



M. Flom Associates, Inc.

International Compliance Testing Laboratory

3356 N. San Marcos Place, Suite 107
Chandler, AZ 85225

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<http://www.mflom.com>
info@mflom.com

Date: June 28, 2005

Federal Communications Commission
Via: Electronic Filing

Attention: Authorization & Evaluation Division

Applicant: Fiber-Span LLC
Equipment: FS31LM-01-LMC/FS31HM-85-C-18-65
FCC ID: Q4VFS31X-85-C
FCC Rules: 90, Confidentiality

Gentlemen:

On behalf of the Applicant, enclosed please find Application Form 731, Engineering Test Report and all pertinent documentation, the whole for approval of the referenced equipment as shown.

Filing fees are attached.

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,

Michael Schafer, General Manager

enclosure(s)
cc: Applicant
MS/del



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Transmitter Certification
(Amplifier)

of

Model: FS31LM-01-LMC/FS31HM-85-C-18-65
FCC ID: Q4VFS31X-85-C

to

Federal Communications Commission

Rule Part(s) 90, Confidentiality

Date of report: June 28, 2005

On the Behalf of the Applicant:

Fiber-Span LLC

At the Request of:

P.O. 5078

Fiber-Span LLC
One Possumtown Road
Piscataway, NJ 08854

Attention of:

Henry Wojtunik, President
email: hwojtunik@fiber-span.com
(732) 564-9000; FAX: -1990
Jim Stewart, Engineering Manager
jims@fiber-span.com

Supervised by:

Michael Findley, Laboratory Manager

List of Exhibits

(FCC **Certification** (Transmitters) - Revised 9/28/98)

Applicant: Fiber-Span LLC

FCC ID: Q4VFS31X-85-C

By Applicant:

1. Letter of Authorization
2. Confidentiality Request: 0.457 And 0.459
3. Identification Drawings, 2.1033(c)(11)
 - Label
 - Location of Label
 - Compliance Statement
 - Location of Compliance Statement
4. Photographs, 2.1033(c)(12)
5. Documentation: 2.1033(c)
 - (3) User Manual
 - (9) Tune Up Info
 - (10) Schematic Diagram
 - (10) Circuit Description
 - Block Diagram
 - Parts List
 - Active Devices

By M.F.A. Inc.:

- A. Testimonial & Statement of Certification

The Applicant has been cautioned as to the following:

15.21 Information to the 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 85225

c) Report Number: d0560047

d) Client: Fiber-Span LLC
One Possumtown Road
Piscataway, NJ 08854

e) Identification: FS31LM-01-LMC/FS31HM-85-C-18-65
FCC ID: Q4VFS31X-85-C
EUT Description: Fiber Optic Connected RF Amplifier

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


g) Report Date: June 28, 2005
EUT Received: 2005-Jun-10

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:



Michael Findley, Laboratory Manager

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.

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 Radio Beacons (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

Standard Test Conditions and Engineering Practices

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

In accordance with ANSI C63.4-1992/2000, 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.



A2LA

"A2LA has accredited M. Flom Associates, Inc. Chandler, AZ for technical competence in the field of Electrical 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 17025 – 1999 'General Requirements for the Competence of Testing and Calibration Laboratories' and any additional program requirements in the identified field of testing."

Certificate Number: **2152-01**



NIST

I am pleased to inform you that your laboratory has been validated by the Chinese Taipei Bureau of Standards, Metrology and Inspection (BSMI) under the Asia Pacific Economic Cooperation Mutual Recognition Agreement (APEC MRA). Your laboratory is now formally designated to act as a Conformity Assessment Body (CAB) under Appendix B, Phase I Procedures, of the APEC MRA between the American Institute in Taiwan (AIT) and the Taipei Economic and Cultural Representative Office (TECRO) in the United States, covering equipment subject to Electro-Magnetic Compatibility (EMC) requirements. The names of all validated and nominated laboratories will be posted on the NIST website at <http://ts.nist.gov/mra> under the 'Asia' category."

BSMI Number: **SL2-IN-E-041R**

List of General Information Required for Certification

In Accordance with FCC Rules and Regulations,
Volume II, Part 2 and to 90, Confidentiality

Sub-part 2.1033

(c)(1): **Name and Address of Applicant:**

Fiber-Span LLC
One Possumtown Road
Piscataway, NJ 08854

Manufacturer:

Applicant

(c)(2): **FCC ID:**

Q4VFS31X-85-C

Model Number:

FS31LM-01-LMC/FS31HM-85-C-18-65

(c)(3): **Instruction Manual(s):**

Please see attached exhibits

(c)(4): **Type of Emission:**

F3, F1

(c)(5): **Frequency Range, MHz:**

851.000 to 869.000

(c)(6): **Power Rating, Watts:**

1.0

_____ Switchable

_____ Variable

_____ X N/A

(c)(7): **Maximum Power Rating, Watts:**

300

DUT Results:

Passes _____ X _____

Fails _____

Subpart 2.1033 (continued)

(c)(8): Voltages & currents in all elements in final RF stage, including final transistor or solid-state device:

Collector Current, A	=	See manual
Collector Voltage, Vdc	=	See manual
Supply Voltage, Vdc	=	12

(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:**

<u> </u>	Attached Exhibits
<u> x </u>	N/A

(c)(14): **Test and Measurement Data:**

Follows

Name of Test: Carrier Output Power (Conducted)

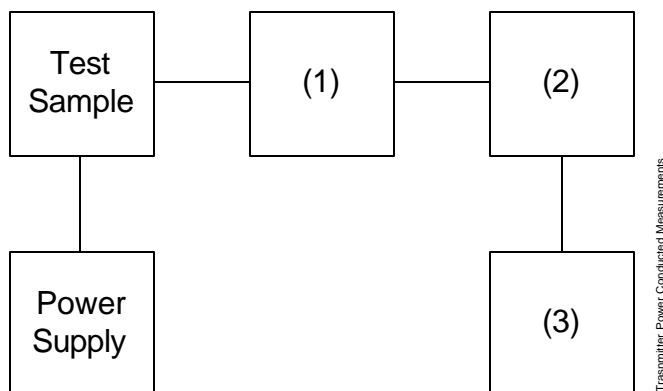
Specification: 47 CFR 2.1046(a)

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

Measurement Procedure

- A) The EUT was connected to a resistive coaxial attenuator of normal load impedance, and the unmodulated output power was measured by means of an RF Power Meter.
- B) Measurement accuracy is $\pm 3\%$.

Transmitter Test Set-Up: RF Power Output



	Asset	Description	s/n	Cycle	Last Cal
(1)	Coaxial Attenuator				
X	i00231/2	PASTERNAK PE7021-30 (30 dB)	231 or 232	NCR	
	i00122/3	NARDA 766 (10 dB)	7802 or 7802A	NCR	
(2)	Power Meters				
X	i00020	HP 8901A Power Mode	2105A01087	12 mo.	Apr-05
(3)	Frequency Counter				
X	i00020	HP 8901A Frequency Mode	2105A01087	12 mo.	Apr-05

Name of Test: Carrier Output Power (Conducted)

Measurement Results
(Worst case)

Frequency of Carrier, MHz = 861.000MHz
Ambient Temperature = 23°C ± 3°C

Power Setting	RF Power, dBm	RF Power, Watts
High	30.0	1.00



Performed By:

David E. Lee, Test Engineer

Name of Test: RF Power Output (Radiated)

Specification: 47 CFR 2.1046(a)

Test Equipment: As per attached page

Measurement Procedure (Radiated)

- 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 was calculated from the equation $P_t = ((E \times R)^2 / 49.2)$ watts, where $R = 3m$.
- Measurement accuracy is ± 1.5 dB.

Test Equipment

Asset	Description	s/n	Cycle	Last Cal
Transducer				
i00088	EMCO 3109-B 25MHz-300MHz	2336	24 mo.	Sep-03
X i00089	Apriel 2001 200MHz-1GHz	001500	24 mo.	Sep-03
X i00103	EMCO 3115 1GHz-18GHz	9208-3925	24 mo.	Jan-04
Amplifier				
X i00028	HP 8449A	2749A00121	12 mo.	May-05
Spectrum Analyzer				
X i00029	HP 8563E	3213A00104	12 mo.	May-05
X i00033	HP 85462A	3625A00357	12 mo.	Sep-04

Measurement Results

g0560281: 2005-Jun-28 Tue 05:59:00

State: 2:High Power

Ambient Temperature: 23°C \pm 3°C

Amps Mode:

Frequency Tuned, MHz	Frequency Emission, MHz	Meter, dBuV/m	CF, dB	ERP, dBm	ERP, Watts
0.000000	851.000000	101.60	24.55	28.8	0.76
0.000000	860.000000	102.72	24.68	30.0	1.00
0.000000	869.800000	102.53	24.82	30.0	1.00



Performed By:

David E. Lee, Test Engineer

Name of Test: Unwanted Emissions (Transmitter Conducted)

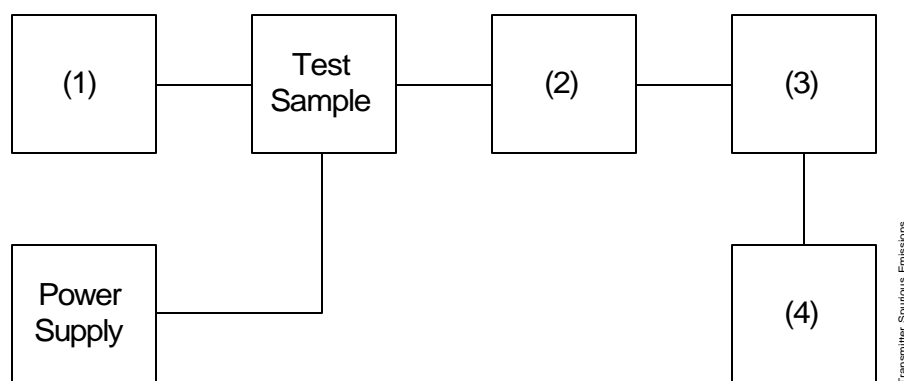
Specification: 47 CFR 2.1051

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

Measurement Procedure

- A) The emissions were measured for the worst case as follows:
- 1). within a band of frequencies defined by the carrier frequency plus and minus one channel.
 - 2). 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.
- B) The magnitude of spurious emissions that are attenuated more than 20 dB below the permissible value need not be specified.

Transmitter Test Set-Up: Spurious Emission



Asset	Description	s/n		
(1) Audio Oscillator/Generator				
X	i00017	HP 8903A Audio Analyzer	2216A01753	12 mo. Apr-05
	i00002	HP 3336B Synthesizer / Level Gen.	1931A01465	12 mo. Apr-05
(2) Coaxial Attenuator				
X	i00231/2	PASTERNAK PE7021-30 (30 dB)	231 or 232	NCR
	i0012/3	NARDA 766 (10 dB)	7802 or 7802A	NCR
(3) Filters; Notch, HP, LP, BP				
	None required			
(4) Spectrum Analyzer				
X	i00048	HP 8566B Spectrum Analyzer	2511A01467	12 mo. Oct-04
	i00029	HP 8563E Spectrum Analyzer	3213A00104	12 mo. May-05

Name of Test: Unwanted Emissions (Transmitter Conducted)

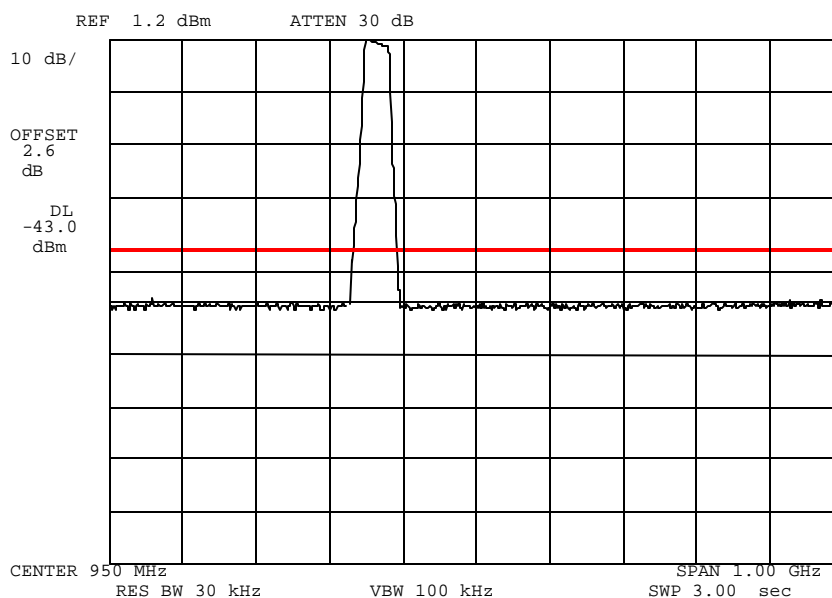
Measurement Results
(Worst Case)

Summary:

Frequency of carrier, MHz	=	Swept Input
Spectrum Searched, GHz	=	450MHz - 1450MHz
Limit(s), dBc		-43dBc (-13dBm Down Link) -43dBc (-43dBm Up Link)

g0560299: 2005-Jun-28 Tue 14:59:00
State: 2:High Power

Ambient Temperature: 23°C ± 3°C



Power:
Modulation:

HIGH
UP LINK CONDUCTED
-43DBC LIMIT(-43DBM)



Performed By:

David E. Lee, Test Engineer

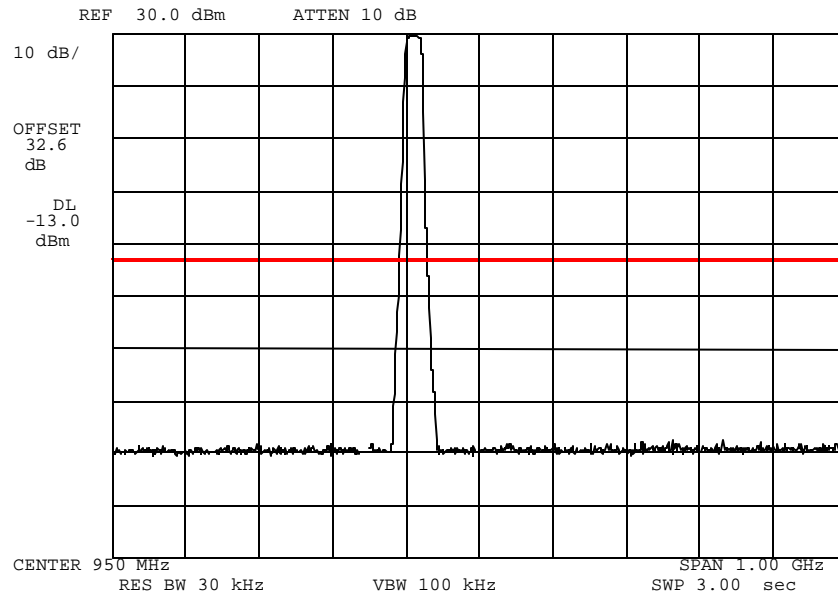
Name of Test: Unwanted Emissions (Transmitter Conducted)

Measurement Results

g0560300: 2005-Jun-28 Tue 15:49:00

State: 2:High Power

Ambient Temperature: 23°C ± 3°C



Power:
Modulation:

HIGH
DOWN LINK CONDUCTED
-43DBC LIMIT (-13DBM)



Performed By:

David E. Lee, Test Engineer

Name of Test: Emission Masks (Occupied Bandwidth)

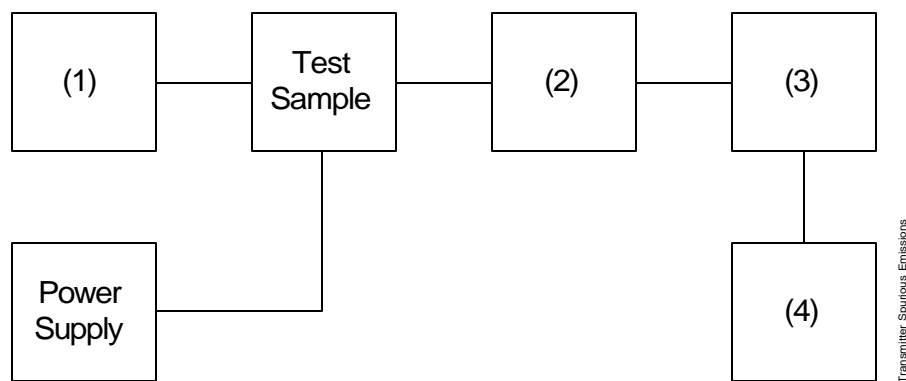
Specification: 47 CFR 2.1049(c)(1)

Guide: ANSI/TIA/EIA-603-1992, Paragraph 2.2.11

Measurement Procedure

- A) The EUT and test equipment were set up as shown below
- B) For EUTs supporting audio modulation, the audio signal generator was adjusted to the frequency of maximum response and with output level set for $\pm 2.5/\pm 1.25$ kHz deviation (or 50% modulation). With level constant, the signal level was increased 16 dB.
- C) For EUTs supporting digital modulation, the digital modulation mode was operated to its maximum extent.
- D) The Occupied Bandwidth was measured with the Spectrum Analyzer controls set as shown on the test results.

Transmitter Test Set-Up: Occupied Bandwidth



Asset	Description	s/n	Cycle	Last Cal
(1) Audio Oscillator/Generator				
X i00017	HP 8903A Modulation Meter	2216A01753	12 mo.	Apr-05
(2) Coaxial Attenuator				
X i00231/2	PASTERNAK PE7021-30 (30 dB)	231 or 232	NCR	
i00123	NARDA 766 (10 dB)	7802A	NCR	
(3) Interface				
X i00021	HP 8954A Transceiver Interface	2146A00159	NCR	
(4) Spectrum Analyzer				
X i00048	HP 8566B Spectrum Analyzer	2511A01467	12 mo.	Oct-04
i00029	HP 8563E Spectrum Analyzer	3213A00104	12 mo.	May-05

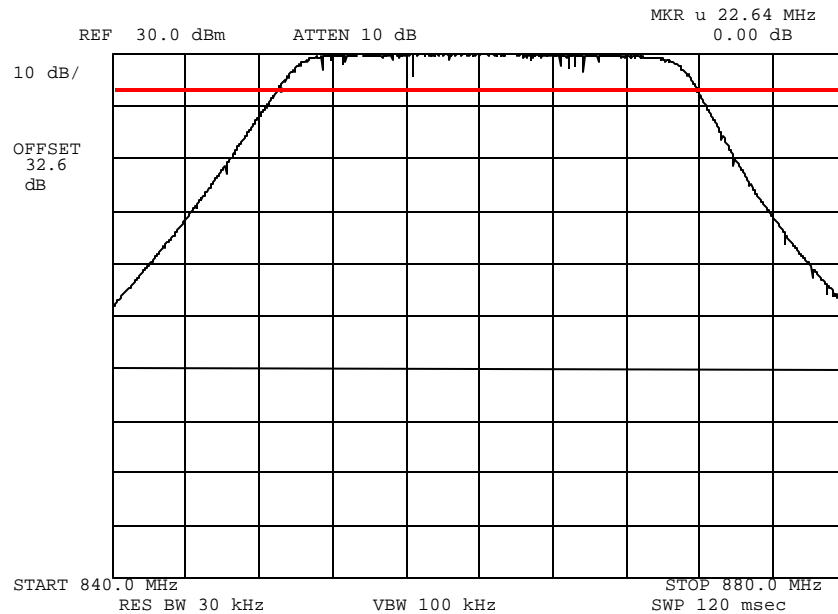
Name of Test: Emission Masks (Occupied Bandwidth)

Measurement Results

g0560293: 2005-Jun-28 Tue 08:53:00

State: 2:High Power

Ambient Temperature: 23°C ± 3°C



Power:
Modulation:

HIGH
DOWN LINK CONDUCTED
6DB BW = 22.64MHZ



Performed By:

David E. Lee, Test Engineer

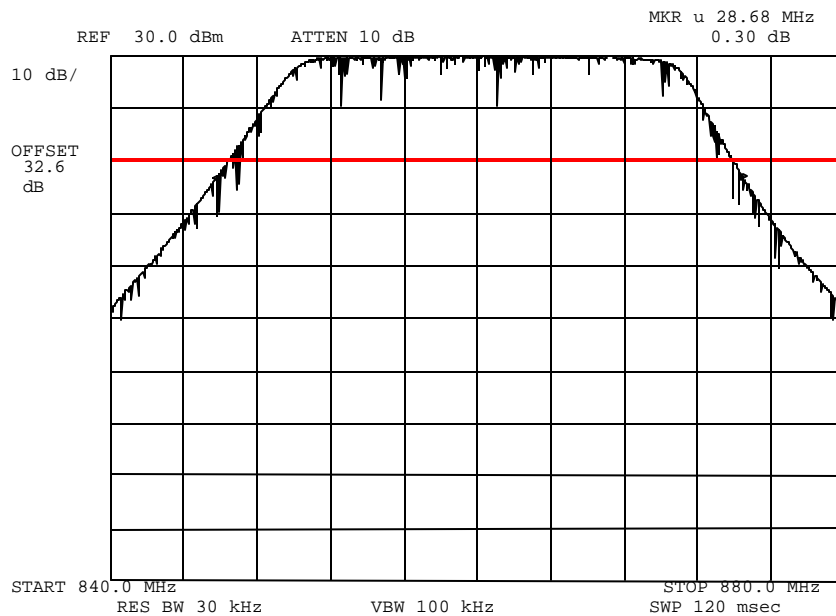
Name of Test: Emission Masks (Occupied Bandwidth)

Measurement Results

g0560294: 2005-Jun-28 Tue 09:05:00

State: 2:High Power

Ambient Temperature: 23°C ± 3°C



Power:
Modulation:

HIGH
DOWN LINK CONDUCTED
20DB BW = 28.68MHZ



Performed By:

David E. Lee, Test Engineer

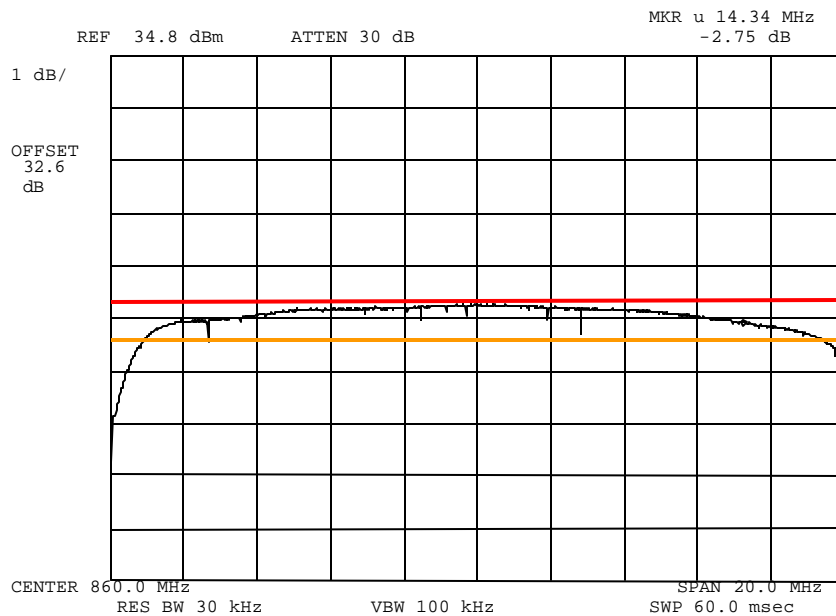
Name of Test: Emission Masks (Occupied Bandwidth)

Measurement Results

g0560295: 2005-Jun-28 Tue 09:16:00

State: 2:High Power

Ambient Temperature: 23°C ± 3°C



Power:
Modulation:

HIGH
DOWN LINK CONDUCTED
FLATNESS = 0.80DB



Performed By:

David E. Lee, Test Engineer

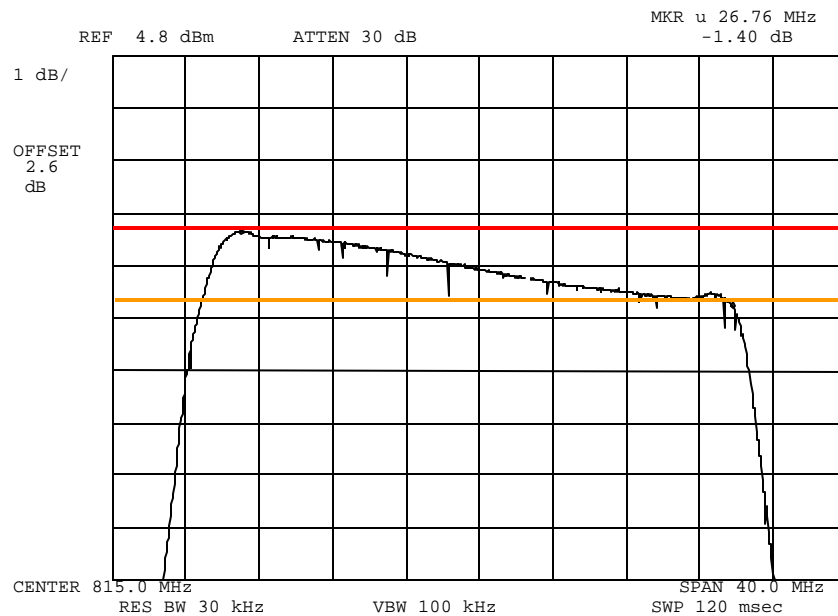
Name of Test: Emission Masks (Occupied Bandwidth)

Measurement Results

g0560296: 2005-Jun-28 Tue 09:36:00

State: 2:High Power

Ambient Temperature: 23°C ± 3°C



Power:
Modulation:

HIGH
UP LINK CONDUCTED
FLATNESS = 1.40DB

Performed By:

David E. Lee, Test Engineer

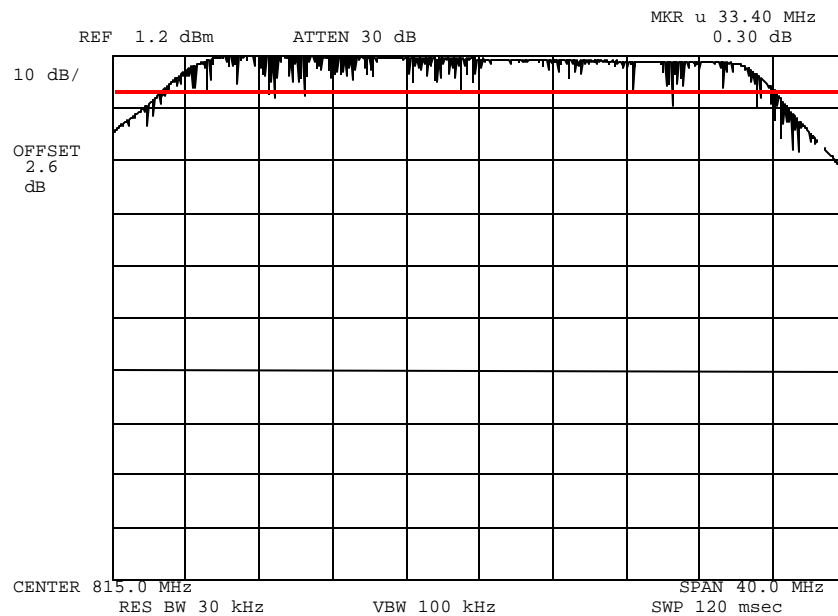
Name of Test: Emission Masks (Occupied Bandwidth)

Measurement Results

g0560297: 2005-Jun-28 Tue 09:44:00

State: 2:High Power

Ambient Temperature: 23°C ± 3°C



Power:
Modulation:

HIGH
UP LINK CONDUCTED
6DB BW = 33.40MHZ



Performed By:

David E. Lee, Test Engineer

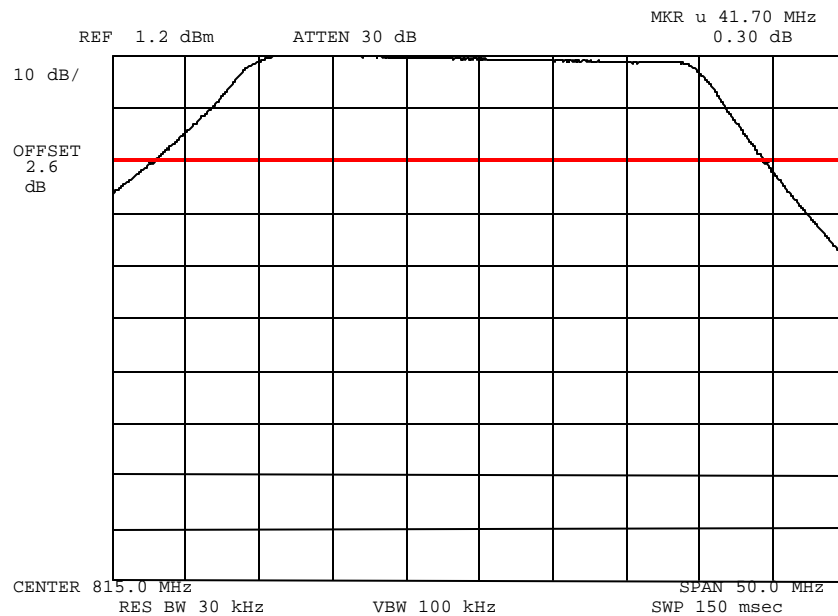
Name of Test: Emission Masks (Occupied Bandwidth)

Measurement Results

g0560298: 2005-Jun-28 Tue 09:55:00

State: 2:High Power

Ambient Temperature: 23°C ± 3°C



Power:
Modulation:

HIGH
UP LINK CONDUCTED
20DB BW = 41.70MHZ



Performed By:

David E. Lee, Test Engineer

Name of Test: Downlink Intermodulation (IP3)

Guide: ANSI/TIA/EIA-603-1992

Measurement Procedure

- A) The EUT and test equipment were set up as shown below. The signal sources were set to 858.000MHz and 858.050MHz and fed to the EUT via a combiner. The composite signal input was -31dBm.
- B) The FM deviation was set on both generators to be 3kHz deviation with a 1kHz tone.
- D) The resultant output was measured with the Spectrum Analyzer controls set as shown on the test results.

Transmitter Test Set-Up: Occupied Bandwidth

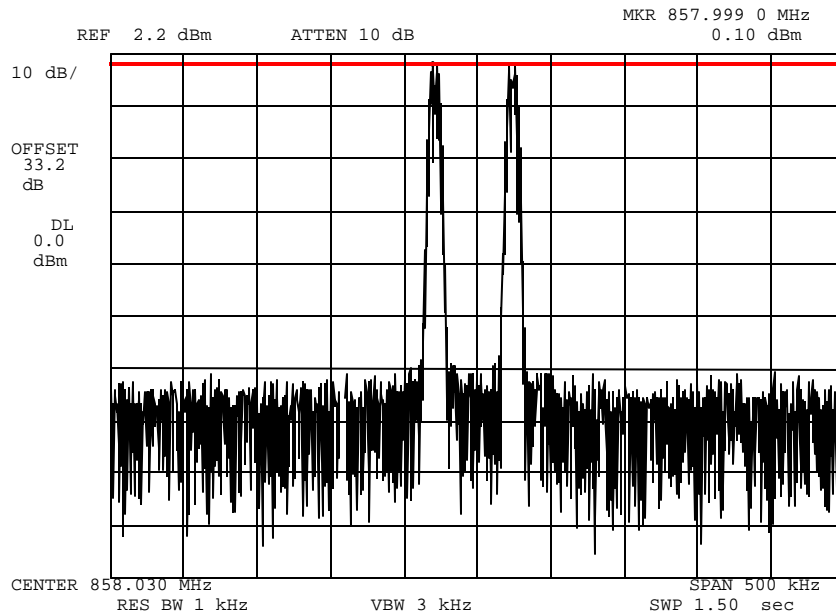
Asset	Description	s/n	Cycle	Last Cal
(1) Signal Generator				
X	RS301 Signal Generator		12 mo.	Aug-04
X i00067	HP 8920A Communication TS	3345U01242	12 mo.	Jun-05
(2) Coaxial Attenuator / Combiner				
X i00231/2	PASTERNAK PE7021-30 (30 dB)	231 or 232	NCR	
X i00154	4 x 25 Ω COMBINER	154	NCR	
(3) Interface				
X i00021	HP 8954A Transceiver Interface	2146A00159	NCR	
(4) Spectrum Analyzer				
X i00048	HP 8566B Spectrum Analyzer	2511A01467	12 mo.	Oct-04
i00029	HP 8563E Spectrum Analyzer	3213A00104	12 mo.	May-05

Name of Test: Downlink Intermodulation (IP3)

Measurement Results

g0570004: 2005-Jul-05 Tue 10:48:00
State: 2:High Power

Ambient Temperature: 23°C ± 3°C



Power:
Modulation:

HIGH (REFERENCE)
2 TONE FM (3KHZ MOD / 1KHZ TONE) - IP3
50KHZ SEPERATION



Performed By:

David E. Lee, Test Engineer

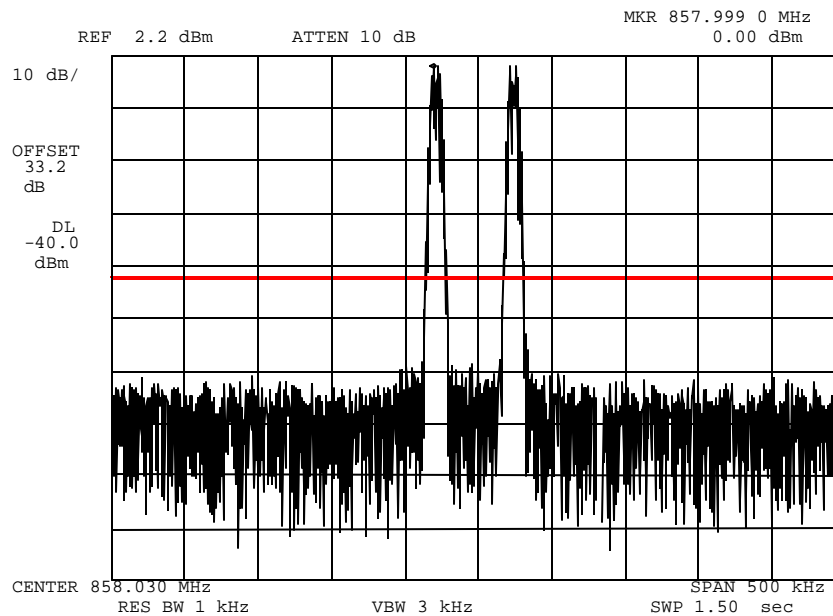
Name of Test: Downlink Intermodulation (IP3)

Measurement Results

g0570005: 2005-Jul-05 Tue 10:49:00

State: 2:High Power

Ambient Temperature: 23°C ± 3°C



Power:

Modulation:

HIGH (-40dB LEVEL)

2 TONE FM (3KHZ MOD / 1KHZ TONE) - IP3
50KHZ SEPERATION



Performed By:

David E. Lee, Test Engineer

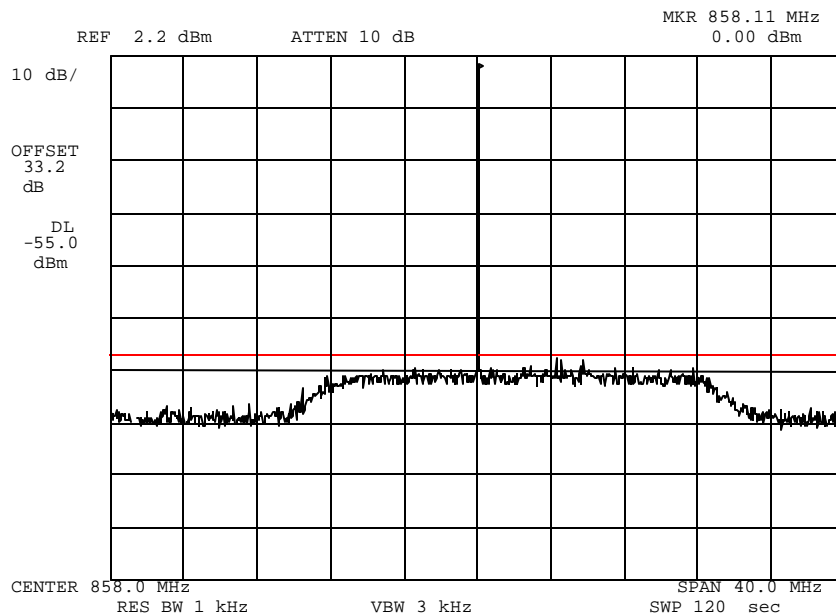
Name of Test: Downlink Intermodulation (IP3)

Measurement Results

g0570006: 2005-Jul-05 Tue 10:57:00

State: 2:High Power

Ambient Temperature: 23°C ± 3°C



Power:
Modulation:

HIGH (FULL BANDWIDTH - NOISE FLOOR)
2 TONE FM (3KHZ MOD / 1KHZ TONE) - IP3
50KHZ SEPERATION



Performed By:

David E. Lee, Test Engineer

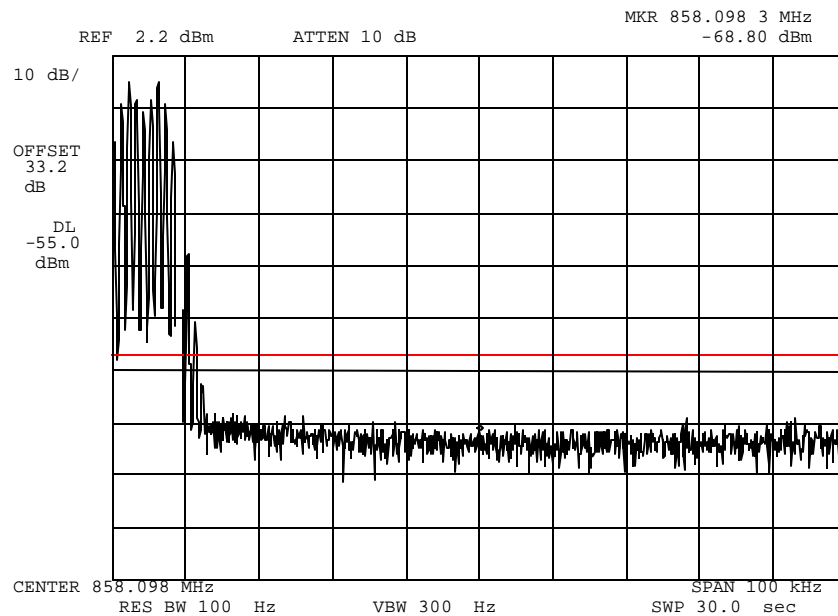
Name of Test: Downlink Intermodulation (IP3)

Measurement Results

g0570007: 2005-Jul-05 Tue 11:03:00

State: 2:High Power

Ambient Temperature: 23°C ± 3°C



Power:
Modulation:

HIGH
2 TONE FM (3KHZ MOD / 1KHZ TONE) - IP3
UPPER FUNDAMENTAL



Performed By:

David E. Lee, Test Engineer

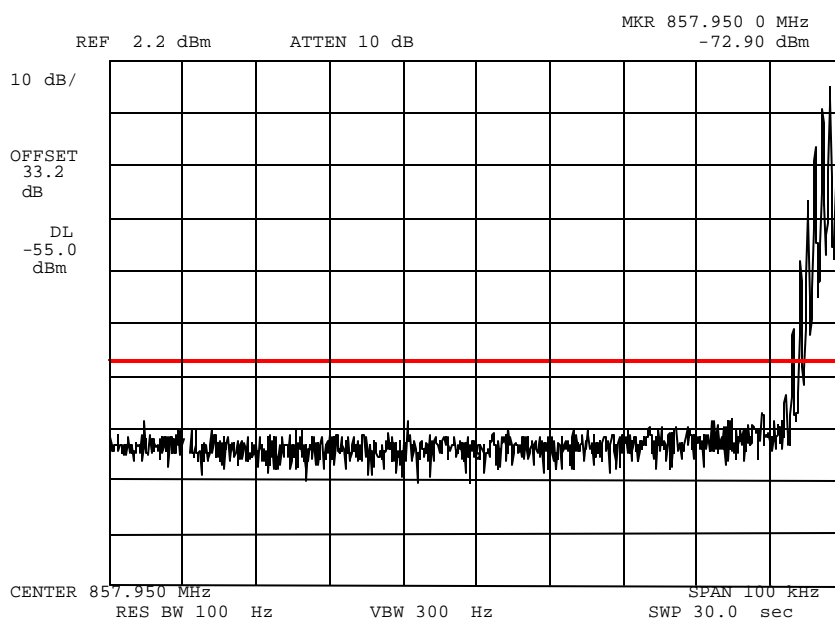
Name of Test: Downlink Intermodulation (IP3)

Measurement Results

g0570008: 2005-Jul-05 Tue 11:05:00

State: 2:High Power

Ambient Temperature: 23°C ± 3°C



Power:
Modulation:

HIGH
2 TONE FM (3KHZ MOD / 1KHZ TONE) - IP3
LOWER FUNDAMENTAL



Performed By:

David E. Lee, Test Engineer

END OF TEST REPORT

**Testimonial
and
Statement of Certification**

This is to Certify:

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.



Michael Findley, Laboratory Manager

Certifying Engineer: