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# Network Approvals Test Report

Author: Frank Li

**Network Attachment Test Report**

**For 38GHz Cross-Pol Terminal Station**

Including

| | |
|---|---|
| **90 –7164 -01** | **38GHz Cross-Pol RT (M/A-Com Radio)** |
| **3CC10329 ACxx** | **NT (2 x Ethernet)** |
| **3CC10329 AExx** | **NT (2 x Ethernet + 2 x T1)** |
| **3CC12568AAAA** | **IGAU** |

**Tested in 7390 LMDS Release 2.2B**

**Tested to FCC Part 101, Subpart C**

**Test Dated: 6th May 2001 ~ 26th June 2001**

# APPROVALS

Vito Scaringi

Manager, Network & Regional Compliance Group

## NOTICE

**The electronically reviewed softcopy is held in Product Development Technical Library. When printed this document is uncontrolled.**

## MANDATORY REVIEWERS

The following people or an authorized delegate must review this document:

1) Manager: Network and Regional Compliance.

## INTERESTED PARTIES

The following people must be notified of the final review of this document but are not required to attend the review;

1) Director of Product Integrity
2) All Approvals Groups' staff

## ABSTRACT

This document provides the test procedure and test report used to fulfill the requirements of the Network Approvals Group personnel and the product designers to **38GHZ CROSS-POL TERMINAL STATION** during Network Approvals testing.

The test data contained in this report is evidence of compliance to specified Network standards for the units described herein.

## GLOSSARY

| | |
|---|---|
| **AMD** | ATM Modulator Demodulator, ATM modem cards in 7390 base station. |
| **ANSA** | Alcatel Networks SA (Alcatel France) |
| **ANSI** | American National Standards Institute |
| **ANT** | ATM Network Termination, OC3/STM-1 interface card in 7390 base station |
| **BS** | Base Station. The Centre office unit, it is the combination of DBS and RBS. |
| **CTR** | Common Technical Regulation |
| **DBS** | Digital Base Station. The indoor unit of 7390 base station, it is a combination of chassis, TNT, ANT, AMD, IBS etc. |
| **ETS** | European Telecommunications Standard |
| **ETSI** | European Telecommunications Standard Institute |
| **FCC** | Federal Communications Commission |
| **EN** | European Standard |
| **EUT** | *Equipment Under Test* |
| **IBS** | Intermediate frequency Base Station, IF turner card in 7390 base station |
| **IC** | Industry Canada (formerly DOC) |
| **IEC** | International Electrotechnical Commission |
| **ITU** | International Telecommunications Union |
| **ITU-R** | International Telecommunications Union, Radiocommunication standardization sector |
| **ITU-T** | International Telecommunications Union, Telecommunication standardization sector |
| **LMDS** | Local multipoint Distribution System |
| **LT** | *Local Terminal. Windows NT based 7390 LMDS management software.* |
| **NT** | Network Terminal. It is the indoor customer unit, which provides wireline connection to outside network. |
| **OTU** | Outdoor Transmitter Unit, It is the radio transmitter module of RBS in the 7390 base station. |
| **ORU** | Outdoor Receiver Unit, It is the radio receiver module of RBS in the 7390 base station |
| **PSU** | *Power Supply Unit. It is a DC to DC converter/distributor.* |

| | |
|---|---|
| **PTS** | Problem Tracking System. A centralized problem tracking database system used by Newbridge to manage the problems found in the field as well as within Newbridge (Design, PI, AppEng, etc.). |
| **RBS** | Radio Base Station. It is the radio transmit/receive portion of the 7390 base station. It consists of OTU and ORU in cross-pol solution. |
| **RT** | Radio Terminal. The radio transceiver unit installed at customer side. |
| **TNT** | TDM Network Termination, TDM T1/E1 interface card in 7390 base station. |
| **TS** | Terminal Station, ----the customer premise unit. It is the combination of NT and RT. |

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# 1 INTRODUCTION

## 1.1 Purpose

This document provides a test report on Network Approvals for **38GHZ CROSS-POL TERMINAL STATION** (39.300~40.000/39.000~39.300 GHz) according to applicable technical requirements in FCC part 101.

## 1.2 Scope

This document shall be used to demonstrate compliance for **38GHZ CROSS-POL TERMINAL STATION** to the test requirements contained in applicable FCC standards. This report is to show compliance for the 39.300 ~ 40.000 / 39.000 ~ 39.300 GHz band only.

## 1.3 Deviations from the Test Plan

None

# 2 EQUIPMENT UNDER TEST (EUT)

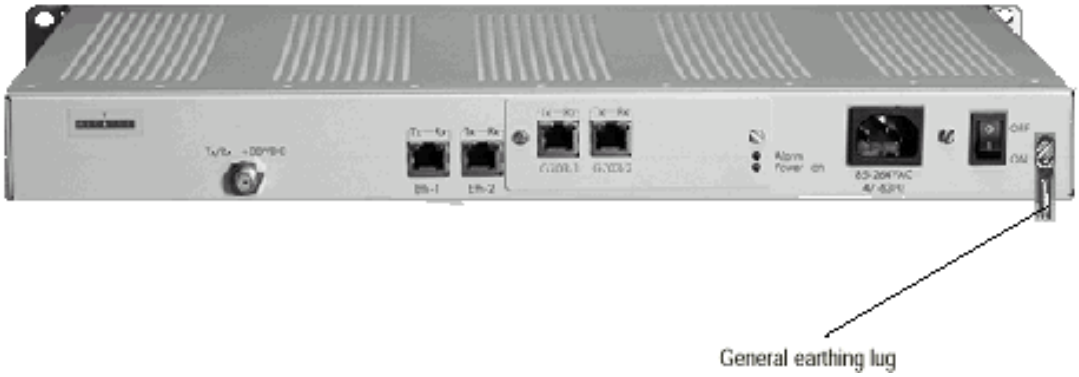
## 2.1 Equipment Description

The Alcatel 7390 LMDS is a multiservice broadband wireless access solution. It connects Base Station and Terminal Station via wireless links. And both sides connect to outside network via wired link.

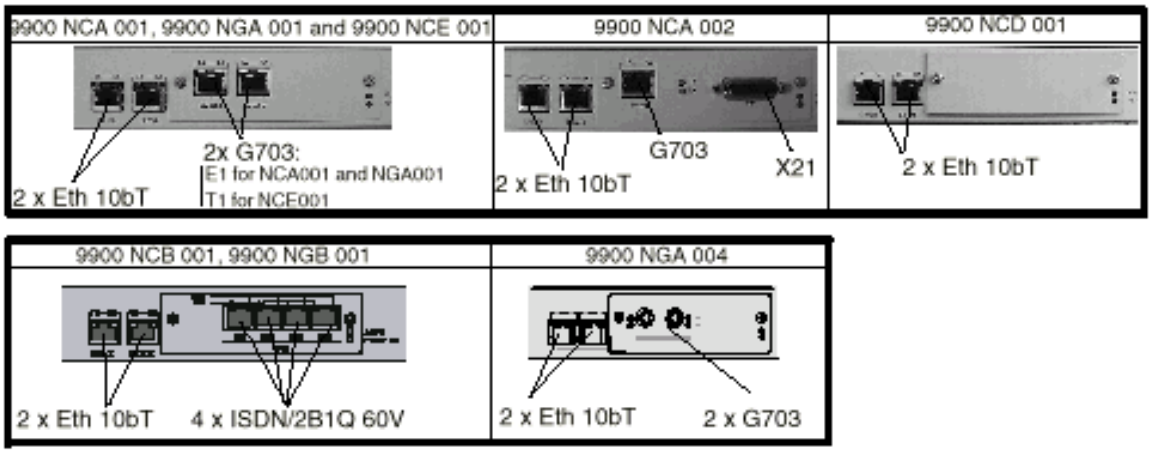
The system consists of TDM QPSK Downlinks and TDMA D-QPSK Uplinks.

The Terminal Station consists of NT, IGAU and RT.

**NT** is the indoor customer unit, which provides wireline connection to outside network. It, on the network side, connects to an external RT via IGAU. And on the customer side it connects to various types of interfaces depending on the type of NT.




The difference among NTs is the type of daughter board (such as T1, E1) plugged into the motherboard. The motherboard provides basic Ethernet ports at wireline customer side and wireless connection to Base Station via IGAU and RT.



**IGAU** is Inline Gain Amplifier Unit, which amplifies Uplink IF signal and feeds it into RT.

**RT** is the outdoor Radio Terminal unit, which typically mounted near the roof of a building at a fixed position.

The RT is developed/provided by an OEM supplier. The OEM supplier for the RT that has been tested and mentioned within this report is:

M/A-COM Communication and Sensor Products

(Tyco Electronics Corp.)

1011 Pawtucket Blvd., Lowell, MA, USA

## 2.2 EUT Configuration

.

| Model Number | Name and Description | S/N | EUT Software |
|---|---|---|---|
| 3CC10329AEAA | 7390 NT (2 Ethernet + 2 T1) | CU004709323 | V2_B2_07 |
| 3CC10329ACAA | 7390 NT (2 Ethernet) | CU002307805 | V2_B2_07 |
| 3CC12568AAAA | IGAU | BS0044U0ZMV | N/A |
| 90-7164-01 | 38 GHz RT (M/A-COM) | B0020170219 | N/A |
| 90-7164-01 | 38 GHz RT (M/A-COM) | 00430170167 | N/A |
| | | | |

## 2.3 EUT Accessories

| Part Number | Name | Brief Descriptions | Quantity |
|---|---|---|---|
| N/A | Bias Tee | Feed DC in RBS | 3 |
| N/A | IF cable | SMA, 6 feet | 5 |
| N/A | 50ohm load | | 2 |
| N/A | RJ45 cable | 5 meter | 1 |
| N/A | RS 422 cable | Radio activation control , 5 meters | 1 |
| N/A | Waveguide to coaxial adapter | WR-28 to k type coaxial | 1 |

| | | | |
|---|---|---|---|
| N/A | Waveguide attenuator | WR-28, 20 dB | 1 |
| N/A | RF cable | V type connector cable, up to 50GHz, 6 feet | 1 |

## 2.4 EUT Setup

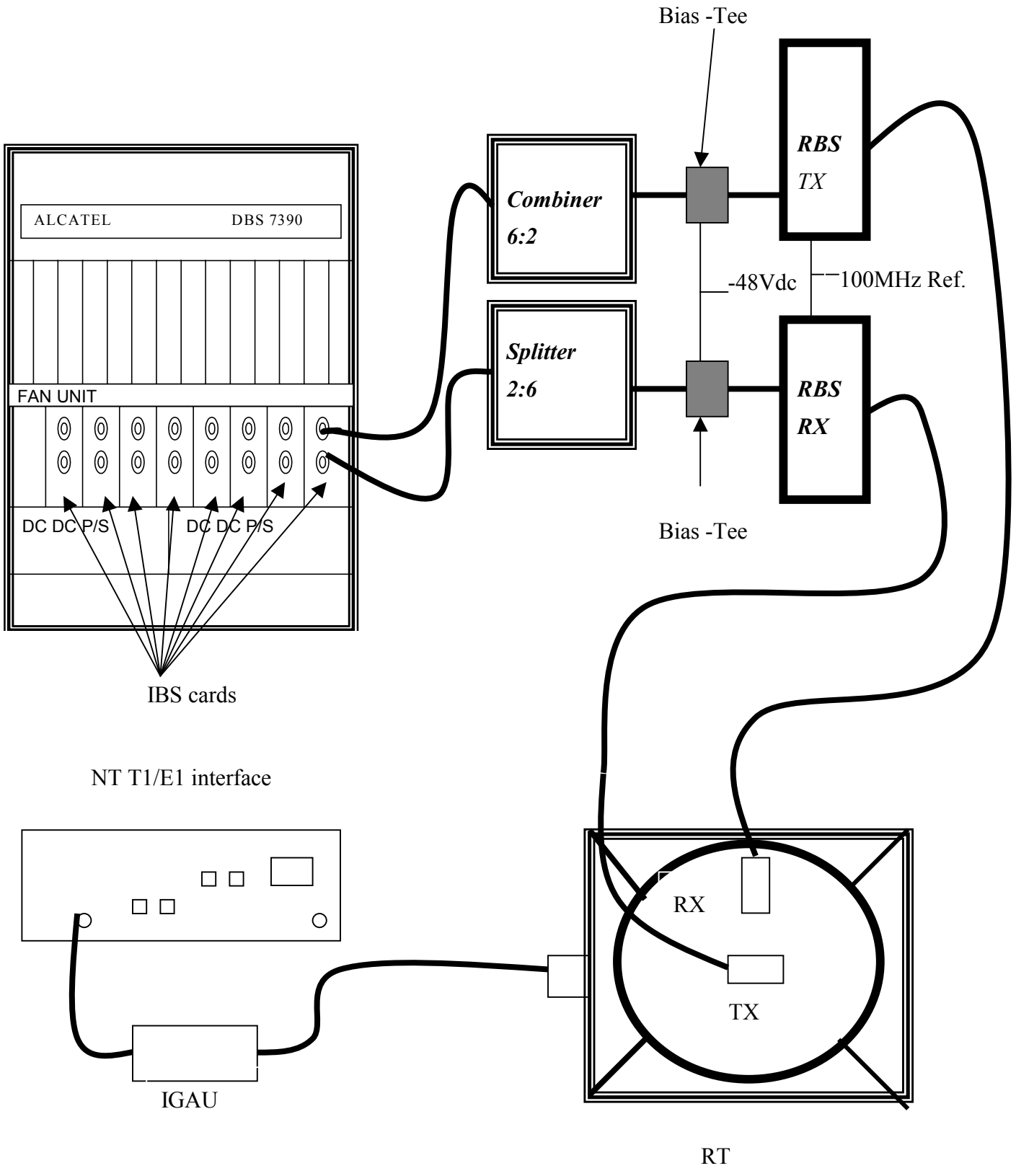



Figure 1 7390 LMDS Cross-Pol TS setup ---- General

## 2.5 EUT Data Path

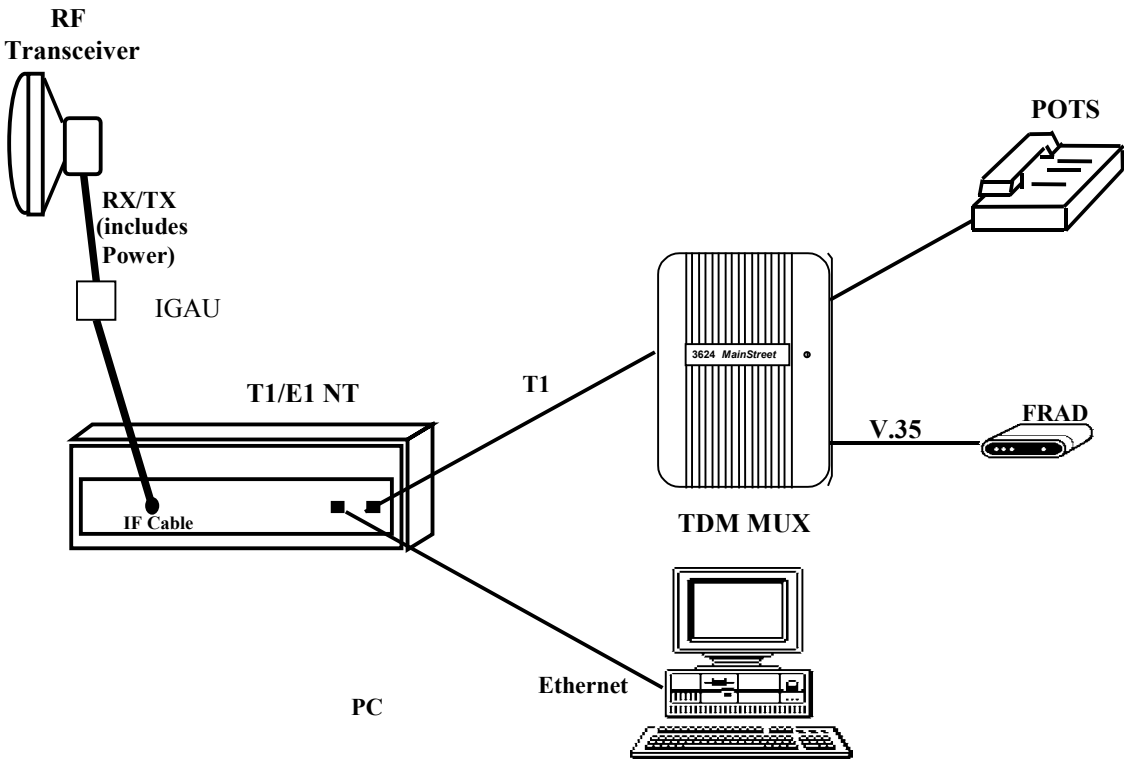



Figure 2 7390 LMDS TS Data Path

## 2.6 EUT modifications

No changes required for compliance or to achieve compliance to FCC part 101.

# 3 NETWORK COMPLIANCE SUMMARY

This report has been read and approved by the following departments responsible for its implementation. All changes made to the EUT for compliance must be escalated via the PTS. The EUT mentioned in this report meets the requirements of standards indicated below.

| Basic Standard | Compliance |
|---|---|
| FCC Part 101,Subpart C | Yes |

***Declaration of Compliance***

*" This equipment has been tested in accordance with the requirements contained in the appropriate Commission regulations. To the best of my knowledge, these tests were performed using measurement procedures consistent with industry or Commission standards and demonstrate that the equipment complies with the appropriate standards. . Each unit manufactured, imported or marketed, as defined in the Commission's regulations, will conform to the sample(s) tested within the variations that can be expected due to quantity production and testing on a statistical basis. I further certify that the necessary measurements were made by Alcatel Canada Inc., 600 March Road, Kanata, Ontario, K2K2E6 and Nemko Canada Inc., 3325 River Road RR#5, Ottawa, Ontario, K1V 1H2 "*

| Standard | Measurement Type | Method/ Limit | Pass/Fail Criteria |
|---|---|---|---|
| FCC Part 101 & FCC Part 2 | Output Power | Section 2.1046 / Section 101.113 | Pass |
| | Spectrum Mask (Occupied Bandwidth) | Section 2.1049 / Section 101.111(a)(2)(ii) | Pass |
| | Radiated Spurious | Section 2.1053 & 2.1057 / Section 101.111(a)(2)(ii) | Pass |
| | Conducted Spurious | Section 2.1051 & 2.1057 / Section 101.111(a)(2)(ii) | Pass |
| | Frequency Stability | Section 2.1055 / Section 101.107 | Pass |

Regulatory Compliance Requirements

**Test Engineer:** Frank Li
Network / Wireless Approvals Specialist

**Date:** July 24th, 2001

**Contact Address**: 600 March Road

Kanata, Ontario, Canada, K2K 2E6

**Reviewer:** Vito Scaringi
Manager, Network and Regional Compliance Group

Date: July 24th, 2001

Contact Address: 600 March Road

Kanata, Ontario, Canada, K2K 2E6

# 4 TEST DATA

**Standards**: **FCC Part 101(10-1-98 Edition):** Fixed Microwave Services
**Subpart C:** Technical Standards

## 4.1 RF Output Power

Limit: + 55dBW (Maximum EIRP)

Measured Value: 17.6 dBm + 35 dBi = 14.6 dBW

Criteria: **Pass**

### 4.1.1 Test Procedure

The RF output power was adjusted to have each carrier set at approximately +17 dBm.

All power measurements were taken in normal operation (modulated).

Note:

a). The system provides RT antennas with maximum gain as 35 dBi.

b). The diplexer is used to separate the Upstream and Downstream IF signals from the +28Vdc. The splitter is used to separate the Upstream path to maintain a closed loop system with the BS at the IF level. Without a closed loop, the Upstream is not able to transmit. The Bias-Tee is used to combine the external +28Vdc and the modulated IF upstream signal to the radio (RT). By increasing the variable attenuator, the BS will detect a weaker signal, which will return a message to the NT via the downstream to increase the power level of the upstream.

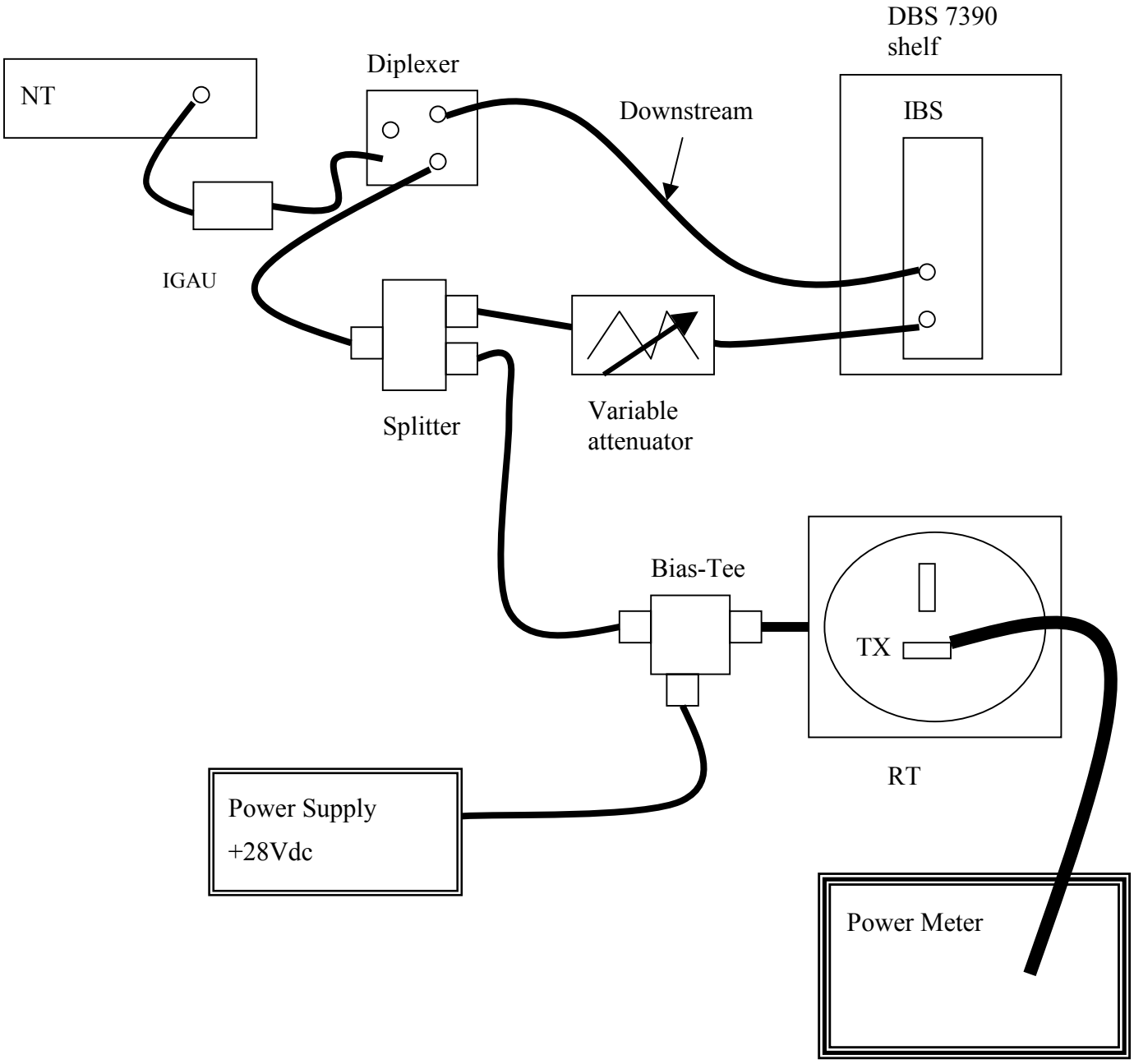



Figure – 3 RF Power Output Test Setup

(1)Calibrate power meter to the proper frequency of transmission.

(2) Turn on the RT and adjust the variable attenuator on the upstream IF path to achieve a ≥ +17dBm at the antenna port. Add the appropriate fixed attenuator to avoid damage to the power meter

(3) Measure output power at the low and high end of the band of operation of the RT. Measure the attenuator and compensate with an offset.

### 4.1.2 Test Condition

| | |
|---|---|
| **Temperature** | 22 ˚C |
| **Relative Humidity** | 65 % |
| **Atmospheric Pressure** | 101 k Pa |
| **Test Location** | Product Integrity Laboratory<br>Alcatel Canada Inc<br>600 March Road, Kanata, Ontario, K2K 2E6 |
| **Test Engineer** | Frank Li<br>Network / Wireless Approvals Specialist |

### 4.1.3 Test Equipment

| Instrument | Mfr./Model / S/N | Calibration |
|---|---|---|
| Power Meter | HP EP4419B<br>Tool #: 8067 | Last: 2000/12/03<br>Due: 2001/12/03 |
| Power Sensor | HP 8487A<br>Tool #: 10419 | Last: 2000/09/26<br>Due: 2001/09/26 |

### 4.1.4 Test Data

| Unit under Test | Frequency Band (MHz) | Maximum Power Level |
|---|---|---|
| TS TX<br>M/A-Com Transceiver | 39000 to 39300 | 17.6dBm(-12.4 dBW) maximum<br>( 3.5 MHz carriers)<br>17.6dBm (-12.4 dBW) maximum<br>( 7 MHz carrier) |

## 4.2 Spectrum Mask

Limit: See Mask Template in test data.

Measured Value: See Test Data

Criteria: **Pass**

### 4.2.1 Test Procedure

The measurements were done with one NT and one RT communicating with the BaseStation to control the output power level. The upstream was attenuated at the IF level, where the BaseStation then provided a command to the NT via the downstream to increase or decrease the output power level for the upstream. The carrier was adjusted at the RF output to approximately +17dBm.

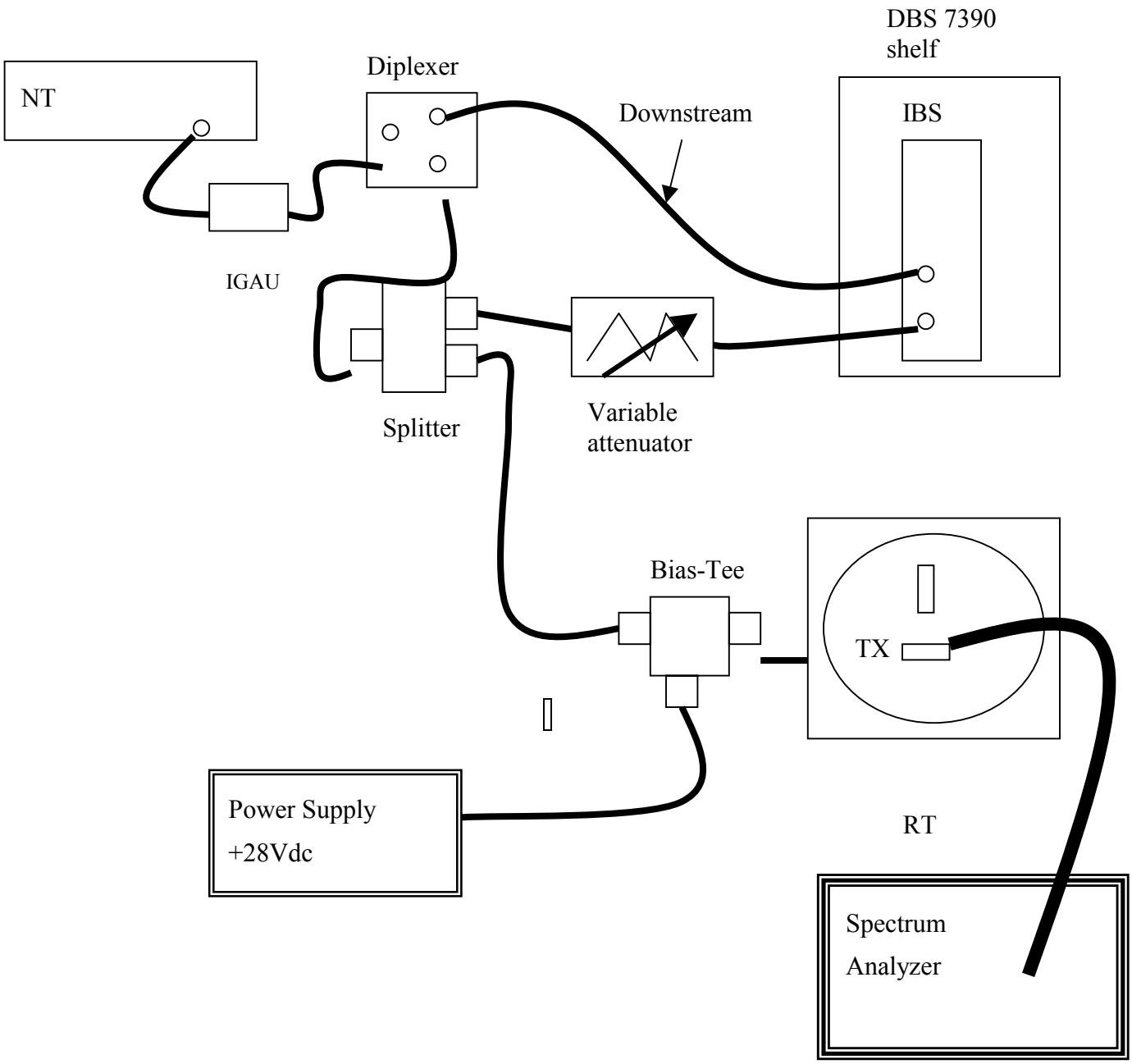



Figure – 4 Spectrum Mask measurement setup

(1) Set the settings of a spectrum analyzer as follows:

| | |
|---|---|
| Center frequency | Set center frequency at the middle of channel or carrier to get the best test result. |
| Sweeping time | Automatic |

| | |
|---|---|
| Resolution bandwidth | 1 MHz |
| Video bandwidth | ≥ 300 kHz (video averaging of display is allowed) |
| Y scale | 10 dB/Div |

(2) Connect spectrum analyzer at the antenna port and record the spectrum shape. Perform measurements at the edge of the frequency block near the higher end of the assigned band. Repeat measurements at the lower end of the assigned band or to the lowest frequency the transmitter can operate at.

(3) Overlay the FCC mask and verify that it does not exceed the limits.

### 4.2.2 Test Condition

| | |
|---|---|
| **Temperature** | 22 ˚C |
| **Relative Humidity** | 65 % |
| **Atmospheric Pressure** | 101 k Pa |
| **Test Location** | Product Integrity Laboratory |
| | Alcatel Canada Inc |
| | 600 March Road, Kanata, Ontario, K2K 2E6 |
| **Test Engineer** | Frank Li |
| | Network / Wireless Approvals Specialist |

### 4.2.3 Test Equipment

| Instrument | Mfr./Model / S/N | Calibration |
|---|---|---|
| Spectrum Analyzer | HP 8564E<br>Tool # 9169 | Last: 2000/08/24<br>Due: 2001/08/24 |

### 4.2.4 Test Data

Transmission Frequency Range: 39,000 to 39,300 MHz.

The center frequency of 7 MHz carrier will be 3.5 MHz away from the edge of the authorized frequency block, which is 50 MHz at 38MHz band.

For 3.5 MHz carrier, the center frequency of carrier will be 1.75 MHz away from the edge of the authorized frequency block.

To demonstrate the system performance meets the technical standard requirement, by engineering judgement, test is performed separately at two different 50MHz authorized blocks, which locate at lower end and upper end of the designed band 39,000 to 39,300 MHz.

**See Appendix A for test plots.**

Note:

The insertion loss of waveguide attenuator and RF coaxial cable at 39 MHz band are 28.04 dB, and have been set as offset in spectrum analyzer.

### 4.3 Conducted Spurious

Limit: -13 dBm / 4 kHz

Measured Value: See Test Data

Criteria: **Pass**

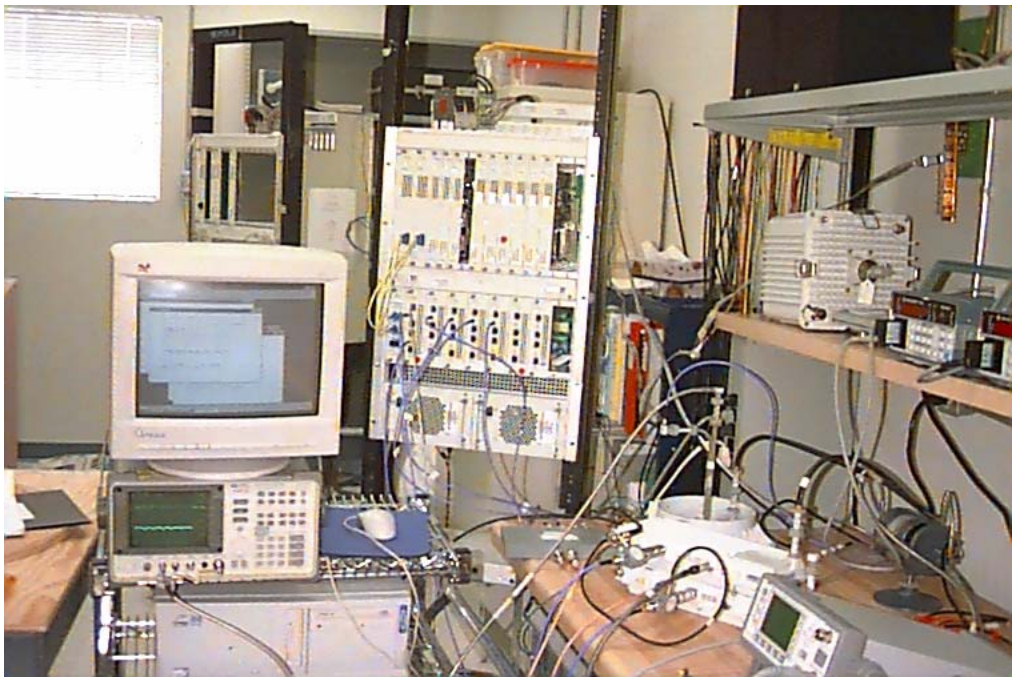
#### 4.3.1 Test Procedure

The conducted spurious are measured at the antenna port of the RT in normal operation.

System configuration is the same as in Spectrum Mask test.

Measured emissions at the frequencies, which are outside the occupied bandwidth up to 200GHz.


Figure – 5 Conducted Spurious measurement setup



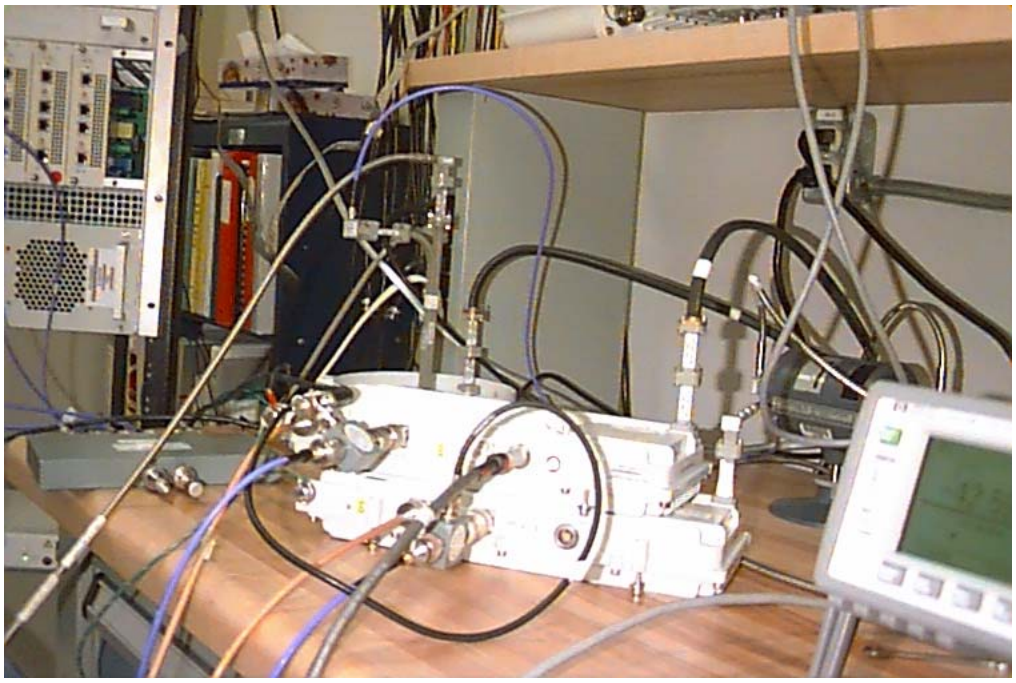


Figure – 6 Conducted Spurious Setup at Nemko Canada Inc. Laboratories

### 4.3.2 Test Condition

| | |
|---|---|
| **Temperature** | 22 ˚C |
| **Relative Humidity** | 65 % |
| **Atmospheric Pressure** | 101 k Pa |
| **Test Location** | Nemko Canada Inc. |
| | 3325 River Road , Ottawa, Ontario K1V 1H2 |
| **Test Engineer** | Glen Westwell |

### 4.3.3 Test Equipment

| Cal Cycle | Equipment | Manufacturer | Model | Serial No. | Last Cal. | Next Cal. |
|---|---|---|---|---|---|---|
| 3 Year | Mixer/Antenna 40-60Ghz | Olsen – OML | M19HWA (H.P.) | | Mar. 15/00 | Mar. 15/03 |
| 3 Year | Mixer /Antenna 60-90Ghz | Olsen – OML | M12HWA (H.P.) | | Mar. 15/00 | Mar. 15/03 |
| 3 Year | Mixer / Antenna 90-140Ghz | Olsen – OML | M08HWA (H.P.) | | Mar. 15/00 | Mar. 15/03 |
| 3 Year | Mixer / Antenna 140-220Ghz | Olsen – OML | M05HWA (H.P.) | | Mar. 15/00 | Mar. 15/03 |
| 1 Year | Spectrum Analyzer | Hewlett Packard | 8564E | 3846A01407 | May 31/00 | Nov. 30/01 |

### 4.3.4 Test Data

Test was performed from 30 MHz to 200 GHz.

**See Appendix B for test plots.**

Note:

The insertion loss of waveguide attenuator and RF coaxial cable has been set as offset in spectrum analyzer.

## 4.4 Radiated Emissions

Limit: -13 dBm / 4 kHz

Measured Value: See Test Data

Criteria: **Pass**

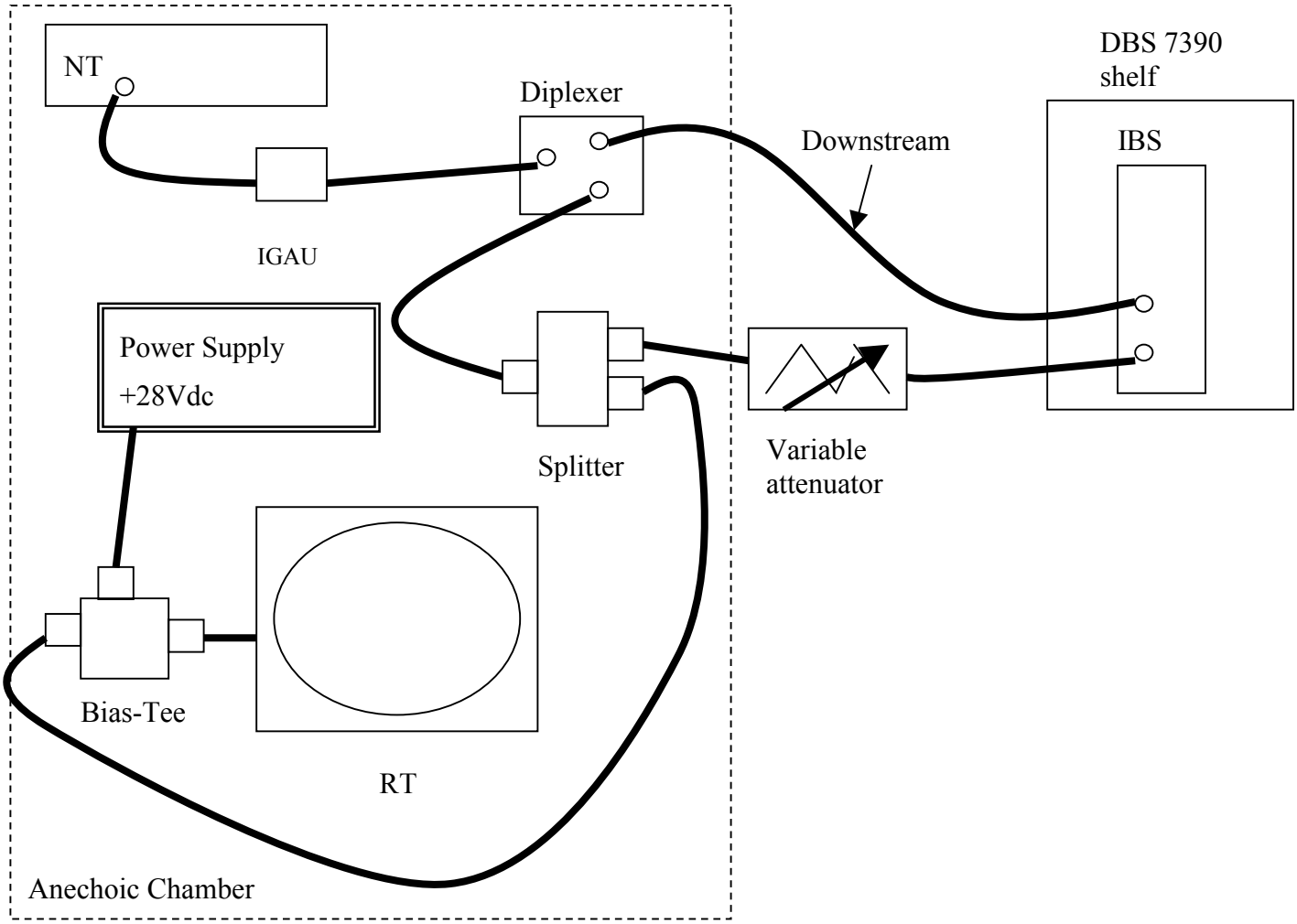
### 4.4.1 Test Procedure

The measurements were done with one NT and the RT was adjusted at the RF output to approximately ≥+17dBm at the antenna port.

The reference level was measured with the vertical polarized antenna that had a gain of 36dBi. Once the reference level was defined, the final measurements were taken with the RT port terminated with a 50Ω load.

All radiated spurious measurements were taken in semi-anechoic room at a distance of 3, 1 or 0.3 meters in the vertical and horizontal polarization.

The system was setup in maximum configuration as indicated below.



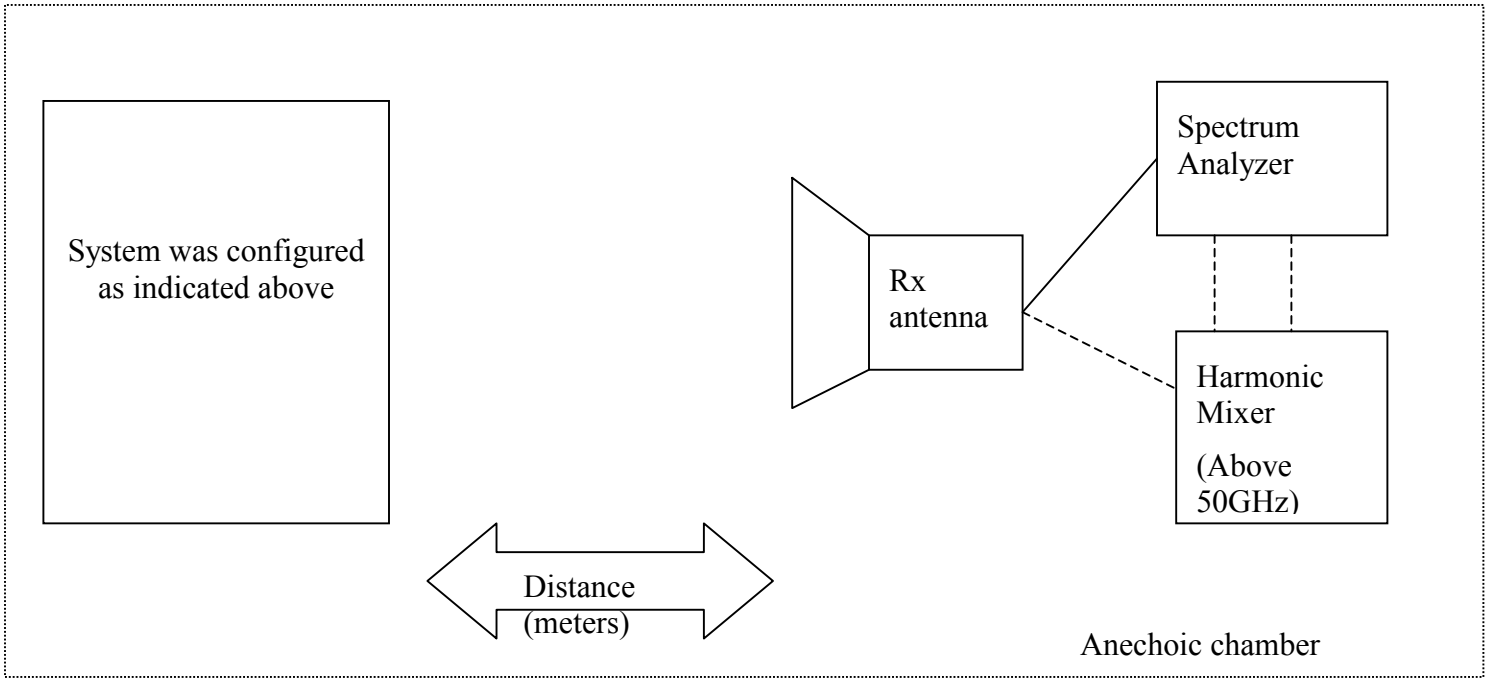
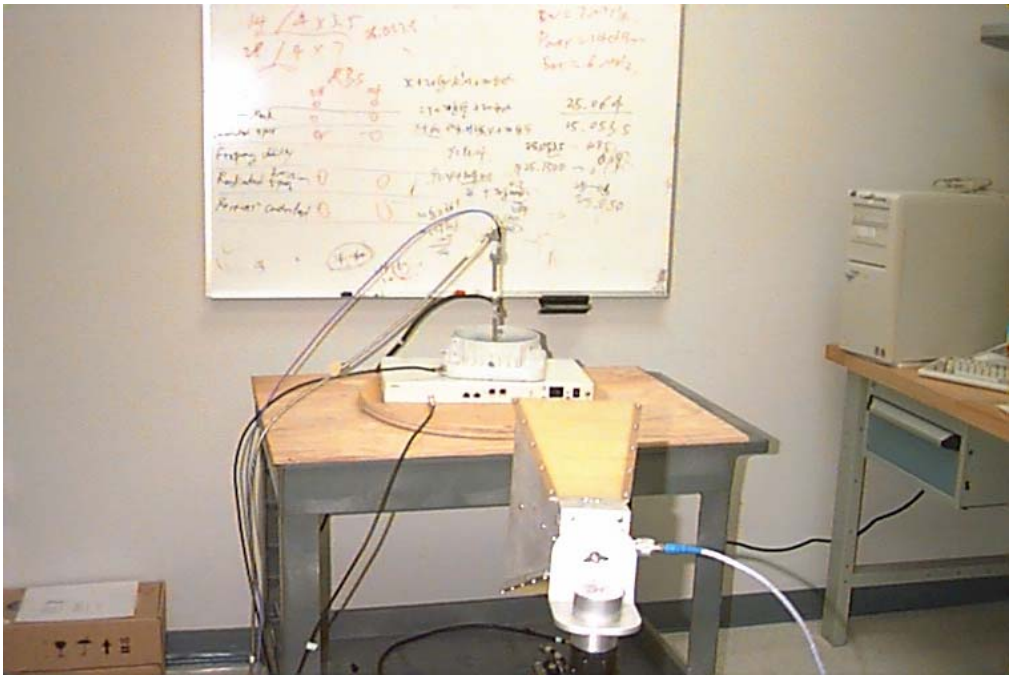



Figure –7 Radiated Spurious measurement setup



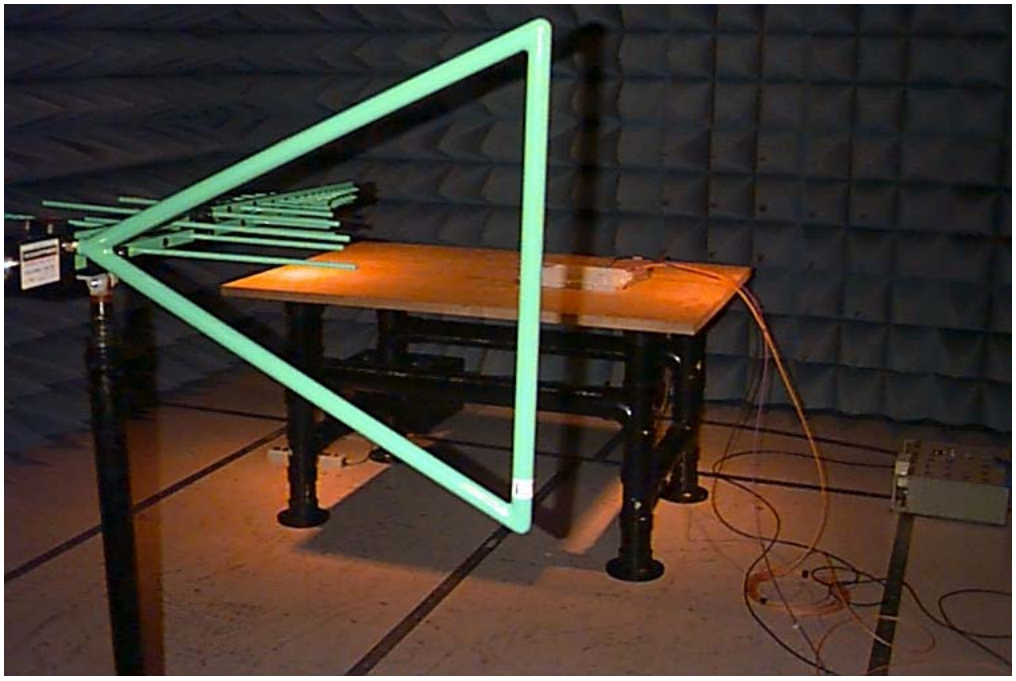


Figure – 8 Radiated Spurious Setup in Nemko Canada Inc. Laboratories

### 4.4.2 Test Condition

| | |
|---|---|
| **Temperature** | 22 ˚C |
| **Relative Humidity** | 65 % |
| **Atmospheric Pressure** | 101 k Pa |
| **Test Location** | Nemko Canada Inc. |
| | 3325 River Road , Ottawa, Ontario K1V 1H2 |
| **Test Engineer** | Glen Westwell |

### 4.4.3 Test Equipment

| CAL CYCLE | EQUIPMENT | MANUFACTURER | MODEL | SERIAL | LAST CAL. | NEXT CAL. |
|---|---|---|---|---|---|---|

| | | | | | | |
|---|---|---|---|---|---|---|
| 1 Year | Spectrum Analyzer | Hewlett Packard | 8564E | 3846A01407 | May 31/00 | Nov. 30/01 |
| 1 Year | Horn Antenna | EMCO #1 | 3115 | 3132 | Dec. 11/00 | Dec. 11/01 |
| 1 Year | Log Periodic Antenna 1 | EMCO | LPA-25 | 1141 | Aug. 3/00 | Aug. 3/01 |
| 3 Year | Diplexer | Olsen - OML | DPL.26 (H.P) | | Mar. 15/00 | Mar 15/03 |
| 3 Year | Mixer/Antenna 40-60Ghz | Olsen – OML | M19HWA (H.P.) | | Mar. 15/00 | Mar. 15/03 |
| 3 Year | Mixer /Antenna 60-90Ghz | Olsen – OML | M12HWA (H.P.) | | Mar. 15/00 | Mar. 15/03 |
| 3 Year | Mixer / Antenna 90-140Ghz | Olsen – OML | M08HWA (H.P.) | | Mar. 15/00 | Mar. 15/03 |
| 3 Year | Mixer / Antenna 140-220Ghz | Olsen – OML | M05HWA (H.P.) | | Mar. 15/00 | Mar. 15/03 |
| 3 Year | Bilog Antenna | Shaftner | CBL6112B | 2651 | Jan. 6/00 | Jan. 6/03 |

NA: Not Applicable

NCR: No Cal Required

COU: CAL On Use

### 4.4.4 Test Data

The spurious emissions were verified from 30MHz to 200 GHz and were below the specification Limit.

**Calculation:**

For power of -13 dBm, the Electric field at far field is:

$$E_{v/m} = (30\ P_t\ G_t)^{0.5} / R$$

Where: Pt: -13 dBm = 50 μW

Gt: Numeric gain of Transmitting Antenna, which is 50ohm load in this case. G t = 1 when frequency > 1 GHz and G t = 1.64 when frequency < 1 GHz

R: distance between transmitter and receiver.

Then, the limit –13 dBm is equivalent to:

$E_{v/m}$ = 84.4 dBμV /m @3 meter below 1 GHz

$E_{v/m}$ = 82.2 dBμV /m @3 meter above 1 GHz

$E_{v/m}$ = 91.8 dBμV /m @1 meter above 1 GHz

$E_{v/m}$ = 102.3 dBμV /m @0.3 meter above 1 GHz

Due to the reading result in spectrum analyzer is dBμV, so the actual test result is:

$E = V_{dB\ v} + Af$

Where:

$V_{dB\ v}$: reading result

Af: antenna factor, which varies with frequency

E shall be less than the limit of Electric field $E_{v/m}$ calculated above.

**See Appendix C for test plots.**

### 4.5 Frequency Stability

| | |
|---|---|
| Limit: | +/- 10 ppm |
| Measured Value: | less than +/- 1 ppm |
| Criteria: | **Pass** |

#### 4.5.1 Test Procedure

For the frequency stability measurements, an external source was used to provide an IF CW to the radio unit. Only the RT was placed in the temperature chamber during this specific test. The NT will usually be in a temperature-controlled environment, but can operate within a range of –10C to +55C.

The NT was not in the setup due to the software will not support in sending a CW to the RT. Also the transmitter will not operate if the system, including the BaseStation, is not receiving traffic from the downstream forming a closed loop.

An algorithm has been designed that will correct the frequency when the system is operating in a closed loop; upstream and downstream fully functional (synchronized). This algorithm has been designed to achieve the ±10ppm limits**.** The tests were done without the closed loop, therefore the algorithm does not come into play and is considered the worst case for the RT.

All measurements were taken according to the method mentioned in the FCC Part 2, where a reading was taken at every $10^{o}$ C intervals and the supply voltage was varied to the range of +23.8Vdc to +32.2Vdc.

**Note: The TS operates on AC, but an external supply was used to vary the DC source to the RT, due to the NT changes the secondary source (DC) very little when the primary (AC) is varied. Therefore the DC supply was varied to show that the frequency is not affected by voltage fluctuation.**

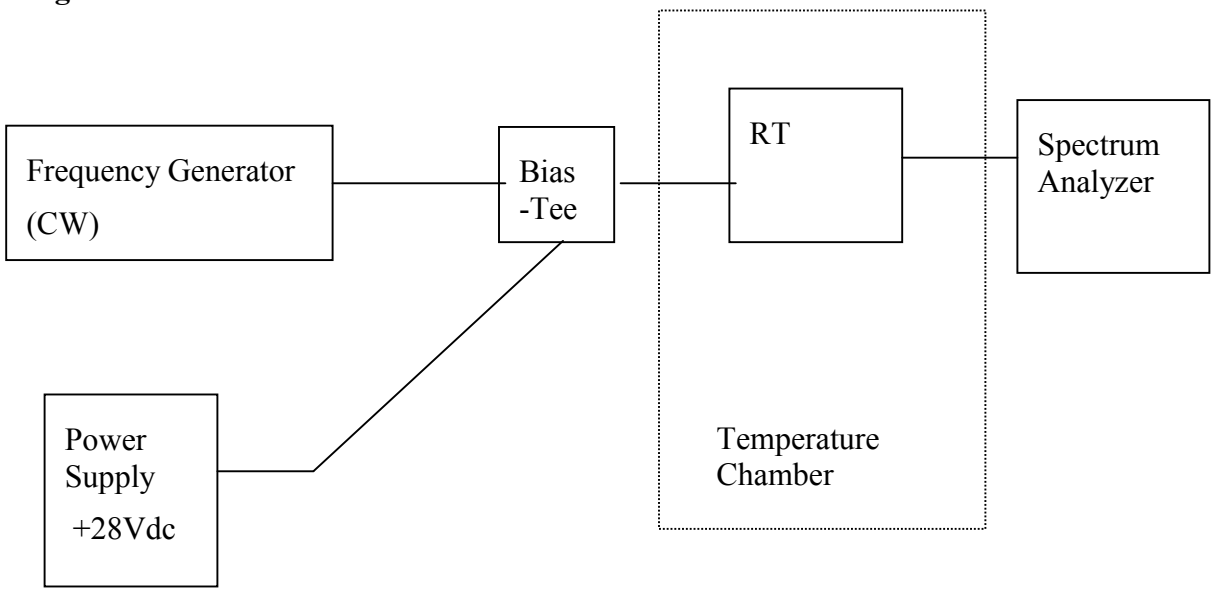



Figure – 9 Frequency Stability measurement setup

### 4.5.2 Test Condition

| | |
|---|---|
| **Temperature** | 22 ˚C |
| **Relative Humidity** | 65 % |
| **Atmospheric Pressure** | 101 k Pa |
| **Test Location** | Product Integrity Laboratory |
| | Alcatel Canada Inc |
| | 600 March Road, Kanata, Ontario, K2K 2E6 |
| **Test Engineer** | Frank Li |
| | Network / Wireless Approvals Specialist |

### 4.5.3 Test Equipment

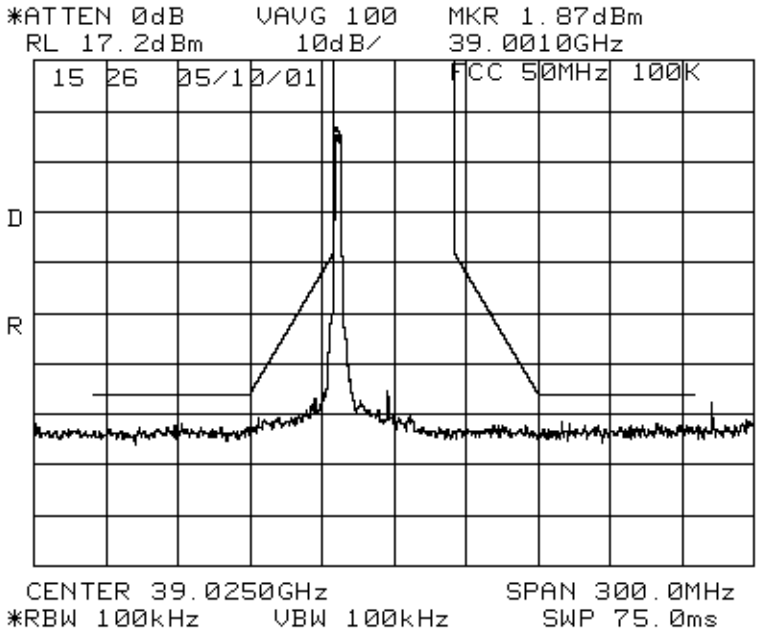
| Instrument | Mfr./Model / S/N | Calibration |
|---|---|---|
| Spectrum Analyzer | HP 8564E<br>Tool # 9169 | Last: 2000/08/24<br>Due: 2001/08/24 |
| Frequency Generator | HP 83640B<br>S/N # 3844A 00761 | Last: 2001/01/19<br>Due: 2002/01/19 |
| Temperature Chamber | Tool # 7263 | Last: 2000/09/07<br>Due: 2002/03/07 |

### 4.5.4 Test Data

| Nominal DC Supply Voltage to Radio is –48Vdc | | | |
|---|---|---|---|
| Note: An external supply was used to vary the DC source from 15V to 38V. | | | |
| Temperature ($^{o}$C) | Frequency (kHz) | Measured Frequency (kHz) | Tolerance |
| | Supply voltage | | Limit (+/-10ppm) |
| | 23.8 VDC | 28 VDC | 32.2 VDC | |
| -30 | 39 149 983.8 | 39 149 983.8 | 39 149 984.0 | <1ppm |
| -20 | 39 149 978.7 | 39 149 978.7 | 39 149.978.7 | <1ppm |
| -10 | 39 149 993.2 | 39 149 993.0 | 39 149 993.2 | <1ppm |
| 0 | 39 150 012.8 | 39 150 013.0 | 39 150 012.8 | <1ppm |
| 10 | 39 150 023.0 | 39 150 023.0 | 39 150 023.0 | <1ppm |
| 20 | 39 150 036.6 | 39 150 036.6 | 39 150 036.6 | <1ppm |
| 30 | 39 150 045.2 | 39 150 045.2 | 39 150 045.2 | <1ppm |
| 40 | 39 150 051.0 | 39 150 051.0 | 39 150 051.0 | <1ppm |
| 50 | 39 150 057.6 | 39 150 057.6 | 39 150 057.6 | <1ppm |

## APPENDIX A: TEST RESULT OF SPECTRAL MASK

### A – 1: Lower Block (39,000 ~ 39,050 MHz)



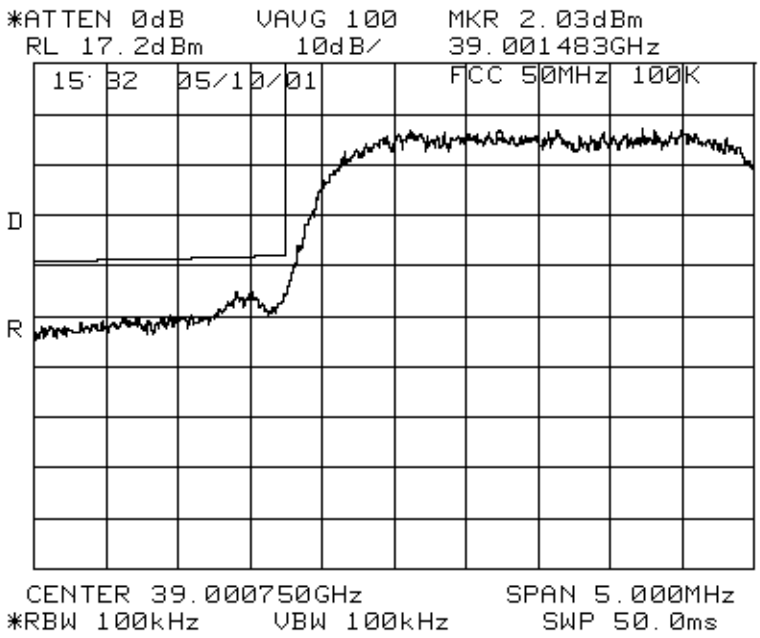

38 GHz RT

3.5 MHz Carrier

f = 39001.75 MHz

bottom of lower channel

with 100kHz RBW



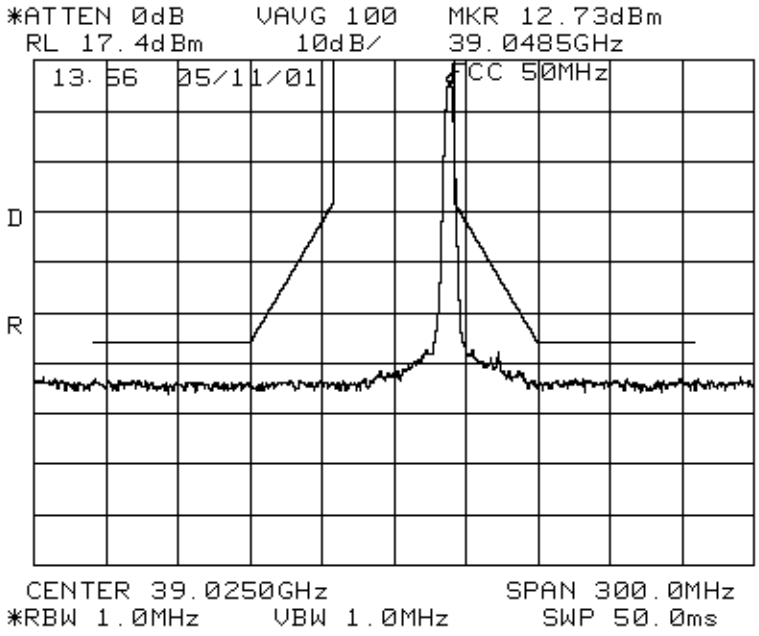

38 GHz RT

3.5 MHz Carrier

f = 39001.75 MHz

bottom of lower channel

with 100kHz RBW

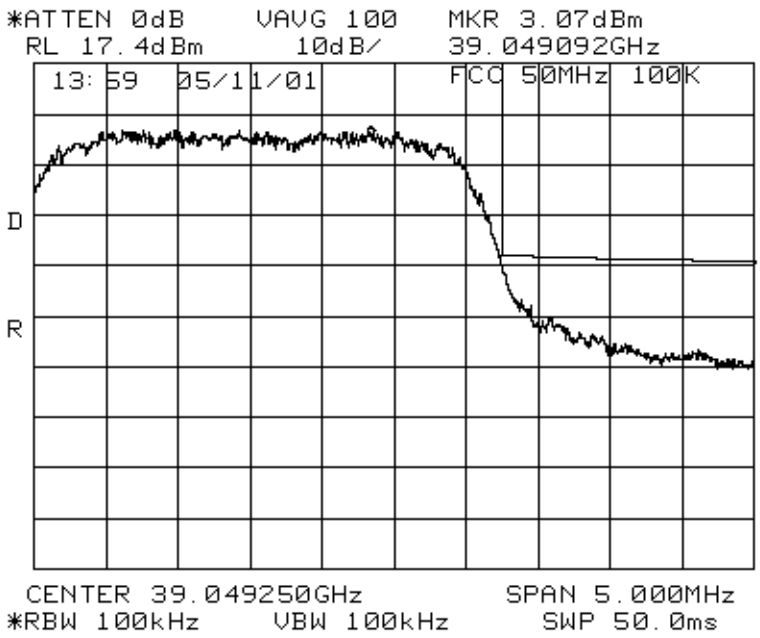



38 GHz RT

3.5 MHz RT

f = 39048.25

upper of lower channel



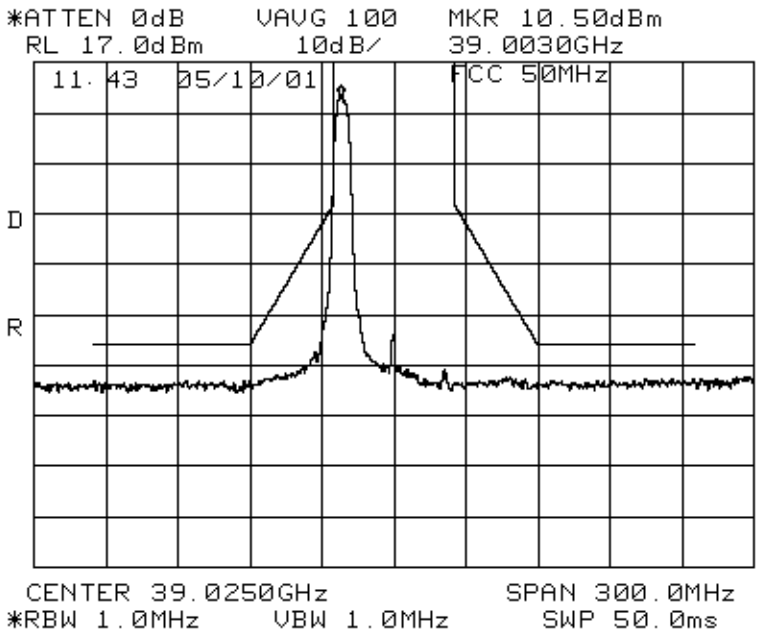

38 GHz RT

3.5 MHz RT

f = 39048.25

upper of lower channel

with 100 kHz RBW

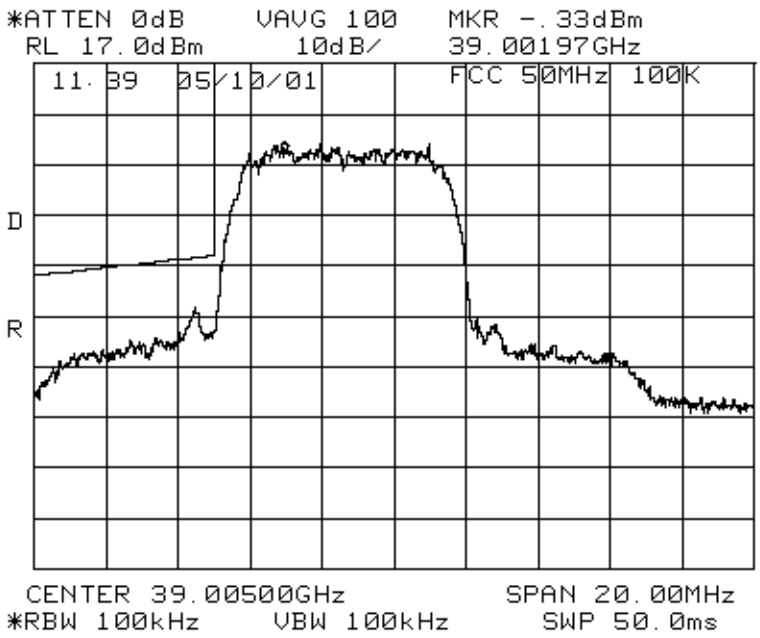



38 GHz RT

7 MHz carrier

f = 39003.5 MHz

bottom of lower channel

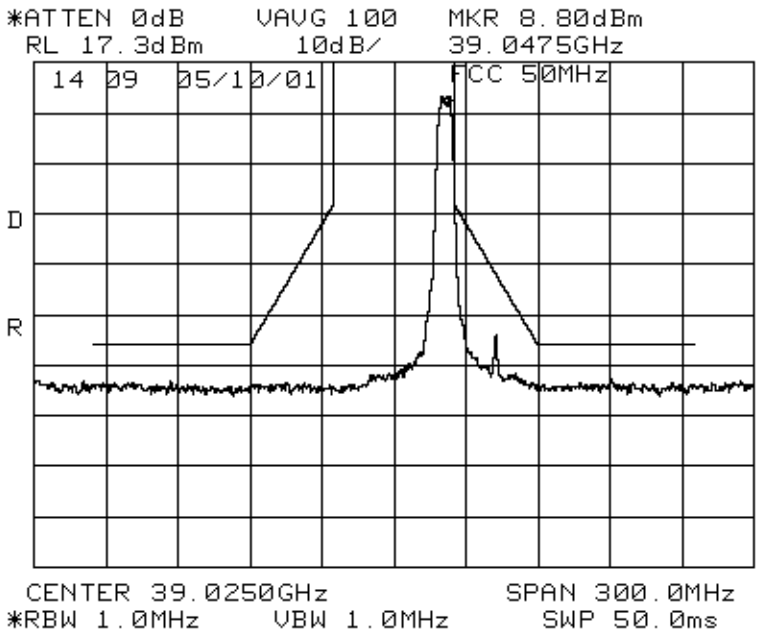



38 GHz RT

7 MHz carrier

f 39003.5 MHz

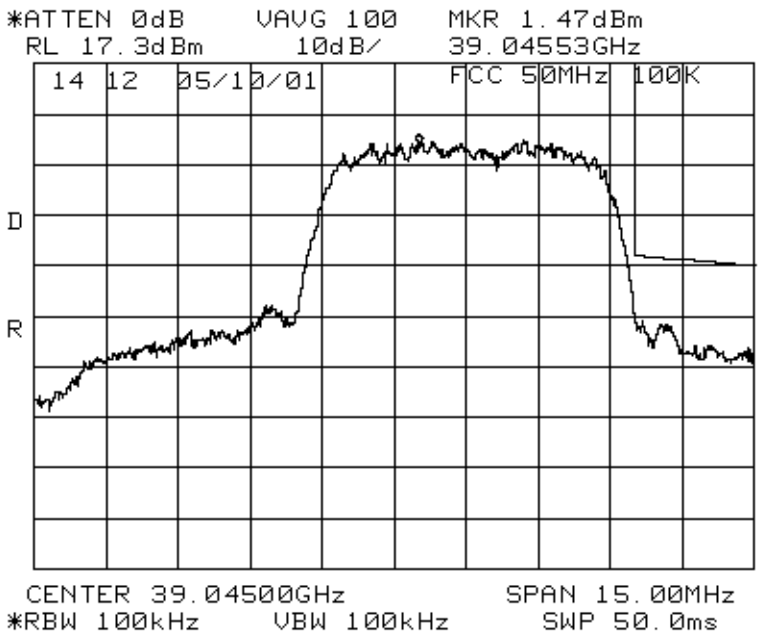
bottom of lower channel
with 100 kHz RBW




38 GHz RT

7 MHz Carrier

f = 39046.5 MHz
upper of lower channel



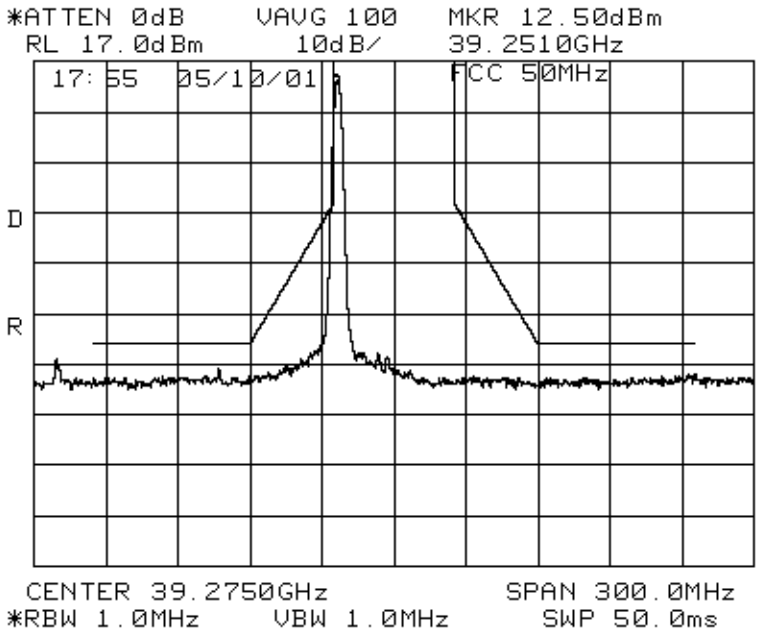

38 GHz RT

7 MHz Carrier

f = 39046.5 MHz
upper of lower channel

with 100kHz RBW

## A – 2: Higher Block (39,250 ~ 39,300 MHz)

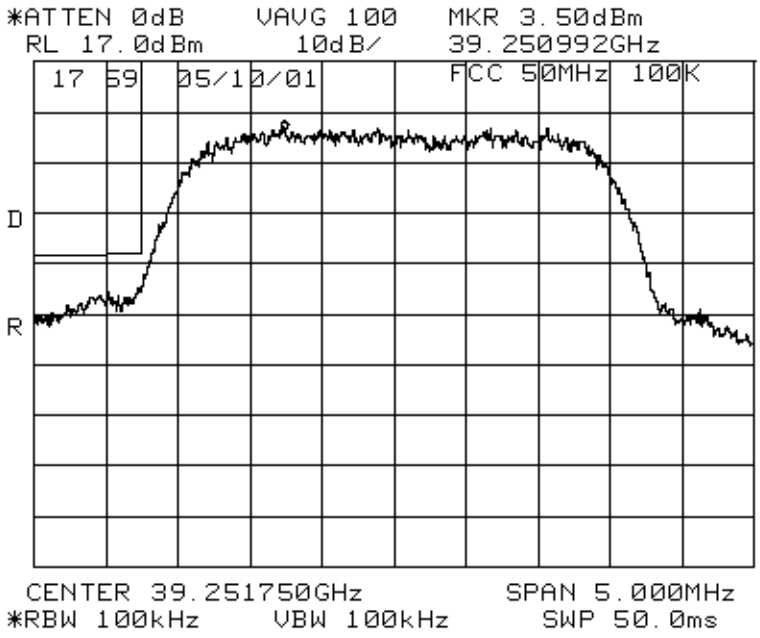



38 GHz RT

3.5 MHz Carrier

f = 39251.75 MHz

bottom of higher channel

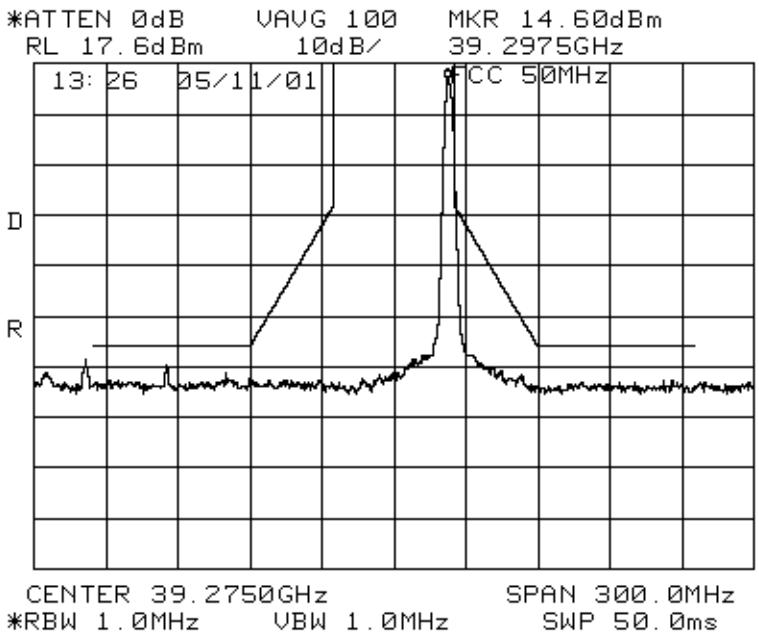



38 GHz RT

3.5 MHz Carrier

f = 39251.75 MHz

bottom of higher channel

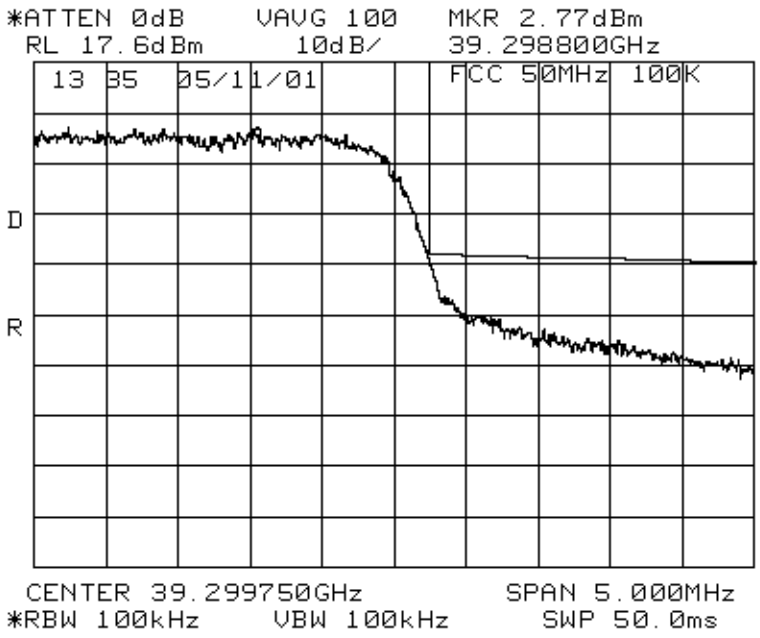



38 GHz RT

3.5 MHz RT

f = 39298.25

upper of higher channel

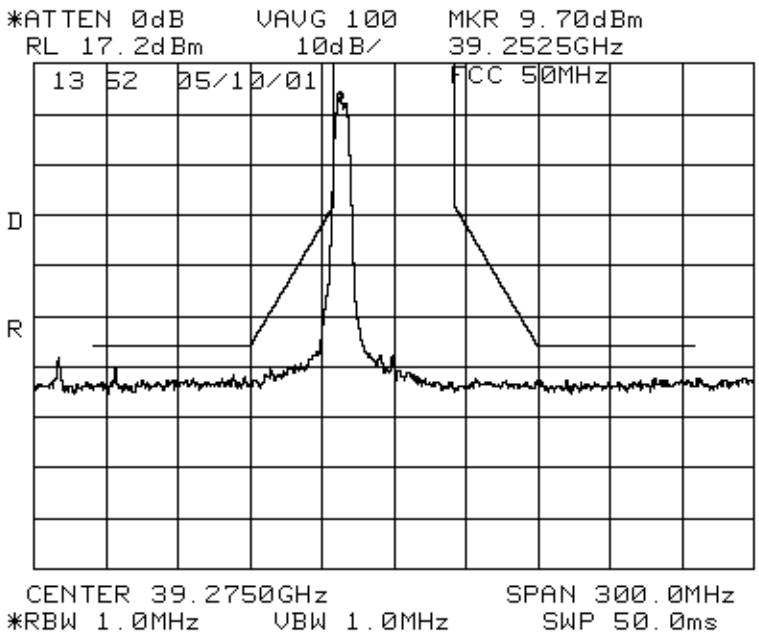



38 GHz RT

3.5 MHz RT

f = 39298.25

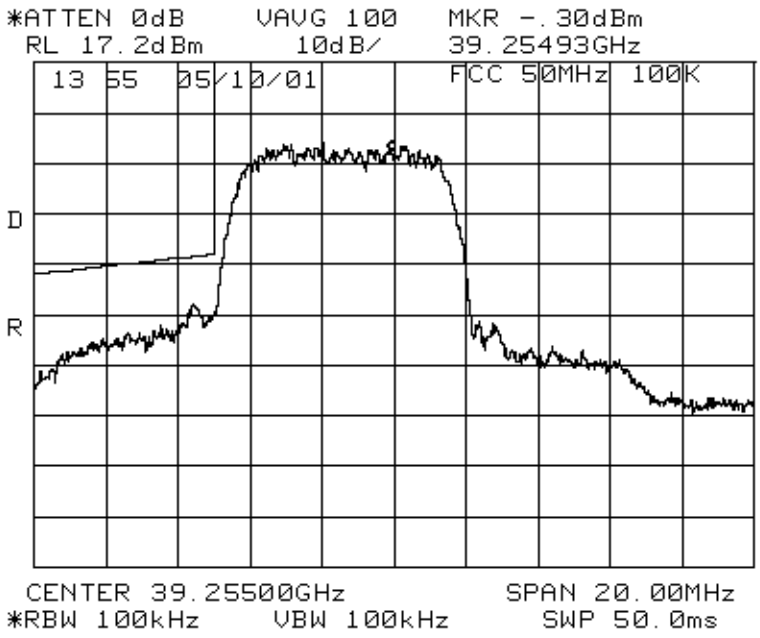
upper of higher channel
with 100kHz RBW




38 GHz RT

7 MHz Carrier

f = 39253.5 MHz
bottom of higher channel

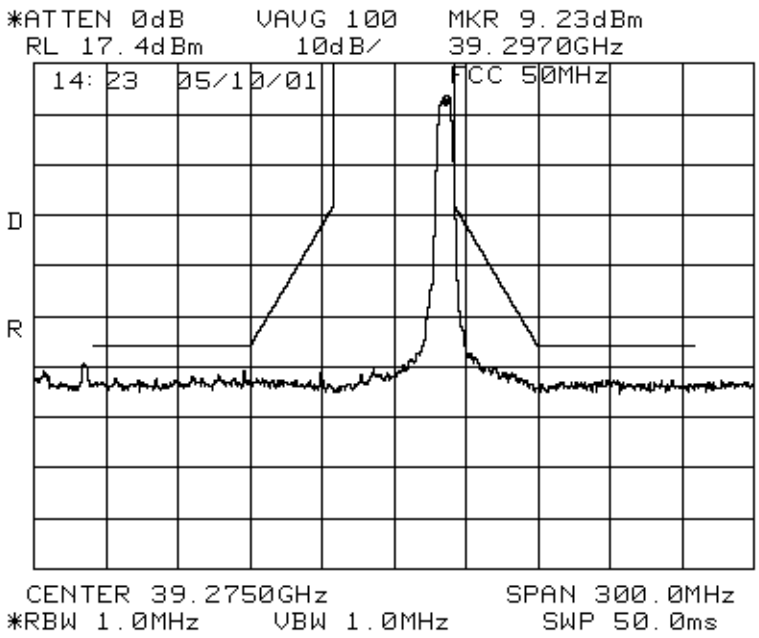



38 GHz RT

7 MHz Carrier

f = 39253.5 MHz
bottom of higher channel

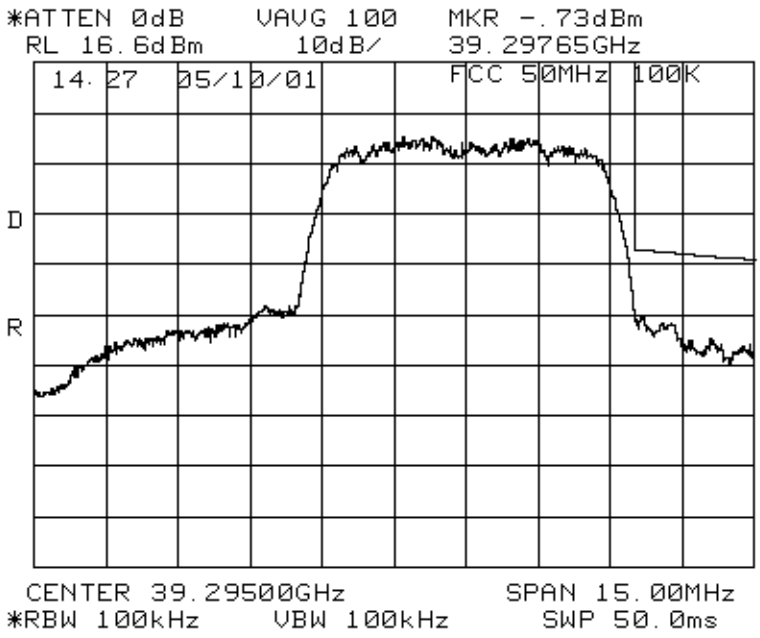
with 100kHz RBW




38 GHz RT

7 MHz Carrier

f = 39296.5 MHz
upper of higher channel



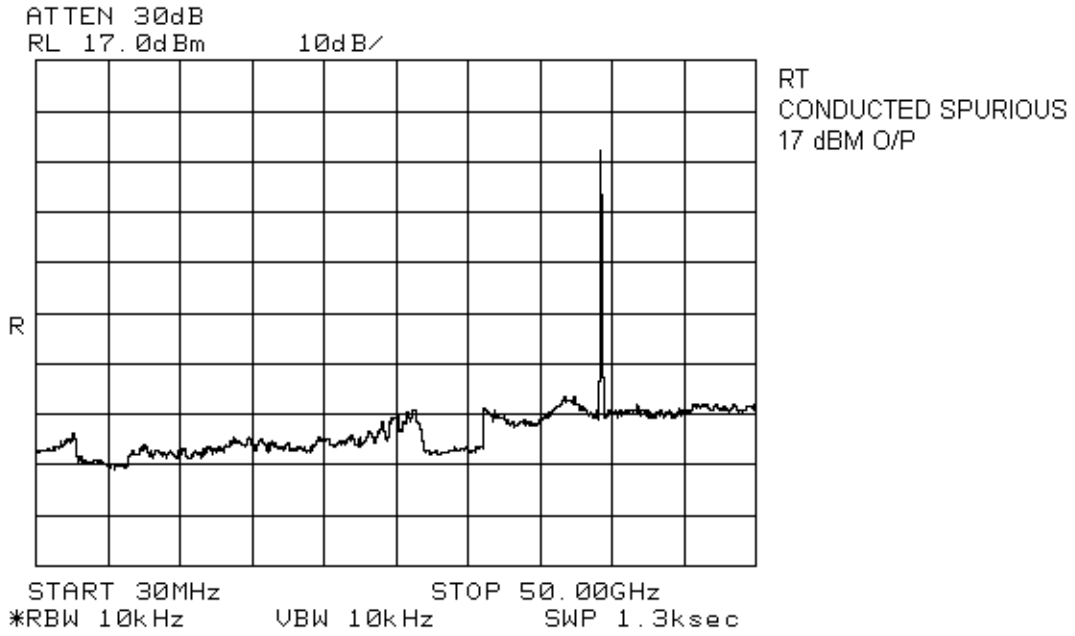

38 GHz RT

7 MHz Carrier

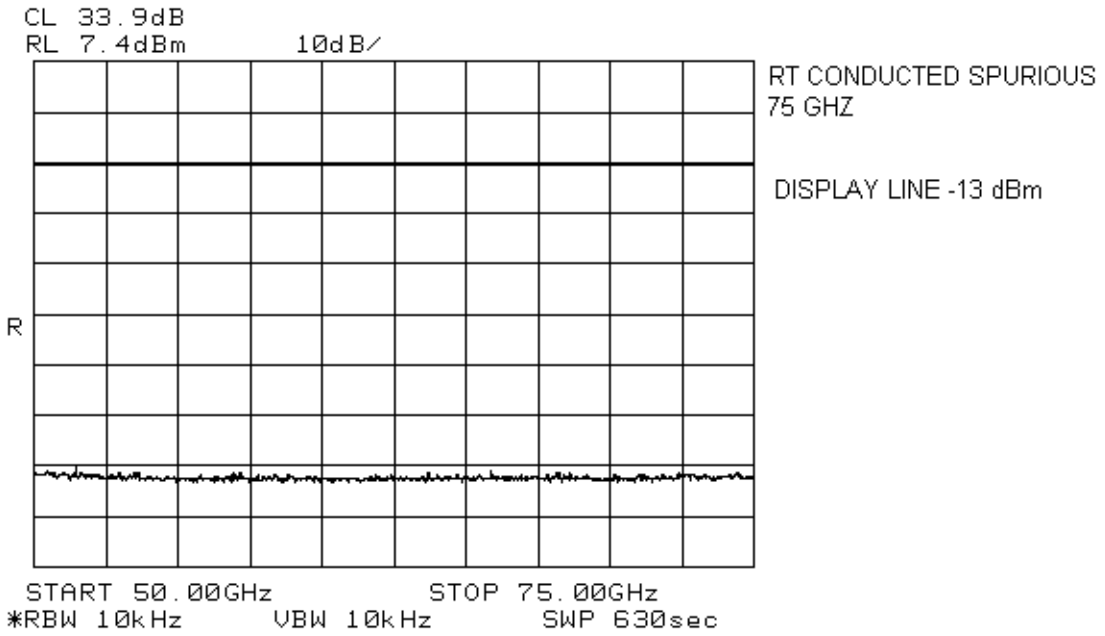
f = 39296.5 MHz
upper of higher channel

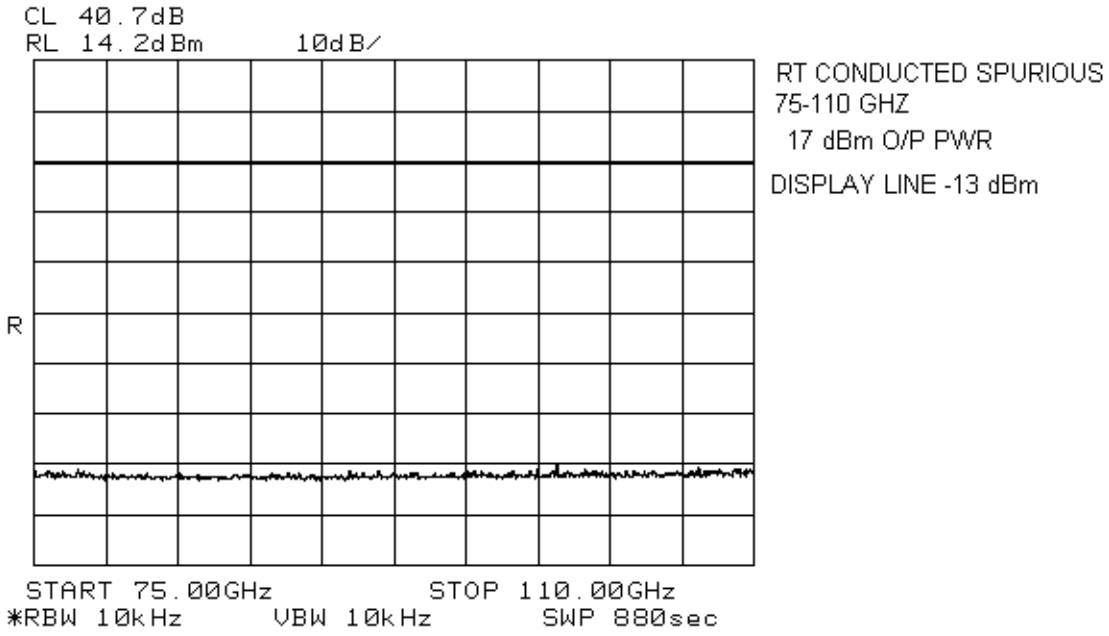
with 100kHz RBW

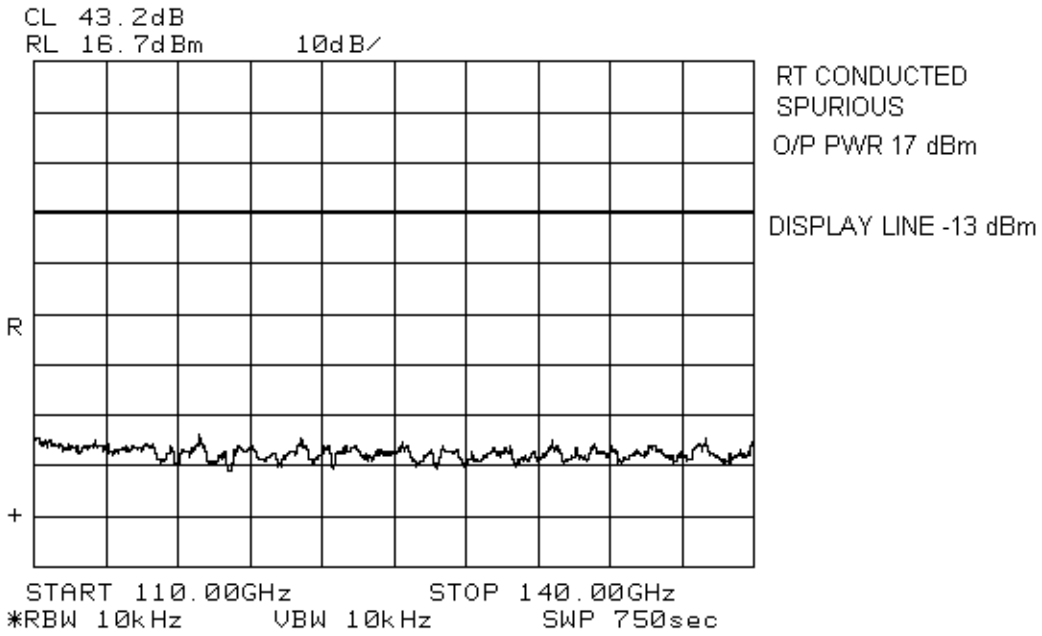
## APPENDIX B: TEST RESULT OF CONDUCTED SPURIOUS

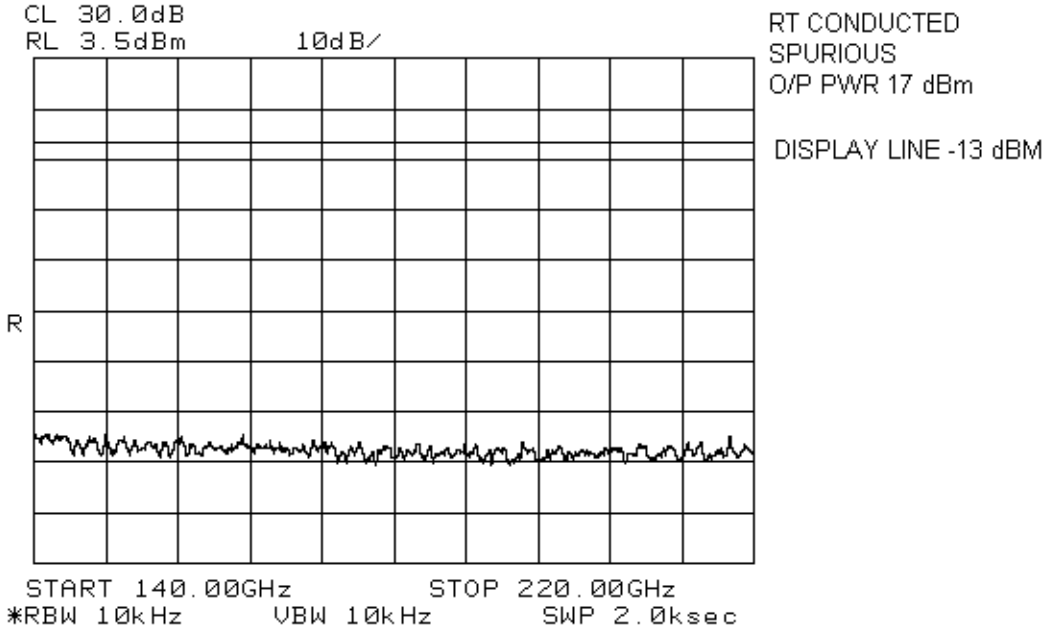



Note: The signal in the spectrum is the operating carrier

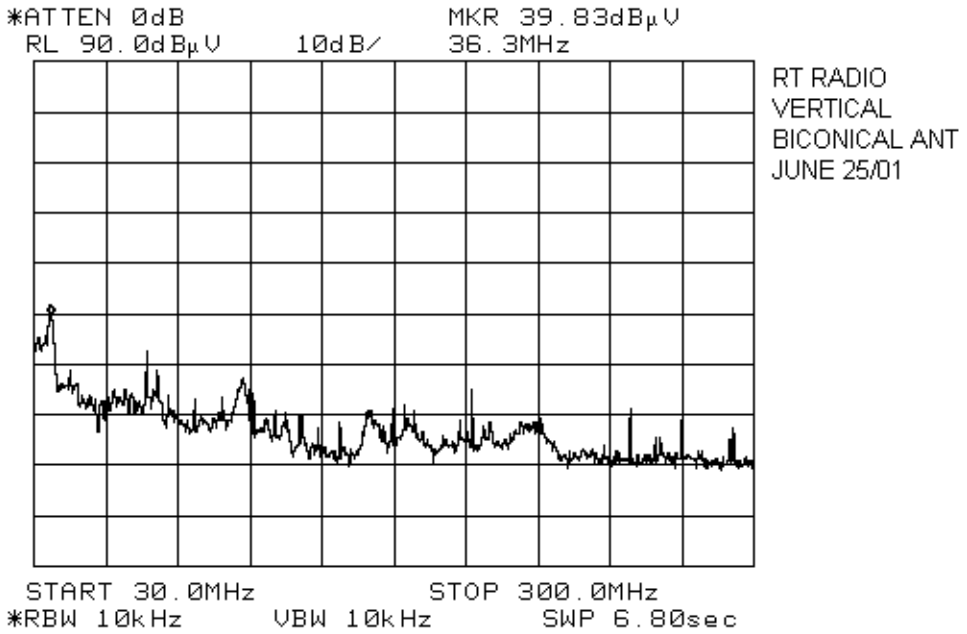

CL 33.9dB
RL 7.4dBm
10dB/
R
RT CONDUCTED SPURIOUS
75 GHZ
DISPLAY LINE -13 dBm
START 50.00GHz
STOP 75.00GHz
*RBW 10kHz
VBW 10kHz
SWP 630sec


CL 40.7dB
RL 14.2dBm
10dB/
R
RT CONDUCTED SPURIOUS
75-110 GHZ
17 dBm O/P PWR
DISPLAY LINE -13 dBm
START 75.00GHz
STOP 110.00GHz
*RBW 10kHz
VBW 10kHz
SWP 880sec


CL 43.2dB
RL 16.7dBm
10dB/
RT CONDUCTED
SPURIOUS
O/P PWR 17 dBm
DISPLAY LINE -13 dBm
R
+
START 110.00GHz
STOP 140.00GHz
*RBW 10kHz
VBW 10kHz
SWP 750sec


CL 30.0dB
RL 3.5dBm
10dB/
RT CONDUCTED
SPURIOUS
O/P PWR 17 dBm
DISPLAY LINE -13 dBM
R
START 140.00GHz
STOP 220.00GHz
*RBW 10kHz
VBW 10kHz
SWP 2.0ksec

## APPENDIX C: TEST RESULT OF RADIATED EMISSIONS




### 3 Meter Below 1GHz

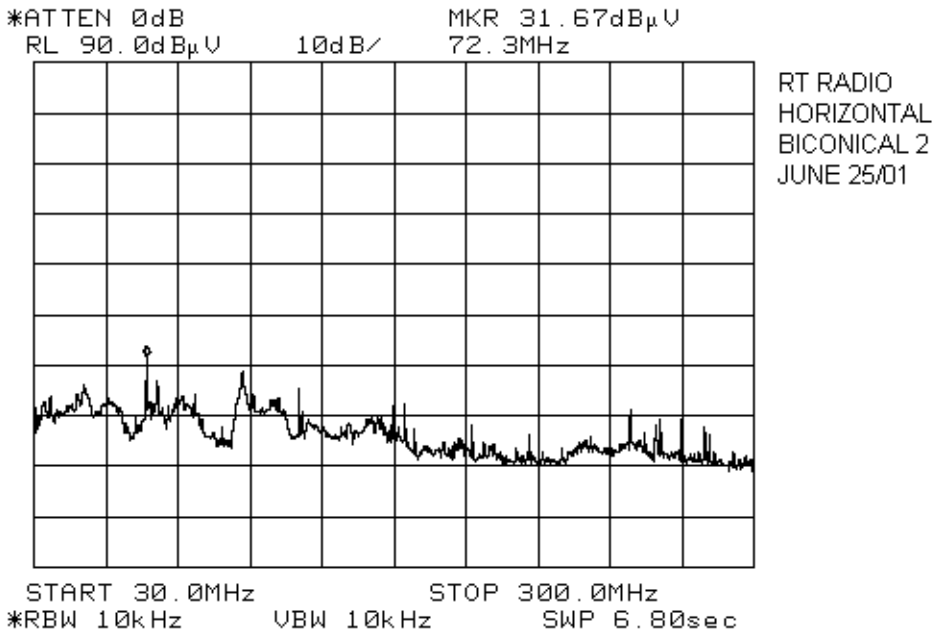
Limit = 84.4 dBµV

RBW Correction Factor = 4dB

Peak Emission = 39.8 dBµV

Af = 12.1

| Peak Emissions Level | | | | | |
|---|---|---|---|---|---|
| **Reading** | **Af** | **RBW Corr.** | **Result** | **Limit dBµV** | **Margin (dB)** |
| 39.8 | 12.1 | -4 | 51.9 | 84.4 | 32.5 |




**3 Meter Below 1GHz**

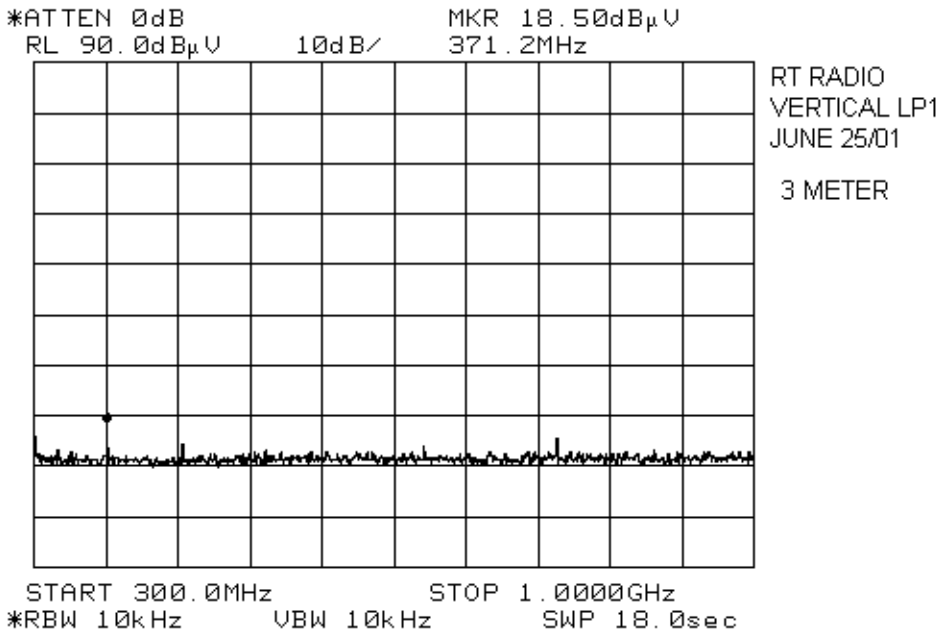
Limit = 84.4 dBµV

RBW Correction Factor = 4dB

Peak Emission = 31.7 dBµV

Af = 8.4

| Peak Emissions Level | | | | | |
|---|---|---|---|---|---|
| **Reading** | **Af** | **RBW Corr.** | **Result** | **Limit dBµV** | **Margin (dB)** |
| 31.7 | 8.4 | -4 | 36.1 | 84.4 | 48.3 |




**3 Meter Below 1GHz**

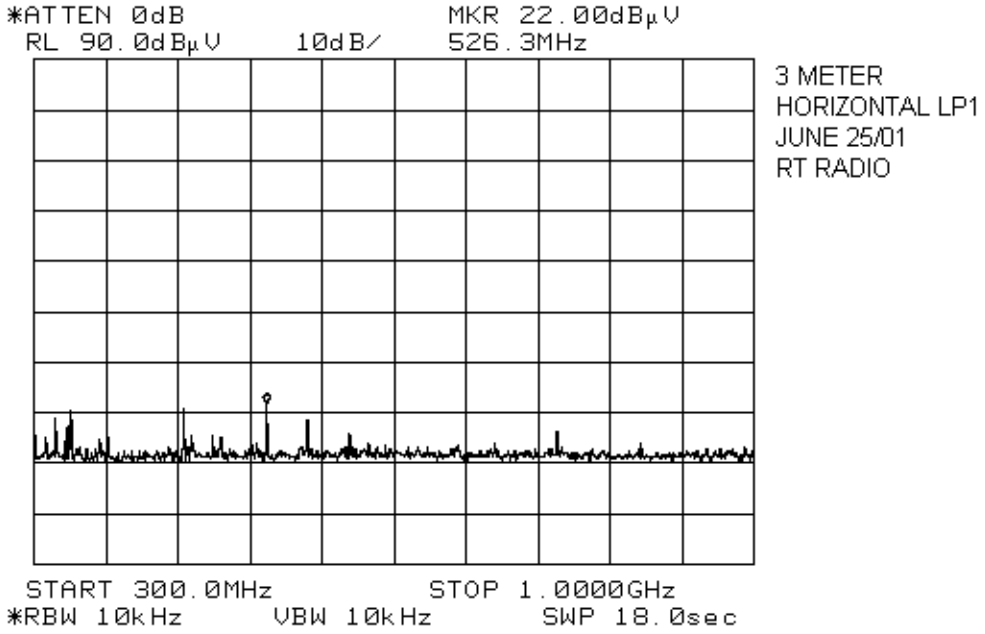
Limit = 84.4 dBµV

RBW Correction Factor = 4dB

Peak Emission = 31.7 dBµV

Af = 8.4

| Peak Emissions Level | | | | | |
|---|---|---|---|---|---|
| **Reading** | **Af** | **RBW Corr.** | **Result** | **Limit dBµV** | **Margin (dB)** |
| 18.5 | 15.6 | -4 | 34.1 | 84.4 | 50.3 |




**3 Meter Below 1GHz**

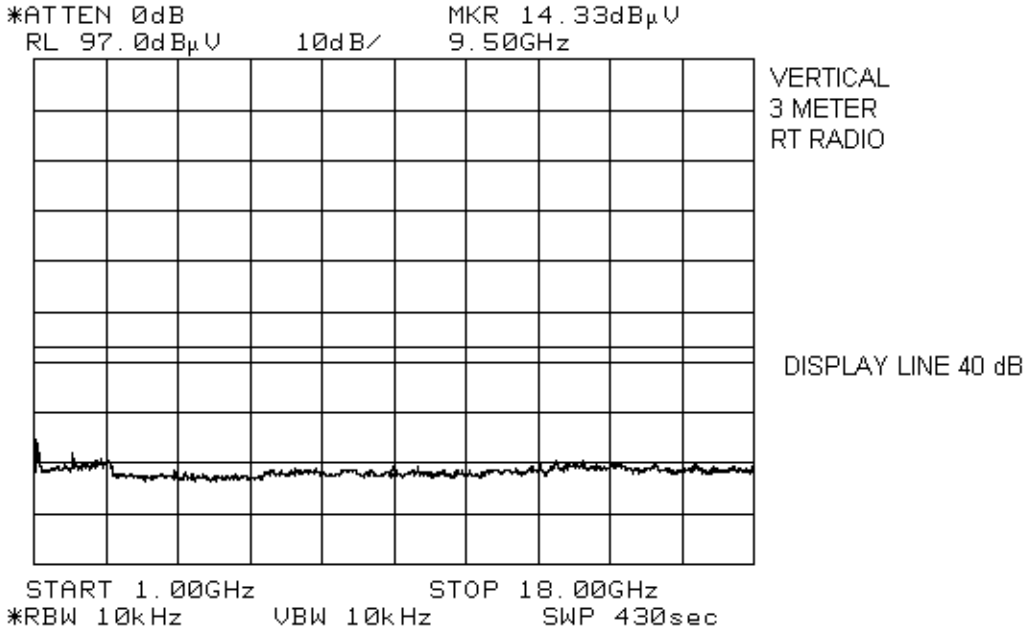
Limit = 84.4 dBµV

RBW Correction Factor = 4dB

Peak Emission = 22.0 dBµV

Af = 18.9

| Peak Emissions Level | | | | | |
|---|---|---|---|---|---|
| **Reading** | **Af** | **RBW Corr.** | **Result** | **Limit dBµV** | **Margin (dB)** |
| 22.0 | 18.9 | -4 | 40.9 | 84.4 | 43.5 |




**3 Meter Above 1GHz**

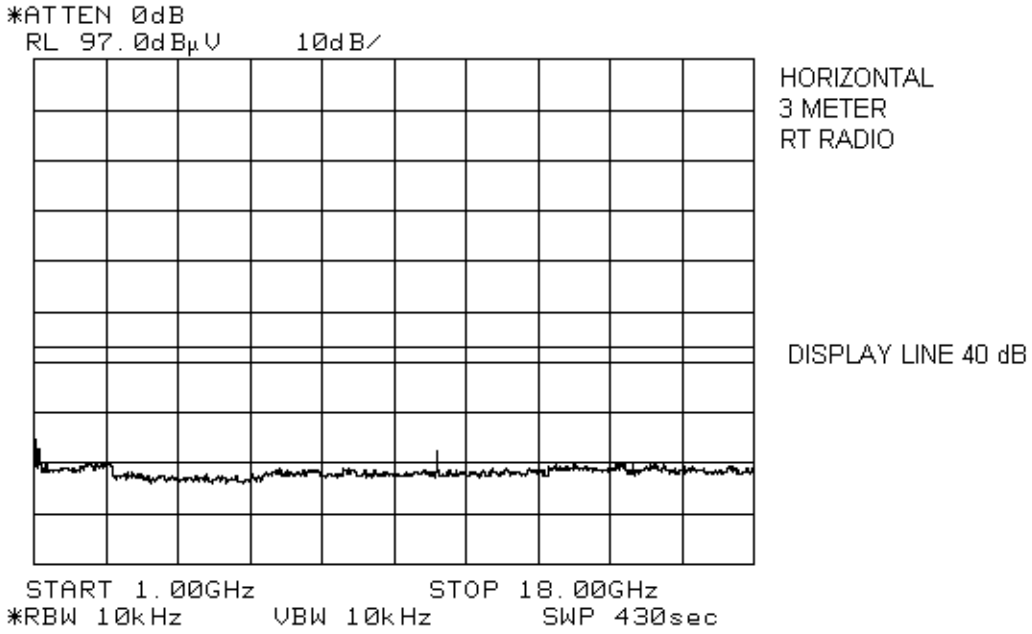
Limit = 82.2 dBµV

RBW Correction Factor = 4dB

Peak Emission = 14.3 dBµV

Af = 44.6 Maximum

| Peak Emissions Level | | | | | |
|---|---|---|---|---|---|
| **Reading** | **Af** | **RBW Corr.** | **Result** | **Limit dBµV** | **Margin (dB)** |
| 14.3 | 44.6 | -4 | 54.9 | 82.2 | 27.3 |




**3 Meter Above 1GHz**

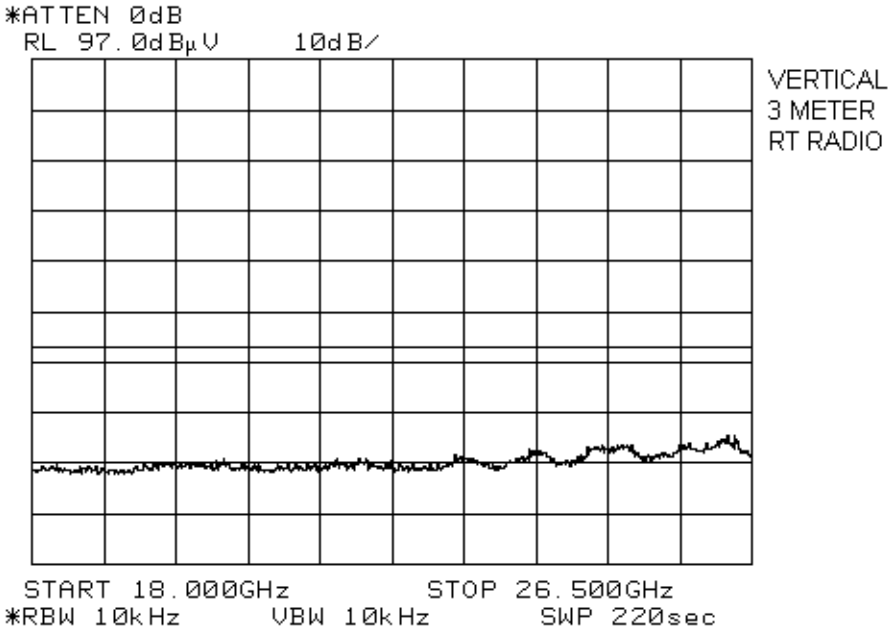
Limit = 82.2 dBµV

RBW Correction Factor = 4dB

Peak Emission = 14.3 dBµV

Af = 44.6 Maximum

| Peak Emissions Level | | | | | |
|---|---|---|---|---|---|
| **Reading** | **Af** | **RBW Corr.** | **Result** | **Limit dBµV** | **Margin (dB)** |
| 14.3 | 44.6 | -4 | 54.9 | 82.2 | 27.3 |




**3 Meter Above 1GHz**

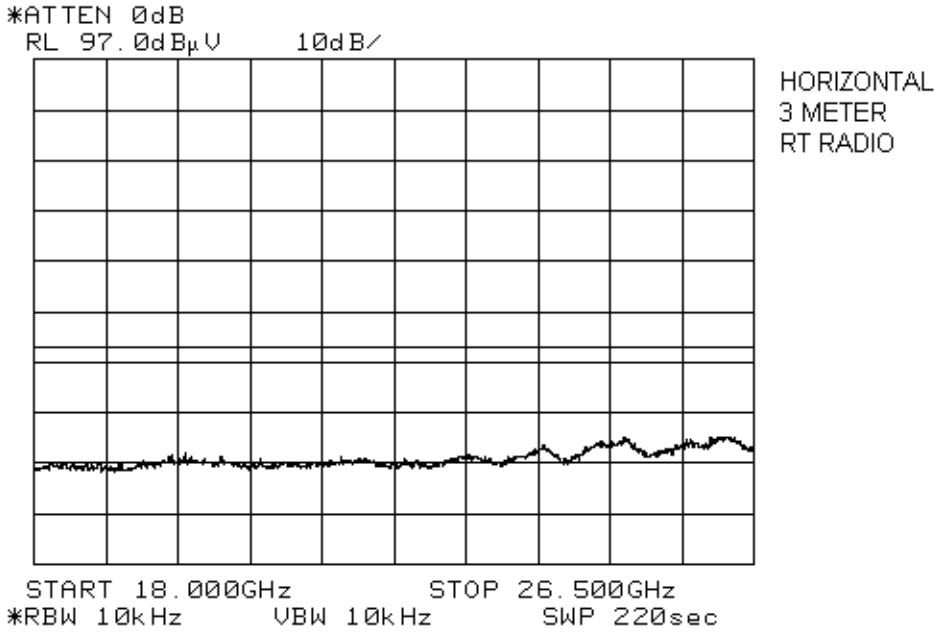
Limit = 82.2 dBµV

RBW Correction Factor = 4dB

Peak Emission = 14.0 dBµV

Af = 40.7 Maximum

| Peak Emissions Level | | | | | |
|---|---|---|---|---|---|
| **Reading** | **Af** | **RBW Corr.** | **Result** | **Limit dBµV** | **Margin (dB)** |
| 14.0 | 40.7 | -4 | 50.7 | 82.2 | 31.5 |




**3 Meter Above 1GHz**

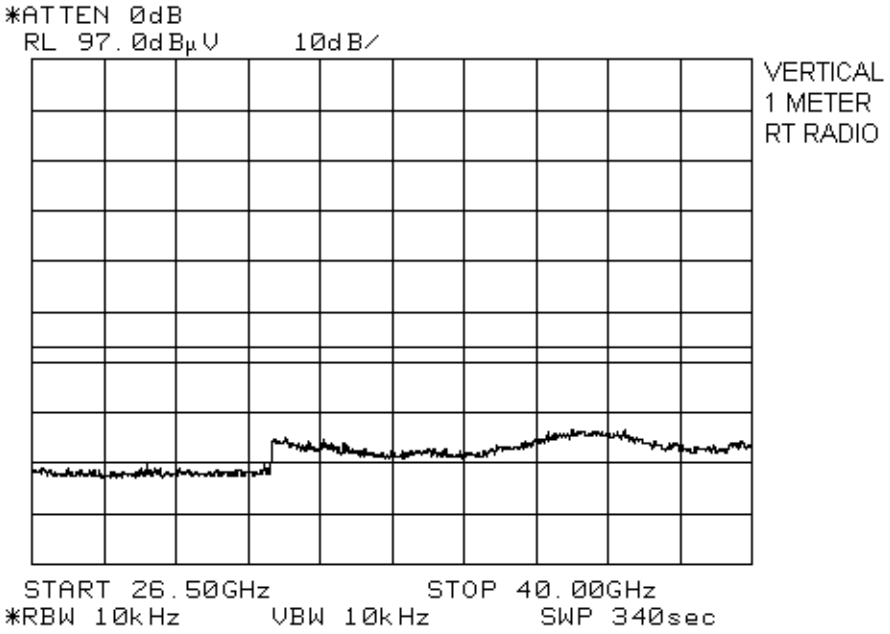
Limit = 82.2 dBµV

RBW Correction Factor = 4dB

Peak Emission = 14.0 dBµV

Af = 40.7 Maximum

| Peak Emissions Level | | | | | |
|---|---|---|---|---|---|
| **Reading** | **Af** | **RBW Corr.** | **Result** | **Limit dBµV** | **Margin (dB)** |
| 14.0 | 40.7 | -4 | 50.7 | 82.2 | 31.5 |




## 1 Meter Above 1GHz

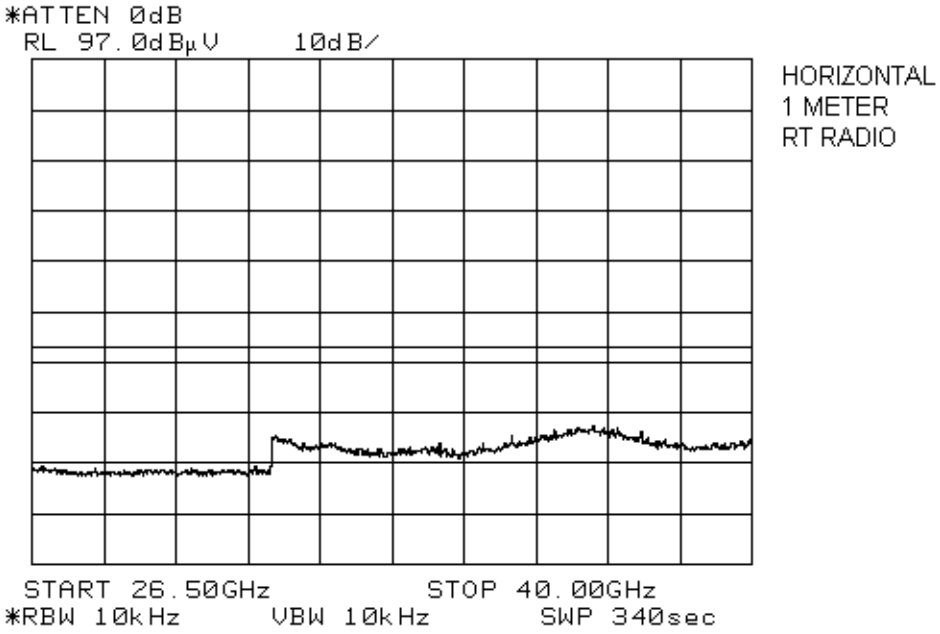
Limit = 91.8 dBµV

RBW Correction Factor = 4dB

Peak Emission = 13.0 dBµV

Af = 44.2 Maximum

| Peak Emissions Level | | | | | |
|---|---|---|---|---|---|
| **Reading** | **Af** | **RBW Corr.** | **Result** | **Limit dBµV** | **Margin (dB)** |
| 13.0 | 44.2 | -4 | 53.2 | 91.8 | 38.6 |




## 1 Meter Above 1GHz

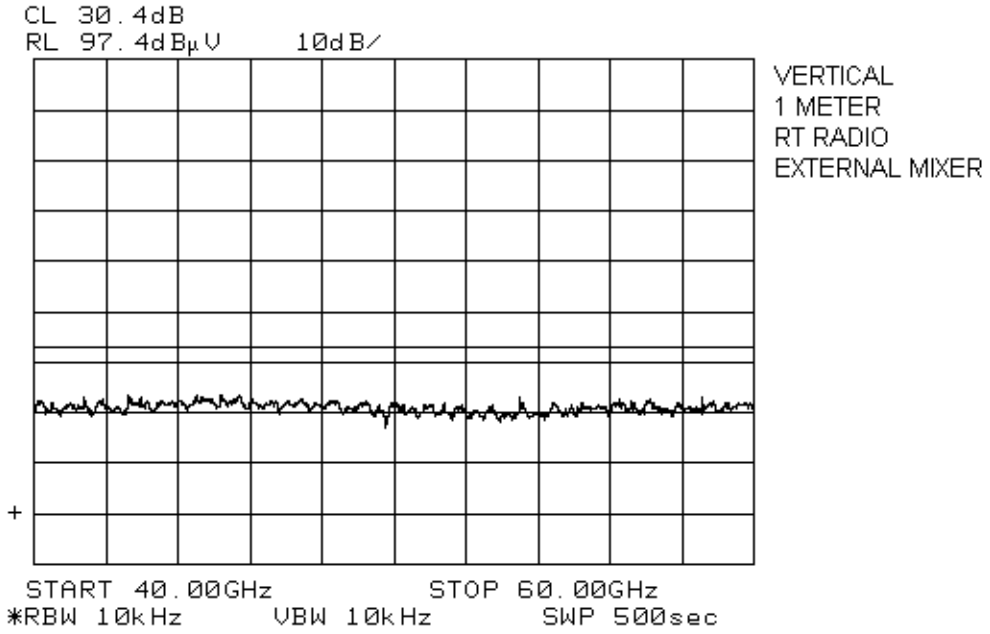
Limit = 91.8 dBµV

RBW Correction Factor = 4dB

Peak Emission = 13.0 dBµV

Af = 44.2

| Peak Emissions Level | | | | | |
|---|---|---|---|---|---|
| **Reading** | **Af** | **RBW Corr.** | **Result** | **Limit dBµV** | **Margin (dB)** |
| 13.0 | 44.2 | -4 | 53.2 | 91.8 | 38.6 |




## 1 Meter Above 1GHz

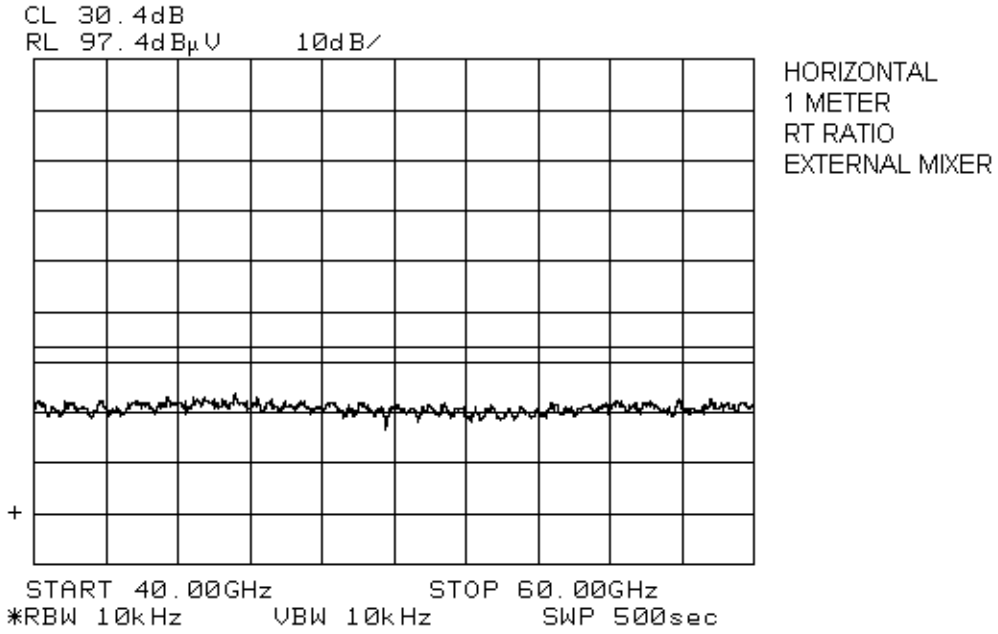
Limit = 91.8 dBµV

RBW Correction Factor = 4dB

Peak Emission = 30.0 dBµV

Af = 40.6

| Peak Emissions Level | | | | | |
|---|---|---|---|---|---|
| **Reading** | **Af** | **RBW Corr.** | **Result** | **Limit dBµV** | **Margin (dB)** |
| 30.0 | 40.6 | -4 | 66.6 | 91.8 | 25.2 |




## 1 Meter Above 1GHz

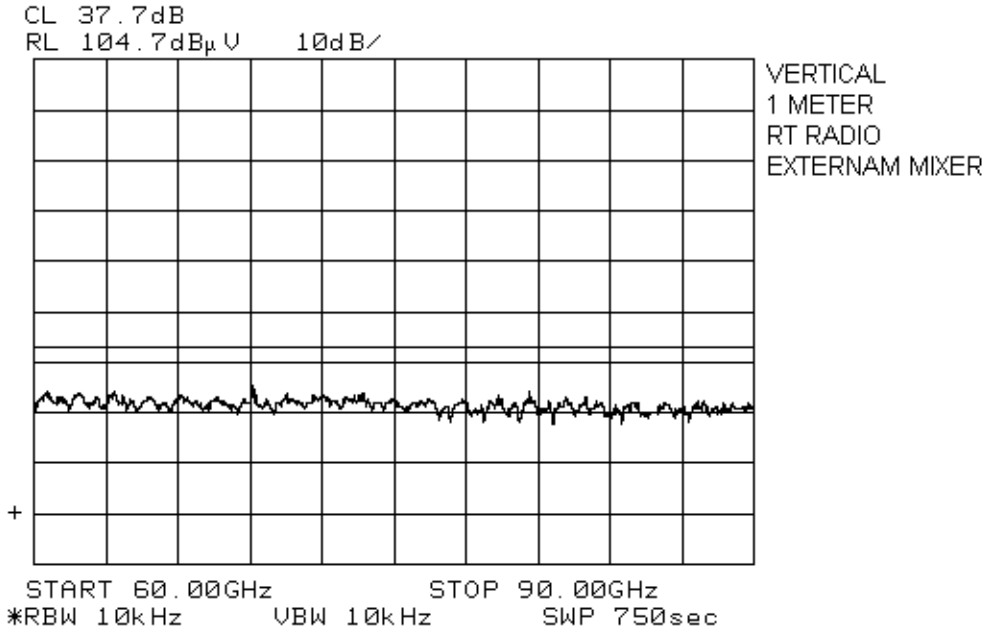
Limit = 91.8 dBµV

RBW Correction Factor = 4dB

Peak Emission = 30.0 dBµV

Af = 40.6

| Peak Emissions Level | | | | | |
|---|---|---|---|---|---|
| **Reading** | **Af** | **RBW Corr.** | **Result** | **Limit dBµV** | **Margin (dB)** |
| 30.0 | 40.6 | -4 | 66.6 | 91.8 | 25.2 |




**1 Meter Above 1GHz**

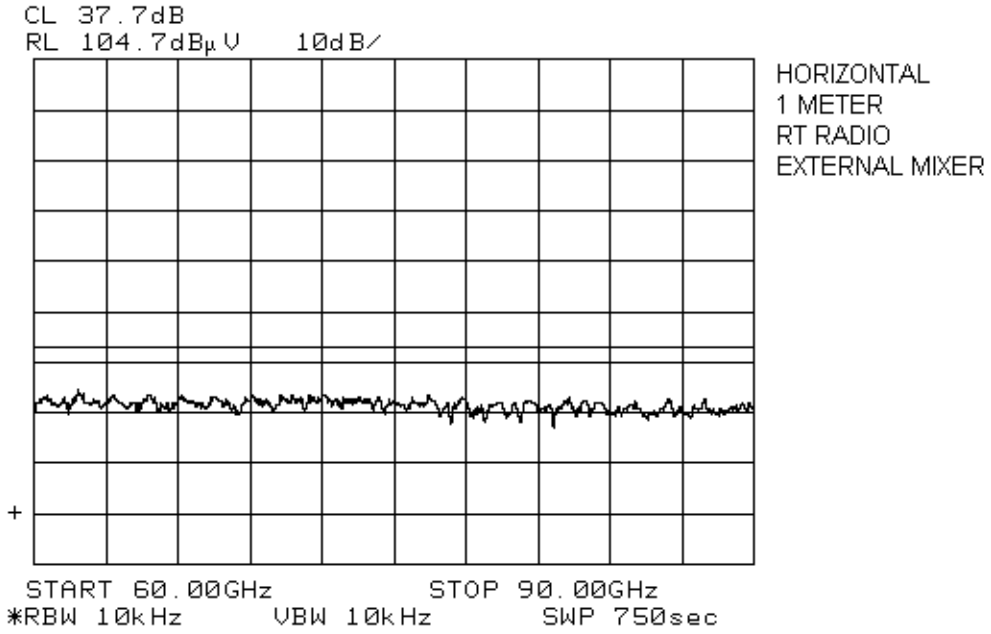
Limit = 91.8 dBµV

RBW Correction Factor = 4dB

Peak Emission = 30.0 dBµV

Af = 44.6

| Peak Emissions Level | | | | | |
|---|---|---|---|---|---|
| **Reading** | **Af** | **RBW Corr.** | **Result** | **Limit dBµV** | **Margin (dB)** |
| 30.0 | 44.6 | -4 | 70.6 | 91.8 | 21.2 |




**1 Meter Above 1GHz**

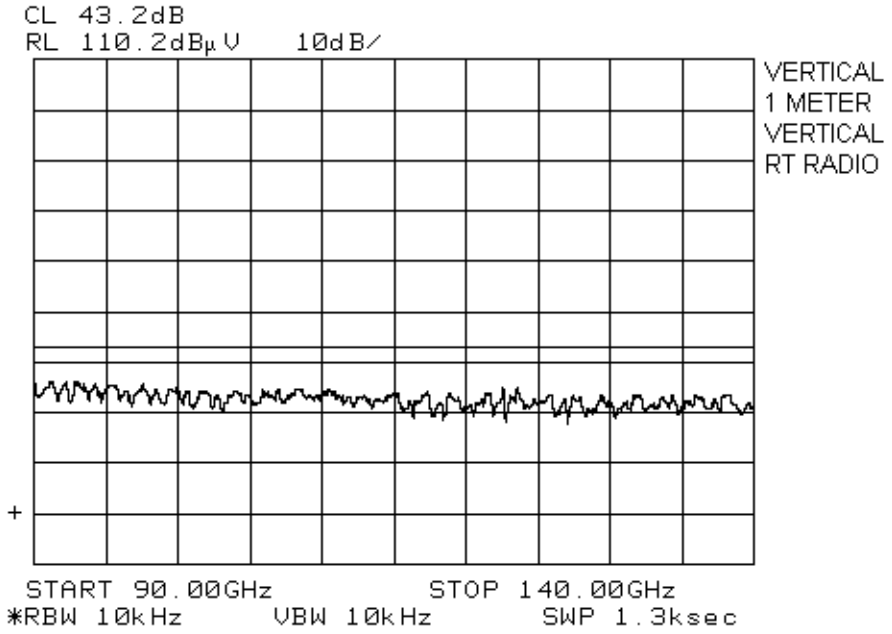
Limit = 91.8 dBµV

RBW Correction Factor = 4dB

Peak Emission = 30.0 dBµV

Af = 44.6

| Peak Emissions Level | | | | | |
|---|---|---|---|---|---|
| **Reading** | **Af** | **RBW Corr.** | **Result** | **Limit dBµV** | **Margin (dB)** |
| 30.0 | 44.6 | -4 | 70.6 | 91.8 | 21.2 |




## 1 Meter Above 1GHz

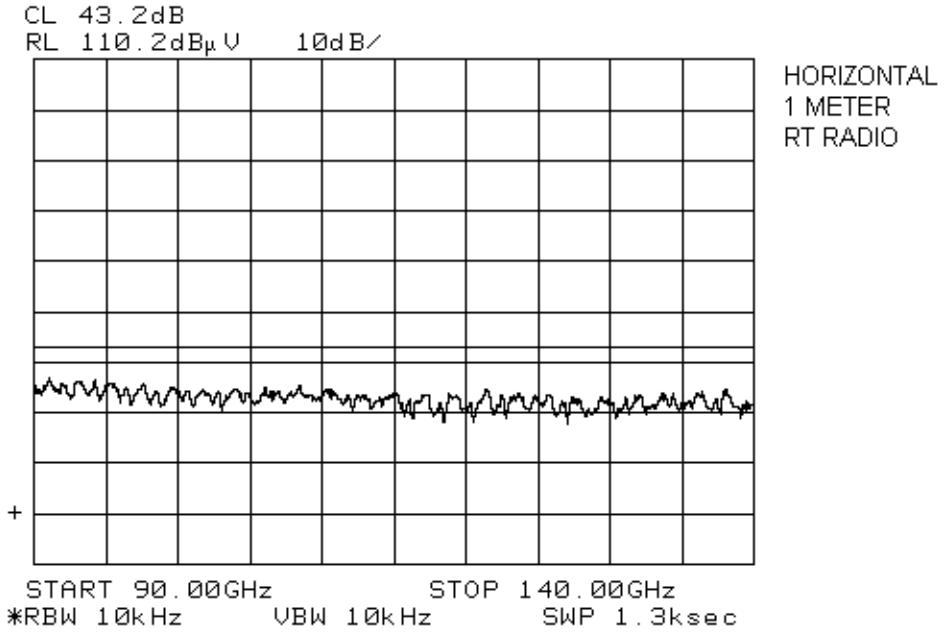
Limit = 91.8 dBµV

RBW Correction Factor = 4dB

Peak Emission = 45.0 dBµV

Af = 48.6

| Peak Emissions Level | | | | | |
|---|---|---|---|---|---|
| **Reading** | **Af** | **RBW Corr.** | **Result** | **Limit dBµV** | **Margin (dB)** |
| 45.0 | 48.6 | -4 | 89.6 | 91.8 | 2.2 |




**1 Meter Above 1GHz**

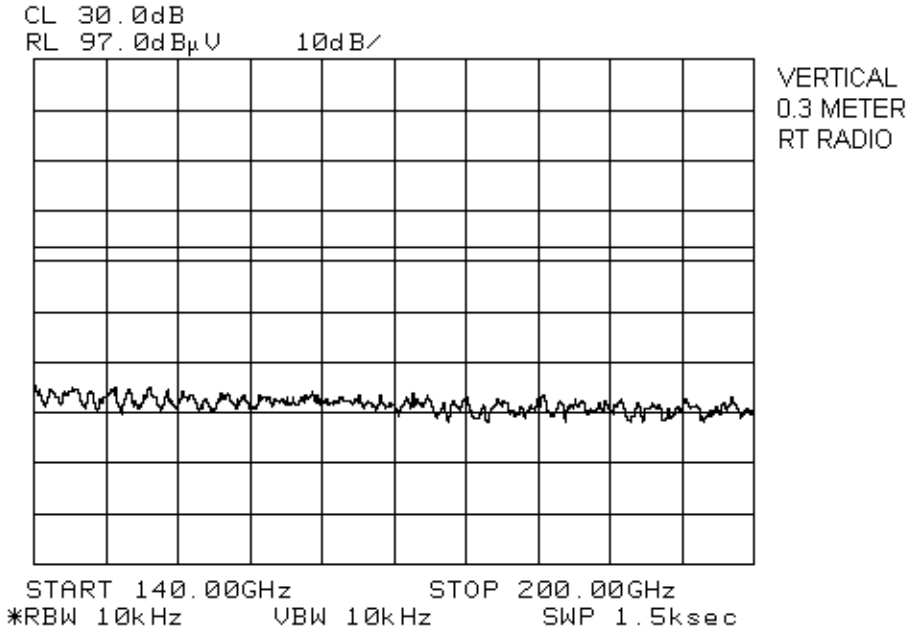
Limit = 91.8 dBµV

RBW Correction Factor = 4dB

Peak Emission = 45.0 dBµV

Af = 48.6

| Peak Emissions Level | | | | | |
|---|---|---|---|---|---|
| **Reading** | **Af** | **RBW Corr.** | **Result** | **Limit dBµV** | **Margin (dB)** |
| 45.0 | 48.6 | -4 | 89.2 | 91.8 | 2.2 |




**0.3 Meter Above 1GHz**

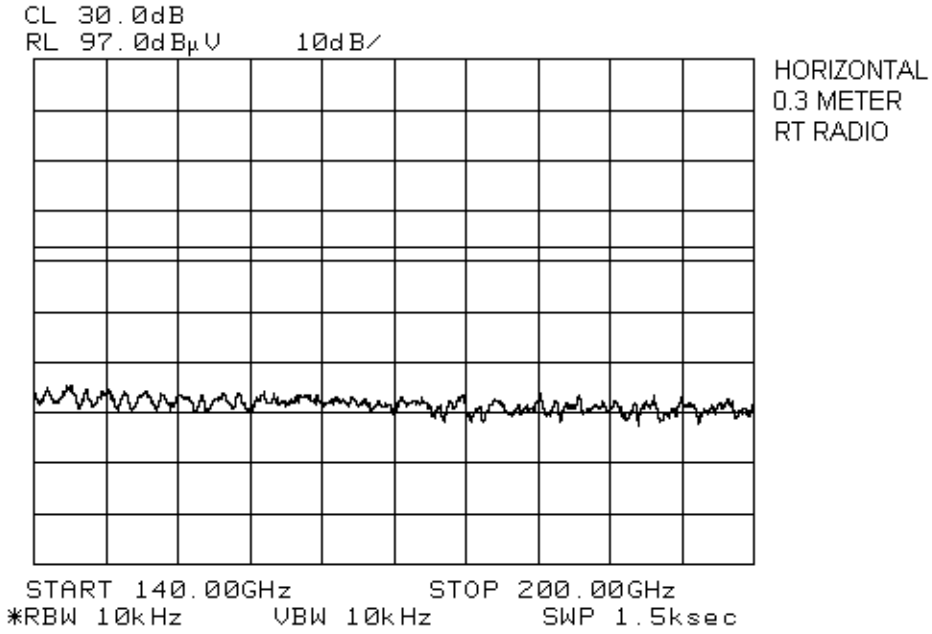
Limit = 102.3 dBµV

RBW Correction Factor = 4dB

Peak Emission = 30.0 dBµV

Af = 52.0

| Peak Emissions Level | | | | | |
|---|---|---|---|---|---|
| **Reading** | **Af** | **RBW Corr.** | **Result** | **Limit dBµV** | **Margin (dB)** |
| 30.0 | 52.0 | -4 | 78.0 | 102.3 | 24.3 |




**0.3 Meter Above 1GHz**

Limit = 102.3 dBµV

RBW Correction Factor = 4dB

Peak Emission = 30.0 dBµV

Af = 52.0

| Peak Emissions Level | | | | | |
|---|---|---|---|---|---|
| **Reading** | **Af** | **RBW Corr.** | **Result** | **Limit dBµV** | **Margin (dB)** |
| 30.0 | 52.0 | -4 | 78.0 | 102.3 | 24.3 |

## REFERENCES

**[1]** Alcatel internal document AQP0001, Regulatory Approvals Overview, D. Moncion. (Formally HQP0009)

**[2]** Alcatel internal document, GTN0039, EMC Test Report Template

**[3]** Alcatel Internal document, GQP 0001 Document Template.

**[4]** Alcatel Internal document, GTP 0004 Network Interface Compliance Test Plan Template.

**[5]** Alcatel Internal document, GTN 0379 Detailed list of Network Interface Conformance Standards.

**[7]** Alcatel Internal Document, GTN 0380 Network Approvals Test Report Template

**[8]** FCC, 47 CFR Part101 Fixed Microwave Services, edition 10-1-00

**[9]** FCC, 47 CFR Part 2 Frequency Allocation and Radio Treaty Matters: General Rules and Regulations, edition 10-1-99

**[10]** Industry Canada, RSS-191 Issue: 1 (Provisional Feb.5, 2000)

(Local Multipoint Communication Systems in 28GHz Band; Point to Point and Point to Multipoint Broadband Communication Systems in the 24 GHz and 38 GHz Bands)

**[11]** Telecordia GR -1089 Electromagnetic Compatibility and Electrical Safety Generic Criteria for Network Telecommunications Equipment.

## HISTORY

This document was created from the document template GQP0001, version 12.1.1.

| Version | Date | Person | Reason |
|---|---|---|---|
| Draft 1.0 | 2001.07.24 | Frank Li | Creation |
| Issued1.0 | 2001.09.24 | Frank Li | Modification |