

COMPLIANCE WORLDWIDE INC. TEST REPORT 305-07R1

In Accordance with the Requirements of
Federal Communications Commission CFR Title 47 Part 15.225, Subpart C
Industry Canada RSS 210, Issue 7, Annex 2

Low Power License-Exempt Radio Communication Devices
Intentional Radiators

Issued to

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for the

B5000
“BorderGuard with Smart Chip”
Document Scanner

Report Issued on January 4, 2008

Tested by



Brian F. Breault

Reviewed by



Larry K. Stillings

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Revision R1: Section 6.5 - Frequency Tolerance of the Carrier Signal

Testing was performed to the FCC Part 15.225 (e) requirement of -20° C to +50° C instead of the manufacturer's product specification of +10° C to +40° C.

1. Scope

This test report certifies that the Viisage B5000 Document Scanner, as tested, meets the CFR Title 47 Part 15.225, Subpart C and Industry Canada RSS 210, Issue 7, Annex 2 requirements. The scope of this test report is limited to the test sample provided by the client, only in as much as that sample represents other production units. If any significant changes are made to the unit, the changes shall be evaluated and a retest may be required.

2. Product Details

2.1. Manufacturer: Viisage Technology, Inc.

2.2. Model Number: B5000 Document Scanner

2.3. Serial Number: Test Unit 18

2.4. Description: The B5000 document scanner has the ability to not only read passports, driver's licenses and ID cards that people use as proof of identity, but also authenticate documents that have the embedded RFID chips in them. The document scanner supports faster customer processing and has a very small footprint which is ideal for environments where counter space is limited.

The B5000 operates in the 13.553 - 13.567 MHz band in accordance with section 15.225.

2.5. Power Source: 12 VDC (external power adapter - 100-240 VAC, 47 - 63 Hz)

2.6. EMC Modifications:

2.6.1. Control card:

1. Remove C31 C32 C37 and C40.
2. Install 0.01uF capacitors at locations C31 C32 C37 and C40.
3. Install 0.01uF capacitor near P6 connector between +5 and GND.
4. Install 0.01uF capacitor near J3 connector between +5 and GND.
5. Cut parallel D+ and D- etches near P14
6. Scrape solder mask to expose copper on D+ and D- etches.
7. Install Coilcraft common mode filter (1206USB-532MLB) in D+ and D- lines.
8. Cut parallel D+ and D- etches near P1
9. Scrape solder mask to expose copper on D+ and D- etches.
10. Install Coilcraft common mode filter (1206USB-532MLB) in D+ and D-lines
11. Cut parallel D+ and D- etches near P2
12. Scrape solder mask to expose copper on D+ and D- etches.
13. Install Coilcraft common mode filter (1206USB-532MLB) in D+ and D- lines
14. Fill in silkscreen label "SUB-PB041-A REV 01."

2.6.2. Camera:

1. Remove L1 L2 L5 and L7
2. Install 0 Ohm 1206 resistors at locations L2 and L7
3. Install ACT YCB-1206 ferrites at locations L1 and L5
4. Remove L3 and L6
5. Install 100 Ohm 0805 resistor at location L3
6. Install 0 Ohm 0805 resistor at location L6
7. Follow trace from L6 to U1 (PCLK/IFCLK trace). Cut the portion of the etch that jumps to the back of the board.

2. Product Details

2.6. EMC Modifications (continued):

2.6.2. Camera (continued):

8. Scrape solder mask to expose copper on this etch PCLK/IFCLK line
9. Install 100 Ohm 0603 resistor in this location
10. Remove L4 and L8
11. Install 0 Ohm 0805 resistor at location L4.
NOTE: Do NOT install any component at location L8
12. Remove C2 C4 C18 C19 C25 and C28.
13. Install 0.01uF capacitors at locations C2 C4 C18 C19 C25 and C28.
14. Cut parallel D+ and D- etches near P1
15. Scrape solder mask to expose copper on D+ and D- etches.
16. Install Coilcraft common mode filter (1206USB-532MLB) in D+ and D- lines
17. Cut XCLK1 etch between C22 (near Y1) and U2.
NOTE: Last digit of C22 silkscreen is difficult to read, so it looks like "C2["
18. Scrape solder mask to expose copper on XCLK1 etch.
19. Install 100 Ohm 0603 resistor between C22
20. Fill in silkscreen label "SUB-PB040-A REV 01."

2.6.3. Camera USB cable:

1. Install white clamp-on ferrite (the same small white one that we used on the grayscale units) to cable, as close to camera board as possible.

3. Product Configuration

3.1. Support Equipment

Device	Manufacturer	Model	Serial No.	Comment
Notebook PC	Dell	Latitude D610	28163864917	

3.2. Cables

Cable Type	Length	Shield	From	To
USB	1.5 Meters	Yes	Notebook PC	B5000 Passport Reader

3.3. Operational Characteristics & Software

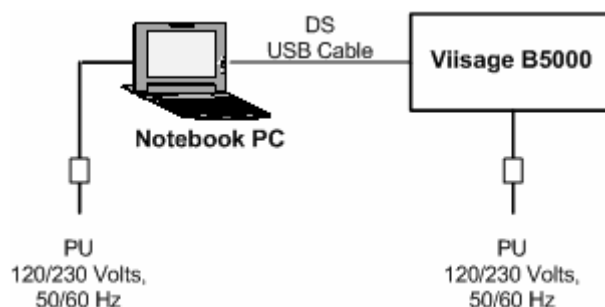
1. Power on the PC.
2. Login as Administrator:
 - Username : Administrator
 - Password : V11sag3
3. Ignore any complaints about virus profiles not being updated or Windows Updates.
4. Connect the Viisage B500SC power supply but do not power up.
5. Connect the Viisage B500SC to the PC using the supplied USB cable. Install the USB cable in the top rear USB port of the PC. This should ensure that the PC doesn't try to reinstall the device drivers.
6. Power on the B5000SC.
7. Run the iA-Examiner application from the desktop. This application has been setup to run in a test mode that will continuously scan and authenticate the supplied demo passport.

3. Product Configuration (continued)

3.3. Operational Characteristics & Software

8. After the iA-Examiner starts, insert the demo passport into the B5000.
9. The software should indicate that the passport is being read every few seconds..

3.4. Block Diagram



4. Measurements Parameters

4.1. Measurement Equipment Used to Perform Test

Device	Manufacturer	Model No.	Serial No.	Cal Due
EMI Receiver	Hewlett Packard	8546A	3650A00360	3/14/2008
Spectrum Analyzer	Hewlett Packard	8593E	3829A03887	3/8/2008
Microwave Preamp	Hewlett Packard	8449B	3008A01323	9/21/2008
Temp. Meter	Fluke	187	4804030	3/14/2008
Thermal Chamber	Associated	SLHU-1-CRLC	0029	N/A
Loop Antenna	EMCO	6502	2197	3/16/2008
Bilog Antenna	Com-Power	AC220	25509	8/2/2008

4.2. Measurement & Equipment Setup

Test Date: 11/11/2007
 Test Engineer: Brian Breault
 Normal Site Temperature (15 - 35°C): 21.6
 Relative Humidity (20 -75%RH): 25
 Frequency Range: 9 kHz to 1 GHz
 Measurement Distance: 3 Meters

4. Measurement Parameters (continued)

4.3. Test Procedure

The test measurements contained in this report are based on the requirements detailed in FCC Part 15, Subpart C - Intentional Radiators, notably Section 15.225, Operation within the band 13.110 – 14.010 MHz.

The test methods used to generate the data in this test report are in accordance with ANSI C63.4: 2003, American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz.

5. Measurement Summary

Test Requirement	FCC Part 15C Reference	Test Report Section	Result	Comment
Antenna Requirement.	15.203	6.1	Compliant	
Conducted Emissions	15.207	6.2	Compliant	Reference ANSI C63.4 Annex H, Paragraph H1(b)
Radiated Emissions	15.209	6.3	Compliant	
Field Strength of Fundamental	15.225(a)	6.4	Compliant	
Frequency Tolerance of the Carrier Signal	15.225(e)	6.5	Compliant	
Occupied Bandwidth	15.215(c)	6.6	Compliant	
Lower and Upper Band Edges	15.215 (c)	6.6	Compliant	
99% Power Bandwidth	N/A	6.7	Compliant	IC RSS 210

6. Measurement Data

6.1. Antenna Requirement

Requirement : An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device.

Justification : The tested product uses an internal integrated antenna.

6.2. Power Line Conducted Emissions (15.207)

Requirement: For an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed the limits in the following table, as measured using a 50 μ H/50 ohms line impedance stabilization network (LISN). Compliance with the provisions of this paragraph shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminal.

Frequency Range (MHz)	Limits (dB μ V)	
	Quasi-Peak	Average
0.15 to 0.50	66 to 56*	56 to 46*
0.50 to 5.0	56	46
5.0 to 30.0	60	50
* Decreases with the logarithm of the frequency.		

6.2.1. Measurement Equipment Used to Perform Test

Device	Manufacturer	Model	Serial No.	Cal Due
EMI Receiver	Hewlett Packard	8546A	3650A00360	3/14/2008
LISN	EMCO	3825/2	9109-1860	1/11/2008

6.2.2. Measurement & Equipment Setup

Test Date:	11/26/2007
Test Engineer:	Brian Breault
Site Temperature (°C):	20.8
Relative Humidity (%RH):	30
Frequency Range:	0.15 MHz to 30 MHz
EMI Receiver IF Bandwidth:	9 kHz
EMI Receiver Avg Bandwidth:	30 kHz
Detector Functions:	Peak, Quasi-Peak. & Average

6.2.3. Test Procedure

Test measurements were made in accordance with ANSI C63.4-2003, Standard Methods of Measurement of Radio Noise Emissions from Low-Voltage Electrical and Electronics Equipment in the Range of 9 kHz to 40 GHz. Specifically, Annex H, paragraph H1(b) regarding the use of a dummy load for a Part 15 transmitter.

6. Measurement Data (continued)

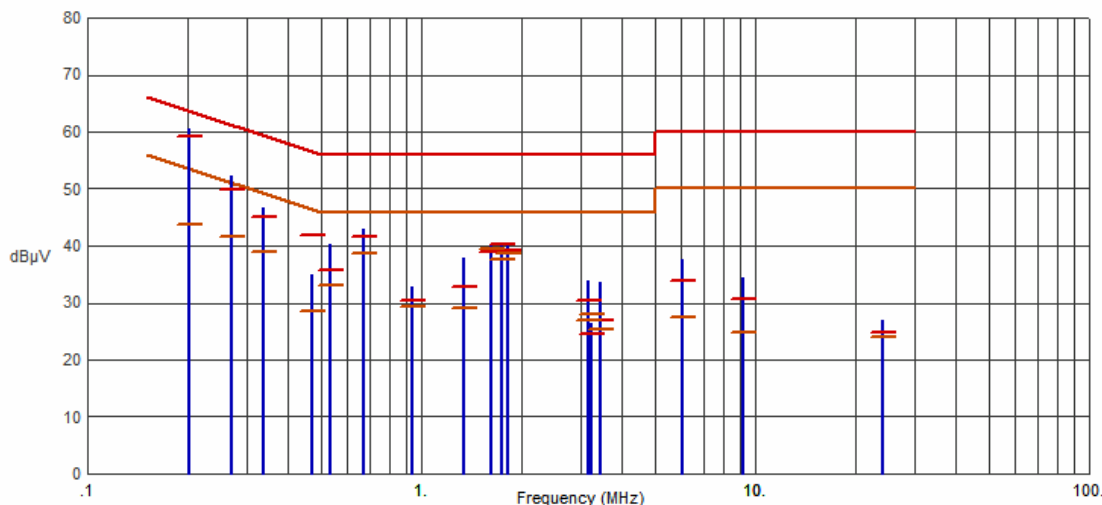
6.2. Power Line Conducted Emissions (15.207) (continued)

6.2.4. Conducted Emissions Test Data (with antenna attached, measured outside the transmitter's fundamental emissions band)

6.2.4.1. 120 Volts, 60 Hz Phase

Test No.: 305-07, 120 Volts, 60 Hz Phase

FCC, Class B



Frequency (MHz)	Pk Amp (dBμV)	QP Amp (dBμV)	QP Limit (dBμV)	QP Margin (dB)	Avg Amp (dBμV)	Avg Limit (dBμV)	Avg Margin (dB)	Comments
.2026	60.41	59.21	63.50	-4.29	43.86	53.50	-9.64	
.2690	52.35	49.88	61.15	-11.27	41.50	51.15	-9.65	
.3368	46.79	44.99	59.28	-14.29	38.98	49.28	-10.30	
.4709	34.92	41.94	56.50	-14.56	28.65	46.50	-17.85	
.5357	40.27	35.74	56.00	-20.26	32.99	46.00	-13.01	
.6731	42.95	41.47	56.00	-14.53	38.66	46.00	-7.34	
.9434	32.89	30.45	56.00	-25.55	29.32	46.00	-16.68	
1.3457	37.75	32.72	56.00	-23.28	29.00	46.00	-17.00	
1.6155	39.89	38.94	56.00	-17.06	39.41	46.00	-6.59	
1.7505	40.59	40.14	56.00	-15.86	37.53	46.00	-8.47	
1.8182	40.46	39.18	56.00	-16.82	38.73	46.00	-7.27	
3.1648	33.88	30.28	56.00	-25.72	26.87	46.00	-19.13	
3.2324	26.50	24.42	56.00	-31.58	28.11	46.00	-17.89	
3.4324	33.64	27.04	56.00	-28.96	25.34	46.00	-20.66	
6.0631	37.59	33.88	60.00	-26.12	27.49	50.00	-22.51	
9.1552	34.42	30.67	60.00	-29.33	24.72	50.00	-25.28	
24.0044	26.89	24.68	60.00	-35.32	24.12	50.00	-25.88	

6. Measurement Data (continued)

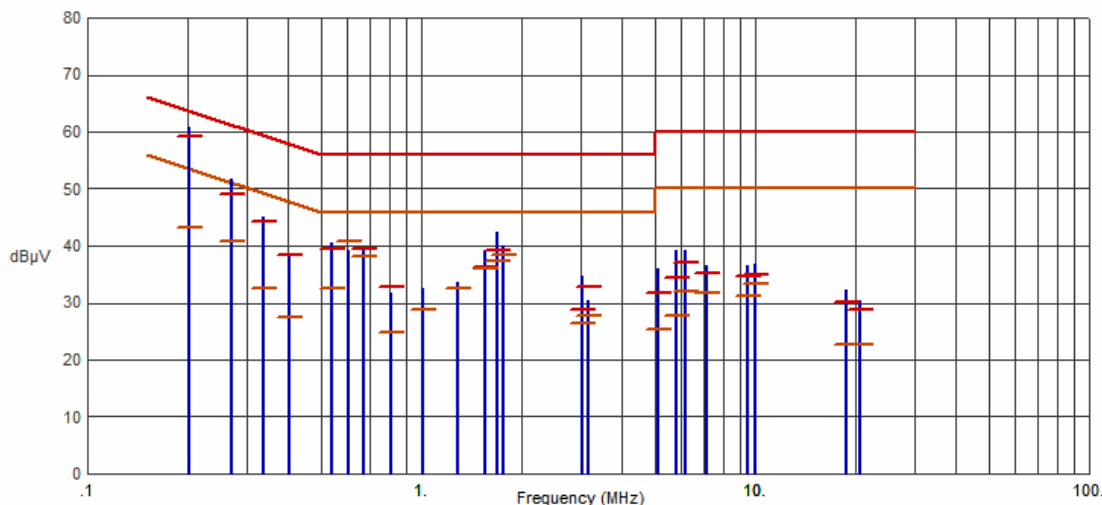
6.2. Power Line Conducted Emissions (15.207) (continued)

6.2.4. Conducted Emissions Test Data (with antenna attached, measured outside the transmitter's fundamental emissions band) (continued)

6.2.4.2. 120 Volts, 60 Hz Neutral

Test No.: 305-07, 120 Volts, 60 Hz Neutral

FCC, Class B



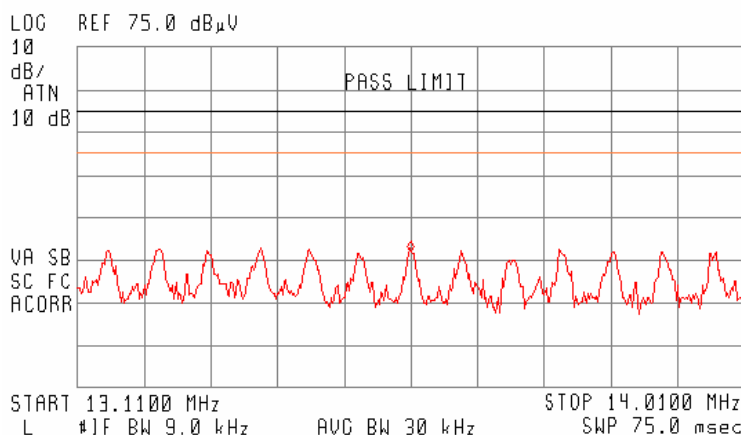
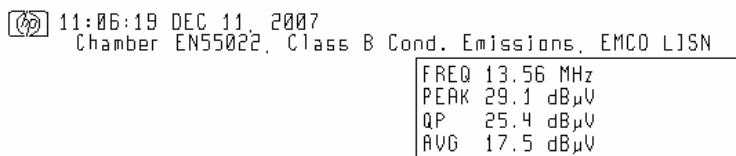
Frequency (MHz)	Pk Amp (dBμV)	QP Amp (dBμV)	QP Limit (dBμV)	QP Margin (dB)	Avg Amp (dBμV)	Avg Limit (dBμV)	Avg Margin (dB)	Comments
.2020	60.80	59.10	63.53	-4.43	43.22	53.53	-10.31	
.2699	51.77	49.15	61.12	-11.97	40.75	51.12	-10.37	
.3372	45.15	44.27	59.27	-15.00	32.64	49.27	-16.63	
.4041	38.61	38.45	57.77	-19.32	27.49	47.77	-20.28	
.5382	40.49	39.39	56.00	-16.61	32.51	46.00	-13.49	
.6061	39.31	40.78	56.00	-15.22	40.80	46.00	-5.20	
.6726	39.07	39.50	56.00	-16.50	38.12	46.00	-7.88	
.8087	31.70	32.85	56.00	-23.15	24.84	46.00	-21.16	
1.0106	32.52	28.82	56.00	-27.18	28.69	46.00	-17.31	
1.2794	33.70	32.44	56.00	-23.56	32.50	46.00	-13.50	
1.5497	39.10	36.18	56.00	-19.82	35.88	46.00	-10.12	
1.6828	42.48	39.16	56.00	-16.84	37.40	46.00	-8.60	
1.7520	40.06	38.28	56.00	-17.72	38.40	46.00	-7.60	
3.0274	34.55	28.69	56.00	-27.31	26.44	46.00	-19.56	
3.1652	30.48	32.86	56.00	-23.14	27.64	46.00	-18.36	
5.1207	36.05	31.67	60.00	-28.33	25.28	50.00	-24.72	
5.7924	39.14	34.27	60.00	-25.73	27.84	50.00	-22.16	
6.1948	39.18	37.07	60.00	-22.93	32.02	50.00	-17.98	
7.1374	36.58	35.18	60.00	-24.82	31.85	50.00	-18.15	
9.4960	36.50	34.55	60.00	-25.45	31.28	50.00	-18.72	
9.9673	36.82	34.85	60.00	-25.15	33.21	50.00	-16.79	
18.6550	32.26	30.06	60.00	-29.94	22.77	50.00	-27.23	
20.6088	30.51	28.77	60.00	-31.23	22.70	50.00	-27.30	

6. Measurement Data (continued)

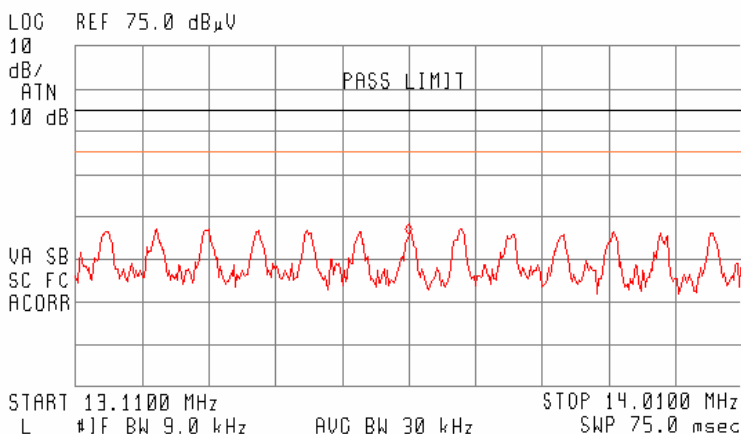
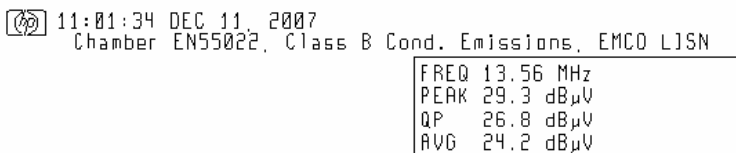
6.2. Power Line Conducted Emissions (15.207) (continued)

6.2.5. Conducted Emissions Test Data (measurement with dummy load, measured inside the transmitter's fundamental emissions band)

6.2.5.1. 120 Volts, 60 Hz Phase



6.2.5.2. 120 Volts, 60 Hz Neutral



6. Measurement Data (continued)

6.3. Spurious Radiated Emissions

Requirement: The emissions from an intentional radiator shall not exceed the field strength levels specified in the following table (Reference FCC 15.209):

Frequency MHz	Distance Meters	Limit dB μ V/m (Quasi-Peak)	Limit μ V/m
1.705 - 30	30	29.5	30
13.553-13.567	30	84.0	15,848/15,500
30 - 88	3	40.0	100
88 - 216	3	43.5	150
216 - 960	3	46.0	200
960 - 1000	3	54.0	500
1000 - 40000	3	54.0 ¹	500 ¹

6.3.1. Measurement Equipment Used to Perform Test

Device	Manufacturer	Model No.	Serial No.	Cal Due
EMI Receiver	Hewlett Packard	8546A	3650A00360	3/14/2008
Biconilog Antenna	Com-Power	AC220	25509	8/3/2008

6.3.2. Measurement & Equipment Setup

Test Date:	11/26/2007
Test Engineer:	Brian Breault
Site Temperature (°C):	21.3
Relative Humidity (%RH):	31
Frequency Range:	1 GHz to 40 GHz
Measurement Distance:	10 Meters (.15 MHz to 30 MHz) 3 Meters (>30 MHz)
EMI Receiver IF Bandwidth:	9 kHz (.15 to 30 MHz) 100 kHz (30 MHz to 1000 MHz) 1 MHz (> 1000 MHz)
EMI Receiver Avg Bandwidth:	30 kHz (.15 to 30 MHz) 300 kHz (30 MHz to 1000 MHz) 3 MHz (> 1000 MHz)
Detector Functions:	Peak, Quasi-Peak and Average
Antenna Height:	1 to 4 meters

6.3.3. Test Procedure

Test measurements were made in accordance with ANSI C63.4-2003, Standard Methods of Measurement of Radio Noise Emissions from Low-Voltage Electrical and Electronics Equipment in the Range of 9 kHz to 40 GHz.

6. Measurement Data (continued)

6.3. Spurious Radiated Emissions (continued)

6.3.4. Radiated Emissions Test – 150 kHz to 30 MHz

Frequency (MHz)	Pk Amp (dBμV/m)	QP Amp (dBμV/m)	QP Limit (dBμV/m)	Margin (dB)	Ant Ht (cm)	Table (Deg)	Result
27.12	37.4	35.4	49.5	-14.1	100	134	Compliant

6.3.5. Radiated Emissions Test - 30 MHz to 1 GHz

Frequency (MHz)	Pk Amp (dBμV/m)	QP Amp (dBμV/m)	QP Limit (dBμV/m)	Margin (dB)	Ant Pol (H/V)	Ant Ht (cm)	Table (Deg)	Result
40.68	39.2	37.9	40.00	-2.10	H	301	218	Compliant
54.24	38.3	29.4	40.00	-10.60	V	100	264	Compliant
67.80	39.3	28.5	40.00	-11.50	V	100	278	Compliant
81.36	36.5	34.1	40.00	-5.90	H	275	268	Compliant
108.48	32.6	26.3	43.50	-17.20	V	100	244	Compliant
122.04	38.3	36.2	43.50	-7.30	H	195	118	Compliant
135.60	38.6	33.0	43.50	-10.50	V	100	194	Compliant
149.16	39.6	34.3	43.50	-9.20	V	100	230	Compliant
162.72	40.9	36.1	43.50	-7.40	V	100	204	Compliant
176.28	35.3	30.3	43.50	-13.20	H	171	244	Compliant
189.84	32.9	26.8	43.50	-16.70	H	156	98	Compliant
203.40	43.6	29.3	43.50	-14.20	H	166	184	Compliant
216.96	38.0	33.5	46.00	-12.50	H	165	124	Compliant
230.52	38.3	32.6	46.00	-13.40	H	171	118	Compliant
244.08	38.2	32.2	46.00	-13.80	H	121	278	Compliant
257.64	44.7	39.1	46.00	-6.90	H	131	278	Compliant
271.20	40.5	36.4	46.00	-9.60	H	121	261	Compliant
284.76	36.7	29.0	46.00	-17.00	H	112	244	Compliant
298.32	27.1	22.9	46.00	-23.10	H	100	290	Compliant
311.88	35.5	33.3	46.00	-12.70	H	100	290	Compliant
325.44	29.0	24.0	46.00	-22.00	V	149	190	Compliant
339.00	32.0	28.4	46.00	-17.60	H	311	280	Compliant
352.56	27.8	24.1	46.00	-21.90	H	328	48	Compliant
366.12	40.2	37.4	46.00	-8.60	H	249	64	Compliant
379.68	26.3	24.1	46.00	-21.90	V	100	40	Compliant
393.24	31.6	29.0	46.00	-17.00	V	142	300	Compliant
406.80	28.2	22.0	46.00	-24.00	H	255	270	Compliant
420.36	38.0	31.5	46.00	-14.50	H	208	290	Compliant
433.92	32.2	26.6	46.00	-19.40	H	123	354	Compliant

6.3.6. Radiated Emissions Test - Above 1 GHz

There were no measurable radiated emissions that could be attributed to the product transmitter.

6. Measurement Data (continued)

6.4. Field Strength of Fundamental

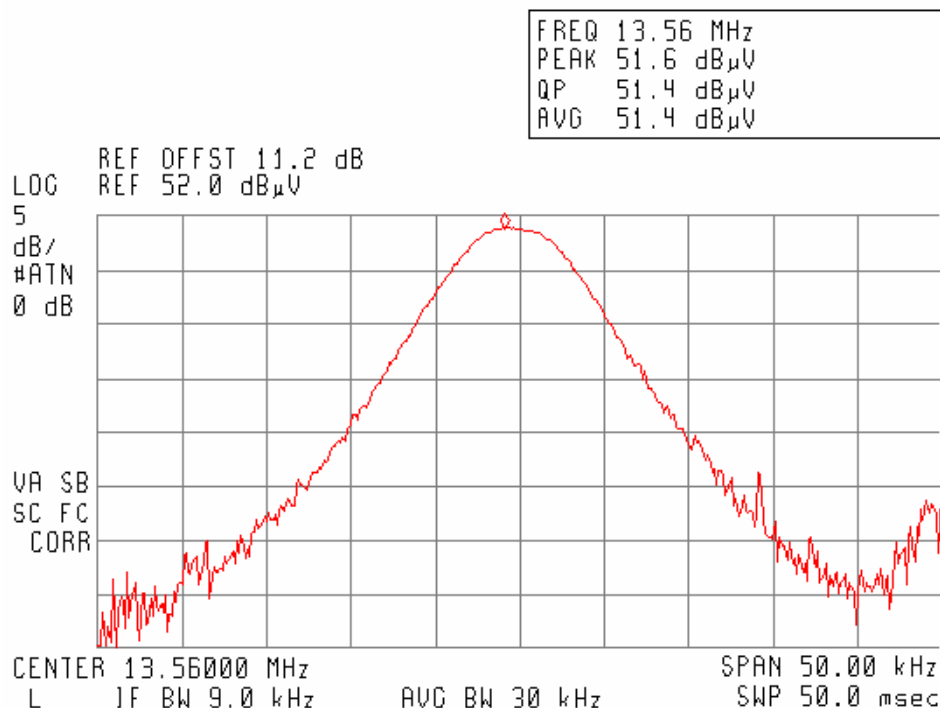
Requirement: The field strength of any emissions within the band 13.553 - 13.567 MHz shall not exceed 15,848 microvolts/meter at 30 meters.

Freq.	Dist.	Measurement		Limit ¹		Margin
MHz	Meters	$\mu\text{V/m}$	$\text{dB}\mu\text{V/m}$	$\mu\text{V/m}$	$\text{dB}\mu\text{V/m}$	$\text{dB}\mu\text{V/m}$
13.56	10	371.43	51.4	158,489.32	104	-52.6

¹ Limit has been extrapolated to 10 meters.

6.4.1. Measurement Plot

14:49:58 DEC 04, 2007



6. Measurement Data (continued)

6.5. Frequency Tolerance of the Carrier Signal

Requirement : The frequency tolerance of the carrier signal shall be maintained within $\pm 0.01\%$ of the operating frequency over a temperature variation of -20 degrees to +50 degrees C at normal supply voltage, and for a variation in the primary supply voltage from 85% to 115% of the rated supply voltage at a temperature of 20 degrees C.

6.5.1. Normal Operating Conditions

Ambient Temp	Normal Voltage	Measured Frequency
°C		MHz
+21.2	120	13.559650

Based on the measured frequency under normal operating conditions, the allowable tolerance of the carrier signal is 13.4244 MHz to 13.6956 MHz.

6.5.2. Temperature Stability (measured at the normal voltage)

Temp	Meas.	Result
°C	MHz	
- 20	13.559675	Compliant
+50	13.559600	Compliant

6.5.3. Voltage Stability (measured at ambient temperature)

Supply Voltage	Meas.	Result
$\pm 15\%$	MHz	
102	13.559758	Compliant
138	13.559755	Compliant

6. Measurement Data (continued)

6.6. Occupied Bandwidth

Requirement: Intentional radiators operating under the alternative provisions to the general emission limits, as contained in Sections 15.217 through 15.255 and in Subpart E of this part, must be designed to ensure that the 20 dB bandwidth of the emission is contained within the frequency band designated in the rule.

Frequency Band: $F_{MIN} = 13.110$ MHz

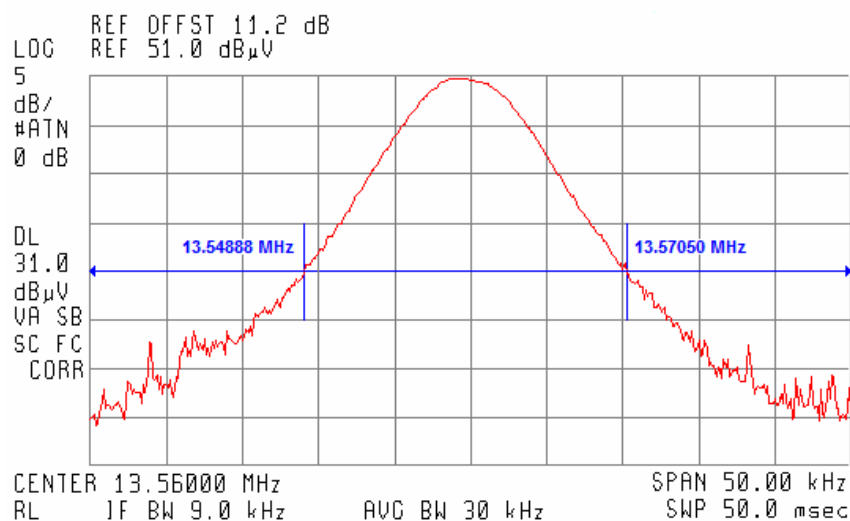
$F_{MAX} = 14.010$ MHz

	-20 dB Frequency Measured	Lower & Upper Band Edge	Result
	MHz	MHz	
F_{LO}	13.5489	13.110	Compliant ($F_{LO} > F_{MIN}$)
F_{HI}	13.5705	14.010	Compliant ($F_{HI} < F_{MAX}$)

6.6.1. Plot of 20 dB Bandwidth vs. Frequency Band Lower and Upper Band Edges

17:14:06 DEC 04, 2007

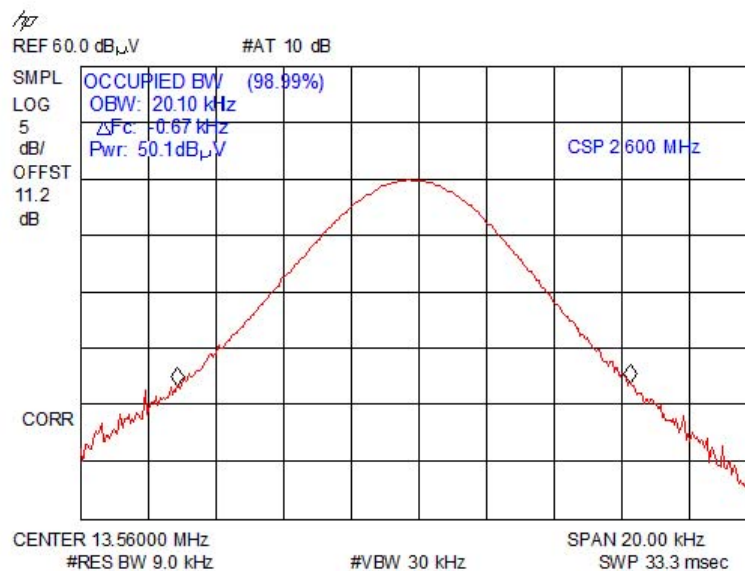
ACTV DET: PEAK
MEAS DET: PEAK QP AVG



6. Measurement Data (continued)

6.7. 99% Power Bandwidth

6.7.1. Plot of 99% Power Bandwidth



7. Test Site Description

Compliance Worldwide is located at 357 Main Street in Sandown, New Hampshire. The test sites at Compliance Worldwide are used for conducted and radiated emissions testing in accordance with Federal Communications Commission (FCC), Industry Canada, and Voluntary Control Council Interference (VCCI) standards. A description of the test sites is on file with the FCC (registration number 96392), Industry Canada (file number IC 3023A-1), and VCCI (member number 2147, registration numbers C-1987 and R-1856).

The radiated emissions test site is a 3 and 10 meter enclosed open area test site (OATS). Personnel, support equipment and test equipment are located in the basement beneath the OATS ground plane.

The conducted emissions site is part of a 16' x 20' x 12' ferrite tile chamber and uses one of the walls for the vertical ground plane required by EN 55022.

Both sites are designed to test products or systems 1.5 meters W x 1.5 meters L x 2.0 meters H, floor standing or table top.