Engineering and Testing for EMC and Safety Compliance

CERTIFICATION APPLICATION REPORT
FCC PART 15.247 CERTIFICATION

Test Lab:	Applicant Information:
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FCC ID:	GU6WJSX2000	**GRANTEE FRN NUMBER:**	0003583150
PLAT FORM:	N/A	**RTL WORK ORDER NUMBER:**	2004024
MODEL:	AlienC1915	**RTL QUOTE NUMBER:**	QRTL04-214
DATE OF TEST REPORT:	March 26, 2004		

American National Standard Institute:	ANSI C63.4: Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz
FCC Classification:	DSS – Part 15 Spread Spectrum Transmitter Frequency Hopping
FCC Rule Part(s):	Part 15.247: Operation within the bands 920-928 MHz, 2400-2483.5 MHz and 5725-5850 MHz Frequency Hopping System
Industry Canada Standard:	RSS-210: Low Power License-Exempt Radio Communication Devices (All Frequency Bands)
Digital Interface Information	Digital Interface was found to be compliant
Receiver Information	Receiver was found to be compliant

Frequency Range (MHz)	Output Power* (W)	Frequency Tolerance	Emission Designator
902.8-927.6	0.028	N/A	N/A

* output power is maximum peak conducted

We, the undersigned, hereby declare that the equipment tested and referenced in this report conforms to the identified standard(s) as described in this test report.

Furthermore, there was no deviation from, additions to, or exclusions from the FCC Part 2, FCC Part 15, Industry Canada RSS-210 and ANSI C63.4.

Signature: _____ Date: March 26, 2004

Typed/Printed Name: Desmond A. Fraser Position: President

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1 GENERAL INFORMATION

1.1 SCOPE

FCC Rules Part 15.247: Frequency Hopping, Direct Spread Spectrum and Hybrid Systems that are in operation within the bands of 902-928 MHz, 2400-2483.5 MHz and 5725-5850 MHz.

IC RSS-210 Section 6.2.2(o): Frequency Hopping, Direct Spread Spectrum and Hybrid Systems that are in operation within the bands of 902-928 MHz, 2400-2483.5 MHz and 5725-5850 MHz.

A direct sequence (DS) system is a spread spectrum (SS) system in which the carrier has been modulated by a high speed spreading code and an information data stream. The high-speed code sequence dominates the "modulating function" and is the direct cause of the wide spreading of the transmitted signal.

1.2 TEST FACILITY

The open area test site and conducted measurement facility used to collect the radiated data is located at 360 Herndon Parkway, Suite 1400, Herndon, Virginia 20170. This site has been fully described in a report and approved by the Federal Communications Commission to perform AC line conducted and radiated emissions testing (ANSI C63.4 2000).

1.3 RELATED SUBMITTAL(S)/GRANT(S)

This is an original application for LIMITETD MODULAR APRROVAL certification for Paxar Americas, Inc., Model AlienC1915, FCC ID: GU6WJSX2000. The IF and LO's were investigated and tested.

1.4 MODIFICATIONS

No modifications were made to the device to achieve the results listed in this report.

2 TEST INFORMATION

2.1 TEST JUSTIFICATION

The EUT was tested in all three orthogonal planes in order to determine worst-case emissions. 902.8 MHz, 915 MHz, and 927.6 MHz were tested and investigated from 9 kHz to 24 GHz. Data for all three channels is presented in this report.

The EUT contains an internal dipole antenna mounted at the printer roller to program labels. The antenna transmits, receives, and is connected to the RFID internal antenna port.

2.2 EXERCISING THE EUT

The EUT was provided with software to stop hopping for transmit at one frequency during testing. The carrier was also checked to verify that information was being transmitted. There were no deviations from the test standard(s) and/or methods.

2.3 TEST RESULT SUMMARY

TABLE 2-1: TEST RESULT SUMMARY FOR FCC RULES AND REGULATIONS

STANDARD	TEST	PASS/FAIL OR N/A
FCC 15.205	Compliance with the Restricted Band Edge	Pass
FCC 15.207	Conducted Emissions	Pass
FCC 15.209	Radiated Emissions	Pass
FCC 15.247(a)(1)	Occupied Bandwidth	Pass
FCC 15.247(b)(2)	Power Output	Pass
FCC 15.247(c)	Antenna Conducted Spurious Emissions	Pass
FCC 15.247(a)(1)(i)	Hopping characteristics	Pass

2.4 TEST SYSTEM DETAILS

The test sample was received on March 8, 2004. The FCC Identifiers for all equipment, plus descriptions of all cables used in the tested system, are identified in Table 2-2.

TABLE 2-2: EQUIPMENT UNDER TEST (EUT)

PART	MANUFACTURER	MODEL	SERIAL NUMBER	FCC ID	CABLE DESCRIPTION	RTL BAR CODE
Controller	Paxar	Paxar 939	04020025	N/A	Unshielded I/O	15741
Printer	Paxar	Paxar 939	04030839	N/A	Unshielded I/O; Unshielded power	15747
RFID Module	Paxar	AlienC1915	N/A	GU6WJSX2000	Unshielded I/O; Unshielded power	

2.5 CONFIGURATION OF TESTED SYSTEM

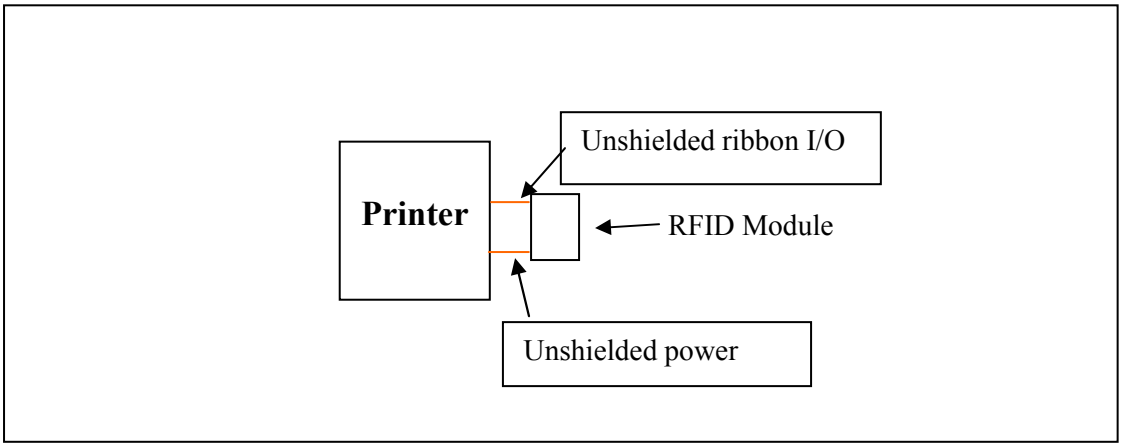


FIGURE 1: WORST CASE CONFIGURATION OF SYSTEM UNDER TEST

3 COMPLIANCE WITH THE RESTRICTED BAND EDGE – FCC §15.205; IC RSS-210 §6.3

3.1 TEST PROCEDURE

Compliance with the band edges was performed using the FCC's "Radiated Measurement at a Band Edge" guidance document.

3.2 BAND EDGE TEST EQUIPMENT

TABLE 3-1: BAND EDGE TEST EQUIPMENT

RTL Asset #	Manufacturer	Model	Part Type	Serial Number	Calibration Due Date
900931	Hewlett Packard	8566B	Spectrum Analyzer (100 Hz - 22 GHz)	3138A07771	5/12/04
901053	Schaffner Chase	CBL6112B	Bi-Log Antenna (20 MHz - 2 GHz)	2648	7/03/04
900811	Rhein Tech Labs	PR-1040	Amplifier	1003	2/13/05

3.3 COMPLIANCE WITH THE RESTRICTED BAND EDGE TEST DATA

Calculation of Lower Band Edge

The level 97.7 dBuV/m is the Field Strength measurement, from which the delta measurement of 77.9 dB is subtracted (reference plots), which is equivalent to a level of 19.8 dB. This level has a margin of 26.2 dB below the limit of 46 dBuV/m

Calculation: 97.7 dBuV/m – 77.9 dB – 46 dBuV/m = -26.2 dB

Calculation of Upper Band Edge

The level 97.1 dBuV/m is the Field Strength measurement, from which the delta measurement of 77.9 dB is subtracted (reference plots), which is equivalent to a level of 19.2 dB. This level has a margin of 26.8 dB below the limit of 46 dBuV/m.

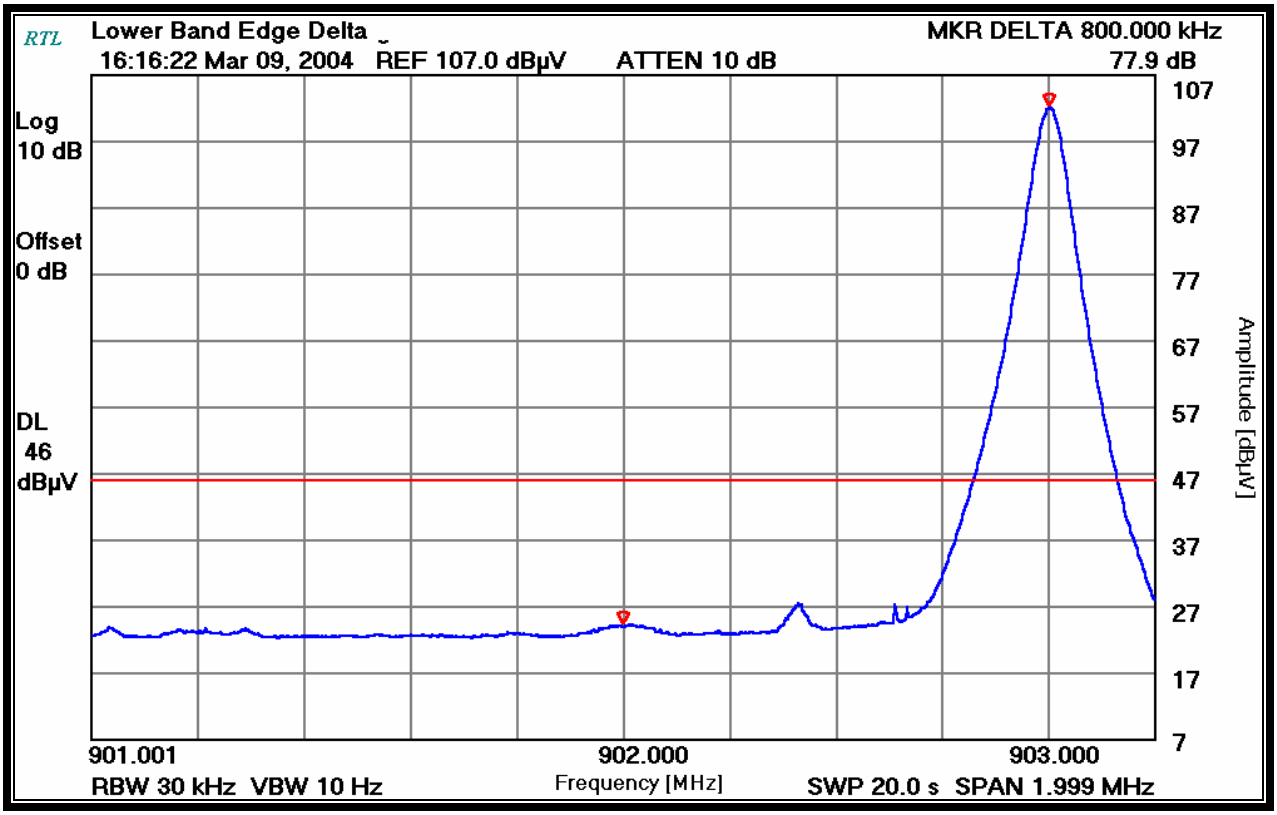
Calculation: 97.1 dBuV/m – 77.9 dB – 46 dBuV/m = -26.8 dB

Frequency (MHz):	902.8
Resolution Bandwidth (kHz):	30
Video Bandwidth (Hz):	10
Sweep Time (s):	20

PLOT 3-1: LOWER BAND EDGE: DELTA MEASUREMENT (902.8 MHZ)

Field strength of Channel 2 (120 kHz RBW) = 97.7 dBuV/m

Delta measurement: 77.9 dB



TEST PERSONNEL:

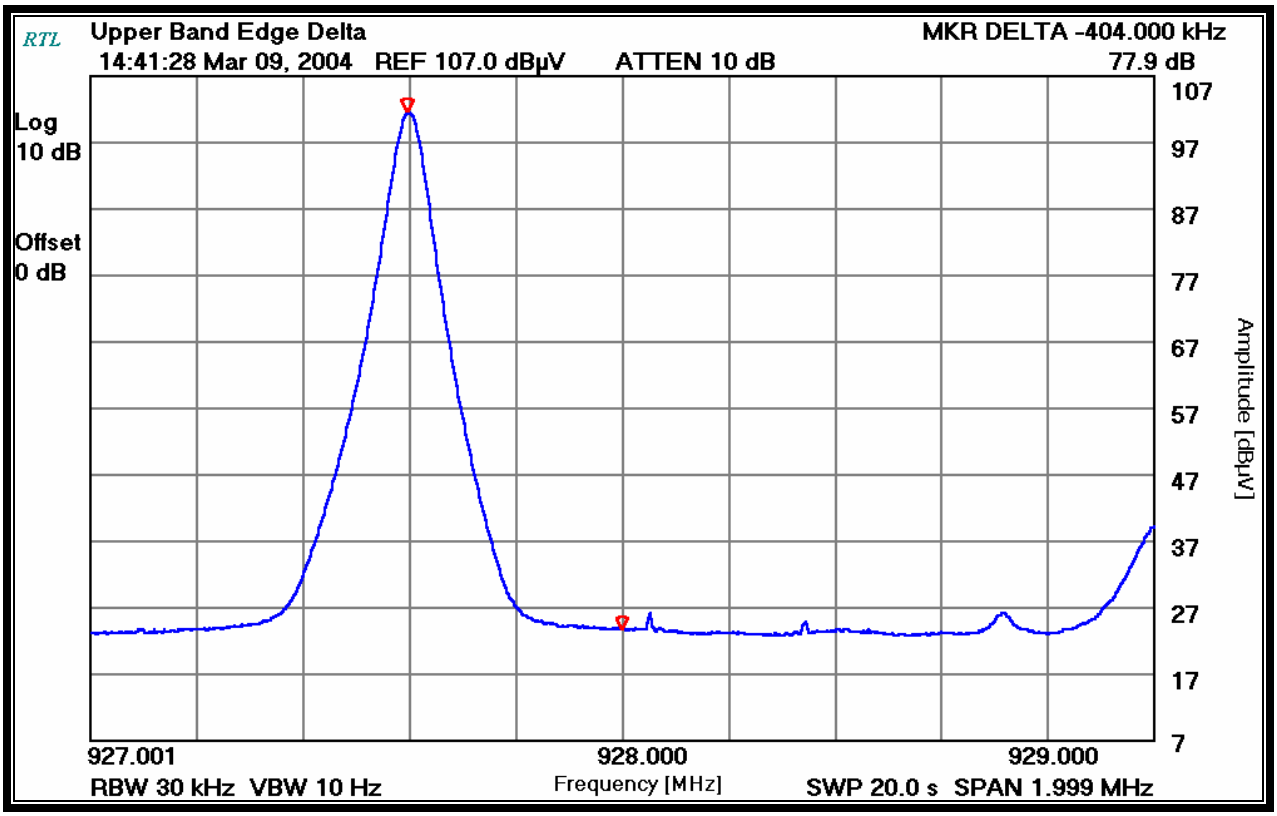
Daniel W. Baltzell		March 9, 2004
EMC Test Engineer	Signature	Date Of Test

Frequency (MHz):	927.6
Resolution Bandwidth (kHz):	30
Video Bandwidth (Hz):	10
Sweep Time (s):	20

PLOT 3-2: UPPER BAND EDGE: DELTA MEASUREMENT (927.6 MHZ)

Field strength of Upper Band Edge (120 kHz RBW) = 97.1 dBuV/m

Delta measurement = 77.9 dB



TEST PERSONNEL:

Daniel W. Baltzell	Daniel W. Baltzell	March 9, 2004
EMC Test Engineer	Signature	Date Of Test

4 CONDUCTED LIMITS – FCC §15.207; IC RSS-210 §6.6 AND 7.4

4.1 CONDUCTED TEST DATA

TABLE 4-1: CONDUCTED TEST DATA; MODE TX, 902.8 MHZ, NEUTRAL SIDE (LINE 1)

Temperature: 74°F Humidity: 23%										
Emission Frequency (MHz)	Test Detector	Analyzer Reading (dBuV)	Site Correction Factor (dB)	Emission Level (dBuV)	FCC QP Limit (dBuV)	FCC QP Margin (dBuV)	FCC AV Limit (dBuV)	FCC AV Margin (dBuV)	Pass/ Fail	Comments
0.152	Pk	42.8	2.0	44.8	65.9	-21.1	55.9	-11.1	Pass	
0.336	Pk	31.0	1.0	32.0	59.3	-27.3	49.3	-17.3	Pass	
0.464	Pk	30.6	0.9	31.5	56.6	-25.1	46.6	-15.1	Pass	
3.630	Pk	25.3	1.7	27.0	56.0	-29.0	46.0	-19.0	Pass	
11.950	Pk	26.9	3.1	30.0	60.0	-30.0	50.0	-20.0	Pass	
26.700	Pk	28.2	4.3	32.5	60.0	-27.5	50.0	-17.5	Pass	

TABLE 4-2: CONDUCTED TEST DATA; MODE TX, 902.8 MHZ, HOT SIDE (LINE 2)

Temperature: 74°F Humidity: 23%										
Emission Frequency (MHz)	Test Detector	Analyzer Reading (dBuV)	Site Correction Factor (dB)	Emission Level (dBuV)	FCC QP Limit (dBuV)	FCC QP Margin (dBuV)	FCC AV Limit (dBuV)	FCC AV Margin (dBuV)	Pass/ Fail	Comments
0.152	Pk	41.4	2.0	43.4	65.9	-22.5	55.9	-12.5	Pass	
0.252	Pk	30.5	1.4	31.9	61.7	-29.8	51.7	-19.8	Pass	
0.337	Pk	29.7	1.0	30.7	59.3	-28.6	49.3	-18.6	Pass	
0.459	Pk	29.3	0.9	30.2	56.7	-26.5	46.7	-16.5	Pass	
3.770	Pk	25.3	1.7	27.0	56.0	-29.0	46.0	-19.0	Pass	
11.680	Pk	24.3	3.0	27.3	60.0	-32.7	50.0	-22.7	Pass	
15.010	Pk	25.1	3.4	28.5	60.0	-31.5	50.0	-21.5	Pass	
26.700	Pk	26.5	4.4	30.9	60.0	-29.1	50.0	-19.1	Pass	

TABLE 4-3: CONDUCTED TEST DATA; MODE TX, 915 MHZ, NEUTRAL SIDE (LINE 1)

Temperature: 74°F Humidity: 23%										
Emission Frequency (MHz)	Test Detector	Analyzer Reading (dBuV)	Site Correction Factor (dB)	Emission Level (dBuV)	FCC QP Limit (dBuV)	FCC QP Margin (dBuV)	FCC AV Limit (dBuV)	FCC AV Margin (dBuV)	Pass/ Fail	Comments
0.155	Pk	43.6	2.0	45.6	65.7	-20.1	55.7	-10.1	Pass	
0.251	Pk	30.2	1.4	31.6	61.7	-30.1	51.7	-20.1	Pass	
0.483	Pk	29.0	0.9	29.9	56.3	-26.4	46.3	-16.4	Pass	
3.530	Pk	25.7	1.6	27.3	56.0	-28.7	46.0	-18.7	Pass	
11.830	Pk	26.6	3.0	29.6	60.0	-30.4	50.0	-20.4	Pass	
26.490	Pk	28.9	4.3	33.2	60.0	-26.8	50.0	-16.8	Pass	

TABLE 4-4: CONDUCTED TEST DATA; MODE TX, 915 MHZ, HOT SIDE (LINE 2)

Temperature: 74°F Humidity: 23%										
Emission Frequency (MHz)	Test Detector	Analyzer Reading (dBuV)	Site Correction Factor (dB)	Emission Level (dBuV)	FCC QP Limit (dBuV)	FCC QP Margin (dBuV)	FCC AV Limit (dBuV)	FCC AV Margin (dBuV)	Pass/ Fail	Comments
0.151	Pk	41.9	2.0	43.9	65.9	-22.0	55.9	-12.0	Pass	
0.213	Pk	31.9	1.6	33.5	63.1	-29.6	53.1	-19.6	Pass	
0.482	Pk	26.0	0.9	26.9	56.3	-29.4	46.3	-19.4	Pass	
0.500	Pk	27.9	0.9	28.8	56.0	-27.2	46.0	-17.2	Pass	
3.570	Pk	25.8	1.7	27.5	56.0	-28.5	46.0	-18.5	Pass	
26.460	Pk	28.6	4.3	32.9	60.0	-27.1	50.0	-17.1	Pass	

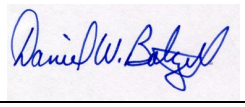
TABLE 4-5: CONDUCTED TEST DATA; MODE TX, 927.6 MHZ, NEUTRAL SIDE (LINE 1)

Temperature: 74°F Humidity: 23%										
Emission Frequency (MHz)	Test Detector	Analyzer Reading (dBuV)	Site Correction Factor (dB)	Emission Level (dBuV)	FCC QP Limit (dBuV)	FCC QP Margin (dBuV)	FCC AV Limit (dBuV)	FCC AV Margin (dBuV)	Pass/ Fail	Comments
0.159	Pk	41.7	2.0	43.7	65.5	-21.8	55.5	-11.8	Pass	
0.249	Pk	26.9	1.4	28.3	61.8	-33.5	51.8	-23.5	Pass	
0.342	Pk	30.2	1.0	31.2	59.2	-28.0	49.2	-18.0	Pass	
3.720	Pk	24.7	1.7	26.4	56.0	-29.6	46.0	-19.6	Pass	
11.890	Pk	25.6	3.0	28.6	60.0	-31.4	50.0	-21.4	Pass	
26.670	Pk	30.9	4.3	35.2	60.0	-24.8	50.0	-14.8	Pass	

TABLE 4-6: CONDUCTED TEST DATA; MODE TX, 927.6 MHZ, HOT SIDE (LINE 2)

Temperature: 74°F Humidity: 23%										
Emission Frequency (MHz)	Test Detector	Analyzer Reading (dBuV)	Site Correction Factor (dB)	Emission Level (dBuV)	FCC QP Limit (dBuV)	FCC QP Margin (dBuV)	FCC AV Limit (dBuV)	FCC AV Margin (dBuV)	Pass/ Fail	Comments
0.150	Pk	43.2	2.0	45.2	66.0	-20.8	56.0	-10.8	Pass	
0.252	Pk	29.8	1.4	31.2	61.7	-30.5	51.7	-20.5	Pass	
0.340	Pk	26.1	1.0	27.1	59.2	-32.1	49.2	-22.1	Pass	
0.491	Pk	25.6	0.9	26.5	56.2	-29.7	46.2	-19.7	Pass	
0.530	Pk	28.6	0.8	29.4	56.0	-26.6	46.0	-16.6	Pass	
3.600	Pk	22.5	1.7	24.2	56.0	-31.8	46.0	-21.8	Pass	
11.980	Pk	25.7	3.1	28.8	60.0	-31.2	46.0	-21.2	Pass	
26.580	Pk	29.1	4.3	33.4	60.0	-26.6	46.0	-16.6	Pass	

TEST PERSONNEL:



Daniel W. Baltzell		March 9, 2004
EMC Test Engineer	Signature	Date Of Test

5 RADIATED EMISSION LIMITS RECEIVER/DIGITAL INTERFACE – FCC §15.209; IC RSS-210 §7.3

5.1 RECEIVER/DIGITAL INTERFACE RADIATED EMISSION LIMITS TEST PROCEDURE

Emissions from the digital portion of the EUT were tested and found to comply with the requirements of FCC Part 15.209.

5.2 RECEIVER/DIGITAL INTERFACE RADIATED EMISSIONS TEST EQUIPMENT

TABLE 5-1: RECEIVER/DIGITAL INTERFACE RADIATED EMISSIONS TEST EQUIPMENT

RTL Asset #	Manufacturer	Model	Part Type	Serial Number	Calibration Due Date
900889	Hewlett Packard	85685A	RF Preselector for HP 8566B or 8568B (20 Hz - 2 GHz)	3146A01309	3/5/05
900905	Rhein Tech Labs	PR-1040	Amplifier	900905	9/10/04
900931	Hewlett Packard	8566B	Spectrum Analyzer (100 Hz - 22 GHz)	3138A07771	5/12/04
900969	Hewlett Packard	85650A	Quasi-Peak Adapter	2412A00414	5/12/04
901053	Schaffner Chase	CBL6112B	Bi-Log Antenna (20 MHz - 2 GHz)	2648	7/03/04

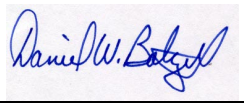
5.3 RECEIVER/DIGITAL INTERFACE RADIATED EMISSION LIMITS TEST DATA

TABLE 5-2: RECEIVER/DIGITAL INTERFACE RADIATED EMISSIONS

Temperature: 42°F Humidity: 51%									
Emission Frequency (MHz)	**Test Detector**	**Antenna Polarity (H/V)**	**Turntable Azimuth (deg)**	**Antenna Height (m)**	**Analyzer Reading (dBuV)**	**Site Correction Factor (dB/m)**	**Emission Level (dBuV/m)**	**Limit (dBuV/m)**	**Margin (dB)**
120.000	Qp	H	350	1.9	47.5	-16.7	30.8	54.0	-23.2
160.000	Qp	H	0	1.8	41.6	-18.8	22.8	54.0	-31.2
240.000	Qp	H	120	1.4	47.3	-16.6	30.7	56.9	-26.2
280.000	Qp	H	120	1.2	46.7	-15.1	31.6	56.9	-25.3
400.000	Qp	H	120	1.0	42.9	-11.7	31.2	56.9	-25.7
480.000	Qp	H	200	1.9	38.9	-9.7	29.2	56.9	-27.7
670.947	Qp	H	260	1.2	49.0	-6.6	42.4	56.9	-14.5
1238.660	Av	H	270	2.0	42.8	0.0	42.8	60.0	-17.2

QP: RES. =100 KHZ, VID= 100 KHZ; AV: RES. = 1 MHZ, VID = 10 HZ

TEST PERSONNEL:



Daniel W. Baltzell		March 9, 2004
EMC Test Engineer	Signature	Date Of Test

6 RADIATED EMISSION LIMITS; SPURIOUS AND HARMONICS – FCC §15.247; IC RSS-210 §6.3

6.1 RADIATED SPURIOUS EMISSION LIMITS TEST PROCEDURE

Radiated Spurious Emissions applies to harmonics and spurious emissions that fall in the restricted and non-restricted bands. The restricted bands are listed in Part 15.205. The maximum permitted average field strength for the restricted band is listed in Part 15.209. The EUT was tested in the X-Y, X-Z and Y-Z orthogonal planes.

6.2 RADIATED SPURIOUS TEST EQUIPMENT

TABLE 6-1: RADIATED SPURIOUS EMISSIONS TEST EQUIPMENT

RTL Asset #	Manufacturer	Model	Part Type	Serial Number	Calibration Due Date
900772	EMCO	3161-02	Horn Antenna (2 - 4 GHz)	9804-1044	3/15/04
900323	EMCO	3160-7	Horn Antennas (8.2 - 12.4 GHz)	9605-1054	6/10/04
900356	EMCO	3160-08	Horn Antennas (12.4 – 18 GHz)	9607-1044	6/10/04
900321	EMCO	3161-03	Horn Antenna (4.0 - 8.2 GHz)	9508-1020	4/10/04
901053	Schaffner & Chase	CBL6112B	Bilog Antenna (20 MHz - 2 GHz)	2648	7/03/04
900905	Rhein Tech Laboratories, Inc.	PR-1040	Pre Amplifier 40dB (10 MHz – 2 GHz)	1006	9/10/04
900325	EMCO	3160-9	Horn Antennas (18 - 26.5 GHz)	9605-1051	3/15/04
900814	Electro-Metrics	EM-6961 (RGA-60)	Double Ridged Guide Antenna (1 - 18 GHz)	2310	2/17/06
900889	Hewlett Packard	85685A	RF Preselector for HP 8566B or 8568B (20 Hz-2 GHz)	3146A01309	11/21/03
900905	Rhein Tech Labs	PR-1040	Amplifier	900905	3/5/05
900931	Hewlett Packard	8566B	Spectrum Analyzer (100 Hz - 22 GHz)	3138A07771	5/12/04
900930	Hewlett Packard	85662A	Spectrum Analyzer Display Section	3144A20839	5/12/04
900932	Hewlett Packard	8449B	Microwave Preamplifier, (1 - 26.5 GHz)	3008A00505	4/22/04
900969	Hewlett Packard	85650A	Quasi-Peak Adapter	2412A00414	5/12/04

6.3 RADIATED EMISSIONS HARMONICS/SPURIOUS TEST DATA

Operating Frequency (MHz): 902.8
Measured Level at 100kHz (dBuV/m): 98.4
Limit (dBuV/m): 78.4

TABLE 6-2: RADIATED EMISSIONS HARMONICS/SPURIOUS (LOW CHANNEL; 902.8 MHZ)

Emission Frequency (MHz)	Test Detector	Antenna Polarity (H/V)	Analyzer Reading (dBuV)	Site Correction Factor (dB/m)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB0
1805.000	Av	V	66.7	4.7	71.4	78.4	-7.0
2707.500	Av	V	24.9	22.6	47.5	54.0	-6.5
3610.000	Av	V	14.8	24.6	39.4	54.0	-14.6
4512.500	Av	H	32.7	13.3	46.0	54.0	-8.0
5415.000	Av	H	33.8	13.5	47.3	54.0	-6.7
6317.500	Av	H	36.8	12.8	49.6	78.4	-28.8
7220.000	Av	H	18.0	12.3	30.3	78.4	-48.1
8122.500	Av	H	15.5	12.5	28.0	54.0	-26.0
9025.000	Av	H	19.2	17.8	37.0	54.0	-17.0

QUASI-PEAK: RES: 100K, VID: 100K; PEAK: RES. =1 MHZ, VID= 1MHZ; AVERAGE: RES. =1 MHZ, VID= 10HZ

Operating Frequency (MHz): 915
Measured Level at 100kHz (dBuV/m): 96.0
Limit (dBuV/m): 76.0

TABLE 6-3: RADIATED EMISSIONS HARMONICS/SPURIOUS (MID CHANNEL; 915 MHZ)

Emission Frequency (MHz)	Test Detector	Antenna Polarity (H/V)	Analyzer Reading (dBuV)	Site Correction Factor (dB/m)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB0
1830.384	Av	H	65.6	6.5	72.1	76.0	-3.9
2745.584	Av	V	27.6	23.1	50.7	54.0	-3.3
3660.784	Av	V	27.8	24.3	52.1	54.0	-1.9
4575.984	Av	H	34.7	14.0	48.7	54.0	-5.3
5491.184	Av	H	32.2	13.5	45.7	76.0	-30.3
6406.384	Av	H	32.2	12.6	44.8	76.0	-31.2
7321.584	Av	H	20.3	12.0	32.3	54.0	-21.7
8236.784	Av	H	20.0	17.3	37.3	54.0	-16.7
9151.984	Av	H	18.8	17.5	36.3	54.0	-17.7

QUASI-PEAK: RES: 100K, VID: 100K; PEAK: RES. =1 MHZ, VID= 1MHZ; AVERAGE: RES. =1 MHZ, VID= 10HZ

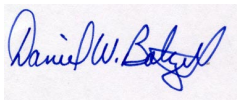
Operating Frequency (MHz): 927.6
Measured Level at 100kHz (dBuV/m): 96.2
Limit (dBuV/m): 76.2

TABLE 6-4: RADIATED EMISSIONS HARMONICS/SPURIOUS (HIGH CHANNEL; 927.6 MHZ)

Emission Frequency (MHz)	Test Detector	Antenna Polarity (H/V)	Analyzer Reading (dBuV)	Site Correction Factor (dB/m)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (Db0
1855.200	Av	H	57.7	7.4	65.1	76.2	-11.1
2782.800	Av	V	30.0	22.7	52.7	54.0	-1.3
3710.400	Av	H	26.5	24.0	50.5	54.0	-3.5
4638.000	Av	H	39.2	14.0	53.2	54.0	-0.8
5565.600	Av	H	39.7	13.2	52.9	54.0	-1.1
6493.200	Av	H	36.3	12.3	48.6	76.2	-27.6
7420.800	Av	H	21.7	11.7	33.4	76.2	-42.8
8348.400	Av	H	23.0	17.5	40.5	54.0	-13.5
9276.000	Av	H	18.7	17.6	36.3	76.2	-39.9

QUASI-PEAK: RES: 100K, VID: 100K; PEAK: RES. =1 MHZ, VID= 1MHZ; AVERAGE: RES. =1 MHZ, VID= 10HZ

TEST PERSONNEL:



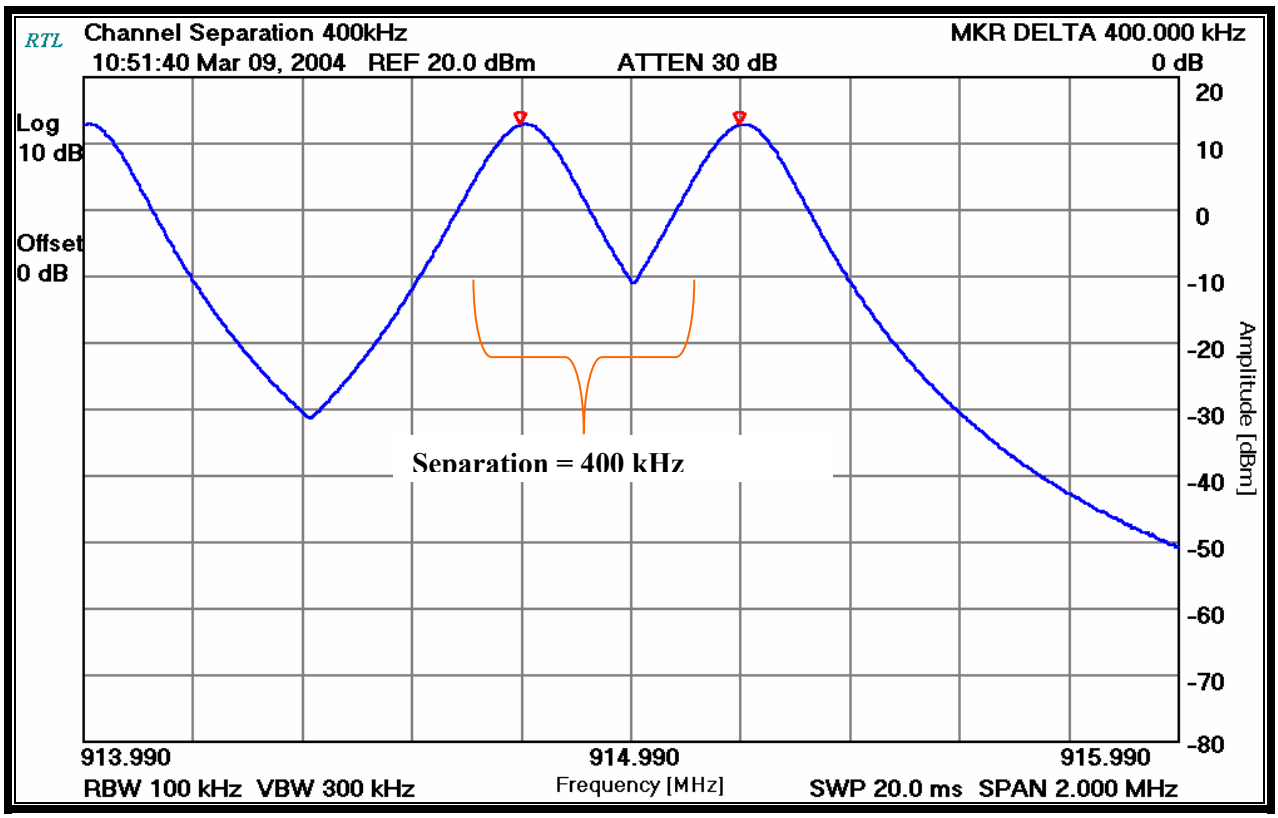
Daniel W. Baltzell		March 9/25, 2004
EMC Test Engineer	Signature	Dates Of Tests

7 CARRIER FREQUENCY SEPARATION - §15.247 (A)(1)

Frequency Hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater.

Measured frequency separation = 400 kHz

PLOT 7-1: CARRIER FREQUENCY SEPARATION



TEST PERSONNEL:

Daniel W. Baltzell	Signature	March 9, 2004
EMC Test Engineer		Date Of Test

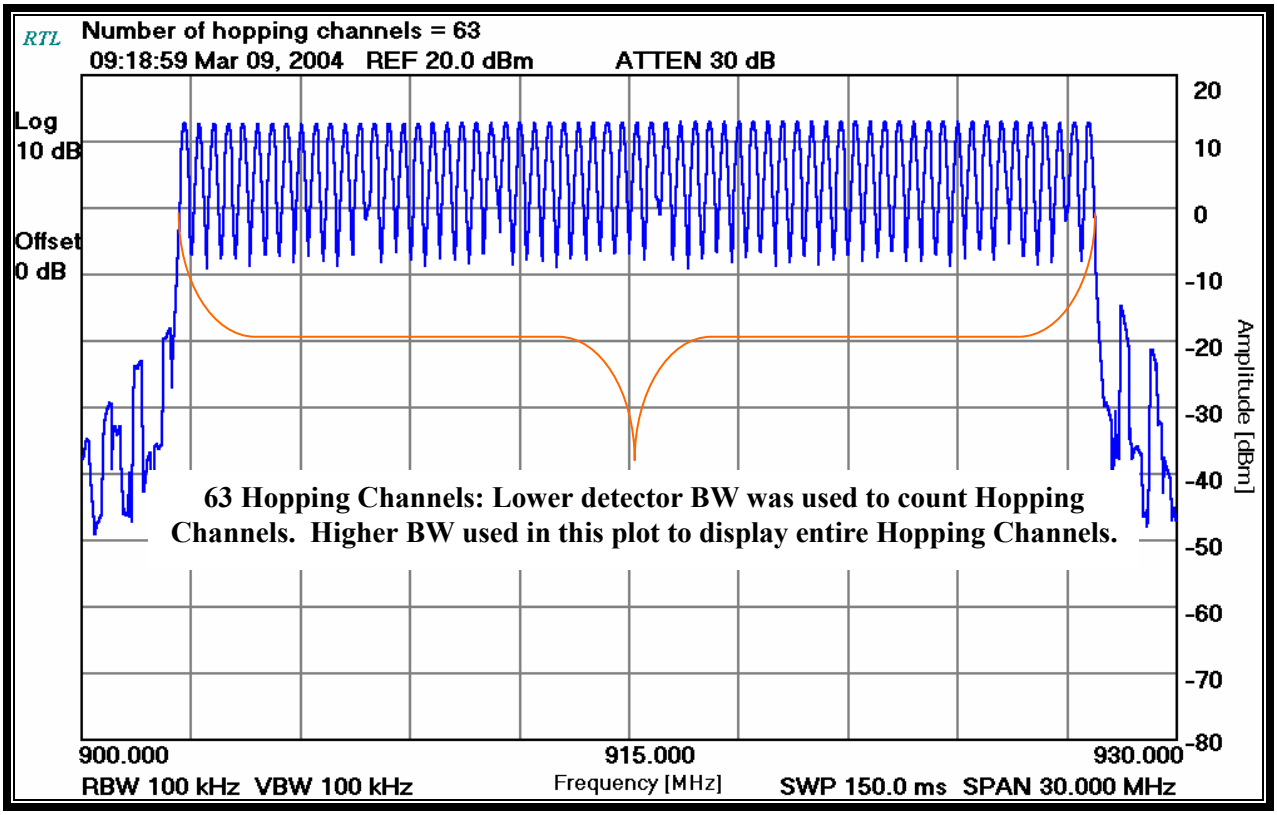
8 HOPPING CHARACTERISTICS – FCC §15.247 (a)(1)(i); IC RSS-210 §6.2.2(O)

8.1 NUMBER OF HOPPING FREQUENCIES

For frequency hopping systems operating in the 902-928 MHz band: if the 20 dB bandwidth of the hopping channel is less than 250 kHz, the system shall use at least 50 hopping frequencies and the average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 20 second period; if the 20 dB bandwidth of the hopping channel is 250 kHz or greater, the system shall use at least 25 hopping frequencies and the average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 10 second period. The maximum allowed 20 dB bandwidth of the hopping channel is 500 kHz.

Measured number of hopping frequencies = 63

PLOT 8-1: NUMBER OF HOPPING FREQUENCIES



TEST PERSONNEL:

Daniel W. Baltzell		March 9, 2004
EMC Test Engineer	Signature	Date Of Test

8.2 20 DB BANDWIDTH TEST PROCEDURE – FCC §15.247 (a)(1)(i); IC RSS-210 §5.9.1

The minimum 20 dB bandwidths per RSS-210 were measured using a 50 Ω spectrum analyzer. The carrier was adjusted on the analyzer so that it was displayed entirely on the Spectrum Analyzer. The sweep time was set to auto and allowed through several sweeps with the max hold function used in peak detector mode. The resolution bandwidth was set to 30 kHz, and the video bandwidth set at 100 kHz. The minimum 20 dB bandwidths were measured using the spectrum analyzer delta marker set 20 dB down from the peak of the carrier. The table below contains the bandwidth measurement results.

TABLE 8-1 20 DB BANDWIDTH TEST EQUIPMENT

RTL Asset #	Manufacturer	Model	Part Type	Serial Number	Calibration Due Date
900931	Hewlett Packard	8566B	Spectrum Analyzer (100 Hz - 22 GHz)	3138A07771	5/12/04

TABLE 8-2 MODULATED BANDWIDTH TEST DATA

Minimum 20 dB bandwidths

CHANNEL	20 dB BANDWIDTH (kHz)
Low; 902.8 MHz	96.9
Mid; 915 MHz	97.4
High; 927.6 MHz	97.3

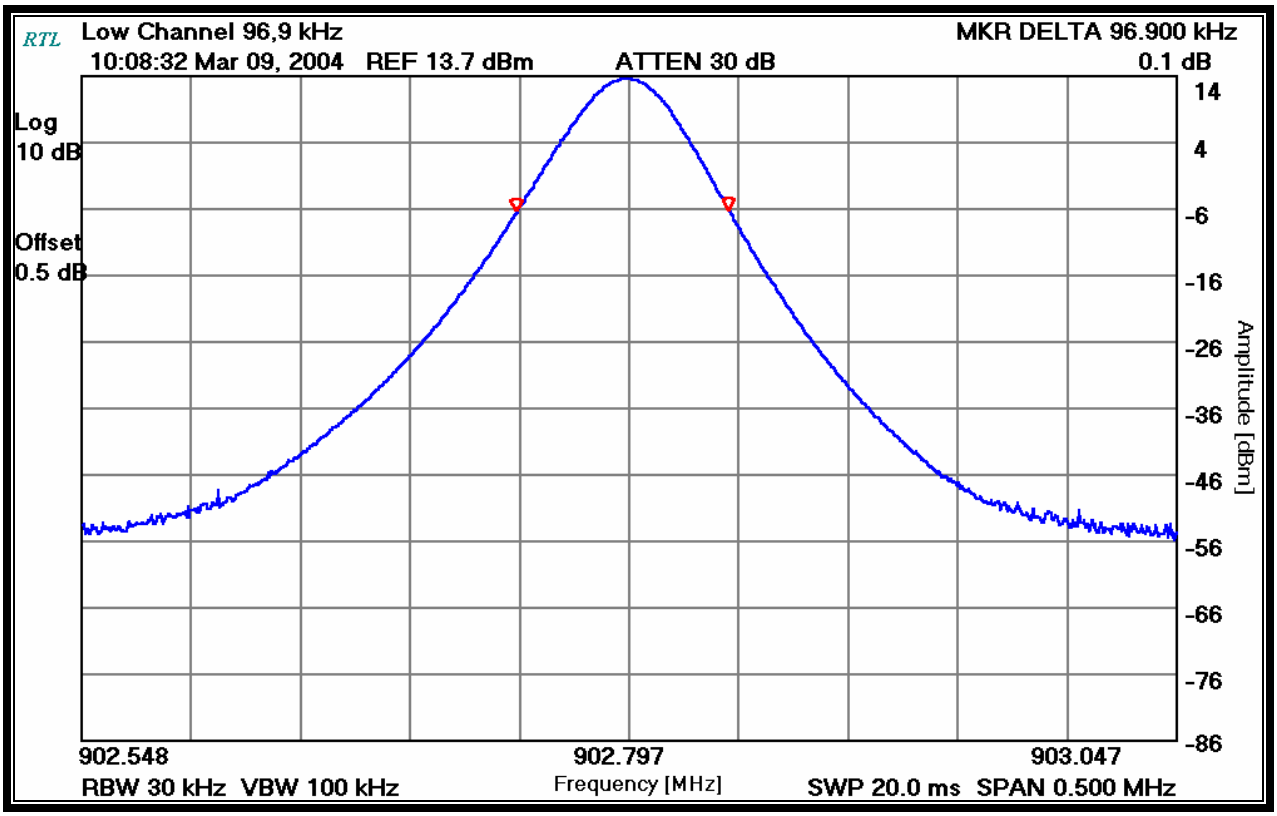
TEST PERSONNEL:

Daniel W. Baltzell		March 9, 2004
EMC Test Engineer	Signature	Date Of Test

20 dB Bandwidth Plots

Channel:	Low
Channel Frequency (MHz):	902.8
Resolution Bandwidth (kHz):	30
Video Bandwidth (kHz):	100
Span (MHz):	0.5

PLOT 8-2: 20 DB BANDWIDTH LOW CHANNEL

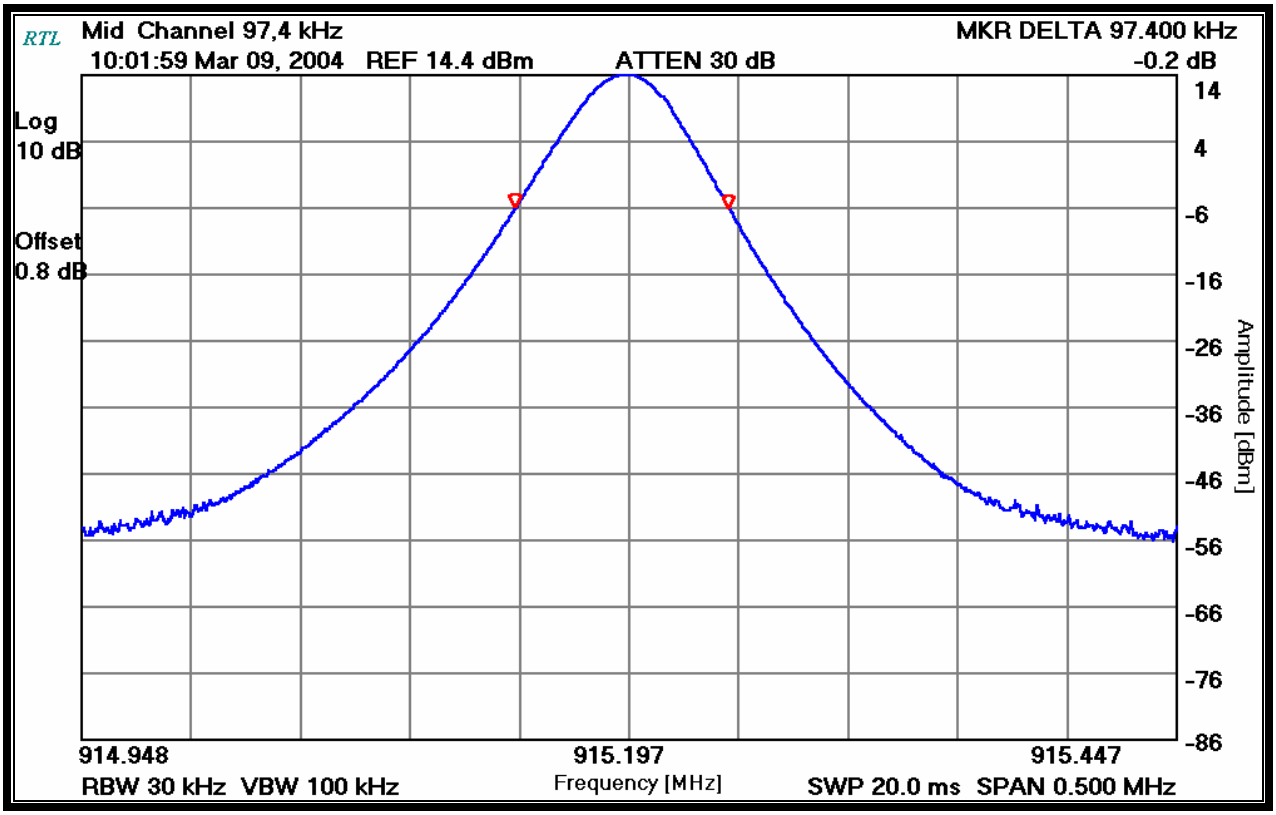


TEST PERSONNEL:

Daniel W. Baltzell		March 9, 2004
EMC Test Engineer	Signature	Date Of Test

Channel:	Mid
Channel Frequency (MHz):	915
Resolution Bandwidth (kHz):	30
Video Bandwidth (kHz):	100
Span (MHz):	0.5

PLOT 8-3: 20 DB BANDWIDTH MID CHANNEL

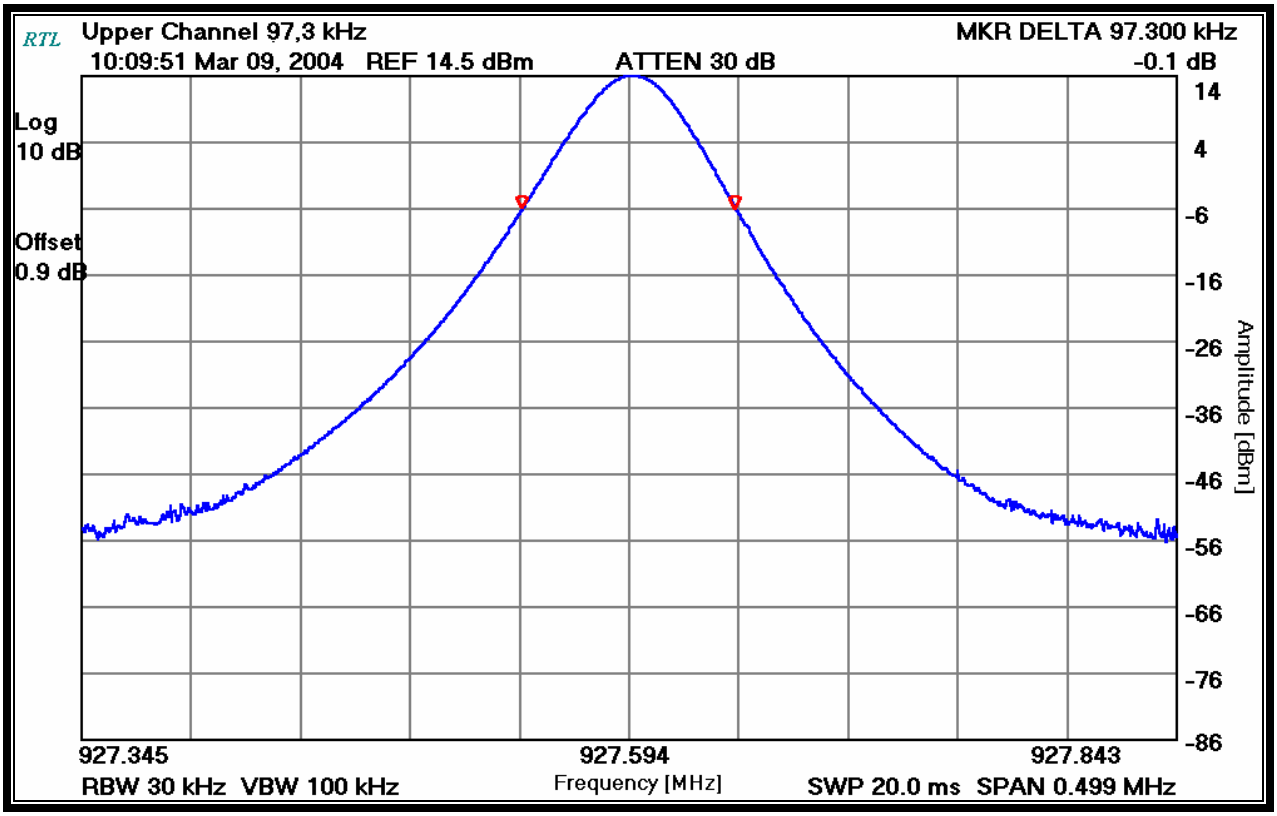


TEST PERSONNEL:

Daniel W. Baltzell		March 9, 2004
EMC Test Engineer	Signature	Date Of Test

Channel:	High
Channel Frequency (MHz):	927.6
Resolution Bandwidth (kHz):	30
Video Bandwidth (kHz):	100
Span (MHz):	0.5

PLOT 8-4: 20 DB BANDWIDTH HIGH CHANNEL



TEST PERSONNEL:

Daniel W. Baltzell		March 9, 2004
EMC Test Engineer	Signature	Date Of Test

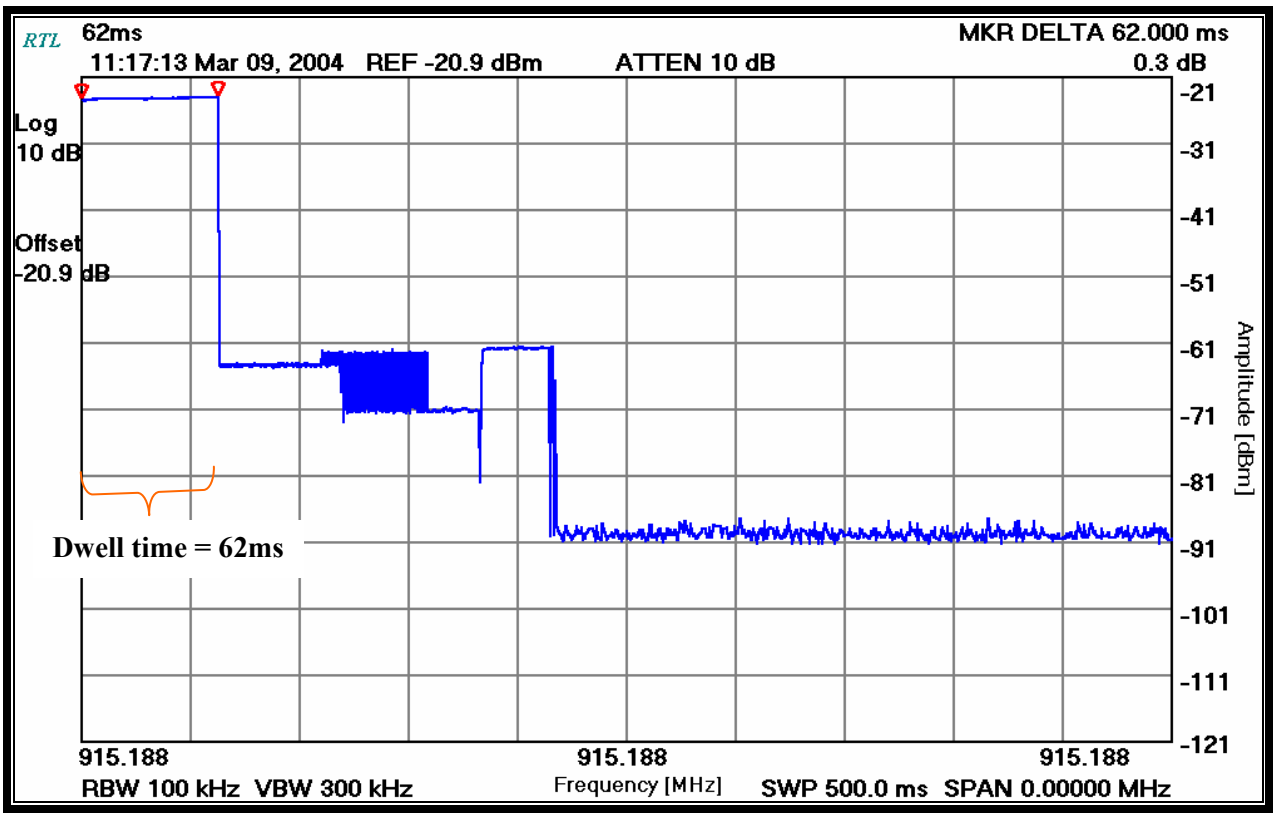
8.3 AVERAGE TIME OF OCCUPANCY

The spectrum analyzer sweep was set to 0.5 seconds, with a zero span with a video trigger enabled to capture a pulse from the device under test. A marker delta was used to measure dwell time for this plot. The sweep was then set to single sweep for 10 seconds for the average time and the number of pulses counted to calculate the average time of occupancy as:

Number of Pulses in 10 Seconds (1) x Dwell Time Measured (62 milliseconds) = 62 ms Average Occupancy in 10 seconds.

The result of an occupancy of 0.124 s in a 20 second period is less than the limit of the time of occupancy of 0.4 seconds within a 20 second period.

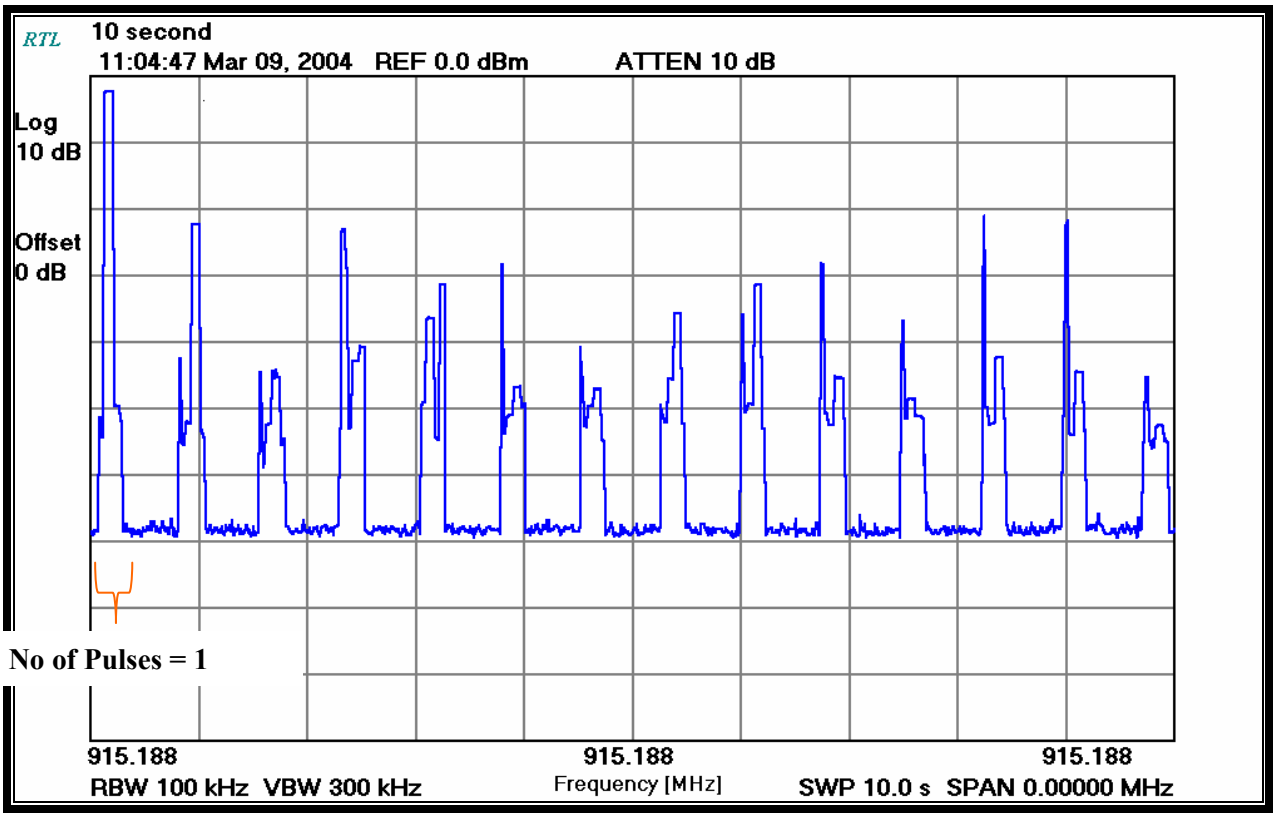
PLOT 8-5: TIME OF OCCUPANCY (DWELL TIME)



TEST PERSONNEL:

Daniel W. Baltzell		March 9, 2004
EMC Test Engineer	Signature	Date Of Test

PLOT 8-6: TIME OF OCCUPANCY (DWELL TIME 10 SECOND SWEEP)



TEST PERSONNEL:

Daniel W. Baltzell		March 9, 2004
EMC Test Engineer	Signature	Date Of Test

9 MODULATED BANDWIDTH - §15.247(A)(2)

9.1 MODULATED BANDWIDTH TEST PROCEDURE – MINIMUM 6 DB BANDWIDTH

The minimum 6 dB bandwidths per FCC 15.247 (a)(2) were measured using a 50 ohm spectrum analyzer with the resolution bandwidth set at 100 kHz, and the video bandwidth set at 300 kHz. The device was modulated using the maximum 2 Mbps data rate. The minimum 6 dB bandwidths are presented in Table 9-2.

9.2 BANDWIDTH TEST EQUIPMENT

TABLE 9-1: BANDWIDTH TEST EQUIPMENT

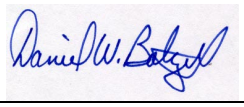
RTL Asset #	Manufacturer	Model	Part Type	Serial Number	Calibration Due Date
900931	Hewlett Packard	8566B	Spectrum Analyzer (100 Hz - 22 GHz)	3138A07771	5/12/04

9.3 BANDWIDTH TEST DATA

TABLE 9-2: MINIMUM 6 DB BANDWIDTH TEST DATA

CHANNEL	6 dB BANDWIDTH (kHz)
Low; 902.8 MHz	45.5
Mid; 915 MHz	46.5
High; 927.6 MHz	46.4

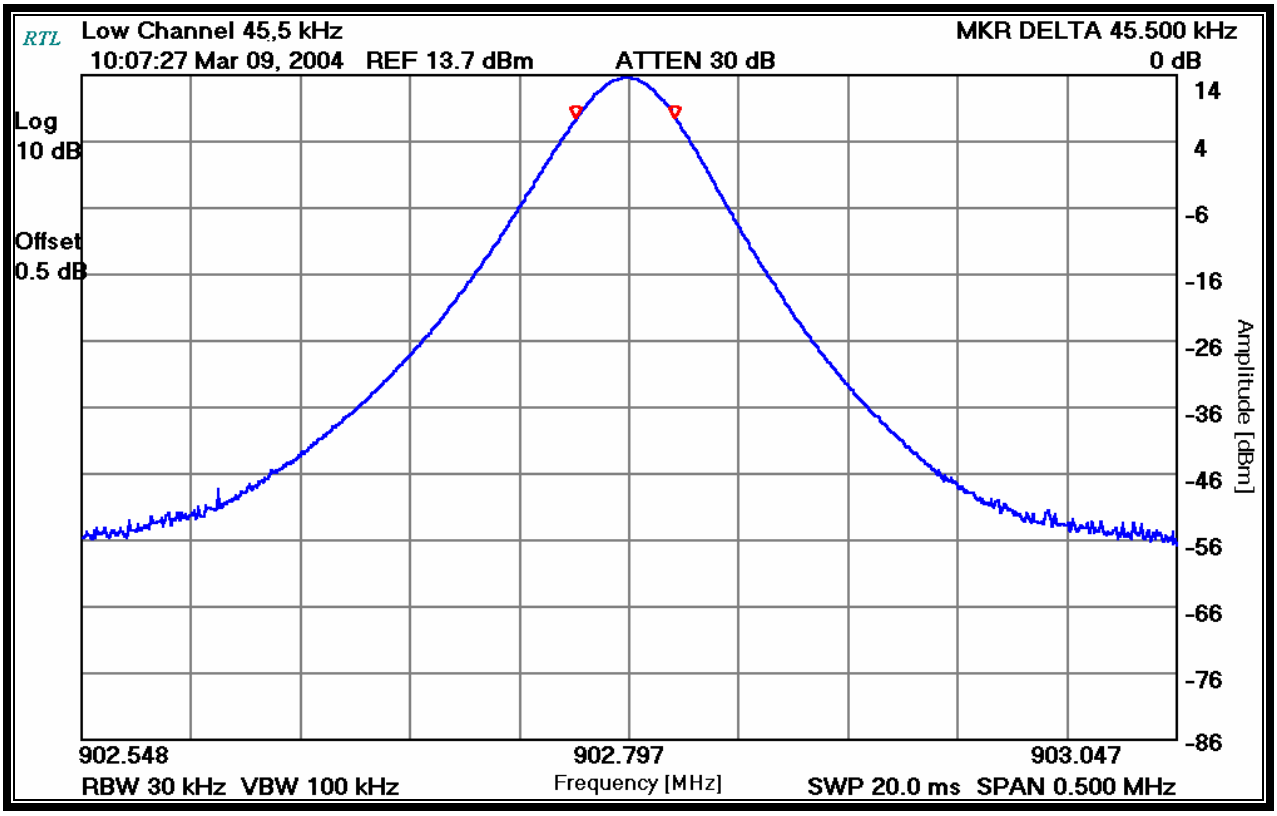
TEST PERSONNEL:

Daniel W. Baltzell		March 9, 2004
EMC Test Engineer	Signature	Date Of Test

9.4 MODULATED BANDWIDTH PLOTS

Channel Number:	Low
Frequency (MHz):	902.8
Resolution Bandwidth (kHz):	30
Video Bandwidth (kHz):	100
Sweep Time (ms):	20.0

PLOT 9-1: MODULATED BANDWIDTH LOW CHANNEL

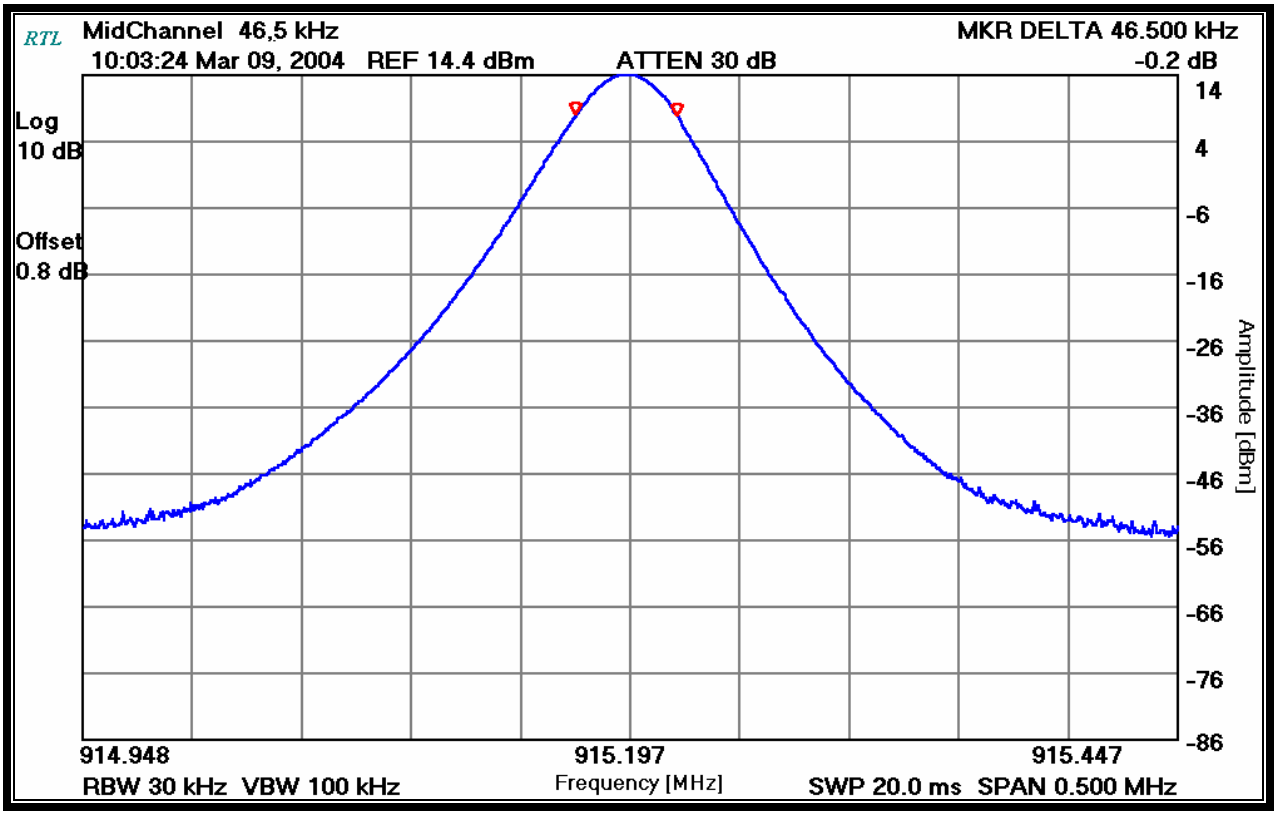


TEST PERSONNEL:

Daniel W. Baltzell		March 9, 2004
EMC Test Engineer	Signature	Date Of Test

Channel Number:	Mid
Frequency (MHz):	915
Resolution Bandwidth (kHz):	30
Video Bandwidth (kHz):	100
Sweep Time (ms):	20.0

PLOT 9-2: MODULATED BANDWIDTH MID CHANNEL

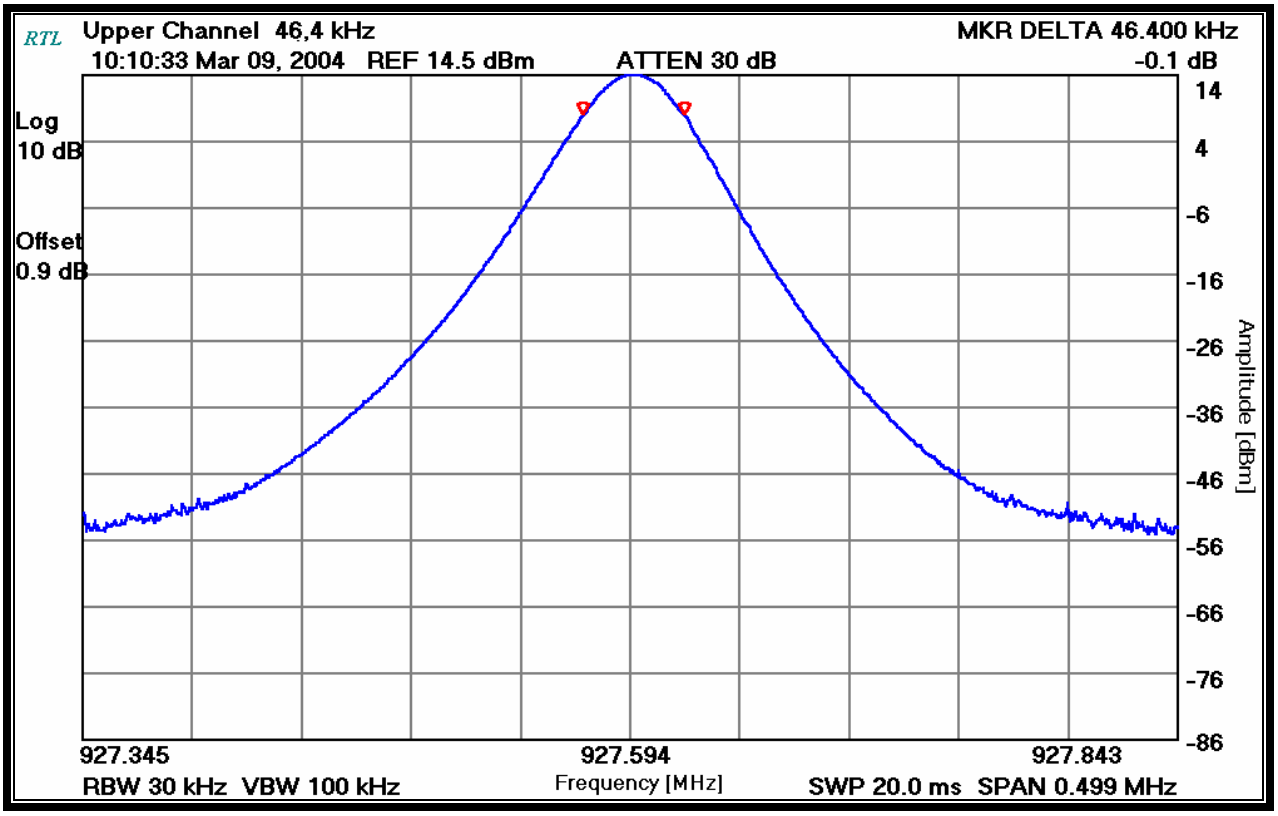


TEST PERSONNEL:

Daniel W. Baltzell		March 9, 2004
EMC Test Engineer	Signature	Date Of Test

Channel Number:	High
Frequency (MHz):	927.6
Resolution Bandwidth (kHz):	30
Video Bandwidth (kHz):	100
Sweep Time (ms):	20.0

PLOT 9-3: MODULATED BANDWIDTH HIGH CHANNEL



TEST PERSONNEL:

Daniel W. Baltzell		March 9, 2004
EMC Test Engineer	Signature	Date Of Test

10 PEAK OUTPUT POWER - FCC §15.247(B)(2); IC RSS-210 §6.2.2(o)(b)

10.1 POWER OUTPUT TEST PROCEDURE

For frequency hopping systems operating in the 902-928 MHz band: 1 watt for systems employing at least 50 hopping channels.

A conducted power measurement of the EUT was taken using an Agilent 4416A EPM-P Series Power Meter with a E9323A Peak and Average Power Sensor.

10.2 POWER OUTPUT TEST EQUIPMENT

TABLE 10-1: POWER OUTPUT TEST EQUIPMENT

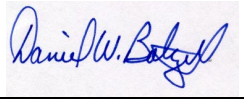
RTL Asset #	Manufacturer	Model	Part Type	Serial Number	Calibration Due Date
901186	Agilent Technologies	E9323A	Peak & Average Power Sensor (50 MHz - 6 GHz)	US40410380	7/30/04
901184	Agilent Technologies	E4416A	EPM-P Power Meter, Single Channel	GB41050573	7/30/04

10.3 POWER OUTPUT TEST DATA

TABLE 10-2: POWER OUTPUT TEST DATA

FREQUENCY (MHZ)	CHANNEL	PEAK POWER CONDUCTED OUTPUT (dBm)	PEAK POWER CONDUCTED OUTPUT (mW)
902.8	Low	13.9	24.5
915	Mid	14.4	27.5
927.6	High	14.5	28.2

TEST PERSONNEL:



Daniel W. Baltzell		March 9, 2004
EMC Test Engineer	Signature	Date Of Test

11 ANTENNA CONDUCTED SPURIOUS EMISSIONS - §15.247(C); IC RSS-210 §6.2.2(o)(e1)

11.1 ANTENNA CONDUCTED SPURIOUS EMISSIONS TEST PROCEDURES

Antenna spurious emission per FCC 15.247(c) was measured from the EUT antenna port using a 50 Ω spectrum analyzer with the resolution bandwidth set at 100 kHz, and the video bandwidth set at 300 kHz. The modulated carrier was identified at 902.8 MHz for the low channel, 915 MHz for the mid channel and 927.6 MHz for the high channel. No other harmonics or spurs were found within 20 dB of the carrier level from 9kHz to the carrier 10th harmonic. See the Antenna Conducted Spurious Noise Table for the test results. The low, middle, and high channels were investigated and tested.

11.2 ANTENNA CONDUCTED SPURIOUS TEST EQUIPMENT

TABLE 11-1: ANTENNA CONDUCTED SPURIOUS TEST EQUIPMENT

RTL Asset #	Manufacturer	Model	Part Type	Serial Number	Calibration Due Date
900931	Hewlett Packard	8566B	Spectrum Analyzer (100 Hz – 22 GHz)	3138A07771	5/12/04

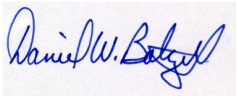
11.3 ANTENNA CONDUCTED SPURIOUS EMISSIONS LOW CHANNEL

Operating Frequency (MHz): 902.8
Channel: Low
Measured Level at 100kHz (dBm): 13.9
Limit (dBm): -6.1

TABLE 11-2: ANTENNA CONDUCTED SPURIOUS EMISSIONS LOW CHANNEL

Frequency (MHz)	Measured Level (dBm)	Measured Level (dBc)	Limit (dBc)	Margin (dB)
1805.000	-39.7	53.6	20.0	-33.6
2707.500	-79.5	93.4	20.0	-73.4
3610.000	-62.8	76.7	20.0	-56.7
4512.500	-86.4	100.3	20.0	-80.3
5415.000	-95.6	109.5	20.0	-89.5
6317.500	-92.7	106.6	20.0	-86.6
7220.000	-93.3	107.2	20.0	-87.2
8122.500	-93.7	107.6	20.0	-87.6
9025.000	-93.6	107.5	20.0	-87.5

TEST PERSONNEL:



Daniel W. Baltzell		March 9, 2004
EMC Test Engineer	Signature	Date Of Test

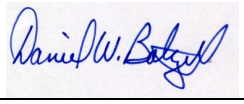
11.4 ANTENNA CONDUCTED SPURIOUS EMISSIONS MID CHANNEL

Operating Frequency (MHz): 915
Channel: Mid
Measured Level at 100kHz (dBm): 14.4
Limit (dBm): -5.6

TABLE 11-3: ANTENNA CONDUCTED SPURIOUS EMISSIONS MID CHANNEL

Frequency (MHz)	Measured Level (dBm)	Measured Level (dBc)	Limit (dBc)	Margin (dB)
1830.400	-44.8	59.2	20.0	-39.2
2745.600	-81.3	95.7	20.0	-75.7
3660.800	-68.4	82.8	20.0	-62.8
4576.000	-95.5	109.9	20.0	-89.9
5491.200	-96.2	110.6	20.0	-90.6
6406.400	-93.1	107.5	20.0	-87.5
7321.600	-93.7	108.1	20.0	-88.1
8236.800	-93.9	108.3	20.0	-88.3
9152.000	-93.7	108.1	20.0	-88.1

TEST PERSONNEL:

Daniel W. Baltzell		March 9, 2004
EMC Test Engineer	Signature	Date Of Test

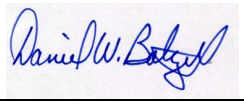
11.5 ANTENNA CONDUCTED SPURIOUS EMISSIONS HIGH CHANNEL

Operating Frequency (MHz): 927.6
Channel: High
Measured Level at 100kHz (dBm): 14.5
Limit (dBm): -5.5

TABLE 11-4: ANTENNA CONDUCTED SPURIOUS EMISSIONS HIGH CHANNEL

Frequency (MHz)	Measured Level (dBm)	Measured Level (dBc)	Limit (dBc)	Margin (dB)
1855.200	-54.0	68.5	20.0	-48.5
2782.800	-83.3	97.8	20.0	-77.8
3710.400	-77.8	92.3	20.0	-72.3
4638.000	96.5	-82.0	20.0	102.0
5565.600	-95.8	110.3	20.0	-90.3
6493.200	-93.5	108.0	20.0	-88.0
7420.800	-93.4	107.9	20.0	-87.9
8348.400	-93.7	108.2	20.0	-88.2
9276.000	-93.7	108.2	20.0	-88.2

TEST PERSONNEL:



Daniel W. Baltzell		March 9, 2004
EMC Test Engineer	Signature	Date Of Test

12 CONCLUSION

The data in this measurement report shows that the Paxar Americas, Inc., Model AlienC1915, FCC ID: GU6WJSX2000 complies with all the requirements of Parts 2 and 15 of the FCC Rules and Industry Canada RSS-210.