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

V E R I F I C A T I O N

of

TRANSMITTER MODEL: Mini-M SATCOM SYSTEM SCS-1000

to

FEDERAL COMMUNICATIONS COMMISSION

Part 2

DATE OF REPORT: December 20, 1999

ON THE BEHALF OF THE APPLICANT:

Honeywell Inc, Commercial Flight Systems Group

AT THE REQUEST OF: P.O. X-406753L-032

Honeywell Inc, Commercial Flight Systems Group
Business and Commuter Aviation Sys Div
5353 W. Bell Rd.
Mail Stop AU2DD80
Glendale, AZ 85308-3999

Attention of: Dick Stadler
E-mail: Dick.Stadler@CAS.honeywell.com
602-436-4190

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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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: d99c0043

d) Client: Honeywell Inc, Commercial Flight Systems Group
Business and Commuter Aviation Sys Div
5353 W. Bell Rd.
Mail Stop AU2DD80
Glendale, AZ 85308-3999

e) Identification: Mini-M SATCOM SYSTEM SCS-1000

Description: Inmarsat Aircraft Telecommunications System

f) EUT Condition: Not required unless specified in individual tests.

g) Report Date: December 20, 1999
EUT Received: 1999-Dec-13

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.

LIST OF GENERAL INFORMATION REQUIRED FOR CERTIFICATION

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

Sub-part 2.1033

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

Honeywell Inc, Commercial Flight Systems Group
Business and Commuter Aviation Sys Div
PO Box 29000
Phoenix, AZ 85038-9000

MANUFACTURER:

Applicant

MODEL NO:

Mini-M SATCOM SYSTEM SCS-1000

(c)(4): TYPE OF EMISSION: N/A

(c)(5): FREQUENCY RANGE, MHz: 1626.5 to 1660.5

(c)(6): POWER RATING, Watts: 16 EIRP
___ Switchable ___ Variable x N/A

(c)(7): MAXIMUM POWER RATING, Watts: N/A

EQUIPMENT USED IN MINI-M SATCOM SYSTEM SCS1000:

MFA Number	Equipment Description	PRODUCT/SERIAL NUMBER
s00582	Mini-M Antenna	S/N 99120101 P/N 7519371-901
s00583	Aero M Controller	S/N 99120101 P/N 7519373-901
s00584	Mini-M Telephone Unit	S/N 99120101 P/N 7519377-901
	Power Supply	S/N 99120101 P/N 7519375-901
	Handset	S/N 101 P/N 7519380-1

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 24th day of November, 1998.

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

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. 4 of 24. AMENDED August 13, 2001

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, 2.1049, 2.1051, 2.1053, 2.1055, 2.1057

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.

NAME OF TEST: Carrier Output Power (Radiated)

SPECIFICATION: 47 CFR 2.1046(a)

GUIDE: ANSI/TIA/EIA-603-1992, Paragraph 2.2.1

TEST EQUIPMENT: As per attached page

MEASUREMENT PROCEDURE (RADIATED)

1. The EUT was placed on an open-field site and its radiated field strength at a known distance was measured by means of a spectrum analyzer. Equivalent loading of a dipole was calculated from the equation $P_t=((E \times R)^2/49.2)$ watts, where R = 3m.

2. Measurement accuracy is ±1.5 dB.

MEASUREMENT RESULTS

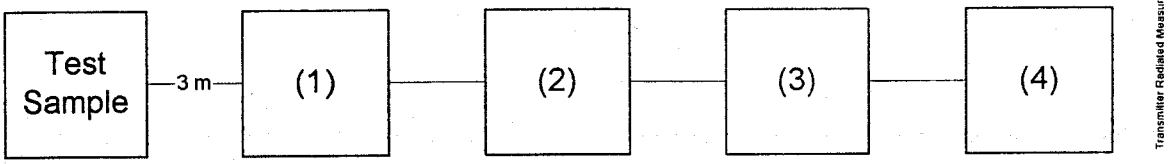
FREQUENCY OF CARRIER, MHz = 1642, 1626.5, 1660.5

POWER SETTING	R. F. POWER, EIRP, WATTS
High	16 EIRP

SUPERVISED BY:

William H. Graff, Director of Engineering

TRANSMITTER RADIATED MEASUREMENTS



Asset	Description (as applicable)	s/n
(1) TRANSDUCER		
i00091	Emco 3115	001469
i00089	Aprel Log Periodic	001500
i00088	Emco 3109-B	2336
(2) HIGH PASS FILTER		
i00	Narda μPAD (In-Band Only)	
i00	Trilithic (Out-Of-Band Only)	
(3) PREAMP		
i00028	HP 8449 (+30 dB)	2749A00121
(4) SPECTRUM ANALYZER		
i00048	HP 8566B	2511A01467
i00043	HP 8558B	2004A02076
i00057	HP 8557A	1531A00191
i00029	HP 8563E	3213A00104

NAME OF TEST: Field Strength of Spurious Radiation

SPECIFICATION: 47 CFR 2.1053(a)

GUIDE: ANSI/TIA/EIA-603-1992, Paragraph 2.2.12

TEST EQUIPMENT: As per attached page

MEASUREMENT PROCEDURE

1. A description of the measurement facilities was filed with the FCC and was found to be in compliance with the requirements of Section 2.948, by letter from the FCC dated March 3, 1997, FILE 31040/SIT. All pertinent changes will be reported to the Commission by up-date prior to March 2000.

2. At first, in order to locate all spurious frequencies and approximate amplitudes, and to determine proper equipment functioning, the test sample was set up at a distance of three meters from the test instrument. Valid spurious signals were determined by switching the power on and off.

3. In the field, the test sample was placed on a wooden turntable above ground at three (or thirty) meters away from the search antenna. Excess power leads were coiled near the power supply.

   The cables were oriented in order to obtain the maximum response. At each emission frequency, the turntable was rotated and the search antennas were raised and lowered vertically.

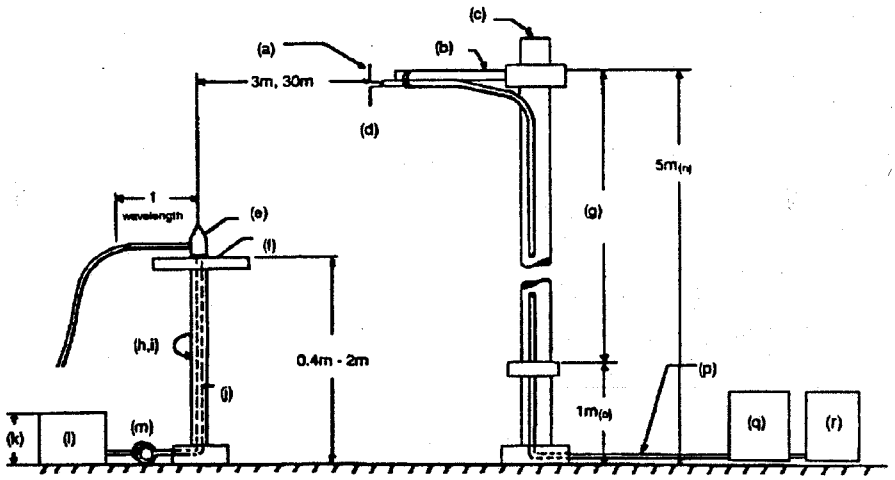
4. The emission was observed with both a vertically polarized and a horizontally polarized search antenna and the worst case was used.

6. The field strength of each emission within 20 dB of the limit was recorded and corrected with the appropriate cable and transducer factors.

7. The worst case for all channels is shown.

8. Measurement results: ATTACHED FOR WORST CASE

RADIATED TEST SETUP



NOTES:

(a) Search Antenna - Rotatable on boom
(b) Non-metallic boom
(c) Non-metallic mast
(d) Adjustable horizontally
(e) Equipment Under Test
(f) Turntable
(g) Boom adjustable in height.
(h) External control cables routed horizontally at least one wavelength.
(i) Rotatable
(j) Cables routed through hollow turntable center
(k) 30 cm or less
(l) External power source
(m) 10 cm diameter coil of excess cable
(n) 25 cm (V), 1 m-7 m (V, H)
(o) 25 cm from bottom end of 'V', 1m normally
(p) Calibrated Cable at least 10m in length
(q) Amplifier (optional)
(r) Spectrum Analyzer

Asset	Description (as applicable)	s/n	Cycle (Per ANSI C63.4-1992, 10.1.4)	Last Cal
TRANSDUCER				
i00088	EMCO 3109-B 25MHz-300MHz	2336	12 mo.	Sep-99
i00065	EMCO 3301-B Active Monopole	2635	12 mo.	Sep-99
i00089	Aprel 2001 200MHz-1GHz	001500	12 mo.	Sep-99
i00103	EMCO 3115 1GHz-18GHz	9208-3925	12 mo.	Sep-99
AMPLIFIER				
i00028	HP 8449A	2749A00121	12 mo.	Mar-99
SPECTRUM ANALYZER				
i00029	HP 8563E	3213A00104	12 mo.	Aug-99
i00033	HP 85462A	3625A00357	12 mo.	May-99
i00048	HP 8566B	2511AD1467	6 mo.	May-99

NAME OF TEST: Field Strength of Spurious Radiation
g99c0244: 1999-Dec-14 Tue 15:57:00
STATE: 2:High Power

FREQUENCY TUNED, MHz	FREQUENCY EMISSION, MHz	METER, dBuV	CF, dB	ERP, dBm	MARGIN, dB
1660.000000	3320.914433	8.17	38.49	-50.7	-37.7
1660.000000	4981.371966	-2	42.86	-56.5	-43.5
1660.000000	6641.829299	1.5	48.04	-47.8	-34.9
1660.000000	8302.286632	2.5	50	-44.9	-31.9
1660.000000	9962.743965	0.5	56.25	-40.6	-27.7
1660.000000	11623.201298	0.5	54.06	-42.8	-29.8
1660.000000	13283.658631	4.83	56.81	-35.7	-22.8
1660.000000	14944.115964	4.67	53.56	-39.1	-26.2
1660.000000	16604.573297	2.67	58.88	-35.8	-22.9

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 ±2.5 kHz deviation (or 50% modulation). With level constant, the signal level was increased 16 dB.

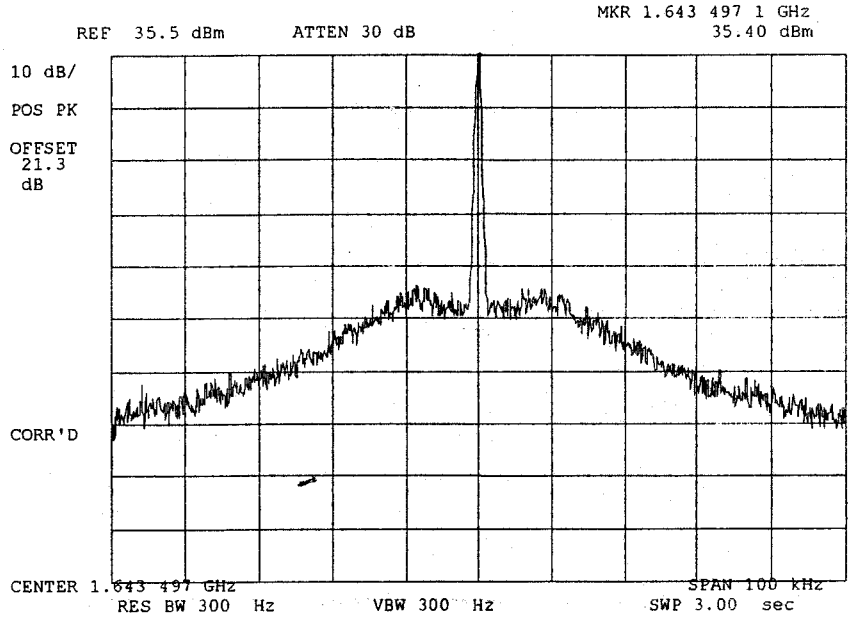
3. For EUTs supporting digital modulation, the digital modulation mode was operated to its maximum extent.

4. The Occupied Bandwidth was measured with the Spectrum Analyzer controls set as shown on the test results.

5. MEASUREMENT RESULTS: ATTACHED

PAGE NO. 12 of 24.

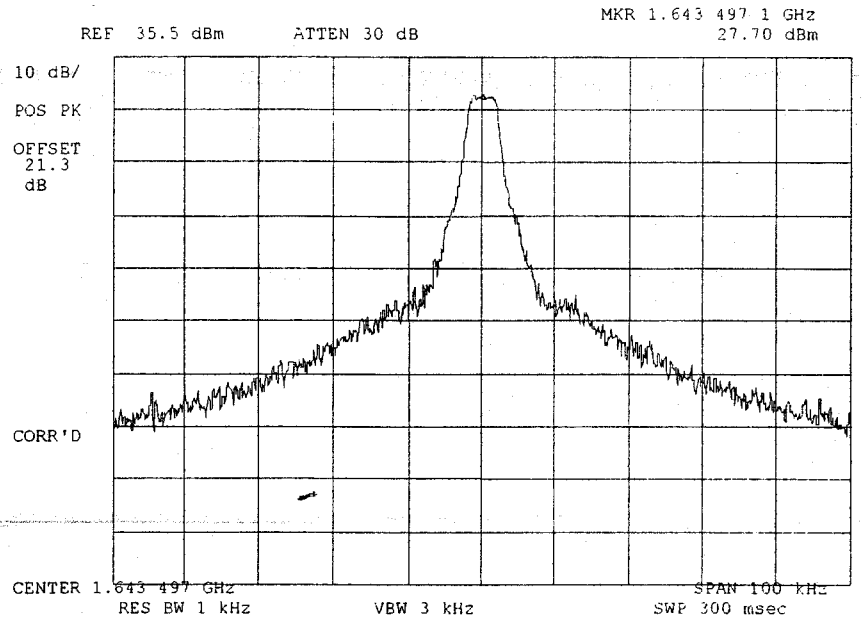
NAME OF TEST: Emission Masks (Occupied Bandwidth)
g99c0246: 1999-Dec-15 Wed 11:00:00
STATE: 2:High Power



POWER: HIGH
MODULATION: NONE

SUPERVISED BY: William H. Graff, Director of Engineering

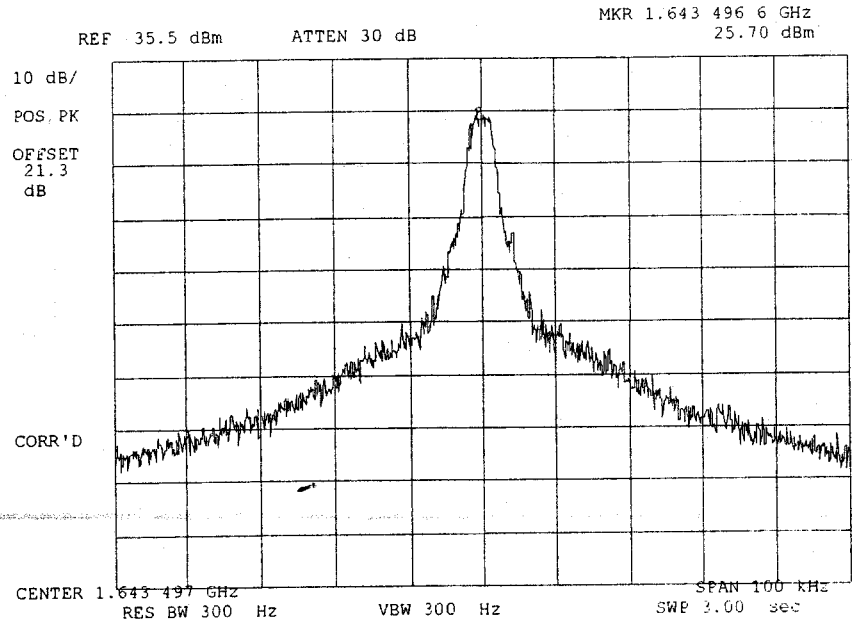
NAME OF TEST: Emission Masks (Occupied Bandwidth)
g99c0253: 1999-Dec-16 Thu 11:16:00
STATE: 2:High Power



POWER: HIGH
MODULATION: OFFSET QPSK RANDOM BITS

SUPERVISED BY: William H. Graff, Director of Engineering

NAME OF TEST: Emission Masks (Occupied Bandwidth)
g99c0254: 1999-Dec-16 Thu 11:17:00
STATE: 2:High Power



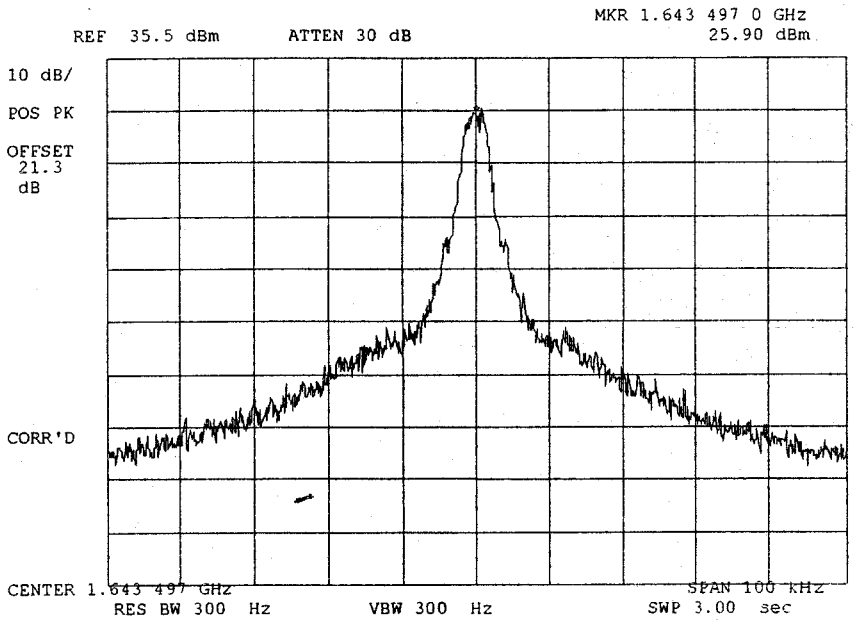
POWER: HIGH
MODULATION: OFFSET QPSK RANDOM BITS

SUPERVISED BY:

William H. Graff, Director
of Engineering

PAGE NO. 15 of 24.

NAME OF TEST: Emission Masks (Occupied Bandwidth)
g99c0255: 1999-Dec-16 Thu 11:18:00
STATE: 2:High Power

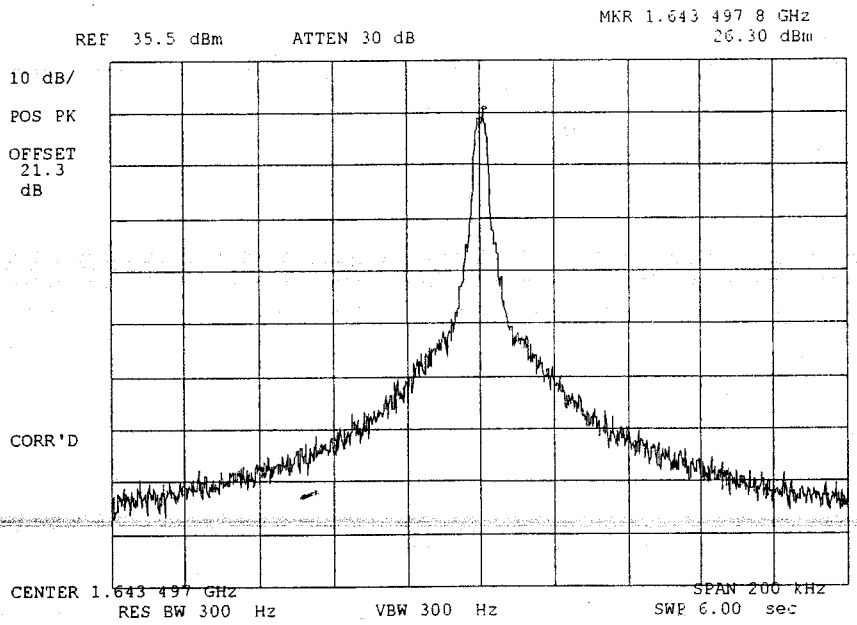


POWER: HIGH
MODULATION: OFFSET QPSK RANDOM BITS

SUPERVISED BY: William H. Graff, Director of Engineering

PAGE NO. 16 of 24.

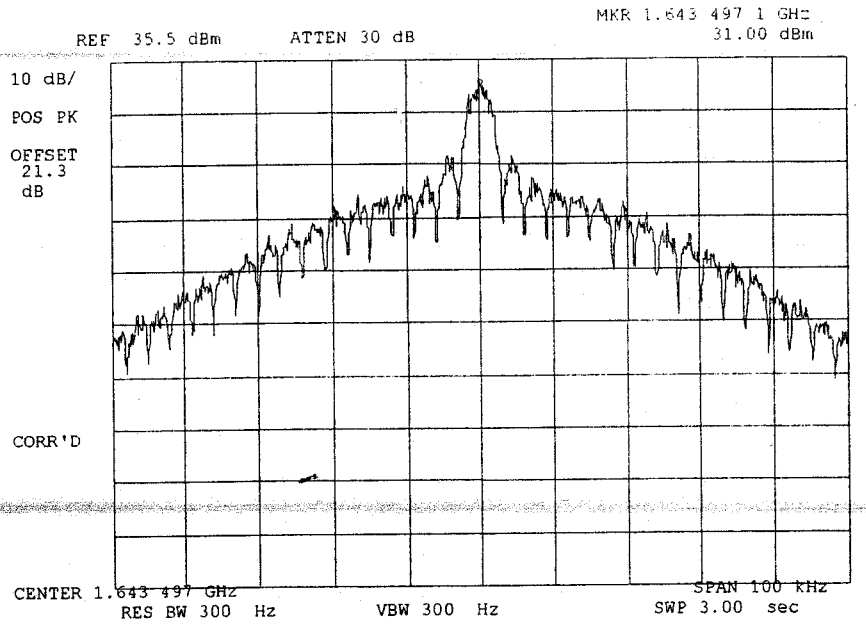
NAME OF TEST: Emission Masks (Occupied Bandwidth)
g99c0256: 1999-Dec-16 Thu 11:19:00
STATE: 2:High Power



POWER: HIGH
MODULATION: OFFSET QPSK RANDOM BITS

SUPERVISED BY: William H. Graff, Director of Engineering

NAME OF TEST: Emission Masks (Occupied Bandwidth)
g99c0249: 1999-Dec-16 Thu 10:11:00
STATE: 2:High Power

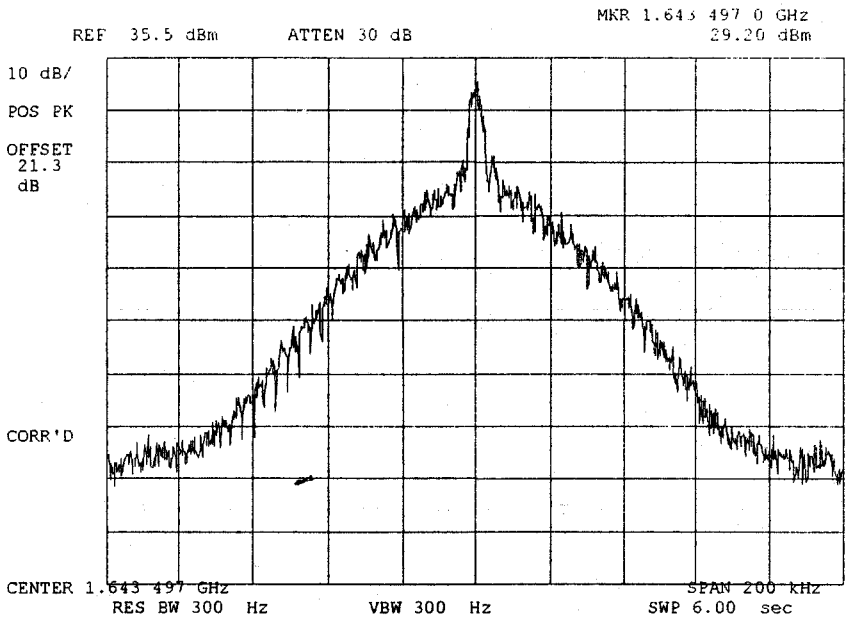


POWER: HIGH
MODULATION: BPSK RANDOM BIT

SUPERVISED BY: William H. Graff, Director of Engineering

PAGE NO. 18 of 24.

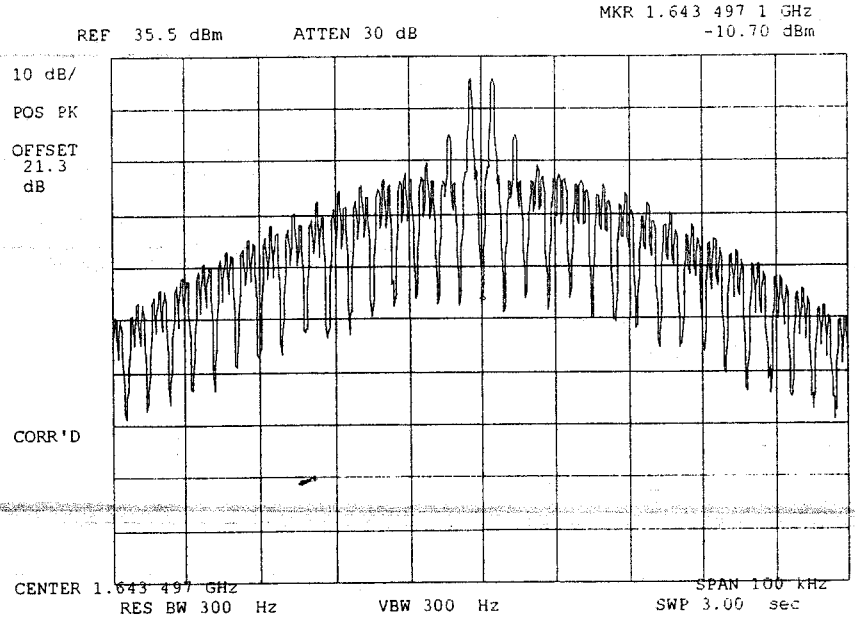
NAME OF TEST: Emission Masks (Occupied Bandwidth)
g99c0250: 1999-Dec-16 Thu 10:12:00
STATE: 2:High Power



POWER: HIGH
MODULATION: BPSK RANDOM BIT

SUPERVISED BY: William H. Graff, Director of Engineering

NAME OF TEST: Emission Masks (Occupied Bandwidth)
g99c0251: 1999-Dec-16 Thu 10:18:00
STATE: 2:High Power

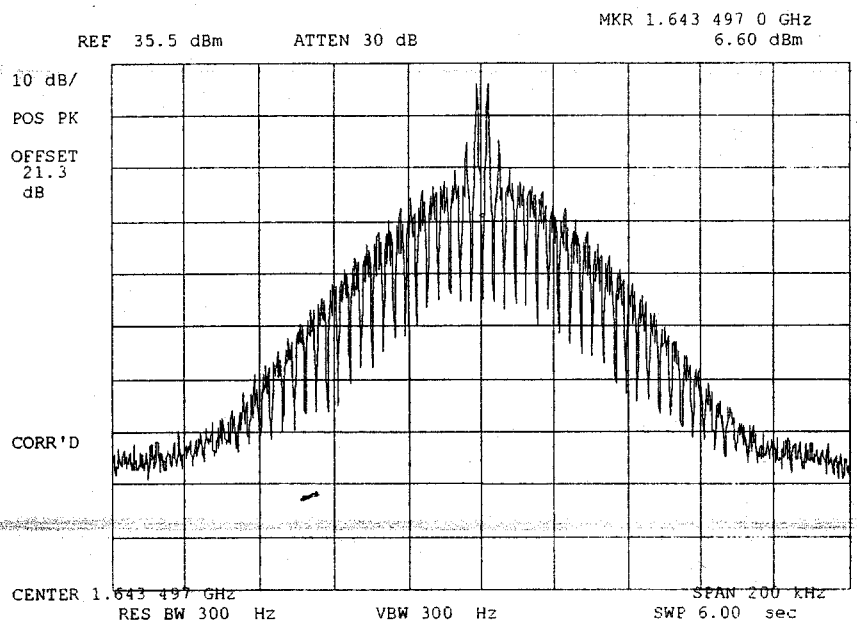


POWER: HIGH
MODULATION: BPSK FIXED BIT

SUPERVISED BY: William H. Graff, Director of Engineering

PAGE NO. 20 of 24.

NAME OF TEST: Emission Masks (Occupied Bandwidth)
g99c0252: 1999-Dec-16 Thu 10:19:00
STATE: 2:High Power



POWER: HIGH
MODULATION: BPSK FIXED BIT

SUPERVISED BY: William H. Graff, Director of Engineering

NAME OF TEST: Frequency Stability (Temperature Variation)

SPECIFICATION: 47 CFR 2.1055(a)(1)

GUIDE: ANSI/TIA/EIA-603-1992, Paragraph 2.2.2

TEST CONDITIONS: As Indicated

TEST EQUIPMENT: As per previous page

MEASUREMENT PROCEDURE

1. The EUT and test equipment were set up as shown on the following page.

2. With all power removed, the temperature was decreased to -30°C and permitted to stabilize for three hours. Power was applied and the maximum change in frequency was noted within one minute.

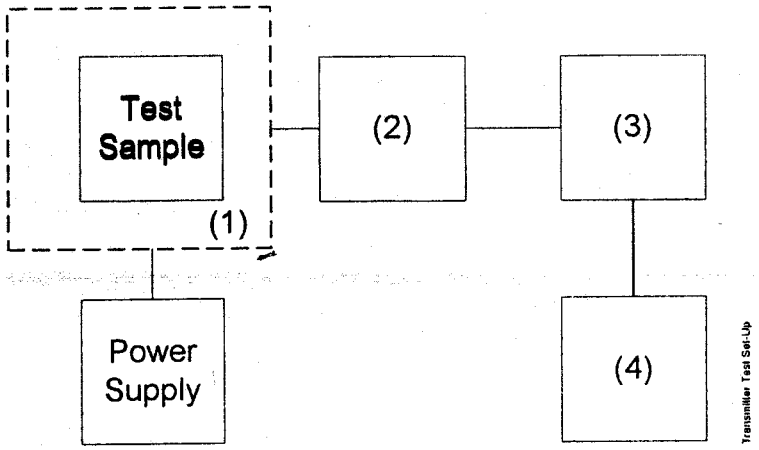
3. With power OFF, the temperature was raised in 10°C steps. The sample was permitted to stabilize at each step for at least one-half hour. Power was applied and the maximum frequency change was noted within one minute.

4. The temperature tests were performed for the worst case.

5. MEASUREMENT RESULTS: ATTACHED

TRANSMITTER TEST SET-UP

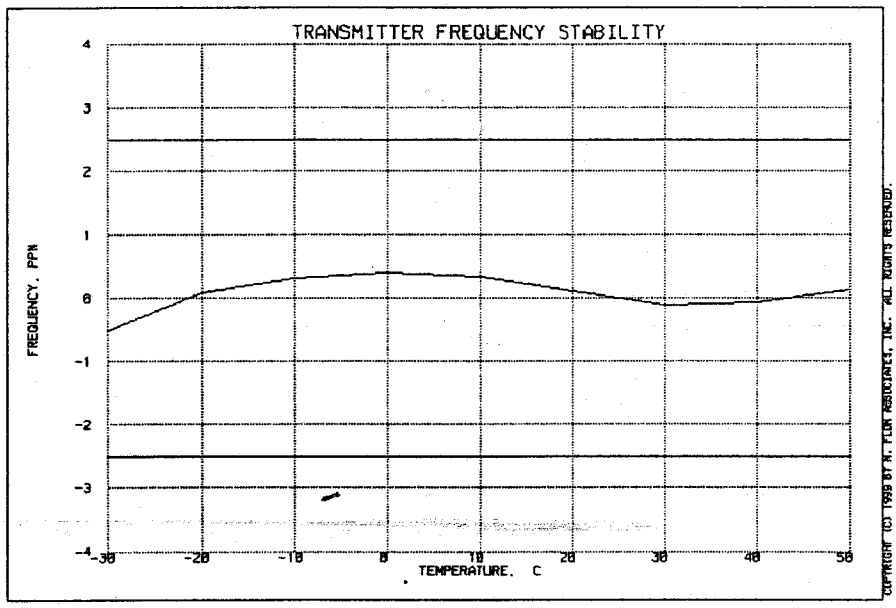
TEST A. OPERATIONAL STABILITY
TEST B. CARRIER FREQUENCY STABILITY
TEST C. OPERATIONAL PERFORMANCE STABILITY
TEST D. HUMIDITY
TEST E. VIBRATION
TEST F. ENVIRONMENTAL TEMPERATURE
TEST G. FREQUENCY STABILITY: TEMPERATURE VARIATION
TEST H. FREQUENCY STABILITY: VOLTAGE VARIATION



Asset (as applicable)	Description	s/n
(1)	TEMPERATURE, HUMIDITY, VIBRATION	
i00027	Tenny Temp. Chamber	9083-765-234
i00	Weber Humidity Chamber	
i00	L.A.B. RVH 18-100	
(2)	COAXIAL ATTENUATOR	
i00122	NARDA 766-10	7802
i00123	NARDA 766-10	7802A
i00113	SIERRA 661A-3D	1059
i00069	BIRD 8329 (30 dB)	10066
(3)	R.F. POWER	
i00014	HP 435A POWER METER	1733A05839
i00039	HP 436A POWER METER	2709A26776
i00020	HP 8901A POWER MODE	2105A01087
(4)	FREQUENCY COUNTER	
i00042	HP 5383A	1628A00959
i00019	HP 5334B	2704A00347
i00020	HP 8901A	2105A01087

PAGE NO. 23 of 24.

NAME OF TEST: Frequency Stability (Temperature Variation)
g99c0222: 1999-Dec-15 Wed 11:43:00
STATE: 0:General



SUPERVISED BY:

William H. Graff, Director
of Engineering

PAGE NO. 24 of 24.

NAME OF TEST: Frequency Stability (Voltage Variation)

SPECIFICATION: 47 CFR 2.1055(b)(1)

GUIDE: ANSI/TIA/EIA-603-1992, Paragraph 2.2.2

TEST EQUIPMENT: As per previous page

MEASUREMENT PROCEDURE

1. The EUT was placed in a temperature chamber at 25±5°C and connected as for "Frequency Stability - Temperature Variation" test.

2. The power supply voltage to the EUT was varied from 85% to 115% of the nominal value measured at the input to the EUT.

3. The variation in frequency was measured for the worst case.

RESULTS: Frequency Stability (Voltage Variation)
g99c0248: 1999-Dec-16 Thu 09:54:10
STATE: 0:General

LIMIT, ppm = 2.5
LIMIT, Hz = 4109
BATTERY END POINT (Voltage) = 22

% of STV	Voltage	Frequency, MHz	Change, Hz	Change, ppm
100	28.0	1643.49700	0	0.00
115	32.2	1643.49697	-30	0.00
85	23.8	1643.49696	-40	0.00
80	22.4	1643.49694	-60	0.00
70	19.6	1643.49694	-60	0.00

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