

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: BreezeCom Ltd.
Atidim Technological Park, Bldg. #1
Tel Aviv 61131, Israel

Product ID: FCC ID: LKT-IF-24

II. DESCRIPTION OF EQUIPMENT UNDER TEST (EUT)

The Breezecom FCC ID: LKT-IF-24 is a frequency hopping spread spectrum (FHSS) transceiver used for WLANs and similar applications.

III. TEST LOCATION

All emissions tests were performed at:

Compliance Certification Services
1366 Bordeaux Drive
Sunnyvale, CA 94089-1005

T.N. Cokenias
EMC Consultant/Agent for Breezecom

3 December 2000

TEST PROCEDURES

Radiated Emissions

Test Requirement: 15.205

Measurement Equipment Used:

HP 8593EM Spectrum Analyzer

HP 8449 Microwave pre-amplifier, 1-26.5 GHz

EMCO 3115 Double Ridged Horn antenna, 1 - 18 GHz

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.
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 10th harmonic.
4. Careful measurements were made at the restricted bands 2310-2390 MHz and 2483.5 – 2500 MHz for the LOW and HIGH channel respectively. The preamplifier was not used for these measurements.
5. 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: The test was repeated with each of the antennas specified for the EUT. Worst case results are presented. Refer to attached data sheets

001116CB

Tom & Thu

Breezecom

OMNI-8 Antenna

EUT

Harmonic's Measurement

Mid Channel set @ 480, Fundamental 2.44GHz

Freq. (MHz)	Reading (dBuV)	AF (dB)	Closs (dB)	Pre-amp (dB)	Dist dB	Other dB	Level (dBuV/m)	Limit FCC_B	Margin (dB)	Pol (H/V)	Height (Meter)	Mark (P/Q/A)
4880	49.84	32.9	4.2	31.25	9.5	1.00	47.19	74.00	-26.81	V	1.0	P
4880	46.90	32.9	4.2	31.25	9.5	1.00	44.25	54.00	-9.75	V	1.0	Av
7320	46.20	37.0	4.9	31.25	9.5	1.00	48.35	74.00	-25.65	V	1.0	P
7320	35.50	37.0	4.9	31.25	9.5	1.00	37.65	54.00	-16.35	V	1.0	Av
9760	43.52	37.8	6.3	31.25	20.0	0.00	36.37	74.00	-37.63	V	1.0	P
9760	32.50	37.8	6.3	31.25	20.0	0.00	25.35	54.00	-28.65	V	1.0	Av
12200	44.89	39.2	6.7	31.25	20.0	1.00	40.54	74.00	-33.46	V	1.0	P
12200	33.59	39.2	6.7	31.25	20.0	1.00	29.24	54.00	-24.76	V	1.0	Av
14640	48.35	39.0	7.7	31.25	20.0	1.00	44.80	74.00	-29.20	V	1.0	P
14640	37.00	39.0	7.7	31.25	20.0	1.00	33.45	54.00	-20.55	V	1.0	Av
17080	48.50	45.0	9.1	31.25	20.0	0.00	51.35	74.00	-22.65	V	1.0	P
17080	38.60	45.0	9.1	31.25	20.0	0.00	41.45	54.00	-12.55	V	1.0	Av
19520	51.90	32.3	10.0	31.25	20.0	1.00	43.95	74.00	-30.05	V	1.0	P
19520	41.20	32.3	10.0	31.25	20.0	1.00	33.25	54.00	-20.75	V	1.0	Av
21960	54.00	32.5	11.2	31.25	20.0	1.00	47.45	74.00	-26.55	V	1.0	P
21960	43.50	32.5	11.2	31.25	20.0	1.00	36.95	54.00	-17.05	V	1.0	Av
24400	43.80	32.6	11.9	31.25	20.0	0.00	37.05	74.00	-36.95	V	1.0	P
24400	42.70	32.6	11.9	31.25	20.0	0.00	35.95	54.00	-18.05	V	1.0	Av

Total data #: 18
V.2f

Peak: RBW=VBW=1MHz
Average: RBW=1MHz, VBW=10Hz

Other = High Pass Filter
Distance = 20*log(dm/ds)

001116CB

T.Cokenias

Breezecom FCC ID LKT-IF-24

26 dBm into OMNI-8 Antenna

EUT

Harmonic's Measurement

Highest Channel set @ 79, Fundamental 2.479GHz

Freq. (MHz)	Reading (dBuV)	AF (dB)	Closs (dB)	Pre-amp (dB)	Dist dB	Other dB	Level (dBuV/m)	Limit FCC_B	Margin (dB)	Pol (H/V)	Height (Meter)	Mark (P/Q/A)
4961	44.85	32.9	4.2	31.25	9.5	1.00	42.20	74.00	-31.80	V	1.0	P
4961	39.60	32.9	4.2	31.25	9.5	1.00	36.95	54.00	-17.05	V	1.0	Av
7440	46.16	37.0	4.9	31.25	9.5	1.00	48.31	74.00	-25.69	V	1.0	P
7440	34.90	37.0	4.9	31.25	9.5	1.00	37.05	54.00	-16.95	V	1.0	Av
9199	43.57	37.8	6.3	31.25	20.0	0.00	36.42	74.00	-37.58	V	1.0	P
9199	32.40	37.8	6.3	31.25	20.0	0.00	25.25	54.00	-28.75	V	1.0	Av
12390	44.90	39.2	6.7	31.25	20.0	1.00	40.55	74.00	-33.45	V	1.0	P
12390	33.48	39.2	6.7	31.25	20.0	1.00	29.13	54.00	-24.87	V	1.0	Av

Total data #: 8
V.2f

Peak: RBW=VBW=1MHz
Average: RBW=1MHz, VBW=10Hz

Other = High Pass Filter
Distance = 20*log(dm/ds)

Breezecom
 FCC ID: LKT-IF-24
 8 dBi OMNI antenna

Compliance Certification Services

1-Dec-00
 T.Cokenias

fo = 2401 MHz (LOW Channel)

Freq. (MHz)	Reading (dBuV)	AF (dB)	Closs (dB)	Pre-amp (dB)	Dist (dB)	Other (dB)	Level (dBuV/m)	Limit FCC_B	Margin (dB)	Pol (H/V)	Height (Meter)	Mark (P/Q/A)
4802	47.00	32.9	4.2	31.25	20.0	1.00	33.85	74.00	-40.15	V	1.0	P
4802	42.50	32.9	4.2	31.25	20.0	1.00	29.35	54.00	-24.65	V	1.0	Av
7203	45.40	37.0	4.9	31.25	20.0	1.00	37.05	74.00	-36.95	V	1.0	P
7203	35.80	37.0	4.9	31.25	20.0	1.00	27.45	54.00	-26.55	V	1.0	Av
9604	43.75	37.8	6.3	31.25	20.0	0.00	36.60	74.00	-37.40	V	1.0	P
9604	32.40	37.8	6.3	31.25	20.0	0.00	25.25	54.00	-28.75	V	1.0	Av
12000	45.00	39.2	6.7	31.25	20.0	1.00	40.65	74.00	-33.35	V	1.0	P
12000	35.00	39.2	6.7	31.25	20.0	1.00	30.65	54.00	-23.35	V	1.0	Av
14410	48.20	39.0	7.7	31.25	20.0	1.00	44.65	74.00	-29.35	V	1.0	P
14410	36.74	39.0	7.7	31.25	20.0	1.00	33.19	54.00	-20.81	V	1.0	Av
16807	49.10	45.0	9.1	31.25	20.0	0.00	51.95	74.00	-22.05	V	1.0	P
16807	38.50	45.0	9.1	31.25	20.0	0.00	41.35	54.00	-12.65	V	1.0	Av
19210	51.60	32.3	10.0	31.25	20.0	1.00	43.65	74.00	-30.35	V	1.0	P
19210	41.20	32.3	10.0	31.25	20.0	1.00	33.25	54.00	-20.75	V	1.0	Av
21610	53.80	32.5	11.2	31.25	20.0	1.00	47.25	74.00	-26.75	V	1.0	P
21610	43.40	32.5	11.2	31.25	20.0	1.00	36.85	54.00	-17.15	V	1.0	Av
24000	53.85	32.6	11.9	31.25	20.0	0.00	47.10	74.00	-26.90	V	1.0	P
24000	42.30	32.6	11.9	31.25	20.0	0.00	35.55	54.00	-18.45	V	1.0	Av

Total data #: 18
 V.2f

Peak: RBW=VBW=1MHz
 Average: RBW=1MHz, VBW=10Hz

Other = High Pass Filter
 Distance = 20*log(dm/ds)

000821f6

Tom & Thu

Breezecom

16 dBi Panel UNI 16

EUT

Out of Band Emissions

Highest Channel set @ 500, Fundamental 2.46GHz

Freq. (MHz)	Reading (dBuV)	AF (dB)	Closs (dB)	Pre-amp (dB)	Dist dB	Other dB	Level (dBuV/m)	Limit FCC_B	Margin (dB)	Pol (H/V)	Height (Meter)	Mark (P/Q/A)
49199	55.20	32.9	4.2	31.25	20.0	1.00	42.05	74.00	-31.95	V	1.0	P
49199	55.20	32.9	4.2	31.25	20.0	1.00	42.05	54.00	-11.95	V	1.0	Av
73799	48.00	37.0	4.9	31.25	20.0	1.00	39.65	74.00	-34.35	V	1.0	P
73799	43.30	37.0	4.9	31.25	20.0	1.00	34.95	54.00	-19.05	V	1.0	Av
98398	45.00	37.8	6.3	31.25	20.0	0.00	37.85	74.00	-36.15	V	1.0	P
98398	32.20	37.8	6.3	31.25	20.0	0.00	25.05	54.00	-28.95	V	1.0	Av
12299	45.00	39.2	6.7	31.25	20.0	1.00	40.65	74.00	-33.35	V	1.0	P
12299	32.50	39.2	6.7	31.25	20.0	1.00	28.15	54.00	-25.85	V	1.0	Av
14759	48.50	39.0	7.7	31.25	20.0	1.00	44.95	74.00	-29.05	V	1.0	P
14759	36.50	39.0	7.7	31.25	20.0	1.00	32.95	54.00	-21.05	V	1.0	Av
17219	49.03	45.0	9.1	31.25	20.0	0.00	51.88	74.00	-22.12	V	1.0	P
17219	38.60	45.0	9.1	31.25	20.0	0.00	41.45	54.00	-12.55	V	1.0	Av
19679	51.66	32.3	10.0	31.25	20.0	1.00	43.71	74.00	-30.29	V	1.0	P
19679	40.30	32.3	10.0	31.25	20.0	1.00	32.35	54.00	-21.65	V	1.0	Av
22139	53.98	32.5	11.2	31.25	20.0	1.00	47.43	74.00	-26.57	V	1.0	P
22139	43.10	32.5	11.2	31.25	20.0	1.00	36.55	54.00	-17.45	V	1.0	Av
24599	53.85	32.6	11.9	31.25	20.0	0.00	47.10	74.00	-26.90	V	1.0	P
24599	42.57	32.6	11.9	31.25	20.0	0.00	35.82	54.00	-18.18	V	1.0	Av

Total data #: 18
V.2f

Peak: RBW=VBW=1MHz
Average: RBW=1MHz, VBW=10Hz

Other = High Pass Filter
Distance = 20*log(dm/ds)

000821f5

Tom & Thu

Breezecom

AN1709 17.5 dB Sectoral Antenna

EUT

Out of Band Emissions

MID channel Fundamental 2.46GHz

Freq. (MHz)	Reading (dBuV)	AF (dB)	Closs (dB)	Pre-amp (dB)	Dist dB	Other dB	Level (dBuV/m)	Limit FCC_B	Margin (dB)	Pol (H/V)	Height (Meter)	Mark (P/Q/A)
49199	46.86	32.9	4.2	31.25	20.0	1.00	33.71	74.00	-40.29	H	1.0	P
49199	39.21	32.9	4.2	31.25	20.0	1.00	26.06	54.00	-27.94	H	1.0	Av
73799	51.44	37.0	4.9	31.25	20.0	1.00	43.09	74.00	-30.91	V	1.0	P
73799	46.11	37.0	4.9	31.25	20.0	1.00	37.76	54.00	-16.24	V	1.0	Av
98398	45.10	37.8	6.3	31.25	20.0	0.00	37.95	74.00	-36.05	V	1.0	P
98398	32.00	37.8	6.3	31.25	20.0	0.00	24.85	54.00	-29.15	V	1.0	Av
12299	45.20	39.2	6.7	31.25	20.0	1.00	40.85	74.00	-33.15	V	1.0	P
12299	33.00	39.2	6.7	31.25	20.0	1.00	28.65	54.00	-25.35	V	1.0	Av
14759	48.41	39.0	7.7	31.25	20.0	1.00	44.86	74.00	-29.14	V	1.0	P
14759	36.80	39.0	7.7	31.25	20.0	1.00	33.25	54.00	-20.75	V	1.0	Av
17219	48.45	45.0	9.1	31.25	20.0	0.00	51.30	74.00	-22.70	V	1.0	P
17219	38.20	45.0	9.1	31.25	20.0	0.00	41.05	54.00	-12.95	V	1.0	Av
19679	51.64	32.3	10.0	31.25	20.0	1.00	43.69	74.00	-30.31	V	1.0	P
19679	40.50	32.3	10.0	31.25	20.0	1.00	32.55	54.00	-21.45	V	1.0	Av
22139	53.95	32.5	11.2	31.25	20.0	1.00	47.40	74.00	-26.60	V	1.0	P
22139	43.10	32.5	11.2	31.25	20.0	1.00	36.55	54.00	-17.45	V	1.0	Av
24599	53.82	32.6	11.9	31.25	20.0	0.00	47.07	74.00	-26.93	V	1.0	P
24599	42.56	32.6	11.9	31.25	20.0	0.00	35.81	54.00	-18.19	V	1.0	Av

Total data #: 18
V.2f

Peak: RBW=VBW=1MHz
Average: RBW=1MHz, VBW=10Hz

Other = High Pass Filter
Distance = 20*log(dm/ds)

001116CB

Thu

Breezecom

UNI-24 dBi antenna

EUT

Harmonic's Measurement

Lowest Channel set @ 1, Fundamental 2.401GHz

Freq. (MHz)	Reading (dBuV)	AF (dB)	Closs (dB)	Pre-amp (dB)	Dist dB	Other dB	Level (dBuV/m)	Limit FCC_B	Margin (dB)	Pol (H/V)	Height (Meter)	Mark (P/Q/A)
4802	60.50	32.9	4.2	31.25	9.5	1.00	57.85	74.00	-16.15	V	1.0	P
4802	56.20	32.9	4.2	31.25	9.5	1.00	53.55	54.00	-0.45	V	1.0	Av
7203	45.28	37.0	4.9	31.25	9.5	1.00	47.43	74.00	-26.57	V	1.0	P
7203	32.80	37.0	4.9	31.25	9.5	1.00	34.95	54.00	-19.05	V	1.0	Av
9604	43.06	37.8	6.3	31.25	20.0	0.00	35.91	74.00	-38.09	V	1.0	P
9604	32.50	37.8	6.3	31.25	20.0	0.00	25.35	54.00	-28.65	V	1.0	Av
12000	44.95	39.2	6.7	31.25	20.0	1.00	40.60	74.00	-33.40	V	1.0	P
12000	34.90	39.2	6.7	31.25	20.0	1.00	30.55	54.00	-23.45	V	1.0	Av
14410	48.32	39.0	7.7	31.25	20.0	1.00	44.77	74.00	-29.23	V	1.0	P
14410	36.80	39.0	7.7	31.25	20.0	1.00	33.25	54.00	-20.75	V	1.0	Av
16807	48.66	45.0	9.1	31.25	20.0	0.00	51.51	74.00	-22.49	V	1.0	P
16807	38.30	45.0	9.1	31.25	20.0	0.00	41.15	54.00	-12.85	V	1.0	Av
19210	51.50	32.3	10.0	31.25	20.0	1.00	43.55	74.00	-30.45	V	1.0	P
19210	40.20	32.3	10.0	31.25	20.0	1.00	32.25	54.00	-21.75	V	1.0	Av
21610	53.69	32.5	11.2	31.25	20.0	1.00	47.14	74.00	-26.86	V	1.0	P
21610	43.20	32.5	11.2	31.25	20.0	1.00	36.65	54.00	-17.35	V	1.0	Av
24000	53.76	32.6	11.9	31.25	20.0	0.00	47.01	74.00	-26.99	V	1.0	P
24000	42.20	32.6	11.9	31.25	20.0	0.00	35.45	54.00	-18.55	V	1.0	Av

Total data #: 18
V.2f

Peak: RBW=VBW=1MHz
Average: RBW=1MHz, VBW=10Hz

Other = High Pass Filter
Distance = 20*log(dm/ds)

001116CB

Tom & Thu

Breezecom

UNI-24 Antenna

EUT

Harmonic's Measurement

MID channel, Fundamental 2.46GHz

Freq. (MHz)	Reading (dBuV)	AF (dB)	Closs (dB)	Pre-amp (dB)	Dist dB	Other dB	Level (dBuV/m)	Limit FCC_B	Margin (dB)	Pol (H/V)	Height (Meter)	Mark (P/Q/A)
4920	53.65	32.9	4.2	31.25	9.5	1.00	51.00	74.00	-23.00	V	1.0	P
4920	49.00	32.9	4.2	31.25	9.5	1.00	46.35	54.00	-7.65	V	1.0	Av
7380	47.87	37.0	4.9	31.25	9.5	1.00	50.02	74.00	-23.98	V	1.0	P
7380	35.70	37.0	4.9	31.25	9.5	1.00	37.85	54.00	-16.15	V	1.0	Av
9840	43.50	37.8	6.3	31.25	20.0	0.00	36.35	74.00	-37.65	V	1.0	P
9840	32.30	37.8	6.3	31.25	20.0	0.00	25.15	54.00	-28.85	V	1.0	Av
12299	45.10	39.2	6.7	31.25	20.0	1.00	40.75	74.00	-33.25	V	1.0	P
12299	33.50	39.2	6.7	31.25	20.0	1.00	29.15	54.00	-24.85	V	1.0	Av
14759	48.50	39.0	7.7	31.25	20.0	1.00	44.95	74.00	-29.05	V	1.0	P
14759	36.80	39.0	7.7	31.25	20.0	1.00	33.25	54.00	-20.75	V	1.0	Av
17219	48.51	45.0	9.1	31.25	20.0	0.00	51.36	74.00	-22.64	V	1.0	P
17219	38.40	45.0	9.1	31.25	20.0	0.00	41.25	54.00	-12.75	V	1.0	Av
19679	51.78	32.3	10.0	31.25	20.0	1.00	43.83	74.00	-30.17	V	1.0	P
19679	41.00	32.3	10.0	31.25	20.0	1.00	33.05	54.00	-20.95	V	1.0	Av
22139	53.85	32.5	11.2	31.25	20.0	1.00	47.30	74.00	-26.70	V	1.0	P
22139	43.20	32.5	11.2	31.25	20.0	1.00	36.65	54.00	-17.35	V	1.0	Av
24599	53.62	32.6	11.9	31.25	20.0	0.00	46.87	74.00	-27.13	V	1.0	P
24599	42.53	32.6	11.9	31.25	20.0	0.00	35.78	54.00	-18.22	V	1.0	Av

Total data #: 18
V.2f

Peak: RBW=VBW=1MHz
Average: RBW=1MHz, VBW=10Hz

Other = High Pass Filter
Distance = 20*log(dm/ds)

AC Line Conducted Emissions
Test Requirement: 15.107, 15.207

Measurement Equipment Used:

Rohde & Schwarz EMI Receiver ESHS-20
Fischer Custom Communication LISN, FCC-LISN-50/250-25-2

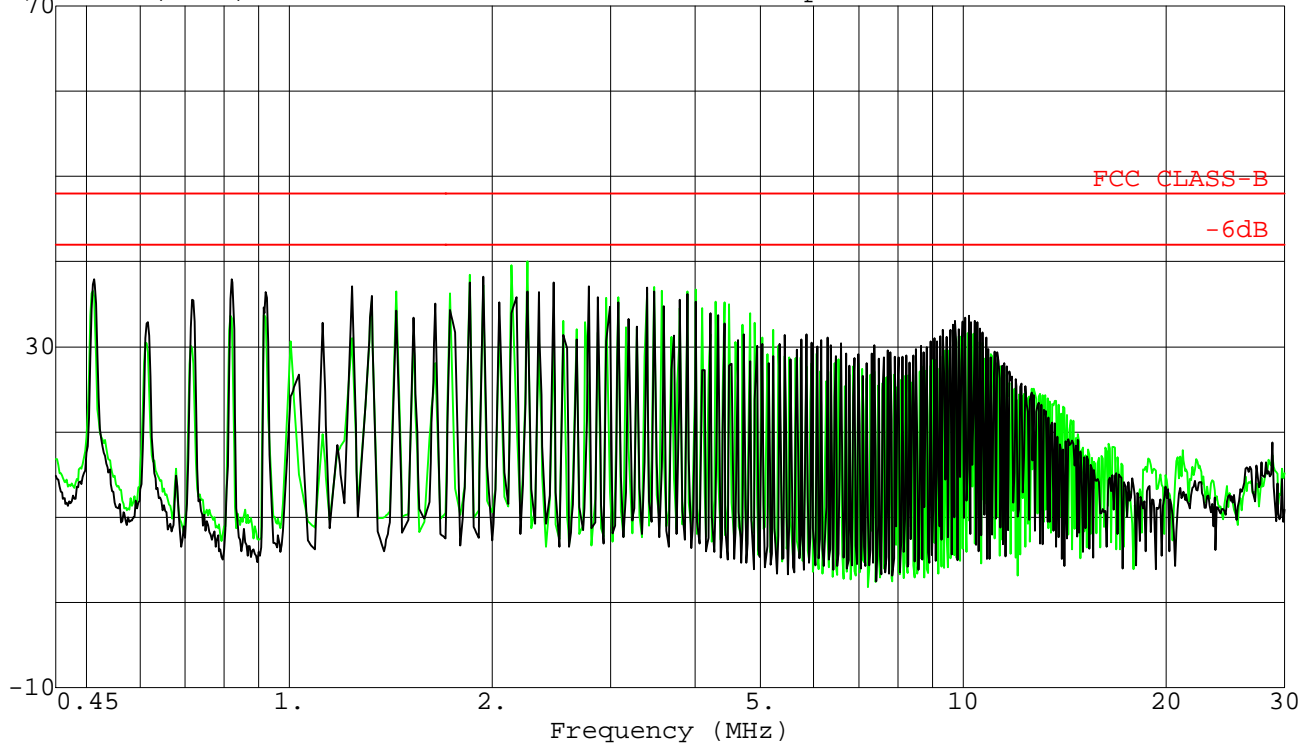
Test Procedure

1. The EUT was placed on a wooden table 40 cm from a vertical ground plane and approximately 80 cm above the horizontal ground plane on the floor. The EUT was set to transmit in normally.
2. Line conducted data was recorded for both NEUTRAL and HOT lines.

Test Results

Refer to attached graph and tabulated data sheets. Data was from previously tested indoor unit identical to the model used for FCC ID: LKT-IF-24.

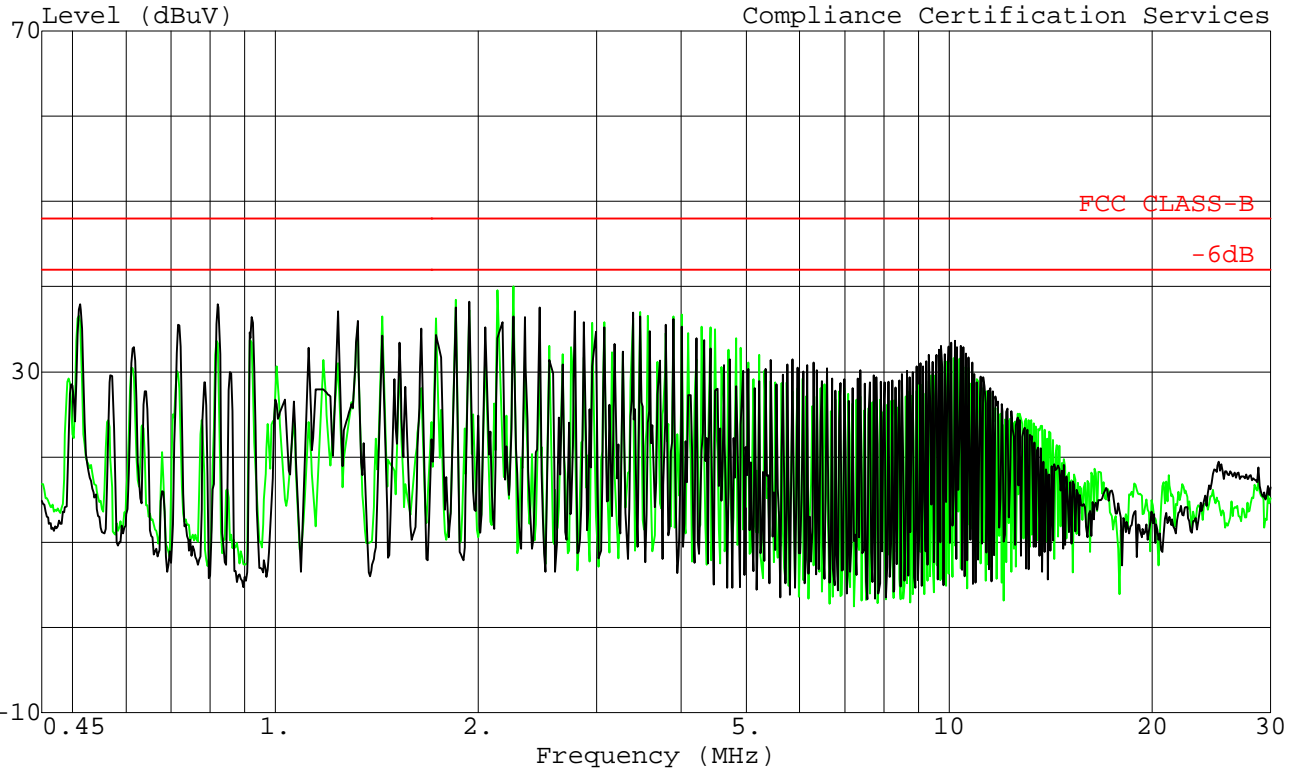
Data#: 7 File#: JUAN.EMI Date: 05-30-2000 Time: 16:44:57
 Level (dBuV) Compliance Certification Services



Trace: 3 Ref Trace:
 Project No. :
 Report No. : 0005291c
 Test Engr : JUAN MARTINEZ
 Company : Breezecom
 EUT : 2.5 GHz transmitter
 Model : (M/N: SU-i-1d1v-2.5a) INDOOR unit
 Test Configuration: EUT ONLY
 Type of Test : FCC CLASS B
 Mode of Operation : RECEIVING
 : PEAK: L1(GREEN), L2(BLACK)
 : 115Vac, 60Hz

Data#: 14 File#: JUAN.EMI

Date: 05-30-2000 Time: 16:44:57



Trace: 10

Project No. : 00u0??

Report No. : 0005291c

Test Engr : JUAN MARTINEZ

Company : Breezecom

EUT : 2.5GHz TX (M/N: BS-AU-2.5a) INDOOR

Model : / (M/N: AU-RE-2.5a) OUTDOOR

Test Configuration: EUT ONLY

Type of Test : FCC CLASS B

Mode of Operation : RECEIVING

: PEAK: L1(GREEN), L2(BLACK)

: 115Vac, 60Hz

Ref Trace:

**Minimum 20 dB Bandwidth for FHSS
Test Requirement: 15.247**

Measurement Equipment Used:

HP 8593EM Spectrum Analyzer
6' length low loss coaxial cable

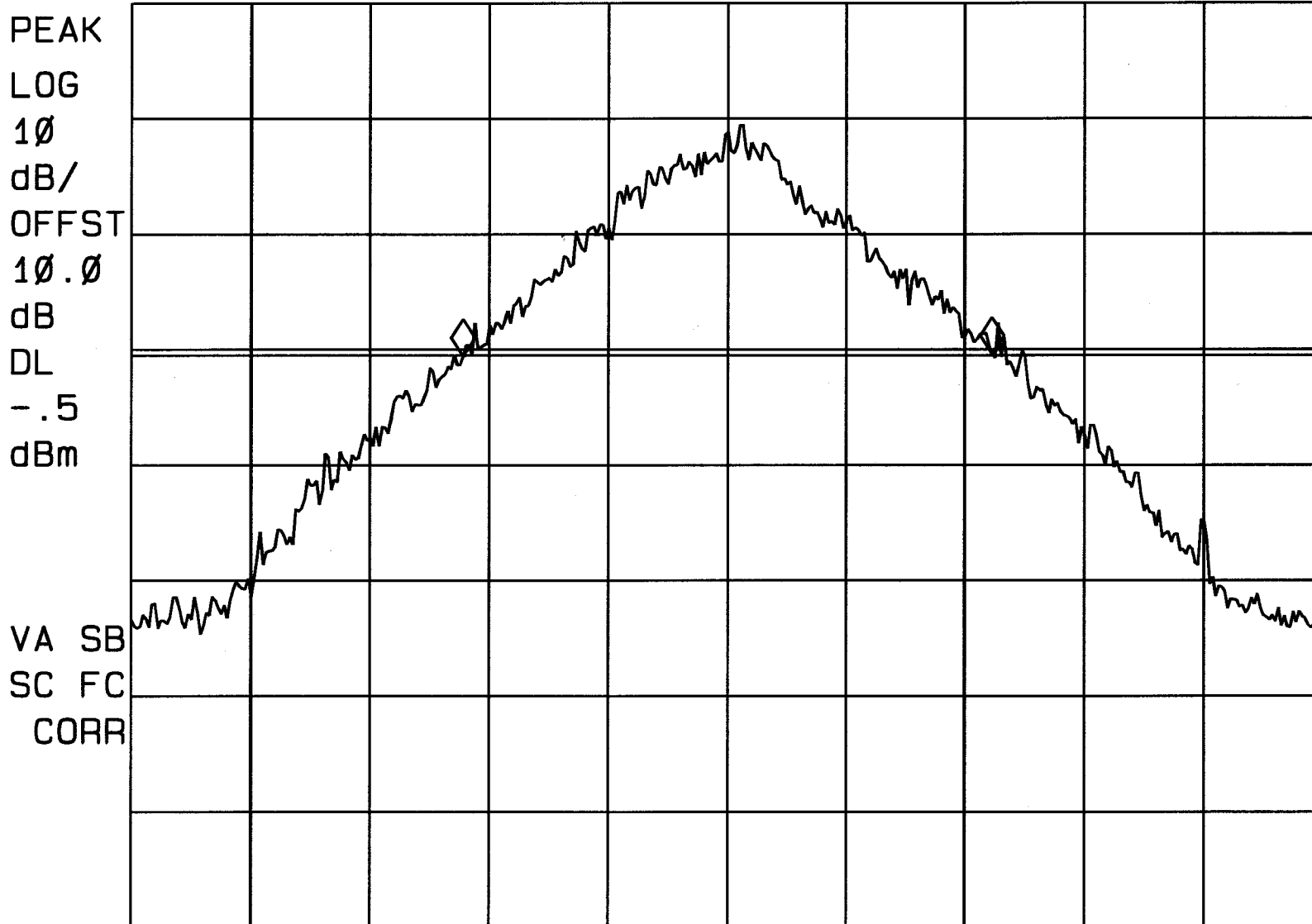
Test Procedures

The EUT was configured on a test bench. The EUT's hopping function was stopped, transmission was continuous at 2.400 GHz (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 Results: Refer to attached spectrum analyzer charts. Data taken with RES BW of 10 kHz shows 20 dB BW of approximately 890 kHz, below the 1 MHz limit in the Rules.

12:25:36 JUL 26, 2000
BREEZECOM OUTDOOR 20dB BW
REF 30.0 dBm AT 30 dB

MKR 890 KHZ
.16 dB



CENTER 2.400000 GHZ
#RES BW 10 KHZ

#VBW 30 KHZ

SPAN 2.000 MHZ
SWP 60.0 msec

RF Power Output
Test Requirement: 15.247

Measurement Equipment Used:

HP 8593EM Spectrum Analyzer
2 ft length low loss A coaxial RF cable

Test Procedures

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

The EUT's hopping function was stopped, transmission was continuous at the 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.

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

Test Results

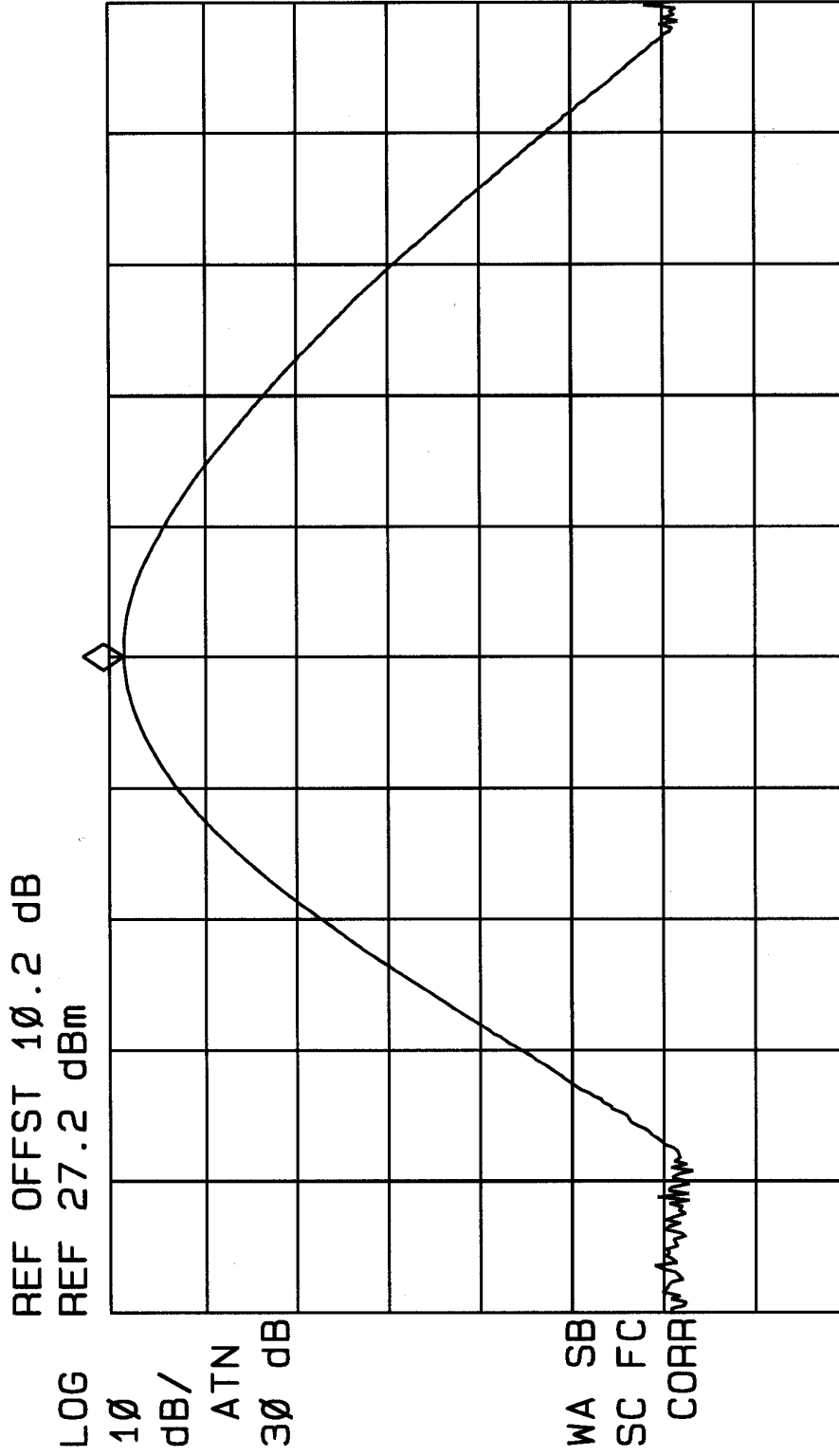
Power level readings converted to dBm are shown below. Refer also to spectrum analyzer graphs. Reference level offset corrects for external attenuation and cable loss.

Channel	Frequency, MHz	Output Power, dBm	Limit, dBm
Low	2401.995	25.6	30.0
Mid	2445.0	24.6	30.0
High	2479.95	25.1	30.0

Maximum output power output is within 0.4 dBm of design maximum 26 dBm.

16: 35: 11 DEC 01, 2000
Breezecom LKT-IF-24 Power Out

ACTV DET: PEAK
MEAS DET: PEAK QP AVG
MKR 2.40190 GHZ
25.60 dBm



CENTER 2.40190 GHZ
#IF BW 3.0 MHz #AVG BW 3 MHz SPAN 20.00 MHz
SWP 20.0 msec

16:33:25 DEC 01, 2000
 Breezecom LKT-IF-24 Power Out

SPAN
 20.00 MHz

ACTV DET: PEAK
 MEAS DET: PEAK QP AVG
 MKR 2.44490 GHz
 24.59 dBm

MARKER
 → HIGH

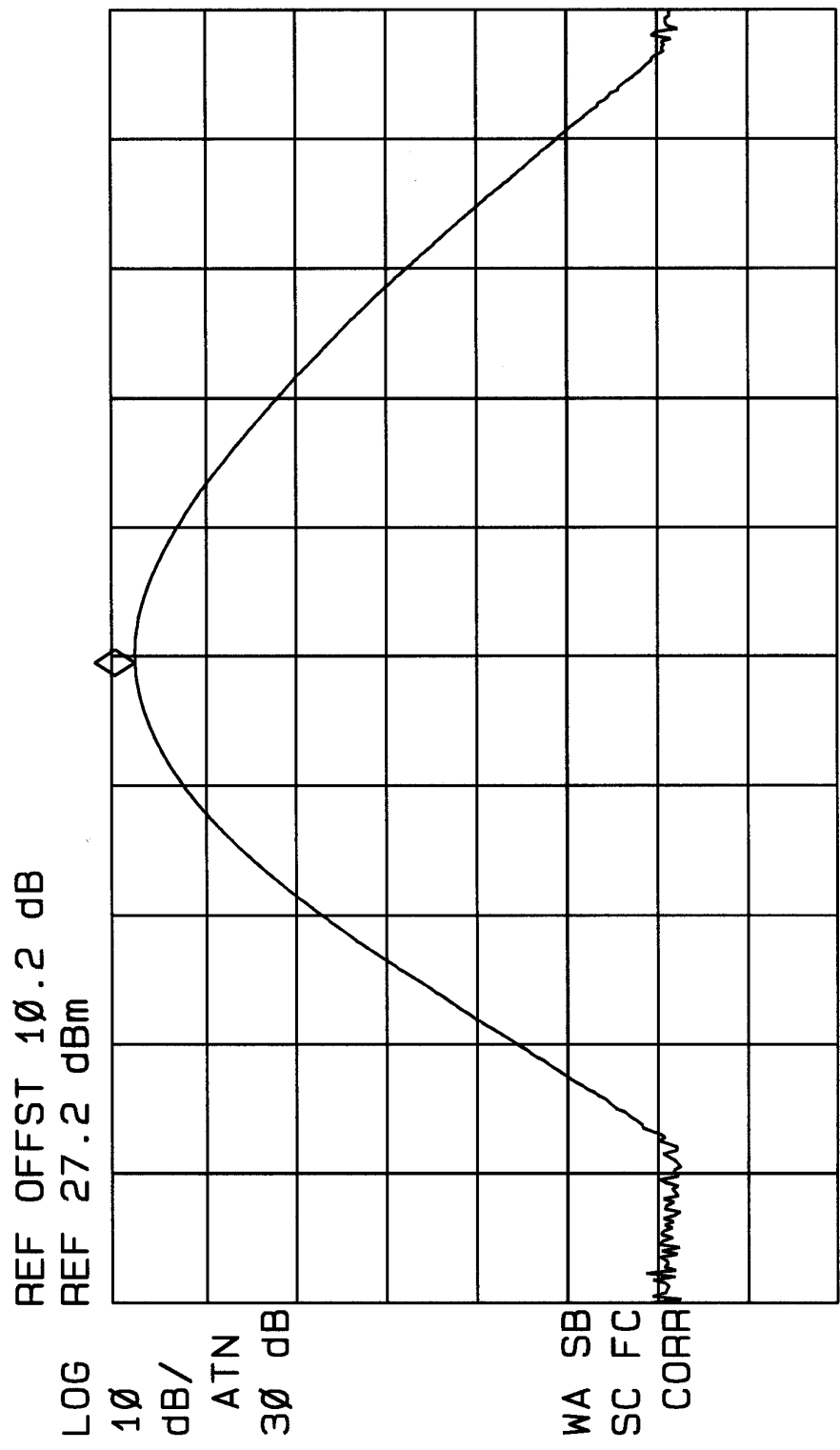
MARKER
 → CF

NEXT
 PEAK

NEXT PK
 RIGHT

NEXT PK
 LEFT

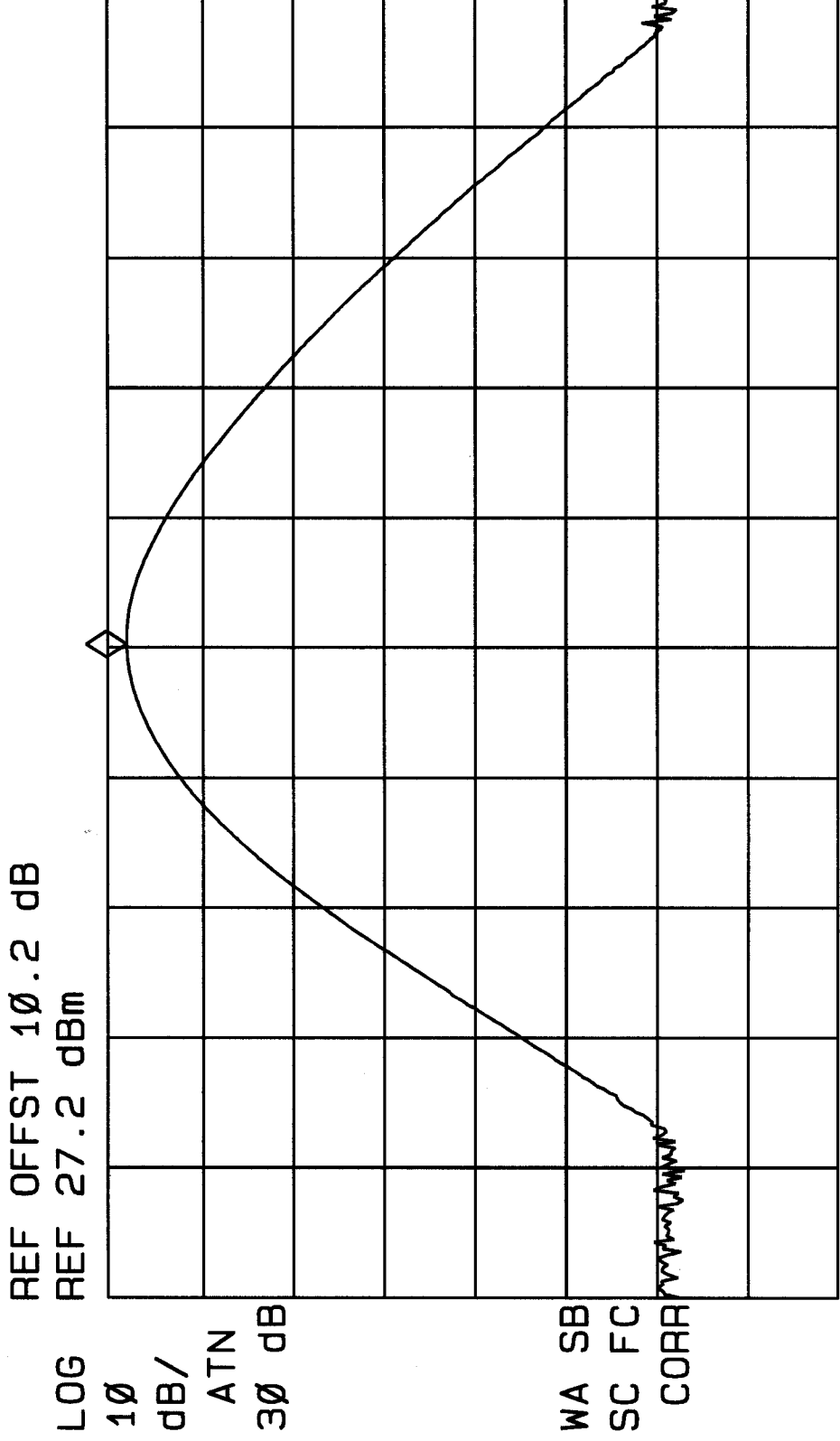
More
 1 of 3



CENTER 2.44500 GHz
 #IF BW 3.0 MHz #AVG BW 3 MHz SPAN 20.00 MHz
 #IF BW 3.0 MHz SWP 20.0 msec

16:32:07 DEC 01, 2000
Breezecom LKT-IF-24 Power Out

ACTV DET: PEAK
MEAS DET: PEAK QP AVG
MKR 2.47995 GHz
25.10 dBm



CENTER 2.47990 GHz
#IF BW 3.0 MHz #AVG BW 3 MHz SPAN 20.00 MHz
SWP 20.0 msec

Out of Band Measurements
Test Requirement: 15.247

Measurement Equipment Used:

HP 8593EM Spectrum Analyzer
2 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. The EUT's hopping function was stopped, transmission was continuous at the 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.

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.

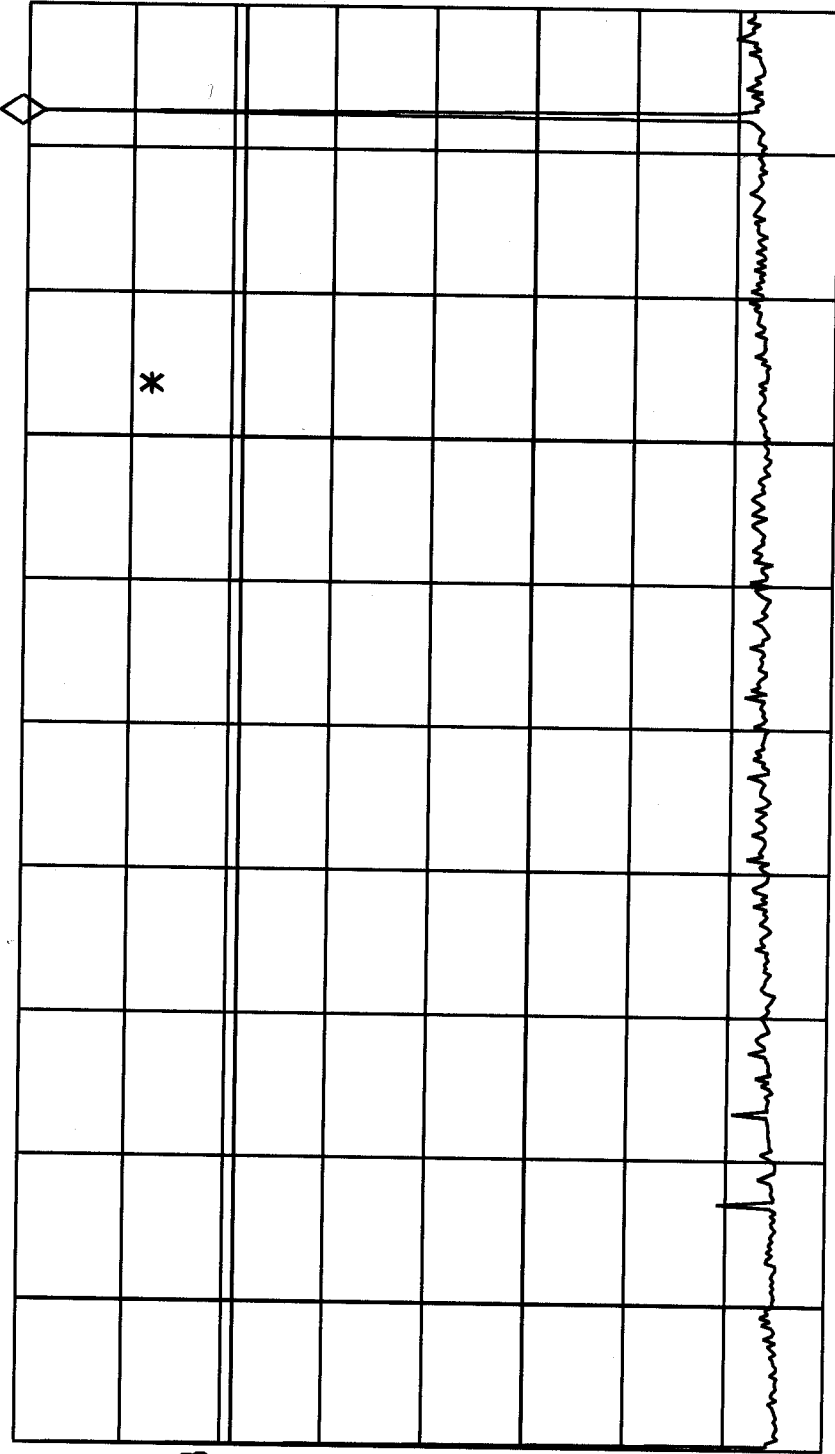
16: 39: 16 DEC 01. 2000

Breezecom LKT-IF-24 Antenna Port Out LOW

ACTV DET: PEAK
MEAS DET: PEAK QP AVG
MKR 2.405 GHZ
25.57 dBm

REF OFFST 10.2 dB
REF 27.2 dBm

LOG 10 dB/ ATN 30 dB
DL 5.7 dBm
VA SB
SC FC
CORR



START 1.0 MHZ STOP 2.600 GHZ
#IF BW 100 KHZ #AVG BW 100 KHZ SWP 780 msec

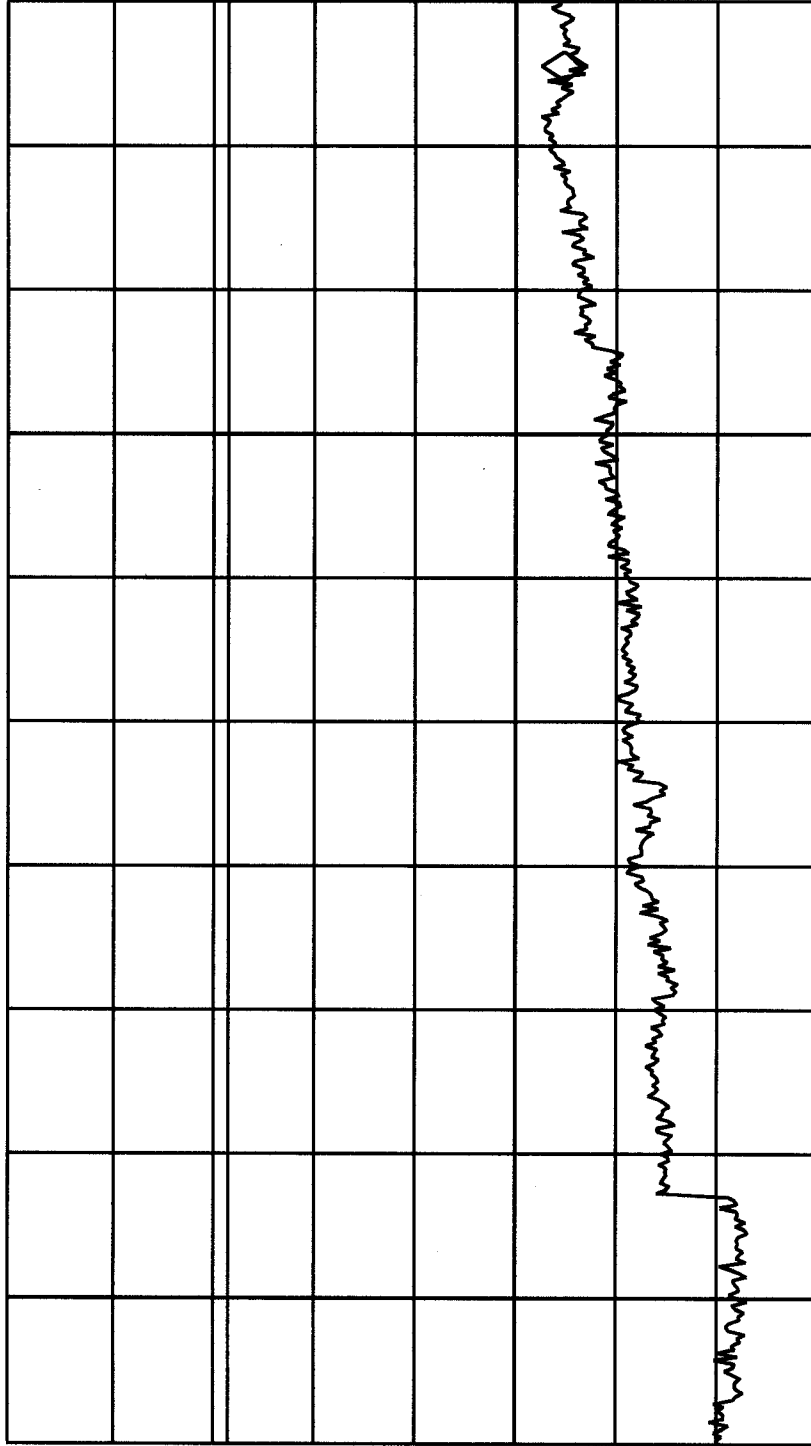
16: 44: 56 DEC 01, 2000

Breezecom LKT-IF-24 Antenna Port Out LOW

ACTV DET: PEAK
MEAS DET: PEAK QP AVG
MKR 23.84 GHZ
-29.96 dBm

REF OFFST 10.2 dB
REF 27.2 dBm

LOG 10 dB/ ATN 30 dB
DL 5.3 dBm
WA SB
SC FC
CORR



START 2.68 GHZ #IF BW 100 KHZ #AVG BW 100 KHZ STOP 24.84 GHZ
SWP 6.65 sec

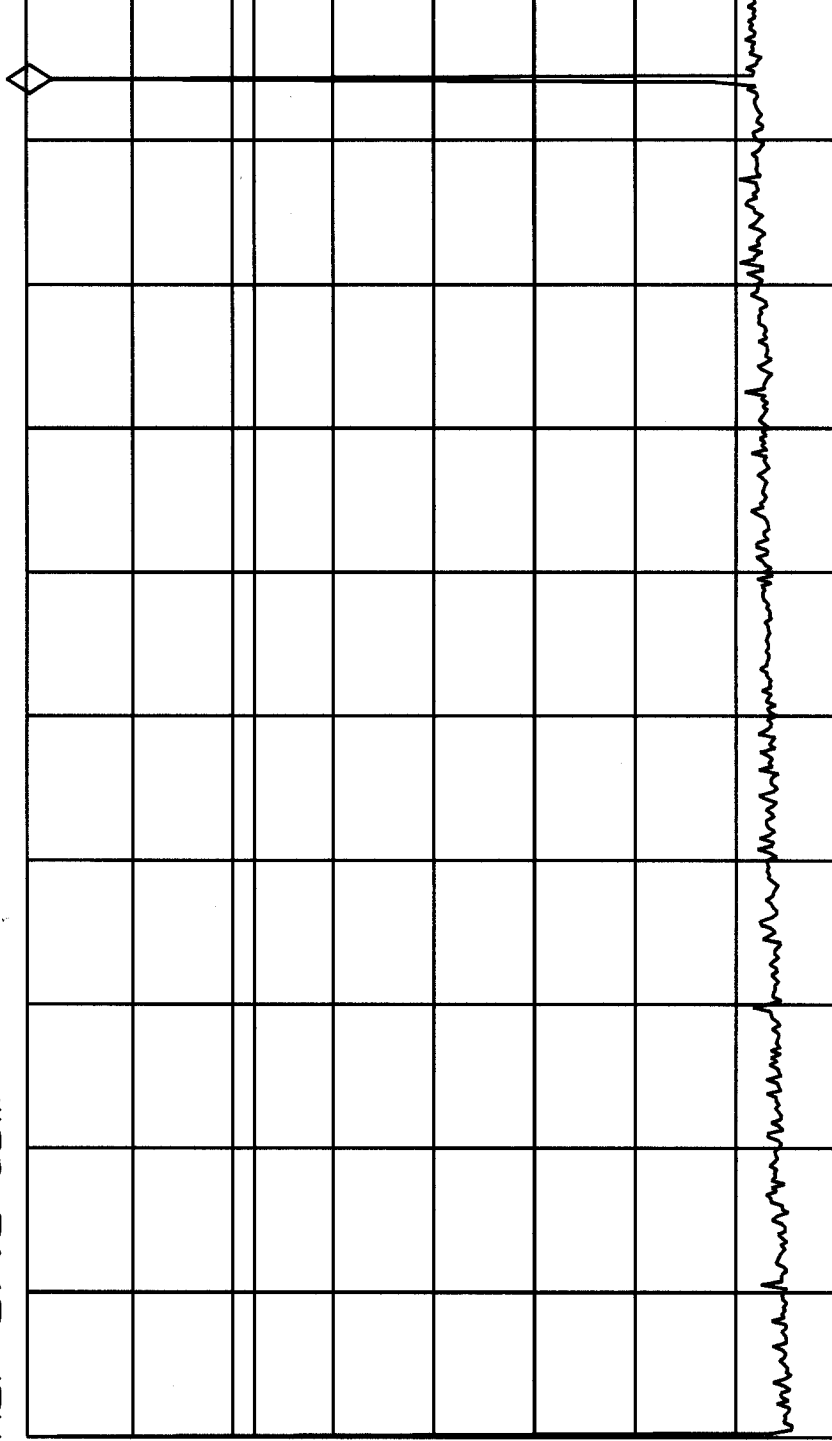
16: 40: 26 DEC 01, 2000

Breezecom LKT-IF-24 Antenna Port Out MID

ACTV DET: PEAK
MEAS DET: PEAK QP AVG
MKR 2.451 GHZ
24.66 dBm

REF OFFST 10.2 dB
REF 27.2 dBm

LOG 10
dB/
ATN
30 dB
DL 4.7
dBm
WA SB
SC FC
CORR



START 1.0 MHZ #IF BW 100 KHZ #AVG BW 100 KHZ STOP 2.600 GHZ
#IF BW 100 KHZ #AVG BW 100 KHZ SWP 780 msec

16: 43: 06 DEC 01, 2000

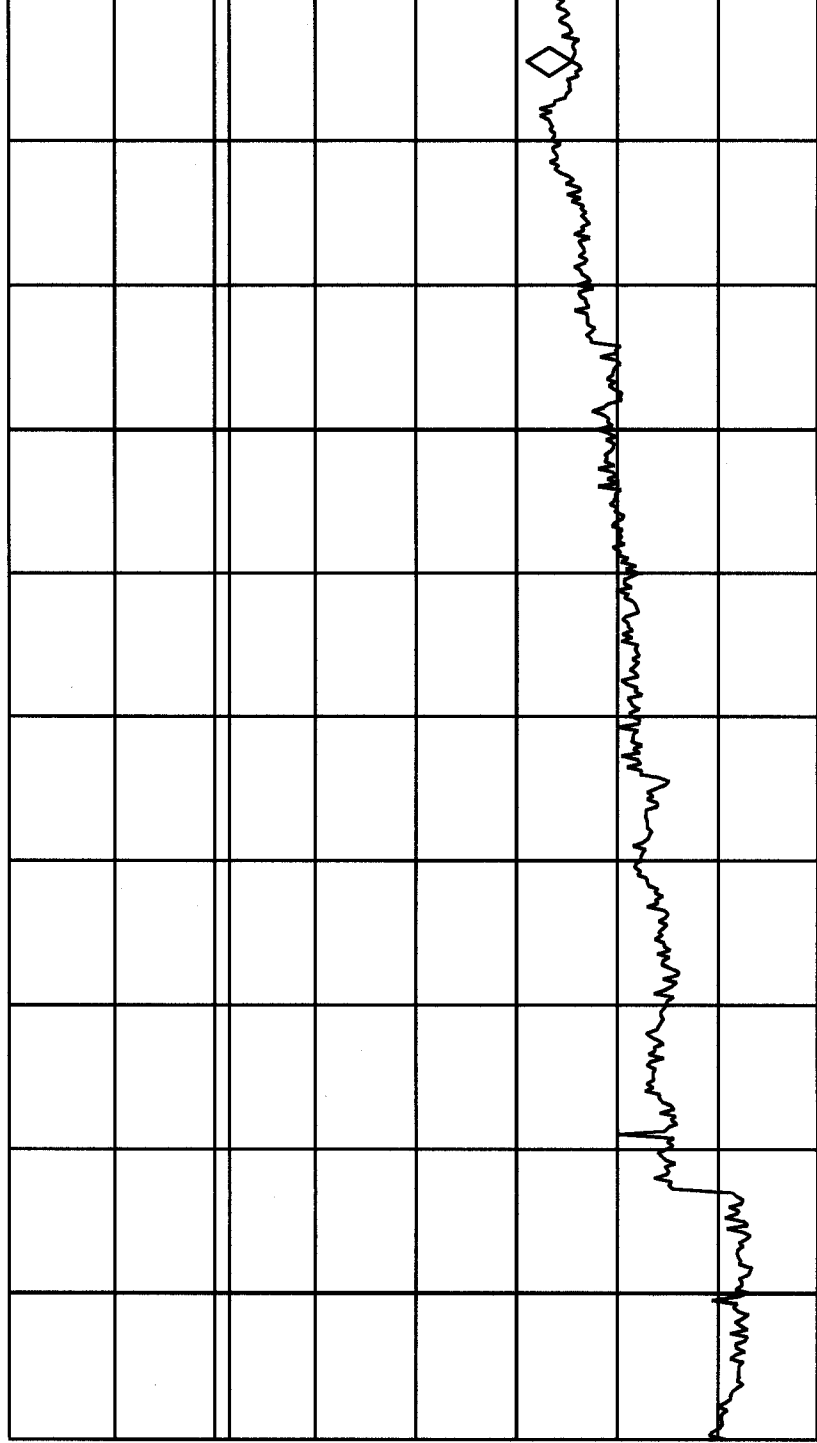
Breezecom LKT-IF-24 Antenna Port Out MID

ACTV DET: PEAK
MEAS DET: PEAK QP AVG
MKR 23.84 GHZ
-28.44 dBm

REF OFFST 10.2 dB
REF 27.2 dBm

LOG 10
dB/
ATN
30 dB

DL 5.3
dBm
WA SB
SC FC
CORR



START 2.68 GHZ #IF BW 100 KHZ #AVG BW 100 KHZ STOP 24.84 GHZ
#IF BW 100 KHZ #AVG BW 100 KHZ SWP 6.65 sec

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Breezecom LKT-IF-24 Antenna Port Out HIGH

DISPLAY LINE

5.3 dBm

ACTV DET: PEAK

MEAS DET: PEAK QP AVG

MKR 2.483 GHz

25.36 dBm

REF OFFST 10.2 dB

REF 27.2 dBm

LOG

10

dB/

ATN

30 dB

DL

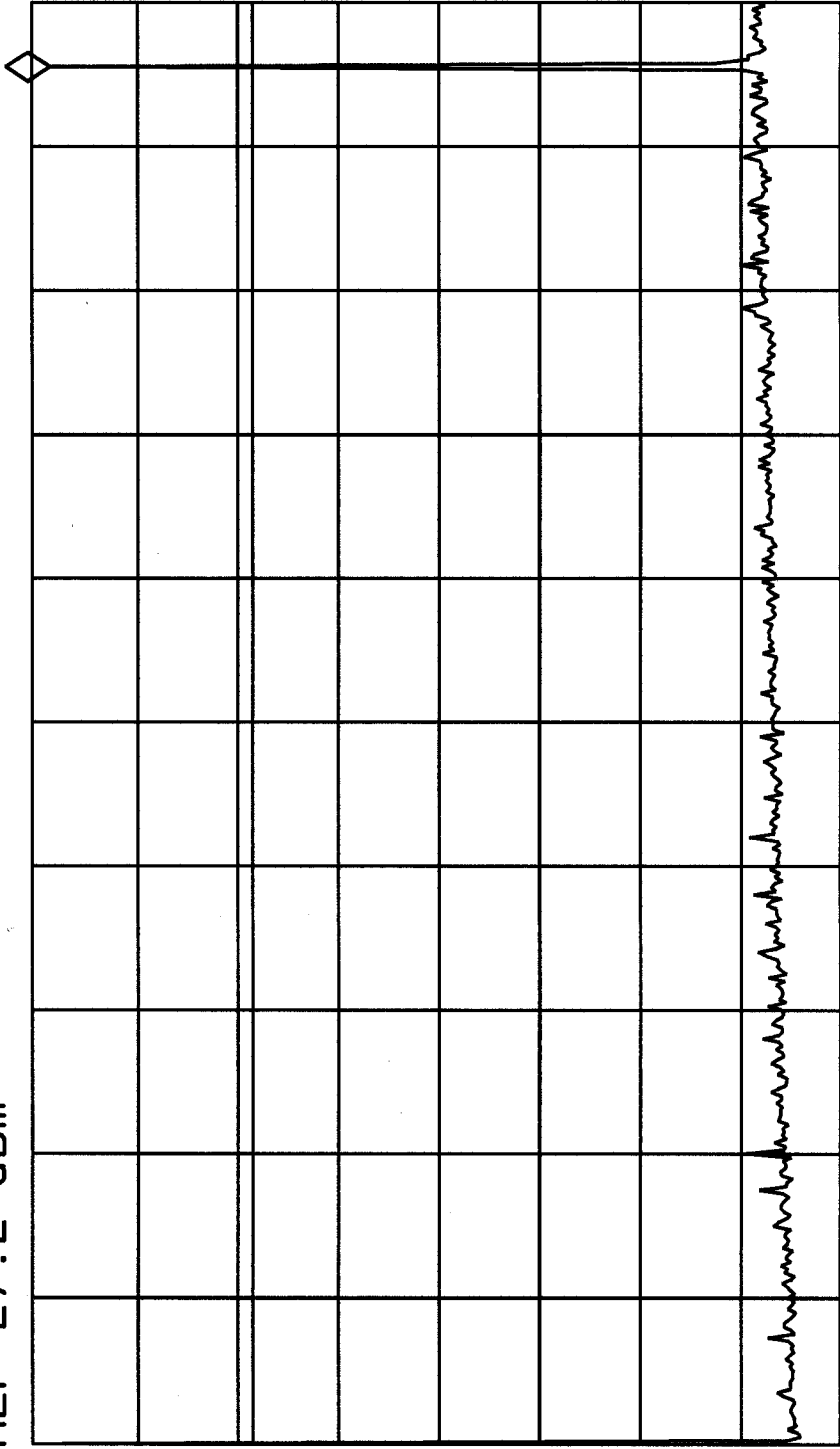
5.3

dBm

WA SB

SC FC

CORR



START 1.0 MHz

#IF BW 100 kHz

#AVG BW 100 kHz

STOP 2.600 GHz

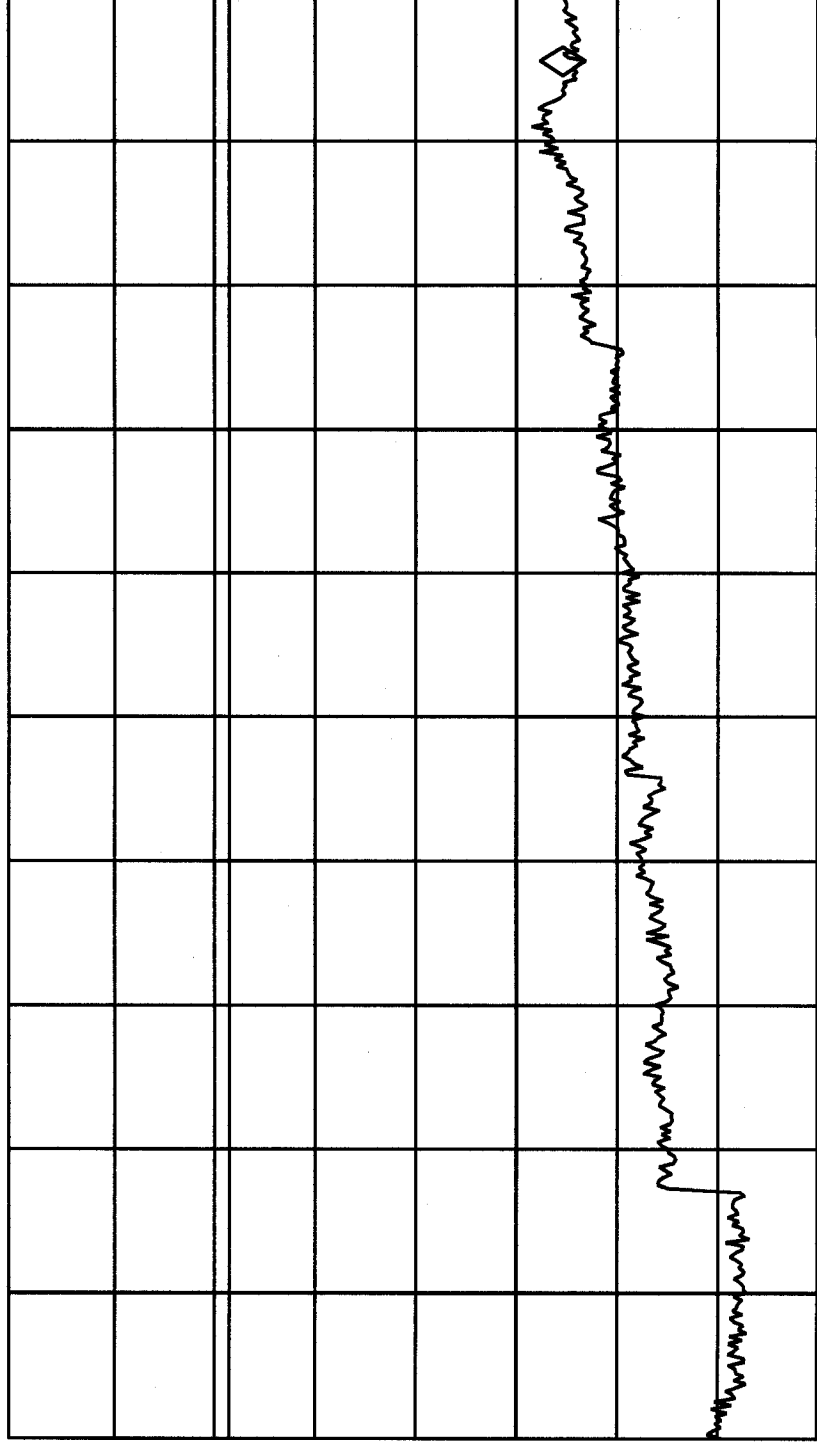
SWP 780 msec

16: 42: 13 DEC 01, 2000
 Breezecom LKT-IF-24 Antenna Port Out HIGH

ACTV DET: PEAK
 MEAS DET: PEAK QP AVG
 MKR 23.84 GHZ
 -29.77 dBm

REF OFFST 10.2 dB
 REF 27.2 dBm

LOG 10 dB/ ATN 30 dB
 DL 5.3 dBm
 WA SB
 SC FC
 CORR



START 2.68 GHZ #IF BW 100 KHZ #AVG BW 100 KHZ STOP 24.84 GHZ
 SWP 6.65 sec

Minimum Number of Hopping Channels
Test Requirement: 15.247(a)(1)(ii)

Measurement Equipment Used:

HP 8593EM Spectrum Analyzer
2 ft length low loss A coaxial RF cable

Test Procedure

The EUT was set to transmit in normal hopping mode. The spectrum analyzer was set to MAX HOLD and swept continuously for 5 - 10 minutes so as to capture all the hopping channels.

Test Results

A total of 79 hopping channels were counted. This corresponds to design. Refer to attached data sheet.

Average Time of Channel Occupancy
Test Requirement: 15.247

Measurement Equipment Used:

HP 8593EM Spectrum Analyzer
2 ft length low loss A coaxial RF cable

Test Procedure

1. The EUT was set to transmit in normal hopping mode.
2. The analyzer was center tuned to 2443.4 MHz. Analyzer frequency SPAN was set to ZERO SPAN. SWEEP TIME was set to 30 seconds, MAX HOLD function was engaged.
3. A total of 10 different 30 second sweeps were performed and the maximum time of channel occupancy was determined by the maximum number of transmissions detected in any 30 second period, times the duration of each transmission.

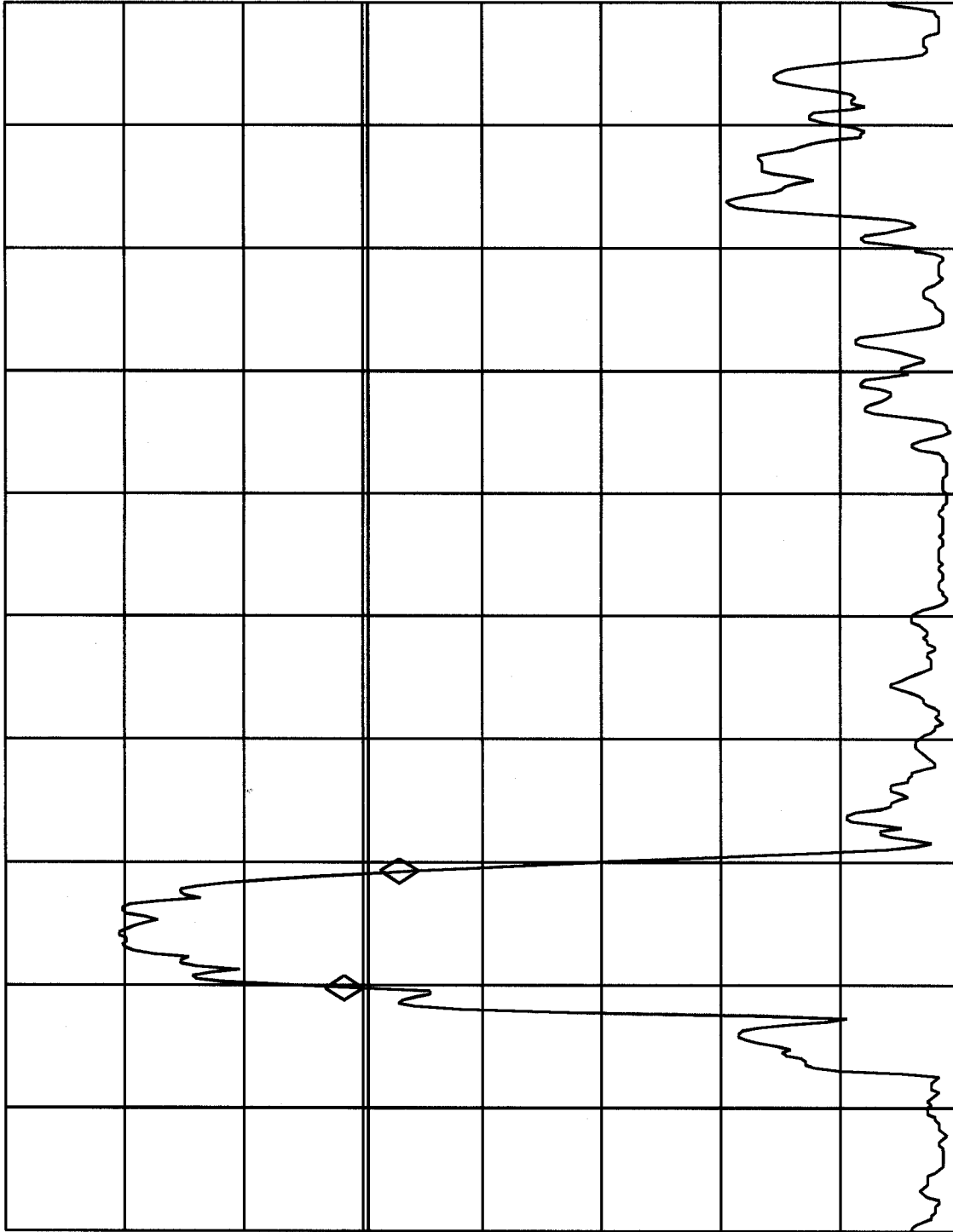
Test Results

Maximum channel occupancy time was determined to be $.475\text{msec} \times 25 \text{ sec} = 11.9 \text{ msec}$, well below the 400 msec (0.4 sec) maximum allowed. Refer to attached spectrum analyzer charts.

14: 42: 16 JUL 26, 2000
BREEZECOM CH OCC.

MKR 475.00 μ sec
-4.65 dB

REF 105.0 dB μ V AT 10 dB



PEAK
LOG
10
dB/

DL
74.6
dB μ V

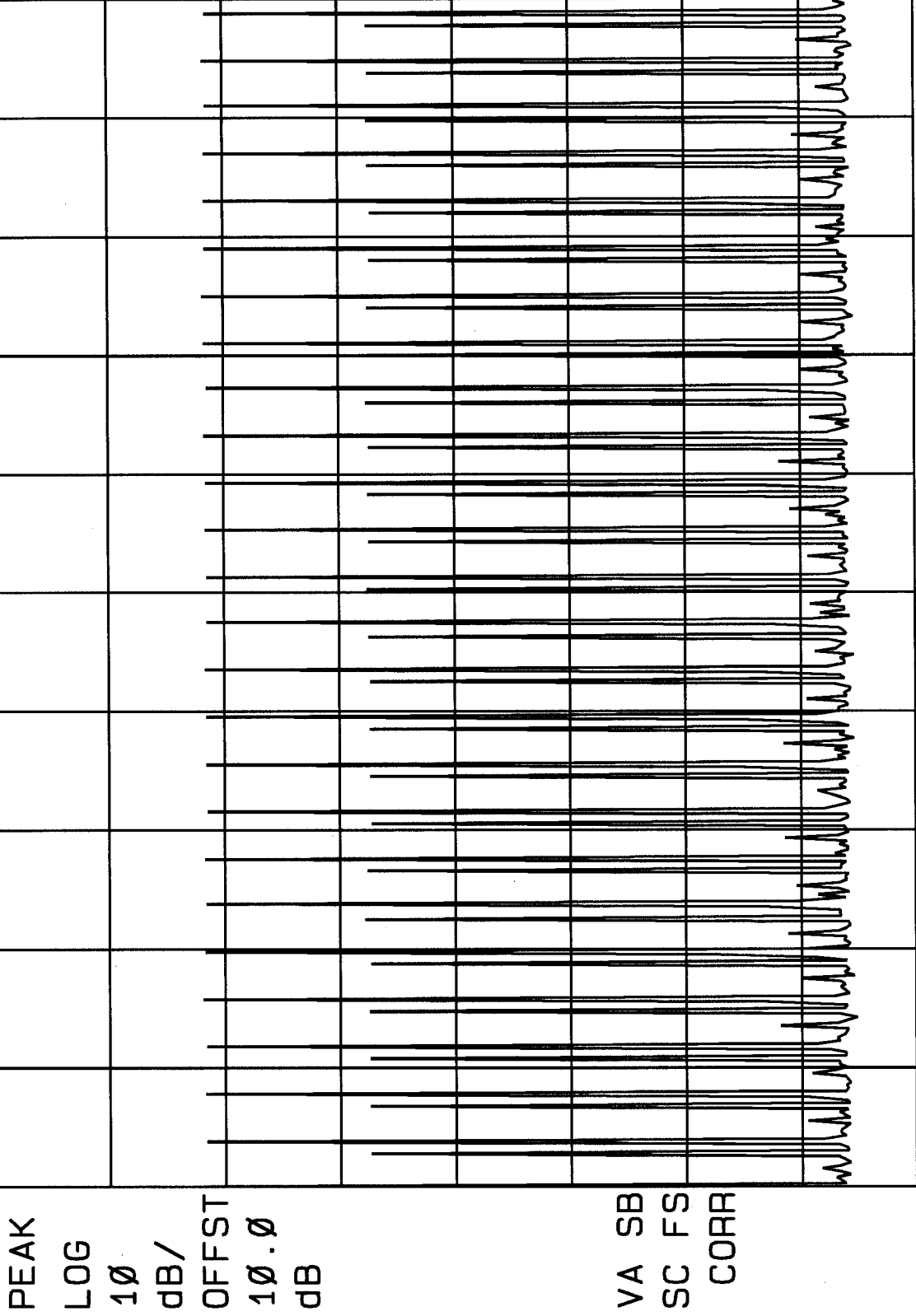
VA SB
SC FC
CORR

CENTER 2.4434000 GHZ
RES BW 10 KHZ
SPAN 0 HZ
#SWP 5.00 msec
VBW 10 KHZ

14:26:28 JUL 26, 2000
BREEZECOM CH OCC.

$475 \text{ msec} \times 25 = 11.875 \text{ msec} / 30 \text{ sec}$

REF 30.0 dBm AT 30 dB



PEAK
LOG
10
dB/
OFFST
10.0
dB

VA SB
SC FS
CORR

CENTER 2.443400 GHZ
#RES BW 100 KHZ

#VBW 100 KHZ
#SWP 30.0 sec
SPAN 0 HZ