

Rothenbuhler Engineering

ADDENDUM TEST REPORT FOR 91266-8

Test Box, 1678-4

Tested To The Following Standards:

**FCC Part 90I
&
RSS-119 Issue 11**

Report No.: 91266-8A

Date of issue: June 16, 2011



This test report bears the accreditation symbol indicating that the testing performed herein meets the test and reporting requirements of ISO/IEC 17025 under the applicable scope of EMC testing for CKC Laboratories, Inc.

We strive to create long-term, trust based relationships by providing sound, adaptive, customer first testing services. We embrace each of our customers' unique EMC challenges, not as an interruption to set processes, but rather as the reason we are in business.

TABLE OF CONTENTS

Administrative Information	3
Test Report Information	3
Report Authorization	3
Test Facility Information	4
Site Registration & Accreditation Information	4
Summary of Results	5
Conditions During Testing	5
Equipment Under Test	6
Peripheral Devices	6
FCC Part 90I & RSS-119	7
90.205 Power Output	7
90.209 Bandwidth Limitations	9
90.210 Emissions Mask	12
90.213 Frequency Stability	21
90.214 Transient Frequency Behavior	24
99% Bandwidth	29
Supplemental Information	33
Measurement Uncertainty	33
Emissions Test Details	33

ADMINISTRATIVE INFORMATION

Test Report Information

REPORT PREPARED FOR:

Rothenbuhler Engineering
524 Rhodes Rd.
Sedro Wooley, WA 98284-0708

REPORT PREPARED BY:

Joyce Walker
CKC Laboratories, Inc.
5046 Sierra Pines Drive
Mariposa, CA 95338

REPRESENTATIVE: Rich Taft
Customer Reference Number: 20238

Project Number: 91266

DATE OF EQUIPMENT RECEIPT:
DATE(S) OF TESTING:

April 4, 2011
April 4-20, 2011 & June 14, 2011

Original: Testing of the Test Box, 1678-4 to FCC Part 90I and RSS-210 Issue 8.

Addendum A: To correct; an error in the referenced Canada standard to RSS-119 Issue 11; references from a PSA being used to a Spectrum Analyzer throughout the report. Retested and replaced data in sections 90.209, 90.210 and 99% Bandwidth.

Report Authorization

The test data contained in this report documents the observed testing parameters pertaining to and are relevant for only the sample equipment tested in the agreed upon operational mode(s) and configuration(s) as identified herein. Compliance assessment remains the client's responsibility. This report may not be used to claim product endorsement by A2LA or any government agencies. This test report has been authorized for release under quality control from CKC Laboratories, Inc.



Steve Behm
Director of Quality Assurance & Engineering Services
CKC Laboratories, Inc.

Test Facility Information



Our laboratories are configured to effectively test a wide variety of product types. CKC utilizes first class test equipment, anechoic chambers, data acquisition and information services to create accurate, repeatable and affordable test results.

TEST LOCATION(S):
CKC Laboratories, Inc.
22116 23rd Drive S.E., Suite A
Bothell, WA 98021-4413

Site Registration & Accreditation Information

Location	CB #	JAPAN	CANADA	FCC
Bothell	US0081	R-2296, C-2506, T-1489 & G-284	3082C-1	318736

SUMMARY OF RESULTS

Standard / Specification: FCC Part 90I & IC RSS-119 Issue 11

Description	Test Procedure/Method	Results
Power Output	FCC Part 90.205(d), TIA-603-C 2.2.1	Pass
Bandwidth Limitations	FCC Part 90.209(b)(5), FCC Part 2.1049, ANSI C63.4	Pass
Emissions Mask	FCC Part 90.210(d), TIA-603-C 2.2.11	Pass
Frequency Stability	FCC Part 2.1055, TIA-603-C 2.2.2, 2.3.2	Pass
Transient Frequency Behavior	TIA-603-C 2.2.19	Pass
99% Bandwidth	RSS-119 & RSS-GEN	Pass

Conditions During Testing

This list is a summary of the conditions noted for or modifications made to the equipment during testing.

Summary of Conditions
None

EQUIPMENT UNDER TEST (EUT)

EQUIPMENT UNDER TEST

Test Box

Manuf: Rothenbuhler Engineering
Model: 1678-4
Serial: 00002

Switching Power Adapter

Manuf: Phihong
Model: PSC30R-120
Serial: P90605345B1

PERIPHERAL DEVICES

The EUT was tested with the following peripheral device(s):

Laptop

Manuf: Dell
Model: D620
Serial: NA

Mini Controller

Manuf: Rothenbuhler Engineering
Model: 1678-6
Serial: 00002

FCC PART 90I & RSS-119

This report contains EMC emissions test results under United States Federal Communications Commission (FCC) 47 CFR 90I requirements for Land Mobile Radio Services.

90.205 Power Output

Test Conditions / Setup	
Comments	
Temp: 21°C	
Humidity: 34%	
Pressure: 102.3kPa	
Frequency Range: 150-174MHz	
EUT's RF output is connected to the Spectrum Analyzer. EUT is connected to a laptop and to a controller. EUT is in operational mode. EUT will be transmitting at LOW (150MHz), MID (162MHz), and HIGH (174MHz) Channels.	

Test Equipment					
Asset/Serial #	Description	Model	Manufacturer	Cal Date	Cal Due
02872	Spectrum Analyzer	E4440A	Agilent	8/25/2009	8/25/2011
P05747	Attenuator	PE7004-20	Pasternack	3/18/2010	3/18/2012
03122	Cable	32026-2-29801-36	Astrolab	12/23/2010	12/23/2012

Engineer Name: A. Del Angel

Results Table			
Frequency (MHz)	RF Output Power (dBm)	90.205 Limit	Result
150.00	29.5	30dBm	Pass
162.00	29.5	30dBm	Pass
174.00	29.5	30dBm	Pass

Test Setup Photo



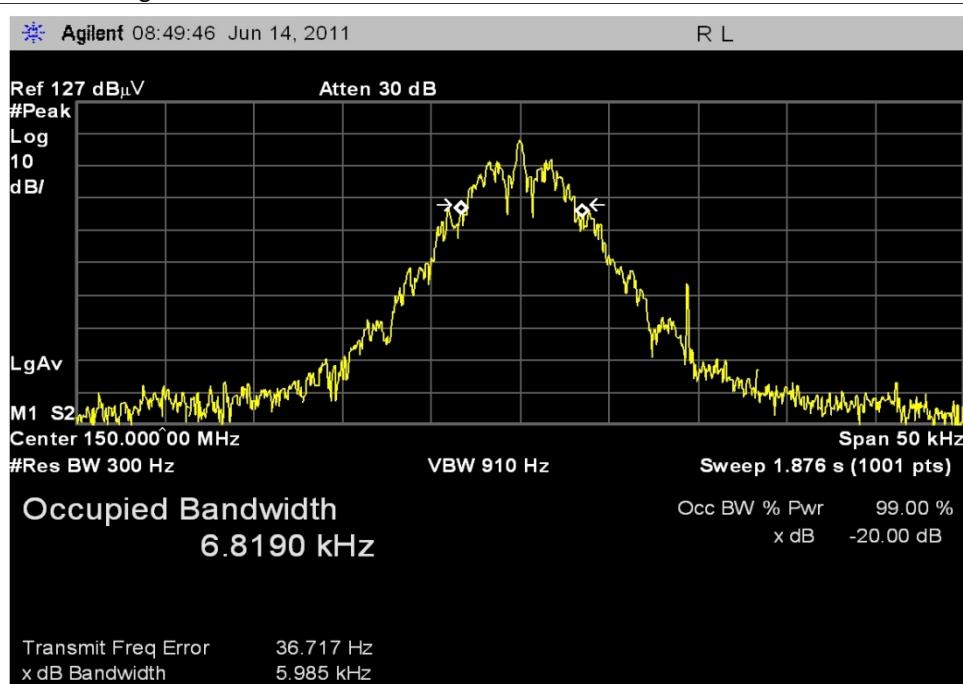
90.209 Bandwidth Limitations

Test Conditions / Setup	
	Comments
Temp: 21°C	
Humidity: 34%	
Pressure: 102.3kPa	
Frequency Range: 150-174MHz	
EUT's RF output is connected to the Spectrum Analyzer. EUT is connected to a laptop and to a controller. EUT is in operational mode. EUT will be transmitting at LOW (150MHz), MID (162MHz), and HIGH (174MHz) Channels.	
RBW = 300Hz.	
VBW = 900H	

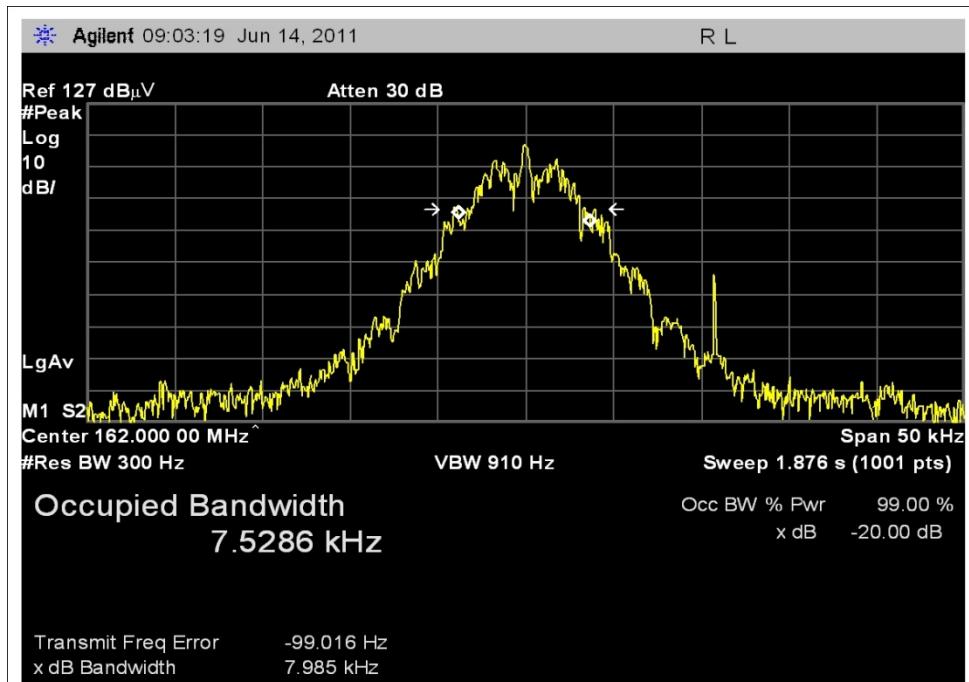
Test Equipment					
Asset/Serial #	Description	Model	Manufacturer	Cal Date	Cal Due
02872	Spectrum Analyzer	E4440A	Agilent	8/25/2009	8/25/2011
P05747	Attenuator	PE7004-20	Pasternack	3/18/2010	3/18/2012
03122	Cable	32026-2-29801-36	Astrolab	12/23/2010	12/23/2012

Test Plots

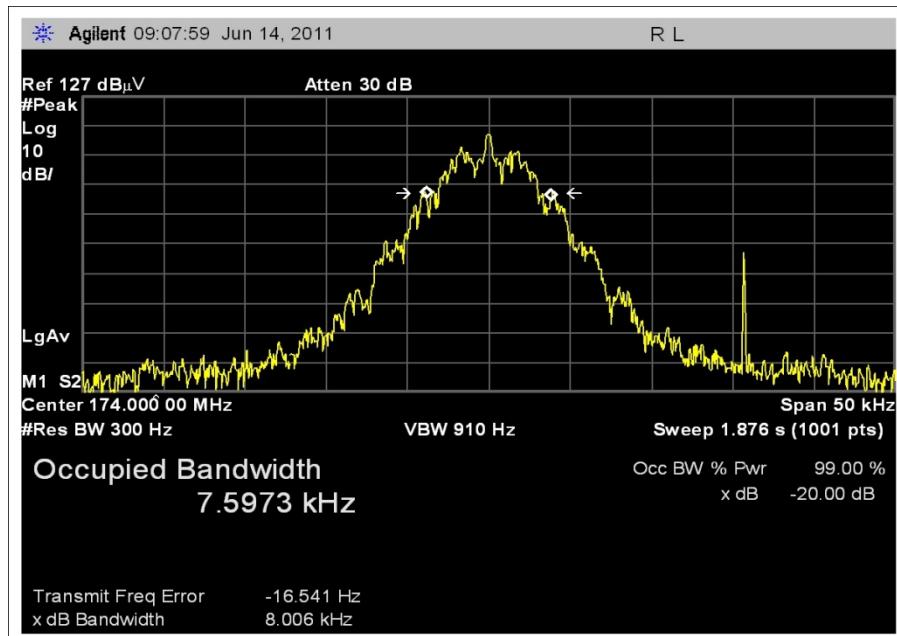
Engineer Name: A. Del Angel



Low Channel



Middle Channel



High Channel

Test Setup Photos



90.210 Emissions Mask

Test Conditions / Setup

Comments

Temp: 21°C

Humidity: 34%

Pressure: 102.3kPa

Frequency Range: 9kHz-2GHz

EUT is located on the test table. EUT is connected to a laptop and to a controller. EUT is in operational mode. EUT will be transmitting at LOW (150MHz), MID (162MHz), and HIGH (174MHz) Channels. Only highest emissions will be recorded. EUT is being tested to Emission Mask D.

RBW: 200Hz 9kHz - 150kHz
 10kHz 150kHz - 30MHz
 100kHz 30MHz - 1GHz
 1MHz 1-2GHz

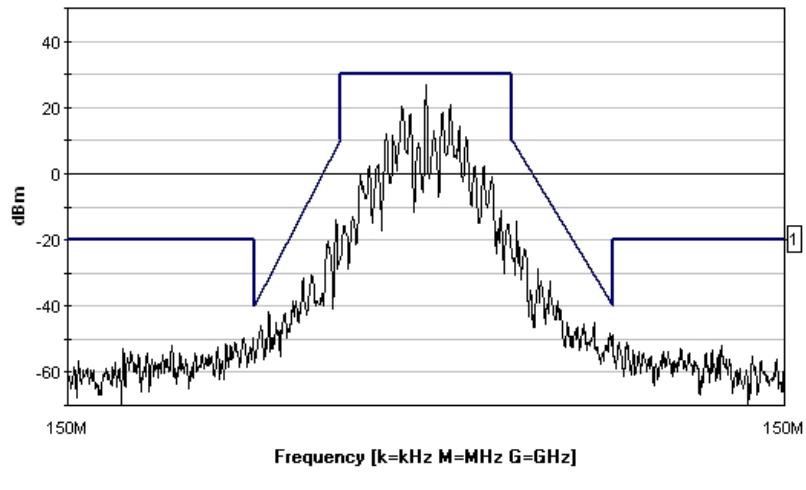
VBW: 10x RBW

Sweep: Auto

Test Equipment

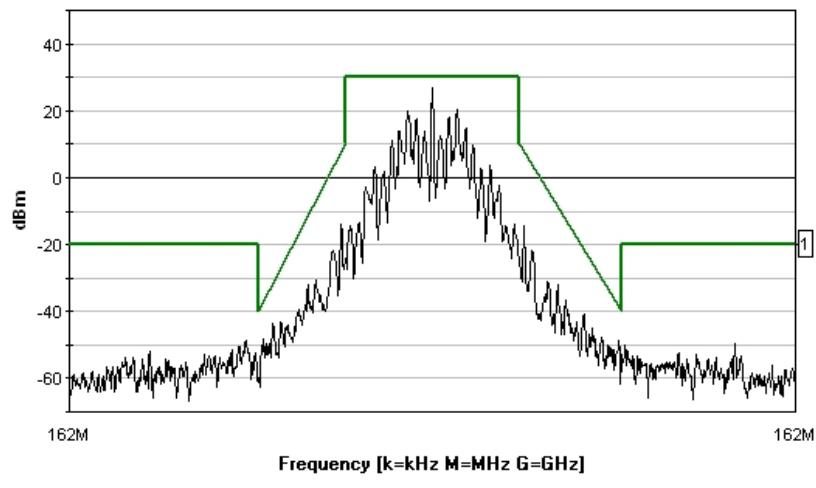
Asset/Serial #	Description	Model	Manufacturer	Cal Date	Cal Due
02872	Spectrum Analyzer	E4440A	Agilent	8/25/2009	8/25/2011
05747	Attenuator	PE7004-20	Pasternack	3/18/2010	3/18/2012
03122	Cable	32026-2-29801-36	Astrolab	12/23/2010	12/23/2012
01316	Preamp	8447D	HP	5/21/2010	5/21/2012
01993	Biconilog Antenna	CBL6111C	Chase	10/9/2009	10/9/2011
05238	Cable	27	Heliax	4/17/2009	4/17/2011
05360	Cable	RG214	Belden	11/8/2010	11/8/2012
01467	Horn Antenna	3115	EMCO	9/17/2009	9/17/2011
00052	Loop Antenna	6502	EMCO	6/8/2010	6/8/2012

CKC Laboratories, Inc. Date: 4/5/2011 Time: 1:54:28 PM Rothenbuhler Engineering WO#: 91266
 47 CFR §90.210(d) Spurious Emissions LOW Test Lead: Line Line Sequence#: 13 Ext ATTN: 0 dB

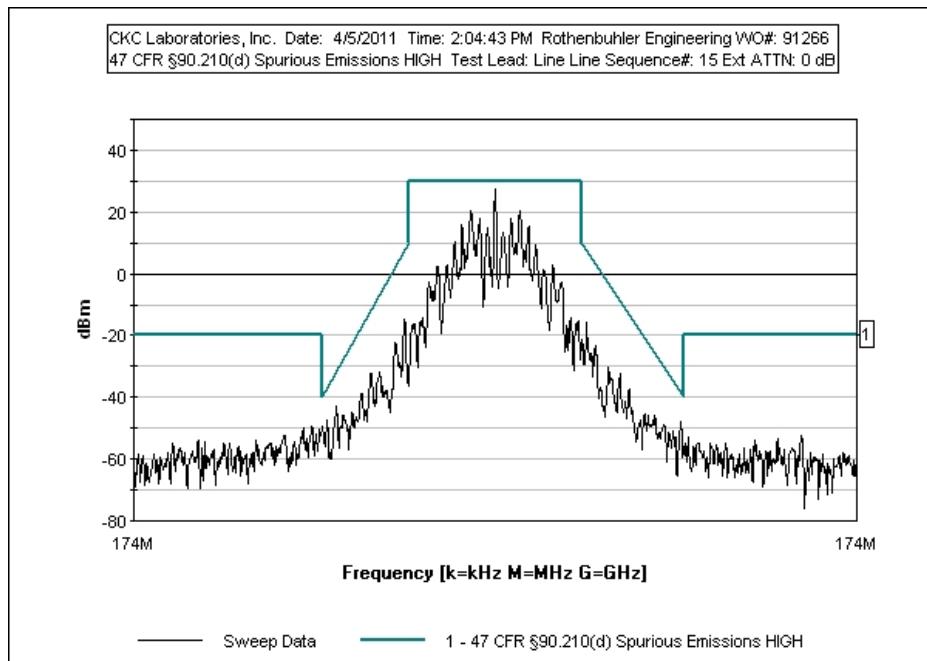


Low Channel

CKC Laboratories, Inc. Date: 4/5/2011 Time: 1:58:25 PM Rothenbuhler Engineering WO#: 91266
 47 CFR §90.210(d) Spurious Emissions MID Test Lead: Line Line Sequence#: 14 Ext ATTN: 0 dB



Middle Channel



High Channel

Test Data Sheets for Radiated Spurious Emissions

Engineer Name: A. Del Angel

Date of Testing: 4/5/11

Operating Frequency:	150 MHz - 174 MHz			
Channels:				
Highest Measured Output Power:	29.54 (dBm)	= 0.9 (Watts)		
Distance:	3 meters			
Limit:	50+10Log(P) = 49.54	dBc		

Freq. (MHz)	Reference Level (dBm)	Antenna Polarity (H/V)	dBc
300.01	-35.1	Vertical	64.64
324.00	-35.7	Vertical	65.24
348.00	-41.3	Vertical	70.84
450.01	-38.8	Horizontal	68.34
486.00	-41.4	Vertical	70.94
521.99	-33.3	Vertical	62.84
599.99	-41.6	Vertical	71.14
647.99	-41.6	Horizontal	71.14
695.99	-43.1	Vertical	72.64
750.00	-42.3	Vertical	71.84
809.99	-38.5	Vertical	68.04
869.99	-40.5	Vertical	70.04
900.01	-52.5	Horizontal	82.04
971.99	-52	Vertical	81.54
1,043.99	-49.3	Vertical	78.84
1,049.97	-42.2	Vertical	71.74
1,134.01	-42.1	Vertical	71.64
1,200.02	-49.7	Vertical	79.24
1,217.99	-48.9	Horizontal	78.44
1,295.93	-51.3	Vertical	80.84
1,349.95	-51	Vertical	80.54
1,457.95	-47.1	Vertical	76.64
1,500.00	-52.8	Vertical	82.34
1,565.99	-38.7	Vertical	68.24
1,620.02	-44	Vertical	73.54
1,739.98	-41.1	Vertical	70.64

Test Setup Photos



Test Data Sheets for Conducted Spurious Emissions

Test Location: CKC Laboratories, Inc. • 22116 23rd Drive SE, Suite A • Bothell, WA 98021 • (425) 402-1717

Customer: **Rothenbuhler Engineering**
 Specification: **47 CFR §90.210(d) Spurious Emissions LOW**
 Work Order #: **91266** Date: **4/5/2011**
 Test Type: **Conducted Emissions** Time: **13:14:08**
 Equipment: **Test Box** Sequence#: **12**
 Manufacturer: Rothenbuhler Engineering Tested By: Armando del Angel
 Model: 1678-4 120V 60Hz
 S/N: 00002

Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	ANP05747	Attenuator	PE7004-20	3/18/2010	3/18/2012
T2	AN03122	Cable	32026-2-29801-36	12/23/2010	12/23/2012
T3	AN02872	Spectrum Analyzer	E4440A	8/25/2009	8/25/2011

Equipment Under Test (* = EUT):

Function	Manufacturer	Model #	S/N
Test Box*	Rothenbuhler Engineering	1678-4	00002
Switching Power Adapter	Phihong	PSC30R-120	P90605345B1

Support Devices:

Function	Manufacturer	Model #	S/N
Laptop	Dell	D620	
Controller	Rothenbuhler Engineering	1678-6	00002

Test Conditions / Notes:

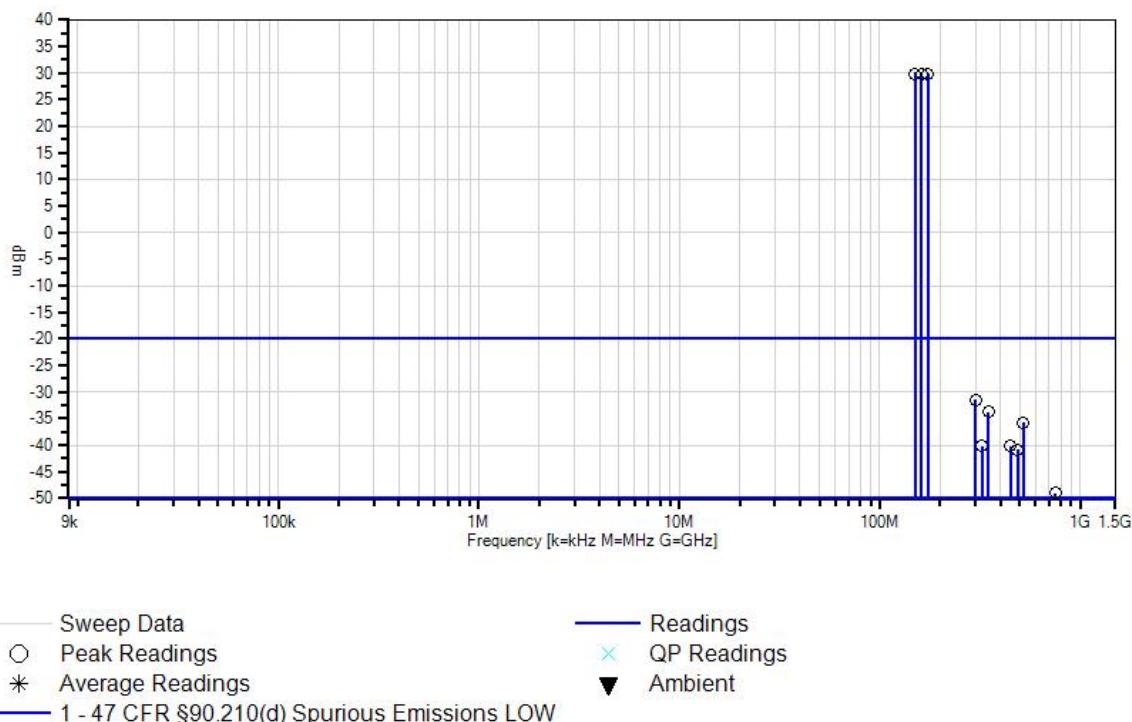
Temp: 21°C
Humidity: 34%
Pressure: 102.3kPa
Frequency Range: 9kHz-2GHz
EUT's RF output is connected to the Spectrum Analyzer.
EUT is connected to a laptop and to a controller.
EUT is in operational mode.
EUT will be transmitting at LOW (150MHz), MID (162MHz), and HIGH (174MHz) Channels.
Only highest emissions will be recorded. EUT is being tested to Emission Mask D.
RBW: 200Hz 9kHz - 150kHz
10kHz 150kHz - 30MHz
100kHz 30MHz - 1GHz
1MHz 1-2GHz
VBW: 10x RBW
Sweep: Auto

Ext Attn: 0 dB

Measurement Data: Reading listed by margin.				Test Lead: Line							
#	Freq MHz	Rdng dB μ V	T1 dB	T2 dB	T3 dB	dB	Dist Table	Corr dBm	Spec dBm	Margin dB	Polar Ant
1	174.000M	9.6	+20.1	+0.2	+0.0		+0.0	29.9	30.0	-0.1	Line
											HIGH Fundamental
2	161.998M	9.6	+20.1	+0.2	+0.0		+0.0	29.9	30.0	-0.1	Line
											MID Fundamental
3	150.001M	9.6	+20.1	+0.2	+0.0		+0.0	29.9	30.0	-0.1	Line
											LOW Fundamental
4	300.000M	-51.8	+20.1	+0.2	+0.0		+0.0	-31.5	-20.0	-11.5	Line
											LOW Channel
5	348.000M	-54.1	+20.1	+0.3	+0.0		+0.0	-33.7	-20.0	-13.7	Line
											HIGH Channel
6	522.000M	-56.1	+20.1	+0.3	+0.0		+0.0	-35.7	-20.0	-15.7	Line
											HIGH Channel
7	324.000M	-60.5	+20.1	+0.3	+0.0		+0.0	-40.1	-20.0	-20.1	Line
											MID Channel
8	450.000M	-60.6	+20.1	+0.3	+0.0		+0.0	-40.2	-20.0	-20.2	Line
											LOW Channel
9	486.000M	-61.2	+20.1	+0.3	+0.0		+0.0	-40.8	-20.0	-20.8	Line
											MID Channel
10	750.000M	-69.5	+20.1	+0.4	+0.0		+0.0	-49.0	-20.0	-29.0	Line
											LOW Channel
11	1134.000M	-71.4	+20.1	+0.5	+0.0		+0.0	-50.8	-20.0	-30.8	Line
											MID Channel
12	696.000M	-71.3	+20.1	+0.4	+0.0		+0.0	-50.8	-20.0	-30.8	Line
											HIGH Channel
13	1218.000M	-72.4	+20.1	+0.5	+0.0		+0.0	-51.8	-20.0	-31.8	Line
											HIGH Channel
14	600.000M	-72.9	+20.1	+0.3	+0.0		+0.0	-52.5	-20.0	-32.5	Line
											LOW Channel
15	1740.000M	-73.7	+20.2	+0.6	+0.0		+0.0	-52.9	-20.0	-32.9	Line
											HIGH Channel
16	648.000M	-73.5	+20.1	+0.4	+0.0		+0.0	-53.0	-20.0	-33.0	Line
											MID Channel
17	810.000M	-75.8	+20.1	+0.4	+0.0		+0.0	-55.3	-20.0	-35.3	Line
											MID Channel
18	1350.000M	-79.0	+20.1	+0.5	+0.0		+0.0	-58.4	-20.0	-38.4	Line
											LOW Channel
19	1044.000M	-80.9	+20.1	+0.4	+0.0		+0.0	-60.4	-20.0	-40.4	Line
											HIGH Channel
20	1200.000M	-81.2	+20.1	+0.5	+0.0		+0.0	-60.6	-20.0	-40.6	Line
											LOW Channel
21	1050.000M	-81.2	+20.1	+0.4	+0.0		+0.0	-60.7	-20.0	-40.7	Line
											LOW Channel
22	972.000M	-81.9	+20.1	+0.4	+0.0		+0.0	-61.4	-20.0	-41.4	Line
											MID Channel
23	870.000M	-82.5	+20.1	+0.4	+0.0		+0.0	-62.0	-20.0	-42.0	Line
											HIGH Channel

24	1458.000M	-82.6	+20.1	+0.5	+0.0	+0.0	-62.0	-20.0	-42.0	Line
25	1392.000M	-82.8	+20.1	+0.5	+0.0	+0.0	-62.2	-20.0	-42.2	Line
26	1566.000M	-83.1	+20.1	+0.5	+0.0	+0.0	-62.5	-20.0	-42.5	Line
27	900.000M	-84.4	+20.1	+0.4	+0.0	+0.0	-63.9	-20.0	-43.9	Line
28	1296.000M	-84.6	+20.1	+0.5	+0.0	+0.0	-64.0	-20.0	-44.0	Line
29	1500.000M	-85.2	+20.2	+0.5	+0.0	+0.0	-64.5	-20.0	-44.5	Line
30	1620.000M	-85.3	+20.2	+0.5	+0.0	+0.0	-64.6	-20.0	-44.6	Line
										MID Channel

CKC Laboratories, Inc. Date: 4/5/2011 Time: 13:14:08 Rothenbuhler Engineering WO#: 91266
 47 CFR §90.210(d) Spurious Emissions LOW Test Lead: Line Line Sequence#: 12 Ext ATTN: 0 dB



Test Setup Photos



90.213 Frequency Stability

Test Conditions / Setup	
	Comments
Temp: 21°C	
Humidity: 34%	
Pressure: 102.3kPa	
Frequency Range: 150-174MHz	
EUT's RF output is connected to the Spectrum Analyzer. EUT is connected to a laptop. EUT is in operational mode. EUT is located inside the Temperature chamber. EUT will be transmitting at LOW (150MHz), MID (162MHz), and HIGH (174MHz) Channels.	

Test Equipment					
Asset/Serial #	Description	Model	Manufacturer	Cal Date	Cal Due
02872	Spectrum Analyzer	E4440A	Agilent	8/25/2009	8/25/2011
P05747	Attenuator	PE7004-20	Pasternack	3/18/2010	3/18/2012
03121	Cable	32026-2-29080-84	Astrolab	10/23/2009	10/23/2011
02907	Multimeter	87	Fluke	5/11/2009	5/11/2011
03193	Power Supply	PS50050	HQ	12/2/2010	12/2/2012
02757	Temperature Chamber	F100/350-8	Bemco	1/30/2011	1/30/2013

Engineer Name: A. Del Angel

Results Table						
Temperature	Input Voltage	LOW PPM	MID PPM	HIGH PPM	90.213 Limit PPM	Result
-30°C	85%	-0.9333	0.8641	2.2988	±5.000	Pass
	115%	0.3999	0.7407	1.6091	±5.000	Pass
-20°C	85%	0	1.4814	1.954	±5.000	Pass
	115%	-0.6666	0	1.3793	±5.000	Pass
-10°C	85%	0.2666	0.3703	0.8045	±5.000	Pass
	115%	0	-0.1234	1.03447	±5.000	Pass
0°C	85%	-0.3999	0.7407	0.6896	±5.000	Pass
	115%	-1.1999	0.4938	1.4942	±5.000	Pass
10°C	85%	-0.5333	-0.2469	0.6896	±5.000	Pass
	115%	-1.8666	0	1.2643	±5.000	Pass
20°C	85%	-0.5333	0	0.8045	±5.000	Pass
	115%	-1.7333	0.6172	0.8045	±5.000	Pass
30°C	85%	-1.0666	0.2469	1.03447	±5.000	Pass
	115%	-1.1999	-0.3703	0.5747	±5.000	Pass
40°C	85%	-1.7333	-0.9876	0.5747	±5.000	Pass
	115%	-1.0666	-0.3703	-0.1149	±5.000	Pass
50°C	85%	-1.3333	-0.7407	1.0344	±5.000	Pass
	115%	-1.7333	-0.7407	0.8045	±5.000	Pass
60°C	85%	-1.1999	-1.7283	0.1149	±5.000	Pass
	115%	-1.4666	-0.9876	0	±5.000	Pass

Test Setup Photos



90.214 Transient Frequency Behavior

Test Conditions / Setup

Comments

Temp: 21°C

Humidity: 34%

Pressure: 102.3kPa

Frequency Range: 150-174MHz

EUT's RF output and Signal Generator output are connected to the 4 port splitter. The Output of the splitter is connected to a pre-amp and the output of the pre-amp is connected to the demodulator input and the Spectrum Analyzer through a step attenuator. The Spectrum Analyzer is only being used to be sure that the signal output is 20dB lower than the EUT's output. The Output of the demodulator is connected to an oscilloscope. EUT is connected to a laptop. EUT is in operational mode. EUT will be transmitting at LOW (150MHz), MID (162MHz), and HIGH (174MHz) Channels. Vertical scale represents 12.5kHz.

Test Equipment

Asset/Serial #	Description	Model	Manufacturer	Cal Date	Cal Due
02872	Spectrum Analyzer	E4440A	Agilent	8/25/2009	8/25/2011
01706	Attenuator / 70 dB	8495B	HP	10/26/2009	10/26/2011
P01313	Splitter, 4-Way		Motorola	NCR	NCR
02072	RF Characteristics Analyzer	8901A	HP	4/14/2011	4/14/2013
02307	Preamp	8447D	HP	3/15/2010	3/15/2012
03052	Oscilloscope	54615B	HP	1/8/2010	1/8/2012

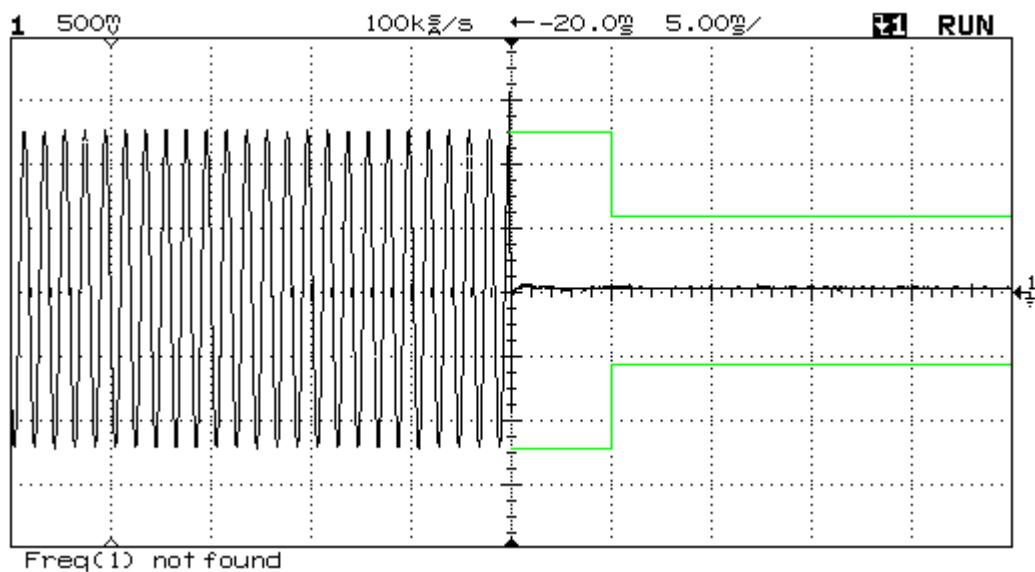
NCR = No calibration required.

Test Plots

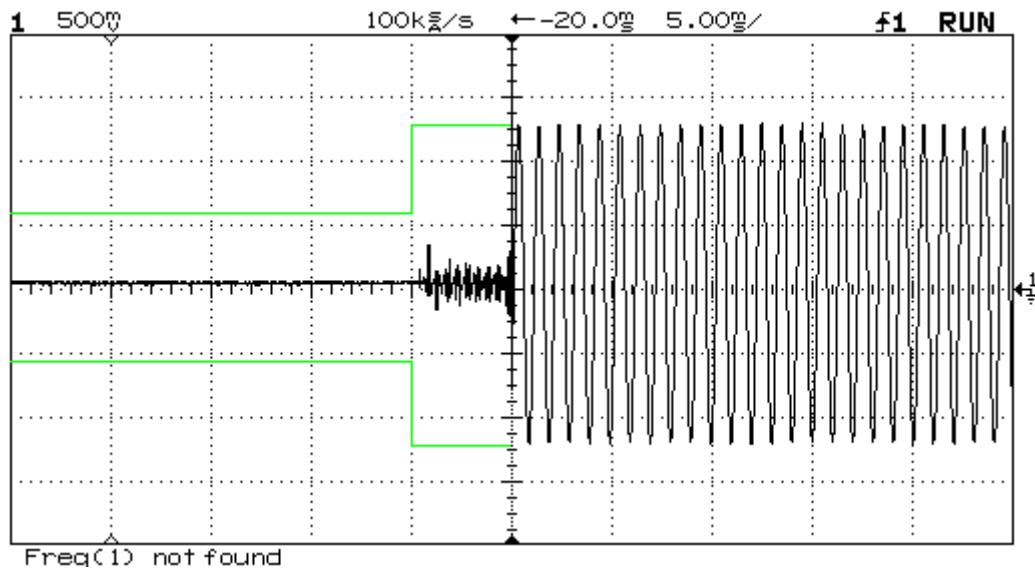
Engineer Name: A. Del Angel

150MHz

ON time

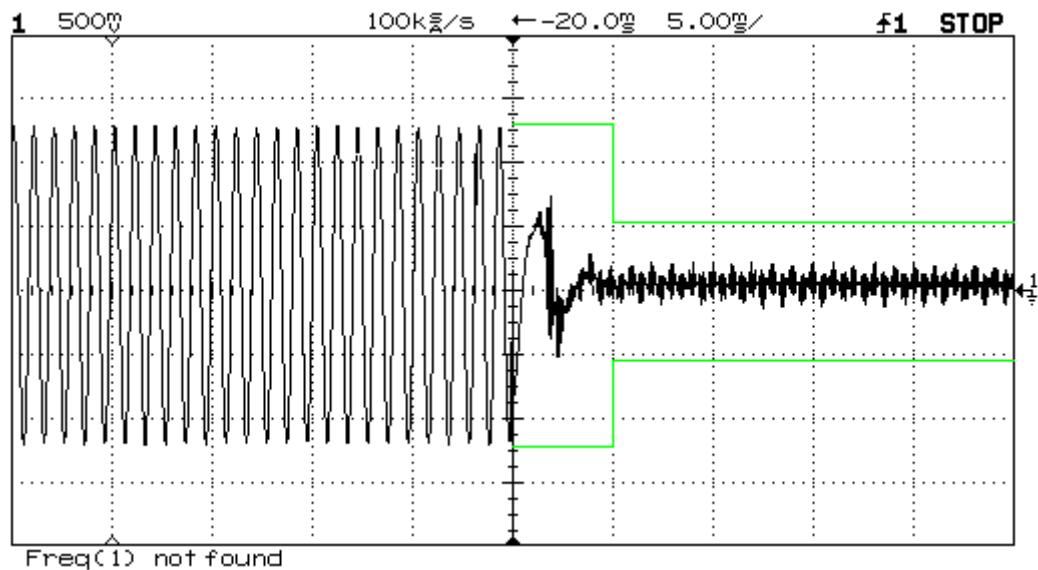


OFF time

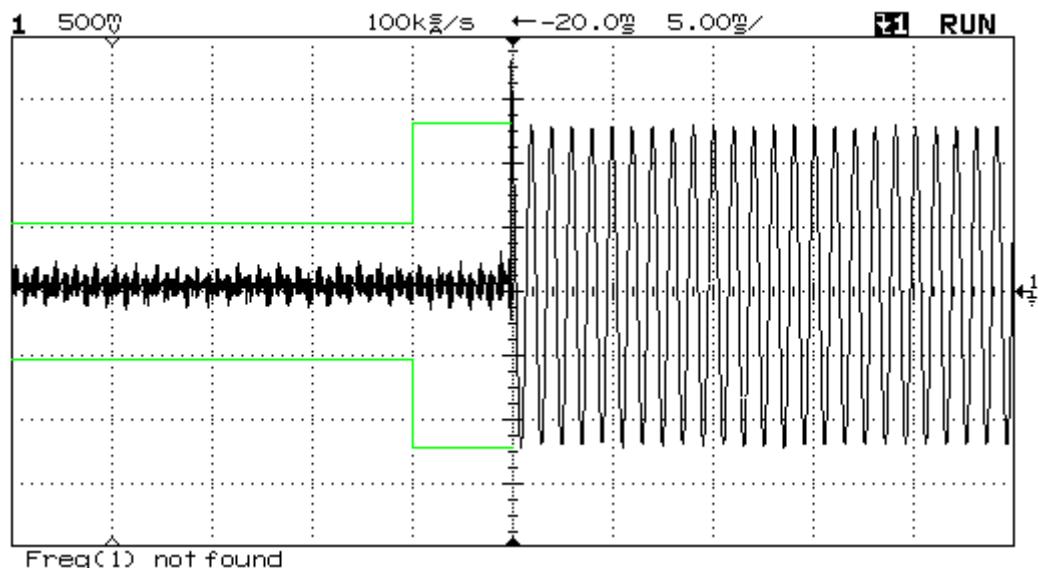


162MHz

ON time

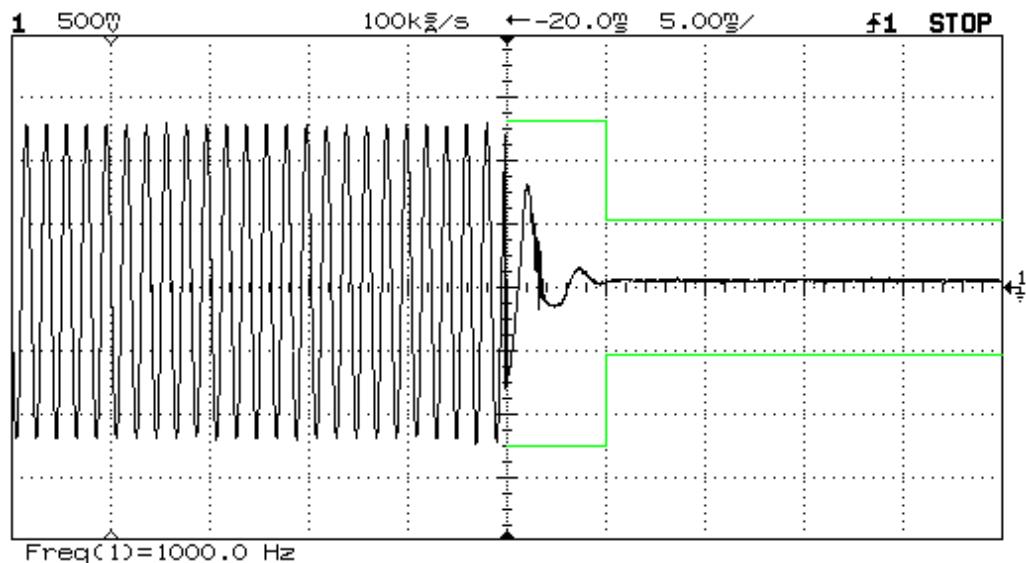


OFF time

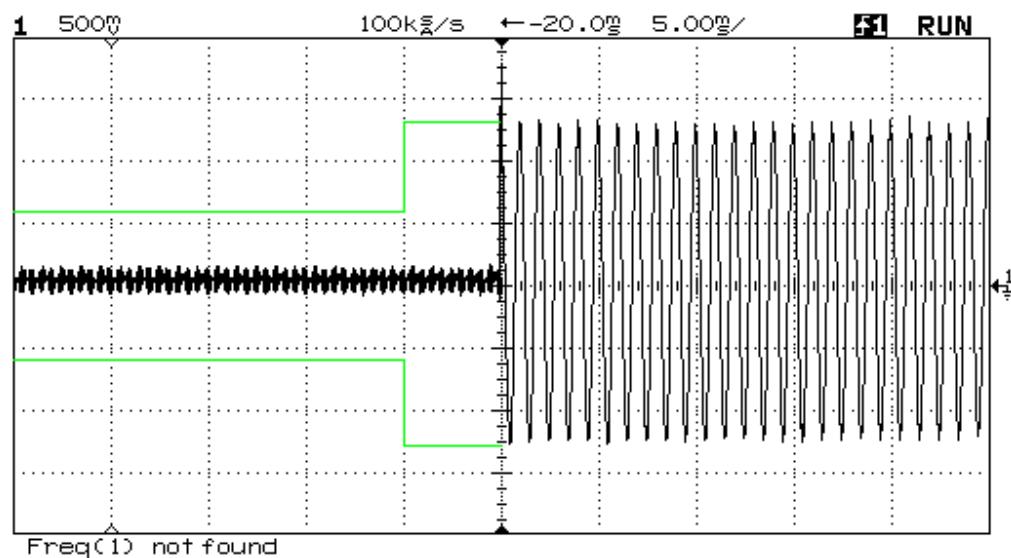


174MHz

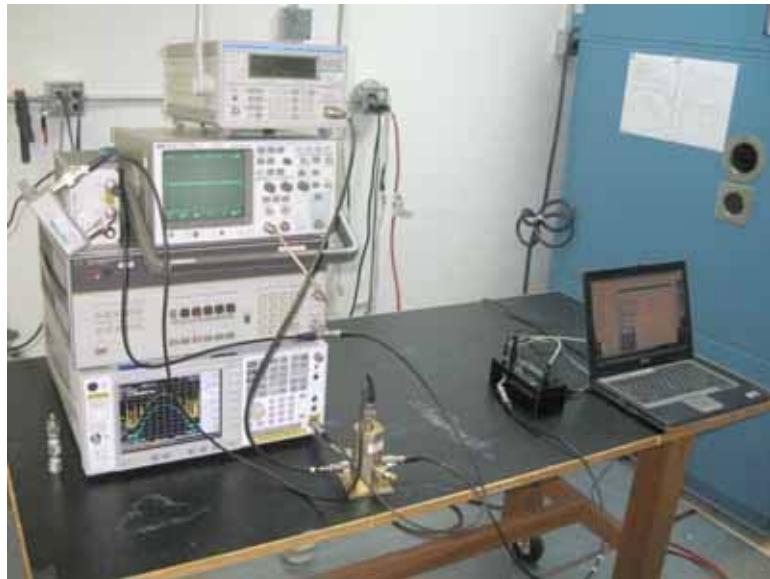
ON time



OFF time



Test Setup Photos



99% Bandwidth

Test Conditions / Setup

Comments

Temp: 21°C

Humidity: 34%

Pressure: 102.3kPa

Frequency Range: 150-174MHz

EUT's RF output is connected to the Spectrum Analyzer. EUT is connected to a laptop and to a controller. EUT is in operational mode. EUT will be transmitting at LOW (150MHz), MID (162MHz), and HIGH (174MHz) Channels.

RBW = 1kHz.

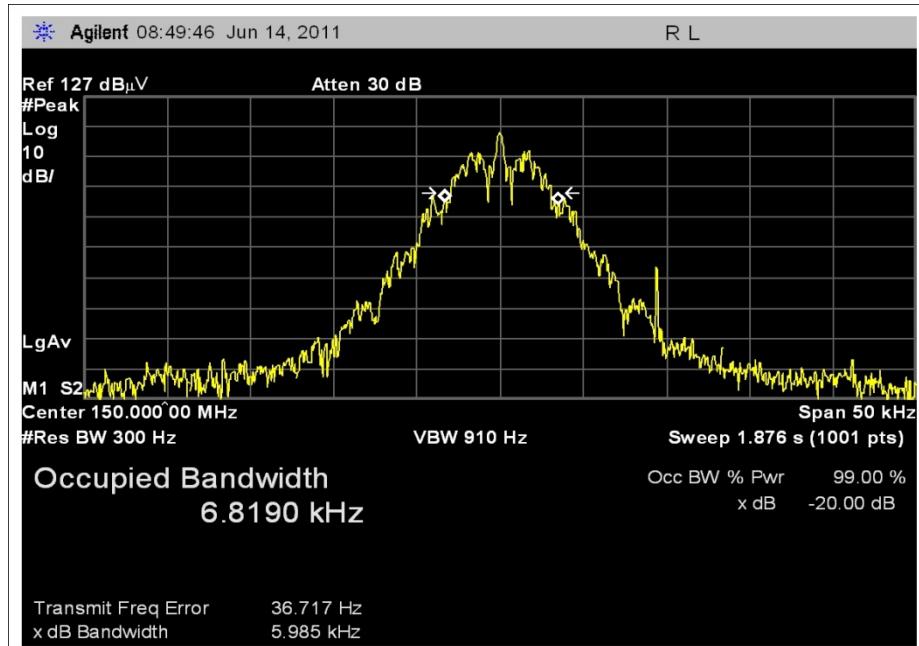
VBW = 10kHz.

Test Equipment

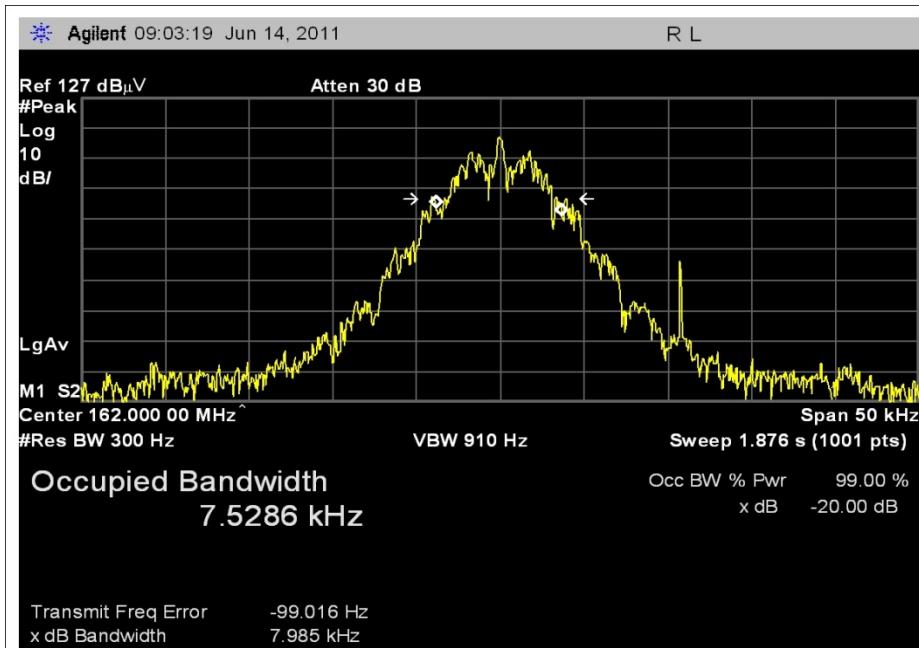
Asset/Serial #	Description	Model	Manufacturer	Cal Date	Cal Due
02872	Spectrum Analyzer	E4440A	Agilent	8/25/2009	8/25/2011
P05747	Attenuator	PE7004-20	Pasternack	3/18/2010	3/18/2012
03122	Cable	32026-2-29801-36	Astrolab	12/23/2010	12/23/2012

Test Plots

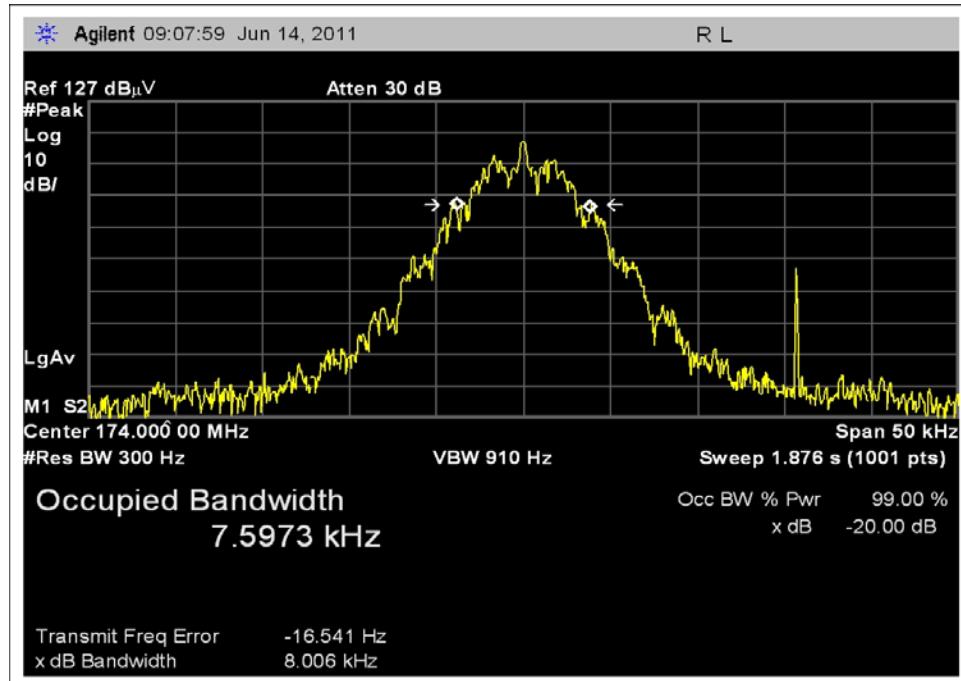
Engineer Name: A. Del Angel



Low Channel



Middle



Test Setup Photos



SUPPLEMENTAL INFORMATION

Measurement Uncertainty

Uncertainty Value	Parameter
4.73 dB	Radiated Emissions
3.34 dB	Mains Conducted Emissions
3.30 dB	Disturbance Power

The reported measurement uncertainties are calculated based on the worst case of all laboratory environments from CKC Laboratories, Inc. test sites. Only those parameters which require estimation of measurement uncertainty are reported. The reported worst case measurement uncertainty is less than the maximum values derived in CISPR 16-4-2. Reported uncertainties represent expanded uncertainties expressed at approximately the 95% confidence level using a coverage factor of k=2. Compliance is deemed to occur provided measurements are below the specified limits.

Emissions Test Details

TESTING PARAMETERS

The cables were routed consistent with the typical application by varying the configuration of the test sample. Interface cables were connected to the available ports of the test unit. The effect of varying the position of the cables was investigated to find the configuration that produced maximum emissions. Cables were of the type and length specified in the individual requirements. The length of cable that produced maximum emissions was selected.

The equipment under test (EUT) was set up in a manner that represented its normal use, as shown in the setup photographs. Any special conditions required for the EUT to operate normally are identified in the comments that accompany the emissions tables.

The emissions data was taken with a spectrum analyzer or receiver. Incorporating the applicable correction factors for distance, antenna, cable loss and amplifier gain, the data was reduced as shown in the table below. The corrected data was then compared to the applicable emission limits. Preliminary and final measurements were taken in order to ensure that all emissions from the EUT were found and maximized.

CORRECTION FACTORS

The basic spectrum analyzer reading was converted using correction factors as shown in the highest emissions readings in the tables. For radiated emissions in dB μ V/m, the spectrum analyzer reading in dB μ V was corrected by using the following formula. This reading was then compared to the applicable specification limit.

SAMPLE CALCULATIONS	
Meter reading	(dB μ V)
+ Antenna Factor	(dB)
+ Cable Loss	(dB)
- Distance Correction	(dB)
- Preamplifier Gain	(dB)
= Corrected Reading	(dB μ V/m)

TEST INSTRUMENTATION AND ANALYZER SETTINGS

The test instrumentation and equipment listed were used to collect the emissions data. A spectrum analyzer or receiver was used for all measurements. The following table shows the measuring equipment bandwidth settings that were used in designated frequency bands. For testing emissions, an appropriate reference level and a vertical scale size of 10 dB per division were used.

MEASURING EQUIPMENT BANDWIDTH SETTINGS PER FREQUENCY RANGE			
TEST	BEGINNING FREQUENCY	ENDING FREQUENCY	BANDWIDTH SETTING
CONDUCTED EMISSIONS	150 kHz	30 MHz	9 kHz
RADIATED EMISSIONS	30 MHz	1000 MHz	120 kHz
RADIATED EMISSIONS	1000 MHz	>1 GHz	1 MHz

SPECTRUM ANALYZER/RECEIVER DETECTOR FUNCTIONS

The notes that accompany the measurements contained in the emissions tables indicate the type of detector function used to obtain the given readings. Unless otherwise noted, all readings were made in the "Peak" mode. Whenever a "Quasi-Peak" or "Average" reading is listed as one of the highest readings, this is indicated as a "QP" or an "Ave" on the appropriate rows of the data sheets. The following paragraphs describe in more detail the detector functions and when they were used to obtain the emissions data.

Peak

In this mode, the spectrum analyzer/receiver readings recorded all emissions at their peak value as the frequency band selected was scanned. By combining this function with another feature of the measuring device called "peak hold," the measuring device had the ability to measure transients or low duty cycle transient emission peak levels. In this mode the measuring device made a slow scan across the frequency band selected and measured the peak emission value found at each frequency across the band.

Quasi-Peak

When the true peak values exceeded or were within 2 dB of the specification limit, quasi-peak measurements were taken using the quasi-peak detector.

Average

For certain frequencies, average measurements may be made using the spectrum analyzer/receiver. To make these measurements, the test engineer reduces the video bandwidth on the measuring device until the modulation of the signal is filtered out. At this point the measuring device is set into the linear mode and the scan time is reduced.