

PAGE NO.

5 of 43.

Sub-part
2.1033(b):TEST AND MEASUREMENT DATA

All tests and measurement data shown were performed in accordance with FCC Rules and Regulations, Volume II; Part 2, Sub-part J, Sections 2.1031, 2.1033, 2.1035, 2.1041, 2.1043, 2.1045, and the following individual Parts:

- _____ 15.209 Radiated emission limits; general requirements
- _____ 15.211 Tunnel radio systems
- _____ 15.213 Cable locating equipment
- _____ 15.214 Cordless telephones
- _____ 15.217 Operation in the band 160-190 kHz
- _____ 15.219 Operation in the band 510-1705 kHz
- _____ 15.221 Operation in the band 525-1705 kHz (leaky coax)
- _____ 15.223 Operation in the band 1.705-10 MHz
- _____ 15.225 Operation in the band 13.553-13.567 MHz
- _____ 15.227 Operation in the band 26-27.28 MHz (remote control)
- _____ 15.229 Operation in the band 40.66-40.70 MHz
- _____ 15.231 Periodic operation in the band 40.66-40.70 MHz and above 70 MHz
- _____ 15.233 Operation within the bands 43.71-44.49, 46.60-46.98 MHz 48.75-49.51 MHz and 49.66-50.0 MHz
- _____ 15.235 Operation within the band 49.82-49.90 MHz
- _____ 15.237 Operation within the bands 72.0-73.0 MHz, 74.6-74.8 MHz and 75.2-76.0 MHz (auditory assistance)
- _____ 15.239 Operation in band 88-108 MHz
- _____ 15.241 Operation in the band 174-216 MHz (biomedical)
- _____ 15.243 Operation in the band 890-940 MHz (materials)
- _____ 15.245 Operation within the bands 902-928 MHz, 2435-2465 MHz, 5785-5815 MHz, 10500-10550 MHz, and 24075-24175 MHz (filed disturbance sensors)
- x _____ 15.247 Operation within bands 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz (spread spectrum)
- _____ 15.249 Operation within the bands 902-928 MHz, 2400-2483.5 MHz, 5725-5875 MHz, and 24.0-24.25 GHz
- _____ 15.251 Operation within the bands 2.9-3.26 GHz, 3.267-3.332 GHz, 3.339-3.3458 GHz, and 3.358-3.6 GHz (vehicle identification systems)
- _____ 15.321 Specific requirements for asynchronous devices operating in the 1910-1920 MHz and 2390-2400 MHz bands (Unlicensed PCS)
- _____ 15.323 Specific requirements for isochronous devices operating in the 1920-1930 MHz sub-band (Unlicensed PCS)

PAGE NO.

6 of 43.

STANDARD TEST CONDITIONS
and
ENGINEERING PRACTICES

Except as noted herein, the following conditions and procedures were observed during the testing:

In accordance with ANSI C63.4-1992, section 6.1.9, and unless otherwise indicated in the specific measurement results, the ambient temperature of the actual EUT was maintained within the range of 10° to 40°C (50° to 104 °F) unless the particular equipment requirements specify testing over a different temperature range. Also, unless otherwise indicated, the humidity levels were in the range of 10% to 90% relative humidity.

Prior to testing, the EUT was tuned up in accordance with the manufacturer's alignment procedures. All external gain controls were maintained at the position of maximum and/or optimum gain throughout the testing.

Measurement results, unless otherwise noted, are worst case measurements.

PAGE NO. 7 of 43.

NAME OF TEST: Maximum Peak Output Power

SPECIFICATION: 47 CFR 15.247(b)

SPEC. LIMIT: ≤ 1 Watt peak (0.25 if <50 Hopping Channels)

TEST EQUIPMENT: Attached

MEASUREMENT DATA

ANTENNA GAIN, dBi = 1

PEAK OUTPUT POWER, Watts = 0.794

WORST CASE FOR
ALL CHANNELS

FREQUENCY TUNED, MHz	FREQUENCY EMISSION, MHz	METER, dBuV	CF, dB	uV/m @ m	ERP, dBm	MARGIN, dB
-------------------------	----------------------------	----------------	-----------	----------	-------------	---------------

CONDUCTED:					19	
2412	2412				18	
2442	2442				18	
2462	2462					

Sample Calculation:

$$P_{ERP} = (E_v \times R_m)^2 / 49.2 = (2.1 \times 3)^2 / 49.2 = 0.794 \text{ Watts}$$

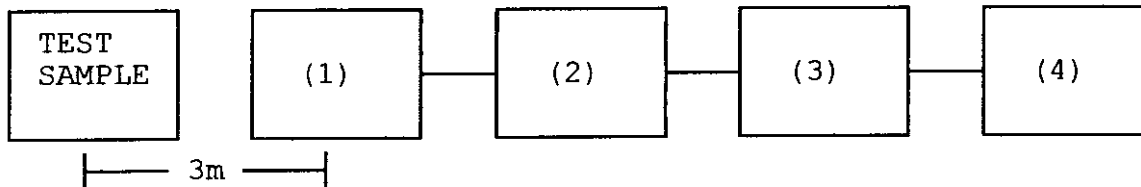
SUPERVISED BY:

Morton Flom, P. Eng.

Morton Flom, P. Eng.

PAGE NO.

8 of 43.

TRANSMITTER RADIATED MEASUREMENTS

Asset Description

s/n

(1) TRANSDUCER

<u>x</u>	i00091	Emco 3115	001469
<u>x</u>	i00089	Aprel Log Periodic	001500

(2) HIGH PASS FILTER

<u>x</u>	i00	Narda μ PAD (In-Band Only)
<u>x</u>	i00	Trilithic
—		(Out-Of-Band Only)

(3) PREAMP

<u>x</u>	i00028	HP 8449 (+30 dB)	2749A00121
----------	--------	------------------	------------

(4) SPECTRUM ANALYZER

<u>x</u>	i00048	HP 8566B	2511A01467
—	i00043	HP 8558B	2004A02076
—	i00057	HP 8557A	1531A00191
<u>x</u>	i00029	HP 8563E	3213A00104

PAGE NO. 10 of 43.

NAME OF TEST: Out of Band Emissions

SPECIFICATION: 47 CFR 15.247(c), 15.209(a)

SPEC. LIMIT: See Below

TEST EQUIPMENT: As per previous page

SEARCH ANTENNAS: 10 kHz - 32 MHz: LOOP 94598-1
 32 MHz - 1 GHz: SINGER DM105, T₁T₂T₃
 1 GHz - 18 GHz: EMCO 3115

LIMIT

In any 100 kHz bandwidth outside these frequency bands, radio frequency power that is produced by the modulation products of the spreading sequence, information sequence, and the carrier frequency shall be either

at least 20 dB below that in any 100 kHz bandwidth within the band that contains the highest level of the desired power

or

shall not exceed the general levels specified in 15.209(a),

whichever results in the lesser attenuation.

All other emissions outside these bands shall not exceed the general radiated emission limits specified in 15.209(a).

MEASUREMENTS PROCEDURE:

At first, bench tests were performed to locate the emissions at the antenna terminals.

In the field, tests were conducted over the range shown. The test sample was set up on a wooden turntable above ground, and at a distance of three meters from the antenna connected to the spectrum analyzer.

In order to obtain the maximum response at each frequency, the turntable was rotated, and the search antenna was raised and lowered. The EUT was also adjusted for maximum response.

The field strength was calculated from:

$$E \text{ } \mu\text{V/m @ 3 m} = \text{LOG}_{10}^{-1}(\text{dBm} + 107 + \text{A.F.} + \text{C.L.})$$

The following results are worst case conditions. Tests were conducted in Horizontal and Vertical polarization modes.

MEASUREMENT RESULTS: ATTACHED

PAGE NO.

11 of 43.

NAME OF TEST: Out of Band Emissions
 g98b0339: 1998-Nov-25 Wed 08:51:00
 STATE: 2:High Power

FREQUENCY TUNED, MHz	FREQUENCY EMISSION, MHz	METER, dBuV	CF, dB	uV/m @ 3m	ERP, dBm	MARGIN, dB
2412.000000	4824.000000	43.67	7.61	366.44	-46.05	-2.7
2412.000000	4824.000000	32.5	12.65	180.93	-52.25	-8.9
2442.000000	4884.000000	33	7.81	109.77	-56.55	-13.2
2442.000000	4884.000000	42.83	7.81	340.41	-46.75	-3.4
2462.000000	4924.000000	32.83	7.95	109.4	-56.55	-13.2
2462.000000	4924.000000	41.83	7.95	308.32	-47.55	-4.2
2412.000000	7236.000000	32.33	11.82	161.25	-53.25	-9.9
2412.000000	7236.000000	41.5	11.82	463.45	-44.05	-0.7
2442.000000	7326.000000	41.67	12.02	483.62	-43.65	-0.3
2442.000000	7326.000000	32.5	12.02	168.27	-52.85	-9.5
2462.000000	7386.000000	43.83	12.15	629.51	-41.35	2
2462.000000	7386.000000	33	12.15	180.93	-52.25	-8.9
2412.000000	9648.000000	43.17	13.99	721.11	-40.25	3.2
2412.000000	9648.000000	33.17	13.99	228.03	-50.25	-6.8
2442.000000	9768.000000	33.5	14.11	240.16	-49.75	-6.4
2442.000000	9768.000000	44.33	14.11	835.6	-38.95	4.4
2462.000000	9848.000000	33.33	14.17	237.14	-49.85	-6.5
2462.000000	9848.000000	42.67	14.17	695.02	-40.55	2.8
2412.000000	12060.000000	32.83	14.91	243.78	-49.65	-6.3
2412.000000	12060.000000	42.17	14.91	714.5	-40.25	3.1
2442.000000	12210.000000	42	14.93	702.26	-40.45	2.9
2442.000000	12210.000000	32.83	14.93	244.34	-49.65	-6.2
2462.000000	12310.000000	42.33	14.94	730.3	-40.15	3.3
2462.000000	12310.000000	33	14.94	249.46	-49.45	-6.1
2412.000000	14472.000000	44.33	17.29	1205.04	-35.75	7.6
2412.000000	14472.000000	33.83	17.29	359.75	-46.25	-2.9
2442.000000	14652.000000	34	17.26	365.59	-46.15	-2.7
2442.000000	14652.000000	43	17.26	1030.39	-37.15	6.3
2462.000000	14772.000000	34	17.24	364.75	-46.15	-2.8
2462.000000	14772.000000	42.83	17.24	1008.09	-37.35	6.1
2412.000000	16884.000000	34.17	18.3	420.24	-44.95	-1.5
2412.000000	16884.000000	43.17	18.3	1184.4	-35.95	7.5
2442.000000	17094.000000	41.5	19.34	1101.54	-36.55	6.8
2442.000000	17094.000000	33.67	19.34	447.2	-44.35	-1
2462.000000	17234.000000	42.67	20.08	1372.46	-34.65	8.8
2462.000000	17234.000000	33.83	20.08	496.02	-43.45	-0.1

PAGE NO.

12 of 43.

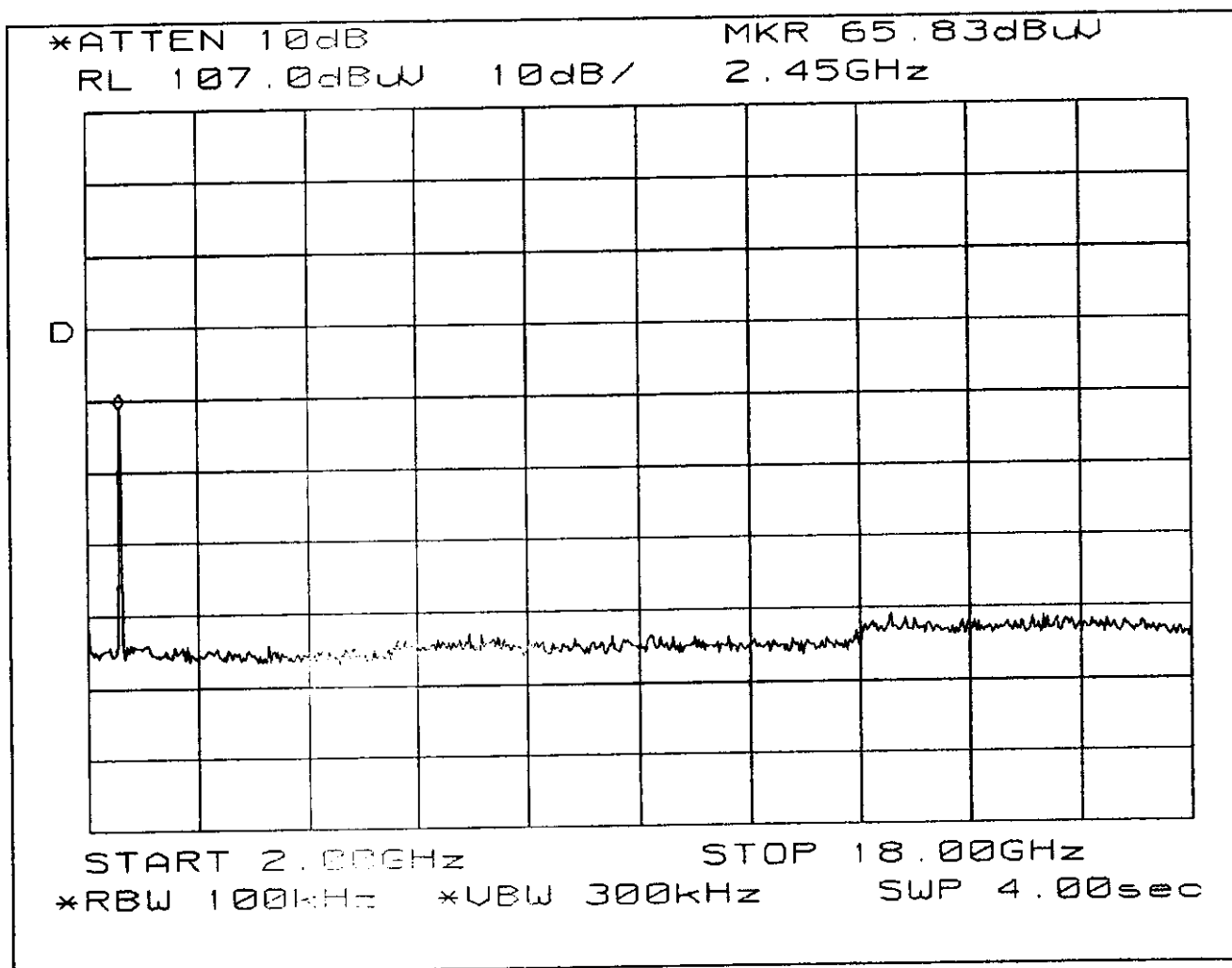
NAME OF TEST: Out of Band Emissions
 g98b0294: 1998-Nov-16 Mon 16:08:00
 STATE: 1:Low Power

FREQUENCY TUNED, MHz	FREQUENCY EMISSION, MHz	METER, dBuV	CF, dB	uV/m @ 3m	ERP, dBm	MARGIN, dB
2412.000000	2365.130000	9.22	35.39	170.02	-52.75	-9.4
2412.000000	2370.000000	10.29	35.41	192.75	-51.65	-8.3
2412.000000	2375.000000	10.02	35.43	187.28	-51.95	-8.6
2412.000000	2380.000000	11.71	35.46	228.3	-50.25	-6.8
2412.000000	2385.000000	1.74	35.48	72.61	-60.15	-16.8
2412.000000	2385.000000	13.76	35.48	289.73	-48.15	-4.8
2412.000000	2389.750000	14.91	35.49	331.13	-46.95	-3.6
2412.000000	2389.750000	2.33	35.49	77.8	-59.55	-16.2
2462.000000	2483.630000	9.68	35.89	189.89	-51.85	-8.4
2462.000000	2483.630000	21.65	35.89	753.36	-39.85	3.5
2462.000000	2488.630000	22.18	35.9	801.68	-39.25	4.1
2462.000000	2488.630000	9.6	35.9	188.36	-51.85	-8.5
2462.000000	2493.130000	9.55	35.92	187.72	-51.95	-8.5
2462.000000	2493.130000	21.73	35.92	762.96	-39.75	3.7
2462.000000	2498.750000	20.63	35.94	673.75	-40.85	2.6
2462.000000	2498.750000	9.32	35.94	183.23	-52.15	-8.7
2462.000000	2503.630000	9.53	35.96	188.15	-51.85	-8.5
2462.000000	2503.630000	21.87	35.96	778.93	-39.55	3.8

EMISSIONS

AIRONET, LM4800

1998-NOV-16, 11:53, MON

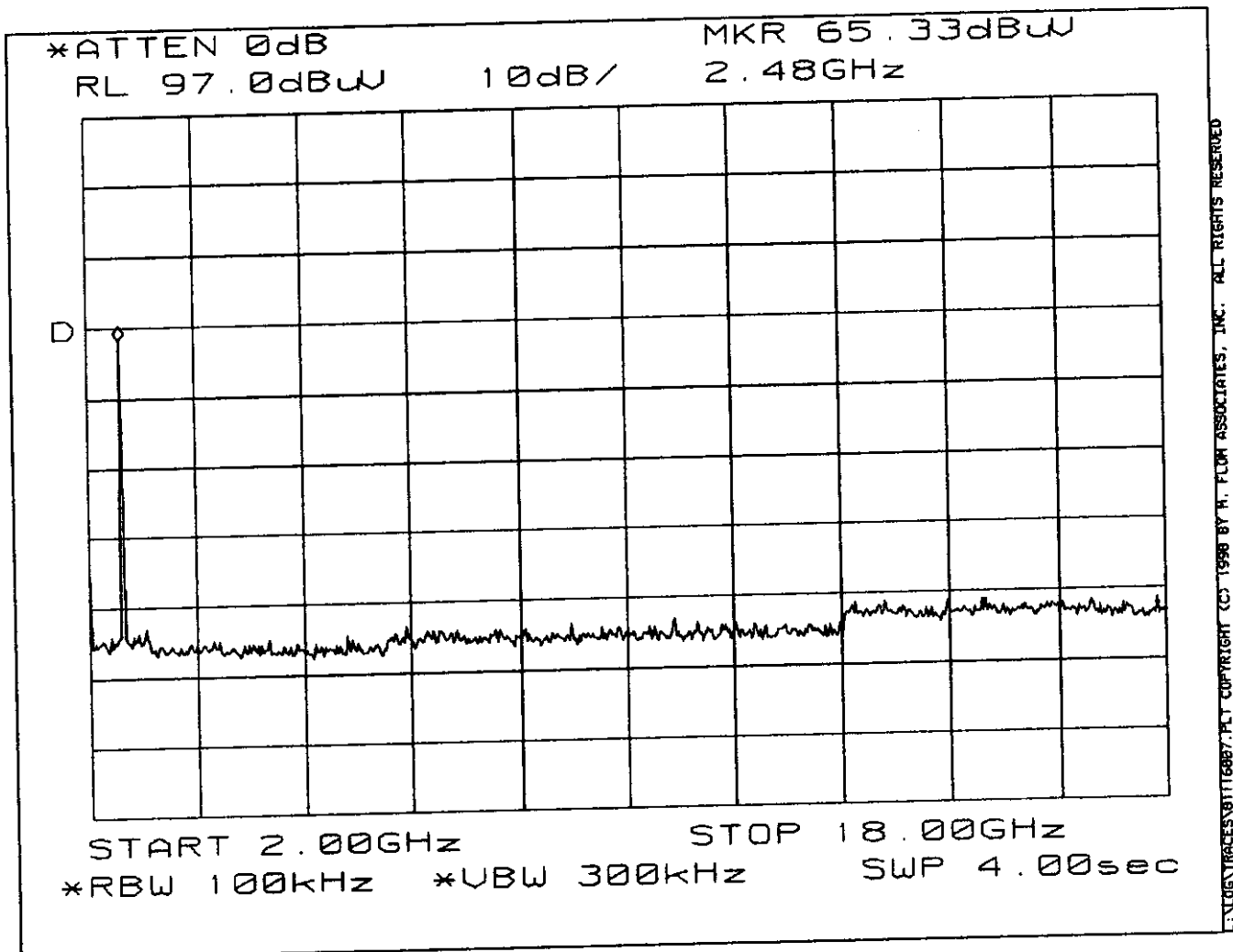


PAGE 14 of 43.

EMISSIONS

AIRNET, LM4800

1998-NOV-16, 11:12, MON



PAGE NO. 15 of 43.
NAME OF TEST: Restricted Bands of Operation
SPECIFICATION: 47 CFR 15.205
TEST EQUIPMENT: As per attached page

MEASUREMENT PROCEDURE

The EUT was set up on a three meter open field site according to the procedure on ANSI C63.4.

Sensitivity of system was measured:

Below 2 GHz:
 CISPR Bandwidths = 8 dB μ V
 1 MHz RBW, 1 MHz VBW = 12 dB μ V
 1 MHz RBW, 10 Hz VBW = 3 dB μ V
 Above 2 GHz:
 1 MHz RBW, 1 MHz VBW = 33 dB μ V
 1 MHz RBW, 10 Hz VBW = 22 dB μ V

Sensitivity of system with preamps:

Below 2 GHz:
 Preamps are not used in this range.
 Above 2 GHz:
 Peak = 3 dB μ V
 Average = -8 dB μ V

Cable Loss:
 915 MHz = -0.8 dB μ V
 2450 MHz = -3 dB μ V

Note:
 dB loss vs. frequency included in programmed software.

Reference Level Offset:
 set @ 1 dB, accounts for cable and connector loss.

TEST RESULTS: No harmonic or spurious emissions were detected in the restricted bands in excess of the limits of 15.205. System measurement sensitivity was -130 dBm.

M. Flom P. Eng

SUPERVISED BY:

Morton Flom, P. Eng.

PAGE NO. 16 of 43.
NAME OF TEST: Emissions At Band Edges
SPECIFICATION: 47 CFR
TEST EQUIPMENT: As for "Out of Band Emissions"

MEASUREMENT RESULTS

ATTACHED

SUPERVISED BY:

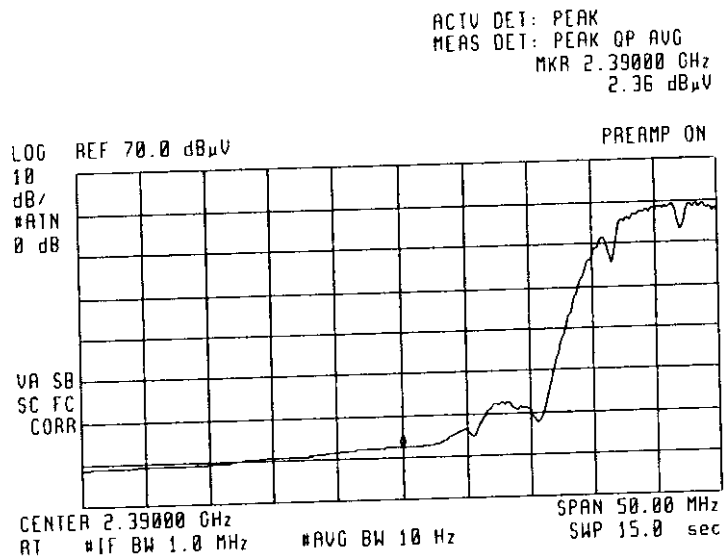


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PAGE NO.

17 of 43.

NAME OF TEST: Emissions At Band Edges
g98b0315: 1998-Nov-16 Mon 16:12:00
STATE: 0:General



1 MB MODE
LOWER BANDEDGE, 1.0 MHz RBW

SUPERVISED BY:

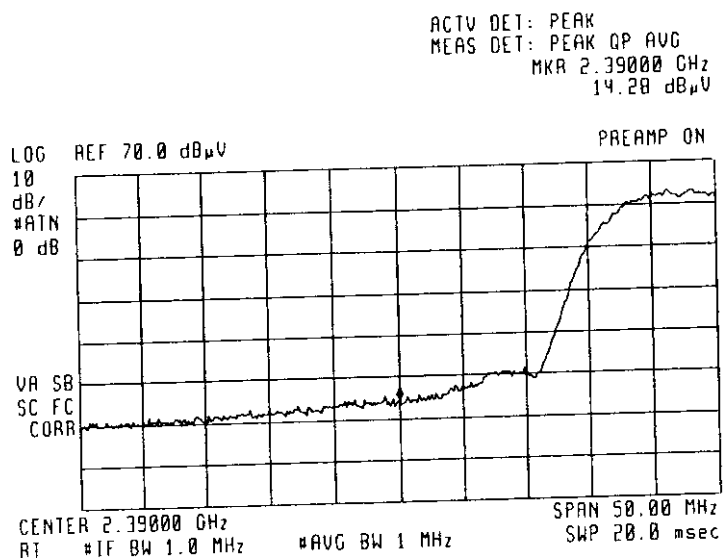
M. Flom P. Eng.
Morton Flom, P. Eng.

PAGE NO.

18 of 43.

NAME OF TEST: Emissions At Band Edges
g98b0316: 1998-Nov-16 Mon 16:09:00
STATE: 0:General

(42)



1 MB MODE
LOWER BANDEDGE, 1.0 MHz RBW

SUPERVISED BY:

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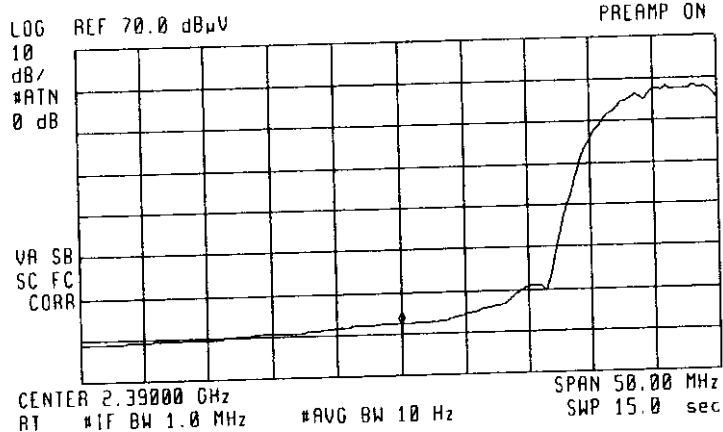
PAGE NO.

19 of 43.

NAME OF TEST: Emissions At Band Edges
g98b0317: 1998-Nov-16 Mon 16:03:00
STATE: 0:General

(6)

ACTV DET: PEAK
MEAS DET: PEAK QP AVG
MKR 2.39000 GHz
2.44 dBμV



2 MB MODE
LOWER BANDEDGE, 1.0 MHz RBW

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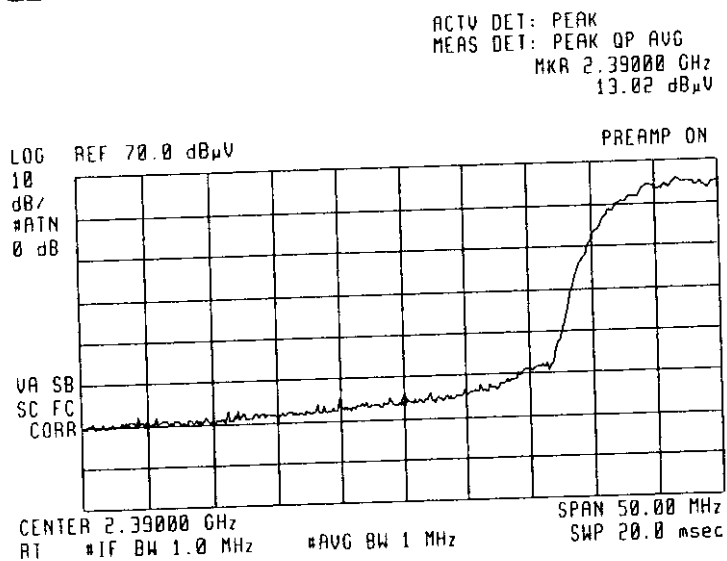
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PAGE NO.

20 of 43.

NAME OF TEST: Emissions At Band Edges
g98b0318: 1998-Nov-16 Mon 16:01:00
STATE: 0:General

(2)



2 MB MODE
LOWER BANDEDGE, 1.0 MHz RBW

SUPERVISED BY:

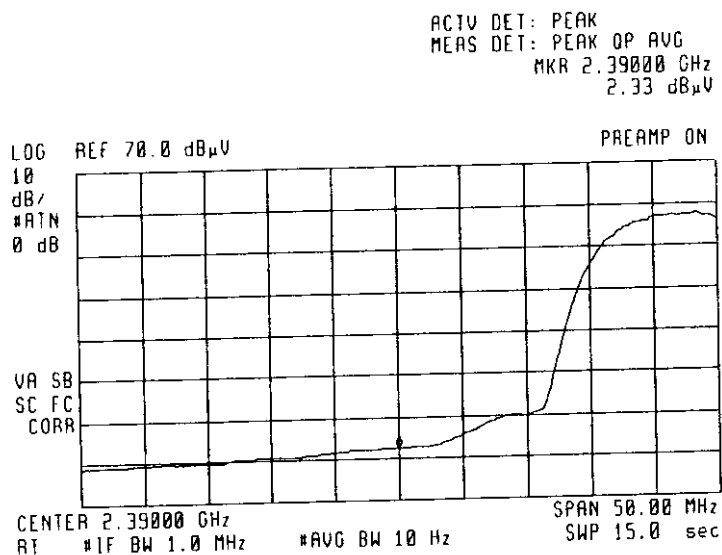
Morton Flom P. Eng.
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PAGE NO.

21 of 43.

NAME OF TEST: Emissions At Band Edges
g98b0332: 1998-Nov-16 Mon 15:59:00
STATE: 0:General

(7)



5.5 MB MODE
LOWER BANDEDGE, 1.0 MHz RBW

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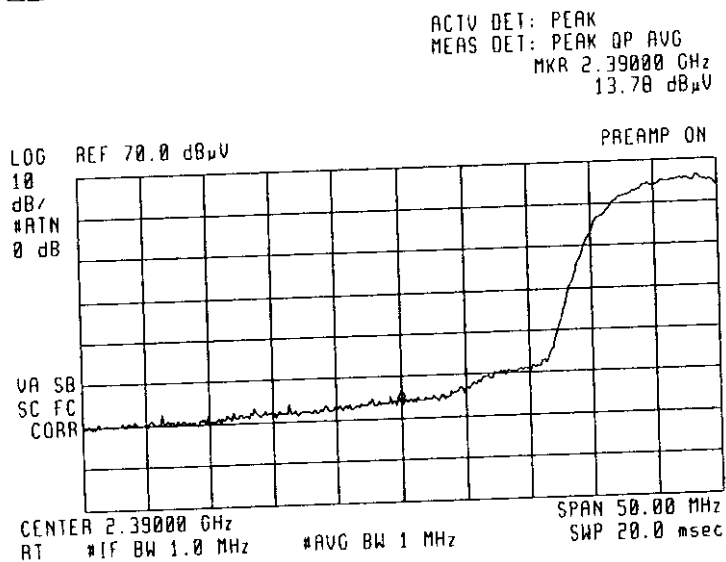
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PAGE NO.

22 of 43.

NAME OF TEST: Emissions At Band Edges
g98b0320: 1998-Nov-16 Mon 15:57:00
STATE: 0:General

(2)



5.5 MB MODE
LOWER BANDEDGE, 1.0 MHz RBW

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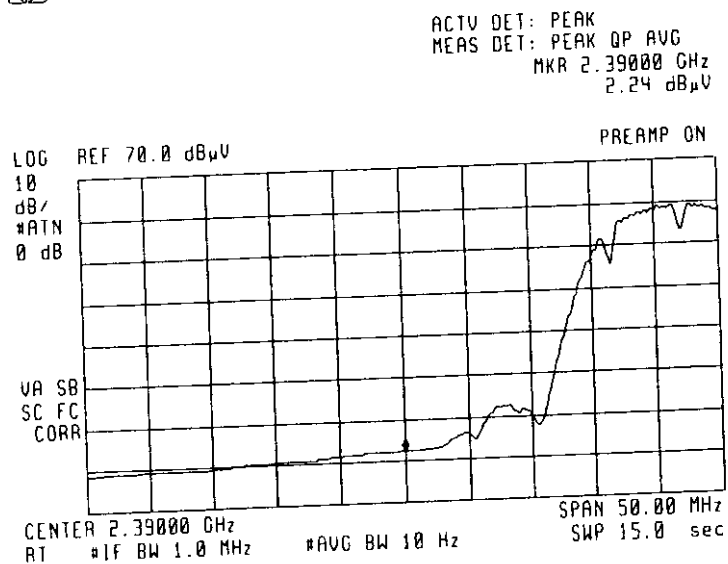
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PAGE NO.

23 of 43.

NAME OF TEST: Emissions At Band Edges
g98b0321: 1998-Nov-16 Mon 15:49:00
STATE: 0:General

(2)



11 MB MODE
LOWER BANDEDGE, 1.0 MHz RBW

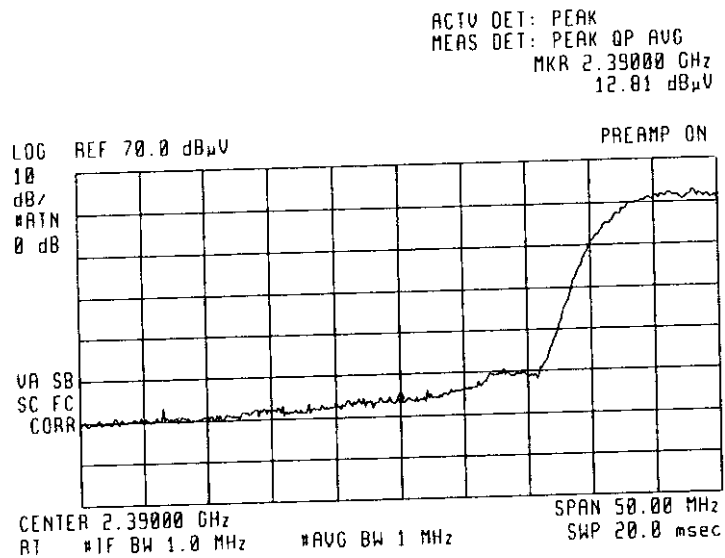
SUPERVISED BY:

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PAGE NO.

24 of 43.

NAME OF TEST: Emissions At Band Edges
g98b0322: 1998-Nov-16 Mon 15:46:00
STATE: 0:General



11 MB MODE
LOWER BANDEDGE, 1.0 MHz RBW

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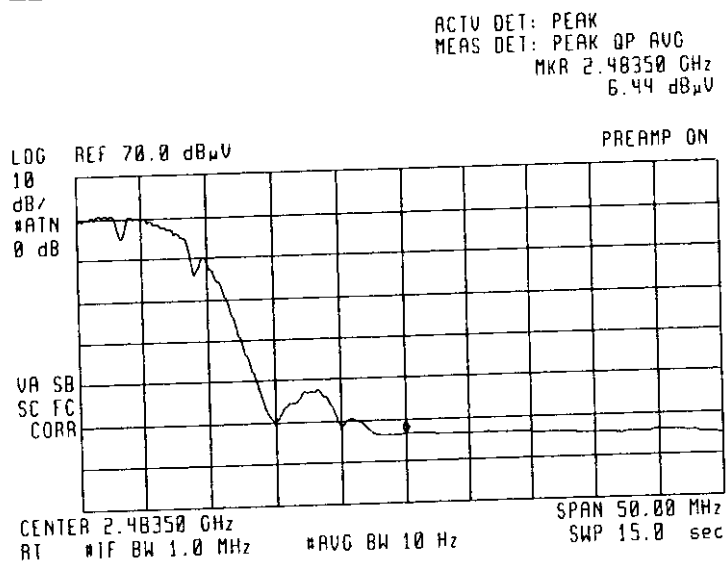
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PAGE NO.

25 of 43.

NAME OF TEST: Emissions At Band Edges
g98b0323: 1998-Nov-16 Mon 14:29:00
STATE: 0:General

(2)



1 MB MODE
UPPER BANDEDGE, 1.0 MHz RBW

SUPERVISED BY:

M. Morton

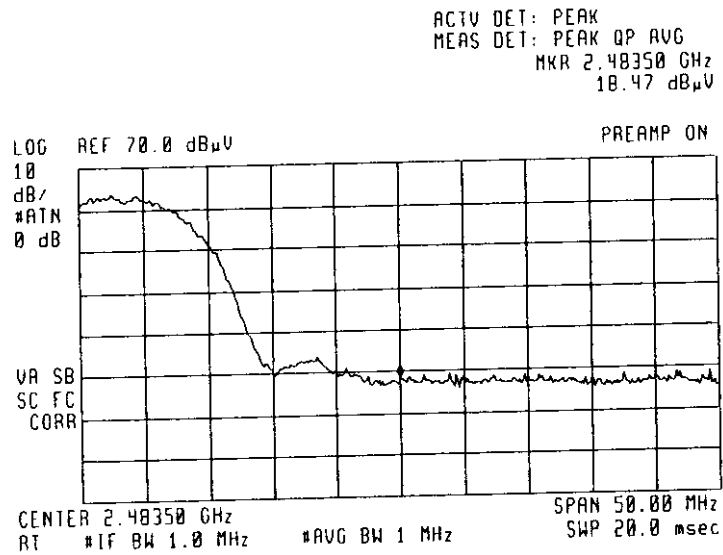
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PAGE NO.

26 of 43.

NAME OF TEST: Emissions At Band Edges
g98b0324: 1998-Nov-16 Mon 14:42:00
STATE: 0:General

(7)



1 MB MODE
UPPER BANDEDGE, 1.0 MHz RBW

SUPERVISED BY:

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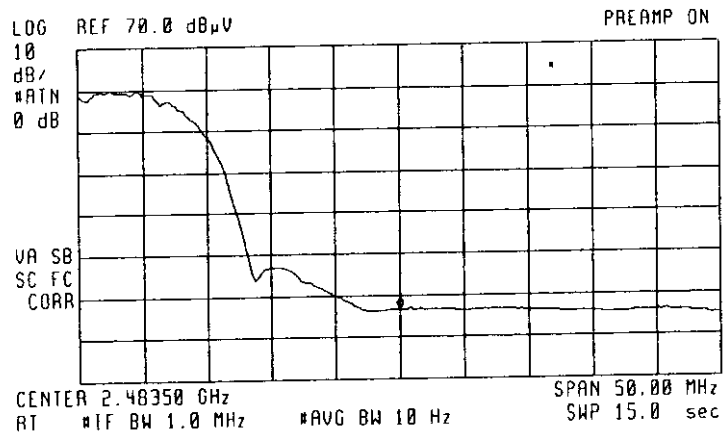
PAGE NO.

27 of 43.

NAME OF TEST: Emissions At Band Edges
g98b0325: 1998-Nov-16 Mon 14:23:00
STATE: 0:General

(12)

ACTV DET: PEAK
MEAS DET: PEAK QP AVG
MKR 2.48350 GHz
6.65 dBμV



2 MB MODE
UPPER BANDEDGE, 1.0 MHz RBW

SUPERVISED BY:

M. Flom P. Eng.

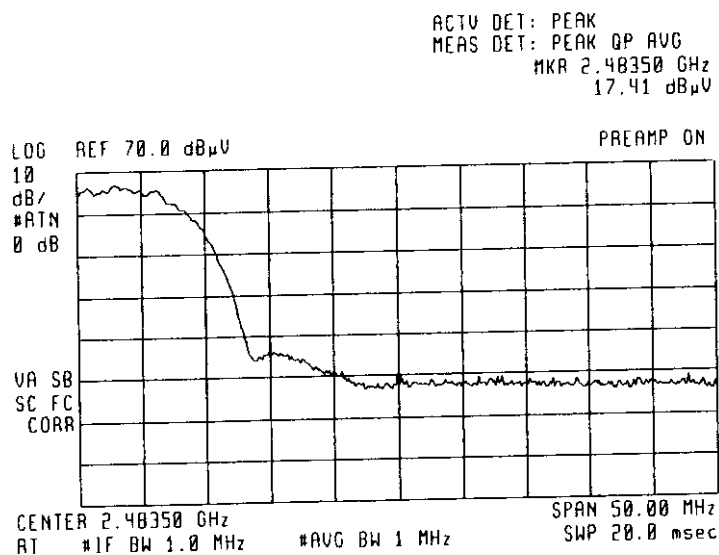
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PAGE NO.

28 of 43.

NAME OF TEST: Emissions At Band Edges
g98b0326: 1998-Nov-16 Mon 14:24:00
STATE: 0:General

(6)



2 MB MODE
UPPER BANDEDGE, 1.0 MHz RBW

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PAGE NO.

29 of 43.

NAME OF TEST: Emissions At Band Edges
g98b0327: 1998-Nov-16 Mon 14:19:00
STATE: 0:General

(2)

ACTV DET: PEAK
MEAS DET: PEAK OP AVG
MKR 2.48350 GHz
6.46 dBμV

Last Hrd
Key Menu

SPAN

LOG REF 70.0 dBμV

PREAMP ON

CLEAR
WRITE A

10
dB/
#ATTN
0 dB

MAX
HOLD A

VR SB
SC FC
CORR

VIEW A

BLANK A

Trace
A B C

CENTER 2.48350 GHz
RT #IF BW 1.0 MHz

#AVG BW 10 Hz

SPAN 50.00 MHz
SWP 15.0 sec

More
1 of 3

5.5 MB MODE
UPPER BANDEDGE, 1.0 MHz RBW

SUPERVISED BY:

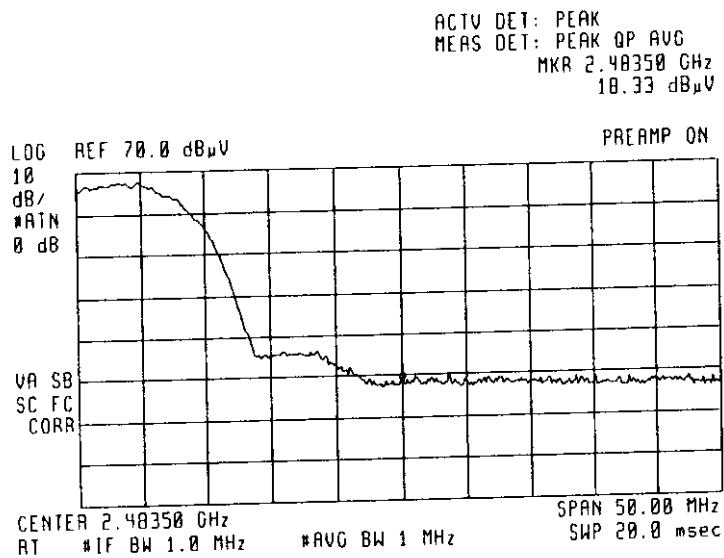
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PAGE NO.

30 of 43.

NAME OF TEST: Emissions At Band Edges
g98b0328: 1998-Nov-16 Mon 14:17:00
STATE: 0:General

(7)



5.5 MB MODE
UPPER BANDEDGE, 1.0 MHz RBW

SUPERVISED BY:

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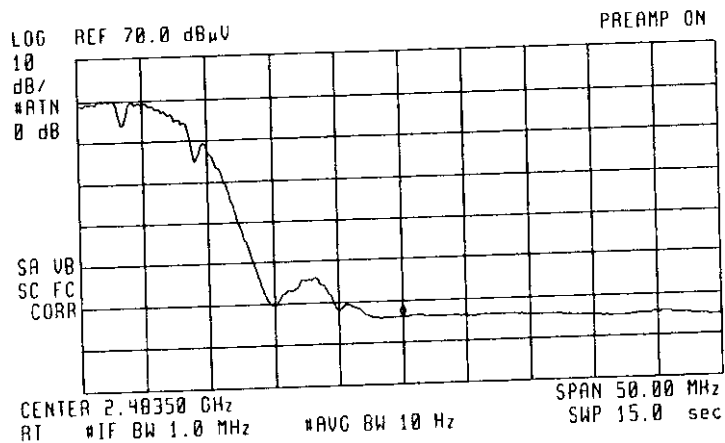
PAGE NO.

31 of 43.

NAME OF TEST: Emissions At Band Edges
g98b0329: 1998-Nov-16 Mon 15:01:00
STATE: 0:General

(C)

ACTV DET: PEAK
MEAS DET: PEAK QP AVG
MKR 2.48350 GHz
6.00 dBμV



11 MB MODE
UPPER BANDEDGE, 1.0 MHz RBW

SUPERVISED BY:

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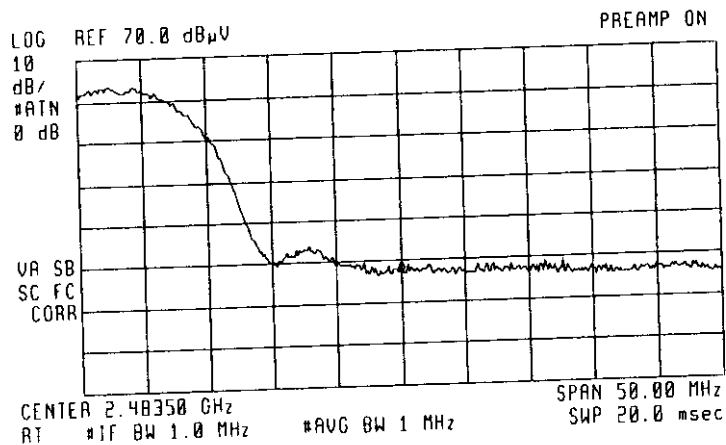
PAGE NO.

32 of 43.

NAME OF TEST: Emissions At Band Edges
g98b0330: 1998-Nov-16 Mon 14:49:00
STATE: 0:General



ACTV DET: PEAK
MEAS DET: PEAK QP AVG
MKR 2.48350 GHz
16.67 dBμV



11 MB MODE
UPPER BANDEDGE, 1.0 MHz RBW

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PAGE NO.

33 of 43.

NAME OF TEST:Spread Spectrum Technology
Direct Sequence Systems15.247(a)(2) Minimum 5 dB BandwidthRESULTS: Please see results for "Allowed Occupied Bandwidth"15.247(d) Transmitter Power DensityLIMIT: The transmitter power density peak over any 1 second interval shall not be greater than 8 dBm in any 3 kHz Bandwidth within these bands.RESULTS: Please see attached plots.
Transmitter Power Density, dBm = -7.315.247(e) Processing GainLIMIT: The processing gain shall be ≥ 10 dBRESULTS: See Applicant's statementPseudorandom Sequence DescriptionRESULTS: See Applicant's statementChip RateRESULTS: See Applicant's statement

SUPERVISED BY:



Morton Flom, P. Eng.

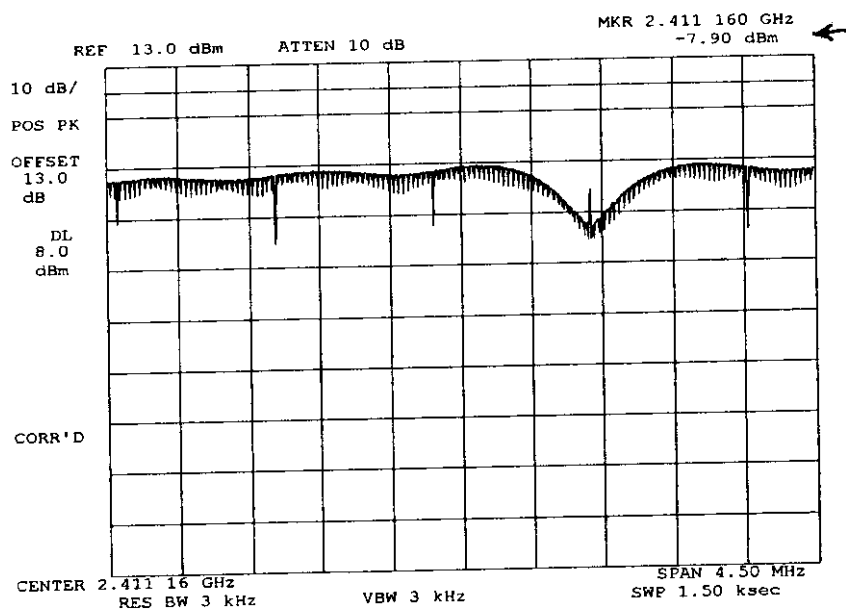
PAGE NO.

34 of 43.

NAME OF TEST: Emission Masks (Occupied Bandwidth)
 Indicating 6/20 dB Bandwidth

g98b0296: 1998-Nov-18 Wed 13:26:00

STATE: 0:General



POWER:

MODULATION:

+ 13 DBM

11MB/SEC

15.247 (D) SPECTRAL POWER
 DENSITY

SUPERVISED BY:

Morton Flom, P. Eng.

PAGE NO.

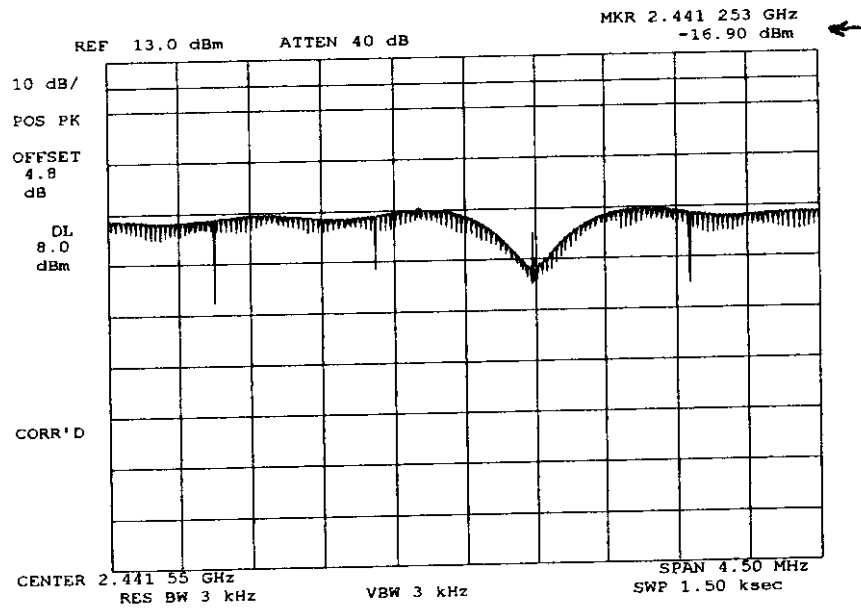
35 of 43.

NAME OF TEST:

Emission Masks (Occupied Bandwidth)
Indicating 6/20 dB Bandwidth

g98b0297: 1998-Nov-18 Wed 14:25:00

STATE: 0:General



POWER:

MODULATION:

+ 13DBM

11MB/SEC

15.247 (D) SPECTRAL POWER
DENSITY

SUPERVISED BY:

Morton Flom, P. Eng.

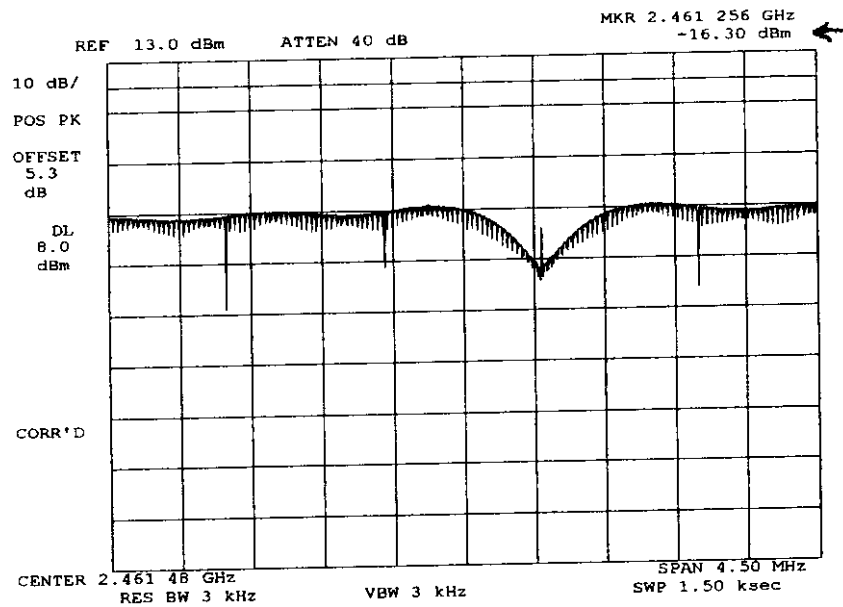
PAGE NO.

36 of 43.

NAME OF TEST: Emission Masks (Occupied Bandwidth)
 Indicating 6/20 dB Bandwidth

g98b0298: 1998-Nov-18 Wed 16:49:00

STATE: 0:General



POWER:

MODULATION:

+ 13DBM

11MB/SEC

15.247 (D) SPECTRAL POWER
 DENSITY

SUPERVISED BY:

Morton Flom P. Eng.

Morton Flom, P. Eng.

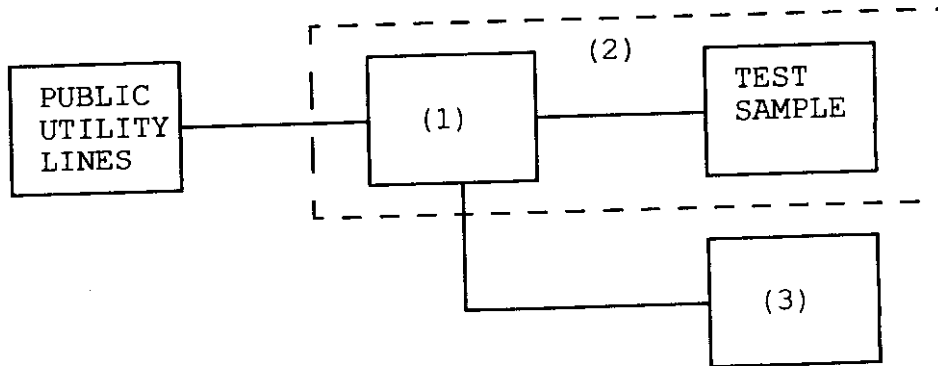
PAGE NO. 38 of 44.
NAME OF TEST: A/C Powerline Conducted Emissions
SPECIFICATION: FCC: 47 CFR 15.107
GUIDE: IEEE Standard 213
TEST CONDITIONS: S. T. & H.
TEST EQUIPMENT: As per attached page

MEASUREMENT PROCEDURE

1. A test sample was connected to the Public Utility lines through a LISN Ailtech Model 94641-1 (50 μ H).
2. A reference level of 250 μ V was set on the Spectrum Analyzer. The spectrum was searched over the range of 450 kHz to 30 MHz.
3. All other emissions were 20 dB or more below limit.
4. ☐ The test sample used a charger.
☒ The test sample does not use a charger.
5. Measurement Results: Attached.

PAGE NO.

38 of 43.

AC POWERLINE CONDUCTED MEASUREMENTS

Asset	Description	s/n	Cycle	Last Cal
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Per ANSI C63.4-1992, 10.1.4

(1) LINE IMPEDANCE STABILIZATION NETWORK

	i00077	Singer 91221-1 (5 μ H)	0396	12 mo.	
x	i00155	Eaton 94641-1 (50 μ H)	178	12 mo.	Sep-98
	i00167	Ailtech 94641-1 (50 μ H)	0103	12 mo.	

(2) SCREEN ROOM

x	i00169	Lindgren 22-2/2-0	3861		
	i00170	Lindgren LG170	4999		

(3) SPECTRUM ANALYZER

	i00029	HP 8563E	3213A00104	12 mo.	
x	i00033	HP 85462A	3625A00357	12 mo.	Dec-97
	i00048	HP 8566B	2511AD1467	6 mo.	Mar-98

PAGE 39 of 43.

EMISSIONS

AIRNET, LM4800

1998-NOV-17, 10:18, TUE

REMARK: POWERLINE CONDUCTED, NEUTRAL SIDE, UNGROUNDED

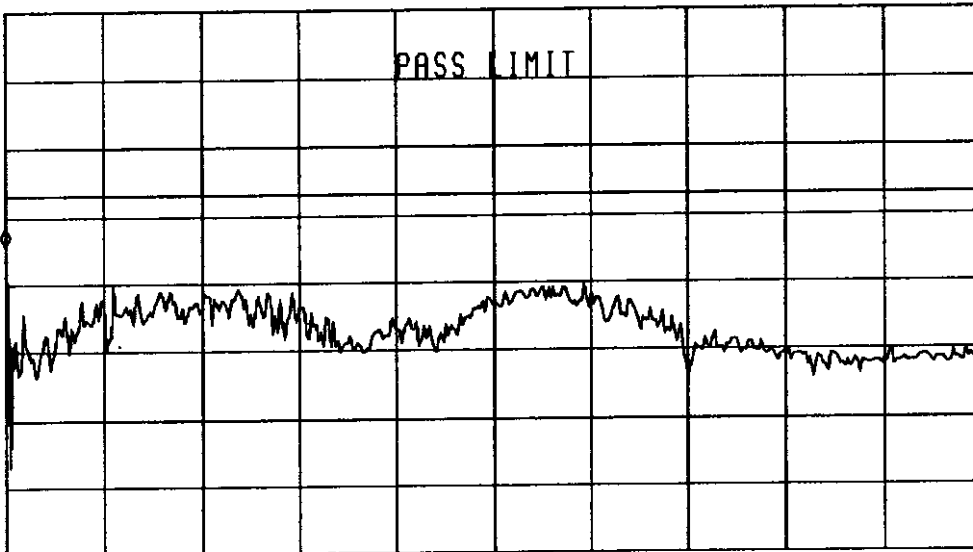


ACTV DET: PEAK
MEAS DET: PEAK QP AVG
MKR 450 kHz
40.52 dB μ V

LOG REF 75.0 dB μ V

10
dB/
ATN
10 dB

VA SB
SC FC
ACORR



START 450 kHz

RT #IF BW 9.0 kHz

AVG BW 30 kHz

STOP 30.00 MHz

SWP 2.46 sec

PAGE 40 of 43.

EMISSIONS

AIRNET, LM4800

1998-NOV-17, 10:18, TUE

REMARK: POWERLINE CONDUCTED, LINE SIDE, UNGROUNDED



ACTV DET: PEAK
MEAS DET: PEAK QP AVG
MKR 450 kHz
40.52 dBμV

LOG REF 75.0 dBμV

10
dB/
ATN
10 dB

PASS LIMIT

VA SB
SC FC
ACORR

START 450 kHz

RT #IF BW 9.0 kHz

AVG BW 30 kHz

STOP 30.00 MHz

SWP 2.46 sec

EMISSIONS

AIRONET, LM4800

1998-NOV-17, 10:18, TUE

REMARK: POWERLINE CONDUCTED, NEUTRAL SIDE, GROUNDED



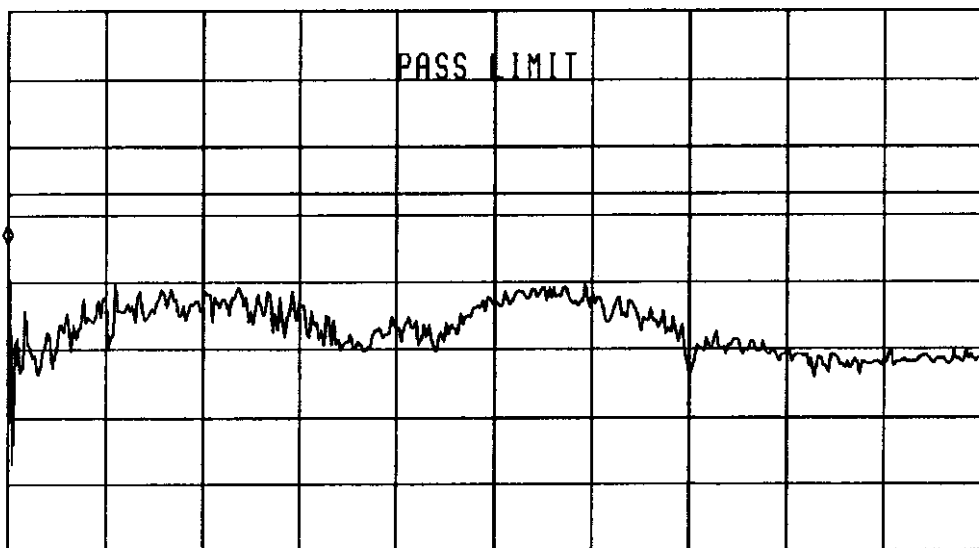
ACTV DET: PEAK
MEAS DET: PEAK QP AVG
MKR 450 kHz
40.52 dBμV

LOG REF 75.0 dBμV

10
dB/
ATN
10 dB

PASS LIMIT

VA SB
SC FC
ACORR



START 450 kHz

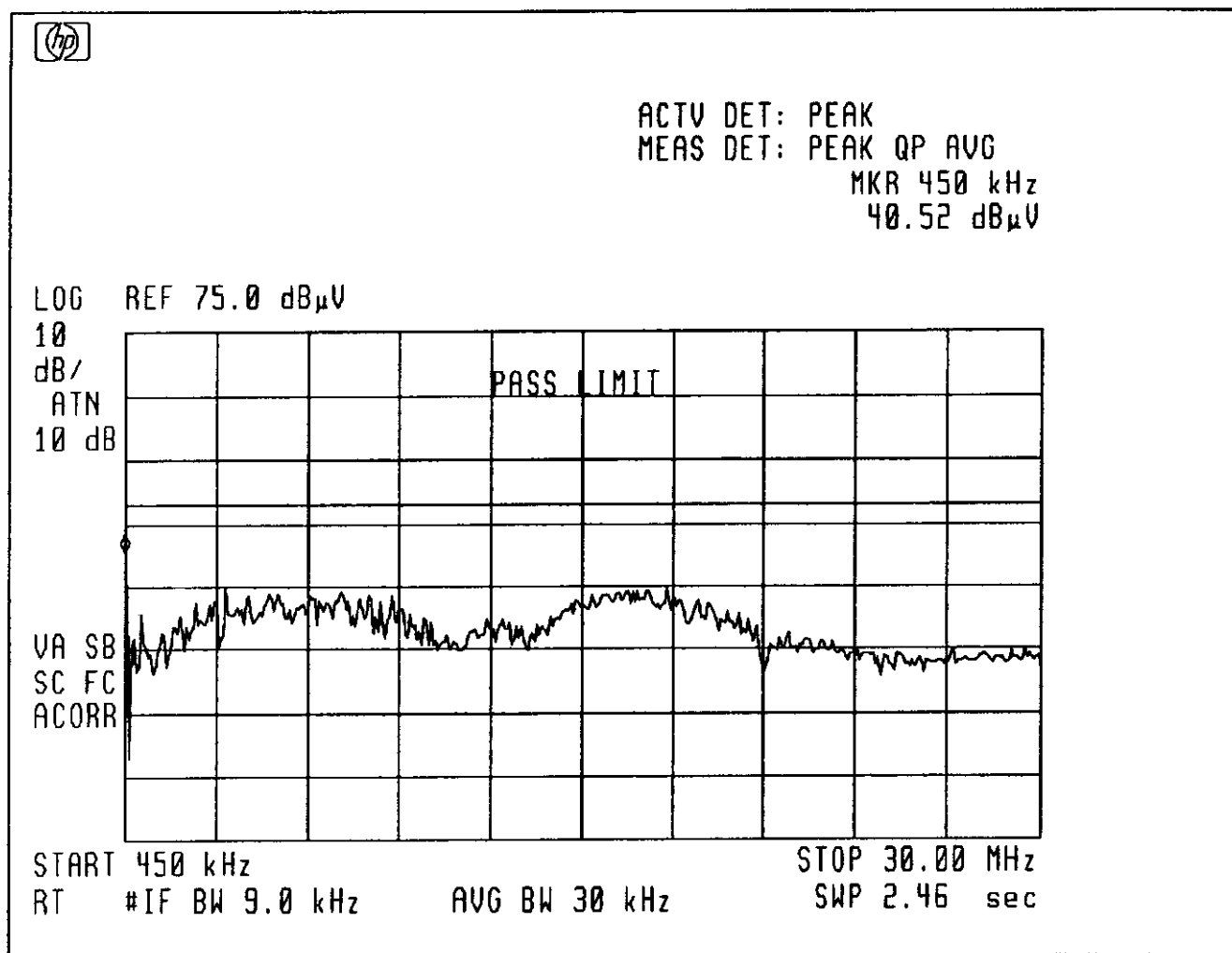
RT #IF BW 9.0 kHz

AVG BW 30 kHz

STOP 30.00 MHz

SWP 2.46 sec

REMARK: POWERLINE CONDUCTED, LINE SIDE, GROUNDED



PAGE NO. 43 of 43.

NAME OF TEST: Necessary Bandwidth and Emission Bandwidth

SPECIFICATION: 47 CFR 2.202(g)

Necessary Bandwidth
Necessary Bandwidth (B_N), MHz = 9.38 (Measured)

SUPERVISED BY:

A handwritten signature in black ink, appearing to read "M. Flom P. Eng.", with a horizontal line drawn underneath the signature.

Morton Flom, P. Eng.

RADIATED MEASUREMENTS
FOR PART 15 TRANSMITTERS W/ INTEGRAL ANTENNAS

Radiated Measurements

<u>RANGE OF MEASUREMENT</u>	<u>SPECIFICATION</u>	<u>RESOLUTION B/W</u>	<u>VIDEO B/A</u>
30 to 1000 MHz	CISPR	≥ 100 kHz	≥ 100 kHz
>1000 MHz	FCC, 15.37(b)	1 MHz	≥ 1 MHz
(if averaging)	FCC, 15.37(b)	1 MHz	10 Hz

Measuring Equipment

a. ANTENNAS:

EMCO 3109	20 - 300 MHz
APREL AALP2001	200 - 1000 MHz
APREL AAB20200	20 - 200 MHz
APREL AAH118	1 - 18 GHz

b. INSTRUMENTS:

HP8566B	Spectrum Analyzer
HP85685A	Preselector, w/ preamp below 2 GHz
HP85650A	Quasi Peak Adapter
HP8449	Preamp, above 2 GHz

All test instrumentation is calibrated every January and every July. In addition, all test instrumentation is calibrated daily, or as required by the manufacturer. A Calibration Agreement is maintained with Hewlett Packard.

Occupied Bandwidth

Occupied Bandwidth is measured as a radiated signal without attenuators and/or filter. RBW, VBW and scan settings as shown were set to produce a meaningful result in accordance with ANSI C63.4, Section 13.1.7.

Part 15.21, Information to User

The users manual or instruction manual for an intentional or unintentional radiator shall caution the user that changes or modifications not expressly avoided by the party responsible for compliance could void the user's authority to operate the equipment.

§ 15.205 Restricted Bands of Operation

(a) Except as shown in paragraph (b) of this section, only spurious emissions are permitted in any of the frequency bands listed below:

MHz	MHz	MHz	GHz
0.090-0.110	16.42-16.423	399.9-410	4.5-5.25
0.495-0.505	16.69475-16.69625	608-614	5.35-5.46
2.1735-2.1905	16.80425-16.80475	960-1240	7.25-7.75
4.125-4.128	25.5-25.67	1300-1427	8.025-8.5
4.17725-4.17775	37.5-38.25	1435-1626.5	9.0-9.2
4.20725-4.20775	73-74.6	1645.5-1646.5	9.3-9.5
6.215-6.218	74.8-75.2	1660-1710	10.6-12.7
6.26775-6.26825	108-121.94	1718.8-1722.2	13.25-13.4
6.31175-6.31225	123-138	2200-2300	14.47-14.5
8.291-8.294	149.9-150.05	2310-2390	15.35-16.2
8.362-8.366	156.52475-156.52525	2483.5-2500	17.7-21.4
8.37625-8.38675	156.7-156.9	2655-2900	22.01-23.12
8.41425-8.41475	162.0125-167.17	3260-3267	23.6-24.0
12.29-12.293	167.72-173.2	3332-3339	31.2-31.8
12.51975-12.52025	240-285	3345.8-3358	36.43-36.5
12.57675-12.57725	322-339.4	3600-4400	(2)
13.36-13.41			

Until February 1, 1999, this restricted band shall be 0.490-0.510 MHz. Above 38.6