TEST REPORT

FROM

Ensemble Communications Inc.

Test of the Fiberless [TM] 3900 Series Outdoor Unit - Base Station (BS) and Customer Premises Equipment (CPE)

To CFR 47 part 101, subpart C (Oct 1998)

Test Report Serial No.: Radio-TR-001-v0.1

This report supersedes: NONE

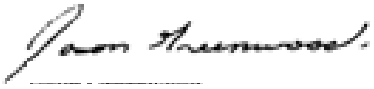
Remarks:

Equipment complied with the specification	[√]
Equipment did not comply with the specification	[ ]
Results were within measurement uncertainties	[ ]

This Test Report is Issued Under the Authority of:

.....

Sam Liu, Director of Hardware Development



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Tested by Jason Greenwood

.....

Checked by Sam Liu

Copy No:

Issue date: 12 February 2002

Issue to: Ensemble Communications, Inc.
9890 Towne Centre Drive
San Diego, California 92121

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1 Executive Summary

Purpose

The purpose of this test program was to demonstrate compliance of the Ensemble Fiberless 3900 (CPE ODU) and the Fiberless 39XXX (Base Station ODU, where XXX are used to define the sector size and polarization) 39 GHz LMDS outdoor unit (ODU) transceivers against the current FCC technical standards for digital radio relay system authorization requirements. The ODU transceiver demonstrated compliance against the standard "FCC CFR 47, part 101, Subpart C (1998-10).

EUT Description

Consisting of four major components - the 16200 Series BS-IDU, 320 Series CPE-IDU, 3900 Series ODU transceivers, and the Fiberless Management System (FMS) - the Ensemble Fiberless™ System represents the highest functionality, the most flexible, and most easily deployable system on the market today.

The 16200 Series Base Station Indoor Unit and 320 Series Customer Premises Equipment Indoor Unit operate with a range of outdoor unit transceivers in the range of 10 to 45 GHz. The configuration tested operates in the 38.65 to 39.8GHz frequency band. Both the 16200 Series BS-IDU and the 320 Series CPE-IDU are connected to the 3900 Series ODU transceivers by a single RG-6 coaxial cable and can be separated by up to 1000 feet.

The 16200 Series Base Station indoor unit, a 19" or 23" rack mountable, 10U box, features hot swappable cards for easy servicing and growth. It is designed to support up to eighteen 25 MHz carriers with network interfaces ranging from a single DS-3/E3 up to multiple OC-3s/STM-1s. Overall, a single base station rack can terminate up to 1.2 Gbit/s of backhaul network capacity supplied from TDM, IP, or ATM networks.

The 320 series CPE indoor unit is a compact 1.5U high, rackable/stackable box supporting up to 12 service ports. Combining the functionality of a broadband, burst modem and a multiservice access concentrator, the unit is customisable and scalable through deployment of different types of cards in three expansion slots. Interfaces offered include the full range for voice and data connections including T1/E1, 10/100BT, and V.35. Available services include TDM, Frame Relay, Ethernet, Native IP, FXO and FXS. Flexible deployment schemes allow multiple subscribers to be connected to a single CPE indoor unit or multiple CPE indoor units to be connected to a single CPE outdoor unit.

The 3900 Series outdoor unit comes in two form factors, the BS-ODU and the CPE-ODU. The form factors differ to accommodate the different BS and CPE antennas while the internal electronics remain the same. The 3900 Series BS-ODU is an integrated radio and antenna in a single, compact form factor that supports flexible, modular deployments of multiple sectorization schemes ranging from 3 to 90 degrees. Like the BS-ODU, the CPE-ODU is an integrated radio and parabolic antenna in a compact design of approximately 10 inches square.

The Fiberless system uses Ensemble's patented Adaptix technology for the air interface, which comprises an advanced feature set incorporating Adaptive Time Division Duplexing (Adaptive TDD), Adaptive Time Division Multiple Access (Adaptive TDMA) and Adaptive Modulation technologies. The Fiberless system allocates a time slot on demand to a specific customer, upstream or downstream at any modulation scheme at variable bandwidth amounts based on demand or service level agreement resulting in the most efficient air interface in the industry. As a result, Fiberless allows carriers to lead the market with both existing and new services while minimizing deployment and operation costs.

The Fiberless system uses its patented Adaptive TDD to support contiguous, asymmetrical spectrum band allocations. Adaptive TDD supports real-time asymmetry in a single channel to maximize efficiency and reduce capital and operational expenses. This innovative technology flexibly allocates upstream and downstream capacity on demand to ensure efficient use of channel bandwidth. The operational benefits result from no field activity related to changes in asymmetry on a channel, as an FDD system would require.

The Fiberless system uses Adaptive TDMA to allocate bandwidth instantaneously in variable packet sizes for each user's specific need while maintaining quality of service (QoS) on each link. Compared to first generation BWA systems that have a fixed frequency bandwidth allocation for each user, Adaptive TDMA can increase a carrier's revenues by a factor of 4 or more through the over-subscription of facilities while enabling market-leading, differentiated services.

The Fiberless system also uses Adaptive Modulation, which selects QPSK, QAM 16, and QAM 64 automatically on each burst, every one millisecond depending on the distance to the customer, environmental and other RF conditions. By automatically selecting the most efficient modulation scheme possible for each customer transmission, Ensemble's Adaptive Modulation technology maximizes both system range and capacity simultaneously. Maximum range is achieved by using QPSK while maximum capacity is achieved by using QAM 16 and QAM 64 for bursts where link conditions allow.

2 Technical Details

Purpose	To verify the 3900 and 390XX Transceivers against the specification by means of a type test.
Applicant / Client	Ensemble Communications, Inc. 9890 Towne Centre Drive San Diego, CA 92129
Manufacturer	Ensemble Communications, Inc.
Laboratory performing the tests	Ensemble Communications, Inc. 9890 Towne Centre Drive San Diego, CA 92129
Test report reference number	Radio-TR-001-v0.1
Standard applied	CFR 47 part 101, subpart C (Oct 1998)
Dates of test (from - to)	November 29, 2001 - January16, 2002
No of Units:	two
Equipment Category:	Microwave Fixed Link
Trade Name:	Fiberless 16200 / Fiberless 320
Type No:	M/A-Comm
Technical Variants:	Base Station (BS) / CPE
ITU Emission Code(s):	25 M0D7W

Unit No 1

Type of Unit:	Non-protected Base Station Outdoor Unit (NP ODU) Fiberless 390XX
Power Characteristics:	Nominal Output Power +17 dBm
Modulation:	QPSK, 16QAM, 64QAM
Transceiver Frequency Range:	38.65 GHz to 39.8 GHz Tx
Filter Frequency Range:	1.15 GHz (38.65 GHz - 39.8 GHz)
Temperature Range:	-40 to +55 degrees C

Unit No 2

Type of Unit:	Non-protected CPE Outdoor Unit (NP ODU) Fiberless 3900
Power Characteristics:	Nominal Output Power +17 dBm
Modulation:	QPSK, 16QAM, 64QAM
Transceiver Frequency Range:	38.65 GHz to 39.8 GHz Tx
Filter Frequency Range:	1.15 GHz (38.65 GHz - 39.8 GHz)
Temperature Range:	-40 to +55 degrees C

Unit No 3

Type of Unit:	Non-Protected Indoor Base Station Unit (IDU)
Voltage Range:	Nominal 48 V DC, Extremes -36Vdc to -72 Vdc.
Temperature Range:	0 degrees C to +50 degrees C

Unit No 4

Type of Unit:	Non-Protected Indoor CPE Unit (IDU)
Voltage Range:	Nominal 110 Vac/240 Vac, Extremes 90 Vac to 264 Vac
Temperature Range:	0 degrees C to +50degrees C

3 Tests Required

PARAMETER	COMPLIANT
TRANSMITTER CHARACTERISTICS	
RF power output	Yes
Modulation characteristics	Yes
Occupied bandwidth	Yes
Spurious emissions at antenna terminals	Yes
Field strength of spurious radiation	Yes
Frequency stability	N/A note 1

Notes:

1. *Equipment operating in the 38.6 GHz-40GHz band is exempt from the frequency tolerance requirement found in part 101 of the FCC rules.*

4 Measurements, Examinations and Derived Results

4.1 General observations

Equipment serial number(s)

MODULE:	SERIAL NUMBER:
16200 BS indoor unit (IDU) – MIC BOARD	304200390036
16200 BS outdoor unit (ODU)	C0007601420004
320 CPE indoor unit (IDU)	113101040002
320 CPE outdoor unit (ODU)	C0007501360005

4.2 Test Results

4.2.1 Transmitter characteristics

4.2.1.1 RF power output

Ambient temperature: **25.0** °C Relative humidity: **35.0** %

Radio Parameters:

TX frequencies: Lower #1 38.6625GHz, lower #2 38.6875 GHz, middle #1 39.2125GHz, middle #2 39.2375GHz, Upper #1 39.7625 GHz, Upper #2 39.7875 GHz

Voltage= -48Vdc

OP power: +17 dBm

Results:

TABLE OF OUTPUT POWER RESULTS (Base Station-ODU)

Transmitter Power (dBm)						
Modulation	**Low Channels**		**Mid Channels**		**High Channels**	
	38.6625 GHz	**38.6875 GHz**	**39.2125 GHz**	**39.2375 GHz**	**39.7625 GHz**	**39.7875 GHz**
QPSK	**15.98**	**16.10**	**16.68**	**16.40**	**16.12**	**16.07**
16QAM	**13.48**	**13.64**	**14.22**	**13.93**	**13.64**	**13.60**
64QAM	**12.40**	**12.58**	**13.16**	**12.85**	**12.57**	**12.55**

TABLE OF OUTPUT POWER RESULTS (CPE-ODU)

Transmitter Power (dBm)						
Modulation	**Low Channels**		**Mid Channels**		**High Channels**	
	38.6625 GHz	**38.6875 GHz**	**39.2125 GHz**	**39.2375 GHz**	**39.7625 GHz**	**39.7875 GHz**
QPSK	**16.20**	**15.89**	**16.25**	**16.35**	**16.19**	**16.10**
16QAM	**13.27**	**13.39**	**13.74**	**13.85**	**13.88**	**13.89**
64QAM	**12.18**	**12.29**	**12.65**	**12.75**	**12.78**	**12.80**

Specification:

Rated output power: +17 dBm

LIMITS CLAUSE:

Maximum Power (dBm)	+55 dBW EIRP [1]

Note 1: Base station antenna gain: 21 dBi typical. Subscriber antenna gain: 35 dBi typical.

Test Equipment Used:

#	INSTRUMENT	MANUFACTURER	MODEL #	SERIAL #	CALIBRATION DATE / DUE
1	Power Meter	Agilent	E4418B	MY40330474	28/04/02
2	Power Sensor	Agilent	8487A	MY41090136	28/04/02
3	High Freq. Cables	Megaphase			

4.2.1.2 Modulation characteristics

Ambient temperature: **25.0**°C Relative humidity: **35.0**%

Data Rate: QPSK; 40 Mbit/s, 16-QAM; Mbit/s, 64-QAM; Mbit/s O/P Power: +25 dBm

Results:

All of the plots take into account the cable losses associated with the test set up.

SPECTRUM MASK PLOTS (CPE-ODU)

Reference to plot in Annex B-Graphical Results						
Modulation	**Low Channels**		**Mid Channels**		**High Channels**	
	38.6625 GHz	**38.6875 GHz**	**39.2125 GHz**	**39.2375 GHz**	**39.7625 GHz**	**39.7875 GHz**
QPSK	CPE001 CPE002	CPE051 CPE052	CPE066 CPE067	CPE082 CPE083	CPE096 CPE097	CPE113 CPE114
16QAM	CPE040 CPE041 CPE043	CPE056 CPE057 CPE059	CPE072 CPE074note 1 CPE075note 1	CPE086 CPE087 CPE089note 1	CPE100 CPE101 CPE103 CPE104 CPE105	CPE117note 1 CPE118note 1 CPE120note 1 CPE121note 1
64QAM	CPE046 CPE047 CPE049	CPE061 CPE062 CPE064	CPE077 CPE078 CPE080	CPE091 CPE092 CPE094	CPE107 CPE108 CPE110 CPE111	CPE123 CPE124 CPE126 CPE127

SPECTRUM MASK PLOTS (Base Station-ODU)

Reference to plot in Annex B-Graphical Results						
Modulation	**Low Channels**		**Mid Channels**		**High Channels**	
	38.6625 GHz	**38.6875 GHz**	**39.2125 GHz**	**39.2375 GHz**	**39.7625 GHz**	**39.7875 GHz**
QPSK	BS005 BS001 BS004 BS006	BS060 BS062 BS064	BS077 BS078 BS080	BS095 BS096 BS098	BS110 BS111 BS113 BS114	BS128 note 1 BS129 note 1 BS131 note 1 BS132 note 1
16QAM	BS050 BS052 BS054	BS065 BS066 BS069	BS082 BS083 BS086 note 1 BS087 note 1	BS100 note 1 BS101 note 1 BS102 note 1	BS116 BS117 BS119 BS120	BS134 note 1 BS135 note 1 BS137 note 1 BS138 note 1
64QAM	BS055 BS056 BS059	BS071 BS072 BS074 BS075	BS089 BS090 BS092 BS093	BS103 BS105 BS106 BS108	BS122 BS123 BS125 BS126	BS140 note 1 BS141 note 1 BS143 note 1

Note 1: An addition 4 dB attenuation was added to the input signal from the ODU in order to allow the internal attenuation in the spectrum analyser to be reduced thus lowering the noise floor of the spectrum analyser.

Specification:

LIMITS CLAUSE: 101.111

Per CFR 47, Part 101.111 (a)(2)(ii), for operating frequencies above 15 GHz, in any 1 MHz band, the center frequency of which is removed from the assigned frequency by more than 50 percent up to and including 250 percent of the authorized bandwidth, the mean power of emissions must be attenuated below the mean output power of the transmitter as specified by the following equation but in no event less than 11 decibels:

$A = 11 + 0.4(P - 50) + 10 \log_{10}B$. (Attenuation greater than 56 decibels is not required.)

where:

A = Attenuation (in decibels) below the mean output power level.

P = Percent removed from the carrier frequency.

B = Authorized bandwidth in MHz

These masks are calculated at the maximum transmitter output power only.

Test Equipment Used:

#	INSTRUMENT	MANUFACTURER	MODEL #	SERIAL #	CALIBRATION DATE / DUE
1	Spectrum Analyser	HP	8564E	3943A01770	05/18/02
2	High Freq. Cables	Megaphase	TM40 K1K1 38	16071GVT4	
3	High Freq. Cables	Megaphase	TM40 K1K1 38	1424GVT4	

4.2.1.3 Occupied bandwidth

Ambient temperature: **25.0** °C Relative humidity: **35.0** %

Results:

TABLE OF OCCUPIED BANDWIDTH RESULTS (Base Station-ODU)

TEST CONDITIONS		TRANSMITTER OCCUPIED BANDWIDTH (MHZ)		
		QPSK	16 QAM	64 QAM
T nom (**25.0**°C) V nom (**-48V**)	Low Band	BS002 BS063	BS053 BS067	BS058 BS073
	Mid Band	BS079 BS097	BS084 BS102	BS091 BS107
	High Band	BS112 BS130	BS118 BS136	BS124 BS142
Maximum occupied bandwidth observed (MHz)		22.48	22.33	22.33
Minimum occupied bandwidth observed (MHz)		22.17	22.17	22.17
Variation in occupied bandwidth observed (MHz)		.31	.16	.16

TABLE OF OCCUPIED BANDWIDTH RESULTS (CPE-ODU)

TEST CONDITIONS		TRANSMITTER OCCUPIED BANDWIDTH (MHZ)		
		QPSK	16 QAM	64 QAM
T nom (**25.0**°C) V nom (**-48V**)	Low Band	CPE003 CPE053	CPE042 CPE058	CPE048 CPE063
	Mid Band	CPE068 CPE084	CPE073 CPE088	CPE079 CPE093
	High Band	CPE098 CPE115	CPE102 CPE119	CPE109 CPE125
Maximum occupied bandwidth observed (MHz)		22.50	22.33	22.33
Minimum occupied bandwidth observed (MHz)		22.17	22.17	22.17
Variation in occupied bandwidth observed (MHz)		.33	.16	.16

Specification:

LIMITS CLAUSE: 101.109

Maximum authorized bandwidth	50 MHz

Test Equipment Used:

#	INSTRUMENT	MANUFACTURER	MODEL #	SERIAL #	CALIBRATION DATE / DUE
1	Spectrum Analyser	HP	8564E	3943A01770	05/18/02
2	High Freq. Cables	Megaphase	TM40 K1K1 38	16071GVT4	

4.2.1.4 Spurious emissions at antenna terminals

Ambient temperature: **25.0** °C Relative humidity: **35.0**%

Transmission Frequency: 38.6625 GHz O/P Power: 17 dBm

Results: SPURIOUS EMISSION PLOTS (CPE-ODU)

Frequency (GHz)	Highest Level Observed (dBm)	Reference to plot in Annex B
9 kHz-50 kHz	-78.97	CPE006
50 kHz-100 kHz	-79.47	CPE007
100 kHz-150 kHz	-80.13	CPE008
150.0 kHz-1.0 MHz	-71.63	CPE010
1.0 MHz -10.0 MHz	-72.63	CPE011
10.0 MHz -30.0 MHz	-69.63	CPE012
30.0 MHz -200 MHz	-65.63	CPE015
200 MHz -500 MHz	-56.63	CPE016
500 MHz -800 MHz	-65.63	CPE017
800 MHz-1.0GHz	-70.63	CPE014
1.0 GHz -2.5 GHz	-56.97	CPE020
2.5 GHz -5.0 GHz	-54.13	CPE021
5.0 GHz -7.5 GHz	-51.30	CPE022
7.5 GHz -10.0 GHz	-54.97	CPE024
10.0 GHz -13.0 GHz	-56.97	CPE025
13.0 GHz -15.0 GHz	-50.47	CPE027
15.0 GHz -17.0 GHz	-51.97	CPE028
17.0 GHz -20.0 GHz	-53.47	CPE029
20.0 GHz -22.5 GHz	-49.13	CPE031
22.5 GHz -25.0 GHz	-48.80	CPE032
25.0 GHz -27.5 GHz	-56.30	CPE033
27.5 GHz -30.0 GHz	-49.13	CPE034
30.0 GHz -32.5 GHz	-48.80	CPE035
32.5 GHz -35.0 GHz	-45.13	CPE036
35.0 GHz -38.5 GHz	-43.13	CPE037
38.75 GHz -40.0 GHz	-42.63	CPE038
40.0 GHz -60.0 GHz	>30dB below limit (Note 1) (Note2)	CPE200
60.0 GHz -90.0 GHz	-50.0(Note2)	CPE201
90.0 GHz -110.0 GHz	-53.67(Note2)	CPE202
110.0 GHz -200.0 GHz	-53.17(Note2)	CPE203

Note1: A comparison was done using a signal generator to determine if the signals in the 40Ghz-60GHz range were actual signals or if they were signals created in the mixer. From this it was determined that there were no observable spurious emissions from the radio in this range. See plots BS204, BS205, BS206 and BS207. The plots read dBuV but the actual measurement is in dBm. This is due to a limitation in the software used to capture the plots.

Note2: Measurements for this frequency range were conducted with the Radio in CW mode, which gives the worst possible case for harmonic emissions. The plots read dBuV but the actual measurement is in dBm. This is due to a limitation in the software used to capture the plots.

SPURIOUS EMISSION PLOTS (BS-ODU)

Frequency (GHz)	Highest Level Observed (dBm)	Reference to plot in Annex B-Graphical Results
10 kHz-50 kHz	-79.17	BS007a
50 kHz-100kHz	-78.83	BS007b
100kHz-150kHz	-79.17	BS007c
150kHz-1.0MHz	-76.33	BS008a
1.0MHz-10.0MHz	-77.33	BS008b
10.0MHz-30.0MHz	-75.5	BS008c
30.0MHz-100.0MHz	-64.67	BS012
100.0MHz-500.0MHz	-67.33	BS013
500MHz-800.0MHz	-68.00	BS014
800MHz-1.0GHz	-67.33	BS015
1.0 GHz-1.5 GHz	-57.00	BS020
1.5 GHz-2.0 GHz	-57.67	BS021
2.0 GHz-2.5 GHz	-57.17	BS022
2.5 GHz-3.0 GHz	-54.33	BS023
3.0 GHz-3.5 GHz	-57.50	BS024
3.5 GHz-4.0 GHz	-57.00	BS025
4.0 GHz-4.5 GHz	-56.67	BS026
4.5 GHz-5.0 GHz	-58.33	BS027
5.0 GHz-5.5 GHz	-59.17	BS028
5.5 GHz -6.0 GHz	-55.67	BS029
6.0 GHz -6.5 GHz	-56.83	BS030
6.5 GHz -7.0 GHz	-56.33	BS031
7.0 GHz -7.5 GHz	-52.33	BS032
7.5 GHz -8.0 GHz	-54.00	BS033
8.0 GHz -8.5 GHz	-53.50	BS034
8.5 GHz -9.0 GHz	-53.00	BS035
9.0 GHz –9.5 GHz	-52.50	BS035a
9.5 GHz -10.0 GHz	-55.33	BS036
10.0 GHz-10.5 GHz	-54.17	BS037
10.5 GHz -11.0 GHz	-53.67	BS038
11.0 GHz -12.0 GHz	-53.33	BS039
12.0 GHz -13.0 GHz	-52.33	BS040
13.0 GHz -15.0 GHz	-53.17	BS041
15.0 GHz -17.0 GHz	-54.67	BS042
17.0 GHz -20.0 GHz	-52.33	BS043

Frequency (GHz)	Highest Level Observed (dBm)	Reference to plot in Annex B-Graphical Results
20.0 GHz -25.0 GHz	-46.67	BS044
25.0 GHz -30.0 GHz	-48.83	BS045
30.0 GHz -35.0 GHz	-45.87	BS047
35.0 GHz -38.5 GHz	-42.50	BS048
38.7 GHz -40.0 GHz	-41.50	BS049
40.0 GHz -60.0 GHz	>30dB below limit (note 1) (Note2)	BS200
60.0 GHz -90.0 GHz	-55.83 (Note2)	BS201
90.0 GHz -110.0 GHz	-55.33 (Note2)	BS202
110.0 GHz -200.0 GHz	-53.5 (Note2)	BS203

Note1: a comparison was done using a signal generator to determine if the signals in the 40Ghz-60GHz range were actual signals or if they were signals created in the mixer. From this it was determined that there were no observable spurious emissions from the radio in this range. See plots BS204, BS205, BS206 and BS207. The plots read dBuV but the actual measurement is in dBm. This is due to a limitation in the software used to capture the plots.
Note2: Measurements for this frequency range were conducted with the Radio in CW mode, which gives the worst possible case for harmonic emissions. The plots read dBuV but the actual measurement is in dBm. This is due to a limitation in the software used to capture the plots.

Specification:

LIMITS CLAUSE: 101.111

FREQUENCY RANGE	REQUIRED ATTENUATION (DB)
10 kHz to 38.65 GHz	$43+10*\log_{10}$ (mean output power in Watts) decibels
38.8 GHz to 200 GHz	$43+10*\log_{10}$ (mean output power in Watts) decibels

Note 1: In any 4 kHz band, the center frequency of which is removed from the assigned frequency by more than 250 percent of the authorized bandwidth: At least $43+10*\log_{10}$ (mean output power in Watts) decibels, or 80 decibels, whichever is the lesser attenuation.

Test Equipment Used:

#	INSTRUMENT	MANUFACTURER	MODEL #	SERIAL #	CALIBRATION DATE / DUE
1	Spectrum Analyser	HP	8564EC	4111A00506	01/15/03
2	Mixer 40-60GHz	Oleson Microwave			
3	Mixer 60-90GHz	Oleson Microwave			
4	Mixer 90-110GHz	Oleson Microwave			
5	Mixer 110-200GHz	Oleson Microwave			
6	High Freq. Cables	Megaphase	TM40 K1K1 38	16071GVT4	

4.2.1.5 Frequency stability

Ambient temperature: **25.0**°C Relative humidity: **35.0** %

Results:

Equipment operating in the 38.6 GHz-40 GHz band is exempt from the frequency tolerance requirement found in part 101 of the FCC rules, therefore the Fiberless 3900 radios were not tested to this requirement.

Specification:

LIMITS **CLAUSE:** 101.107 (a)

Maximum frequency error (**%**)	**±0.001**

Test Equipment Used:

#	INSTRUMENT	MANUFACTURER	MODEL #	SERIAL #	CALIBRATION DATE / DUE
1	N/A				

4.2.1.6 Automatic Transmit Power Control

ITEM	YES	NO
Equipment has ATPC:	√	
ATPC is a fixed permanent feature:	√	
ATPC range:	45dB	
ATPC step size:	0.2dB	
Output power tolerance across ATPC range:	±2dB	

4.2.1.7 RF Safety Evaluation

#	ITEM	VALUE
1	Maximum TX power	17dBm or 50mW
2	Highest gain CPE antenna	35 dBi
3	Max EIRP	52 dBm or 158.5 W

The Max EIRP value of 158.5 W is well below 1640W. Therefore, an RF warning label is not required.

4.2.1.8 Field Strength of Spurious Emissions

There were no observable Radiated emissions from the Transceiver portion of the EUT in the 30MHz-5 GHz range. All of the measurable radiated emissions are related to the digital device portion of the EUT, and thus are compared to the 47CFR 15 Class B field strength limit.

The highest measurable spurious emission was –40.60 dBm at 39.6035 GHz for the CPE ODU and –33.40 dBm at 39.6035GHz for the Base station ODU, which translates into a field strength at 3m of 54.63 dBuV/m and 61.83 dBuV/m respectively (See calculations below). These field strengths are more than 20dB below the field strength of 82.23 dBuV/m that would be generated by a –13dBm source.

Spur Field Strength Based on Isotropic Radiation Pattern (Base Station ODU)

P_{spur} =	**-33.40**	dBm	Worst Case Spur Power @ 100KHz - 1.0 GHz Radiated emission
G_{ant} =	0	dB	Antenna Gain (Assume Isotropic Radiation Pattern)
d =	3	m	Distance
P_{out} =	4.57E-07	W	Spur Power
G_{ant} =	1		Antenna Gain
EIRP =	4.57E-07	W	$P_{out} * G_{ant}$
S_r =	4.04E-09	W/m^2	Received Power Density = EIRP / $(4\pi r^2)$
E_r =	1.23E-03	V/m	Received Electric Field Strength = $(S_r * 120\pi)^{1/2}$
E_{spur} =	**61.83**	dBuV/m	Field strength in dBuV/M = 20*log(E_r / 1e-6)

Spur Field Strength Based on Isotropic Radiation Pattern (CPE ODU)

P_{spur} =	**-40.60**	dBm	Worst Case Spur Power @ 100KHz - 1.0 GHz Radiated emission
G_{ant} =	0	dB	Antenna Gain (Assume Isotropic Radiation Pattern)
d =	3	m	Distance
P_{out} =	8.71E-08	W	Spur Power
G_{ant} =	1		Antenna Gain
EIRP =	8.71E-08	W	$P_{out} * G_{ant}$
S_r =	7.70E-10	W/m^2	Received Power Density = EIRP / $(4\pi r^2)$
E_r =	5.39E-04	V/m	Received Electric Field Strength = $(S_r * 120\pi)^{1/2}$
E_{spur} =	**54.63**	dBuV/m	Field strength in dBuV/M = 20*log(E_r / 1e-6)

FCC Emission Mask Converted to Received Field Strength

P_{max} =	**-13**	dBm	Max Spur Level (a constant: 30 - 43 = -13)
G_{ant} =	0	dB	Antenna Gain (Assume Isotropic Radiation Pattern)
d =	3	m	Distance
P_{out} =	5.01E-05	W	Spur Power
G_{ant} =	1		Antenna Gain
EIRP =	5.01E-05	W	Pout * Gant

S_r =	4.43E-07	W/m^2	Received Power Density = EIRP / ($4\pi r^2$)
E_r =	0.012925	V/m	Received Electric Field Strength = (S_r * 120π)$^{1/2}$
E_{max} =	**82.23**	dBuV/m	Field strength in dBuV/M = 20*log(E_r / 1e-6)

5 Test Equipment Used

Nominal Test Temperature: 25C, Humidity: 35%

#	INSTRUMENT	MANUFACTURER	MODEL #	SERIAL #	CALIBRATION DATE / DUE
1	Power Meter	Agilent	E4418B	MY40330474	28/04/02
2	Power Sensor	Agilent	8487A	MY41090136	28/04/02
3	Spectrum Analyser	HP	8564E	3943A01770	05/18/02
4	Spectrum Analyser	HP	8564EC	4111A00506	01/15/03
5	Mixer 40-60GHz	Oleson Microwave			
6	Mixer 60-90GHz	Oleson Microwave			
7	Mixer 90-110GHz	Oleson Microwave			
8	Mixer 110-200GHz	Oleson Microwave			
9	High Freq. Cables	Megaphase	TM40 K1K1 38	16071GVT4	
10	High Freq. Cables	Megaphase	TM40 K1K1 38	1424GVT4	

6 Summary Of Test Results

PARAMETER	C	NC	NT	NA	REFERENCE TO REMARK
TRANSMITTER CHARACTERISTICS					
RF power output	X				
Modulation characteristics	X				
Occupied bandwidth	X				
Spurious emissions at antenna terminals	X				
Field strength of spurious radiation	X				
Frequency stability				X	

Note: C: The parameter is compliant with the requirements.

NC: The parameter is not compliant with the requirements.

NT: The parameter is not tested.

NA: The test of this parameter is not applicable.

7 Test set-up illustrations

7.1 Base Station (BS) Test Configuration

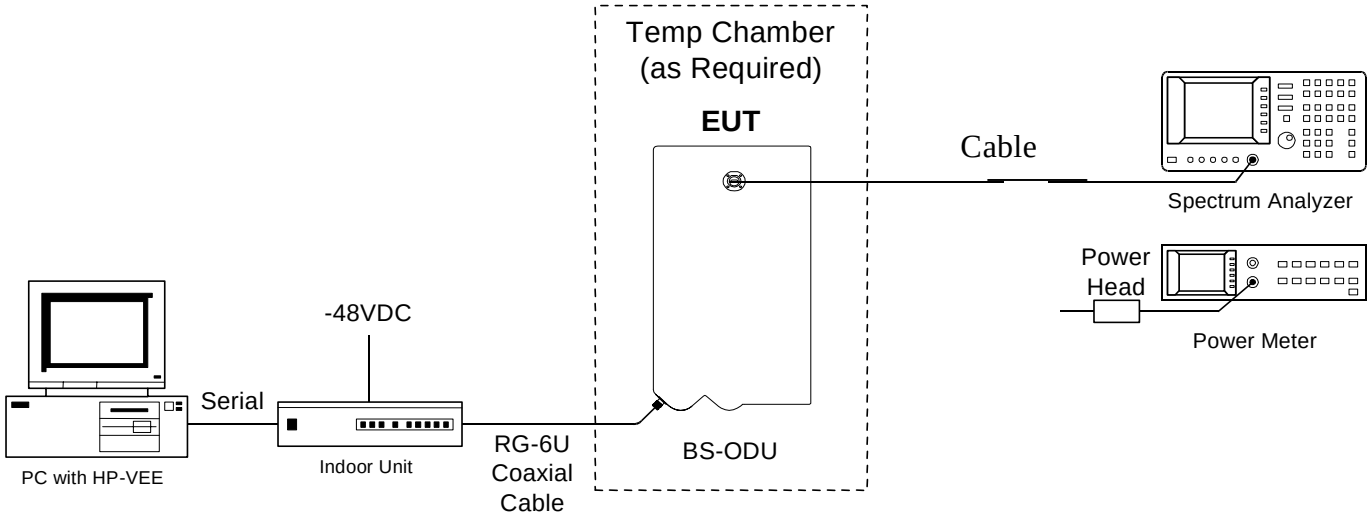


Figure 1 Base Station ODU Test Set Up Drawing

Figure 2 Base Station ODU 9kHz-40GHz Test Set Up

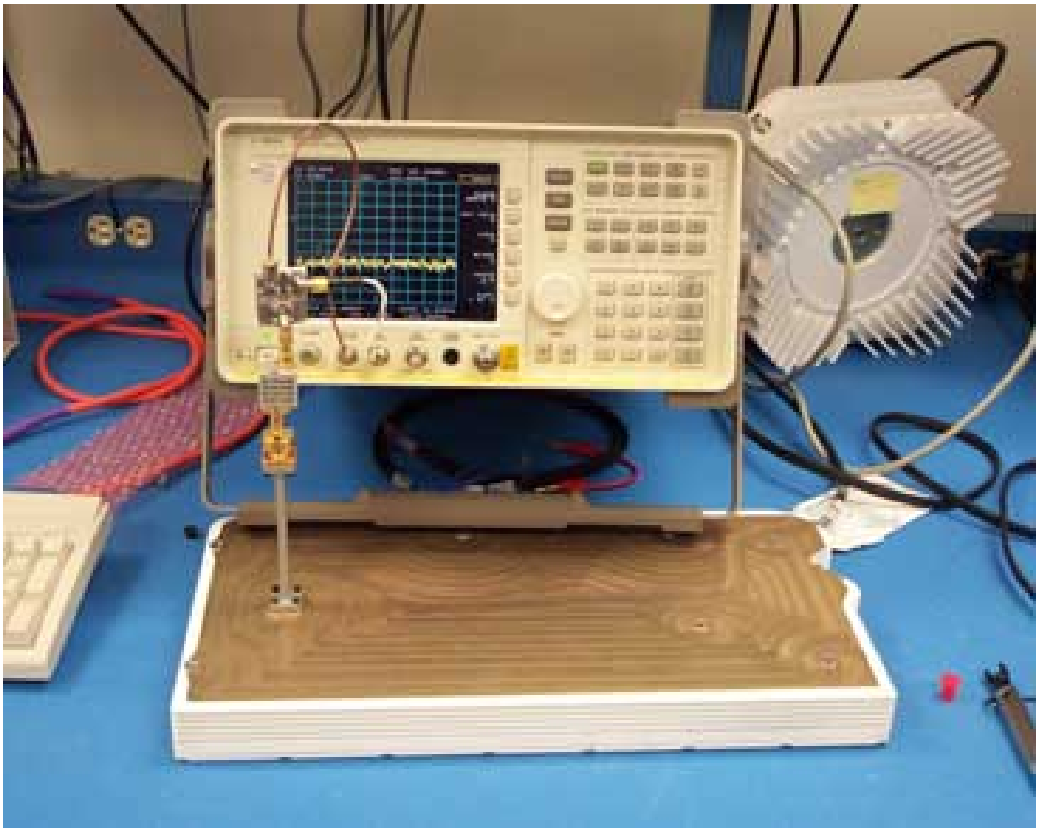


Figure 3 Base Station ODU 40 GHz-200 GHz Test Set Up

7.2 Customer Premises Equipment (CPE) Test Configuration

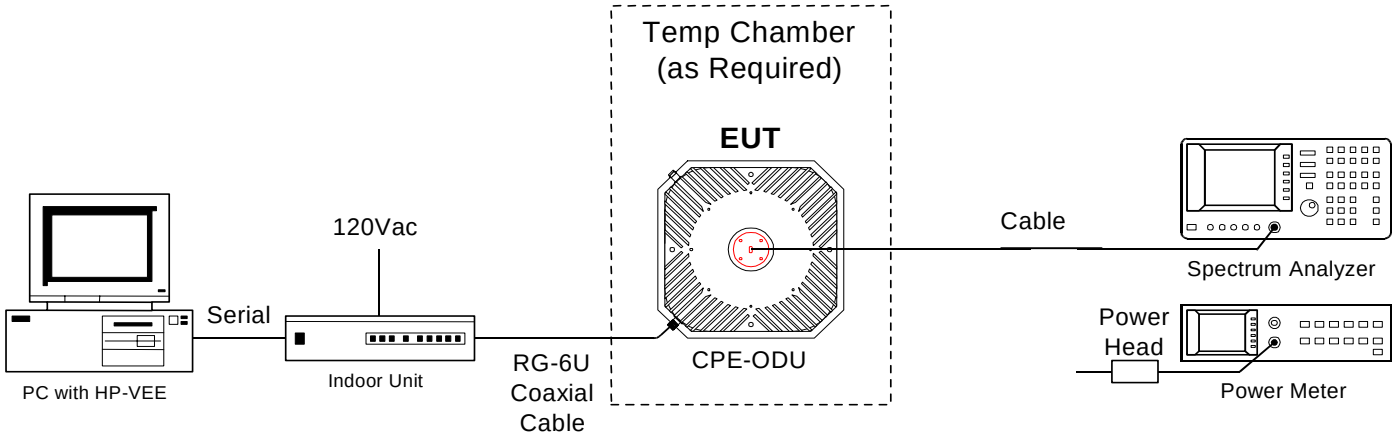


Figure 4 CPE ODU Test Set UP Drawing

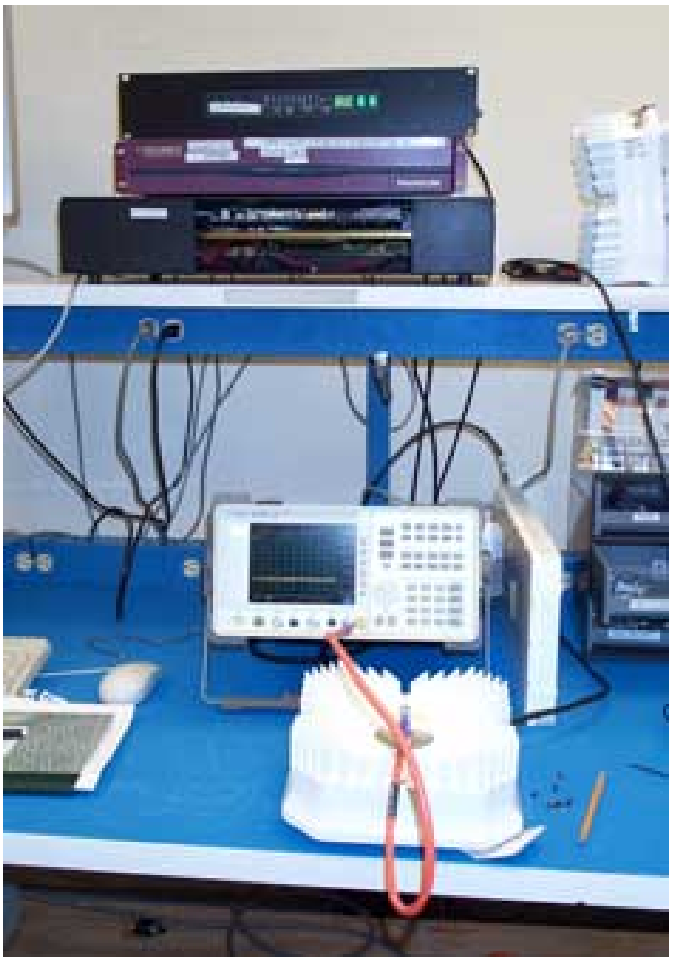


Figure 5 CPE ODU 9 kHz-200 GHz Test Set Up

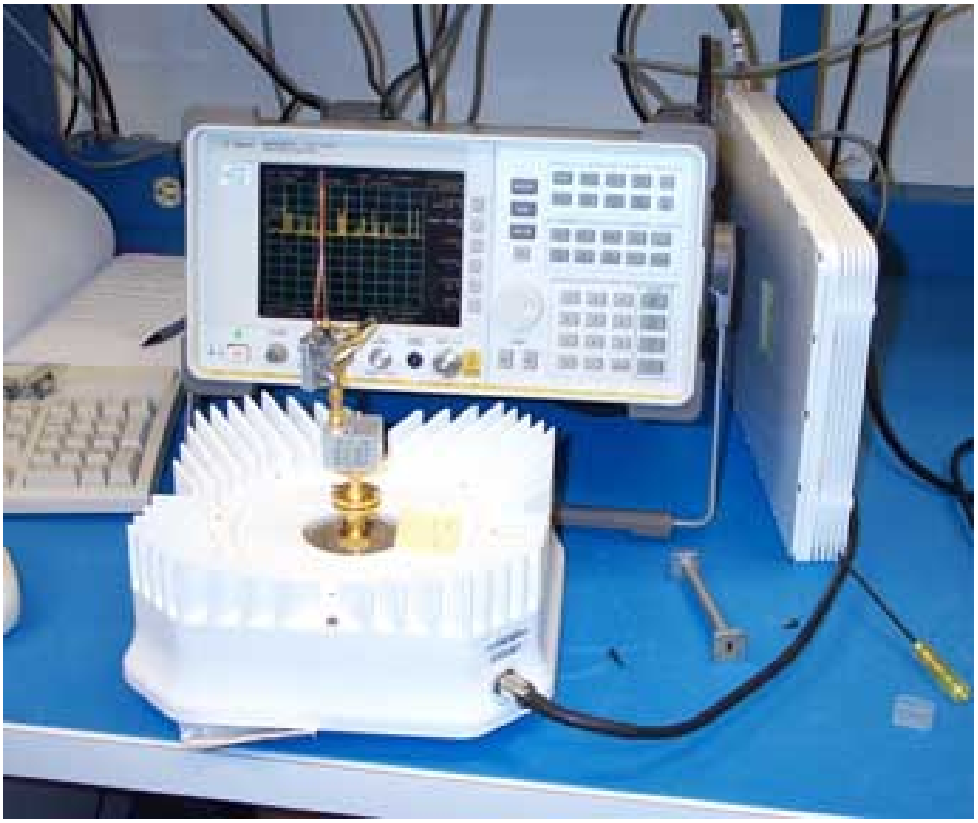
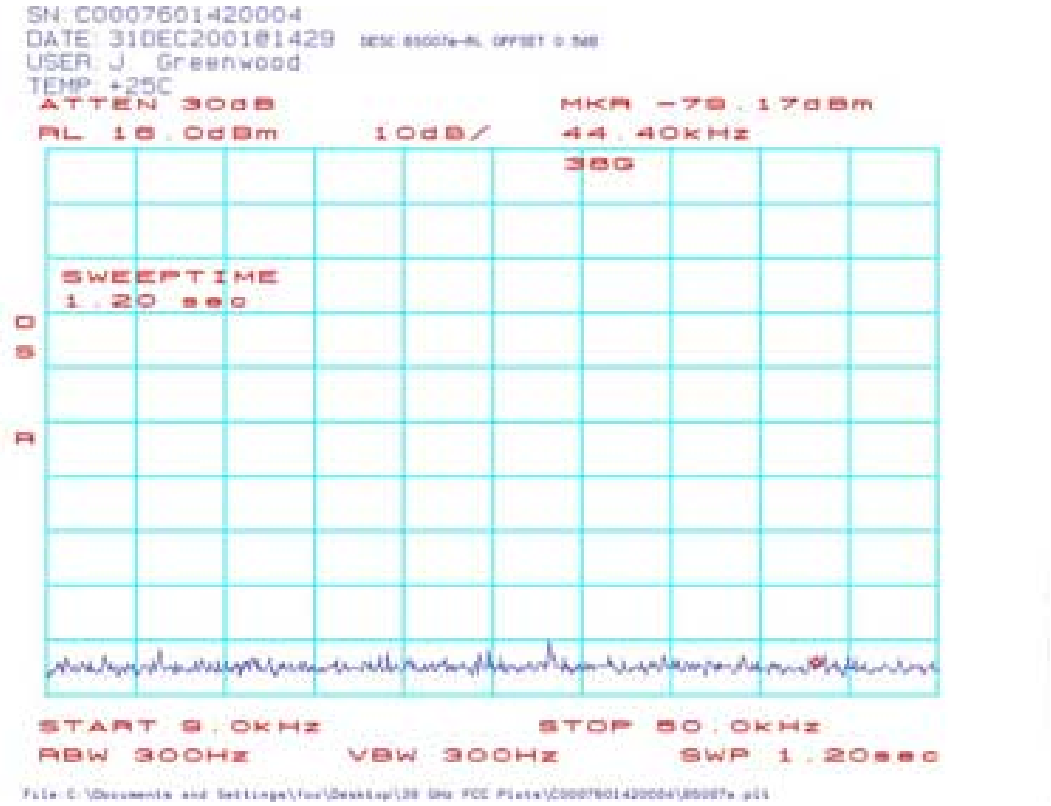


Figure 6 CPE ODU 40 GHz-200 GHz Test Set Up

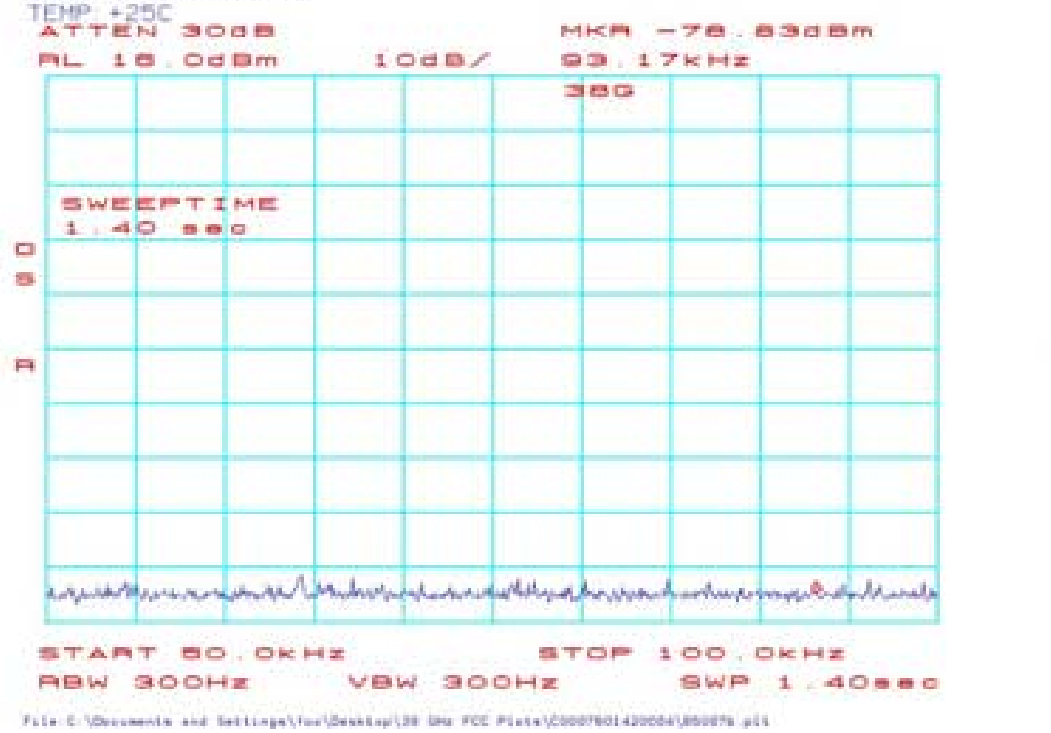
8 Graphical Results

This report is accompanied by the following graphs indicated in the tables in Section 4.2 above.

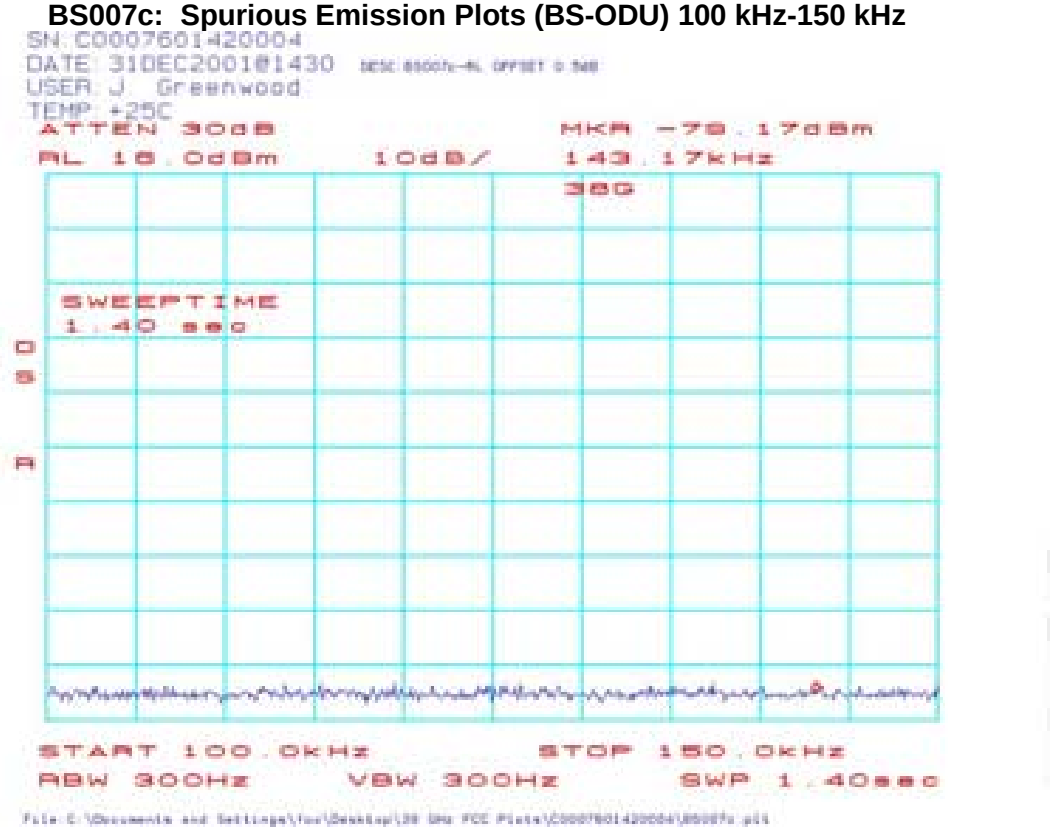
BS007a: Spurious Emission Plots (BS-ODU) 10 kHz-50 kHz



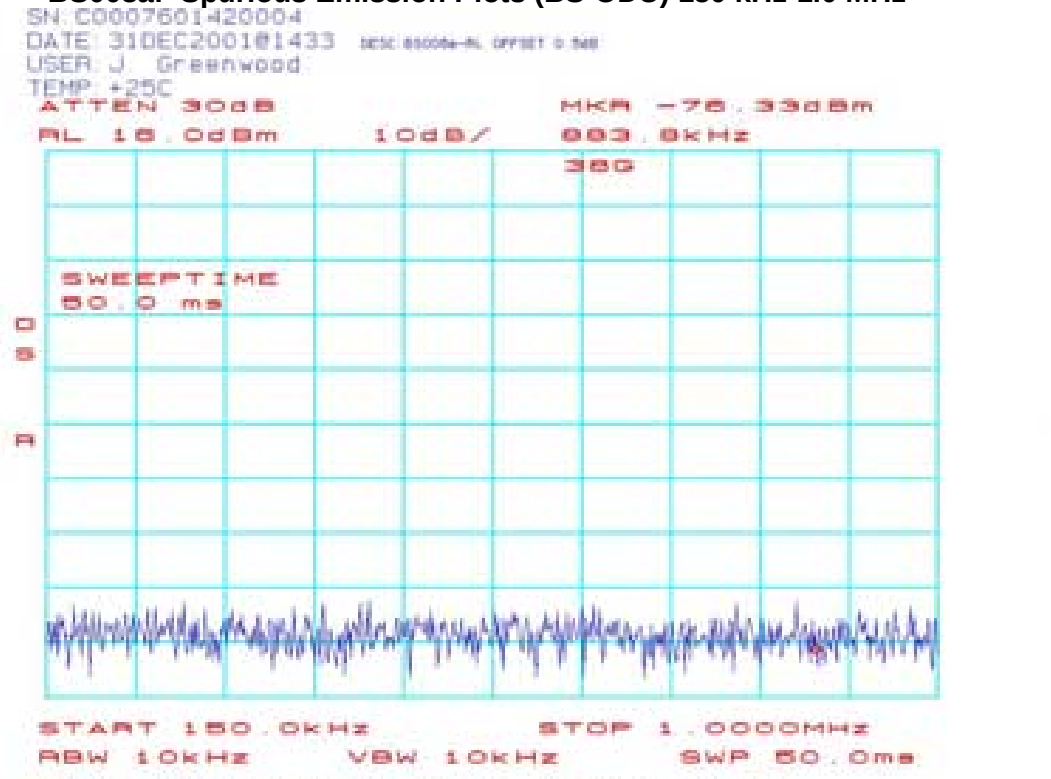
BS007b: Spurious Emission Plots (BS-ODU) 50 kHz-100 kHz



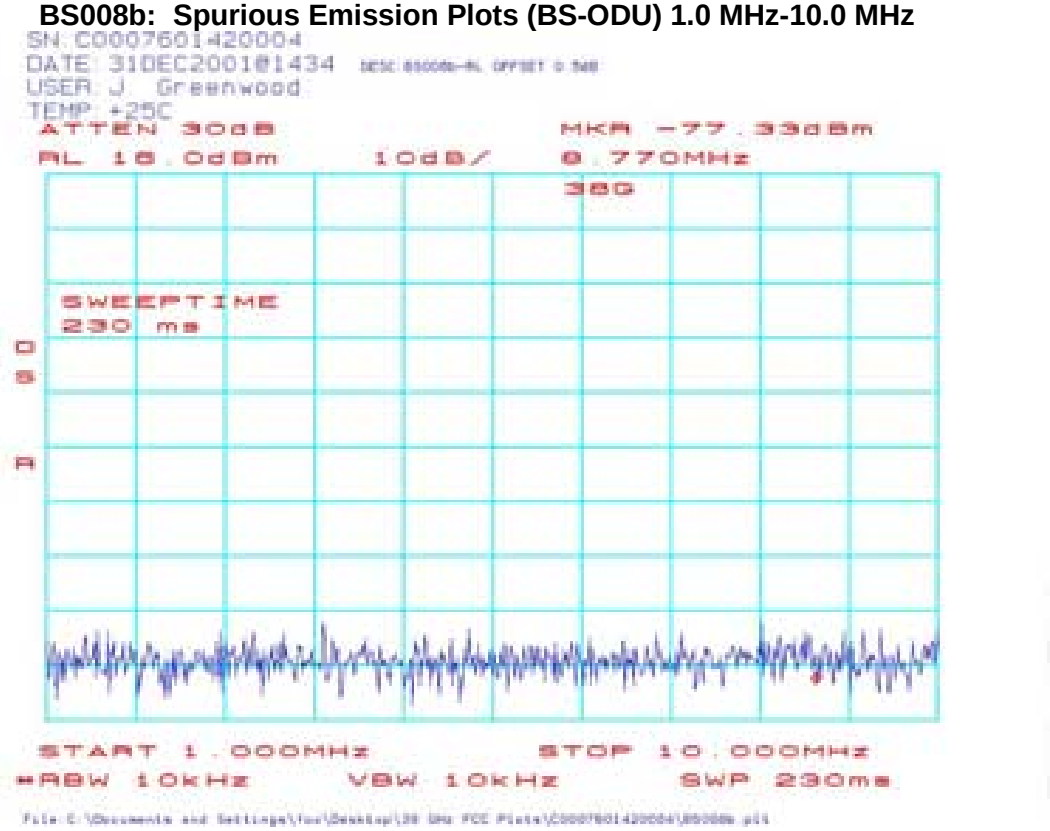
BS007c: Spurious Emission Plots (BS-ODU) 100 kHz-150 kHz



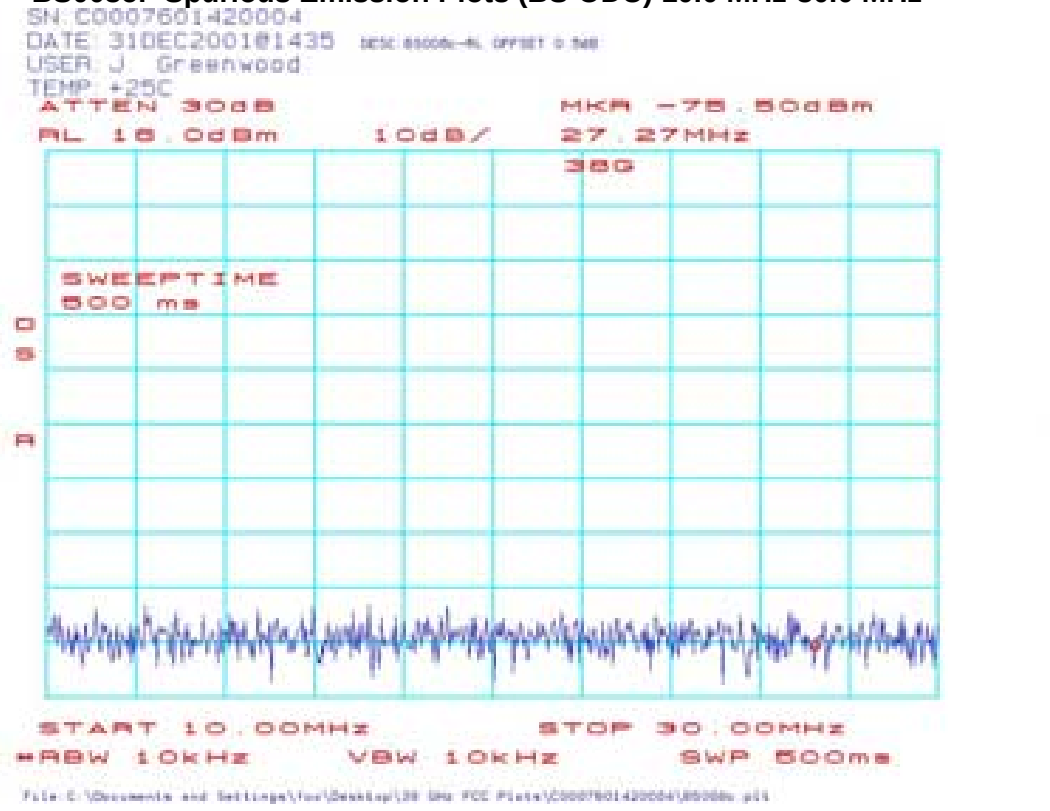
BS008a: Spurious Emission Plots (BS-ODU) 150 kHz-1.0 MHz



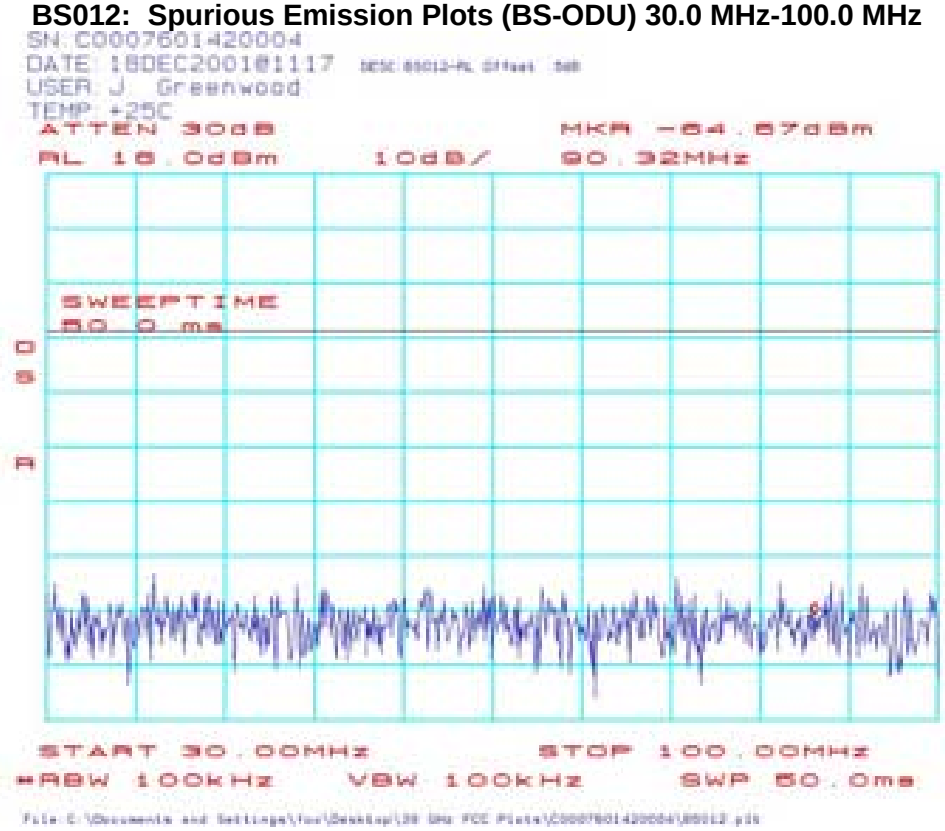
BS008b: Spurious Emission Plots (BS-ODU) 1.0 MHz-10.0 MHz



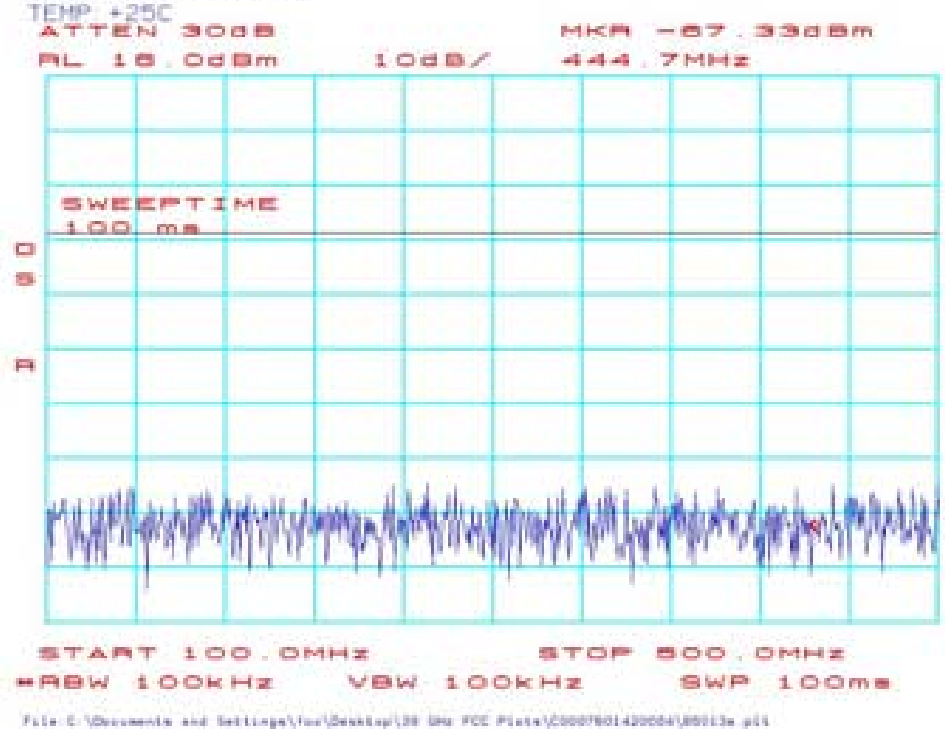
BS008c: Spurious Emission Plots (BS-ODU) 10.0 MHz-30.0 MHz



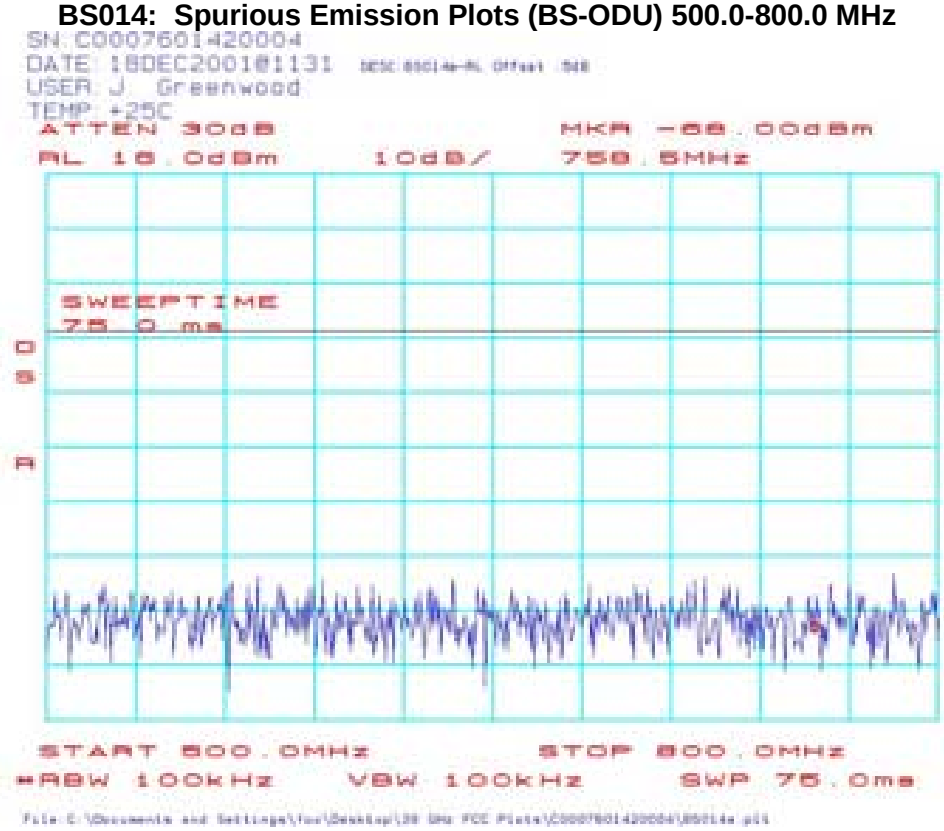
BS012: Spurious Emission Plots (BS-ODU) 30.0 MHz-100.0 MHz



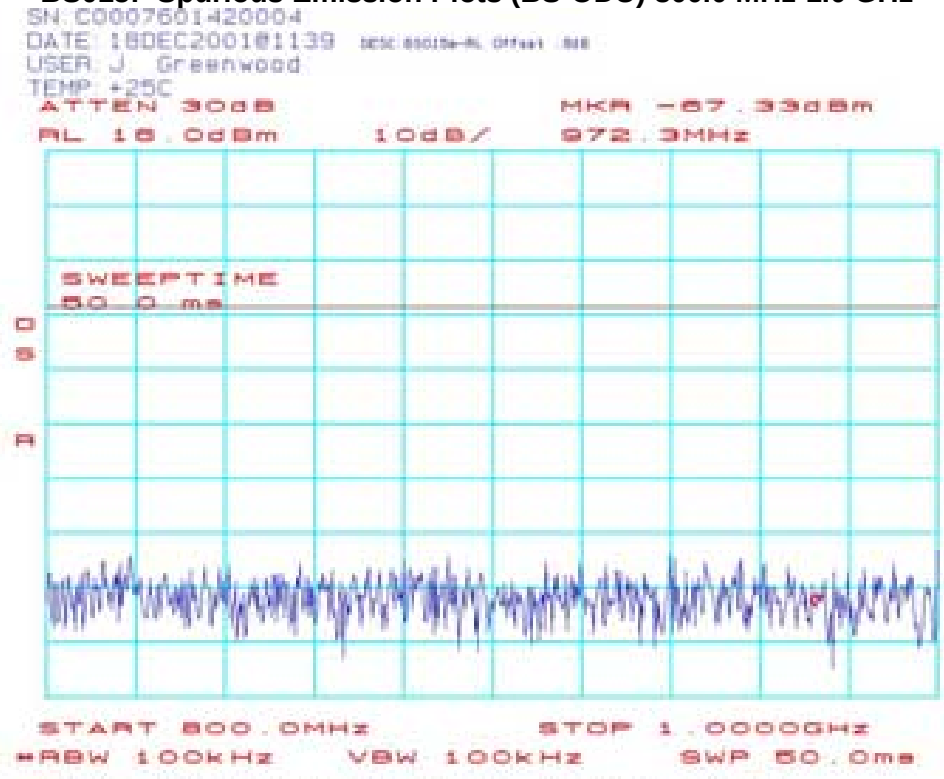
BS013: Spurious Emission Plots (BS-ODU) 100.0-500.0 MHz



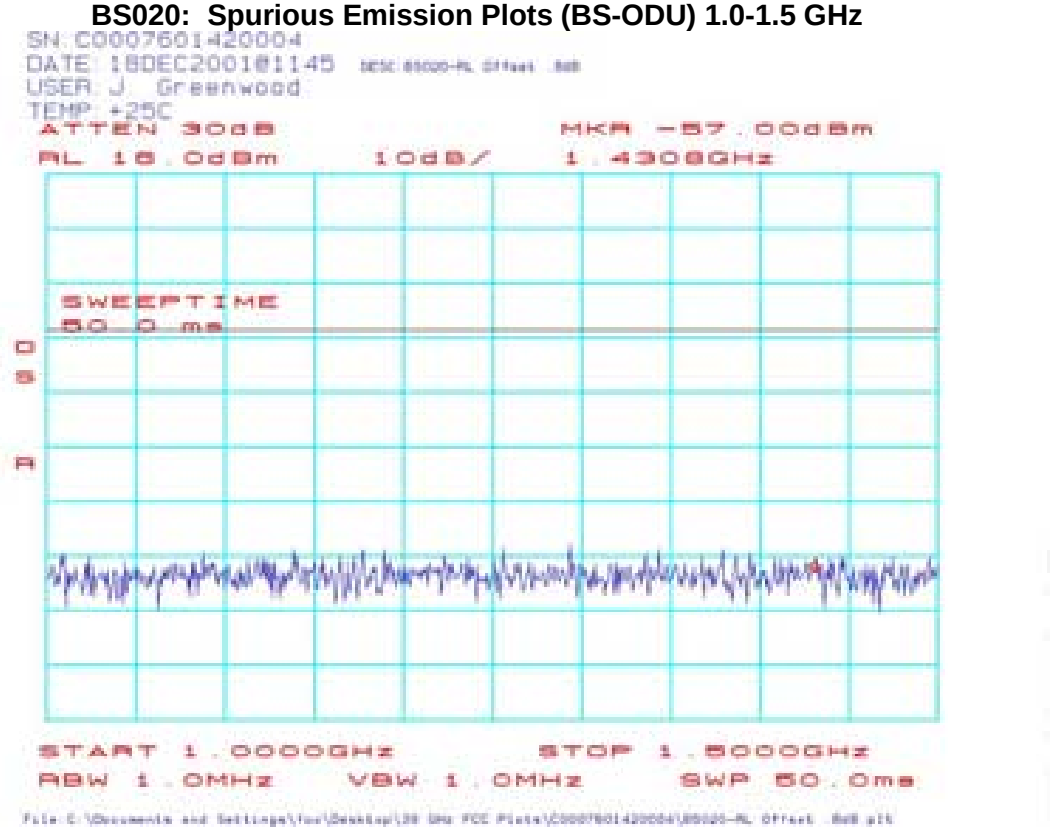
BS014: Spurious Emission Plots (BS-ODU) 500.0-800.0 MHz



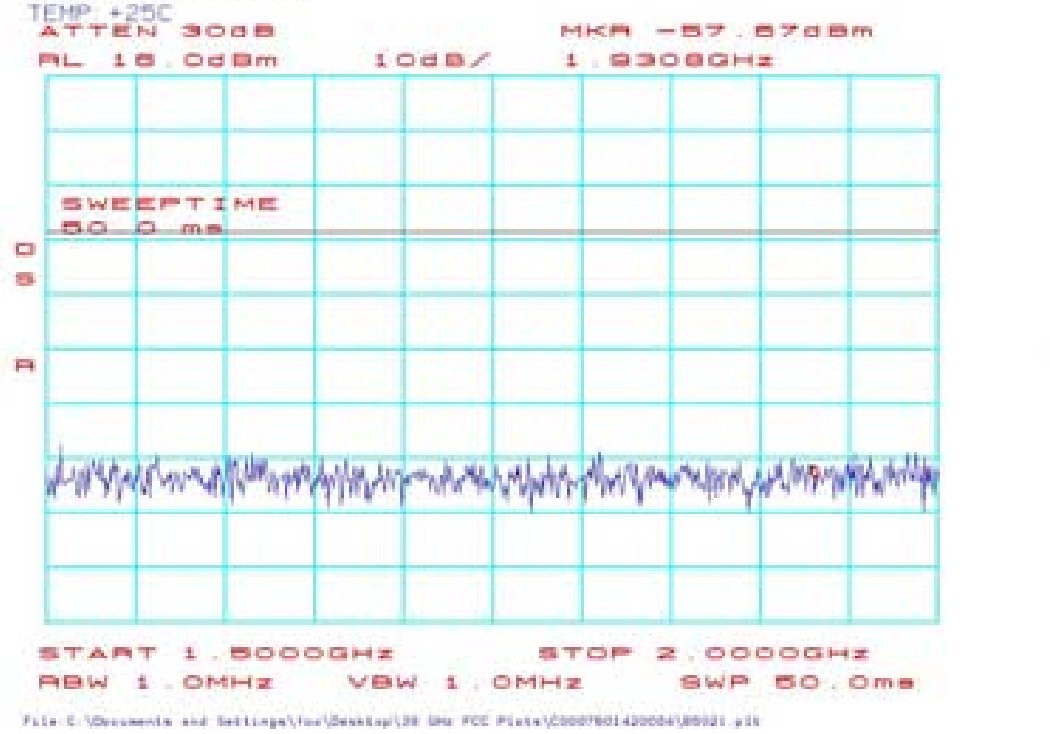
BS015: Spurious Emission Plots (BS-ODU) 800.0 MHz-1.0 GHz



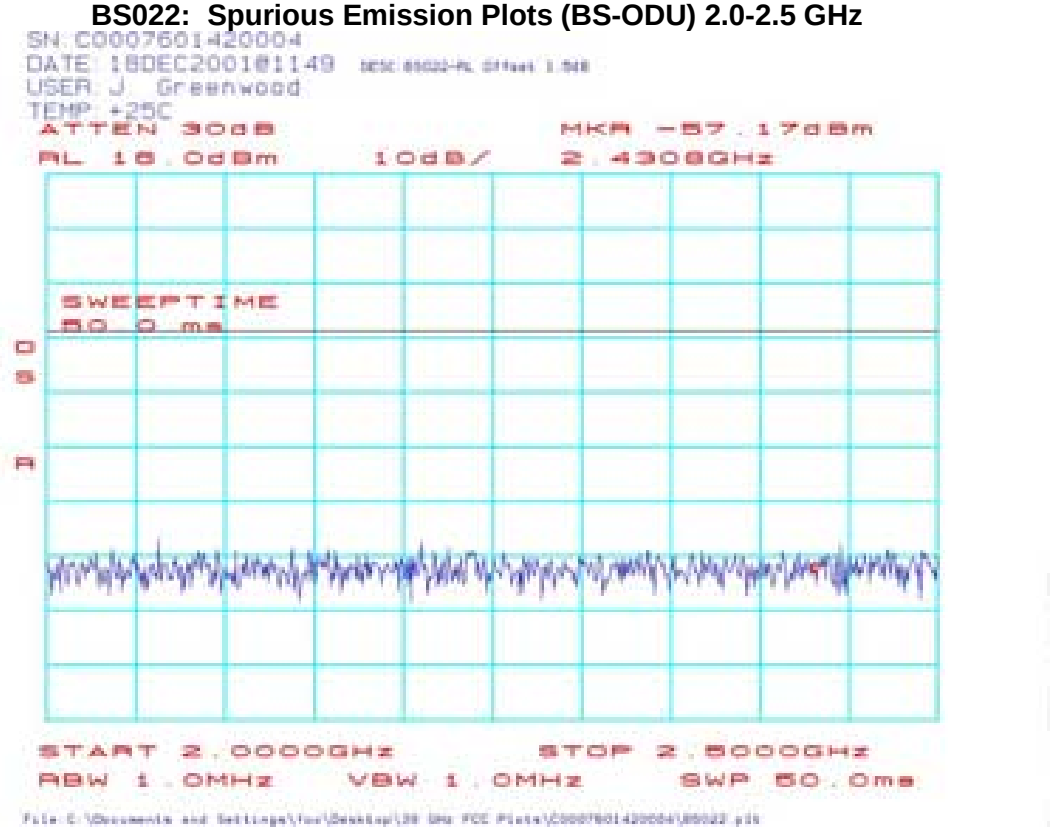
BS020: Spurious Emission Plots (BS-ODU) 1.0-1.5 GHz



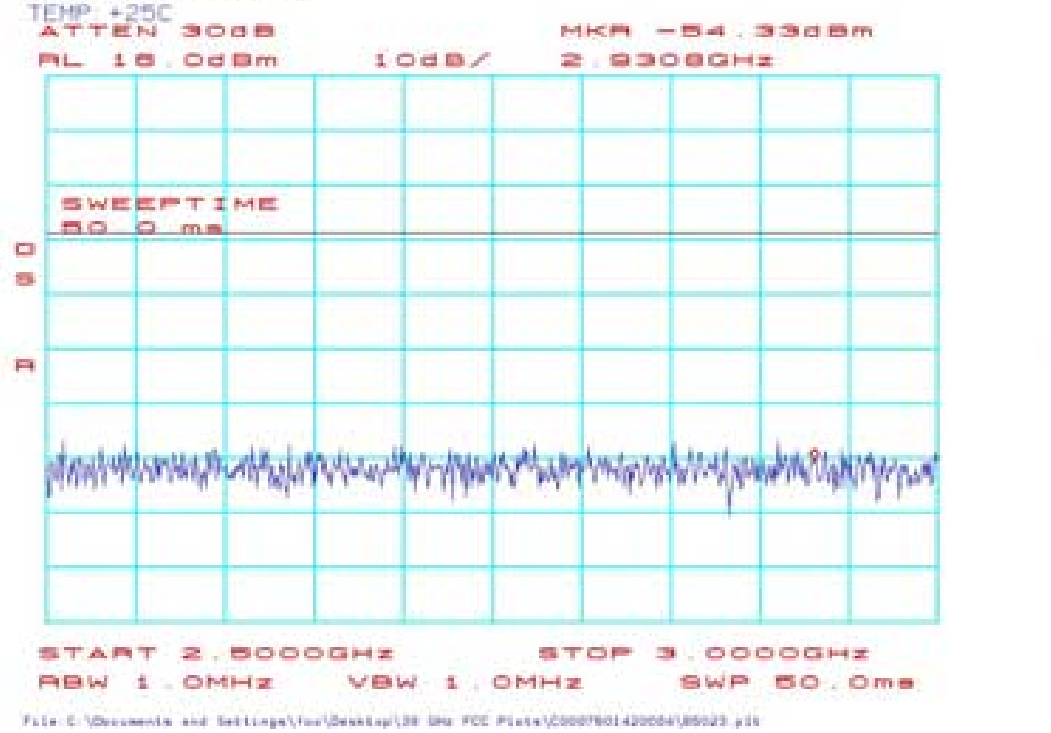
BS021: Spurious Emission Plots (BS-ODU) 1.5-2.0 GHz



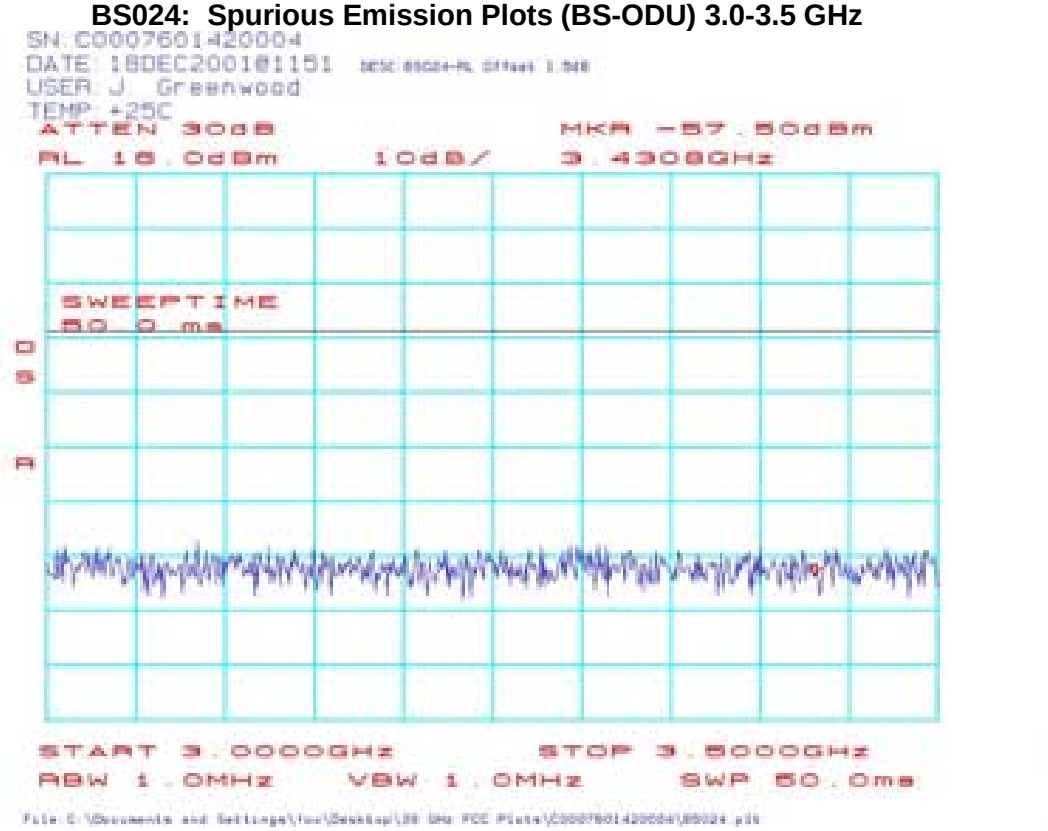
BS022: Spurious Emission Plots (BS-ODU) 2.0-2.5 GHz



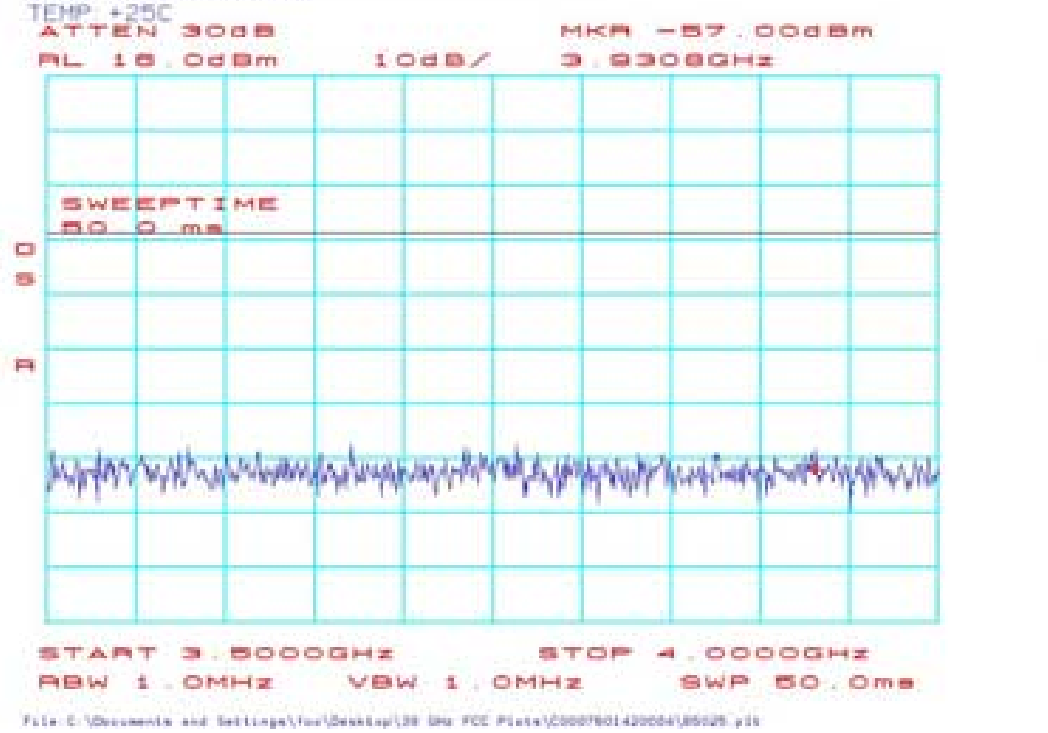
BS023: Spurious Emission Plots (BS-ODU) 2.5-3.0 GHz



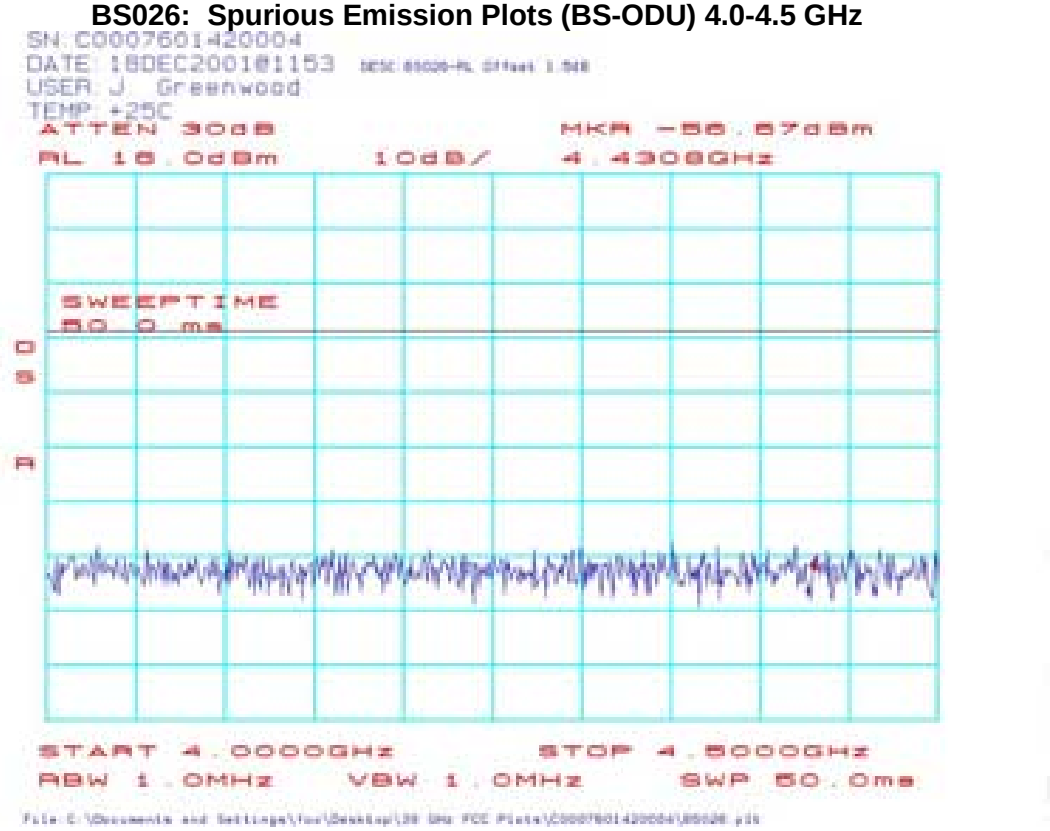
BS024: Spurious Emission Plots (BS-ODU) 3.0-3.5 GHz



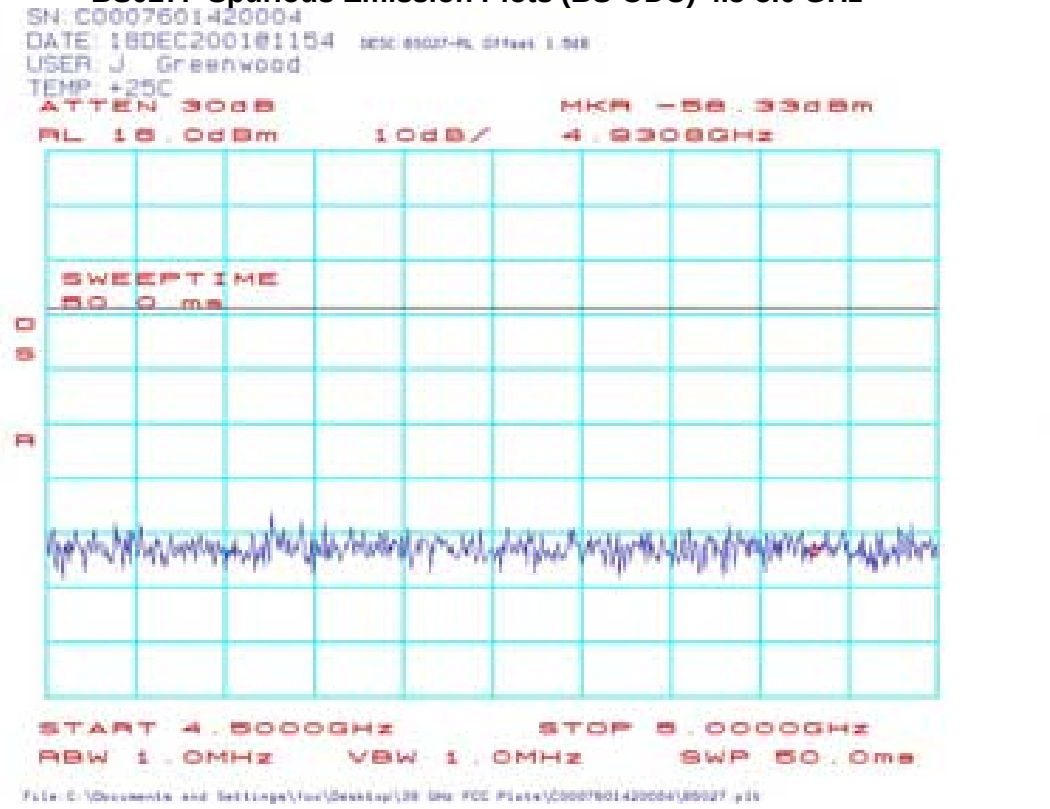
BS025: Spurious Emission Plots (BS-ODU) 3.5-4.0 GHz



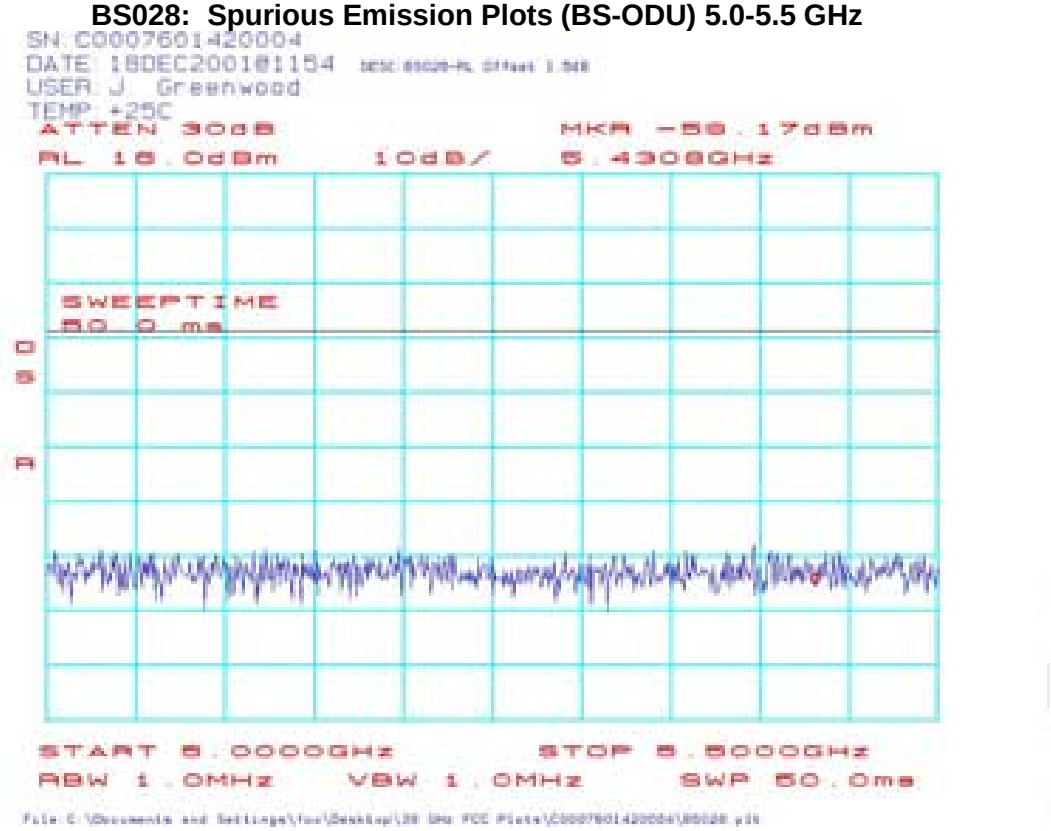
BS026: Spurious Emission Plots (BS-ODU) 4.0-4.5 GHz



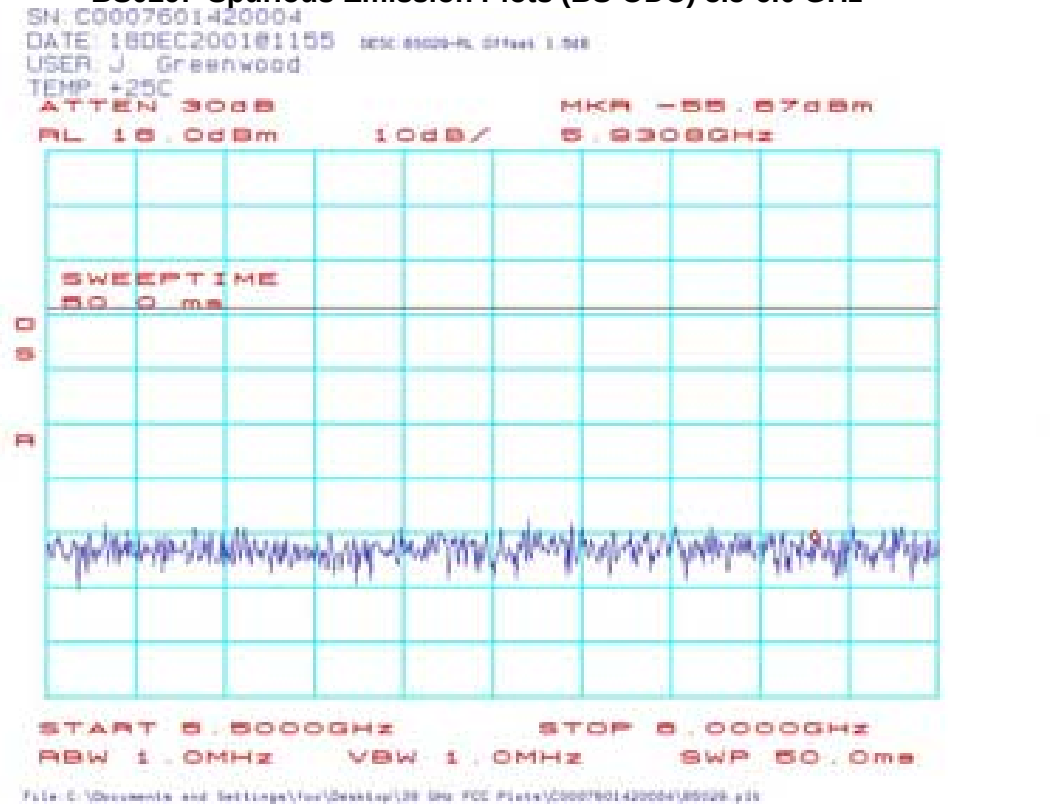
BS027: Spurious Emission Plots (BS-ODU) 4.5-5.0 GHz



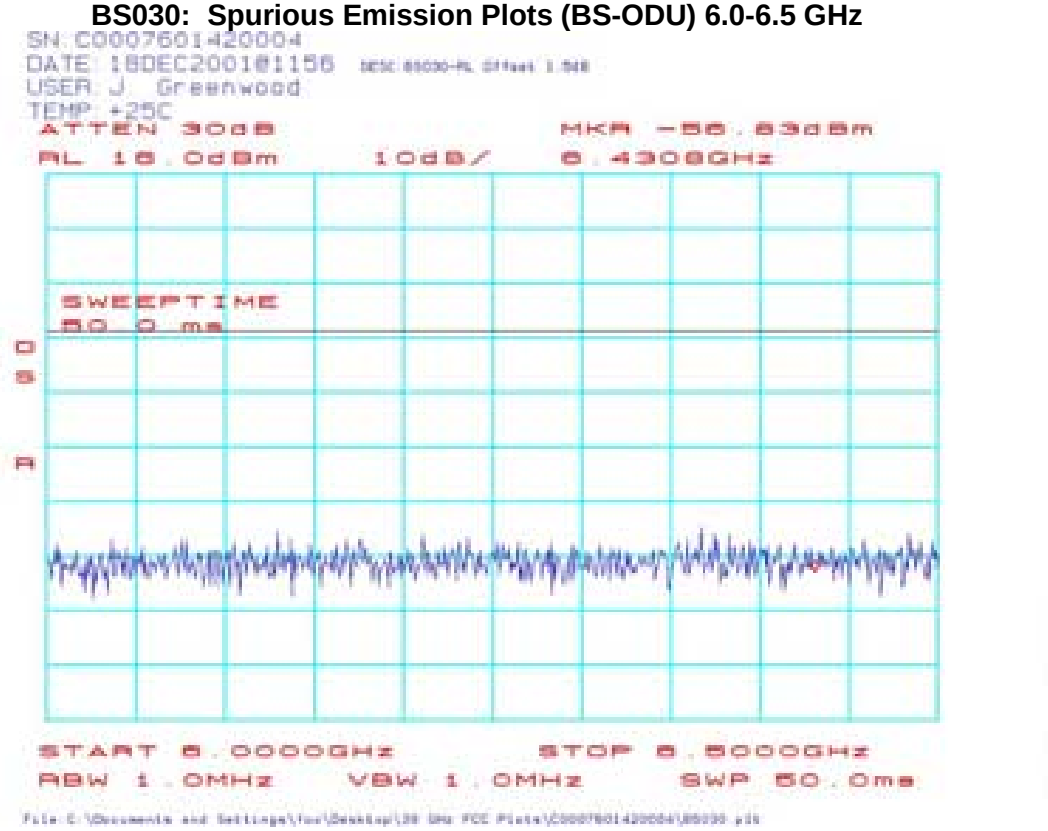
BS028: Spurious Emission Plots (BS-ODU) 5.0-5.5 GHz



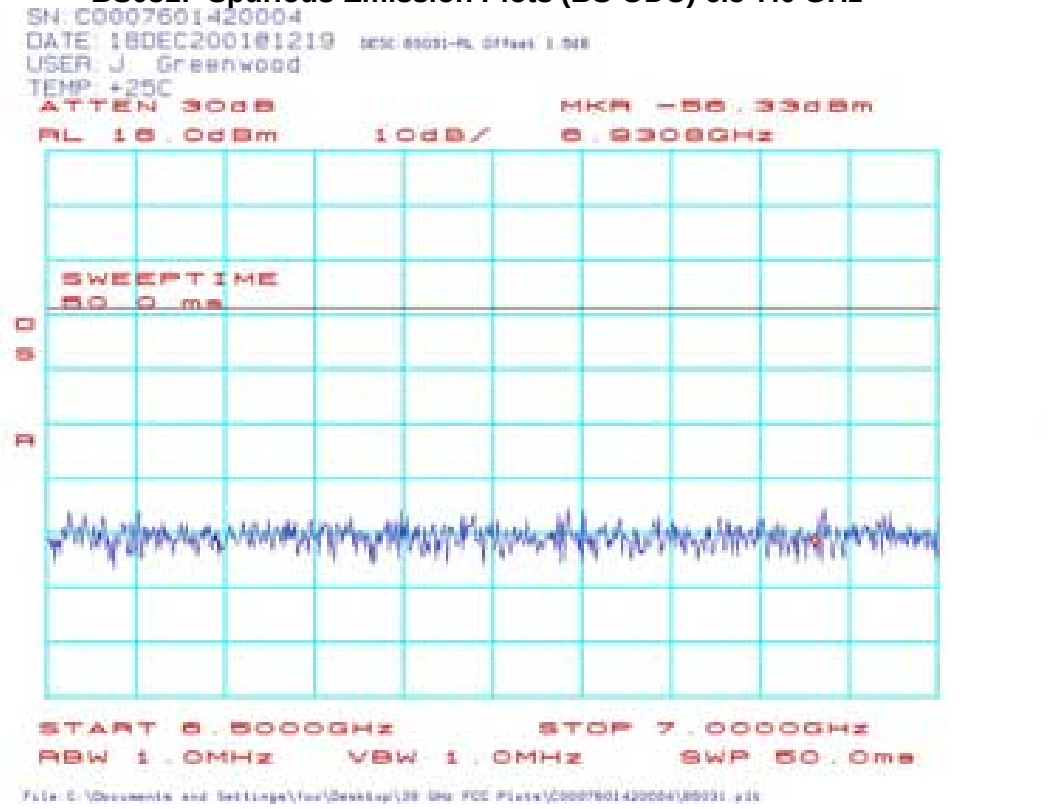
BS029: Spurious Emission Plots (BS-ODU) 5.5-6.0 GHz



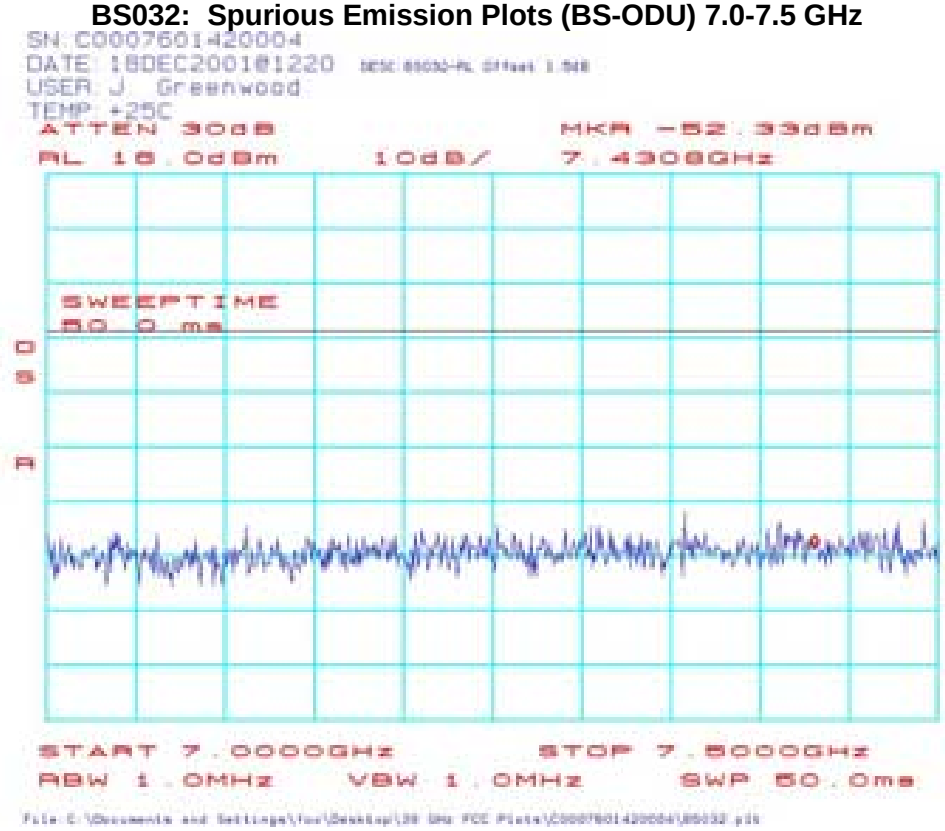
BS030: Spurious Emission Plots (BS-ODU) 6.0-6.5 GHz



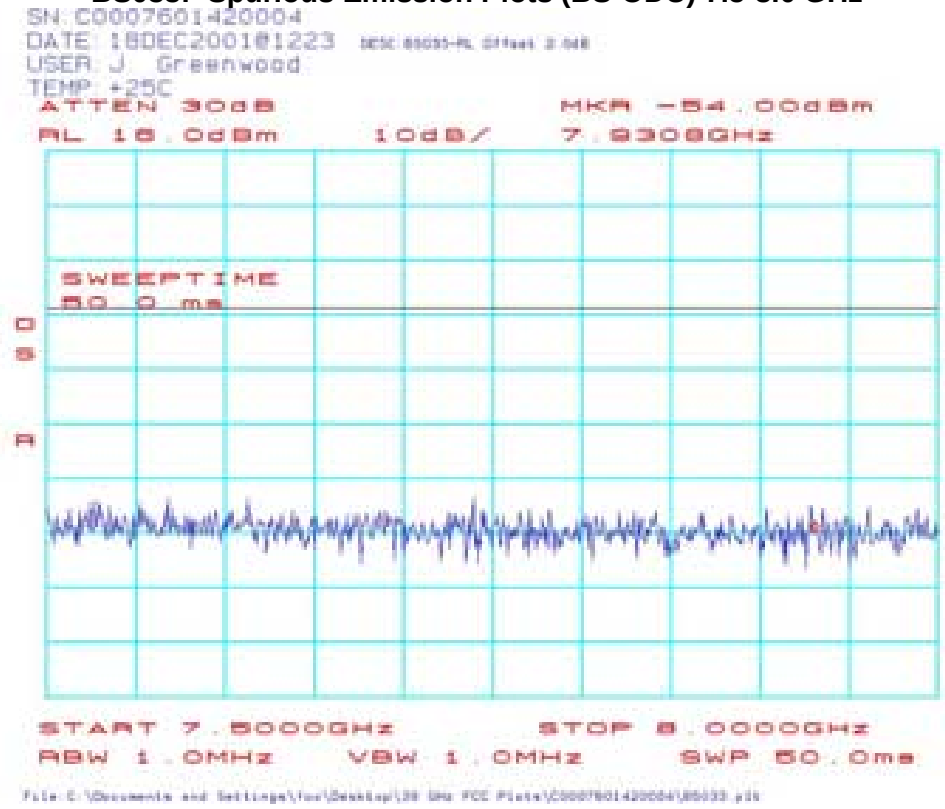
BS031: Spurious Emission Plots (BS-ODU) 6.5-7.0 GHz



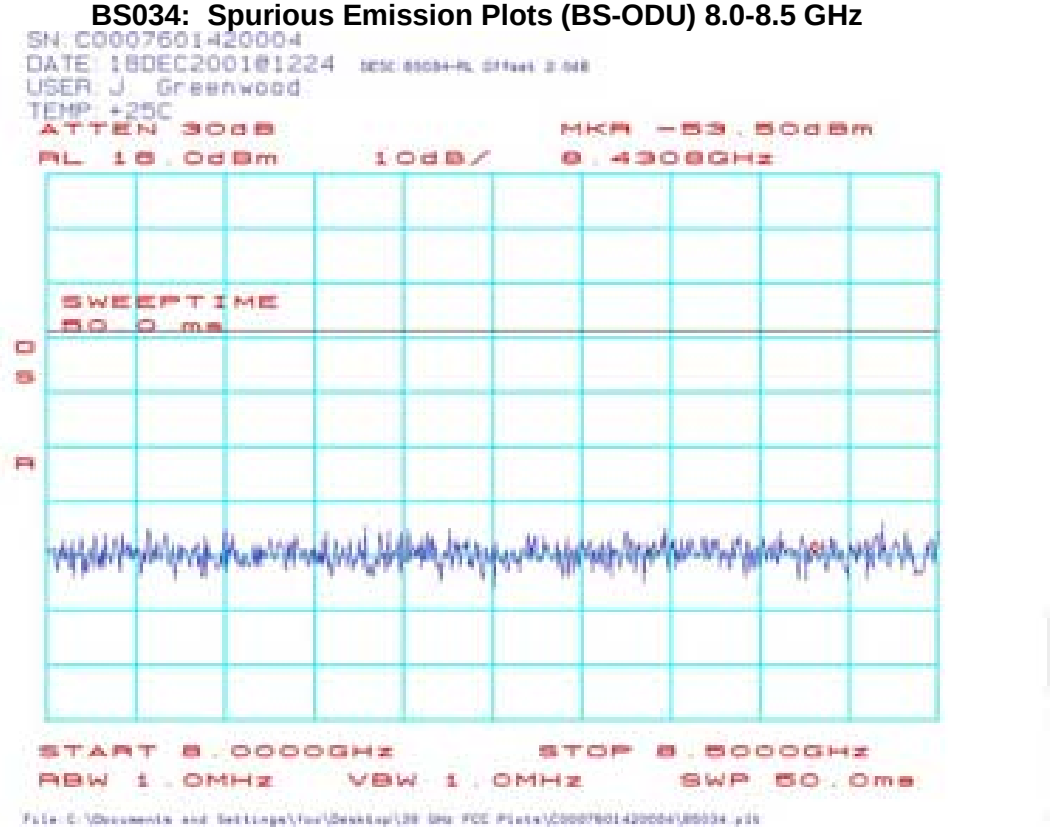
BS032: Spurious Emission Plots (BS-ODU) 7.0-7.5 GHz



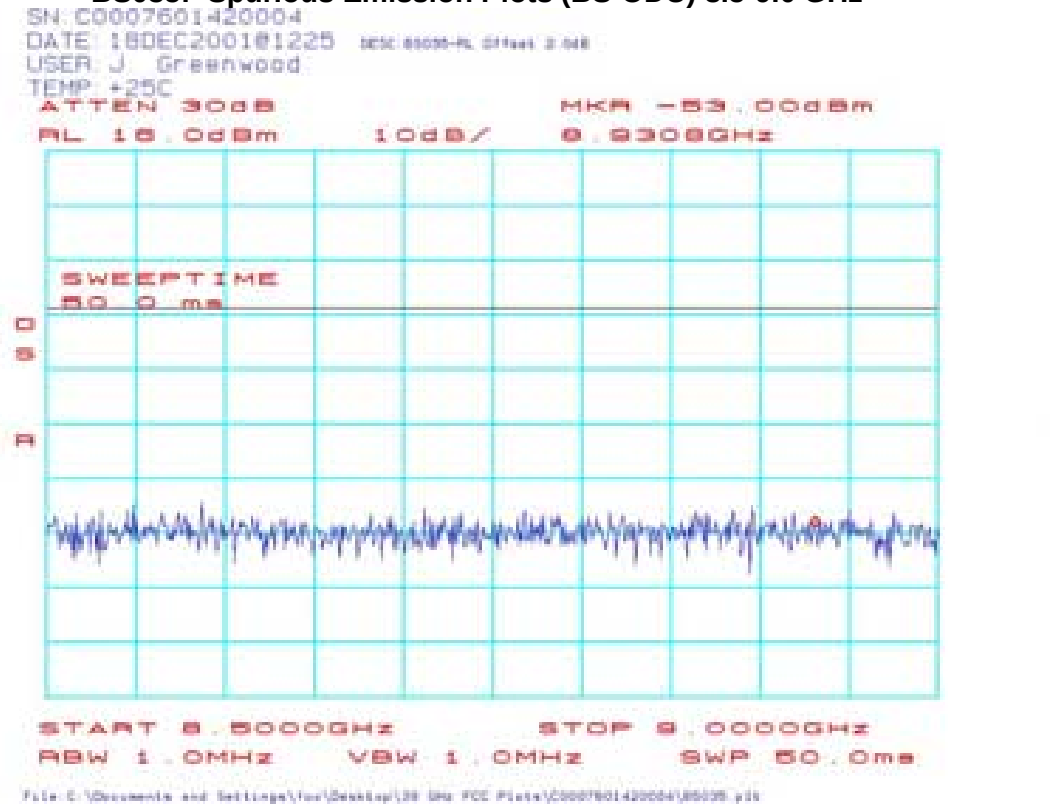
BS033: Spurious Emission Plots (BS-ODU) 7.5-8.0 GHz



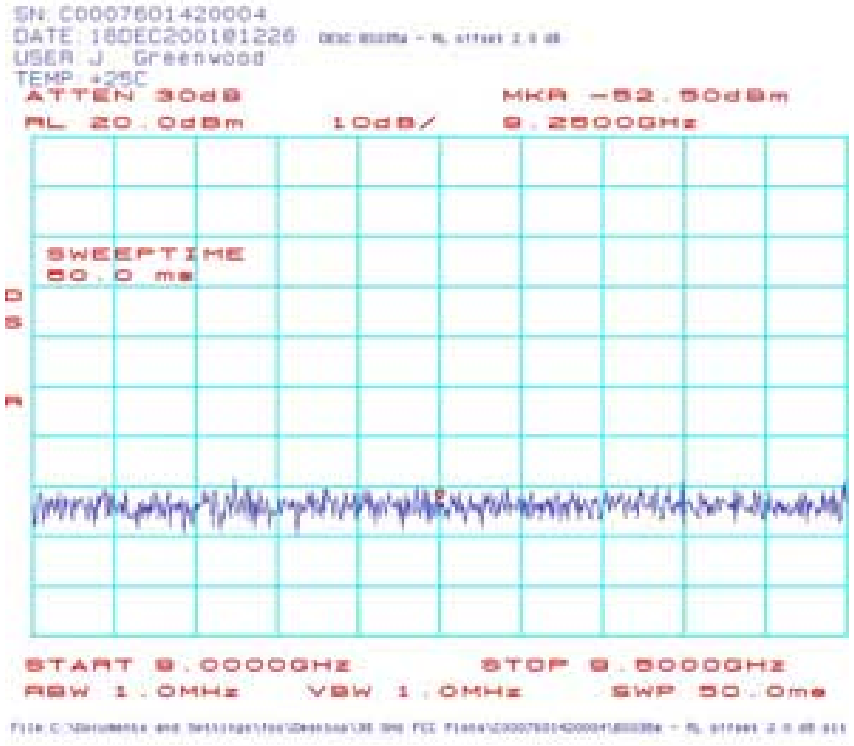
BS034: Spurious Emission Plots (BS-ODU) 8.0-8.5 GHz



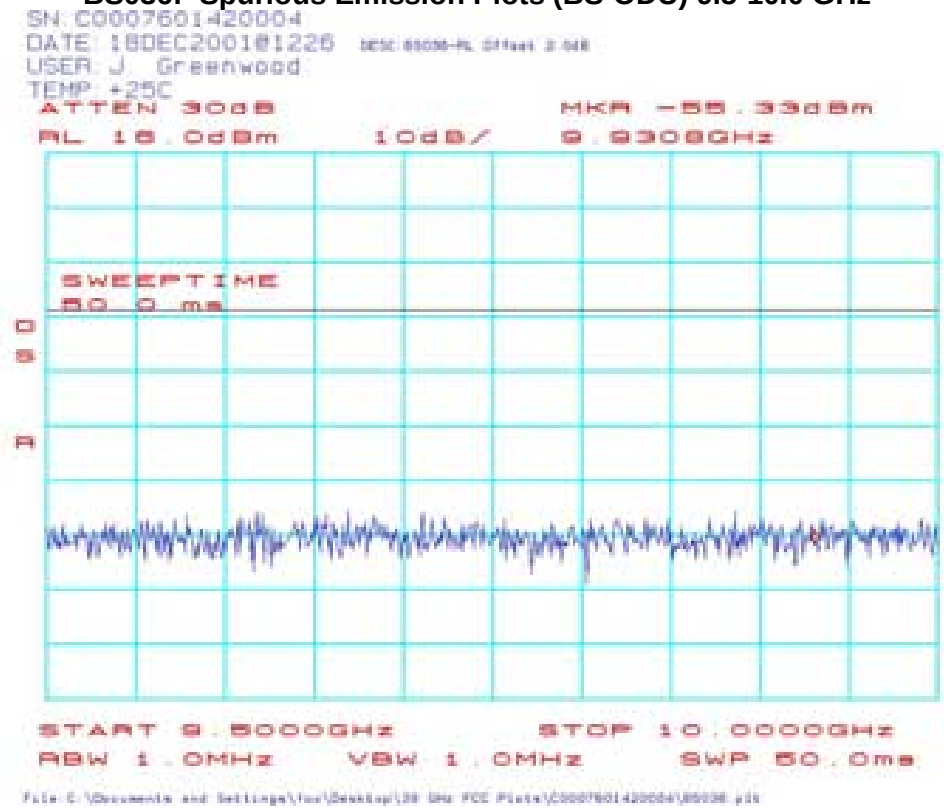
BS035: Spurious Emission Plots (BS-ODU) 8.5-9.0 GHz



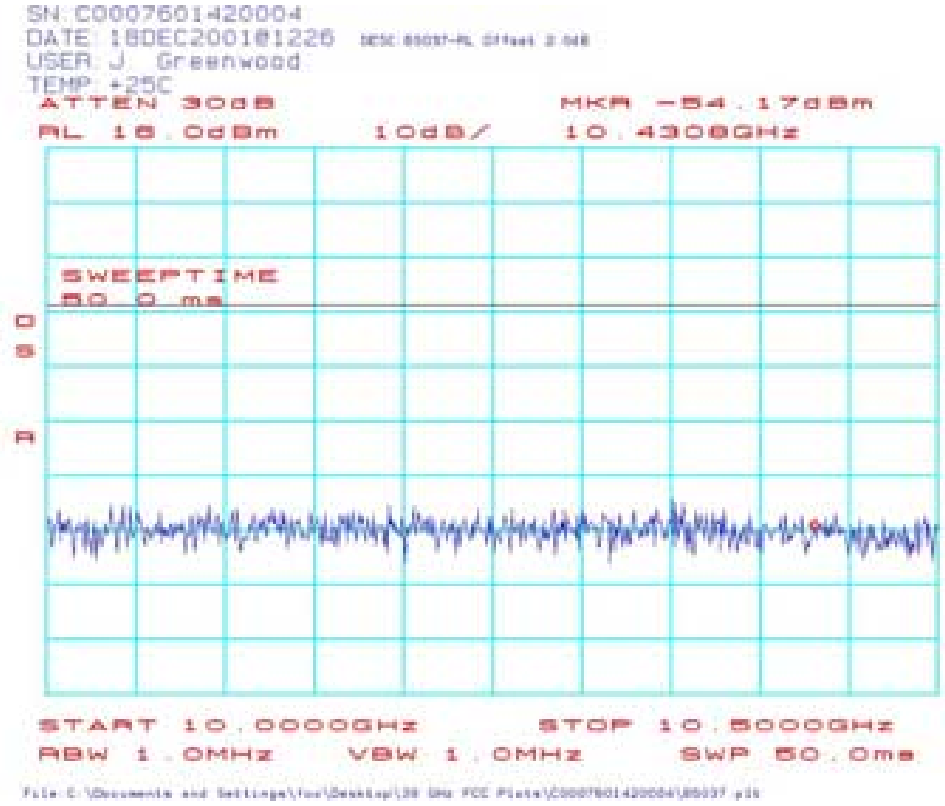
BS035a: Spurious Emission Plots (BS-ODU) 9.0-9.5 GHz



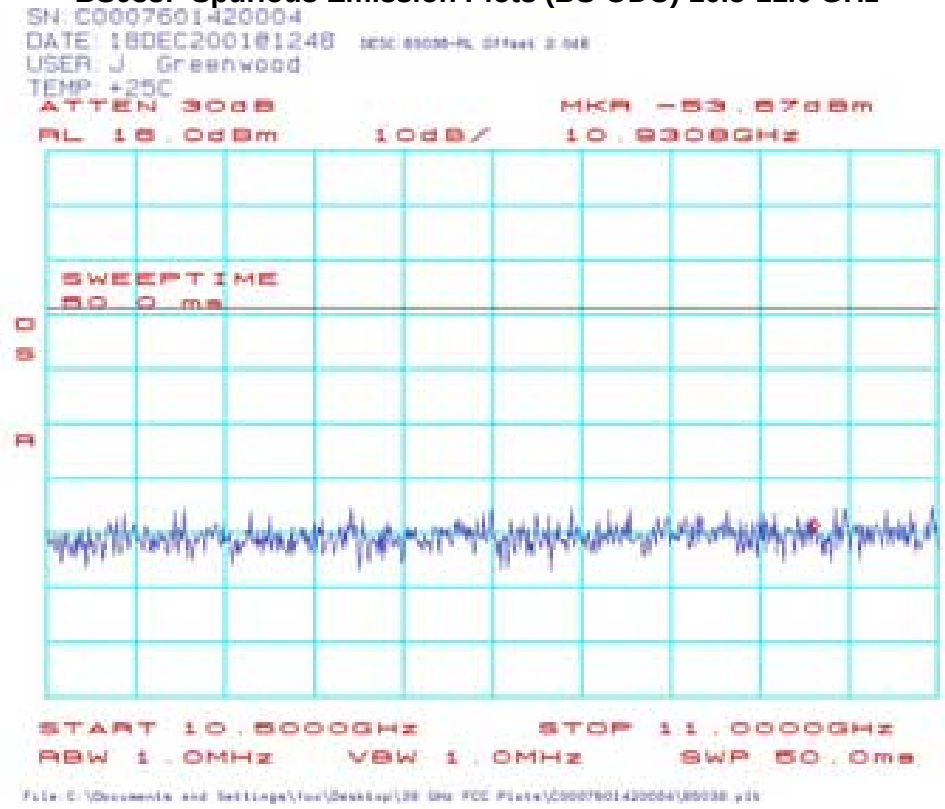
BS036: Spurious Emission Plots (BS-ODU) 9.5-10.0 GHz



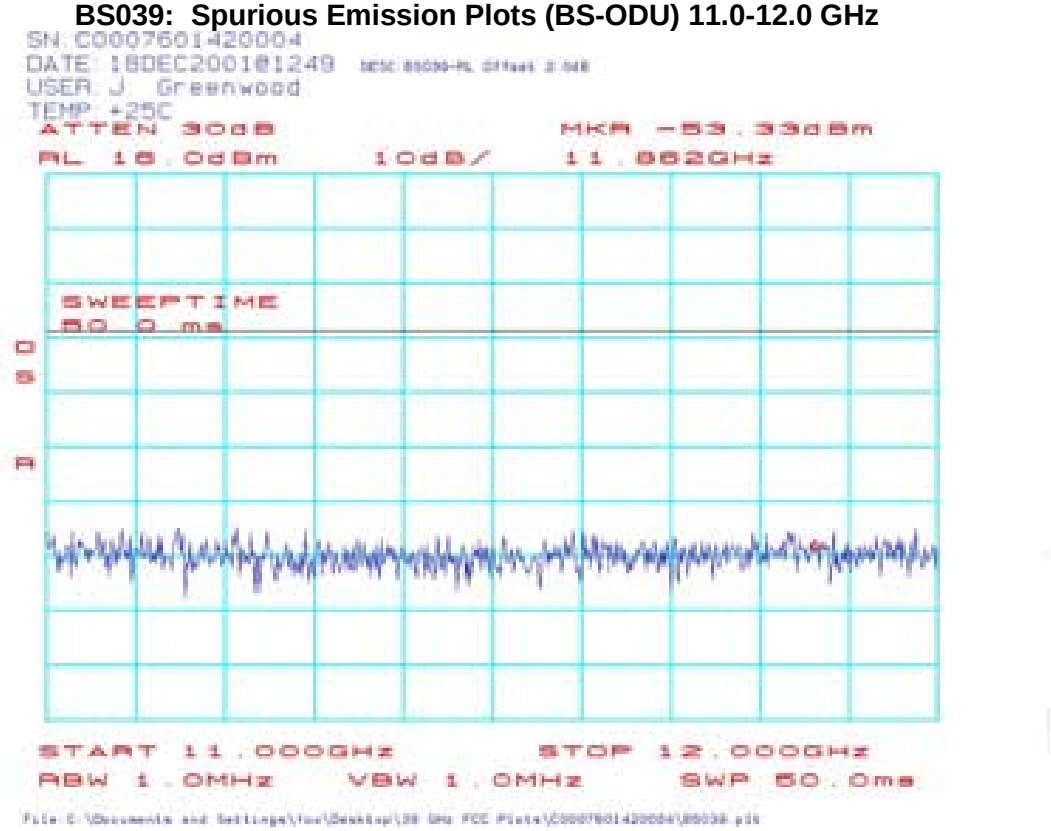
BS037: Spurious Emission Plots (BS-ODU) 10.0-10.5 GHz



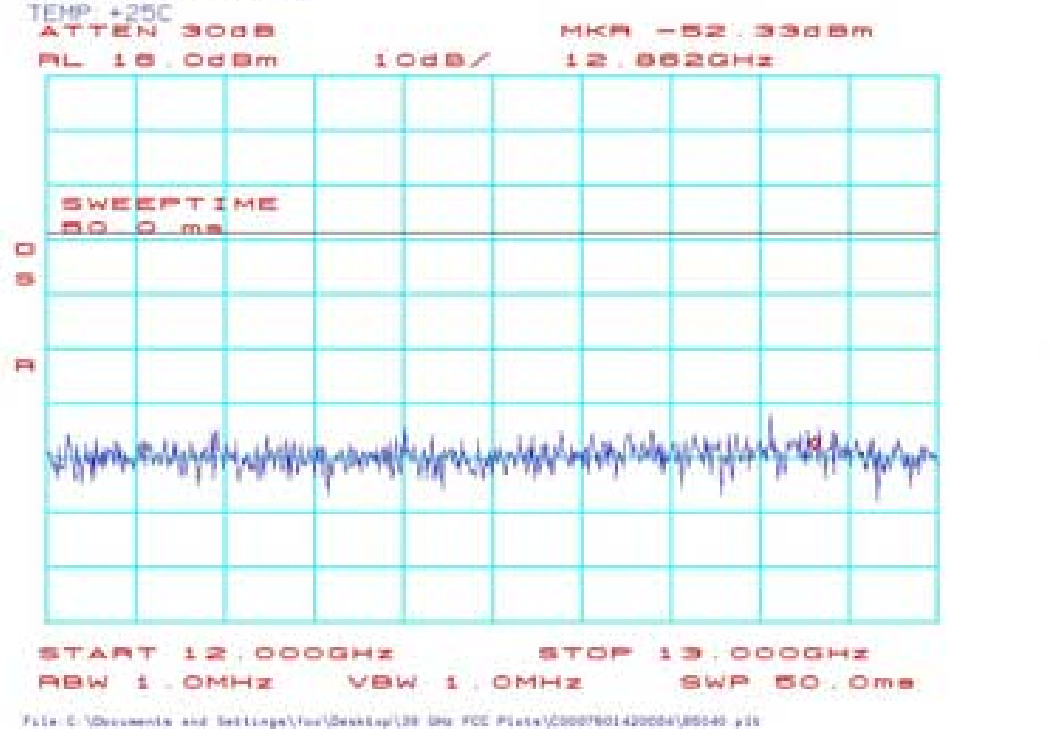
BS038: Spurious Emission Plots (BS-ODU) 10.5-11.0 GHz



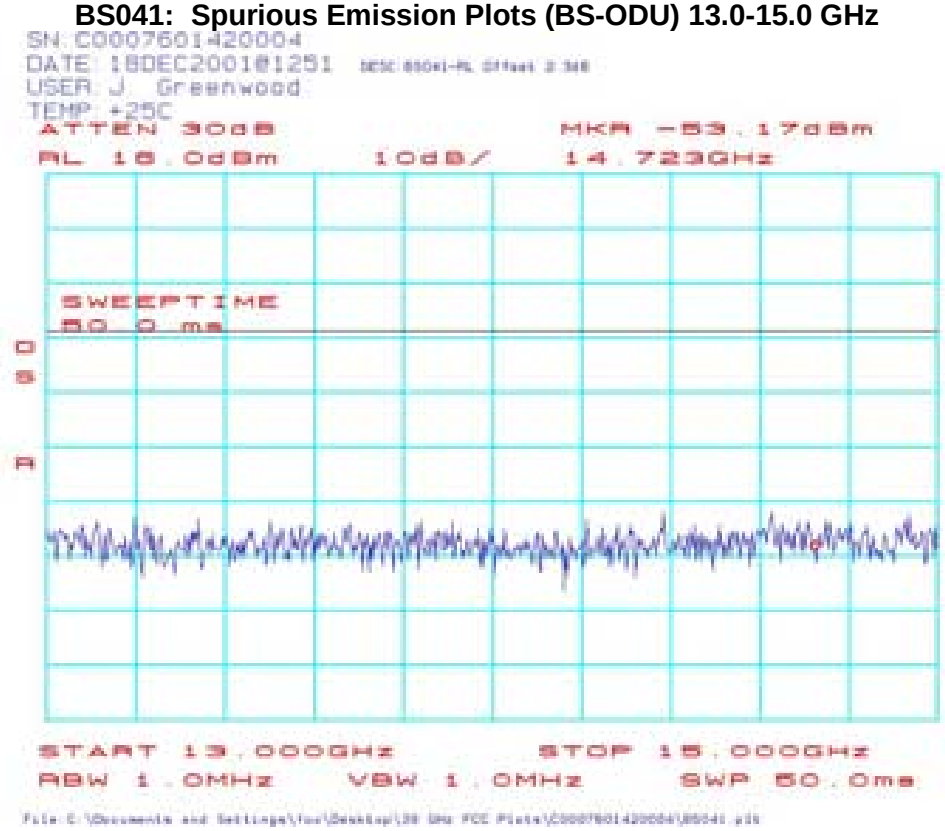
BS039: Spurious Emission Plots (BS-ODU) 11.0-12.0 GHz



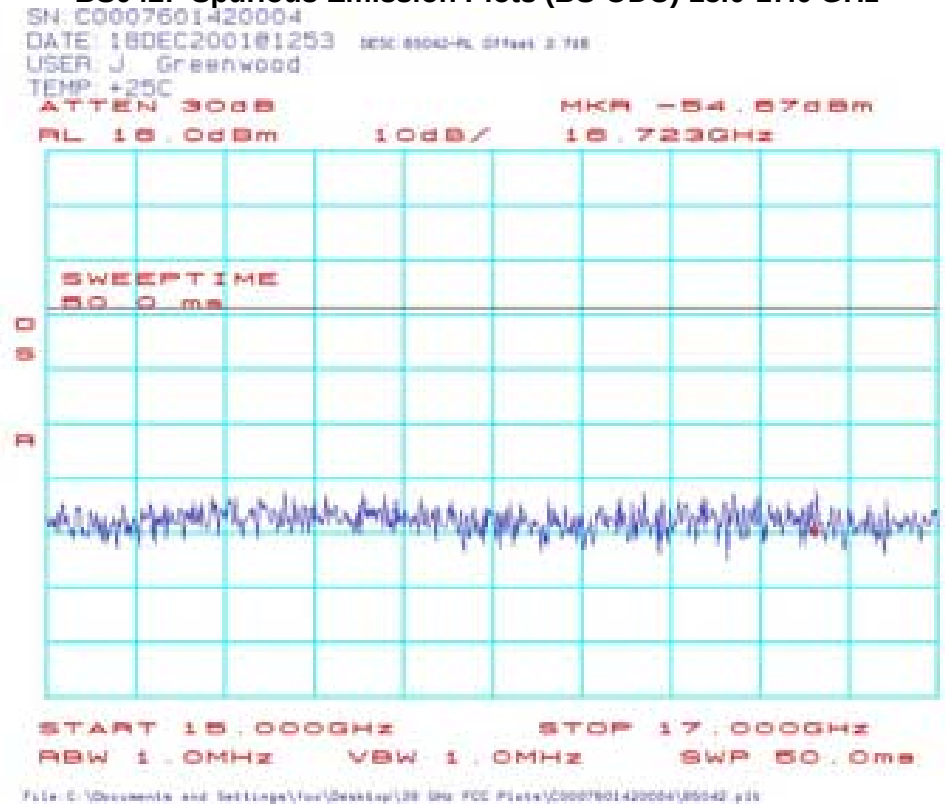
BS040: Spurious Emission Plots (BS-ODU) 12.0-13.0 GHz



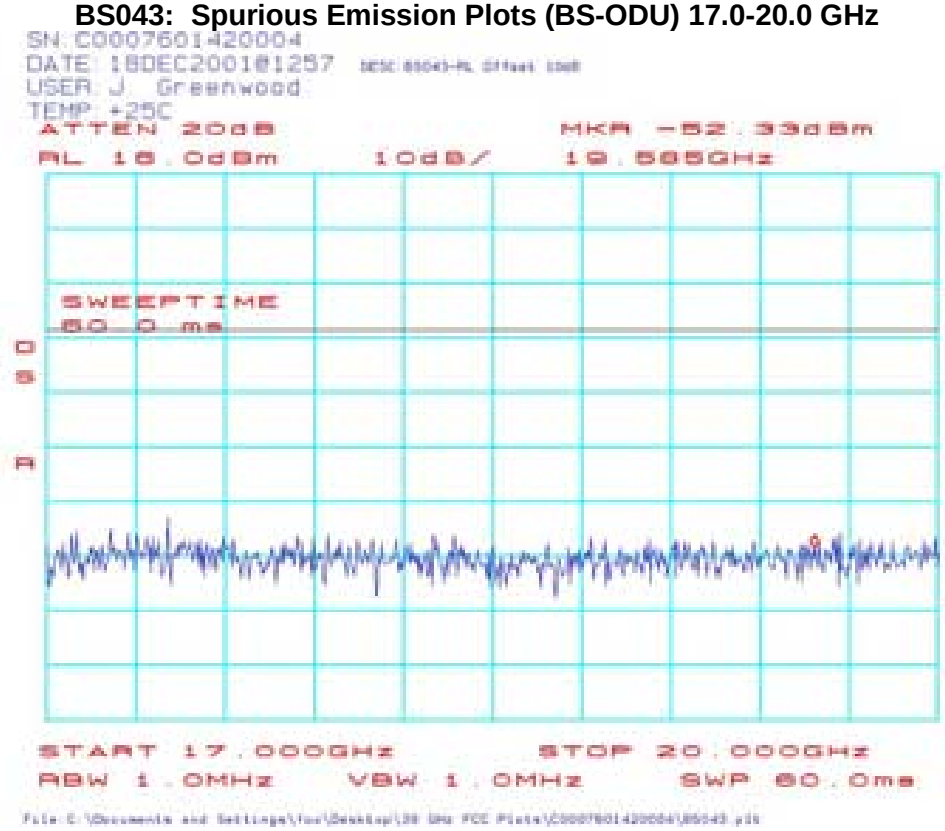
BS041: Spurious Emission Plots (BS-ODU) 13.0-15.0 GHz



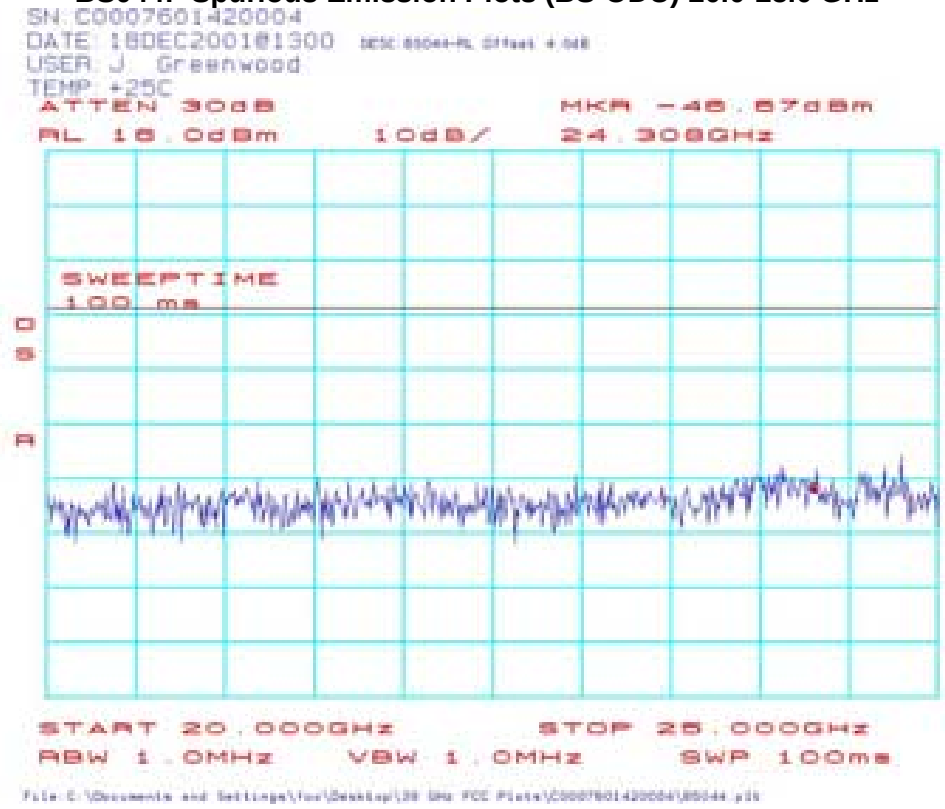
BS042: Spurious Emission Plots (BS-ODU) 15.0-17.0 GHz



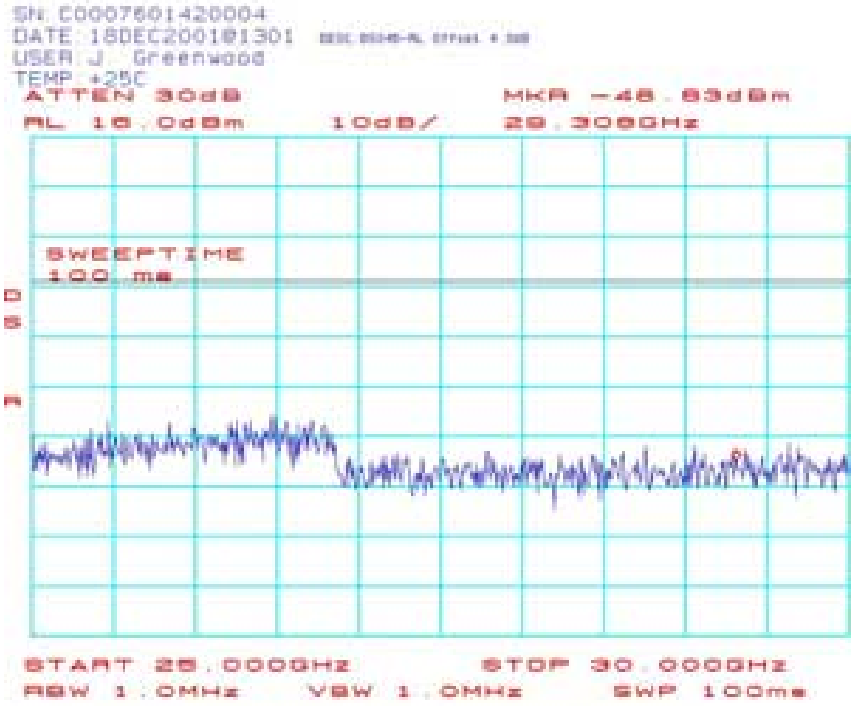
BS043: Spurious Emission Plots (BS-ODU) 17.0-20.0 GHz



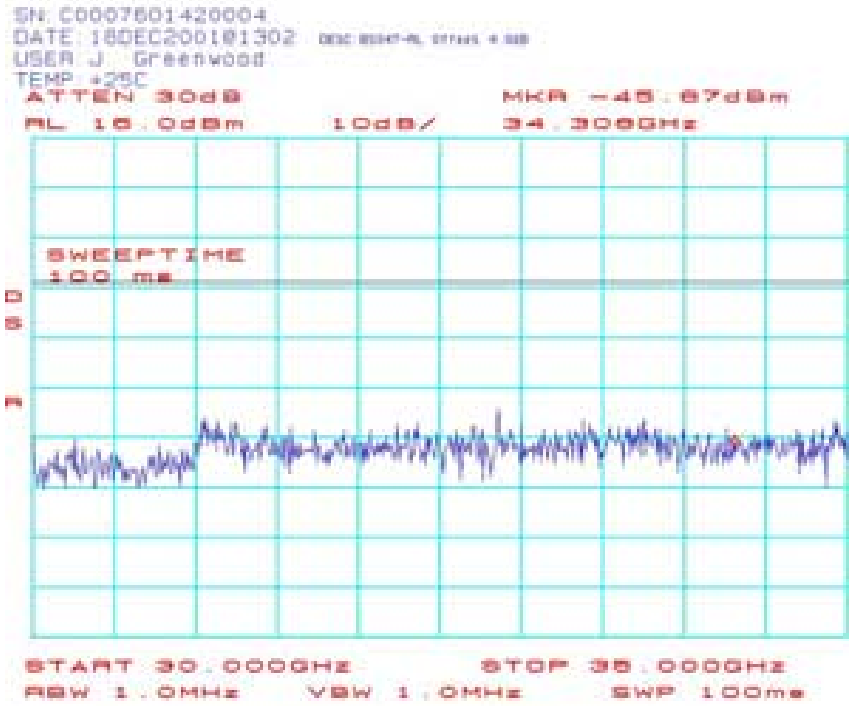
BS044: Spurious Emission Plots (BS-ODU) 20.0-25.0 GHz



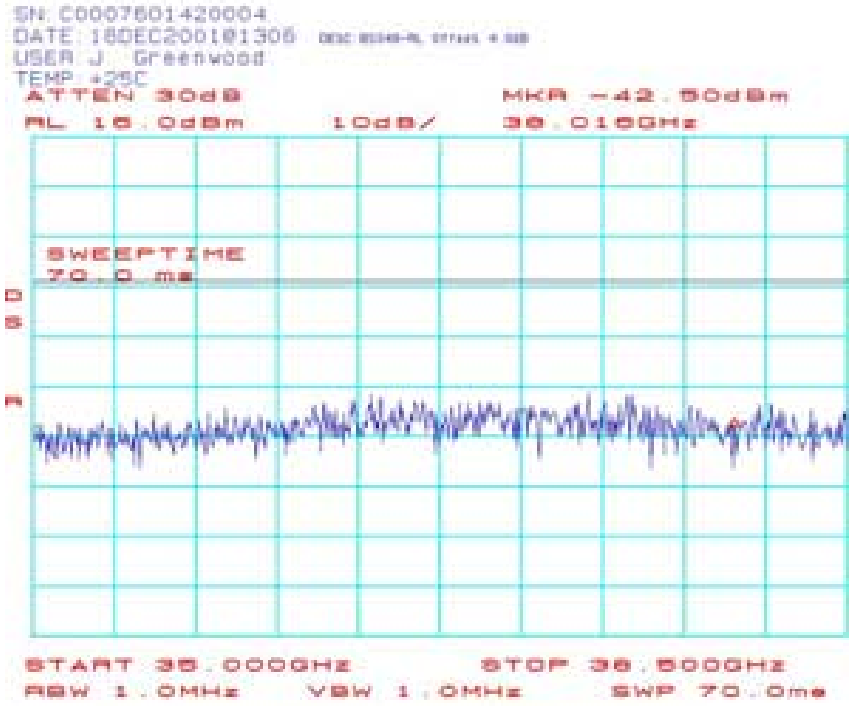
BS045: Spurious Emission Plots (BS-ODU) 25.0-30.0 GHz



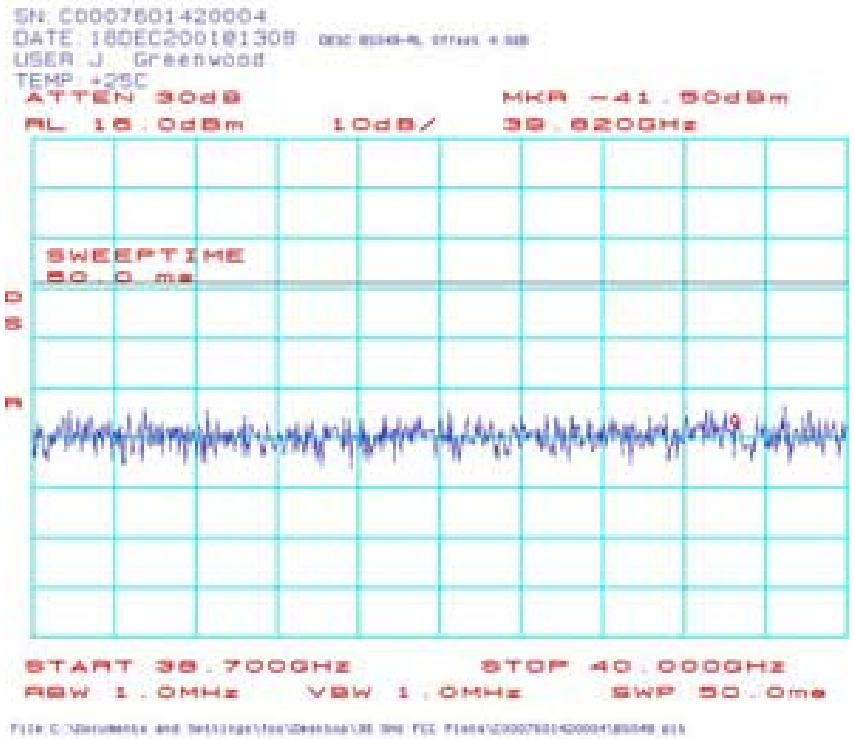
BS047: Spurious Emission Plots (BS-ODU) 30-35.0 GHz



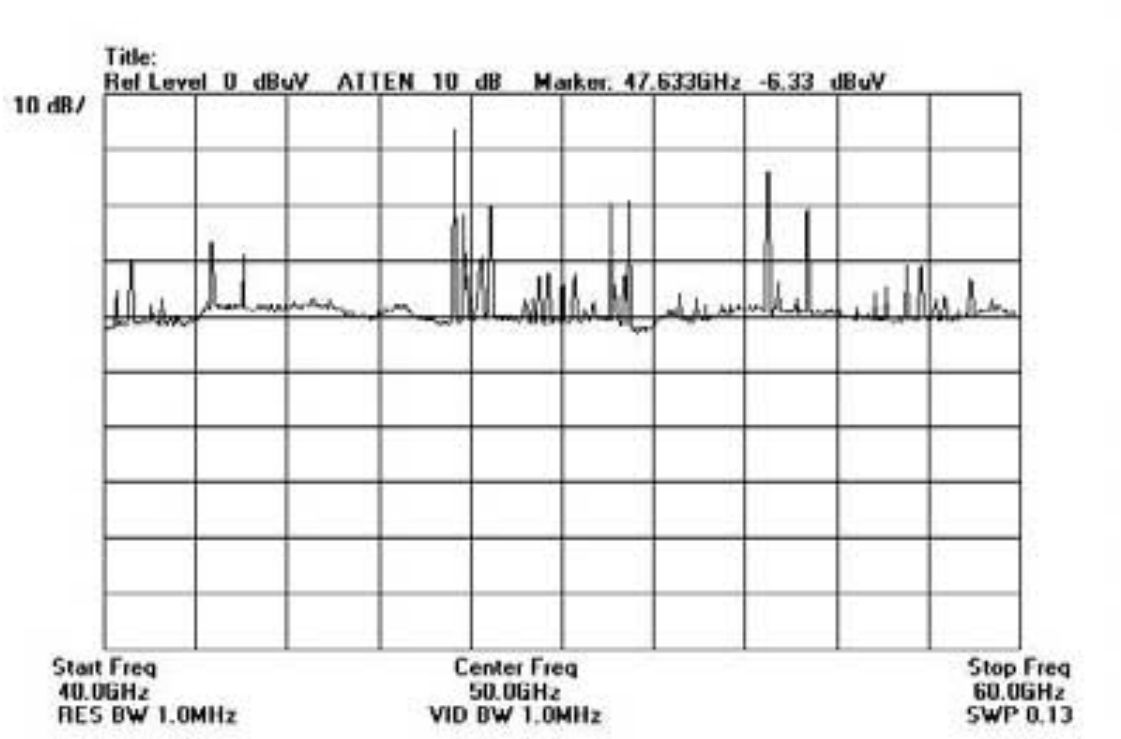
BS048: Spurious Emission Plots (BS-ODU) 35.0-38.5 GHz



BS049: Spurious Emission Plots (BS-ODU) 38.7-40.0 GHz

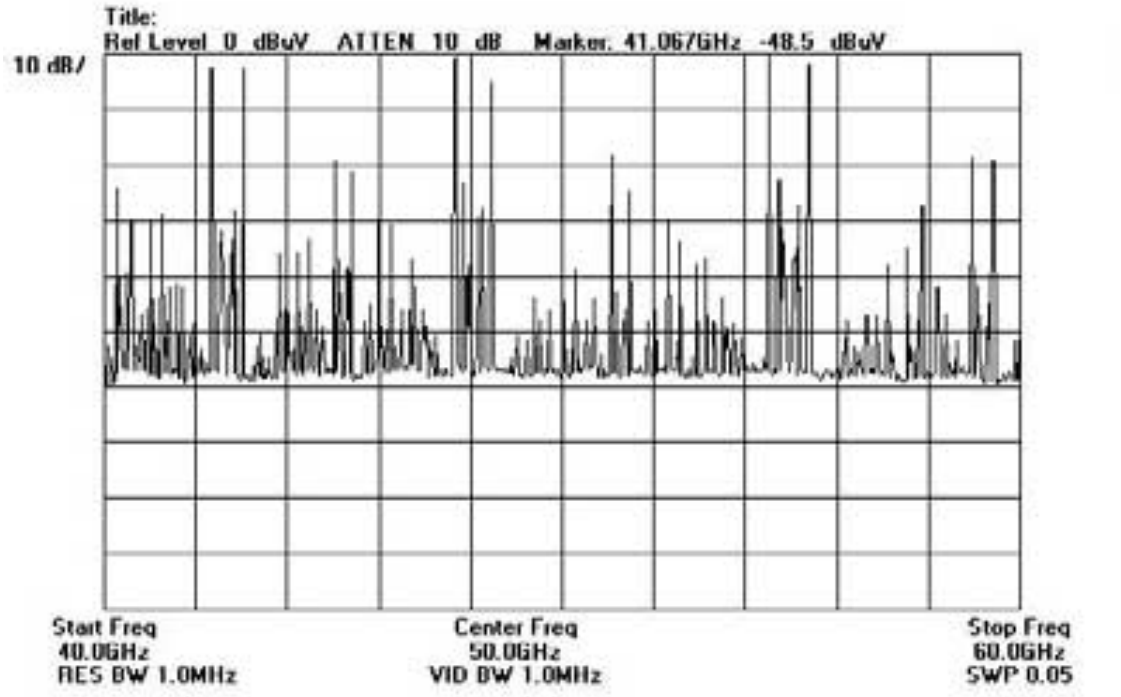


BS200: Spurious Emission Plots (BS-ODU) 40-60.0 GHz



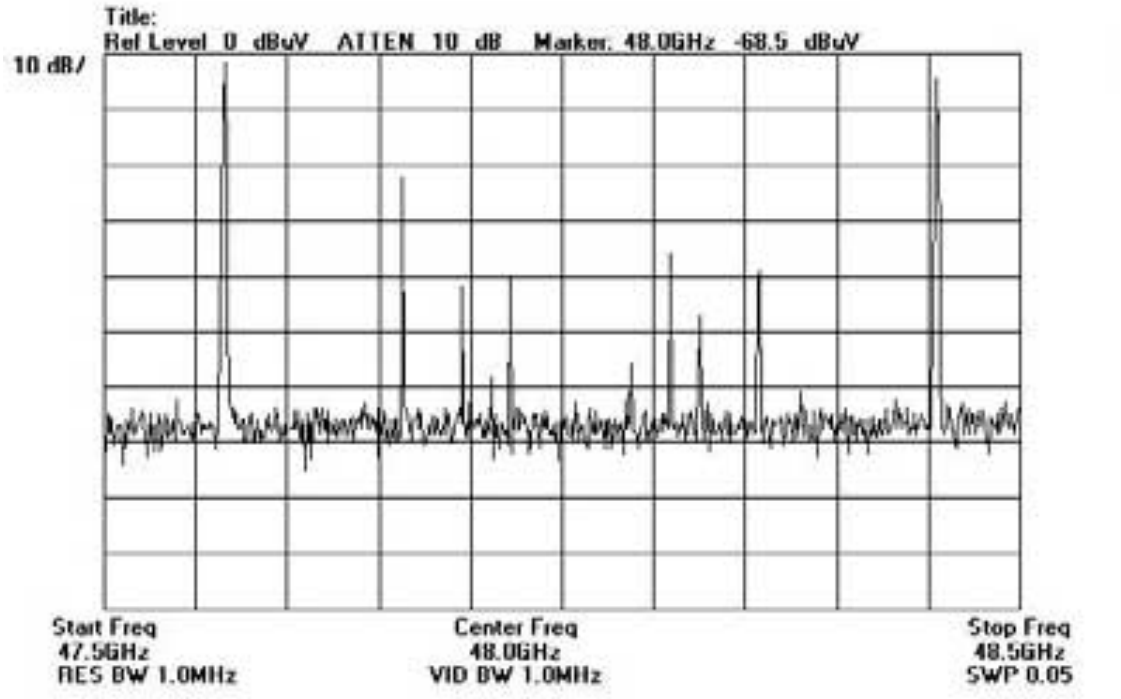
Note: the plots read dBuV but the actual measurement is in dBm. This is due to a limitation in the software used to capture the plots.

BS204: Spurious Emission Plots with signal from a signal generator 40-60.0 GHz



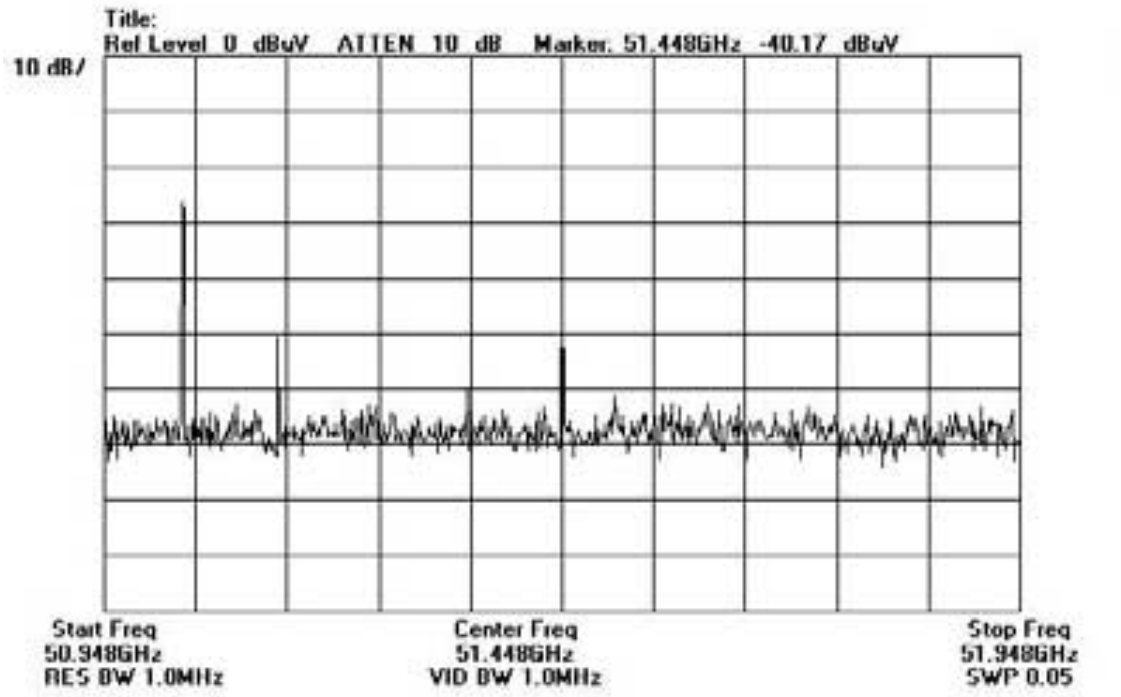
Note: the plots read dBuV but the actual measurement is in dBm. This is due to a limitation in the software used to capture the plots.

BS205: Spurious Emission Plots with signal from a signal generator 47.5-48.5.0 GHz



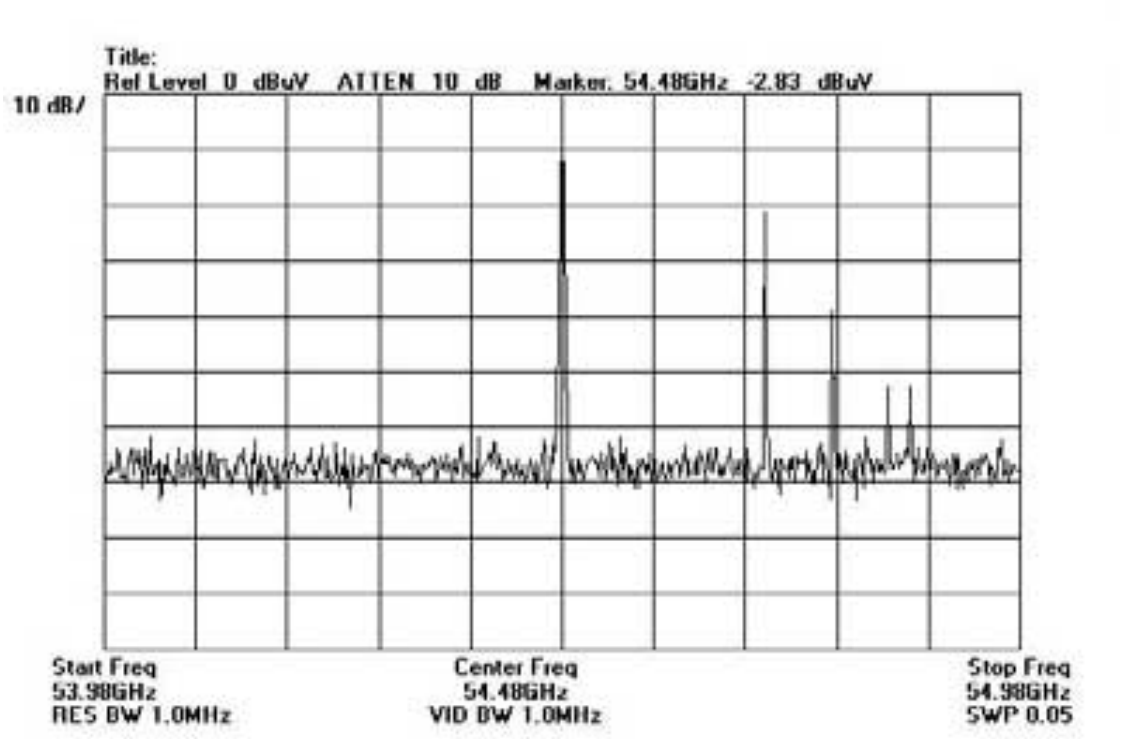
Note: the plots read dBuV but the actual measurement is in dBm. This is due to a limitation in the software used to capture the plots.

BS206: Spurious Emission Plots with signal from a signal generator 50.948-51.948 GHz



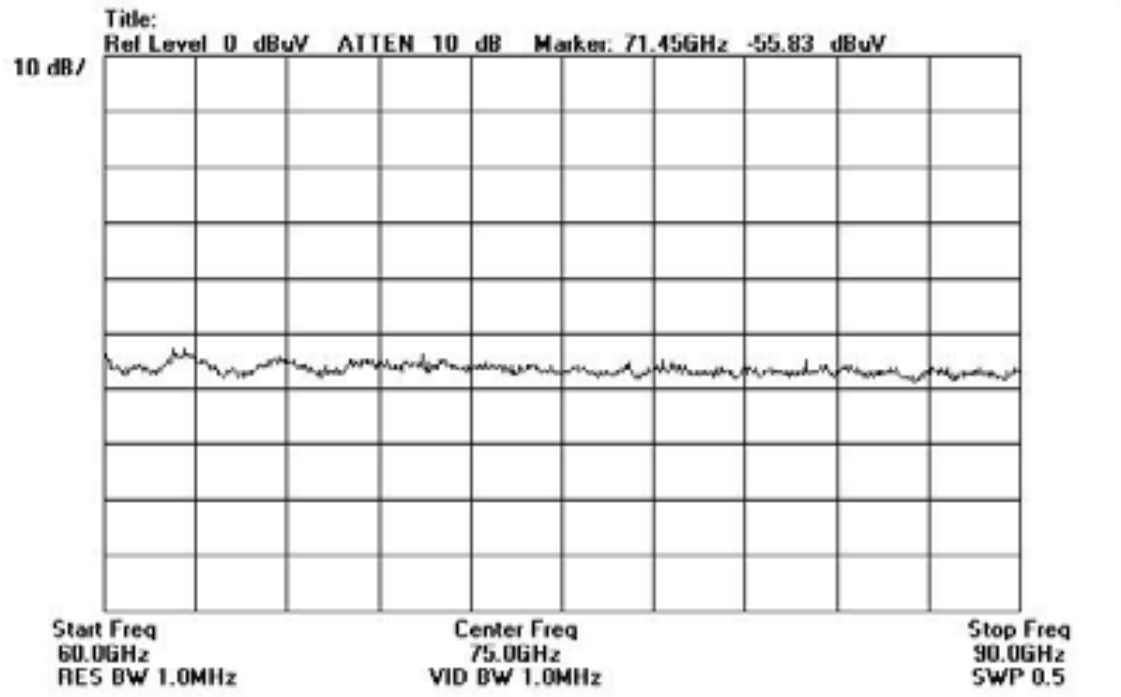
Note: the plots read dBuV but the actual measurement is in dBm. This is due to a limitation in the software used to capture the plots.

BS207: Spurious Emission Plots with signal from a signal generator 53.98-54.98 GHz



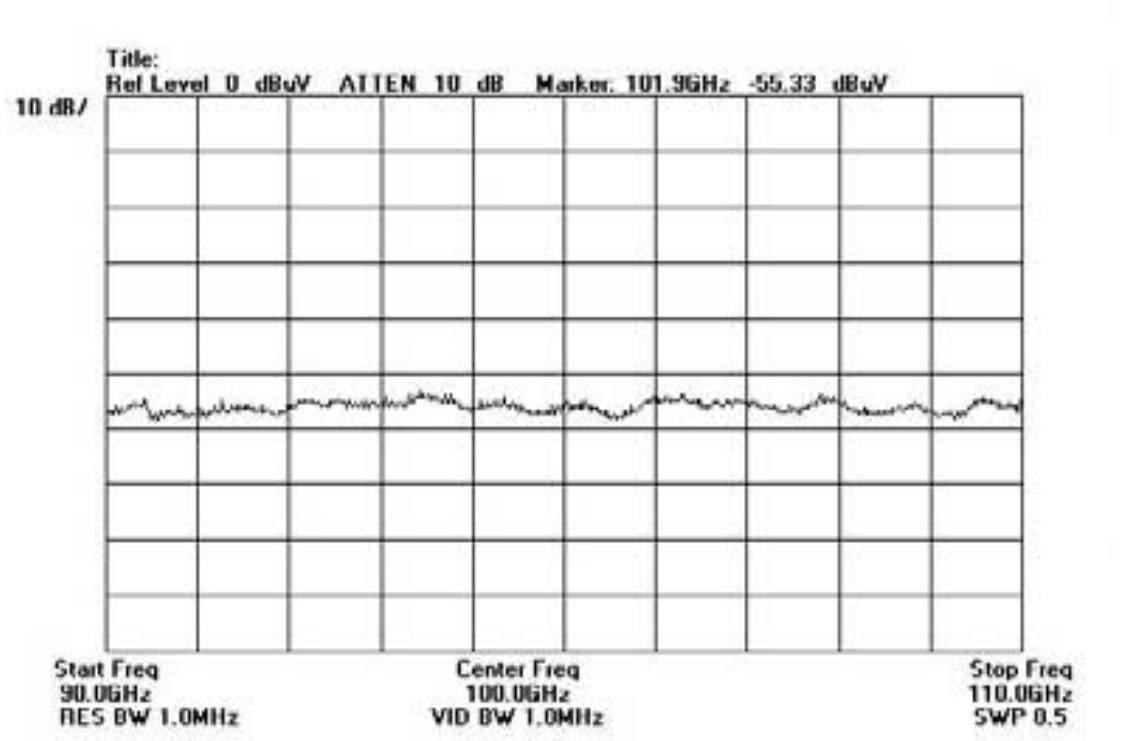
Note: the plots read dBuV but the actual measurement is in dBm. This is due to a limitation in the software used to capture the plots.

BS201: Spurious Emission Plots (BS-ODU) 60-90.0 GHz



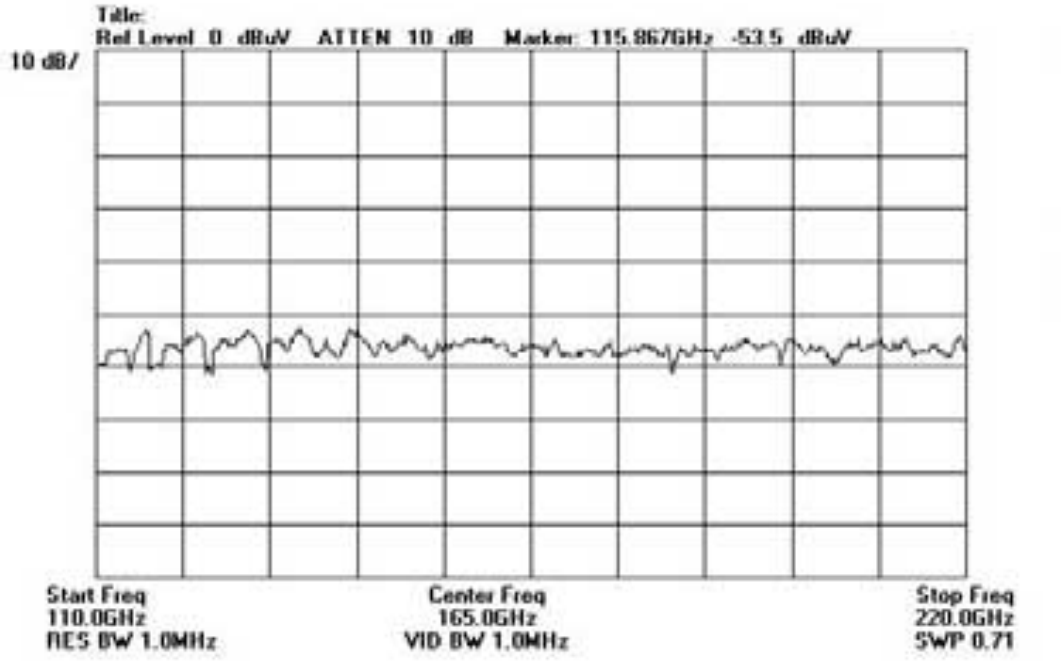
Note: the plots read dBuV but the actual measurement is in dBm. This is due to a limitation in the software used to capture the plots.

BS202: Spurious Emission Plots (BS-ODU) 90-110.0 GHz



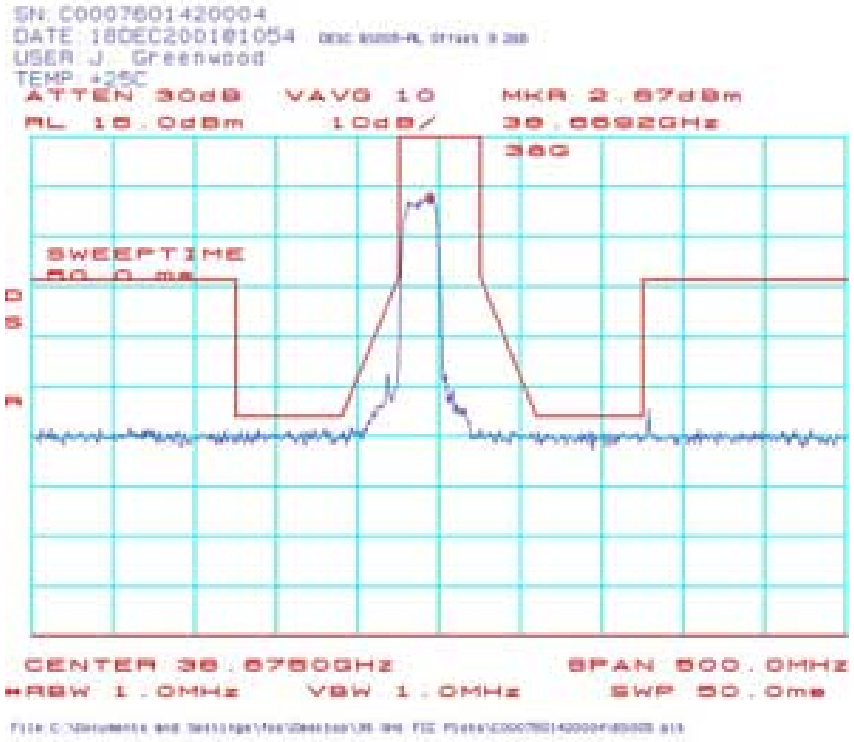
Note: the plots read dBuV but the actual measurement is in dBm. This is due to a limitation in the software used to capture the plots.

BS203: Spurious Emission Plots (BS-ODU) 110-200.0 GHz

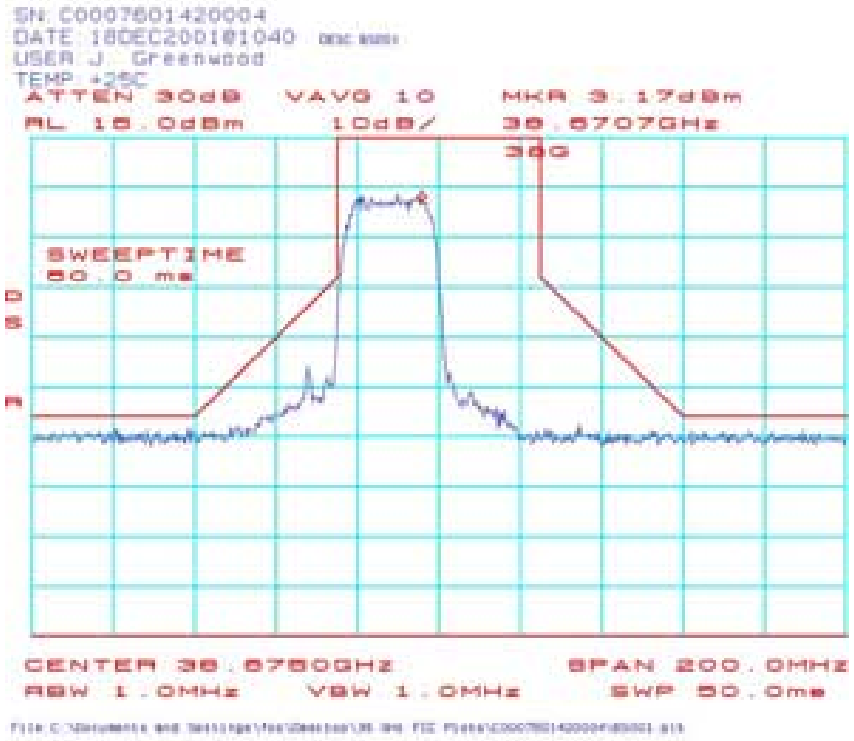


Note: the plots read dBuV but the actual measurement is in dBm. This is due to a limitation in the software used to capture the plots.

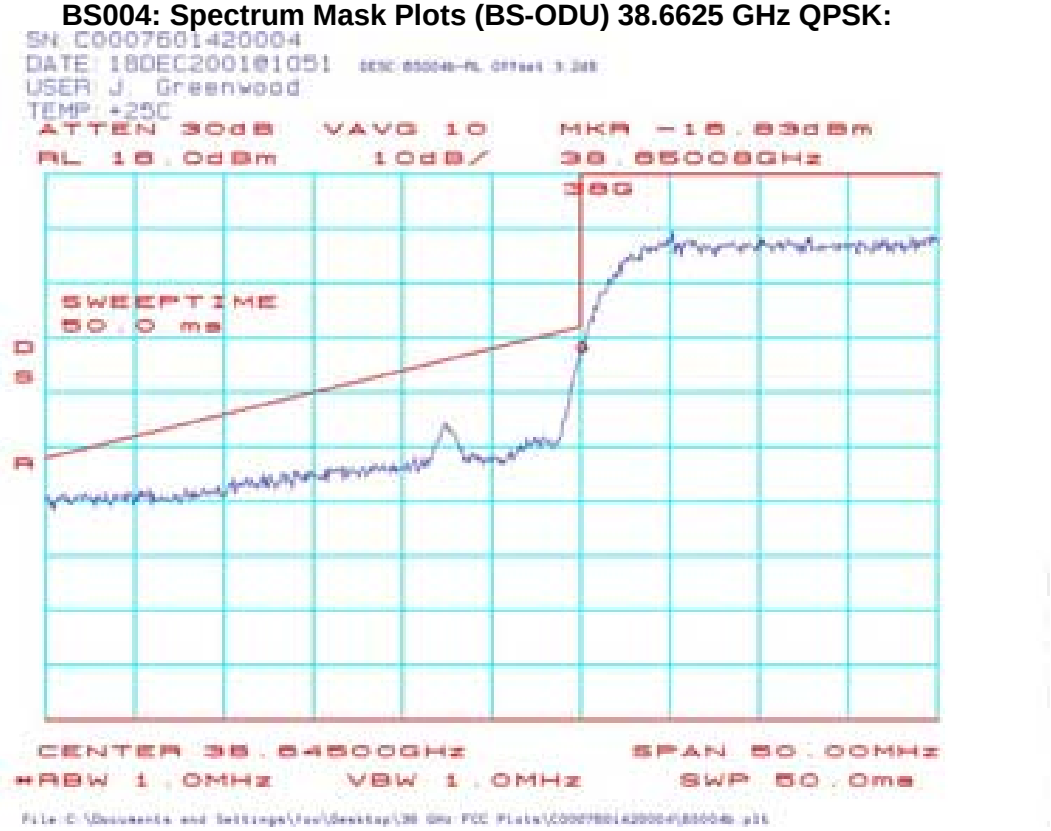
BS005: Spectrum Mask Plots (BS-ODU) 38.6625 GHz QPSK:



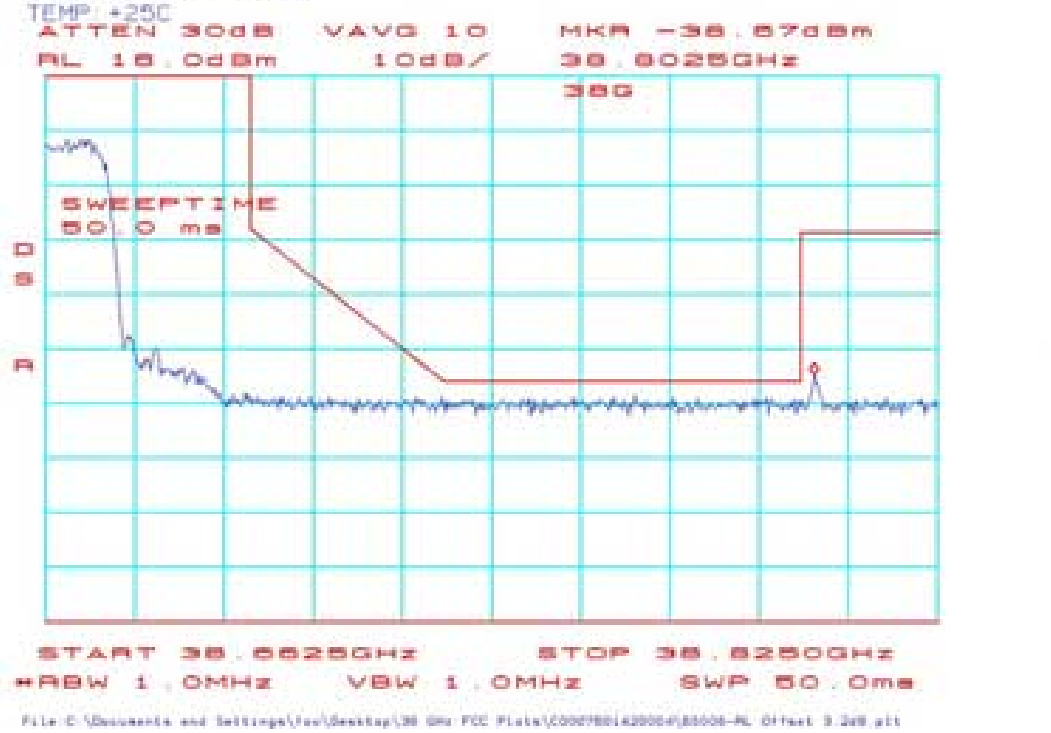
BS001: Spectrum Mask Plots (BS-ODU) 38.6625 GHz QPSK:



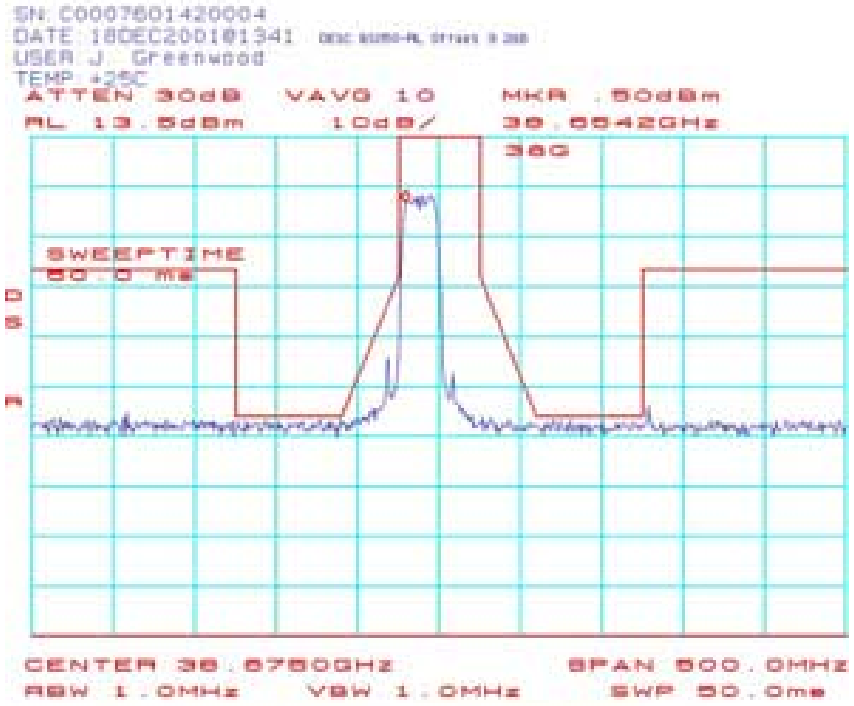
BS004: Spectrum Mask Plots (BS-ODU) 38.6625 GHz QPSK:



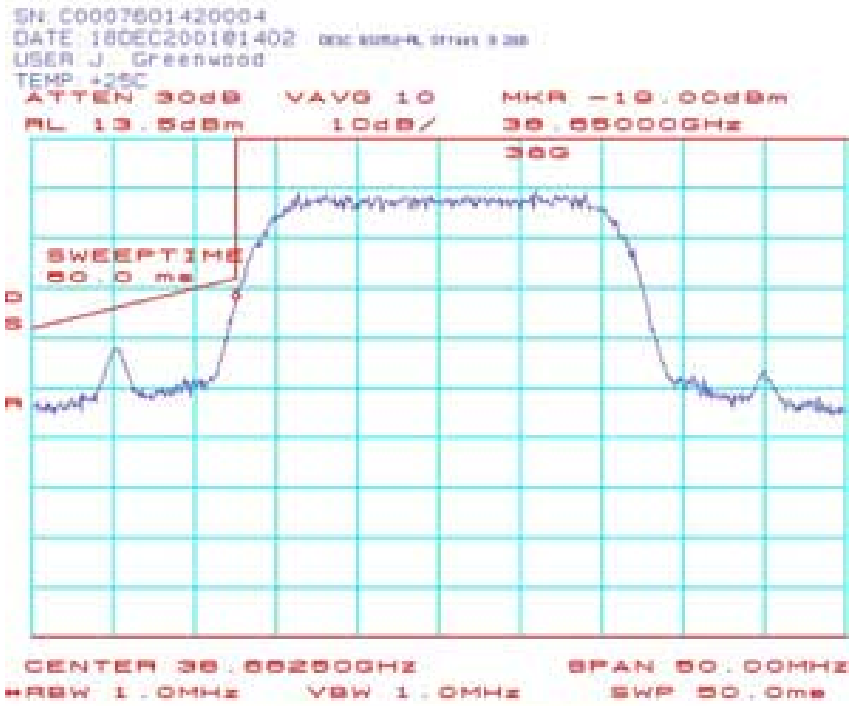
BS006: Spectrum Mask Plots (BS-ODU) 38.6625 GHz QPSK:



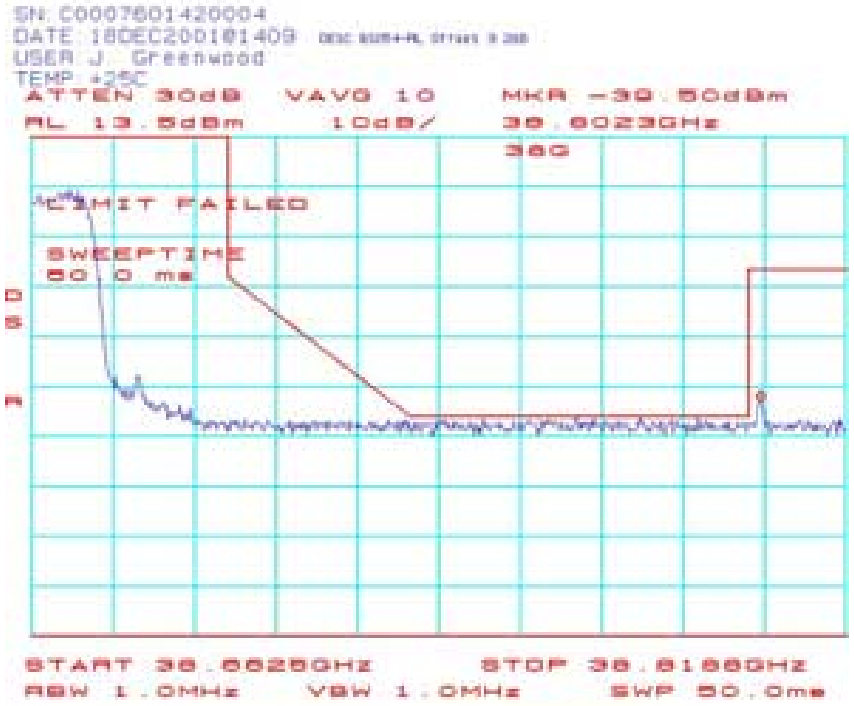
BS050: Spectrum Mask Plots (BS-ODU) 38.6625 GHZ 16QAM:



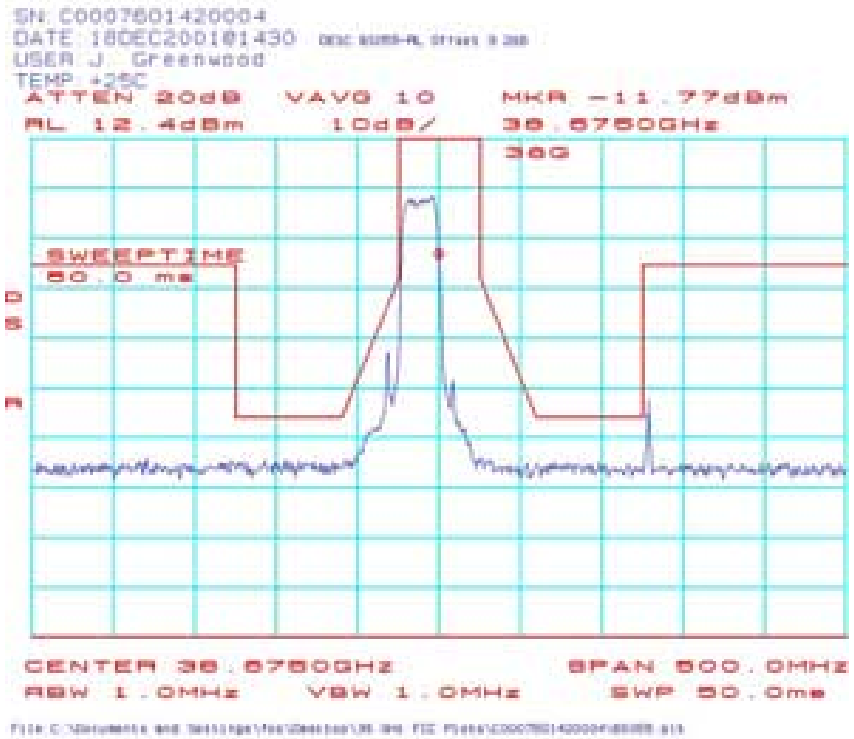
BS052: Spectrum Mask Plots (BS-ODU) 38.6625 GHz 16QAM:



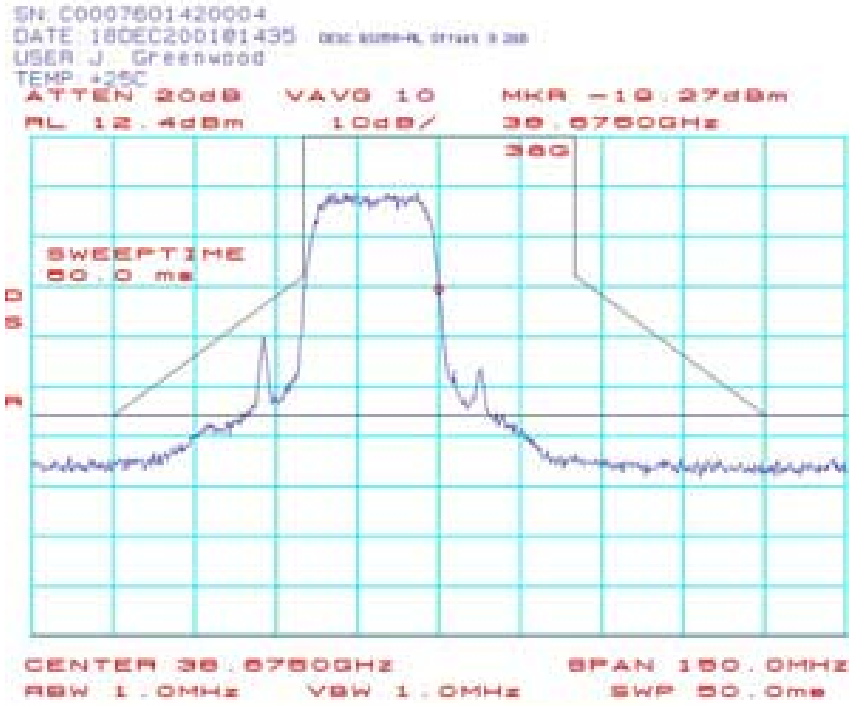
BS054: Spectrum Mask Plots (BS-ODU) 38.6625 GHz 16QAM:



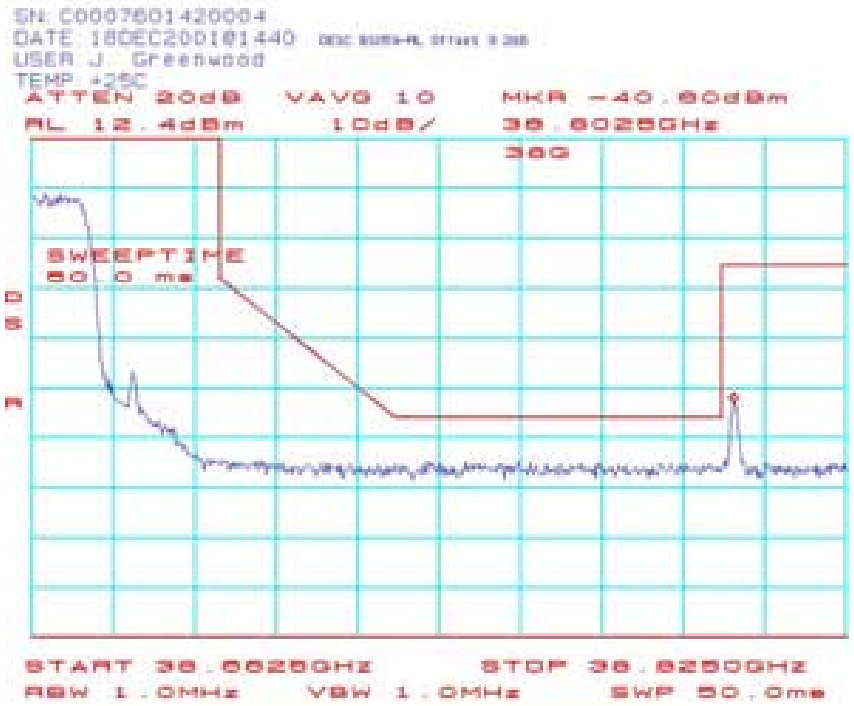
BS055:Spectrum Mask Plots (BS-ODU) 38.6625 GHz 64QAM:



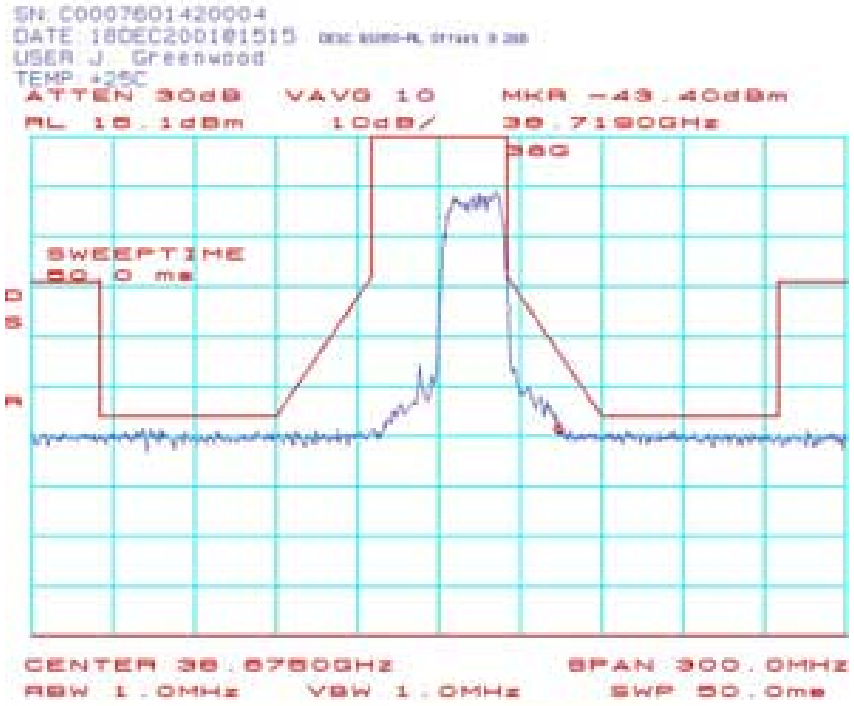
BS056: Spectrum Mask Plots (BS-ODU) 38.6625 GHz 64QAM:



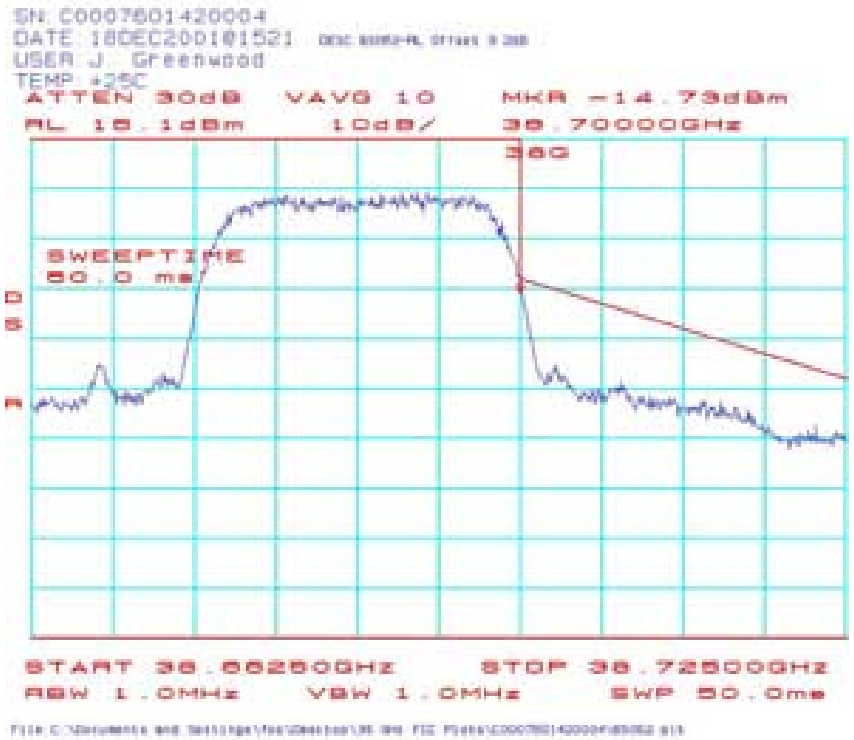
BS059: Spectrum Mask Plots (BS-ODU) 38.6625 GHz 64QAM:



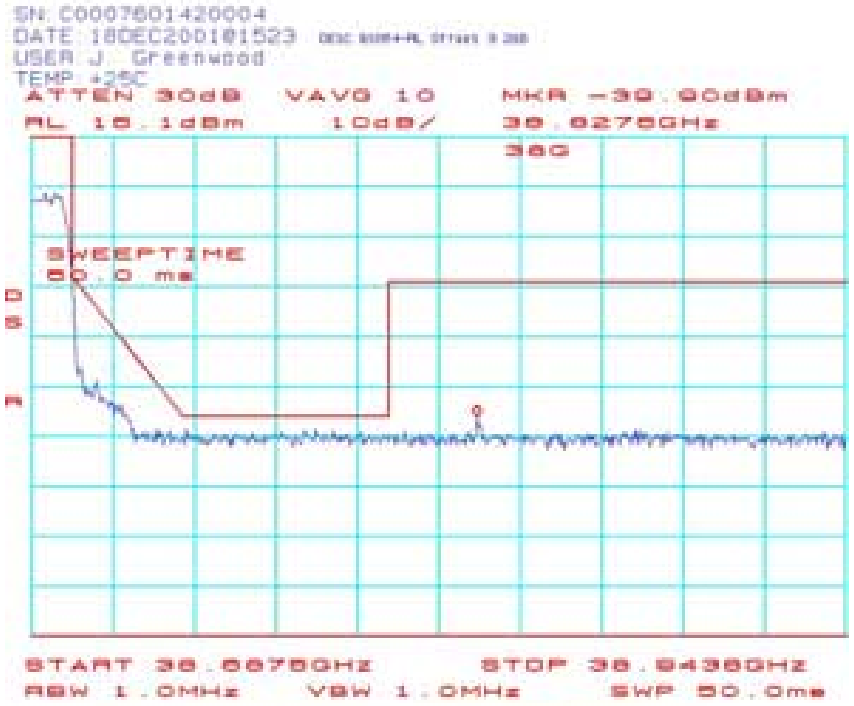
BS060: Spectrum Mask Plots (BS-ODU) 38.6875 GHz QPSK:



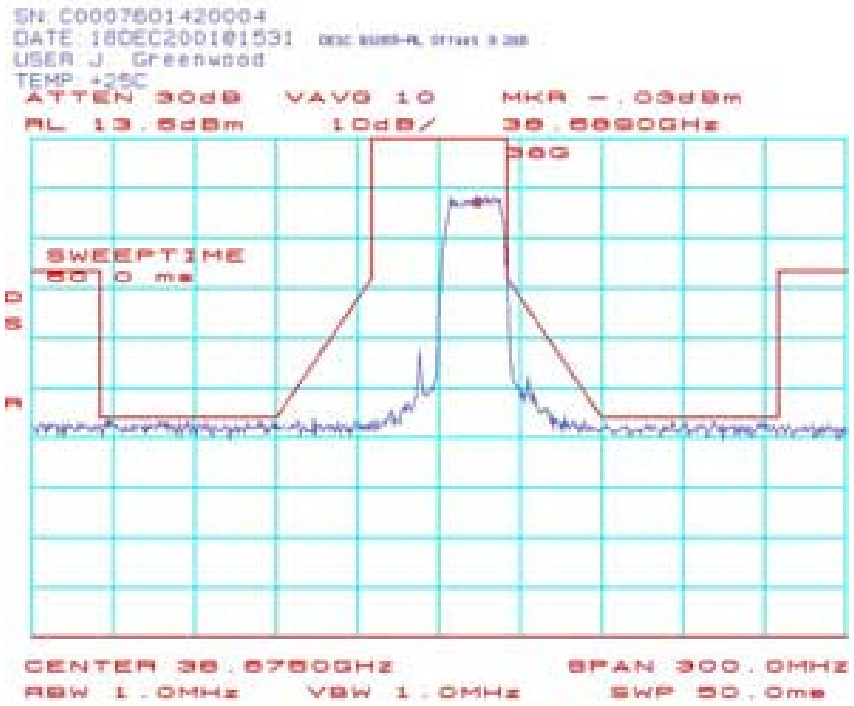
BS062: Spectrum Mask Plots (BS-ODU) 38.6875 GHz QPSK:



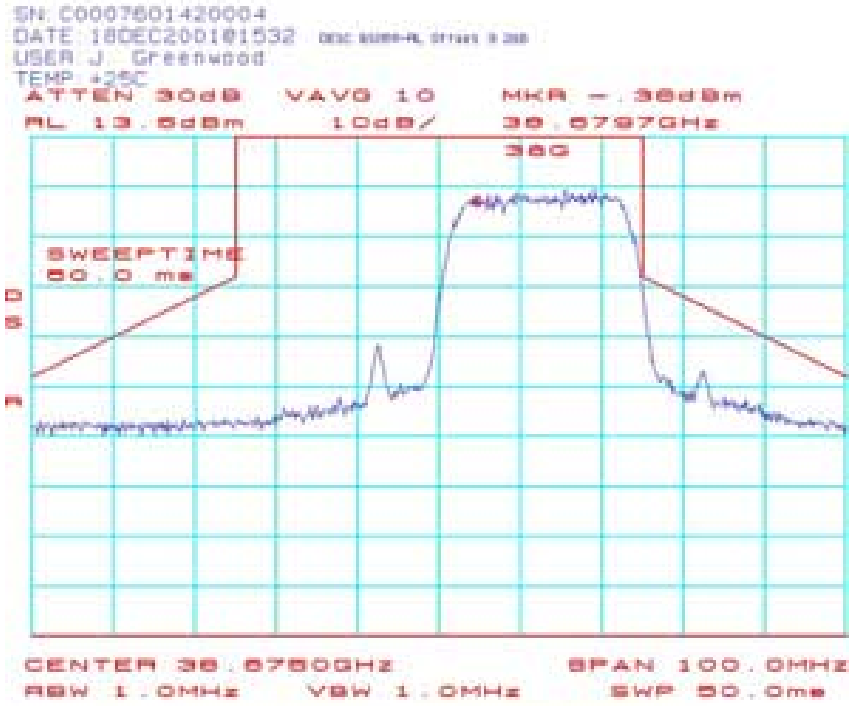
BS064: Spectrum Mask Plots (BS-ODU) 38.6875 GHz QPSK:



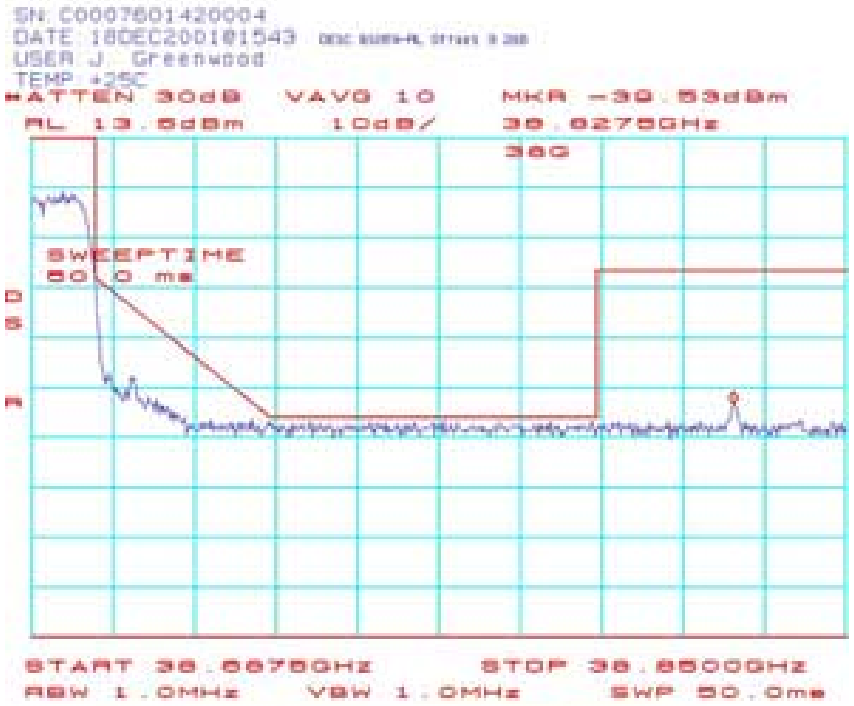
BS065: Spectrum Mask Plots (BS-ODU) 38.6875 GHZ 16QAM:



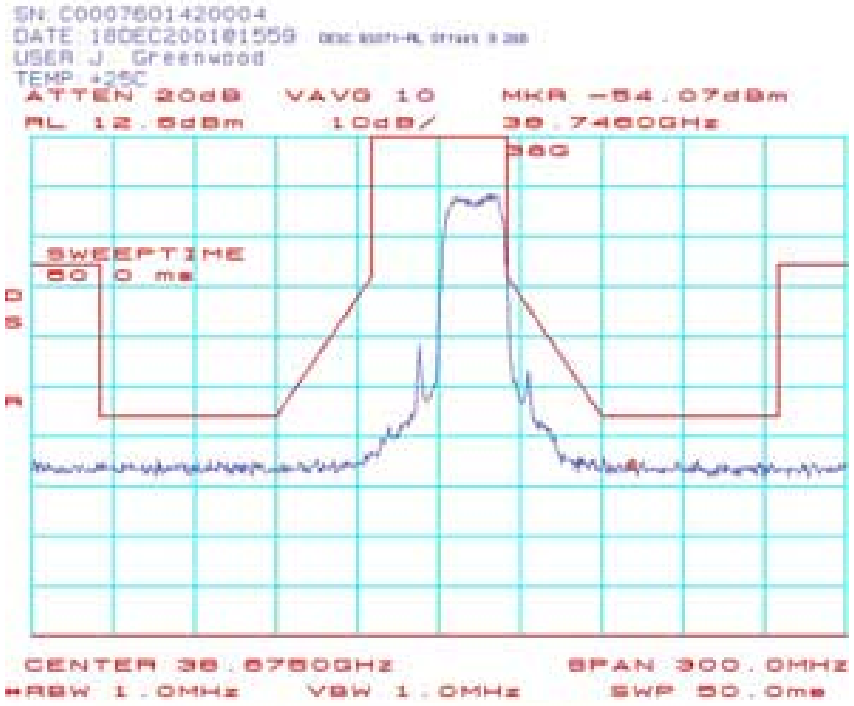
BS066: Spectrum Mask Plots (BS-ODU) 38.6875 GHz16QAM:



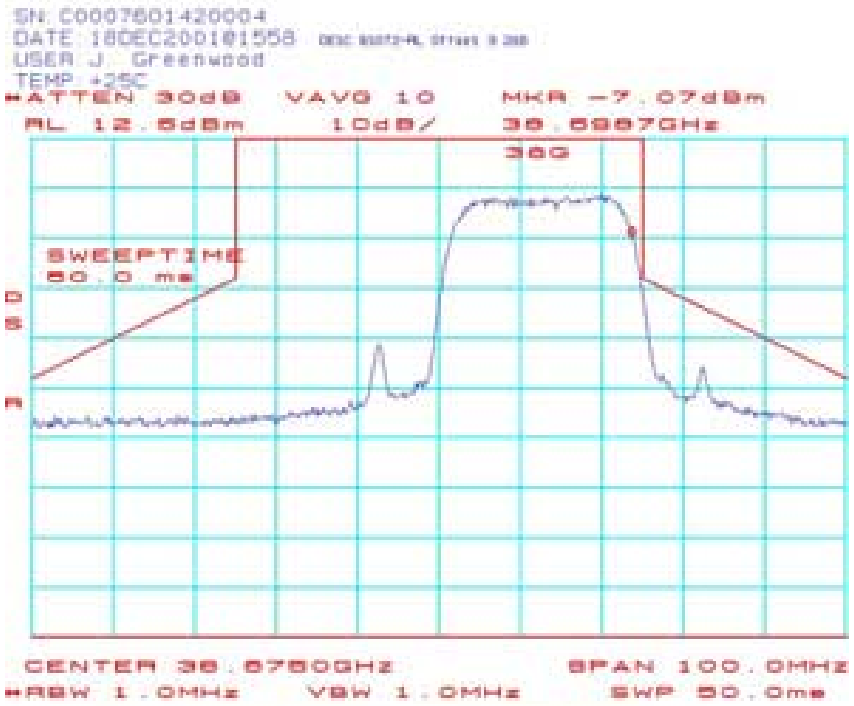
BS069: Spectrum Mask Plots (BS-ODU) 38.6875 GHz 16QAM:



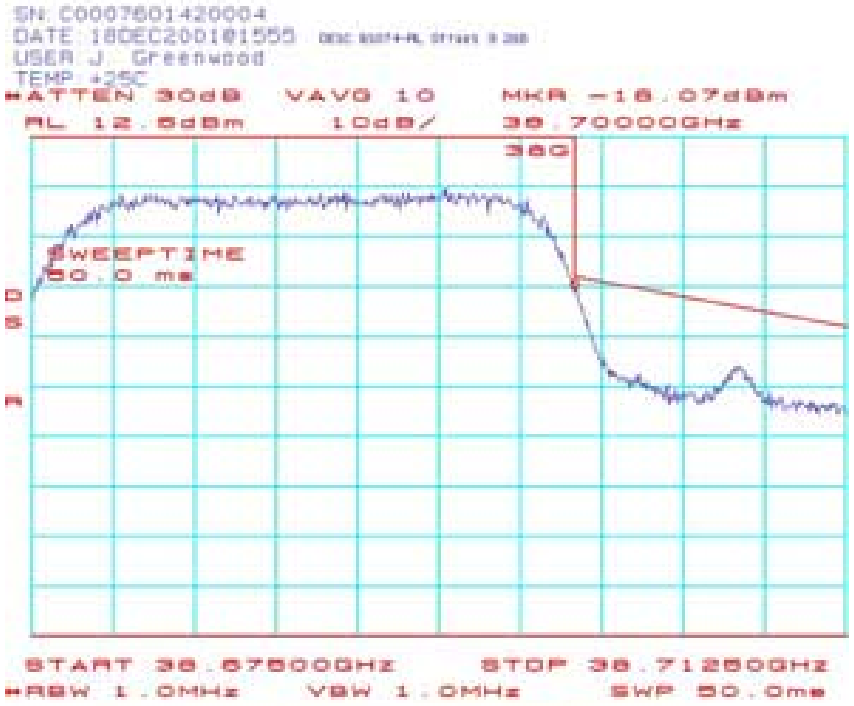
BS071: Spectrum Mask Plots (BS-ODU) 38.6875 GHz 64QAM:



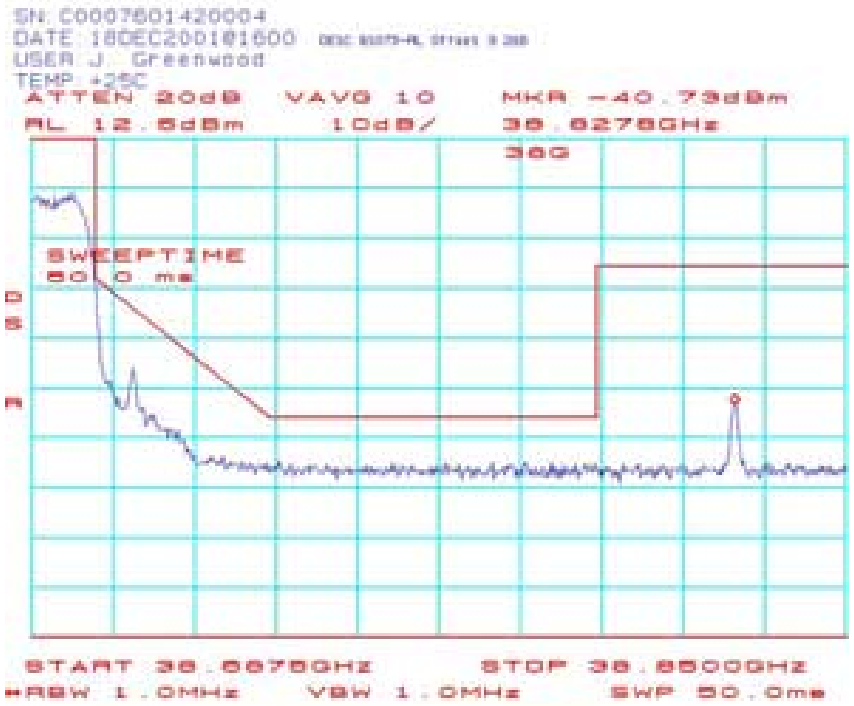
BS072: Spectrum Mask Plots (BS-ODU) 38.6875 GHz 64QAM:



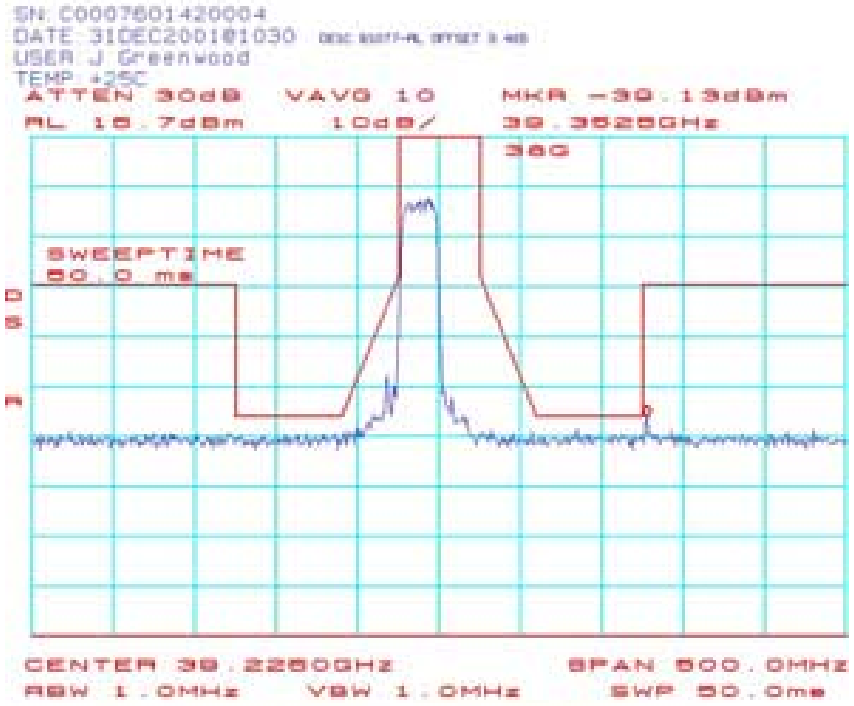
BS074: Spectrum Mask Plots (BS-ODU) 38.6875 GHz 64QAM:



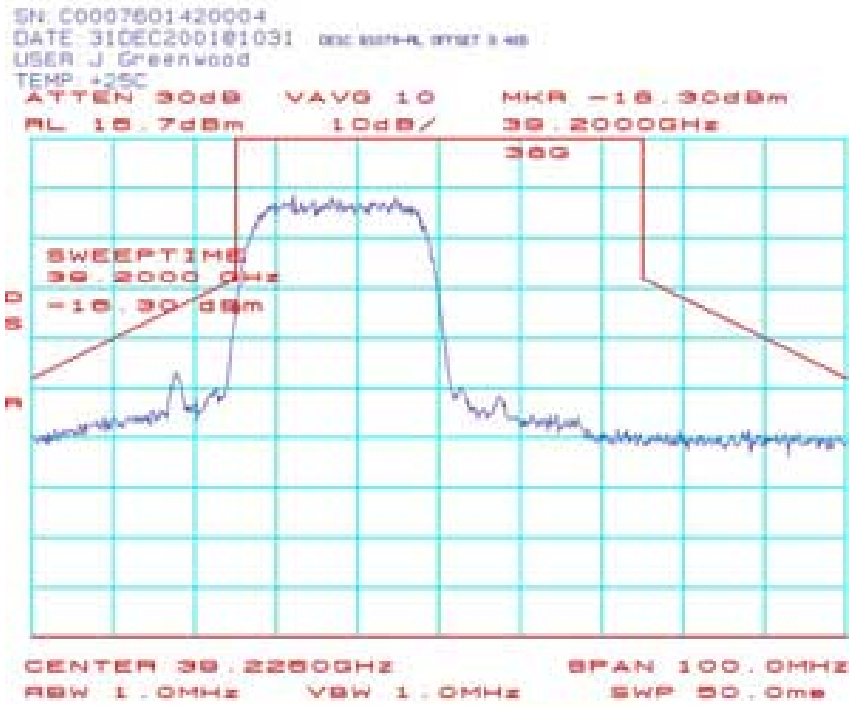
BS075: Spectrum Mask Plots (BS-ODU) 38.6875 GHz 64QAM:



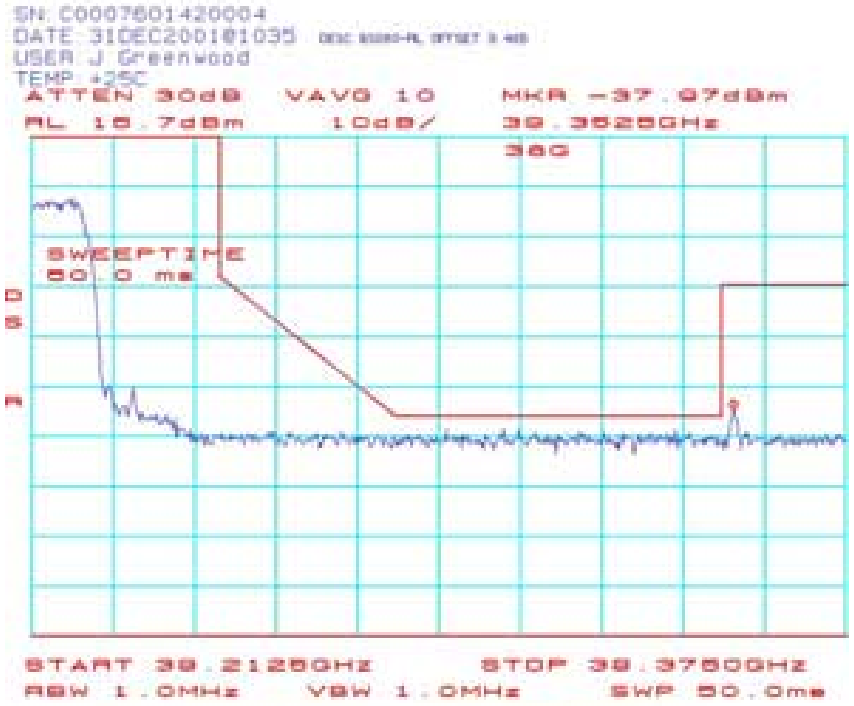
BS077: Spectrum Mask Plots (BS-ODU) 39.2125 GHz QPSK:



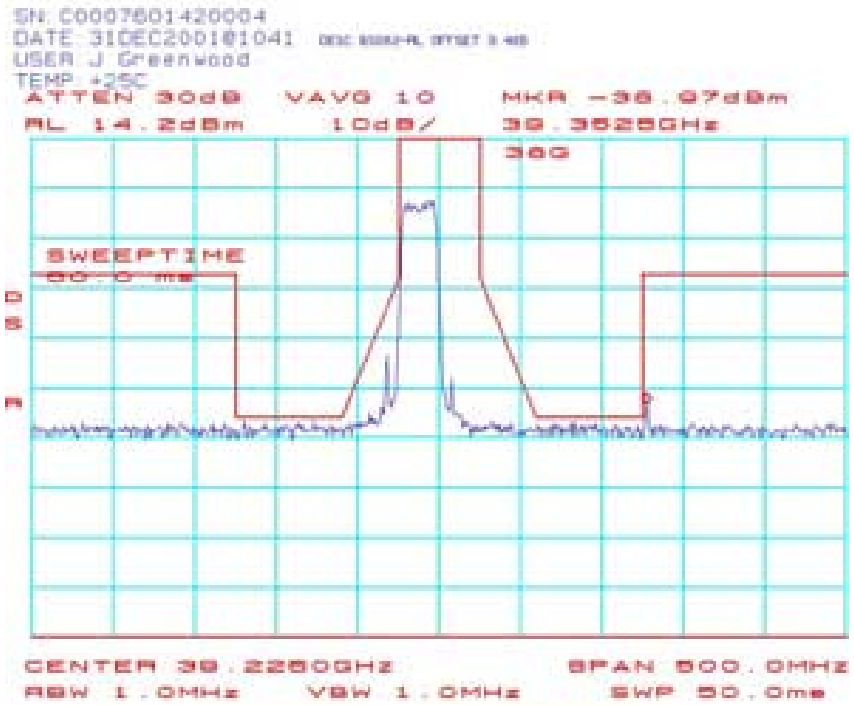
BS078: Spectrum Mask Plots (BS-ODU) 39.2125 GHz QPSK:



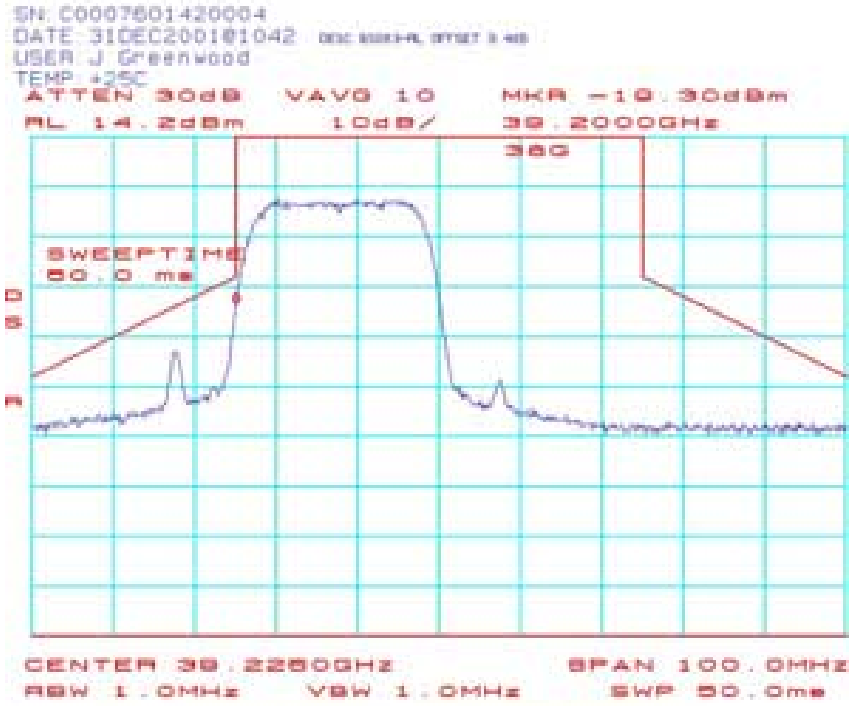
BS080: Spectrum Mask Plots (BS-ODU) 39.2125 GHZ QPSK:



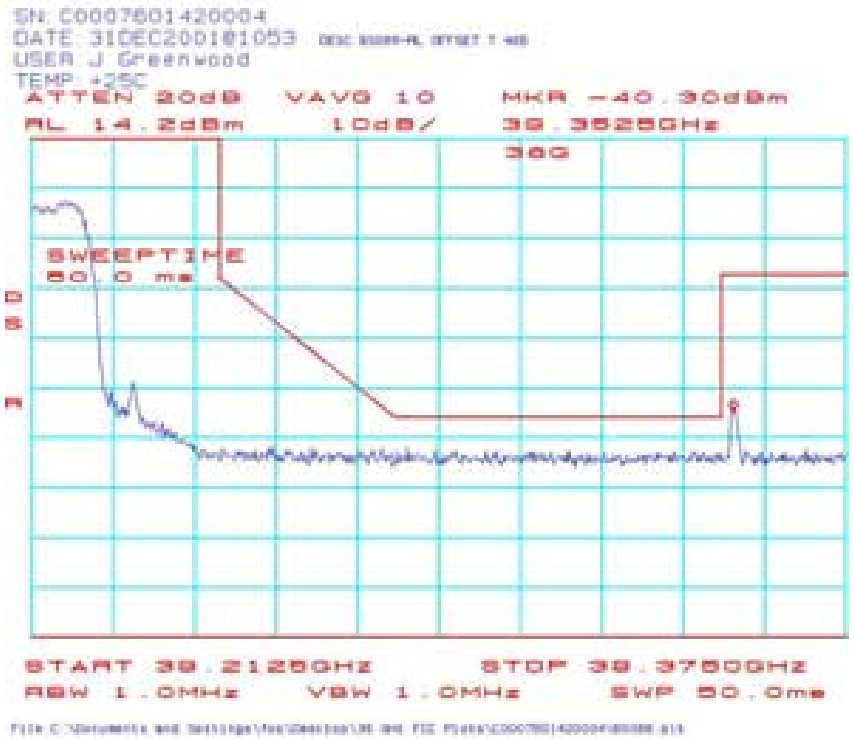
BS082: Spectrum Mask Plots (BS-ODU) 39.2125 GHz 16QAM:



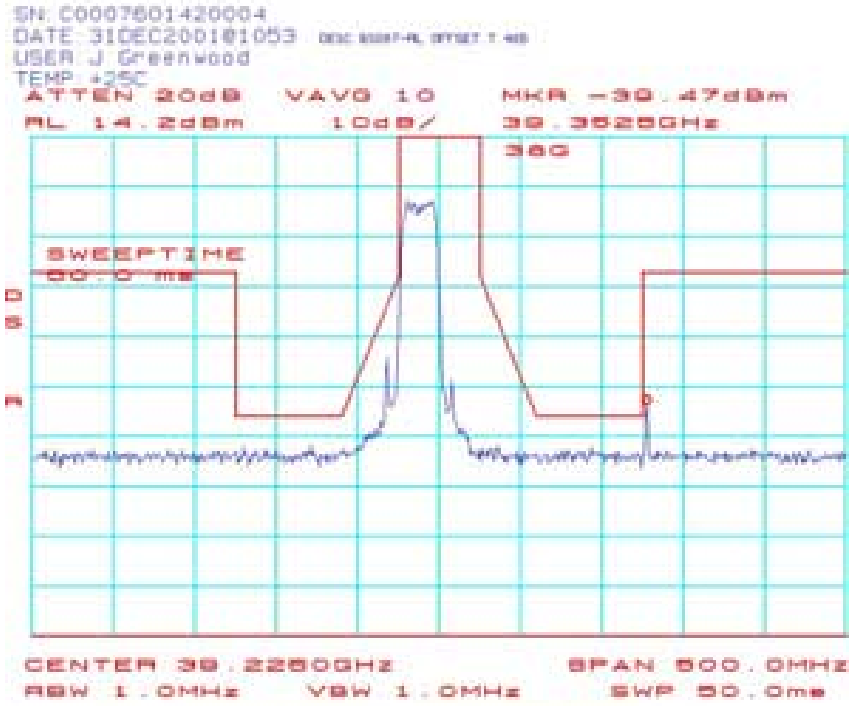
BS083: Spectrum Mask Plots (BS-ODU) 39.2125 GHz 16QAM:



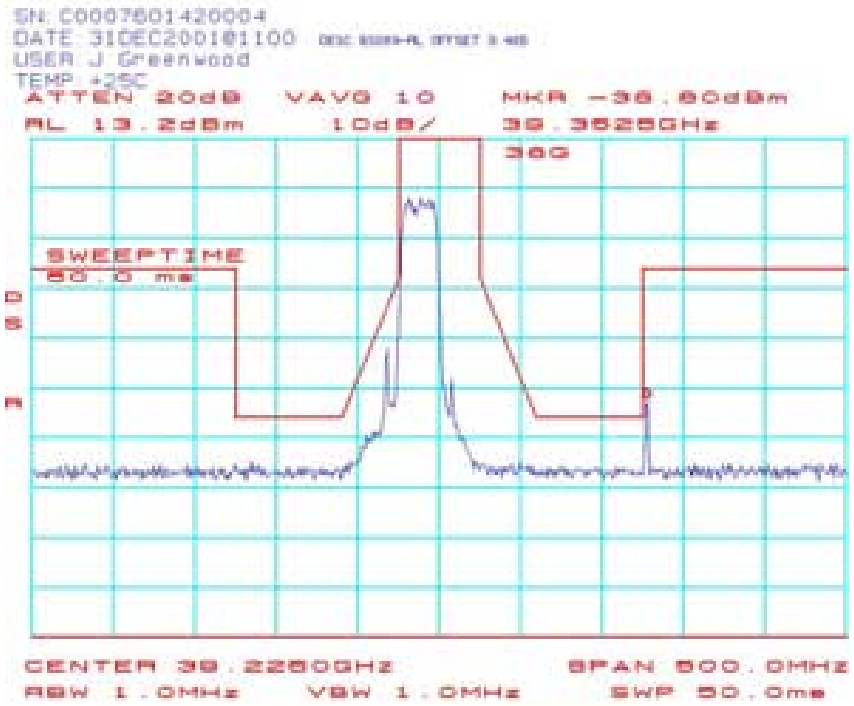
BS086: Spectrum Mask Plots (BS-ODU) 39.2125 GHz 16QAM:



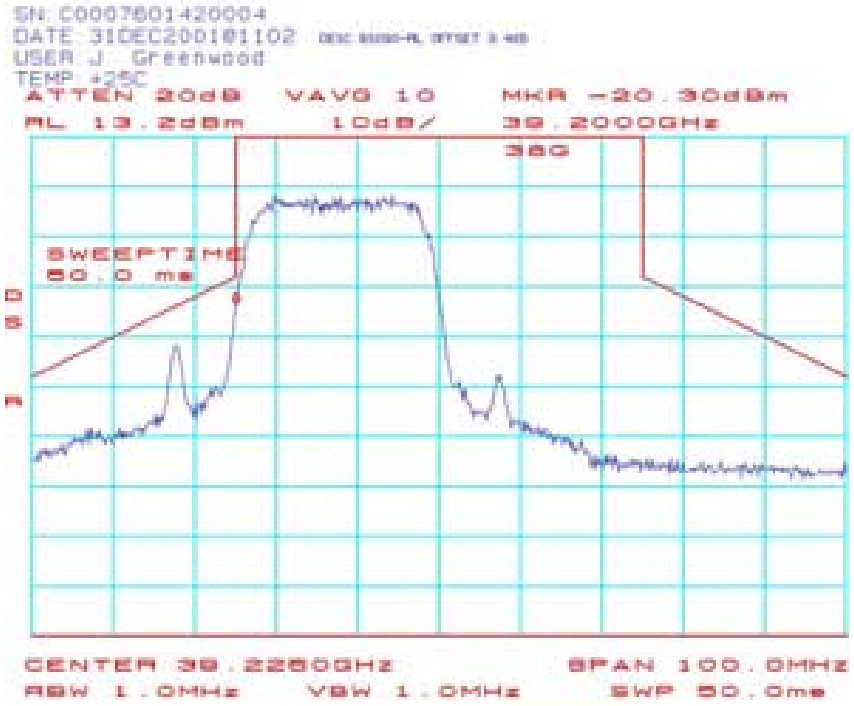
BS087: Spectrum Mask Plots (BS-ODU) 39.2125 GHz 16QAM:



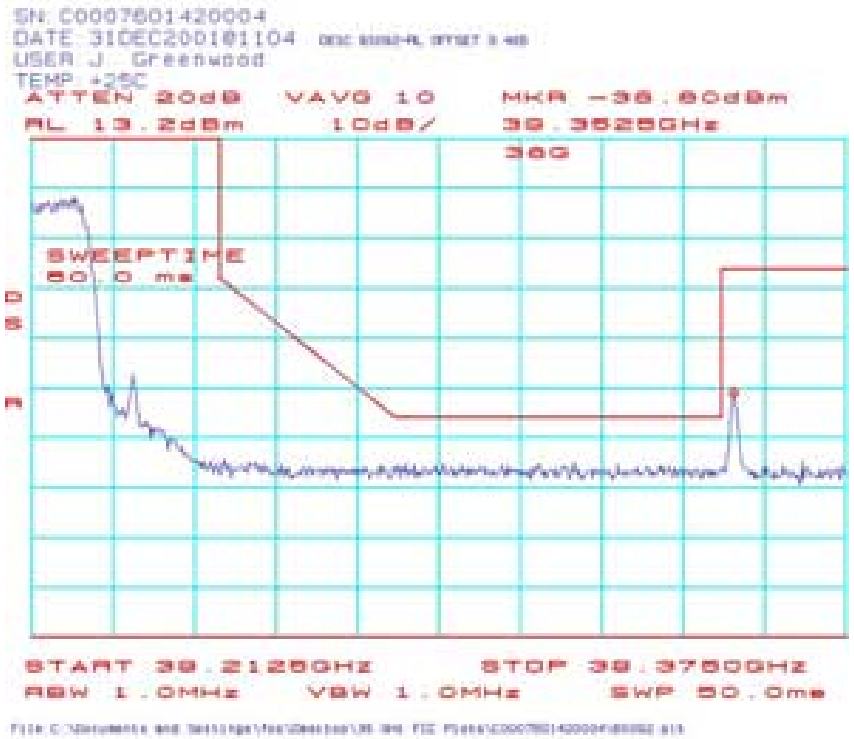
BS089: Spectrum Mask Plots (BS-ODU) 39.2125 GHz 64QAM:



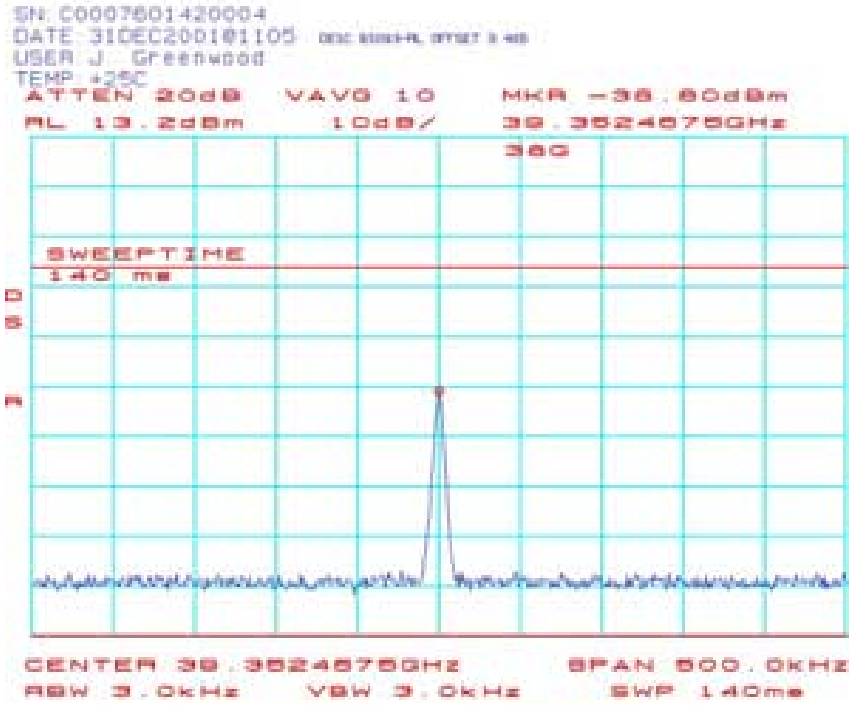
BS090: Spectrum Mask Plots (BS-ODU) 39.2125 GHz 64QAM:



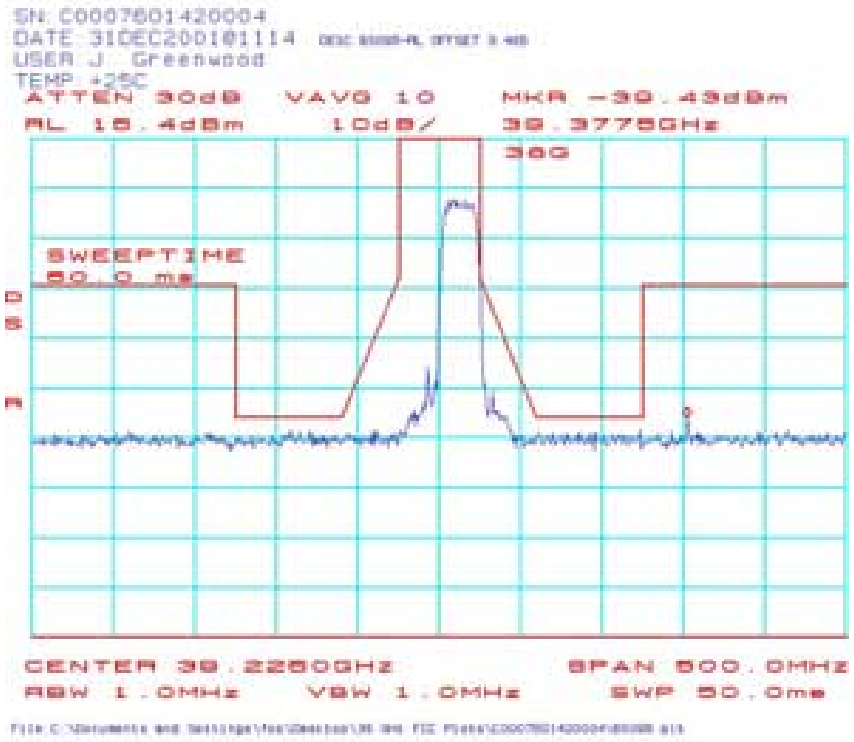
BS092: Spectrum Mask Plots (BS-ODU) 39.2125 GHZ 64QAM:



BS093: Spectrum Mask Plots (BS-ODU) 39.2125 GHZ 64QAM:

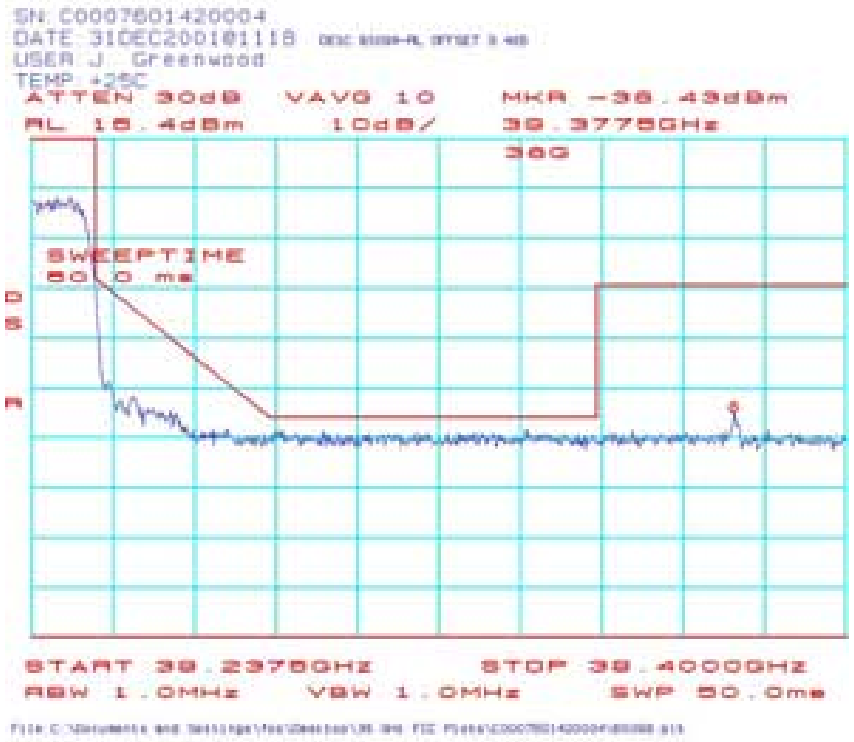


BS095: Spectrum Mask Plots (BS-ODU) 39.2375 GHz QPSK:

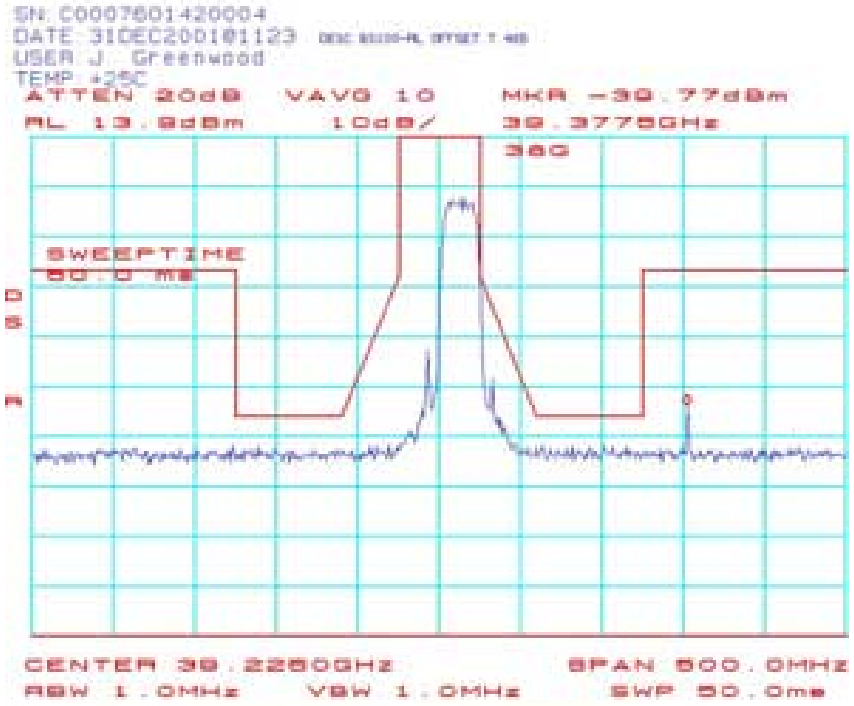


BS096: Spectrum Mask Plots (BS-ODU) 39.2375 GHz QPSK:

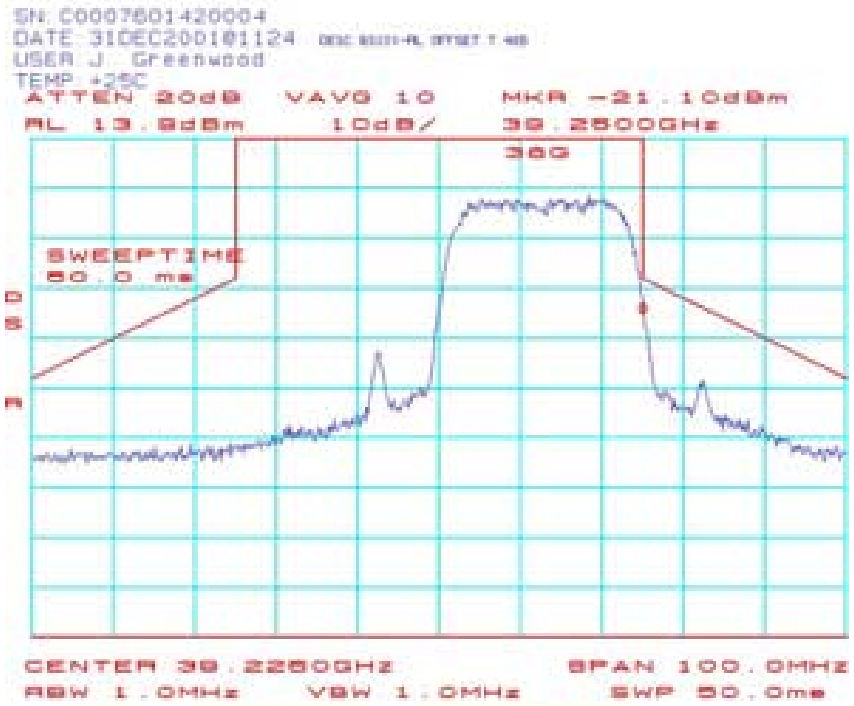
BS098: Spectrum Mask Plots (BS-ODU) 39.2375 GHz QPSK:



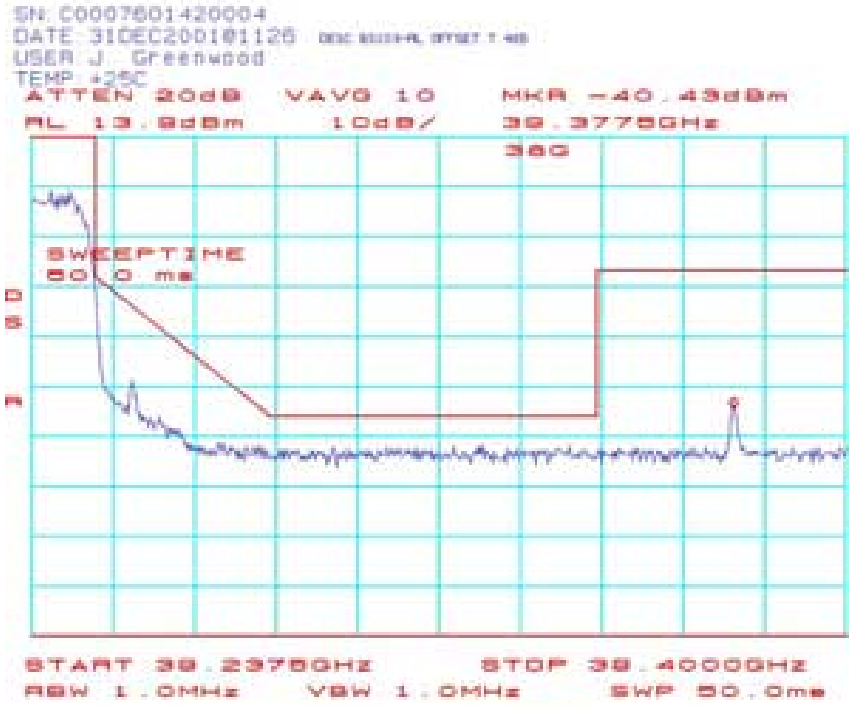
BS100: Spectrum Mask Plots (BS-ODU) 39.2375 GHz 16QAM:



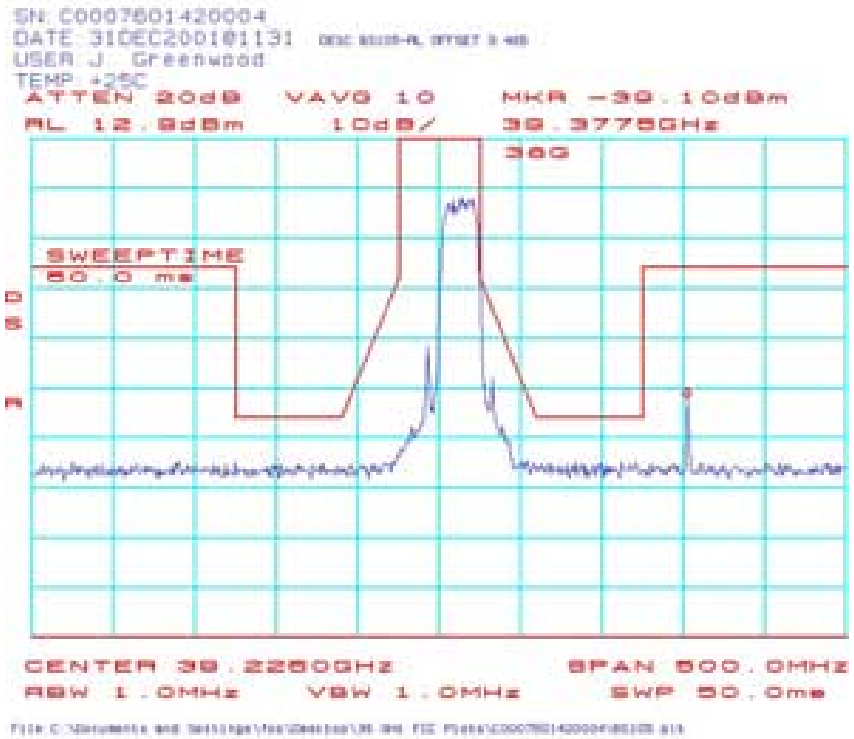
BS101: Spectrum Mask Plots (BS-ODU) 39.2375 GHz 16QAM:



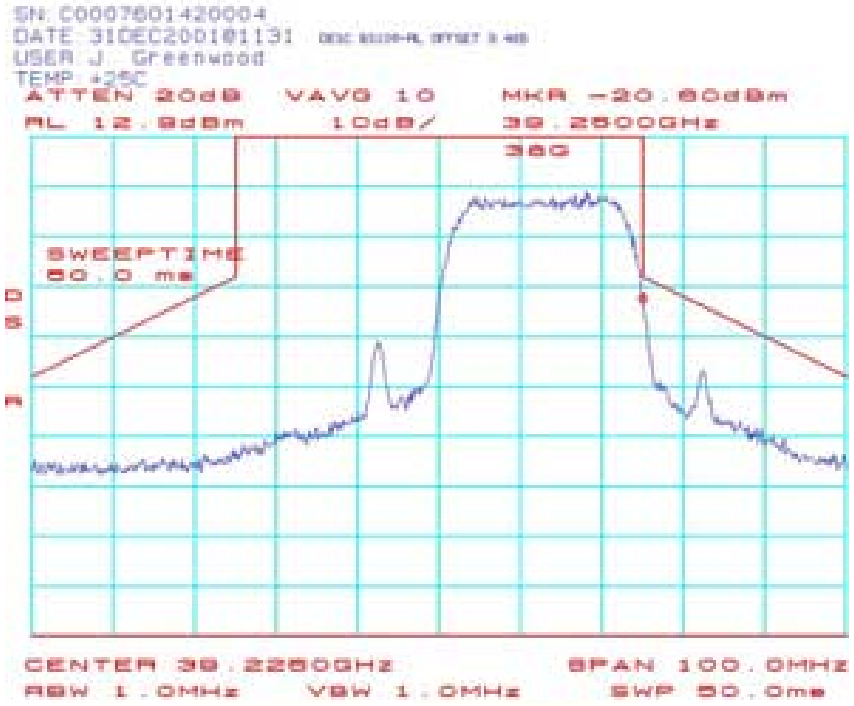
BS103: Spectrum Mask Plots (BS-ODU) 39.2375 GHz 16QAM:



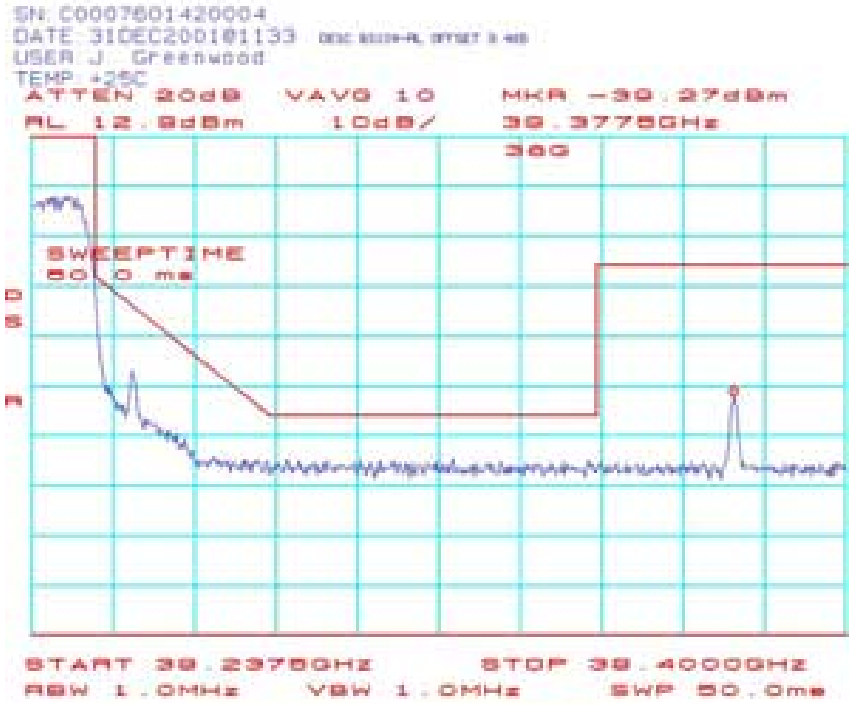
BS105: Spectrum Mask Plots (BS-ODU) 39.2375 GHz 64QAM:



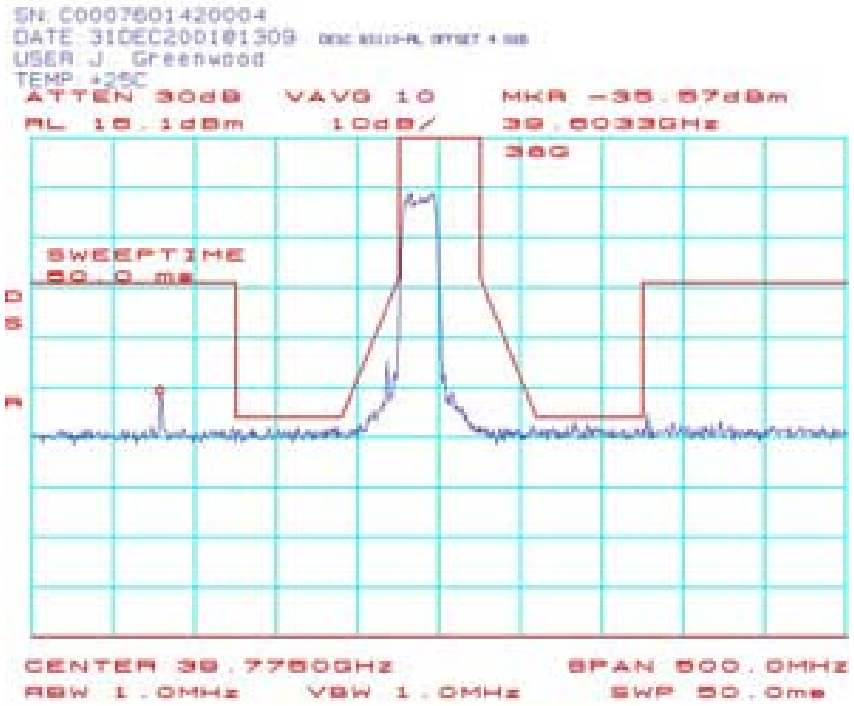
BS106: Spectrum Mask Plots (BS-ODU) 39.2375 GHz 64QAM:



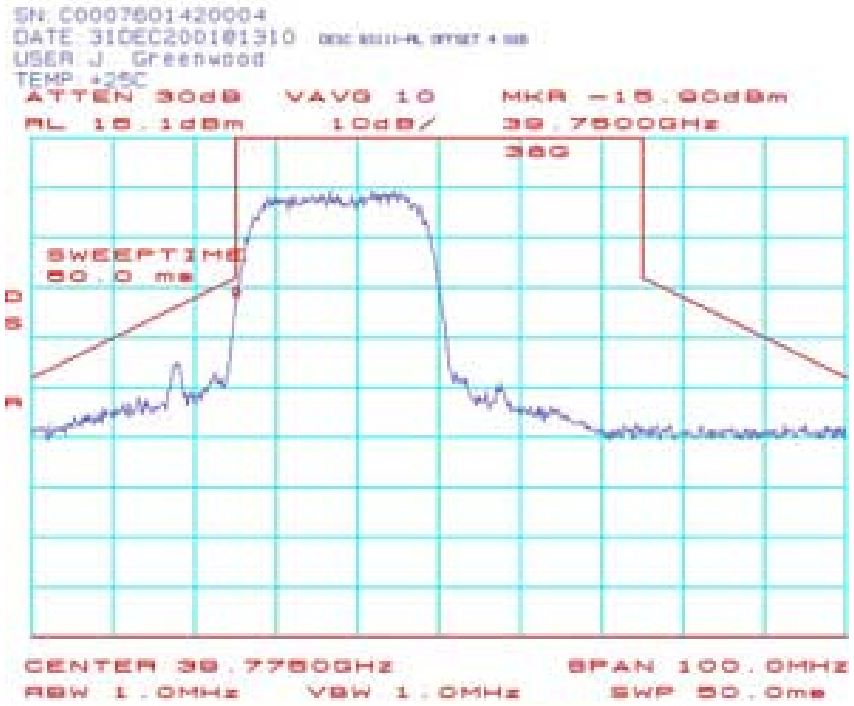
BS108 Spectrum Mask Plots (BS-ODU) 39.2375 GHz 64QAM:



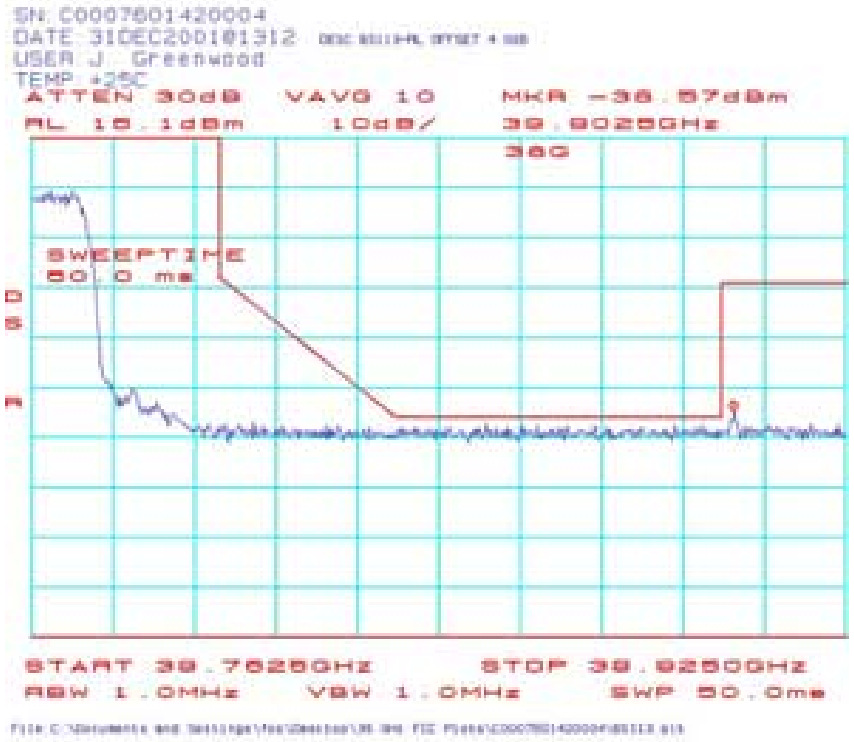
BS110: Spectrum Mask Plots (BS-ODU) 39.7625 GHz QPSK:



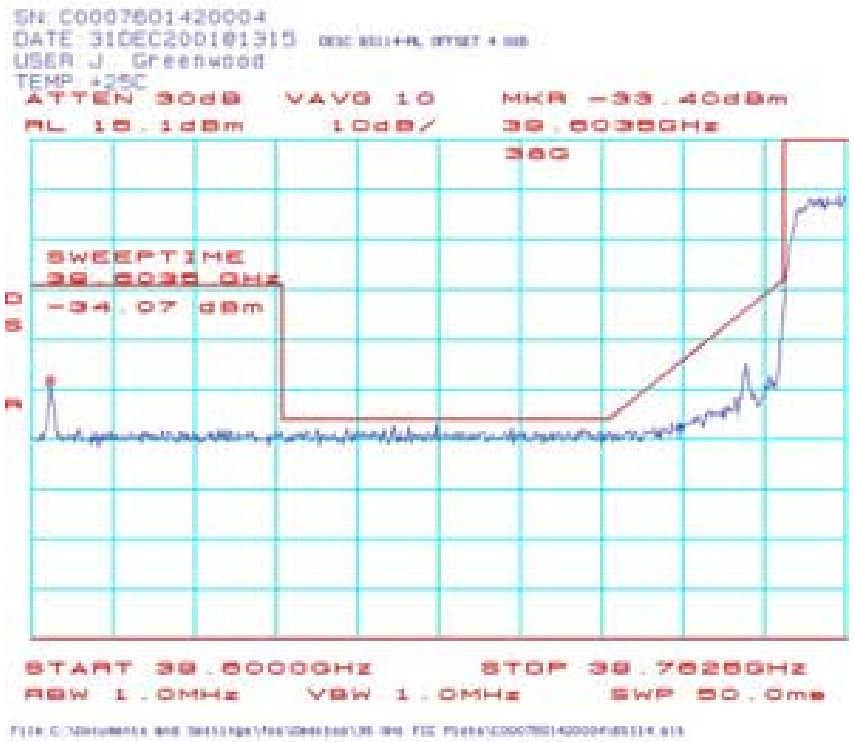
BS111: Spectrum Mask Plots (BS-ODU) 39.7625 GHz QPSK:



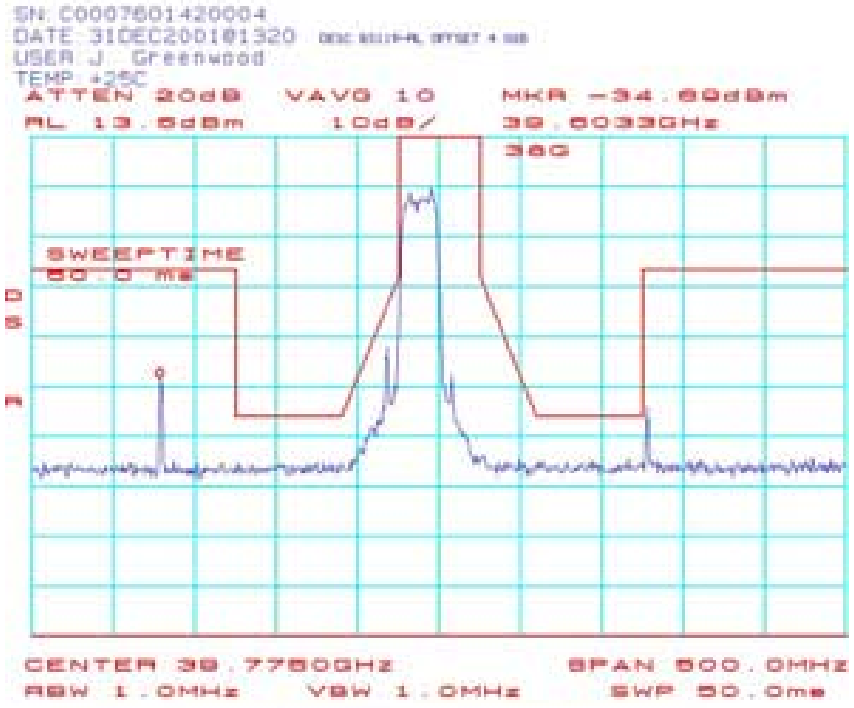
BS113: Spectrum Mask Plots (BS-ODU) 39.7625 GHz QPSK:



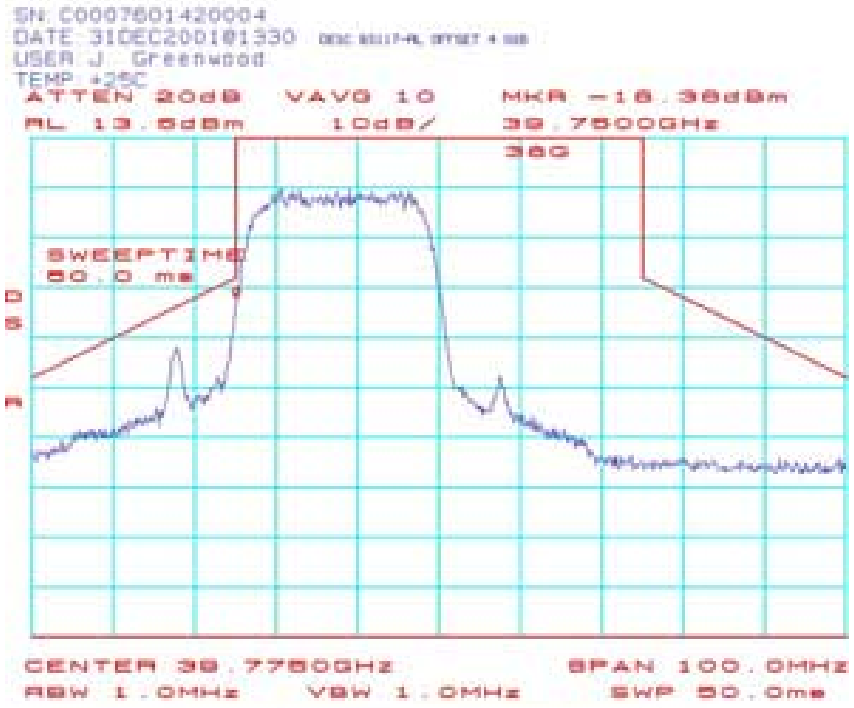
BS114: Spectrum Mask Plots (BS-ODU) 39.7625 GHz QPSK:



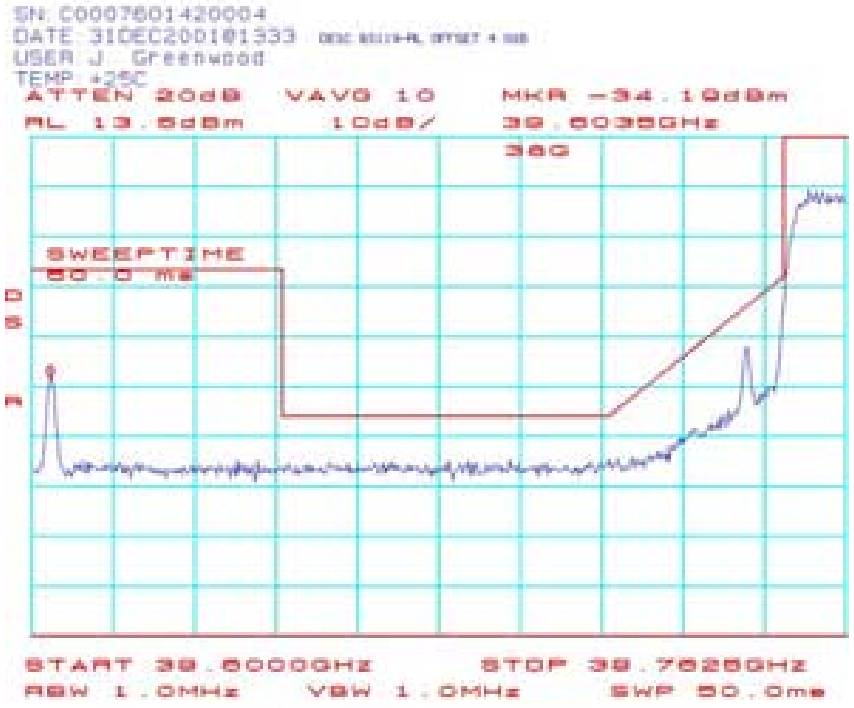
BS116: Spectrum Mask Plots (BS-ODU) 39.7625 GHz 16QAM:



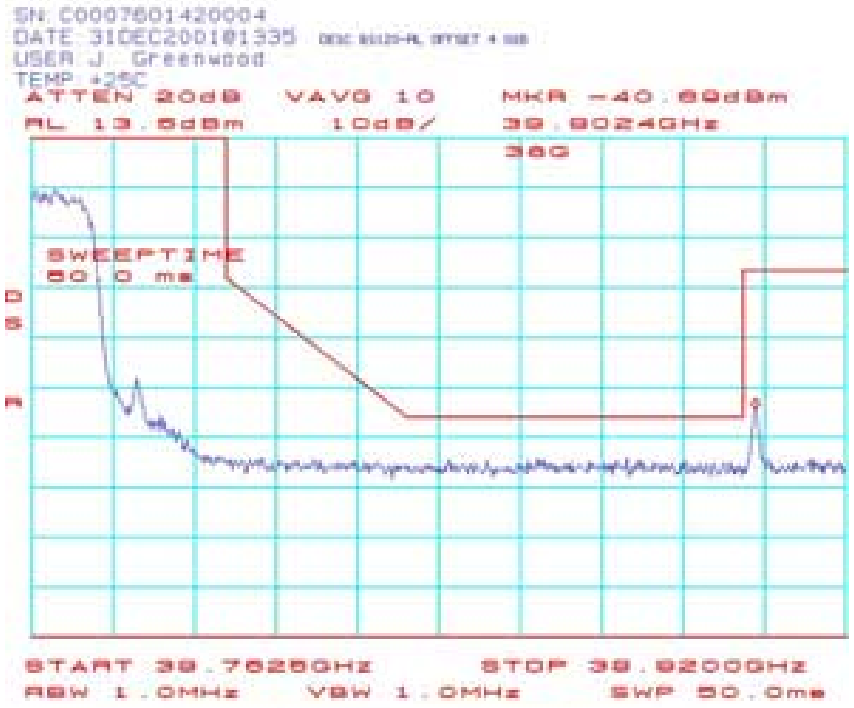
BS117: Spectrum Mask Plots (BS-ODU) 39.7625 GHz 16QAM:



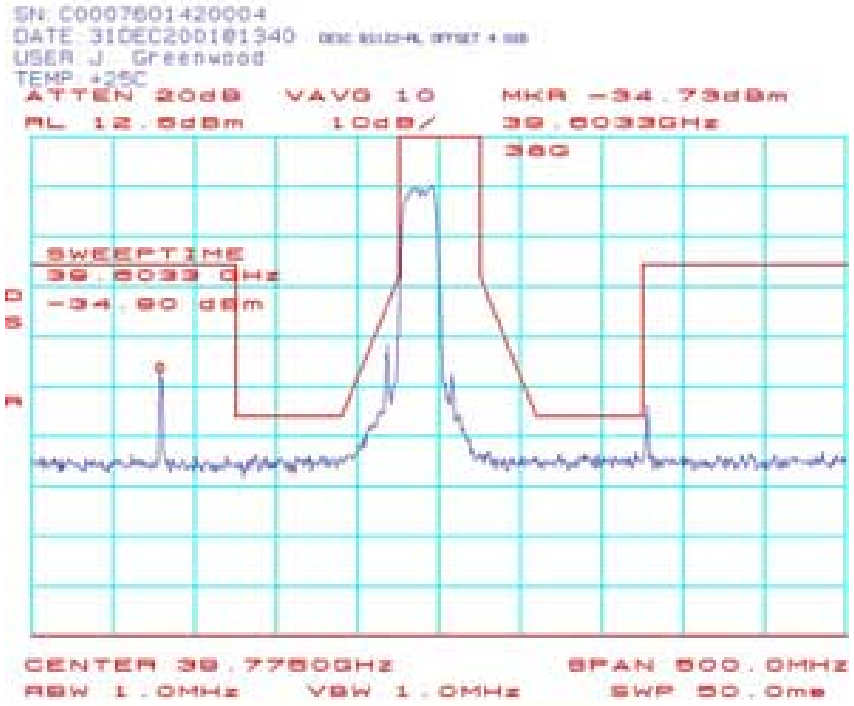
BS119: Spectrum Mask Plots (BS-ODU) 39.7625 GHz 16QAM:



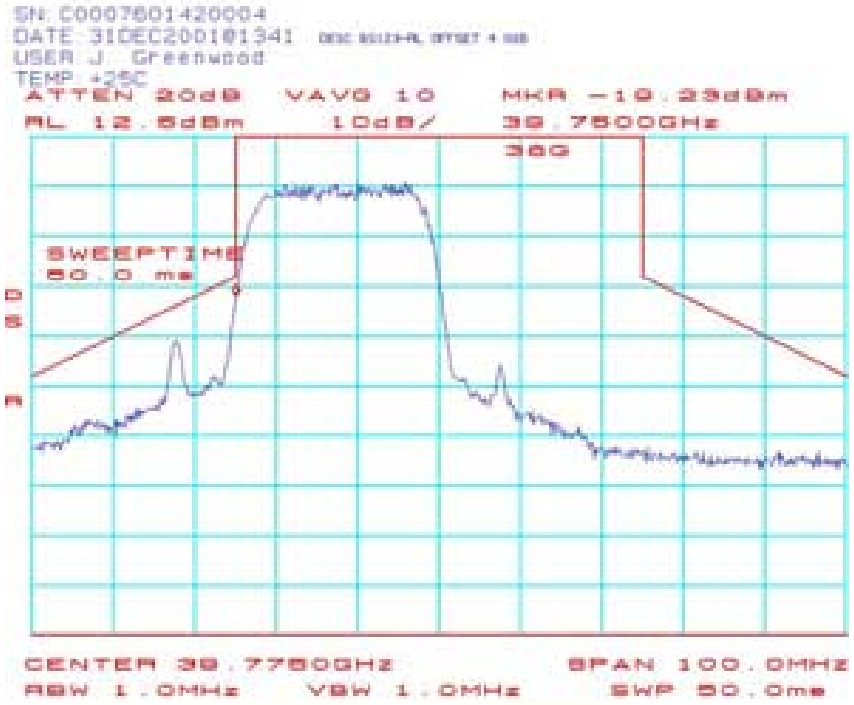
BS120: Spectrum Mask Plots (BS-ODU) 39.7625 GHz 16QAM:



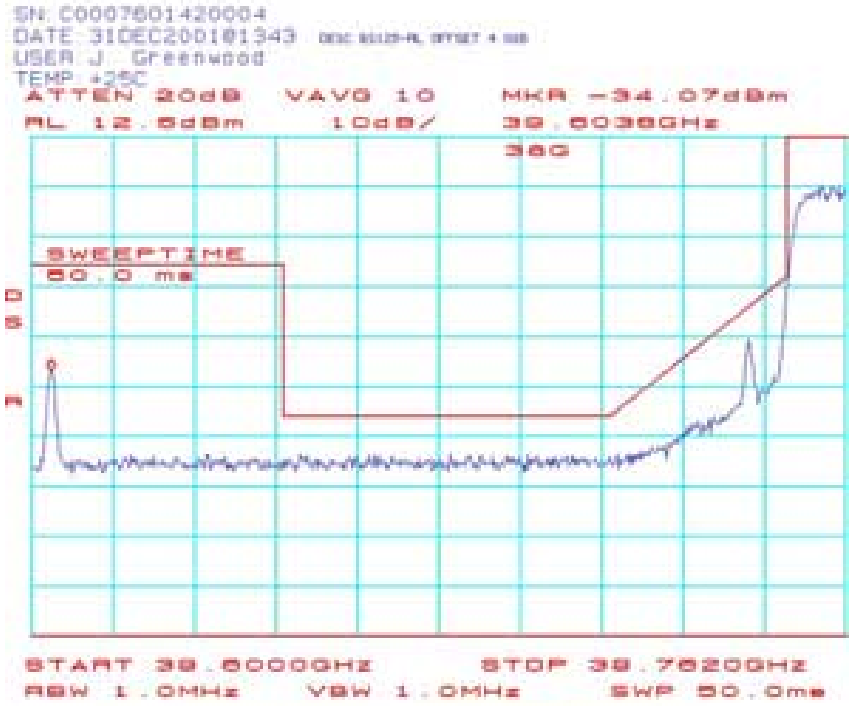
BS122: Spectrum Mask Plots (BS-ODU) 39.7625 GHz 64QAM:



BS123: Spectrum Mask Plots (BS-ODU) 39.7625 GHz 64QAM:

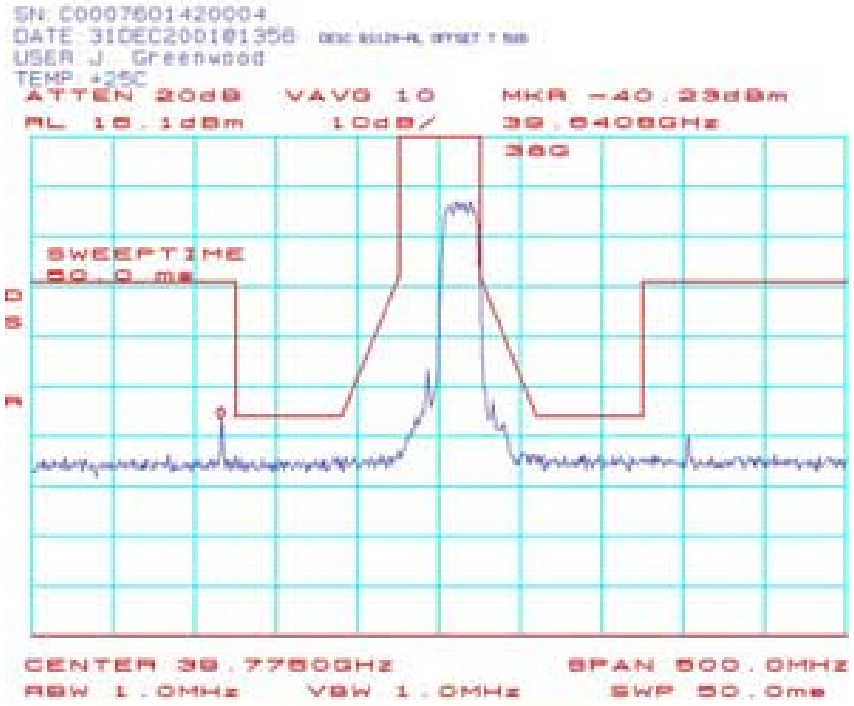


BS125: Spectrum Mask Plots (BS-ODU) 39.7625 GHz 64QAM:

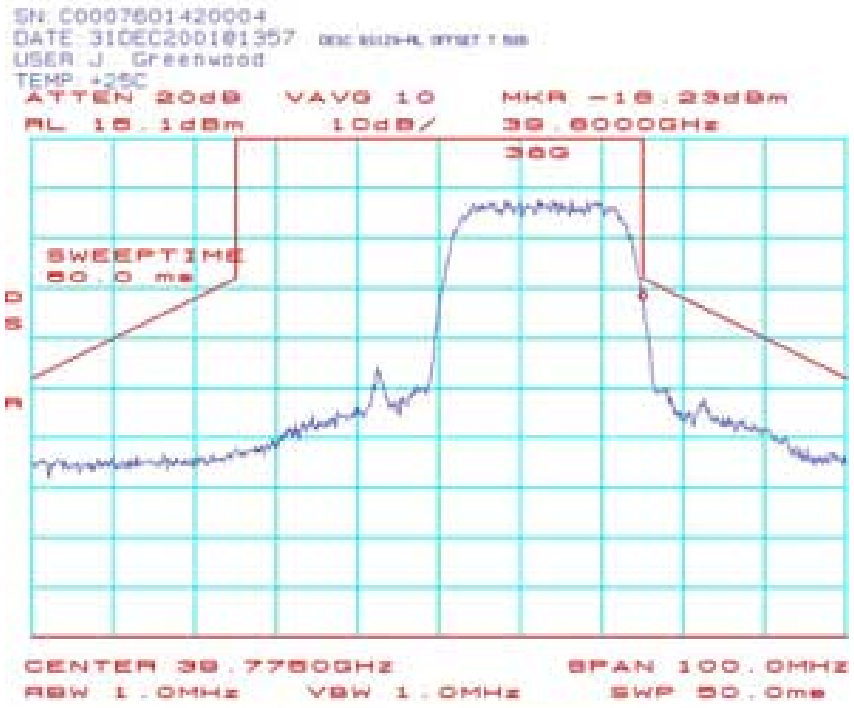


BS126: Spectrum Mask Plots (BS-ODU) 39.7625 GHz 64QAM:

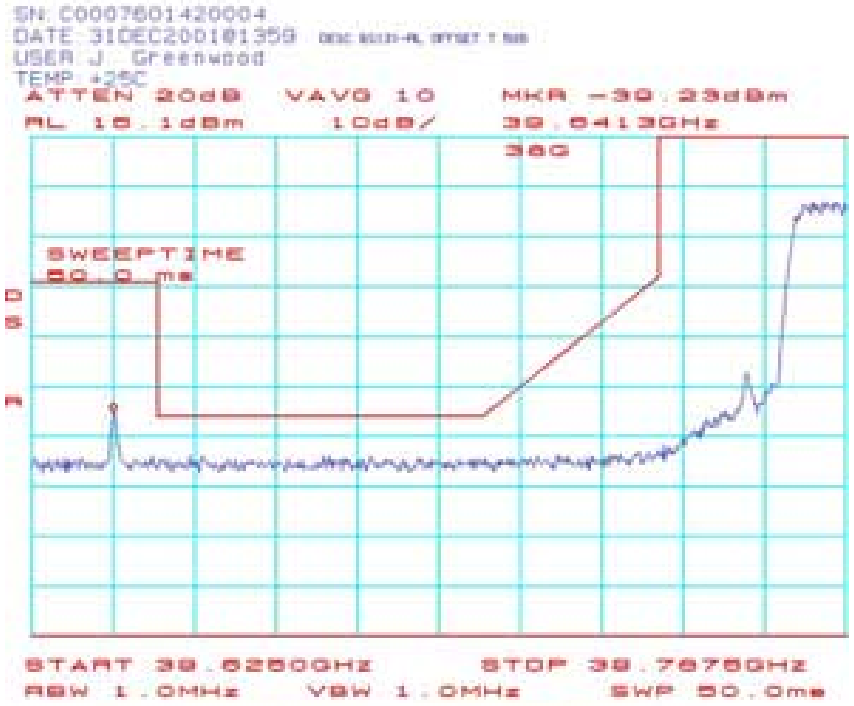
BS128: Spectrum Mask Plots (BS-ODU) 39.7875 GHz QPSK:



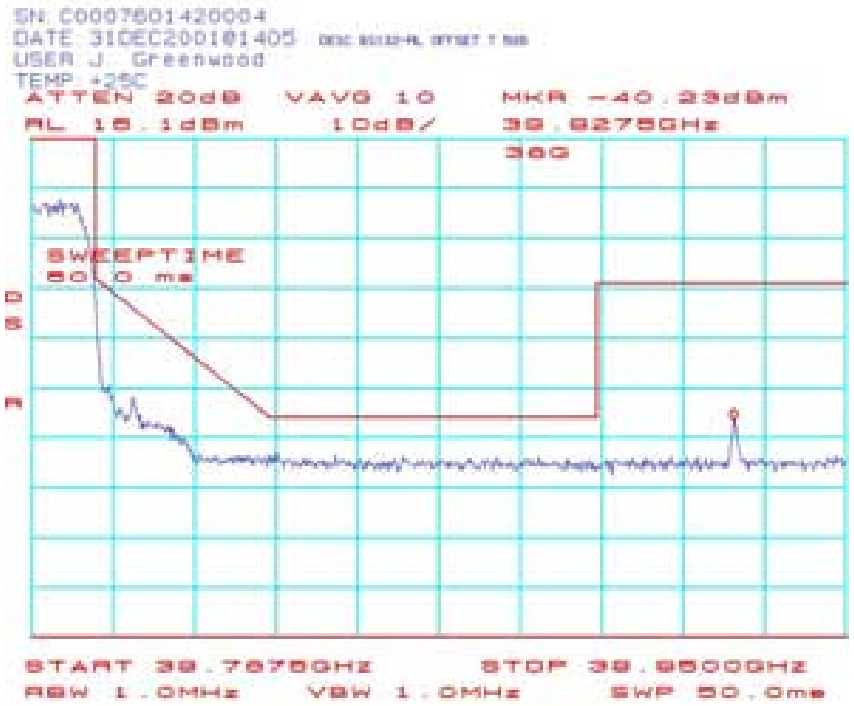
BS129 Spectrum Mask Plots (BS-ODU) 39.7875 GHz QPSK:



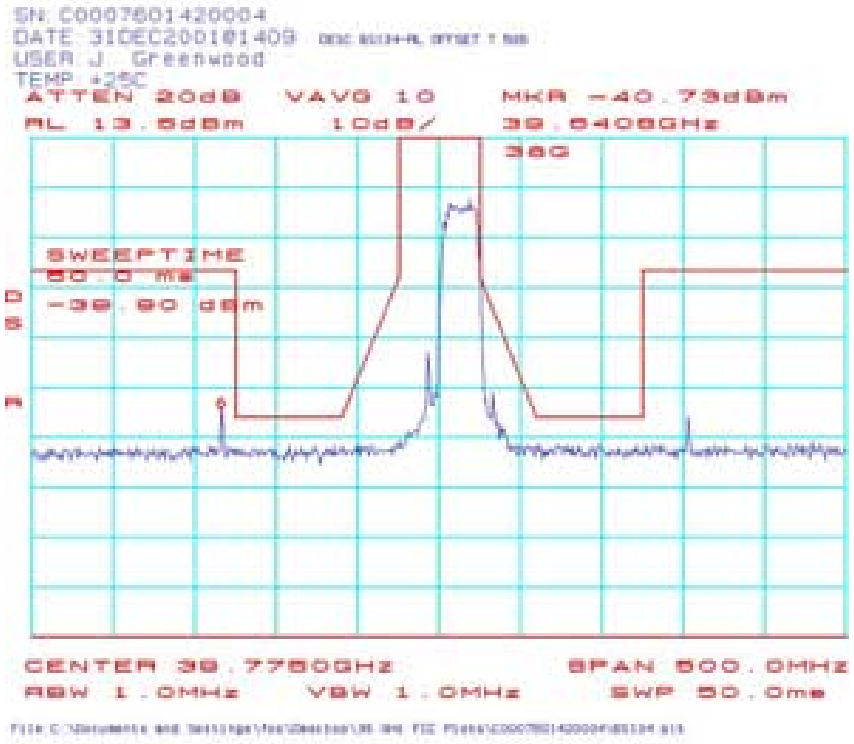
BS131: Spectrum Mask Plots (BS-ODU) 39.7875 GHz QPSK:



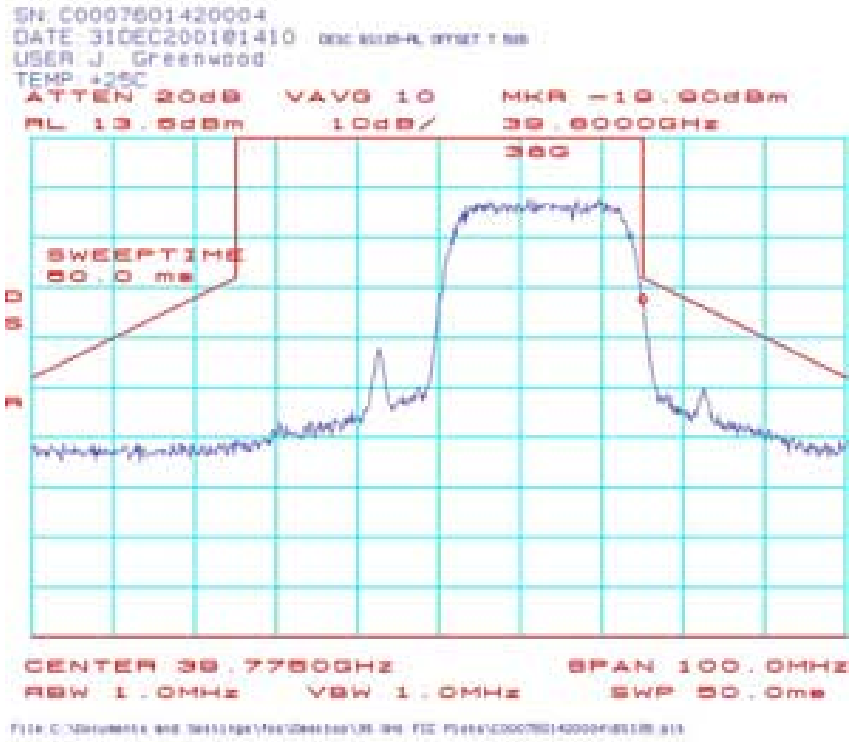
BS132: Spectrum Mask Plots (BS-ODU) 39.7875 GHz QPSK:



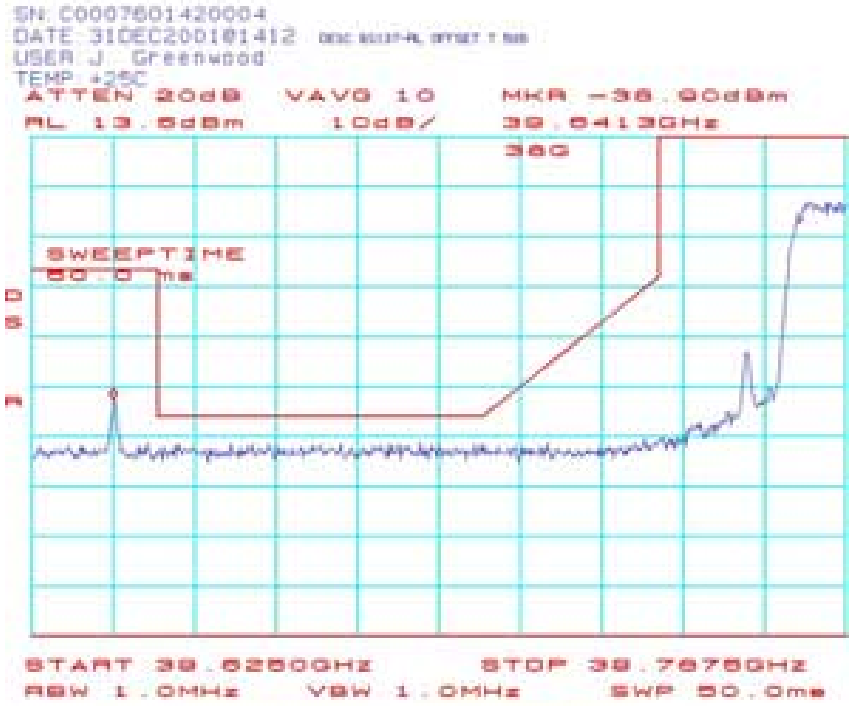
BS134: Spectrum Mask Plots (BS-ODU) 39.7875 GHz 16QAM:



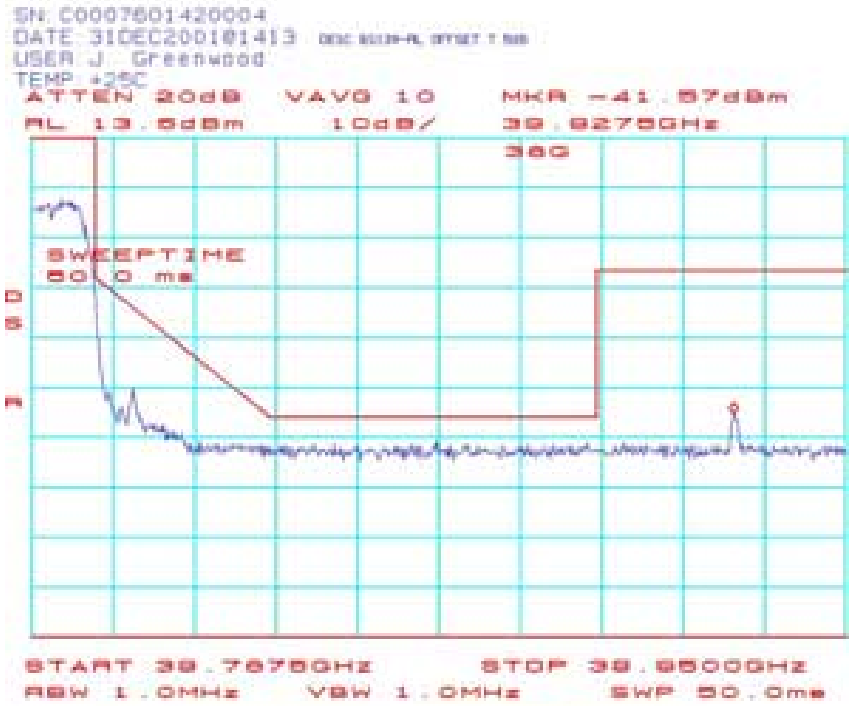
BS135: Spectrum Mask Plots (BS-ODU) 39.7875 GHz 16QAM:



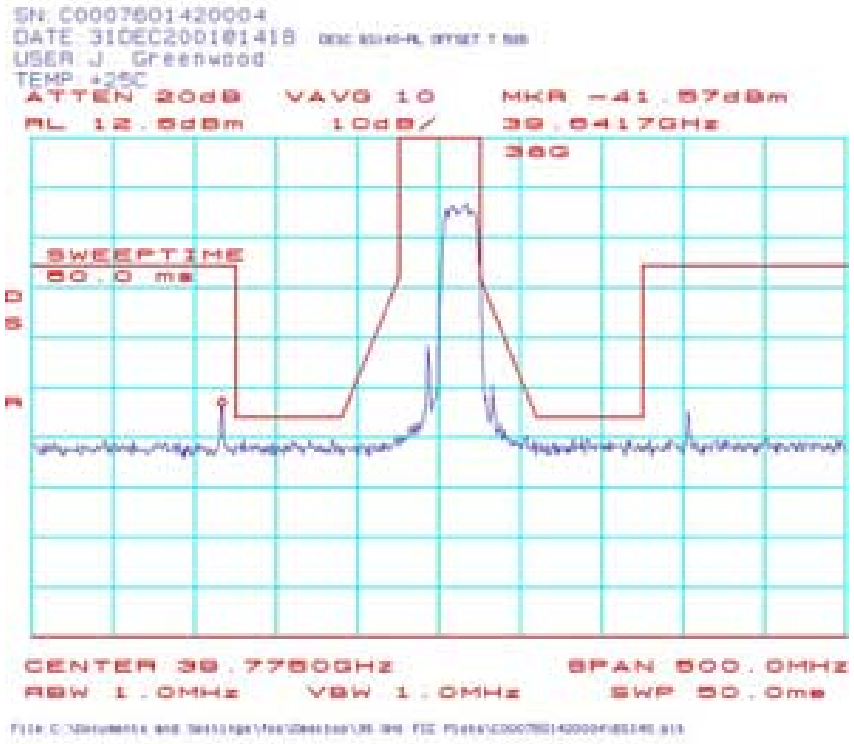
BS137: Spectrum Mask Plots (BS-ODU) 39.7875 GHz 16QAM:



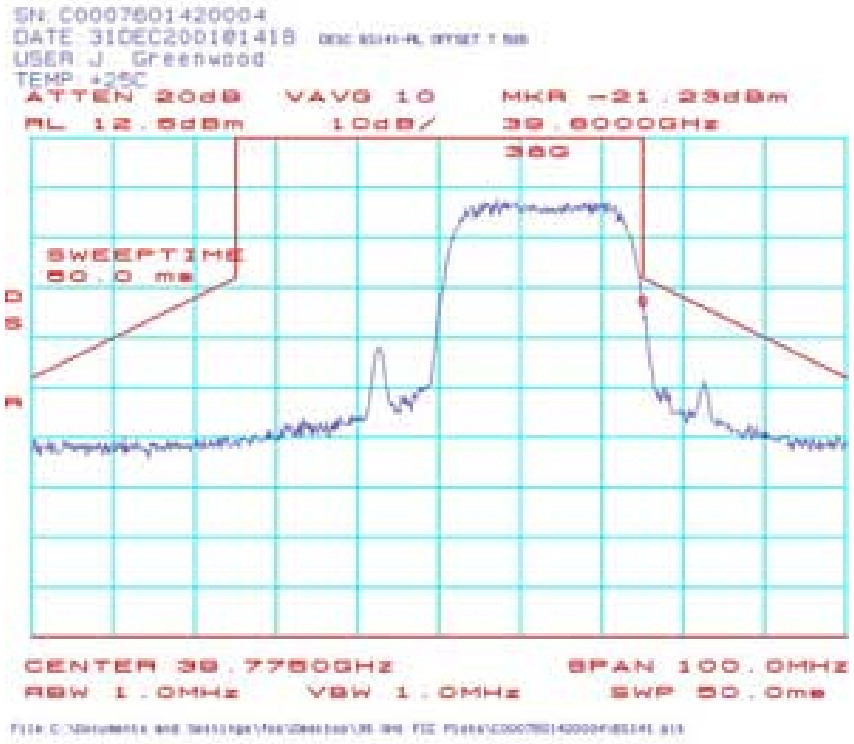
BS138: Spectrum Mask Plots (BS-ODU) 39.7875 GHz 16QAM:



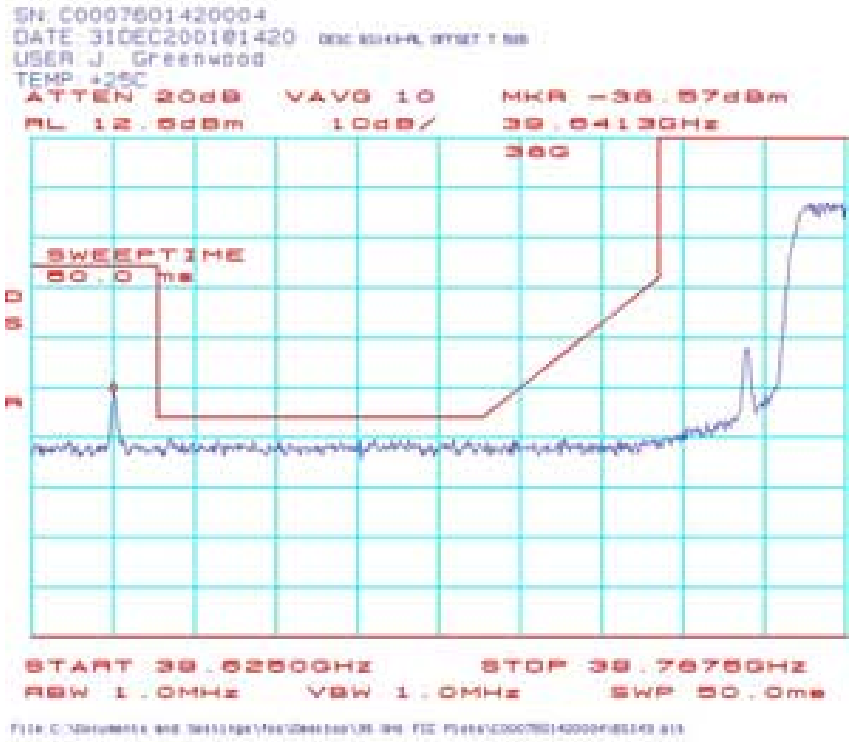
BS140: Spectrum Mask Plots (BS-ODU) 39.7875 GHz 64QAM:



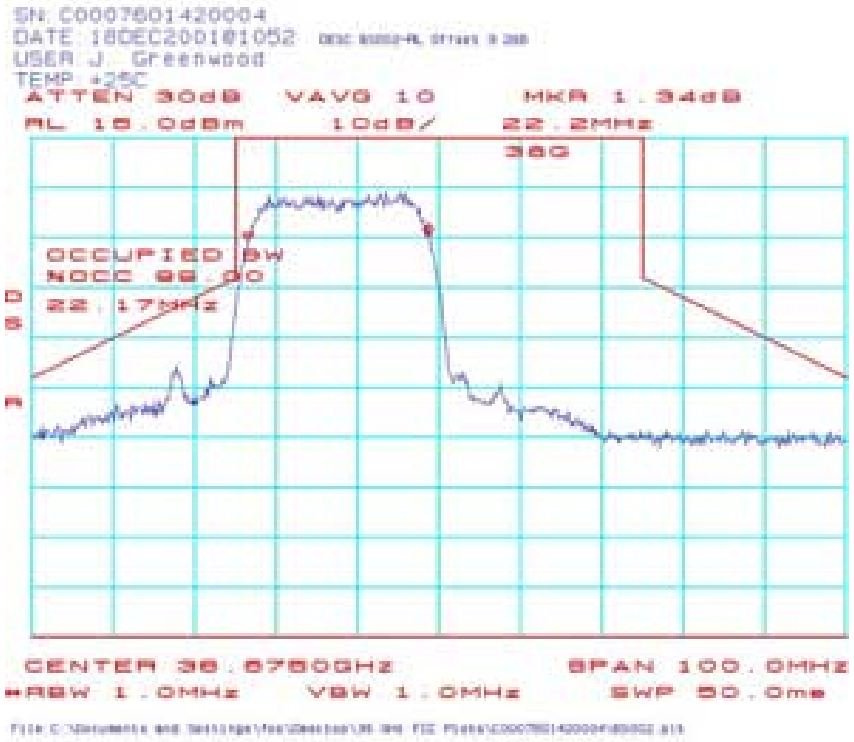
BS141: Spectrum Mask Plots (BS-ODU) 39.7875 GHz 64QAM:



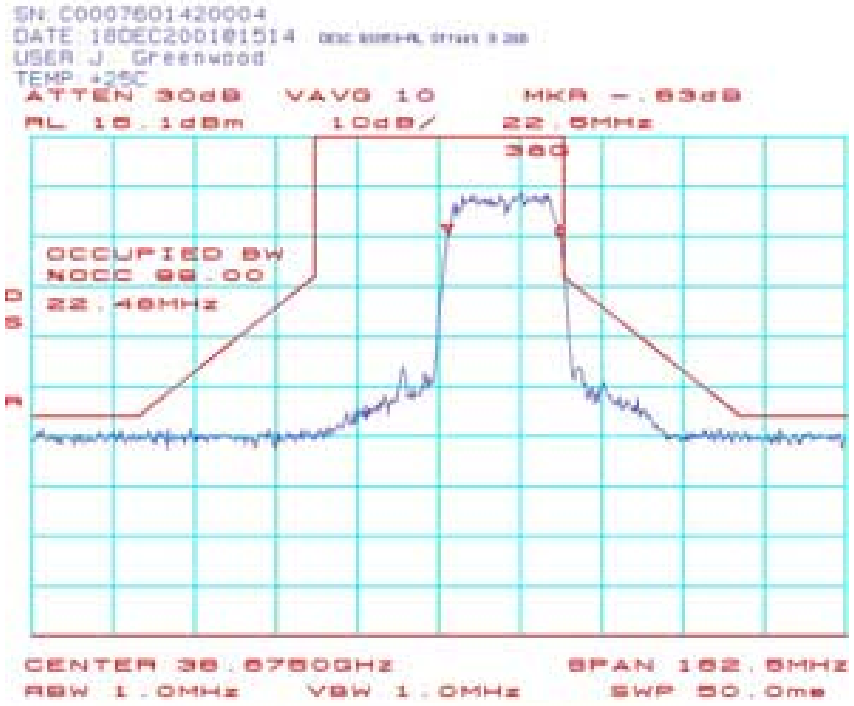
BS143: Spectrum Mask Plots (BS-ODU) 39.7875 GHz 64QAM:



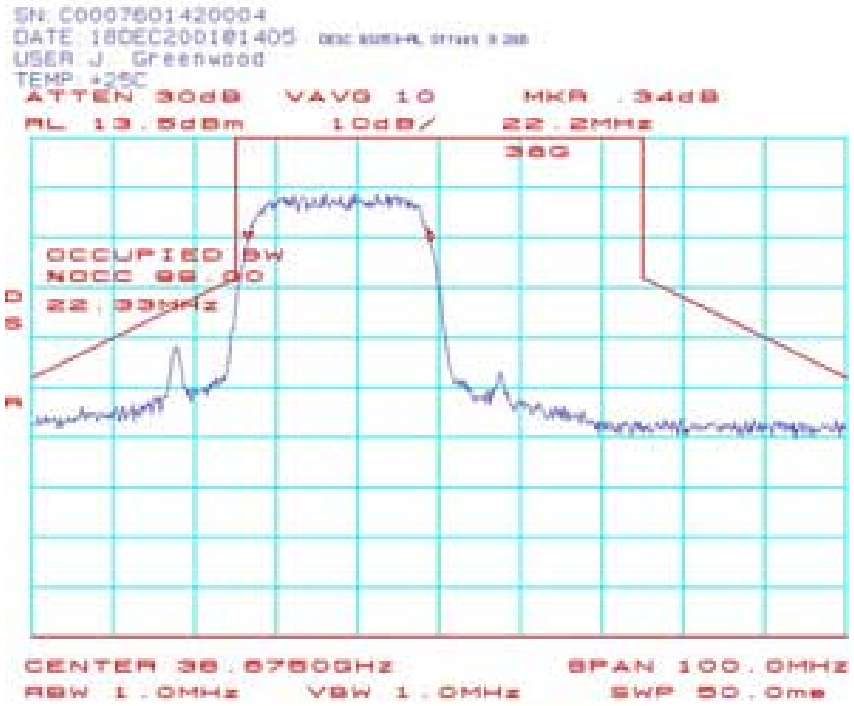
BS002: Occupied Bandwidth (BS-ODU) 38.6625GHz QPSK:



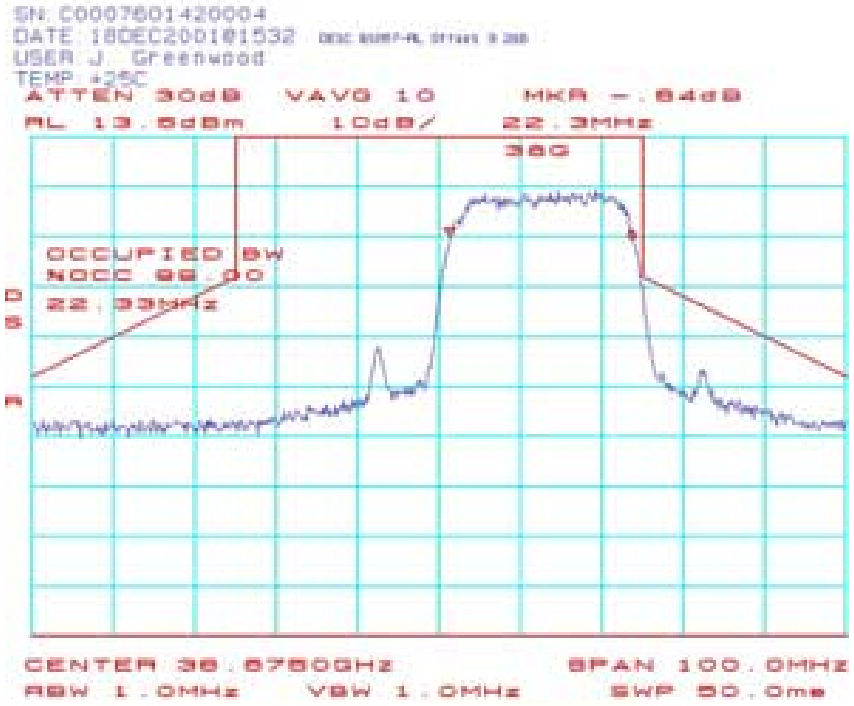
BS063: Occupied Bandwidth (BS-ODU) 38.6875 GHz QPSK:



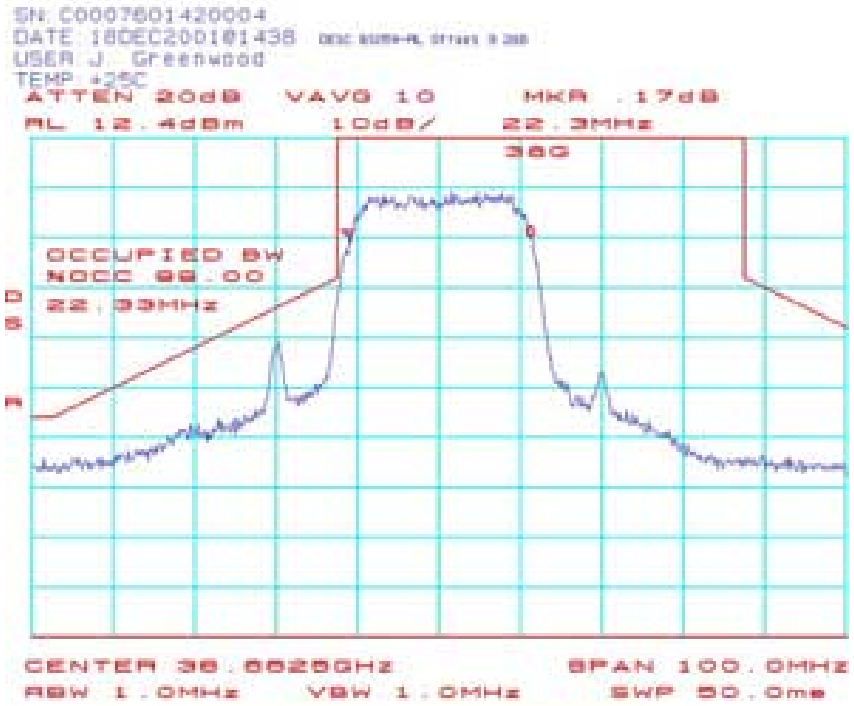
BS053: Occupied Bandwidth (BS-ODU) 38.6625 GHz 16QAM:



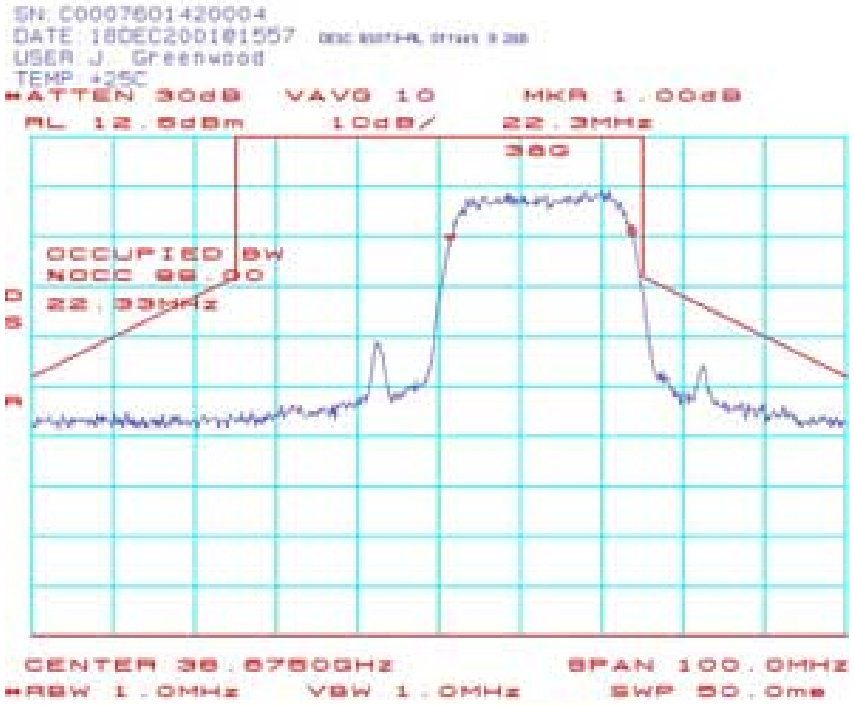
BS067: Occupied Bandwidth (BS-ODU) 38.6875 GHz 16QAM:



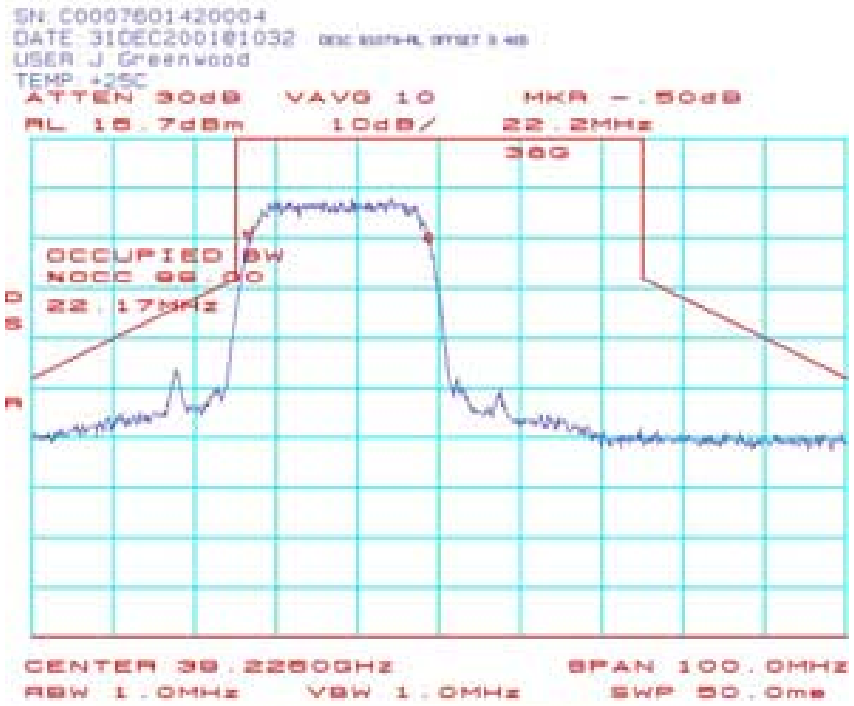
BS058: Occupied Bandwidth (BS-ODU) 38.6625 GHz 64QAM:



BS073: Occupied Bandwidth (BS-ODU) 38.6875 GHz 64QAM:

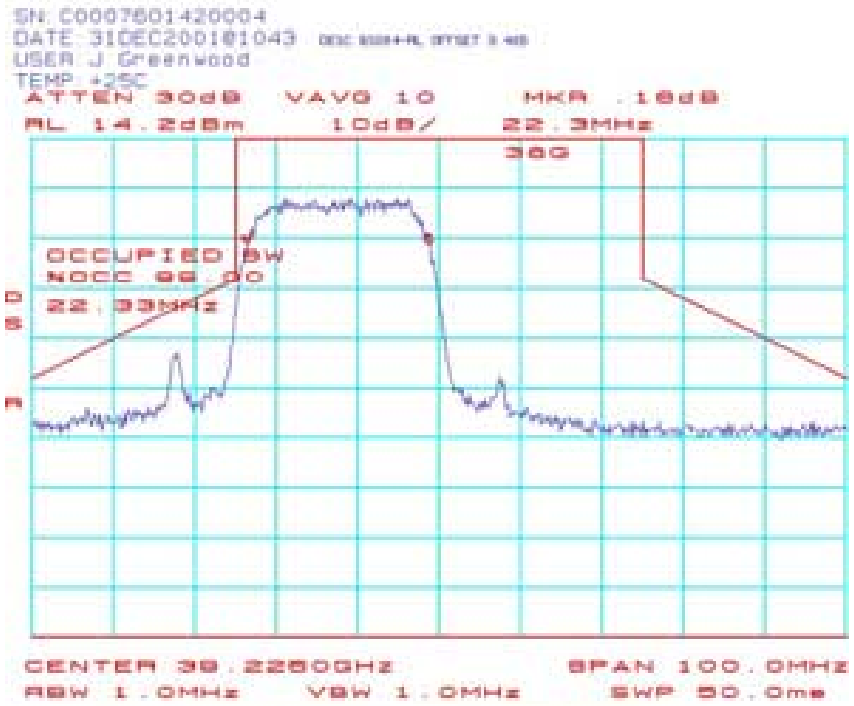


BS079: Occupied Bandwidth (BS-ODU) 39.2125 GHz QPSK:

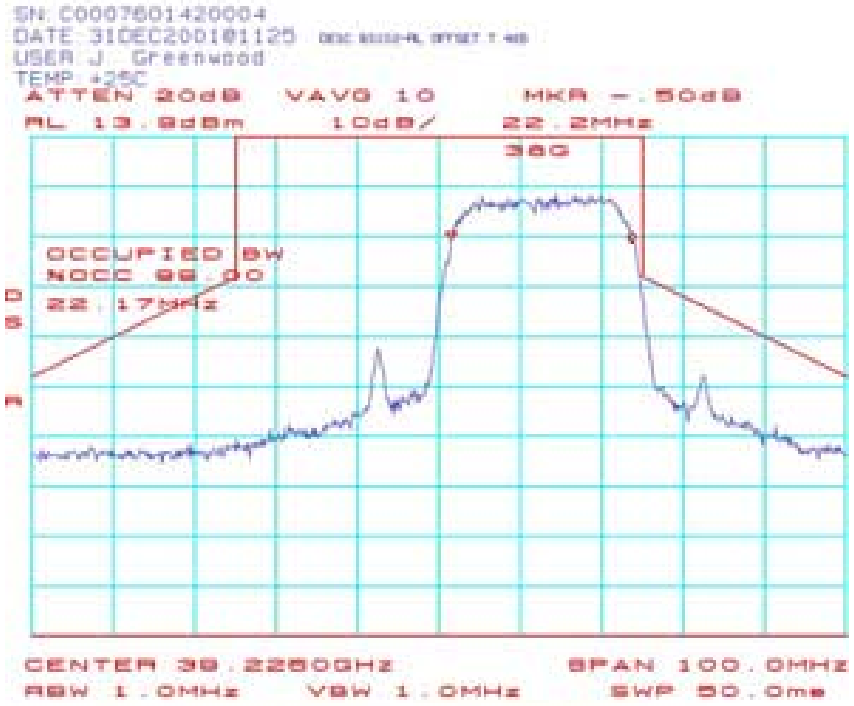


BS097: Occupied Bandwidth (BS-ODU) 39.2375 GHz QPSK:

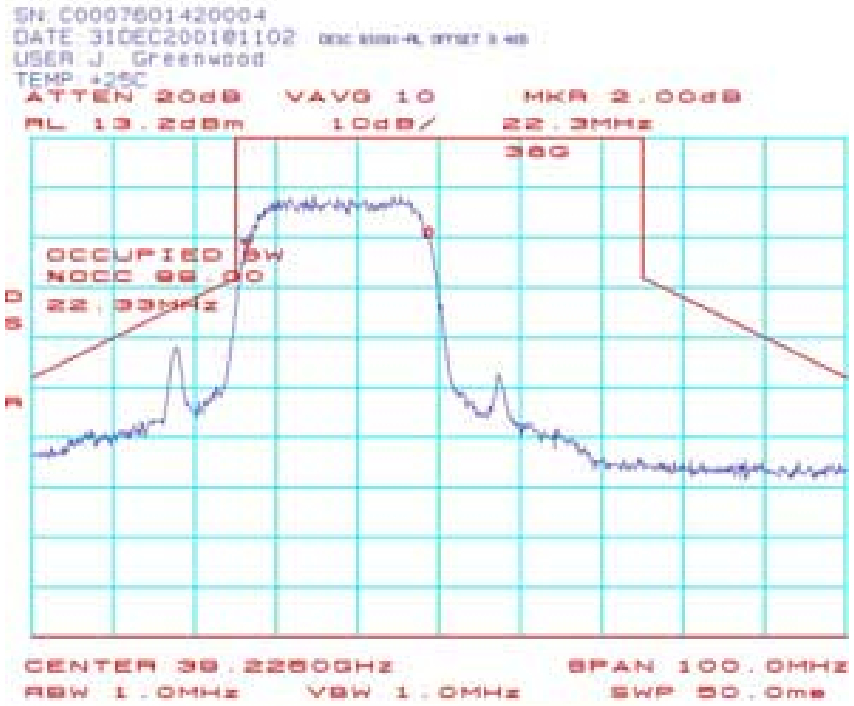
BS084: Occupied Bandwidth (BS-ODU) 39.2125 GHz 16QAM:



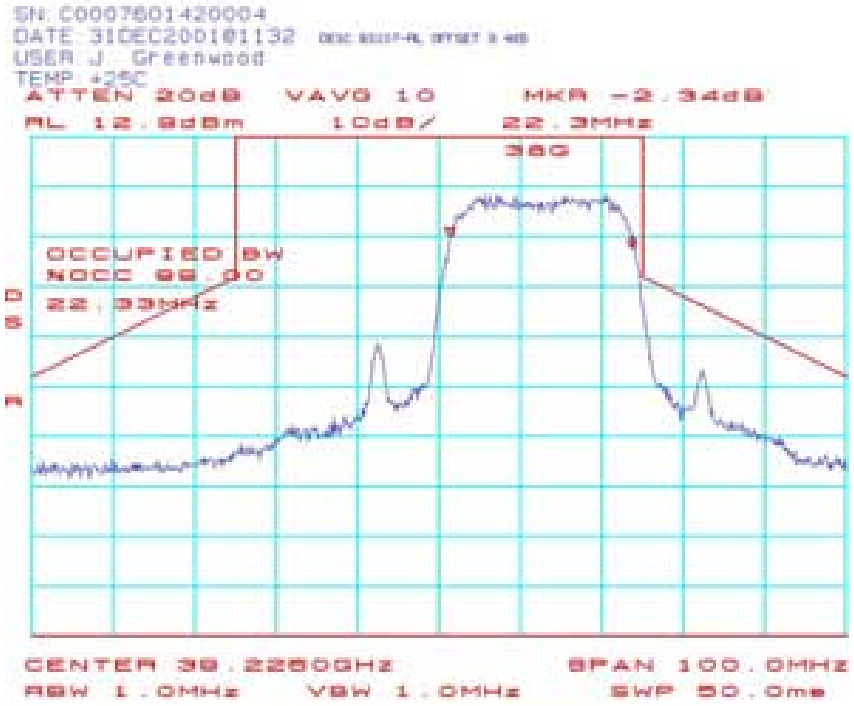
BS102: Occupied Bandwidth (BS-ODU) 38.2375 GHz 16QAM:



BS091: Occupied Bandwidth (BS-ODU) 39.2125 GHz 64QAM:

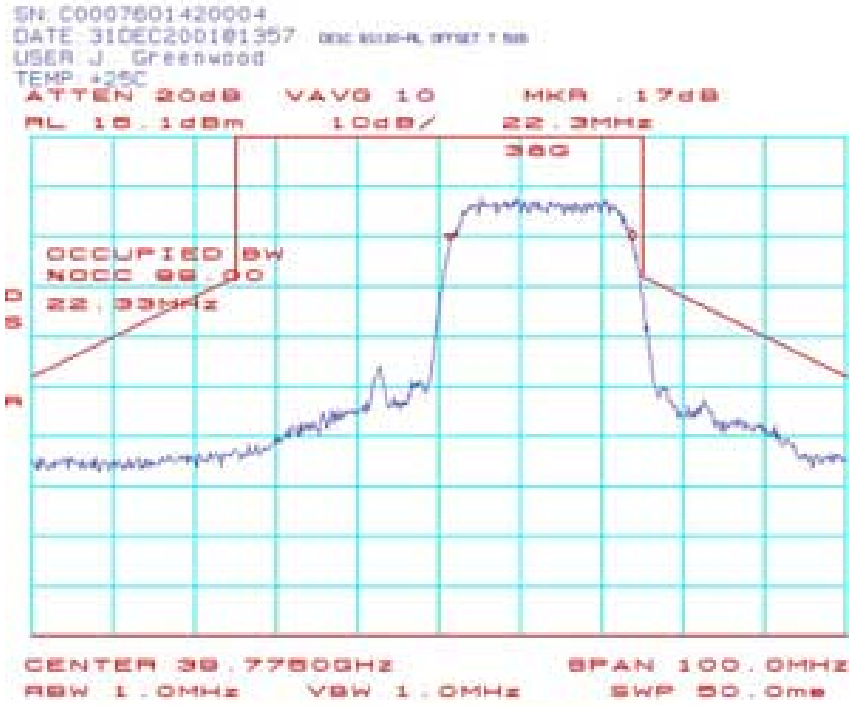


BS107: Occupied Bandwidth (BS-ODU) 39.2375 GHz 64QAM:



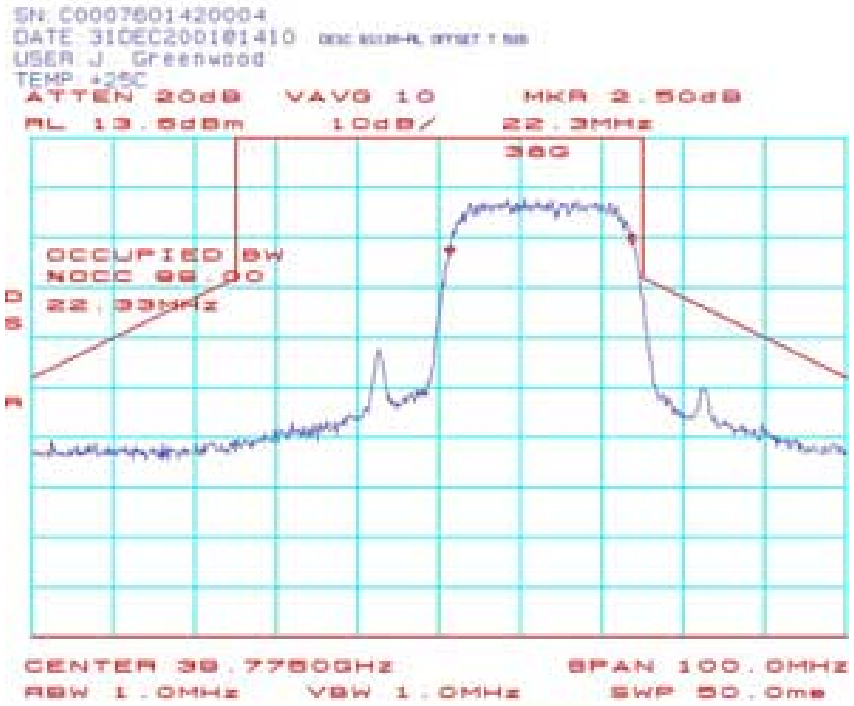
BS112: Occupied Bandwidth (BS-ODU) 39.7625 GHz QPSK:

BS130: Occupied Bandwidth (BS-ODU) 39.7875 GHz QPSK:

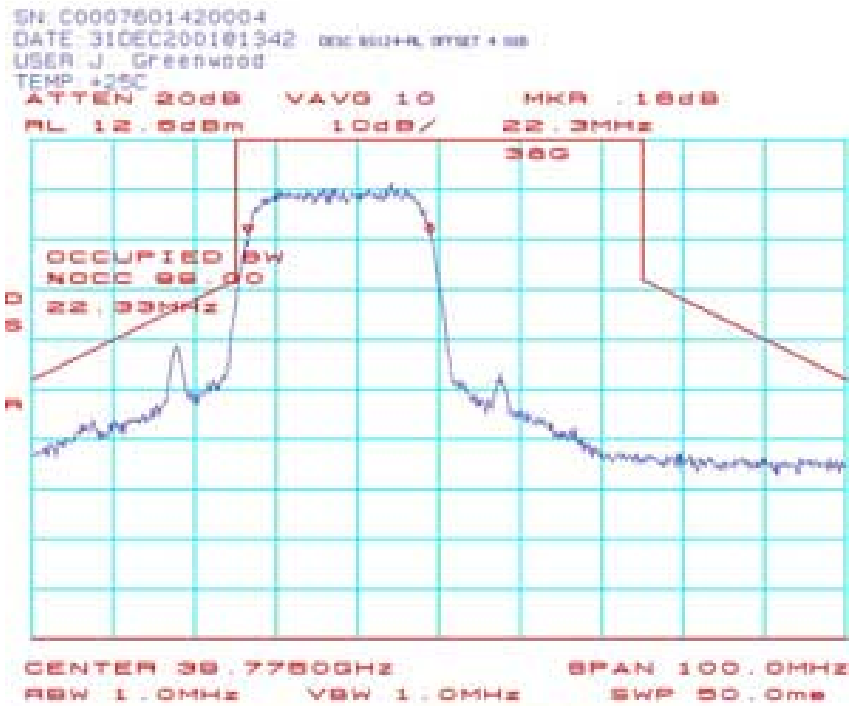


BS118: Occupied Bandwidth (BS-ODU) 39.7625 GHz 16QAM:

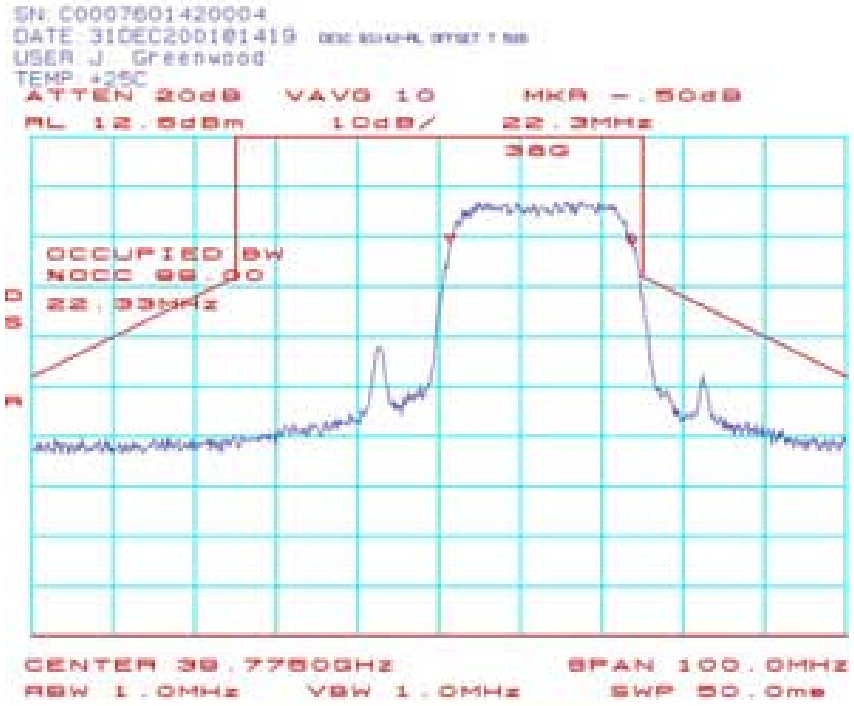
BS136: Occupied Bandwidth (BS-ODU) 39.7875 GHz 16QAM:



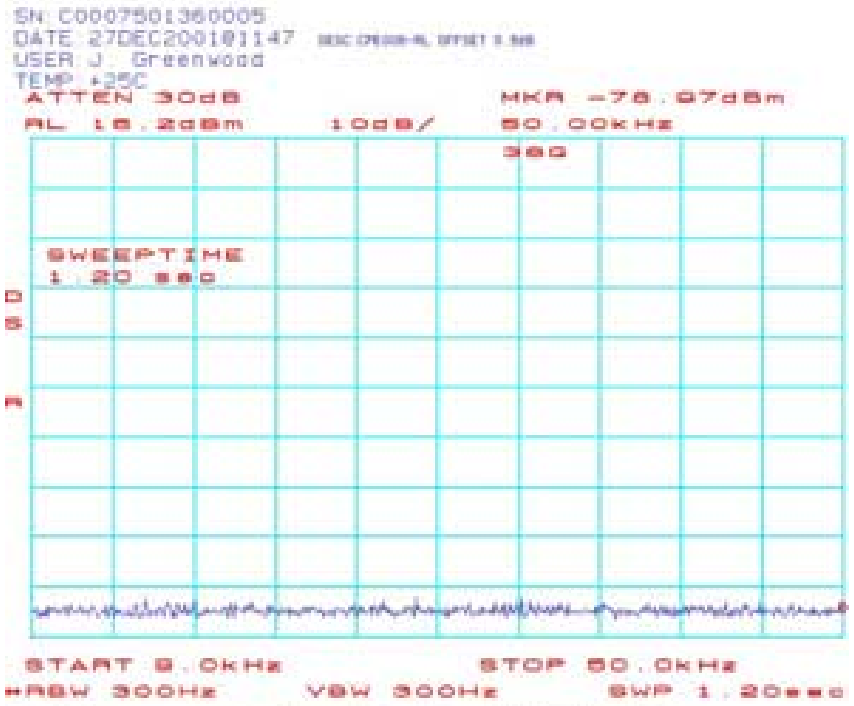
BS124: Occupied Bandwidth (BS-ODU) 39.7625 GHz 64QAM:



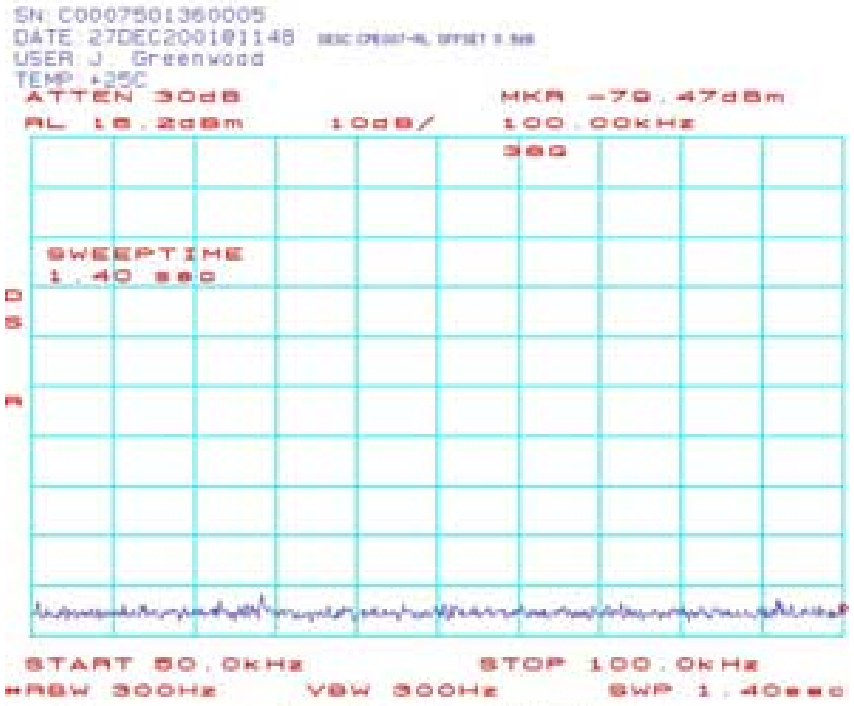
BS142: Occupied Bandwidth (BS-ODU) 39.7875 GHz 64QAM:



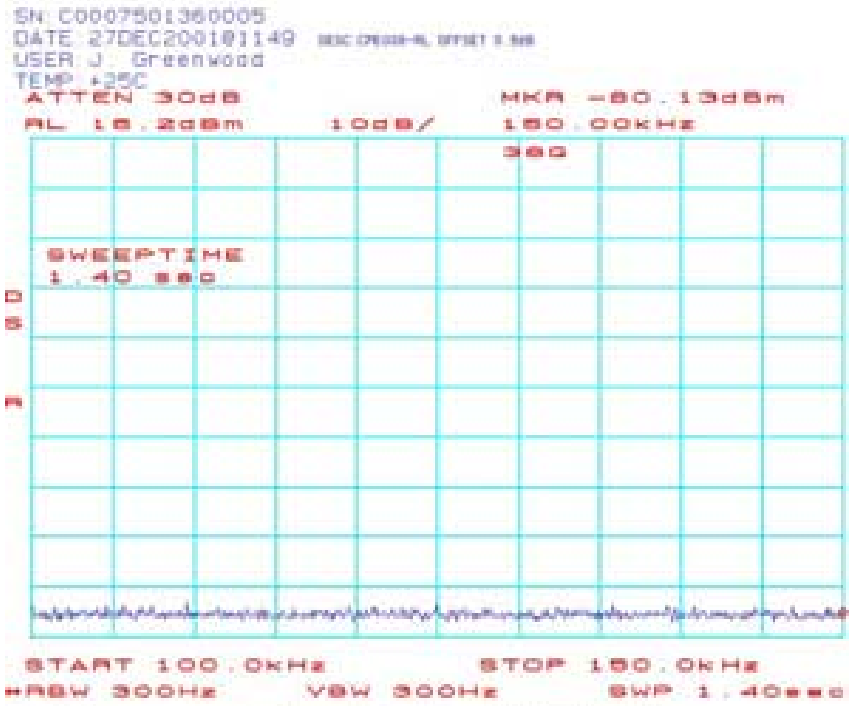
CPE006: Spurious Emission Plots (CPE-ODU) 9 kHz-50 kHz



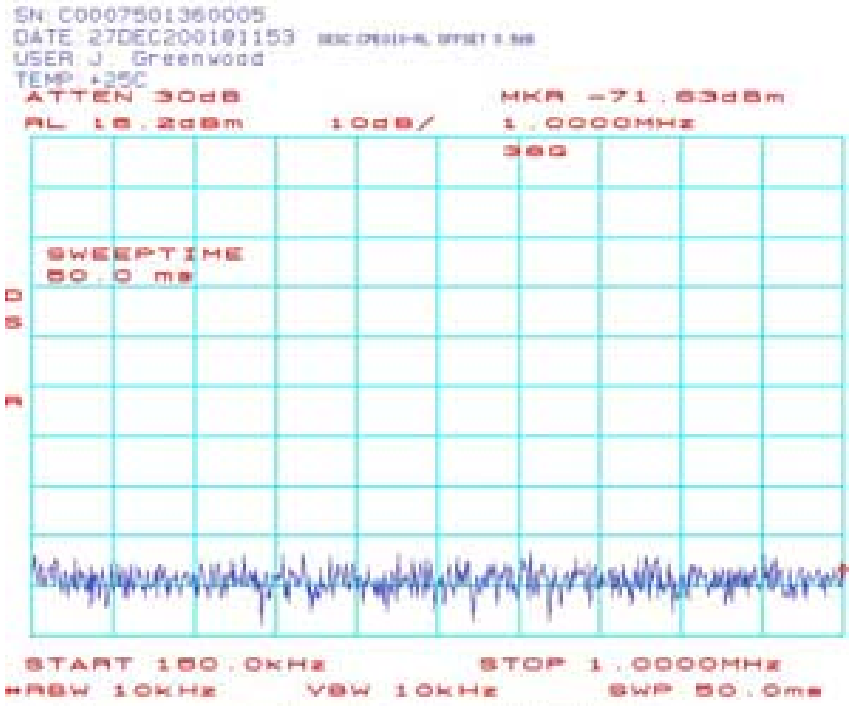
CPE007: Spurious Emission Plots (CPE-ODU) 50 kHz-100 kHz



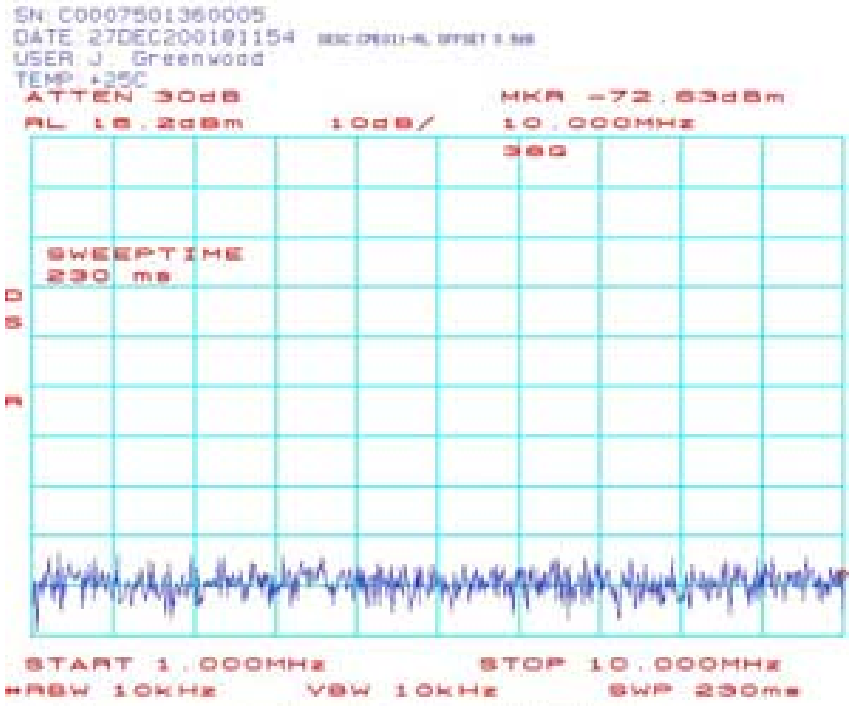
CPE008: Spurious Emission Plots (CPE-ODU) 100kHz-150 kHz



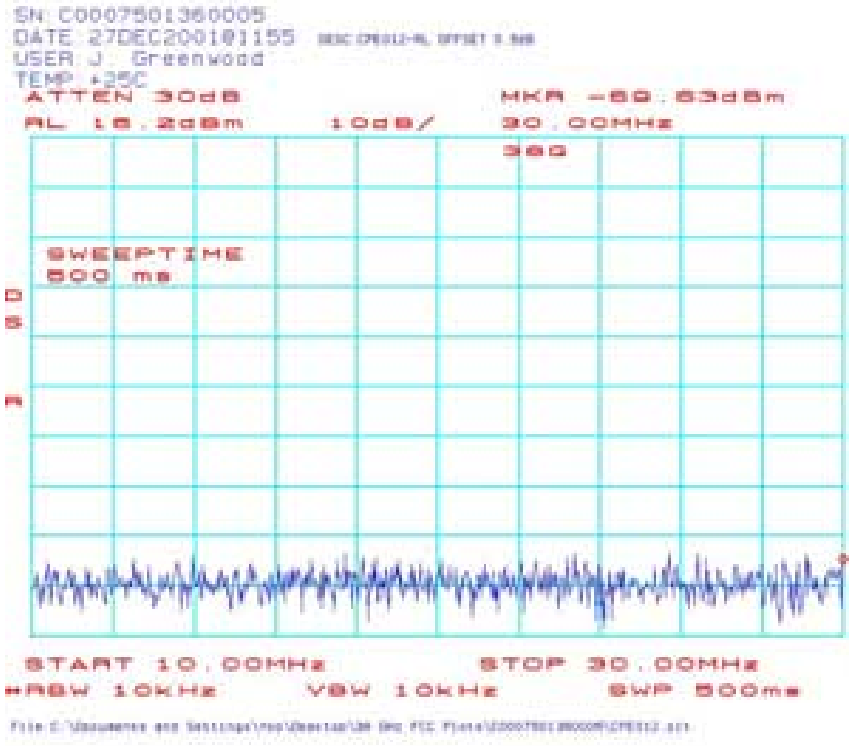
CPE010: Spurious Emission Plots (CPE-ODU) 150 kHz-1.0 MHz



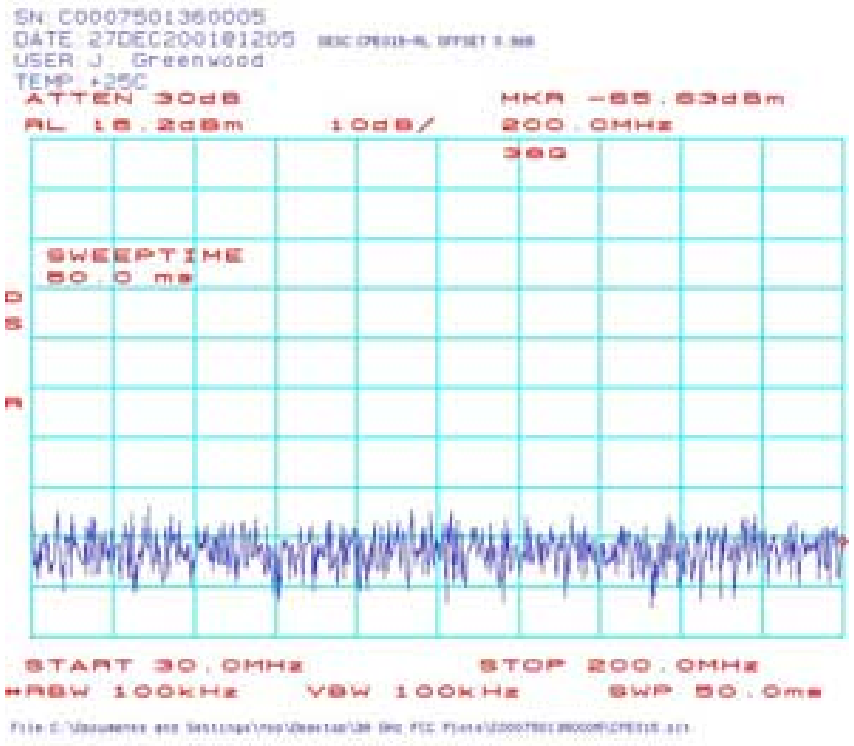
CPE011: Spurious Emission Plots (CPE-ODU) 1.0 MHz-10.0 MHz



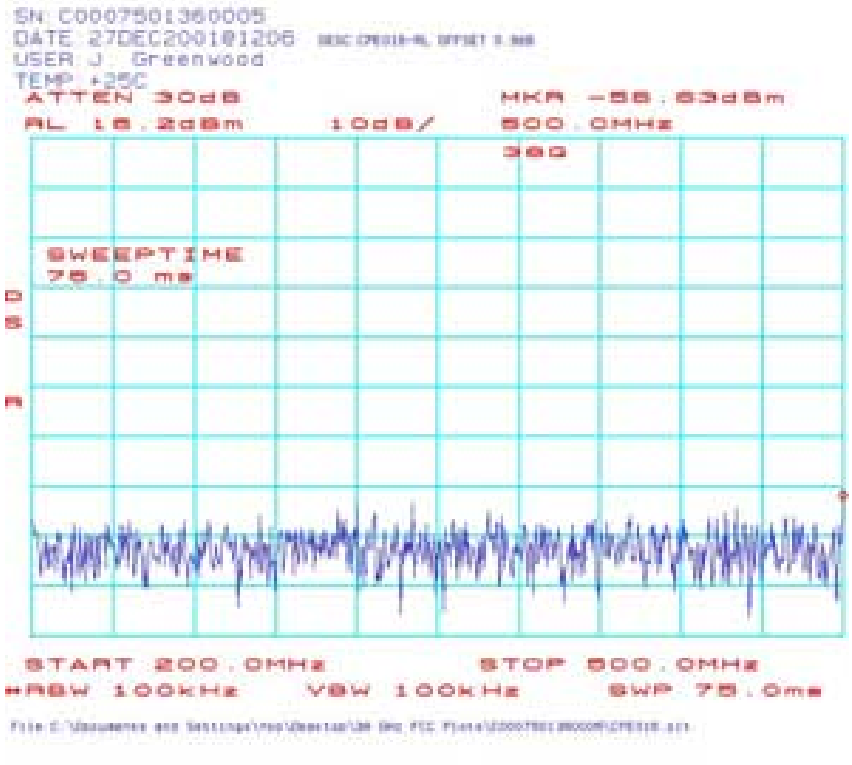
CPE012: Spurious Emission Plots (CPE-ODU) 10.0 MHz-30.0 MHz



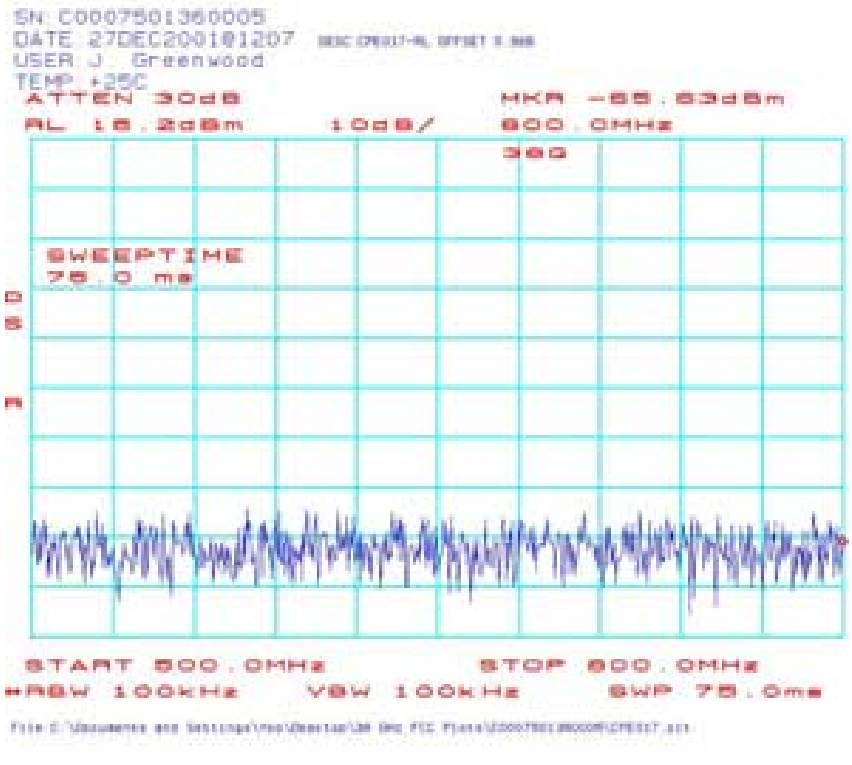
CPE015: Spurious Emission Plots (CPE-ODU) 30.0 MHz -200.0 MHz



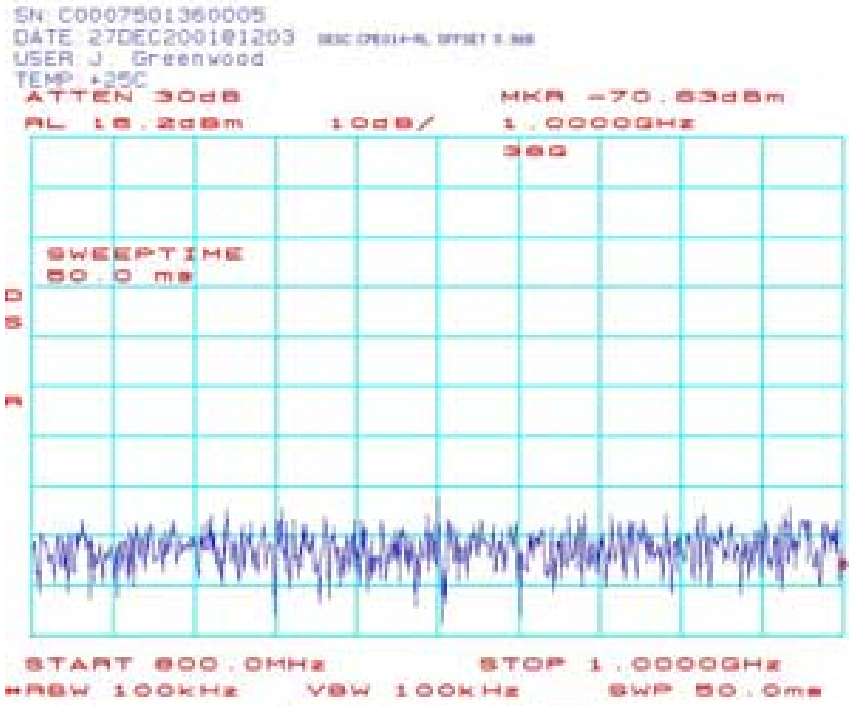
CPE016: Spurious Emission Plots (CPE-ODU) 200.0-500.0 MHz



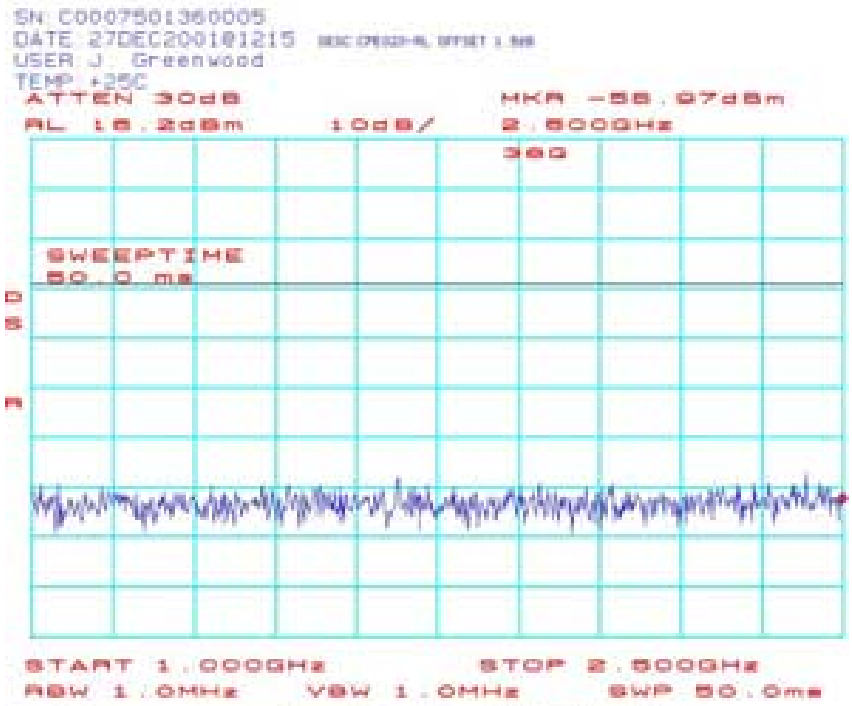
CPE017: Spurious Emission Plots (CPE-ODU) 500.0-800.0 MHz



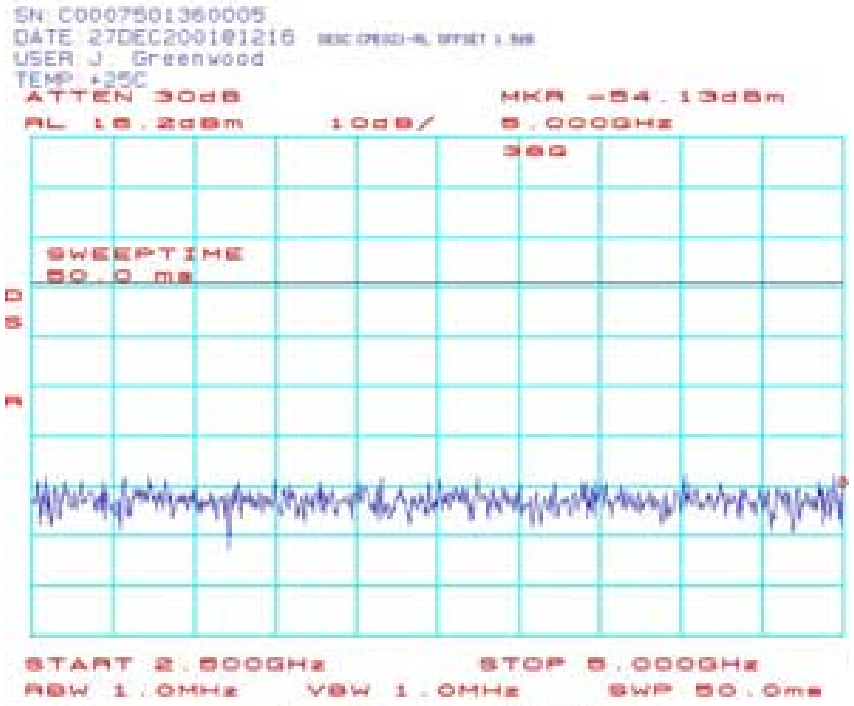
CPE014: Spurious Emission Plots (CPE-ODU) 800 MHz-1.0 GHz



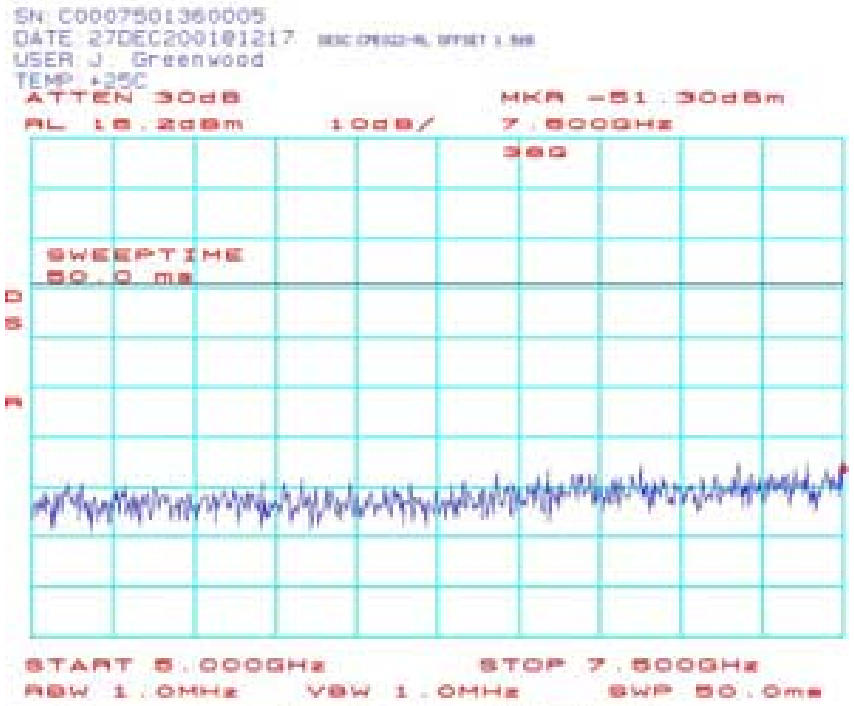
CPE020: Spurious Emission Plots (CPE-ODU) 1.0-2.5 GHz



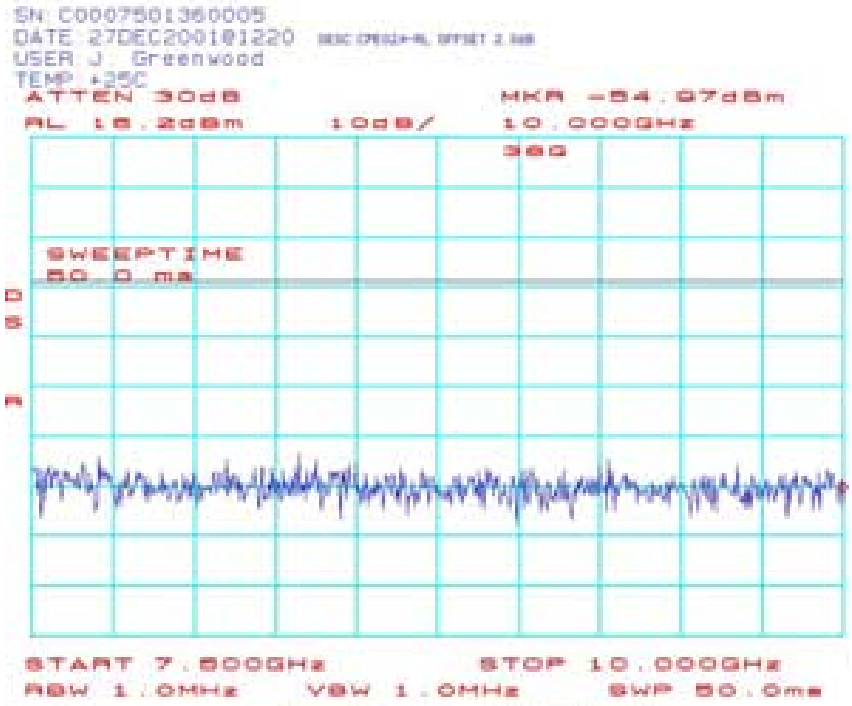
CPE021: Spurious Emission Plots (CPE-ODU) 2.5-5.0 GHz



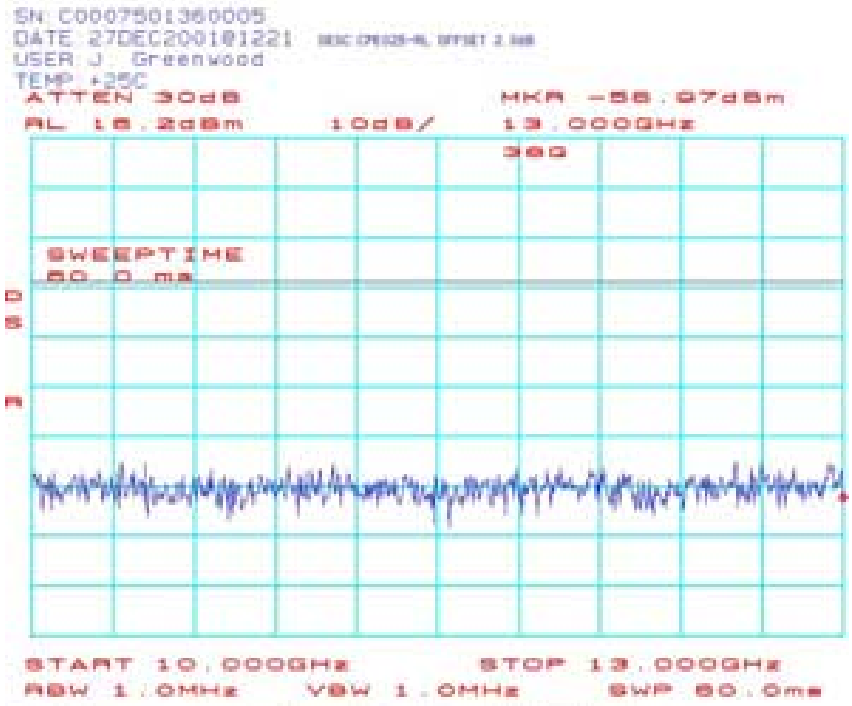
CPE022: Spurious Emission Plots (CPE-ODU) 5.0-7.5 GHz



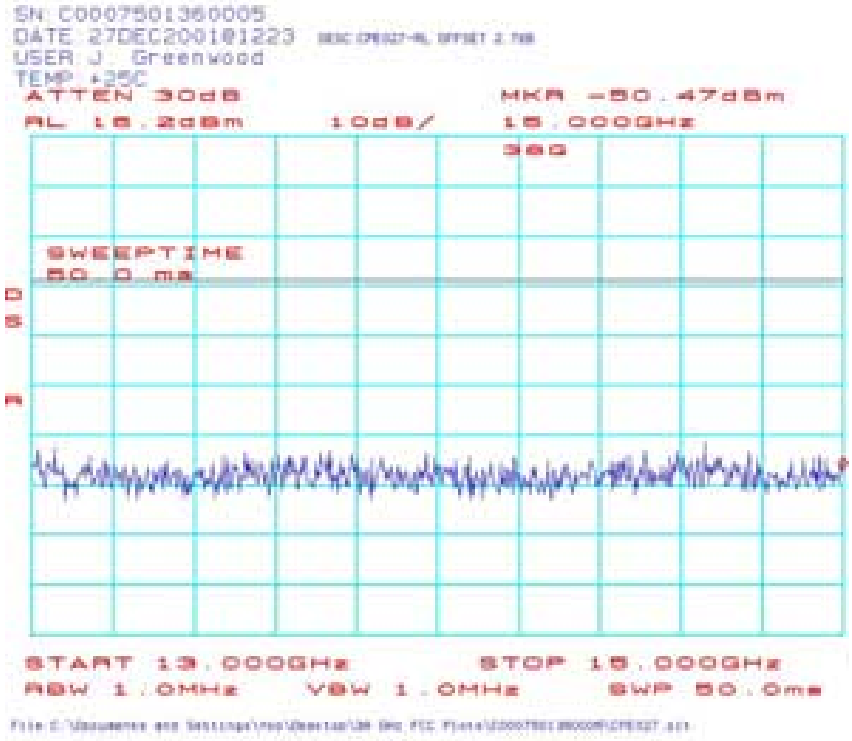
CPE024: Spurious Emission Plots (CPE-ODU) 7.5-10.0 GHz



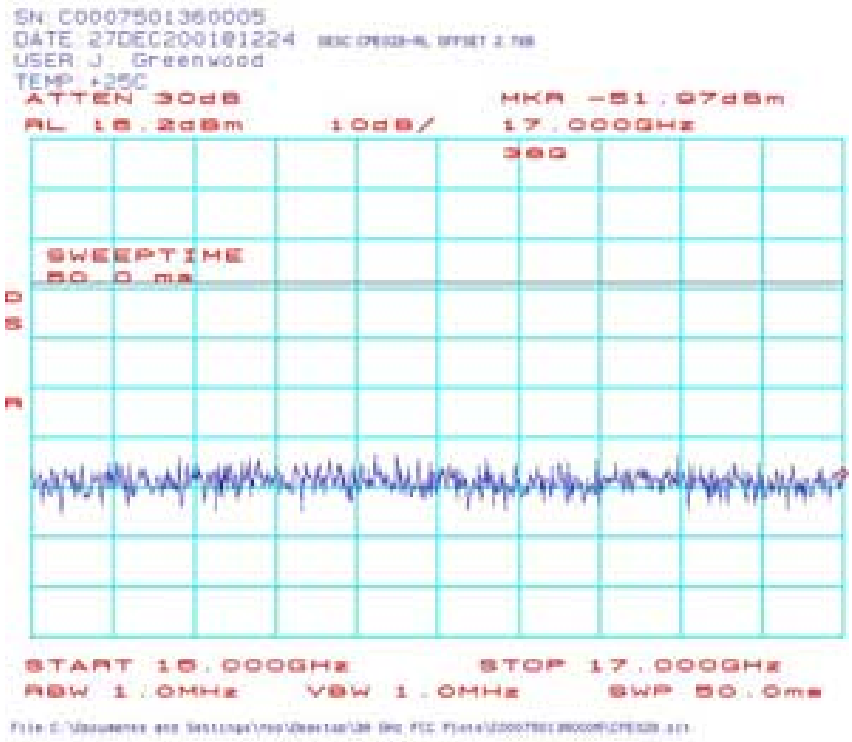
CPE025: Spurious Emission Plots (CPE-ODU) 10.0-13.0 GHz



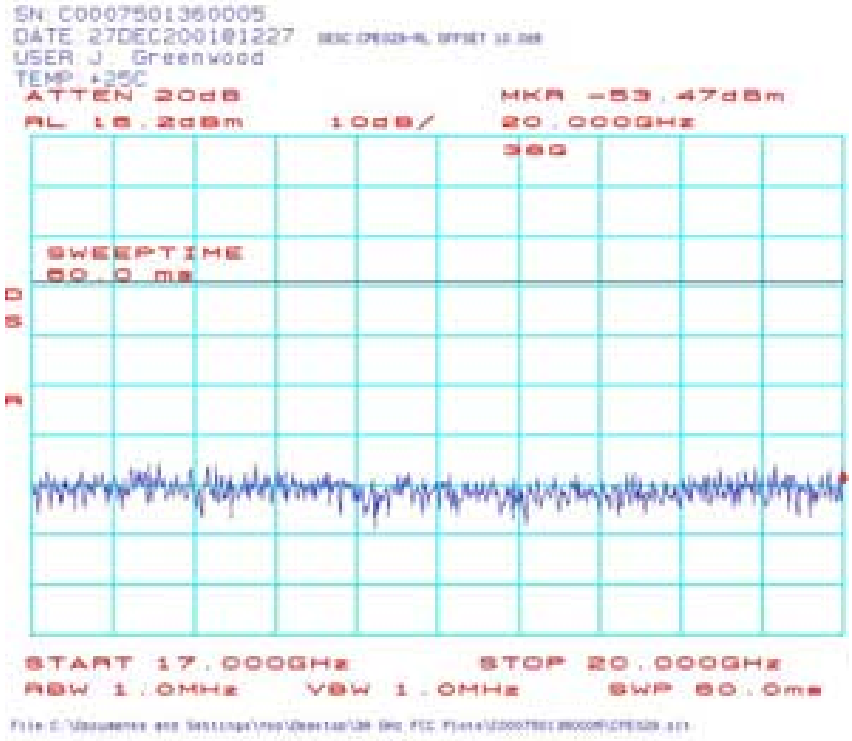
CPE027: Spurious Emission Plots (CPE-ODU) 13.0-15.0 GHz



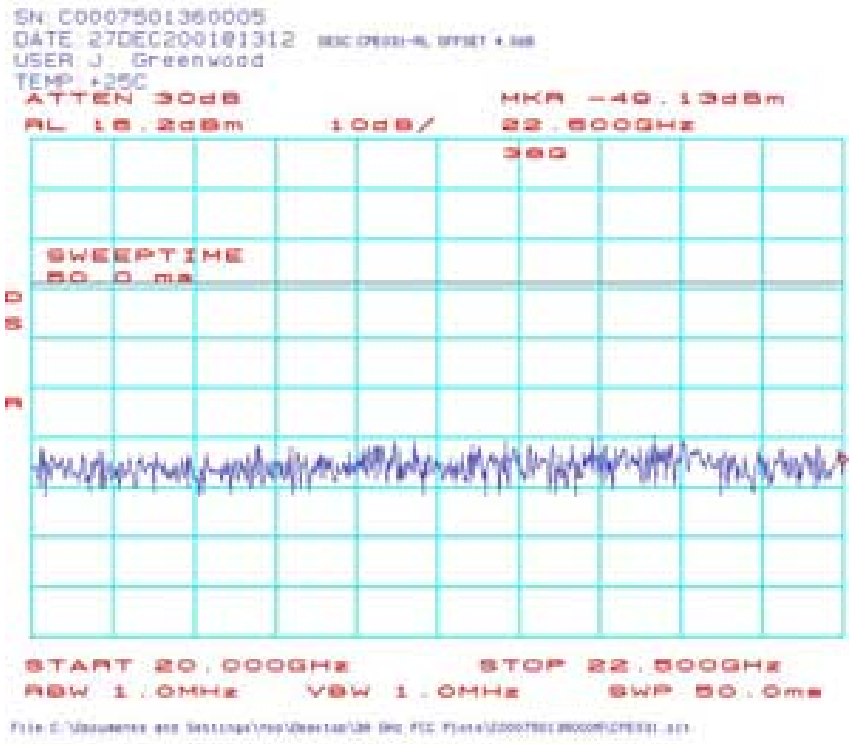
CPE028: Spurious Emission Plots (CPE-ODU) 15.0-17.0 GHz



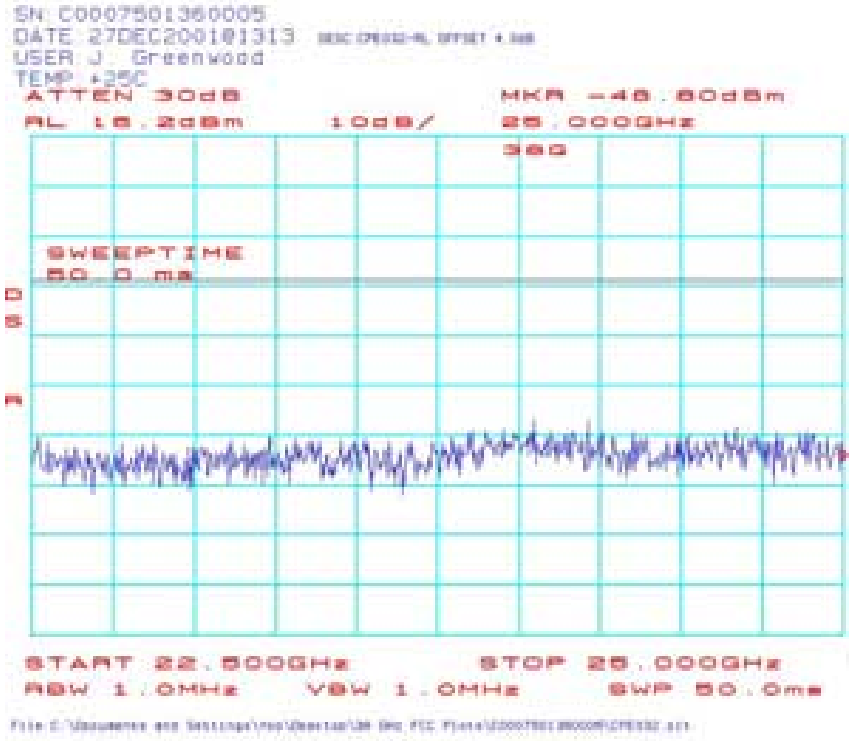
CPE029: Spurious Emission Plots (CPE-ODU) 17.0-20.0 GHz



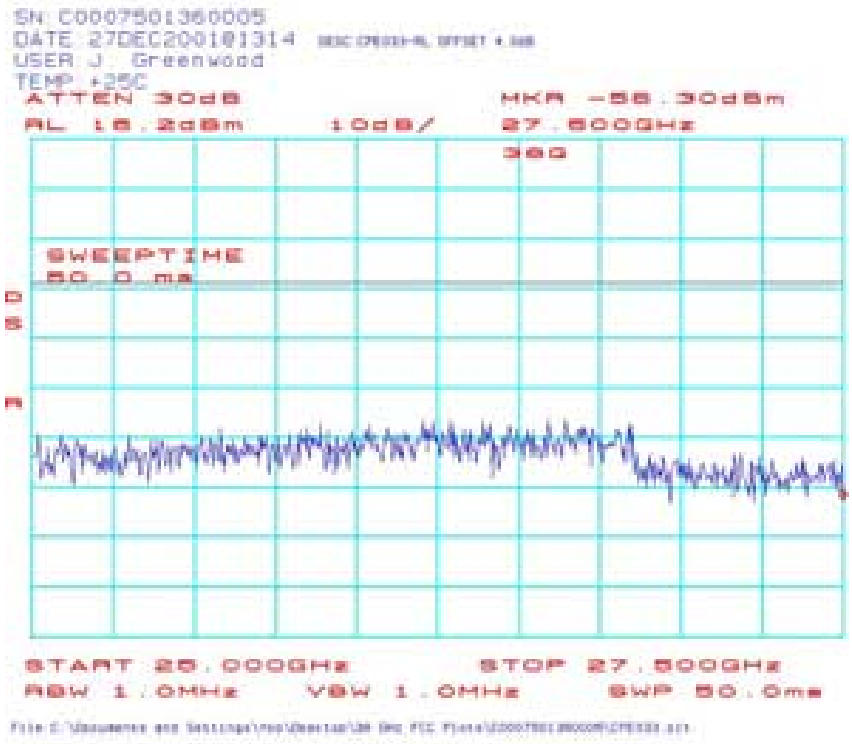
CPE031: Spurious Emission Plots (CPE-ODU) 20.0-22.5 GHz



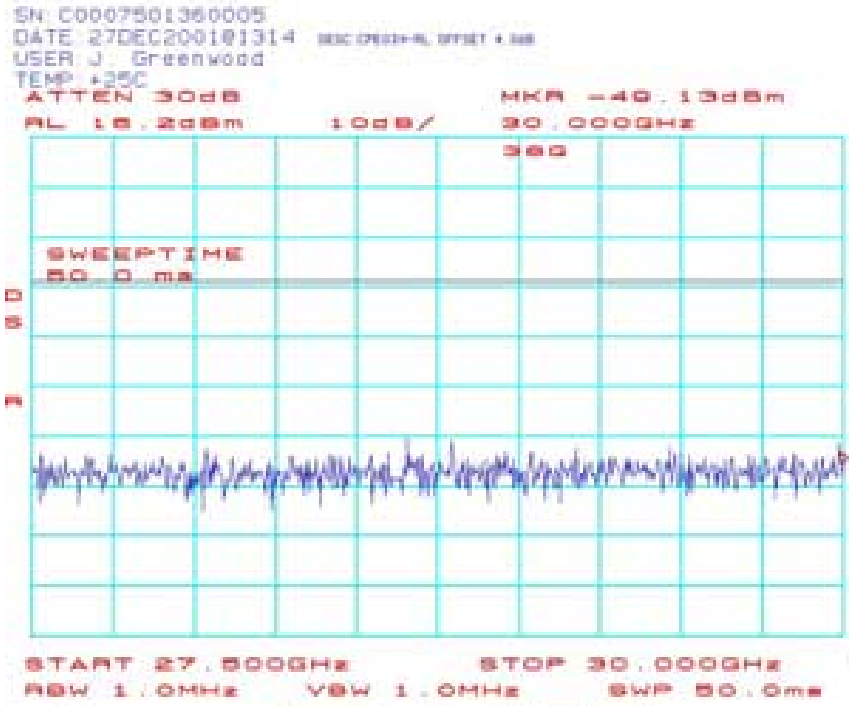
CPE032: Spurious Emission Plots (CPE-ODU) 22.5-25.0 GHz



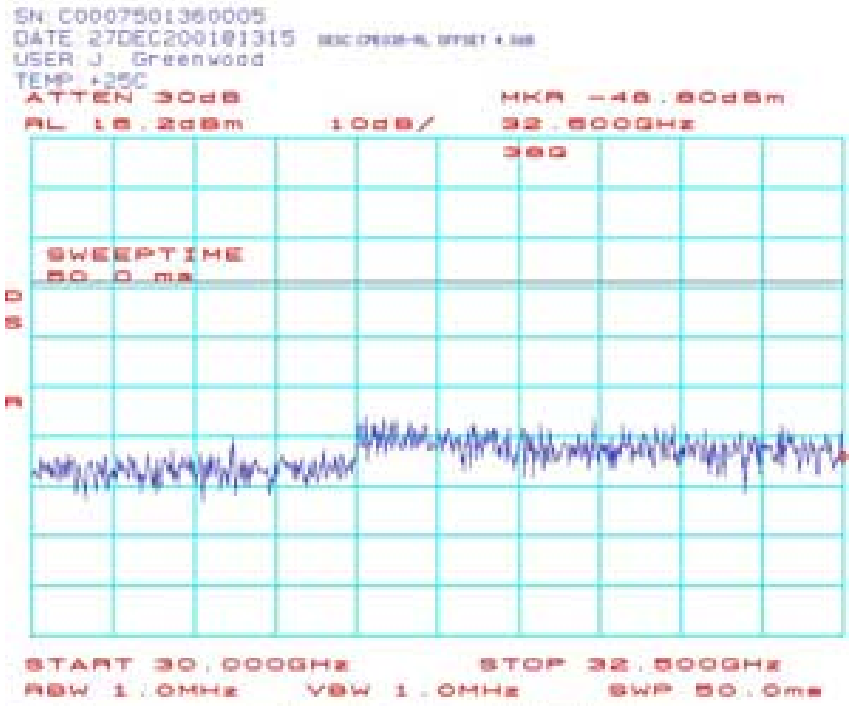
CPE033: Spurious Emission Plots (CPE-ODU) 25.0-27.5 GHz



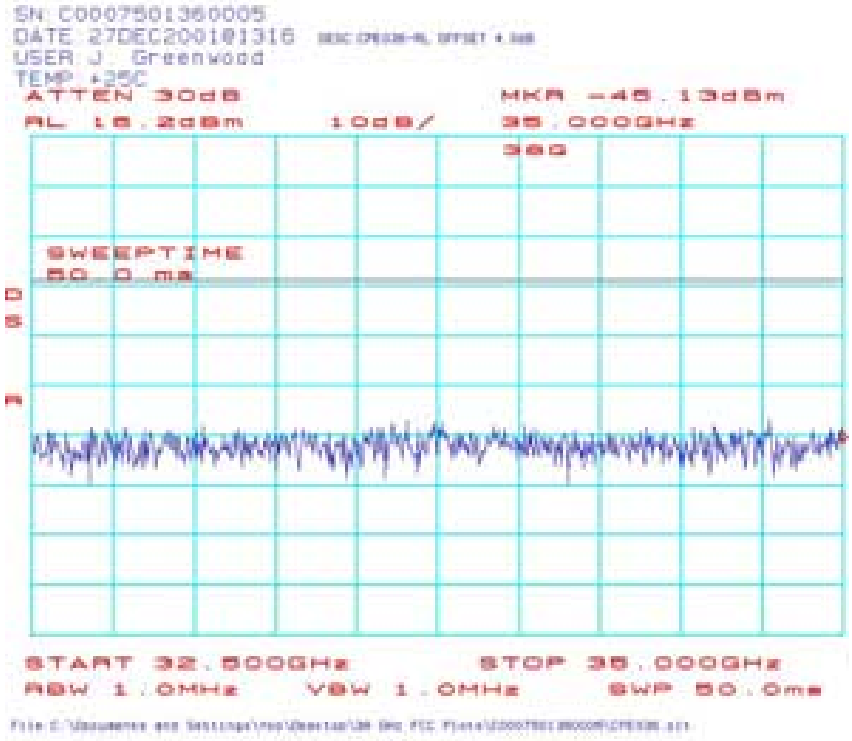
CPE034: Spurious Emission Plots (CPE-ODU) 27.5-30.0 GHz



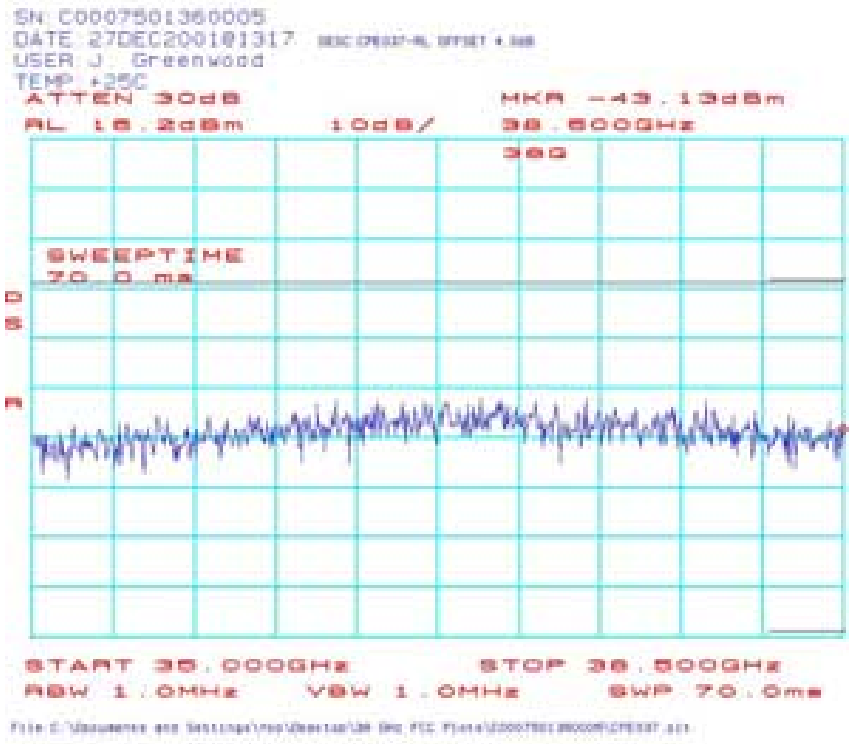
CPE035: Spurious Emission Plots (CPE-ODU) 30.0-32.5 GHz



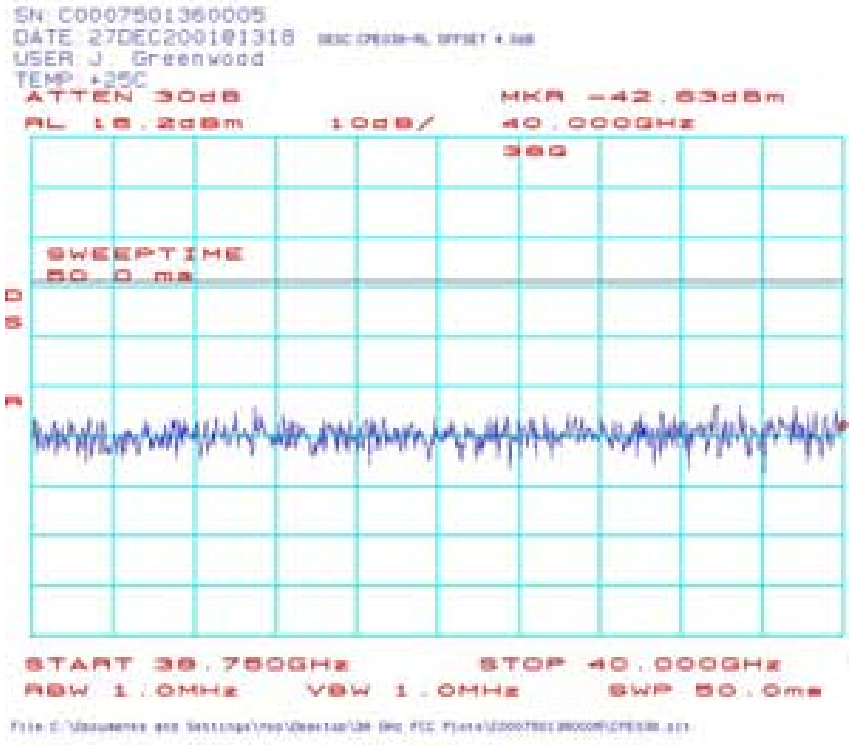
CPE036: Spurious Emission Plots (CPE-ODU) 32.5-35.0 GHz



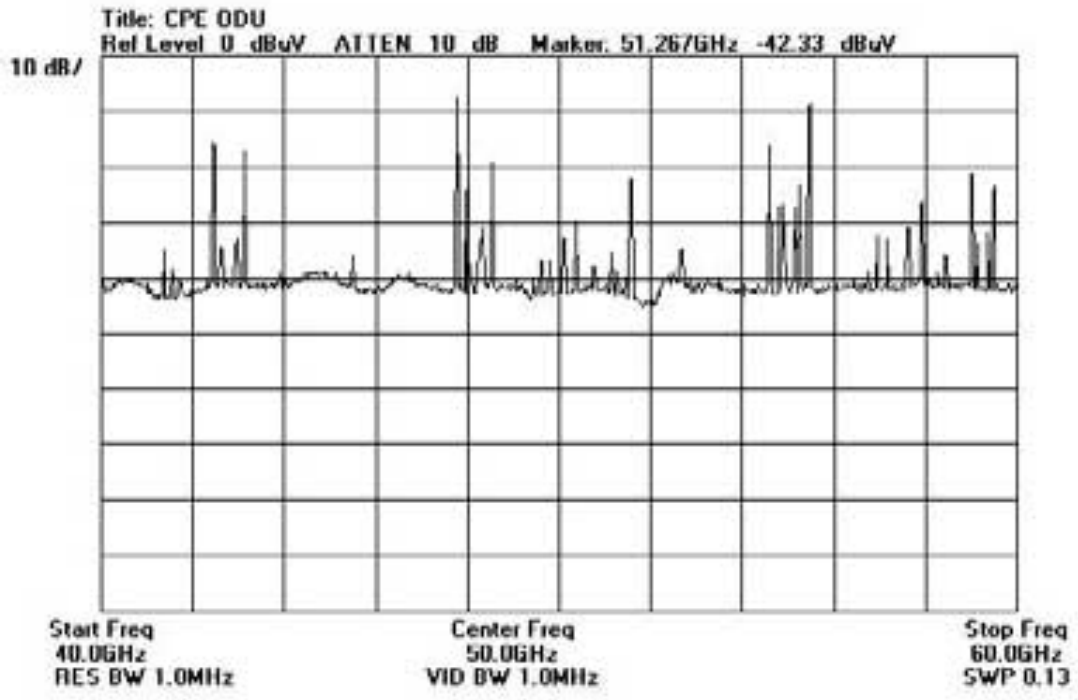
CPE037: Spurious Emission Plots (CPE-ODU) 35.0-38.5 GHz



CPE038: Spurious Emission Plots (CPE-ODU) 38.75-40.0 GHz

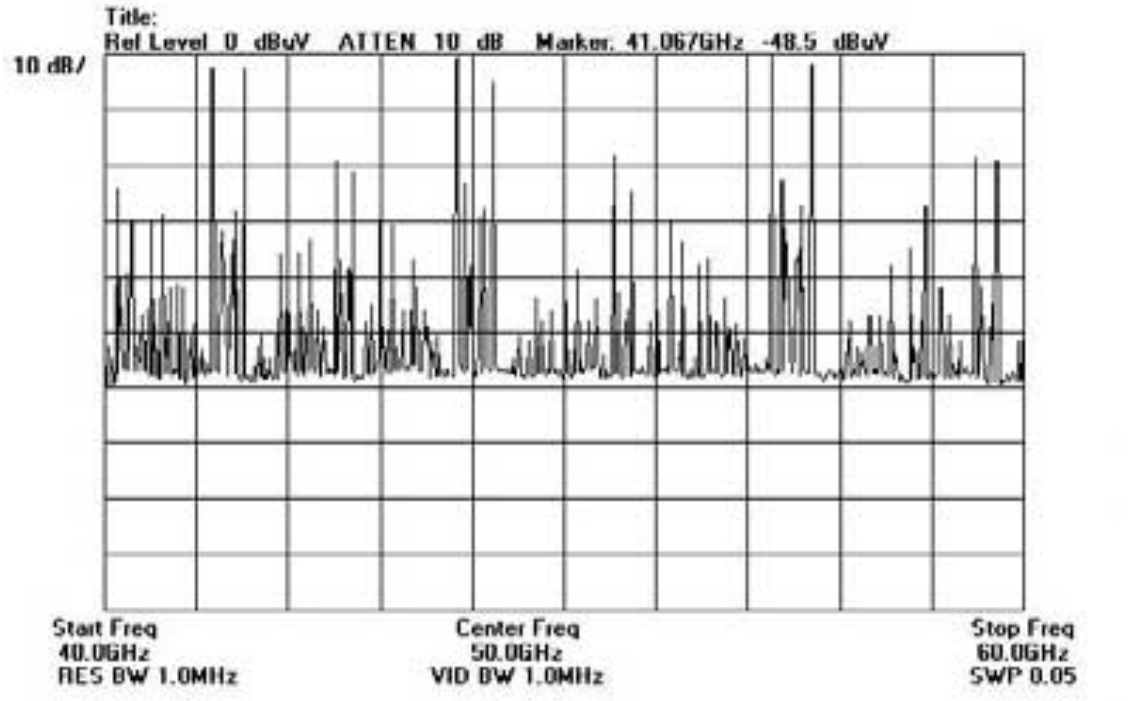


CPE200: Spurious Emission Plots (CPE-ODU) 40-60.0 GHz



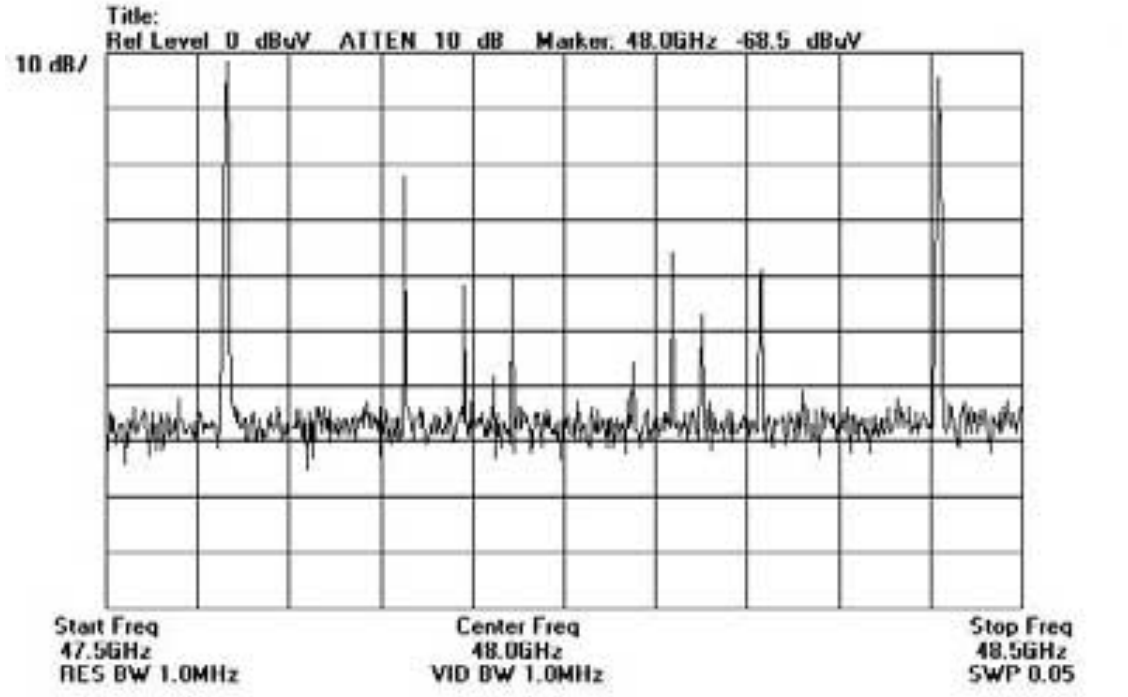
Note: the plots read dBuV but the actual measurement is in dBm. This is due to a limitation in the software used to capture the plots.

CPE204: Spurious Emission Plots with signal from a signal generator 40-60.0 GHz



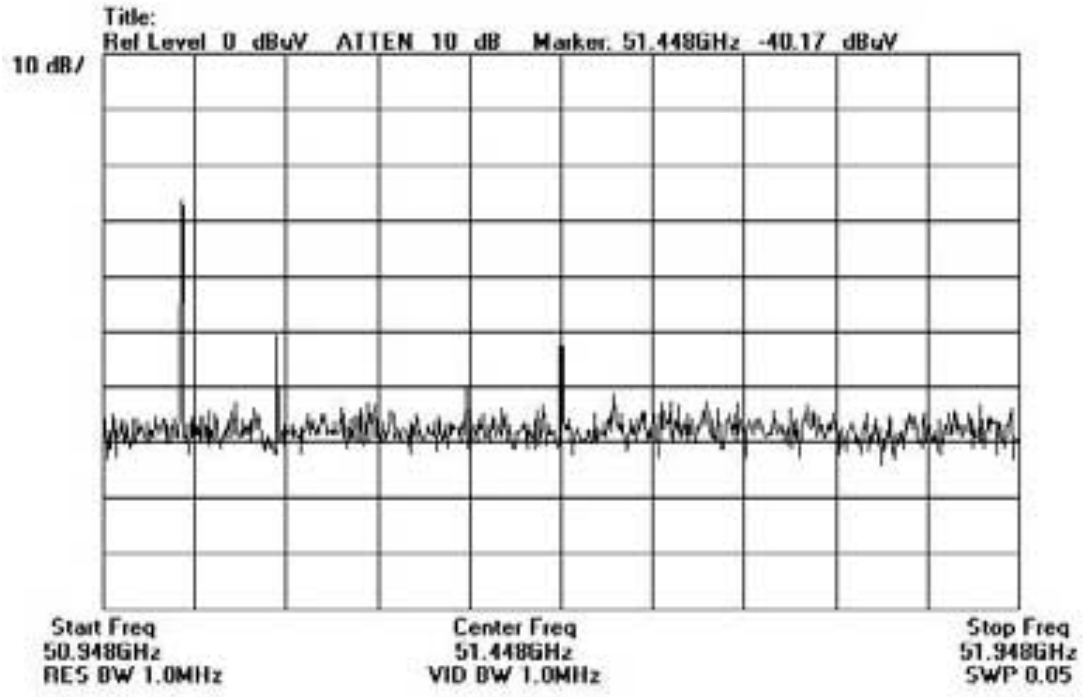
Note: the plots read dBuV but the actual measurement is in dBm. This is due to a limitation in the software used to capture the plots.

CPE205: Spurious Emission Plots with signal from a signal generator 47.5-48.5.0 GHz



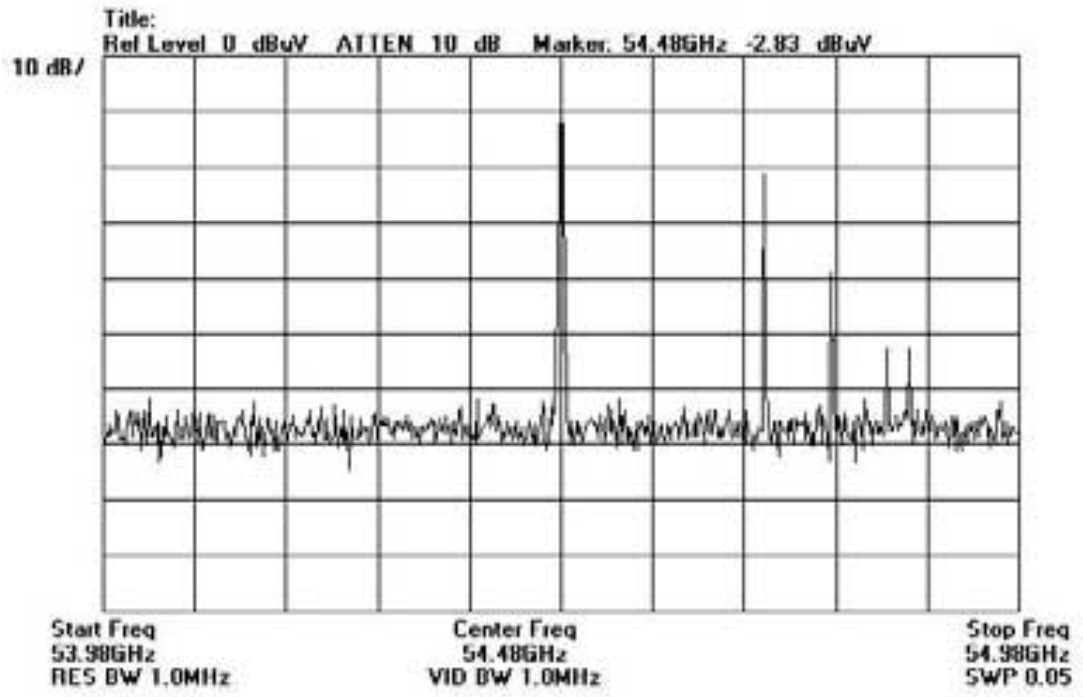
Note: the plots read dBuV but the actual measurement is in dBm. This is due to a limitation in the software used to capture the plots.

CPE206: Spurious Emission Plots with signal from a signal generator 50.948-51.948 GHz



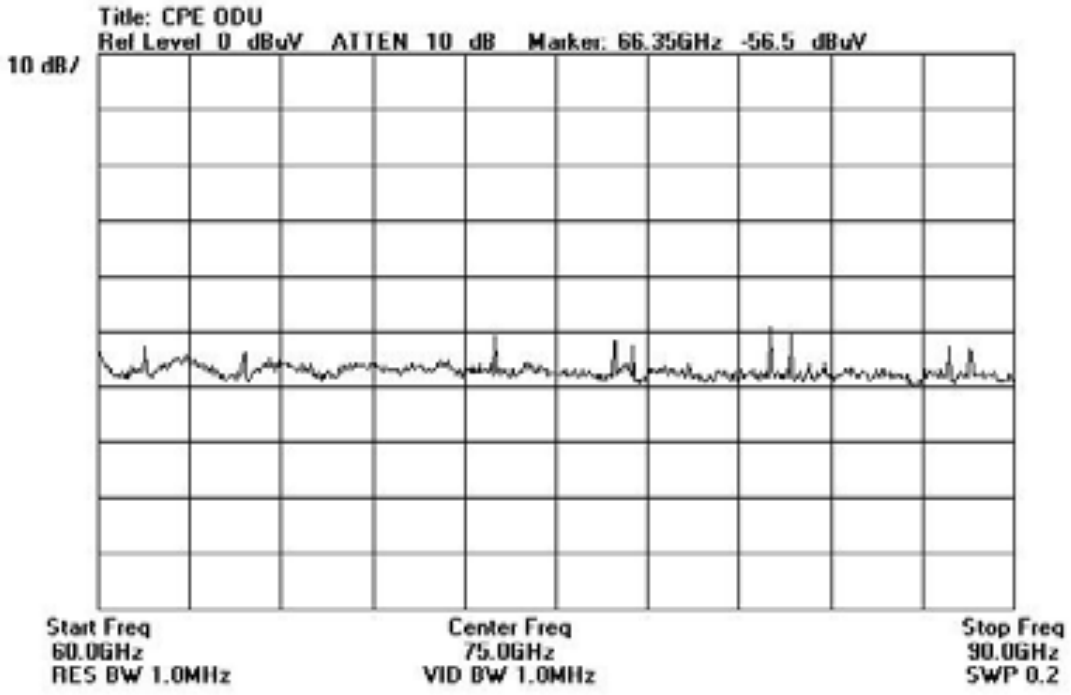
Note: the plots read dBuV but the actual measurement is in dBm. This is due to a limitation in the software used to capture the plots.

CPE207: Spurious Emission Plots with signal from a signal generator 53.98-54.98 GHz



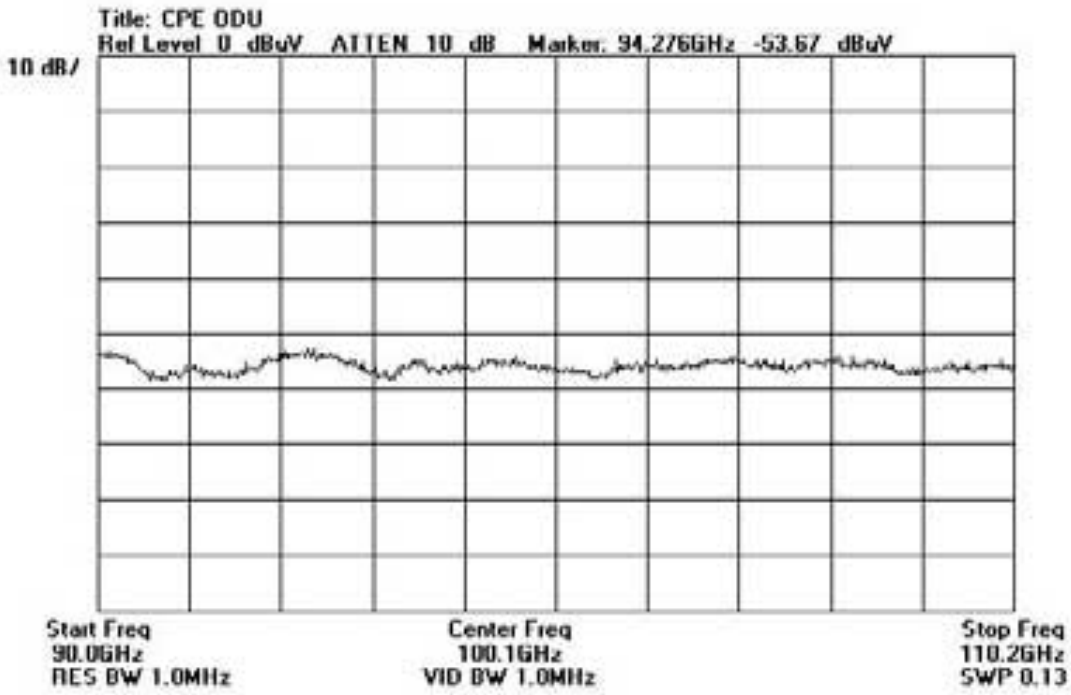
Note: the plots read dBuV but the actual measurement is in dBm. This is due to a limitation in the software used to capture the plots.

CPE201: Spurious Emission Plots (CPE-ODU) 60-90.0 GHz



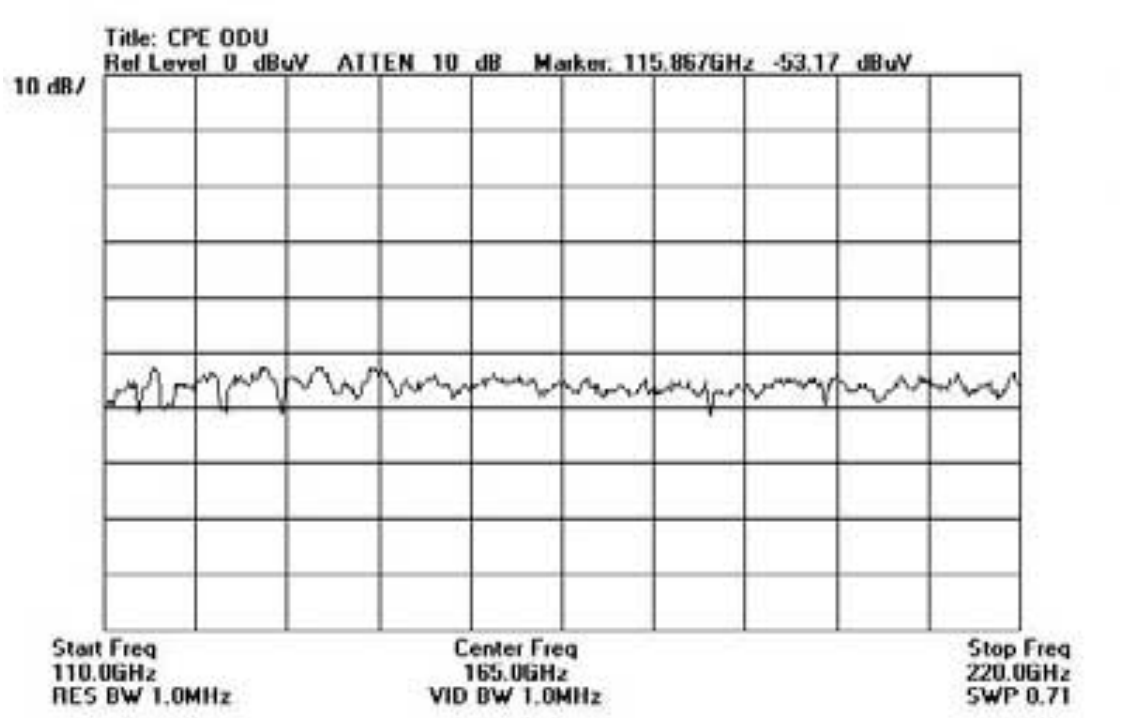
Note: the plots read dBuV but the actual measurement is in dBm. This is due to a limitation in the software used to capture the plots.

CPE202: Spurious Emission Plots (CPE-ODU) 90.0-110.0 GHz



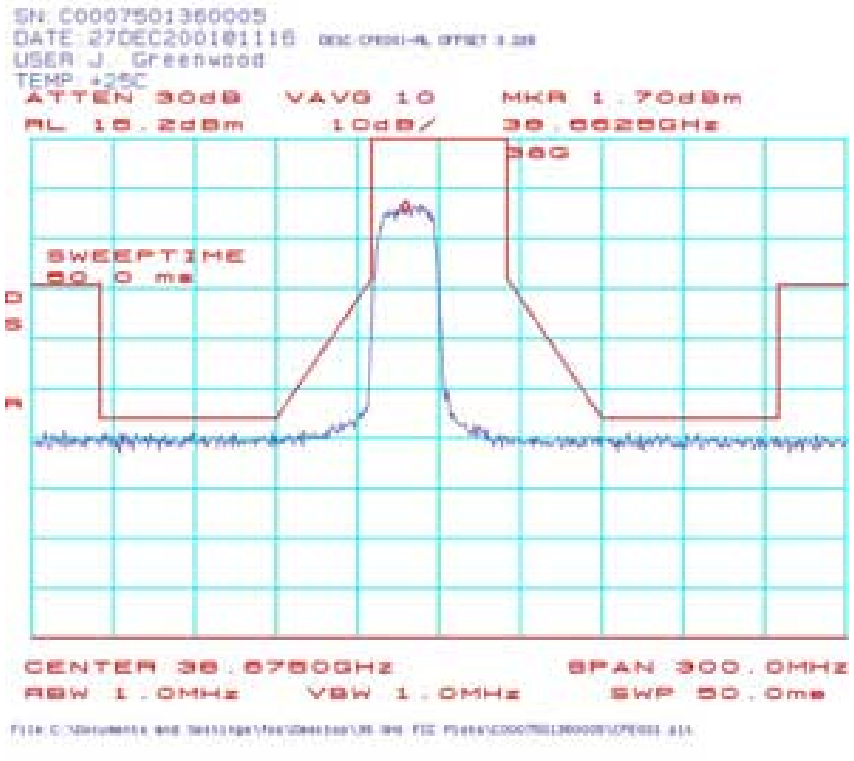
Note: the plots read dBuV but the actual measurement is in dBm. This is due to a limitation in the software used to capture the plots.

CPE203: Spurious Emission Plots (CPE-ODU) 110.0-200.0 GHz



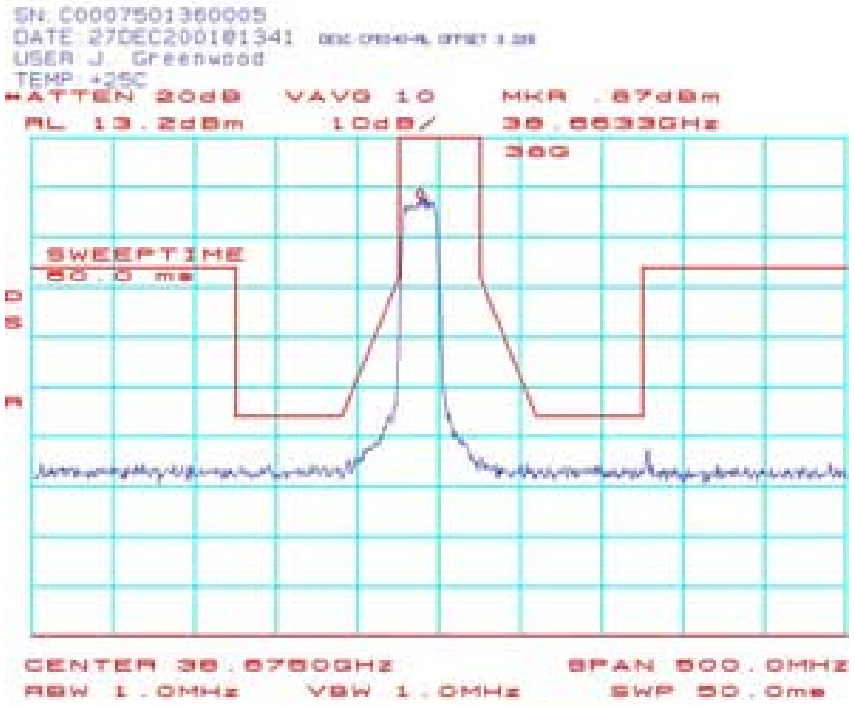
Note: the plots read dBuV but the actual measurement is in dBm. This is due to a limitation in the software used to capture the plots.

CPE001: Spectrum Mask Plots (CPE-ODU) 38.6625 GHz QPSK:

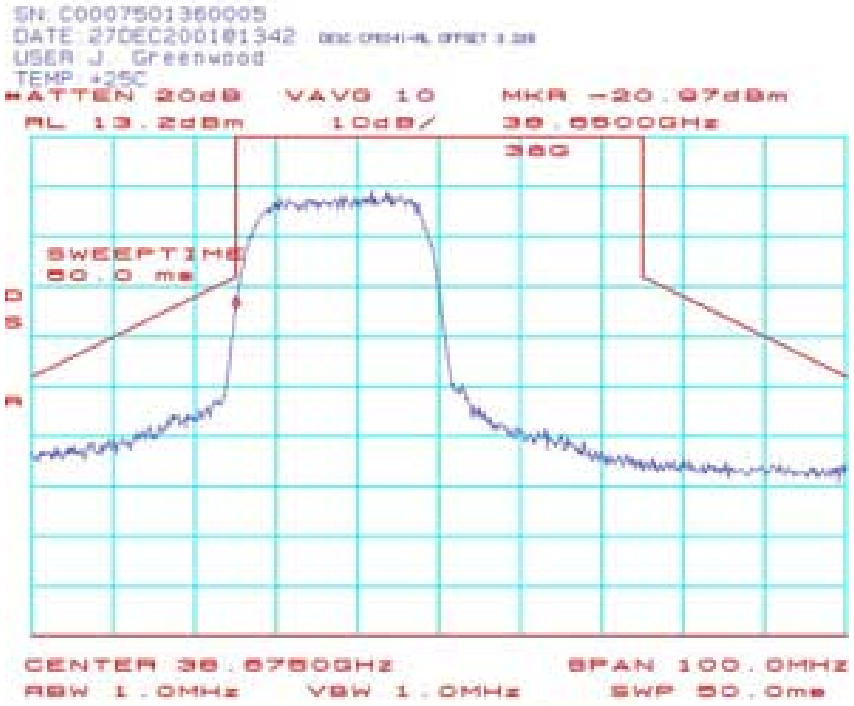


CPE002: Spectrum Mask Plots (CPE-ODU) 38.6625 GHz QPSK:

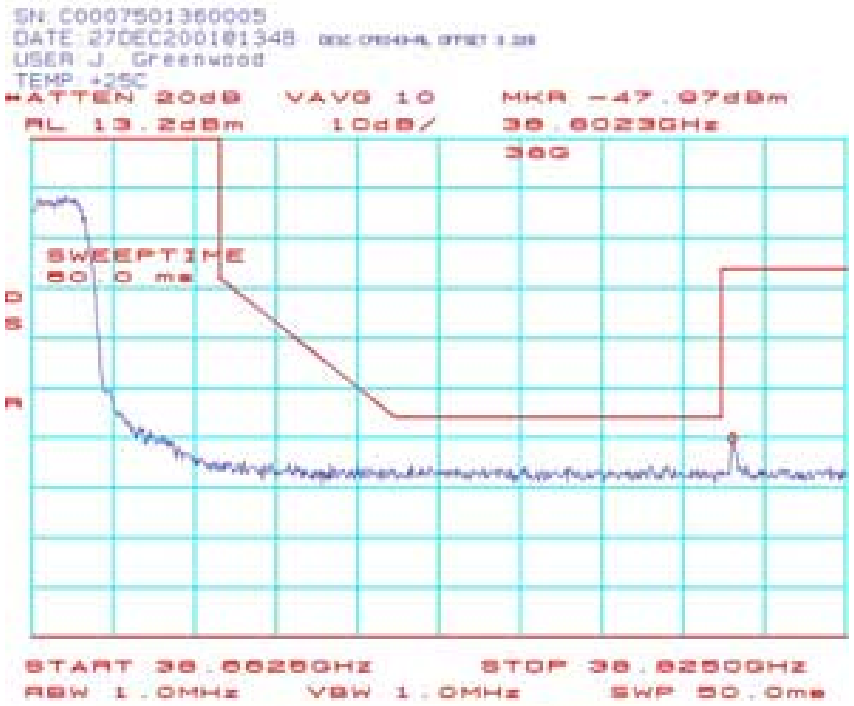
CPE040: Spectrum Mask Plots (CPE-ODU) 38.6625 GHZ 16QAM:



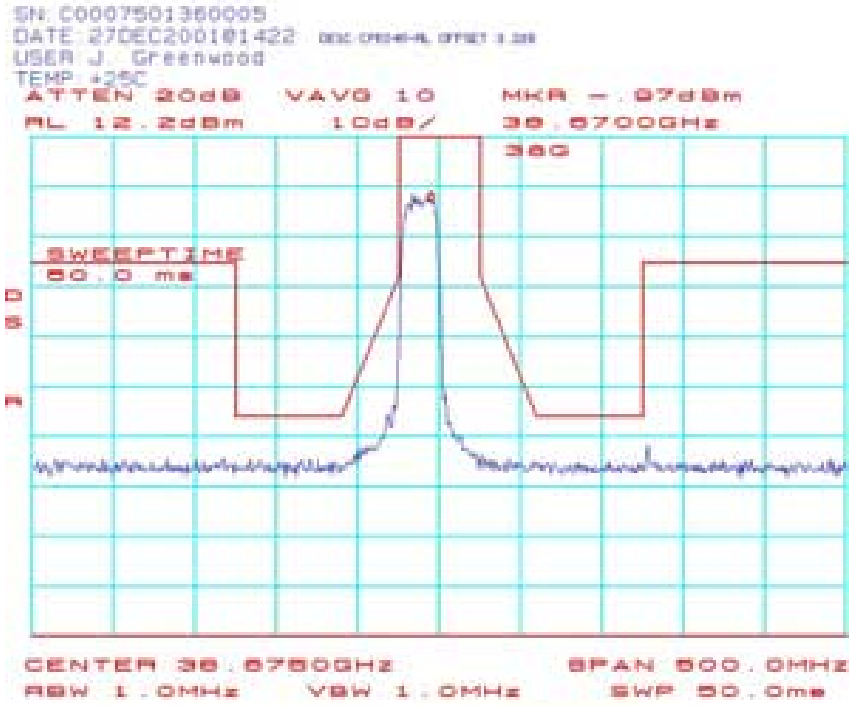
CPE041 Spectrum Mask Plots (CPE-ODU) 38.6625 GHZ 16QAM:



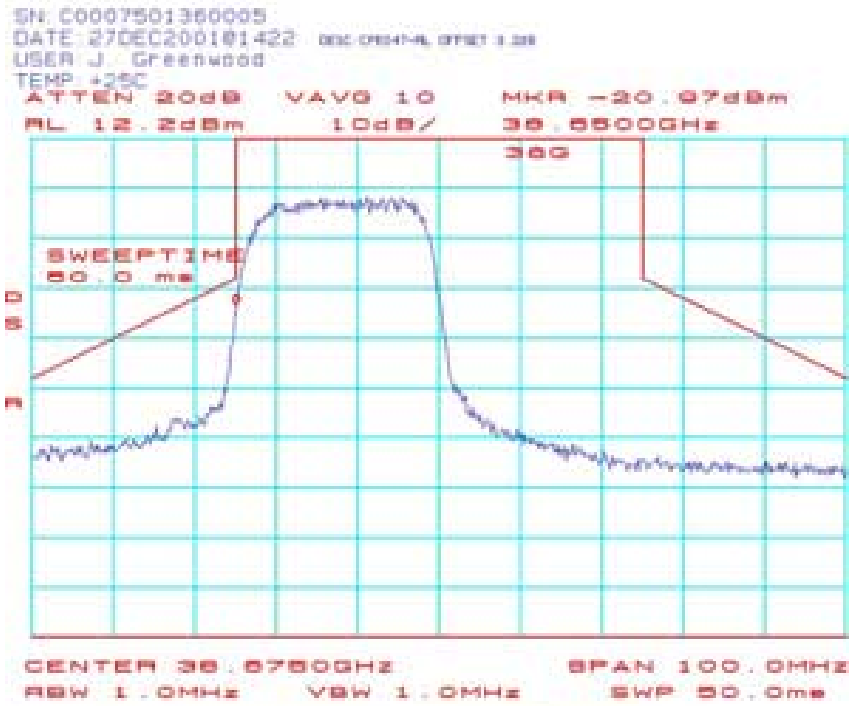
CPE043 Spectrum Mask Plots (CPE-ODU) 38.6625 GHz 16QAM:



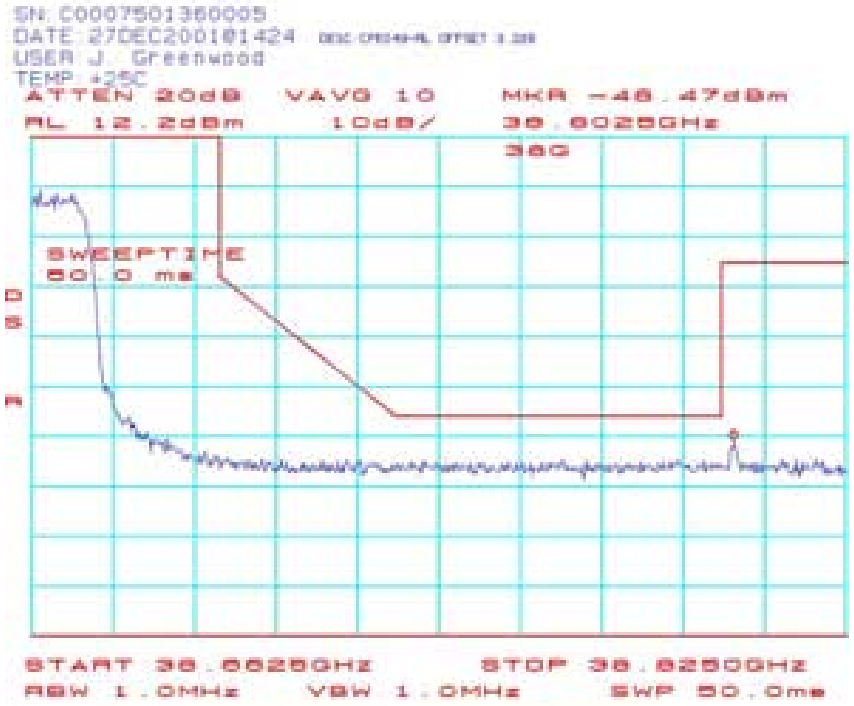
CPE046 Spectrum Mask Plots (CPE-ODU) 38.6625 GHz 64QAM:



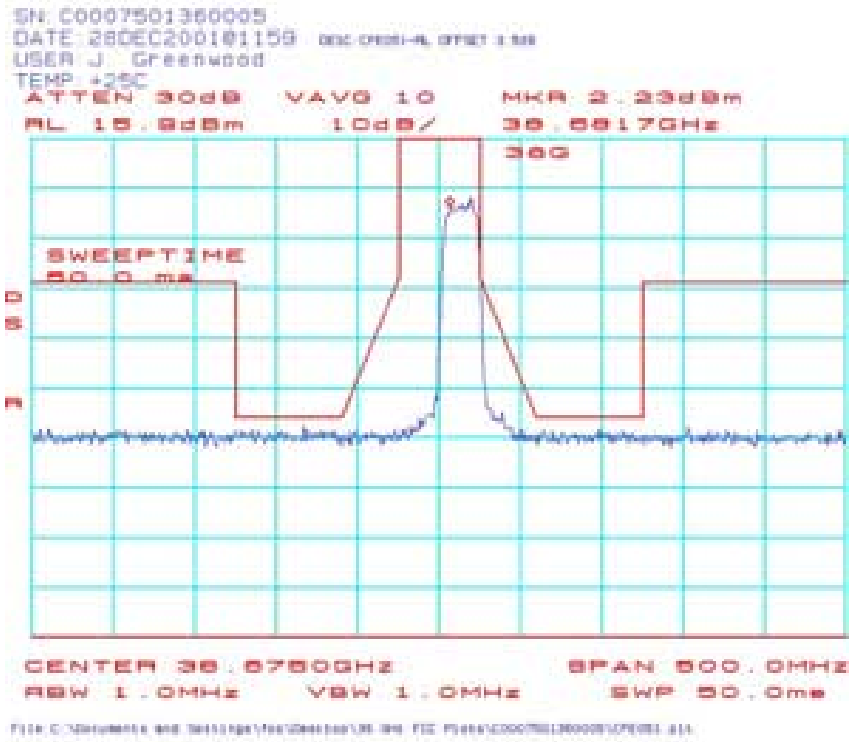
CPE047 Spectrum Mask Plots (CPE-ODU) 38.6625 GHz 64QAM:



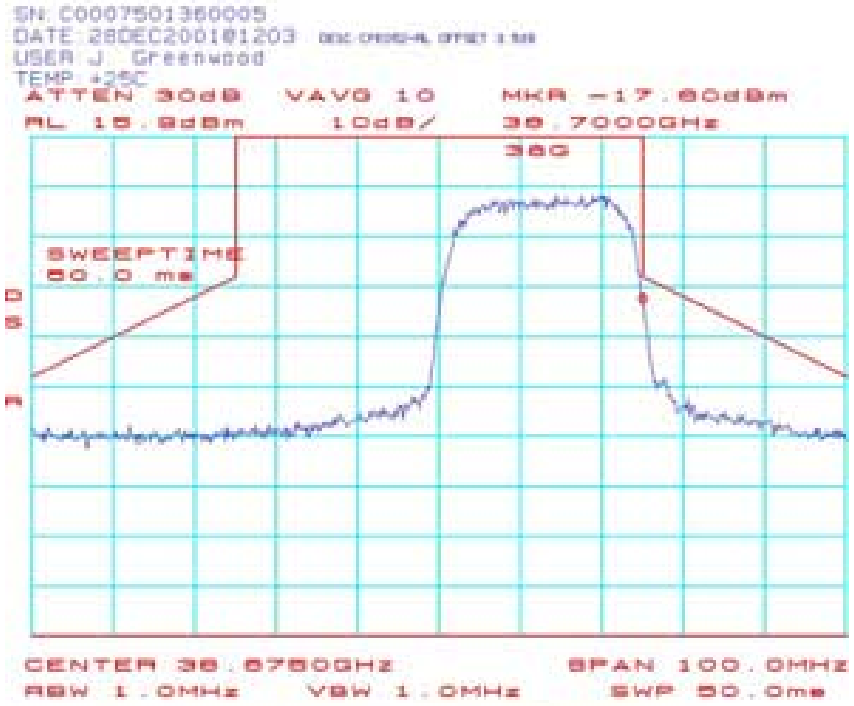
CPE049: Spectrum Mask Plots (CPE-ODU) 38.6625 GHz 64-QAM:



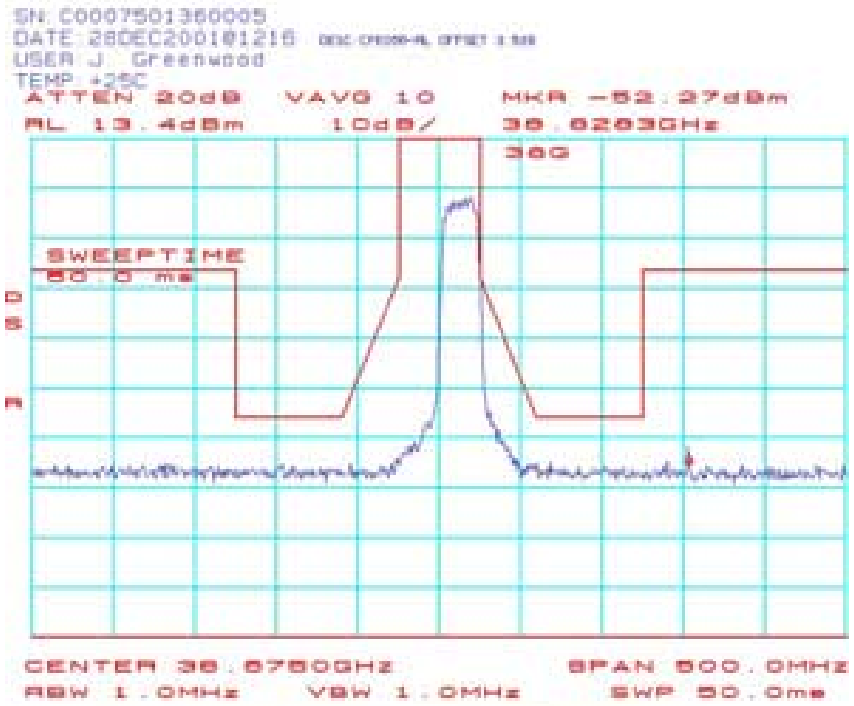
CPE051 Spectrum Mask Plots (CPE-ODU) 38.6875 GHz QPSK:



CPE052 Spectrum Mask Plots (CPE-ODU) 38.6875 GHz QPSK:

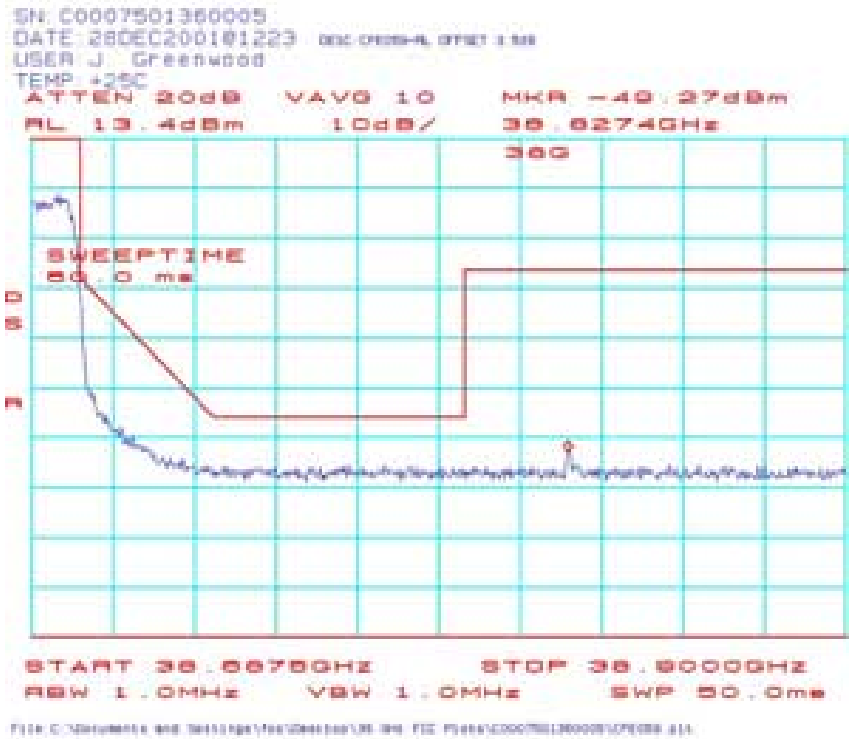


CPE056: Spectrum Mask Plots (CPE-ODU) 38.6875 GHz 16QAM:

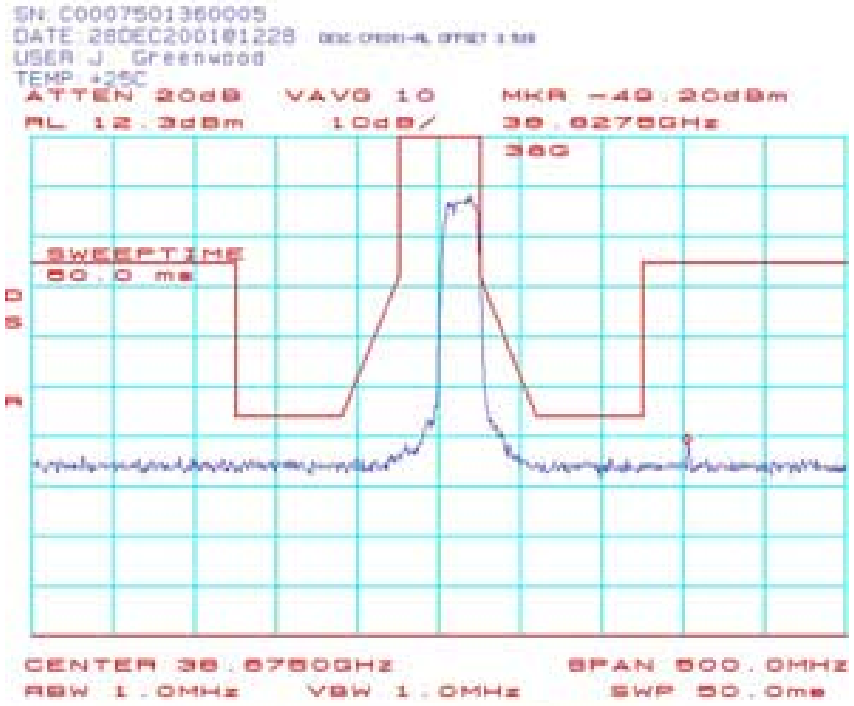


CPE057 Spectrum Mask Plots (CPE-ODU) 38.6875 GHz 16QAM:

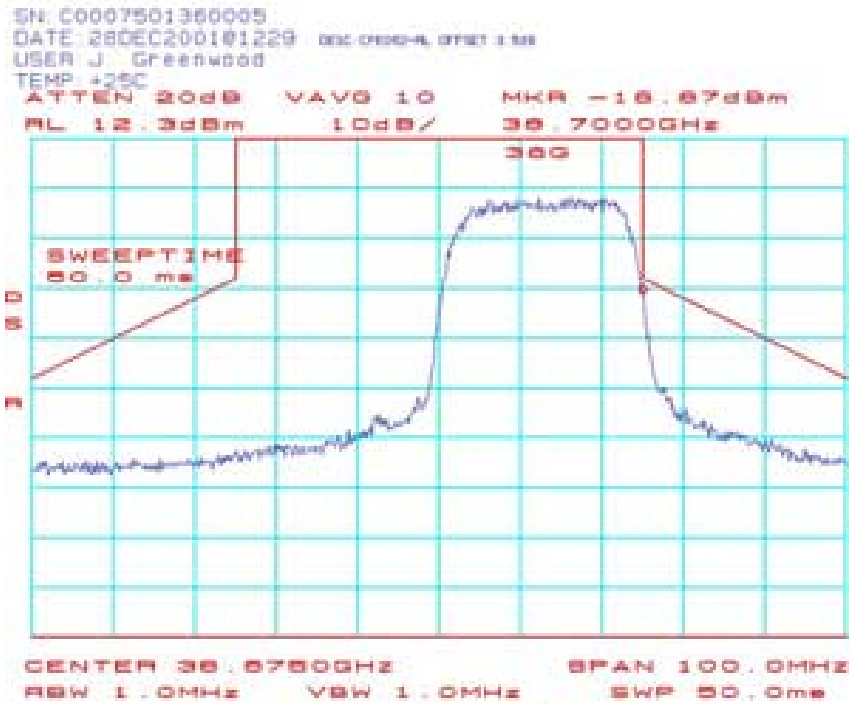
CPE059 Spectrum Mask Plots (CPE-ODU) 38.6875 GHz 16QAM:



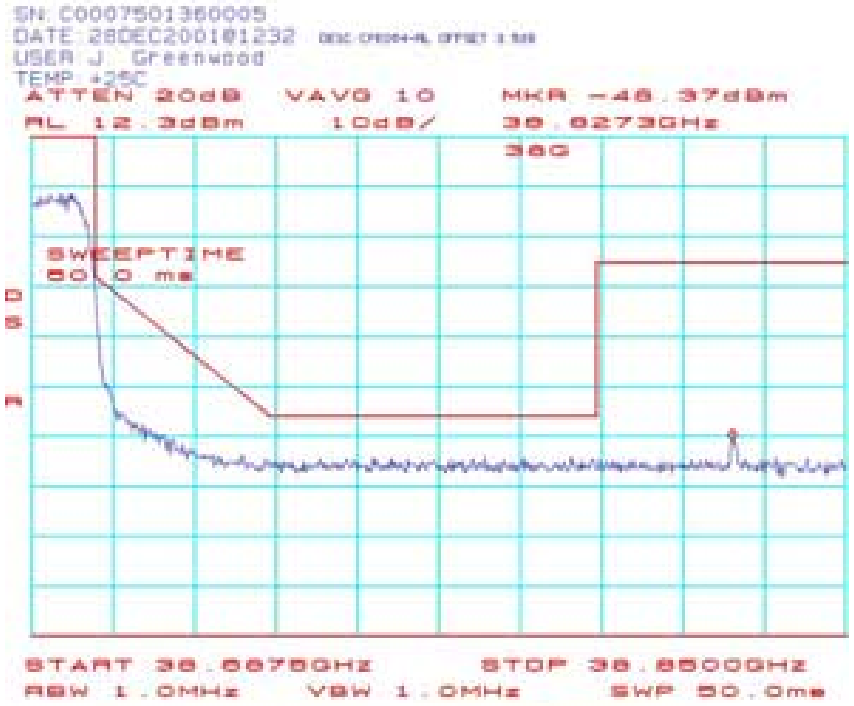
CPE061: Spectrum Mask Plots (CPE-ODU) 38.6875 GHz 64-QAM:



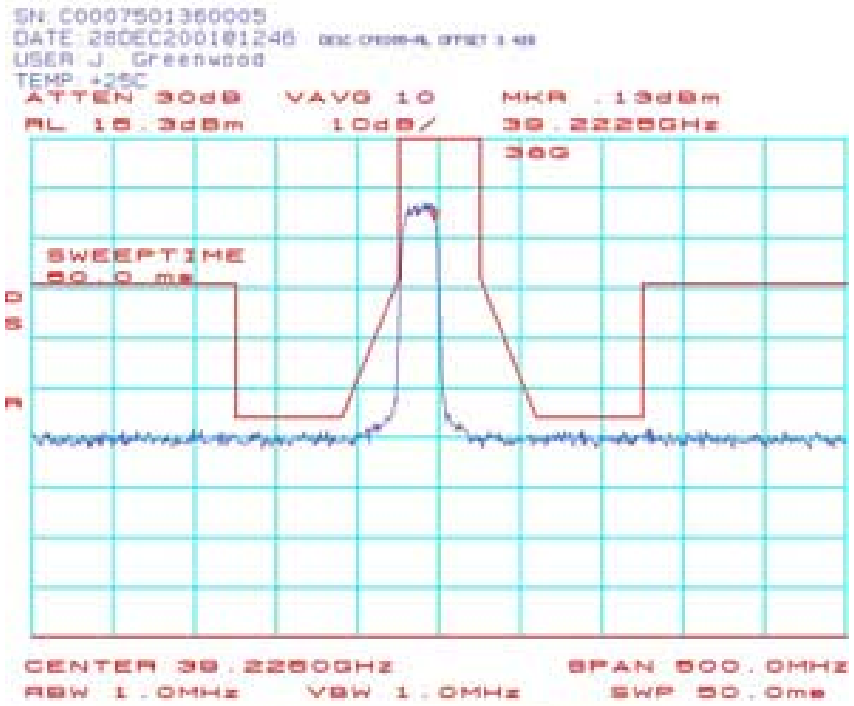
CPE062 Spectrum Mask Plots (CPE-ODU) 38.6875 GHz 64QAM:



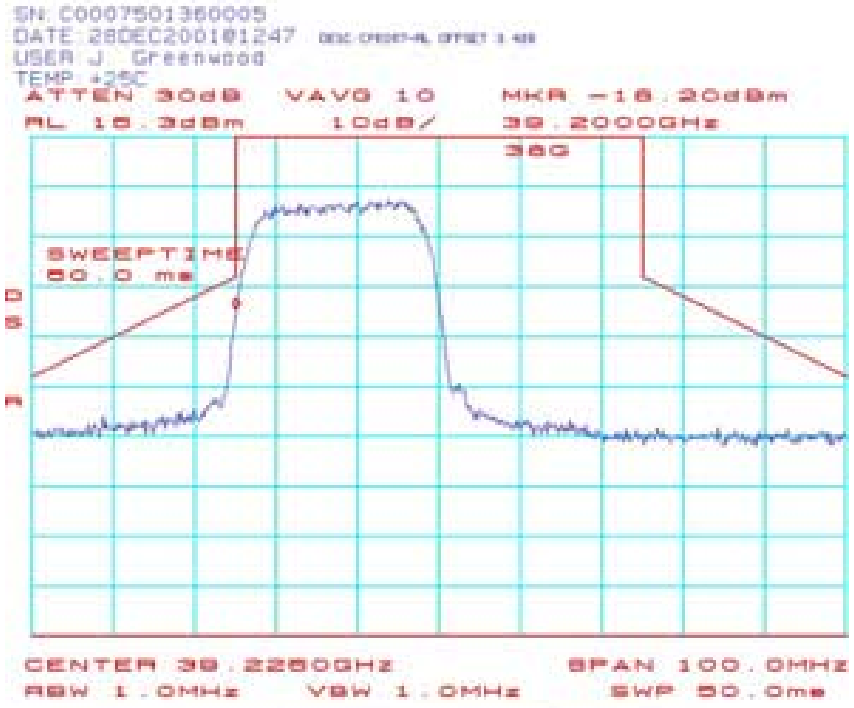
CPE064 Spectrum Mask Plots (CPE-ODU) 38.6875 GHz 64QAM:



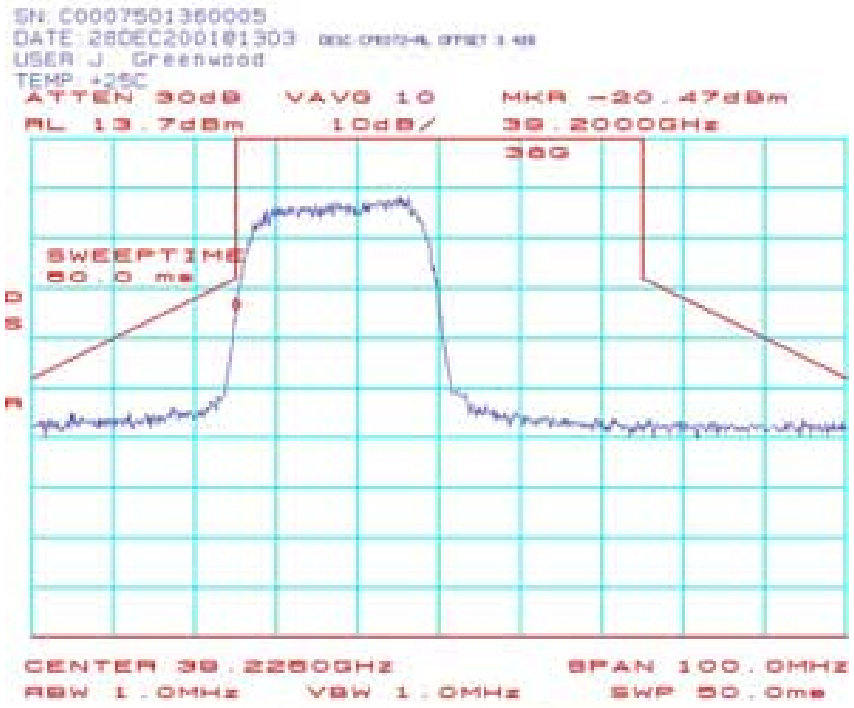
CPE066: Spectrum Mask Plots (CPE-ODU) 39.2125 GHz QPSK:



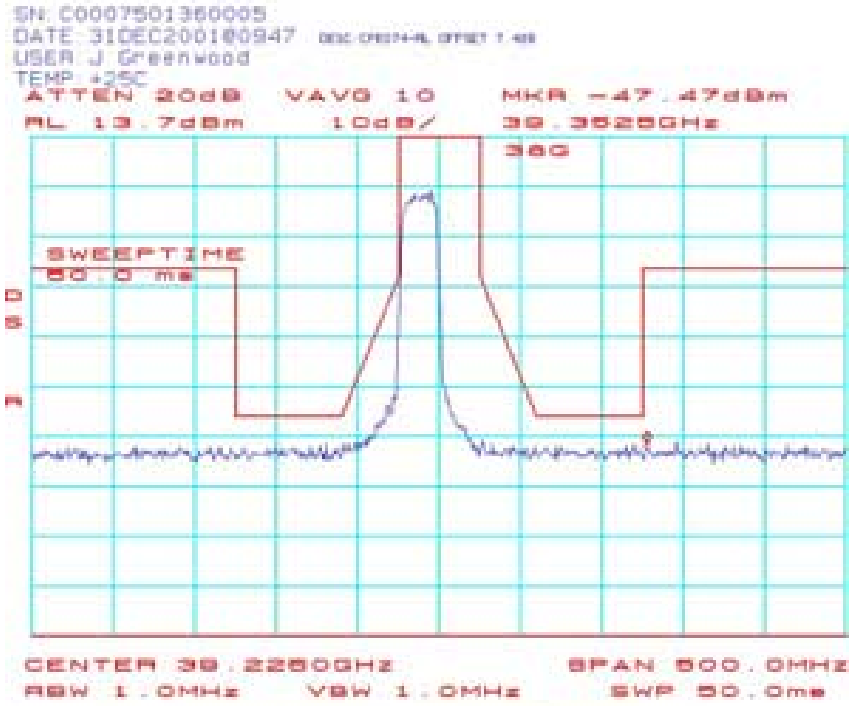
CPE067 Spectrum Mask Plots (CPE-ODU) 39.2125 GHz QPSK:



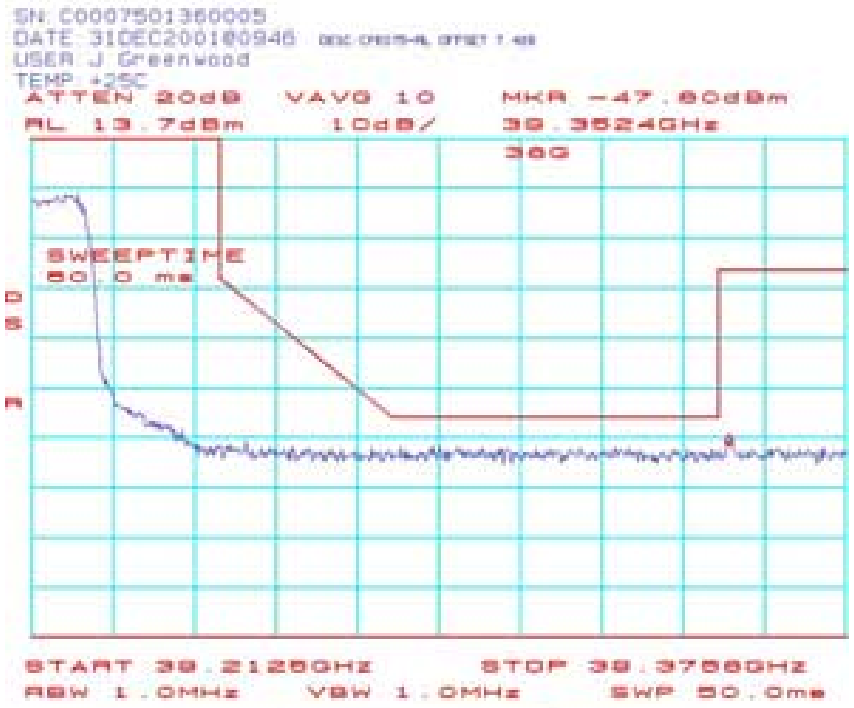
CPE072: Spectrum Mask Plots (CPE-ODU) 39.2125 GHz 16QAM:



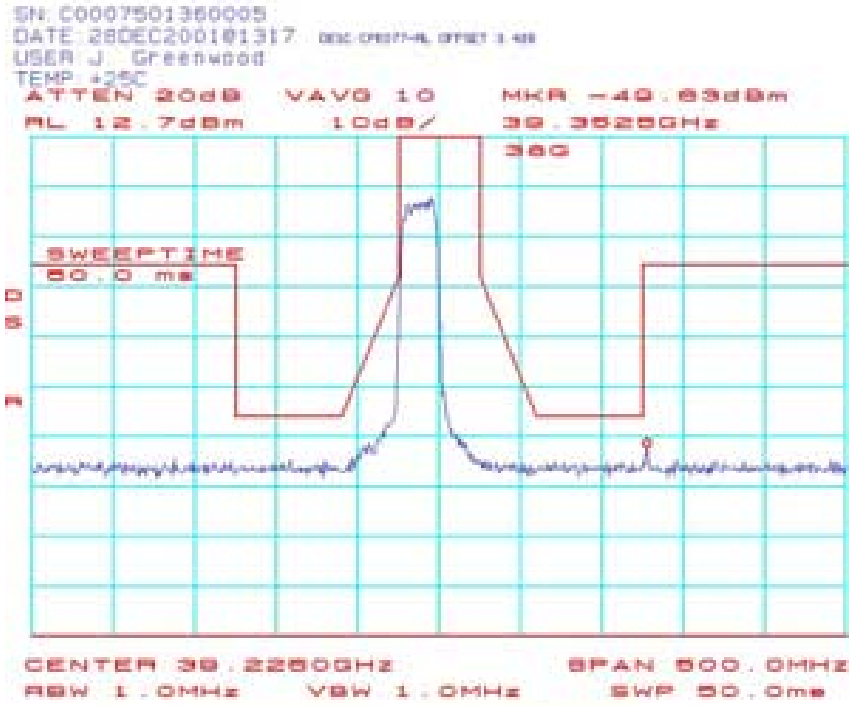
CPE074 Spectrum Mask Plots (CPE-ODU) 39.2125 GHz 16QAM:



CPE075: Spectrum Mask Plots (CPE-ODU) 39.2125 GHz 16QAM:

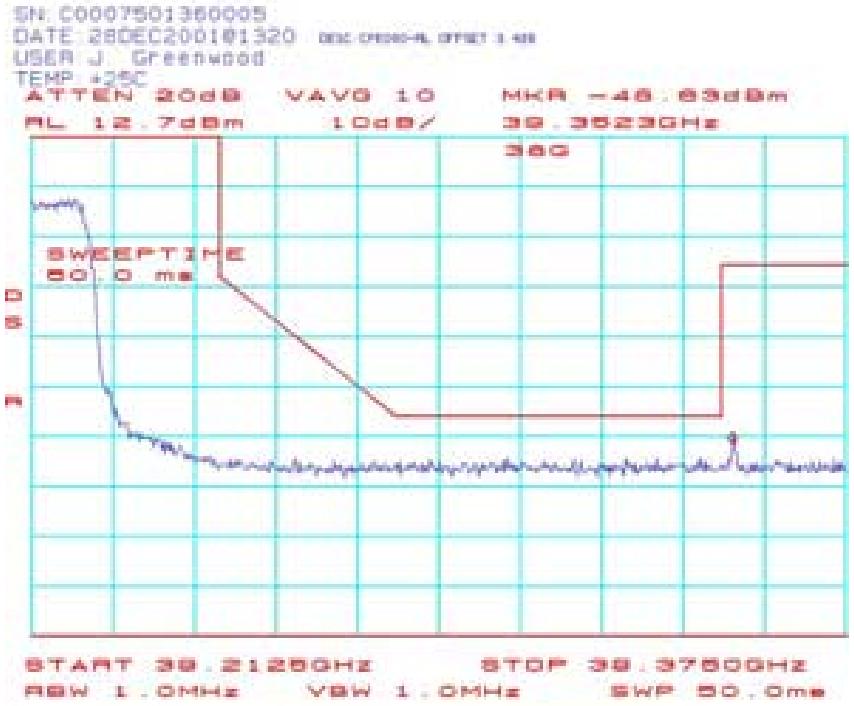


CPE077 Spectrum Mask Plots (CPE-ODU) 39.2125 GHz 64QAM:

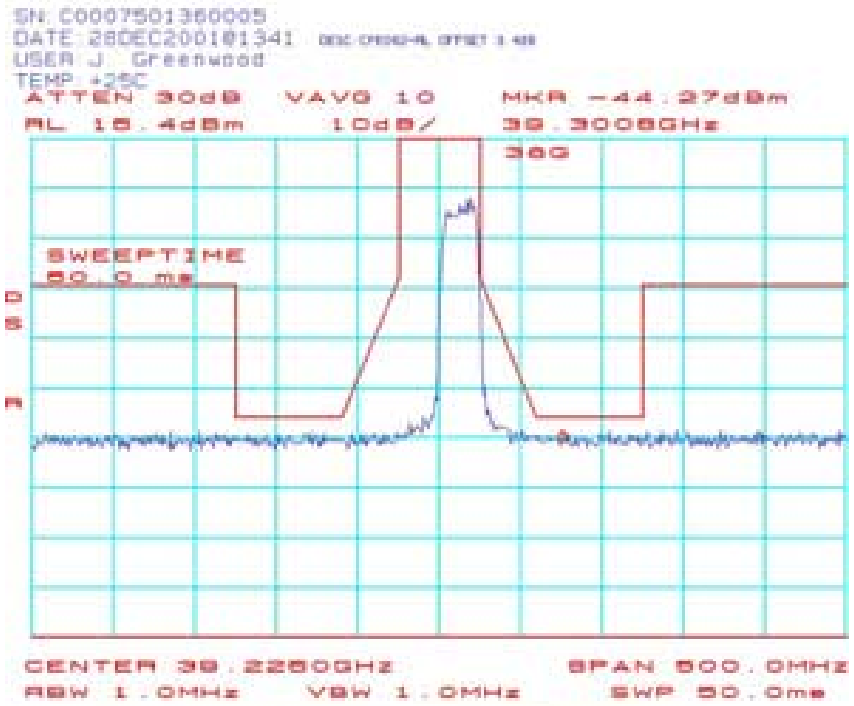


CPE078: Spectrum Mask Plots (CPE-ODU) 39.2125 GHz 64QAM:

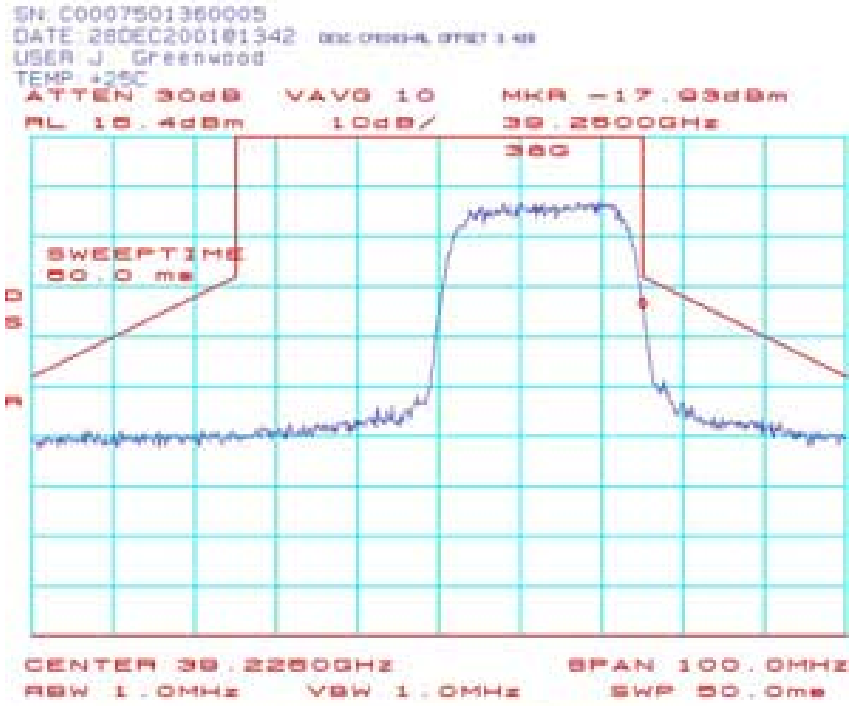
CPE080: Spectrum Mask Plots (CPE-ODU) 39.2125 GHz 64QAM:



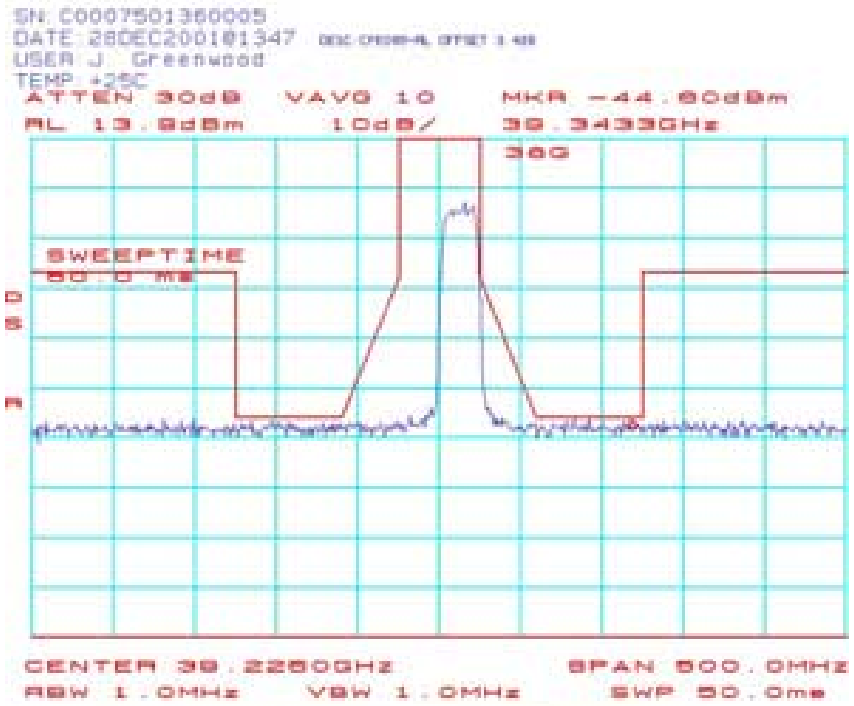
CPE082 Spectrum Mask Plots (CPE-ODU) 39.2375 GHz QPSK:



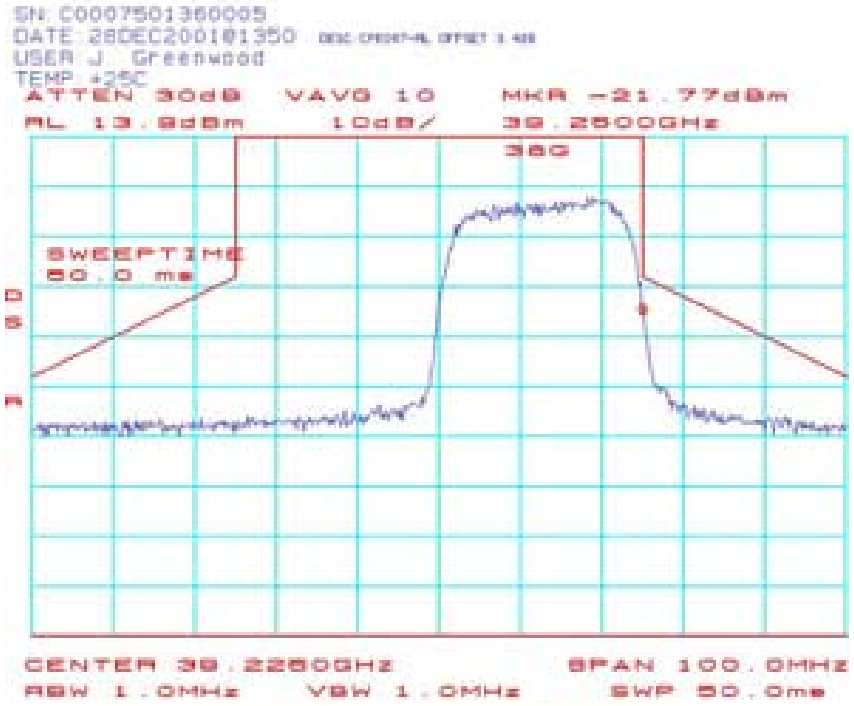
CPE083 Spectrum Mask Plots (CPE-ODU) 39.2375 GHz QPSK:



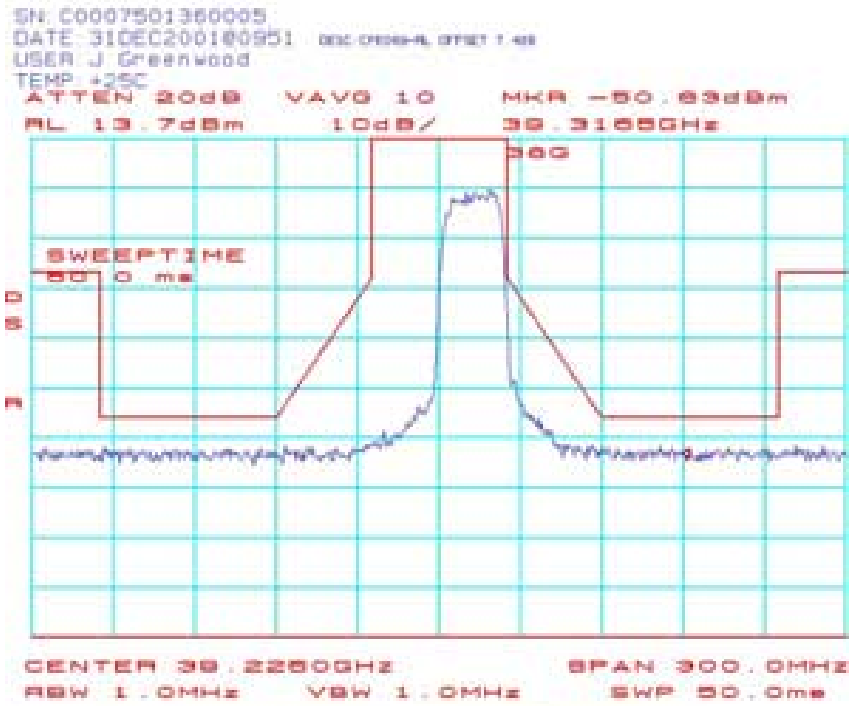
CPE086: Spectrum Mask Plots (CPE-ODU) 39.2375 GHz 16QAM:



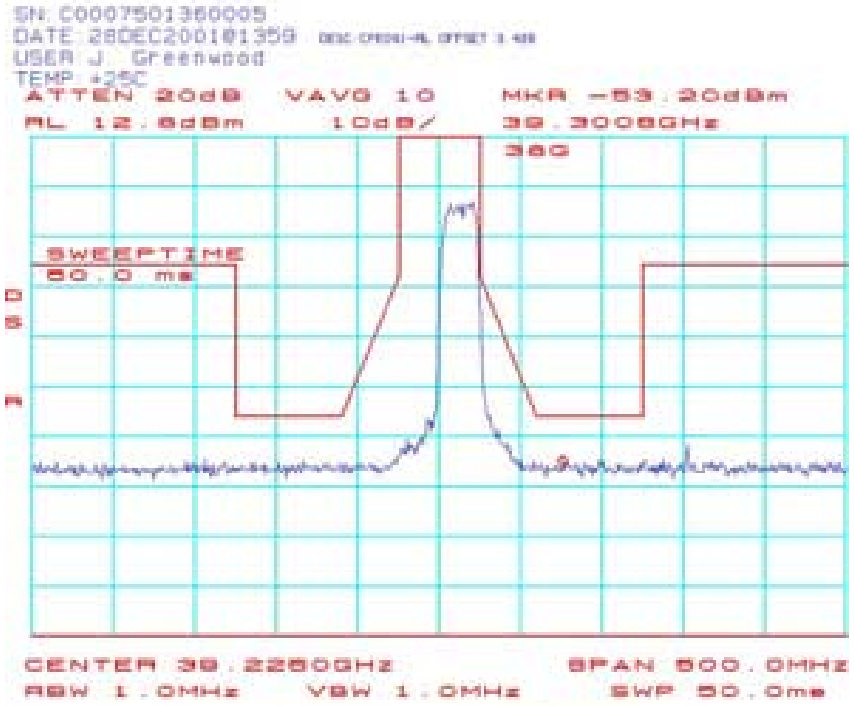
CPE087 Spectrum Mask Plots (CPE-ODU) 39.2375 GHz 16QAM:



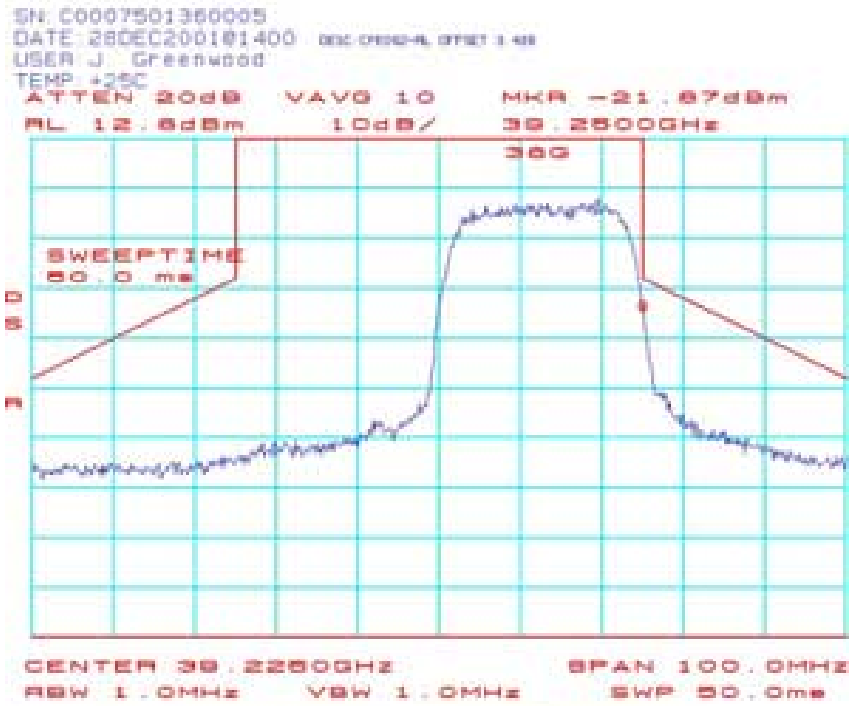
CPE089: Spectrum Mask Plots (CPE-ODU) 39.2375 GHZ 16QAM:



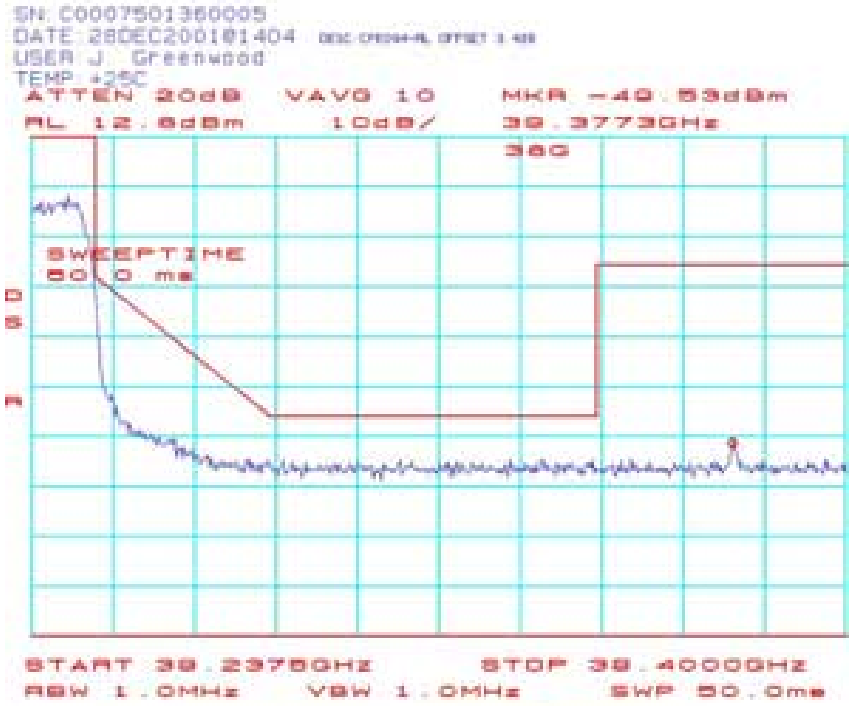
CPE091 Spectrum Mask Plots (CPE-ODU) 39.2375 GHz 64QAM:



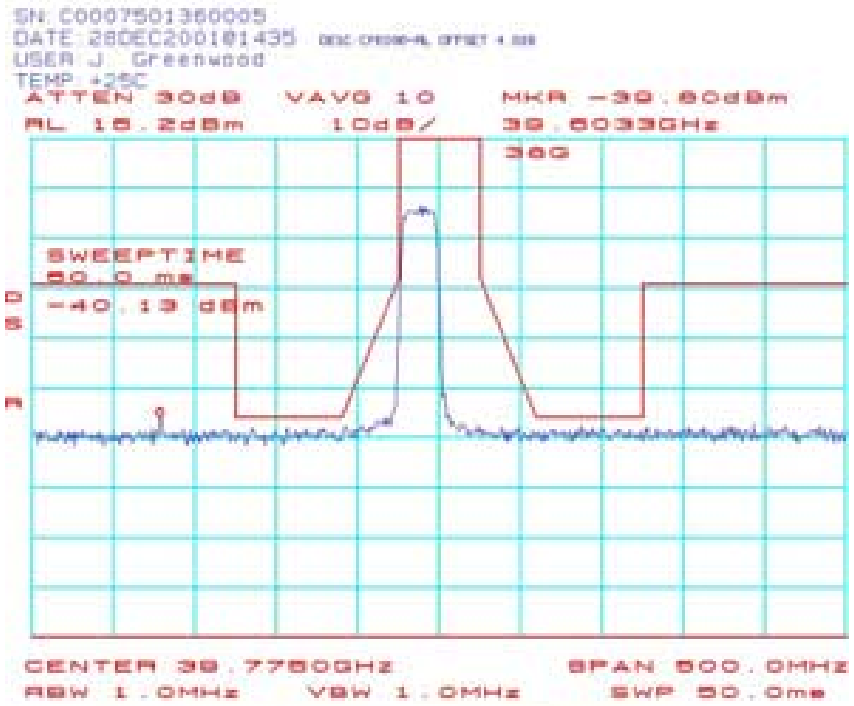
CPE092 Spectrum Mask Plots (CPE-ODU) 39.2375 GHz 64QAM:



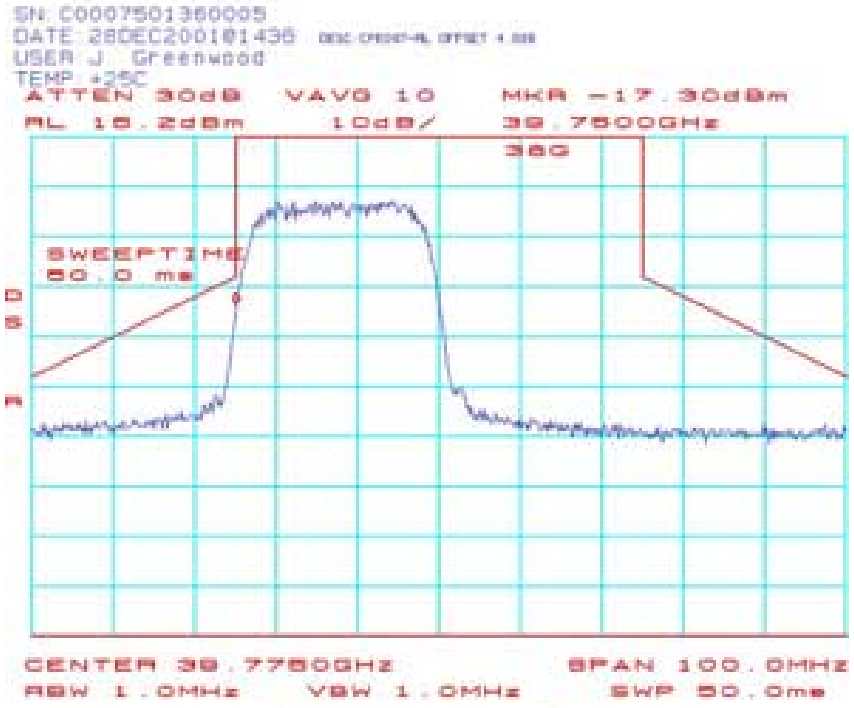
CPE094 Spectrum Mask Plots (CPE-ODU) 39.2375 GHz 64QAM:



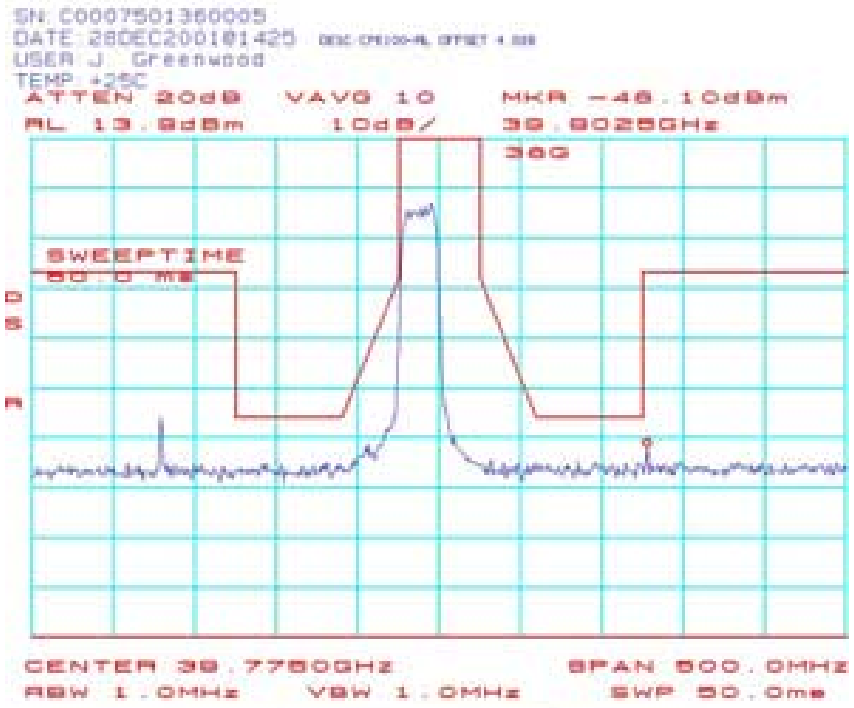
CPE096: Spectrum Mask Plots (CPE-ODU) 39.7625 GHz QPSK:



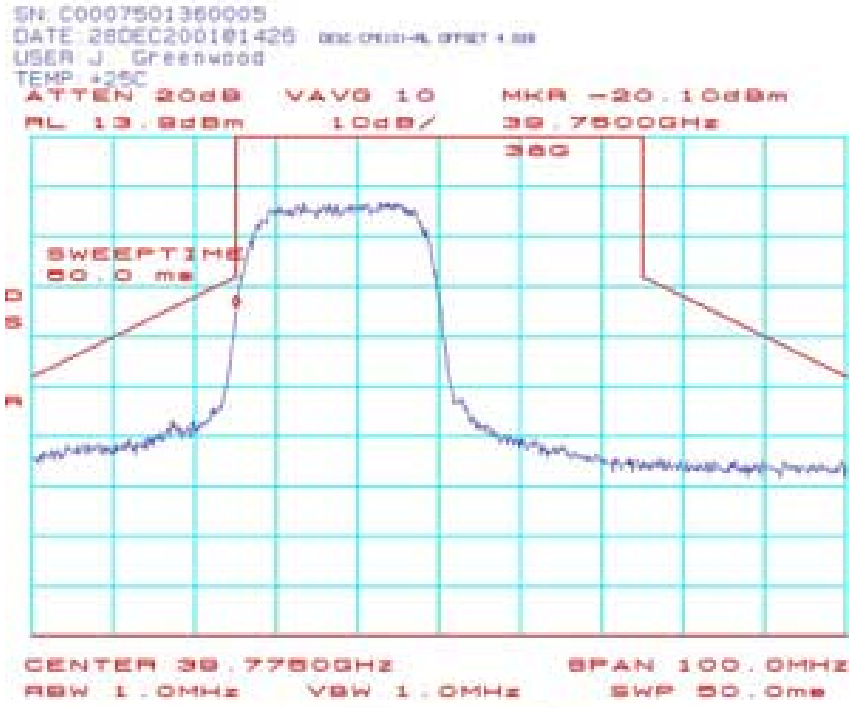
CPE097: Spectrum Mask Plots (CPE-ODU) 39.3625 GHz QPSK:



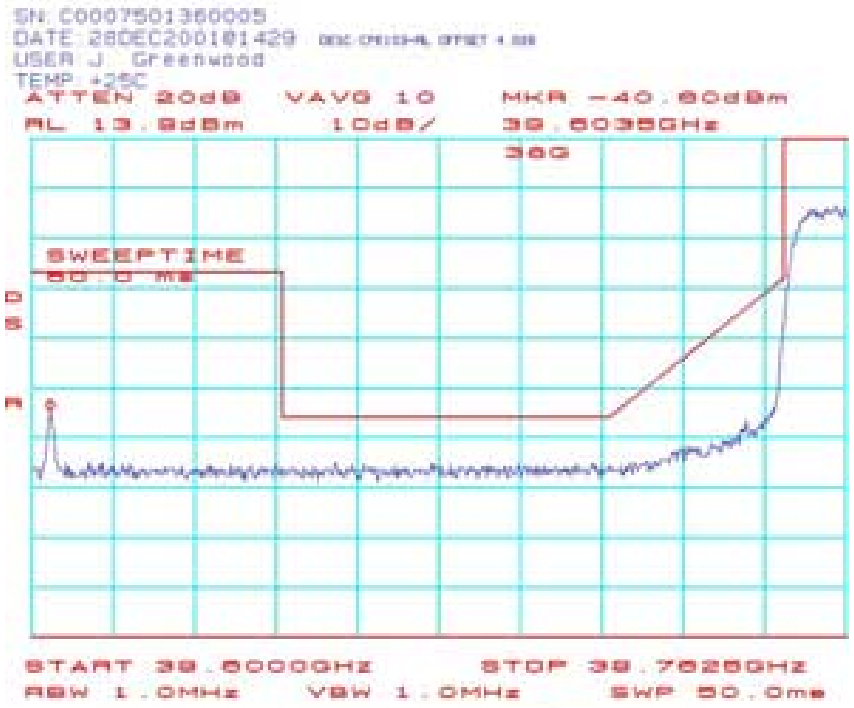
CPE100: Spectrum Mask Plots (CPE-ODU) 39.3625 GHz 16QAM:



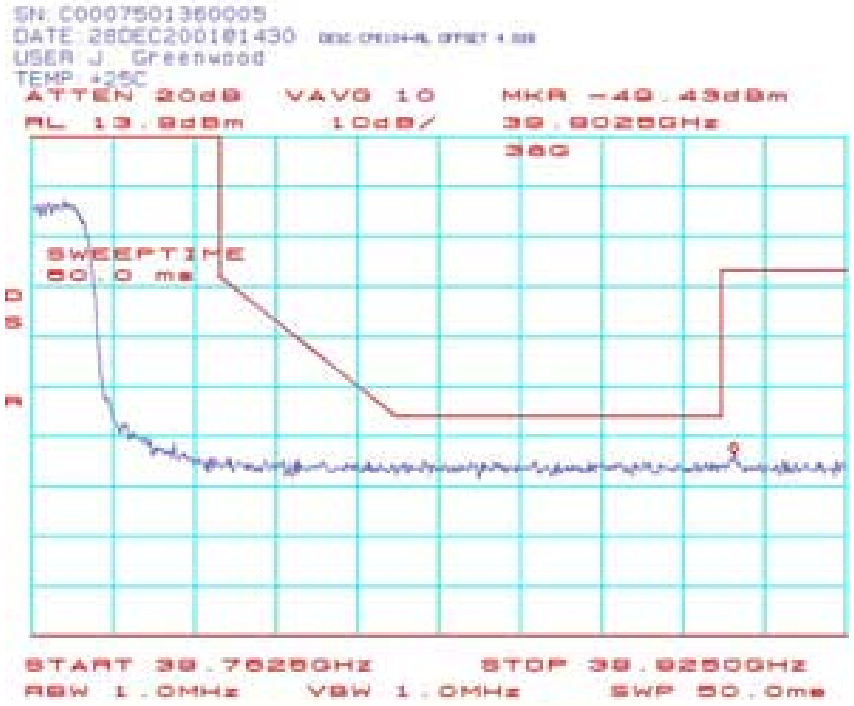
CPE101: Spectrum Mask Plots (CPE-ODU) 39.3625 GHz 16QAM:



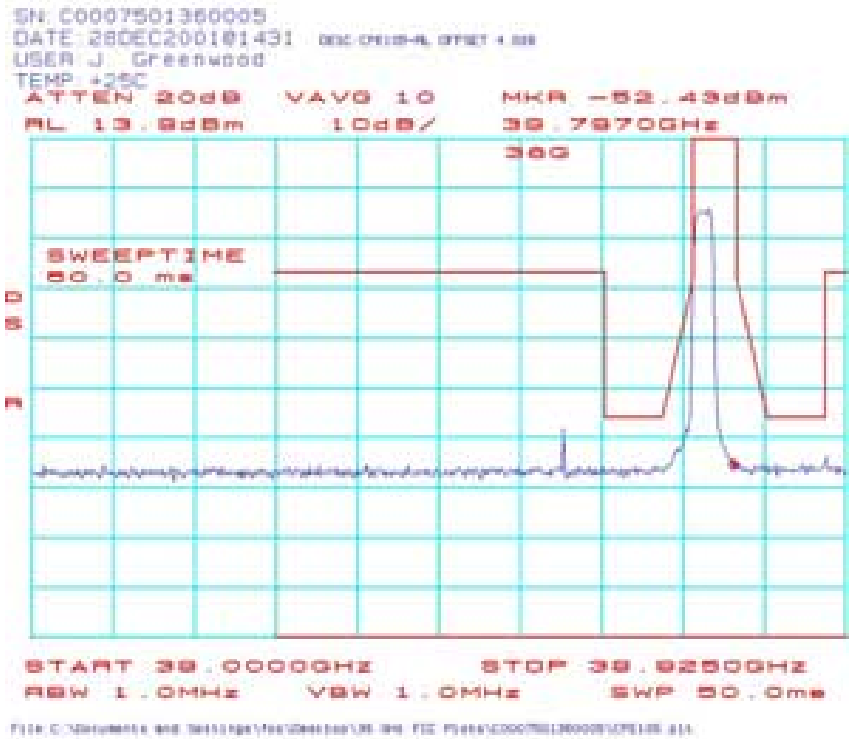
CPE103: Spectrum Mask Plots (CPE-ODU) 39.3625 GHz 16QAM:



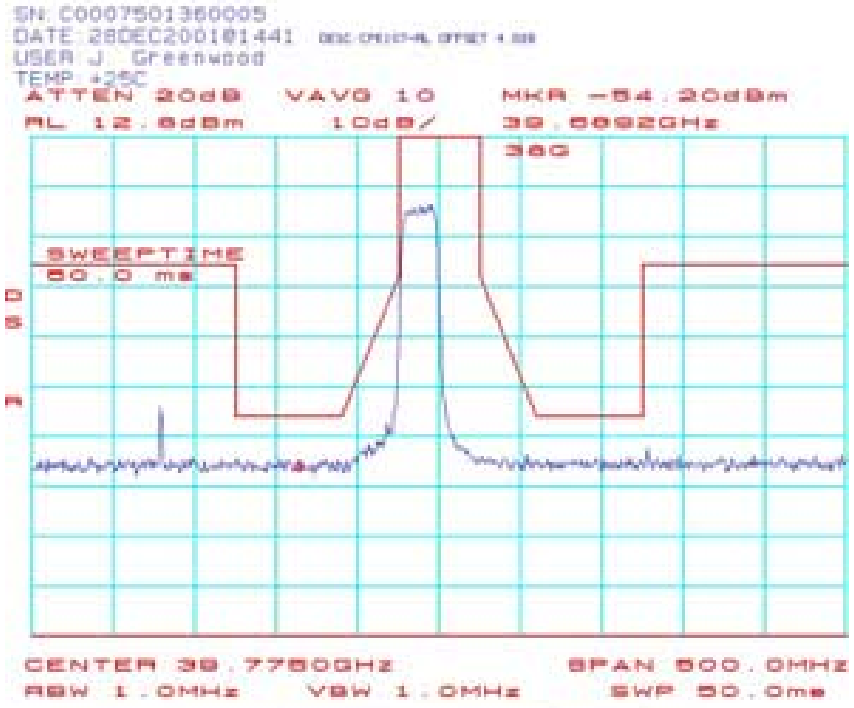
CPE104: Spectrum Mask Plots (CPE-ODU) 39.3625 GHz 16QAM:



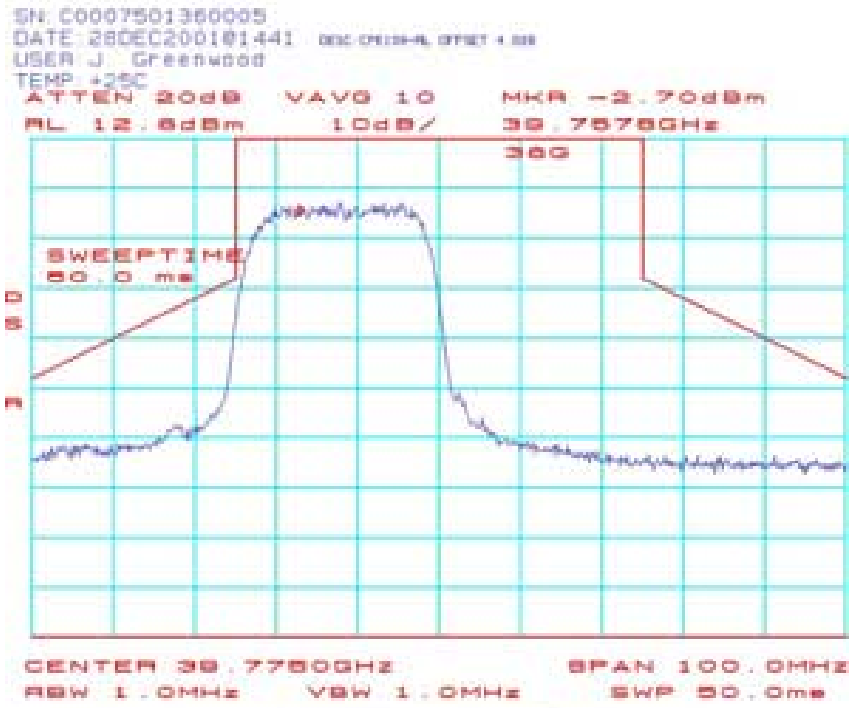
CPE105: Spectrum Mask Plots (CPE-ODU) 39.3625 GHz 16QAM:



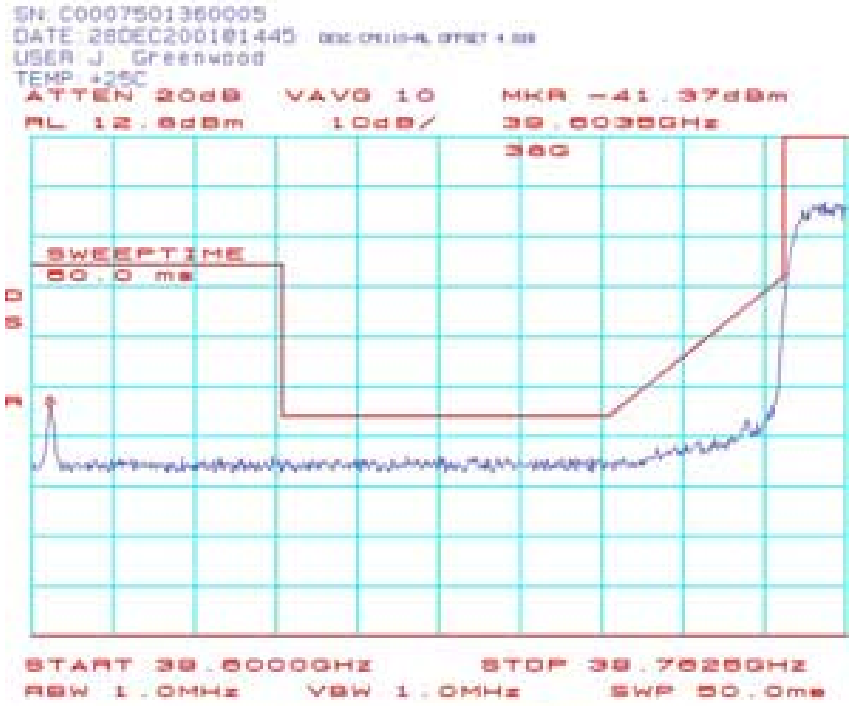
CPE107: Spectrum Mask Plots (CPE-ODU) 39.3625 GHz 64QAM:



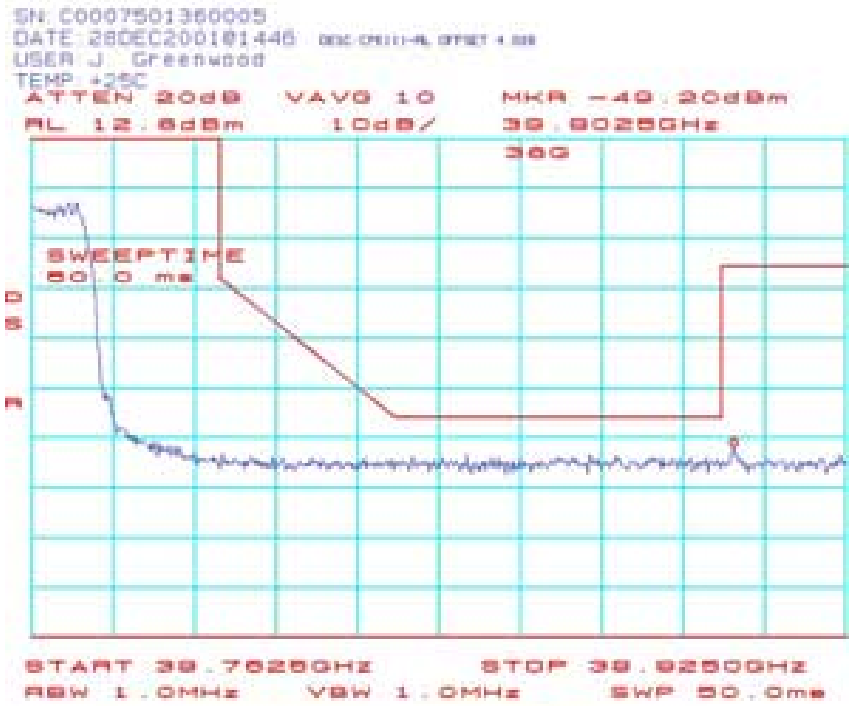
CPE108: Spectrum Mask Plots (CPE-ODU) 39.3625 GHz 64QAM:



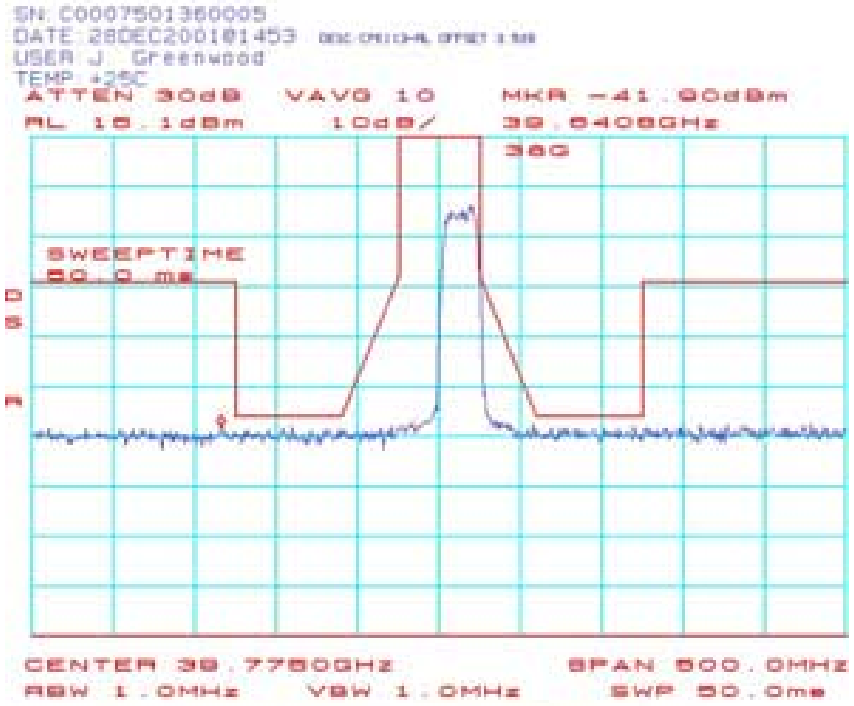
CPE110: Spectrum Mask Plots (CPE-ODU) 39.3625 GHz 64QAM:



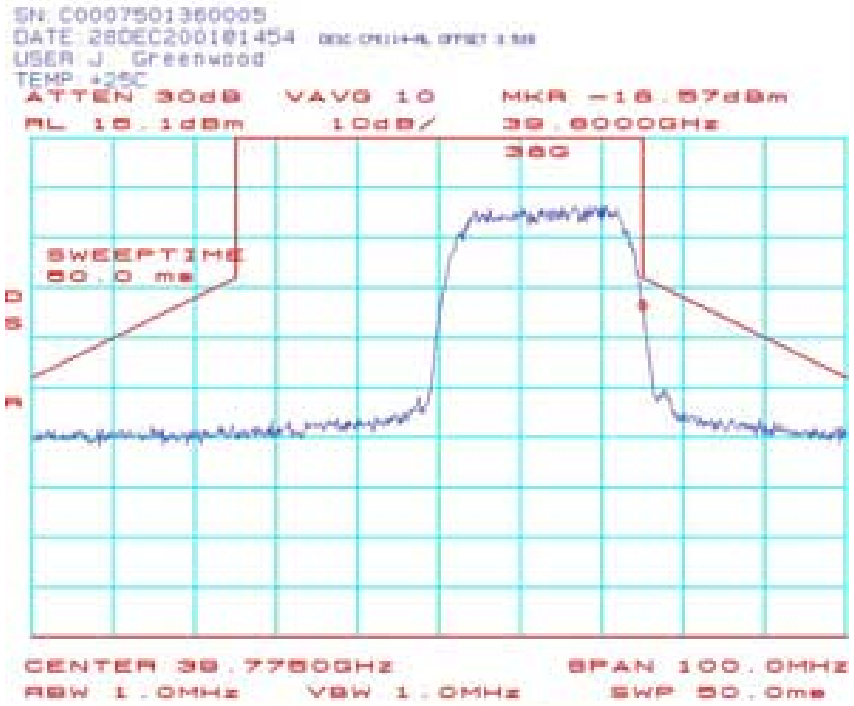
CPE111: Spectrum Mask Plots (CPE-ODU) 39.3625 GHz 64QAM:



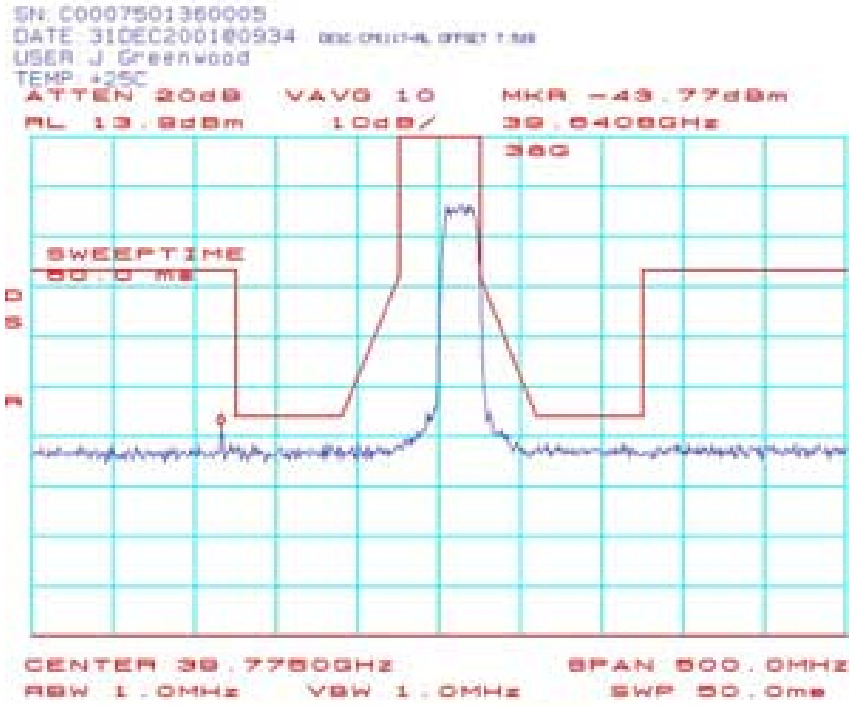
CPE113: Spectrum Mask Plots (CPE-ODU) 39.7875 GHz QPSK:



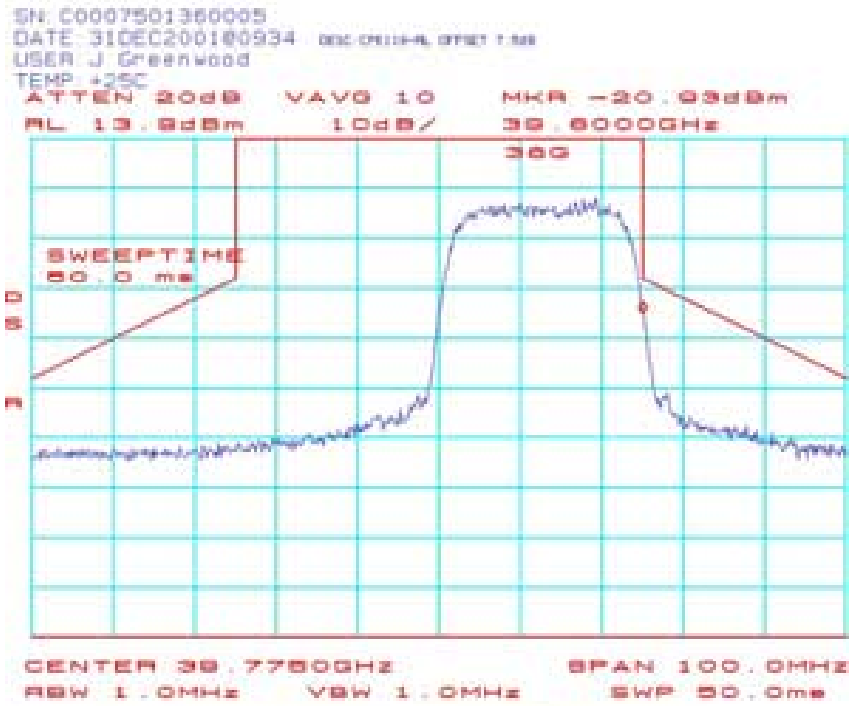
CPE114: Spectrum Mask Plots (CPE-ODU) 39.7875 GHz QPSK:



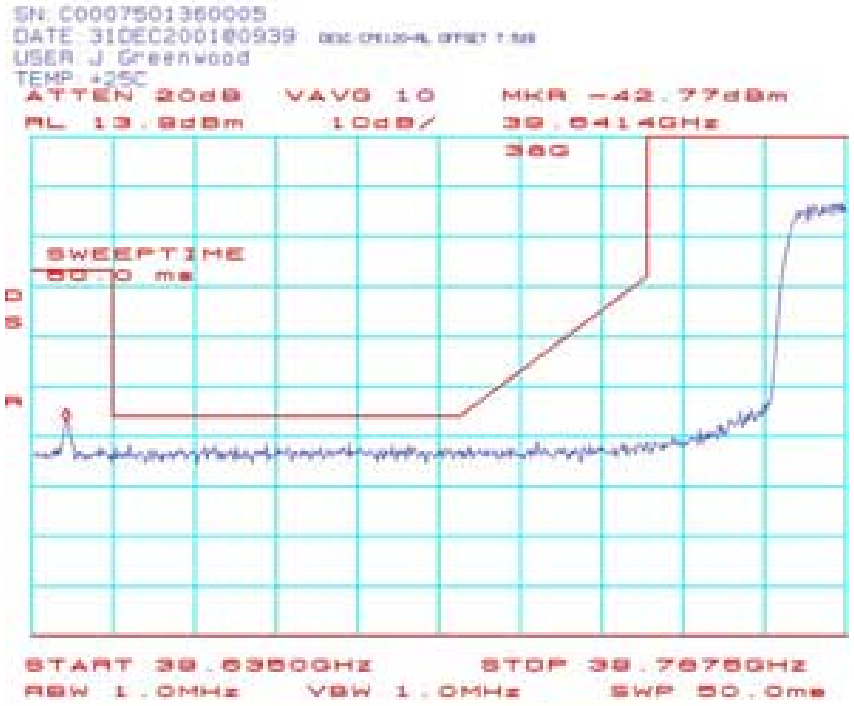
CPE117: Spectrum Mask Plots (CPE-ODU) 39.7875 GHz 16QAM:



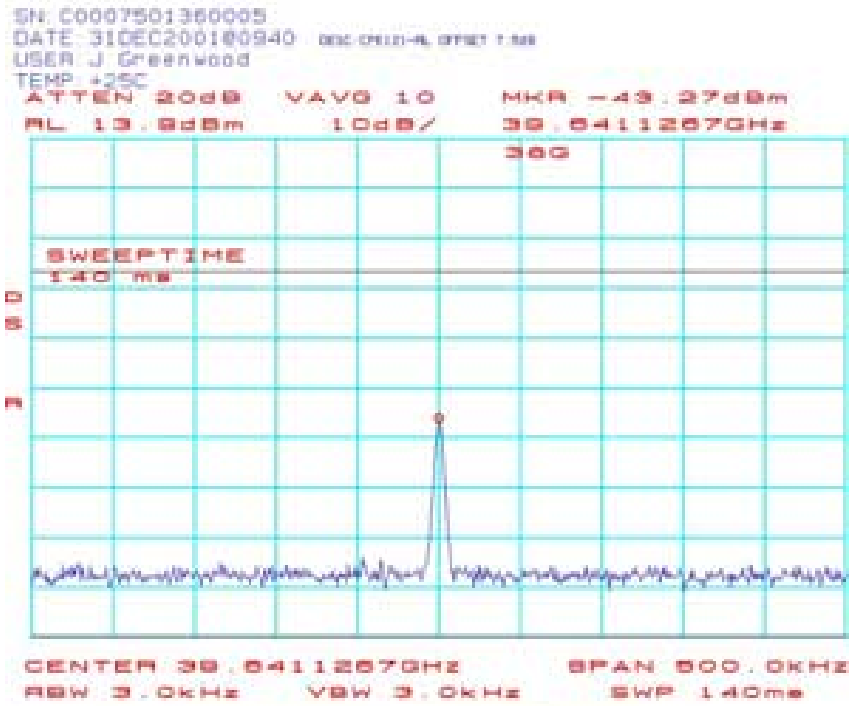
CPE118: Spectrum Mask Plots (CPE-ODU) 39.7875 GHz 16QAM:



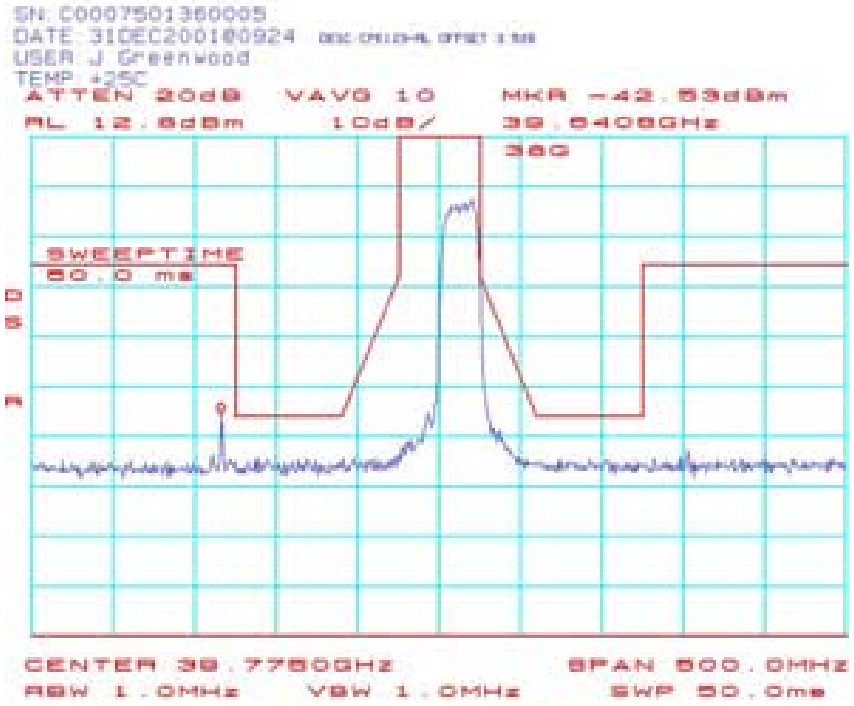
CPE120: Spectrum Mask Plots (CPE-ODU) 39.7875 GHz 16QAM:



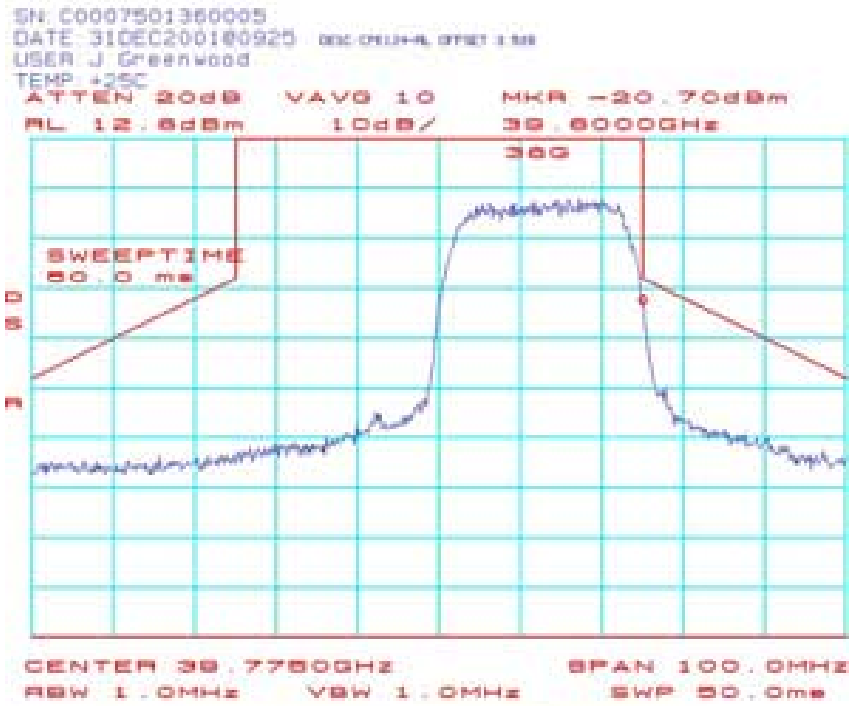
CPE121: Spectrum Mask Plots (CPE-ODU) 39.7875 GHz 16QAM:



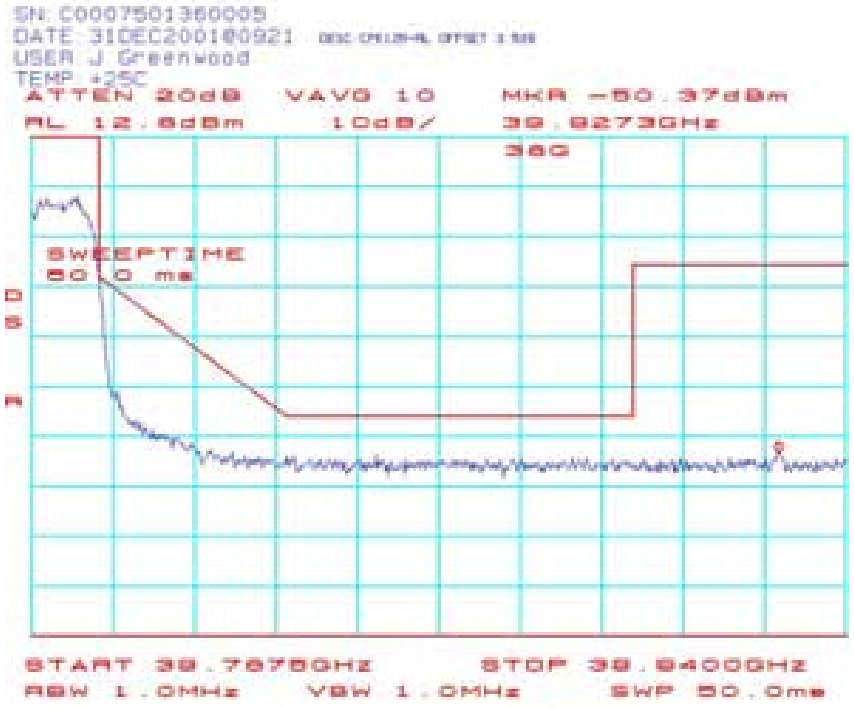
CPE123: Spectrum Mask Plots (CPE-ODU) 39.7875 GHz 64QAM:



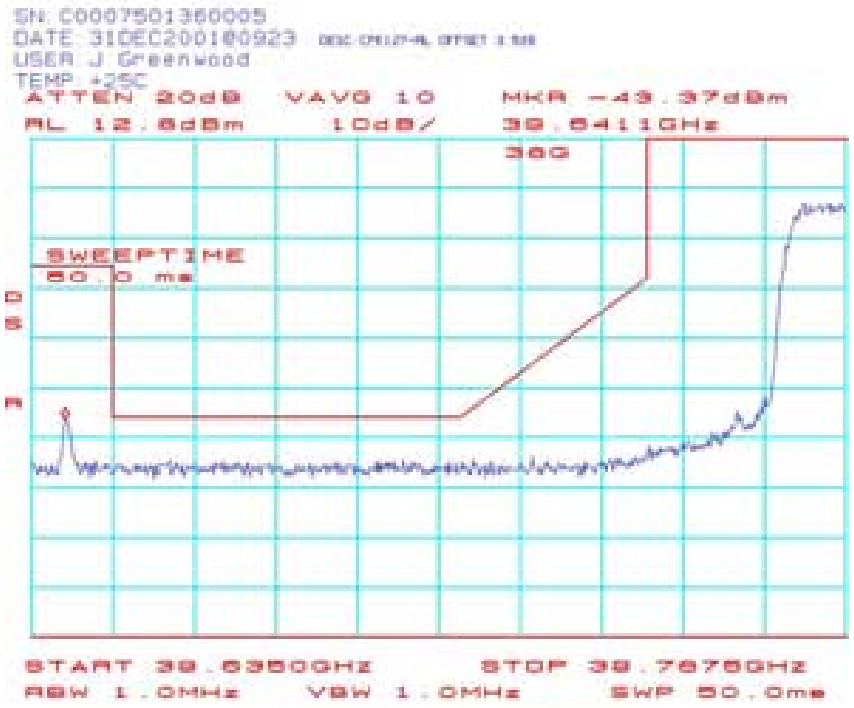
CPE124: Spectrum Mask Plots (CPE-ODU) 39.7875 GHz 64QAM:



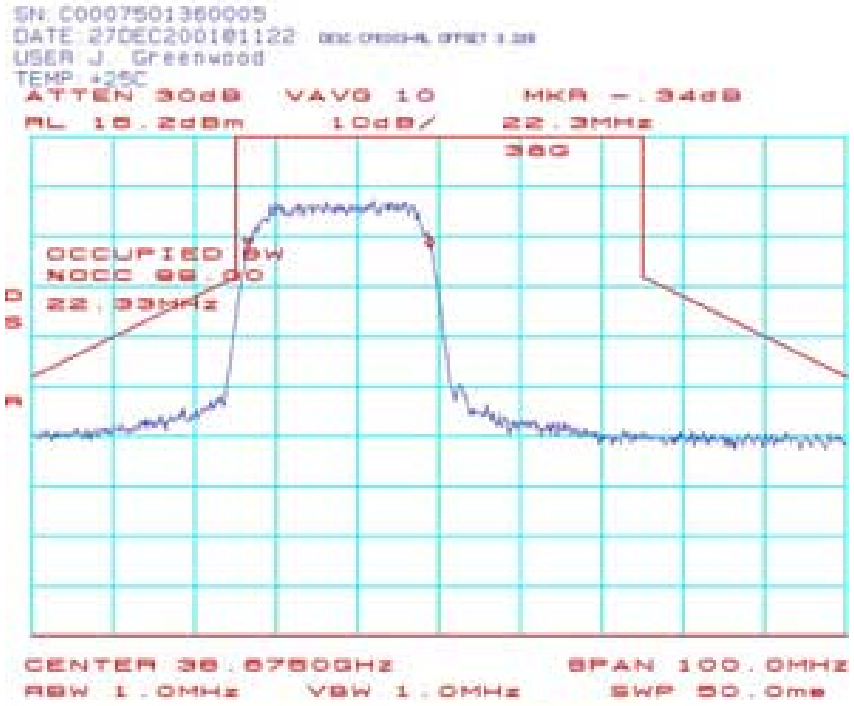
CPE126: Spectrum Mask Plots (CPE-ODU) 39.7875 GHz 64QAM:



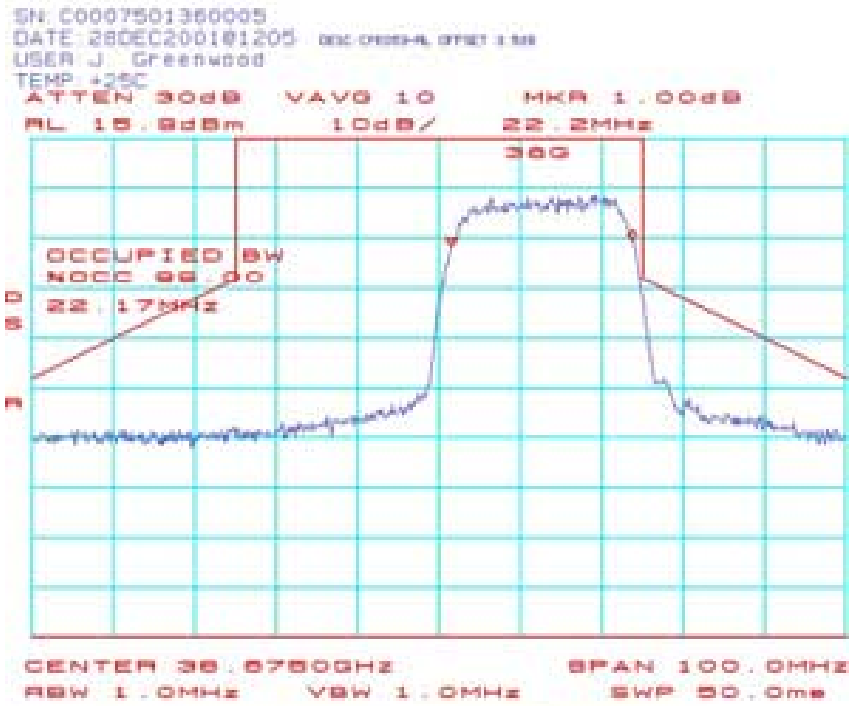
CPE127 Spectrum Mask Plots (CPE-ODU) 39.7875 GHz 64QAM:



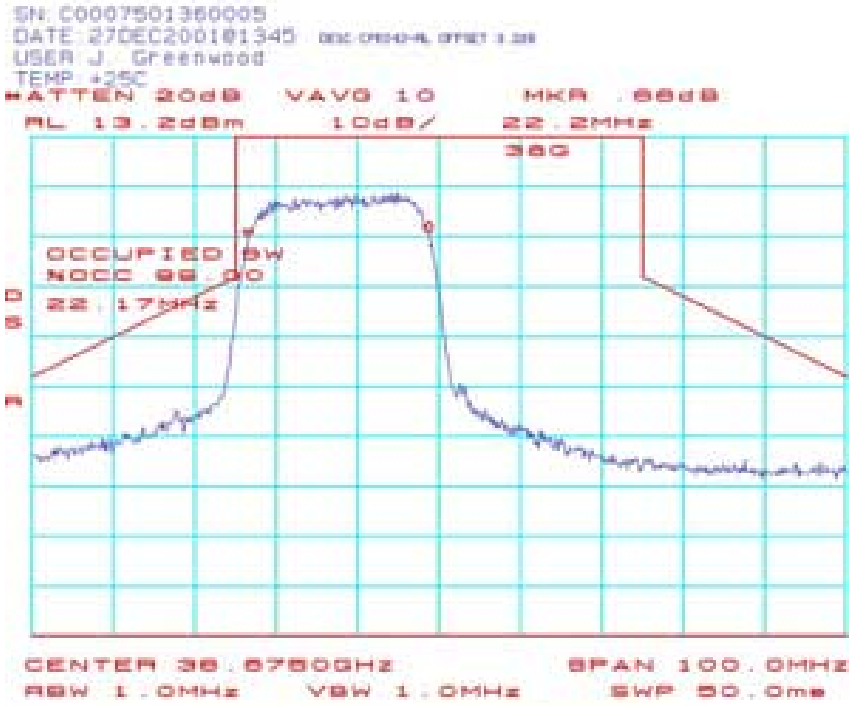
CPE003: Occupied Bandwidth (CPE-ODU) 38.6625 GHz QPSK:



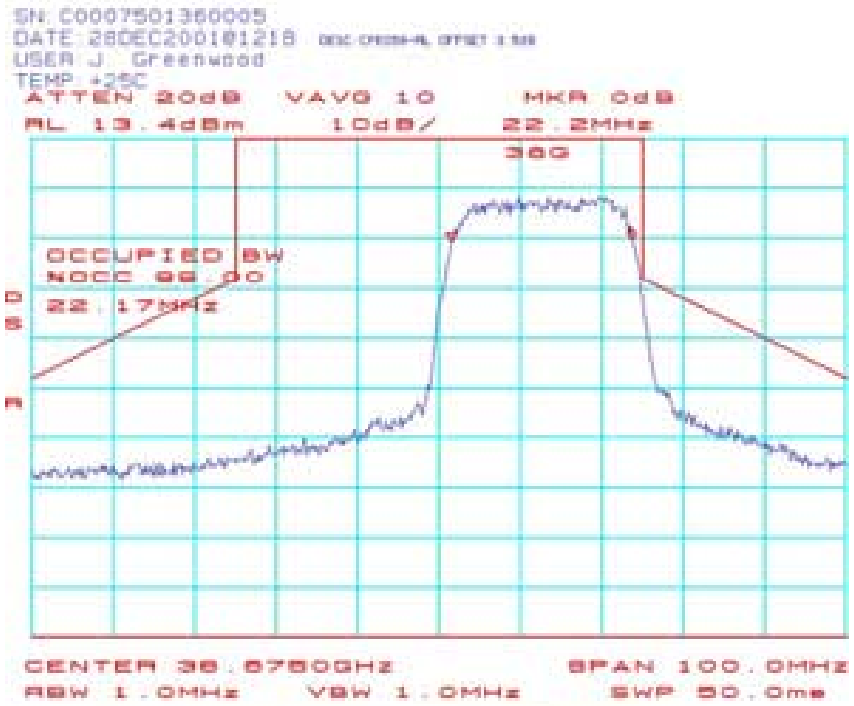
CPE053: Occupied Bandwidth (CPE-ODU) 38.6875 GHz QPSK:



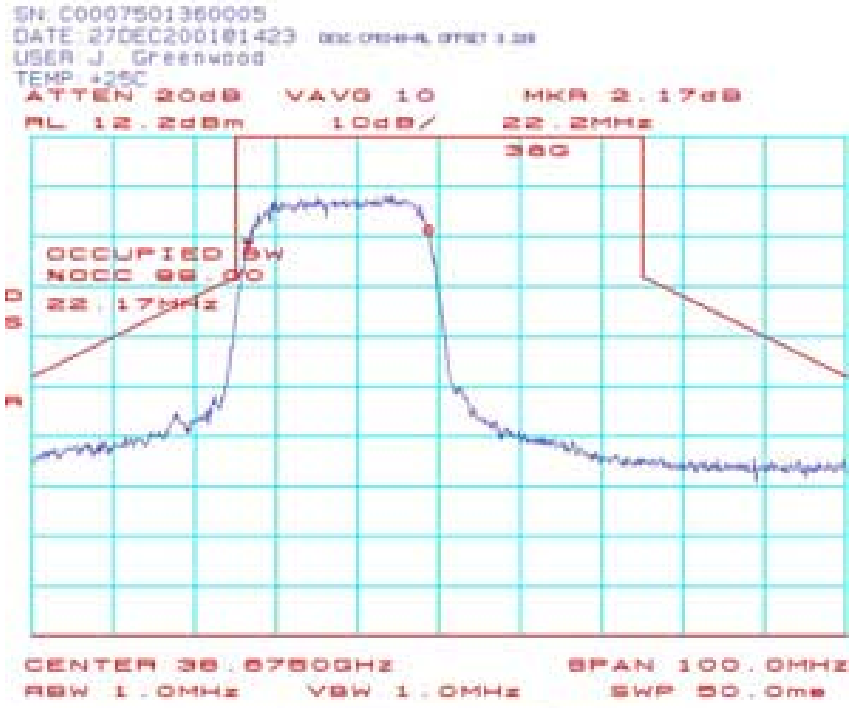
CPE042: Occupied Bandwidth (CPE-ODU) 38.6625 GHz 16QAM:



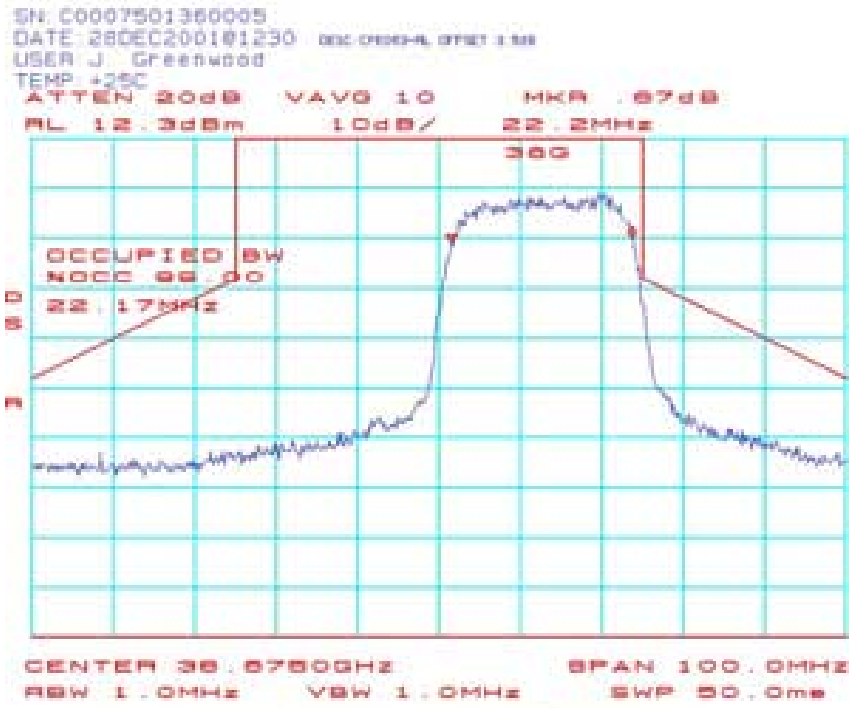
CPE058: Occupied Bandwidth (CPE-ODU) 38.6875 GHz 16QAM:



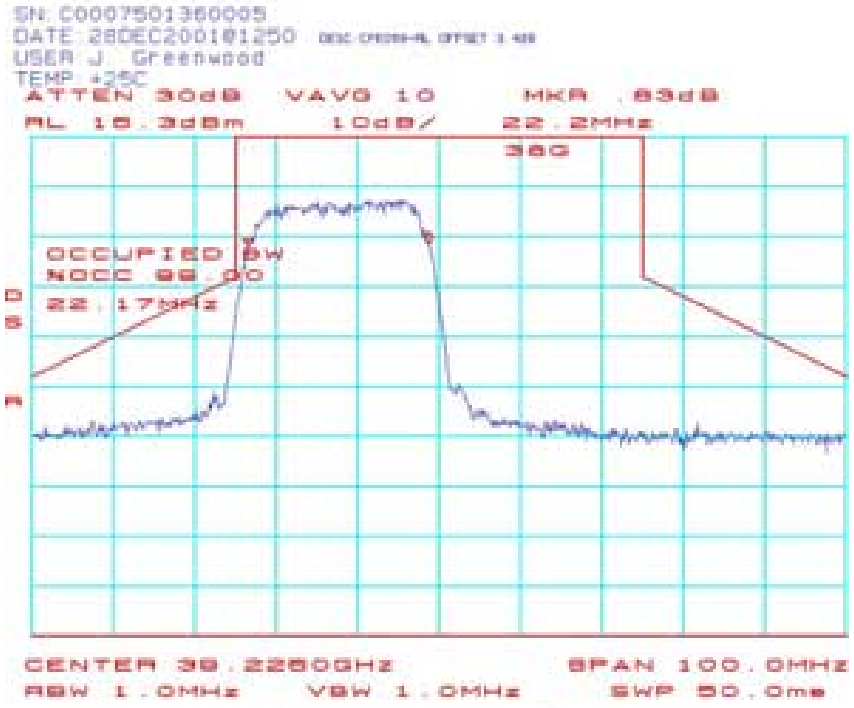
CPE048: Occupied Bandwidth (CPE-ODU) 38.6625 GHz 64QAM:



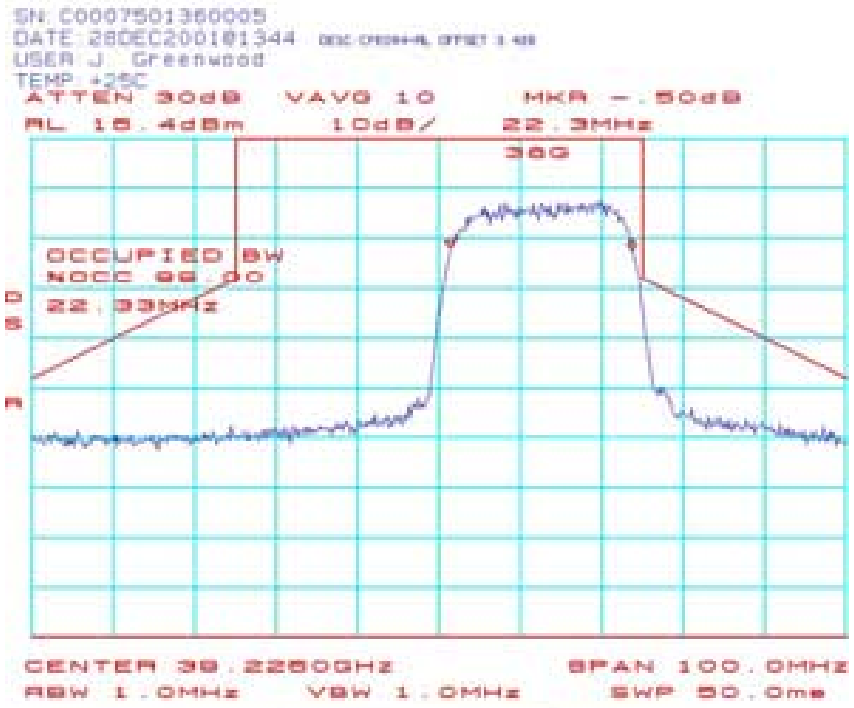
CPE063: Occupied Bandwidth (CPE-ODU) 38.6875 GHz 64QAM:



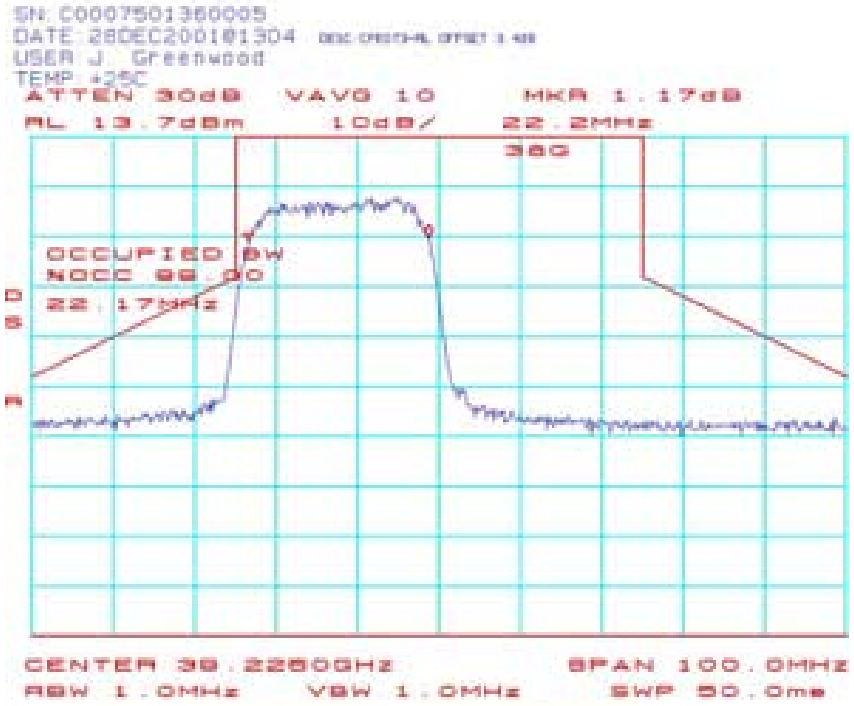
CPE068: Occupied Bandwidth (CPE-ODU) 39.2125 GHz QPSK:



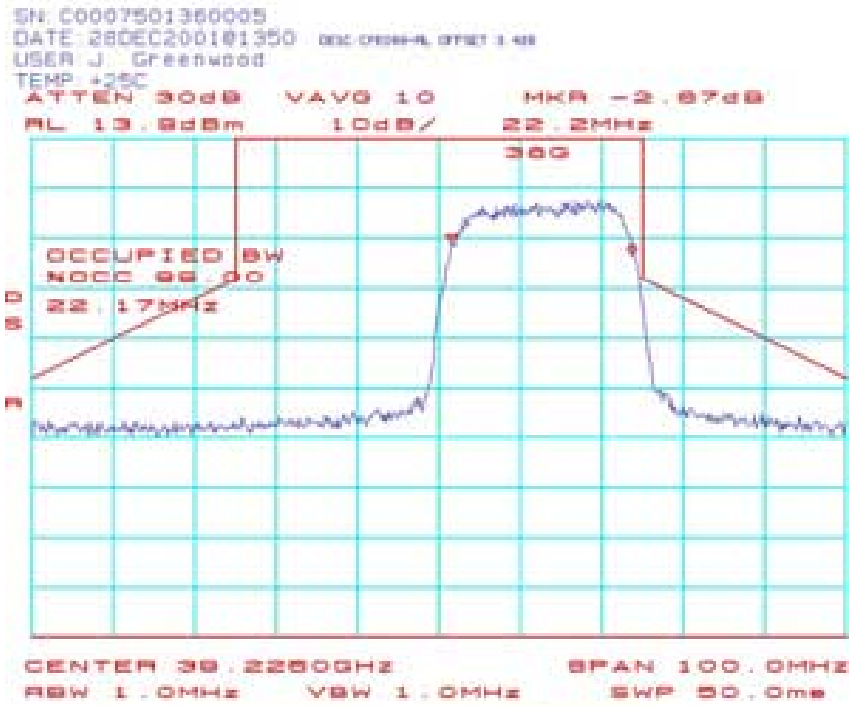
CPE084: Occupied Bandwidth (CPE-ODU) 39.2375 GHz QPSK:



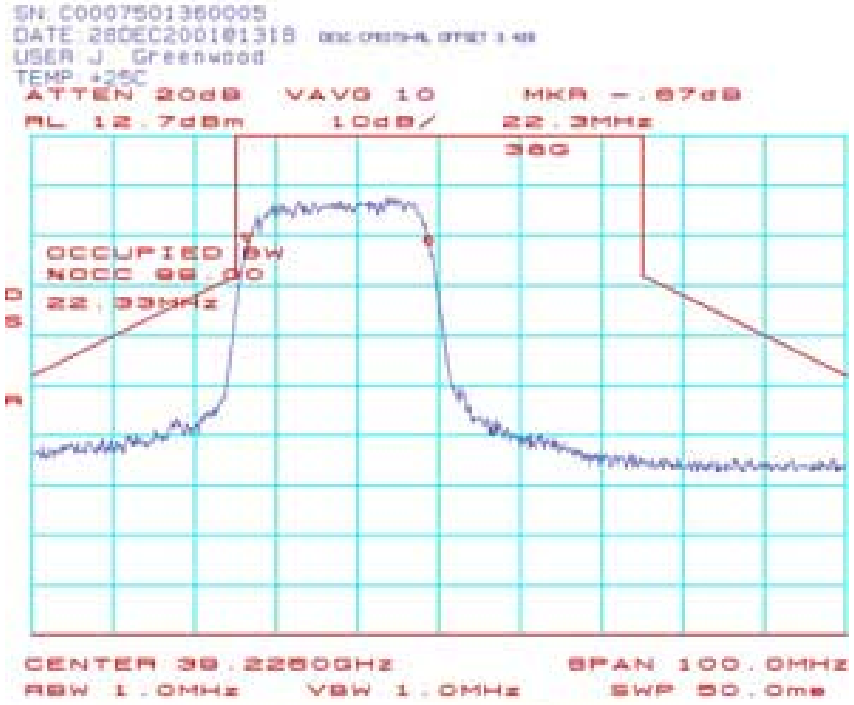
CPE073: Occupied Bandwidth (CPE-ODU) 39.2125 GHz 16QAM:



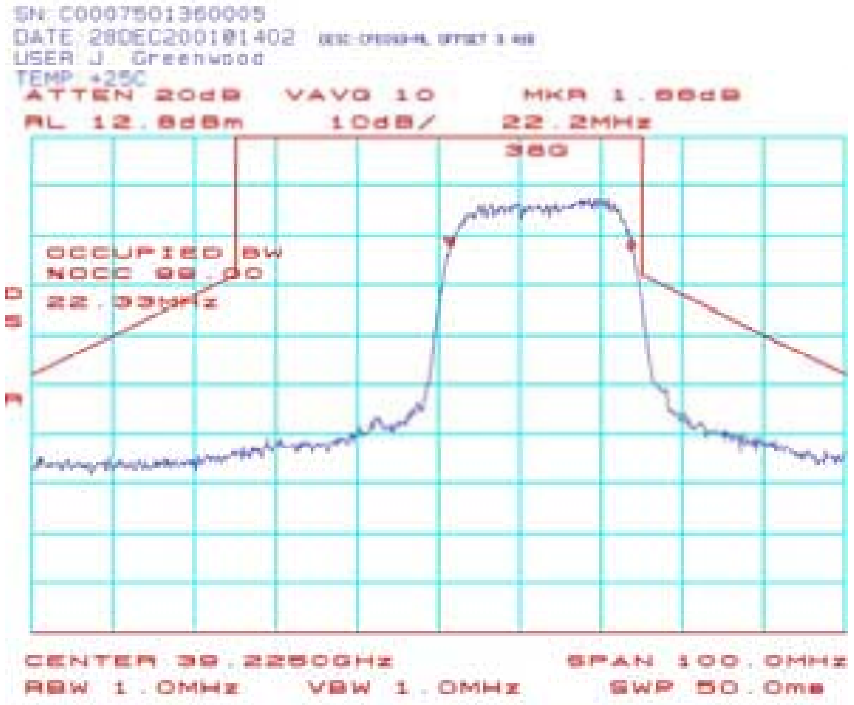
CPE088: Occupied Bandwidth (CPE-ODU) 39.2375 GHz 16QAM:



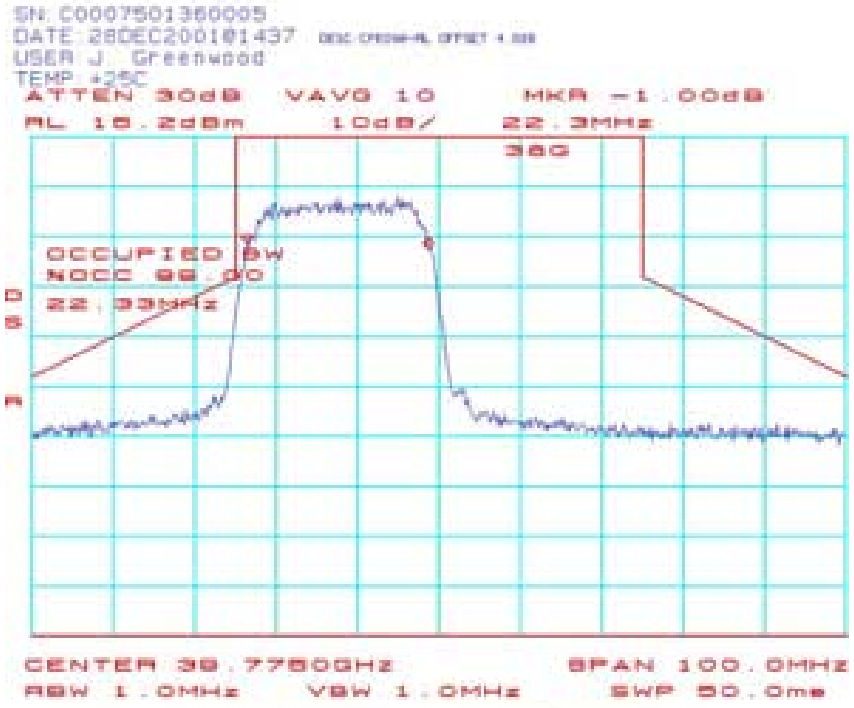
CPE079: Occupied Bandwidth (CPE-ODU) 39.2125 GHz 64QAM:



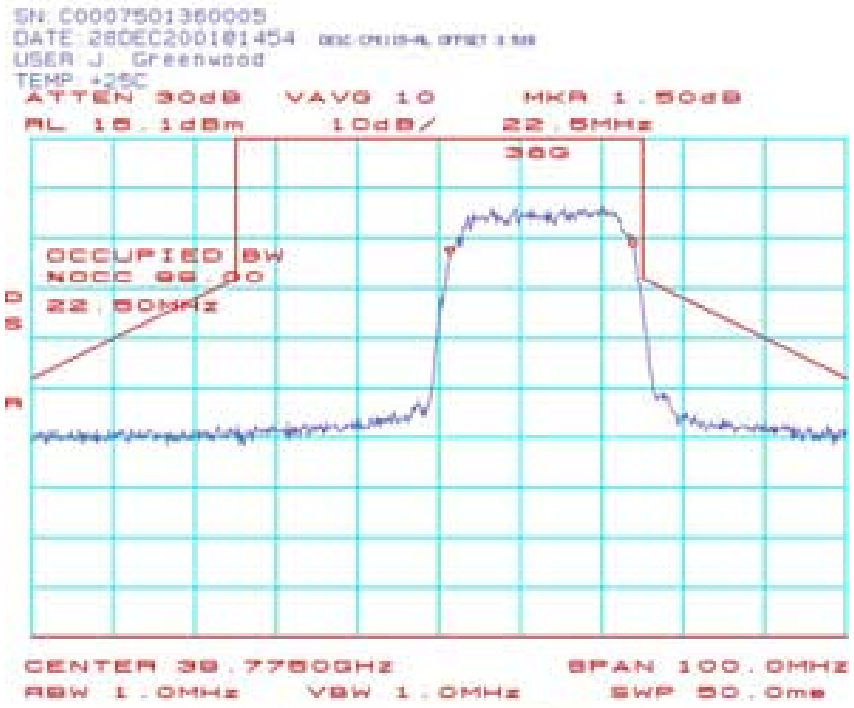
CPE093: Occupied Bandwidth (CPE-ODU) 39.2375 GHz 64QAM:



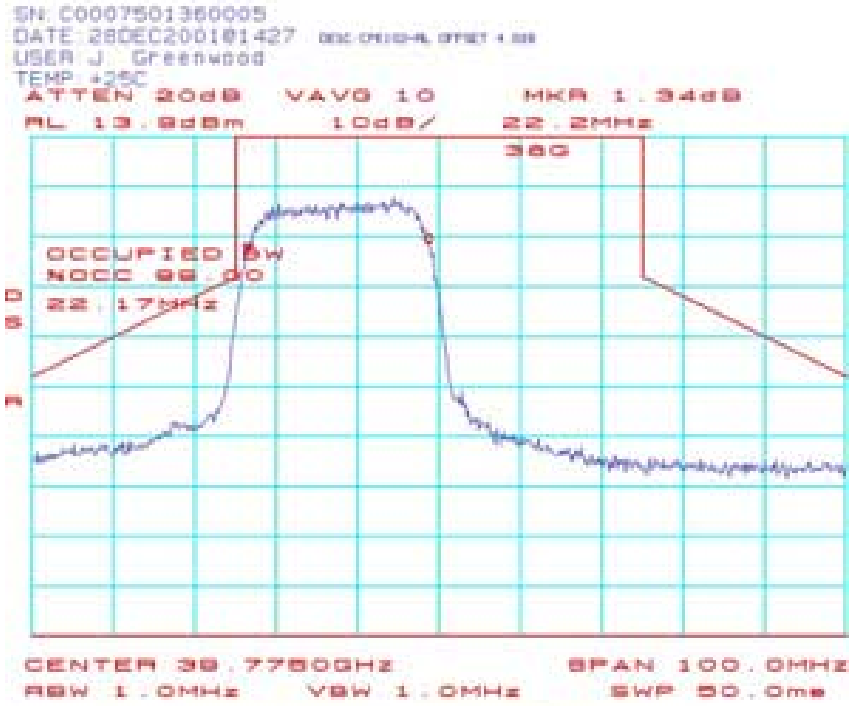
CPE098: Occupied Bandwidth (CPE-ODU) 39.7625 GHz QPSK:



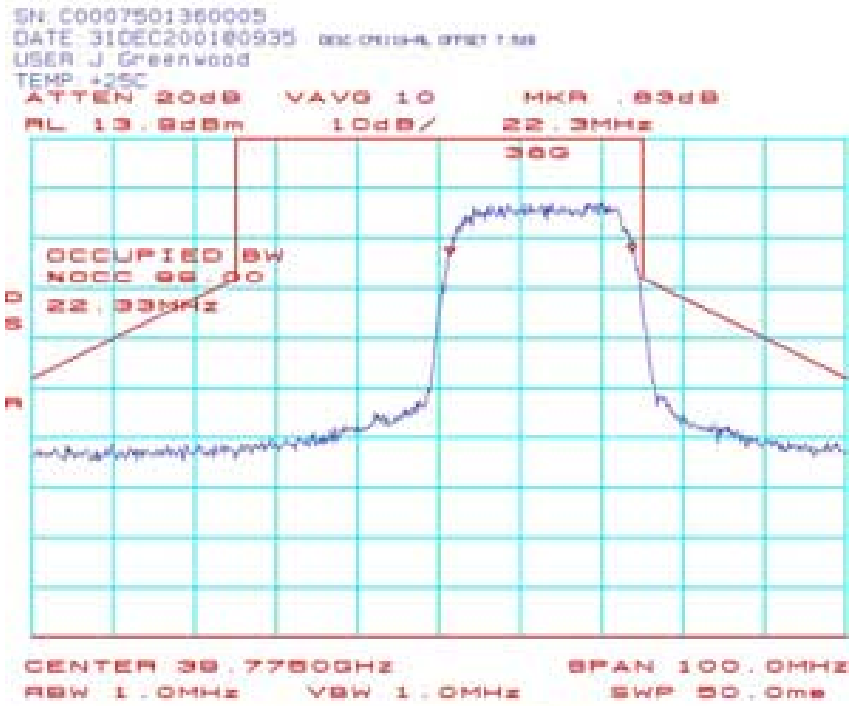
CPE115: Occupied Bandwidth (CPE-ODU) 39.7875 GHz QPSK:



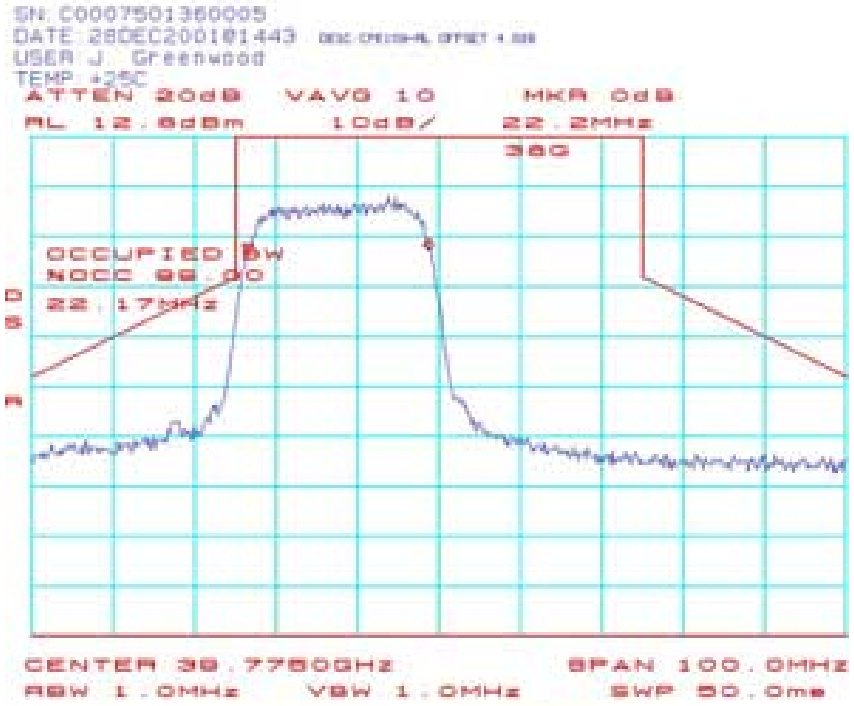
CPE102 Occupied Bandwidth (CPE-ODU) 39.7625 GHz 16QAM:



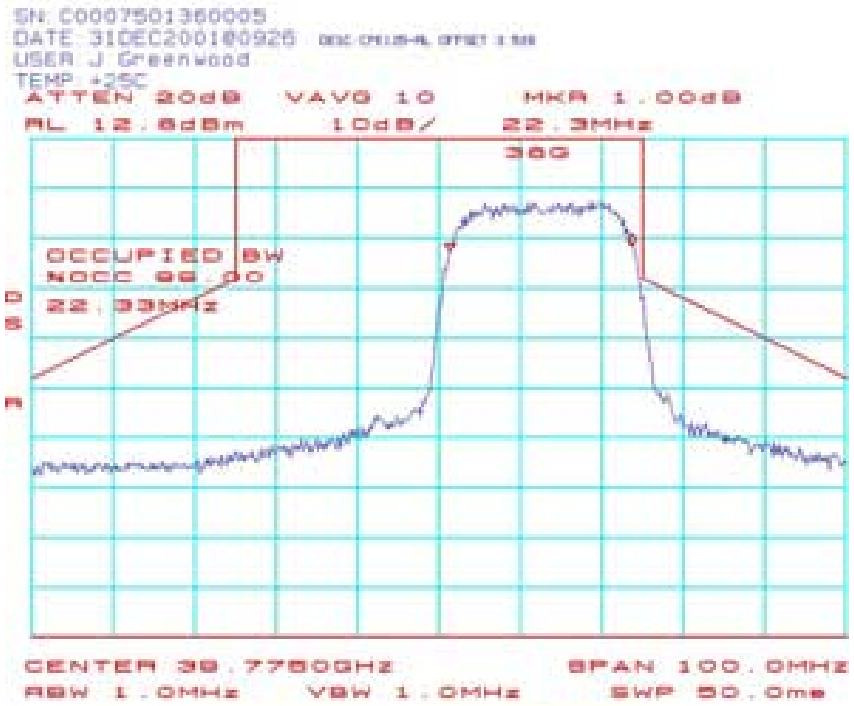
CPE119: Occupied Bandwidth (CPE-ODU) 39.7875 GHz 16QAM:



CPE109: Occupied Bandwidth (CPE-ODU) 39.7625 GHz 64QAM:



CPE125: Occupied Bandwidth (CPE-ODU) 39.7875 GHz 64QAM:



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