

# Electromagnetic Compatibility Test Report

*Prepared in accordance with*

**FCC Part 15, RSS-210**

On

**Portable Biometric Identification Terminal**

**DSV3-EP**

Datastrip Products, Inc.

1 Waterview Drive

Shelton, CT 06484



Prepared by:

**TUV Rheinland of North America, Inc.**

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**Report No.:**
**30967181.003 Rev. E**

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<b>Client:</b>		Datastrip Products, Inc. 1 Waterview Drive Shelton, CT 06484  Scott Robinson (203) 225-9184 Fax: (203) 225-9260 Email: srobinson@datastrip.net	
<b>Identification:</b>	Portable Biometric Identification Terminal	<b>Serial No.:</b>	DSV3EPAK083900052
<b>Test item:</b>	<b>DSV3-EP</b>	<b>Date tested:</b>	30 June - 3 July 2009
<b>Testing location:</b>	TUV Rheinland of North America 762 Park Avenue Youngsville, NC 27596-9470 U.S.A.	Tel: (919) 554-3668 Fax: (919) 554-3542	
<b>Test specification:</b>	<b>Emissions:</b> FCC Part 15, Subpart C, RSS-210 Issue 7: FCC Parts 15.205, 15.209, 15.215(b), FCC Part 15.225 and RSS-210 A2.6, FCC Part 15.225(a) and RSS-210 A2.6(a), FCC Part 15.225(b) and RSS-210 A2.6(b), FCC Part 15.225(c) and RSS-210 A2.6(c), FCC Part 15.225(d) and RSS-210 A2.6(d), FCC Part 15.225(e) and RSS-210 A2.6, FCC Part 15.225(f) and RSS-210 Part 2.5, FCC Part 15.215 (c) and RSS-210		
<b>Test Result</b>	The above product was found to be <b>Compliant</b> to the above test standard(s)		
<b>tested by:</b> Mark Ryan		<b>reviewed by:</b> Robert Richards	
9 September 2009 _____ Date Signature		9 September 2009 _____ Date Signature	
<b>Other Aspects:</b>	None		
Abbreviations: OK, Pass, Compliant, Complies = passed Fail, Not Compliant, Does Not Comply = failed N/A = not applicable			
  <b>90552 and 100881</b>		 <b>NVLAP Lab Code (200094-0)</b>	
		<b>Industry Canada</b>  <b>IC-2932H</b>	

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## **1 General Information**

### **1.1 Scope**

This report is intended to document the status of conformance with the requirements of the FCC Part 15, RSS-210 based on the results of testing performed on 30 June - 3 July 2009 on the Portable Biometric Identification Terminal, Model No. DSV3-EP, manufactured by Datastrip Products, Inc.. This report only applies to the specific samples tested under the stated test conditions. It is the responsibility of the manufacturer to assure that additional production units of this model are manufactured with identical or EMI equivalent electrical and mechanical components. This report is further intended to document changes and modifications to the EUT throughout its life cycle. All documentation will be included as a supplement.

### **1.2 Purpose**

Testing was performed to evaluate the EMC performance of the EUT (Equipment Under Test) in accordance with the applicable requirements, procedures, and criteria defined in the application of regulations and application of standards listed in this report.

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### 1.3 Summary of Test Results

<b>Applicant</b>	Datastrip Products, Inc. 1 Waterview Drive Shelton, CT 06484	<b>Tel</b>	(203) 225-9184	<b>Contact</b>	Scott Robinson
		<b>Fax</b>	(203) 225-9260	<b>e-mail</b>	srobinson@datastrip.net
<b>Description</b>	Portable Biometric Identification Terminal	<b>Model Number</b>	DSV3-EP		
<b>Serial Number</b>	DSV3EPAK083900052	<b>Test Voltage/Freq.</b>	120VAC / 60Hz		
<b>Test Date Completed:</b>	30 June - 3 July 2009	<b>Test Engineer</b>	Mark Ryan		
Standards	Description	Severity Level or Limit		Criteria	Test Result
FCC Part 15, Subpart C Standard	Radio Frequency Devices- Subpart C: Intentional Radiators	See called out basic standards below		See Below	<b>Complies</b>
RSS-210 Issue 7 Standard	Low-Power Licence-exempt Radiocommunication Devices Category I Equipment	See called out basic standards below		See Below	<b>Complies</b>
FCC Parts 15.205, 15.209, 15.215(b)	Radiated Emissions	Below limit of sections 15.205, 15.209(a) and 15.109(g) - Class B		Below Limit	Complies
FCC Part 15.207	Conducted Emissions	Below limit of section 15.207(a) and 15.107(a) - Class B		Below Limit	Complies
FCC Part 15.215 (c) RSS-210	20 dB Bandwidth 99% Power Bandwidth	Contained within the Frequency Band		Within Limit	Complies
FCC Part 15.225 and RSS-210 A2.6	Operation within the band 13.110 – 14.01 MHz	See called out basic standards below		Below Limit	Complies
FCC Part 15.225(a) and RSS-210 A2.6(a)	Field strength Emissions within 13.553 – 13.567 MHz	15,848 µV/m at 30m 84 dBµV/m at 30m		Below Limit	Complies
FCC Part 15.225(b) and RSS-210 A2.6(b)	Field strength Emissions within 13.410 – 13.553 MHz and 13.567 - 13.710	334 µV/m at 30m 50.5 dBµV/m at 30m		Below Limit	Complies
FCC Part 15.225(c) and RSS-210 A2.6(c)	Field strength Emissions within 13.110 – 13.410 MHz and 13.710 - 14.010	106 µV/m at 30m 40.5 dBµV/m at 30m		Below Limit	Complies
FCC Part 15.225(d) and RSS-210 A2.6(d)	Field strength outside the 13.110 - 14.010 MHz band	Shall not exceed the limits of FCC Part 15.209		Below Limit	Complies
FCC Part 15.225(e) and RSS-210 A2.6	Frequencny tolerance over -20°C to +50°C at normal power supply and for 85% and 115% of rated supply voltage.	0.01% of operating frequency		Within Limit	Complies
FCC Part 15.225(f) and RSS-210 Part 2.5	Frequency Powered Tags	Not Applicable: Tags are not powered.		NA	Complies

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## 2 Laboratory Information

### 2.1.1 US Federal Communications Commission

TUV Rheinland of North America located at 762 Park Avenue, Youngsville, NC 27596-9470 is accredited by the commission for performing testing services for the general public on a fee basis. This laboratory test facilities have been fully described in reports submitted to and accepted by the FCC (Registration No 90552 and 100881). The laboratory scope of accreditation includes: Title 47 CFR Part 15, and 18. The accreditation is updated every 3 years.

### 2.1.2 NIST / NVLAP

Program, which is administered under the auspices of the National Institute of Standards and Technology. The laboratory has been assessed and accredited in accordance with ISO Standard 17025:2005 (Lab code: 200094-0). The scope of laboratory accreditation includes emission and immunity testing. The accreditation is updated annually.

### 2.1.3 Industry Canada

Registration No.: IC-2932H The OATS has been accepted by Industry Canada to perform testing to 3 and to 10m, based on the test procedures described in ANSI C63.4-2003.

### 2.1.4 Japan – VCCI

The Voluntary Control Council for Interference by Information Technology Equipment (VCCI) is a group that consists of Information Technology Equipment (ITE) manufacturers and EMC test laboratories. The purpose of the Council is to take voluntary control measures against electromagnetic interference from Information Technology Equipment, and thereby contribute to the development of a socially beneficial and responsible state of affairs in the realm of Information Technology Equipment in Japan. TUV Rheinland at the 762 Park Ave. Youngsville, N.C 27596 address has been assessed and approved in accordance with the Regulations for Voluntary Control Measures. (Registration No. R-1174, R-1679, C-1790 and C-1791).

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### 2.1.5 Sample Calculation – radiated & conducted emissions

The field strength is calculated by subtracting the Amplifier Gain and adding the Cable Loss and Antenna Correction Factor to the measured reading. The basic equation is as follows:

$$\text{Field Strength (dB}\mu\text{V/m)} = \text{RAW} - \text{AMP} + \text{CBL} + \text{ACF}$$

Where: RAW = Measured level before correction (dB $\mu$ V)

AMP = Amplifier Gain (dB)

CBL = Cable Loss (dB)

ACF = Antenna Correction Factor (dB/m)

$$\mu\text{V/m} = 10^{\frac{\text{dB}\mu\text{V/m}}{20}}$$

### 2.1.6 Sample radiated emissions calculation @ 30 MHz

**Measurement +Antenna Factor–Amplifier Gain+Cable loss=Radiated Emissions (dB $\mu$ V/m)**

$$25 \text{ dB}\mu\text{V/m} + 17.5 \text{ dB} - 20 \text{ dB} + 1.0 \text{ dB} = 23.5 \text{ dB}\mu\text{V/m}$$

## 2.2 Measurement Uncertainty Emissions

	<b>U<sub>lab</sub></b>	<b>U<sub>cispr</sub></b>
<b>Radiated Disturbance @ 10m</b>		
30 MHz – 1,000 MHz	3.3 dB	5.2 dB
<b>Conducted Disturbance @ Mains Terminals</b>		
150 kHz – 30 MHz	1.18 dB	3.6 dB
<b>Disturbance Power</b>		
30 MHz – 300 MHz	3.88 dB	4.5 dB

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**Measurement Uncertainty Immunity**

The estimated combined standard uncertainty for harmonic current and flicker measurements is $\pm 2.5$ %
The estimated combined standard uncertainty for ESD immunity measurements is 4.10 %
The estimated combined standard uncertainty for radiated immunity measurements is $\pm 2.05$ dB
The estimated combined standard uncertainty for EFT fast transient immunity measurements is $\pm 2.92$ %
The estimated combined standard uncertainty for surge immunity measurements is $\pm 2.92$ %
The estimated combined standard uncertainty for conducted immunity measurements is $\pm 1.83$
The estimated combined standard uncertainty for power frequency magnetic field immunity measurements is $\pm 5.8$ %
The estimated combined standard uncertainty for voltage variation and interruption measurements is $\pm 1.74$ %

The expanded uncertainty at a level of 95% confidence is obtained by multiplying the combined standard uncertainty by a coverage factor of 2. Compliance criteria are not based on measurement uncertainty.

**2.3 Calibration Traceability**

All measurement instrumentation is traceable to the National Institute of Standards and Technology (NIST). Measurement method complies with ANSI/NCSL Z540-1-1994 and ISO Standard 17025:2005. Equipment calibration records are kept on file at the test facility.

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## 2.4 Measurement Equipment Used

Equipment	Manufacturer	Model #	Serial/Inst #	Last Cal dd/mm/yy	Next Cal dd/mm/yy	Test
Ant. BiconiLog	Chase	CBL6140A	1108	13-Jun-08	13-Jun-10	RE
Antenna Loop	EMCO	6502	3336	17-Jun-08	17-Jun-10	RE
Receiver, EMI	Rohde & Schwarz	ESIB40	100043	29-Jun-09	29-Jun-10	RE
Cable, Coax	Andrew	FSJ1-50A	003	22-Jan-09	22-Jan-10	RE
Cable, Coax	Andrew	FSJ1-50A	030	22-Jan-09	22-Jan-10	RE
Cable, Coax	Andrew	FSJ1-50A	045	22-Jan-09	22-Jan-10	RE
Spectrum Analyzer	Agilent Tec.	E7405A	US39440157	02-Dec-08	02-Dec-09	CE
LISN 15-18 (NSLK 8126)	Schwarzbeck Mess- Elektronik	NSLK 8126	003885	02-Feb-09	02-Feb-10	CE
Transient Limiter	Schaffner	CFL-9206	1649	23-Jan-09	23-Jan-10	CE
Cable, Coax	Pasternack	RG-223	051	22-Jan-09	22-Jan-10	CE
Meter, Multi	Fluke	179	90580752	02-Dec-08	02-Dec-09	ALL
AC Source	Elgar	SW1750A	0114A1040	03-Dec-08	03-Dec-09	PLIH
Isolation Transformer	Solar Electronics	6220-1A	None	CNR II	CNR II	PLIH

Note: CE = Conducted Emissions, CI= Conducted Immunity, DP=Disturbance Power, EFT=Electrical Fast Transients, ESD = Electrostatic Discharge, FLI=Flicker, HAR=Harmonics, MF=Magnetic Field Immunity, RE=Radiated Emissions, RI=Radiated Immunity, SI=Surge Immunity, VDSI=Voltage Dips and Short Interruptions, PLIH=Power Line Inter-Harmonics

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### **3 Product Information**

#### **3.1 Product Description**

The DSV3® Series of products are portable, handheld computers specifically designed for security, law enforcement, border control and positive I.D. verification applications. They feature the ability to interface with Contact-less Smart Cards. An integrated fingerprint sensor enables biometric verification of identity.

The apparatus has two antennas that alternate at a rate of 2 times a second looking for a tag. Both antennas will be active (not transmitting at the same time) for these tests. The antenna that gets the strongest return from the tag will take precedence. The scans will be made without a RFID tag. Therefore, both antennas will alternate and therefore the worst case emissions will be measured automatically, by default. Refer to the Operational Description document for more details of this process.

#### **3.2 Equipment Modifications**

No modifications were needed to bring product into compliance.

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## 4 Emissions

### 4.1 Radiated Emissions

This test measures the electromagnetic levels of spurious signals generated by the EUT that radiated from the EUT and may affect the performance of other nearby electronic equipment.

Except for a fraction of a second pause, The EUT is transmitting at all times.

#### 4.1.1 Over View of Test

Results	Complies (as tested per this report)					Date	03/06/09	
Standard	FCC Parts 15.205, 15.209, 15.215(b)							
Product Model	DSV3-EP				Serial#	DSV3EPAK083900052		
Configuration	See test plan for details							
Test Set-up	Tested on 10m O.A.T.S. placed on turn-table, see test plans for details							
EUT Powered By	120 VAC 60Hz	Temp	21°C	Humidity	31%	Pressure	1004mbar	
Frequency Range	30 MHz to 2 GHz							
Perf. Criteria	. (Below Limit)			Perf. Verification		Readings Under Limit		
Mod. to EUT	None			Test Performed By		Dave Hollis		

#### 4.1.2 Test Procedure

Radiated and FCC emissions tests were performed using the procedures of ANSI C63.4 including methods for signal maximizations and EUT configuration. The photos included with the report show the EUT in its maximized configuration.

The frequency range from 30 MHz to 2GHz was investigated for radiated emissions.

Radiated emission testing was first performed at a distance of 3 meters in the semi-anechoic chamber in order to identify the specific frequencies for which these measurements will be made on the 10 m OATS.

The EUT employs two antenna systems that are constantly alternating, the values in this report will be worst case emissions (refer to section 3.1 of this report).

#### 4.1.3 Deviations

There were no deviations from the test methodology listed in the test plan for the radiated emission test.

#### 4.1.4 Final Test

All final radiated emissions measurements were below (in compliance) the limits.

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#### 4.1.5 Final Graphs

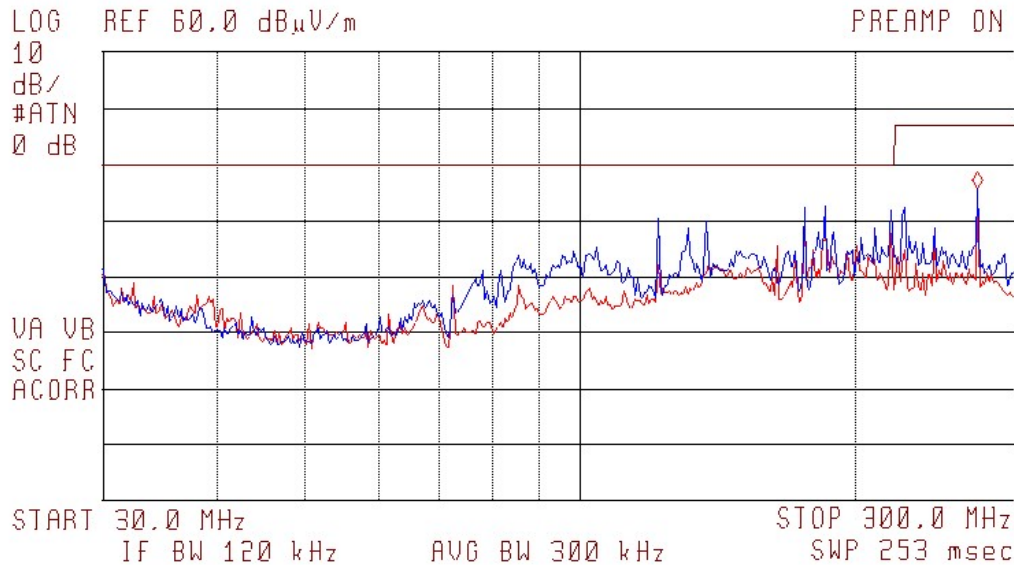
NOTES:

**Radiated Emissions Prescan at 30 MHz to 300 MHz**

**Vertical / Horizontal**

12:30:01 MAR 27, 2009  
DATASTRIP MODEL DSV3-EP

ACTV DET: PEAK  
MEAS DET: PEAK QP AVG  
MKR 277.5 MHz  
35.61 dB $\mu$ V/m



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NOTES:

**Radiated Emissions Prescan at 300 MHz to 1 GHz**  
**Vertical / Horizontal**

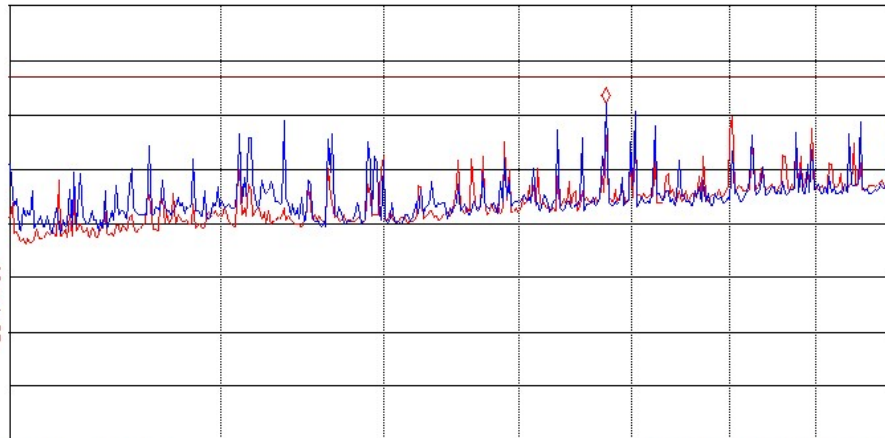
12:31:54 MAR 27, 2009  
DATASTRIP MODEL DSV3-EP

ACTV DET: PEAK  
MEAS DET: PEAK QP AVG  
MKR 704.5 MHz  
41.96 dB $\mu$ V/m

LOG REF 60.0 dB $\mu$ V/m  
10  
dB/  
#ATN  
0 dB

PREAMP ON

VA VB  
SC FC  
ACDRR



START 300.0 MHz  
IF BW 120 kHz  
AUG BW 300 kHz  
STOP 1.0000 GHz  
SWP 656 msec

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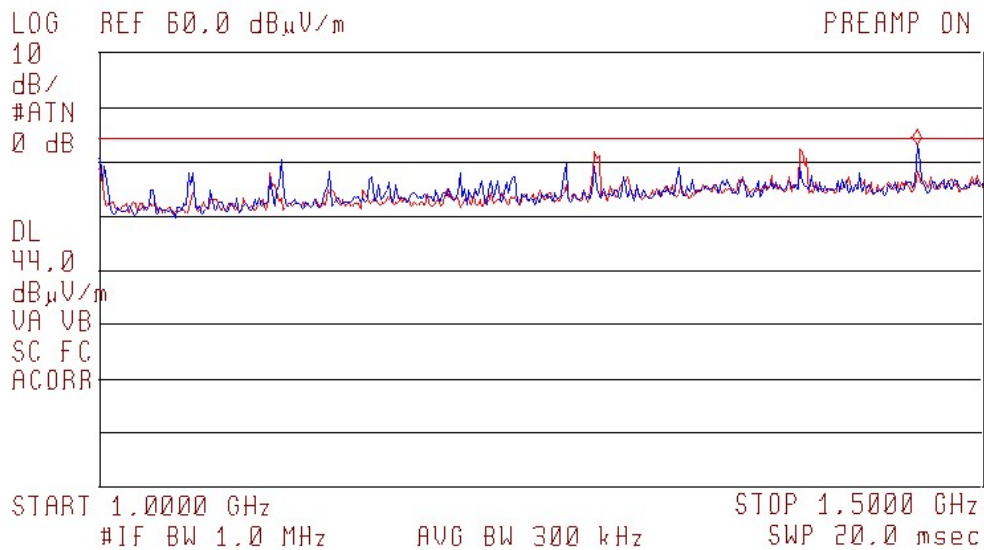
NOTES:

Radiated Emissions Prescan at 1 GHz to 1.5 GHz

Vertical / Horizontal

12:39:16 MAR 27, 2009  
DATASTRIP MODEL DSV3-EP

ACTV DET: PEAK  
MEAS DET: PEAK QP AVG  
MKR 1.4625 GHz  
43.05 dB $\mu$ V/m



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NOTES:

Radiated Emissions Prescan at 1.5 GHz to 2.0 GHz

Vertical / Horizontal

12:40:58 MAR 27, 2009  
DATASTRIP MODEL DSV3-EP

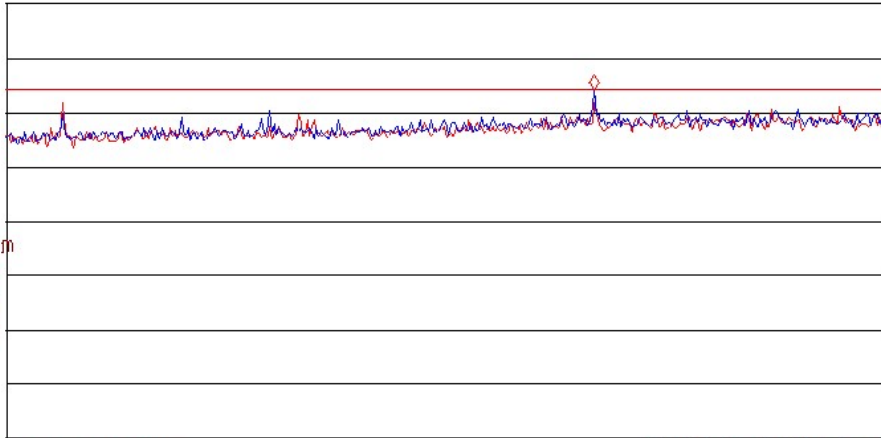
ACTV DET: PEAK  
MEAS DET: PEAK QP AVG  
MKR 1.6325 GHz  
43.99 dB $\mu$ V/m

LOG REF 60.0 dB $\mu$ V/m

PREAMP ON

10  
dB/  
#ATN  
0 dB

DL  
44.0  
dB $\mu$ V/m  
VA VB  
SC FC  
ACORR



START 1.5000 GHz STOP 2.0000 GHz  
#IF BW 1.0 MHz AVG BW 300 kHz SWP 20.0 msec

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#### 4.1.6 Pre Scan Data

Meas #	Freq (MHz)	Peak	Antenna Polarization	Angle (degrees)	Antenna Height (meters)	Comment
1	125.6875	31.20	Vertical	180	1.50	Prescan
2	192.0500	32.35	Vertical	180	1.50	Prescan
3	276.5250	36.77	Vertical	180	1.50	Prescan
4	452.5125	39.81	Vertical	180	1.50	Prescan
5	703.9000	43.51	Vertical	180	1.50	Prescan
6	733.1750	41.18	Vertical	180	1.50	Prescan
7	1106.1825	42.23	Vertical	180	1.50	Prescan
8	1233.1250	39.72	Vertical	180	1.50	Prescan
9	1466.4250	44.73	Vertical	180	1.50	Prescan
10	1532.8000	43.95	Horizontal	180	1.50	Prescan
11	1833.0000	46.82	Vertical	180	1.50	Prescan
Tested by: David Hollis						
TUV Rheinland of North America, Inc. 12 Commerce Road Newtown, CT 06470 RE22_B.xlt Revised 21OCT05						

#### 4.1.7 Final Tabulated Data

Radiated Emissions Measurements												
Standard:	EN 55022: 2006 Class B/FCC Part 15.109(g)				PRESCAN or FINAL:			Final	Date:	3/27/09		
Device Tested:	Datastrip Model DSV3_EP				Distance:			10m				
		Measured Level										
							Antenna + Cable Correction Factor (included in measured levels)					
Meas #	Freq (MHz)	Peak	Quasi-Peak	Average	Quasi-Peak Limit	Quasi-Peak Δ		Result	Antenna Polarization	Angle (degrees)	Antenna Height (meters)	Comment
1	125.6875	33.69	26.07	23.68	30.00	-3.93	13.08	Complied	Vertical	360	1.00	Maximum Emissions
2	192.0250	29.19	24.20	17.69	30.00	-5.80	11.62	Complied	Vertical	360	1.00	
3	276.5400	31.60	29.76	29.04	37.00	-7.24	15.56	Complied	Vertical	360	1.50	
4	452.5120	35.16	32.95	31.31	37.00	-4.05	19.42	Complied	Vertical	360	1.50	
5	703.9000	35.41	32.79	31.14	37.00	-4.21	22.71	Complied	Vertical	360	2.20	
6	733.1625	35.00	32.68	30.04	37.00	-4.32	22.70	Complied	Vertical	360	2.20	
					Avg Limit	Avg Δ						
7	1106.0000	48.38	29.66	24.41	43.51	-19.10	27.10	Complied	Vertical	360	2.20	
8	1233.1250	40.11	30.29	26.73	43.51	-16.78	28.22	Complied	Vertical	360	2.00	
9	1491.5513	43.34	33.45	29.91	43.51	-13.60	30.78	Complied	Vertical	360	2.00	
10	1534.3338	43.47	33.99	30.36	43.51	-13.15	31.13	Complied	Vertical	360	1.80	
11	1833.0000	47.30	37.81	34.24	43.51	-9.27	33.14	Complied	Vertical	360	1.80	

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## 4.2 Conducted Emissions

This test measures the electromagnet levels of spurious signals generated by the EUT on the AC power line that may affect the performance of other near by electronic equipment.

Except for a fraction of a second pause, The EUT is transmitting at all times.

### 4.2.1 Over View of Test

Results	Complies (as tested per this report)					Date	03/06/09	
Standard	FCC Part 15.207(a)							
Product Model	DSV3-EP				Serial#	DSV3EPAK083900052		
Configuration	See test plan for details							
Test Set-up	Tested in shielded room		EUT placed on table			see test plans for details		
EUT Powered By	120/60	230/50	Temp	22° C	Humidity	34%	Pressure	1000mbar
Frequency Range	150 kHz – 30 MHz							
Perf. Criteria	Below Limits			Perf. Verification		Readings Under Limits for L1 and L2		
Mod. to EUT	See section 4.2.3			Test Performed By		Mark Ryan		

### 4.2.2 Test Procedure

Conducted and FCC emissions tests were performed using the procedures of ANSI C63.4 including methods for signal maximizations and EUT configuration. The photos included with the report show the EUT in its maximized configuration.

The frequency range from 150 kHz to 30 MHz was investigated for conducted emissions.

Conducted Emissions measurements were performed in the shielded room using procedures specified in the test plan and standard.

### 4.2.3 Deviations

Since the RFID operated at 13.5MHz, and the conducted emission at that frequency is well above the limit, the procedures of FCC Publication 174176 (the use of a dummy load in place of the RFID antenna) were used.

### 4.2.4 Final Test

All final conducted emissions measurements were below (in compliance) the limits.

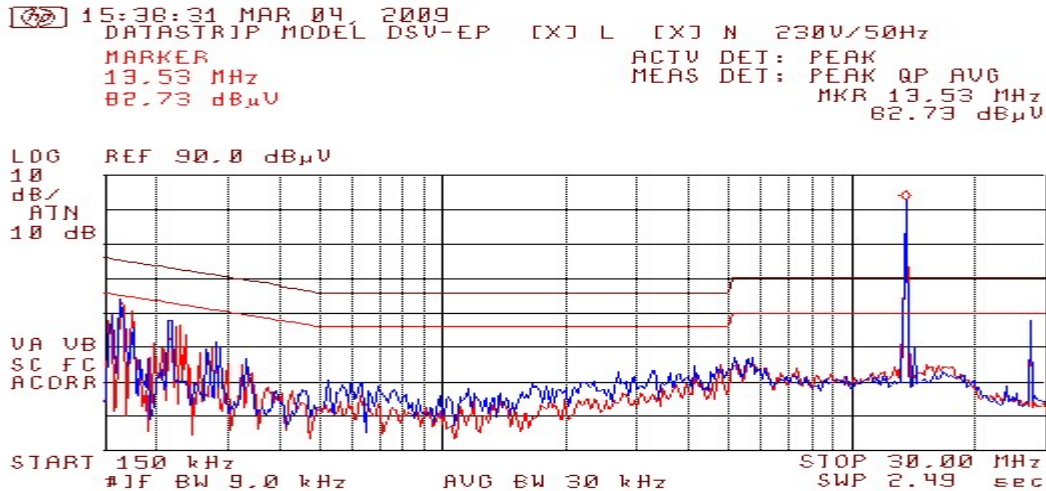
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## 4.2.5 Final Graphs and Tabulated Data

### NOTES:

**Conducted Emissions @ 230V/50Hz (with internal antennas active)**

**Line / Neutral**



## 4.2.6 Final Tabulated Data at of EUT with internal antennas connected (no dummy loads)

Conducted Emissions Measurements												
Standard:	EN55022:1998, Class B/FCC Part 15.107 (a)									Date:	4-Mar-09	
Device Tested:	Datastrip Model DSV3-EP at 230VAC/50Hz without Dummy Load on RFID									File: .xls	9030401	
Signal Num	Freq	Peak Amp	QP Amp	Avg Amp	QP Limit	Avg Limit	Conductor	QP Δ	QP Result	Avg Δ	Average Result	Mode
	MHz	dBuV	dBuV	dBuV	dBuV	dBuV		dB		dB		
1	0.176	54.22	53.04	22.80	64.65	54.65	Line	-11.61	Complied	-31.85	Complied	
2	0.235	41.14	29.84	27.43	62.27	52.27	Line	-32.43	Complied	-24.84	Complied	
3	1.280	25.25	20.22	10.67	56.00	46.00	Line	-35.78	Complied	-35.33	Complied	
4	5.268	37.41	29.90	18.80	60.00	50.00	Line	-30.10	Complied	-31.20	Complied	
5	13.559	82.64	79.35	81.14	60.00	50.00	Line	19.35	Did Not Comply	31.14	Did Not Comply	
6	27.119	47.88	46.73	46.71	60.00	50.00	Line	-13.27	Complied	-3.29	Complied	
7	0.177	55.01	41.73	29.14	64.62	54.62	Neutral	-22.89	Complied	-25.48	Complied	
8	0.220	37.59	31.31	26.79	62.82	52.82	Neutral	-31.51	Complied	-26.03	Complied	
9	0.637	31.14	27.98	16.86	56.00	46.00	Neutral	-28.02	Complied	-29.14	Complied	
10	5.578	35.66	30.71	19.32	60.00	50.00	Neutral	-29.29	Complied	-30.68	Complied	
11	13.559	82.46	79.97	81.37	60.00	50.00	Neutral	19.97	Did Not Comply	31.37	Did Not Comply	
12	27.119	49.23	47.56	47.04	60.00	50.00	Neutral	-12.44	Complied	-2.96	Complied	
Tested by:	Mark Ryan											
TUV Rheinland of North America, Inc. 12 Commerce Road Newtown, CT 06470 Tel:(203) 426-0888 Fax: (203) 426-4009												
CE22 B.xlt Revised 13APR09												

CE22\_B.xls Revised 13APR05

**NOTE:** Per the procedures of FCC Publication 174176; if the RFID fails conducted emissions at the operating frequency (13.56MHz) then the antenna will be replaced with a dummy load. The data above is with internal Antennas.

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NOTES:

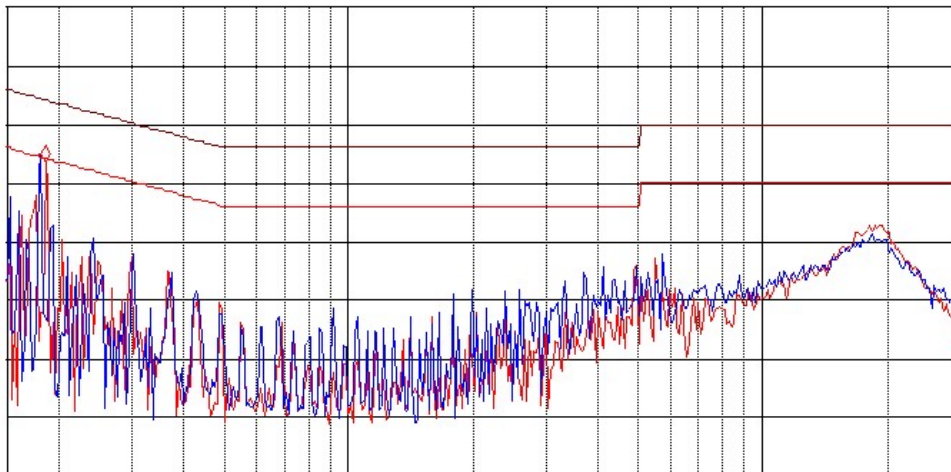
**Conducted Emissions @ 120V/60Hz (w/ dummy load)**  
**Line / Neutral**

13:32:20 MAR 06, 2009  
DATASTRIP MODEL DSV3-EP [X] L [X] N 120V/60Hz  
MARKER  
190 kHz  
53.48 dB $\mu$ V  
ACTV DET: PEAK  
MEAS DET: PEAK QP AVG  
MKR 190 kHz  
53.48 dB $\mu$ V

LOG REF 80.0 dB $\mu$ V

10  
dB/  
ATN  
10 dB

VA VB  
SC FC  
ACORR



START 150 kHz  
#IF BW 9.0 kHz  
AUG BW 30 kHz  
STOP 30.00 MHz  
SWP 2.49 sec

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### 4.2.7 Final Tabulated Data at 120V/60Hz

Conducted Emissions Measurements													
Standard:	EN55022:1998, Class B/FCC Part 15.107(a)									Date:	6-Mar-09		
Device Tested:	Datastrip Model DSV3-EP at 120VAC/60Hz with Dummy Load on RFID									File: .xls	9030602		
Signal Num	Freq	Peak Amp	QP Amp	Avg Amp	QP Limit	Avg Limit	Conductor	QP Δ	QP Result	Avg Δ	Average Result	Mode	
	MHz	dBuV	dBuV	dBuV	dBuV	dBuV		dB		dB			
1	0.185	55.84	54.65	42.27	64.24	54.24	Line	-9.59	Complied	-11.97	Complied		
2	0.371	36.70	35.09	25.53	58.48	48.48	Line	-23.39	Complied	-22.95	Complied		
3	0.496	29.34	27.44	19.49	56.06	46.06	Line	-28.62	Complied	-26.57	Complied		
4	2.046	27.99	26.21	20.50	56.00	46.00	Line	-29.79	Complied	-25.50	Complied		
5	4.708	36.72	34.13	23.25	56.00	46.00	Line	-21.87	Complied	-22.75	Complied		
6	18.652	43.69	41.83	36.75	60.00	50.00	Line	-18.17	Complied	-13.25	Complied		
7	0.185	55.27	54.21	42.11	64.24	54.24	Neutral	-10.03	Complied	-12.13	Complied		
8	0.248	47.29	45.65	34.82	61.82	51.82	Neutral	-16.17	Complied	-17.00	Complied		
9	0.930	28.75	25.02	20.69	56.00	46.00	Neutral	-30.98	Complied	-25.31	Complied		
10	2.664	33.31	31.26	26.07	56.00	46.00	Neutral	-24.74	Complied	-19.93	Complied		
11	5.577	38.82	36.85	28.40	60.00	50.00	Neutral	-23.15	Complied	-21.60	Complied		
12	18.094	41.24	39.32	34.13	60.00	50.00	Neutral	-20.68	Complied	-15.87	Complied		
Tested by:	Mark Ryan												
TUV Rheinland of North America, Inc. 12 Commerce Road Newtown, CT 06470 Tel:(203) 426-0888 Fax: (203) 426-4009													
CE22_B.xls Revised 13APR05													

NOTE: Per the procedures of FCC Publication 174176 the RFID antennas were replaced with a dummy loads.

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### 4.3 Band Width Measurement - FCC Part 15.215(c) and RSS-210

Intentional radiators must be designed to ensure that the 20 dB bandwidth of the emission is contained within the frequency band designated in the rule section under which the equipment is operated.

#### 4.3.1 Test Over View

Results	Complies (as tested per this report)				Date	01 July 2009		
Standard	FCC Part 15.215 (c) and RSS-210							
Product Model	DSV3-EP			Serial#	DSV3EPAK083900052			
Configuration	See test plan for details							
Test Set-up	Tested in temperature chamber. See test plans for details							
EUT Powered By	120VAC / 60Hz	Temp	78 °F	Humidity	35%	Pressure	997 mbar	
Perf. Criteria	0.01% of the operating frequency		Perf. Verification		Readings within Limit			
Mod to EUT	None		Test Performed By		Mark Ryan			

#### 4.3.2 Test Procedure

Radiated field strength emissions tests were performed using the procedures of ANSI C63.4 including methods for signal maximizations and EUT Configuration. Testing was performed, using the worst-case orientation, at a distance of 3 meters in the compliant 5m chamber. Measurements made were the 20dB and 99% Power Bandwidths.

#### 4.3.3 Deviations

There were no deviations from the test methodology listed for this test.

#### 4.3.4 Final Test

The Frequency Tolerance was within the limits (in compliance) as specified in FCC Part 15.215(c).

#### 4.3.5 Final Test Data

<b>Band width</b>	<b>Frequency (in kHz)</b>	<b>Results</b>
20dB	3.13	Complies
99% PBW	2.76	Complies

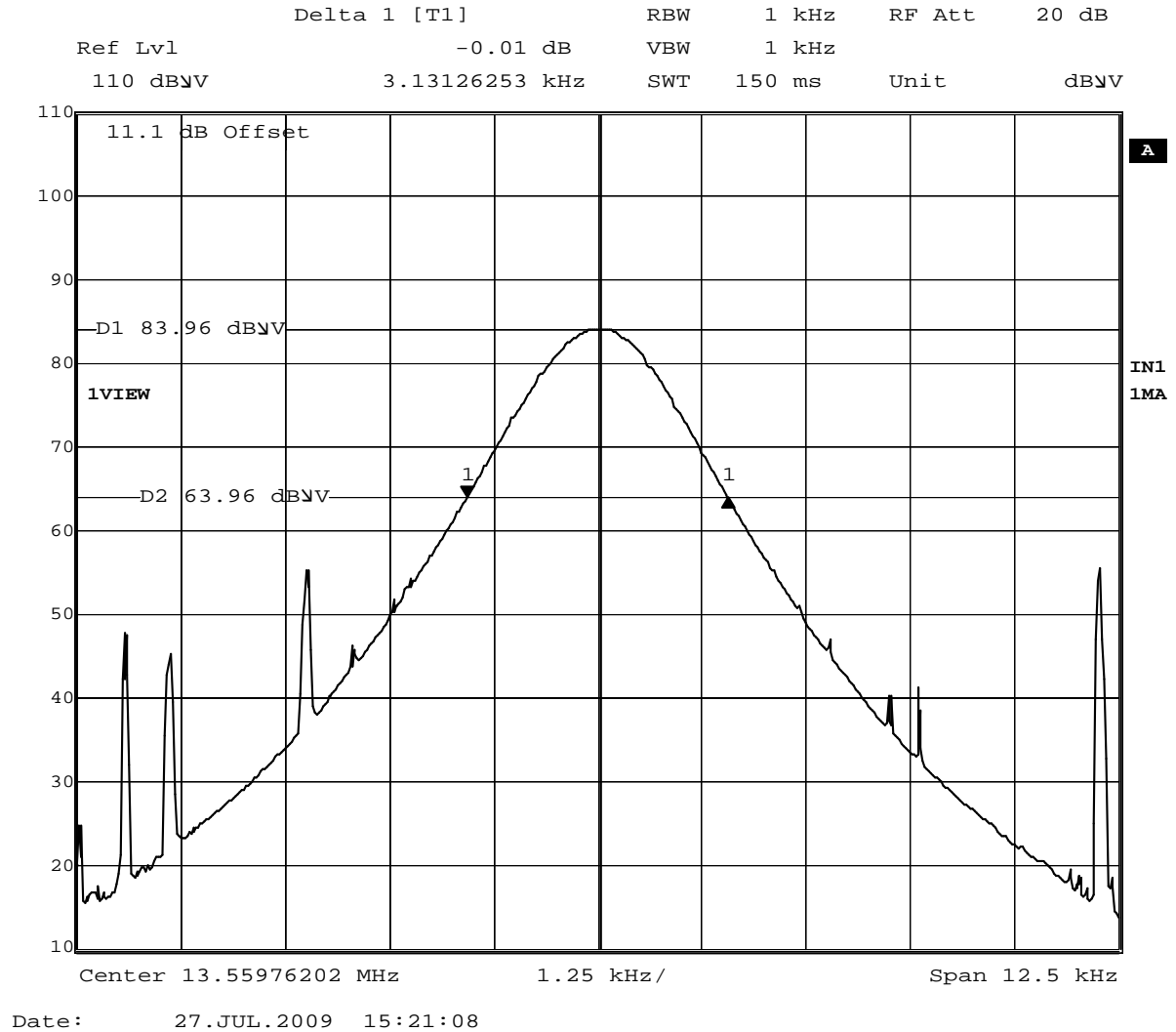
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#### 4.3.6 Final graphs



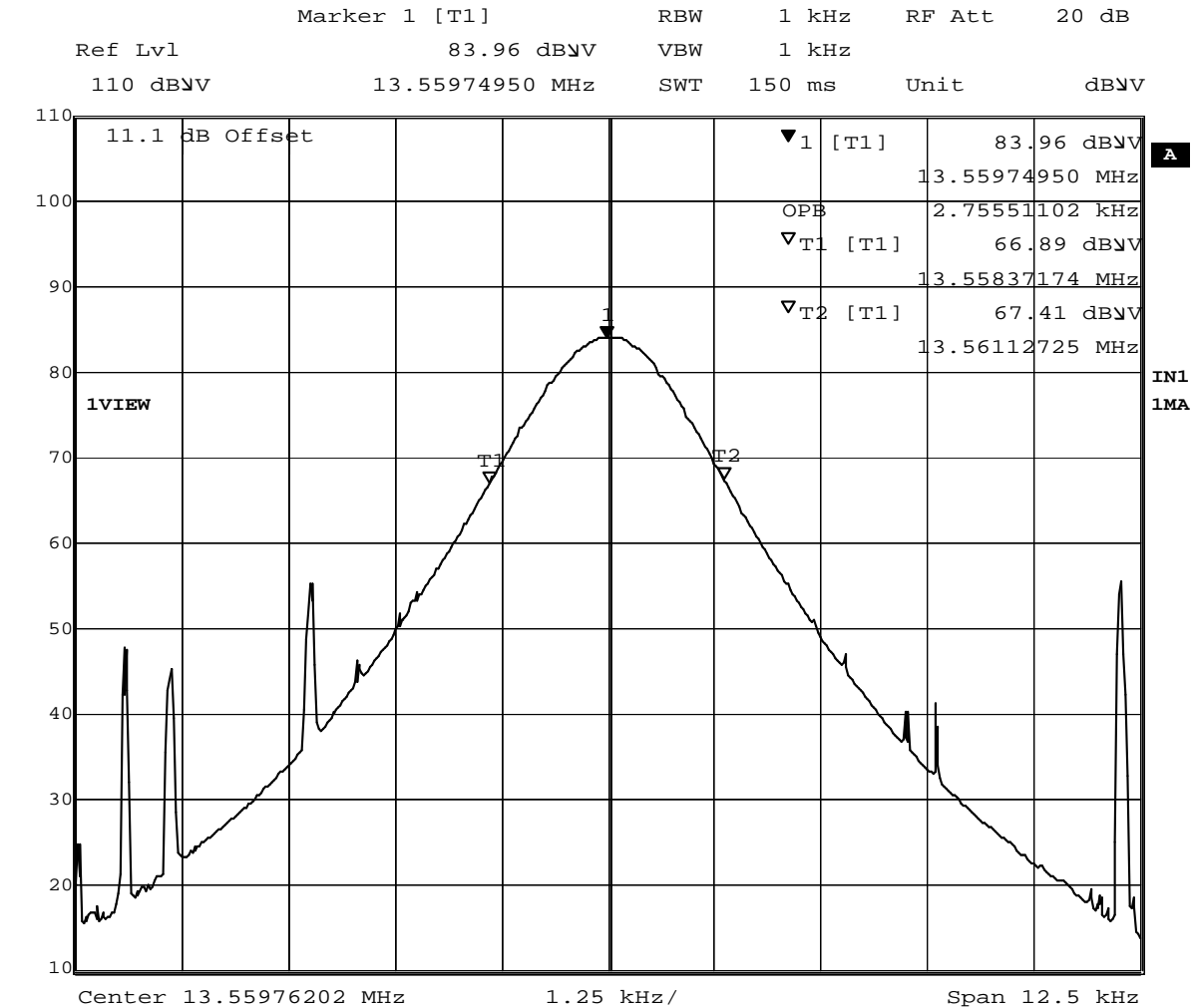
20 dB Bandwidth = 3.13 kHz

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Date: 27.JUL.2009 15:23:03

99% Power Bandwidth = 2.76 kHz

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#### 4.4 Radiated Field Strength Emissions FCC Parts 15.225 (a), (b) and (c)

- (a) The field strength of any emissions within the band 13.553 to 13567 MHz shall not exceed 15,848 microvolts/meter at 30 meters.
- (b) Within the bands 13.410 to 13.553 MHz and 13.567 to 13.710 MHz, the field strength of any emissions shall not exceed 334 microvolts/meter at 30 meters.
- (c) Within the bands 13.110 to 13.410 MHz and 13.710 to 14.010 MHz, the field strength of any emissions shall not exceed 106 microvolts/meter at 30 meters.

##### 4.4.1 Test Over View

Results	Complies (as tested per this report)					Date	27 July 2009	
Standard	FCC Parts 15.225(a), (b), (c) and RSS-210 A2.6(a), (b), (c)							
Product Model	DSV3-EP				Serial#	DSV3EPAK083900052		
Configuration	See test plan for details							
Test Set-up	Tested in compliant 5m chamber, EUT placed on table See test plan for details							
EUT Powered By	120VAC / 60Hz	Temp	78 °F	Humidity	40%	Pressure	1005 mbar	
Perf. Criteria	Below Limit			Perf. Verification		Readings under Limit		
Mod to EUT	None			Test Performed By		Mark Ryan		

##### 4.4.2 Test Procedure

The frequency range from 13.110 MHz to 14.010 MHz was investigated in three orientations for worst-case radiated field strength emissions. Radiated field strength emissions were performed using the procedures of ANSI C63.4 including methods for signal maximizations and EUT configuration. Testing was performed in a compliant 5m chamber.

##### 4.4.3 Deviations

The measurement distance was 3m for all frequencies. The limits below 30 MHz were adjusted for this shorter measurement distance. See section 4.4.6 of this test report for details.

##### 4.4.4 Final Test

All radiated emissions measurements were below (in compliance with) the limits.

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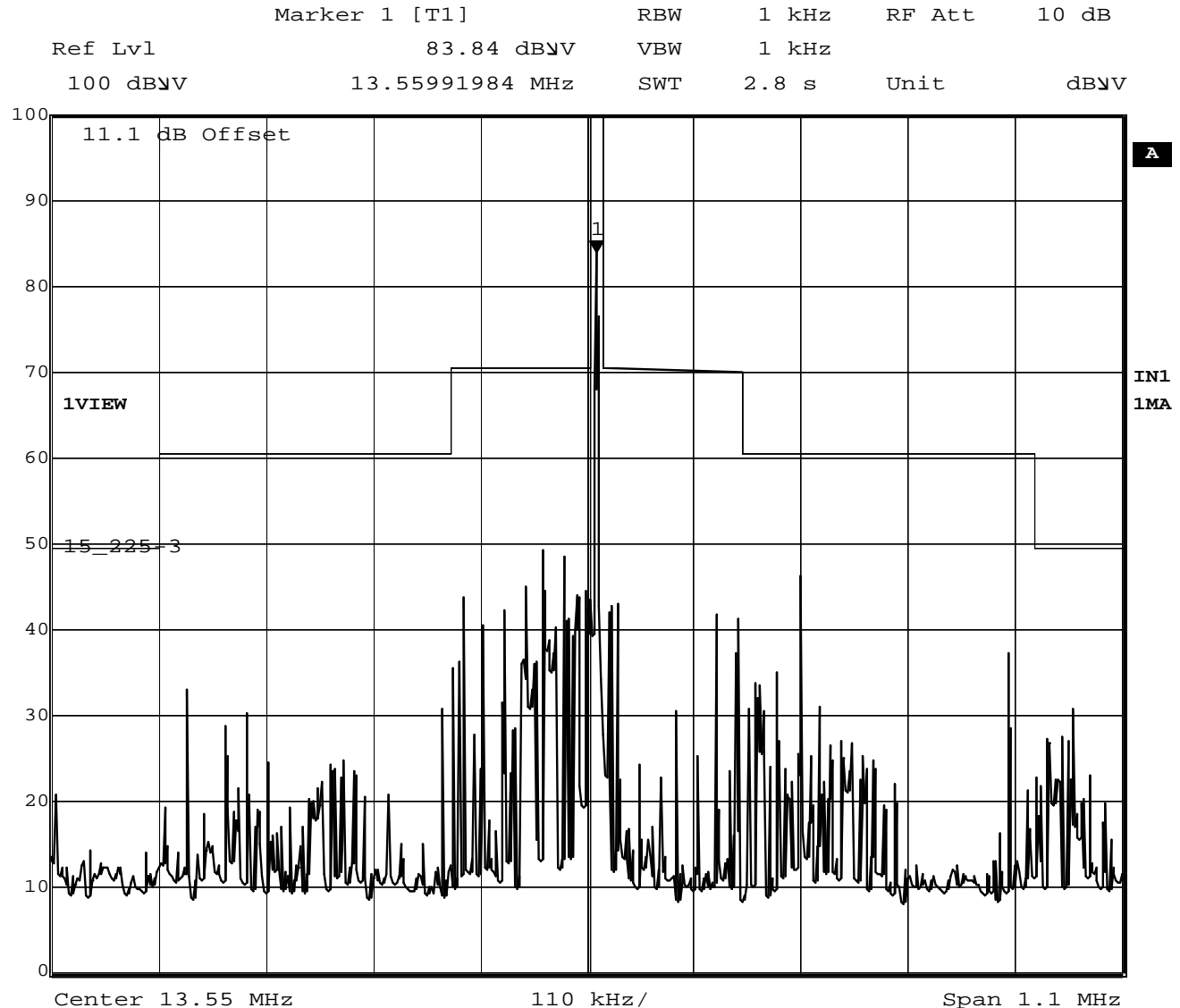


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#### 4.4.5 Final Field Strength Data



Date: 27.JUL.2009 15:00:07

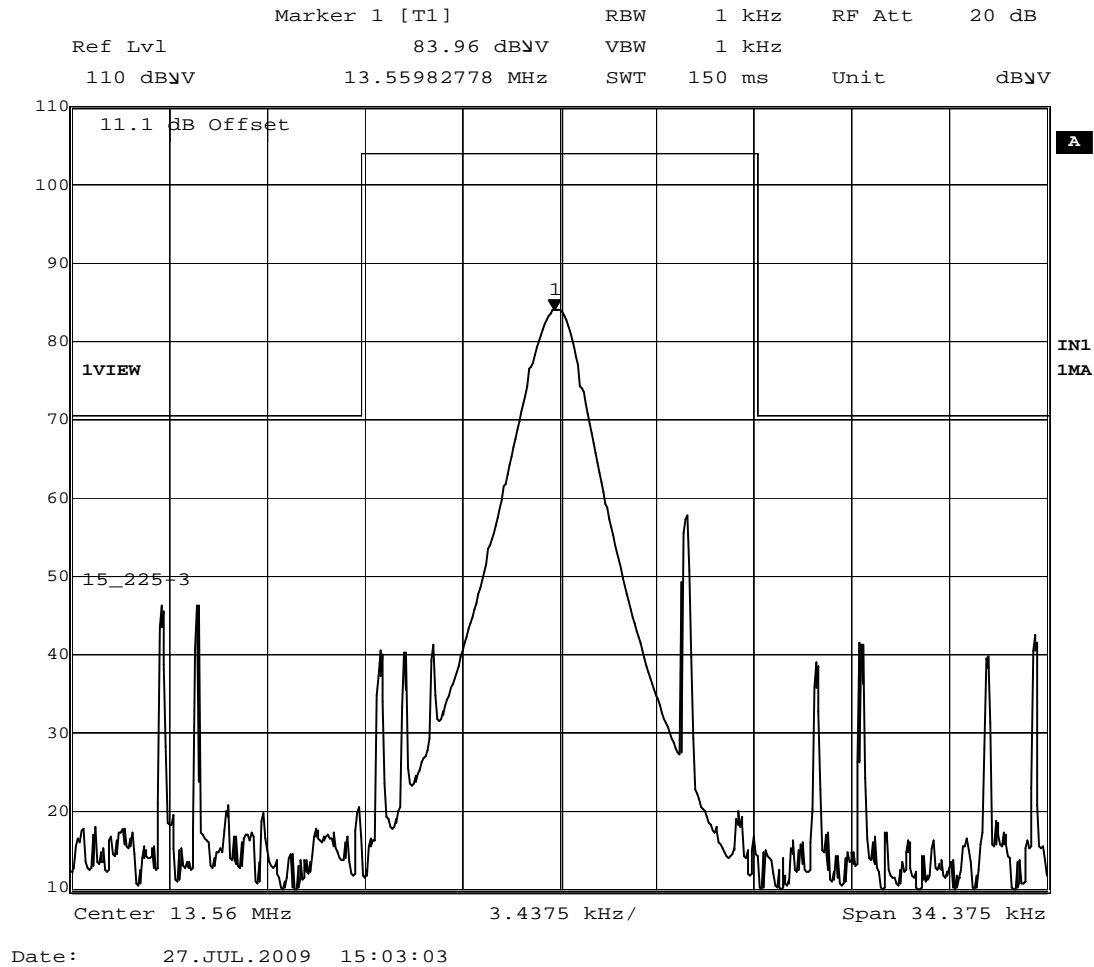
#### Frequency Mask to include FCC Parts 15.225(a), (b), (c), and (d)

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### Frequency Mask to include FCC Part 15.225(a)

Note: Limits shown were converted from  $\mu\text{V}/\text{m}$  at 30m to  $\text{dB}\mu\text{V}/\text{m}$  at 3 m measurement distance. The plot also includes 11.1 dB of correction factors for at 3m, for this band.

#### 4.4.6 Final Data

All peak emissions are more than 20 dB below the limit. The limit was adjusted for  $\text{dB}\mu\text{V}$  at 3m measurements by using the following formula:  $3\text{m Limit} = (10\text{m limit in } \mu\text{V}) + 20\log(30\text{m} / 3\text{m})$

For example the limit between 13.110 MHz and 14.010 MHz is 15,848 $\mu\text{V}$  at 30m, therefore:

$$\text{The 3 m Limit} = 20 * \log(15,848) + 20 * \log(30/3) = 84 + 20 = 104 \text{ dB}\mu\text{V}$$

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#### 4.5 Radiated Field Strength Emissions FCC Part 15.225(d)

(d) The field strength of any emissions appearing outside of the 13.110 to 14.010 band shall not exceed the general radiated emissions in section 15.209.

##### 4.5.1 Test Over View

Results	Complies (as tested per this report)						Date	27 July 2001
Standard	FCC Part 15.225(d) and RSS-210 A2.6(d)							
Product Model	DSV3-EP				Serial#	DSV3EPAK083900052		
Configuration	See test plan for details							
Test Set-up	Tested in shielded room   EUT placed on table   See test plan for details							
EUT Powered By	120VAC / 60Hz	Temp	78 °F	Humidity	40%	Pressure	2005 mbar	
Frequency Range								
Perf. Criteria	Below Limit			Perf. Verification		Readings Under Limit		
Mod to EUT	None			Test Performed By		Mark Ryan		

##### 4.5.2 Test Procedure

Radiated field strength emissions test were performed using the procedures of ANSI C63.4 including methods for signal maximizations and EUT configuration.

The frequency range from 150 kHz to 30 MHz was investigated with a loop antenna and then from 30 MHz to 1000 MHz was investigated using a Bilog antenna.

A preliminary emission scan was performed in order to identify the specific frequencies for which these measurements were made at 3 meters in the 5 meter compliant chamber. Limits were adjusted for 3 meter measurement distance where needed.

All spurious emission between these frequency ranges were investigated and compared to the limits stated in section 12.209. Restricted bands of operation were also investigated as stated in section 15.205. The additional provisions stated in section 15.215(b) were also considered during this test.

##### 4.5.3 Deviations

There were no deviations from the test methodology listed in the test plan for this test.

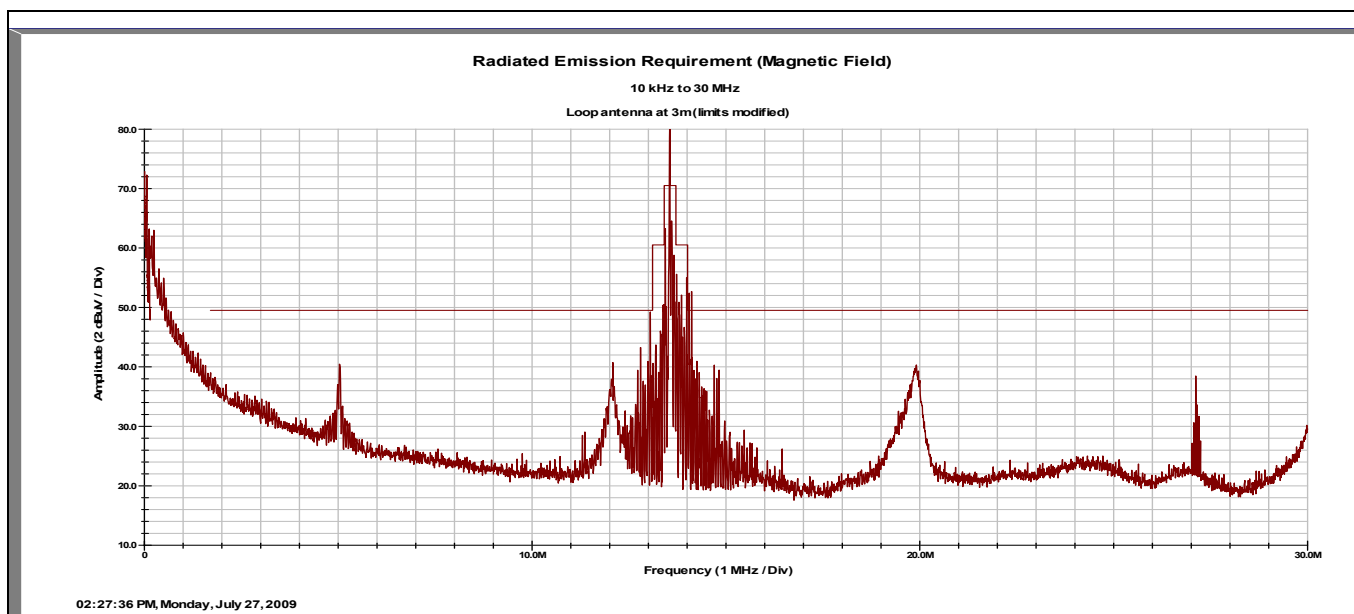
##### 4.5.4 Final Test

All radiated field strength emissions measurements were below (in compliance with) the 15.209 limits, including those not in the restricted bands as stated in part 15.205.

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## 4.5.5 Final Graphs and Tabulated Data

### Radiated Emissions – Worst Case 3 Orientations investigated.



Emission Freq (MHz)	ANT Polar (P/p)	ANT Pos (m)	Table Pos (deg)	FIM Value (dBμV)	Amp Gain (dB)	Cable Loss (dB)	ANT Factor (dB/m)	E-Field Value (dBμV/m)	Spec Limit (dBμV/m)	Spec Margin (dB)
13.56		1	257	61.96	0.00	0.39	10.57	72.92	104.00	-31.08
13.56	⊥	1	120	41.48	0.00	0.39	10.57	52.44	104.00	-51.56
13.56		1	197	72.90	0.00	0.39	10.57	83.86	104.00	-20.14
13.56	⊥	1	258	71.18	0.00	0.39	10.57	82.14	104.00	-21.86
13.56		1	248	72.80	0.00	0.39	10.57	83.76	104.00	-20.24
13.56	⊥	1	245	69.85	0.00	0.39	10.57	80.81	104.00	-23.19

Spec Margin = E-Field Value - Limit, E-Field Value = FIM Value - Amp Gain + Cable Loss + ANT Factor ± Uncertainty

Combined Standard Uncertainty  $u_c(y) = \pm 1.6\text{dB}$  Expanded Uncertainty  $U = k u_c(y)$   $k = 2$  for 95% confidence

Notes: Antenna Orientation: || = Parallel, ⊥ = Perpendicular

Signal shown in **RED** is Orientation 1

Signal shown in **GREEN** is Orientation 2 (worst case)

Signal shown in **BLUE** is Orientation 3

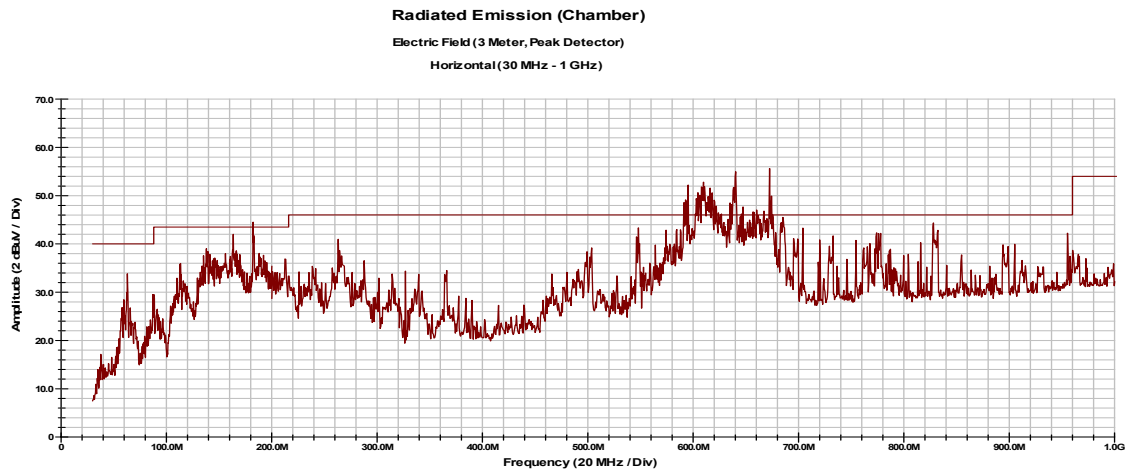
Limits shown were adjusted from μV/m at 30m to dBμV/m at 1 m measurement distance.

Peak is approx QP +1, Ave is approx QP-1

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**Radiated Emissions**

**Horizontal**



Emission Freq (MHz)	ANT Polar (H/V)	ANT Pos (m)	Table Pos (deg)	FIM Value (dBμV)	Amp Gain (dB)	Cable Loss (dB)	ANT Factor (dB/m)	E-Field Value (dBμV /m)	Spec Limit (dBμV /m)	Spec Margin (dB)
63.56	H	2.4	146	13.06	0.00	0.85	9.89	23.79	40.00	-16.21
182.20	H	1.2	99	22.85	0.00	1.45	9.66	33.96	43.50	-9.54
609.20	H	2.3	82	18.00	0.00	2.72	19.00	39.72	46.00	-6.28
639.96	H	1	79	19.05	0.00	2.79	20.10	41.94	46.00	-4.06
668.80	H	1	80	12.03	0.00	2.85	20.20	35.08	46.00	-10.92
827.76	H	1.2	5	15.34	0.00	3.17	21.86	40.37	46.00	-5.63

Spec Margin = E-Field Value - Limit, E-Field Value = FIM Value - Amp Gain + Cable Loss + ANT Factor ± Uncertainty

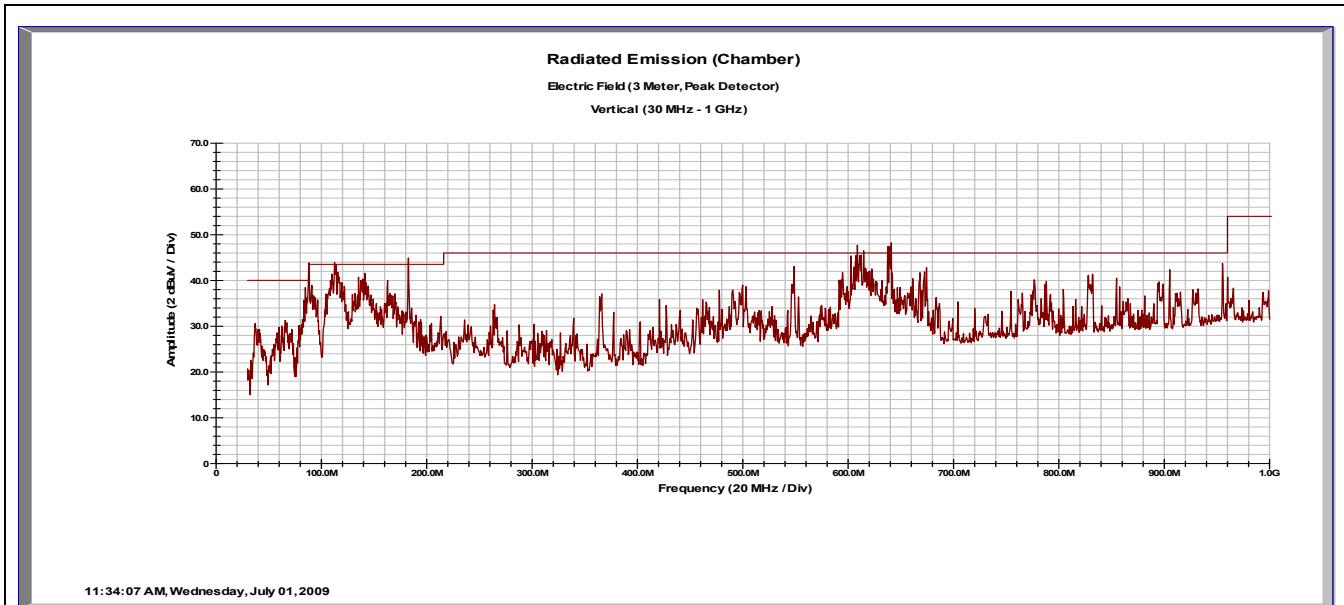
Combined Standard Uncertainty  $u_c(y) = \pm 1.6\text{dB}$  Expanded Uncertainty  $U = ku_c(y)$   $k = 2$  for 95% confidence

Notes:

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**Radiated Emissions**

**Vertical**



Emission Freq (MHz)	ANT Polar (H/V)	ANT Pos (m)	Table Pos (deg)	FIM Value (dBμV)	Amp Gain (dB)	Cable Loss (dB)	ANT Factor (dB/m)	E-Field Value (dBμV/m)	Spec Limit (dBμV/m)	Spec Margin (dB)
90.56	V	1	251	25.52	0.00	1.01	6.61	33.14	43.50	-10.36
113.44	V	1	156	26.85	0.00	1.14	7.53	35.52	43.50	-7.98
182.96	V	1	127	21.54	0.00	1.45	9.22	32.21	43.50	-11.29
609.72	V	1	336	11.85	0.00	2.72	19.59	34.16	46.00	-11.84
639.16	V	1	332	13.51	0.00	2.79	20.48	36.78	46.00	-9.22
955.32	V	1	216	17.01	0.00	3.49	23.31	43.81	46.00	-2.19

Spec Margin = E-Field Value - Limit, E-Field Value = FIM Value - Amp Gain + Cable Loss + ANT Factor ± Uncertainty

Combined Standard Uncertainty  $u_c(y) = \pm 1.6\text{dB}$  Expanded Uncertainty  $U = ku_c(y)$   $k = 2$  for 95% confidence

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NOTES:

**Radiated Emissions Prescan at 1 GHz to 1.5 GHz**

Vertical / Horizontal

12:39:16 MAR 27, 2009  
DATASTRIP MODEL DSV3-EP

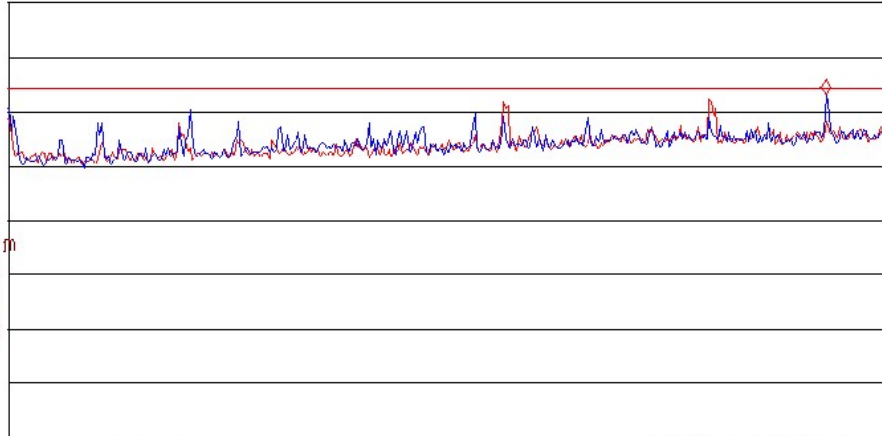
ACTV DET: PEAK  
MEAS DET: PEAK QP AVG  
MKR 1.4625 GHz  
43.05 dB $\mu$ V/m

LOG REF 60.0 dB $\mu$ V/m

PREAMP ON

10  
dB/  
#ATN  
0 dB

DL  
44.0  
dB $\mu$ V/m  
VA VB  
SC FC  
ACORR



START 1.0000 GHz

STOP 1.5000 GHz

#IF BW 1.0 MHz

AVG BW 300 kHz

SWP 20.0 msec

Meas #	Freq (MHz)	Measured Level			Quasi-Peak Limit Avg Limit	Quasi-Peak $\Delta$ Avg $\Delta$	Antenna + Cable Correction Factor (included in measured levels)	Result	Antenna Polarization	Angle (degrees)	Antenna Height (meters)	Comment
		Peak	Quasi-Peak	Average								
1	1106.0000	48.38	29.66	24.41	43.51	-13.85	27.10	Complied	Vertical	0	2.20	
2	1233.1250	40.11	30.29	26.73	43.51	-13.22	28.22	Complied	Vertical	0	2.00	
3	1491.5513	43.34	33.45	29.91	43.51	-10.06	30.78	Complied	Vertical	0	2.00	
4	1534.3338	43.47	33.99	30.36	43.51	-9.52	31.13	Complied	Vertical	0	1.80	
5	1833.0000	47.30	37.81	34.24	43.51	-5.70	33.14	Complied	Vertical	0	1.80	

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NOTES:

**Radiated Emissions Prescan at 1.5 GHz to 2.0 GHz**

Vertical / Horizontal

12:40:58 MAR 27, 2009  
DATASTRIP MODEL DSV3-EP

ACTV DET: PEAK  
MEAS DET: PEAK QP AVG  
MKR 1.6325 GHz  
43.99 dB $\mu$ V/m

LOG REF 60.0 dB $\mu$ V/m

PREAMP ON

10  
dB/  
#ATTN  
0 dB

DL  
44.0  
dB $\mu$ V/m  
VA VB  
SC FC  
ACORR

START 1.5000 GHz

#IF BW 1.0 MHz

AVG BW 300 kHz

STOP 2.0000 GHz

SWP 20.0 msec

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#### 4.6 Frequency Tolerance FCC Part 15.225(e) and RSS-210, A2.6

The frequency tolerance of the carrier signal shall be maintained within  $\pm 0.01\%$  of the operating frequency over a temperature variation of  $-20^{\circ}\text{C}$  to  $+50^{\circ}\text{C}$  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  $+20^{\circ}\text{C}$ . For battery operated equipment, the equipment tests shall be performed using a new battery.

##### 4.6.1 Test Over View

Results	Complies (as tested per this report)					Date	02 July 2009	
Standard	FCC Part 15.225(e) and RSS-210 A2.6							
Product Model	DSV3-EP				Serial#	DSV3EPAK083900052		
Configuration	See test plan for details							
Test Set-up	Tested in temperature chamber. See test plans for details							
EUT Powered By	120VAC / 60Hz	Temp	75° F	Humidity	39%	Pressure	1005mb	
Perf. Criteria	0.01% of the operating frequency			Perf. Verification		Readings within Limit		
Mod to EUT	None			Test Performed By		Mark Ryan		

##### 4.6.2 Test Procedure

The EUT was placed in a temperature chamber for the temperature variation test. Readings were made as per ANSI C63.4:2003 section H.5.2.

Voltage variations tests were performed by connecting the AC/DC adapter to a variable power supply. The EUT also used a chargeable battery, so the test set up included a freshly charged battery, per ANSI C63.4:2003, section H.5.3.

##### 4.6.3 Deviations

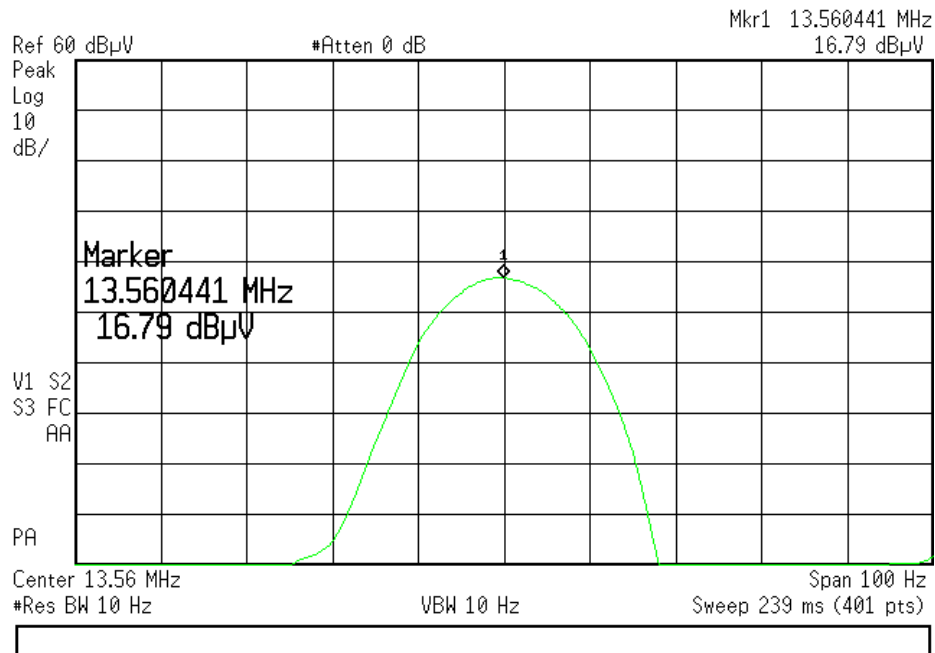
There were no deviations from the test methodology listed in the test plan for this test.

##### 4.6.4 Final Test

The Frequency Tolerance was within the limits (in compliance) as specified in FCC Part 15.225(e).

#### 4.6.5 Final Data for Temperature Variations

Agilent 08:53:31 Jul 2, 2009



Reference frequency at +20°C, nominal 120 VAC/60Hz Voltage

0.01% of 13.56MHz = 1.356 KHz

Temp °C	Measured frequency (in MHz)	Δ Reference (in Hz)	Permitted Band Edge in MHz (±0.01%)	Results
-20	13.560570	+129	13.5586 to 13.5614	Complied
20	13.560441	0		Complied
+50	13.560437	-4		Complied

Variations from low to high temperature, measurements made after a minimum 30 minutes soak at temperature.

#### 4.6.6 Final Data for Voltage Variations

The Power module is rated from 100V to 240VAC, Reference Voltage is 120VAC

±0.01% of 13.56MHz = ±1.356 KHz

Voltage	Measured frequency (in MHz)	Δ Reference (in Hz)	Permitted Band Edge in MHz (±0.01%)	Results
-85	13.560441	0	13.5586 to 13.5614	Complied
120	13.560441	0		Complied
+276	13.560441	0		Complied

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#### **4.7 Powered Tags FCC Part 15.225(f)**

In the case of radio frequency powered tags designed to operate with a device authorized under this section, the tag may be approved with the device or be considered as a separate device subject to its own authorization. Powered tags approved with a device under a single application shall be labeled with the same identification number as the device.

##### **4.7.1 Deviations**

There were no deviations from the test methodology listed in the test plan for the Conducted Immunity test.

##### **4.7.2 Final Test**

The EUT does not use Powered Tags

##### **4.7.3 Final Data**

The EUT uses passive tags; therefore this section is compliant without testing.

## Appendix A

### 5 Test Plan

This test report is intended to follow this test plan outlined here in unless other wise stated in this here report. The following test plan will give details on product information, standards to be used, test set ups and refer to TUV test procedures. The test procedures will give the steps to be taken when performing the stated test. The product information below came via client, product manual, product itself and or the internet.

#### 5.1 General Information

<b>Client</b>	Datastrip Products, Inc.
<b>Address 1</b>	1 Waterview Drive
<b>Address 2</b>	Shelton, CT 06484
<b>Contact Person</b>	Scott Robinson
<b>Telephone</b>	(203) 225-9184
<b>Fax</b>	(203) 225-9260
<b>e-mail</b>	srobinson@datastrip.net

#### 5.2 Model(s) Name

DSV3-EP

#### 5.3 Type of Product

Portable Biometric Identification Terminal

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#### 5.4 Equipment Under Test (EUT) Description

The DSV3® Series of products are portable, handheld computers specifically designed for security, law enforcement, border control and positive I.D. verification applications. They feature the ability to interface with Contact-less Smart Cards. An integrated fingerprint sensor enables biometric verification of identity.

#### 5.5 Applicable Documents

Standards	Description
FCC Part 15, Subpart C	Radio Frequency Devices- Subpart C: Intentional Radiators
RSS-210 Issue 7	Low-Power Licence-exempt Radiocommunication Devices Category I Equipment
FCC Parts 15.205, 15.209, 15.215(b)	Radiated Emissions
FCC Part 15.207	Conducted Emissions
FCC Part 15.225 and RSS-210 A2.6	Operation within the band 13.110 – 14.01 MHz
FCC Part 15.225(a) and RSS- 210 A2.6(a)	Field strength Emissions within 13.553 – 13.567 MHz
FCC Part 15.225(b) and RSS- 210 A2.6(b) Basic test standard	Field strength Emissions within 13.410 – 13.553 MHz and 13.567 - 13.710
FCC Part 15.225(c) and RSS-210 A2.6(c) Basic test standard	Field strength Emissions within 13.110 – 13.410 MHz and 13.710 - 14.010
FCC Part 15.225(d) and RSS-210 A2.6(d) Basic test standard	Field strength outside the 13.110 - 14.010 MHz band
FCC Part 15.225(e) and RSS-210 A2.6 Basic test standard	Frequencny tolerance over -20°C to +50°C at normal power supply and for 85% and 115% of rated supply voltage.
FCC Part 15.225(f) and RSS-210 Part 2.5 Basic test standard	Frequency Powered Tags
FCC Part 15.215 (c) Basic test standard	20 dB Bandwidth
RSS-210 Basic test standard	99% Power Bandwidth

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## 5.6 General Product Information

<b>Size</b>		<b>H</b>	18 cm	<b>W</b>	5.5 cm	<b>L</b>	15.5 cm
<b>Weight</b>		1 kg		<b>Fork-Lift Needed</b>		No	
<b>Notes</b>	Not including the external DC power module						

## 5.7 EUT Clock/Oscillator Frequencies

<input type="checkbox"/>	Less than 108MHz	FCC – scan up to 1GHz
<input checked="" type="checkbox"/>	Less than 500MHz	FCC – scan up to 2GHz
<input type="checkbox"/>	Less than 1000MHz	FCC – scan up to 5GHz
<input type="checkbox"/>	Greater then 1000MHz	FCC – scan up to 5 <sup>th</sup> Harmonic or 40GHz

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