

**MFA** **M. Flom Associates, Inc. - Global Compliance Center**  
3356 North San Marcos Place, Suite 107, Chandler, Arizona 85225-7176  
www.mflom.com general@mflom.com (480) 926-3100, FAX: 926-3598

---

Date: January 10, 2000

Federal Communications Commission  
Via: Electronic Filing

Attention: Authorization & Evaluation Division

Applicant: Kenwood Communications Corporation  
Equipment: TK-780H-2  
FCC ID: ALH24583220  
FCC Rules: 22, 74, 90, CLASS II PERMISSIVE CHANGE

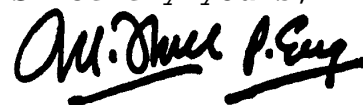
Gentlemen:

In support of a CLASS II PERMISSIVE CHANGE, attached please find the following:

1. Application Form 731
2. Filing Fee Form 159
3. Copy of original Grant
4. Engineering Test Data Report

We trust the same is in order. Should you need any further information, kindly contact the writer who is authorized to act as agent.

Sincerely yours,



Morton Flom, P. Eng.

enclosure(s)  
cc: Applicant  
MF/cvr

**MFA** **M. Flom Associates, Inc. - Global Compliance Center**  
3356 North San Marcos Place, Suite 107, Chandler, Arizona 85225-7176  
www.mflom.com general@mflom.com (480) 926-3100, FAX: 926-3598

---

Sub-part  
2.1033(c):

EQUIPMENT IDENTIFICATION

FCC ID: ALH24583220

NAMEPLATE DRAWING

ATTACHED, EXHIBIT 1.

LOCATION

AS PER LABEL DRAWING(S)

DATE OF REPORT

January 10, 2000

SUPERVISED BY:



Morton Flom, P. Eng.

THE APPLICANT HAS BEEN CAUTIONED AS TO THE FOLLOWING:

15.21 INFORMATION TO USER.

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

15.27(a) SPECIAL ACCESSORIES.

Equipment marketed to a consumer must be capable of complying with the necessary regulations in the configuration in which the equipment is marketed. Where special accessories, such as shielded cables and/or special connectors are required to enable an unintentional or intentional radiator to comply with the emission limits in this part, the equipment must be marketed with, i.e. shipped and sold with, those special accessories. However, in lieu of shipping or packaging the special accessories with the unintentional or intentional radiator, the responsible party may employ other methods of ensuring that the special accessories are provided to the consumer, without additional charge.


Information detailing any alternative method used to supply the special accessories for a grant of equipment authorization or retained in the verification records, as appropriate. The party responsible for the equipment, as detailed in § 2.909 of this chapter, shall ensure that these special accessories are provided with the equipment. The instruction manual for such devices shall include appropriate instructions on the first page of text concerned with the installation of the device that these special accessories must be used with the device. It is the responsibility of the user to use the needed special accessories supplied with the equipment.

TABLE OF CONTENTS

<u>RULE</u>	<u>DESCRIPTION</u>	<u>PAGE</u>
	Test Report	1
	Expository Statement for Permissive Changes	2
2.1033(c)	General Information Required	3
2.1033(c)(14)	Rule Summary	6
	Standard Test Conditions and Engineering Practices	7
2.1046(a)	Carrier Output Power (Conducted)	8
2.1049(c)(1)	Emission Masks (Occupied Bandwidth)	12
90.214	Transient Frequency Behavior	19
2.202(g)	Necessary Bandwidth and Emission Bandwidth	29

PAGE NO. 1 of 29.

*Required information per ISO/IEC Guide 25-1990, paragraph 13.2:*

- a) TEST REPORT
- b) Laboratory: M. Flom Associates, Inc.  
(FCC: 31040/SIT) 3356 N. San Marcos Place, Suite 107  
(Canada: IC 2044) Chandler, AZ 85224
- c) Report Number: d0010027
- d) Client: Kenwood Communications Corporation  
P.O. Box 22745  
Long Beach, CA 90801-5745
- e) Identification: TK-780H-2  
FCC ID: ALH24583220  
Description: UHF FM Mobile Transceiver
- f) EUT Condition: Not required unless specified in individual tests.
- g) Report Date: January 10, 2000  
EUT Received: July 12, 1999
- h, j, k): As indicated in individual tests.
- i) Sampling method: No sampling procedure used.
- l) Uncertainty: In accordance with MFA internal quality manual.
- m) Supervised by:   
Morton Flom, P. Eng.
- n) Results: The results presented in this report relate only to the item tested.
- o) Reproduction: This report must not be reproduced, except in full, without written permission from this laboratory.

PAGE NO. 2 of 29.

EXPOSITORY STATEMENT  
PERMISSIVE CHANGE

APPLICANT: Kenwood Communications Corporation

FCC ID: ALH24583220

The applicant has made design changes/improvements to the originally FCC approved equipment.

Data contained herein confirms that a Permissive Change to the unit has been effected and that the performance of the unit is at or better than the levels originally reported to the commission.

A copy of the original grant of equipment approval is included for convenience.

The following changes/improvements have been made:

Addition of data modulation

PAGE NO. 3 of 29.

LIST OF GENERAL INFORMATION REQUIRED FOR CERTIFICATION

IN ACCORDANCE WITH FCC RULES AND REGULATIONS,  
VOLUME II, PART 2 AND TO

22, 74, 90

Sub-part 2.1033

(c)(1): NAME AND ADDRESS OF APPLICANT:

Kenwood Communications Corporation  
2201 E. Dominguez St  
P.O. Box 22745  
Long Beach, CA 90801-5745

MANUFACTURER:

Kenwood Technologies Pte. Ltd.  
1 Ang Mo Kio Street 63  
Singapore 569110

(c)(2): FCC ID: ALH24583220

MODEL NO: TK-780H-2

(c)(3): INSTRUCTION MANUAL(S):

PLEASE SEE ATTACHED EXHIBITS


(c)(4): TYPE OF EMISSION: 16K0F3E, 11K0F3E

(c)(5): FREQUENCY RANGE, MHz: 136 to 162

(c)(6): POWER RATING, Watts: 10 to 45  
     Switchable    x Variable      N/A

(c)(7): MAXIMUM POWER RATING, Watts: 300

M. Flom Associates, Inc. is accredited by the American Association for Laboratory Association (A2LA) as shown in the scope below.



**THE AMERICAN ASSOCIATION FOR LABORATORY ACCREDITATION**

**ACCREDITED LABORATORY**

A2LA has accredited

**M. FLOM ASSOCIATES, INC.**  
Chandler, AZ

for technical competence in the field of

**Electrical (EMC) Testing**


The accreditation covers the specific tests and types of tests listed on the agreed scope of accreditation. This laboratory meets the requirements of ISO/IEC Guide 25-1990 "General Requirements for the Competence of Calibration and Testing Laboratories" (equivalent to relevant requirements of the ISO 9000 series of standards) and any additional program requirements in the identified field of testing.

Presented this 24<sup>th</sup> day of November, 1998.



*Peter Almy*  
President  
For the Accreditation Council  
Certificate Number 1008.01  
Valid to December 31, 2000

For tests or types of tests to which this accreditation applies, please refer to the laboratory's Electrical (EMC) Scope of Accreditation



**American Association for Laboratory Accreditation**

**SCOPE OF ACCREDITATION TO ISO/IEC GUIDE 25-1990 AND EN 45001**

M. FLOM ASSOCIATES, INC.  
Electronic Testing Laboratory  
3356 North San Marcos Place, Suite 107  
Chandler, AZ 85224-1571  
Morton Flom Phone: 602 926 3100

**ELECTRICAL (EMC)**

Valid to: December 31, 2000 Certificate Number: 1008-01

In recognition of the successful completion of the A2LA evaluation process, accreditation is granted to this laboratory to perform the following **electromagnetic compatibility tests**:

Tests	Standard(s)
RF Emissions	FCC Part 15 (Subparts B and C) using ANSI C63.4-1992; CISPR 11; CISPR 13; CISPR 14; CISPR 22; EN 55011; EN 55013; EN 55014; EN 55022; EN 50081-1; EN 50081-2; FCC Part 18; ICES-003; AS/NZS 1044; AS/NZS 1053; AS/NZS 3548; AS/NZS 4251.1
RF Immunity	EN 50082-1; EN 50082-2; AS/NZS 4251.1
Radiated Susceptibility	EN 61000-4-3; ENV 50140; ENV 50204; IEC 1000-4-3; IEC 801-3
ESD	EN 61000-4-2; IEC 1000-4-2; IEC 801-2
EFT	EN 61000-4-4; IEC 1000-4-4; IEC 801-4
Surge	EN 61000-4-5; ENV 50142; IEC 1000-4-5; IEC 801-5
47 CFR (FCC)	2, 21, 22, 23, 24, 74, 80, 87, 90, 95, 97

*Peter Almy*

5301 Buckeystown Pike, Suite 350 • Frederick, MD 21704-8307 • Phone: 301 644 3200 • Fax: 301 662 2974

"This laboratory is accredited by the American Association for Laboratory Accreditation (A2LA) and the results shown in this report have been determined in accordance with the laboratory's terms of accreditation unless stated otherwise in the report."

Should this report contain any data for tests for which we are not accredited, or which have been undertaken by a subcontractor that is not A2LA accredited, such data would not covered by this laboratory's A2LA accreditation.



PAGE NO. 5 of 29.

Subpart 2.1033 (continued)

(c)(8): VOLTAGES & CURRENTS IN ALL ELEMENTS IN FINAL R. F. STAGE, INCLUDING FINAL TRANSISTOR OR SOLID STATE DEVICE:

COLLECTOR CURRENT, A = per manual  
 COLLECTOR VOLTAGE, Vdc = per manual  
 SUPPLY VOLTAGE, Vdc = 13.6

(c)(9): TUNE-UP PROCEDURE:

PLEASE SEE ATTACHED EXHIBITS

(c)(10): CIRCUIT DIAGRAM/CIRCUIT DESCRIPTION:

Including description of circuitry & devices provided for determining and stabilizing frequency, for suppression of spurious radiation, for limiting modulation and limiting power.

PLEASE SEE ATTACHED EXHIBITS

(c)(11): LABEL INFORMATION:

PLEASE SEE ATTACHED EXHIBITS

(c)(12): PHOTOGRAPHS:

PLEASE SEE ATTACHED EXHIBITS

(c)(13): DIGITAL MODULATION DESCRIPTION:

     ATTACHED EXHIBITS  
  x   N/A

(c)(14): TEST AND MEASUREMENT DATA:

FOLLOWS

PAGE NO.

6 of 29.

Sub-part  
2.1033(c)(14):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 2.947, 2.1033(c), 2.1041, 2.1046, 2.1047, 2.1079, 2.1051, 2.1053, 2.1055, 2.1057 and the following individual Parts:

- 21 - Domestic Public Fixed Radio Services
- 22 - Public Mobile Services
- 22 Subpart H - Cellular Radiotelephone Service
- 22.901(d) - Alternative technologies and auxiliary services
- 23 - International Fixed Public Radiocommunication services
- 24 - Personal Communications Services
- 74 Subpart H - Low Power Auxiliary Stations
- 80 - Stations in the Maritime Services
- 80 Subpart E - General Technical Standards
- 80 Subpart F - Equipment Authorization for Compulsory Ships
- 80 Subpart K - Private Coast Stations and Marine Utility Stations
- 80 Subpart S - Compulsory Radiotelephone Installations for Small Passenger Boats
- 80 Subpart T - Radiotelephone Installation Required for Vessels on the Great Lakes
- 80 Subpart U - Radiotelephone Installations Required by the Bridge-to-Bridge Act
- 80 Subpart V - Emergency Position Indicating Radiobeacons (EPIRB'S)
- 80 Subpart W - Global Maritime Distress and Safety System (GMDSS)
- 80 Subpart X - Voluntary Radio Installations
- 87 - Aviation Services
- 90 - Private Land Mobile Radio Services
- 94 - Private Operational-Fixed Microwave Service
- 95 Subpart A - General Mobile Radio Service (GMRS)
- 95 Subpart C - Radio Control (R/C) Radio Service
- 95 Subpart D - Citizens Band (CB) Radio Service
- 95 Subpart E - Family Radio Service
- 95 Subpart F - Interactive Video and Data Service (IVDS)
- 97 - Amateur Radio Service
- 101 - Fixed Microwave Services

PAGE NO.

7 of 29.

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. 8 of 29.

NAME OF TEST: Unwanted Emissions (Transmitter Conducted)

SPECIFICATION: 47 CFR 2.1051

GUIDE: ANSI/TIA/EIA-603-1992, Paragraph 2.2.13

TEST EQUIPMENT: As per attached page

MEASUREMENT PROCEDURE

1. The emissions were measured for the worst case as follows:
  - (a): within a band of frequencies defined by the carrier frequency plus and minus one channel.
  - (b): from the lowest frequency generated in the EUT and to at least the 10th harmonic of the carrier frequency, or 40 GHz, whichever is lower.
2. The magnitude of spurious emissions that are attenuated more than 20 dB below the permissible value need not be specified.
3. MEASUREMENT RESULTS: ATTACHED FOR WORST CASE

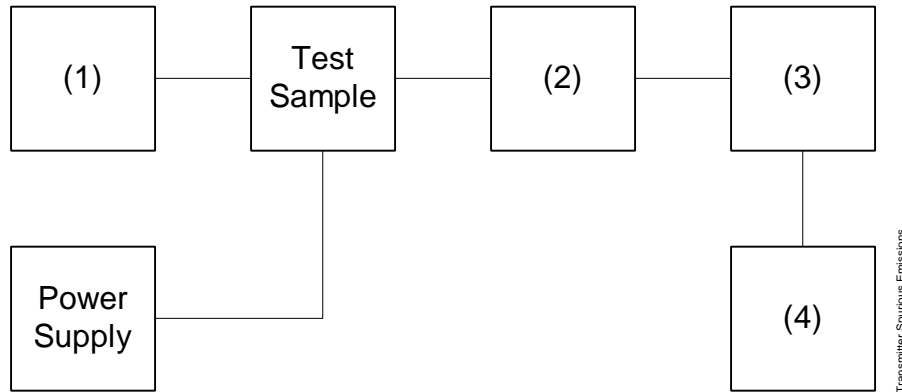
FREQUENCY OF CARRIER, MHz	=	149.1, 136.1, 161.9
SPECTRUM SEARCHED, GHz	=	0 to 10 x F <sub>c</sub>
MAXIMUM RESPONSE, Hz	=	0
ALL OTHER EMISSIONS	=	= 20 dB BELOW LIMIT
LIMIT(S), dBc		
	- (50+10xLOG P)	= -60 (10 Watts)
	- (50+10xLOG P)	= -66.5 (45 Watts)

SUPERVISED BY:

Morton Flom, P. Eng.

TRANSMITTER SPURIOUS EMISSION

TEST A. OCCUPIED BANDWIDTH (IN-BAND SPURIOUS)  
 TEST B. OUT-OF-BAND SPURIOUS



Asset Description (as applicable)	s/n
<u>(1) AUDIO OSCILLATOR/GENERATOR</u>	
i00010 HP 204D	1105A04683
i00017 HP 8903A	2216A01753
i00012 HP 3312A	1432A11250
<u>(2) COAXIAL ATTENUATOR</u>	
i00122 Narda 766-10	7802
i00123 Narda 766-10	7802A
i00069 Bird 8329 (30 dB)	1006
i00113 Sierra 661A-3D	1059
<u>(3) FILTERS; NOTCH, HP, LP, BP</u>	
i00126 Eagle TNF-1	100-250
i00125 Eagle TNF-1	50-60
i00124 Eagle TNF-1	250-850
<u>(4) SPECTRUM ANALYZER</u>	
i00048 HP 8566B	2511A01467
i00029 HP 8563E	3213A00104

PAGE NO. 10 of 29.

NAME OF TEST: Unwanted Emissions (Transmitter Conducted)  
 g0010066: 2000-Jan-07 Fri 10:07:00  
 STATE: 2:High Power

FREQUENCY TUNED, MHz	FREQUENCY EMISSION, MHz	LEVEL, dBm	LEVEL, dBc	MARGIN, dB
136.100000	272.190000	-25.7	-72.2	-5.7
149.100000	297.840000	-27.7	-74.2	-7.7
161.900000	323.866667	-30	-76.5	-10
136.100000	408.180000	-29.5	-76	-9.5
149.100000	447.335000	-28.7	-75.2	-8.7
161.900000	485.450000	-28.8	-75.3	-8.8
136.100000	544.215000	-29.3	-75.8	-9.3
149.100000	596.380000	-29.5	-76	-9.5
161.900000	647.441667	-28.3	-74.8	-8.3
136.100000	680.320000	-29.3	-75.8	-9.3
149.100000	745.320000	-29.8	-76.3	-9.8
161.900000	809.368333	-29.2	-75.7	-9.2
136.100000	816.300000	-29.8	-76.3	-9.8
149.100000	894.141667	-28.8	-75.3	-8.8
136.100000	952.606667	-29.2	-75.7	-9.2
161.900000	971.575000	-29	-75.5	-9
149.100000	1044.078333	-28.5	-75	-8.5
136.100000	1089.180000	-29.5	-76	-9.5
161.900000	1133.743333	-29.3	-75.8	-9.3
149.100000	1192.530000	-29	-75.5	-9
136.100000	1224.466667	-28.7	-75.2	-8.7
161.900000	1295.125000	-29.5	-76	-9.5
149.100000	1341.573333	-29.5	-76	-9.5
136.100000	1360.781667	-29.5	-76	-9.5
161.900000	1457.011667	-29.7	-76.2	-9.7
149.100000	1490.533333	-28.8	-75.3	-8.8
136.100000	1496.626667	-29.7	-76.2	-9.7
161.900000	1619.346667	-29.2	-75.7	-9.2
136.100000	1633.526667	-29.3	-75.8	-9.3
149.100000	1639.643333	-29	-75.5	-9
136.100000	1769.415000	-29.8	-76.3	-9.8
161.900000	1781.386667	-28.3	-74.8	-8.3
149.100000	1789.666667	-29.2	-75.7	-9.2
136.100000	1905.585000	-29.2	-75.7	-9.2
149.100000	1938.616667	-29.2	-75.7	-9.2
161.900000	1942.303333	-29.5	-76	-9.5
136.100000	2041.730000	-28.2	-74.7	-8.2
149.100000	2087.463333	-29.2	-75.7	-9.2
161.900000	2104.568333	-29.8	-76.3	-9.8
149.100000	2236.510000	-28.5	-75	-8.5
161.900000	2266.926667	-28	-74.5	-8
161.900000	2428.413333	-27.8	-74.3	-7.8

PAGE NO. 11 of 29.

NAME OF TEST: Unwanted Emissions (Transmitter Conducted)  
 g0010067: 2000-Jan-07 Fri 10:26:00  
 STATE: 2:High Power

FREQUENCY TUNED, MHz	FREQUENCY EMISSION, MHz	LEVEL, dBm	LEVEL, dBc	MARGIN, dB
136.100000	272.193333	-26.5	-66.5	-6.5
149.100000	298.198333	-37.2	-77.2	-17.2
161.900000	323.493333	-40.2	-80.2	-20.2
136.100000	407.858333	-39.7	-79.7	-19.7
149.100000	447.301667	-39.3	-79.3	-19.3
161.900000	485.696667	-38.7	-78.7	-18.7
136.100000	544.436667	-39	-79	-19
149.100000	596.553333	-40	-80	-20
161.900000	647.761667	-39.8	-79.8	-19.8
136.100000	680.915000	-39.3	-79.3	-19.3
149.100000	745.155000	-40.2	-80.2	-20.2
161.900000	809.903333	-39.3	-79.3	-19.3
136.100000	816.221667	-40.3	-80.3	-20.3
149.100000	894.651667	-39	-79	-19
136.100000	952.488333	-39.2	-79.2	-19.2
161.900000	971.841667	-40.3	-80.3	-20.3
149.100000	1043.616667	-39.7	-79.7	-19.7
136.100000	1088.390000	-40.3	-80.3	-20.3
161.900000	1132.805000	-40.2	-80.2	-20.2
149.100000	1193.085000	-40	-80	-20
136.100000	1224.578333	-40.3	-80.3	-20.3
161.900000	1294.930000	-40.3	-80.3	-20.3
149.100000	1341.463333	-40.5	-80.5	-20.5
136.100000	1361.373333	-40	-80	-20
161.900000	1456.763333	-40	-80	-20
149.100000	1490.615000	-40.2	-80.2	-20.2
136.100000	1497.013333	-40.2	-80.2	-20.2
161.900000	1619.391667	-40.2	-80.2	-20.2
136.100000	1632.850000	-39	-79	-19
149.100000	1640.210000	-40.5	-80.5	-20.5
136.100000	1769.175000	-40.2	-80.2	-20.2
161.900000	1780.595000	-39.5	-79.5	-19.5
149.100000	1789.203333	-39.5	-79.5	-19.5
136.100000	1905.260000	-40.3	-80.3	-20.3
149.100000	1938.238333	-39.8	-79.8	-19.8
161.900000	1942.408333	-39.5	-79.5	-19.5
136.100000	2041.070000	-39.3	-79.3	-19.3
149.100000	2087.438333	-39	-79	-19
161.900000	2105.005000	-39.7	-79.7	-19.7
149.100000	2236.555000	-39.8	-79.8	-19.8
161.900000	2266.293333	-40.2	-80.2	-20.2
161.900000	2428.463333	-38.5	-78.5	-18.5

PAGE NO. 12 of 29.  
NAME OF TEST: Emission Masks (Occupied Bandwidth)  
SPECIFICATION: 47 CFR 2.1049(c)(1)  
GUIDE: ANSI/TIA/EIA-603-1992, Paragraph 2.2.11  
TEST EQUIPMENT: As per previous page

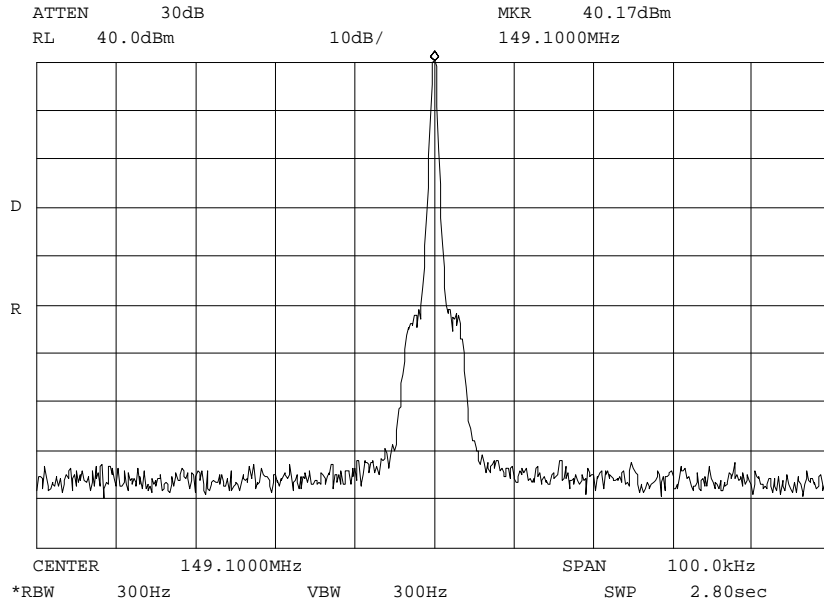
MEASUREMENT PROCEDURE

1. The EUT and test equipment were set up as shown on the following page, with the Spectrum Analyzer connected.
2. For EUTs supporting audio modulation, the audio signal generator was adjusted to the frequency of maximum response and with output level set for  $\pm 2.5$  kHz deviation (or 50% modulation). With level constant, the signal level was increased 16 dB.
3. For EUTs supporting digital modulation, the digital modulation mode was operated to its maximum extent.
4. The Occupied Bandwidth was measured with the Spectrum Analyzer controls set as shown on the test results.
5. MEASUREMENT RESULTS: ATTACHED



PAGE NO. 13 of 29.

NAME OF TEST: Emission Masks (Occupied Bandwidth)  
g0010062: 2000-Jan-07 Fri 09:44:00  
STATE: 1:Low Power



POWER: LOW  
MODULATION: NONE

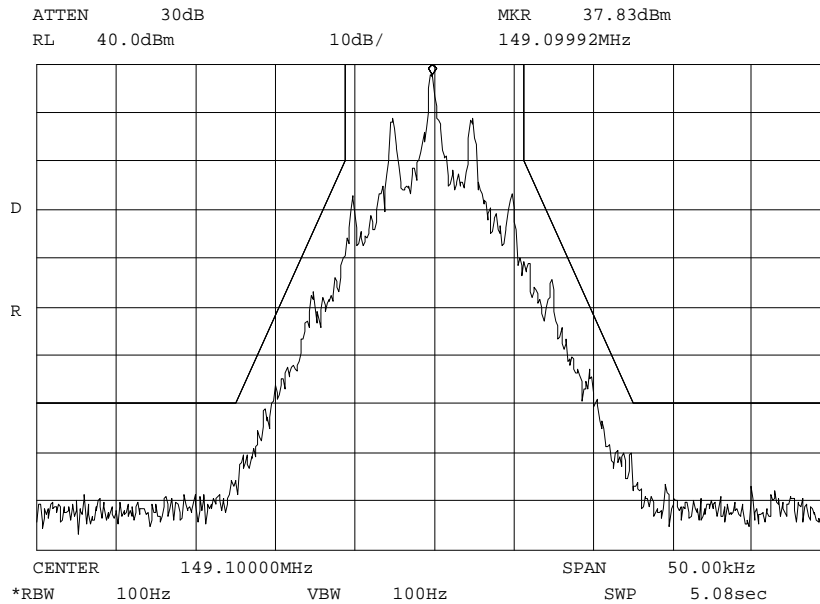
SUPERVISED BY:

Morton Flom, P. Eng.



PAGE NO. 15 of 29.

NAME OF TEST: Emission Masks (Occupied Bandwidth)  
g0010065: 2000-Jan-07 Fri 09:54:00  
STATE: 1:Low Power



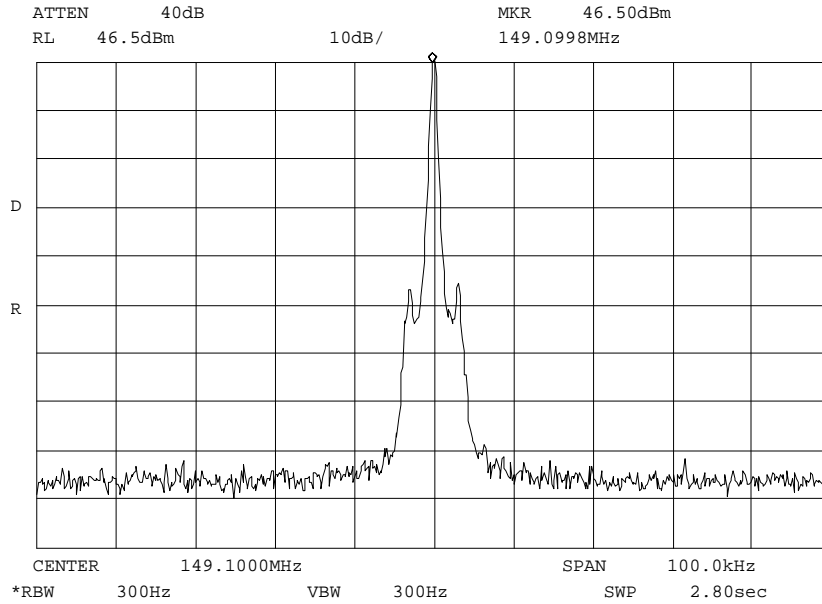
POWER: LOW  
MODULATION: GMSK @ 9600 BITS PER SECOND  
MASK: D, VHF/UHF 12.5kHz BW

SUPERVISED BY:

Morton Flom, P. Eng.

PAGE NO. 16 of 29.

NAME OF TEST: Emission Masks (Occupied Bandwidth)  
g0010063: 2000-Jan-07 Fri 09:47:00  
STATE: 2:High Power



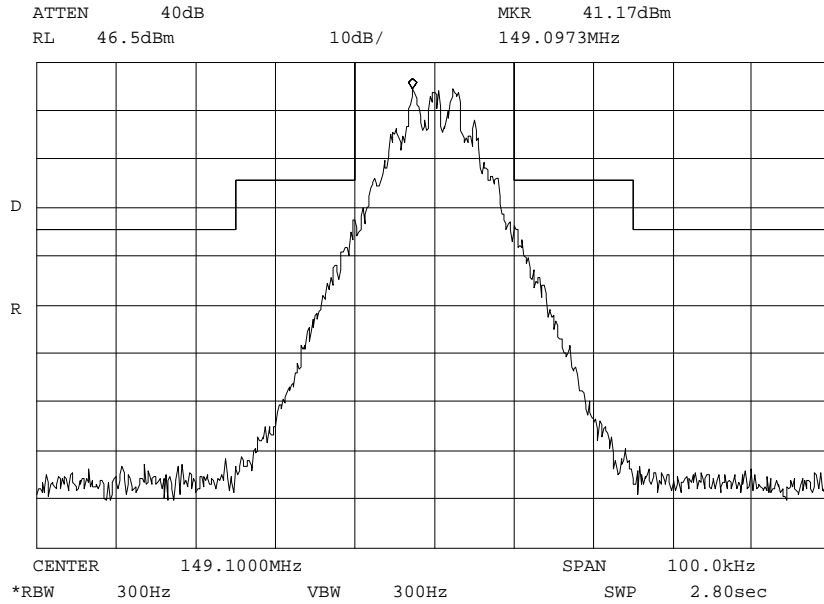
POWER: HIGH  
MODULATION: NONE

SUPERVISED BY:

Morton Flom, P. Eng.

PAGE NO. 17 of 29.

NAME OF TEST: Emission Masks (Occupied Bandwidth)  
g0010060: 2000-Jan-07 Fri 09:41:00  
STATE: 2:High Power



POWER:  
MODULATION:

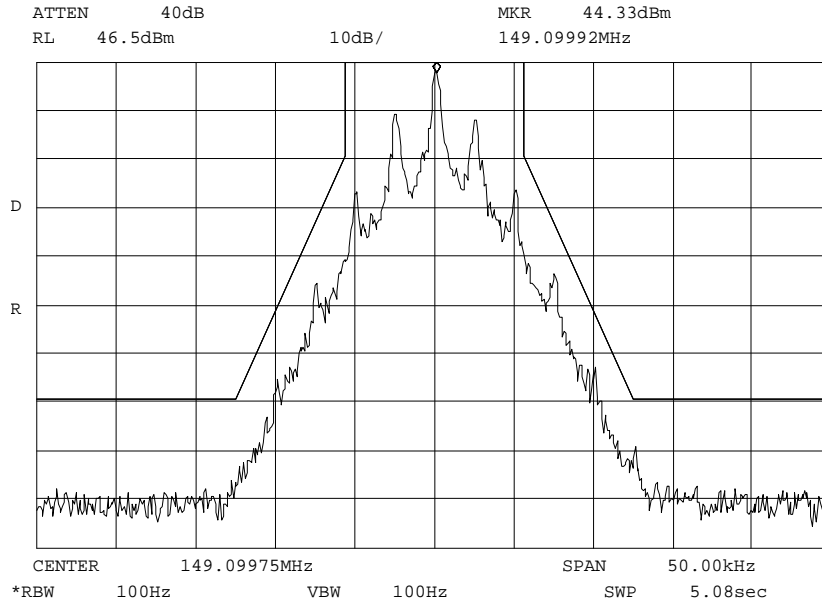
HIGH  
GMSK @ 19200 BITS PER  
SECOND  
MASK: B, VHF/UHF 25kHz,  
w/LPF

SUPERVISED BY:

*Morton Flom P. Eng.*  
Morton Flom, P. Eng.

PAGE NO. 18 of 29.

NAME OF TEST: Emission Masks (Occupied Bandwidth)  
g0010064: 2000-Jan-07 Fri 09:52:00  
STATE: 2:High Power



POWER:  
MODULATION:

HIGH  
GMSK @ 9600 BITS PER SECOND  
MASK: D, VHF/UHF 12.5kHz BW

SUPERVISED BY:

*Morton Flom P. Eng.*  
Morton Flom, P. Eng.

PAGE NO. 19 of 29.  
NAME OF TEST: Transient Frequency Behavior  
SPECIFICATION: 47 CFR 90.214  
GUIDE: ANSI/TIA/EIA-603-1992, Paragraph 2.2.19  
TEST EQUIPMENT: As per attached page

MEASUREMENT PROCEDURE

1. The EUT was setup as shown on the attached page, following TIA/EIA-603 steps a, b, and c as a guide.
2. The transmitter was turned on.
3. Sufficient attenuation was provided so that the transmitter carrier level measured at the output of the combiner was 40 dB below the maximum input level of the test receiver. This level was recorded as step f.
4. The transmitter was turned off.
5. An RF signal generator (1) modulated with a 1 kHz tone at either 25, 12.5, or 6.25 kHz deviation, and set to the same frequency as the assigned transmitter frequency, (2) was adjusted to a level -20 dB below the level recorded for step f, as measured at the output of the combiner. This level was then fixed for the remainder of the test and is recorded at step h.
6. The oscilloscope was setup using TIA/EIA-603 steps j and k as a guide, and to either 10 ms/div (UHF) or 5 ms/div (VHF).
7. The 30 dB attenuator was removed, the transmitter was turned on, and the level of the carrier at the output of the combiner was recorded as step l.
8. The carrier on-time as referenced in TIA/EIA-603 steps m, n, and o was captured and plotted. The carrier off-time as referenced in TIA/EIA-603 steps p, q, r, and s was captured and plotted.

LEVELS MEASURED:

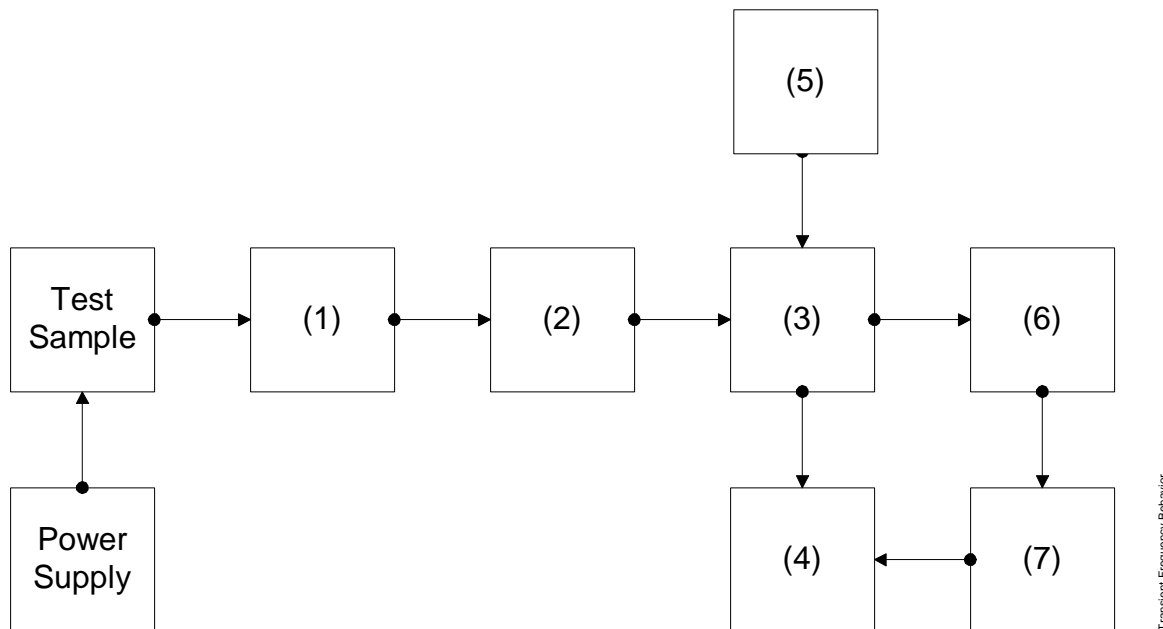
step f, dBm	=	-16.5
step h, dBm	=	-34.3
step l, dBm	=	16.2



SUPERVISED BY:

Morton Flom, P. Eng.

TRANSIENT FREQUENCY BEHAVIOR

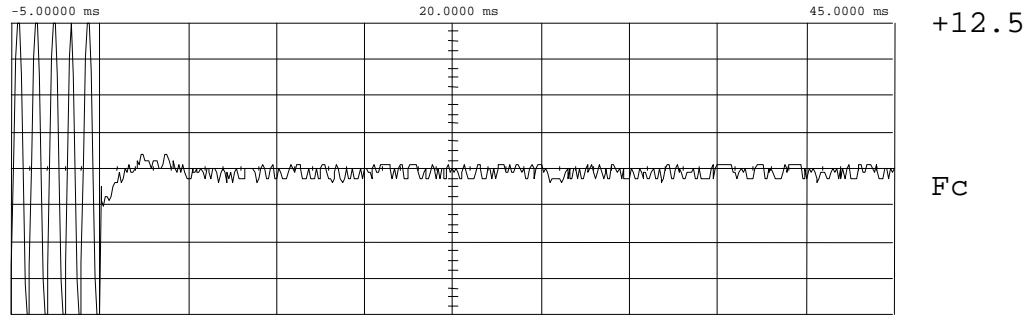


Asset	Description (as applicable)	s/n
(1)	<u>ATTENUATOR</u> (Removed after 1st step) i00112 Philco 30 dB	989
(2)	<u>ATTENUATOR</u> i00112 Philco 30 dB i00172 Bird 30 dB i00122 Narda 10 dB i00123 Narda 10 dB i00110 Kay Variable	989 989 7802 7802A 145-387
(3)	<u>COMBINER</u> i00154 4 x 25 Ω COMBINER	154
(4)	<u>CRYSTAL DETECTOR</u> i00159 HP 8470B	1822A10054
(5)	<u>RF SIGNAL GENERATOR</u> i00018 HP 8656A i00031 HP 8656A i00067 HP 8920A	2228A03472 2402A06180 3345U01242
(6)	<u>MODULATION ANALYZER</u> i00020 HP 8901A	2105A01087
(7)	<u>SCOPE</u> i00030 HP 54502A	2927A00209



PAGE NO. 21 of 29.

NAME OF TEST: Transient Frequency Behavior  
 g0010069: 2000-Jan-07 Fri 12:13:00  
 STATE: 2:High Power



Main	Timebase	Delay/Pos	Reference	Mode
	5.00 ms/div	20.0000 ms	Center	Repetitive
Channel 1	Sensitivity	Offset	Probe	Coupling
	250 mV/div	0.00000 V	1.000 :1	dc (1M Ohm)

Trigger mode : Edge  
 On Negative Edge Of Chan2  
 Trigger Level  
 Chan2 = -4.000 mV (noise reject ON)  
 Holdoff = 40.000 ns

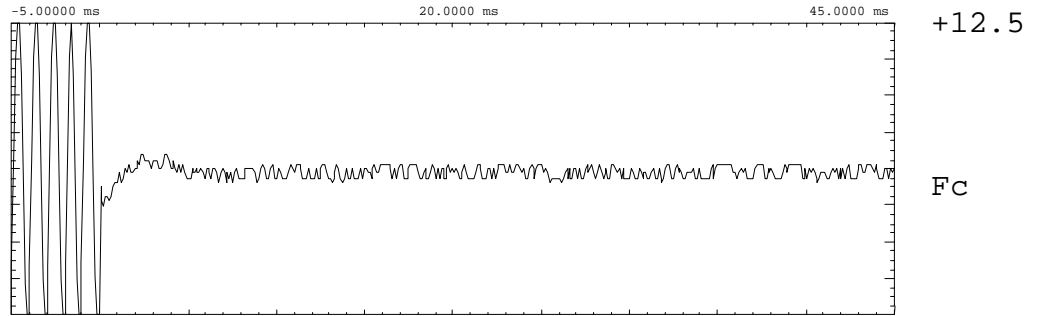
POWER :	HIGH
MODULATION :	Ref Gen=12.5 kHz Deviation
DESCRIPTION :	CARRIER ON TIME

SUPERVISED BY:

*Morton Flom P. Eng.*  
 Morton Flom, P. Eng.

PAGE NO. 22 of 29.

NAME OF TEST: Transient Frequency Behavior  
 g0010070: 2000-Jan-07 Fri 12:13:00  
 STATE: 2:High Power



Main	Timebase 5.00 ms/div	Delay/Pos 20.0000 ms	Reference Center	Mode Repetitive
Channel 1	Sensitivity 250 mV/div	Offset 0.00000 V	Probe 1.000 :1	Coupling dc (1M Ohm)

Trigger mode : Edge  
 On Negative Edge Of Chan2  
 Trigger Level  
 Chan2 = -4.000 mV (noise reject ON)  
 Holdoff = 40.000 ns

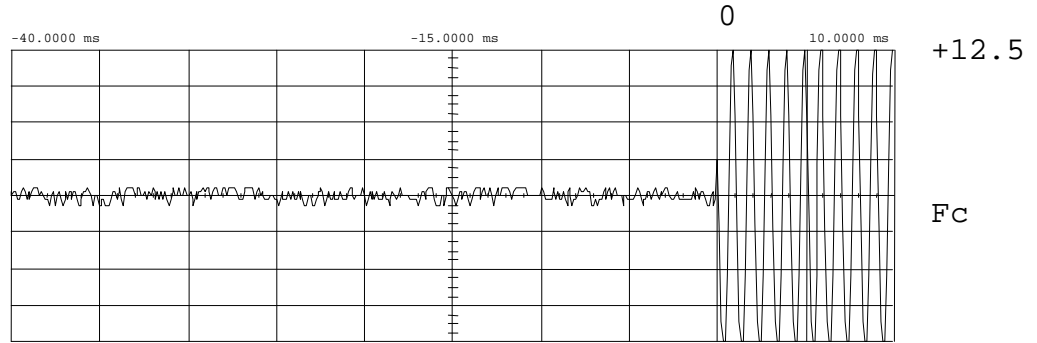
POWER :	HIGH
MODULATION :	Ref Gen=12.5 kHz Deviation
DESCRIPTION :	CARRIER ON TIME

SUPERVISED BY:

*Morton Flom P. Eng.*  
 Morton Flom, P. Eng.

PAGE NO. 23 of 29.

NAME OF TEST: Transient Frequency Behavior  
 g0010071: 2000-Jan-07 Fri 12:15:00  
 STATE: 2:High Power



Main	Timebase 5.00 ms/div	Delay/Pos -15.0000 ms	Reference Center	Mode Repetitive
Channel 1	Sensitivity 250 mV/div	Offset 0.00000 V	Probe 1.000 :1	Coupling dc (1M Ohm)

Trigger mode : Edge  
 On Positive Edge Of Chan2  
 Trigger Level  
 Chan2 = -175.000 mV (noise reject ON)  
 Holdoff = 40.000 ns

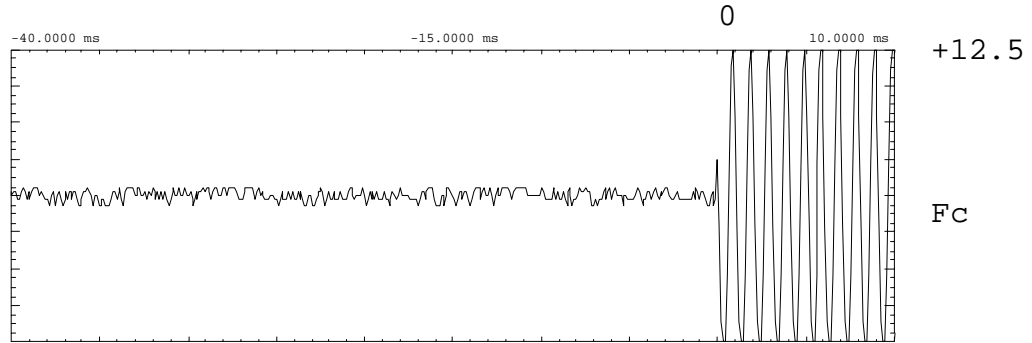
POWER :	HIGH
MODULATION :	Ref Gen=12.5 kHz Deviation
DESCRIPTION :	CARRIER OFF TIME

SUPERVISED BY:

*Morton Flom P. Eng.*  
 Morton Flom, P. Eng.

PAGE NO. 24 of 29.

NAME OF TEST: Transient Frequency Behavior  
 g0010072: 2000-Jan-07 Fri 12:15:00  
 STATE: 2:High Power



Main	Timebase	Delay/Pos	Reference	Mode
	5.00 ms/div	-15.0000 ms	Center	Repetitive
Channel 1	Sensitivity	Offset	Probe	Coupling
	250 mV/div	0.00000 V	1.000 :1	dc (1M Ohm)

Trigger mode : Edge  
 On Positive Edge Of Chan2  
 Trigger Level  
 Chan2 = -175.000 mV (noise reject ON)  
 Holdoff = 40.000 ns

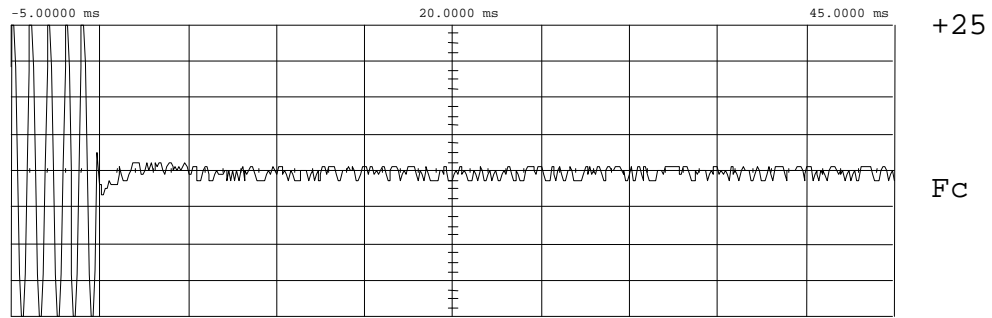
POWER :	HIGH
MODULATION :	Ref Gen=12.5 kHz Deviation
DESCRIPTION :	CARRIER OFF TIME

SUPERVISED BY:

Morton Flom, P. Eng.

PAGE NO. 25 of 29.

NAME OF TEST: Transient Frequency Behavior  
 g0010073: 2000-Jan-07 Fri 12:17:00  
 STATE: 2:High Power



Main	Timebase 5.00 ms/div	Delay/Pos 20.0000 ms	Reference Center	Mode Repetitive
Channel 1	Sensitivity 500 mV/div	Offset 0.00000 V	Probe 1.000 :1	Coupling dc (1M Ohm)

Trigger mode : Edge  
 On Negative Edge Of Chan2  
 Trigger Level  
 Chan2 = -4.500 mV (noise reject ON)  
 Holdoff = 40.000 ns

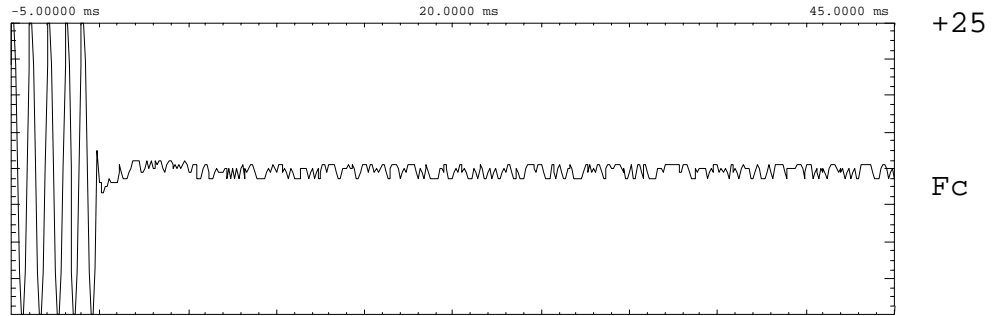
POWER :	HIGH
MODULATION :	Ref Gen=25 kHz Deviation
DESCRIPTION :	CARRIER ON TIME

SUPERVISED BY:

*Morton Flom P. Eng.*  
 Morton Flom, P. Eng.

PAGE NO. 26 of 29.

NAME OF TEST: Transient Frequency Behavior  
 g0010074: 2000-Jan-07 Fri 12:18:00  
 STATE: 2:High Power



Main	Timebase 5.00 ms/div	Delay/Pos 20.0000 ms	Reference Center	Mode Repetitive
Channel 1	Sensitivity 500 mV/div	Offset 0.00000 V	Probe 1.000 :1	Coupling dc (1M Ohm)

Trigger mode : Edge  
 On Negative Edge Of Chan2  
 Trigger Level  
 Chan2 = -4.500 mV (noise reject ON)  
 Holdoff = 40.000 ns

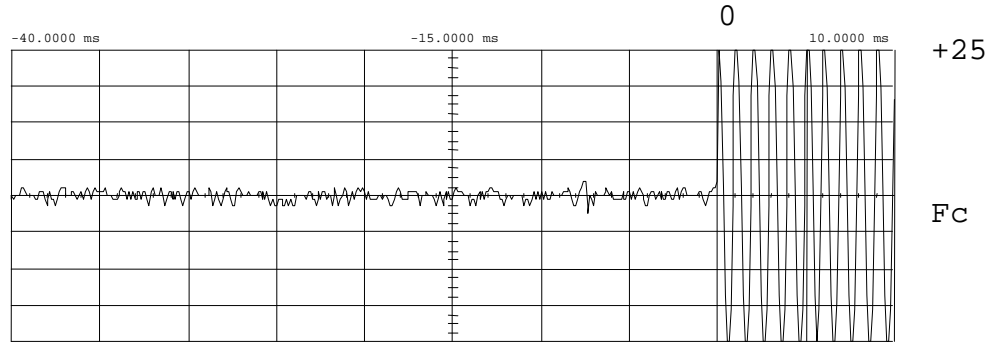
POWER :	HIGH
MODULATION :	Ref Gen=25 kHz Deviation
DESCRIPTION :	CARRIER ON TIME

SUPERVISED BY:

*Morton Flom P. Eng.*  
 Morton Flom, P. Eng.

PAGE NO. 27 of 29.

NAME OF TEST: Transient Frequency Behavior  
 g0010075: 2000-Jan-07 Fri 12:19:00  
 STATE: 2:High Power



Main	Timebase	Delay/Pos	Reference	Mode
	5.00 ms/div	-15.0000 ms	Center	Repetitive
Channel 1	Sensitivity	Offset	Probe	Coupling
	500 mV/div	0.00000 V	1.000 :1	dc (1M Ohm)

Trigger mode : Edge  
 On Positive Edge Of Chan2  
 Trigger Level  
 Chan2 = -187.500 mV (noise reject ON)  
 Holdoff = 40.000 ns

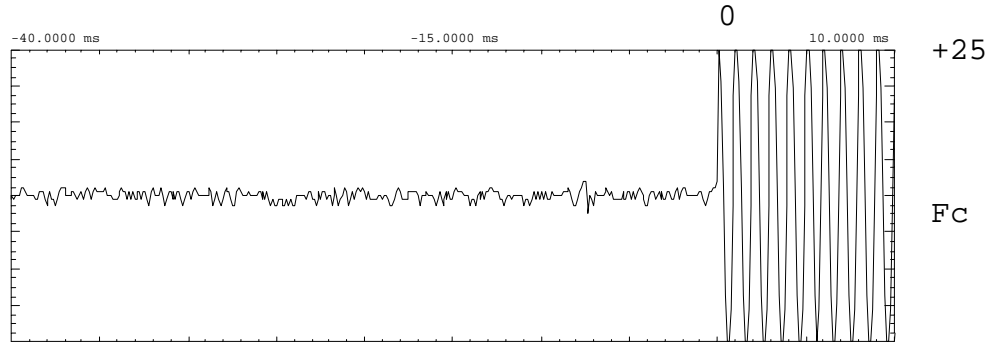
POWER :	HIGH
MODULATION :	Ref Gen=25 kHz Deviation
DESCRIPTION :	CARRIER OFF TIME

SUPERVISED BY:

Morton Flom, P. Eng.

PAGE NO. 28 of 29.

NAME OF TEST: Transient Frequency Behavior  
 g0010076: 2000-Jan-07 Fri 12:19:00  
 STATE: 2:High Power



Main	Timebase 5.00 ms/div	Delay/Pos -15.0000 ms	Reference Center	Mode Repetitive
Channel 1	Sensitivity 500 mV/div	Offset 0.00000 V	Probe 1.000 :1	Coupling dc (1M Ohm)

Trigger mode : Edge  
 On Positive Edge Of Chan2  
 Trigger Level  
 Chan2 = -187.500 mV (noise reject ON)  
 Holdoff = 40.000 ns

POWER :	HIGH
MODULATION :	Ref Gen=25 kHz Deviation
DESCRIPTION :	CARRIER OFF TIME

SUPERVISED BY:

*Morton Flom P. Eng.*  
 Morton Flom, P. Eng.



PAGE NO. 29 of 29.  
NAME OF TEST: Necessary Bandwidth and Emission Bandwidth  
SPECIFICATION: 47 CFR 2.202(g)

MODULATION = 20K0F1D

NECESSARY BANDWIDTH CALCULATION:

MAXIMUM MODULATION (M), kHz = 6.4  
 MAXIMUM DEVIATION (D), kHz = 3.6  
 CONSTANT FACTOR (K) = 1  
 NECESSARY BANDWIDTH ( $B_N$ ), kHz =  $(2 \times M) + (2 \times D \times K)$   
 = 20.0

MODULATION = 11K2F1D

NECESSARY BANDWIDTH CALCULATION:

MAXIMUM MODULATION (M), kHz = 3.2  
 MAXIMUM DEVIATION (D), kHz = 2.4  
 CONSTANT FACTOR (K) = 1  
 NECESSARY BANDWIDTH ( $B_N$ ), kHz =  $(2 \times M) + (2 \times D \times K)$   
 = 11.2

SUPERVISED BY:



Morton Flom, P. Eng.

TESTIMONIAL  
AND  
STATEMENT OF CERTIFICATION

THIS IS TO CERTIFY THAT:

1. THAT the application was prepared either by, or under the direct supervision of, the undersigned.
2. THAT the technical data supplied with the application was taken under my direction and supervision.
3. THAT the data was obtained on representative units, randomly selected.
4. THAT, to the best of my knowledge and belief, the facts set forth in the application and accompanying technical data are true and correct.

CERTIFYING ENGINEER:



Morton Flom, P. Eng.