

February 6, 2001

Federal Communications Commission
Authorization and Evaluation Division
7435 Oakland Mills Road Columbia, MD 21046

Attention: Applications Examiner

Applicant: Allgon Telecom, Ltd.
7317 Jack Newell Blvd. North Fort Worth, Texas 76118

Equipment: Allgon Microwave Radio 23 GHz-1200
FCC ID: L6GAMR23-1200

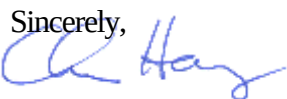
Specification: 47 CFR 101 Licensed Certification

Dear Examiner:

The following application for Grant of Equipment Authorization is presented on behalf of Allgon Telecom Ltd.. for the Licensed Certification of their Allgon Microwave radio 23 GHz-1200.

Enclosed, please find a complete data and documentation package demonstrating that this device complies with the technical requirements of 47 CFR, Part 101..

If you have any questions, please contact the undersigned, who is authorized to act as Agent.

Sincerely,


Chris Harvey
Director, EMC Laboratory

MET Laboratories, Inc. *Safety Certification - EMI - Telecom Environmental Simulation*

914 WEST PATAPSCO AVENUE ! BALTIMORE, MARYLAND 21230-3432 ! PHONE (410) 354-3300 ! FAX (410) 354-3313

ENGINEERING TEST REPORT

in support of the
Application for Grant of Equipment Authorization

EQUIPMENT: Allgon Microwave Radio 23 GHz-1200

FCC ID: L6GAMR23-1200

Specification: 47 CFR 101

On Behalf of the Applicant: Allgon Telecom Ltd.
7317 Jack Newell Blvd. North
FortWorth, TX 76118

Manufacturer: Allgon Telecom Ltd.
7317 Jack Newell Blvd. North
FortWorth, TX 76118

Manufacturer's Representative Mr. Tim Purvis

Test Date(s): December 21 , 2000 thru January 4, 2001

ENGINEERING STATEMENT

I ATTEST: the measurements shown in this report were made in accordance with the procedures indicated, and that the emissions from this equipment were found to be within the limits applicable. I assume full responsibility for the accuracy and completeness of these measurements. On the basis of the measurements made, the equipment tested is capable of operation in accordance with the requirements of Part 101 of the FCC Rules under normal use and maintenance.

Liming Xu

Project Engineer, MET Laboratories

1.0 INTRODUCTION

The following data is presented on behalf of the Applicant, Allgon Telecom Ltd. as verification of the compliance of the Allgon Microwave Radio 23GHz-1200 to the requirements of 47CFR 101.

2.0 TEST SITE

All testing was conducted at MET Laboratories, Inc., 914 West Patapsco Avenue, Baltimore, Maryland 21230-3493. Radiated emissions measurements were performed on a three-meter open area test site (OATS). A complete site description is on file with the FCC Laboratory Division as 31040/SIT/MET.

3.0 TEST EQUIPMENT USED

Manufacturer	Equipment	Calibration Due	Cal. Interval
Hewlett Packard	8563A Spectrum Analyzer	8/8/01	annual
EMCO	Biconical Antenna 3104	03/06/01	annual
EMCO	EMCO Log Periodic Antenna	4/10/01	annual
EMCO	Double Ridge Guided Horn	2/17/01	annual
Hewlett Packard	8546A Analyzer	8/23/01	annual

4.0 EQUIPMENT UNDER TEST CONFIGURATION

The Microwave Radio was configured with DC power supply modules and an external PC to program the EUT to output a Continuous Phase Modulation RF signal (21.2-23.6 Ghz) with maximum signal gains at different Bandwidth(2.5,5,10 and 20 MHz). The EUT was operated in a manner representative of the typical usage of the equipment. During all testing, system components were manipulated within the confines of typical usage to maximize each emission.

5.0 TEST TYPE(S)

- 5.1 Radiated Emissions: 47CFR2.1053, 101.111
- 5.2 Occupied Bandwidth: 47CFR2.1049, 101.109
- 5.3 RF Power Output: 47CFR 2.1046, 101.113
- 5.4 Spurious Emission at Antenna Terminals: 47CFR 2.1051, 101.111
- 5.5 Frequency Stability vs temperature variations: 47 CFR 2.1055(a)(1), 101.107
- 5.6 Frequency Stability vs variations in supply voltage: 47 CFR 2.1055 (d)(1), 101.107
- 5.7 Modulation Characteristics: 47 CFR 2.1047(a)

6.0 TEST RESULTS**6.1 TEST TYPE:** Radiated Emissions**6.1.1 TECHNICAL SPECIFICATION:** 2.1053; 101.111**6.1.2 TEST DATE(S):** Jan 01, 2001**6.1.3 MEASUREMENT PROCEDURES:**

As required by 47 CFR 2.1053, *field strength of spurious radiation measurements* were performed. Preliminary radiated emission measurements were performed inside an open area (not OATS). The frequency list from the preliminary measurements was used as a guide for making final measurements. The unit was scanned over the frequency range of 9 kHz to 110 GHz.

The Calculated Radiated Spurious Emissions *Limit* is obtained by the following:

Based on an output power (as measured at the RF output of the EUT) of 0.1 watts:

$$P_o = 0.1 \text{ W}$$

The radiated power level of all spurious emissions must be attenuated by at least $43 + 10\log(P_o)$ below P_o , yielding:

$$P_o \& [43 \% 10\log(0.1)] \text{ ' \& 13.1dBm@1meter}$$

All of the measurable radiated emissions are related to the digital device portion of the EUT, and thus are compared to the 47CFR 15 Class A field strength limit. Mathematical calculations indicate that these field strengths yield radiated power levels greater than 30 dB below the -13 dBm limit for spurious emissions from the transmitter portion of the EUT calculated above. There were no observable radiated emissions from the transmitter portion of the EUT.



Photograph of Radiated Emissions Test Setup

6.2 TEST TYPE: Occupied Bandwidth

6.2.1 TECHNICAL SPECIFICATION: 47 CFR 2.1046; 101.111

6.2.2 TEST DATE(S): December 21, 2000

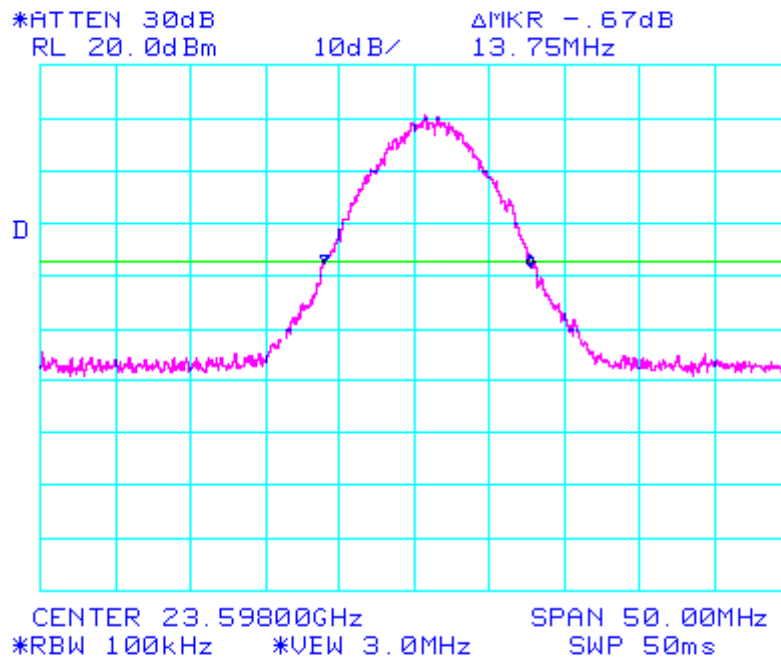
6.2.3 MEASUREMENT PROCEDURES:

As required by 47 CFR 2.1049, *occupied bandwidth measurements* were made on the Microwave Radio. The EUT was configured to transmit a modulated carrier signal. Using 2.5, 5, 10 and 20 MHz bandwidth, We determined the occupied bandwidth of the emission at the center of the selectable range.

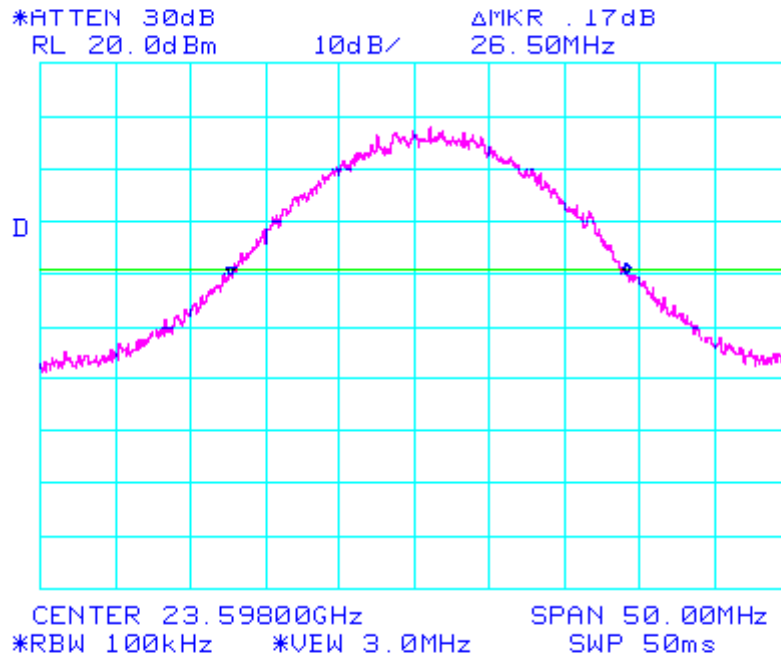
6.2.4 RESULTS:

Equipment complies with Section 2.1049. Plots of the occupied bandwidth, as measured at the antenna RF output port as follows:

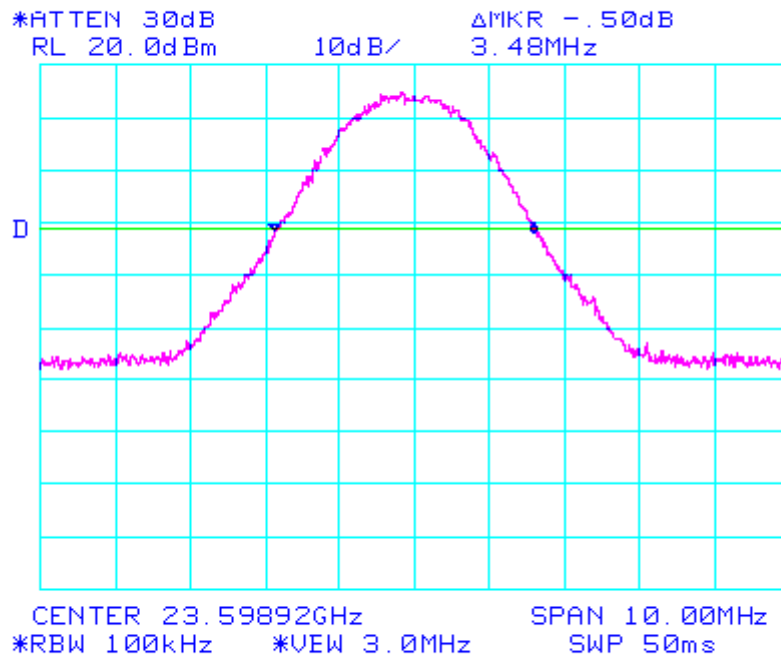
Occupied B/W (-26dB), 10MHz Met# 10409



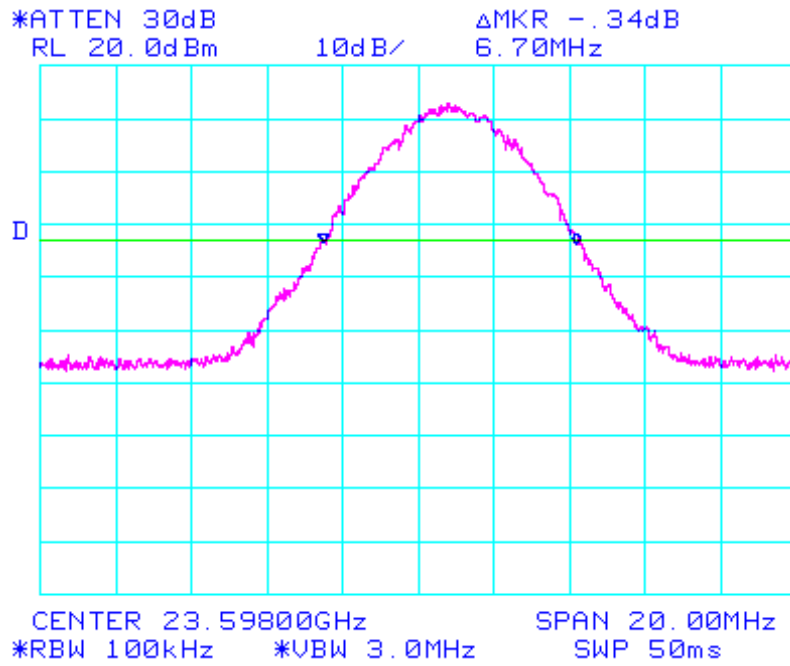
Occupied B/W (-26dB), 20MHz B/W Met# 10409



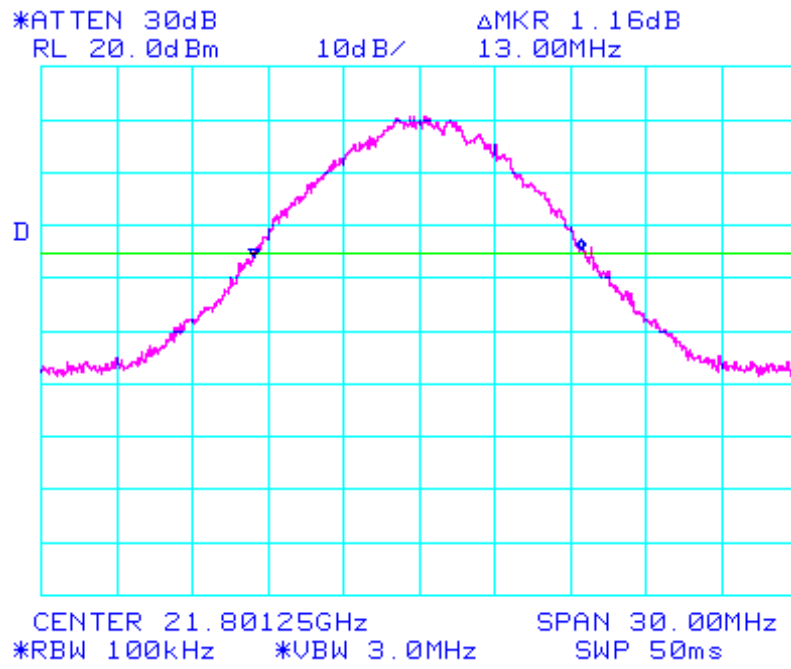
Occupied B/W (-26dB) at 2.5MHz Met# 10409



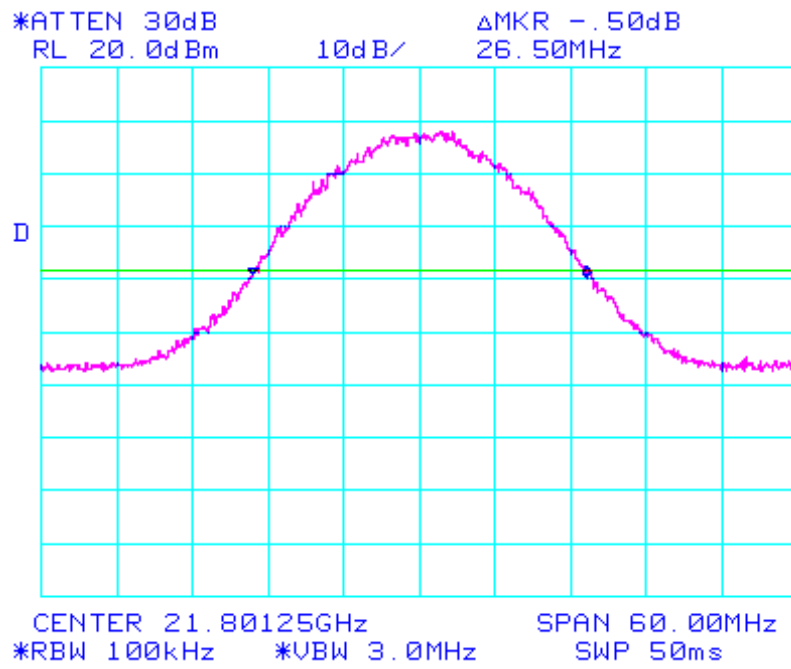
Occupied B/W (-26dB), at 5MHz Met# 10409



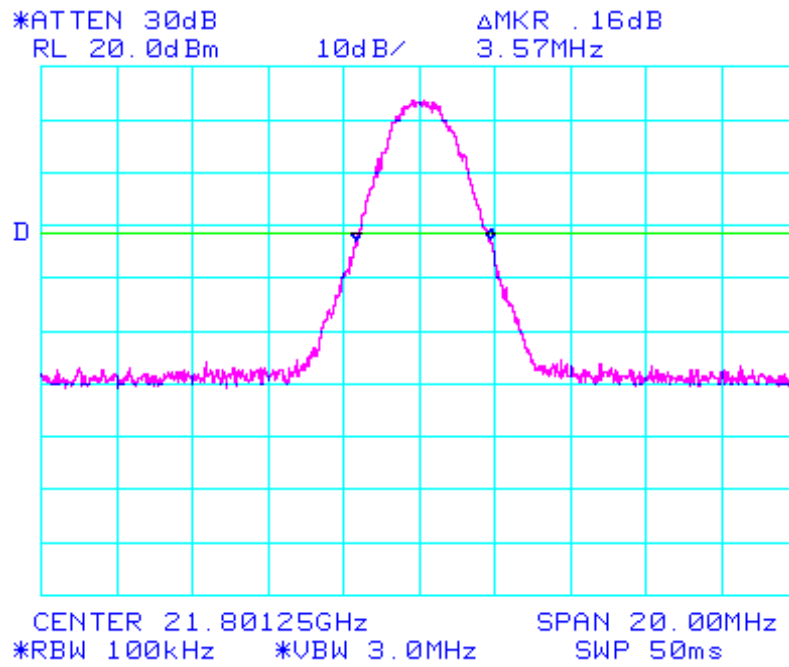
Occupied B/W (-26dB) 10MHz Met#10409



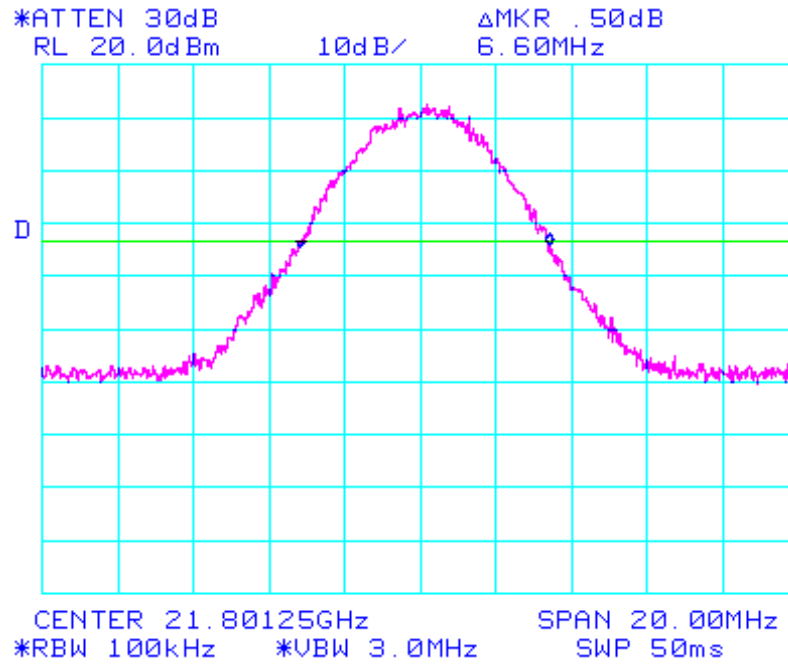
Occupied B/W (-26dB) 20MHz Met#10409



Occupied B/W (-26dB) 2.5MHz Met#10409



Occupied B/W (-26dB) 5MHz Met#10409



6.3 TEST TYPE: RF POWER OUTPUT

6.3.1 TECHNICAL SPECIFICATION: 47 CFR 2.1046 and 101.113

6.3.2 TEST DATE(S): December 22, 2000

6.3.3 MEASUREMENT PROCEDURES:

As required by 47 CFR 2.1046, *RF power output measurements* were made at the RF output terminals using an attenuator and spectrum analyzer. This test was performed with carrier modulated by continuous phase modulation signal.

Plots of the RF output Power level of the modulated carrier, as measured at the RF output terminals of the EUT appear on the following pages (the readings appear on the plots should add 2.5 dB loss on the cable and fixture) :

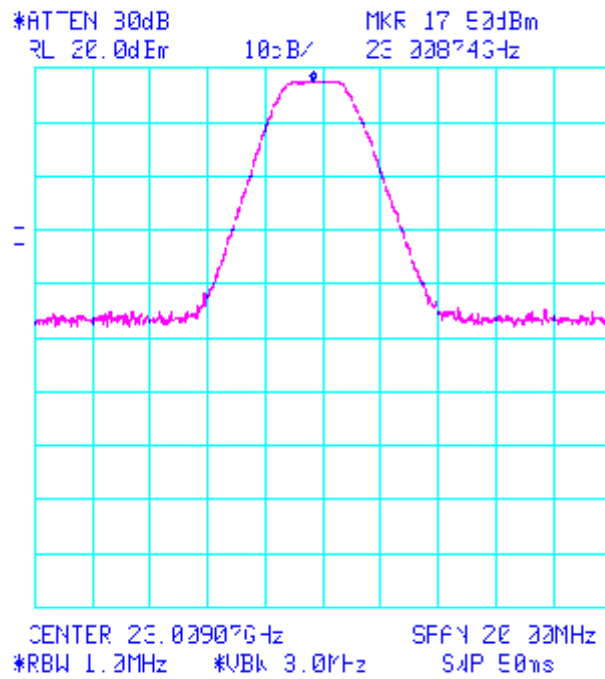
6.3.4 RESULTS:

Equipment complies with 47CFR 2.1046 and 101.113

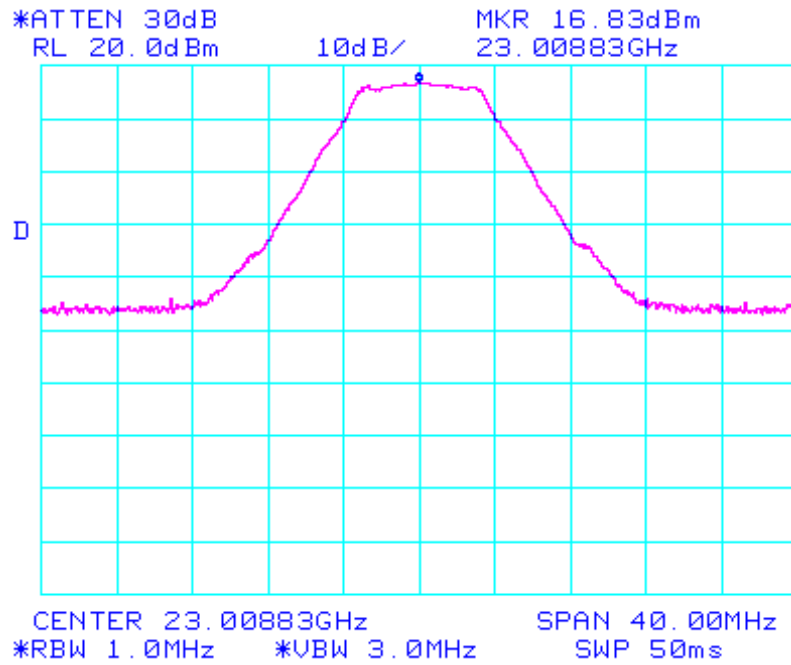
Photograph of Antenna Conducted Spurious Emissions and RF Power Output Test Configuration



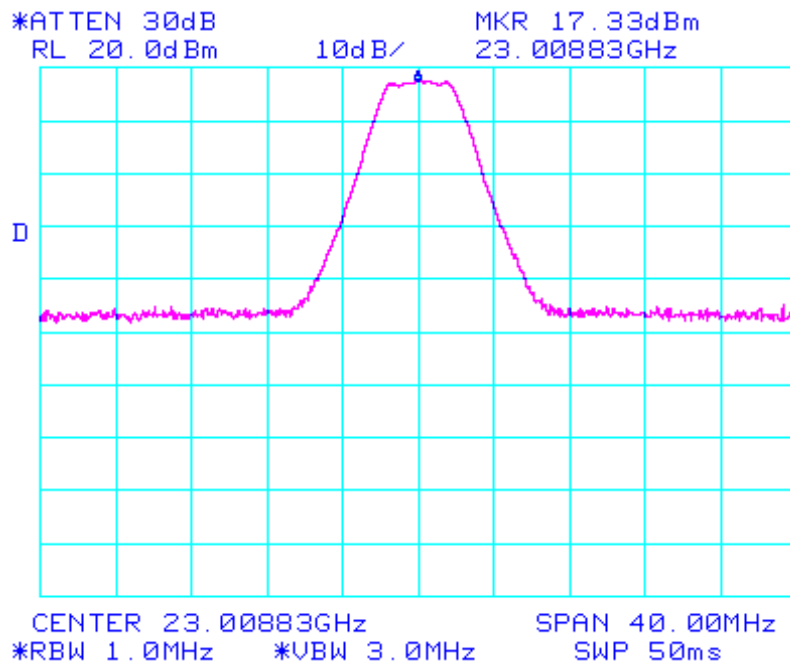
RF Output power at antenna terminal
2.5 MHz B/W Met#10409



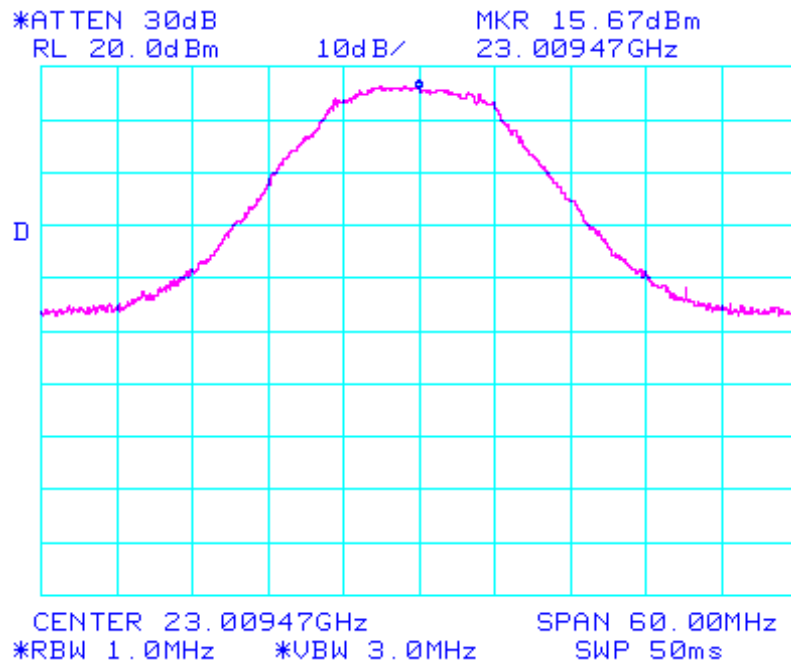
RF output power at antenna terminal
10 MHz B/W Met# 10409



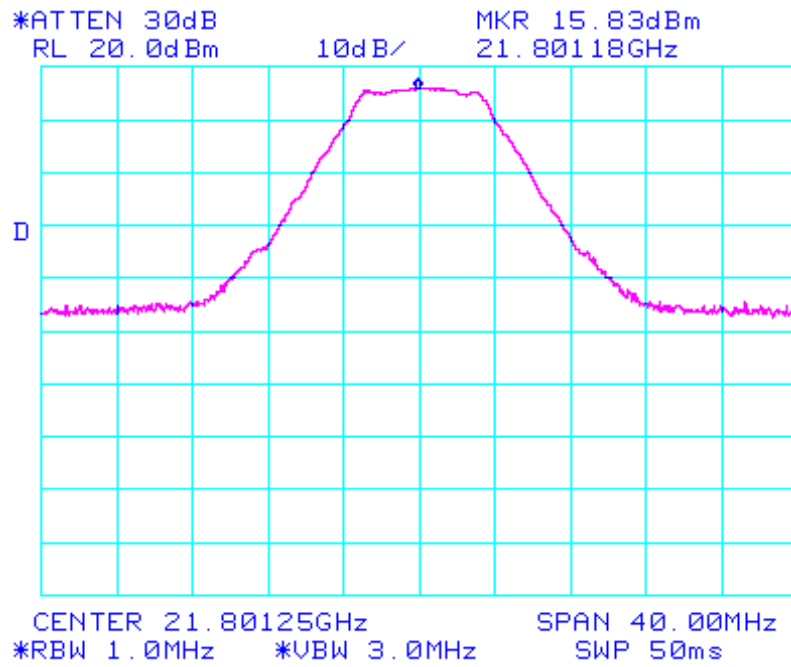
RF output power at antenna terminal
5 MHz B/W Met# 10409



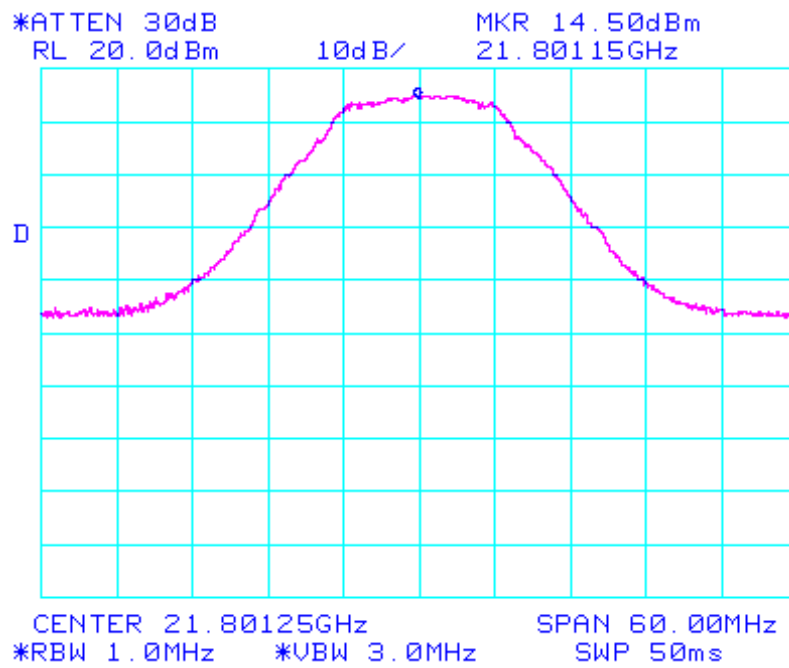
RF output power at antenna terminal Met#10409



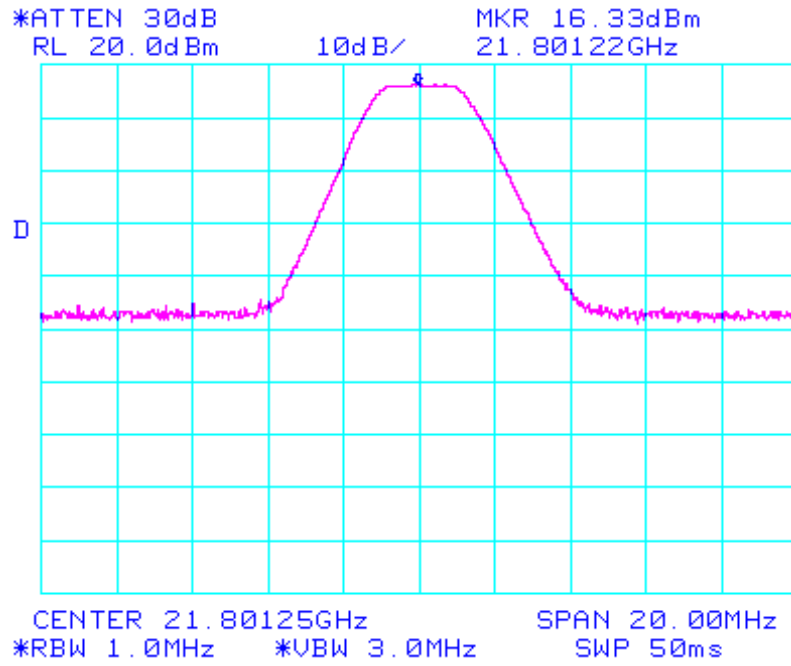
RF output power at antenna terminal
10 MHz B/W Met#10409



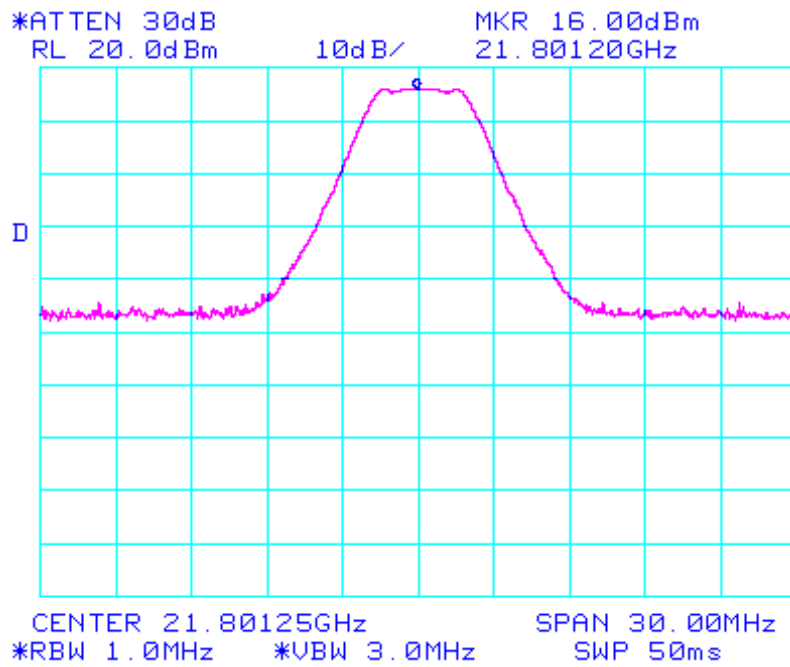
RF output power at antenna terminal
20 MHz B/W Met#10409



RF output power at antenna terminal
2.5 MHz B/W Met#10409



RF output power at antenna terminal
5 MHz B/W Met#10409



6.4 TEST TYPE: Spurious Emissions at Antenna Terminals

6.4.1 TECHNICAL SPECIFICATION: 2.1051; 101.111

6.4.2 TEST DATE(S): December 22, 2000

6.4.3 MEASUREMENT PROCEDURES:

As required by 47 CFR 2.1051, *spurious emissions at antenna terminal measurements* were made at the RF output terminals using a 50 S attenuator and spectrum analyzer. This test was performed with modulated carrier signals. The frequency spectrum was investigated from 9.0 KHz to 110 GHz. For measuring emissions above 26 Ghz, UsingMixer horn.

6.4.4 RESULTS:

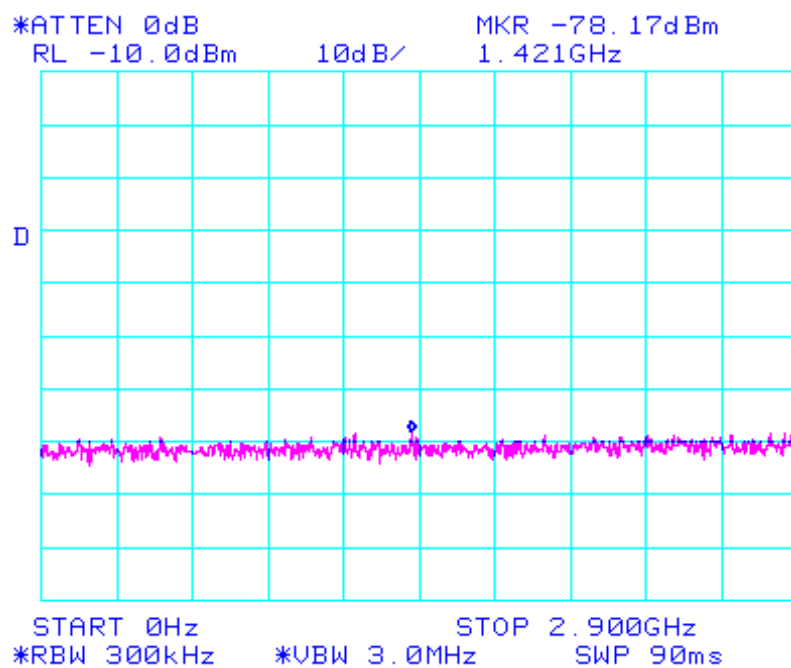
Spur limit = $P_o - (43 + 10\log P) = . -13.1 \text{ dBm}$

Equipment complies with Section 2.1051 and 101.111

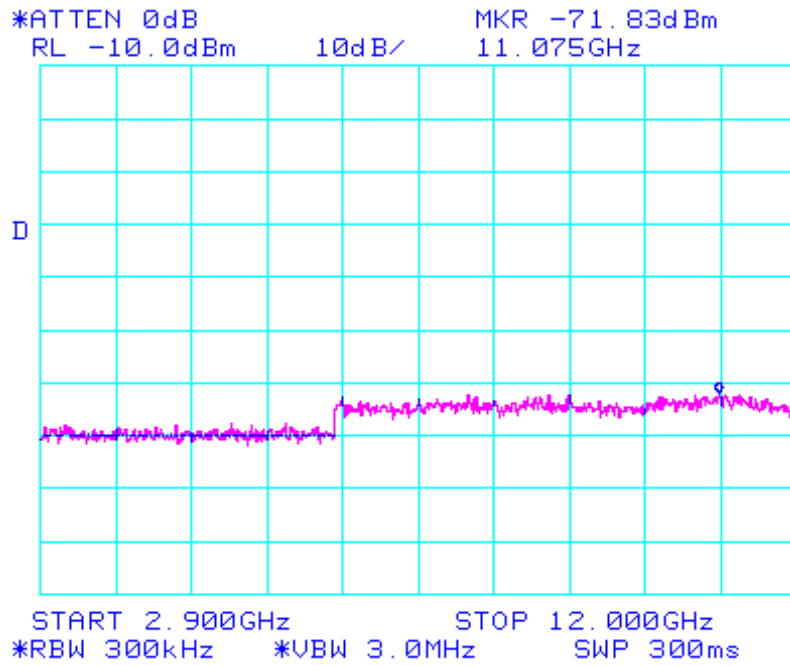
PLOTS OF SPURIOUS EMISSIONS AT ANTENNA TERMINALS : on following pages

* The pairs of spur show up on the plots (in pages 31,39 and 40) are the inter-modulation products of the Mixer.

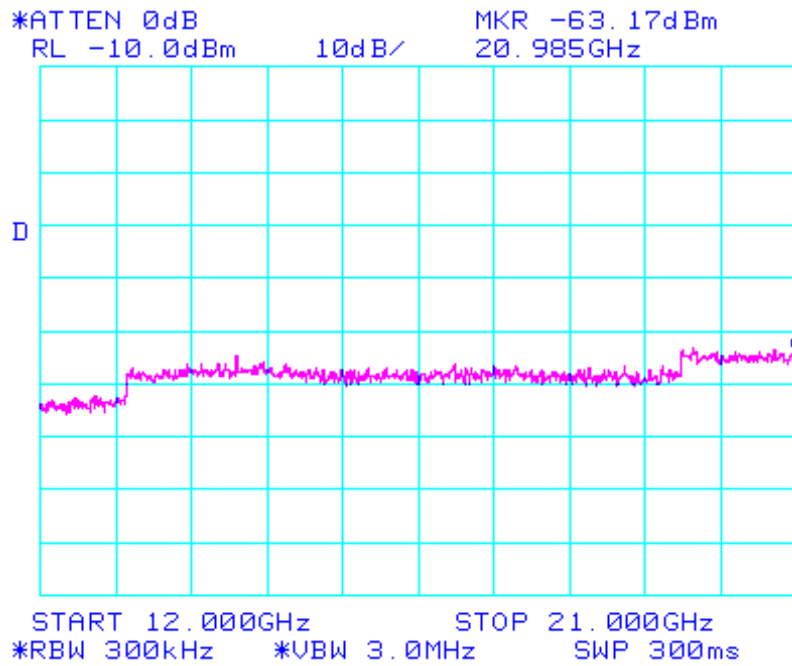
Conducted Spur Met# 10409



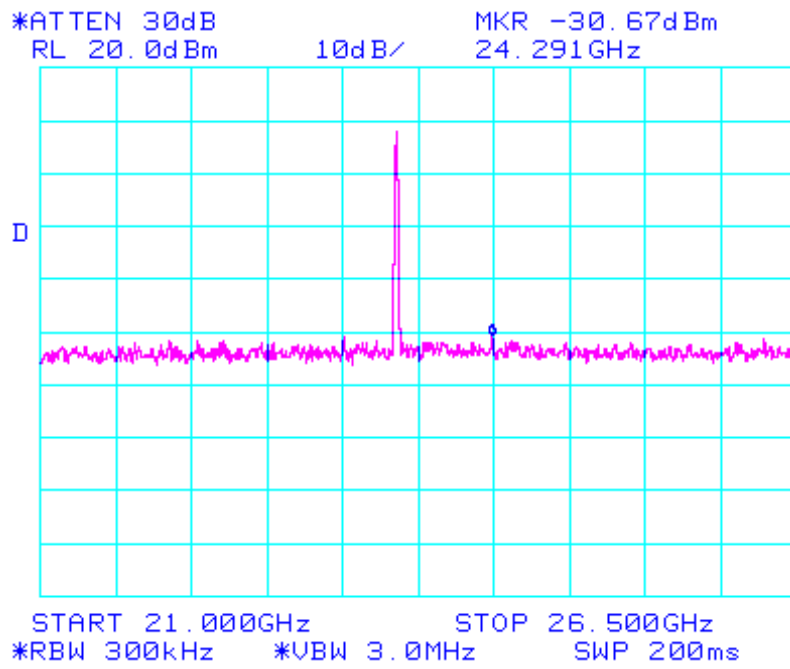
Conducted Spur Met#10409



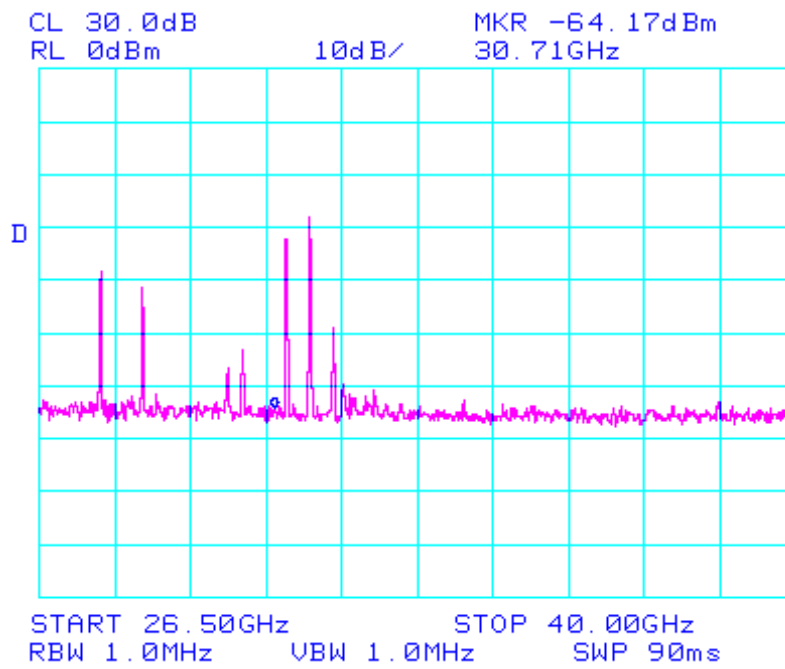
Conducted Spur Met#10409



Conducted Spur Met#10409

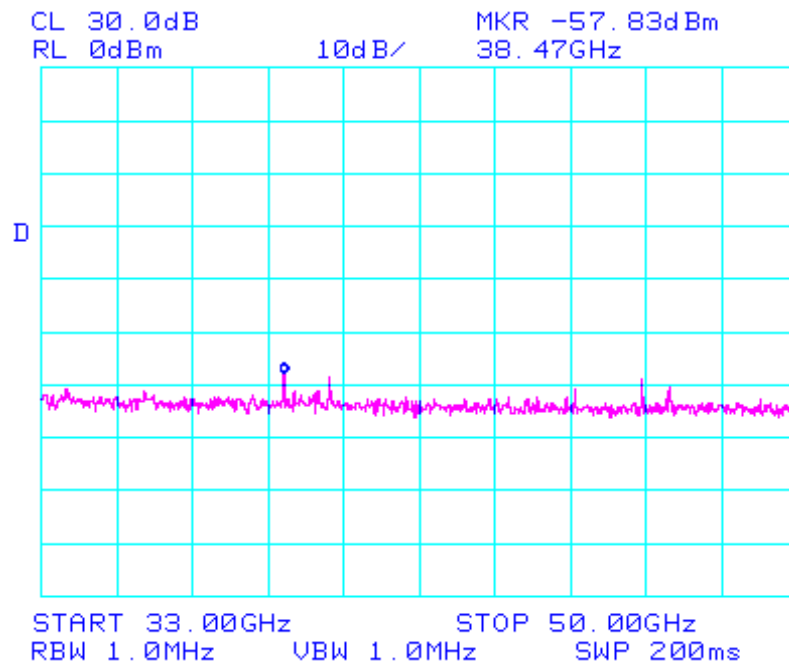


Spur at Mixer horn FCC1 Met#10409

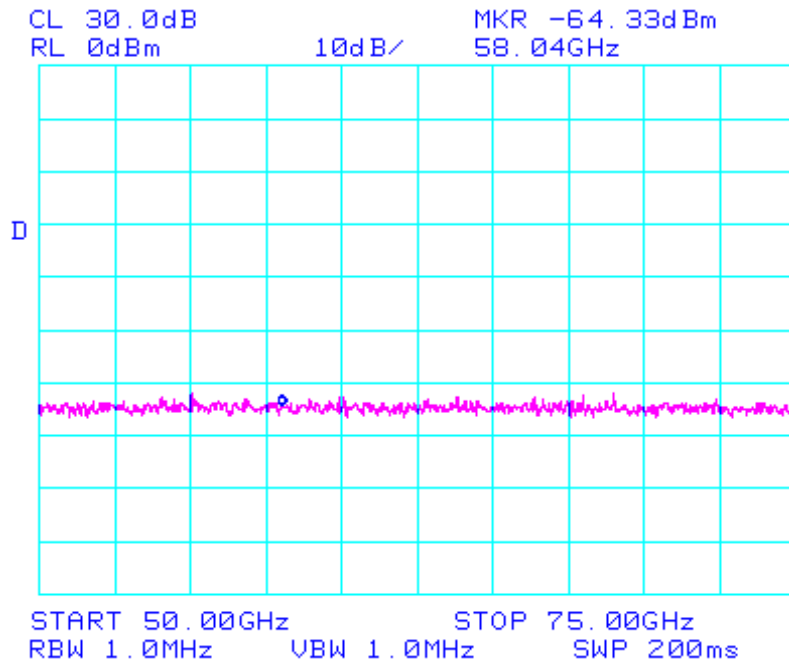


*

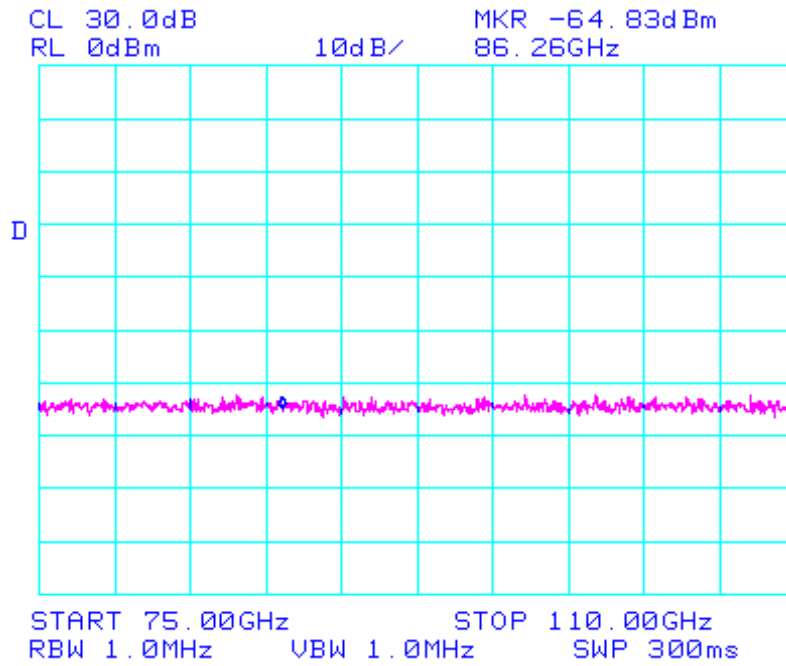
Spur at Mixer horn FCC1 Met#10409



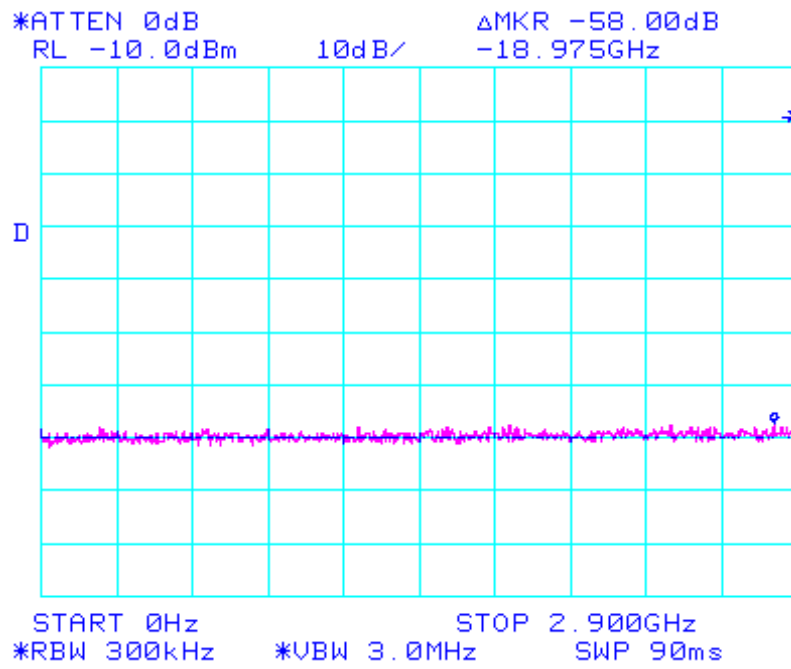
Spur at Mixer horn FCC1 Met#10409



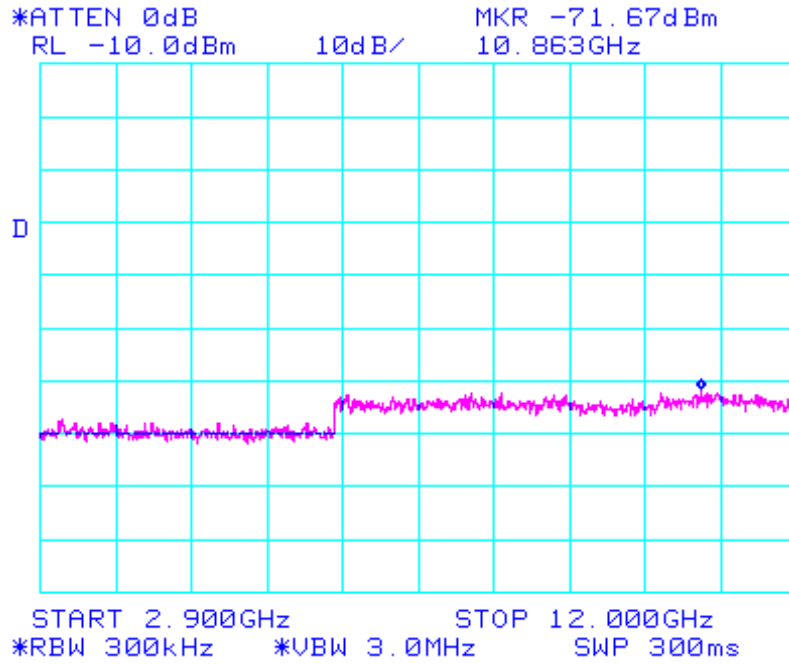
Spur at Mixer horn FCC1 Met#10409



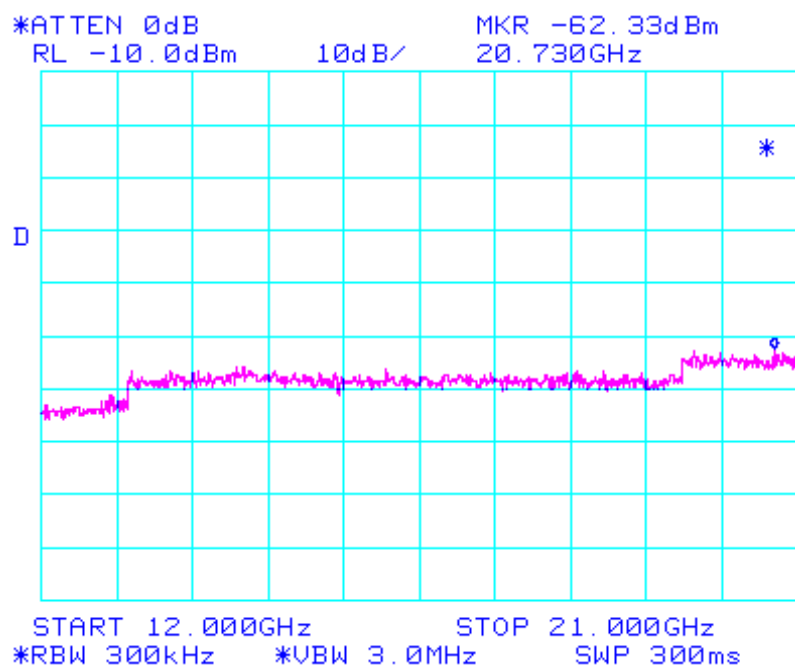
Conducted Spur Met#10409



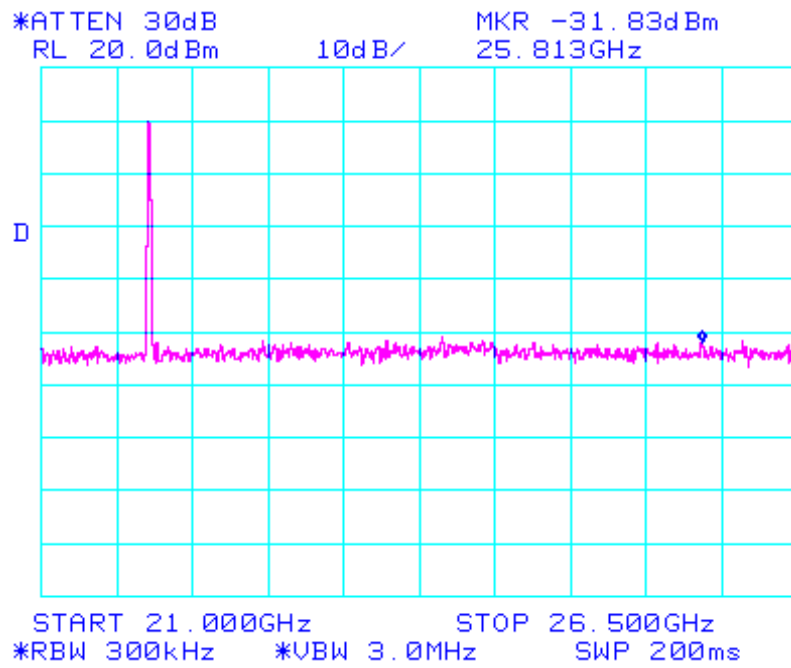
Conducted Spur Met#10409



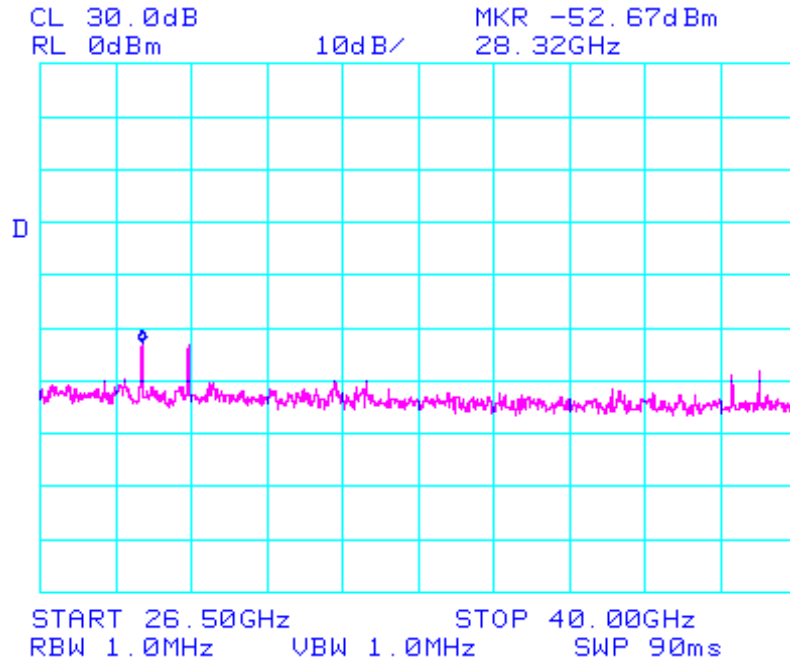
Conducted Spur Met#10409



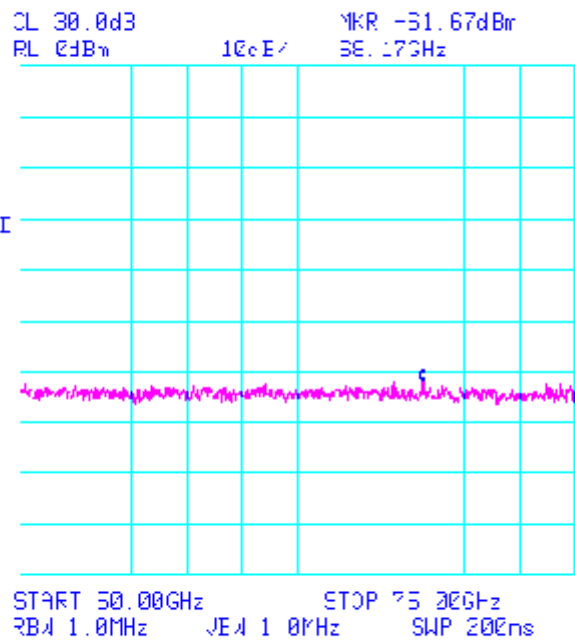
Conducted Spur Met#10409



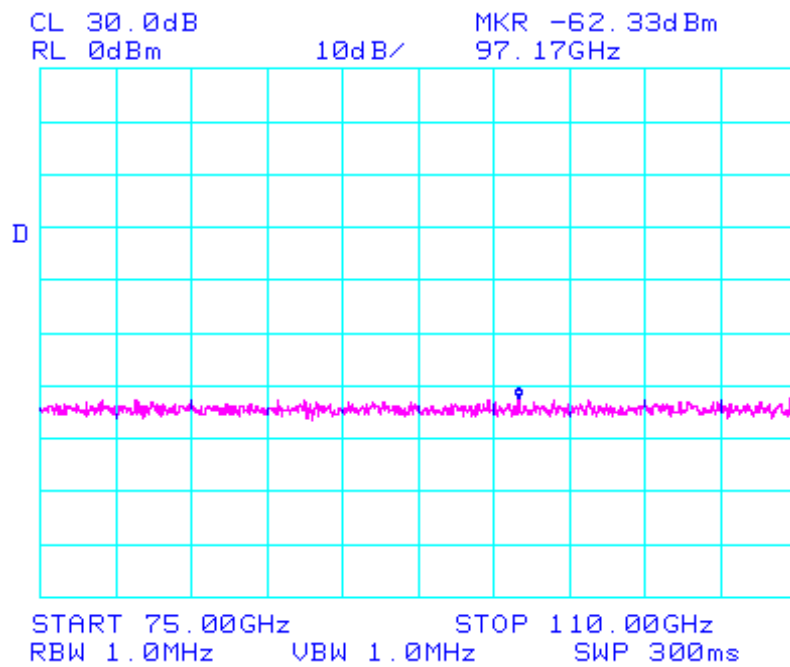
Spur at Mixer horn FCC2 Met# 10409



Spur at Mixer from FCC2 Met# 10409



Spur at Mixer horn FCC2 Met#10409



6.5 TEST TYPE: Frequency Stability over Temperature Variations**6.5.1 TECHNICAL SPECIFICATION:** 2.1055(a)(1); 101.107**6.5.2 TEST DATE(S):** Jan. 04, 2001**6.5.3 MEASUREMENT PROCEDURES:**

As required by §2.1055(a)(1) of CFR 47, *frequency tolerance measurements* were made over the temperature range of -30°C to +50°C. The frequency measurements were made using direct input to a spectrum analyzer. Climatic control was accomplished using an environmental simulation chamber. The temperature was first lowered to -30°C and then raised hourly in 10°C increments. The unit remained in the chamber during temperature transitions and during the measurement process.

6.5.4 Results:

Frequency tolerance of carrier signal: +/- 10 ppm for a temperature variation from -30°C to +50°C at normal supply voltage.

CARRIER FREQUENCY DEVIATIONS DUE TO TEMPERATURE INSTABILITY

Temperature (°C)	Carrier Frequency (1897.54) (MHz)	Frequency Deviation (KHz)	Tolerance Limit (%)
-30	23598.75	0	0.03
-20	23598.75	0	0.03
-10	23598.75	0	0.03
0	23598.75	0	0.03
+10	23598.75	0	0.03
+20	23598.75	0	0.03
+30	23598.75	0	0.03
+40	23598.75	0	0.03
+50	23598.75	0	0.03

The unit meets the requirements of 2.1055 (a)(1)

6.6 TEST TYPE: Frequency Stability over Voltage Variations**6.6.1 TECHNICAL SPECIFICATION:** 2.1055(d)(1); 101.107**6.6.2 TEST DATE(S):** Jan. 03, 2001**6.6.3 MEASUREMENT PROCEDURES:**

As required by §2.1055(d)(1) of CFR 47, *frequency tolerance measurements* were made over changes in the supply voltage to the EUT from 85% to 115% of the nominal supply voltage using a variable DC supply. The frequency measurements were made using direct input to a spectrum analyzer.

6.6.4 Results:

Frequency tolerance of carrier signal: ± 10 ppm for a variation in primary voltage from 85% to 115% of the **rated supply**.

Percentage of Rated Supply	DC Voltage (VDC)	Carrier Frequency(MHz)	Deviation (KHz)	Tolerance Limit (%)
85 %	40	23589.75	0	0.03
100 %	48	23589.75	0	0.03
115 %	65	23598.75	0	0.03

The unit meets the requirements of 2.1055 (d)(1)

6.7 TEST TYPE: Modulation Characteristics

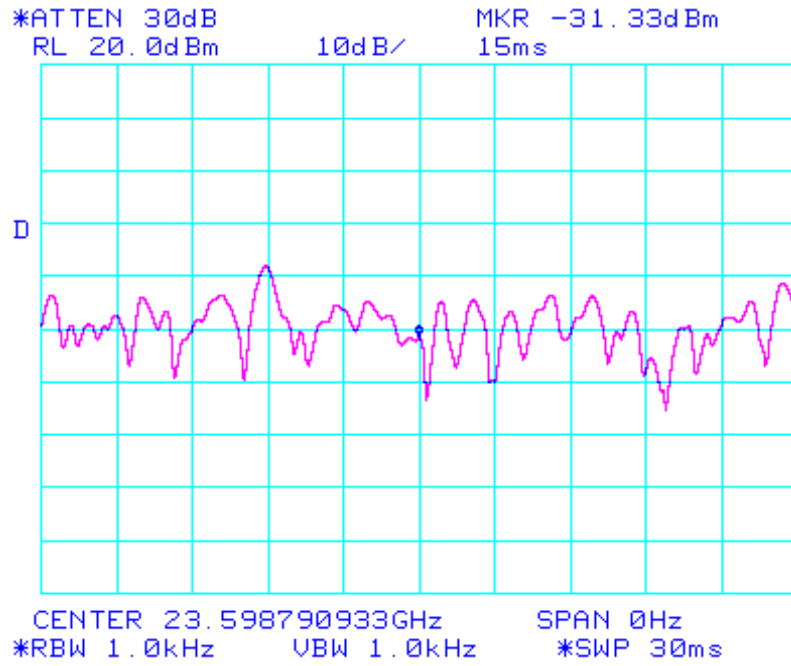
6.7.1 TECHNICAL SPECIFICATION: 2.1047(a)

6.7.2 TEST DATE(S): Jan. 03, 2001

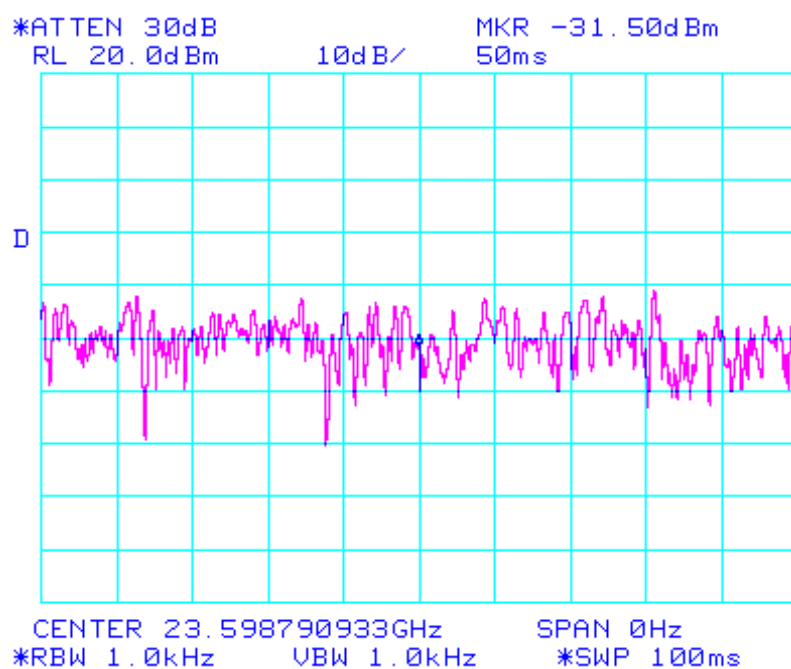
6.7.3 MEASUREMENTS REQUIRED:

The following plots give a detailed explanation of the modulation scheme (Continuous Phase modulation).

Modulation characteristics Met# 10409



Modulation Characteristics Met# 10409



Modulation Characteristics Met# 10409

