631	3.3	48.3	39.5	33.3	4.8	-34.7	-9.5	1.0	43.2	34.4	74.0	54.0	-30.8	-19.6	V
4.631	3.3	50.8	43.5	33.3	4.8	-34.7	-9.5	1.0	45.7	38.4	74.0	54.0	-28.3	-15.6	H
5.557	3.3	46.3	36.9	35.1	5.4	-34.5	-9.5	1.0	43.9	34.5	74.0	54.0	-30.1	-19.5	H
5.557	3.3	47.3	40.2	35.1	5.4	-34.5	-9.5	1.0	44.9	37.8	74.0	54.0	-29.1	-16.2	V
6.483	3.3	51.8	42.6	35.4	5.9	-34.5	-9.5	1.0	50.2	41.0	74.0	54.0	-23.8	-13.0	V
6.483	3.3	55.9	50.1	35.4	5.9	-34.5	-9.5	1.0	54.3	48.5	74.0	54.0	-19.7	-5.5	H
7.409	3.3	50.7	43.0	37.4	6.4	-34.6	-9.5	1.0	51.4	43.7	74.0	54.0	-22.6	-10.3	H
7.409	3.3	50.9	41.1	37.4	6.4	-34.6	-9.5	1.0	51.6	41.8	74.0	54.0	-22.4	-12.2	V
8.335	3.3	49.6	35.7	38.2	6.8	-34.8	-9.5	1.0	51.4	37.5	74.0	54.0	-22.6	-16.5	V
8.335	3.3	48.1	36.2	38.2	6.8	-34.8	-9.5	1.0	49.9	38.0	74.0	54.0	-24.1	-16.0	H
9.262	3.3	49.0	37.3	39.2	7.2	-34.8	-9.5	1.0	52.1	40.4	74.0	54.0	-21.9	-13.6	H
9.262	3.3	49.9	38.2	39.2	7.2	-34.8	-9.5	1.0	53.0	41.3	74.0	54.0	-21.0	-12.7	V
								1.0							
								1.0							

f	Measurement Frequency	Amp	Preamp Gain	Avg Lim	Average Field Strength Limit
Dist	Distance to Antenna	D Corr	Distance Correct to 3 meters	Pk Lim	Peak Field Strength Limit
Read	Analyzer Reading	Avg	Average Field Strength @ 3 m	Avg Mar	Margin vs. Average Limit
AF	Antenna Factor	Peak	Calculated Peak Field Strength	Pk Mar	Margin vs. Peak Limit
CL	Cable Loss	HPF	High Pass Filter		

Radiated Emissions
Test Requirement: 15.109

Measurement Equipment Used:

HP 8566 Spectrum Analyzer, 30-1000 MHz
HP 8447D Pre-amplifier, .1 - 1300 MHz
Schaffner/Chase CBL6112B Bilog Antenna, 30 - 2000 MHz

Radiated emissions generated by the digital portion of the EUT were measured.

1. The EUT was placed on a wooden table resting on a turntable on the open air test site. The search antenna was placed 3m from the EUT. The EUT antenna was mounted vertically as per normal installation. The EUT was set to transmit continuously on the MID channel.

2. The turntable was slowly rotated to locate the direction of maximum emission at each emission falling in the restricted bands of 15.205.

3. Once maximum direction was determined, the search antenna was raised and lowered in both vertical and horizontal polarizations. The maximum readings so obtained are recorded in the data listed below.

Test Results: EUT meets requirements. No emissions were detected coming from the 952-956 MHz receiver portion of the EUT. The ASH receiver does not use oscillators and as such does not generate any emissions. Refer to data spreadsheet below for emissions from the 902-928 MHz transceiver.

COMPLIANCE Certification Services

FCC, VCCI, CISPR, CE, AUSTEL, NZ
UL, CSA, TUV, BSMI, DHHS, NVLAP

561F MONTEREY ROAD, SAN JOSE, CA 95037-9001
PHONE: (408) 463-0885 FAX: (408) 463-0888

Project #:	TOM #1
Report #:	021111A1
Date& Time:	11/11/02 12:04 PM
Test Engr:	Thanh Nguyen

Company:	JVENSYS METERING SYSTEM
EUT Description:	utomatic Meter Reading
Test Configuration :	UT and 6 Meters.
Type of Test:	CC Part 15 Class B
Mode of Operation:	X at MID channel 915MHz

A-Site | B-Site | C-Site | F-Site | 6 Worst Data | Descending

Freq. (MHz)	Reading (dBuV)	AF (dB)	Closs (dB)	Pre-amp (dB)	Level (dBuV/m)	Limit FCC_B	Margin (dB)	Pol (H/V)	Az (Deg)	Height (Meter)	Mark (P/Q/A)
Check 8MHz Oscilator											
32.00	40.30	12.59	0.89	27.04	26.74	40.00	-13.26	3mV	0.00	1.00	P
36.00	41.00	12.86	0.93	27.03	27.76	40.00	-12.24	3mV	0.00	1.00	P
68.00	42.80	6.13	1.32	27.01	23.24	40.00	-16.76	3mV	0.00	1.00	P
76.00	42.60	6.74	1.36	27.02	23.68	40.00	-16.32	3mV	0.00	1.00	P
112.03	40.60	10.54	1.65	26.94	25.84	43.50	-17.66	3mV	0.00	1.00	P
136.00	38.00	13.75	1.80	26.90	26.65	43.50	-16.85	3mV	0.00	1.00	P
212.00	40.10	10.36	2.30	26.63	26.13	43.50	-17.37	3mV	0.00	1.00	P
300.00	39.40	14.71	2.80	26.54	30.37	46.00	-15.63	3mV	0.00	1.00	P
420.00	40.10	16.09	3.34	27.36	32.17	46.00	-13.83	3mV	0.00	1.00	P
528.00	40.50	18.27	3.79	27.78	34.77	46.00	-11.23	3mV	0.00	1.00	P
648.00	40.60	20.17	4.21	28.11	36.88	46.00	-9.12	3mV	0.00	1.00	P
742.44	39.40	21.37	4.53	28.12	37.19	46.00	-8.81	3mV	0.00	1.00	P
No more signal was detected up to 1GHz both Vertical & Horizontal Antenna											
Total data #: 12											
V.2a											

AC Line Conducted Emissions
Test Requirement: 15.107, 15.207

THIS TEST NOT PERFORMED, NOT REQUIRED: THE EUT IS BATTERY OPERATED ONLY

6dB Bandwidth for DTS
Test Requirement: 15.247

Measurement Equipment Used:

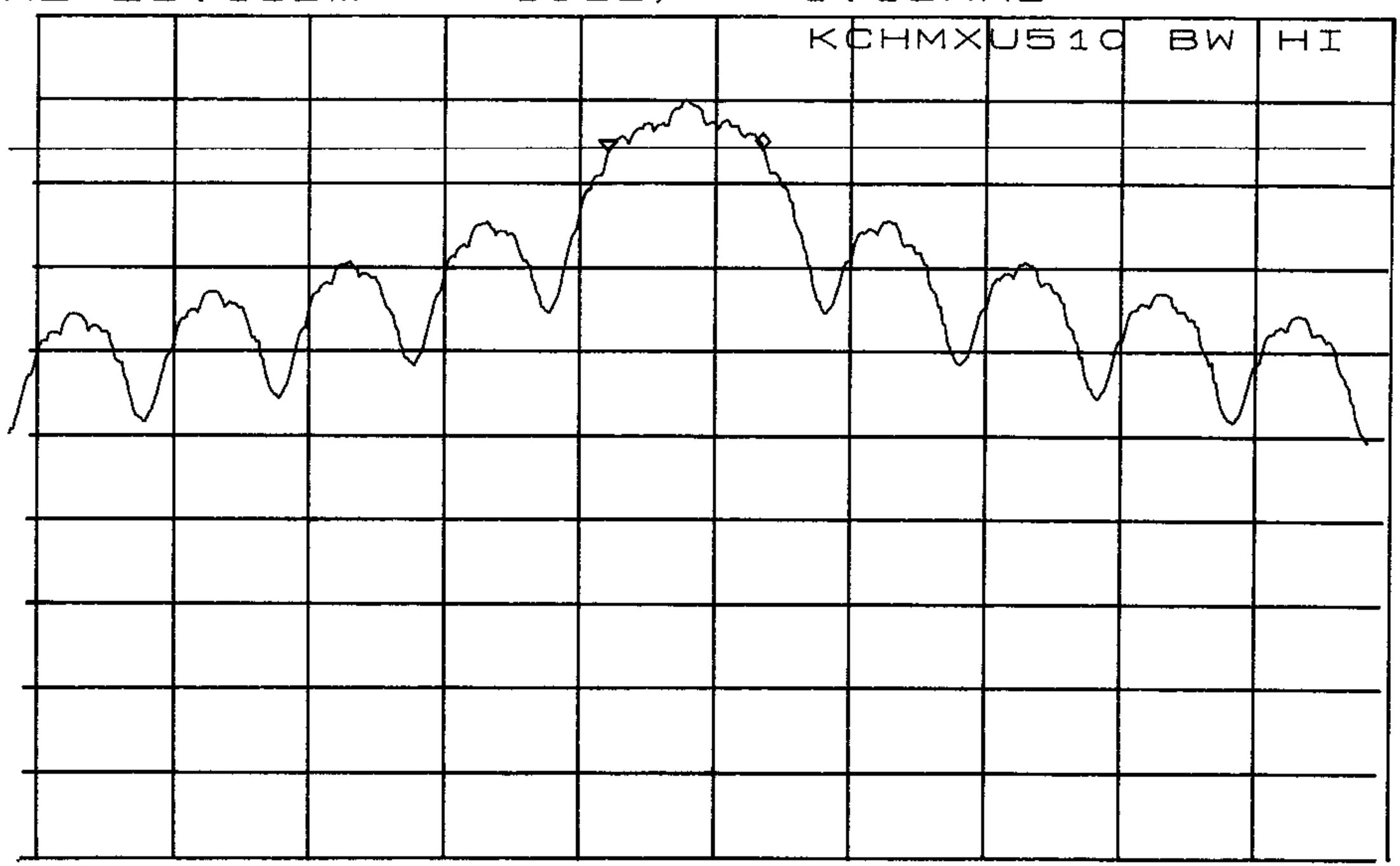
HP 8593EM Spectrum Analyzer
2ft test coaxial cable from antenna connector (test purposes only)

Test Procedures

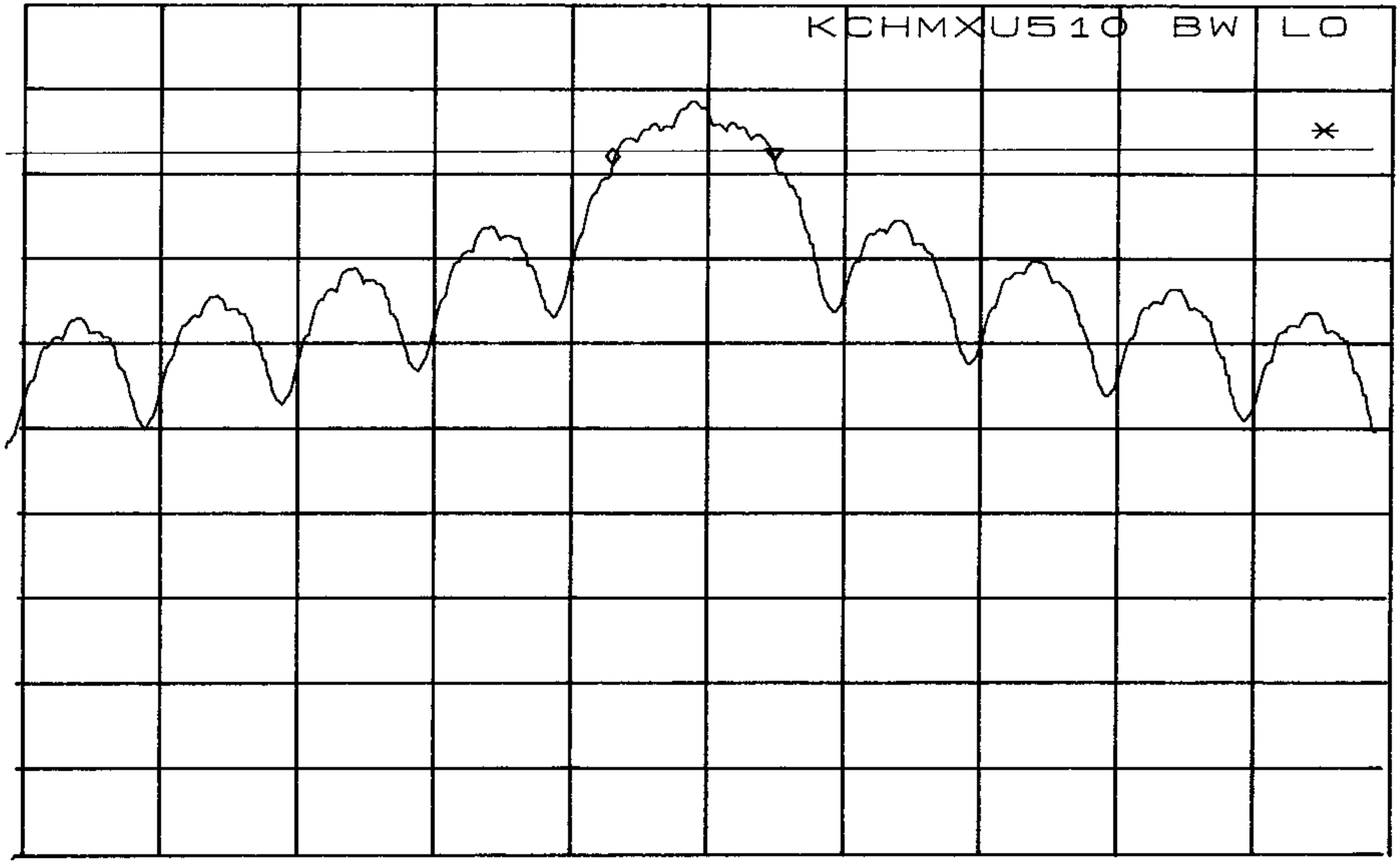
A modified EUT with a coaxial cable attached to the radio antenna port was configured on a test bench. The cable's SMA connector was connected to the spectrum analyzer. The EUT transmission was continuous at \903.8 MHz (LOW channel). While the transmitter broadcast a steady stream of digital data, the analyzer MAX HOLD function was used to capture the envelope of the transmission occupied bandwidth.

Test was repeated for MID and HIGH channels.

Test Results: Measured approximately 1.18MHz 6 dB BW. Refer to data sheets below.

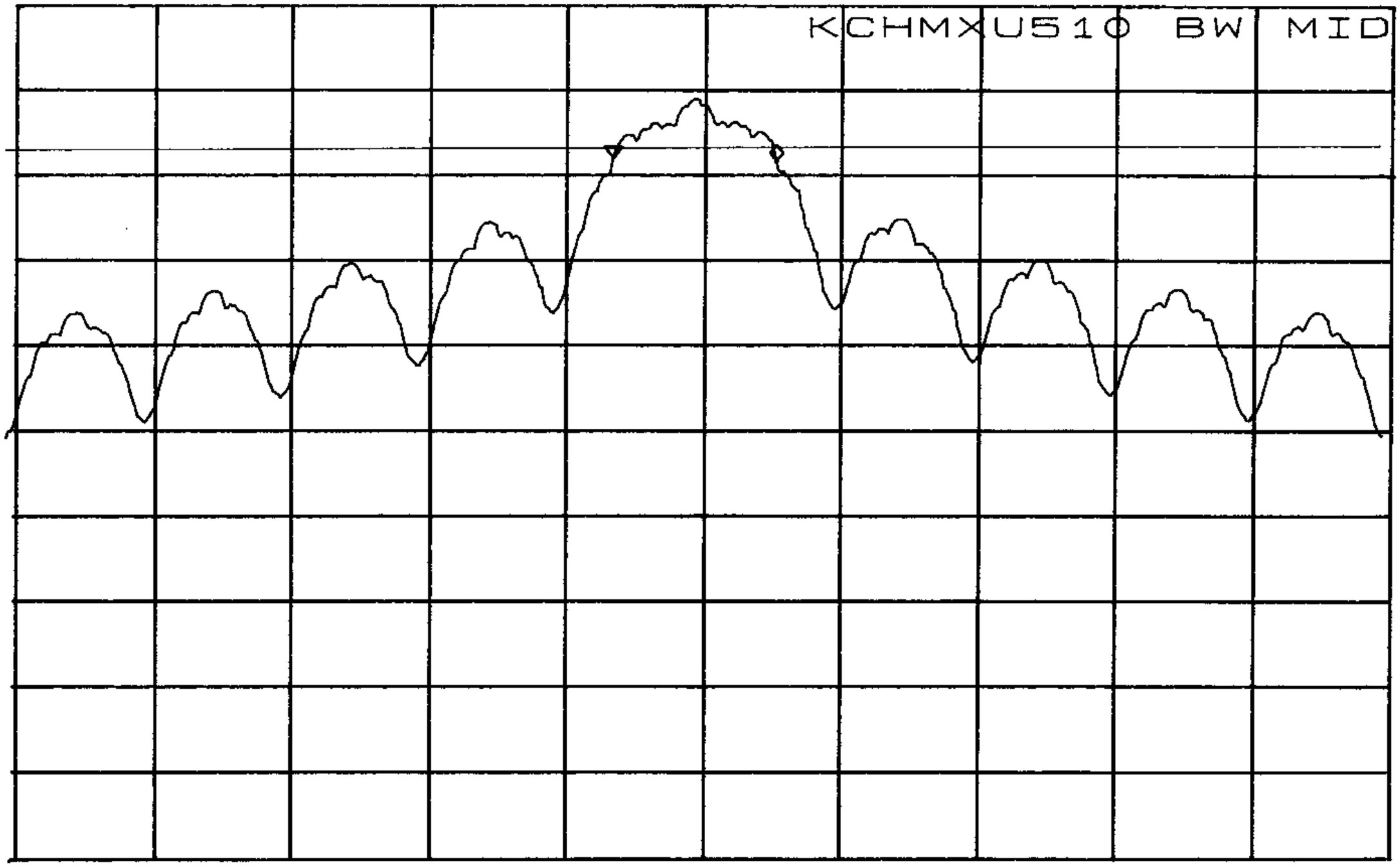

ATTEN 40dB
RL 28.1dBm
10dB/
ΔMKR .16dB
1.13MHz
KCHMXU510
BW
HI
CENTER 926.25MHz
SPAN 10.00MHz
*RBW 100kHz
VBW 100kHz
SWP 50.0ms

ATTEN 40dB
RL 30.0dBm
10dB/
ΔMKR −.50dB
−1.18MHz
KCHMXU510 BW LO



CENTER 903.82MHz
SPAN 10.00MHz
*RBW 100kHz
VBW 100kHz
SWP 50.0ms

ATTEN 40dB
RL 30.0dBm
10dB/
ΔMKR −.50dB
1.18MHz
KCHMXU510 BW MID



CENTER 915.03MHz
SPAN 10.00MHz
*RBW 100kHz
VBW 100kHz
SWP 50.0ms

RF Power Output
Test Requirement: 15.247

Measurement Equipment Used:

Agilent E4416A power meter
Agilent E9327A RF sensor
20 dB attenuator

Test Procedures

1. The EUT was configured on a test bench. The power meter was zeroed and calibrated. The control software was activated and power was set to produce highest output level.
2. The 20 dB attenuator was connected to the antenna port of the EUT. The power meter head was connected to the other end of the attenuator. Peak power was read directly off the meter, accounting for the 20 dB attenuator.

3. The process in (1) and (2) was repeated for MID channel and HIGH channel.

Test Results

Power level readings converted to dBm are shown below. Refer also to spectrum analyzer graphs. Reference level offset corrects for external attenuation and cable loss.

Channel	Frequency, MHz	Output Power, dBm
LOW	903.8	22.62
MID	915	22.58
HIGH	926.2	22.62

Spurious Emissions, Conducted
Test Requirement: 15.247(c)

Measurement Equipment Used:

HP 8593EM Spectrum Analyzer
20 dB attenuator
3 ft length low loss A coaxial RF cable

Test Procedure

1. The EUT was configured on a test bench. The cable was connected between the EUT antenna port and the spectrum analyzer input port.

Spectrum analyzer RES BW was set to 100 kHz. While the transmitter broadcast a steady stream of digital data, the analyzer MAX HOLD function was used to capture the envelope of the transmission.

Readings were taken out to 10fo.

2. The process in (1) was repeated for MID channel and HIGH channel.

Test Results

Refer to attached data sheets. Data shows out of band emissions are suppressed well below the -20 dBc minimum required by the Rules.

Channel	**Frequency, MHz**
LOW	903.8
MID	915
HIGH	926.2

ATTEN 30dB
RL 28.6dBm

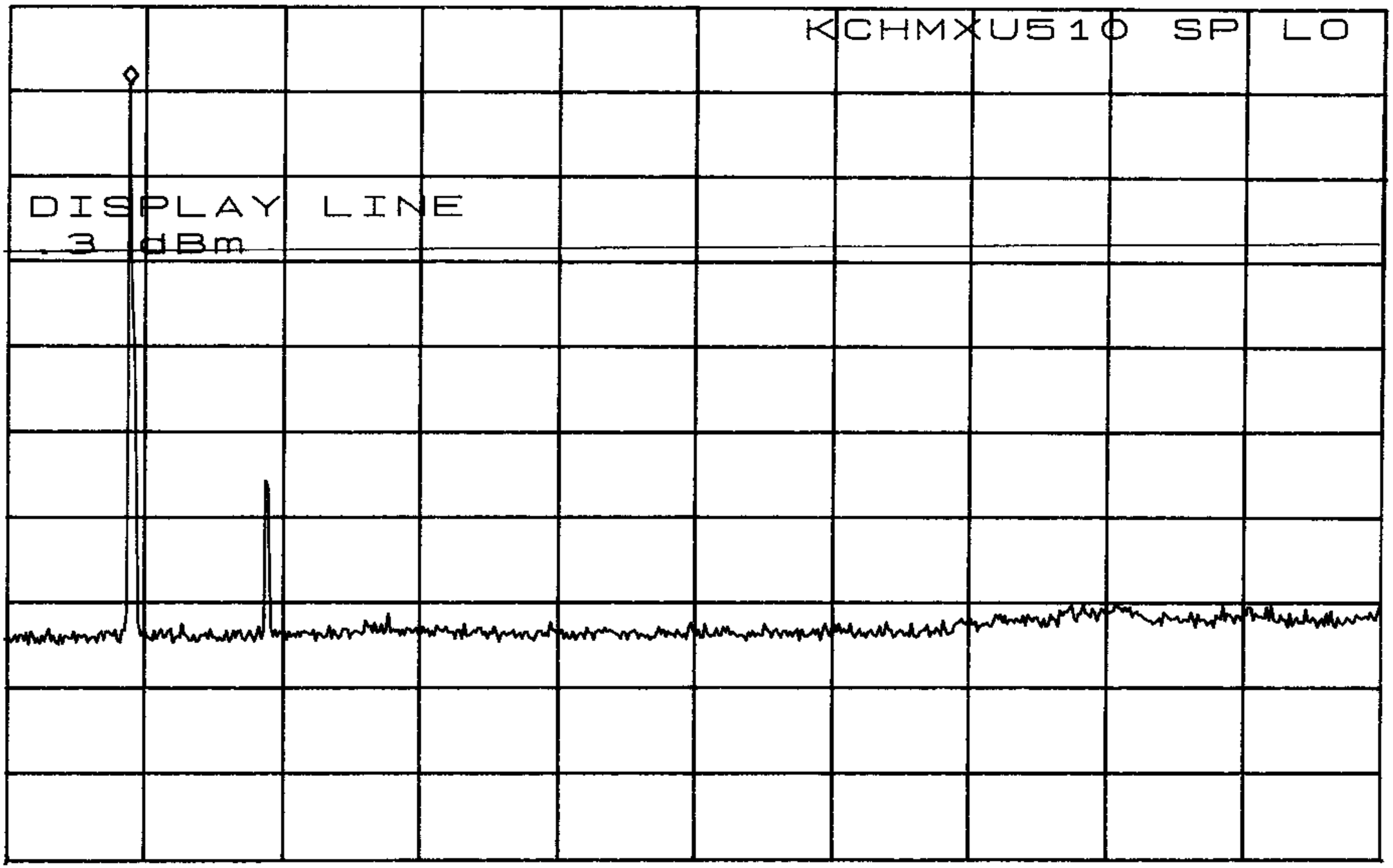
10dB/

MKR 20.27dBm
895MHz

KCHMXU510 SP LO

DISPLAY LINE
3 dBm

R



START 30MHz

STOP 9.300GHz

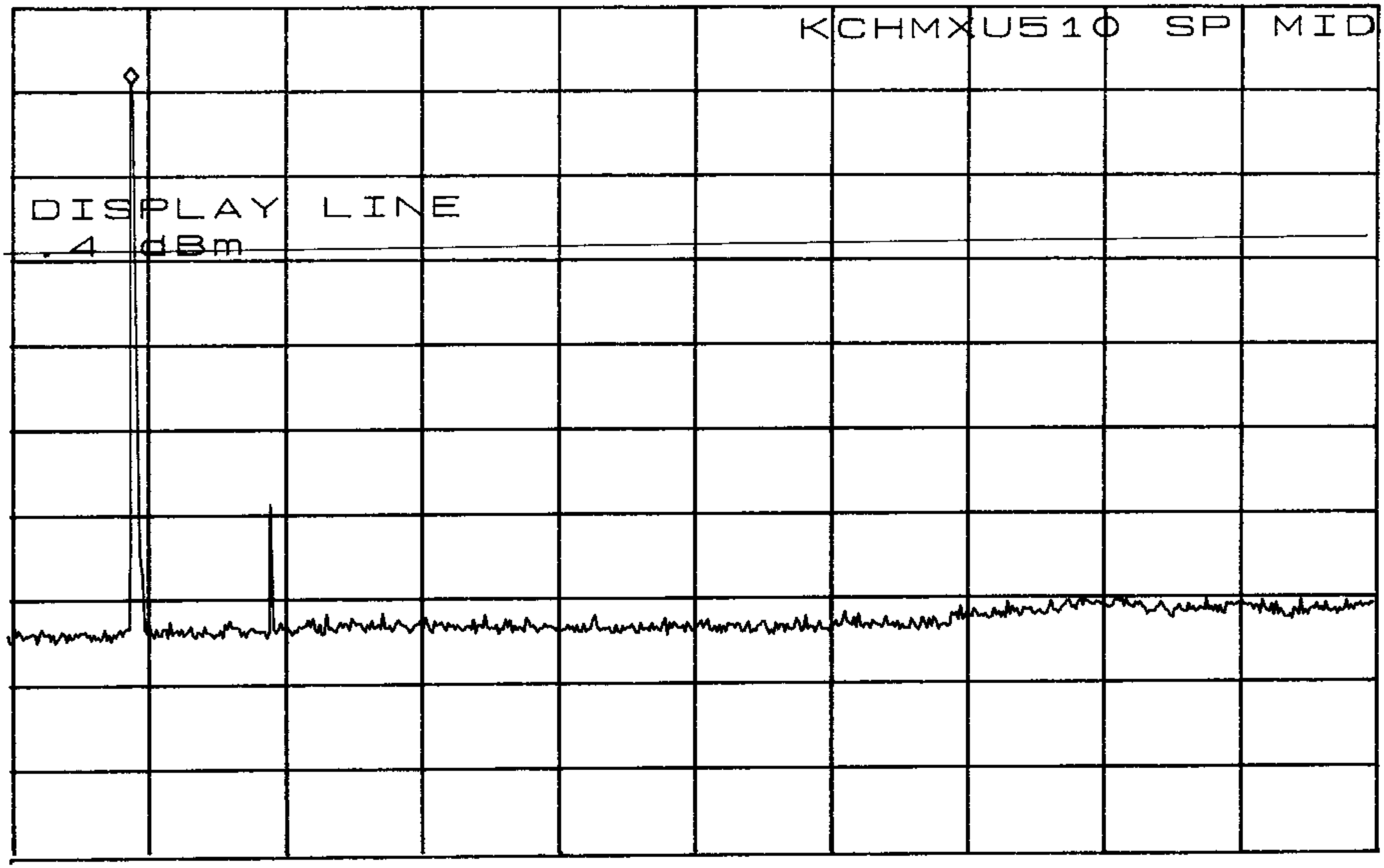
*RBW 100kHz *VBW 100kHz SWP 2.40sec

ATTEN 30dB
RL 28.6dBm

10dB/

MKR 20.43dBm
911MHz

KCHMXU510 SP MID



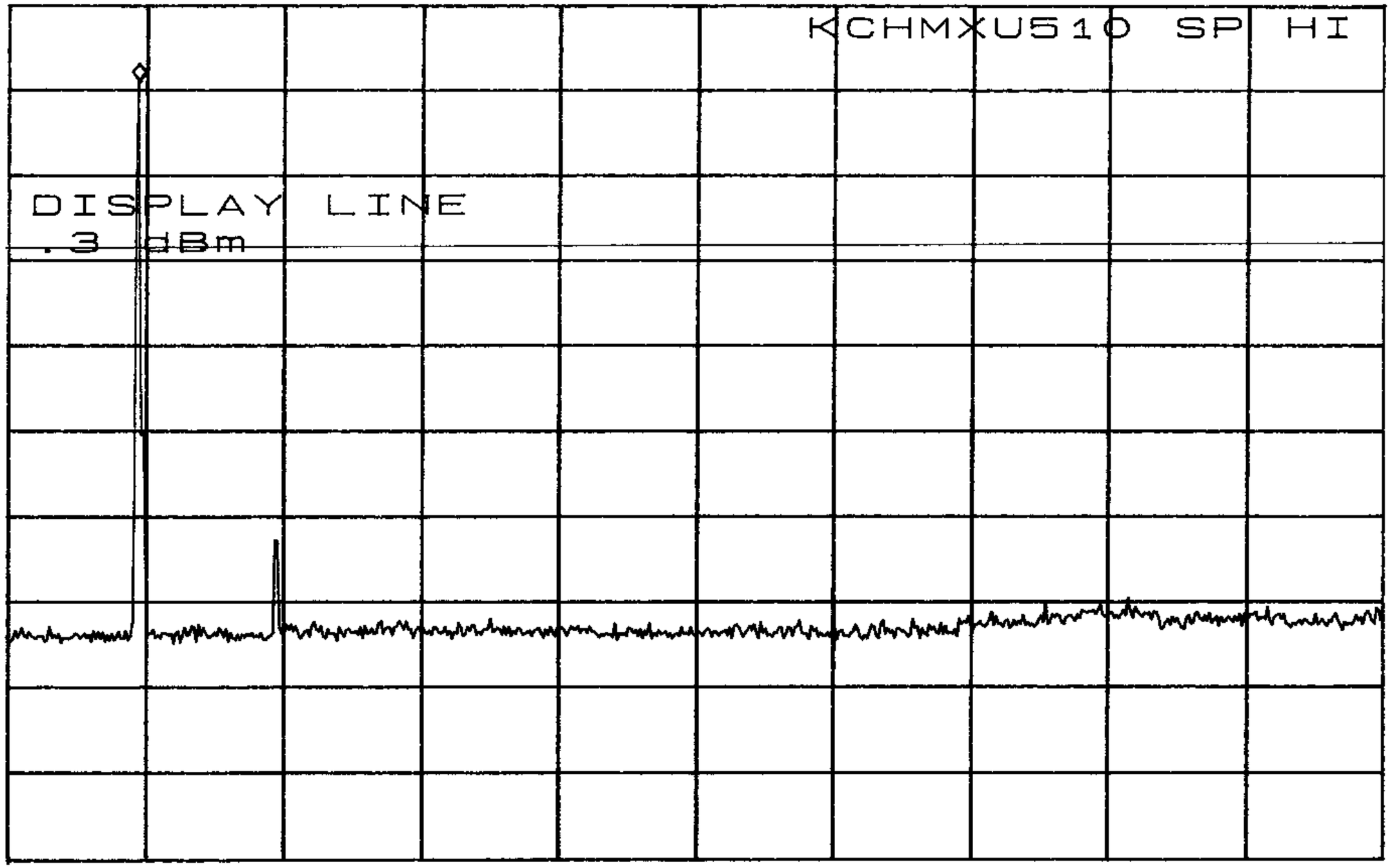
R

START 30MHz

STOP 9.300GHz

*RBW 100kHz *VBW 100kHz SWP 2.40sec

ATTEN 30dB
RL 28.6dBm
10dB/
MKR 20.27dBm
926MHz
KCHMXU510 SP HI



START 30MHz
STOP 9.300GHz
*RBW 100kHz
*VBW 100kHz
SWP 2.40sec

Power Spectral Density
Test Requirement: 15.247(d)

Measurement Equipment Used:

HP 8564E Spectrum Analyzer
2 ft length low loss A coaxial RF cable connected on EUT pcb at antenna connection
Test Procedure

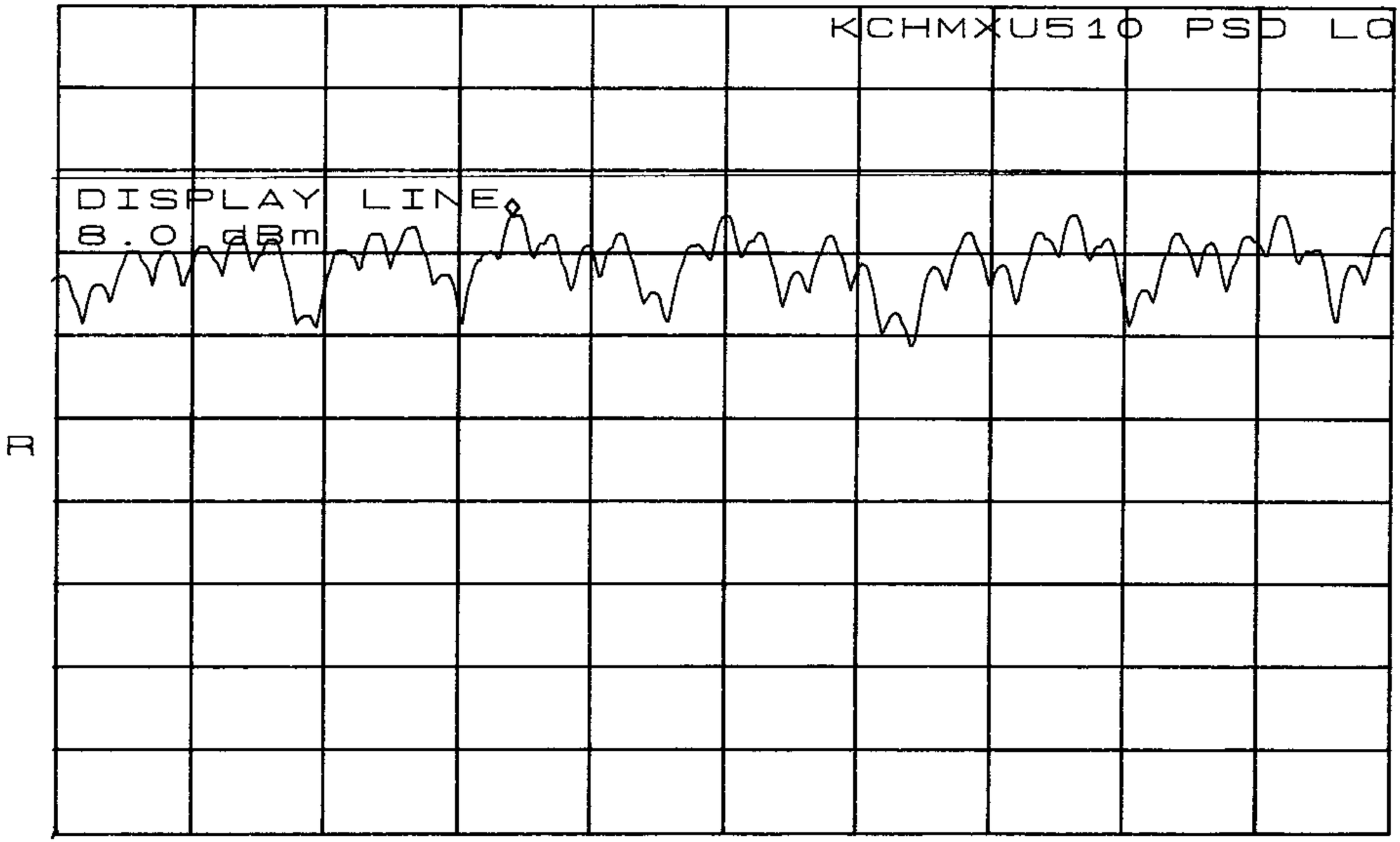
For the LOW channel, the emission peak was set to the center of the display. The SPAN was set to 300 kHz, the RES BW and VID BW were set to 3 kHz, and SWEEP TIME was set to 100 seconds. The maximum trace was recorded and compared to the 8 dBm limit.

The test was repeated for MID and HIGH channel.

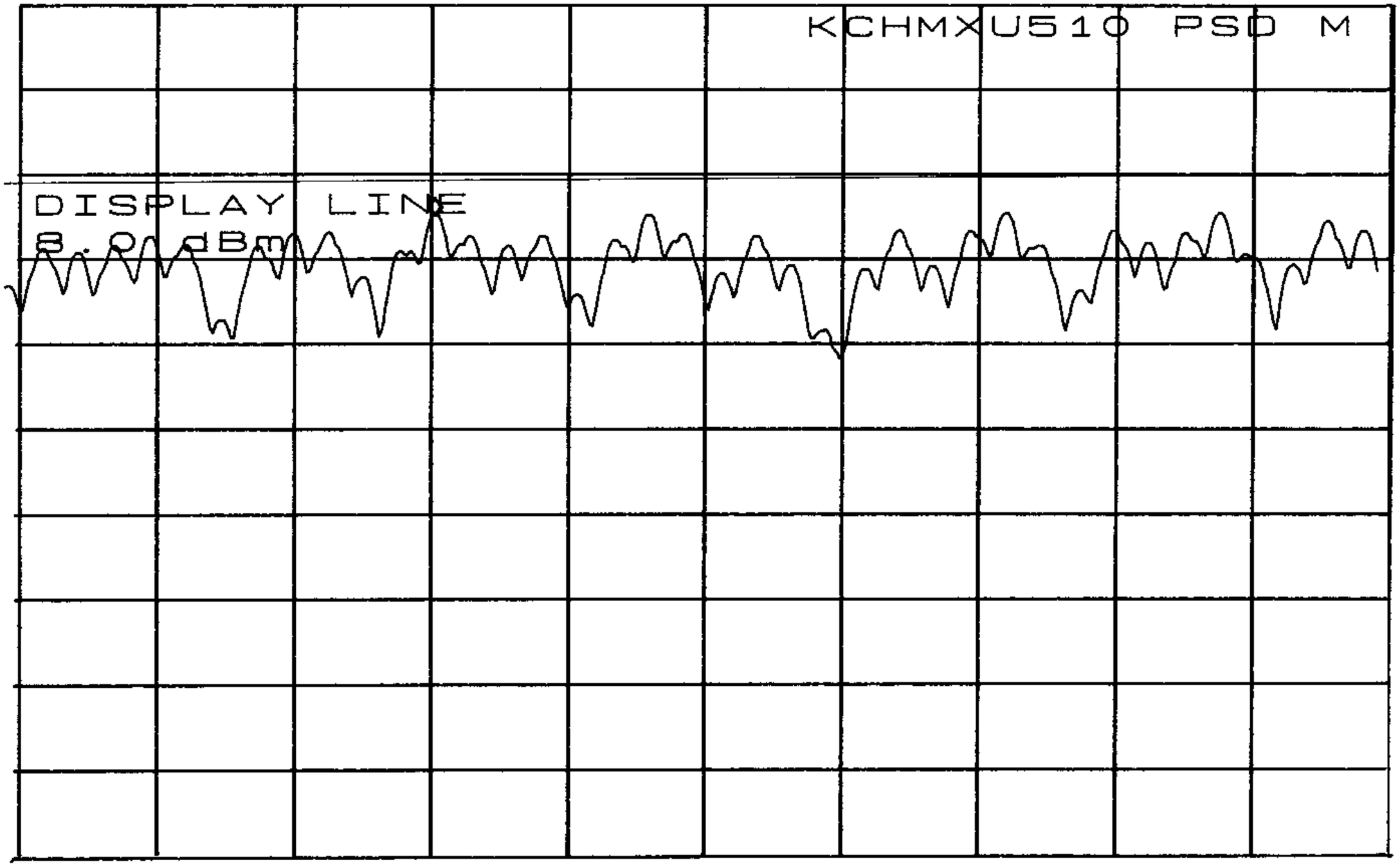
Test Results

Maximum measured PSD was approximately 4.3 dBm. Refer to attached spectrum analyzer charts.

Channel	**Frequency, MHz**
LOW	903.8
MID	915
HIGH	926.2


ATTEN 40dB
RL 28.6dBm
10dB/
MKR 3.60dBm
903.7178MHz
KCHMXU510 PSD LO
DISPLAY LINE
8.0 dBm
R
CENTER 903.7648MHz
SPAN 300.0kHz
*RBW 3.0kHz
*VBW 3.0kHz
*SWP 100sec

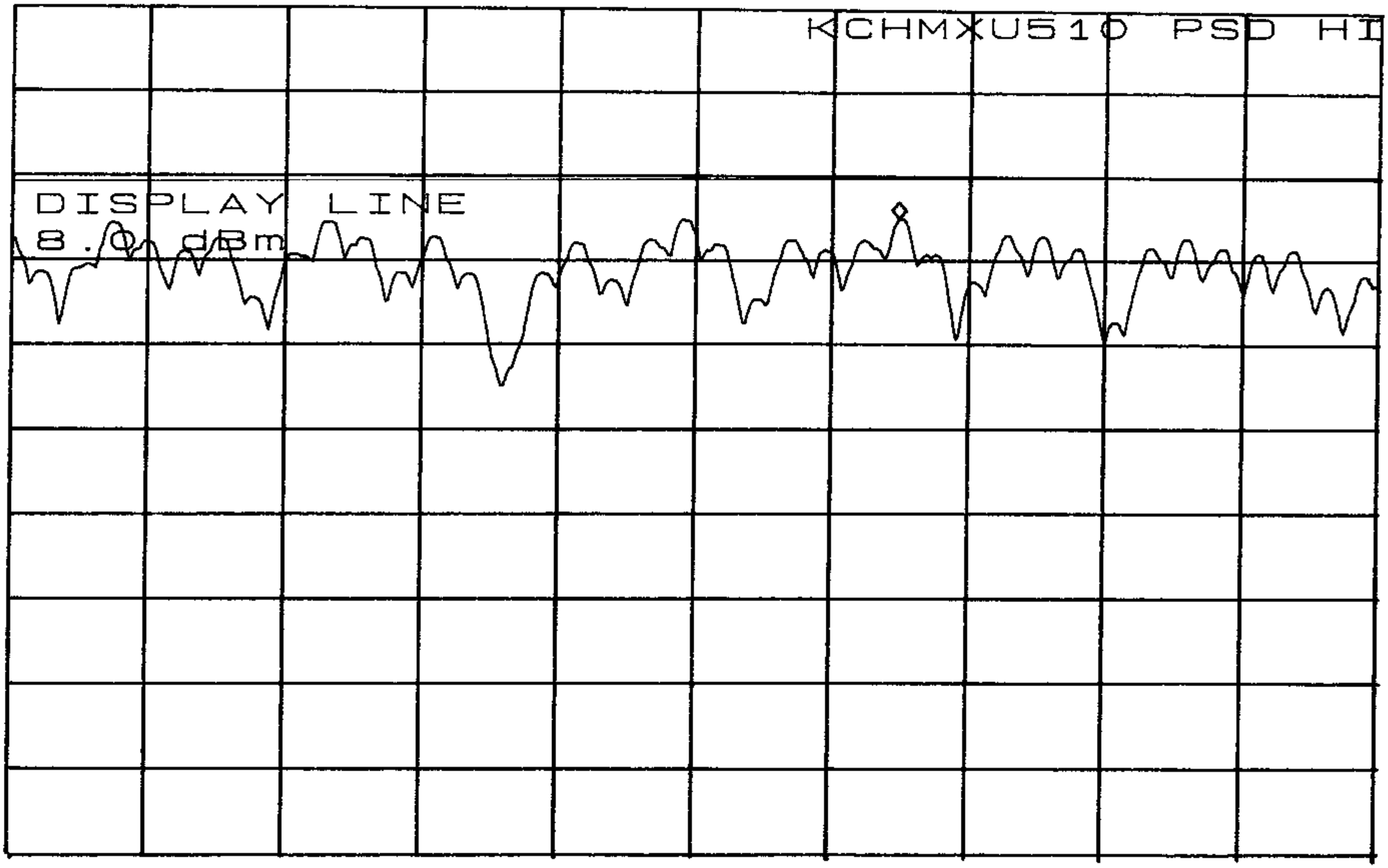
ATTEN 40dB
RL 28.6dBm
10dB/
MKR 4.27dBm
914.9196MHz
KCHMXU510 PSD M



R

CENTER 914.9756MHz
SPAN 300.0kHz
*RBW 3.0kHz
*VBW 3.0kHz
*SWP 100sec

ATTEN 40dB
RL 28.6dBm
10dB/
CNT 3.60dBm
926.16 MHz
KCHMXU510 PSD HI



R

CENTER 926.2433MHz
SPAN 300.0kHz
*RBW 3.0kHz
*VBW 3.0kHz
*SWP 100sec

RF Exposure (MPE) Calculations

905 - 924.6 MHz DTS Radio

Applicant: **Invensys Metering Systems**

FCC ID: **KCHMXU510**

RF Hazard Distance Calculation (worst case)

mW/cm2 from Table1: **0.60**

Max RF Power P, dBm	TX Antenna G, dBi	MPE Safe Distance, cm
22.6	**2.2**	**6.3**

Basis of Calculations:

E^2/3770 = S, mW/cm2
E, V/m = (Pwatts*Ggain*30)^.5/d, meters
d = ((Pwatts*G*30)/3770*S))^0.5 Pwatts*Ggain = 10^(PdBm-30+GdBi)/10)