Network Approvals Test Report

Author: Frank Li

Network Attachment Test Report

For 38GHz Cross-Pol Base Station

Including

90 - 7162 - 01	**38GHz Cross-Pol OTU (Telaxis Radio)**
90 –7163 – 01	**38GHz Cross-Pol ORU (Telaxis Radio)**
3CC11656 AAAA	**AMD Card G2**
3CC11815 AAAA	**Cross-Pol IBS Card**

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

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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 BASE 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 BASE 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 BASE 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 Base Station consists of DBS and RBS.

DBS is the indoor unit housing in a 19" shelf and contains the following main elements:

ANT cards: Provides ATM connection to ATM switch and functions like a control centre.

TNT cards: Provides TDM T1/E1 connection to switch.

AMD cards: ATM modem card.

IBS cards: Intermediate Frequency Tuner card. It connects to IF combiner/splitter complex, which is used to interface to the OTU and ORU.

CPL cards: Optical coupler card. Provides redundancy fiber connection for master and slave ANT.

RBS is the outdoor radio Unit. It is made of OTU and ORU. They are located on pole mounts such that each sector has dedicated transmitters and receivers. The OTU, ORU are mounted directly onto their respective sector antennas.

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

Telaxis Communication Corporation

20 Industrial Drive East

P.O. Box 109

South Deerfield Massachusetts 01373-0109, USA

2.2 EUT Configuration

The maximum configuration including 2 X ANT, 4 X TNT, 8 X AMD, 1 X CPL and 8 X IBS.

The number of AMD/IBS cards required depends on the number of users supported. Today's system configuration can handle up to 6 AMD/IBS with one OTU.

Model Number	Name and Description	S/N	EUT Software
3CC09908AAAA	DBS shelf	CU001907833	N/A
3CC09743ADAA	ANT card	CU002309748	V2_B2_07
3CC09744ACAA	T1 TNT card	CU001808767	V2_B2_07
3CC09915ABAA	CPL card	CU002301382	N/A
3CC11656AAAA	AMD card	CU005203040	V2_B2_07
3CC11656AAAA	AMD card	CU010701494	V2_B2_07
3CC11656AAAA	AMD card	CU010701469	V2_B2_07
3CC11656AAAA	AMD card	CU010701489	V2_B2_07
3CC11656AAAA	AMD card	CU010701492	V2_B2_07
3CC11656AAAA	AMD card	CU010701507	V2_B2_07
3CC11815AAAA	IBS card	CU010704480	N/A
3CC11815AAAA	IBS card	CU010704491	N/A
3CC11815AAAA	IBS card	CU010704485	N/A
3CC11815AAAA	IBS card	CU010704487	N/A
3CC11815AAAA	IBS card	CU011103600	N/A
3CC11815AAAA	IBS card	None	N/A
1AF01899AAAA	PSU	00000989	N/A
1AF01899AAAA	PSU	00000961	N/A
3CC10101AAAA	Fan Unit	CU002100780	N/A
PS6-A19 (9832)	Combiner / Splitter	None	N/A
PS6-A19(9832)	Combiner / Splitter	None	N/A
90-7163-01	38GHz ORU	A002007464	N/A
90-7162-01	38GHz OTU	B002216243	N/A
90-7162-01	38GHz OTU	C011098044	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	15

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

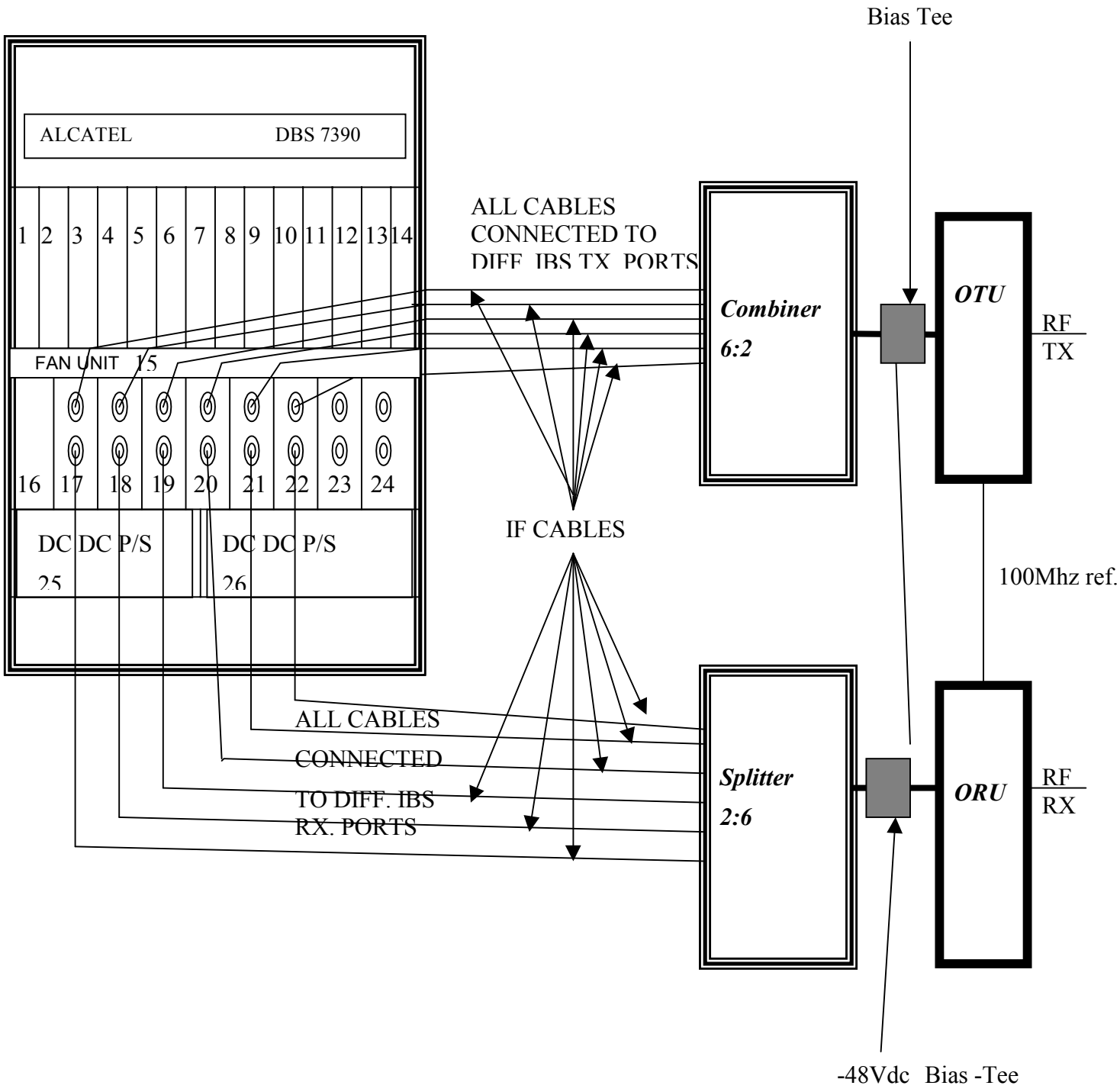


Figure 1 7390 LMDS Cross-Pol BS setup ---- General

2.6 EUT Data Path

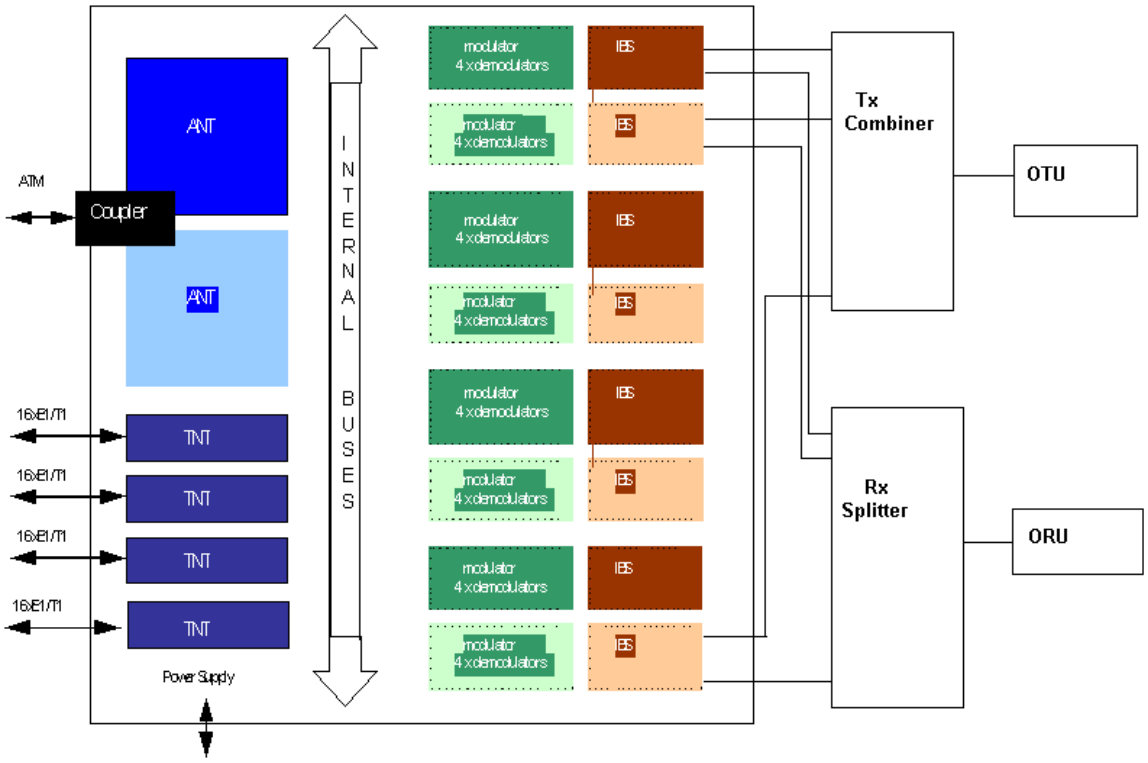


Figure 2 7390 LMDS BS Data Path

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: 22.6 dBm + 22 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.

The OTU can support maximum 6 carriers or less with 28 or 14 MHz carrier bandwidth. Due to the limitation of 50MHz of FCC's authorized bandwidth at 38GHz band, the test was performed with 1 X 28 MHz and 3 X 14 MHz configurations to achieve the maximum power within 50MHz authorized bandwidth.

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

Note: The maximum antenna gain is 22 dBi.

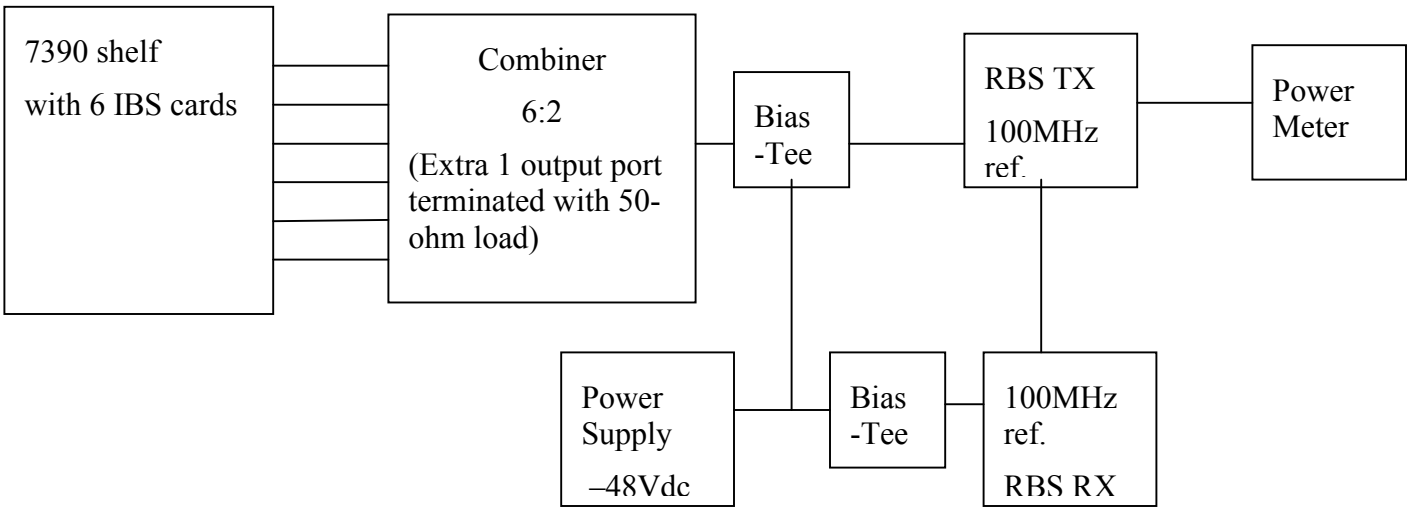


Figure – 3 RF Power Output Test Setup

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

(2) Enable RBS TX and add the appropriate attenuation at the antenna port to avoid damage to the power meter.

(3) Measure output power at the low and high end of the band of operation of the RBS TX. 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
	Alcatel Canada Inc
	600 March Road, Kanata, Ontario, K2K 2E6
Test Engineer	Frank Li
	Network / Wireless Approvals Specialist

4.1.3 Test Equipment

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

4.1.4 Test Data

Unit under Test	Frequency Band (MHz)	Maximum Power Level
RBS TX Telaxis BaseStation Transmitter	39300 to 40000	22.6dBm(-7.4 dBW) maximum (3 X 14 MHz carriers) 17.5 dBm (-12.5 dBW) maximum (1 X 28 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 6 IBS cards inserted in the 7390 shelf and the 6:2 combiner. Each carrier was adjusted at the RF output to approximately +17dBm, which gave a measured total power at the antenna port of + 22 dBm with 3 carriers.

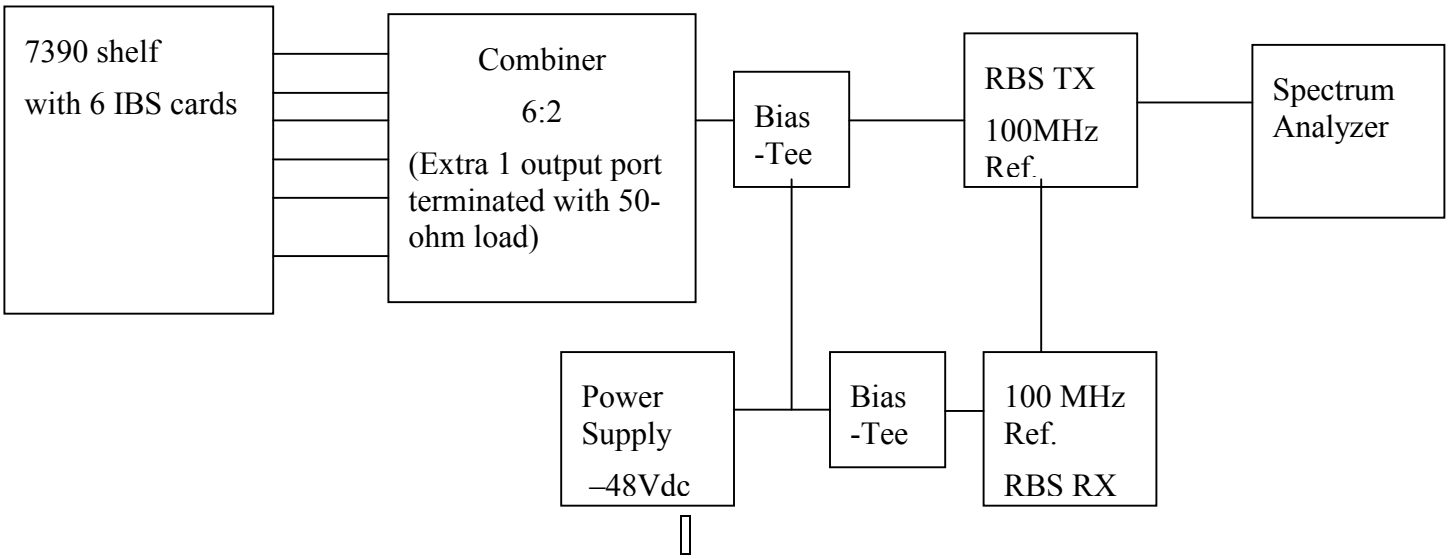


Figure – 4 Spectrum Mask measurement setup

(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	$\geq$ 300 kHz (video averaging of display is allowed)
Y scale	10 dB/Div

(1) Connect spectrum analyzer at the antenna port and record the spectrum shape. Perform measurements at the edge of the frequency block with all carriers grouped side by side 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.

(2) 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 Tool # 9169	Last: 2000/08/24 Due: 2001/08/24

4.2.4 Test Data

Transmission Frequency Range: 39,300 to 40,000 MHz.

The center frequency of 28 MHz carrier will be 14 MHz away from the edge of the authorized frequency block, which is 50 MHz at 38MHz band.

For 14 MHz carrier, the center frequency of carrier will be 7 MHz away from the edge of the authorized frequency block. And in the multicarriers configuration, carriers will be grouped one by one with 14MHz spacing between centre frequencies.

To demonstrate the system performance meets the technical standard requirement, by engineering judgement, test is performed with the maximum configuration (1 X 28 MHz, 1 X 14 MHz and 3 X 14 MHz) to provide the worst possible test result.

And test is performed separately at three different 50MHz authorized blocks, which locate at lower end, middle, and upper end of the designed band 39,300 to 40,000 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 RBS TX in normal operation.

The measurements were done with 3 X 14 MHz multicarriers configuration. Each carrier was adjusted at the RF output to approximately $\geq$ +17dBm, which gave a measured total power at the antenna port of +22dBm maximum.

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

Figure – 5 Conducted Spurious measurement setup

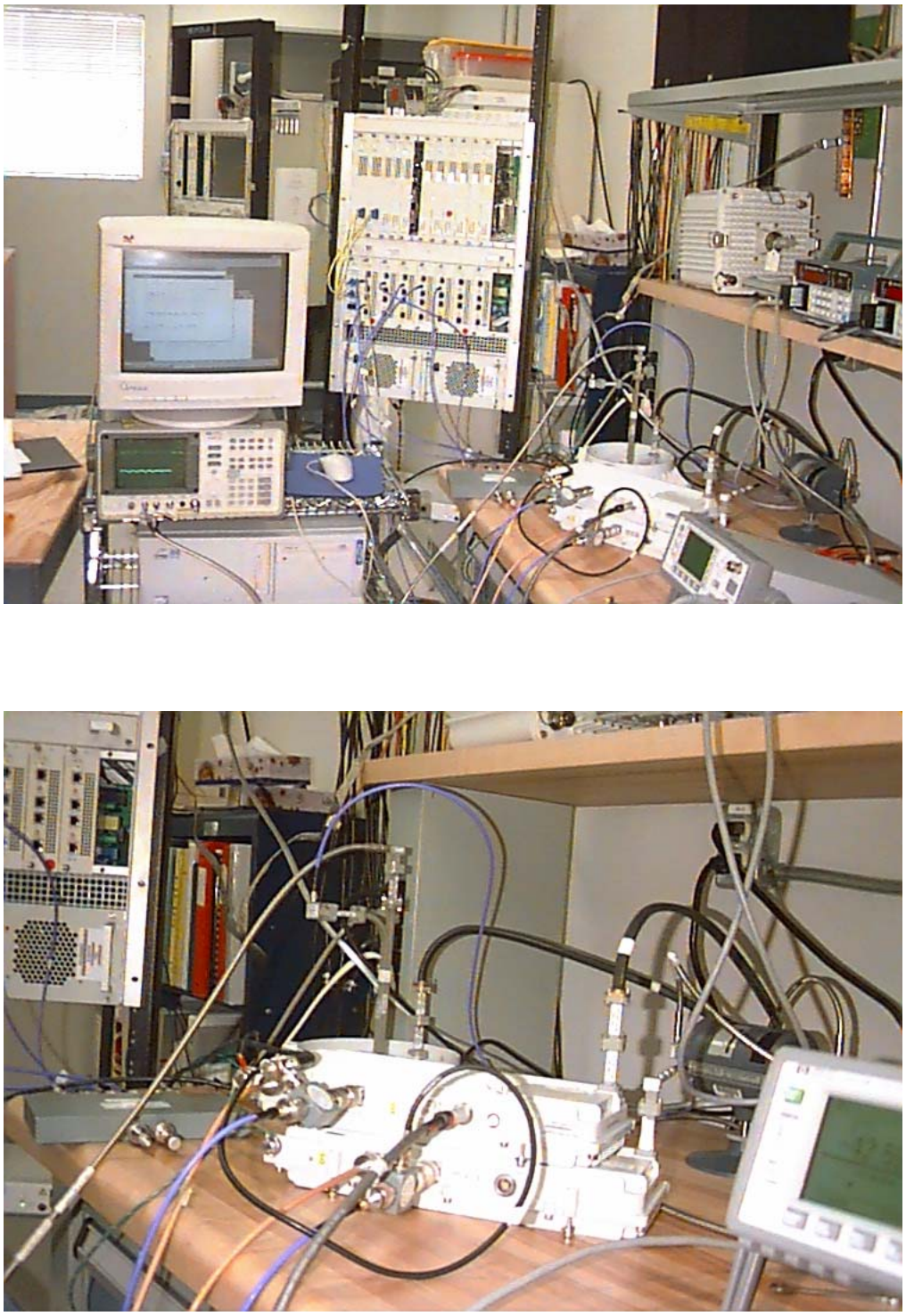


Figure – 6 Conducted Spurious Setup at Nemko Canada Inc. Laboratories

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**

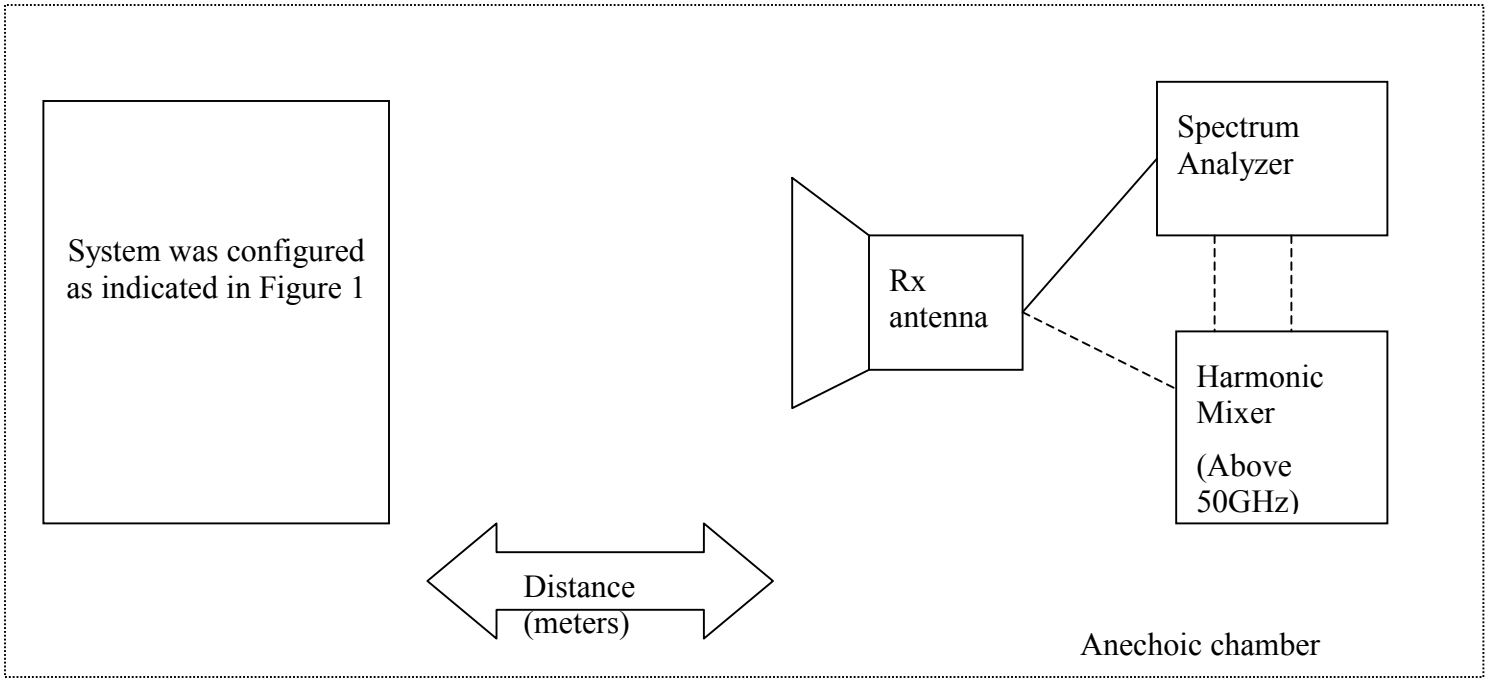
4.4.1 Test Procedure

The measurements were done with 3 X 14 MHz multicarriers configuration. Each carrier was adjusted at the RF output to approximately ≥+17dBm, which gave a measured total power at the antenna port of +22dBm maximum.

The reference level was measured with the vertical polarized 90-degree sector antenna that had a gain of 21dBi. Once the reference level was defined, the final measurements were taken with the RBS TX 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 in figure 1.



Radiated Spurious measurement setup

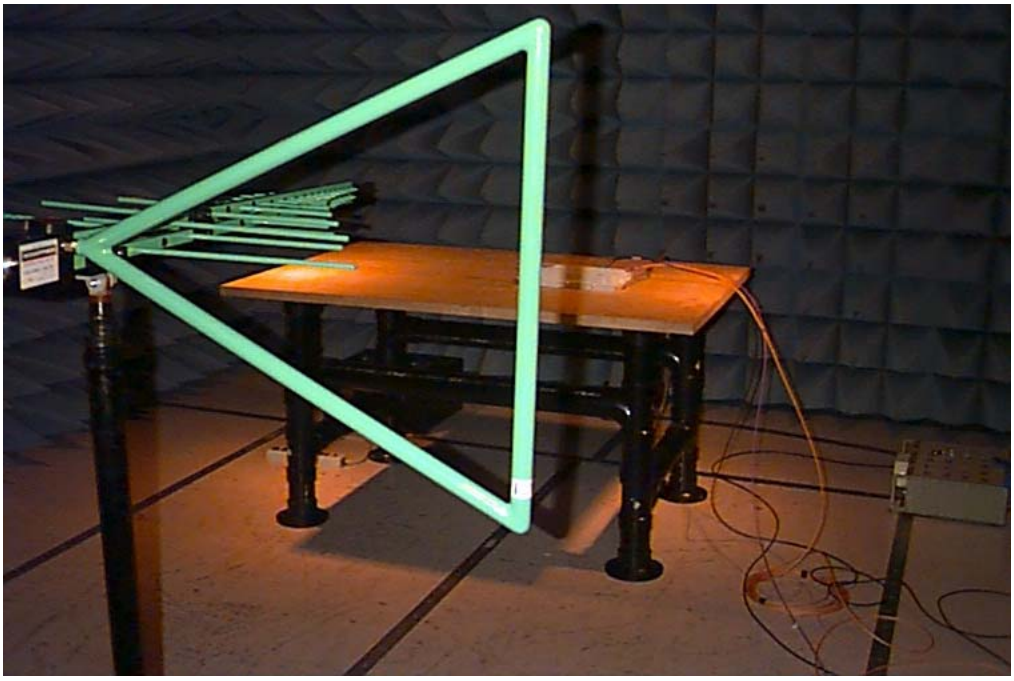


Figure – 7 Radiated Spurious Setup in a Semi- Anechoic Chamber at Nemko Canada Inc. Laboratories

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	CBL6112 B	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 across 30 MHz to 200 GHz and associated test result.

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 units. Only the RBS TX and RBS RX were placed in the temperature chamber during this specific test due to the 7390 shelf will be in a temperature-controlled environment, and can operate within a range of –10C to +55C.

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 -38Vdc to –56Vdc.

<u>Note:</u> The BS operates only on DC, therefore the DC supply was varied to show that the frequency is not affected by voltage fluctuation.

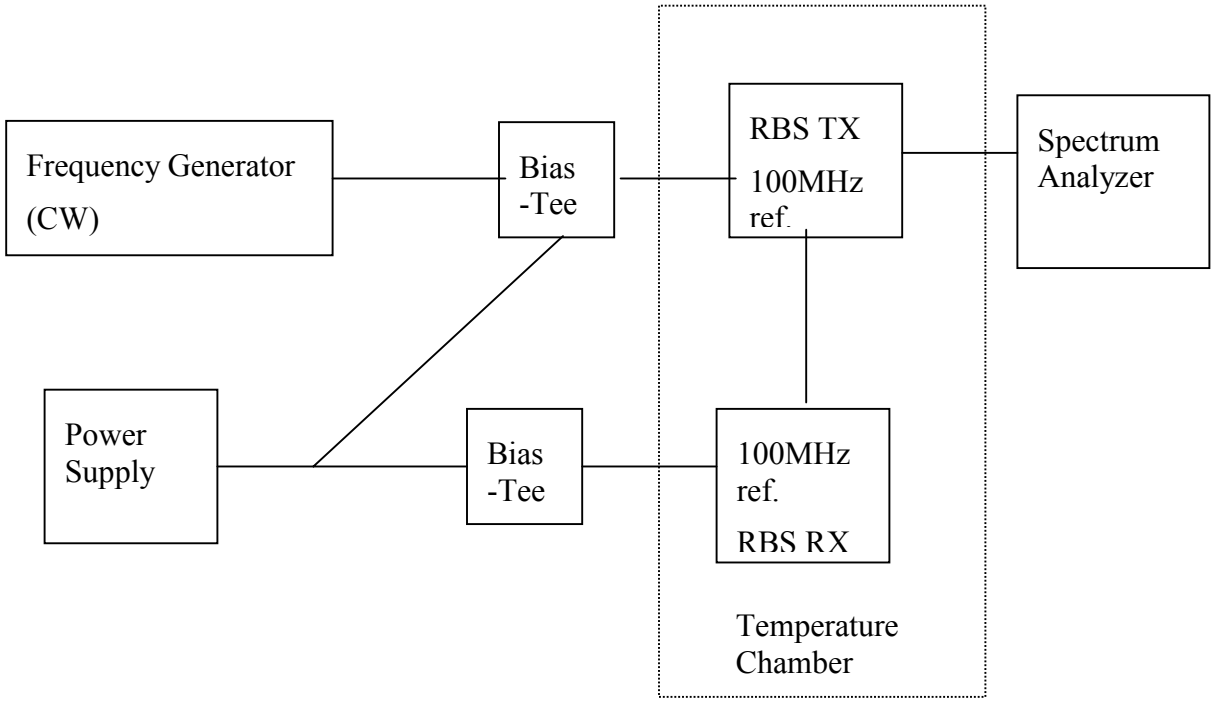


Figure – 8 Frequency Stability measurement setup

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 Tool # 9169	Last: 2000/08/24 Due: 2001/08/24
Frequency Generator	HP 83640B S/N # 3844A 00761	Last: 2001/01/19 Due: 2002/01/19
Temperature Chamber	Tool # 7263	Last: 2000/09/07 Due: 2002/03/07

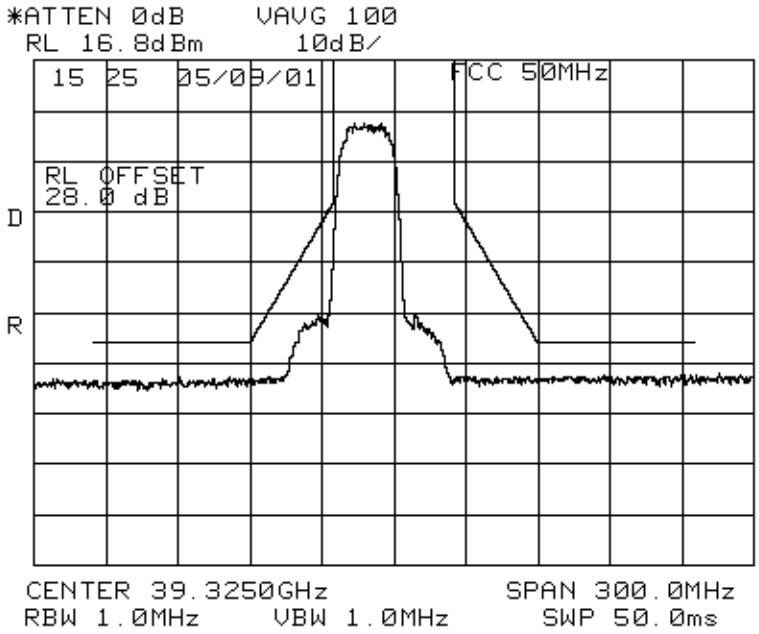
4.5.4 Test Data

Nominal DC Supply Voltage to Radio is –48Vdc			
Note: An external supply was used to vary the DC source from –38V to –56V.			
Temperature (^{o}C)	Frequency (kHz)	Measured Frequency (kHz)	Tolerance

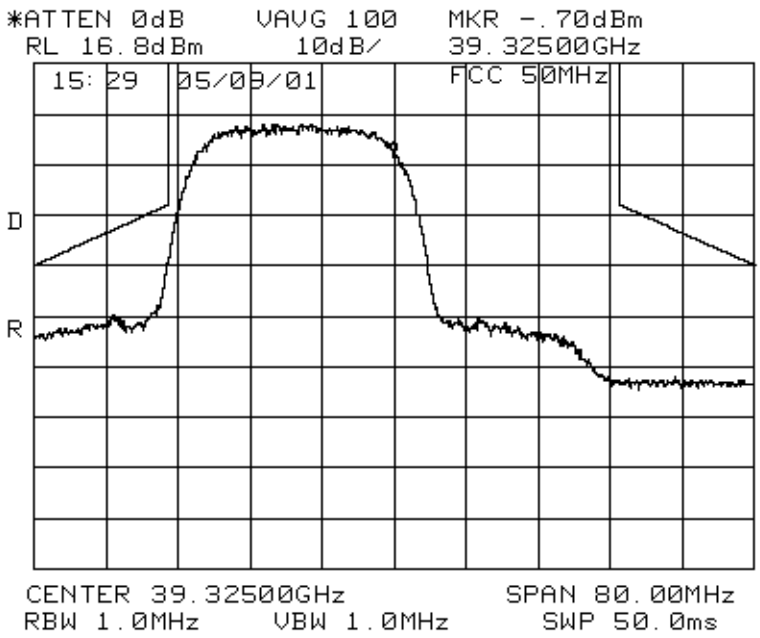
	Supply voltage			Limit (+/-10ppm)
	-48 VDC	-40.8 VDC	-55.2 VDC	
-30	39 650 025.7	39 650 025.5	39 650 025.7	<1ppm
-20	39 650 025.7	39 650 025.5	39 650 025.3	<1ppm
-10	39 650 025.5	39 650 025.3	39 650 025.5	<1ppm
0	39 650 025.2	39 650 025.2	39 650 025.2	<1ppm
10	39 650 016.7	39 650 016.7	39 650 016.7	<1ppm
20	39 650 022.0	39 650 022.0	39 650 022.0	<1ppm
30	39 650 020.6	39 650 020.6	39 650 020.6	<1ppm
40	39 650 019.2	39 650 019.2	39 650 019.2	<1ppm
50	39 650 018.2	38 650 018.5	39 650 018.2	<1ppm

APPENDIX A: TEST RESULT OF SPECTRAL MASK

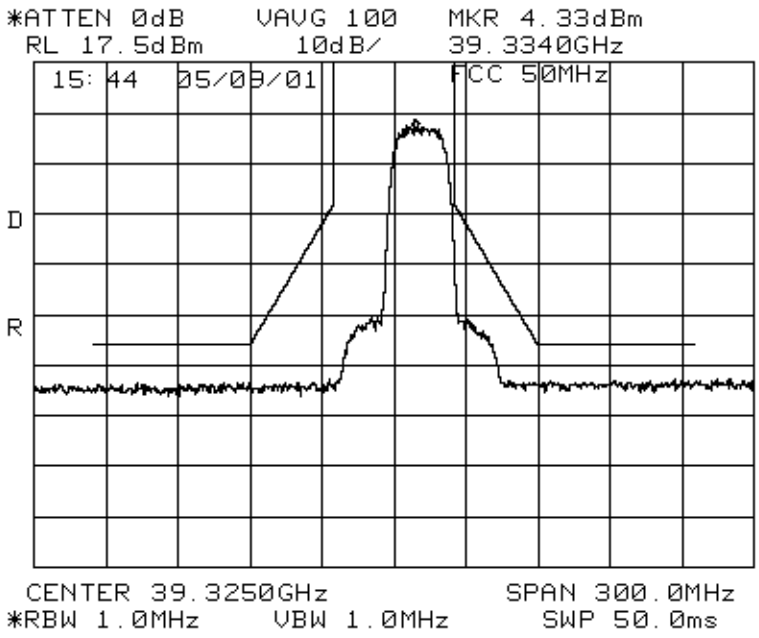
A – 1: Lower Block (39,300 ~ 39,350 MHz)



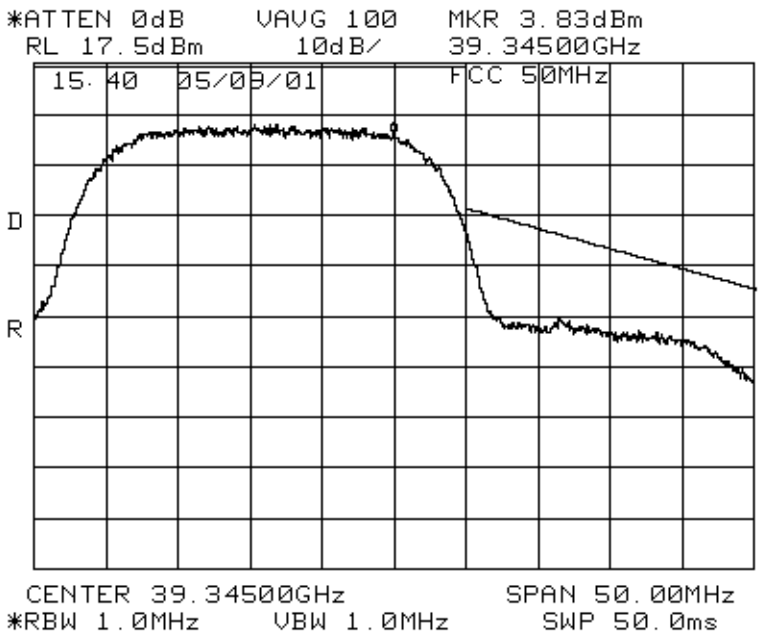
38 GHz RBS
1 X 28 MHz carrier
f= 39314 MHz
bottom of lower channel



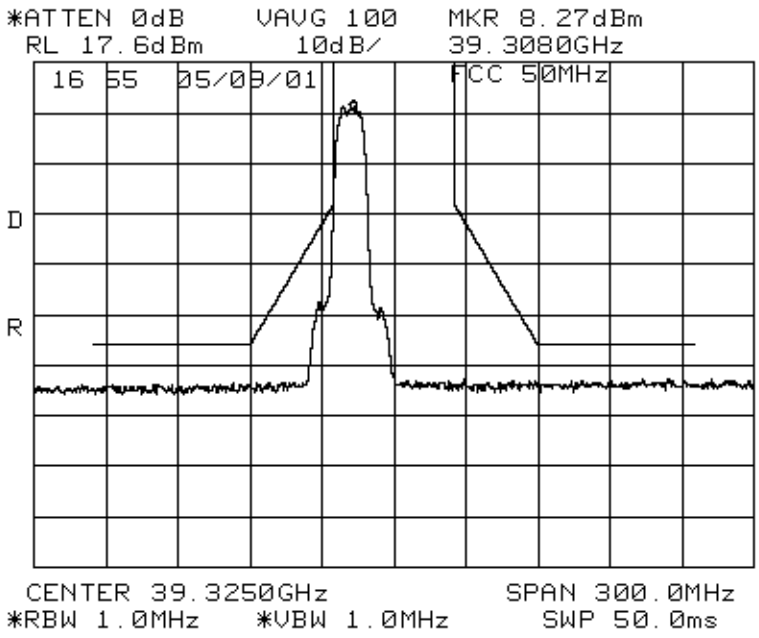
38 GHz RBS
1 X 28 MHz carrier
f = 39314 MHz
bottom of lower channel



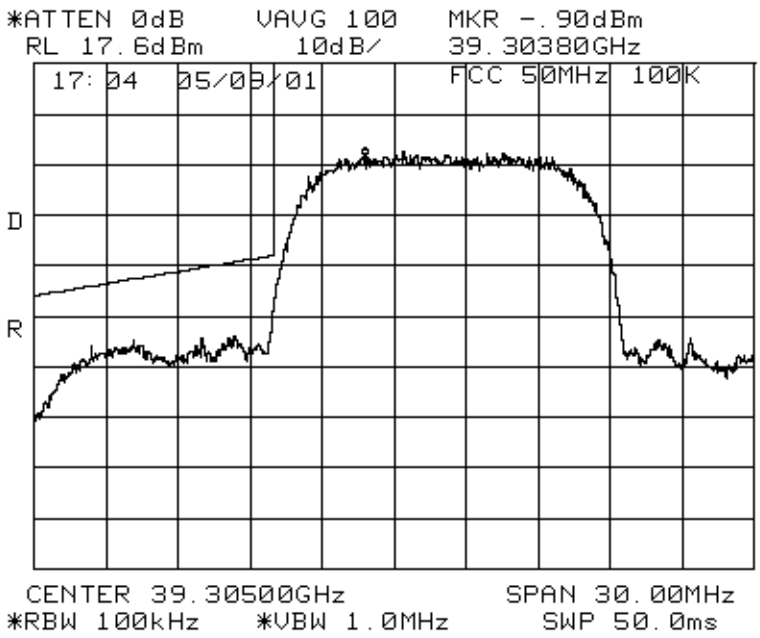
38 GHz RBS
1 X 28 MHz carrier
f = 39336 MHz
upper of lower channel



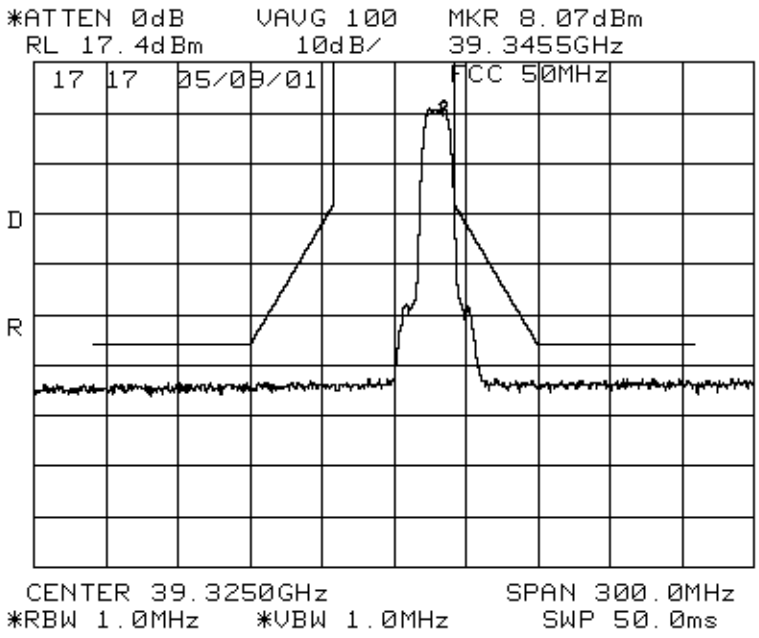
38 GHz RBS
1 X 28 MHz carrier
f = 39336 MHz
upper of lower channel



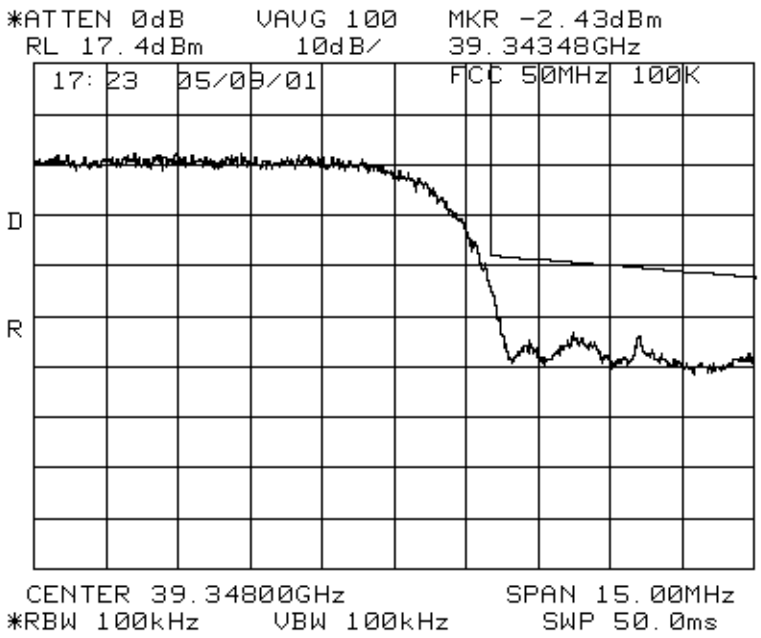
38 GHz RBS
1 X 14 MHz carrier
f = 39307 MHz
bottom of lower channel



38 GHz RBS
1 X 14 MHz carrier
f = 39307 MHz
bottom of lower channel
100kHz RBW

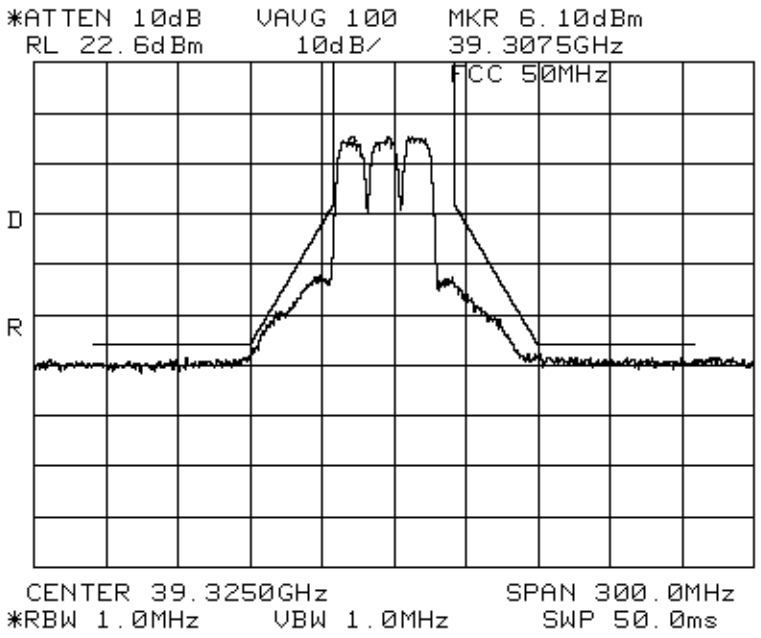


38 GHz RBS
1 X 14 MHz carrier
f = 39343 MHz
Upper of lower channel



38 GHz RBS
1 X 14 MHz carrier
f = 39343 MHz
upper of lower channel

with 100kHz RBW



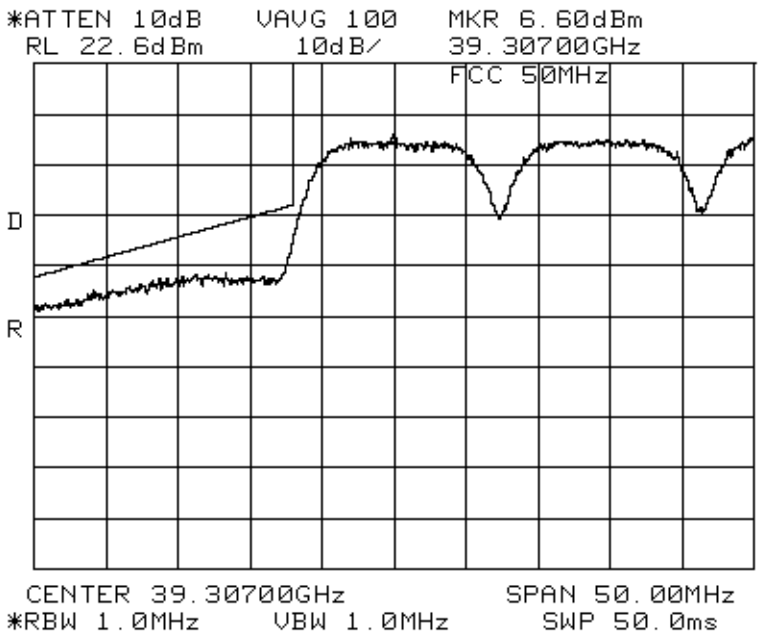
38 GHz RBS
3 X 14 MHz

for 50 MHz Channel

f1 = 39307 MHz
f2 = 39321 MHz
f3 = 39335 MHz

bottom of lower channel

Bocc = 12.1 X 3 = 36.3 MHz



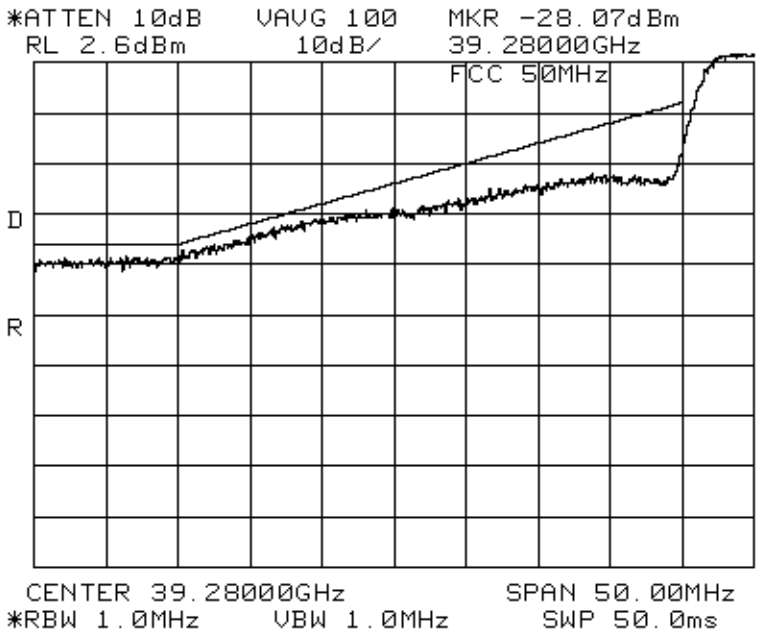
38 GHz RBS
3 X 14 MHz

for 50 MHz Channel

f1 = 39307 MHz
f2 = 39321 MHz
f3 = 39335 MHz

bottom of lower channel

Bocc = 12.1 X 3 = 36.3 MHz



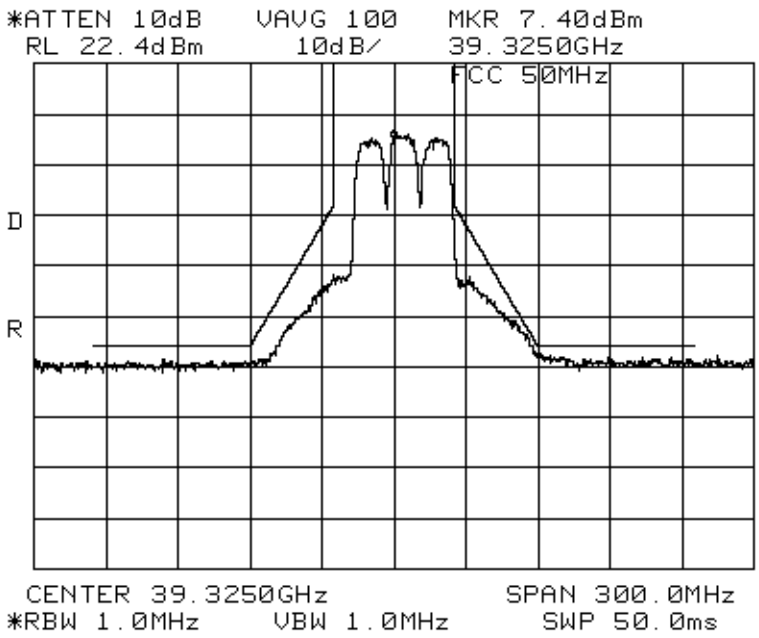
38 GHz RBS
3 X 14 MHz

for 50 MHz Channel

f1 = 39307 MHz
f2 = 39321 MHz
f3 = 39335 MHz

bottom of lower channel

Bocc = 12.1 X 3 = 36.3 MHz



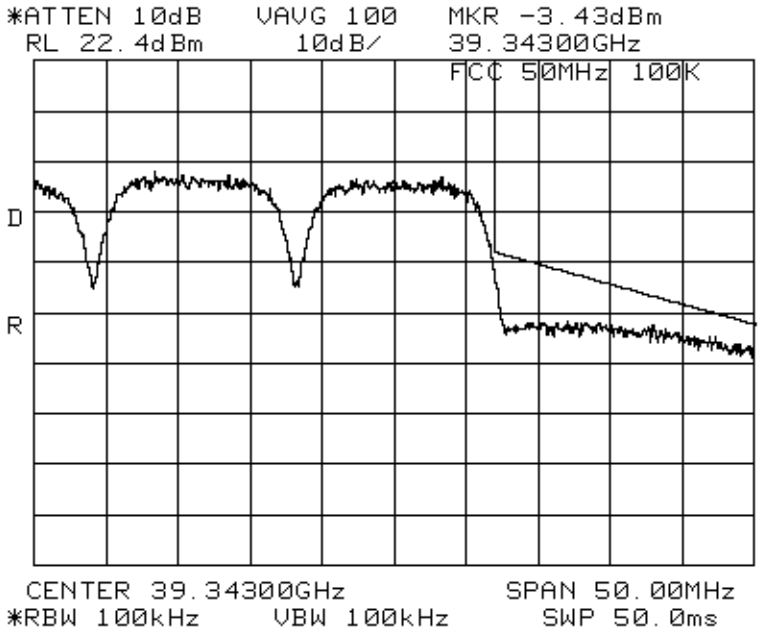
38 GHz RBS
3 X 14 MHz

for 50 MHz Channel

f1 = 39315 MHz
f2 = 39329 MHz
f3 = 39343 MHz

upper of lower channel

Bocc = 12.1 X 3 = 36.3 MHz



38 GHz RBS
3 X 14 MHz

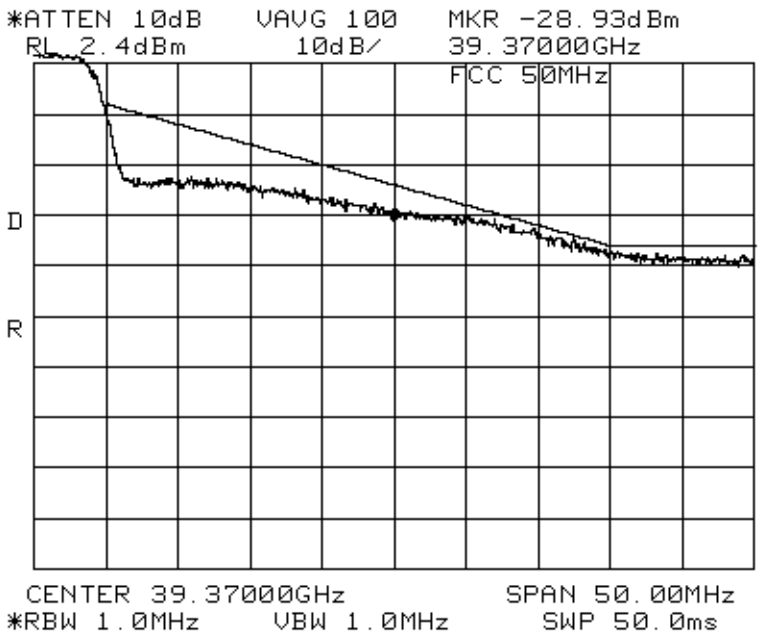
for 50 MHz Channel

f1 = 39315 MHz
f2 = 39329 MHz
f3 = 39343 MHz

upper of lower channel

Bocc = 12.1 X 3 = 36.3 MHz

with 100 kHz RBW



38 GHz RBS
3 X 14 MHz

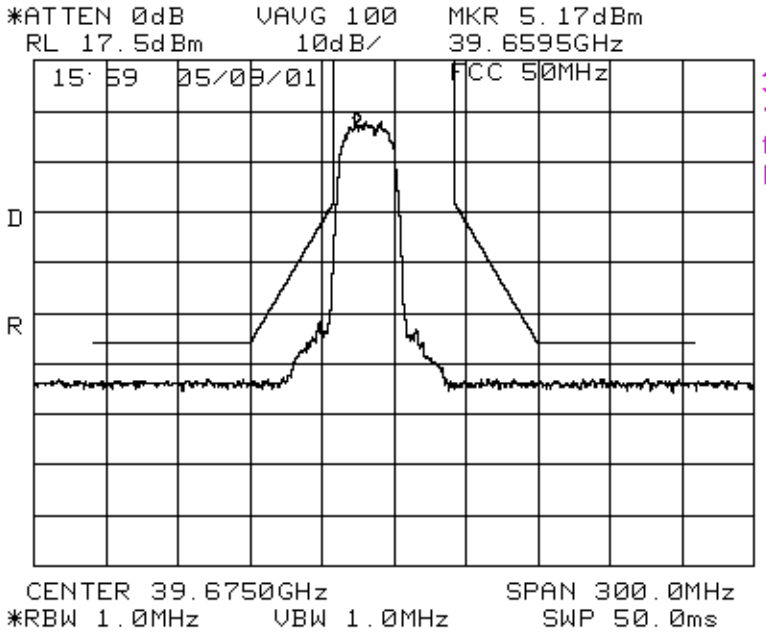
for 50 MHz Channel

f1 = 39315 MHz
f2 = 39329 MHz
f3 = 39343 MHz

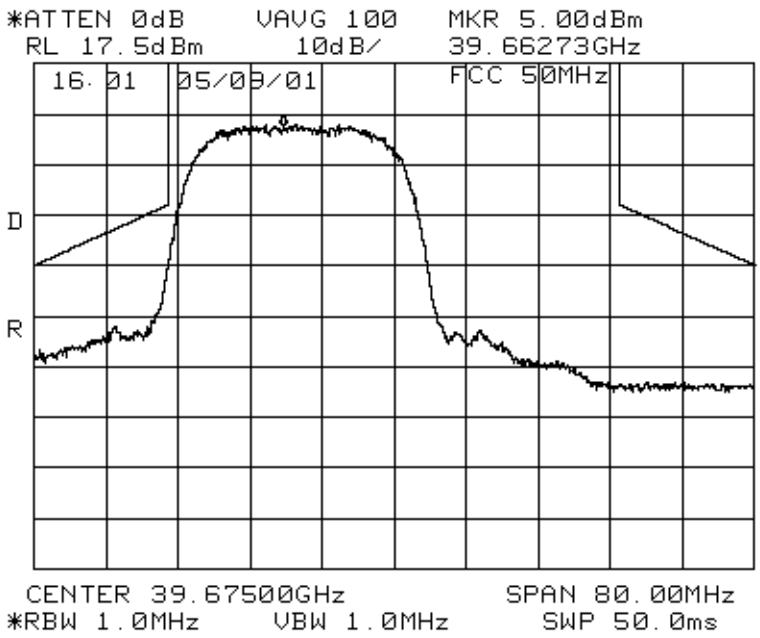
upper of lower channel

Bocc = 12.1 X 3 = 36.3 MHz

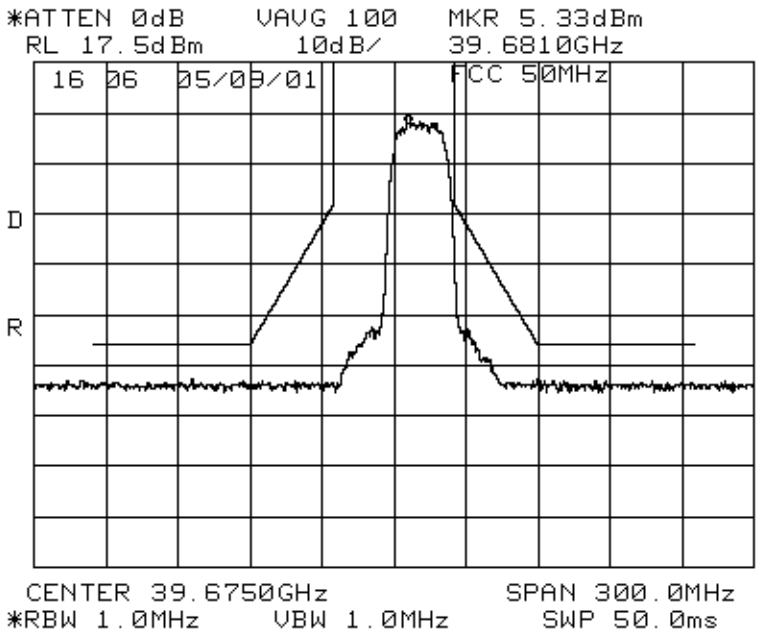
A – 2: Middle Block (39,650 ~ 39,700 MHz)



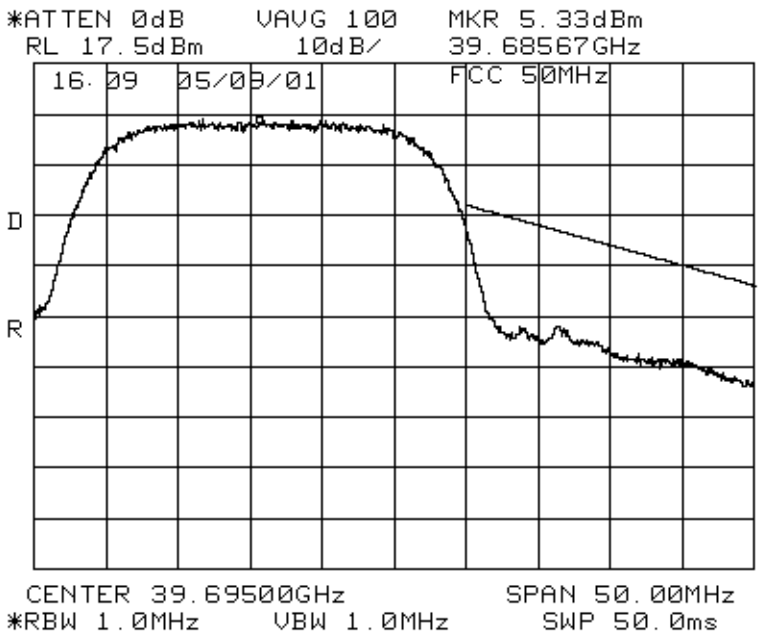
38 GHz RBS
1 X 28 MHz carrier
f = 39664 MHz
bottom of middle channel



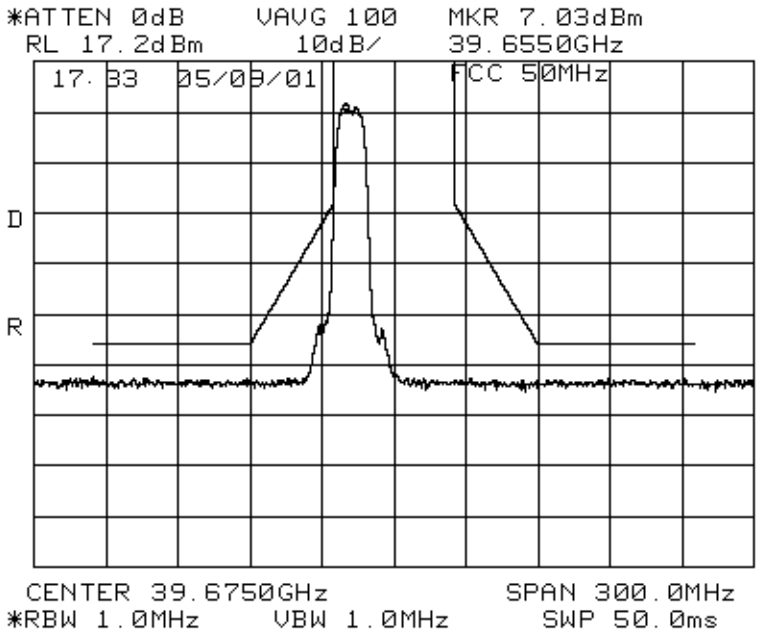
38 GHz RBS
1 X 28 MHz carrier
f = 39664 MHz
bottom of middle channel



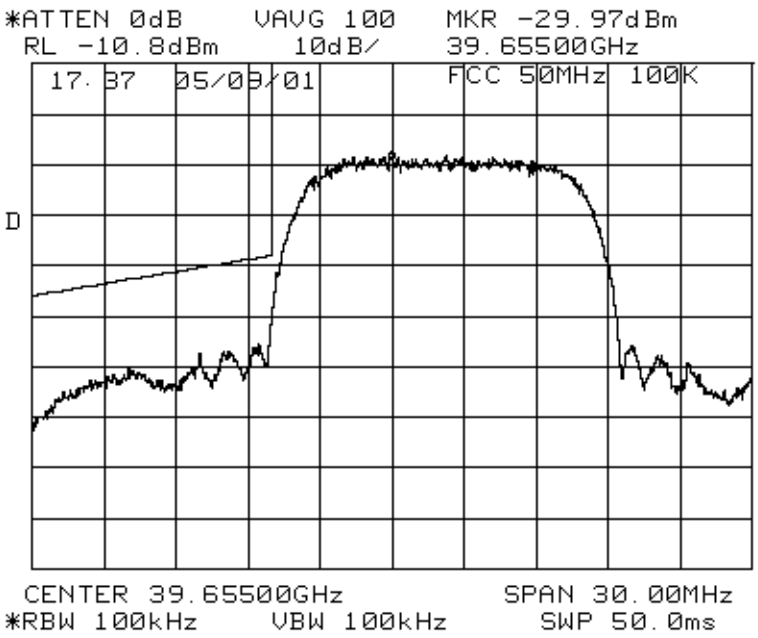
38 GHz RBS
1 X 28 MHz carrier
f = 39686 MHz
uppper of middle channel



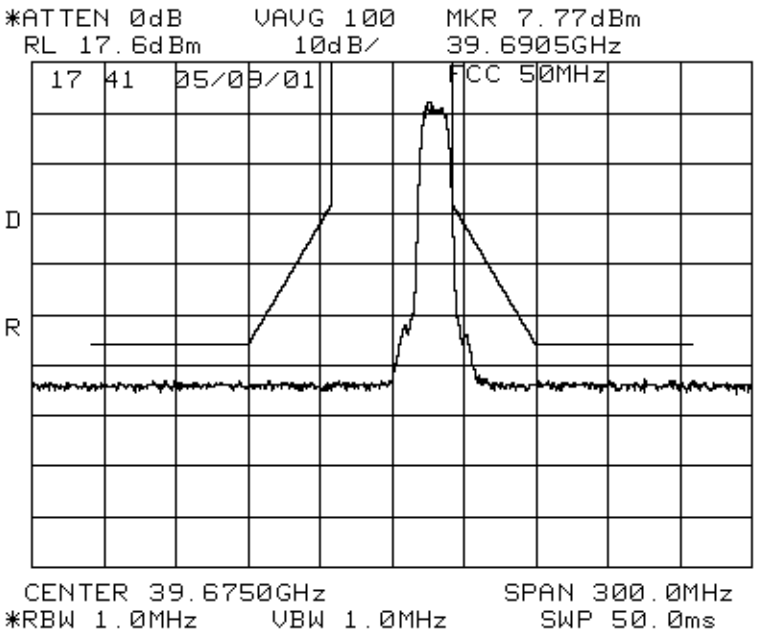
38 GHz RBS
1 X 28 MHz carrier
f = 39686 MHz
upper of middle channel



38 GHz RBS
1 X 14 MHz carrier
f = 39657 MHz
bottom of middle band

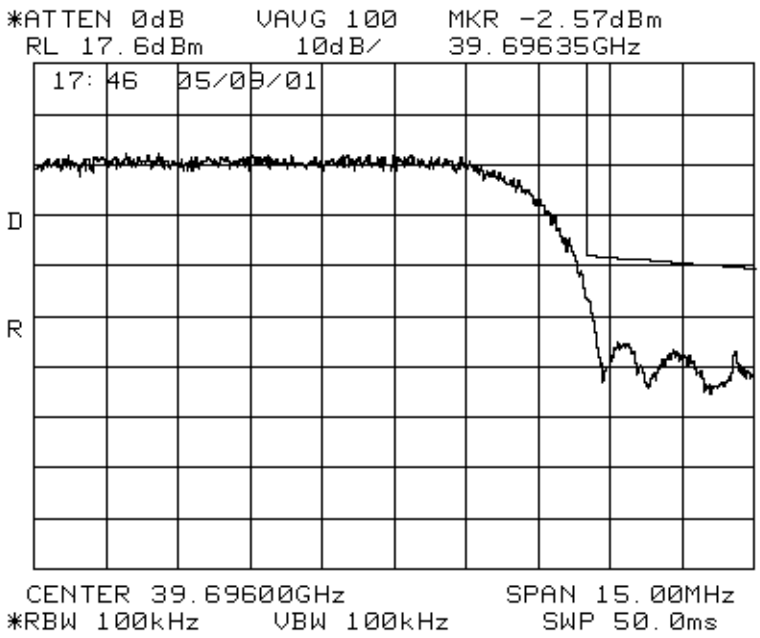


38 GHz RBS
1 X 14 MHz carrier
f = 39657 MHz
bottom of middle band
with 100kHz RBW



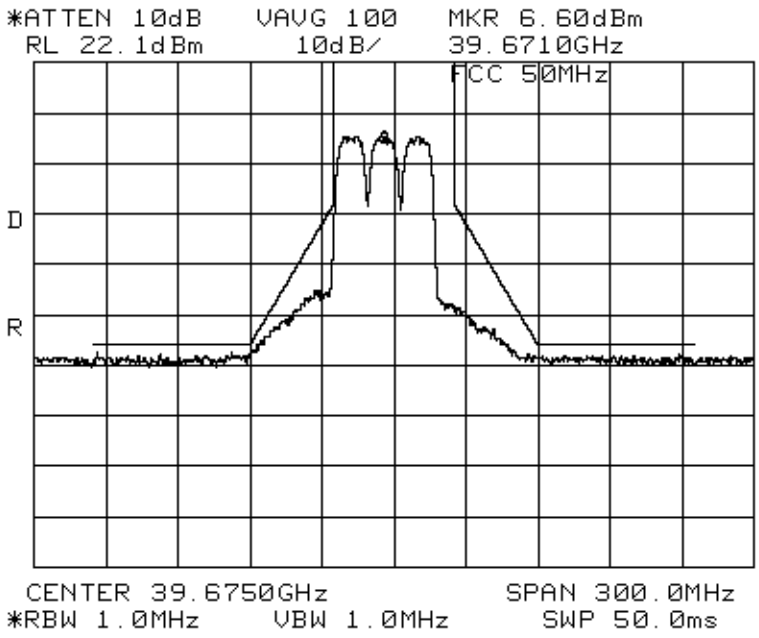
38 GHz RBS
1 X 14 MHz carrier
f = 39693 MHz

upper of middle channel



38 GHz RBS
1 X 14 MHz carrier
f = 39693 MHz

upper of middle channel
with 100kHz RBW



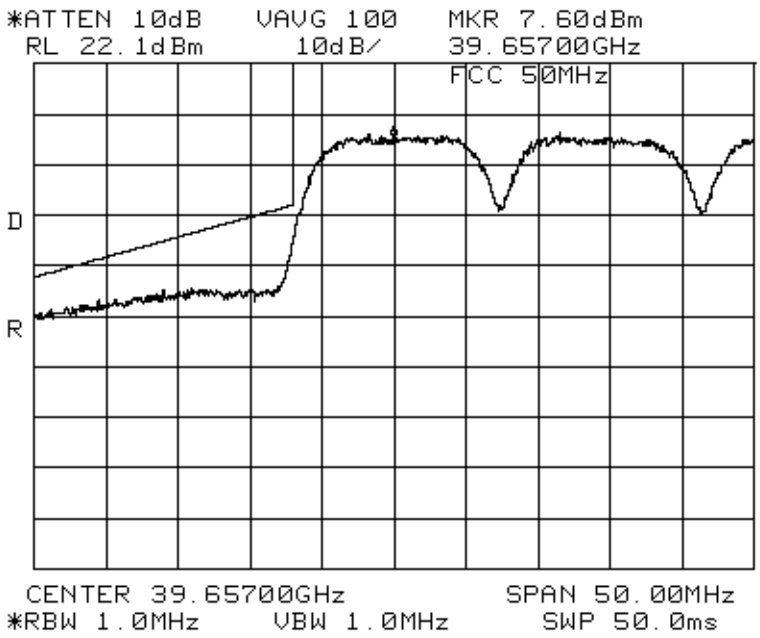
38 GHz RBS
3 X 14 MHz

for 50 MHz Channel

f1 = 39657 MHz
f2 = 39671 MHz
f3 = 39685 MHz

bottom of middle channel

Bocc = 12.1 X 3 = 36.3 MHz



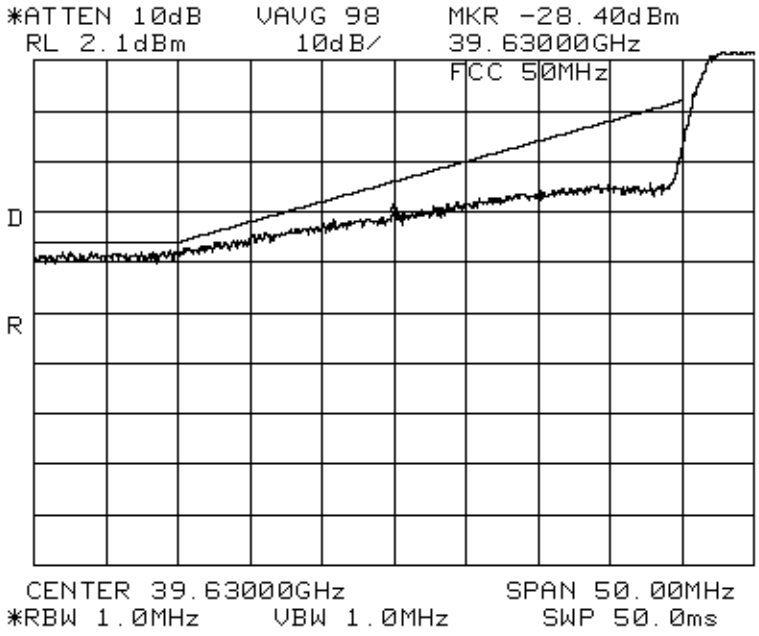
38 GHz RBS
3 X 14 MHz

for 50 MHz Channel

f1 = 39657 MHz
f2 = 39671 MHz
f3 = 39685 MHz

bottom of middle channel

Bocc = 12.1 X 3 = 36.3 MHz



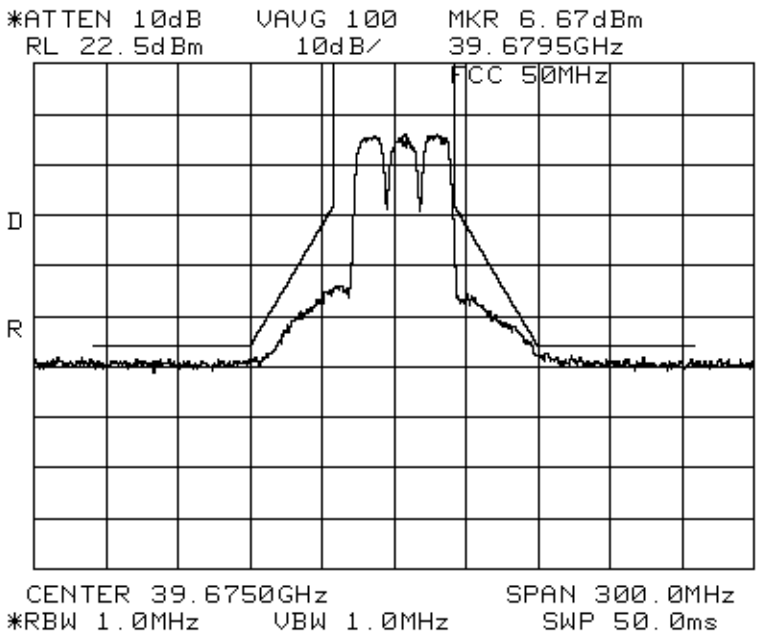
38 GHz RBS
3 X 14 MHz

for 50 MHz Channel

f1 = 39657 MHz
f2 = 39671 MHz
f3 = 39685 MHz

bottom of middle channel

Bocc = 12.1 X 3 = 36.3 MHz



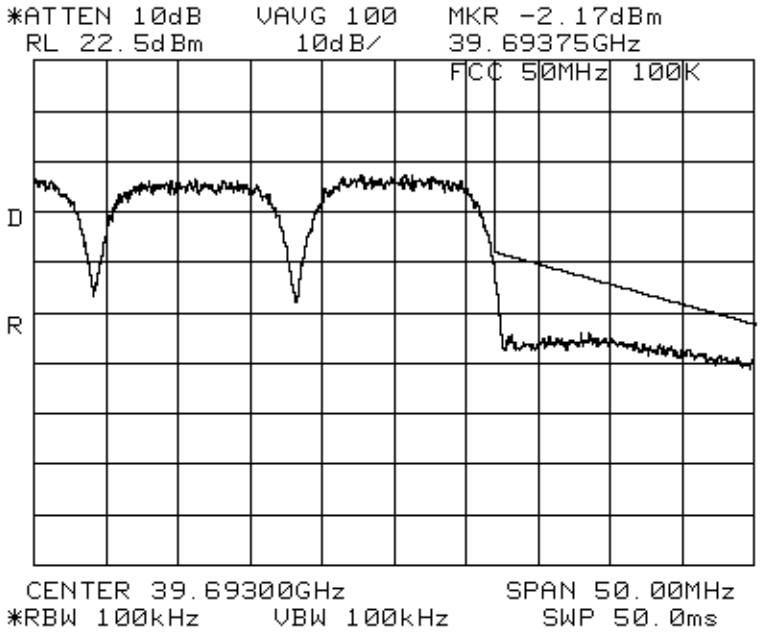
38 GHz RBS
3 X 14 MHz

for 50 MHz Channel

f1 = 39665 MHz
f2 = 39679 MHz
f3 = 39693MHz

upper of middle channel

Bocc = 12.1 X 3 = 36.3 MHz



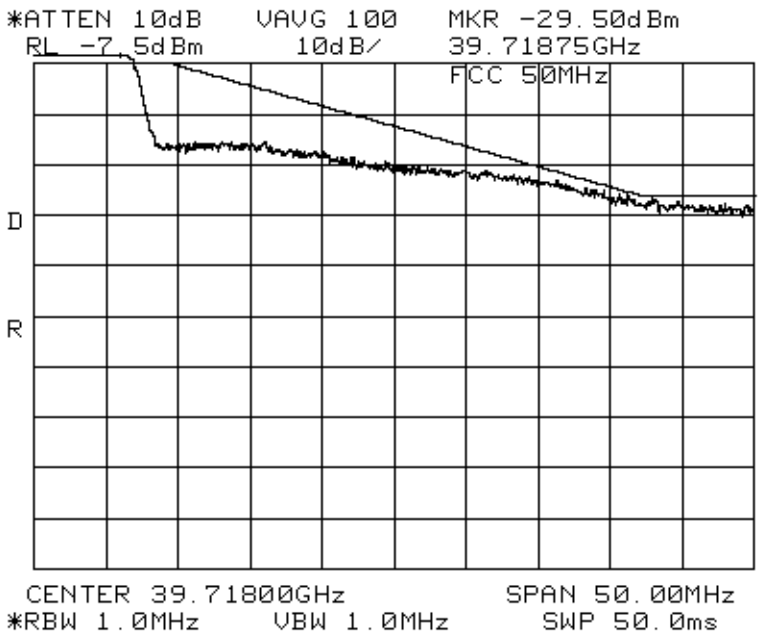
38 GHz RBS
3 X 14 MHz

for 50 MHz Channel

f1 = 39665 MHz
f2 = 39679 MHz
f3 = 39693MHz

upper of middle channel

Bocc = 12.1 X 3 = 36.3 MHz



38 GHz RBS
3 X 14 MHz

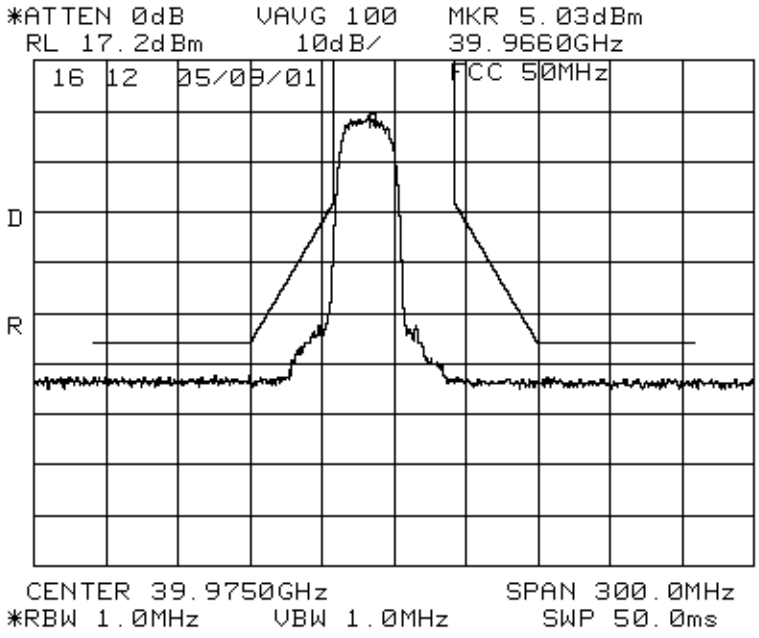
for 50 MHz Channel

f1 = 39665 MHz
f2 = 39679 MHz
f3 = 39693MHz

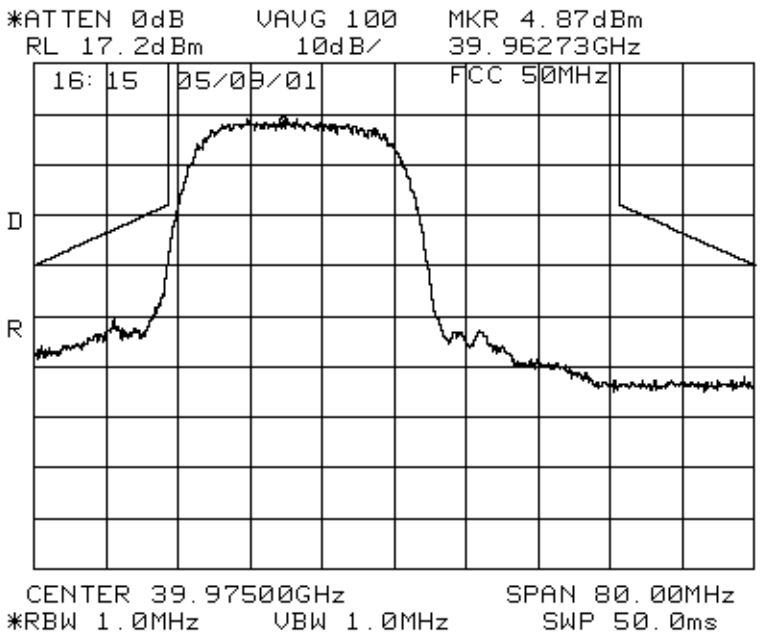
upper of middle channel

Bocc = 12.1 X 3 = 36.3 MHz

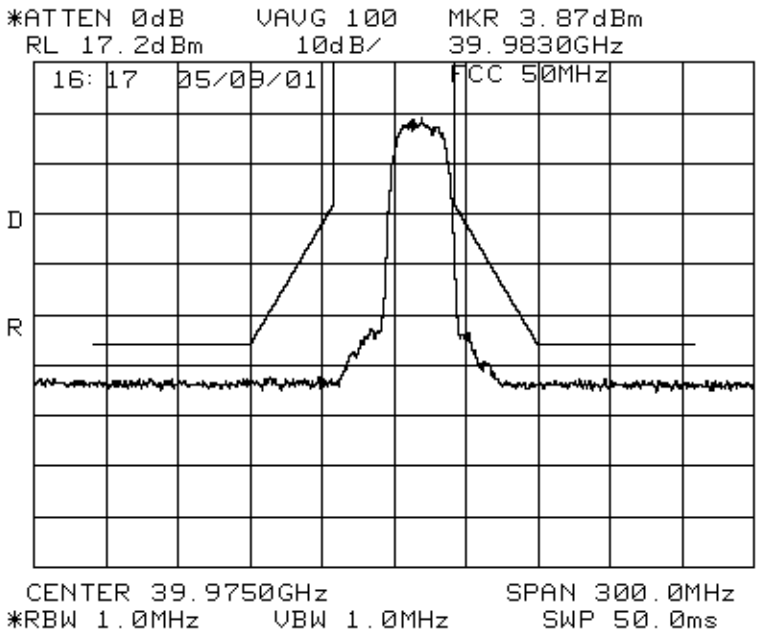
A – 3: Higher Block (39,950 ~ 40,000 MHz)



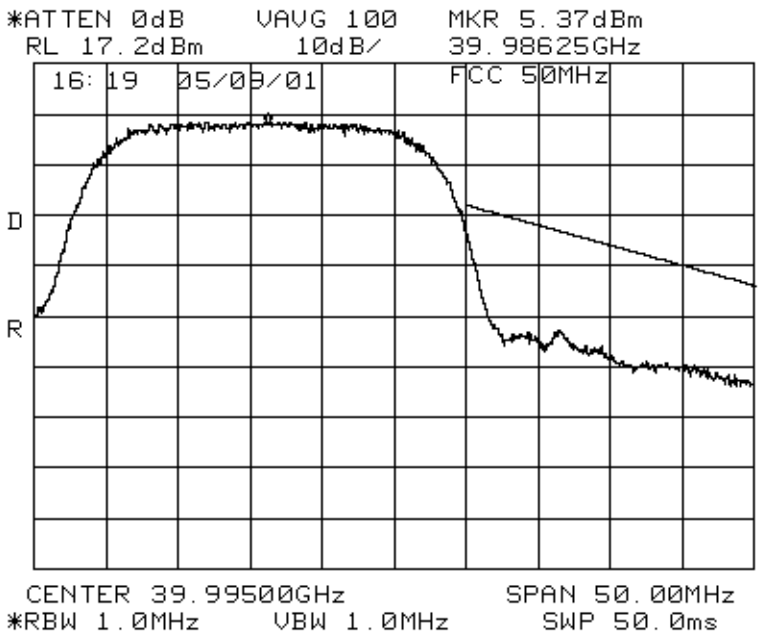
38 GHz RBS
1 X 28 MHz carrier
f = 39964 MHz
bottom of higher channel



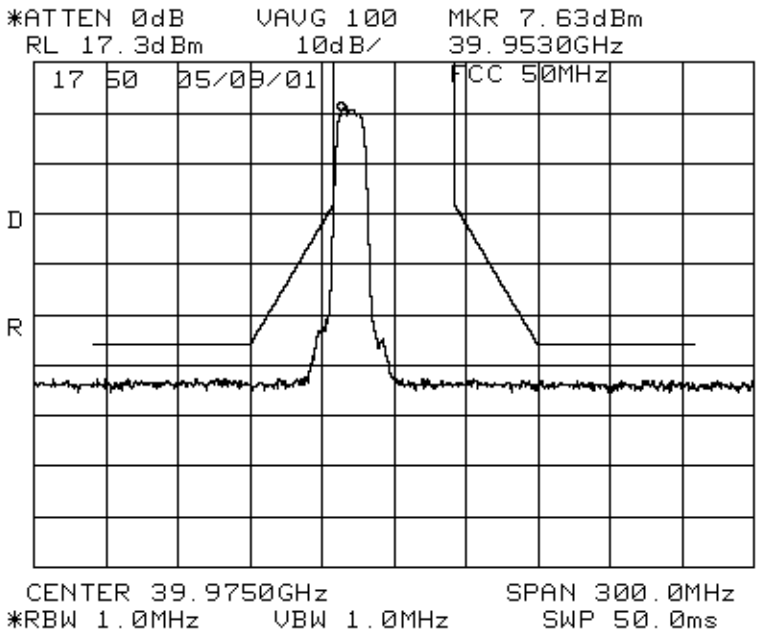
38 GHz RBS
1 X 28 MHz carrier
f = 39964 MHz
bottom of higher channel



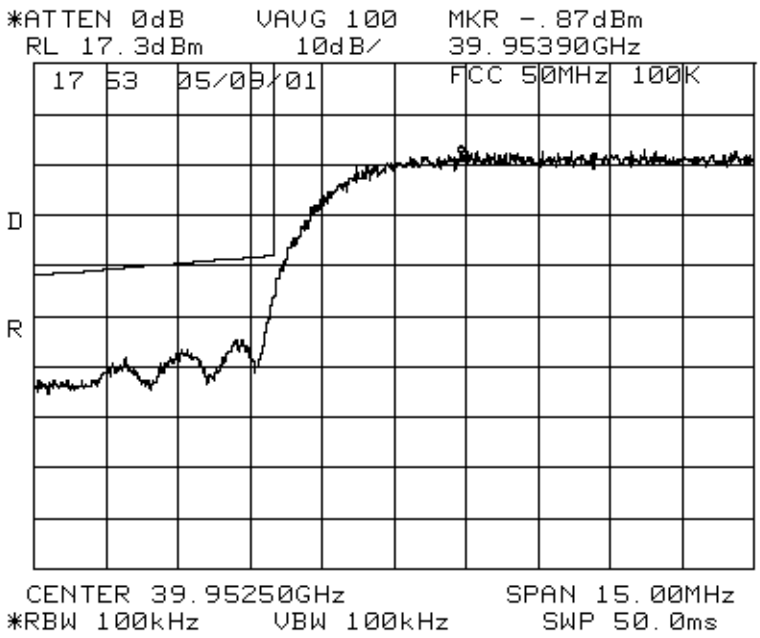
38 GHz RBS
1 X 28 MHz carrier
f = 39986 MHz
upper of higher channel



38 GHz RBS
1 X 28 MHz carrier
f = 39986 MHz
upper of higher channel

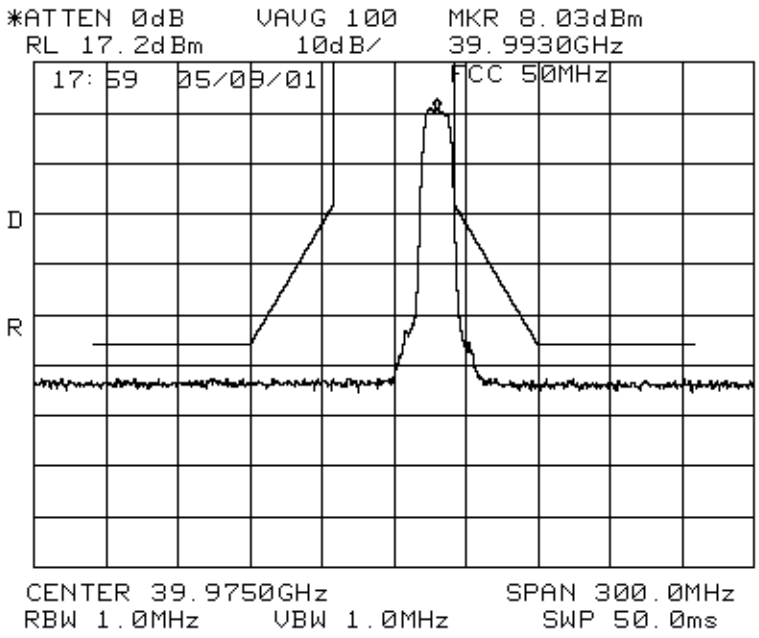


38 GHz RBS
1 X 14 MHz carrier
f = 39957 MHz
bottom of higher channel

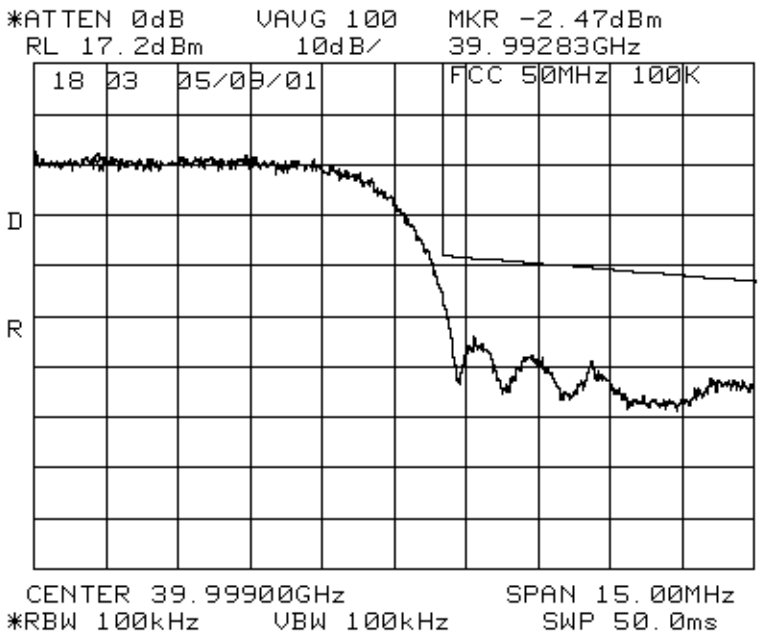


38 GHz RBS
1 X 14 MHz carrier
f = 39957 MHz
bottom of higher channel

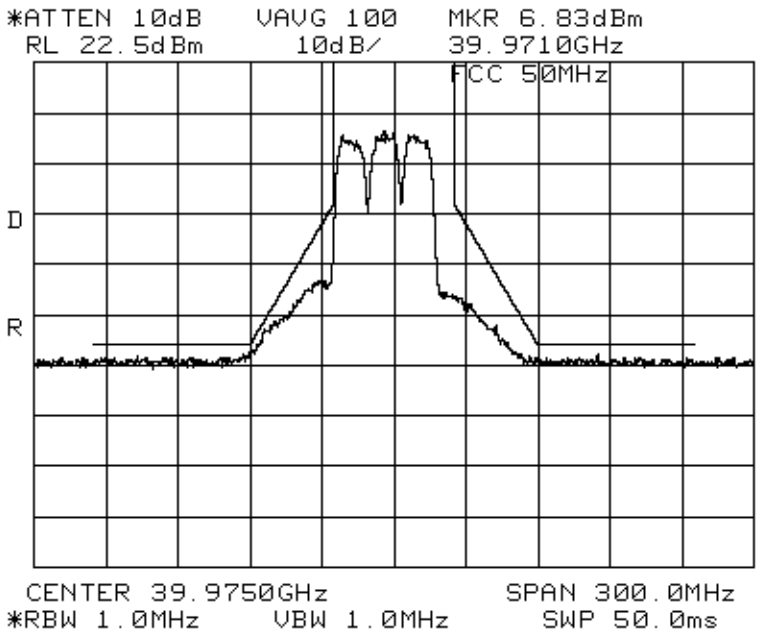
with 100 kHz RBW



38 GHz RBS
1 X 14 MHz carrier
f = 39993 MHz
upper of higher channel



38 GHz RBS
1 X 14 MHz carrier
f = 39993 MHz
upper of higher channel
with 100kHz RBW



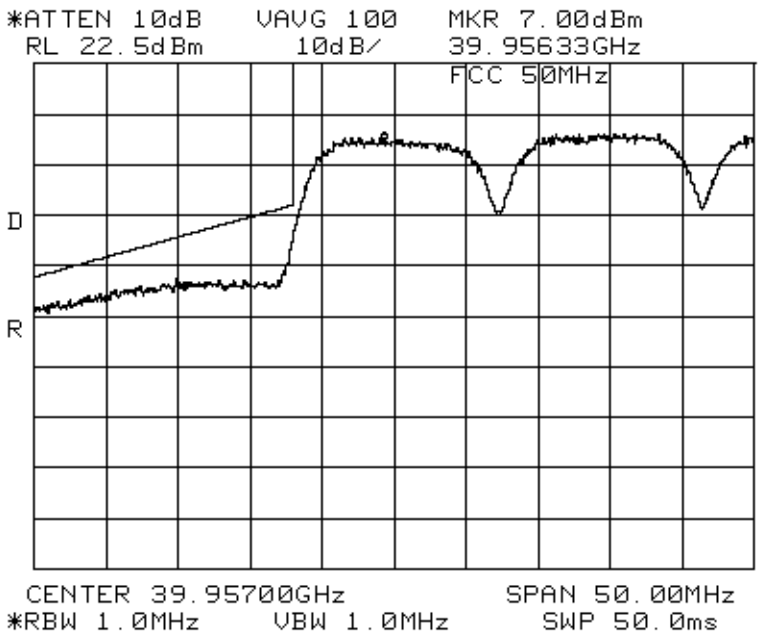
38 GHz RBS
3 X 14 MHz

for 50 MHz Channel

f1 = 39957 MHz
f2 = 39971 MHz
f3 = 39985 MHz

bottom of higher channel

Bocc = 12.1 X 3 = 36.3 MHz



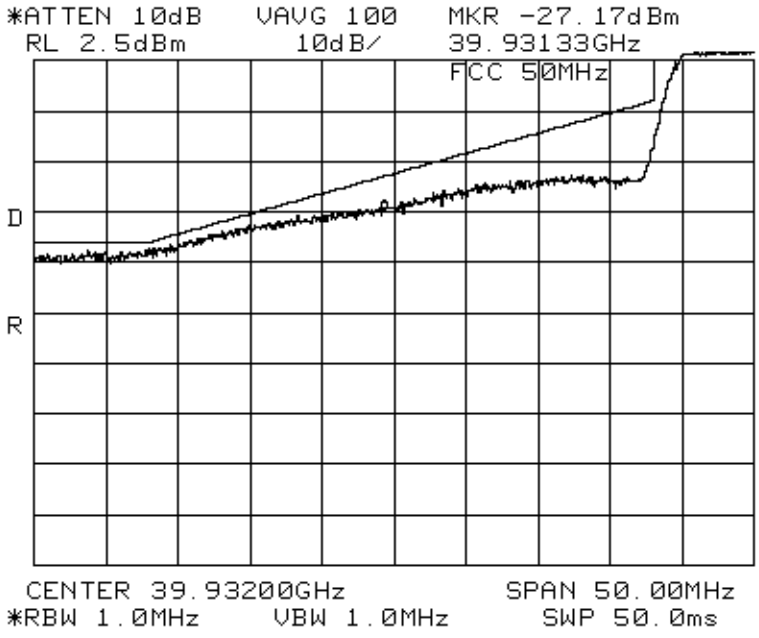
38 GHz RBS
3 X 14 MHz

for 50 MHz Channel

f1 = 39957 MHz
f2 = 39971 MHz
f3 = 39985 MHz

bottom of higher channel

Bocc = 12.1 X 3 = 36.3 MHz



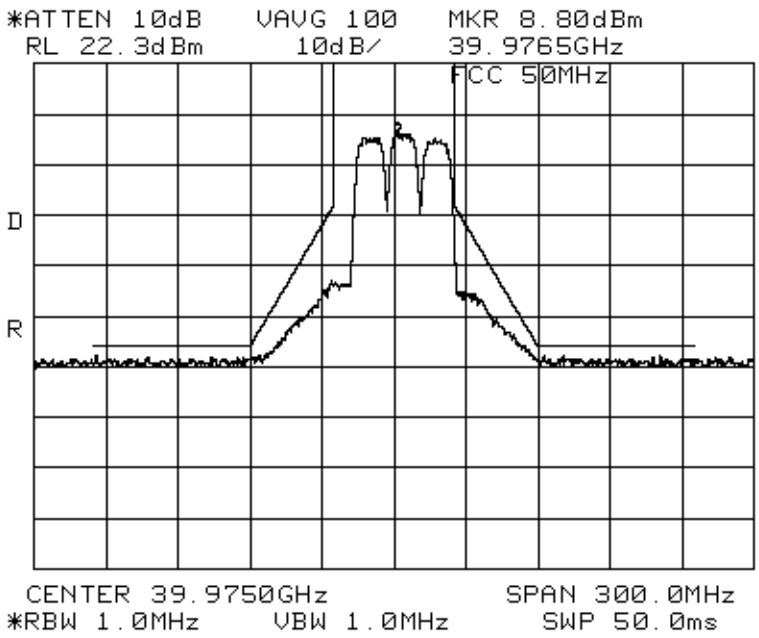
38 GHz RBS
3 X 14 MHz

for 50 MHz Channel

f1 = 39957 MHz
f2 = 39971 MHz
f3 = 39985 MHz

bottom of higher channel

Bocc = 12.1 X 3 = 36.3 MHz



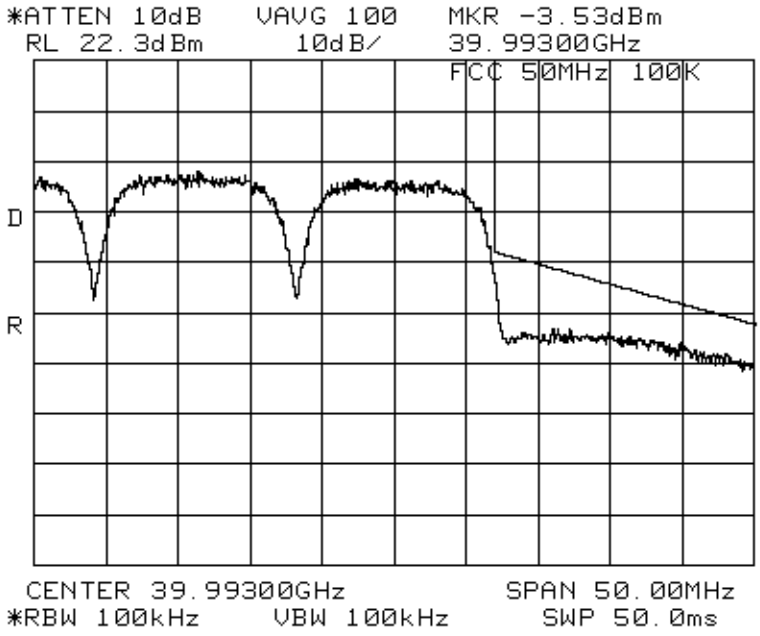
38 GHz RBS
3 X 14 MHz

for 50 MHz Channel

f1 = 39965 MHz
f2 = 39979 MHz
f3 = 39993 MHz

upper of higher channel

Bocc = 12.1 X 3 = 36.3 MHz



38 GHz RBS
3 X 14 MHz

for 50 MHz Channel

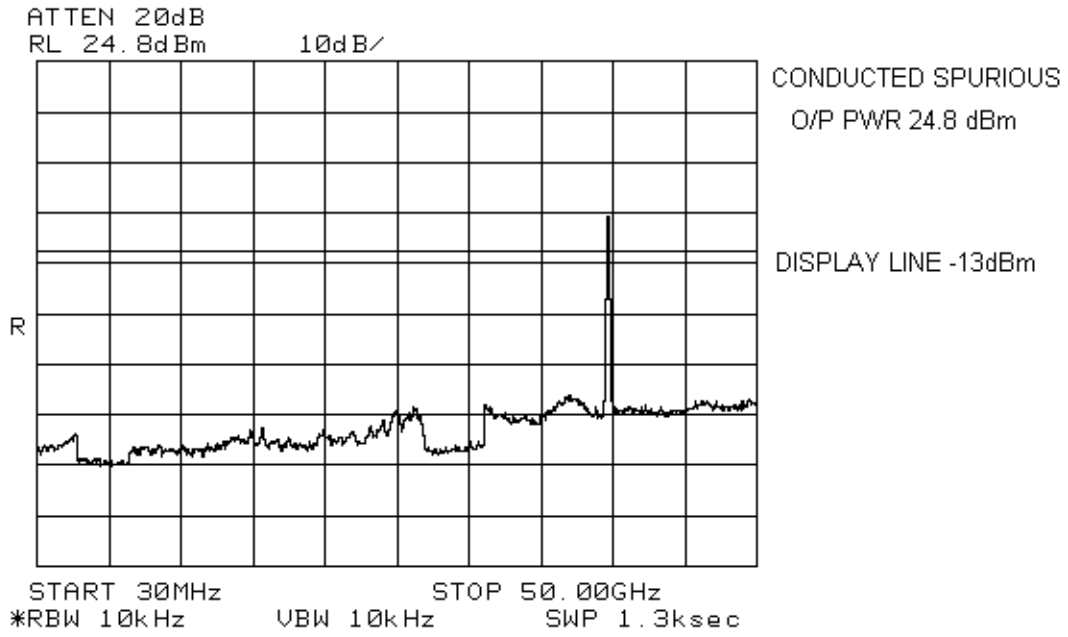
f1 = 39965 MHz
f2 = 39979 MHz
f3 = 39993 MHz

upper of higher channel

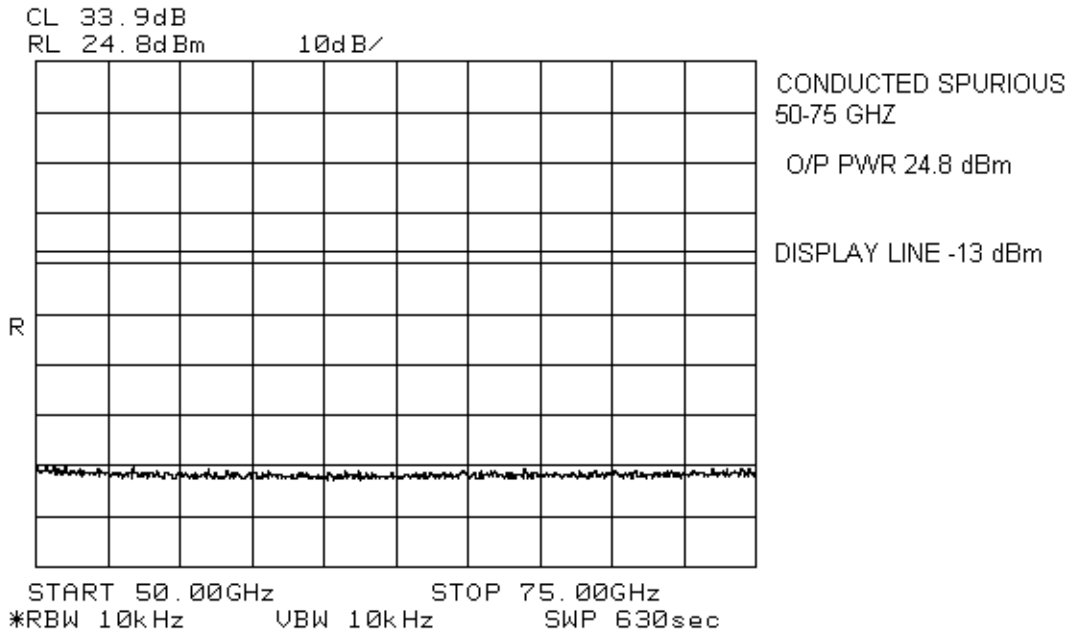
Bocc = 12.1 X 3 = 36.3 MHz

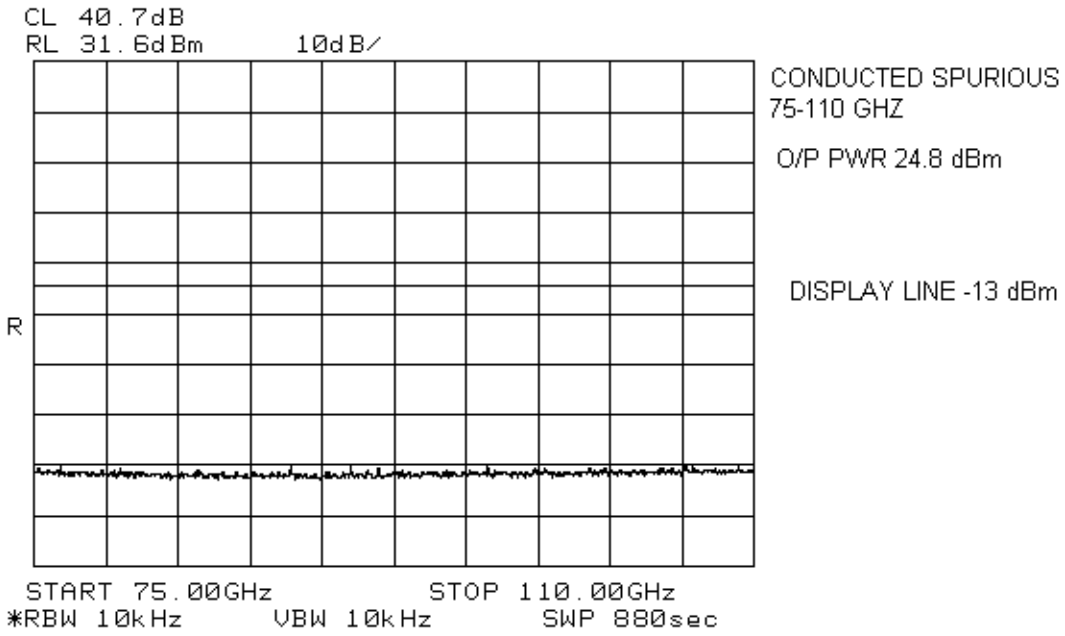
with 100 kHz RBW

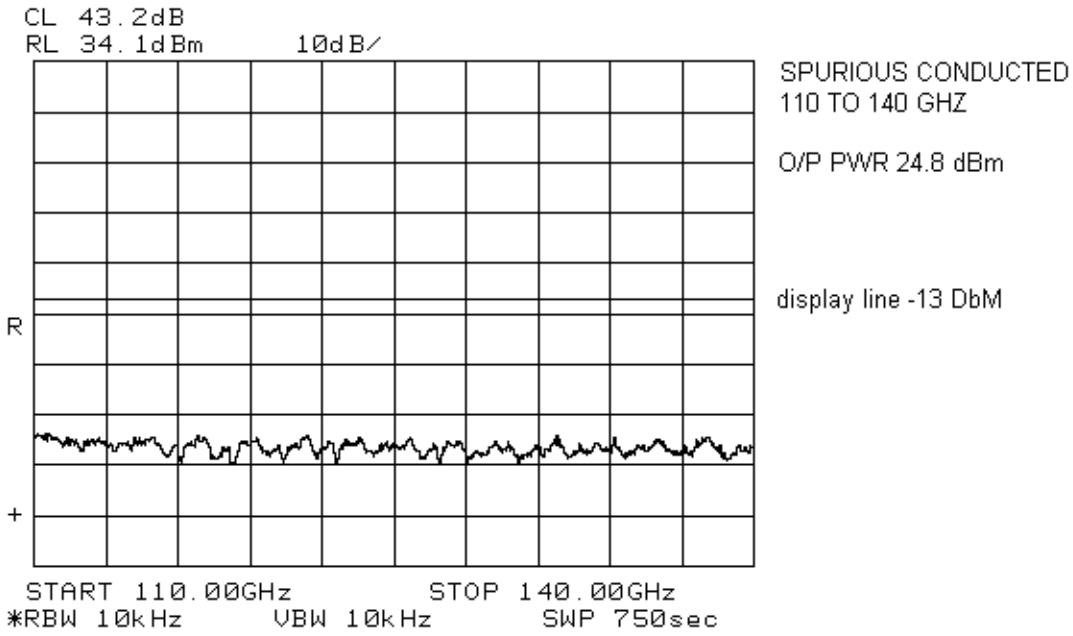
APPENDIX B: TEST RESULT OF CONDUCTED SPURIOUS

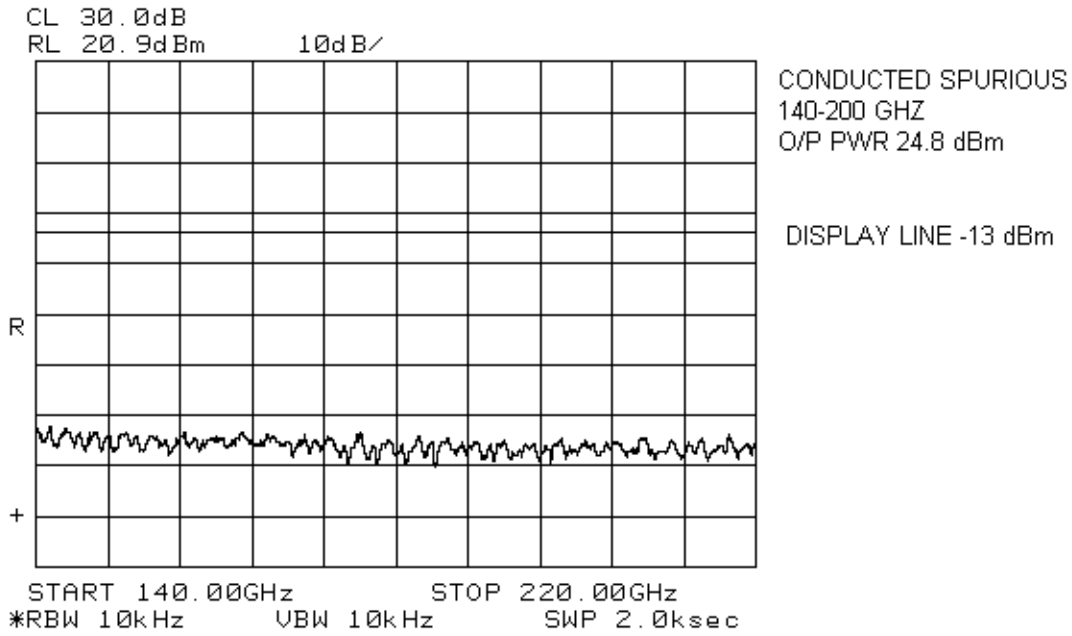


Note: The signal in the spectrum is the operating carriers

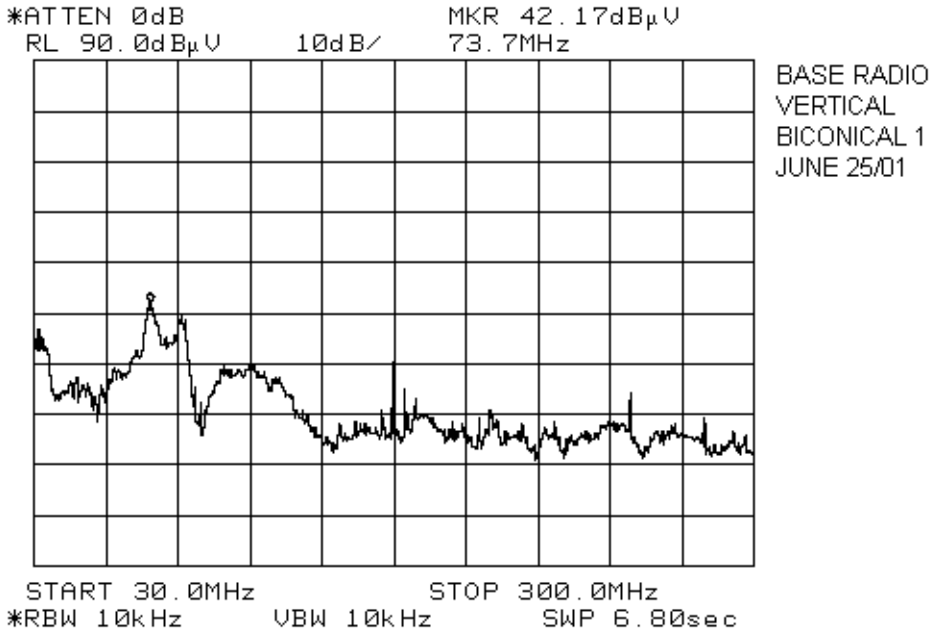

CL 33.9dB
RL 24.8dBm
10dB/
R
CONDUCTED SPURIOUS
50-75 GHZ
O/P PWR 24.8 dBm
DISPLAY LINE -13 dBm
START 50.00GHz
STOP 75.00GHz
*RBW 10kHz
VBW 10kHz
SWP 630sec


CL 40.7dB
RL 31.6dBm 10dB/
R
START 75.00GHz STOP 110.00GHz
*RBW 10kHz VBW 10kHz SWP 880sec
CONDUCTED SPURIOUS
75-110 GHZ
O/P PWR 24.8 dBm
DISPLAY LINE -13 dBm


CL 43.2dB
RL 34.1dBm 10dB/
R
+
START 110.00GHz STOP 140.00GHz
*RBW 10kHz VBW 10kHz SWP 750sec
SPURIOUS CONDUCTED
110 TO 140 GHZ
O/P PWR 24.8 dBm
display line -13 DbM


CL 30.0dB
RL 20.9dBm
10dB/
R
+
START 140.00GHz
STOP 220.00GHz
*RBW 10kHz
VBW 10kHz
SWP 2.0ksec
CONDUCTED SPURIOUS
140-200 GHZ
O/P PWR 24.8 dBm
DISPLAY LINE -13 dBm

APPENDIX C: TEST RESULT OF RADIATED EMISSIONS



3 Meter Below 1GHz

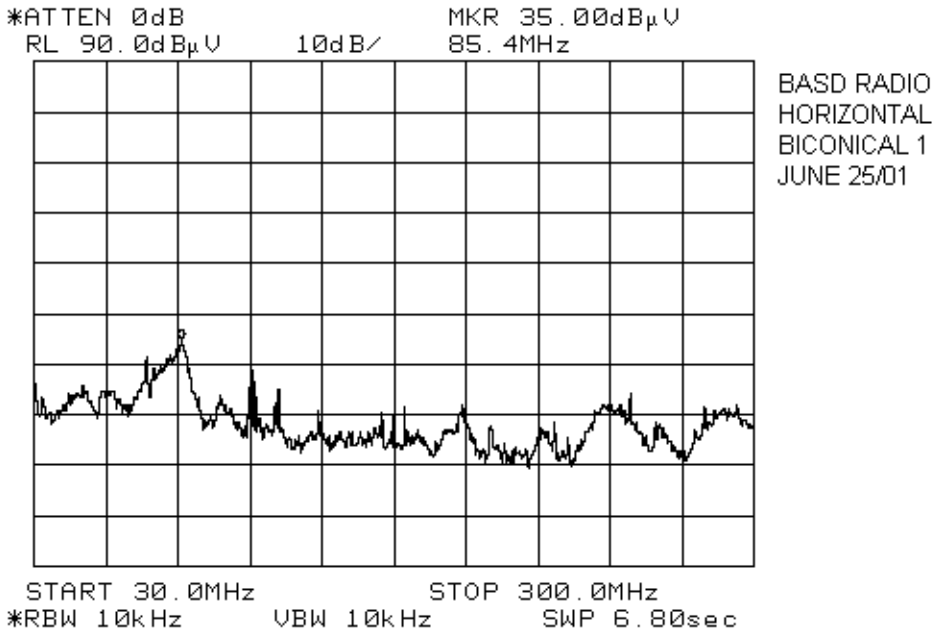
Limit = 84.4 dBµV/m

RBW Correction Factor = 4dB

Peak Emission = 42.2

Af = 7.5

Peak Emissions Level					
Reading	**Af**	**RBW Corr.**	**Result**	**Limit dBµV**	**Margin (dB)**
42.2	7.5	-4	45.7	84.4	38.7



3 Meter Below 1GHz

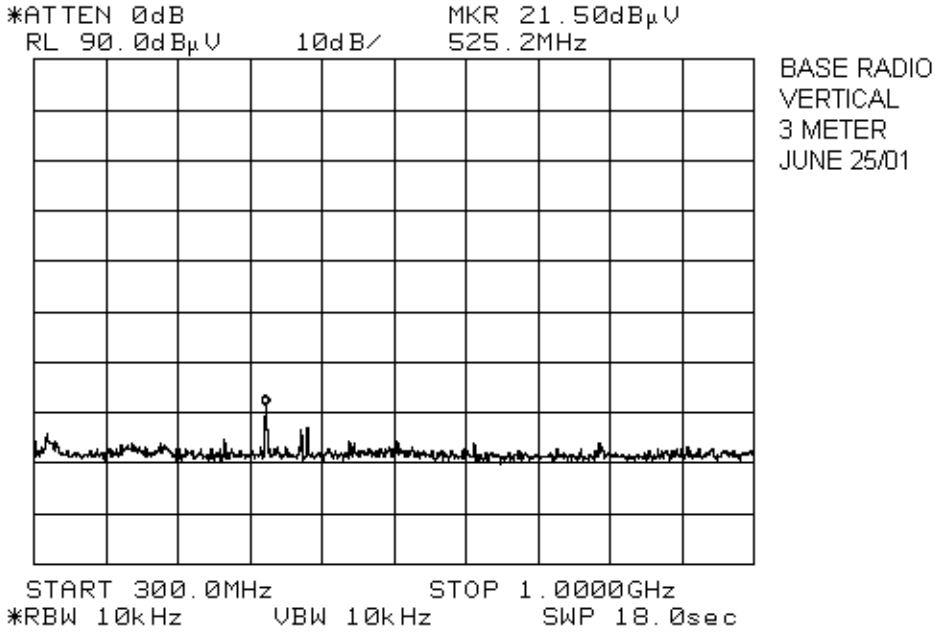
Limit = 84.4 dBµV/m

RBW Correction Factor = 4dB

Peak Emission = 35.0

Af = 7.2

Peak Emissions Level					
Reading	**Af**	**RBW Corr.**	**Result**	**Limit dBµV**	**Margin (dB)**
35.0	7.2	-4	38.2	84.4	46.2



3 Meter Below 1GHz

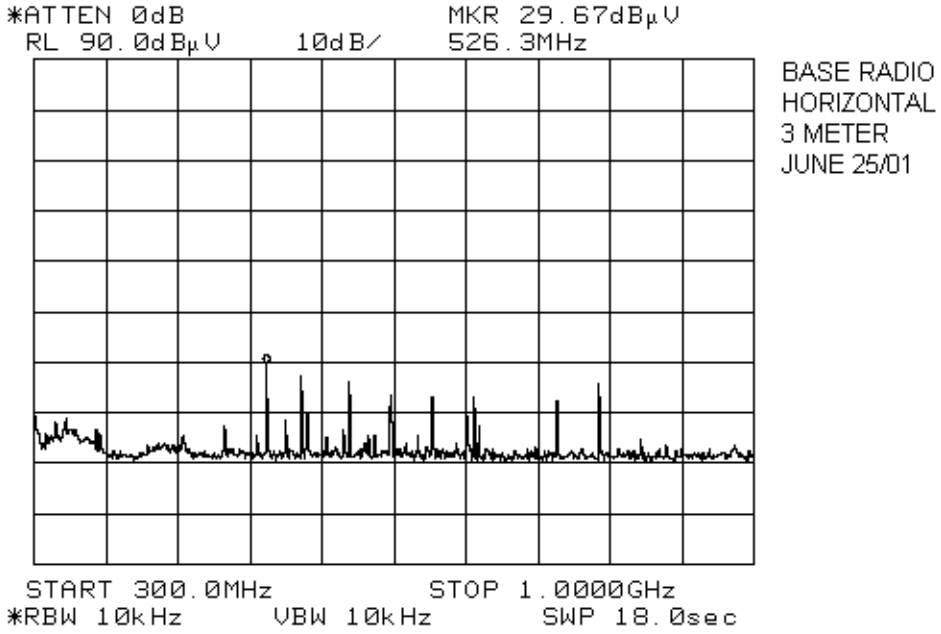
Limit = 84.4 dBµV/m

RBW Correction Factor = 4dB

Peak Emission = 21.5

Af = 19.0

Peak Emissions Level					
Reading	**Af**	**RBW Corr.**	**Result**	**Limit dBµV**	**Margin (dB)**
21.5	19.0	-4	36.5	84.4	47.9



3 Meter Below 1GHz

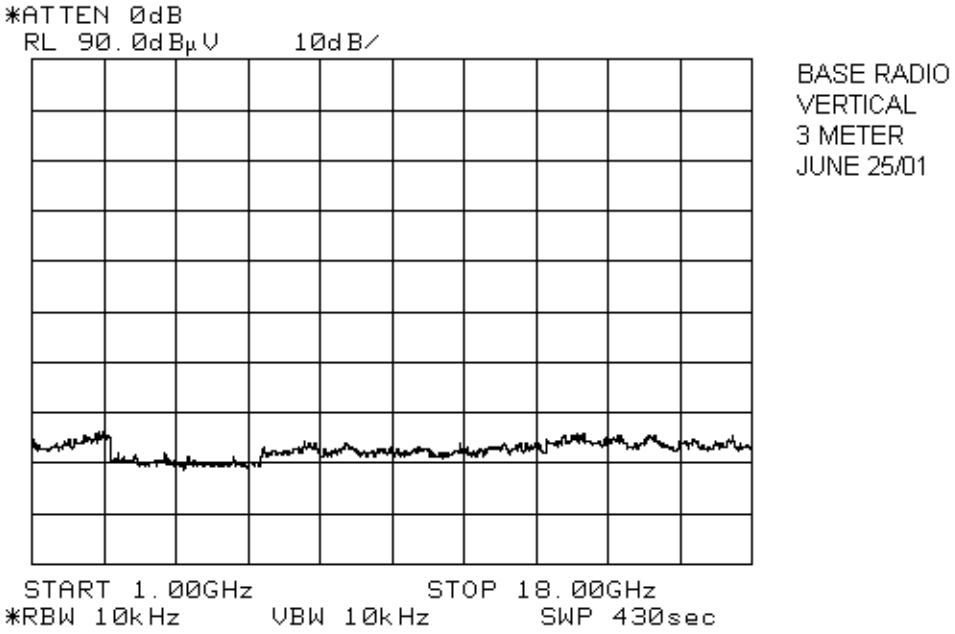
Limit = 84.4 dBµV/m

RBW Correction Factor = 4dB

Peak Emission = 29.7

Af = 19.0

Peak Emissions Level					
Reading	**Af**	**RBW Corr.**	**Result**	**Limit dBµV**	**Margin (dB)**
29.7	19.0	-4	44.7	84.4	39.7



3 Meter Above 1GHz

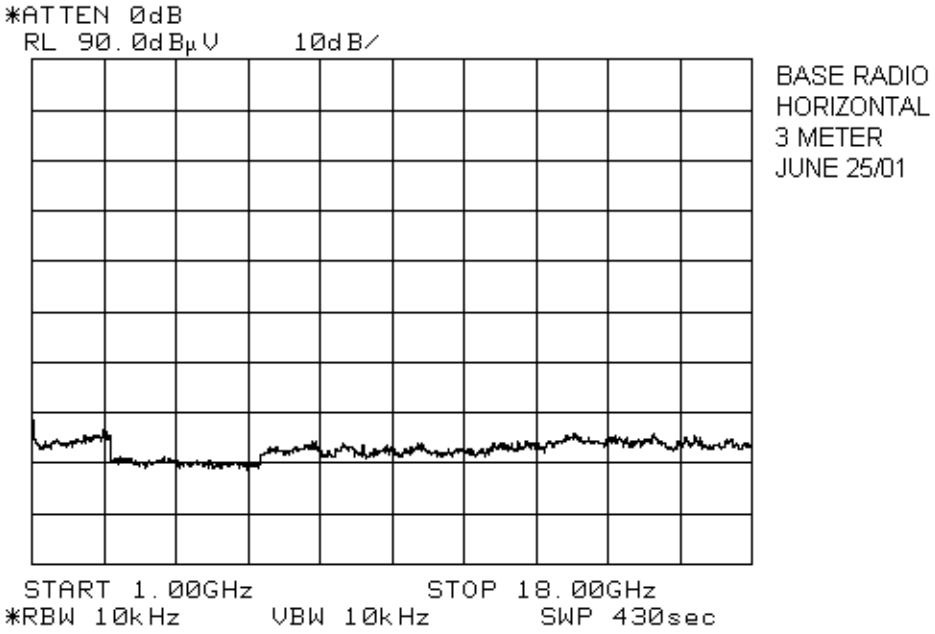
Limit = 82.2 dBµV/m

RBW Correction Factor = 4dB

Peak Emission = 15 dBµV

Af = 44.6 Maximum

Peak Emissions Level					
Reading	**Af**	**RBW Corr.**	**Result**	**Limit dBµV**	**Margin (dB)**
15.0	44.6	-4	55.6	82.2	26.6



3 METER ABOVE 1GHZ

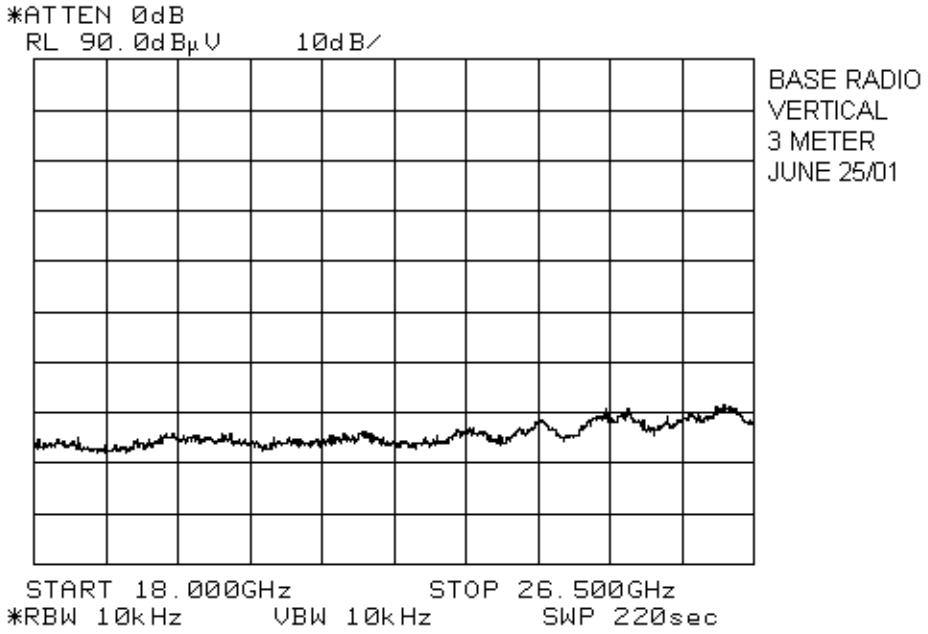
Limit = 82.2 dBµV/m

RBW Correction Factor = 4dB

Peak Emission = 15 dBµV

Af = 44.6 Maximum

Peak Emissions Level					
Reading	**Af**	**RBW Corr.**	**Result**	**Limit dBµV**	**Margin (dB)**
15.0	44.6	-4	55.6	82.2	26.6



3 METER ABOVE 1GHZ

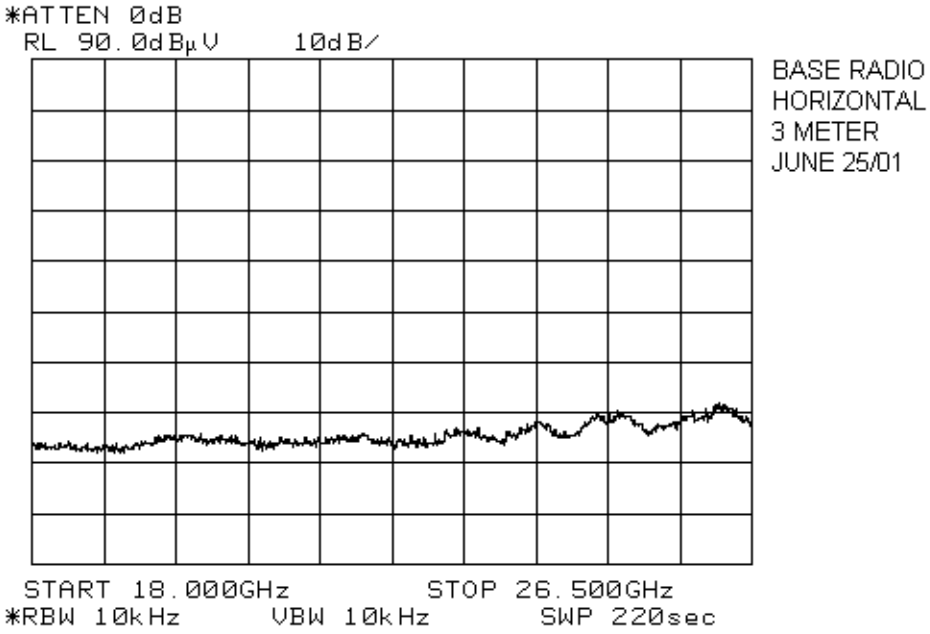
Limit = 82.2 dBµV/m

RBW Correction Factor = 4dB

Peak Emission = 21 dBµV

Af = 40.7 Maximum

Peak Emissions Level					
Reading	**Af**	**RBW Corr.**	**Result**	**Limit dBµV**	**Margin (dB)**
21.0	40.7	-4	57.7	82.2	24.5



3 Meter Above 1GHz

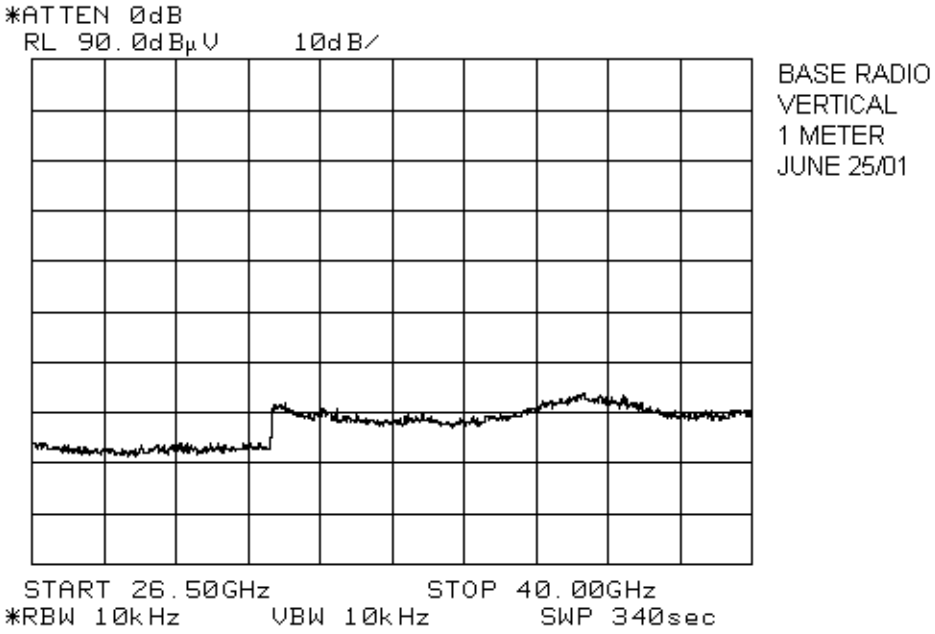
Limit = 82.2 dBµV/m

RBW Correction Factor = 4dB

Peak Emission = 21 dBµV

Af = 40.7 Maximum

Peak Emissions Level					
Reading	**Af**	**RBW Corr.**	**Result**	**Limit dBµV**	**Margin (dB)**
21.0	40.7	-4	57.7	82.2	24.5



1 Meter Above 1GHz

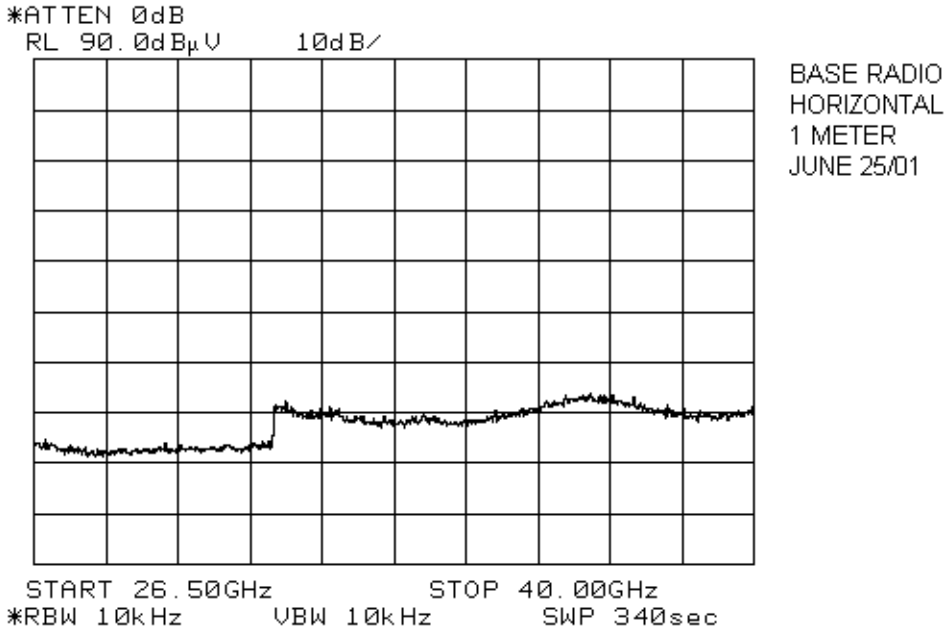
Limit = 91.8 dBµV/m

RBW Correction Factor = 4dB

Peak Emission = 23

Af = 44.2 Maximum

Peak Emissions Level					
Reading	**Af**	**RBW Corr.**	**Result**	**Limit dBµV**	**Margin (dB)**
23.0	44.2	-4	63.2	91.8	28.6



1 Meter Above 1GHz

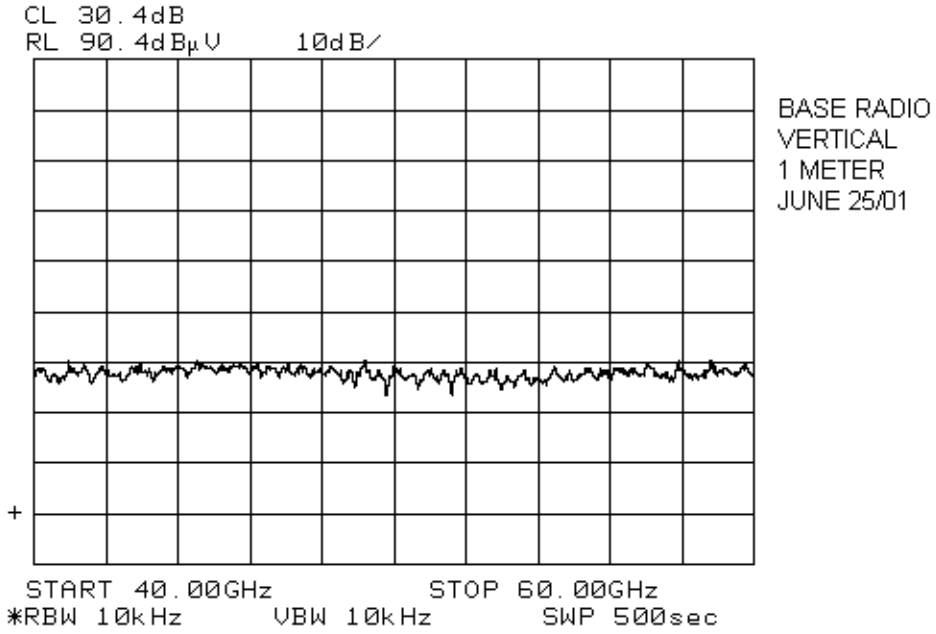
Limit = 91.8 dBµV/m

RBW Correction Factor = 4dB

Peak Emission = 23

Af = 44.2 Maximum

Peak Emissions Level					
Reading	**Af**	**RBW Corr.**	**Result**	**Limit dBµV**	**Margin (dB)**
23.0	44.2	-4	63.2	91.8	28.6



1 Meter Above 1GHz

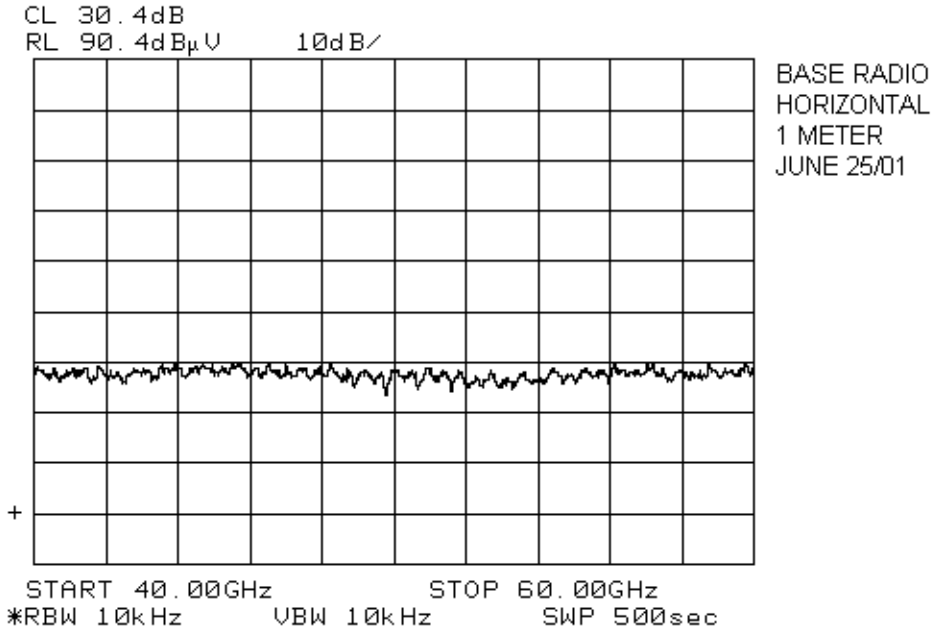
Limit = 91.8 dBµV/m

RBW Correction Factor = 4dB

Peak Emission = 30

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

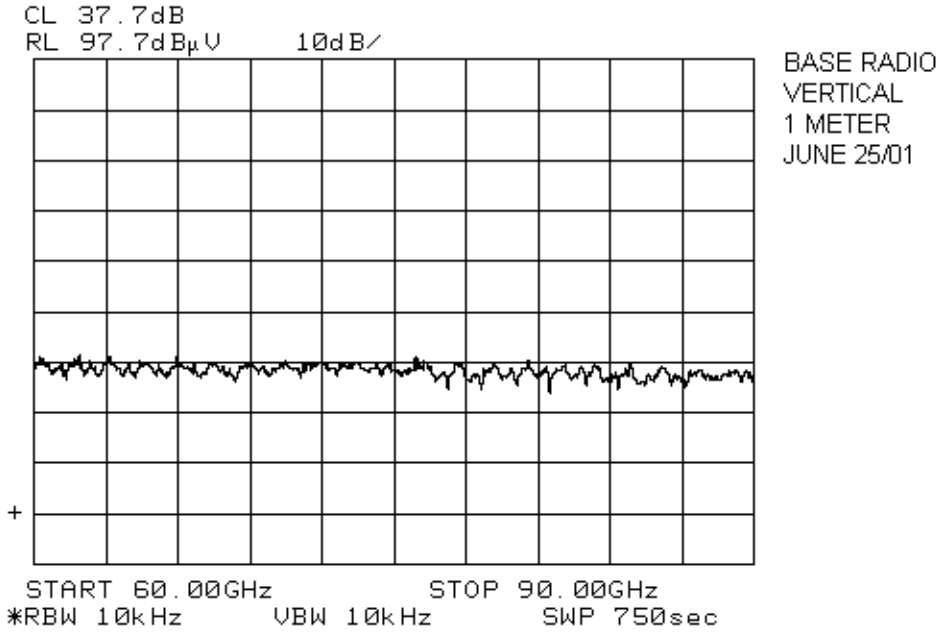
Limit = 91.8 dBµV/m

RBW Correction Factor = 4dB

Peak Emission = 30

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

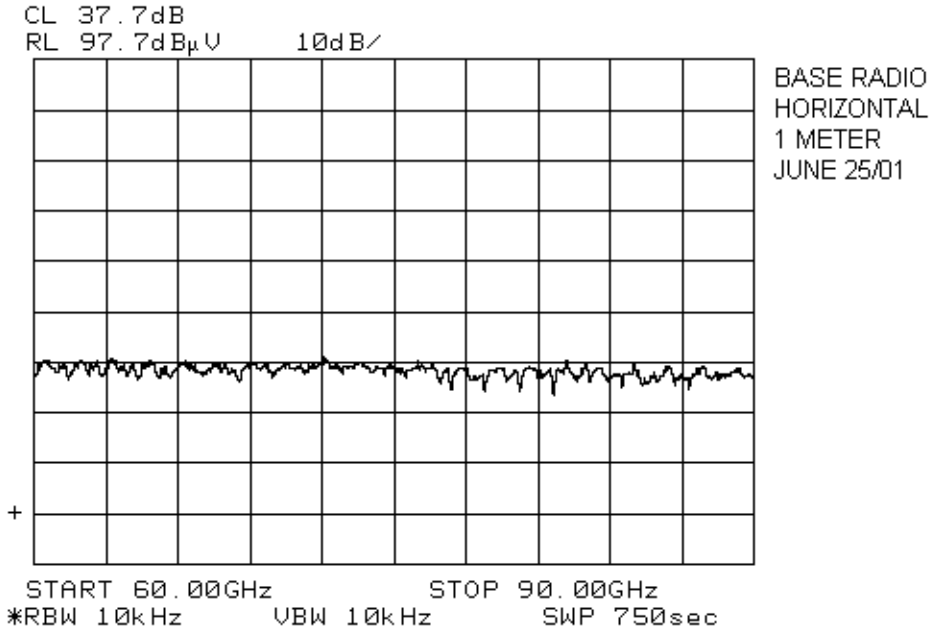
Limit = 91.8 dBµV/m

RBW Correction Factor = 4dB

Peak Emission = 30

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

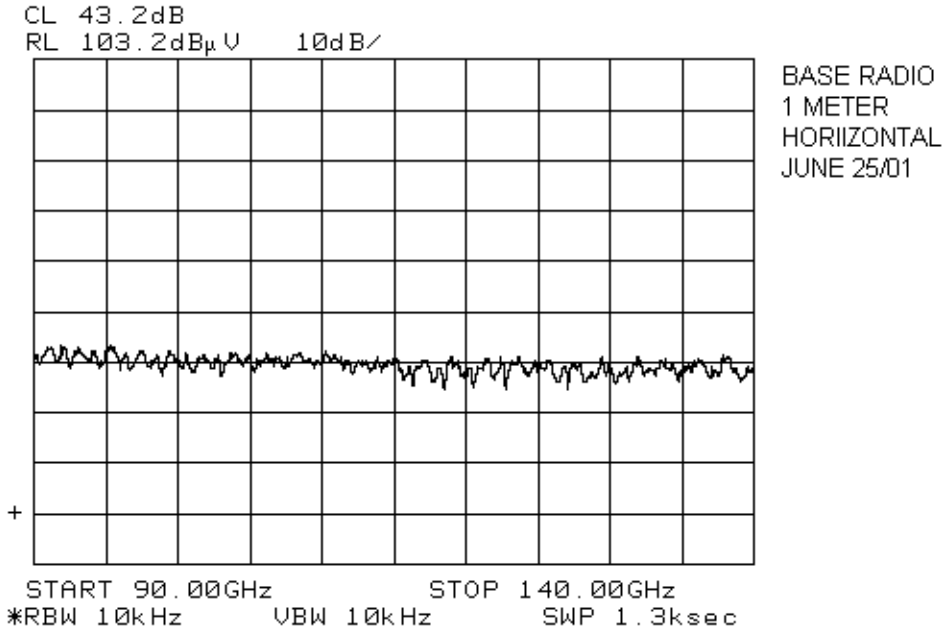
Limit = 91.8 dBµV/m

RBW Correction Factor = 4dB

Peak Emission = 30

Af = 44.6

Peak Emissions Level					
Reading	**Af**	**RBW Corr.**	**Result**	**Limit dBµV**	**Margin (dB)**
30	44.6	-4	70.6	91.8	21.2



1 Meter Above 1GHz

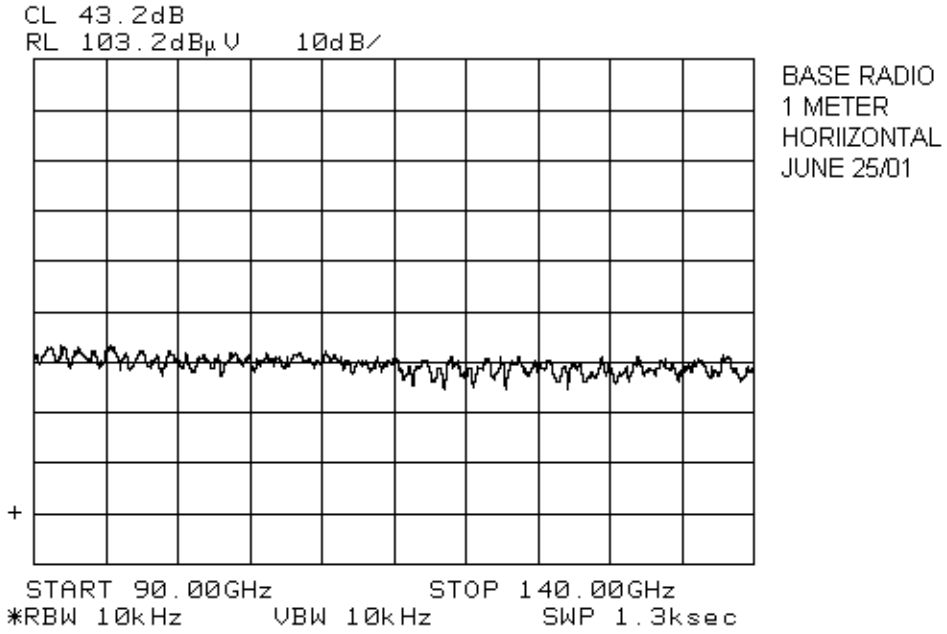
Limit = 91.8 dBµV/m

RBW Correction Factor = 4dB

Peak Emission = 45

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

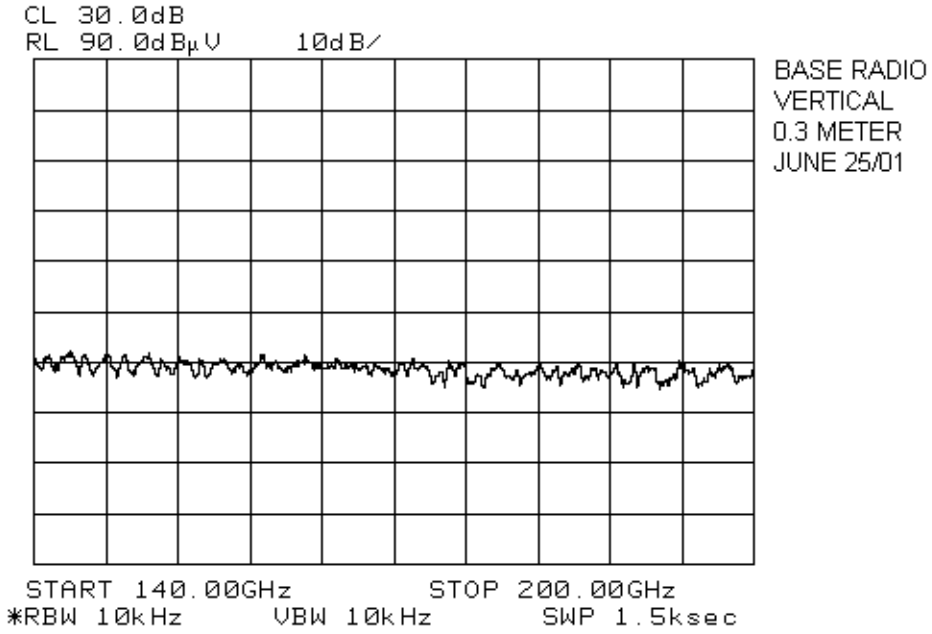
Limit = 91.8 dBµV/m

RBW Correction Factor = 4dB

Peak Emission = 45

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



0.3 Meter Above 1GHz

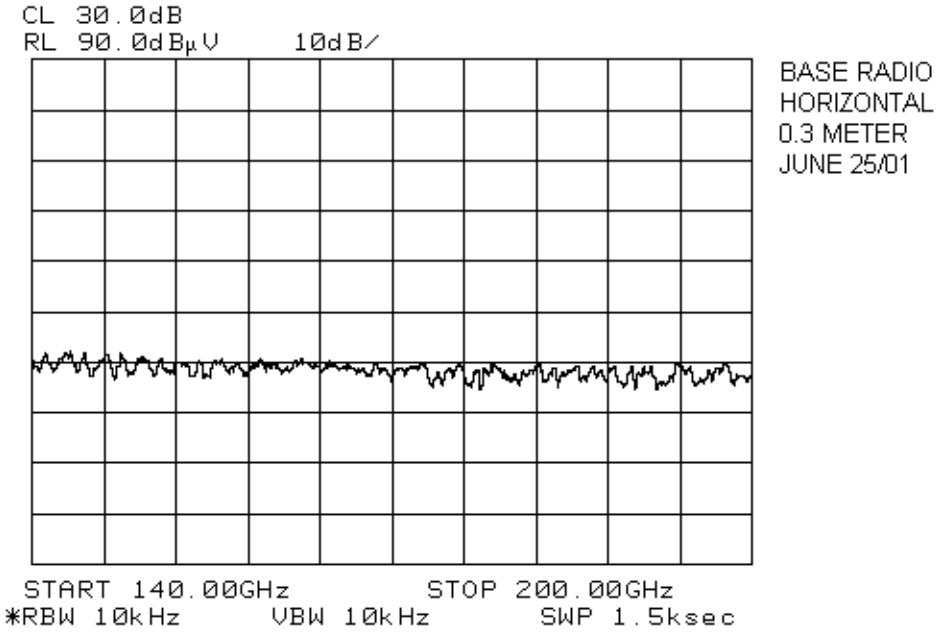
Limit = 102.3 dBµV/m

RBW Correction Factor = 4dB

Peak Emission = 33

Af = 52.0

Peak Emissions Level					
Reading	**Af**	**RBW Corr.**	**Result**	**Limit dBµV**	**Margin (dB)**
33.0	52.0	-4	81.0	102.3	21.3



0.3 Meter Above 1GHz

Limit = 102.3 dBµV/m

RBW Correction Factor = 4dB

Peak Emission = 33

Af = 52.0

Peak Emissions Level					
Reading	**Af**	**RBW Corr.**	**Result**	**Limit dBµV**	**Margin (dB)**
33.0	52.0	-4	81.0	102.3	21.3

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
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