



Flom Test Labs
EMI, EMC, RF Testing Experts Since 1963

toll-free: (866) 311-3268
fax: (480) 926-3598
<http://www.flomlabs.com>
info@flomlabs.com

Date: February 8, 2007

Applicant: Samyung Enc Co Ltd
1123-17, Dongsam-3-Dong
Busan
Korea

Attention of: Freddy
freddy@samyungenc.com
82-51-601-5555

Equipment: SMR-3600
FCC ID: UQZRSU-3600
P.O. Number:
FCC Rules: Part 80, Part 2

Gentlemen:

Enclosed please find your copy of the Engineering Test Report for which you are subject to the restrictions as listed on the attached summary.

As you know, the FCC, after a TCB issues a Grant, still has 30 days to review a submission and request added information. It is your decision whether or not to market the equipment subject to a possible recall before the end of the 30 days.

If your equipment is still retained by us, it will be returned to you 30 days after approval is achieved. Our invoice for services has been directed to your Accounts Payable Department.

Should you need any clarification, just fax or phone. Thank you again for this order - it has been a pleasure to be of service.

Sincerely yours,

Hoosamuddin S. Bandukwala, Lab Director

enclosure(s)
HSB/mdw



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Equipment: SMR-3600
FCC ID: UQZRSU-3600
FCC Rules: Part 80, Part 2

Gentlemen:

Enclosed please find your copies of the Application Form, covering letter to the FCC and Engineering Test Report, the whole for approval of the reference equipment as indicated.

Please allow from 8-12 weeks to hear from the Commission, who may request additional data or information, and even a sample for pre-grant audit testing. In the meantime, you are subject to the restrictions as listed on the attached summary.

If your equipment is still retained by us, it will be returned to you as soon as approval is achieved. Our invoice for services has been directed to your Accounts Payable Department.

Should you need any clarification, just fax or phone. Thank you again for this order - it has been a pleasure to be of service.

Sincerely yours,

Hoosamuddin S. Bandukwala, Lab Director

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Memo

Date: February 8, 2007

Applicant: Samyung Enc Co Ltd
1123-17, Dongsam-3-Dong
Busan
Korea

Equipment: SMR-3600
FCC ID: UQZRSU-3600

Please note that the enclosed Reports reflect the results of tests performed to the currently published Federal Communications Commissions Rules and Regulations.

Should the FCC's Examiners' interpretations request new and unpublished requirements, we will be pleased to provide them. We will invoice you accordingly, i.e. for the time spent on re-testing, providing the amended pages and/or Reports and for the time necessary to be spent on electronic filing. We will of course provide you with copies of any of the additions.

We regret any added expense to the Applicants, but of late the FCC continues to change their requirements without any prior written publication and/or notices.

As in the past, we will continue to provide all liaison with the FCC necessary for the successful conclusion of your project and the receipt of your Grant of Equipment Authorization.

Sincerely yours,

Hoosamuddin S. Bandukwala, Lab Director



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Summary of Restrictions

1. All submissions to the FCC are subject to their Examiner's interpretation.
2. Please allow from 60 to 90 days before hearing from the FCC with regard to any submission.
3. The FCC can set aside any action; modify or set aside any action, within 30 days. (FCC Rule 1.108, 1.113).
4. Under Rule 2.803, if device is not type accepted/certificated then it must not be sold, leased, offered for sale, imported, shipped or distributed or advertised for sale.
5. FCC can revoke its certificates at any time if the equipment does not meet or continue to meet their Rules. (Rule Parts 2.927, 2.939).
6. FCC can request a sample at any time (2.936).

M. Flom Associates, Inc.

Hoosamuddin S. Bandukwala, Lab Director



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Date: February 8, 2007

Federal Communications Commission
Via: Electronic Filing

Attention: Authorization & Evaluation Division

Applicant: Samyung Enc Co Ltd
Equipment: SMR-3600
FCC ID: UQZRSU-3600
FCC Rules: Part 80, Part 2

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.

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,

Hoosamuddin S. Bandukwala, Lab Director

enclosure(s)
cc: Applicant
HSB/mdw

Flom Test Labs
3356 North San Marcos Place, Suite 107
Chandler, Arizona 85225-7176
(866) 311-3268 phone, (480) 926-3598 fax

MFA p06a0015, d0720011



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Transmitter Certification

of

Model: SMR-3600

to

Federal Communications Commission

Rule Part(s) 80, Part 2

Date of report: February 8, 2007

On the Behalf of the Applicant:

Samyung Enc Co Ltd

At the Request of:

Samyung Enc Co Ltd
1123-17, Dongsam-3-Dong
Busan
Korea

Attention of:

Freddy
freddy@samyoungenc.com
82-51-601-5555

Supervised by:

Hoosamuddin S. Bandukwala, Lab Director



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List of Exhibits

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

Applicant: Samyung Enc Co Ltd

FCC ID: UQZRSU-3600

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 Guide 17025-2005, 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: d0720011

d) Client: Samyung Enc Co Ltd
1123-17, Dongsam-3-Dong
Busan
Korea

e) Identification: SMR-3600
EUT Description: Marine Radar

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

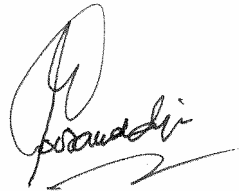
g) Report Date: February 8, 2007
EUT Received:

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:



Hoosamuddin S. Bandukwala, Lab Director

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.

Accessories used during testing:

| Type | Quantity | Manufacturer | Model | Serial No. | FCC ID |
|------|----------|--------------|-------|------------|--------|
|------|----------|--------------|-------|------------|--------|

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:

- ☐ 15 - Radio Frequency Devices (unlicensed)
- ☐ 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

A2LA

"A2LA has accredited Flom Test Labs, 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 17025:2005 'General Requirements for the Competence of Testing and Calibration Laboratories' and any additional program requirements in the identified field of testing."

Please refer to www.a2la.org for current scope of accreditation.

Certificate Number: **2152.01**

List of General Information Required for Certification

In Accordance with FCC Rules and Regulations,
Volume II, Part 2 and to Part 80

Sub-part 2.1033

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

Samyung Enc Co Ltd
1123-17, Dongsam-3-Dong
Busan
Korea

Manufacturer:

Samyung Enc Co Ltd
1123-17, Dongsam-3-Dong
Busan
Korea

(c)(2): FCC ID: UQZRSU-3600

Model Number: SMR-3600

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

Please see attached exhibits

(c)(4): Type of Emission: 41M3P0NAN

(c)(5): Frequency Range, MHz: 9410 +- 30 MHz

(c)(6): System Power Rating, Watts: 4000 watts
_____ Switchable _____ Variable _____ N/A

FCC Grant Note:

DUT Results: Passes _____ x _____ Fails _____

(c)(7): Tune-Up Procedure:

Please see attached exhibits

(c)(8): 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)(9): Label Information:

Please see attached exhibits

(c)(10): Photographs:

Please see attached exhibits

(c)(11): Digital Modulation Description:

☐ Attached Exhibits

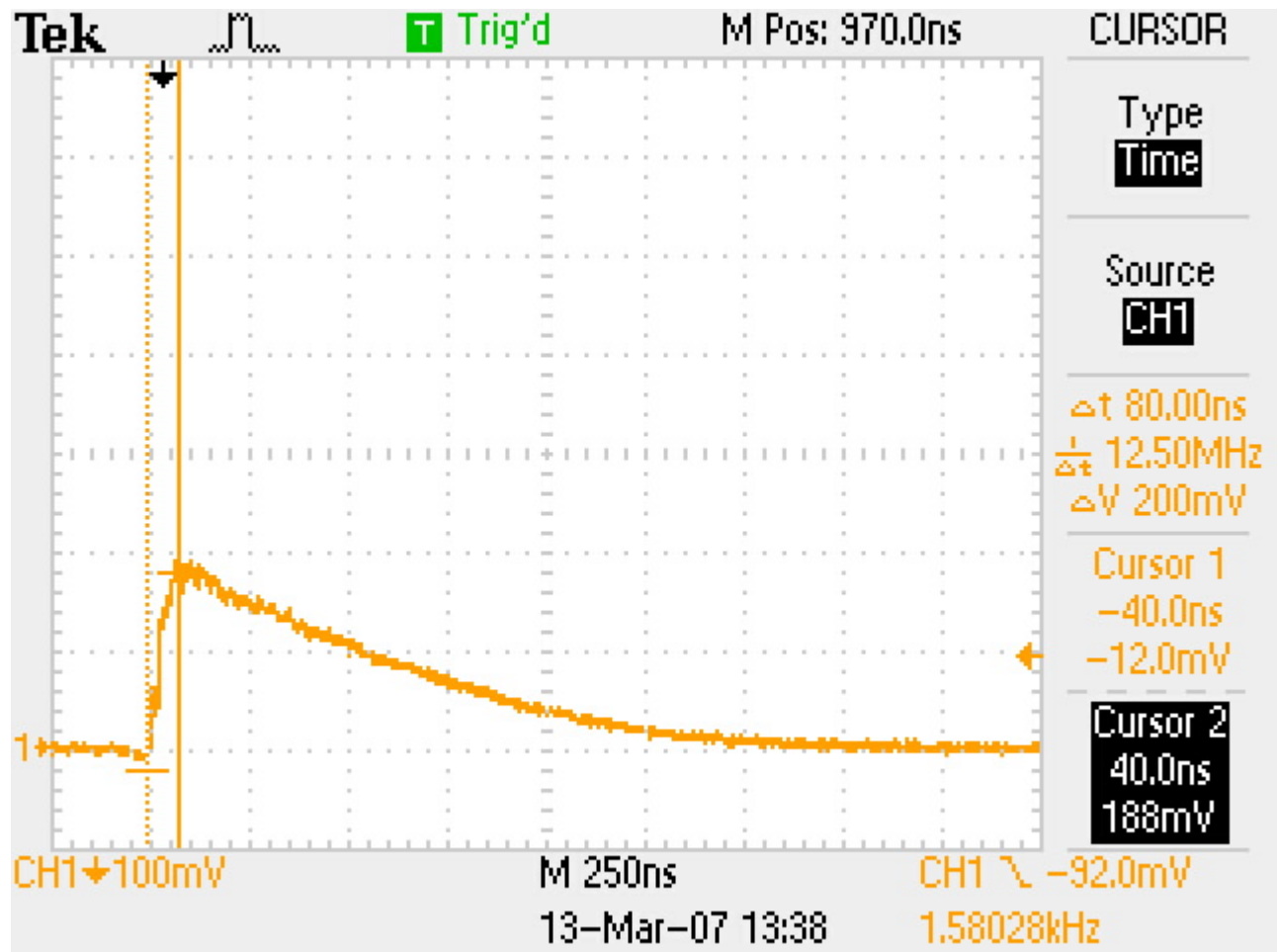
☒ N/A

(c)(12): Test and Measurement Data:

Follows:

Name of Test: Output Power (Conducted)

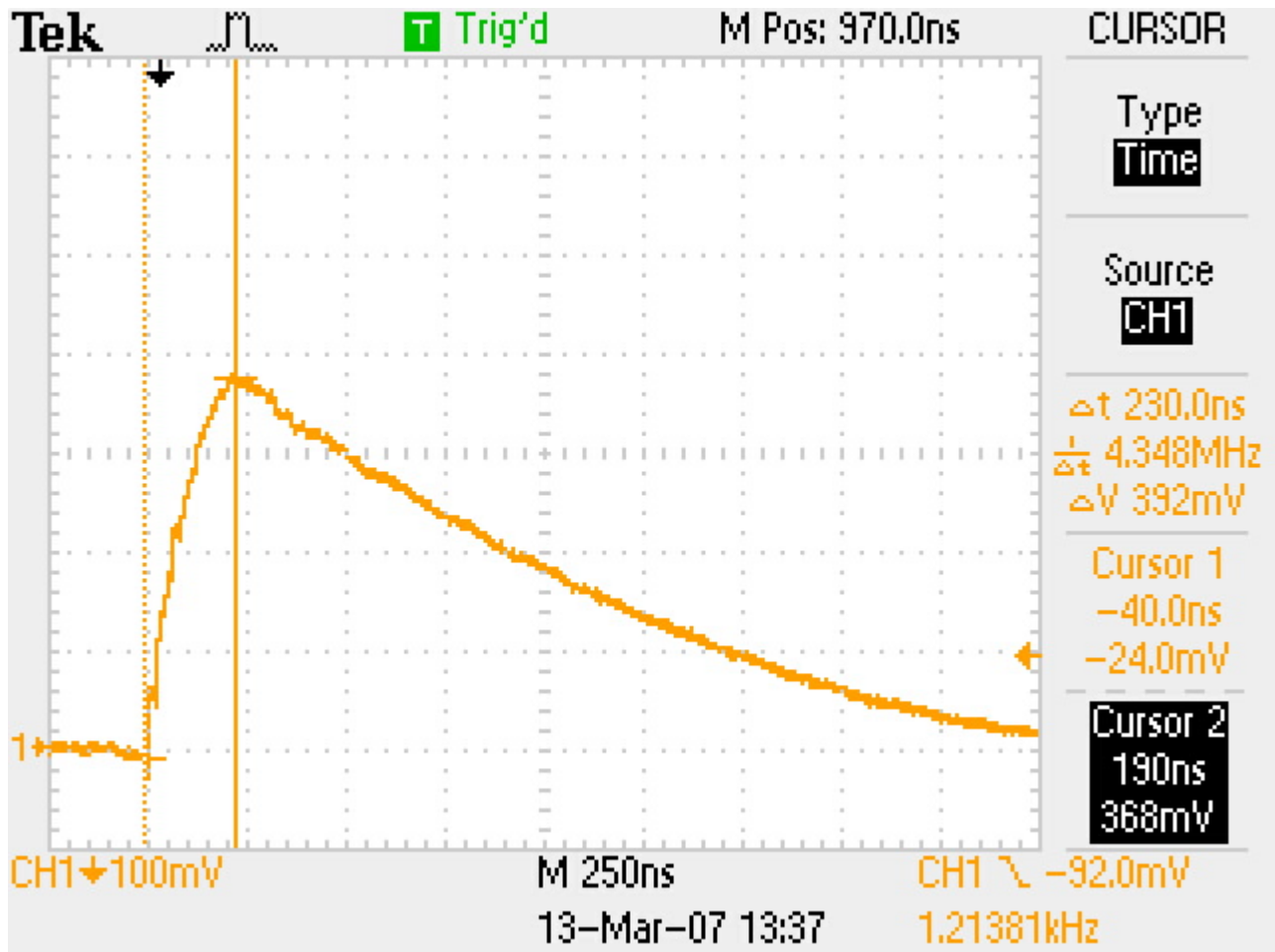
Measurement Results



The Pulse Width time is 80nS.

Name of Test: Output Power (Conducted)

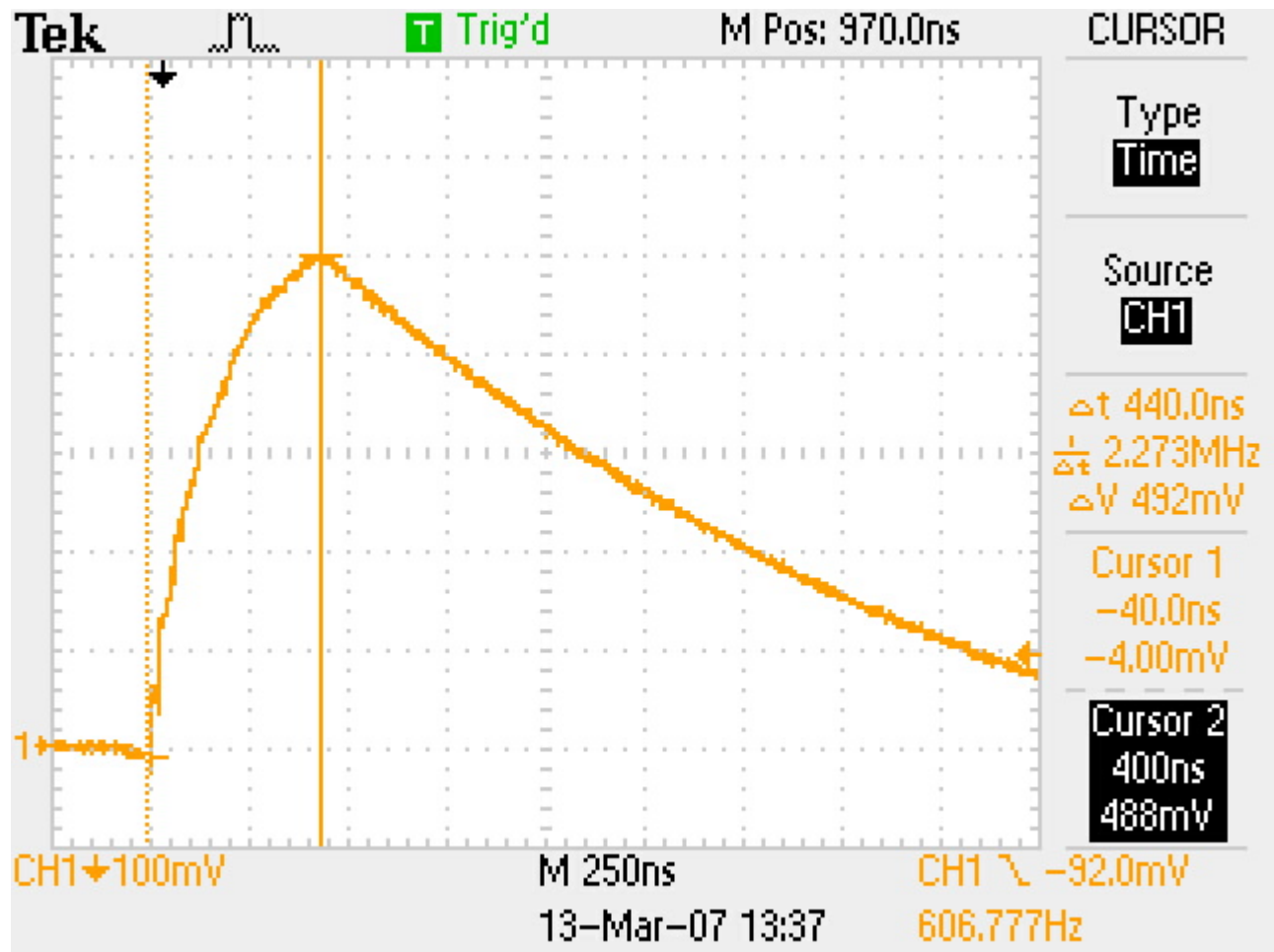
Measurement Results



The Pulse Width time is 230nS.

Name of Test: Output Power (Conducted)

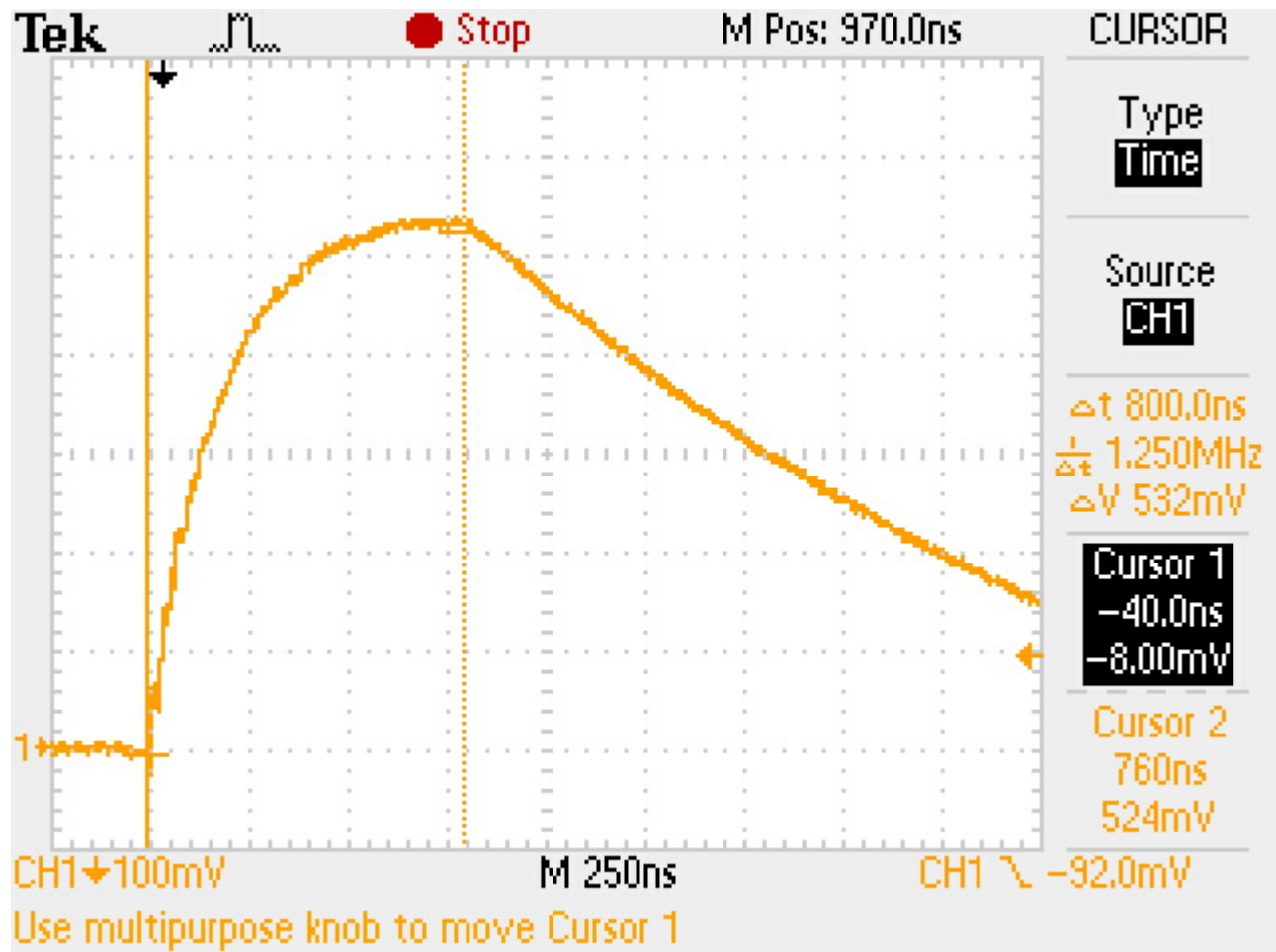
Measurement Results



The Pulse Width time is 440nS.

Name of Test: Output Power (Conducted)

Measurement Results



The Pulse Width time is 800ns.

Name of Test: Output Power (Conducted)

Measurement Results

| PRF, Hz | PW, nSec | Correction, dB | Attenuation, dB | Pulsed Power, dBm (raw data) | Peak Power, dBm | Average Power, dBm | Average Power, Watts |
|---------|----------|----------------|-----------------|---------------------------------|-----------------|--------------------|----------------------|
| 1628 | 80 | -38.8 | 49.4 | 14.70 | 64.10 | 25.30 | .35 |
| 1213 | 240 | -35.3 | 49.4 | 15.23 | 64.63 | 29.33 | .82 |
| 606 | 440 | -35.7 | 49.4 | 15.89 | 65.29 | 29.59 | .95 |
| 709 | 800 | -32.5 | 49.4 | 15.66 | 65.06 | 32.56 | 1.8 |

The pulsed power was taken with an Agilent E4416A power meter and 8481A power head. The Directional Coupler has a coupled attenuation of 19.4 dB at 9400 MHz. There is a 30 dB attenuator on the coupled output from the directional coupler.

Name of Test: Unwanted Emissions (Transmitter Conducted)

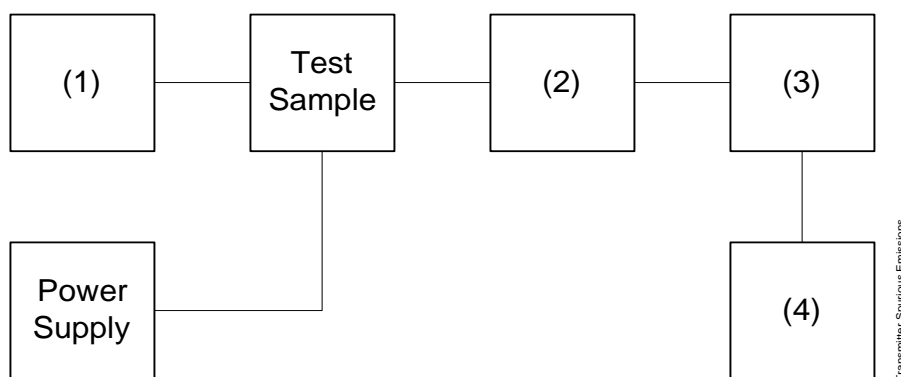
Specification: 47 CFR 2.1051

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



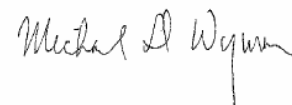
| Asset | Description | s/n | Cal Interval | Last Cal |
|--------------------------------|---|---------------|--------------|----------|
| (1) Audio Oscillator/Generator | | | | |
| i00324 | HP 8903B Audio Analyzer | 3011A09079 | 12 mo. | Oct-06 |
| i00002 | HP 3336B Synthesizer / Level Gen. | 1931A01465 | N/A | NCR |
| (2) Coaxial Attenuator | | | | |
| X | Weinschel 68-30-34(30 dB) | | N/A | NCR |
| i0012/3 | NARDA 766 (10 dB) | 7802 or 7802A | N/A | NCR |
| (3) Filters; Notch, HP, LP, BP | | | | |
| | | | N/A | NCR |
| (4) Spectrum Analyzer | | | | |
| i00048 | HP 8566B Spectrum Analyzer | 2511A01467 | 12 mo. | Aug-06 |
| X | i00029 HP 8563E Spectrum Analyzer | 3213A00104 | 12 mo. | Feb-07 |
| X | i00193 HP 11970A Harmonic Mixer 26.5-40 | 3003A07720 | 12 mo. | Sep-06 |

Name of Test: Unwanted Emissions (Transmitter Conducted)

Measurement Results
(Worst Case)

Summary:

| | | |
|---------------------------|---|--------------------------|
| Frequency of carrier, MHz | = | 9.415 GHz |
| Spectrum Searched, GHz | = | 0 to $10 \times F_c$ |
| Maximum Response, Hz | = | |
| All Other Emissions | = | ≥ 20 dB Below Limit |
| Peak Output Power | | 64.50 dBm (conducted) |



Performed by:

Michael Wyman

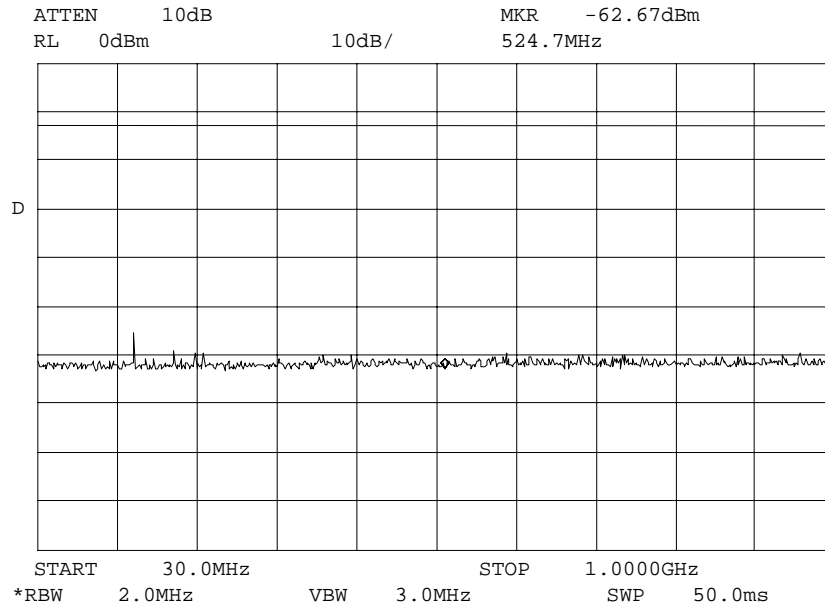
Name of Test: Transmitted Conducted Spurious

Measurement Results

g0720013: 2007-Feb-06 Tue 13:03:00

State: 2:High Power

Ambient Temperature: 23°C ± 3°C



Power:

Modulation:

HIGH

.30 - 1 GHz

CONDUCTED SPURIOUS

Michael D Wyman

Performed by:

Michael Wyman

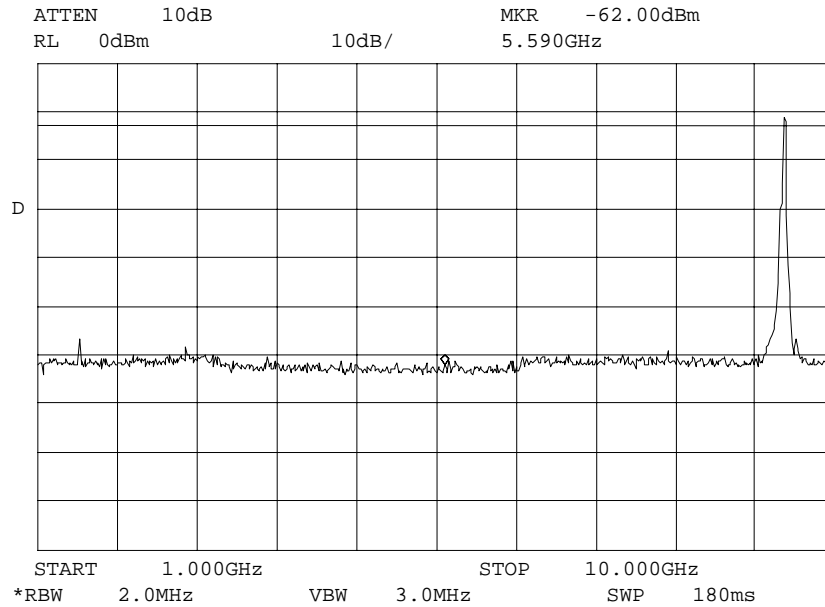
Name of Test: Transmitted Conducted Spurious

Measurement Results

g0720014: 2007-Feb-06 Tue 13:06:00

State: 2:High Power

Ambient Temperature: 23°C ± 3°C



Power:
Modulation: P0N

HIGH
1 - 10 GHz
CONDUCTED SPURIOUS

Michael D Wyman

Performed by:

Michael Wyman

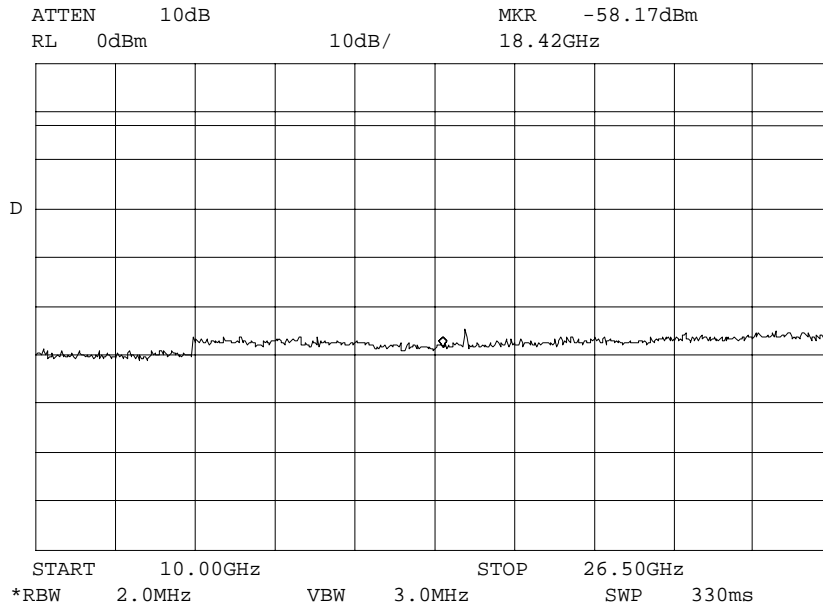
Name of Test: Transmitted Conducted Spurious

Measurement Results

g0720015: 2007-Feb-06 Tue 13:14:00

State: 2:High Power

Ambient Temperature: 23°C ± 3°C



Power:
Modulation: P0N

HIGH
10 - 26GHz
CONDUCTED SPURIOUS

Michael D Wyman

Performed by:

Michael Wyman

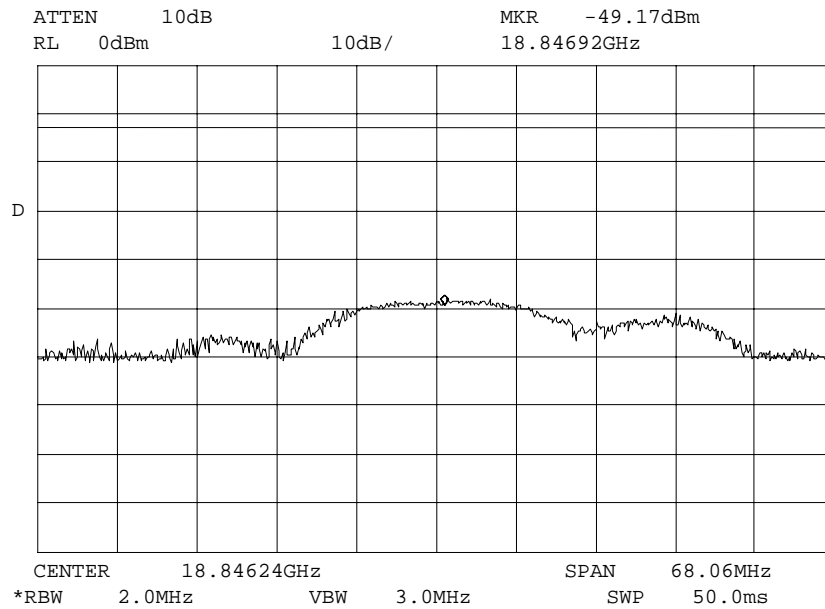
Name of Test: Transmitted Conducted Spurious

Measurement Results

g0720012: 2007-Feb-06 Tue 11:31:00

State: 2:High Power

Ambient Temperature: 23°C ± 3°C



Power:
Modulation:

HIGH
18.7GHz
2ND HARMONIC

Michael D Wyman

Performed by:

Michael Wyman

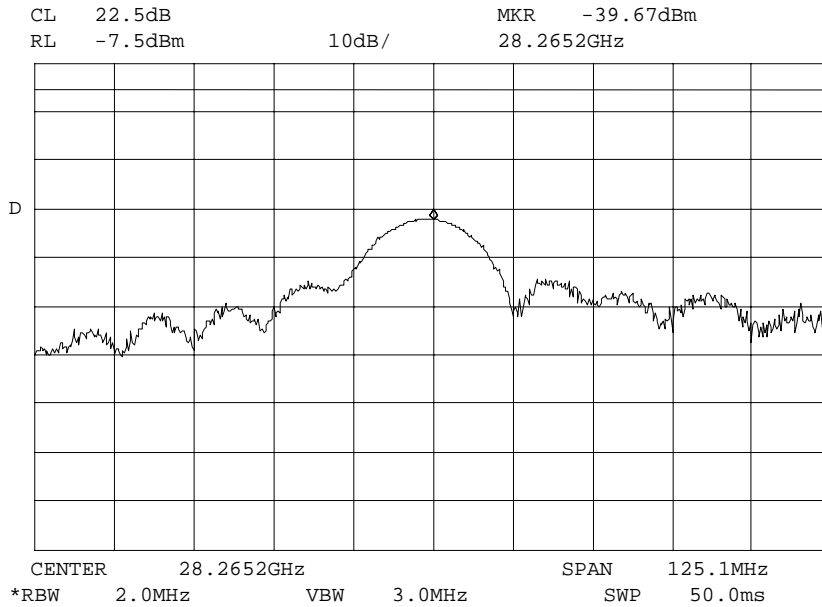
Name of Test: Transmitted Conducted Spurious

Measurement Results

g0720011: 2007-Feb-06 Tue 11:18:00

State: 2:High Power

Ambient Temperature: 23°C ± 3°C



Power:
Modulation:

HIGH
28.2652 GHz
3RD HARMONIC

Michael D Wyman

Performed by:

Michael Wyman

Name of Test: Field Strength of Spurious Radiation

Specification: 47 CFR 2.1053(a)

Guide: ANSI/TIA/EIA-603-1992/2001, Paragraph 1.2.12 and Table 16, 47 CFR 22.917

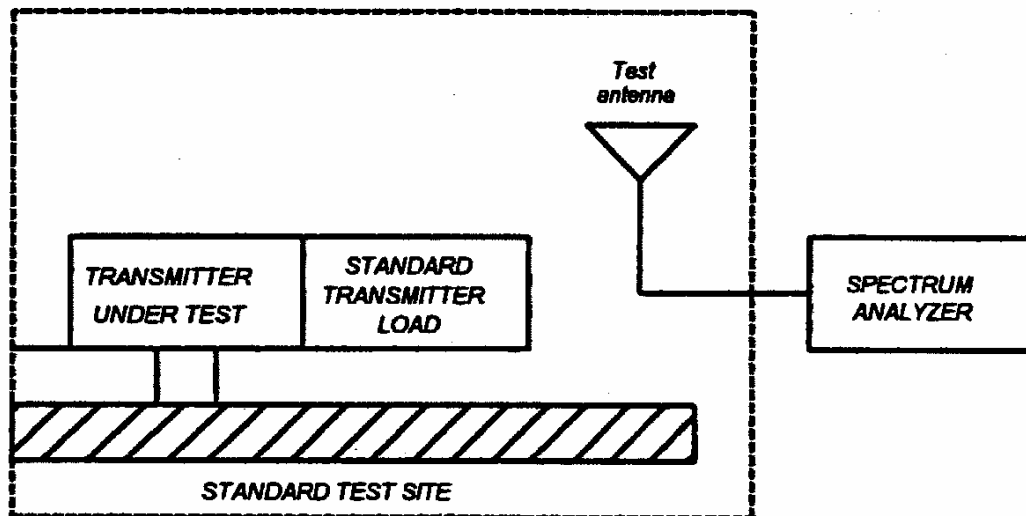
Measurement Procedure

Definition:

Radiated spurious emissions are emissions from the equipment when transmitting into a non-radiating load on a frequency or frequencies which are outside an occupied band sufficient to ensure transmission of information of required quality for the class of communications desired.

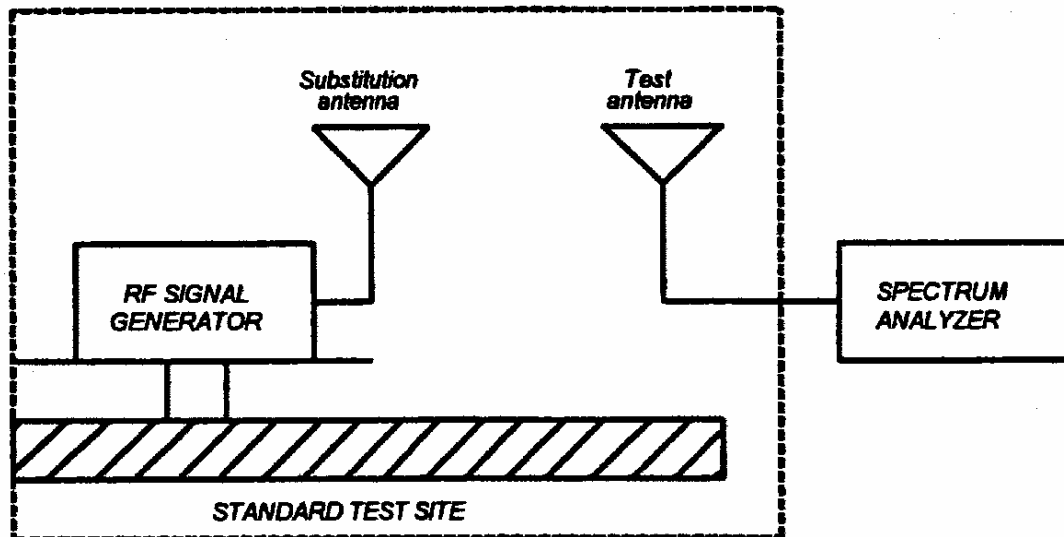
Method of Measurement:

- A) Connect the equipment as illustrated
- B) Adjust the spectrum analyzer for the following settings:
 - 1) Resolution Bandwidth 100 kHz (<1 GHz), 1 MHz (> 1GHz).
 - 2) Video Bandwidth ≥ 3 times Resolution Bandwidth, or 30 kHz (22.917)
 - 3) Sweep Speed ≤ 2000 Hz/second
 - 4) Detector Mode = Mean or Average Power
- C) Place the transmitter to be tested on the turntable in the standard test site. The transmitter is transmitting into a non-radiating load that is placed on the turntable. The RF cable to this load should be of minimum length.



Name of Test: Field Strength of Spurious Radiation (Cont.)

- D) For each spurious measurement the test antenna should be adjusted to the correct length for the frequency involved. This length may be determined from a calibration ruler supplied with the equipment. Measurements shall be made from the lowest radio frequency generated in the equipment to the tenth harmonic of the carrier, except for the region close to the carrier equal to \pm the test bandwidth (see section 1.3.4.4).
- E) For each spurious frequency, raise and lower the test antenna from 1 m to 4 m to obtain a maximum reading on the spectrum analyzer with the test antenna at horizontal polarity. Repeat this procedure to obtain the highest possible reading. Record this maximum reading.
- F) Repeat step E) for each spurious frequency with the test antenna polarized vertically.



- G) Reconnect the equipment as illustrated.
- H) Keep the spectrum analyzer adjusted as in step B).
- I) Remove the transmitter and replace it with a substitution antenna (the antenna should be half-wavelength for each frequency involved). The center of the substitution antenna should be approximately at the same location as the center of the transmitter. At lower frequencies, where the substitution antenna is very long, this will be impossible to achieve when the antenna is polarized vertically. In such case the lower end of the antenna should be 0.3 m above the ground.

Name of Test: Field Strength of Spurious Radiation (Cont.)

- J) Feed the substitution antenna at the transmitter end with a signal generator connected to the antenna by means of a non-radiating cable. With the antennas at both ends horizontally polarized and with the signal generator tuned to a particular spurious frequency, raise and lower the test antenna to obtain a maximum reading at the spectrum analyzer. Adjust the level of the signal generator output until the previously recorded maximum reading for this set of conditions is obtained. This should be done carefully repeating the adjustment of the test antenna and generator output.
- K) Repeat step J) with both antennas vertically polarized for each spurious frequency.
- L) Calculate power in dBm into a reference ideal half-wave dipole antenna by reducing the readings obtained in steps J) and K) by the power loss in the cable between the generator and the antenna and further corrected for the gain of the substitution antenna used relative to an ideal half-wave dipole antenna.
- M) The levels recorded in step L) are absolute levels of radiated spurious emissions in dBm. The radiated spurious emissions in dB can be calculated by the following:

Radiated spurious emissions dB =

$$10\log_{10}(\text{TX power in watts}/0.001) - \text{the levels in step I)}$$

NOTE: It is permissible that other antennas provided can be referenced to a dipole.

Test Equipment

| Asset | Description | s/n | Cycle | Last Cal |
|-------------------------------|----------------------------|------------|--------|----------|
| Transducer | | | | |
| X i00088 | EMCO 3109-B 25MHz-300MHz | 2336 | 36 mo. | Oct-05 |
| X i00089 | Aprel 2001 200MHz-1GHz | 001500 | 36 mo. | Oct-05 |
| i00103 | EMCO 3115 1GHz-18GHz | 9208-3925 | 36 mo. | Sep-06 |
| X I00271 | ARA DRG-1181A Horn Antenna | 1176 | 36 mo. | Feb-07 |
| X I00273 | MWH-1826/B Horn Antenna | 1044 | 36 mo. | Feb-07 |
| Amplifier | | | | |
| i00028 | HP 8449A | 2749A00121 | 12 mo. | Jun-06 |
| Spectrum Analyzer | | | | |
| X i00029 | HP 8563E | 3213A00104 | 12 mo. | Feb-07 |
| i00033 | HP 85462A | 3625A00357 | 12 mo. | Oct-06 |
| X i00193 | HP 11970A Harmonic Mixer | 3003A07720 | 12 mo. | Sep-06 |
| Substitution Generator | | | | |
| i00067 | HP 8920A Communication TS | 3345U01242 | 12 mo. | Jun-06 |
| i00207 | HP 8753D Network Analyzer | 3410A08514 | 12 mo. | May-06 |

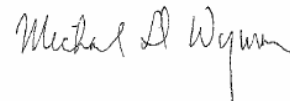
Name of Test: Field Strength of Spurious Radiation

Measurement Results

g0720035: 2007-Feb-07 Wed 13:40:00
STATE: 2:High Power

Ambient Temperature: 23°C ± 3°C

Data was taken on a 3 meter OATS site. Past the second harmonic there were no discernable spurious signals. All signal above 18GHz all the way up to 40GHz were at or below the noise floor. Since the unit is terminated into a closed conduit, the energy at 18 GHz was probably radiation from the mixer at the front end of the magnetron.



Performed by:

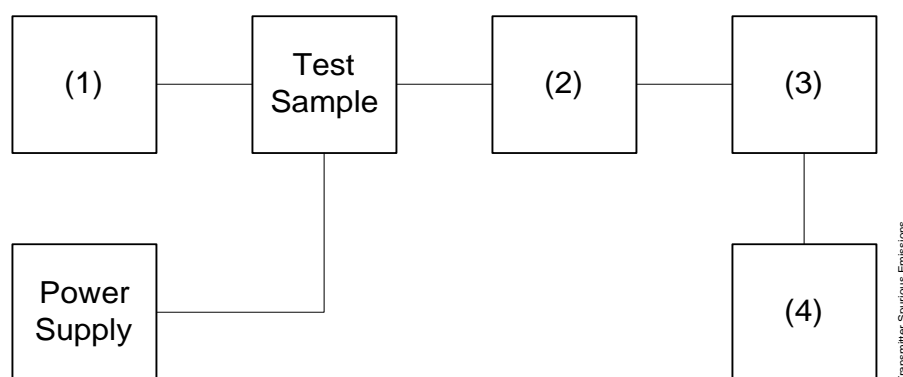
Michael Wyman

Name of Test: 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. The Occupied Bandwidth is measured at the 99.75% BW or 27 dB down from the carrier.

Transmitter Test Set-Up: Occupied Bandwidth



| Asset | Description | s/n | Cycle | Last Cal |
|--------|---|------------|--------|----------|
| (1) | Audio Oscillator/Generator | | | |
| i00324 | HP 8903B Modulation Meter | 3011A09079 | 12 mo. | Oct-06 |
| (2) | Coaxial Directional Coupler / Attenuator / Load | | | |
| X | ATM 2207-30 30 dB attenuator | H045501 | N/A | NCR |
| X | ATM 2207.10 10 dB attenuator | H045501 | N/A | NCR |
| X | ATM 90-308A-20-6-6 Dir. Coupler 20dB | H045301-01 | N/A | NCR |
| X | ATM 90-745-6 Hi Power 60 db atten. | H045601-01 | N/A | NCR |
| (3) | Interface | | | |
| i00021 | HP 8954A Transceiver Interface | 2146A00159 | N/A | NCR |
| (4) | Spectrum Analyzer | | | |
| i00048 | HP 8566B Spectrum Analyzer | 2511A01467 | 12 mo. | Aug-06 |
| X | i00029 HP 8563E Spectrum Analyzer | 3213A00104 | 12 mo. | Feb-07 |

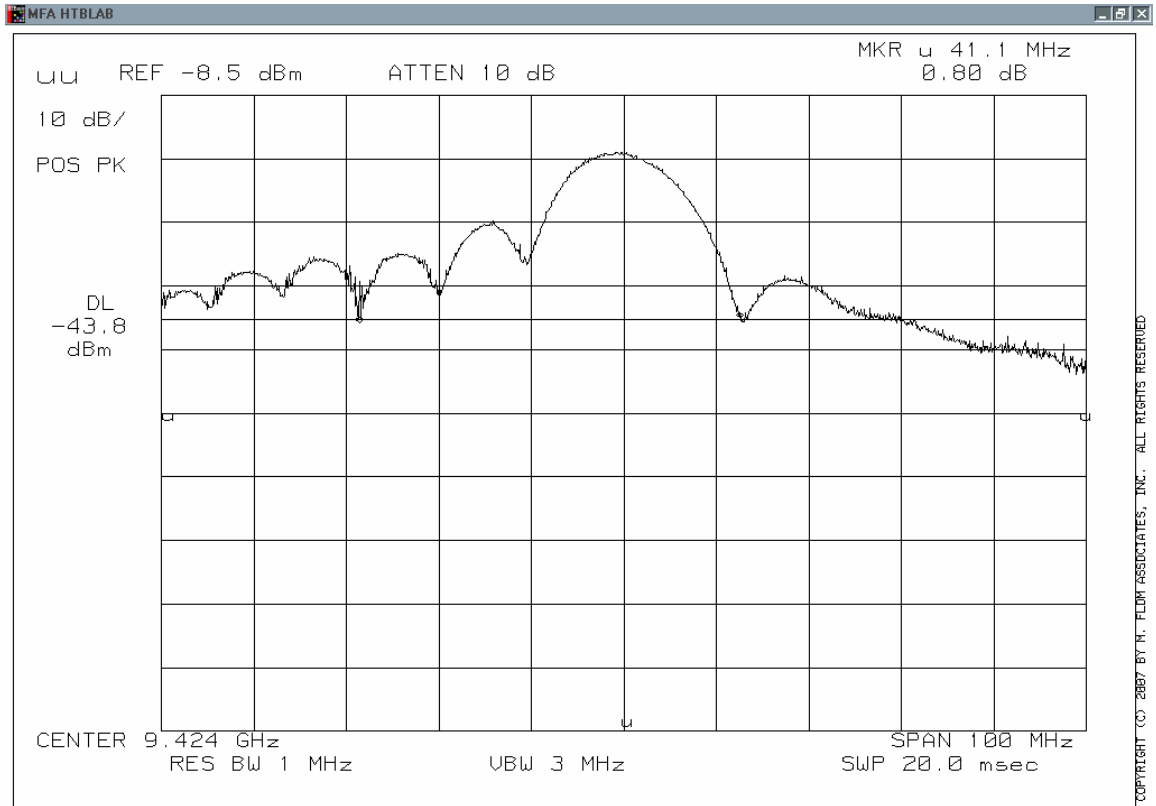
Name of Test: Occupied Bandwidth

Measurement Results

g0720005: 2007-Feb-06 Tue 09:31:00

State: 2:High Power

Ambient Temperature: 23°C ± 3°C



Power:
Modulation: P0N
Bandwidth

HIGH
80nS Occupied Bandwidth
41.3MHz BW @26dBc

Michael D Wyman

Performed by:

Michael Wyman

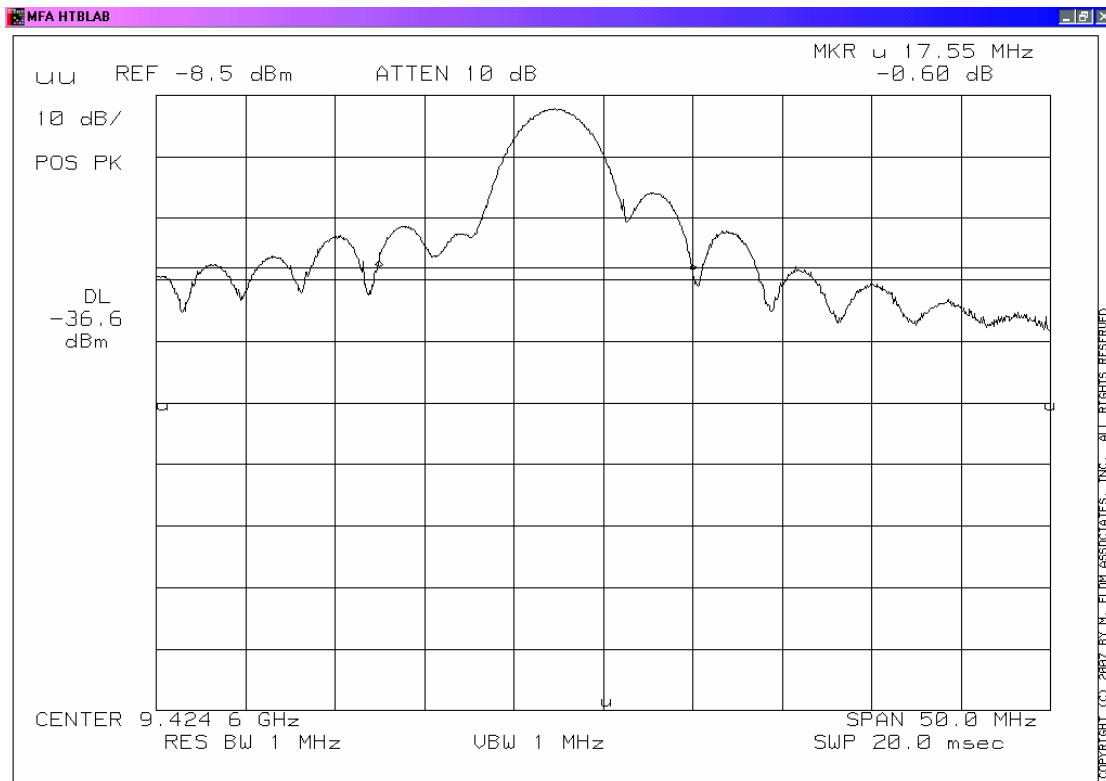
Name of Test: Occupied Bandwidth

Measurement Results

g0720006: 2007-Feb-06 Tue 09:33:00

State: 2:High Power

Ambient Temperature: 23°C ± 3°C



Power:
Modulation: P0N
Bandwidth

HIGH
250nS Occupied Bandwidth
17.55 MHz BW@26dBc

Michael D Wyman

Performed by:

Michael Wyman

Flom Test Labs
3356 North San Marcos Place, Suite 107
Chandler, Arizona 85225-7176
(866) 311-3268 phone, (480) 926-3598 fax

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MFA p06a0015, d0720011

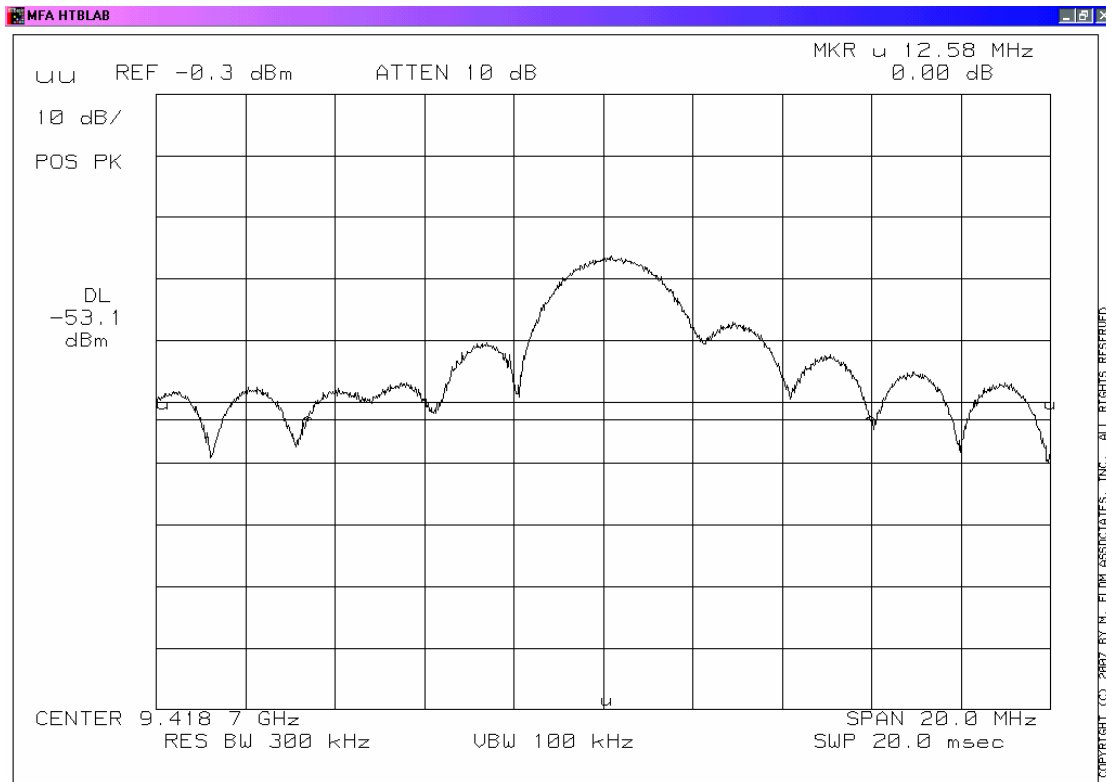
Name of Test: Occupied Bandwidth

Measurement Results

g0720007: 2007-Feb-06 Tue 09:35:00

State: 2:High Power

Ambient Temperature: 23°C ± 3°C



Power:
Modulation: P0N
Bandwidth

HIGH
500nS Occupied Bandwidth
12.58 MHz BW@26dBc

Michael D Wyman

Performed by:

Michael Wyman

Flom Test Labs
3356 North San Marcos Place, Suite 107
Chandler, Arizona 85225-7176
(866) 311-3268 phone, (480) 926-3598 fax

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MFA p06a0015, d0720011

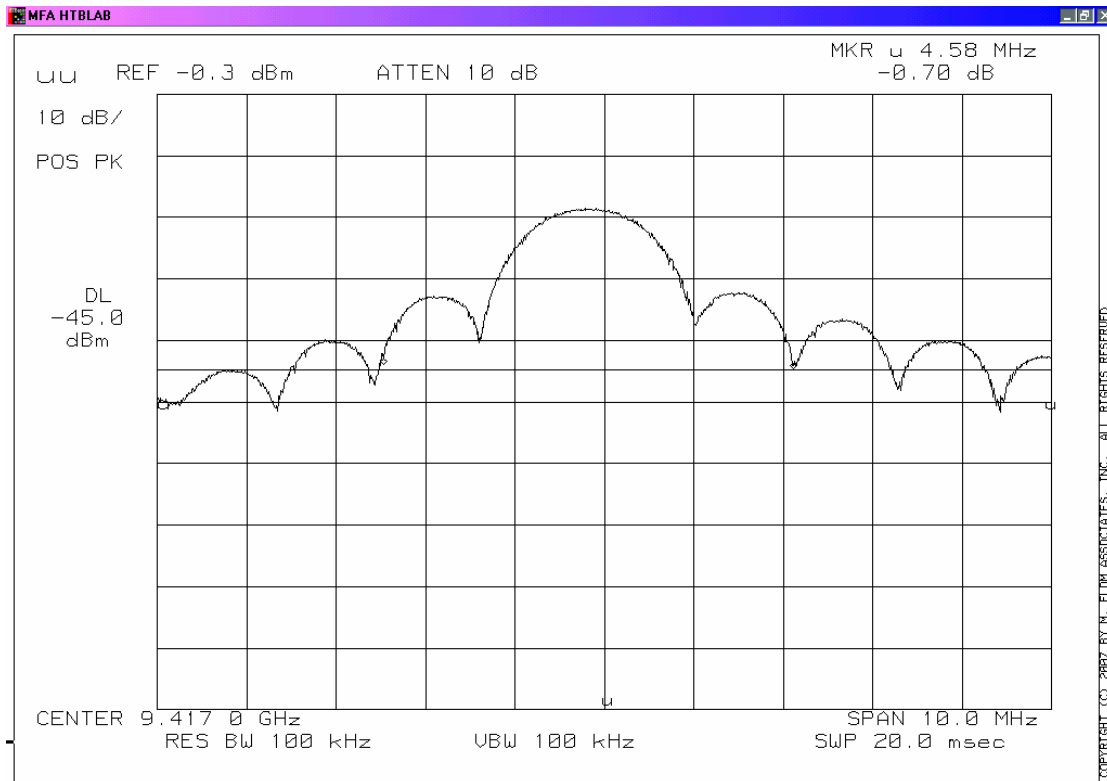
Name of Test: Occupied Bandwidth

Measurement Results

g0720008: 2007-Feb-06 Tue 09:37:00

State: 2:High Power

Ambient Temperature: 23°C ± 3°C



Power:
Modulation: P0N
Bandwidth

HIGH
1000nS Occupied Bandwidth
4.58 MHz BW@26dBc

Michael D Wyman

Performed by:

Michael Wyman

Flom Test Labs
3356 North San Marcos Place, Suite 107
Chandler, Arizona 85225-7176
(866) 311-3268 phone, (480) 926-3598 fax

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MFA p06a0015, d0720011

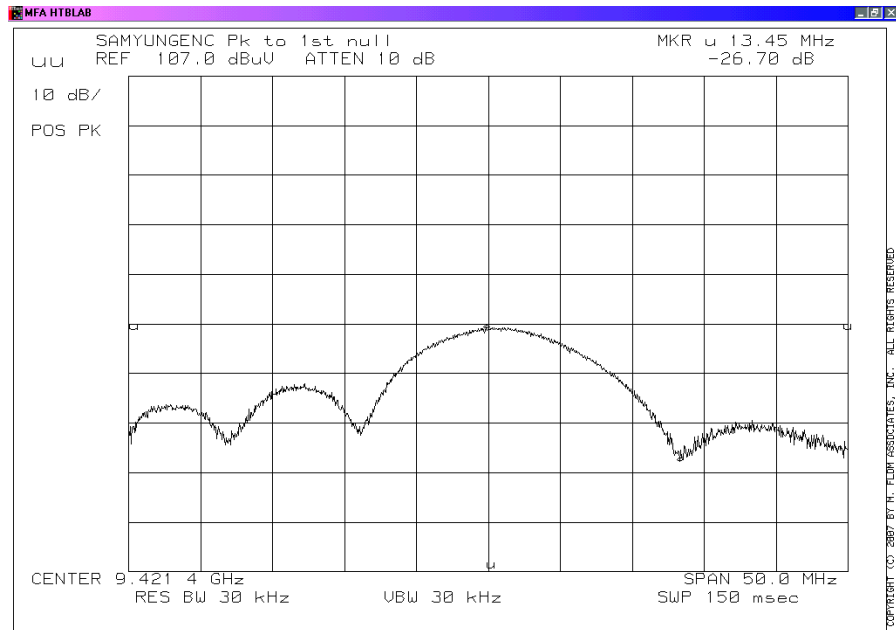
Name of Test: Occupied Bandwidth

Measurement Results

g0720005: 2007-Feb-06 Tue 09:31:00

State: 2:High Power

Ambient Temperature: 23°C ± 3°C



Power:
Modulation: P0N

HIGH
80nS Peak to first null Bandwidth

The above graph shows the null points for ~ 80 nS pulse. The center vertical graph line is the peak line. The marker delta is located 13.45 MHz from the peak. The peak to first null (or null to null) frequency delta is measured and the frequency converted to time. Hence 74 nS.

Michael D Wyman

Performed by:

Michael Wyman

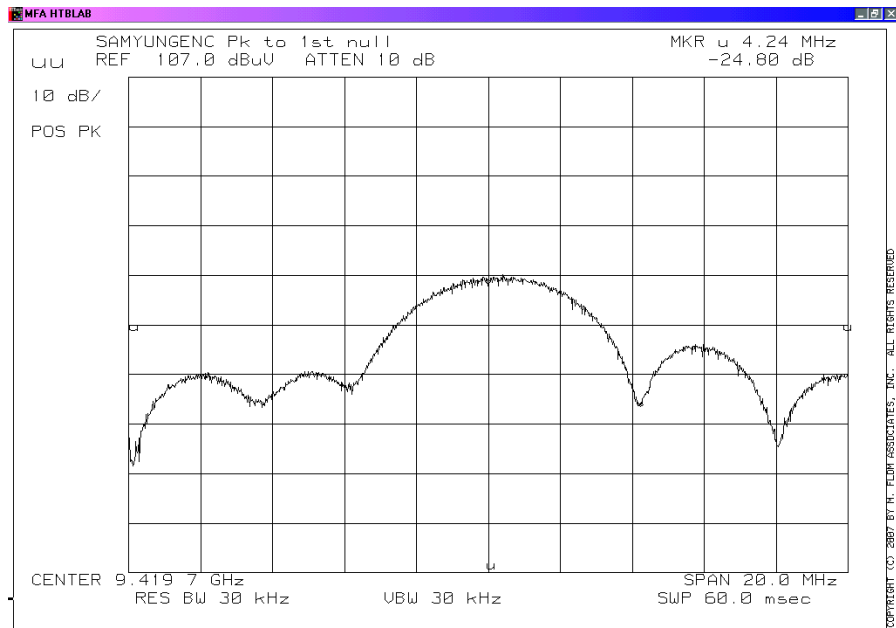
Name of Test: Occupied Bandwidth

Measurement Results

g0720006: 2007-Feb-06 Tue 09:33:00

State: 2:High Power

Ambient Temperature: 23°C ± 3°C



Power:
Modulation: P0N

HIGH
250nS Peak to first null Bandwidth

The above graph shows the null points for an ~250 nS pulse. The center vertical graph line is the peak line. The marker delta is located 4.24 MHz from the peak. The peak to first null (or null to null) frequency delta is measured and the frequency converted to time. Hence 230 nS.

Michael D Wyman

Performed by:

Michael Wyman

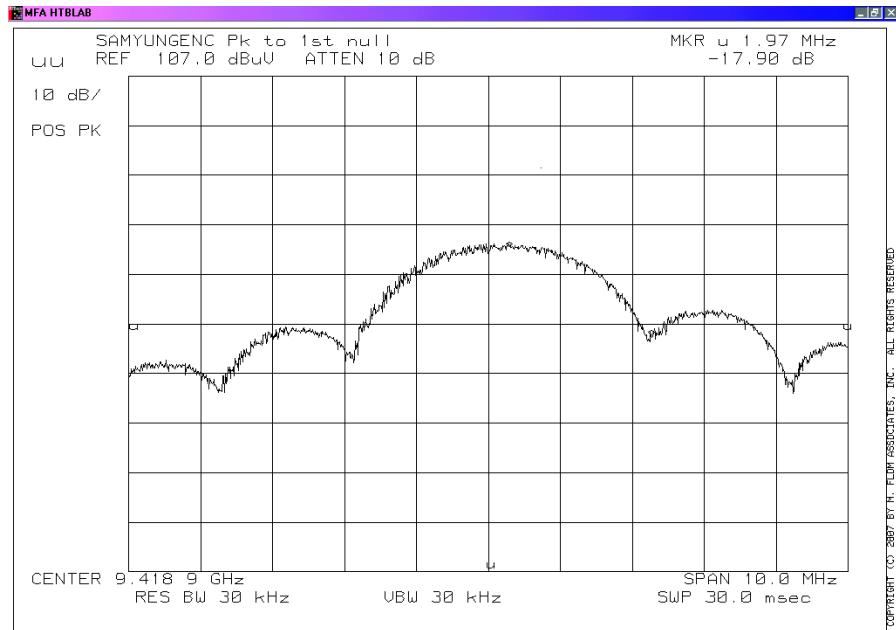
Name of Test: Occupied Bandwidth

Measurement Results

g0720007: 2007-Feb-06 Tue 09:35:00

State: 2:High Power

Ambient Temperature: 23°C ± 3°C



Power:
Modulation: P0N

HIGH
500nS Peak to first null Bandwidth

The above graph shows the null points for an ~500 nS pulse. The center vertical graph line is the peak line. The marker delta is located 1.97 MHz from the peak. The peak to first null (or null to null) frequency delta is measured and the frequency converted to time. Hence 507 nS.

Michael D Wyman

Performed by:

Michael Wyman

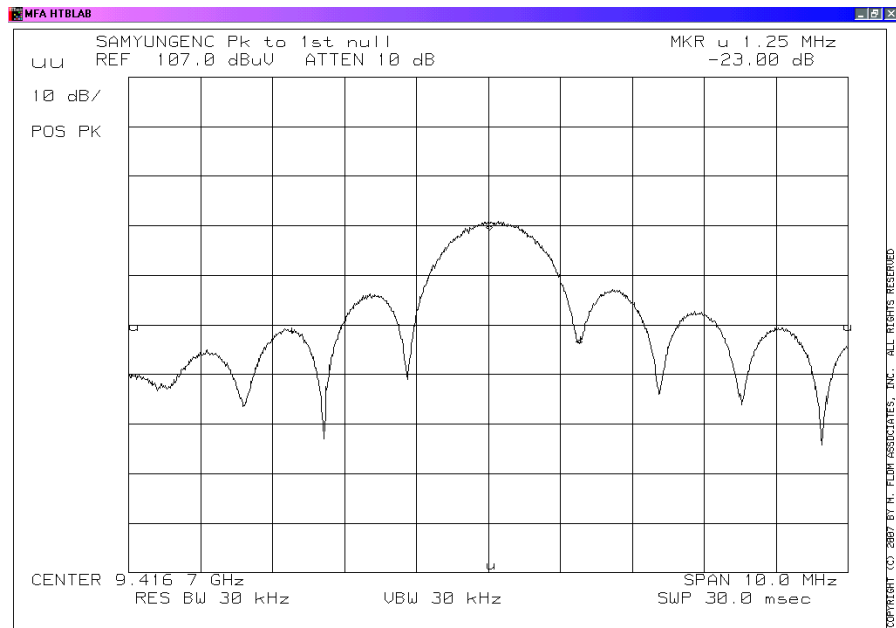
Name of Test: Occupied Bandwidth

Measurement Results

g0720008: 2007-Feb-06 Tue 09:37:00

State: 2:High Power

Ambient Temperature: 23°C ± 3°C



Power:
Modulation: P0N

HIGH
1000nS Peak to first null Bandwidth

The above graph shows the null points for an ~1000 nS pulse. The peak to first null (or null to null) frequency delta is measured and the frequency converted to time. The center vertical graph line is the peak line. The marker delta is located 1.25 MHz from the peak. Hence 800 nS.

Michael D Wyman

Performed by:

Michael Wyman

Name of Test: Frequency Stability (Temperature Variation)

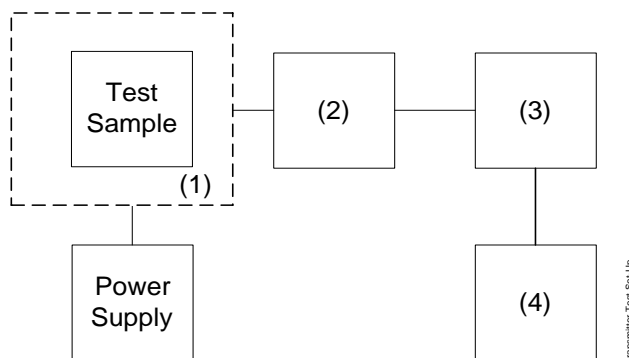
Specification: 47 CFR 2.1055(a)(1)

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

Measurement Procedure

- A) The EUT and test equipment were set up as shown on the following page.
- B) 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.
- C) 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.
- D) The temperature tests were performed for the worst case.

Transmitter Test Set-Up: Temperature Variation



| Asset | Description | s/n | Cycle | Last Cal |
|--|---|------------------------|------------|------------|
| (1) Temperature, Humidity, Vibration X i00027 | Tenney Temp. Chamber | 9083-765-234 | 12 mo. | Sep-06 |
| (2) Coaxial Attenuator i00122/3 | Weinschel 68-30-34 (30 dB) NARDA 766 (10 dB) | LW934 7802 or 7802A | N/A N/A | NCR NCR |
| (3) RF Power X i00029 | HP 8563E Spectrum Analyzer | | 12 mo. | Mar-07 |
| (4) Frequency Counter X i00029 | HP 8563E Spectrum Analyzer | | 12 mo. | Mar-07 |

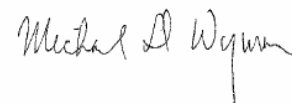
Name of Test: Frequency Stability (Temperature Variation)

Measurement Results

State: Ambient Temperature: $23^{\circ}\text{C} \pm 3^{\circ}\text{C}$

| Temperature °C | Frequency, GHz |
|----------------|----------------|
| -20 | 9.426811 |
| -10 | 9.424440 |
| 0 | 9.422660 |
| 10 | 9.420693 |
| 20 | 9.418911 |
| 30 | 9.417022 |
| 40 | 9.415272 |
| 50 | 9.413659 |

The resultant data remains within the authorized band limits and within the manufacturers specifications.



Performed by:

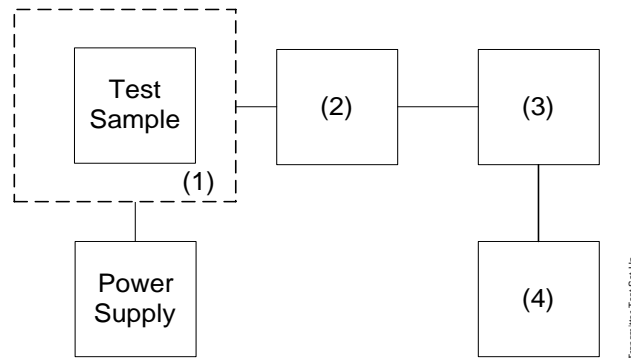
Michael Wyman

Name of Test: Frequency Stability (Voltage Variation)
Specification: 47 CFR 2.1055(d)(1)
Guide: ANSI/TIA/EIA-603-1992, Paragraph 2.2.2

Measurement Procedure

- A) The power supply voltage to the EUT was varied from 85% to 115% of the nominal value measured at the input to the EUT.
- B) The variation in frequency was measured for the worst case.

Transmitter Test Set-Up: Voltage Variation



| Asset | Description | s/n | Cycle | Last Cal |
|--|-----------------------------------|---------------|--------|----------|
| (1) Temperature, Humidity, Vibration i00027 | Tenney Temp. Chamber | 9083-765-234 | N/A | NCR |
| (2) Coaxial Attenuator X | Weinschel 68-30-34(30 dB) | | N/A | NCR |
| i00122/3 | NARDA 766 (10 dB) | 7802 or 7802A | N/A | NCR |
| (3) RF Power X | i00029 HP 8563E Spectrum Analyzer | | 12 mo. | Mar-07 |
| (4) Frequency Counter X | i00029 HP 8563E Spectrum Analyzer | | 12 mo. | Mar-07 |

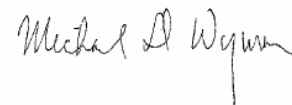
Results: Frequency Stability (Voltage Variation)

Measurement Results

State: Ambient Temperature: $23^{\circ}\text{C} \pm 3^{\circ}\text{C}$

| % of STV | Voltage, (dc) | Frequency, GHz |
|------------------|---------------|----------------|
| 85% of 12.0 Vdc | 10.2 | 9.41754814 |
| 100% of 12.0 Vdc | 12.0 | 9.41802342 |
| 100% of 32.0 Vdc | 32.0 | 9.41694840 |
| 115% of 32.0 Vdc | 36.8 | 9.41862275 |

The resultant data remains within the authorized band limits and within the manufacturers specifications.



Performed by:

Michael Wyman

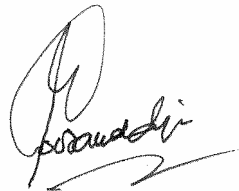
END OF TEST REPORT

**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.

Certifying Engineer:



Hoosamuddin S. Bandukwala, Lab Director