

**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

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Date: November 16, 1999

Federal Communications Commission  
Via: Electronic Filing

Attention: Authorization & Evaluation Division

Applicant: Kenwood Communications Corporation  
Equipment: TK-880H-3  
FCC ID: ALH24593230  
FCC Rules: 90, CLASS II PERMISSIVE CHANGE: DATA MODEM

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,



William H. Graff, Director  
of Engineering

enclosure(s)  
cc: Applicant  
WHG/cvr

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Sub-part  
2.1033(c):

EQUIPMENT IDENTIFICATION

FCC ID: ALH24593230

NAMEPLATE DRAWING

ATTACHED, EXHIBIT 1.

LOCATION

AS PER LABEL DRAWING(S)

DATE OF REPORT

November 16, 1999

SUPERVISED BY:



William H. Graff, Director  
of Engineering

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.

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PAGE NO. 1 of 23.

*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: d99b0049
- d) Client: Kenwood Communications Corporation  
P.O. Box 22745  
Long Beach, CA 90801-5745
- e) Identification: TK-880H-3  
FCC ID: ALH24593230  
Description: UHF FM Mobile Transceiver
- f) EUT Condition: Not required unless specified in individual tests.
- g) Report Date: November 16, 1999  
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:   
William H. Graff, Director  
of Engineering
- 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 23.

EXPOSITORY STATEMENT  
PERMISSIVE CHANGE

APPLICANT: Kenwood Communications Corporation

FCC ID: ALH24593230

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 Modem

PAGE NO. 3 of 23.

LIST OF GENERAL INFORMATION REQUIRED FOR CERTIFICATION

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

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

(c)(2): FCC ID: ALH24593230

MODEL NO: TK-880H-3

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

PLEASE SEE ATTACHED EXHIBITS


(c)(4): TYPE OF EMISSION: 20K0F1D, 16K0F3E, 11K0F3E,  
11K2F1D

(c)(5): FREQUENCY RANGE, MHz: 400 to 430

(c)(6): POWER RATING, Watts: 10 to 40  
     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 23.

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.

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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
- x 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

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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 23.  
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

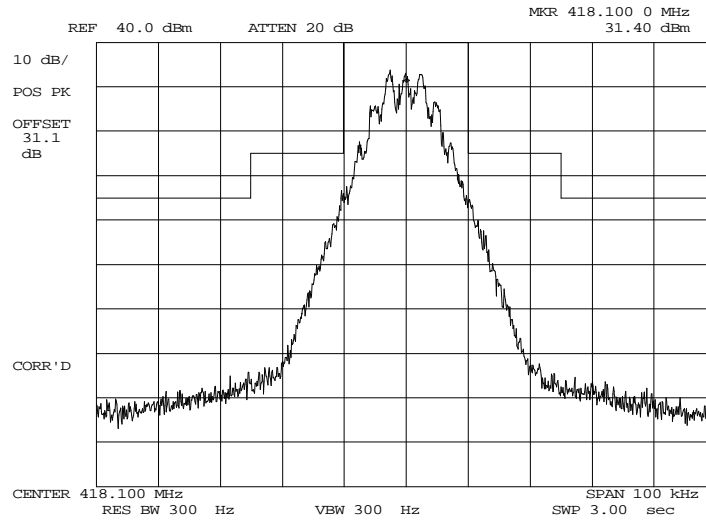
MEASUREMENT PROCEDURE

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.

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NAME OF TEST: Emission Masks (Occupied Bandwidth)  
g99b0224: 1999-Nov-05 Fri 10:12:00  
STATE: 1:Low Power



POWER:  
MODULATION:

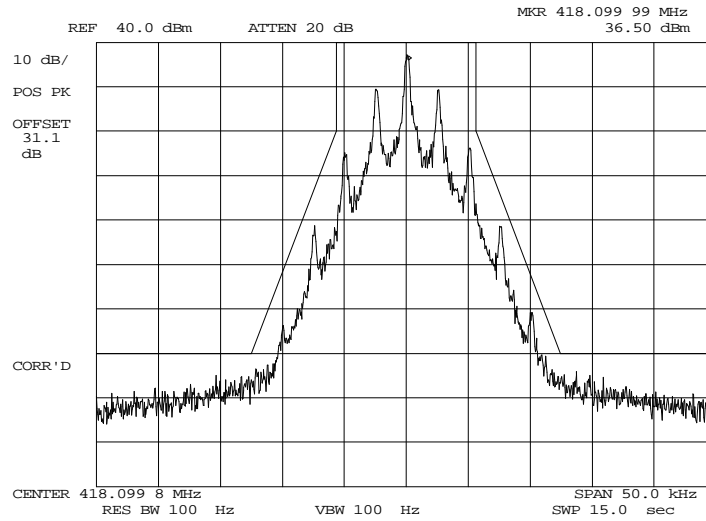
LOW  
GMSK 19200 BITS PER SECOND  
MASK: B, VHF/UHF 25kHz,  
w/LPF

SUPERVISED BY:

  
William H. Graff, Director  
of Engineering

PAGE NO. 10 of 23.

NAME OF TEST: Emission Masks (Occupied Bandwidth)  
 g99b0223: 1999-Nov-05 Fri 10:09:00  
 STATE: 1:Low Power



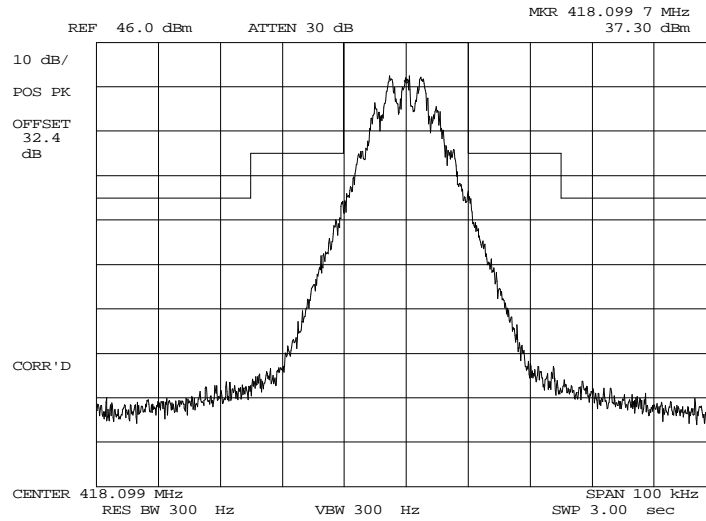
POWER: LOW  
 MODULATION: GMSK 9600 BITS PER SECOND  
 MASK: D, VHF/UHF 12.5 KHZ  
 BW

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*William H. Graff*  
 William H. Graff, Director  
 of Engineering


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NAME OF TEST: Emission Masks (Occupied Bandwidth)  
g99b0225: 1999-Nov-05 Fri 10:21:00  
STATE: 2:High Power



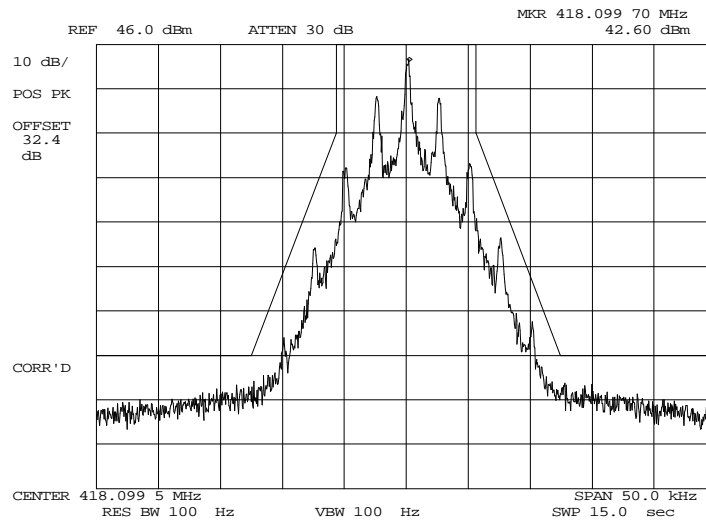
POWER: HIGH  
MODULATION: GMSK 19200 BITS PER SECOND  
MASK: B, VHF/UHF 25kHz,  
w/LPF

SUPERVISED BY:

  
William H. Graff, Director  
of Engineering

PAGE NO. 12 of 23.

NAME OF TEST: Emission Masks (Occupied Bandwidth)  
g99b0226: 1999-Nov-05 Fri 10:30:00  
STATE: 2:High Power



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

SUPERVISED BY:

William H. Graff, Director  
of Engineering



PAGE NO. 13 of 23.

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:

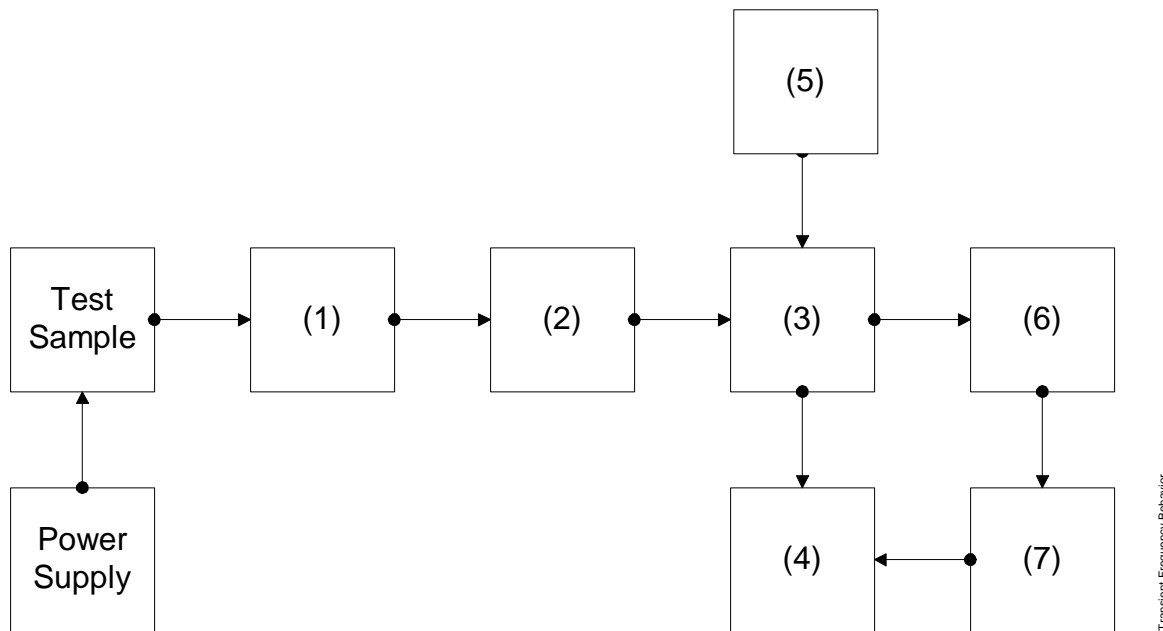
step f, dBm	=	-17.3
step h, dBm	=	-36.4
step l, dBm	=	13.8

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of Engineering

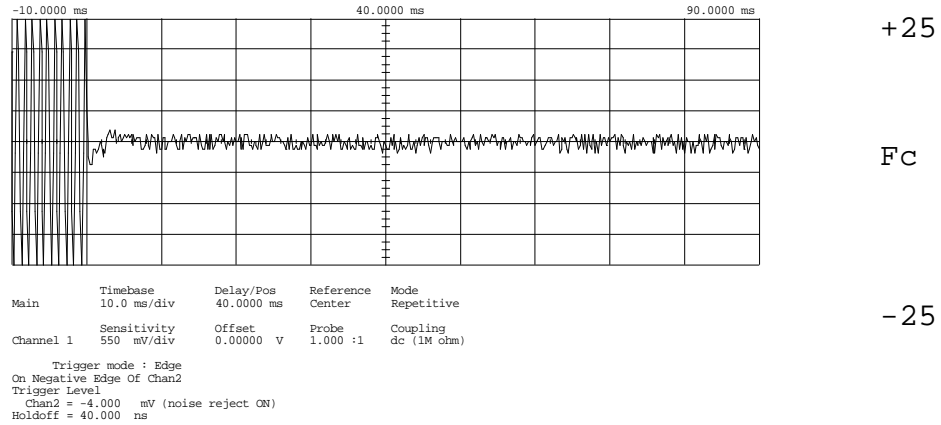
TRANSIENT FREQUENCY BEHAVIOR



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

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NAME OF TEST: Transient Frequency Behavior  
g99b0227: 1999-Nov-08 Mon 11:49:00  
STATE: 2:High Power



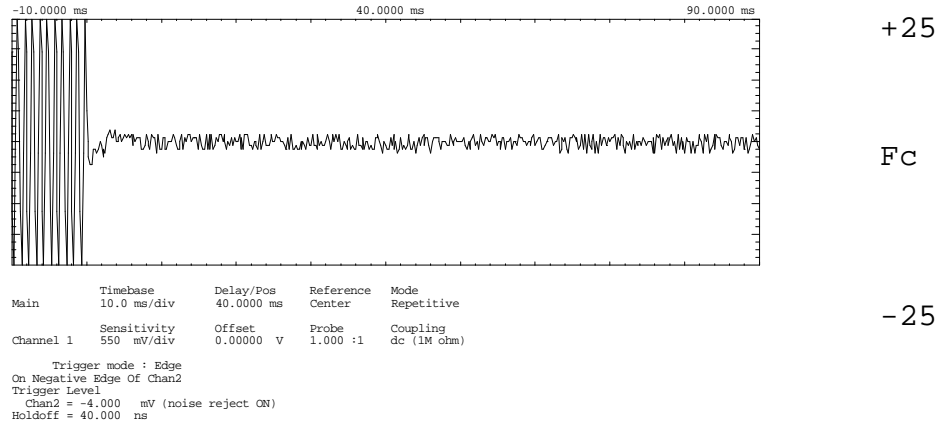
POWER :	HIGH
MODULATION :	Ref Gen=25 kHz Deviation
DESCRIPTION :	CARRIER ON TIME

SUPERVISED BY:

*William H. Graff*  
William H. Graff, Director  
of Engineering

PAGE NO. 16 of 23.

NAME OF TEST: Transient Frequency Behavior  
g99b0228: 1999-Nov-08 Mon 11:49:00  
STATE: 2:High Power



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

SUPERVISED BY:

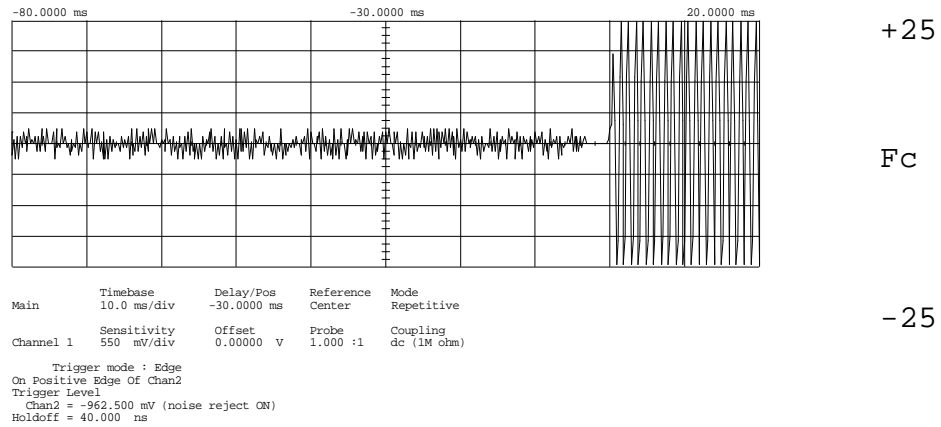
*William H. Graff*  
William H. Graff, Director  
of Engineering

PAGE NO.

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NAME OF TEST: Transient Frequency Behavior  
 g99b0229: 1999-Nov-08 Mon 11:52:00  
 STATE: 2:High Power

0



POWER :  
 MODULATION :  
 DESCRIPTION :

HIGH  
 Ref Gen=25 kHz Deviation  
 CARRIER OFF TIME

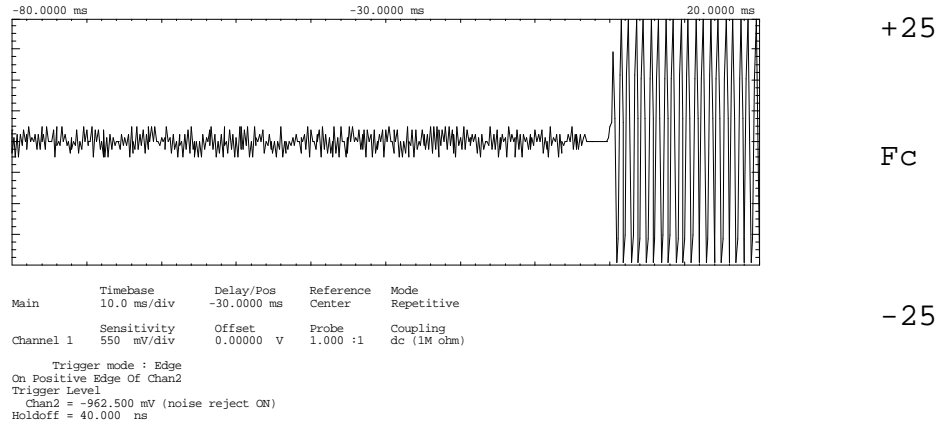
SUPERVISED BY:

*William H. Graff*  
 William H. Graff, Director  
 of Engineering

PAGE NO. 18 of 23.

NAME OF TEST: Transient Frequency Behavior  
g99b0230: 1999-Nov-08 Mon 11:52:00  
STATE: 2:High Power


0



POWER :  
MODULATION :  
DESCRIPTION :

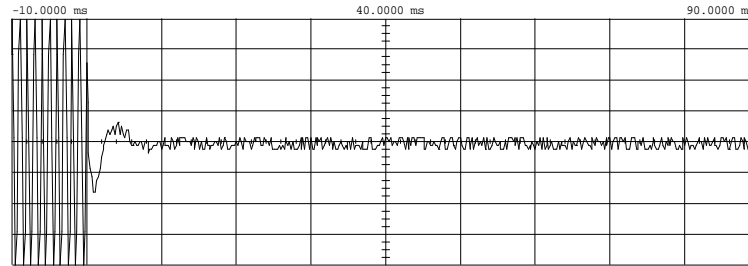
HIGH  
Ref Gen=25 kHz Deviation  
CARRIER OFF TIME

SUPERVISED BY:

  
William H. Graff, Director  
of Engineering

PAGE NO. 19 of 23.

NAME OF TEST: Transient Frequency Behavior  
g99b0231: 1999-Nov-08 Mon 12:40:00  
STATE: 2:High Power




Main	Timebase 10.0 ms/div	Delay/Pos 40.0000 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 = -3.000 mV (noise reject ON)  
Holdoff = 40.000 ns

POWER :  
MODULATION :  
DESCRIPTION :

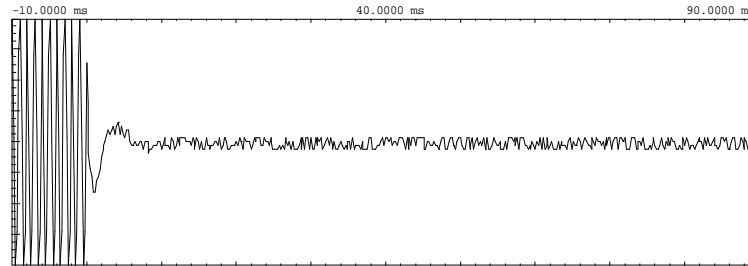
HIGH  
Ref Gen=12.5 kHz Deviation  
CARRIER ON TIME

SUPERVISED BY:

  
William H. Graff, Director  
of Engineering

PAGE NO. 20 of 23.

NAME OF TEST: Transient Frequency Behavior  
g99b0232: 1999-Nov-08 Mon 12:41:00  
STATE: 2:High Power



Main	Timebase 10.0 ms/div	Delay/Pos 40.0000 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 = -3.000 mV (noise reject ON)  
Holdoff = 40.000 ns

POWER :  
MODULATION :  
DESCRIPTION :

HIGH  
Ref Gen=12.5 kHz Deviation  
CARRIER ON TIME

SUPERVISED BY:

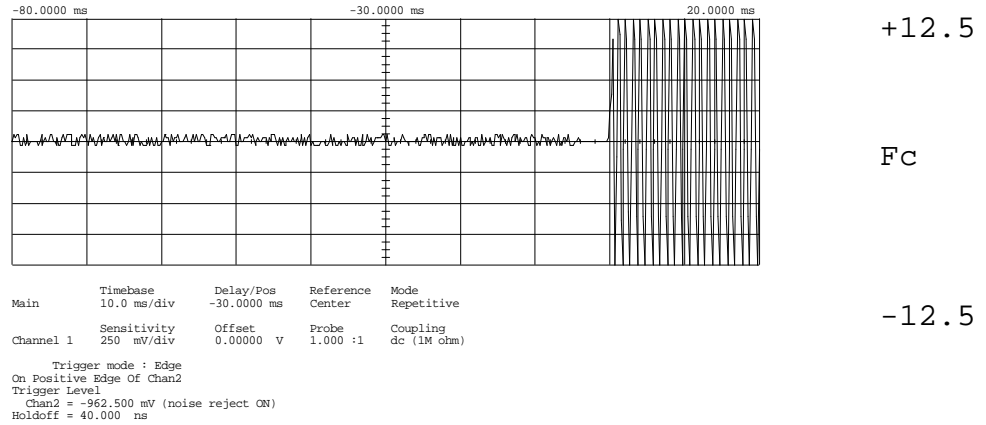
*William H. Graff*  
William H. Graff, Director  
of Engineering



PAGE NO. 21 of 23.

NAME OF TEST: Transient Frequency Behavior  
g99b0237: 1999-Nov-08 Mon 12:53:00  
STATE: 2:High Power

0



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

SUPERVISED BY:

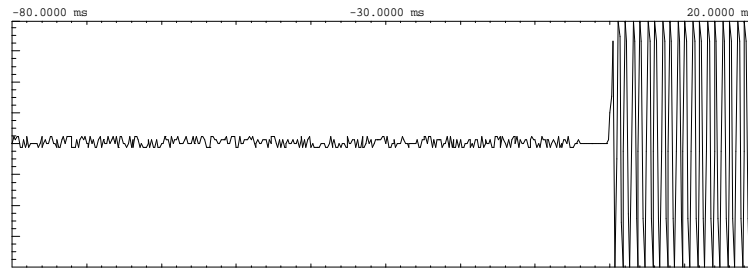
*William H. Graff*  
William H. Graff, Director  
of Engineering

PAGE NO.

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NAME OF TEST: Transient Frequency Behavior  
g99b0238: 1999-Nov-08 Mon 12:54:00  
STATE: 2:High Power

0



Main	Timebase 10.0 ms/div	Delay/Pos -30.0000 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 = -962.500 mV (noise reject ON)  
Holdoff = 40.000 ns

+12.5

Fc

-12.5

POWER :  
MODULATION :  
DESCRIPTION :

HIGH  
Ref Gen=12.5 kHz Deviation  
CARRIER OFF TIME

SUPERVISED BY:

*William H. Graff*  
William H. Graff, Director  
of Engineering

PAGE NO. 23 of 23.  
NAME OF TEST: Necessary Bandwidth and Emission Bandwidth  
SPECIFICATION: 47 CFR 2.202(g)

MODULATION = 20K0F1D

NECESSARY BANDWIDTH CALCULATION:

MAXIMUM MODULATION (M), kHz = 6400  
 MAXIMUM DEVIATION (D), kHz = 3600  
 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 = 3200  
 MAXIMUM DEVIATION (D), kHz = 2400  
 CONSTANT FACTOR (K) = 1  
 NECESSARY BANDWIDTH ( $B_N$ ), kHz =  $(2 \times M) + (2 \times D \times K)$   
 = 11.0

SUPERVISED BY:



William H. Graff, Director  
 of Engineering

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:



William H. Graff, Director  
of Engineering