FCC CFR47 PART 90, SUBPART I
CERTIFICATION TEST REPORT

FOR

RF POWER AMPLIFIER

MODEL NUMBER: PA1-1AEL

FCC ID: BBD1-1AEL

REPORT NUMBER: 07U10911-1

ISSUE DATE: MARCH 25, 2007

Prepared for
TPL COMMUNICATION
3370 SAN FERNANDO ROAD, SUITE 206
LOS ANGELES, CA 90065, USA

Prepared by
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NVLAP LAB CODE 200065-0

Revision History

Rev.	Issue Date	Revisions	Revised By
---	03/25/07	Initial Issue	T. Chan

TABLE OF CONTENTS

1. ATTESTATION OF TEST RESULTS

COMPANY NAME: TPL COMMUNICATION
3370 SAN FERNANDO ROAD, SUITE 206
LOS ANGELES, CA 90065 USA

EUT DESCRIPTION: RF POWER AMPLIFIER, 29.7 to 36MHz

MODEL: PA1-1AEL

SERIAL NUMBER: 1888

DATE TESTED: MARCH 16-17, 2007

APPLICABLE STANDARDS	
STANDARD	**TEST RESULTS**
FCC PART 90 SUBPART I	NO NON-COMPLIANCE NOTED

Compliance Certification Services, Inc. tested the above equipment in accordance with the requirements set forth in the above standards. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.

Note: The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein. This document may not be altered or revised in any way unless done so by Compliance Certification Services and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by Compliance Certification Services will constitute fraud and shall nullify the document. No part of this report may be used to claim product certification, approval, or endorsement by NVLAP, NIST, or any government agency.

Approved & Released For CCS By:

THU CHAN
EMC SUPERVISOR
COMPLIANCE CERTIFICATION SERVICES

Tested By:

CHIN PANG
EMC ENGINEER
COMPLIANCE CERTIFICATION SERVICES

2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with TIA/EIA 603C (2004), FCC CFR 47 Part 2, and FCC CFR 47 Part 90.

3. FACILITIES AND ACCREDITATION

The test sites and measurement facilities used to collect data are located at 47173 Benicia Street, Fremont, California, USA. The sites are constructed in conformance with the requirements of ANSI C63.4, ANSI C63.7 and CISPR Publication 22. All receiving equipment conforms to CISPR Publication 16-1, "Radio Interference Measuring Apparatus and Measurement Methods."

CCS is accredited by NVLAP, Laboratory Code 200065-0. The full scope of accreditation can be viewed at http://www.ccsemc.com.

4. CALIBRATION AND UNCERTAINTY

4.1. MEASURING INSTRUMENT CALIBRATION

The measuring equipment utilized to perform the tests documented in this report has been calibrated in accordance with the manufacturer's recommendations, and is traceable to recognized national standards.

4.2. MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the apparatus:

PARAMETER	UNCERTAINTY
Radiated Emission, 30 to 200 MHz	+/- 3.3 dB
Radiated Emission, 200 to 1000 MHz	+4.5 / -2.9 dB
Radiated Emission, 1000 to 2000 MHz	+4.5 / -2.9 dB
Power Line Conducted Emission	+/- 2.9 dB

Uncertainty figures are valid to a confidence level of 95%.

5. EQUIPMENT UNDER TEST

5.1. DESCRIPTION OF EUT

The EUT is a RF Power Amplifier, the operation frequency range is: 29.7-36 MHz, 110 Watt.
The radio module is manufactured by TPL Communications.

5.2. MAXIMUM OUTPUT POWER

The transmitter has a maximum conducted output power as follows:

Frequency Range (MHz)	Modulation	Conducted Output Power (dBm)	Conducted Output Power (W)
29.7-36	CW	50.38	109.1

5.3. WORST-CASE CONFIGURATION AND MODE

The worst-case channel is determined as the channel with the highest output power. The highest measured output power was at 32.85MHz mid channel.

5.4. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

PERIPHERAL SUPPORT EQUIPMENT LIST				
Description	**Manufacturer**	**Model**	**Serial Number**	**Cal Due**
500 Watt 50 Ohm Terminator	Bird Electronic Corp	8201	13288	NA
Signal Generator, 1024 MHz	R & S	SMY01	839957/011	12/12/07
DC Power Supply	Innovative Circuit Technology	ICT22012-30A/TP	30A532186	NA
Power Amplifier	Amplifier Research	75A250	303332	NA
Directional Coupler 500W 40dB	Werlatone	C6021	8576	CNR

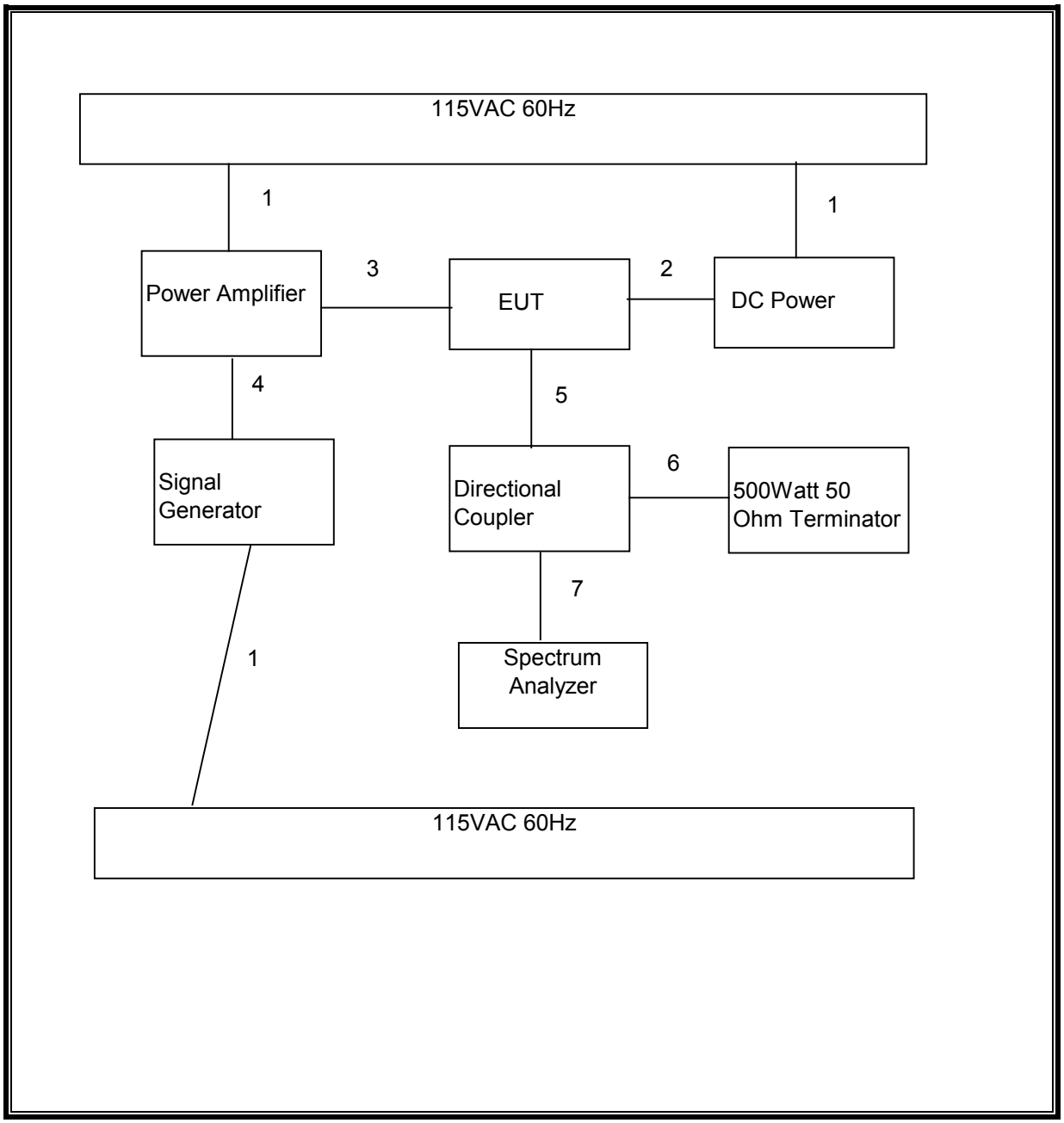
I/O CABLES

I/O CABLE LIST						
Cable No.	**Port**	**# of Identical Ports**	**Connector Type**	**Cable Type**	**Cable Length**	**Remarks**
1	AC	2	US 115V	Un-shielded	2m	N/A
2	DC	1	DC	Un-shielded	2m	N/A
3 to 7	RF In/Out	5	N-Type Connector	Shielded	1m	N/A

TEST SETUP

The EUT is a stand-alone device. The input was given by signal generator as the source modulations of CW and FM during the tests.

SETUP DIAGRAM FOR TESTS



6. TEST AND MEASUREMENT EQUIPMENT

The following test and measurement equipment was utilized for the tests documented in this report:

TEST EQUIPMENT LIST				
Description	**Manufacturer**	**Model**	**Serial Number**	**Cal Due**
Signal Generator, 1024 MHz	R & S	SMY01	839957/011	12/12/2007
Spectrum Analyzer 3 Hz ~ 44 GHz	Agilent / HP	E4446A	US42070220	7/29/2007
Antenna, Horn 1 ~ 18 GHz	ETS	3117	29310	4/22/2007
Antenna, Bilog 30 MHz ~ 2 Ghz	Sunol Sciences	JB1	A0022704	9/3/2007
Preamplifier, 1300 MHz	Agilent / HP	8447D	1937A02062	1/23/2008
SA RF Section, 1.5 GHz	Agilent / HP	85680B	2814A04227	1/7/2008
Quasi-Peak Adaptor	Agilent / HP	85650A	3145A01654	1/21/2008
SA Display Section 2	Agilent / HP	85662A	2816A16696	4/7/2008

7. LIMITS AND RESULTS

7.1. OCCUPIED BANDWIDTH

LIMIT

None: for reporting purposes only.

TEST PROCEDURE

Measurements were made with the modulating signal at 2.5 KHz with 5 KHz of FM deviation. The transmitter output is connected to a spectrum analyzer. The RBW is set to 1% to 3% of the 26 dB bandwidth. The VBW is set to 3 times the RBW. The sweep time is coupled.

RESULTS

No non-compliance noted:

FM Modulation - Input

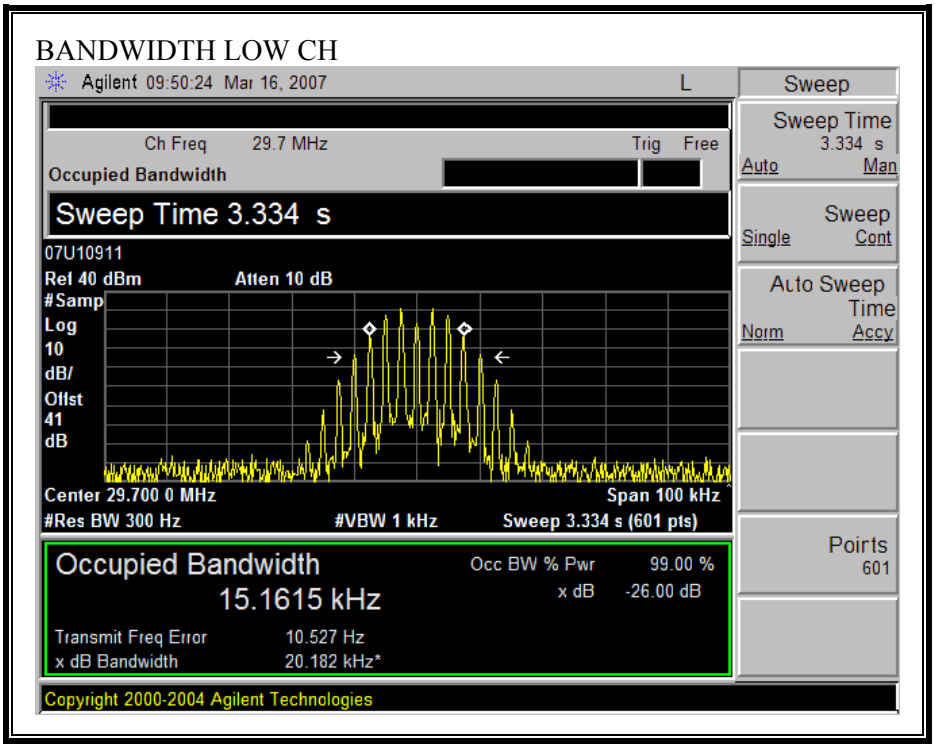
Channel	Frequency (MHz)	99% BW (KHz)	26dBc BW (KHz)
Low	29.7	15.162	20.182
Middle	32.85	15.163	20.182
High	36	15.165	20.180

FM Modulation - Output

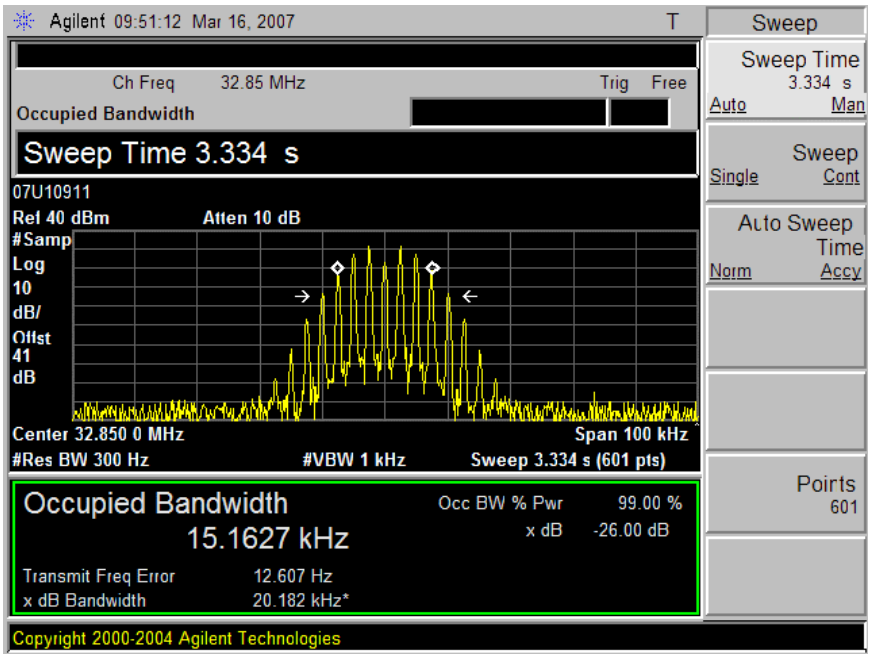
Channel	Frequency (MHz)	99% BW (KHz)	26dBc BW (KHz)
Low	29.7	15.163	20.185
Middle	32.85	15.163	20.182
High	36	15.165	20.181

FM 26 dB BANDWIDTH - INPUT

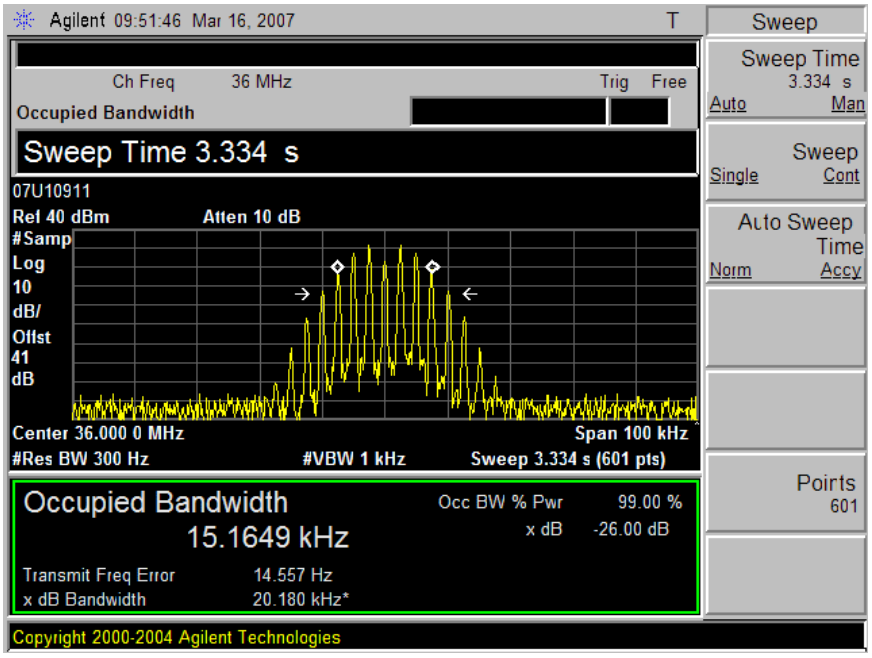
BANDWIDTH LOW CH



BANDWIDTH MID CH

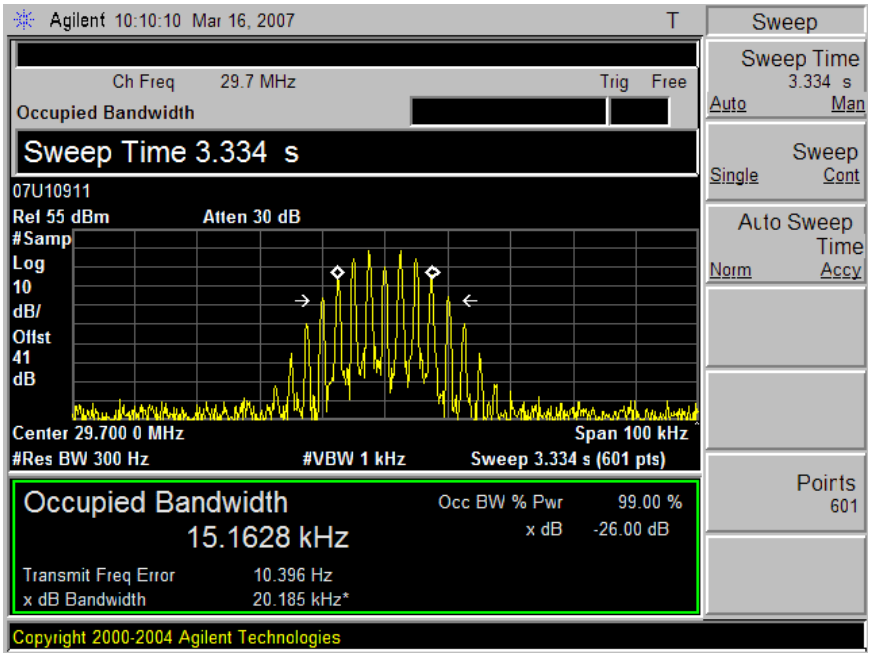


BANDWIDTH HIGH CH

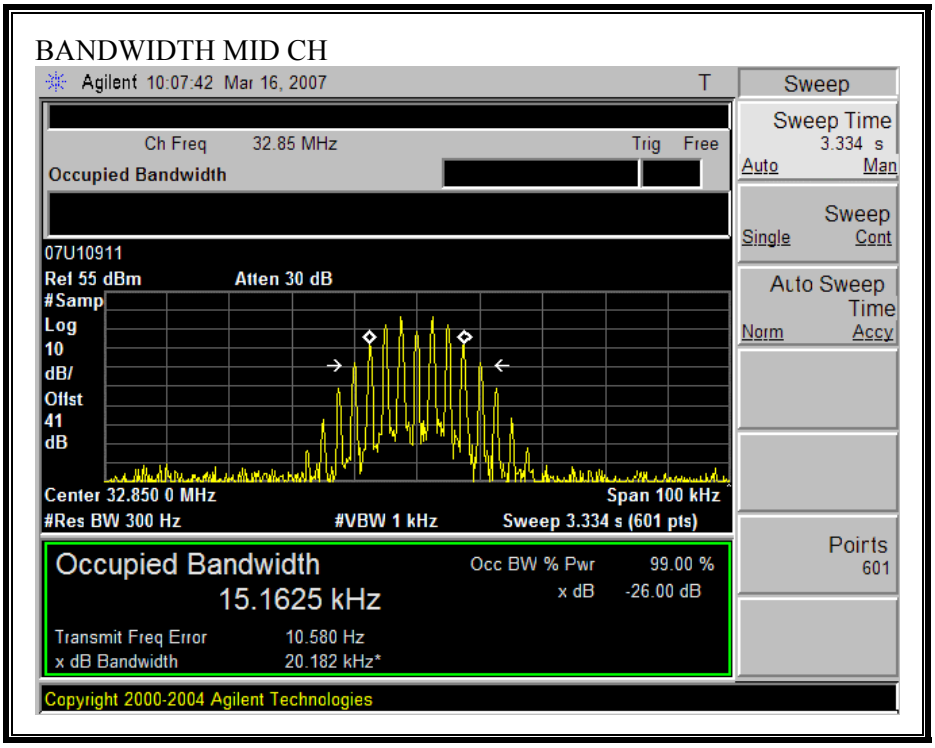


FM 26 dB BANDWIDTH -OUTPUT

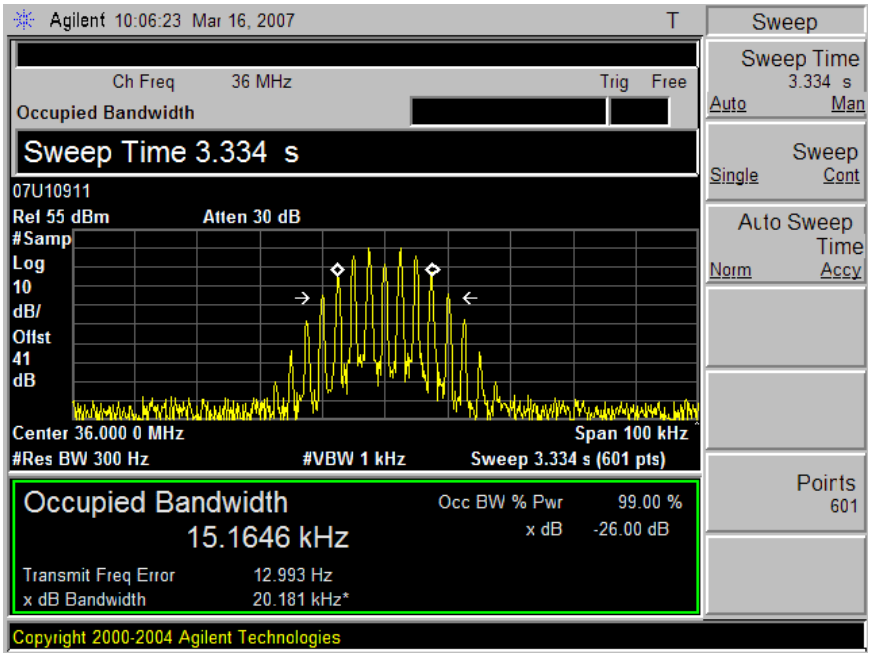
BANDWIDTH LOW CH



BANDWIDTH MID CH



BANDWIDTH HIGH CH



7.2. FM EMISSION LIMITATION

LIMIT

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§90.210(c):
For transmitters that are not equipped with an audio low-pass filter, the power of any emission must be attenuated below the unmodulated carrier power (P) as follows:
(1) On any frequency removed from the center of the authorized bandwidth by a displacement frequency (fd in kHz) of more than 5 kHz, but no more than 10 kHz: At least 83 log (fd/5) dB;
(2) On any frequency removed from the center of the authorized bandwidth by a displacement frequency (fd in kHz) of more than 10 kHz, but not more than 250 percent of the authorized bandwidth: At least 29 log (fd 2/11) dB or 50 dB, whichever is the lesser attenuation;
(3) On any frequency removed from the center of the authorized bandwidth by more than 250 percent of the authorized bandwidth: At least 43 + 10 log (P) dB.

TEST PROCEDURE

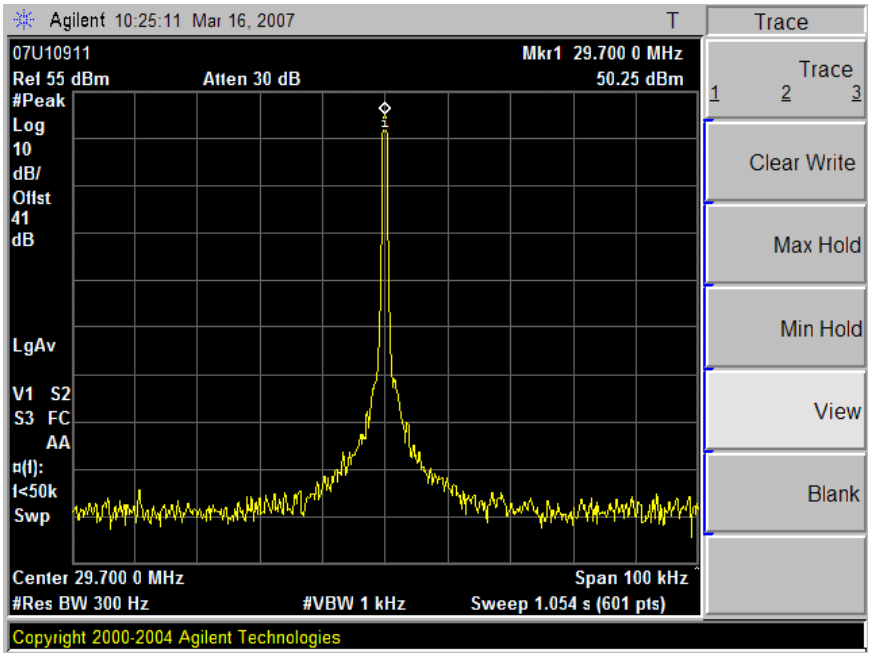
ANSI / TIA / EIA 603 Clause 3.2.11

RESULTS

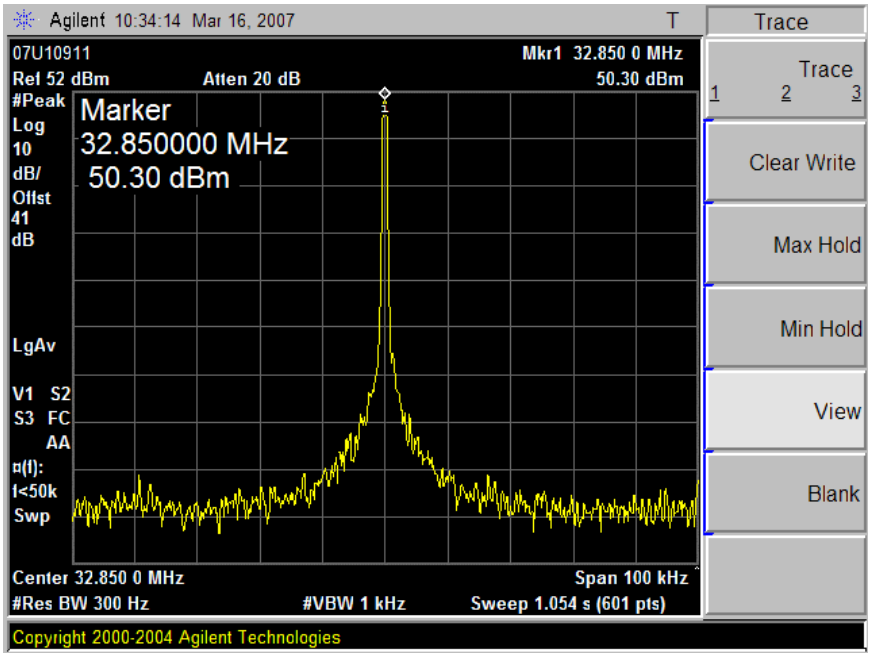
No non-compliance noted:

Un-modulated Signal:

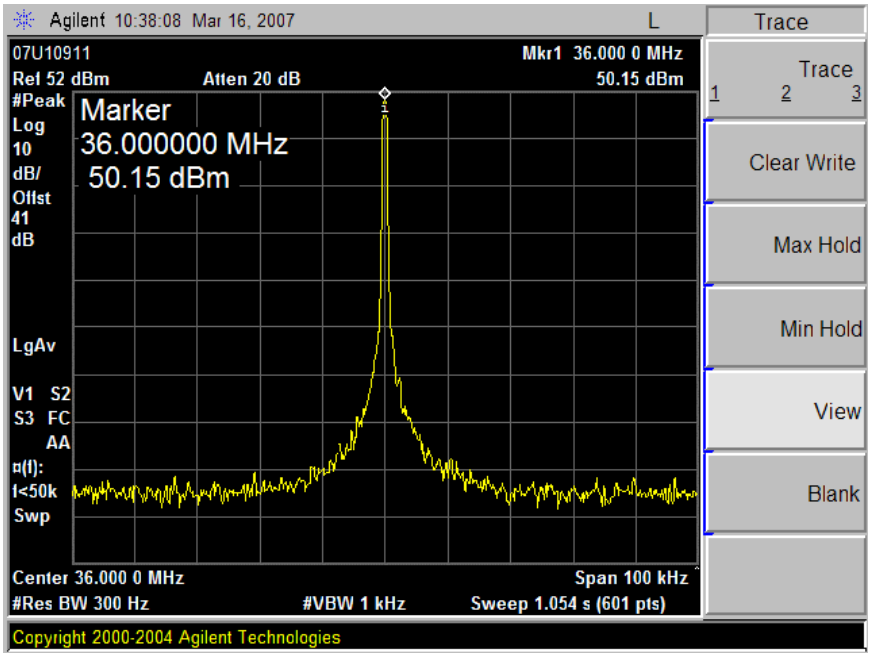
UNMODULATED LOW CH



UNMODULATED MID CH

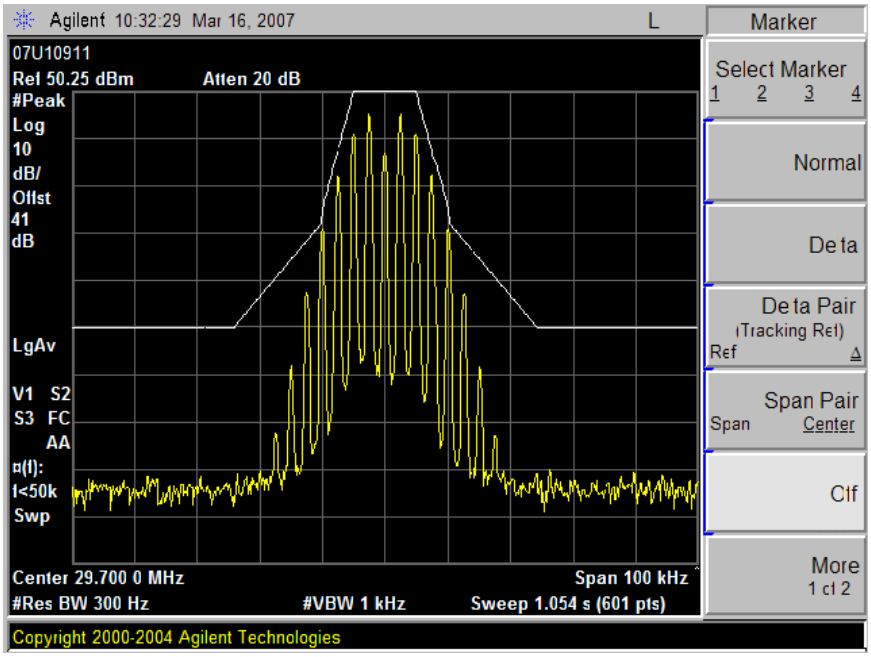


UNMODULATED HIGH CH

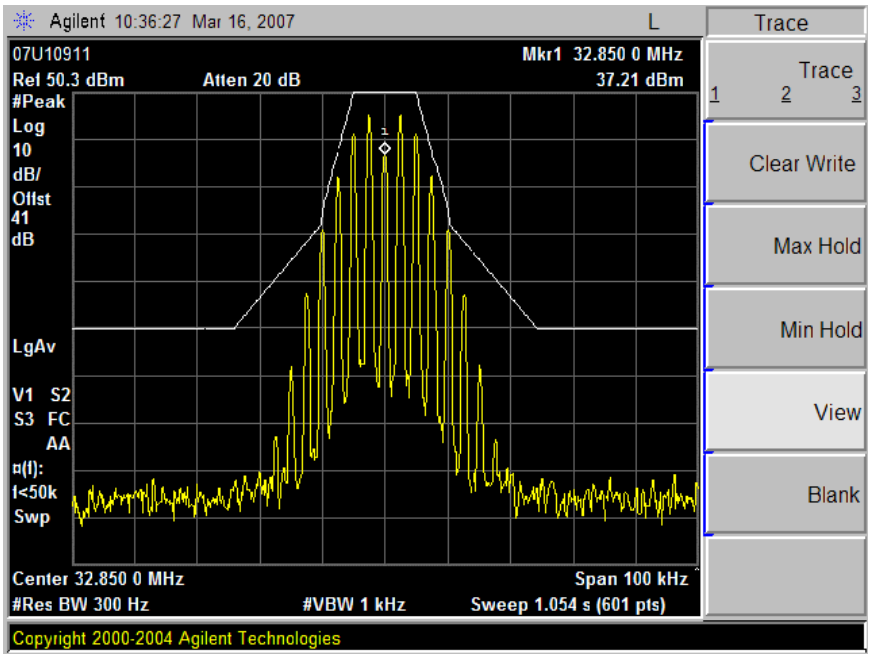


FM EMISSIONS MASK

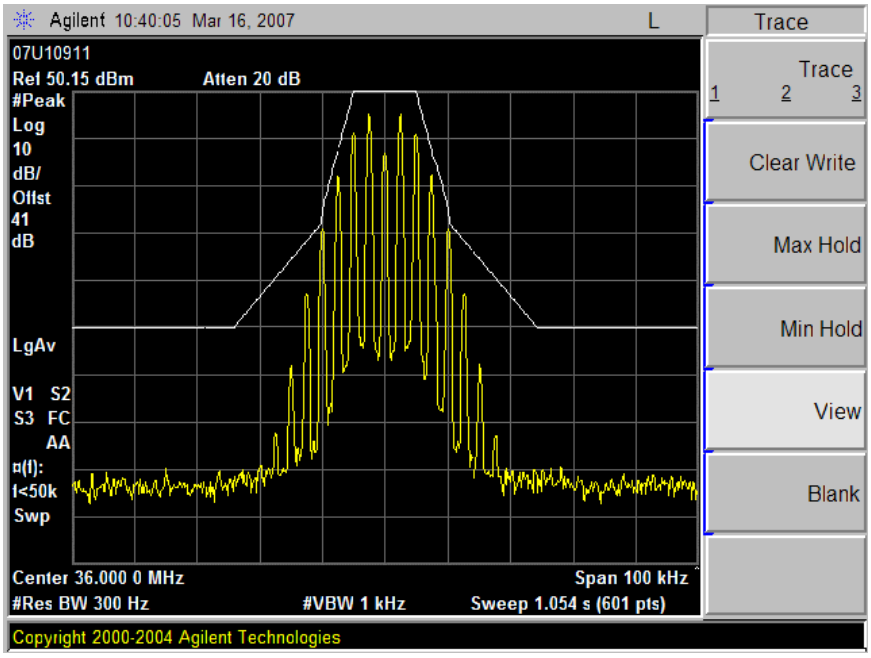
EMISSIONS MASK LOW CH



EMISSIONS MASK MID CH



EMISSIONS MASK HIGH CH



7.3. MODULATION CHARACTERISTICS

Not Applicable. Due to this EUT is a power amplifier and has no Mix circuitry to modulate the RF signal.

7.4. RF POWER OUTPUT

LIMIT

FCC part 90: The Maximum ERP transmitter power will be considered and authorized on a case-by-case basis. Please refer to the limitations on power and antenna heights are specified in §90.205, §90.279, and §90.309.

FCC part 90: (b) 25–50 MHz. The maximum transmitter output power is 300 watts.

TEST PROCEDURE

ANSI / TIA / EIA 603 Clause 3.2.1

RESULTS

No non-compliance noted.

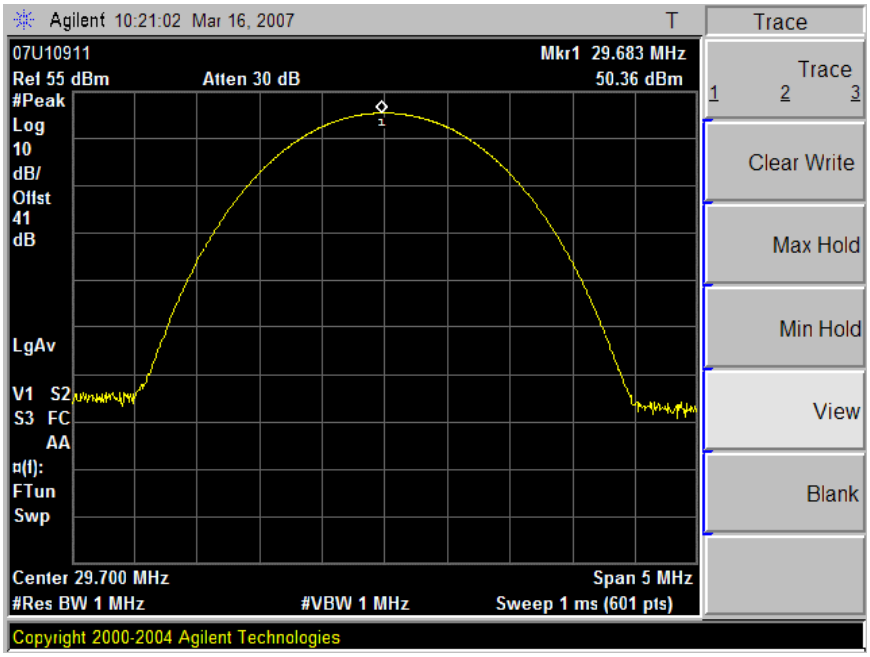
Conducted Output Power

CW Output Power

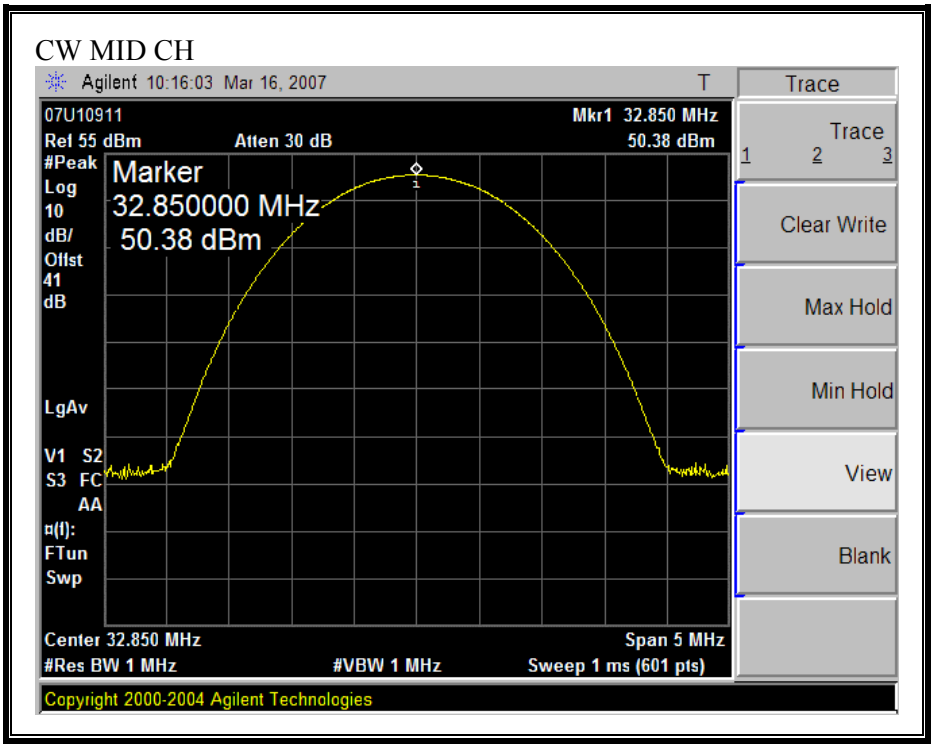
Channel	Frequency (MHz)	Output Power (dBm)	Output Power (W)
Low	29.7	50.36	108.64
Mid	32.85	50.38	109.14
High	36	50.24	105.68

Conducted Output Power

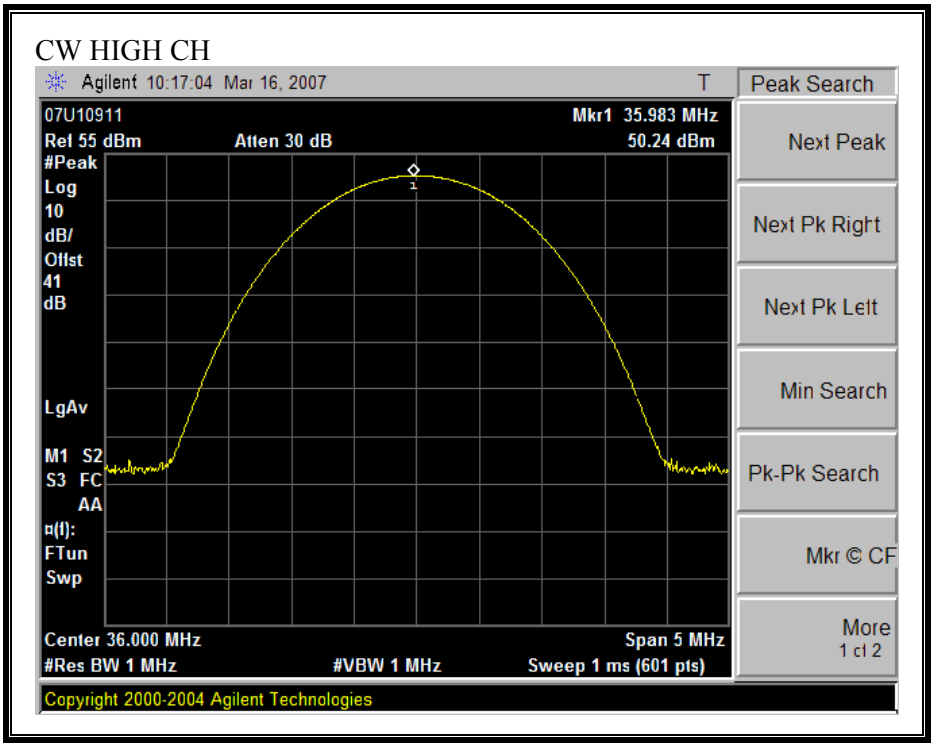
CW LOW CH



CW MID CH



CW HIGH CH



7.5. VOLTAGE STABILITY

LIMIT

FCC part 90: The Maximum ERP transmitter power will be considered and authorized on a case-by-case basis. Please refer to the limitations on power and antenna heights are specified in §90.205, §90.279, and §90.309.

TEST PROCEDURE

ANSI / TIA / EIA 603 Clause 3.2.1

Conducted Output Power vs Voltage

CW Output Power vs Voltage

Channel Frequency (MHz)	Output Power at DC Normal Voltage 13.8		Output Power at 85% Voltage 11.73		Output Power at 115% Voltage 15.87	
	dBm	Watt	dBm	Watt	dBm	Watt
29.7	50.36	108.64	49.27	84.53	51.15	130.32
32.85	50.38	109.14	49.84	96.38	50.55	113.50
36	50.24	105.68	50.20	104.71	50.26	106.17

7.6. SPURIOUS EMISSION AT ANTENNA TERMINAL

LIMIT

§90.210 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

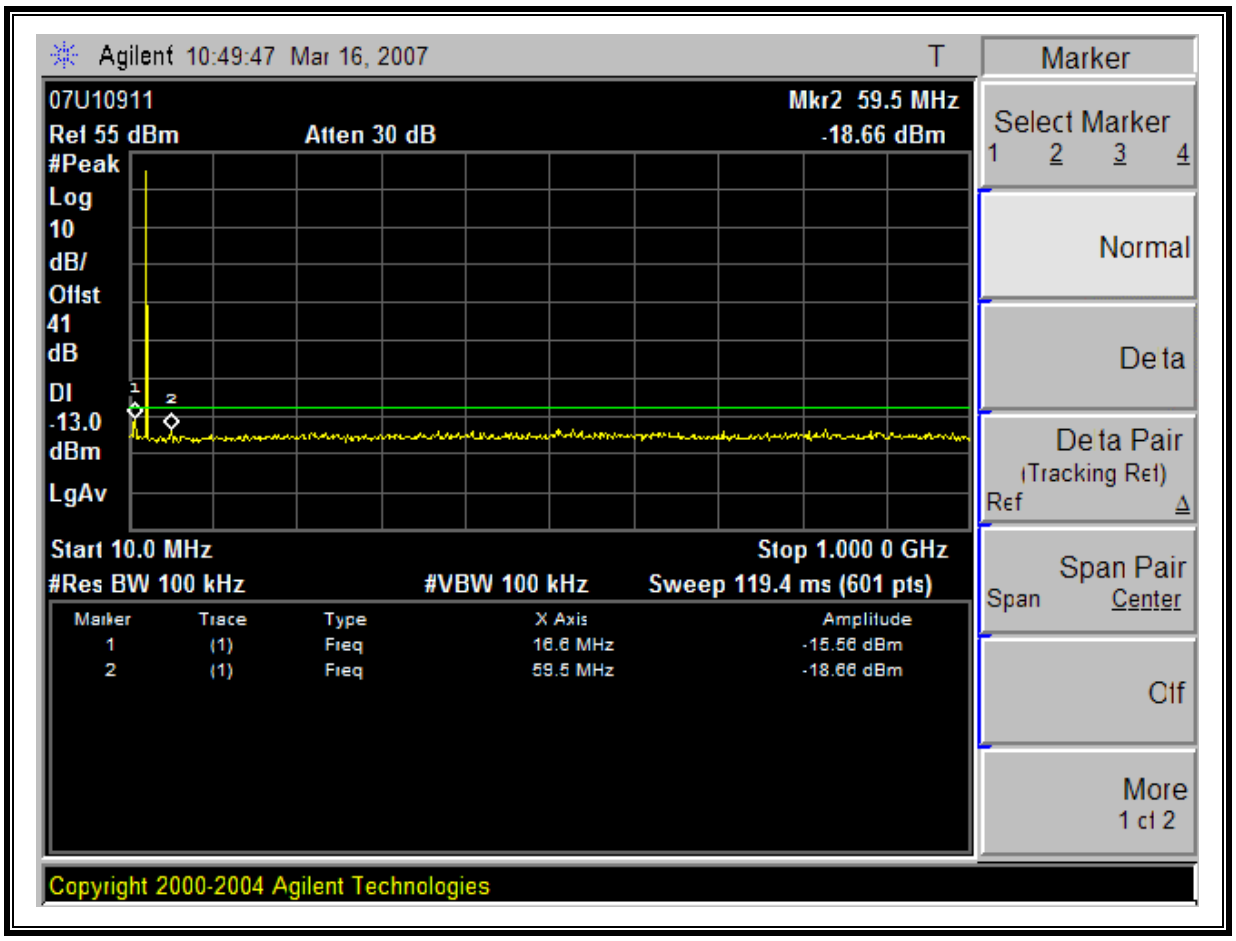
TEST PROCEDURE

ANSI / TIA / EIA 603 Clause 3.2.13, & FCC 90.210

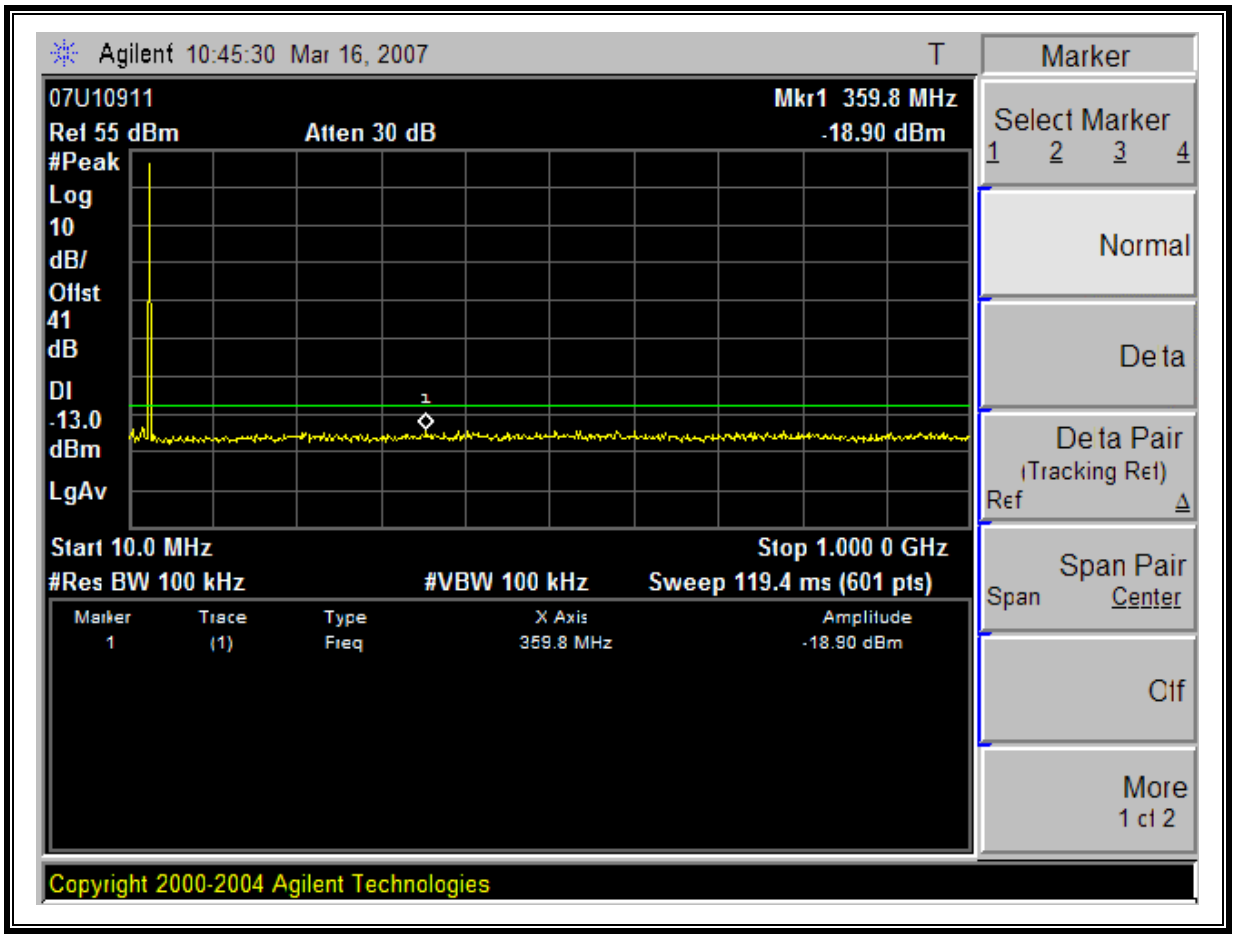
RESULTS

No non-compliance noted.

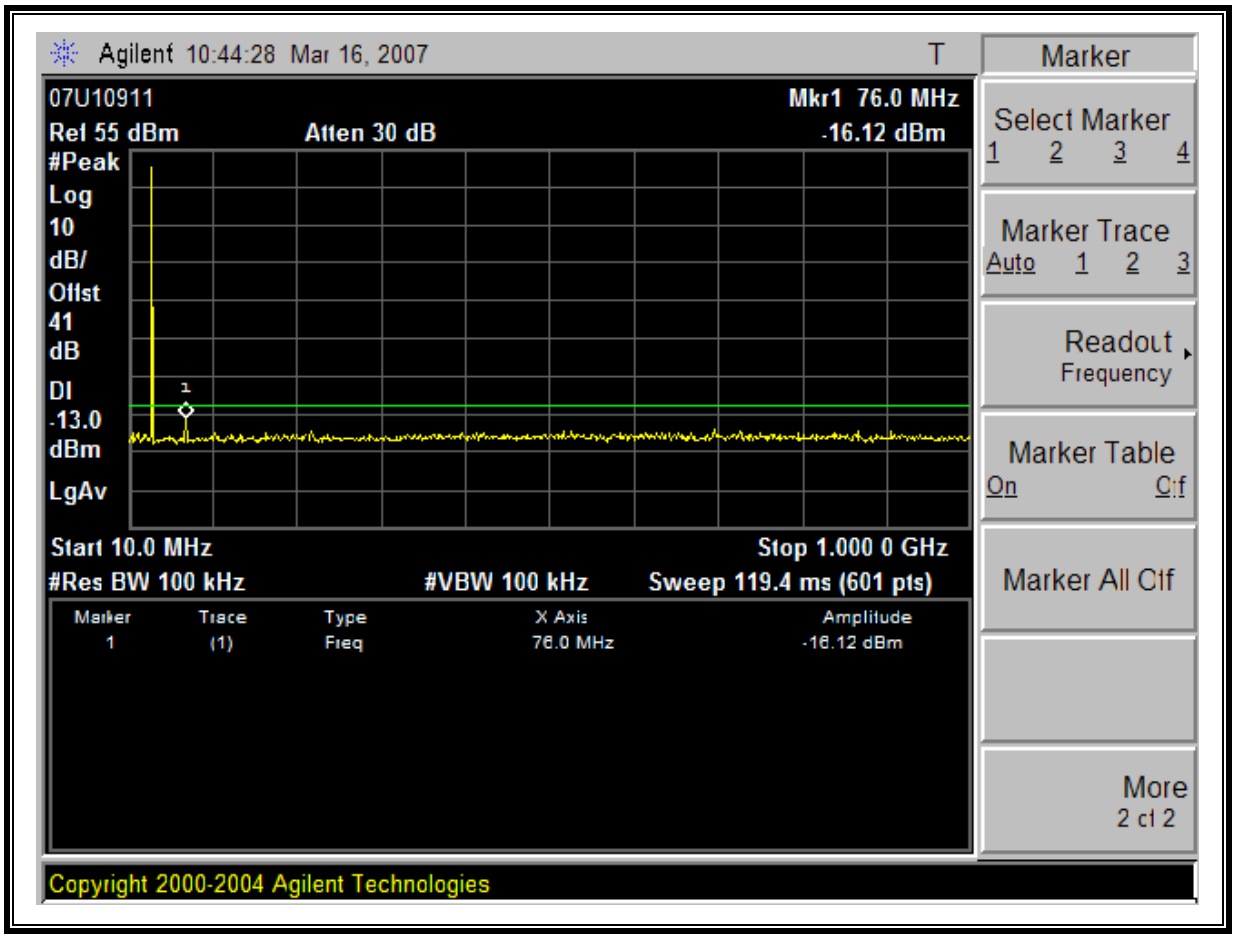
Low Channel, 10MHz to 1000MHz



Mid Channel, 10MHz to 1000MHz



High Channel, 10MHz to 1000MHz



7.7. FIELD STRENGTH OF SPURIOUS RADIATION

LIMIT

§90.210 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.

TEST PROCEDURE

ANSI / TIA / EIA 603 Clause 3.2.13, & FCC 90.210

RESULTS

No non-compliance noted.

7.7.1. 30MHz TO 1000MHz SPURIOUS RADIATION

Spurious & Harmonic (ERP)

30 - 1000MHz Substitution Measurement
Compliance Certification Services, Fremont 5m A-Chamber

Company: TPL Communications
Project #: 07U10911
Date: 3/16/2007
Test Engineer: Chin Pang
Configuration: EUT/Support Equipment
Mode: TX (29.7-36MHz)

Test Equipment:

Bilog Antenna	Cable	Pre-amplifer 8447D	Limit
5m Chamber Sunol Bilog	5m Chamber Cable	T5 8447D	ERP

f MHz	SA reading (dBuV/m)	Ant. Pol. (H/V)	SG reading (dBm)	CL (dB)	Gain (dBi)	Gain (dBd)	ERP (dBm)	Limit (dBm)	Margin (dB)	Notes
Low Ch, 30MHz										
60.00	92.3	V	-23.6	1.1	-2.2	-4.4	-29.0	-13.0	-16.0	
90.00	90.2	V	-22.0	1.3	-0.2	-2.4	-25.6	-13.0	-12.6	
150.00	85.0	V	-23.1	1.6	0.4	-1.8	-26.4	-13.0	-13.4	
210.00	70.4	V	-40.1	1.9	5.7	3.6	-38.3	-13.0	-25.3	
30.00	99.0	H	-0.9	0.9	-19.4	-21.5	-23.4	-13.0	-10.4	
60.00	78.6	H	-37.0	1.1	-2.2	-4.4	-42.5	-13.0	-29.5	
90.00	69.0	H	-44.3	1.3	-0.2	-2.4	-48.0	-13.0	-35.0	
150.00	68.9	H	-39.8	1.6	0.4	-1.8	-43.1	-13.0	-30.1	
210.00	69.3	H	-41.2	1.9	5.7	3.6	-39.5	-13.0	-26.5	
Mid ch, 32.85MHz										
66.00	80.0	V	-35.3	1.1	-1.9	-4.1	-40.5	-13.0	-27.5	
99.70	87.0	V	-23.6	1.3	-0.9	-3.1	-27.9	-13.0	-14.9	
165.20	72.0	V	-37.8	1.6	1.7	-0.4	-39.8	-13.0	-26.8	
230.80	69.3	V	-40.5	1.9	5.9	3.8	-38.6	-13.0	-25.6	
33.00	97.5	H	-3.6	0.9	-17.4	-19.5	-24.1	-13.0	-11.1	
66.00	82.0	H	-33.0	1.1	-1.9	-4.1	-38.2	-13.0	-25.2	
99.70	80.3	H	-31.4	1.3	-0.9	-3.1	-35.8	-13.0	-22.8	
165.20	69.7	H	-39.3	1.6	1.7	-0.4	-41.4	-13.0	-28.4	
230.80	67.0	H	-42.8	1.9	5.9	3.8	-41.0	-13.0	-28.0	
High Ch, 36MHz										
72.90	91.0	V	-21.3	1.2	-1.4	-3.6	-26.1	-13.0	-13.1	
109.10	79.0	V	-29.7	1.4	-1.7	-3.9	-34.9	-13.0	-21.9	
181.30	75.0	V	-34.4	1.7	3.1	1.0	-35.1	-13.0	-22.1	
218.00	70.0	V	-40.2	1.9	5.8	3.7	-38.4	-13.0	-25.4	
36.00	99.8	H	-4.2	1.0	-15.2	-17.4	-22.6	-13.0	-9.6	
72.90	88.0	H	-27.1	1.2	-1.4	-3.6	-31.8	-13.0	-18.8	
109.10	76.5	H	-32.2	1.4	-1.7	-3.9	-37.5	-13.0	-24.5	
181.30	72.0	H	-37.5	1.7	3.1	1.0	-38.2	-13.0	-25.2	
218.00	68.0	H	-42.2	1.9	5.8	3.7	-40.5	-13.0	-27.5	

Note: No other emissions were detected above the system noise floor up to 1Ghz.

Rev. 3.13.7

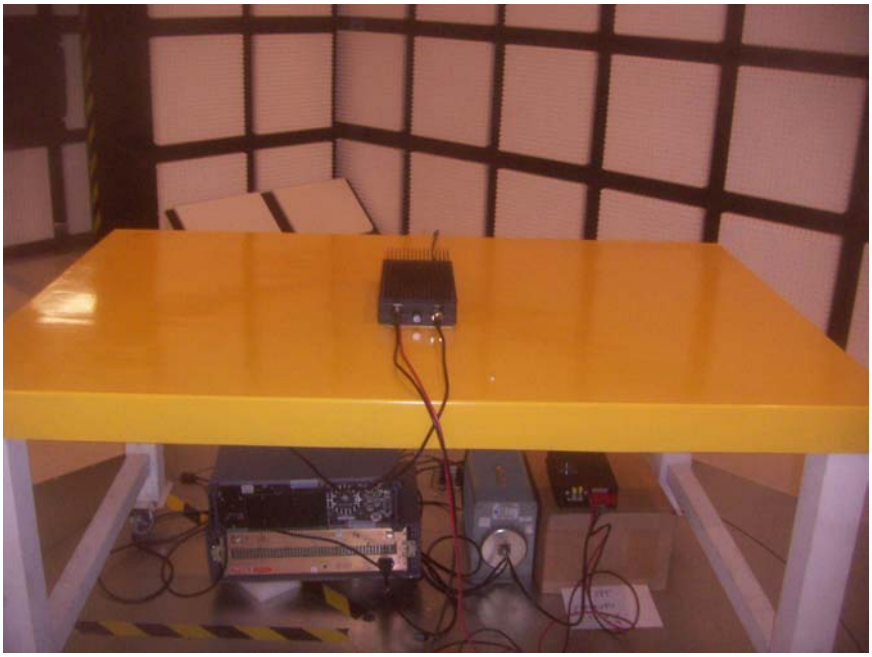
8. SETUP PHOTOS

ANTENNA PORT CONDUCTED RF MEASUREMENT SETUP

ANTENNA PORT CONDUCTED PHOTO

RADIATED RF MEASUREMENT SETUP

RADIATED FRONT PHOTO



RADIATED BACK PHOTO

END OF REPORT