

EMC Test Report

Kingfisher 40W 1900MHz CDMA SCPA

Product # 100.0195.001
Unity Wireless Systems Corp.

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Report No.: 170506.1

Labs: 19473 Fraser Way, Pitt Meadows, BC, Canada V3Y 2V4



Bruce Balston
EMC Engineer



Andrew Marles
EMC Coordinator

Revision History

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1.0 General Information

1.1 EUT Description

Product Name	Kingfisher
Company Name	Unity Wireless Systems Corp.
FCC ID	TTK-100-0195-001
Model No.	100.0195.001
Frequency Range	1930-1990 MHz
Number of Channels	Extender
Type of Modulation	One CDMA 1X carrier
Antenna Gain	n/a
Product Software	n/a
Test Software	n/a
Operator Channel Selection	Base station
Power Adapter	Supplied by manufacturer

Product sample tested:

Manufacturer	Model No.	Serial No.
Unity Wireless Systems Corp	100.0195.001	05050884

The Kingfisher 40W 1900MHz CDMA SCPA is tuned for the frequency range of 1930-1990 MHz downlink. The product is only available in one configuration and is tuned at the factory to customer order.

The tests were performed on a production sample model to demonstrate compliance with FCC Parts 2 and 24.

1.2 Operational Description

The Kingfisher 40W SCPA is a compact high power amplifier (HPA) designed for single channel CDMA in the frequency range of 1930-1990MHz.

The amplifier is composed of an RF line-up and a function board. The RF line-up provides the necessary amplification of the input signal. The function board processes alarms, provides power supplies to the RF board and monitoring functions for the external user. The function board also provides for RF shut down in case of a major alarm condition. The SCPA requires forced-air cooling appropriate to the efficiency.

An additional feature of the Kingfisher is the special alarming function. When an alarm occurs and extends beyond 2 seconds, the HPA will be shut down automatically. The alarm functions included are over power alarm, VSWR alarm, device failure alarm, and over temperature alarm. To clear the alarm, the user must disable the HPA for 1 second, and then activate the enable command. This function is monitored by a micro-controller inside the HPA.

1.3 EUT Testing Configuration

Extensive pre-scanning for individual tests was performed to determine worst case. Data is presented for worst case measurements only.

The EUT was mounted to a custom non-metallic stand to ease polarization changes and to best represent a typical user installation.

The EUT was tested with the following modulation type: CDMA.

1.4 EUT Modifications

In order to meet the required limits for conducted spurious emissions, the EUT was tested as a system with the following duplexer:

Manufacturer: ATC Telecom Corporation
Model #: 2DP003A

The use of the duplexer is necessary for the final configuration of the unit. The manufacturer requires the use of this specific model of duplexer in all product installations, as specified in the product literature.

1.5 Overview of Test Results

FCC 2.1033(c)(3) User's Manual: The necessary information is contained in a separate document.

FCC 2.1033 (c)(4) Type of Emissions: F9W.

FCC 2.1033 (c)(5) Frequency Range: 1930-1990 MHz.

FCC 2.1033 (c)(6) Operating Power: 40 Watts.

FCC 2.1033 (c)(7) Maximum Power Rating: 1640 Watts.

FCC 2.1033 (c)(8) DC Voltages: The EUT has the following voltages:
-48 VCD nominal
-36 to -75 VCD operation range
Power consumption 350 W (max)

FCC 2.1033 (c)(9) Tune-up Procedure: The necessary information is contained in a separate document.

FCC 2.1033(c)(10) Schematics and Circuitry Description: The necessary information is contained in a separate document.

FCC 2.1033(c)(11) Label and Placement: The necessary information is contained in a separate document.

FCC 2.1033(c)(12) Submittal Photos: The necessary information is contained in a separate document.

FCC 2.1033 (c)(13) Modulation Information: Extender.

1.6 Test Facilities

Tranzeo EMC Labs
19473 Fraser Way
Pitt Meadows, BC V3Y 2V4
Canada

Phone: (604) 460-6002
Fax: (604) 460-6005

FCC registration number: 960532
Industry Canada Number: 5238A

1.7 Test Equipment

Manufacturer	Model	Description	Serial No.	Cal Due Date
Sunol Sciences	SM46C	Turntable	051204-2	N/R
Sunol Sciences	Custom	Mast motor	TREML0001	N/R
Sunol Sciences	JB3	Antenna	A042004	29-May-06
Sunol Sciences	DRH-118	Antenna	A052804	02-Jun-06
FCC	FCC-LISN-50-25-2	LISN	105	02-Jun-06
Rohde & Schwarz	FSP40	Spectrum analyzer	100184	24-Aug-06
Rohde & Schwarz	NRP	Power meter	100055	02-Aug-06
Rohde & Schwarz	ESCI	EMI Receiver	100123	23-Aug-06

1.8 Test System Details

The following auxiliary equipment and cables were used for performing the tests:

Manufacturer	Model	Description	Serial No.
Rohde & Schwarz	SMJ100A	Vector signal generator	100151
ATC Telecom Corporation	2DP003A	Duplexer	Sample001

1.9 Test Results

The Kingfisher 40W SCPA complies with FCC Part 24.

2.0 RF Output Power

2.1 Test Standard

FCC Part 24.

§ 24.232 Power and antenna height limits.

(a) Base stations are limited to 1640 watts peak equivalent isotropically radiated power (EIRP) with an antenna height up to 300 meters HAAT, except as described in paragraph (b) below. See §24.53 for HAAT calculation method. Base station antenna heights may exceed 300 meters with a corresponding reduction in power; see Table 1 of this section. The service area boundary limit and microwave protection criteria specified in §§24.236 and 24.237 apply. †

The manufacturer does not provide an antenna for sale with the EUT, therefore EIRP is not measured nor calculated. Since the unit will only be used in a professional installation, the end-user of this product is to exercise proper engineering judgment to ensure the EIRP limits are met.

The RF power of the EUT was measured at the antenna port with a modulated carrier.

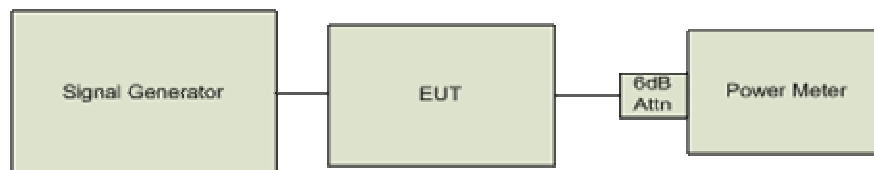
2.2 Test Limits

The ERP may not exceed 500 Watts.

2.3 Test Setup

The input of the EUT is connected to the digital signal generator and the output connected through a suitable attenuator to the measurement equipment.

2.3.1 Test Setup Block Diagram



2.4 Test Results

Freq (MHz)	Meas Rdg (dBm)	Limit (dBm)	Margin (dB)	Result
1931	45.92	62.15	-15.53	PASS
1960	46.05	62.15	-15.40	PASS
1988	45.50	62.15	-15.95	PASS

3.0 Transmitter Radiated Spurious Emissions

3.1 Test Standard

FCC Part 24.238

1 (a) Out of band emissions. The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least $43 + 10 \log(P)$ dB. 1

3.2 Test Limits

Required attenuation = $43 + 10 \log P$ dB

Conducted limit = -13 dBm

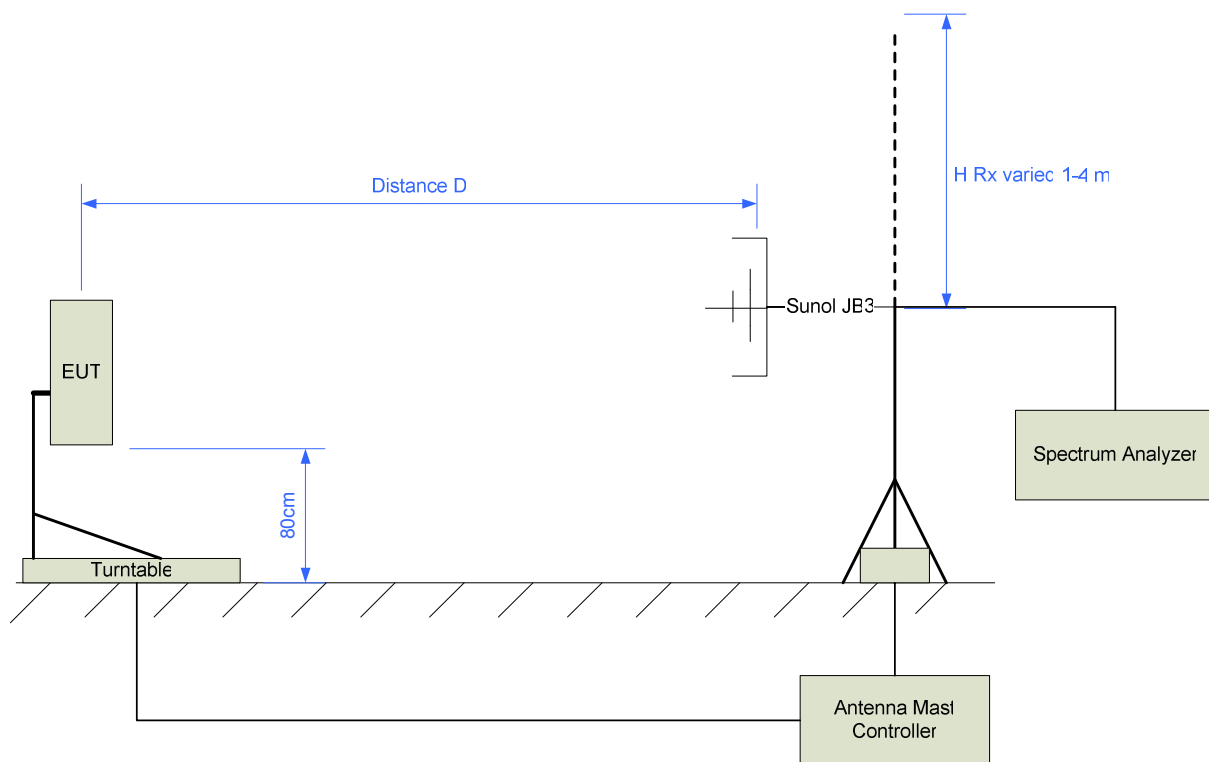
Radiated limit = 84.5 dBuV

3.3 Test Setup

The unit was prescanned to determine worst case. The EUT was exercised with CDMA modulation. The output of the transmitter was connected to 1 m of cable and terminated with a 50 ohms load. Emissions were measured from 30 MHz to 10 GHz. The EUT was rotated 360 degrees and the receive antenna swept from 1 m to 4 m to determine the maximum emissions level. The measurement distance was 3 m. Only the data taken from the worst case is shown below.

Measurements above 1 GHz were taken with RBW, VBW = 1 MHz.

3.3.1 Test Setup Block Diagram



Note: Measurements below 1 GHz were performed with the Sunol JB3 antenna. Measurements above 1 GHz were performed with the Com-Power AHA-118 antenna. The measurement distance was 3 m.

3.4 Test Results

3.4.1 Below 1 GHz

No signals were found below 1 GHz within 20 dB of limit. Signals within 20 dB of limit were investigated and determined to be ambient.

3.4.2 Above 1 GHz

Frequency (Mhz)	Corr Rdg (dBm)	Limit (dBm)	Margin (dB)	Polarization	Rtype	Result
5796.768	-24.97	-13	-11.97	Vert	Peak	Pass
5796.768	-27.28	-13	-14.28	Horiz	Peak	Pass
3864.363	-13.4	-13	-0.4	Horiz	Peak	Pass
3864.363	-15.7	-13	-2.7	Vert	Peak	Pass

4.0 Transmitter Conducted Harmonic and Spurious Emissions

4.1 Test Standard

FCC Part 24.238

1 (a) Out of band emissions. The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least $43 + 10 \log(P)$ dB. 1

4.2 Test Limits

Required attenuation = $43 + 10 \log P$ dB

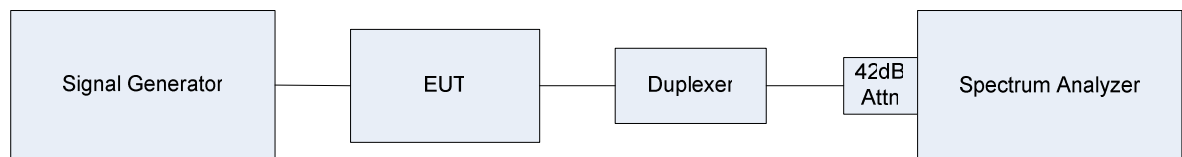
Conducted limit = -13 dBm

Radiated limit = 84.5 dBuV

4.3 Test Setup

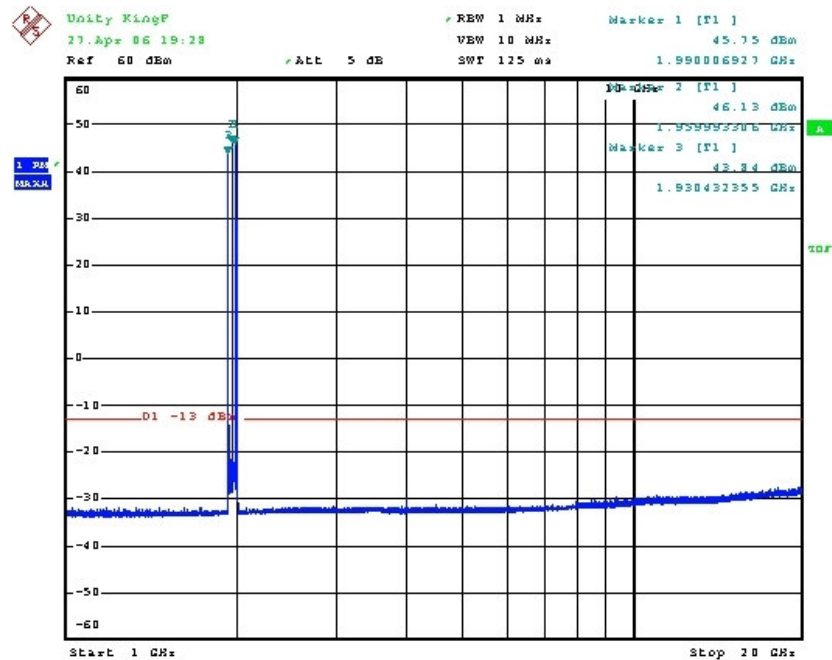
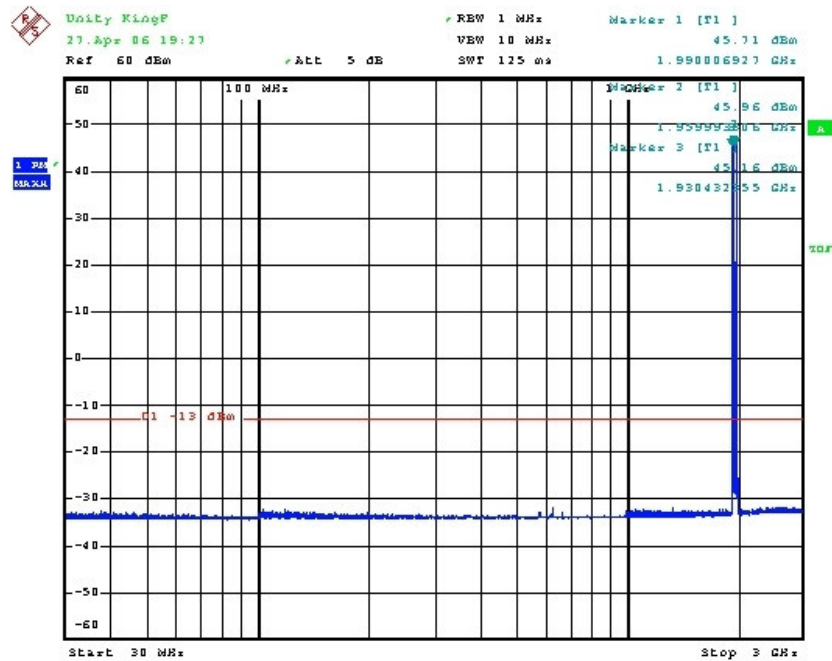
The input of the EUT is connected to the digital signal generator and the output connected through a suitable attenuator to the measurement equipment. Only worst case measurements are shown below.

4.3.1 Test Setup Block Diagram – Conducted Measurements (Harmonics)



4.4 Test Results

No conducted spurious emissions were detected.



5.0 Band Edge

5.1 Test Standard

FCC Part 24.238

|(a) Out of band emissions. The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least $43 + 10 \log(P)$ dB. |

5.2 Test Limits

Required attenuation = $43 + 10 \log P$ dB

Conducted limit = -13 dBm

Radiated limit = 84.5 dBuV

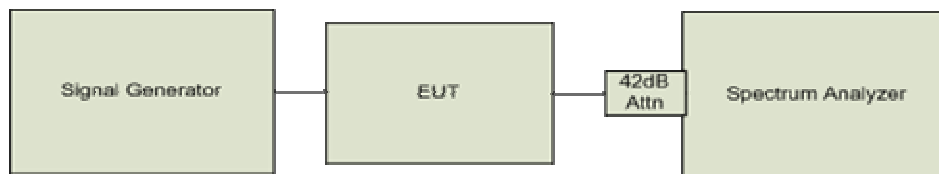
5.3 Test Setup

The input of the EUT is connected to the digital signal generator and the output connected through a suitable attenuator to the measurement equipment.

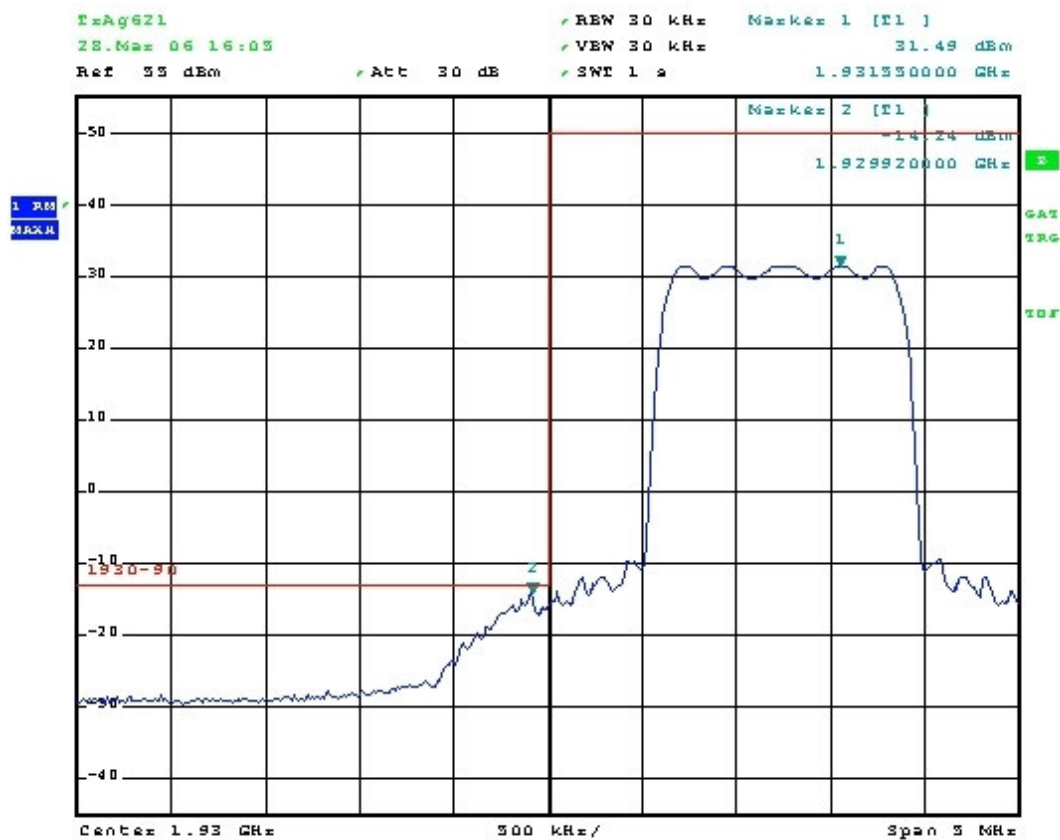
CDMA measurements are shown below.

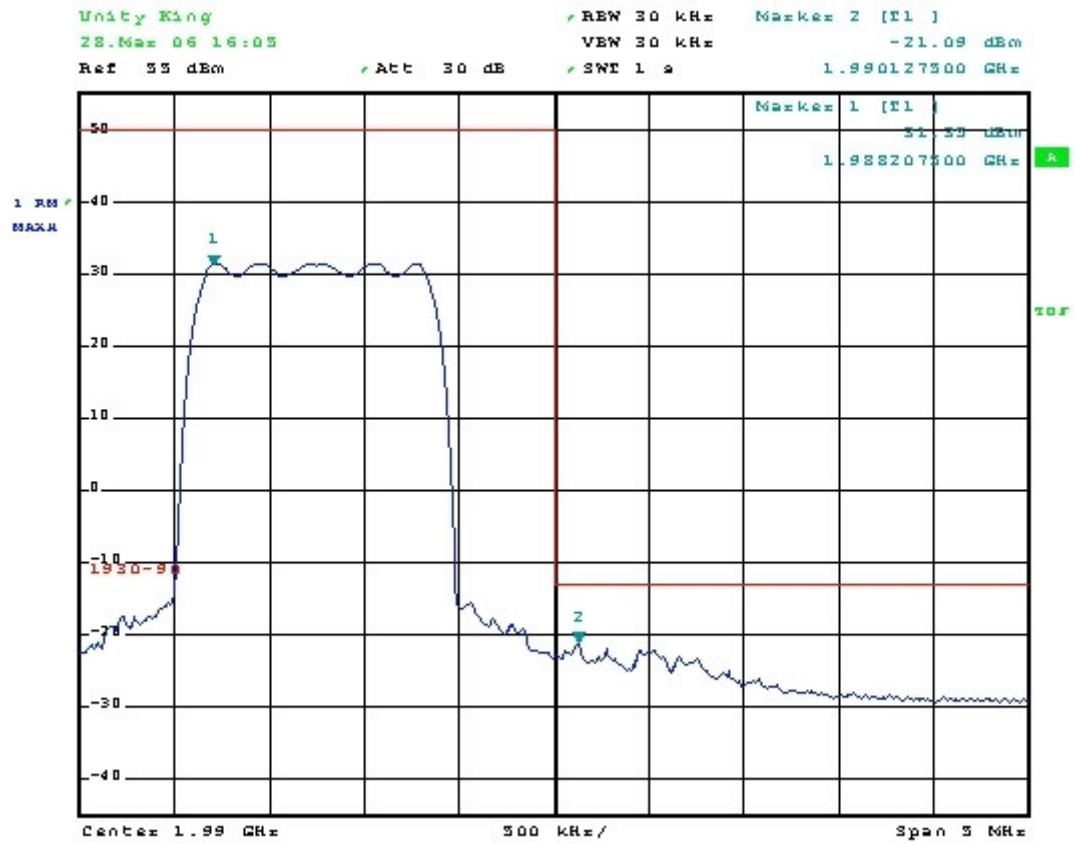
5.3.1 Test Setup Block Diagram

Conducted Setup



5.4 Test Results





Spurious emissions are below -13 dBm.

6.0 Occupied Bandwidth/Linearity

6.1 Test Standard

FCC Part 24.238

1 (a) Out of band emissions. The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least $43 + 10 \log(P)$ dB. 1

6.2 Test Limits

Required attenuation = $43 + 10 \log P$ dB

Conducted limit = -13 dBm

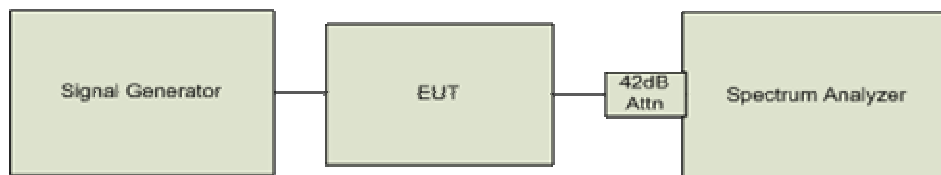
Radiated limit = 84.5 dBuV

6.3 Test Setup

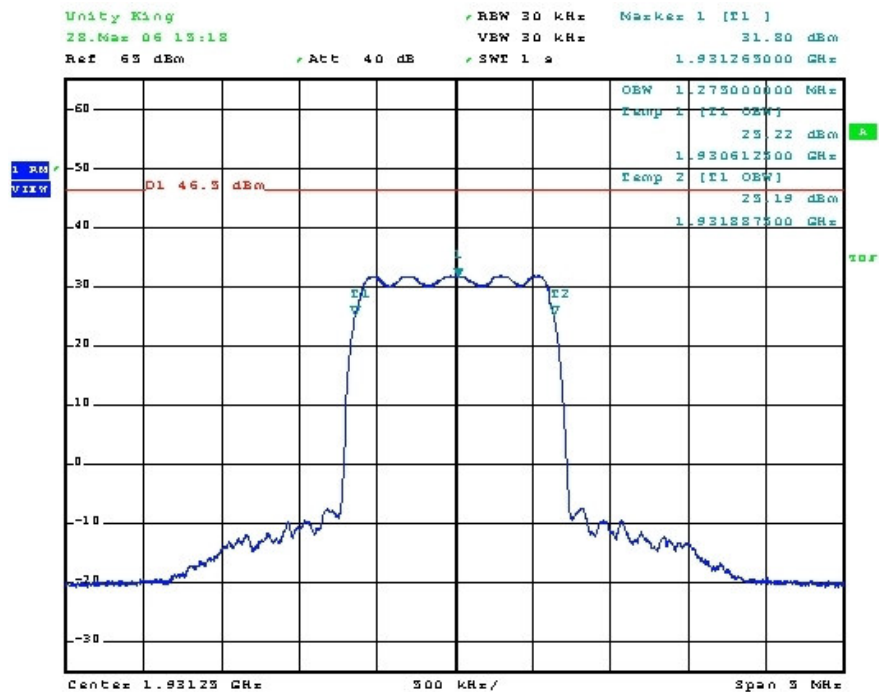
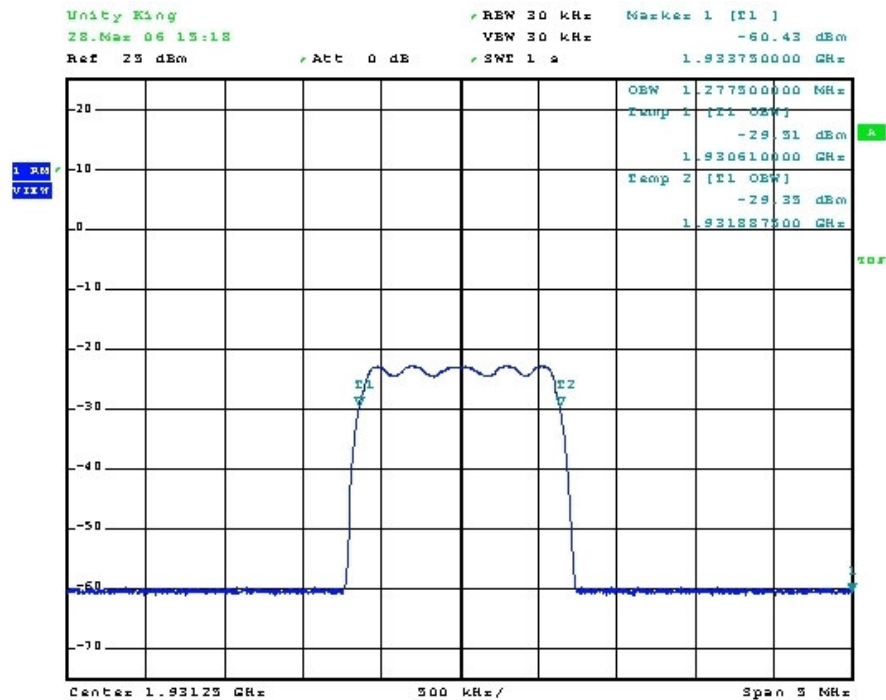
The input of the EUT is connected to the digital signal generator and the output connected through a suitable attenuator to the measurement equipment.

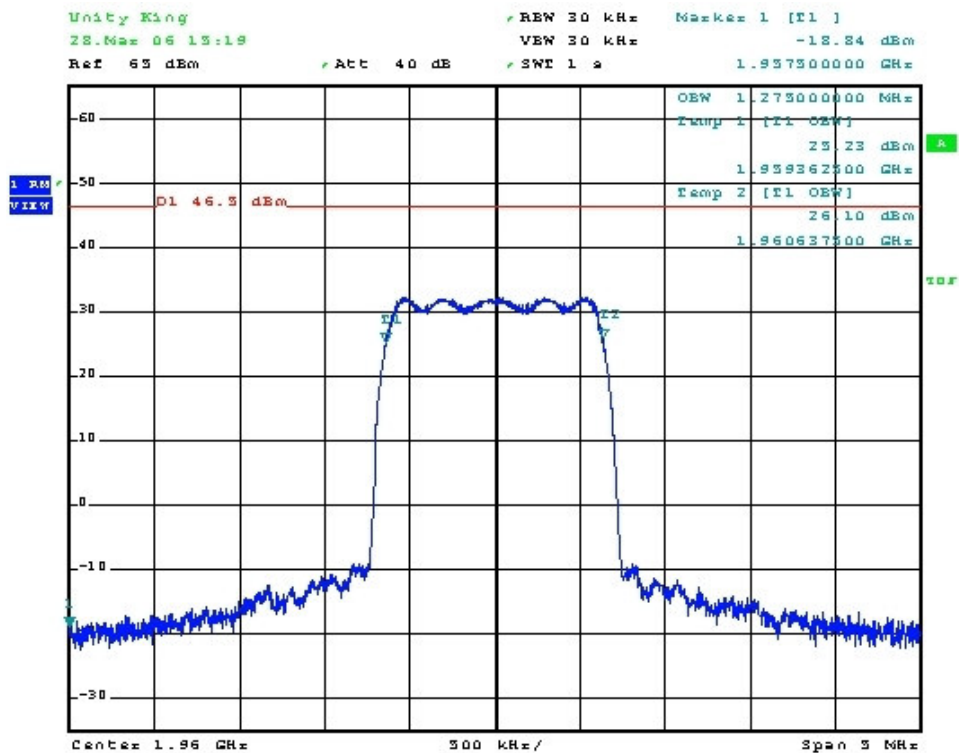
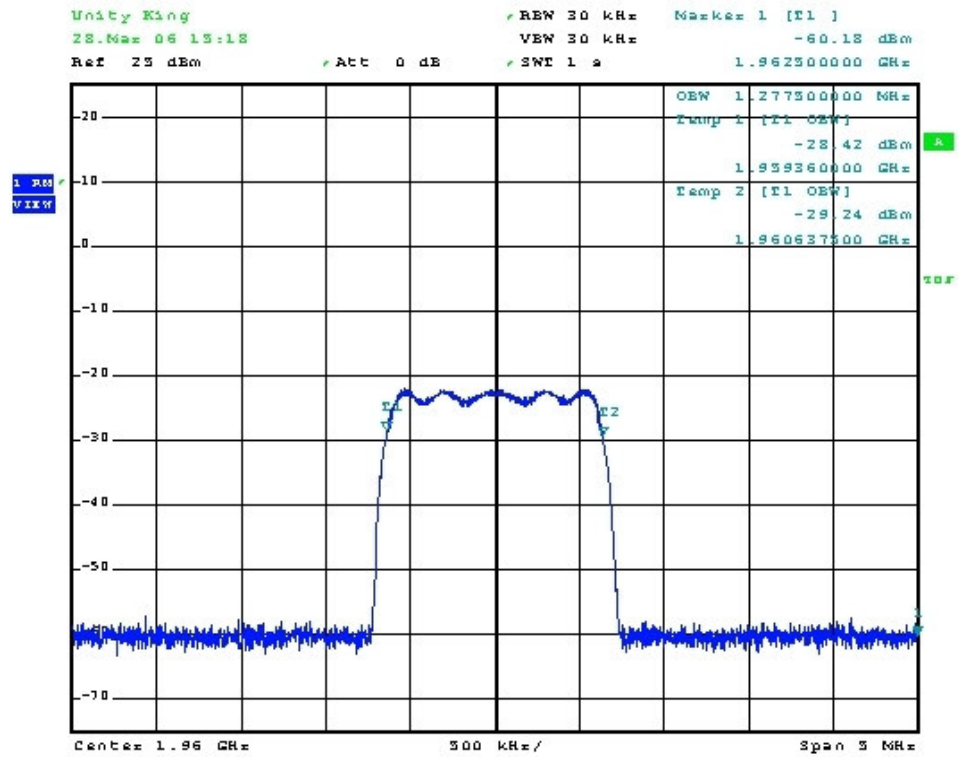
The occupied bandwidth was measured by comparison of the input signal to the output signal. This was done in order to determine if there was any degradation in the output signal due to amplification. Testing was performed on low, middle and high channels.

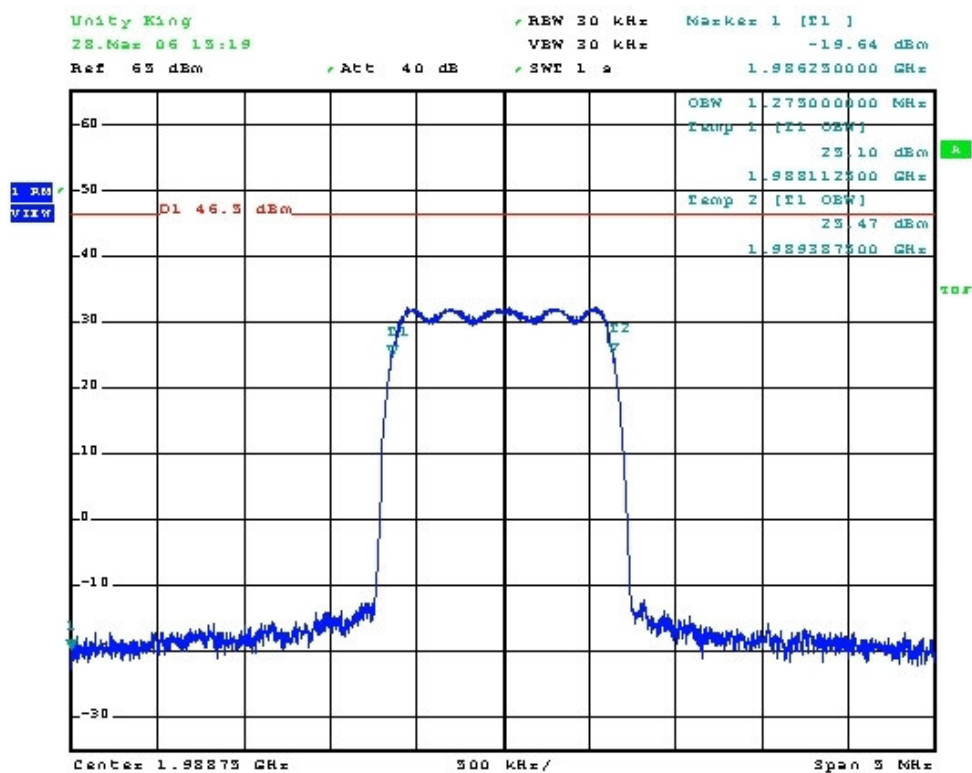
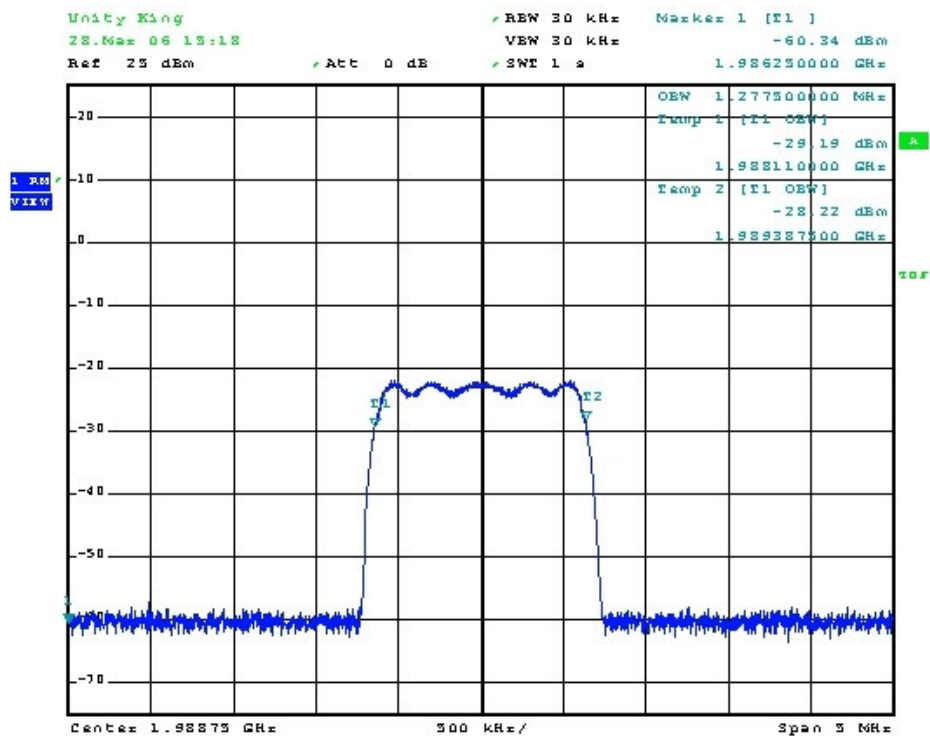
6.3.1 Test Setup Block Diagram



6.4 Test Results







7.0 Test Photos

