FCC CFR47 PART 90
CERTIFICATION
TEST REPORT

FOR

RF POWER AMPLIFIER

MODEL NUMBER: PA8-1DB-K

FCC ID: BBD8-1DB-K

REPORT NUMBER: 05U3506

ISSUE DATE: JANUARY 24, 2005

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

Prepared by
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d.b.a.
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Revision History

LAB CODE:200065-0

Rev.	Revisions	Revised By

TABLE OF CONTENTS

1. ATTESTATION OF TEST RESULTS

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

EUT DESCRIPTION: RF POWER AMPLIFIER

MODEL: PA8-1DB-K

SERIAL NUMBER: N/A

DATE TESTED: JANUARY 17 – 20, 2005

APPLICABLE STANDARDS	
STANDARD	**TEST RESULTS**
FCC PART 90	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:

WILLIAM ZHUANG
EMC ENGINEER
COMPLIANCE CERTIFICATION SERVICES

2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with TIA/EIA 603A (2001), ANSI C63.4-2003, 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 561F Monterey Road, Morgan Hill, 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 Power Amplifier.

5.2. MAXIMUM OUTPUT POWER

The transmitter has a maximum peak conducted output power and ERP as follows:

High Power

Frequency Range (MHz)	Modulation	Conducted Output Power (dBm)	Conducted Output Power (mW)
806 - 870	CW	46.53	44977.99

Low Power

Frequency Range (MHz)	Modulation	Conducted Output Power (dBm)	Conducted Output Power (mW)
806 - 870	CW	45.43	34914.03

5.3. DESCRIPTION OF AVAILABLE ANTENNAS

The radio utilizes device has no antenna. RF output provided by female “N” connector

5.4. 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 838 MHz.

5.5. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

PERIPHERAL SUPPORT EQUIPMENT LIST				
Description	**Manufacturer**	**Model**	**Serial Number**	**FCC ID**
Signal Generator, 1024 MHz	R & S	SMY01	DE 12311	4/11/2006
Amplifier	Amplifier Research	30S1G3	303877	CNR
DC Converter	HP	Harisson 6268A	6N1497	CNR
Power Attenuator	Tenuline	8343-200	970	CNR

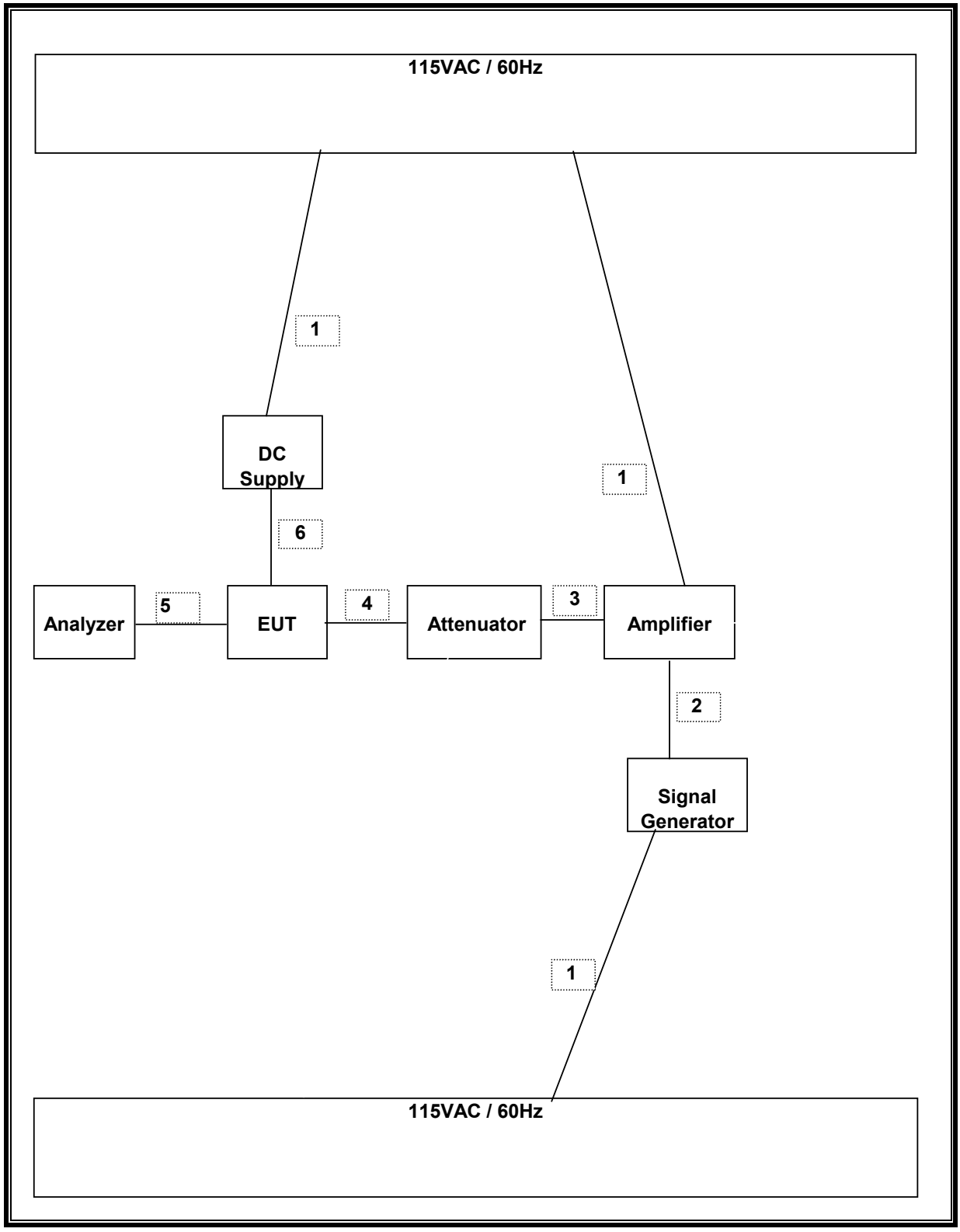
I/O CABLES

I/O CABLE LIST						
Cable No.	**Port**	**# of Identical Ports**	**Connector Type**	**Cable Type**	**Cable Length**	**Remarks**
1	AC	5	US115	Unshielded	1.8m	
2 -- 5	N-Connector	4	N-Type	Shileded	1m	
6	DC	1	Din	Unshielded	2m	

TEST SETUP

The EUT is installed as a stand-alone device and signal generator as the source modulations of CW or 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**
Peak / Average Power Sensor	Agilent	E9327A	US40440755	11/7/2005
Peak Power Meter	Agilent	E4416A	GB41291160	11/7/05
EMI Receiver, 9 kHz ~ 2.9 GHz	HP	8542E	3942A00286	11/20/05
RF Filter Section	HP	85420E	3705A00256	11/20/05
Spectrum Analyzer 20 Hz ~ 44 GHz	Agilent	E4446A	US42070220	1/13/05
Signal Generator, 2 ~ 40 GHz	R & S	SMP04	DE 34210	5/25/05
Antenna, Horn 1 ~ 18 GHz	EMCO	3115	2238	2/4/05
Antenna, Tuned Dipoe	CDI	ROBERTS	117	5/15/05
Antenna, Horn 1 ~ 18 GHz	EMCO	3115	6717	2/4/05

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 the 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. The spectrum analyzer internal –26 dB bandwidth function is utilized.

RESULTS

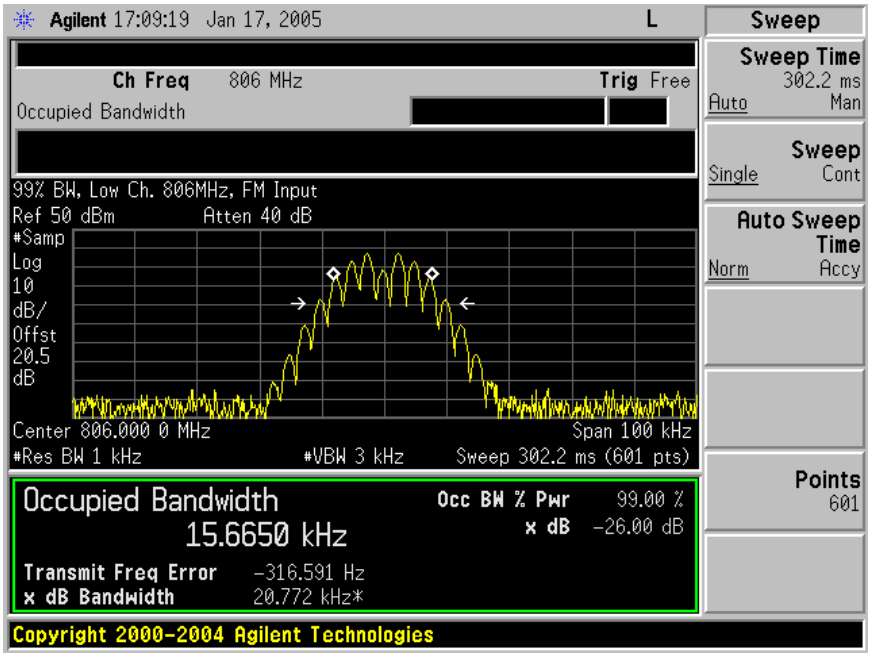
No non-compliance noted:

FM Modulation

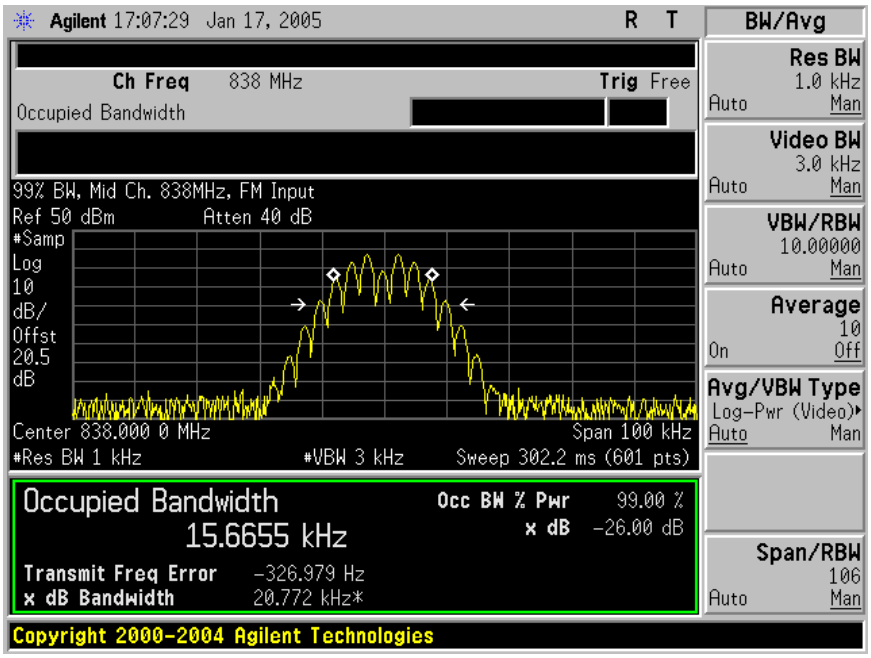
Channel	Frequency (MHz)	Bandwidth (KHz)
Low	806	20.776
Middle	838	20.771
High	870	20.787

FM 26 dB INPUT BANDWIDTH

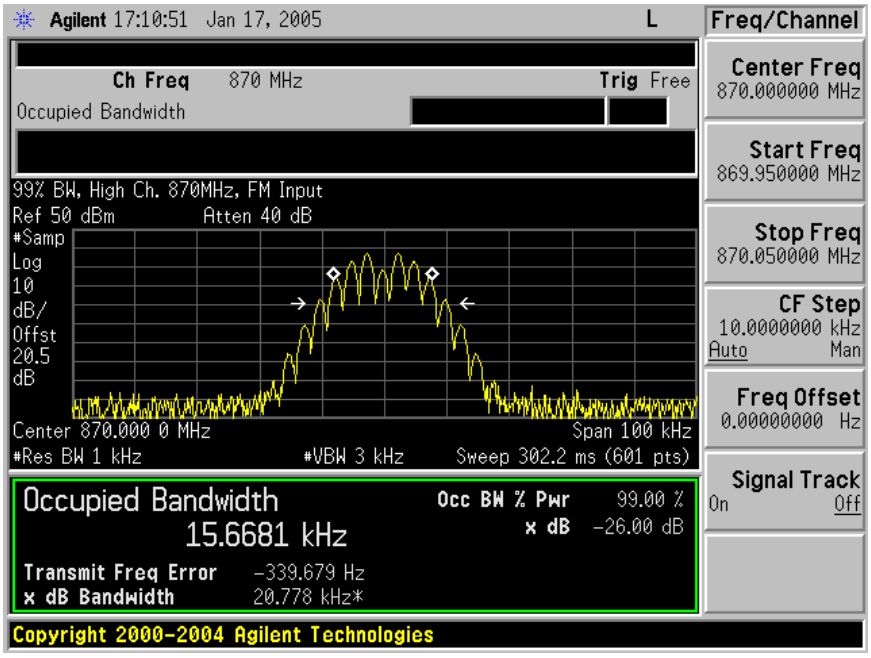
INPUT BANDWIDTH LOW CH



INPUT BANDWIDTH MID CH

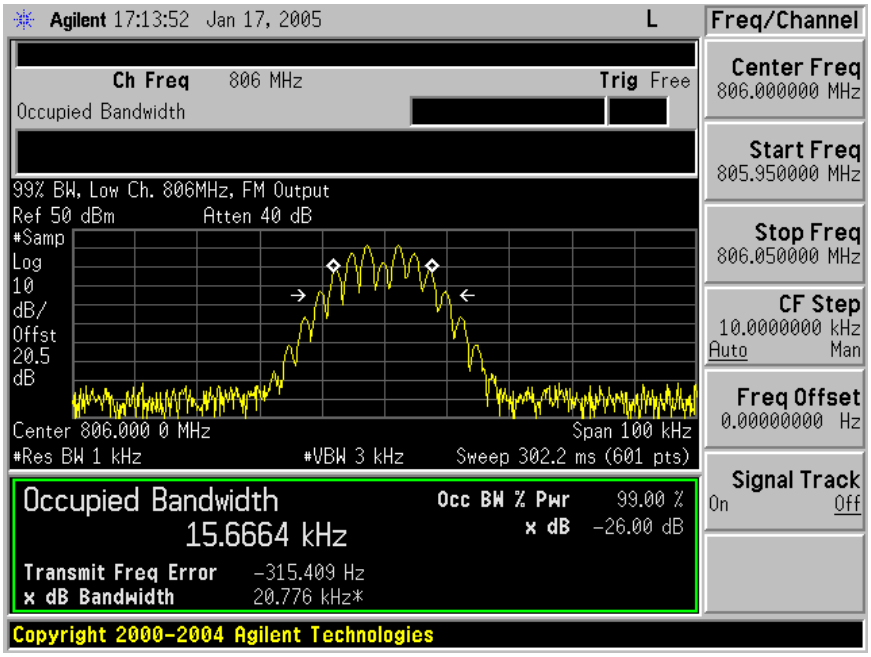


INPUT BANDWIDTH HIGH CH

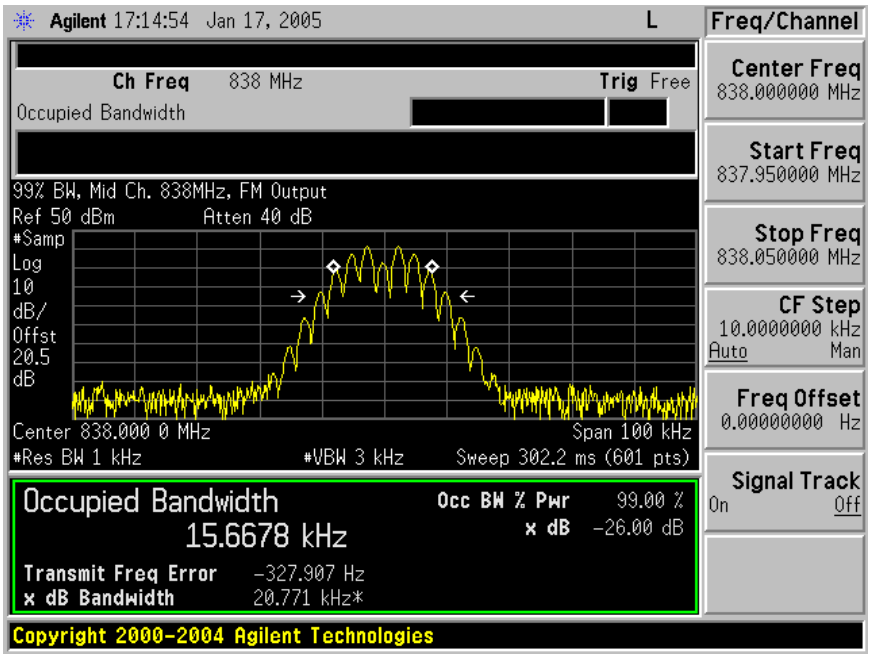


FM 26 dB OUTPUT BANDWIDTH

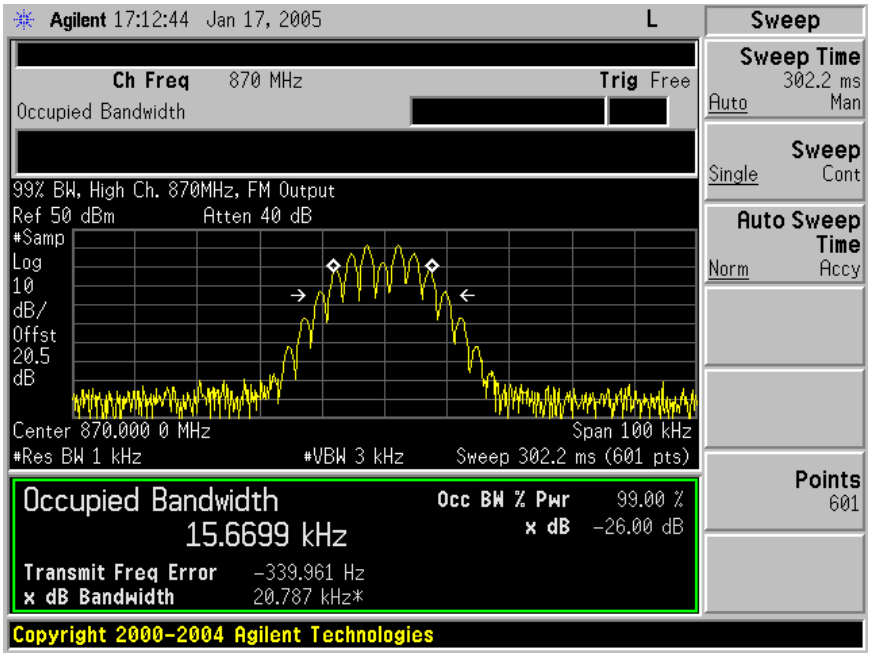
OUTPUT BANDWIDTH LOW CH



OUTPUT BANDWIDTH MID CH



OUTPUT BANDWIDTH HIGH CH



7.2. FM EMISSION LIMITATION

LIMIT

§90.210 Except as indicated elsewhere in this part, transmitters used in the radio services governed by this part must comply with the emission masks outlined in this section. Unless otherwise stated, per paragraphs (d)(4), (e)(4), and (m) of this section, measurements of emission power can be expressed in either peak or average values provided that emission powers are expressed with the same parameters used to specify the unmodulated transmitter carrier power.

APPLICABLE EMISSION MASKS

Frequency band (MHz)	Mask for equipment with Audio low pass filter	Mask for equipment without audio low pass filter
Below 25[1]	A or B	A or C
25–50	B	C
72–76	B	C
150–174[2]	B, D, or E	C, D, or E
150 Paging-only	B	C
220–222	F	F
421–512[2]	B, D, or E	C, D, or E
450 Paging-only	B	G
806–821/851–866[3]	B	G
821–824/866–869	B	H
896–901/935–940	I	J
902–928	K	K
929–930	B	G
4940–4990 MHz	L	L
5850–5925	K	K
All other bands	B	C

[1] Equipment using single sideband J3E emission must the requirements of Emission Mask A. Equipment using other emissions must meet the requirements of Emission Mask B or C, as applicable.

(g) Emission Mask G. 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 no more than 250 percent of the authorized bandwidth: At least 116 log (fd/6.1) dB, or 50 + 10 log (P) dB, or 70 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 2.4.10

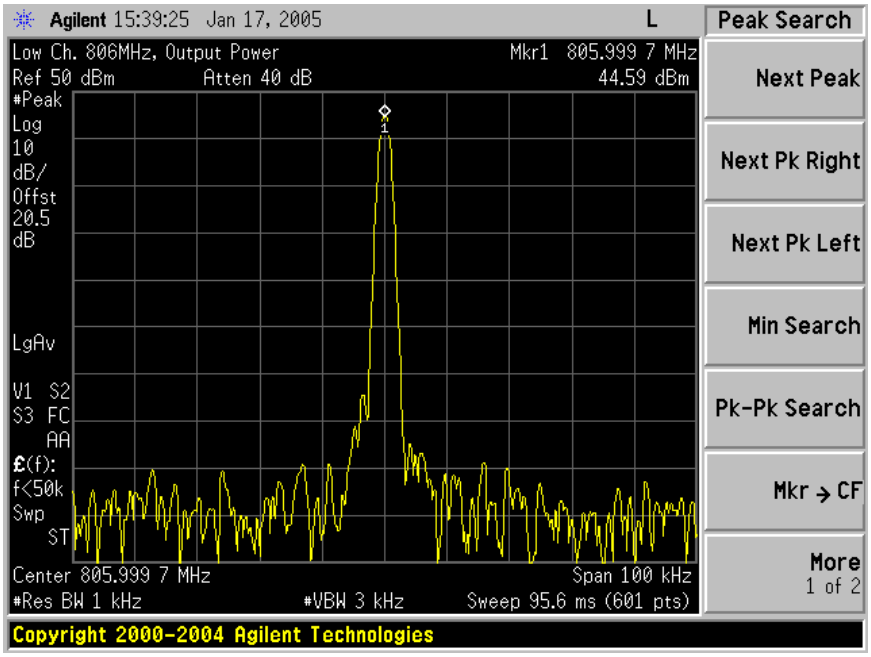
RESULTS

No non-compliance noted:

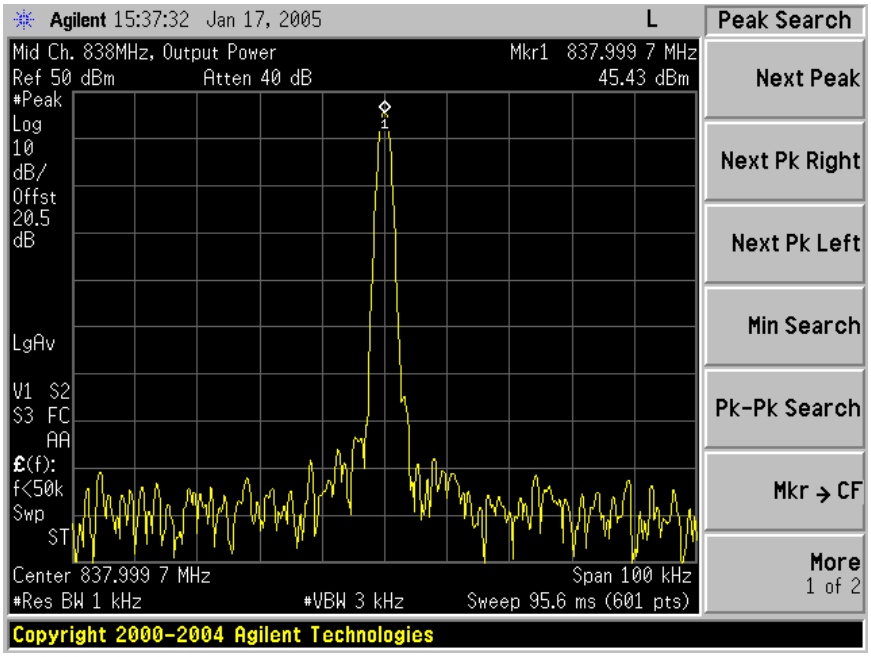
LOW POWER:

Un-modulation Signal:

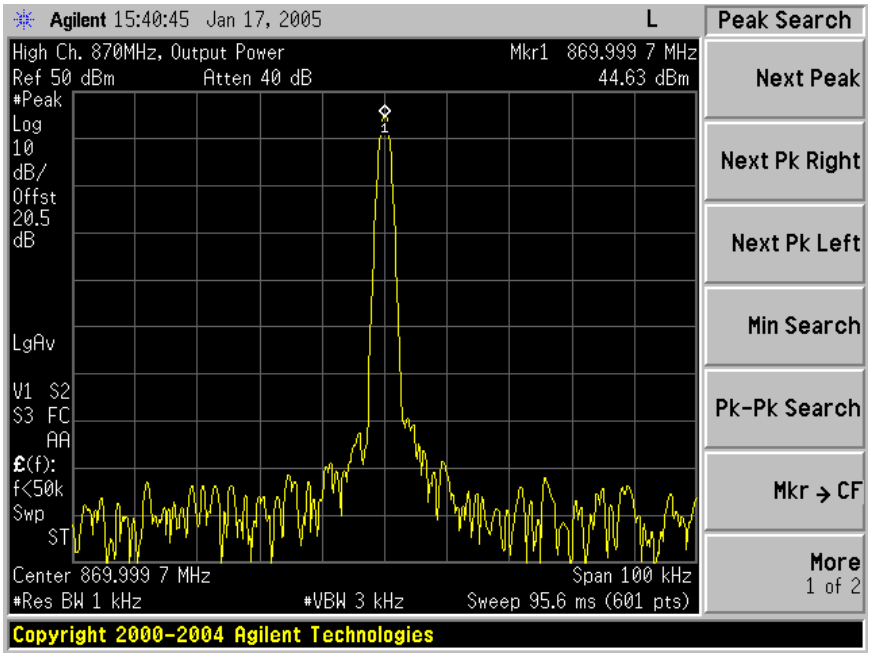
UN-MODULATION LOW CH



UN-MODULATION MID CH

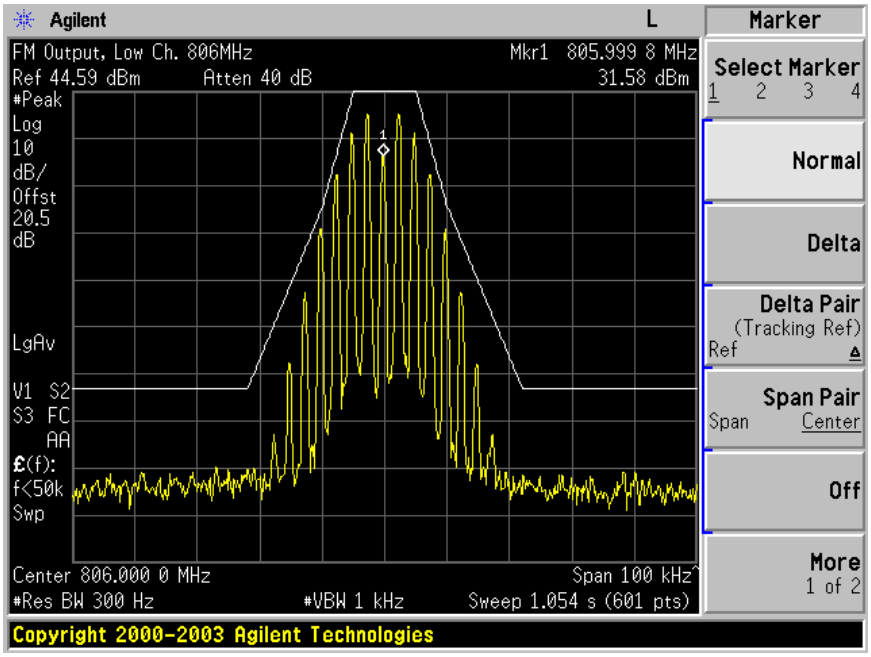


UN-MODULATION HIGH CH

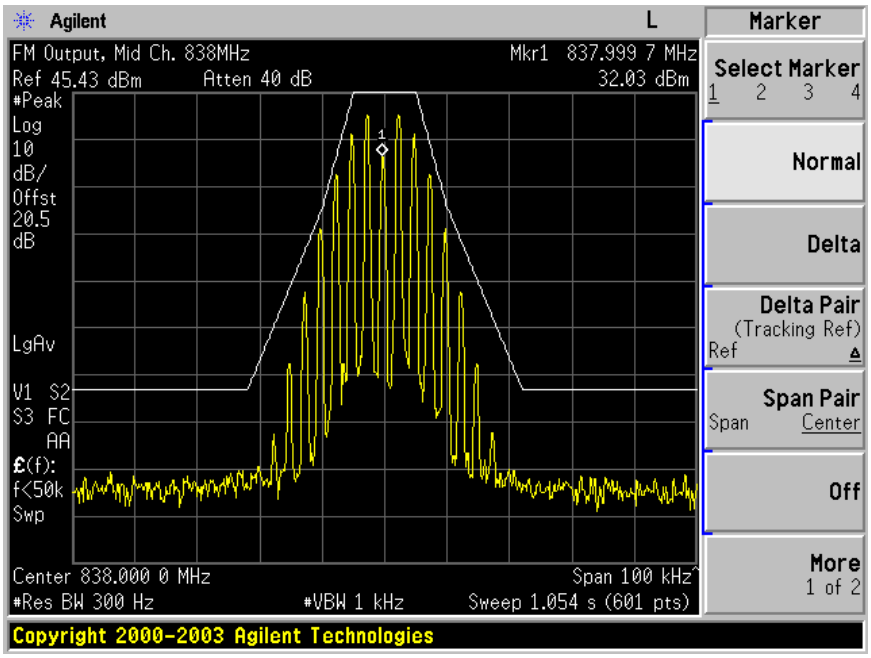


FM EMISSIONS MASK

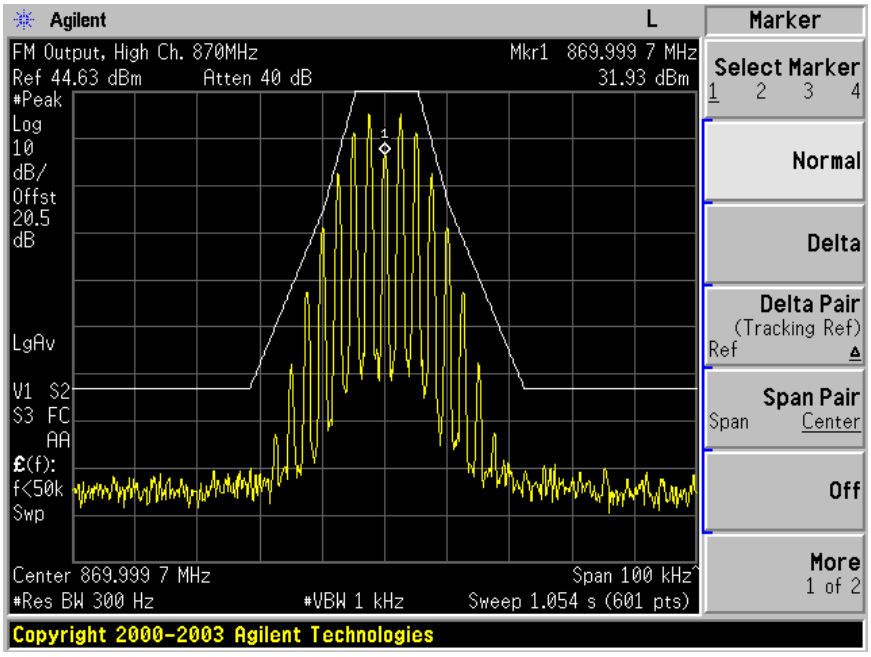
EMISSIONS MASK LOW CH



EMISSIONS MASK MID CH



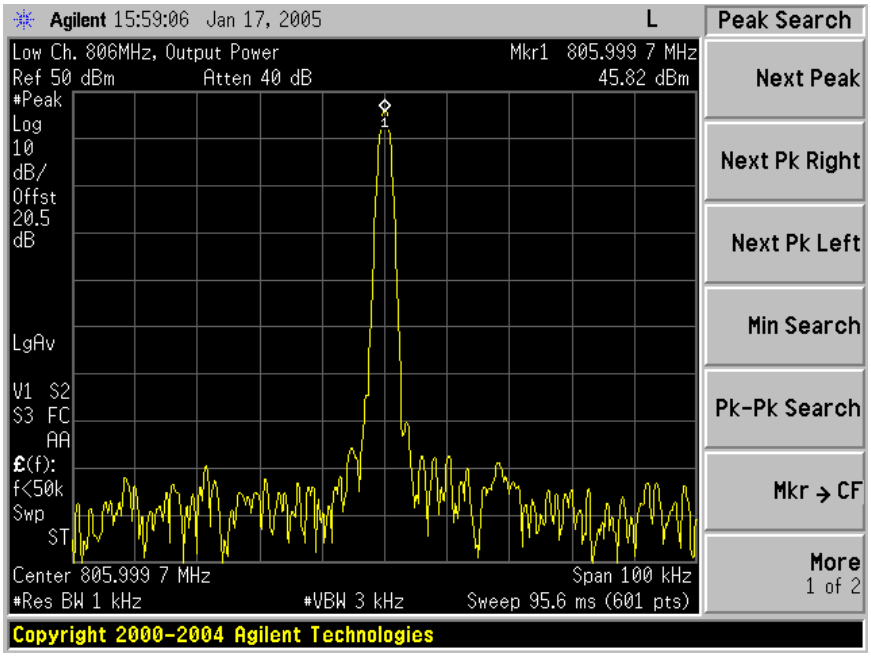
EMISSIONS MASK HIGH CH



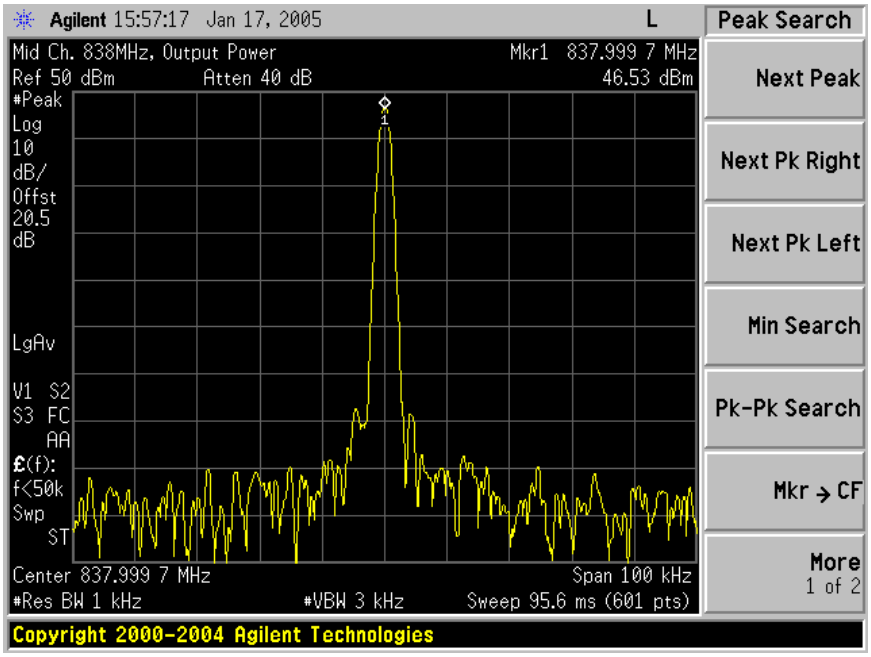
HIGH POWER:

Un-modulation Signal:

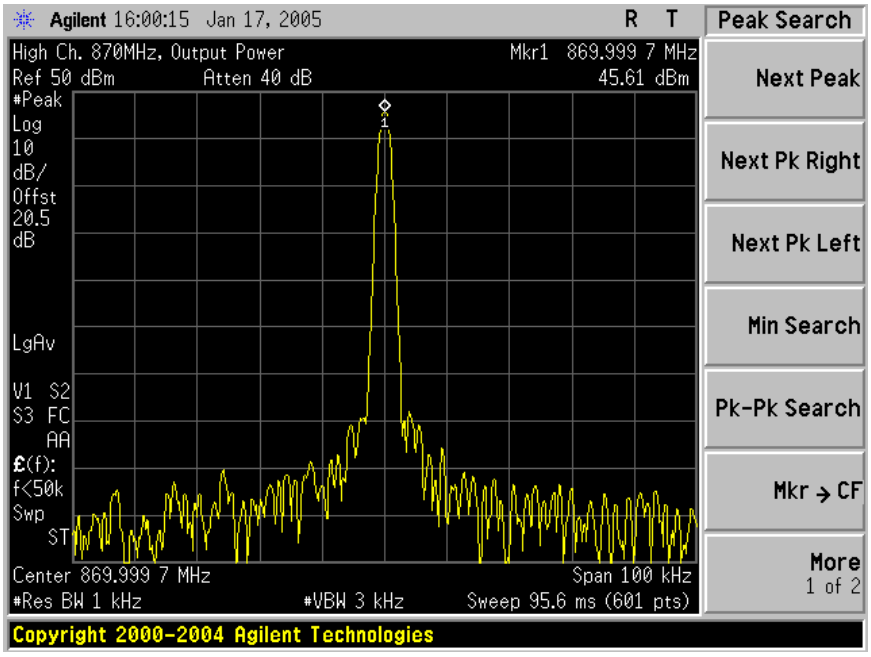
UN-MODULATION LOW CH



UN-MODULATION MID CH

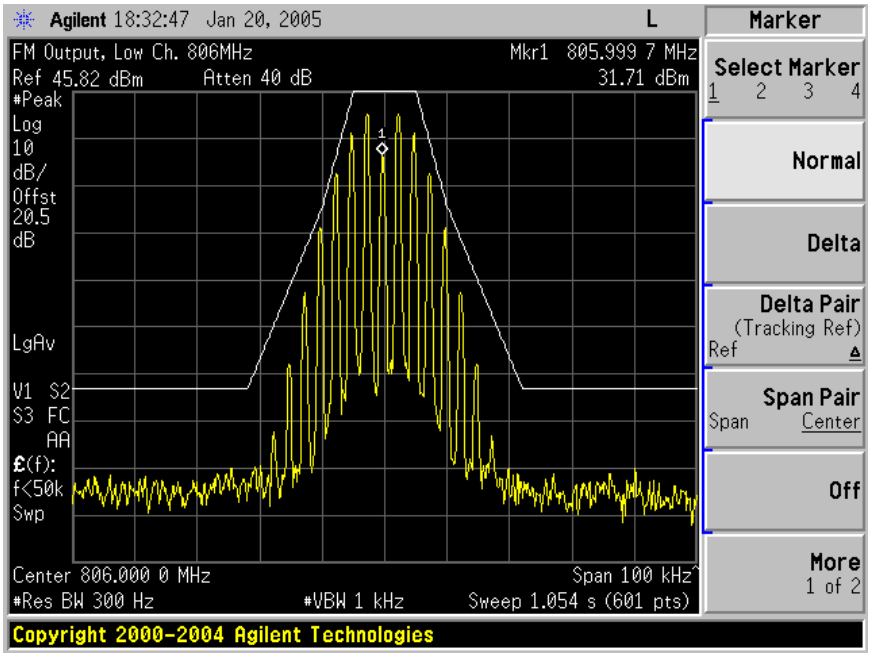


UN-MODULATION HIGH CH

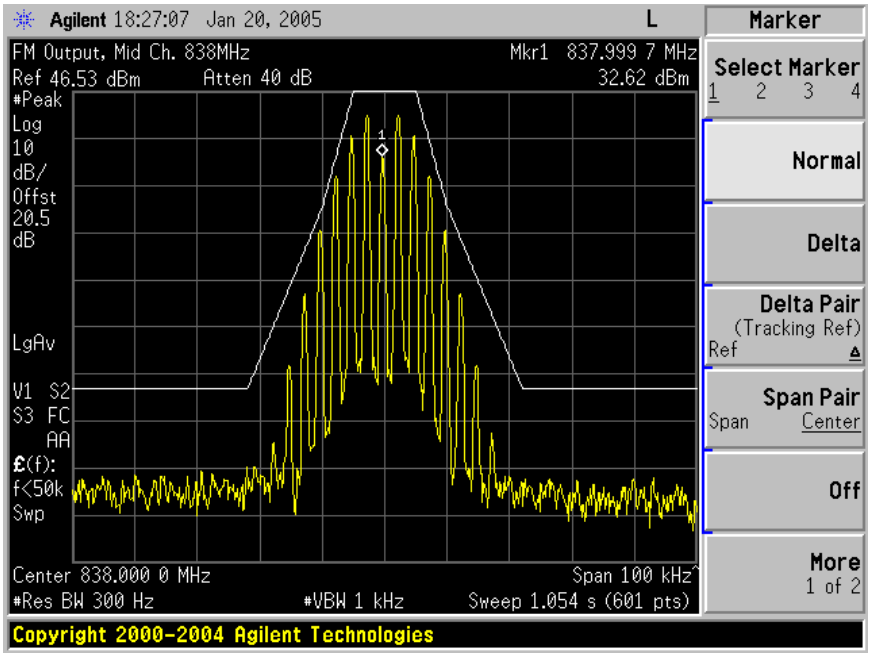


FM EMISSIONS MASK

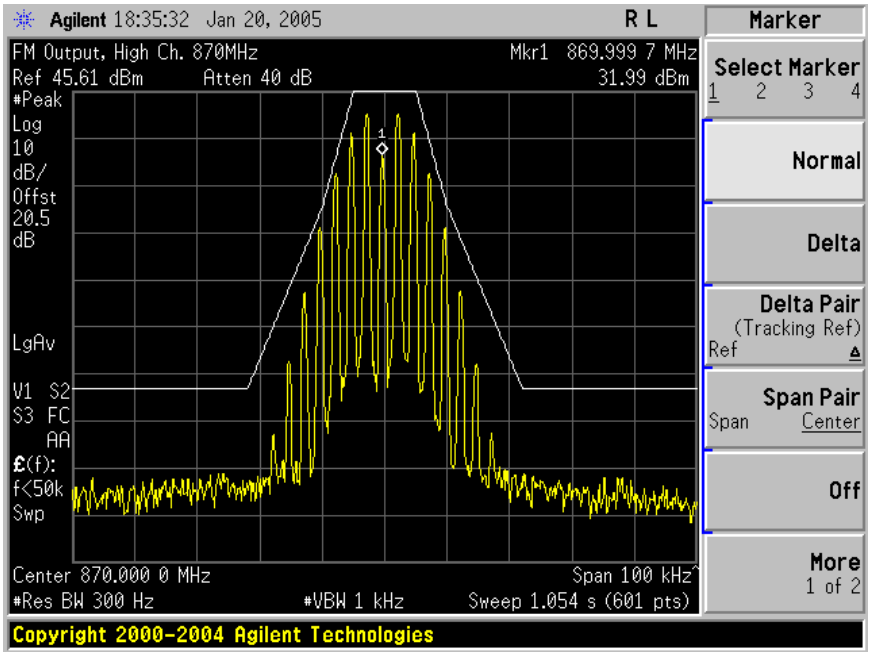
EMISSIONS MASK LOW CH



EMISSIONS MASK MID CH



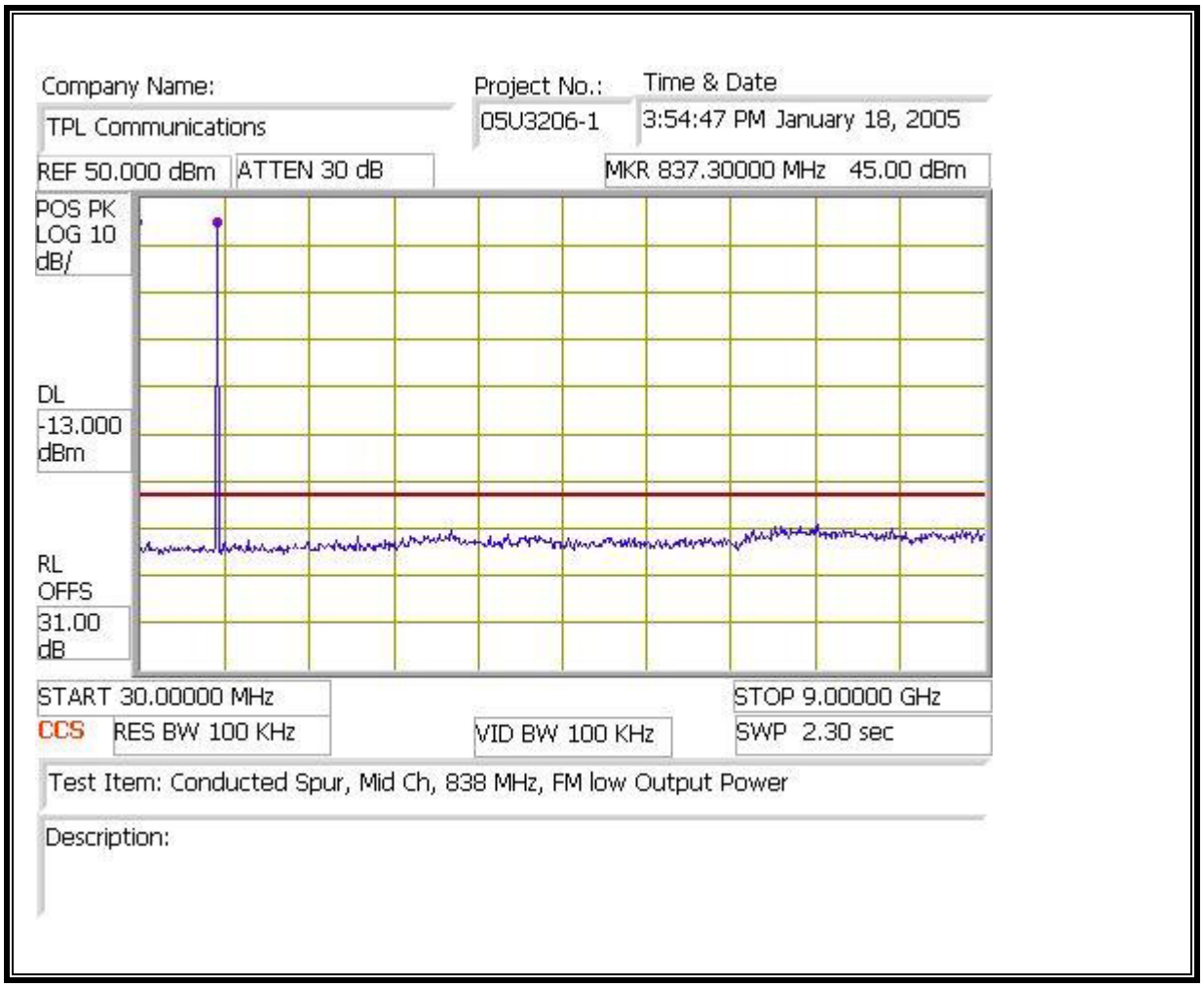
EMISSIONS MASK HIGH CH



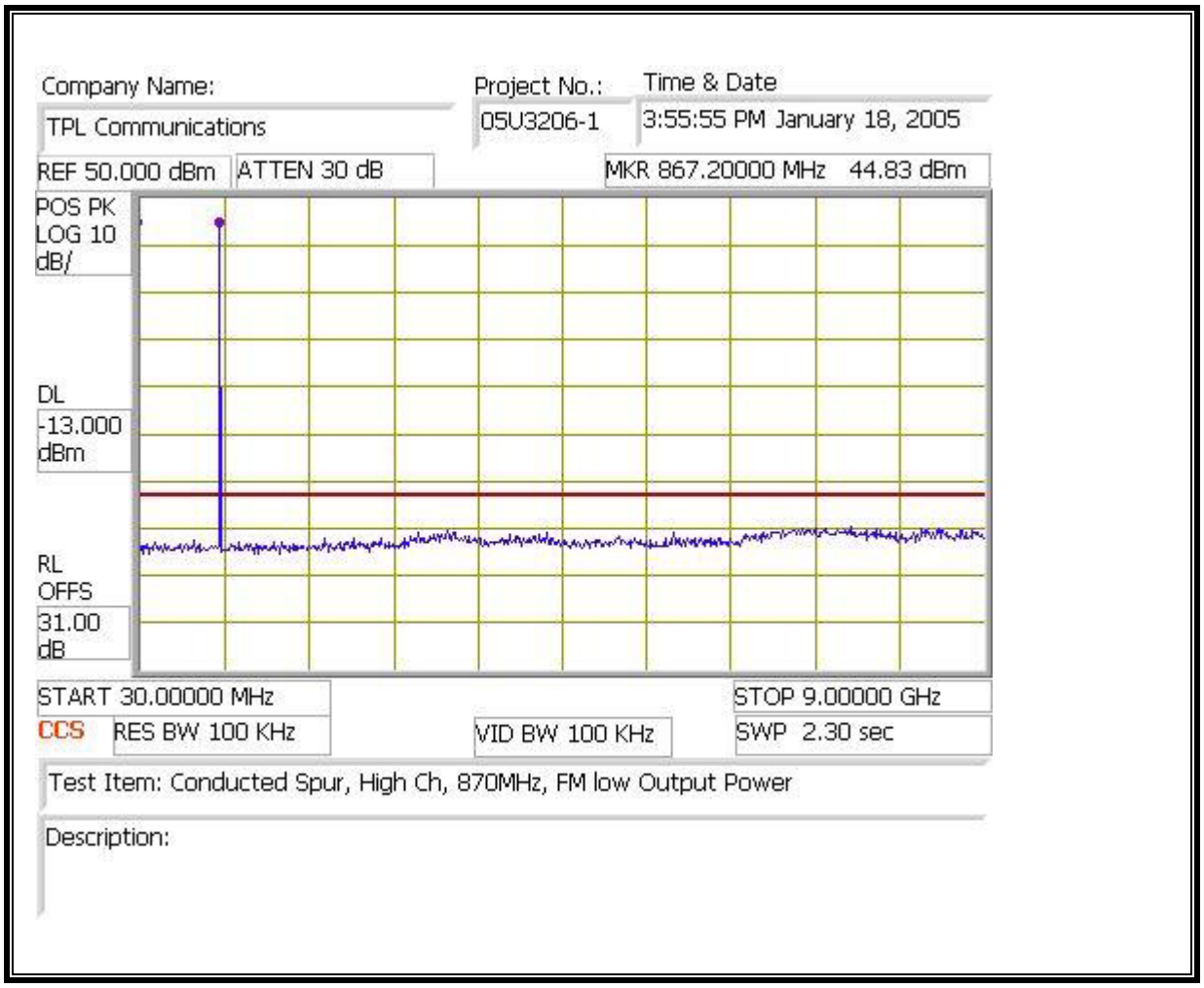
Low Power:

Low Channel, Out-Of-Band Emissions

Mid Channel, Out-Of-Band Emissions

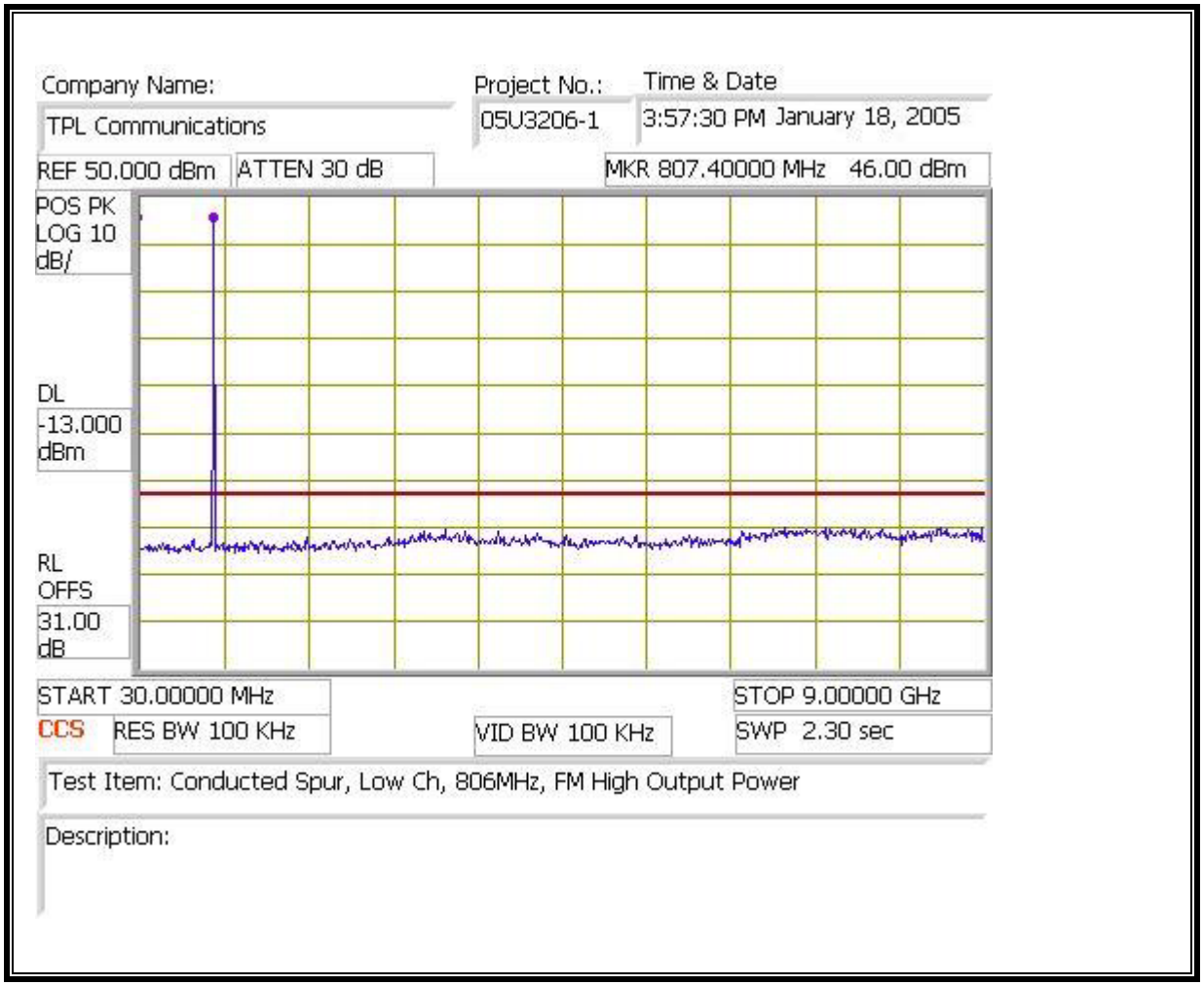


High Channel, Out-Of-Band Emissions

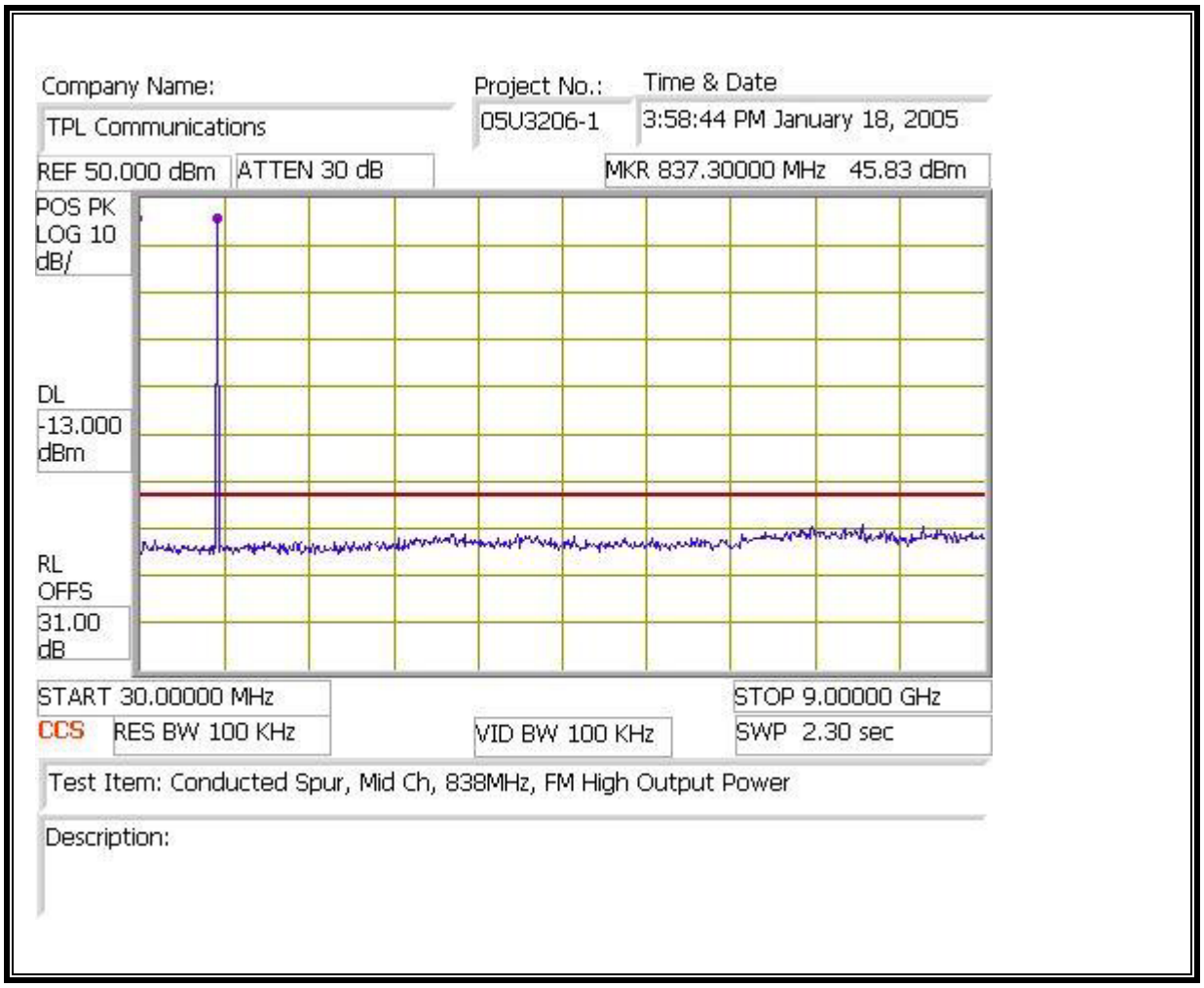


High Power:

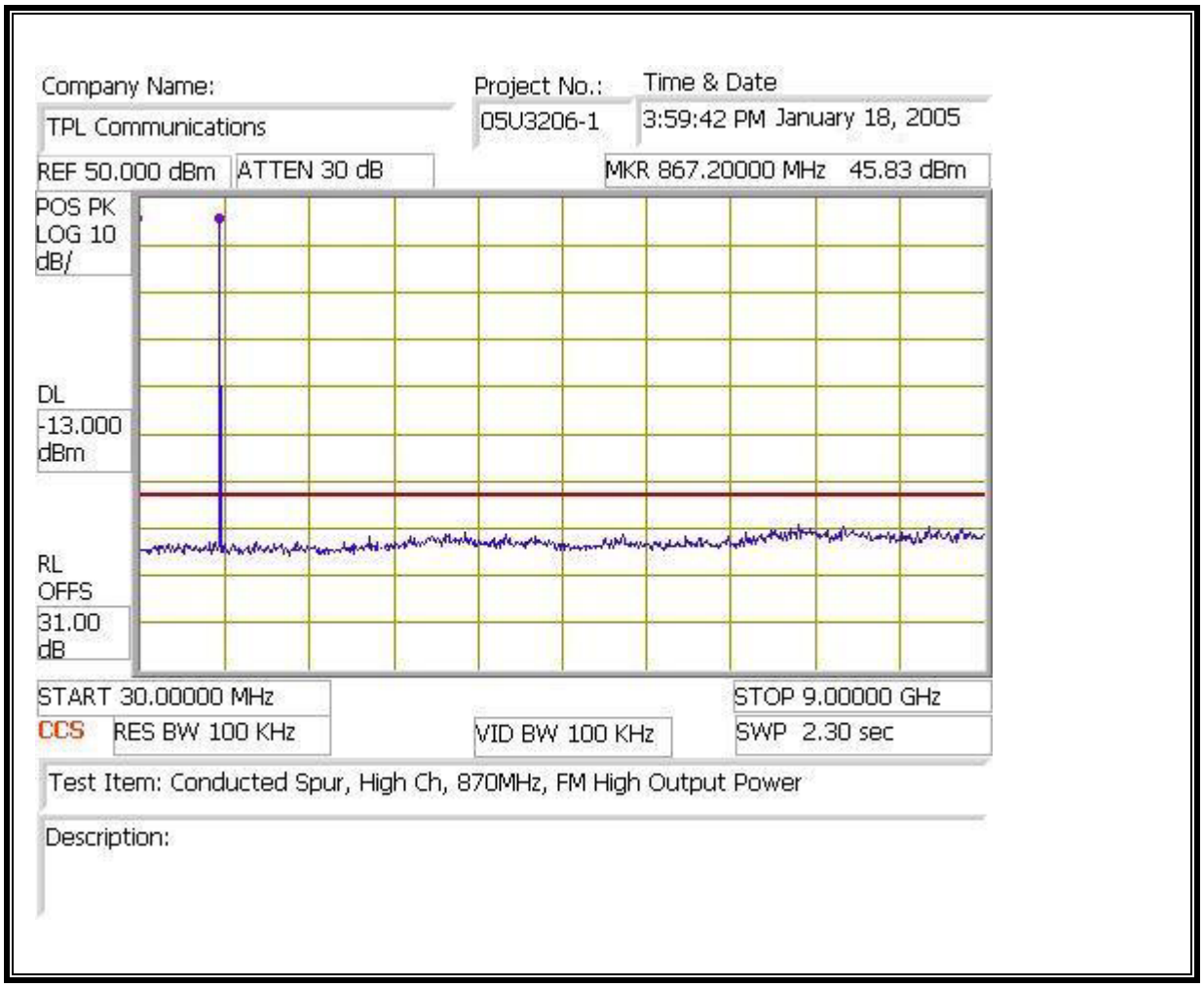
Low Channel, Out-Of-Band Emissions



Mid Channel, Out-Of-Band Emissions



High Channel, Out-Of-Band Emissions



7.3. MODULATION CHARACTERISTICS

Not Applicable. This EUT is a power amplifier and contains no circuitry to modify the RF signal provided by the driver except to raise the power level.

7.4. FREQUENCY STABILITY

Not Applicable. This EUT is a power amplifier and contains no circuitry to modify the RF signal provided by the driver except to raise the power level.

7.5. RF POWER OUTPUT

LIMIT

§90.205 (q) All other frequency bands. Requested transmitter power will be considered and authorized on a case-by-case basis.

TEST PROCEDURE

ANSI / TIA / EIA 603 Clause 2.2.1

RESULTS

No non-compliance noted.

Conducted Output Power

CW Output Power vs Voltage			
Channel Freq.	**Output Power at normal voltage 13.8 Vdc**	**Output Power at 85% voltage 11.7 Vdc**	**Output Power at 115% voltage 15.9 Vdc**
Low input power: 12W			
806 MHz	44.59 dBm / 28.77 W	43.97 dBm / 25.95 W	44.59 dBm / 28.77 W
838 MHz	45.43 dBm / 34.91 W	44.61 dBm / 28.91 W	45.43 dBm / 34.91 W
870 MHz	44.63 dBm / 29.04 W	43.47 dBm / 22.23 W	44.63 dBm / 29.04 W
High input power: 15W			
806 MHz	45.82 dBm / 38.19 W	45.05 dBm / 31.99 W	45.82 dBm / 38.19 W
838 MHz	46.53 dBm / 44.98 W	45.70 dBm / 37.15 W	46.53 dBm / 44.98 W
870 MHz	45.61 dBm / 36.39 W	44.85 dBm / 30.55 W	45.61 dBm / 36.39 W

7.6. SPURIOUS EMISSION AT ANTENNA TERMINAL

LIMIT

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

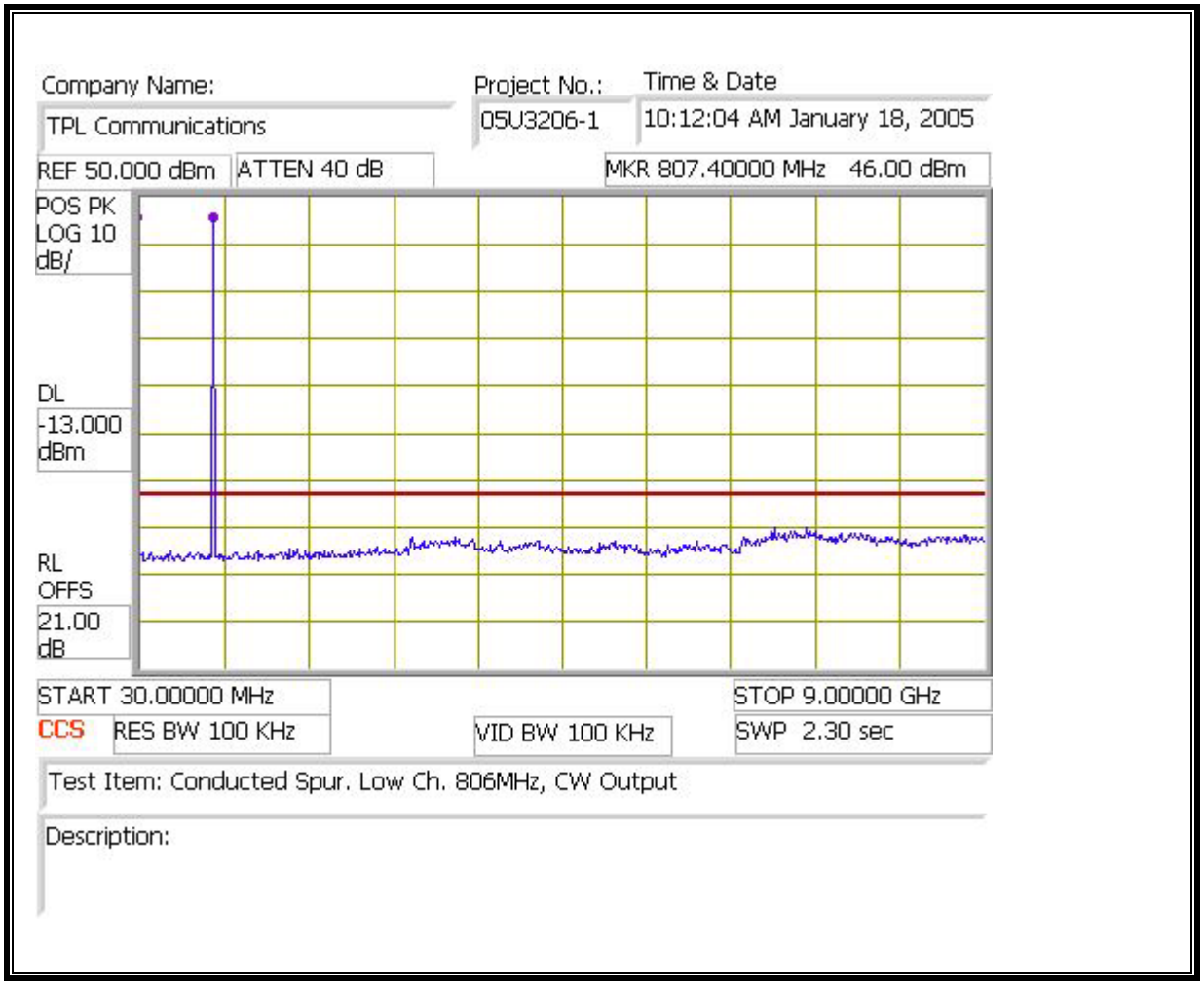
ANSI / TIA / EIA 603 Clause 3.2.13

RESULTS

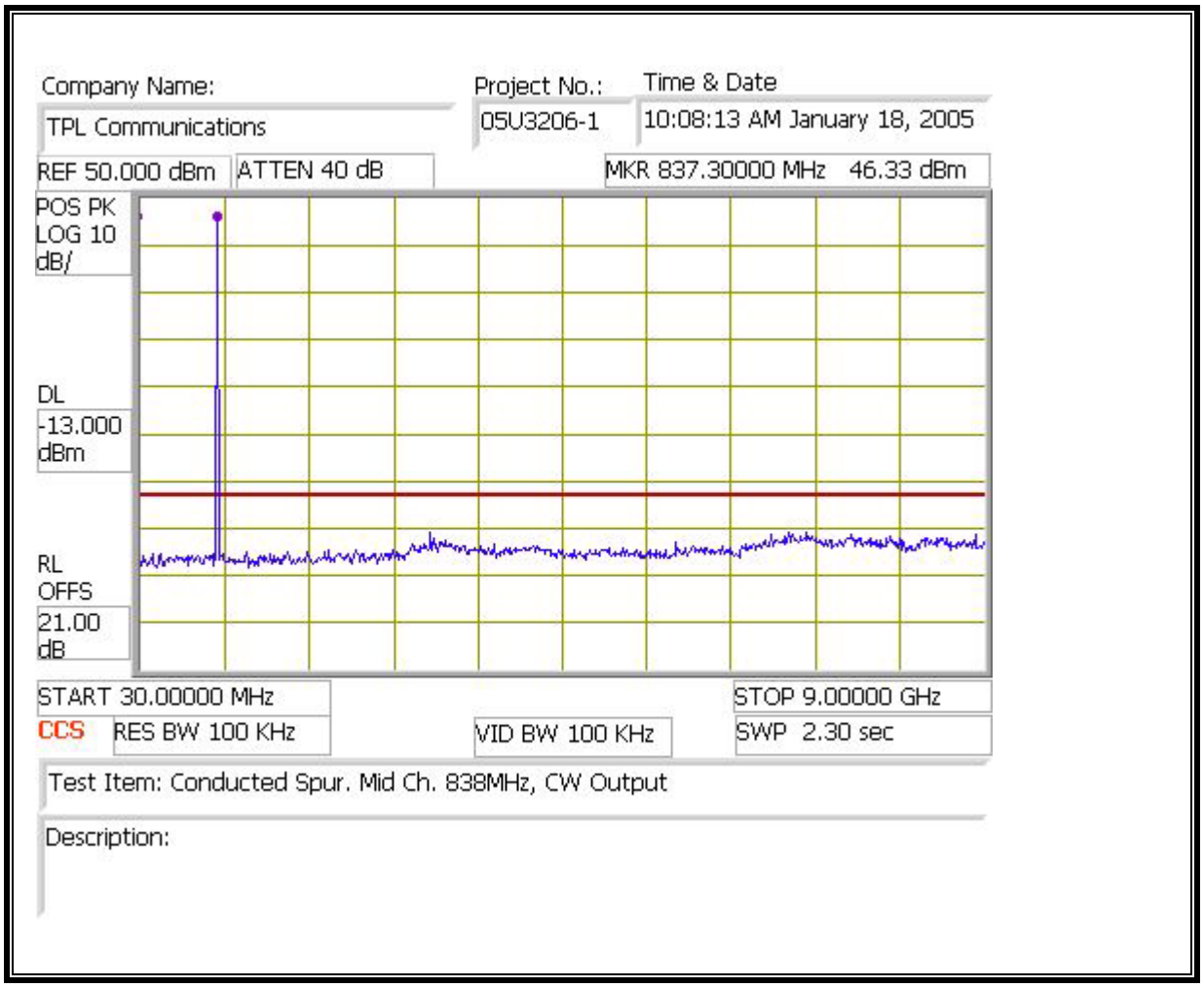
No non-compliance noted.

HIGH POWER AT WORST CASE RESULTS:

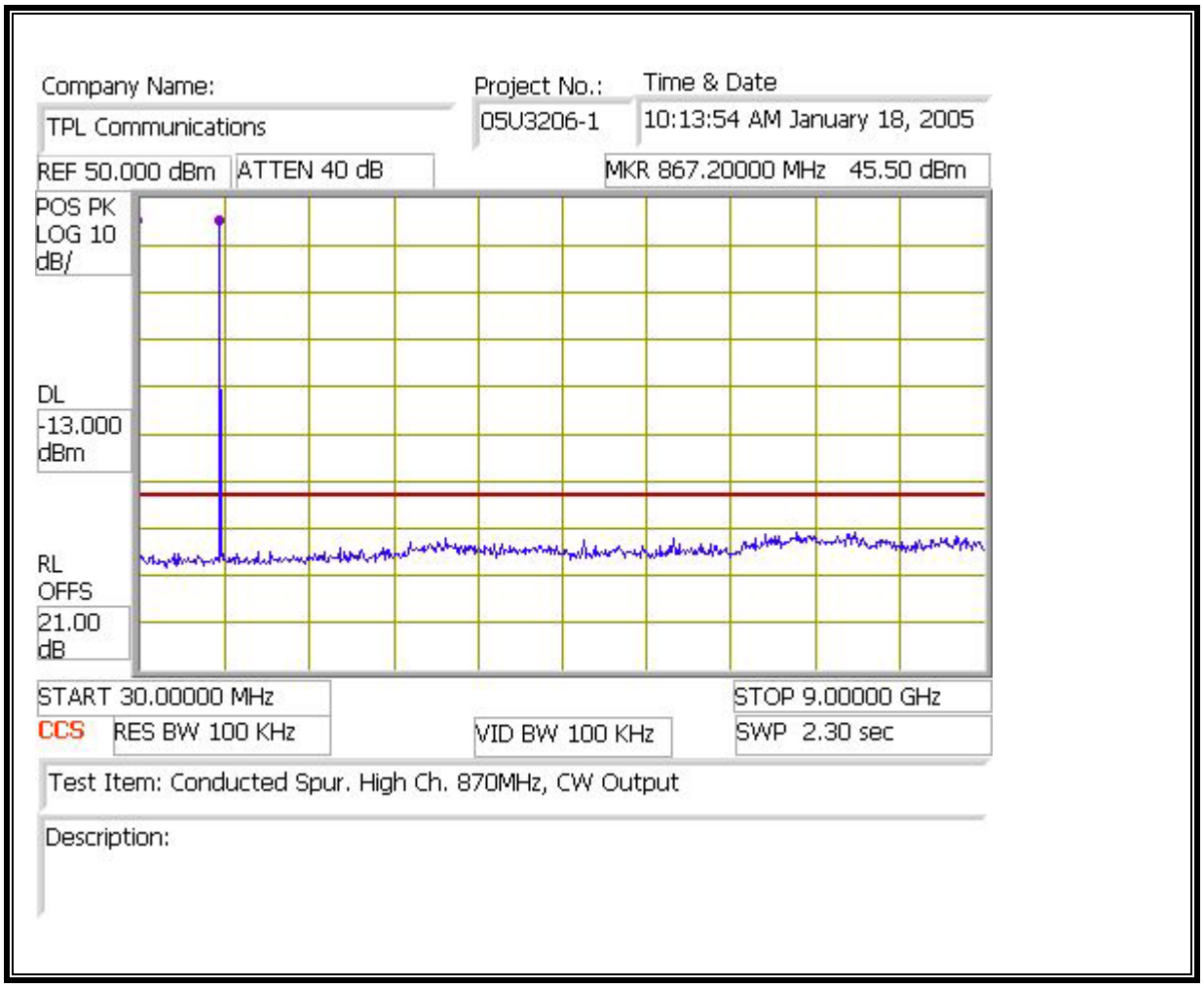
Low Channel, Out-Of-Band Emissions



Mid Channel, Out-Of-Band Emissions



High Channel, Out-Of-Band Emissions



7.7. FIELD STRENGTH OF SPURIOUS RADIATION

LIMIT

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 2.2.12

RESULTS

No non-compliance noted.

High Power Spurious & Harmonic (ERP)

01/29/04 **High Frequency Substitution Measurement**

Compliance Certification Services, Morgan Hill 5m Chamber Site

Test Engr: Hitesh H. Solanki
Project #: 05U3206-1
Company: TPL Communications
EUT Descrip.: RF Power Amplifier, 80 - 870 MHz Band, 40 Watts, FM/CW Modulation
EUT M/N: PA8-1DB-K
Test Target: FCC part 22
Mode Oper: Transmit only

Test Equipment:

EMCO Horn 1-18GHz: T60; S/N: 2238 @3m
Horn > 18GHz:
Limit: FCC 22 & 90
☑ High Pass Filter

Hi Frequency Cables: ☑ (2 ft) ☐ (2 ~ 3 ft) ☐ (4 ~ 6 ft) ☑ (12 ft)

Pre-amplifer 1-26GHz: T87 Miteq 924342
Pre-amplifer 26-40GHz:

f GHz	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 Channel										
1.740	56.5	H	-53.1	1.6	7.1	4.9	-49.8	-13.0	-36.8	
2.610	48.7	H	-58.5	2.0	8.4	6.3	-54.2	-13.0	-41.2	
3.480	35.2	H	-70.4	2.4	9.4	7.2	-65.6	-13.0	-52.6	
1.740	52.7	V	-57.6	1.6	7.1	4.9	-54.3	-13.0	-41.3	
2.610	48.5	V	-58.9	2.0	8.4	6.3	-54.6	-13.0	-41.6	
3.480	35.0	V	-70.7	2.4	9.4	7.2	-65.9	-13.0	-52.9	
Middle Channel										
1.672	66.2	H	-43.8	1.6	7.0	4.8	-40.5	-13.0	-27.5	
2.508	49.2	H	-58.2	1.9	8.3	6.1	-54.0	-13.0	-41.0	
3.344	35.5	H	-70.4	2.3	9.3	7.2	-65.5	-13.0	-52.5	
1.672	57.8	V	-52.9	1.6	7.0	4.8	-49.6	-13.0	-36.6	
2.508	47.7	V	-59.9	1.9	8.3	6.1	-55.7	-13.0	-42.7	
3.224	35.8	V	-70.3	2.3	9.3	7.1	-65.5	-13.0	-52.5	
High Channel										
1.612	55.7	H	-54.6	1.6	6.9	4.8	-51.4	-13.0	-38.4	
2.418	47.3	H	-60.3	1.9	8.1	5.9	-56.3	-13.0	-43.3	
3.224	37.2	H	-68.9	2.3	9.3	7.1	-64.0	-13.0	-51.0	
1.612	52.3	V	-58.7	1.6	6.9	4.8	-55.5	-13.0	-42.5	
2.418	47.8	V	-60.0	1.9	8.1	5.9	-56.0	-13.0	-43.0	
3.224	35.8	V	-70.4	2.3	9.3	7.1	-65.5	-13.0	-52.5	

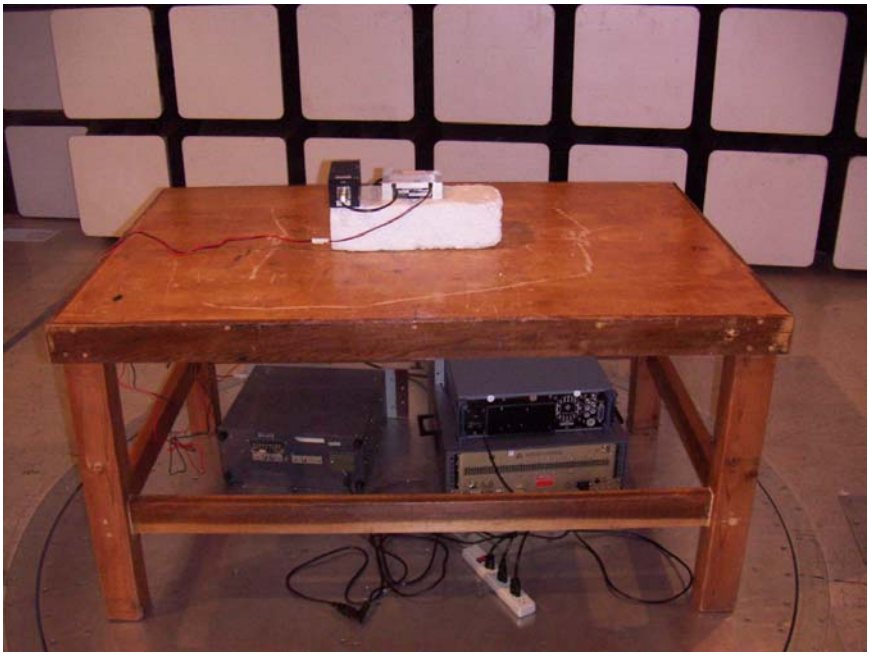
8. SETUP PHOTOS

ANTENNA PORT CONDUCTED RF MEASUREMENT SETUP

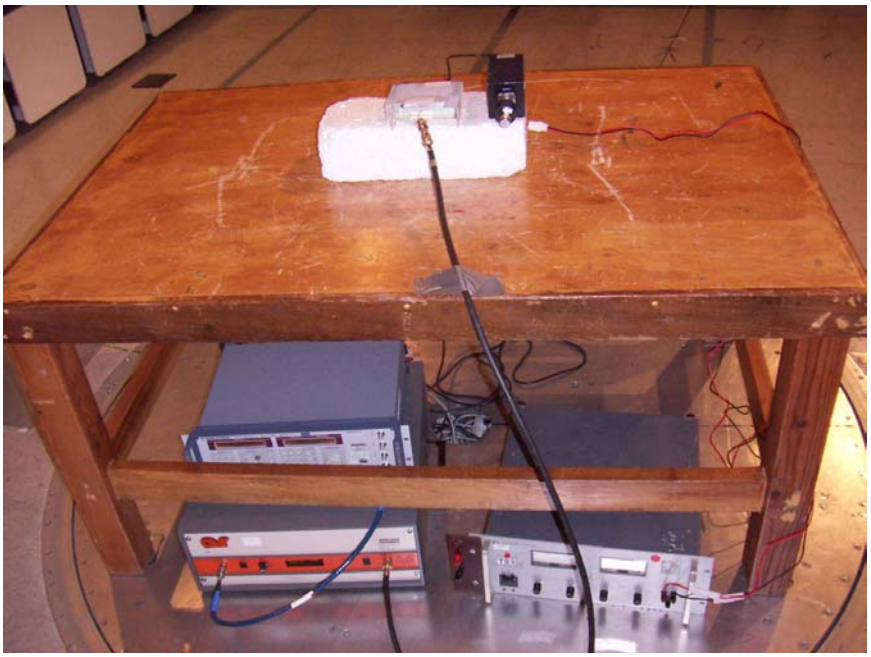
ANTENNA PORT CONDUCTED PHOTO

RADIATED RF MEASUREMENT SETUP FOR MOBILE CONFIGURATION

RADIATED FRONT PHOTO



RADIATED BACK PHOTO



END OF REPORT